

REPORT NUMBER: NCAP-KAR-20-021

**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

**NISSAN MOTOR CO., LTD.
2020 NISSAN SENTRA 4-DOOR SEDAN**

NHTSA NUMBER: M20205209

**PREPARED BY:
APPLUS+ IDIADA KARCO ENGINEERING, LLC.
9270 HOLLY ROAD
ADELANTO, CA 92301**



MAY 26, 2020

FINAL REPORT

**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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NHTSA, Office of Crashworthiness Standards

Date: _____

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16. Abstract A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2020 Nissan Sentra 4-door sedan 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 footwell intrusion performance. The test was conducted at the Applus+ IDIADA KARCO Engineering, LLC. facility in Adelanto, California on May 12, 2020. The impact velocity of the vehicle was 56.09 km/h and the ambient temperature at the barrier face at the time of impact was 21.7°C. The target vehicle's post-test maximum crush was 508 mm at the vehicle's centerline. The test vehicle's performance is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD</th> <th colspan="2">Passenger ATD</th> </tr> <tr> <th>Threshold</th> <th>Result</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td>N/A</td> <td>700</td> <td>292.0</td> <td>700</td> <td>494.5</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-22</td> <td>52</td> <td>-15</td> </tr> <tr> <td>Nij</td> <td>N/A</td> <td>1</td> <td>0.29</td> <td>1</td> <td>0.53</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>1563.1</td> <td>2620</td> <td>1318.2</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td>-389.1</td> <td>2520</td> <td>-412.0</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10000</td> <td>-1467.1</td> <td>6805</td> <td>-1416.7</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10000</td> <td>-1161.9</td> <td>6805</td> <td>-1737.6</td> </tr> </tbody> </table>				Measurement Description	Units	Driver ATD		Passenger ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)	N/A	700	292.0	700	494.5	Maximum Chest Compression	mm	63	-22	52	-15	Nij	N/A	1	0.29	1	0.53	Neck Tension	N	4170	1563.1	2620	1318.2	Neck Compression	N	4000	-389.1	2520	-412.0	Left Femur Force	N	10000	-1467.1	6805	-1416.7	Right Femur Force	N	10000	-1161.9	6805	-1737.6
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SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

This 56.3 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 number 693JJ919D000004. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

The 56.3 km/h frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing.

SUMMARY

A load cell barrier consisting of 176 load cells was impacted by a 2020 Nissan Sentra 4-door sedan at a velocity of 56.09 km/h. The test was performed at Applus+ IDIADA KARCO Engineering, LLC. on May 12, 2020. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A of this report.

One (1) real-time cameras and sixteen (16) high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in Data Sheet 6 of 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 seating position according to dummy placement instructions specified in the Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing.

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

The driver (position 1) ATD (Serial No. 360) and the right-front passenger (position 2) ATD (Serial No. DH1644) were qualified prior to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

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

There was 100 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 test vehicle was 508 mm at the vehicle's centerline. 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: the driver ATD's head contacted the frontal airbag and headrest. The upper torso contacted the frontal airbag. Both the left and right knees contacted the knee airbag.

The passenger's visible contact points were as follows: the passenger ATD's head contacted the frontal airbag and headrest. The upper torso contacted the frontal airbag. Both the left and right knees contacted the knee airbag.

The occupant data is summarized below:

ATD Position	HIC ₁₅	Nij	Neck Tension (N)	Neck Comp. (N)	3ms Chest Clip (g)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50th Male)	292.0	0.29	1563.1	-389.1	43	-22	-1467.1	-1161.9
Passenger (5th Female)	494.5	0.53	1318.2	-412.0	38	-15	-1416.7	-1737.6

GENERAL COMMENTS

- Driver and Passenger Lap Belt Force channels were not installed
- Driver and Passenger Shoulder Belt Force channels were not installed
- LC1103 – Barrier Mz channel failed
- The following photographs in Appendix A include an incorrect test placard. Test placard should read "Post-Test"
 - Figure 47. Post-Test Driver's Side Floorpan
 - Figure 70. Post-Test Passenger's Side Floorpan

SECTION 2

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

Test Vehicle: 2020 Nissan Sentra 4-Door Sedan NHTSA No.: M20205209
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/12/20

CONVERSION FACTORS

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	miles/hr	km/hr	1.609344
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.574
Pressure	Tire Pressures	lb/in ²	kPa	6.895
Temperature	General Use	°F	°C	$=(T_f - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf-ft	N•m	1.355

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2020 Nissan Sentra 4-Door Sedan NHTSA No.: M20205209
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/12/20

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	M20205209
Model Year	2020
Make	Nissan
Model	Sentra
Body Style	4-Door Sedan
VIN	3N1AB8CV3LY238362
Body Color	Gun Metallic
Odometer Reading (km / mi)	13 / 8
Engine Displacement (L)	2.0
Type / No. of Cylinders	Inline 4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	CVT
Overdrive	Yes
Final Drive	FWD
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes
Automatic Door Locks (ADLs)	Yes

Traction Control System	Yes
Power Steering	Yes
Power Window Auto-Reverse	Yes
Driver Frontal Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Front Pass. Frontal Airbag	Yes
Front Pass. Curtain Airbag	Yes
Front Pass. Head/Torso Airbag	No
Front Pass. Torso Airbag	No
Front Pass. Torso/Pelvis Airbag	Yes
Front Pass. Pelvis Airbag	No
Front Pass. Knee Airbag	Yes
Driver Seat Belt Pretensioner	Yes
Driver Load Limiter	Yes
Front Pass. Seat Belt Pretensioner	Yes
Front Pass. Load Limiter	Yes
Other Safety Restraint	N/A

Does Owner's Manual provide instructions to turn off automatic door locks?

No

DATA FROM CERTIFICATION LABEL

Manufactured By	Nissan Motor Co., Ltd.
Date of Manufacture	03/20

GVWR (kg)	1815
GAWR Front (kg)	980
GAWR Rear (kg)	845

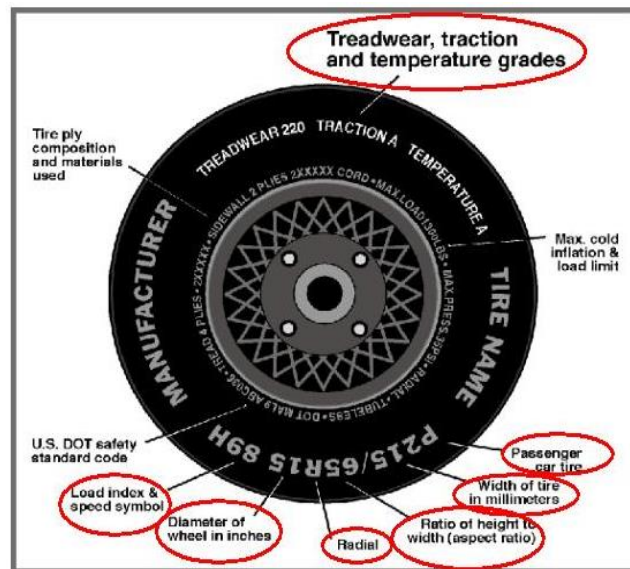
VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Type of Seats	Bucket	Bench			
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				400.0	A
DSC x 68.04 (kg)				340.2	B
Cargo Weight (RCLW) (kg)				59.8	A-B

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2020 Nissan Sentra 4-Door Sedan NHTSA No.: M20205209
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/12/20



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	230	230
Recommended Tire Size	205/60R16	205/60R16
Tire Size on Vehicle	205/60R16	205/60R16
Tire Manufacturer	Hankook	Hankook
Tire Model	Kinergy GT	Kinergy GT
Treadwear	500	500
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	2 Steel, 1 Polyester, 1 Nylon	2 Steel, 1 Polyester, 1 Nylon
Load Index / Speed Symbol	92H	92H
Tire Material	Steel, Polyester, Nylon	Steel, Polyester, Nylon
DOT Safety Code Left	1BC9X 1BH0 5119	1BC9X 1BH0 5119
DOT Safety Code Right	1BC9X 1BH0 5119	1BC9X 1BH0 5119

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

Test Vehicle: 2020 Nissan Sentra 4-Door Sedan NHTSA No.: M20205209
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/12/20

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UWV)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	413.0	271.0		452.0	355.0	
Right	kg	427.0	265.5		441.5	323.0	
Ratio	%	61.0%	39.0%	100.0%	56.9%	43.1%	100.0%
Total	kg	840.0	536.5	1376.5	893.5	678.0	1571.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UWV)	kg	1376.5	A
Weight of 1 P572E ATD & 1 P572O ATD	kg	141.0	B
Rated Cargo/Luggage Weight (RCLW)	kg	59.8	C
Calculated Vehicle Target Weight (TVTW)	kg	1577.3	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	LF	RF	LR	RR	CG Aft of Front Axle
As Delivered	mm	685	687	694	697	1052
As Tested	mm	671	677	660	663	1165
Post-Test	mm	675	705	650	665	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheelbase	mm	2700
Total Vehicle Length at Left Side	mm	3999
Total Vehicle Length at Centerline	mm	4650
Total Vehicle Length at Right Side	mm	3998
Weight of Ballast in Cargo Area	kg	54.0
Weight of Vehicle Components Removed	kg	27.0
Amount of Stoddard Solvent in Fuel Tank	L	43.30

VEHICLE COMPONENTS REMOVED TO MEET TEST WEIGHT:

Spare tire and tools (20.0 kg), rear trim (7.0 kg)

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

Test Vehicle: 2020 Nissan Sentra 4-Door Sedan NHTSA No.: M20205209
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/12/20

TARGET VEHICLE STRUCTURAL MEASUREMENTS

No.	Description	Pre-Test
1	Total Length	4650
2	Total Width	1815
3	Bumper Top Height	362
4	Bumper Bottom Height	220
5	Longitudinal Member Top Height	565
6	Distance Between Longitudinal Members	930
7	Longitudinal Member Width	60
8	Engine Top Height	805
9	Engine Bottom Height	180
10	Engine and Gearbox Width	600
11	Front Bumper to Engine Distance	440
12	Front Shock Absorber Fixing Height	845
13	Bonnet Leading Edge Height	735
14	Front Shock Absorber Fixing Width	1180
15	Front Bumper to Front Axle Distance	905
16	Front Axle to A-Pillar Distance	505
17	A-Pillar to B-Pillar Distance	1009
18	B-Pillar to Rear Axle Distance	1102
19	B-Pillar to C-Pillar Distance	847
20	Roof Sill Bottom Height	1303
21	Roof Sill Top Height	1420
22	Floor Sill Bottom Height	195
23	Floor Sill Top Height	380

All measurements in millimeters.

DATA SHEET NO. 2

SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2020 Nissan Sentra 4-Door Sedan

NHTSA No.: M20205209

Test Program: 56.3 km/h Frontal Impact NCAP Test

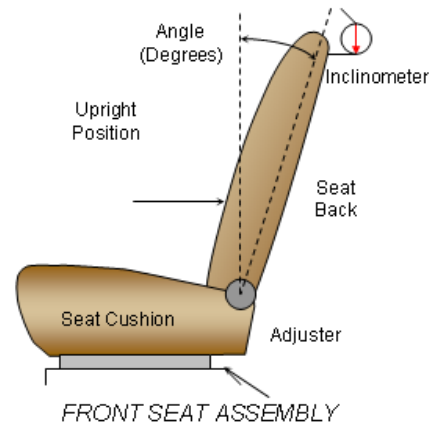
Test Date: 05/12/20

NOMINAL DESIGN RIDING POSITION

The procedure for the driver is as follows: the seat back is set to the manufacturer's designated angle. The procedure for the passenger is as follows: the seat back is set to position the transverse instrumentation platform of the dummy's head at $0^\circ \pm 0.5^\circ$. Seat back angle is measured at the headrest post.

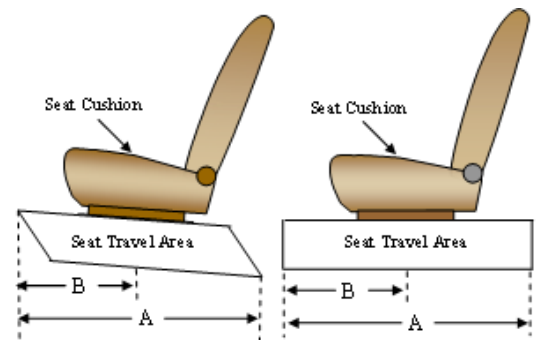
SEAT BACK ANGLE

Seating Position	Degrees
Driver Seat Back Angle	7.0
Passenger Seat Back Angle	1.6



SEAT FORE / AFT POSITIONING

The total seat travel is measured from the forward most possible position to the rear most possible position. The driver's seat is set to the middle of the fore-aft travel. The passenger's seat is set to the forward most position where the ATD will not contact any interior panels.



SEAT FORE/AFT POSITIONS

Seating Position	Total Fore-Aft Travel	Placed in Position
Driver Seat	295 mm (25 detents)	148 mm (9th detent)
Passenger Seat	240 mm (25 detents)	0 mm (12th detent)

SEAT BELT UPPER ANCHORAGE

The seat belt upper anchorage is positioned to the manufacturer's design position for a 50th percentile adult male ATD for the driver, and a 5th percentile adult female ATD for the passenger. Position "L" is the lowermost position, followed by position "M1". Position "H" is the uppermost position.

SEAT BELT UPPER ANCHORAGES

Seating Position	Total No. of Positions	Placed in Position
Driver Seat	4	H
Passenger Seat	4	H

DATA SHEET NO. 2 ... (CONTINUED)

SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

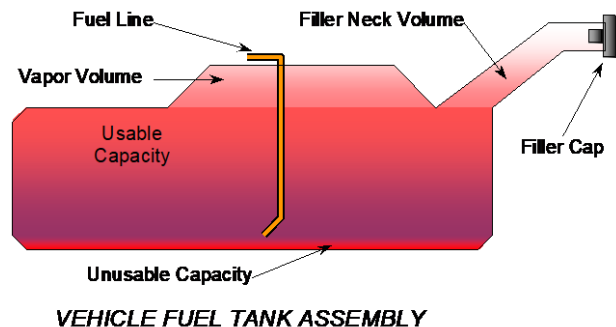
Test Vehicle: 2020 Nissan Sentra 4-Door Sedan NHTSA No.: M20205209
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/12/20

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	46.56
Usable Capacity of "Optional Tank"	
92 - 94% of Usable Capacity	42.84 to 43.77
Actual Amount of Stoddard Solvent Used	43.30
1/3 of Usable Capacity	15.52

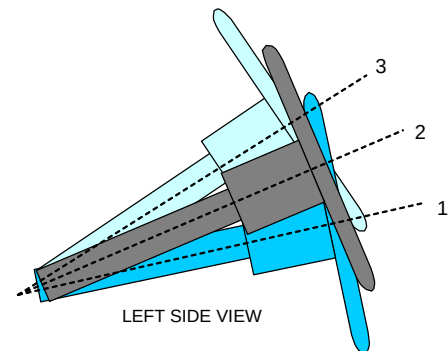
FUEL PUMP

The vehicle is equipped with an electronic fuel pump. The fuel pump normally operates when the vehicle's electrical system is activated. The fuel pump operates for 1.0 second after the ignition is switched to "ON", while the engine is running, and for 1.5 seconds after the engine stops.



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. A digital inclinometer is used to measure a plate which is placed across the rim of the steering wheel for angular measurements.



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONING

	Degrees	Fore-Aft Position (mm)
Lowermost Position, No. 1	22.9	85
Geometric Center Position, No. 2	24.9	108
Uppermost Position, No. 3	27.0	130
Telescoping Steering Wheel Travel		45
Test Position	24.9	108

DATA SHEET NO. 3

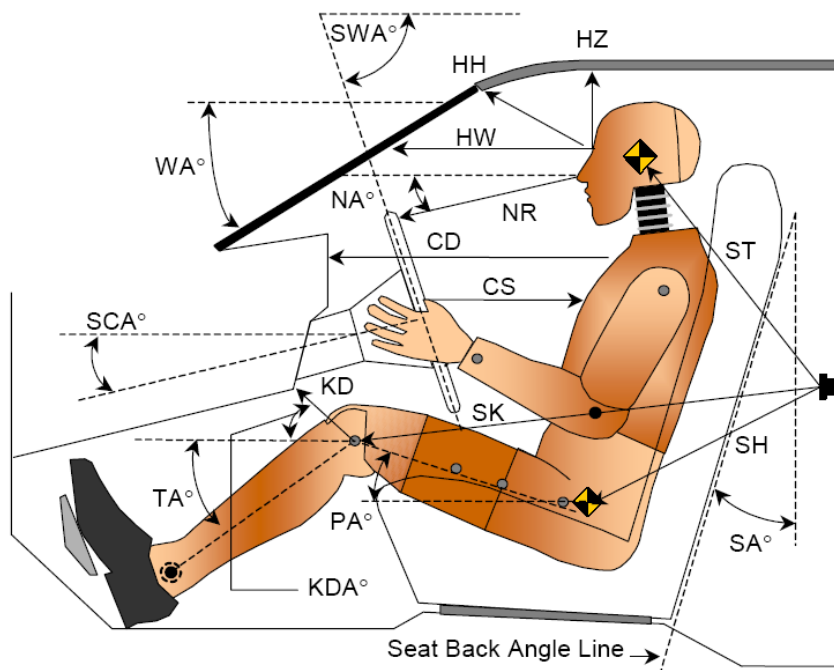
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2020 Nissan Sentra 4-Door Sedan

NHTSA No.: M20205209

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 05/12/20



LEFT SIDE VIEW

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		25.4		
SWA°	Steering Wheel Angle		20.7		
SCA°	Steering Column Angle		69.3		
SA°	Seat Back Angle (On Headrest Post)		7.0		1.6
HZ	Head to Roof	204	90.0	214	90.0
HH	Head to Header	361	25.2	295	40.6
HW	Head to Windshield	632	0.0	624	0.0
NR	Nose to Rim	373	10.0	427	15.4
CD	Chest to Dash	524	19.8	385	6.1
CS	Chest to Steering Hub	320	0.0		
RA	Rim to Abdomen	202	0.0		
KDL	Left Knee to Dash	168	26.8	79	44.4
KDR	Right Knee to Dash	110	38.6	117	40.5
PA°	Pelvic Angle		25.0		20.5
TA°	Tibia Angle		46.0		48.1
SK	Striker to Knee	633	40.7	755	23.8
ST	Striker to Head	590	73.3	565	61.2
SH	Striker to H-Point	329	3.7	404	4.9

DATA SHEET NO. 4

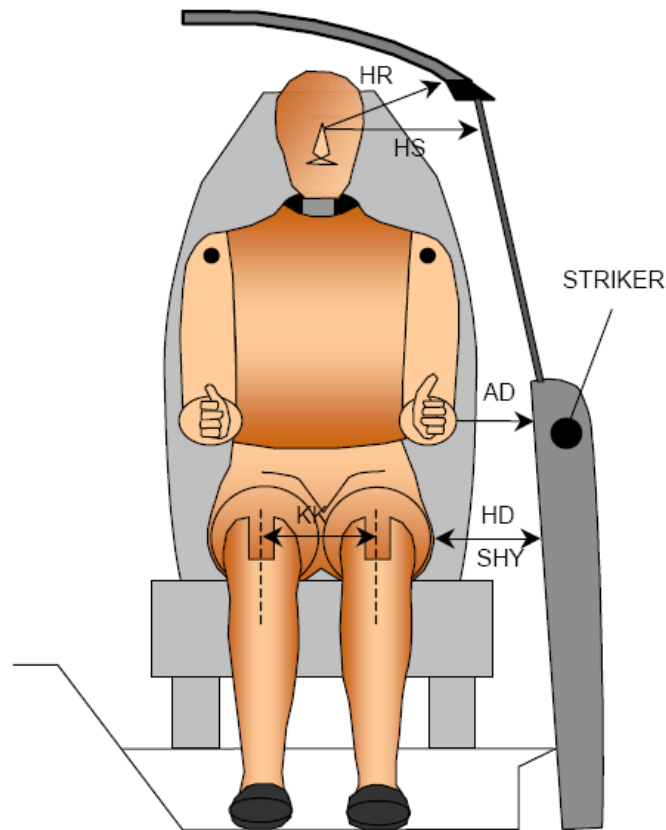
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2020 Nissan Sentra 4-Door Sedan

NHTSA No.: M20205209

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 05/12/20



Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	108	148
HD	H-Point to Door	122	172
HR	Head to Side Header	241	237
HS	Head to Side Window	349	380
KK	Knee to Knee	404	210
SHY	Striker to H-Point (Y-Direction)	242	255
AA	Ankle to Ankle	387	155

DATA SHEET NO. 5

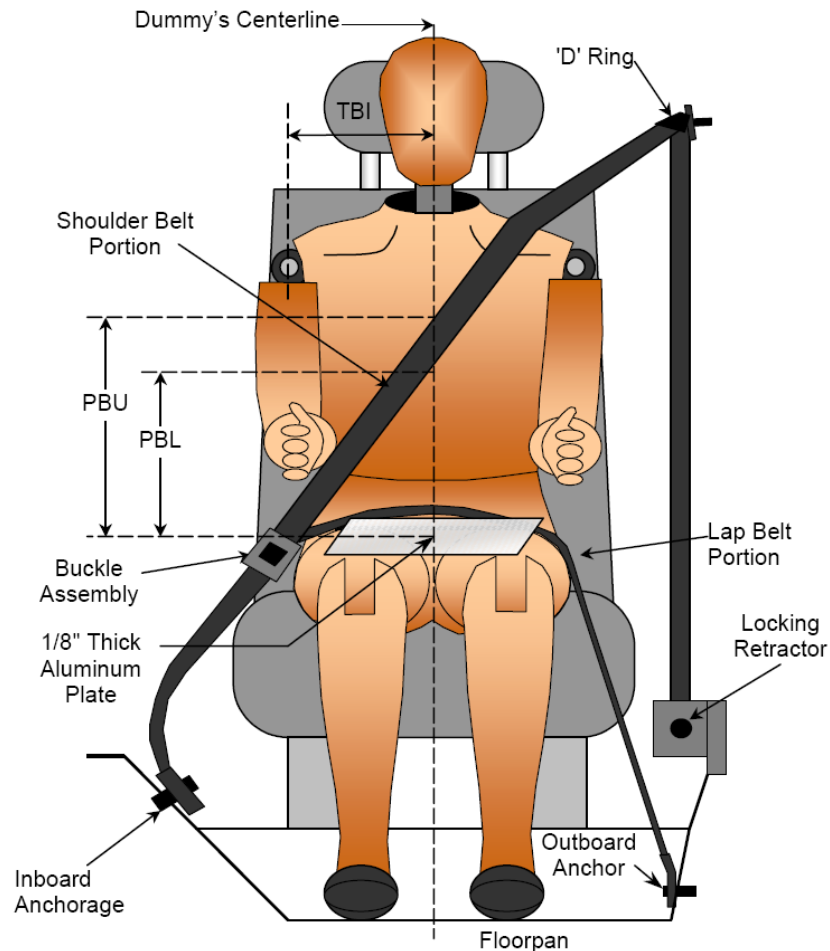
SEAT BELT POSITIONING DATA

Test Vehicle: 2020 Nissan Sentra 4-Door Sedan

NHTSA No.: M20205209

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 05/12/20



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Code	Measurement Description	Units	Driver	Passenger
PBU	Top Surface of Aluminum Plate to Belt Upper Edge	mm	320	280
PBL	Top Surface of Aluminum Plate to Belt Lower Edge	mm	250	195

BELT LENGTH DATA

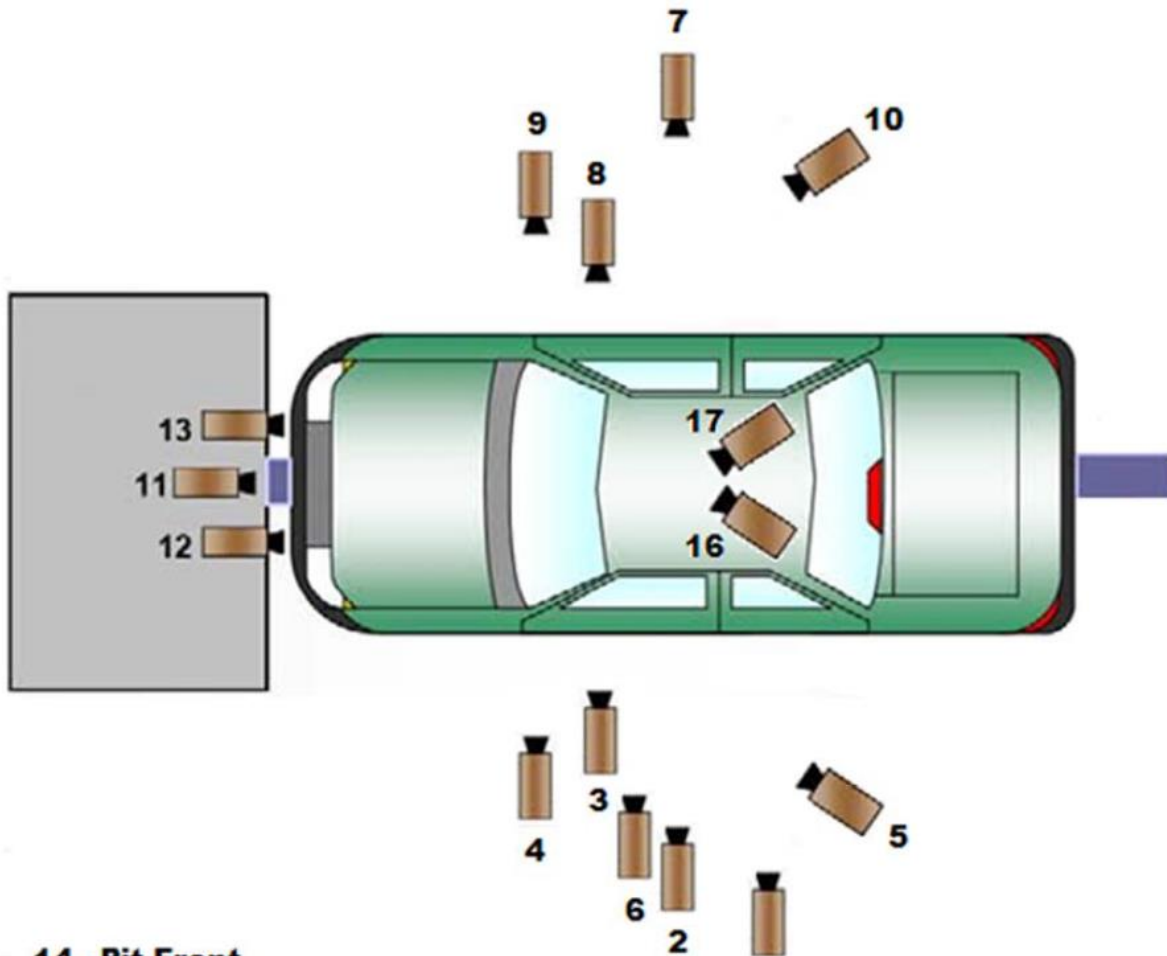
Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as Measured on ATD	mm	854	280
Lap Belt Length as Measured on ATD	mm	725	195
Remainder of Belt on Reel	mm	1100	969
Total Belt Length for Continuous Webbing Systems	mm	2679	1444

DATA SHEET NO. 6

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2020 Nissan Sentra 4-Door Sedan NHTSA No.: M20205209
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/12/20

CAMERA POSITIONS FOR FRONTAL IMPACTS



14 - Pit Front

15 - Pit Rear

16 & 17 - Driver and Passenger Onboard

1- Real Time Camera

*****Camera locations are approximate and not to scale***

DATA SHEET NO. 6 ... (CONTINUED)**HIGH-SPEED CAMERA LOCATIONS AND DATA**Test Vehicle: 2020 Nissan Sentra 4-Door Sedan NHTSA No.: M20205209Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/12/20**CAMERA LOCATIONS**

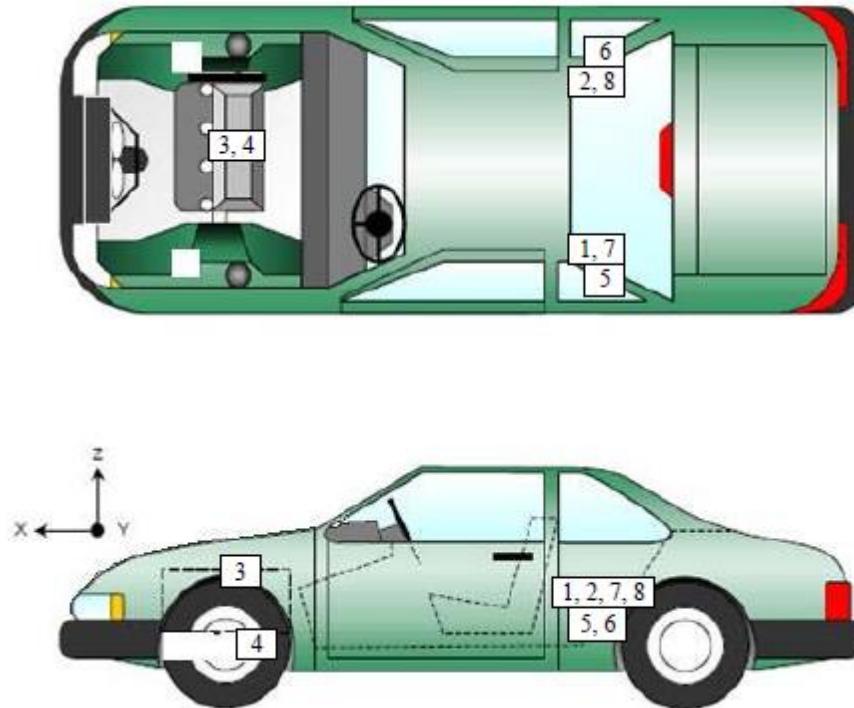
No.	Description	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-11412	-8150	-1484		30
2	Left Overall	-2456	-7975	-1025	20	1000
3	Driver Close-Up	-2590	-7950	-1371	50	1000
4	Left Front Half	-1701	-6197	-1701	35	1000
5	Left Angle	-6696	-10308	-3211	105	1000
6	Steering Column	-1966	-10412	-3688	35	1000
7	Right Overall	-2336	7569	-1012	20	1000
8	Passenger Close-Up	-1733	7581	-1408	50	1000
9	Right Front Half	-1600	8214	-1811	35	1000
10	Right Angle	-6217	9516	-4830	85	1000
11	Windshield	-354	0	-5749	28	1000
12	Driver Windshield	297	-366	-2460	24	1000
13	Passenger Windshield	297	366	-2460	24	1000
14	Pit Front	-756	0	1495	20	1000
15	Pit Rear	-3398	0	1495	20	1000
16	Driver Onboard	-1585	196	-1273	8	1000
17	Passenger Onboard	-1585	-196	-1273	8	1000

Coordinates: +X = forward impact plane
 +Y = right of monorail center
 +Z = into ground

DATA SHEET NO. 7

VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2020 Nissan Sentra 4-Door Sedan NHTSA No.: M20205209
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/12/20



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Description	Location		
		X	Y	Z
1	Left Rear Accelerometer X-Direction	1910	-730	-390
2	Right Rear Accelerometer X-Direction	1910	730	-390
3	Engine Top X	3780	255	-315
4	Engine Bottom X	3610	-235	-155
5	Left Rear Accelerometer Z-Direction	1910	-730	-390
6	Right Rear Accelerometer Z-Direction	1910	730	-390
7	Left Rear Accelerometer X-Direction Redundant	1910	-730	-390
8	Right Rear Accelerometer X-Direction Redundant	1910	730	-390

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

DATA SHEET NO. 8

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

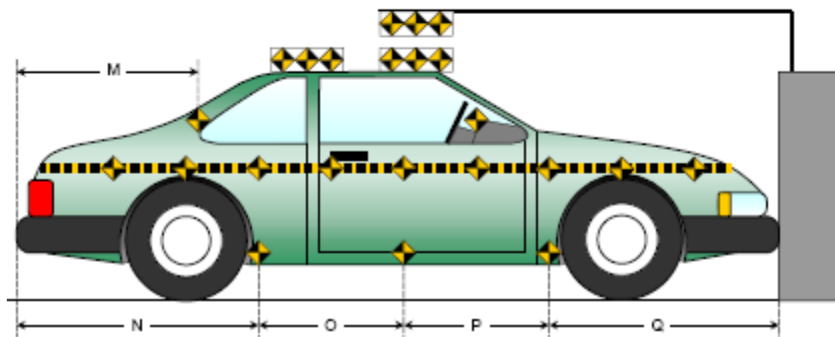
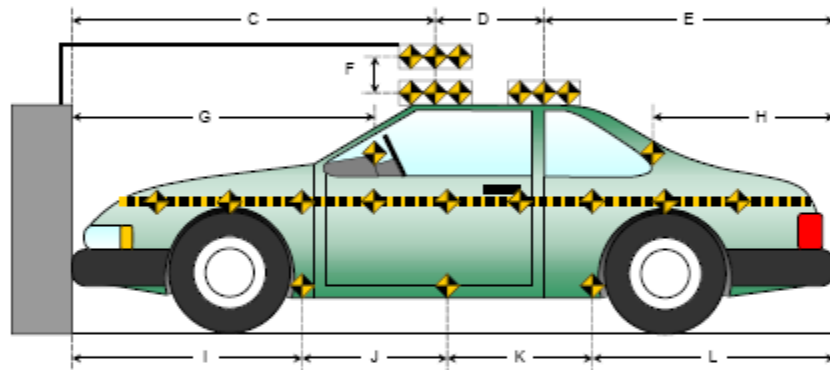
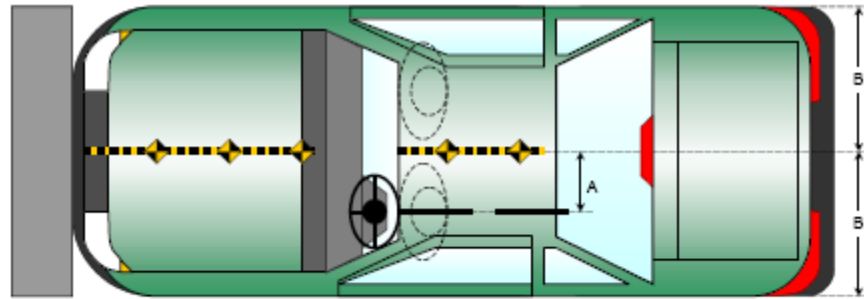
Test Vehicle: 2020 Nissan Sentra 4-Door Sedan

NHTSA No.: M20205209

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 05/12/20

Item	Value
A	376
B	908
C	2125
D	610
E	1914
F	305
G	1706
H	1035
I	1341
J	927
K	927
L	1455
M	1035
N	1451
O	927
P	927
Q	1340



All measurements in millimeters.

DATA SHEET NO. 9

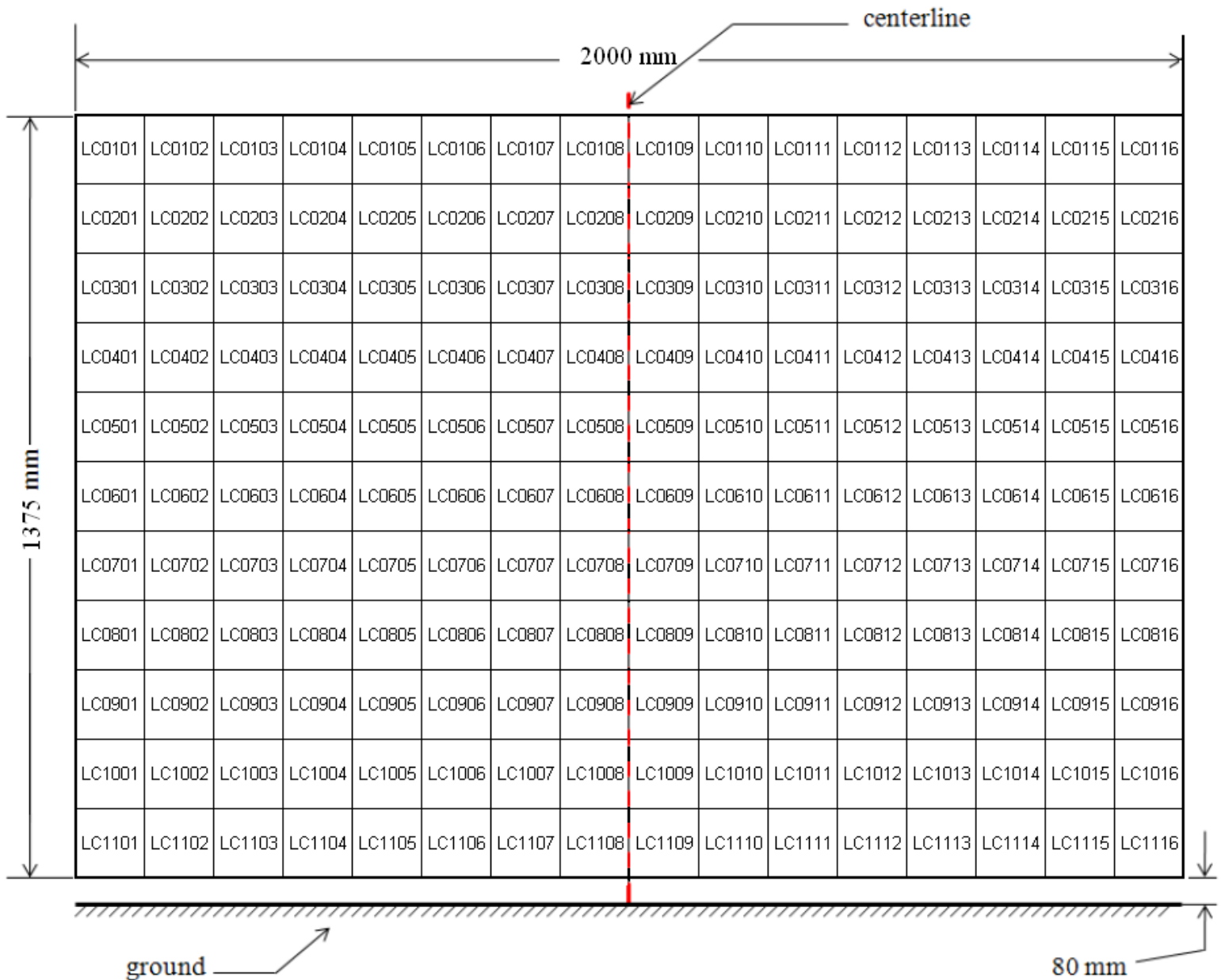
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2020 Nissan Sentra 4-Door Sedan

NHTSA No.: M20205209

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 05/12/20



DATA SHEET NO. 10**TEST VEHICLE SUMMARY OF RESULTS**

Test Vehicle: 2020 Nissan Sentra 4-Door Sedan NHTSA No.: M20205209
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/12/20

INSTRUMENTATION

Driver Dummy Accelerometers	47
Passenger Dummy Accelerometers	47
Vehicle Structure Accelerometers	8
Load Cell Barrier	528
Total	630

CAMERA COVERAGE

High-Speed Vehicle On Board	2
High-Speed Off Board	14
Real Time	1
Total	17

DATA SHEET NO. 11
POST-TEST OBSERVATIONS

Test Vehicle: 2020 Nissan Sentra 4-Door Sedan NHTSA No.: M20205209
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/12/20

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Passenger
Dummy Type/Serial No.	P572E 50th Percentile Male ATD / 360	P572O 5th Percentile Female ATD / DH1644
Head Contact	Frontal Airbag, Headrest	Frontal Airbag, Headrest
Upper Torso Contact	Frontal Airbag	Frontal Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Airbag	Knee Airbag
Right Knee Contact	Knee Airbag	Knee Airbag

DOOR OPENING, TRUNK OPENING, AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked / Unlocked Doors	Locked	Locked
Front Door Opening	Remained closed and latched, operational	Remained closed and latched, operational
Rear Door Opening	Remained closed and latched, operational	Remained closed and latched, operational
Trunk/Hatch/Tailgate Opening	None	
Seat Track Shift (mm)	0	0
Seat Back Movement from Initial Position	None	None

OTHER VEHICLE POST-TEST OBSERVATIONS

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

VEHICLE REBOUND FROM BARRIER

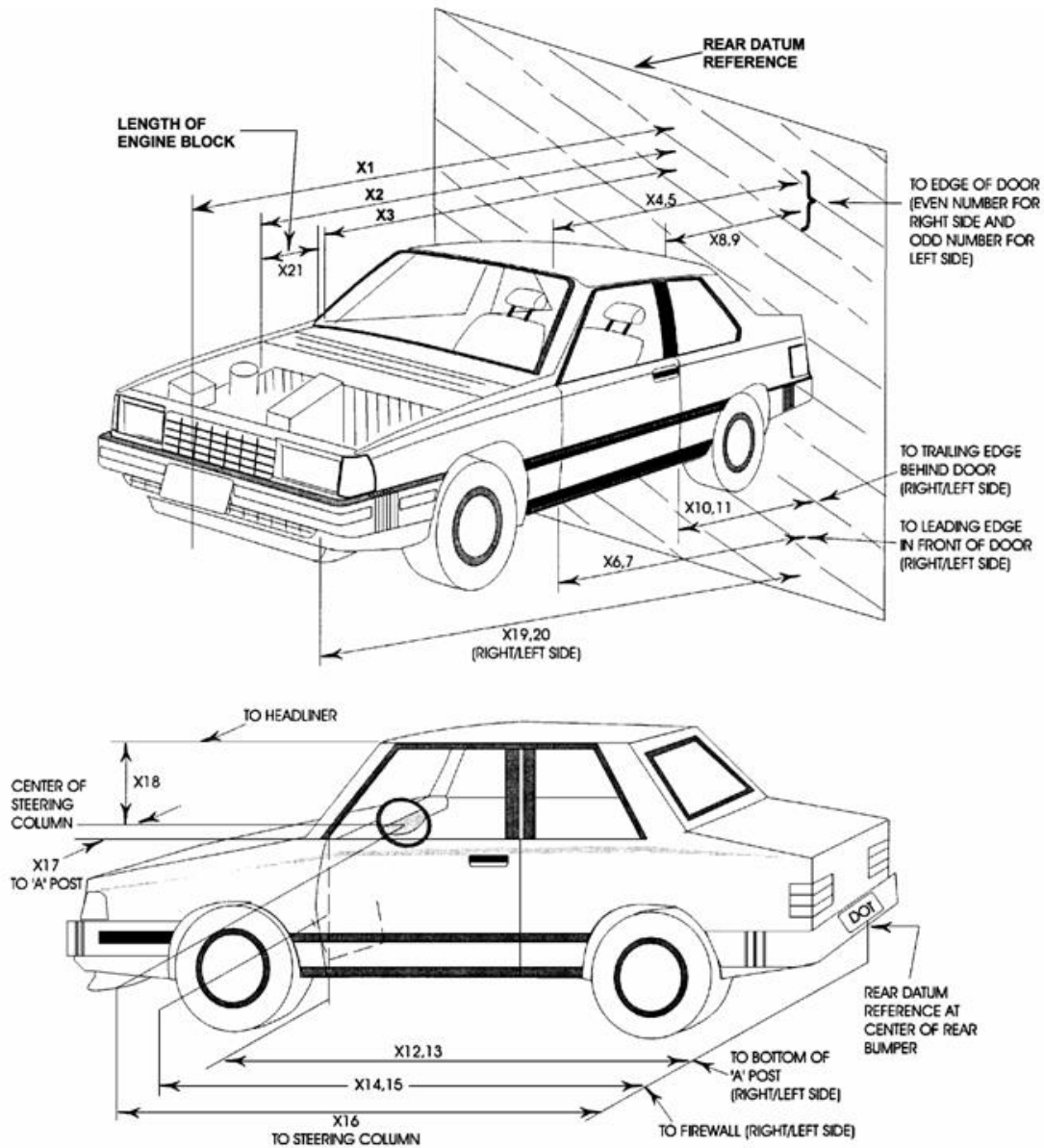
Measured Parameter	Units	Value
Left Side	mm	5690
Center	mm	5470
Right Side	mm	5500
Average	mm	5553

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

DATA SHEET NO. 12 **VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2020 Nissan Sentra 4-Door Sedan NHTSA No.: M20205209
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/12/20

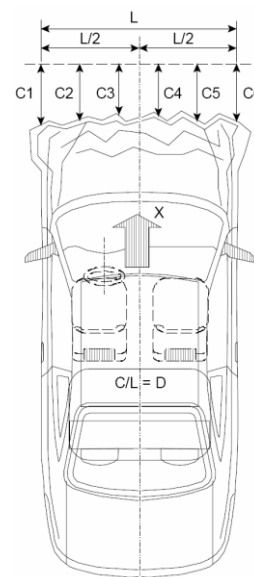


DATA SHEET NO. 12 ... (CONTINUED)**VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2020 Nissan Sentra 4-Door Sedan NHTSA No.: M20205209
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/12/20

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4650	4142	-508
2	Rear Surface of Vehicle to Front of Engine	4216	3998	-218
3	RSOV to Firewall	3738	3692	-46
4	RSOV to Upper Leading Edge of Right Door	3243	3241	-2
5	RSOV to Upper Leading Edge of Left Door	3243	3240	-3
6	RSOV to Lower Leading Edge of Right Door	3218	3217	-1
7	RSOV to Lower Leading Edge of Left Door	3219	3218	-1
8	RSOV to Upper Trailing Edge of Right Door	2122	2121	-1
9	RSOV to Upper Trailing Edge of Left Door	2123	2122	-1
10	RSOV to Lower Trailing Edge of Right Door	2154	2153	-1
11	RSOV to Lower Trailing Edge of Left Door	2154	2153	-1
12	RSOV to Bottom of A-Pillar, Right Side	2972	2971	-1
13	RSOV to Bottom of A-Pillar, Left Side	3208	3207	-1
14	RSOV to Firewall, Right Side	3695	3690	-5
15	RSOV to Firewall, Left Side	3706	3688	-18
16	RSOV to Steering Column	2768	2809	41
17	Center of Steering Column to A-Pillar	460	420	-40
18	Center of Steering Column to Headliner	400	520	120
19	RSOV to Right Side of Front Bumper	3998	3943	-55
20	RSOV to Left Side of Front Bumper	3999	3951	-48
21	Length of Engine Block	570	570	0
RD	RSOV to Right Side of Dash Panel	2970	2970	0
CD	RSOV to Center of Dash Panel	2914	2913	-1
LD	RSOV to Left Side of Dash Panel	2974	2978	4

All measurements in millimeters.

