

REPORT NUMBER: R&D-KAR-20-019

**VEHICLE TO RIGID BARRIER CRASH TEST IN SUPPORT OF
NHTSA'S FRONTAL RESEARCH CRASH TEST PROGRAM
LEFT SIDE 30° FRONTAL RIGID BARRIER IMPACT**

**MAZDA MOTOR CORPORATION
2021 MAZDA CX-5 5-DOOR MPV**

NHTSA No: Q20215417

**PREPARED BY:
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OCTOBER 08, 2021

FINAL REPORT

**PREPARED FOR:
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NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
VEHICLE SAFETY RESEARCH
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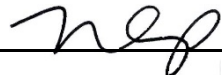
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OFFICE OF STRUCTURAL AND RESTRAINTS RESEARCH DIVISION:

TOM, Vehicle Crash Testing
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Date: _____

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16. Abstract A 40.0 km/h Left Side 30° Frontal Rigid Barrier Impact Test was conducted on a 2021 Mazda CX-5 5-door MPV in accordance with Contract DTNH22-14-D-00360L, Task Order #693JJ918F000199. The test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The test was conducted at the Applus IDIADA KARCO Engineering, LLC. facility in Adelanto, California on September 24, 2021. The impact velocity of the vehicle was 39.93 km/h and the ambient temperature at the test vehicle at the time of impact was 33.0°C. The vehicle's post-test maximum crush was 397.3 mm measured to left of the vehicle's centerline. The test vehicle's performance was as follows: <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th>Driver THOR DO9799</th> <th>Passenger THOR EG2595</th> </tr> <tr> <th>Result</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td></td> <td>149.7</td> <td>113.0</td> </tr> <tr> <td>Brain Injury Criteria (BrIC)</td> <td></td> <td>0.8</td> <td>0.6</td> </tr> <tr> <td>Nij</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Peak Neck Tension</td> <td>N</td> <td>870.8</td> <td>505.2</td> </tr> <tr> <td>Peak Neck Compression</td> <td>N</td> <td>-3808.9</td> <td>-2587.0</td> </tr> <tr> <td>Peak Chest Deflection</td> <td>mm</td> <td>31.0</td> <td>40.6</td> </tr> <tr> <td>Peak Abdomen Deflection</td> <td>mm</td> <td>-41.4</td> <td>-40.9</td> </tr> <tr> <td>Peak Resultant Acetabulum Force</td> <td>N</td> <td>2410.2</td> <td>2235.3</td> </tr> <tr> <td>Peak Femur Force</td> <td>N</td> <td>-4295.9</td> <td>-4442.4</td> </tr> <tr> <td>Peak Tibia Index</td> <td></td> <td>0.4</td> <td>0.4</td> </tr> </tbody> </table>				Measurement Description	Units	Driver THOR DO9799	Passenger THOR EG2595	Result	Result	Head Injury Criteria (HIC ₁₅)		149.7	113.0	Brain Injury Criteria (BrIC)		0.8	0.6	Nij				Peak Neck Tension	N	870.8	505.2	Peak Neck Compression	N	-3808.9	-2587.0	Peak Chest Deflection	mm	31.0	40.6	Peak Abdomen Deflection	mm	-41.4	-40.9	Peak Resultant Acetabulum Force	N	2410.2	2235.3	Peak Femur Force	N	-4295.9	-4442.4	Peak Tibia Index		0.4	0.4
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SECTION 1

TEST PURPOSE AND PROCEDURE

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

This 40.0 km/h (24.8 mph) Left Side 30° Frontal Rigid Barrier Impact Test is part of the Frontal Research Crash Test Program outlined in Contract No. DTNH22-14-D-00360L, Task Order #693JJ918F000199. The purpose of this test is to obtain vehicle crashworthiness and occupant restraint system performance data for research purposes.

This test was conducted in accordance with the instructions set forth for a 40.0 km/h Left Side 30° Frontal Rigid Barrier Impact, outlined in Contract No. DTNH22-14-D-00360L, Task Order #693JJ918F000199. Data indicant of Federal Motor Vehicle Safety Standard FMVSS 208 - Occupant Crash Protection, FMVSS 212 – Windshield Mounting, FMVSS 219 (partial) – Windshield Zone Intrusion, and FMVSS 301 – Fuel System Integrity was obtained, in addition to the data required by Contract No. DTNH22-14-D-00360L, Task Order #693JJ918F000199.

SECTION 2

SUMMARY OF TEST RESULTS

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

A 40.0 km/h Left Side 30° Frontal Rigid Barrier Impact Test was conducted on a 2021 Mazda CX-5 5-Door MPV. The test was performed at Applus IDIADA KARCO Engineering, LLC. on September 24, 2021.

The test was documented by one (1) real-time and eighteen (18) high-speed video cameras. Pre- and post-test photographs of the test vehicle and test setup were taken using a digital still camera. Photographic documentation of the test is presented in Appendix A of this report.

One (1) 50th percentile adult male THOR anthropomorphic test device (ATD) (Serial No. DO9799) was seated in the left front seating position (P1 – Driver) and one 50th percentile adult male THOR ATD (Serial No. EG2595) was seated in the right front passenger seating position (P3 - Passenger). The driver was positioned according to instructions specified in the THOR 50th Percentile Male Dummy Seating & Positioning Procedures: Driver Position. The passenger was positioned according to instructions specified in the THOR 50th Percentile Male Dummy Seating & Positioning Procedures: Passenger Position.

Both ATD's are unbelted.

SECTION 2 ... (CONTINUED)
SUMMARY OF TEST RESULTS

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

Two hundred sixty-three (263) channels of data from the two (2) ATD's and the test vehicle were collected using Diversified Technical Systems, Inc. data acquisition systems. Appendix B contains dummy data plots, as well as vehicle response data plots.

The windshield was broken during impact but there was no separation recorded. There was no intrusion into the protected zone of the windshield during any portion of the impact event. The maximum static crush of the vehicle was 397 mm measured to the left of the vehicle's centerline.

All four vehicle doors remained closed and latched during the test. All doors remained operational after the impact event.

Structural observations include the following:

- The front end including the bumper, grille, and hood were crushed, with the damage concentrated on the left side
- The windshield was broken due to impact with the rigid barrier and contact with the driver ATD head.

The driver ATD's visible contact points were:

- Head contacted the frontal airbag, headliner, windshield, and steering wheel
- Torso contacted the frontal airbag
- Left leg contacted the knee bolster
- Right leg contacted the knee bolster

The right front passenger ATD's visible contact points were:

- Head contacted the frontal airbag and windshield
- Torso contacted the frontal airbag
- Left leg contacted the knee bolster
- Right leg contacted the knee bolster

SECTION 2 ... (CONTINUED)
SUMMARY OF TEST RESULTS

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
 Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

PRIMARY IMPACT DATA

Measured Parameter	Units	Value
Vehicle Test Weight	kg	1770.5
Vehicle Maximum Static Crush	mm	397
Number of Data Channels		263
Number of Real-Time Cameras		1
Number of High-Speed Cameras		18

DUMMY CONTACTS

Description	Driver	Picture Ref.	Passenger	Picture Ref.
Dummy Type	THOR, S/N: DO9799		THOR, S/N: EG2595	
Head Contact	Frontal airbag, A-pillar trim, and windshield	A-22, A-44, A-56, A-89 A-91a, A-95	Frontal airbag, windshield	A-22, A-93, A-95, A-99, A-134, A-136a
Upper Torso Contact	Frontal airbag, Torso/Pelvis Airbag	A-89, A-91b	Frontal airbag	A-134
Lower Torso Contact	Frontal airbag	A-89	Frontal airbag	A-134
Left Leg Contact	Knee bolster	A-80, A-82	Knee bolster	A-125
Right Leg Contact	Knee bolster	A-80, A-82	Knee bolster	A-125

SECTION 2 ... (CONTINUED)
SUMMARY OF TEST RESULTS

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

DATA ANOMALIES

Channel Description	Explanation
P2TH ACETABULUM Right X FORCE	No data collected, known channel failure
P1TH ASIS LEFT X FORCE	Questionable Data, random noise spikes after 70.0ms.
P1TH ASIS LEFT Y MOMENT	No Data, Channel Failed, Cabling Issues
P1TH ACETABULUM RIGHT Y FORCE	Channel Failed at 78.0ms
P1TH FEMUR RIGHT Y FORCE	Channel Failed at 0 ms

SECTION 2 ... (CONTINUED)
SUMMARY OF TEST RESULTS

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
 Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

Driver, THOR S/N DO9799					
LOCATION	DESCRIPTION	UNIT	SOURCE	MAX	MIN
Head	HIC 15ms		Compute	149.7	
	Brain Injury Criteria (BrIC)		Compute	0.773	
	Head Rotational Velocity X	Deg/s	60	400.4	-425.0
	Head Rotational Velocity Y	Deg/s	60	276.5	-2313.6
	Head Rotational Velocity Z	Deg/s	60	667.0	-168.1
Neck	Upper Neck Z-axis Force	N	1000	870.8	-3808.9
	Upper Neck Y-axis Moment	Nm	600	20.1	-13.9
Chest	Upper Left Resultant Chest Deflection	mm	Compute	31.0	
	Upper Right Resultant Chest Deflection	mm	Compute	23.2	
	Lower Left Resultant Chest Deflection	mm	Compute	23.0	
	Lower Right Resultant Chest Deflection	mm	Compute	13.3	
Abdomen	Lower Left X-axis Deflection	mm	Compute	3.0	-41.4
	Lower Right X-axis Deflection	mm	Compute	5.1	-11.4
Acetabulum	Left Acetabulum Resultant Force	N	Compute	2410.2	
	Right Acetabulum Resultant Force	N	Compute	2320.2	
Femur	Left Femur Force, FZ	N	600	314.3	-4295.9
	Right Femur Force, FZ	N	600	245.2	-4272.8
Tibia	Left Upper Tibia, FZ	N	600	98.9	-1004.6
	Left Upper Tibia Index		Compute	0.373	
	Right Upper Tibia, FZ	N	600	153.0	-1666.5
	Right Upper Tibia Index		Compute	0.212	
	Left Lower Tibia, FZ	N	600	181.9	-1579.4
	Left Lower Tibia Index		Compute	0.188	
	Right Lower Tibia, FZ	N	600	141.7	-2240.9
	Right Lower Tibia Index		Compute	0.208	
Ankle	Left Ankle Rotation, RX	Deg	180	21.2	-10.3
	Left Ankle Rotation, RY	Deg	180	24.0	-1.2
	Left Ankle Dorsiflexion Moment, MY	Nm	Compute	21.5	-92.0
	Left Ankle In/Eversion Moment, MX	Nm	Compute	30.1	-10.3
	Right Ankle Rotation, RX	Deg	180	4.5	-31.1
	Right Ankle Rotation, RY	Deg	180	13.1	-3.2
	Right Ankle Dorsiflexion Moment, MY	Nm	Compute	14.6	-61.7
	Right Ankle In/Eversion Moment, MX	Nm	Compute	4.8	-49.2

Anomalies:

ASIS Left X Force, ASIS Left Y Moment, Acetabulum Right Y Force, Femur Right Y Force

SECTION 2 ... (CONTINUED)
SUMMARY OF TEST RESULTS

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

Driver, THOR S/N EG2595					
LOCATION	DESCRIPTION	UNIT	SOURCE	MAX	MIN
Head	HIC 15ms		Compute	113.0	
	Brain Injury Criteria (BrIC)		Compute	0.573	
	Head Rotational Velocity X	Deg/s	60	20.7	-547.0
	Head Rotational Velocity Y	Deg/s	60	45.0	-1670.8
	Head Rotational Velocity Z	Deg/s	60	494.2	-173.7
Neck	Upper Neck Z-axis Force	N	1000	505.2	-2587.0
	Upper Neck Y-axis Moment	Nm	600	19.8	-19.0
Chest	Upper Left Resultant Chest Deflection	mm	Compute	22.0	
	Upper Right Resultant Chest Deflection	mm	Compute	21.6	
	Lower Left Resultant Chest Deflection	mm	Compute	40.6	
	Lower Right Resultant Chest Deflection	mm	Compute	36.1	
Abdomen	Lower Left X-axis Deflection	mm	Compute	3.1	-40.9
	Lower Right X-axis Deflection	mm	Compute	2.9	-8.8
Acetabulum	Left Acetabulum Resultant Force	N	Compute	2235.3	
	Right Acetabulum Resultant Force	N	Compute	1548.1	
Femur	Left Femur Force, FZ	N	600	242.9	-3954.1
	Right Femur Force, FZ	N	600	176.2	-4442.4
Tibia	Left Upper Tibia, FZ	N	600	233.7	-1773.4
	Left Upper Tibia Index		Compute	0.439	
	Right Upper Tibia, FZ	N	600	119.3	-1389.9
	Right Upper Tibia Index		Compute	0.176	
	Left Lower Tibia, FZ	N	600	110.2	-2005.2
	Left Lower Tibia Index		Compute	0.147	
	Right Lower Tibia, FZ	N	600	84.5	-1399.0
	Right Lower Tibia Index		Compute	0.125	
Ankle	Left Ankle Rotation, RX	Deg	180	23.8	-10.0
	Left Ankle Rotation, RY	Deg	180	-13.4	-25.7
	Left Ankle Dorsiflexion Moment, MY	Nm	Compute	19.3	-76.3
	Left Ankle In/Eversion Moment, MX	Nm	Compute	18.7	-7.0
	Right Ankle Rotation, RX	Deg	180	0.6	-17.8
	Right Ankle Rotation, RY	Deg	180	-6.9	-22.9
	Right Ankle Dorsiflexion Moment, MY	Nm	Compute	15.9	-58.2
	Right Ankle In/Eversion Moment, MX	Nm	Compute	5.3	-14.4

Anomalies:

Acetabulum Fx not functional

SECTION 3

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

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	lbf/in ²	kPa	6.895
Temperature	General Use	°F	°C	$=(T_f - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf-ft	N•m	1.355

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
 Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	Q20205417
Model Year	2021
Make	Mazda
Model	CX-5
Body Style	5-Door MPV
VIN	JM3KFABM0M0370245
Body Color	Eternal Blue Mica
Odometer Reading (km / mi)	5246 / 3260
Engine Displacement (L)	2.5
Type / No. of Cylinders	Inline 4-Cylinder
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6
Overdrive	Yes
Final Drive	AWD
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes
Automatic Door Locks (ADLs)	Yes

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

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

Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Mazda Motor Corporation
Date of Manufacture	Jan-21

GVWR (kg)	2075
GAWR Front (kg)	1075
GAWR Rear (kg)	1000

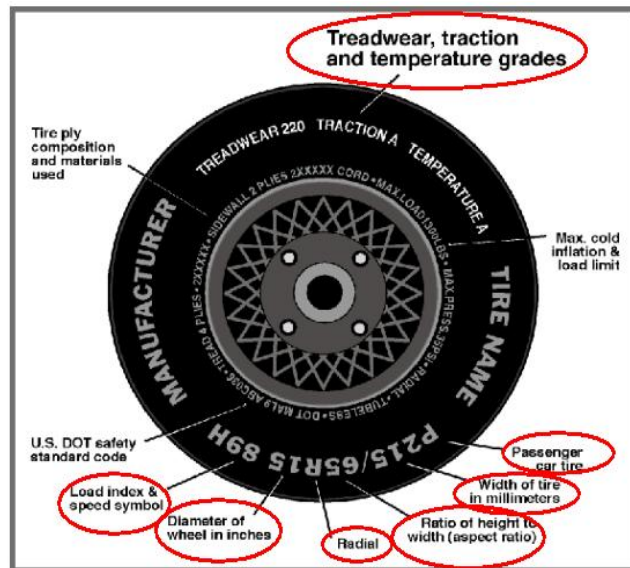
VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Type of Seats	Bucket	Bench			
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				385.0	A
DSC x 68.04 (kg)				340.2	B
Cargo Weight (RCLW) (kg)				44.8	A-B

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
 Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21



Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	300	300
Cold Pressure (kPa)	230	230
Recommended Tire Size	P225/65R17	P225/65R17
Tire Size on Vehicle	P225/65R17	P225/65R17
Tire Manufacturer	Yokohama	Yokohama
Tire Model	Geolander G91	Geolander G91
Treadware	280	280
Traction Grade	B	B
Temperature Grade	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Nylon	2 Polyester, 2 Steel, 1 Nylon
Load Index/Speed Symbol	100H	100H
Tire Material	Polyester, Steel, Nylon	Polyester, Steel, Nylon
DOT Safety Code Left	FDF5-PC50 221	FDF5-PC50 221
DOT Safety Code Right	FDF5-PC50 221	FDF5-PC50 221

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

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
 Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)*		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	464.0	301.5		563.5	326.0	
Right	kg	451.0	330.0		537.5	343.5	
Ratio	%	59.2%	40.8%	100.0%	62.2%	37.8%	100.0%
Total	kg	915.0	631.5	1546.5	1101.0	669.5	1770.5

*Vehicle as tested mass was reduced at the request of NHTSA. The vehicle is an AWD model being in comparison with FWD models.

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1546.5	A
Weight of THOR-50M and THOR-50M	kg	186.0	B
Rated Cargo/Luggage Weight (RCLW)	kg	44.8	C
Calculated Vehicle Target Weight (TVTW)	kg	1777.3	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	LF	RF	LR	RR	CG Aft of Front Axle
As Delivered	mm	873	873	900	905	1095
As Tested	mm	859	861	858	866	1014
Post-Test	mm	846	855	879	855	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2681
Total Vehicle Length at Left Side	mm	4317
Total Vehicle Length at Centerline	mm	4565
Total Vehicle Length at Right Side	mm	4312
Weight of Ballast/Equipment in Cargo Area	kg	72.9
Weight of Vehicle Components Removed	kg	5.5
Amount of Stoddard Solvent in Fuel Tank	L	52.20

VEHICLE COMPONENTS REMOVED TO MEET TEST WEIGHT:

Trunk Trim 2.5kg, Tire Pump 3.0kg

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

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

TARGET VEHICLE STRUCTURAL MEASUREMENTS

No.	Description	Units	Pre-Test
1	Total Length	mm	4565
2	Total Width	mm	1846
3*	Bumper Top Height	mm	620
4*	Bumper Bottom Height	mm	495
5*	Longitudinal Member Top Height	mm	598
6	Distance Between Longitudinal Members	mm	899
7	Longitudinal Member Width	mm	83
8*	Engine Top Height	mm	843
9*	Engine Bottom Height	mm	223
10	Engine and Gearbox Width	mm	630
11	Front Bumper to Engine Distance	mm	488
12*	Front Shock Absorber Fixing Height	mm	990
13*	Bonnet Leading Edge Height	mm	920
14	Front Shock Absorber Fixing Width	mm	592
15	Front Bumper to Front Axle Distance	mm	940
16	Front Axle to A-Pillar Distance	mm	599
17	A-Pillar to B-Pillar Distance	mm	990
18	B-Pillar to Rear Axle Distance	mm	1091
19	B-Pillar to C-Pillar Distance	mm	990
20*	Roof Sill Bottom Height	mm	1495
21*	Roof Sill Top Height	mm	1600
22*	Floor Sill Bottom Height	mm	410
23*	Floor Sill Top Height	mm	470

*Note: Height measurements are in reference to the ground.

DATA SHEET NO. 2

SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL

Test Vehicle: 2021 Mazda CX-5 5-Door MPV

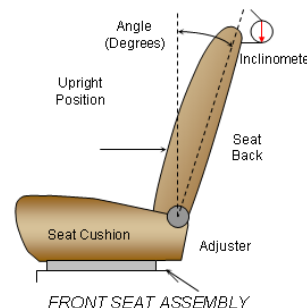
NHTSA No. Q20215417

Test Program: Left Side 30° Frontal Rigid Barrier Impact

Test Date: 09/24/21

NOMINAL DESIGN RIDING POSITION

The driver seat back was initially set to the manufacturer's designated angle listed in FORM 208 but was moved forward per THOR seating procedure to level the head. The passenger seat back was set to the manufacturer's designated angle listed in FORM 208 but was moved rearward to level the head.



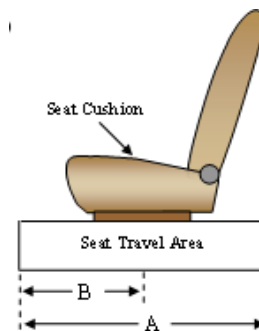
SEAT BACK ANGLE

Seating Position	Unit	FORM 208 Position	After ATD Positioning
Driver Seat Back Angle	Degrees	6.2	6.1
Passenger Seat Back Angle	Degrees	6.2	8.2

*Neck load cell was installed in passenger ATD. Neck bracket could not be adjusted, therefore the seat back was reclined in order to level the passenger ATD head.

SEAT FORE / AFT POSITIONING

The passenger seat travel is measured from the forward most position to the rear most position with the seat cushion set at mid angle. The passenger seat was initially positioned 25 mm rearward of mid-track before being moved as far forward as possible where the ATD did not contact any interior panels, up to mid-track. The driver seat travel is measured from the forward most possible position to the rear most possible position. The driver seat is set to the middle of the fore-aft travel.



SEAT FORE/AFT POSITIONS

Seating Position	Total Fore/Aft Travel (mm)	Placed in Position (mm)
Driver Seat	258	129
Passenger Seat	260	130

SEAT BELT UPPER ANCHORAGE

The seat belt upper anchorage is positioned to the manufacturer's design position for a 50th percentile adult male ATD for the driver and passenger. Position "H" is the uppermost position, followed by position "M1" and "M2." Position "L" is the lowermost 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

Test Vehicle: 2021 Mazda CX-5 5-Door MPV

NHTSA No. Q20215417

Test Program: Left Side 30° Frontal Rigid Barrier Impact

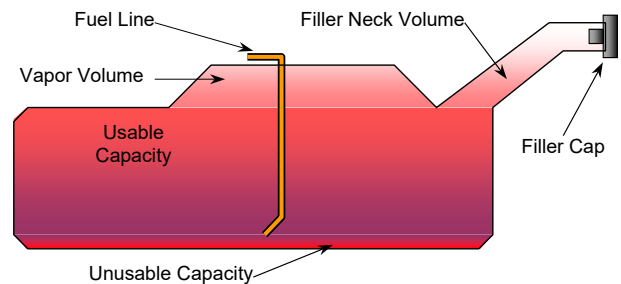
Test Date: 09/24/21

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	56.02
Usable Capacity of "Optional Tank"	
93% of Usable Capacity	52.10
Actual Amount of Stoddard Solvent Used	57.92
1/3 of Usable Capacity	18.67

FUEL PUMP

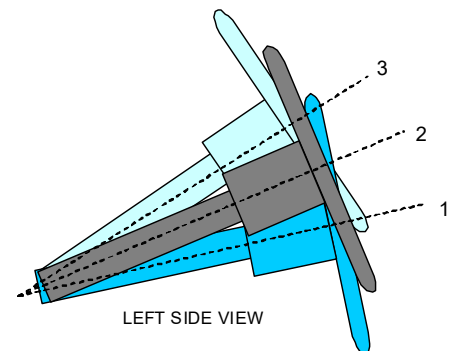
Fuel was evacuated according to the specifications provided by the manufacturer in Form 208. The electric fuel pump operates when the starter or engine is activated.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. A digital inclinometer is used to measure a plate which is placed across the rim of the steering wheel for angular measurements. A tape measure is used to measure telescoping steering wheel travel.



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONING

	Degrees	Fore-Aft Position (mm)
Lowermost Position, No. 1	23.6	110
Geometric Center Position, No. 2	26.2	132
Uppermost Position, No. 3	28.8	154
Telescoping Steering Wheel Travel		44
Test Position	26.2	132

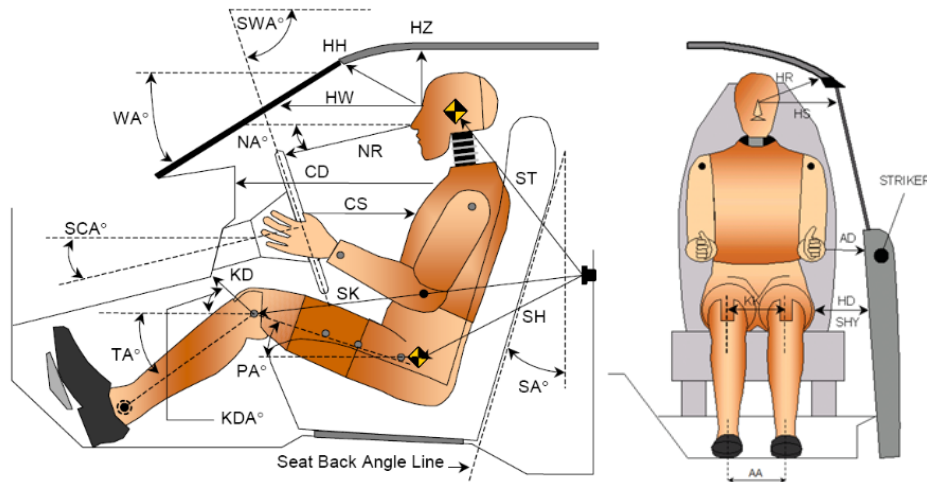
DATA SHEET NO. 3
DUMMY CLEARANCE DIMENSIONS

Test Vehicle: 2021 Mazda CX-5 5-Door MPV

NHTSA No. Q20215417

Test Program: Left Side 30° Frontal Rigid Barrier Impact

Test Date: 09/24/21



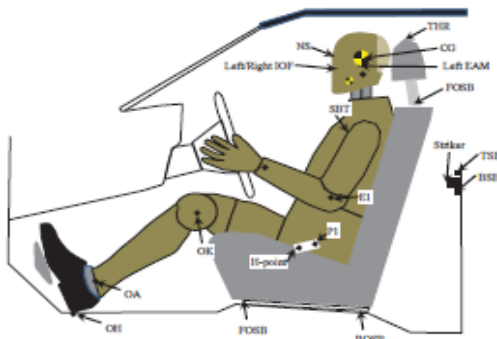
LEFT SIDE VIEW

Code	Measurement Description	Driver S/N# DO9799		Passenger S/N# EG2595	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
HZ	Nasion to Roof (Z Distance)	199		202	
HH	Nasion to Header (3D Distance)	377		385	
HW	Nasion to Windshield Point 1 Inside (X Distance)	717		725	
NR	Tip of Nose to Top of Steering Wheel (3D Distance)	502			
CD	Chest Point 1 to Dash Point 1 (3D Distance)	590		584	
CS	Chest Point 2 to Center of Steering Wheel (X Distance)	343			
CBS	Chest Point 3 to Bottom of Steering Wheel (X Distance)	200			
IKD	Inboard Knee to Dash Point 3 (3D Distance)			91	
OKD	Outboard Knee to Dash Point 2 (3D Distance)	130		121	
HR	Nasion to Side Header (3D Distance)	213		212	
HS	Nasion to Side Window Distance (Y Distance)	347		341	
AD	Elbow to Door (Y Distance)	150		66	
HD	H-Point to Door (Y Distance)				
HLHL	Inboard Heel to Outboard Heel (Y Distance)	340		217	
KK	Inboard Knee to Outboard Knee (Y Distance)			224	
SH	Striker to H-Point (3D Distance)	326		338	
HRA	Head Restraint Post Angle		6.1		8.2
	H-Point Tool Angle		32.8		33.2
	Torso Angle		19.7		19.0
	Windshield Angle		61.1		61.1
	Head Angle (X)		-0.3		0.1
	Head Angle (Y)		-0.2		-0.9
	T1 Angle (X)		0.0		
	T1 Angle (Y)		0.8		
	T6 Angle (X)		0.3		
	T6 Angle (Y)		19.7		
	T12 Angle (X)		0.2		
	T12 Angle (Y)		31.4		
	Pelvis Angle (X)		-0.2		0.2
	Pelvis Angle (Y)		32.6		33.0

DATA SHEET NO. 4

DUMMY CMM MEASUREMENTS RELATIVE TO VCS

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
 Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21



Description	Units	Driver S/N# DO9799			Passenger S/N# EG2595		
		X	Y	Z	X	Y	Z
Center of Upper Striker Bolt	mm	2033	-793	-326	2034	797	-325
Center of Lower Striker Bolt	mm	2038	-794	-290	2040	799	-291
Center of Striker Bar	mm	2066	-795	-314	2068	800	-313
Front Outboard Seat Bolt	mm	2557	-606	81	2561	608	56
Rear Outboard Seat Bolt	mm	2116	610	127	2116	610	127
Center of Steering Wheel Hub	mm	2560	-367	-525			
Outer Head Restraint Post	mm	1856	-455	-681	1857	451	-666
Right Head CG	mm	2070	-285	-813	2063	448	-813
Left Head CG	mm	2069	-440	-810	2064	294	-815
Right EAM	mm	2078	-290	-787	2074	444	-786
Left EAM	mm	2075	-436	-785	2071	295	-787
Nasion	mm	2161	-364	-829	2160	372	-830
Right IOF	mm	2162	-332	-789	2158	404	-792
Left IOF	mm	2160	-398	-791	2160	341	-792
Tip of Nose	mm	2164	-365	-790	2158	369	-791
Tip of Chin	mm	2164	-364	-691	2165	374	-698
Chest Point 1	mm	2193	-366	-569	2197	371	-580
Chest Point 2	mm	2220	-364	-528			
Chest Point 3	mm	2314	-367	-367			
Shoulder Point 1	mm	2062	-562	-587	2056	564	-583
Shoulder Point 2	mm	2120	-553	-553			
Elbow	mm	2314	-611	-353	2217	629	-309
Center of H-Point Tool	mm	2221	-626	-194			
H-Point on H-Point Tool	mm	2299	-622	-168	2232	636	-201
H-Point on ATD Skin	mm	2297	-569	-167	2308	604	-176
Outboard Knee	mm	2699	-569	-310	2307	564	-176
Inboard Knee	mm				2721	534	-283
Outboard Ankle	mm	2954	-575	25	2724	311	-297
Inboard Ankle	mm	2990	-242	19	3013	554	12
Outboard Heel	mm	2971	-551	156	3002	316	22
Inboard Heel	mm	2985	-212	155	2988	496	151

Reference Point:

+X – From the rear of the vehicle to the front of the vehicle

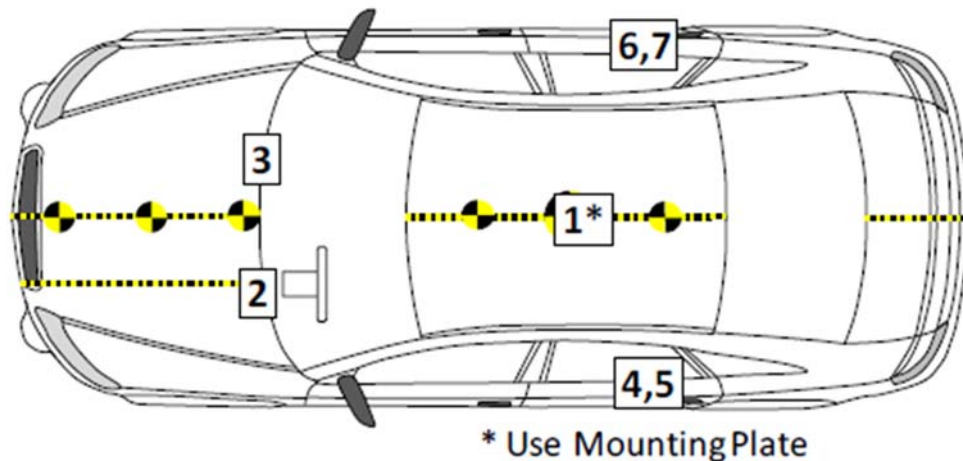
+Y – From the left side of the vehicle to the right side of the vehicle

+Z – From the top of the vehicle to the bottom of the vehicle

DATA SHEET NO. 5

VEHICLE INSTRUMENTATION DATA

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
 Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS RELATIVE TO VCS

No.	Instrumentation Location	Axes	Units	Coordinates (mm)		
				X	Y	Z
1	Vehicle CG (Acceleration and Angular Rate)	x, y, z	g, °/s	1818	1	76
2	Driver Floor Pan	x, y, z	°/s	3296	-404	27
3	Passenger Floor Pan	x, y, z	g	3237	393	77
4	Door Sill LR	x, y	g	1605	-719	155
5	Door Sill LR Redundant	x, y	g	1585	-719	156
6	Door Sill RR	x, y	g	1604	708	157
7	Door Sill RR Redundant	x, y	g	1583	709	158

Reference Point:

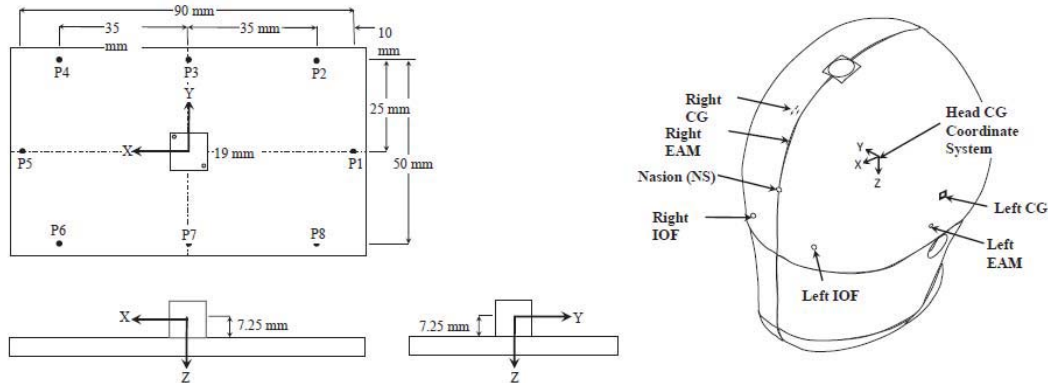
- +X – From the rear of the vehicle to the front of the vehicle
- +Y – From the left side of the vehicle to the right side of the vehicle
- +Z – From the top of the vehicle to the bottom of the vehicle

DATA SHEET NO. 5 ... (CONTINUED)

VEHICLE INSTRUMENTATION DATA

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
 Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

ANGULAR RATE SENSOR MOUNTING PLATE & THOR HEAD POINT DEFINITIONS



CG ARS MOUNTING PLATE - VEHICLE COORDINATE SYSTEM

No.	Description	Units	X	Y	Z
P1	Plate Point 1	mm	1860	8	48
P2	Plate Point 2	mm	1850	-19	52
P3	Plate Point 3	mm	1816	-19	60
P4	Plate Point 4	mm	1781	-20	61
P5	Plate Point 5	mm	1769	5	60
P6	Plate Point 6	mm	1780	30	57
P7	Plate Point 7	mm	1815	30	52
P8	Plate Point 8	mm	1851	31	47

DRIVER HEAD POINTS IN RELATION TO HEAD CG COORDINATE SYSTEM

Description	Units	x	y	z
Left CG	mm	64	-41	45
Left EAM	mm	73	-37	73
Left IOF	mm	155	5	73
Right IOF	mm	155	67	73
Nasion	mm	157	36	36
Right EAM	mm	72	108	74
Right CG	mm	66	113	45

PASSENGER HEAD POINTS IN RELATION TO HEAD CG COORDINATE SYSTEM

Description	Units	x	y	z
Left CG	mm	65	-42	46
Left EAM	mm	73	-38	72
Left IOF	mm	153	5	72
Right IOF	mm	154	68	74
Nasion	mm	156	37	36
Right EAM	mm	71	108	72
Right CG	mm	63	113	43

DATA SHEET NO. 5 ... (CONTINUED)

VEHICLE INSTRUMENTATION DATA

Test Vehicle: 2021 Mazda CX-5 5-Door MPV

NHTSA No. Q20215417

Test Program: Left Side 30° Frontal Rigid Barrier Impact

Test Date: 09/24/21

Location No.	Description	Axes	Units	Positive Direction		Negative Direction	
				Max	Time (ms)	Min	Time (ms)
1	Vehicle CG	x	g	6.7	27.7	-29.1	76.0
		y	g	9.2	60.3	-4.5	97.0
		z	g	25.0	32.0	-18.6	25.0
	Vehicle CG Rotation	x	°/s	96.2	77.3	-239.8	62.2
		y	°/s	108.4	45.3	-64.6	42.0
		z	°/s	17.5	56.5	-81.7	299.8
2	Driver Floor Pan	x	g	14.6	17.7	-22.3	90.6
		y	g	11.7	64.8	-9.1	17.4
		z	g	17.7	76.3	-5.0	17.8
3	Passenger Floor Pan	x	g	3.3	24.7	-13.4	74.9
		y	g	13.0	51.7	-8.2	94.4
		z	g	24.5	75.3	-4.2	28.8
4	Door Sill LR	x	g	3.9	28.0	-24.2	78.8
		y	g	8.7	58.0	-3.9	20.4
5	Door Sill LR Redundant	x	g	3.6	28.2	-23.1	78.3
		y	g	6.3	46.8	-4.8	20.6
6	Door Sill RR	x	g	1.1	160.7	-27.0	75.5
		y	g	8.5	57.1	-2.9	41.9
7	Door Sill RR Redundant	x	g	1.2	161.0	-26.3	75.5
		y	g	8.1	47.7	-3.3	42.1

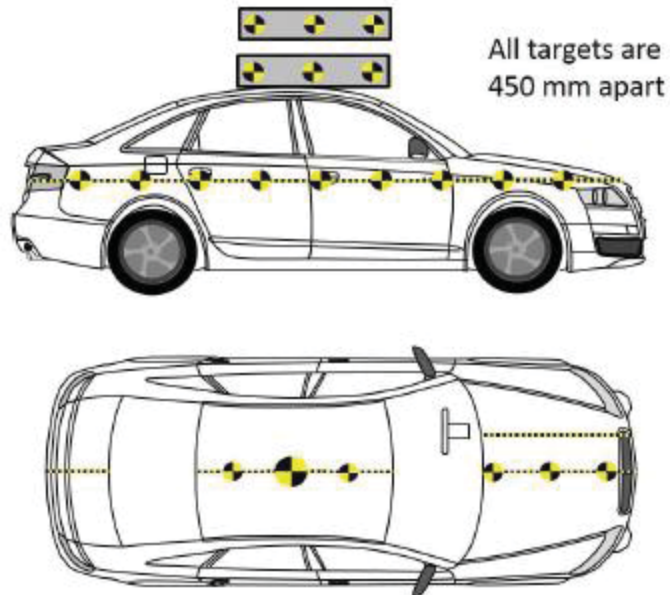
Note: See Appendix B for all vehicle data plots

DATA SHEET NO. 6

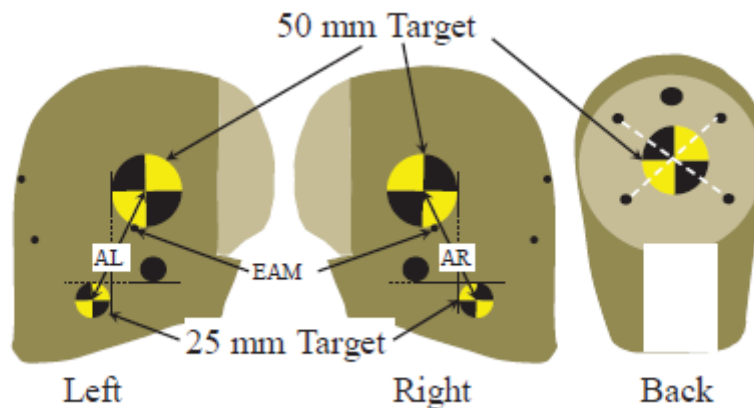
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

VEHICLE TARGETS



ATD HEAD TARGETS



Driver

Target	Units	Measurement
AL	mm	97
AR	mm	98

DATA SHEET NO. 7**TEST VEHICLE SUMMARY OF RESULTS**

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

INSTRUMENTATION

Instrumentation	Number of Channels Collected
Driver Dummy Sensors	134
Passenger Dummy Sensors	99
Vehicle Structure Sensors	20
Airbag Timing Sensors	10
Total	263

CAMERA COVERAGE

Type of Camera	Number of Cameras Collected
High-Speed Vehicle Onboard	4
High-Speed Off-Board	14
Real-Time Panning	1
Total	19

DATA SHEET NO. 8
POST TEST OBSERVATIONS

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

TEST DUMMY INFORMATION AND CONTACT

Description	Driver	Passenger
Dummy Type/Serial No.	THOR-50M / DO9799	THOR-50M / EG2595
Head Contact	Frontal airbag, Headliner, windshield, and Steering Wheel	Frontal airbag and Windshield
Upper Torso Contact	Frontal airbag, Torso/Pelvis airbag	Frontal airbag
Lower Torso Contact	Frontal airbag	Frontal airbag
Left Knee Contact	Knee bolster	Knee bolster
Right Knee Contact	Knee bolster	Knee bolster

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked / Unlocked Doors	Unlocked	Unlocked
Front Door Opening	Remained closed and latched, operational	Remained closed and latched, operational
Rear Door Opening	Remained closed and latched, operational	Remained closed and latched, operational
Seat Track Shift (mm)		
Seat Back Failure	None	None
Glazing Damage	Broken	

POST TEST STRUCTURAL OBSERVATIONS

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

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	No
Side Airbag 2 (Torso/Pelvis)	Yes	Yes	Yes	No
Knee Airbag	No		No	
Seat Belt Pretensioner				
Seat Belt Load Limiter*				

*Test was performed unbelted

DATA SHEET NO. 9
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4565	4441	-124
2	Rear Surface of Vehicle to Front of Engine	4073	3996	-77
3	RSOV to Firewall	3553	3547	-6
4	RSOV to Upper Leading Edge of Right Door	3063	3063	0
5	RSOV to Upper Leading Edge of Left Door	3060	3059	-1
6	RSOV to Lower Leading Edge of Right Door	3063	3088	25
7	RSOV to Lower Leading Edge of Left Door	3086	3082	-4
8	RSOV to Upper Trailing Edge of Right Door	1946	1946	0
9	RSOV to Upper Trailing Edge of Left Door	1943	1942	-1
10	RSOV to Lower Trailing Edge of Right Door	2073	2074	0
11	RSOV to Lower Trailing Edge of Left Door	2071	2068	-3
12	RSOV to Bottom of A-Pillar, Right Side	3022	3022	0
13	RSOV to Bottom of A-Pillar, Left Side	3020	3019	-1
14	RSOV to Firewall, Right Side	3637	3638	1
15	RSOV to Firewall, Left Side	3641	3621	-21
16	RSOV to Steering Column	2565	2613	49
17	Center of Steering Column to A-Pillar	456	406	-50
18	Center of Steering Column to Headliner	474	497	23
19	RSOV to Right Side of Front Bumper	4312	4366	54
20	RSOV to Left Side of Front Bumper	4317	3920	-397
21	Length of Engine Block	489	457	-32
RD	RSOV to Right Side of Dash Panel	2785	2789	4
CD	RSOV to Center of Dash Panel	2753	2762	9
LD	RSOV to Left Side of Dash Panel	2784	2786	2

All measurements in millimeters.

DATA SHEET NO. 10**ACCIDENT INVESTIGATION DIVISION DATA**

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

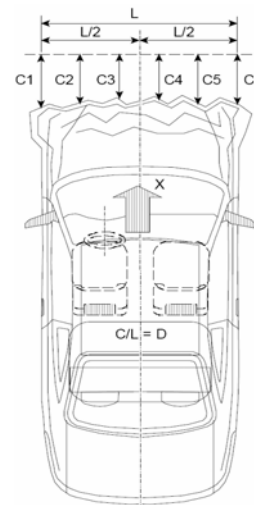
VEHICLE INFORMATION

VIN: JM3KFABM0M0370245
Vehicle Size Category: 5-door MPV

Wheelbase (mm): 2681
Test Weight (kg): 1770.5

ACCELEROMETER DATA

Accelerometer Locations: Vehicle CG_x
Cal. Procedure/Interval: Vibration Test / 6 months
Integration Algorithm: NHTSA Standard
Linearity: Good
Impact Velocity (km/h): 39.93

**CRUSH PROFILE**

Collision Deformation Classification: 12FLEW2
Midpoint of Damage: 752.5
Damage Region Length (mm): 1505
Impact Mode: Left Side 30° Frontal

Crush Measurements

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	4313	3915	-397
C2	Crush Zone 2 at Left Side	mm	4454	4214	-240
C3	Crush Zone 3 at Left Side	mm	4513	4399	-114
C4	Crush Zone 4 at Right Side	mm	4513	4509	-4
C5	Crush Zone 5 at Right Side	mm	4453	4537	84
C6	Crush Zone 6 at Right Side	mm	4308	4362	54
L	C1 to C6	mm	1505		

DATA SHEET NO. 11

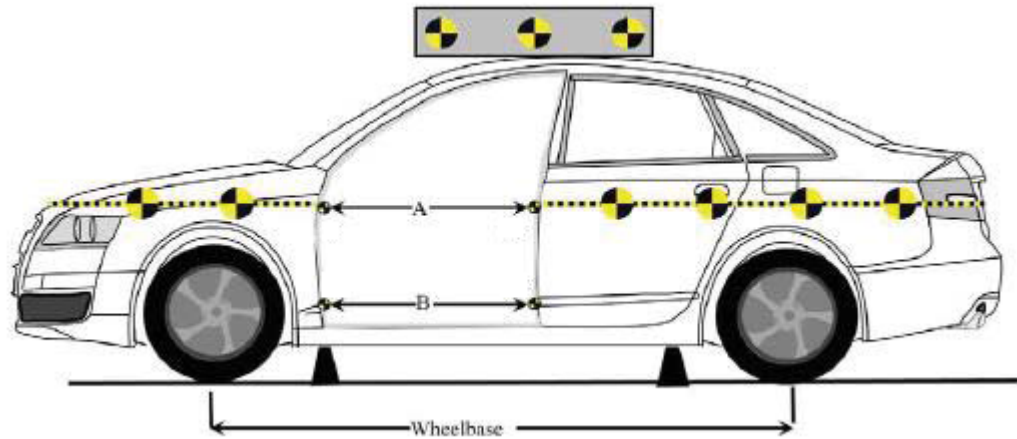
VEHICLE INTRUSION MEASUREMENTS RELATIVE TO VCS

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417

Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Driver Side Upper	mm	871	870	1
B	Driver Side Lower	mm	734	735	-1
D	Passenger Side Upper	mm	870	869	-3
E	Passenger Side Lower	mm	735	735	0



DATA SHEET NO. 11 ... (CONTINUED)

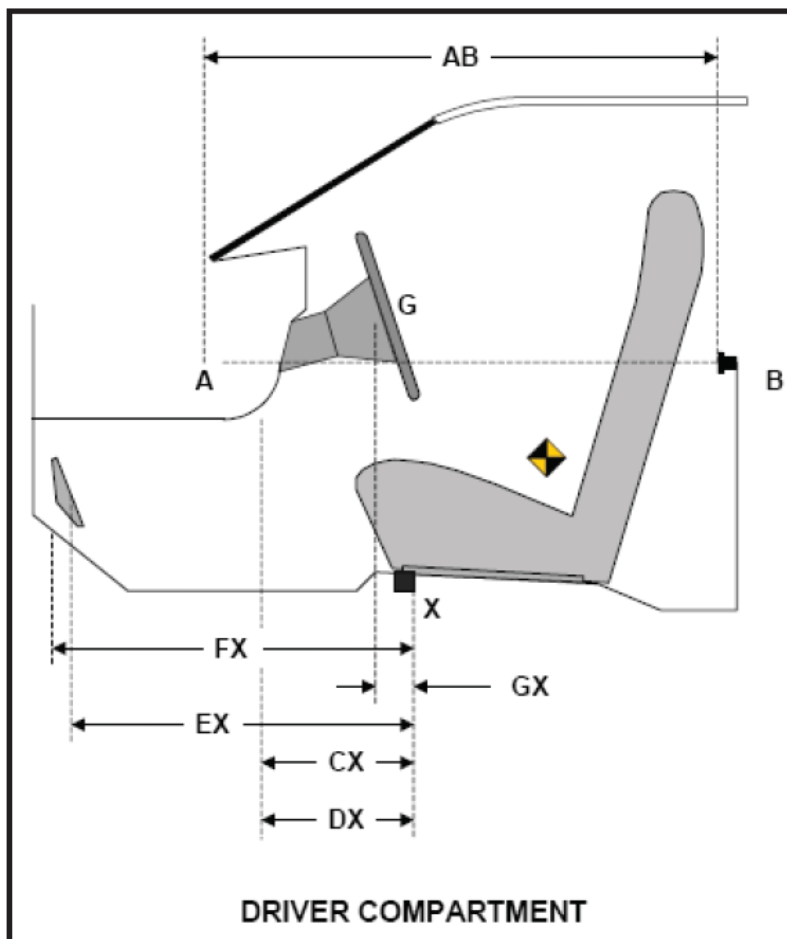
VEHICLE INTRUSION MEASUREMENTS RELATIVE TO VCS

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
 Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	864	866	-2
CX	Left Knee Bolster to X	mm	287	287	0
DX	Right Knee Bolster to X	mm	269	284	-15
EX	Brake Pedal to X	mm	525	525	0
FX	Footrest to X	mm	663	660	3
GX	Center of Steering Column Wheel Hub to X	mm	3	53	-50

X = Front of Seat Track (Stationary)

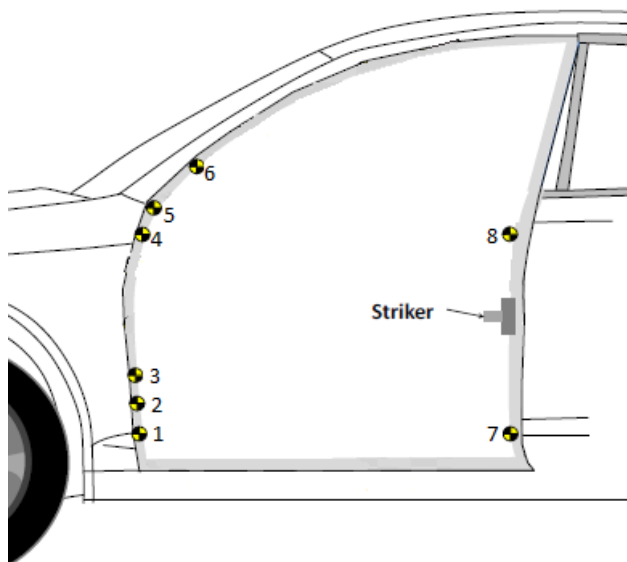


DATA SHEET NO. 11 ... (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS RELATIVE TO VCS

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
 Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

DRIVER SIDE DOOR SILL INTRUSIONS



+X – From the rear of the vehicle to the front of the vehicle
 +Y – From the left side of the vehicle to the right side of the vehicle
 +Z – From the top of the vehicle to the bottom of the vehicle

Point	Pre-Test			Post-Test			Difference		
	x	y	z	x	y	z	x	y	z
1	2956	-753	-12	2956	-753	-10	0	0	2
2	2964	-748	-87	2967	-749	-83	3	-1	4
3	2956	-744	-161	2957	-746	-159	1	-1	2
4	2918	-744	-461	2918	-746	-459	0	-2	1
5	2907	-749	-541	2908	-751	-538	1	-2	3
6	2881	-750	-616	2881	-753	-613	0	-3	3
7	2222	-757	-14	2220	-757	-12	-2	-1	2
8	2047	-740	-464	2048	-740	-465	1	0	-1

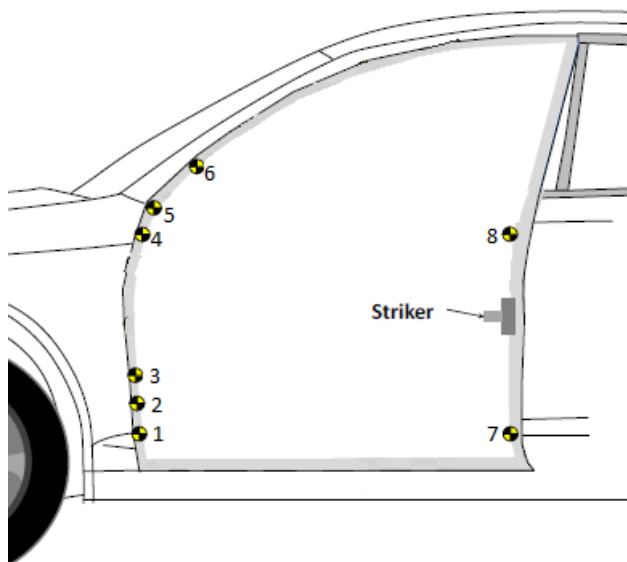
All measurements in millimeters.

DATA SHEET NO. 11 ... (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS RELATIVE TO VCS

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
 Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

PASSENGER SIDE DOOR SILL INTRUSIONS



+X – From the rear of the vehicle to the front of the vehicle
 +Y – From the left side of the vehicle to the right side of the vehicle
 +Z – From the top of the vehicle to the bottom of the vehicle

Point	Pre-Test			Post-Test			Difference		
	x	y	z	x	y	z	x	y	z
1	2959	755	-13	2959	754	-12	0	0	1
2	2965	750	-88	2966	749	-86	1	0	2
3	2957	746	-161	2959	746	-159	2	0	2
4	2919	748	-464	2920	748	-464	0	0	0
5	2908	751	-540	2911	753	-537	2	1	3
6	2880	753	-616	2882	755	-613	2	1	2
7	2225	761	-12	2224	760	-10	0	-1	2
8	2049	744	-464	2050	743	-462	2	-1	2

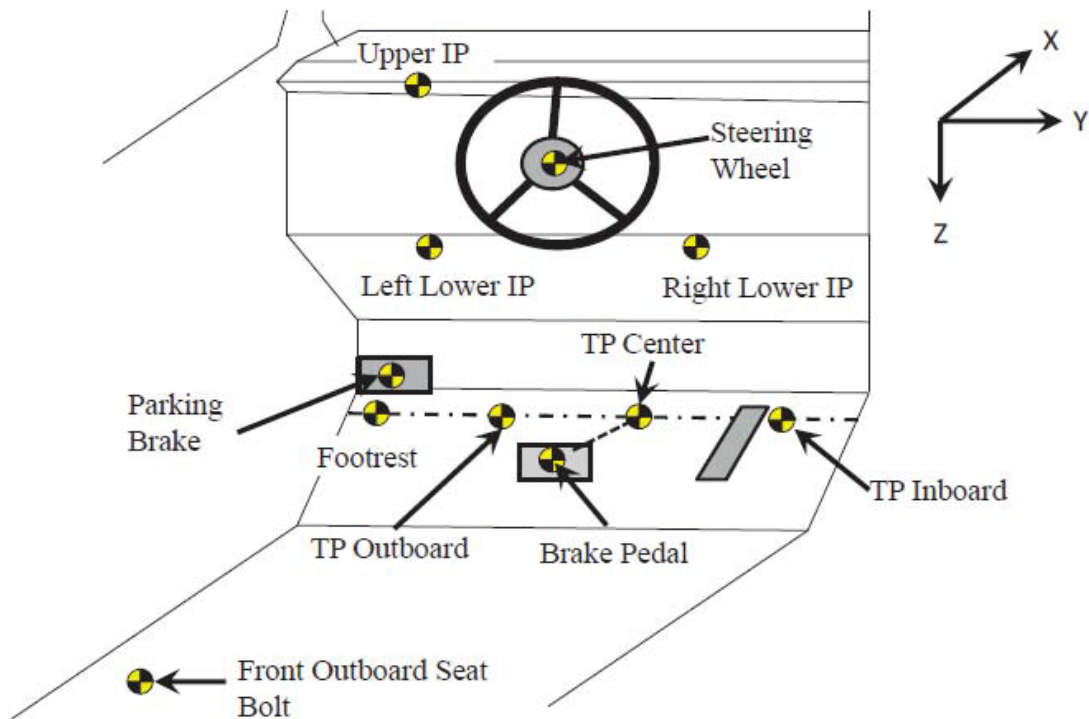
All measurements in millimeters.

DATA SHEET NO. 11 ... (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS RELATIVE TO VCS

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
 Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

DRIVER FLOOR PAN MEASUREMENTS



Intrusion Location	Pre-Test (mm)			Post-Test (mm)			Difference (mm)		
	x	y	z	x	y	z	x	y	z
TP Inboard	3362	-180	-28	3357	-184	-31	-5	-4	-3
TP Center	3351	-334	-13	3344	-337	-18	-6	-3	-4
TP Outboard	3299	-483	-14	3286	-481	-16	-12	3	-2
TP Footrest	3220	-583	-14	3218	-586	-14	-3	-3	0
Brake Pedal	3082	-329	-13	3083	-326	-10	1	3	3
Left Lower IP	2844	-522	-299	2845	-524	-298	1	-2	1
Right Lower IP	2826	-220	-297	2842	-223	-302	16	-3	-6
Upper IP	2755	-520	-433	2759	-523	-435	4	-3	-2
Steering Wheel	2560	-367	-525	2611	-351	-504	51	16	21
Front Outboard Bolt	2558	-607	80	2558	-609	82	0	-2	3
Emergency Brake									

Reference point:

+X – From the rear of the vehicle to the front of the vehicle

+Y – From the left side of the vehicle to the right side of the vehicle

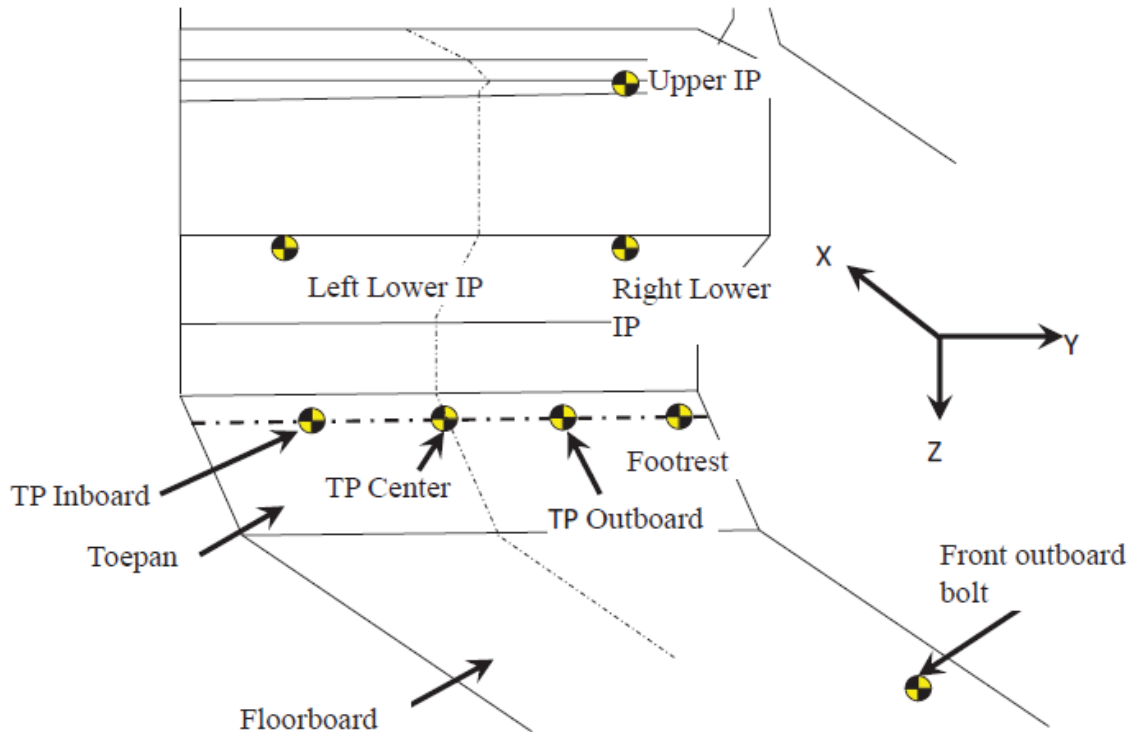
+Z – From the top of the vehicle to the bottom of the vehicle

DATA SHEET NO. 11 ... (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS RELATIVE TO VCS

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
 Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

PASSENGER FLOOR PAN MEASUREMENTS



Intrusion Location	Pre-Test (mm)			Post-Test (mm)			Difference (mm)		
	x	y	z	x	y	z	x	y	z
TP Inboard	3323	213	-15	3315	210	-13	-8	-3	2
TP Center	3350	363	-13	3345	363	-7	-6	0	6
TP Outboard	3257	512	-11	3257	513	-9	0	1	2
TP Footrest	3207	610	-12	3207	612	-10	-1	2	2
Left Lower IP	2807	210	-301	2823	207	-304	16	-3	-3
Right Lower IP	2842	513	-300	2851	510	-302	9	-3	-2
Upper IP	2748	514	-451	2755	513	-449	6	-1	2
Front Outboard Seat Bolt	2560	610	79	2560	610	81	-1	0	2

Reference point:

+X – From the rear of the vehicle to the front of the vehicle

+Y – From the left side of the vehicle to the right side of the vehicle

+Z – From the top of the vehicle to the bottom of the vehicle

DATA SHEET NO. 12

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

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

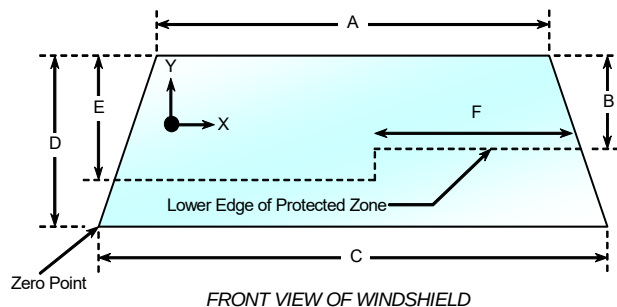
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with plastic molding and rubber cement.

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: 21.1 °C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2308	2308	100.0%
Right Side	2308	2308	100.0%
Total	4616	4616	100.0%



Item	Units	Value
A	mm	1235
B	mm	380
C	mm	1535
D	mm	923
E	mm	505
F	mm	500

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.
- 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

X	Y

DATA SHEET NO. 12 ... (CONTINUED)

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

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 33.0 °C Test Time: 3:40 PM

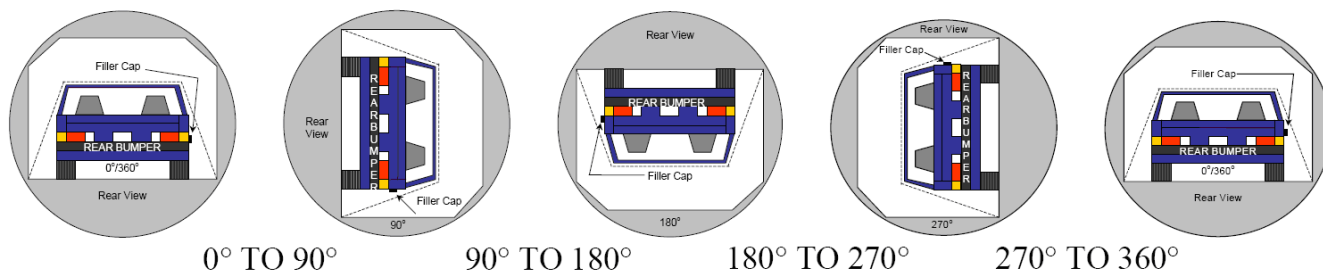
Stoddard Solvent Spillage Measurements

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

DATA SHEET NO. 13

FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2021 Mazda CX-5 5-Door MPV NHTSA No. Q20215417
 Test Program: Left Side 30° Frontal Rigid Barrier Impact Test Date: 09/24/21



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

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	84	300	384
90° To 180°	81	300	381
180° To 270°	84	300	384
270° To 360°	87	300	387

FMVSS 301 SPILLAGE TABLE

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

SOLVENT SPILLAGE LOCATION TABLE

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

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PHOTOGRAPHS

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FIGURE 1. Test Vehicle Certification Label



FIGURE 2. Test Vehicle Tire Placard



FIGURE 3. Right Front $\frac{3}{4}$ View, As Received



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



FIGURE 5. Pre-Test Front View of Test Vehicle

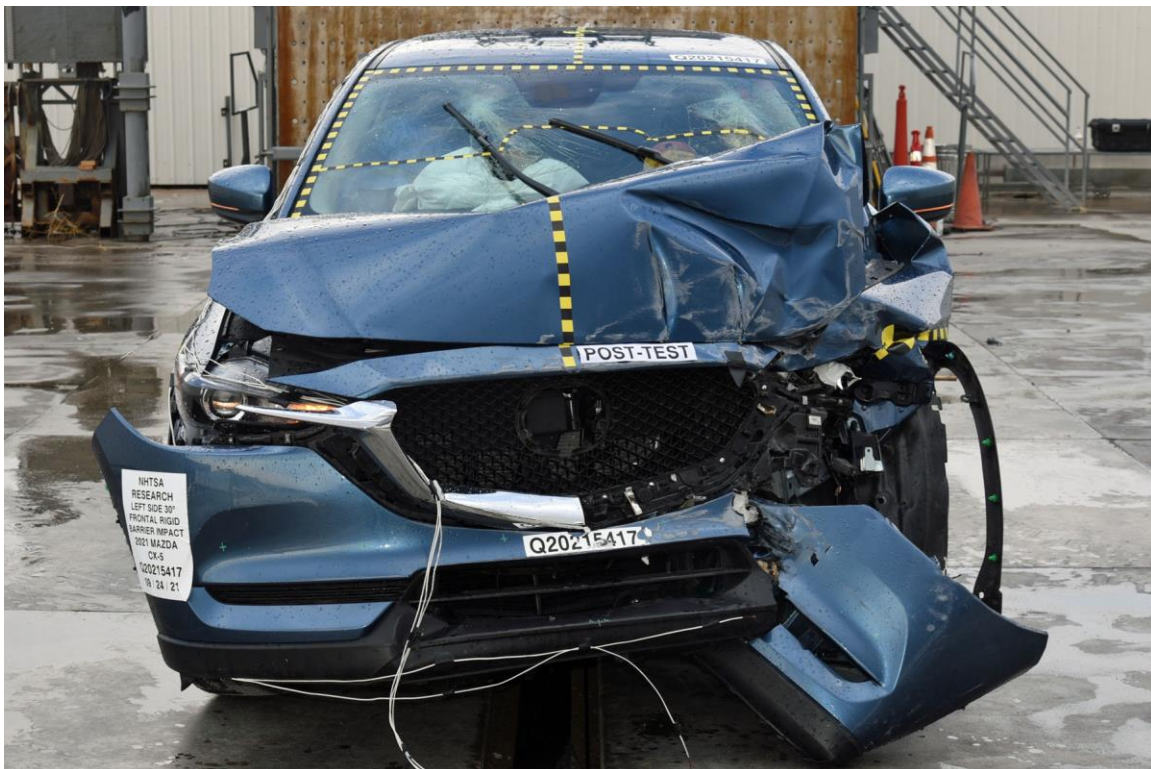


FIGURE 6. Post-Test Front View of Test Vehicle



FIGURE 7. Pre-Test Left View of Test Vehicle



FIGURE 8. Post-Test Left View of Test Vehicle



FIGURE 9. Pre-Test Right View of Test Vehicle



FIGURE 10. Post-Test Right View of Test Vehicle



FIGURE 11. Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle



FIGURE 12. Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle



FIGURE 13. Pre-Test Right Front $\frac{3}{4}$ View of Test Vehicle

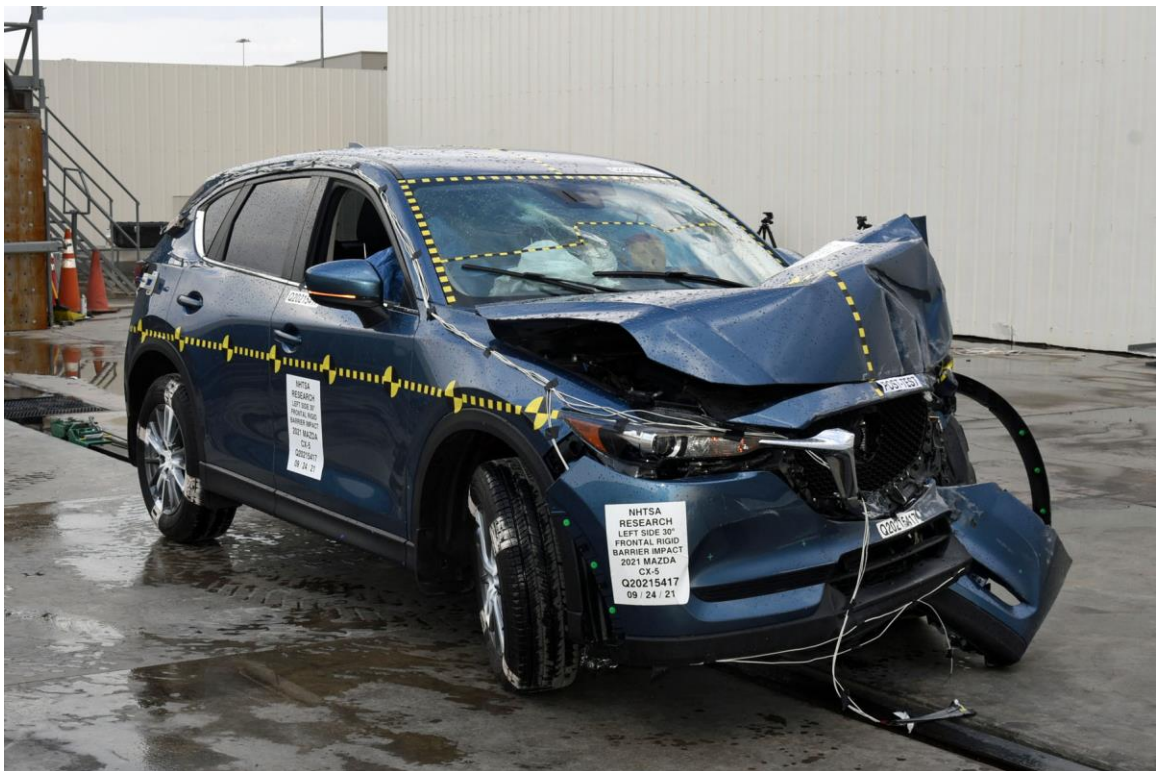


FIGURE 14. Post-Test Right Front $\frac{3}{4}$ View of Test Vehicle



FIGURE 15. Pre-Test Right Rear $\frac{3}{4}$ View of Test Vehicle



FIGURE 16. Post-Test Right Rear $\frac{3}{4}$ View of Test Vehicle



FIGURE 17. Pre-Test Rear View of Test Vehicle



FIGURE 18. Post-Test Rear View of Test Vehicle



FIGURE 19. Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



FIGURE 20. Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle

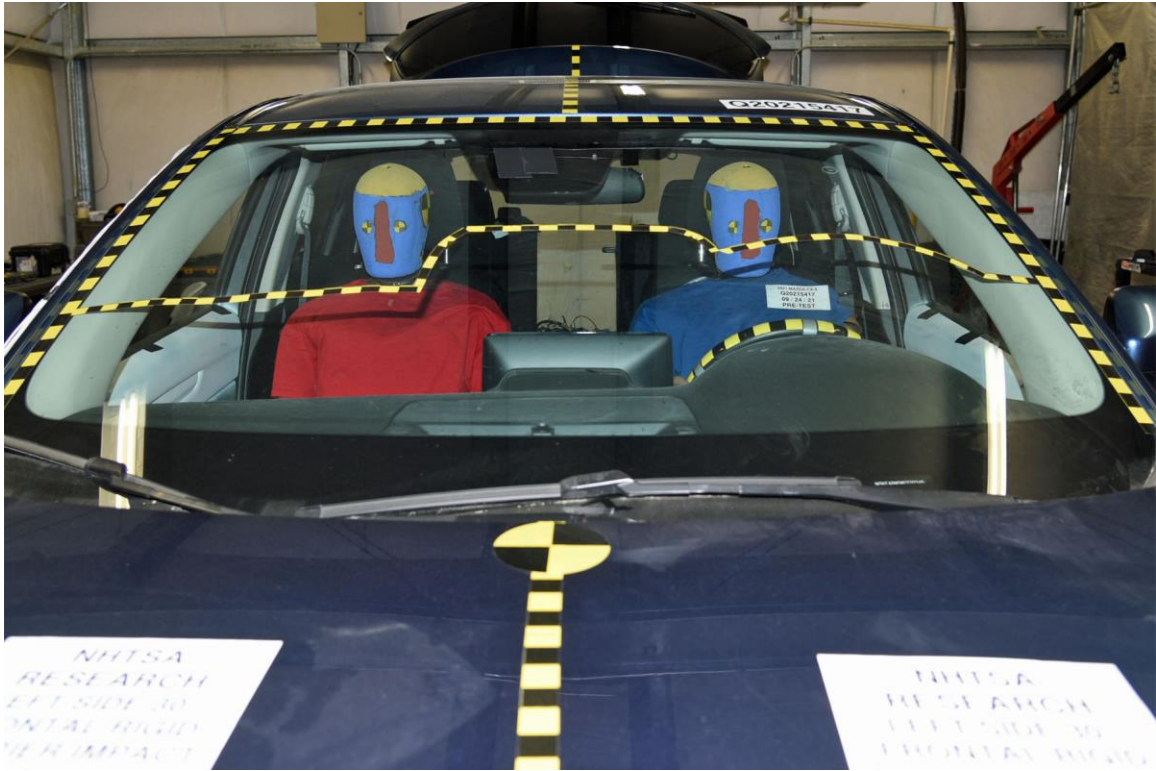


FIGURE 21. Pre-Test Windshield View



FIGURE 22. Post-Test Windshield View



FIGURE 23. Pre-Test Engine Compartment View



FIGURE 24. Post-Test Engine Compartment View



FIGURE 25. Pre-Test Fuel Filler Cap View



FIGURE 26. Post-Test Fuel Filler Cap View

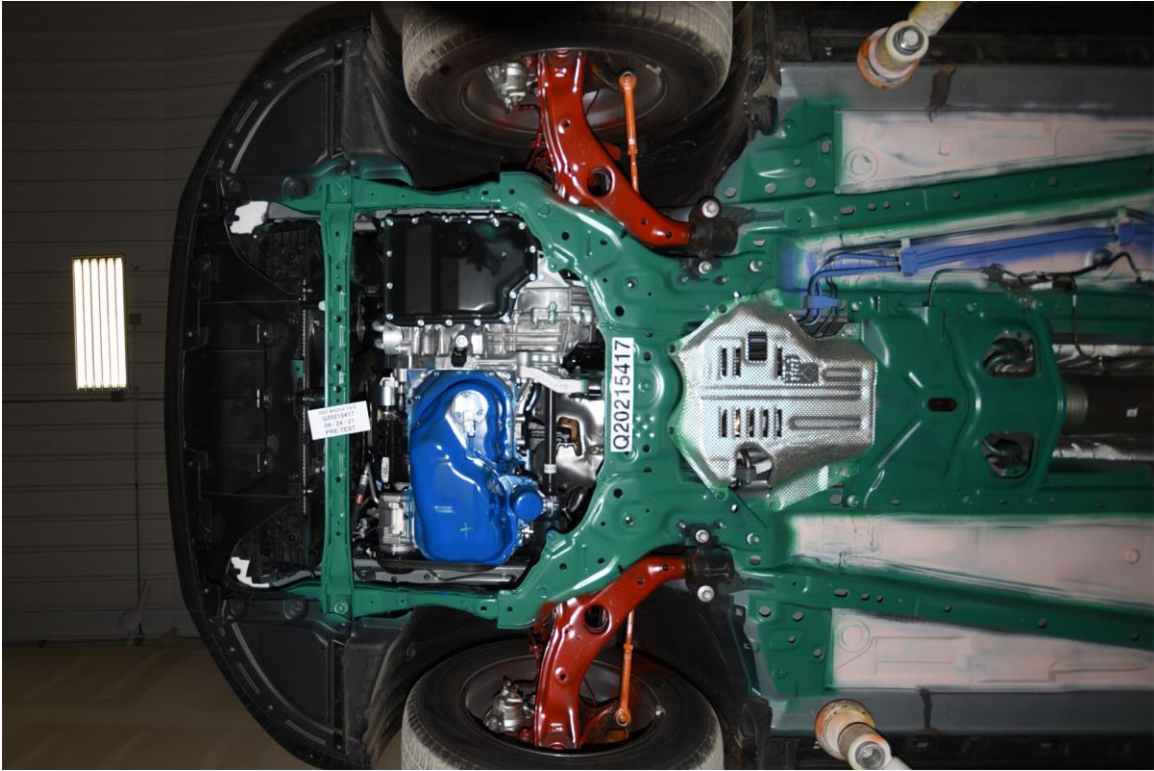


FIGURE 27. Pre-Test Front Underbody View

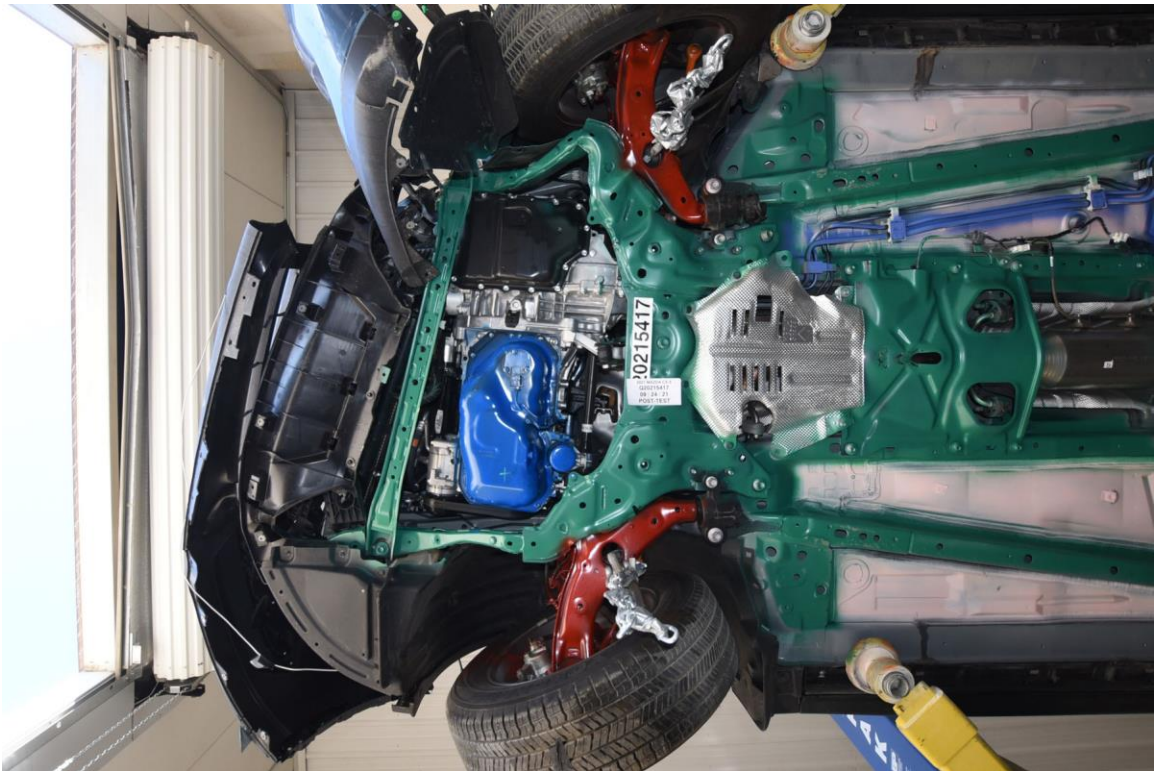


FIGURE 28. Post-Test Front Underbody View

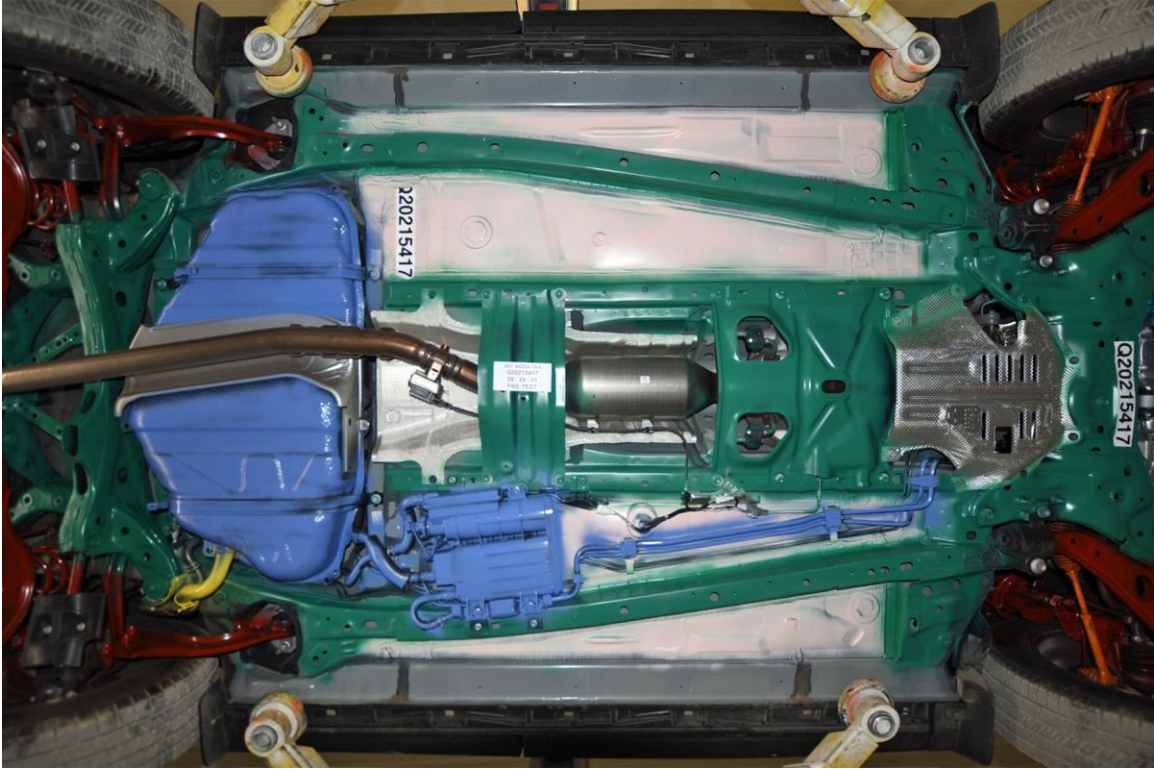


FIGURE 29. Pre-Test Mid Underbody View

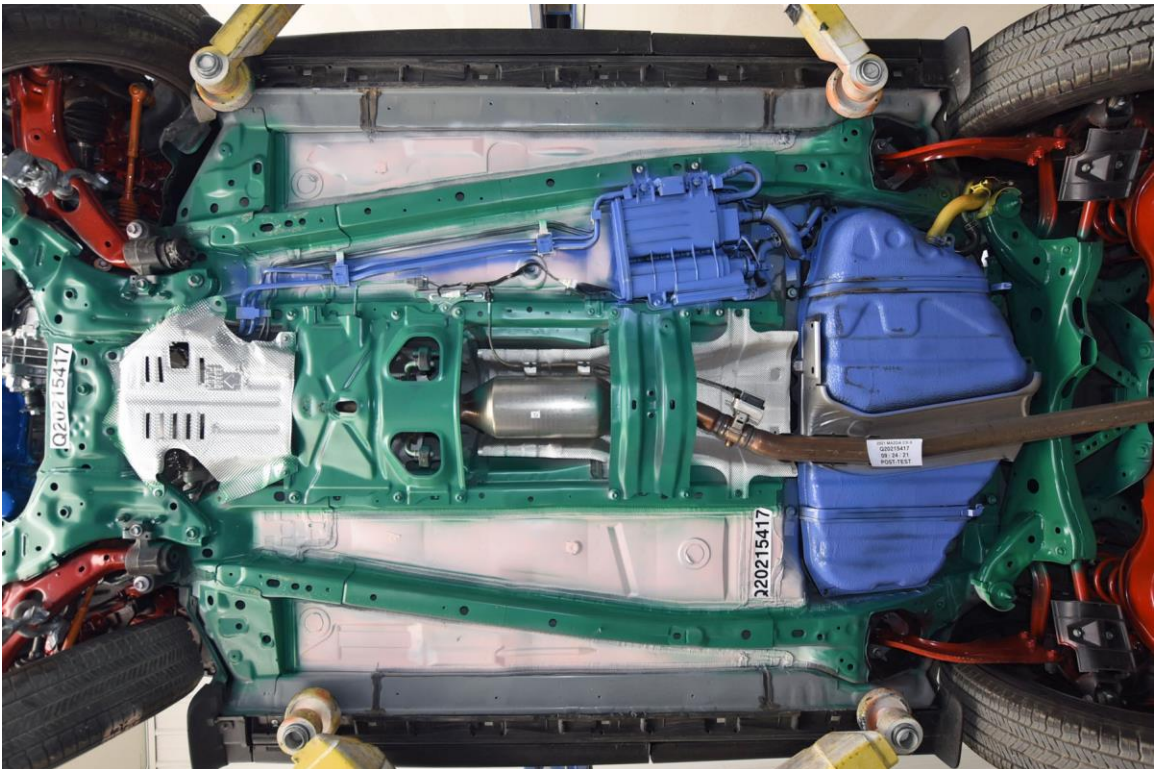


FIGURE 30. Post-Test Mid Underbody View



FIGURE 31. Pre-Test Rear Underbody View



FIGURE 32. Post-Test Rear Underbody View



FIGURE 33. Pre-Test Bumper to Rail Attachments and Crush Initiators



FIGURE 34. Post-Test Bumper to Rail Attachments and Crush Initiators

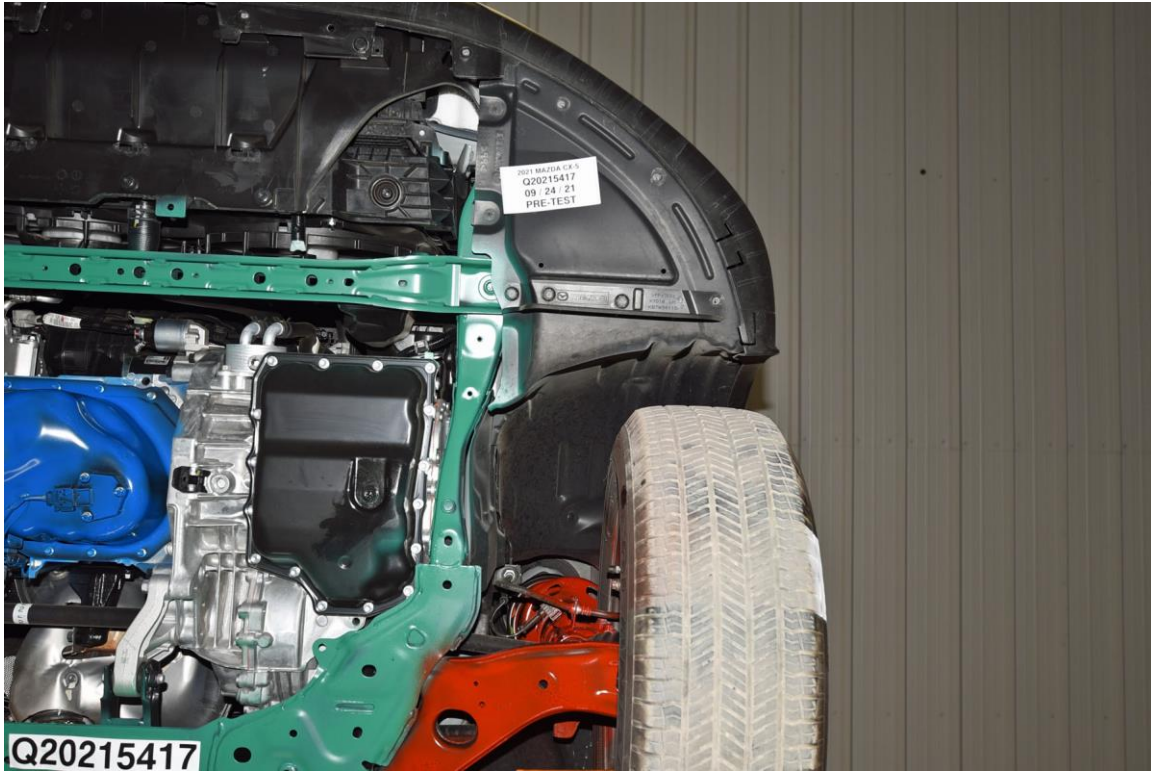


FIGURE 35. Pre-Test Driver Side Bumper to Rail Attachments and Crush Initiators



FIGURE 36. Post-Test Driver Side Bumper to Rail Attachments and Crush Initiators

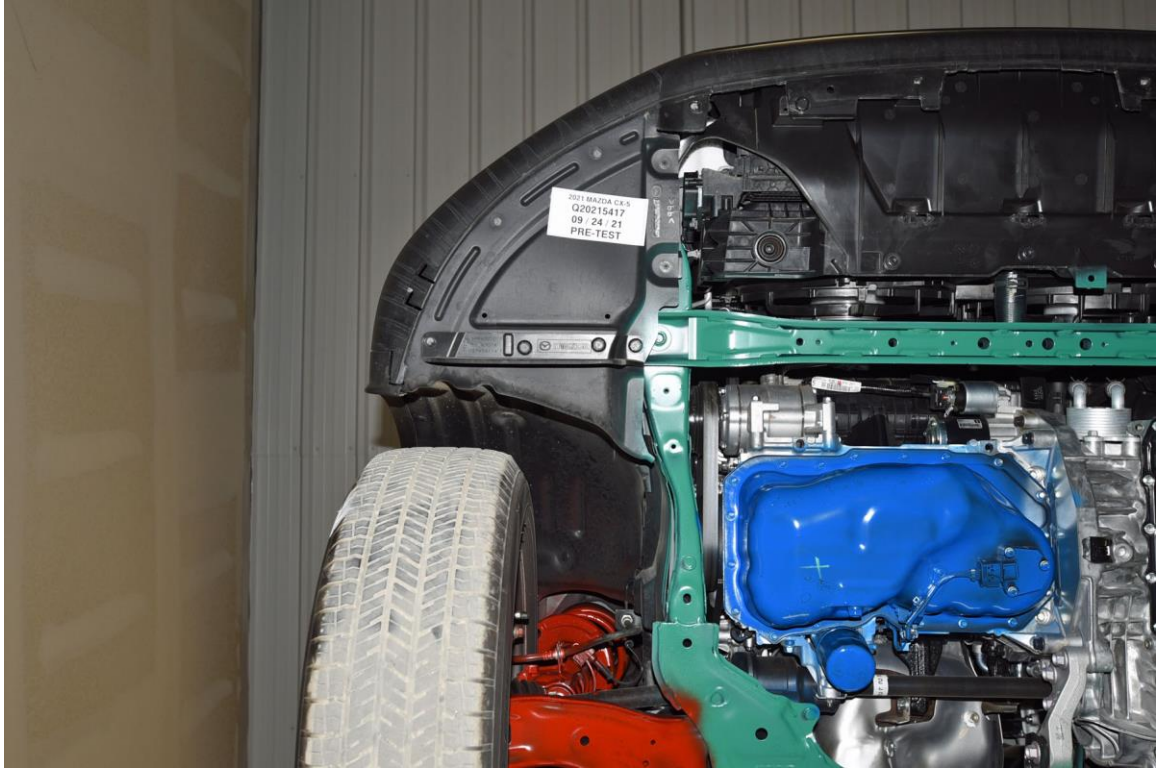


FIGURE 37. Pre-Test Passenger Side Bumper to Rail Attachments and Crush Initiators



FIGURE 38. Post-Test Passenger Side Bumper to Rail Attachments and Crush Initiators



FIGURE 39. Pre-Test Driver Side Rocker

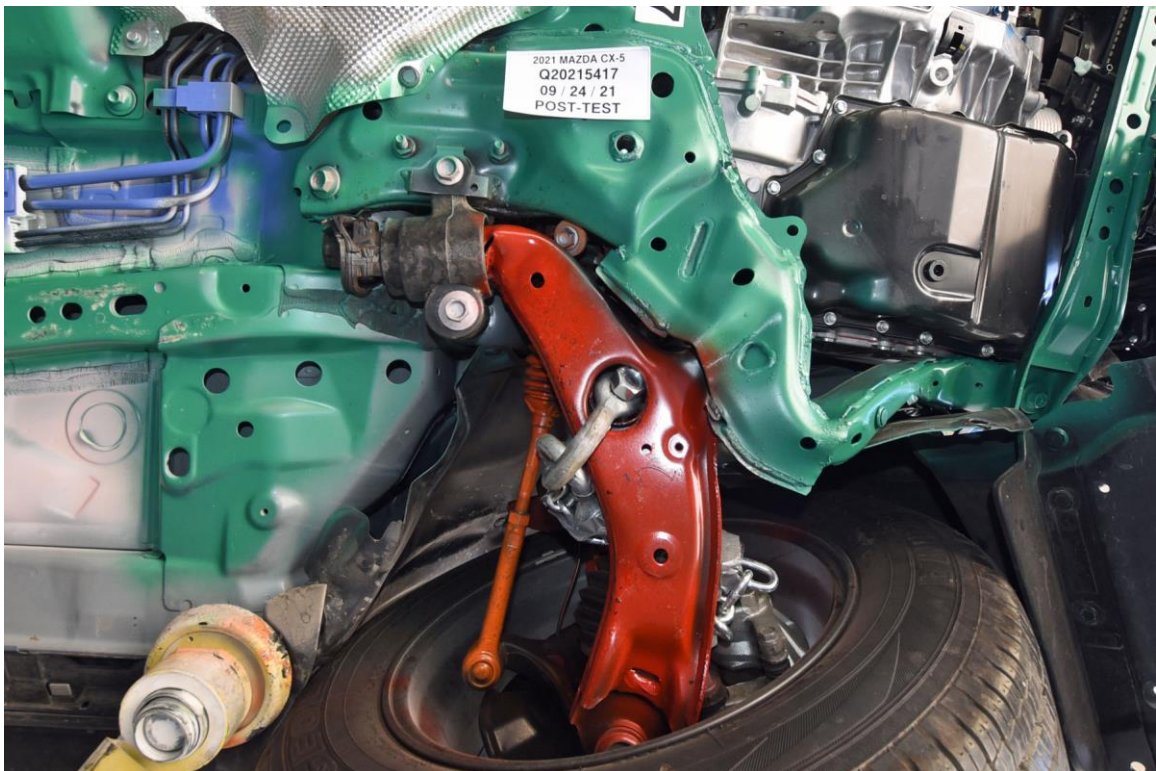


FIGURE 40. Post-Test Driver Side Rocker



FIGURE 41. Pre-Test Passenger Side Rocker

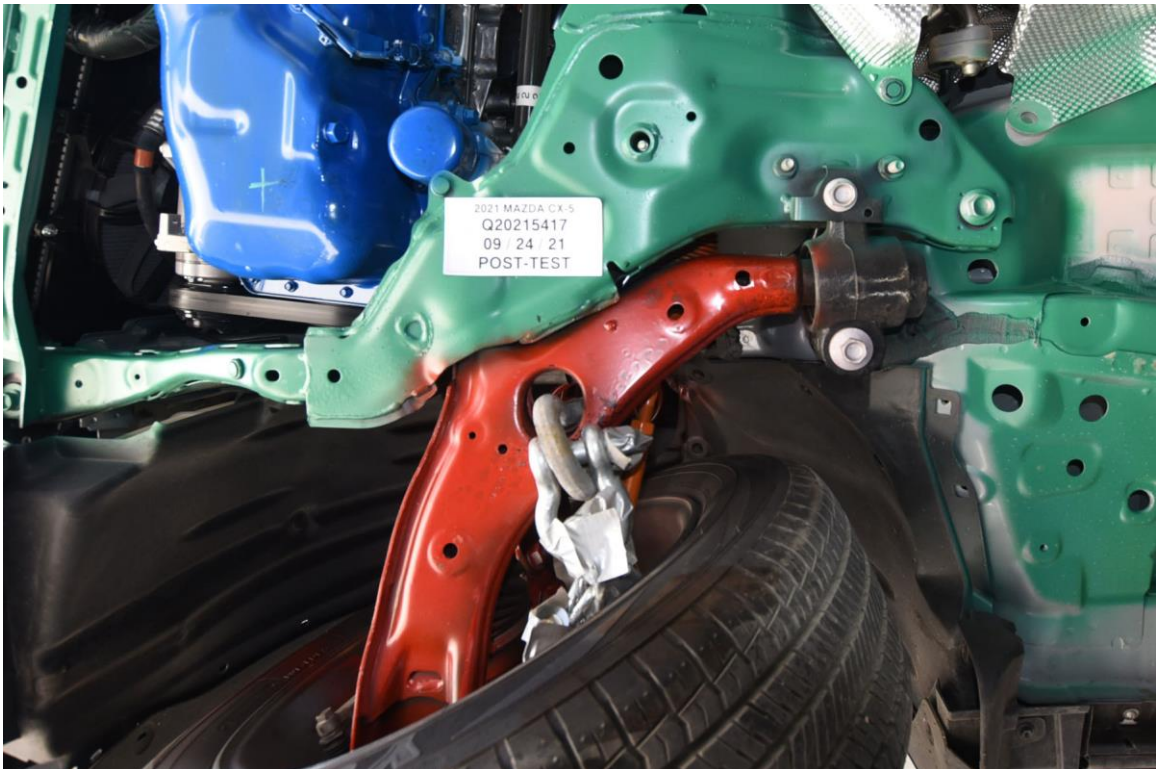


FIGURE 42. Post-Test Passenger Side Rocker



FIGURE 43. Pre-Test Driver Front Windshield View



FIGURE 44. Post-Test Driver Front Windshield View



FIGURE 45. Pre-Test Driver Side Front Window View



FIGURE 46. Post-Test Driver Side Front Window View



FIGURE 47. Pre-Test View of Driver Door Clearance



FIGURE 48. Post-Test View of Driver Door Clearance



FIGURE 49. Pre-Test Left Side View of Driver and Interior



FIGURE 50. Post-Test Left Side View of Driver and Interior

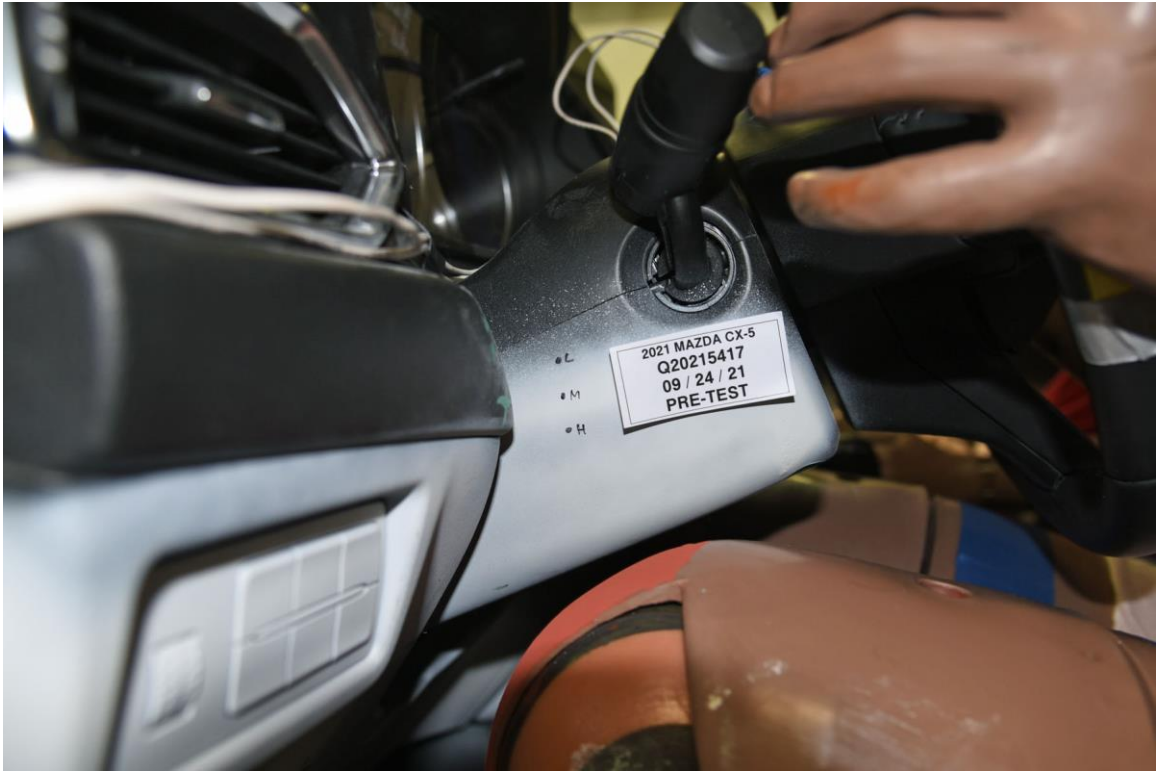


FIGURE 51. Pre-Test Left Side View of Steering Wheel Position

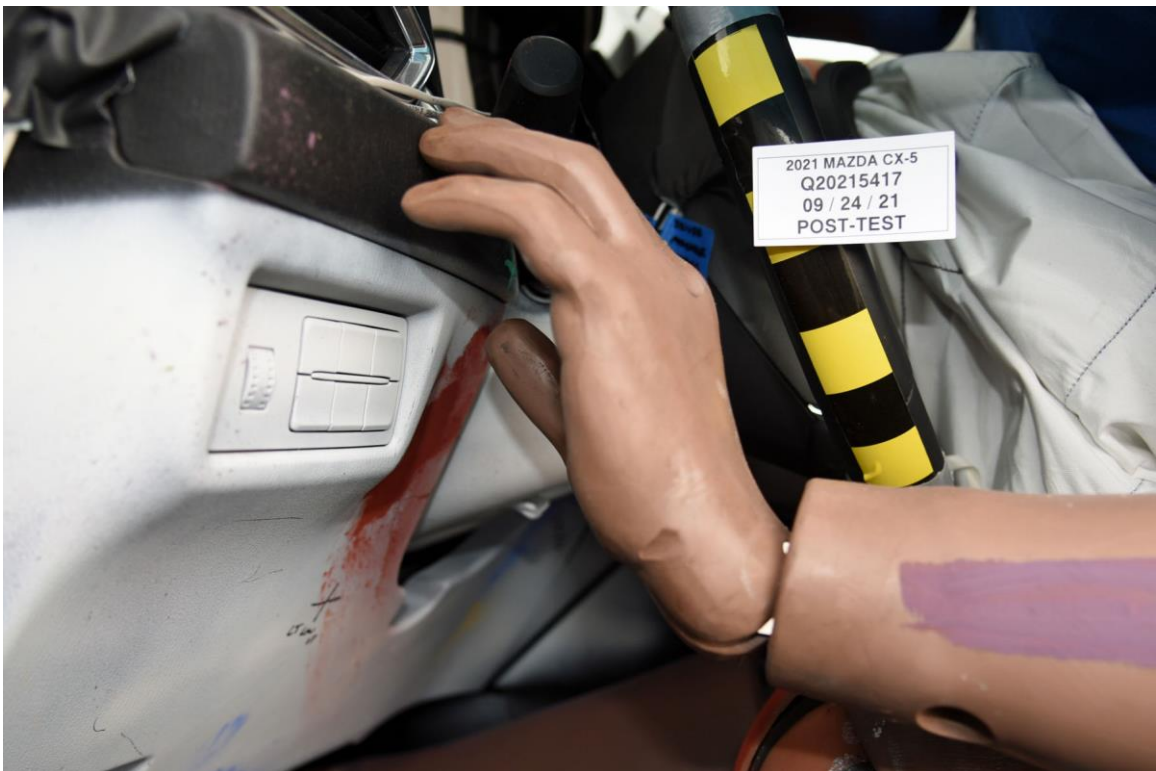


FIGURE 52. Post-Test Left Side View of Steering Wheel Position



FIGURE 53. Pre-Test Overhead View of Driver Thighs on Seat



FIGURE 54. Post-Test Overhead View of Driver Thighs on Seat



FIGURE 55. Pre-Test View of Driver Abdomen



FIGURE 56. Post-Test View of Driver Abdomen



FIGURE 57. Pre-Test Right Side View of Driver and Interior

Photograph Not Available

FIGURE 58. Post-Test Right Side View of Driver and Interior



FIGURE 59. Pre-Test View of Driver Left Knee and Bolster



FIGURE 60. Post-Test View of Driver Left Knee and Bolster

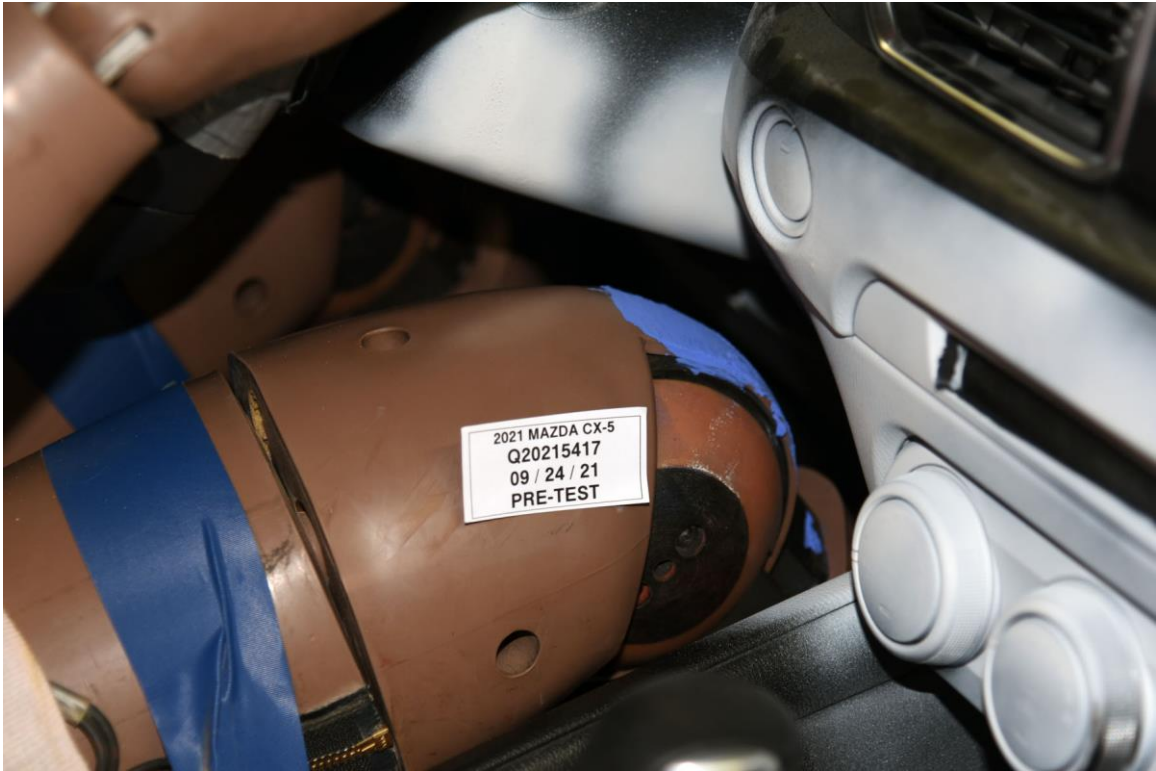


FIGURE 61. Pre-Test View of Driver Right Knee and Bolster



FIGURE 62. Post-Test View of Driver Right Knee and Bolster



FIGURE 63. Pre-Test View of the Driver Left Leg



FIGURE 64. Post-Test View of the Driver Left Leg

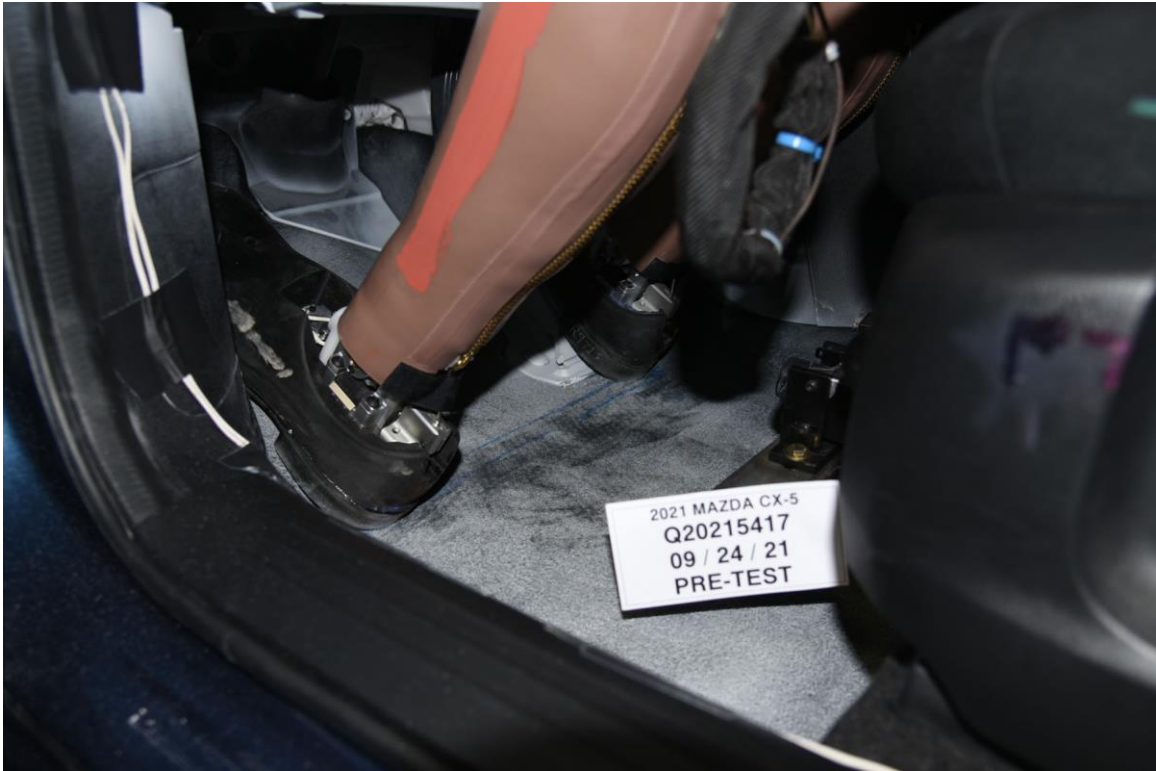


FIGURE 65. Pre-Test View of the Driver Feet



FIGURE 66. Post-Test View of the Driver Feet



FIGURE 67. Pre-Test Driver Adjustable D-Ring



FIGURE 68. Post-Test Driver Adjustable D-Ring



FIGURE 69. Pre-Test Driver Seat Fore-Aft Markings



FIGURE 70. Post-Test Driver Seat Fore-Aft Markings



FIGURE 71. Pre-Test Driver Seat Back Markings



FIGURE 72. Post-Test Driver Seat Back Markings



FIGURE 73. Pre-Test Close-Up View of Driver Door Latch



FIGURE 74. Post-Test Close-Up View of Driver Door Latch



FIGURE 75. Pre-Test Driver Inner Door Panel



FIGURE 76. Post-Test Driver Inner Door Panel



FIGURE 77. Pre-Test Left Side View of Driver Knee Bolster



FIGURE 78. Post-Test Left Side View of Driver Knee Bolster



FIGURE 79. Pre-Test Overall View of Driver Knee Bolster



FIGURE 80. Post-Test Overall View of Driver Knee Bolster



FIGURE 81. Pre-Test Right Side View of Driver Knee Bolster



FIGURE 82. Post-Test Right Side View of Driver Knee Bolster



FIGURE 83. Pre-Test View of Driver Floor Pan from Outside of Vehicle



FIGURE 84. Post-Test View of Driver Floor Pan from Outside of Vehicle



FIGURE 85. Pre-Test View of Driver Floor Pan from Top of Seat



FIGURE 86. Post-Test View of Driver Floor Pan from Top of Seat



FIGURE 87. Pre-Test View of Driver Floor Pan from Center of Vehicle



FIGURE 88. Post-Test View of Driver Floor Pan from Center of Vehicle



FIGURE 89. Post-Test Driver Dummy Contact with Front Airbag

Photograph Not Applicable

FIGURE 90. Post-Test Driver Dummy Contact with Side Airbag

Photograph Not Applicable

FIGURE 91. Post-Test Driver Dummy Contact with Knee Airbag

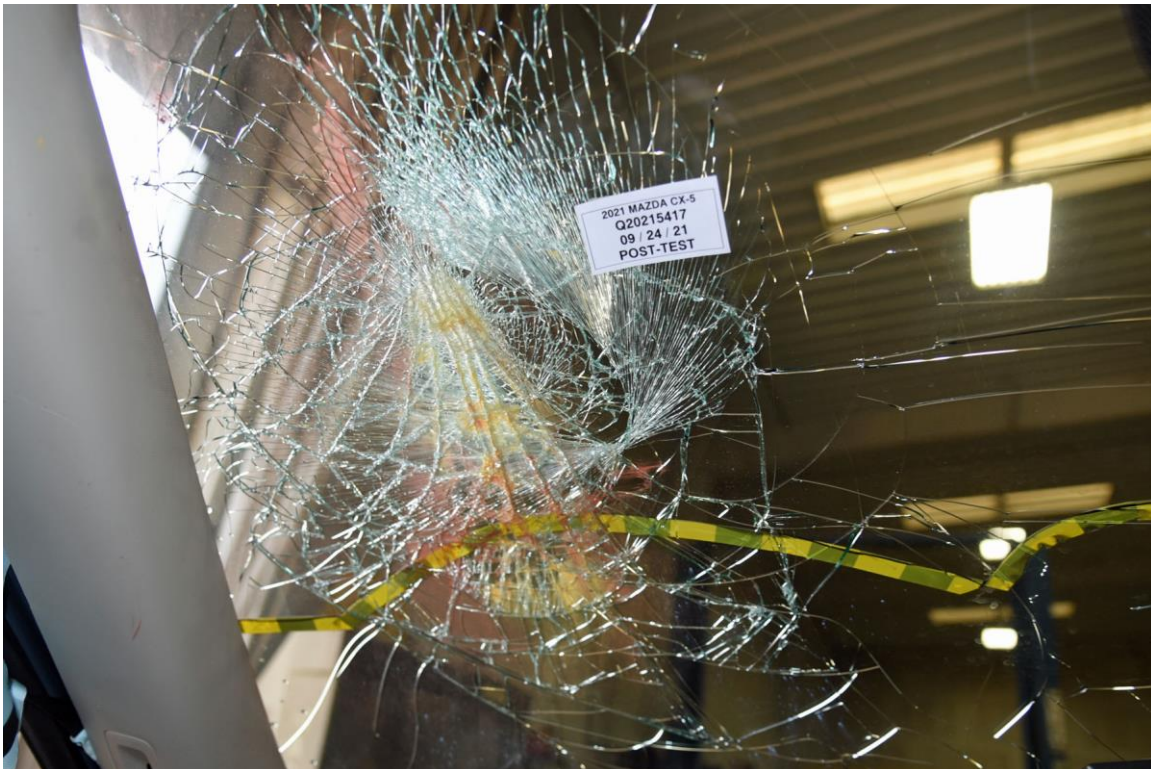


FIGURE 91a. Post-Test Driver Dummy Contact with Windshield



FIGURE 91b. Post-Test Driver Dummy Contact with Vehicle Interior



FIGURE 92. Pre-Test Passenger Front Windshield View



FIGURE 93. Post-Test Passenger Front Windshield View



FIGURE 94. Pre-Test Passenger Side Front Window View



FIGURE 95. Post-Test Passenger Side Front Window View



FIGURE 96. Pre-Test View of Passenger Door Clearance



FIGURE 97. Post-Test View of Passenger Door Clearance



FIGURE 98. Pre-Test Right Side View of Passenger and Interior



FIGURE 99. Post-Test Right Side View of Passenger and Interior



FIGURE 100. Pre-Test Overhead View of Passenger Thighs on Seat



FIGURE 101. Post-Test Overhead View of Passenger Thighs on Seat



FIGURE 102. Pre-Test View of Passenger Abdomen



FIGURE 103. Post-Test View of Passenger Abdomen



FIGURE 104. Pre-Test Left Side Passenger and Interior View



FIGURE 105. Post-Test Left Side Passenger and Interior View



FIGURE 106. Pre-Test View of Passenger Right Knee and Bolster



FIGURE 107. Post-Test View of Passenger Right Knee and Bolster



FIGURE 108. Pre-Test View of Passenger Left Knee and Bolster



FIGURE 109. Post-Test View of Passenger Left Knee and Bolster



FIGURE 110. Pre-Test View of the Passenger Feet



FIGURE 111. Post-Test View of the Passenger Feet



FIGURE 112. Pre-Test Passenger Adjustable D-Ring



FIGURE 113. Post-Test Passenger Adjustable D-Ring



FIGURE 114. Pre-Test Right Front Passenger Seat Fore-Aft Markings



FIGURE 115. Post-Test Right Front Passenger Seat Fore-Aft Markings



FIGURE 116. Pre-Test Passenger Seat Back Markings



FIGURE 117. Post-Test Passenger Seat Back Markings



FIGURE 118. Pre-Test Close-up View of Passenger Door Latch



FIGURE 119. Post-Test Close-up View of Passenger Door Latch



FIGURE 120. Pre-Test Passenger Inner Door Panel



FIGURE 121. Post-Test Passenger Inner Door Panel



FIGURE 122. Pre-Test Right Side View of Passenger Knee Bolster



FIGURE 123. Post-Test Right Side View of Passenger Knee Bolster



FIGURE 124. Pre-Test Center View of Passenger Knee Bolster



FIGURE 125. Post-Test Center View of Passenger Knee Bolster



FIGURE 126. Pre-Test Left Side View of Passenger Knee Bolster



FIGURE 127. Post-Test Left Side View of Passenger Knee Bolster



FIGURE 128. Pre-Test View of Passenger Floor Pan from Outside of Vehicle



FIGURE 129. Post-Test View of Passenger Floor Pan from Outside of Vehicle



FIGURE 130. Pre-Test View of Passenger Floor Pan from Top of Front Seat



FIGURE 131. Post-Test View of Passenger Floor Pan from Top of Front Seat



FIGURE 132. Pre-Test View of Passenger Floor Pan from Center of Vehicle



FIGURE 133. Post-Test View of Passenger Floor Pan from Center of Vehicle



FIGURE 134. Post-Test Passenger Dummy Contact with Front Airbag

Photograph Not Applicable

FIGURE 135. Post-Test Passenger Dummy Contact with Side Airbag

Photograph Not Applicable

FIGURE 136. Post-Test Passenger Dummy Contact with Knee Airbag



FIGURE 136a. Post-Test Passenger Dummy Contact with Windshield

Photograph Not Applicable

No Stoddard Solvent Spillage

FIGURE 137. Post-Test Stoddard Solvent Spillage Location View



FIGURE 138. Post-Test Speed Trap Read-Out



FIGURE 139. Vehicle at 0° on Static Rollover Device



FIGURE 140. Vehicle at 90° on Static Rollover Device

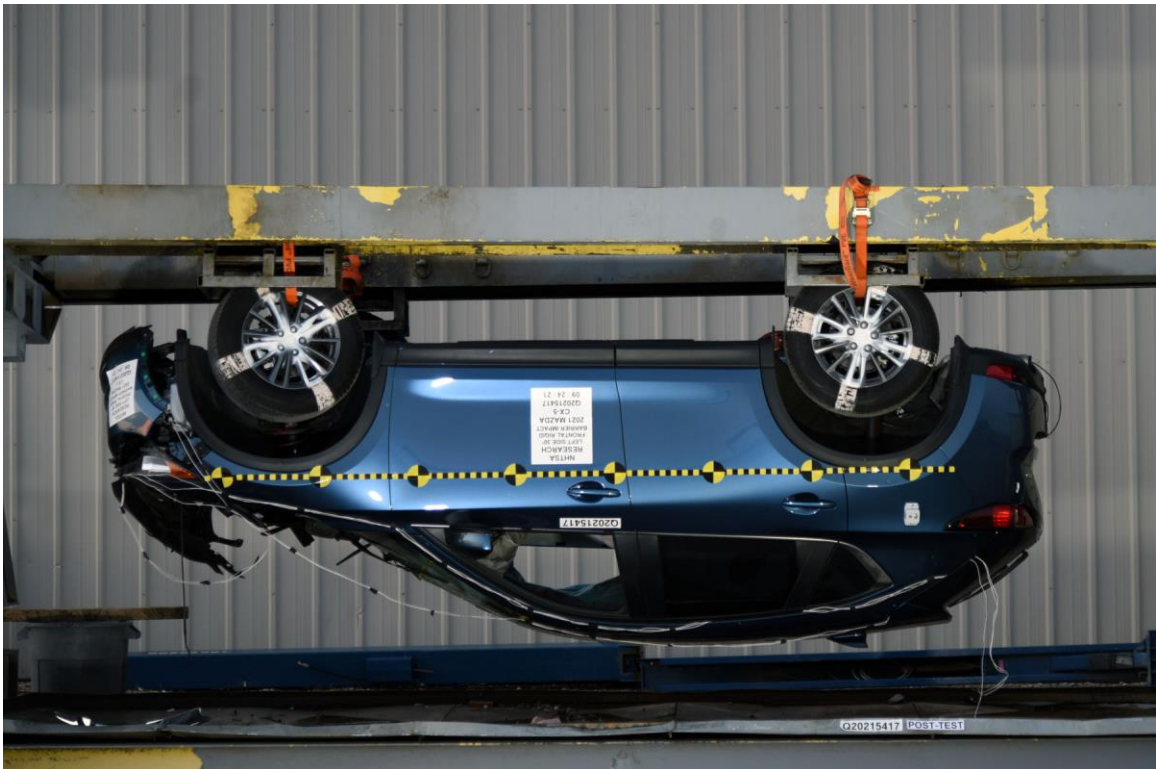


FIGURE 141. Vehicle at 180° on Static Rollover Device

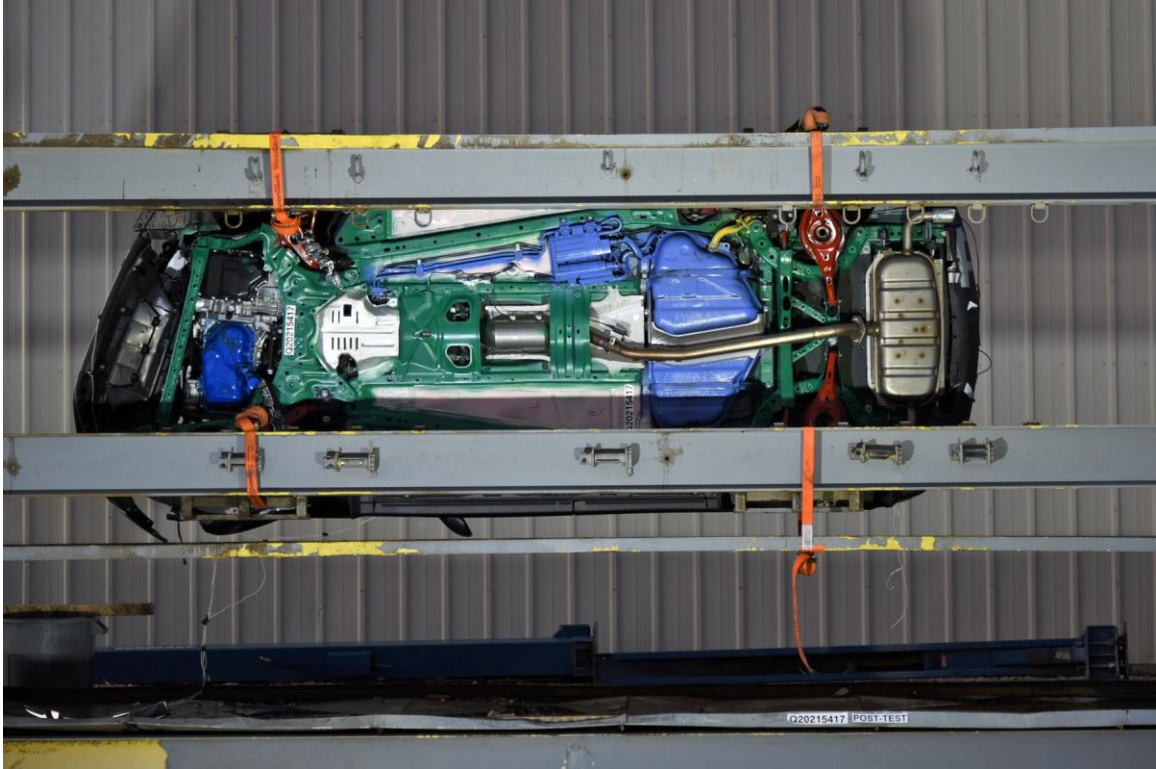




FIGURE 144. Frontal Impact Event

2021 Mazda CX-5

Model: 2021 CX-5 SPORT FWD
Exterior Color: ETHERIAL BLUE MICA
Interior Color: BLACK

Fuel Economy and Environment

28 MPG
combined city/hwy

25 city
31 highway

3.6 gallons per 100 miles

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

Annual fuel cost \$1,450

Fuel Economy & Greenhouse Gas Rating (suppose only) **6** (Best)

Smog Rating (suppose only) **7** (Best)

fuel economy.gov
Calculate personalized estimates and compare vehicles

PARTS CONTENT INFORMATION:

FOR VEHICLES IN THIS COUNTRY, U.S. CANADIAN PARTS CONTENT OF MAJOR SOURCE OF FOREIGN PARTS CONTENT JAPAN 65%.

NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

FOR THIS VEHICLE:
FINAL ASSEMBLY POINT: HIROSHIMA, JAPAN
COUNTRY OF ORIGIN: JAPAN
TRANSMISSION: JAPAN

This label is affixed pursuant to the Federal Automobile Discount Act, Gasoline, License and Title fees, State and Local taxes, and Dealer installed options are not included.

STANDARD EQUIPMENT

ENGINE/MECHANICAL FEATURES

- SKYACTIV G 2.5L ENGINE
- 187 HORSEPOWER, 181 LB.-FT. TORQUE
- SKYACTIV-DRIVE 6SPD SPORT MODE AT
- FRONT VENTILATED DISC BRAKES
- REAR SOLID DISC BRAKES

EXTERIOR FEATURES

- 17-INCH ALLOY WHEELS
- P225/65R17 ALL-SEASON TIRES
- RAIN-SENSING WINDSHIELD WIPERS
- FUSED-INTERMITTENT REAR WIPER
- BODY-COLORED REAR ROOF SPOILER
- POWER SIDE MIRRORS WITH TURN LAMPS

INTERIOR FEATURES

- 8-PASSENGER SEATING
- CLOTH-TRIMMED SEATS
- 8-WAY MANUAL DRIVER'S SEAT
- LEATHER-WRAPPED STEERING WHEEL
- LEATHER-TRIMMED SHIFT KNOB
- POWER AUTOMATIC DOOR LOCKS
- POWER WINDOW/DOOR KEYLESS ENTRY
- ELECTRONIC PARKING BRAKE
- REMOTE KEYLESS ENTRY
- PUSH BUTTON ENGINE START
- REARVIEW CAMERA
- MAZDA CONNECTED SERVICES CAPABLE

SAFETY AND SECURITY FEATURES

- 6-MODE ABS WITH 10-SPD BRAKE-ASSIST
- 360° MI BUMPER-TO-BUMPER WARRANTY
- 24-HOUR ROADSIDE ASSISTANCE
- 5-PASSENGER 3-POINT SAFETY BELTS
- LATCH CHILD SAFETY SEAT ANCHORS
- ANTI-LOCK BRAKE SYSTEM
- LANE DEVIATION MONITORING SYSTEM
- BLIND SPOT MONITORING
- LANE DEVIATION MONITORING SYSTEM
- LANE KEEP ASSIST
- REAR CROSS TRAFFIC ALERT

ADDITIONAL FEATURES

- INDEPENDENT FRONT/REAR SUSPENSION
- FRONT & REAR STABILIZER BARS
- ELECTRIC POWER ASSISTED STEERING
- FRONT WHEEL DRIVE
- G-VECTORING CONTROL PLUS
- LED HEADLIGHTS W/ AUTO ON/OFF
- DAYTIME RUNNING LIGHTS
- HIGH BEAM CONTROL
- ROOF MOUNTED SHARKFIN ANTENNA
- BRIGHT FINISH EXHAUST OUTLETS
- 10.25" COLOR DISPLAY
- MULTI-FUNCTION COMMANDER CONTROL
- MID WITH TRIP COMPUTER
- AIR CONDITIONING
- AM/FM/HD & SATELLITE RADIO
- BLUETOOTH HANDS-FREE PHONE/AUDIO
- AUX JACK / 2 USB INPTS
- CENTER ARMREST W/ COVERED STORAGE
- 60/40 SPLIT FOLD-DOWN REAR SEAT
- DUAL COVERED VANITY MIRRORS
- CARPETED FLOOR MATS
- ANDROID AUTO™ / APPLE CARPLAY™

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score ★★★★★
Based on the combined ratings of frontal, side and rollover.
Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash ★★★★★
Driver Passenger
Based on the risk of injury in a frontal impact.
Should ONLY be compared to other vehicles of similar size and weight.

Side Crash ★★★★★
Front seat Rear seat
Based on the risk of injury in a side impact.

Rollover ★★★★★
Based on the risk of rollover in a single vehicle crash.

