

**REPORT NUMBER: NCAP-KAR-22-007**

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

**TOYOTA MOTOR MANUFACTURING, TEXAS, INC.  
2022 TOYOTA TUNDRA CREWMAX 4X4 4-DOOR TRUCK**

**NHTSA NUMBER: M20225103**

**PREPARED BY:  
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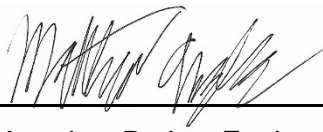


**SEPTEMBER 12, 2022**

**FINAL REPORT**

**U.S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
OFFICE OF CRASHWORTHINESS STANDARDS  
MAIL CODE : NRM-100  
1200 NEW JERSEY AVE, SE  
WASHINGTON, DC 20590**

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Approval Date: September 12, 2022

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: \_\_\_\_\_

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

Date: \_\_\_\_\_

## TECHNICAL REPORT DOCUMENTATION PAGE

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<b>12. Sponsoring Agency Name and Address</b> U. S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NRM-100) 1200 New Jersey Ave., SE Washington, D.C. 20590		<b>14. Sponsoring Agency Code</b> NRM-100																																																					
		<b>15. Supplementary Notes</b>																																																					
<b>16. Abstract</b> A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2022 Toyota Tundra CrewMax 4x4 4-door truck in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure. The test was conducted at the Applus+IDIADA KARCO Engineering, LLC. facility in Adelanto, California on August 29, 2022.  The impact velocity of the vehicle was 56.26 km/h and the ambient temperature at the barrier face at the time of impact was 31.1°C. The target vehicle's post-test maximum crush was 631mm at DPD2 to the left of the vehicle's centerline. The test vehicle's performance is as follows:																																																							
<table border="1" style="width: 100%; border-collapse: collapse;"> <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 (HIC<sub>15</sub>)</td> <td>N/A</td> <td>700</td> <td>172.282</td> <td>700</td> <td>225.185</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-24.123</td> <td>52</td> <td>-12.562</td> </tr> <tr> <td>Nij</td> <td>N/A</td> <td>1</td> <td>0.298</td> <td>1</td> <td>0.374</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4170</td> <td>1733.495</td> <td>2620</td> <td>1011.591</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4000</td> <td>-251.674</td> <td>2520</td> <td>-380.716</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10000</td> <td>-868.077</td> <td>6800</td> <td>-1937.958</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10000</td> <td>-1406.301</td> <td>6800</td> <td>-1780.587</td> </tr> </tbody> </table>				Measurement Description	Units	Driver ATD		Passenger ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC <sub>15</sub> )	N/A	700	172.282	700	225.185	Maximum Chest Compression	mm	63	-24.123	52	-12.562	Nij	N/A	1	0.298	1	0.374	Neck Tension	N	4170	1733.495	2620	1011.591	Neck Compression	N	4000	-251.674	2520	-380.716	Left Femur Force	N	10000	-868.077	6800	-1937.958	Right Femur Force	N	10000	-1406.301	6800	-1780.587
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<b>17. Key Words</b> 56.3 km/h (35 mph) Full Frontal Rigid Barrier Impact Test New Car Assessment Program (NCAP)		<b>18. Distribution Statement</b> National Highway Traffic Safety Administration Technical Information Services Division 1200 New Jersey Ave, SE Washington, DC 20590																																																					
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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 dated May 2018 for NCAP Full Frontal Rigid Barrier Impact Testing.

#### **SUMMARY**

A load cell barrier consisting of 176 load cells was impacted by a 2022 Toyota Tundra CrewMax 4x4 4-door truck at a velocity of 56.26 km/h. The test was performed at Applus+ IDIADA KARCO Engineering, LLC. on August 29, 2022. 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 HIII 50<sup>th</sup> percentile male anthropomorphic test device (ATD) was placed in the driver seating position and one Part HIII 5<sup>th</sup> 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 106 channels of dummy and vehicle response data were recorded on an on-board data acquisition system. Appendix B contains the dummy response data traces. Appendix D contains a complete list of instrumentation used for dummies and the vehicle.

There was 100 percent windshield retention and 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 631 mm at DPD2 to the left of 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 and lower torso contacted the frontal airbag. Both 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 and lower torso contacted the frontal airbag. Both left and right knees contacted the knee airbag.

The occupant data is summarized below:

ATD Position	HIC <sub>15</sub>	Nij	Neck Tension (N)	Neck Comp. (N)	3ms Chest Clip (g)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50th Male)	172.282	0.298	1733.495	-251.674	51.560	-24.123	-868.077	-1406.301
Passenger (5th Female)	225.185	0.374	1011.591	-380.716	44.520	-12.562	-1937.958	-1780.587

**GENERAL COMMENTS:**

Driver Shoulder Belt Force, noise spikes present from 71.4 to 101.4 ms.

## SECTION 2

### OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck NHTSA No.: M20225103

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/29/2022

### 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 <sup>2</sup>	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: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck      NHTSA No.: M20225103  
 Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 08/29/2022

**TEST VEHICLE INFORMATION AND OPTIONS**

NHTSA Number	M20225103
Model Year	2022
Make	Toyota
Model	Tundra
Body Style	4-Door Truck
VIN	5TFLA5EC9NX007912
Body Color	Grey
Odometer Reading (km / mi)	10 / 6
Engine Displacement (L)	3.5
Type / No. of Cylinders	V6
Engine Placement	Longitudinal
Transmission Type	Automatic
Transmission Speeds	10
Overdrive	Yes
Final Drive	4WD
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
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	No

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

**DATA FROM CERTIFICATION LABEL**

Manufactured By	Toyota Motor Manufacturing, Texas, Inc.
Date of Manufacture	Jun-22

GVWR (kg)	3330
GAWR Front (kg)	1850
GAWR Rear (kg)	1750

**VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION**

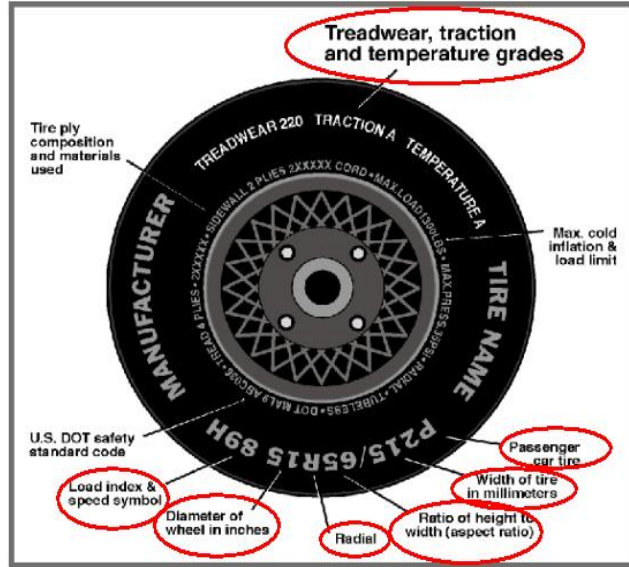
Measured Parameter	Front	Rear	Third	Total	
Type of Seats	Bucket	Split Bench			
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				615.0	A
DSC x 68.04 (kg)				340.2	B
Cargo Weight (RCLW) (kg)				274.8	A-B

**DATA SHEET NO. 1 ... (CONTINUED)**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck NHTSA No.: M20225103

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/29/2022



**VEHICLE TIRE INFORMATION**

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	265/70 R18	265/70 R18
Tire Size on Vehicle	265/70 R18	265/70 R18
Tire Manufacturer	Michelin	Michelin
Tire Model	LTX Trail	LTX Trail
Treadwear	480	480
Traction	B	B
Temperature Grades	B	B
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Steel, 2 Polyester, 1 Polyamide	2 Steel, 2 Polyester, 1 Polyamide
Load Index / Speed Symbol	116T	116T
Tire Material	Polyester, Steel, Polyamide	Polyester, Steel, Polyamide
DOT Safety Code Left	1B3 ON OOBX 0522	1B3 ON OOBX 0522
DOT Safety Code Right	1B3 ON OOBX 0522	1B3 ON OOBX 0522

**DATA SHEET NO. 1 ... (CONTINUED)**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck      NHTSA No.: M20225103  
 Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 08/29/2022

**TEST VEHICLE WEIGHTS**

	Units	As Delivered Weights (UWV)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	744.5	551.5		781.0	621.0	
Right	kg	758.0	527.5		798.0	653.0	
Ratio	%	58.2%	41.8%	100.0%	55.3%	44.7%	100.0%
Total	kg	1502.5	1079.0	2581.5	1579.0	1274.0	2853.0

**TARGET TEST WEIGHT CALCULATION**

Measured Parameter	Units	Value	
Total Delivered Weight (UWV)	kg	2581.5	A
Weight of 1 360 ATD & 1 DH1644 ATD	kg	141.0	B
Rated Cargo/Luggage Weight (RCLW)	kg	136.0	C
Calculated Vehicle Target Weight (TVTW)	kg	2858.5	A+B+C

**TEST VEHICLE ATTITUDES**

Condition	Units	LF	RF	LR	RR	CG Aft of Front Axle
As Delivered	mm	1023	1025	1080	1088	1675
As Tested	mm	917	919	948	958	1789
Post-Test	mm	1050	1002	975	955	

**GENERAL TEST VEHICLE DATA**

Measurement Description	Units	Value
Total Vehicle Wheelbase	mm	4006
Total Vehicle Length at Left Side	mm	5815
Total Vehicle Length at Centerline	mm	6226
Total Vehicle Length at Right Side	mm	5812
Weight of Ballast in Cargo Area	kg	68.0
Weight of Vehicle Components Removed	kg	0.0
Amount of Stoddard Solvent in Fuel Tank	L	113.37

**VEHICLE COMPONENTS REMOVED TO MEET TEST WEIGHT:**

None.  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**DATA SHEET NO. 1 ... (CONTINUED)**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck NHTSA No.: M20225103  
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/29/2022

**TARGET VEHICLE STRUCTURAL MEASUREMENTS**

<b>No.</b>	<b>Description</b>	<b>Pre-Test</b>
1	Total Length	6226
2	Total Width	2023
3	Bumper Top Height	979
4	Bumper Bottom Height	364
5	Longitudinal Member Top Height	663
6	Distance Between Longitudinal Members	921
7	Longitudinal Member Width	120
8	Engine Top Height	1186
9	Engine Bottom Height	357
10	Engine and Gearbox Width	506
11	Front Bumper to Engine Distance	561
12	Front Shock Absorber Fixing Height	843
13	Bonnet Leading Edge Height	1193
14	Front Shock Absorber Fixing Width	1150
15	Front Bumper to Front Axle Distance	574
16	Front Axle to A-Pillar Distance	758
17	A-Pillar to B-Pillar Distance	733
18	B-Pillar to Rear Axle Distance	2507
19	B-Pillar to C-Pillar Distance	1085
20	Roof Sill Bottom Height	1868
21	Roof Sill Top Height	1896
22	Floor Sill Bottom Height	483
23	Floor Sill Top Height	555

All measurements in millimeters.

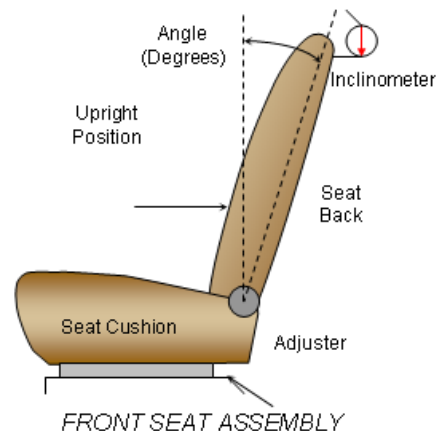
## DATA SHEET NO. 2

### SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck      NHTSA No.: M20225103  
 Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 08/29/2022

#### 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 with a flat edge along the seat back.

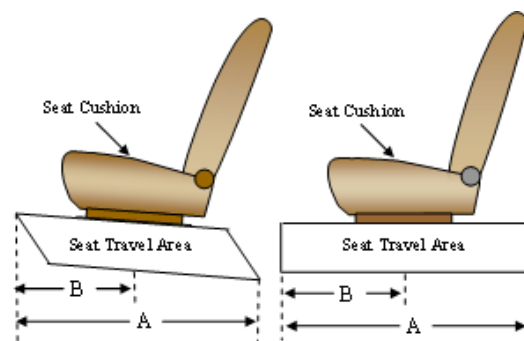


#### SEAT BACK ANGLE

Seating Position	Degrees
Driver Seat Back Angle	1.5
Passenger Seat Back Angle	2.1

#### 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	319 mm	159 mm
Passenger Seat	320 mm	0 mm

#### SEAT BELT UPPER ANCHORAGE

The seat belt upper anchorage is positioned to the manufacturer’s design position for a 50<sup>th</sup> percentile adult male ATD for the driver, and a 5<sup>th</sup> 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

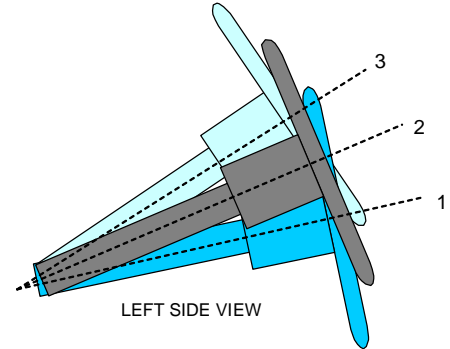
**DATA SHEET NO. 2 ... (CONTINUED)**

**SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA**

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck      NHTSA No.: M20225103  
 Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 08/29/2022

**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.



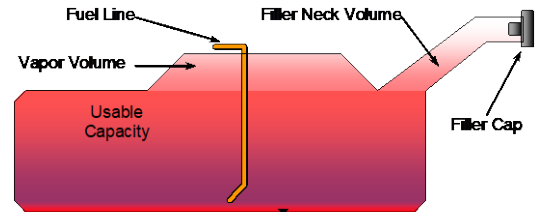
LEFT SIDE VIEW  
STEERING COLUMN ASSEMBLY

**STEERING COLUMN POSITIONING**

	Degrees	Fore-Aft Position (mm)
Lowermost Position, No. 1	65.3	80
Geometric Center Position, No. 2	67.5	110
Uppermost Position, No. 3	69.6	140
Telescoping Steering Wheel Travel		60
Test Position	67.5	110

**FUEL PUMP**

The vehicle is equipped with an electric fuel pump. The pump will work at "ignition on" until pressure in the system has reached working pressure in the system; then it will stop pumping fuel until the engine has been started.



VEHICLE FUEL TANK ASSEMBLY

**FUEL TANK CAPACITY**

Description	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	121.89
Usable Capacity of "Optional Tank" (see Form No. 1)	84.79
Usable Capacity of "Standard Tank" (see Owner's Manual)	121.89
Usable Capacity of "Optional Tank" (see Owner's Manual)	84.79
93% of Usable Capacity	113.36
Actual amount of Solvent Used in Test	113.36
1/3 of Usable Capacity	40.63

Is the Actual Amount of Solvent Used in the test equal to 93% ± 1% of the Usable Capacity stated in the Form No. 1?       Yes       No

### DATA SHEET NO. 3

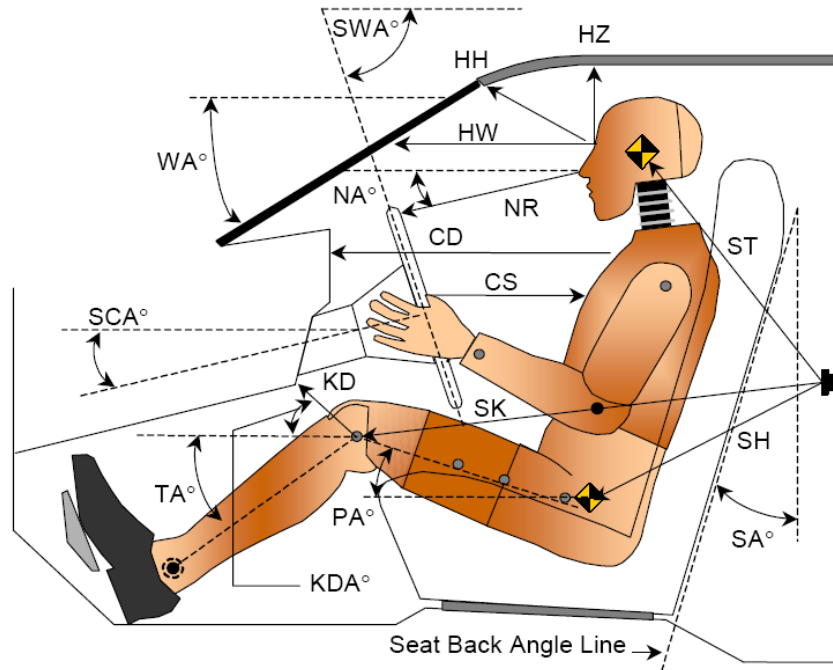
### DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck

NHTSA No.: M20225103

Test Program: 56.3 km/h Frontal Impact NCAP Test

Test Date: 08/29/2022



**LEFT SIDE VIEW**

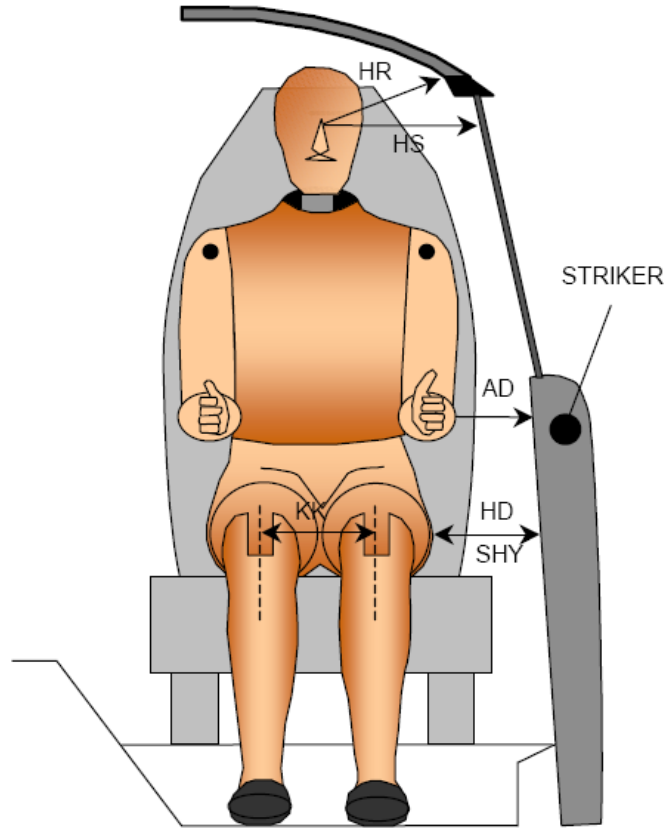
Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		55.5		
SWA°	Steering Wheel Angle		22.5		
SCA°	Steering Column Angle		62.5		
SA°	Seat Back Angle (On Seatback Post)		1.5		2.1
HZ	Head to Roof	293	90.0	306	90.0
HH	Head to Header	514	20.5	420	38.6
HW	Head to Windshield	748	0.0	663	0.0
NR	Nose to Rim	397	7.9	436	36.4
CD	Chest to Dash	543	17.4	375	9.4
CS	Chest to Steering Hub	312	0.1		
RA	Rim to Abdomen	209	0.0		
KDL	Left Knee to Dash	154	15.7	74	38.0
KDR	Right Knee to Dash	143	22.4	88	35.2
PA°	Pelvic Angle		22.7		20.5
TA°	Tibia Angle		49.1		51.4
SK	Striker to Knee	663		780	
ST	Striker to Head	598		598	
SH	Striker to H-Point	326		406	

## DATA SHEET NO. 4

### DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck      NHTSA No.: M20225103

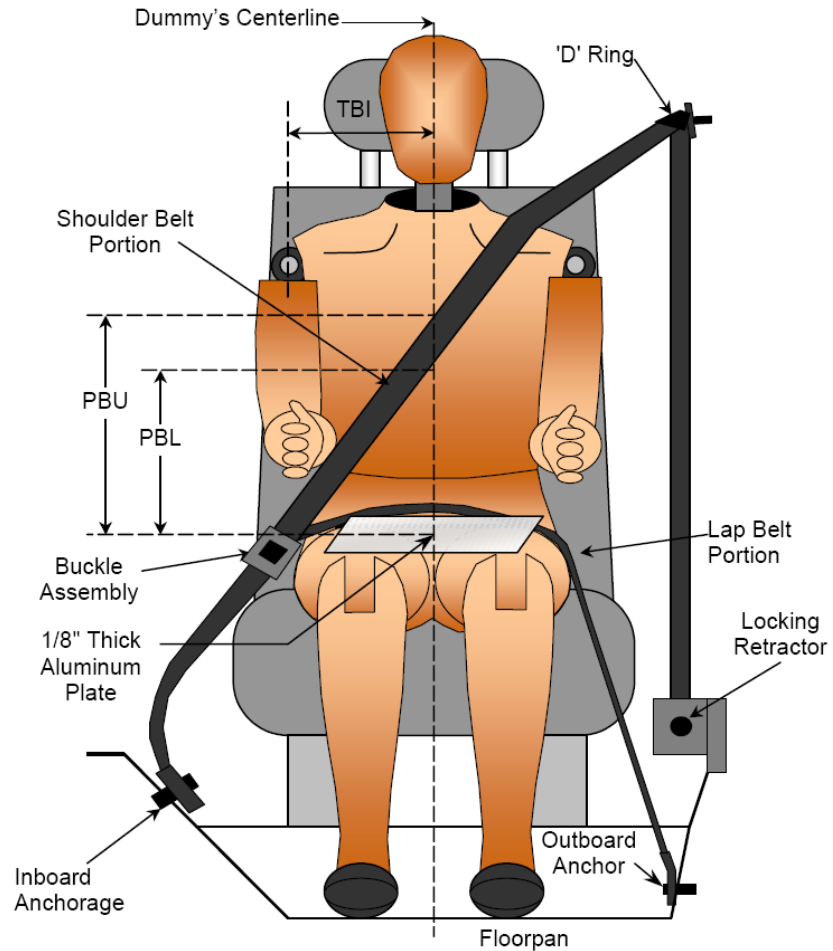
Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 08/29/2022



Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	135	75
HD	H-Point to Door	161	197
HR	Head to Side Header	268	303
HS	Head to Side Window	385	360
KK	Knee to Knee	305	165
SHY	Striker to H-Point (Y-Direction)	144	90
AA	Ankle to Ankle	330	175

**DATA SHEET NO. 5**  
**SEAT BELT POSITIONING DATA**

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck      NHTSA No.: M20225103  
 Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 08/29/2022



**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	305	260
PBL	Top Surface of Aluminum Plate to Belt Lower Edge	mm	220	188

**BELT LENGTH DATA**

Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as Measured on ATD	mm	885	975
Lap Belt Length as Measured on ATD	mm	802	867
Remainder of Belt on Reel	mm	924	650
Total Belt Length for Continuous Webbing Systems	mm	2611	2492

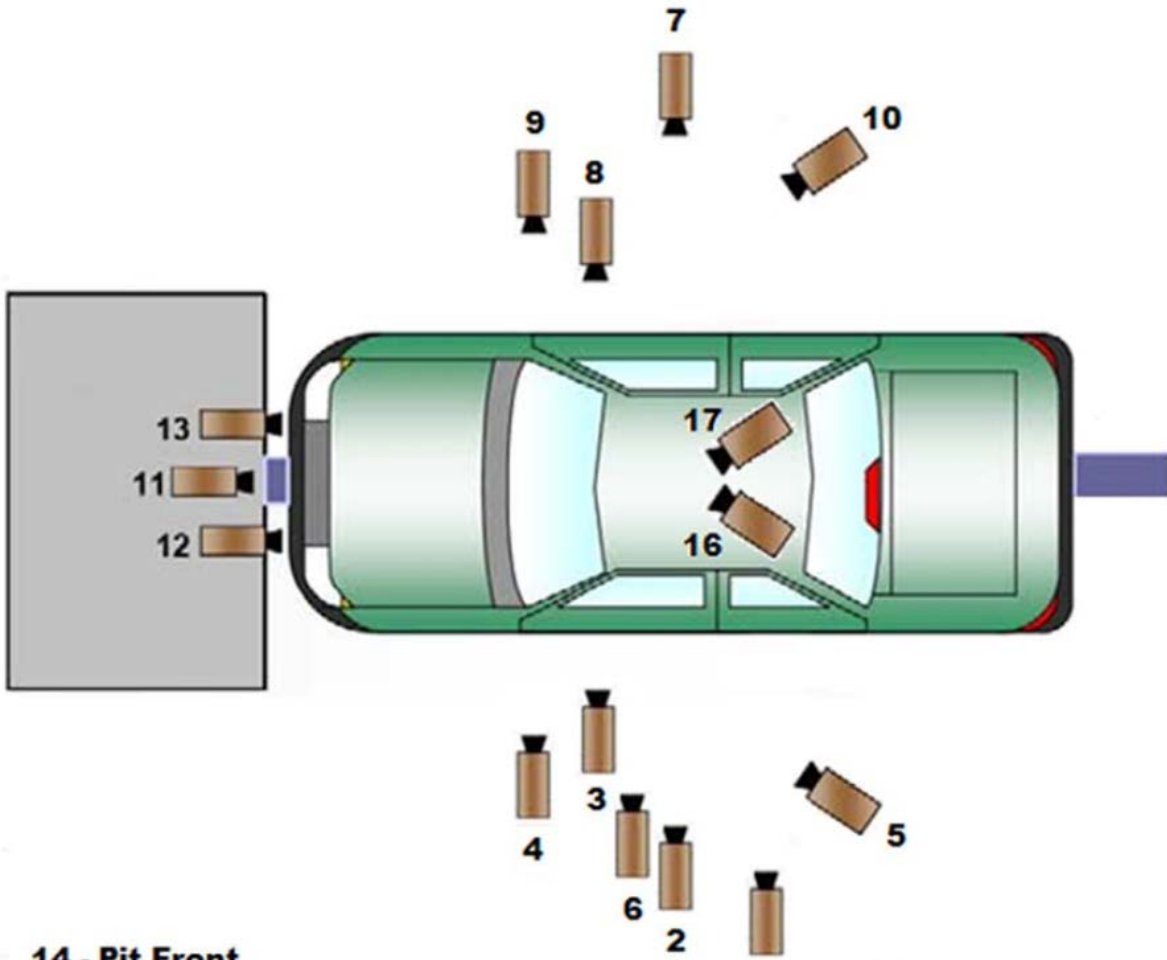
**DATA SHEET NO. 6**

**HIGH-SPEED CAMERA LOCATIONS AND DATA**

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck NHTSA No.: M20225103

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/29/2022

**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: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck      NHTSA No.: M20225103  
 Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 08/29/2022

**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	21	1000
15	Pit Rear	-3398	0	1495	15	1000
16	Driver Onboard	-2796	-247	-1721	8	1000
17	Passenger Onboard	-2796	247	-1721	8	1000

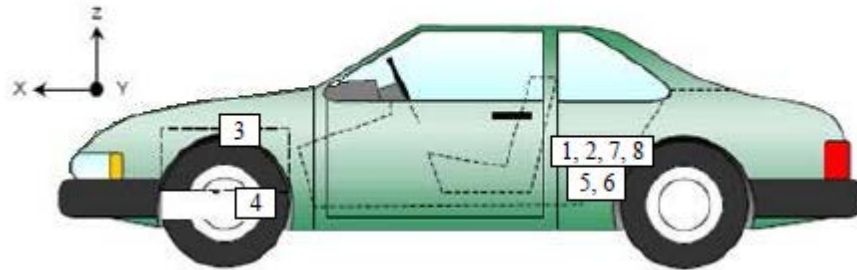
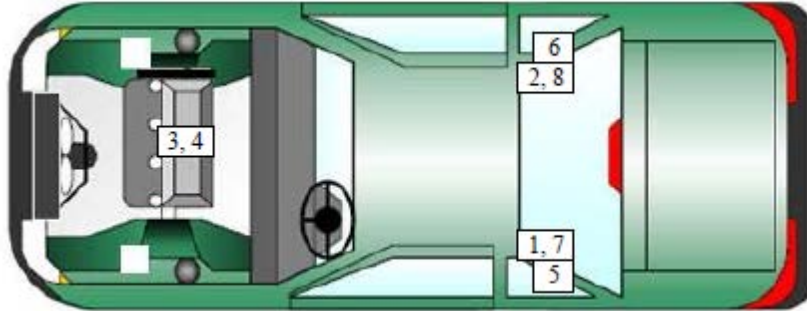
Coordinates:      +X = forward impact plane  
                          +Y = right of monorail center  
                          +Z = into ground

**DATA SHEET NO. 7**

**VEHICLE ACCELEROMETER LOCATIONS**

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck NHTSA No.: M20225103

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/29/2022



**VEHICLE ACCELEROMETER PRE-TEST LOCATIONS**

No.	Description	Location		
		X	Y	Z
1	Left Rear Accelerometer X-Direction	3480	-694	600
2	Right Rear Accelerometer X-Direction	3455	756	597
3	Engine Top X	1095	57	1224
4	Engine Bottom X	1144	-22	368
5	Left Rear Accelerometer Z-Direction	3480	-694	600
6	Right Rear Accelerometer Z-Direction	3455	756	597
7	Left Rear Accelerometer X-Direction Redundant	3480	-694	600
8	Right Rear Accelerometer X-Direction Redundant	3455	756	597

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

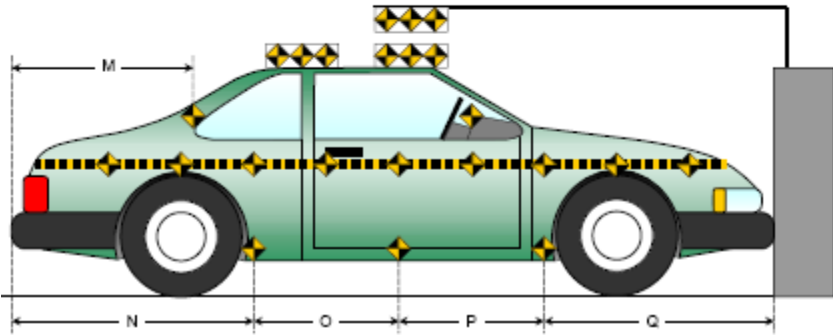
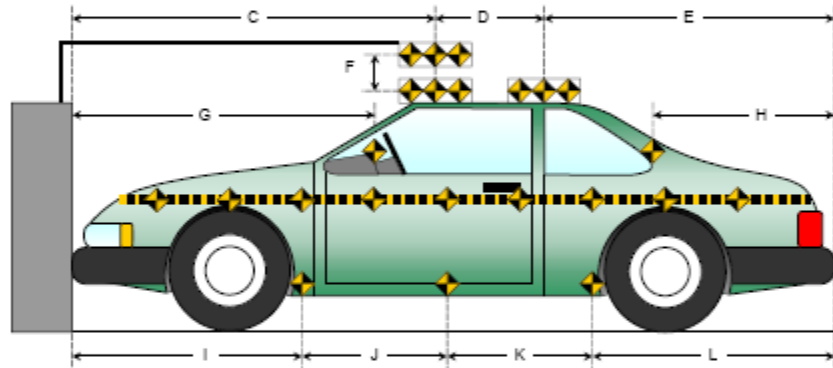
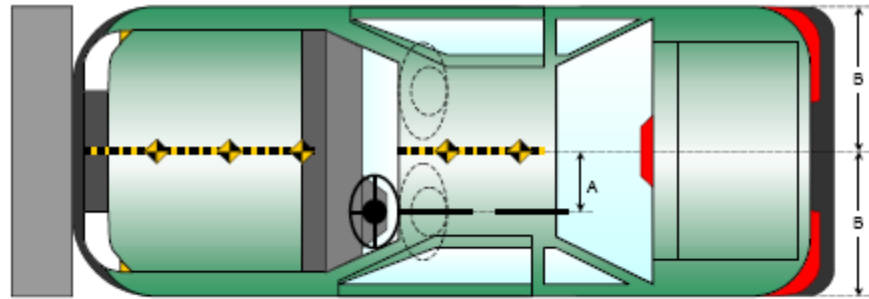
**DATA SHEET NO. 8**

**PHOTOGRAPHIC REFERENCE TARGET LOCATIONS**

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck NHTSA No.: M20225103

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/29/2022

Item	Value
A	463
B	922
C	2408
D	610
E	3208
F	305
G	1917
H	2315
I	1591
J	1165
K	1135
L	2335
M	2325
N	2315
O	1155
P	1145
Q	1611



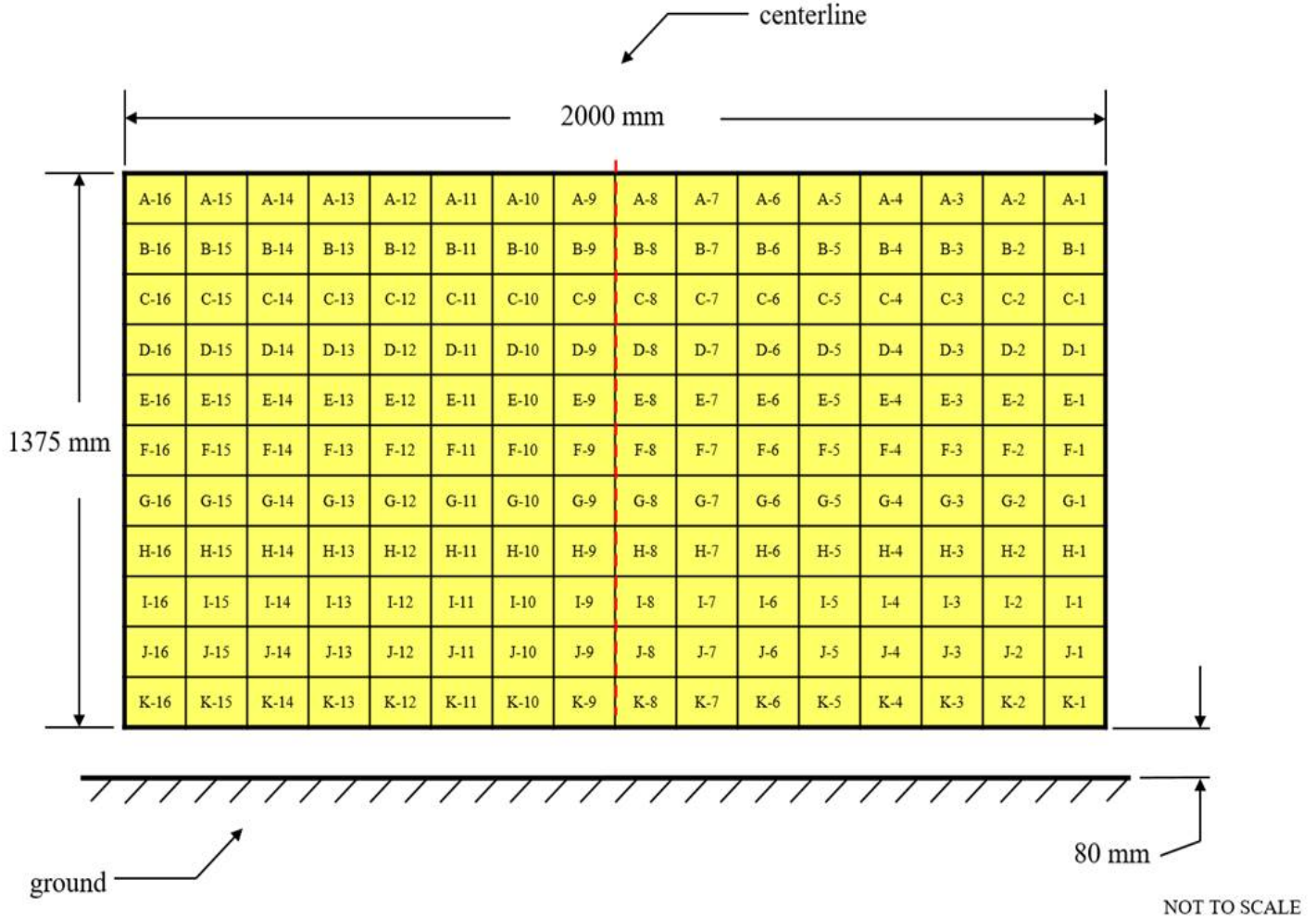
All measurements in millimeters.

**DATA SHEET NO. 9**

**LOAD CELL LOCATIONS ON FIXED BARRIER**

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck NHTSA No.: M20225103

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/29/2022



**DATA SHEET NO. 10**

**TEST VEHICLE SUMMARY OF RESULTS**

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck NHTSA No.: M20225103

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/29/2022

**INSTRUMENTATION**

Driver Dummy Sensors	47
Passenger Dummy Sensors	47
Vehicle Structure Accelerometers	8
Seat Belt Load Cells	4
Load Cell Barrier	528
Total	634

**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: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck NHTSA No.: M20225103  
 Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/29/2022

**TEST DUMMY INFORMATION AND CONTACT LOCATIONS**

Description	Driver	Passenger
Dummy Type/Serial No.	HIII 50th Percentile Male ATD / 360	HIII 5th Percentile Female ATD / DH1644
Head Contact	Frontal Airbag, Headrest	Frontal Airbag, Headrest
Upper Torso Contact	Frontal Airbag	Frontal Airbag
Lower Torso Contact	Frontal Airbag	Frontal Airbag
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	Unlocked	Unlocked
Front Door Opening	Remained closed, latched, and operational	Remained closed, latched, and operational
Rear Door Opening	Remained closed, latched, and operational	Remained closed, latched, and 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	None
Window Damage	None
Other Notable Effects	None

**VEHICLE REBOUND FROM BARRIER**

Measured Parameter	Units	Value
Left Side	mm	3710
Center	mm	3606
Right Side	mm	3507
Average	mm	3608

**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

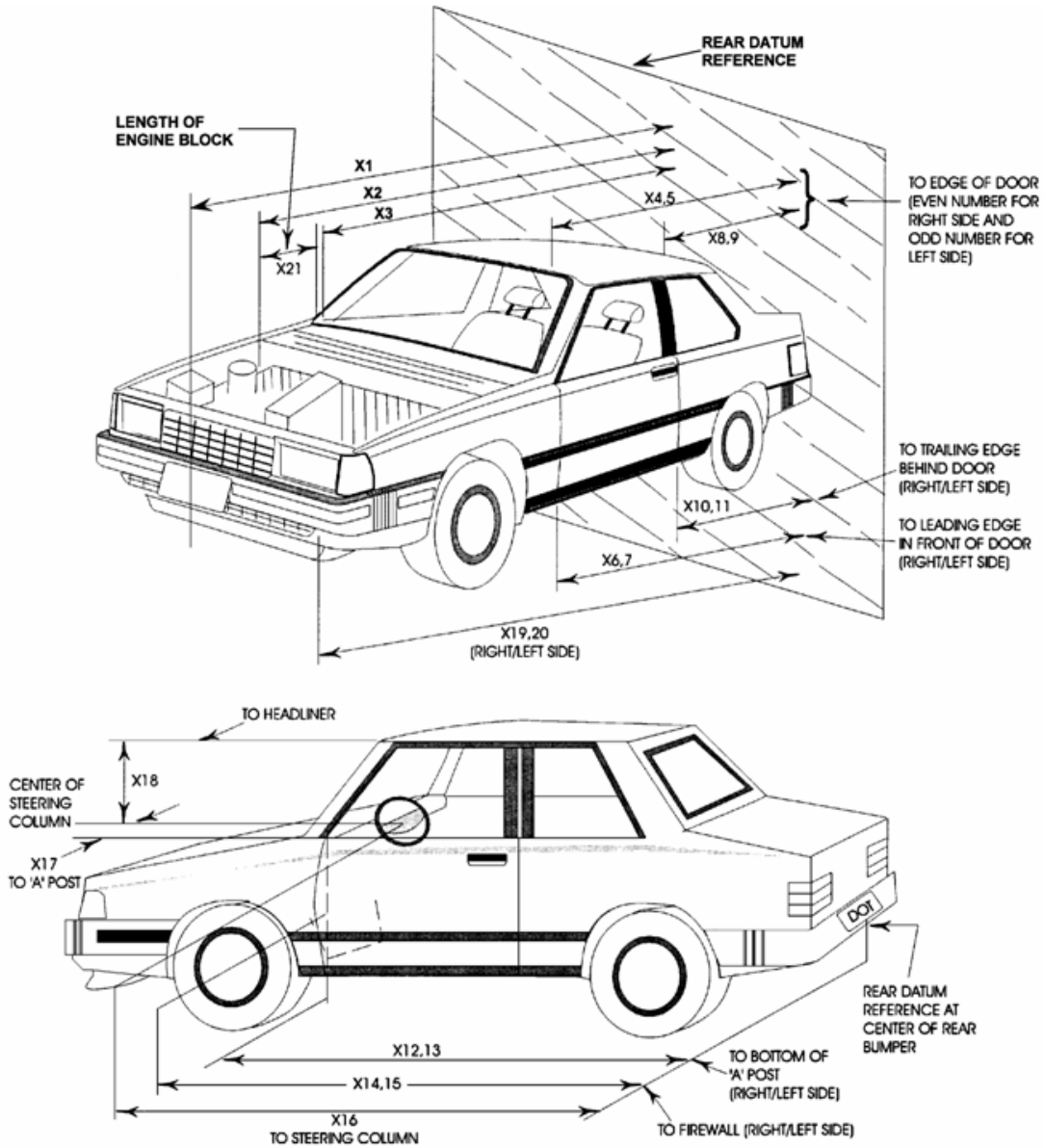
Restraint Type	Driver		Passenger	
	Installed	Operated	Installed	Operated
Front Airbag	Yes	Yes	Yes	Yes
Side Airbag 1 (Curtain)	Yes	Yes	Yes	Yes
Side Airbag 2 (Torso/Pelvis)	Yes	No	Yes	No
Knee Airbag	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes

# DATA SHEET NO. 12

## VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck NHTSA No.: M20225103

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/29/2022



**DATA SHEET NO. 12 ... (CONTINUED)**

**VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck      NHTSA No.: M20225103

Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 08/29/2022

No.	Description	Pre-Test	Post-Test	Change
1	Total Length of Vehicle at Centerline	6226	5602	-624
2	Rear Surface of Vehicle to Front of Engine	5465	5338	-127
3	RSOV to Firewall	4949	4944	-5
4	RSOV to Upper Leading Edge of Right Door	4593	4605	12
5	RSOV to Upper Leading Edge of Left Door	4601	4613	12
6	RSOV to Lower Leading Edge of Right Door	4558	4570	12
7	RSOV to Lower Leading Edge of Left Door	4566	4578	12
8	RSOV to Upper Trailing Edge of Right Door	3469	3480	11
9	RSOV to Upper Trailing Edge of Left Door	3478	3490	12
10	RSOV to Lower Trailing Edge of Right Door	3450	3460	10
11	RSOV to Lower Trailing Edge of Left Door	3444	3457	13
12	RSOV to Bottom of A-Pillar, Right Side	4480	4490	10
13	RSOV to Bottom of A-Pillar, Left Side	4472	4483	11
14	RSOV to Firewall, Right Side	4952	4965	13
15	RSOV to Firewall, Left Side	4949	4944	-5
16	RSOV to Steering Column	4109	4159	50
17	Center of Steering Column to A-Pillar	371	324	-47
18	Center of Steering Column to Headliner	567	610	43
19	RSOV to Right Side of Front Bumper	5812	5598	-214
20	RSOV to Left Side of Front Bumper	5815	5710	-105
21	Length of Engine Block	414	357	-57
RD	RSOV to Right Side of Dash Panel	4395	4409	14
CD	RSOV to Center of Dash Panel	4361	4381	20
LD	RSOV to Left Side of Dash Panel	4394	4412	18

All measurements in millimeters.