DATA SHEET NO. 13**ACCIDENT INVESTIGATION DIVISION DATA**Test Vehicle: 2020 Nissan Sentra 4-Door SedanNHTSA No.: M20205209Test Program: 56.3 km/h Frontal Impact NCAP TestTest Date: 05/12/20**VEHICLE INFORMATION**VIN: 3N1AB8CV3LY238362Wheelbase (mm): 2700Vehicle Size Category: Passenger CarTest Weight (kg): 1571.5**ACCELEROMETER DATA**Accelerometer Locations: Left Rear CrossmemberCal. Procedure/Interval: Vibration Test / 6 monthsIntegration Algorithm: NHTSA StandardImpact Velocity (km/h): 56.09Velocity Change (km/h): 65.3Time of Separation (msec): 65.2Linearity: Good**CRUSH PROFILE**Collision Deformation Classification: 12FDEW2Midpoint of Damage: Vehicle CenterlineDamage Region Length (mm): 1433Impact Mode: Full Frontal

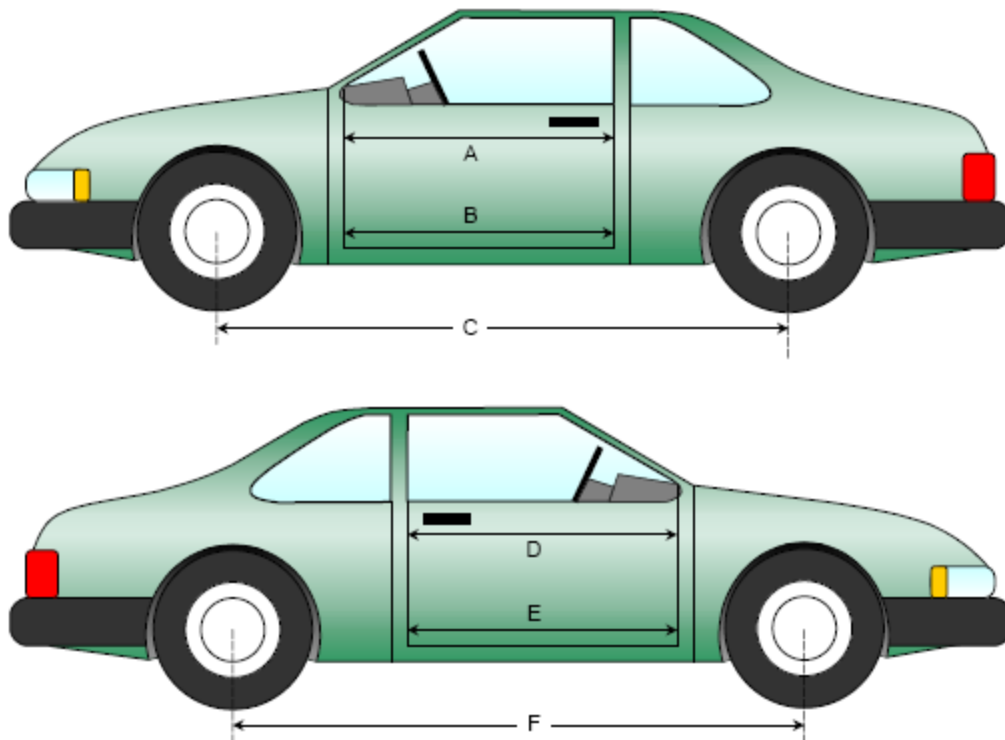
No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	216	547	331
C2	Crush Zone 2 at Left Side	mm	50	501	451
C3	Crush Zone 3 at Left Side	mm	18	503	485
C4	Crush Zone 4 at Right Side	mm	18	509	491
C5	Crush Zone 5 at Right Side	mm	50	498	448
C6	Crush Zone 6 at Right Side	mm	216	539	323
L	C1 to C6	mm	1433		

DATA SHEET NO. 14**VEHICLE INTRUSION MEASUREMENTS**Test Vehicle: 2020 Nissan Sentra 4-Door SedanNHTSA No.: M20205209Test Program: 56.3 km/h Frontal Impact NCAP TestTest Date: 05/12/20**DOOR OPENING WIDTH**

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1009	1013	-4
B	Left Side Lower	mm	937	930	7
D	Right Side Upper	mm	1018	1017	1
E	Right Side Lower	mm	956	962	-6

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2700	2680	20
F	Right Side Wheelbase	mm	2700	2685	15



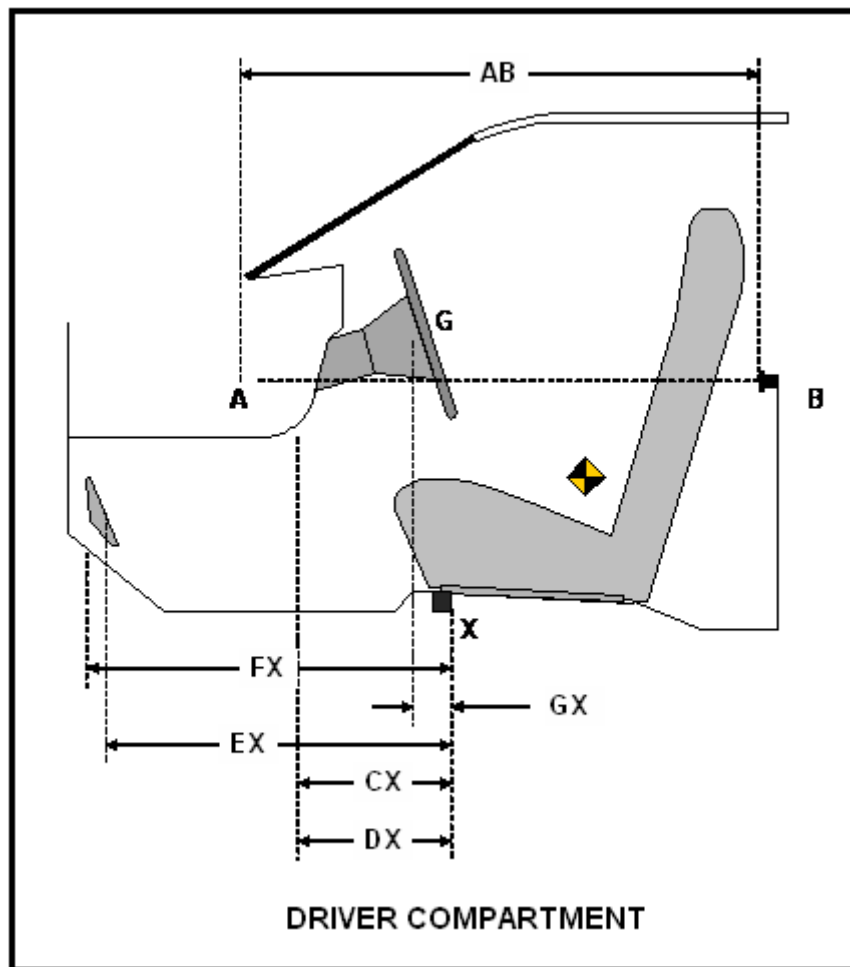
DATA SHEET NO. 14 ... (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2020 Nissan Sentra 4-Door Sedan NHTSA No.: M20205209
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/12/20

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	907	905	2
CX	Left Knee Bolster to X	mm	320	330	-10
DX	Right Knee Bolster to X	mm	310	300	10
EX	Brake Pedal to X	mm	580	640	-60
FX	Foot Rest to X	mm	585	590	-5
GX	Center of Steering Wheel Hub to X	mm	80	100	-20

X = Front of Seat Track (Stationary)



DATA SHEET NO. 15

SUMMARY OF INDICANT FMVSS 212 AND 219 (PARTIAL) DATA

Test Vehicle: 2020 Nissan Sentra 4-Door Sedan NHTSA No.: M20205209
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/12/20

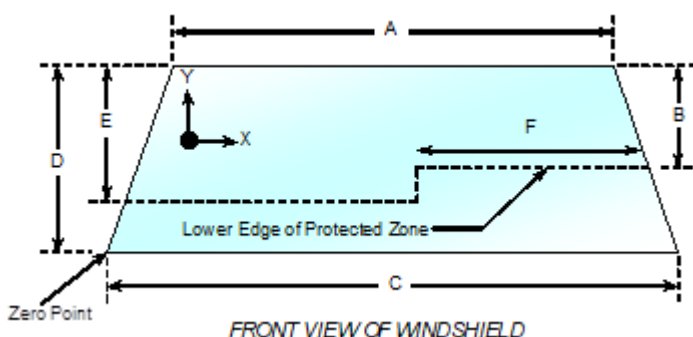
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with rubber molding and rubber cement.

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

Temperature of windshield molding during test: 21.2° C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2265	2265	100.0%
Right Side	2265	2265	100.0%
Total	4530	4530	100.0%



Item	Units	Value
A	mm	1220
B	mm	320
C	mm	1505
D	mm	902
E	mm	470
F	mm	545

AREAS OF PROTECTED ZONE FAILURES

- A.** Provide Coordinates of the area that the protected zone was penetrated more than 0.25 inches by a vehicle component other than one that is normally in contact with the windshield.

X	Y

- B.** Provide coordinates of the area beneath the protected zone that the inner surface of the windshield was penetrated by a vehicle component.

X	Y

DATA SHEET NO. 16

FMVSS 301 BARRIER IMPACT AND STATIC ROLLOVER RESULTS

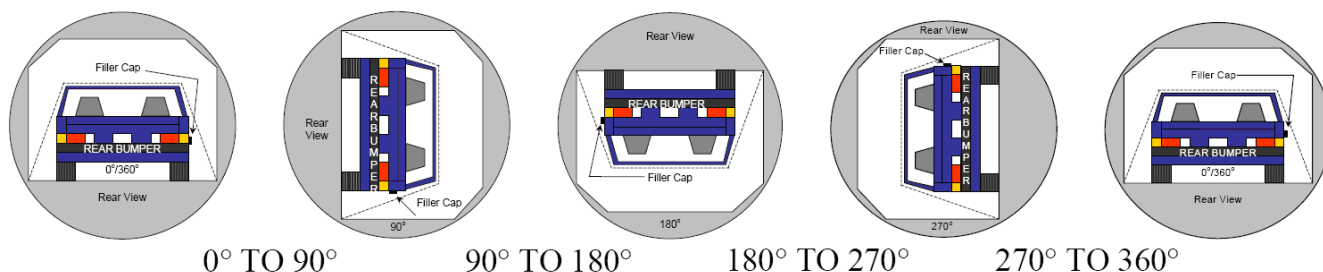
Test Vehicle: 2020 Nissan Sentra 4-Door Sedan NHTSA No.: M20205209
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/12/20

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21.7° C Test Time: 4:38 PM

Stoddard Solvent Spillage Measurements

- A. From impact until vehicle motion ceases: 0 oz.
 (Maximum allowable = 1 oz.)
- B. For the 5 minute period after motion ceases: 0 oz.
 (Maximum allowable = 5 oz.)
- C. For the following 25 minutes: 0 oz.
 (Maximum allowable = 1 oz./minute)
- D. Spillage: There was no Stoddard solvent spillage.



- The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
- The position hold time at each position is 300 seconds (minimum).
- Details of Stoddard solvent spillage: There was no Stoddard solvent spillage.

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	84	300	384
90° To 180°	79	300	379
180° To 270°	80	300	380
270° To 360°	78	300	378

DATA SHEET NO. 16 ... (CONTINUED)**FMVSS 301 BARRIER IMPACT AND STATIC ROLLOVER RESULTS**Test Vehicle: 2020 Nissan Sentra 4-Door Sedan NHTSA No.: M20205209Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 05/12/20**FMVSS 301 SPILLAGE TABLE**

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° To 90°	0	0	0	
90° To 180°	0	0	0	
180° To 270°	0	0	0	
270° To 360°	0	0	0	

SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° To 90°	
90° To 180°	
180° To 270°	
270° To 360°	

DATA SHEET NO. 17

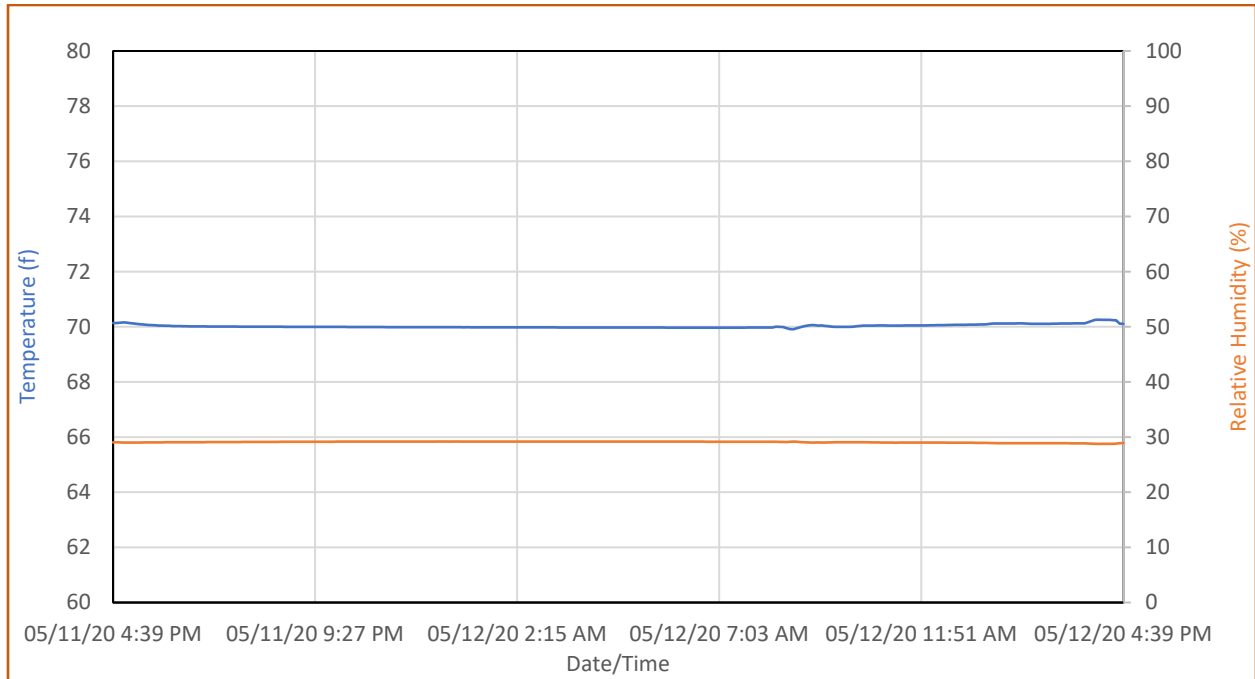
DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2020 Nissan Sentra 4-Door Sedan

NHTSA No.: M20205209

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 05/12/20



APPENDIX A
PHOTOGRAPHIC DOCUMENTATION

NOTE: Figure 47. Post-Test Driver's Side Floorpan and Figure 70. Post-Test Passenger's Side Floorpan include an incorrect test placard. Test placard should read "Post-Test"

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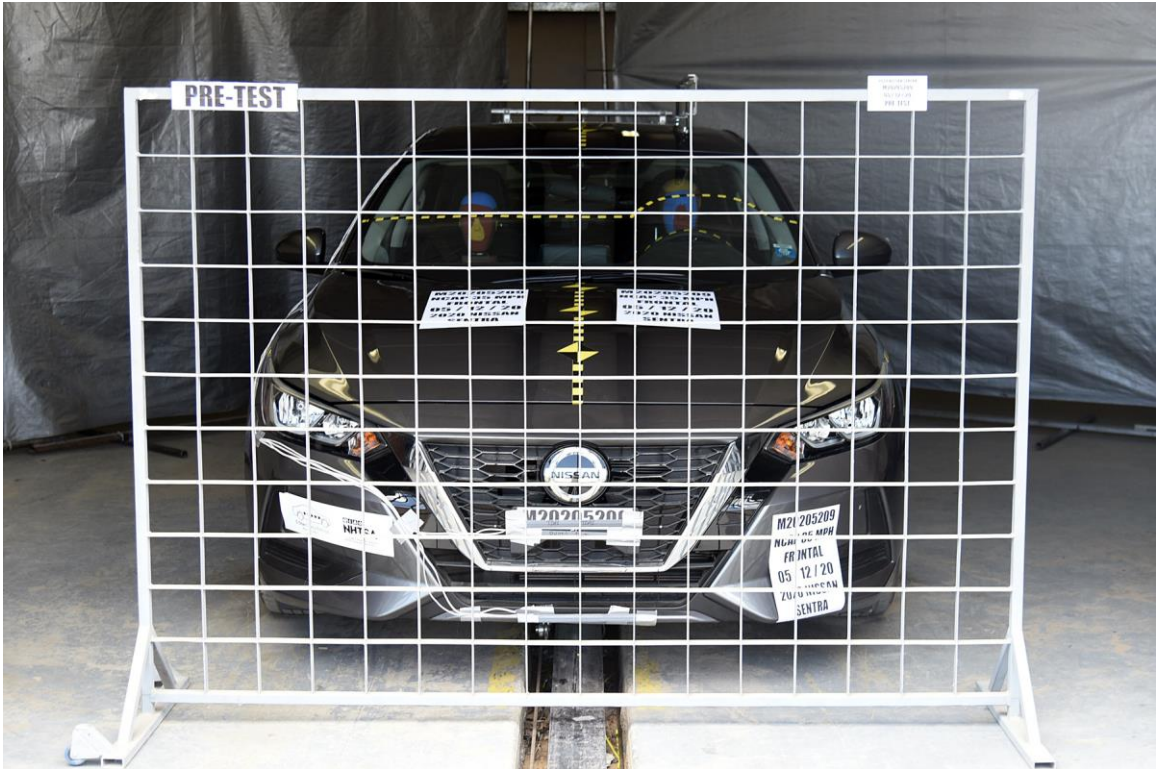