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest.
Source: National Highway Traffic Safety Administration (NHTSA)
www.safercar.gov or 1-888-327-4235

MSRP \$25,370

Total Vehicle and Options \$25,370
Delivery, Processing and Handling Fee \$1,175

Total MSRP \$26,545

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FIGURE 145. Monroney Label Photograph

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA TRACES
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TABLE OF DATA PLOTS

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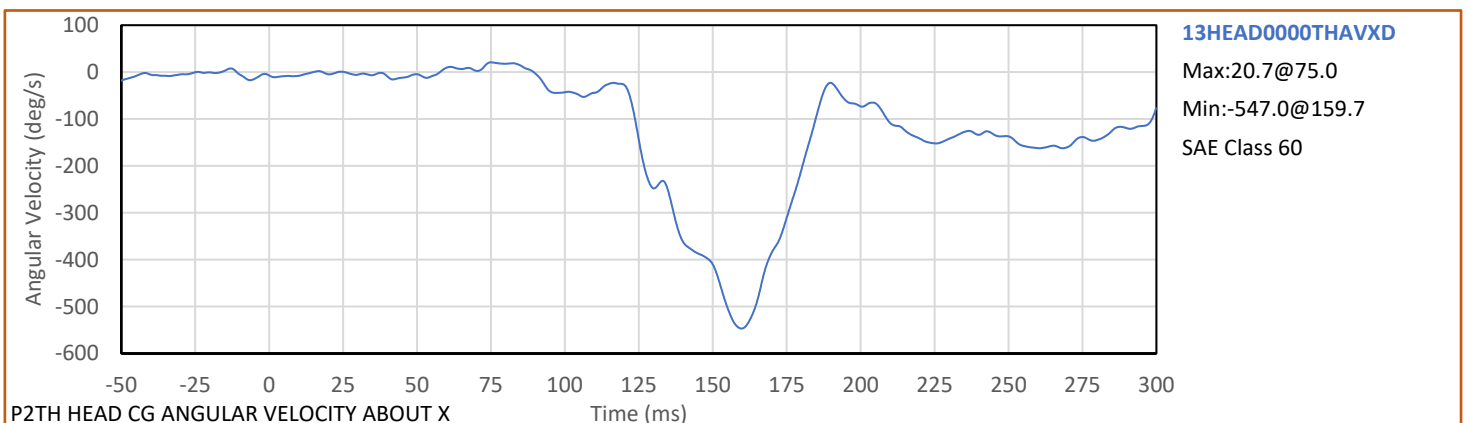
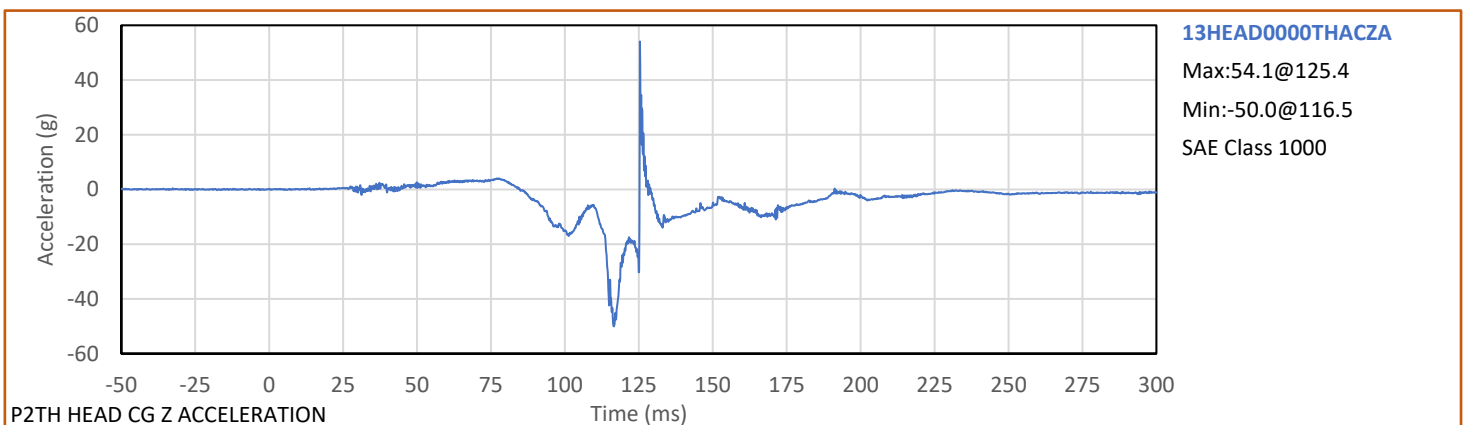
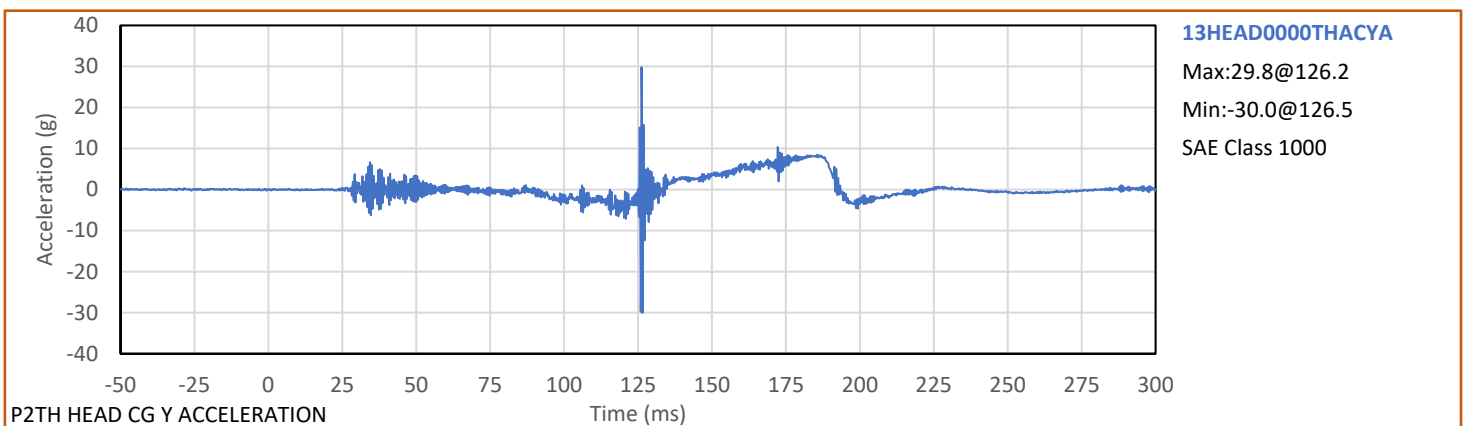
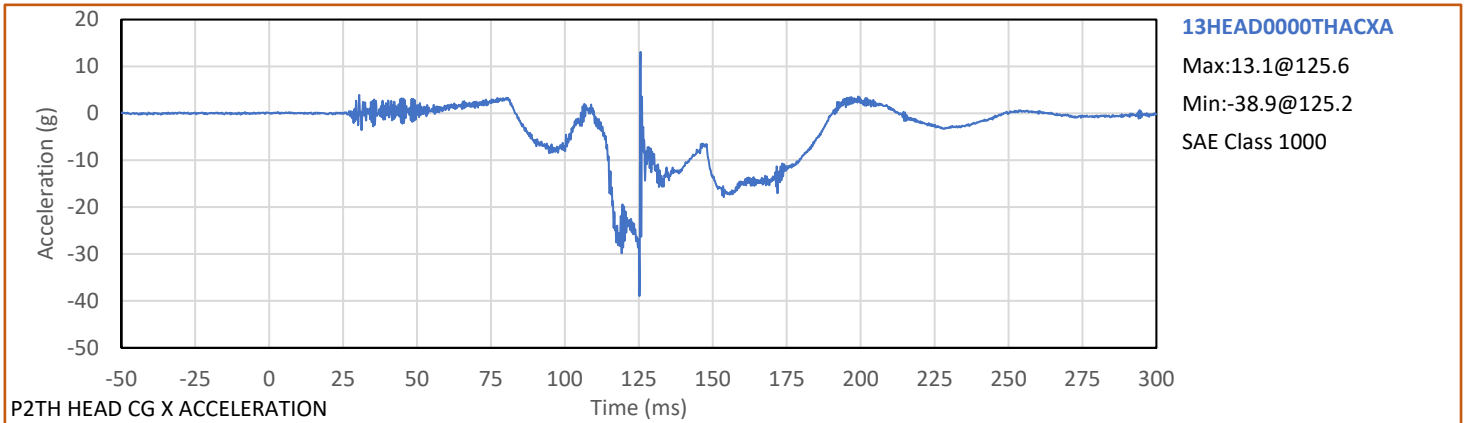
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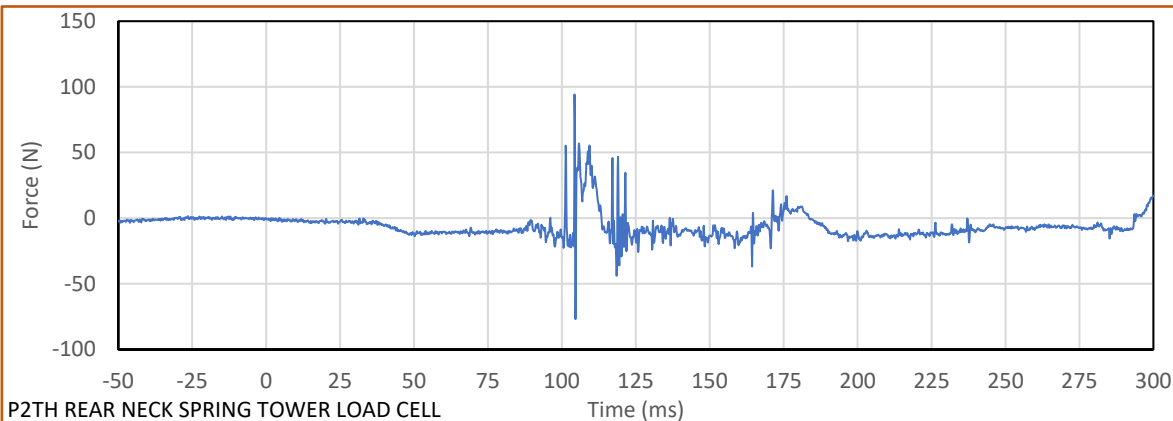
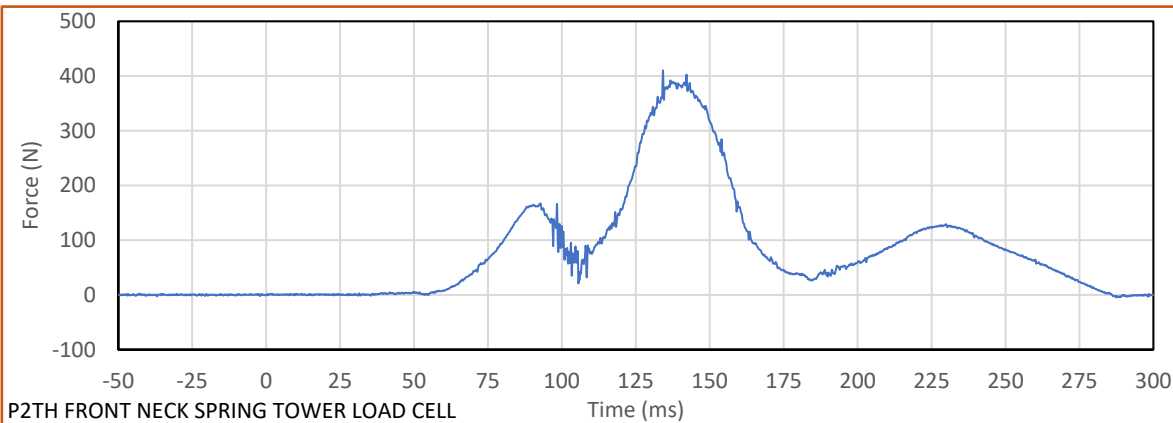
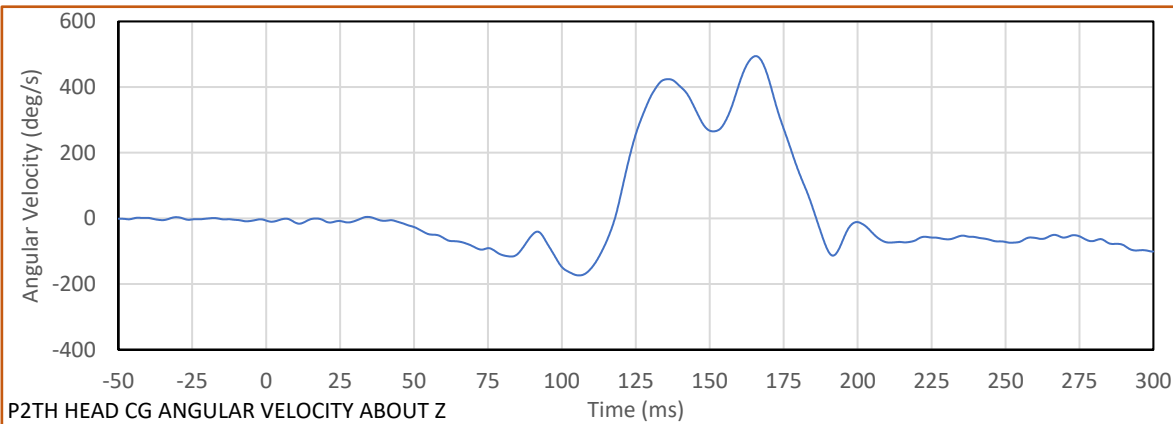
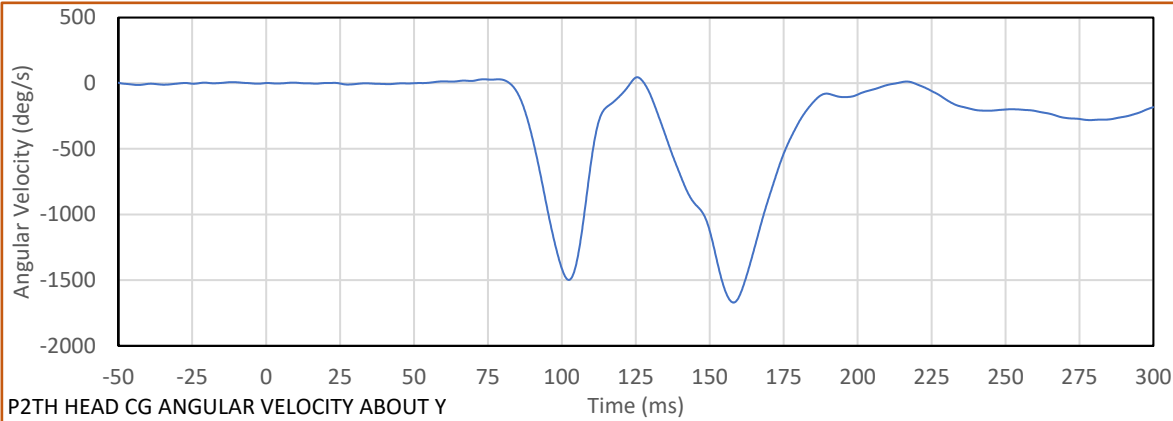
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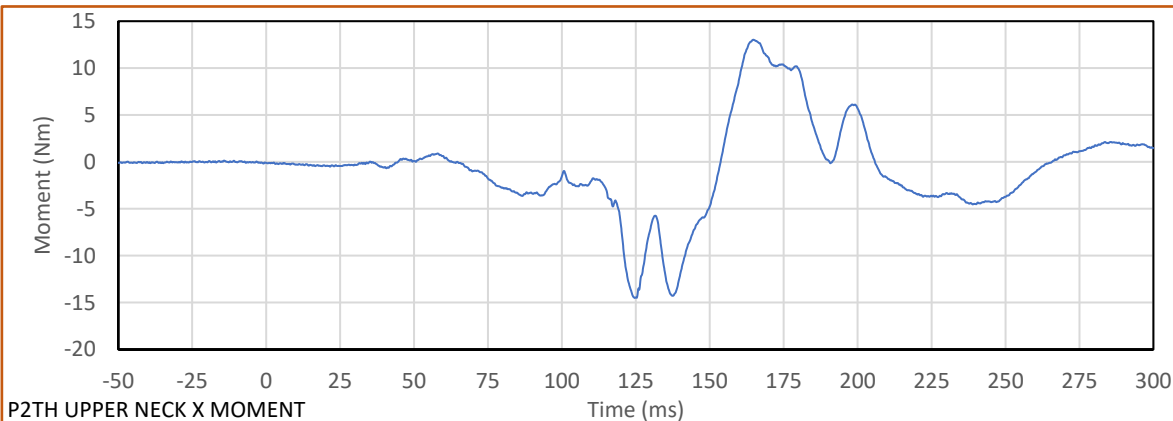
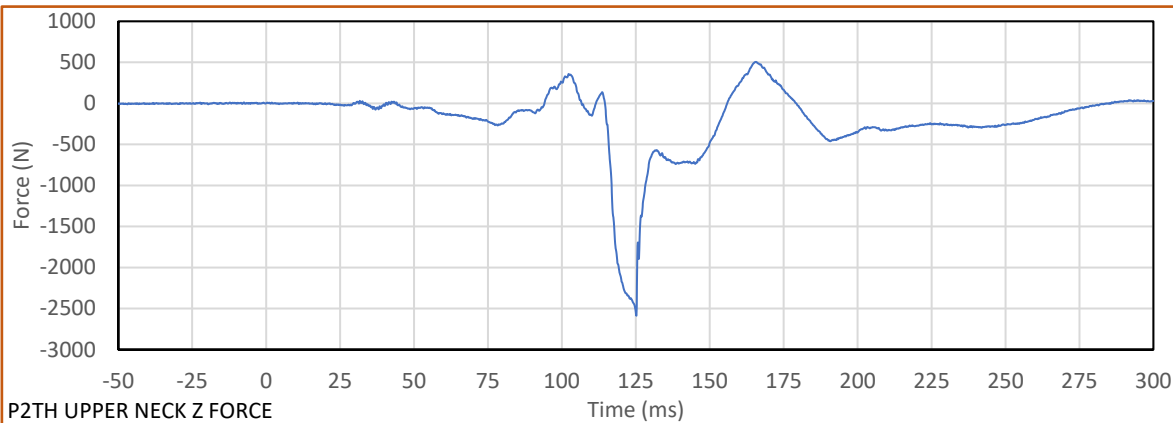
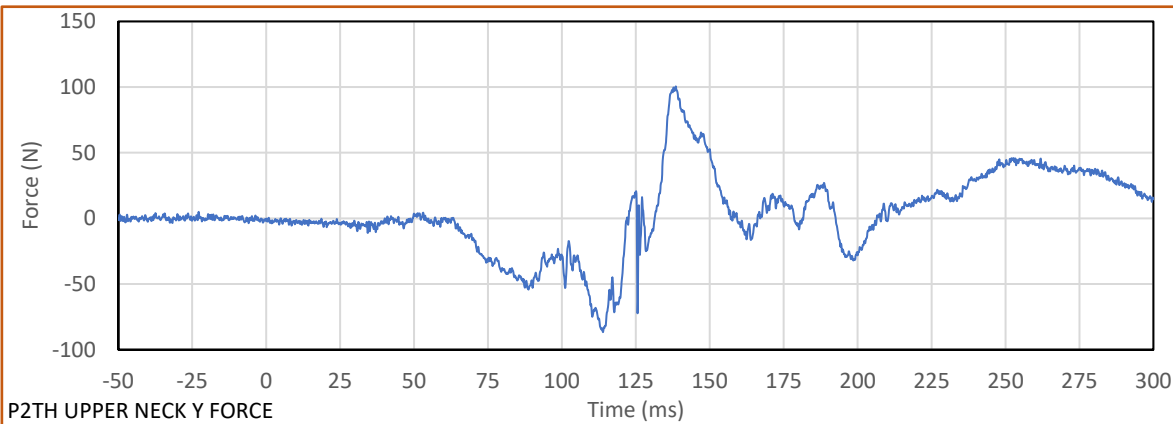
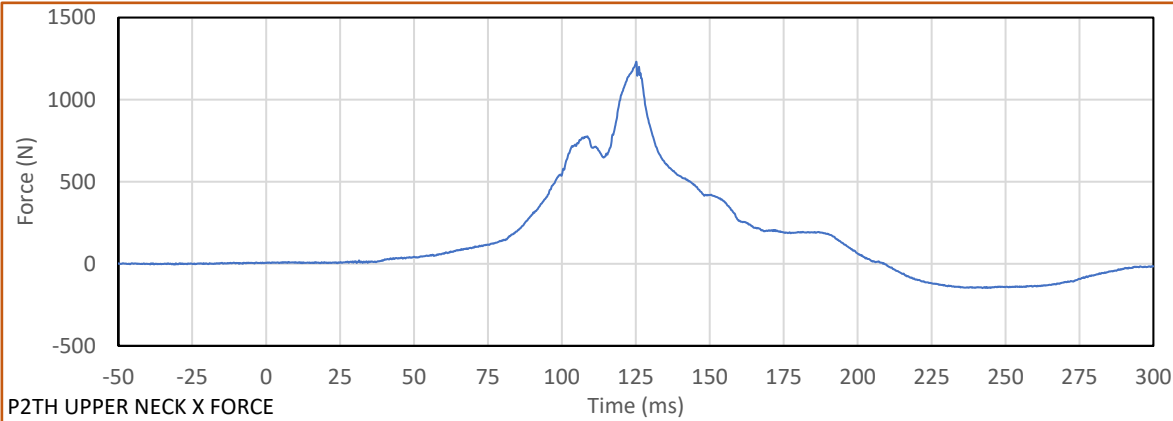
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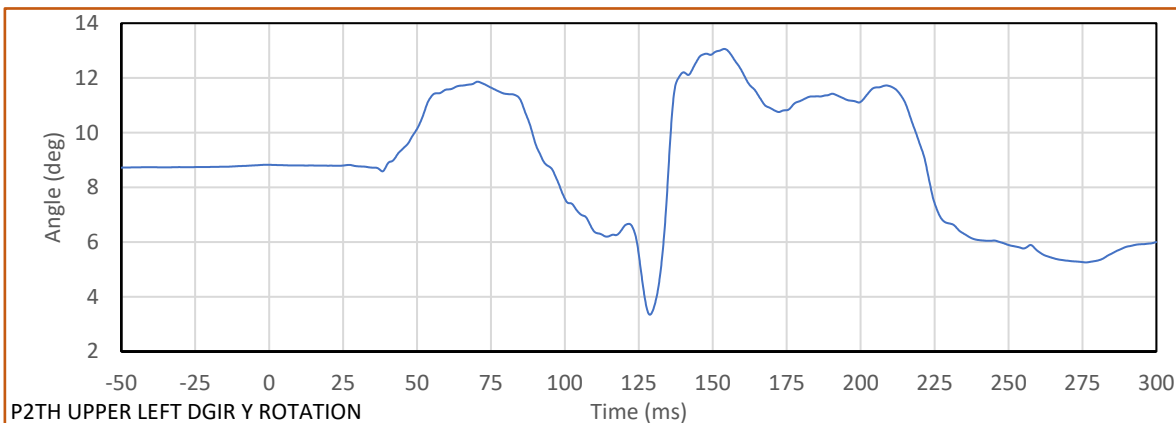
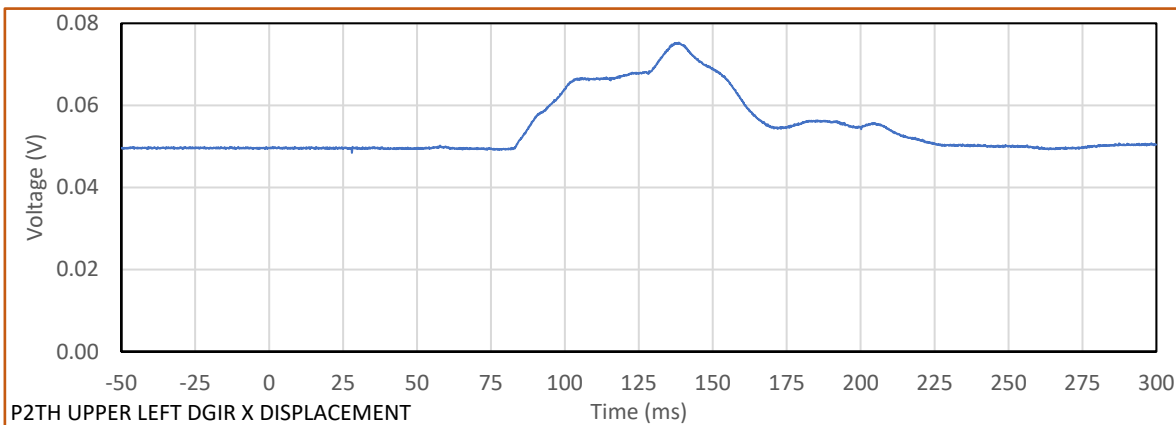
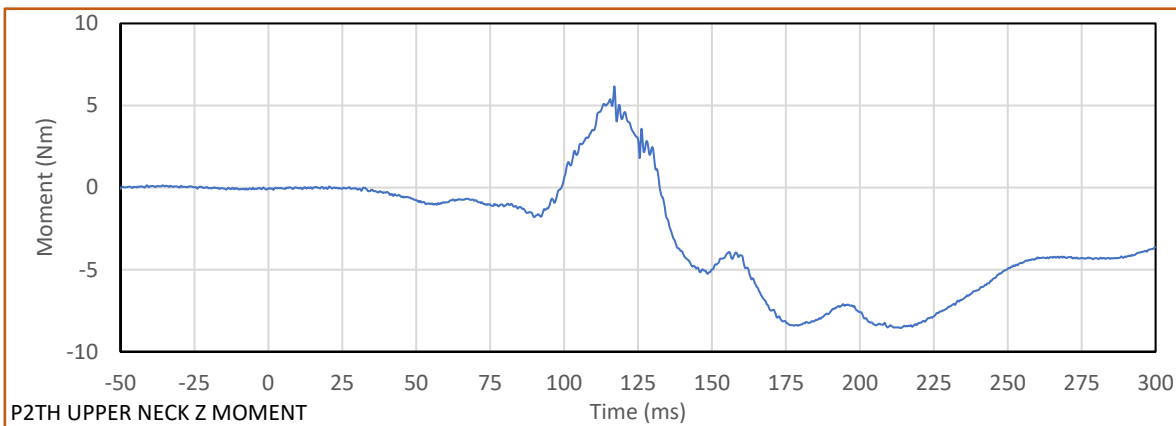
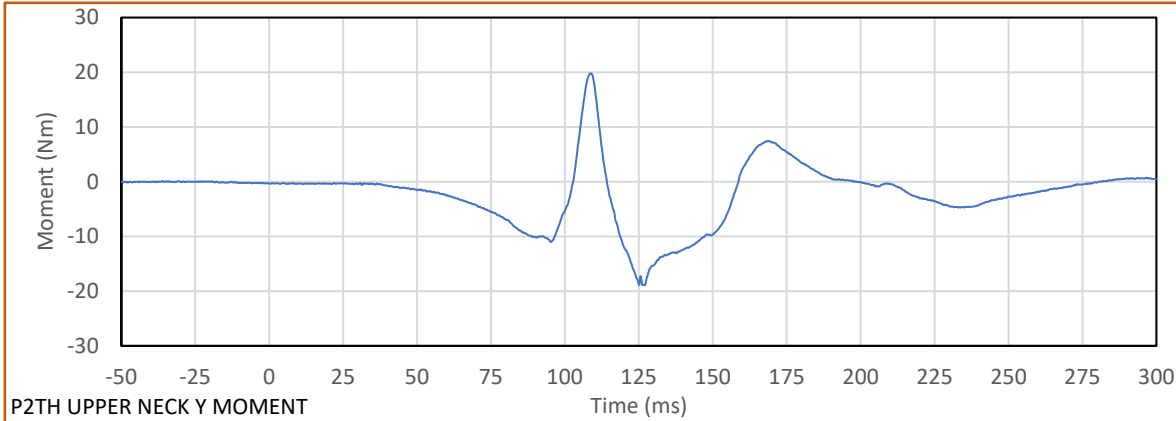
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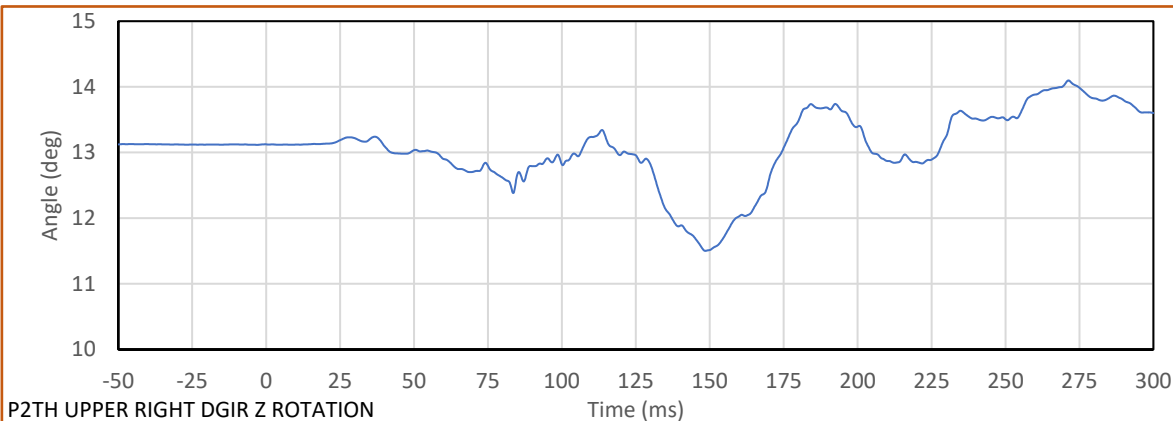
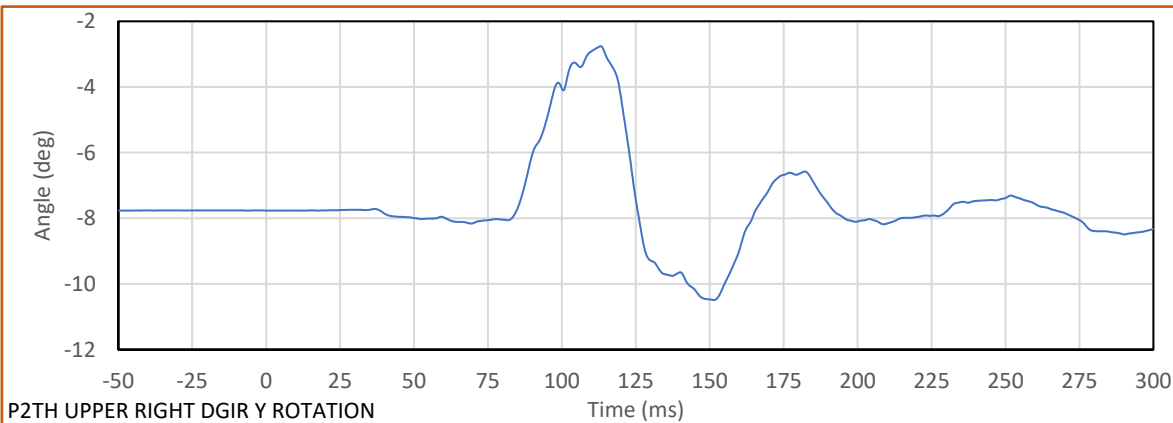
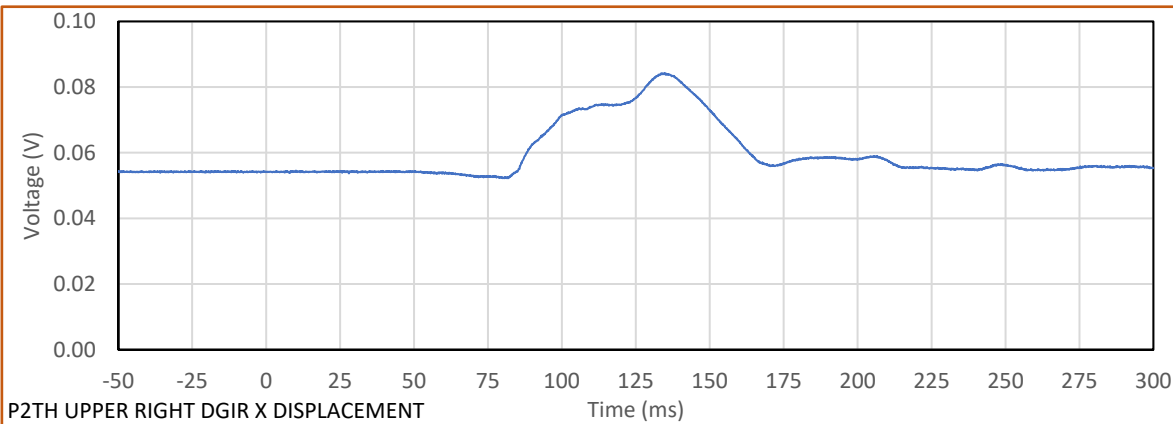
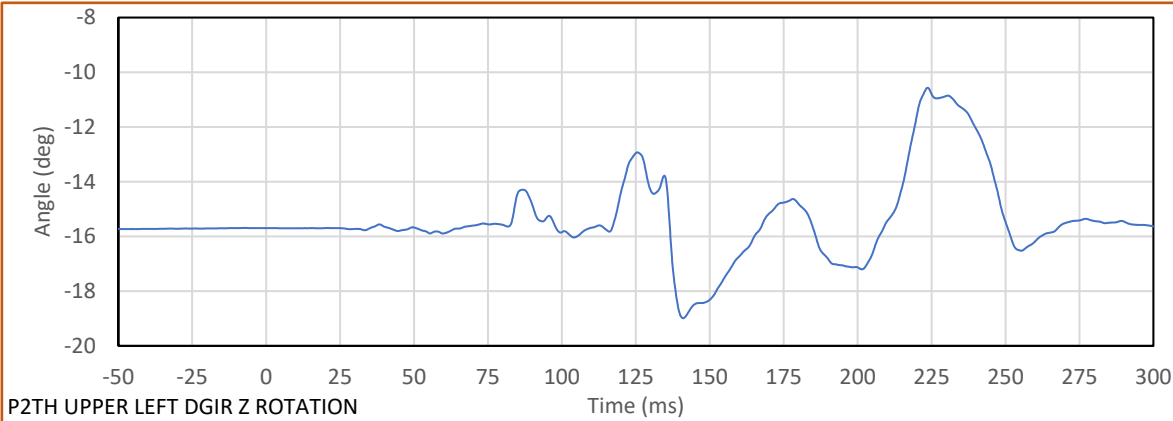
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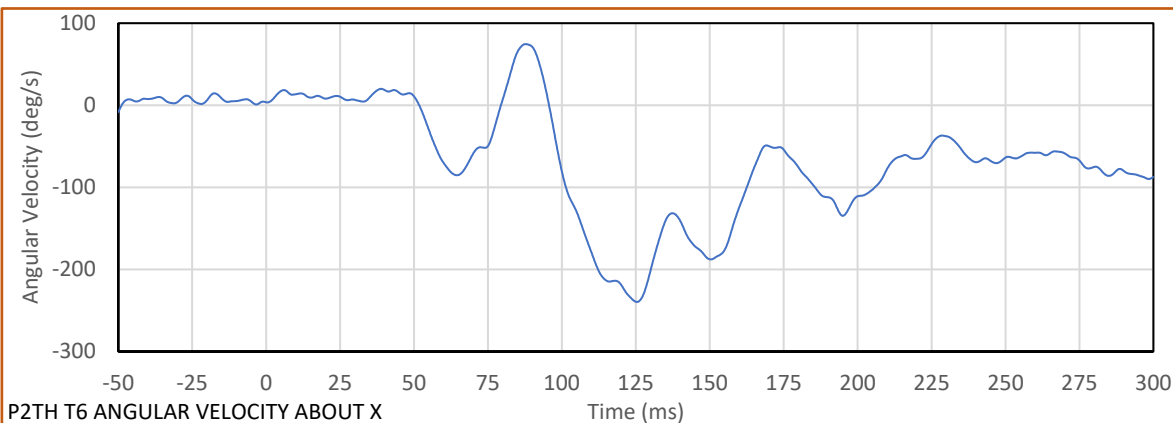
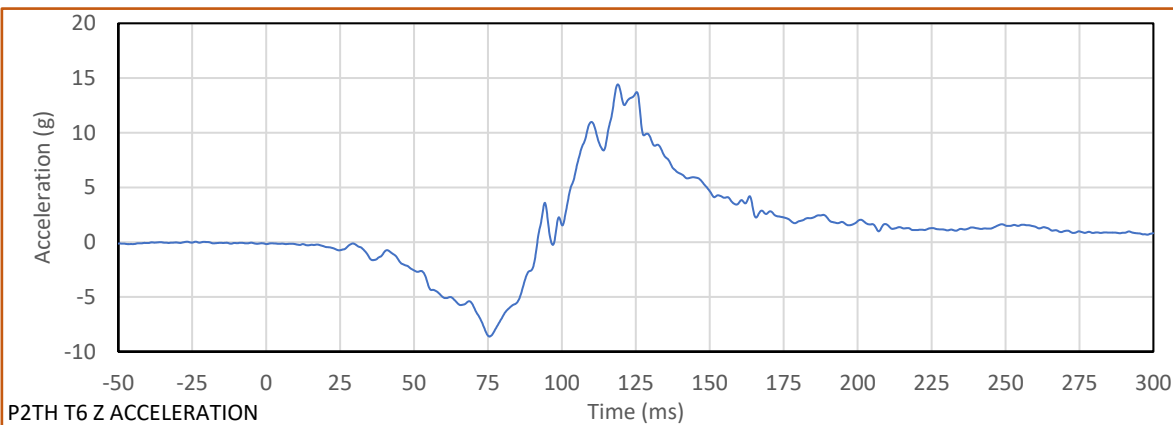
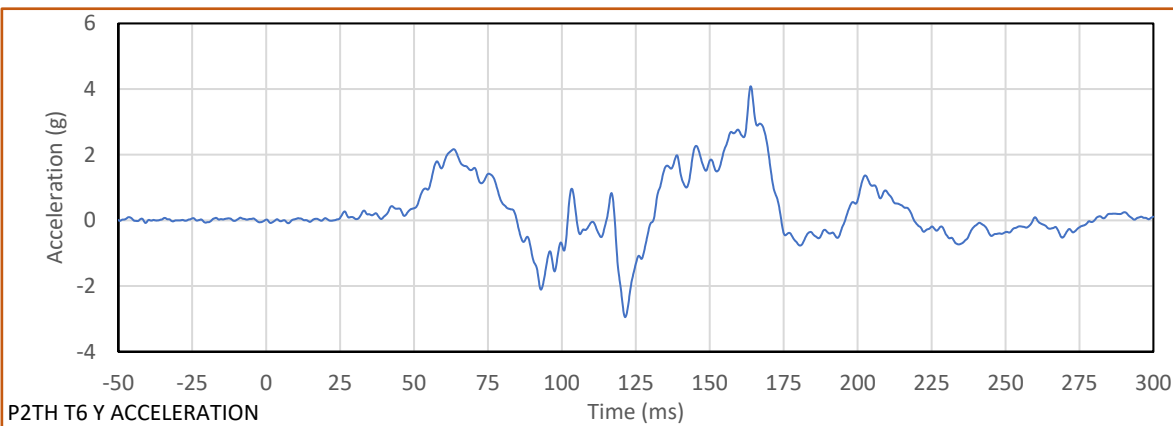
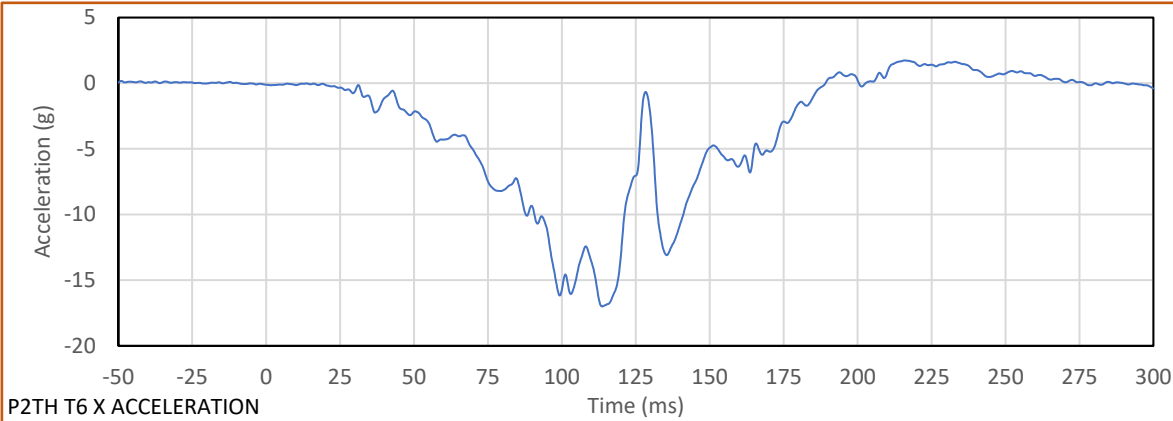


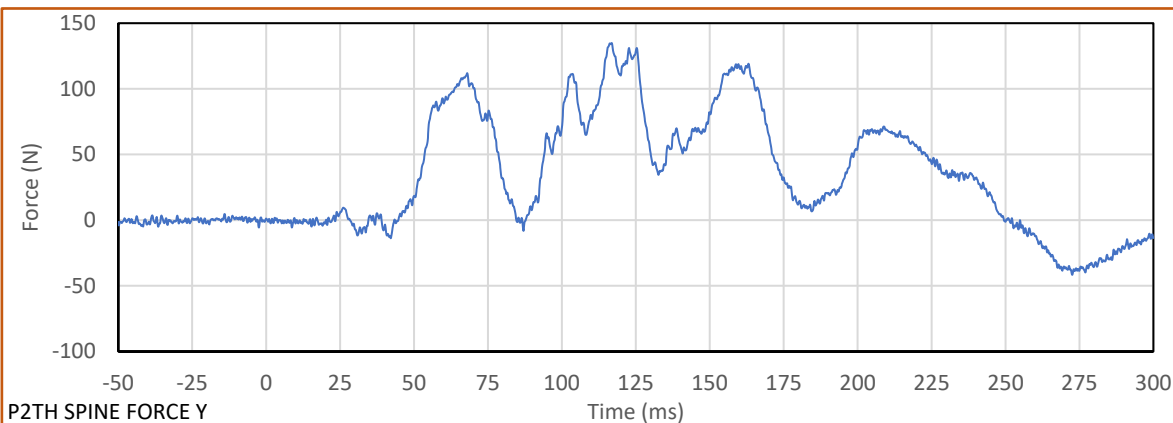
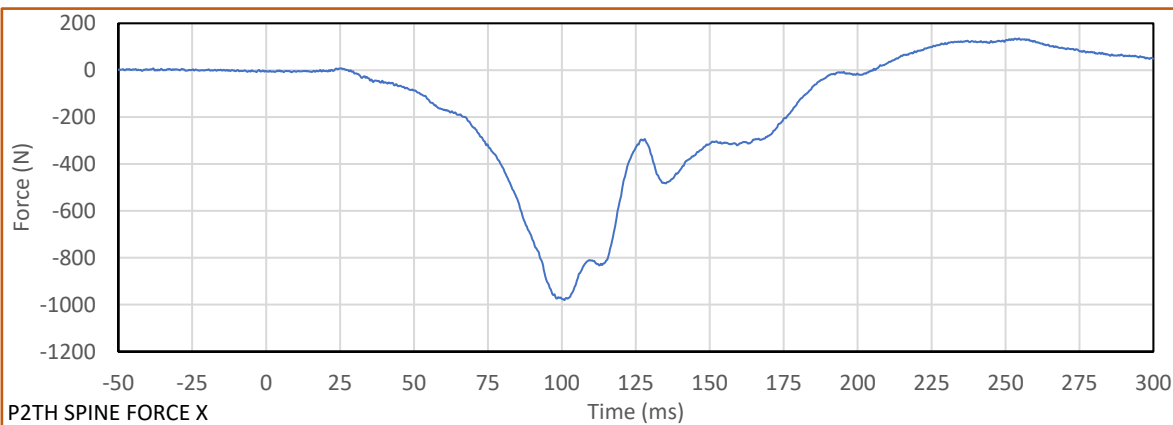
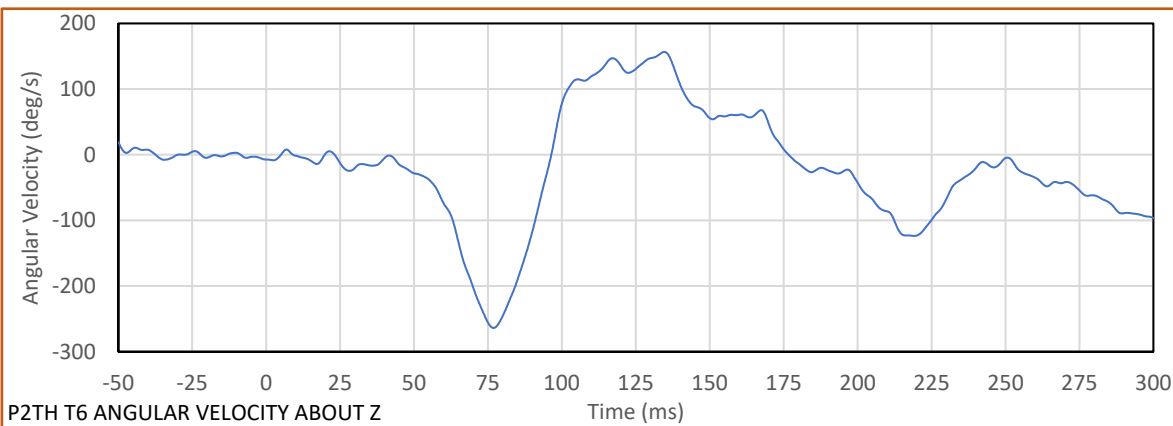
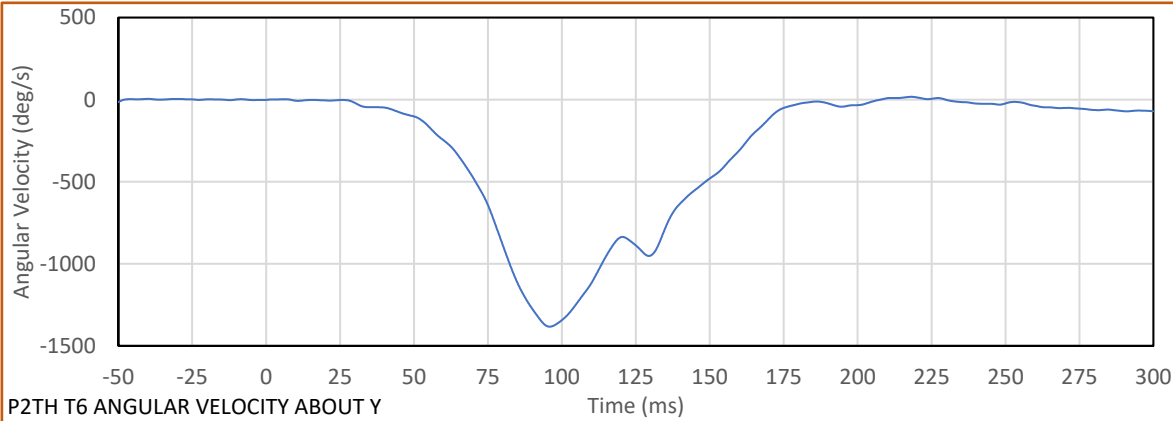


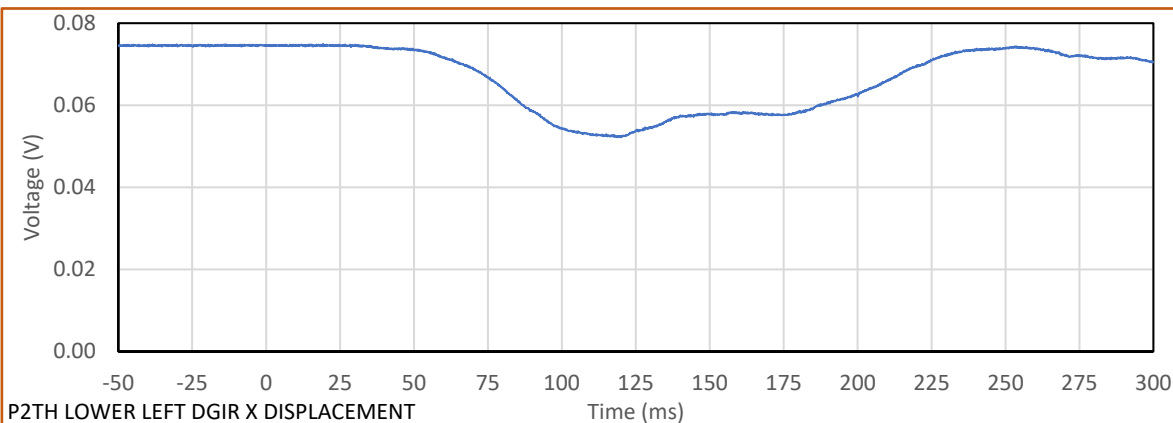
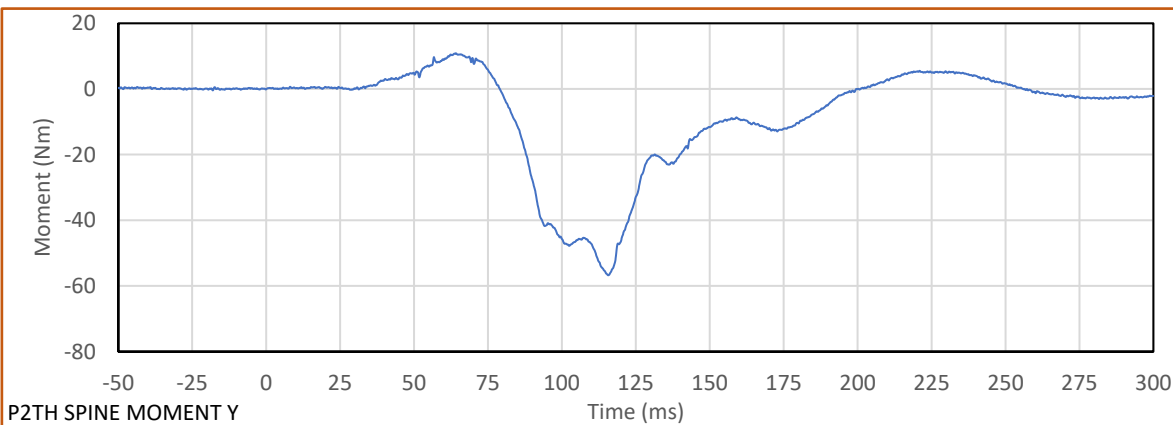
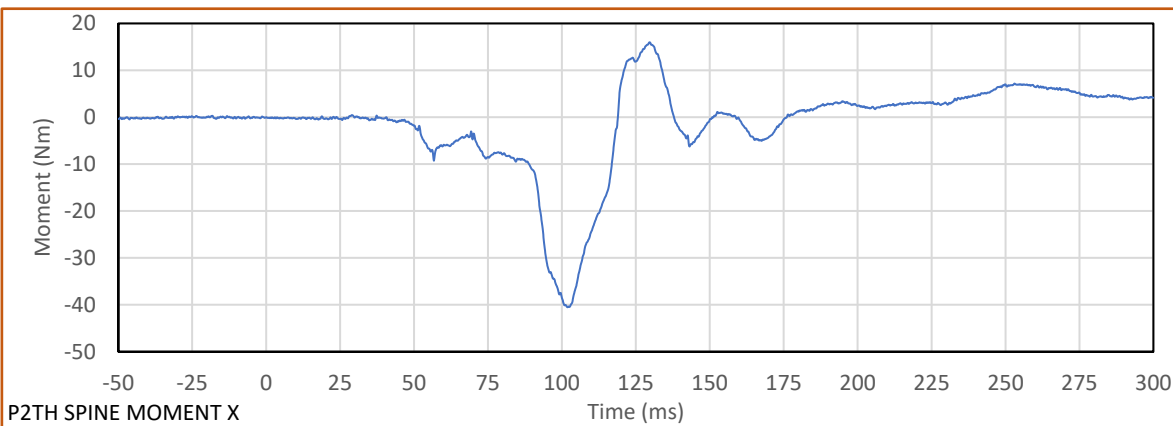
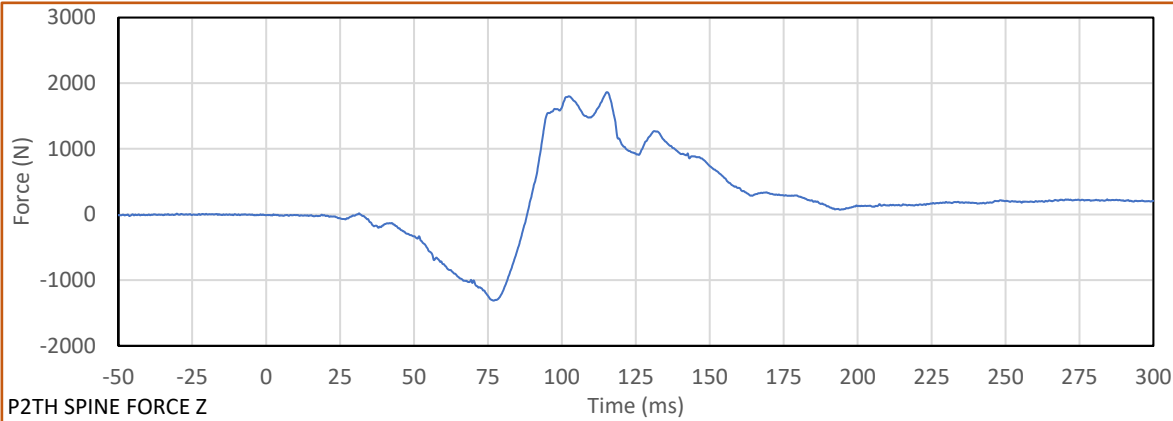


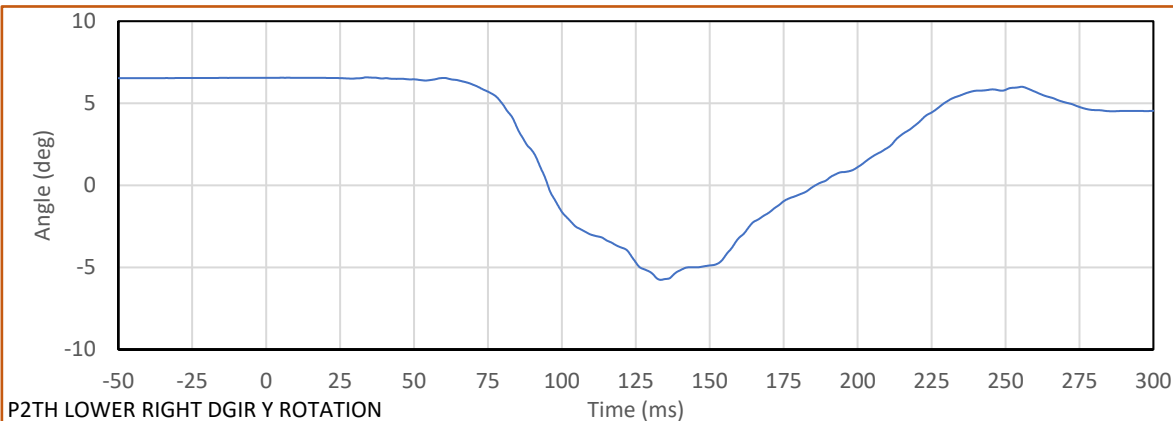
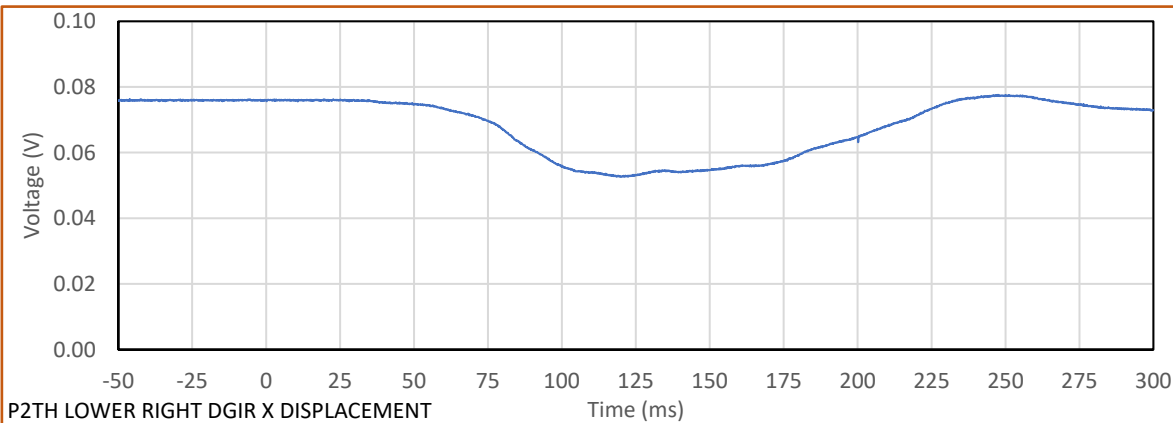
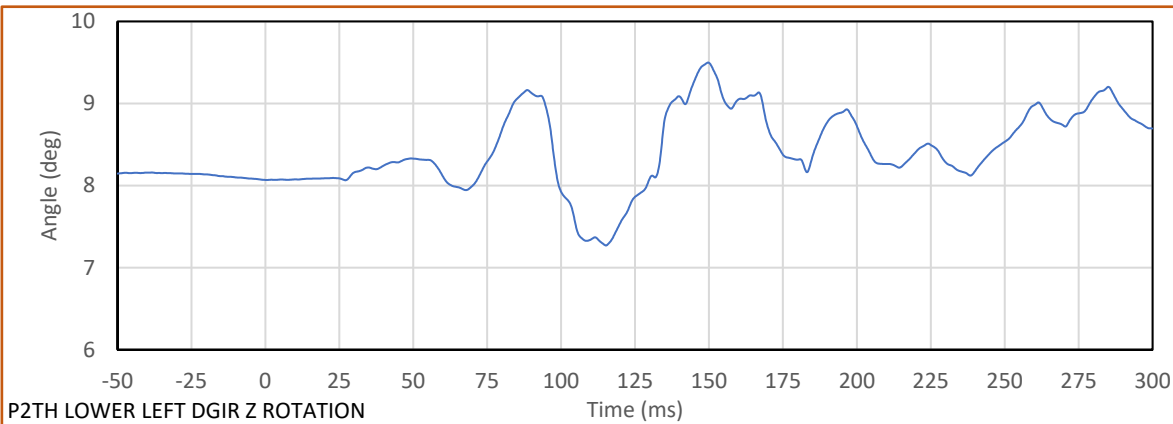
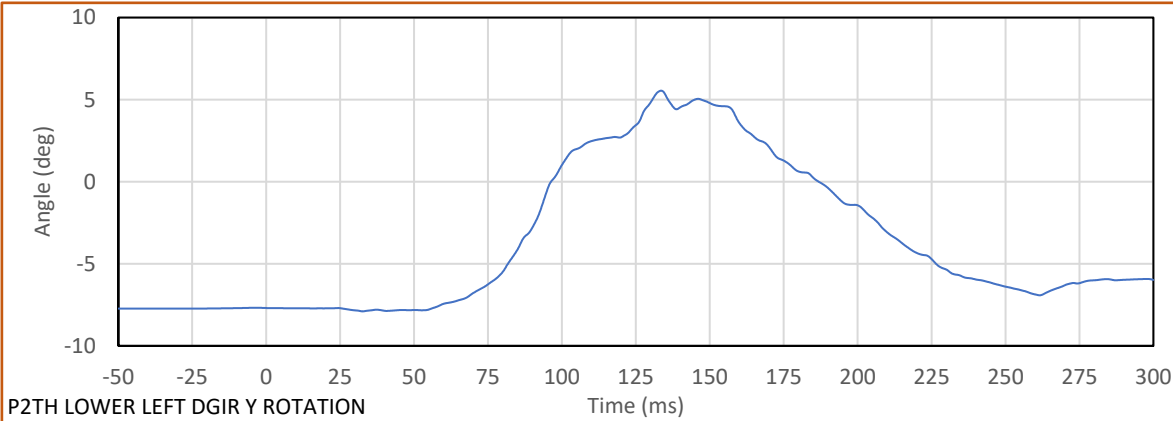


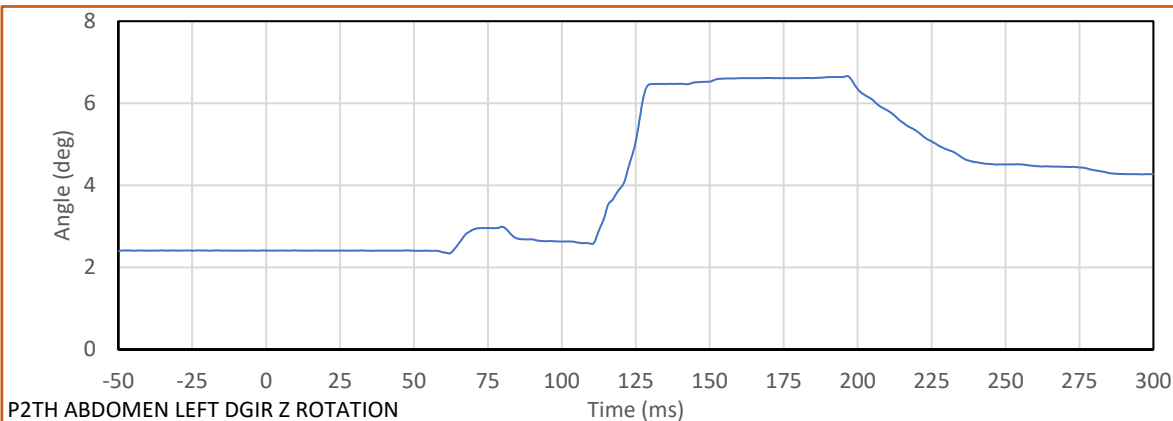
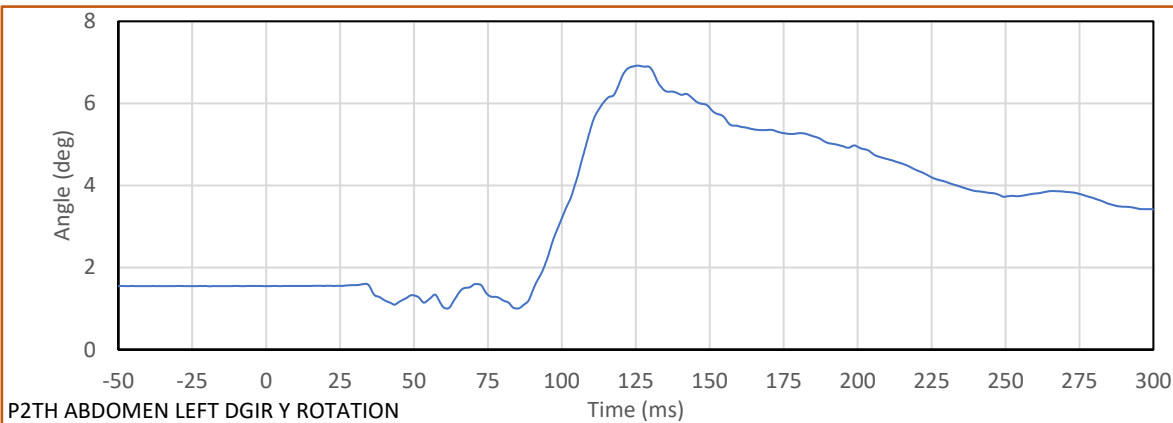
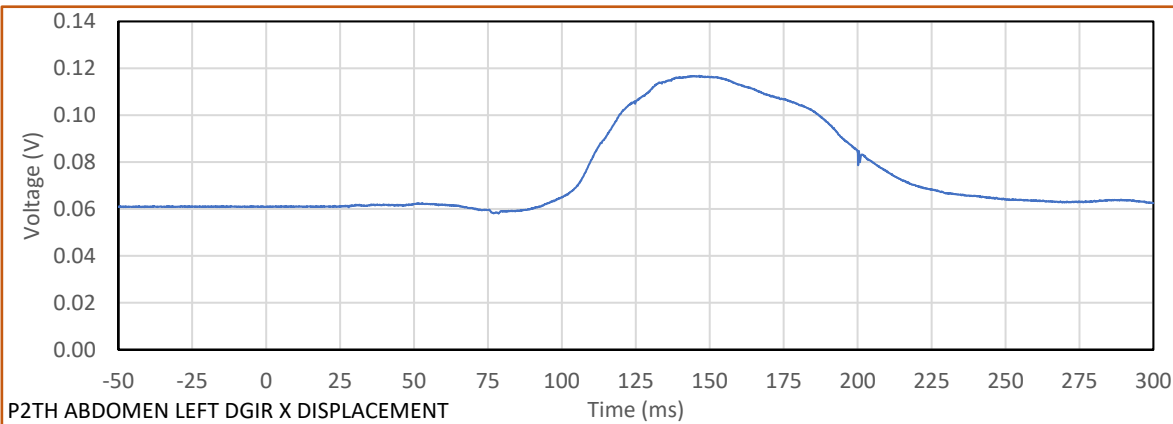
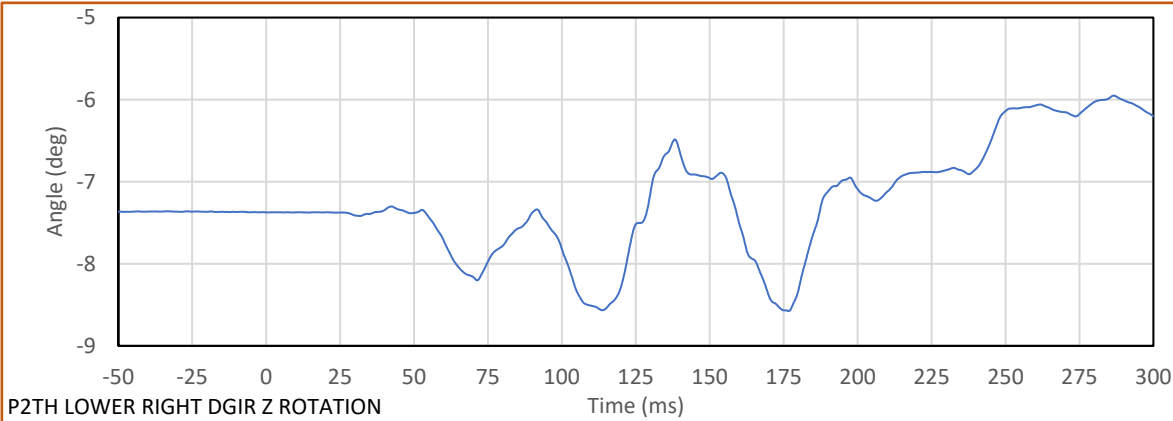


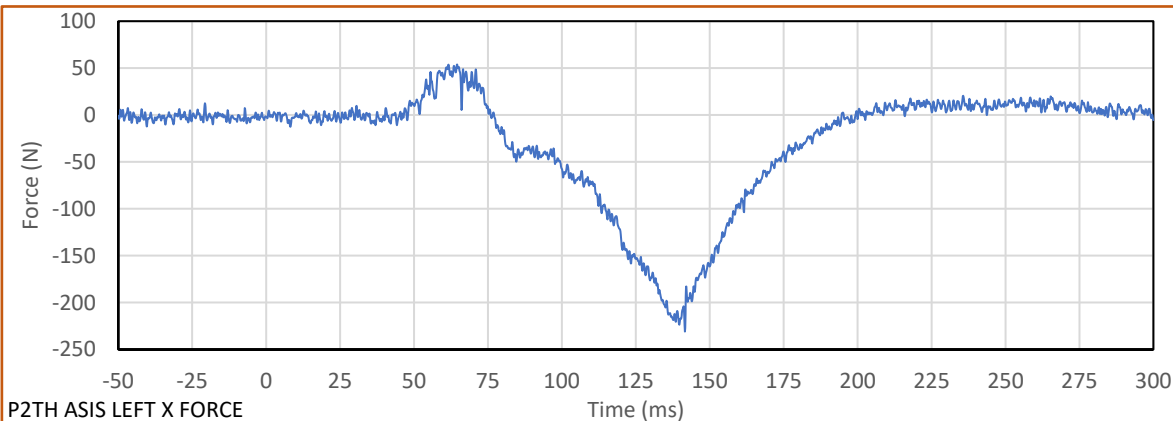
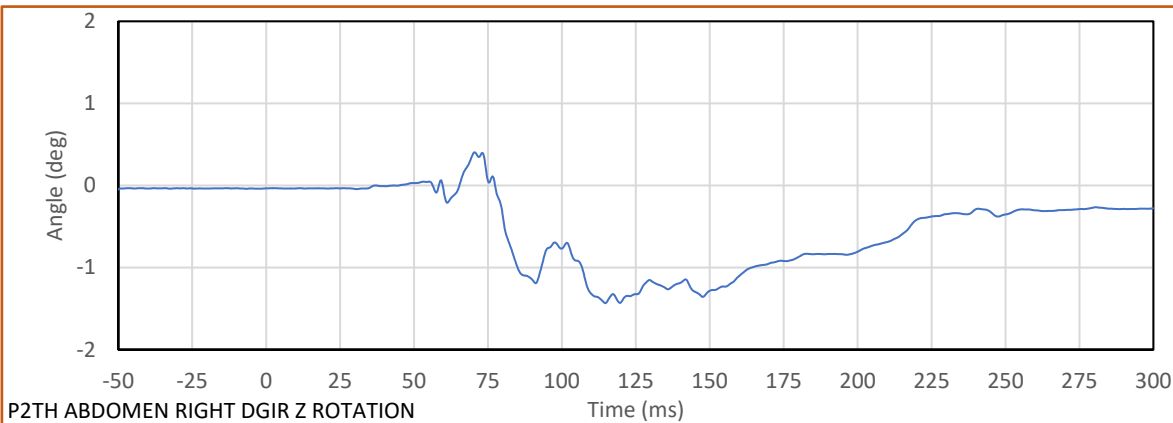
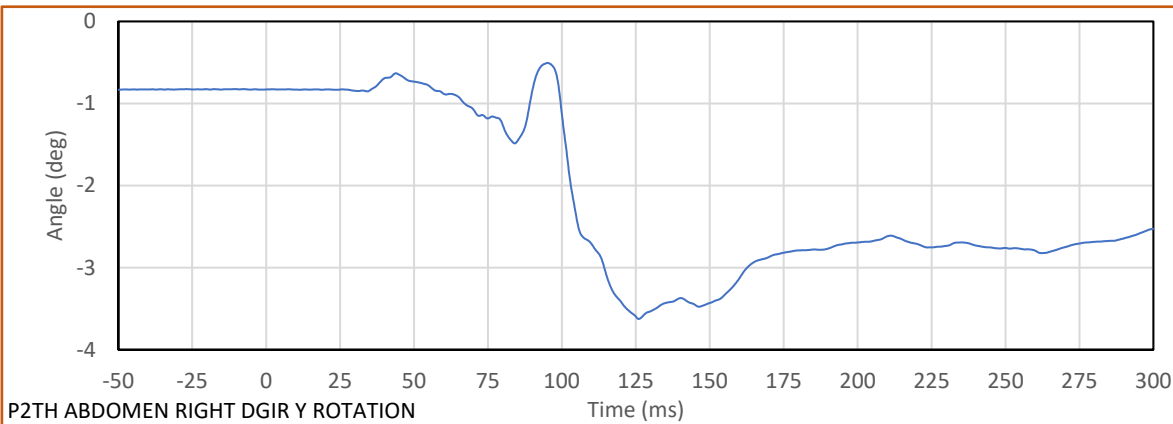
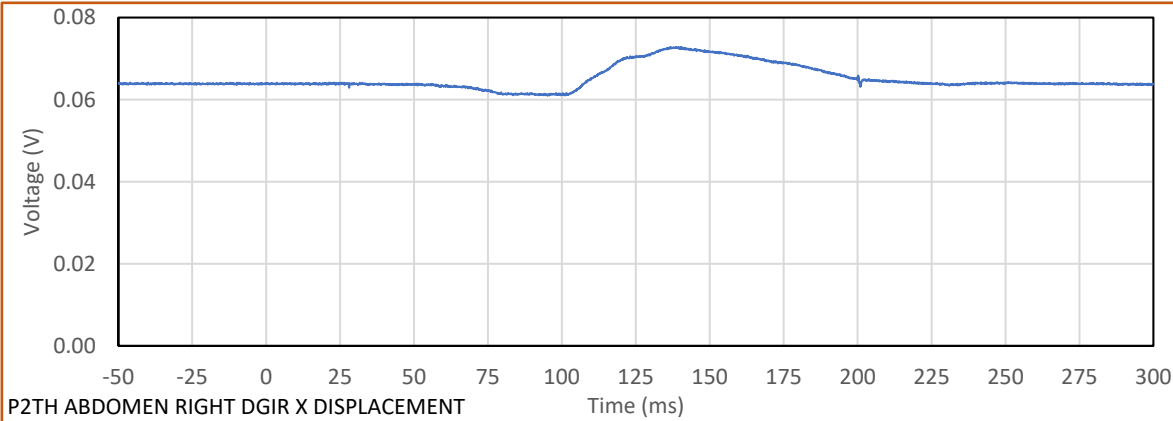


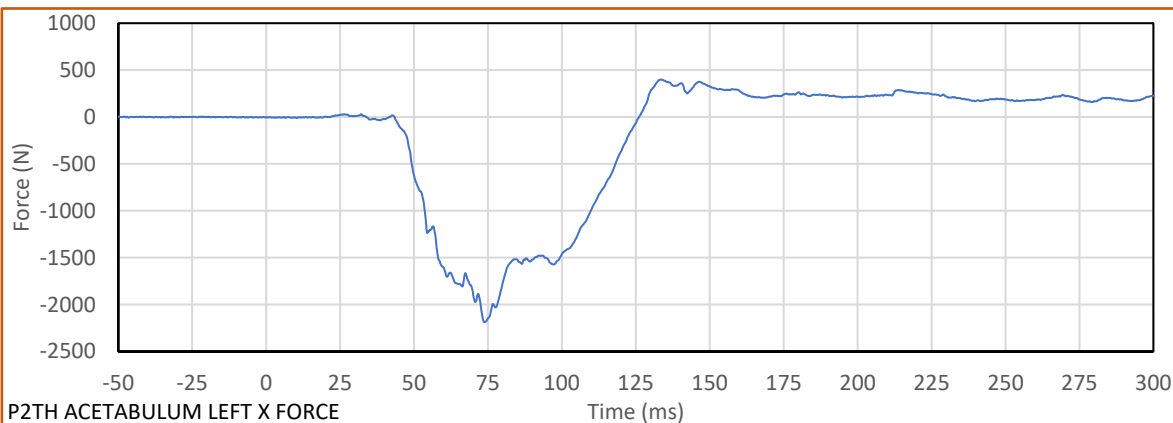
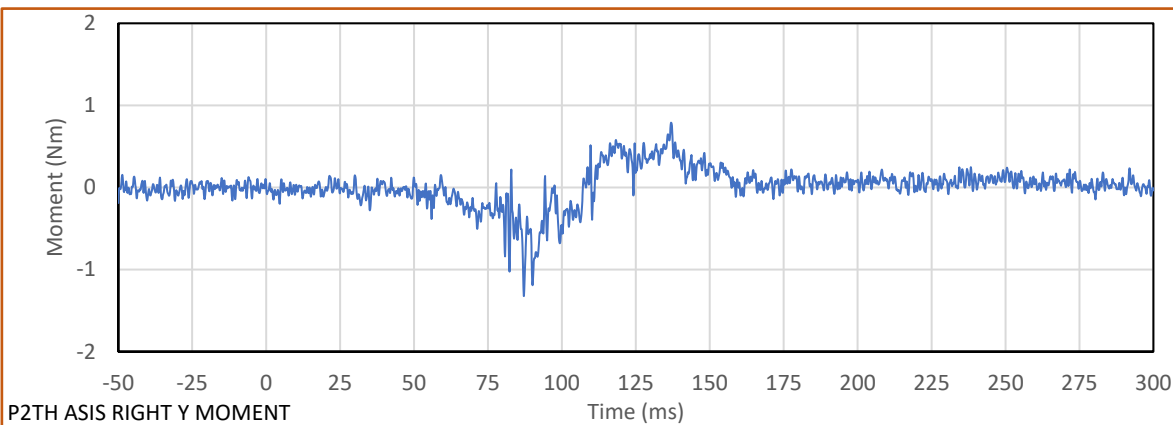
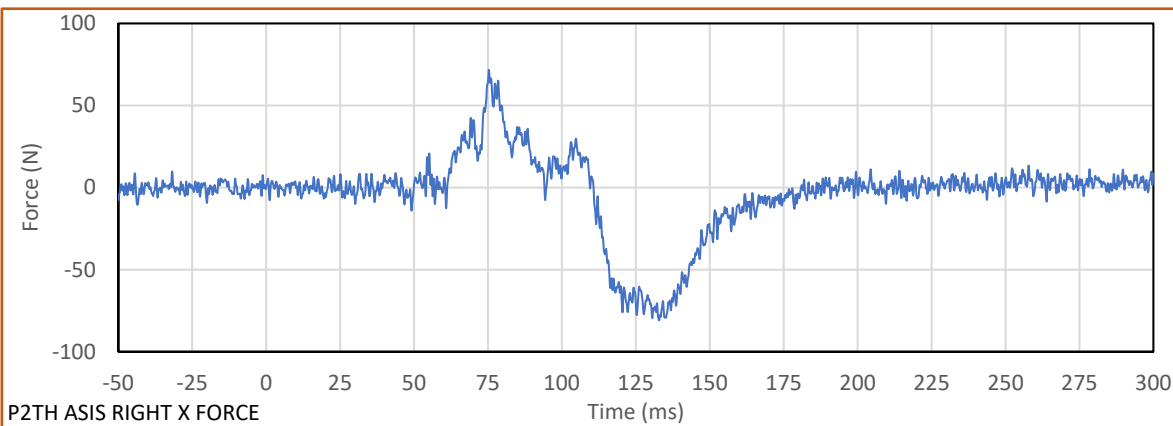
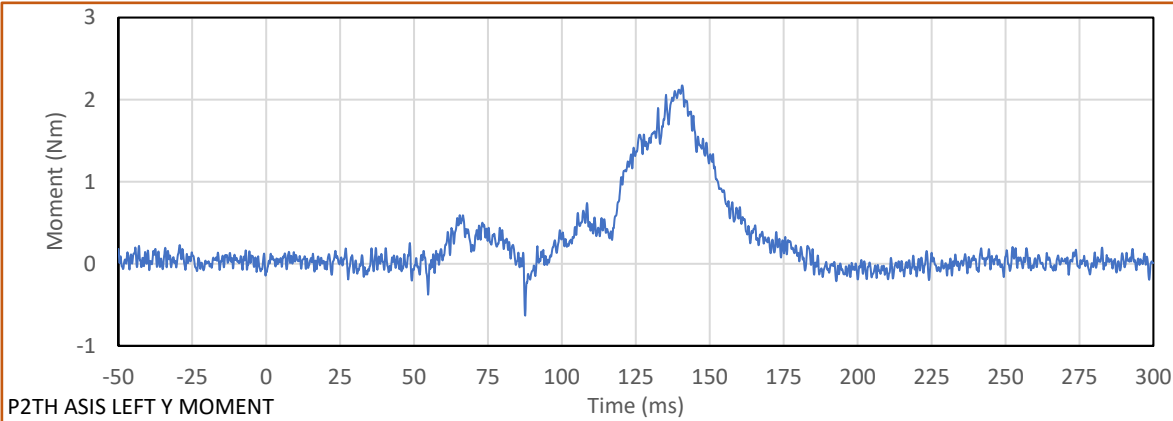


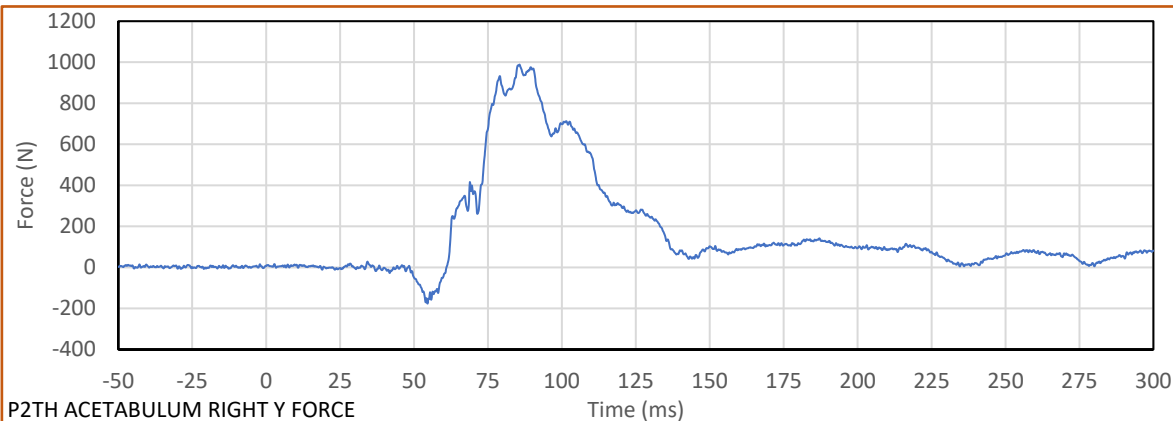
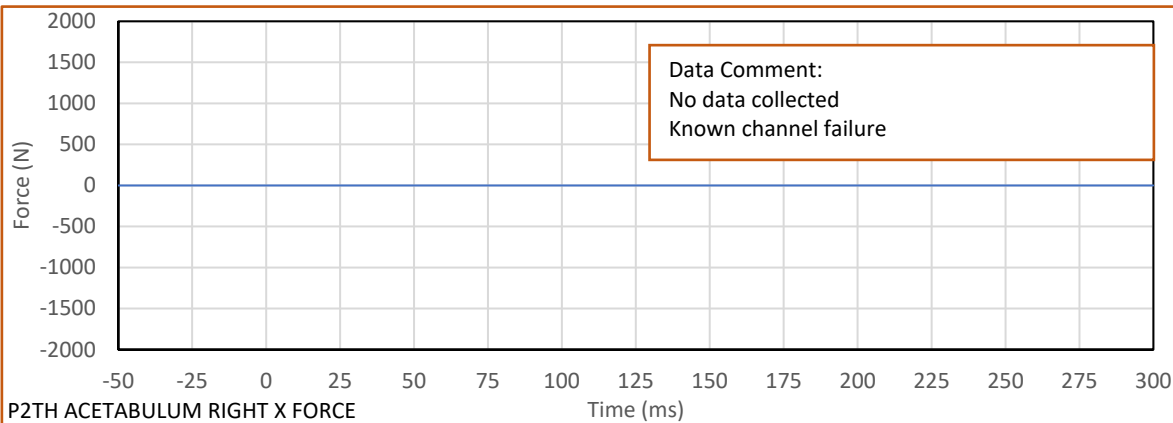
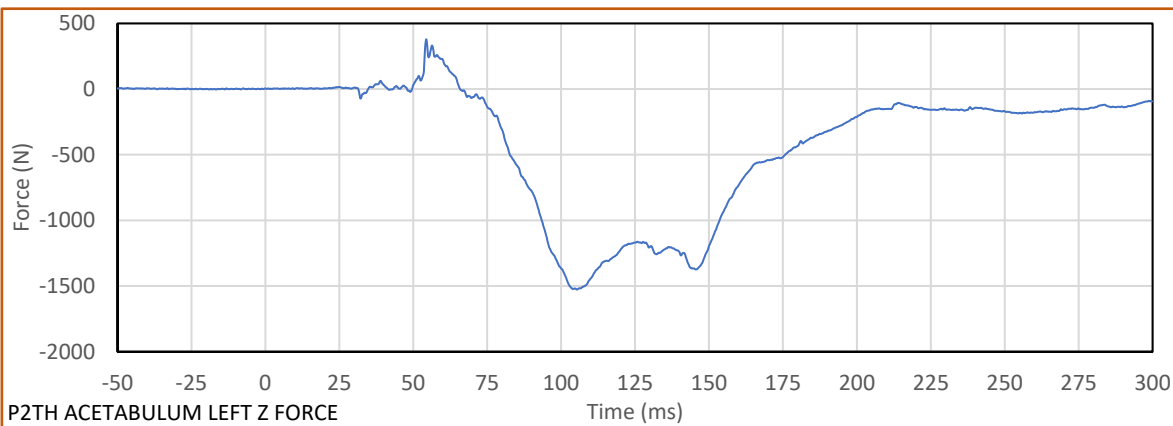
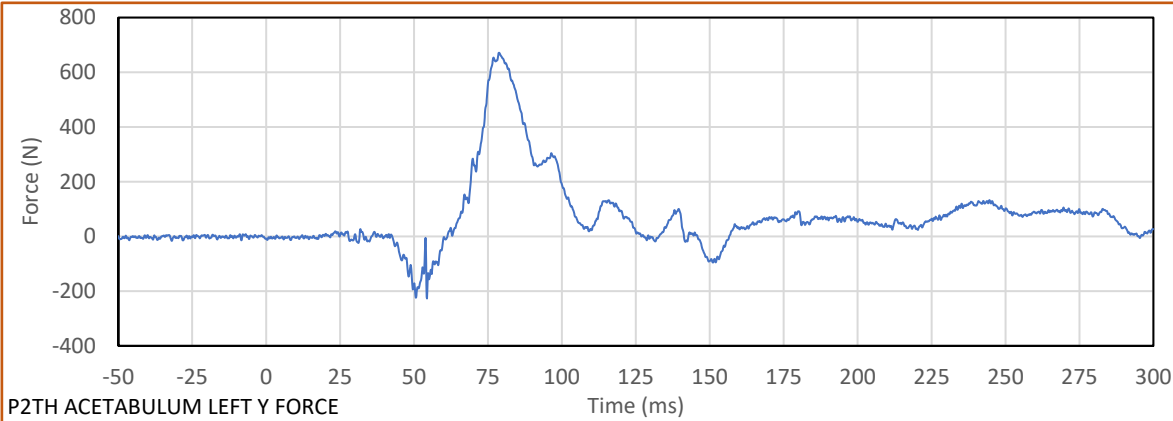


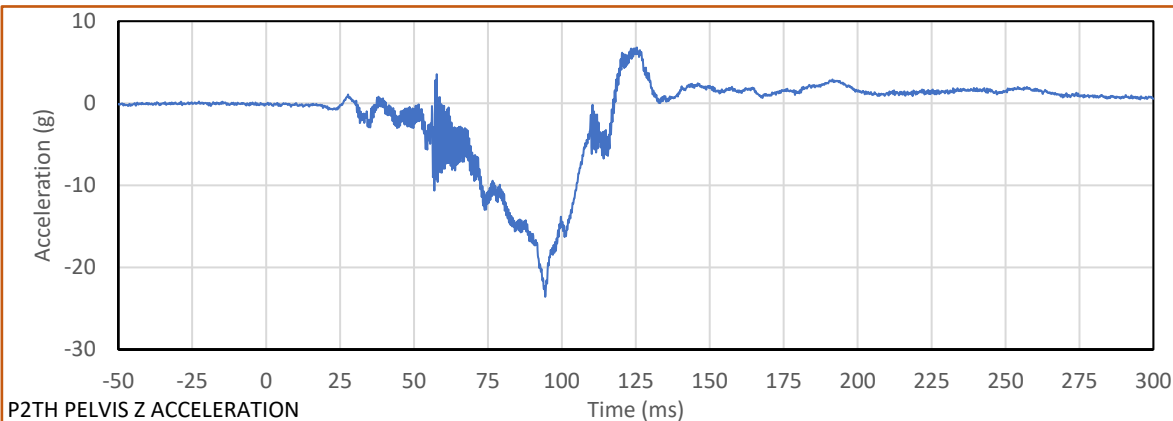
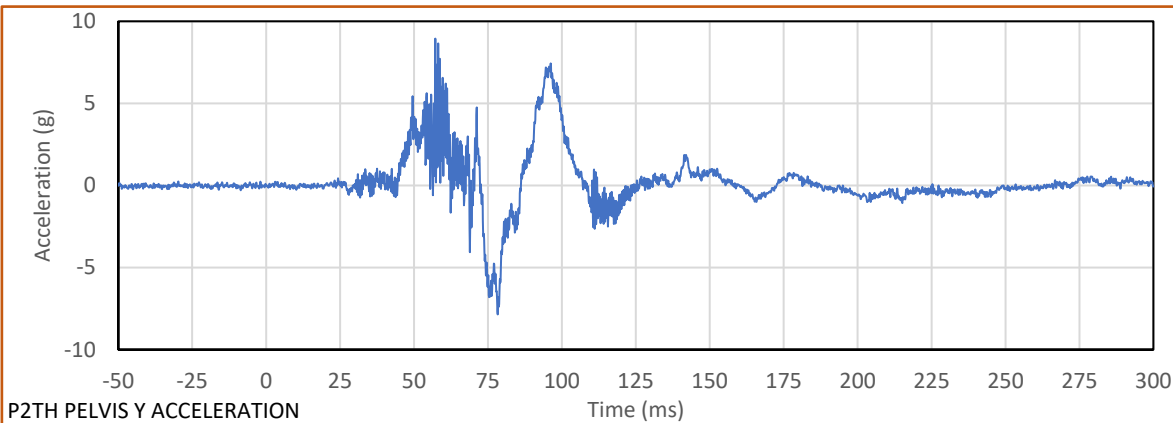
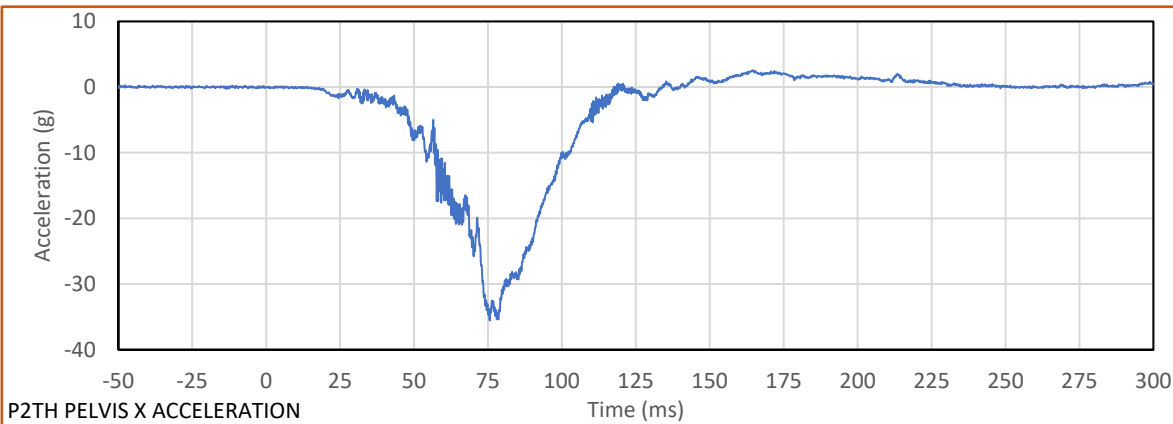
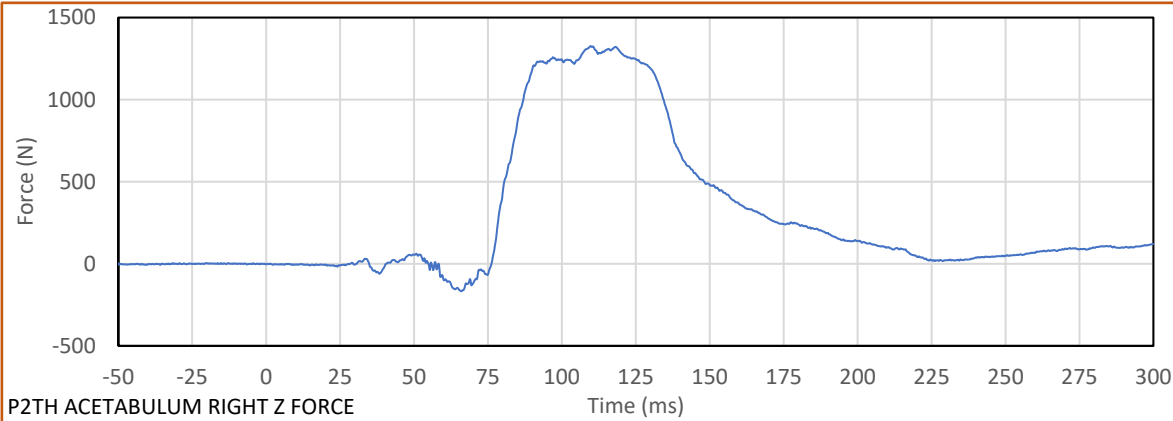


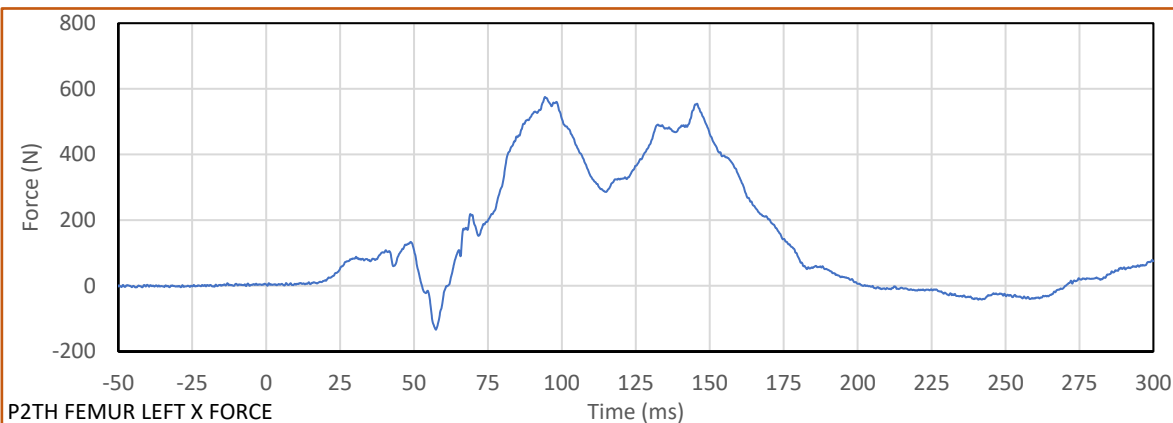
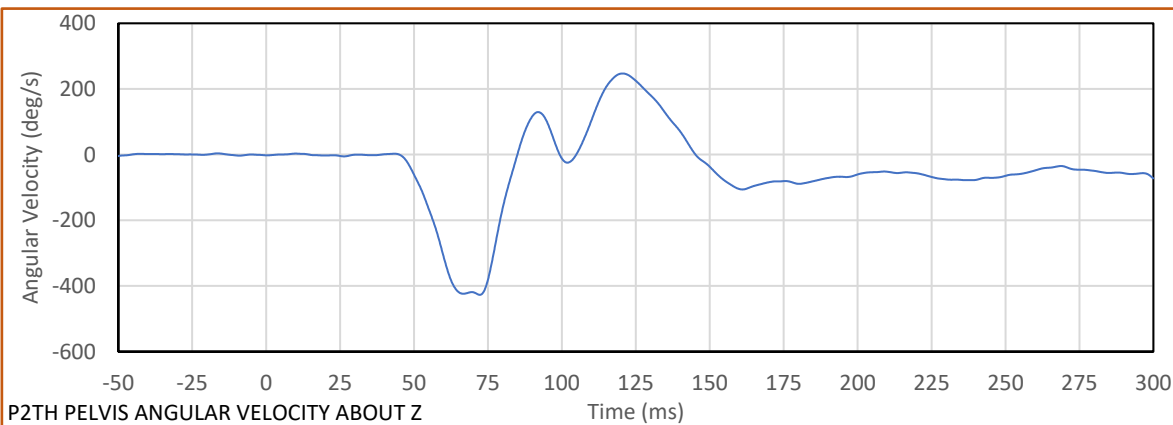
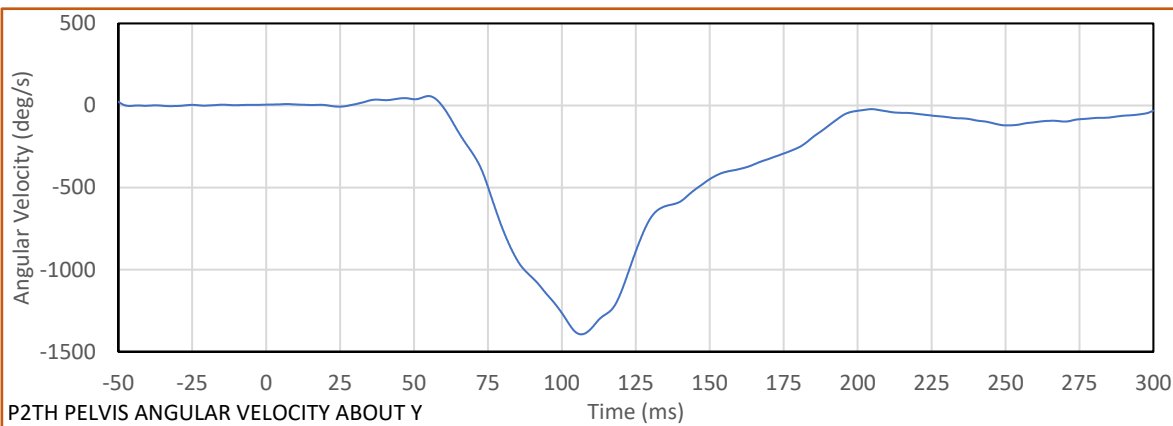
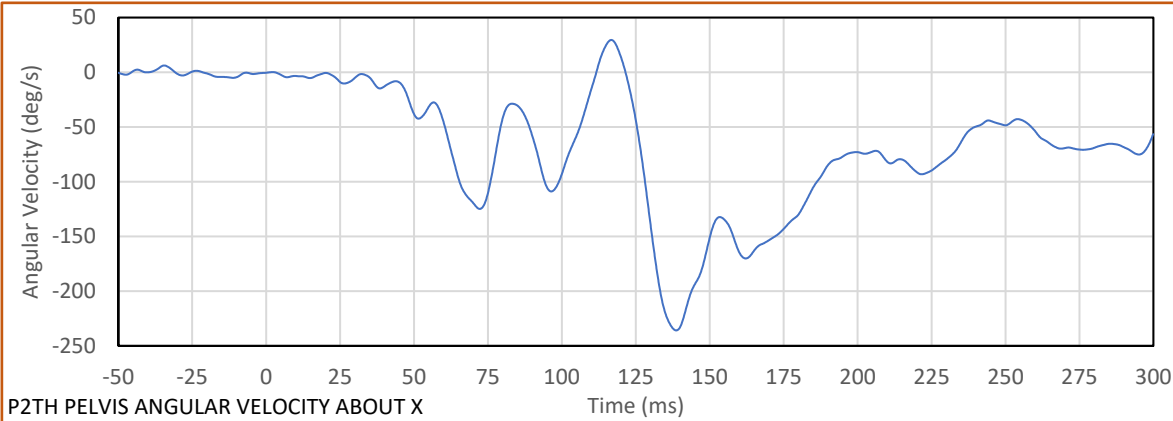


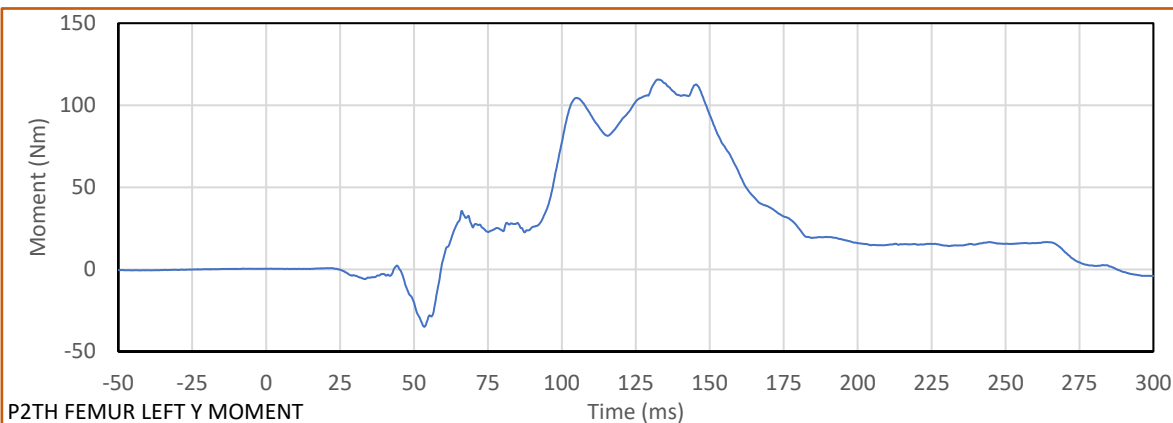
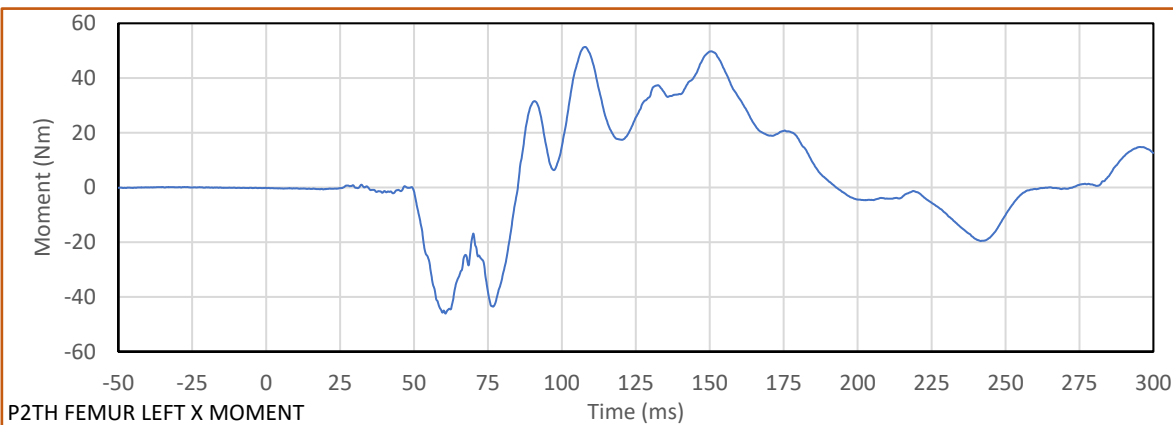
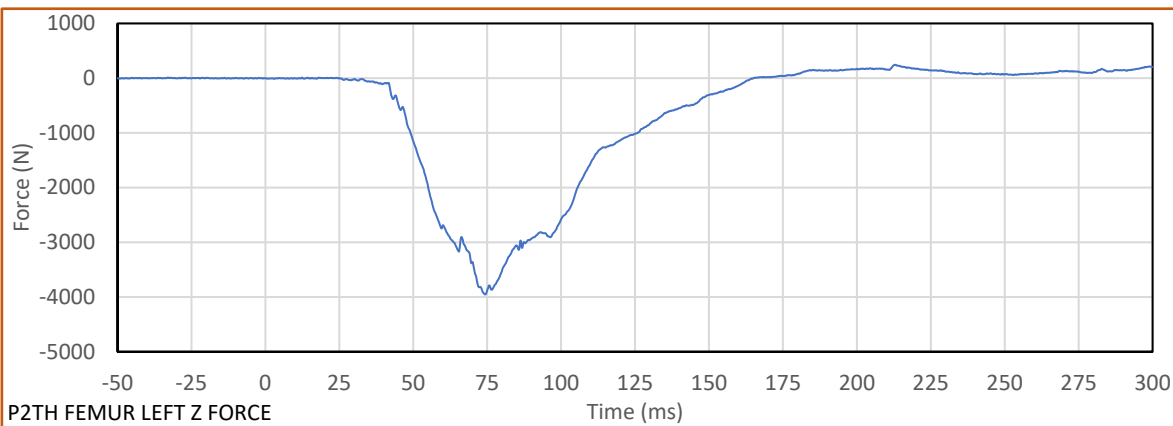
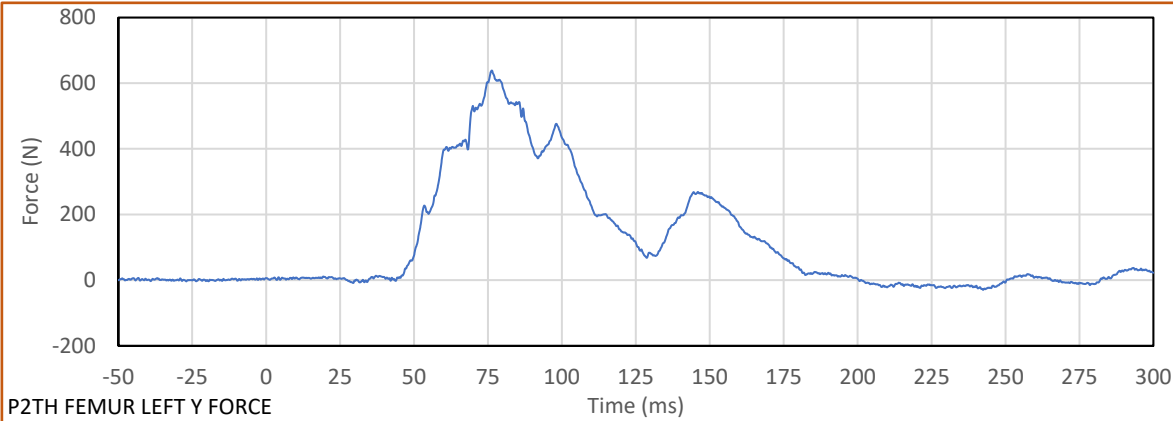


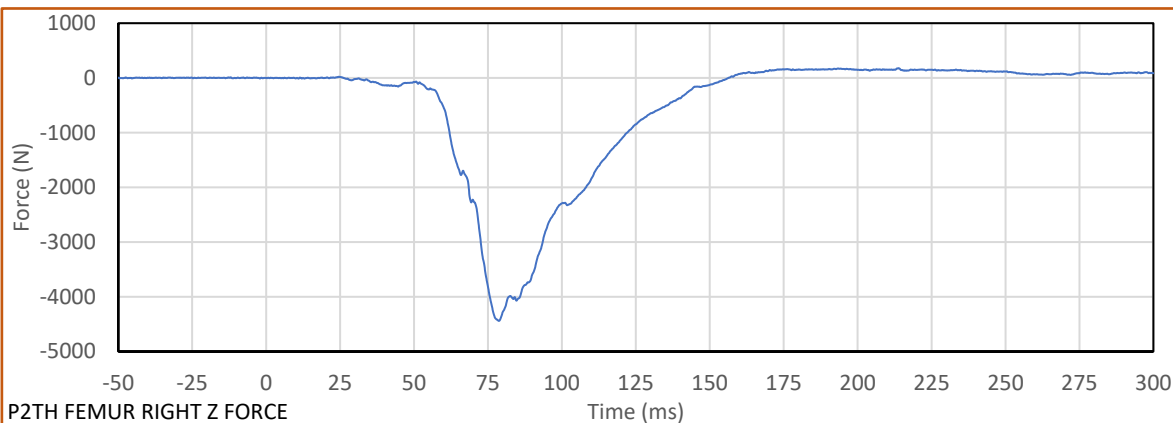
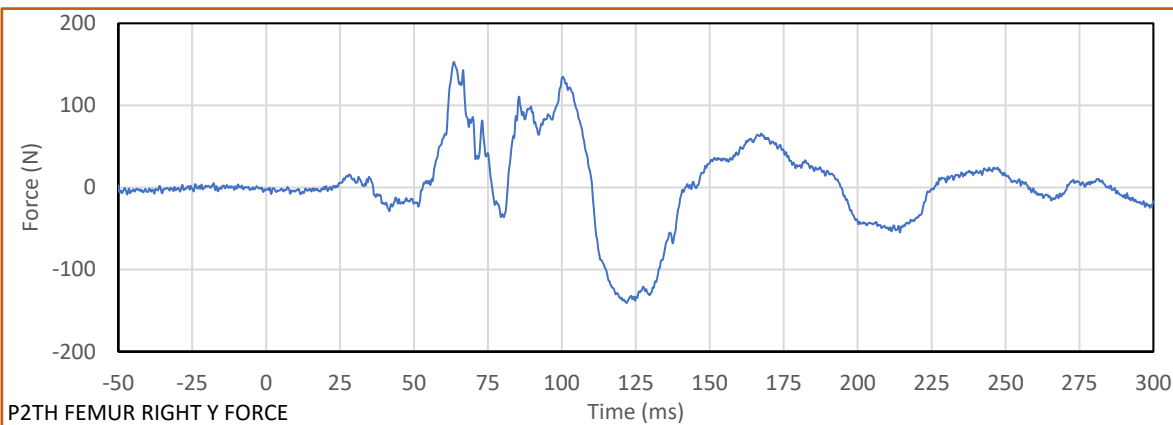
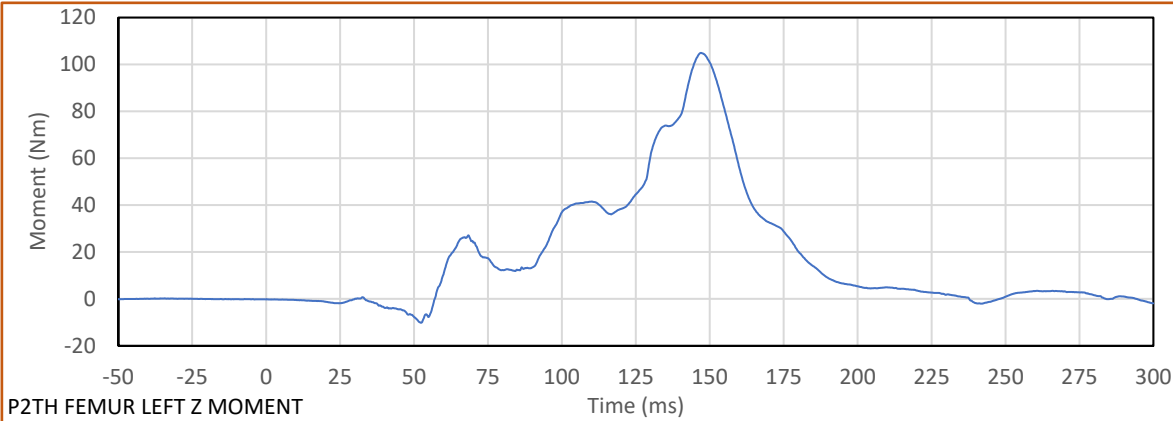


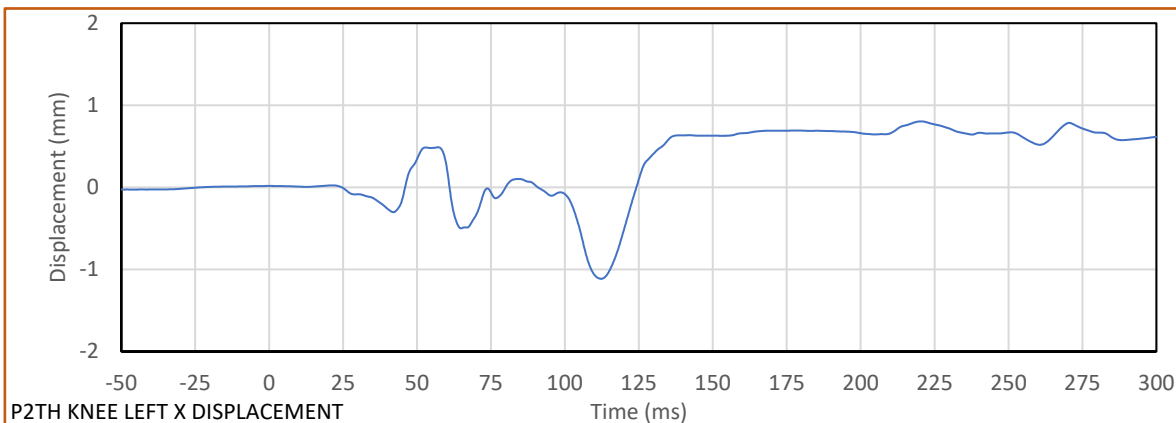
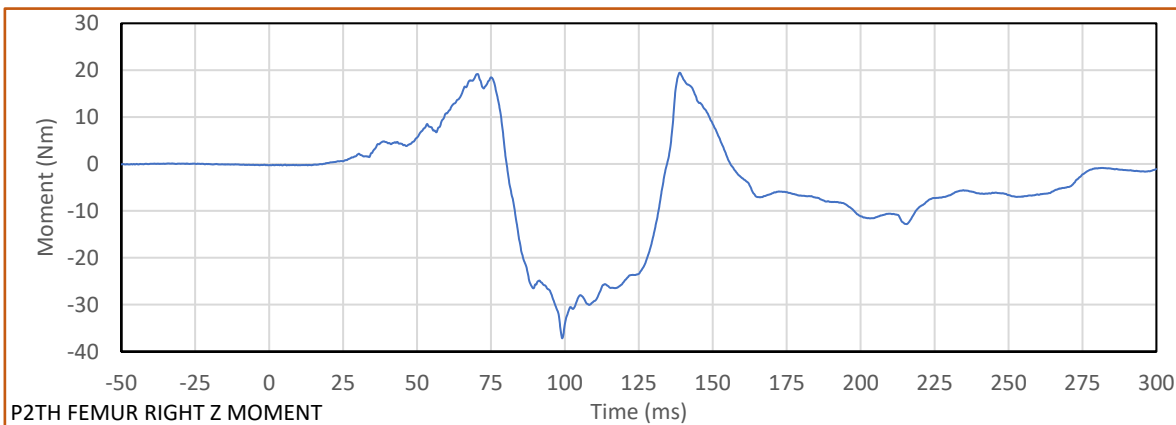
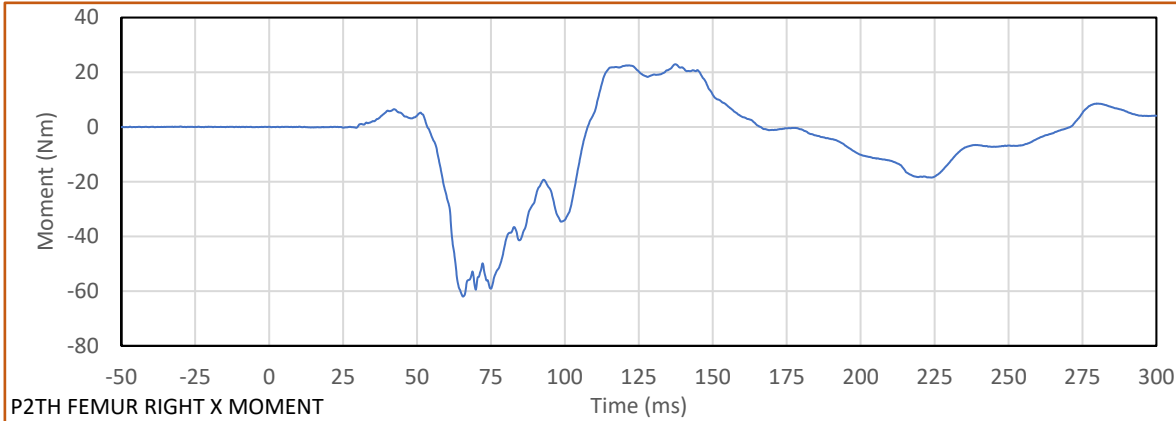


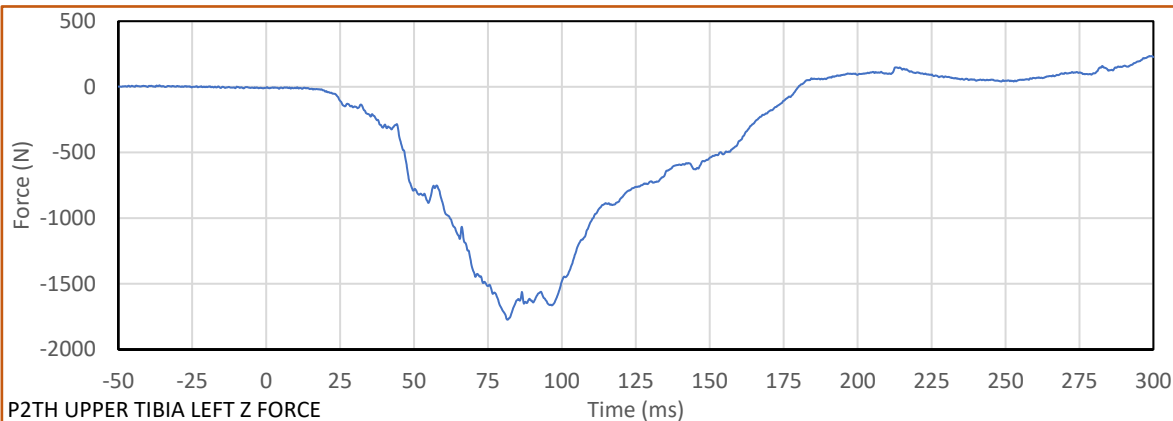
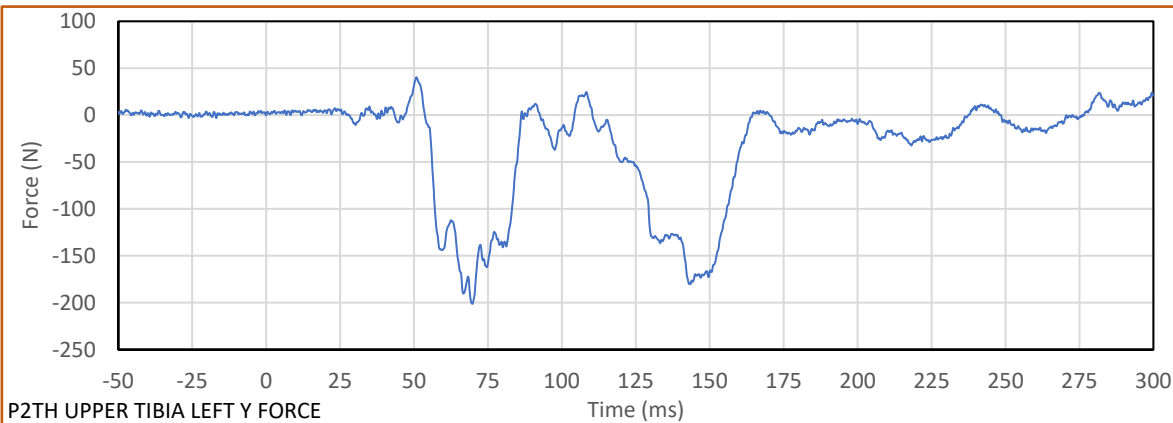
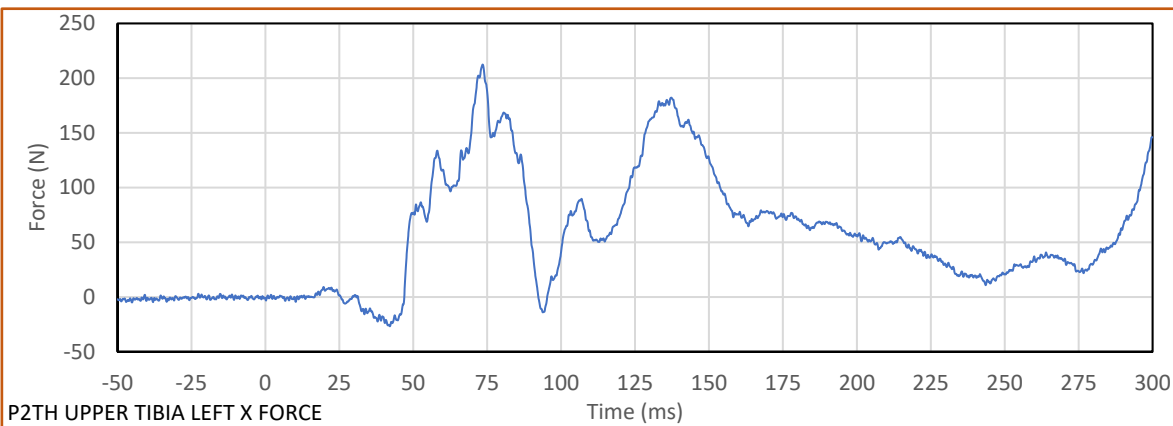
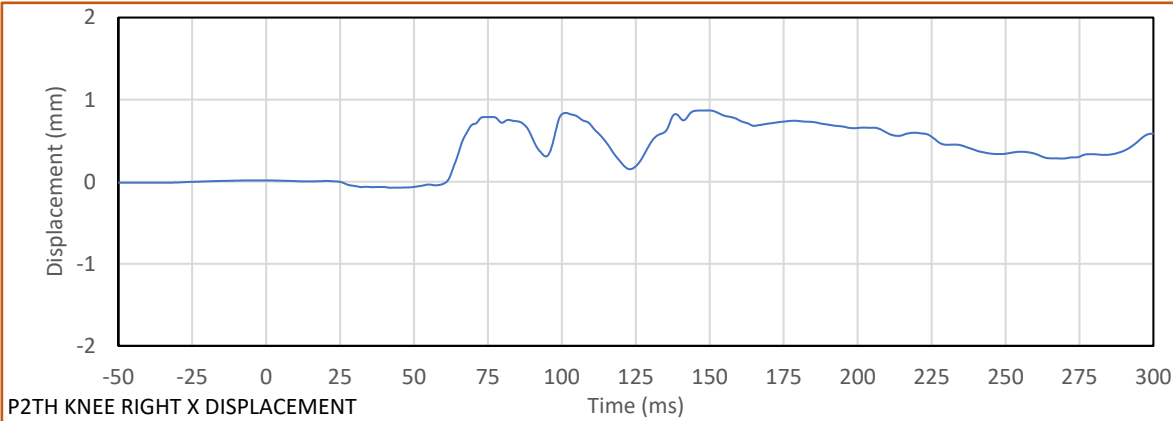


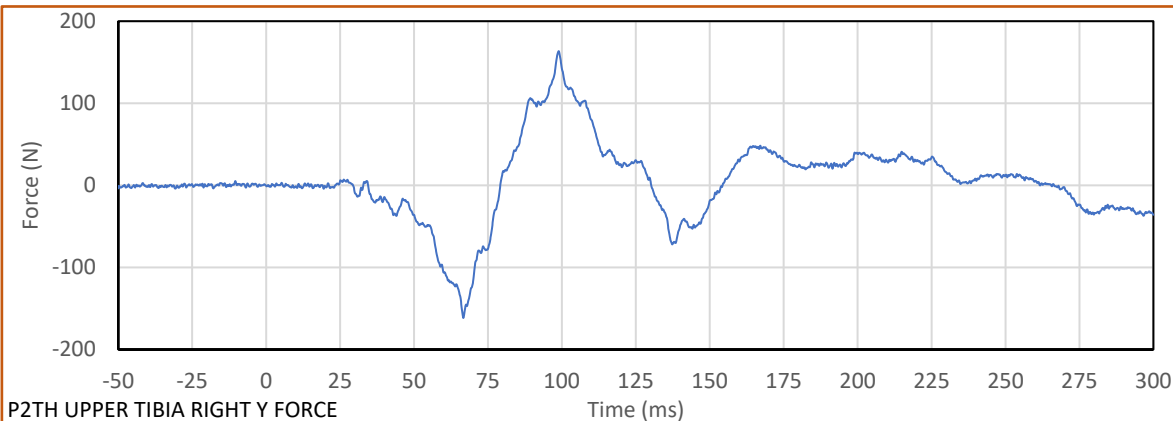
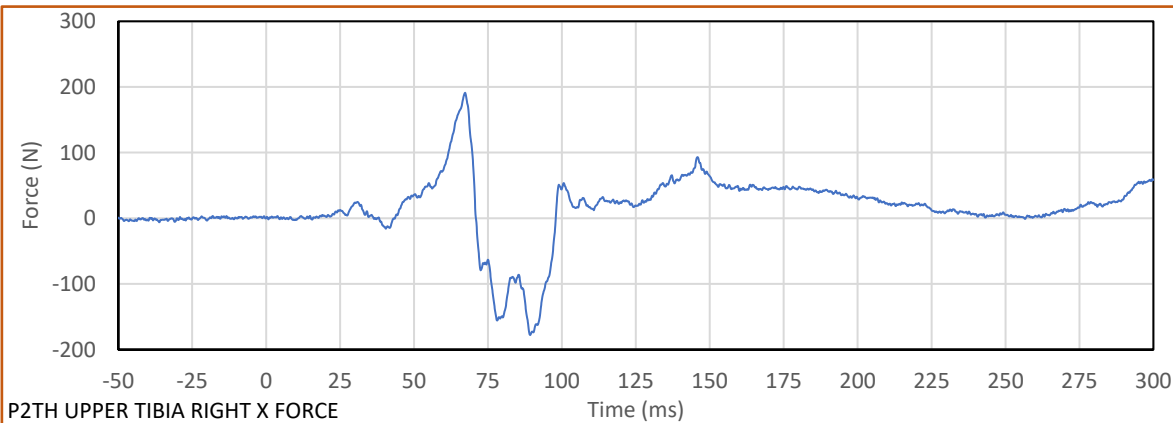
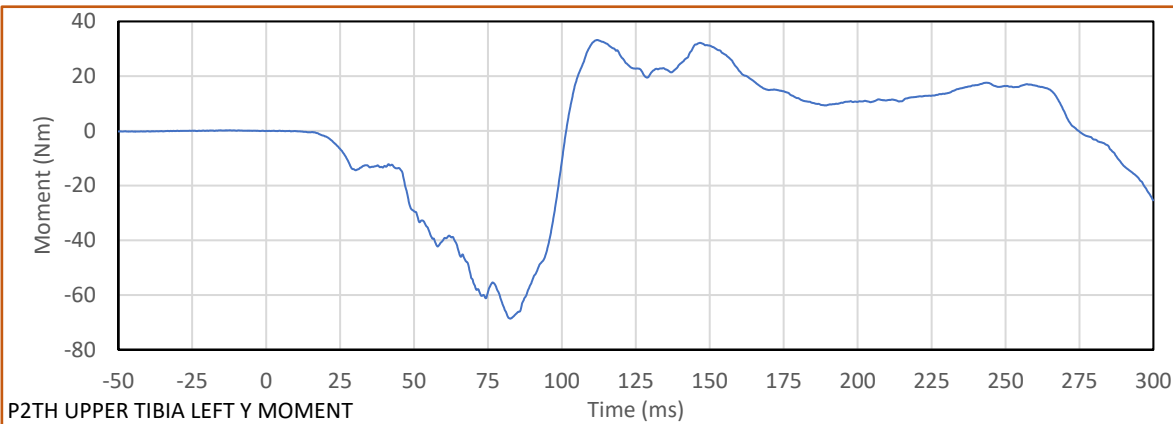
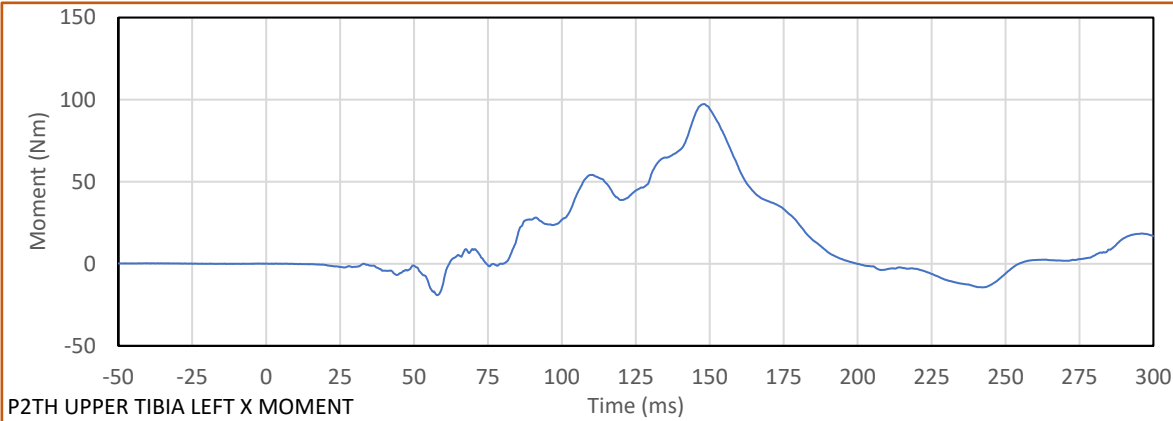