**DATA SHEET NO. 13**

**ACCIDENT INVESTIGATION DIVISION DATA**

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck      NHTSA No.: M20225103  
 Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 08/29/2022

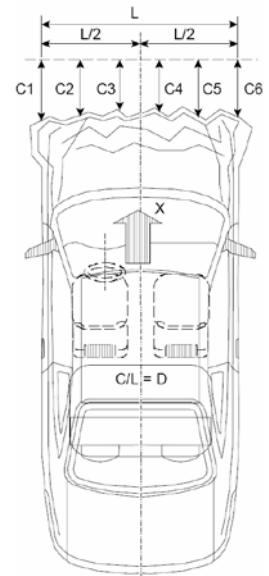
**VEHICLE INFORMATION**

VIN: 5TFLA5EC9NX007912      Wheelbase (mm): 4006  
 Vehicle Size Category: Truck      Test Weight (kg): 2853.0

**ACCELEROMETER DATA**

Accelerometer Locations: Left Rear Crossmember  
 Cal. Procedure/Interval: Vibration Test / 6 months  
 Integration Algorithm: NHTSA Standard  
 Impact Velocity (km/h): 56.26  
 Velocity Change (km/h): 64.6  
 Time of Separation (msec): 71.8

Linearity: Good



**CRUSH PROFILE**

Collision Deformation Classification: 12FDEW2  
 Midpoint of Damage: Vehicle Centerline  
 Damage Region Length (mm): 1882  
 Impact Mode: Full Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Crush
C1	Crush Zone 1 at Left Side	mm	288	497	209
C2	Crush Zone 2 at Left Side	mm	30	661	631
C3	Crush Zone 3 at Left Side	mm	4	621	617
C4	Crush Zone 4 at Right Side	mm	6	627	621
C5	Crush Zone 5 at Right Side	mm	30	644	614
C6	Crush Zone 6 at Right Side	mm	287	717	430
L	C1 to C6	mm	1882		

**DATA SHEET NO. 14**

**VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck NHTSA No.: M20225103

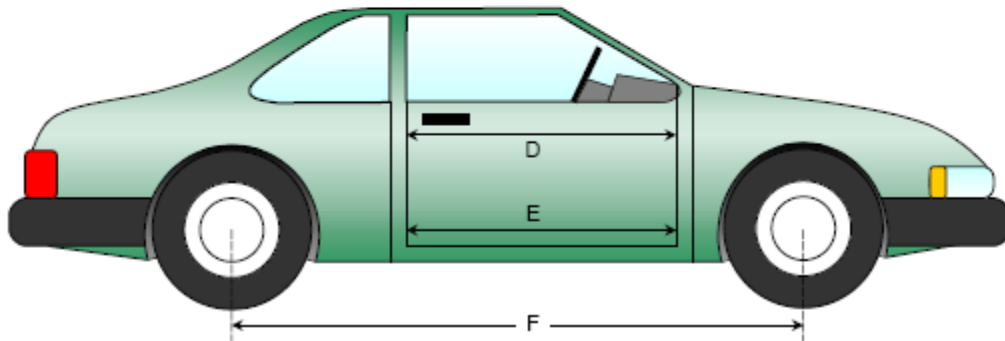
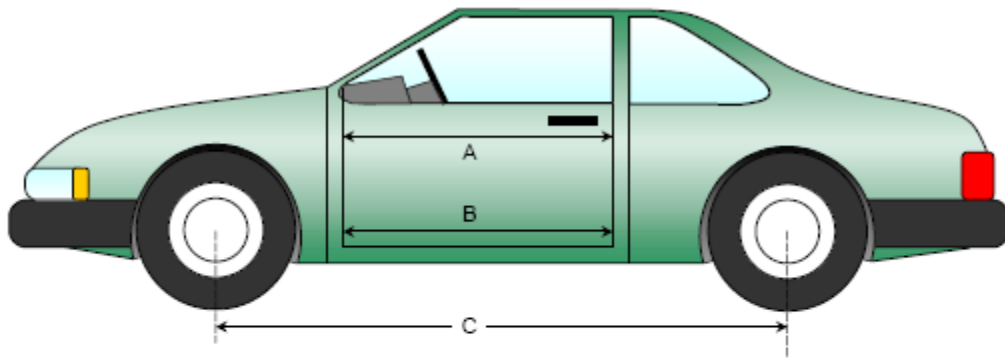
Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/29/2022

**DOOR OPENING WIDTH**

Item	Description	Units	Pre-Test	Post-Test	Change
A	Left Side Upper	mm	1124	1123	-1
B	Left Side Lower	mm	1122	1121	-1
D	Right Side Upper	mm	1125	1125	0
E	Right Side Lower	mm	1108	1110	2

**WHEELBASE MEASUREMENTS**

Item	Description	Units	Pre-Test	Post-Test	Change
C	Left Side Wheelbase	mm	4006	3928	-78
F	Right Side Wheelbase	mm	4013	3947	-66



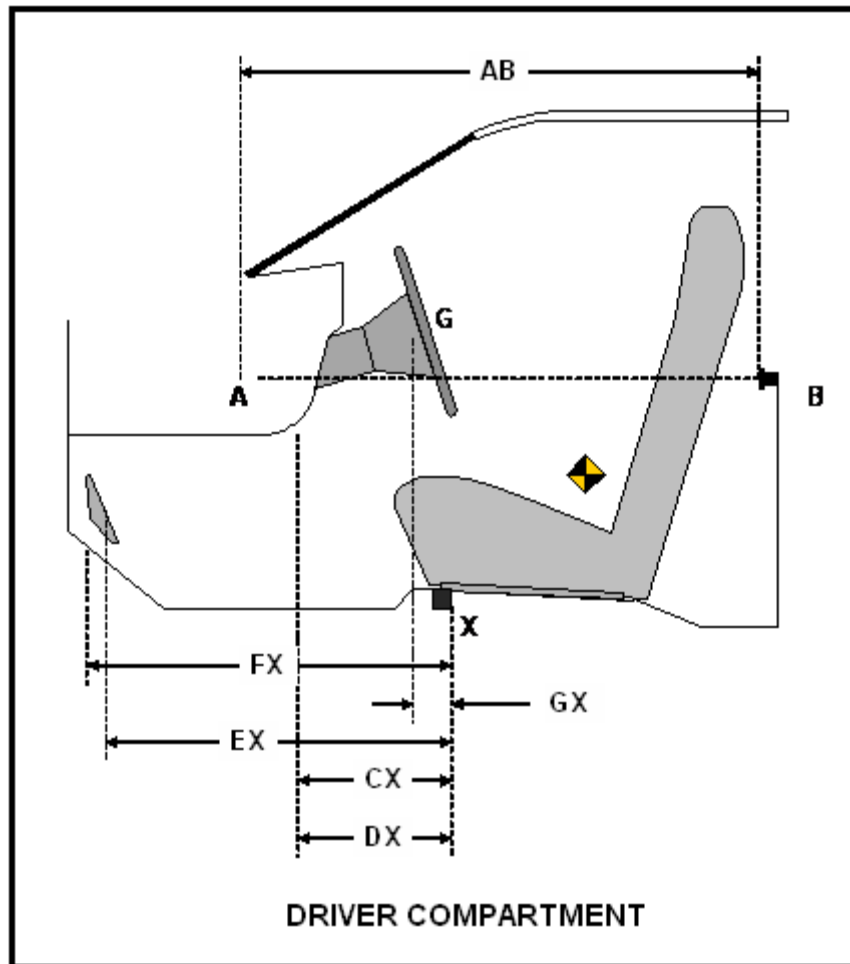
**DATA SHEET NO. 14 ... (CONTINUED)**  
**VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck      NHTSA No.: M20225103  
 Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 08/29/2022

**DRIVER COMPARTMENT INTRUSION**

Item	Description	Units	Pre-Test	Post-Test	Change
AB	Door Opening (Inside Window Jam)	mm	1071	1069	-2
CX	Left Knee Bolster to X	mm	237	233	-4
DX	Right Knee Bolster to X	mm	258	256	-2
EX	Brake Pedal to X	mm	549	543	-6
FX	Foot Rest to X	mm	561	556	-5
GX	Center of Steering Wheel Hub to X	mm	55	89	34

X = Front of Seat Track (Stationary)



**DATA SHEET NO. 15**

**SUMMARY OF INDICANT FMVSS 212 AND 219 (PARTIAL) DATA**

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck      NHTSA No.: M20225103  
 Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 08/29/2022

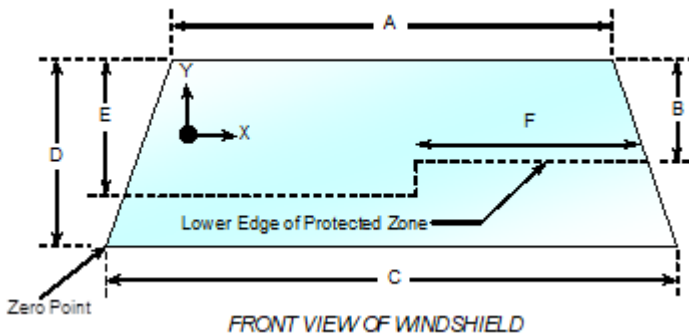
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with rubber molding and rubber cement.

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: 21.9°C

**WINDSHIELD PERIPHERY MEASUREMENTS**

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2350	2350	100.0%
Right Side	2350	2350	100.0%
Total	4700	4700	100.0%



Item	Units	Value
A	mm	1410
B	mm	365
C	mm	1670
D	mm	810
E	mm	425
F	mm	760

**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**

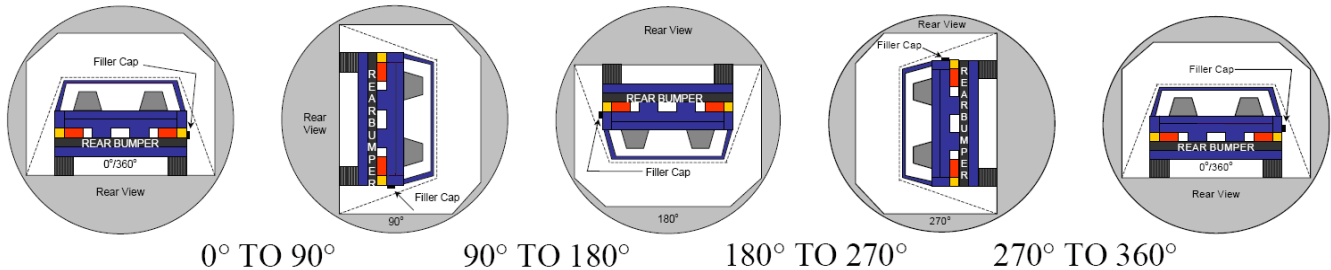
Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck      NHTSA No.: M20225103  
 Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 08/29/2022

**FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA**

Temperature at Time of Impact: 31.1°C      Test Time: 7:09PM

**Stoddard Solvent Spillage Measurements**

- A. From impact until vehicle motion ceases:     N/A     oz.  
(Maximum allowable = 1 oz.)
- B. For the 5 minute period after motion ceases:     N/A     oz.  
(Maximum allowable = 5 oz.)
- C. For the following 25 minutes:     N/A     oz.  
(Maximum allowable = 1 oz./minute)
- D. 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:     N/A

**SOLVENT COLLECTION TIME TABLE IN SECONDS**

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	81	300	381
90° To 180°	81	300	381
180° To 270°	83	300	383
270° To 360°	82	300	382

**DATA SHEET NO. 16 ... (CONTINUED)**

**FMVSS 301 BARRIER IMPACT AND STATIC ROLLOVER RESULTS**

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck NHTSA No.: M20225103

Test Program: 56.3 km/h Frontal Impact NCAP Test Test Date: 08/29/2022

**FMVSS 301 SPILLAGE TABLE**

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

**SOLVENT SPILLAGE LOCATION TABLE**

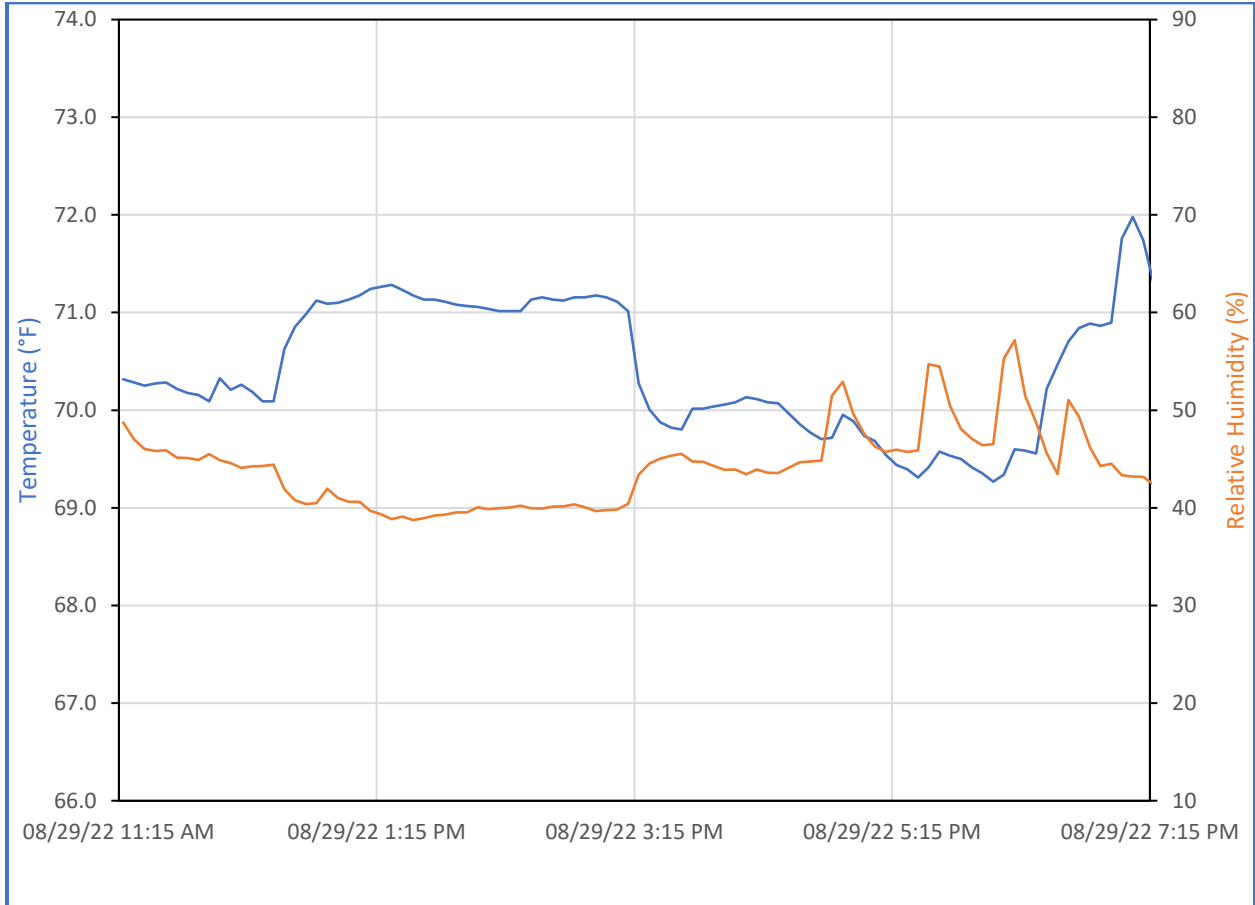
Test Phase	Spillage Location
0° To 90°	
90° To 180°	
180° To 270°	
270° To 360°	

**DATA SHEET NO. 17**

**DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART**

Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck      NHTSA No.: M20225103

Test Program: 56.3 km/h Frontal Impact NCAP Test      Test Date: 08/29/2022



**APPENDIX A**  
**PHOTOGRAPHIC DOCUMENTATION**

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**Photograph Not Applicable**

FIGURE 1. Load Cell Location

**Photograph Not Applicable**

FIGURE 2. Pre-Test Load Cell Wall

# Photograph Not Applicable

FIGURE 3. Post-Test Load Cell Wall



FIGURE 4. Manufacturer's Label

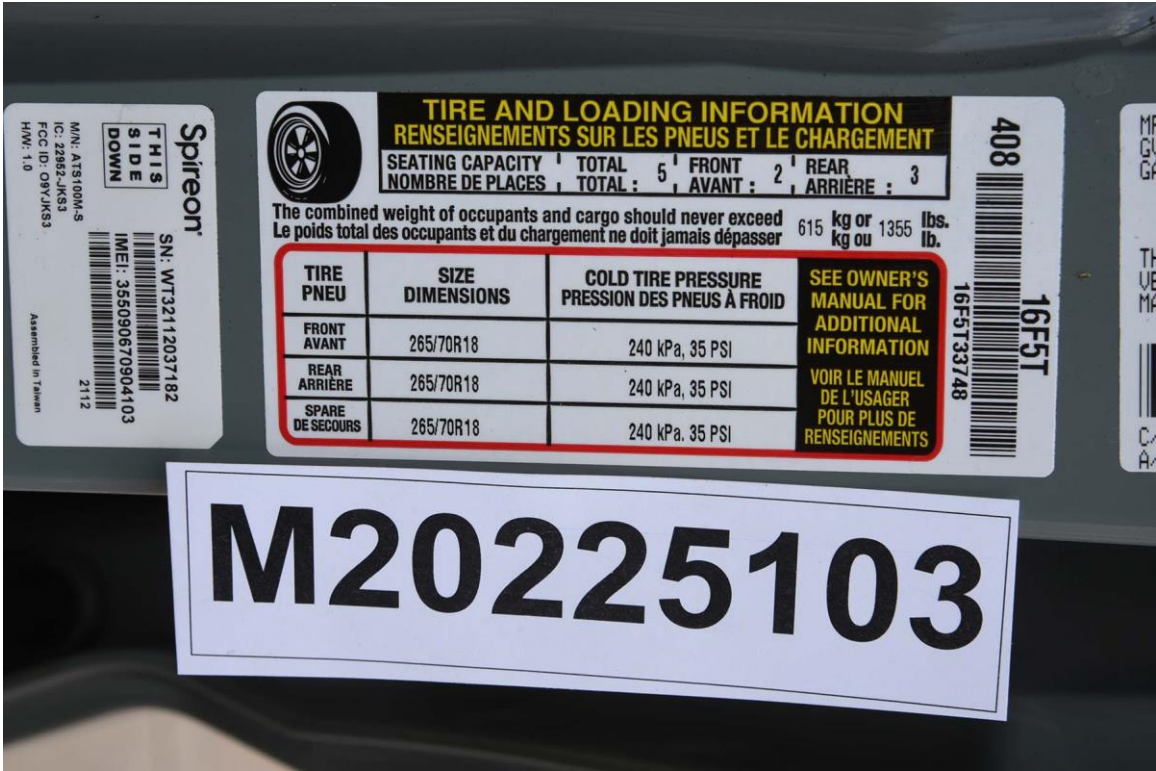


FIGURE 5. Tire Placard



FIGURE 6. 2022 Toyota Tundra Crewmax 4x4 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 ¼ 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