FIGURE 1. Load Cell Location

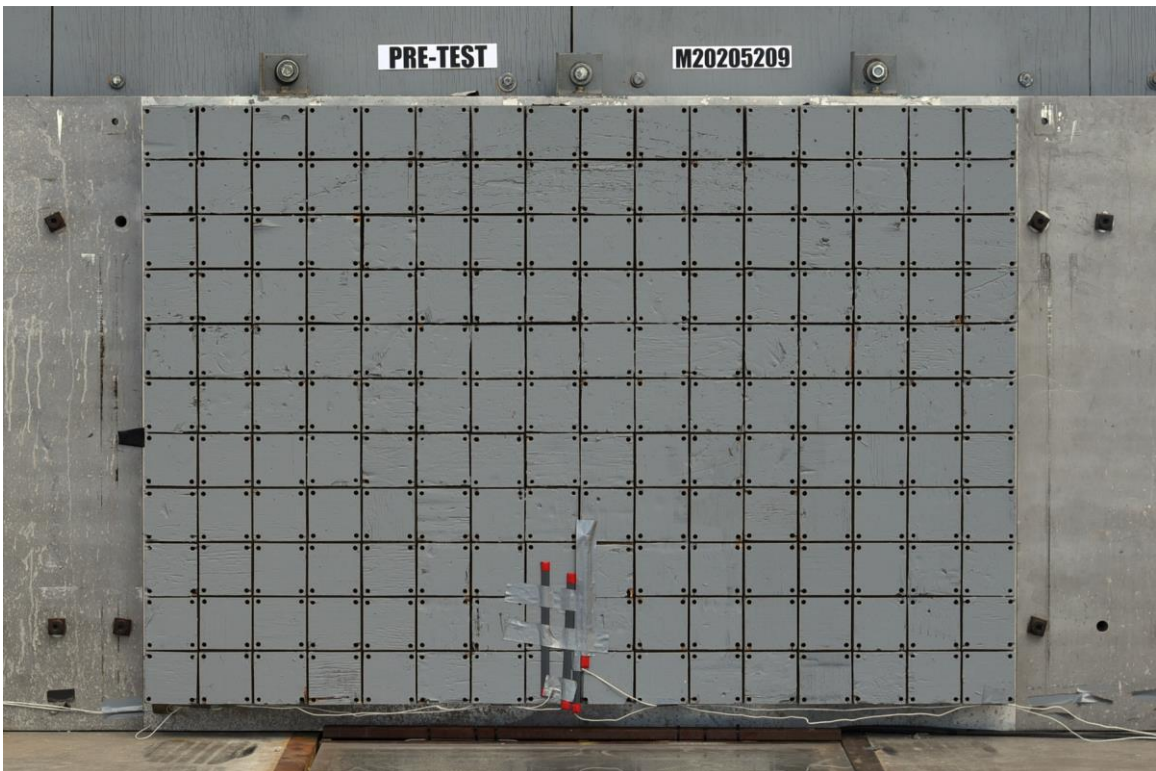


FIGURE 2. Pre-Test Load Cell Wall

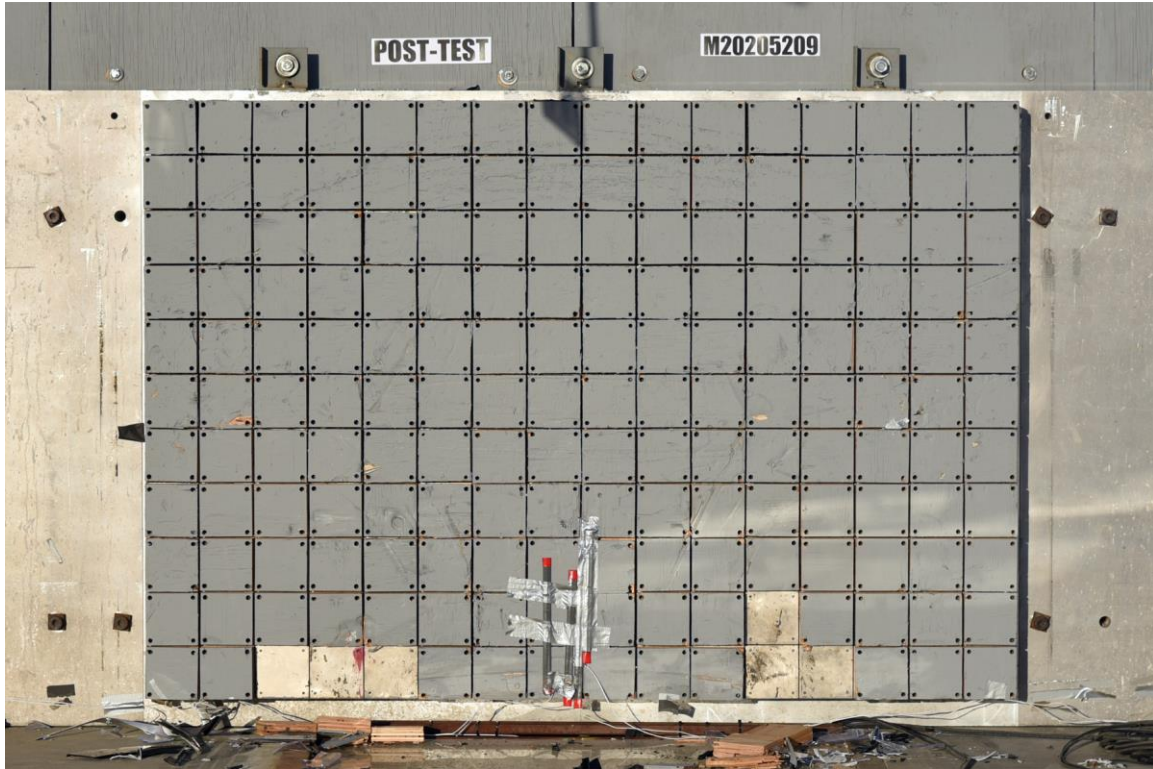


FIGURE 3. Post-Test Load Cell Wall

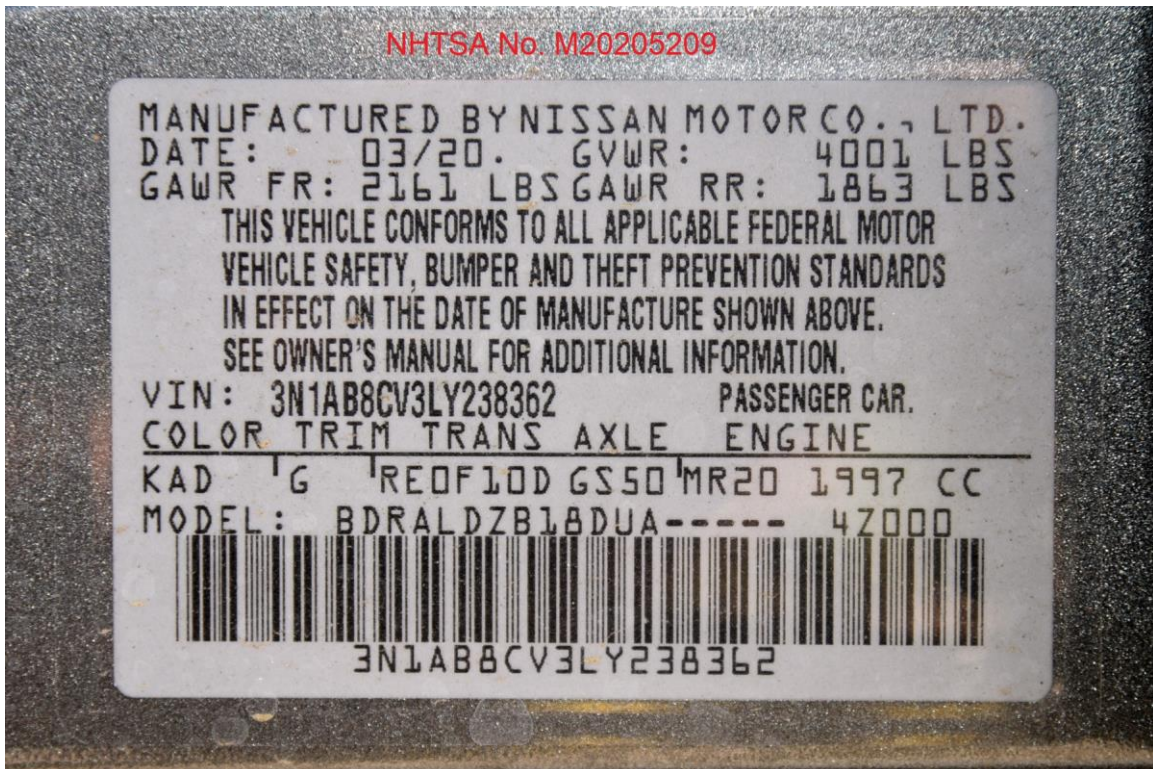


FIGURE 4. Manufacturer's Label

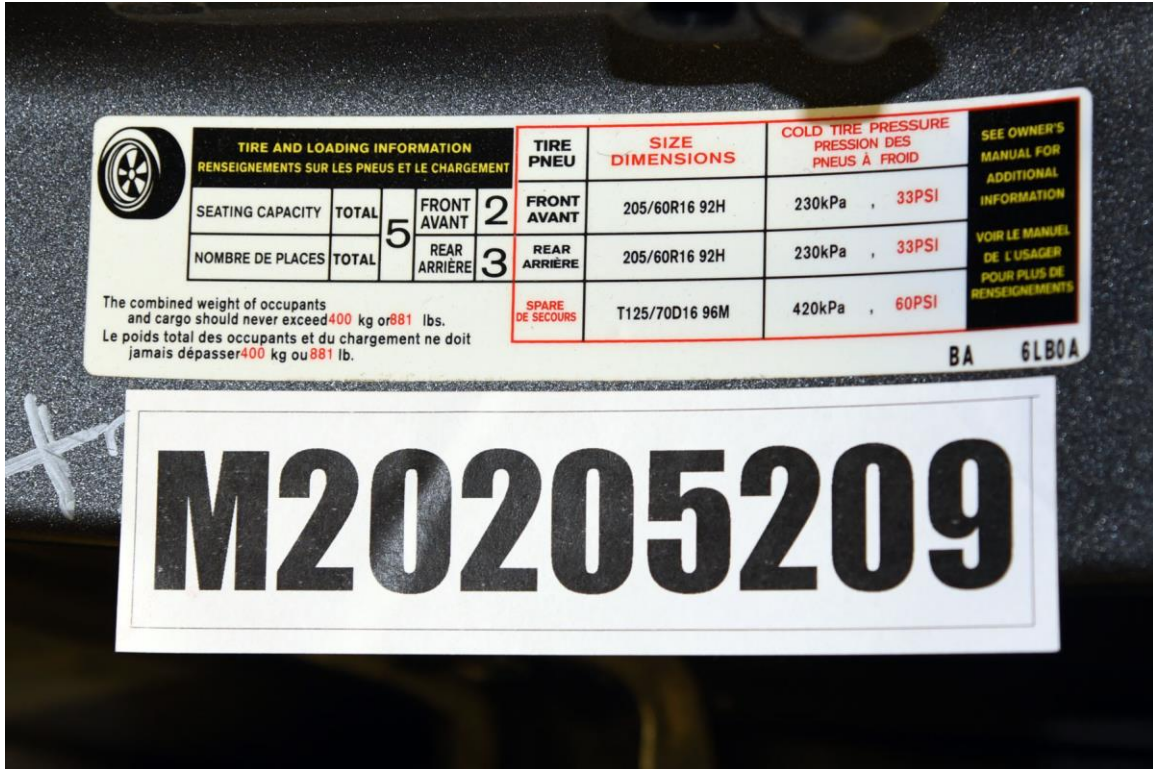


FIGURE 5. Tire Placard



FIGURE 6. 2020 Nissan Sentra Frontal as Delivered



FIGURE 7. Left Rear $\frac{3}{4}$ View, as Received

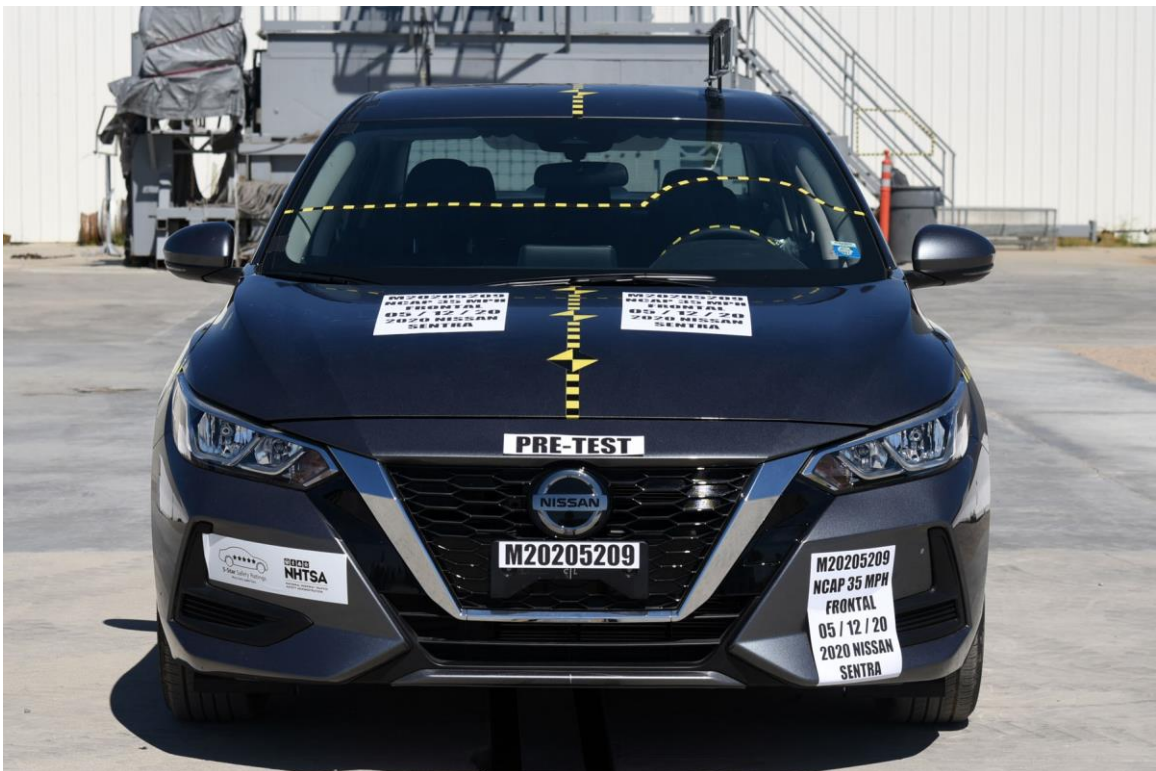


FIGURE 8. Pre-Test Front View of Test Vehicle

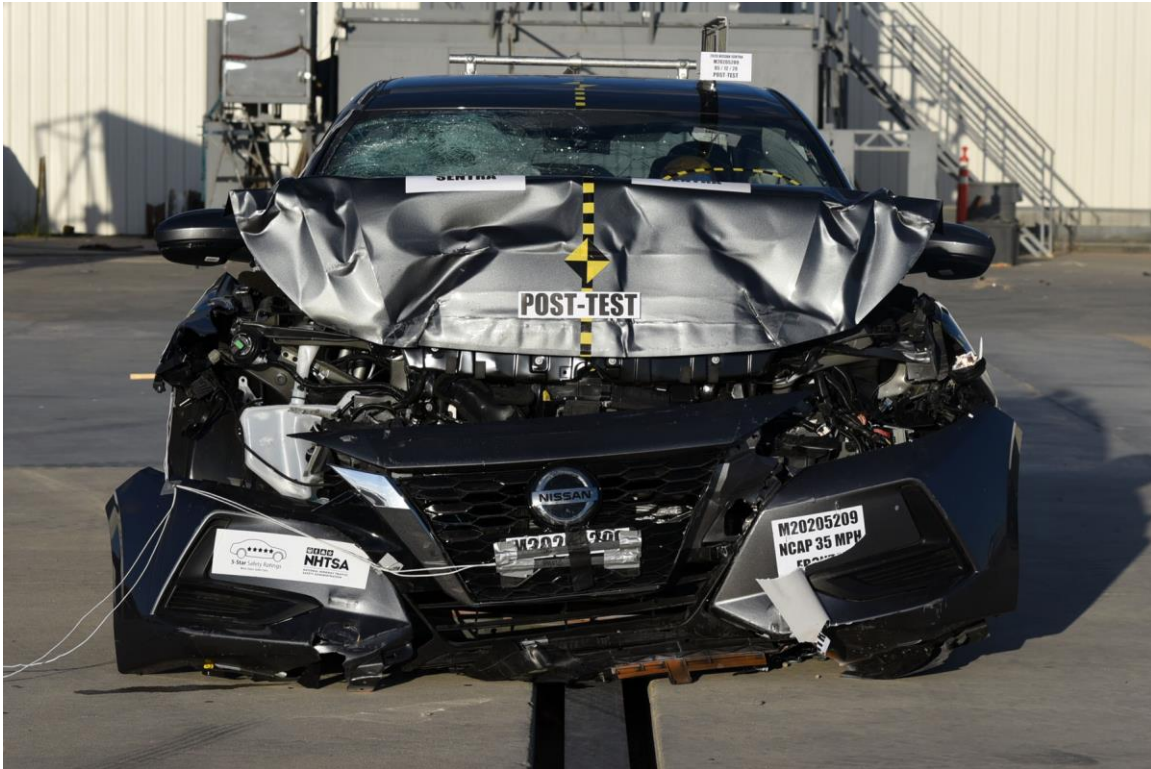


FIGURE 9. Post-Test Front View of Test Vehicle



FIGURE 10. Pre-Test Left View of Test Vehicle



FIGURE 11. Post-Test Left View of Test Vehicle



FIGURE 12. Pre-Test Right View of Test Vehicle



FIGURE 13. Post-Test Right View of Test Vehicle



FIGURE 14. Pre-Test Right Front $\frac{3}{4}$ View

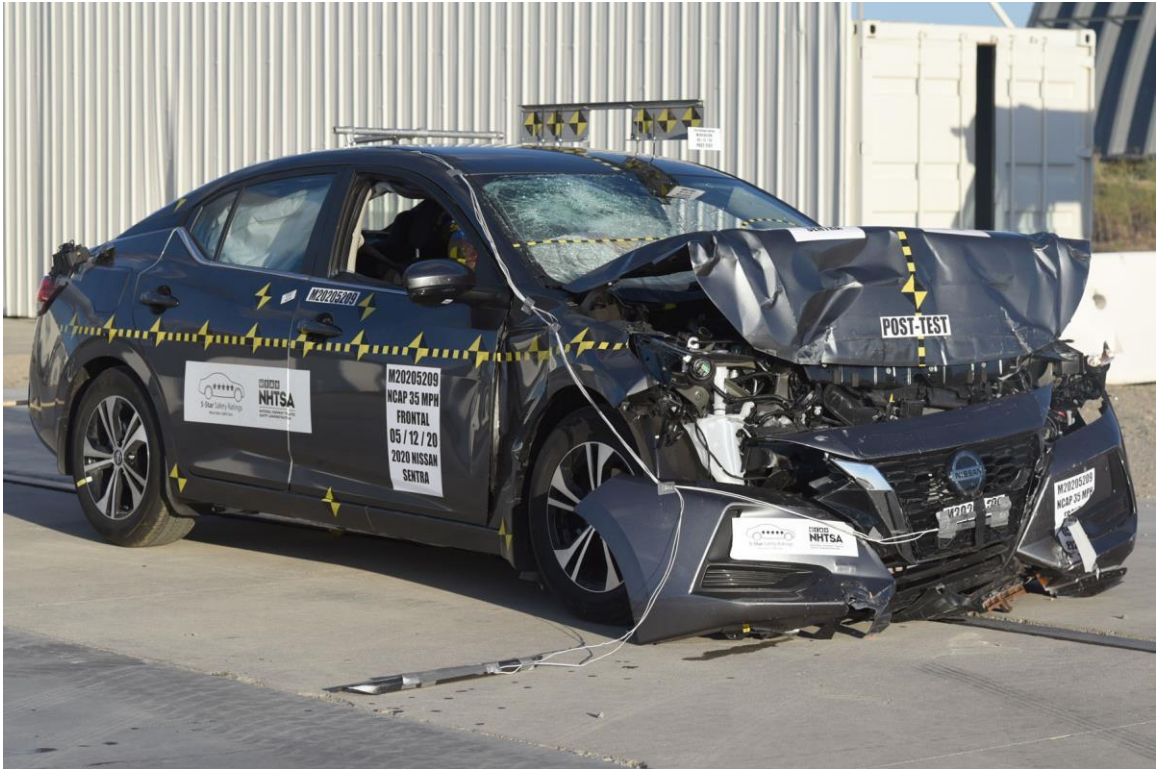


FIGURE 15. Post-Test Right Front $\frac{3}{4}$ View



FIGURE 16. Pre-Test Left Rear $\frac{3}{4}$ View



FIGURE 17. Post-Test Left Rear $\frac{3}{4}$ View

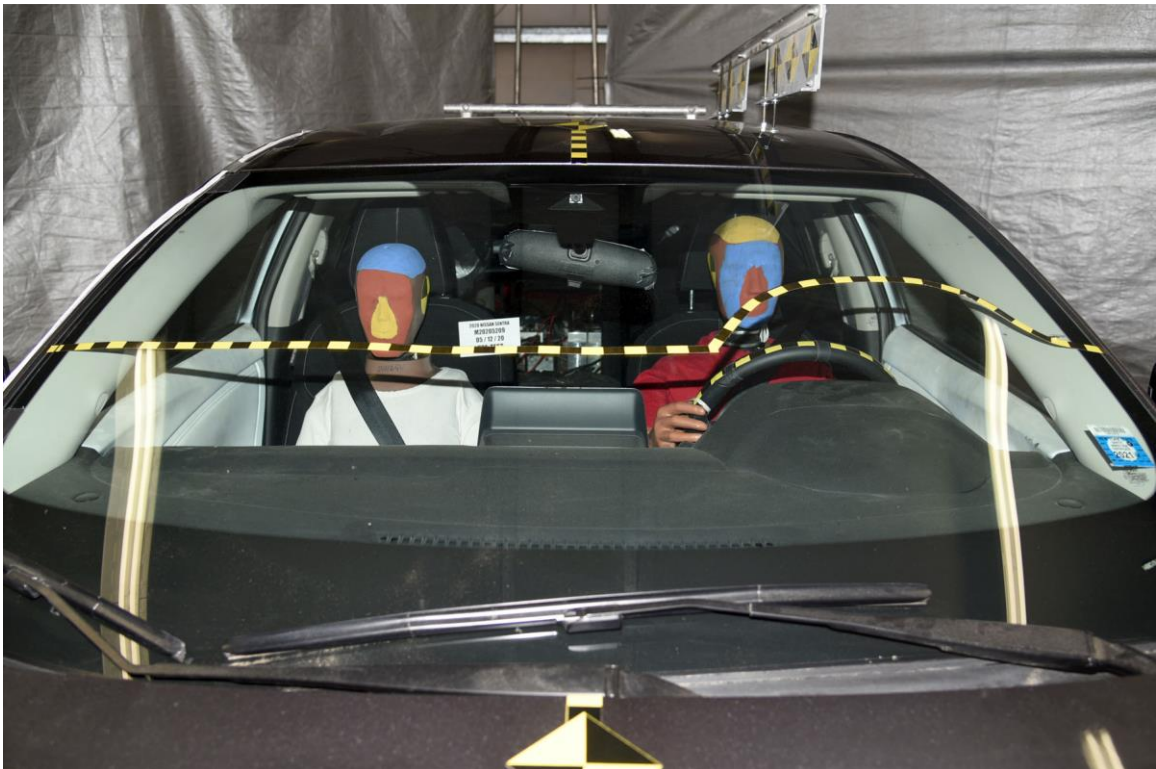


FIGURE 18. Pre-Test Windshield View

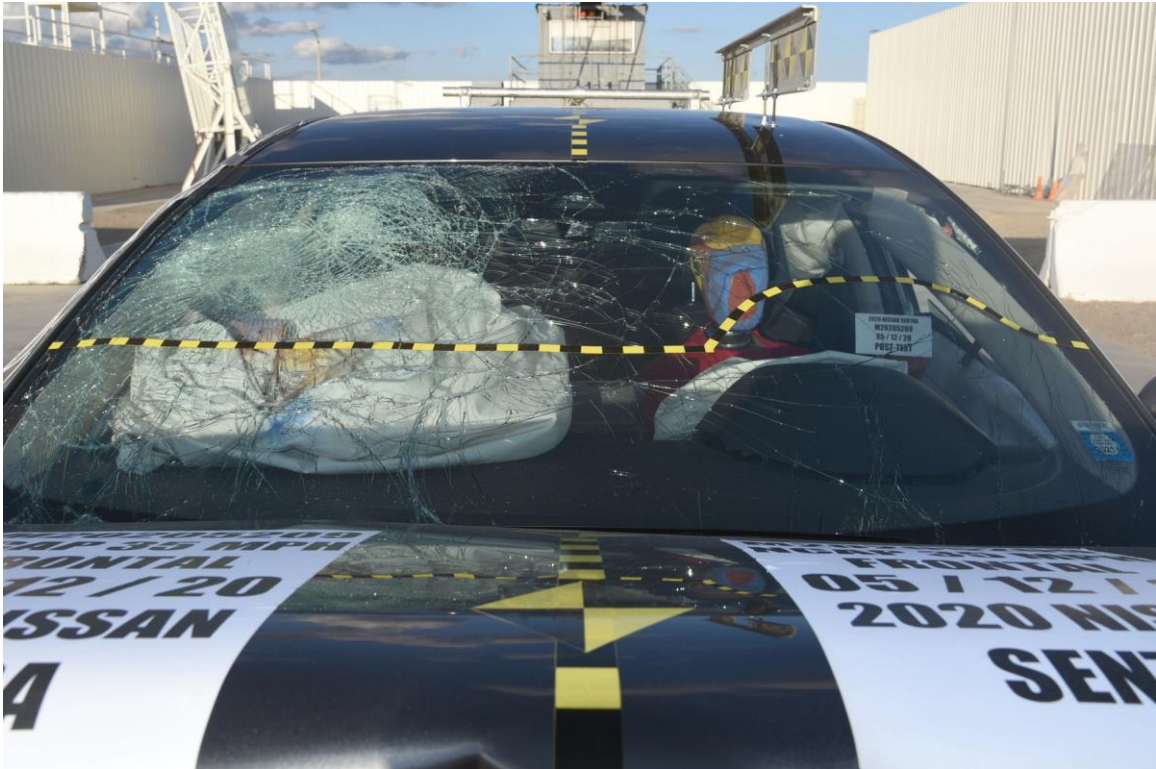


FIGURE 19. Post-Test Windshield View

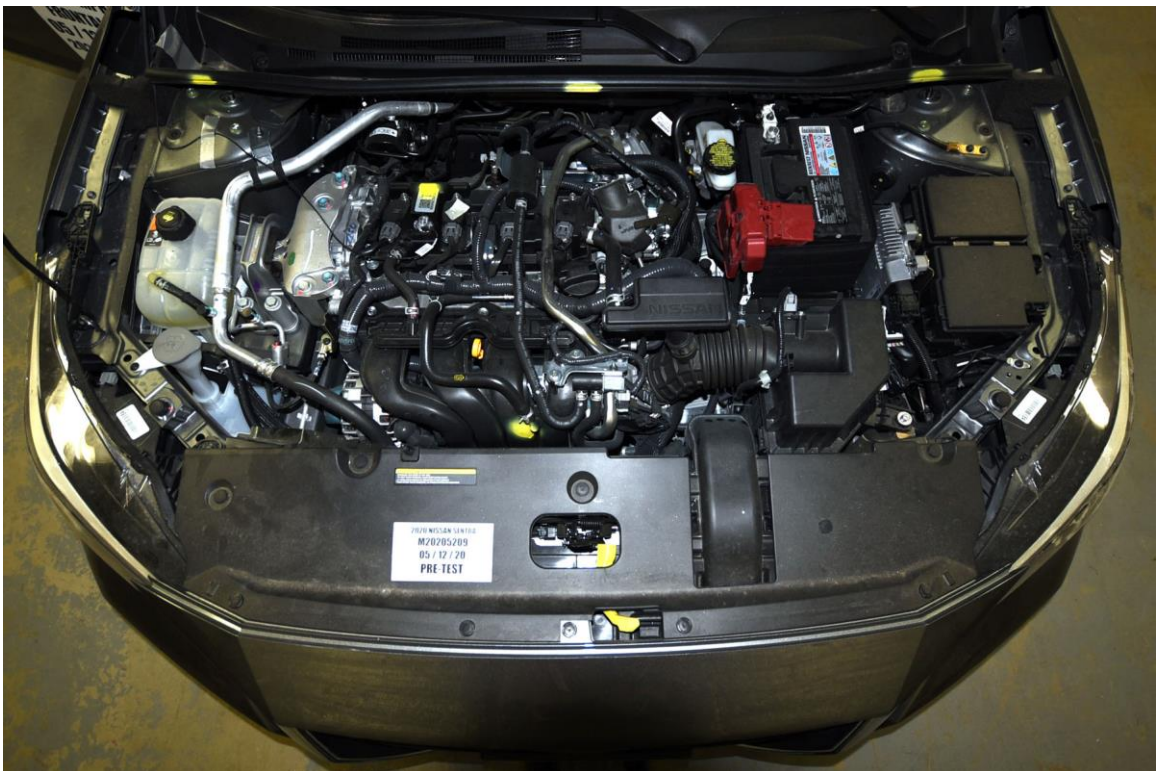


FIGURE 20. Pre-Test Engine Compartment View



FIGURE 21. Post-Test Engine Compartment View



FIGURE 22. Pre-Test Fuel Filler Cap View



FIGURE 23. Post-Test Fuel Filler Cap View

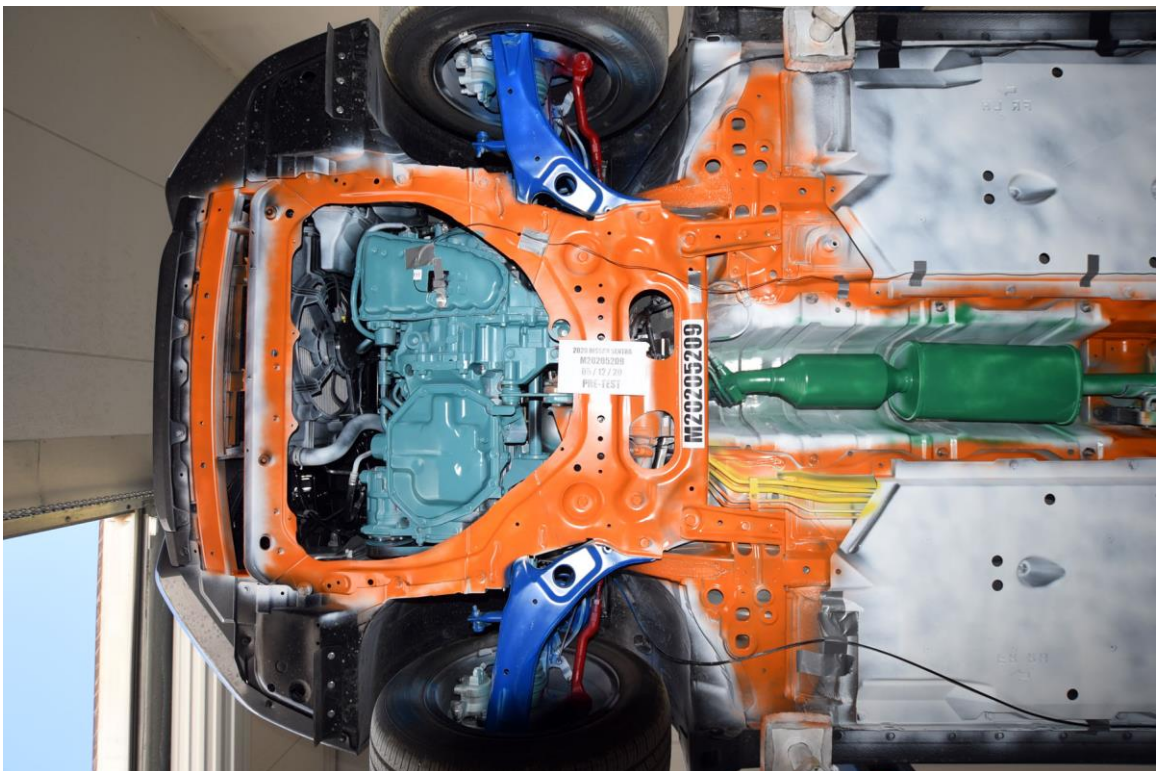


FIGURE 24. Pre-Test Front Underbody View



FIGURE 25. Post-Test Front Underbody View

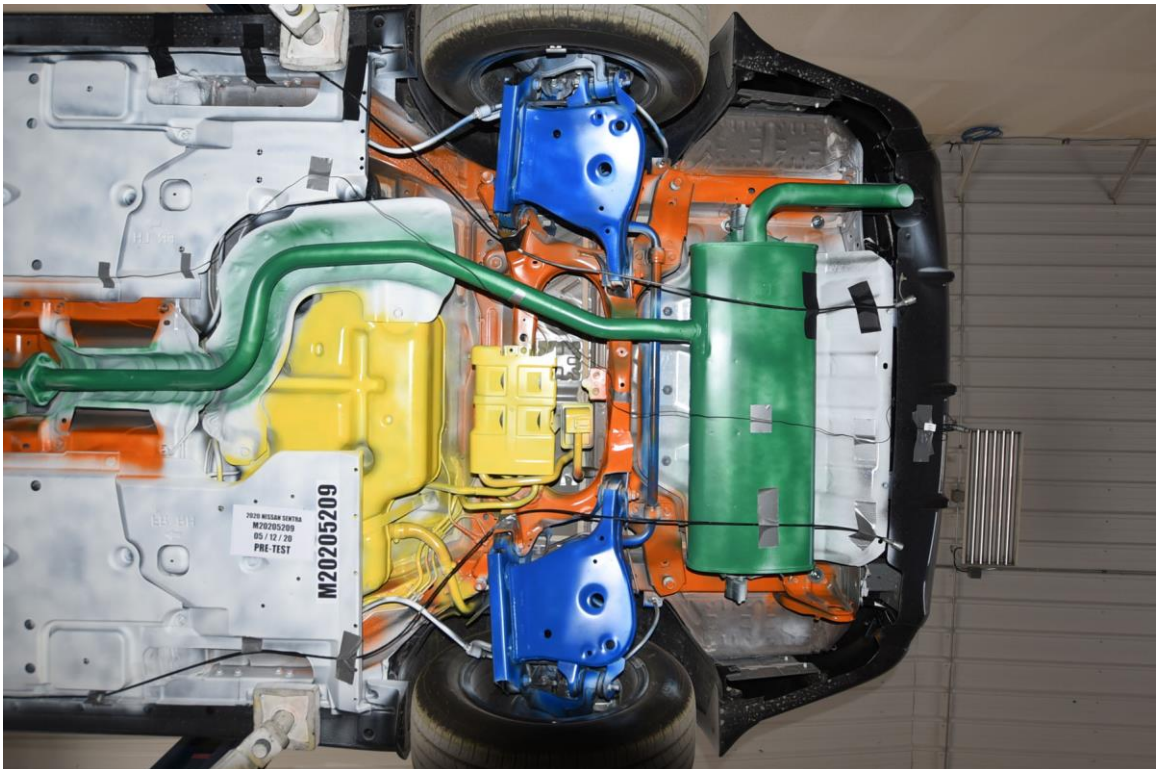


FIGURE 26. Pre-Test Rear Underbody View

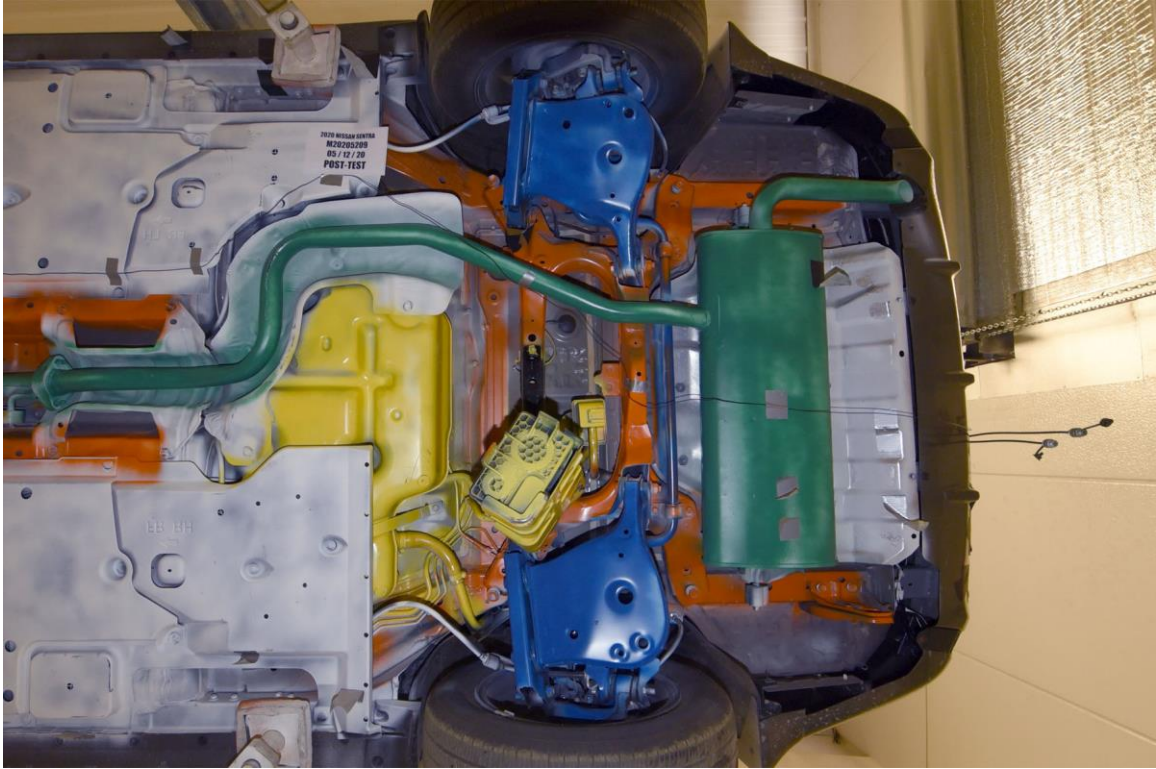


FIGURE 27. Post-Test Rear Underbody View



FIGURE 28. Pre-Test Dummy Cable Routing



FIGURE 29. Post-Test Dummy Cable Routing



FIGURE 30. Pre-Test Driver Dummy Front View



FIGURE 31. Post-Test Driver Dummy Front View



FIGURE 32. Pre-Test Driver Dummy Window View



FIGURE 33. Post-Test Driver Dummy Window View



FIGURE 34. Pre-Test Driver Dummy and Vehicle Interior View



FIGURE 35. Post-Test Driver Dummy and Vehicle Interior View



FIGURE 36. Pre-Test Driver's Seat Fore-Aft Markings



FIGURE 37. Post-Test Driver's Seat Fore-Aft Markings



FIGURE 38. Pre-Test View of Belt Anchorage for Driver Dummy



FIGURE 39. Post-Test View of Belt Anchorage for Driver Dummy

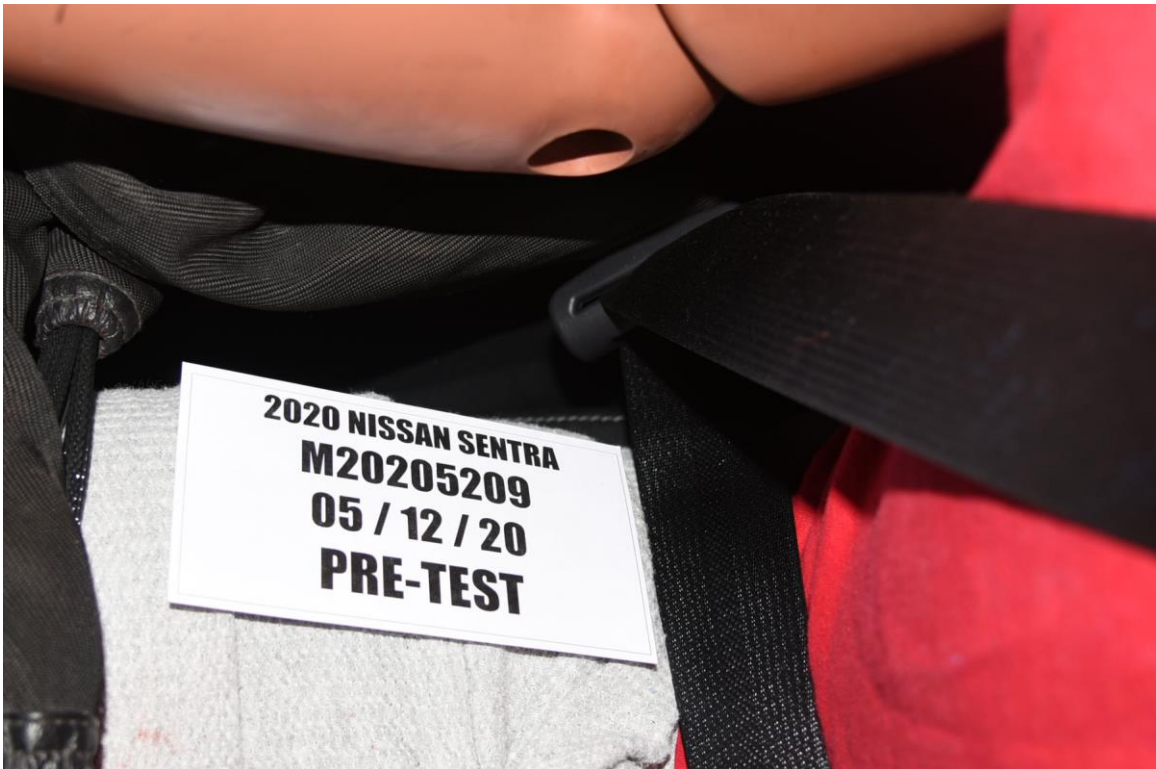


FIGURE 40. Pre-Test View of Belt Buckle and Latch Plate for Driver Dummy



FIGURE 41. Post-Test View of Belt Buckle and Latch Plate for Driver Dummy



FIGURE 42. Pre-Test Driver Dummy Feet



FIGURE 43. Post-Test Driver Dummy Feet



FIGURE 44. Pre-Test Driver's Side Knee Bolster



FIGURE 45. Post-Test Driver's Side Knee Bolster



FIGURE 46. Pre-Test Driver's Side Floorpan



FIGURE 47. Post-Test Driver's Side Floorpan



FIGURE 48. Post-Test Driver Dummy Face

NOTE: Figure 47 includes incorrect test placard. Test placard should read "Post-Test".



FIGURE 49. Post-Test Driver Dummy Contact with Airbag



FIGURE 50. Post-Test Driver Dummy Contact with Headrest



FIGURE 50a. Post-Test Driver Dummy Contact with Knee Airbag



FIGURE 51. Pre-Test View of the Steering Wheel



FIGURE 52. Post-Test View of the Steering Wheel



FIGURE 53. Pre-Test Passenger Dummy Front View



FIGURE 54. Post-Test Passenger Dummy Front View



FIGURE 55. Pre-Test Passenger Dummy Window View



FIGURE 56. Post-Test Passenger Dummy Window View



FIGURE 57. Pre-Test Passenger Dummy and Vehicle Interior View

Photograph Not Available

FIGURE 58. Post-Test Passenger Dummy and Vehicle Interior View



FIGURE 59. Pre-Test Passenger's Seat Fore-Aft Markings



FIGURE 60. Post-Test Passenger's Seat Fore-Aft Markings



FIGURE 61. Pre-Test View of Belt Anchorage for Passenger Dummy



FIGURE 62. Post-Test View of Belt Anchorage for Passenger Dummy



FIGURE 63. Pre-Test View of Belt Buckle and Latch Plate for Passenger Dummy



FIGURE 64. Post-Test View of Belt Buckle and Latch Plate for Passenger Dummy



FIGURE 65. Pre-Test Passenger Dummy Feet



FIGURE 66. Post-Test Passenger Dummy Feet



FIGURE 67. Pre-Test Passenger's Side Knee Bolster

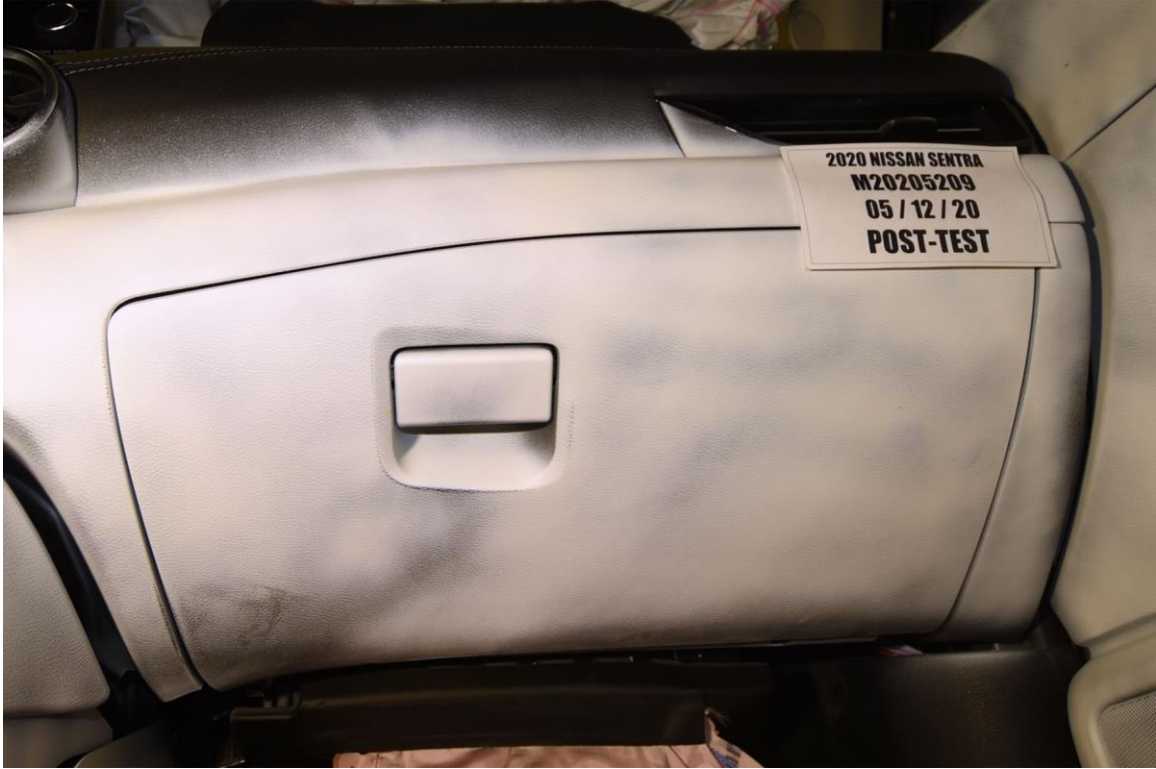


FIGURE 68. Post-Test Passenger's Side Knee Bolster



FIGURE 69. Pre-Test Passenger's Side Floorpan



FIGURE 70. Post-Test Passenger's Side Floorpan



FIGURE 71. Post-Test Passenger Dummy Face

NOTE: Figure 70 includes incorrect test placard. Test placard should read "Post-Test".



FIGURE 72. Post-Test Passenger Dummy Contact with Airbag

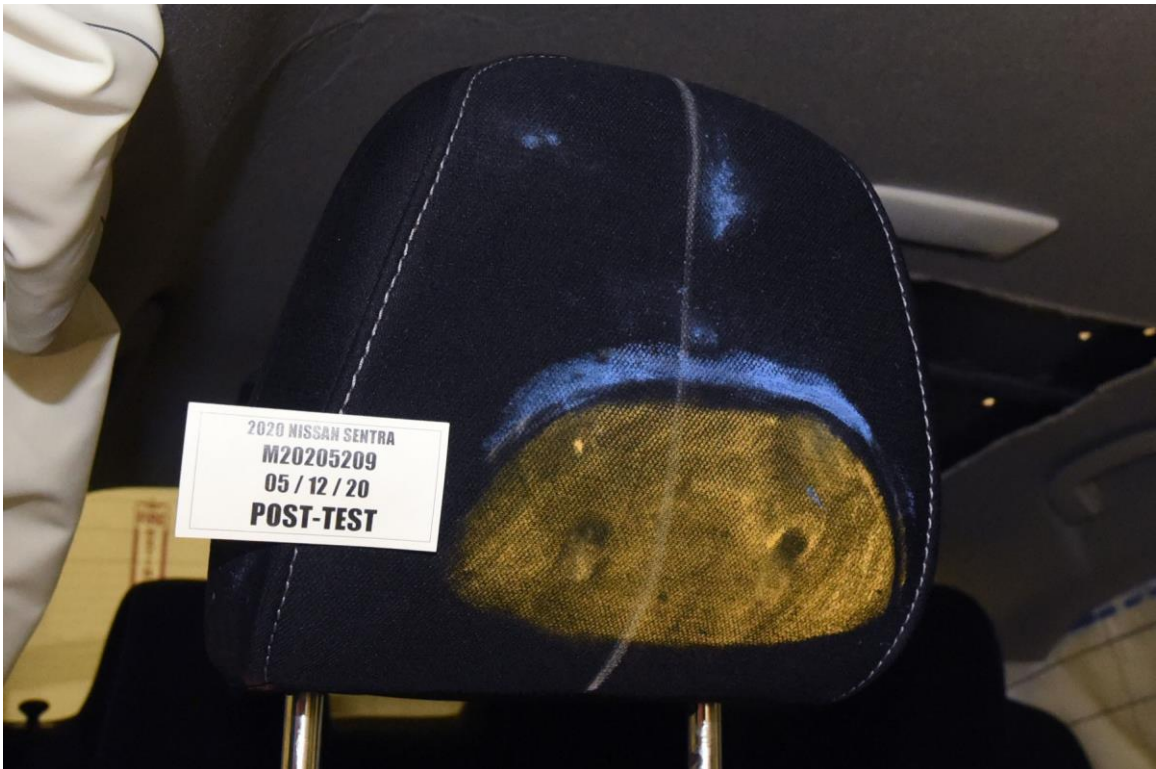


FIGURE 73. Post-Test Passenger Dummy Contact with Headrest



FIGURE 73a. Post-Test Passenger Dummy Contact with Knee Airbag

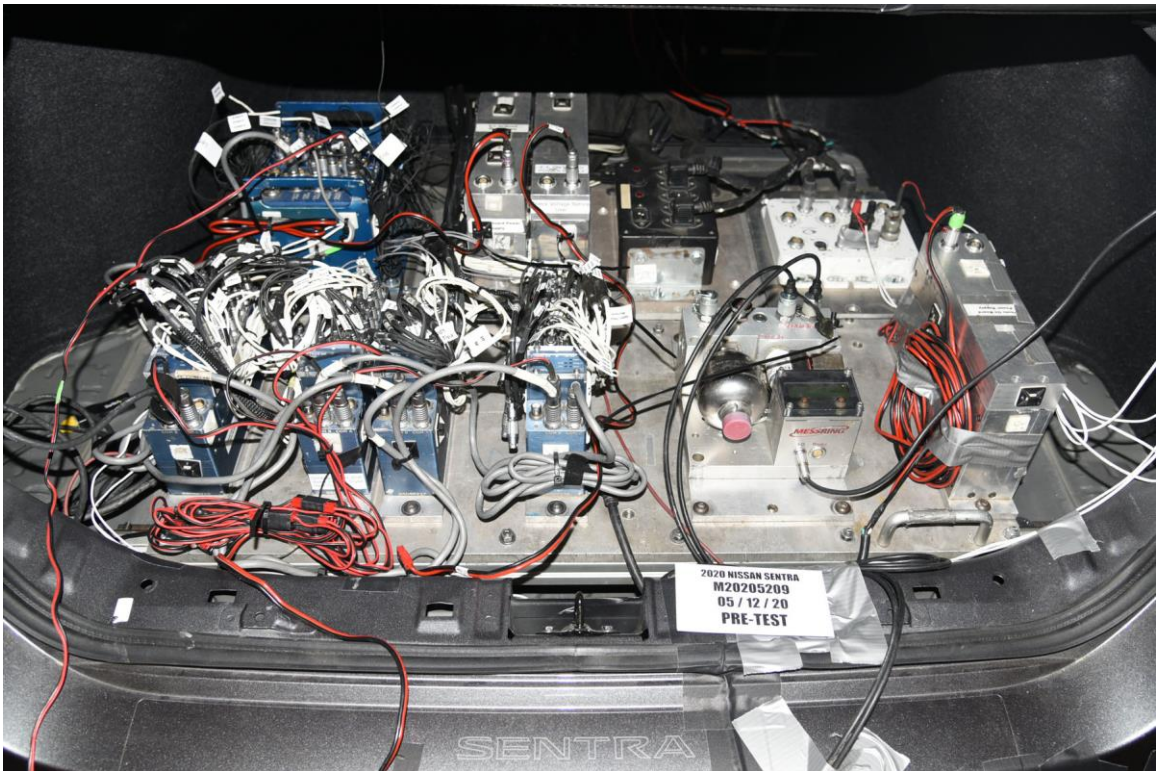


FIGURE 74. Photograph of Ballast Installed in Vehicle

Photograph Not Applicable

No Stoddard Solvent Spillage

FIGURE 75. Post-Test Stoddard Solvent Spillage Location View



FIGURE 76. Post-Test Speed Trap Read-Out



FIGURE 77. Vehicle at 0° on Static Rollover Device



FIGURE 78. Vehicle at 90° on Static Rollover Device

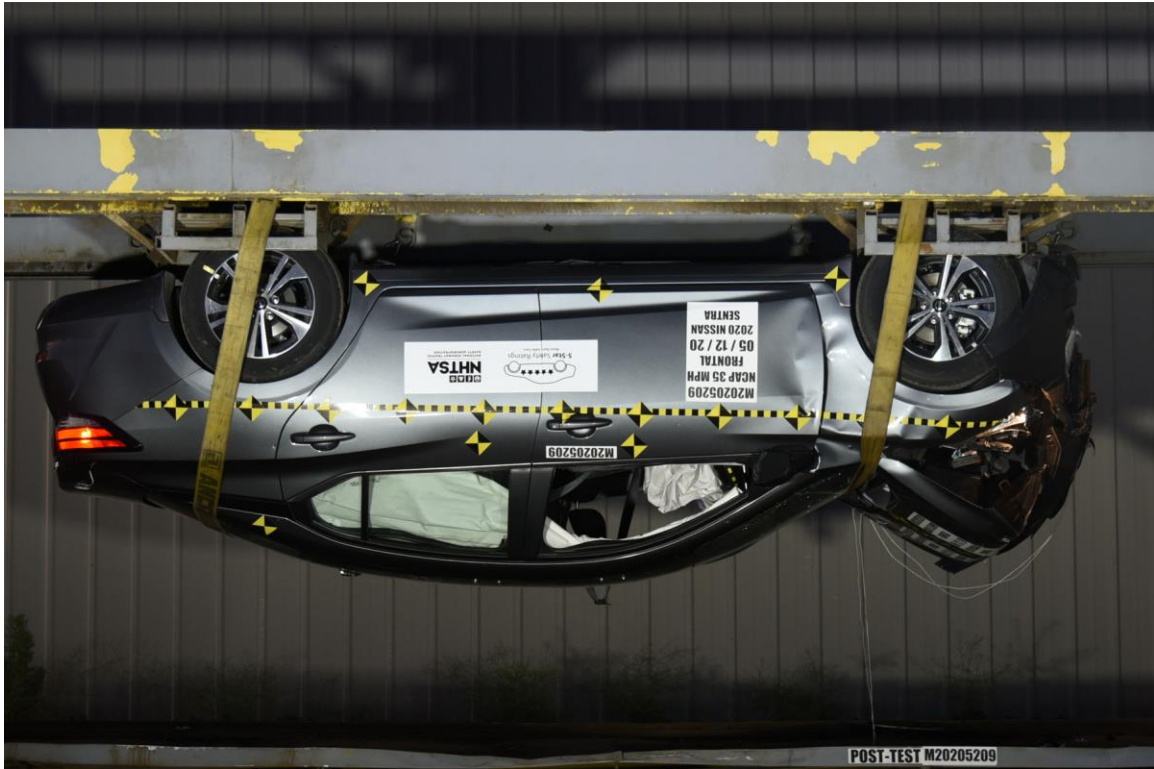


FIGURE 79. Vehicle at 180° on Static Rollover Device

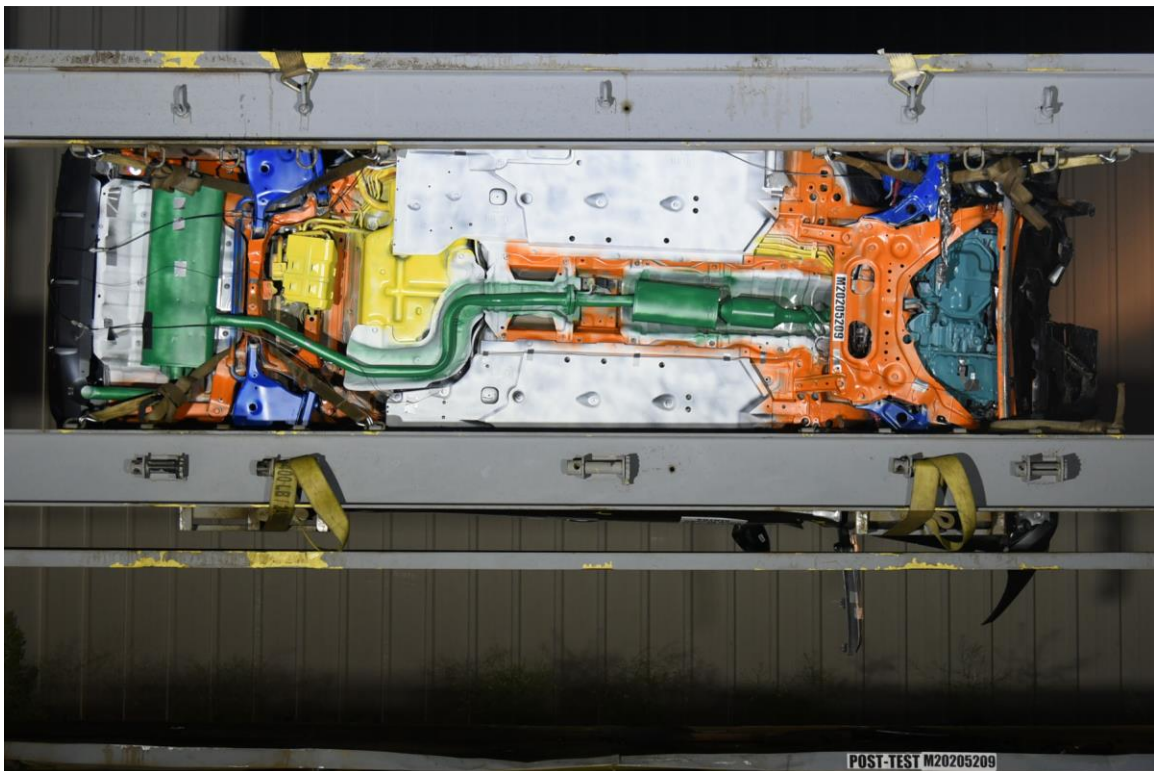


FIGURE 80. Vehicle at 270° on Static Rollover Device



FIGURE 81. Vehicle at 360° on Static Rollover Device



FIGURE 82. 2020 Nissan Sentra Frontal Impact Event

2020 NISSAN SENTRA

2.0 SV CVT

Scan QR code for general model information & options

Standard Equipment Included at No Extra Charge

MECHANICAL & PERFORMANCE
 2.0 Liter DCHC 4-Cylinder Engine
 149 Horsepower & 146 lb-ft Torque
 Xtronic CVT™
 Dual Precision Electric Power Steering (DP-EPS)
 Active Understeer Control (AUC)
 Independent Strut Front and Multilink Rear Suspension
 Intelligent Trace Control (ITC)
 Intelligent Ride Control (IRC)

SAFETY AND SECURITY
 Automatic Emergency Braking w/ Pedestrian Detection (AEB w/ Ped.)
 Intelligent Forward Collision Warning (i-FCW)
 Rear Automatic Braking (RAB)
 Blind Spot Warning (BSW)
 Rear Cross Traffic Alert (RCTA)
 Intelligent Driver Alertness (I-DA)
 Lane Departure Warning (LDW) w/ Haptic Steering Wheel
 High Beam Assist (HBA)
 Rear Door Alert
 RearView Monitor
 Nissan Advanced Air Bag System (AABS) w/ Dual-Stage Supplemental Driver and Passenger Front Airbags
 Roof-mounted Curtain Side-impact and Rollover Supplemental Air Bags
 Seat-mounted Driver and Front-passenger Side-impact Supplemental Air Bags
 Seat-mounted Rear Outboard Side-impact Supplemental Air Bags
 Driver and Passenger Supplemental Knee Air Bags
 Front Seat Belts w/ Pretensioners and Load Limiters
 Height Adjustable Front Seats
 Anti-lock Braking System (ABS)
 Electronic Brake Force Distribution (EBD)
 Vehicle Dynamic Control System (VDC)
 Traction Control System (TCS)
 Tire Pressure Monitoring System (TPMS) and Easy Fill Tire Alert
 LATCH System (Lower Anchors and Tethers for Children)

COMFORT & CONVENIENCE
 Nissan Intelligent Key® w/ 2-key FOBs
 Remote Engine Start & Push Button Ignition
 Power Windows w/ Driver's One-Touch Auto Up/Down Feature
 Power Door Locks w/ Speed Sensing Auto-Lock Feature
 Manual Tilt and Telescoping Steering Column
 Intelligent Auto Headlamps
 Rear Window Defroster w/ Timer
 Dual Zone Auto Climate Control

AUDIO AND ENTERTAINMENT
 7" Advanced Driver Assist Display in Meter+ NissanConnect®
 8" Color Display w/ Multi-Touch Control
 SiriusXM® Radio w/ Advanced Features+ Apple CarPlay®
 Android Auto™ + Streaming Audio via Bluetooth®+ Bluetooth® Hands-Free Phone System+
 (2) Front USB (Type A & C) and (1) Charge-only USB (Type A) Rear Hands-Free Text Messaging Assistant+ Siri® Eyes Free+ Voice Recognition+ 6-Speaker Audio System

EXTERIOR
 18" Alloy Wheels w/ Rear Disc Brakes
 205/60R16 All-Season Tires
 Halogen Headlamps w/ Chrome Signature
 Heated Exterior Mirrors w/ Turn Signal Indicators
 SV Grade Emblem

INTERIOR
 6-Way Manual Driver's Seat
 60/40 Split Folding rear bench seat
 Leather Wrapped Steering Wheel

Manufacturer's Suggested Retail Base Price: \$20,270.00

Options Included by Manufacturer:

SPLASH GUARDS	200.00
CLEAR REAR BUMPER PROTECTOR	75.00
CARPETED FLOOR MATS WITH TRUNK MAT	205.00

DESTINATION CHARGES: 925.00

Total* \$21,675.00

EPA Fuel Economy and Environment Gasoline Vehicle

Fuel Economy MIDDLE CARs range from 12 to 136 MPG. The best vehicle rates 136 MPG.

33 MPG
 29 combined city/hwy 39 city highway
 3.0 gallons per 100 miles

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

Annual fuel Cost \$1,250

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

1 7 10 Best 1 7 10 Best

This vehicle emits 268 grams CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at fuelconomy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 27 MPG and costs \$7,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.70 per gallon. MPG is in miles per gallon (tailpipe only). Vehicle emissions are a significant cause of climate change and smog.

fuelconomy.gov
 Calculate personalized estimates and compare vehicles

GOVERNMENT 5-STAR SAFETY RATINGS

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

Frontal Crash	Driver Passenger	Not Rated
Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.		
Side Crash	Front seat Rear seat	Not Rated
Based on the risk of injury in a side impact.		
Rollover	Not Rated	
Based on the risk of rollover in a single-vehicle crash.		

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

DELIVERY

VEHICLE COLORS:
 EXT: GUN METALLIC
 INT: CHARCOAL

FINAL ASSEMBLY POINT:
 AGUAS (ABV) MEX

TRANSPORT METHOD:
 TRUCK

DEALER:
 MAGUIRE NISSAN, INC.
 504 S MEADOW ST
 ITTACA, NY 14850

This Vehicle

FIGURE 83. Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

TABLE OF DATA PLOTS

Plot		Page
1	Driver Head Acceleration X Primary	B-1
2	Driver Head Acceleration Y Primary	B-1
3	Driver Head Acceleration Z Primary	B-1
4	Driver Head Resultant Acceleration Primary	B-1
5	Driver Chest X Deflection	B-2
6	Driver Upper Neck Force X	B-3
7	Driver Upper Neck Force Z	B-3
8	Driver Upper Neck Moment Y	B-3
9	Driver Nij	B-3
10	Driver Chest Acceleration X Primary	B-4
11	Driver Chest Acceleration Y Primary	B-4
12	Driver Chest Acceleration Z Primary	B-4
13	Driver Chest Resultant Acceleration Primary	B-4
14	Driver Left Femur Force Z	B-5
15	Driver Right Femur Force Z	B-5
16	Passenger Head Acceleration X Primary	B-6
17	Passenger Head Acceleration Y Primary	B-6
18	Passenger Head Acceleration Z Primary	B-6
19	Passenger Head Resultant Acceleration Primary	B-6
20	Passenger Chest X Deflection	B-7
21	Passenger Upper Neck Force X	B-8
22	Passenger Upper Neck Force Z	B-8
23	Passenger Upper Neck Moment Y	B-8
24	Passenger Nij	B-8
25	Passenger Chest Acceleration X Primary	B-9
26	Passenger Chest Acceleration Y Primary	B-9
27	Passenger Chest Acceleration Z Primary	B-9
28	Passenger Chest Resultant Acceleration Primary	B-9
29	Passenger Left Femur Force Z	B-10
30	Passenger Right Femur Force Z	B-10

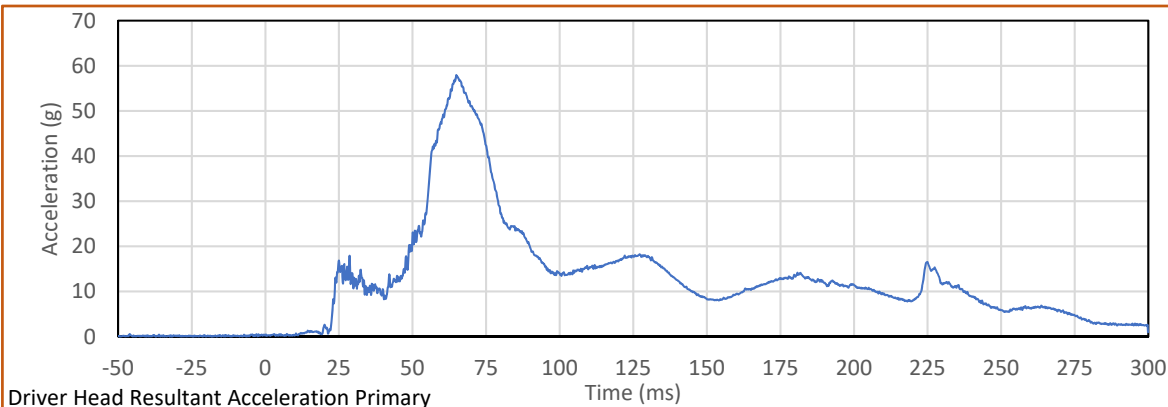
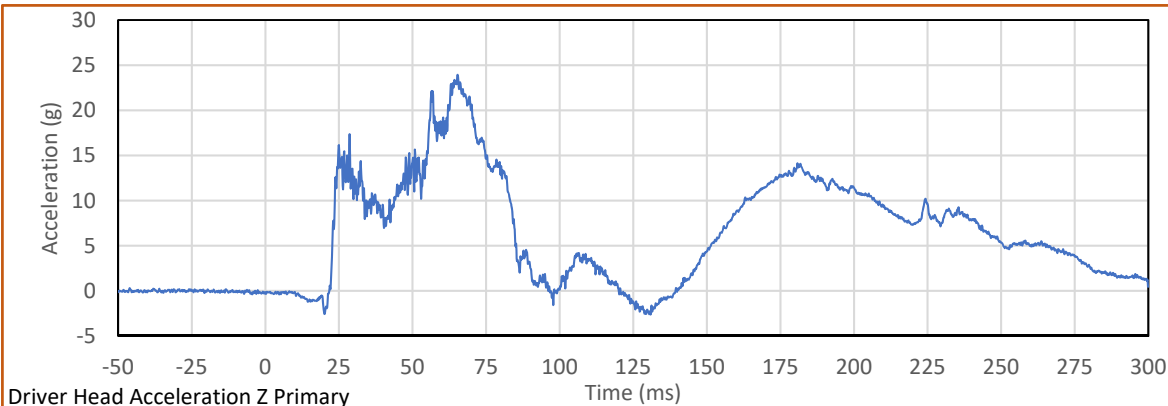
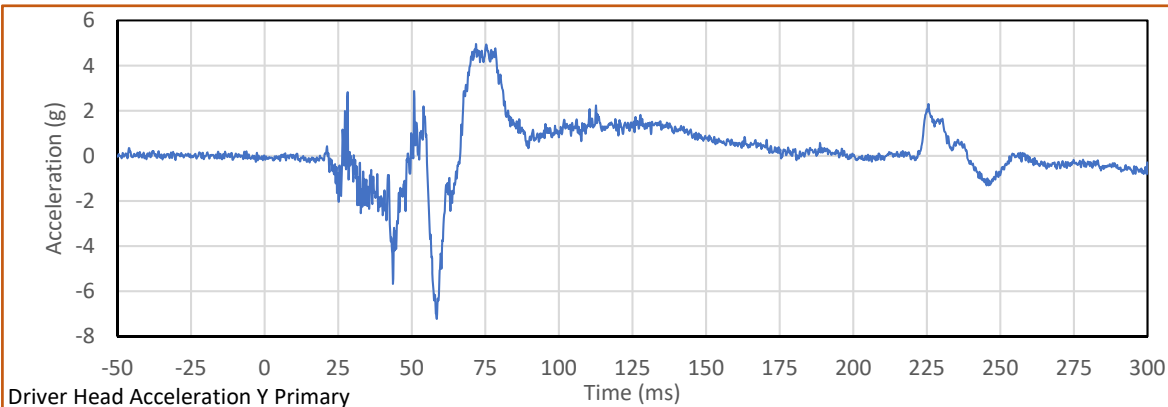
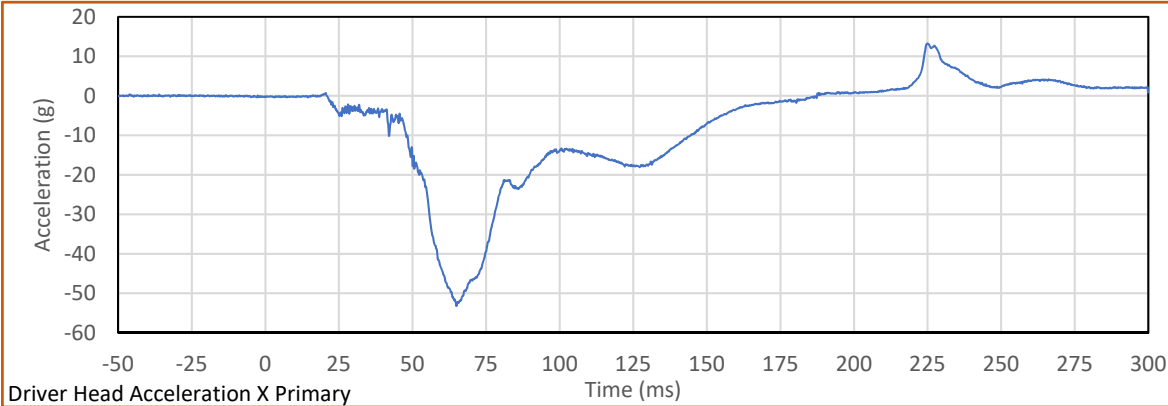
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.gov