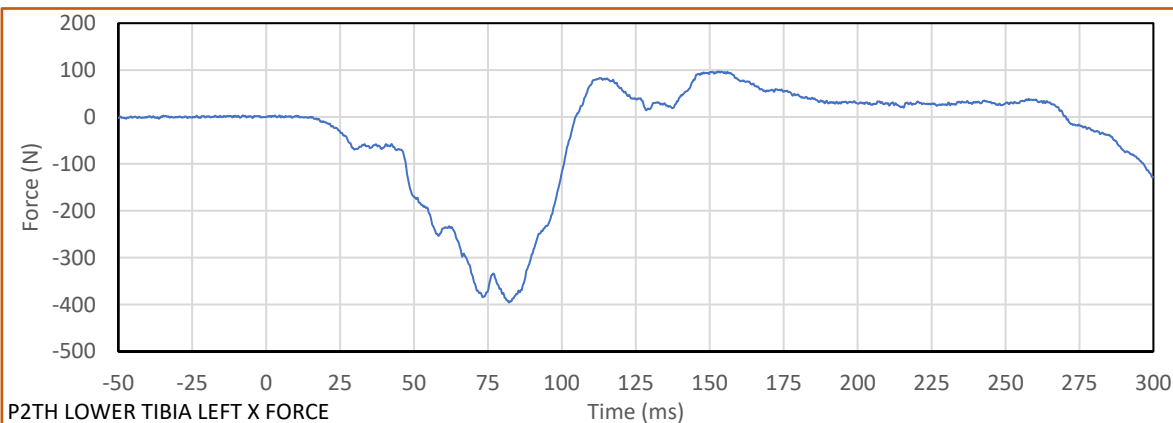
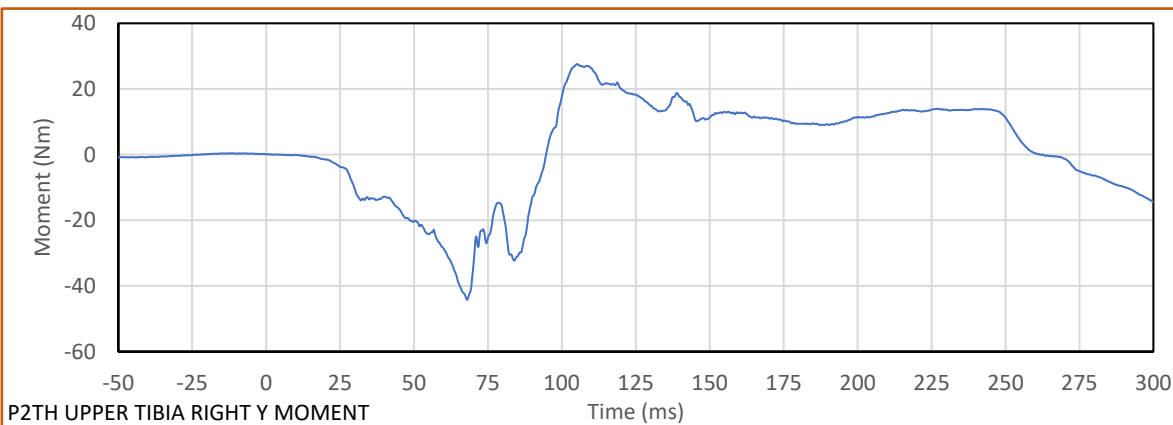
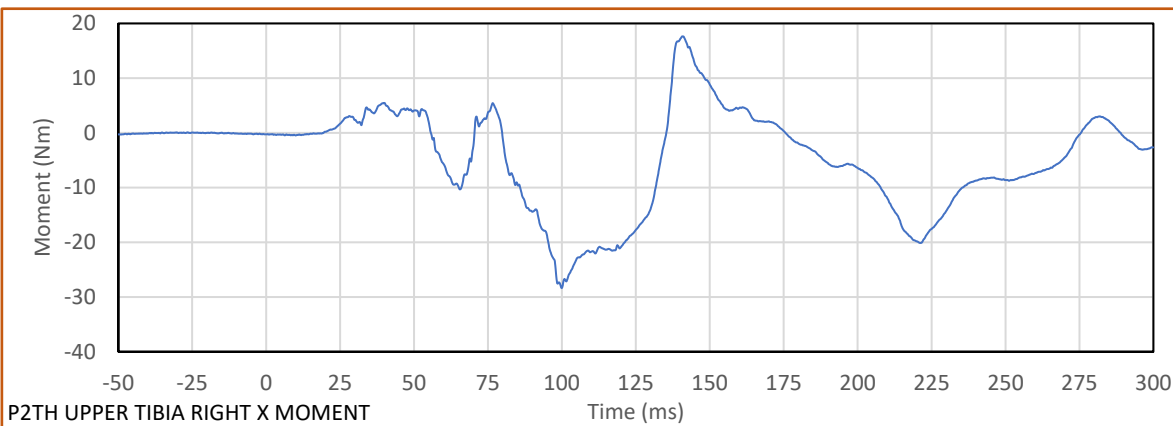
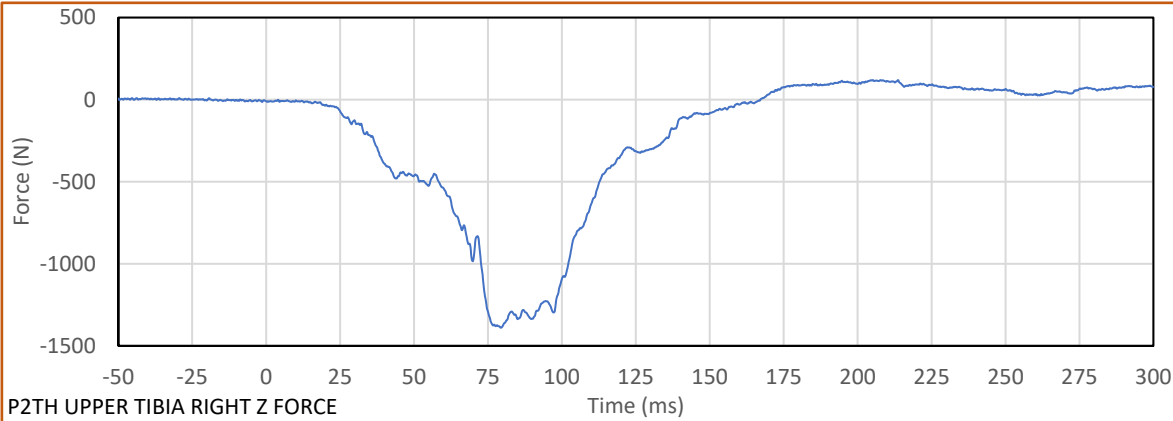


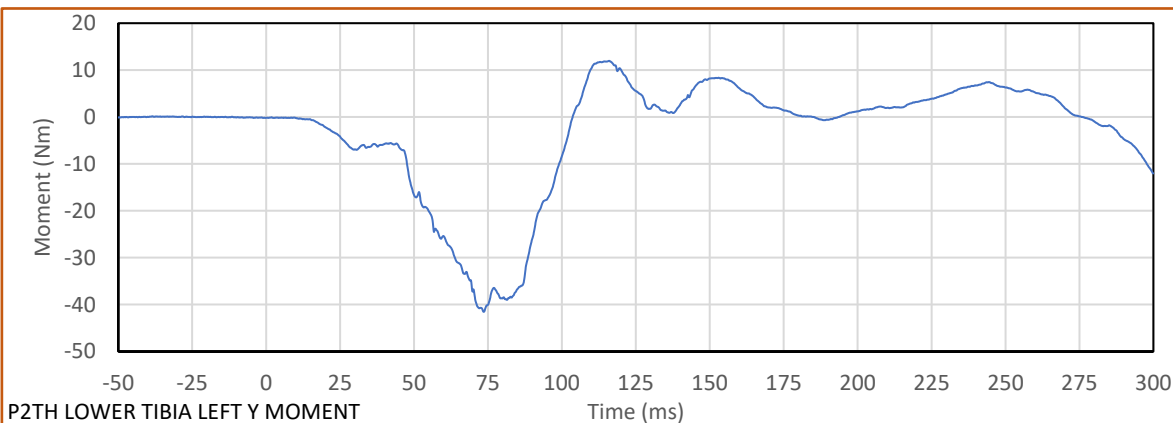
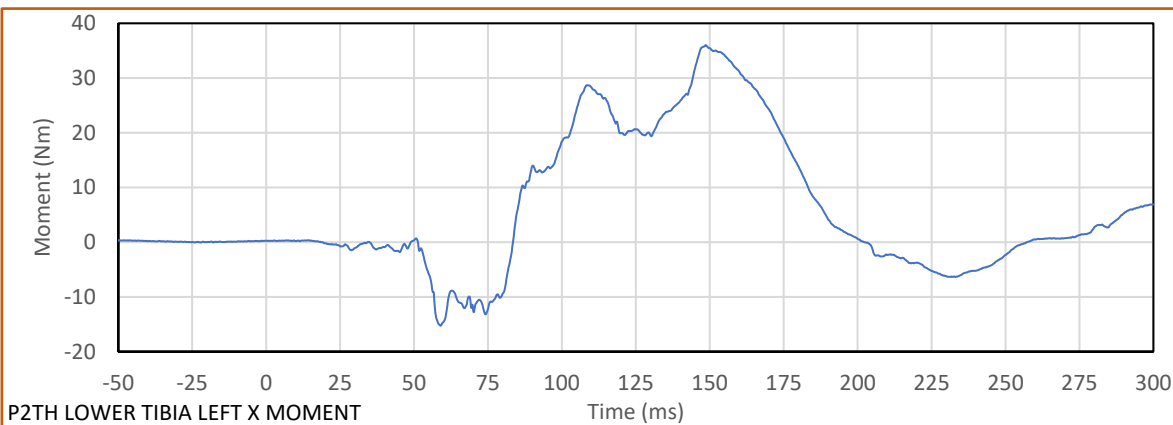
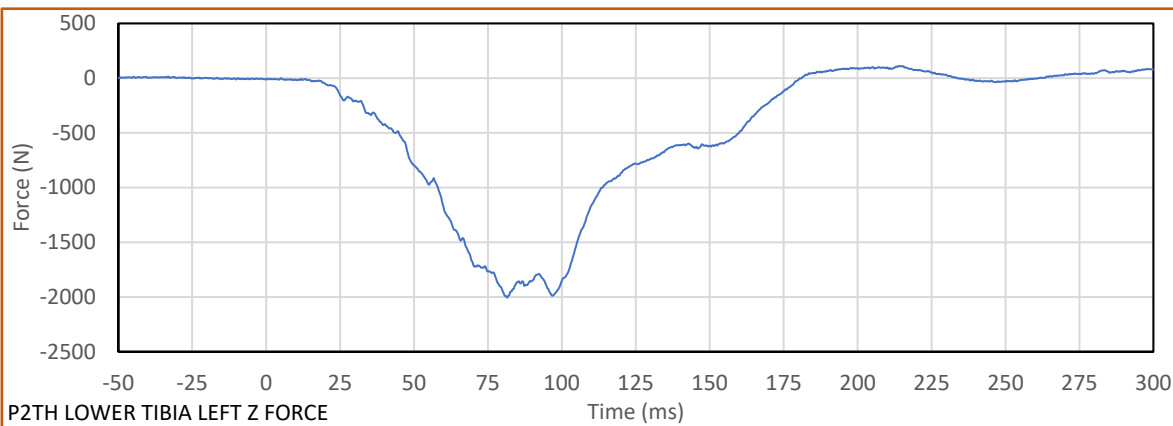
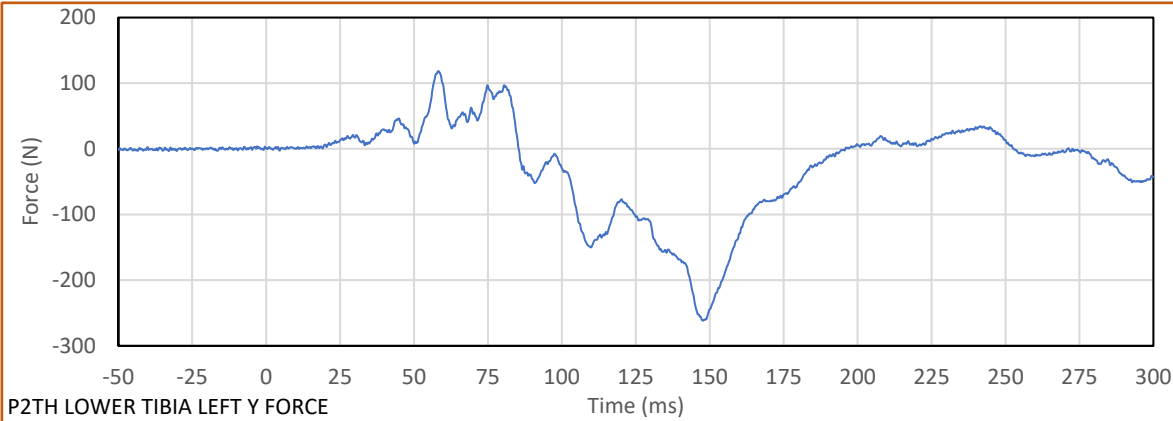


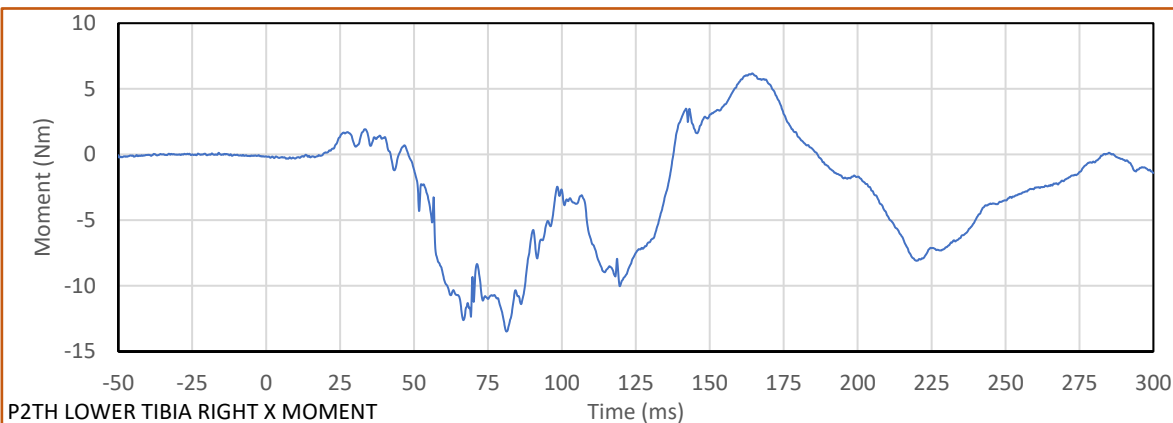
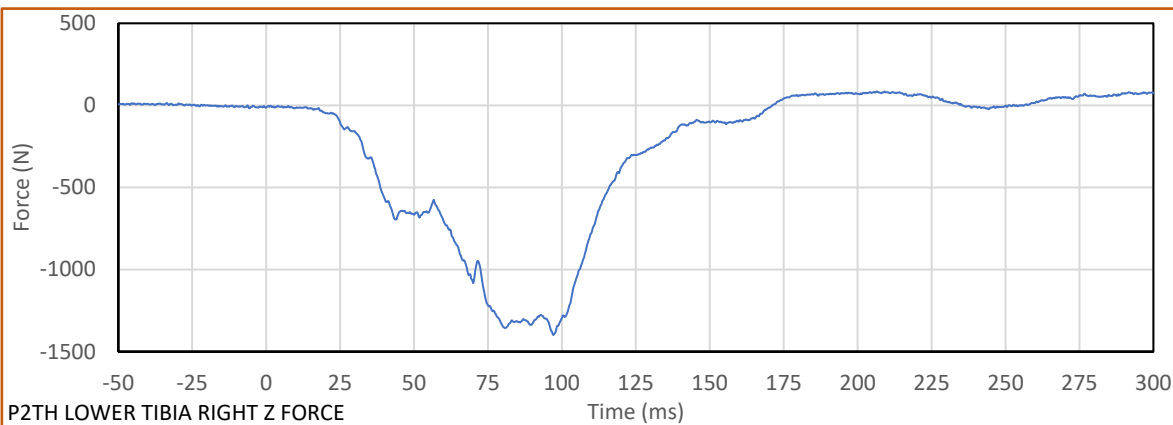
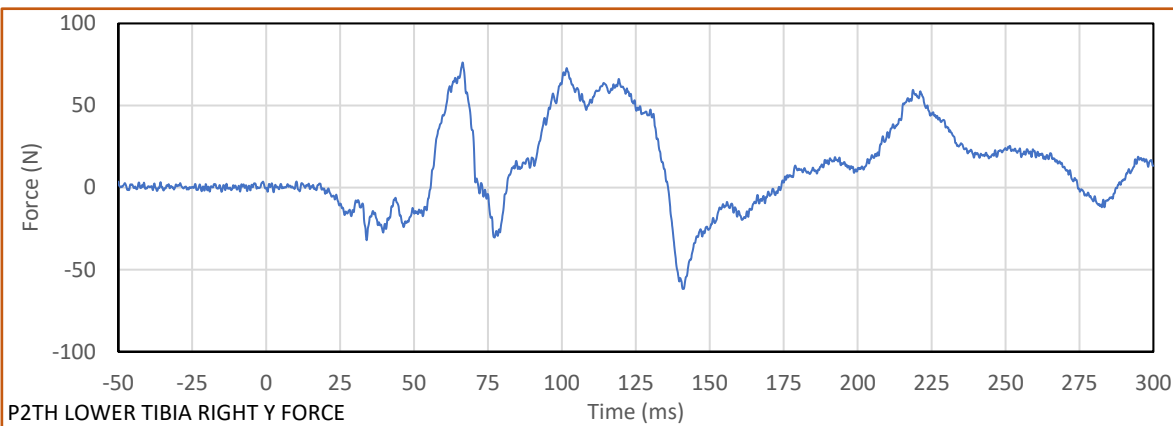
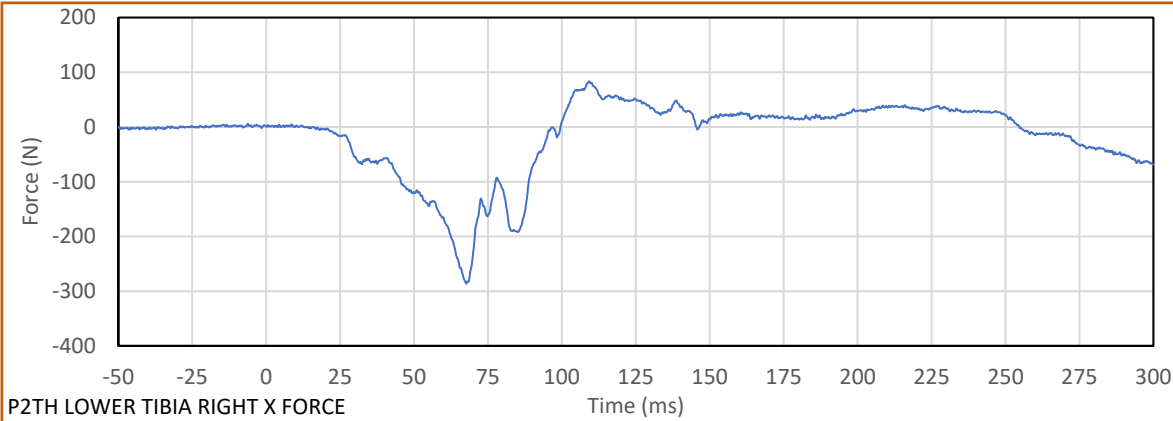


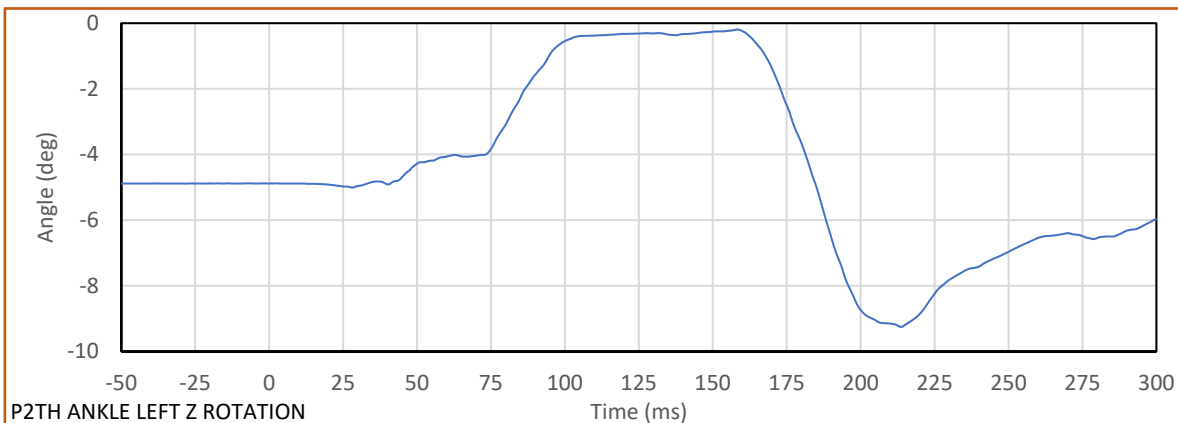
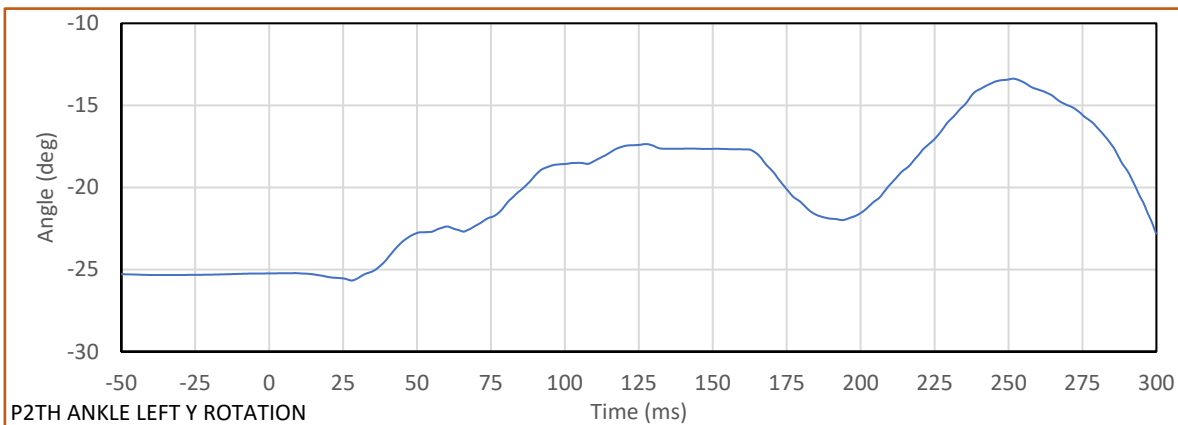
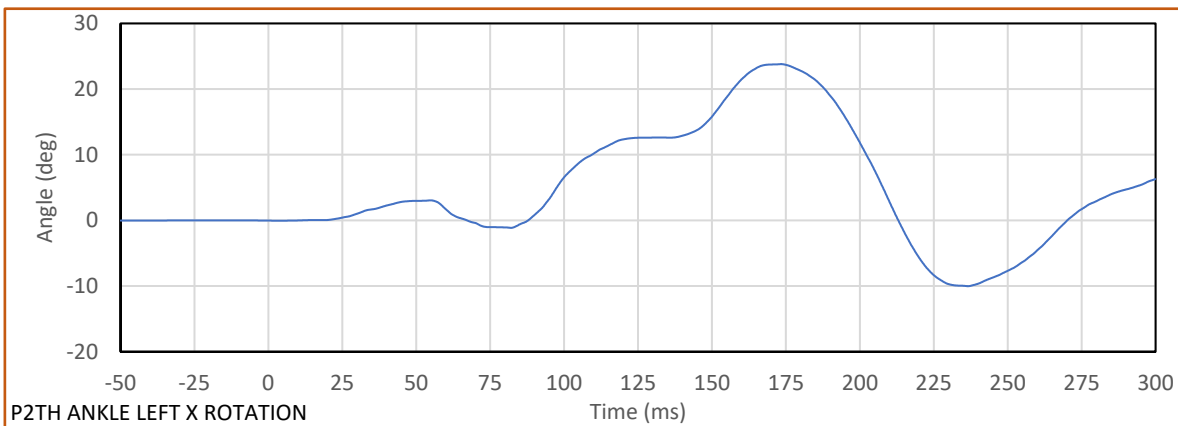
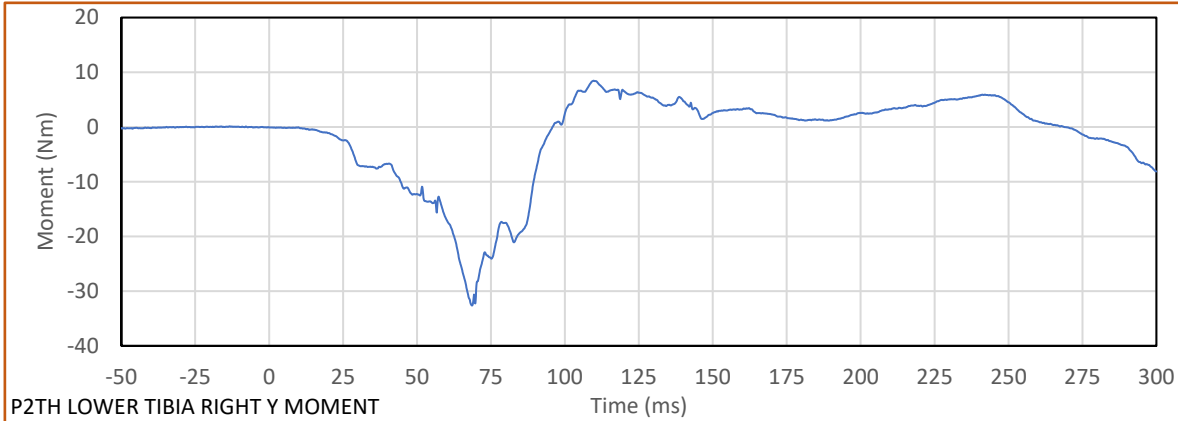


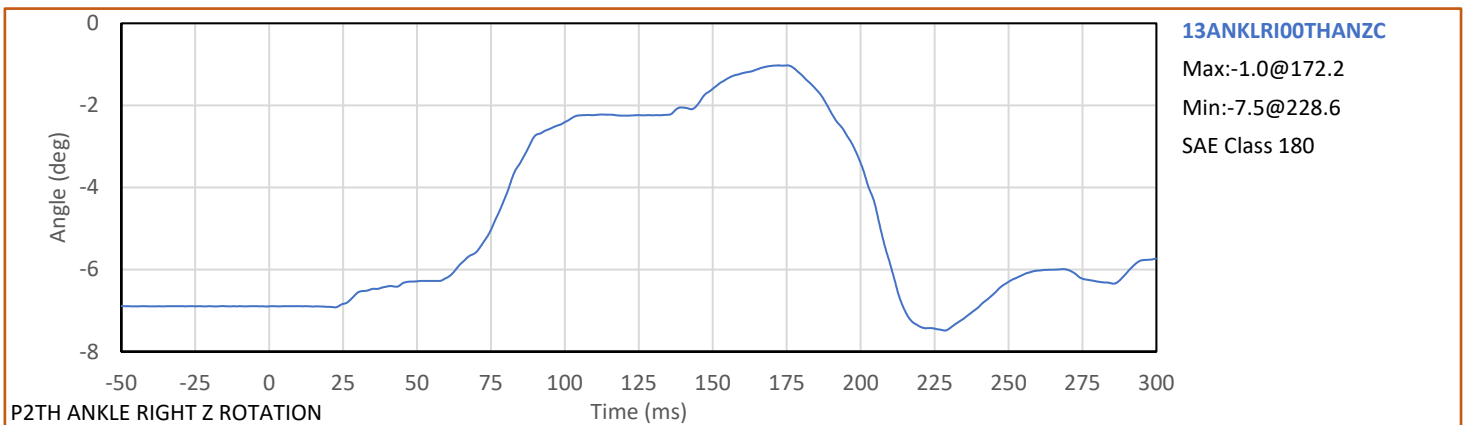
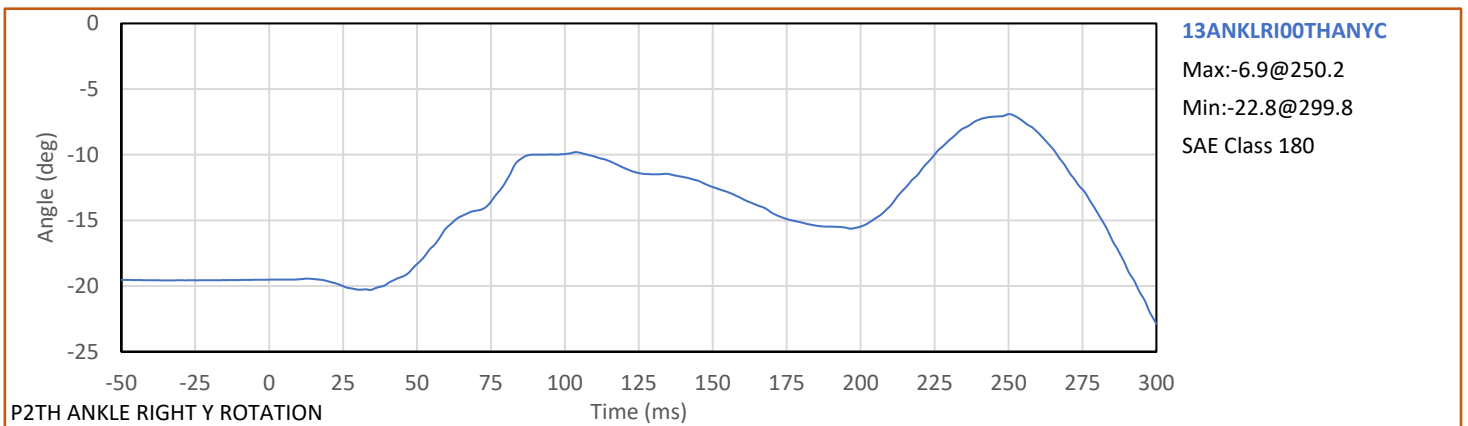
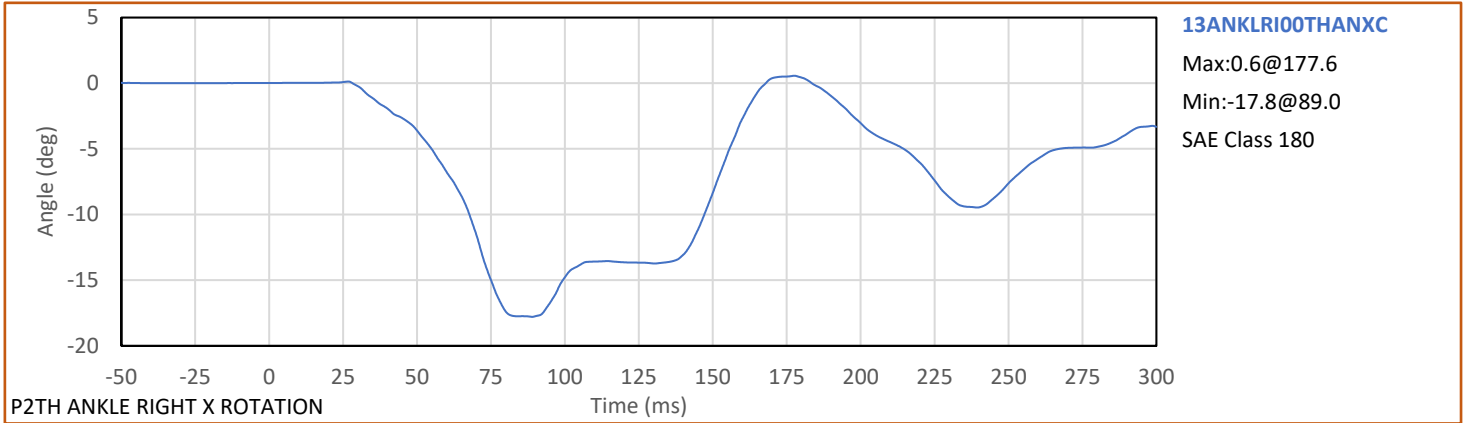


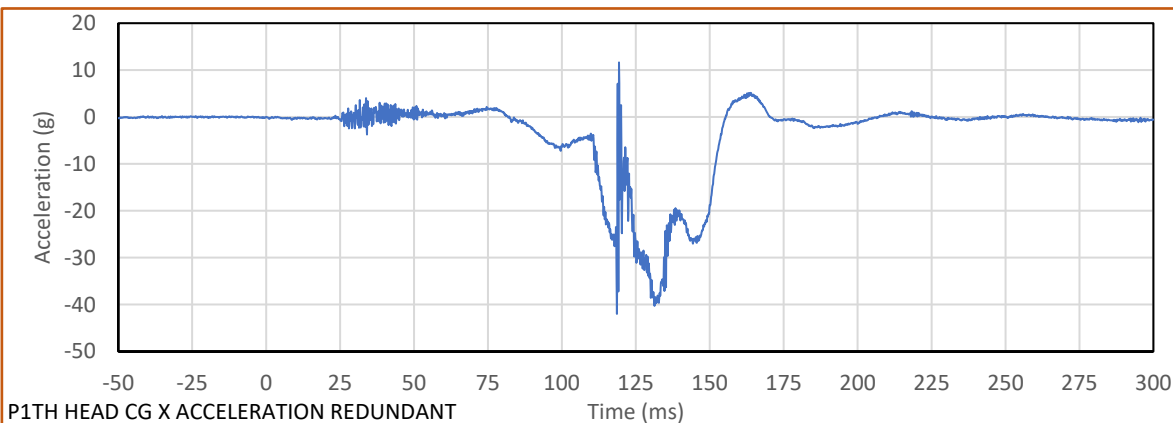
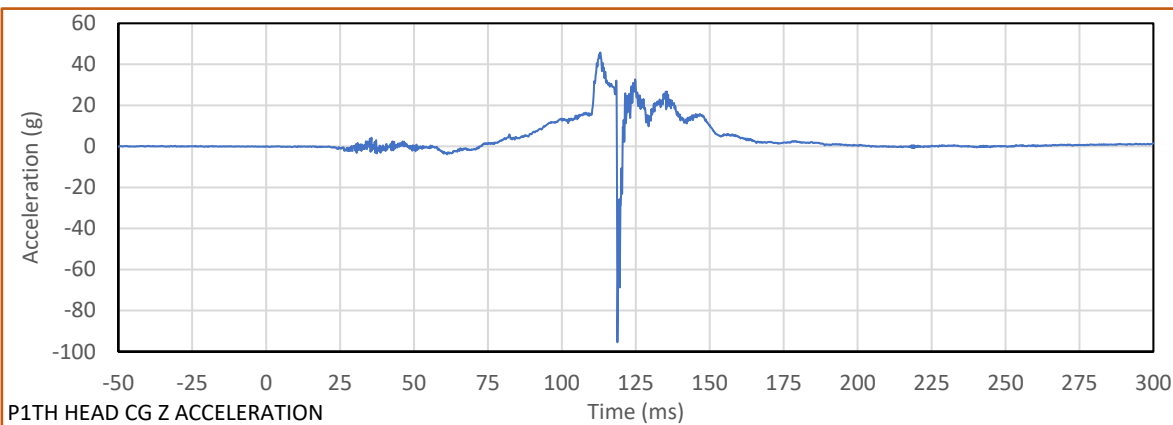
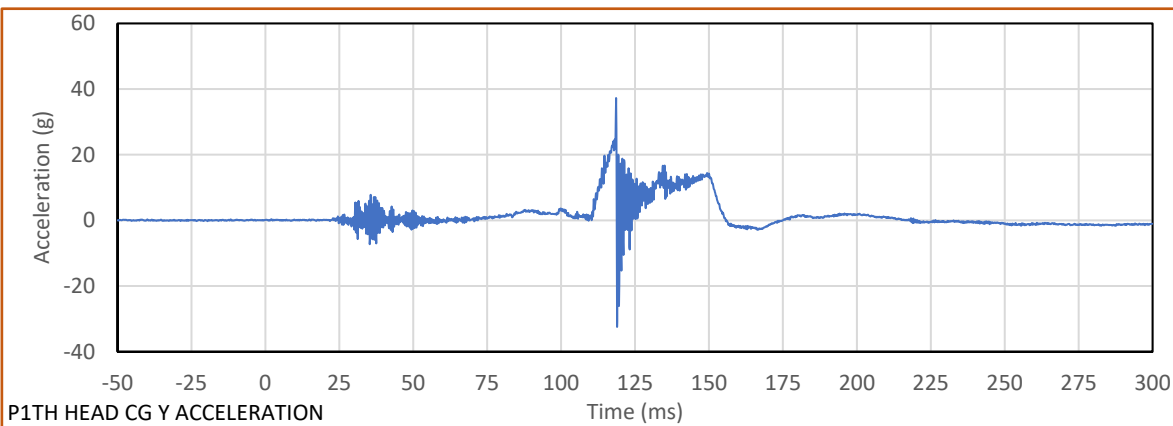
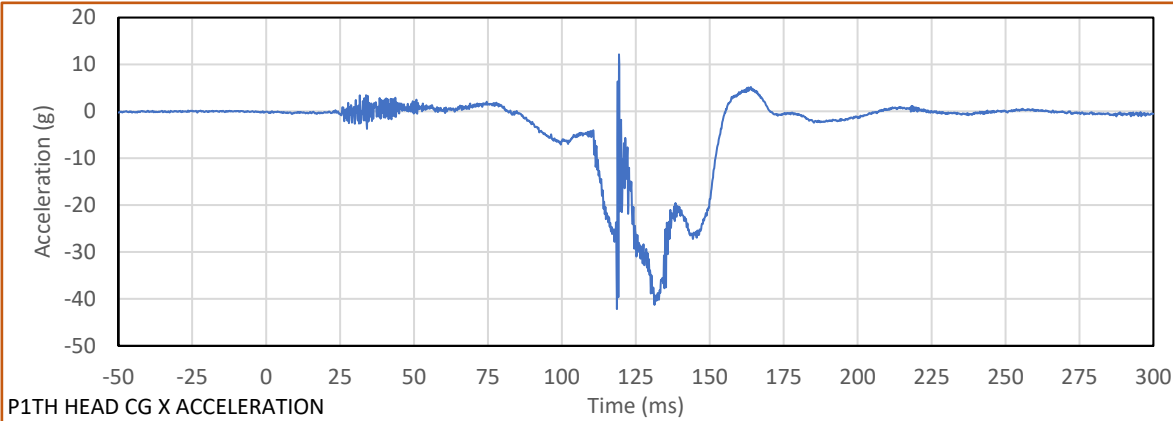


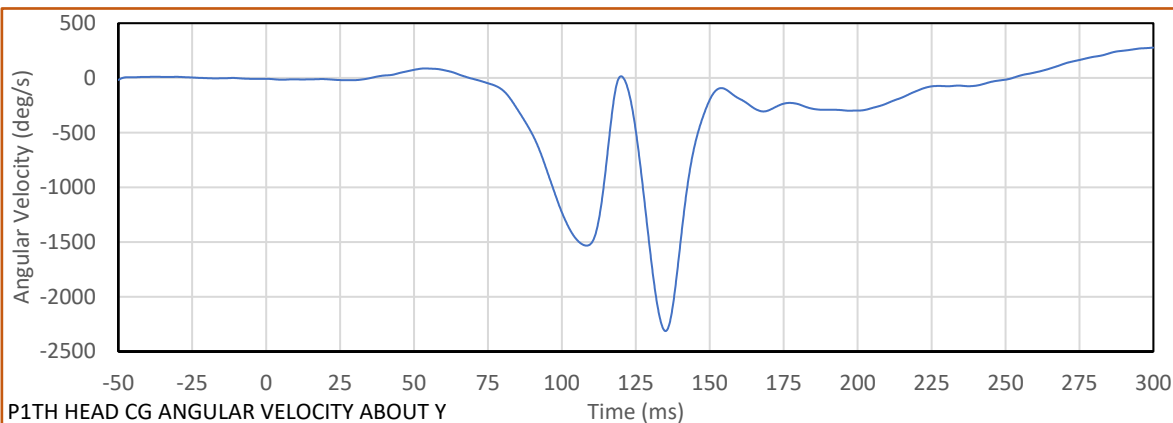
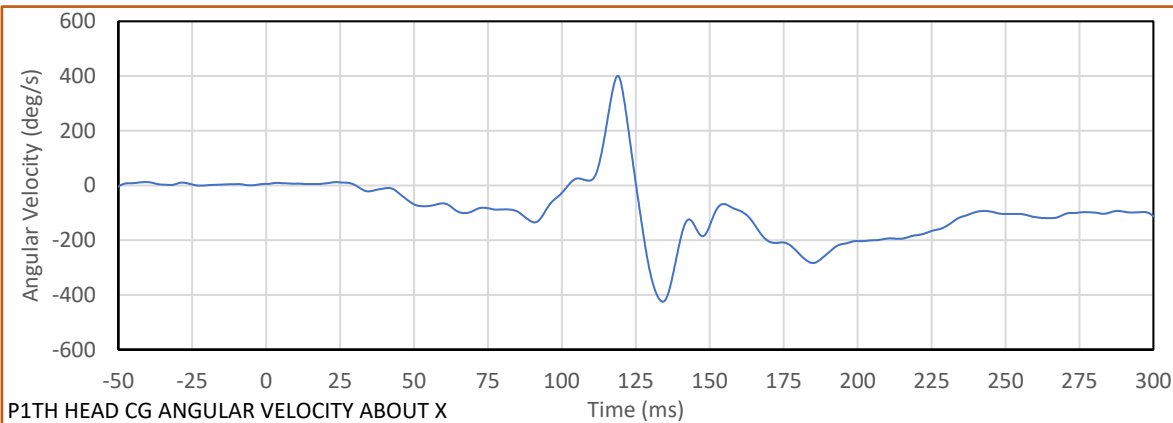
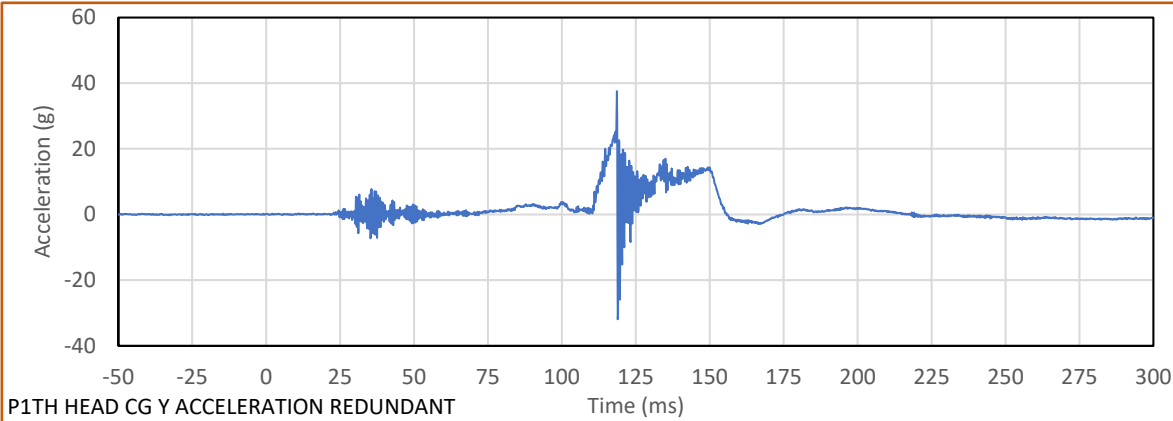


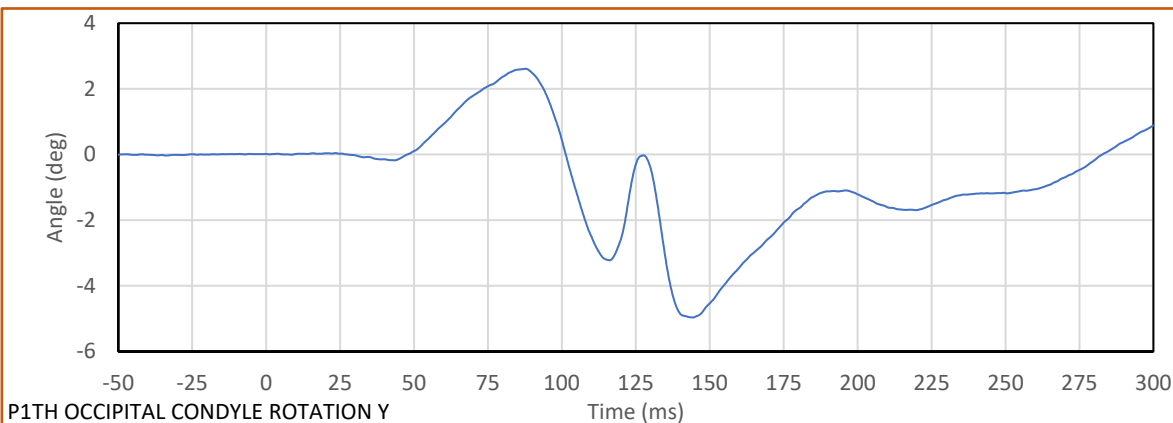
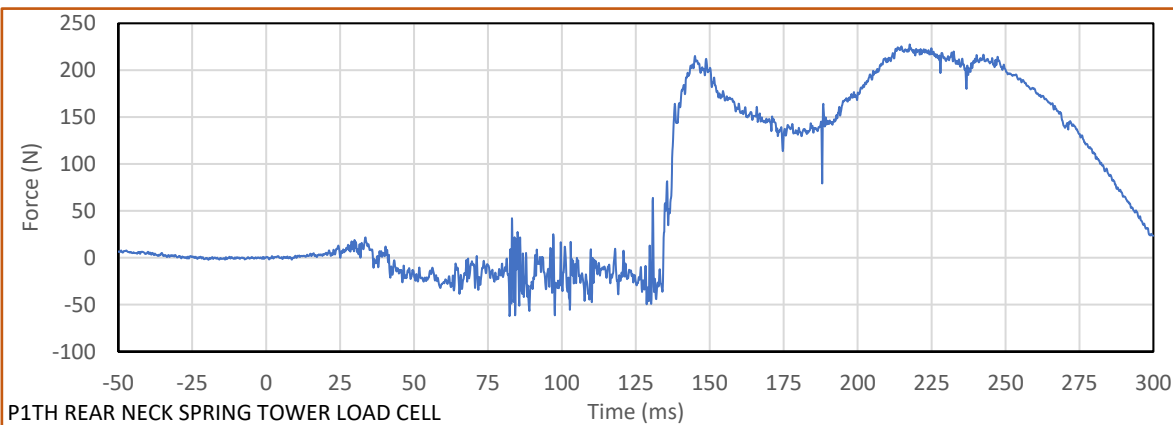
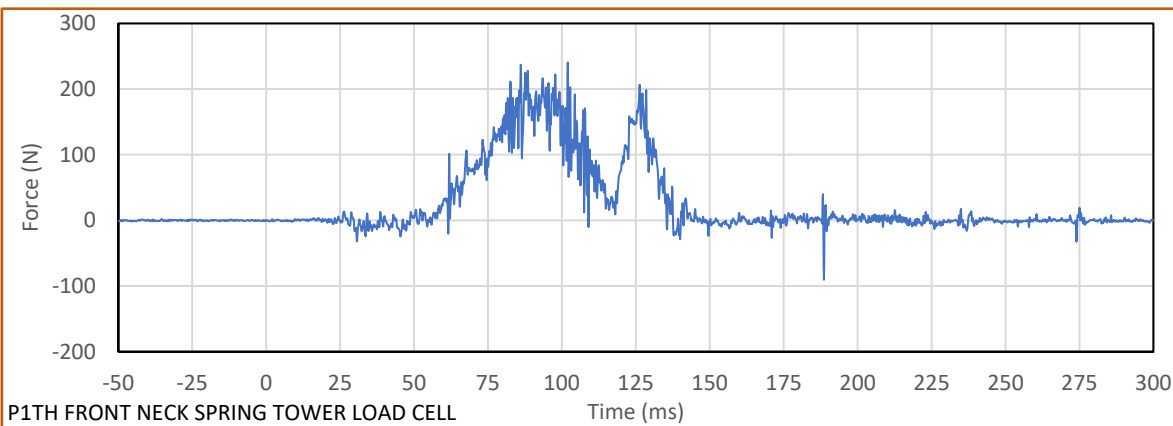
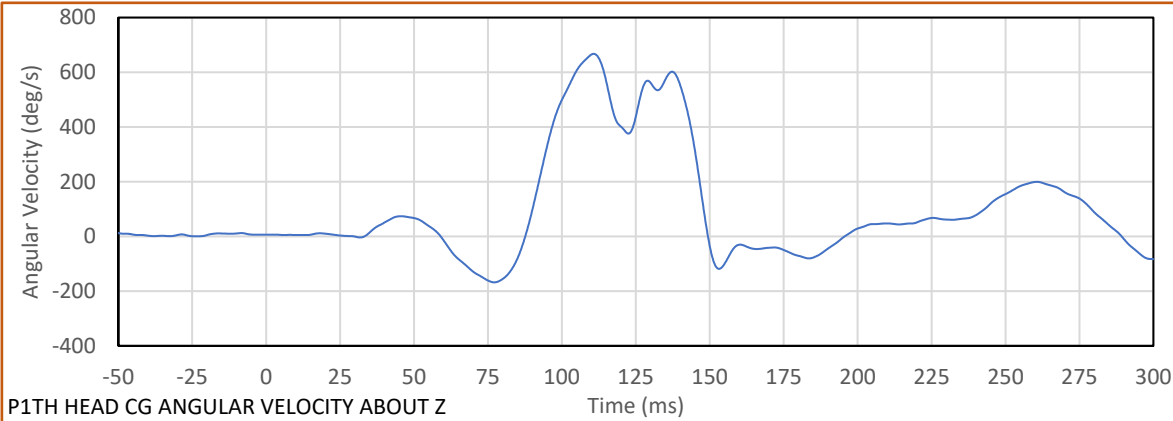


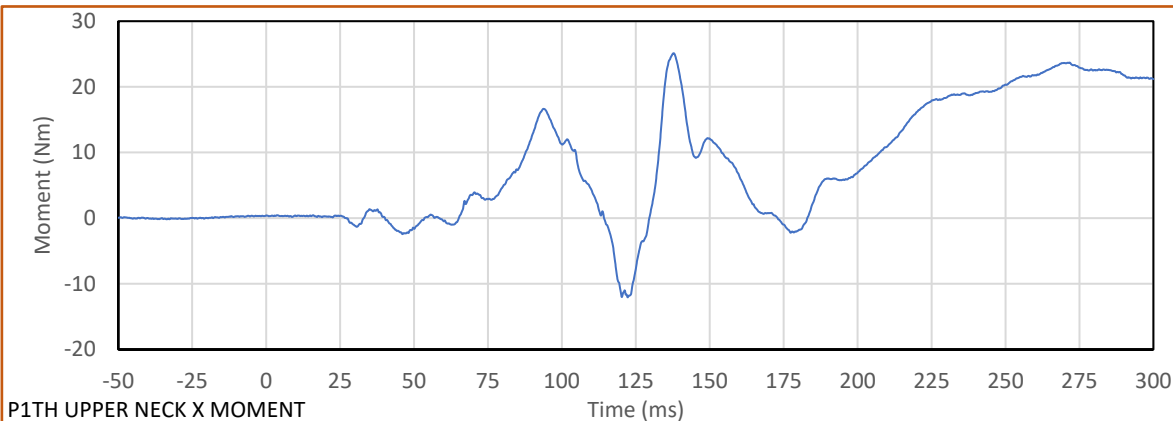
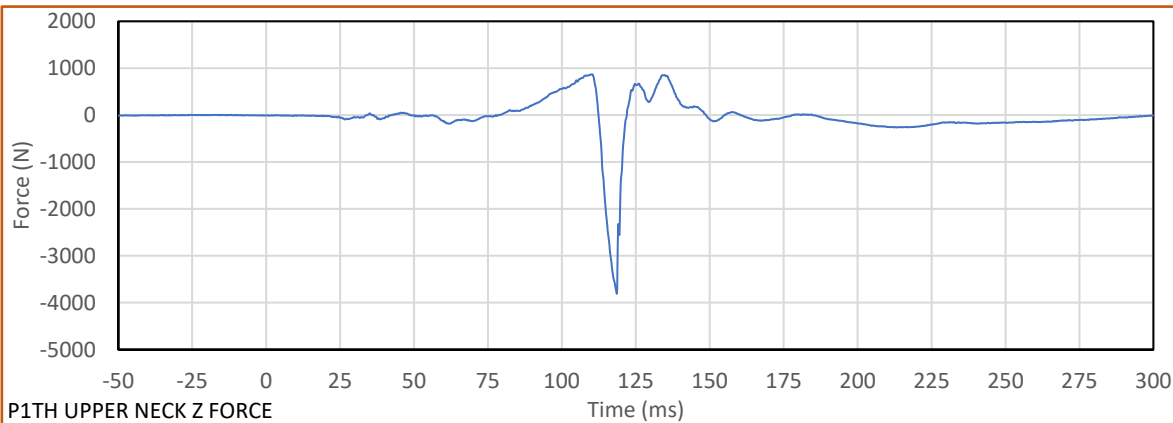
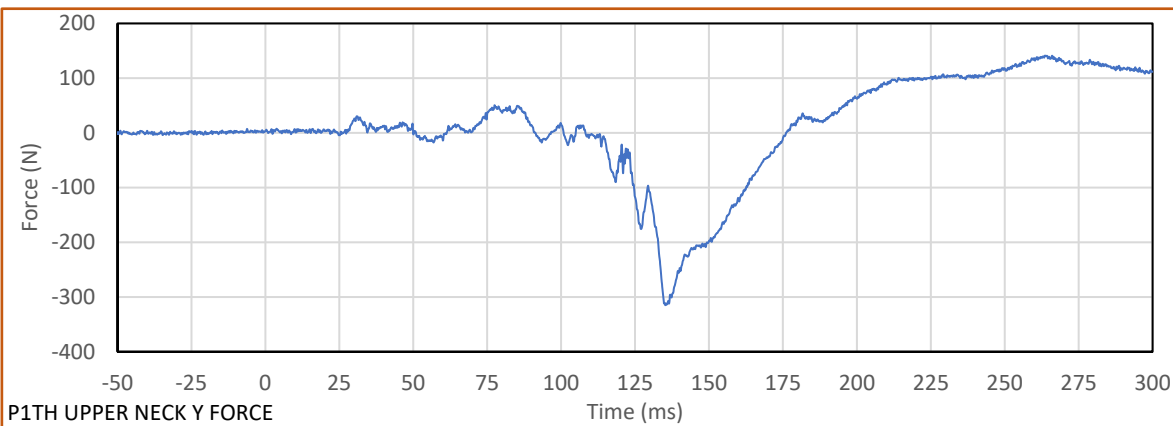
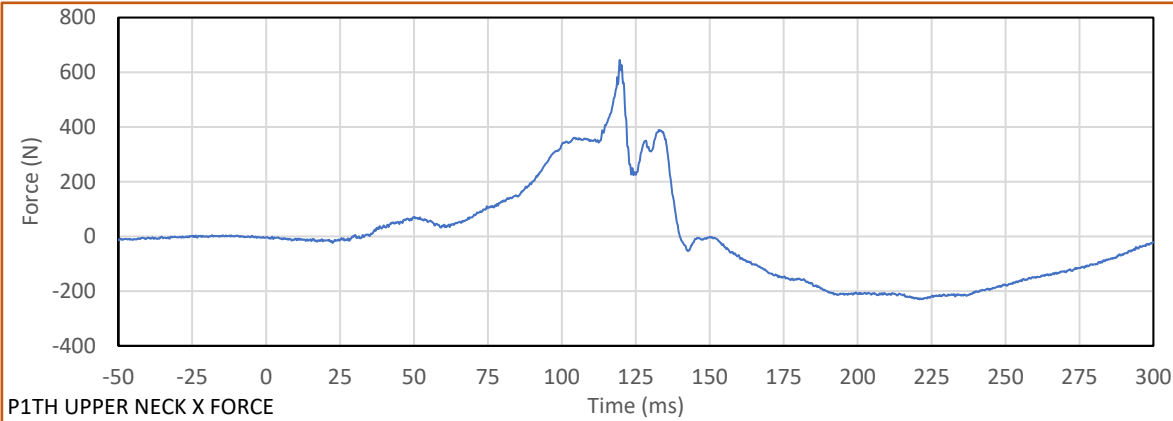


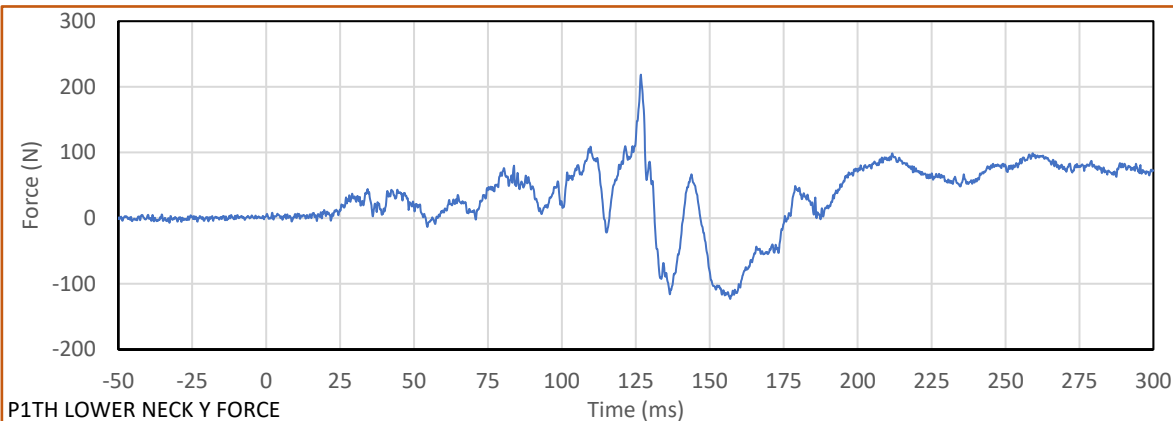
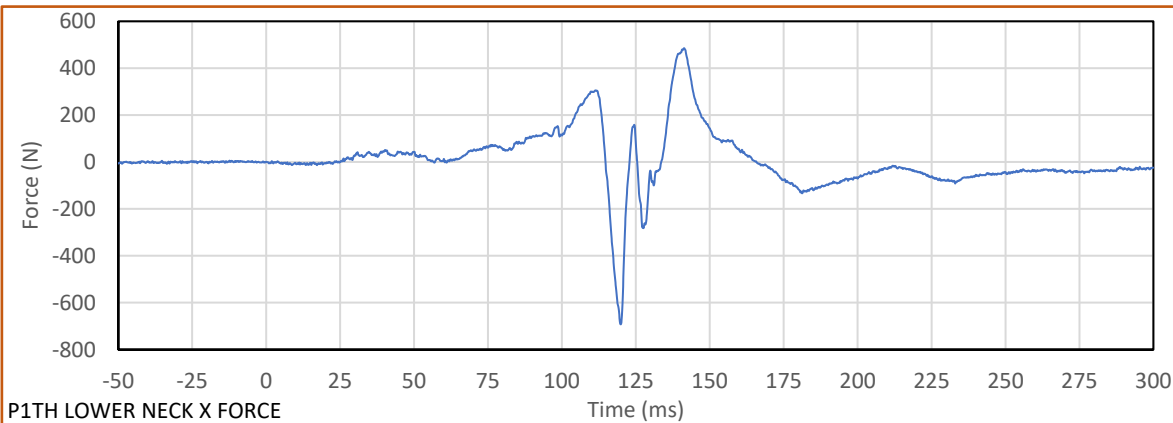
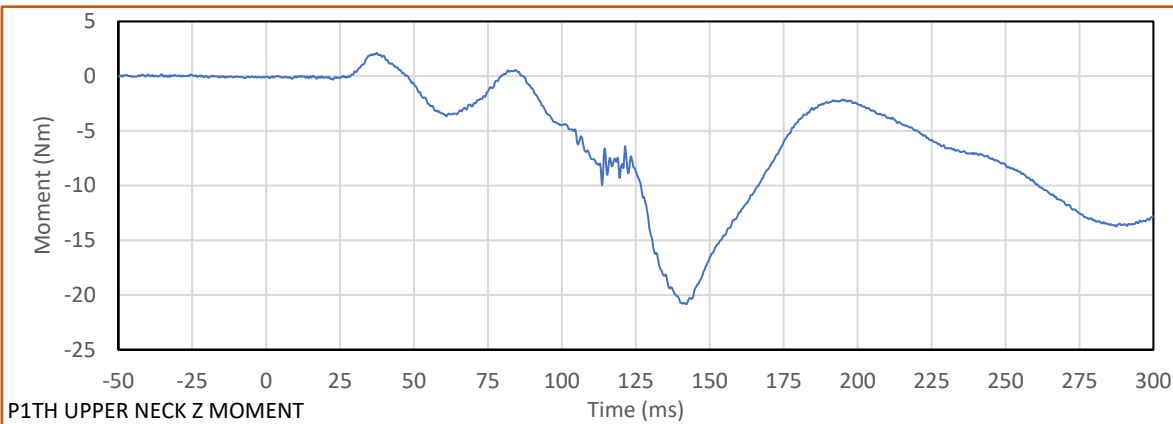
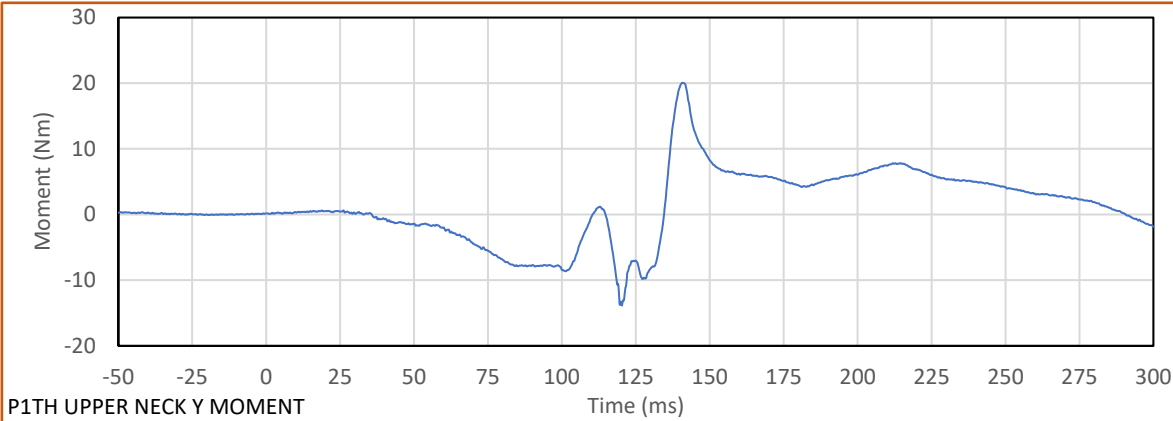


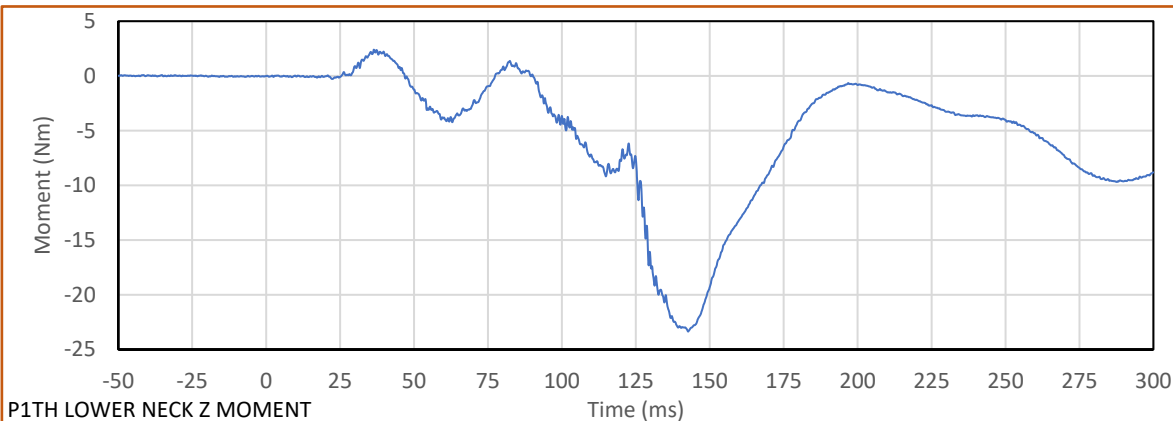
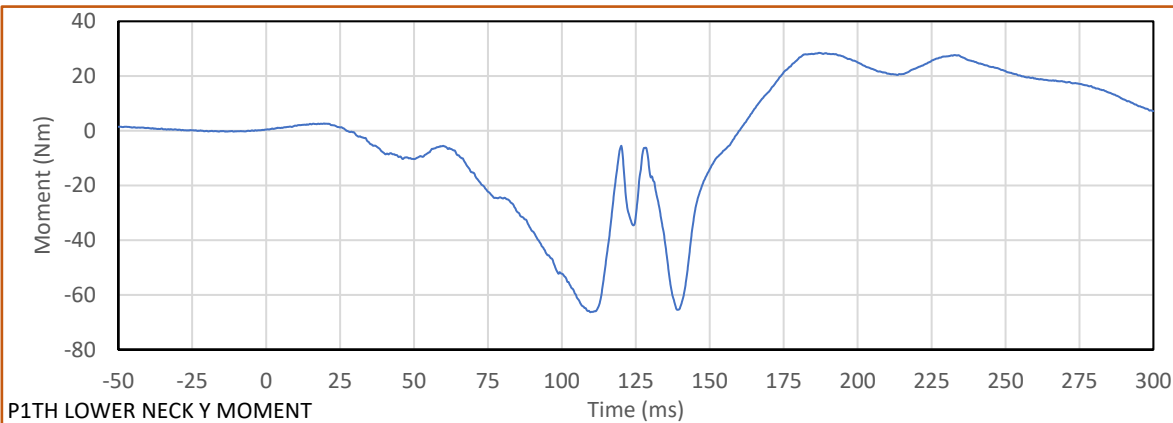
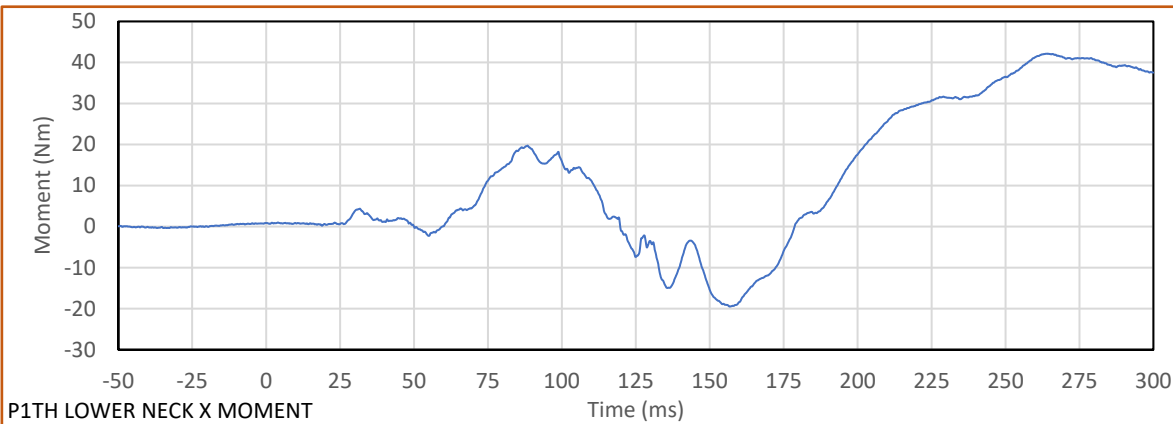
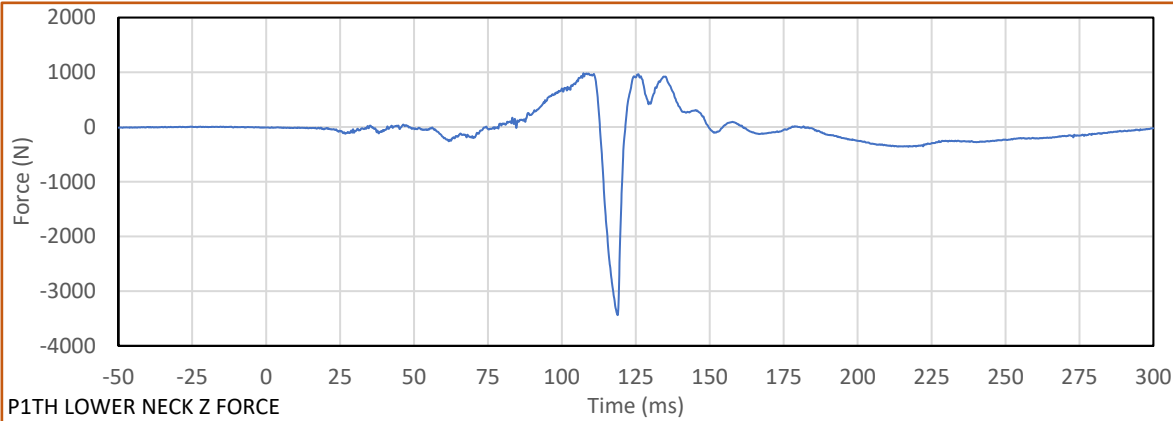


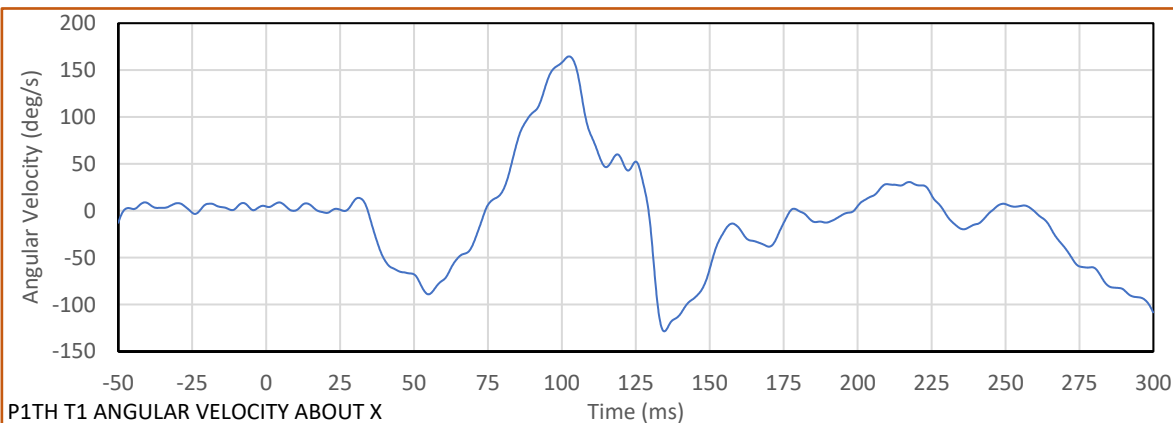
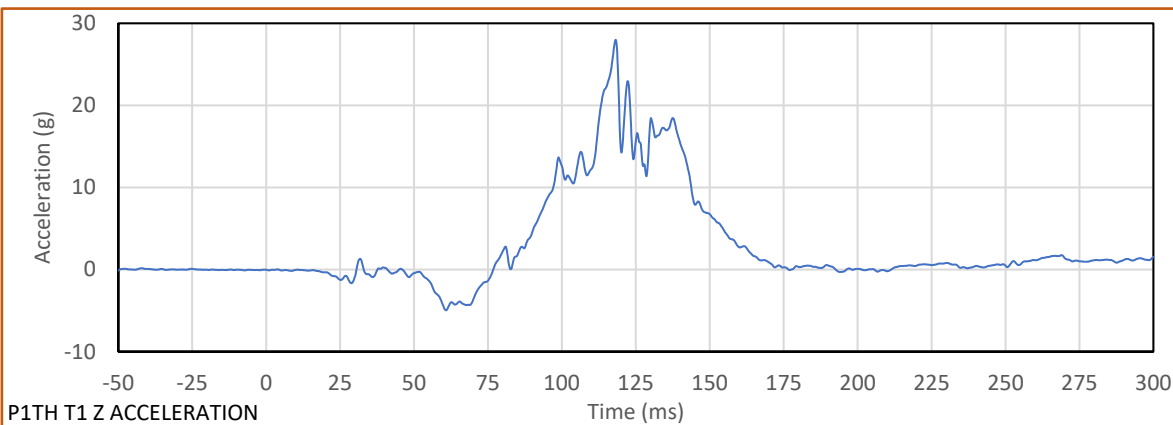
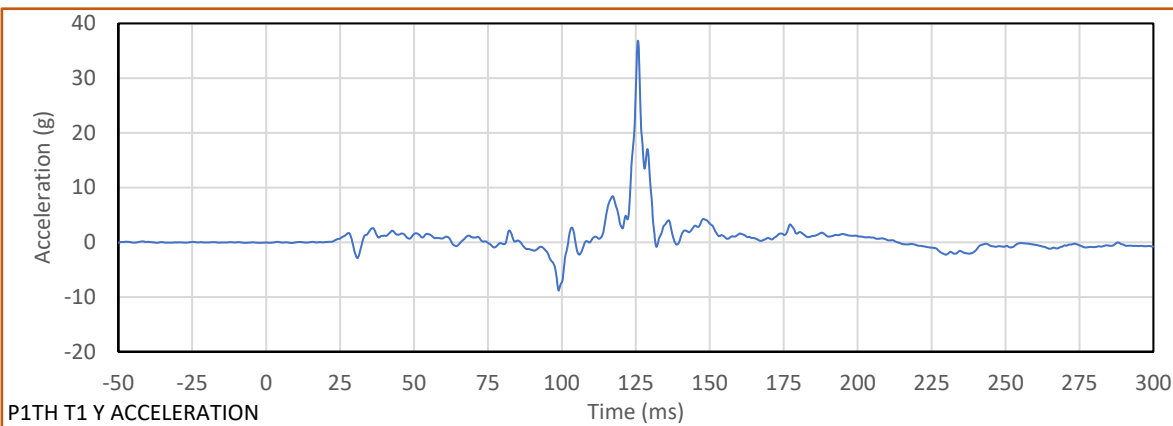
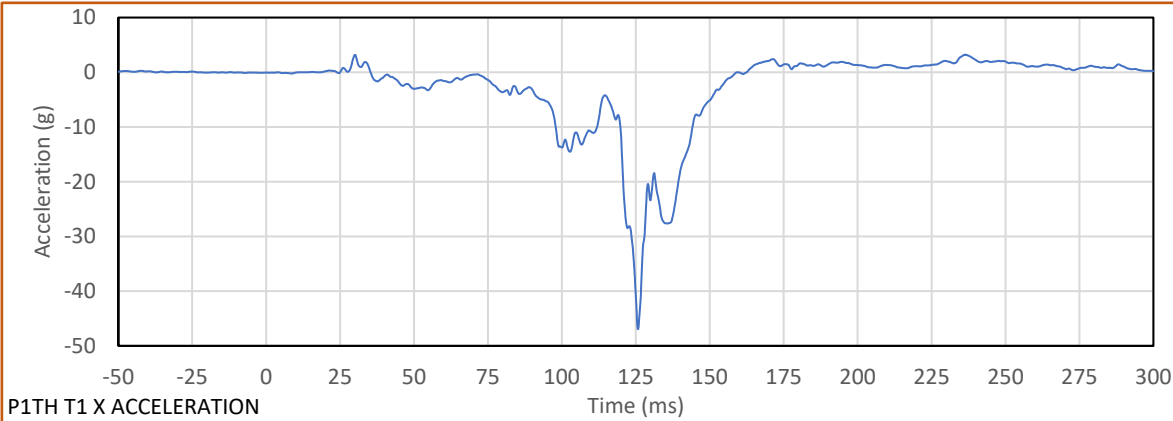


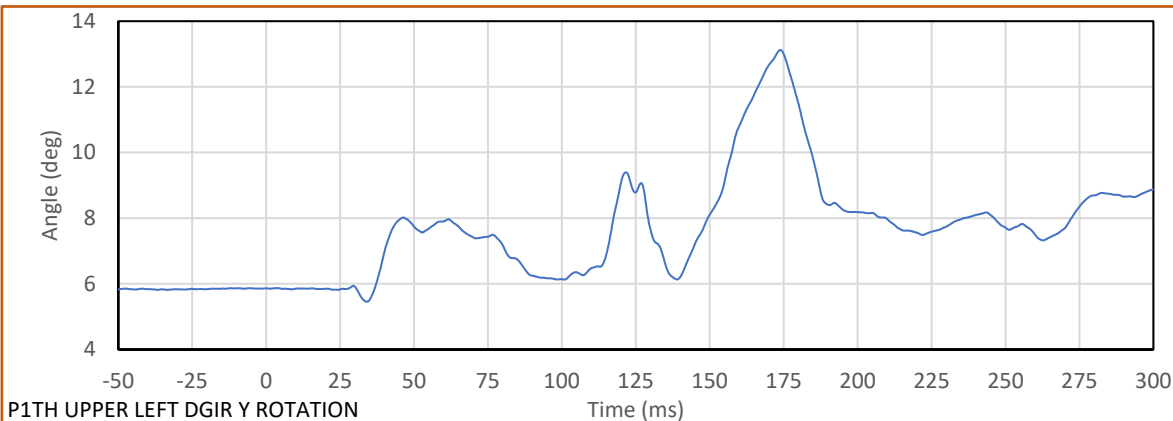
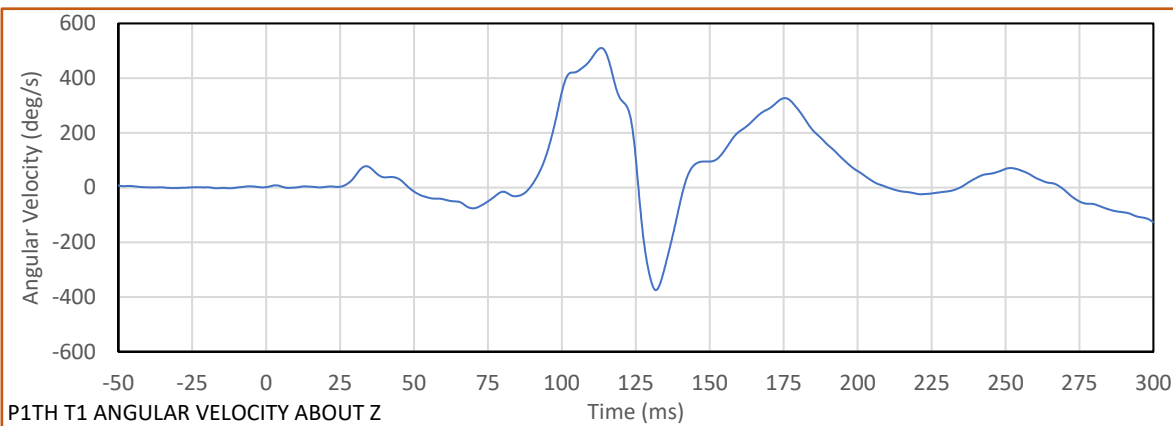
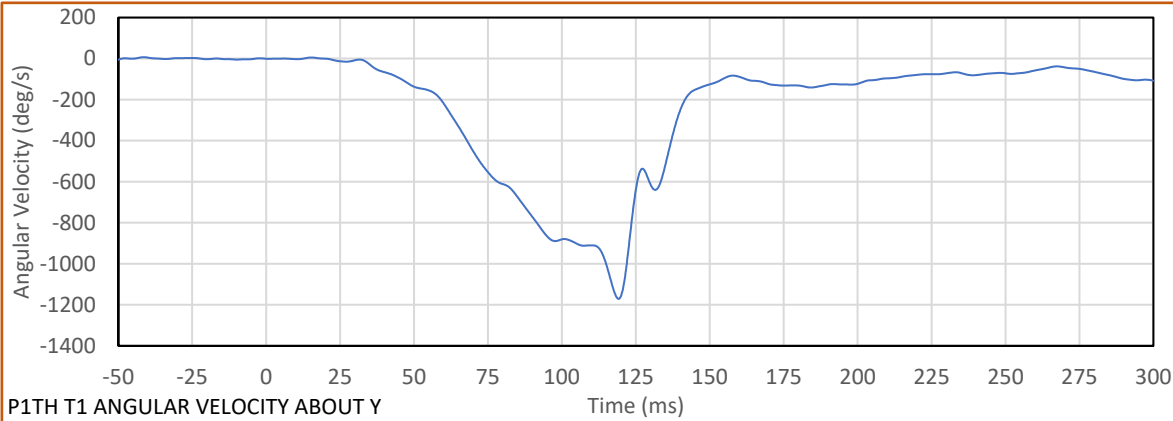


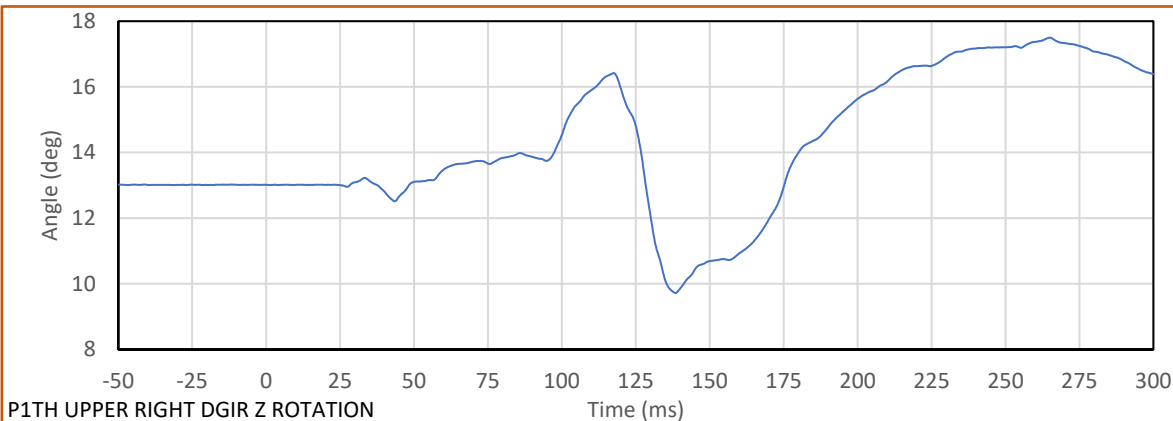
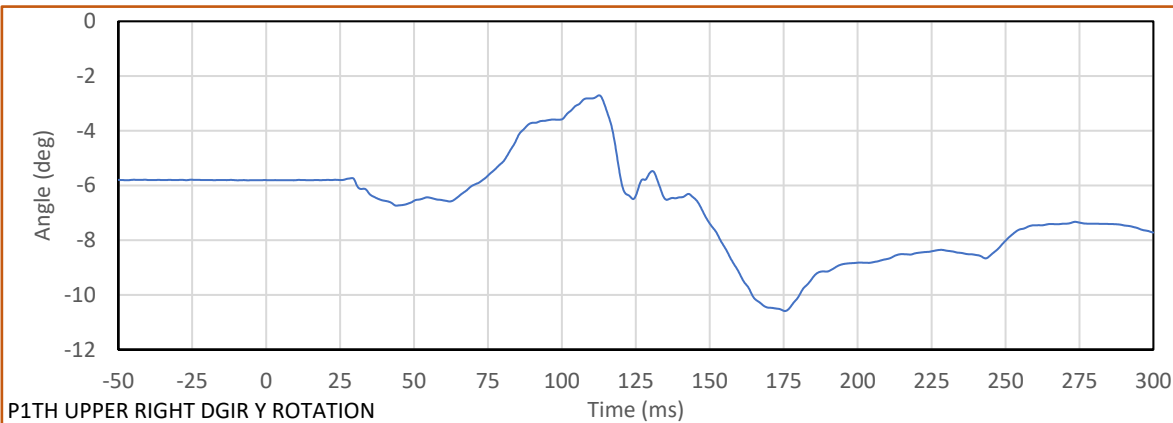
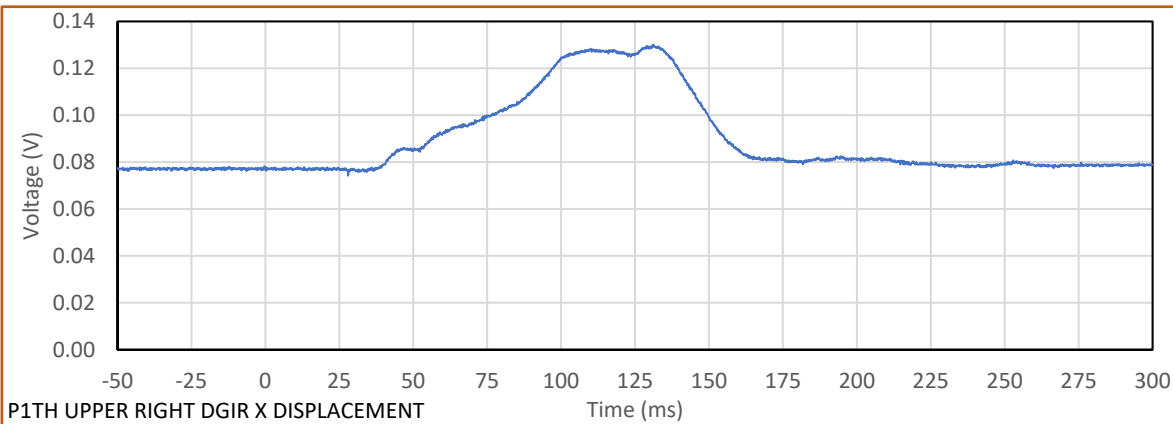
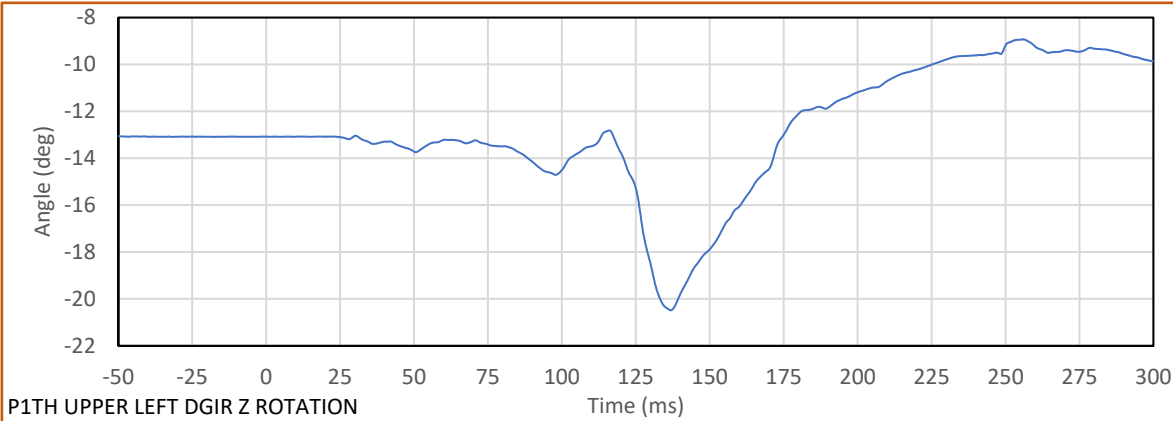


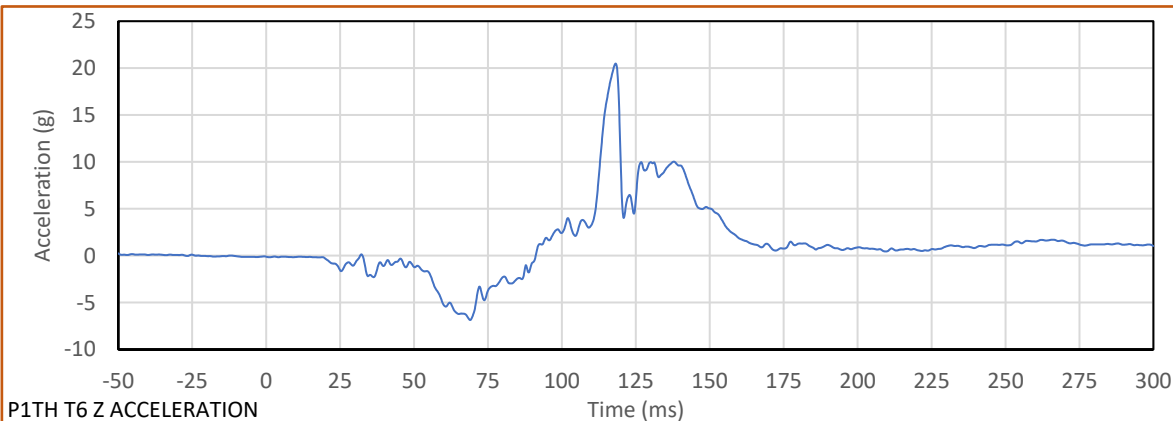
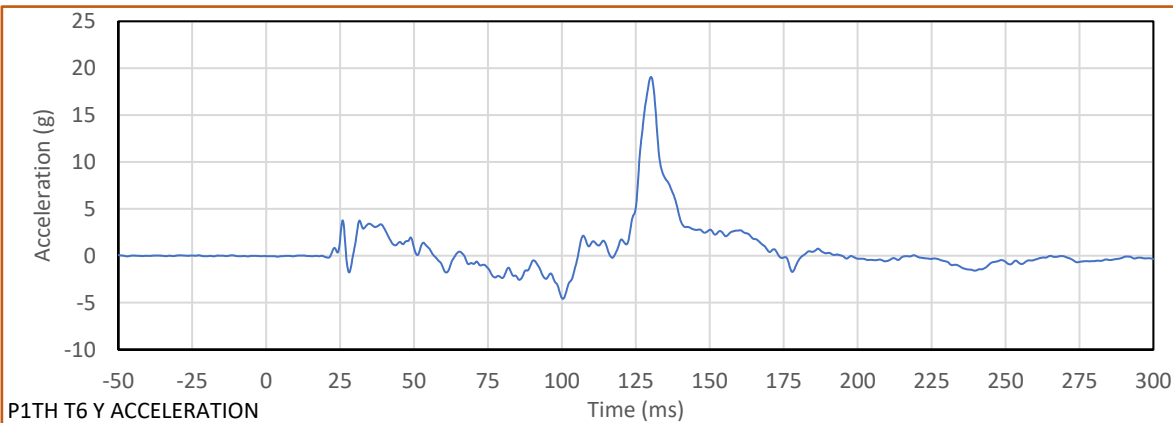
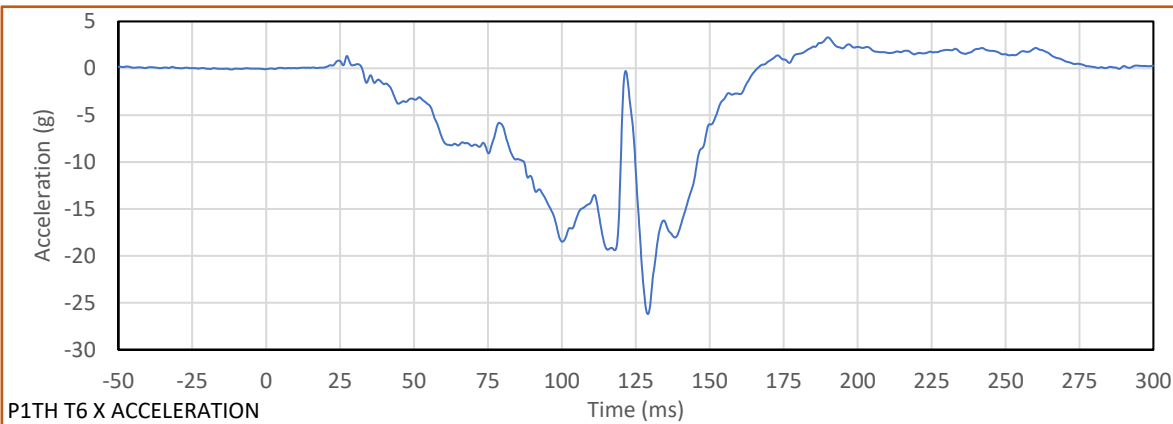
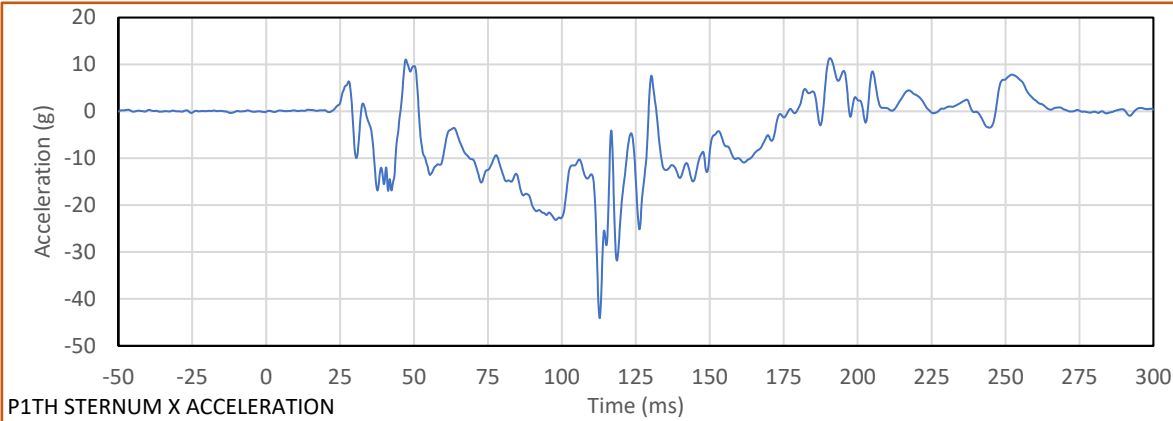


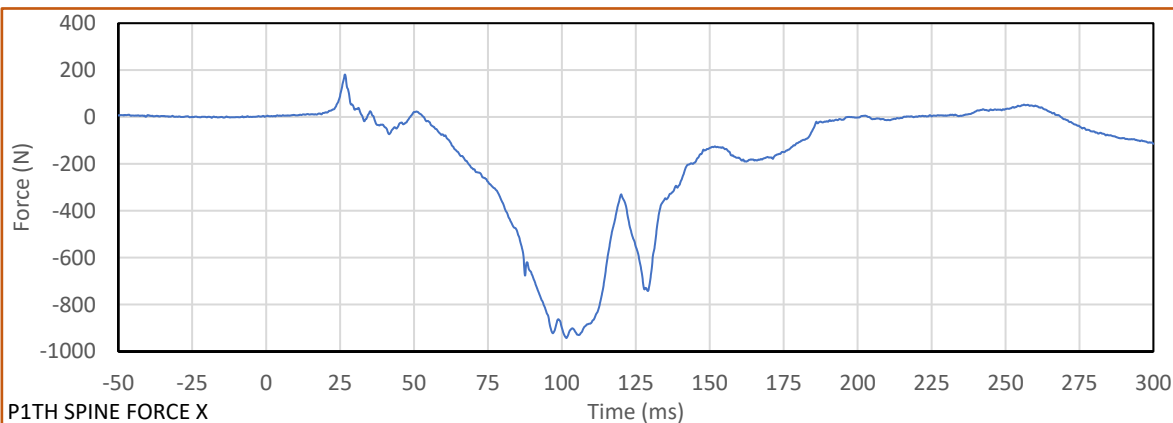
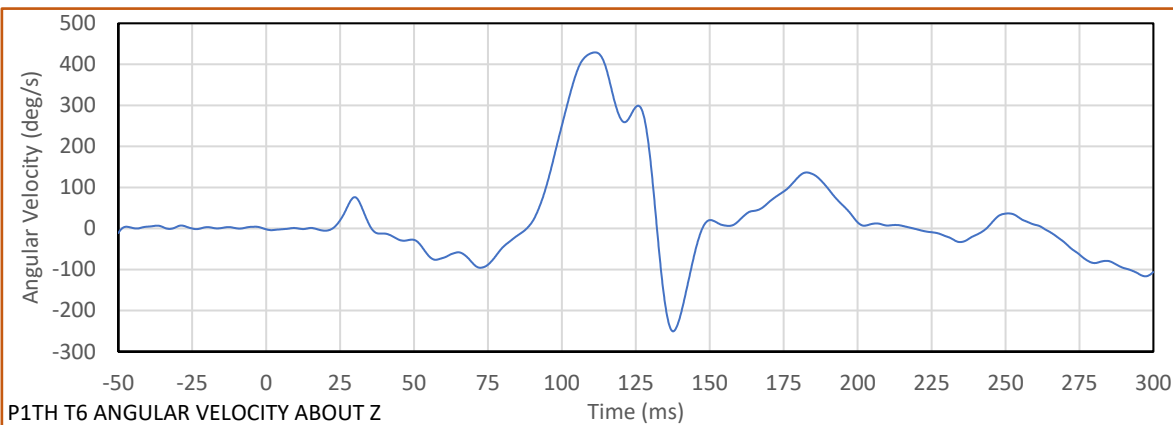
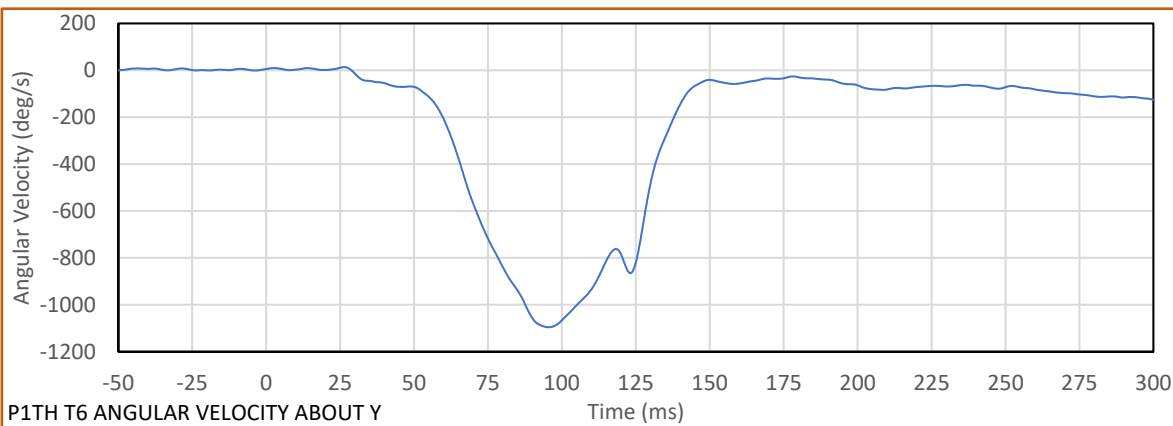
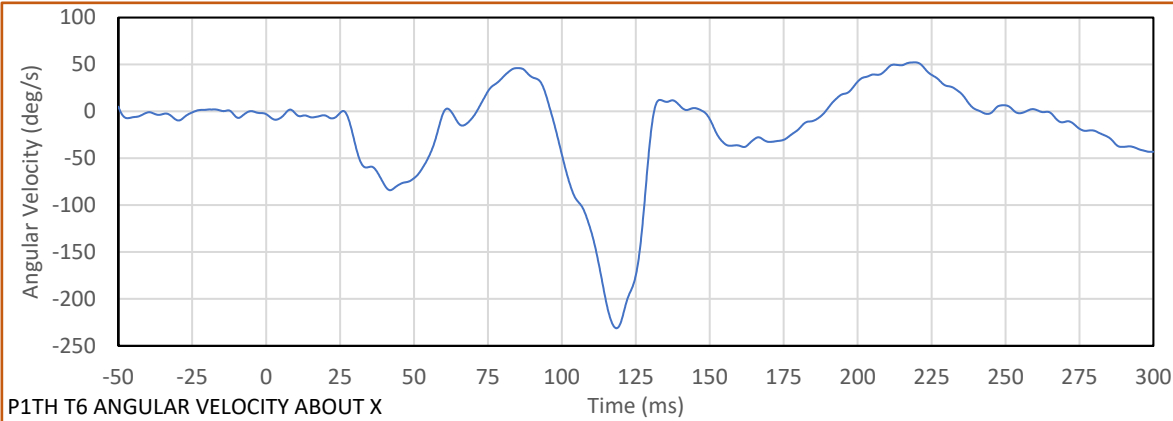


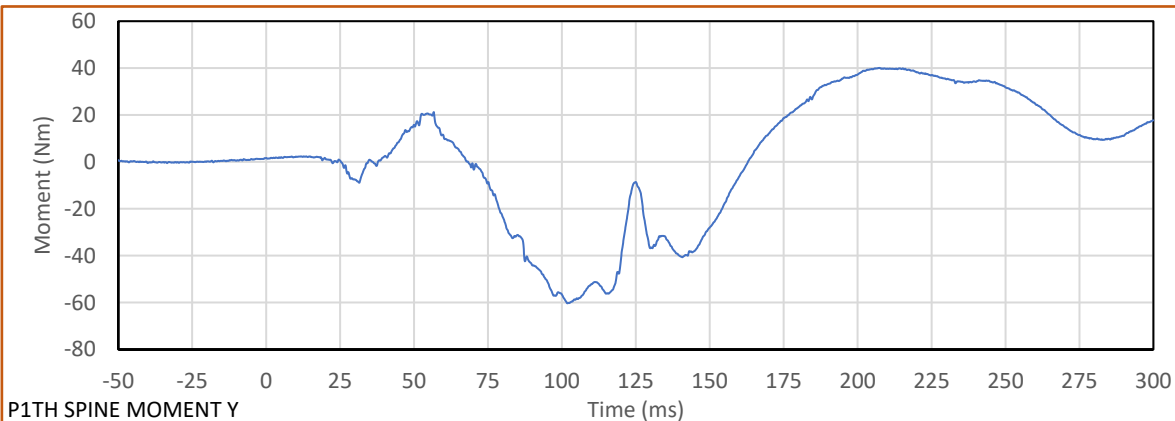
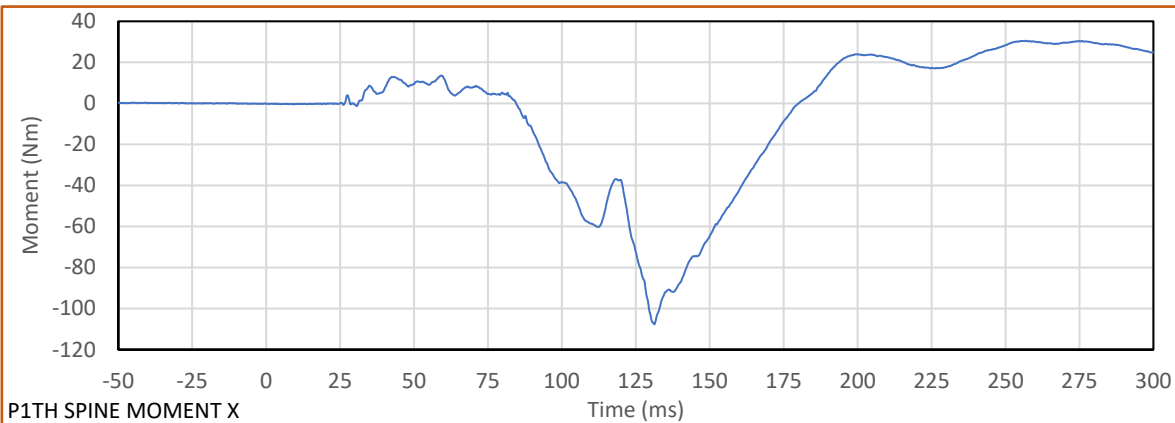
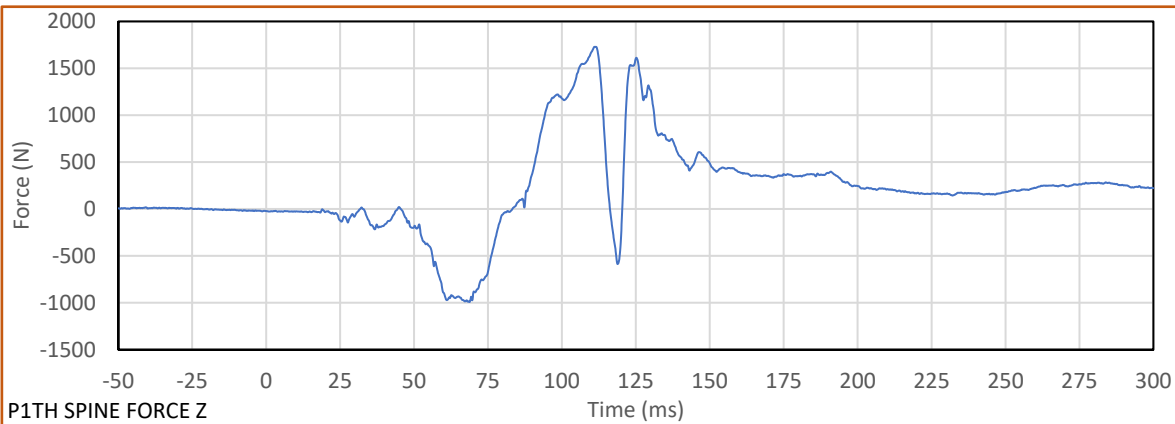
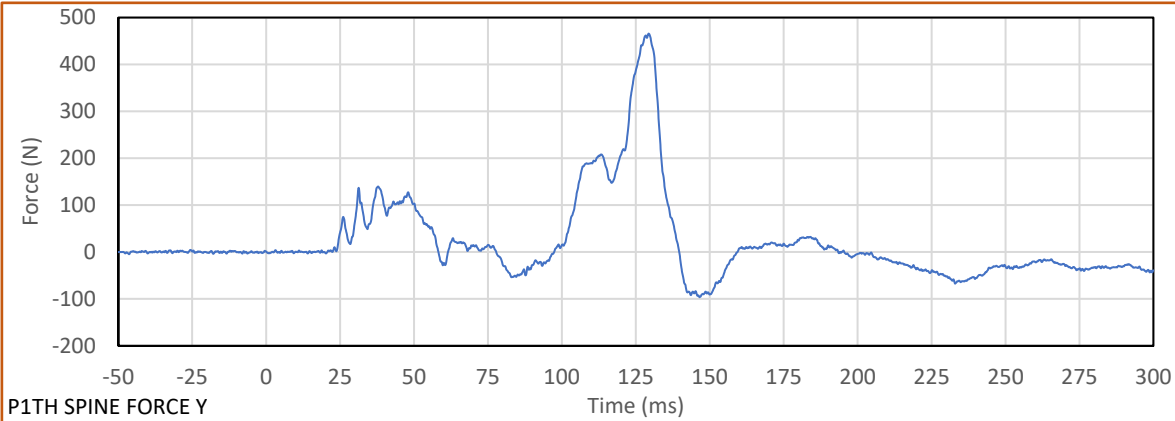


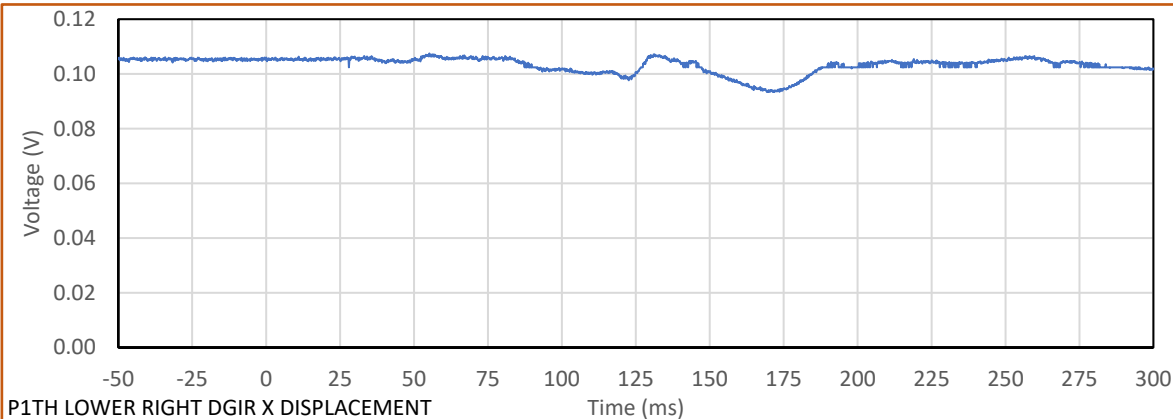
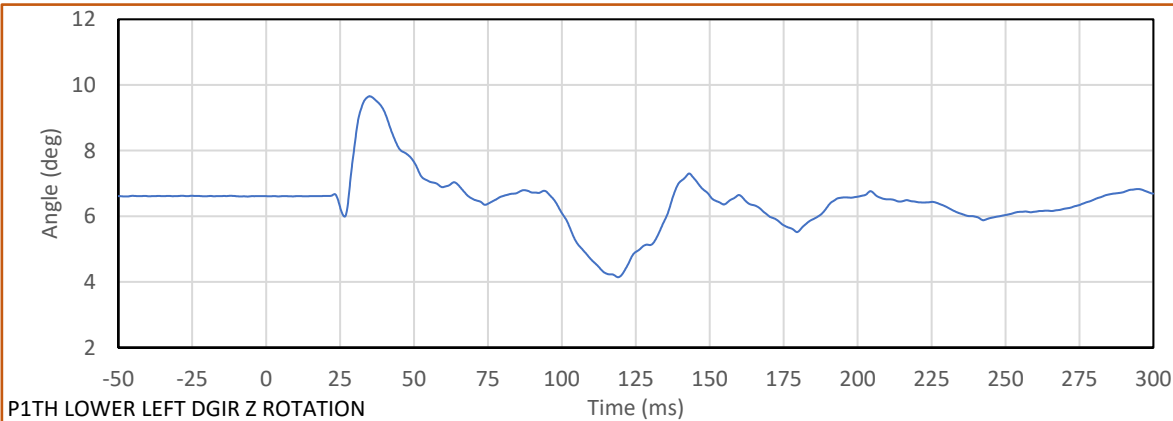
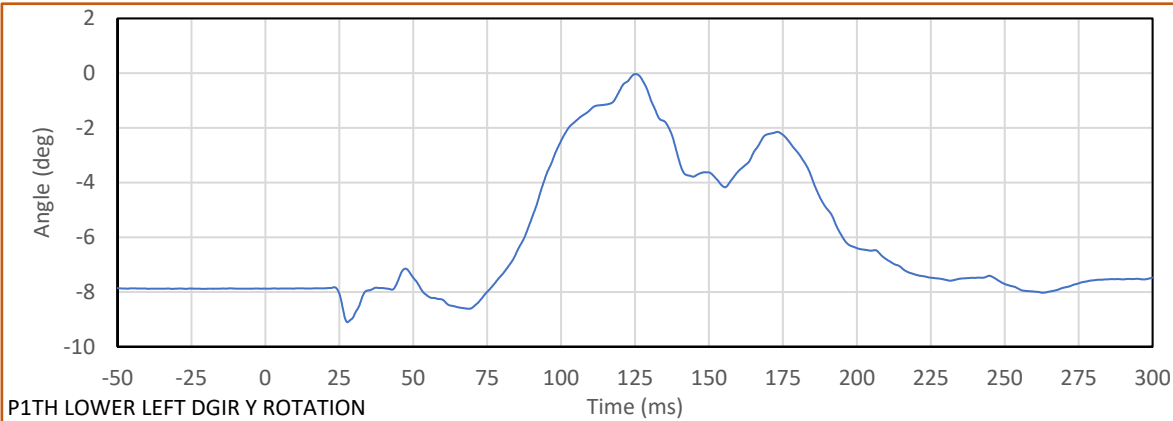
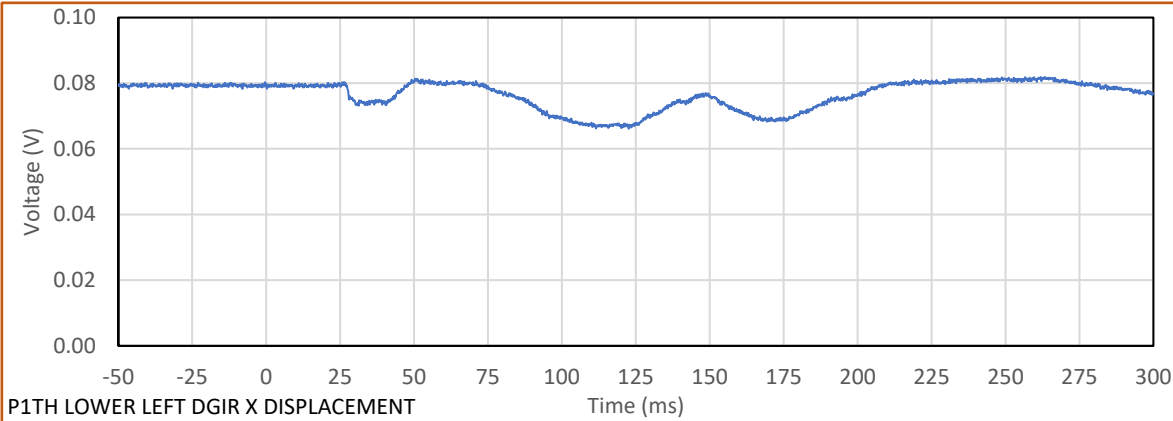


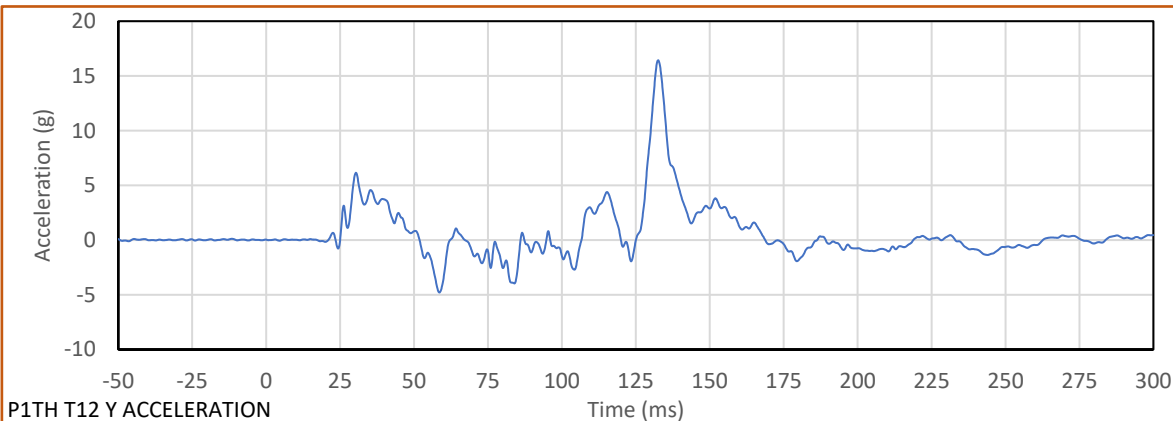
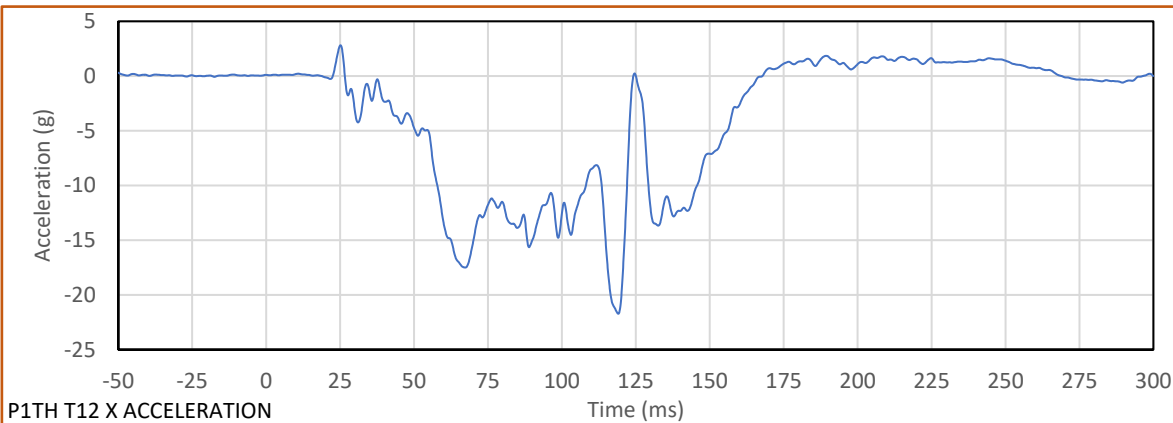
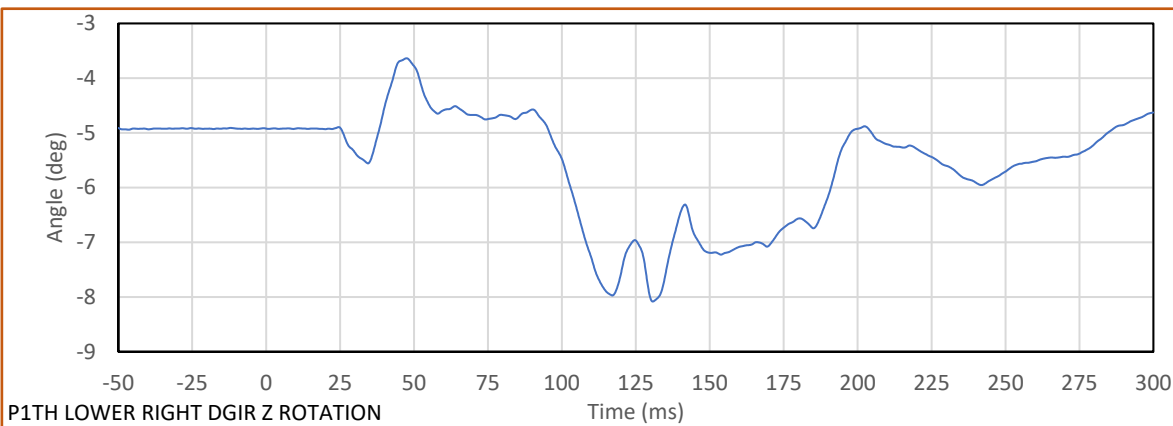
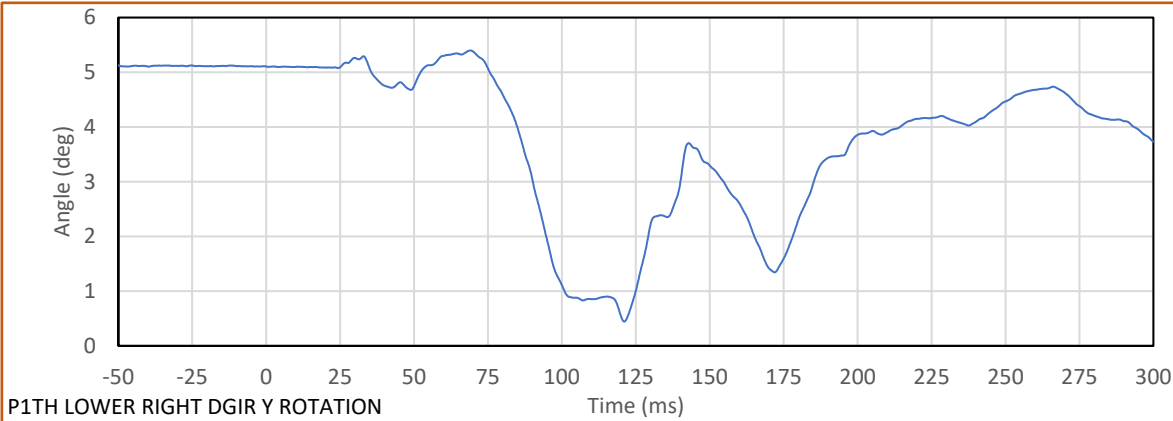


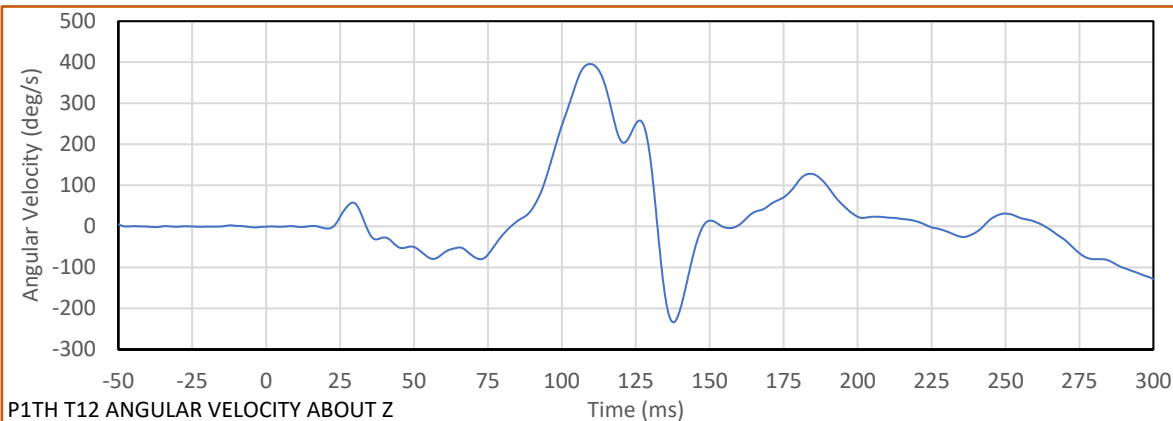
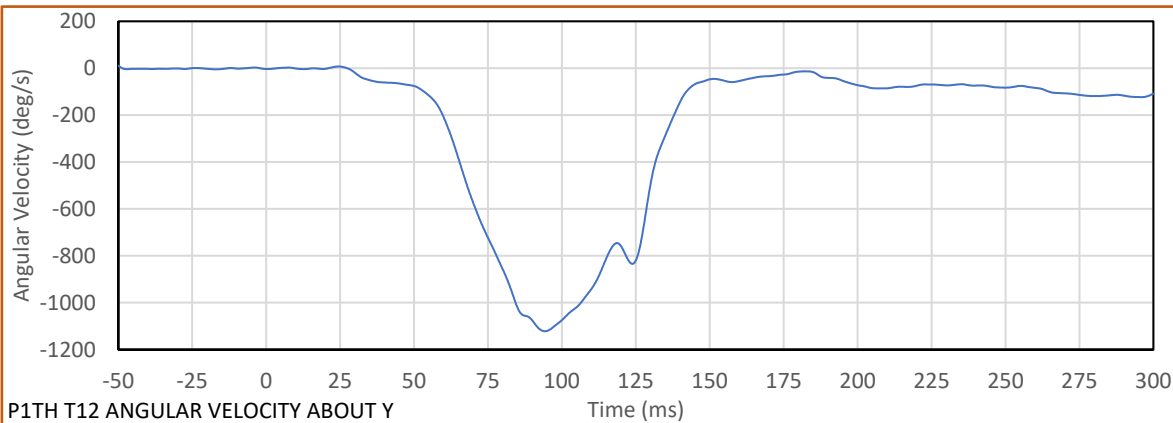
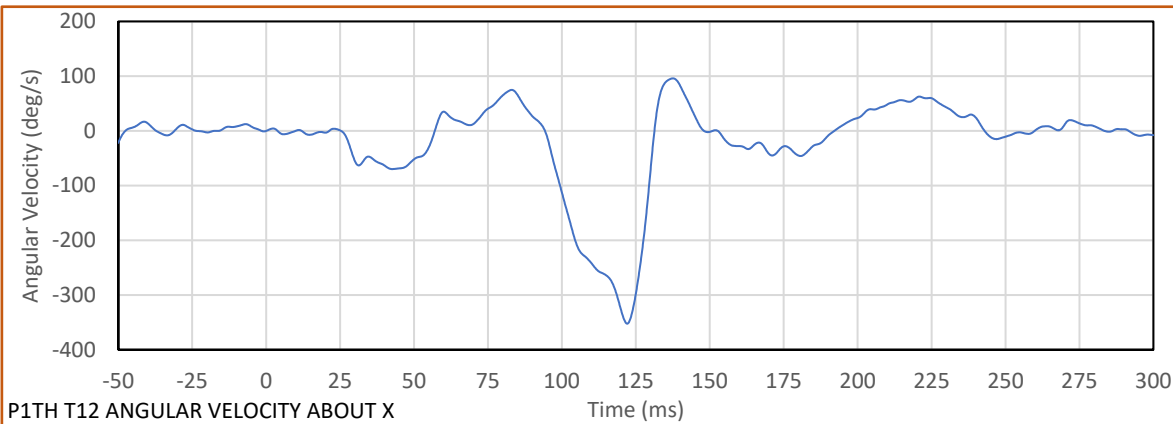
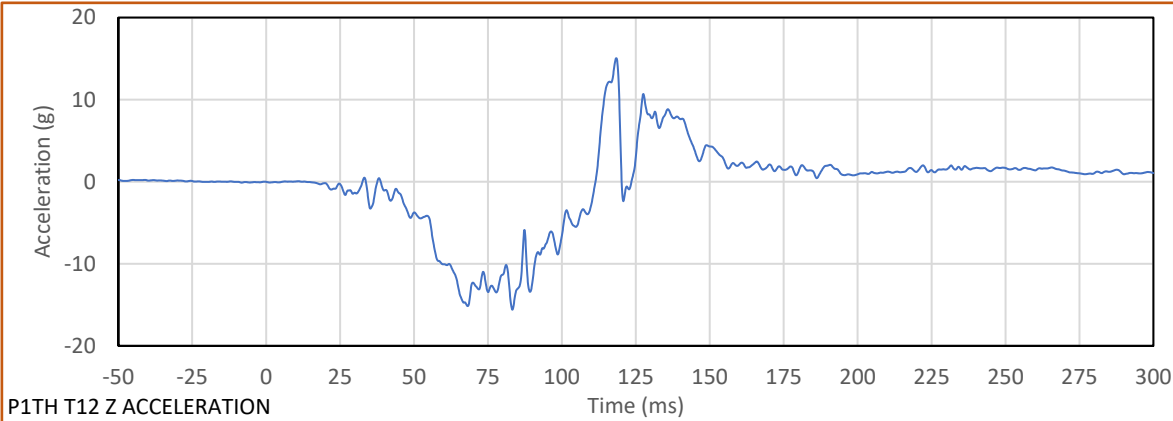


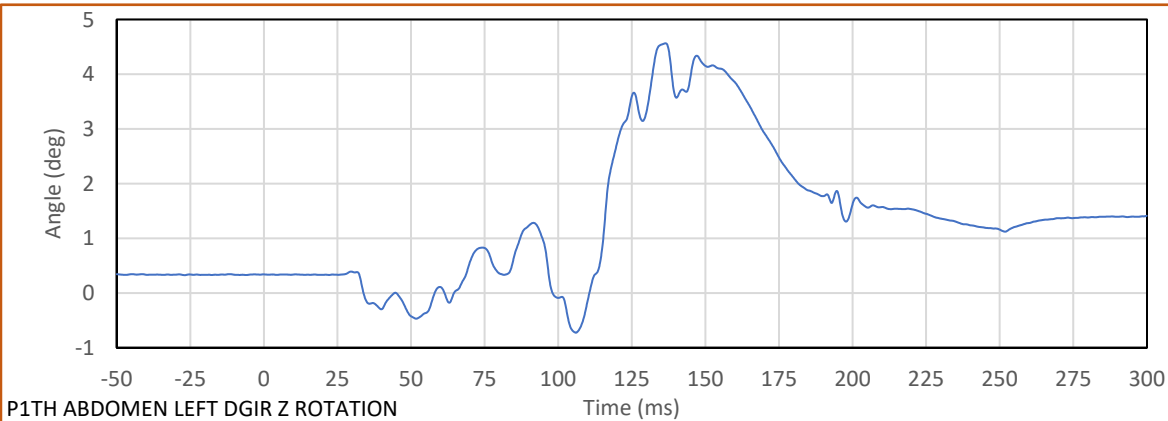
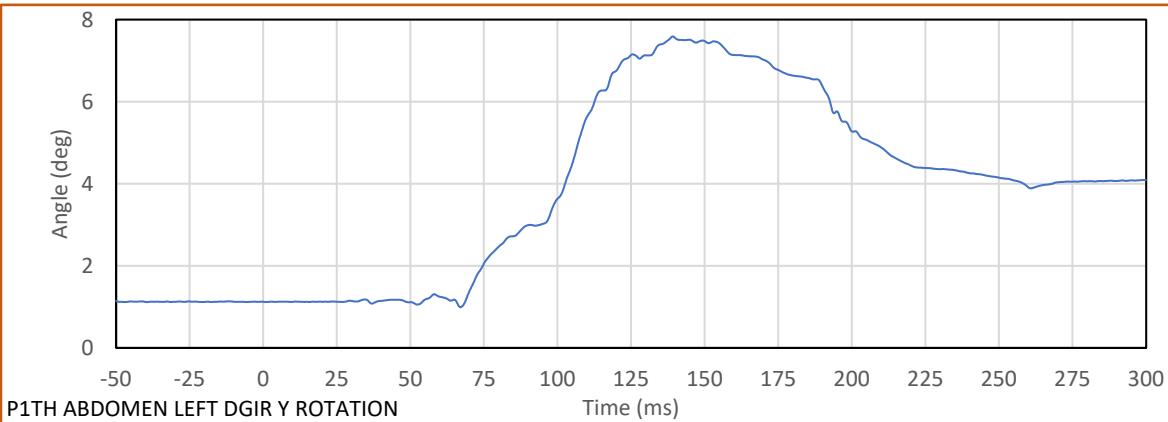
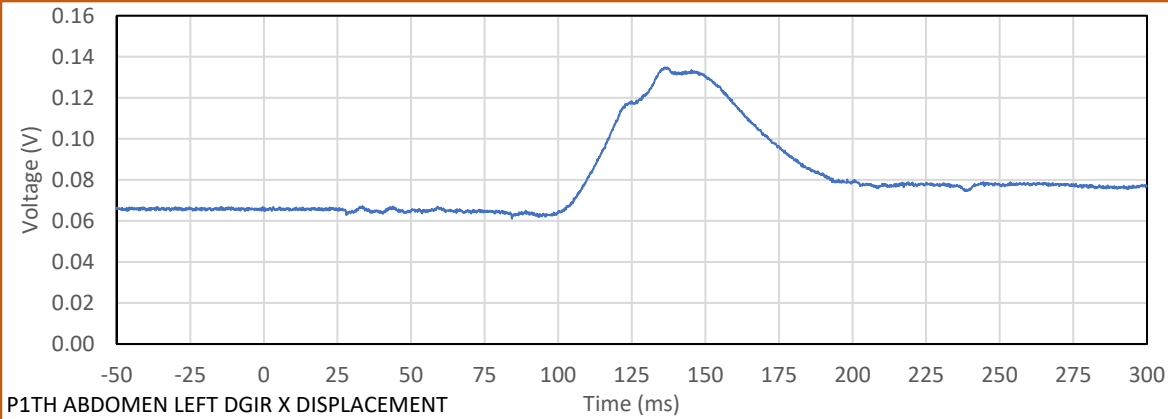