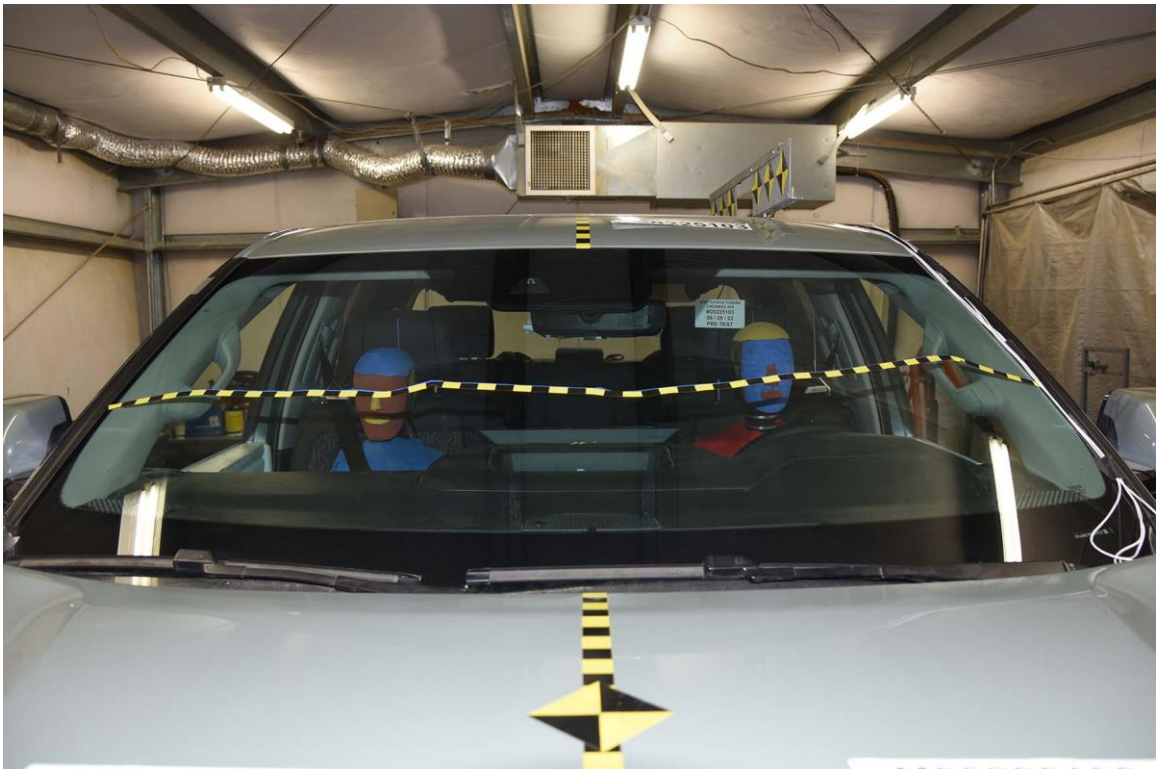


FIGURE 18. Pre-Test Windshield View



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

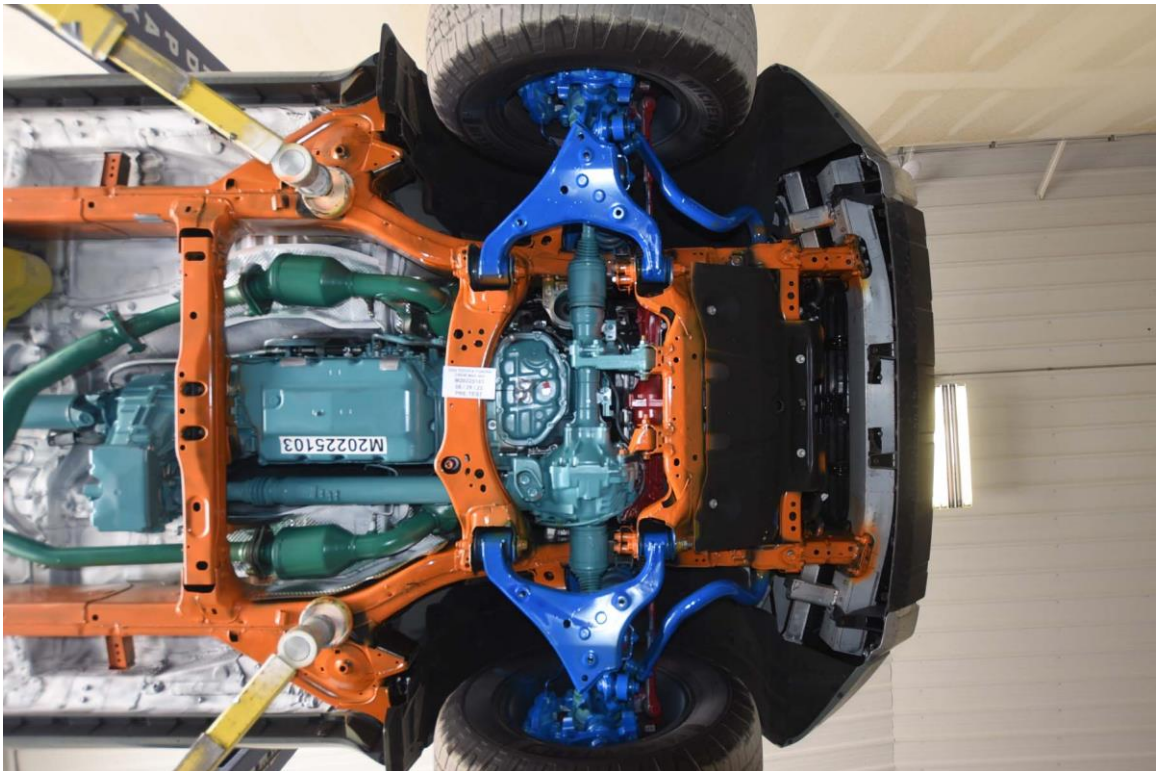


FIGURE 24. Pre-Test Front Underbody View

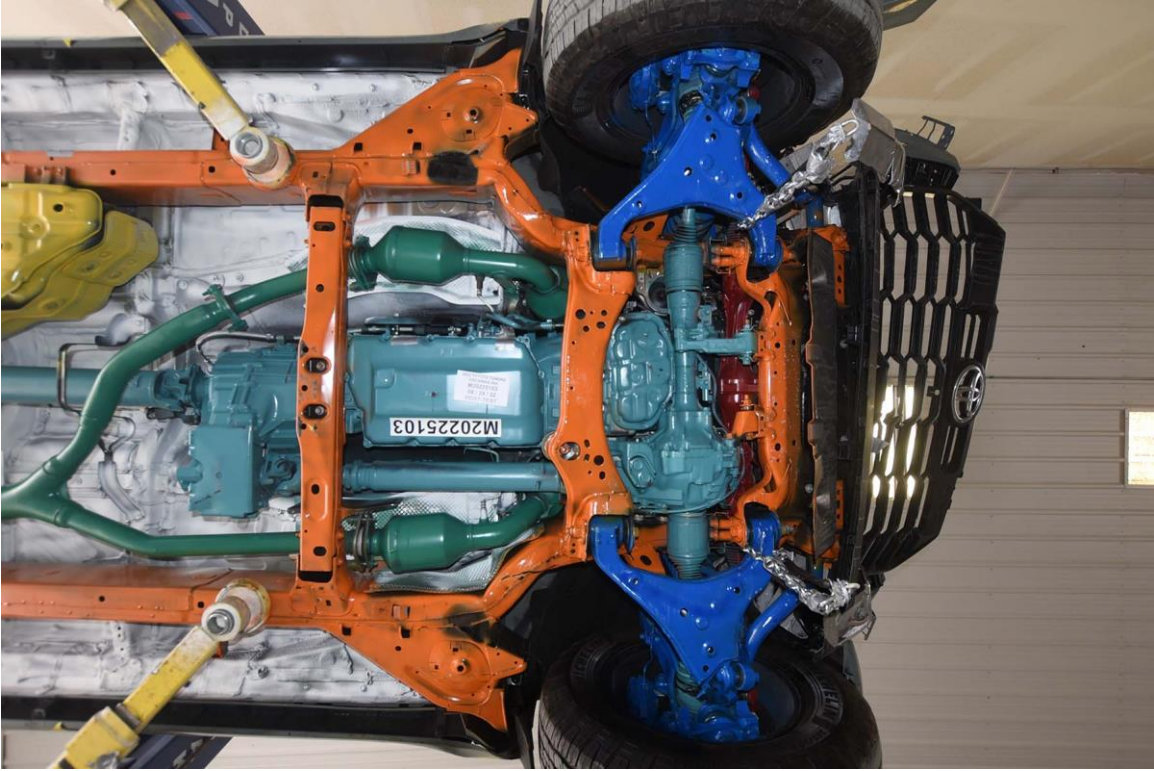


FIGURE 25. Post-Test Front Underbody View

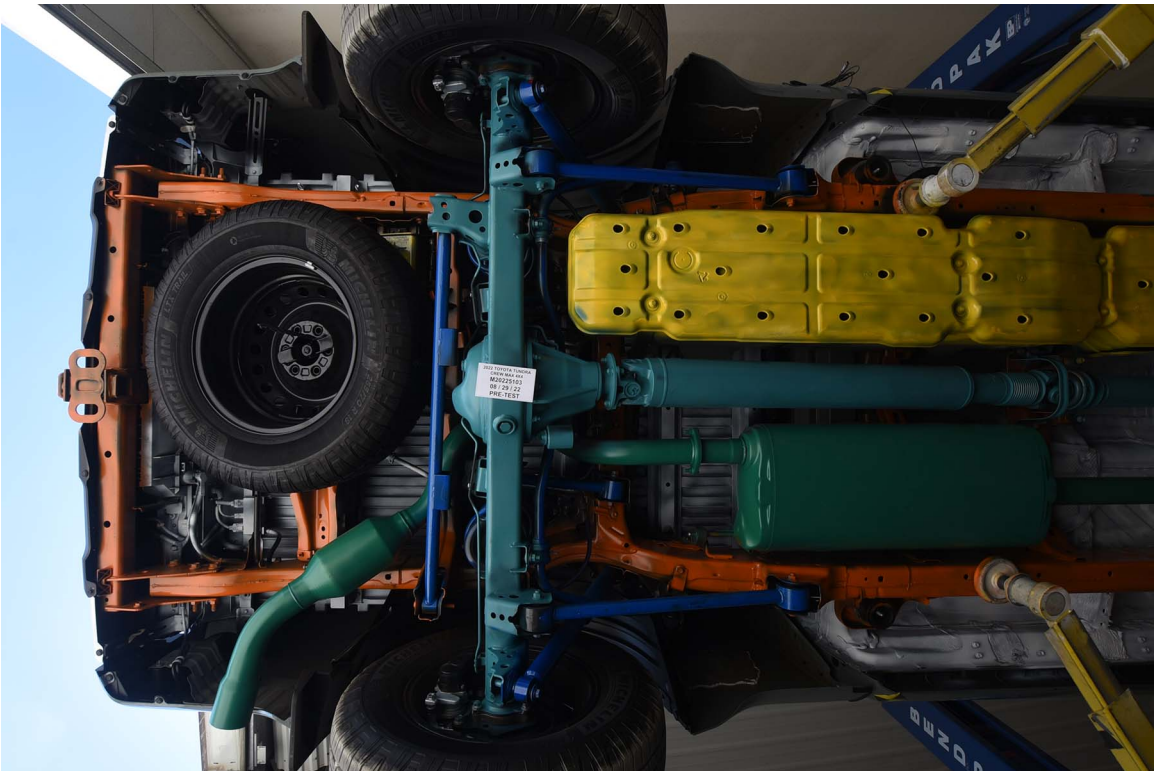


FIGURE 26. Pre-Test Rear Underbody View

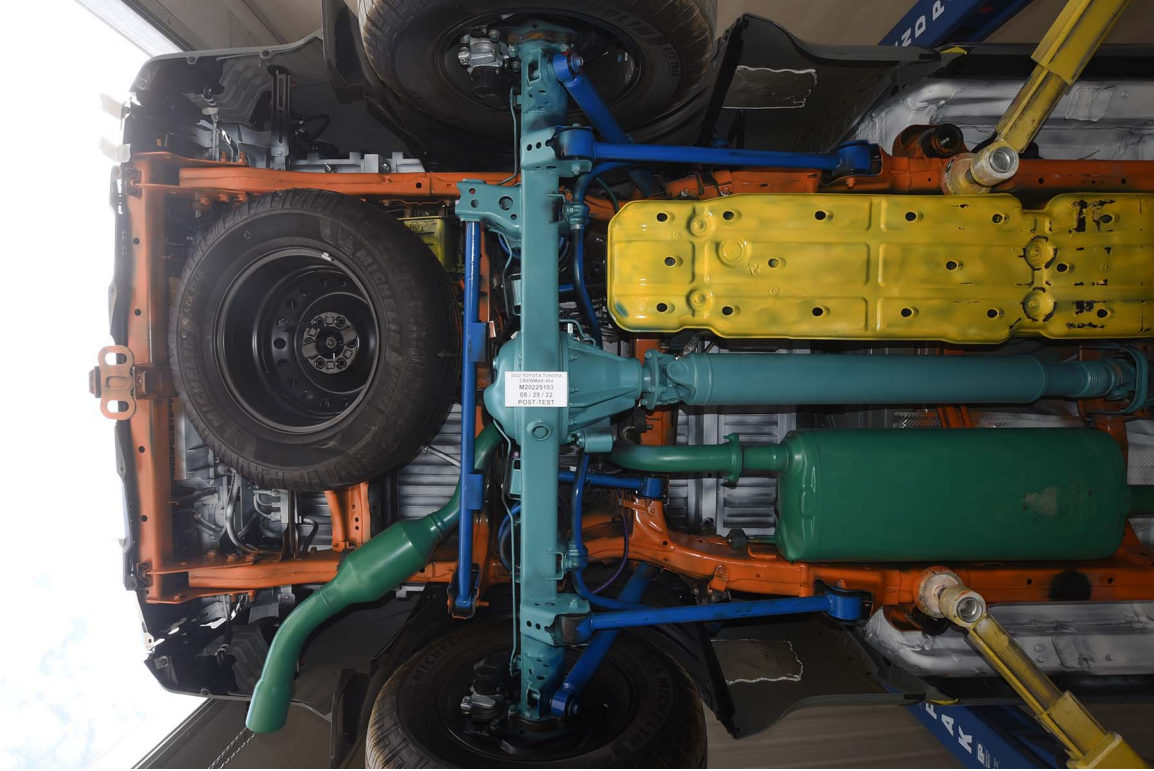


FIGURE 27. Post-Test Rear Underbody View

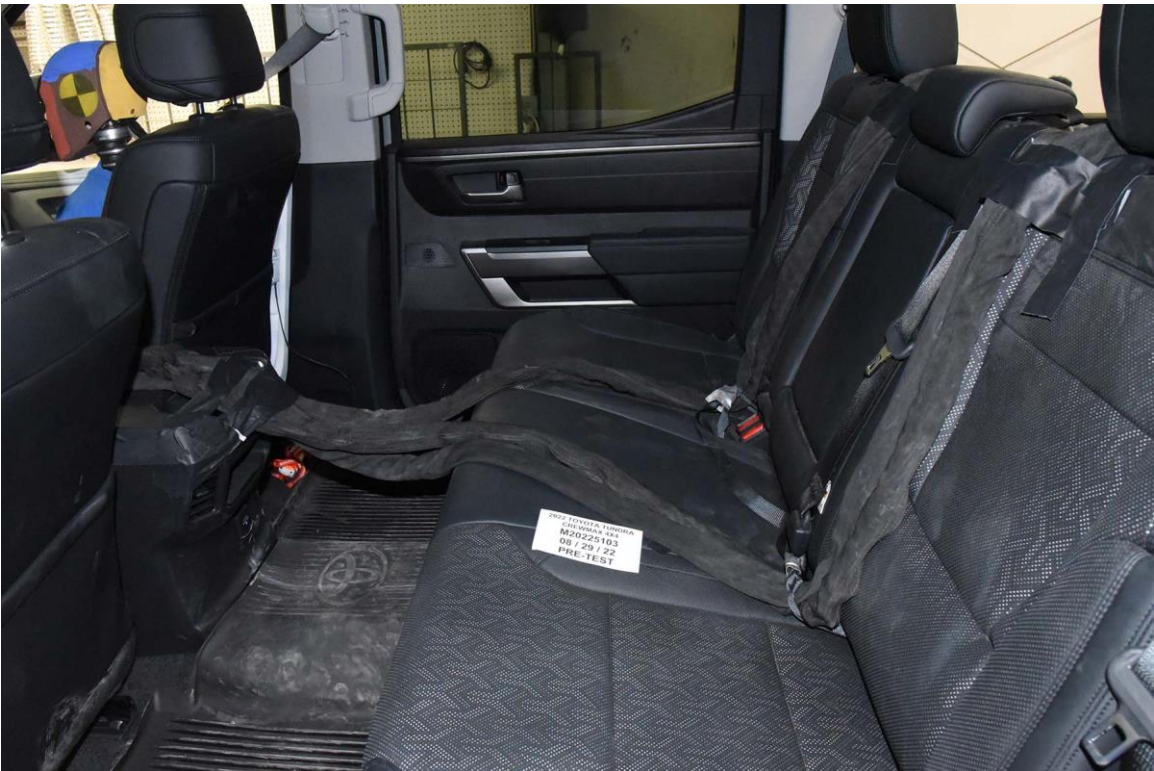


FIGURE 28. Pre-Test Dummy Cable Routing



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



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



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



FIGURE 72. Post-Test Passenger Dummy Contact with Airbag

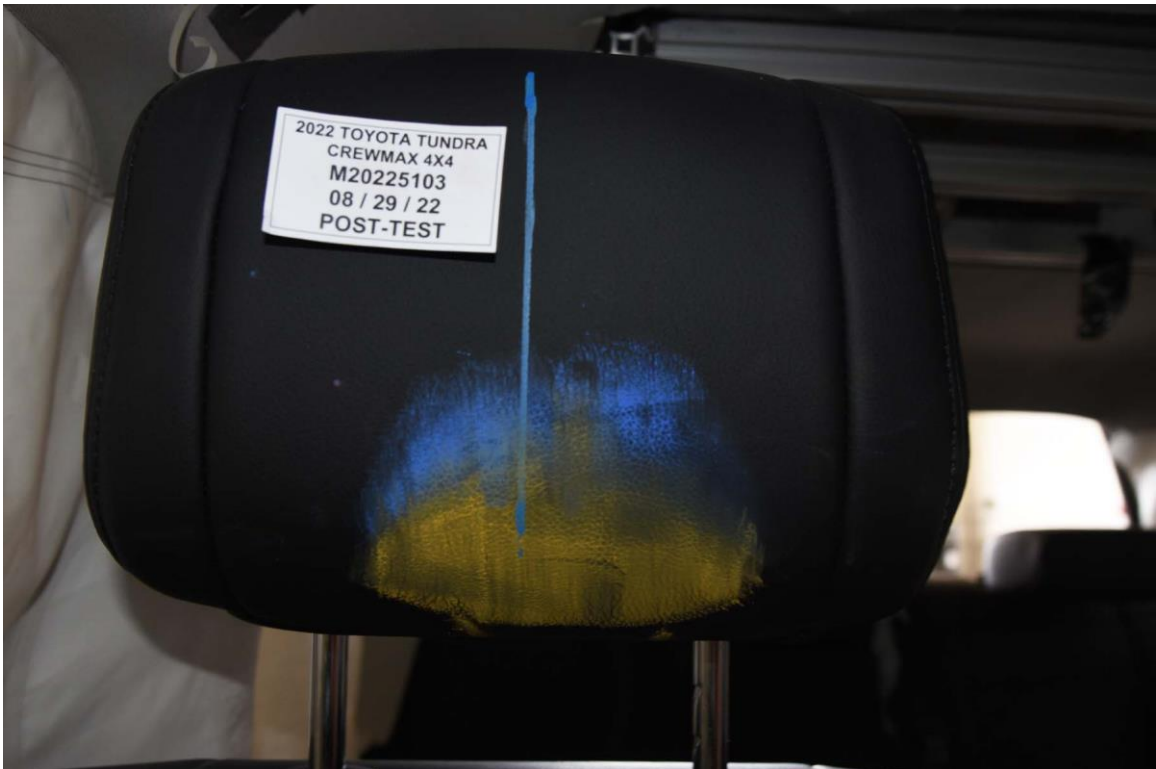


FIGURE 73. Post-Test Passenger Dummy Contact with Headrest



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

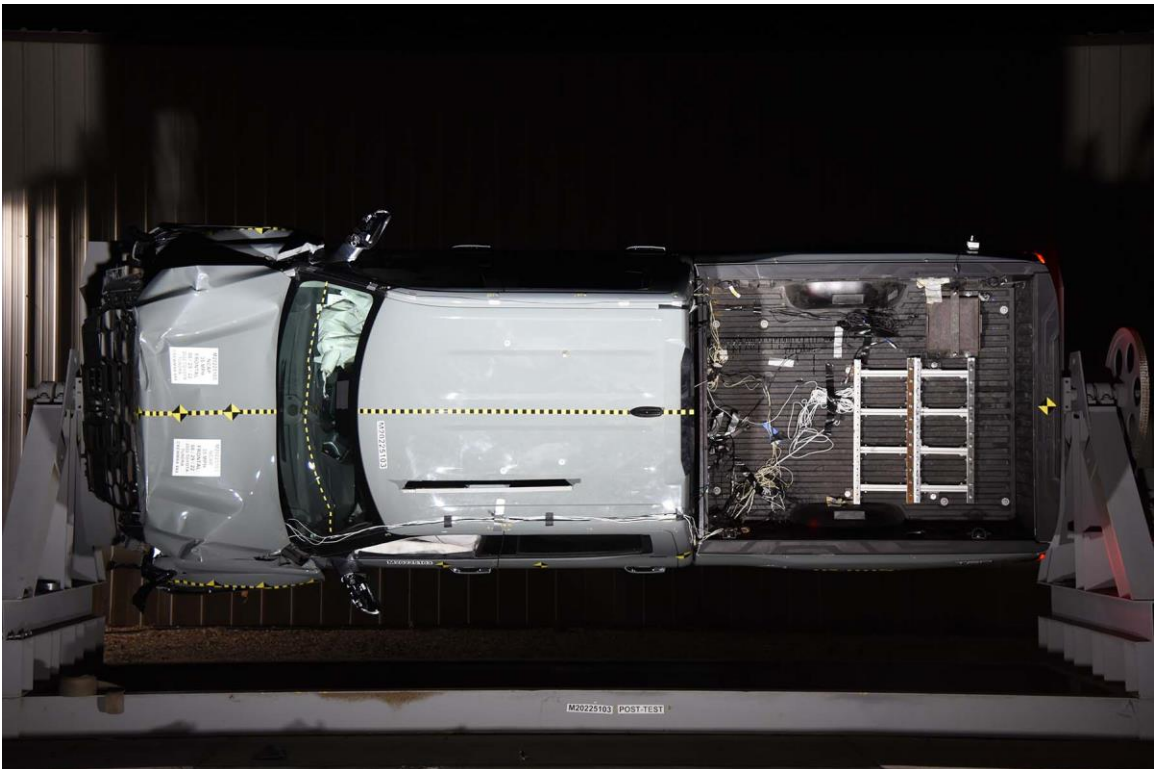


FIGURE 78. Vehicle at 90° on Static Rollover Device

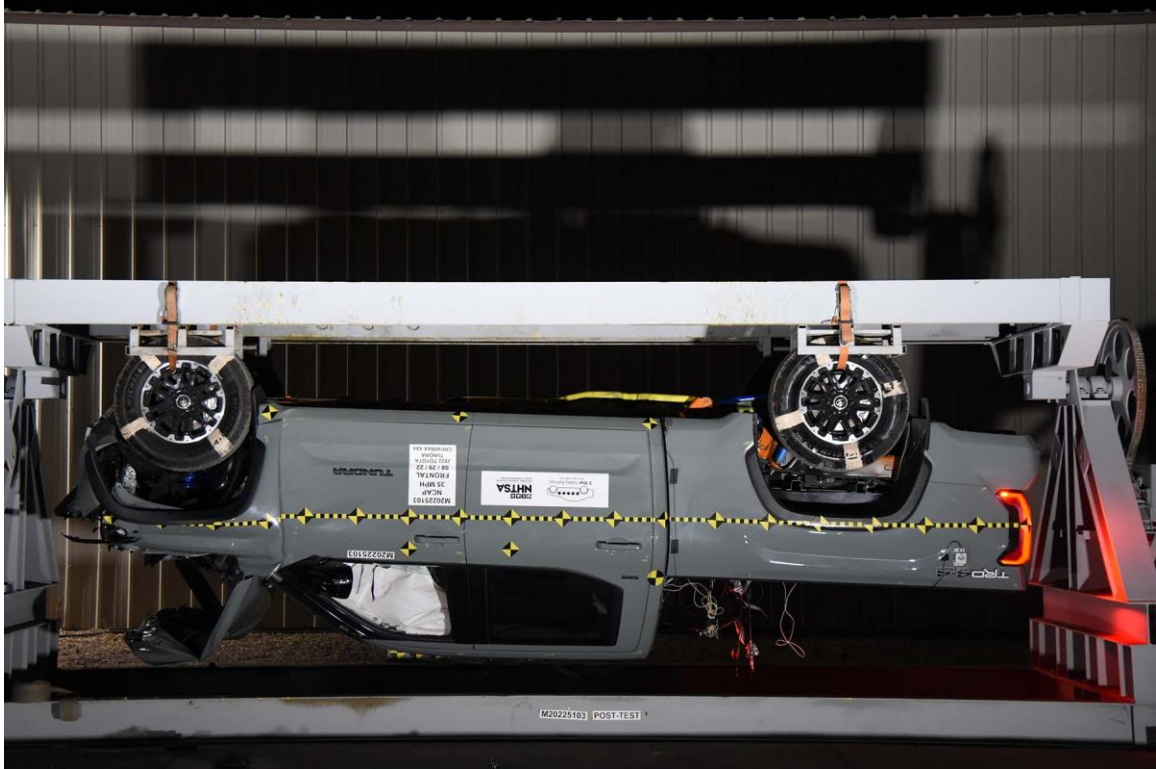


FIGURE 79. Vehicle at 180° on Static Rollover Device

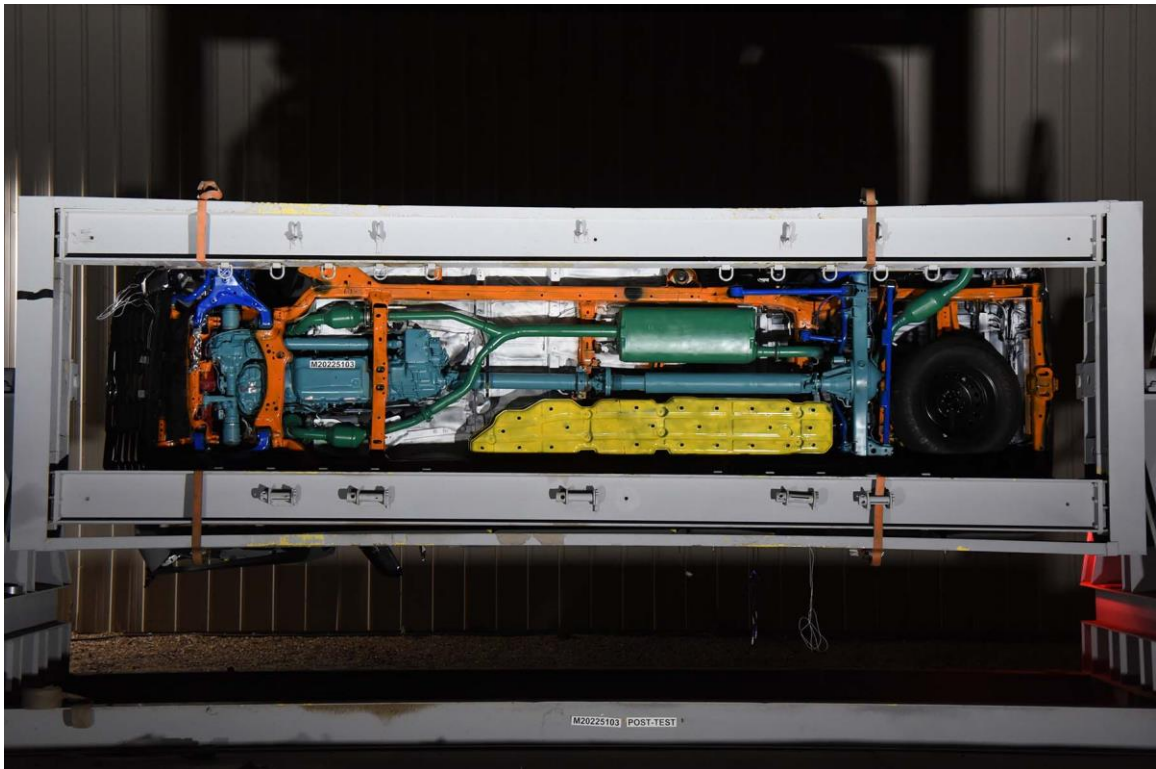


FIGURE 80. Vehicle at 270° on Static Rollover Device

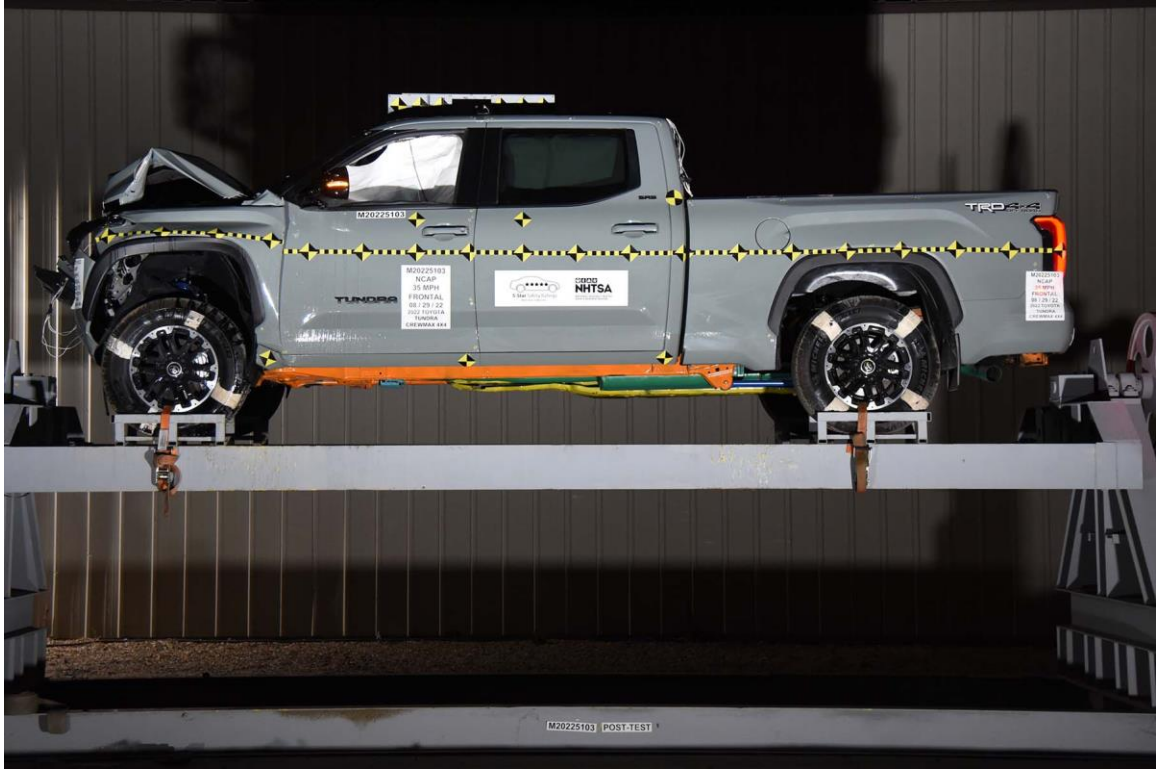



FIGURE 81. Vehicle at 360° on Static Rollover Device



FIGURE 82. 2022 Toyota Tundra Crewmax 4x4 4-Door Truck Frontal Impact Event



**TOYOTA**

DESC: **TUNDRA 4X4**      **SRS CREWMAX 6.5**  
VIN: **5TFLA5EC9NX007912**  
YR/MDL: 2022/8381A  
CLR: LUNAR ROCK/BLACK/RED (06X3/21)  
FINAL ASSEMBLY POINT: SAN ANTONIO, TEXAS, U.S.A.

**STANDARD EQUIPMENT**  
UNLESS REPLACED BY OPTIONAL EQUIPMENT

**MECHANICAL & PERFORMANCE**

- 1-FORCE 3.5L Twin-Turbo V6, DOHC 24V with Dual VVT-i, 389 hp/479 lb-ft
- 10-Spd Auto Trans with Sequential Shift
- Drive Mode Select with TOW/HAUL Modes
- Start and Stop Engine System
- 4WDemand Part-Time 4WD w/Elec Controlled Transfer Case and Auto Limited Slip Diff
- Multi-Link Rear Suspension
- Tow Rev Hitch w/Integ 4/7-Pin Connector

**SAFETY & CONVENIENCE**

- Toyota Safety Sense 2.5: Pre-Collision Sys w/Pedestrian Detection, Full-Speed Range Dynamic Radar Cruise Control, Lane Departure Alert w/Steering Assist, Lane Tracing Assist, Automatic High Beams, Road Sign Assist
- Trailer Brake Cont & Trailer Sway Cont

**EXTERIOR**

- 18-in. Alloy Wheels
- Aluminum Reinforced Composite Bed
- LED Headlights with DRLs and Manual Leveling Adjustment

**INTERIOR**

- 8-in. Audio Multimedia, with wireless Apple CarPlay & Android Auto capability, SiriusXM w/3-Month Platinum Plan Trial
- Integrated Backup Camera
- Combination Meter w/4.2-in. Color MID
- Single Zone Automatic Climate Control
- Smart Key System with Push Button Start
- Fabric-Trimmed 4-Way Adjustable Driver & Front Passenger Seat with Center Console
- 60/40 Split, Fold-Up Rear Seats with Under-Seat Storage Compartment
- Power Vertical-Rear Window

**MANUFACTURER'S SUGGESTED RETAIL PRICE \$47,115.00**

**OPTIONAL EQUIPMENT**

- 1 E 50 State Emissions - Includes 14-in Audio Multimedia, Bed + Cabin Power Supply (400W/120V AC), and LED Bed Lights - 1,145.00
- 1 O Advanced Offroad Technology Package - Includes Blind Spot Monitor (BSM), Multi-Terrain Monitor (MTM), and Trailer Backup Guide with Straight-Path Assist - 2,620.00
- 1 IQ TRD Off-Road Premium Package - Includes 18-inch TRD alloy wheels with all-terrain tires, TRD grille, "TRD OFF-ROAD" bed-side decal, off-road suspension with Bilstein shocks, skid plates, mud guards, red TRD engine start button, TRD leather shift knob, aluminum sport pedals, electronically controlled locking rear differential, Multi-Terrain Select (MTS), Crawl Control (CRAWL) and Downhill Assist Control (DAC), Softex-trimmed seats, 8-way power adjustable front seats with 2-way power lumbar, heated front seats, dual zone automatic climate control, and color-keyed outer door handles - 4,180.00
- 1 RS Heated Leather Steering Wheel - 320.00
- 1 S All-Weather Floor Liners - 160.00
- 1 Stainless Steel Door Edge Guard - 150.00

**GOVERNMENT 5-STAR SAFETY RATINGS**

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

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

**Fuel Economy and Environment** Gasoline Vehicle

**Fuel Economy** **19** MPG Std Pickup range from 12 to 26 MPG. The best vehicle rates 142 MPG.  
combined city/hwy    **17** **22** city highway  
**5.3** gallons per 100 miles

**You spend \$2,750 more in fuel costs over 5 years compared to the average new vehicle.**

**Annual fuel cost \$1,850**

**Fuel Economy & Greenhouse Gas Rating** (tailpipe only) **4** **Smog Rating** (tailpipe only) **5**

This vehicle emits 480 grams CO<sub>2</sub> per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions. Learn more at fueleconomy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 27 MPG and costs \$6,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.35 per gallon, 80¢ per mile per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

**fueleconomy.gov**  
Calculate personalized estimates and compare vehicles

**DELIVERY, PROCESSING AND HANDLING FEE 1,695.00**

**TOTAL \$57,394.00**

The New Vehicle Limited Warranty provides 3-year/50,000-mile basic coverage, 5-year/100,000-mile powertrain coverage, and unlimited-mile corrosion perforation coverage. See Warranty and Maintenance Guide for details. An applicable federal, state and local taxes and dealer and distributor needed options and accessories are not included in the manufacturer's suggested retail price.

Destination, which covers normal factory-installed transportation for the first 20,000 miles, is included as part of the sales price of the vehicle for qualifying buyers. Dealer fee, freight and storage charges.

Delivered by Truck to: **19037**  
**ERRY'S TOYOTA**  
**8001 BELAIR RD**  
**BALTIMORE MD21236**



THL82N

FIGURE 83. Monroney Label Photograph

**APPENDIX B**  
**DUMMY RESPONSE DATA TRACES**

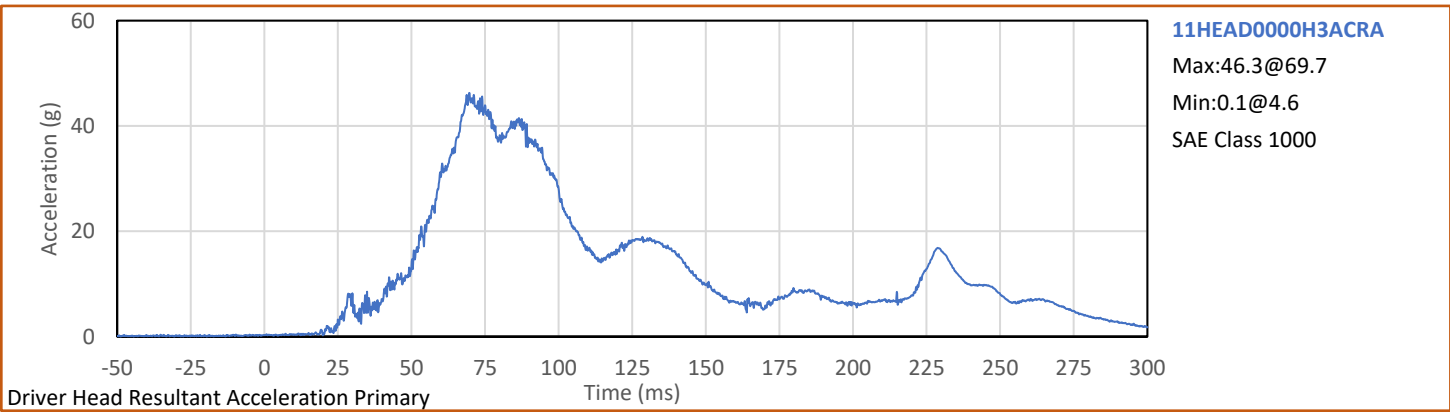
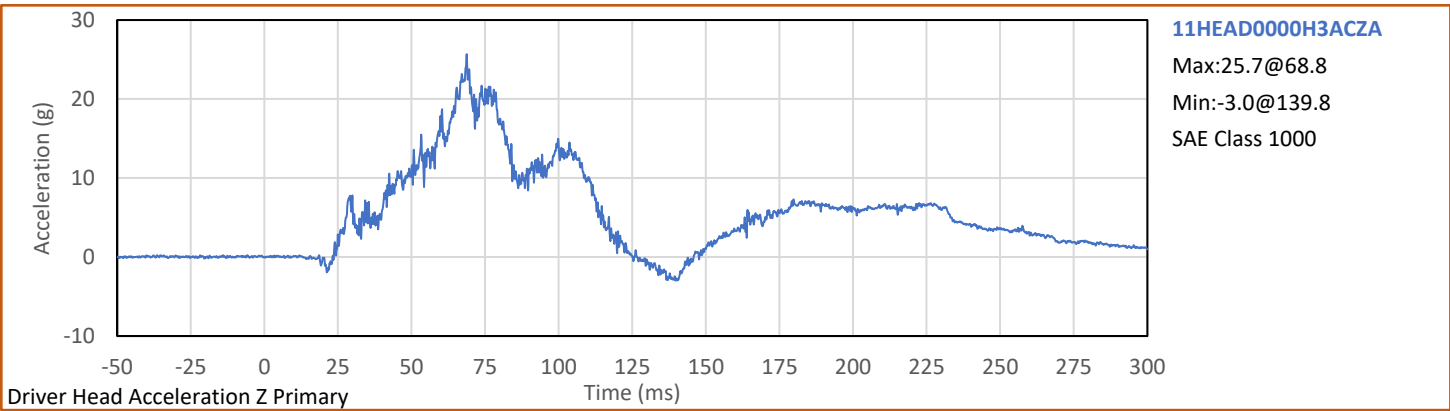
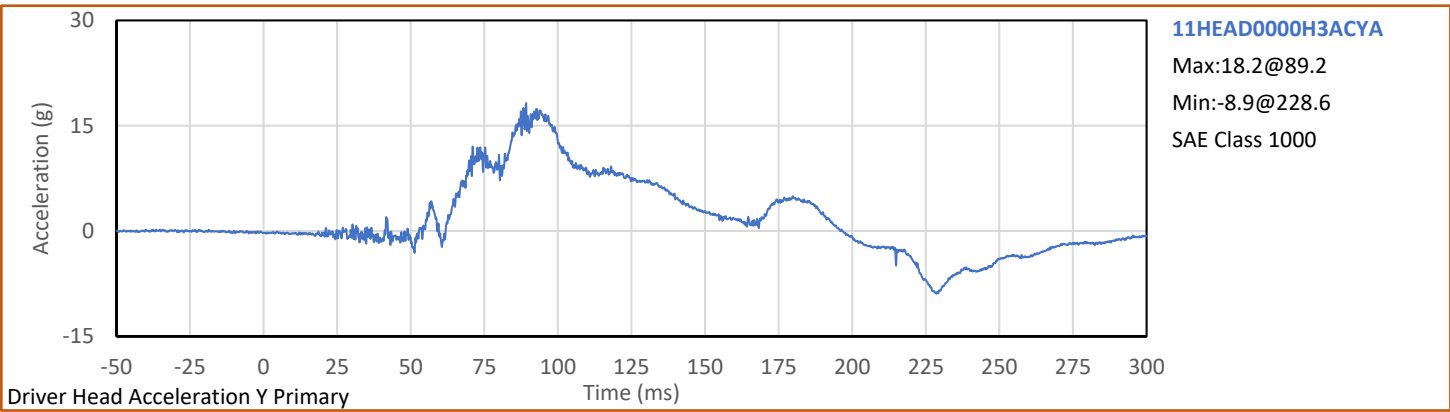
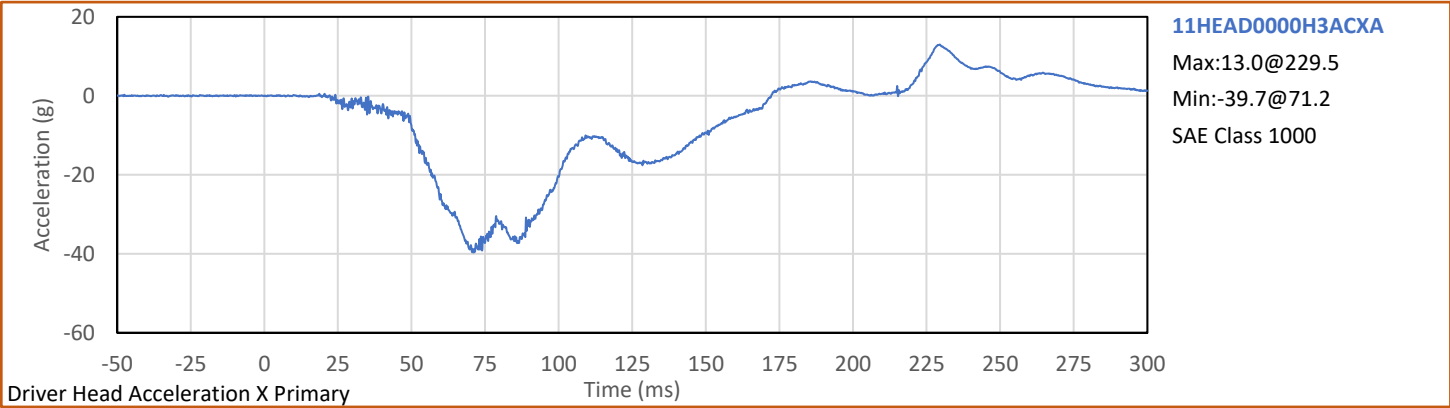
## TABLE OF DATA PLOTS

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6	Driver Upper Neck Force X	B-3
7	Driver Upper Neck Force Z	B-3
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The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at [www.nhtsa.gov](http://www.nhtsa.gov)

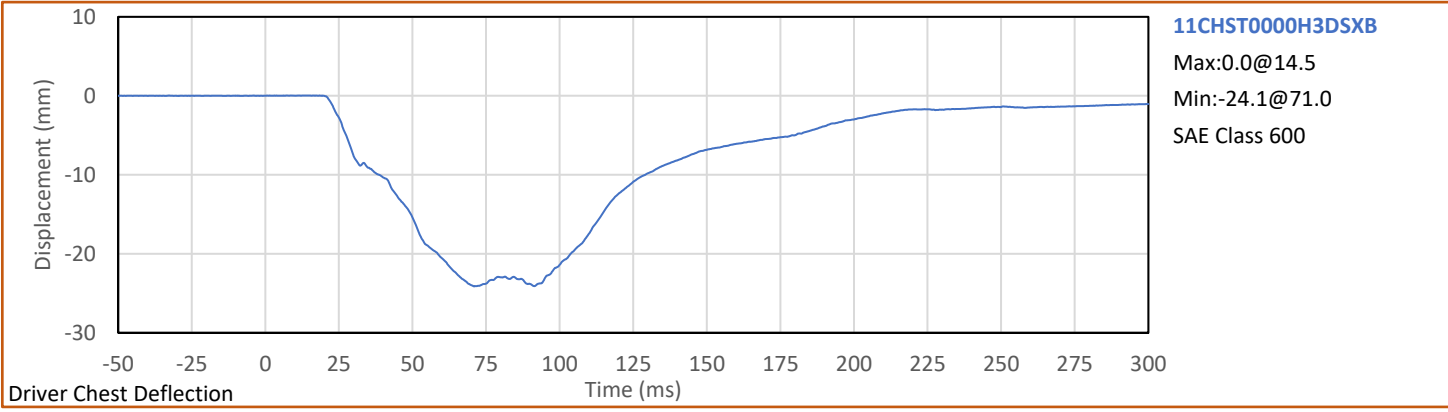
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Driver Chest Y Acceleration Redundant  
Driver Chest Z Acceleration Redundant  
Driver Pelvis X  
Driver Pelvis Y  
Driver Pelvis Z  
Driver Left Femur Force Z Redundant  
Driver Right Femur Force Z Redundant  
Driver Left Upper Tibia Moment X  
Driver Left Upper Tibia Moment Y  
Driver Left Upper Tibia Force Z  
Driver Left Lower Tibia Moment X  
Driver Left Lower Tibia Moment Y  
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Driver Lap Belt Force  
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Driver Head Angular Velocity Y  
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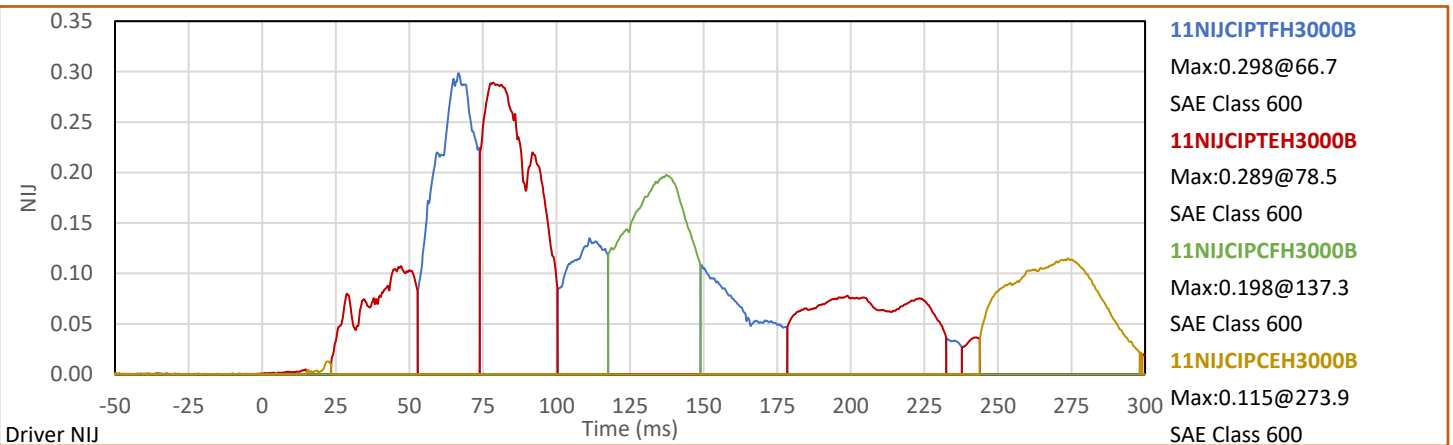
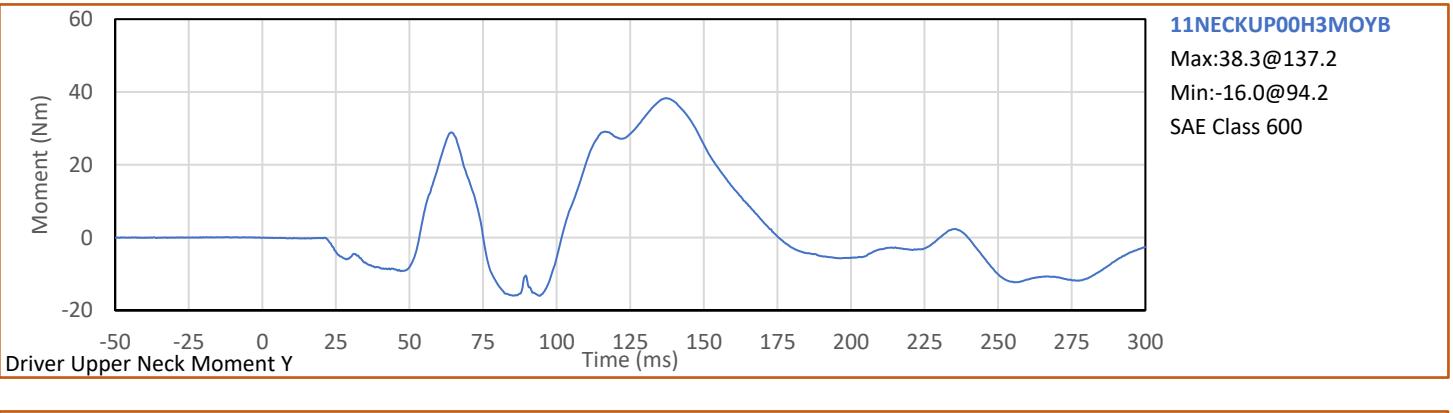
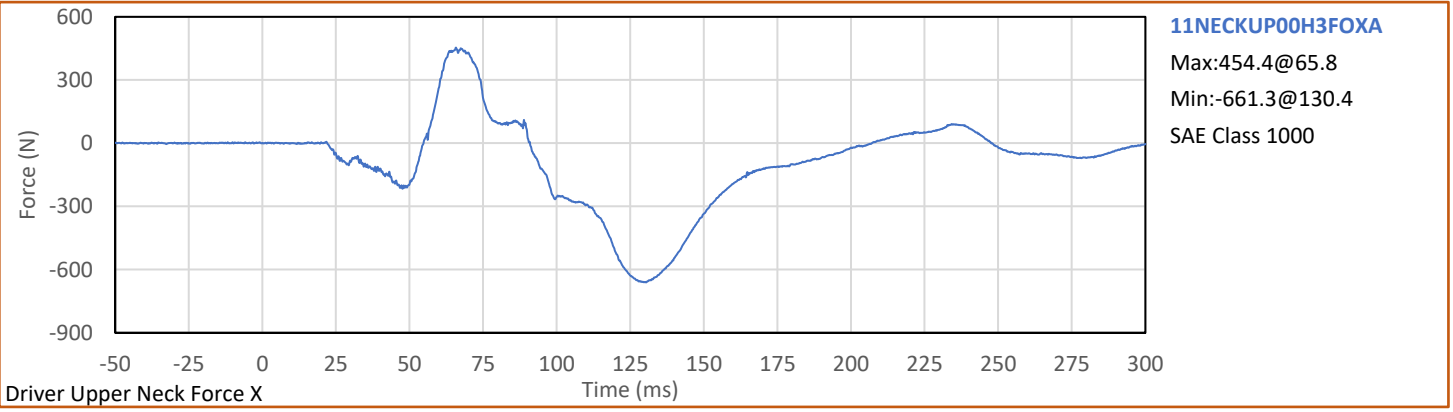
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Passenger Left Lower Tibia Moment Y  
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Passenger Right Upper Tibia Moment Y  
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Passenger Right Lower Tibia Moment X  
Passenger Right Lower Tibia Moment Y  
Passenger Right Lower Tibia Force Z  
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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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Vehicle Engine Bottom X  
Load Cell Barrier Forces and Moments

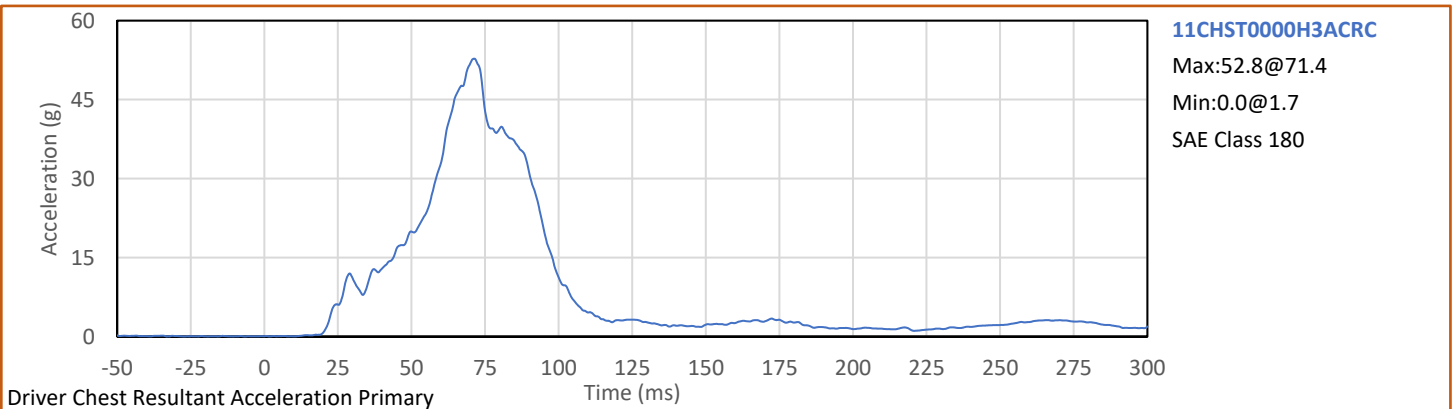
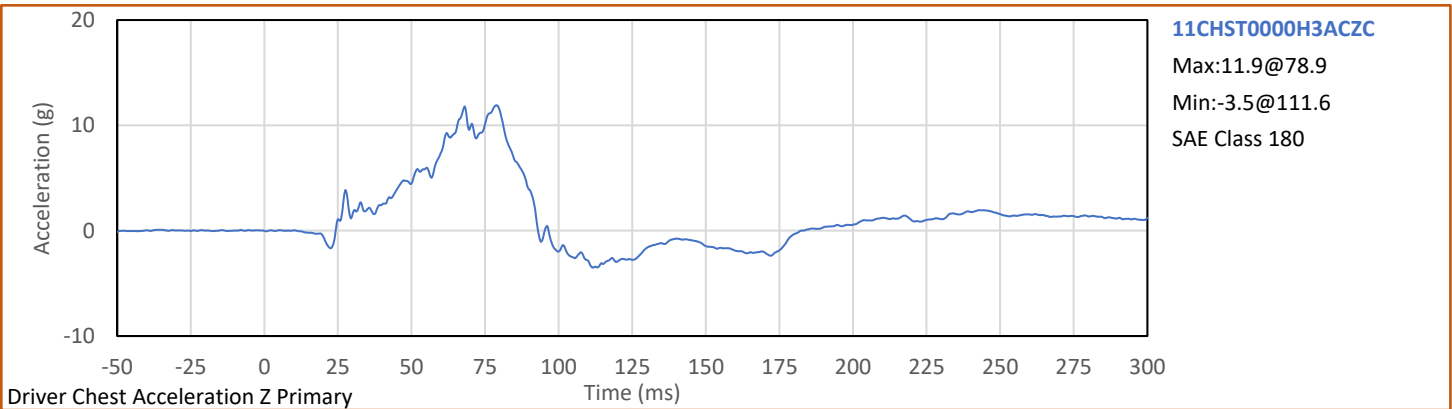
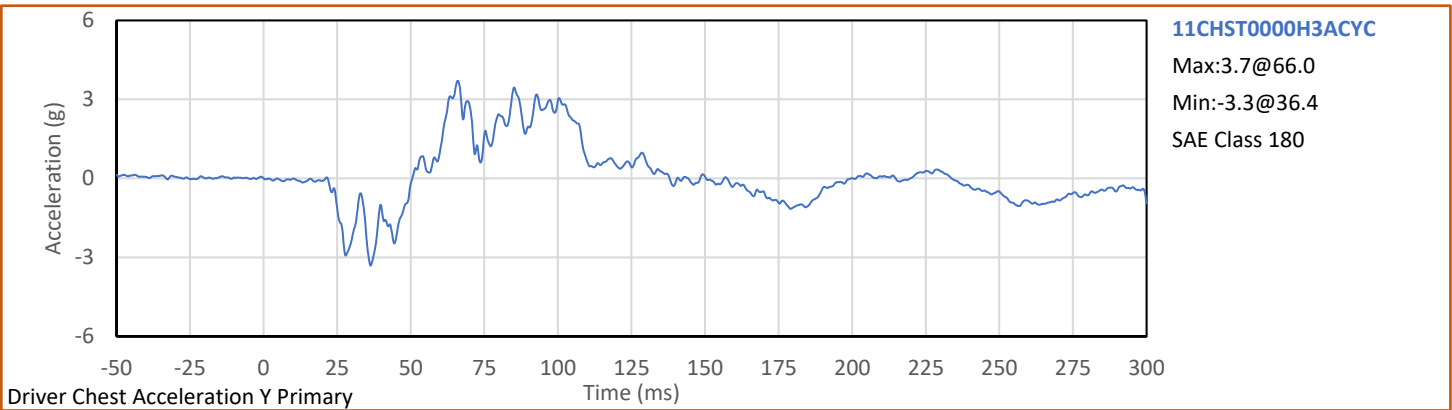
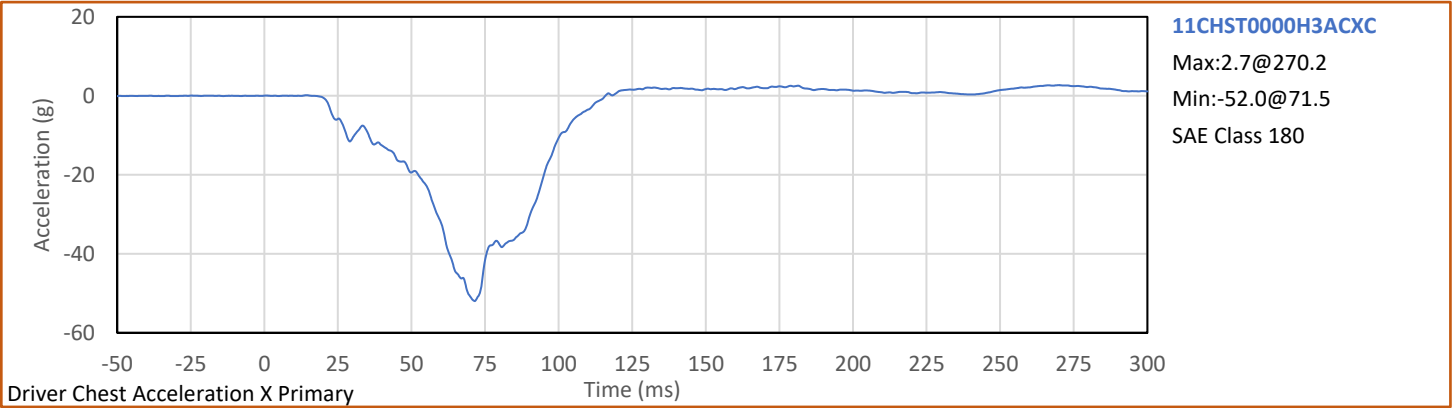


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Test Program: 56.3 km/h Frontal Impact NCAP Test