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

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

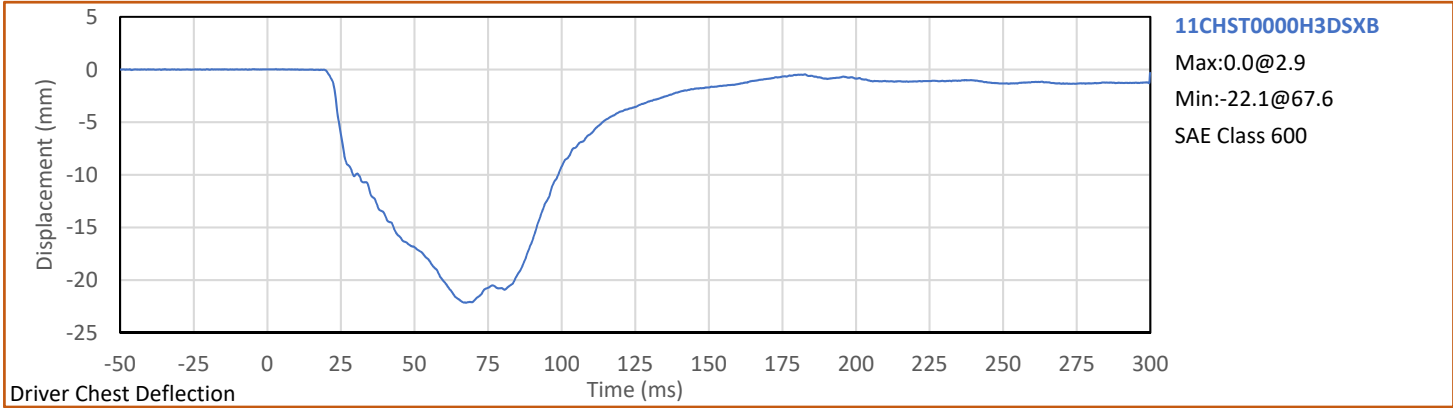
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Test Program: 56.3 km/h Frontal Impact NCAP Test

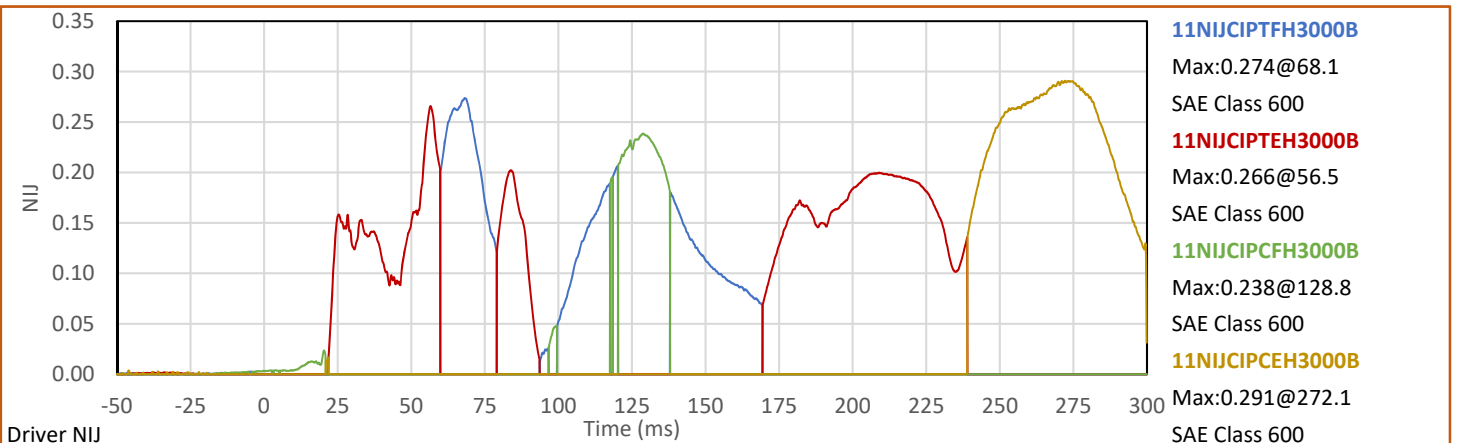
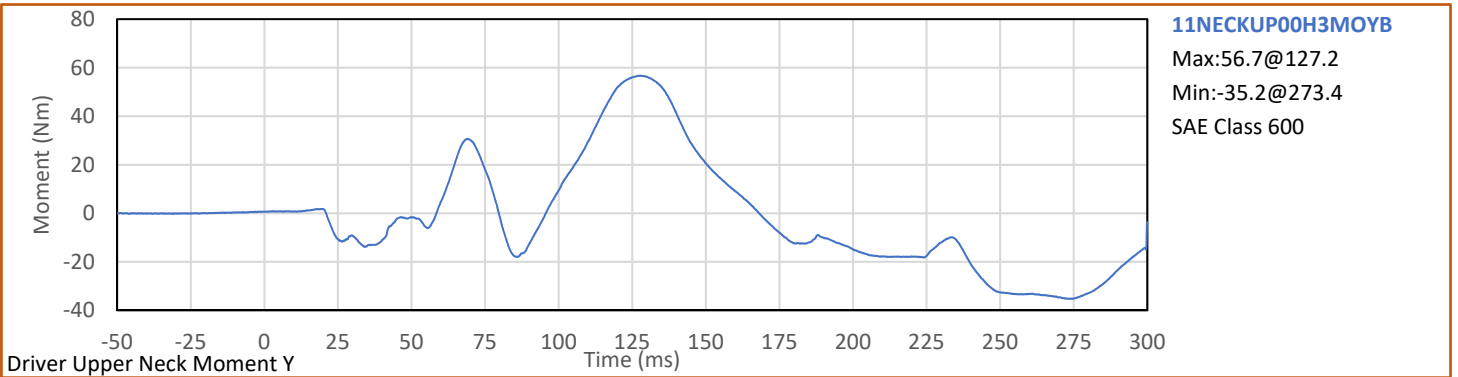
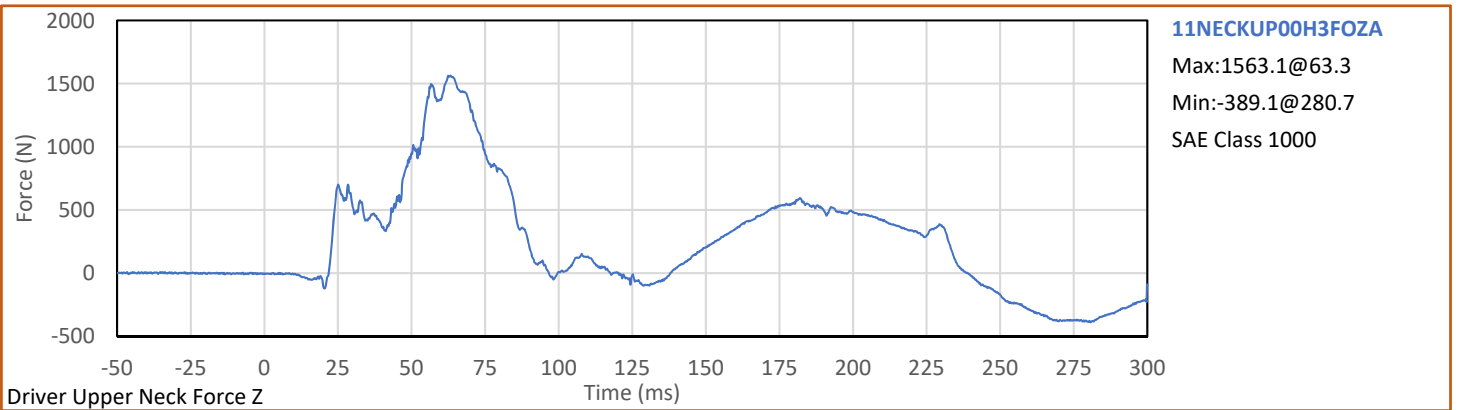
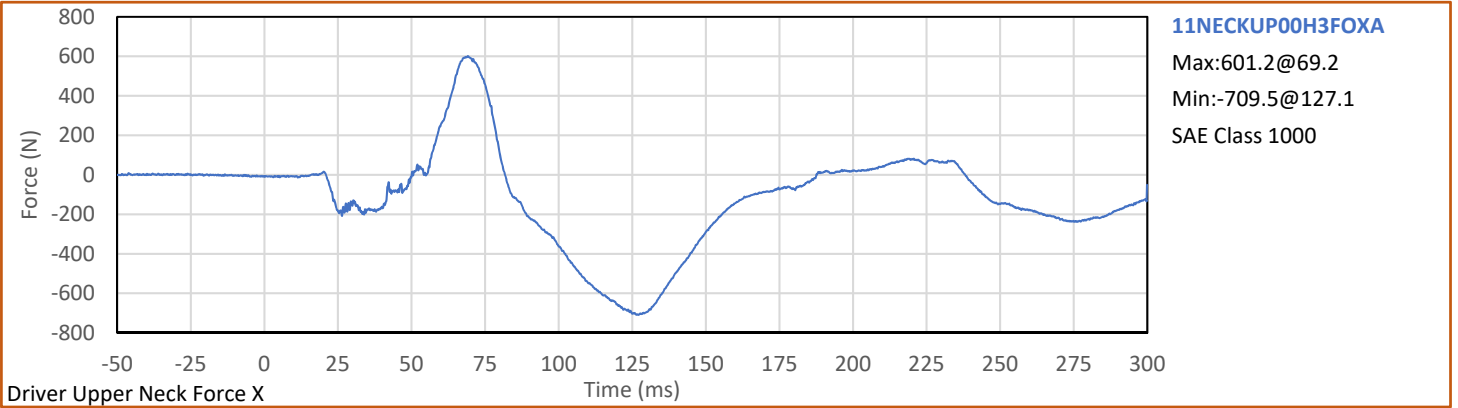
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Test Date: 5/12/2020

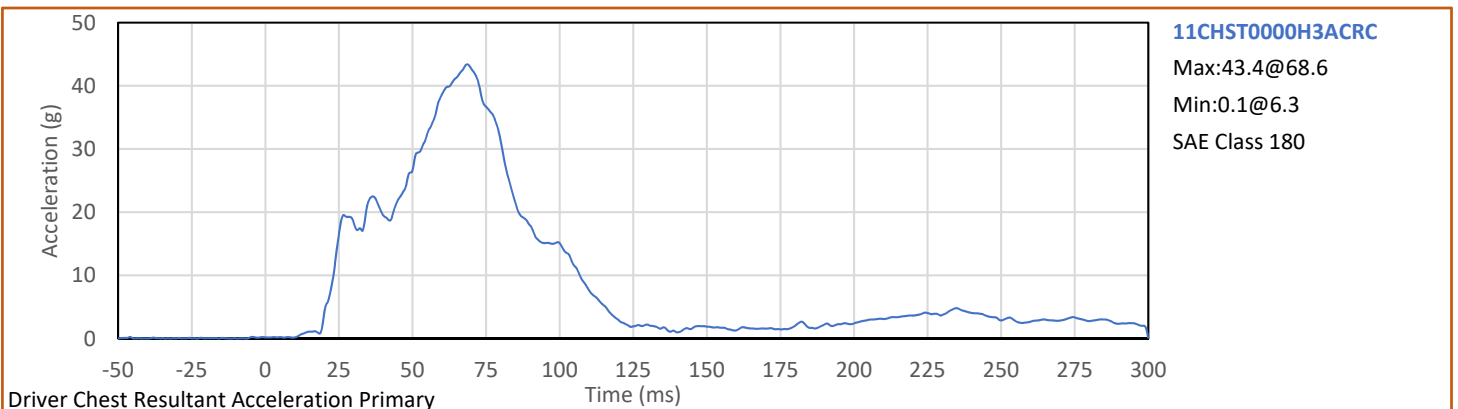
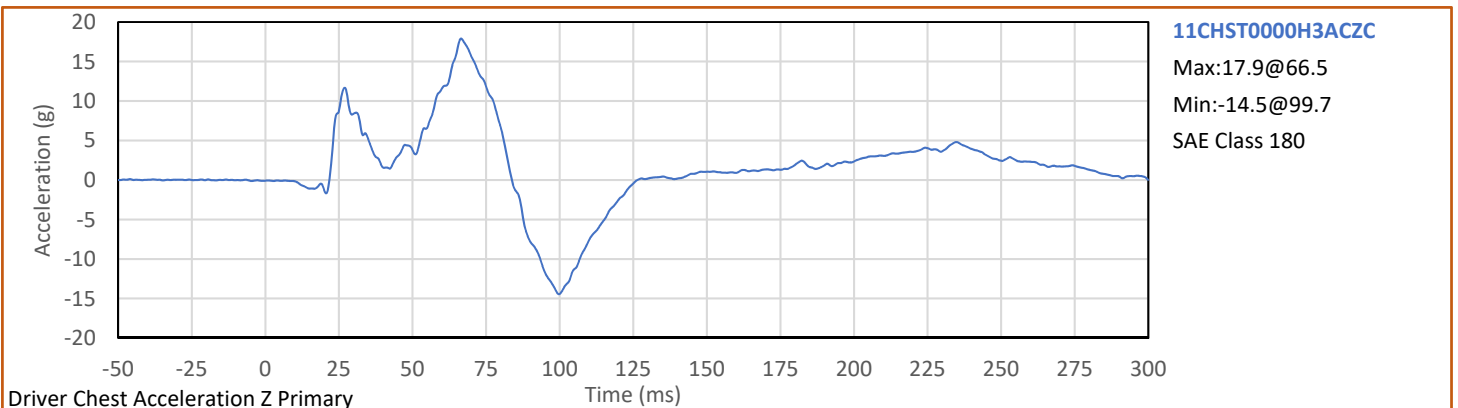
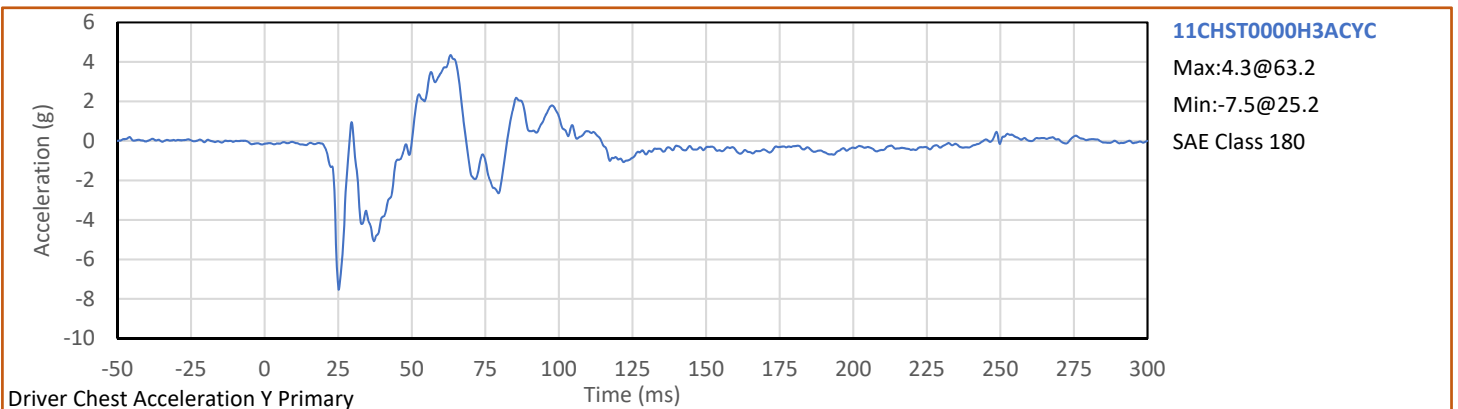
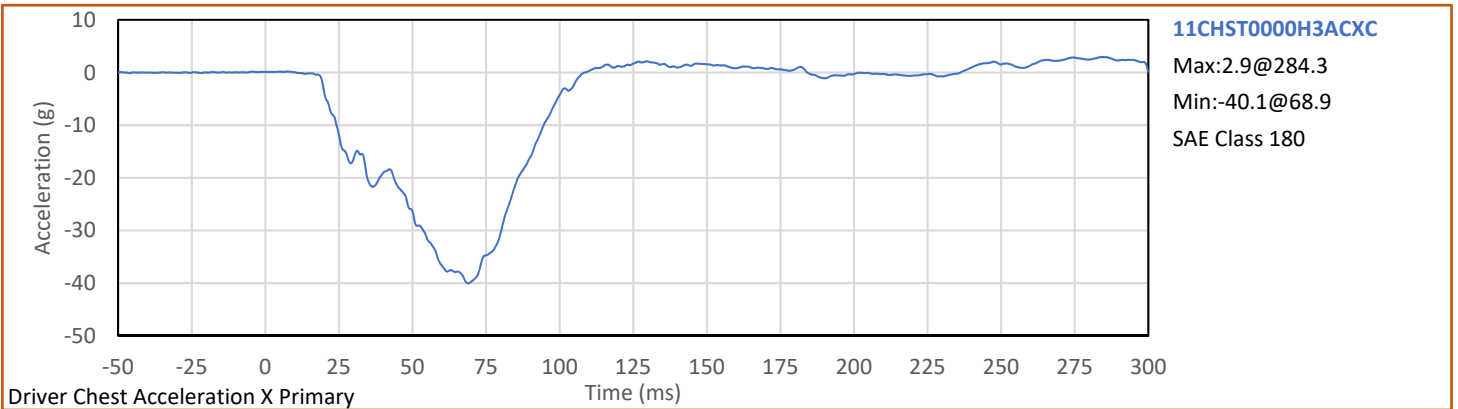


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NHTSA No.: M20205209
Test Date: 5/12/2020

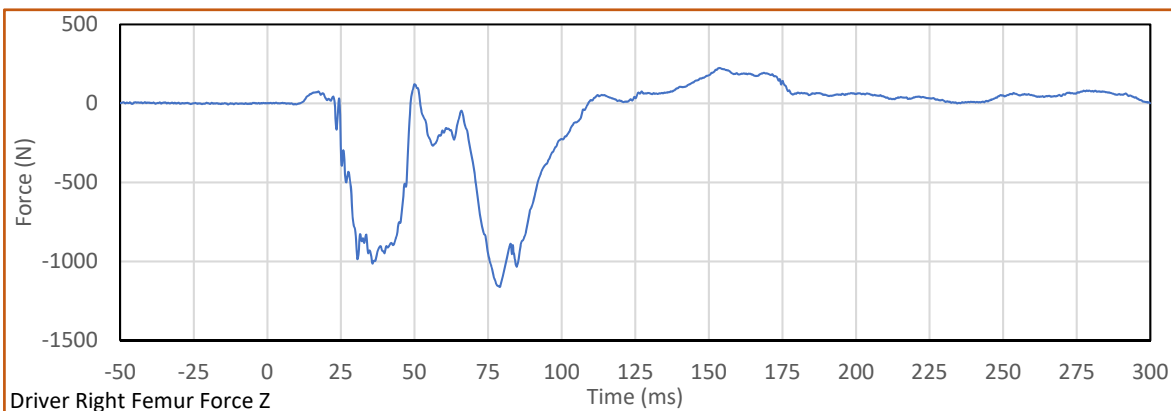
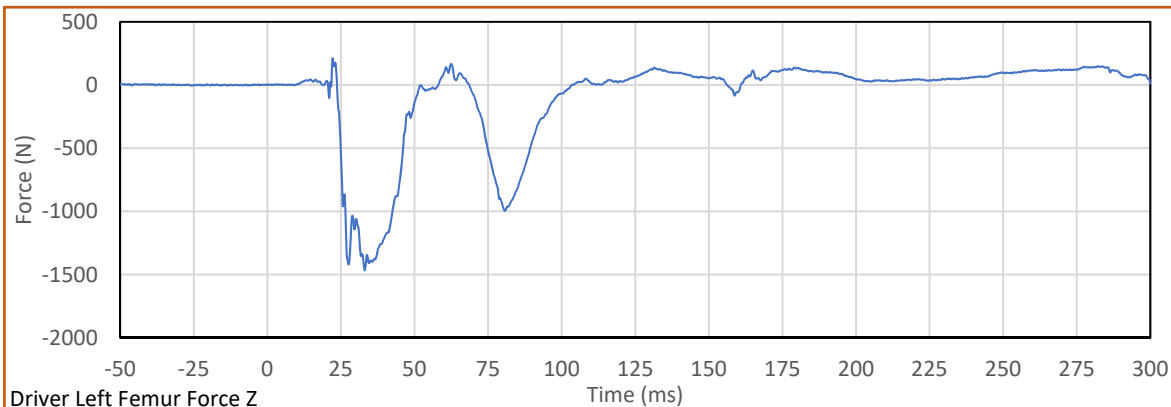






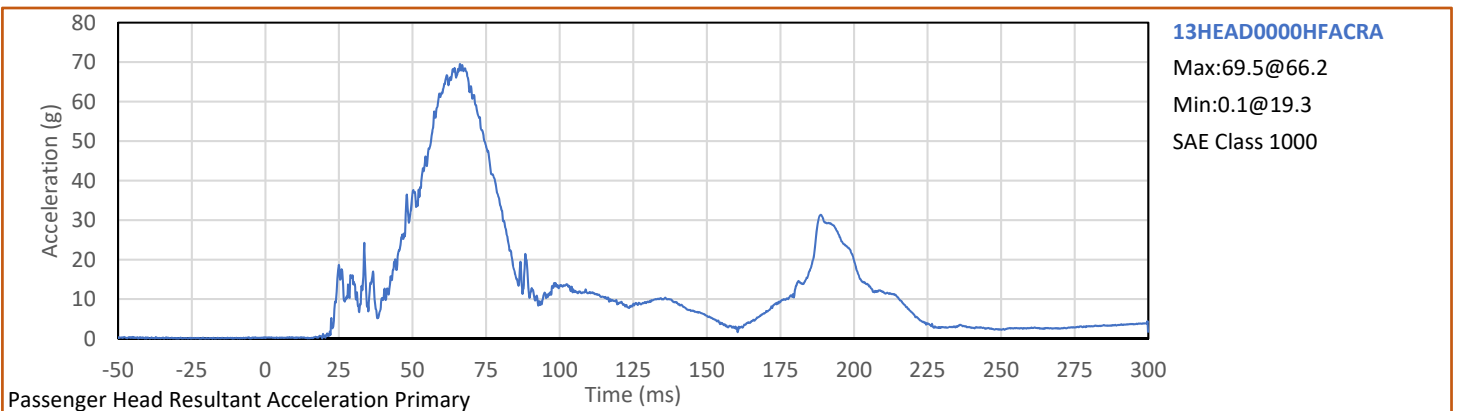
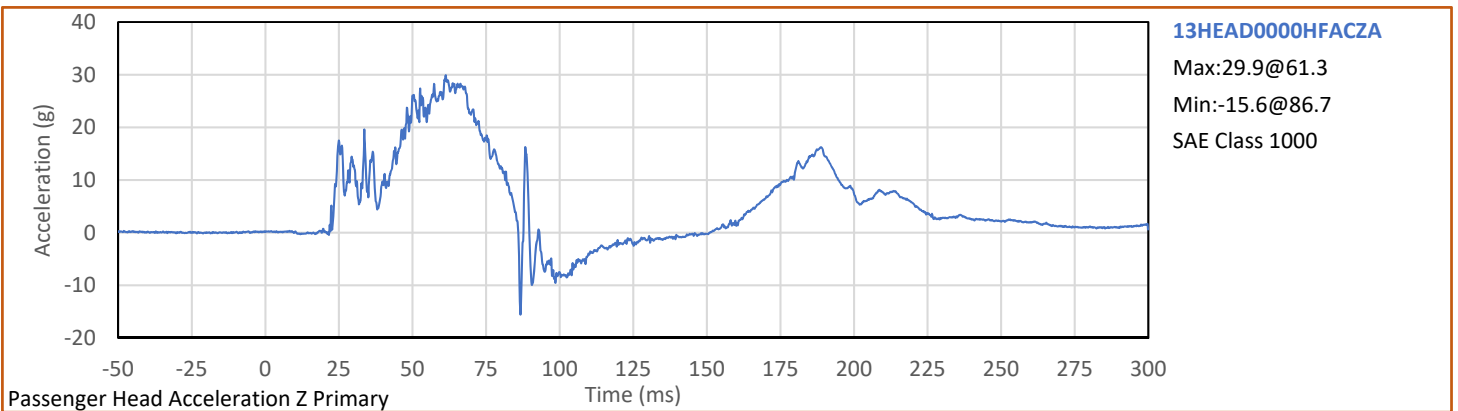
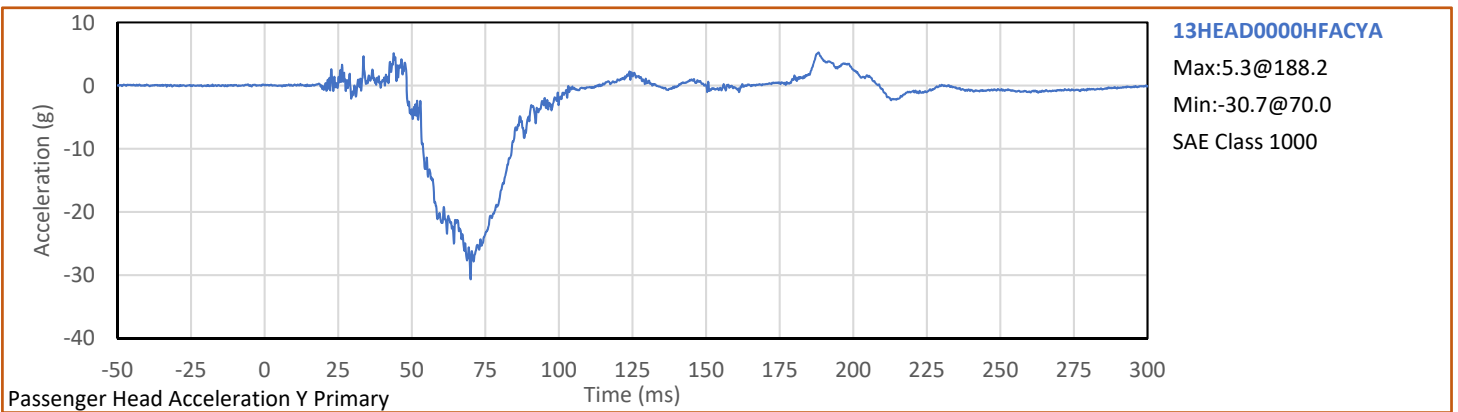
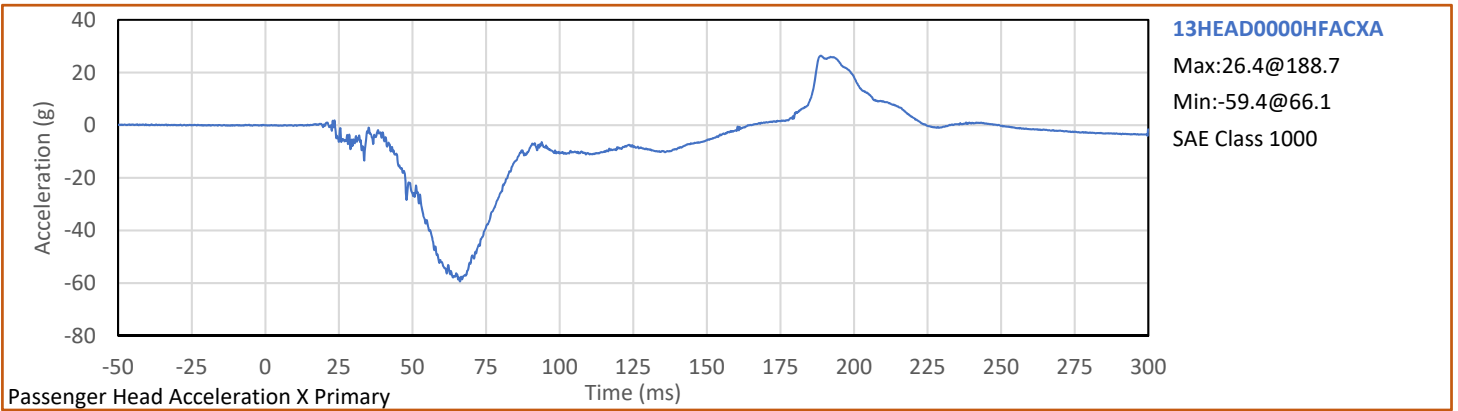
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Test Program: 56.3 km/h Frontal Impact NCAP Test

NHTSA No.: M20205209
Test Date: 5/12/2020



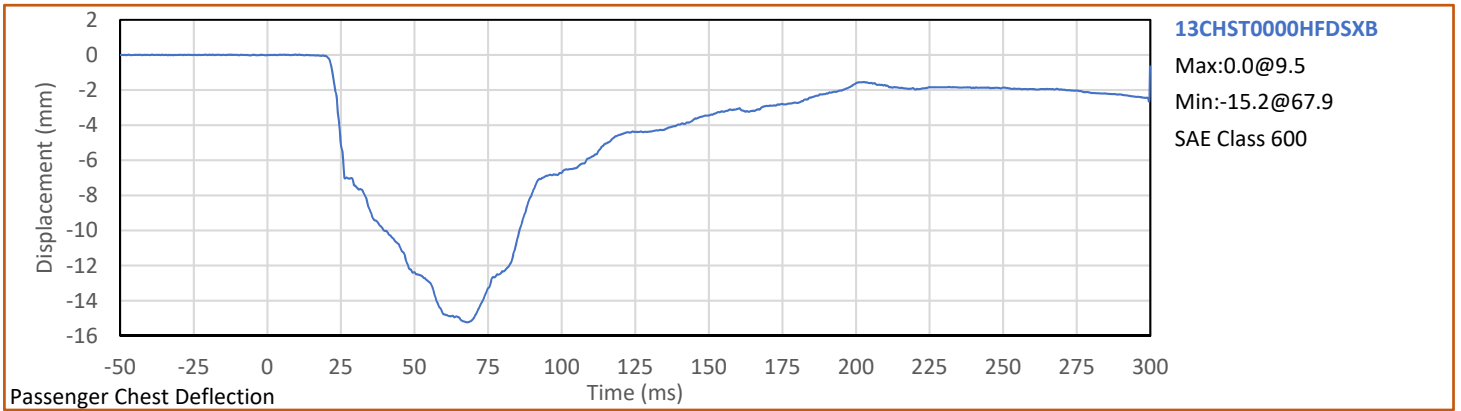
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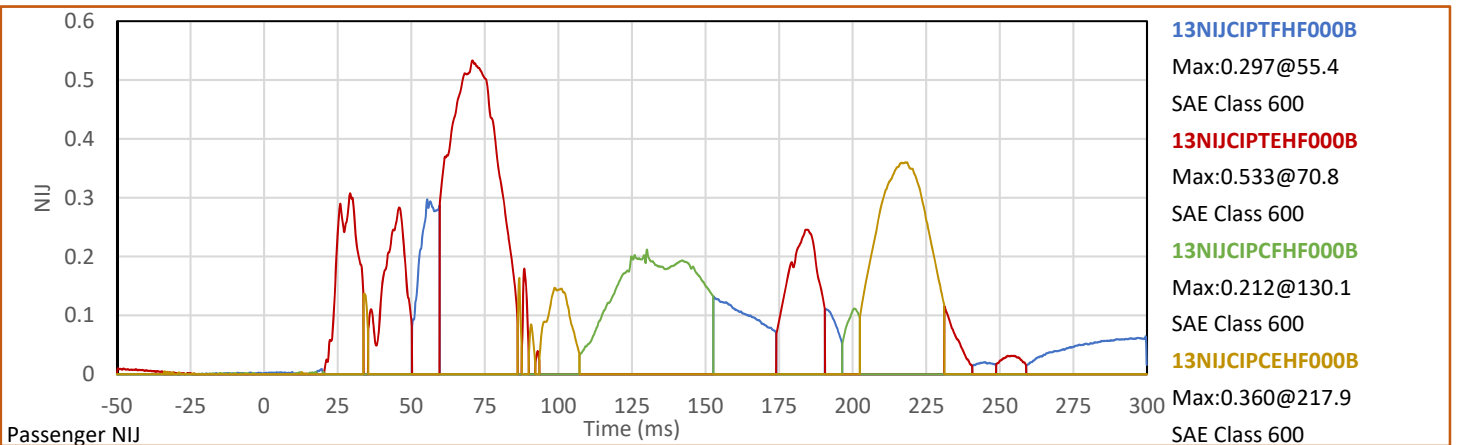
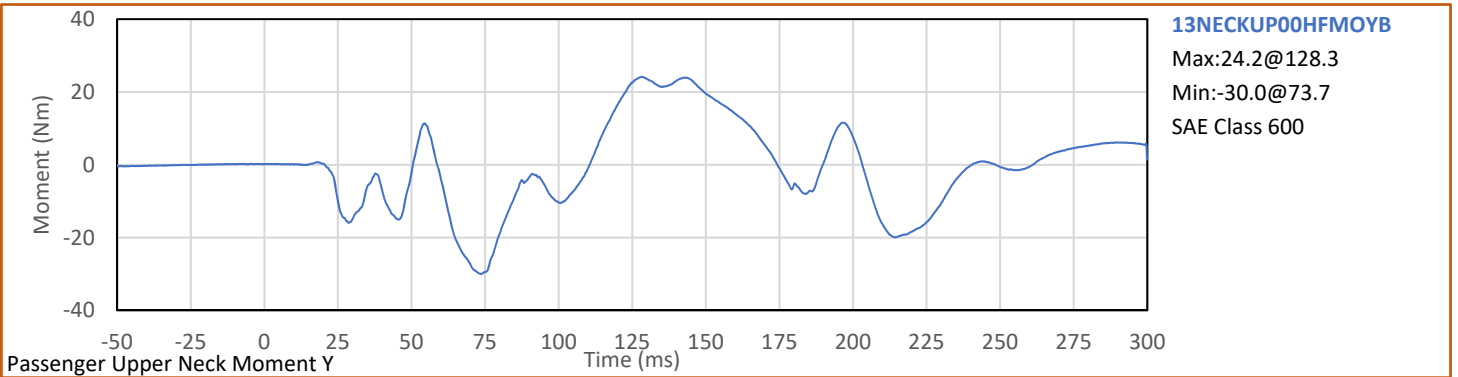
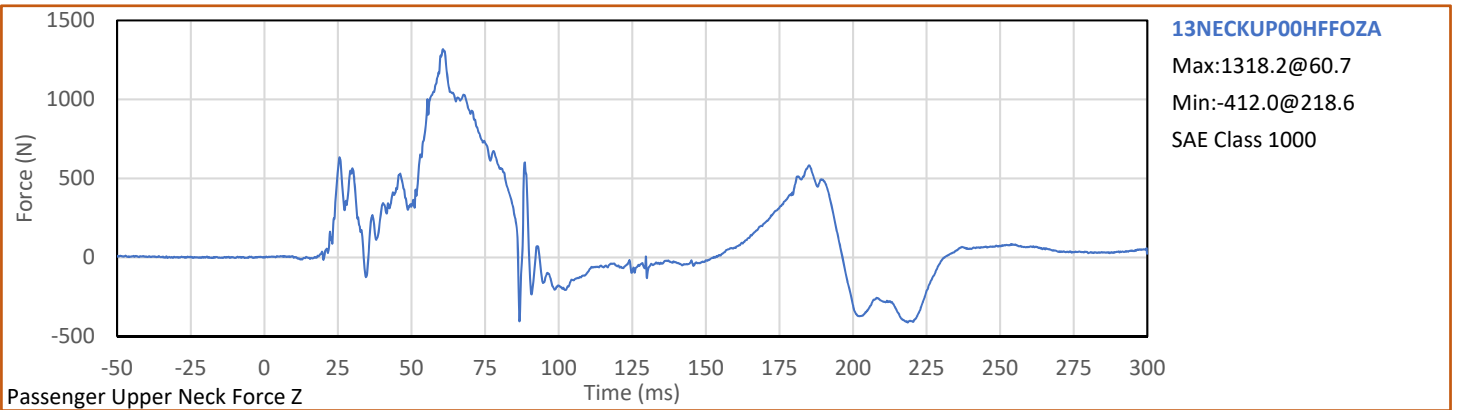
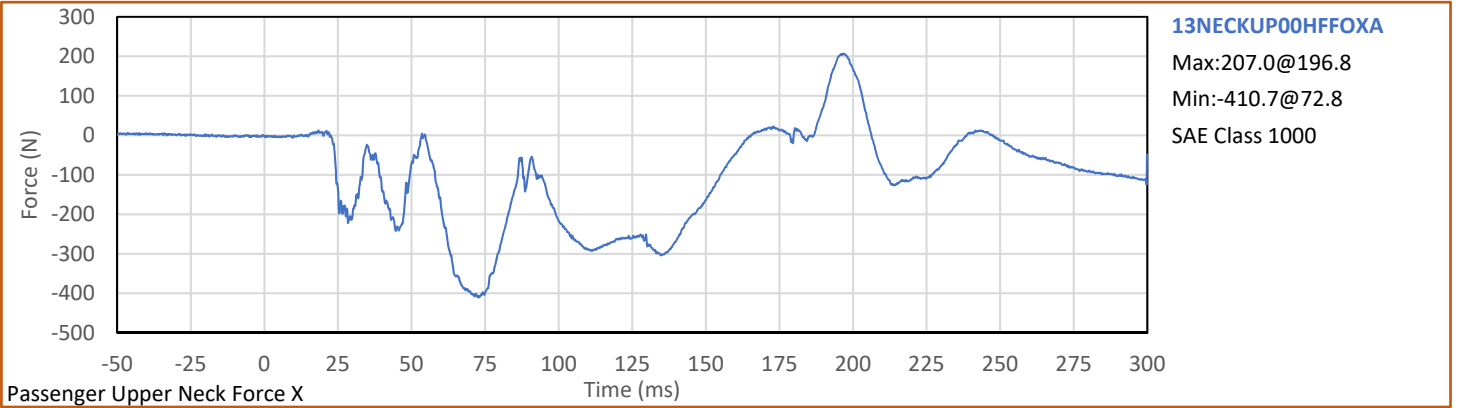
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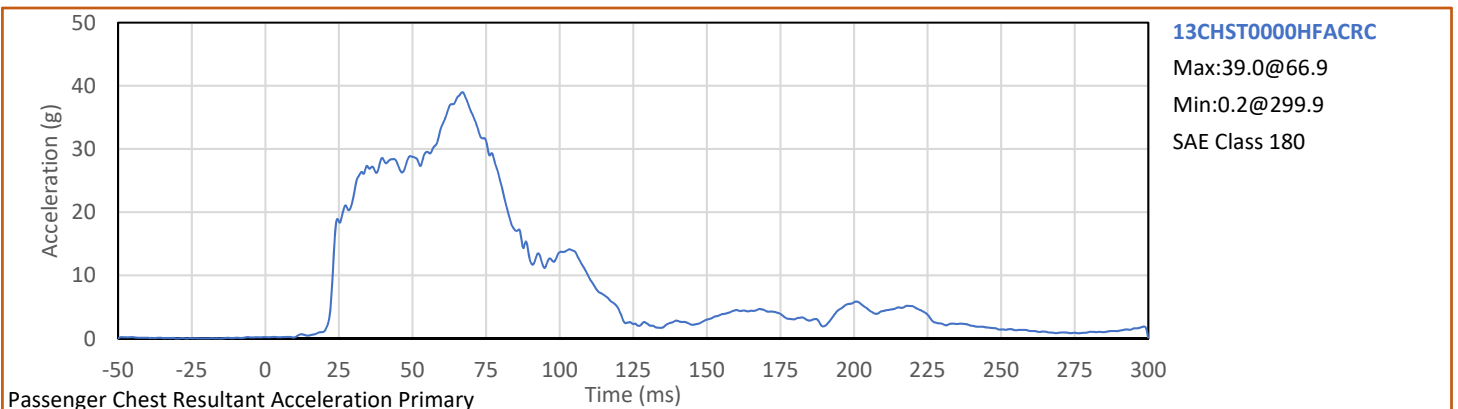
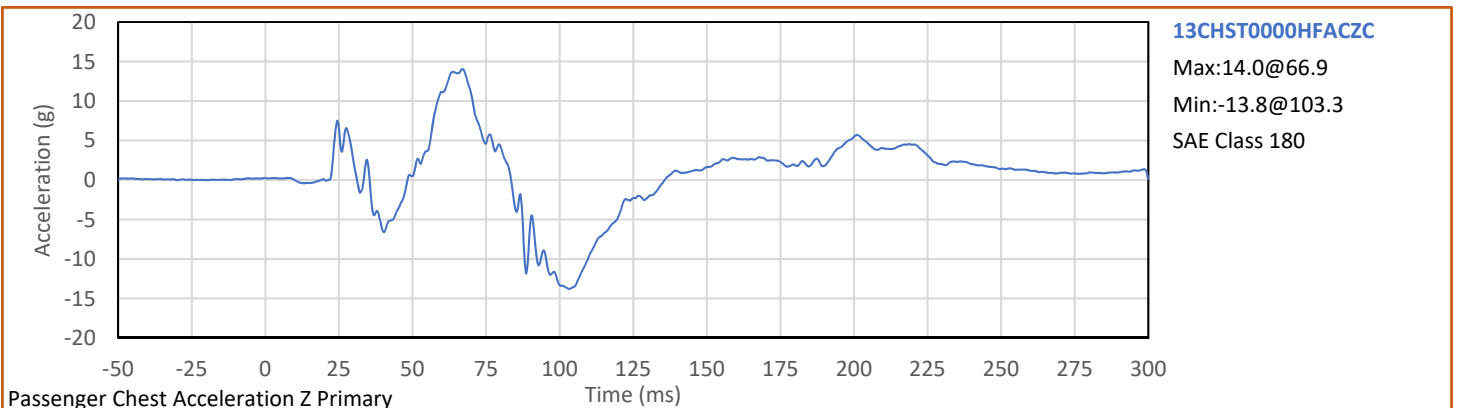
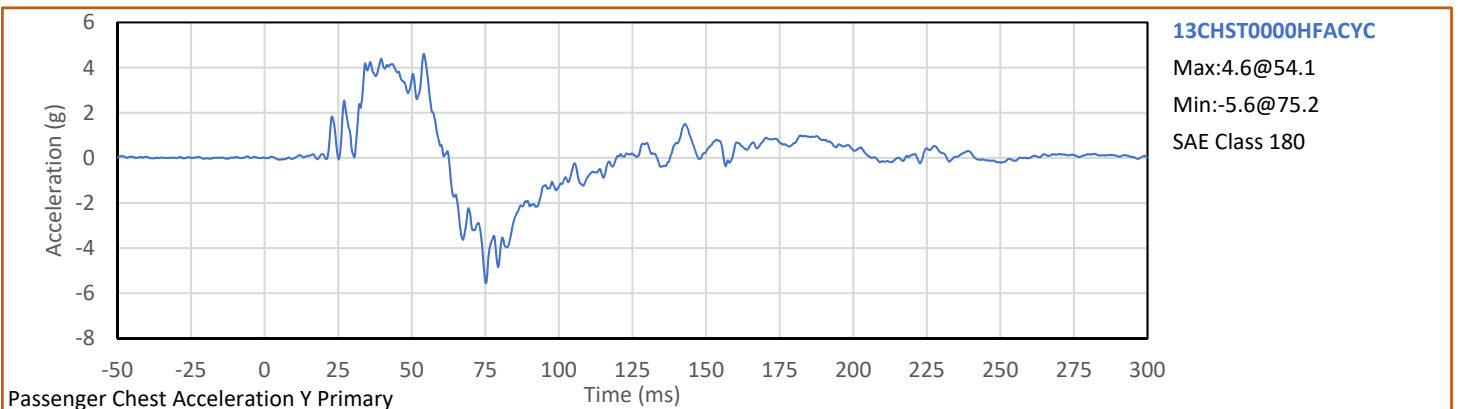
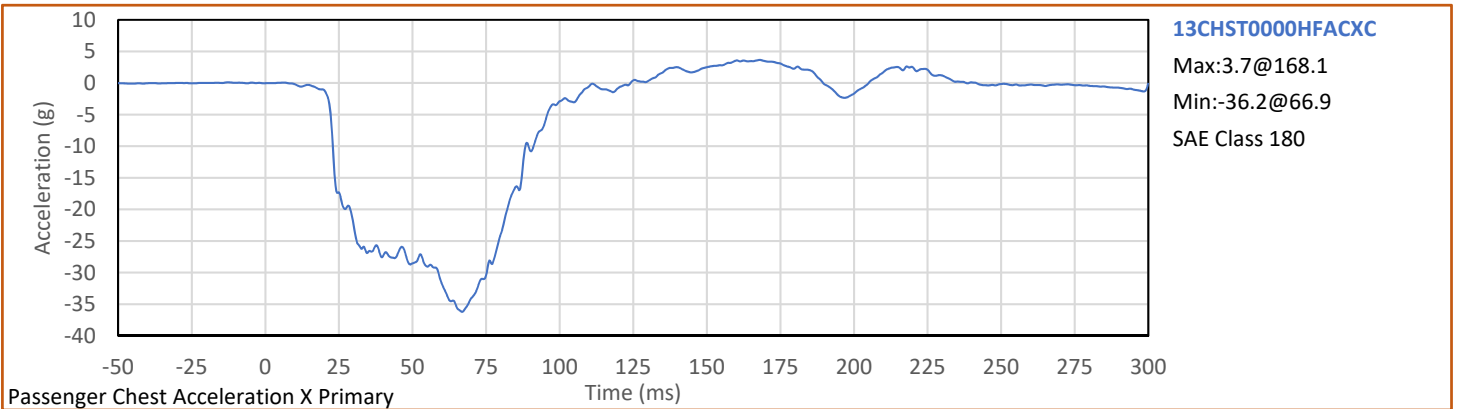
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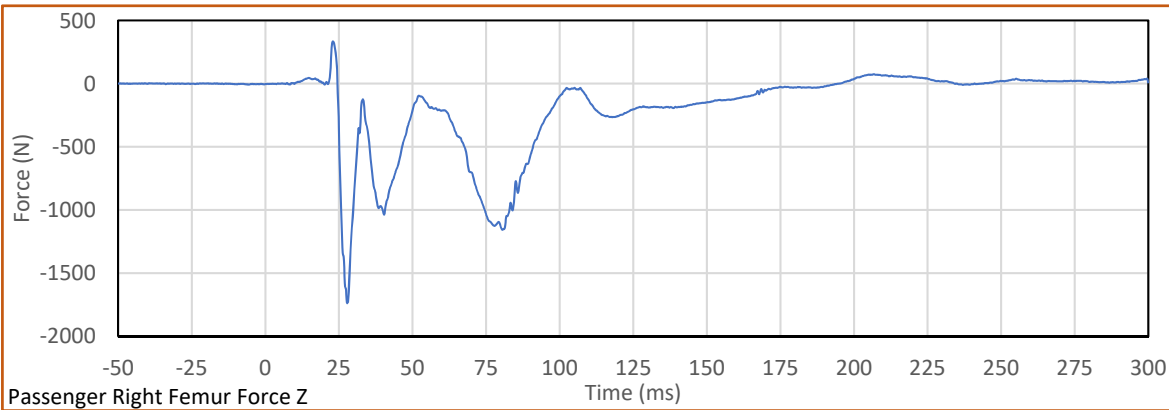
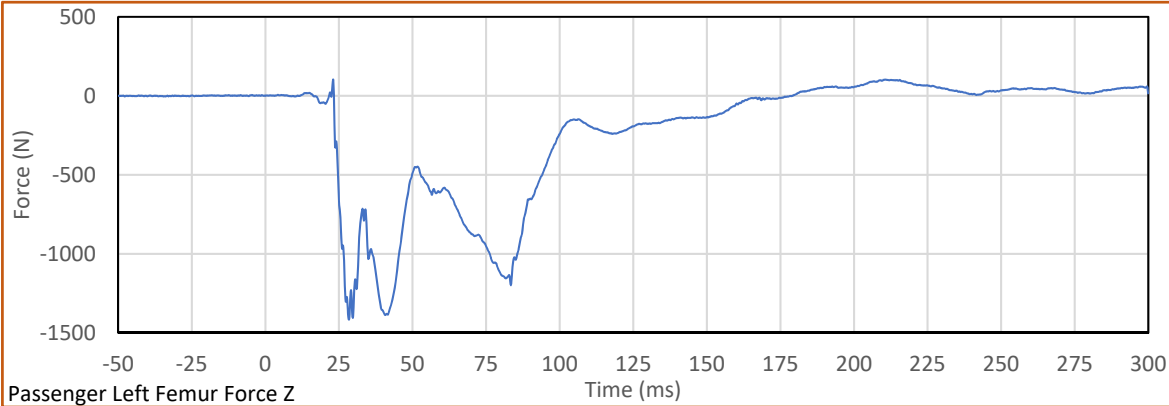
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Test Program: 56.3 km/h Frontal Impact NCAP Test