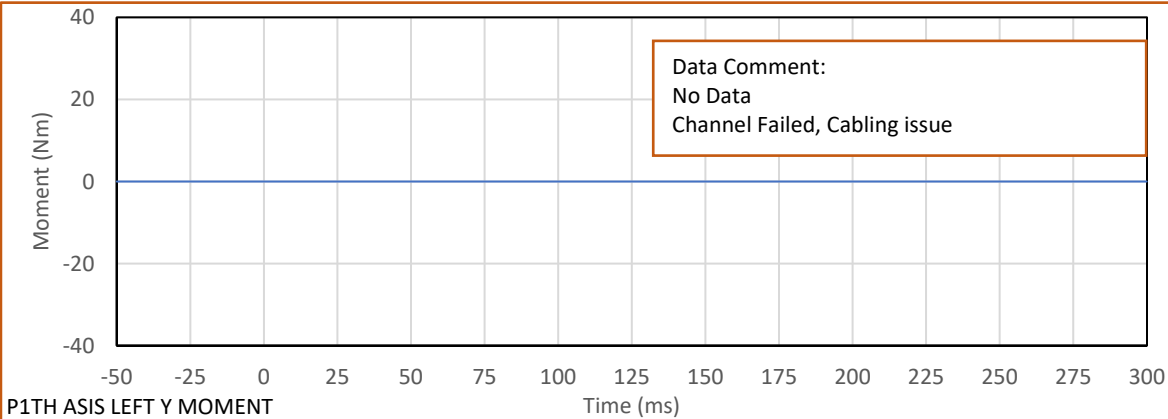
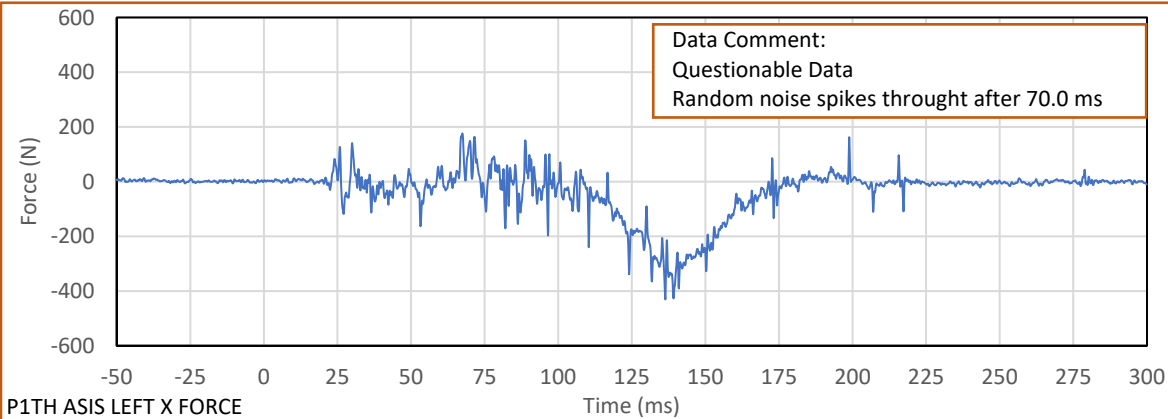
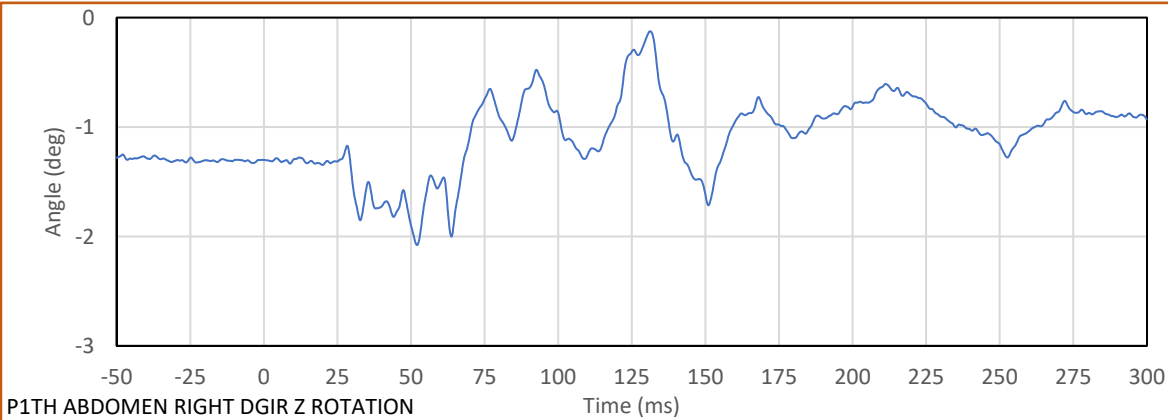
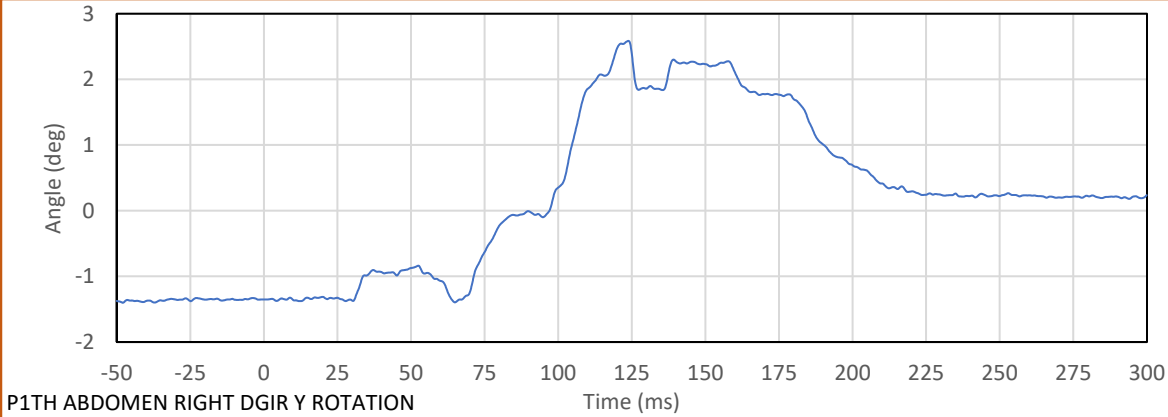


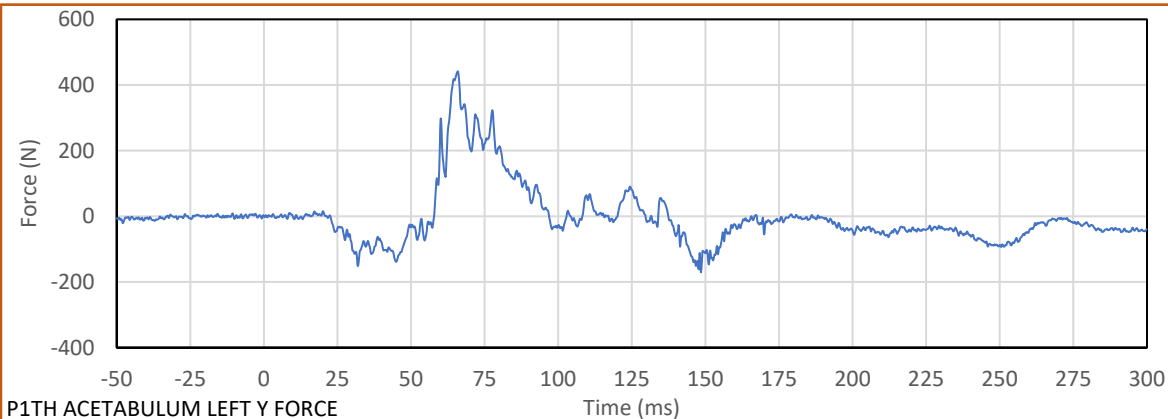
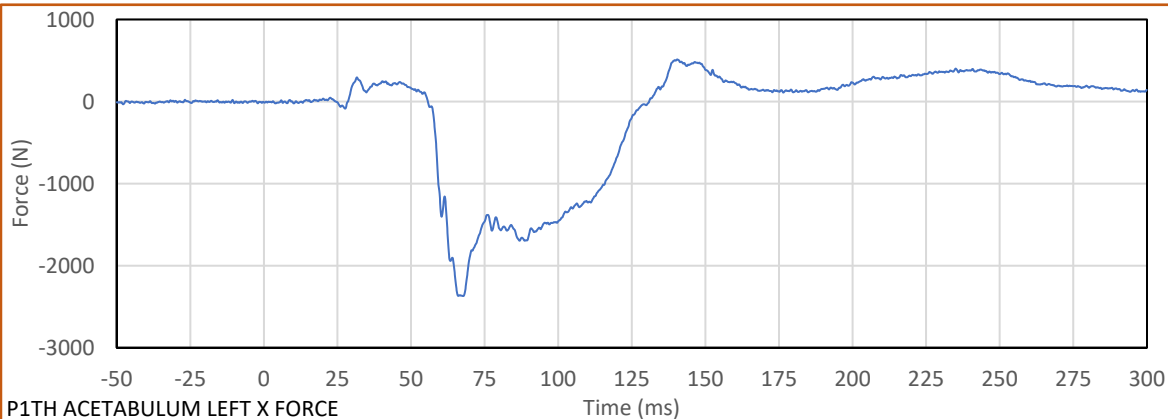
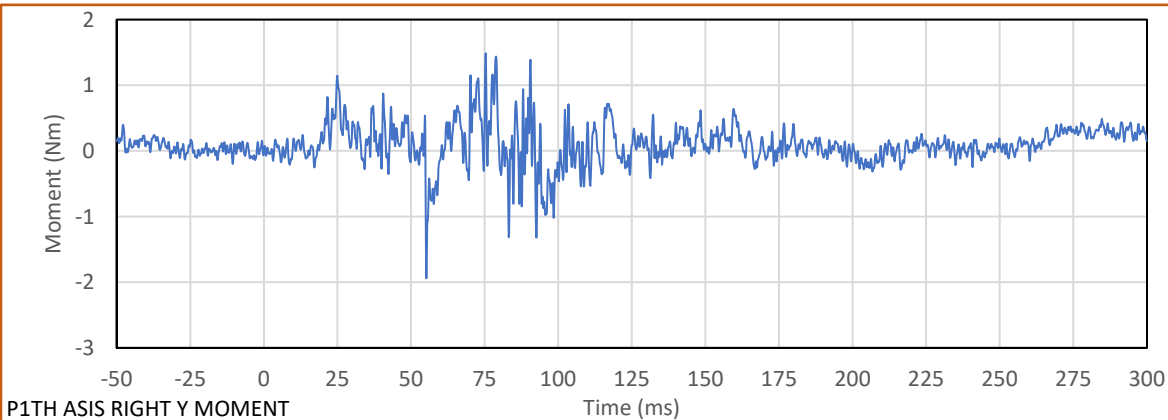
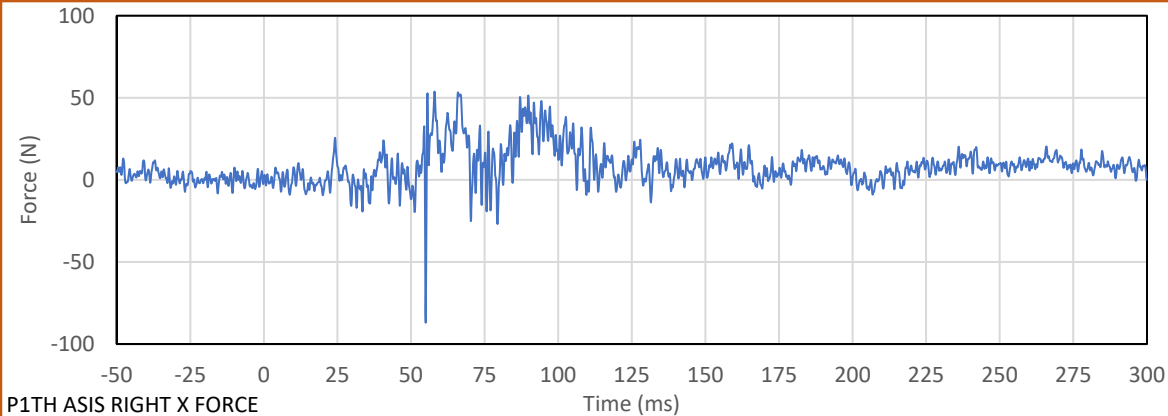


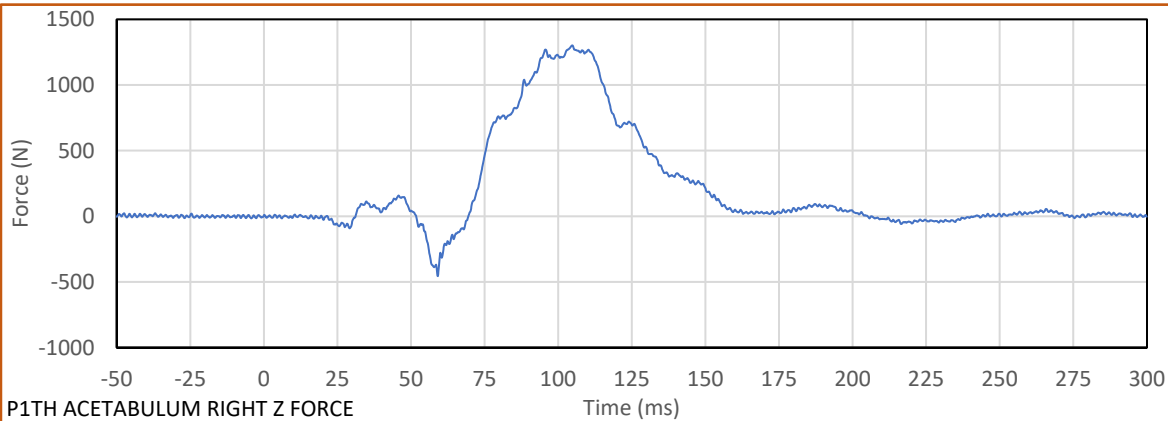
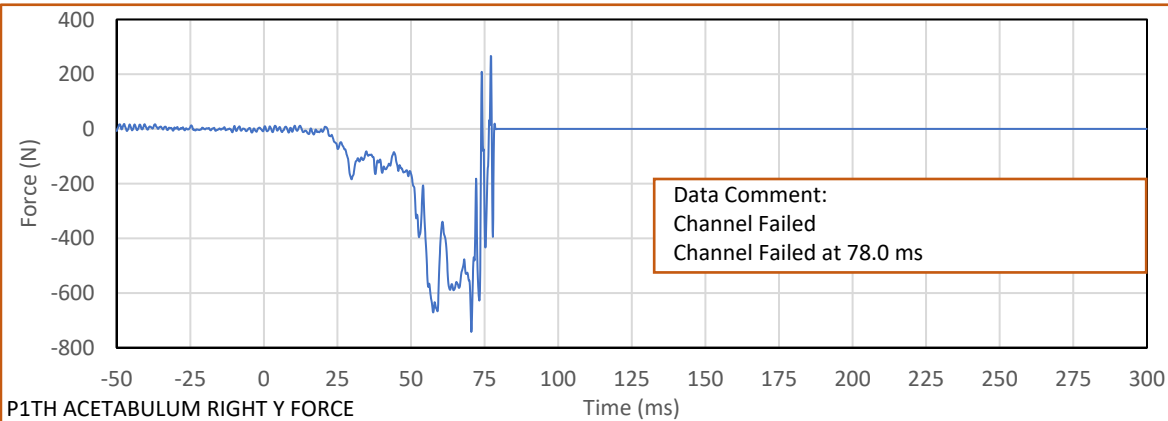
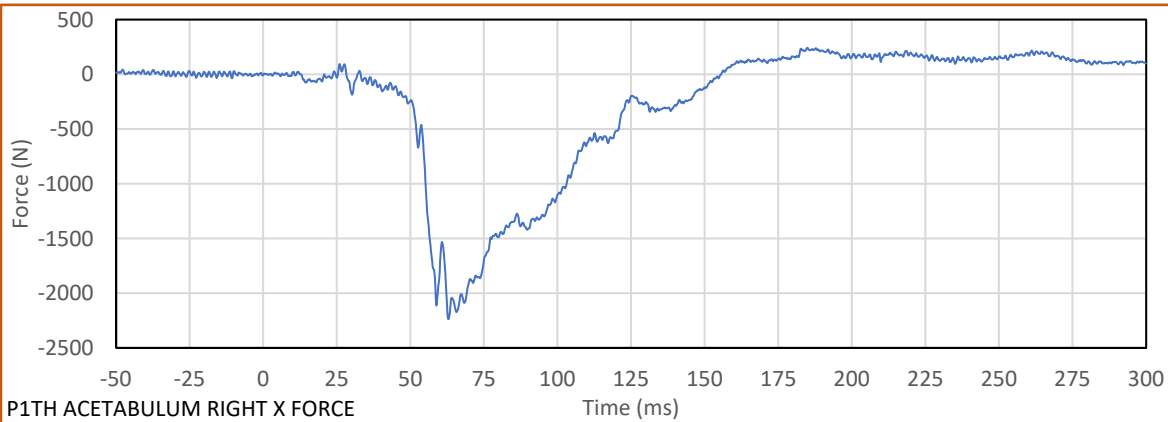
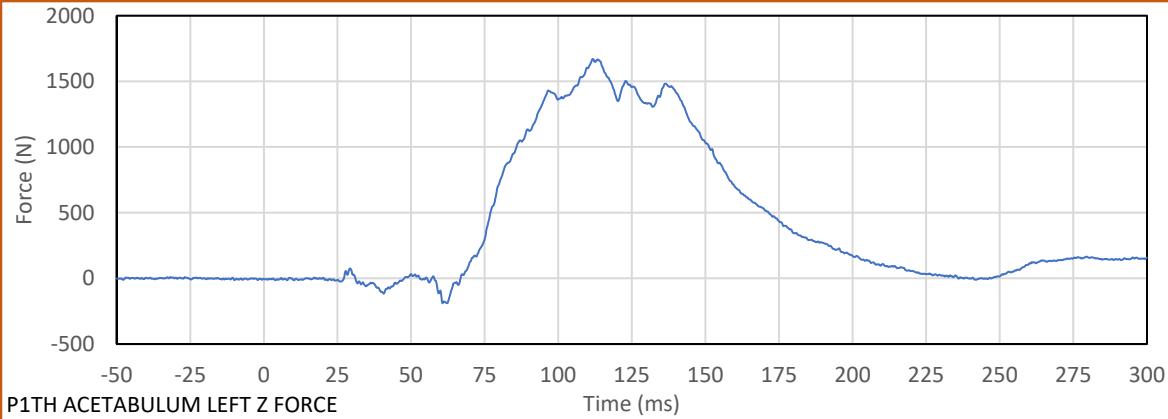


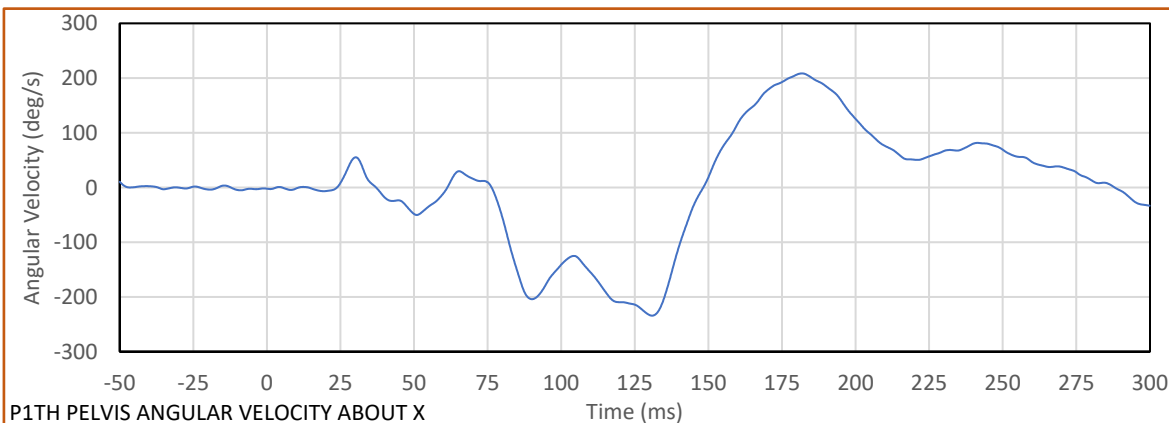
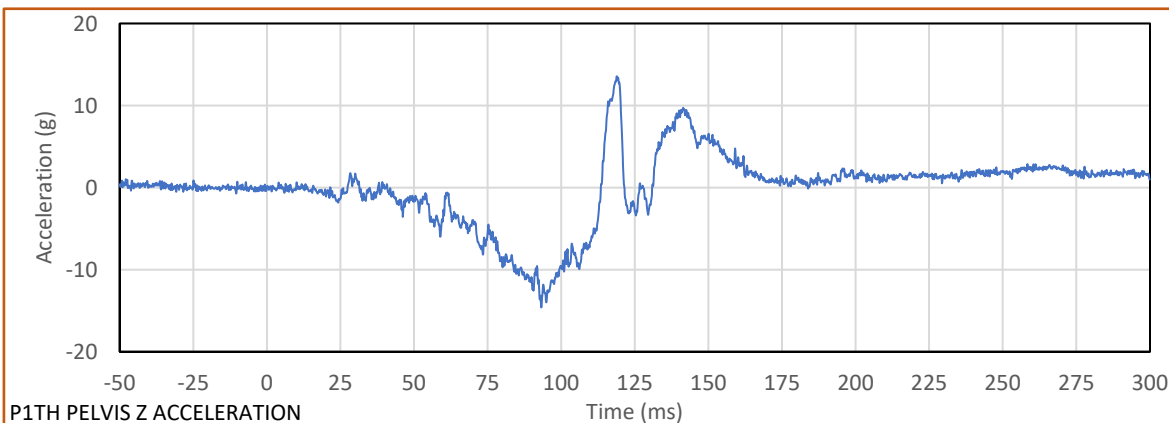
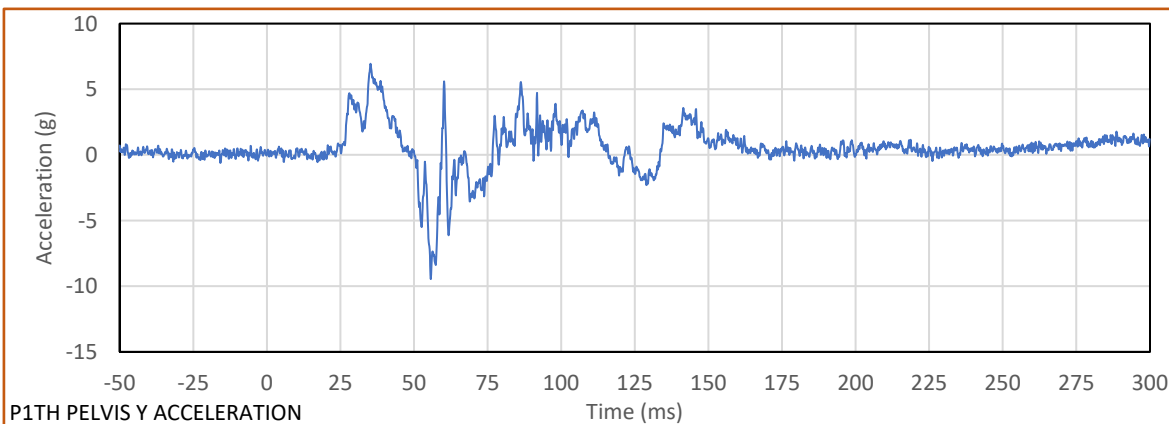
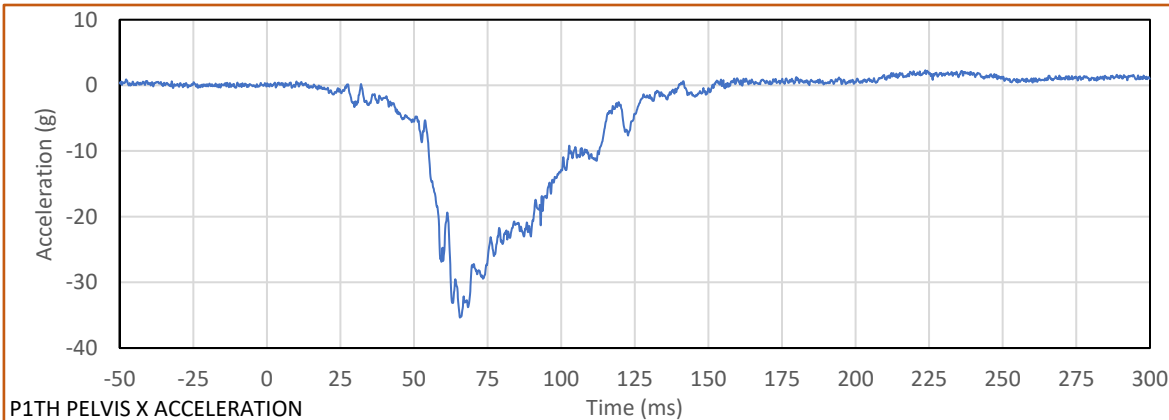


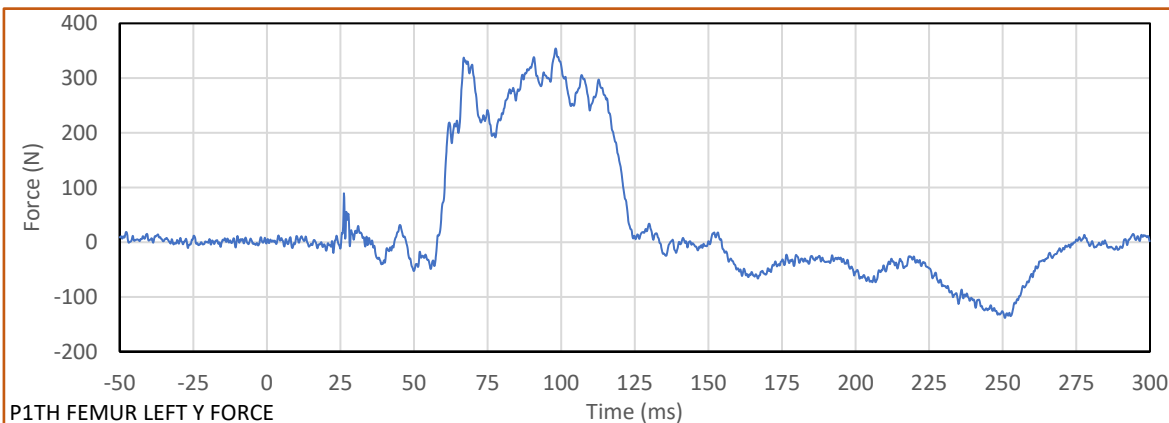
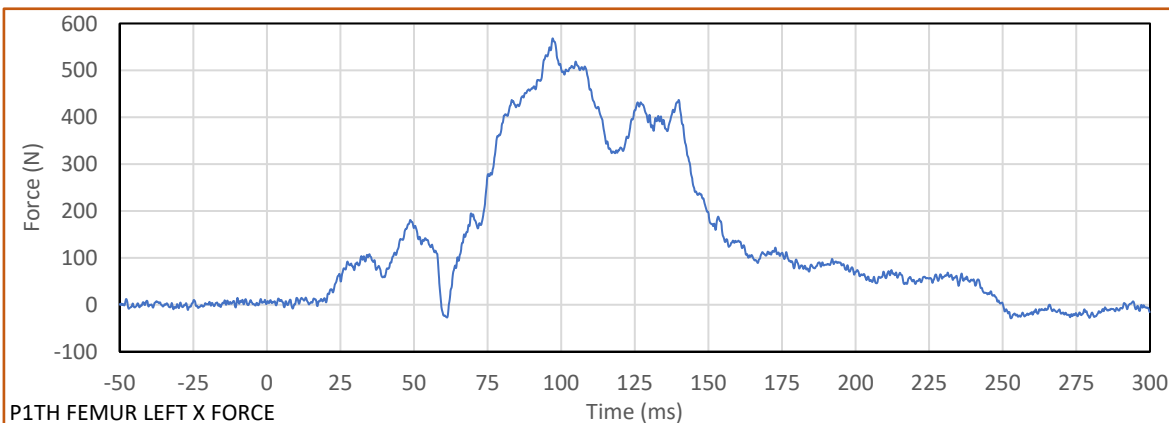
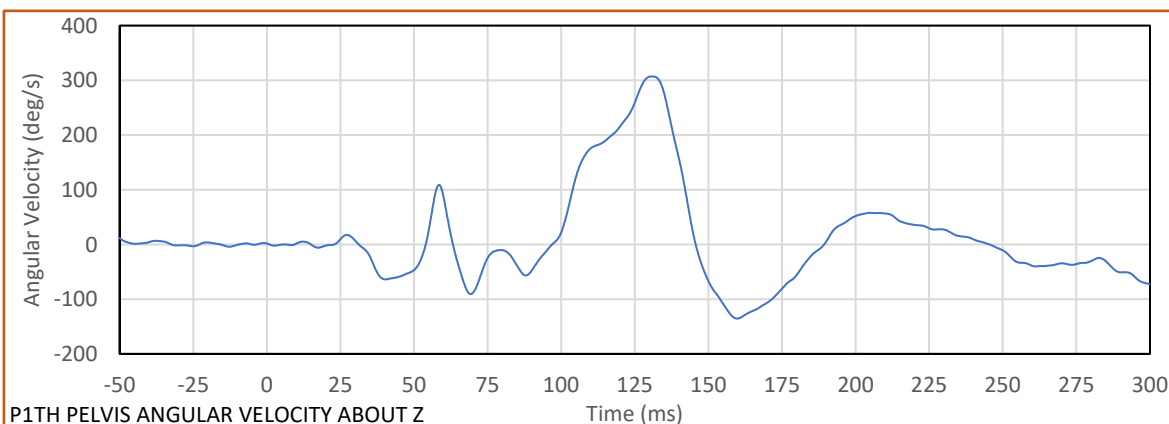
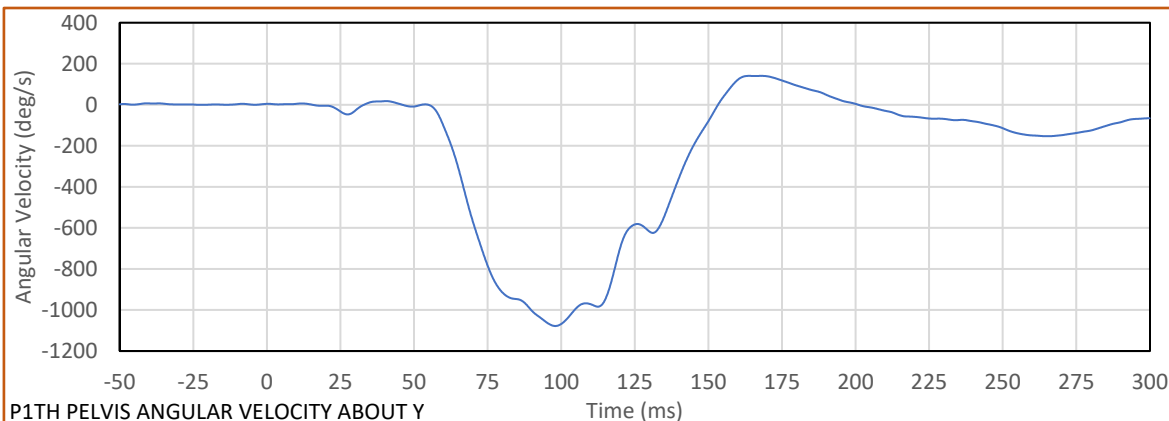


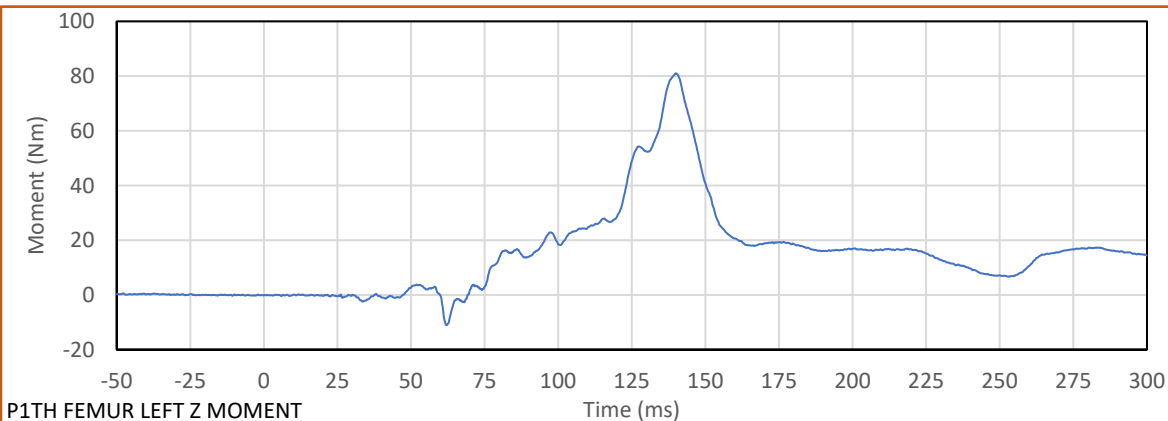
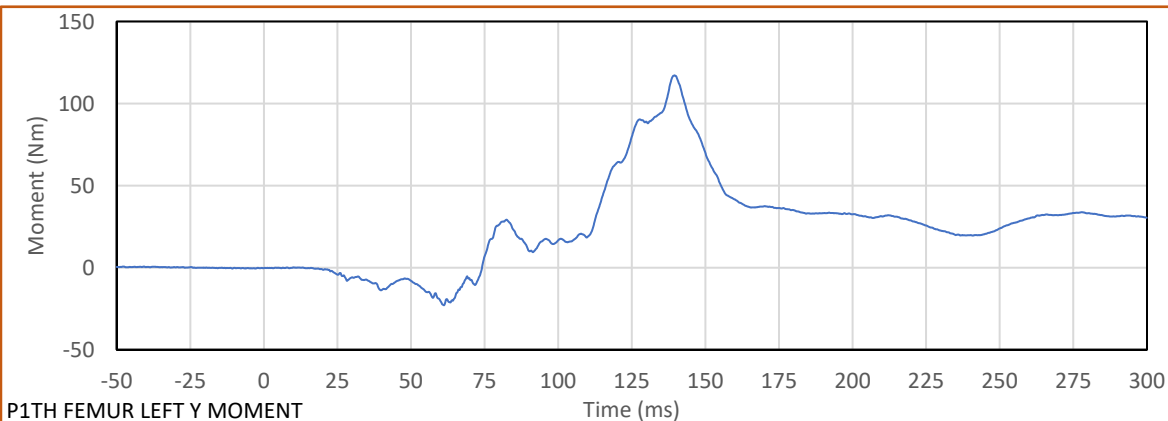
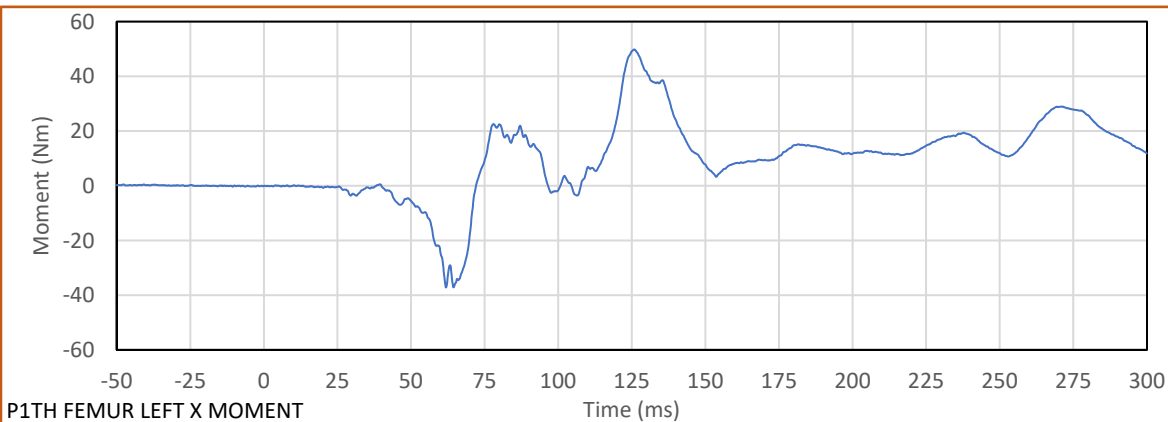
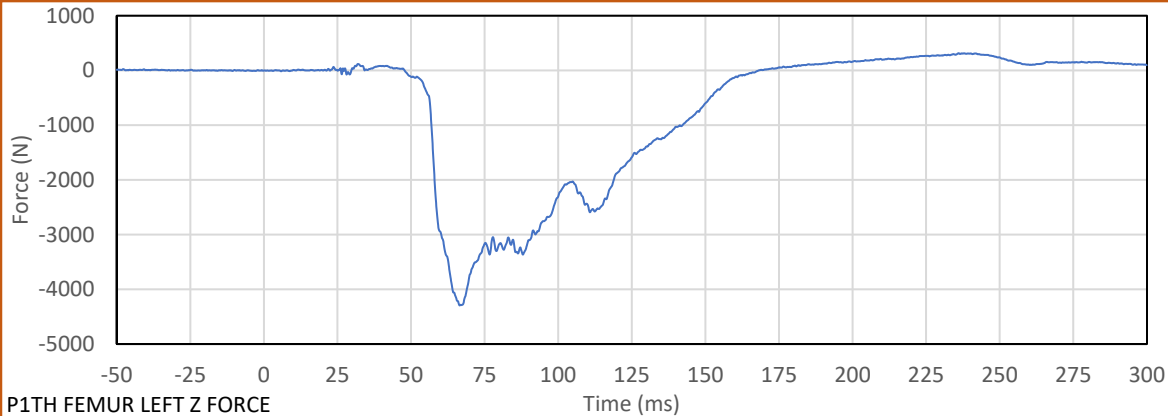


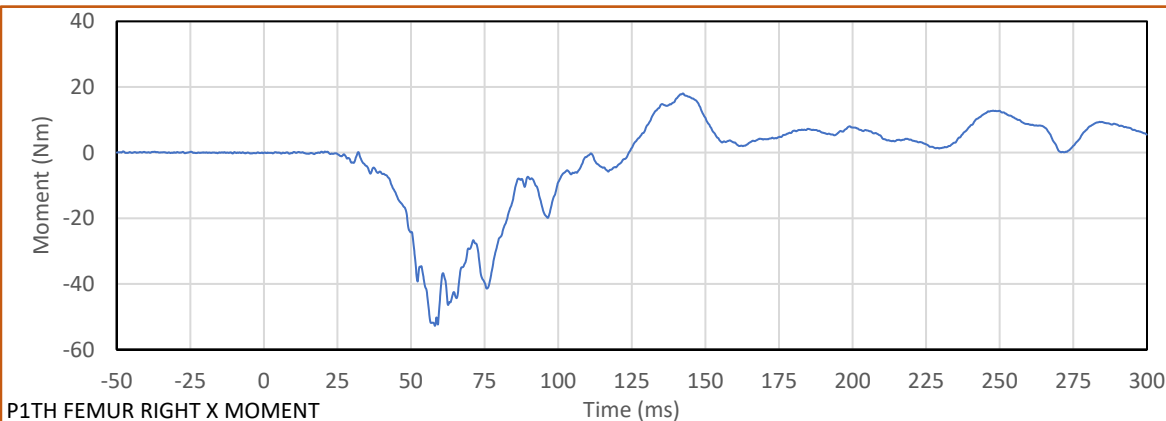
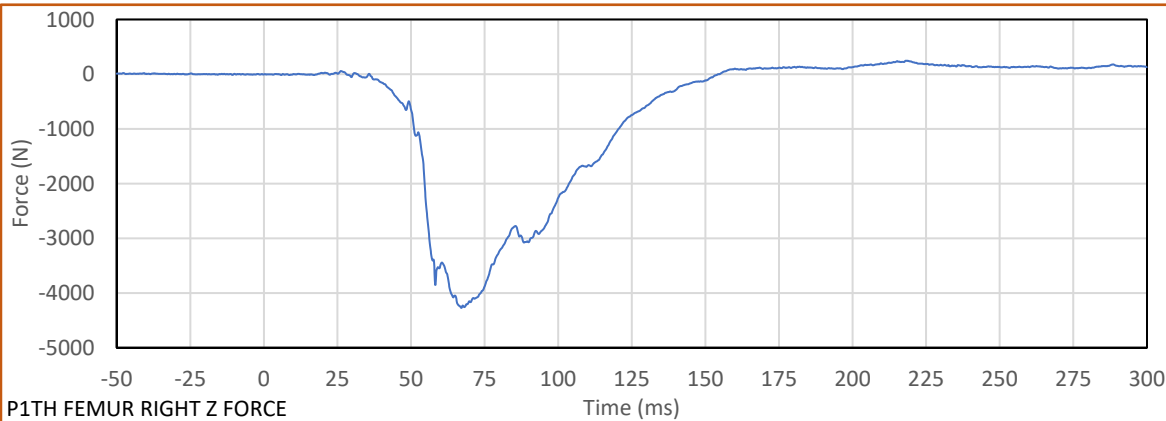
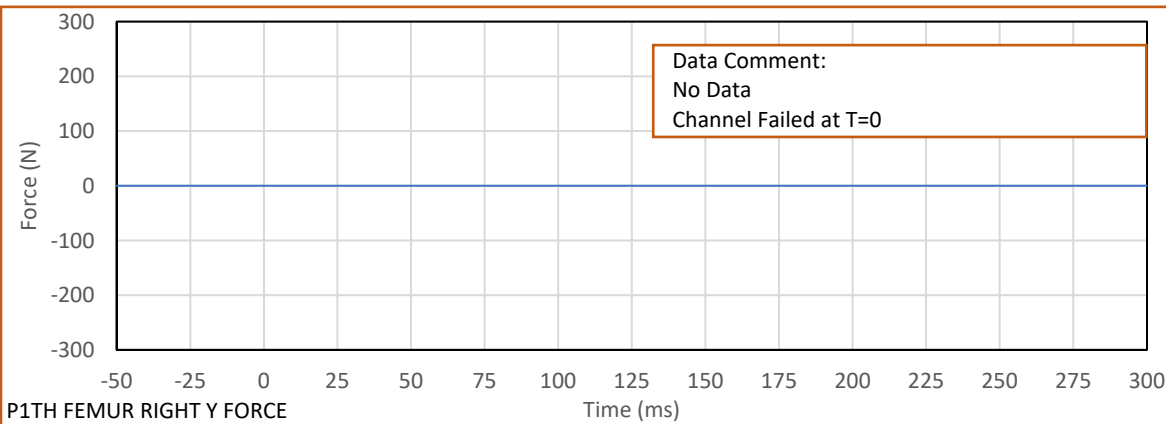
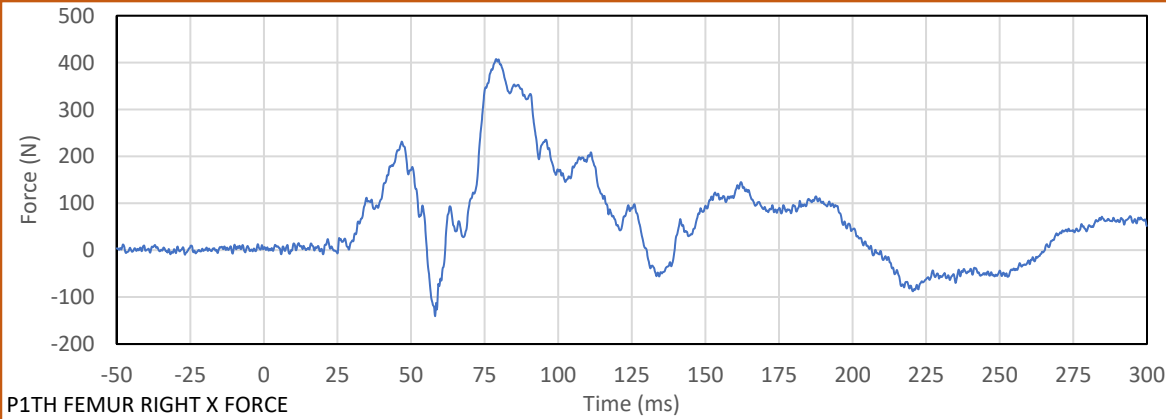


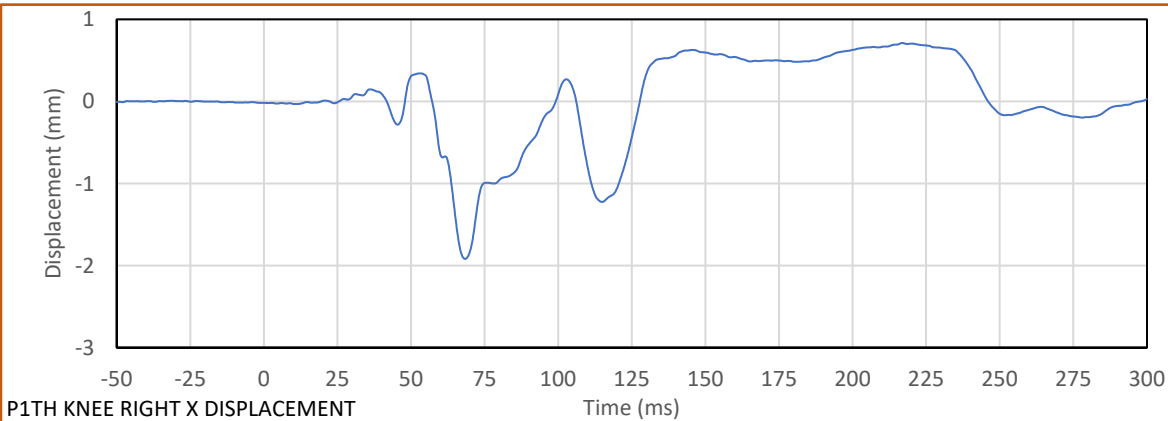
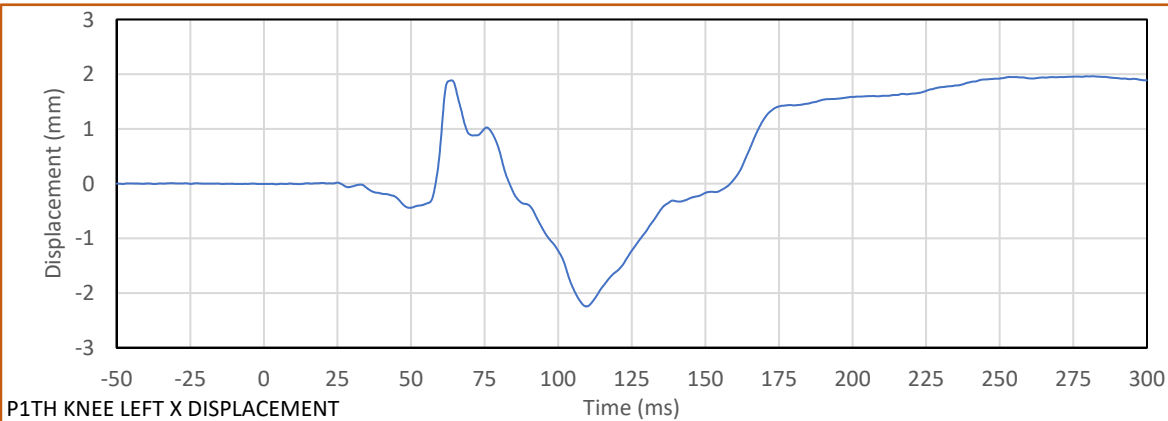
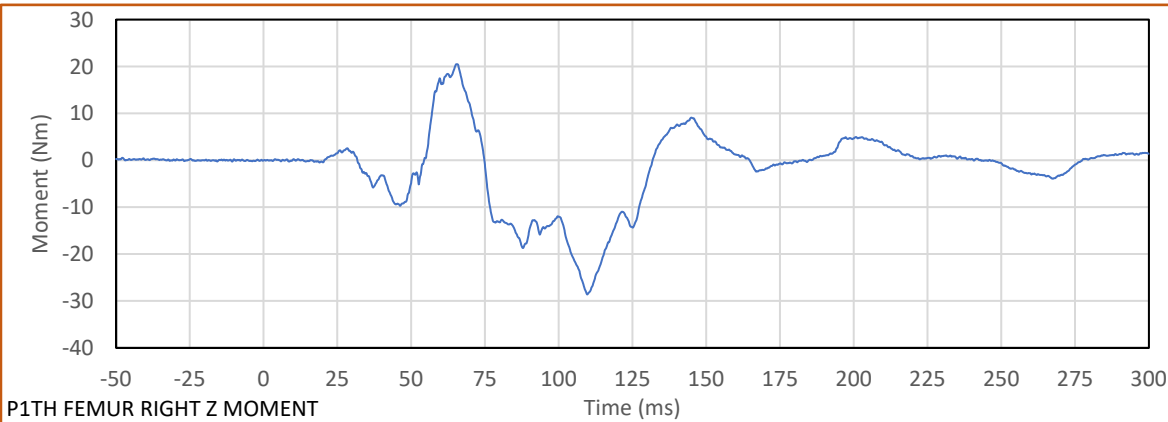
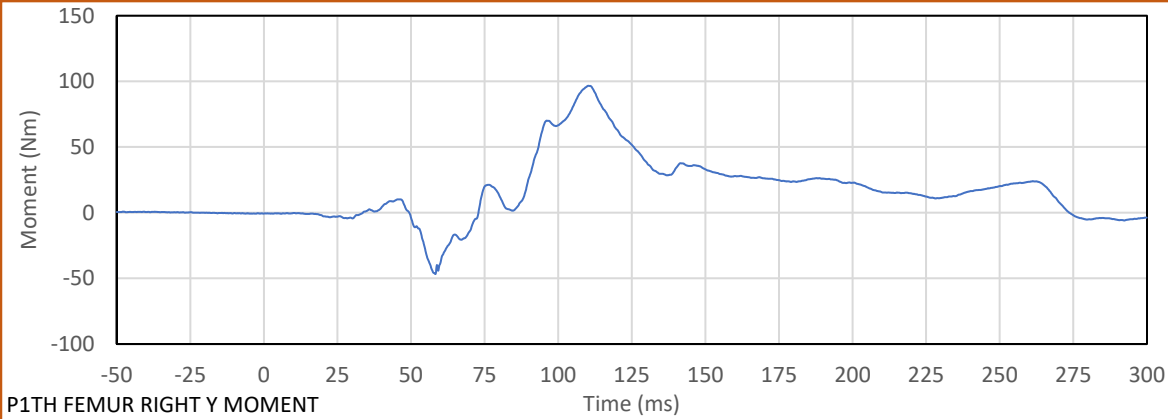


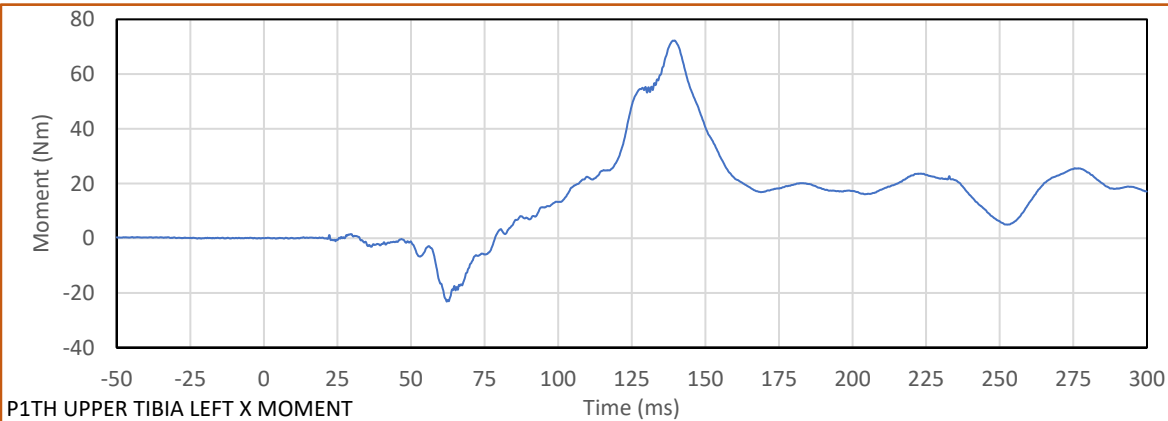
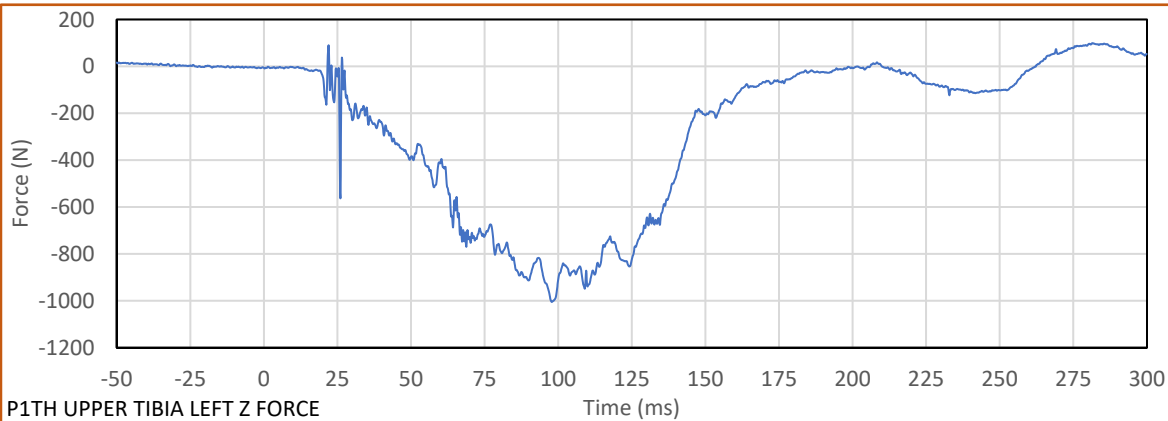
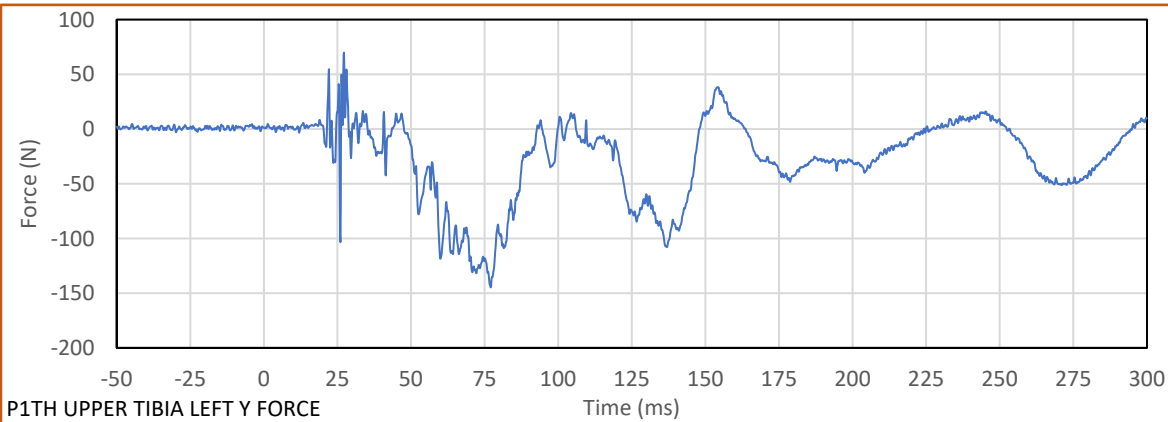
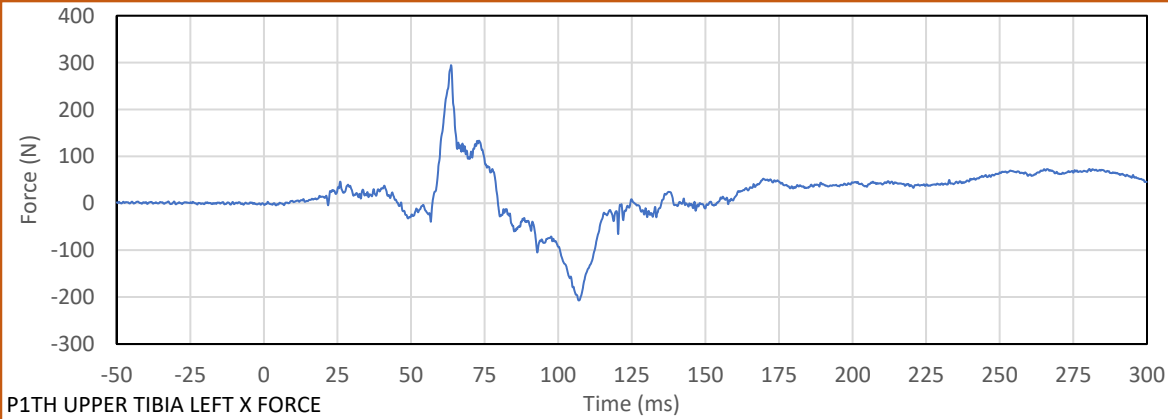


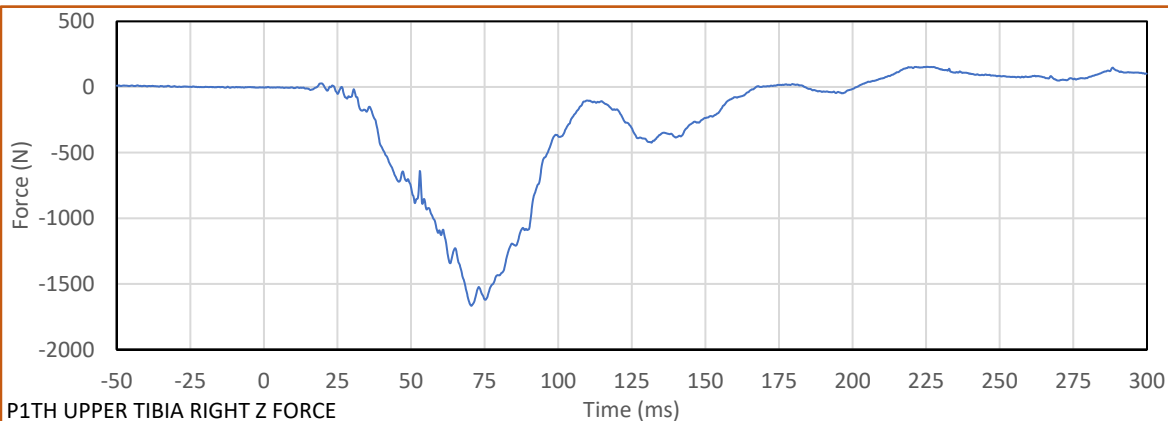
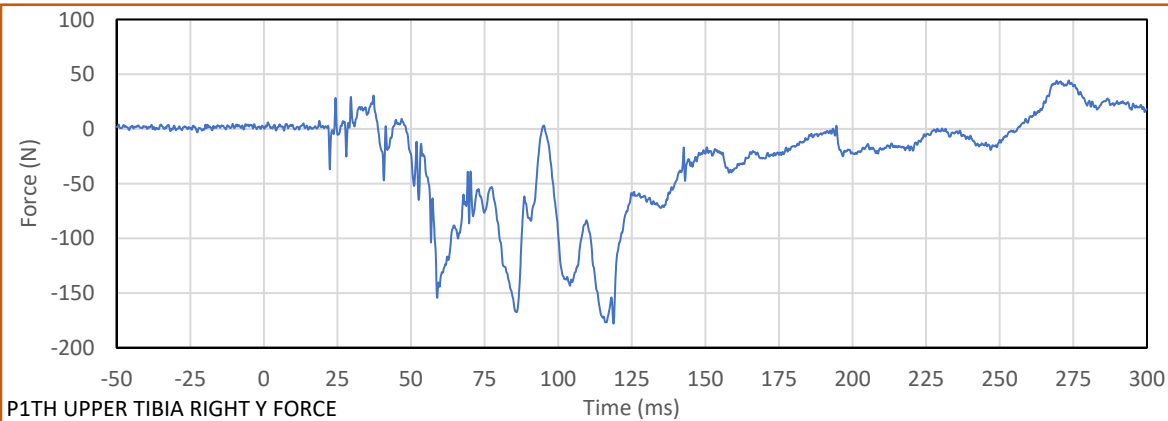
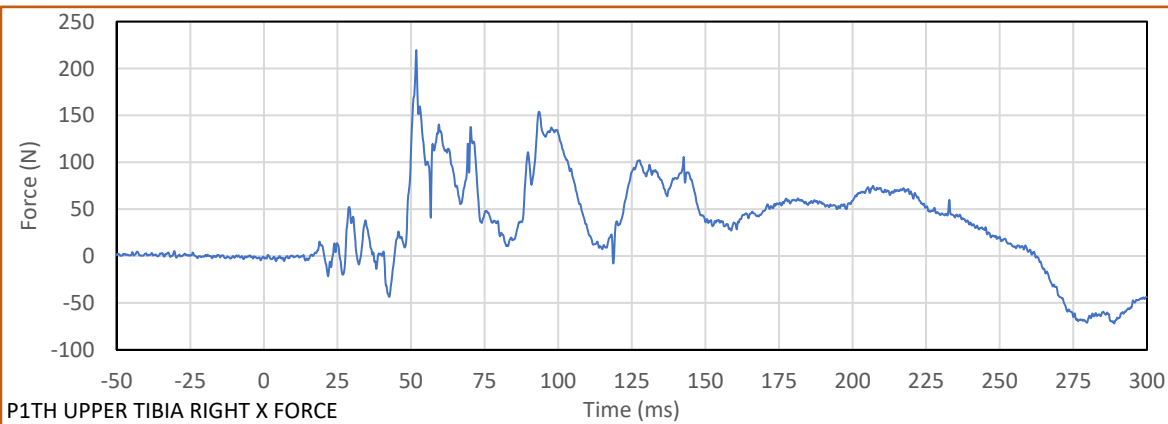
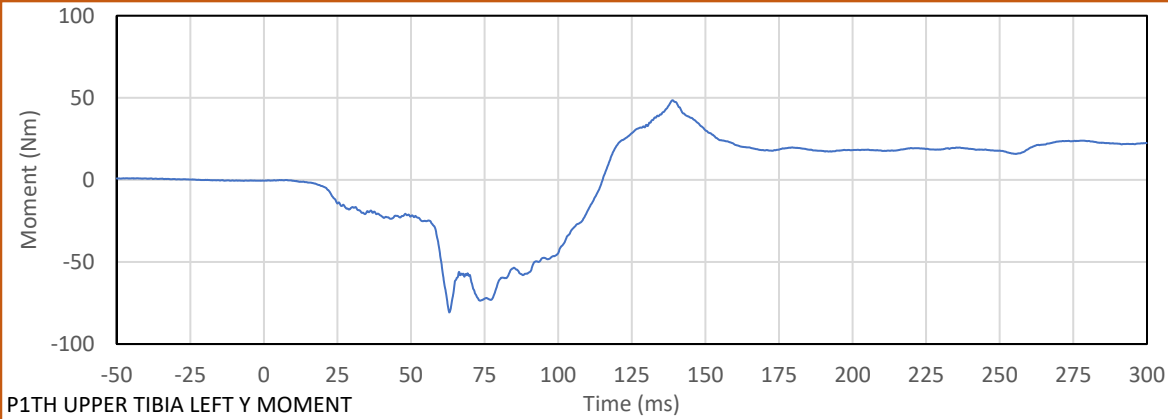


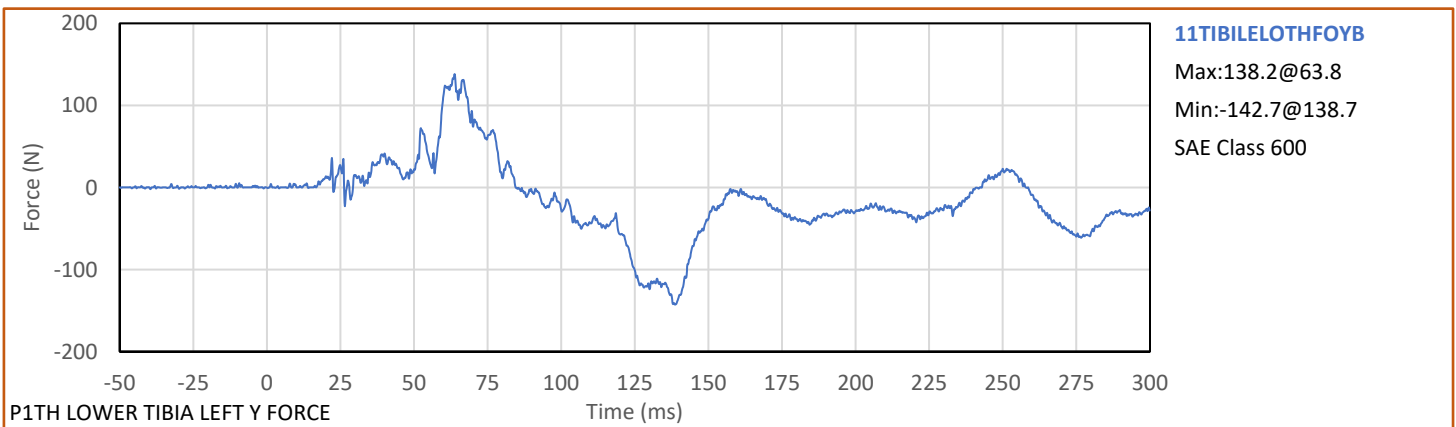
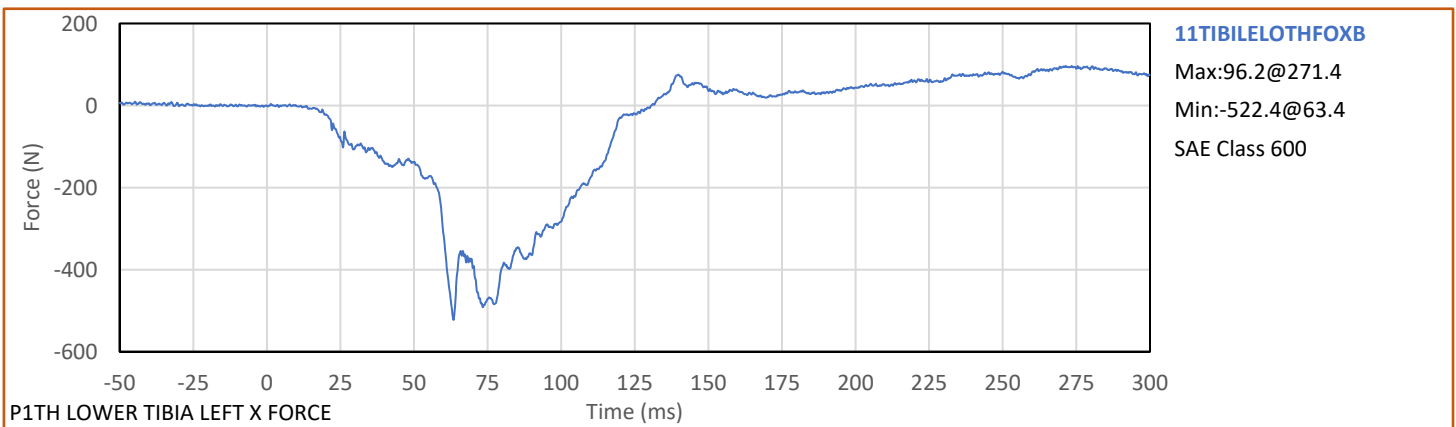
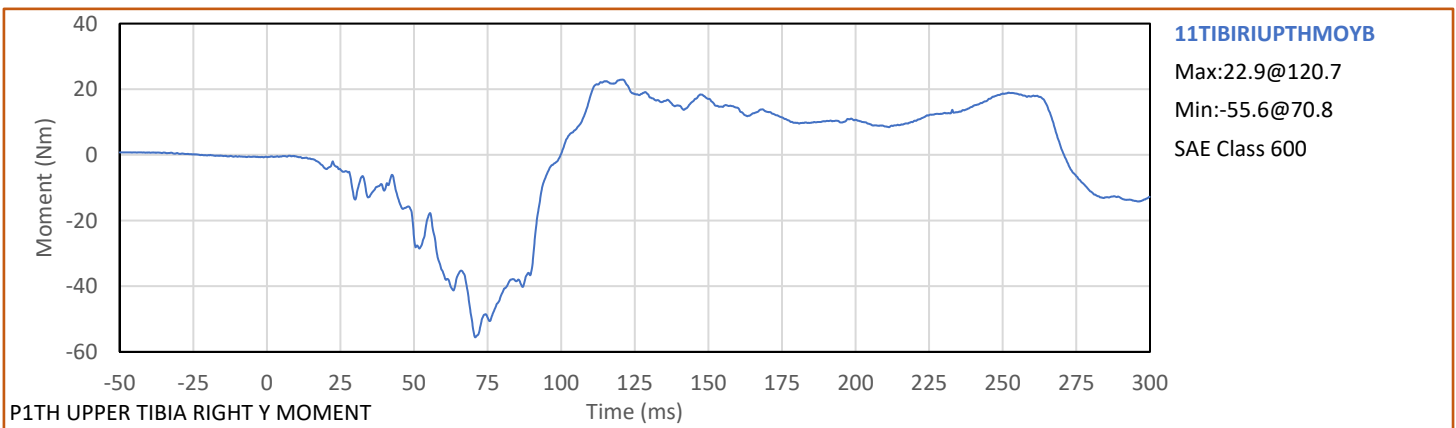
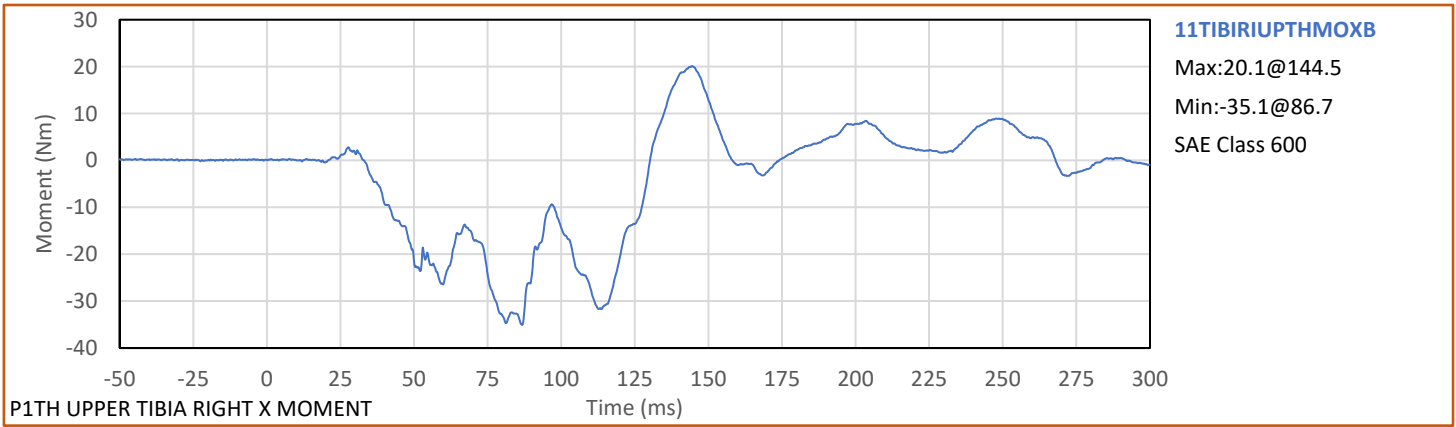


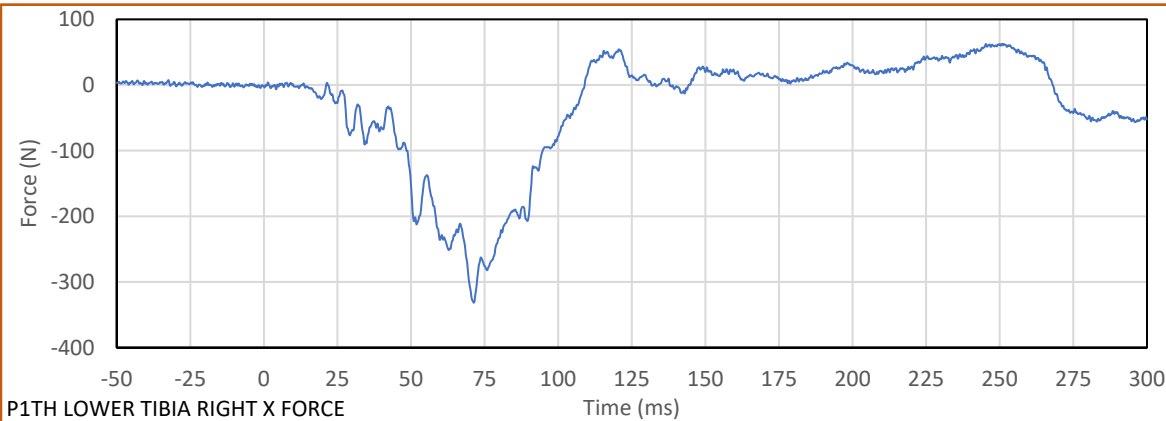
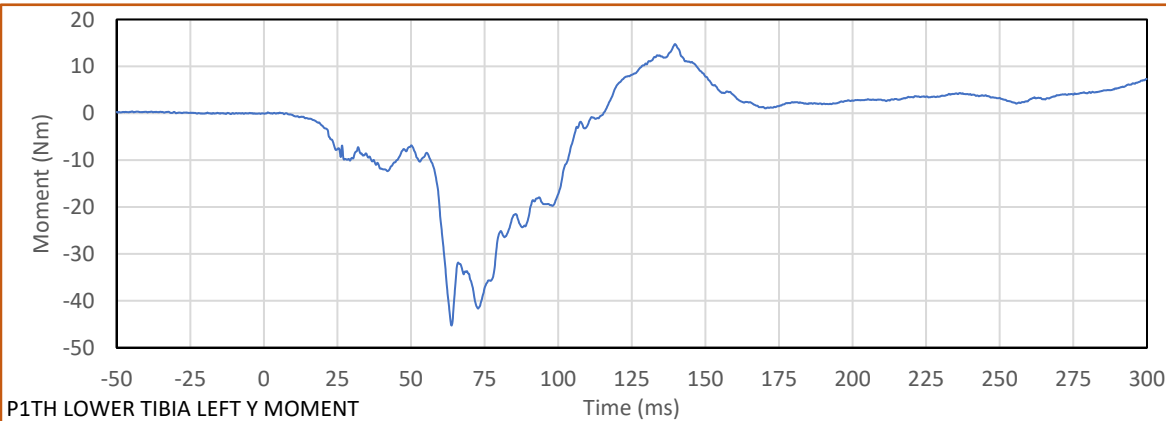
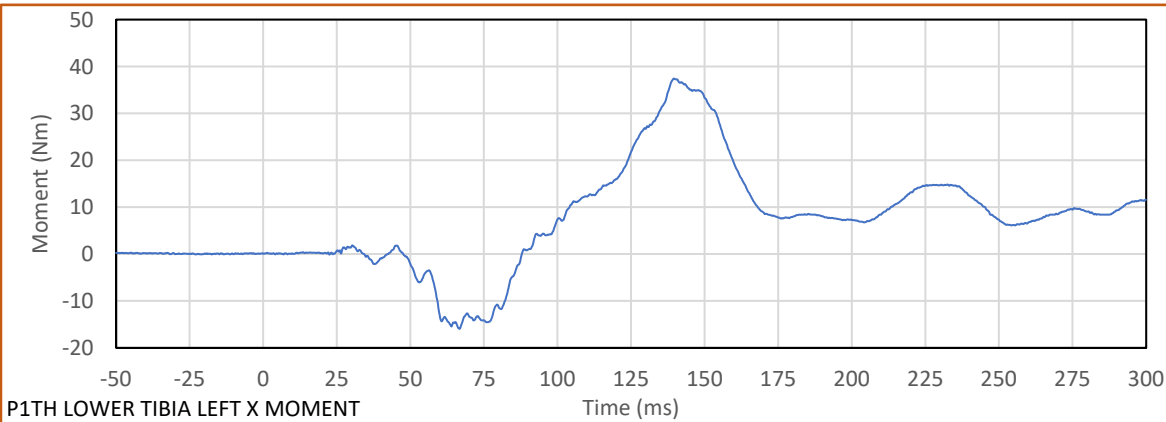
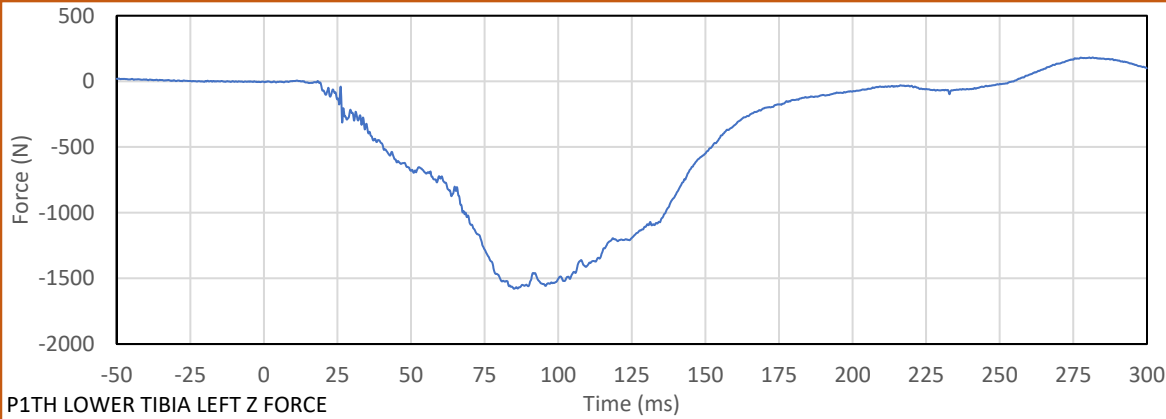


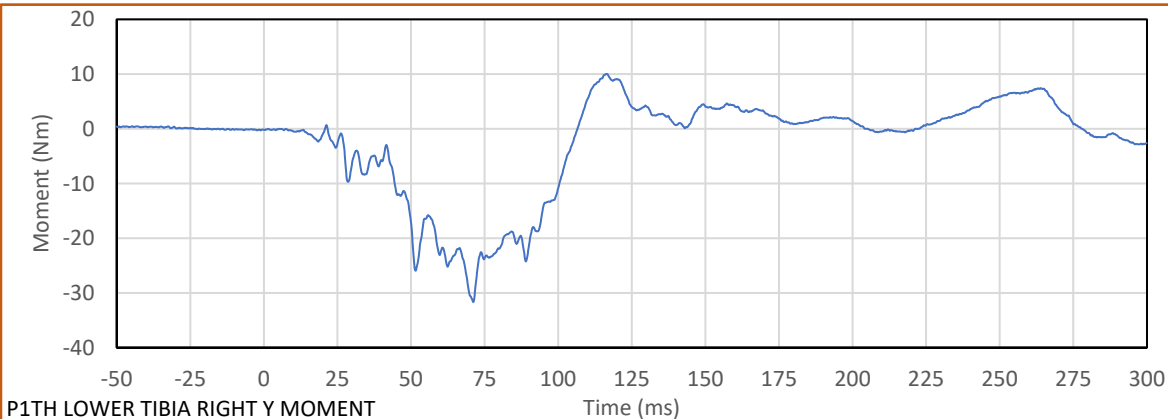
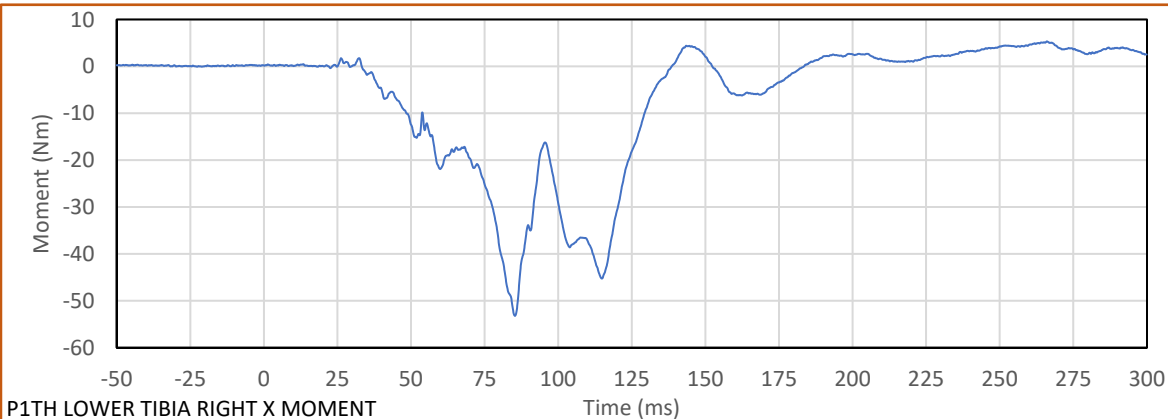
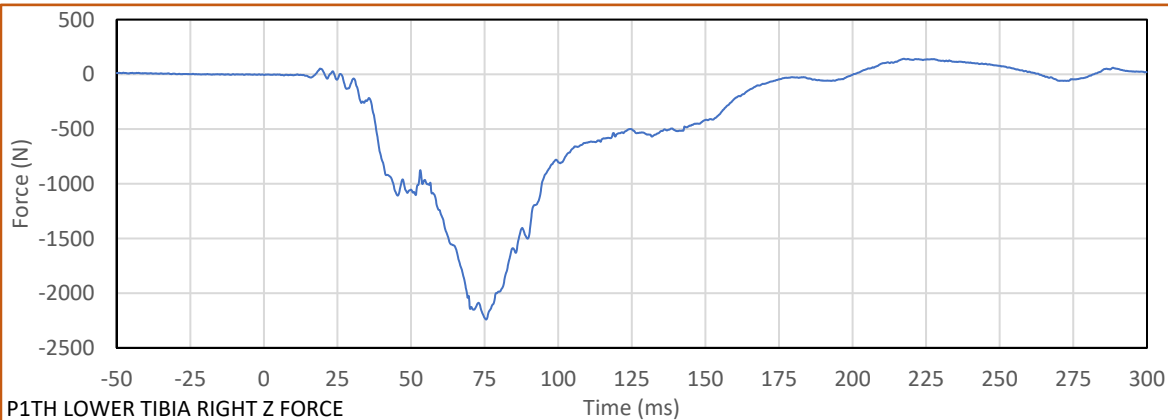
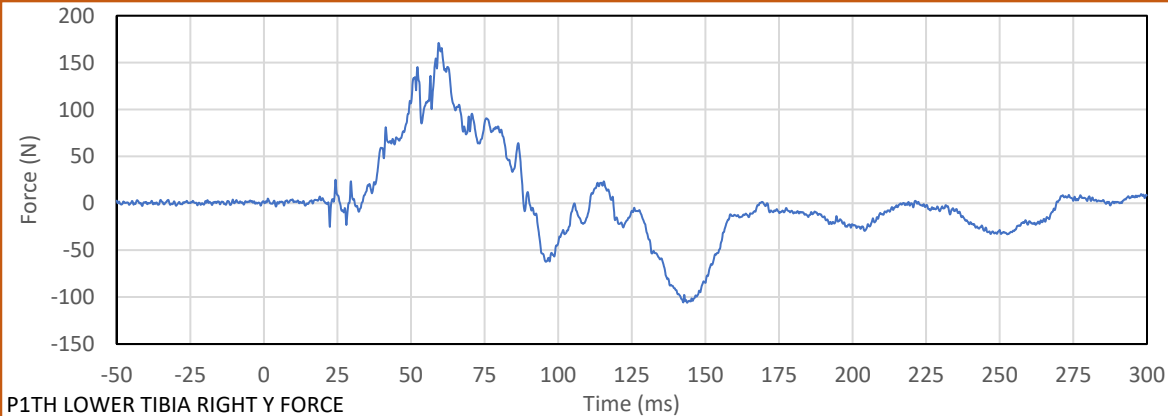


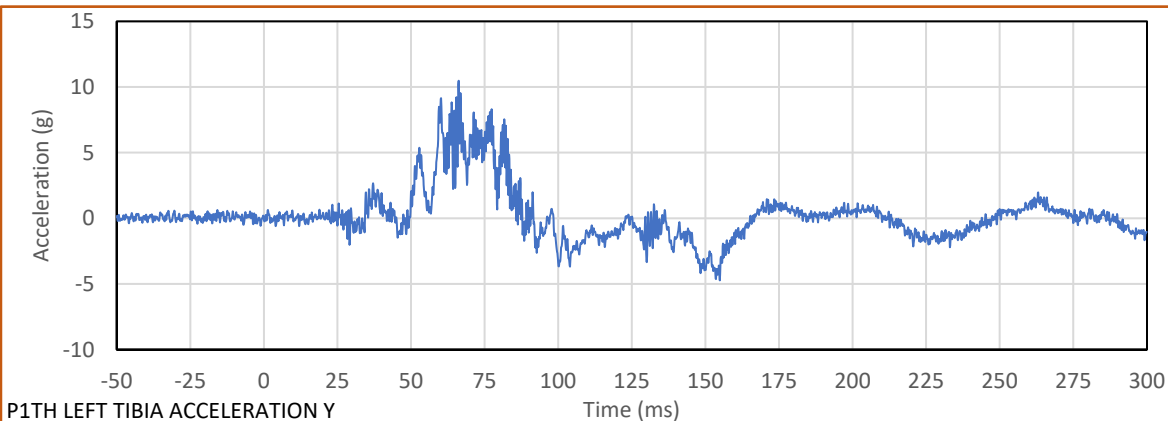
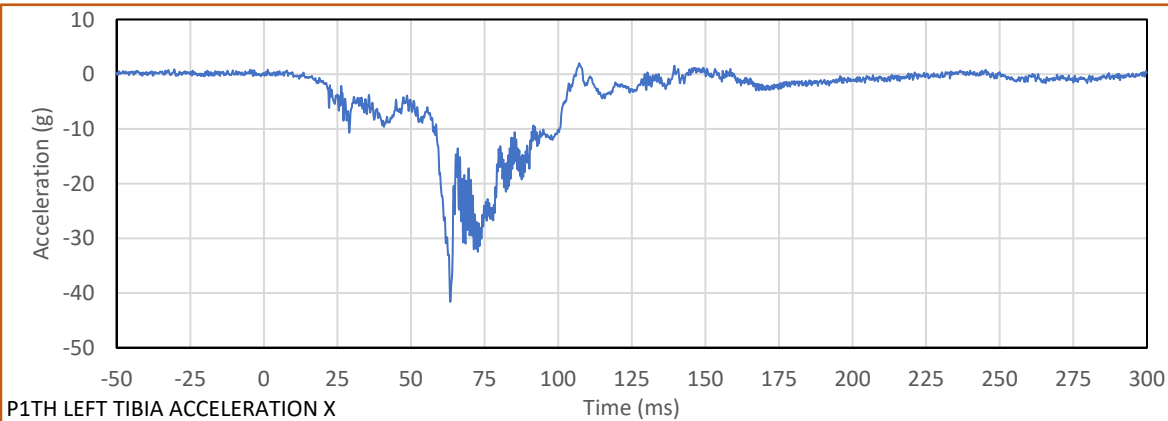
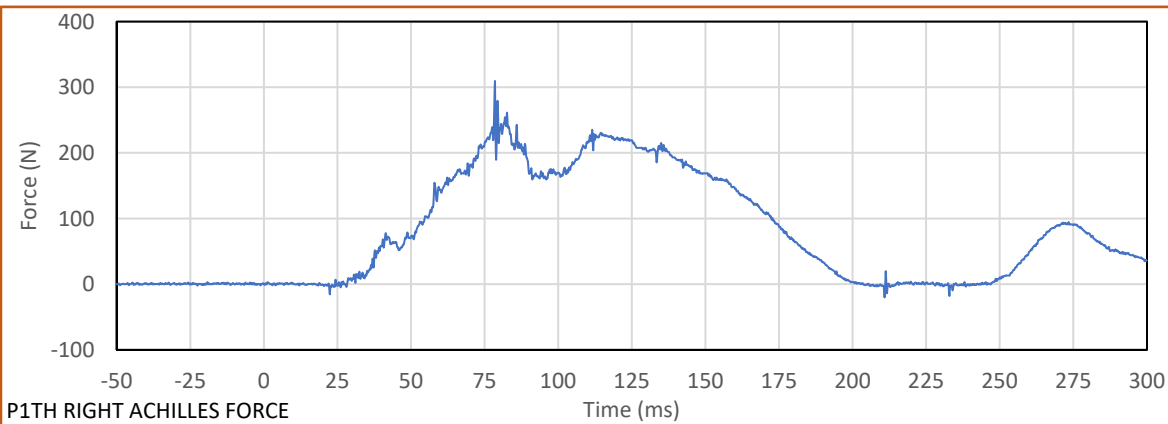
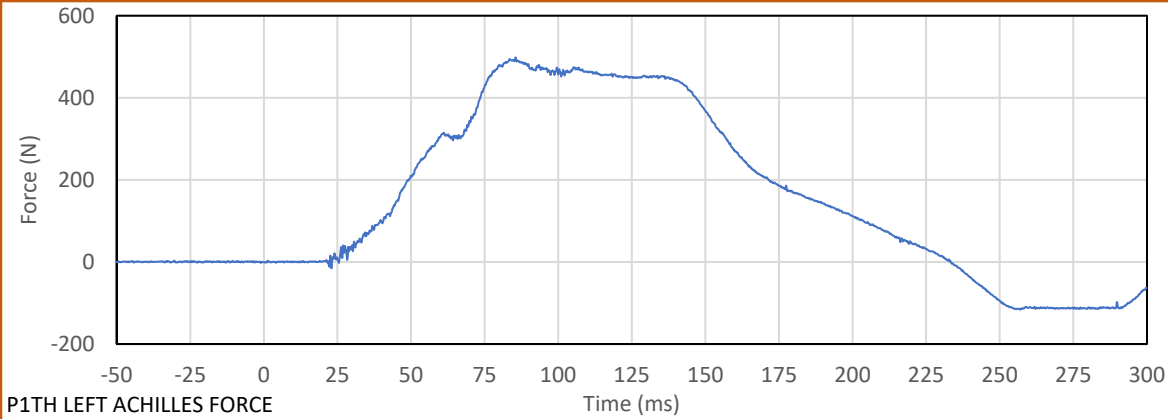


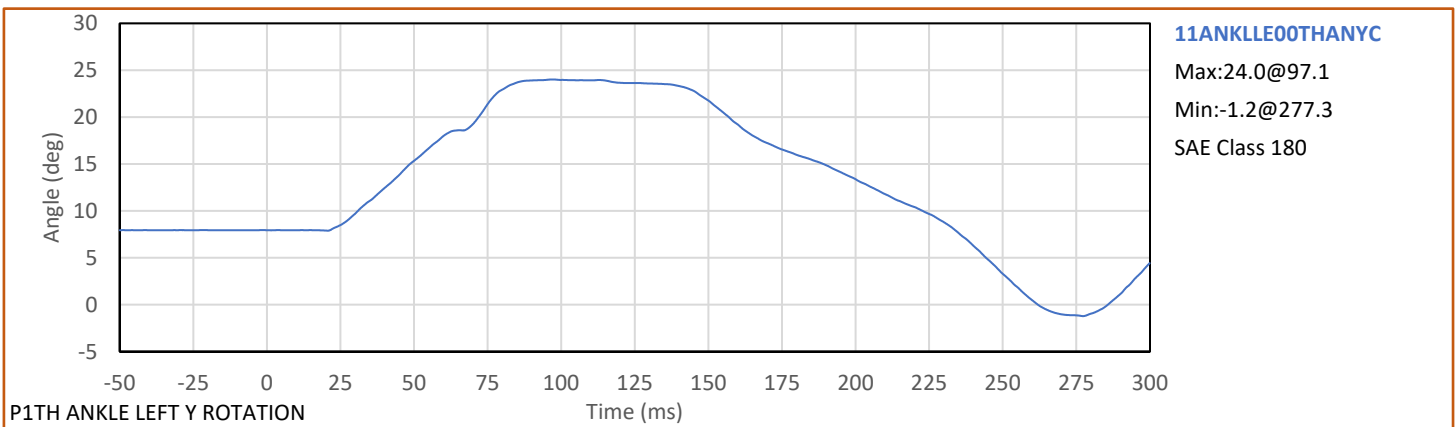
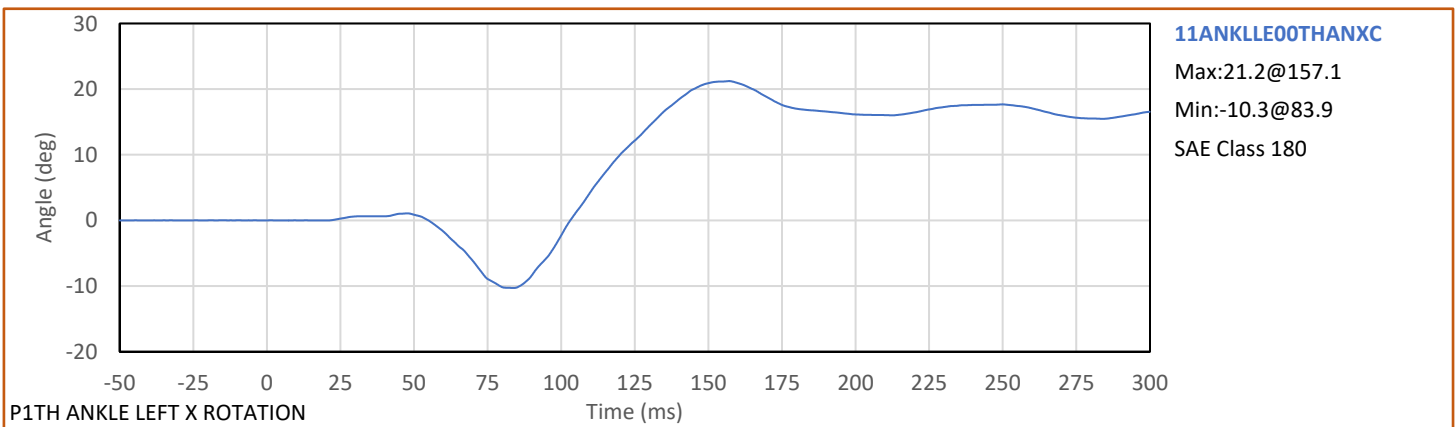
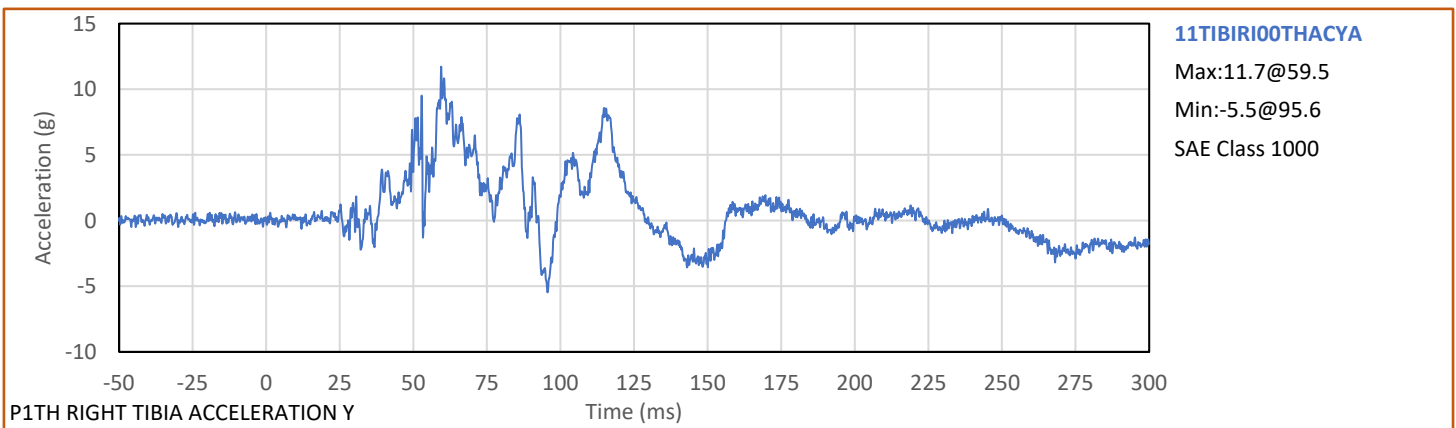
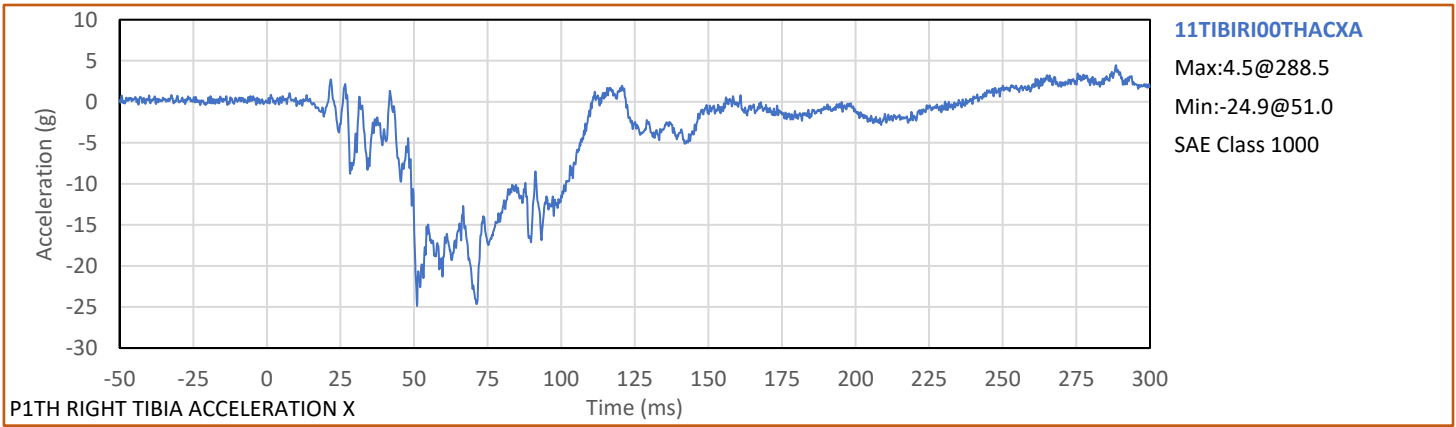


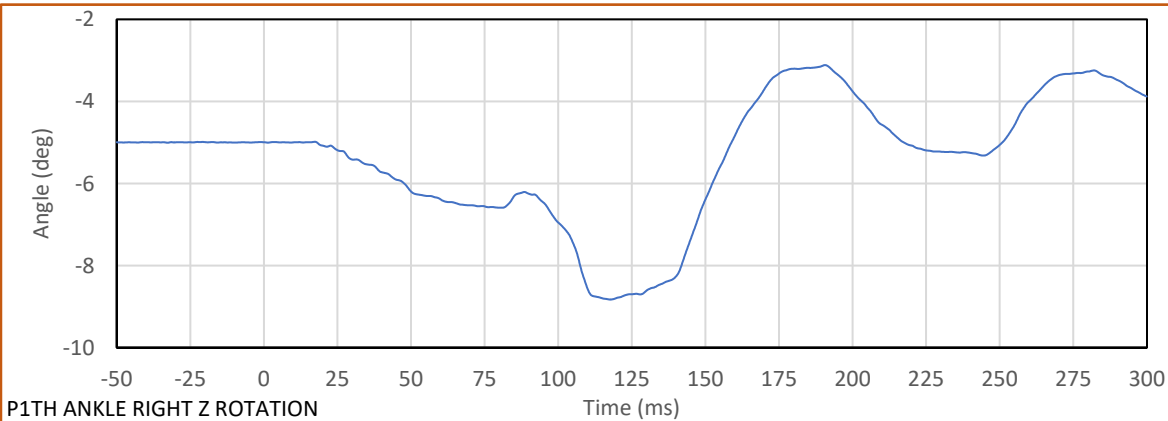
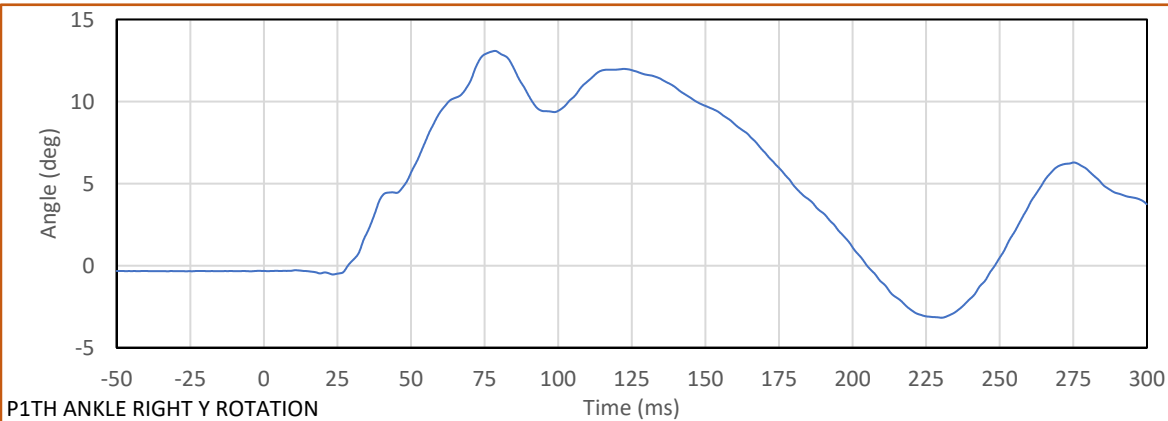
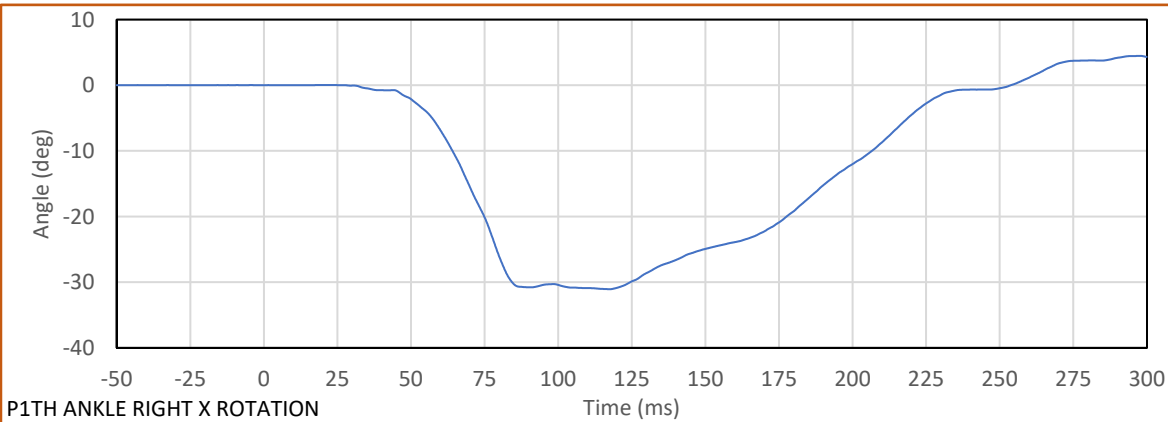
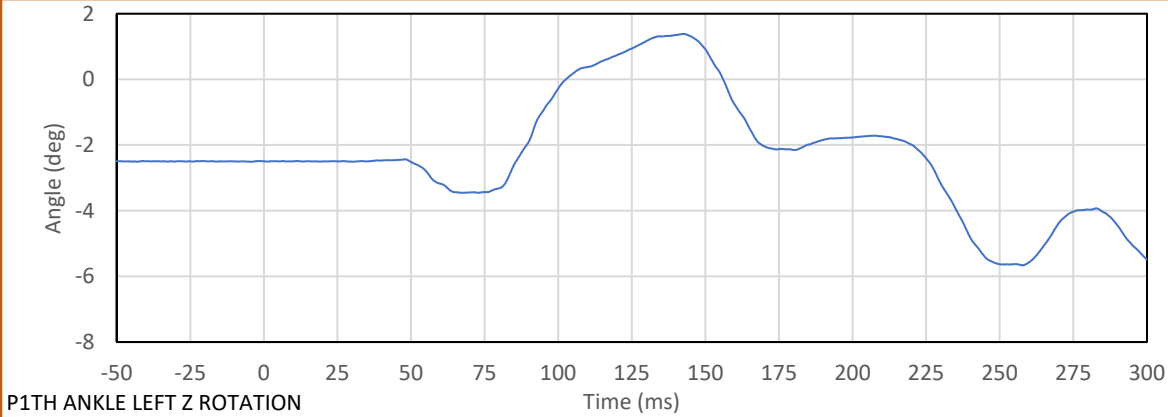


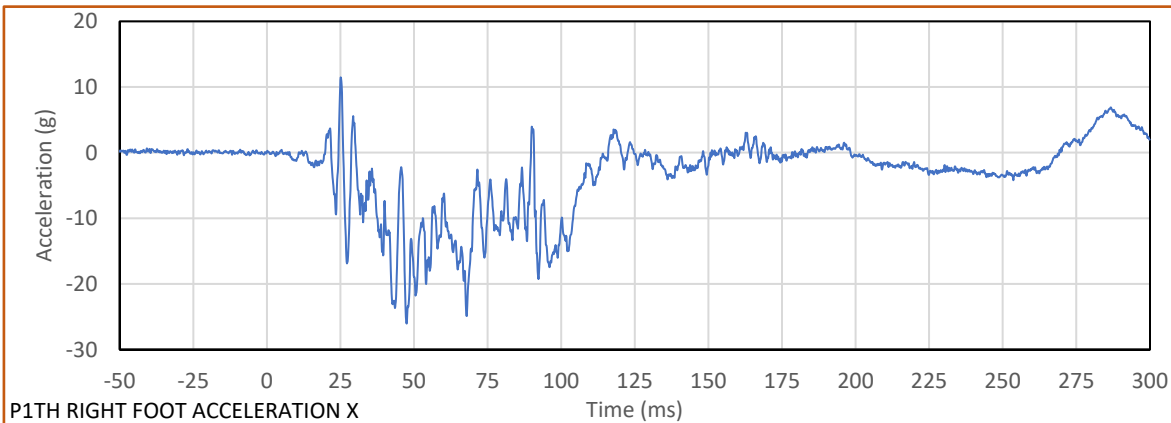
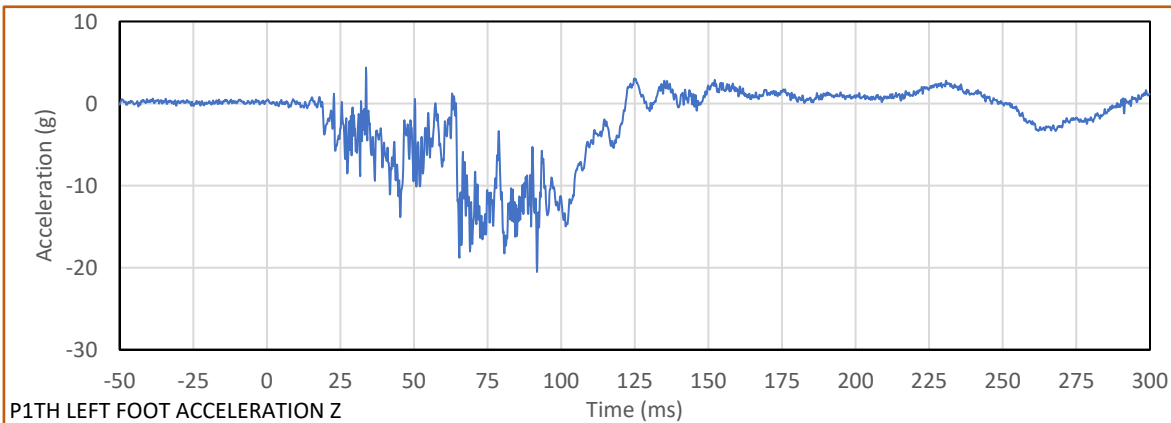
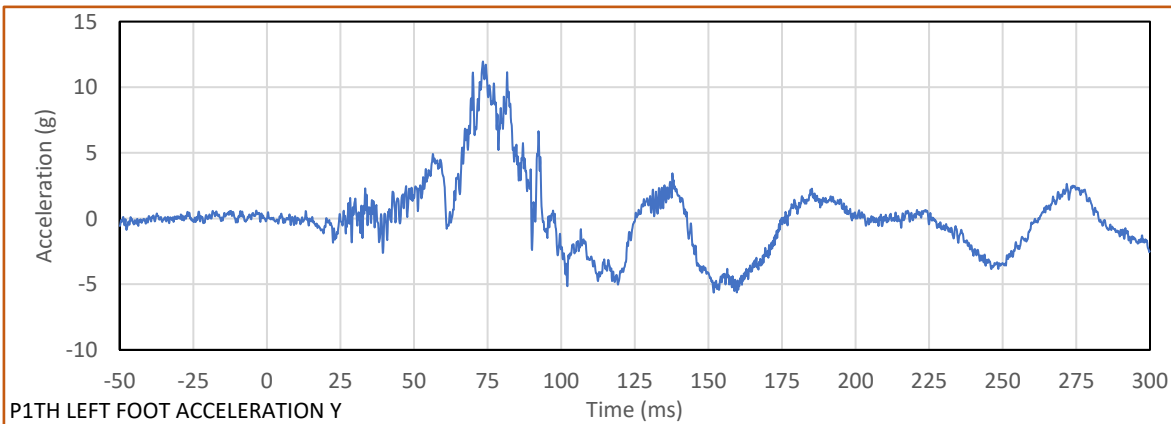
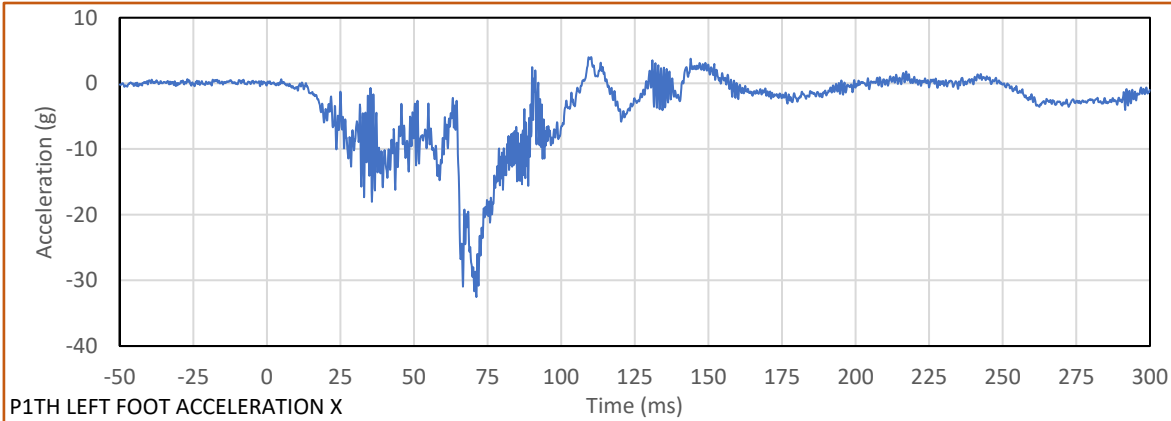






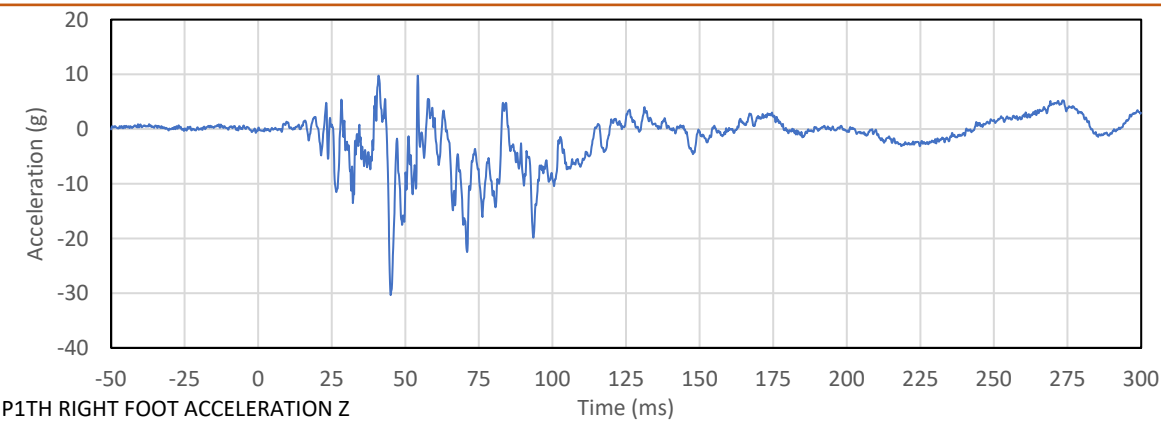
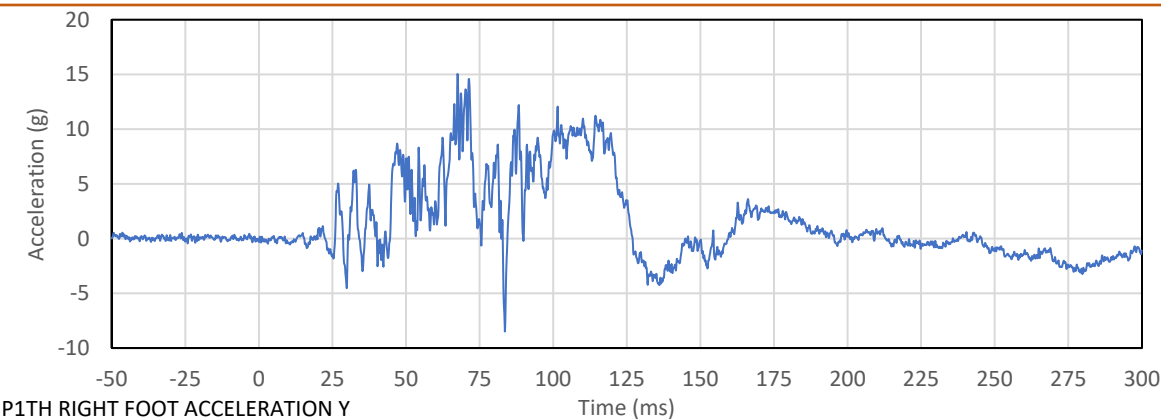


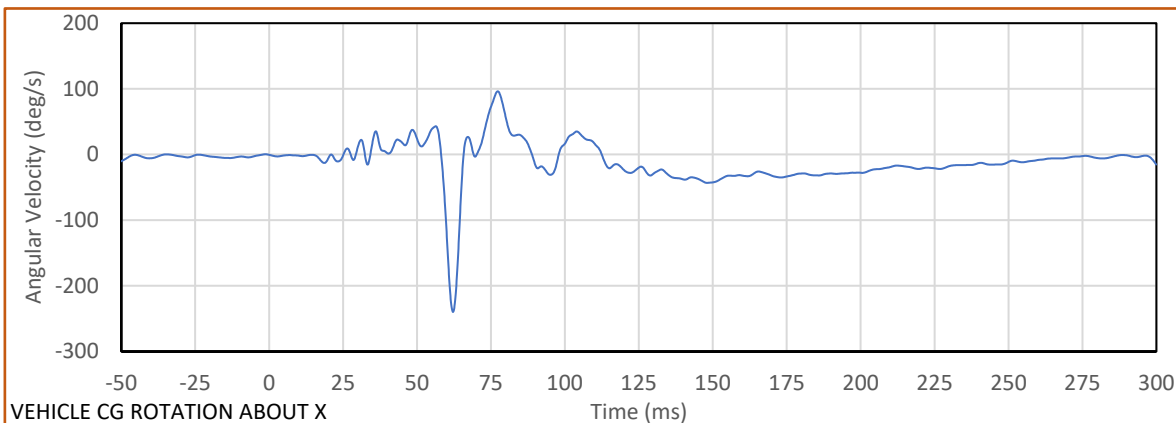
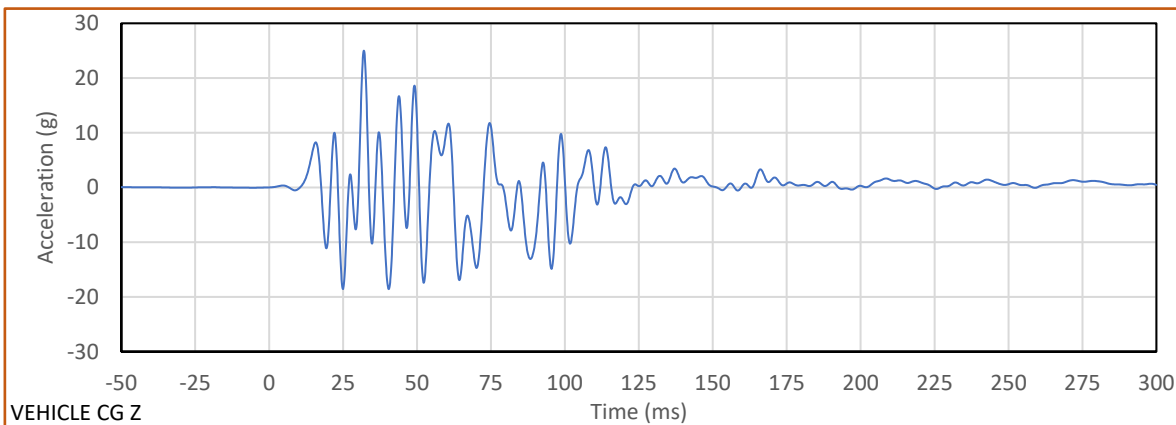
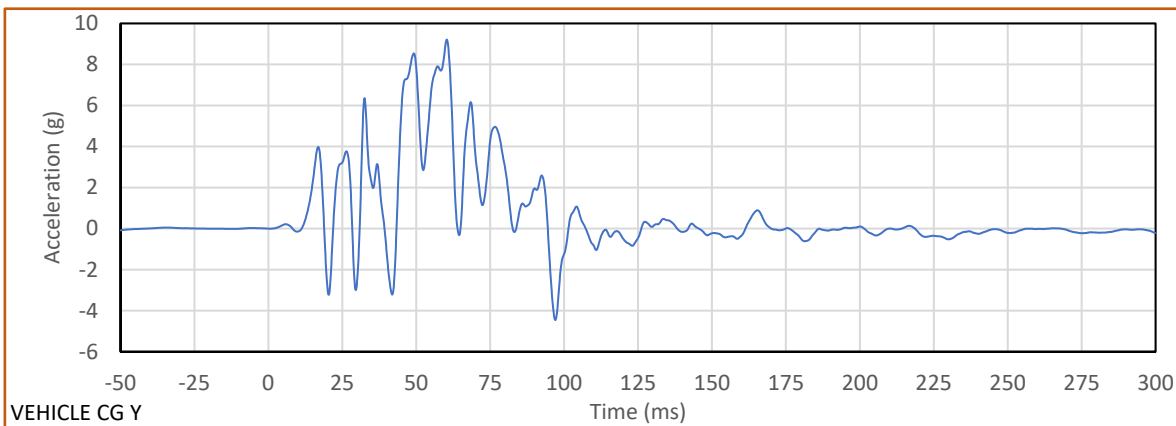
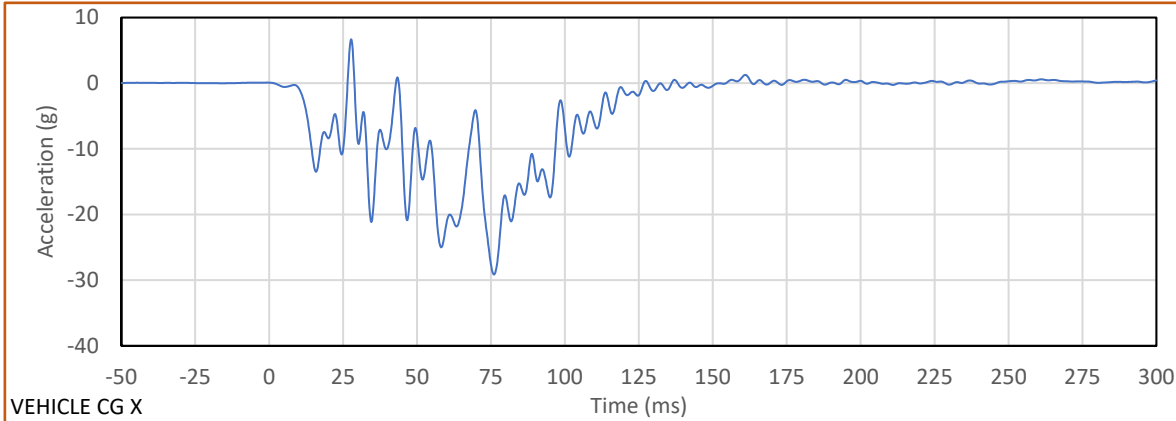


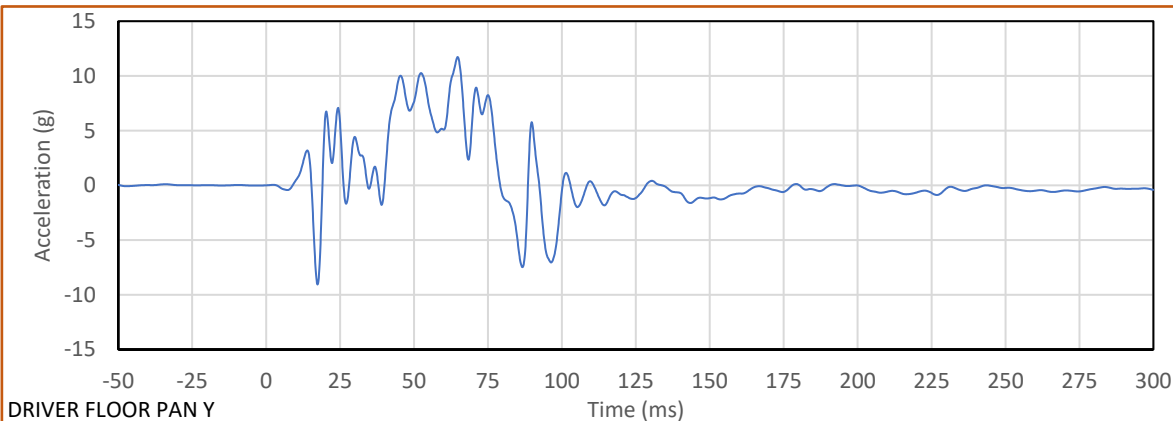
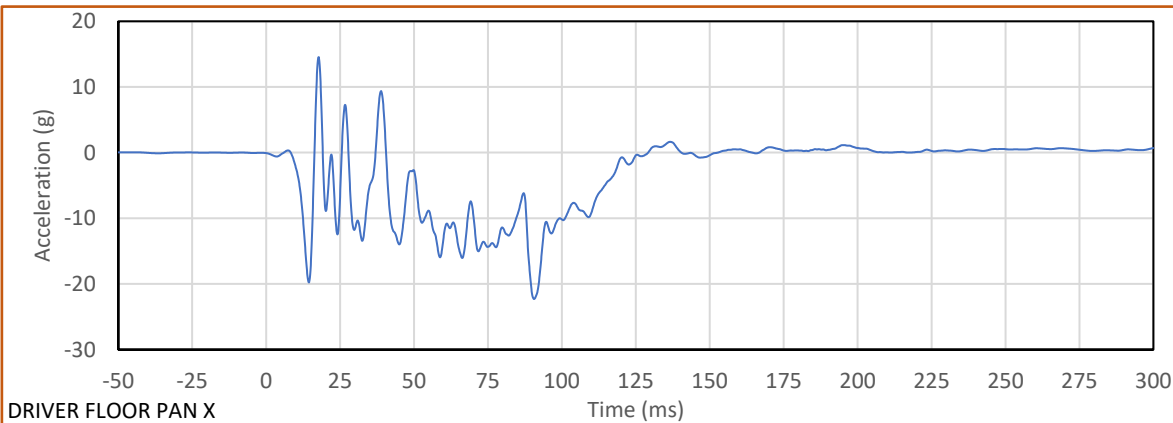
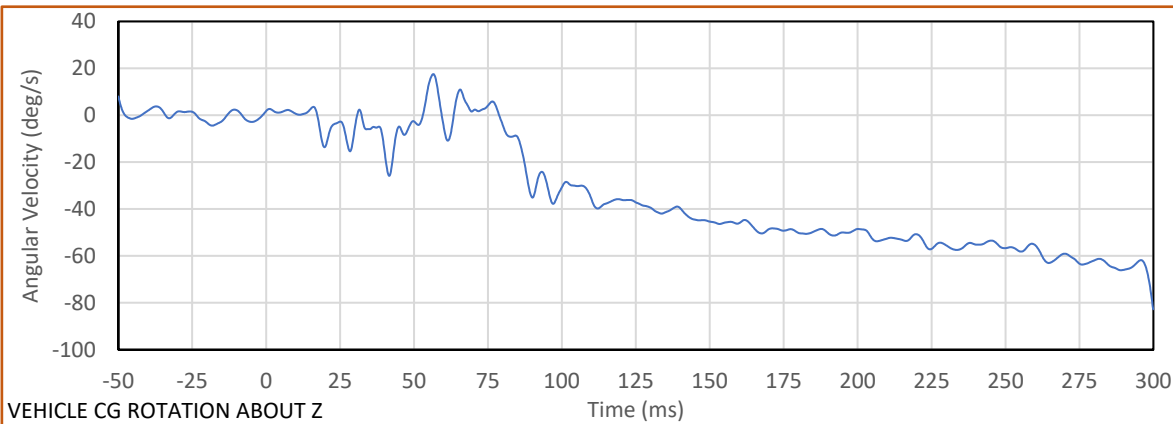
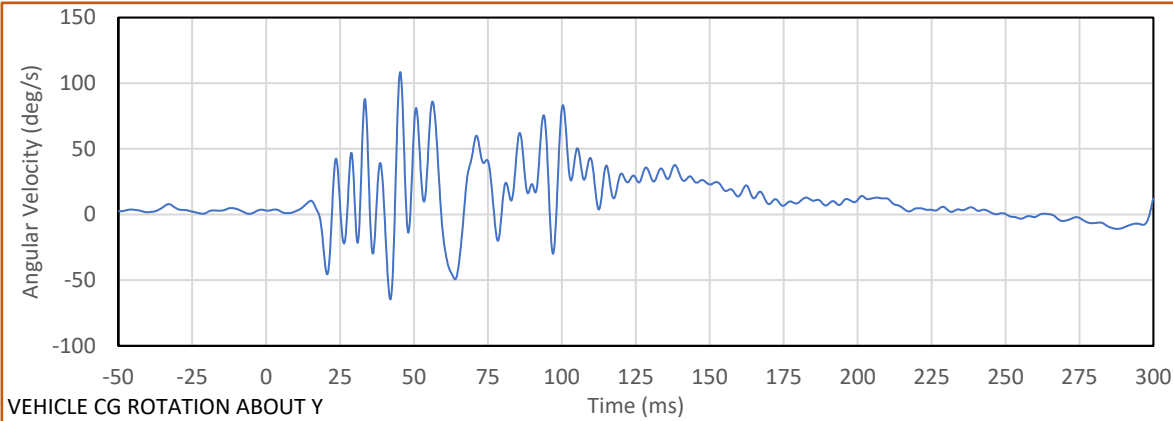


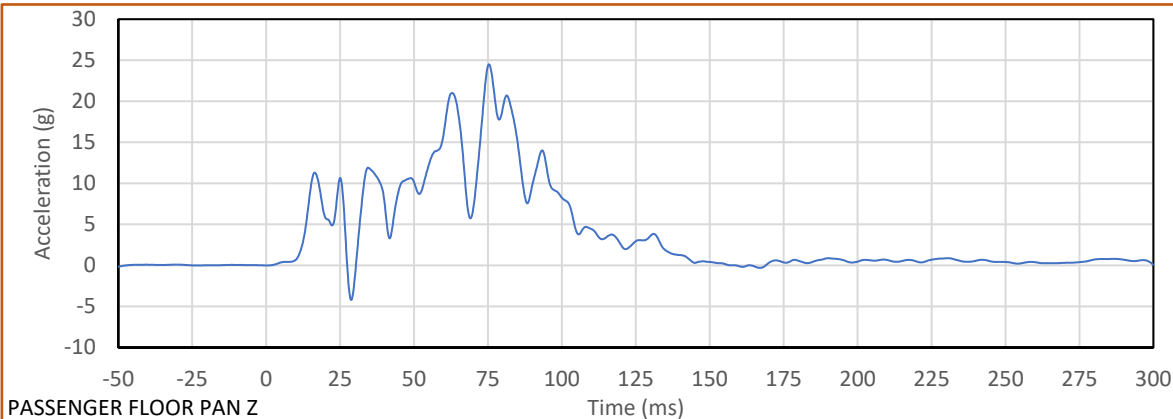
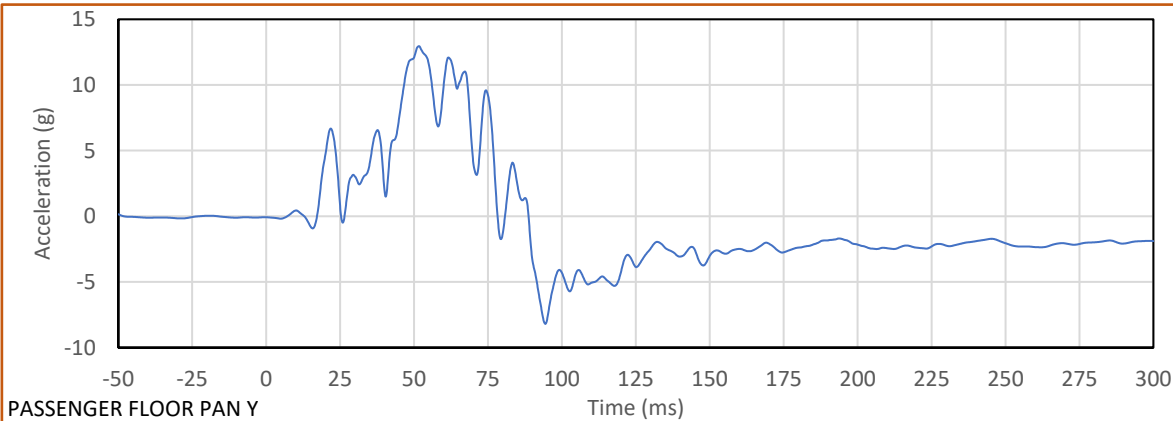
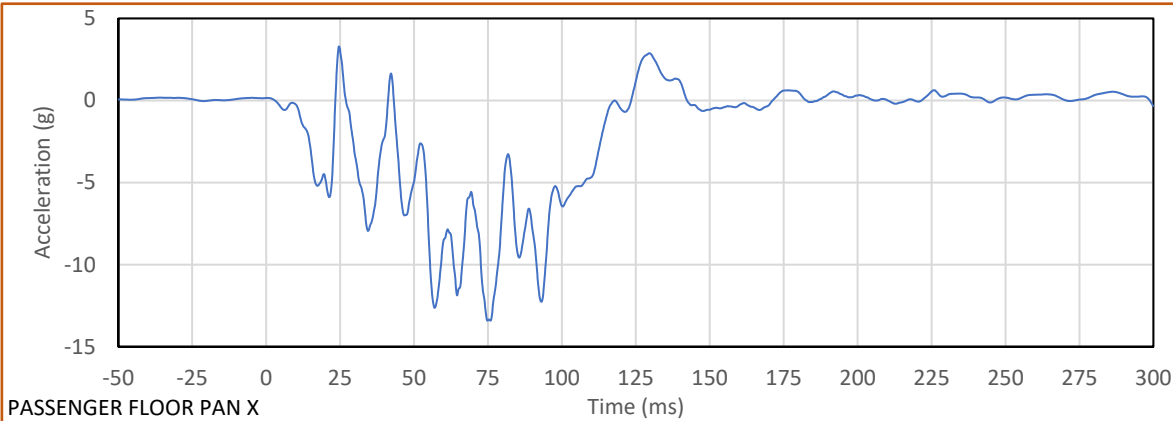
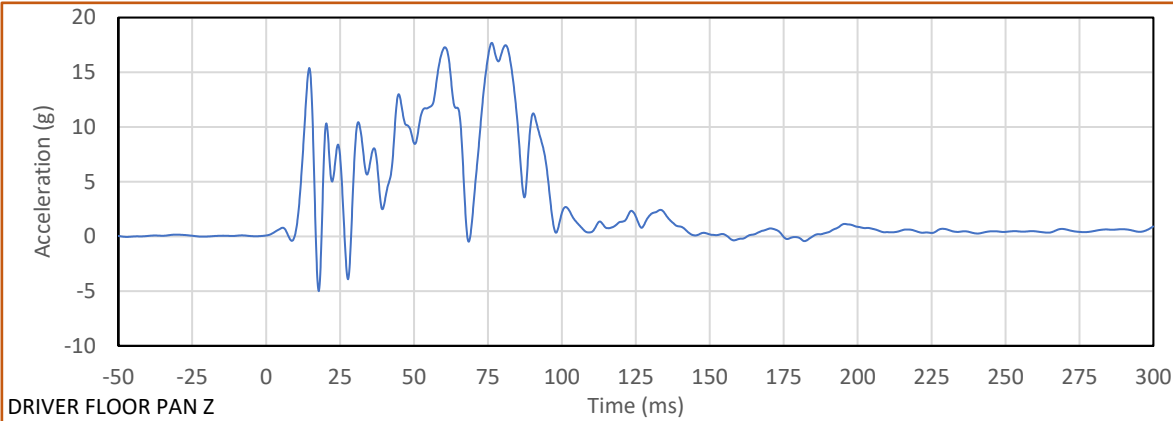
Test Vehicle: 2021 Mazda CX-5 FWD 5-Door MPV
Test Program: Left Side 30° Frontal Rigid Barrier Impact