NHTSA No.: M20225103  
Test Date: 8/29/2022







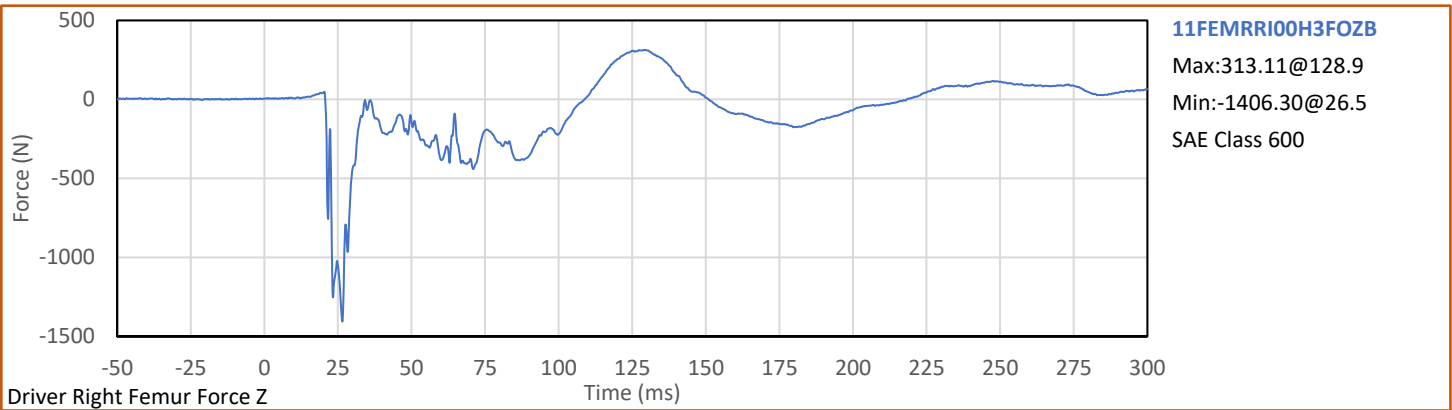
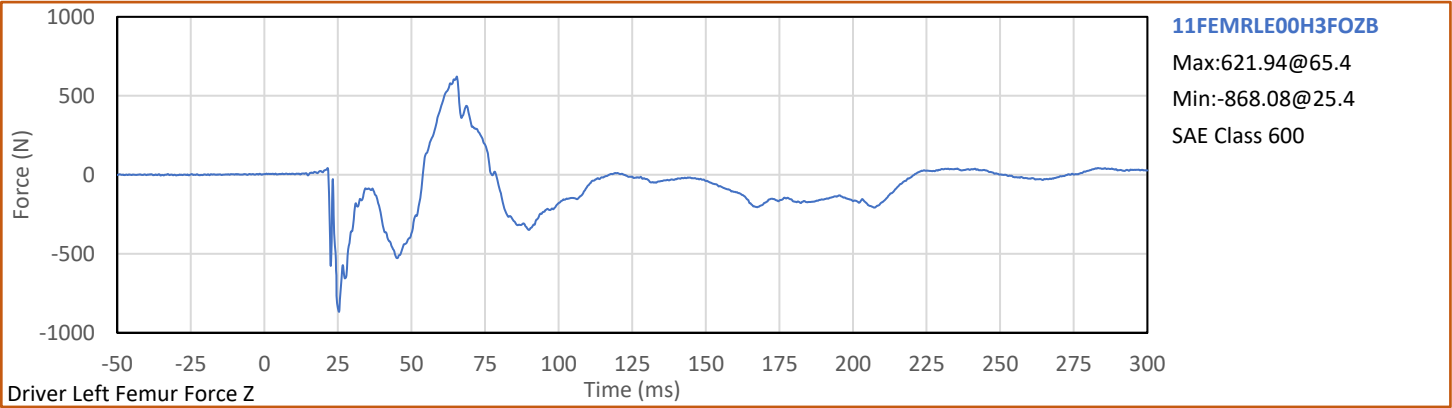
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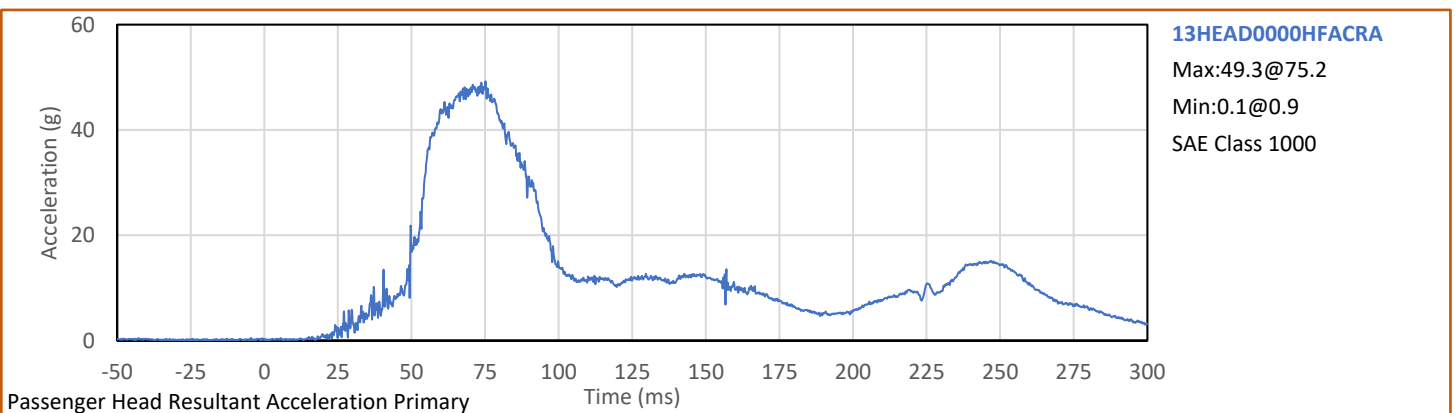
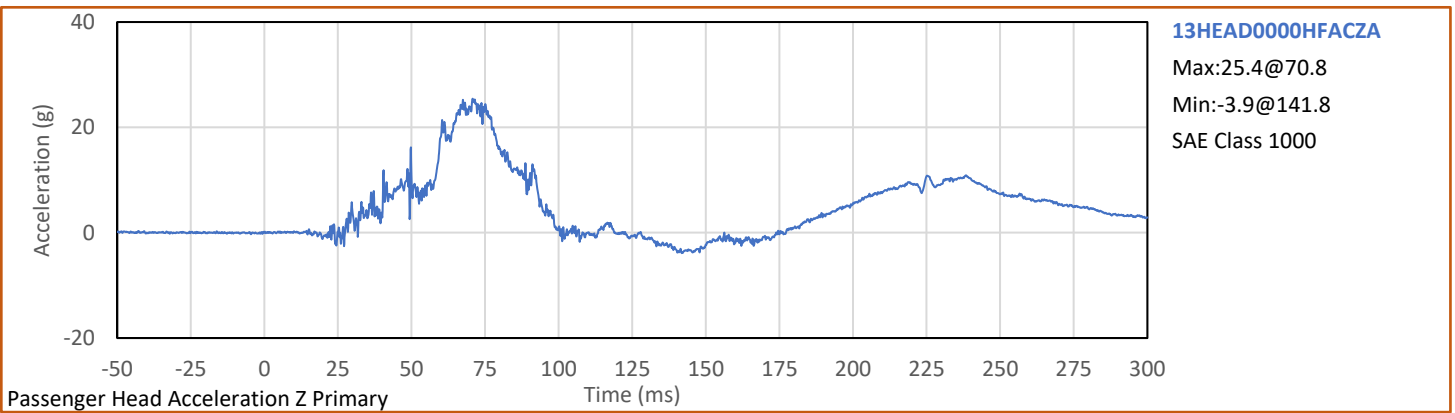
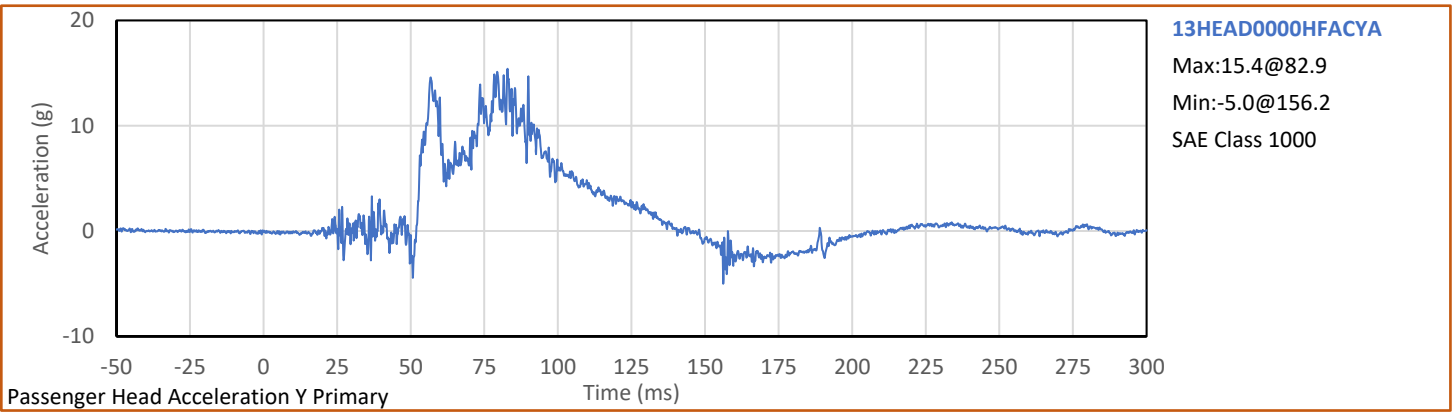
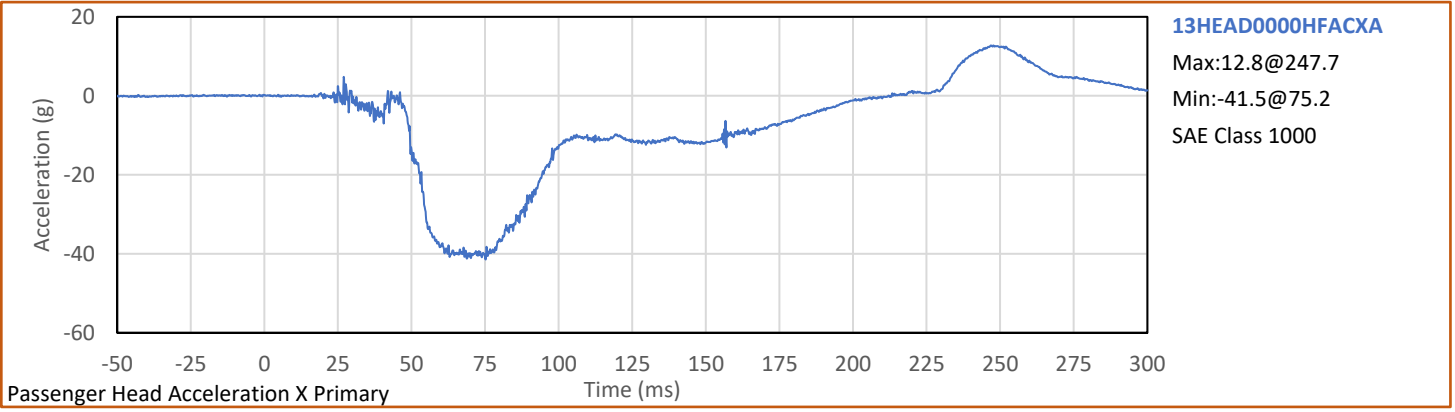
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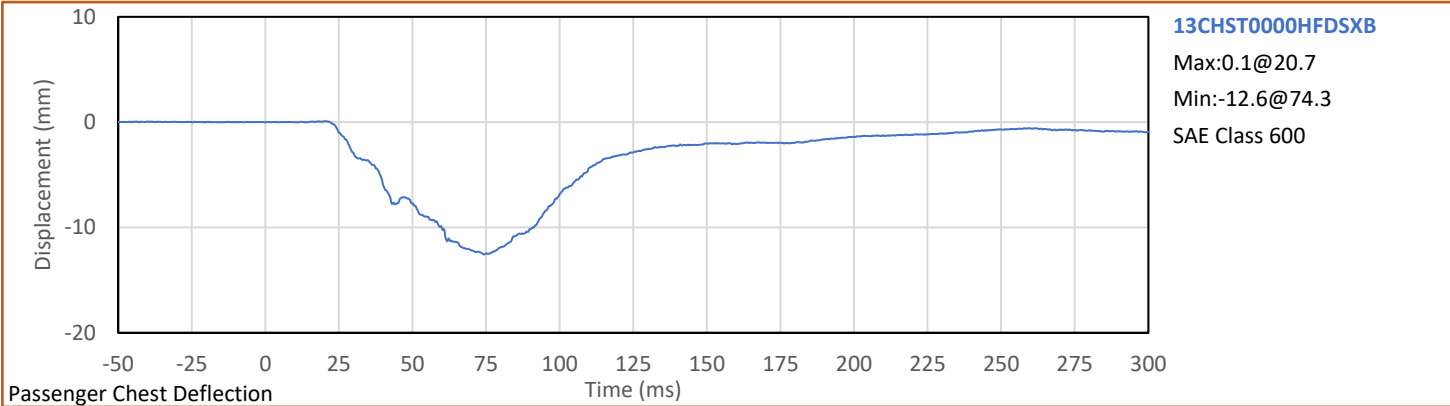
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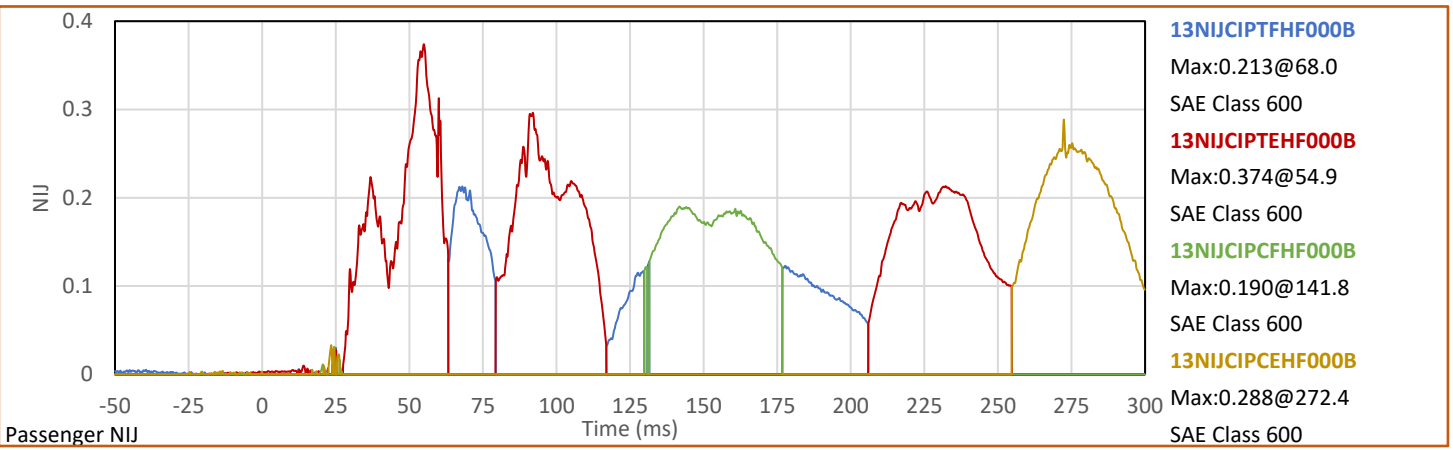
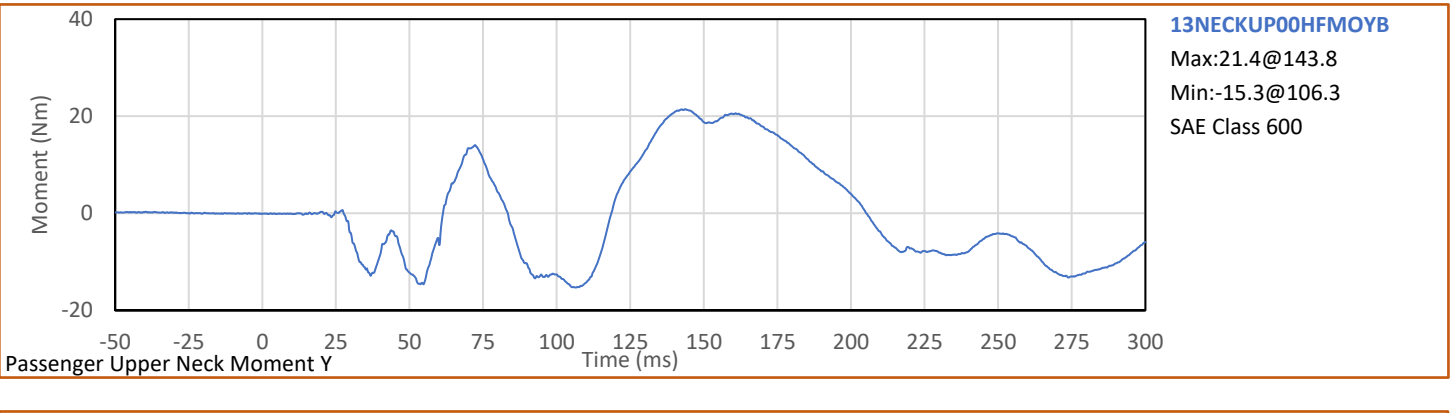


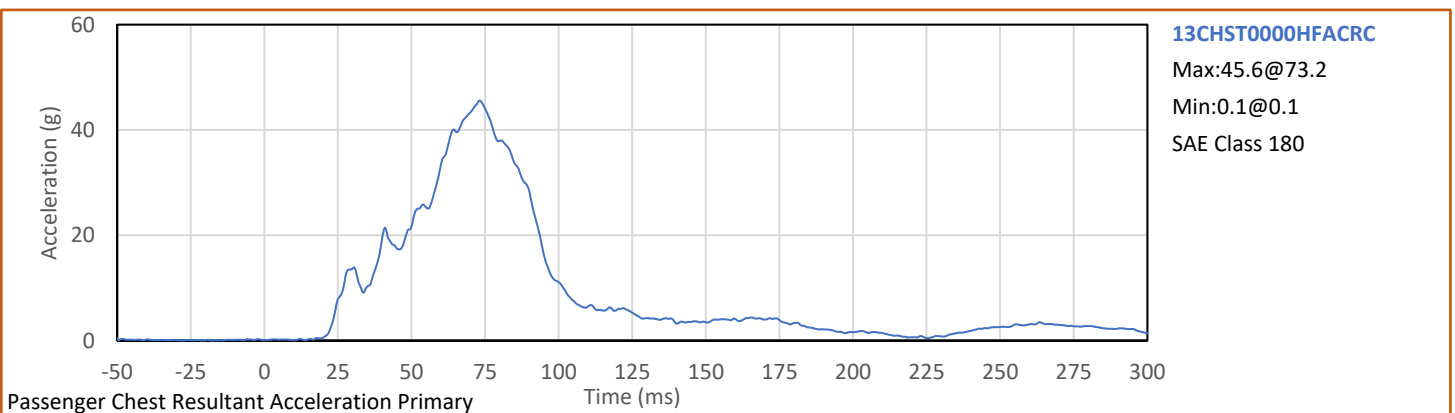
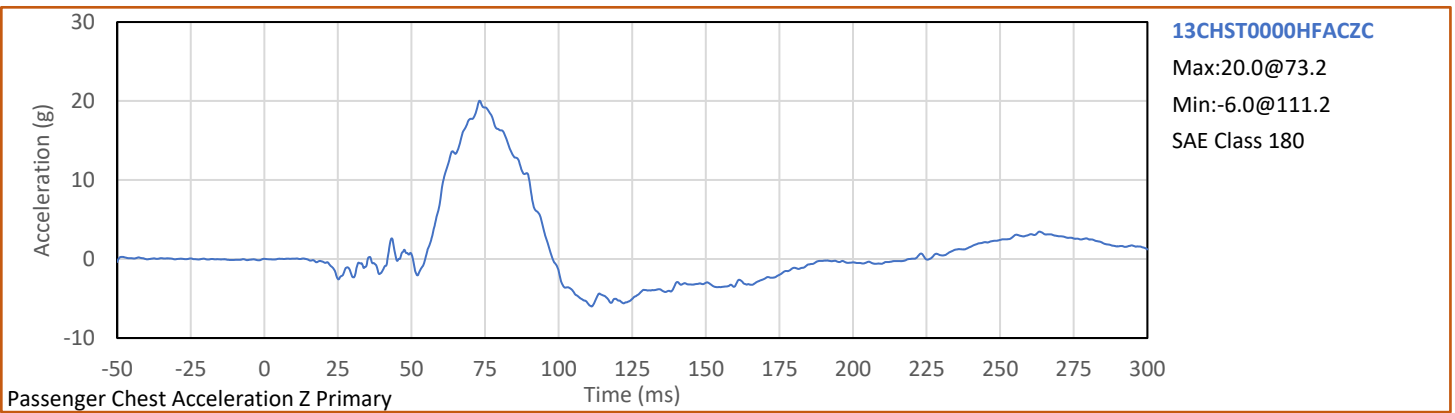
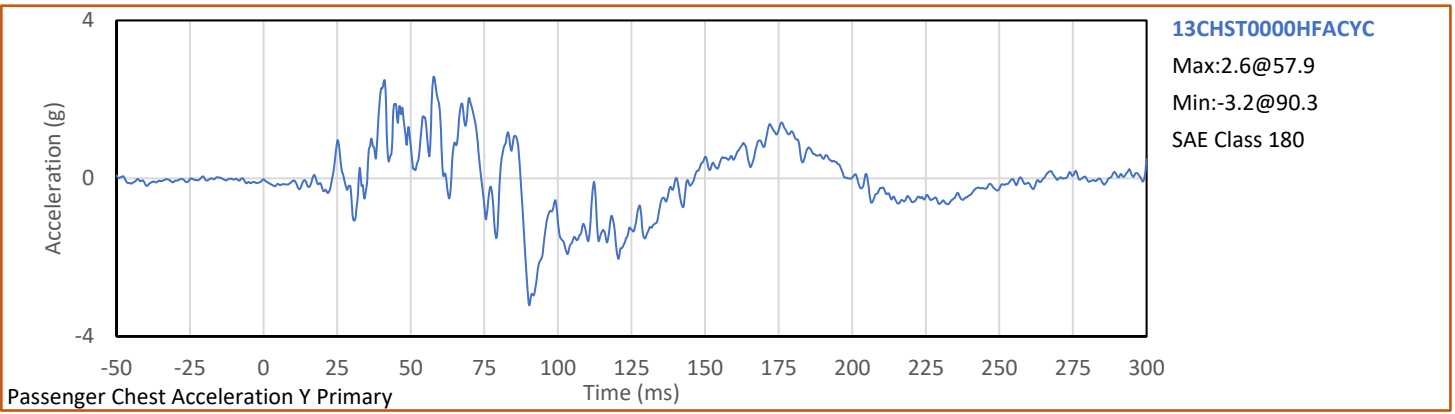
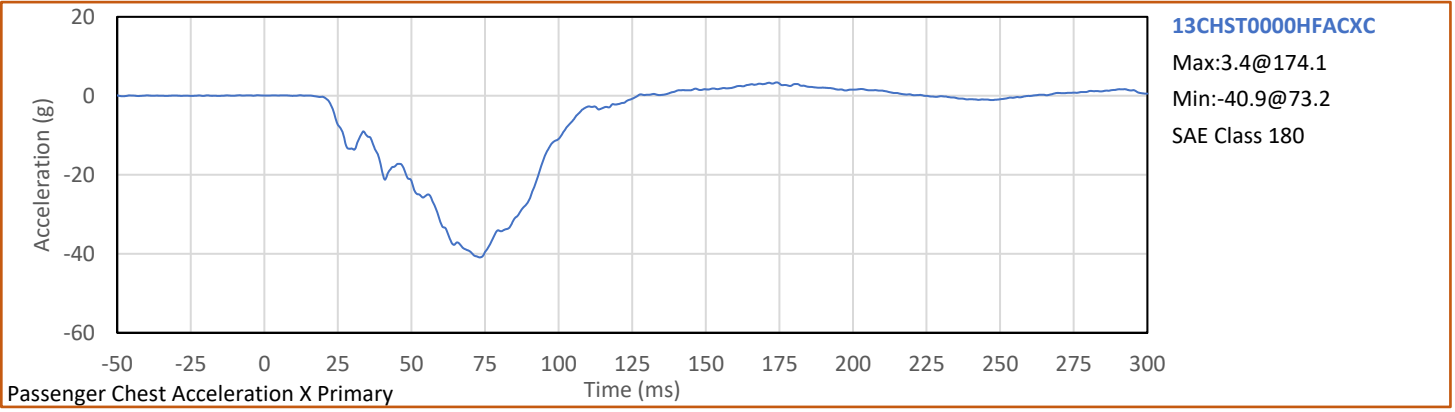


Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck  
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Test Date: 8/29/2022

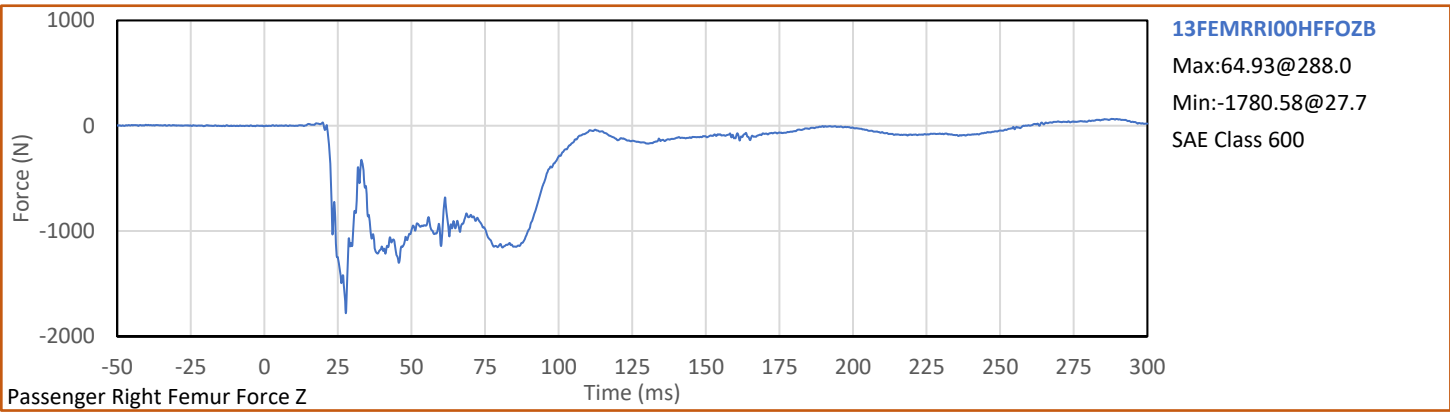
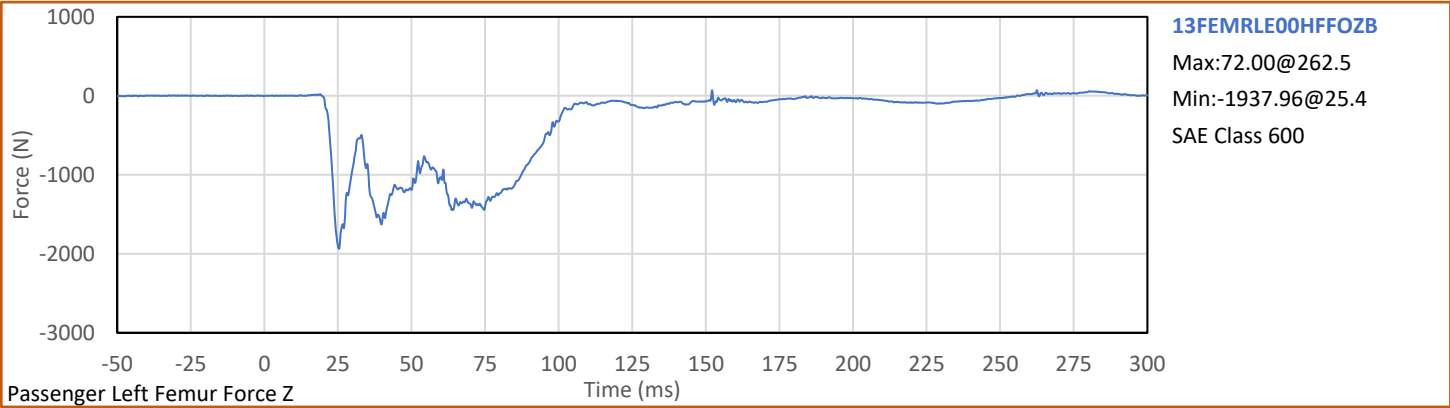






Test Vehicle: 2022 Toyota Tundra CrewMax 4x4 4-Door Truck  
Test Program: 56.3 km/h Frontal Impact NCAP Test

NHTSA No.: M20225103  
Test Date: 8/29/2022



**APPENDIX C**  
**DUMMY QUALIFICATION AND PERFORMANCE VERIFICATION DATA**

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

ATD Serial No.: 360


Test Date: 2022-08-24

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:   
G. Holguin

Approved By:   
J. Hernandez

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	879	889	885	Pass
B - Shoulder pivot height	mm	505	521	515	Pass
C - 'H' point height	mm	84	89	87	Pass
D - 'H' point location from backline	mm	135	140	138	Pass
E - Shoulder pivot from backline	mm	84	94	90	Pass
F - Thigh clearance	mm	140	155	149	Pass
G - Back of elbow to wrist pivot	mm	290	305	300	Pass
H - Head back to backline	mm	41	46	45	Pass
I - Shoulder to elbow length	mm	330	345	339	Pass
J - Elbow rest height	mm	190	211	204	Pass
K - Buttock to knee length	mm	579	604	593	Pass
L - Popliteal length	mm	429	455	444	Pass
M - Knee pivot height	mm	485	500	493	Pass
N - Buttock popliteal length	mm	452	477	464	Pass
O - Chest depth without jacket	mm	213	229	218	Pass
P - Foot length	mm	251	267	256	Pass
V - Shoulder breadth	mm	422	437	431	Pass
W - Foot breadth	mm	91	107	99	Pass
Y - Chest circum. (w/chest jacket)	mm	970	1001	987	Pass
Z - Waist circum.	mm	836	866	854	Pass
AA - Location for chest circum.	mm	429	434	431	Pass
BB - Location for waist circum.	mm	226	231	229	Pass
Overall Test Results					Pass

Technician:



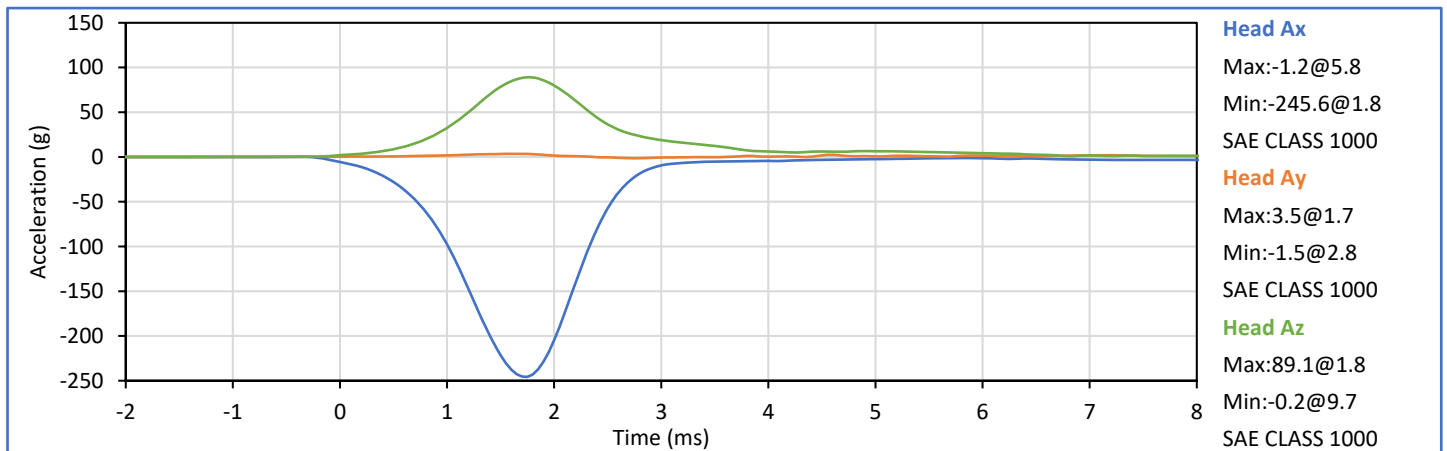
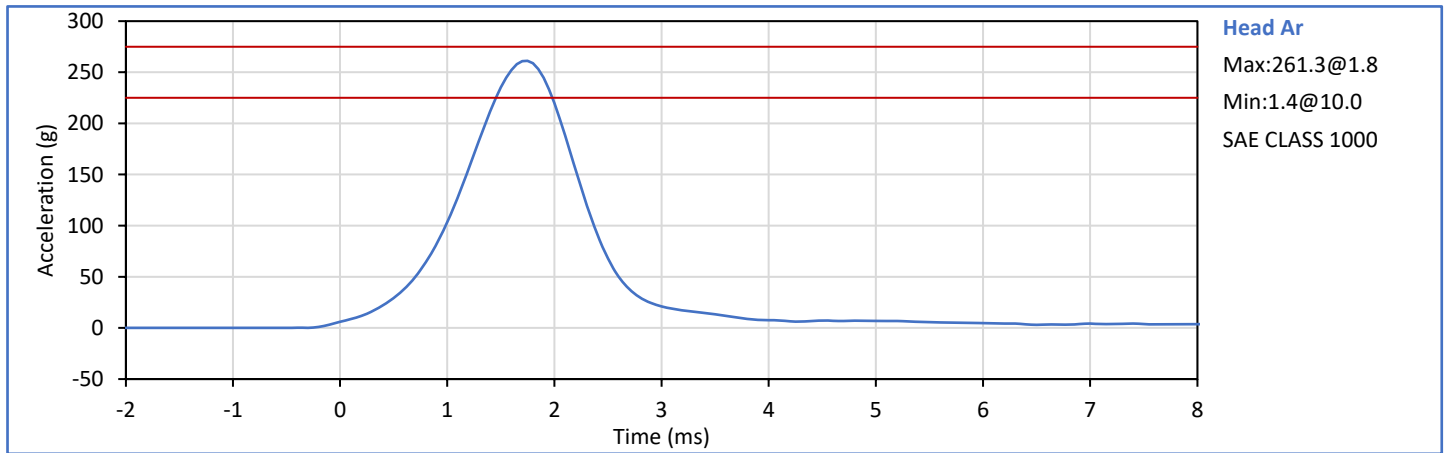
G. Holguin

Approved By:




J. Hernandez

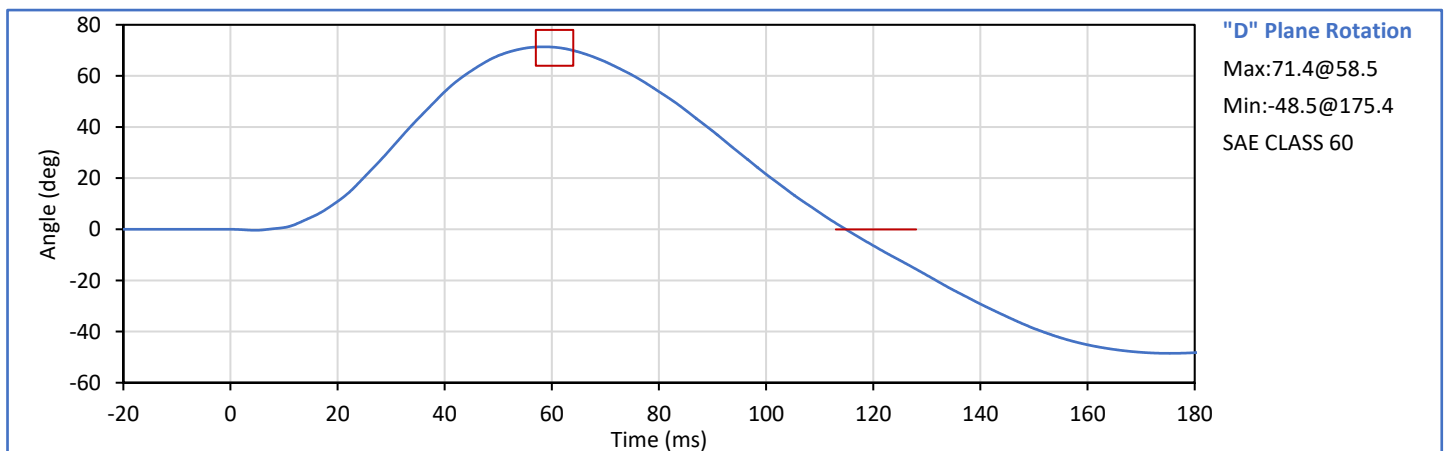
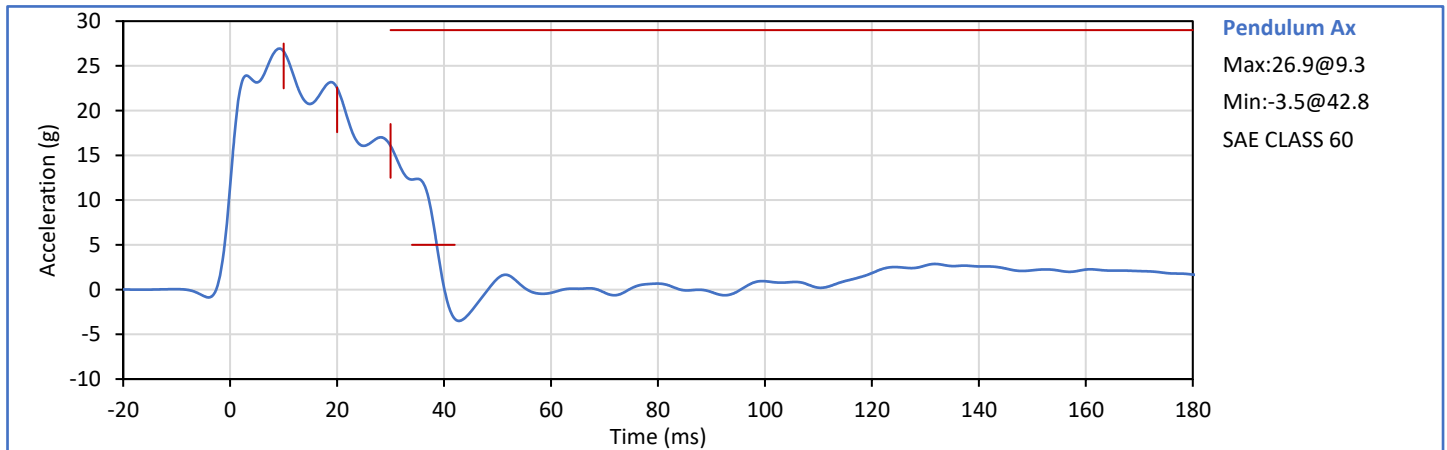
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.2	Pass
Laboratory Relative Humidity	%	10	70	50	Pass
Peak Resultant Acceleration	g	225.0	275.0	261.3	Pass
Peak Lateral Acceleration	g	-15.0	15.0	3.5	Pass
Oscillations After Main Pulse	%	0.0	10.0	0.0	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
<b>Overall Test Results</b>					<b>Pass</b>



Technician:   
G. Holguin

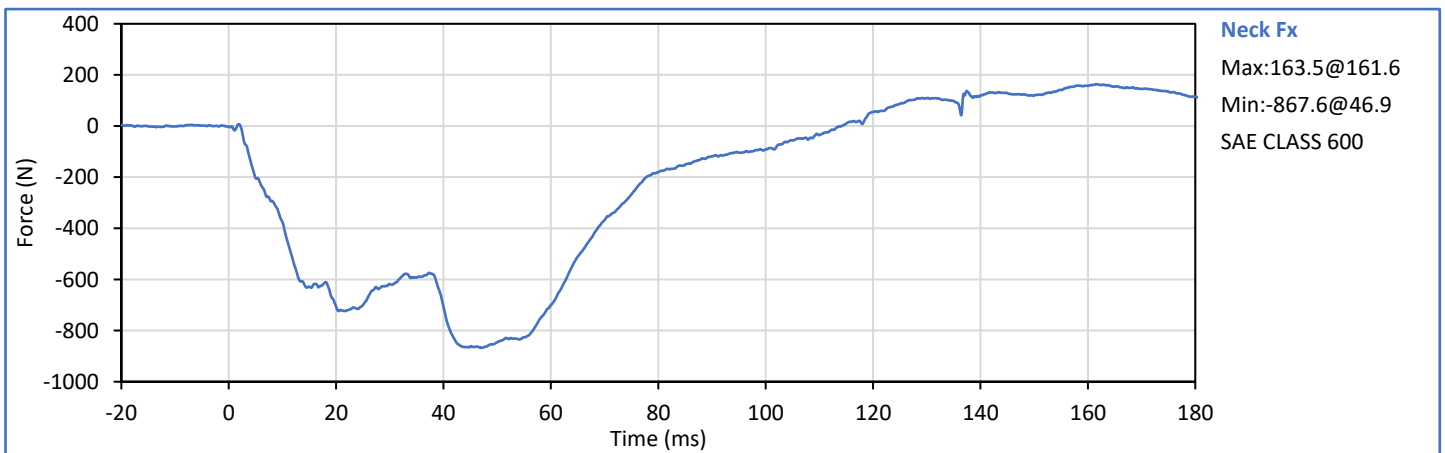
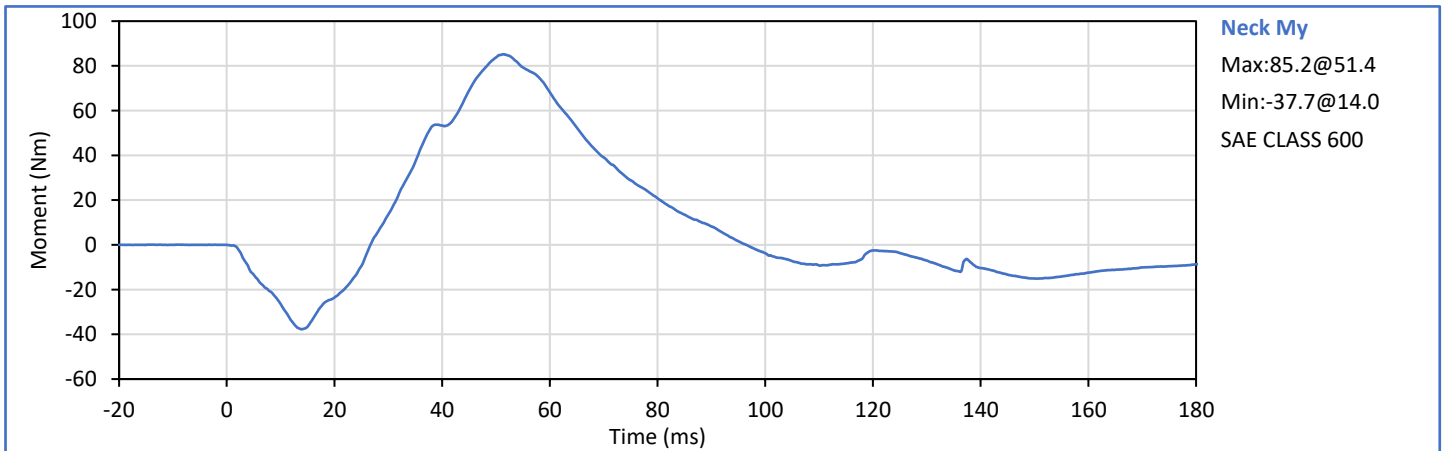
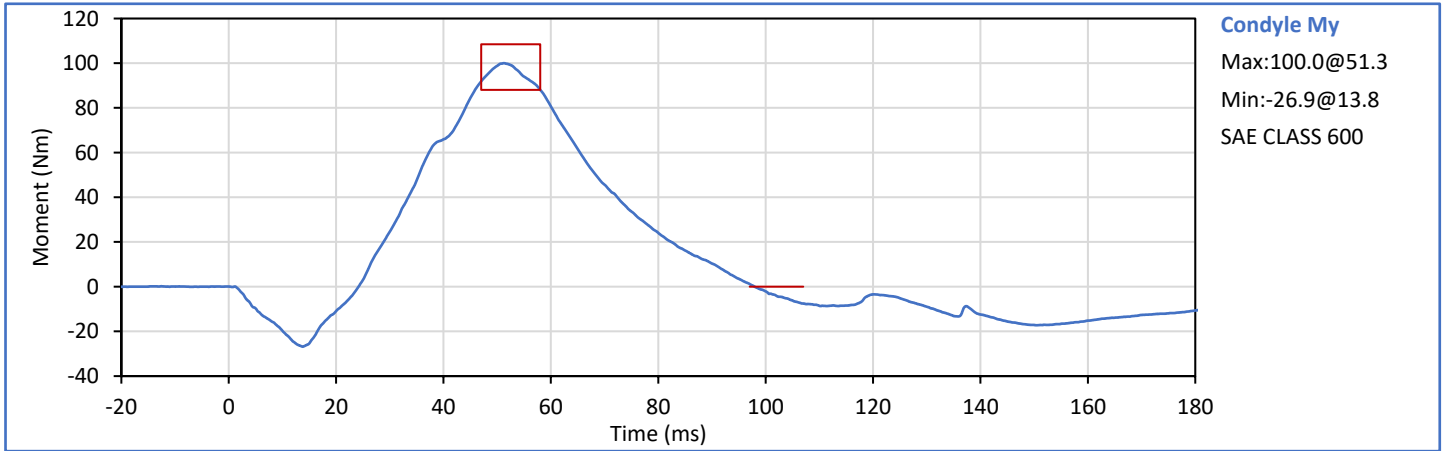
Approved By:   
J. Hernandez