NHTSA No.: M20205209
Test Date: 5/12/2020



Test Vehicle: 2020 Nissan Sentra 4-Door Sedan
Test Program: 56.3 km/h Frontal Impact NCAP Test

NHTSA No.: M20205209
Test Date: 5/12/2020



APPENDIX C
DUMMY QUALIFICATION AND PERFORMANCE VERIFICATION

APPENDIX C
Pre-Test ATD Qualification and Performance Verification
Hybrid III 50th Percentile Male ATD
S/N: 360

ATD Serial No.: 360

Test Date: 2020-05-07

Dummy Item	Inspect for	Comments	Damage	OK
Entire ATD	Perform general cleaning			✓
Outer Skin	Gashes, rips, cracks			✓
Head	Ballast secure			✓
	General appearance			✓
Neck bracket	Upper neck firmly attached to lower bracket			✓
Neck	Broken or cracked rubber			✓
	Looseness at the condyle joint			✓
Nodding block	Cracked or out of position			✓
Lumbar Spine	Broken or cracked rubber			✓
Ribs	Broken or bent ribs			✓
	Broken or bent rib supports			✓
	Damping material separated or cracked			✓
	Rubber bumpers in place			✓
Chest Displ. Assembly	Bent shaft			✓
	Slider arm riding in track			✓
Sensors	Check cables for cuts, tears			✓
	Check for damaged insulation			✓
Accelerometer Mounting	Head mounting secure			✓
	Chest mounting secure			✓
Knees	Skin condition			✓
	Insert (do not remove)			✓
	Casting			✓
Limbs	Normal movement and adjustment			✓
Knee Sliders	Wires intact			✓
	Rubber returned to "resting" position			✓
Pelvis	Broken			✓
Other	Describe below as needed			✓

Describe any repairs or replacement of parts or other findings:

No Problems Found

Technician: _____



J. Hernandez

Approved By: _____



P. Puzzuto

ATD Serial No.: 360

Test Date: 2020-05-07

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Relative Humidity	%	10	70	26	Pass
A - Total sitting height	mm	879	889	885	Pass
B - Shoulder pivot height	mm	505	521	518	Pass
C - 'H' point height	mm	84	89	88	Pass
D - 'H' point location from backline	mm	135	140	137	Pass
E - Shoulder pivot from backline	mm	84	94	89	Pass
F - Thigh clearance	mm	140	155	152	Pass
G - Back of elbow to wrist pivot	mm	290	305	297	Pass
H - Head back to backline	mm	41	46	44	Pass
I - Shoulder to elbow length	mm	330	345	337	Pass
J - Elbow rest height	mm	190	211	200	Pass
K - Buttock to knee length	mm	579	604	588	Pass
L - Popliteal length	mm	429	455	441	Pass
M - Knee pivot height	mm	485	500	494	Pass
N - Buttock popliteal length	mm	452	477	461	Pass
O - Chest depth without jacket	mm	213	229	226	Pass
P - Foot length	mm	251	267	258	Pass
V - Shoulder breadth	mm	422	437	430	Pass
W - Foot breadth	mm	91	107	103	Pass
Y - Chest circum. (w/chest jacket)	mm	970	1001	977	Pass
Z - Waist circum.	mm	836	866	846	Pass
AA - Location for chest circum.	mm	429	434	433	Pass
BB - Location for waist circum.	mm	226	231	227	Pass
				Overall Test Results	Pass

Technician:



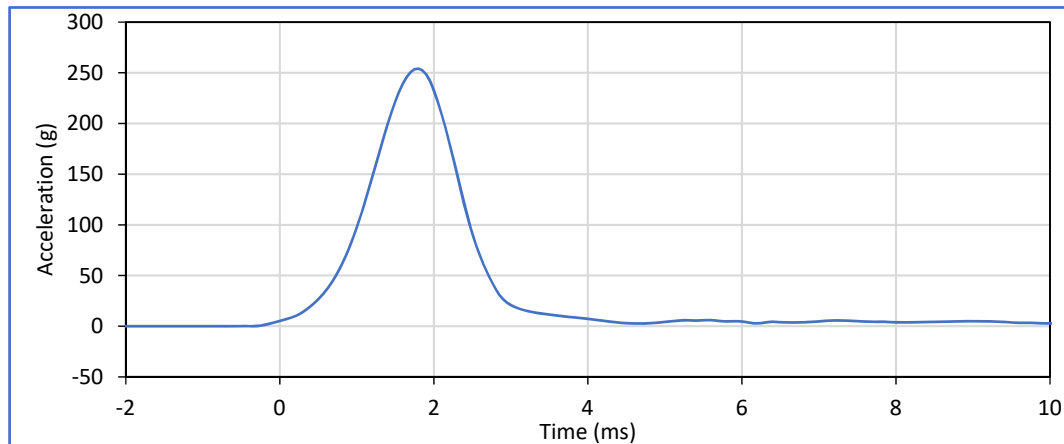
J. Hernandez

Approved By:



P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Relative Humidity	%	10	70	27	Pass
Peak Resultant Acceleration	g	225.0	275.0	254.1	Pass
Peak Lateral Acceleration	g	-15.0	15.0	-4.7	Pass
Oscillations After Main Pulse	%	0.0	10.0	2.3	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results		Pass

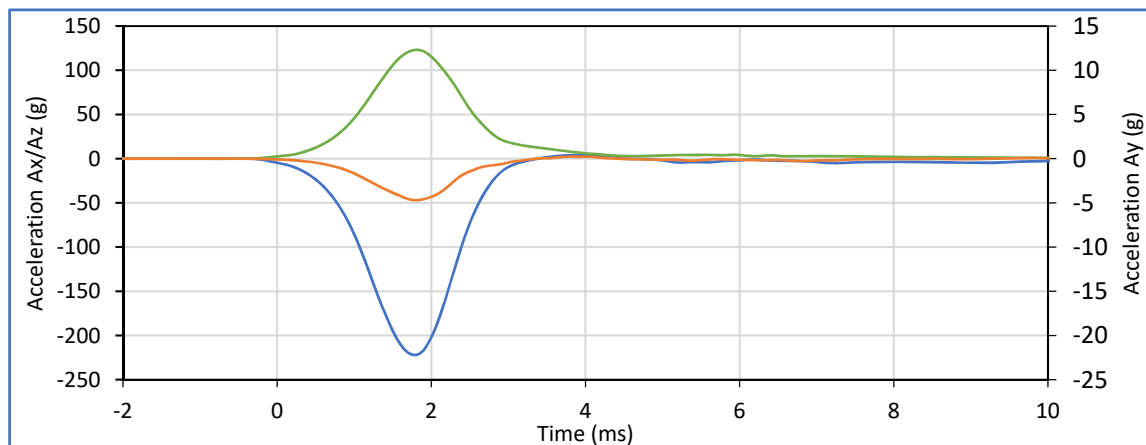


Head Resultant

Max:254.1@1.8

Min:2.7@4.7

SAE Class 1000



Head Ax

Max:3.9@4.0

Min:-222.2@1.8

SAE Class 1000

Head Ay

Max:0.2@3.8

Min:-4.7@1.8

SAE Class 1000

Head Az

Max:123.3@1.8

Min:0.9@10.0

SAE Class 1000

Technician:

J. Hernandez

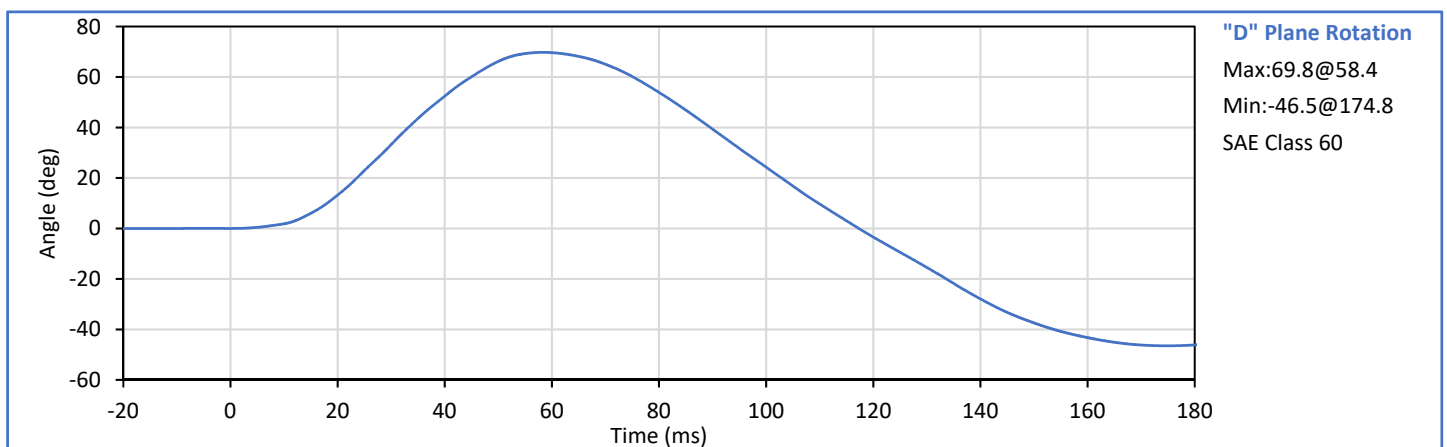
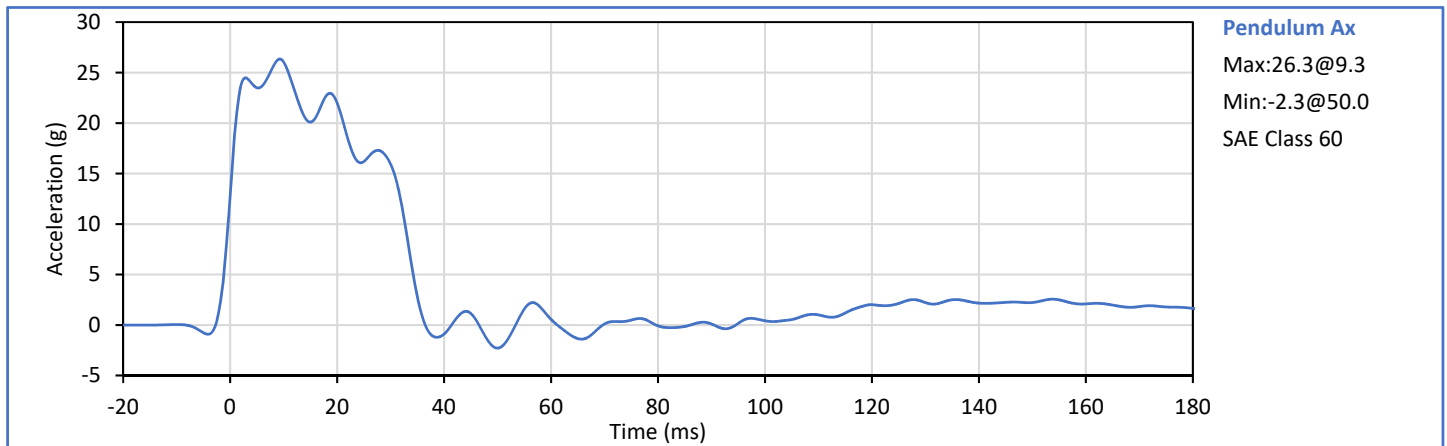
J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	26	Pass
Pendulum Velocity	m/s	6.89	7.13	7.03	Pass
Pendulum Deceleration at 10 ms	g	22.5	27.5	26.0	Pass
Pendulum Deceleration at 20 ms	g	17.6	22.6	22.0	Pass
Pendulum Deceleration at 30 ms	g	12.5	18.5	15.9	Pass
Peak Pendulum Decel. after 30 ms	g	0.0	29.0	15.9	Pass
Deceleration Decay to Cross 5 g	ms	34.0	42.0	34.2	Pass
"D" Plane Rotation peak	deg	64.0	78.0	69.8	Pass
	ms	57.0	64.0	58.4	Pass
"D" Plane Rotation Decay To Zero	ms	113.0	128.0	117.4	Pass
Moment About Occipital Condyle	Nm	88.1	108.5	89.4	Pass
	ms	47.0	58.0	53.2	Pass
Moment Decay, Peak to Zero	ms	97.0	107.0	97.8	Pass
Overall Test Results				Pass	



Technician:

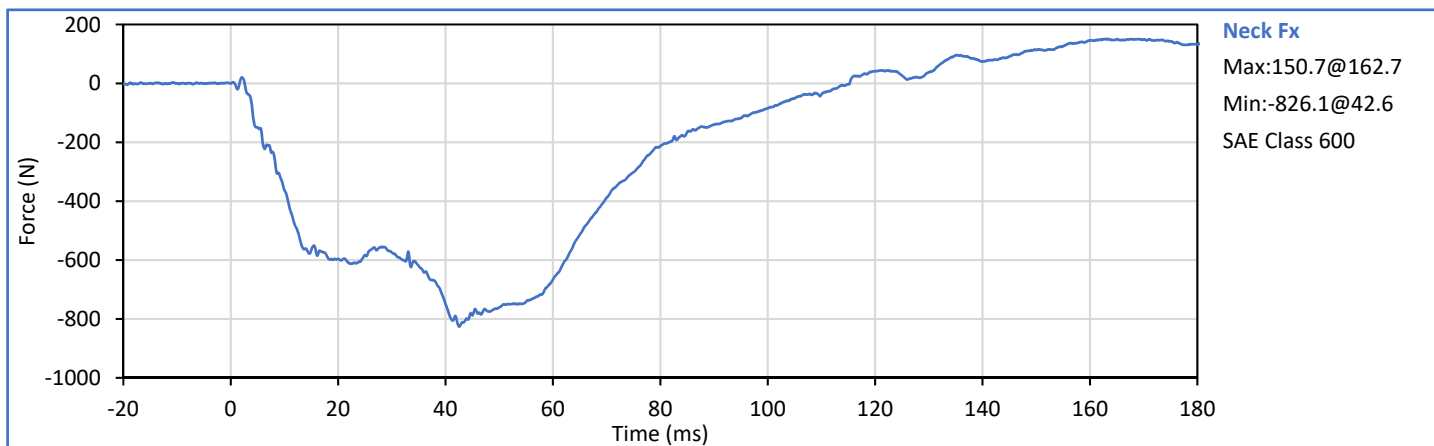
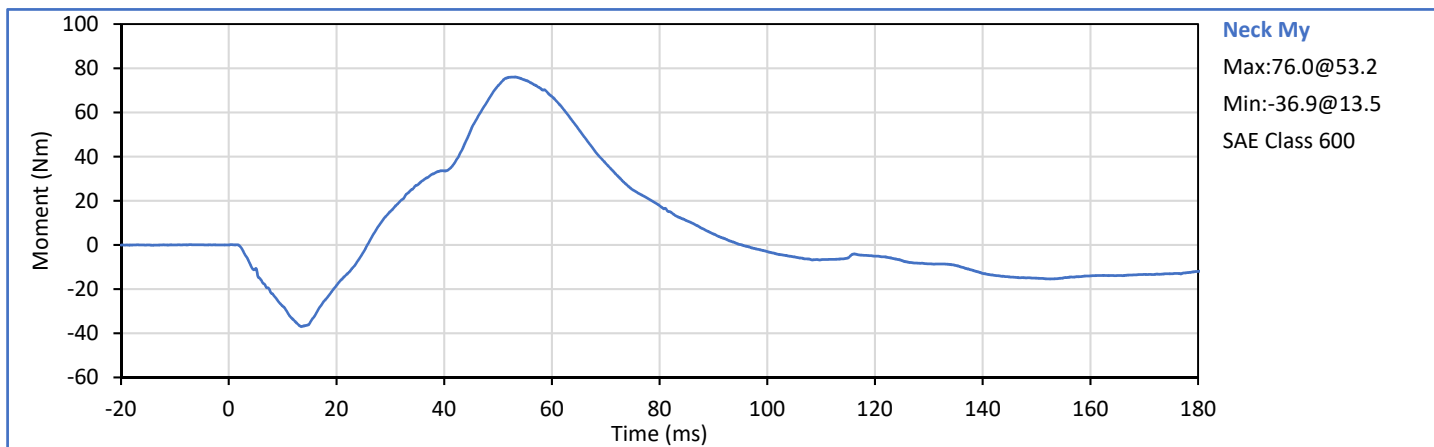
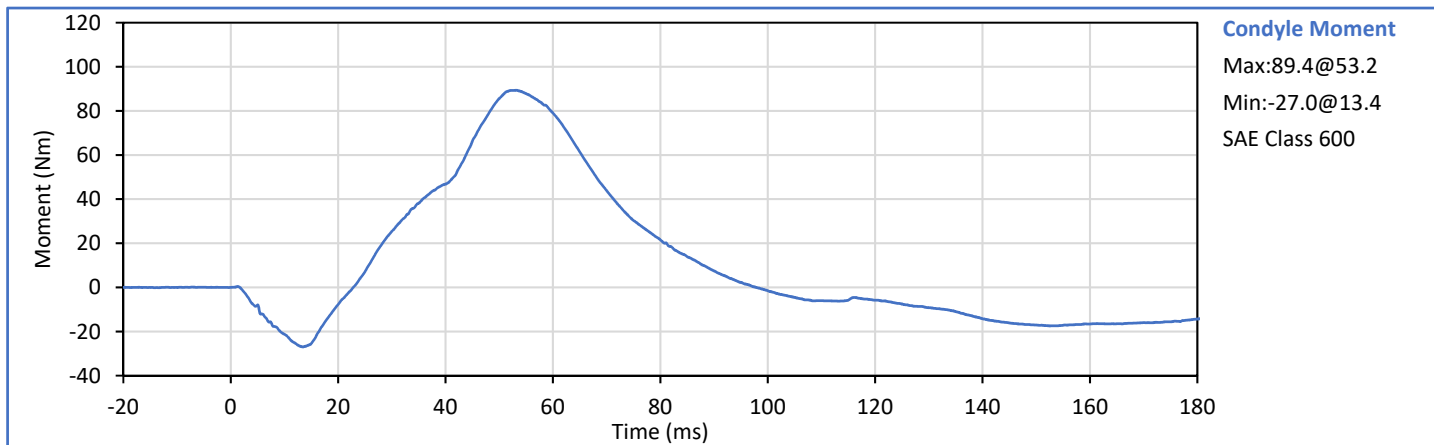
J. Hernandez

J. Hernandez

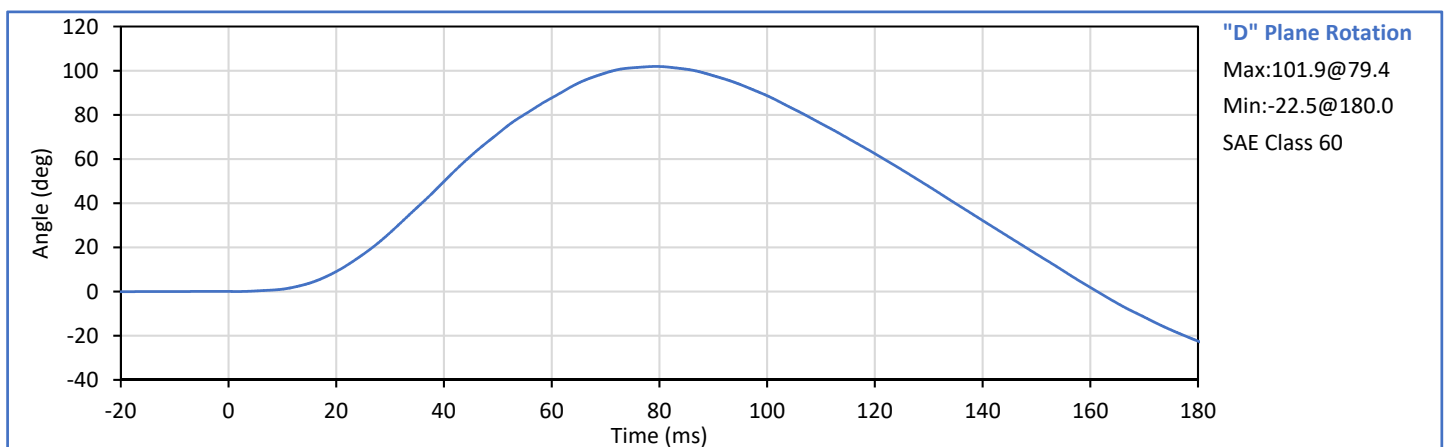
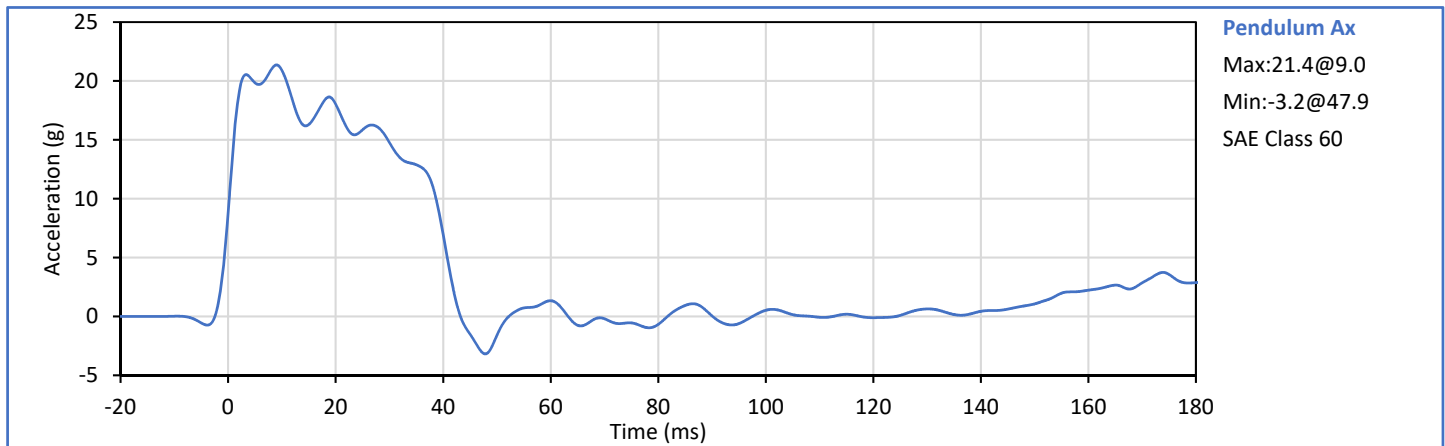
Approved By:

P. Puzzuto

P. Puzzuto



Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	26	Pass
Pendulum Velocity	m/s	5.94	6.19	5.98	Pass
Pendulum Deceleration at 10 ms	g	17.2	21.2	20.9	Pass
Pendulum Deceleration at 20 ms	g	14.0	19.0	18.0	Pass
Pendulum Deceleration at 30 ms	g	11.0	16.0	14.8	Pass
Peak Pendulum Decel. after 30 ms	g	0.0	22.0	14.8	Pass
Deceleration Decay to Cross 5 g	ms	38.0	46.0	40.8	Pass
"D" Plane Rotation peak	deg	81.0	106.0	101.9	Pass
	ms	72.0	82.0	79.4	Pass
"D" Plane Rotation Decay To Zero	ms	147.0	174.0	161.4	Pass
Moment About Occipital Condyle	Nm	-79.9	-52.9	-75.0	Pass
	ms	65.0	79.0	65.9	Pass
Moment Decay, Peak to Zero	ms	120.0	148.0	132.8	Pass
Overall Test Results				Pass	



Technician:

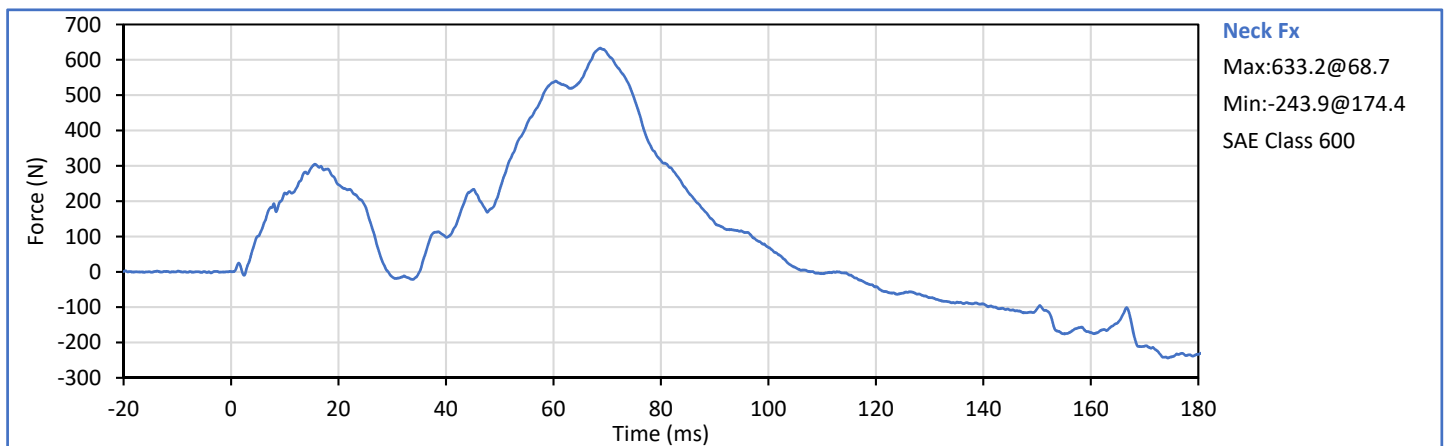
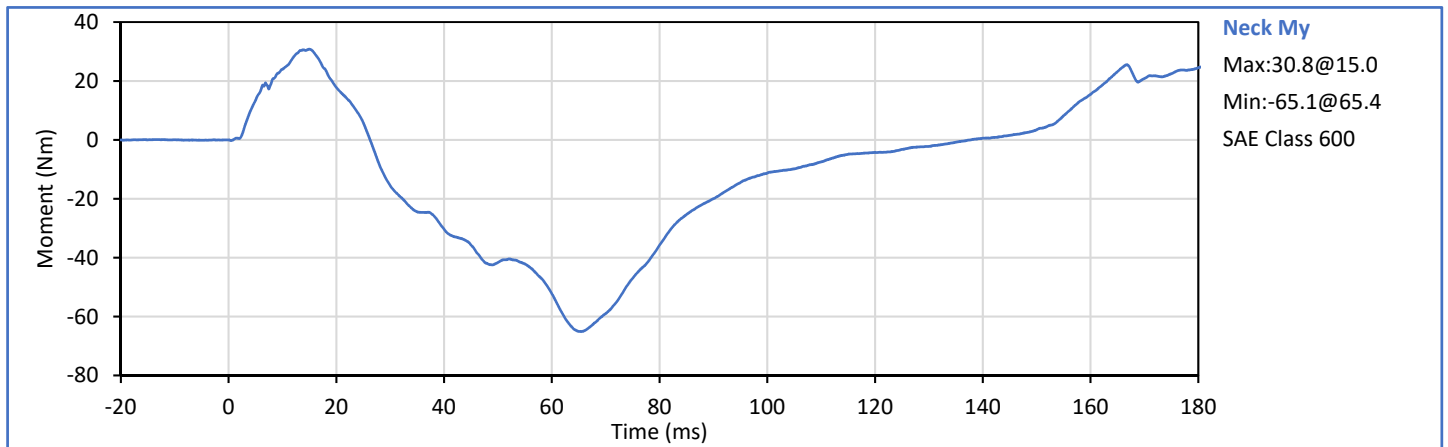
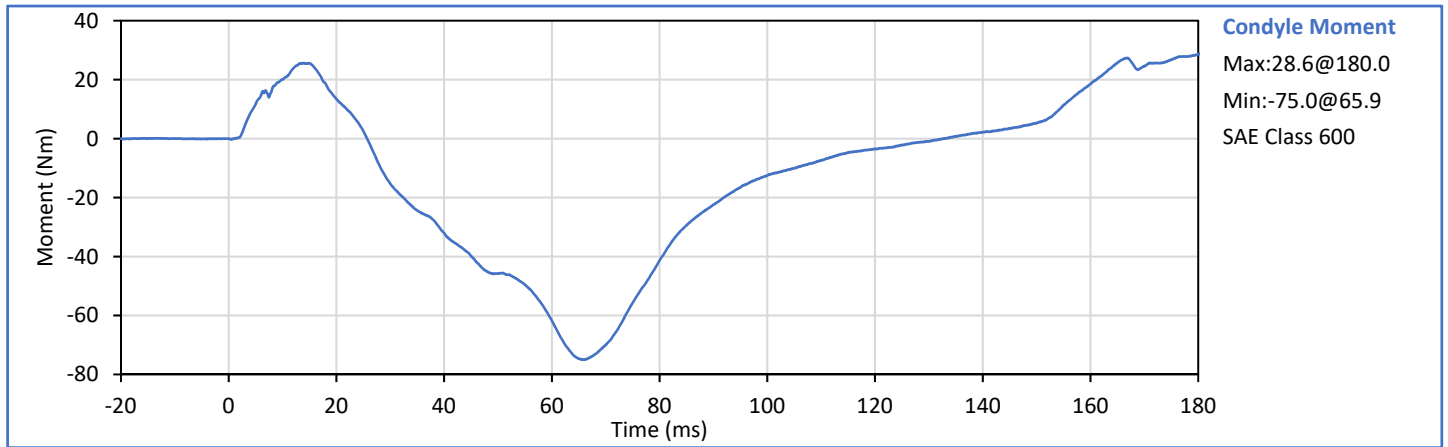
J. Hernandez

J. Hernandez

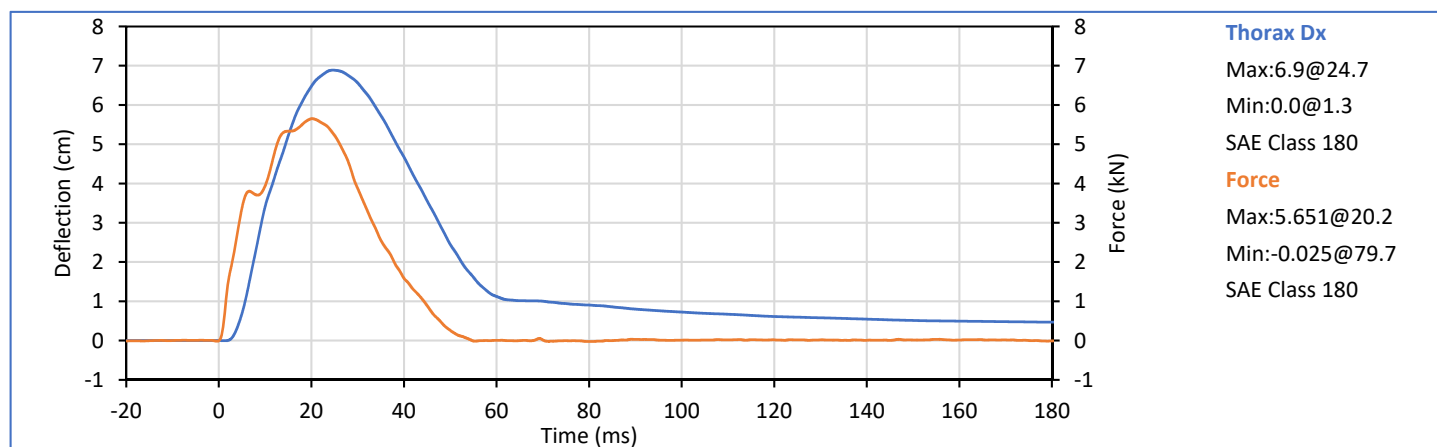
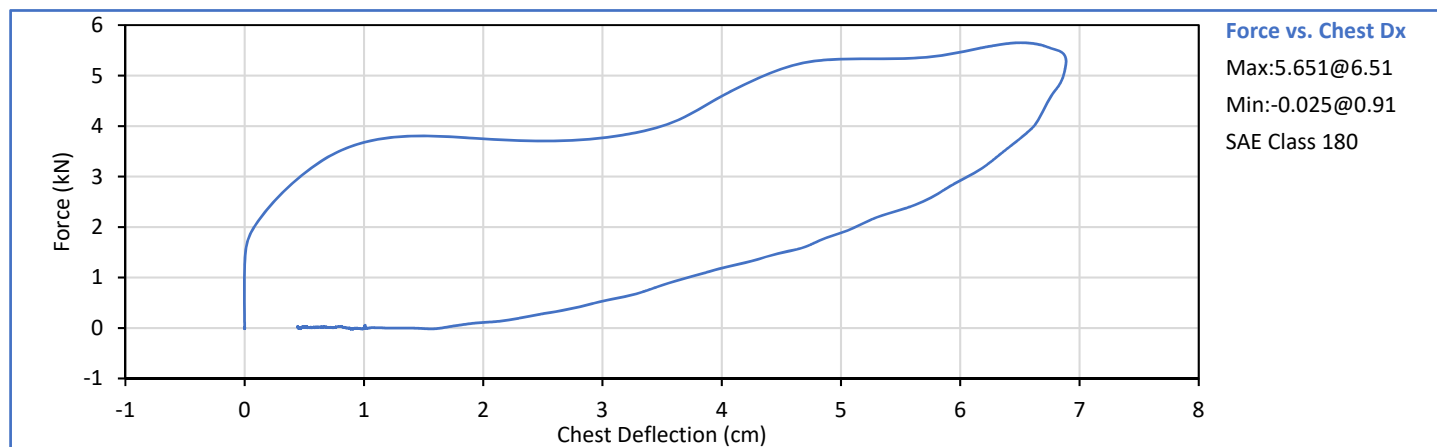
Approved By:

P. Puzzuto

P. Puzzuto



Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	22	Pass
Probe Velocity	m/s	6.58	6.82	6.79	Pass
Peak Chest Deflection	cm	6.35	7.26	6.89	Pass
Peak Probe Force	kN	5.159	5.893	5.651	Pass
Internal Hysteresis	%	69.0	85.0	72.0	Pass
Overall Test Results				Pass	Pass



Technician:

J. Hernandez

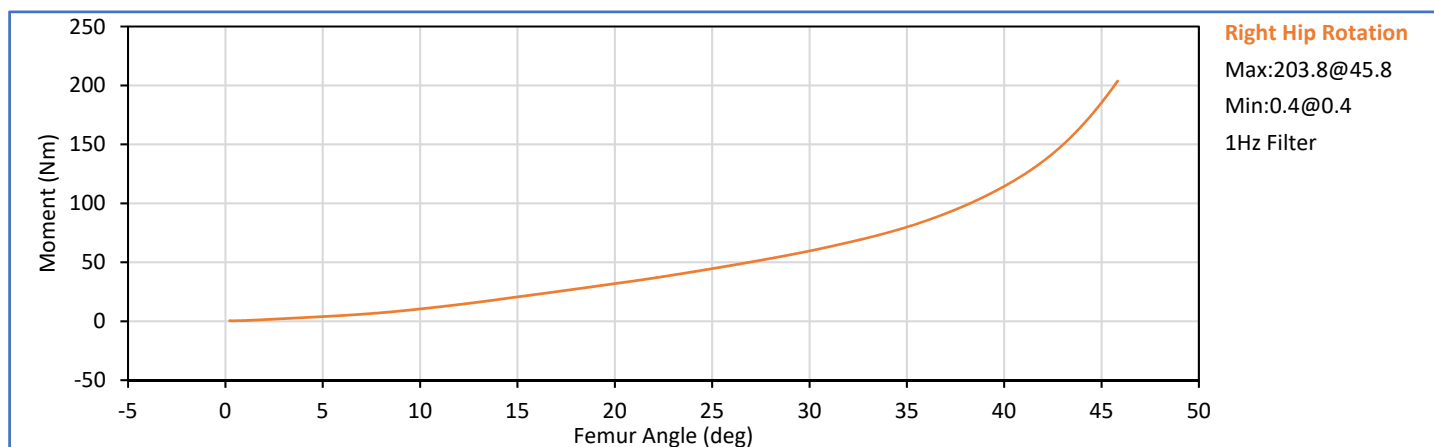
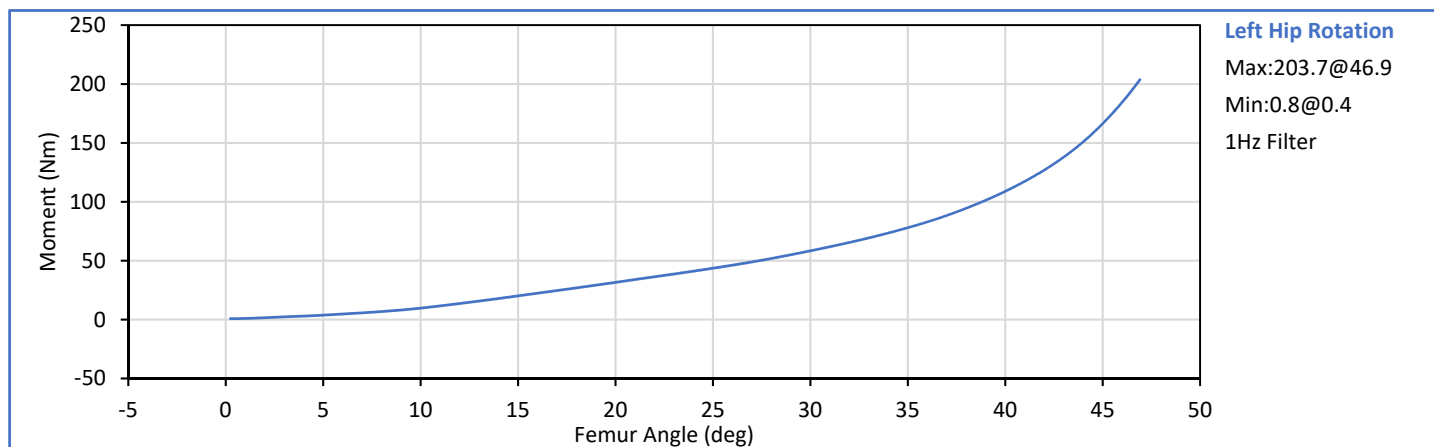
J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

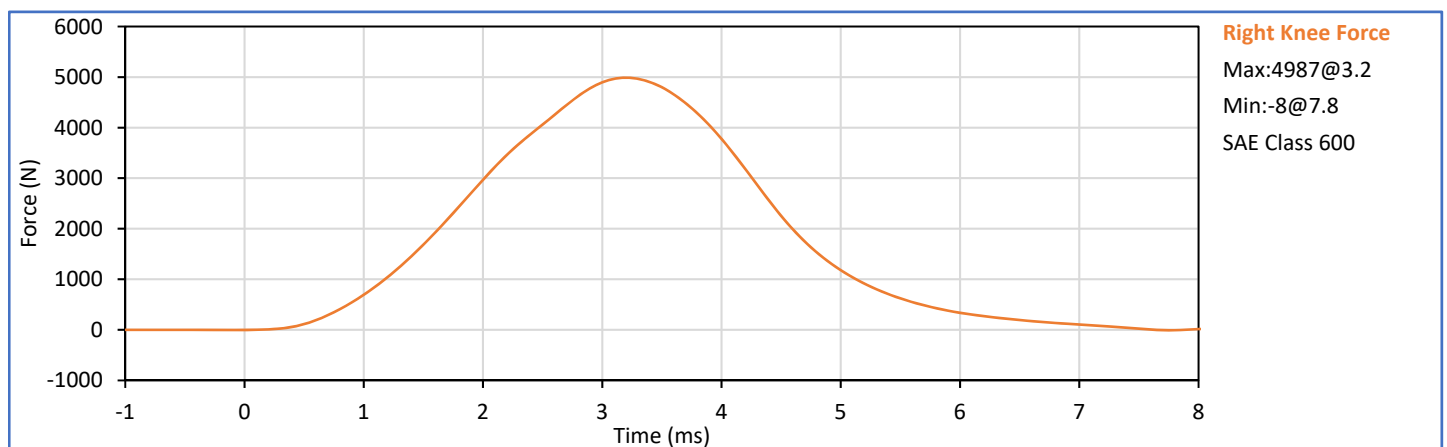
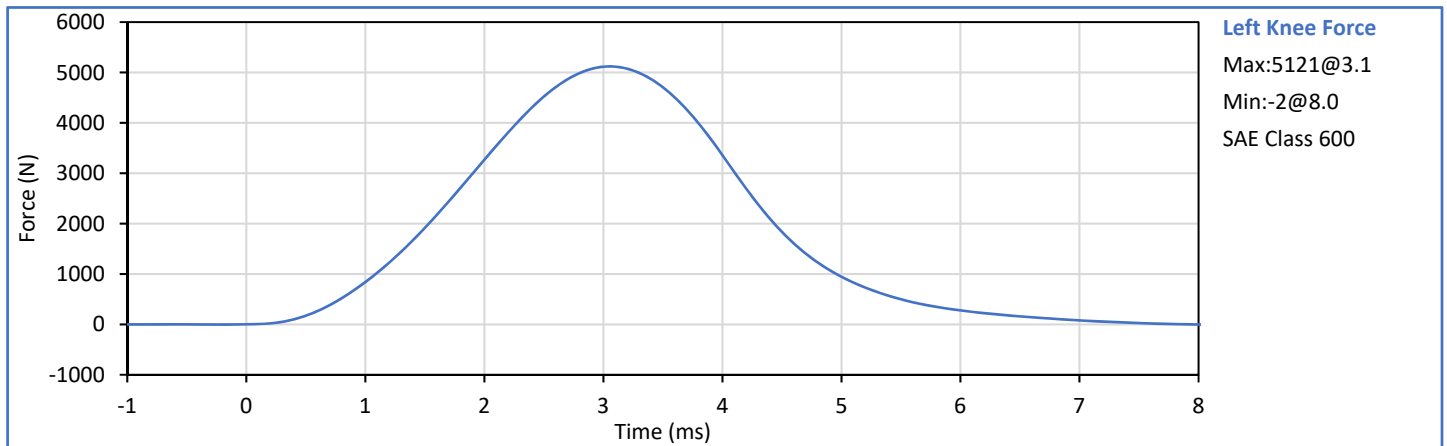
Tested Parameter		Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature		°C	18.9	25.6	21.1	Pass
Laboratory Relative Humidity		%	10	70	33	Pass
Left Hip	Left Hip Rotation Rate	deg/s	5.0	10.0	6.2	Pass
	Left Femur Torque at 30°	Nm	0.0	95.0	58.4	Pass
	Left Hip Rotation at 203 Nm	deg	40.0	50.0	46.9	Pass
Right Hip	Right Hip Rotation Rate	deg/s	5.0	10.0	6.2	Pass
	Right Femur Torque at 30°	Nm	0.0	95.0	59.7	Pass
	Right Hip Rotation at 203 Nm	deg	40.0	50.0	45.8	Pass
Overall Test Results						Pass