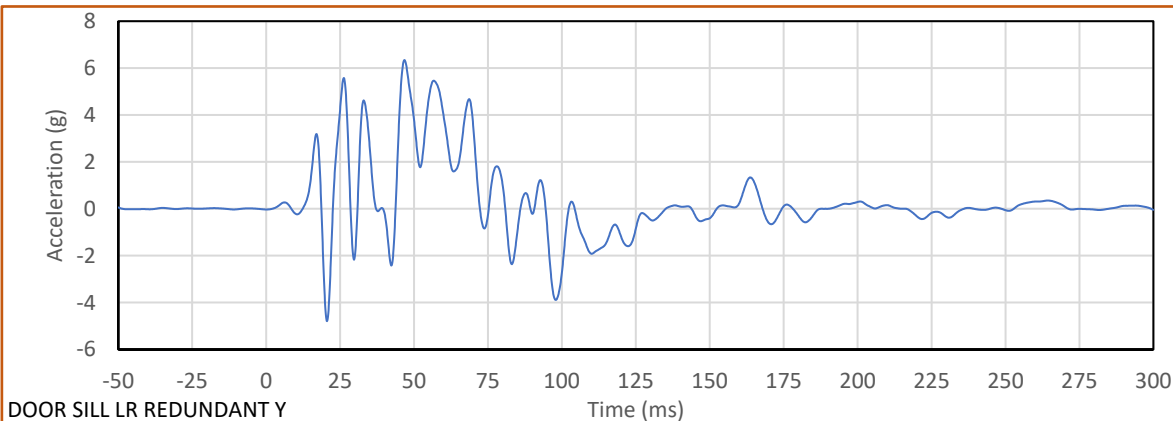
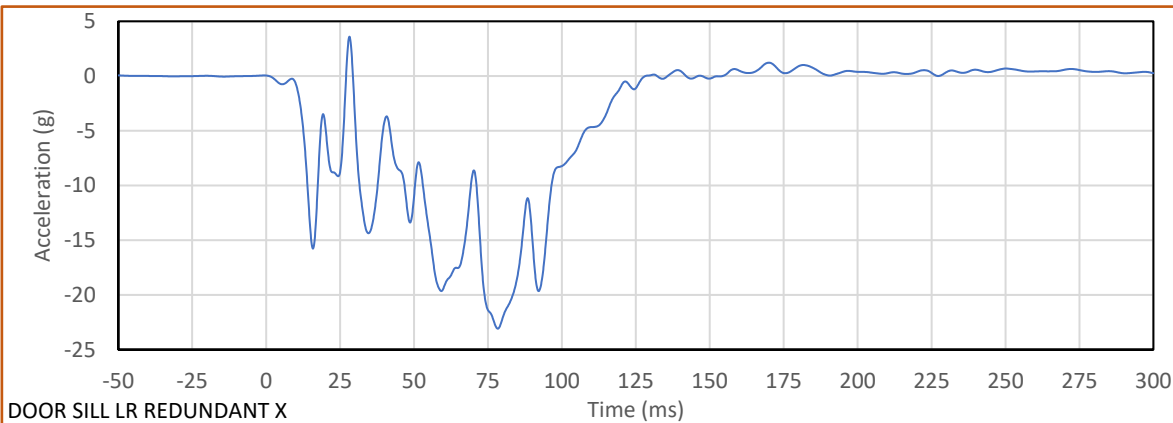
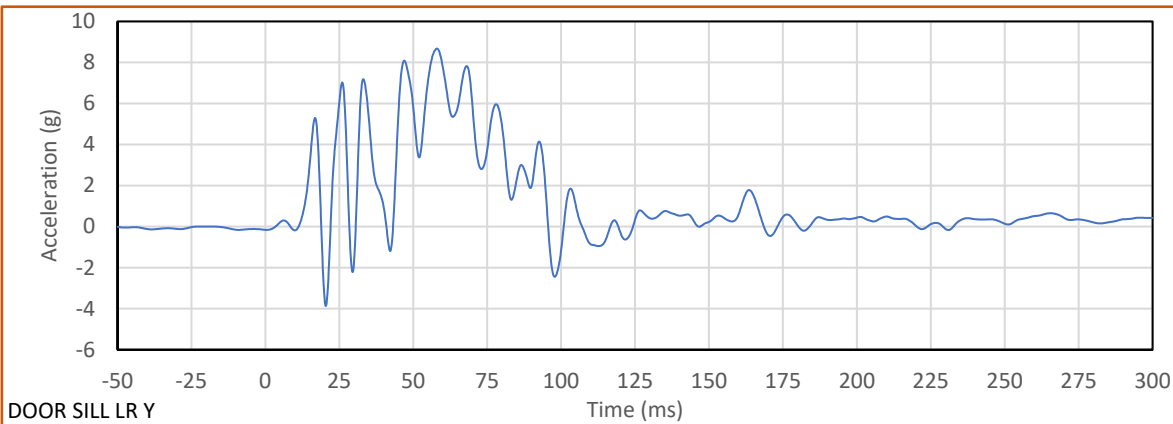
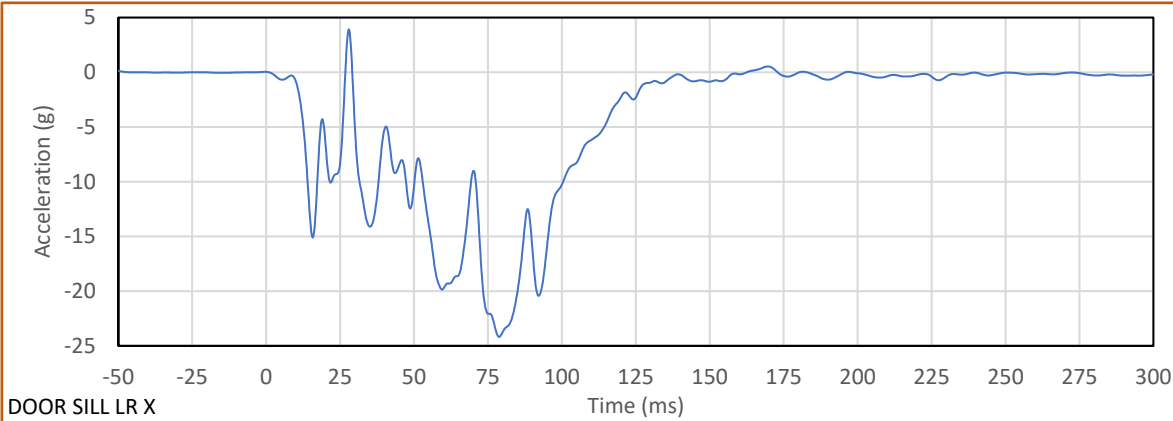
NHTSA No.: Q20215417
Test Date: 9/24/2021

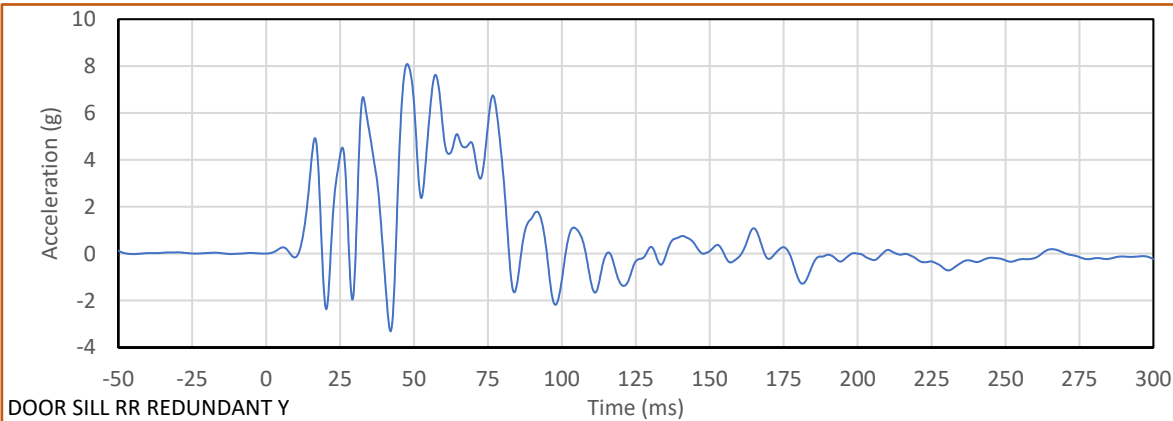
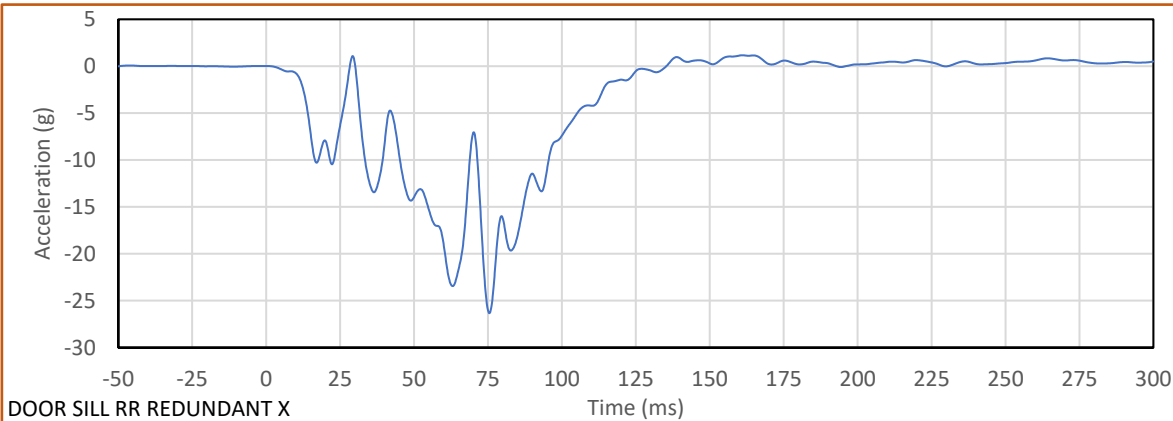
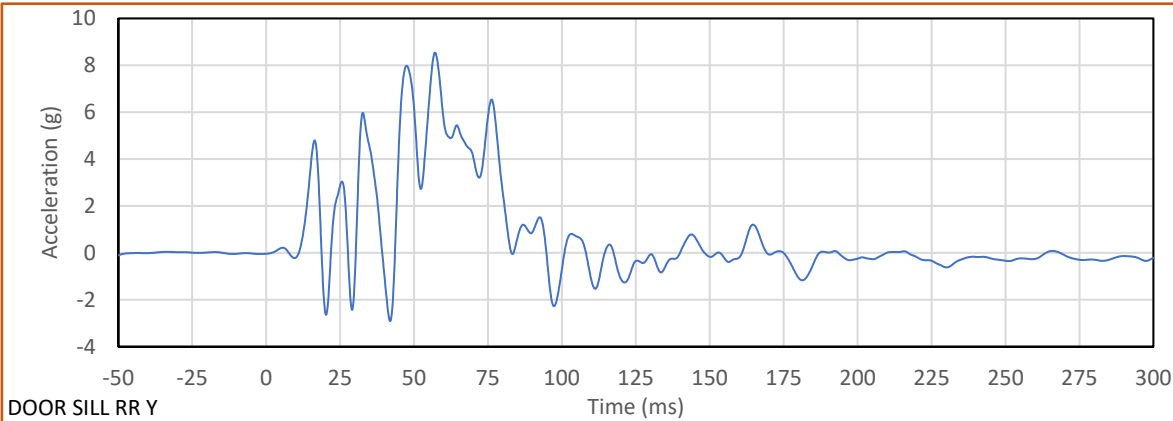
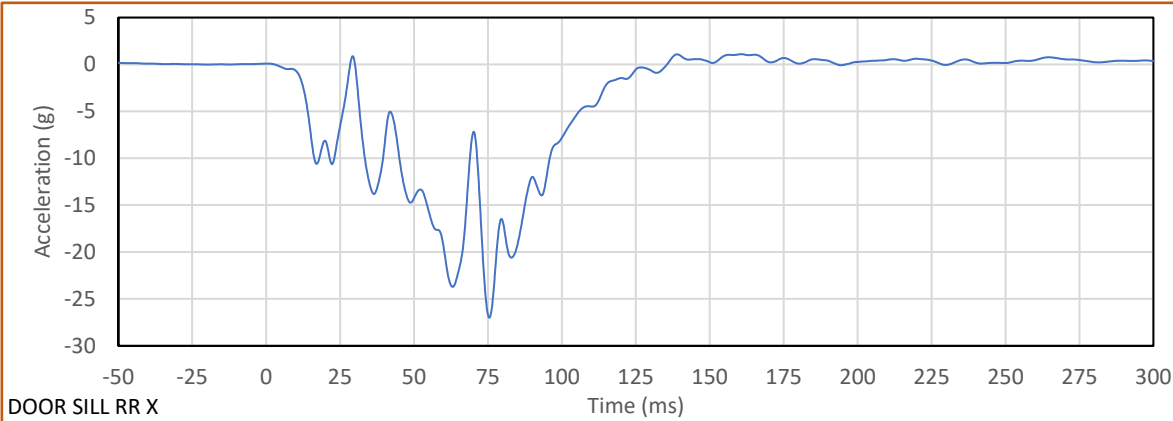






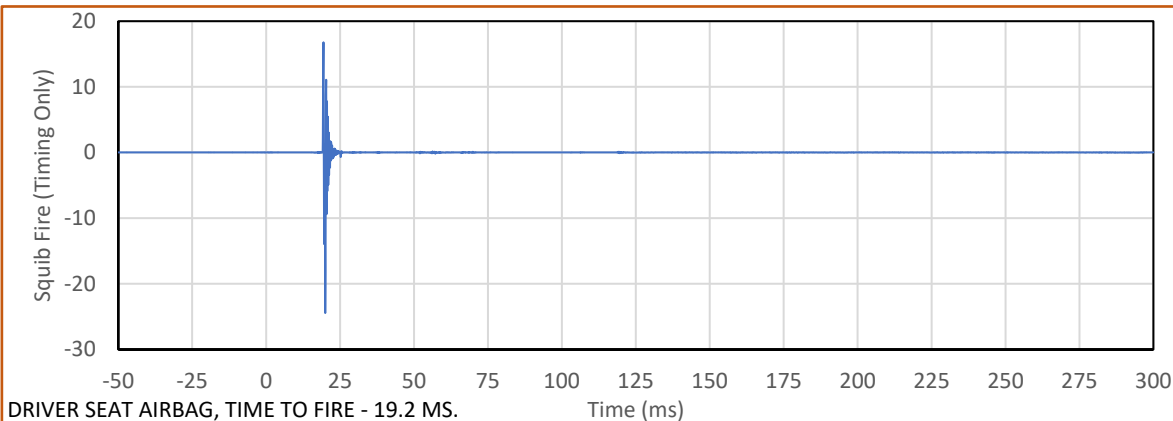
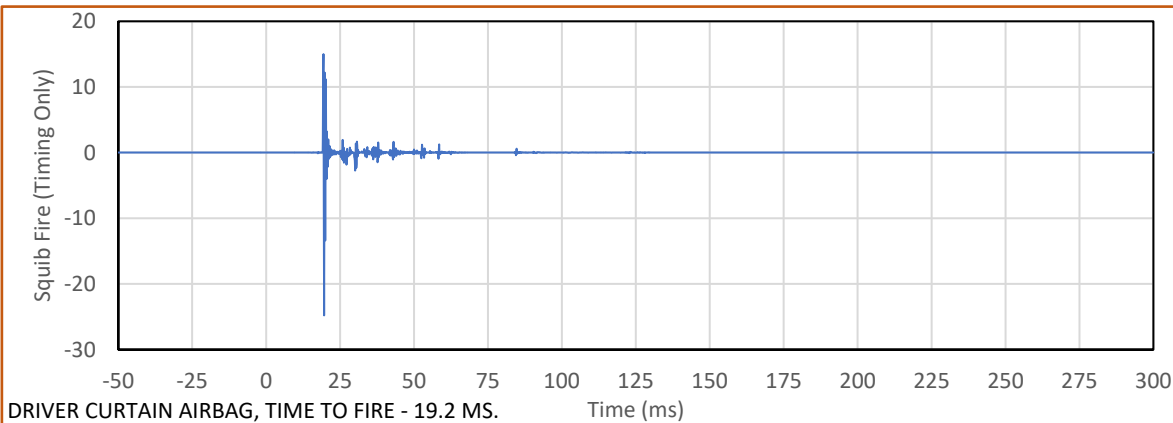
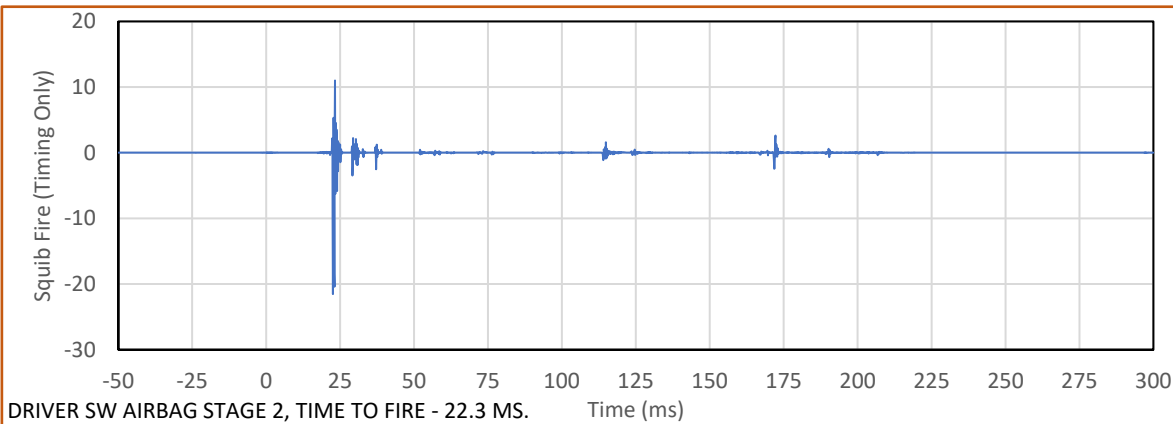
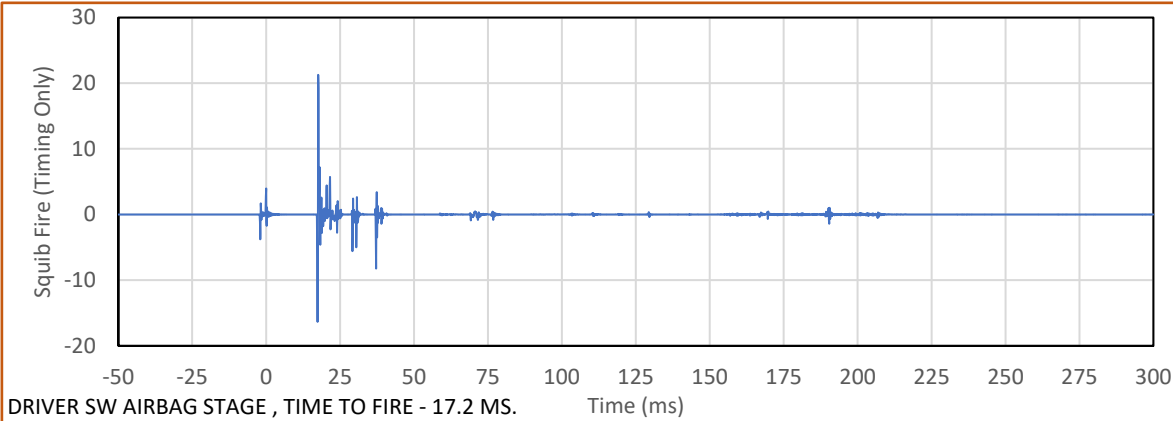






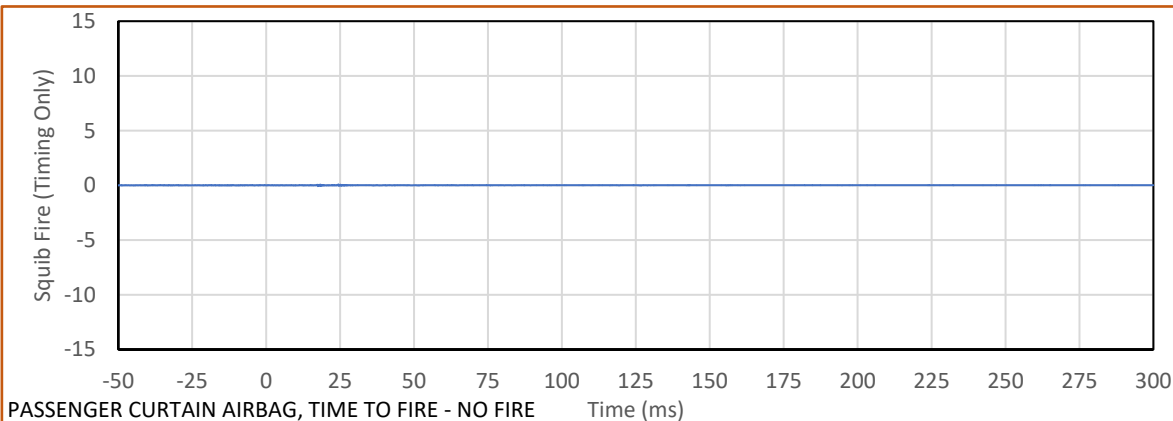
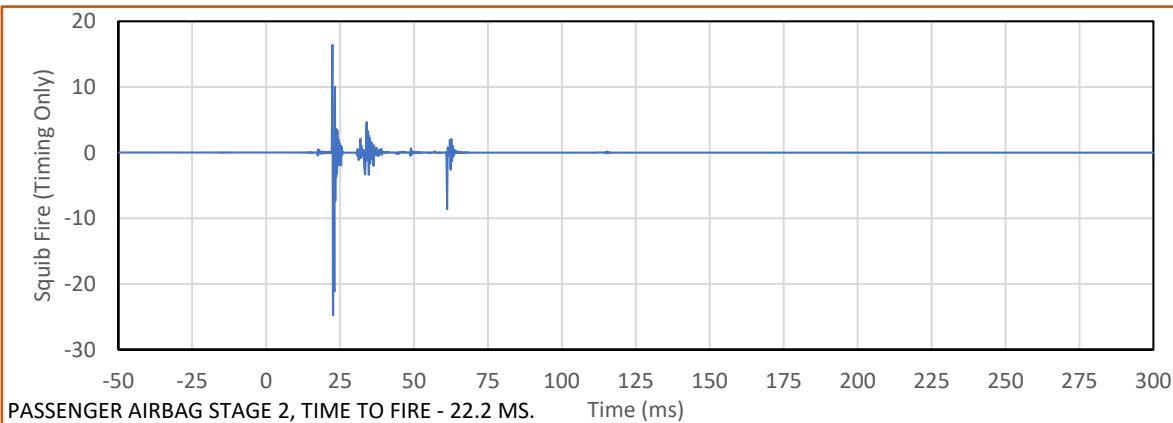
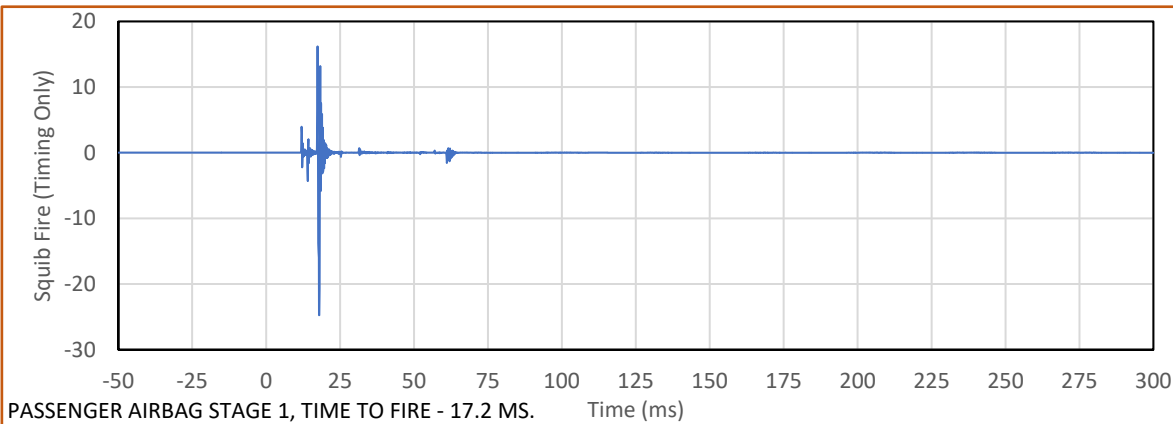
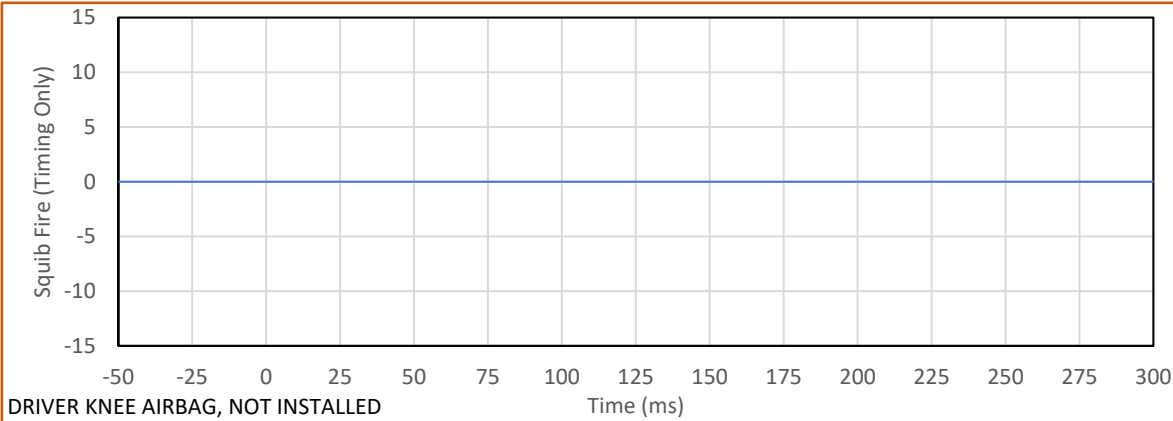
Test Vehicle: 2021 Mazda CX-5 FWD 5-Door MPV
Test Program: Left Side 30° Frontal Rigid Barrier Impact

NHTSA No.: Q20215417
Test Date: 9/24/2021



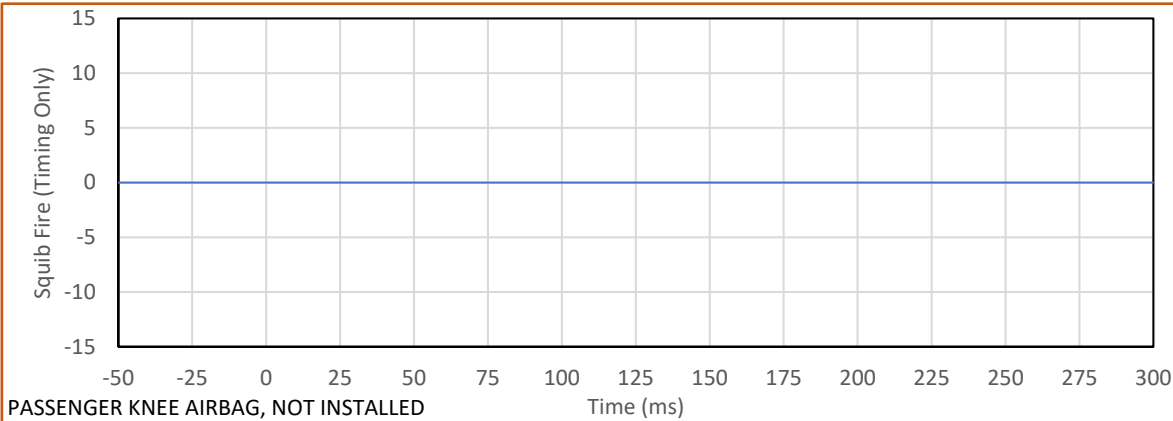
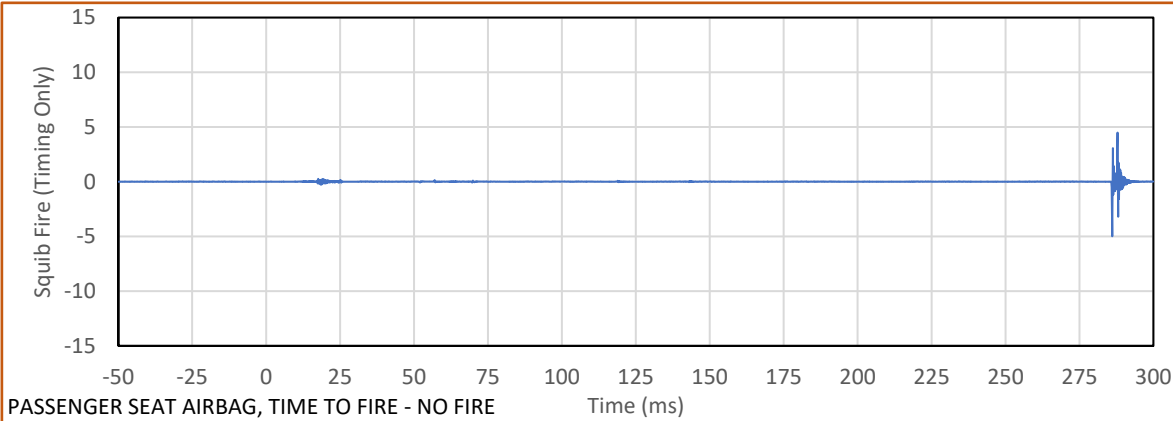
Test Vehicle: 2021 Mazda CX-5 FWD 5-Door MPV
Test Program: Left Side 30° Frontal Rigid Barrier Impact

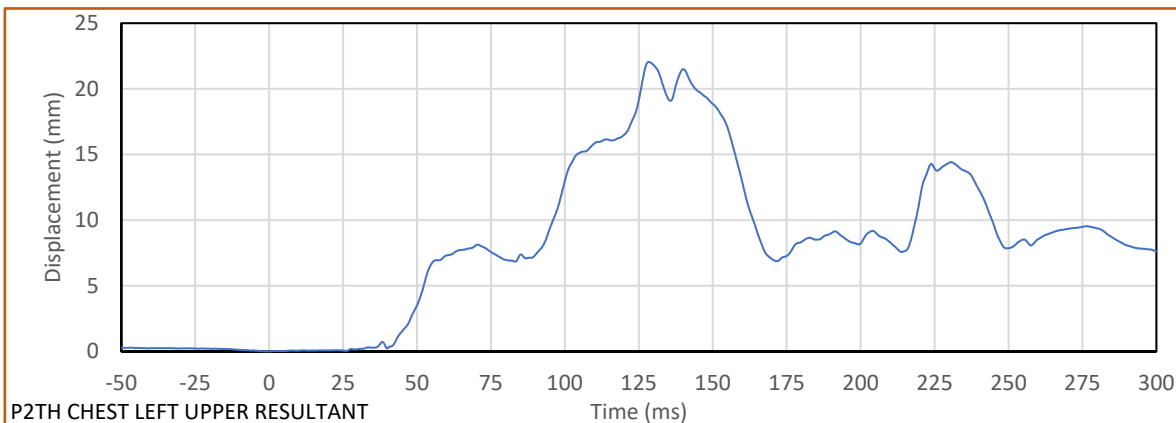
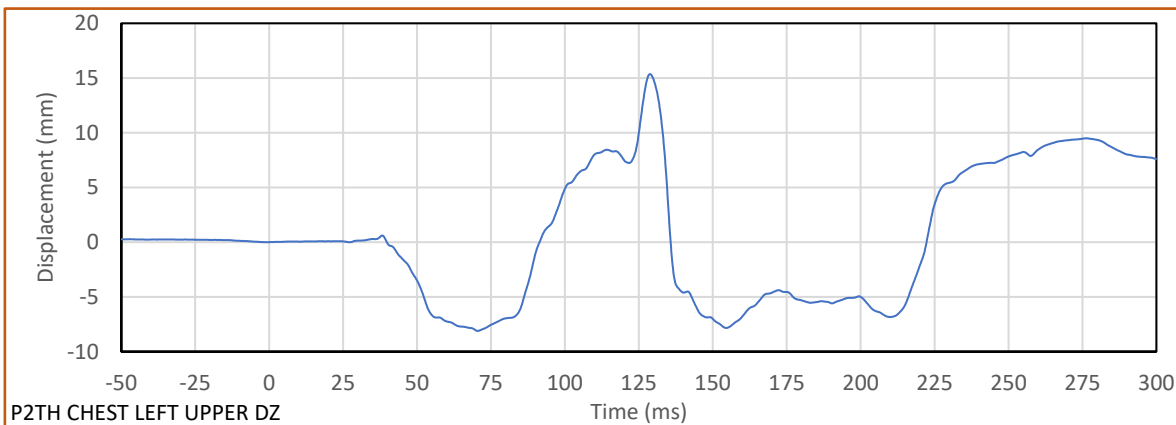
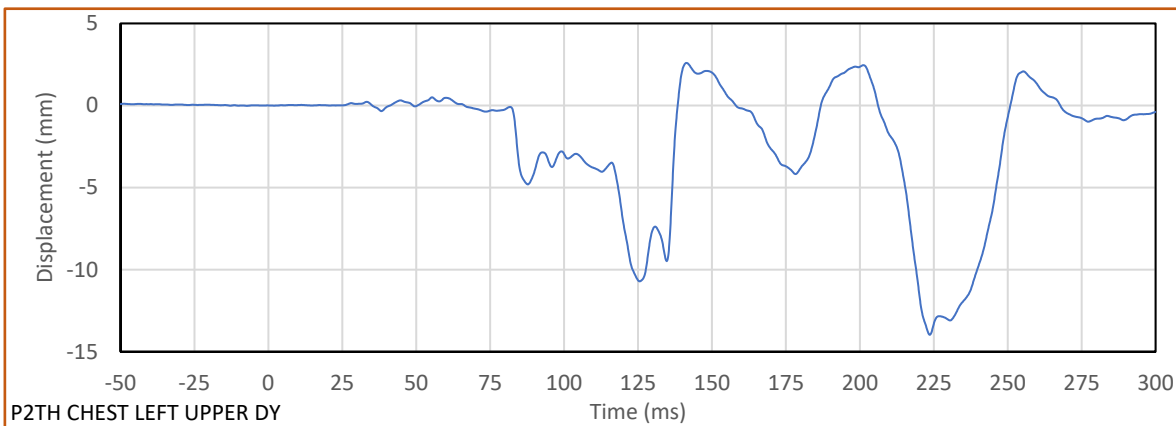
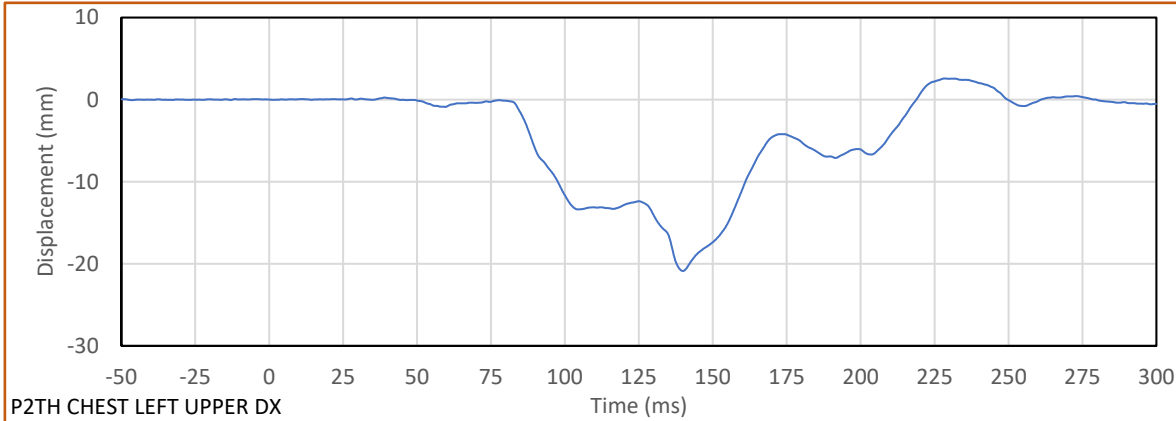
NHTSA No.: Q20215417
Test Date: 9/24/2021

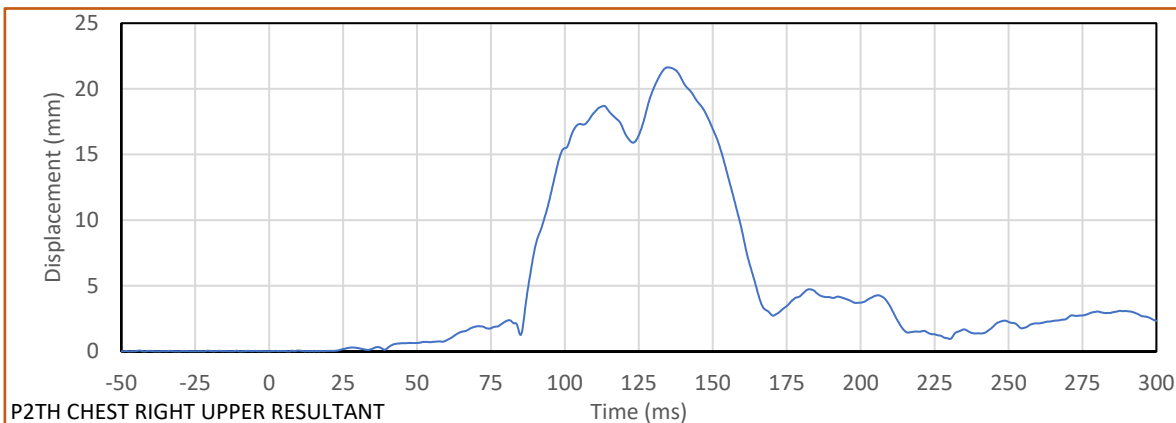
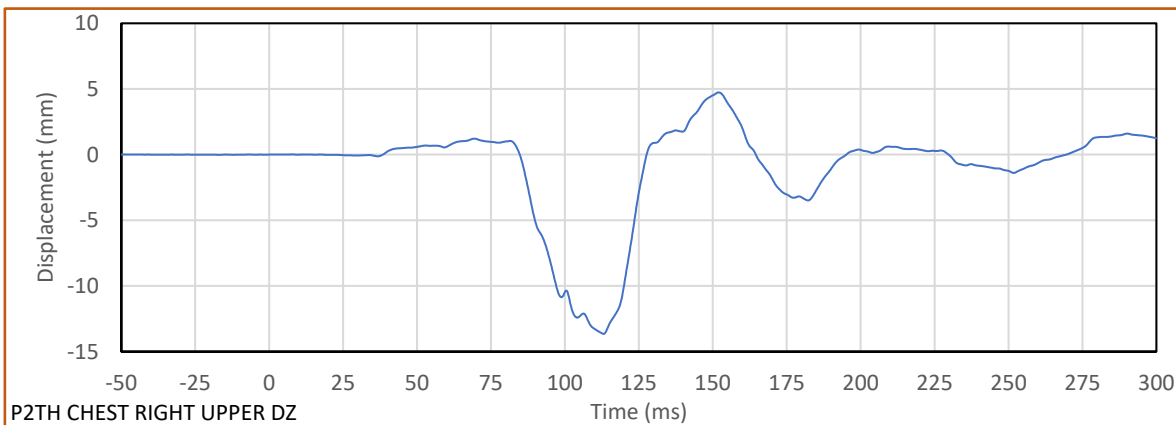
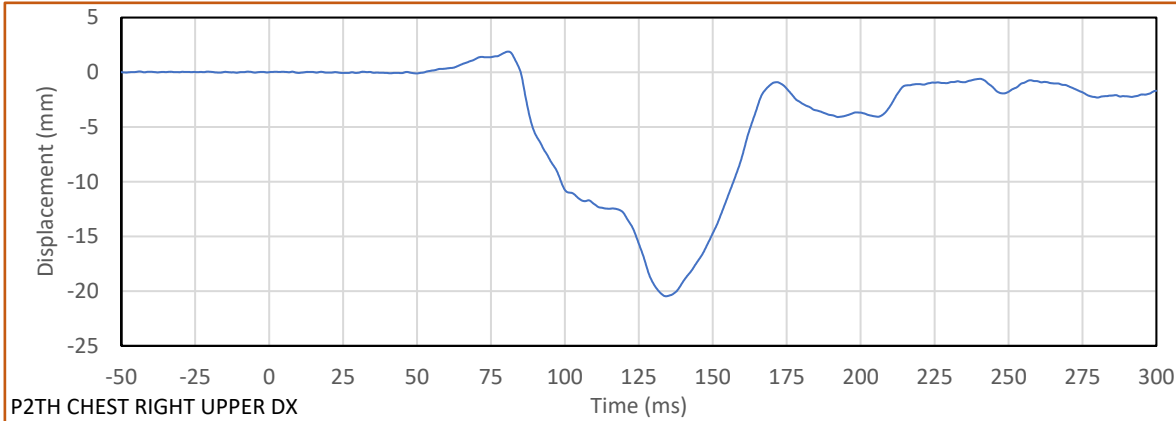


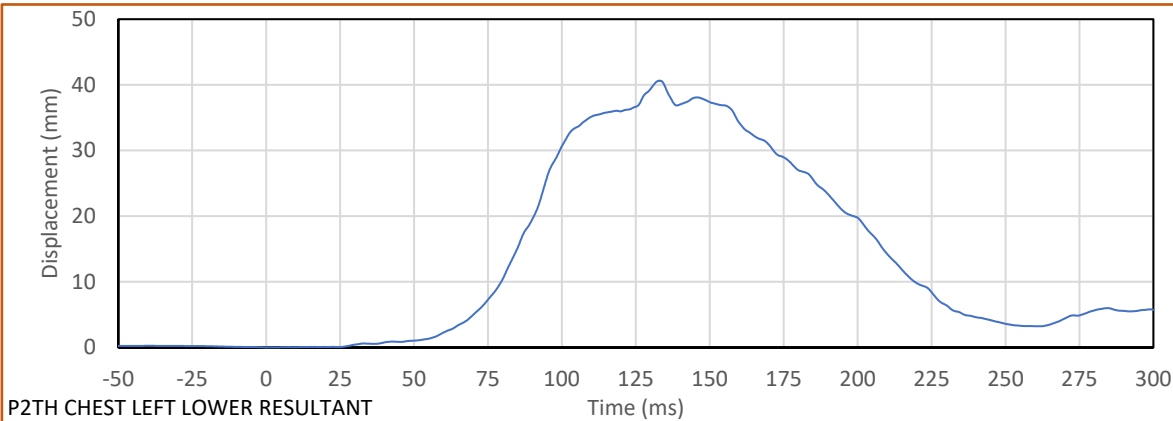
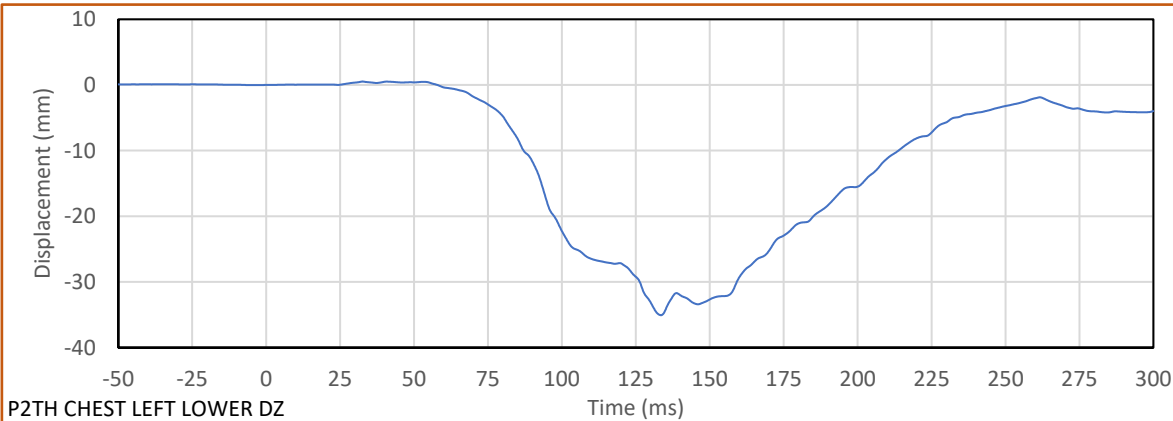
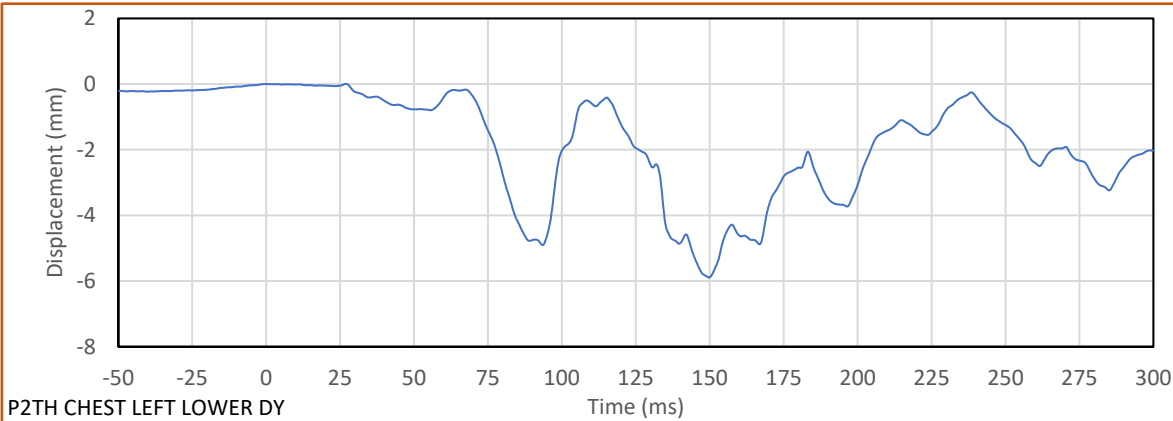
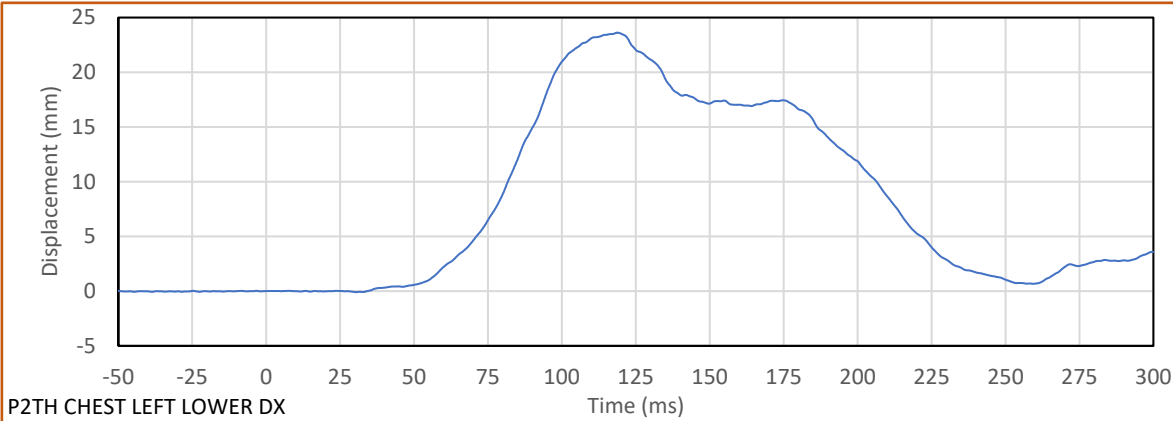
Test Vehicle: 2021 Mazda CX-5 FWD 5-Door MPV
Test Program: Left Side 30° Frontal Rigid Barrier Impact

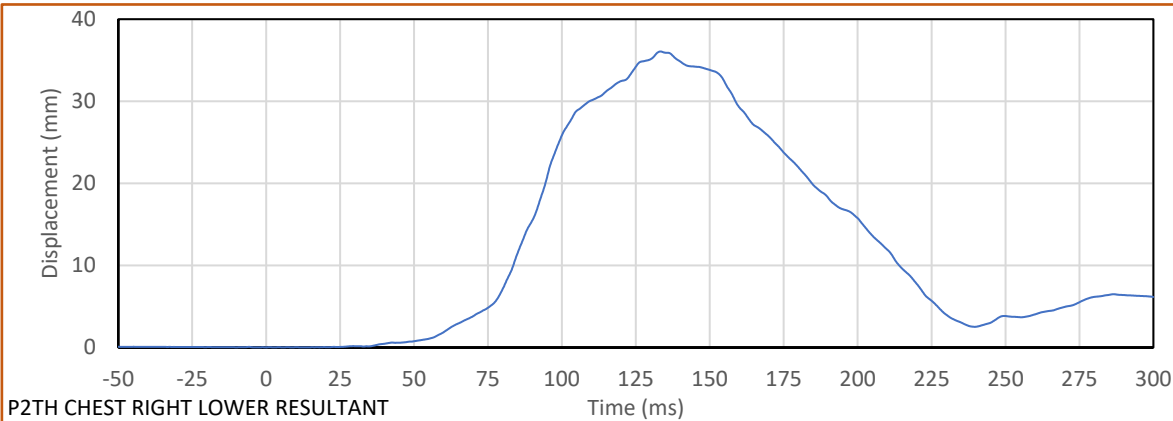
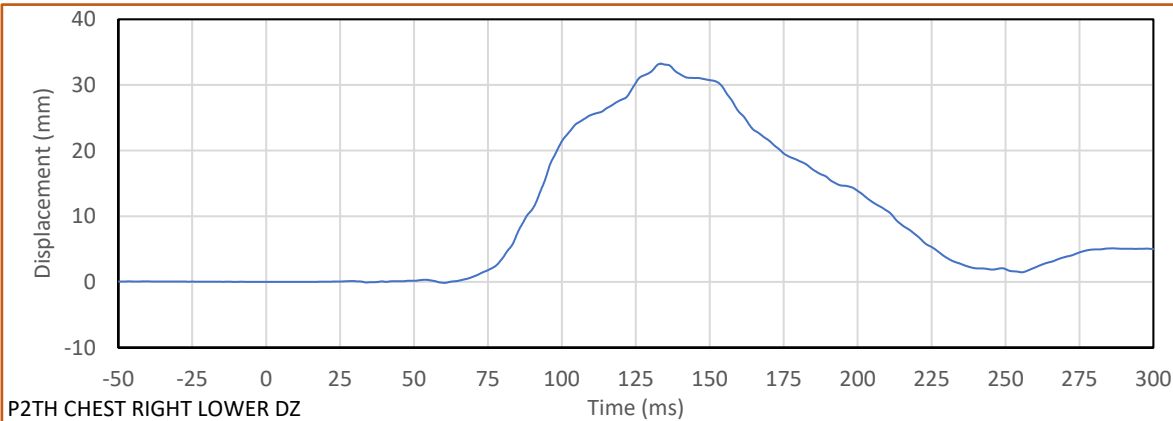
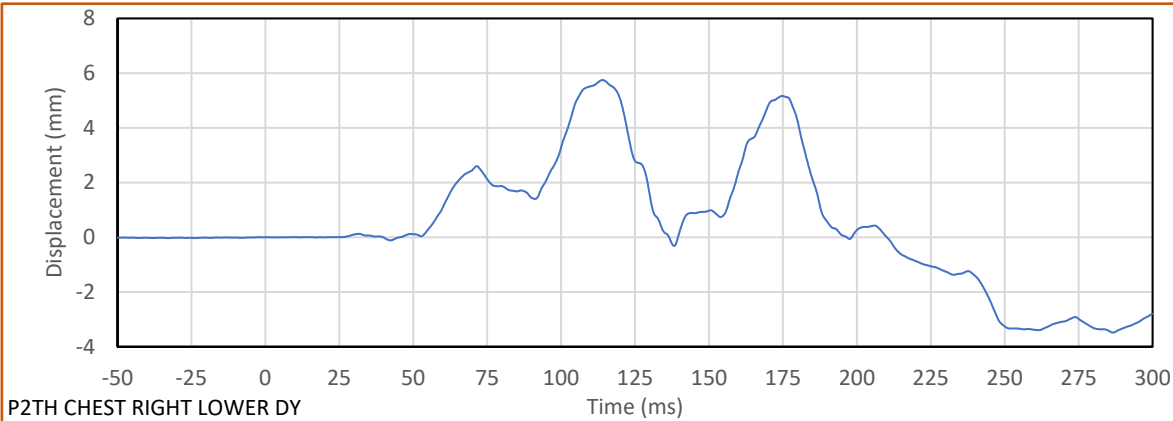
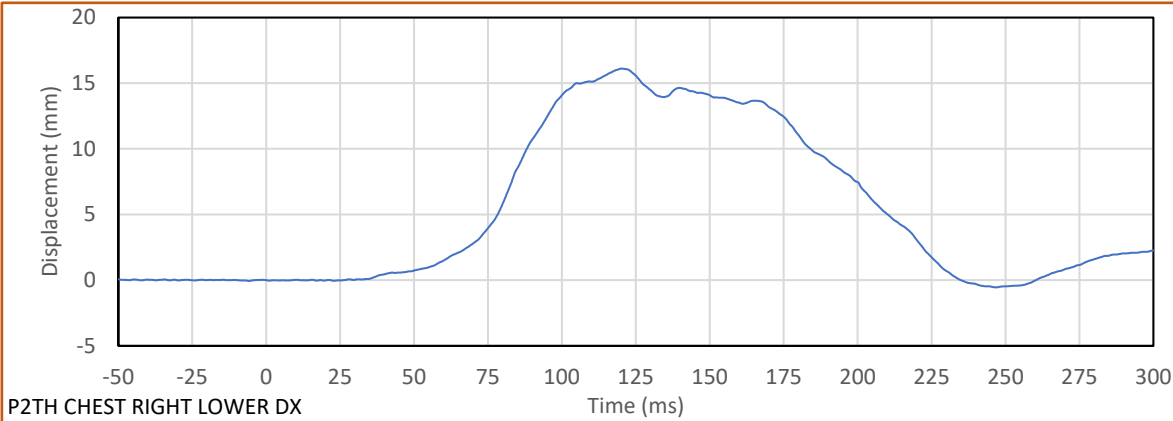
NHTSA No.: Q20215417
Test Date: 9/24/2021

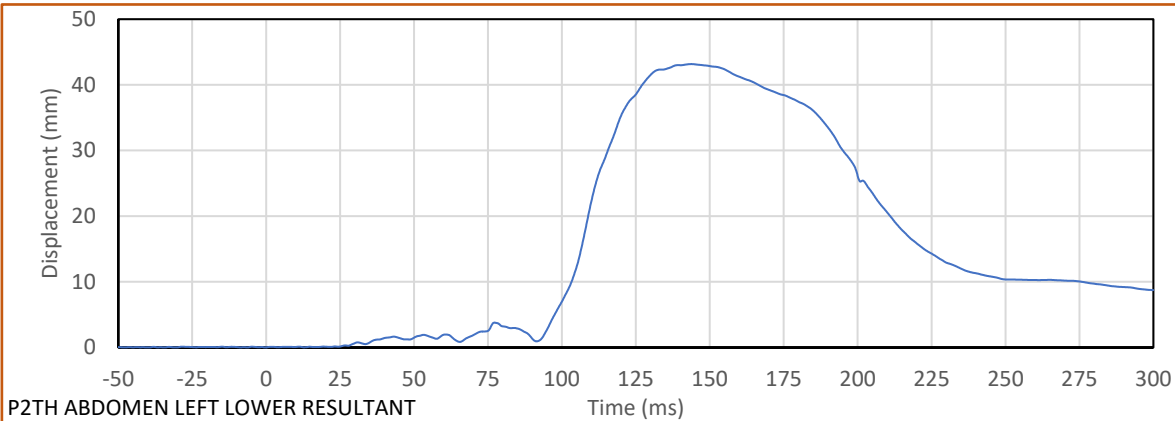
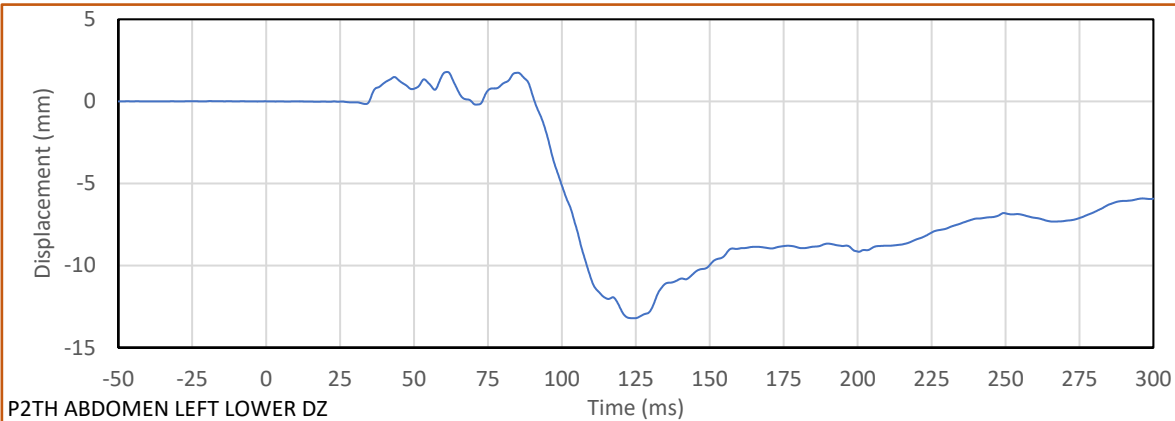
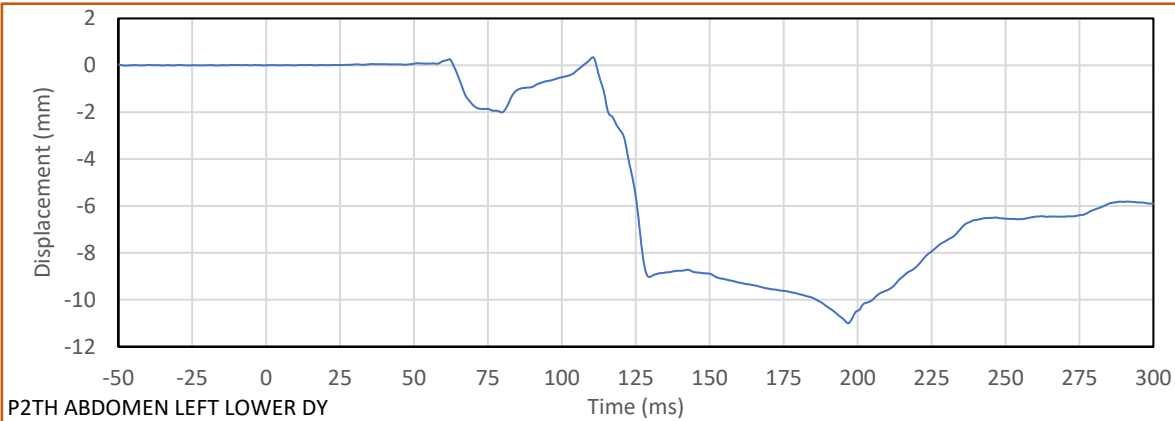
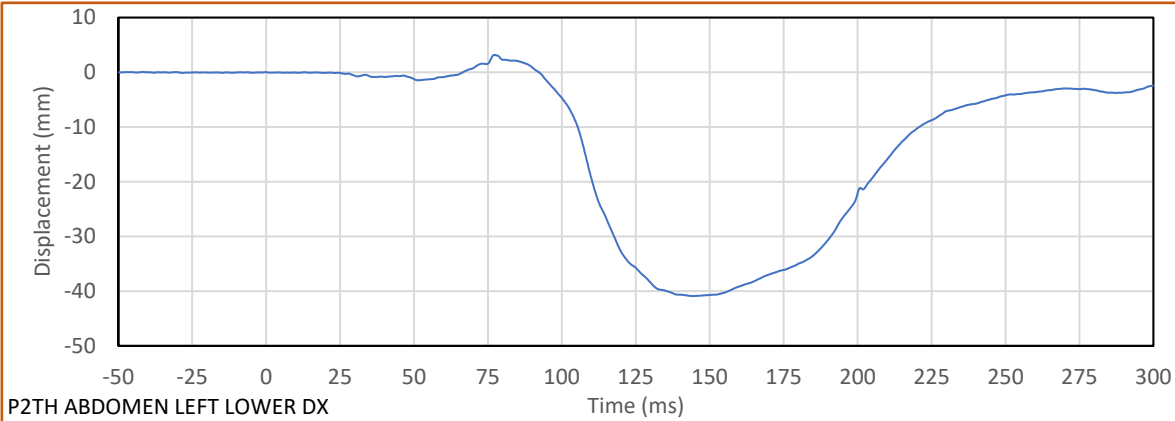


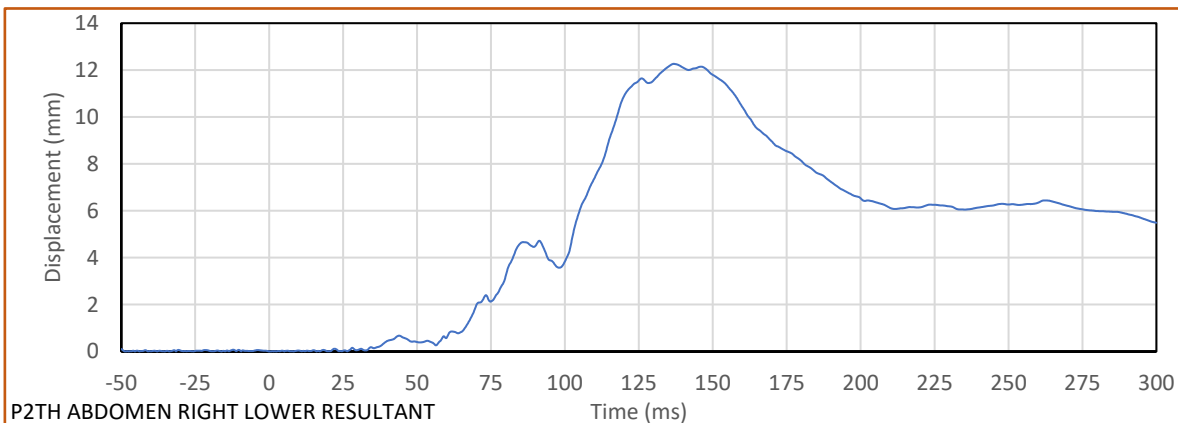
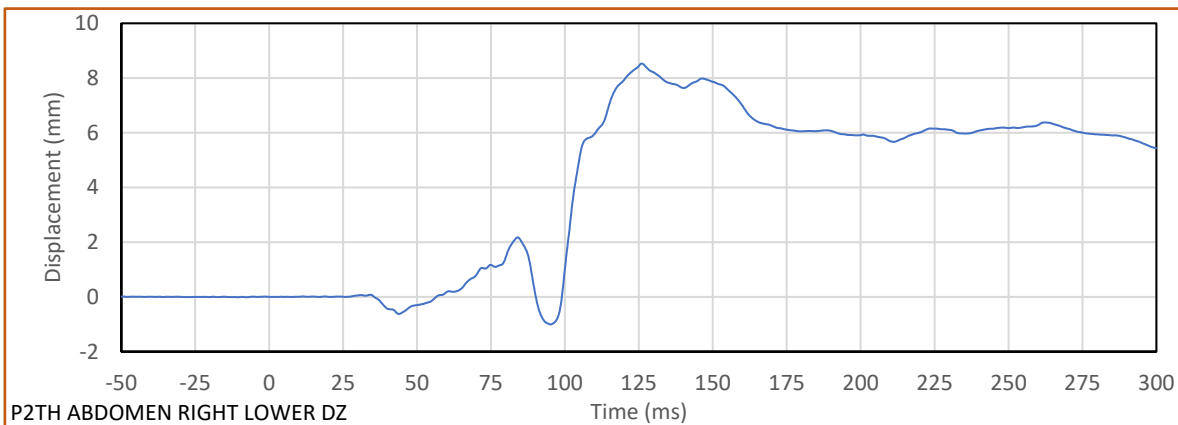
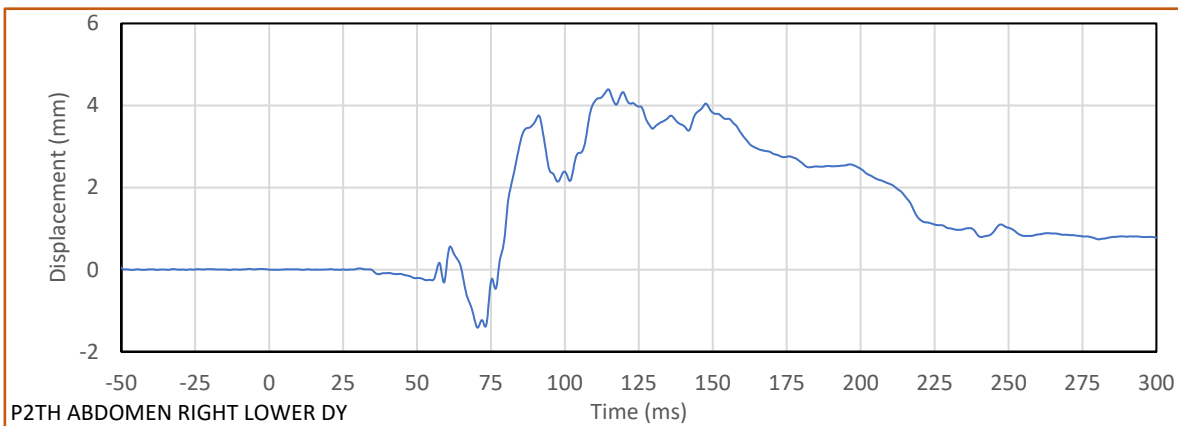
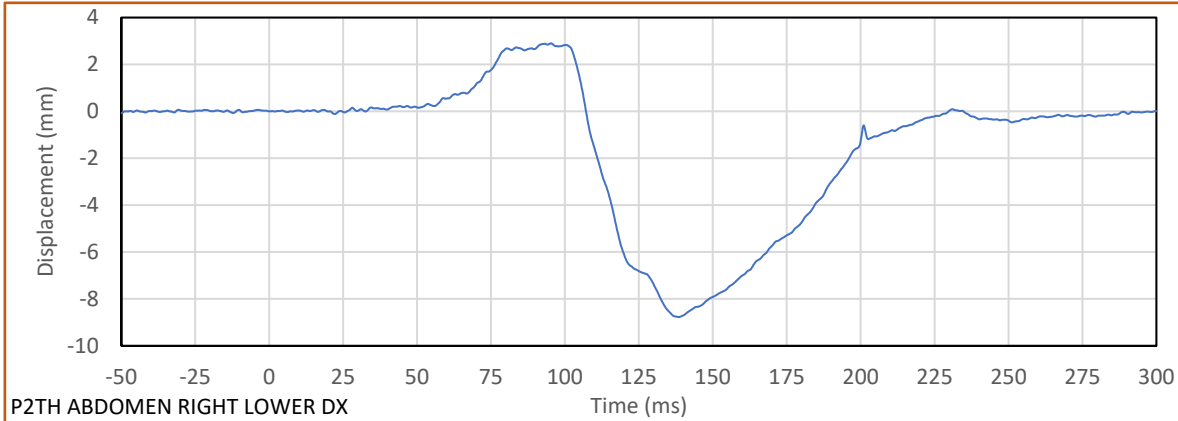


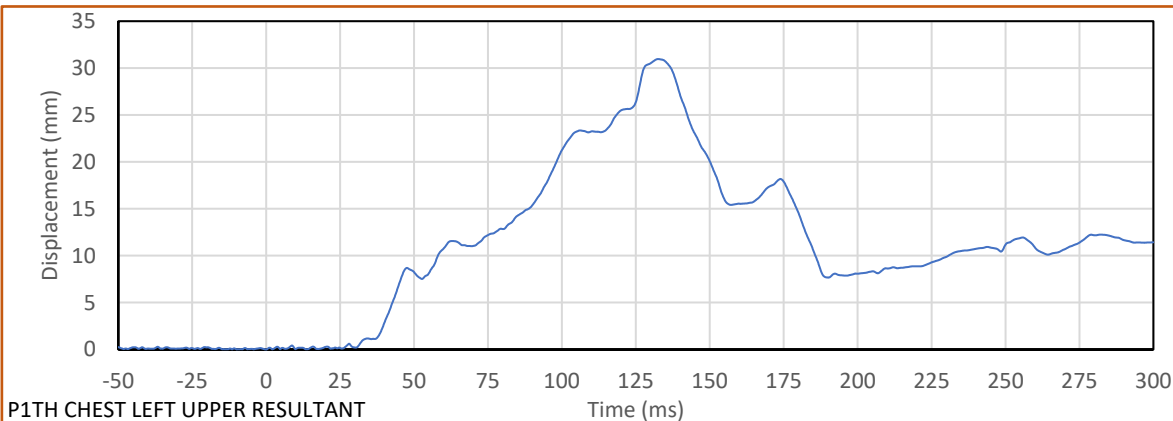
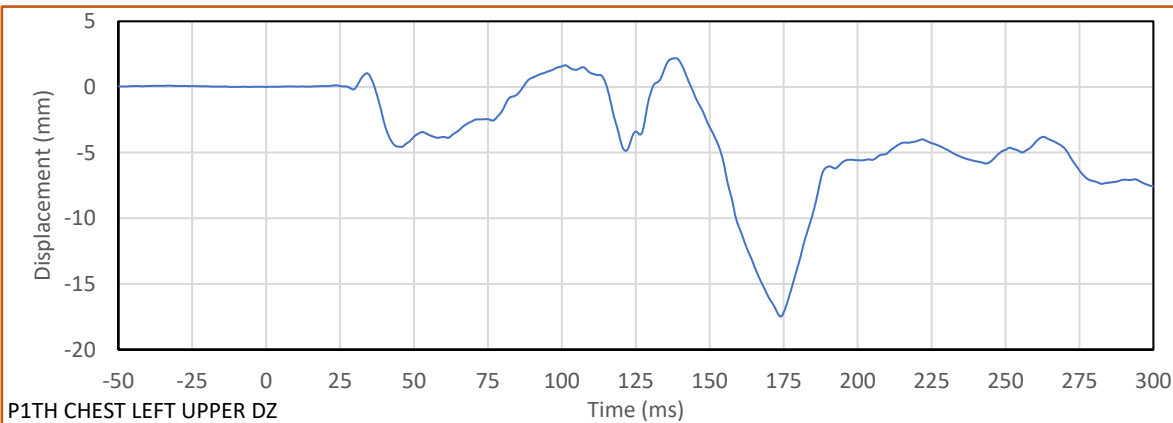
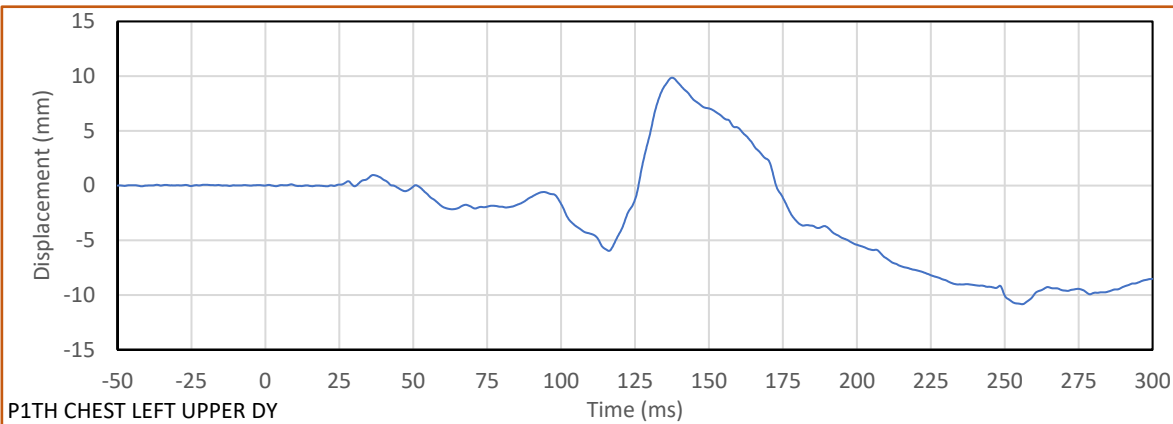
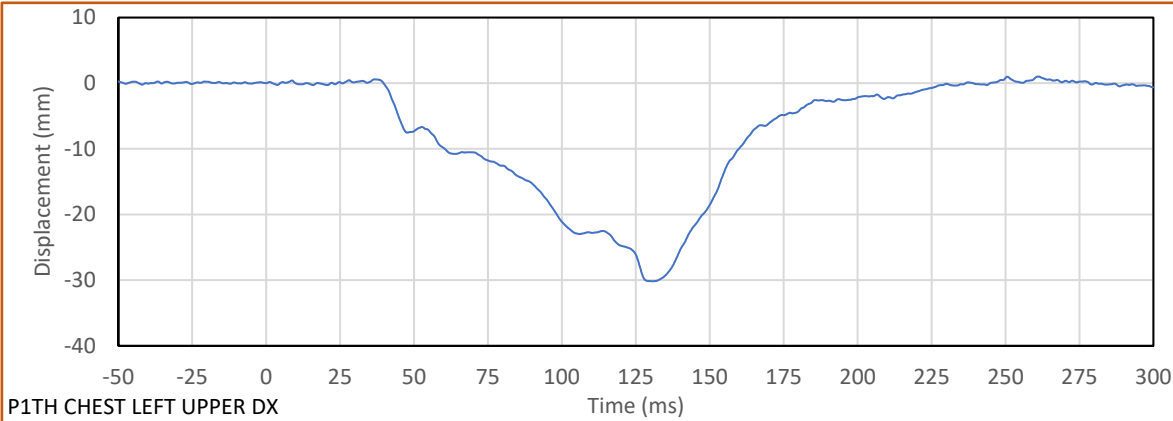


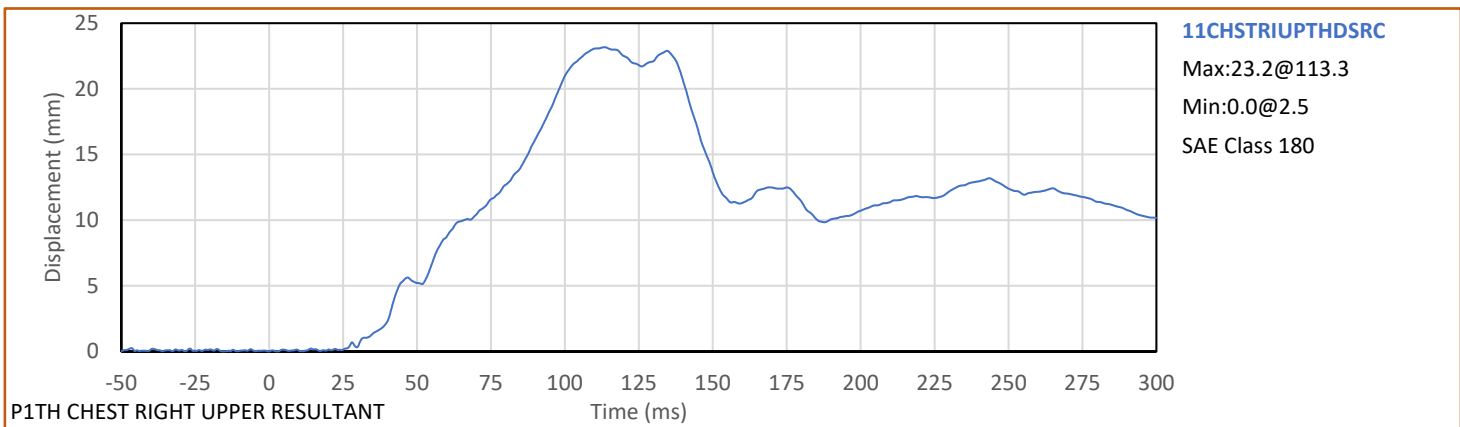
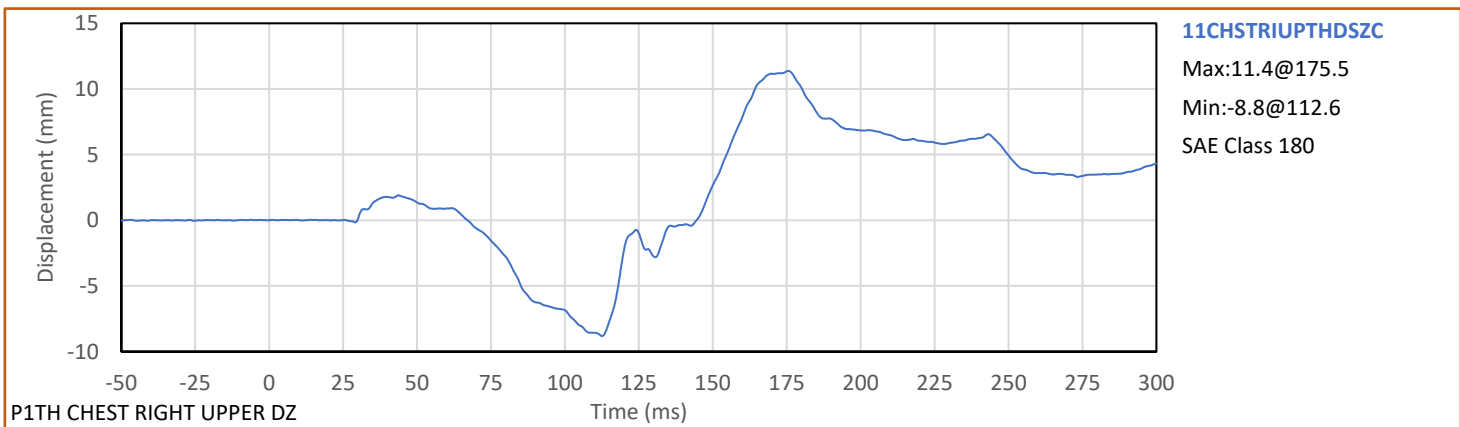
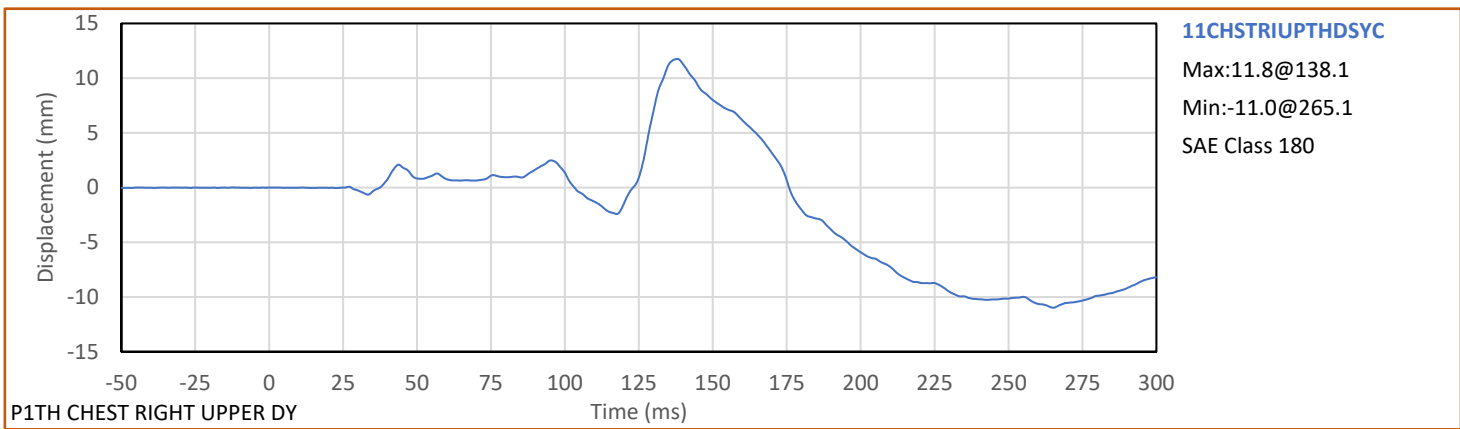
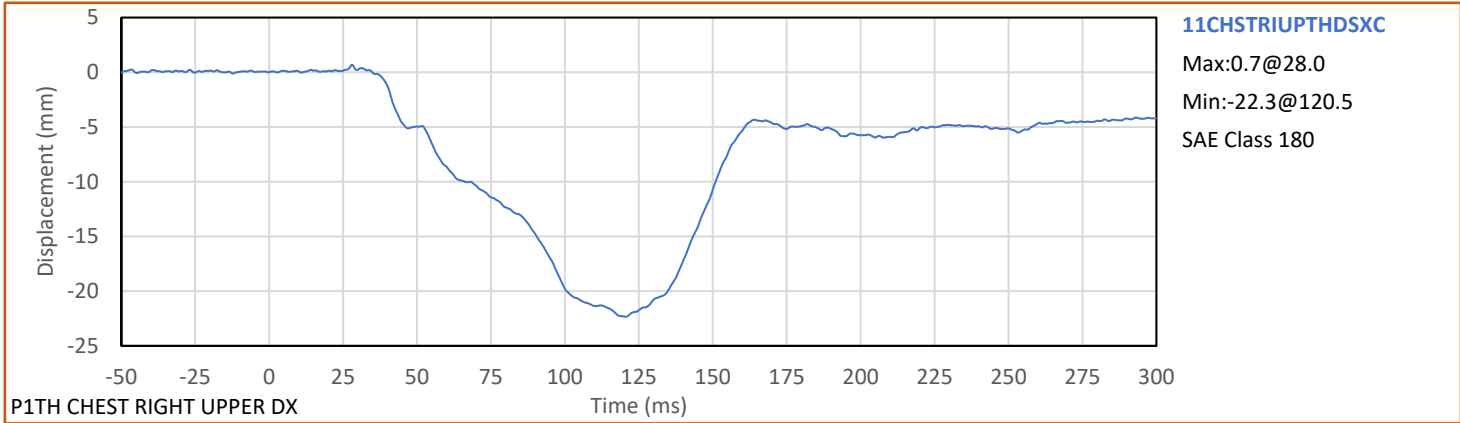


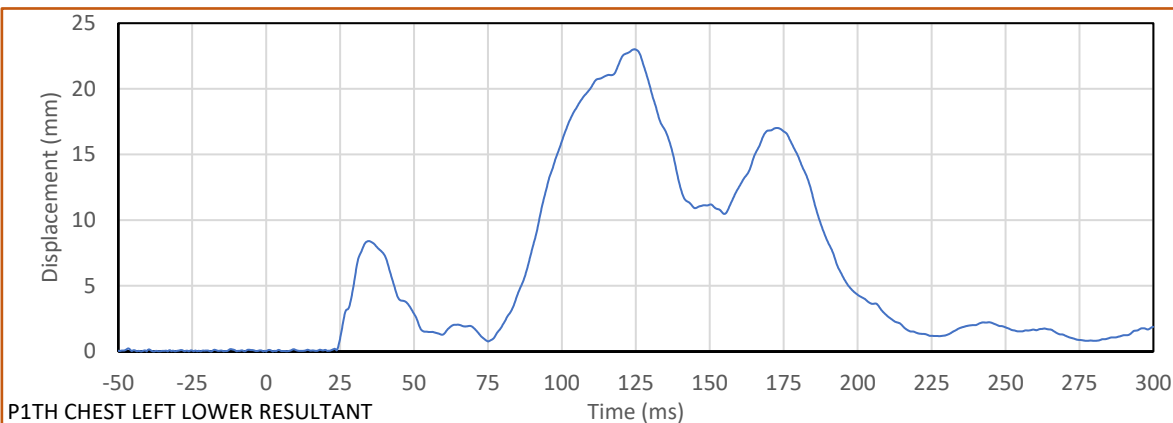
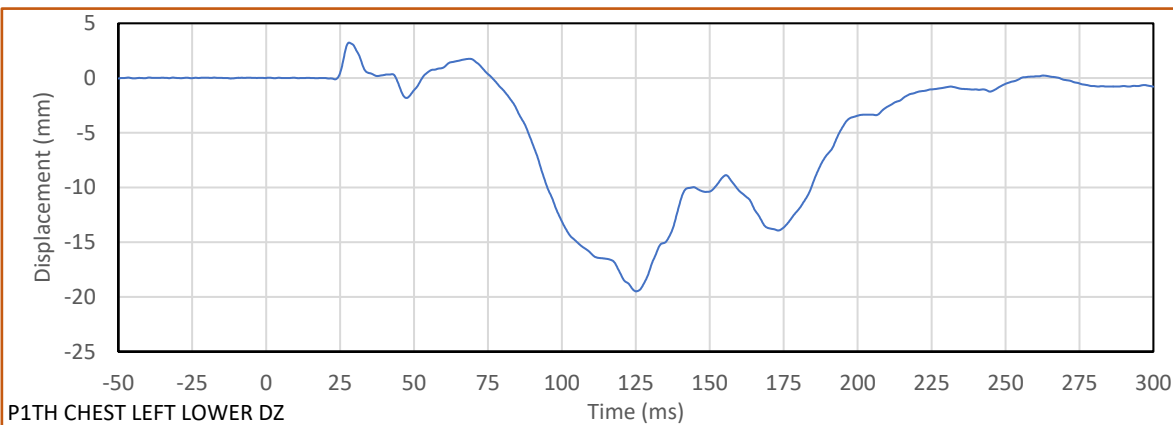
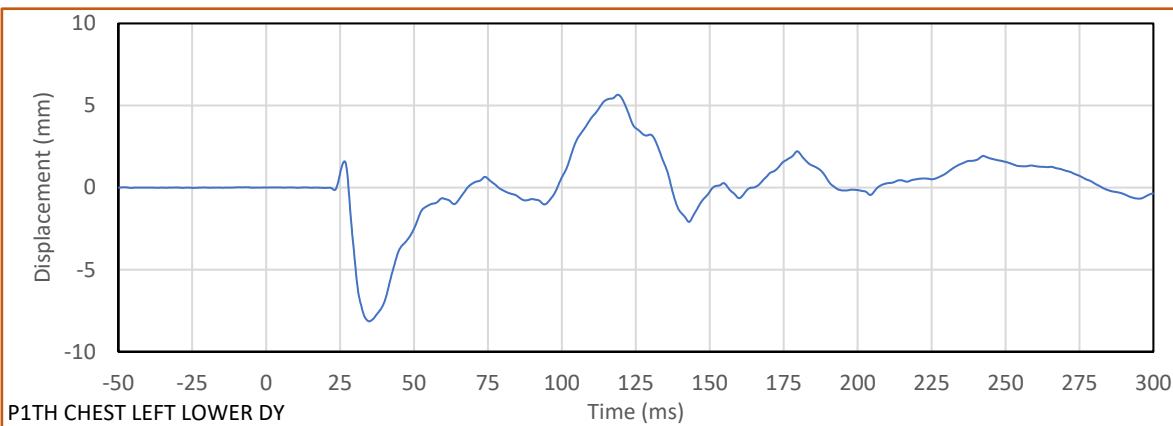
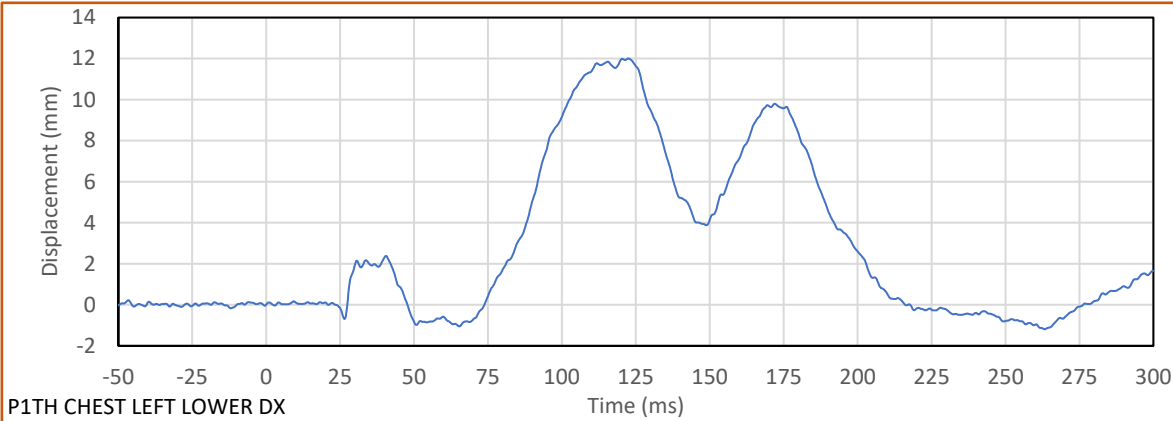


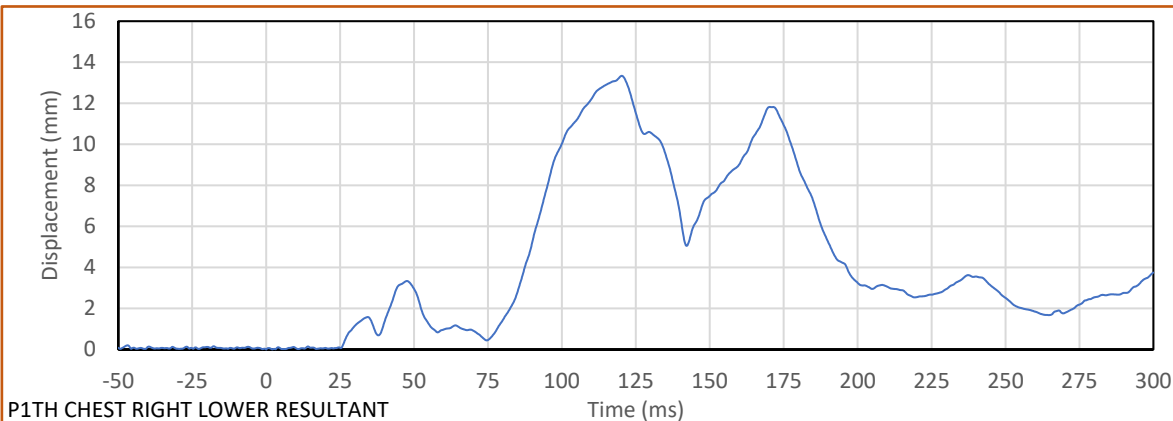
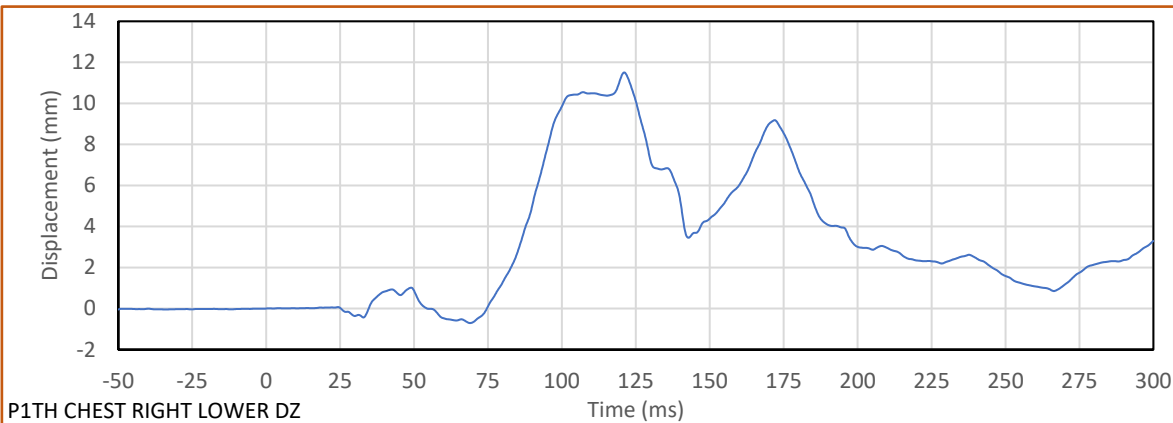
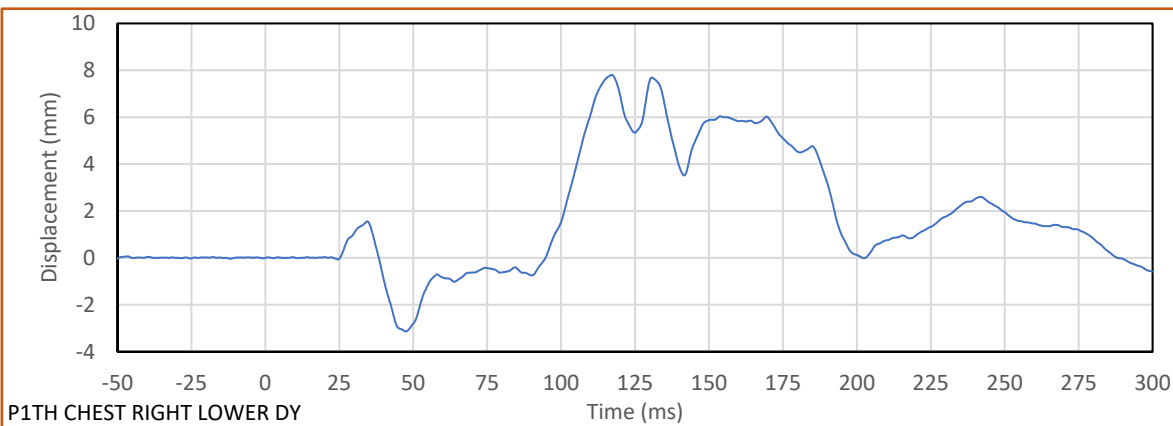
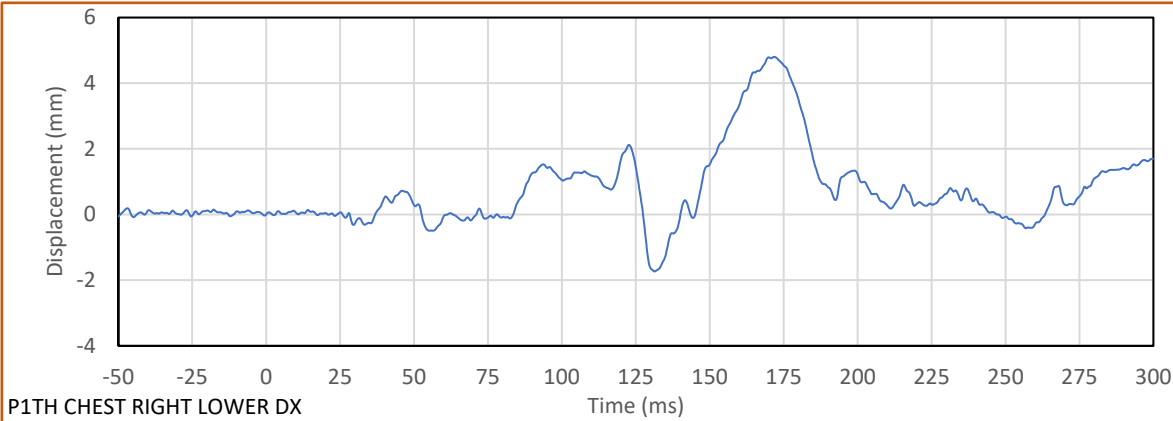


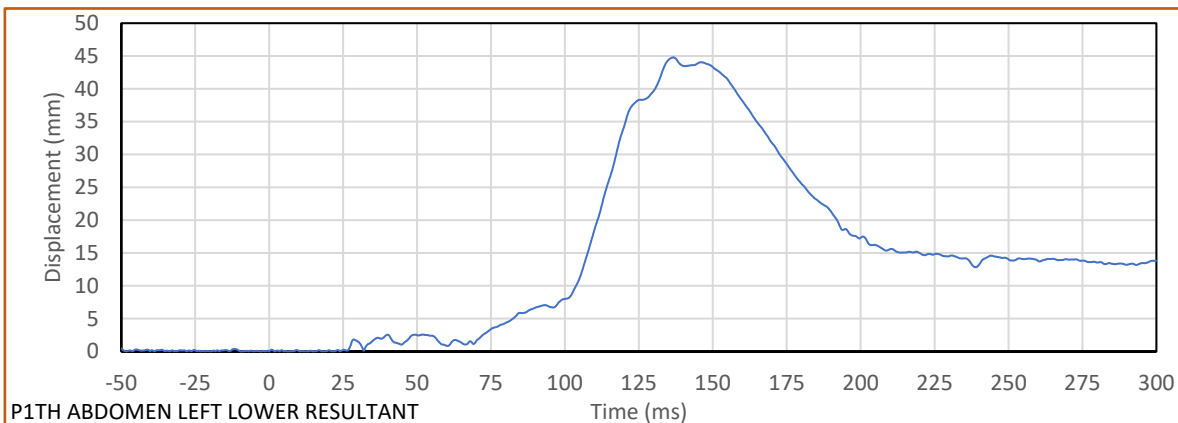
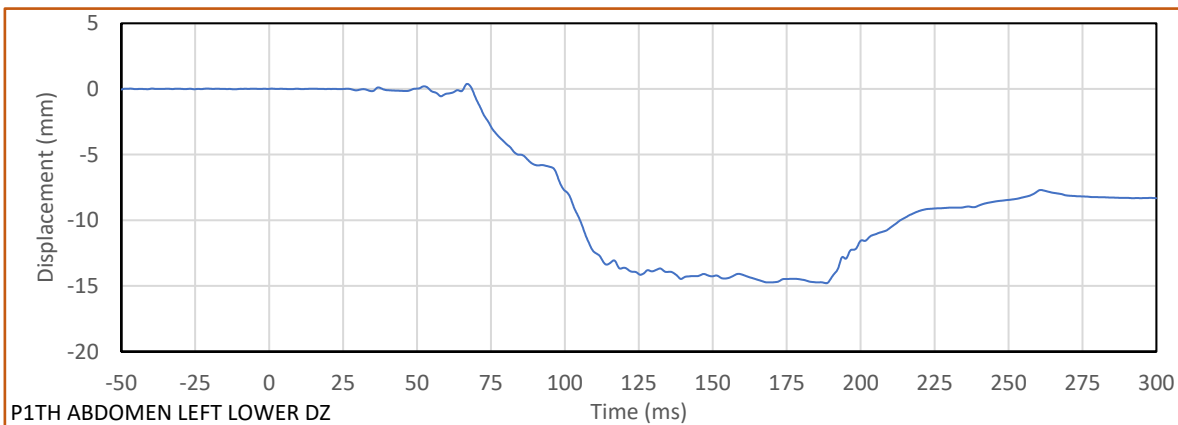
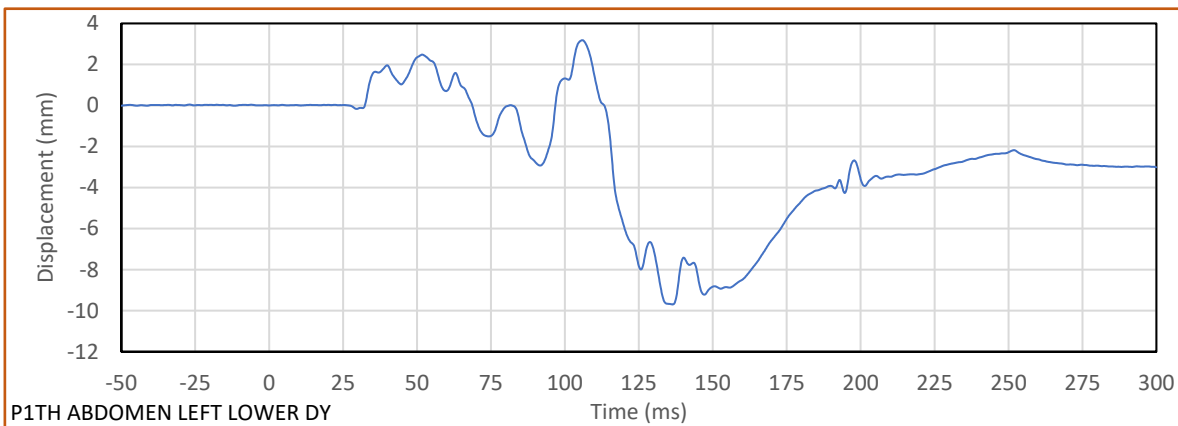
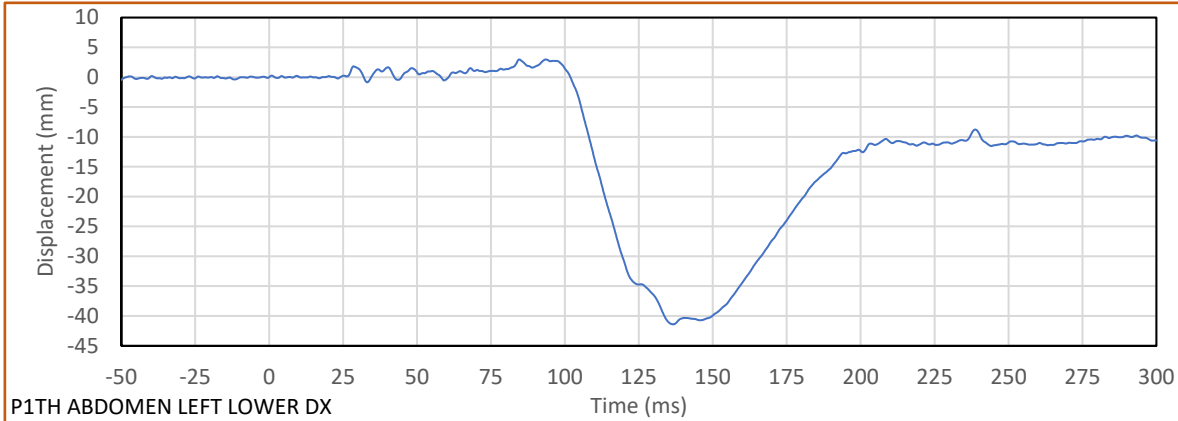


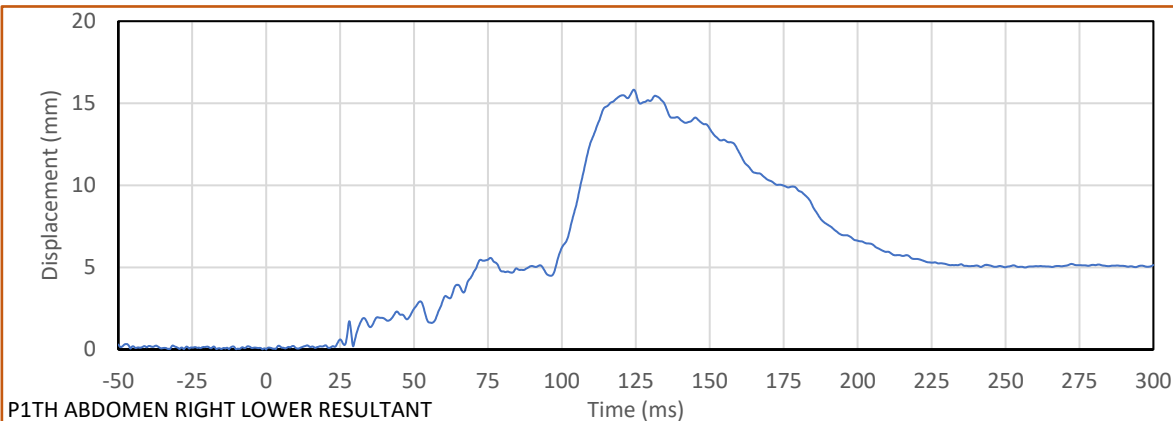
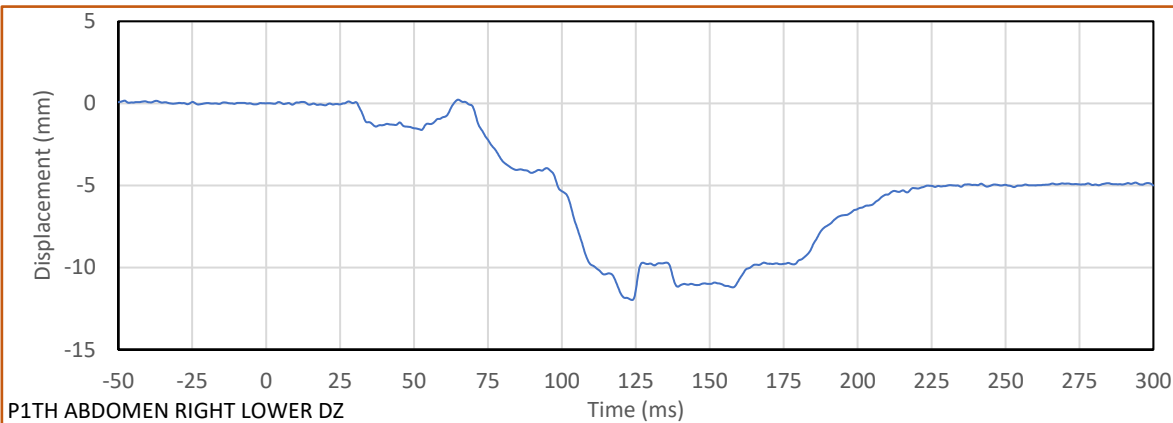
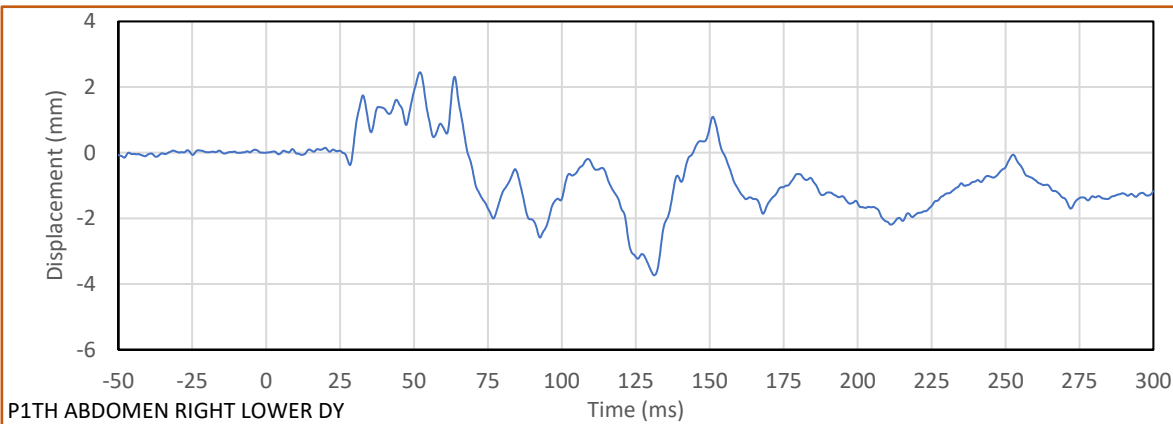
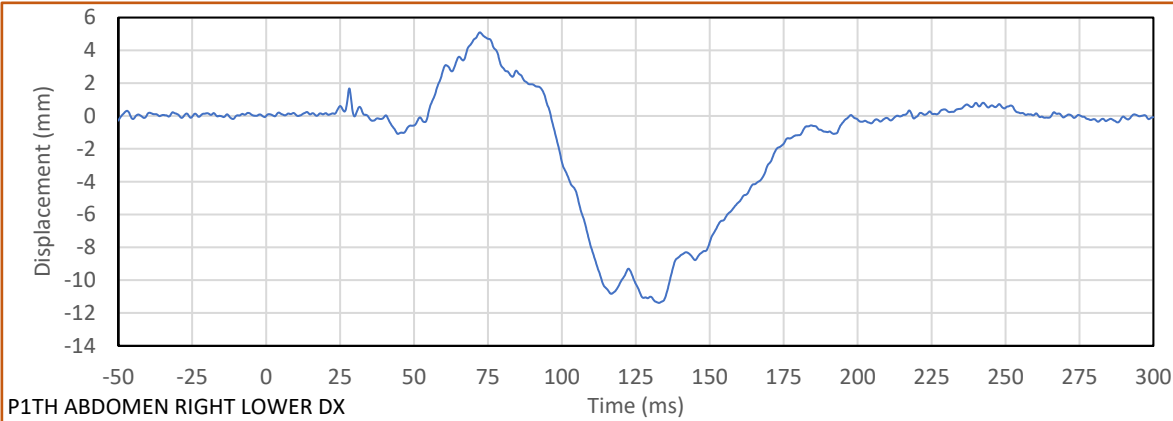








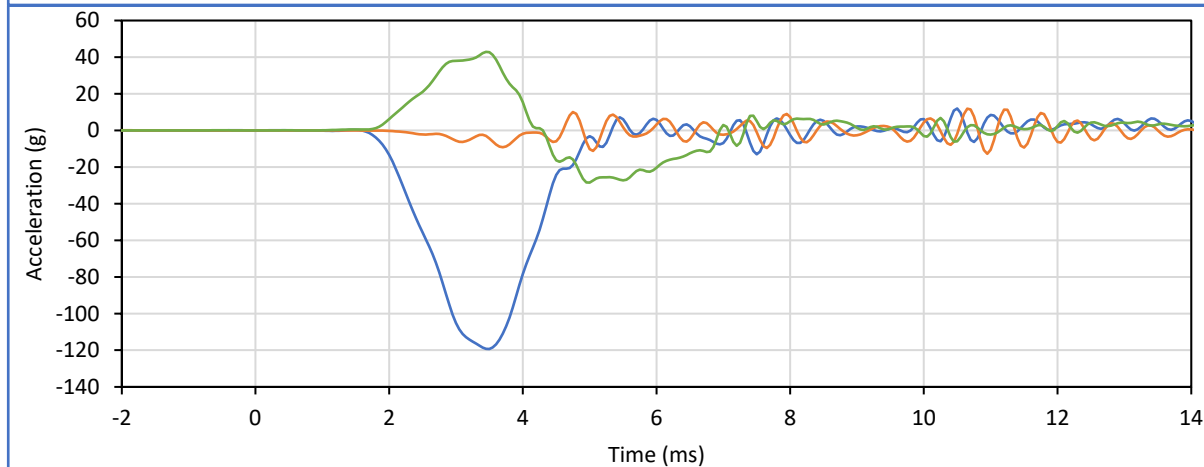
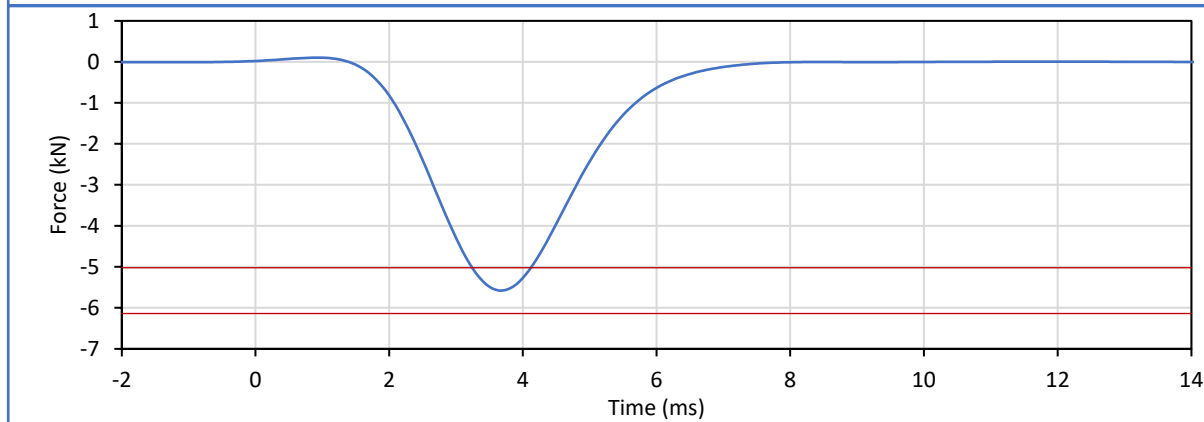
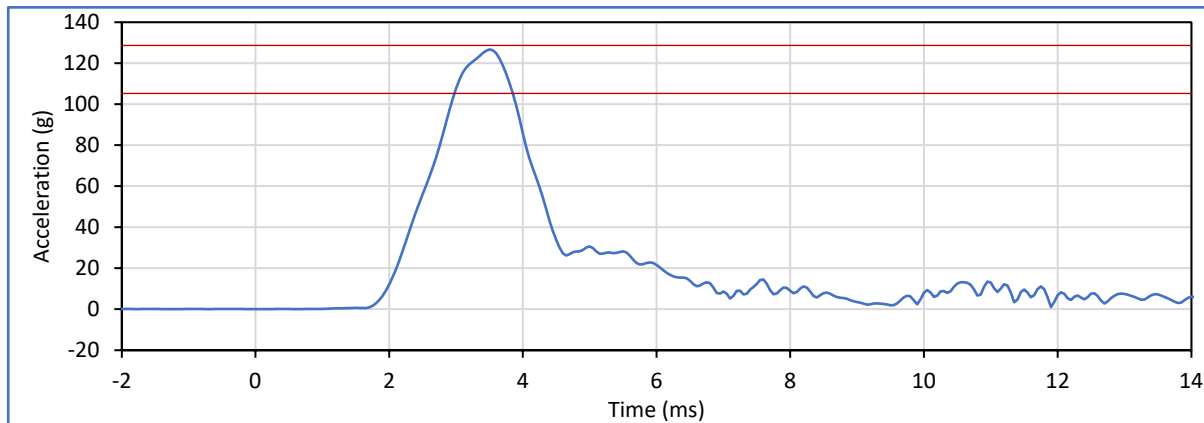




APPENDIX C
ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA
THOR-50M 50TH PERCENTILE MALE ATD
PRE-TEST QUALIFICATION (PARTIAL)

APPENDIX C
ATD Configuration and Performance Verification Data
THOR-50M 50th Percentile Male ATD
Pre-Test Qualification (Partial) S/N: EG2595

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	46	Pass
Velocity	m/s	1.95	2.05	1.99	Pass
Peak Impactor Force	kN	-6.138	-5.022	-5.579	Pass
Peak Head Resultant Acceleration	g	105.3	128.7	126.7	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



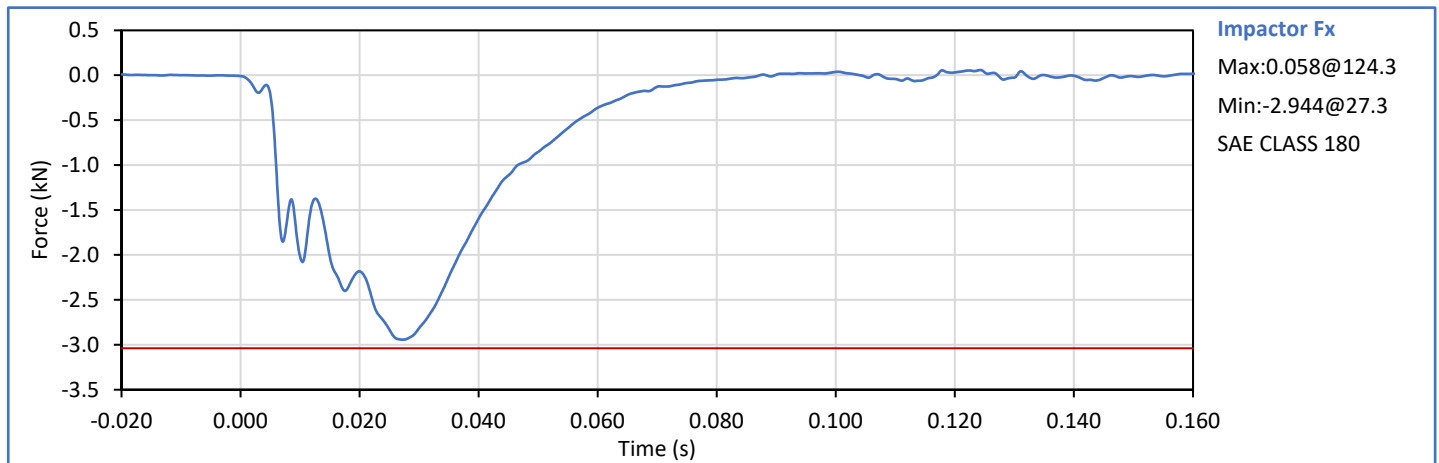
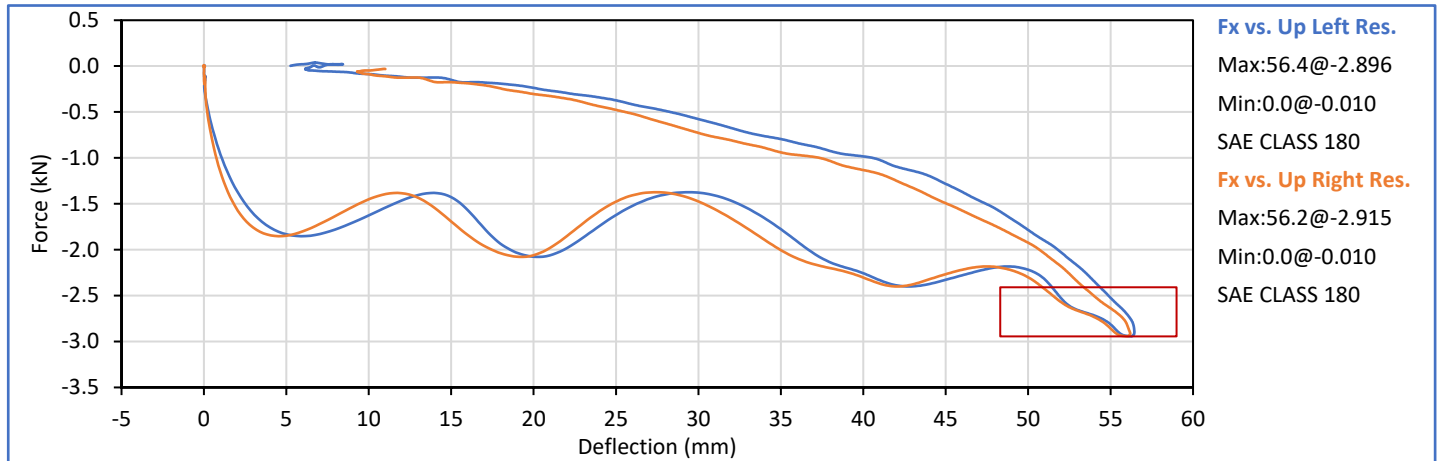
Technician:

J. Hernandez

Approved By:

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	52	Pass
Probe Velocity	m/s	4.25	4.35	4.33	Pass
Peak Probe Force	kN	-3.039		-2.944	Pass
Peak Upper Left Deflection Res.	mm	48.3	59.0	56.4	Pass
Peak Upper Right Deflection Res.	mm			56.2	Pass
Absolute Difference L/R Defl. Res.	mm	0.0	5.0	0.3	Pass
Force at Peak Upper Left Res.	mm	-2.944	-2.409	-2.896	Pass
Force at Peak Upper Right Res.	mm			-2.915	Pass
NHTSA Corridor 2019-05			Overall Test Results		Pass



Technician:

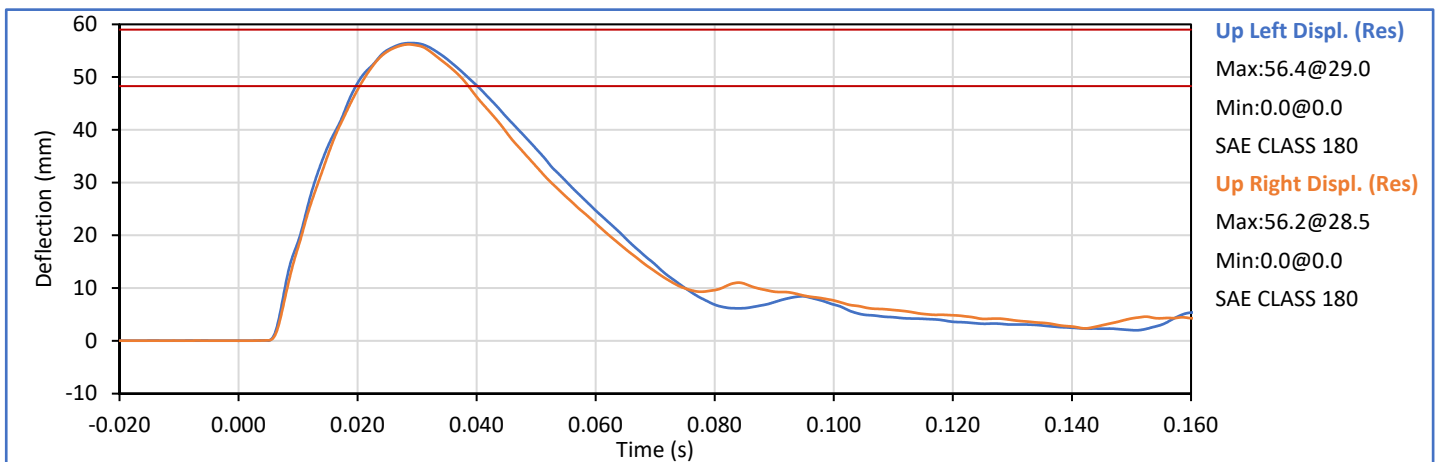
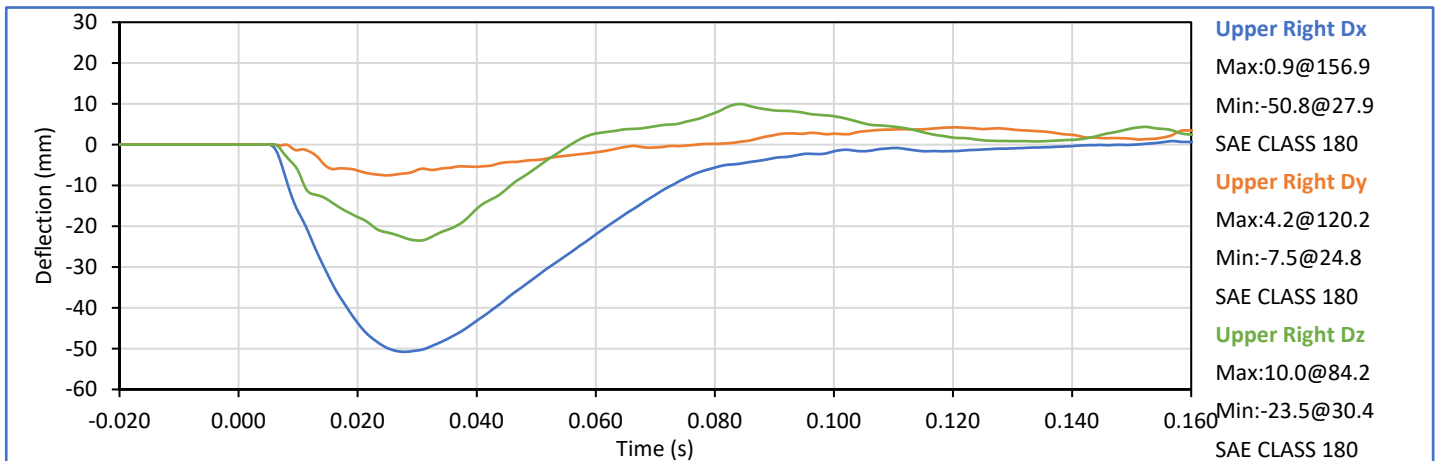
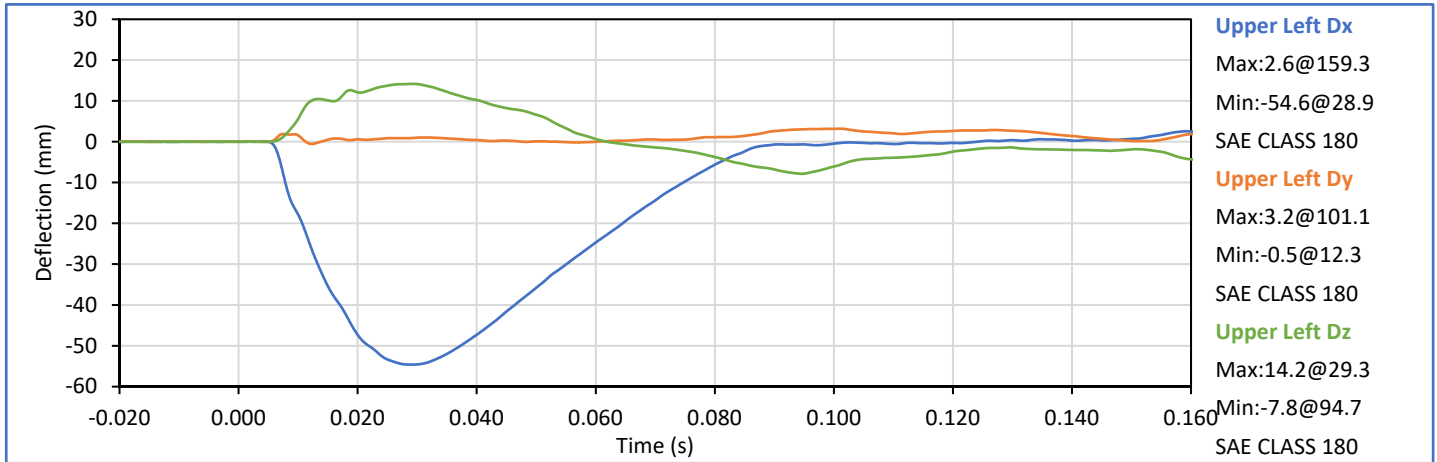
J. Hernandez