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	48	Pass
Pendulum Velocity	m/s	6.89	7.13	6.96	Pass
Pendulum Deceleration at 10 ms	g	22.5	27.5	26.6	Pass
Pendulum Deceleration at 20 ms	g	17.6	22.6	22.5	Pass
Pendulum Deceleration at 30 ms	g	12.5	18.5	16.1	Pass
Peak Pendulum Decel After 30 ms	g	0.0	29.0	16.1	Pass
Deceleration Decay to Cross 5g	ms	34.0	42.0	38.6	Pass
"D" Plane Rotation peak	deg	64.0	78.0	71.4	Pass
	ms	57.0	64.0	58.5	Pass
"D" Plane Rotation Decay to Zero	ms	113.0	128.0	114.9	Pass
Moment About Occipital Condyle	Nm	88.1	108.5	100.0	Pass
	ms	47.0	58.0	51.3	Pass
Moment Decay, Peak to Zero	ms	97.0	107.0	98.0	Pass
Overall Test Results					Pass

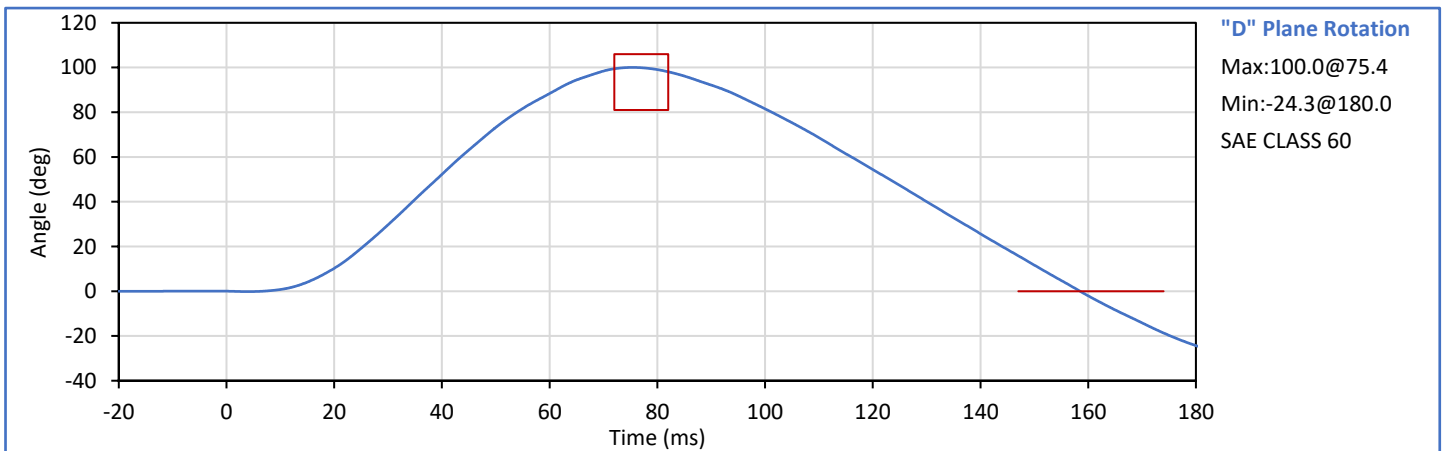
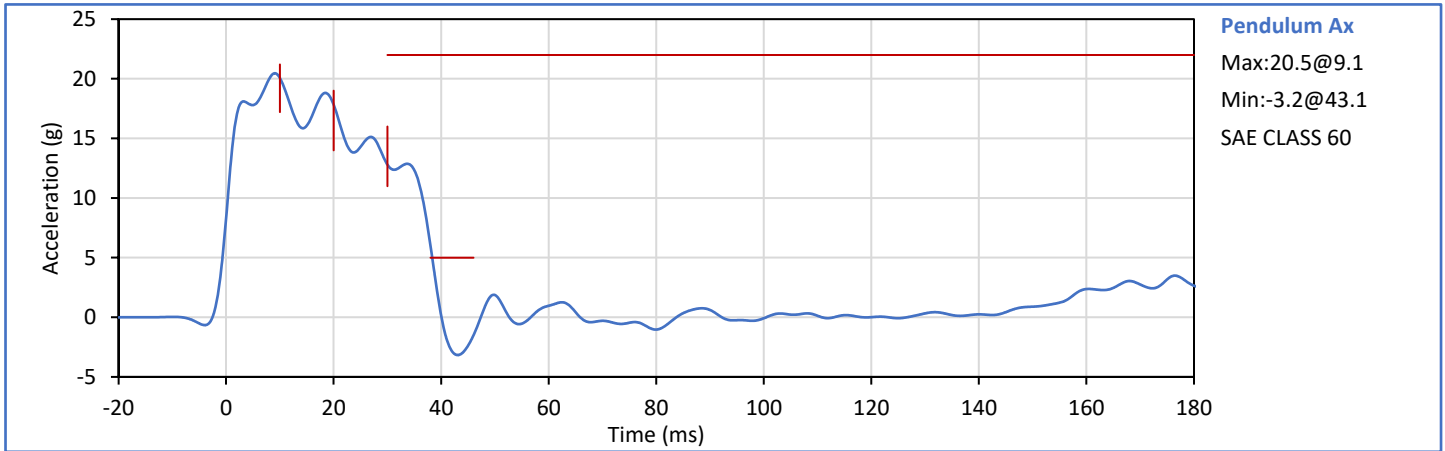


Technician: *G. Holguin*  
G. Holguin

Approved By: *J. Hernandez*  
J. Hernandez

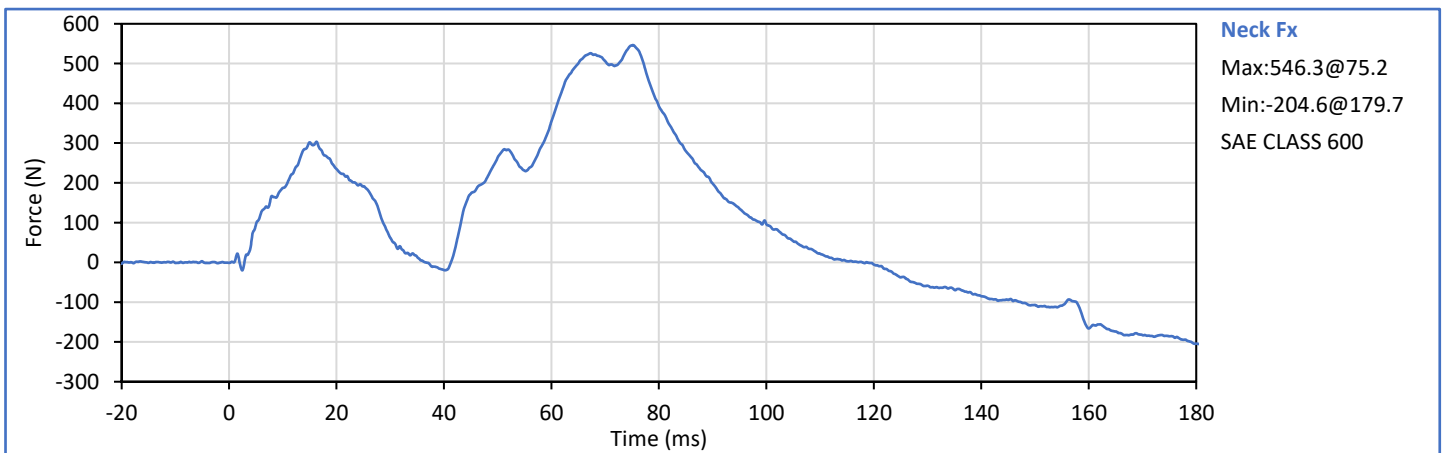
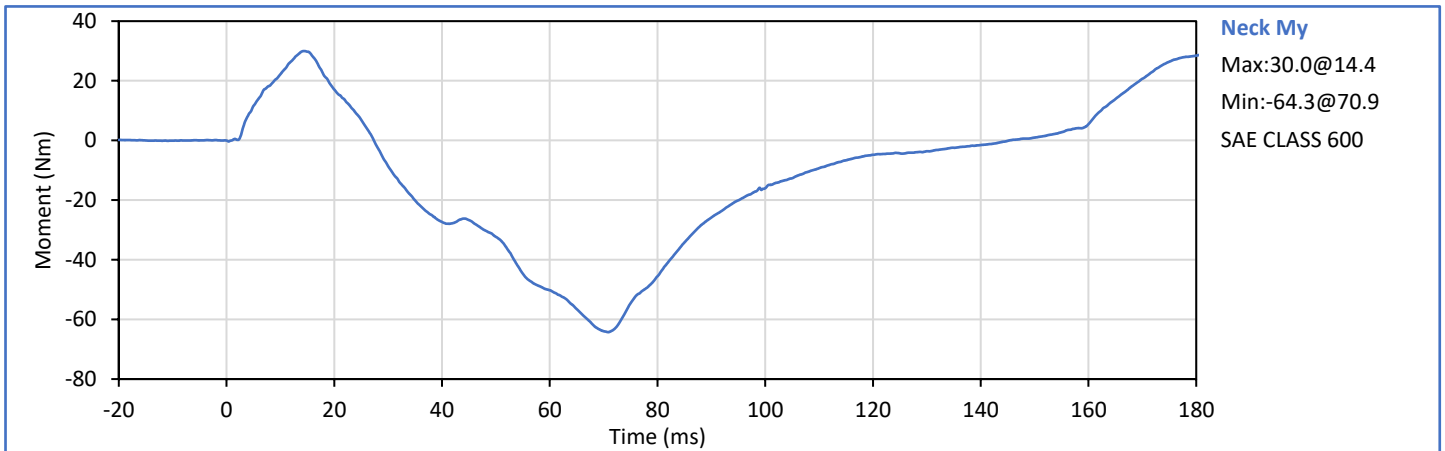
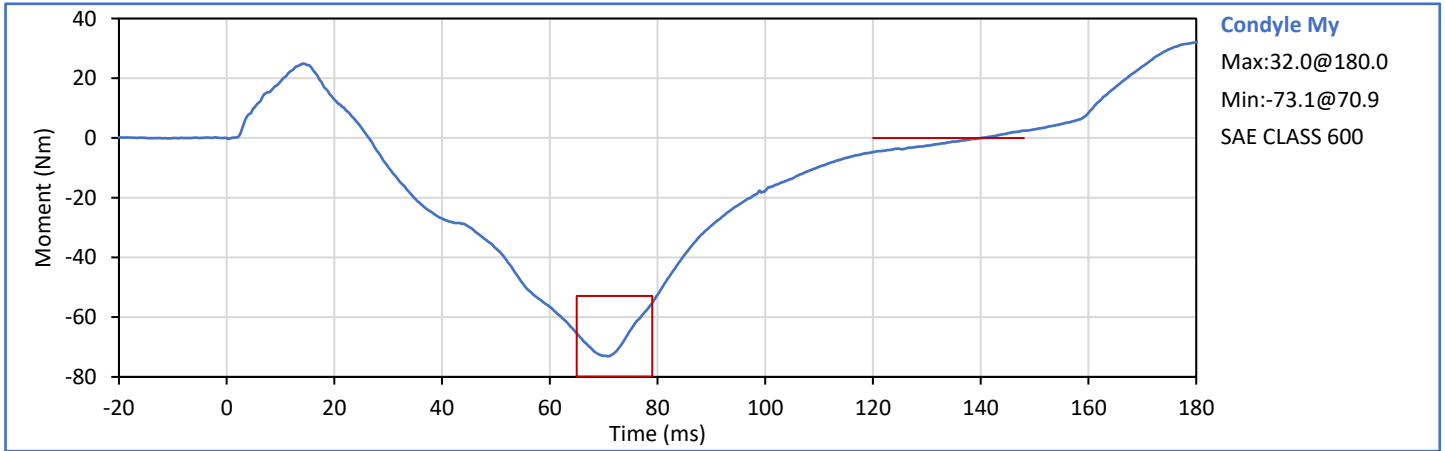


Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Pendulum Velocity	m/s	5.94	6.19	6.11	Pass
Pendulum Deceleration at 10 ms	g	17.2	21.2	20.1	Pass
Pendulum Deceleration at 20 ms	g	14.0	19.0	17.8	Pass
Pendulum Deceleration at 30 ms	g	11.0	16.0	12.8	Pass
Peak Pendulum Decel After 30 ms	g	0.0	22.0	12.9	Pass
Deceleration Decay to Cross 5g	ms	38.0	46.0	38.3	Pass
"D" Plane Rotation peak	deg	81.0	106.0	100.0	Pass
	ms	72.0	82.0	75.4	Pass
"D" Plane Rotation Decay to Zero	ms	147.0	174.0	158.5	Pass
Moment About Occipital Condyle	Nm	-79.9	-52.9	-73.1	Pass
	ms	65.0	79.0	70.9	Pass
Moment Decay, Peak to Zero	ms	120.0	148.0	140.2	Pass
Overall Test Results					Pass

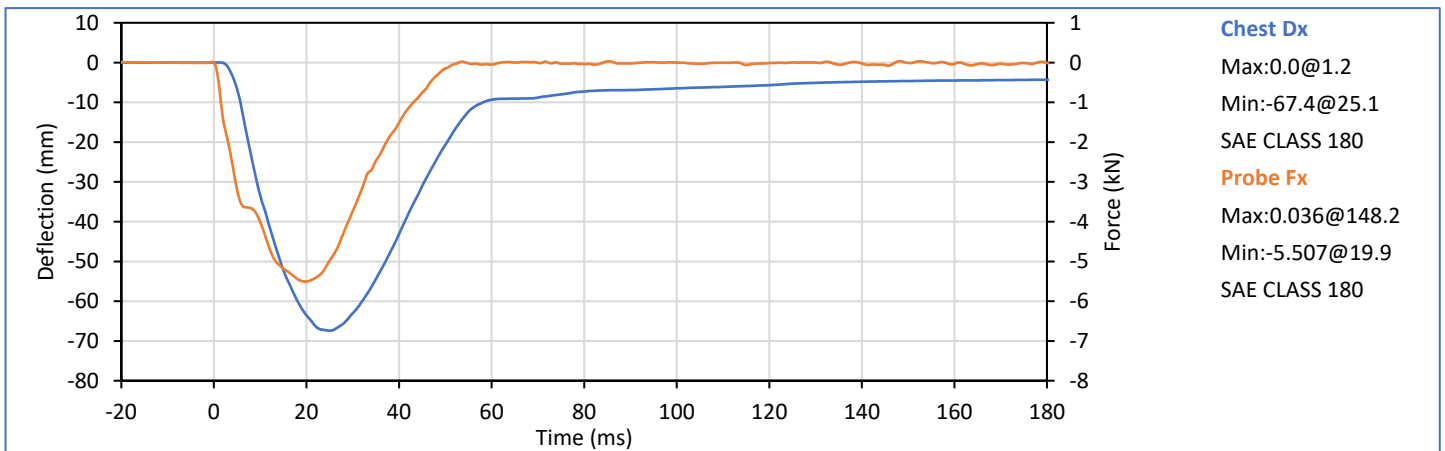
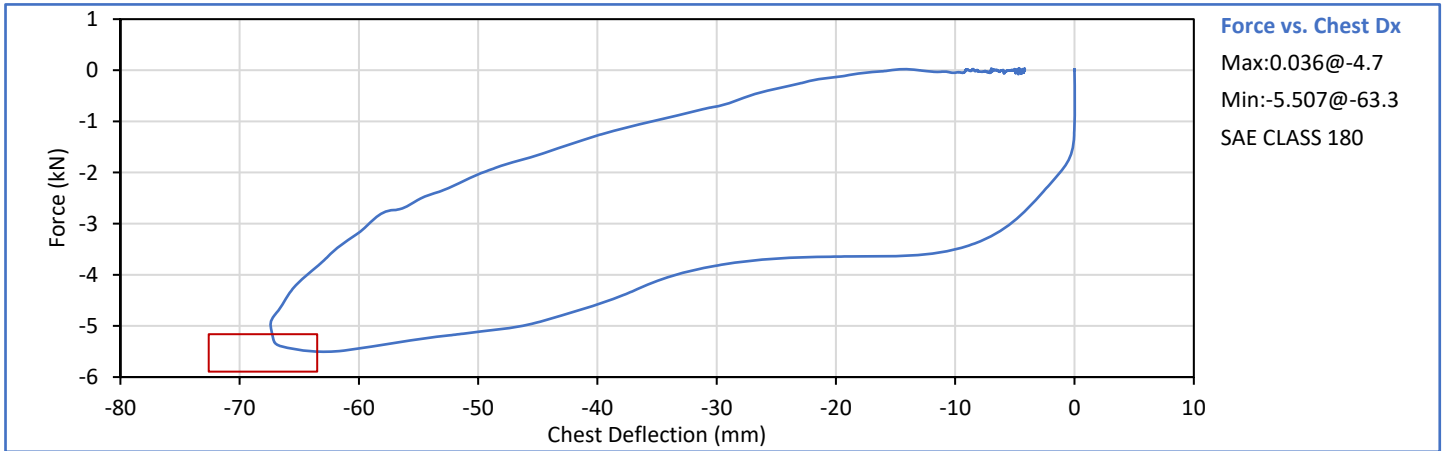


Technician: *G. Holguin*  
G. Holguin

Approved By: *J. Hernandez*  
J. Hernandez



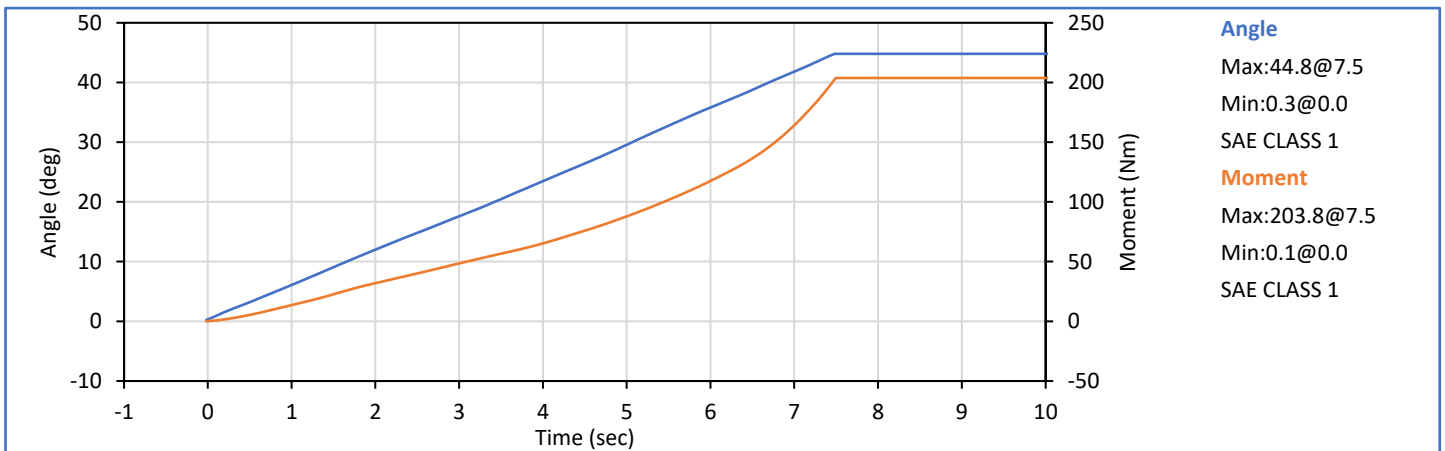
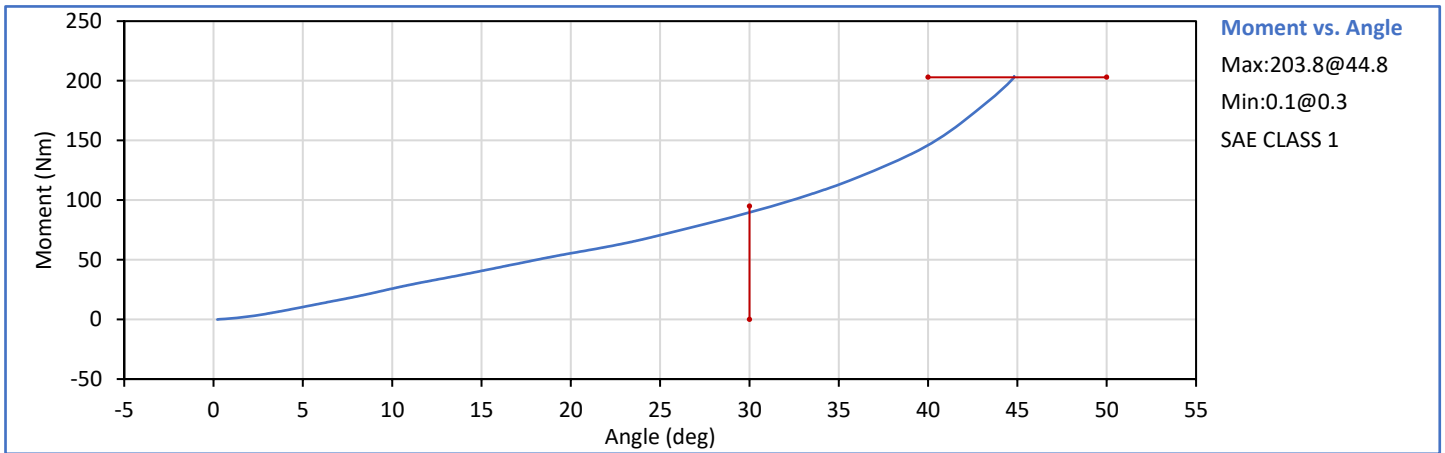
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.9	Pass
Laboratory Relative Humidity	%	10	70	43	Pass
Probe Velocity	m/s	6.58	6.82	6.72	Pass
Peak Chest Deflection	mm	-72.6	-63.5	-67.4	Pass
Peak Probe Force	kN	-5.893	-5.159	-5.507	Pass
Internal Hysterisis	%	69.0	85.0	70.1	Pass
<b>Overall Test Results</b>					<b>Pass</b>




Technician: *G. Holguin*  
G. Holguin

Approved By: *J. Hernandez*  
J. Hernandez

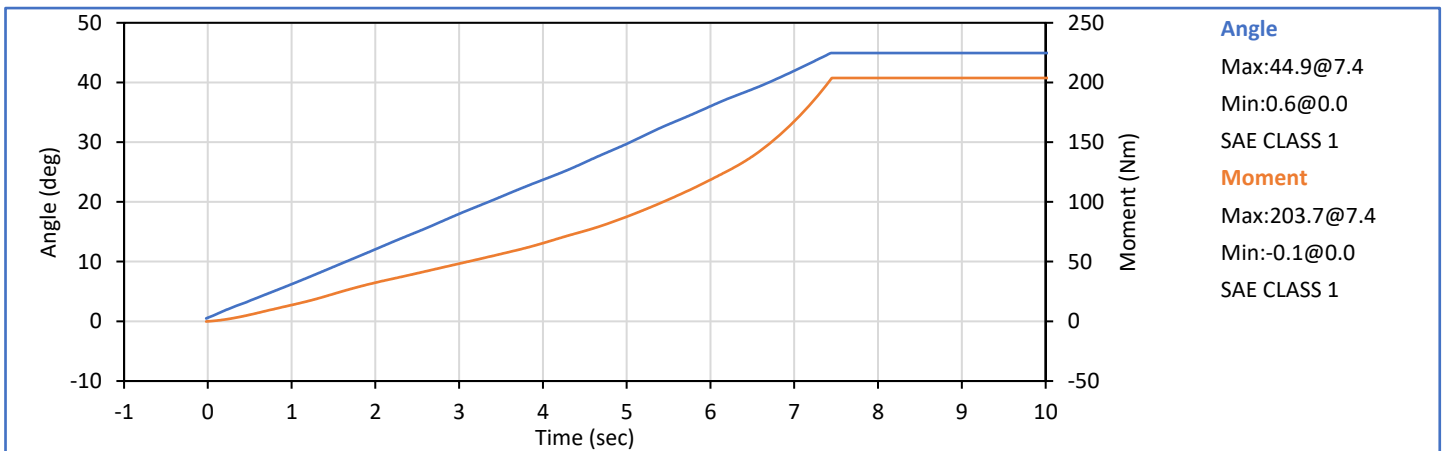
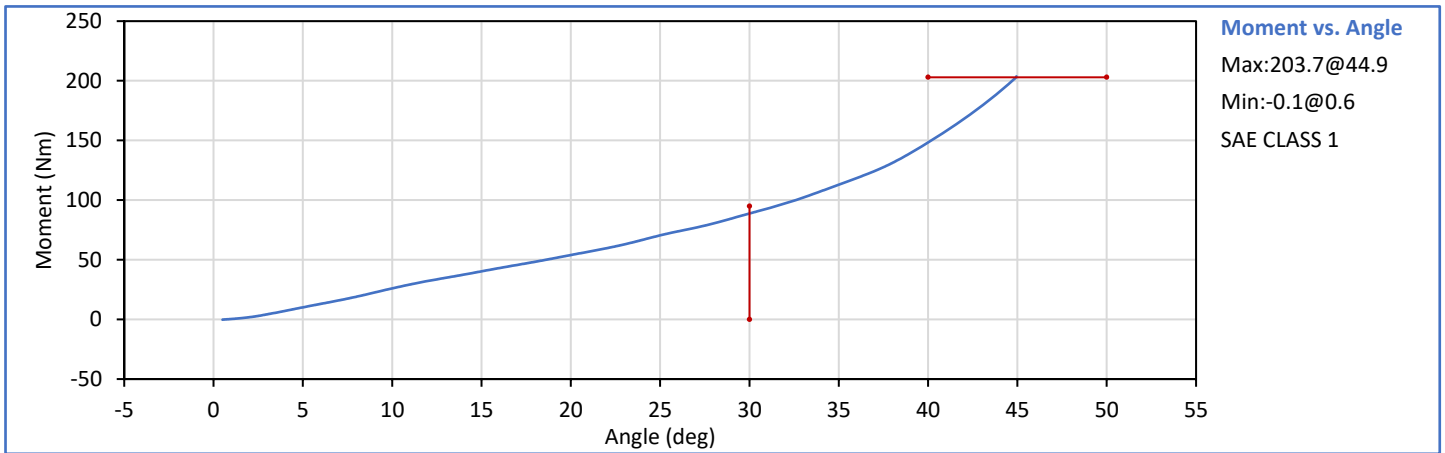
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Relative Humidity	%	10	70	46	Pass
Left Hip Rotation Rate	deg/s	5.0	10.0	5.9	Pass
Left Femur Torque at 30°	Nm	0.0	95.0	89.5	Pass
Left Hip Rotation at 203 Nm	deg	40.0	50.0	44.8	Pass
<b>Overall Test Results</b>					<b>Pass</b>




Technician:   
G. Holguin

Approved By:   
J. Hernandez

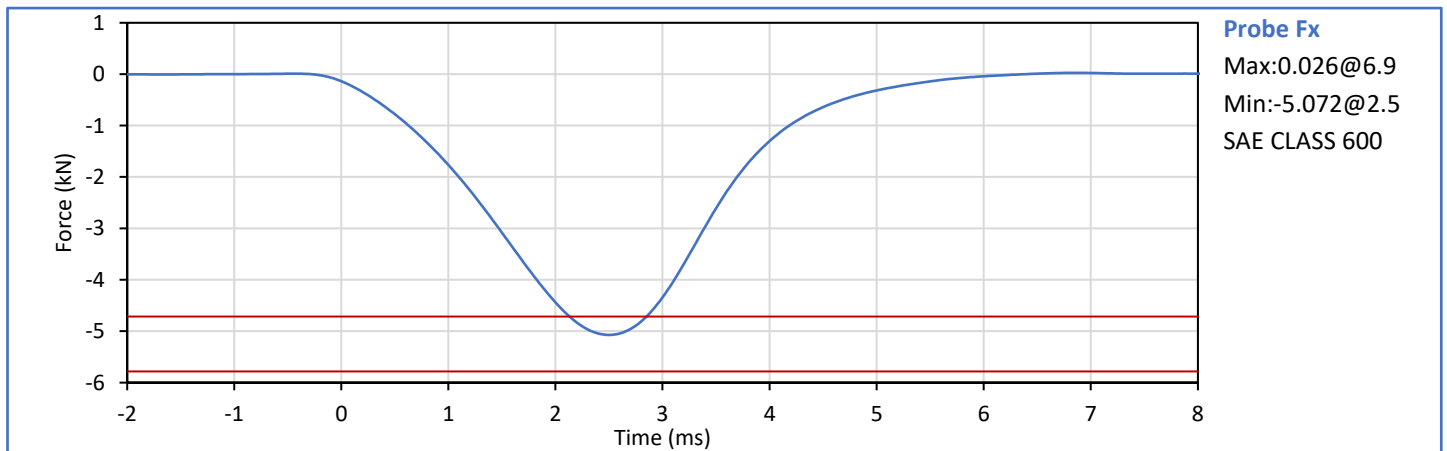
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Relative Humidity	%	10	70	46	Pass
Right Hip Rotation Rate	deg/s	5.0	10.0	5.9	Pass
Right Femur Torque at 30°	Nm	0.0	95.0	88.7	Pass
Right Hip Rotation at 203 Nm	deg	40.0	50.0	44.9	Pass
<b>Overall Test Results</b>					<b>Pass</b>



Technician:   
G. Holguin

Approved By:   
J. Hernandez

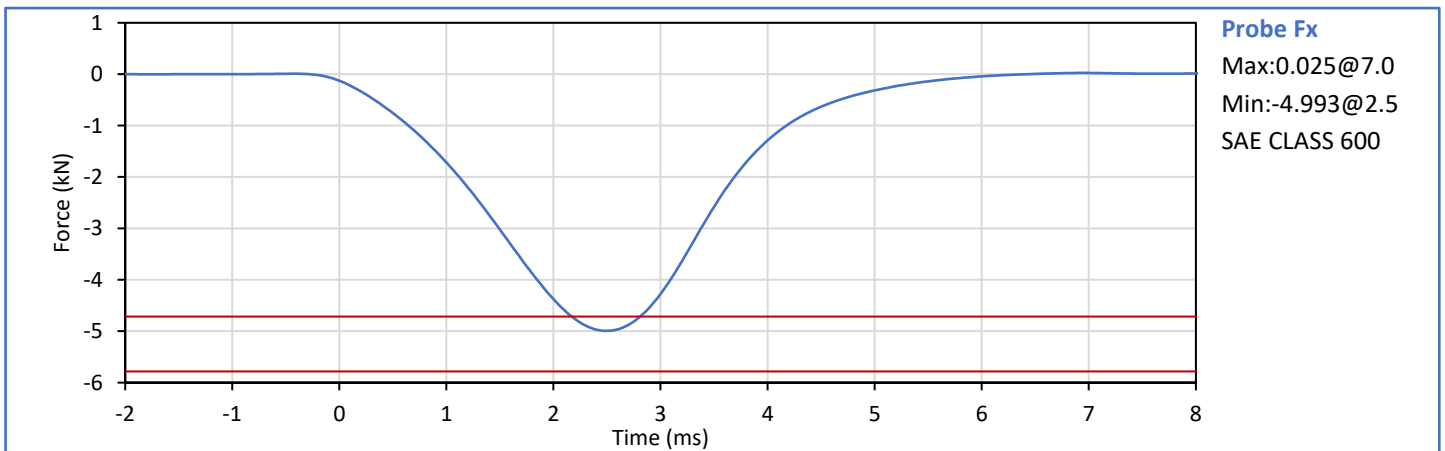
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.7	Pass
Laboratory Relative Humidity	%	10	70	51	Pass
Probe Velocity	m/s	2.070	2.130	2.103	Pass
Peak Resistive Force	kN	-5.782	-4.715	-5.072	Pass
Overall Test Results					Pass



Technician: *G. Holguin*  
G. Holguin

Approved By: *J. Hernandez*  
J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.8	Pass
Laboratory Relative Humidity	%	10	70	50	Pass
Probe Velocity	m/s	2.070	2.130	2.105	Pass
Peak Resistive Force	kN	-5.782	-4.715	-4.993	Pass
<b>Overall Test Results</b>					<b>Pass</b>



Technician: *G. Holguin*  
G. Holguin

Approved By: *J. Hernandez*  
J. Hernandez

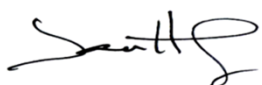
**APPENDIX C**  
**Pre-Test ATD Qualification and Performance Verification**  
**Hybrid III 5th Percentile Female ATD**  
**S/N: DH1644**

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:   
G. Holguin


Approved By:   
J. Hernandez

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	48	Pass
A - Total sitting height	mm	775	800	792	Pass
B - Shoulder pivot height	mm	432	457	444	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	77	Pass
F - Thigh clearance	mm	119	135	125	Pass
G - Back of elbow to wrist pivot	mm	244	259	252	Pass
H - Head back to backline	mm	41	46	44	Pass
I - Shoulder to elbow length	mm	277	297	284	Pass
J - Elbow rest height	mm	183	203	190	Pass
K - Buttock to knee length	mm	521	546	529	Pass
L - Popliteal length	mm	356	376	363	Pass
M - Knee pivot height	mm	394	419	411	Pass
N - Buttock popliteal length	mm	414	439	427	Pass
O - Chest depth without jacket	mm	175	191	183	Pass
P - Foot length	mm	219	234	231	Pass
R - Buttock to Knee Pivot Length	mm	457	483	470	Pass
S - Head Breadth	mm	137	147	144	Pass
T - Head Depth	mm	178	188	185	Pass
U - Hip Breadth	mm	300	315	304	Pass
V - Shoulder breadth	mm	351	366	361	Pass
W - Foot breadth	mm	79	94	92	Pass
X - Head circum.	mm	528	549	544	Pass
Y - Chest circum. (w/chest jacket)	mm	851	881	865	Pass
Z - Waist circum.	mm	760	790	765	Pass
AA - Location for chest circum.	mm	333	358	349	Pass
BB - Location for waist circum.	mm	160	170	165	Pass
Overall Test Results					Pass

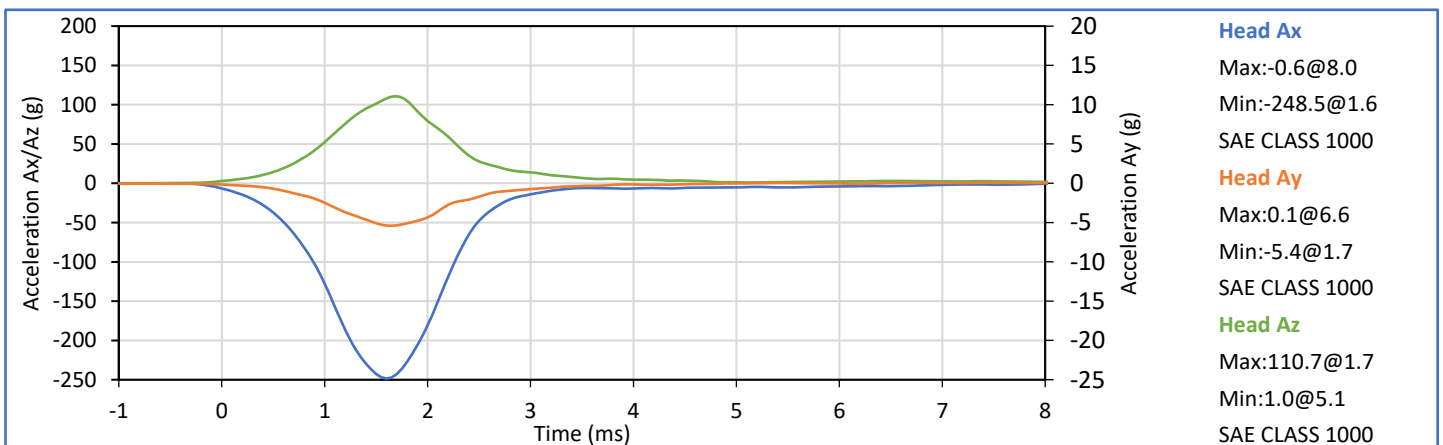
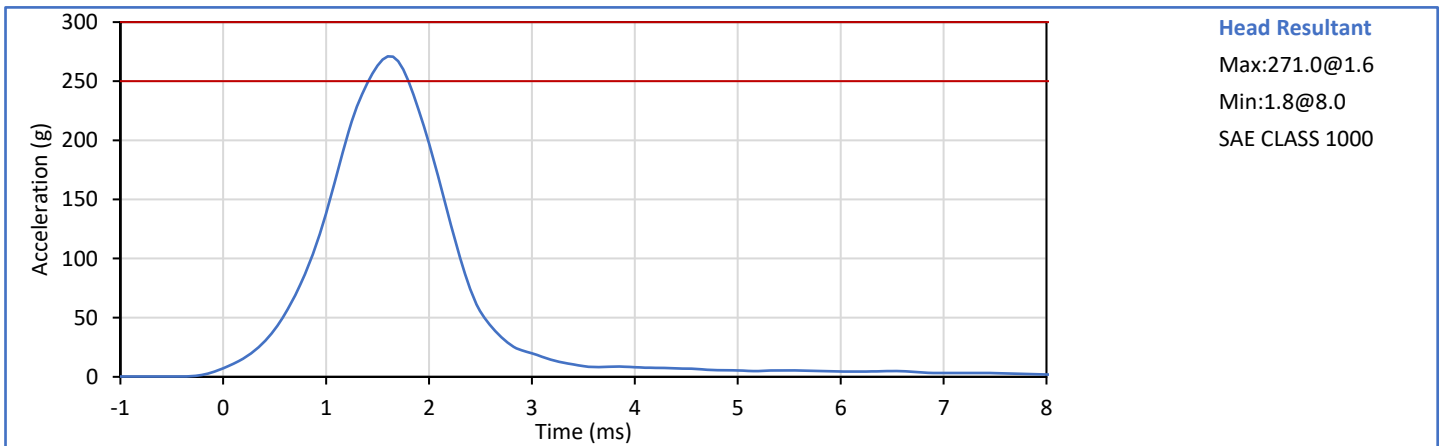
Technician:

  
G. Holguin

Approved By:

  
J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.3	Pass
Laboratory Humidity	%	10	70	51	Pass
Peak Resultant Acceleration	g	250.0	300.0	271.0	Pass
Peak Lateral Acceleration	g	-15.0	15.0	-5.4	Pass
Oscillations After Main Pulse	%	0.0	10.0	1.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
<b>Overall Test Results</b>					<b>Pass</b>



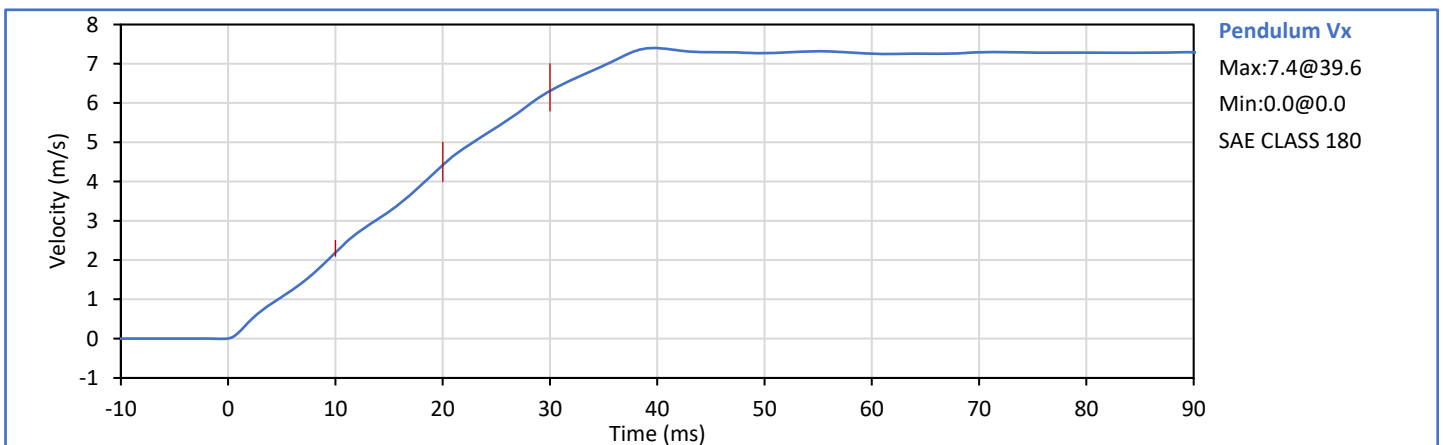
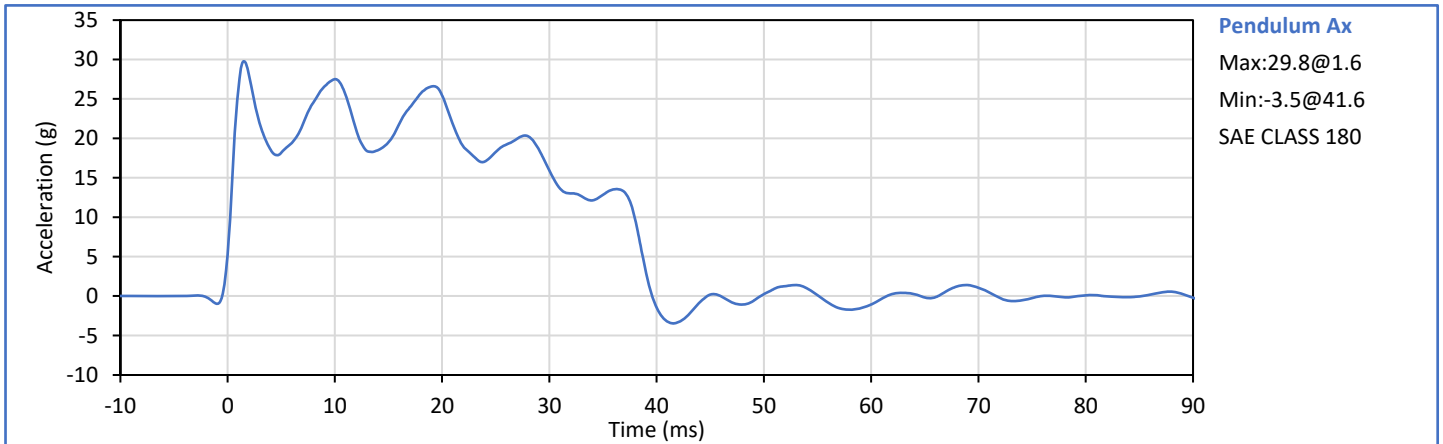
Technician: \_\_\_\_\_