Technician: J. Hernandez

Approved By: P. Puzzuto

	Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
	Laboratory Temperature	°C	18.9	25.6	21.1	Pass
	Laboratory Relative Humidity	%	10	70	31	Pass
Left	Probe Velocity	m/s	2.070	2.130	2.125	Pass
Knee	Peak Resistive Force	N	4715	5782	5121	Pass
Right	Probe Velocity	m/s	2.070	2.130	2.127	Pass
Knee	Peak Resistive Force	N	4715	5782	4987	Pass
Overall Test Results					Pass	



Technician: J. Hernandez

Approved By: P. Puzzuto

APPENDIX C
Pre-Test ATD Qualification and Performance Verification
Hybrid III 5th Percentile Female ATD
S/N: DH1644

ATD Serial No.: DH1644

Test Date: 2019-05-05

Dummy Item	Inspect for	Comments	Damage	Okay
Entire ATD	Perform general cleaning			✓
Outer Skin	Gashes, rips, cracks			✓
Head	Ballast secure			✓
	General appearance			✓
Neck bracket	Upper neck firmly attached to lower bracket			✓
Neck	Broken or cracked rubber			✓
	Looseness at the condyle joint			✓
Nodding block	Cracked or out of position			✓
Lumbar Spine	Broken or cracked rubber			✓
Ribs	Broken or bent ribs			✓
	Broken or bent rib supports			✓
	Damping material separated or cracked			✓
	Rubber bumpers in place			✓
Chest Displ. Assembly	Bent shaft			✓
	Slider arm riding in track			✓
Sensors	Check cables for cuts, tears			✓
	Check for damaged insulation			✓
Accelerometer Mounting	Head mounting secure			✓
	Chest mounting secure			✓
Knees	Skin condition			✓
	Insert (do not remove)			✓
	Casting			✓
Limbs	Normal movement and adjustment			✓
Knee Sliders	Wires intact			✓
	Rubber returned to "resting" position			✓
Pelvis	Broken			✓
Other	Describe below as needed			✓

Describe any repairs or replacement of parts or other findings:

No Problems Found

Technician: _____



J. Hernandez

Approved By: _____



P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	26	Pass
A - Total sitting height	mm	775	800	792	Pass
B - Shoulder pivot height	mm	432	457	453	Pass
C - 'H' point height	mm	81	86	84	Pass
D - 'H' point location from backline	mm	145	150	148	Pass
E - Shoulder pivot from backline	mm	69	84	79	Pass
F - Thigh clearance	mm	119	135	128	Pass
G - Back of elbow to wrist pivot	mm	244	259	251	Pass
H - Head back to backline	mm	41	46	44	Pass
I - Shoulder to elbow length	mm	277	297	288	Pass
J - Elbow rest height	mm	183	203	193	Pass
K - Buttock to knee length	mm	521	546	535	Pass
L - Popliteal length	mm	356	376	369	Pass
M - Knee pivot height	mm	394	419	405	Pass
N - Buttock popliteal length	mm	414	439	430	Pass
O - Chest depth without jacket	mm	175	191	187	Pass
P - Foot length	mm	219	234	225	Pass
R - Buttock to Knee Pivot Length	mm	457	483	474	Pass
S - Head Breadth	mm	137	147	143	Pass
T - Head Depth	mm	178	188	185	Pass
U - Hip Breadth	mm	300	315	305	Pass
V - Shoulder breadth	mm	351	366	359	Pass
W - Foot breadth	mm	79	94	86	Pass
X - Head circum.	mm	528	549	533	Pass
Y - Chest circum. (w/chest jacket)	mm	851	881	862	Pass
Z - Waist circum.	mm	760	790	776	Pass
AA - Location for chest circum.	mm	333	358	339	Pass
BB - Location for waist circum.	mm	160	170	168	Pass
			Overall Test Results		Pass

Technician:



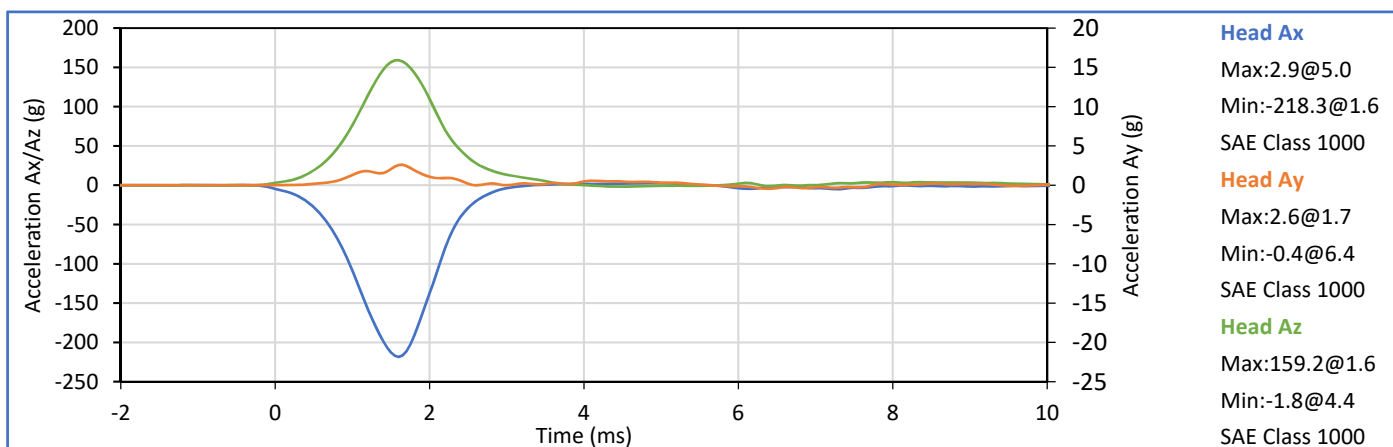
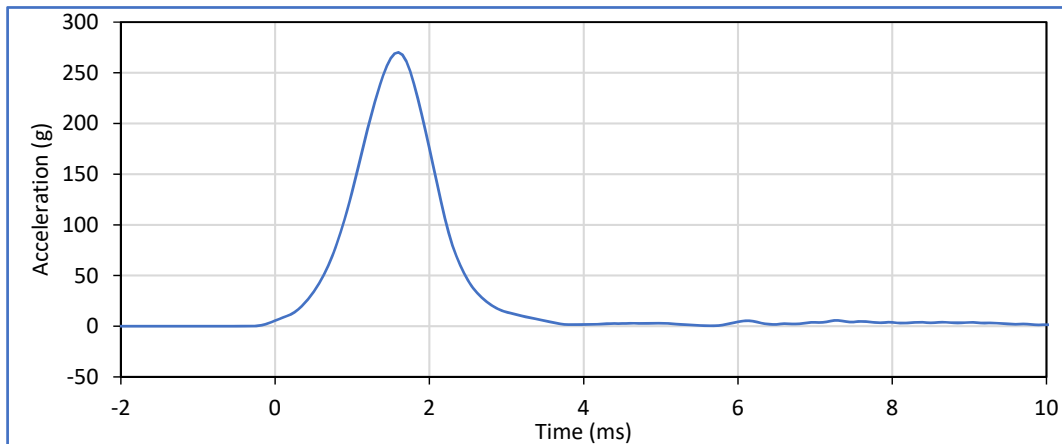
J. Hernandez

Approved By:



P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Humidity	%	10	70	26	Pass
Peak Resultant Acceleration	g	250.0	300.0	270.2	Pass
Peak Lateral Acceleration	g	-15.0	15.0	2.6	Pass
Oscillations After Main Pulse	%	0.0	10.0	2.1	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results	Pass	



Technician:

J. Hernandez

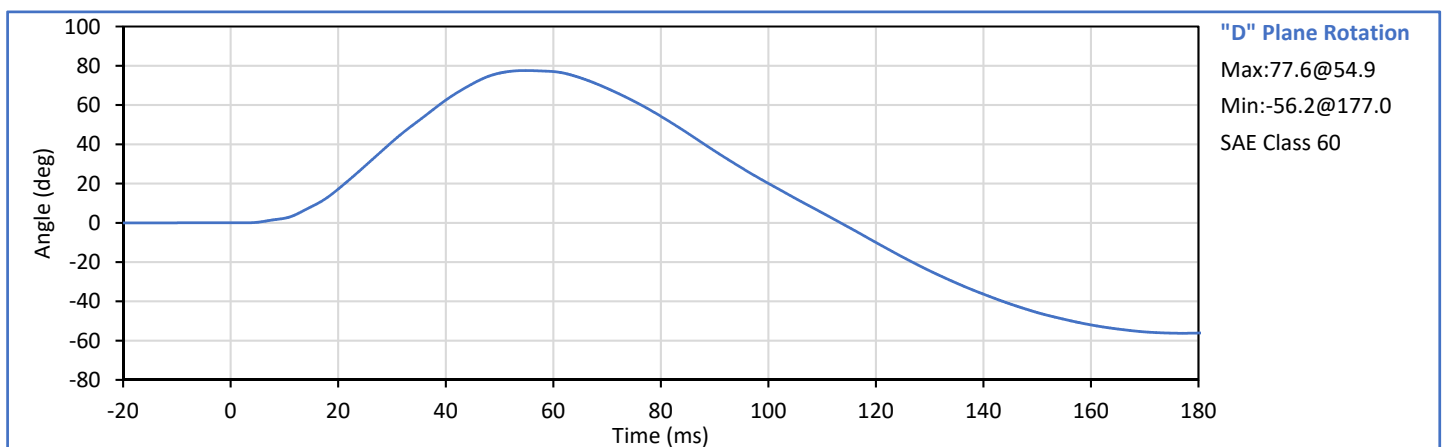
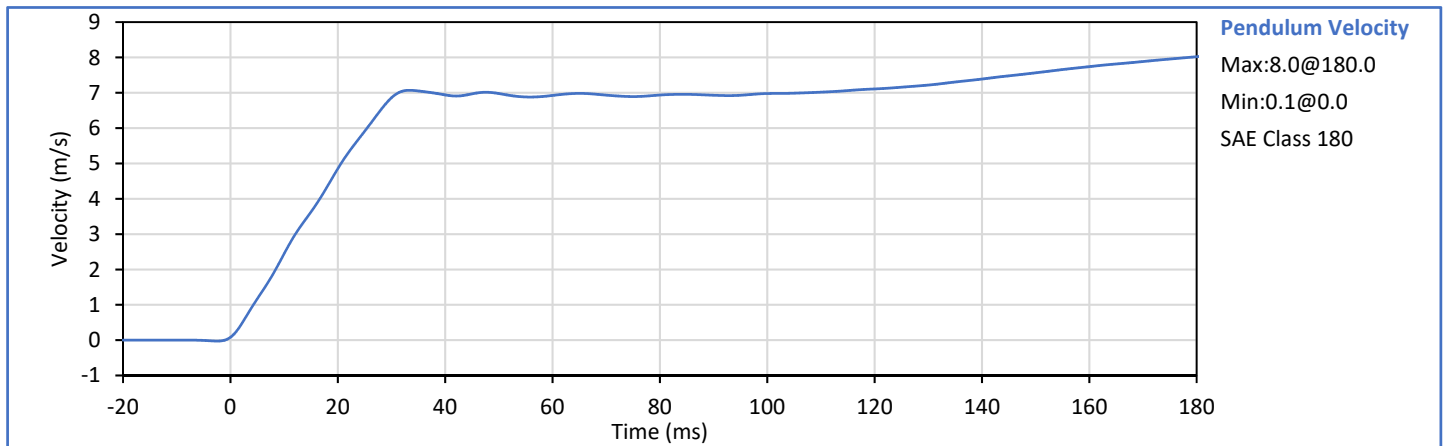
J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	26	Pass
Pendulum Velocity	m/s	6.89	7.13	6.99	Pass
Pendulum Velocity at 10 ms	m/s	2.10	2.50	2.44	Pass
Pendulum Velocity at 20 ms	m/s	4.00	5.00	4.85	Pass
Pendulum Velocity at 30 ms	m/s	5.80	7.00	6.86	Pass
Peak "D" Plane Rotation	deg	77.0	91.0	77.6	Pass
Peak Moment in Rotation	Nm	69.0	83.0	78.6	Pass
Positive Moment Decay to 10 Nm	ms	80.0	100.0	81.6	Pass
Overall Test Results					Pass



Technician:

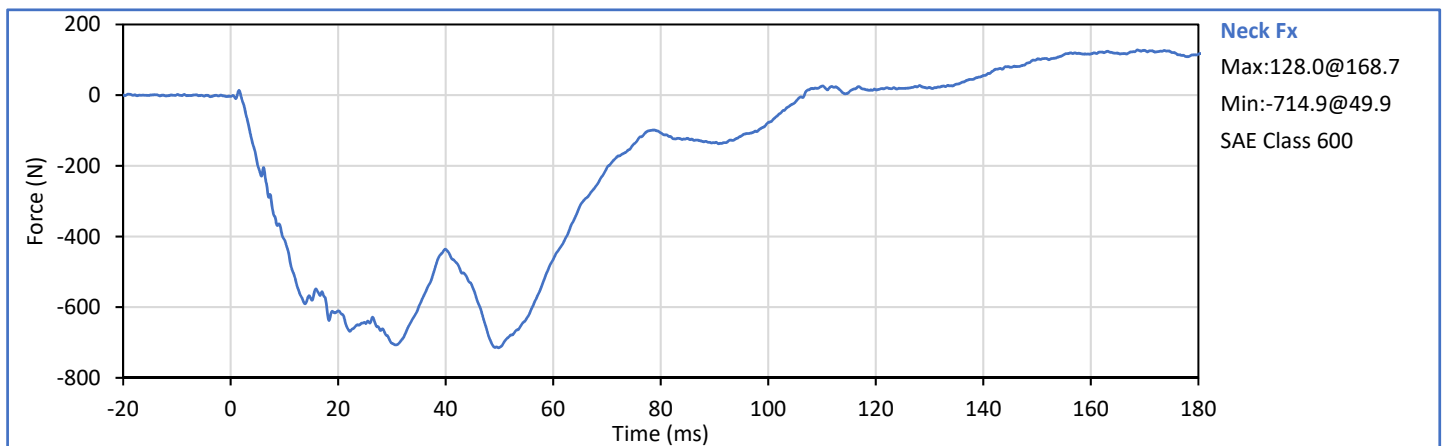
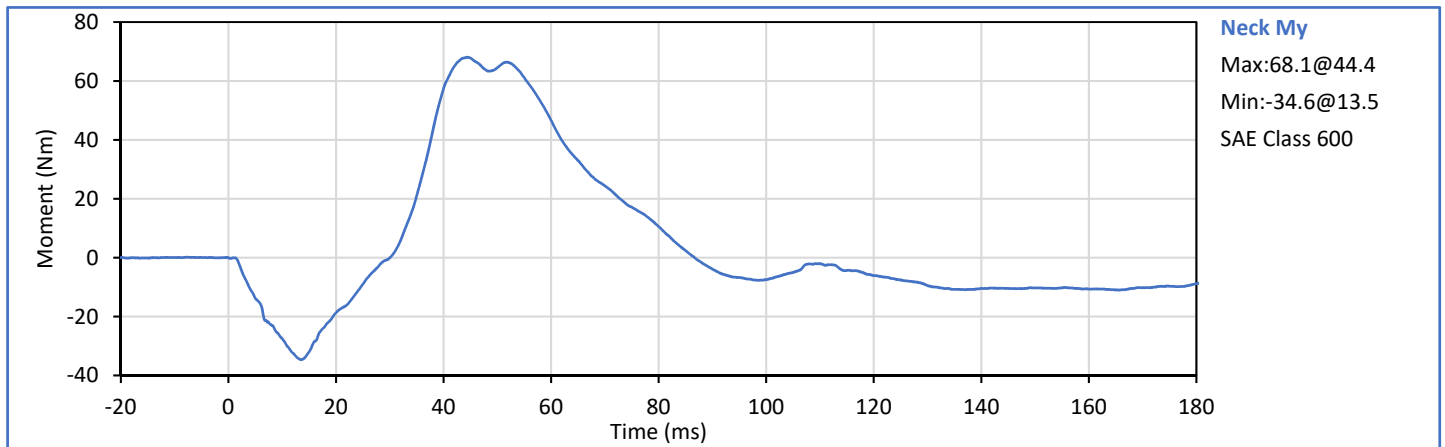
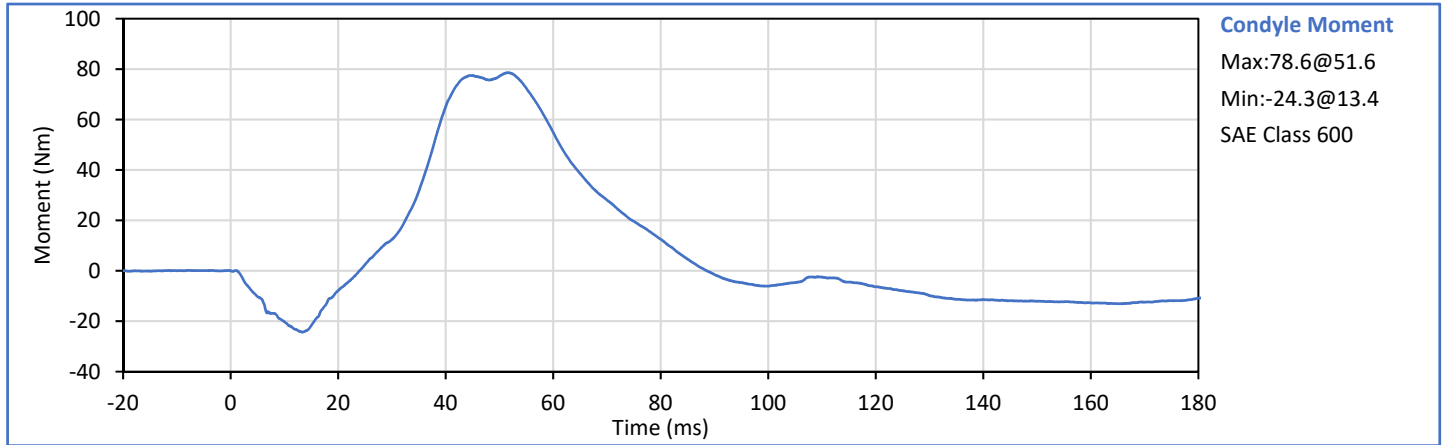
J. Hernandez

J. Hernandez

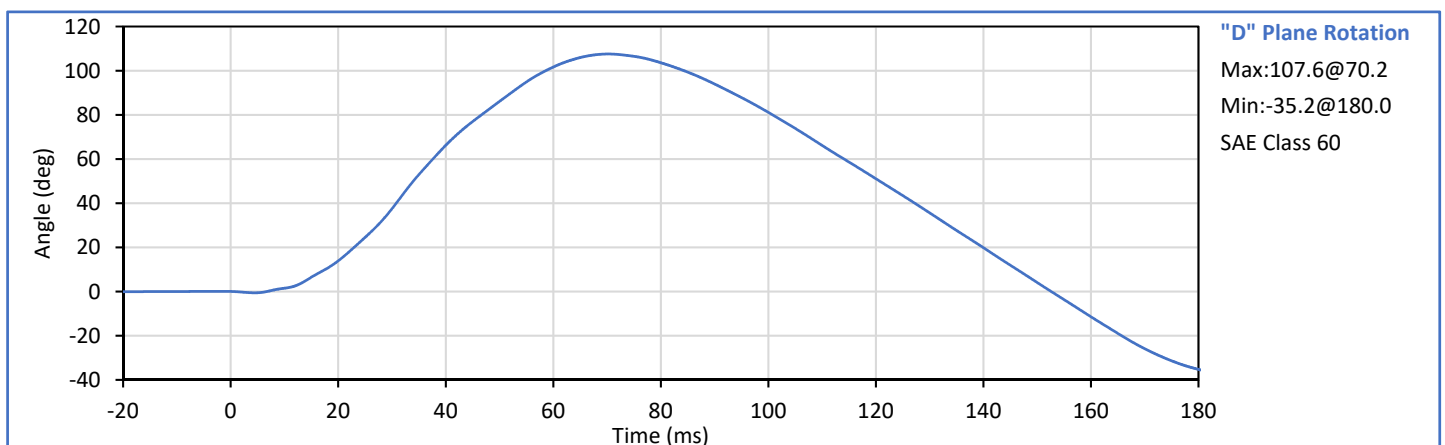
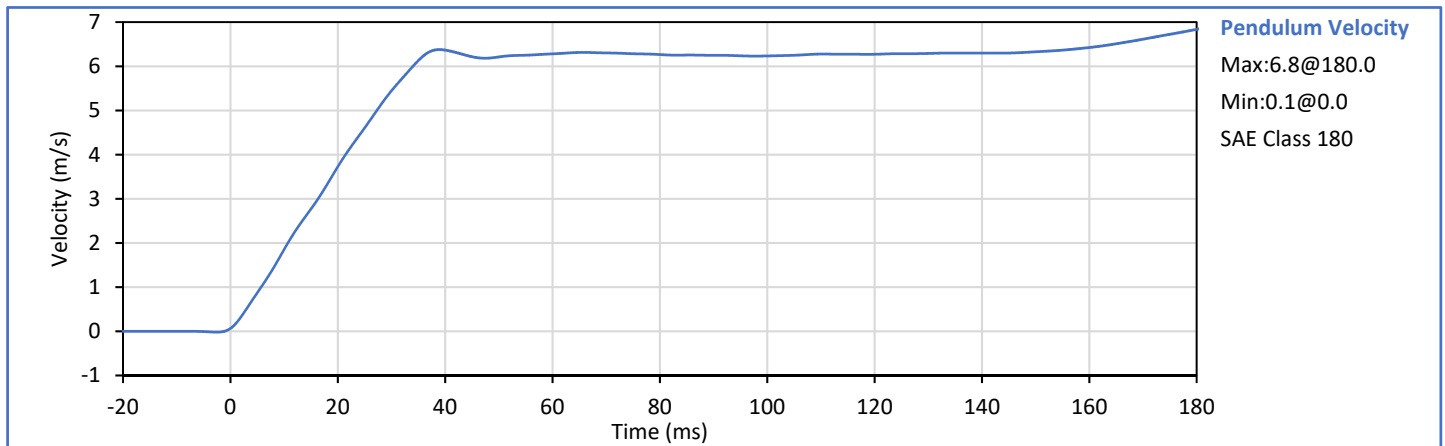
Approved By:

P. Puzzuto

P. Puzzuto



Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	26	Pass
Pendulum Velocity	m/s	5.95	6.19	6.06	Pass
Pendulum Velocity at 10 ms	m/s	1.50	1.90	1.85	Pass
Pendulum Velocity at 20 ms	m/s	3.10	3.90	3.73	Pass
Pendulum Velocity at 30 ms	m/s	4.60	5.60	5.44	Pass
Peak "D" Plane Rotation	deg	99.0	114.0	107.6	Pass
Peak Moment in Rotation	Nm	-65.0	-53.0	-60.8	Pass
Negative Moment Decay to -10 Nm	ms	94.0	114.0	98.2	Pass
Overall Test Results					Pass



Technician:

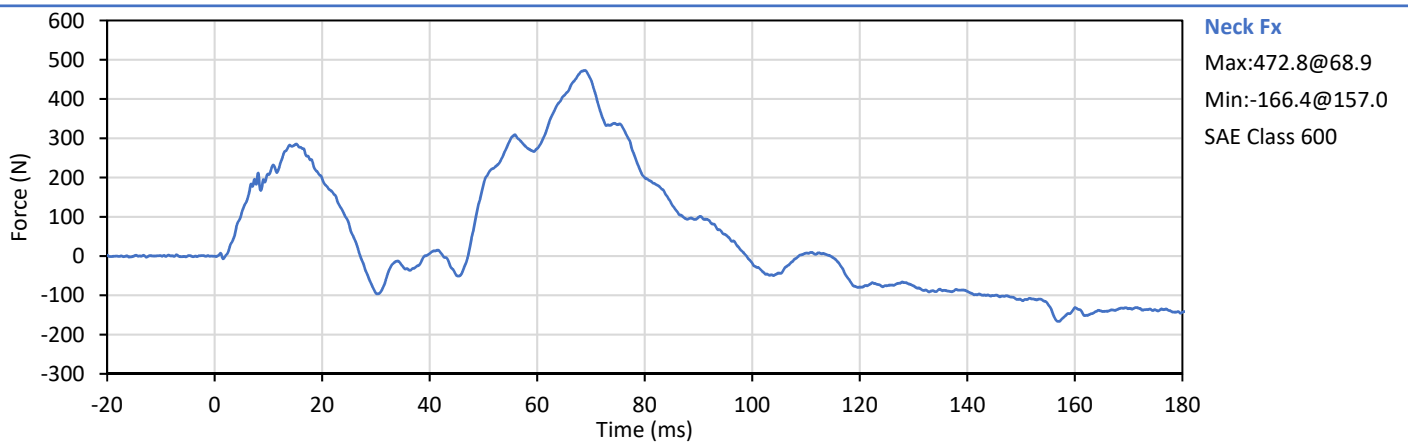
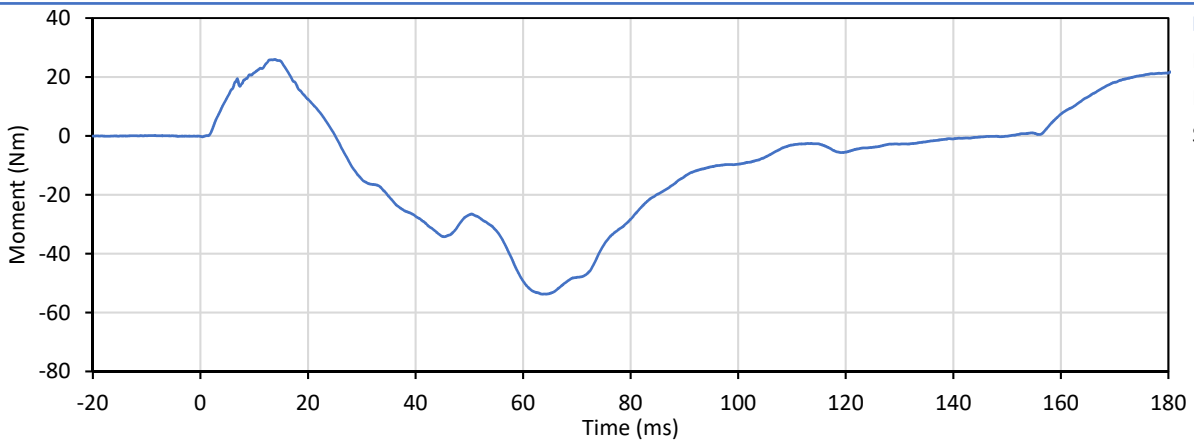
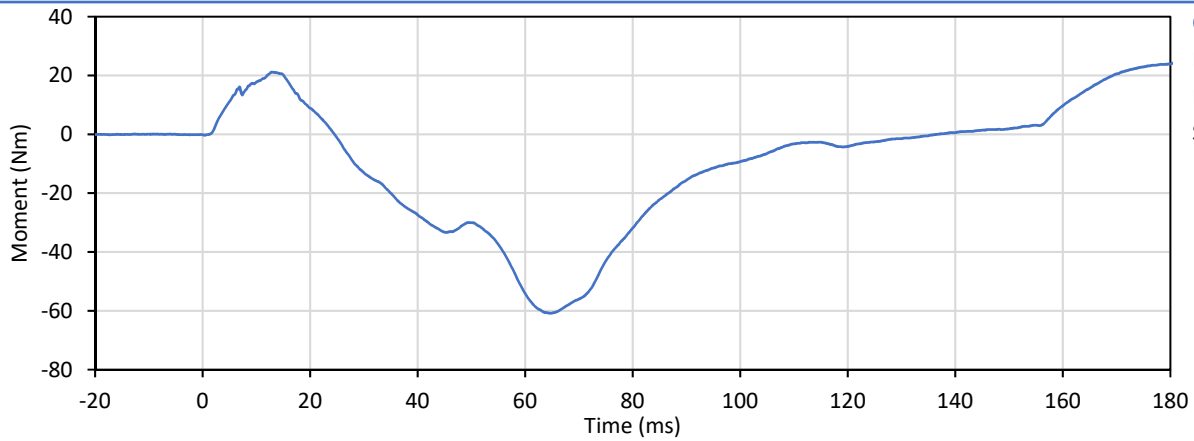
J. Hernandez

J. Hernandez

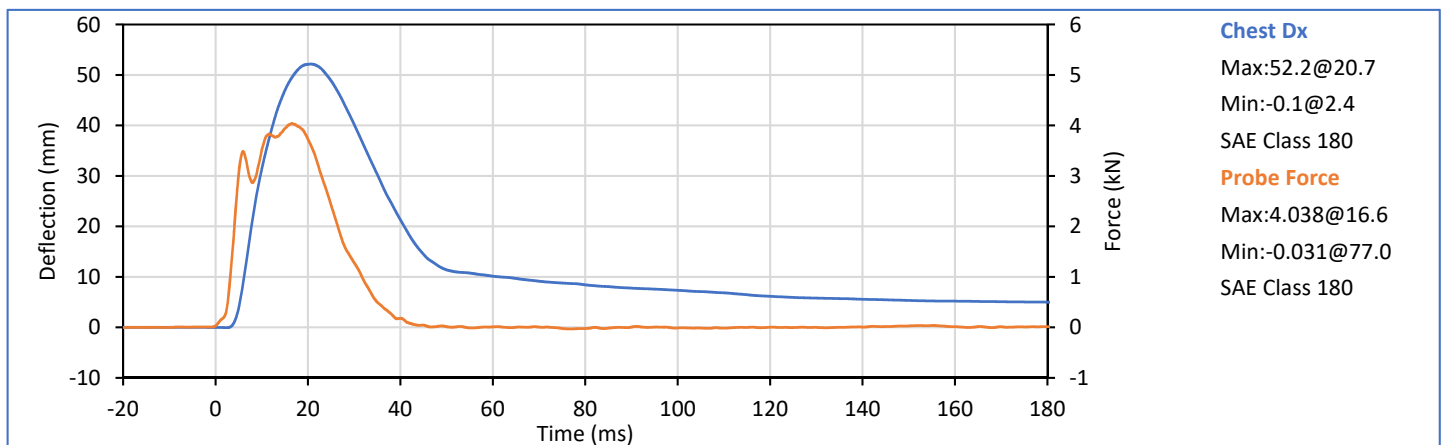
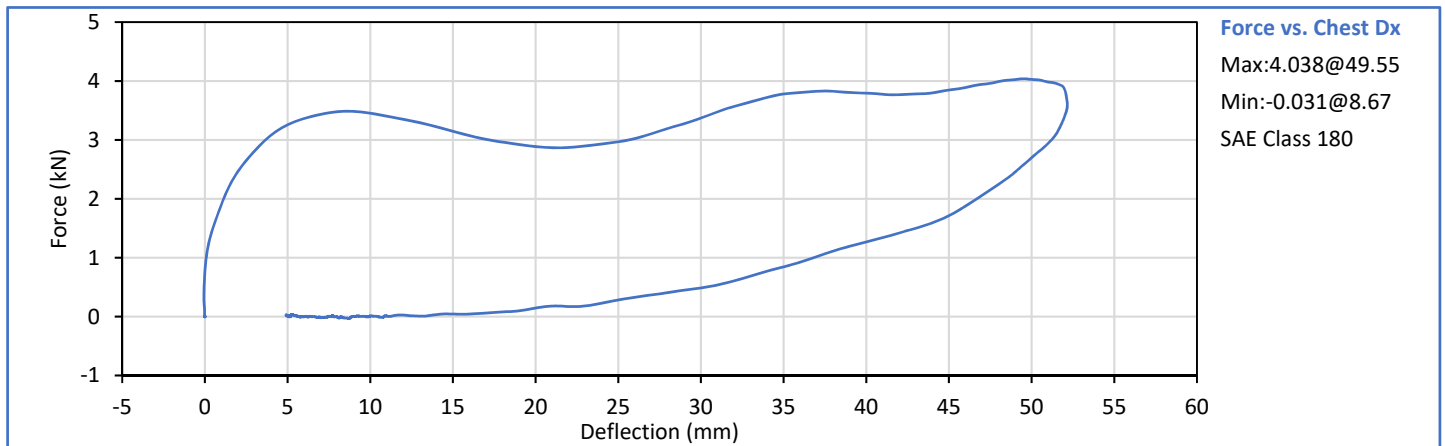
Approved By:

P. Puzzuto

P. Puzzuto



Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	26	Pass
Probe Velocity	m/s	6.59	6.83	6.79	Pass
Peak Chest Deflection	mm	50.0	58.0	52.2	Pass
Peak Probe Force, 50 and 58 mm	kN	3.900	4.400	4.026	Pass
Peak Probe Force, 18 and 50 mm	kN	0.000	4.600	4.038	Pass
Internal Hysteresis	%	69.0	85.0	79.2	Pass
Overall Test Results					Pass



Technician:

J. Hernandez

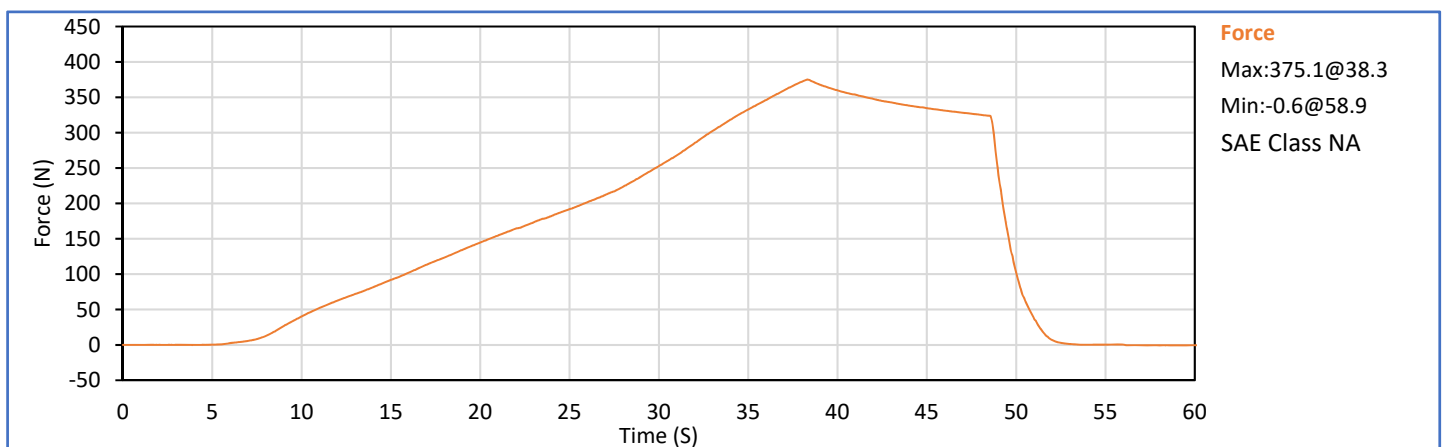
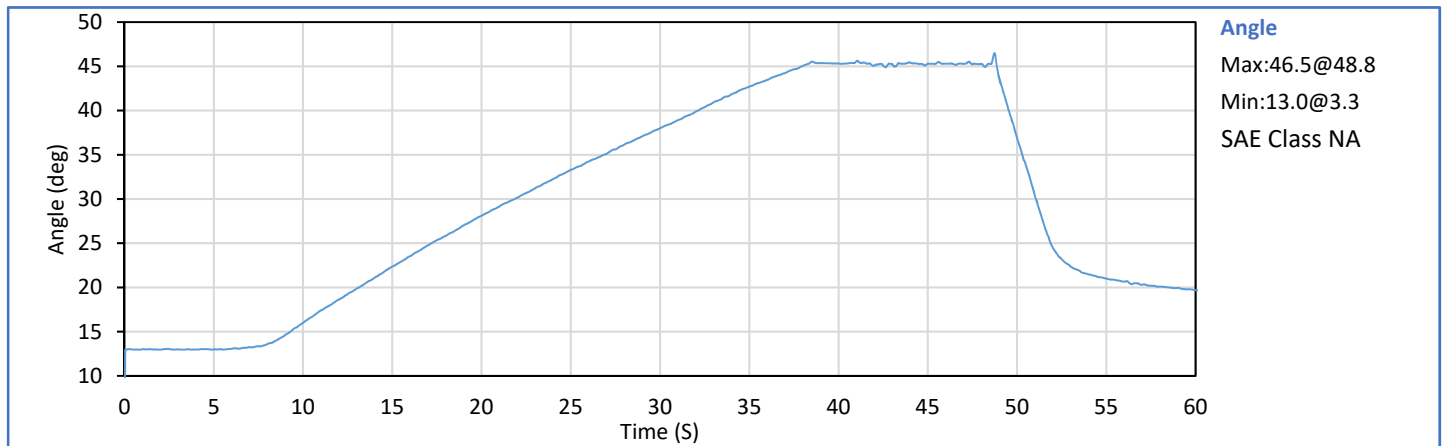
J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Humidity	%	10	70	26	Pass
Orientation Angle	deg	0.0	20.0	12.2	Pass
Test Initial Angle	deg	11.0	19.0	13.0	Pass
Peak Force at 45° (+/-0.5°)	N	320.0	390.0	344.0	Pass
Torso Flexion Rate	deg/s	0.50	1.50	1.05	Pass
Final Reference Plane Angle	deg	-8.0	8.0	7.0	Pass
Overall Test Results					Pass



Technician:

J. Hernandez

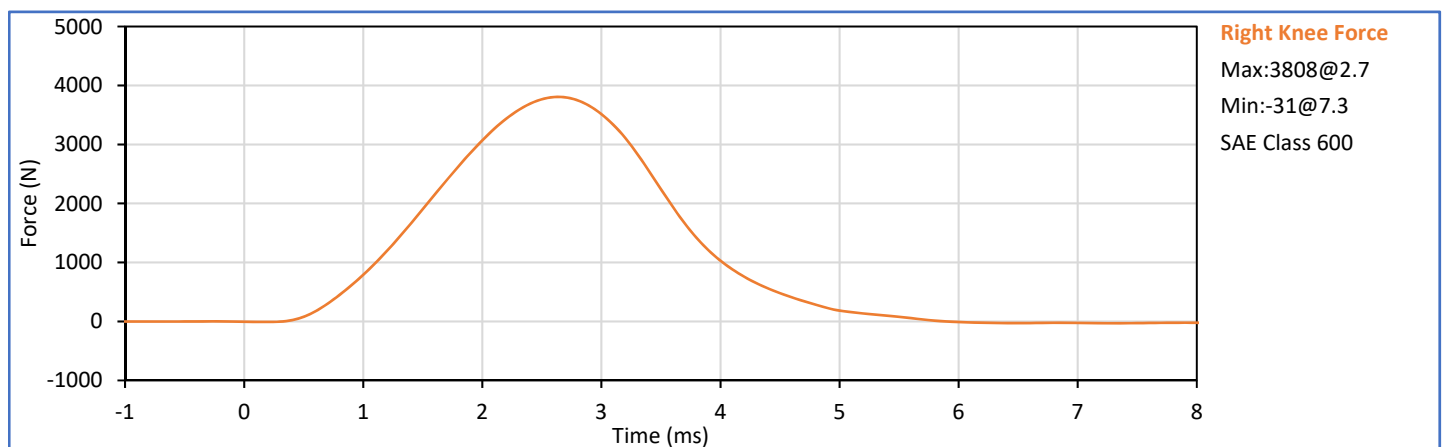
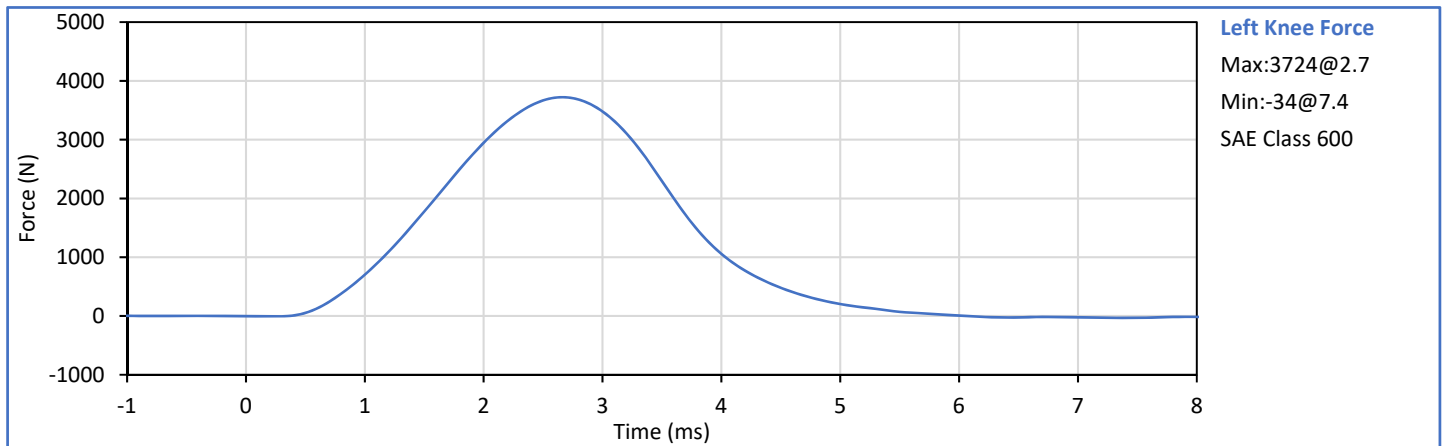
J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

	Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
	Laboratory Temperature	°C	18.9	25.6	21.1	Pass
	Laboratory Humidity	%	10	70	26	Pass
Left	Probe Velocity	m/s	2.070	2.130	2.105	Pass
Knee	Peak Resistive Force	N	3450	4060	3724	Pass
Right	Probe Velocity	m/s	2.070	2.130	2.109	Pass
Knee	Peak Resistive Force	N	3450	4060	3808	Pass
Overall Test Results						Pass



Technician:

J. Hernandez

J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

APPENDIX C
Post-Test ATD Qualification and Performance Verification
Hybrid III 50th Percentile Male ATD
S/N: 360

ATD Serial No.: 360

Test Date: 2020-05-15

Dummy Item	Inspect for	Comments	Damage	OK
Entire ATD	Perform general cleaning			✓
Outer Skin	Gashes, rips, cracks			✓
Head	Ballast secure			✓
	General appearance			✓
Neck bracket	Upper neck firmly attached to lower bracket			✓
Neck	Broken or cracked rubber			✓
	Looseness at the condyle joint			✓
Nodding block	Cracked or out of position			✓
Lumbar Spine	Broken or cracked rubber			✓
Ribs	Broken or bent ribs			✓
	Broken or bent rib supports			✓
	Damping material separated or cracked			✓
	Rubber bumpers in place			✓
Chest Displ. Assembly	Bent shaft			✓
	Slider arm riding in track			✓
Sensors	Check cables for cuts, tears			✓
	Check for damaged insulation			✓
Accelerometer Mounting	Head mounting secure			✓
	Chest mounting secure			✓
Knees	Skin condition			✓
	Insert (do not remove)			✓
	Casting			✓
Limbs	Normal movement and adjustment			✓
Knee Sliders	Wires intact			✓
	Rubber returned to "resting" position			✓
Pelvis	Broken			✓
Other	Describe below as needed			✓

Describe any repairs or replacement of parts or other findings:

No Problems Found

Technician: _____



J. Hernandez

Approved By: _____



P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Relative Humidity	%	10	70	26	Pass
A - Total sitting height	mm	879	889	887	Pass
B - Shoulder pivot height	mm	505	521	517	Pass
C - 'H' point height	mm	84	89	87	Pass
D - 'H' point location from backline	mm	135	140	139	Pass
E - Shoulder pivot from backline	mm	84	94	91	Pass
F - Thigh clearance	mm	140	155	151	Pass
G - Back of elbow to wrist pivot	mm	290	305	297	Pass
H - Head back to backline	mm	41	46	46	Pass
I - Shoulder to elbow length	mm	330	345	343	Pass
J - Elbow rest height	mm	190	211	204	Pass
K - Buttock to knee length	mm	579	604	589	Pass
L - Popliteal length	mm	429	455	440	Pass
M - Knee pivot height	mm	485	500	495	Pass
N - Buttock popliteal length	mm	452	477	464	Pass
O - Chest depth without jacket	mm	213	229	220	Pass
P - Foot length	mm	251	267	258	Pass
V - Shoulder breadth	mm	422	437	431	Pass
W - Foot breadth	mm	91	107	103	Pass
Y - Chest circum. (w/chest jacket)	mm	970	1001	980	Pass
Z - Waist circum.	mm	836	866	851	Pass
AA - Location for chest circum.	mm	429	434	432	Pass
BB - Location for waist circum.	mm	226	231	228	Pass
				Overall Test Results	Pass

Technician:



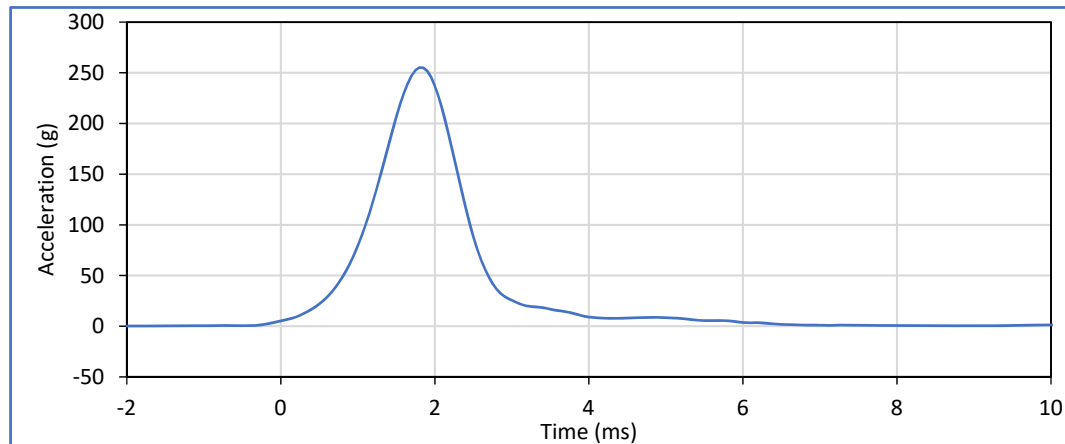
J. Hernandez

Approved By:



P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.7	Pass
Laboratory Relative Humidity	%	10	70	41	Pass
Peak Resultant Acceleration	g	225.0	275.0	255.2	Pass
Peak Lateral Acceleration	g	-15.0	15.0	1.3	Pass
Oscillations After Main Pulse	%	0.0	10.0	2.1	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results		Pass

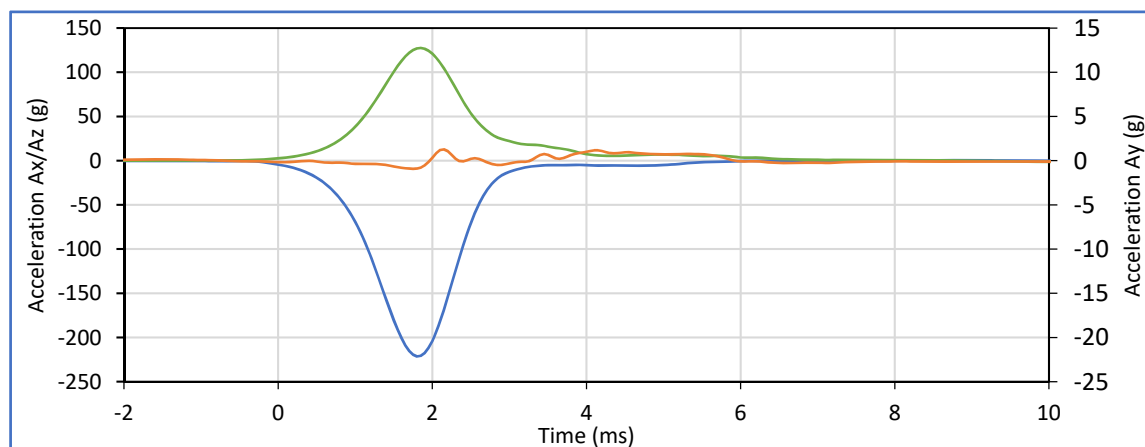


Head Resultant

Max:255.2@1.8

Min:0.3@8.9

SAE Class 1000



Head Ax

Max:0.5@8.5

Min:-221.3@1.8

SAE Class 1000

Head Ay

Max:1.3@2.2

Min:-0.9@1.8

SAE Class 1000

Head Az

Max:127.6@1.9

Min:-1.4@10.0

SAE Class 1000

Technician:

J. Hernandez

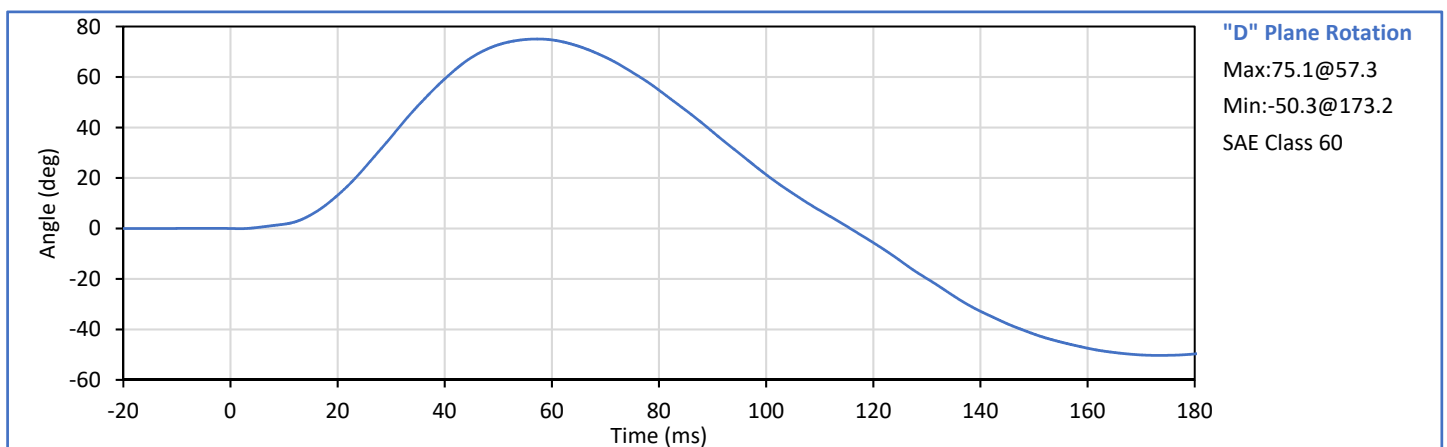
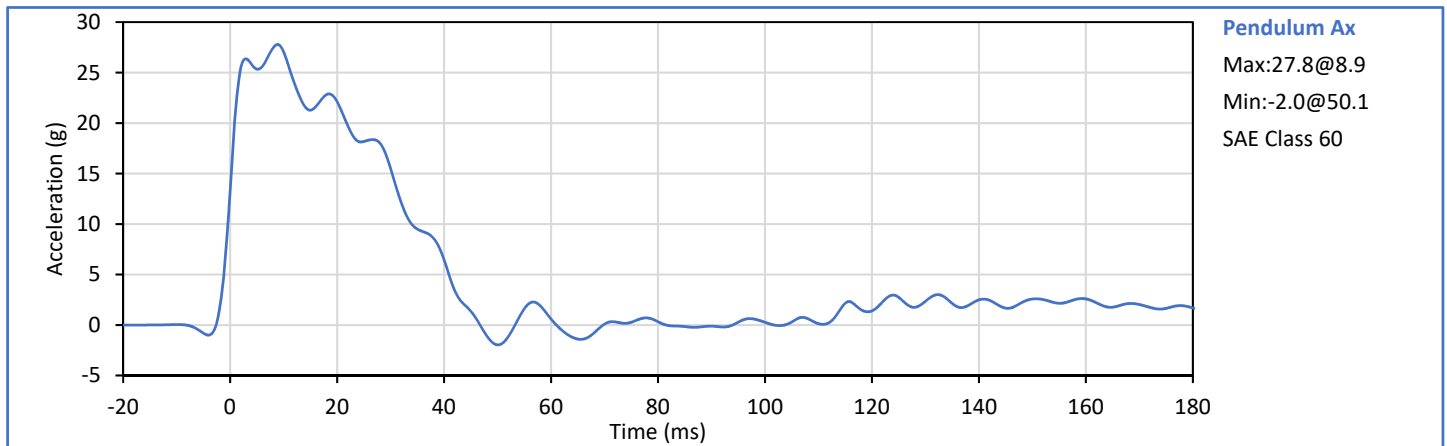
J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Relative Humidity	%	10	70	41	Pass
Pendulum Velocity	m/s	6.89	7.13	7.01	Pass
Pendulum Deceleration at 10 ms	g	22.5	27.5	27.0	Pass
Pendulum Deceleration at 20 ms	g	17.6	22.6	22.1	Pass
Pendulum Deceleration at 30 ms	g	12.5	18.5	15.5	Pass
Peak Pendulum Decel. after 30 ms	g	0.0	29.0	15.5	Pass
Deceleration Decay to Cross 5 g	ms	34.0	42.0	40.9	Pass
"D" Plane Rotation peak	deg	64.0	78.0	75.1	Pass
	ms	57.0	64.0	57.3	Pass
"D" Plane Rotation Decay To Zero	ms	113.0	128.0	115.8	Pass
Moment About Occipital Condyle	Nm	88.1	108.5	98.9	Pass
	ms	47.0	58.0	53.1	Pass
Moment Decay, Peak to Zero	ms	97.0	107.0	97.7	Pass
Overall Test Results					Pass



Technician:

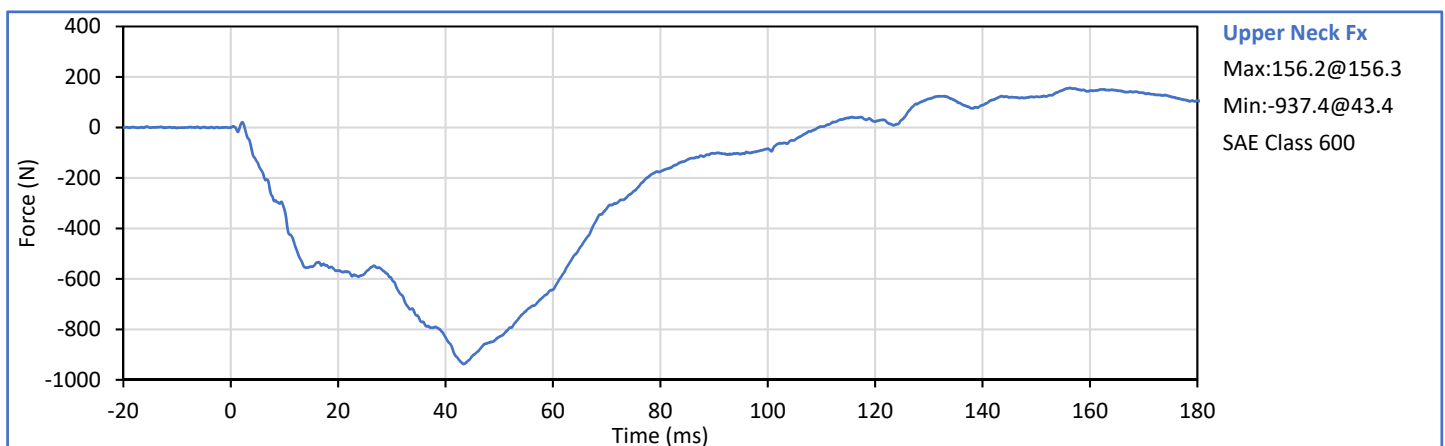
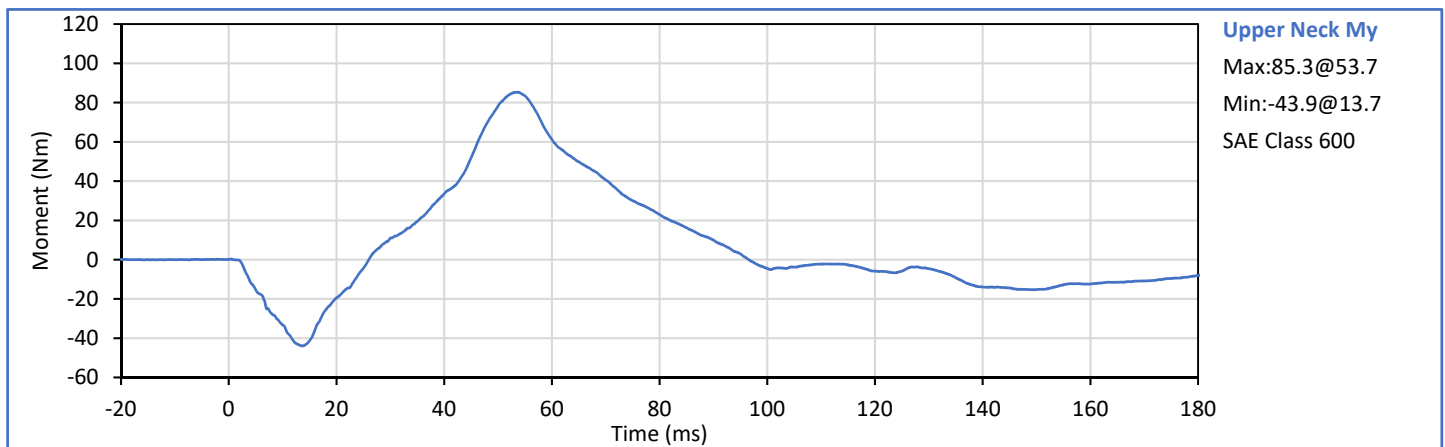
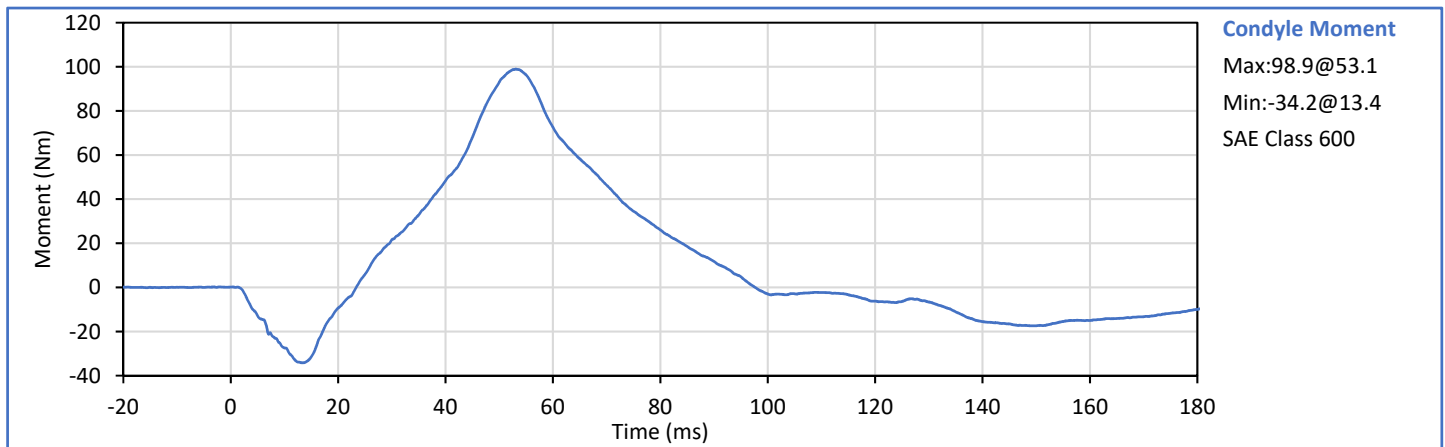
J. Hernandez

J. Hernandez

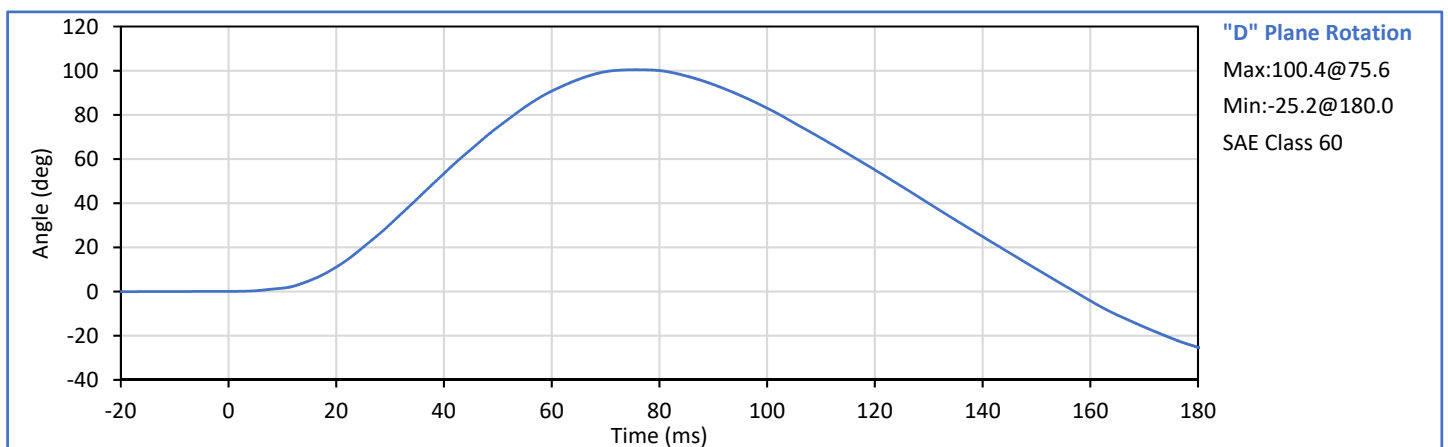
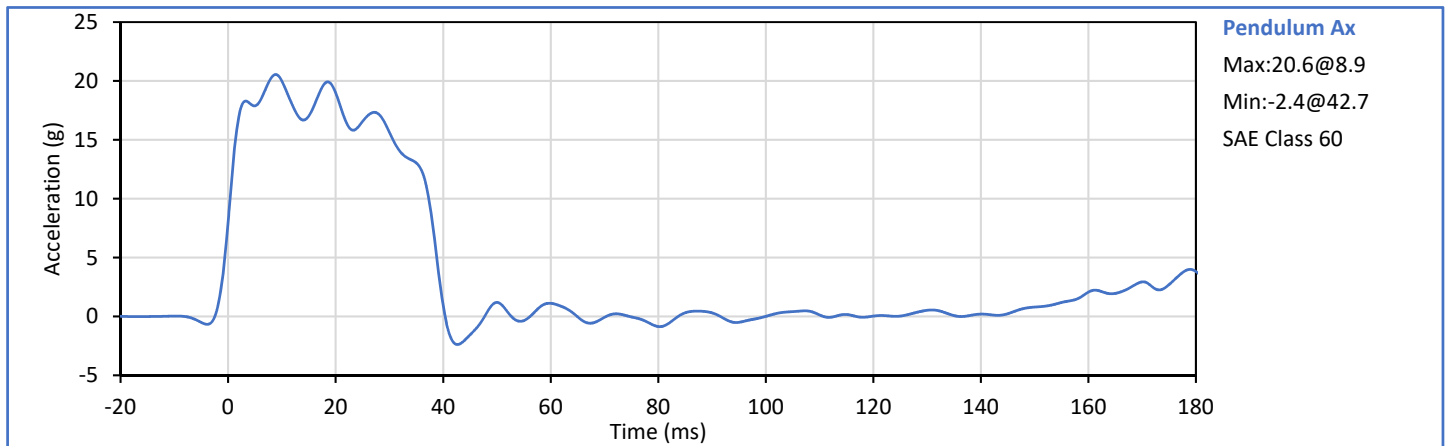
Approved By:

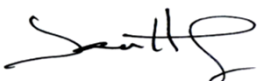
P. Puzzuto

P. Puzzuto

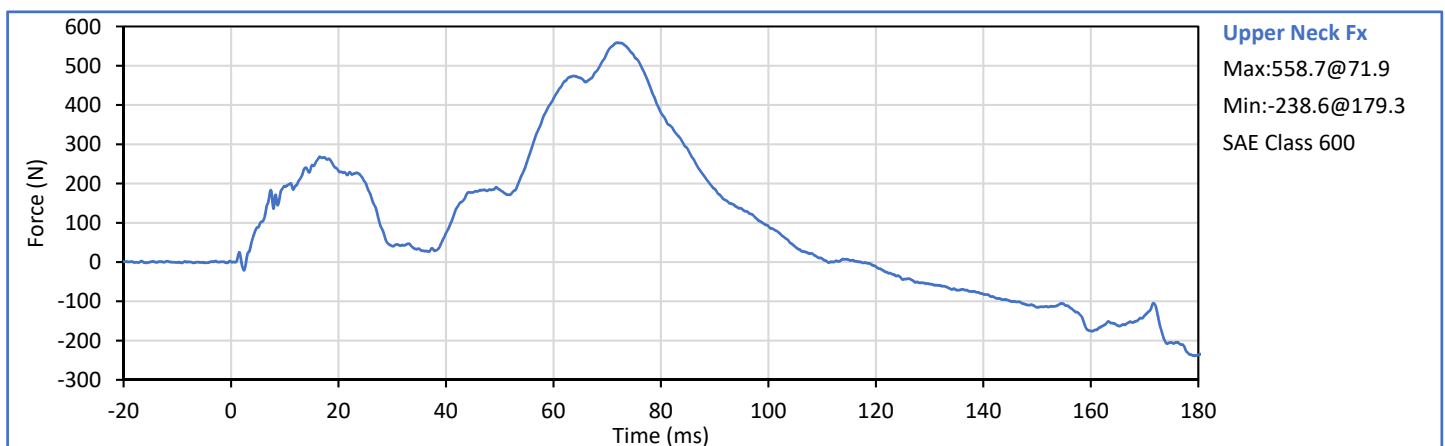
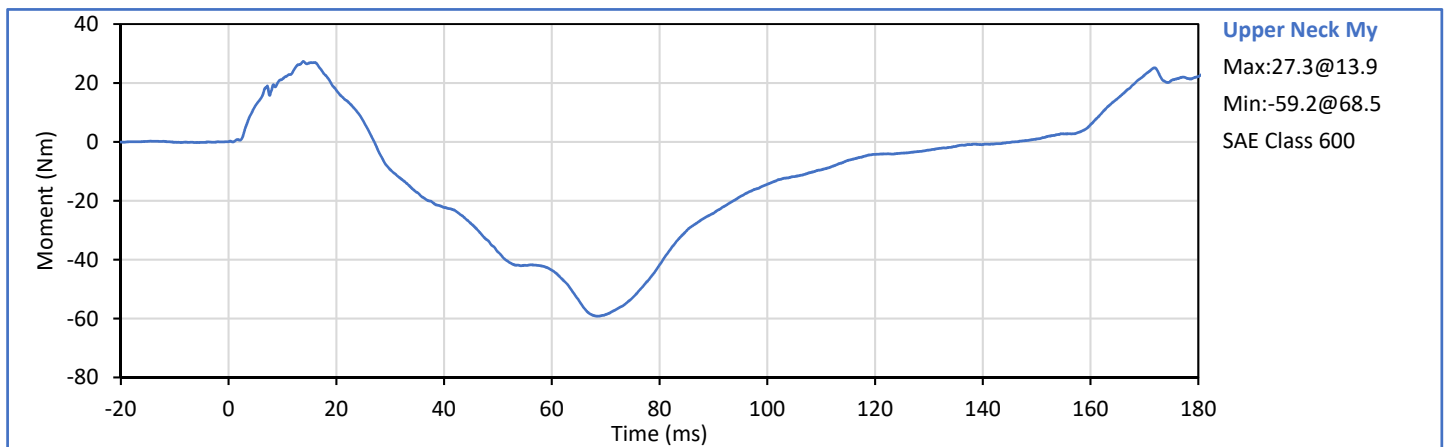
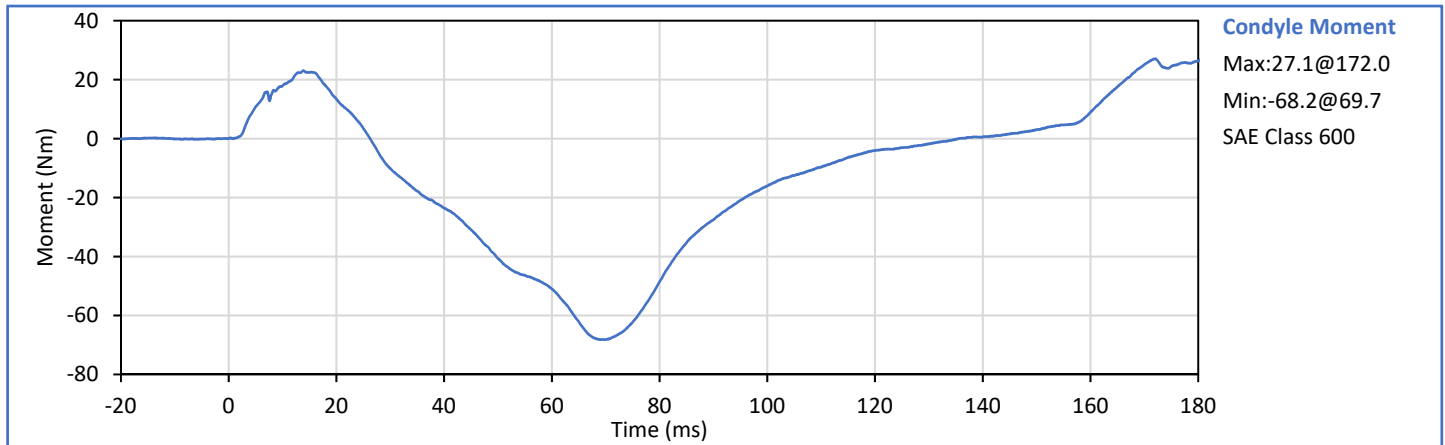


Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Relative Humidity	%	10	70	41	Pass
Pendulum Velocity	m/s	5.94	6.19	5.99	Pass
Pendulum Deceleration at 10 ms	g	17.2	21.2	20.0	Pass
Pendulum Deceleration at 20 ms	g	14.0	19.0	19.0	Pass
Pendulum Deceleration at 30 ms	g	11.0	16.0	15.6	Pass
Peak Pendulum Decel. after 30 ms	g	0.0	22.0	15.6	Pass
Deceleration Decay to Cross 5 g	ms	38.0	46.0	38.8	Pass
"D" Plane Rotation peak	deg	81.0	106.0	100.4	Pass
	ms	72.0	82.0	75.6	Pass
"D" Plane Rotation Decay To Zero	ms	147.0	174.0	157.1	Pass
Moment About Occipital Condyle	Nm	-79.9	-52.9	-68.2	Pass
	ms	65.0	79.0	69.7	Pass
Moment Decay, Peak to Zero	ms	120.0	148.0	135.5	Pass
Overall Test Results				Pass	Pass

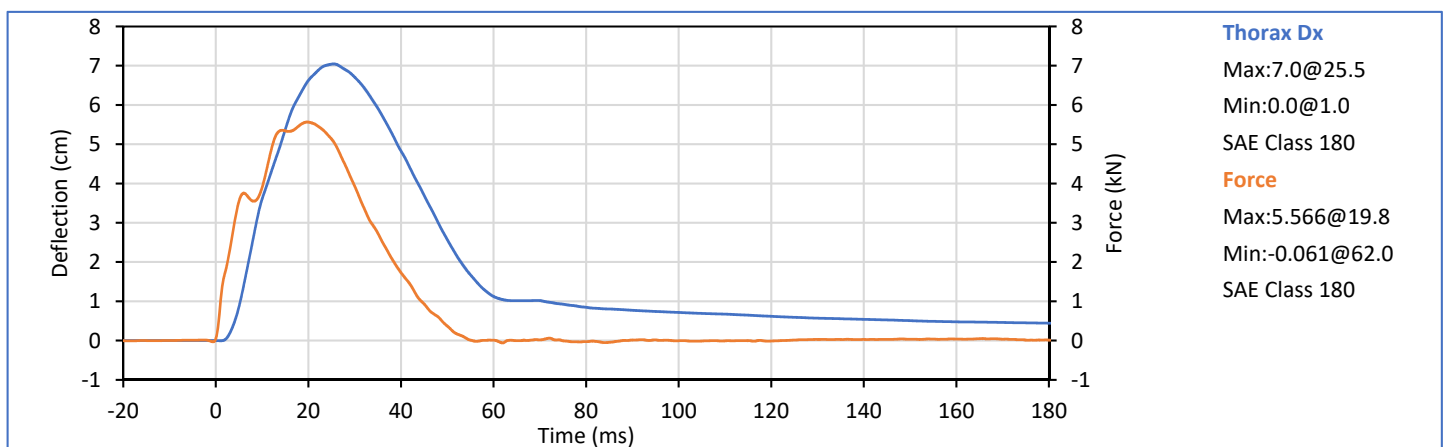
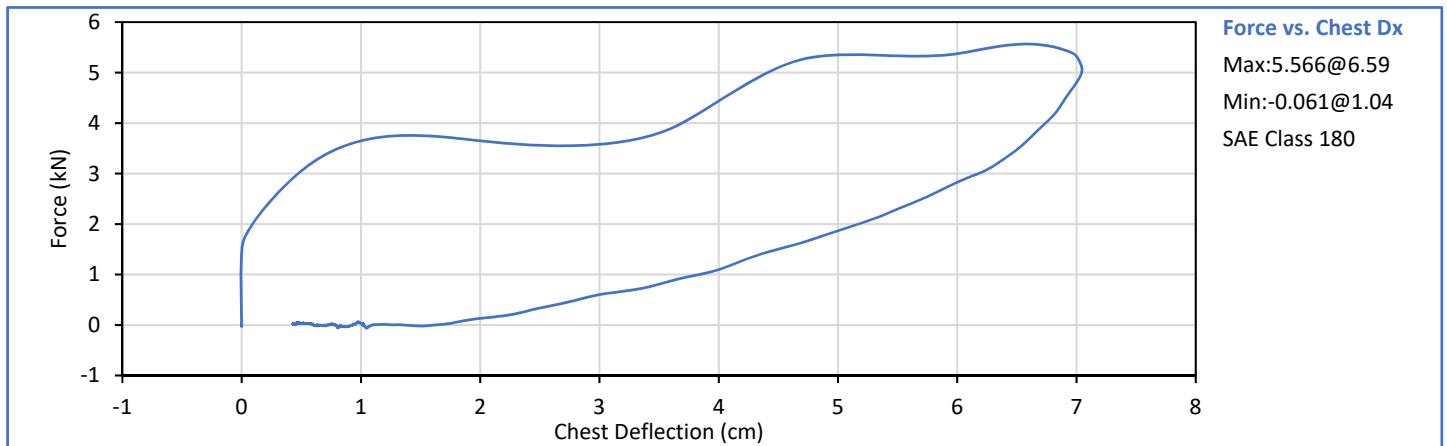


Technician: 
J. Hernandez

Approved By: 
P. Puzzuto



Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	44	Pass
Probe Velocity	m/s	6.58	6.82	6.74	Pass
Peak Chest Deflection	cm	6.35	7.26	7.05	Pass
Peak Probe Force	kN	5.159	5.893	5.566	Pass
Internal Hysteresis	%	69.0	85.0	70.8	Pass
Overall Test Results				Pass	Pass



Technician:

J. Hernandez

J. Hernandez

Approved By:

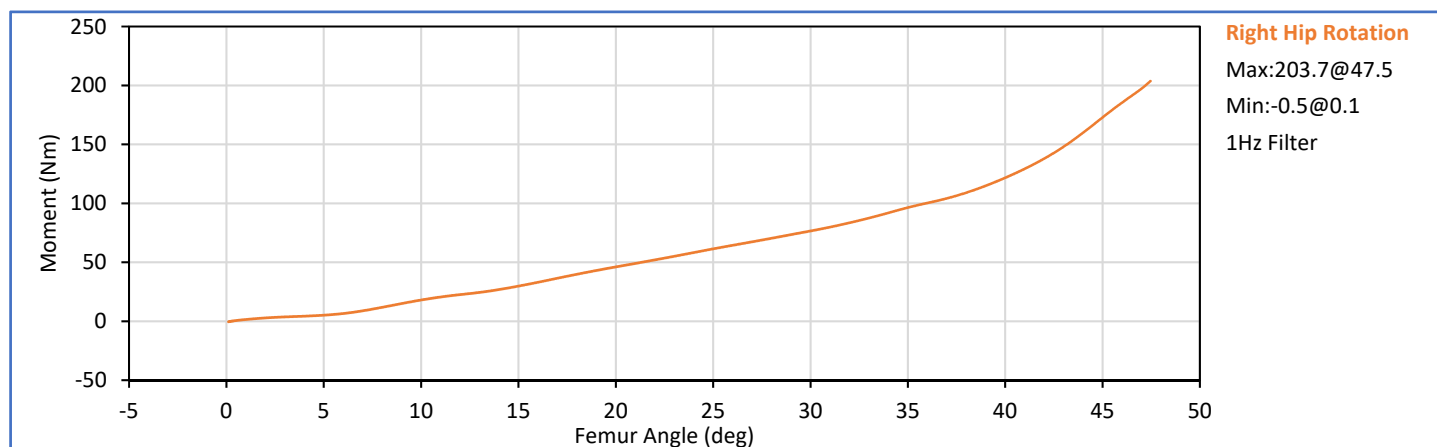
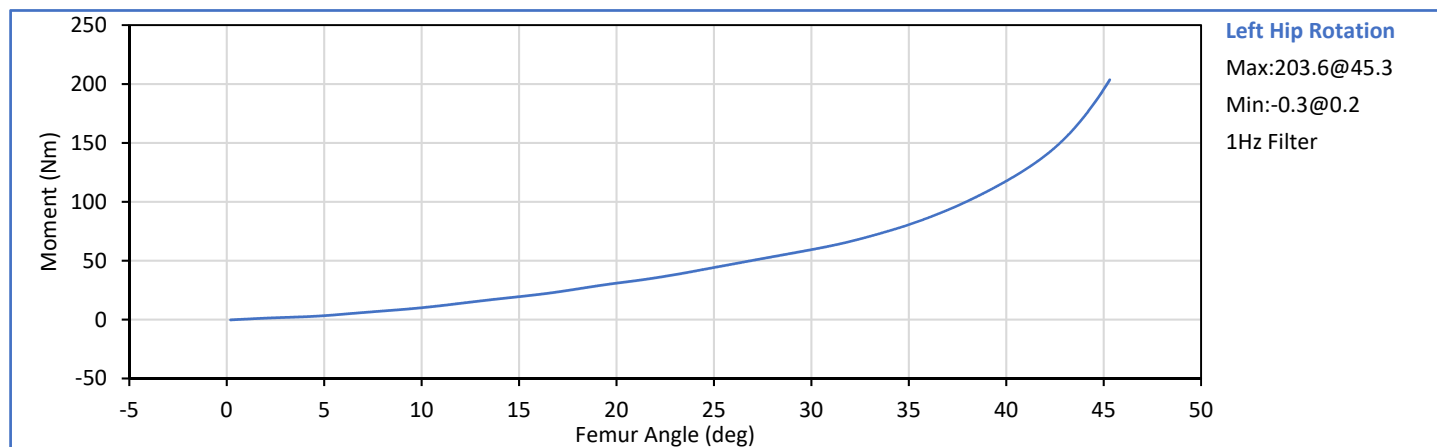
P. Puzzuto

P. Puzzuto

ATD Serial No.: 360

Test Date: 2020-05-18

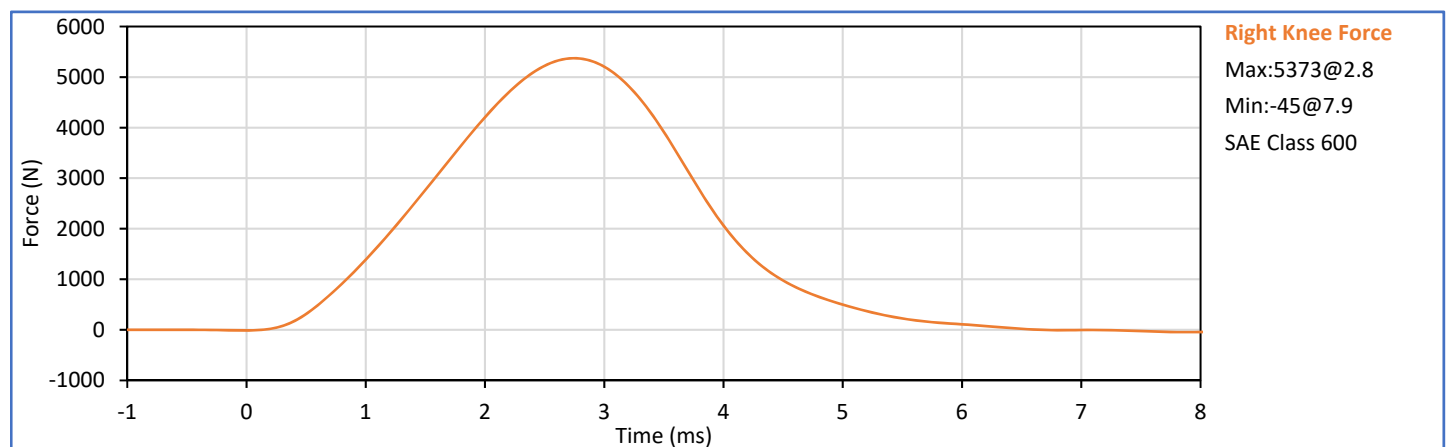
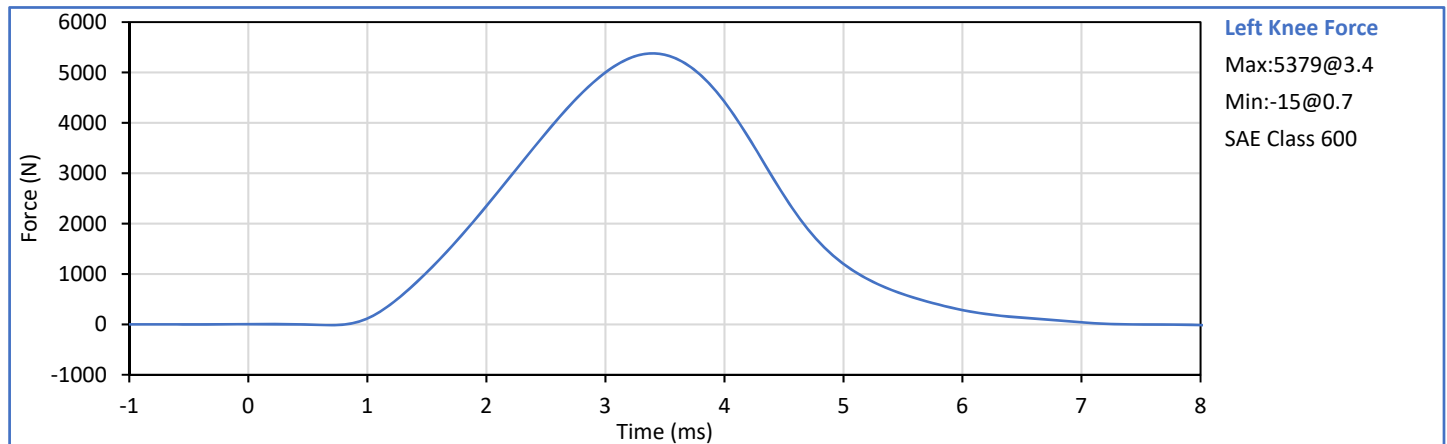
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	Laboratory Temperature	°C	18.9	25.6	21.1	Pass
	Laboratory Relative Humidity	%	10	70	44	Pass
Left Hip	Left Hip Rotation Rate	deg/s	5.0	10.0	6.2	Pass
	Left Femur Torque at 30°	Nm	0.0	95.0	59.4	Pass
	Left Hip Rotation at 203 Nm	deg	40.0	50.0	45.3	Pass
Right Hip	Right Hip Rotation Rate	deg/s	5.0	10.0	6.1	Pass
	Right Femur Torque at 30°	Nm	0.0	95.0	76.7	Pass
	Right Hip Rotation at 203 Nm	deg	40.0	50.0	47.4	Pass
Overall Test Results						Pass



Technician: J. Hernandez

Approved By: P. Puzzuto

	Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
	Laboratory Temperature	°C	18.9	25.6	21.1	Pass
	Laboratory Relative Humidity	%	10	70	30	Pass
Left	Probe Velocity	m/s	2.070	2.130	2.105	Pass
Knee	Peak Resistive Force	N	4715	5782	5379	Pass
Right	Probe Velocity	m/s	2.070	2.130	2.109	Pass
Knee	Peak Resistive Force	N	4715	5782	5373	Pass
Overall Test Results						Pass



Technician: J. Hernandez

Approved By: P. Puzzuto

APPENDIX C
Post-Test ATD Qualification and Performance Verification
Hybrid III 5th Percentile Female ATD
S/N: DH1644

ATD Serial No.: DH1644

Test Date: 2020-05-15

Dummy Item	Inspect for	Comments	Damage	Okay
Entire ATD	Perform general cleaning			✓
Outer Skin	Gashes, rips, cracks			✓
Head	Ballast secure			✓
	General appearance			✓
Neck bracket	Upper neck firmly attached to lower bracket			✓
Neck	Broken or cracked rubber			✓
	Looseness at the condyle joint			✓
Nodding block	Cracked or out of position			✓
Lumbar Spine	Broken or cracked rubber			✓
Ribs	Broken or bent ribs			✓
	Broken or bent rib supports			✓
	Damping material separated or cracked			✓
	Rubber bumpers in place			✓
Chest Displ. Assembly	Bent shaft			✓
	Slider arm riding in track			✓
Sensors	Check cables for cuts, tears			✓
	Check for damaged insulation			✓
Accelerometer Mounting	Head mounting secure			✓
	Chest mounting secure			✓
Knees	Skin condition			✓
	Insert (do not remove)			✓
	Casting			✓
Limbs	Normal movement and adjustment			✓
Knee Sliders	Wires intact			✓
	Rubber returned to "resting" position			✓
Pelvis	Broken			✓
Other	Describe below as needed			✓

Describe any repairs or replacement of parts or other findings:

No Problems Found

Technician:



J. Hernandez

Approved By:



P. Puzzuto

ATD Serial No.: DH1644

Test Date: 2020-05-15

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
A - Total sitting height	mm	775	800	789	Pass
B - Shoulder pivot height	mm	432	457	444	Pass
C - 'H' point height	mm	81	86	85	Pass
D - 'H' point location from backline	mm	145	150	147	Pass
E - Shoulder pivot from backline	mm	69	84	76	Pass
F - Thigh clearance	mm	119	135	124	Pass
G - Back of elbow to wrist pivot	mm	244	259	254	Pass
H - Head back to backline	mm	41	46	44	Pass
I - Shoulder to elbow length	mm	277	297	286	Pass
J - Elbow rest height	mm	183	203	191	Pass
K - Buttock to knee length	mm	521	546	535	Pass
L - Popliteal length	mm	356	376	364	Pass
M - Knee pivot height	mm	394	419	404	Pass
N - Buttock popliteal length	mm	414	439	422	Pass
O - Chest depth without jacket	mm	175	191	186	Pass
P - Foot length	mm	219	234	232	Pass
R - Buttock to Knee Pivot Length	mm	457	483	467	Pass
S - Head Breadth	mm	137	147	146	Pass
T - Head Depth	mm	178	188	185	Pass
U - Hip Breadth	mm	300	315	309	Pass
V - Shoulder breadth	mm	351	366	356	Pass
W - Foot breadth	mm	79	94	90	Pass
X - Head circum.	mm	528	549	534	Pass
Y - Chest circum. (w/chest jacket)	mm	851	881	873	Pass
Z - Waist circum.	mm	760	790	771	Pass
AA - Location for chest circum.	mm	333	358	346	Pass
BB - Location for waist circum.	mm	160	170	166	Pass
			Overall Test Results		Pass

Technician:



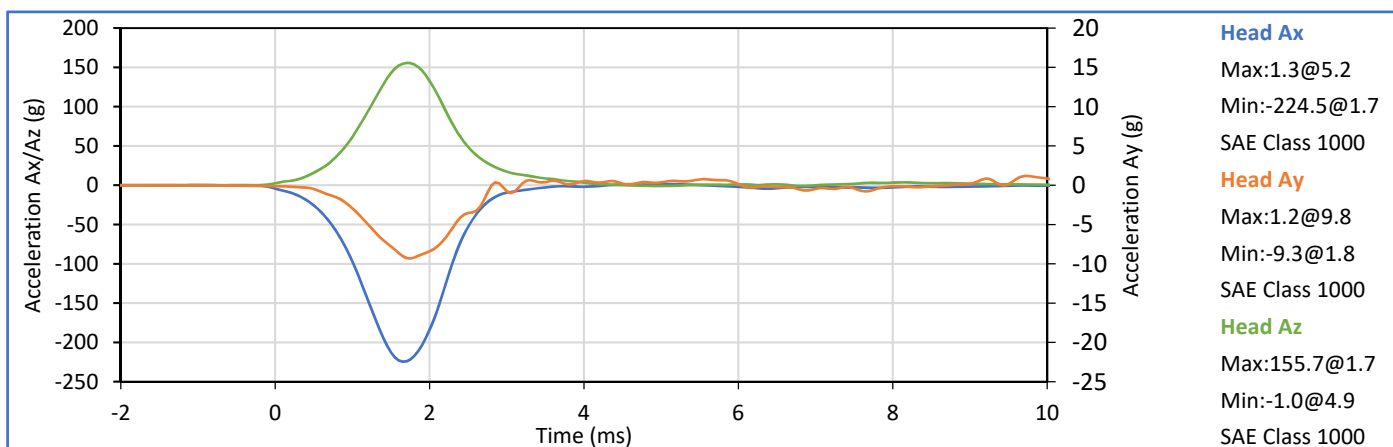
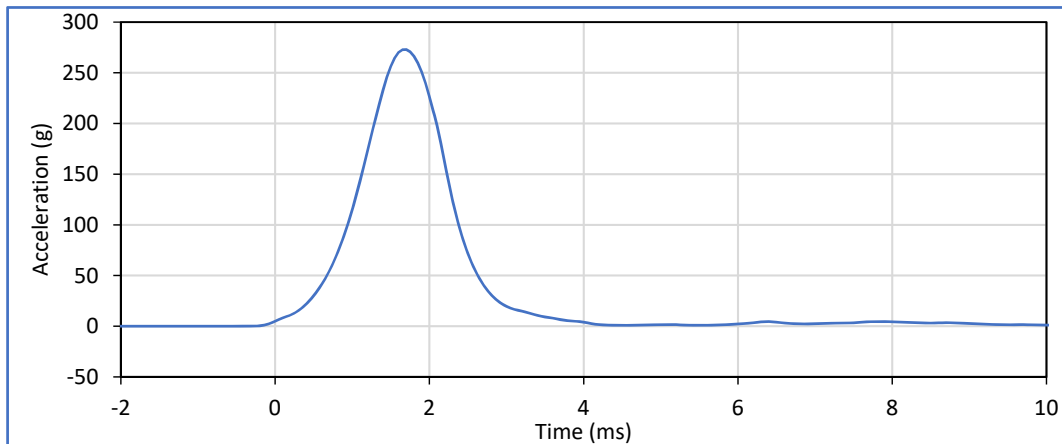
J. Hernandez