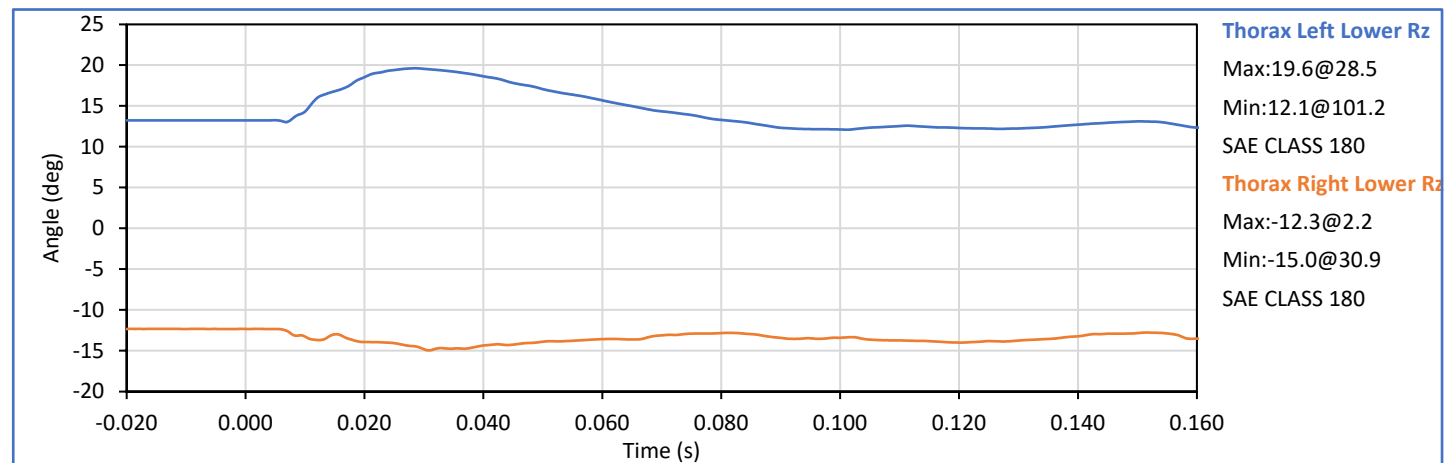
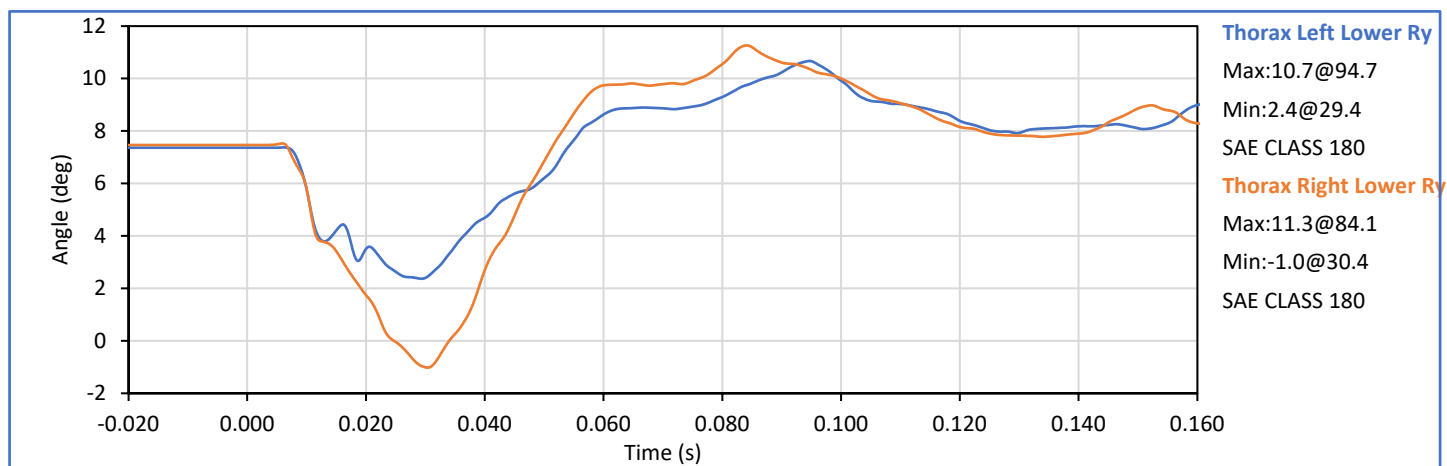
J. Hernandez

Approved By:

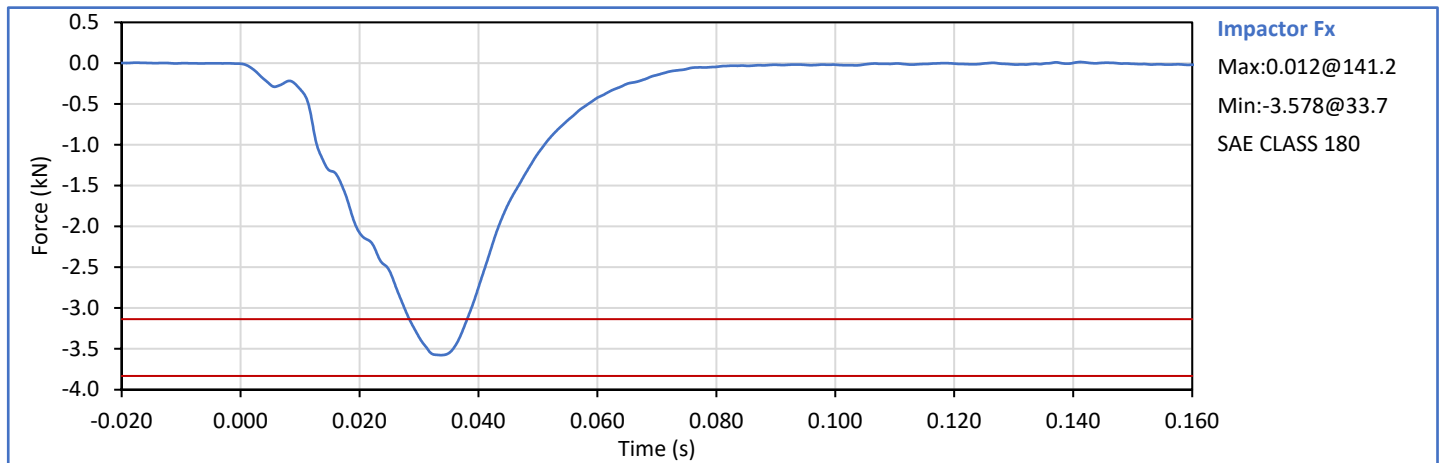
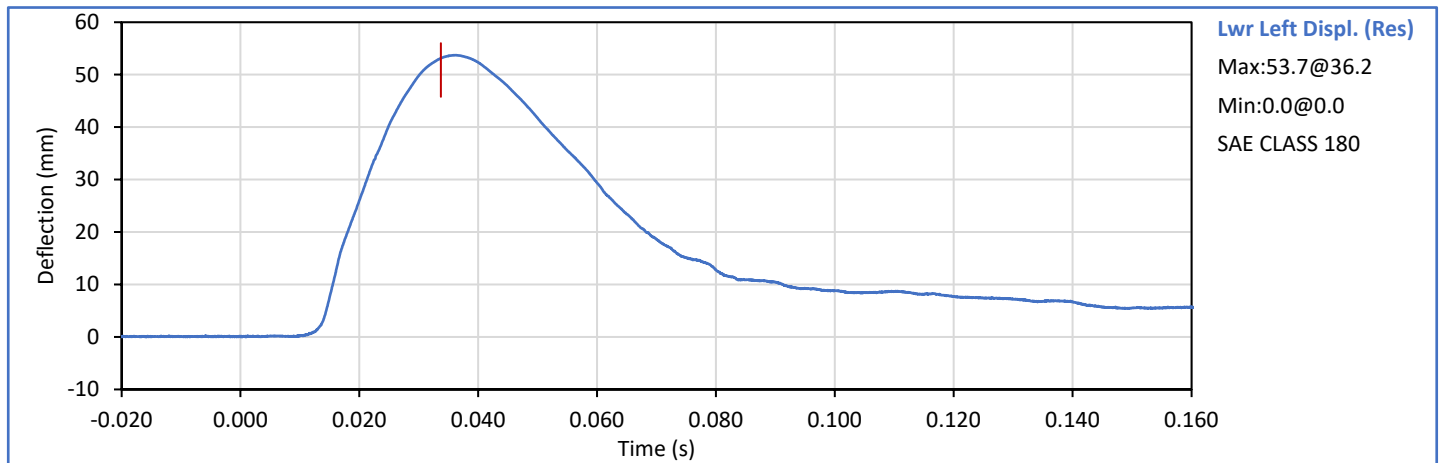
P. Puzzuto

P. Puzzuto





Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.8	Pass
Laboratory Relative Humidity	%	10	70	44	Pass
Probe Velocity	m/s	4.25	4.35	4.34	Pass
Peak Probe Force	kN	-3.832	-3.136	-3.578	Pass
Lower Left Defl. Res. at Peak Fx	mm	45.8	56.0	53.1	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



Technician:

J. Hernandez

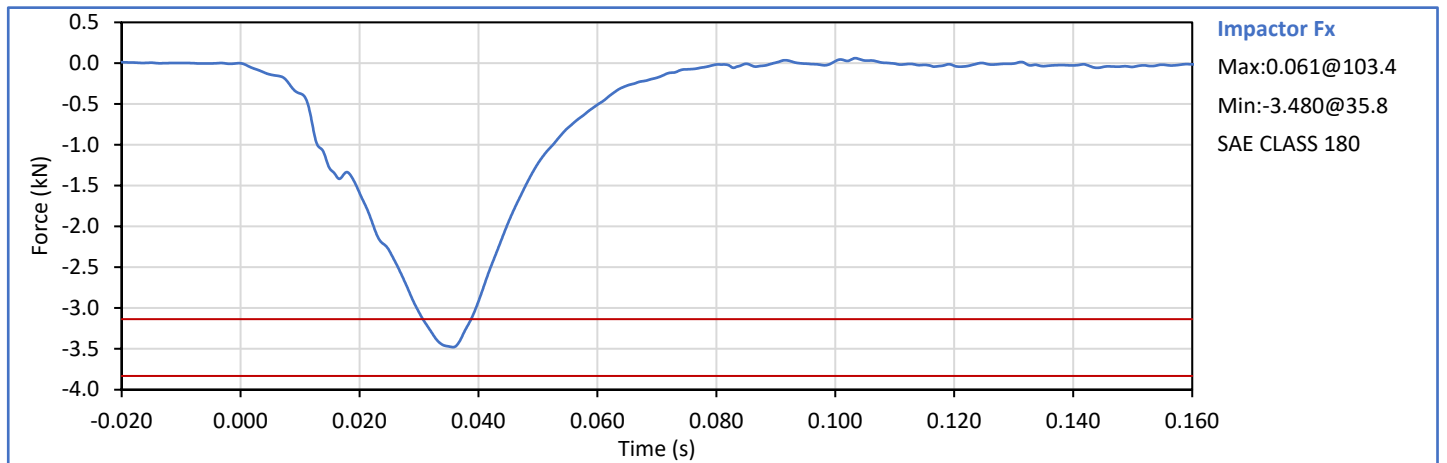
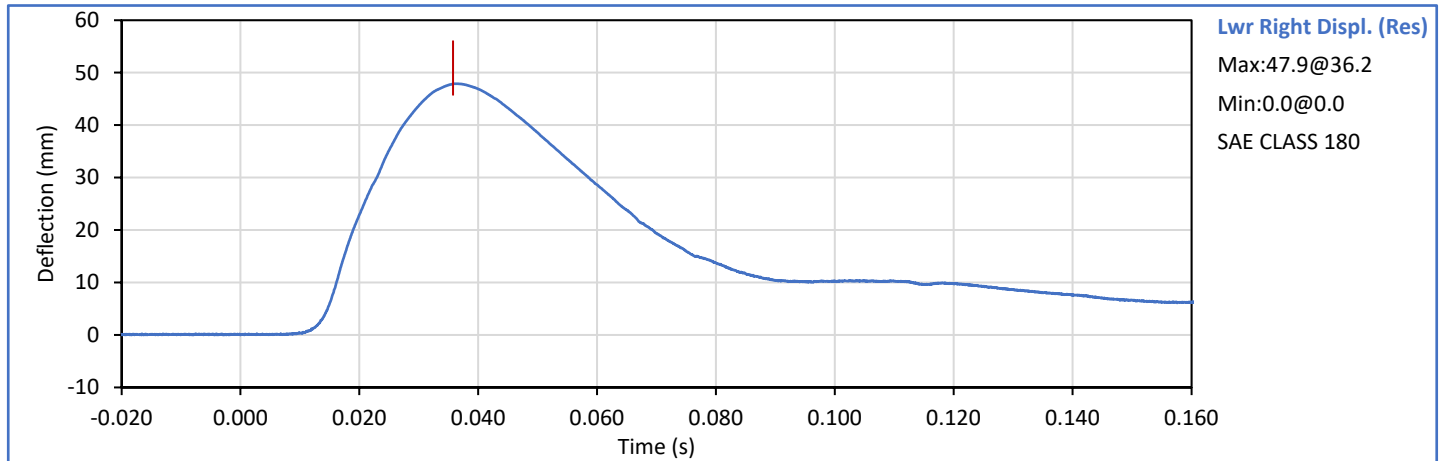
J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	22.2	Pass
Laboratory Relative Humidity	%	10	70	42	Pass
Probe Velocity	m/s	4.25	4.35	4.33	Pass
Peak Probe Force	kN	-3.832	-3.136	-3.480	Pass
Lower Left Defl. Res. at Peak Fx	mm	45.8	56.0	47.8	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



Technician:

J. Hernandez

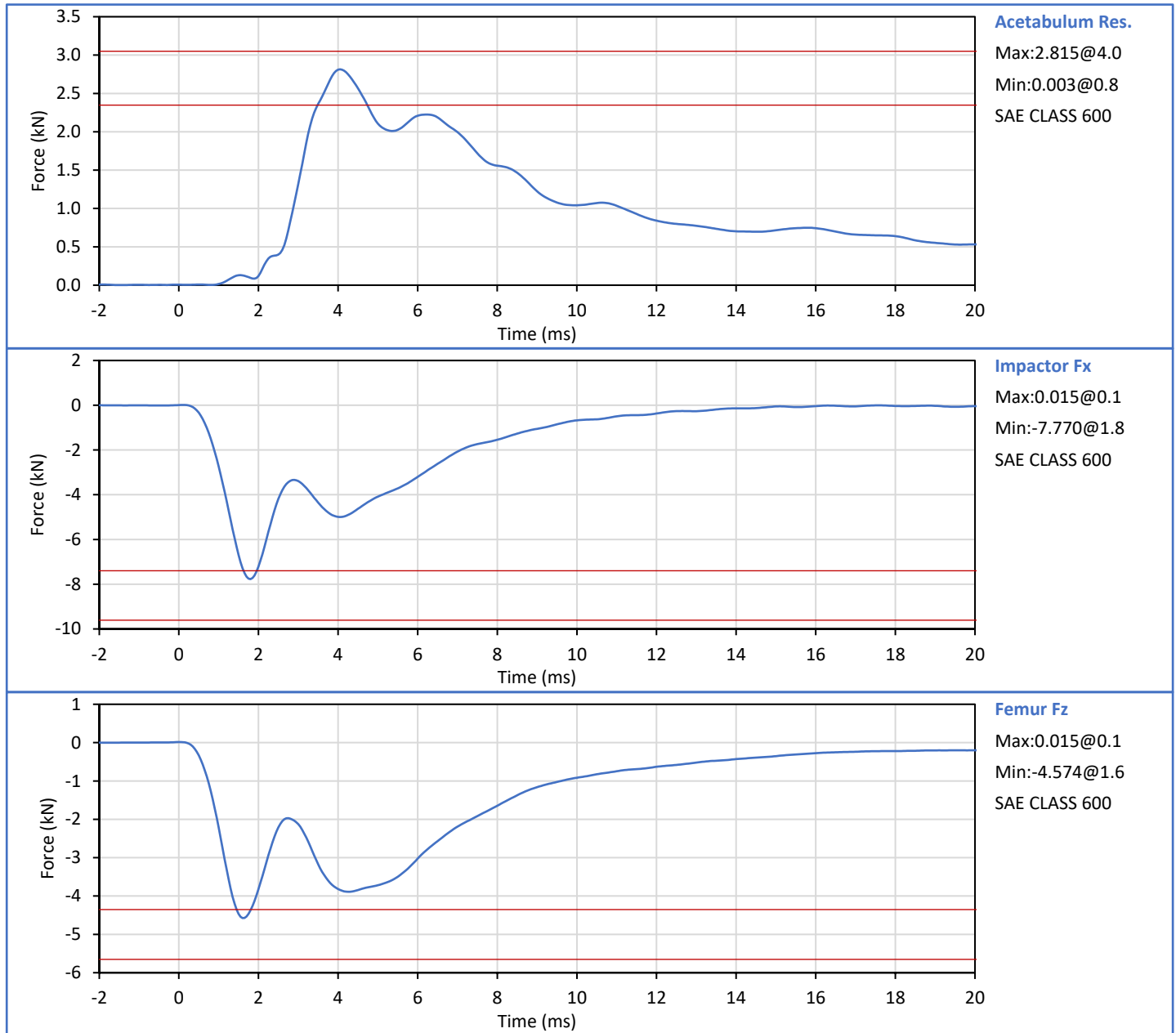
J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low ¹	Spec. High ¹	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	20.6	Pass
Laboratory Humidity	%	10	70	37	Pass
Pendulum Velocity	m/s	3.25	3.35	3.30	Pass
Peak Impactor Force	kN	-9.188	-7.517	-7.770	Pass
Peak Femur Fz	kN	-5.478	-4.482	-4.574	Pass
Acetabulum Force Resultant	kN	2.447	2.991	2.815	Pass
NHTSA Corridor 2020-03 (Preliminary Corridor)				Overall Test Results	Pass



Technician:

J. Hernandez

J. Hernandez

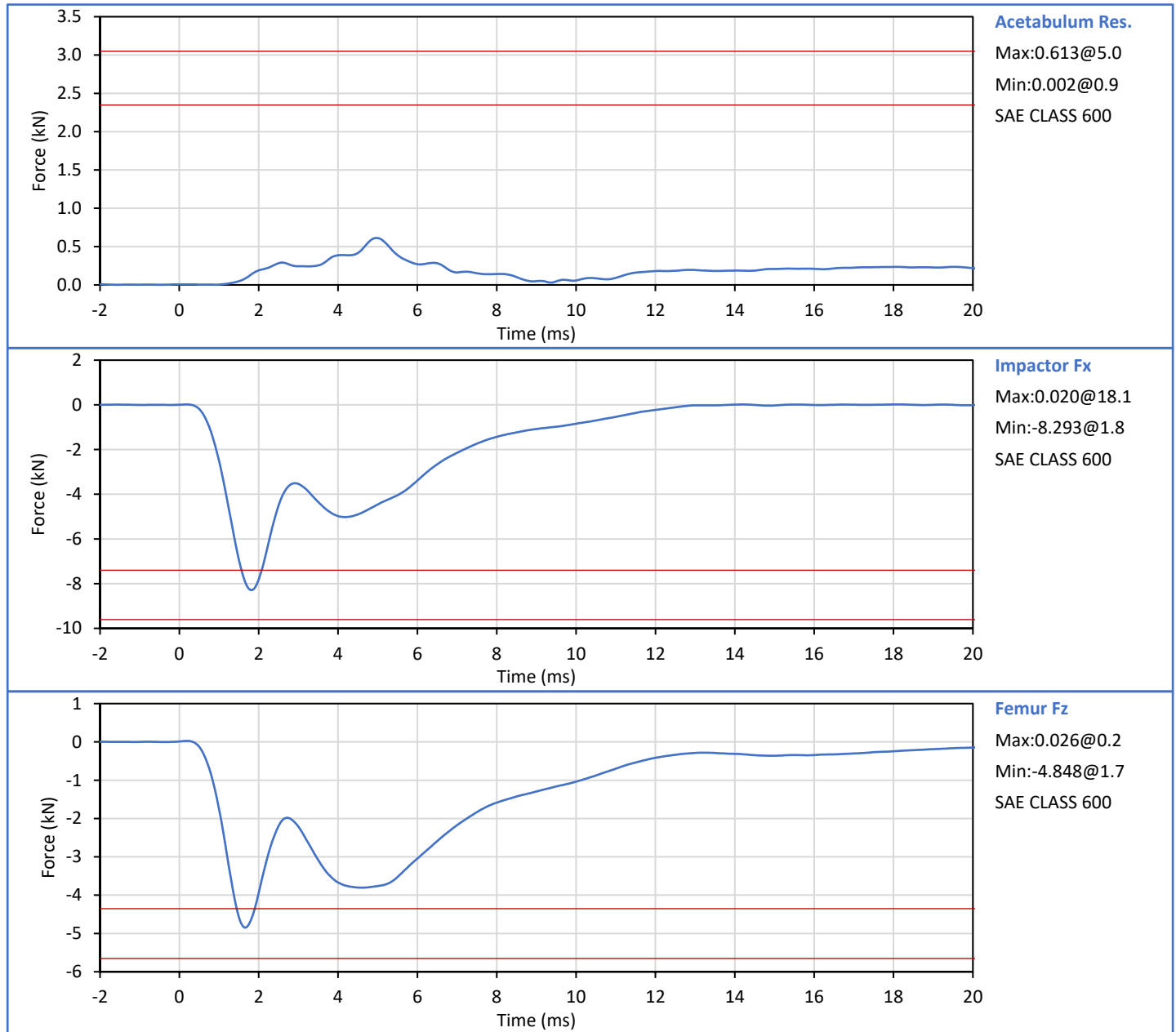
Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low ¹	Spec. High ¹	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	36	Pass
Pendulum Velocity	m/s	3.25	3.35	3.35	Pass
Peak Impactor Force	kN	-9.188	-7.517	-8.293	Pass
Peak Femur Fz	kN	-5.478	-4.482	-4.848	Pass
Acetabulum Force Resultant	kN	2.447	2.991	0.613	Fail
NHTSA Corridor 2020-03 (Preliminary Corridor)				Overall Test Results	Fail

* Acetabulum Load Cell Fx is not functioning



Technician:

J. Hernandez

J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

APPENDIX C
ATD Configuration and Performance Verification Data
THOR-50M 50th Percentile Male ATD
Pre-Test Qualification (Partial/VRTC) S/N: DO9799

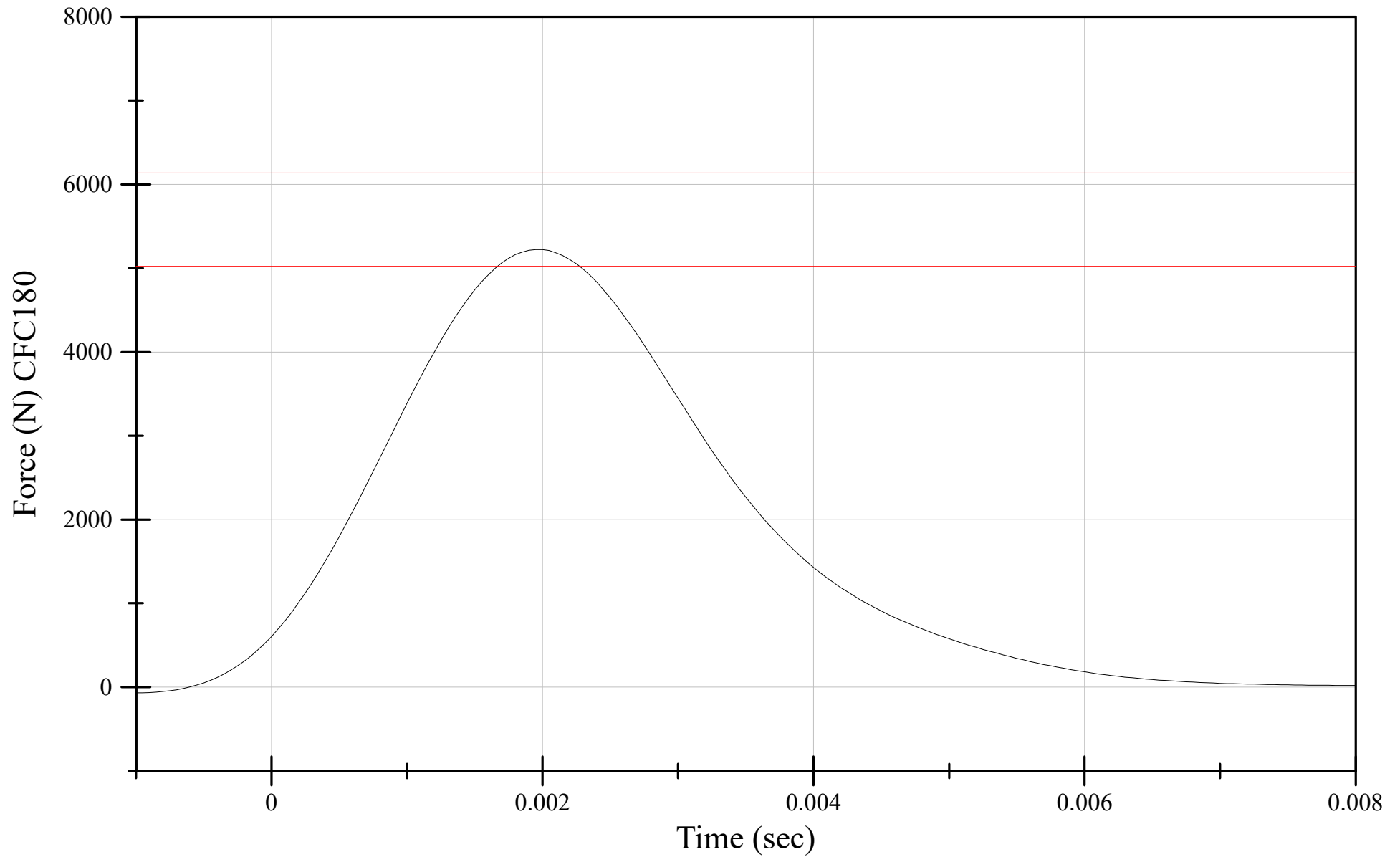
THOR 50M DO9799 210624 Qualification

Pre-Test Qualification (Partial)

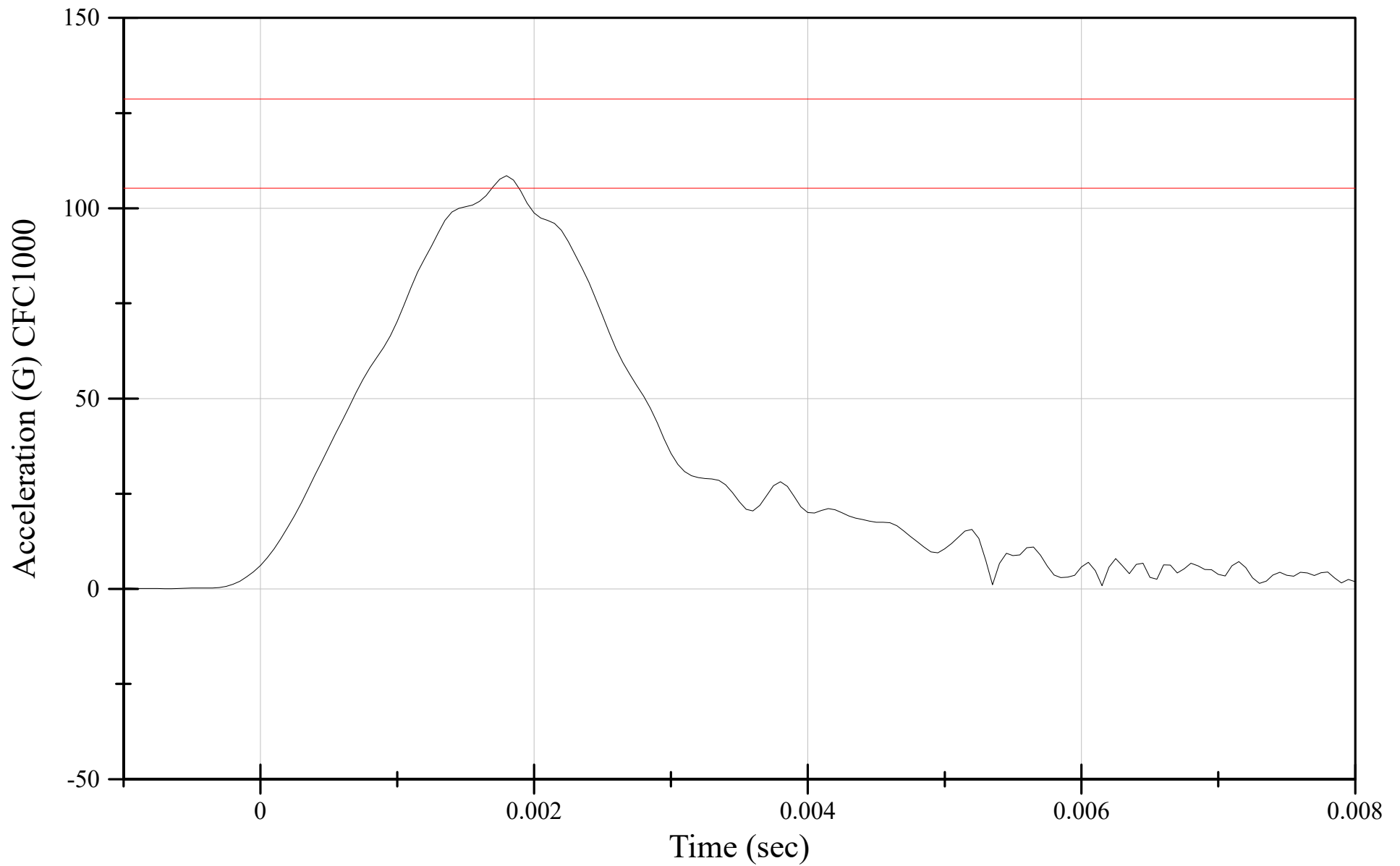
Head: **Pass**
Neck Torsion Left: **Pass**
Neck Torsion Right: **Pass**
Neck Frontal Flexion: **Pass**
Neck Extension: **Fail**
Neck Lateral Flexion Left: **N/A**
Neck Lateral Flexion Right: **N/A**
Upper Thorax: **Pass**
Lower Left Thorax: **Pass**
Lower Right Thorax: **Pass**
Lower Abdomen: **Pass**
Left Upper Leg: **Pass**
Right Upper Leg: **Pass**

Head Qualification

Pre-Test Qualification (Partial)
THOR-50M Head Impact Qualification
Probe Force
Serial Number: DO9799

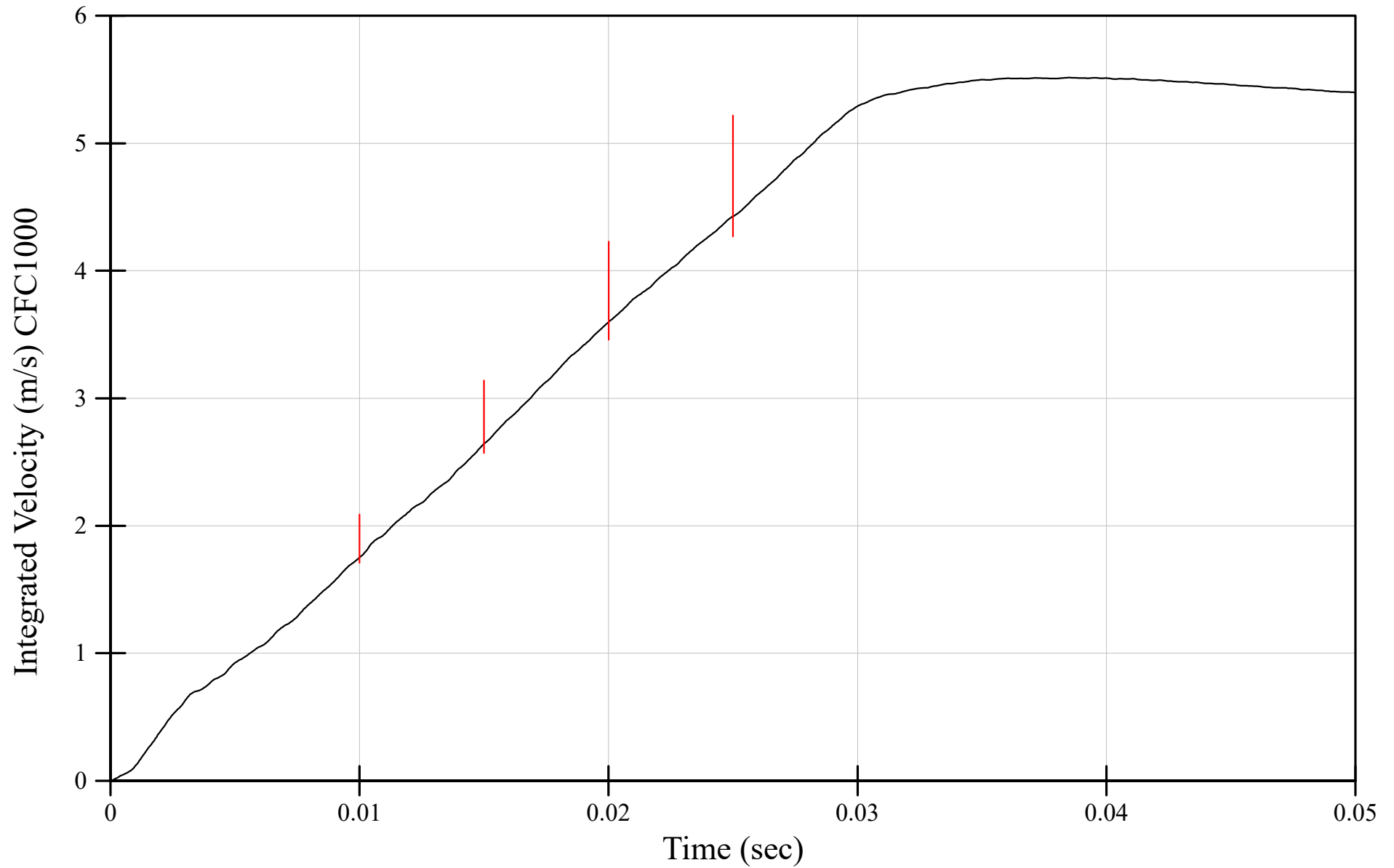


Pre-Test Qualification (Partial)
THOR-50M Head Impact Qualification
Head CG Resultant Acceleration
Serial Number: DO9799

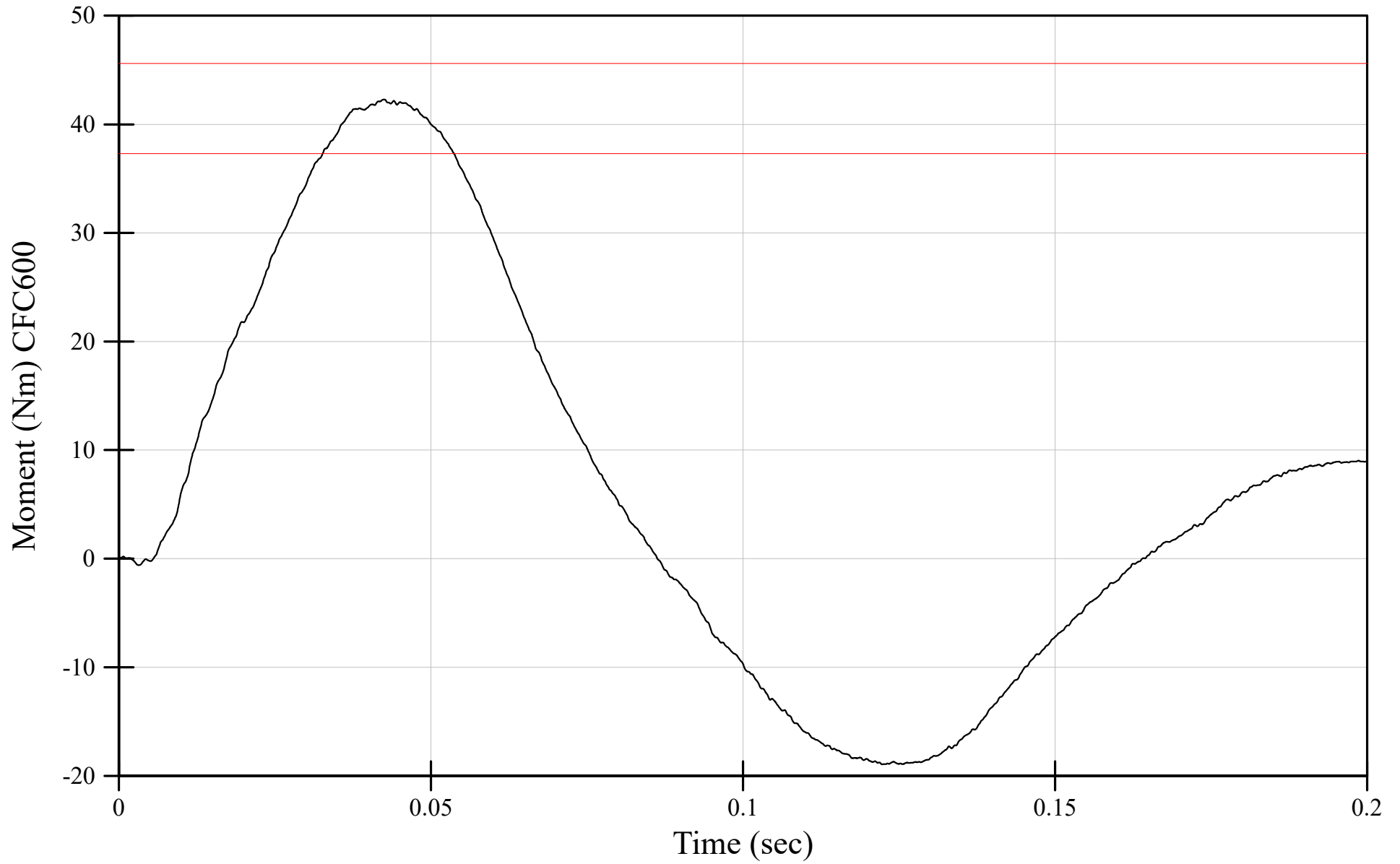


Neck Torsion Left Qualification

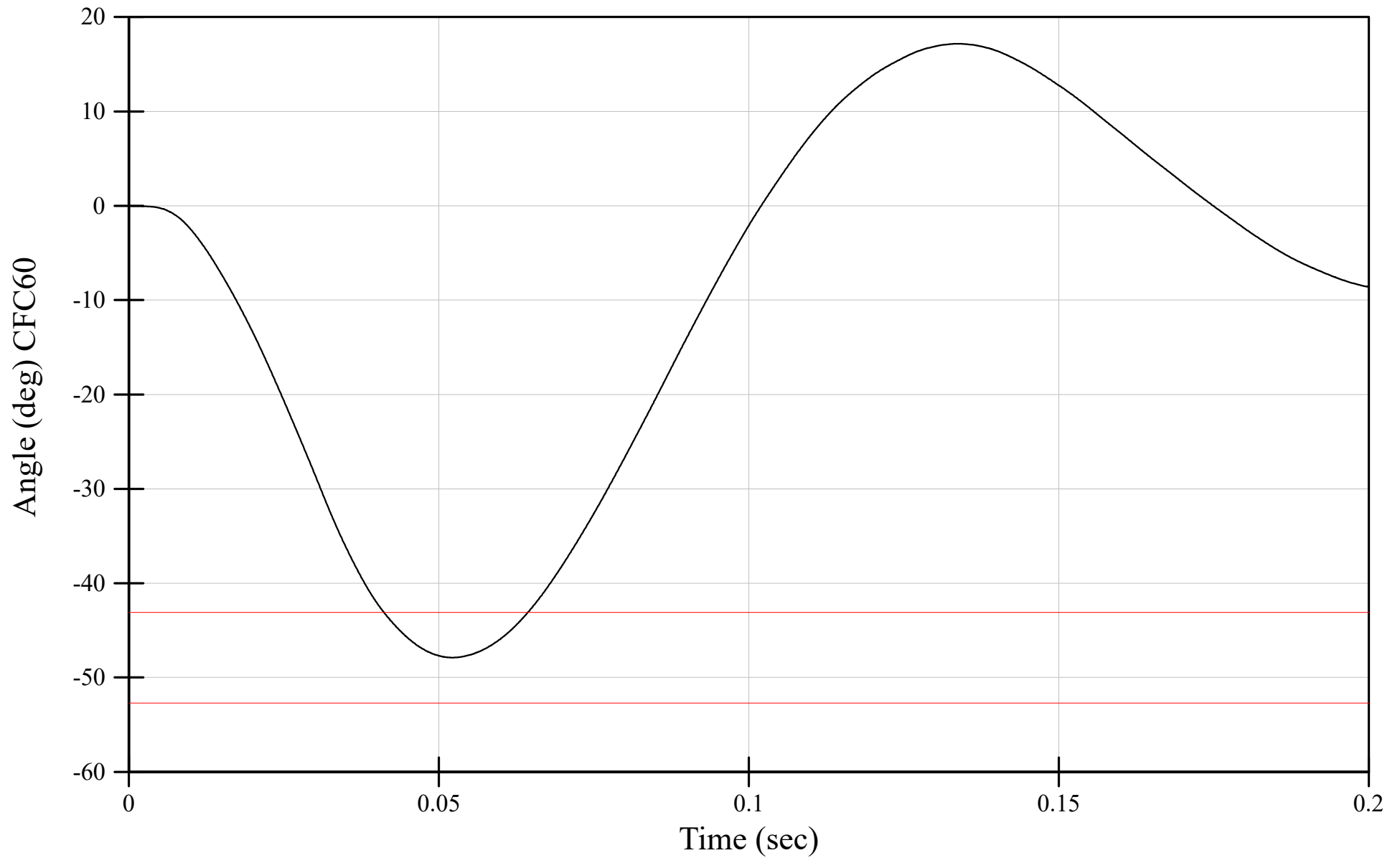
Pre-Test Qualification (Partial)
THOR-50M Neck Left Torsion Qualification
Pendulum Velocity
Serial Number: DO9799



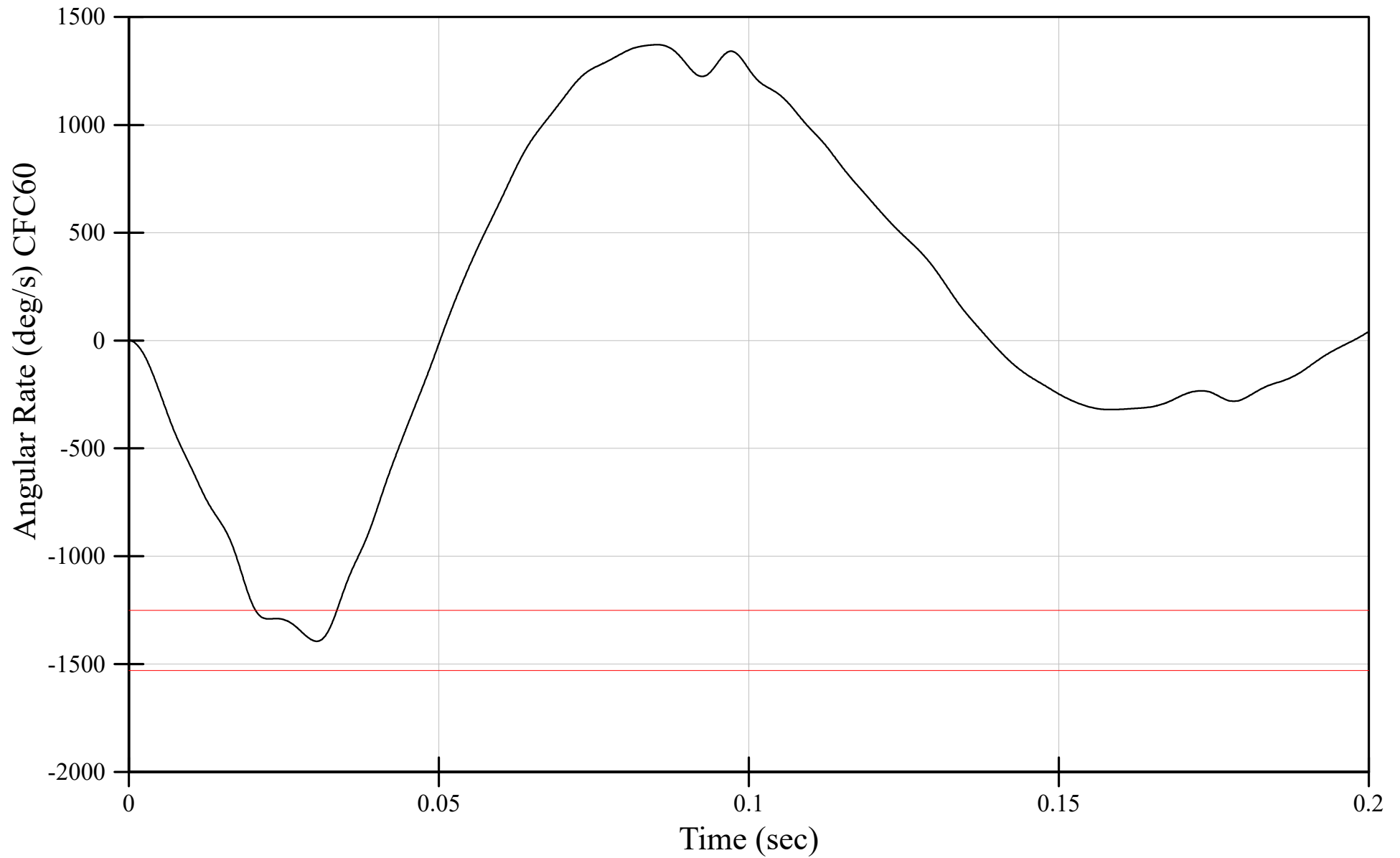
Pre-Test Qualification (Partial)
THOR-50M Neck Left Torsion Qualification
Z-Moment as Measured
Serial Number: DO9799



Pre-Test Qualification (Partial)
THOR-50M Neck Left Torsion Qualification
Neck Fixture Rotation
Serial Number: DO9799

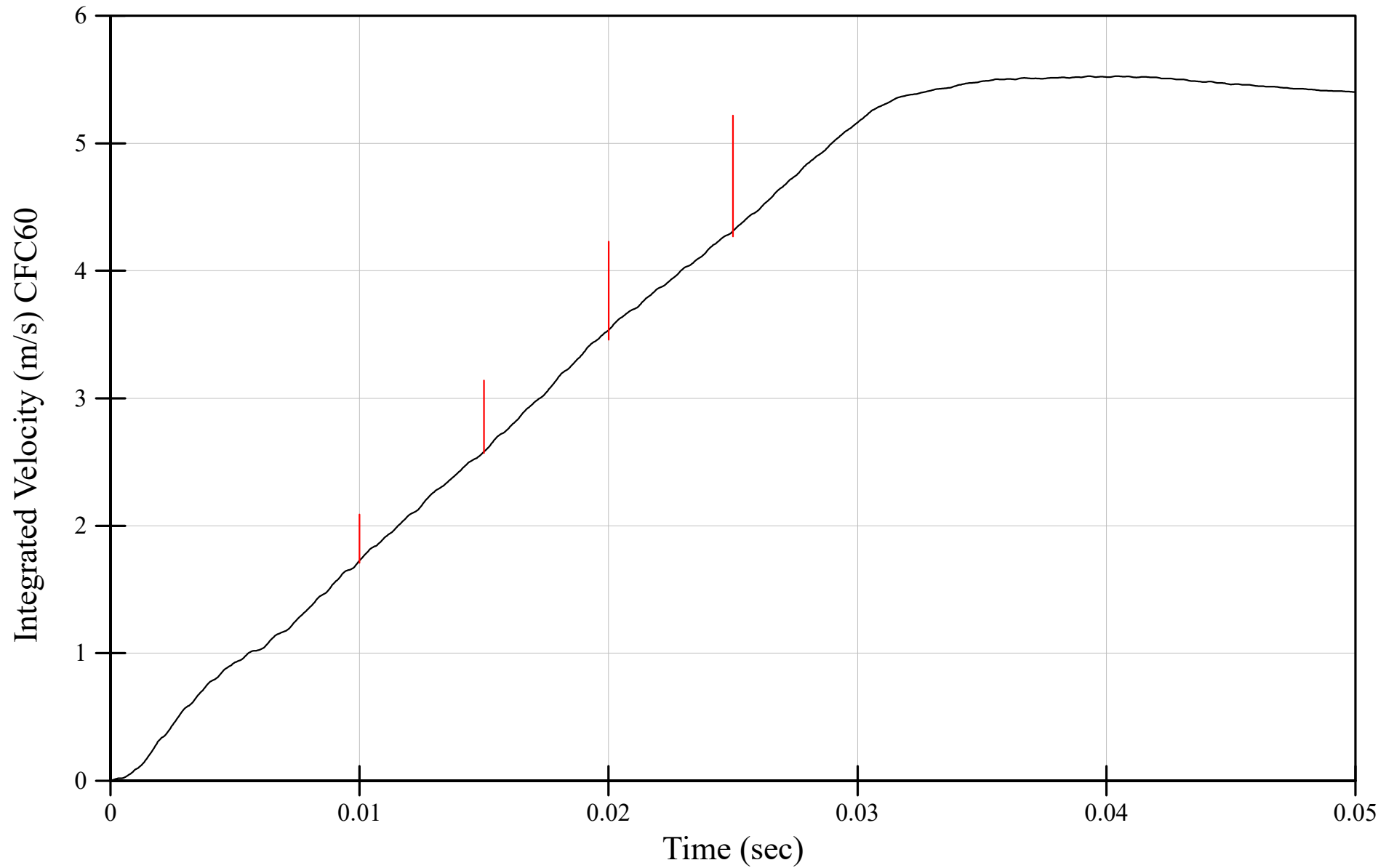


Pre-Test Qualification (Partial)
THOR-50M Neck Left Torsion Qualification
Peak Angular Rate
Serial Number: DO9799

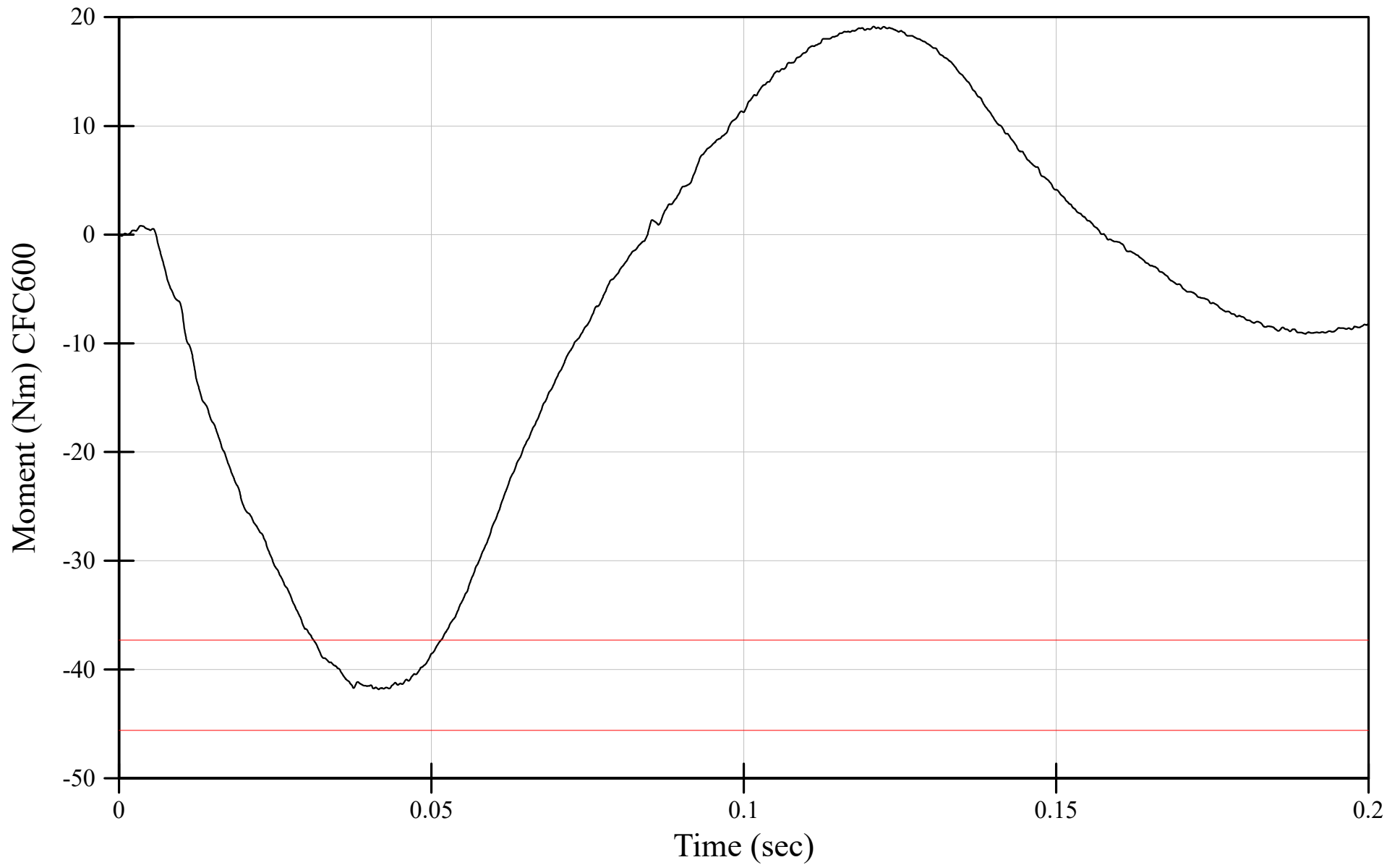


Neck Torsion Right Qualification

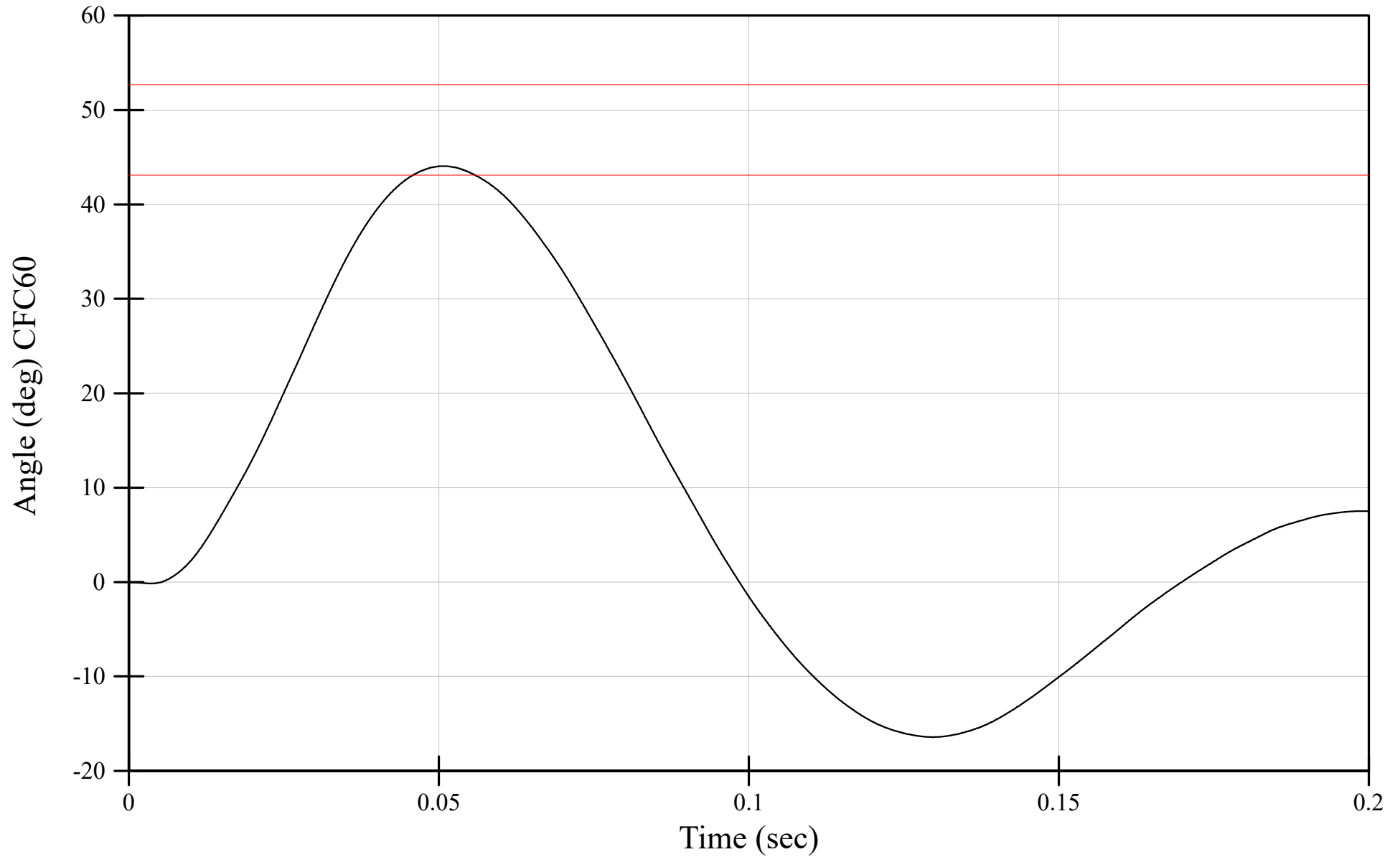
Pre-Test Qualification (Partial)
THOR-50M Neck Right Torsion Qualification
Pendulum Velocity
Serial Number: DO9799



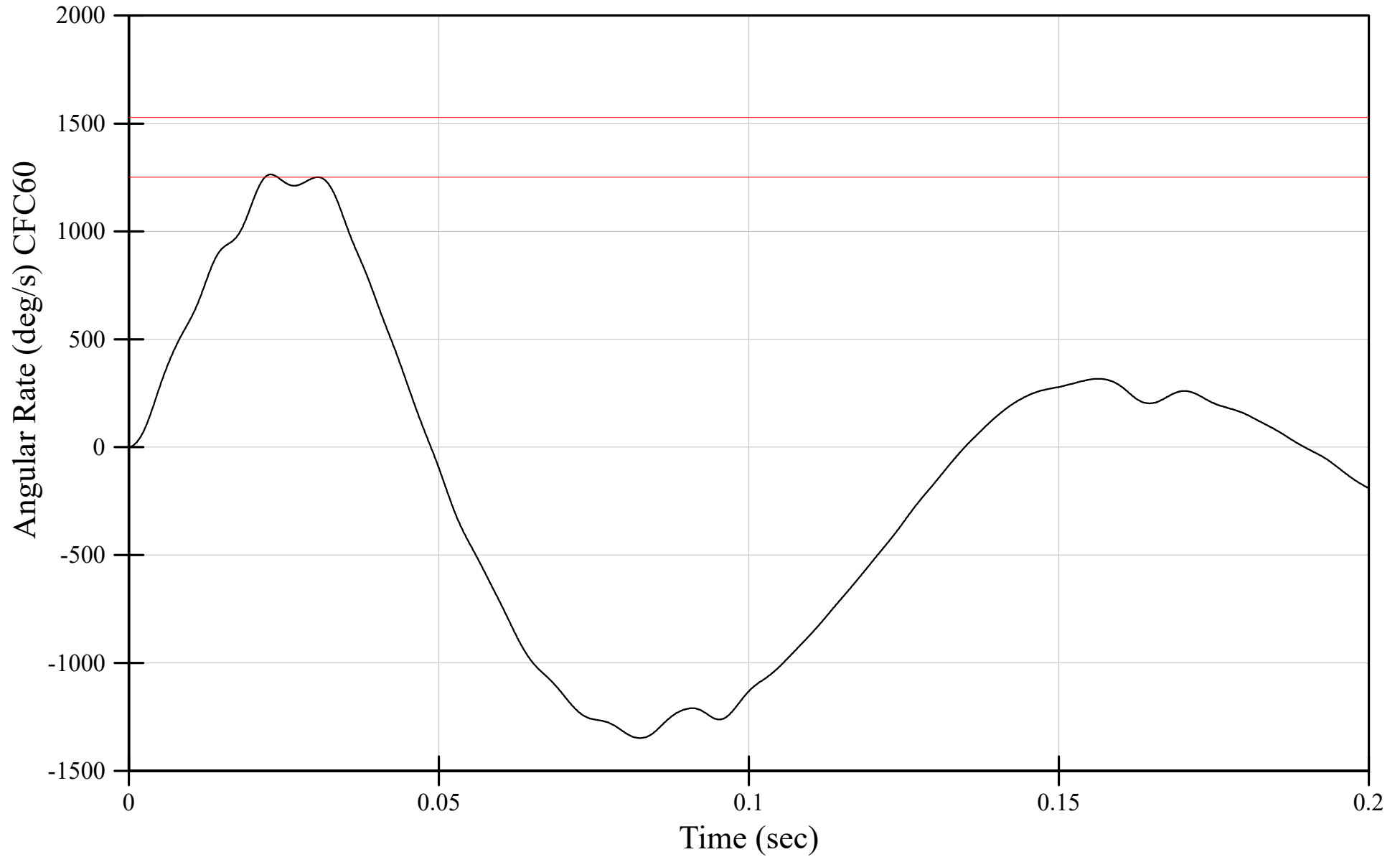
Pre-Test Qualification (Partial)
THOR-50M Neck Right Torsion Qualification
Z-Moment as Measured
Serial Number: DO9799



Pre-Test Qualification (Partial)
THOR-50M Neck Right Torsion Qualification
Neck Fixture Rotation
Serial Number: DO9799

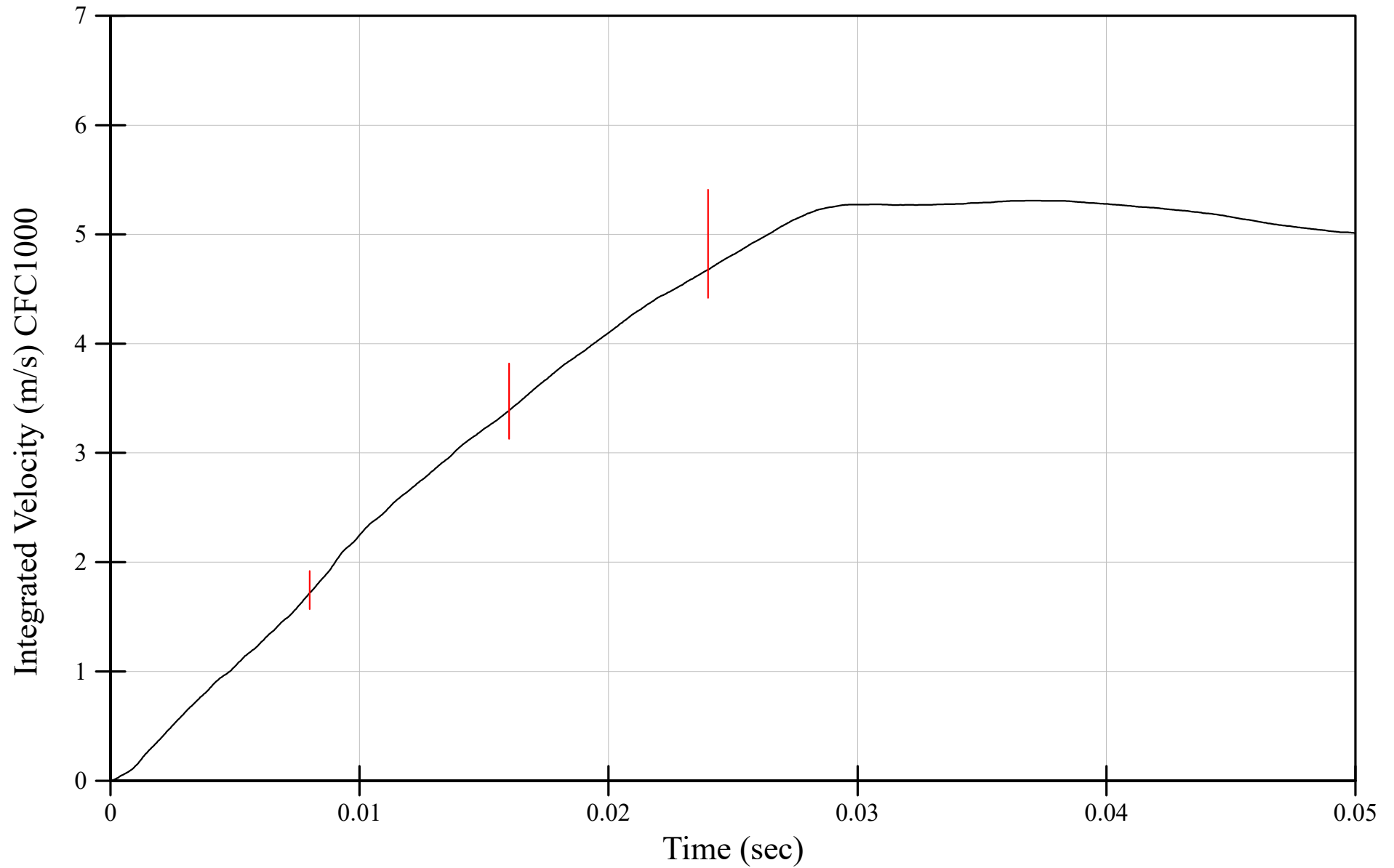


Pre-Test Qualification (Partial)
THOR-50M Neck Right Torsion Qualification
Peak Angular Rate
Serial Number: DO9799

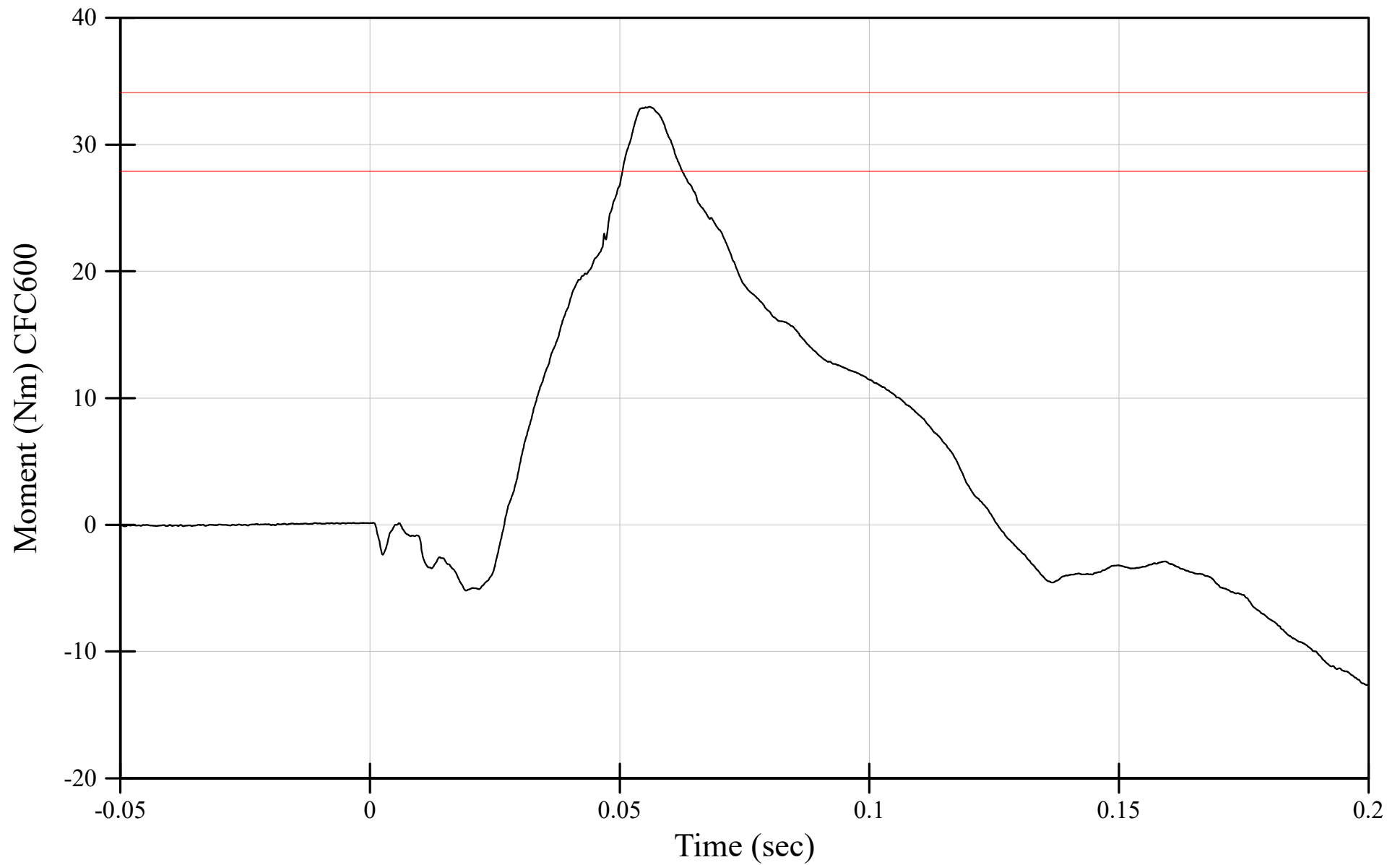


Neck Frontal Flexion Qualification

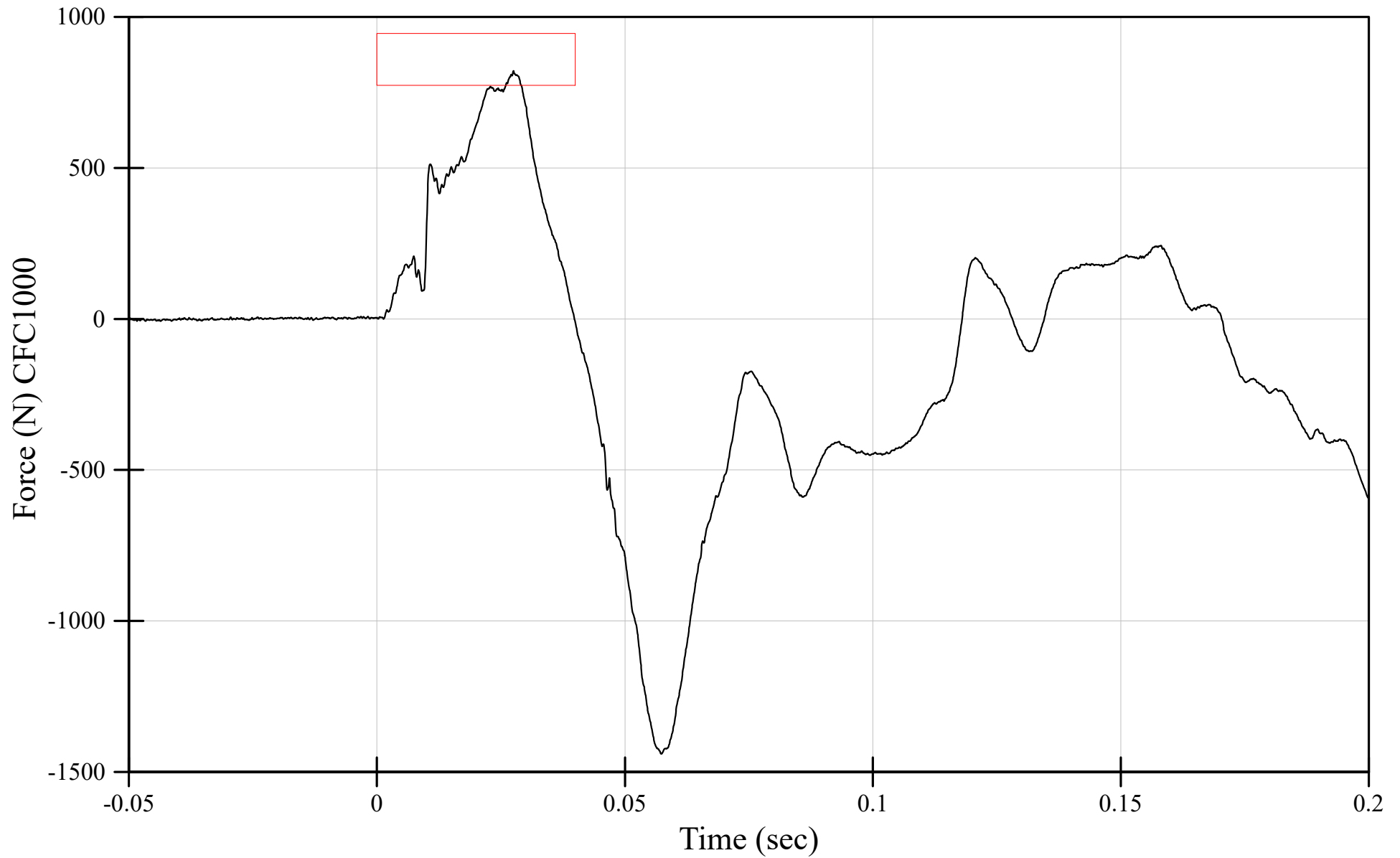
Pre-Test Qualification (Partial)
THOR-50M Neck Front Flexion Qualification
Pendulum Velocity
Neck Serial Number: EA0643



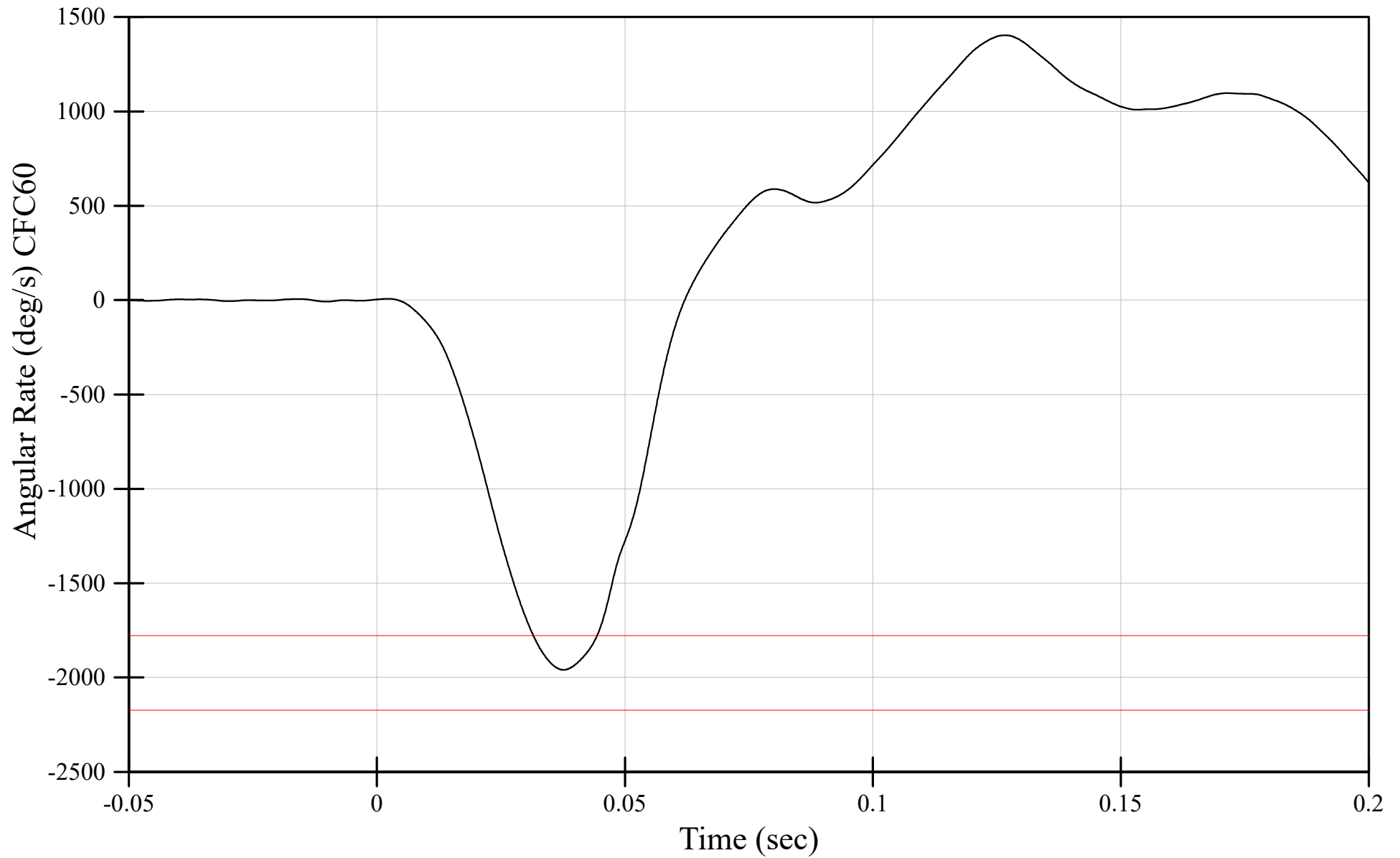
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THOR-50M Neck Front Flexion Qualification
Upper Neck My
Neck Serial Number: EA0643



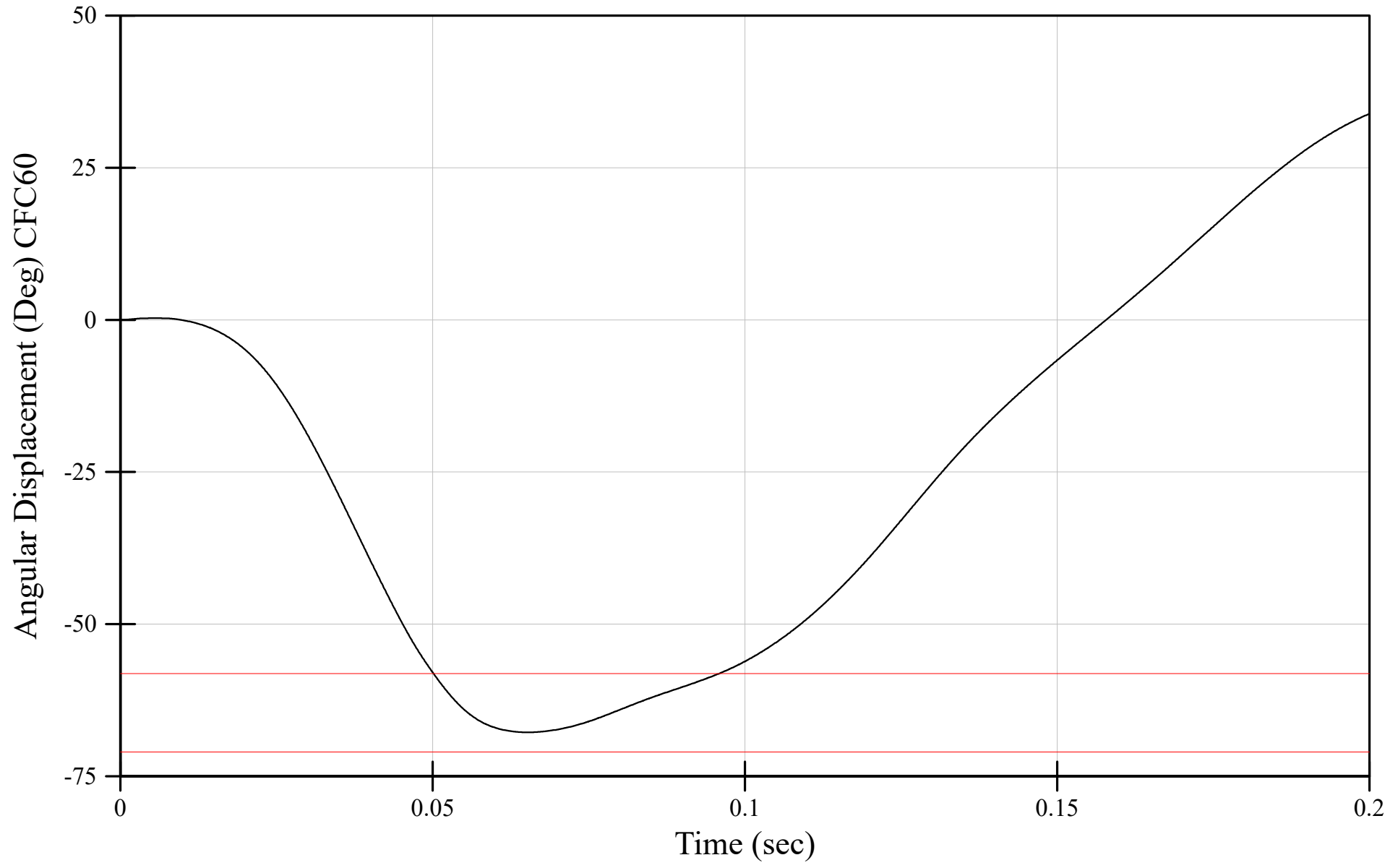
Pre-Test Qualification (Partial)
THOR-50M Neck Front Flexion Qualification
Upper Neck Fz
Neck Serial Number: EA0643



Pre-Test Qualification (Partial)
THOR-50M Neck Front Flexion Qualification
Peak Head Angular Rate
Neck Serial Number: EA0643

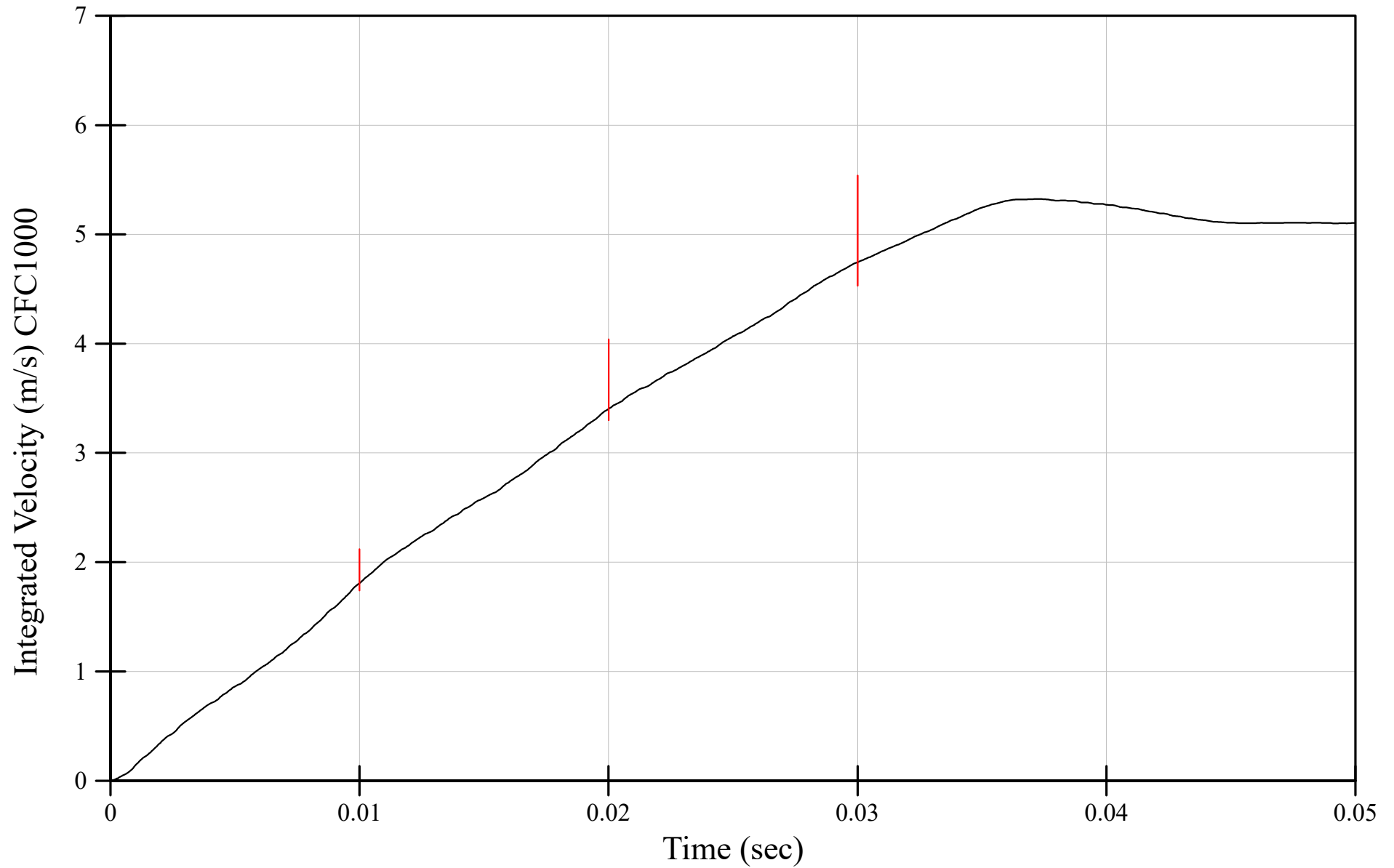


Pre-Test Qualification (Partial)
THOR-50M Neck Front Flexion Qualification
Head Rotation
Neck Serial Number: EA0643

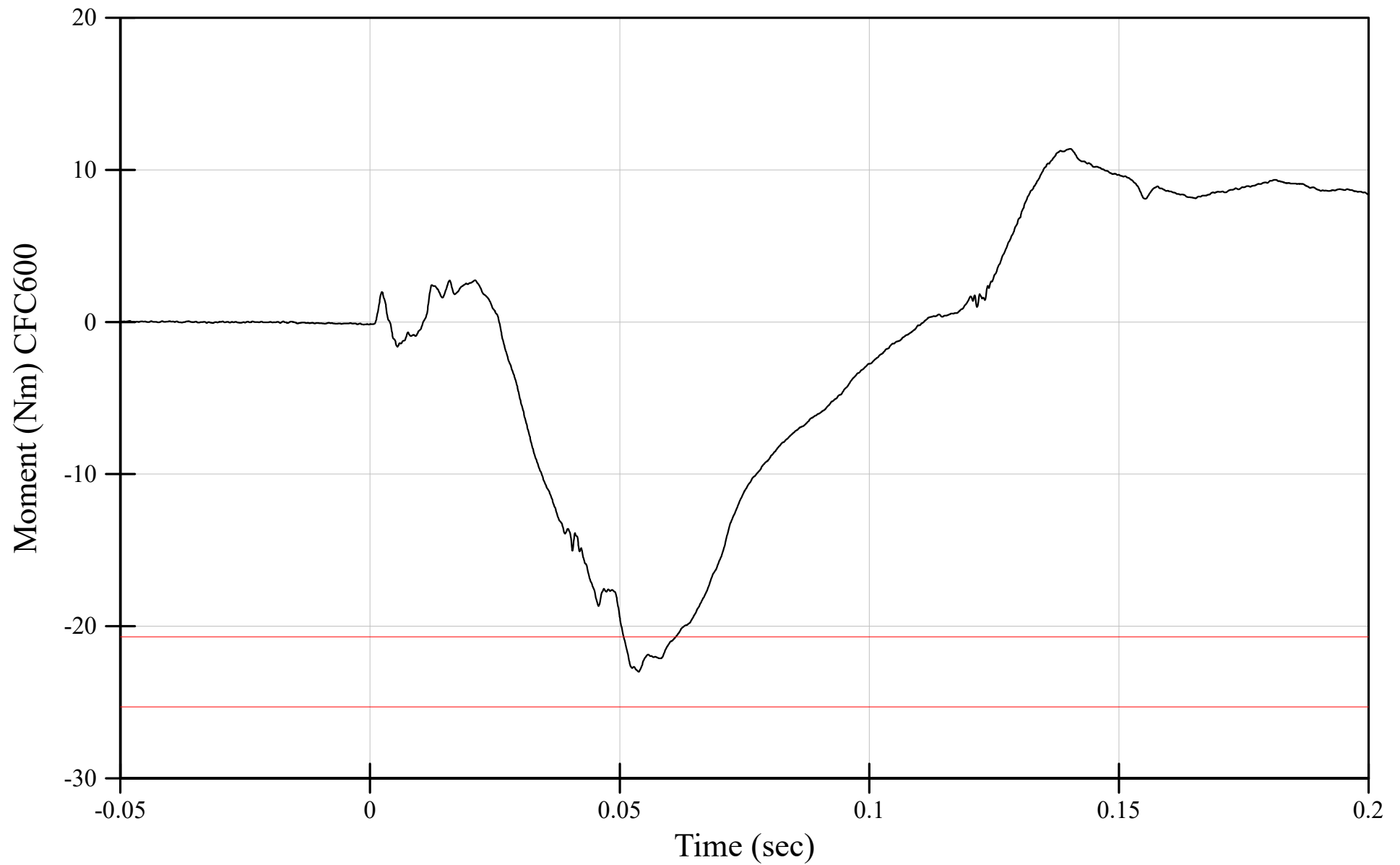


Neck Extension Qualification

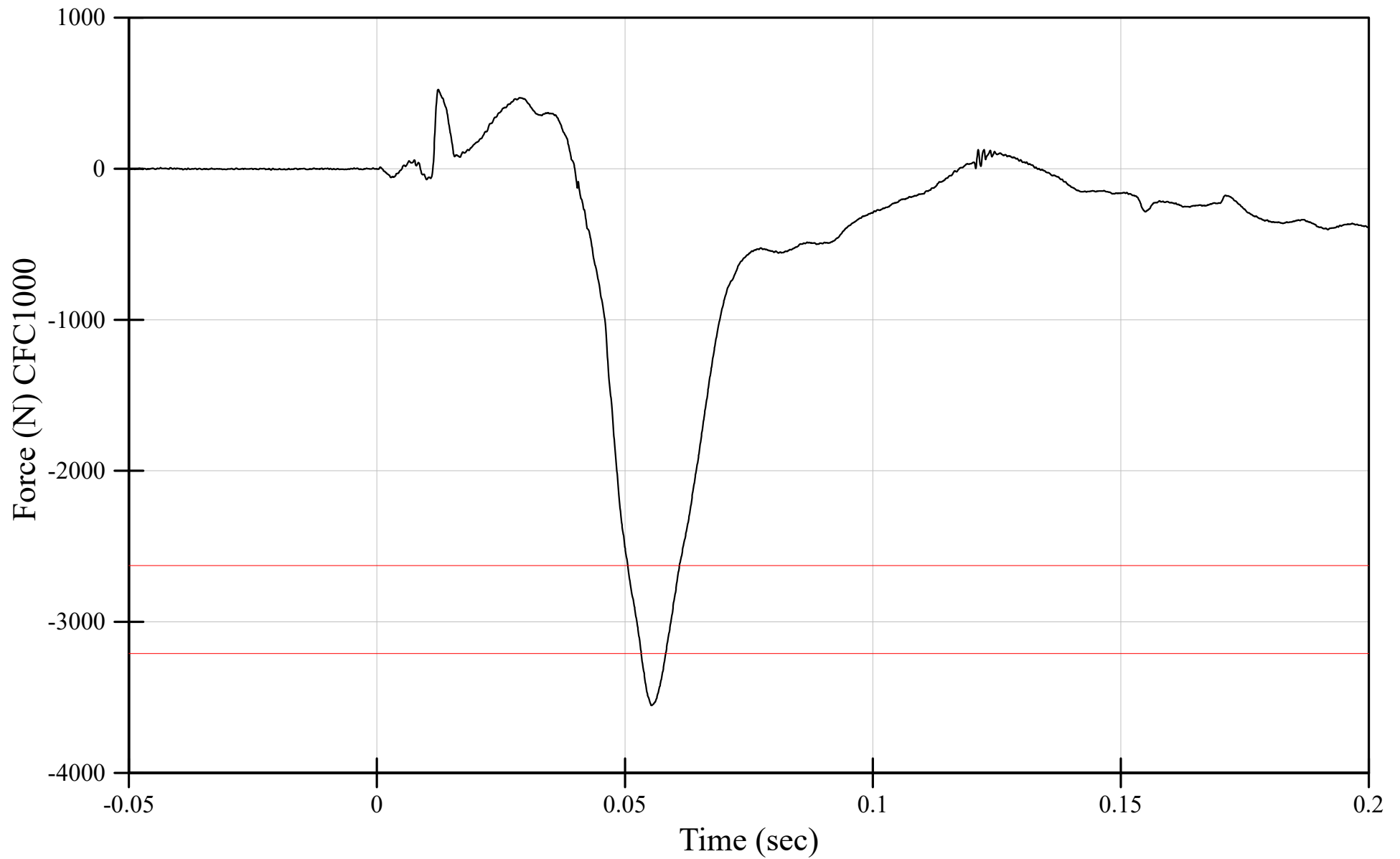
Pre-Test Qualification (Partial)
THOR-50M Neck Extension Qualification
Pendulum Velocity
Neck Serial Number: EA0643



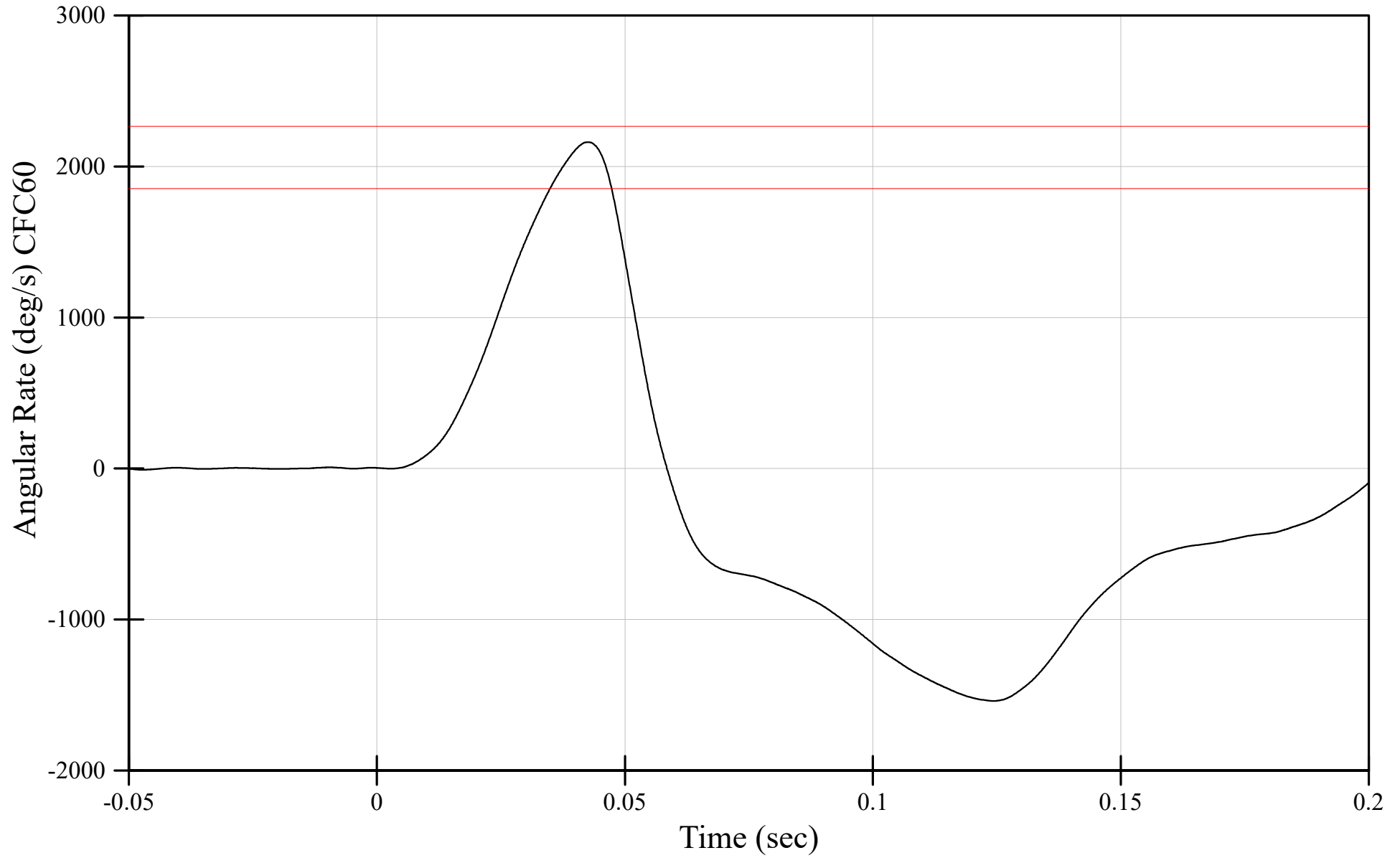
Pre-Test Qualification (Partial)
THOR-50M Neck Extension Qualification
Upper Neck My
Neck Serial Number: EA0643



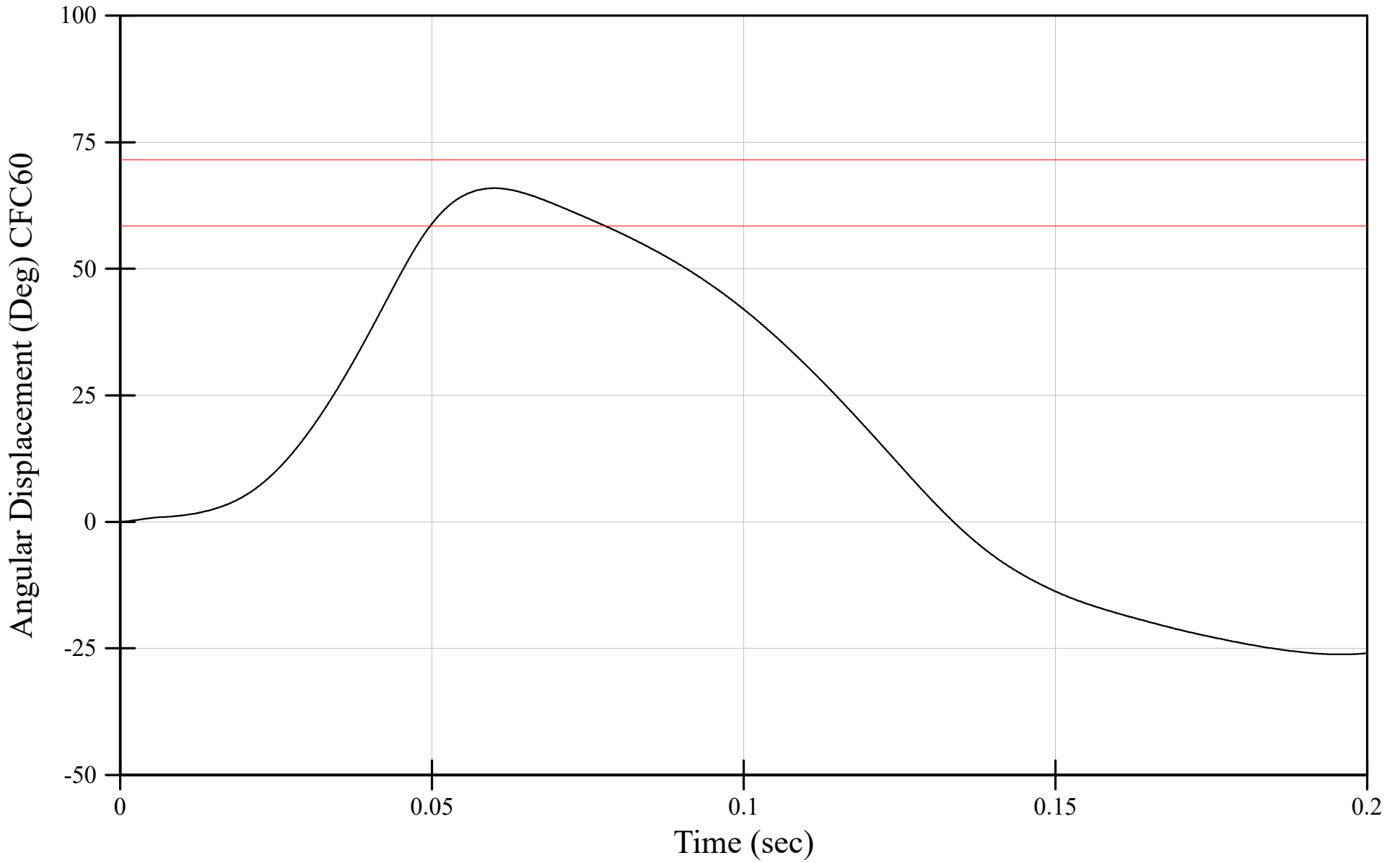
Pre-Test Qualification (Partial)
THOR-50M Neck Extension Qualification
Upper Neck Fz
Neck Serial Number: EA0643



Pre-Test Qualification (Partial)
THOR-50M Neck Extension Qualification
Peak Head Angular Rate
Neck Serial Number: EA0643

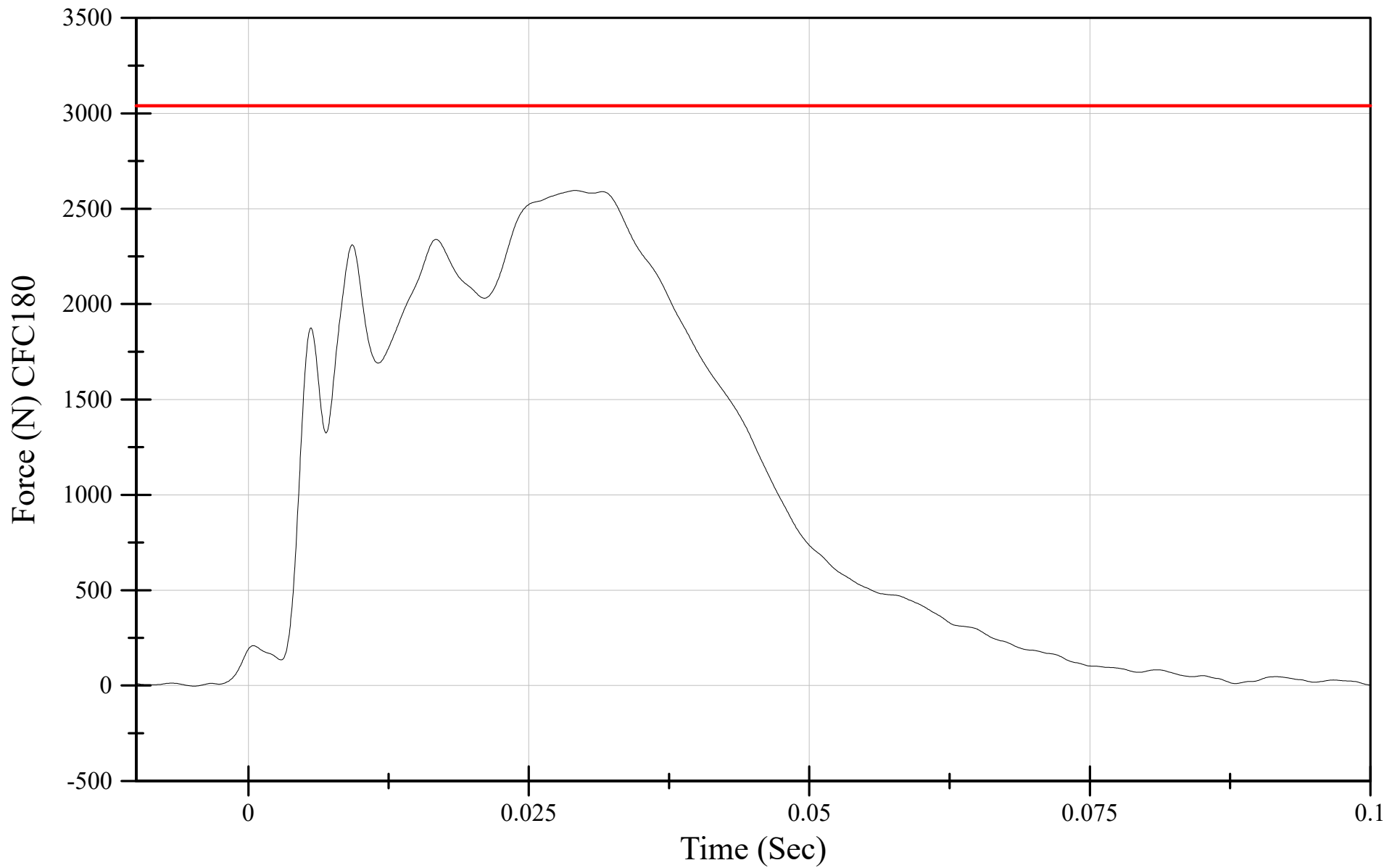


Pre-Test Qualification (Partial)
THOR-50M Neck Extension Qualification
Neck Rotation
Neck Serial Number: EA0643

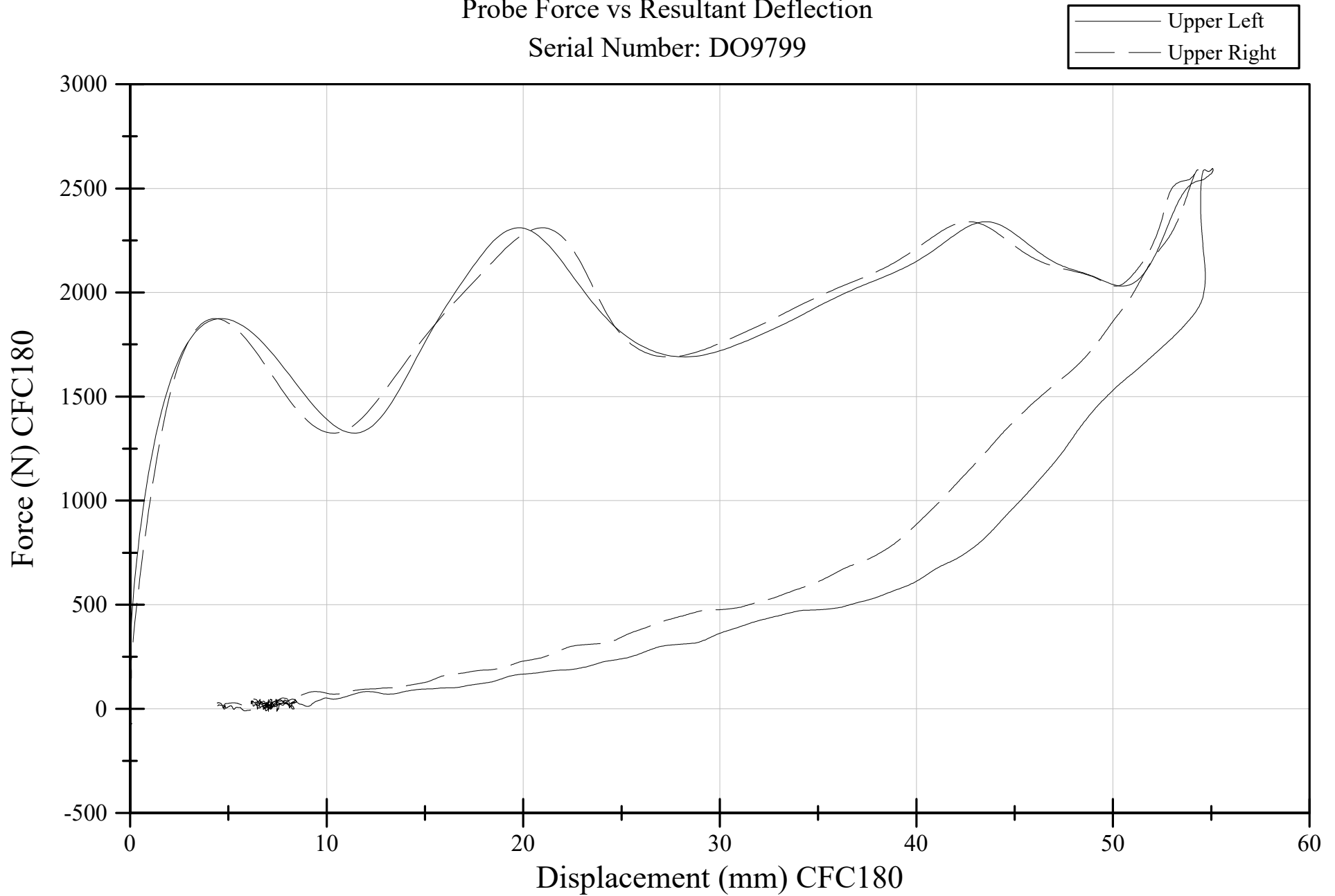


Upper Thorax Qualification

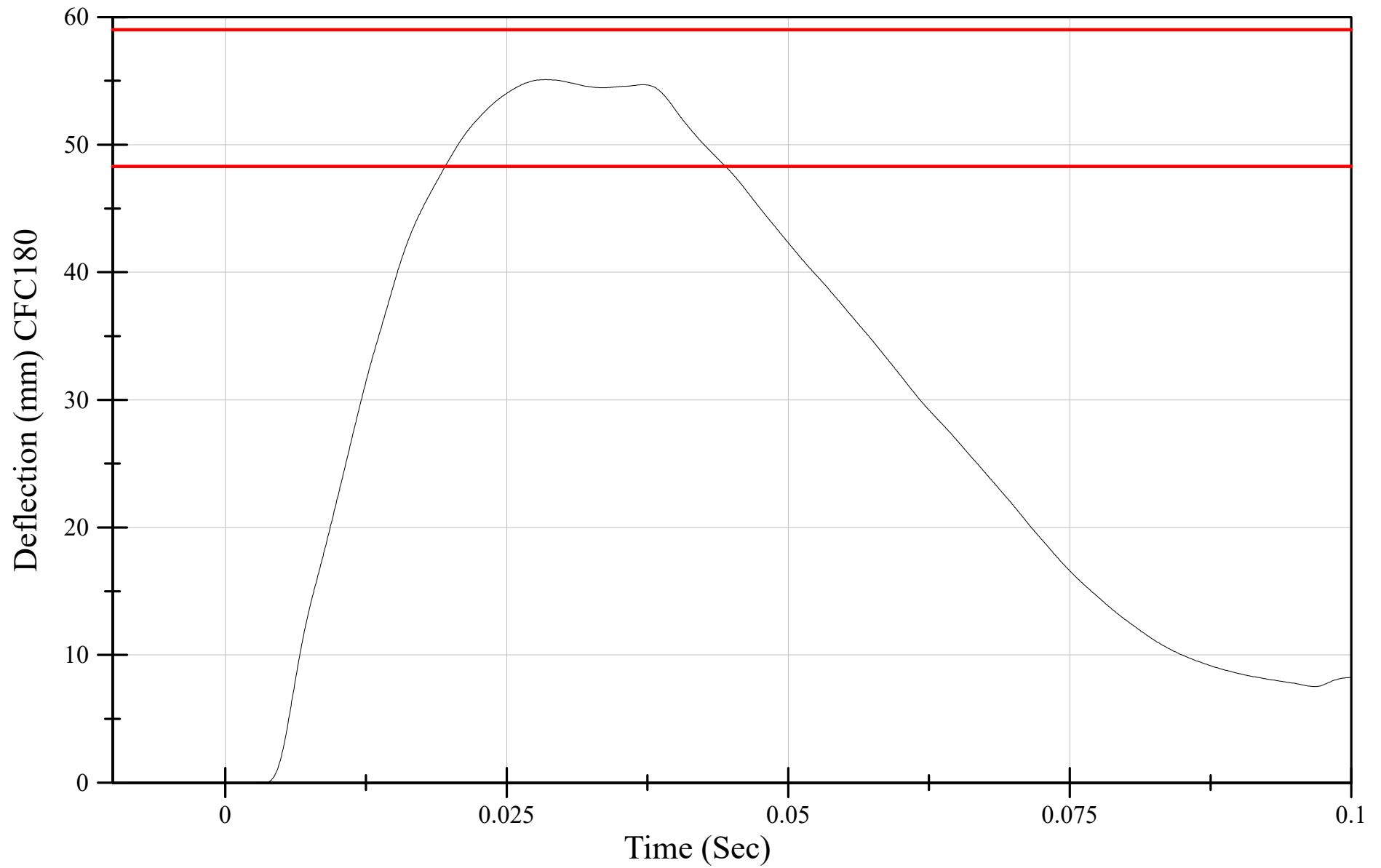
Pre-Test Qualification (Partial)
THOR-50M Upper Thorax Qualification
Probe Force
Serial Number: DO9799



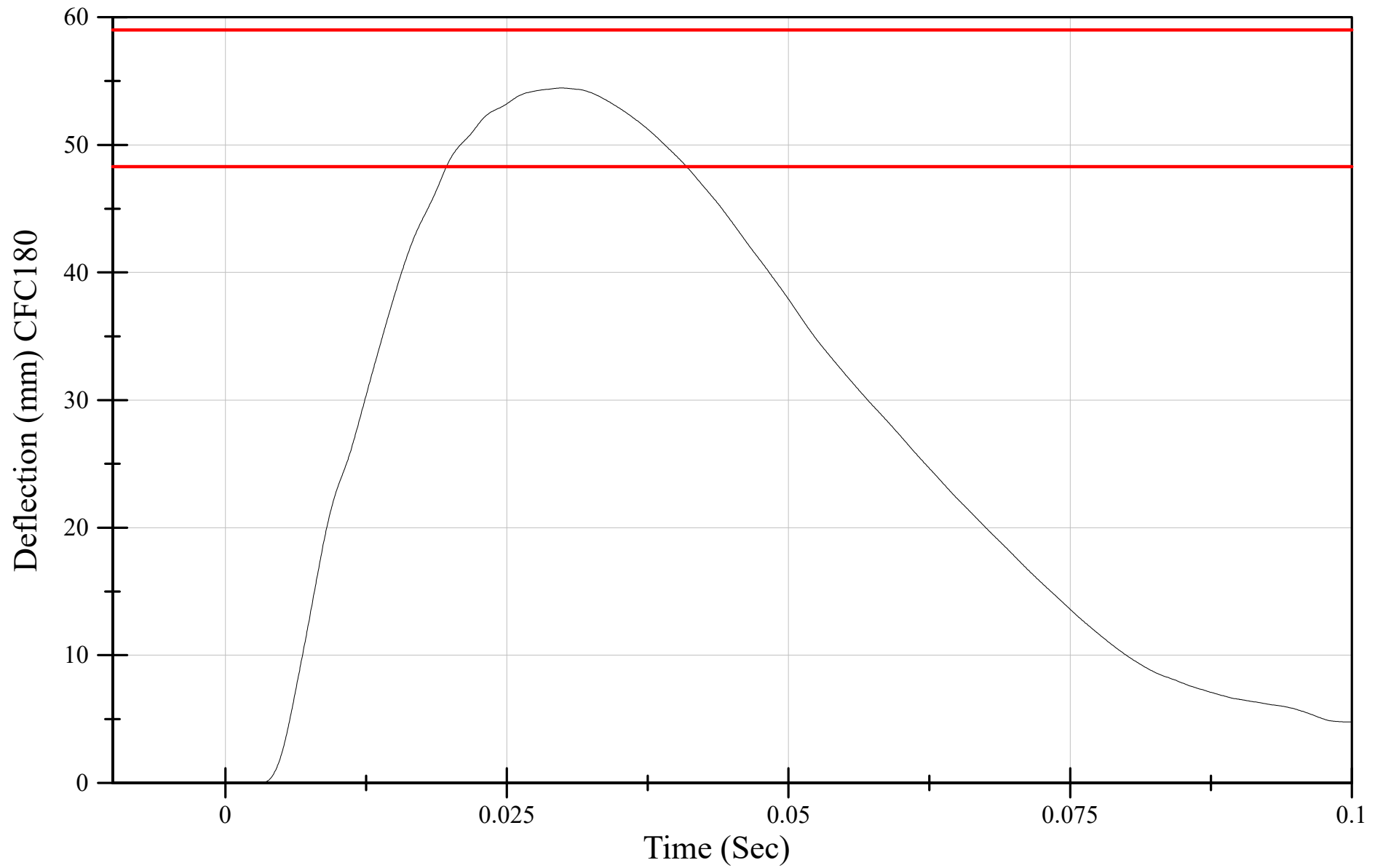
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THOR-50M Upper Thorax Qualification
Probe Force vs Resultant Deflection
Serial Number: DO9799



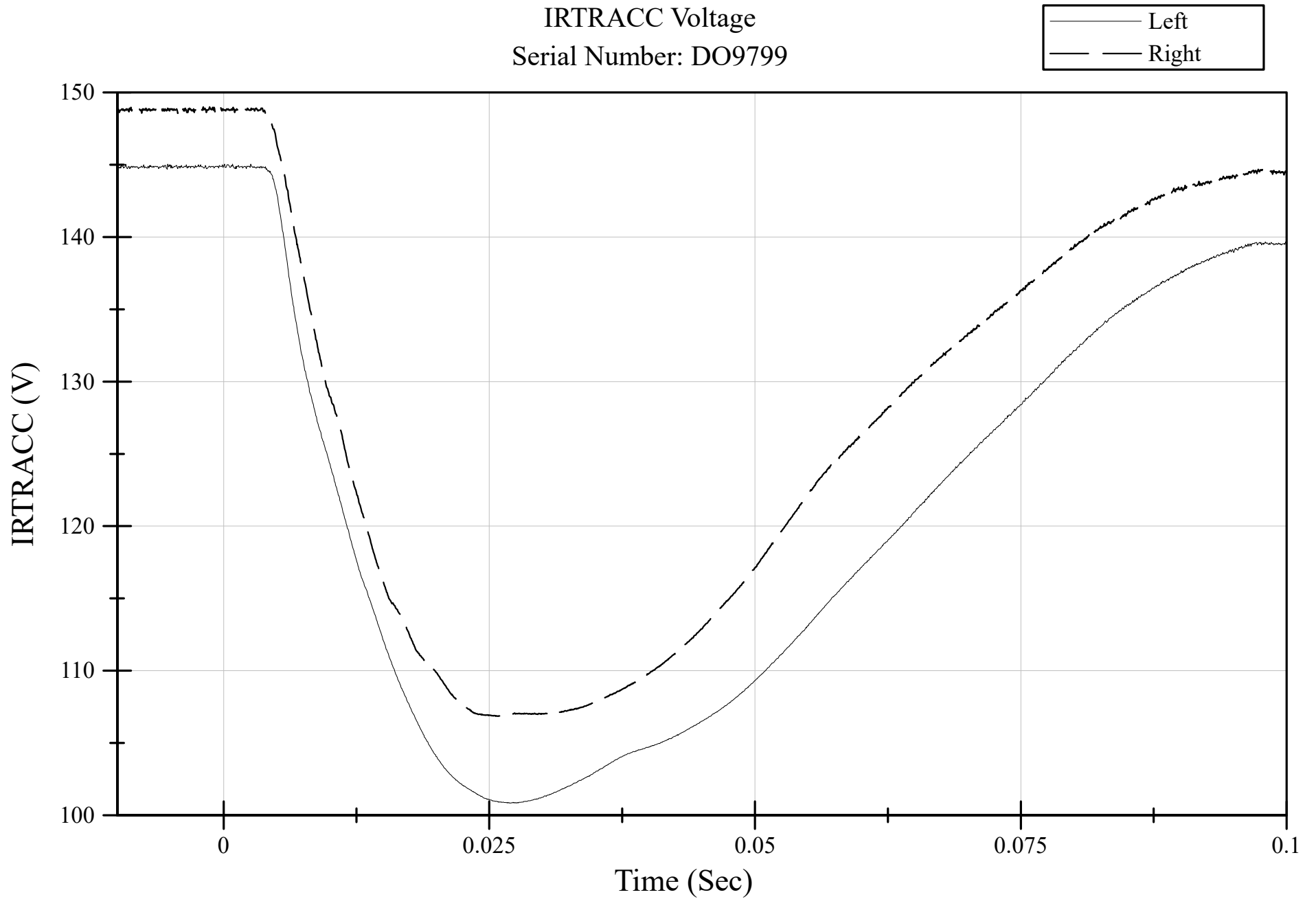
Pre-Test Qualification (Partial)
THOR-50M Upper Thorax Qualification
Left Resultant Deflection
Serial Number: DO9799



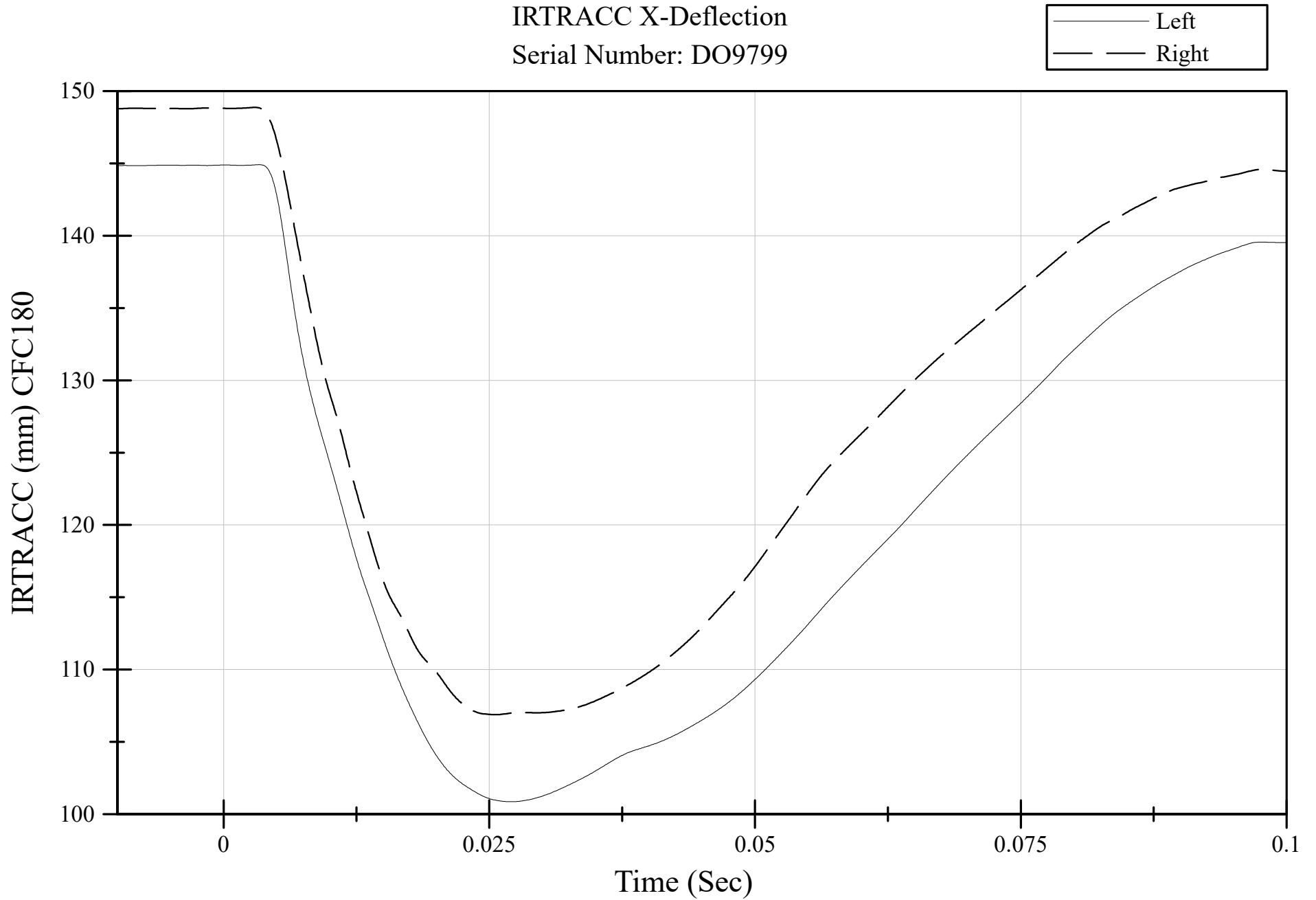
Pre-Test Qualification (Partial)
THOR-50M Upper Thorax Qualification
Right Resultant Deflection
Serial Number: DO9799



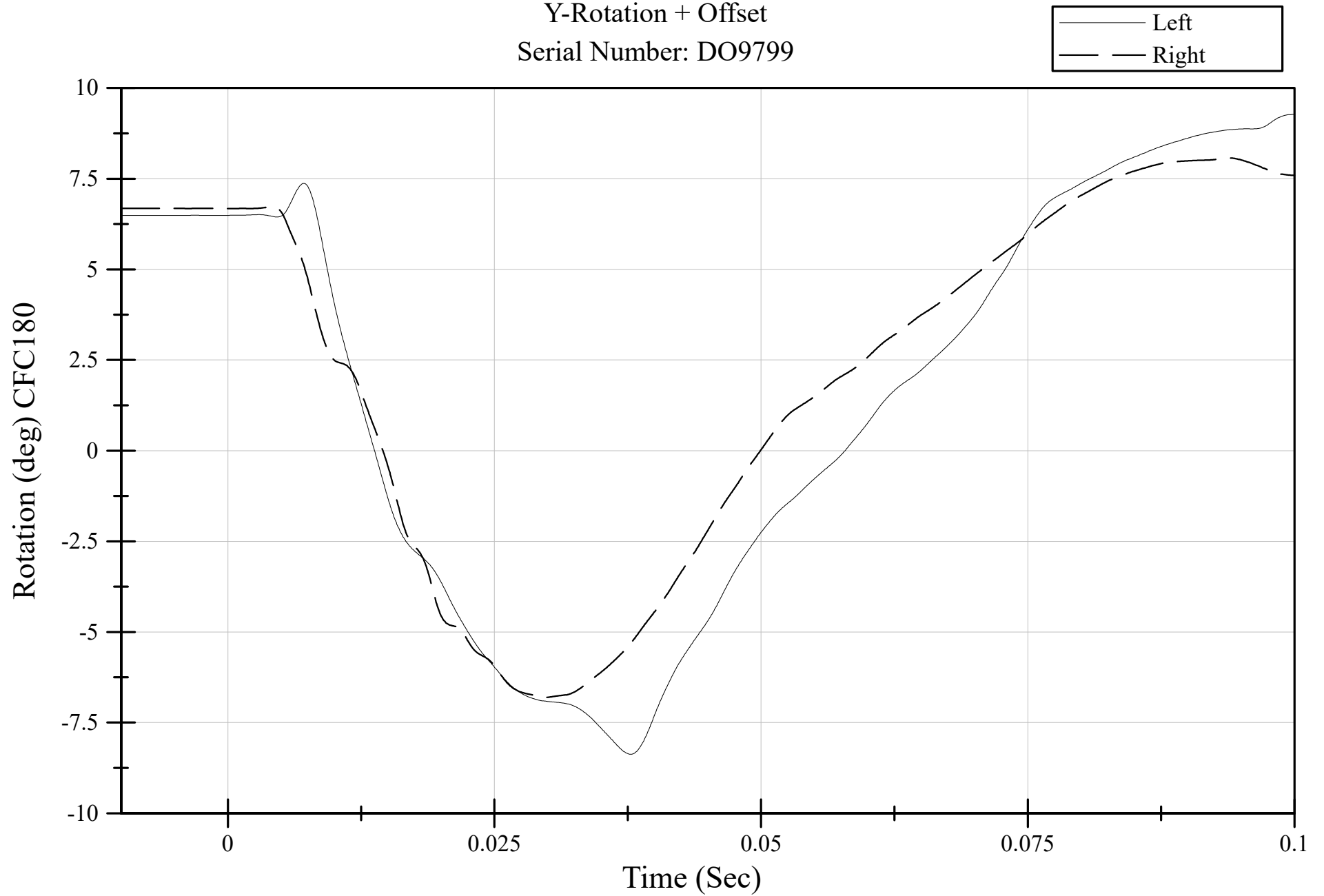
Pre-Test Qualification (Partial)
THOR-50M Upper Thorax Qualification
IRTRACC Voltage
Serial Number: DO9799



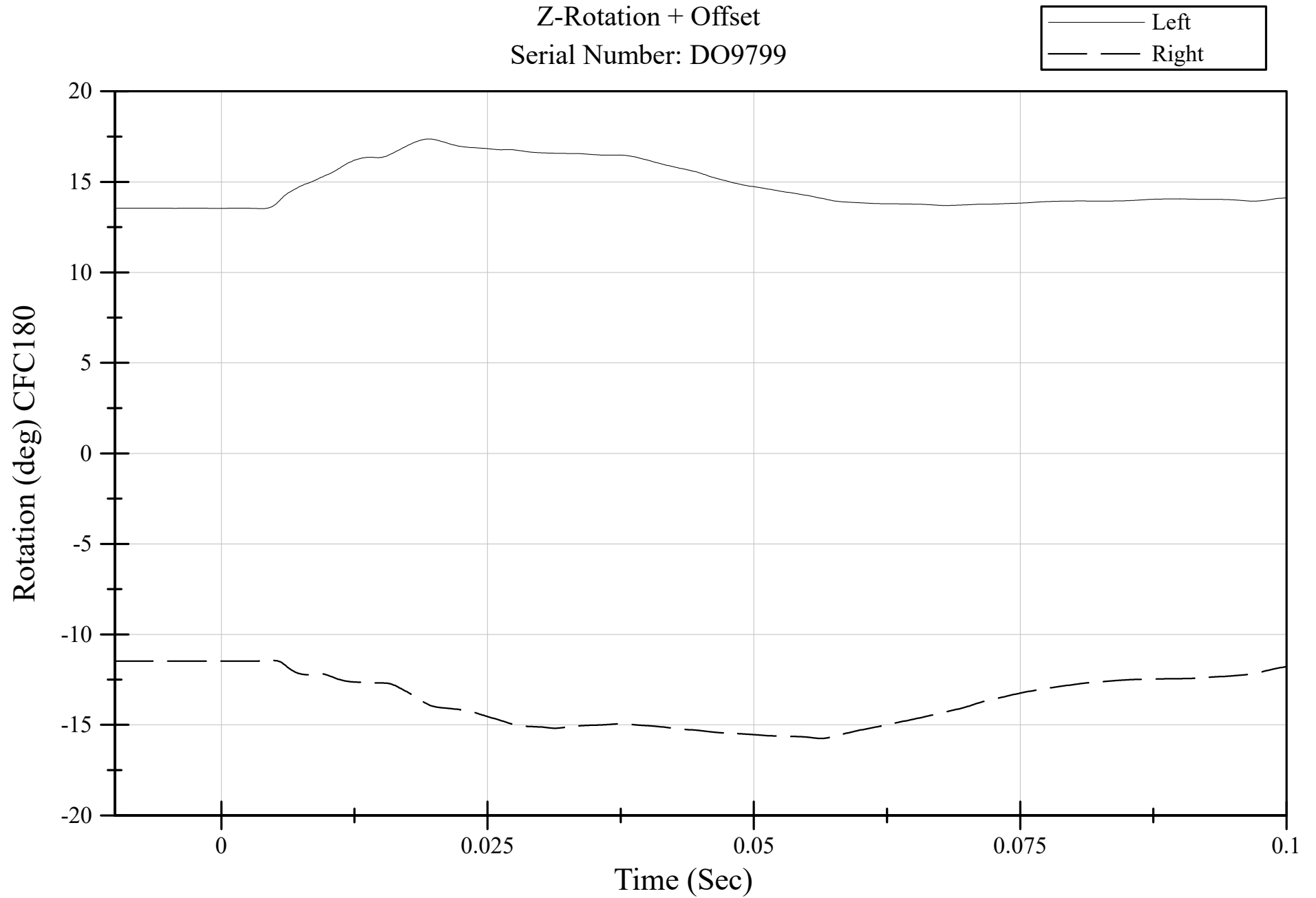
Pre-Test Qualification (Partial)
THOR-50M Upper Thorax Qualification
IRTRACC X-Deflection
Serial Number: DO9799



Pre-Test Qualification (Partial)
THOR-50M Upper Thorax Qualification
Y-Rotation + Offset
Serial Number: DO9799