G. Holguin

Approved By: \_\_\_\_\_

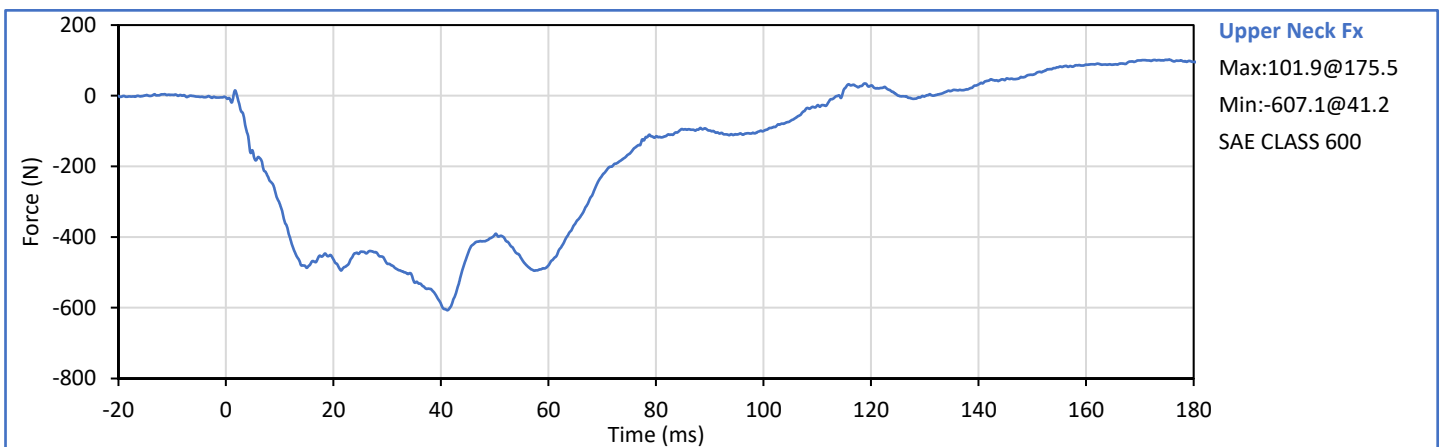
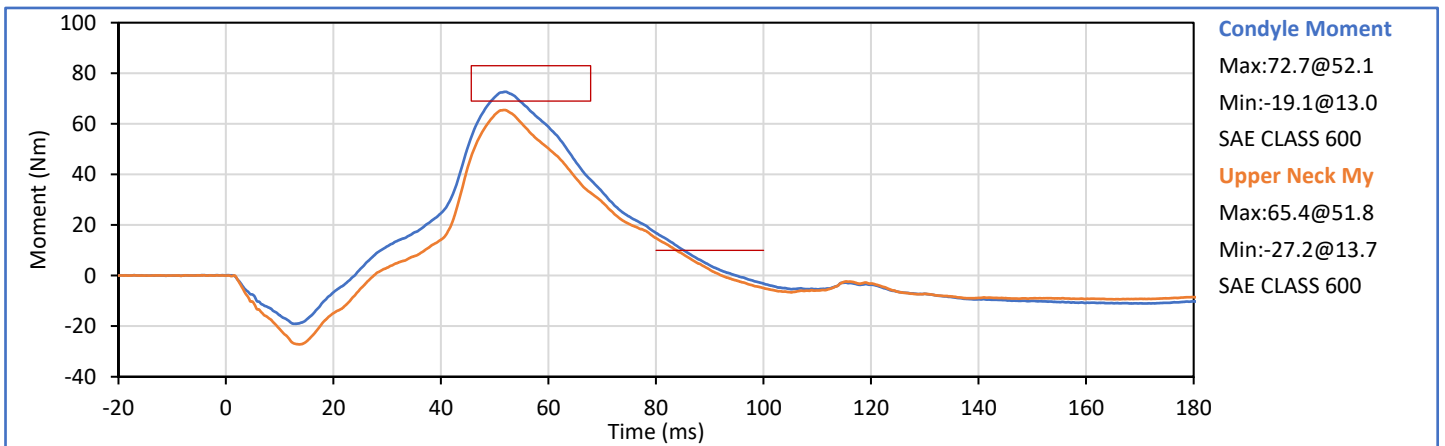
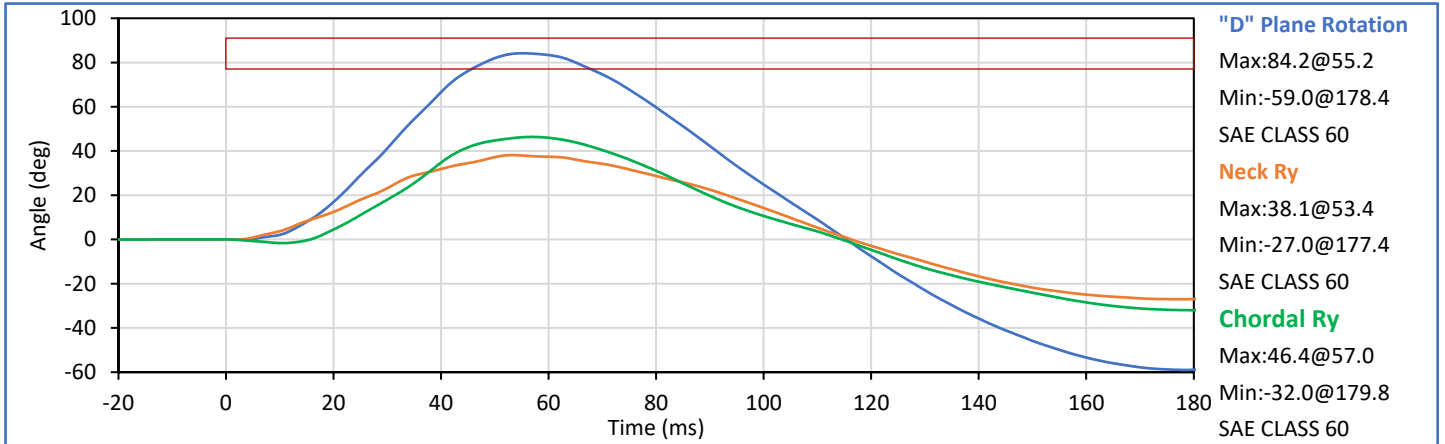
J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	20.9	Pass
Laboratory Humidity	%	10	70	52	Pass
Pendulum Velocity	m/s	6.89	7.13	6.95	Pass
Pendulum Velocity at 10 ms	m/s	2.10	2.50	2.19	Pass
Pendulum Velocity at 20 ms	m/s	4.00	5.00	4.42	Pass
Pendulum Velocity at 30 ms	m/s	5.80	7.00	6.31	Pass
Peak "D" Plane Rotation	deg	77.0	91.0	84.2	Pass
Peak Moment in Rotation	Nm	69.0	83.0	72.7	Pass
Positive Moment Decay to 10 Nm	ms	80.0	100.0	85.2	Pass
Overall Test Results					Pass

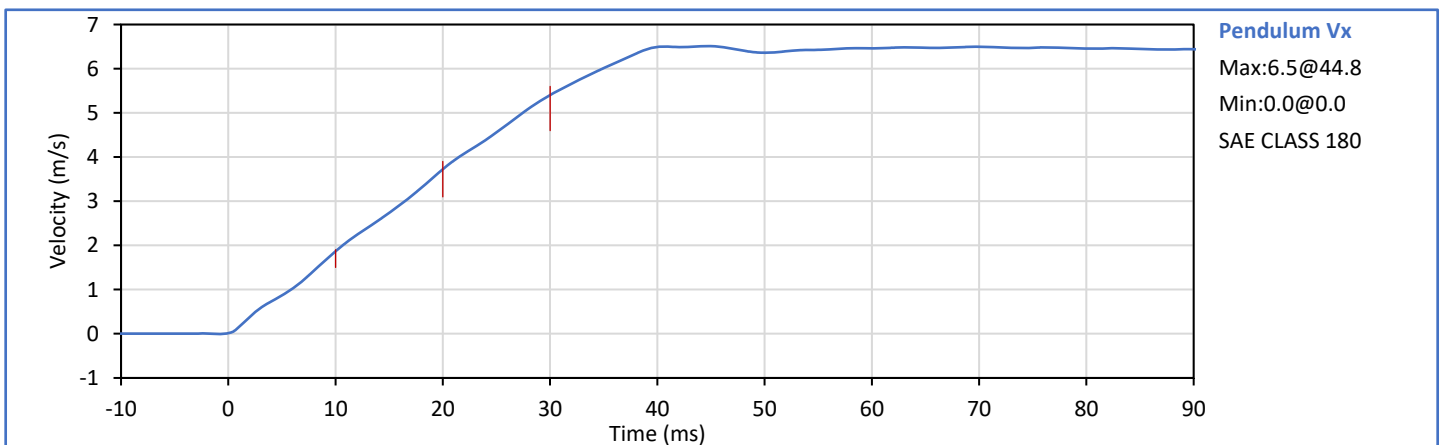
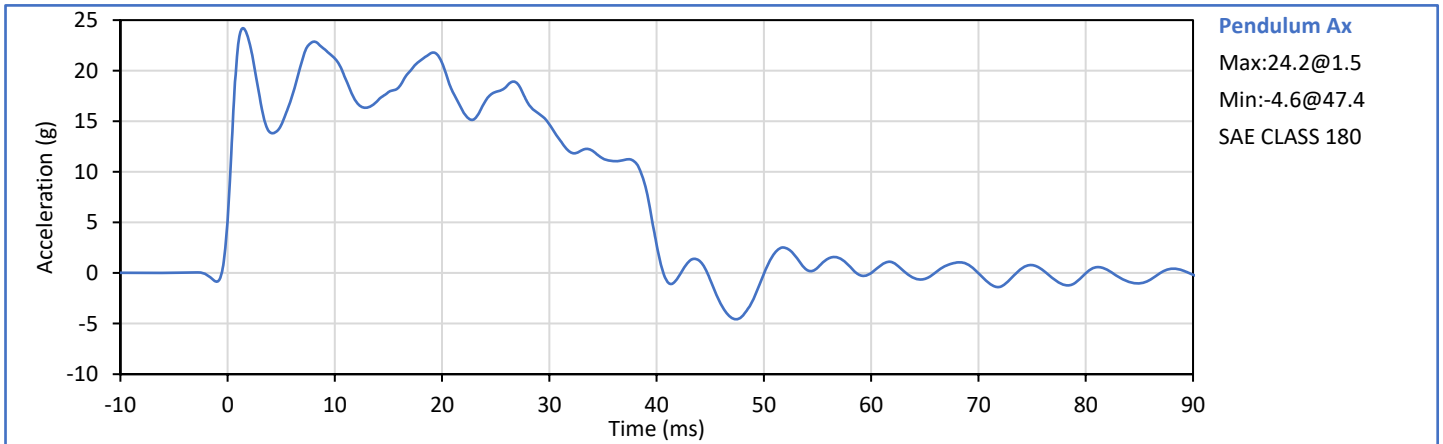


Technician:           *G. Holguin*            
G. Holguin

Approved By:           *J. Hernandez*            
J. Hernandez



Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	51	Pass
Pendulum Velocity	m/s	5.95	6.19	6.08	Pass
Pendulum Velocity at 10 ms	m/s	1.50	1.90	1.86	Pass
Pendulum Velocity at 20 ms	m/s	3.10	3.90	3.72	Pass
Pendulum Velocity at 30 ms	m/s	4.60	5.60	5.40	Pass
Peak "D" Plane Rotation	deg	99.0	114.0	102.9	Pass
Peak Moment in Rotation	Nm	-65.0	-53.0	-55.8	Pass
Negative Moment Decay to -10 Nm	ms	94.0	114.0	107.2	Pass
Overall Test Results					Pass

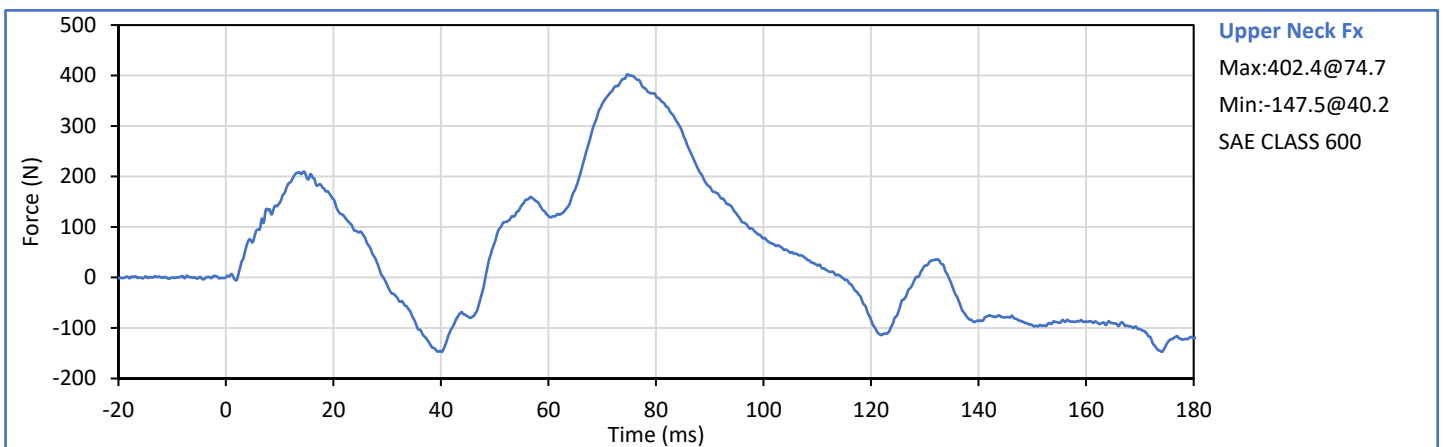
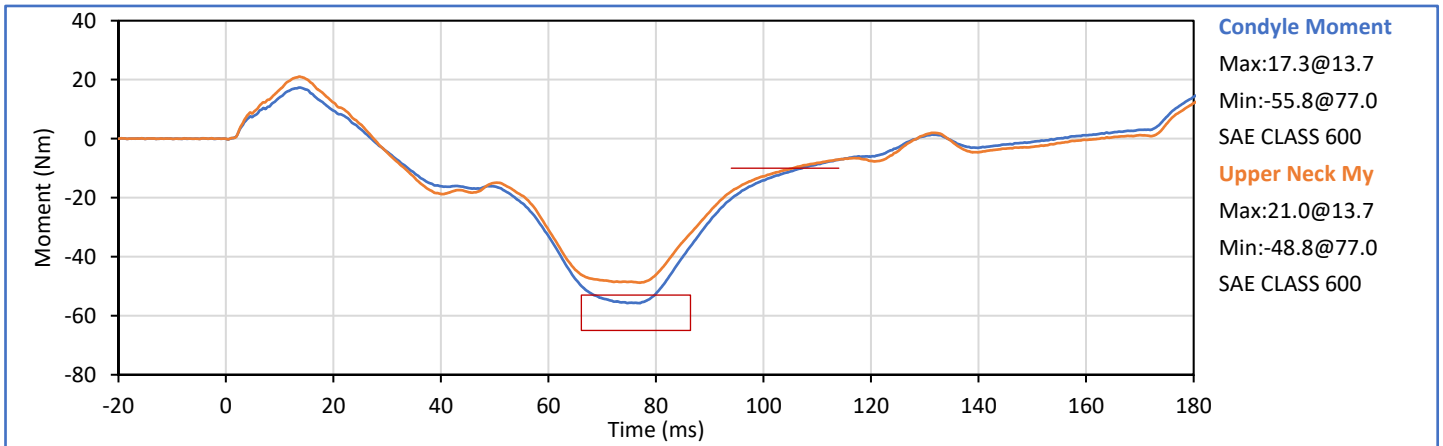
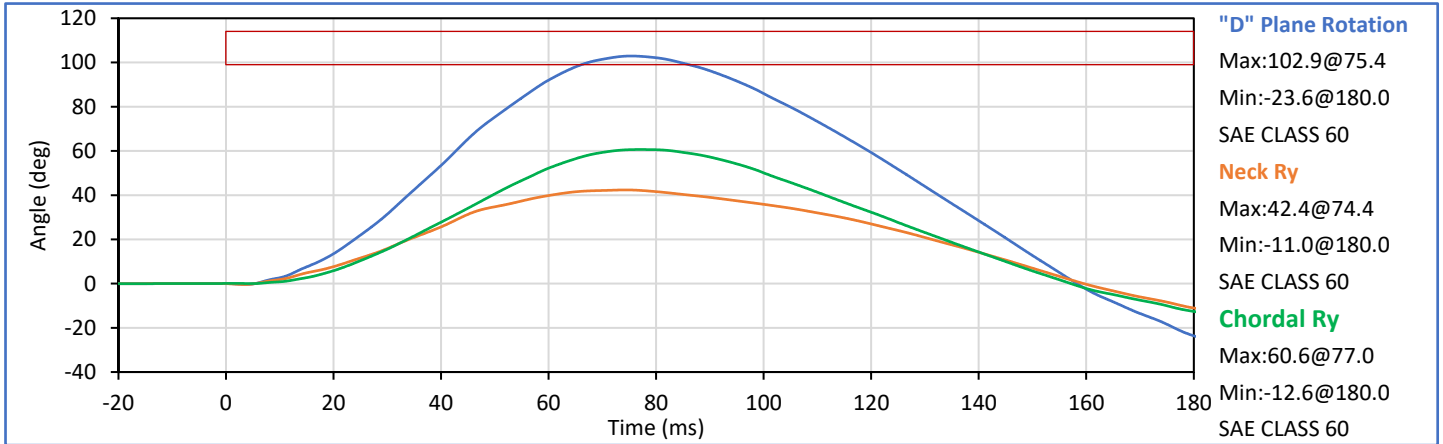


Technician: \_\_\_\_\_

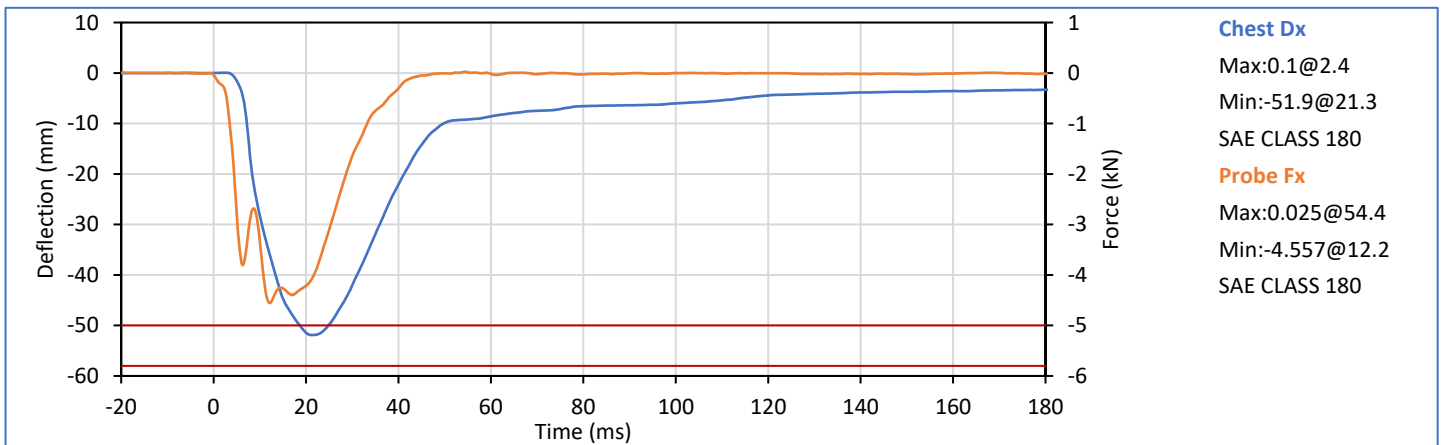
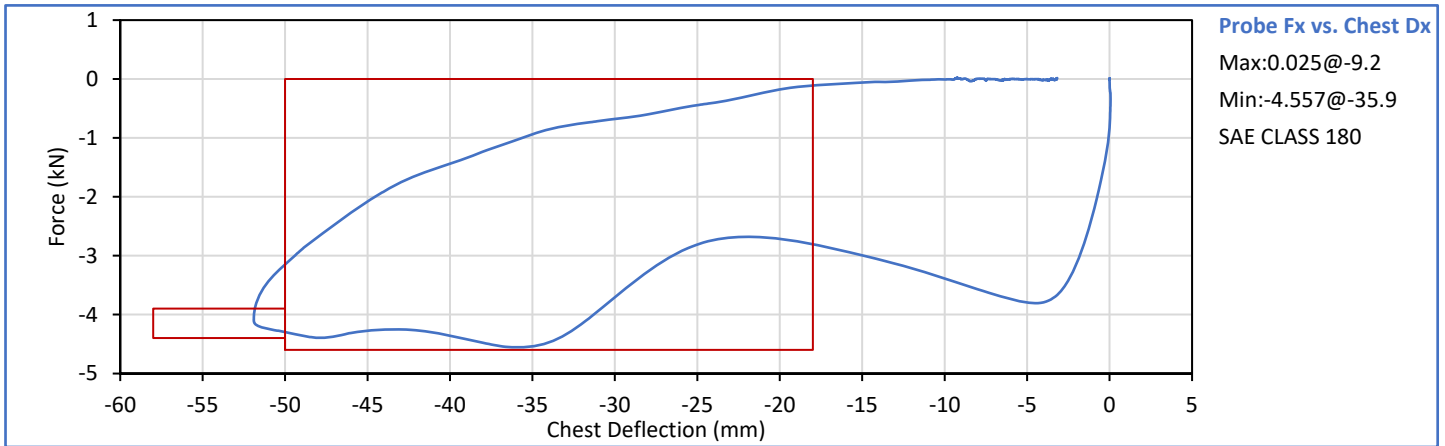
G. Holguin

Approved By: \_\_\_\_\_


J. Hernandez



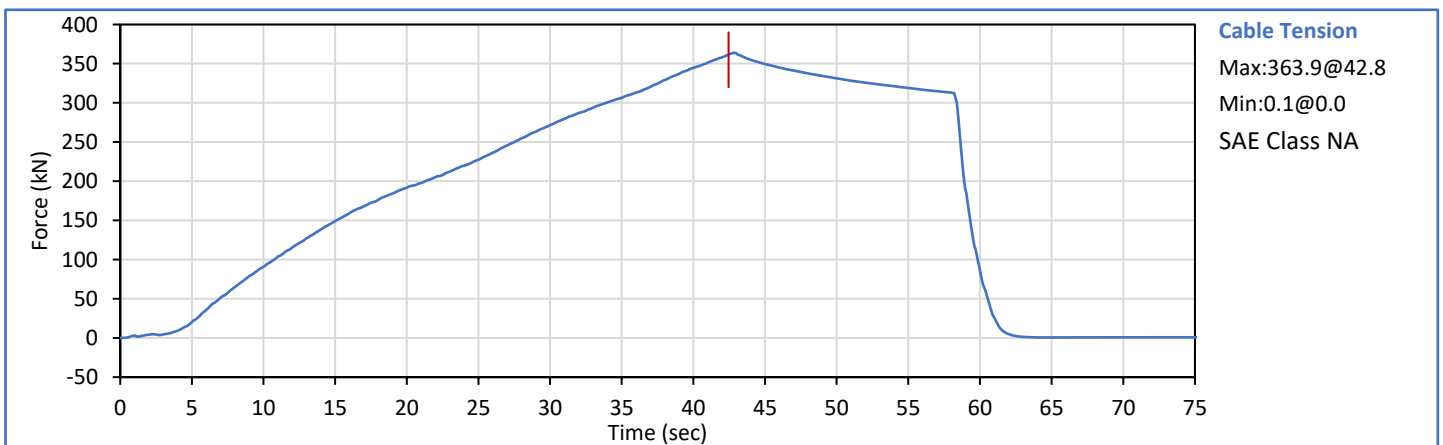
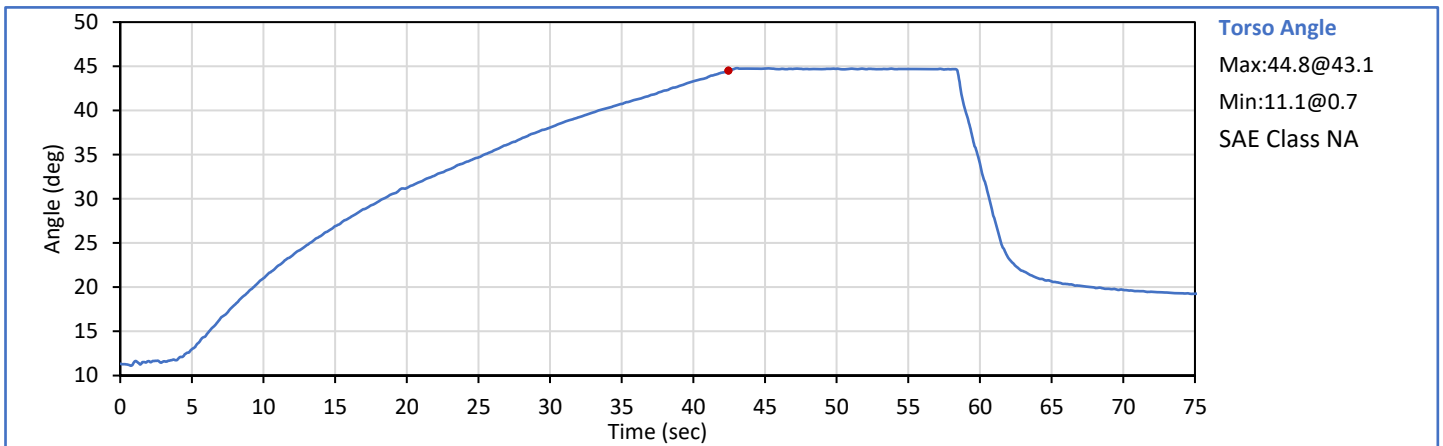
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory RelativeHumidity	%	10	70	47	Pass
Probe Velocity	m/s	6.59	6.83	6.69	Pass
Peak Chest Deflection	mm	-58.0	-50.0	-51.9	Pass
Peak Probe Force, 50 and 58 mm	kN	-4.400	-3.900	-4.297	Pass
Peak Probe Force, 18 and 50 mm	kN	-4.600	0.000	-4.557	Pass
Internal Hysteresis	%	69.0	85.0	77.0	Pass
<b>Overall Test Results</b>					<b>Pass</b>



Technician:   
 G. Holguin

Approved By:   
 J. Hernandez

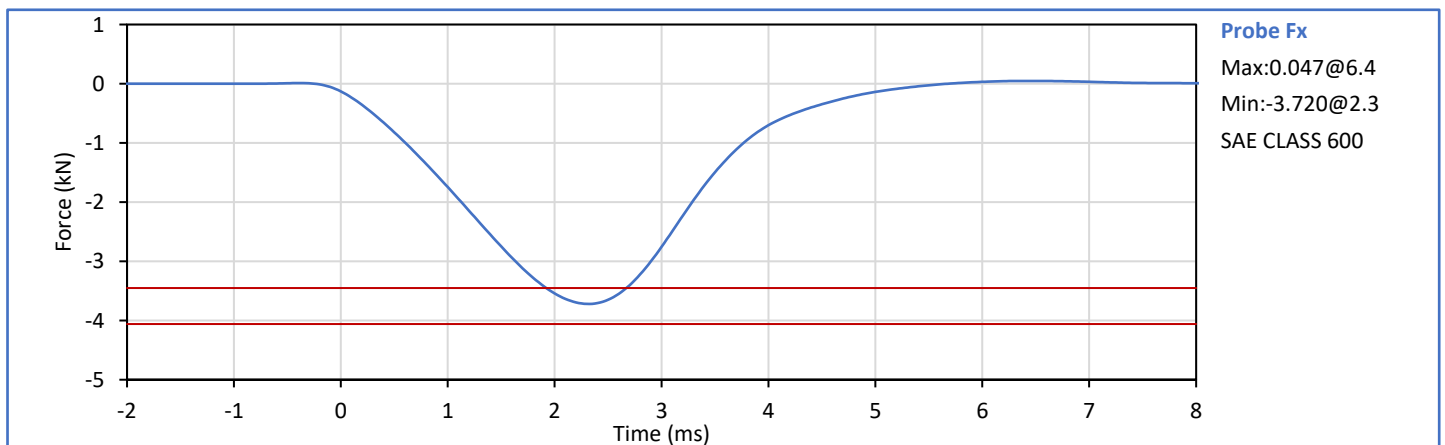
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.2	Pass
Laboratory Humidity	%	10	70	46	Pass
Orientation Angle	deg	0.0	20.0	10.9	Pass
Test Initial Angle	deg	11.0	19.0	11.3	Pass
Peak Force at 45° (+/-0.5°)	N	320.0	390.0	361.6	Pass
Torso Flexion Rate	deg/s	0.50	1.50	0.87	Pass
Final Reference Plane Angle	deg	-8.0	8.0	6.7	Pass
<b>Overall Test Results</b>					<b>Pass</b>



Technician:           *G. Holguin*            
G. Holguin

Approved By:           *J. Hernandez*            
J. Hernandez

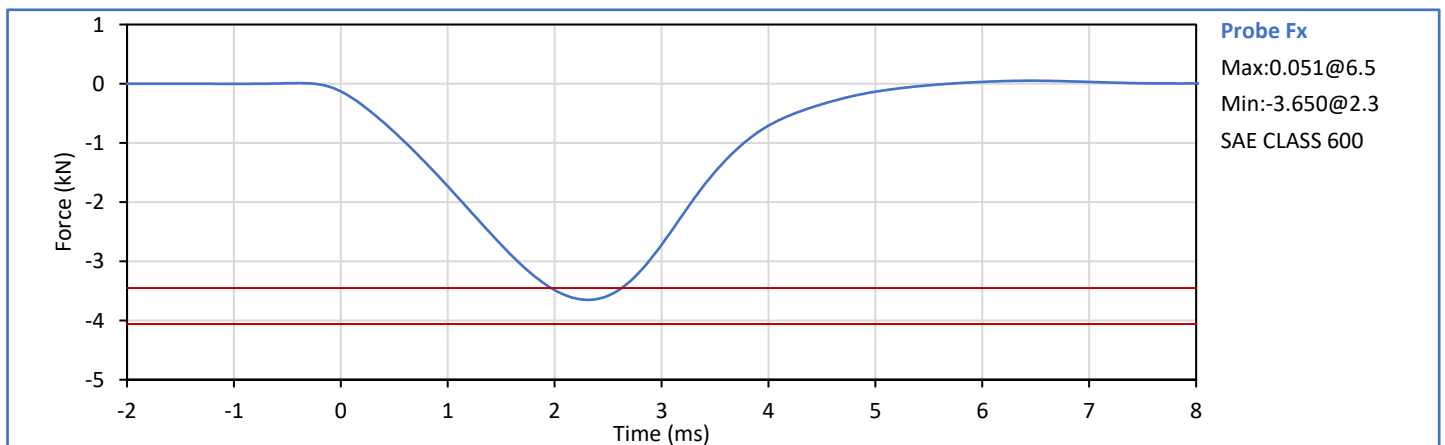
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.7	Pass
Laboratory Relative Humidity	%	10	70	48	Pass
Probe Velocity	m/s	2.070	2.130	2.106	Pass
Peak Resistive Force	kN	-4.060	-3.450	-3.720	Pass
<b>Overall Test Results</b>					<b>Pass</b>



Technician:           *G. Holguin*            
G. Holguin

Approved By:           *J. Hernandez*            
J. Hernandez

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	48	Pass
Probe Velocity	m/s	2.070	2.130	2.106	Pass
Peak Resistive Force	kN	-4.060	-3.450	-3.650	Pass
<b>Overall Test Results</b>					<b>Pass</b>



Technician:           *G. Holguin*            
G. Holguin

Approved By:           *J. Hernandez*            
J. Hernandez

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


ATD Serial No.: 360


Test Date: 2022-08-30

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:   
G. Holguin

Approved By:   
J. Hernandez

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	879	889	881	Pass
B - Shoulder pivot height	mm	505	521	508	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	89	Pass
F - Thigh clearance	mm	140	155	145	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	339	Pass
J - Elbow rest height	mm	190	211	209	Pass
K - Buttock to knee length	mm	579	604	590	Pass
L - Popliteal length	mm	429	455	444	Pass
M - Knee pivot height	mm	485	500	494	Pass
N - Buttock popliteal length	mm	452	477	466	Pass
O - Chest depth without jacket	mm	213	229	226	Pass
P - Foot length	mm	251	267	262	Pass
V - Shoulder breadth	mm	422	437	431	Pass
W - Foot breadth	mm	91	107	98	Pass
Y - Chest circum. (w/chest jacket)	mm	970	1001	989	Pass
Z - Waist circum.	mm	836	866	853	Pass
AA - Location for chest circum.	mm	429	434	431	Pass
BB - Location for waist circum.	mm	226	231	230	Pass
Overall Test Results					Pass

Technician:



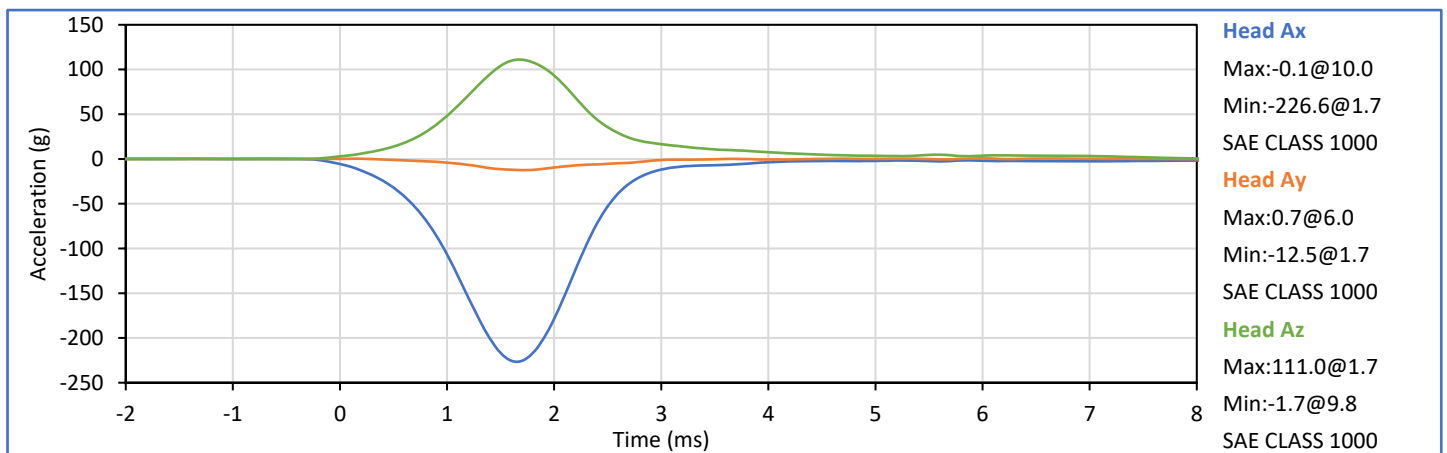
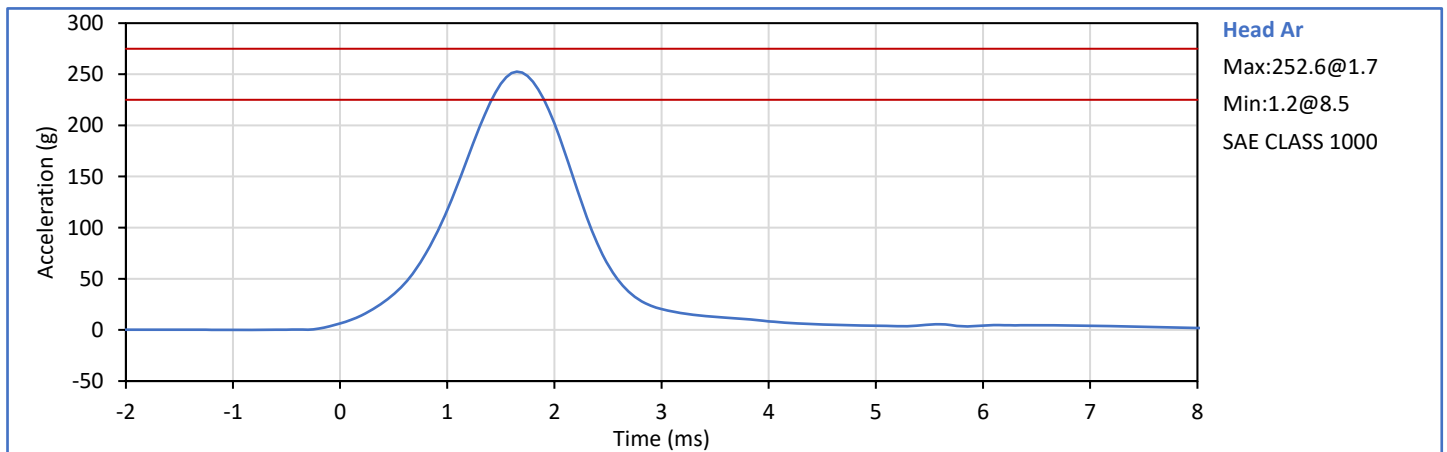
G. Holguin

Approved By:




J. Hernandez

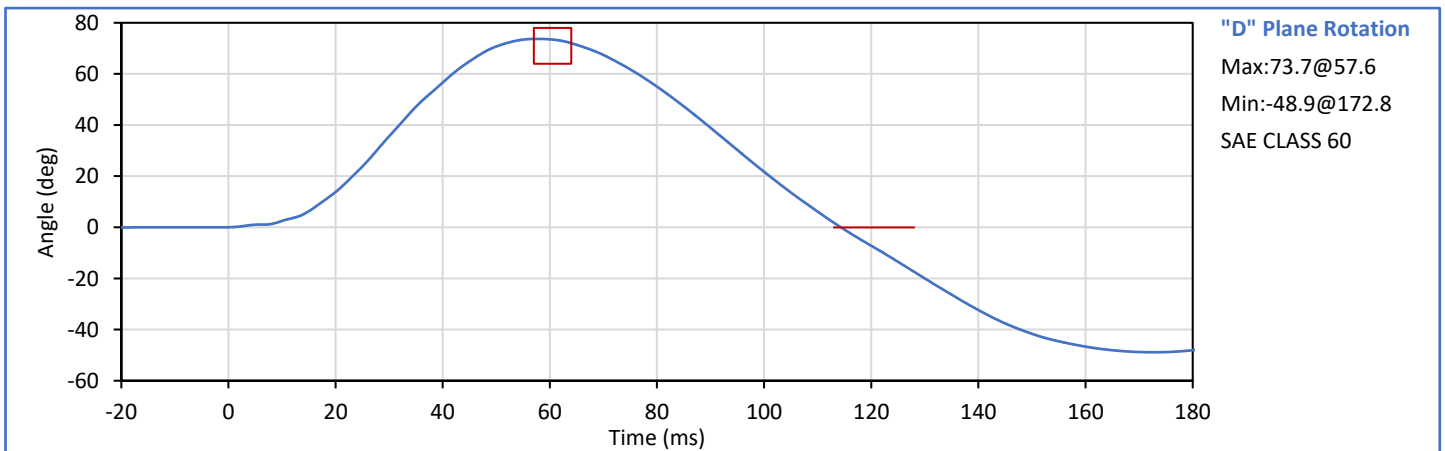
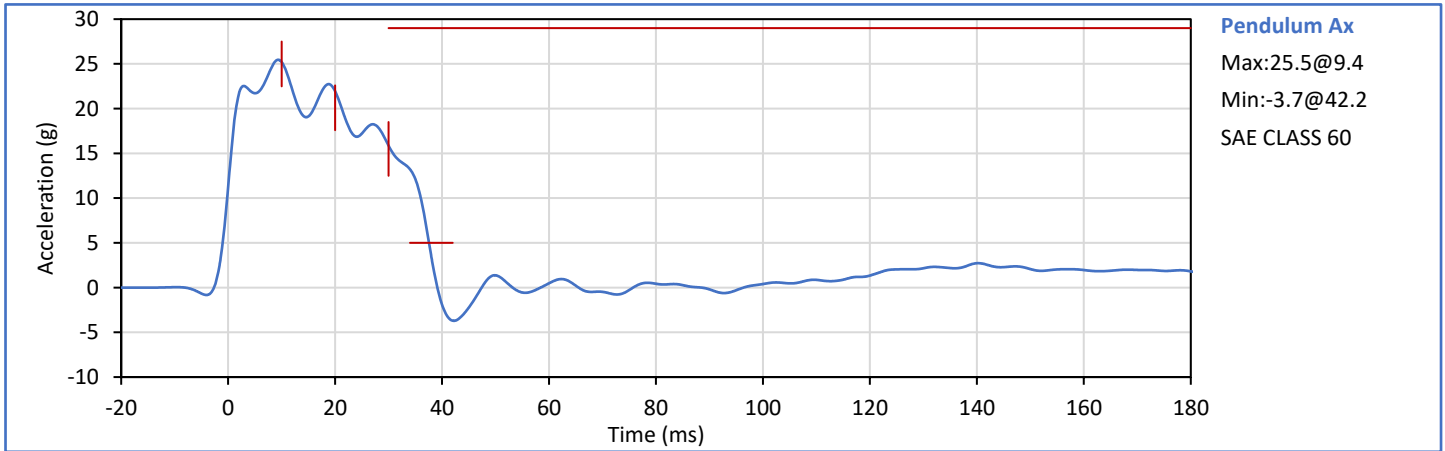
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.8	Pass
Laboratory Relative Humidity	%	10	70	35	Pass
Peak Resultant Acceleration	g	225.0	275.0	252.6	Pass
Peak Lateral Acceleration	g	-15.0	15.0	-12.5	Pass
Oscillations After Main Pulse	%	0.0	10.0	0.0	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
<b>Overall Test Results</b>					<b>Pass</b>