Approved By:



P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.7	Pass
Laboratory Humidity	%	10	70	41	Pass
Peak Resultant Acceleration	g	250.0	300.0	272.9	Pass
Peak Lateral Acceleration	g	-15.0	15.0	-9.3	Pass
Oscillations After Main Pulse	%	0.0	10.0	1.7	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results	Pass	



Technician:

J. Hernandez

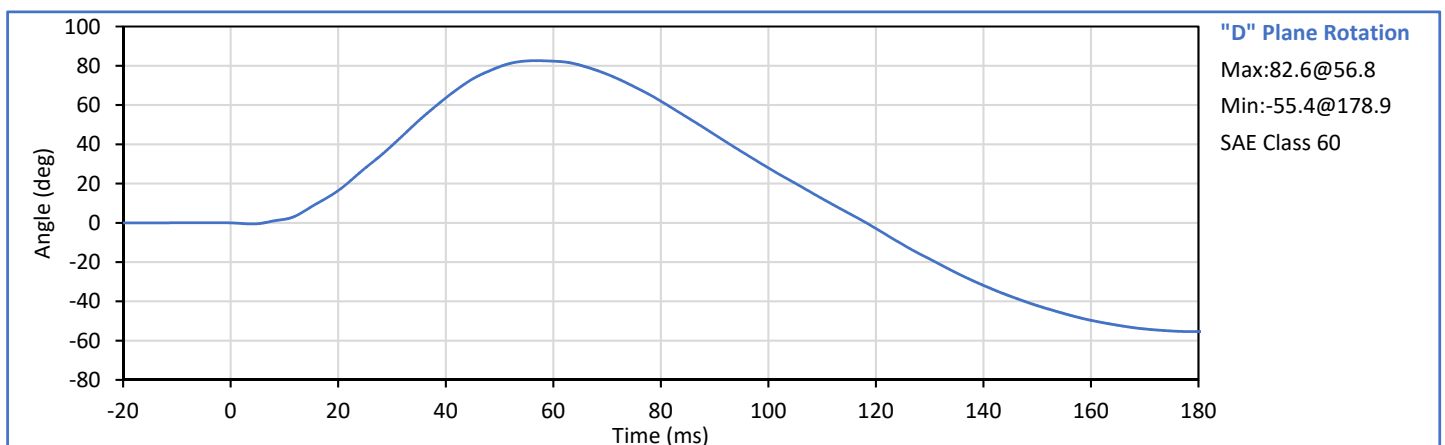
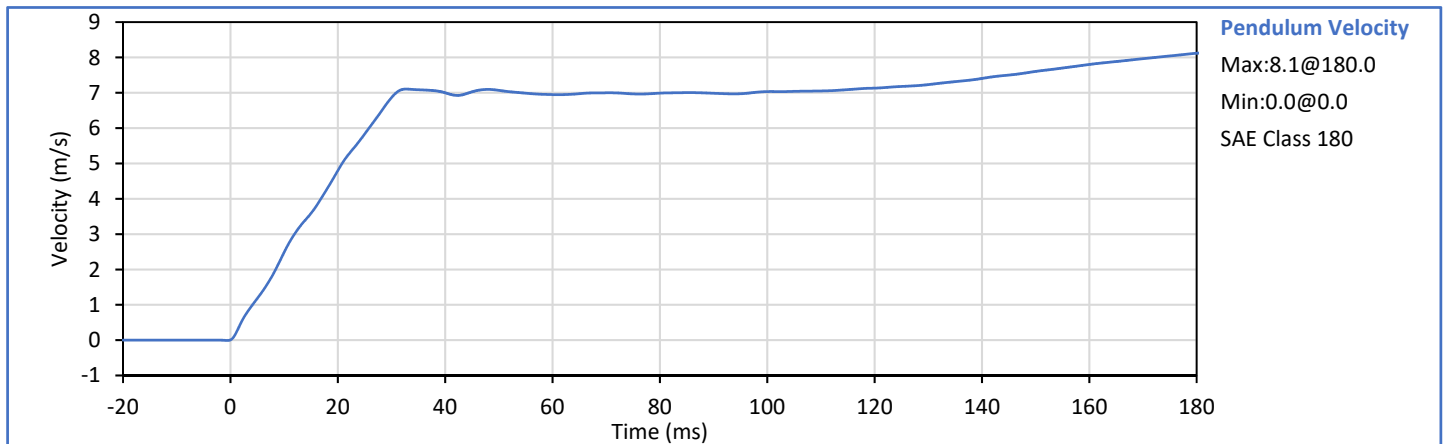
J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Humidity	%	10	70	41	Pass
Pendulum Velocity	m/s	6.89	7.13	7.01	Pass
Pendulum Velocity at 10 ms	m/s	2.10	2.50	2.48	Pass
Pendulum Velocity at 20 ms	m/s	4.00	5.00	4.79	Pass
Pendulum Velocity at 30 ms	m/s	5.80	7.00	6.86	Pass
Peak "D" Plane Rotation	deg	77.0	91.0	82.6	Pass
Peak Moment in Rotation	Nm	69.0	83.0	75.2	Pass
Positive Moment Decay to 10 Nm	ms	80.0	100.0	84.3	Pass
Overall Test Results					Pass



Technician:

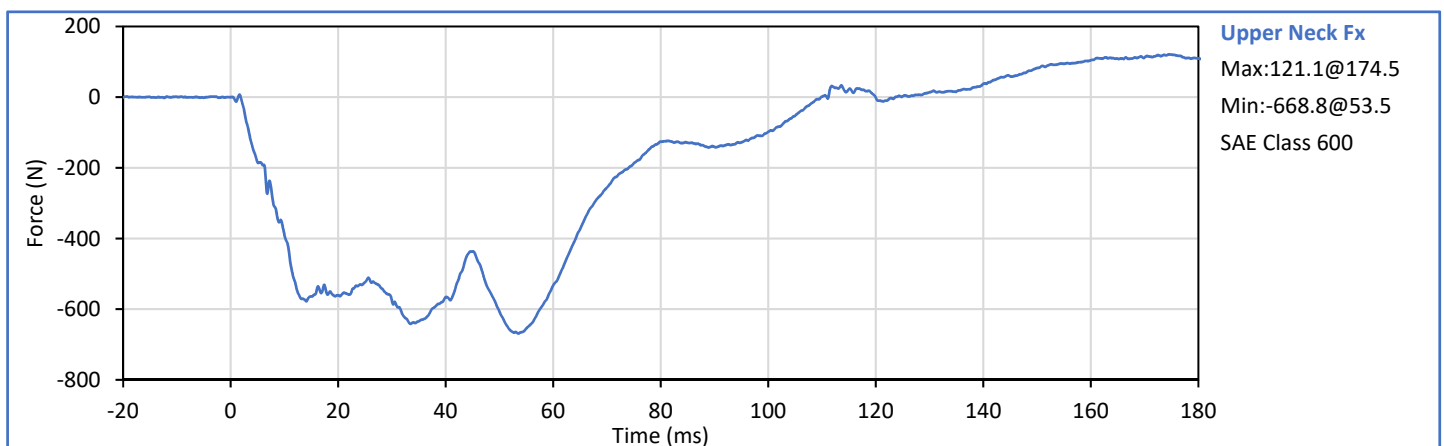
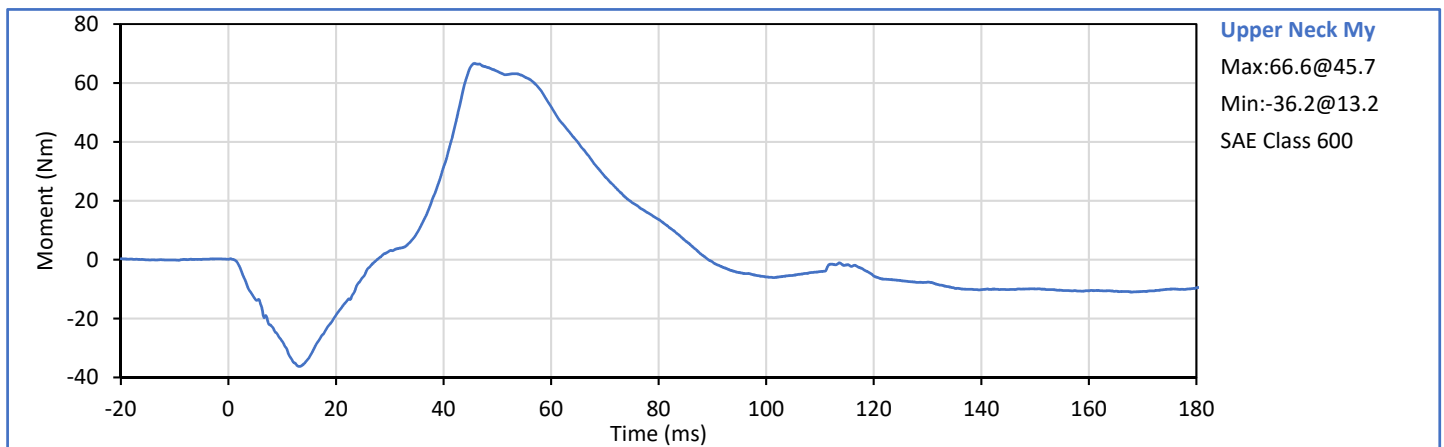
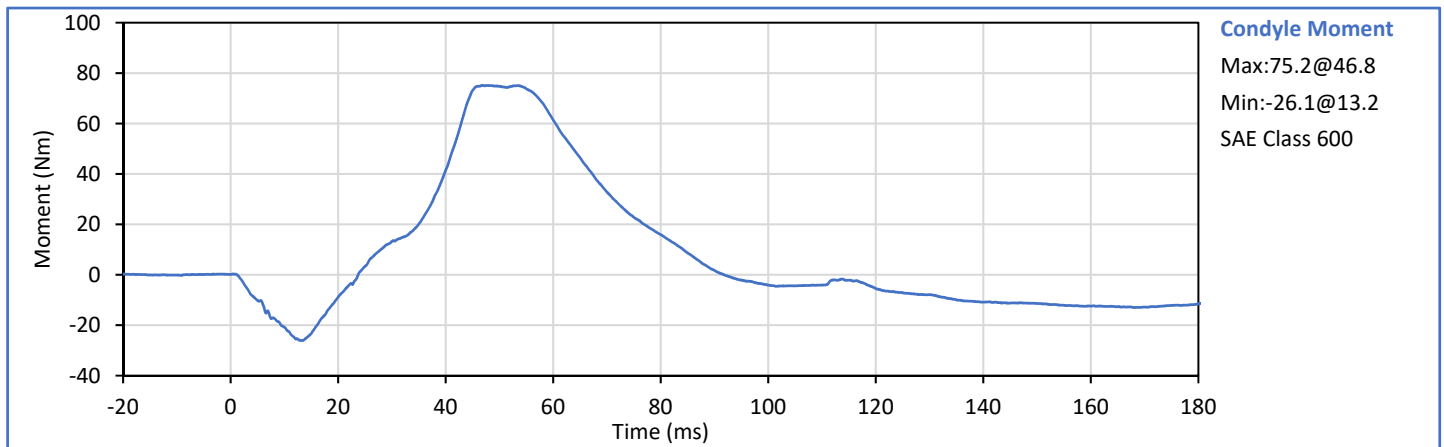
J. Hernandez

J. Hernandez

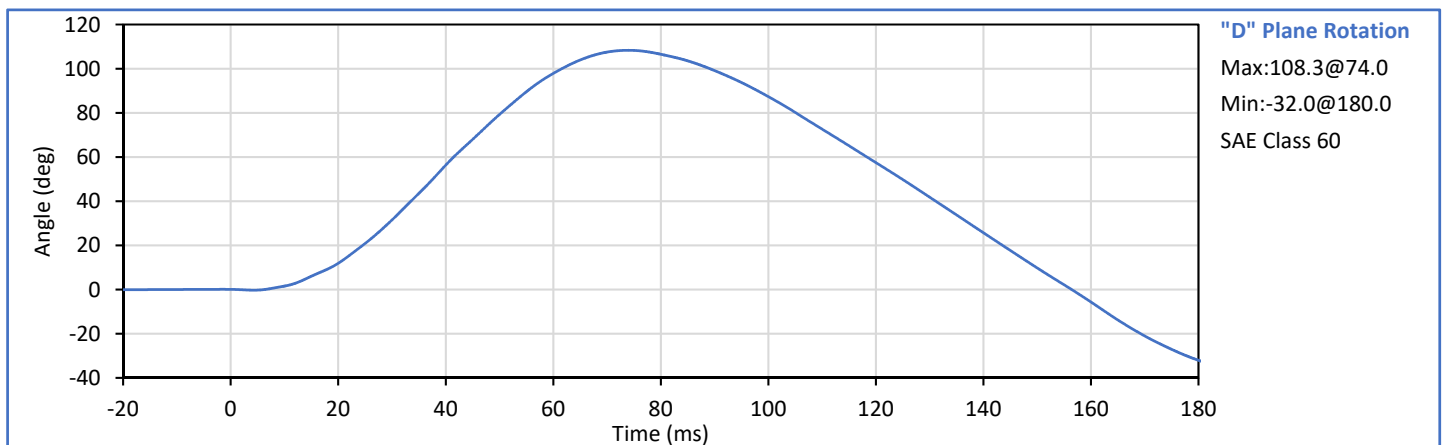
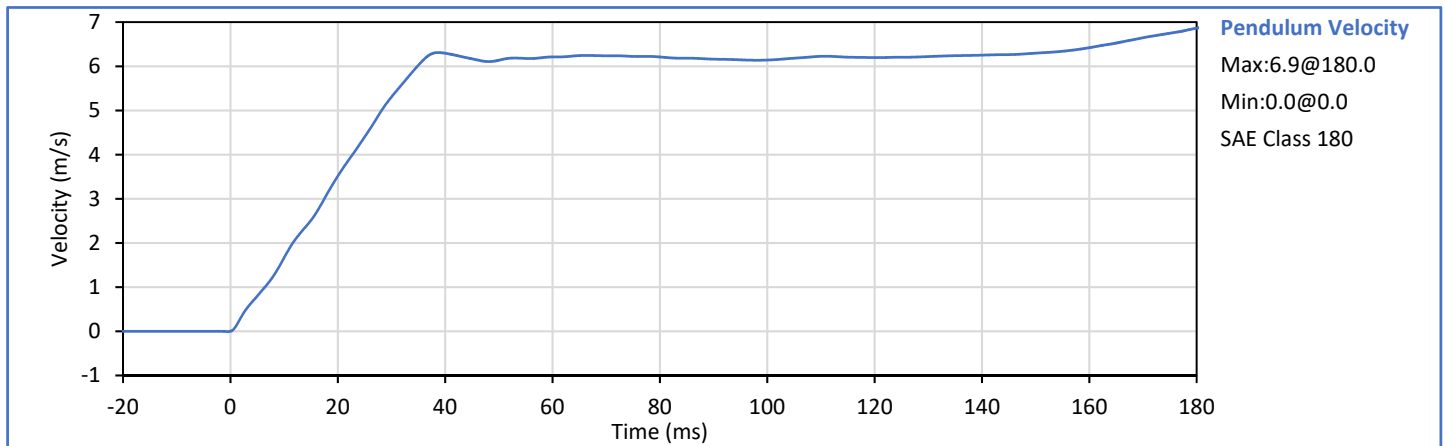
Approved By:

P. Puzzuto

P. Puzzuto



Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Humidity	%	10	70	41	Pass
Pendulum Velocity	m/s	5.95	6.19	6.00	Pass
Pendulum Velocity at 10 ms	m/s	1.50	1.90	1.66	Pass
Pendulum Velocity at 20 ms	m/s	3.10	3.90	3.51	Pass
Pendulum Velocity at 30 ms	m/s	4.60	5.60	5.30	Pass
Peak "D" Plane Rotation	deg	99.0	114.0	108.3	Pass
Peak Moment in Rotation	Nm	-65.0	-53.0	-61.0	Pass
Negative Moment Decay to -10 Nm	ms	94.0	114.0	100.3	Pass
Overall Test Results					Pass



Technician:

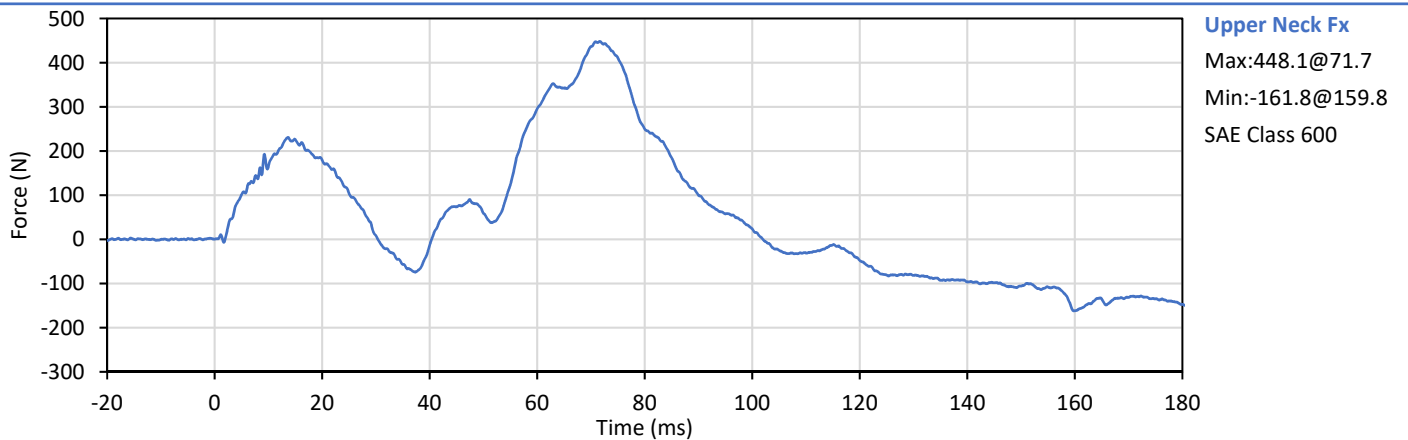
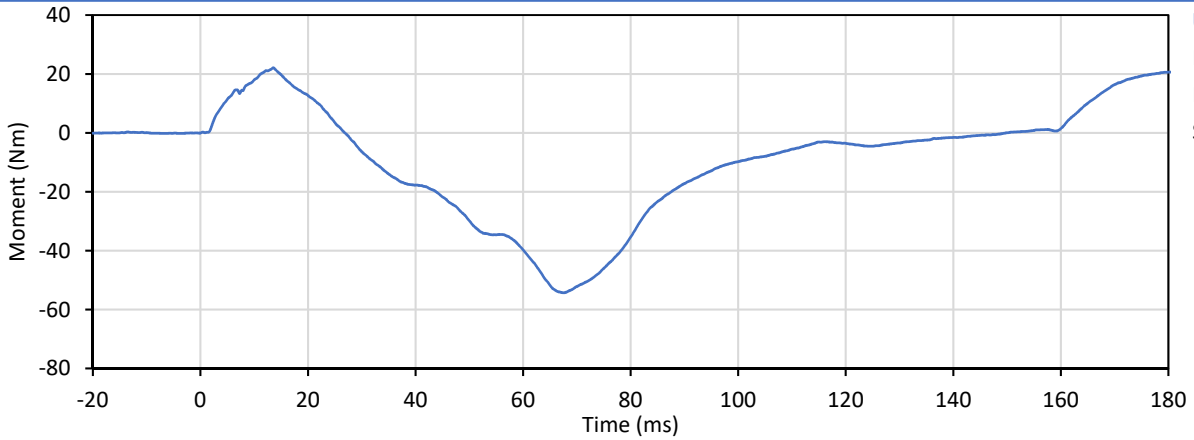
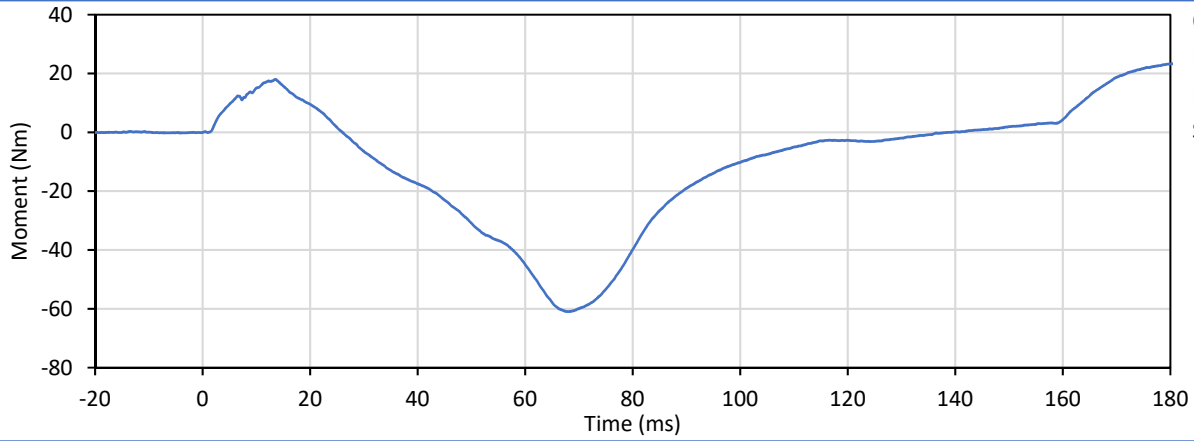
J. Hernandez

J. Hernandez

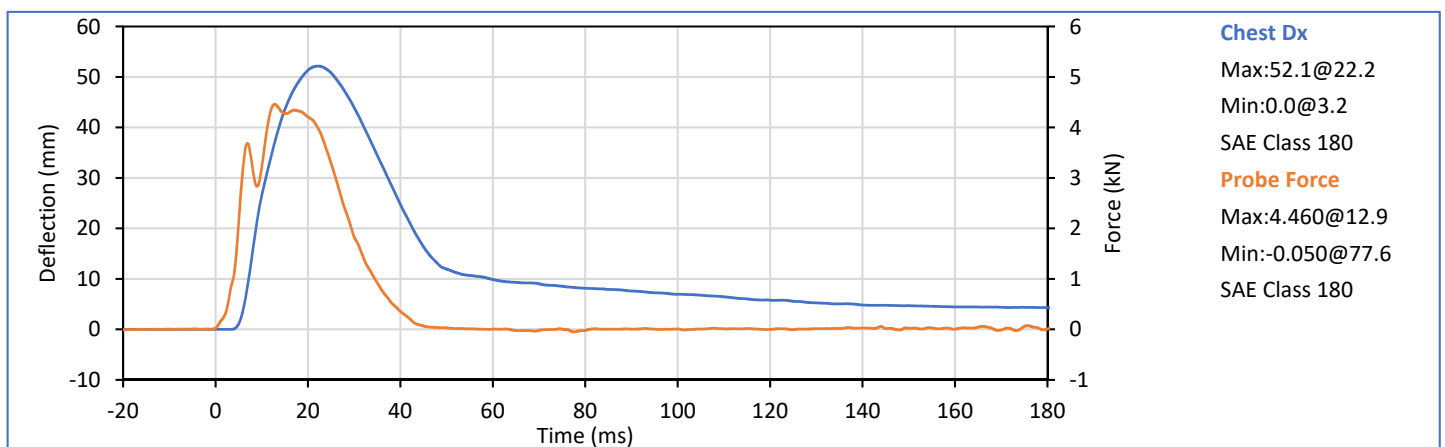
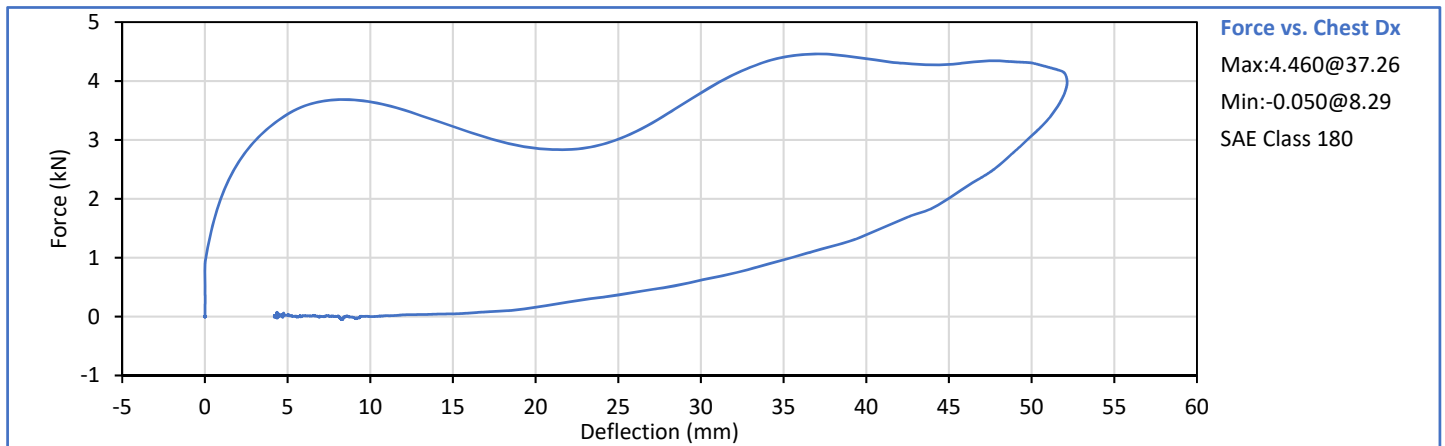
Approved By:

P. Puzzuto

P. Puzzuto



Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	44	Pass
Probe Velocity	m/s	6.59	6.83	6.71	Pass
Peak Chest Deflection	mm	50.0	58.0	52.1	Pass
Peak Probe Force, 50 and 58 mm	kN	3.900	4.400	4.305	Pass
Peak Probe Force, 18 and 50 mm	kN	0.000	4.600	4.460	Pass
Internal Hysteresis	%	69.0	85.0	77.7	Pass
Overall Test Results					Pass



Technician:

[Signature]

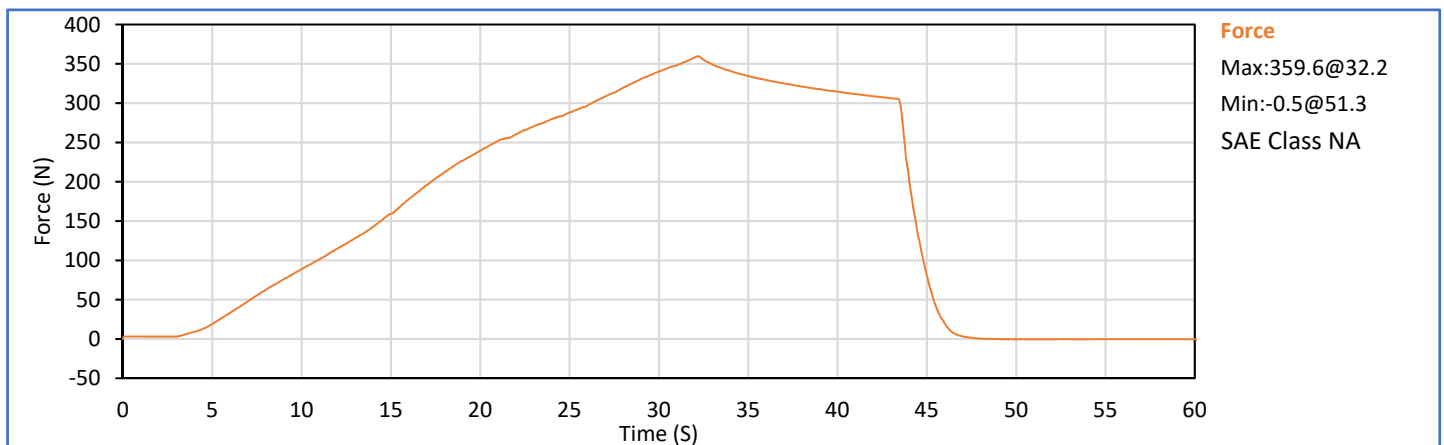
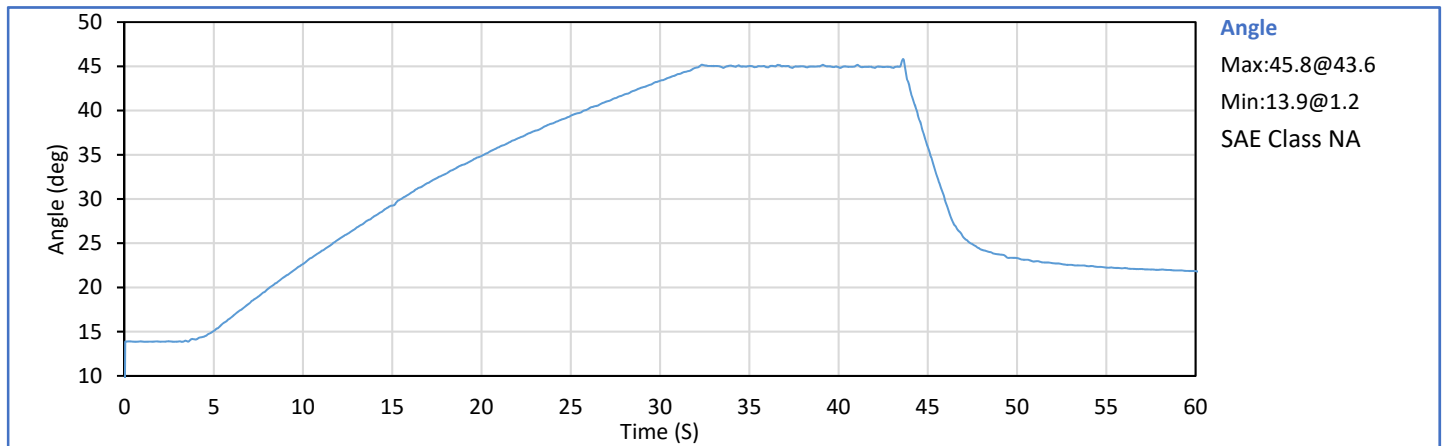
J. Hernandez

Approved By:

[Signature]

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.7	Pass
Laboratory Humidity	%	10	70	41	Pass
Orientation Angle	deg	0.0	20.0	12.3	Pass
Test Initial Angle	deg	11.0	19.0	13.9	Pass
Peak Force at 45° (+/-0.5°)	N	320.0	390.0	359.6	Pass
Torso Flexion Rate	deg/s	0.50	1.50	1.10	Pass
Final Reference Plane Angle	deg	-8.0	8.0	5.9	Pass
Overall Test Results					Pass



Technician:

J. Hernandez

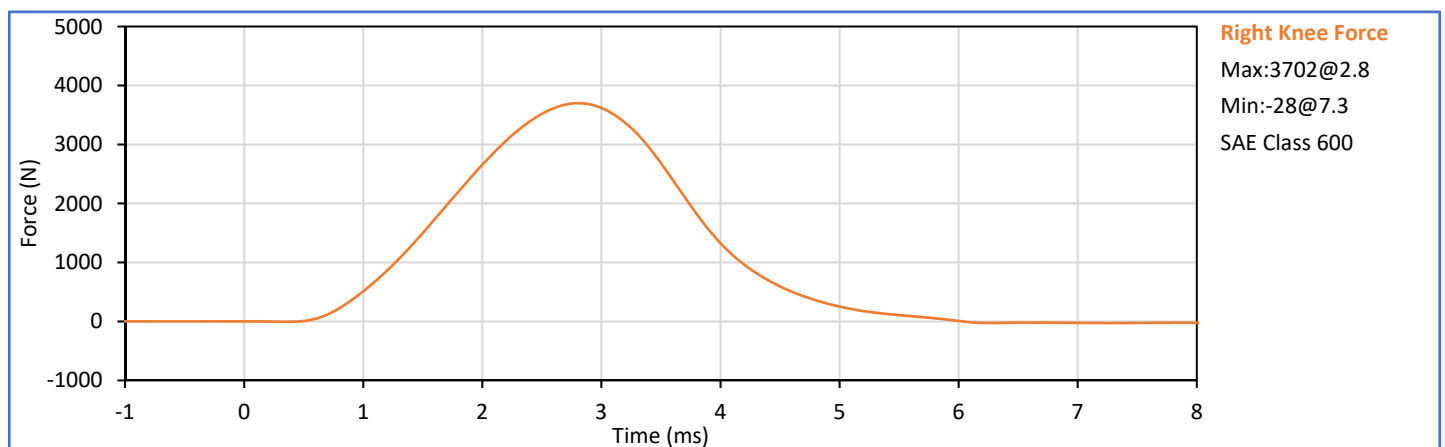
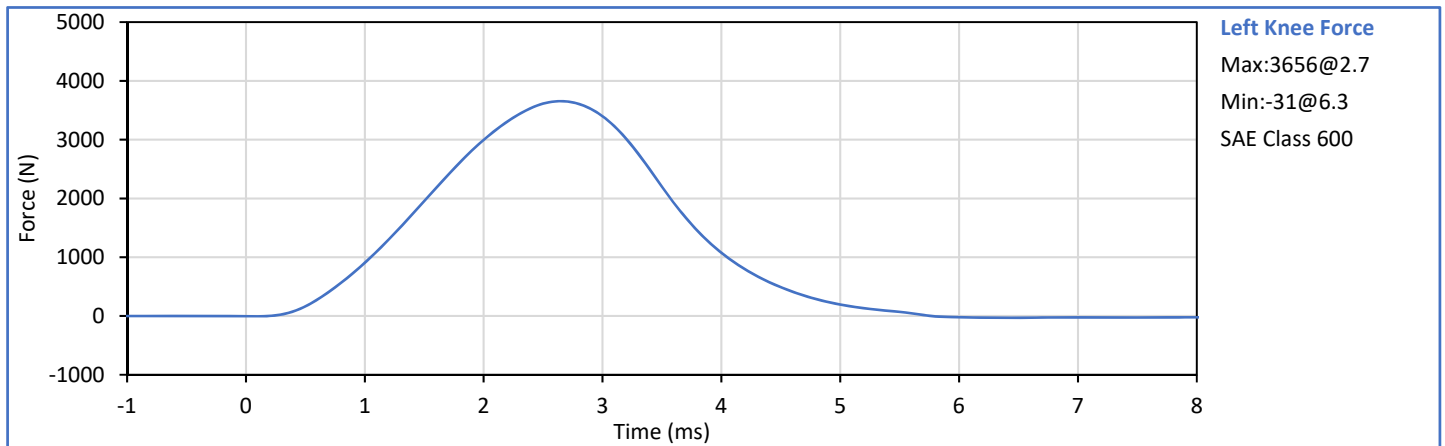
J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

	Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
	Laboratory Temperature	°C	18.9	25.6	21.1	Pass
	Laboratory Humidity	%	10	70	37	Pass
Left	Probe Velocity	m/s	2.070	2.130	2.101	Pass
Knee	Peak Resistive Force	N	3450	4060	3656	Pass
Right	Probe Velocity	m/s	2.070	2.130	2.103	Pass
Knee	Peak Resistive Force	N	3450	4060	3702	Pass
Overall Test Results						Pass



Technician:

[Signature]

J. Hernandez

Approved By:

[Signature]

P. Puzzuto

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION

Table 1 - Driver ATD Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Head Acceleration X Primary	P49209	Endevco	7264C-2k	2020-01-06
Head Acceleration Y Primary	P49228	Endevco	7264C-2k	2020-01-06
Head Acceleration Z Primary	P50101	Endevco	7264C-2k	2020-02-24
Head Acceleration X Redundant	P50103	Endevco	7264C-2k	2020-01-06
Head Acceleration Y Redundant	P49210	Endevco	7264C-2k	2020-01-06
Head Acceleration Z Redundant	P58713	Endevco	7264C-2k	2020-01-06
Head Rotation Rate X	ARS7587	DTS	ARS PRO-8k (2000Hz)	2019-07-08
Head Rotation Rate Y	ARS7426	DTS	ARS PRO-8k (2000Hz)	2019-07-08
Head Rotation Rate Z	ARS7480	DTS	ARS PRO-8k (2000Hz)	2019-07-08
Upper Neck Force X	2185 Fx	R.A. Denton	1716ATF	2019-09-03
Upper Neck Force Y	2185 Fy	R.A. Denton	1716ATF	2019-09-03
Upper Neck Force Z	2185 Fz	R.A. Denton	1716ATF	2019-09-03
Upper Neck Moment X	2185 Mx	R.A. Denton	1716ATF	2019-09-03
Upper Neck Moment Y	2185 My	R.A. Denton	1716ATF	2019-09-03
Upper Neck Moment Z	2185 Mz	R.A. Denton	1716ATF	2019-09-03
Chest Acceleration X Primary	P52112	Endevco	7264C-2k	2020-01-06
Chest Acceleration Y Primary	P49208	Endevco	7264C-2k	2020-01-06
Chest Acceleration Z Primary	P51264	Endevco	7264C-2k	2020-01-06
Chest Acceleration X Redundant	P49461	Endevco	7264C-2k	2020-01-06
Chest Acceleration Y Redundant	P58774	Endevco	7264C-2k	2020-01-06
Chest Acceleration Z Redundant	P49168	Endevco	7264C-2k	2020-01-06
Chest Deflection	0606 (H3)	Servo	14CBI-3615	2020-01-06
Pelvis Acceleration X	P49238	Endevco	7264C-2k	2020-01-06
Pelvis Acceleration Y	P58877	Endevco	7264C-2k	2020-01-06
Pelvis Acceleration Z	P50087	Endevco	7264C-2k	2020-01-06
Left Femur Force Z	DS9756 (pri)	Humanetics	3821JLN2	2019-09-03
Right Femur Force Z	DS4139 (pri)	Humanetics	3821JLN2	2019-09-03
Left Femur Force Z Redundant	DS9756 (red)	Humanetics	3821JLN2	2019-09-03
Right Femur Force Z Redundant	DS4139 (red)	Humanetics	3821JLN2	2019-09-03
Left Upper Tibia Moment X	DH3309 Mx	FTSS	IF-857	2019-09-09
Left Upper Tibia Moment Y	DH3309 My	FTSS	IF-857	2019-09-09
Left Upper Tibia Force Z	DH3309 Fz	FTSS	IF-857	2019-09-09
Left Lower Tibia Moment X	DI4186 Mx	FTSS	IF-853	2019-09-06
Left Lower Tibia Moment Y	DI4186 My	FTSS	IF-853	2019-09-06
Left Lower Tibia Force Z	DI4186 Fz	FTSS	IF-853	2019-09-06
Right Upper Tibia Moment X	DG6679 Mx	FTSS	IF-857	2019-09-09
Right Upper Tibia Moment Y	DG6679 My	FTSS	IF-857	2019-09-09
Right Upper Tibia Force Z	DG6679 Fz	FTSS	IF-857	2019-09-09
Right Lower Tibia Moment X	DI4188 Mx	FTSS	IF-853	2019-09-06
Right Lower Tibia Moment Y	DI4188 My	FTSS	IF-853	2019-09-06
Right Lower Tibia Force Z	DI4188 Fz	FTSS	IF-853	2019-09-06
Left Ankle Acceleration X	03E20-N09	Entran	EGEB6Q-2k	2020-01-02
Left Ankle Acceleration Z	03D30-N13	Entran	EGEB6Q-2k	2020-01-02
Left Toe Acceleration Z	03H07-Z10	Entran	EGEB6Q-2k	2020-01-02
Right Ankle Acceleration X	03E29-N20	Entran	EGEB6Q-2k	2020-01-02
Right Ankle Acceleration Z	03E18-F02	Entran	EGEB6Q-2k	2020-01-02
Right Toe Acceleration Z	05H31-Z04	Entran	EGEB6Q-2k	2020-01-02
Seat Belt Outside Lap Force	Not installed			
Seat Belt Upper Diagonal Force	Not installed			

Table 2 - Right Front Passenger ATD Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Head Acceleration X Primary	P51889	Endevco	7264C-2k	2019-11-25
Head Acceleration Y Primary	P51861	Endevco	7264C-2k	2019-11-25
Head Acceleration Z Primary	P52077	Endevco	7264C-2k	2019-11-25
Head Acceleration X Redundant	P58835	Endevco	7264C-2k	2019-11-25
Head Acceleration Y Redundant	P51703	Endevco	7264C-2k	2019-11-25
Head Acceleration Z Redundant	P52096	Endevco	7264C-2k	2019-11-25
Head Rotation Rate X	ARS7455	DTS	ARS PRO-8k (2000Hz)	2019-07-08
Head Rotation Rate Y	ARS7537	DTS	ARS PRO-8k (2000Hz)	2019-07-08
Head Rotation Rate Z	ARS7582	DTS	ARS PRO-8k (2000Hz)	2019-07-08
Upper Neck Force X	284 Fx	FTSS	IF-205	2020-01-07
Upper Neck Force Y	284 Fy	FTSS	IF-205	2020-01-07
Upper Neck Force Z	284 Fz	FTSS	IF-205	2020-01-07
Upper Neck Moment X	284 Mx	FTSS	IF-205	2020-01-07
Upper Neck Moment Y	284 My	FTSS	IF-205	2020-01-07
Upper Neck Moment Z	284 Mz	FTSS	IF-205	2020-01-07
Chest Acceleration X Primary	P58860	Endevco	7264C-2k	2019-11-25
Chest Acceleration Y Primary	P51876	Endevco	7264C-2k	2019-11-25
Chest Acceleration Z Primary	P58711	Endevco	7264C-2k	2019-11-25
Chest Acceleration X Redundant	P52049	Endevco	7264C-2k	2019-11-25
Chest Acceleration Y Redundant	P51862	Endevco	7264C-2k	2019-11-25
Chest Acceleration Z Redundant	P52048	Endevco	7264C-2k	2019-11-25
Chest Deflection	0724 (HF)	Servo	14CBI-3615	2019-11-25
Pelvis Acceleration X	P52090	Endevco	7264C-2k	2019-11-25
Pelvis Acceleration Y	P58849	Endevco	7264C-2k	2019-11-25
Pelvis Acceleration Z	P58756	Endevco	7264C-2k	2019-11-25
Left Femur Force Z	DS4136 (pri)	Humanetics	3821JLN2	2020-02-17
Right Femur Force Z	DS4138 (pri)	Humanetics	3821JLN2	2020-02-17
Left Femur Force Z Redundant	DS4136 (red)	Humanetics	3821JLN2	2020-02-17
Right Femur Force Z Redundant	DS4138 (red)	Humanetics	3821JLN2	2020-02-17
Left Upper Tibia Moment X	369 Mx	R.A. Denton	3643	2020-02-18
Left Upper Tibia Moment Y	369 My	R.A. Denton	3643	2020-02-18
Left Upper Tibia Force Z	369 Fz	R.A. Denton	3643	2020-02-18
Left Lower Tibia Moment X	494 Mx	R.A. Denton	3644	2020-02-18
Left Lower Tibia Moment Y	494 My	R.A. Denton	3644	2020-02-18
Left Lower Tibia Force Z	494 Fz	R.A. Denton	3644	2020-02-18
Right Upper Tibia Moment X	DH3054 Mx	R.A. Denton	IF-857	2020-02-18
Right Upper Tibia Moment Y	DH3054 My	R.A. Denton	IF-857	2020-02-18
Right Upper Tibia Force Z	DH3054 Fz	R.A. Denton	IF-857	2020-02-18
Right Lower Tibia Moment X	503 Mx	R.A. Denton	3644	2020-02-18
Right Lower Tibia Moment Y	503 My	R.A. Denton	3644	2020-02-18
Right Lower Tibia Force Z	503 Fz	R.A. Denton	3644	2020-02-18
Left Ankle Acceleration X	P52057	Endevco	7264C-2k	2019-11-26
Left Ankle Acceleration Z	03E18-F07	Entran	EGEB6Q-2k	2019-11-26
Left Toe Acceleration Z	P49224	Endevco	7264C-2k	2019-11-26
Right Ankle Acceleration X	P52019	Endevco	7264C-2k	2019-11-26
Right Ankle Acceleration Z	P58755	Endevco	7264C-2k	2019-11-26
Right Toe Acceleration Z	P52076	Endevco	7264C-2k	2019-11-26
Seat Belt Outside Lap Force	Not installed			
Seat Belt Upper Diagonal Force	Not installed			

Table 3 - Vehicle Instrumentation

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Left Rear Primary Ax	A273455	MSI	52F-2000	2019-11-27
Right Rear Primary Ax	10834	Endevco	757F-2k	2019-12-17
Engine Top Ax	A265871	MSI	52F-2000	2019-12-12
Engine Bottom Ax	10913	Endevco	757F-2k	2019-12-17
Left Rear Az	A267280	MSI	52F-2000	2019-12-12
Right Rear Az	10915	Endevco	757F-2k	2019-12-17
Left Rear Redundant Ax	A266317	MSI	52F-2000	2019-11-13
Right Rear Redundant Ax	11176	Endevco	757F-2k	2019-12-17