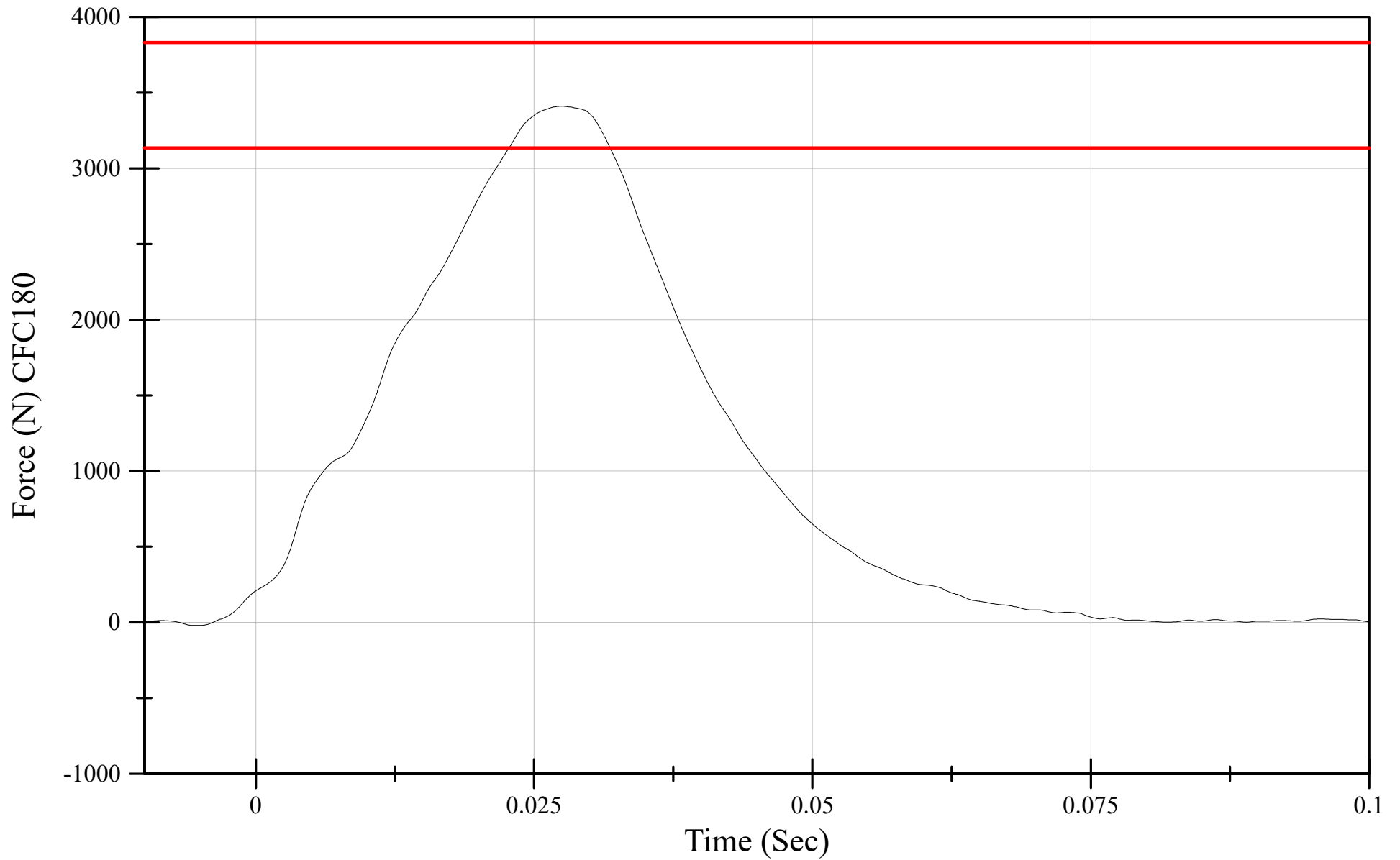


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THOR-50M Upper Thorax Qualification
Z-Rotation + Offset
Serial Number: DO9799

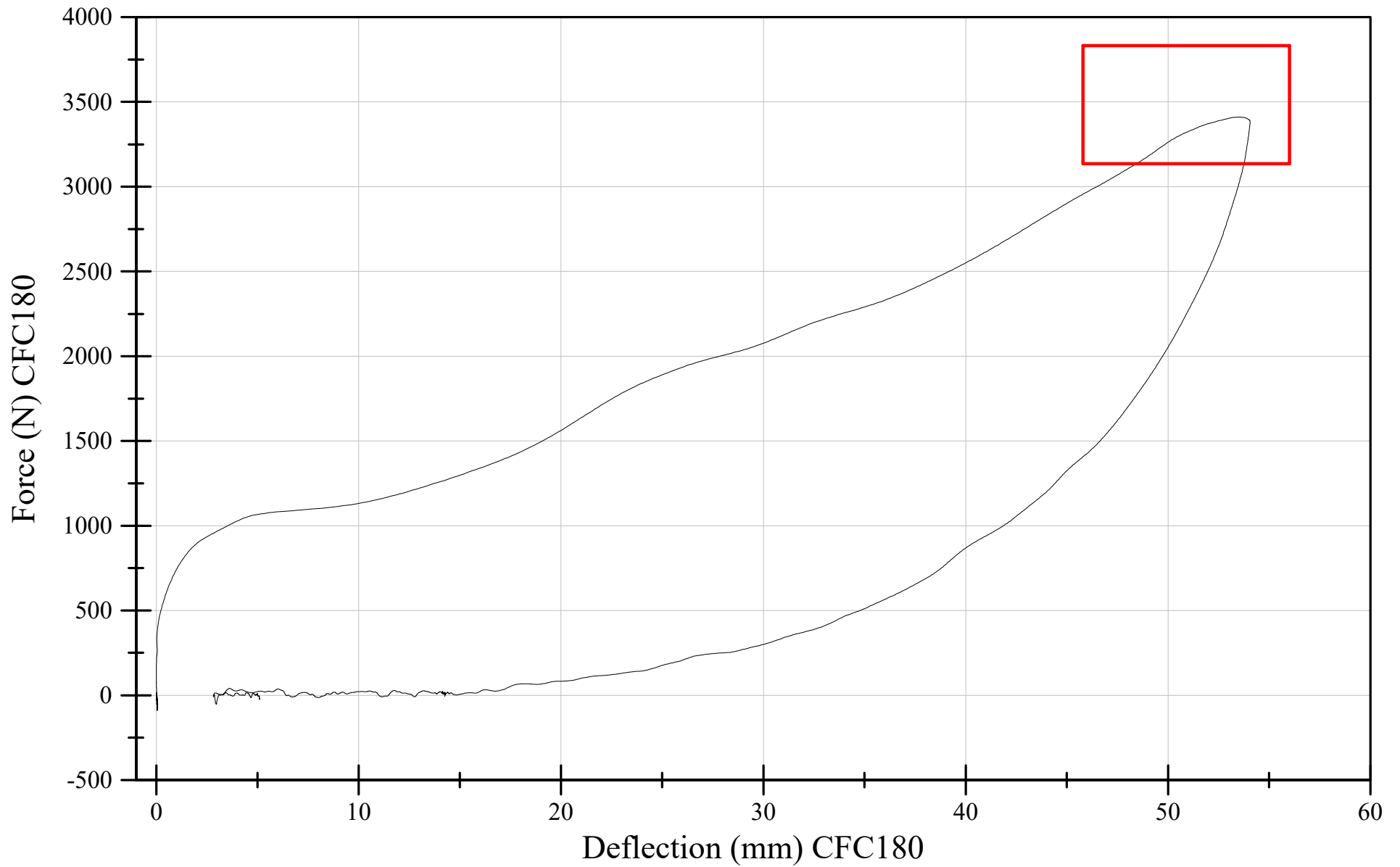


Lower Left Thorax Qualification

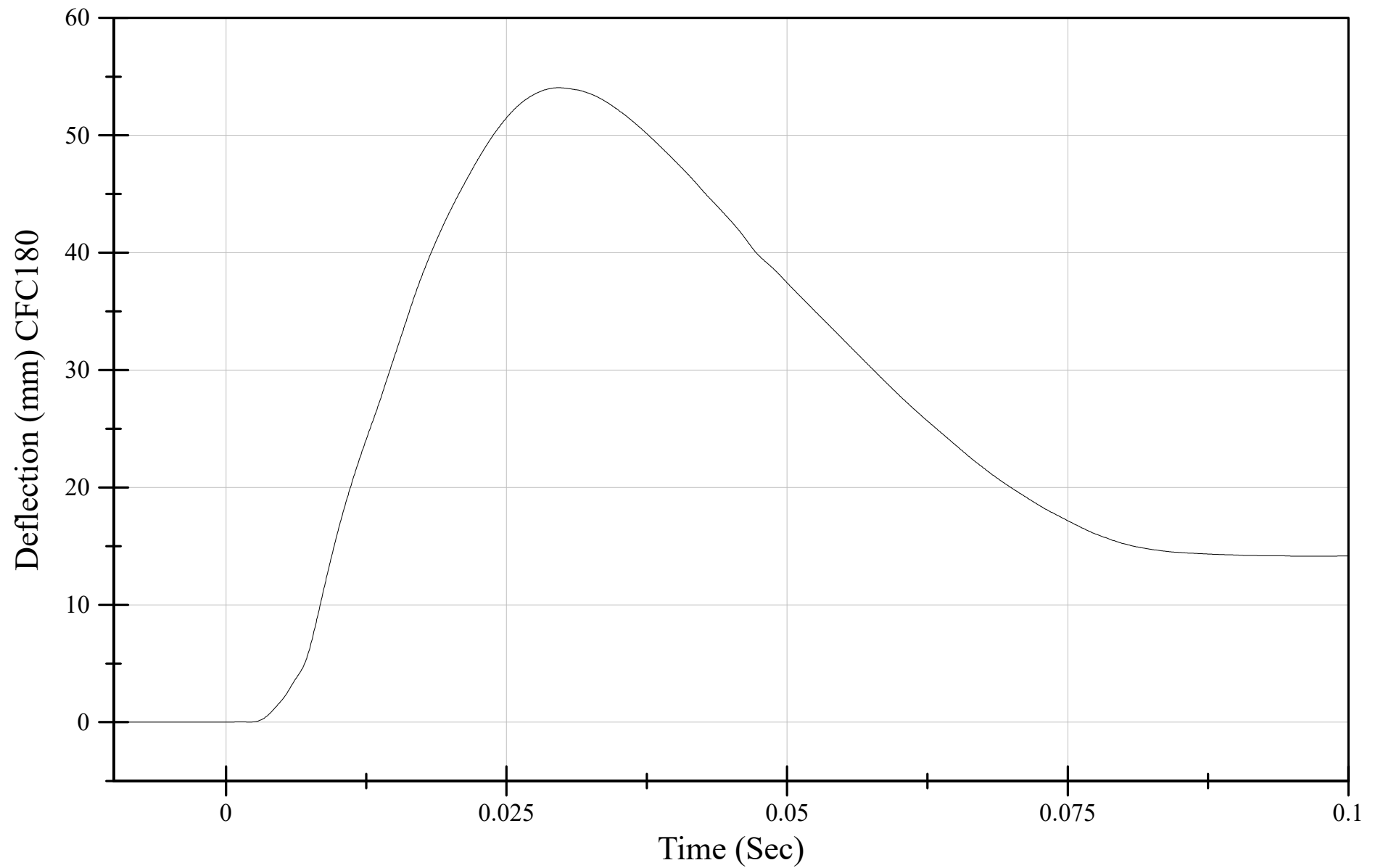
Pre-Test Qualification (Partial)
THOR-50M Lower Left Thorax Qualification
Probe Force
Serial Number: DO9799



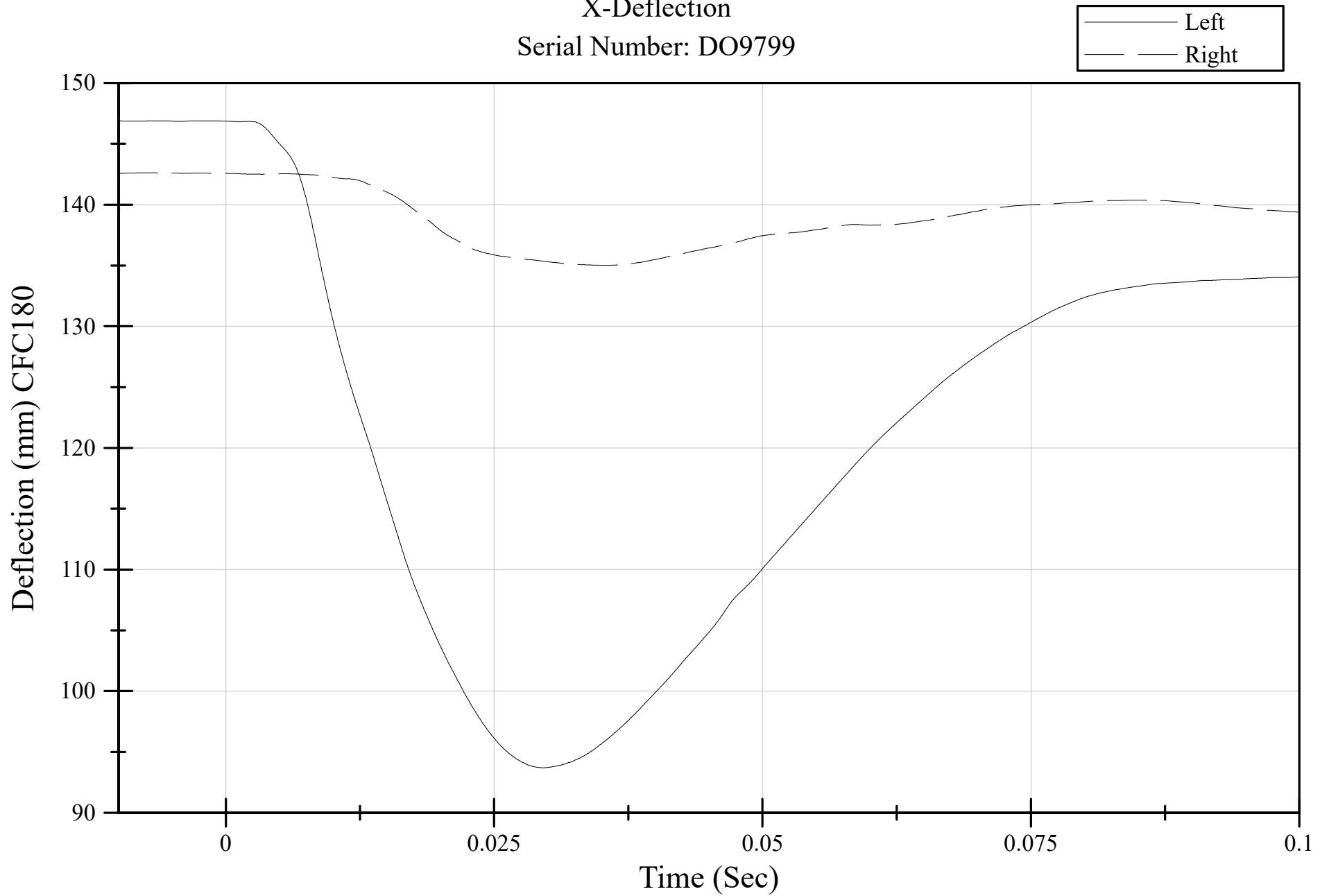
Pre-Test Qualification (Partial)
THOR-50M Lower Left Thorax Qualification
Probe Force vs Left Resultant Deflection
Serial Number: DO9799



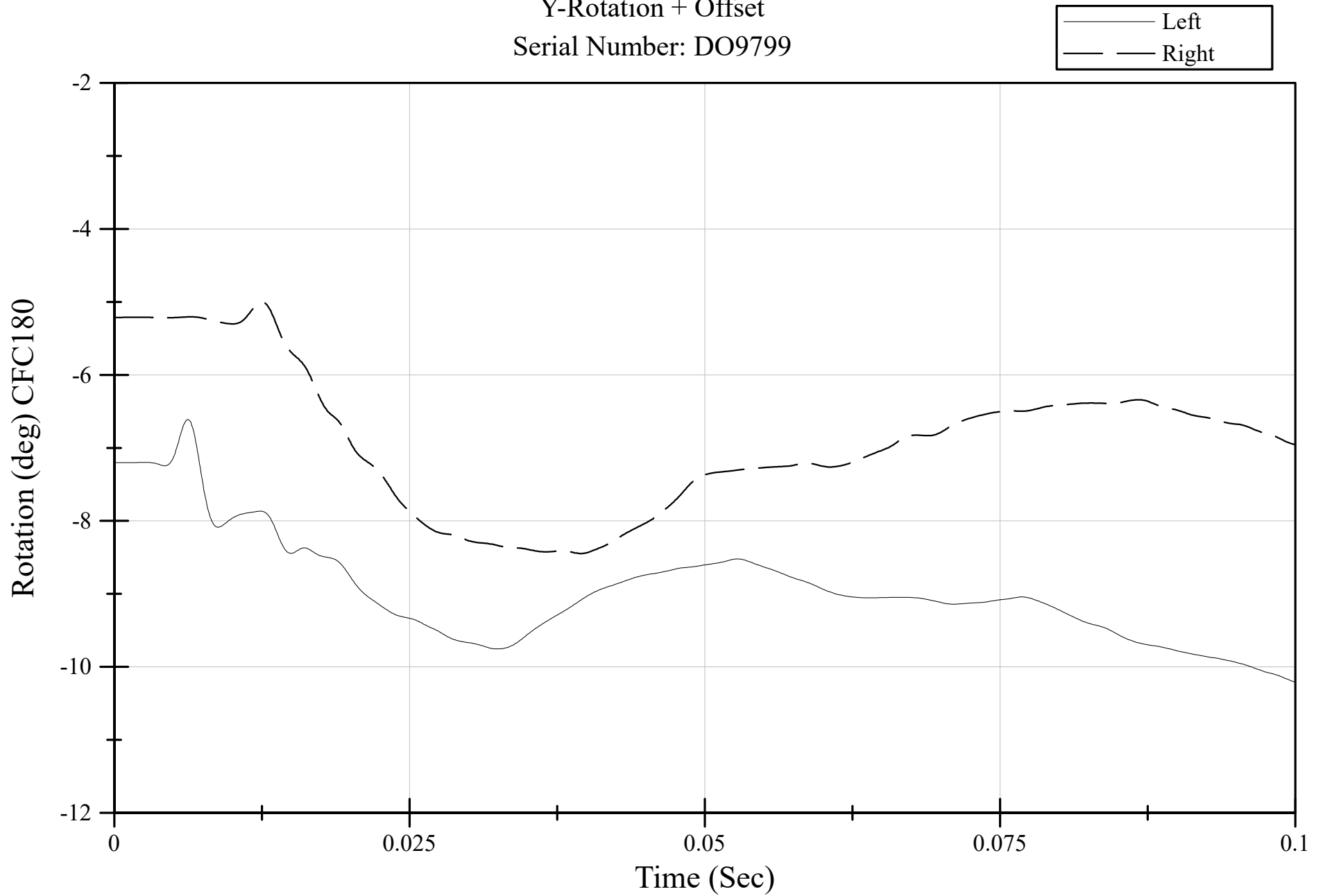
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THOR-50M Lower Left Thorax Qualification
Left Resultant Deflection
Serial Number: DO9799



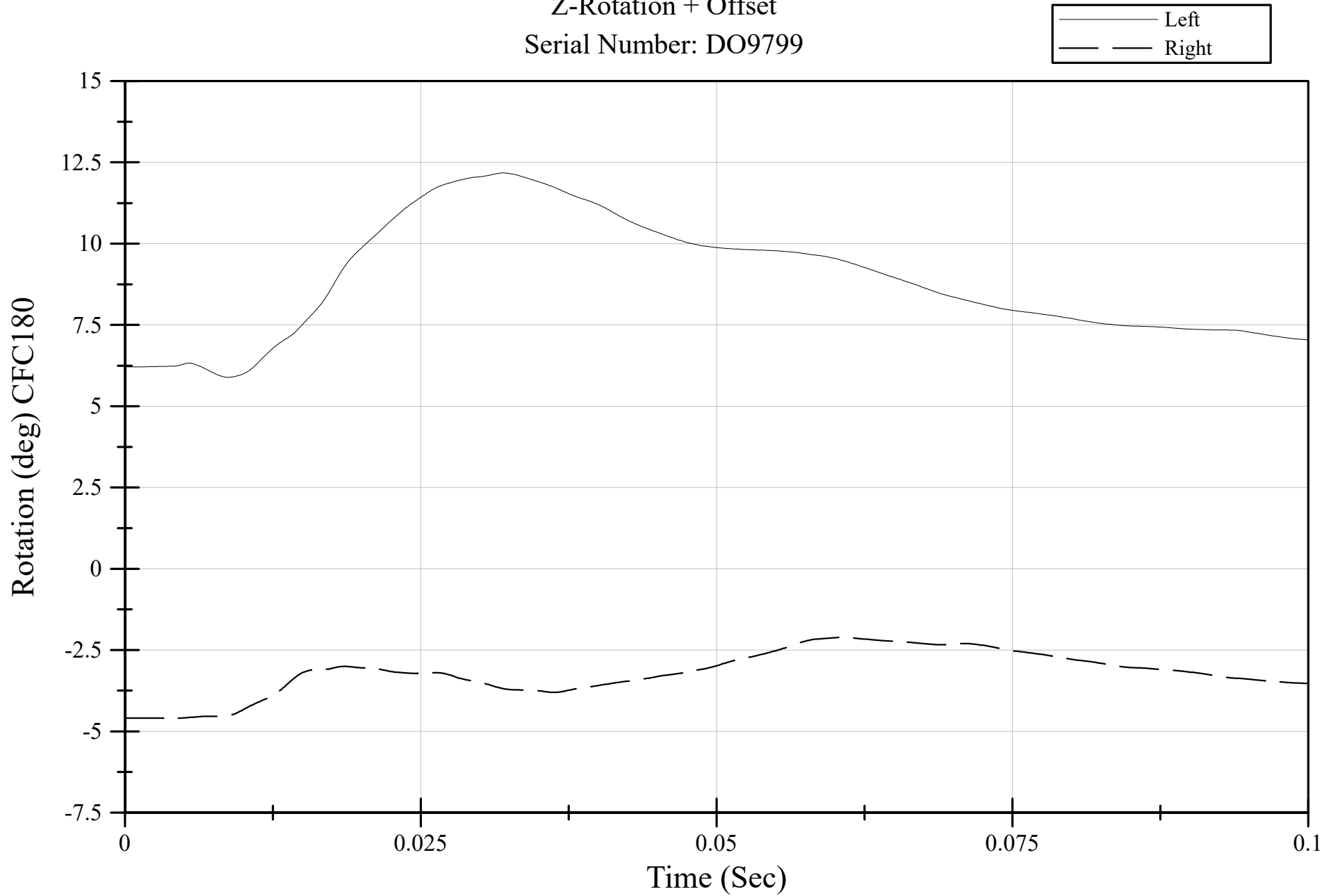
Pre-Test Qualification (Partial)
THOR-50M Lower Left Thorax Qualification
X-Deflection
Serial Number: DO9799



Pre-Test Qualification (Partial)
THOR-50M Lower Left Thorax Qualification
Y-Rotation + Offset
Serial Number: DO9799

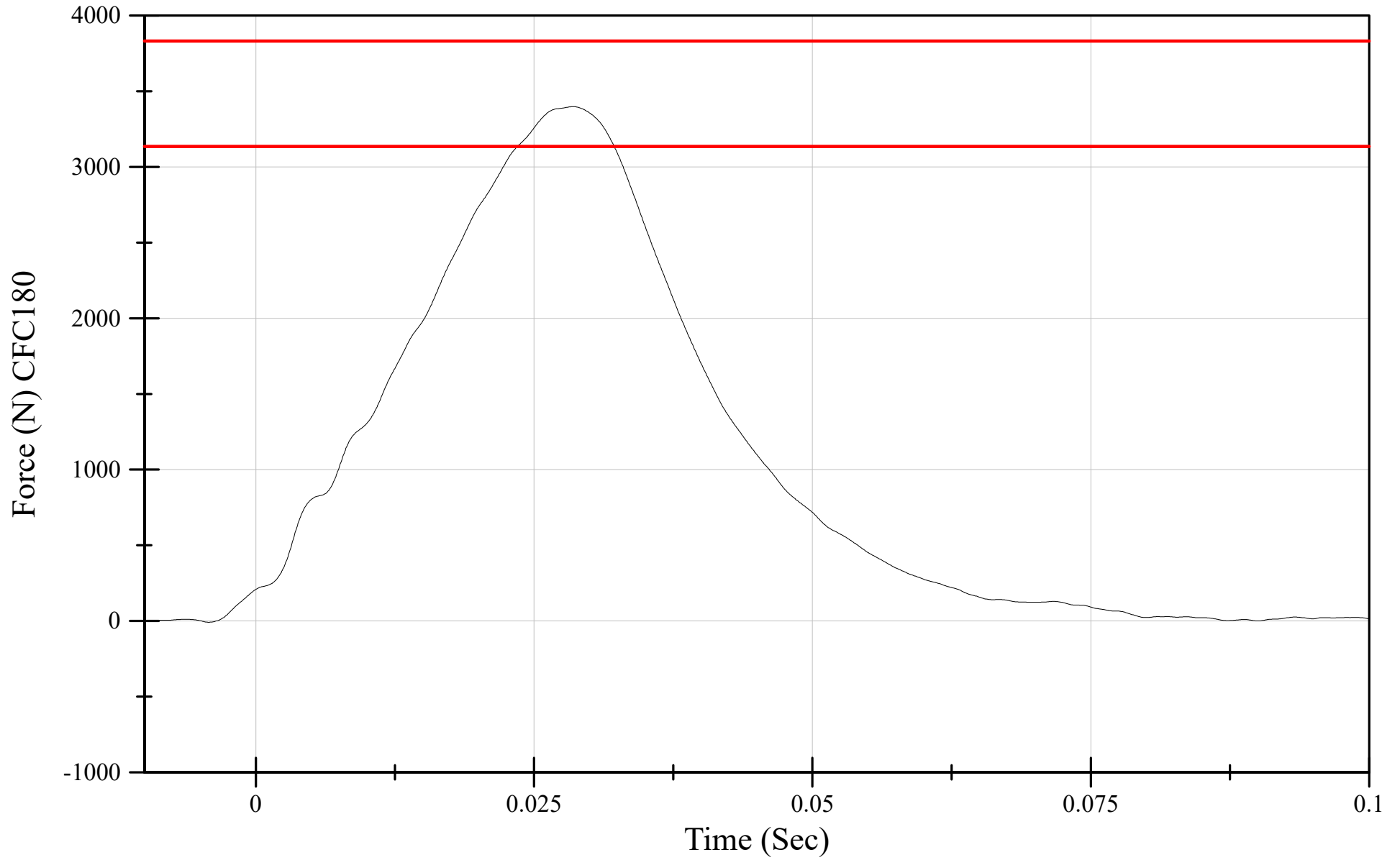


Pre-Test Qualification (Partial)
THOR-50M Lower Left Thorax Qualification
Z-Rotation + Offset
Serial Number: DO9799

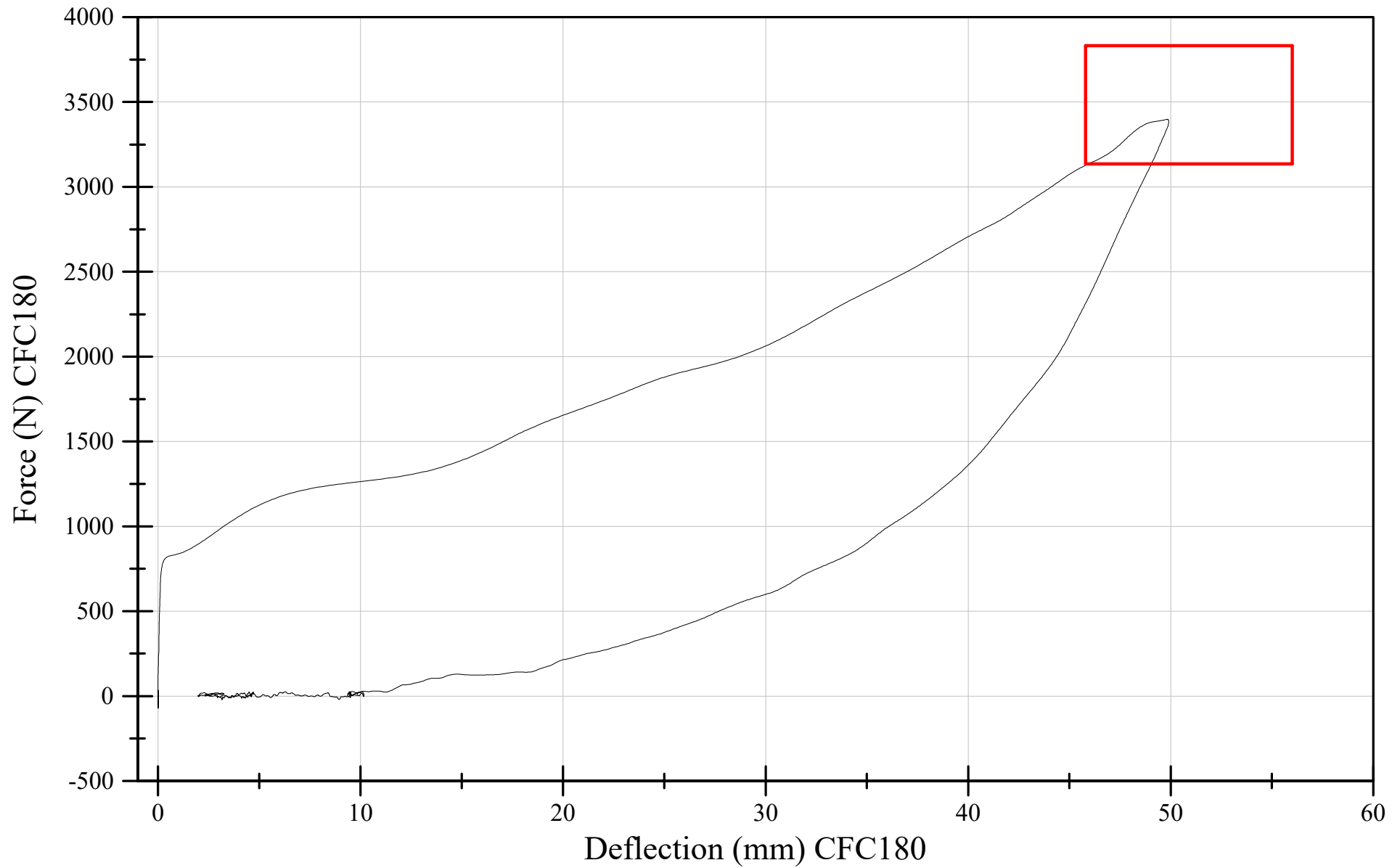


Lower Right Thorax Qualification

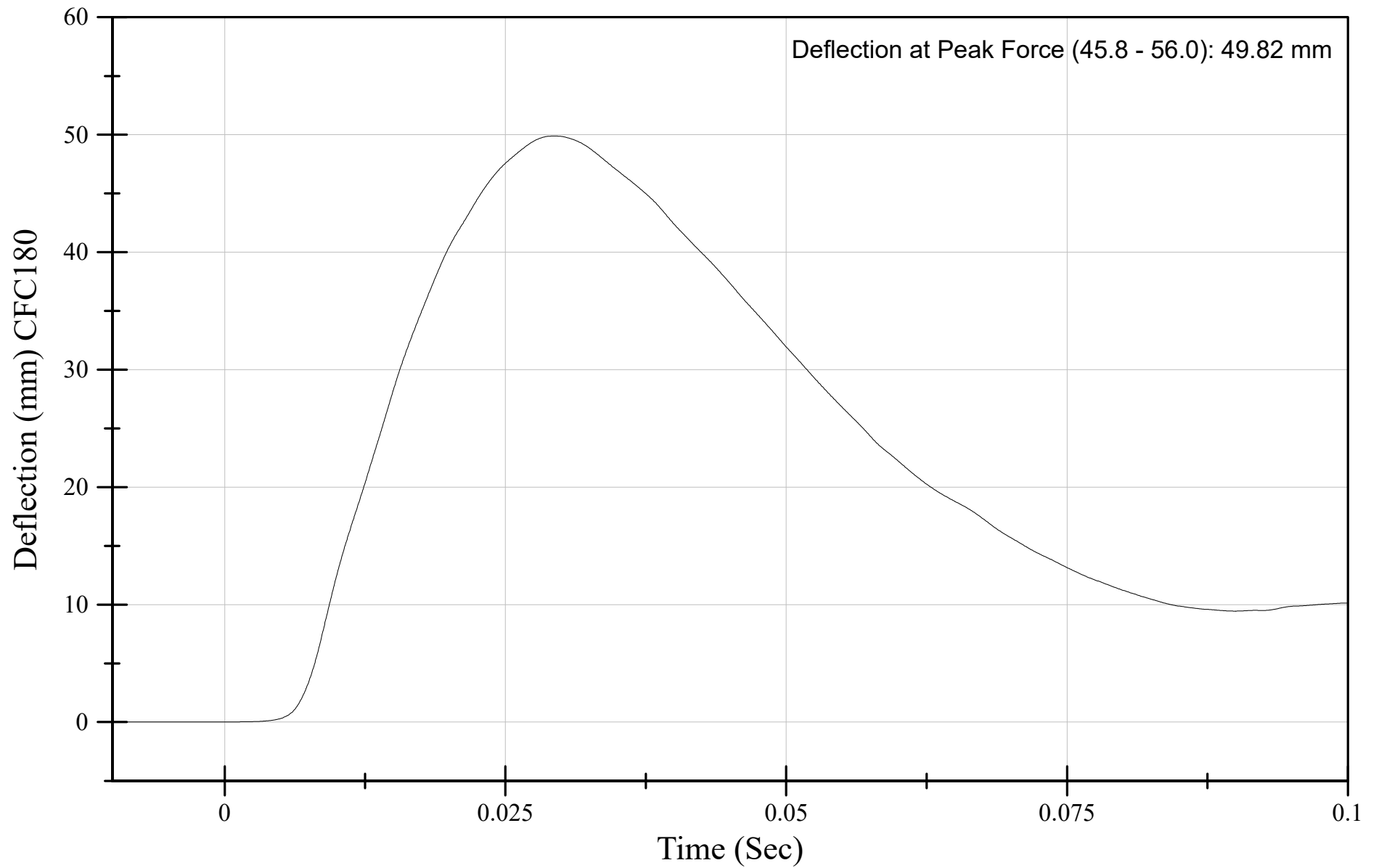
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THOR-50M Lower Right Thorax Qualification
Probe Force
Serial Number: DO9799



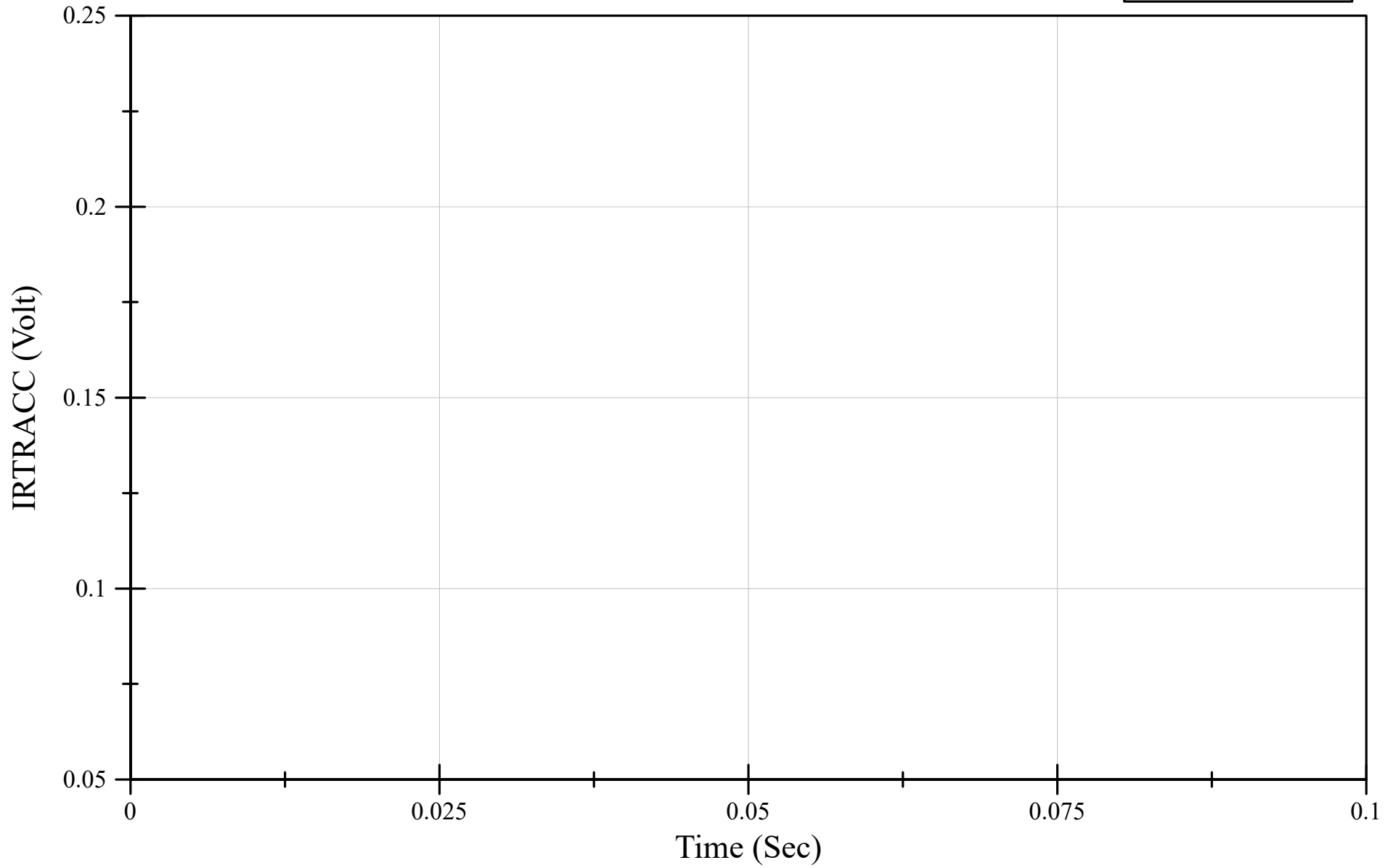
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THOR-50M Lower Right Thorax Qualification
Probe Force vs Right Resultant Deflection
Serial Number: DO9799



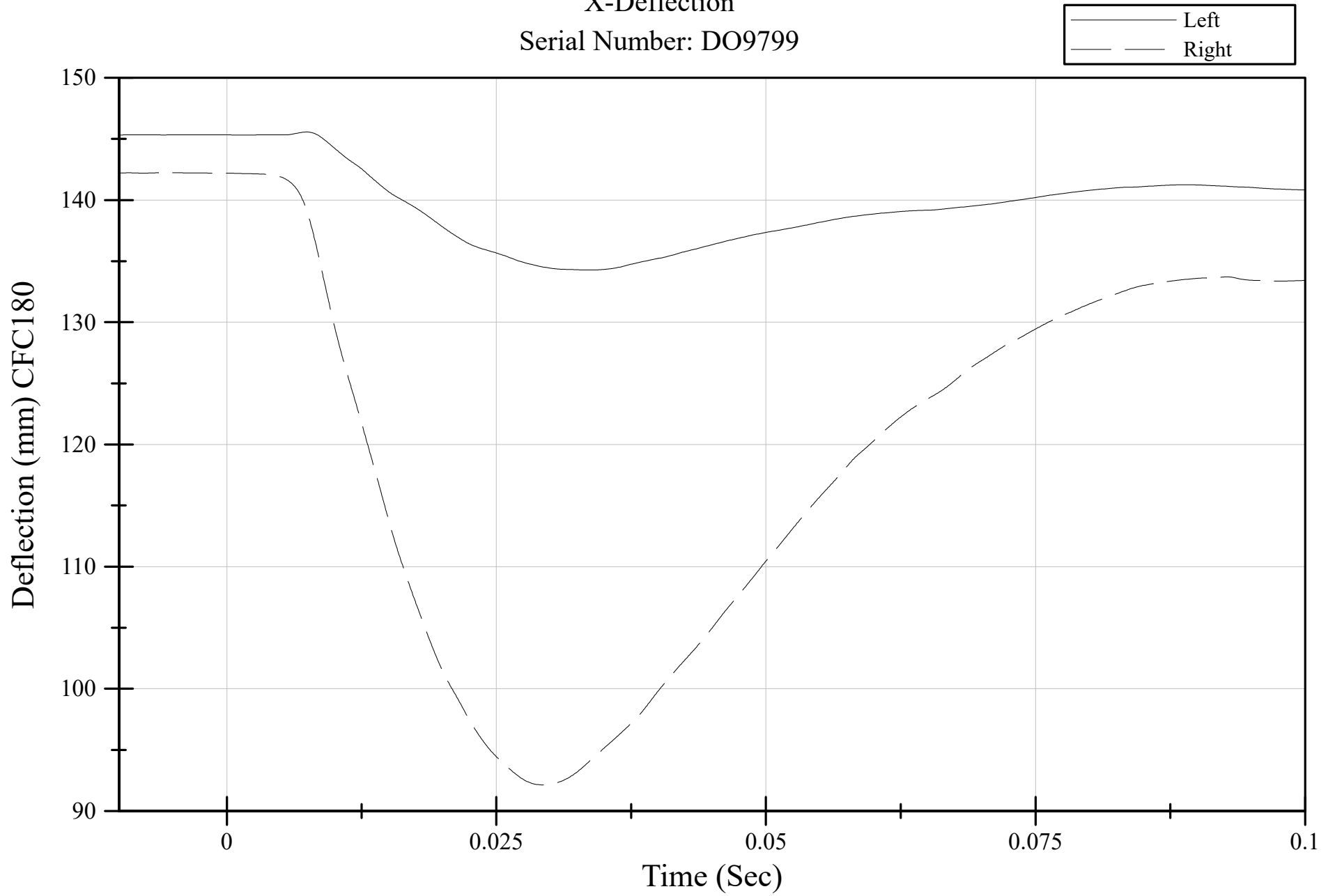
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THOR-50M Lower Right Thorax Qualification
Right Resultant Deflection
Serial Number: DO9799



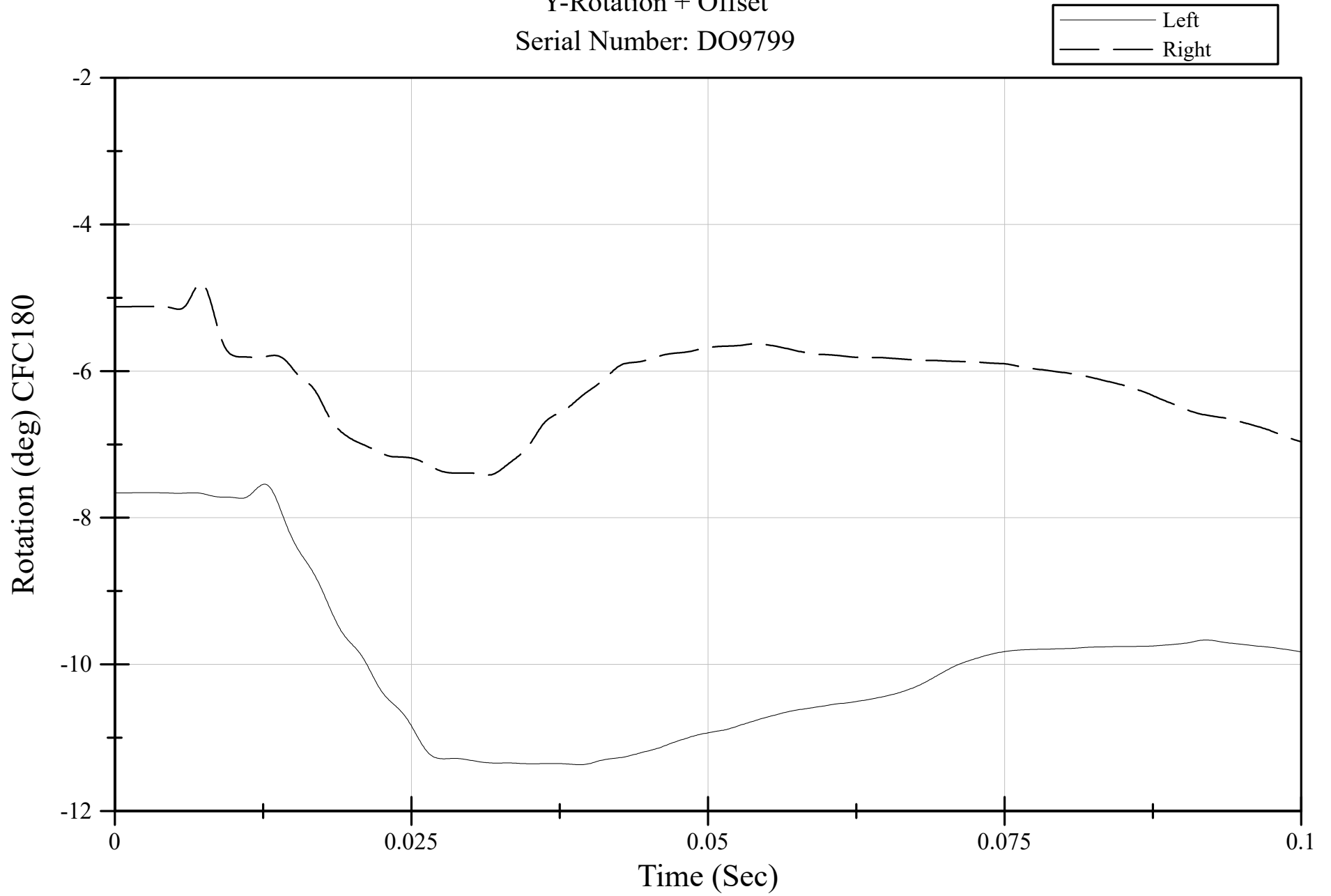
Pre-Test Qualification (Partial)
THOR-50M Lower Right Thorax Qualification
IRTRACC Voltage
Serial Number: DO9799



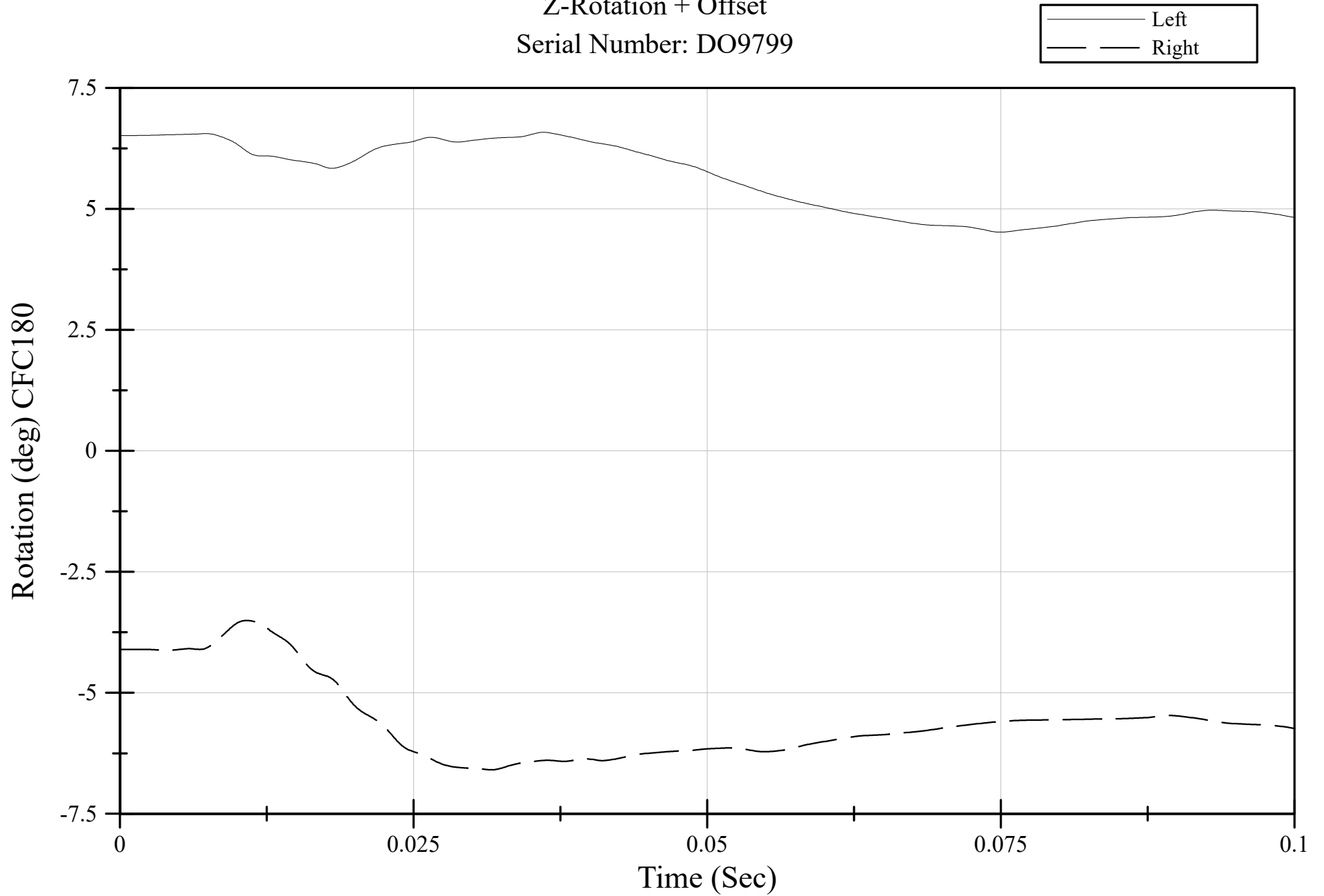
Pre-Test Qualification (Partial)
THOR-50M Lower Right Thorax Qualification
X-Deflection
Serial Number: DO9799



Pre-Test Qualification (Partial)
THOR-50M Lower Right Thorax Qualification
Y-Rotation + Offset
Serial Number: DO9799

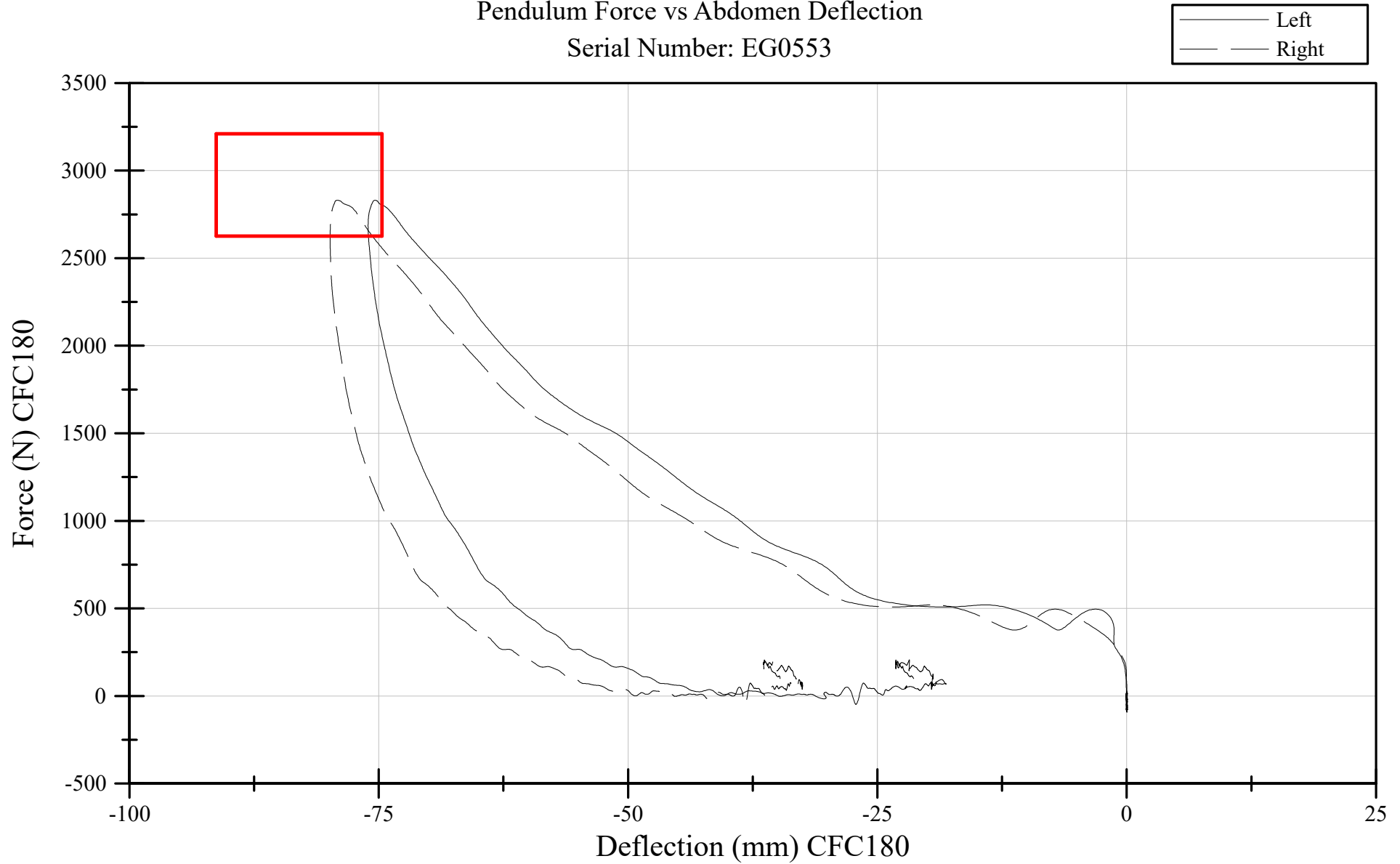


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THOR-50M Lower Right Thorax Qualification
Z-Rotation + Offset
Serial Number: DO9799

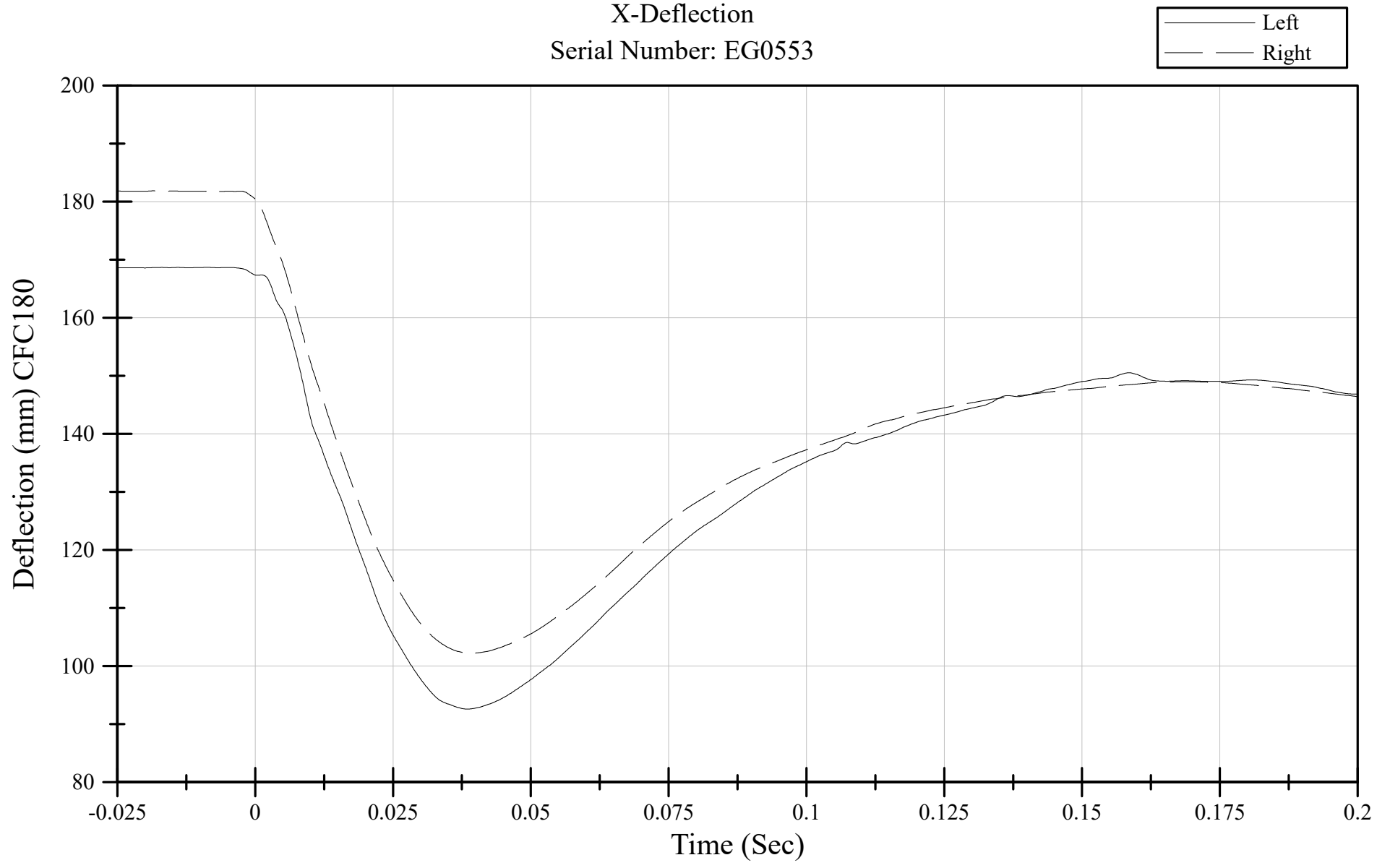


Lower Abdomen Qualification

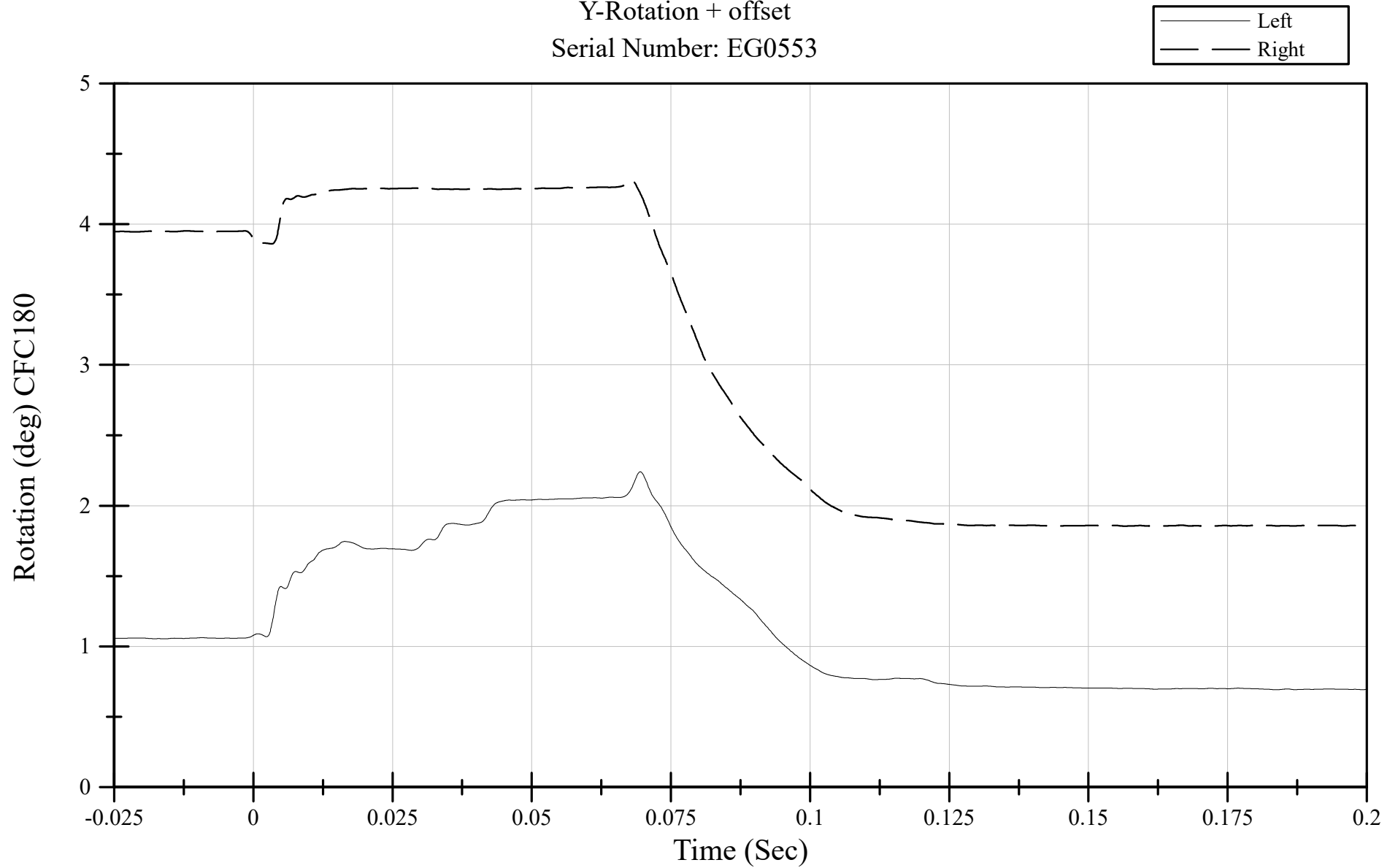
Pre-Test Qualification (Partial)
THOR-50M Lower Abdomen Qualification
Pendulum Force vs Abdomen Deflection
Serial Number: EG0553



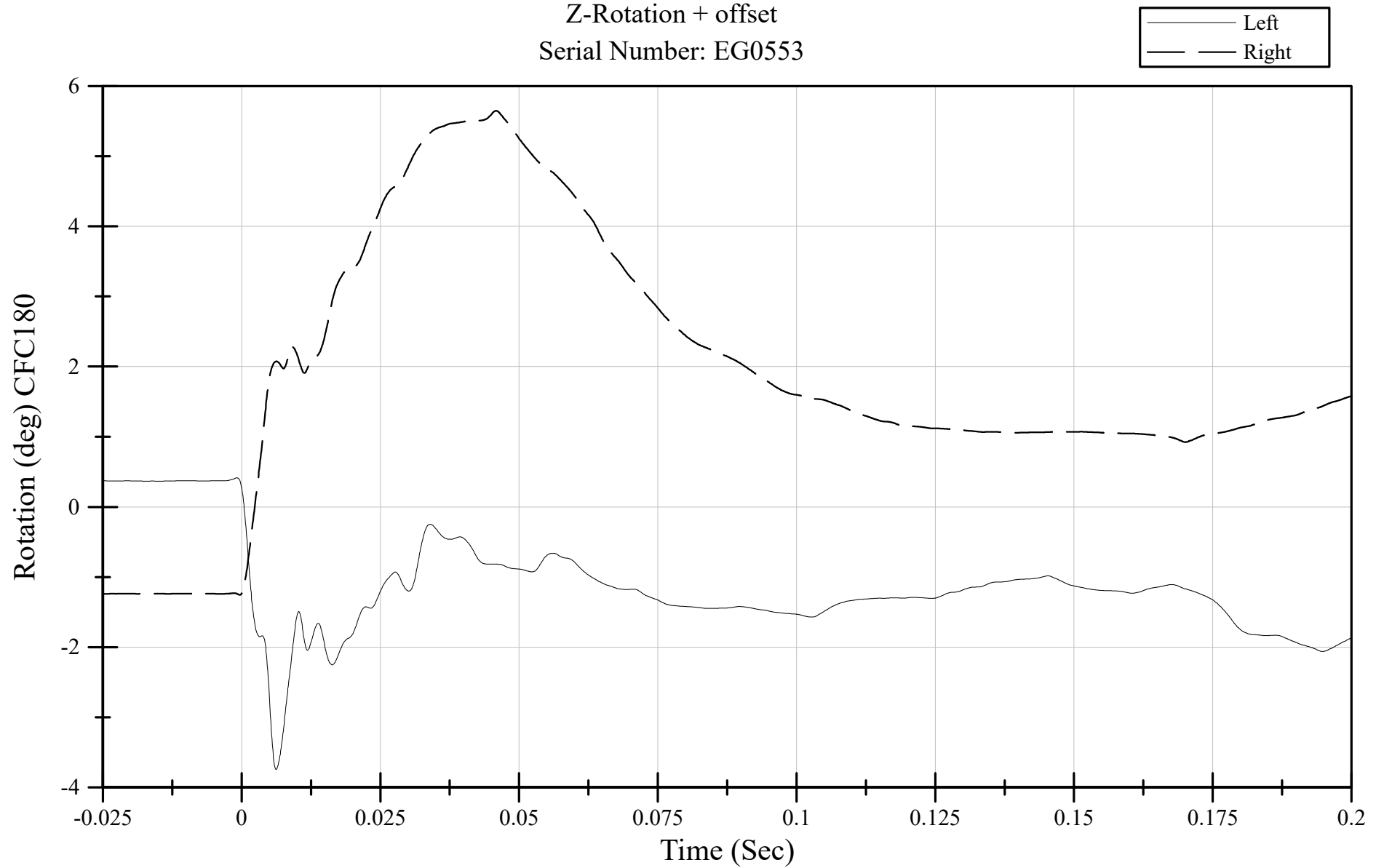
Pre-Test Qualification (Partial)
THOR-50M Lower Abdomen Qualification
X-Deflection
Serial Number: EG0553



Pre-Test Qualification (Partial)
THOR-50M Lower Abdomen Qualification
Y-Rotation + offset
Serial Number: EG0553

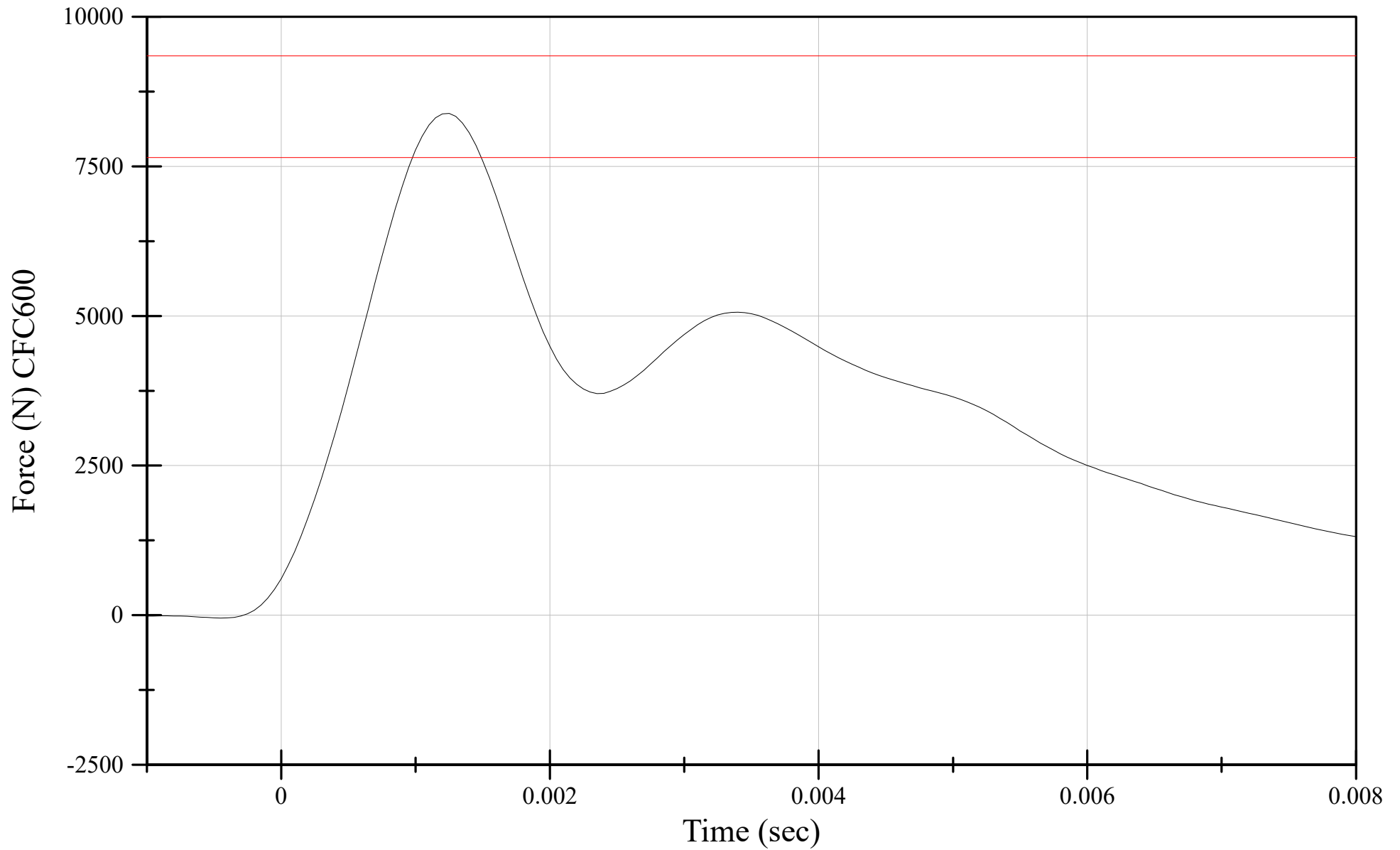


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THOR-50M Lower Abdomen Qualification
Z-Rotation + offset
Serial Number: EG0553

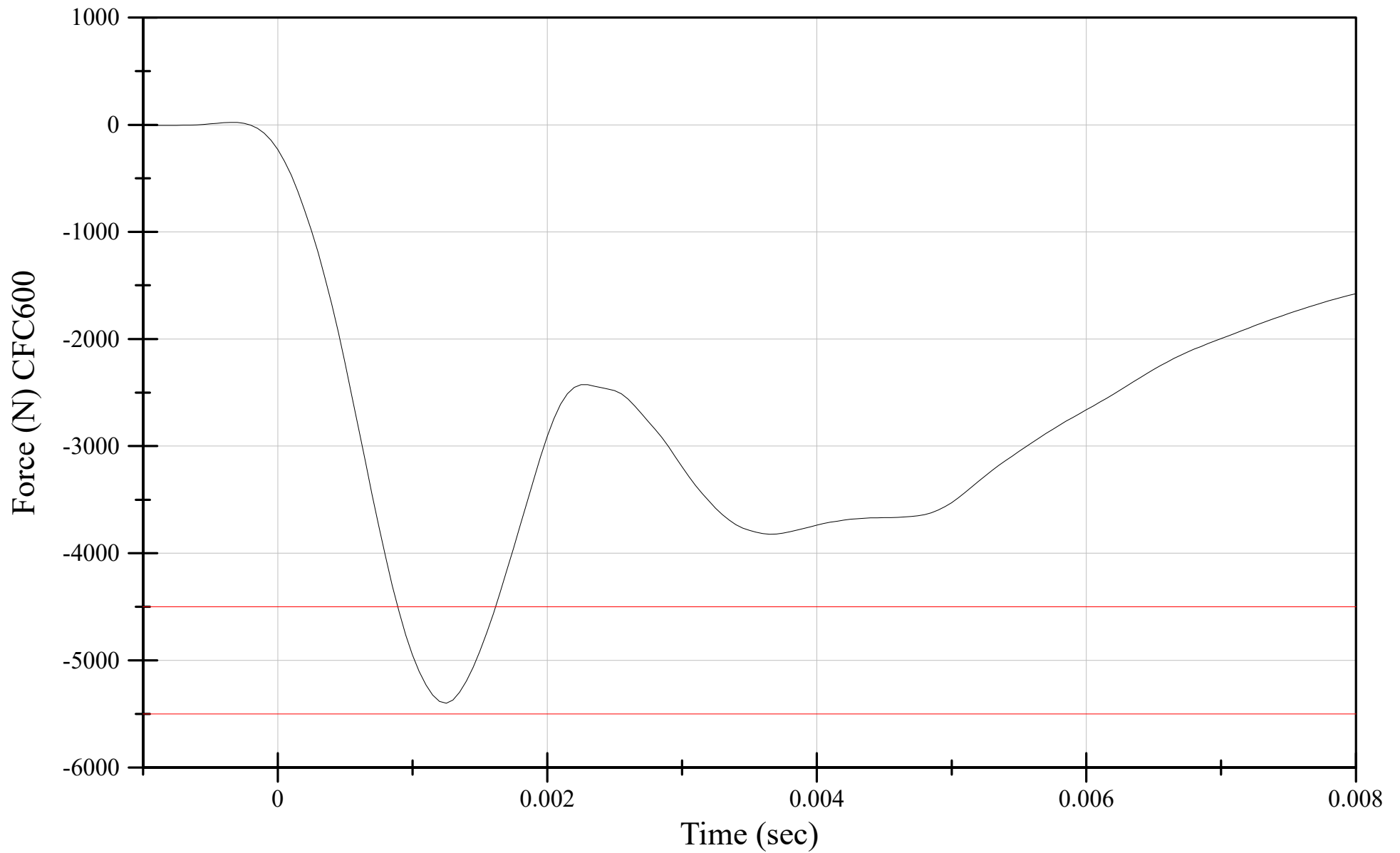


Left Upper Leg Qualification

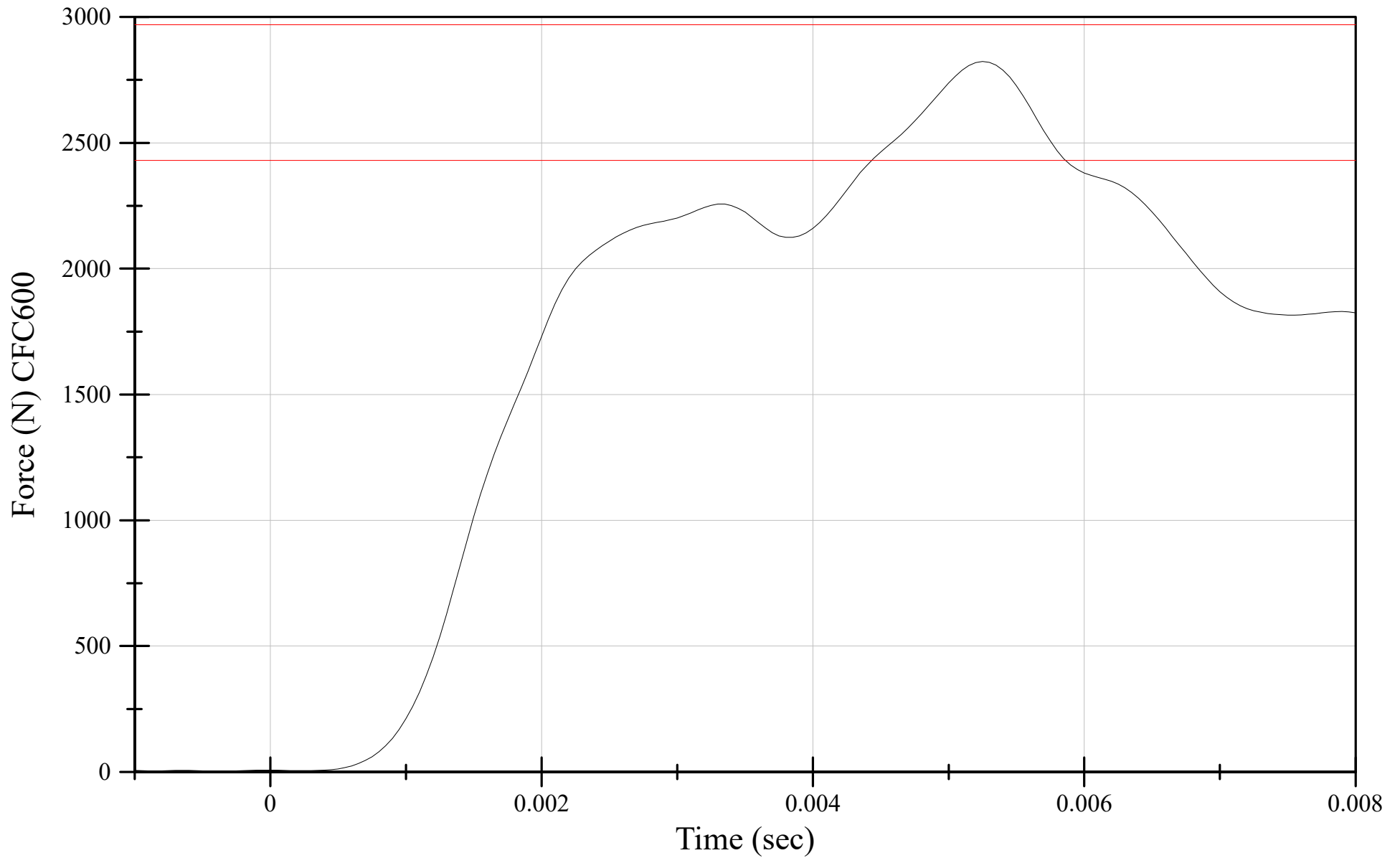
Pre-Test Qualification (Partial)
THOR-50M Left Upper Leg Qualification
Probe Force
Serial Number: DO9799



Pre-Test Qualification (Partial)
THOR-50M Left Upper Leg Qualification
Femur Z-Force
Serial Number: DO9799

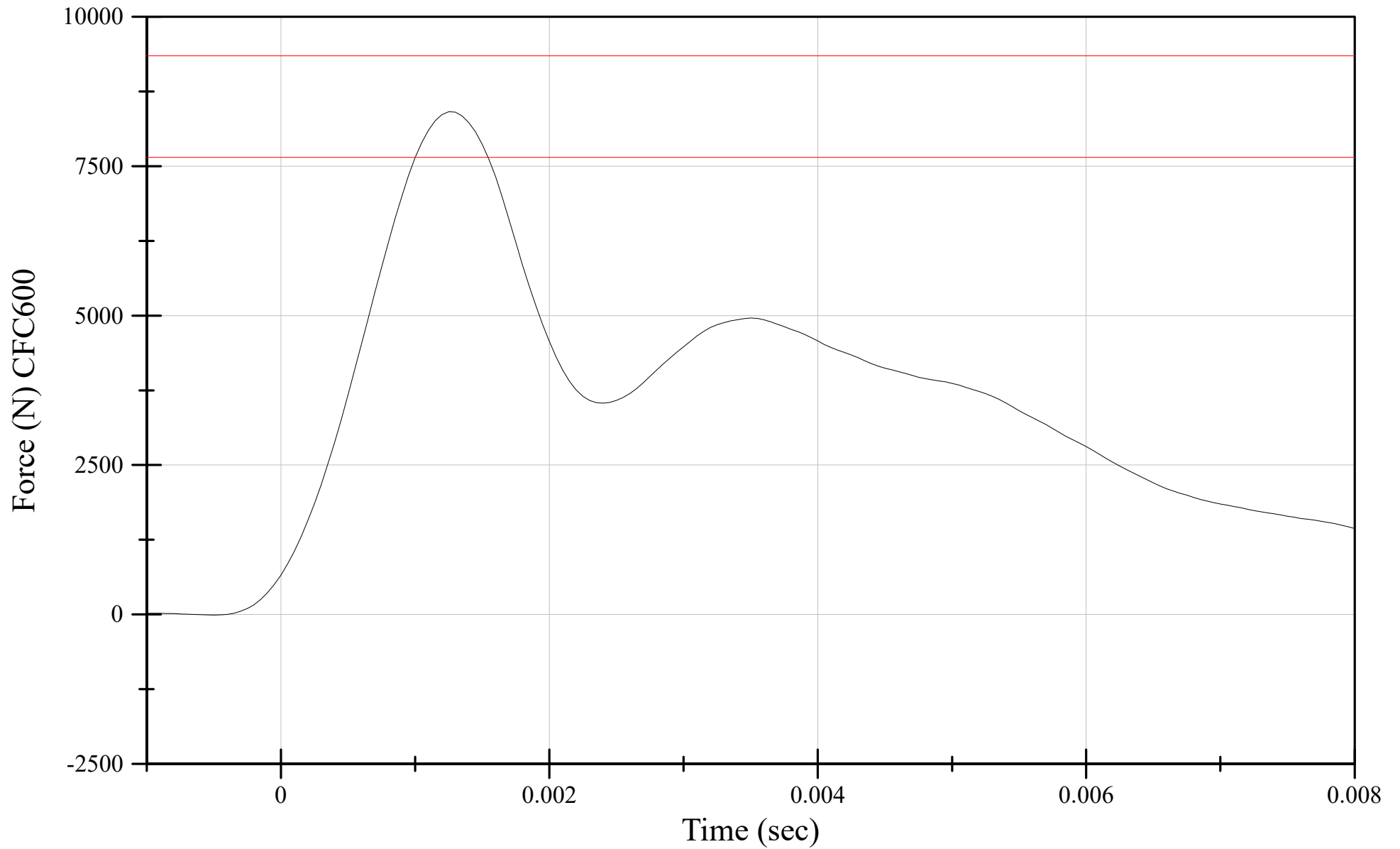


Pre-Test Qualification (Partial)
THOR-50M Left Upper Leg Qualification
Peak Acetabulum Resultant Force
Serial Number: DO9799

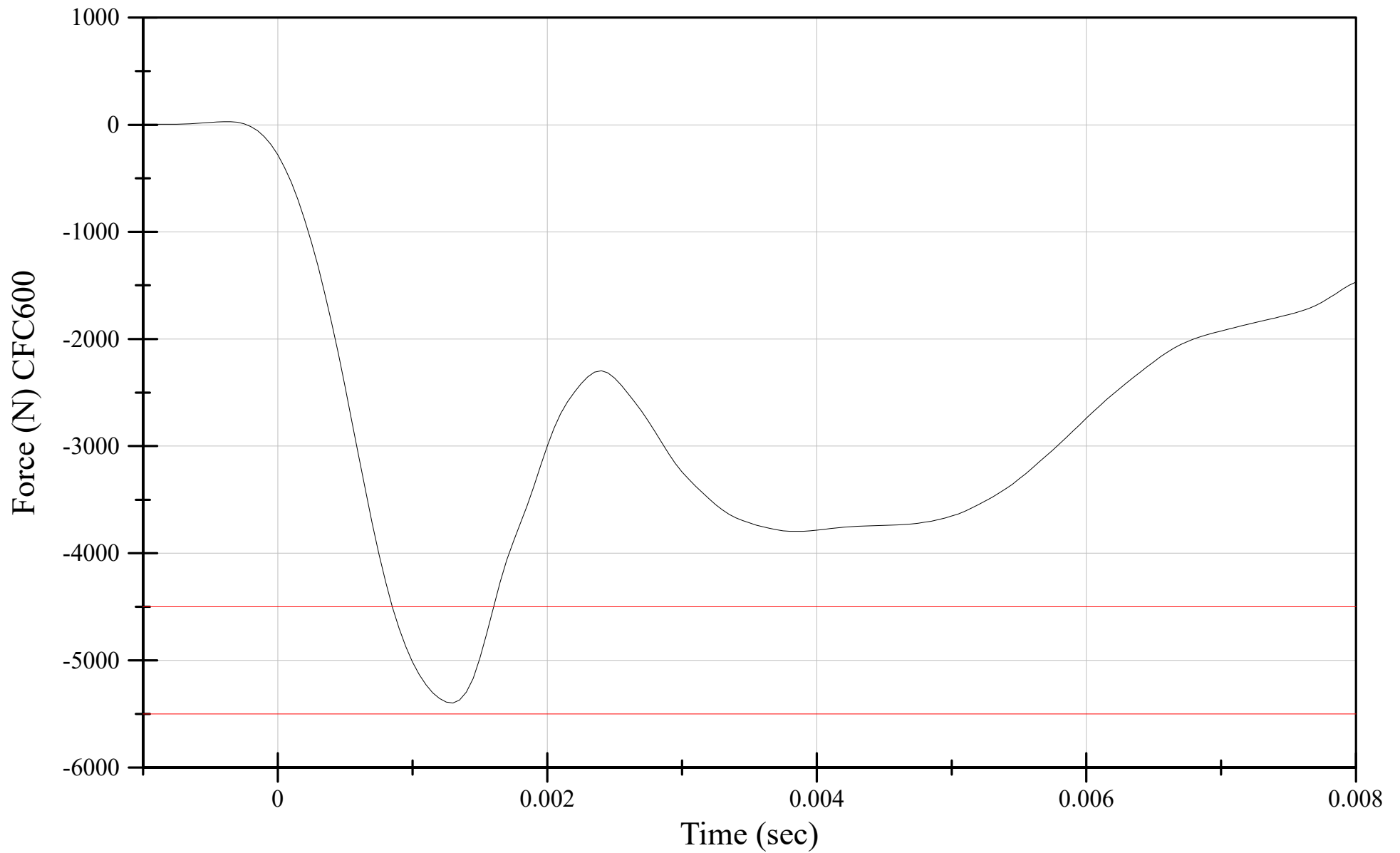


Right Upper Leg Qualification

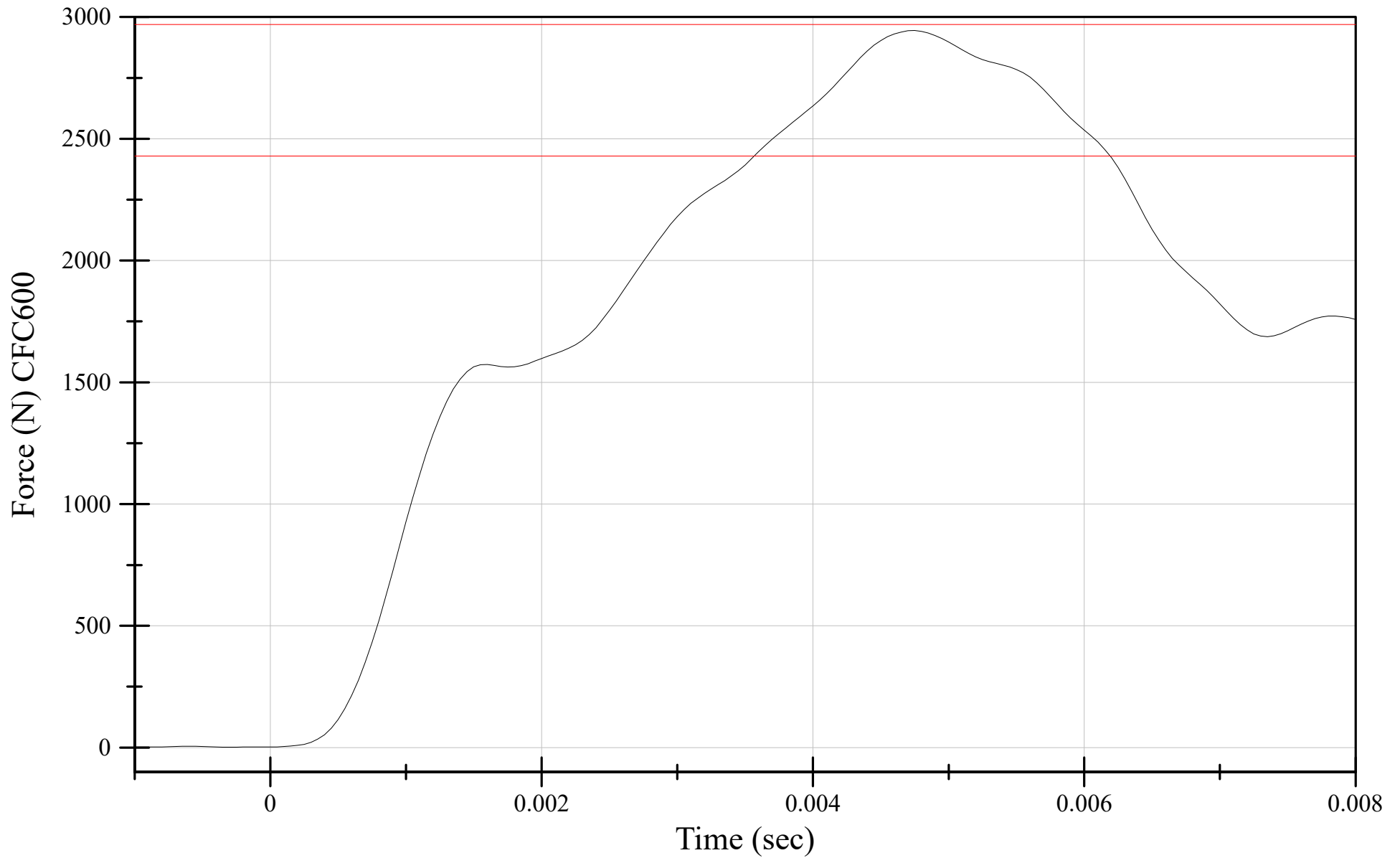
Pre-Test Qualification (Partial)
THOR-50M Right Upper Leg Qualification
Probe Force
Serial Number: DO9799



Pre-Test Qualification (Partial)
THOR-50M Right Upper Leg Qualification
Femur Z-Force
Serial Number: DO9799



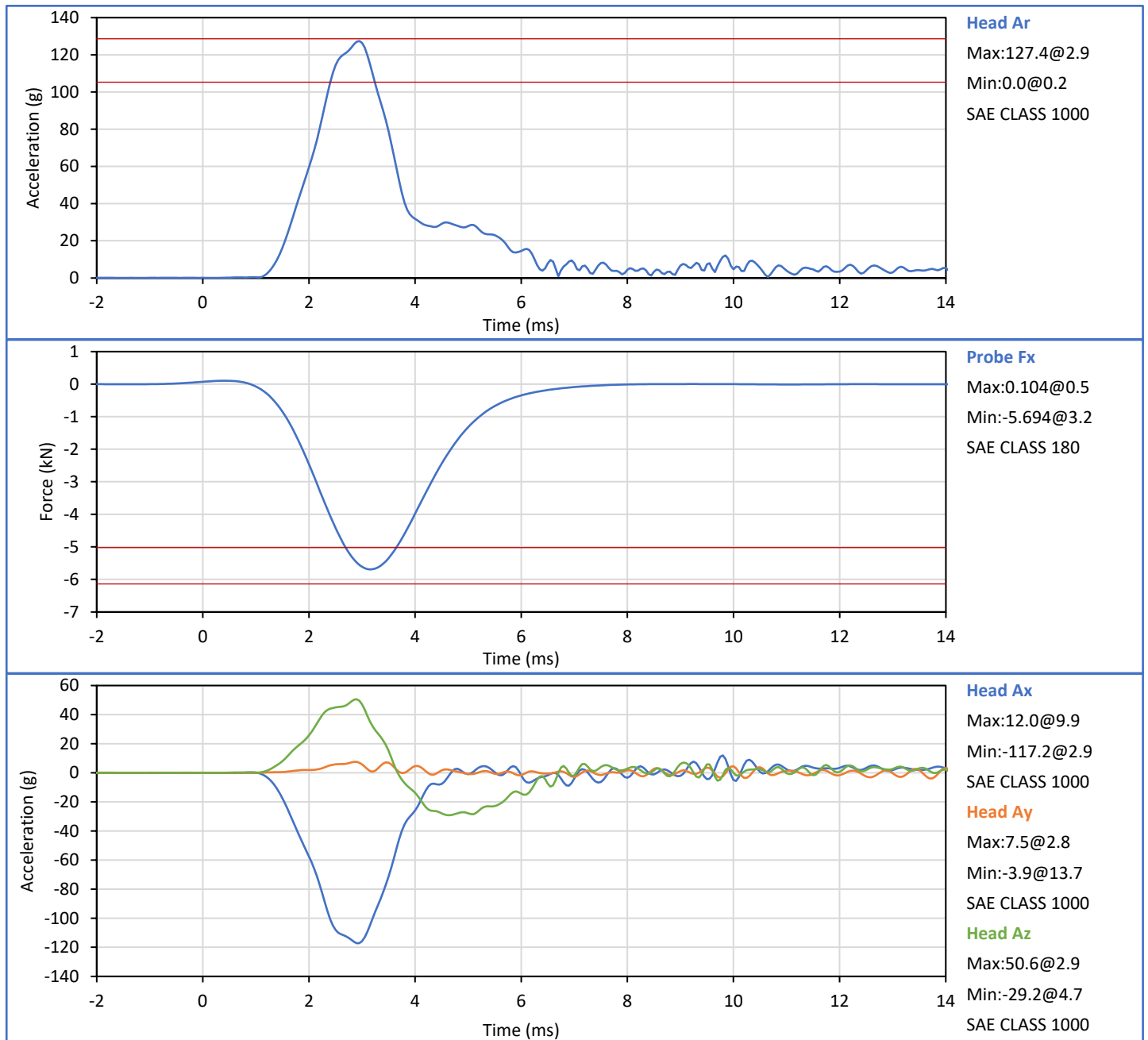
Pre-Test Qualification (Partial)
THOR-50M Right Upper Leg Qualification
Peak Acetabulum Resultant Force
Serial Number: DO9799



APPENDIX D
ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA
THOR-50M 50TH PERCENTILE MALE ATD
POST-TEST QUALIFICATION (FULL)

APPENDIX D
ATD Configuration and Performance Verification Data
THOR-50M 50th Percentile Male ATD
Post-Test Qualification (Full) S/N: EG2595

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	32	Pass
Velocity	m/s	1.95	2.05	1.98	Pass
Peak Probe Force	kN	-6.138	-5.022	-5.694	Pass
Peak Head Resultant Acceleration	g	105.3	128.7	127.4	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



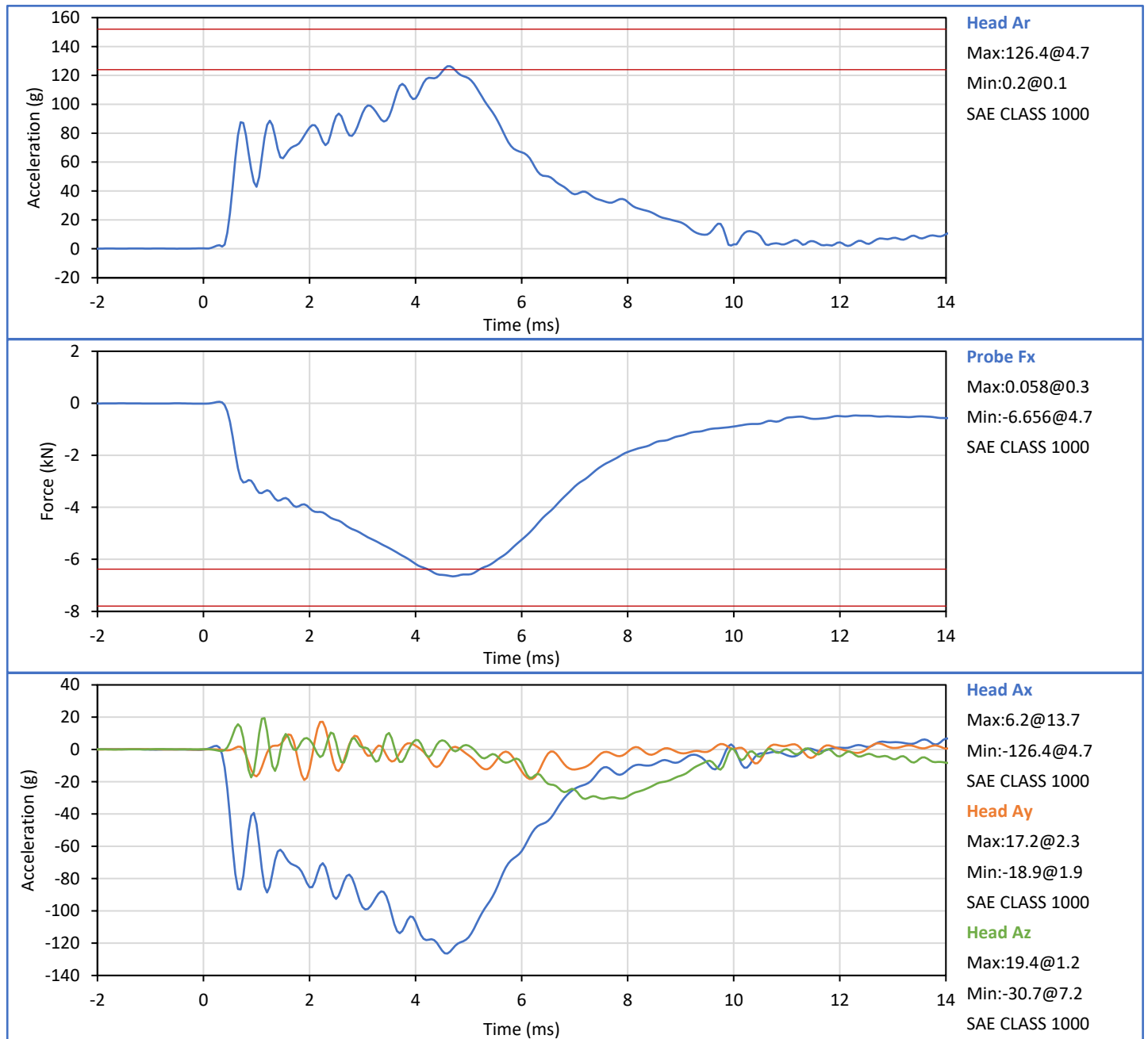
Technician:

J. Hernandez

Approved By:

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Velocity	m/s	6.68	6.78	6.72	Pass
Peak Probe Force	kN	-7.796	-6.378	-6.656	Pass
Peak Head Resultant Acceleration	g	124.0	152.0	126.4	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



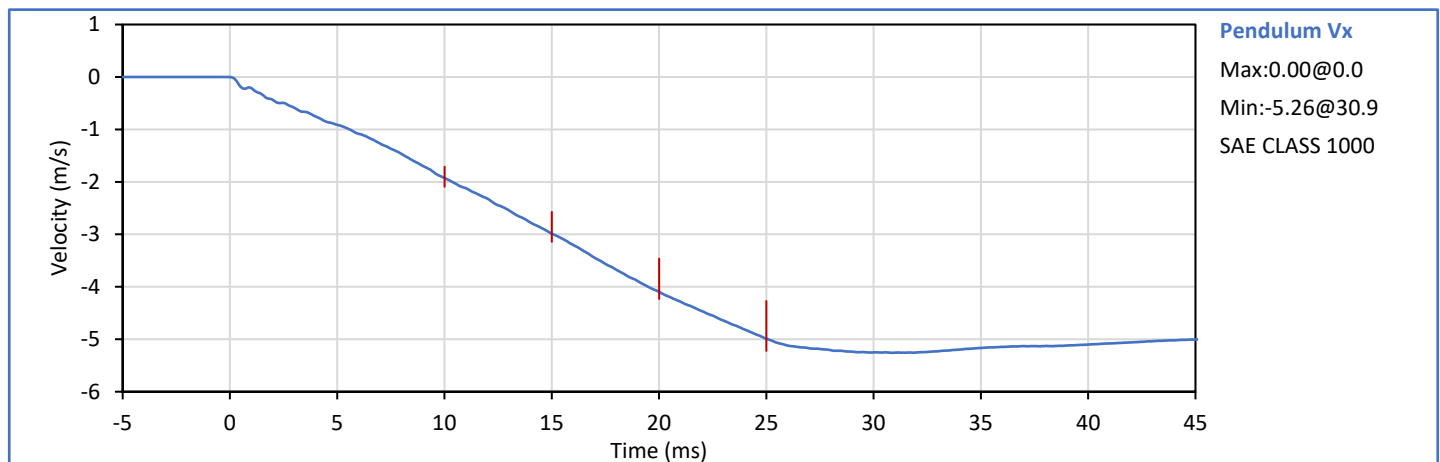
Technician:

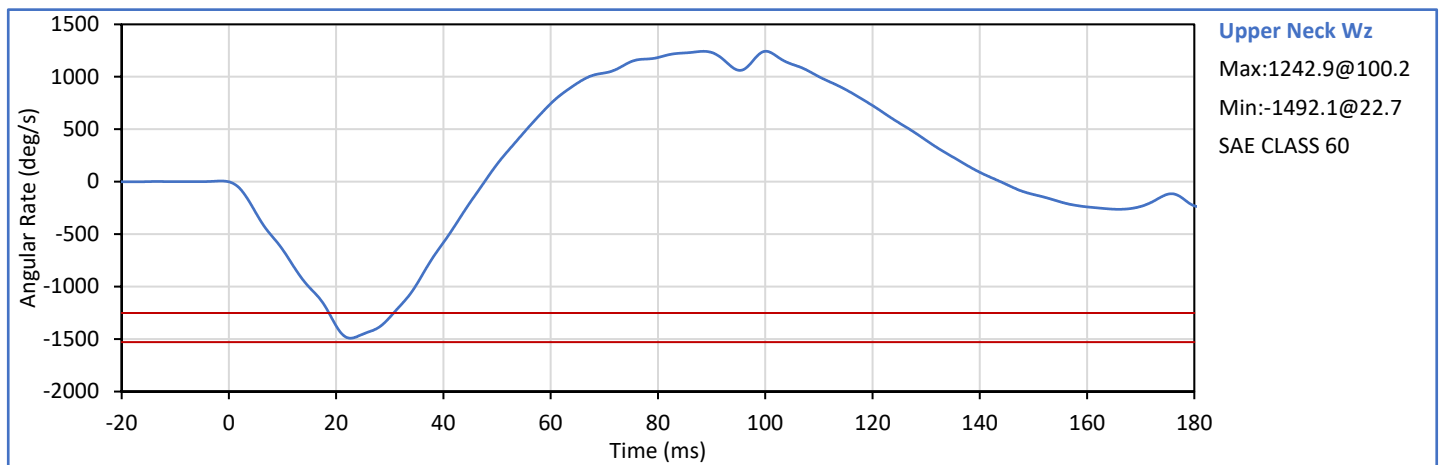
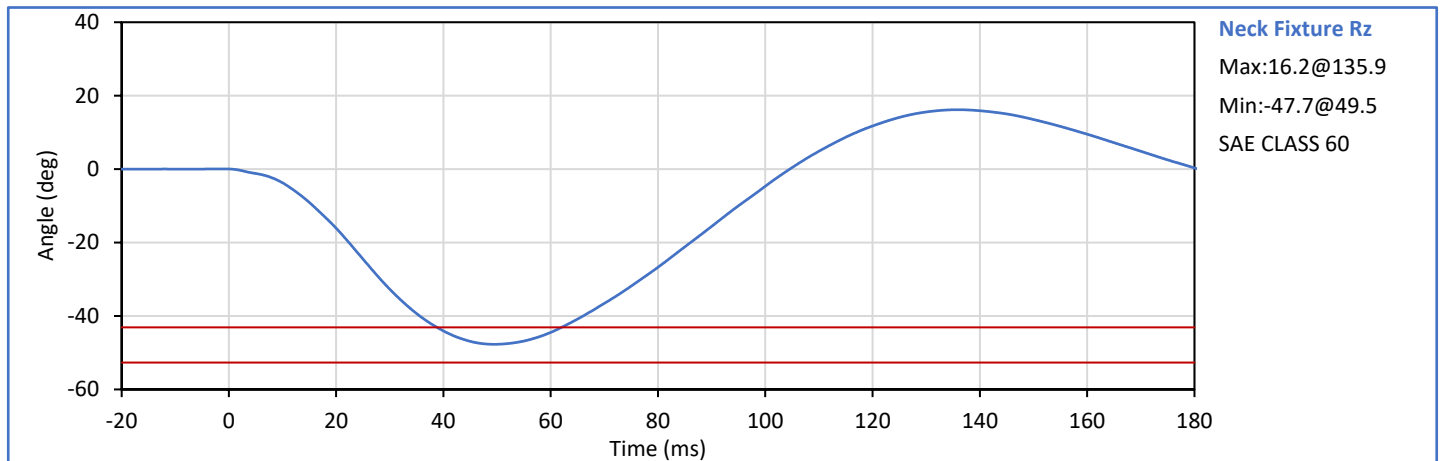
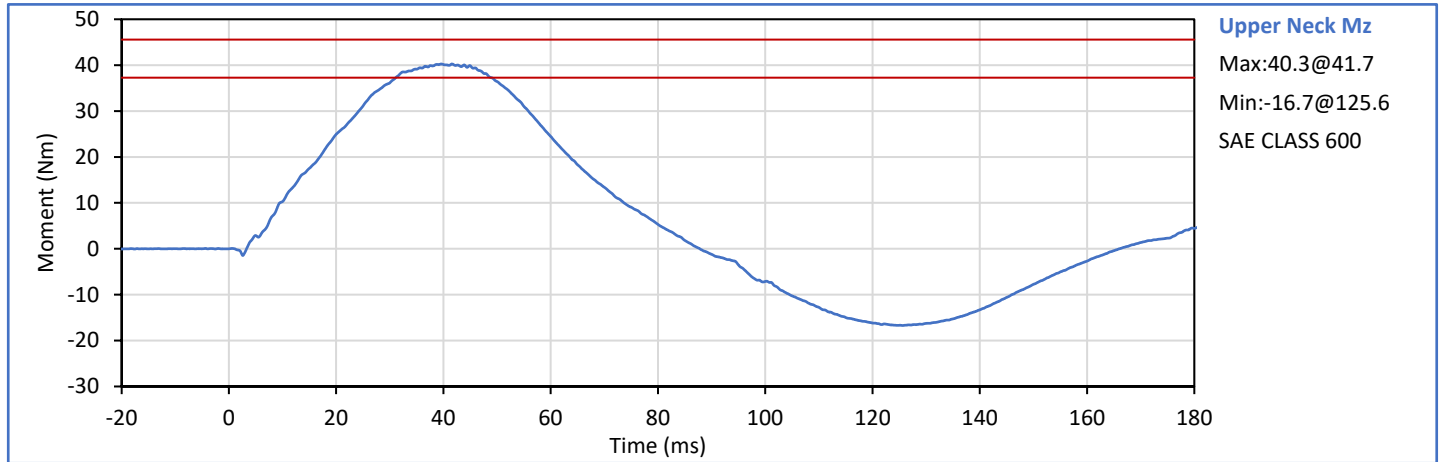
J. Hernandez

Approved By:

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Relative Humidity	%	10	70	24	Pass
Pendulum Velocity	m/s	4.95	5.05	5.02	Pass
Pendulum Velocity at 10 ms	m/s	-2.09	-1.71	-1.93	Pass
Pendulum Velocity at 15 ms	m/s	-3.14	-2.57	-2.99	Pass
Pendulum Velocity at 20 ms	m/s	-4.23	-3.46	-4.10	Pass
Pendulum Velocity at 25 ms	m/s	-5.22	-4.27	-4.99	Pass
Peak Upper Neck Mz	Nm	37.3	45.6	40.3	Pass
Peak Head Wz	deg/s	-1529	-1251	-1492	Pass
Peak Neck Fixture Rotation	deg	-52.7	-43.1	-47.7	Pass
NHTSA 2019-05 Corridor				Overall Test Results	Pass





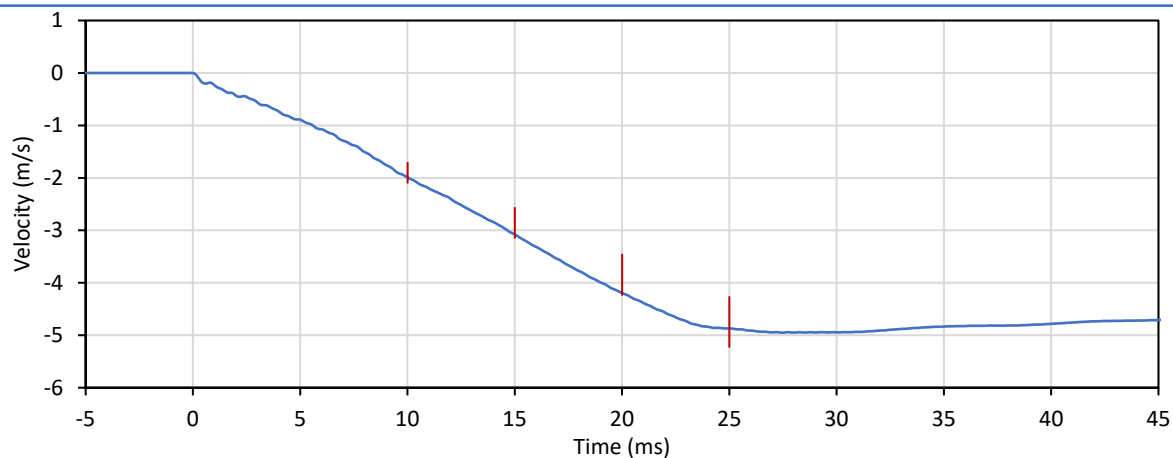
Technician: _____

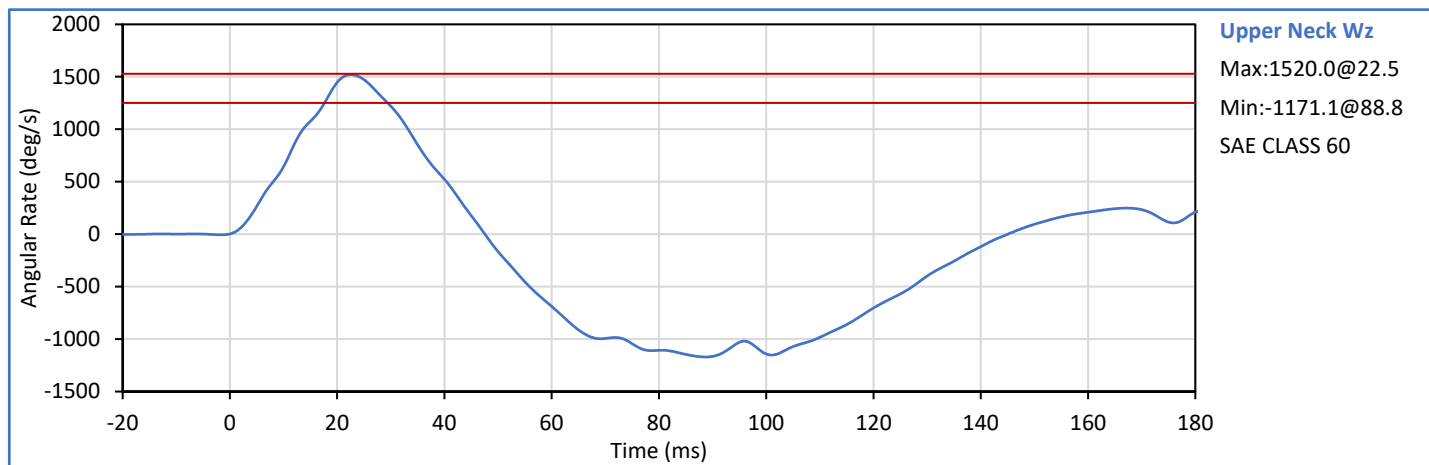
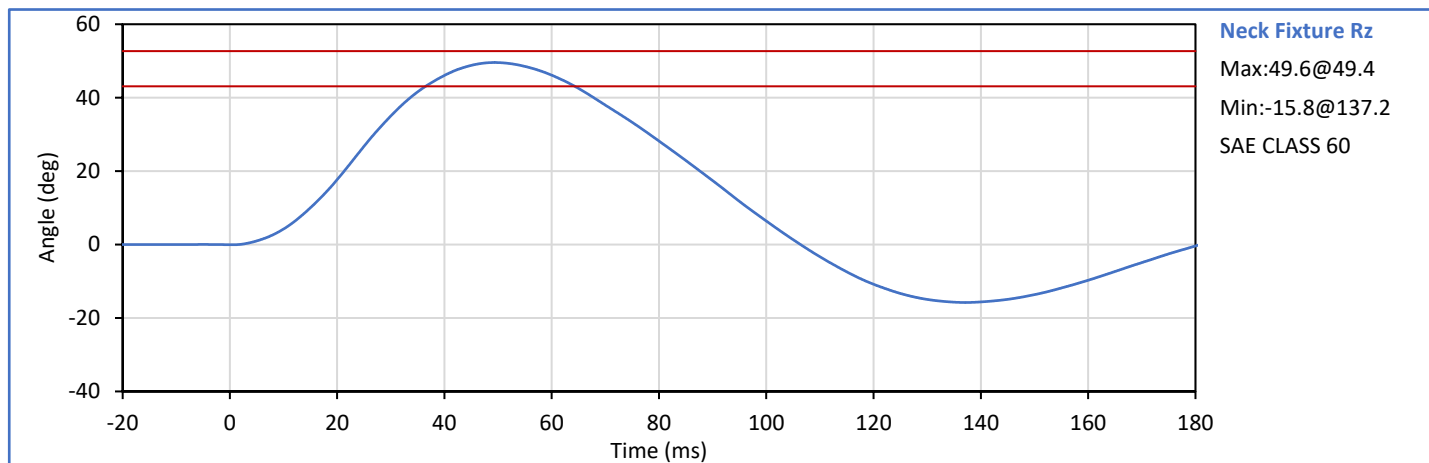
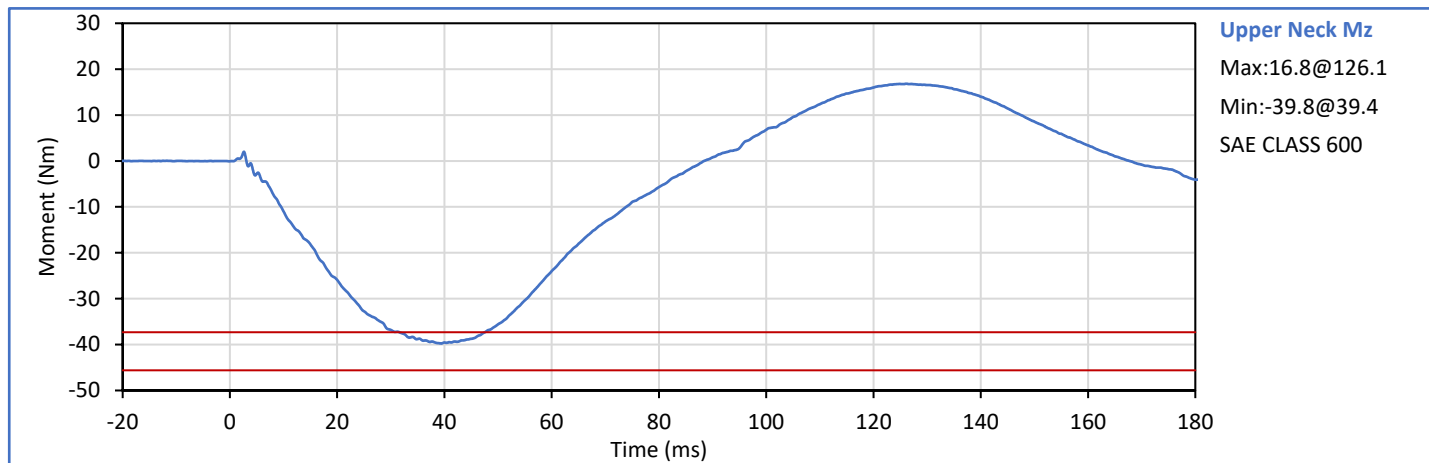
J. Hernandez

Approved By: _____

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Humidity	%	10	70	26	Pass
Pendulum Velocity	m/s	4.95	5.05	5.00	Pass
Pendulum Velocity at 10 ms	m/s	-2.09	-1.71	-1.99	Pass
Pendulum Velocity at 15 ms	m/s	-3.14	-2.57	-3.08	Pass
Pendulum Velocity at 20 ms	m/s	-4.23	-3.46	-4.20	Pass
Pendulum Velocity at 25 ms	m/s	-5.22	-4.27	-4.87	Pass
Peak Upper Neck Mz	Nm	-45.6	-37.3	-39.8	Pass
Peak Head Wz	deg/s	1251	1529	1520	Pass
Peak Neck Fixture Rotation	deg	43.1	52.7	49.6	Pass
NHTSA 2019-05 Corridor				Overall Test Results	Pass





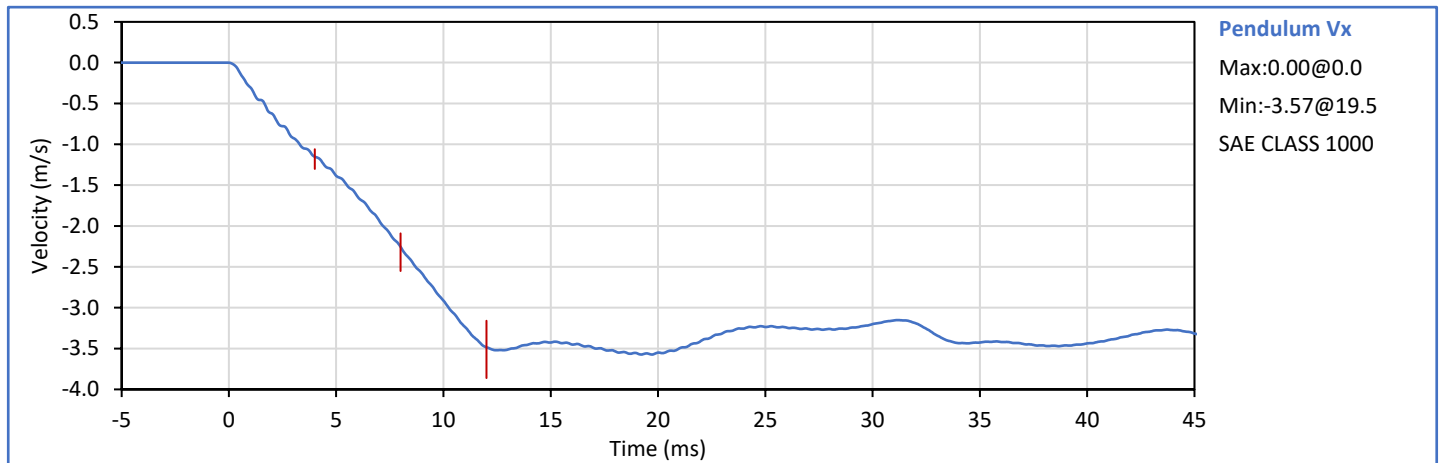
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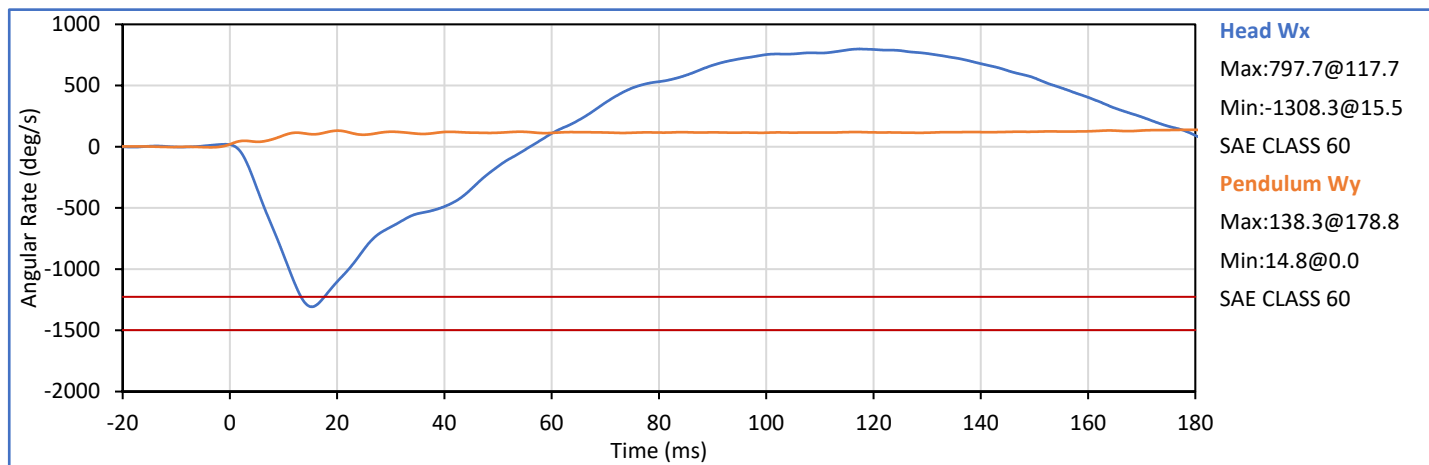
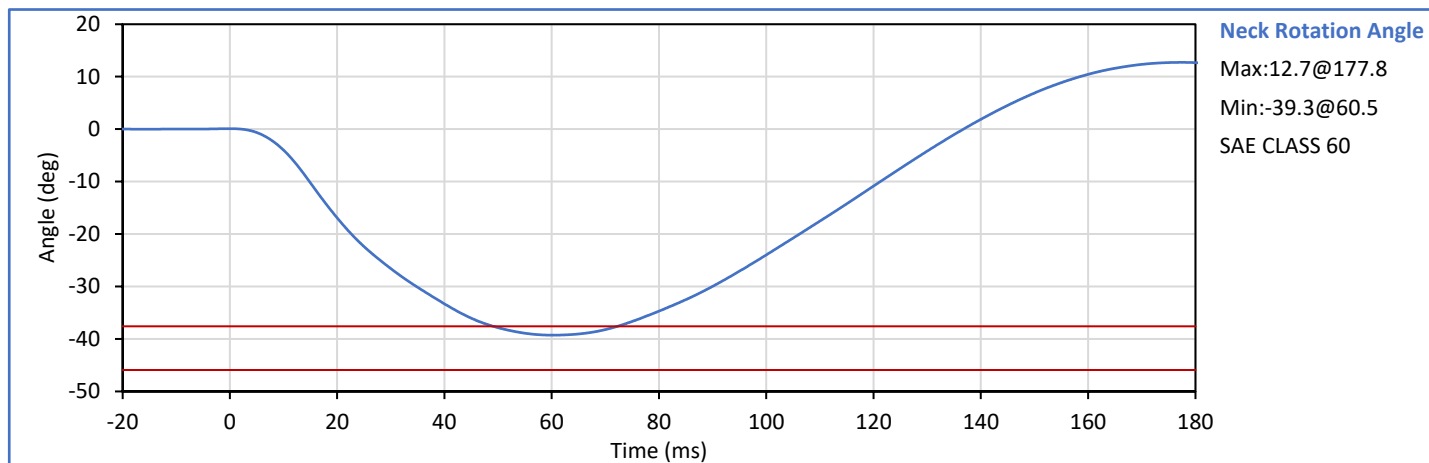
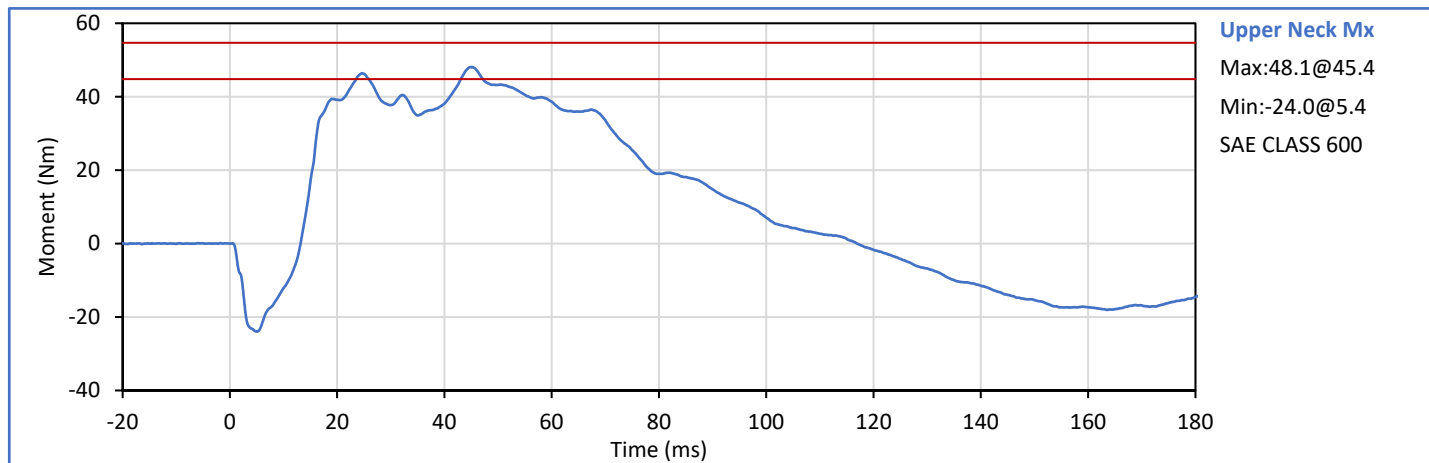
J. Hernandez

Approved By: _____

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Humidity	%	10	70	20	Pass
Pendulum Velocity	m/s	3.35	3.45	3.38	Pass
Pendulum Velocity at 4 ms	m/s	-1.30	-1.06	-1.15	Pass
Pendulum Velocity at 8 ms	m/s	-2.55	-2.09	-2.25	Pass
Pendulum Velocity at 12 ms	m/s	-3.86	-3.16	-3.48	Pass
Peak Upper Neck Mx after 40 ms	Nm	44.8	54.7	48.1	Pass
Peak Head Wx	deg/s	-1498	-1226	-1308	Pass
Peak Head Relative Rotation	deg	-45.9	-37.6	-39.3	Pass
NHTSA 2019-05 Corridor				Overall Test Results	Pass





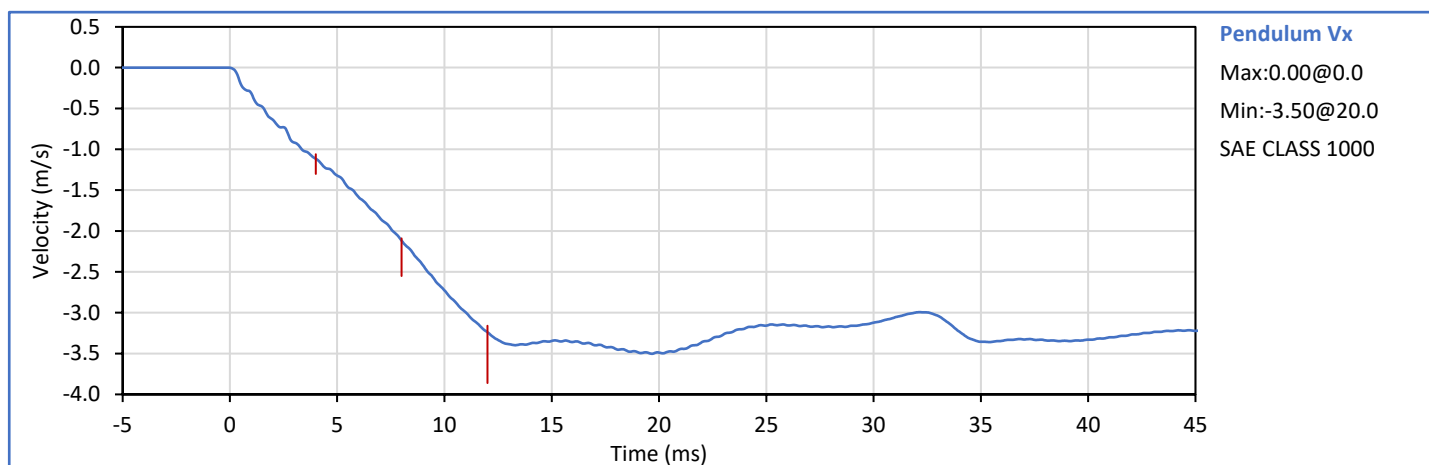
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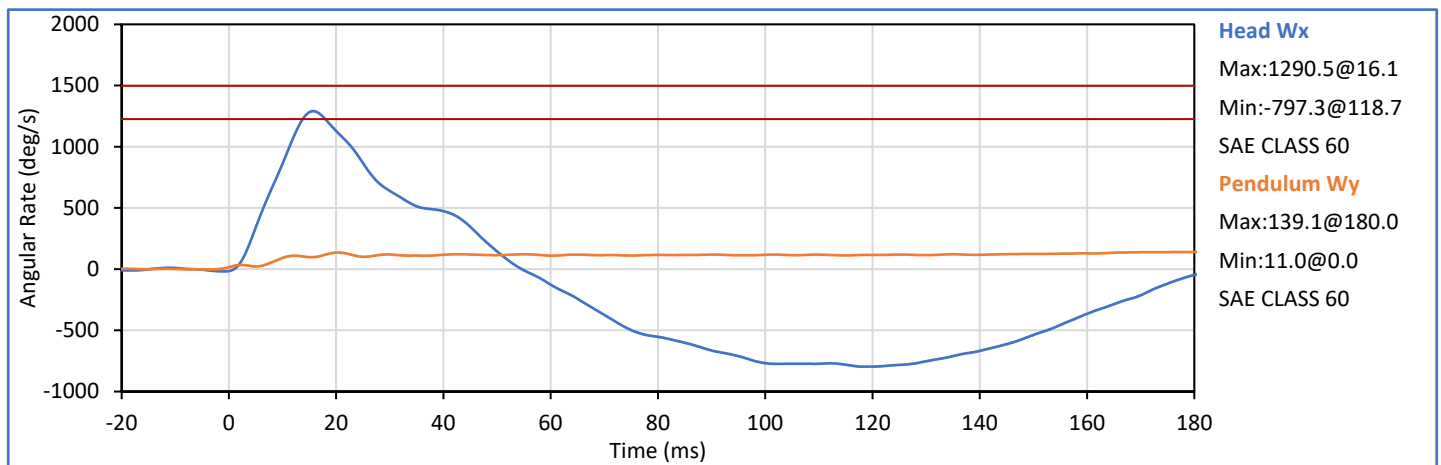
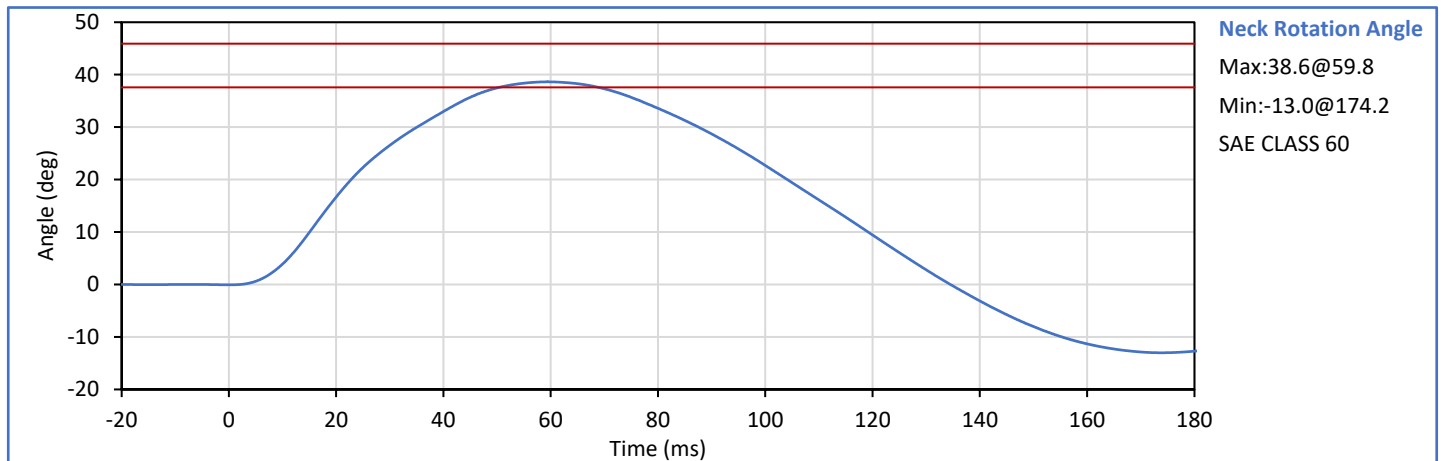
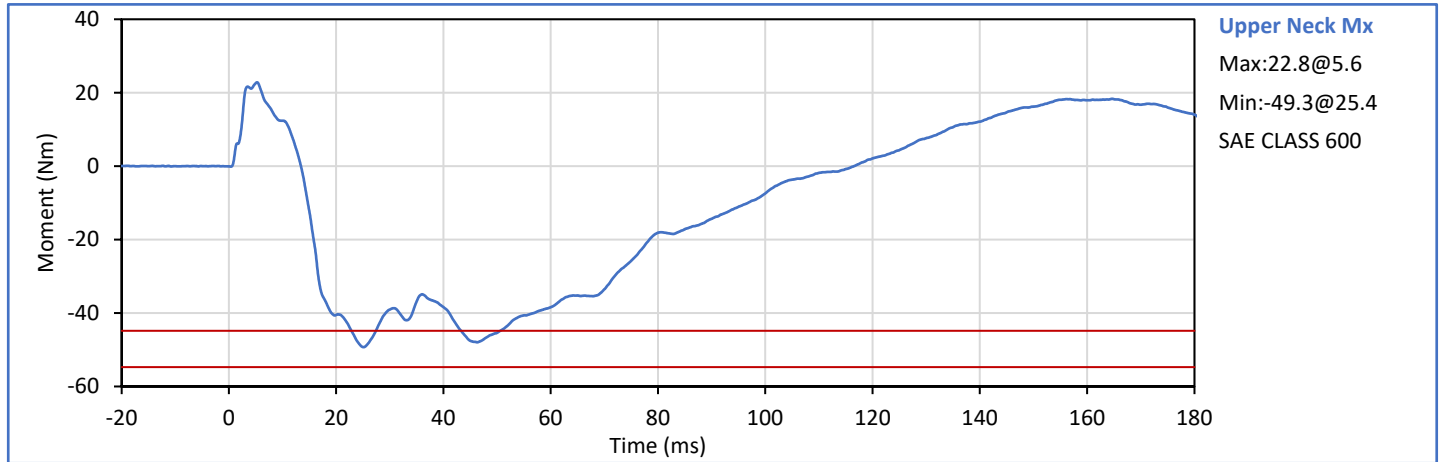
J. Hernandez