Technician:   
G. Holguin

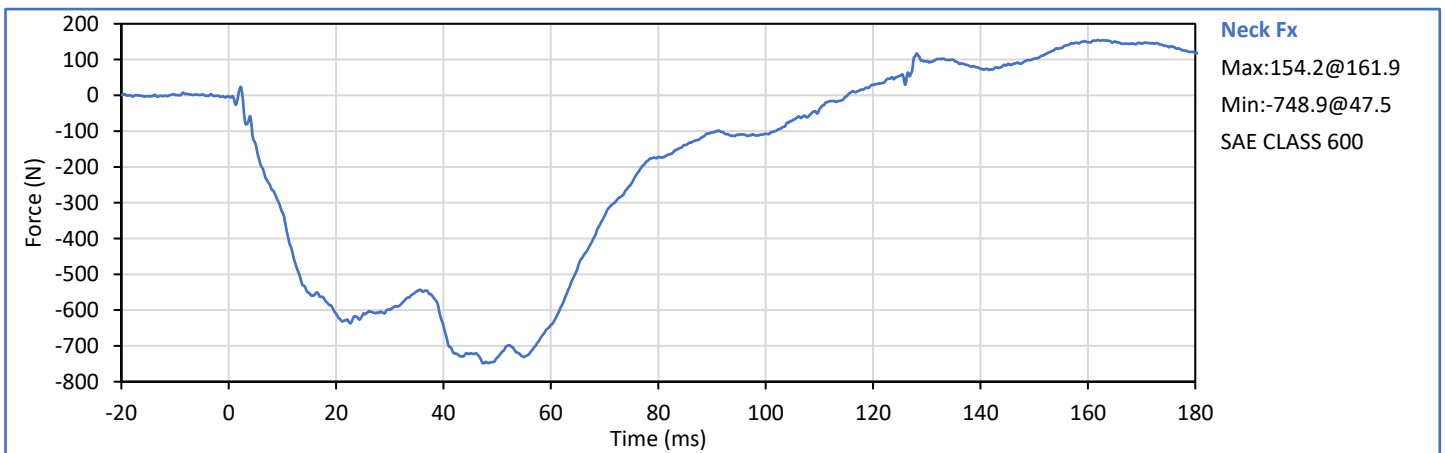
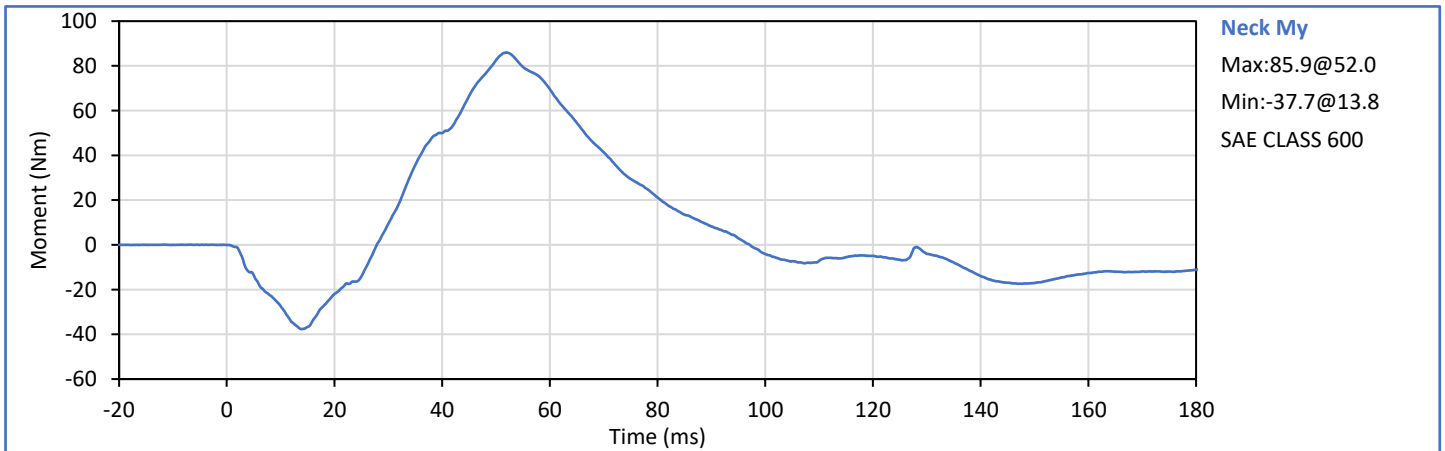
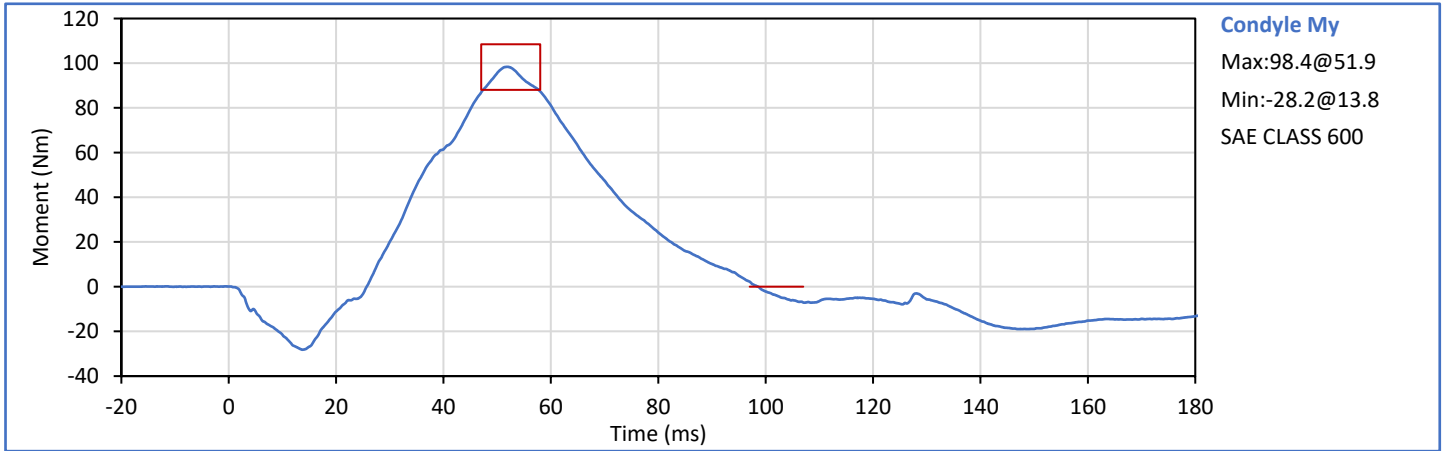
Approved By:   
J. Hernandez

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	40	Pass
Pendulum Velocity	m/s	6.89	7.13	6.96	Pass
Pendulum Deceleration at 10 ms	g	22.5	27.5	25.2	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 5g	ms	34.0	42.0	37.6	Pass
"D" Plane Rotation peak	deg	64.0	78.0	73.7	Pass
	ms	57.0	64.0	57.6	Pass
"D" Plane Rotation Decay to Zero	ms	113.0	128.0	114.4	Pass
Moment About Occipital Condyle	Nm	88.1	108.5	98.4	Pass
	ms	47.0	58.0	51.9	Pass
Moment Decay, Peak to Zero	ms	97.0	107.0	98.6	Pass
<b>Overall Test Results</b>					<b>Pass</b>

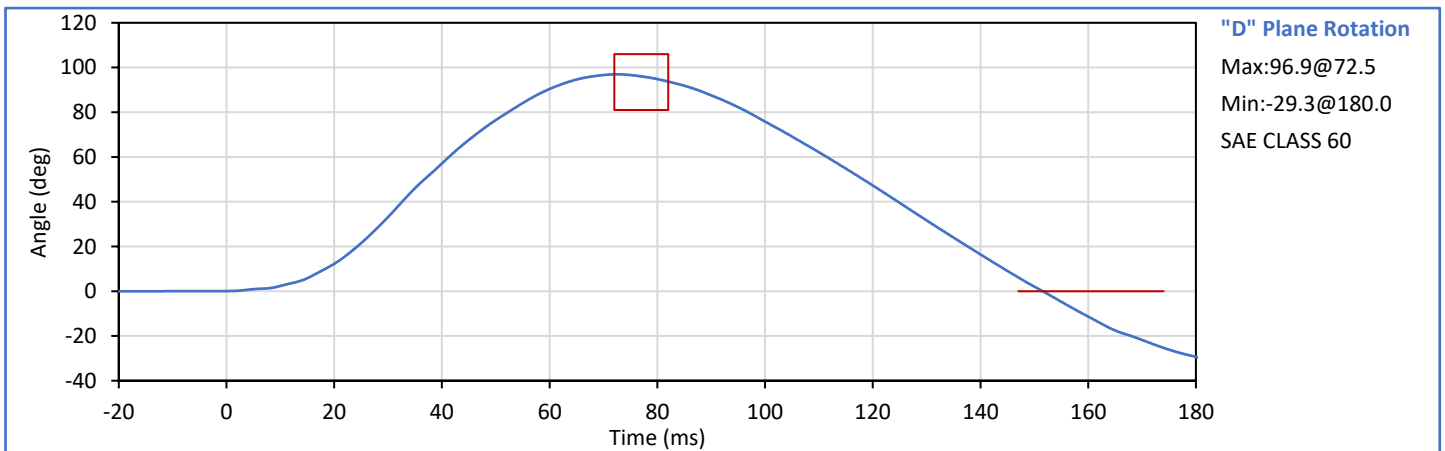
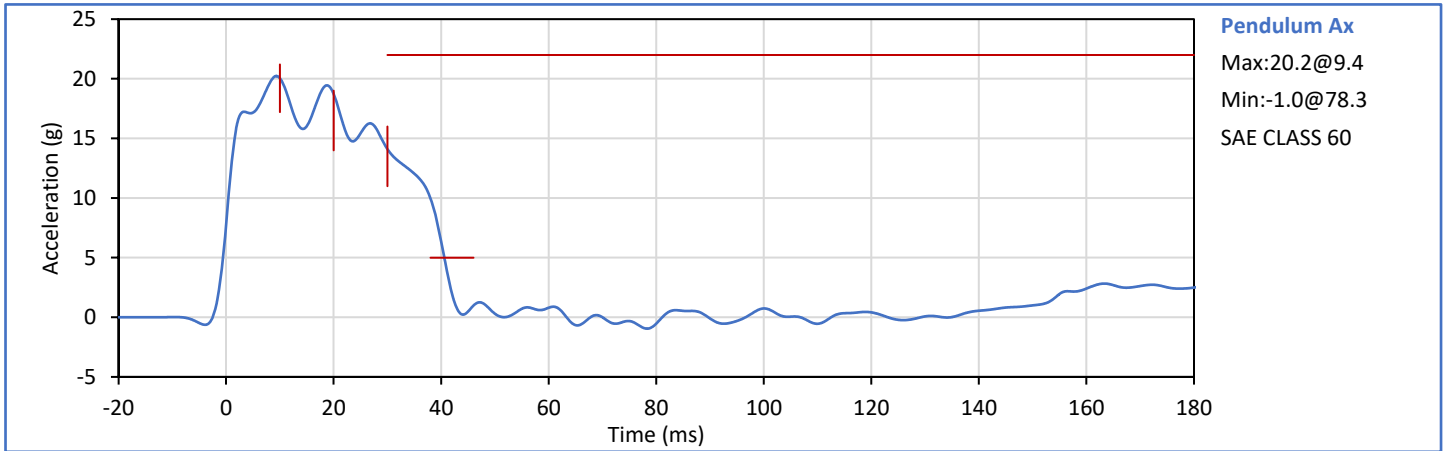


Technician: *G. Holguin*  
G. Holguin


Approved By: *J. Hernandez*  
J. Hernandez

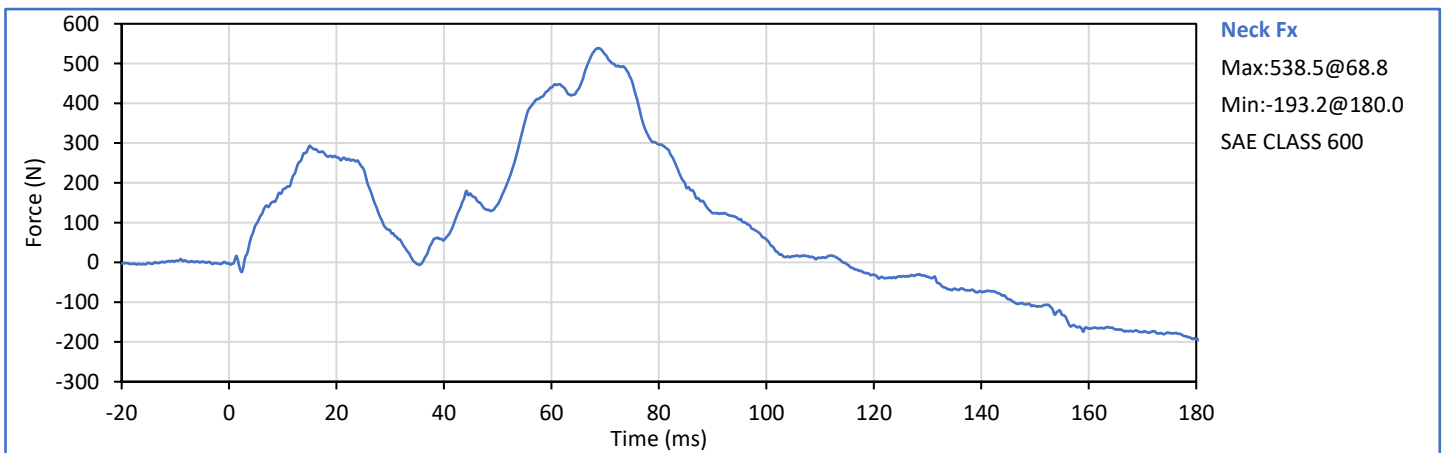
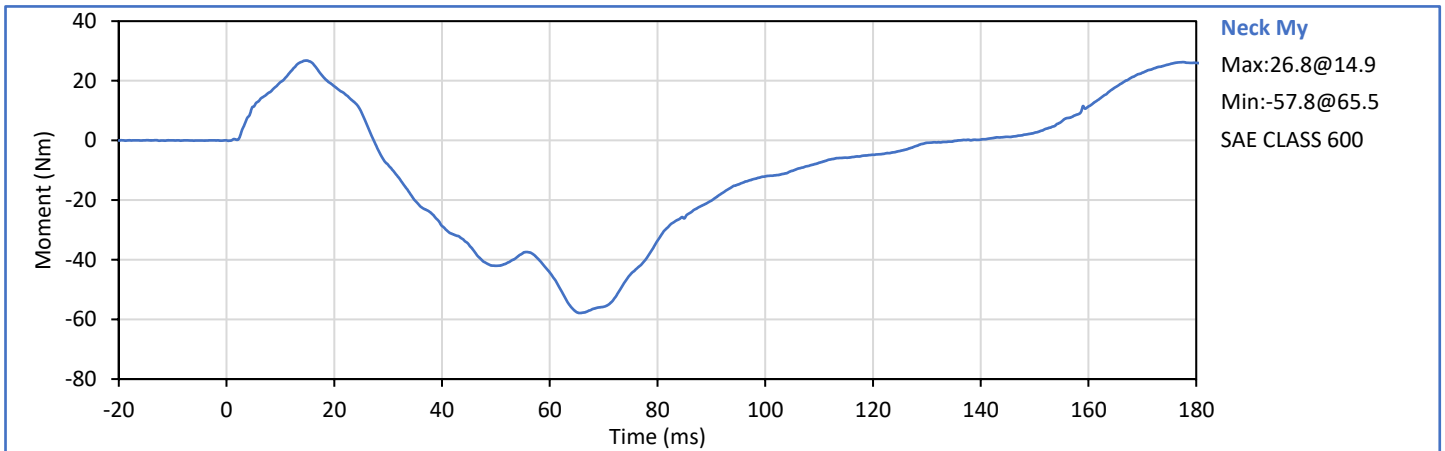
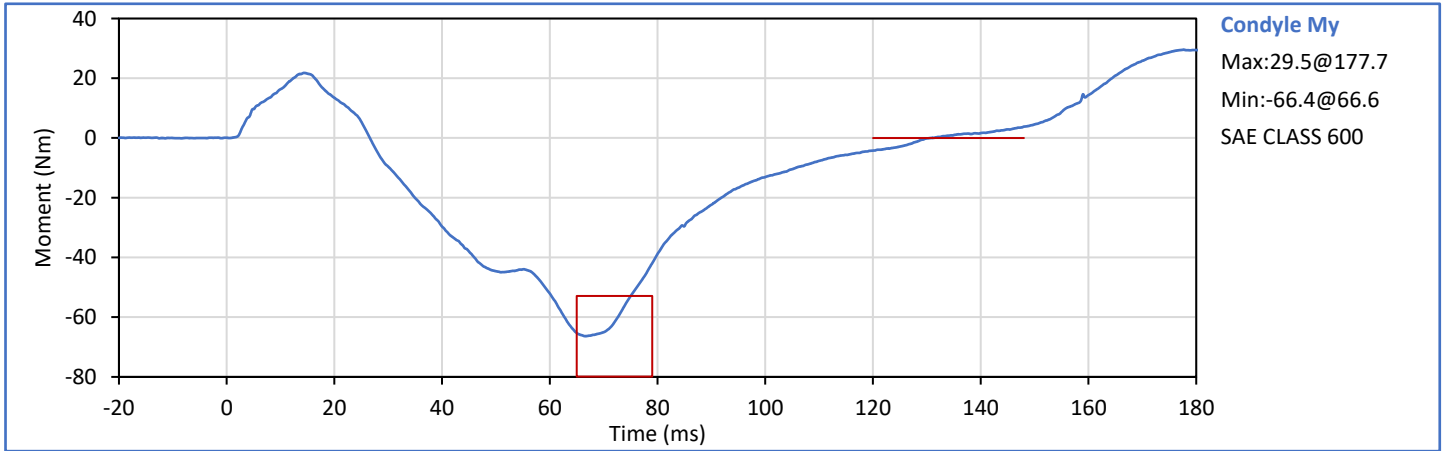


Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Relative Humidity	%	10	70	40	Pass
Pendulum Velocity	m/s	5.94	6.19	6.11	Pass
Pendulum Deceleration at 10 ms	g	17.2	21.2	20.0	Pass
Pendulum Deceleration at 20 ms	g	14.0	19.0	18.7	Pass
Pendulum Deceleration at 30 ms	g	11.0	16.0	14.1	Pass
Peak Pendulum Decel After 30 ms	g	0.0	22.0	14.1	Pass
Deceleration Decay to Cross 5g	ms	38.0	46.0	40.6	Pass
"D" Plane Rotation peak	deg	81.0	106.0	96.9	Pass
	ms	72.0	82.0	72.5	Pass
"D" Plane Rotation Decay to Zero	ms	147.0	174.0	151.6	Pass
Moment About Occipital Condyle	Nm	-79.9	-52.9	-66.4	Pass
	ms	65.0	79.0	66.6	Pass
Moment Decay, Peak to Zero	ms	120.0	148.0	131.3	Pass
Overall Test Results					Pass

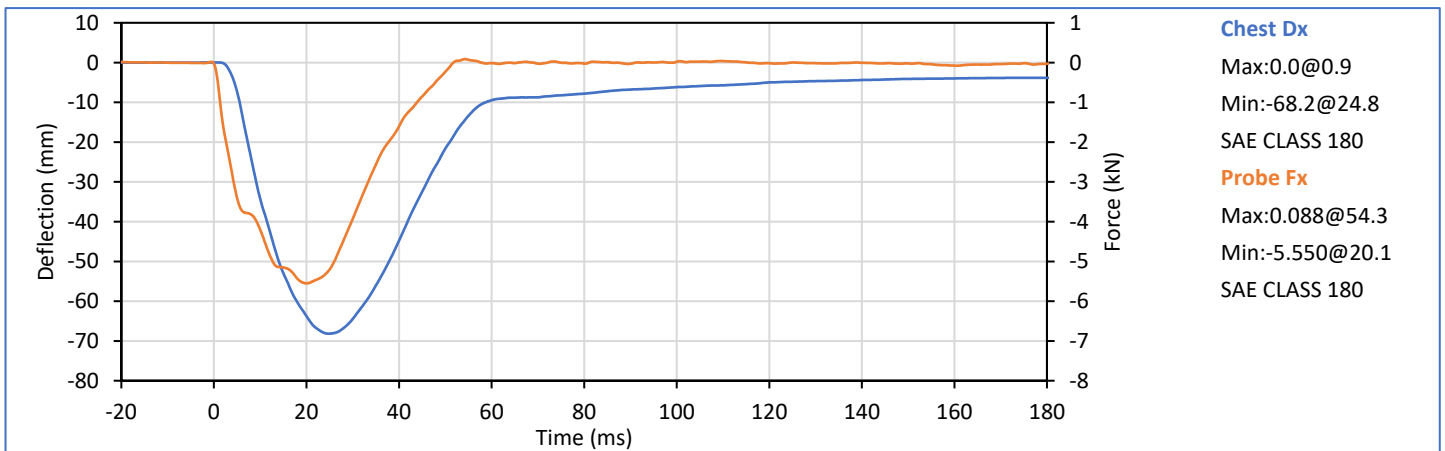
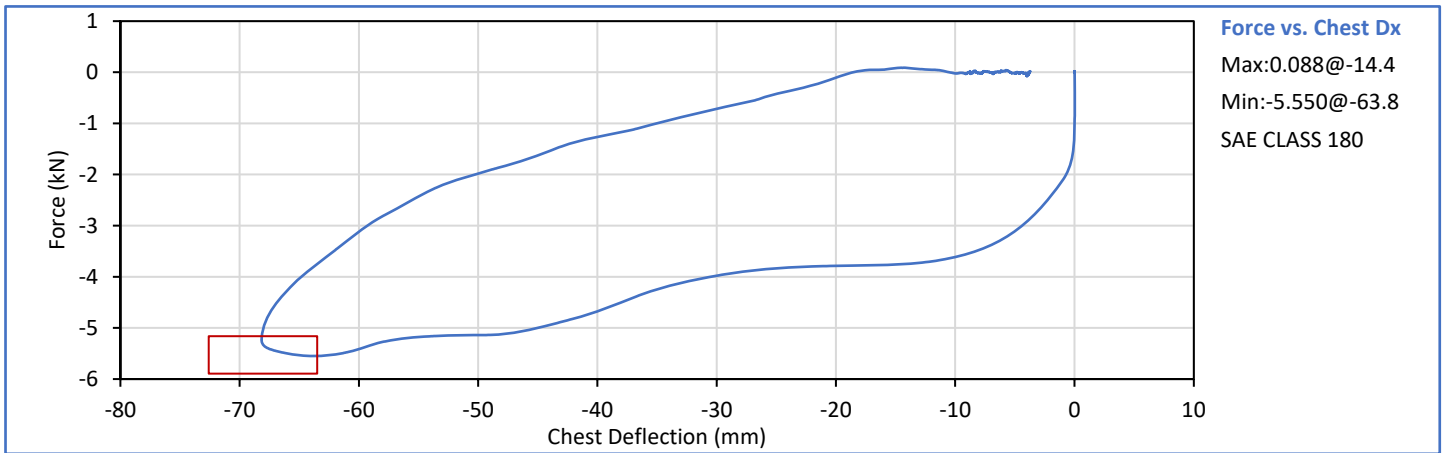


Technician:   
G. Holguin


Approved By:   
J. Hernandez



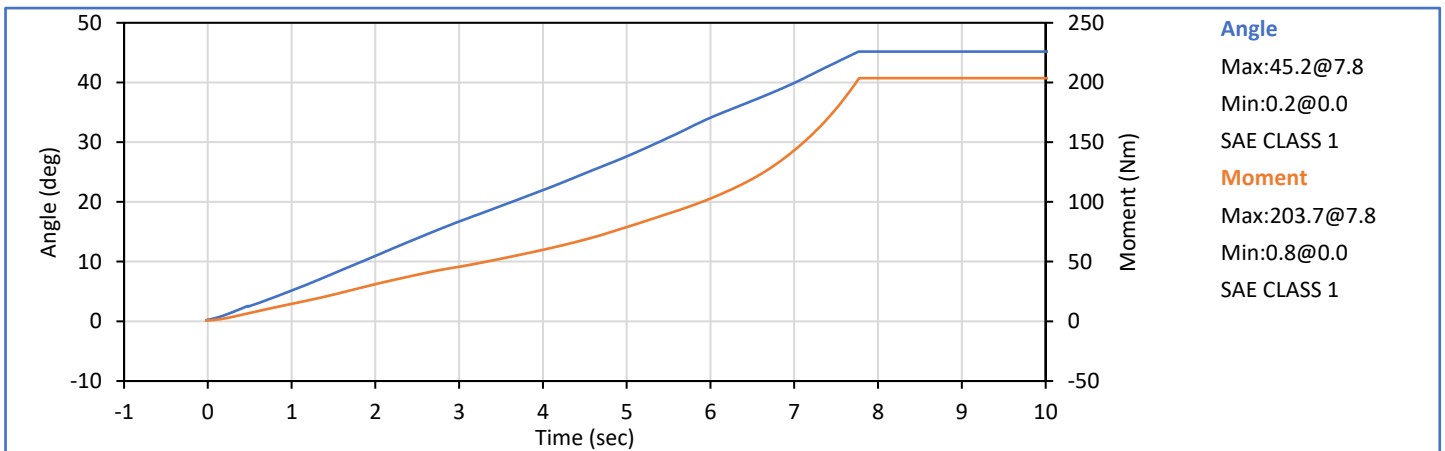
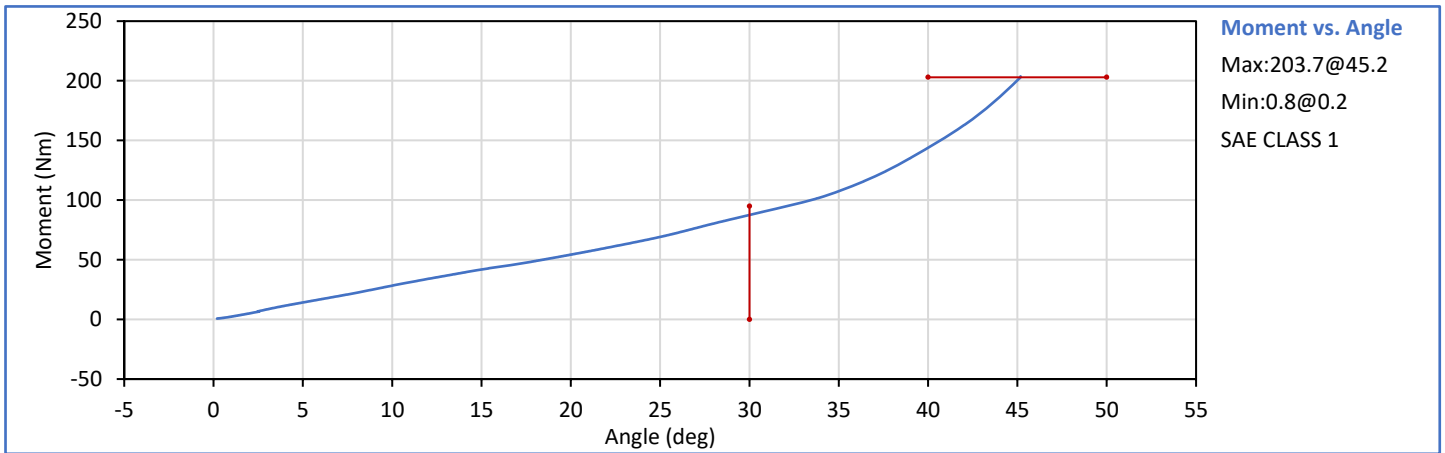
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.9	Pass
Laboratory Relative Humidity	%	10	70	43	Pass
Probe Velocity	m/s	6.58	6.82	6.72	Pass
Peak Chest Deflection	mm	-72.6	-63.5	-68.2	Pass
Peak Probe Force	kN	-5.893	-5.159	-5.550	Pass
Internal Hysteresis	%	69.0	85.0	70.5	Pass
Overall Test Results					Pass




Technician:   
 G. Holguin

Approved By:   
 J. Hernandez

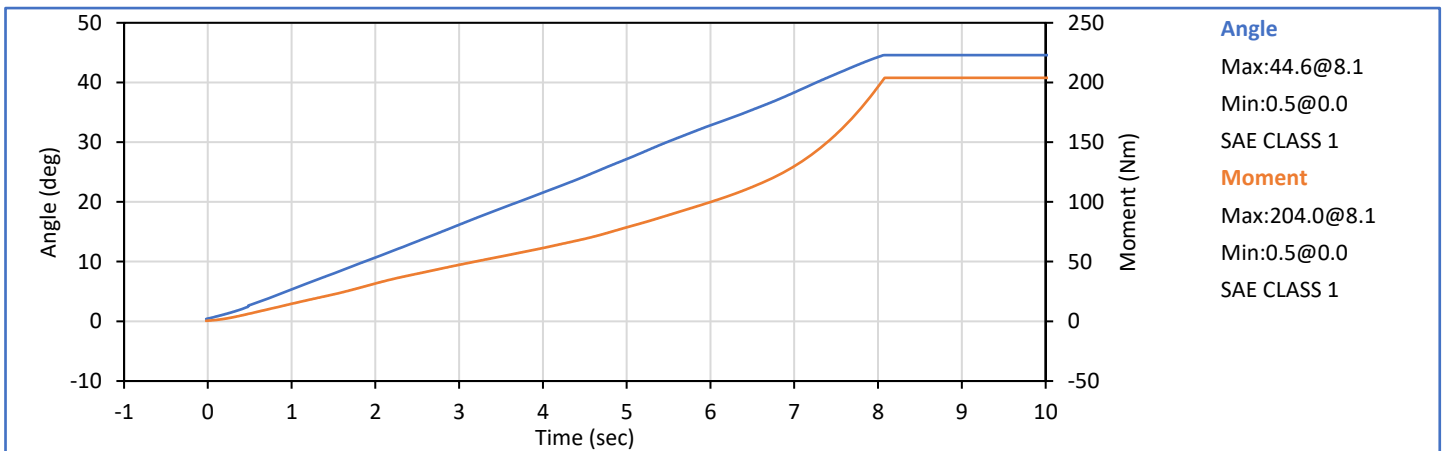
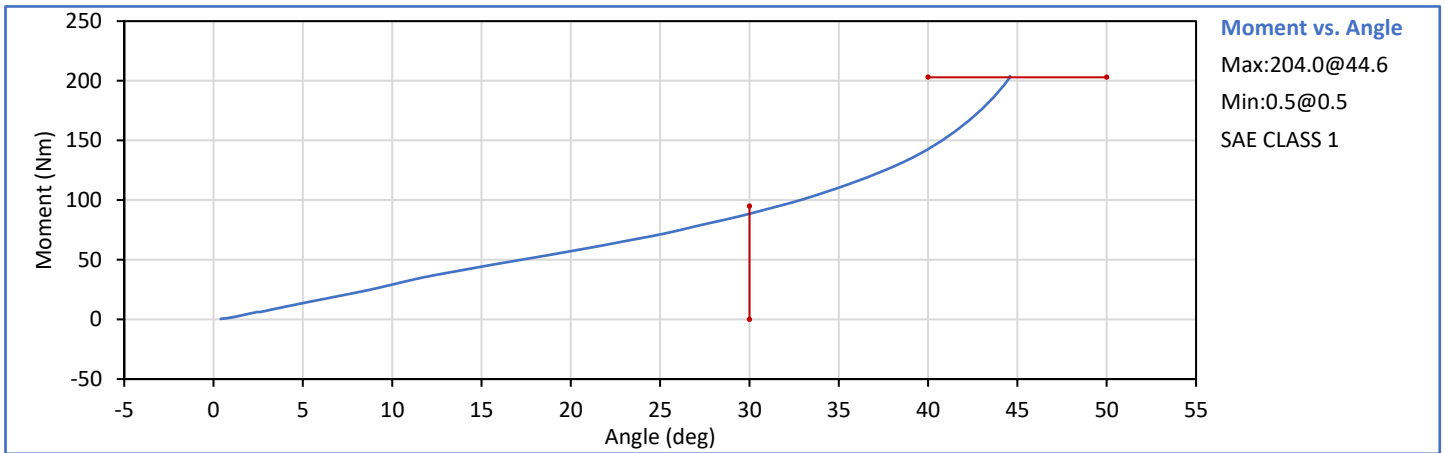
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.9	Pass
Laboratory Relative Humidity	%	10	70	46	Pass
Left Hip Rotation Rate	deg/s	5.0	10.0	5.7	Pass
Left Femur Torque at 30°	Nm	0.0	95.0	87.5	Pass
Left Hip Rotation at 203 Nm	deg	40.0	50.0	45.2	Pass
<b>Overall Test Results</b>					<b>Pass</b>




Technician:   
G. Holguin

Approved By:   
J. Hernandez

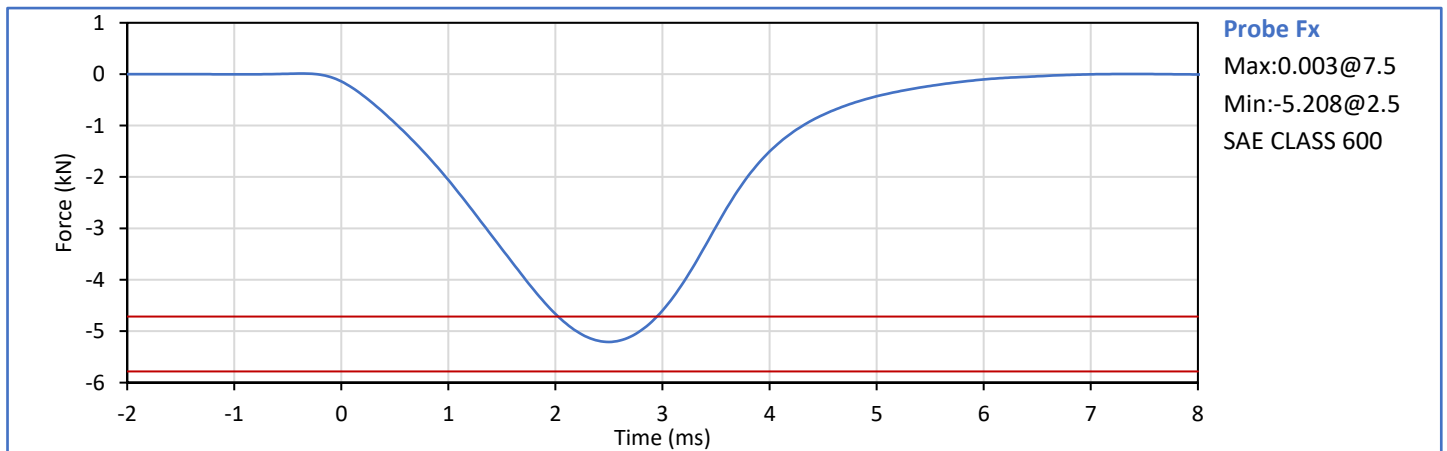
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	22.1	Pass
Laboratory Relative Humidity	%	10	70	46	Pass
Right Hip Rotation Rate	deg/s	5.0	10.0	5.5	Pass
Right Femur Torque at 30°	Nm	0.0	95.0	88.5	Pass
Right Hip Rotation at 203 Nm	deg	40.0	50.0	44.6	Pass
<b>Overall Test Results</b>					<b>Pass</b>



Technician:   
G. Holguin

Approved By:   
J. Hernandez

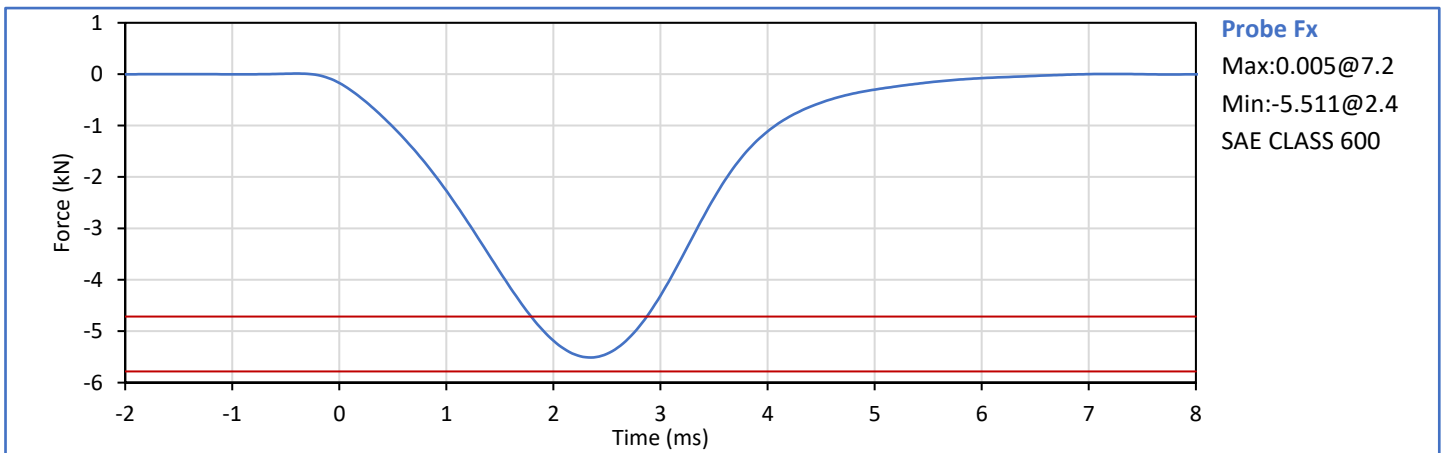
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.3	Pass
Laboratory Relative Humidity	%	10	70	37	Pass
Probe Velocity	m/s	2.070	2.130	2.101	Pass
Peak Resistive Force	kN	-5.782	-4.715	-5.208	Pass
Overall Test Results					Pass



Technician: *G. Holguin*  
G. Holguin

Approved By: *J. Hernandez*  
J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.3	Pass
Laboratory Relative Humidity	%	10	70	42	Pass
Probe Velocity	m/s	2.070	2.130	2.103	Pass
Peak Resistive Force	kN	-5.782	-4.715	-5.511	Pass
<b>Overall Test Results</b>					<b>Pass</b>



Technician: *G. Holguin*  
G. Holguin

Approved By: *J. Hernandez*  
J. Hernandez

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

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:

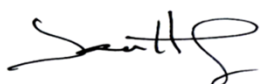
No Problems Found

Technician: \_\_\_\_\_



G. Holguin

Approved By: \_\_\_\_\_



J. Hernandez

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	35	Pass
A - Total sitting height	mm	775	800	784	Pass
B - Shoulder pivot height	mm	432	457	444	Pass
C - 'H' point height	mm	81	86	86	Pass
D - 'H' point location from backline	mm	145	150	148	Pass
E - Shoulder pivot from backline	mm	69	84	73	Pass
F - Thigh clearance	mm	119	135	126	Pass
G - Back of elbow to wrist pivot	mm	244	259	255	Pass
H - Head back to backline	mm	41	46	43	Pass
I - Shoulder to elbow length	mm	277	297	288	Pass
J - Elbow rest height	mm	183	203	189	Pass
K - Buttock to knee length	mm	521	546	535	Pass
L - Popliteal length	mm	356	376	371	Pass
M - Knee pivot height	mm	394	419	405	Pass
N - Buttock popliteal length	mm	414	439	422	Pass
O - Chest depth without jacket	mm	175	191	183	Pass
P - Foot length	mm	219	234	231	Pass
R - Buttock to Knee Pivot Length	mm	457	483	473	Pass
S - Head Breadth	mm	137	147	144	Pass
T - Head Depth	mm	178	188	187	Pass
U - Hip Breadth	mm	300	315	303	Pass
V - Shoulder breadth	mm	351	366	359	Pass
W - Foot breadth	mm	79	94	91	Pass
X - Head circum.	mm	528	549	540	Pass
Y - Chest circum. (w/chest jacket)	mm	851	881	871	Pass
Z - Waist circum.	mm	760	790	772	Pass
AA - Location for chest circum.	mm	333	358	344	Pass
BB - Location for waist circum.	mm	160	170	165	Pass
<b>Overall Test Results</b>					<b>Pass</b>

Technician: \_\_\_\_\_



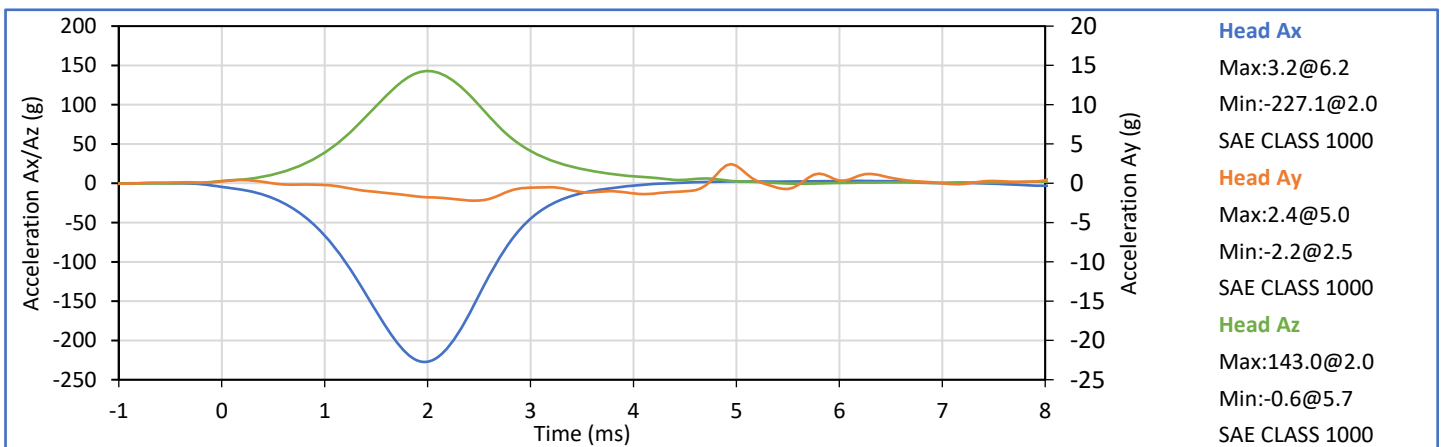
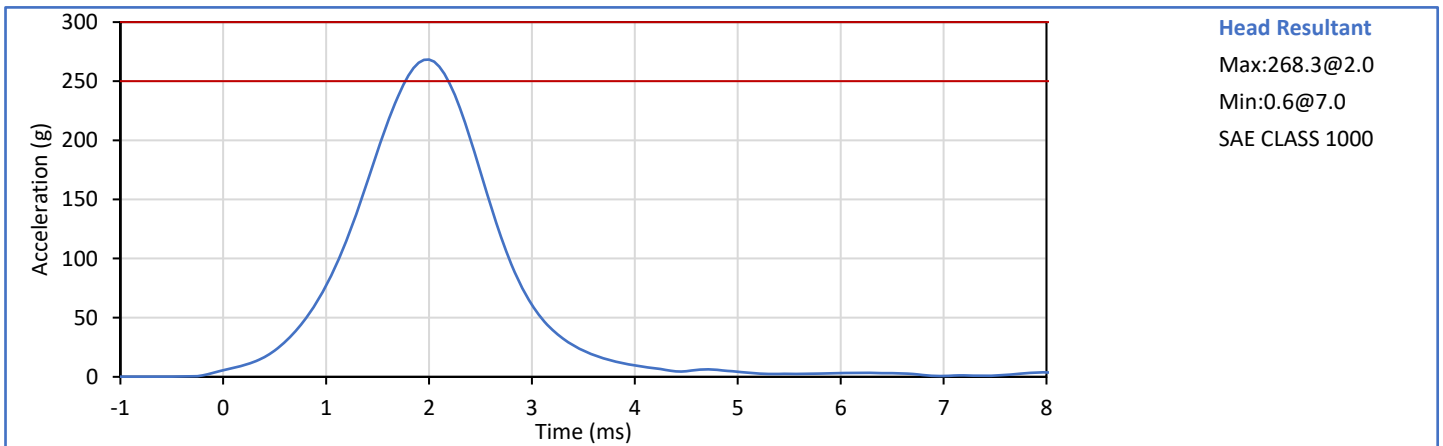
G. Holguin

Approved By: \_\_\_\_\_



J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.3	Pass
Laboratory Humidity	%	10	70	51	Pass
Peak Resultant Acceleration	g	250.0	300.0	268.3	Pass
Peak Lateral Acceleration	g	-15.0	15.0	2.4	Pass
Oscillations After Main Pulse	%	0.0	10.0	1.4	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
<b>Overall Test Results</b>					<b>Pass</b>



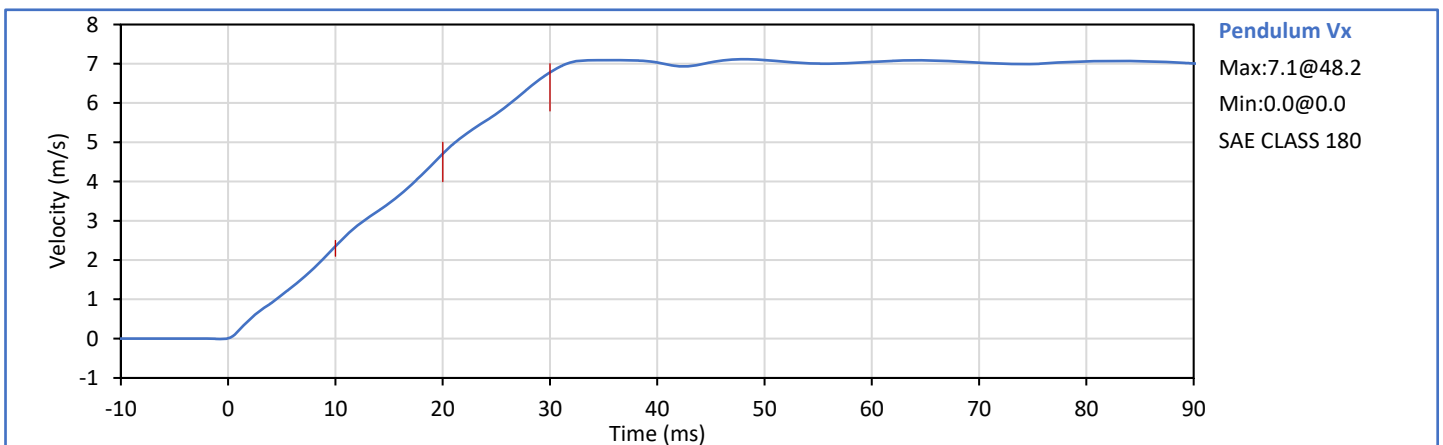
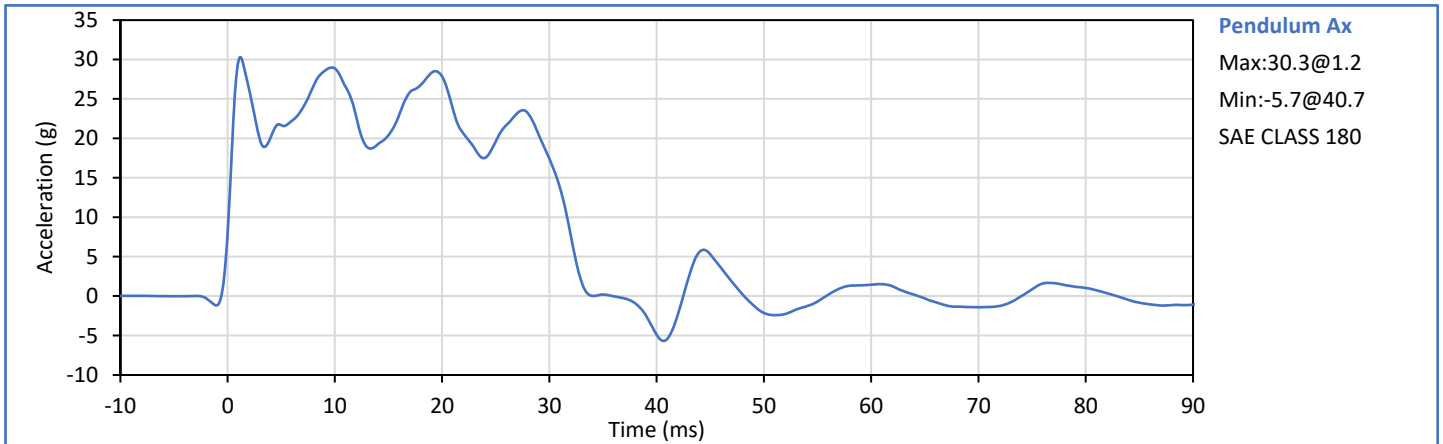
Technician: \_\_\_\_\_

G. Holguin


Approved By: \_\_\_\_\_

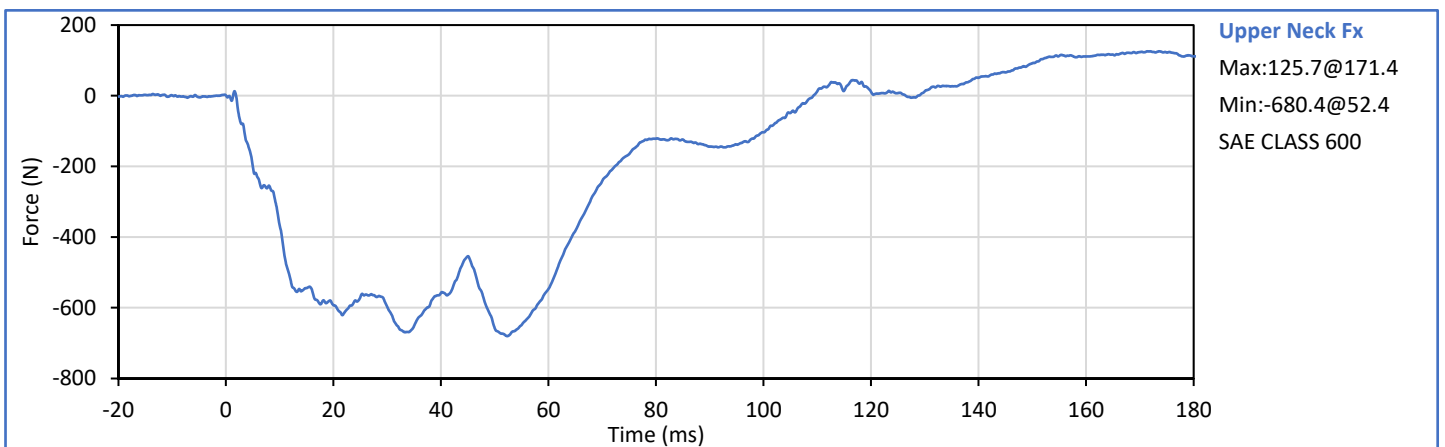
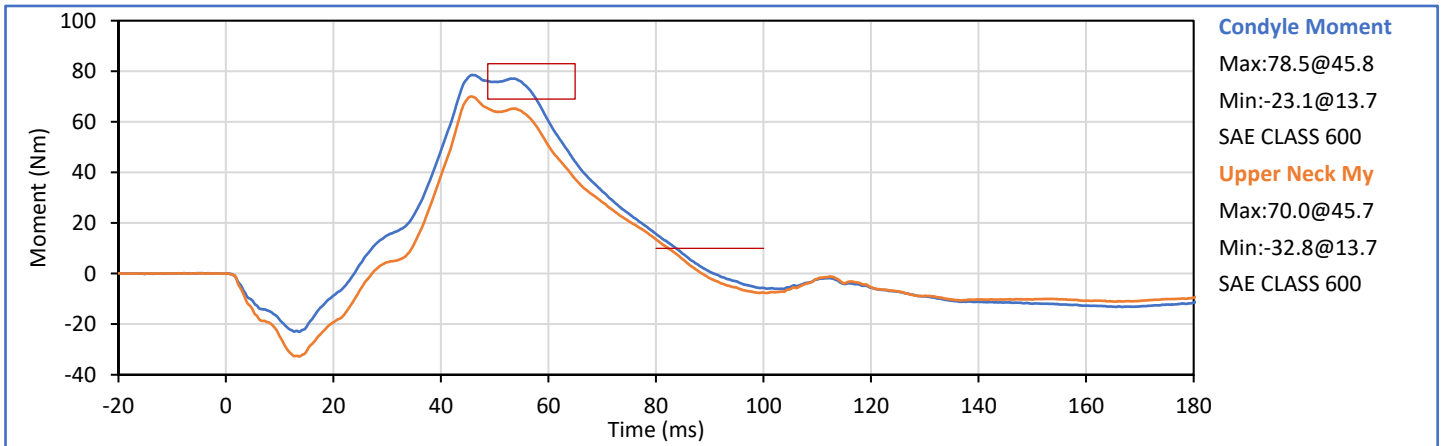
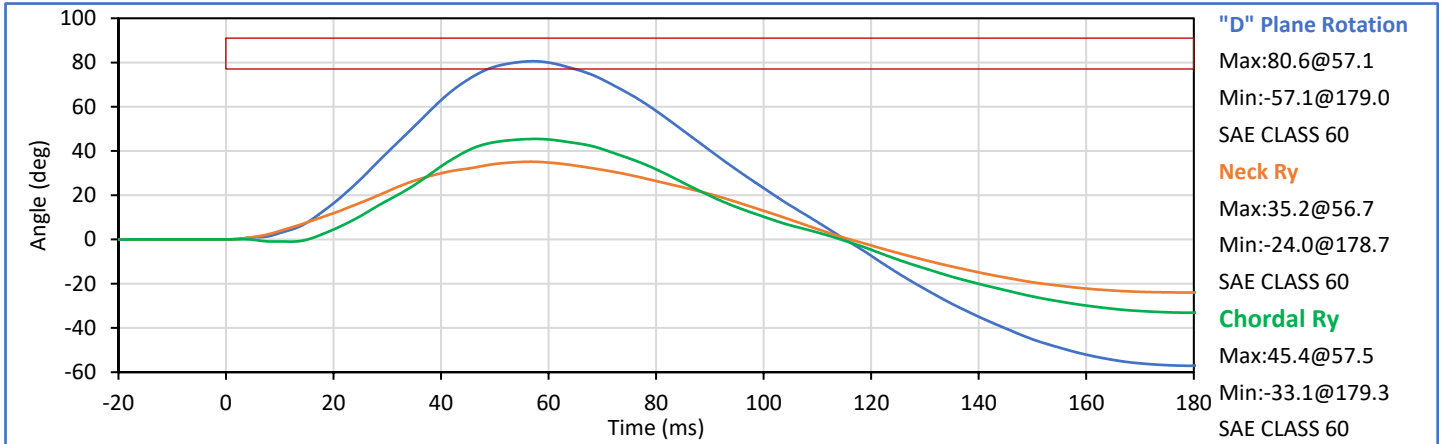
J. Hernandez

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	20.9	Pass
Laboratory Humidity	%	10	70	26	Pass
Pendulum Velocity	m/s	6.89	7.13	6.95	Pass
Pendulum Velocity at 10 ms	m/s	2.10	2.50	2.35	Pass
Pendulum Velocity at 20 ms	m/s	4.00	5.00	4.70	Pass
Pendulum Velocity at 30 ms	m/s	5.80	7.00	6.78	Pass
Peak "D" Plane Rotation	deg	77.0	91.0	80.6	Pass
Peak Moment in Rotation	Nm	69.0	83.0	77.1	Pass
Positive Moment Decay to 10 Nm	ms	80.0	100.0	83.8	Pass
Overall Test Results					Pass

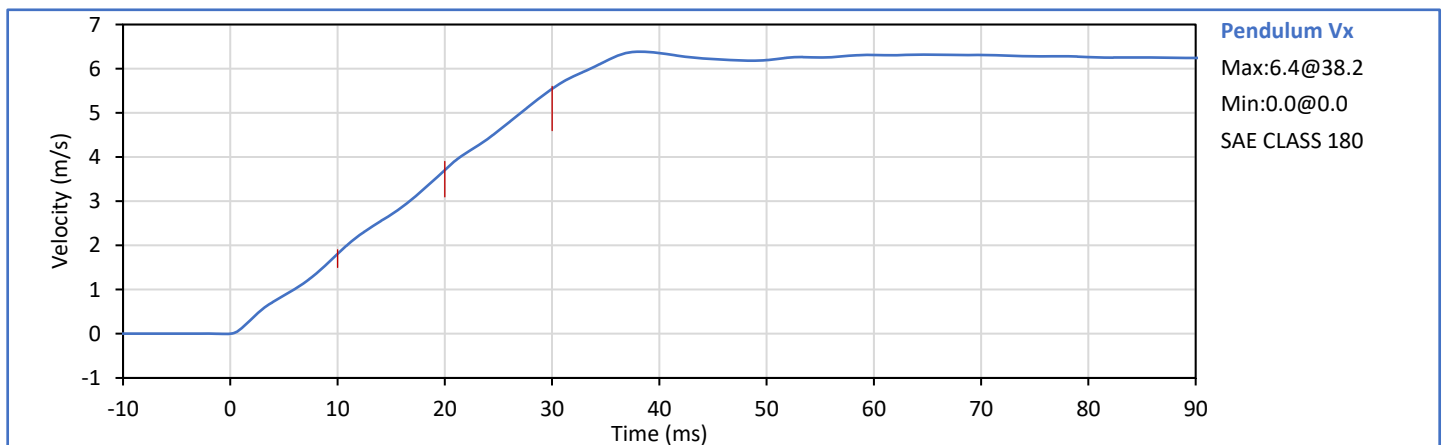
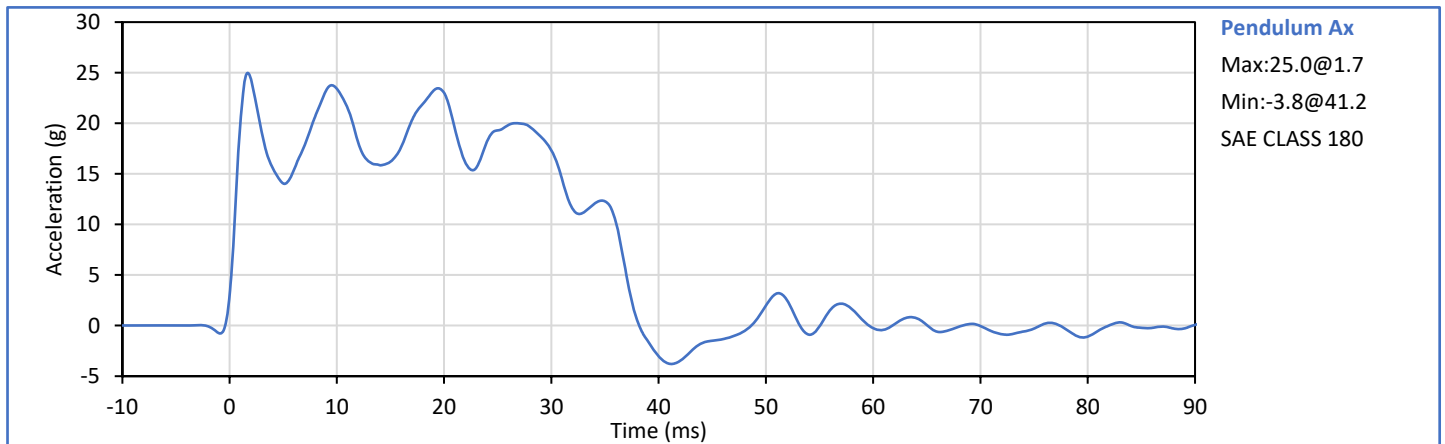


Technician:   
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Approved By:   
J. Hernandez



Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	51	Pass
Pendulum Velocity	m/s	5.95	6.19	6.08	Pass
Pendulum Velocity at 10 ms	m/s	1.50	1.90	1.80	Pass
Pendulum Velocity at 20 ms	m/s	3.10	3.90	3.71	Pass
Pendulum Velocity at 30 ms	m/s	4.60	5.60	5.54	Pass
Peak "D" Plane Rotation	deg	99.0	114.0	107.1	Pass
Peak Moment in Rotation	Nm	-65.0	-53.0	-57.0	Pass
Negative Moment Decay to -10 Nm	ms	94.0	114.0	96.7	Pass
Overall Test Results					Pass

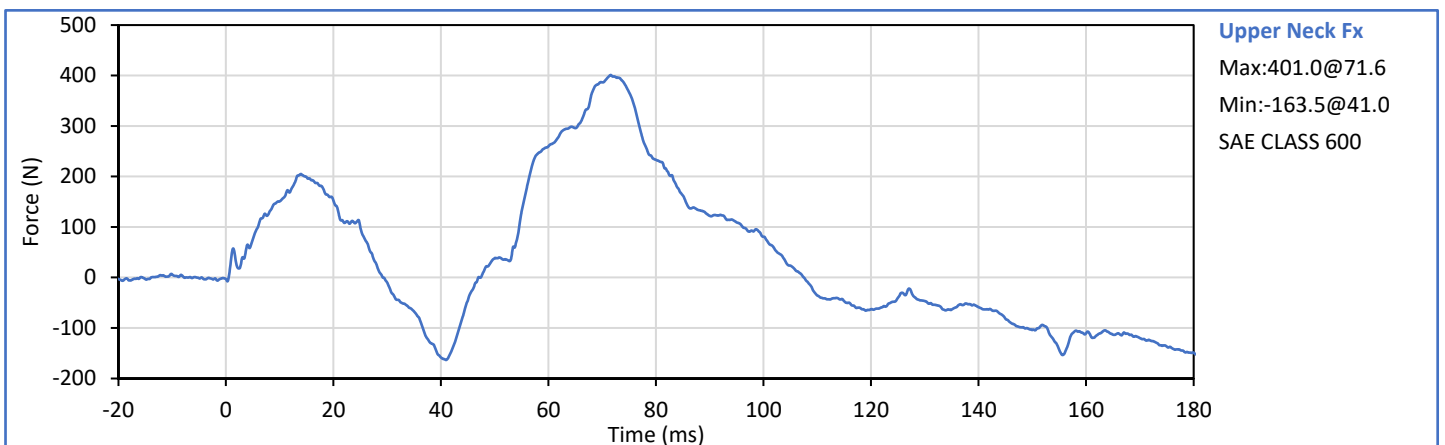
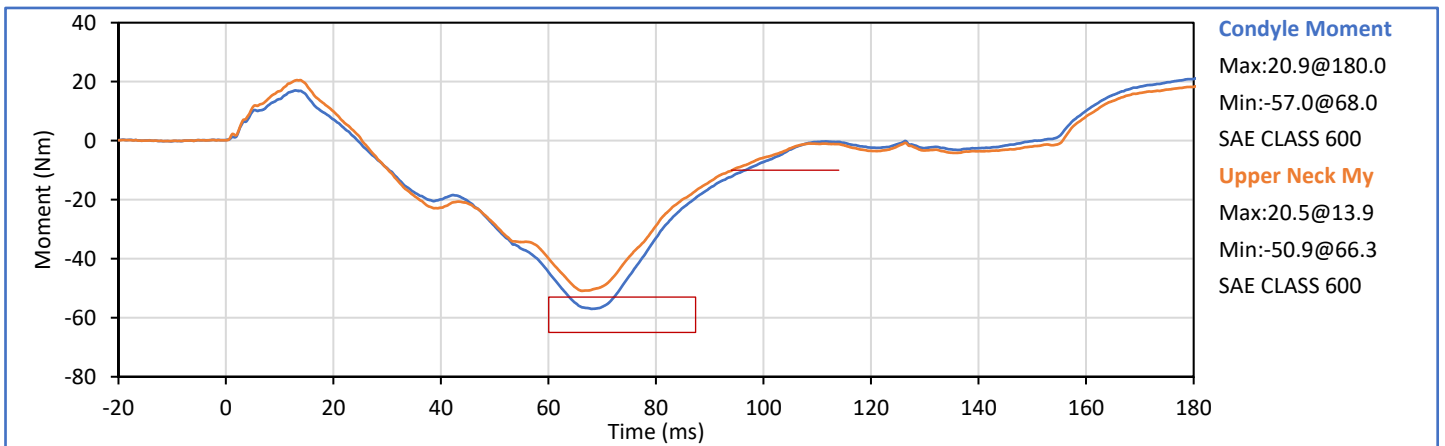
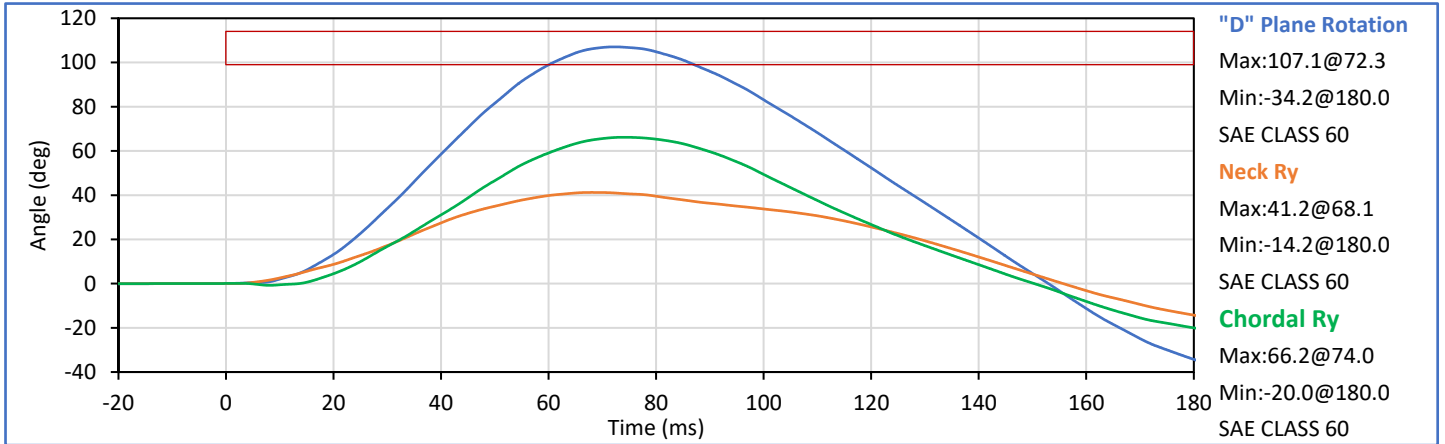


Technician: \_\_\_\_\_

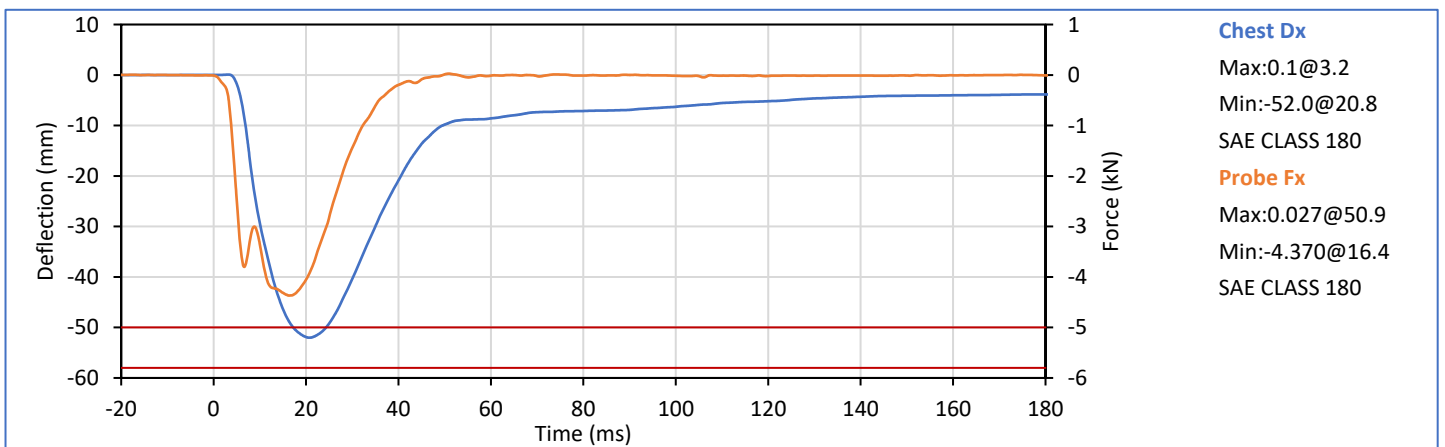
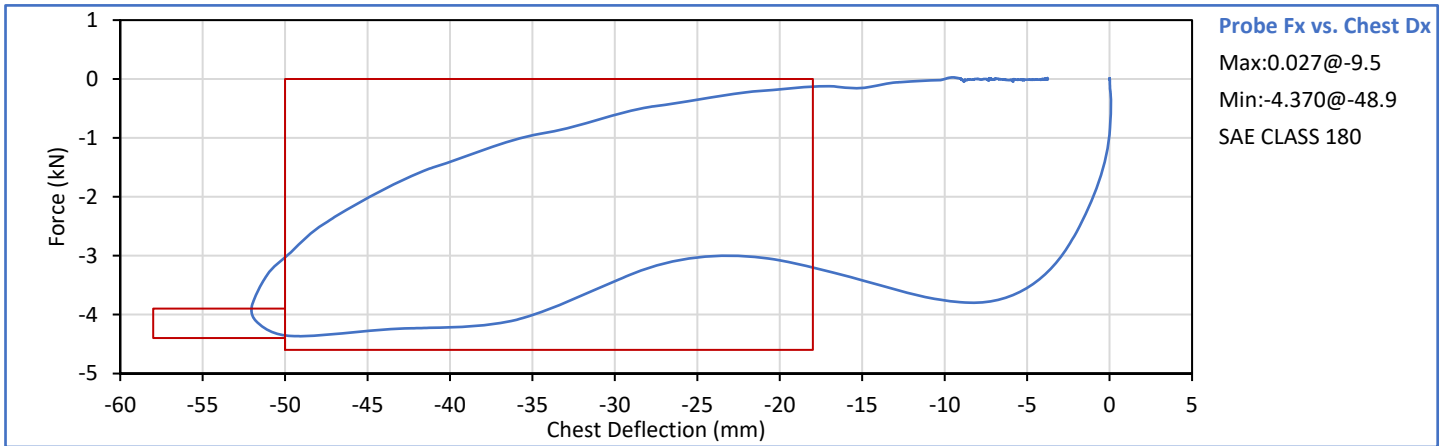
G. Holguin

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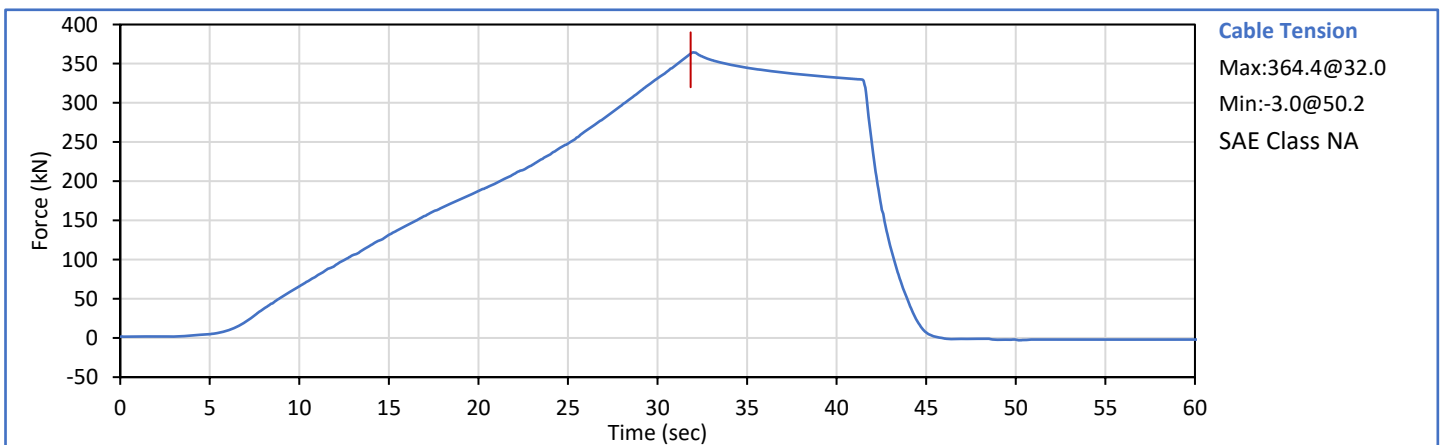
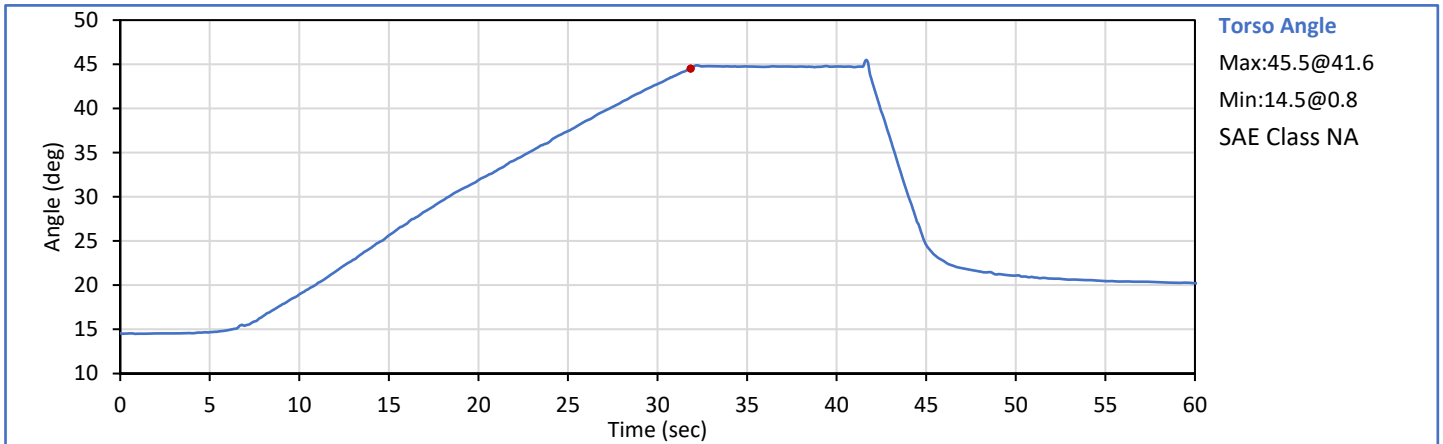
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	20.9	Pass
Laboratory RelativeHumidity	%	10	70	44	Pass
Probe Velocity	m/s	6.59	6.83	6.67	Pass
Peak Chest Deflection	mm	-58.0	-50.0	-52.0	Pass
Peak Probe Force, 50 and 58 mm	kN	-4.400	-3.900	-4.357	Pass
Peak Probe Force, 18 and 50 mm	kN	-4.600	0.000	-4.370	Pass
Internal Hysteresis	%	69.0	85.0	77.6	Pass
<b>Overall Test Results</b>					<b>Pass</b>



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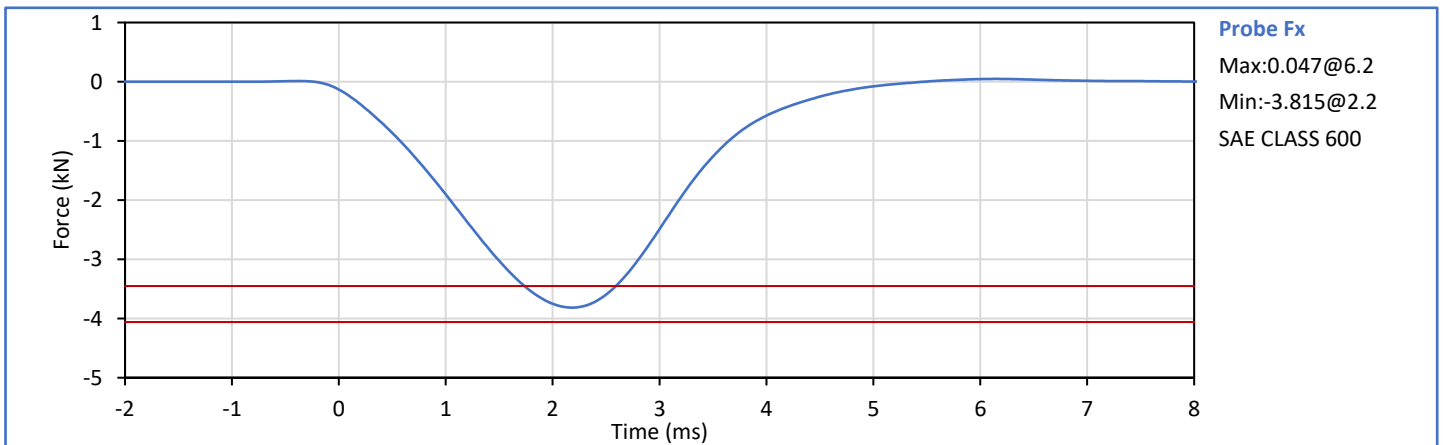
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.2	Pass
Laboratory Humidity	%	10	70	46	Pass
Orientation Angle	deg	0.0	20.0	13.9	Pass
Test Initial Angle	deg	11.0	19.0	14.5	Pass
Peak Force at 45° (+/-0.5°)	N	320.0	390.0	362.6	Pass
Torso Flexion Rate	deg/s	0.50	1.50	1.19	Pass
Final Reference Plane Angle	deg	-8.0	8.0	5.4	Pass
<b>Overall Test Results</b>					<b>Pass</b>



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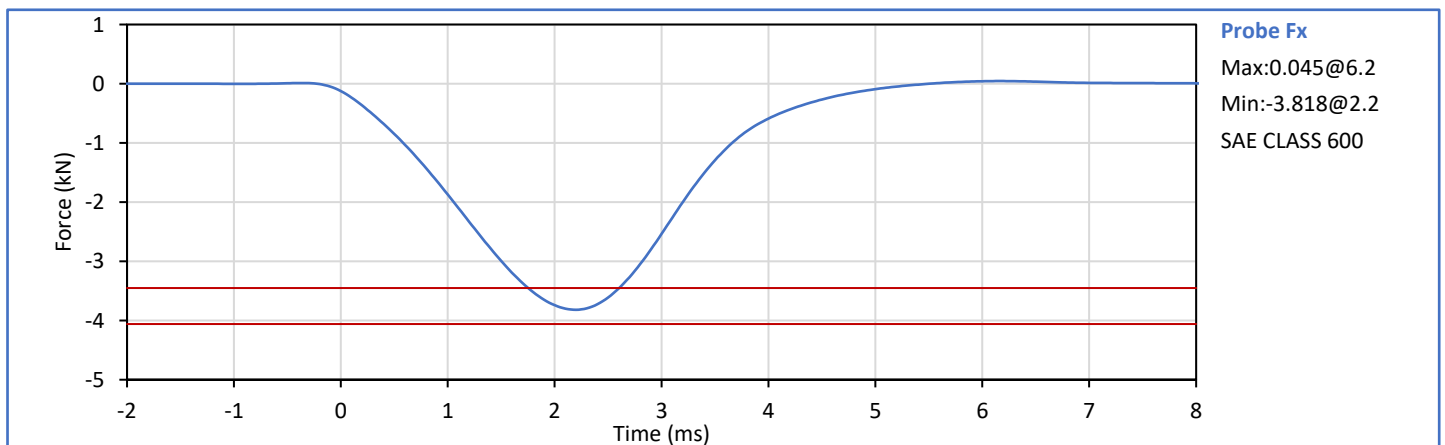
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.7	Pass
Laboratory Relative Humidity	%	10	70	48	Pass
Probe Velocity	m/s	2.070	2.130	2.102	Pass
Peak Resistive Force	kN	-4.060	-3.450	-3.815	Pass
<b>Overall Test Results</b>					<b>Pass</b>



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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	48	Pass
Probe Velocity	m/s	2.070	2.130	2.104	Pass
Peak Resistive Force	kN	-4.060	-3.450	-3.818	Pass
<b>Overall Test Results</b>					<b>Pass</b>



Technician:           *G. Holguin*            
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**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	2022-04-06
Head Acceleration Y Primary	P49228	Endevco	7264C-2k	2022-04-06
Head Acceleration Z Primary	P50101	Endevco	7264C-2k	2022-04-06
Head Acceleration X Redundant	P50103	Endevco	7264C-2k	2022-04-06
Head Acceleration Y Redundant	P49210	Endevco	7264C-2k	2022-04-06
Head Acceleration Z Redundant	P58713	Endevco	7264C-2k	2022-04-06
Head Rotation Rate X	ARS7587	DTS	ARS PRO-8k (2kHz)	2022-03-15
Head Rotation Rate Y	ARS7426	DTS	ARS PRO-8k (2kHz)	2022-03-15
Head Rotation Rate Z	ARS7480	DTS	ARS PRO-8k (2kHz)	2022-03-15
Upper Neck Force X	782 Fx	R.A. Denton	1716A	2022-03-30
Upper Neck Force Y	782 Fy	R.A. Denton	1716A	2022-03-30
Upper Neck Force Z	782 Fz	R.A. Denton	1716A	2022-03-30
Upper Neck Moment X	782 Mx	R.A. Denton	1716A	2022-03-30
Upper Neck Moment Y	782 My	R.A. Denton	1716A	2022-03-30
Upper Neck Moment Z	782 Mz	R.A. Denton	1716A	2022-03-30
Chest Acceleration X Primary	P52112	Endevco	7264C-2k	2022-04-06
Chest Acceleration Y Primary	P49208	Endevco	7264C-2k	2022-04-06
Chest Acceleration Z Primary	P51264	Endevco	7264C-2k	2022-04-06
Chest Acceleration X Redundant	P49461	Endevco	7264C-2k	2022-04-06
Chest Acceleration Y Redundant	P58774	Endevco	7264C-2k	2022-04-06
Chest Acceleration Z Redundant	P49168	Endevco	7264C-2k	2022-04-06
Chest Deflection	0606 (H3)	Servo	14CBI-3615	2022-04-07
Pelvis Acceleration X	P49238	Endevco	7264C-2k	2022-04-06
Pelvis Acceleration Y	P58877	Endevco	7264C-2k	2022-04-06
Pelvis Acceleration Z	P50087	Endevco	7264C-2k	2022-04-06
Left Femur Force Z	107 (pri)	R.A. Denton	3821JTF	2022-03-29
Right Femur Force Z	DS4139 (pri)	Humanetics	3821JLN2	2022-04-29
Left Femur Force Z Redundant	107 (red)	R.A. Denton	3821JTF	2022-03-29
Right Femur Force Z Redundant	DS4139 (red)	Humanetics	3821JLN2	2022-04-29
Left Upper Tibia Moment X	DH3054 Mx	R.A. Denton	IF-857	2022-03-28
Left Upper Tibia Moment Y	DH3054 My	R.A. Denton	IF-857	2022-03-28
Left Upper Tibia Force Z	DH3054 Fz	R.A. Denton	IF-857	2022-03-28
Left Lower Tibia Moment X	497 Mx	R.A. Denton	3644	2022-03-29
Left Lower Tibia Moment Y	497 My	R.A. Denton	3644	2022-03-29
Left Lower Tibia Force Z	497 Fz	R.A. Denton	3644	2022-03-29
Right Upper Tibia Moment X	DH3302 Mx	FTSS	IF-857	2022-03-29
Right Upper Tibia Moment Y	DH3302 My	FTSS	IF-857	2022-03-29
Right Upper Tibia Force Z	DH3302 Fz	FTSS	IF-857	2022-03-29
Right Lower Tibia Moment X	494 Mx	R.A. Denton	3644	2022-03-29
Right Lower Tibia Moment Y	494 My	R.A. Denton	3644	2022-03-29
Right Lower Tibia Force Z	494 Fz	R.A. Denton	3644	2022-03-29
Left Ankle Acceleration X	03E20-N09	Entran	EGEB6Q-2k	2022-04-09
Left Ankle Acceleration Z	03D30-N13	Entran	EGEB6Q-2k	2022-04-09
Left Toe Acceleration Z	03H07-Z10	Entran	EGEB6Q-2k	2022-04-09
Right Ankle Acceleration X	03E29-N20	Entran	EGEB6Q-2k	2022-04-09
Right Ankle Acceleration Z	P68602	Endevco	7264C-2k	2022-04-06
Right Toe Acceleration Z	03D09-N01	Entran	EGEB6Q-2k	2022-04-09
Seat Belt Outside Lap Force	315	FTSS	IF-964	2021-09-06
Seat Belt Upper Diagonal Force	263	FTSS	IF-964	2021-09-06



**Table 3 - Vehicle Instrumentation**

Sensor Location	Sensor S\N	Mfr	Model	Cal Date
Left Rear Primary Ax	M11055	Endevco	758H-2k	2022-04-01
Right Rear Primary Ax	M11214	Endevco	758H-2k	2022-04-25
Engine Top Ax	220131	BST	11CF-2k	2022-06-03
Engine Bottom Ax	220149	BST	11CF-2k	2022-05-24
Left Rear Az	M11289	Endevco	758H-2k	2022-04-28
Right Rear Az	M11149	Endevco	758H-2k	2022-04-26
Left Rear Redundant Ax	M11119	Endevco	758H-2k	2022-04-03
Right Rear Redundant Ax	M11065	Endevco	758H-2k	2022-04-01