Approved By: _____

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Humidity	%	10	70	28	Pass
Pendulum Velocity	m/s	3.35	3.45	3.37	Pass
Pendulum Velocity at 4 ms	m/s	-1.30	-1.06	-1.11	Pass
Pendulum Velocity at 8 ms	m/s	-2.55	-2.09	-2.12	Pass
Pendulum Velocity at 12 ms	m/s	-3.86	-3.16	-3.24	Pass
Peak Upper Neck Mx after 40 ms	Nm	-54.7	-44.8	-49.3	Pass
Peak Head Wx	deg/s	1226	1498	1290	Pass
Peak Head Relative Rotation	deg	37.6	45.9	38.6	Pass
NHTSA 2019-05 Corridor				Overall Test Results	Pass





Technician:

J. Hernandez

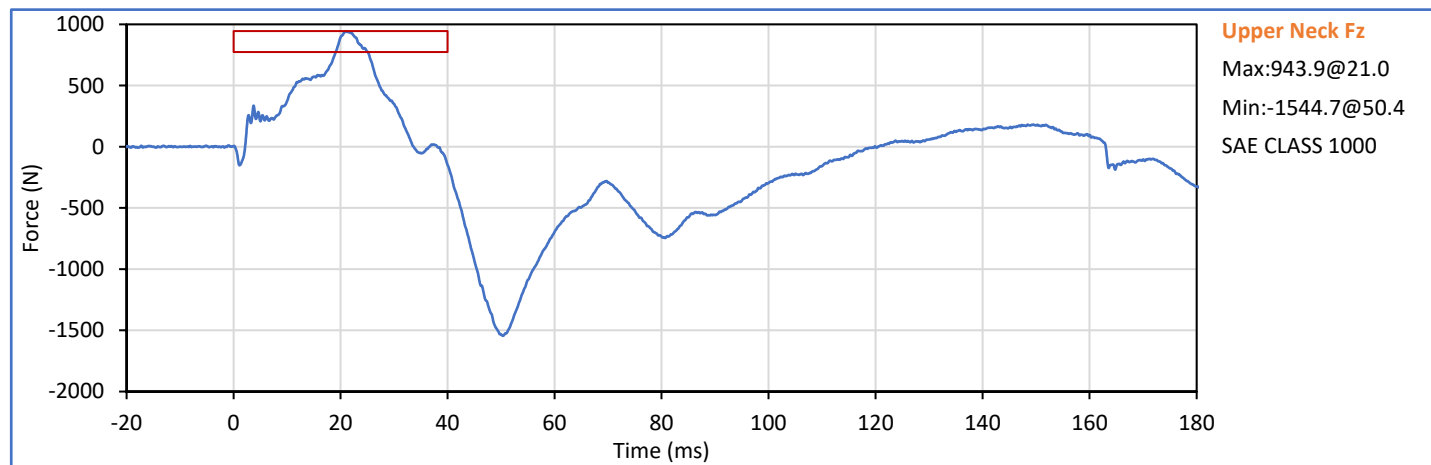
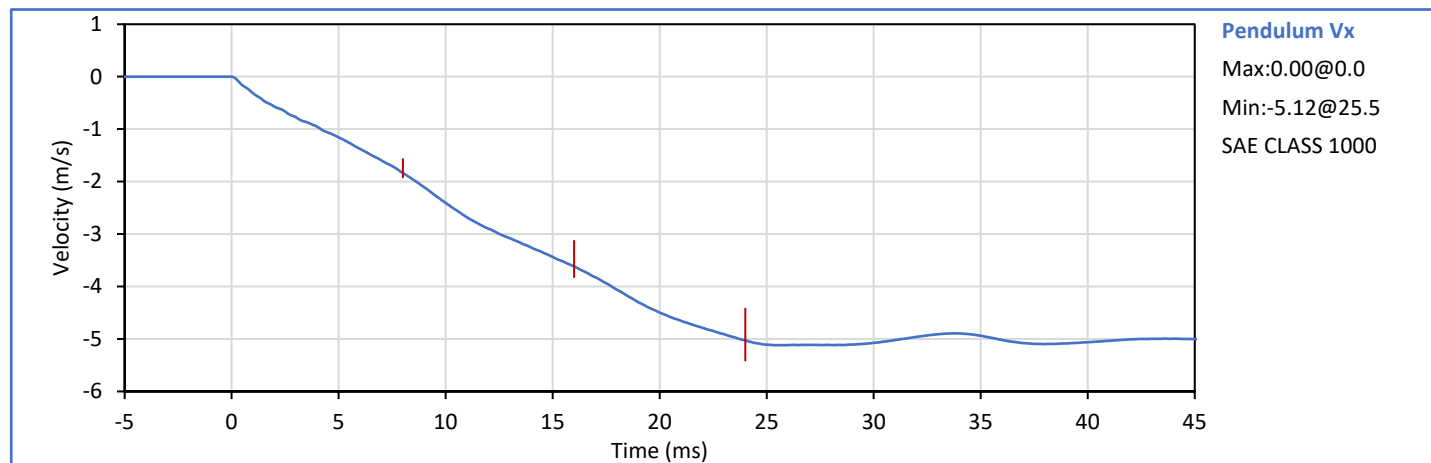
J. Hernandez

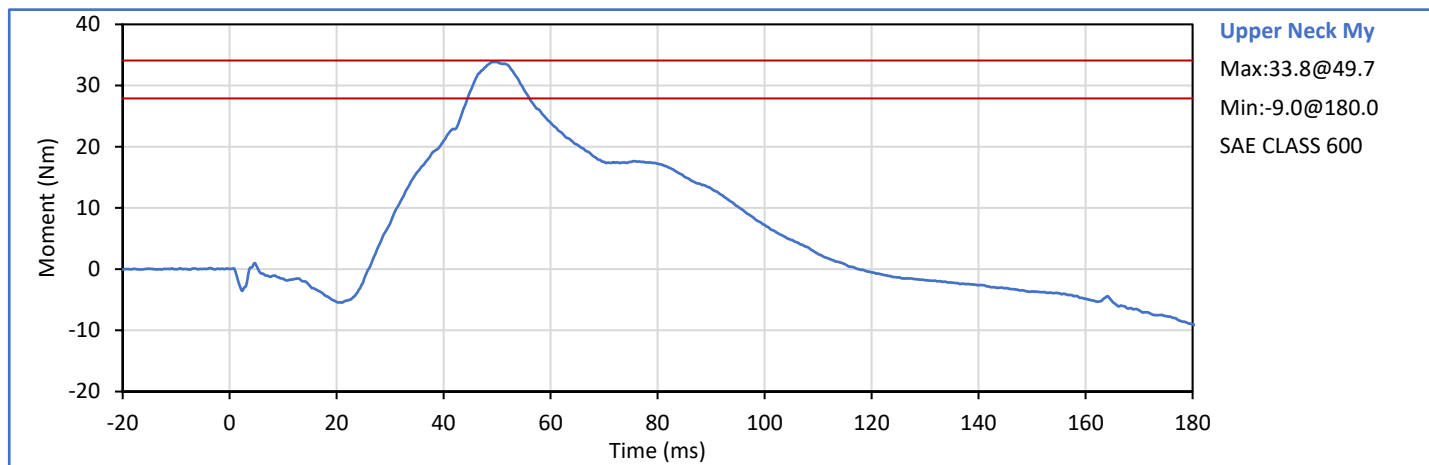
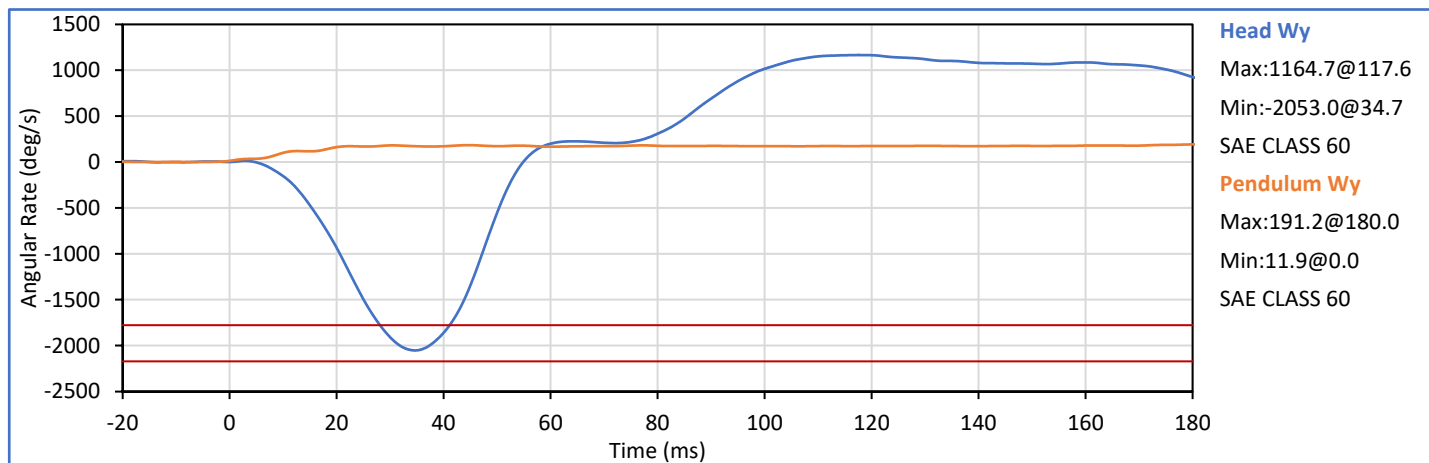
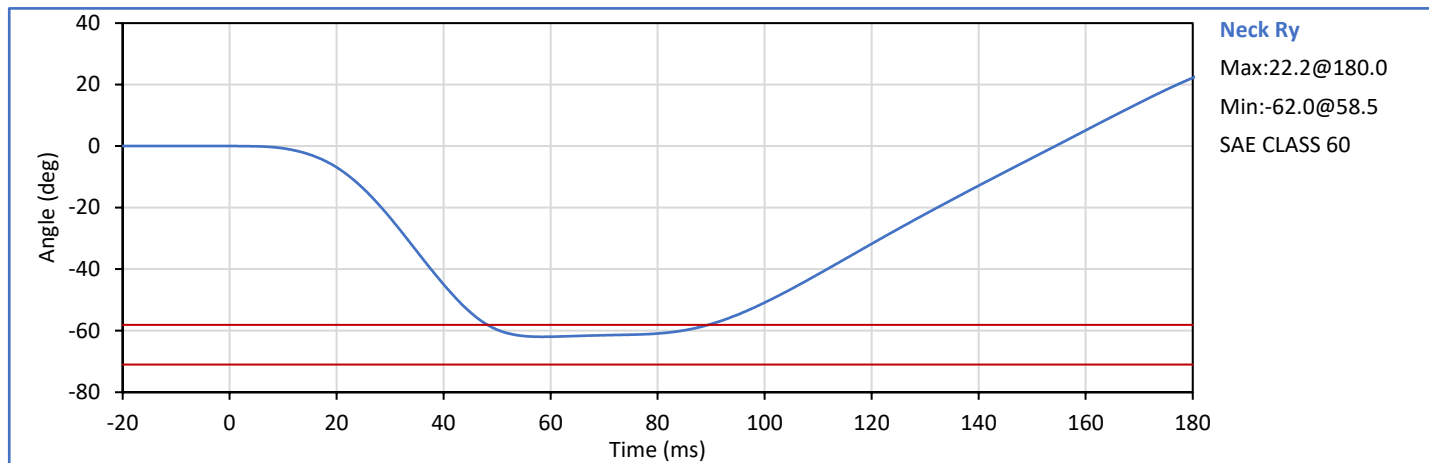
Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Relative Humidity	%	10	70	24	Pass
Pendulum Velocity	m/s	4.95	5.05	5.02	Pass
Pendulum Velocity at 8 ms	m/s	-1.92	-1.57	-1.84	Pass
Pendulum Velocity at 16 ms	m/s	-3.82	-3.13	-3.62	Pass
Pendulum Velocity at 24 ms	m/s	-5.41	-4.42	-5.03	Pass
Peak Upper Neck My	Nm	27.9	34.1	33.8	Pass
Peak Upper Neck Fz (before 40 ms)	N	774	946	944	Pass
Peak Head Wy	deg/s	-2172	-1777	-2053	Pass
Peak Head Relative Rotation	deg	-71.0	-58.1	-62.0	Pass
NHTSA 2019-05 Corridor				Overall Test Results	Pass





Technician:

J. Hernandez

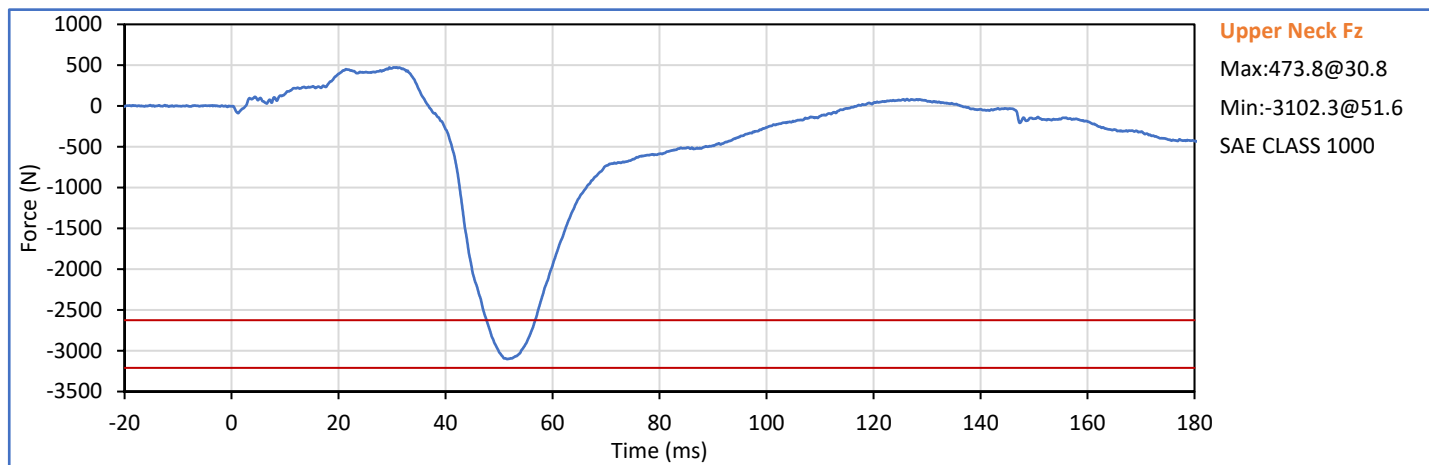
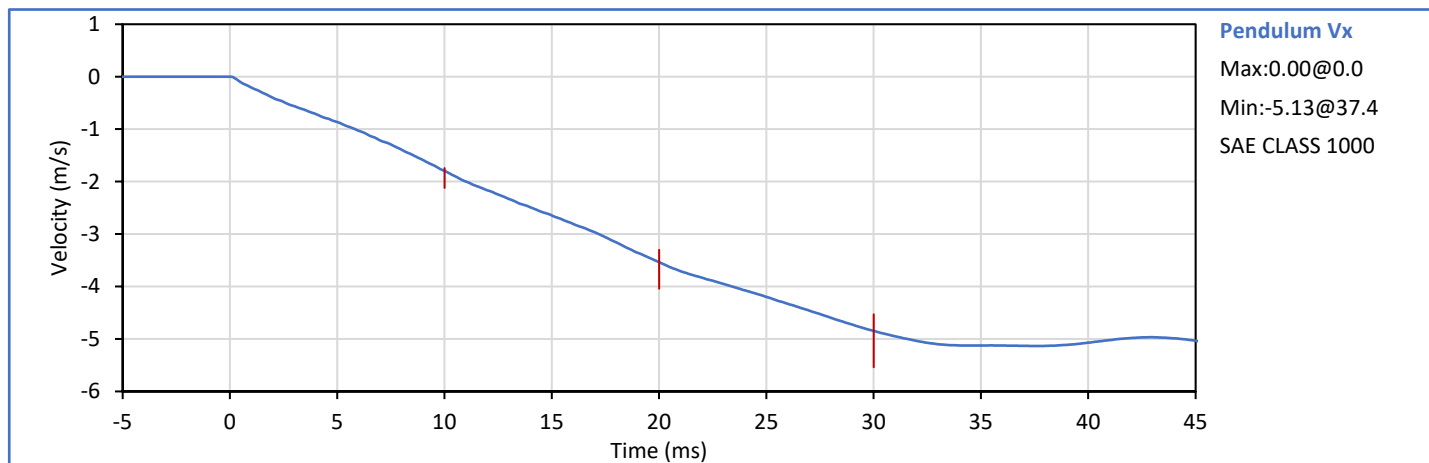
J. Hernandez

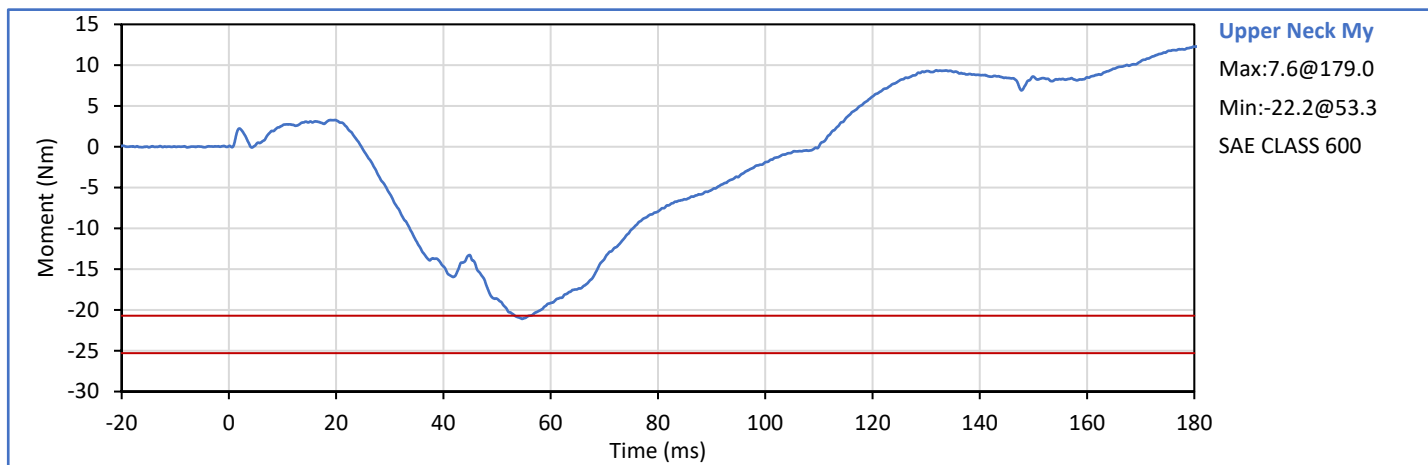
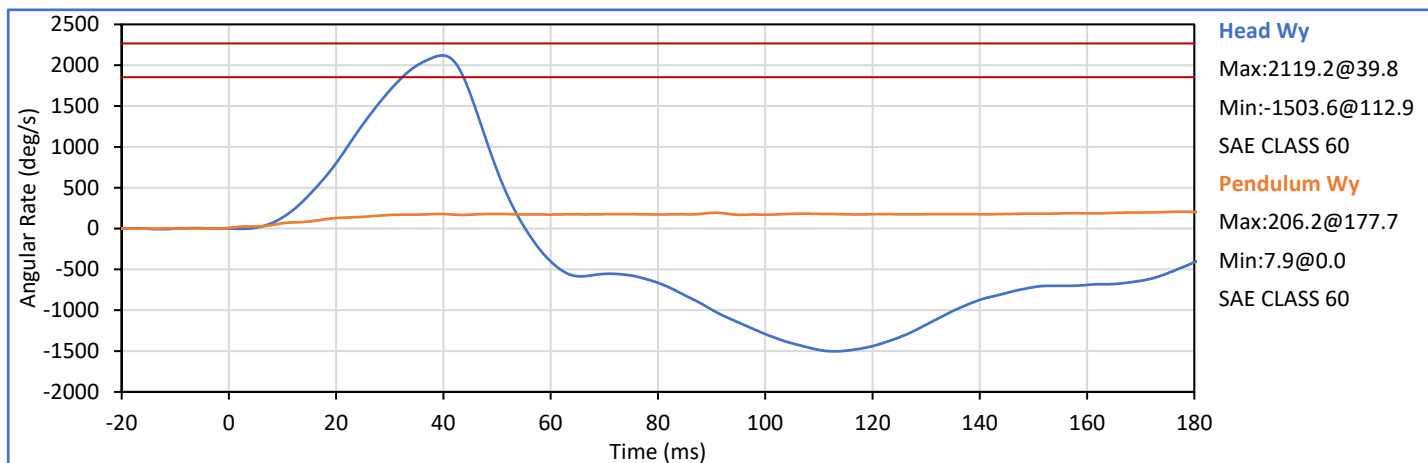
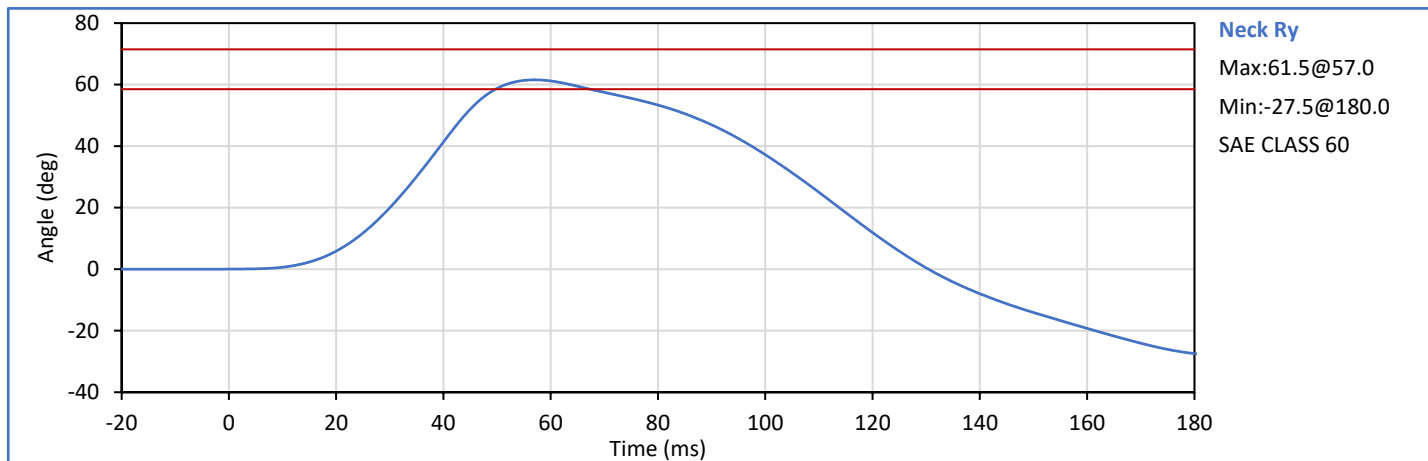
Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	26	Pass
Pendulum Velocity	m/s	4.95	5.05	5.01	Pass
Pendulum Velocity at 10 ms	m/s	-2.12	-1.74	-1.81	Pass
Pendulum Velocity at 20 ms	m/s	-4.04	-3.30	-3.55	Pass
Pendulum Velocity at 30 ms	m/s	-5.54	-4.53	-4.85	Pass
Peak Upper Neck My	Nm	-25.3	-20.7	-21.1	Pass
Peak Upper Neck Fz	N	-3210	-2626	-3102	Pass
Peak Head Wy	deg/s	1855	2267	2119	Pass
Peak Head Relative Rotation	deg	58.5	71.5	61.5	Pass
NHTSA 2019-05 Corridor				Overall Test Results	Pass





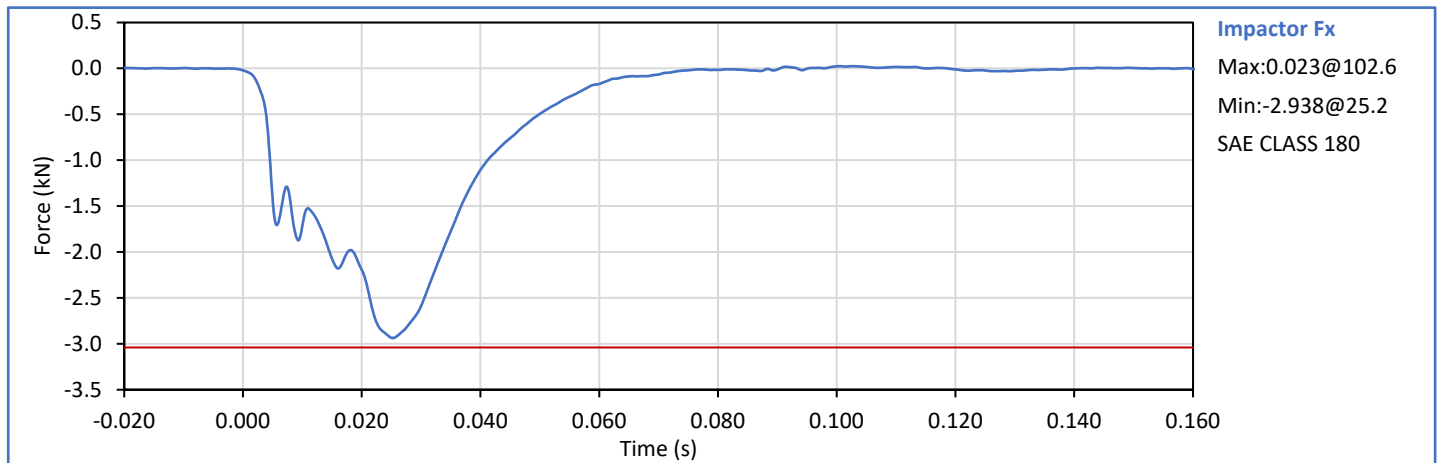
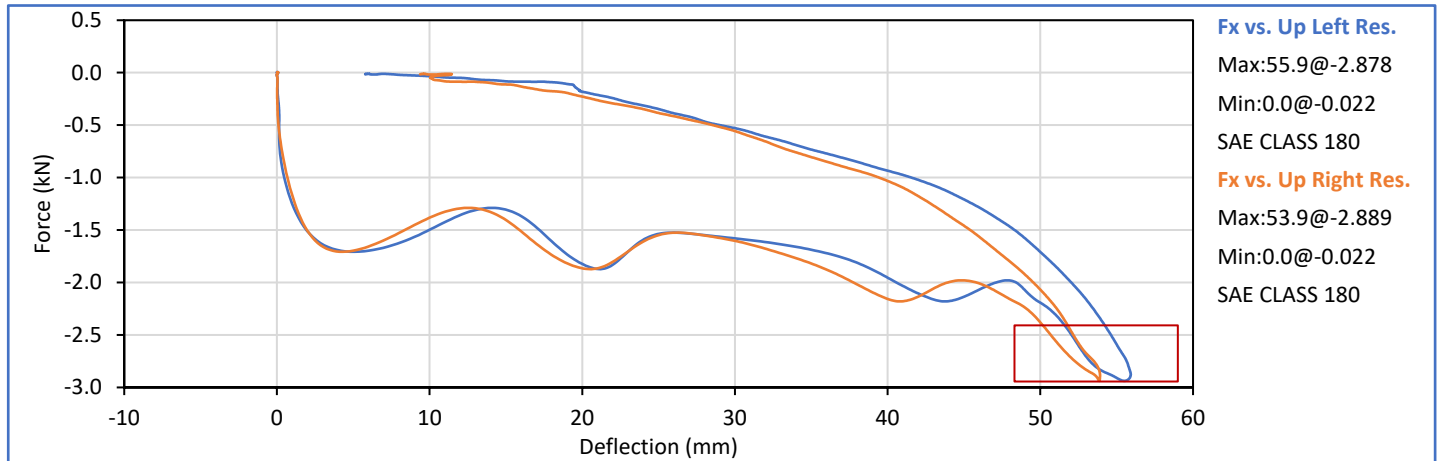
Technician: _____

J. Hernandez

Approved By: _____

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Relative Humidity	%	10	70	25	Pass
Probe Velocity	m/s	4.25	4.35	4.31	Pass
Peak Probe Force	kN	-3.039		-2.938	Pass
Peak Upper Left Deflection Res.	mm	48.3	59.0	55.9	Pass
Peak Upper Right Deflection Res.	mm			53.9	Pass
Absolute Difference L/R Defl. Res.	mm	0.0	5.0	2.0	Pass
Force at Peak Upper Left Res.	mm	-2.944	-2.409	-2.878	Pass
Force at Peak Upper Right Res.	mm			-2.889	Pass
NHTSA Corridor 2019-05			Overall Test Results		Pass



Technician:

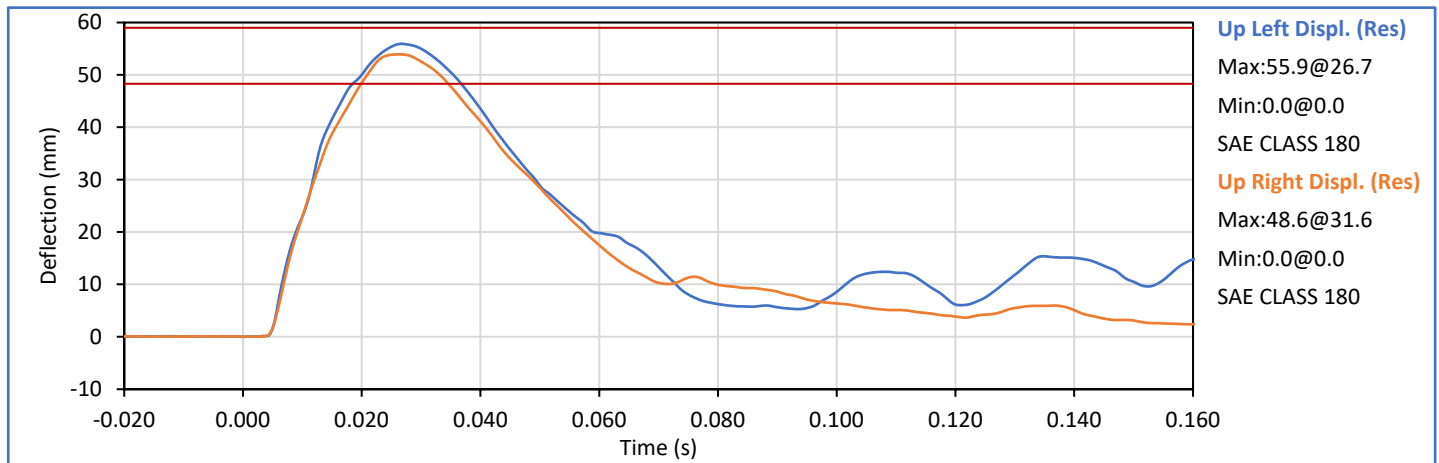
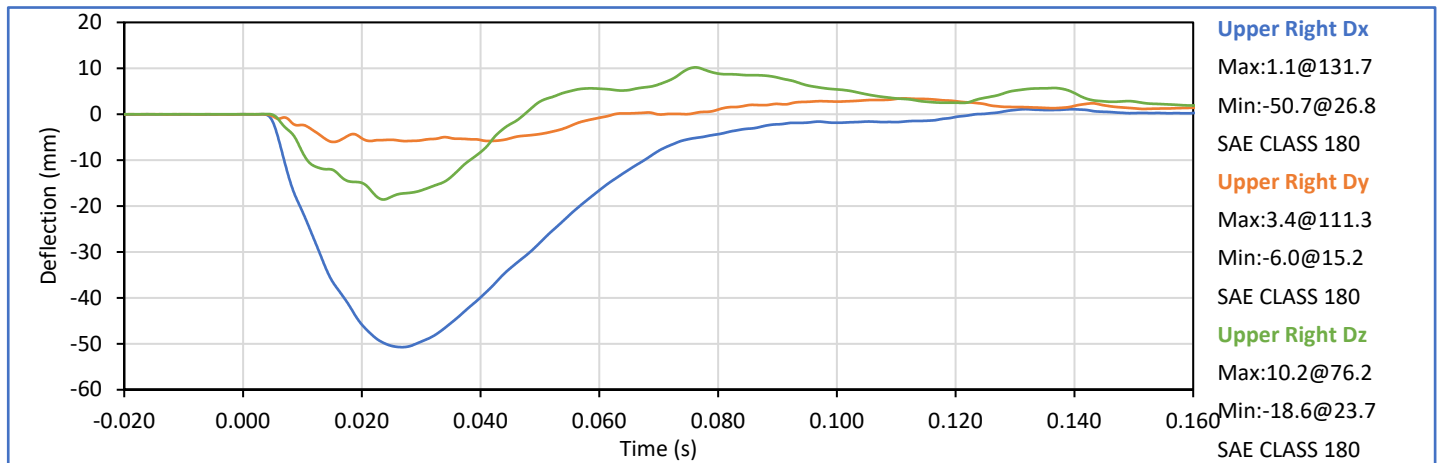
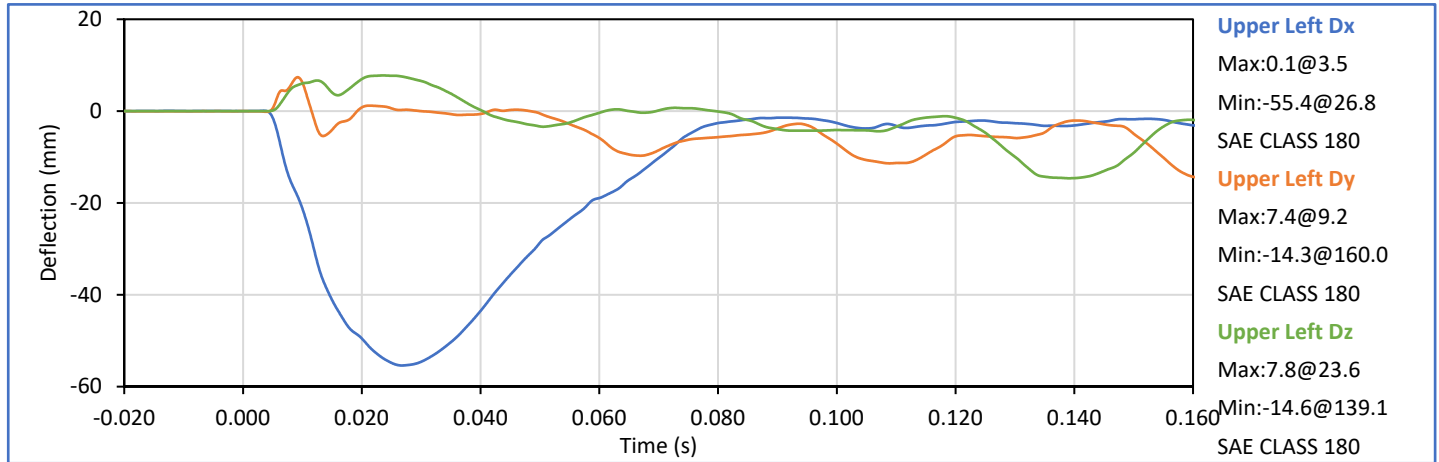
J. Hernandez

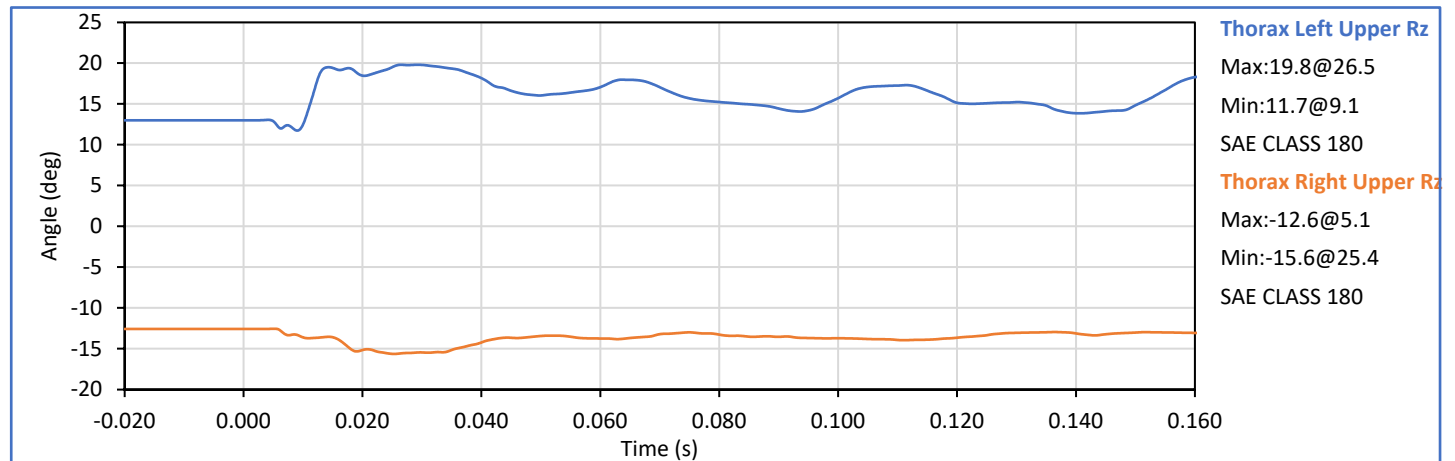
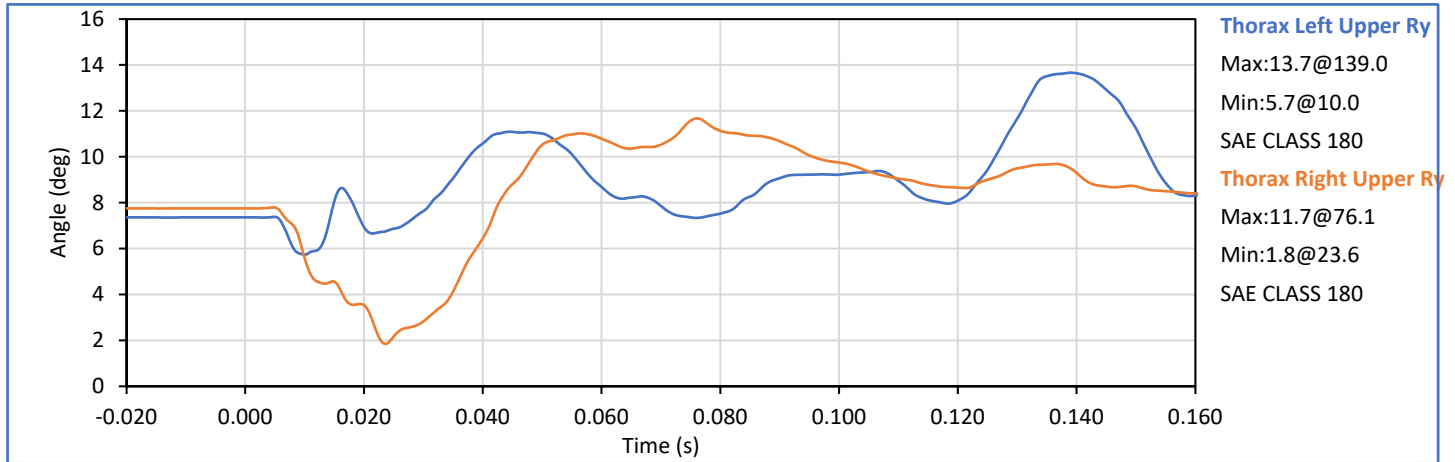
J. Hernandez

Approved By:

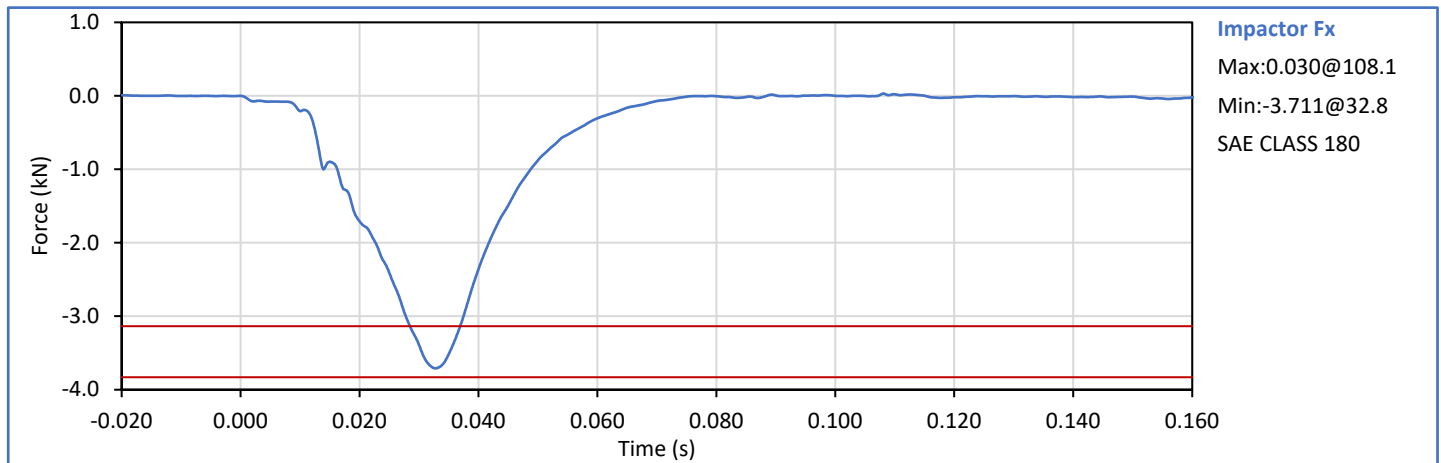
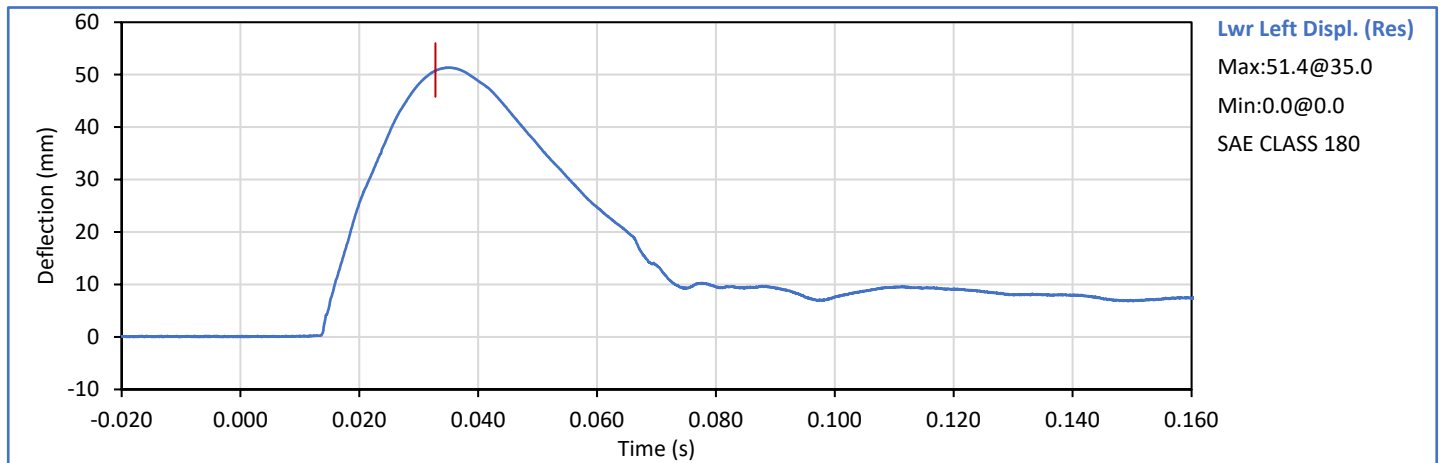
P. Puzzuto

P. Puzzuto





Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	28	Pass
Probe Velocity	m/s	4.25	4.35	4.34	Pass
Peak Probe Force	kN	-3.832	-3.136	-3.711	Pass
Lower Left Defl. Res. at Peak Fx	mm	45.8	56.0	50.8	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



Technician:

J. Hernandez

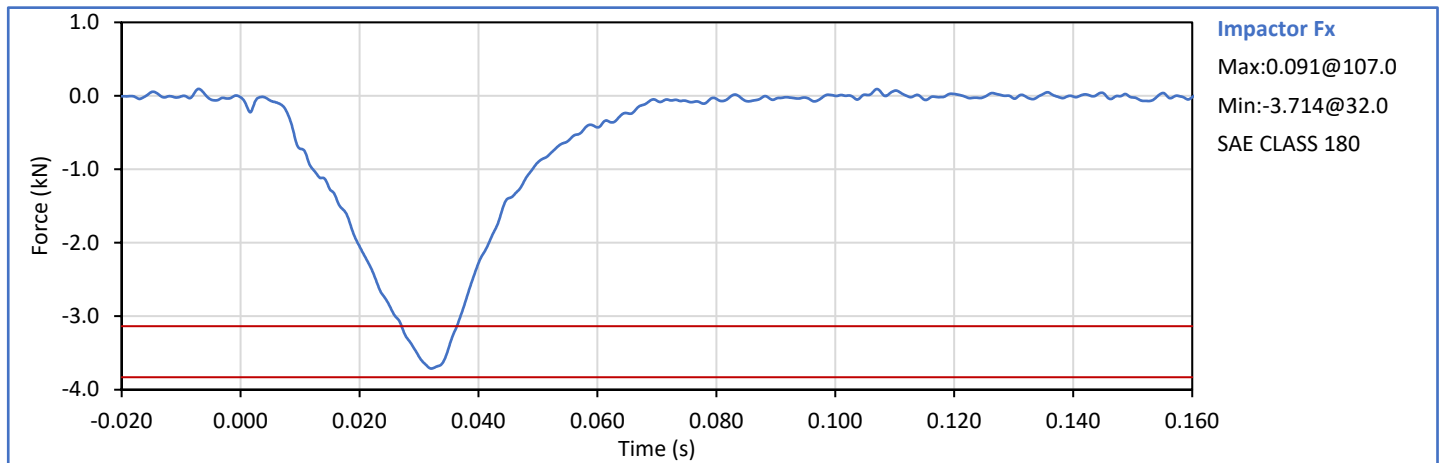
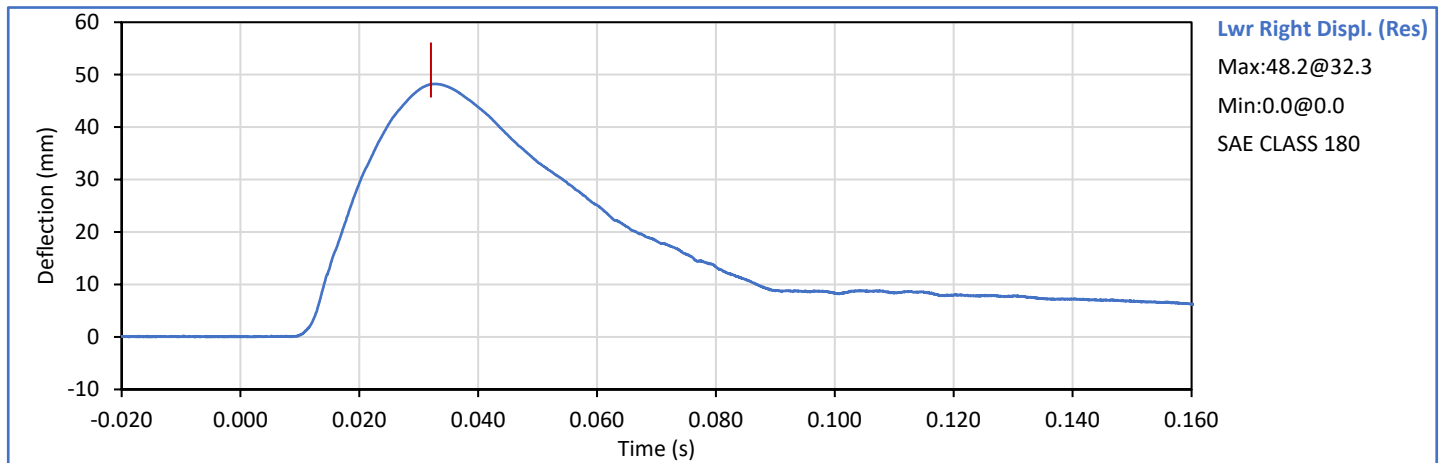
J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	28	Pass
Probe Velocity	m/s	4.25	4.35	4.33	Pass
Peak Probe Force	kN	-3.832	-3.136	-3.714	Pass
Lower Left Defl. Res. at Peak Fx	mm	45.8	56.0	48.2	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



Technician:

J. Hernandez

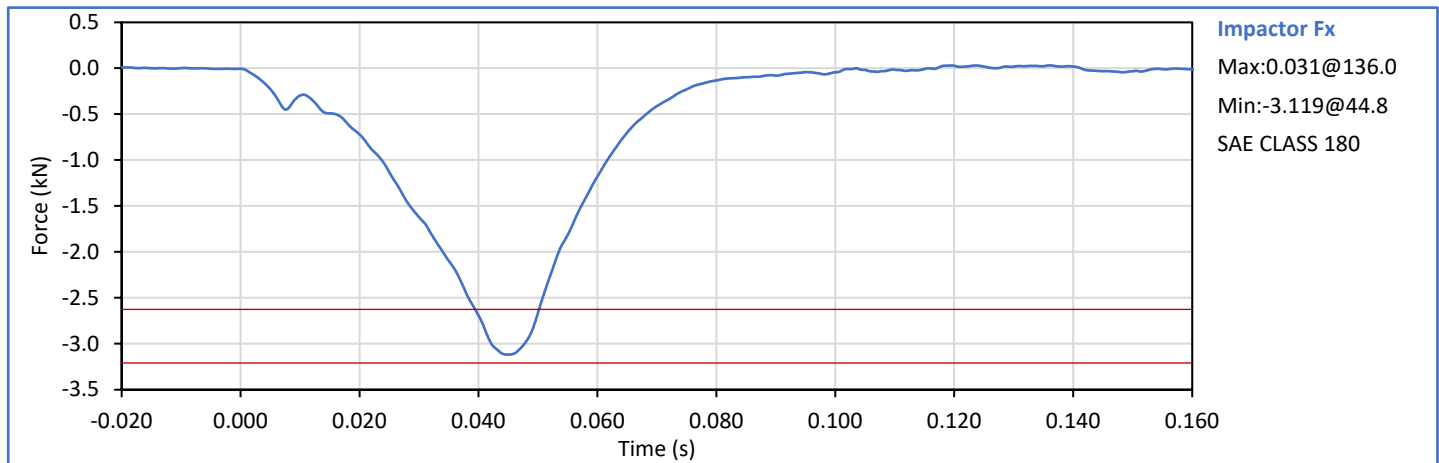
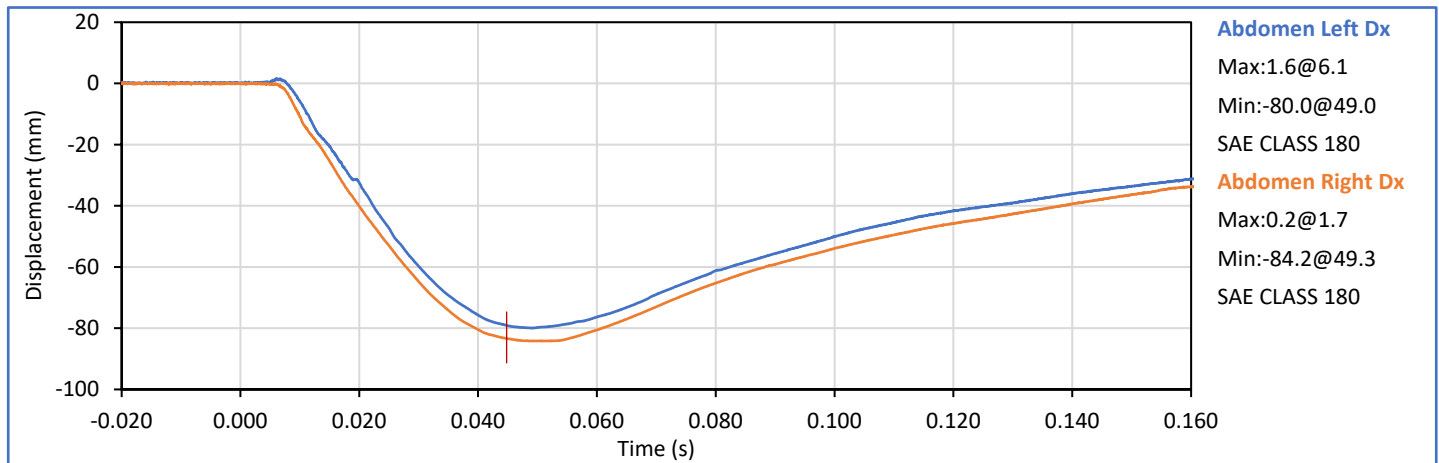
J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	35	Pass
Probe Velocity	m/sec	3.25	3.35	3.31	Pass
Peak Probe Force	kN	-3.210	-2.626	-3.119	Pass
Lower Left Dx at Time of Peak Force	mm	-91.3	-74.7	-79.1	Pass
Lower Right Dx at Time of Peak Force	mm			-83.4	Pass
Absolute Difference of Left/Right Dx	mm	0.0	8.0	4.3	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



Technician:

J. Hernandez

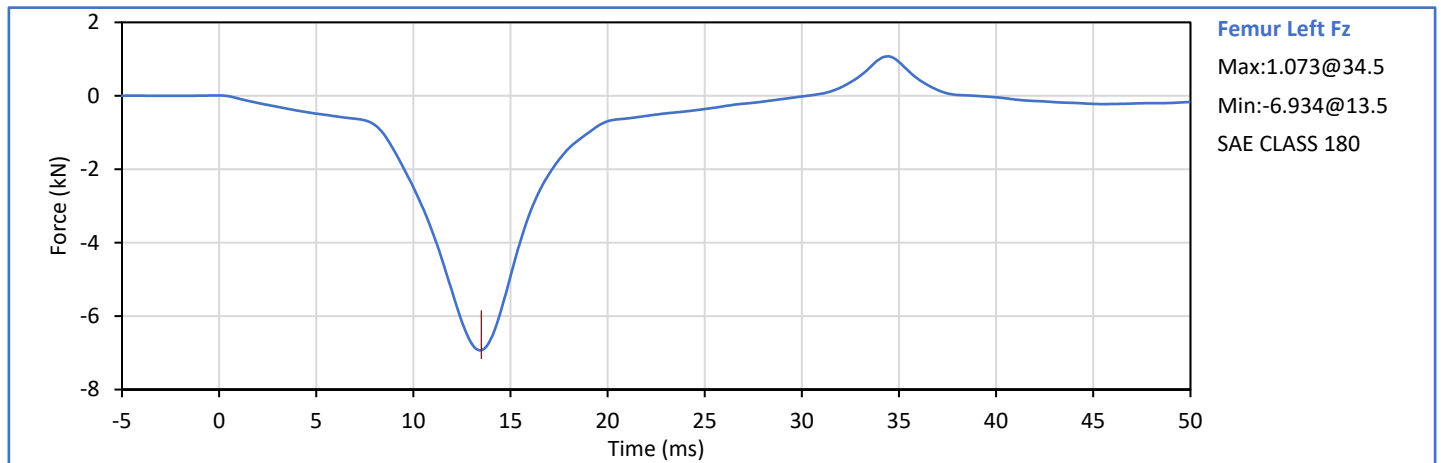
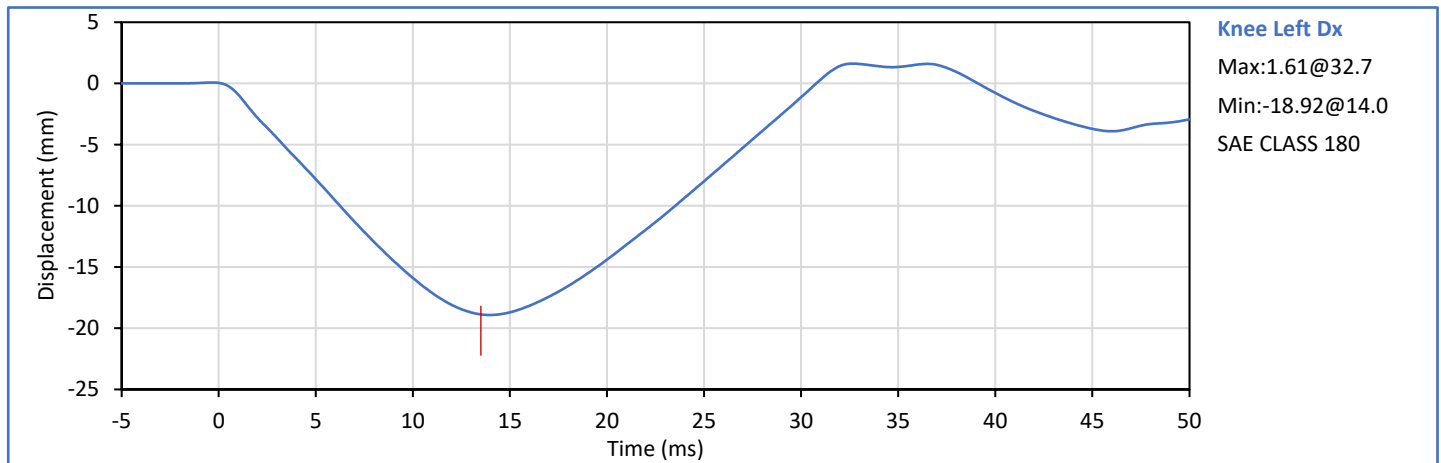
J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

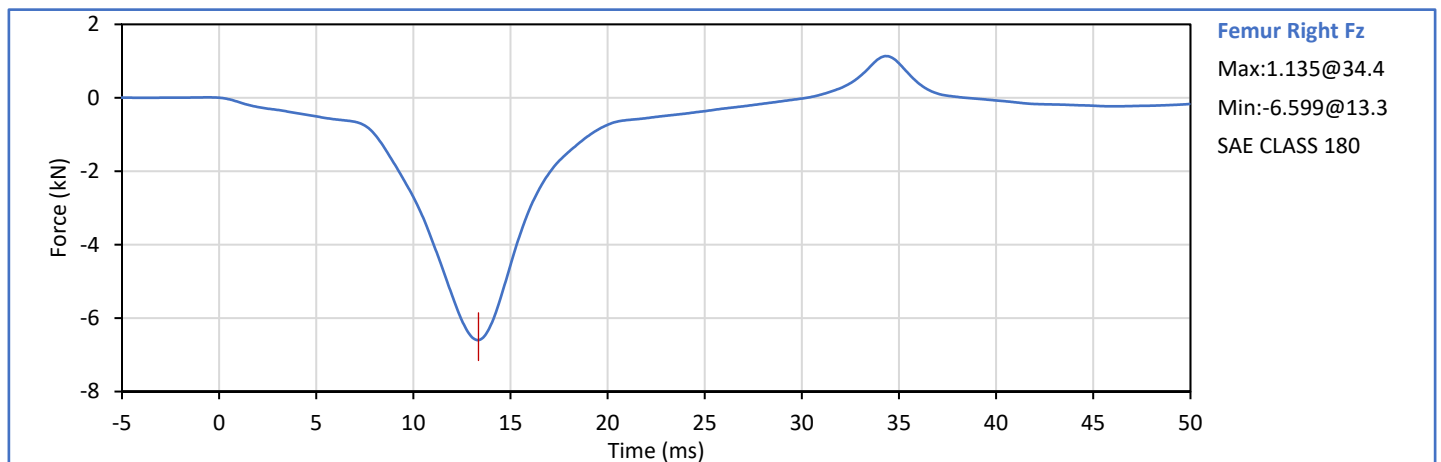
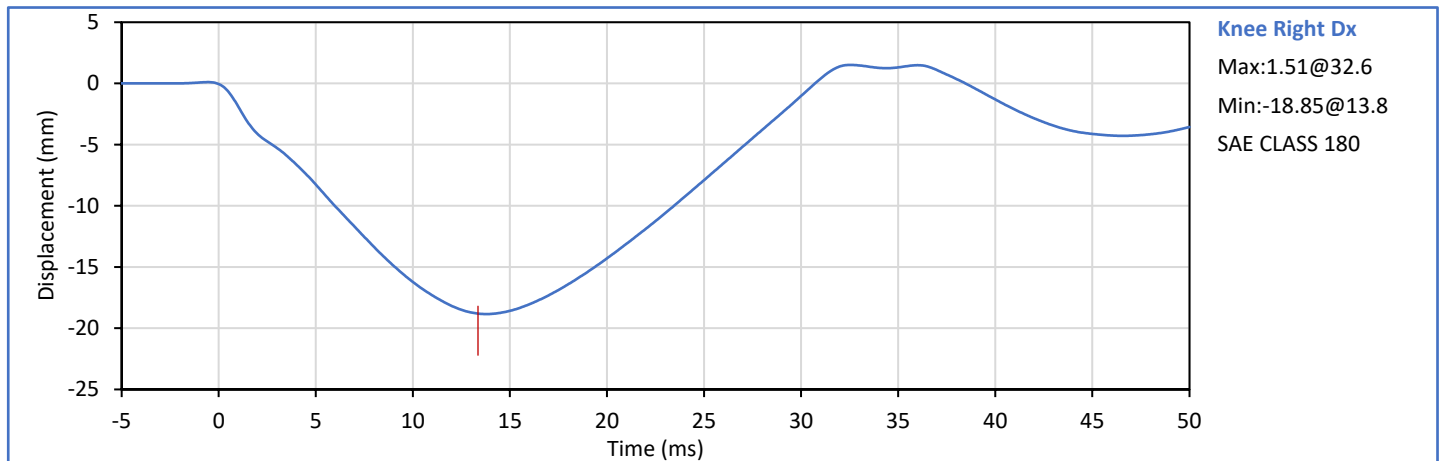
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	31	Pass
Pendulum Velocity	m/s	2.15	2.25	2.20	Pass
Peak Femur Fz	kN	-7.156	-5.855	-6.934	Pass
Knee Dx at Peak Femur Fz	mm	-22.20	-18.20	-18.87	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



Technician: J. Hernandez

Approved By: P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Relative Humidity	%	10	70	27	Pass
Pendulum Velocity	m/s	2.15	2.25	2.21	Pass
Peak Femur Fz	kN	-7.156	-5.855	-6.599	Pass
Knee Dx at Peak Femur Fz	mm	-22.20	-18.20	-18.80	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



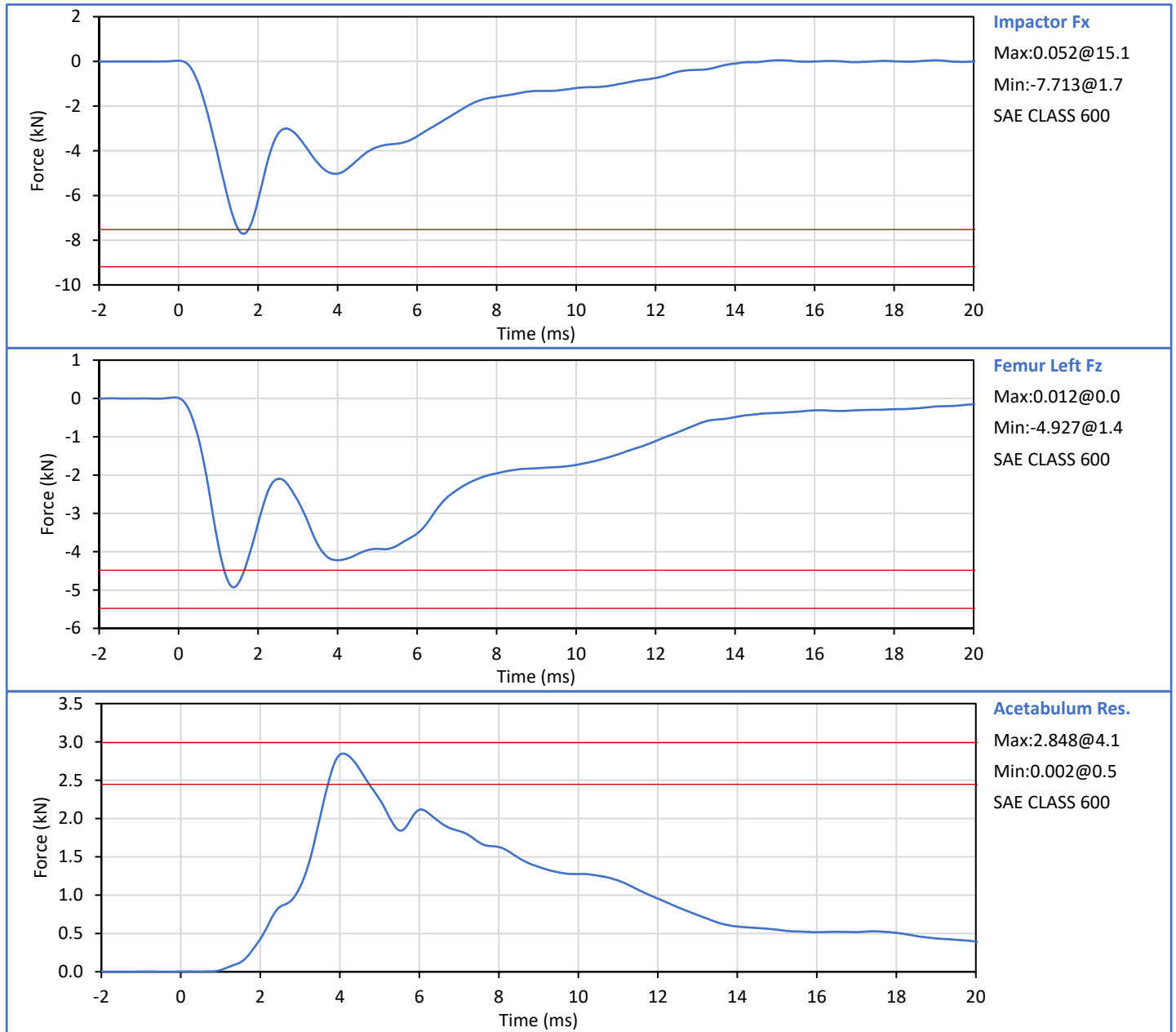
Technician: _____

J. Hernandez

Approved By: _____

P. Puzzuto

Tested Parameter	Units	Spec. Low ¹	Spec. High ¹	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	25	Pass
Pendulum Velocity	m/s	3.25	3.35	3.34	Pass
Peak Impactor Fx	kN	-9.188	-7.517	-7.713	Pass
Peak Femur Fz	kN	-5.478	-4.482	-4.927	Pass
Acetabulum Force Resultant	kN	2.447	2.991	2.848	Pass
¹ NHTSA Corridor 2020-03 (Preliminary Corridor)				Overall Test Results	Pass



Technician:

J. Hernandez

J. Hernandez

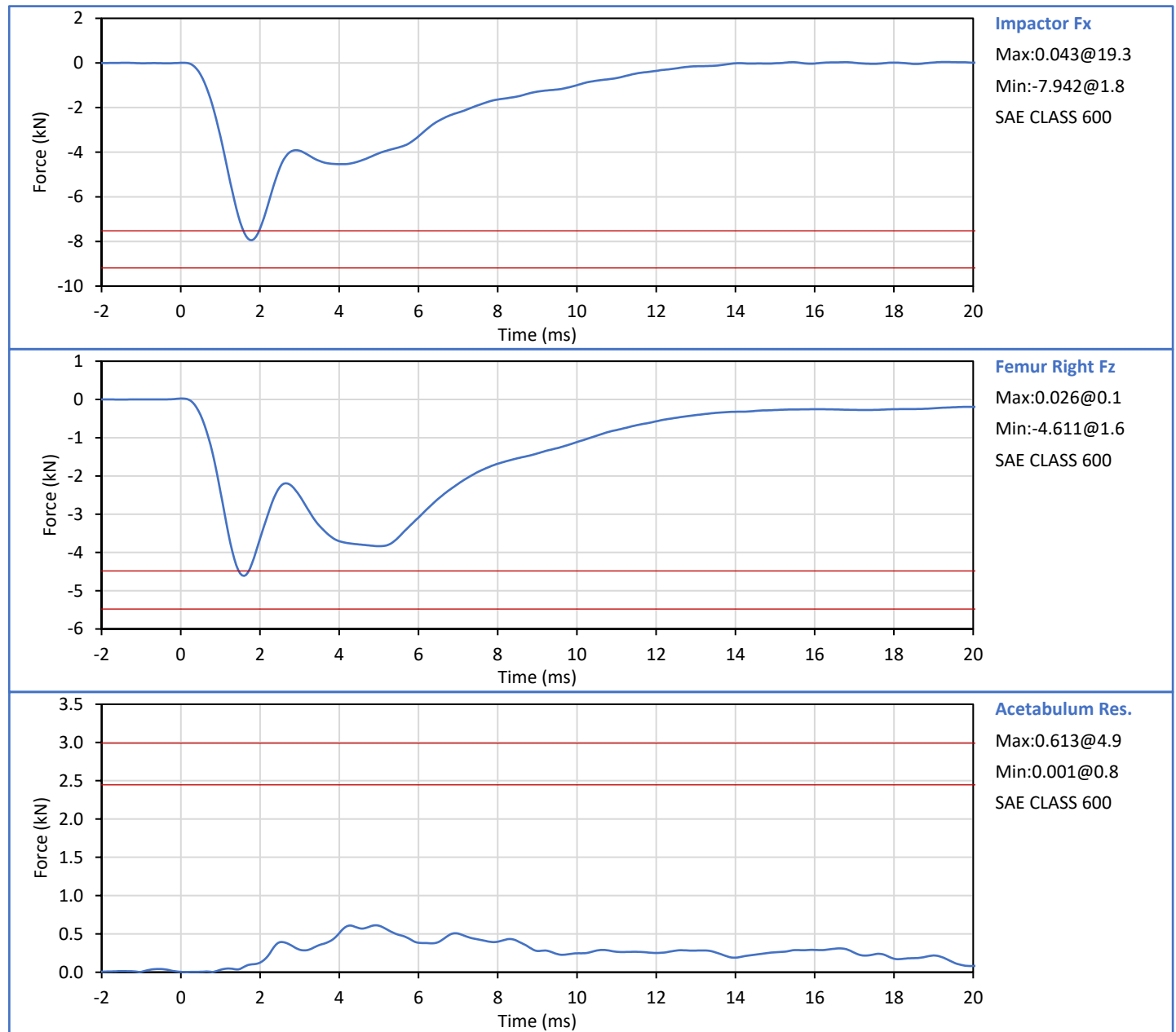
Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low ¹	Spec. High ¹	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.9	Pass
Laboratory Relative Humidity	%	10	70	25	Pass
Pendulum Velocity	m/s	3.25	3.35	3.35	Pass
Peak Impactor Fx	kN	-9.188	-7.517	-7.942	Pass
Peak Femur Fz	kN	-5.478	-4.482	-4.611	Pass
Acetabulum Force Resultant	kN	2.447	2.991	0.613	Fail
¹ NHTSA Corridor 2020-03 (Preliminary Corridor)				Overall Test Results	Fail

* Acetabulum Load Cell Fx is not functioning



Technician:

J. Hernandez

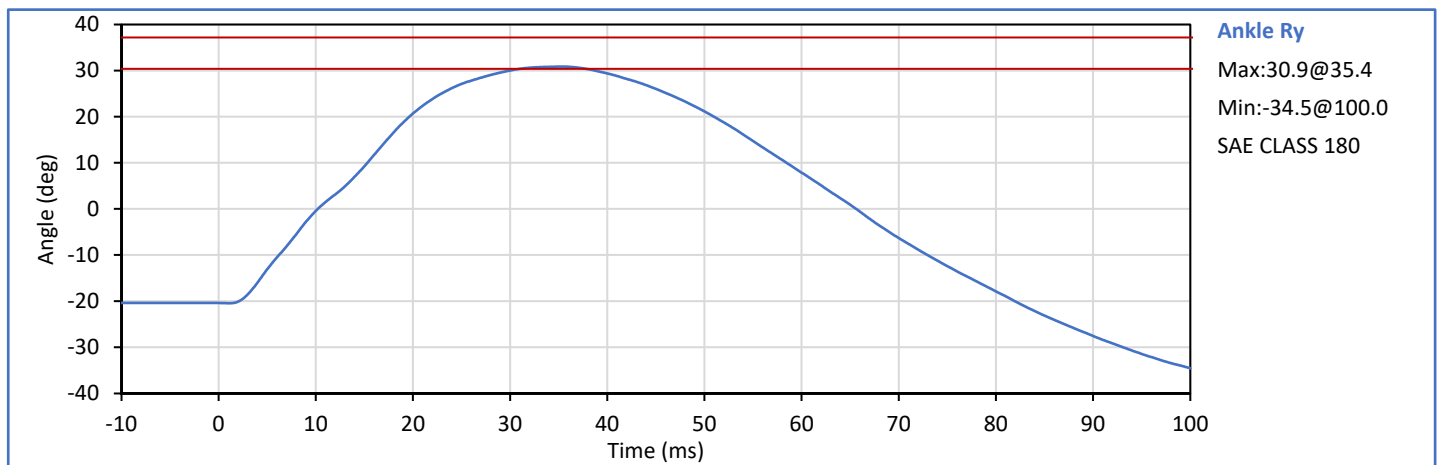
J. Hernandez

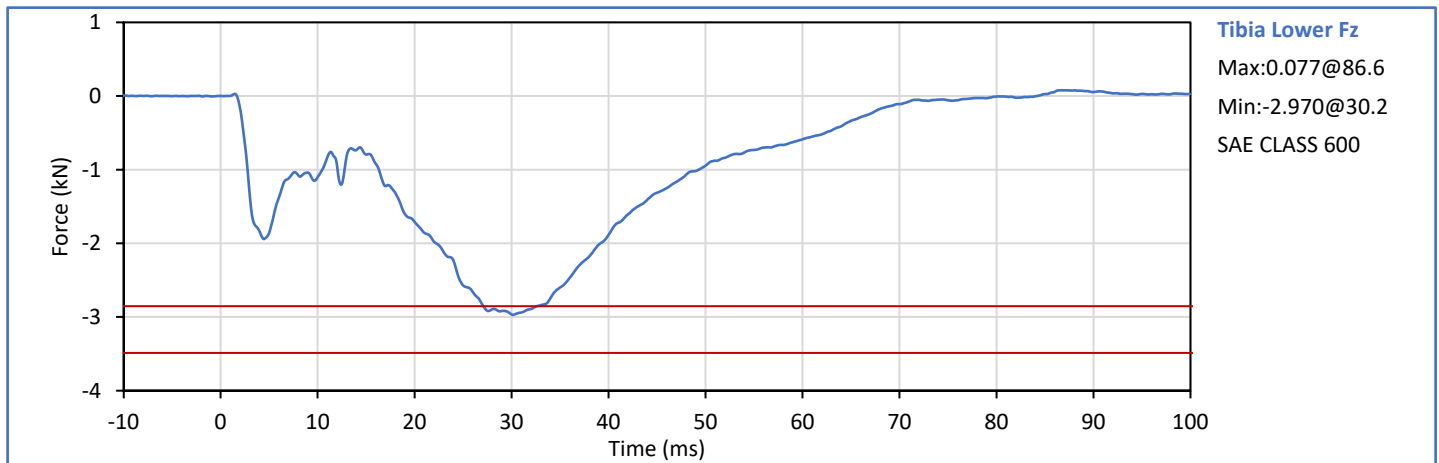
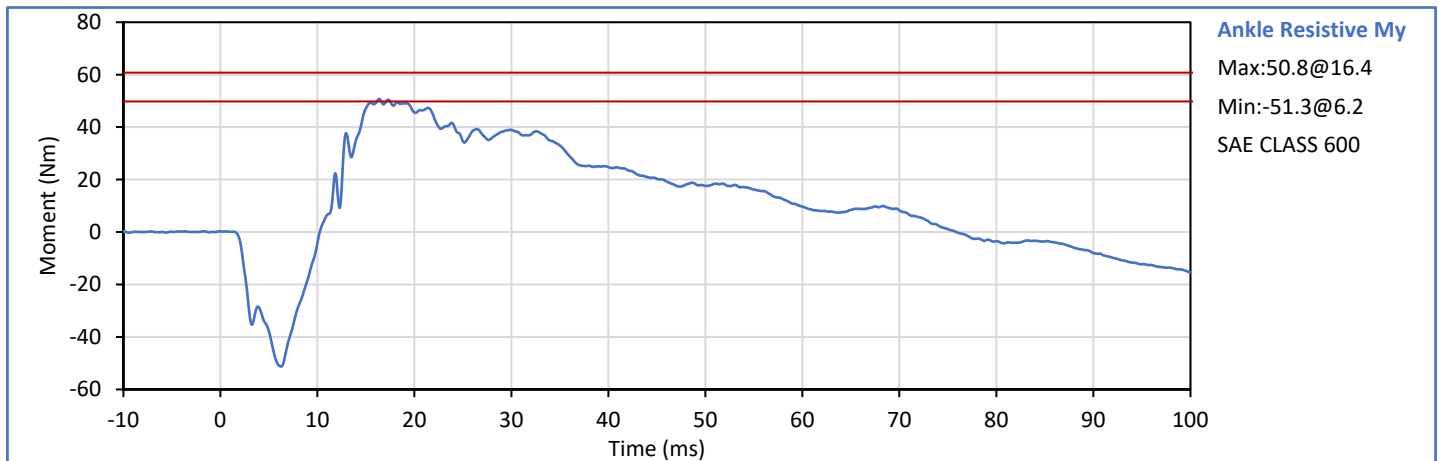
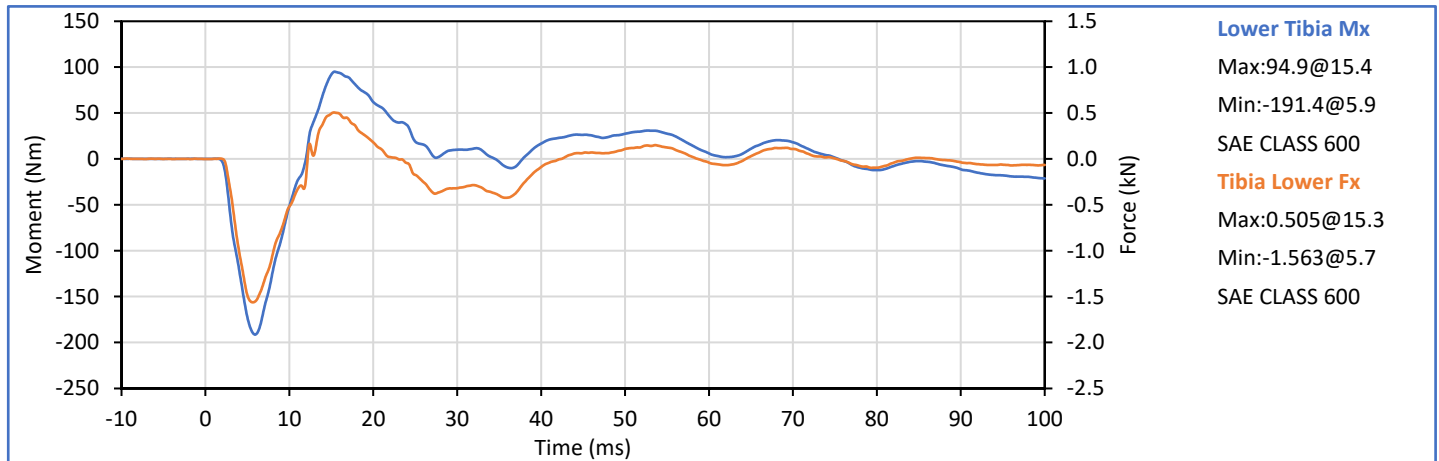
Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	22	Pass
Pendulum Velocity	m/s	4.95	5.05	5.00	Pass
Peak Ankle Ry	deg	30.4	37.2	30.9	Pass
Peak Ankle Resistive My	Nm	49.8	60.8	50.8	Pass
Peak Lower Tibia Fz	kN	-3.487	-2.853	-2.970	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass





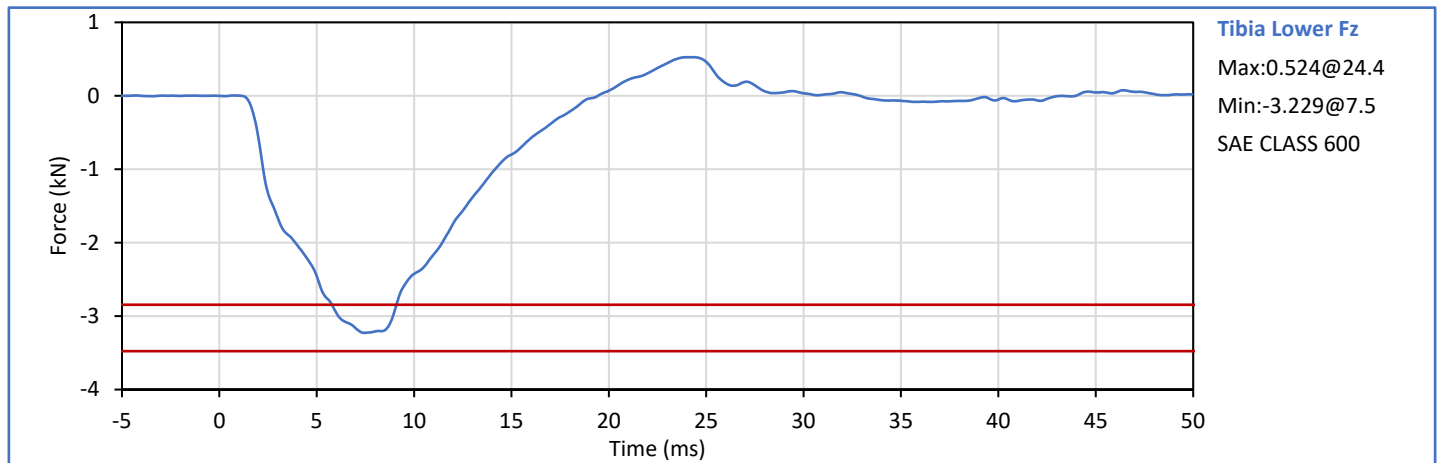
Technician:

J. Hernandez

Approved By:

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	46	Pass
Pendulum Velocity	m/s	3.95	4.05	4.03	Pass
Peak Lower Tibia Fz	kN	-3.478	-2.846	-3.229	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



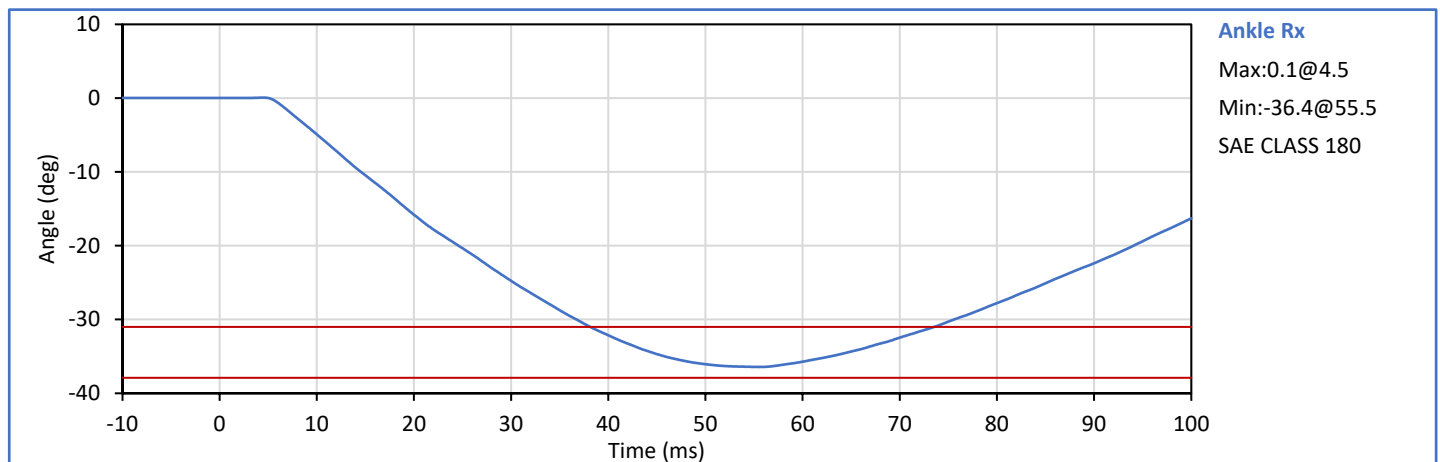
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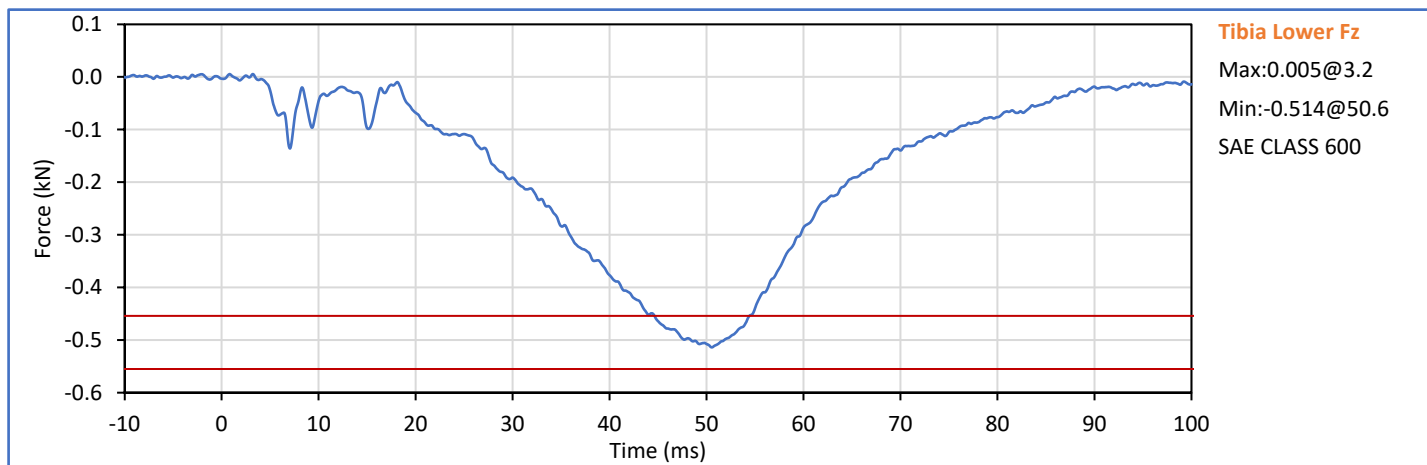
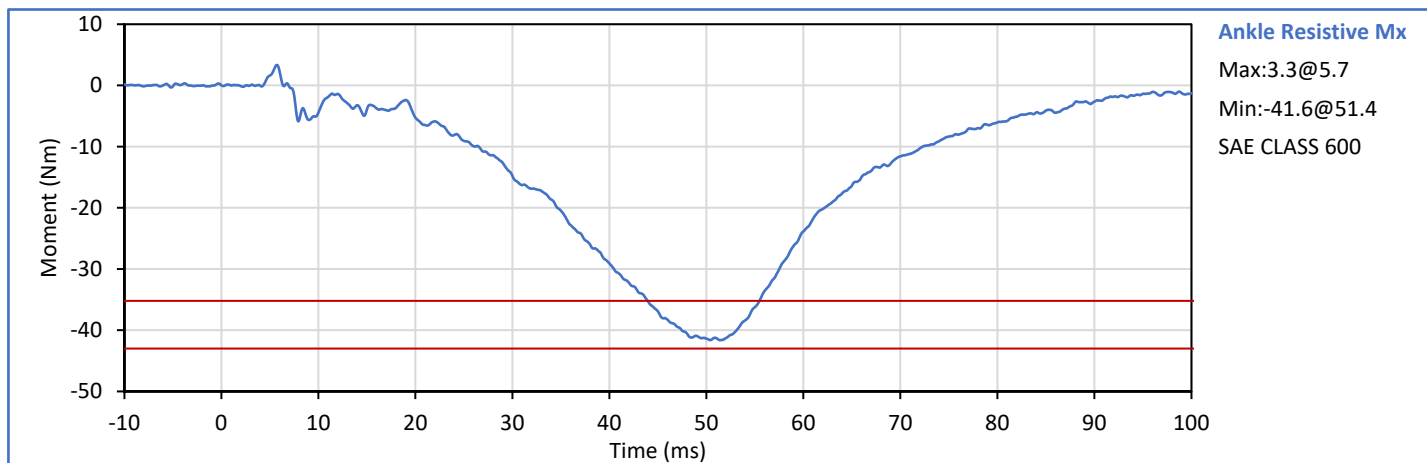
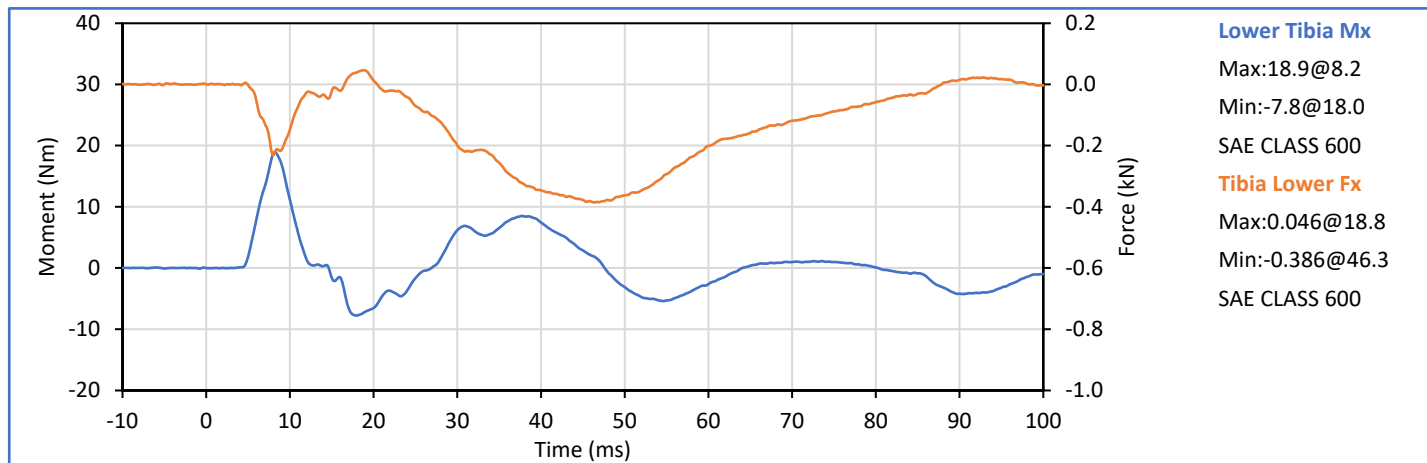
J. Hernandez

Approved By:

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.5	Pass
Laboratory Relative Humidity	%	10	70	49	Pass
Pendulum Velocity	m/s	1.95	2.05	2.02	Pass
Peak Ankle Rx	deg	-37.9	-31.0	-36.4	Pass
Peak Ankle Resistive Mx	Nm	-43.0	-35.2	-41.6	Pass
Peak Lower Tibia Fz	kN	-0.555	-0.454	-0.514	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass





Technician:

J. Hernandez

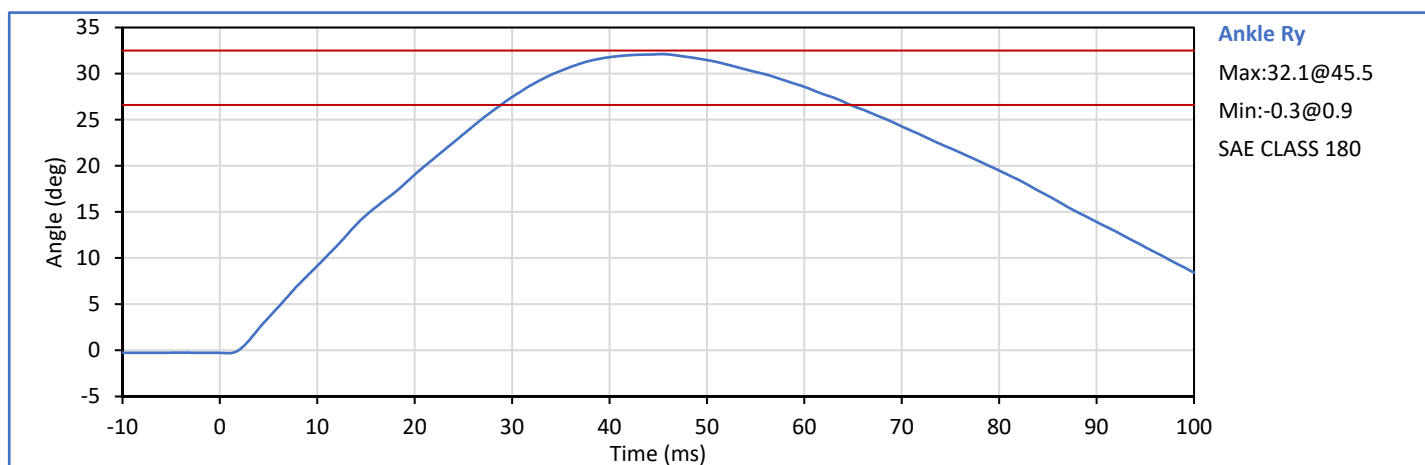
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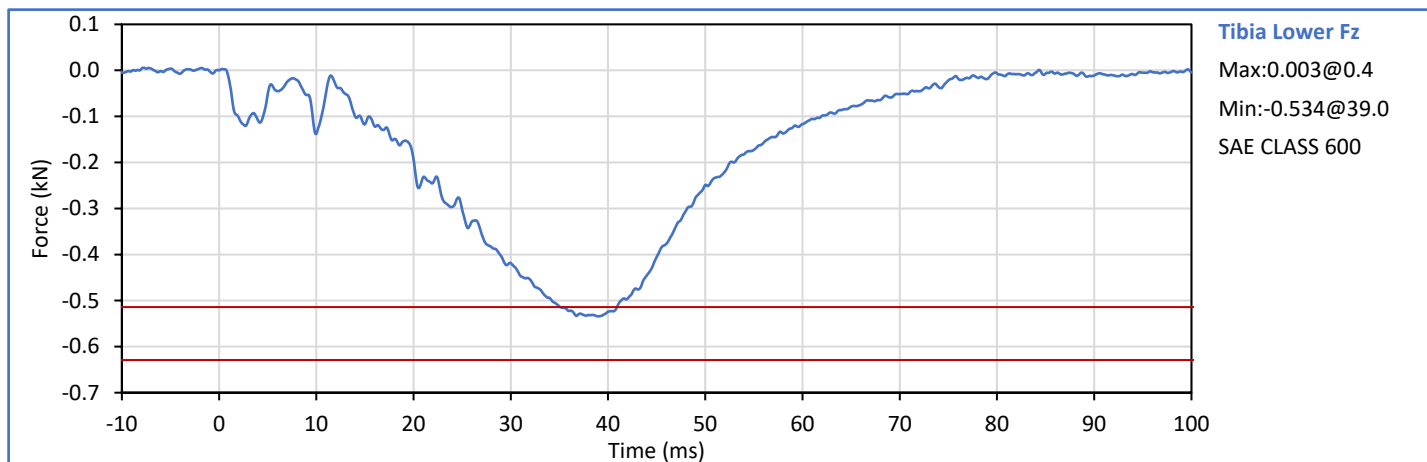
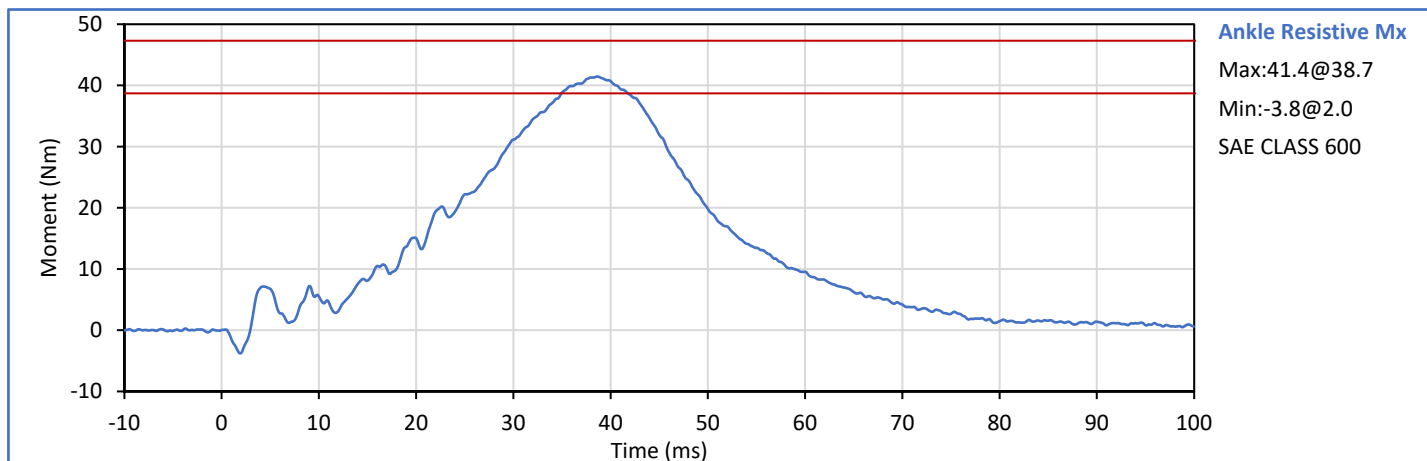
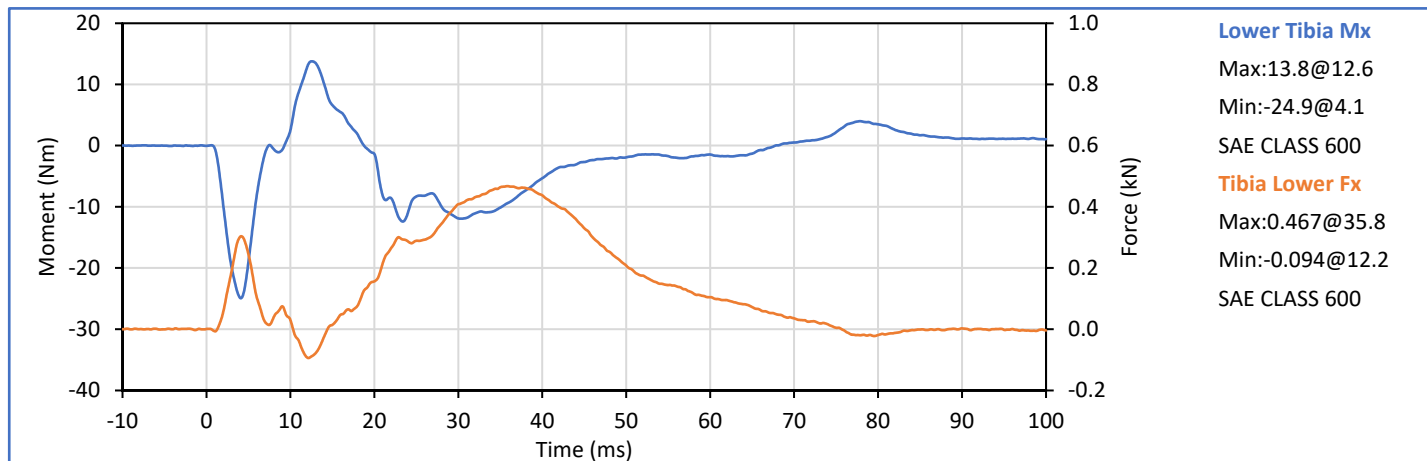
Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.8	Pass
Laboratory Relative Humidity	%	10	70	27	Pass
Pendulum Velocity	m/s	1.95	2.05	2.04	Pass
Peak Ankle Rx	deg	26.6	32.5	32.1	Pass
Peak Ankle Resistive Mx	Nm	38.7	47.3	41.4	Pass
Peak Lower Tibia Fz	kN	-0.629	-0.514	-0.534	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass





Technician:

J. Hernandez

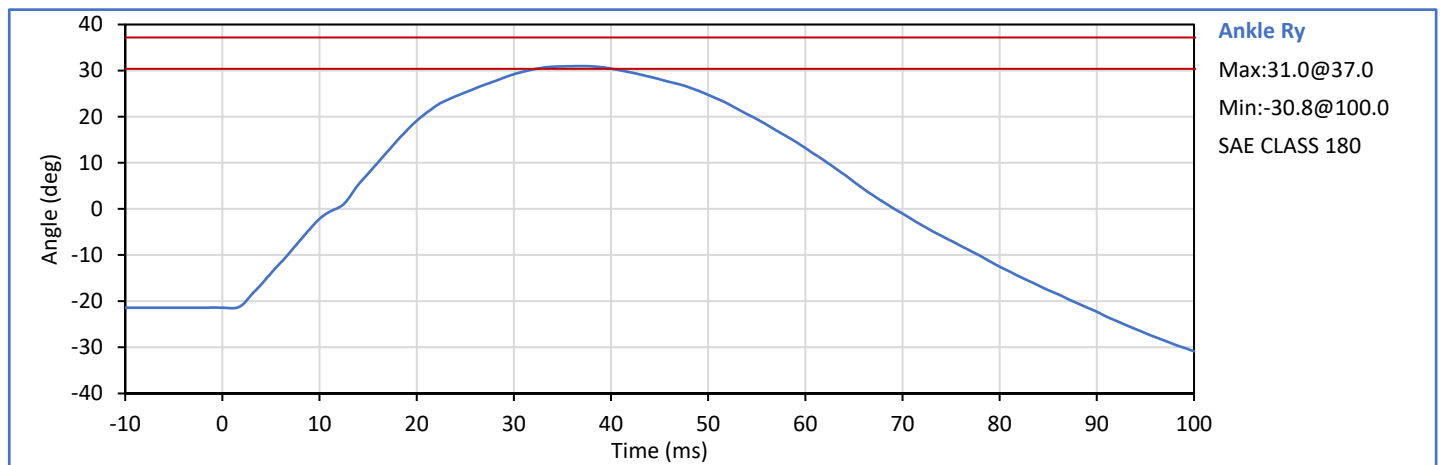
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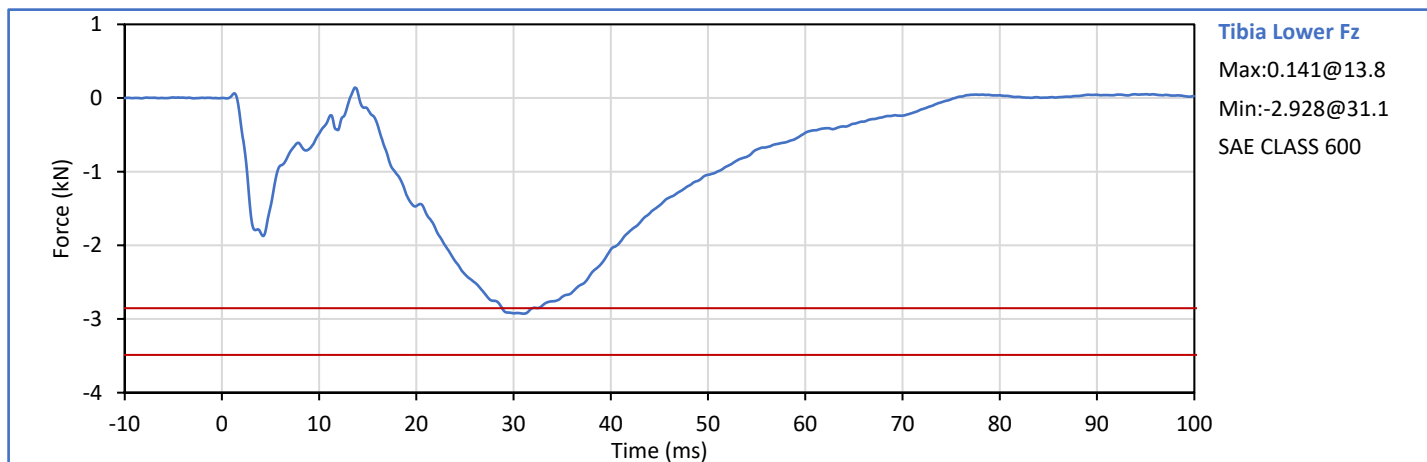
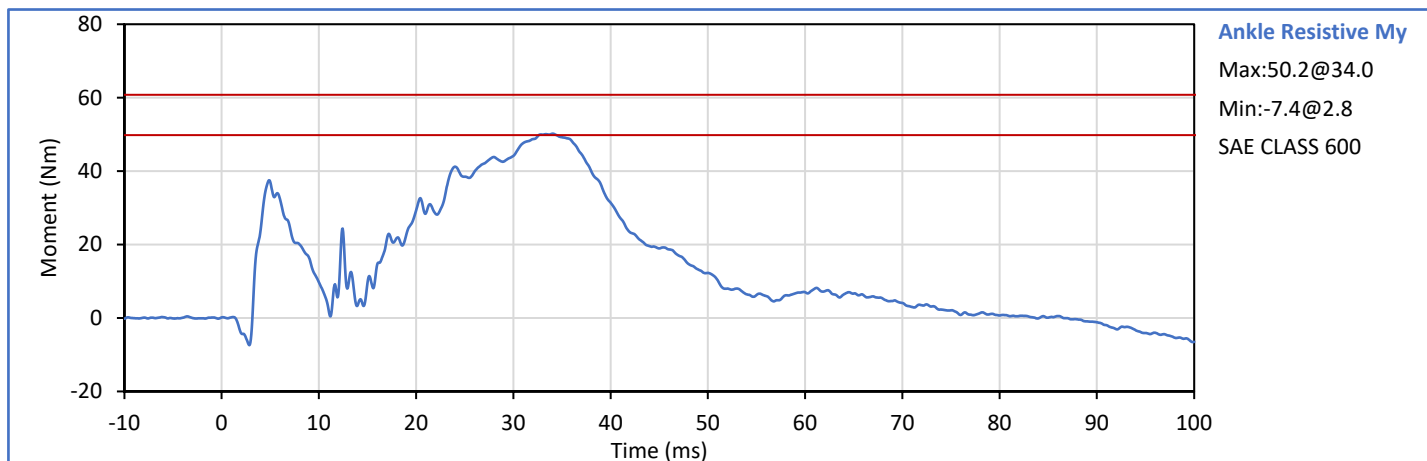
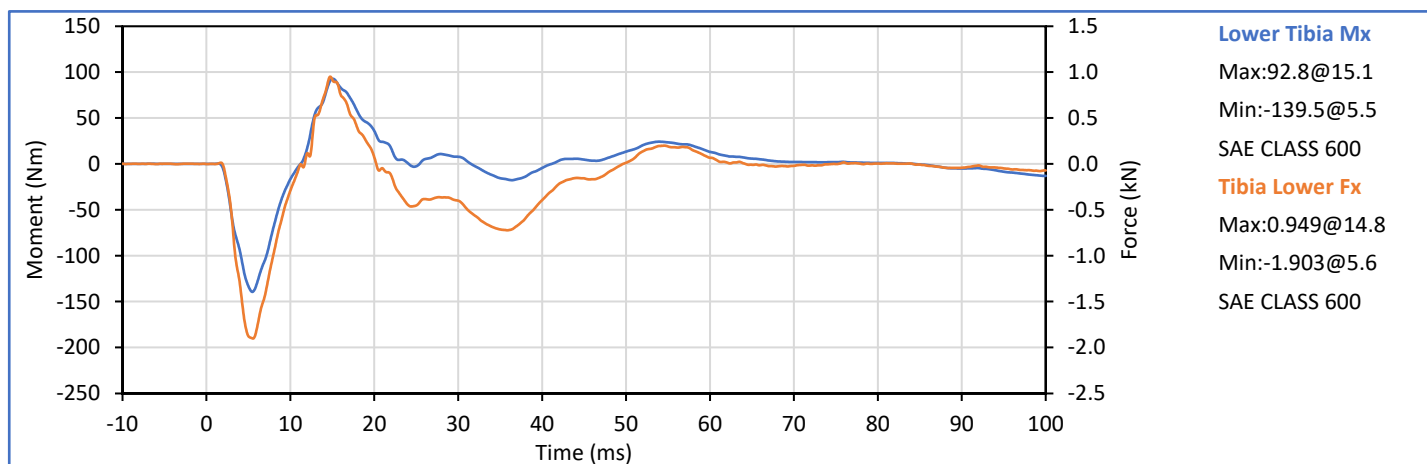
Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	25	Pass
Pendulum Velocity	m/s	4.95	5.05	5.00	Pass
Peak Ankle Ry	deg	30.4	37.2	31.0	Pass
Peak Ankle Resistive My	Nm	49.8	60.8	50.2	Pass
Peak Lower Tibia Fz	kN	-3.487	-2.853	-2.928	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass





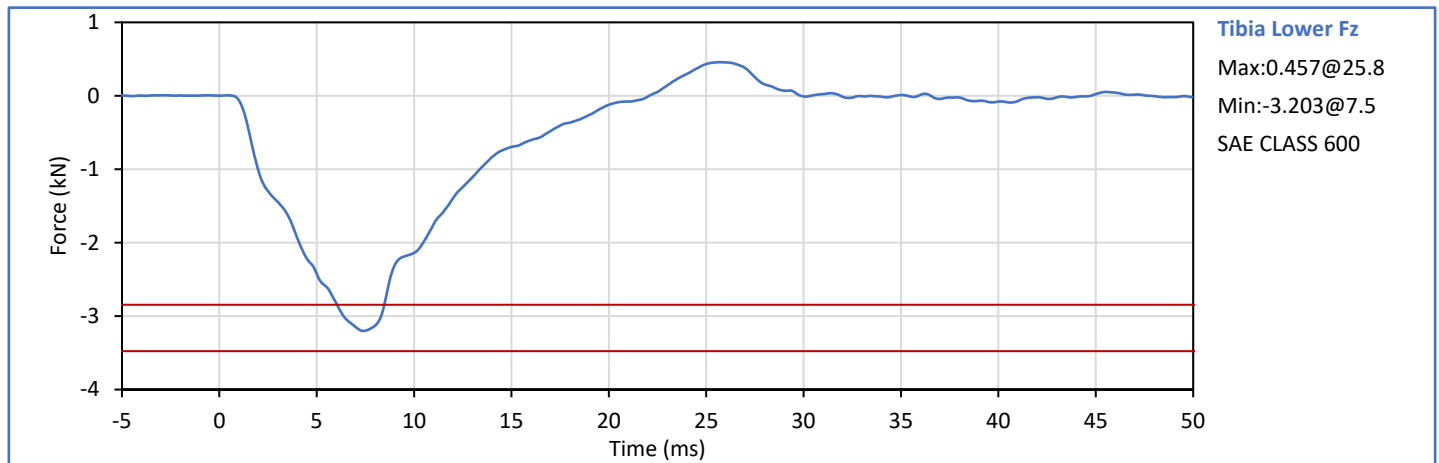
Technician:

J. Hernandez

Approved By:

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	47	Pass
Pendulum Velocity	m/s	3.95	4.05	4.02	Pass
Peak Lower Tibia Fz	kN	-3.478	-2.846	-3.203	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



Technician:

J. Hernandez

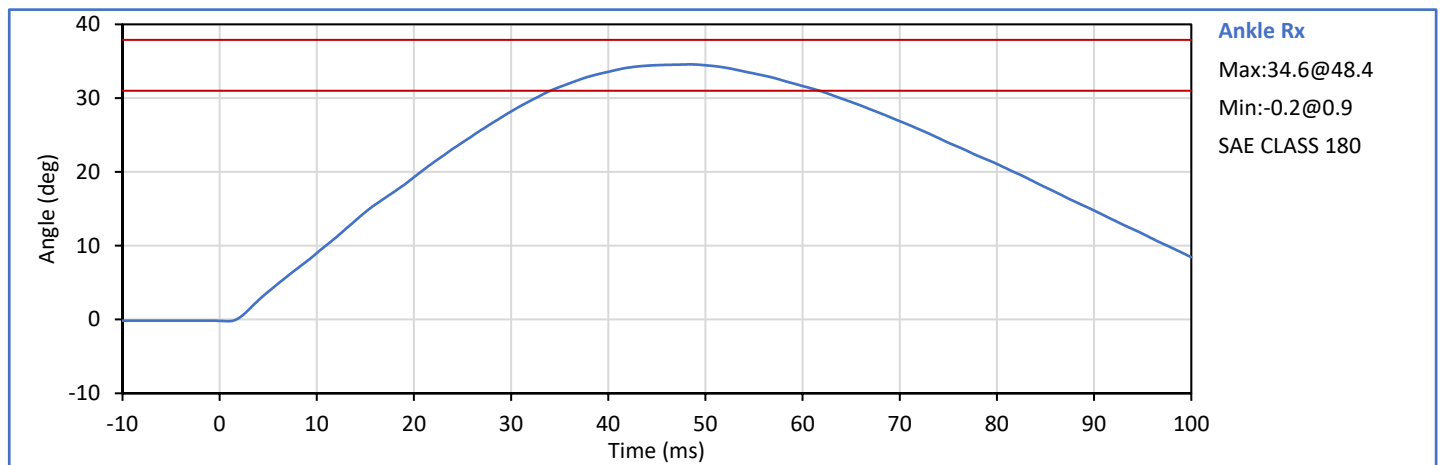
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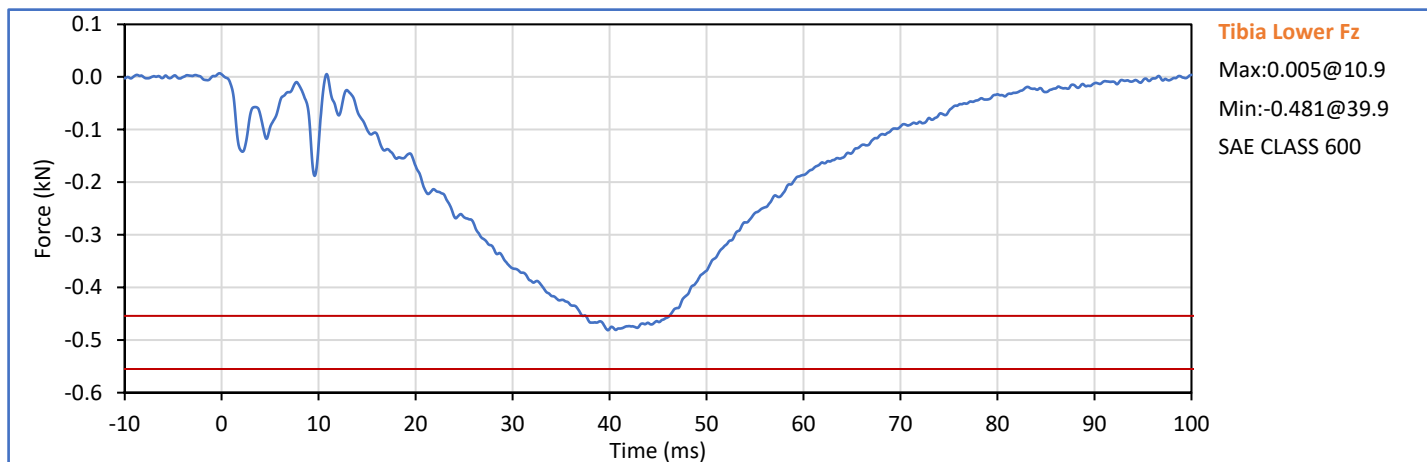
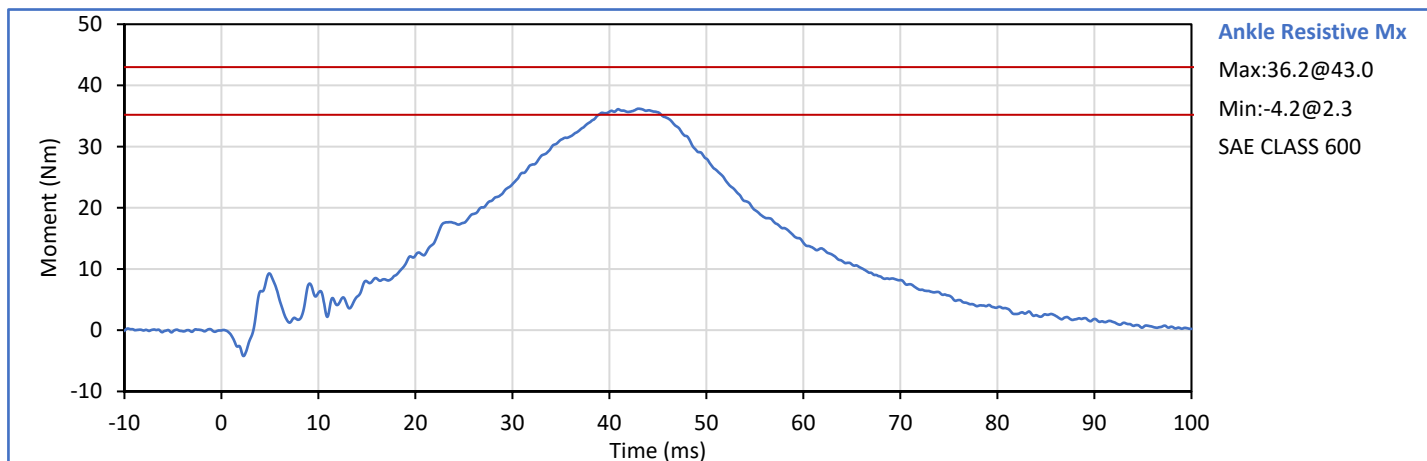
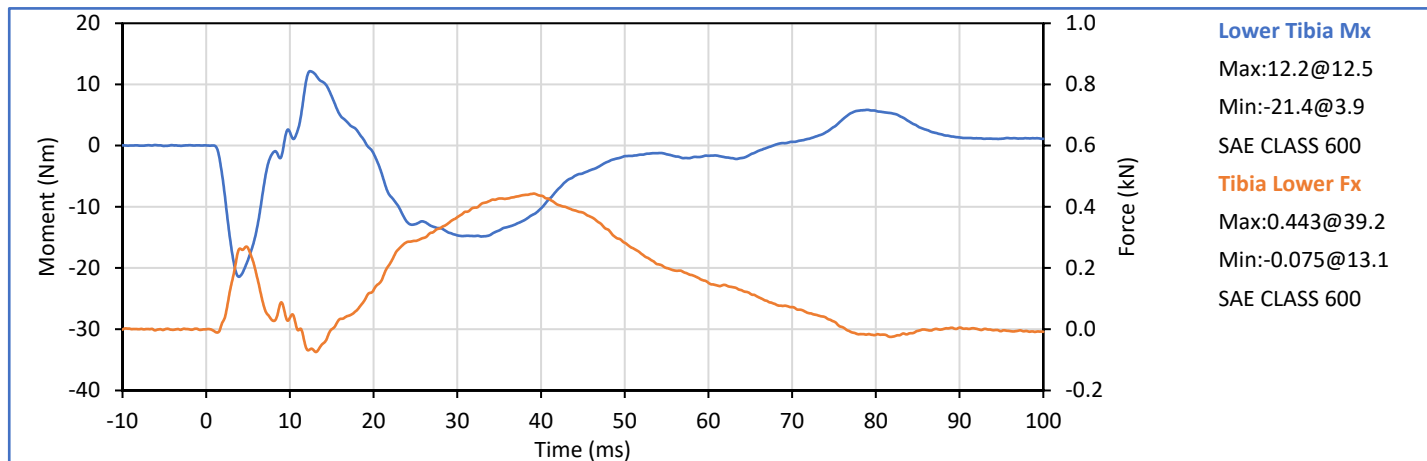
Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.8	Pass
Laboratory Relative Humidity	%	10	70	28	Pass
Pendulum Velocity	m/s	1.95	2.05	2.04	Pass
Peak Ankle Rx	deg	31.0	37.9	34.6	Pass
Peak Ankle Resistive Mx	Nm	35.2	43.0	36.2	Pass
Peak Lower Tibia Fz	kN	-0.555	-0.454	-0.481	Pass
NHTSA Corridor 2019-05			Overall Test Results	Pass	





Technician:

J. Hernandez

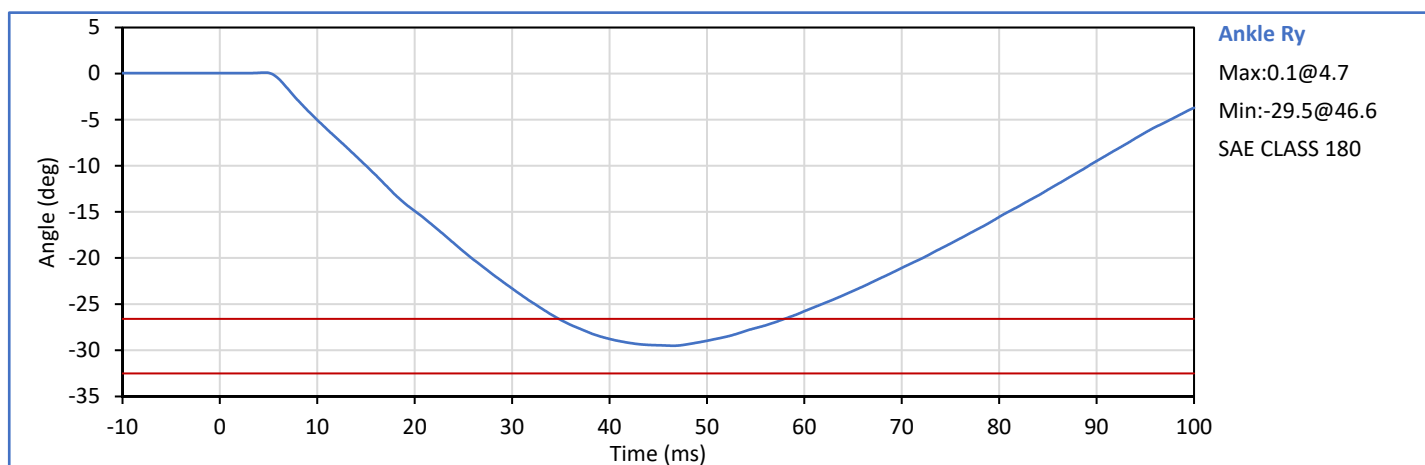
J. Hernandez

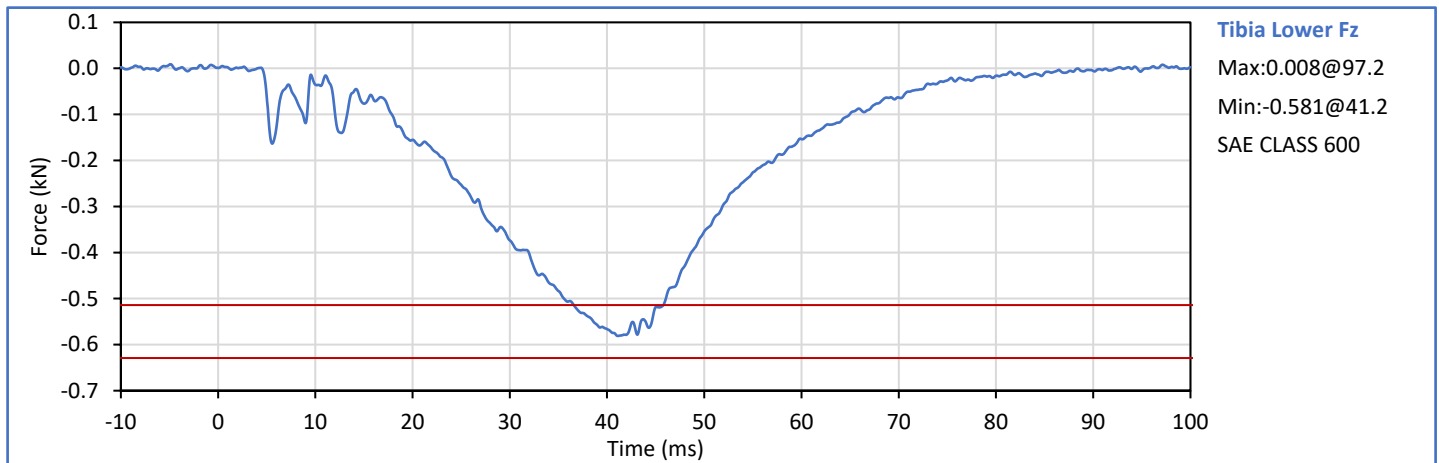
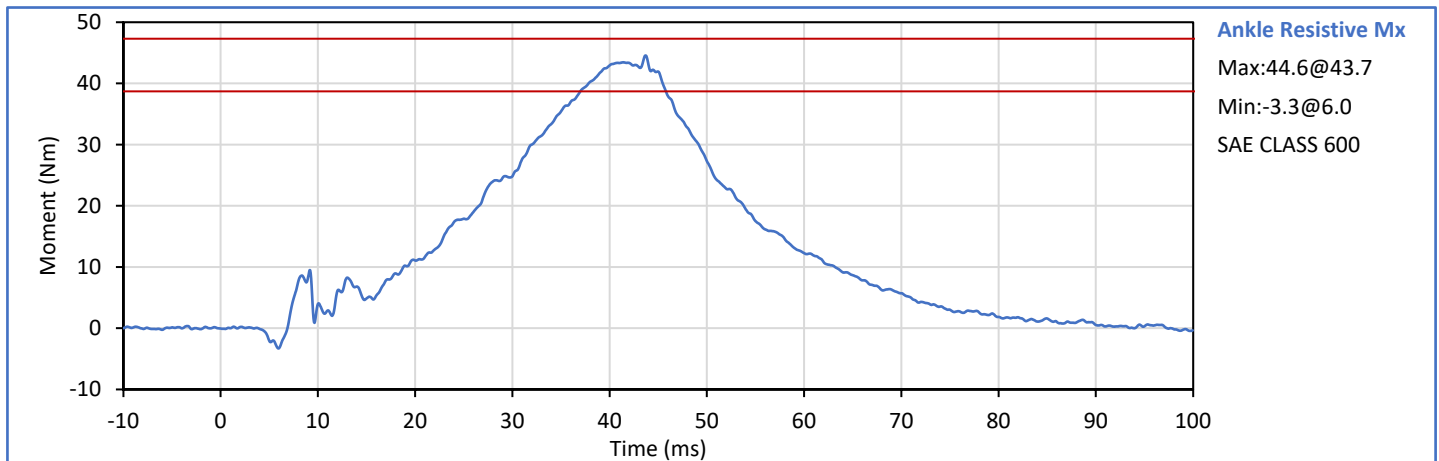
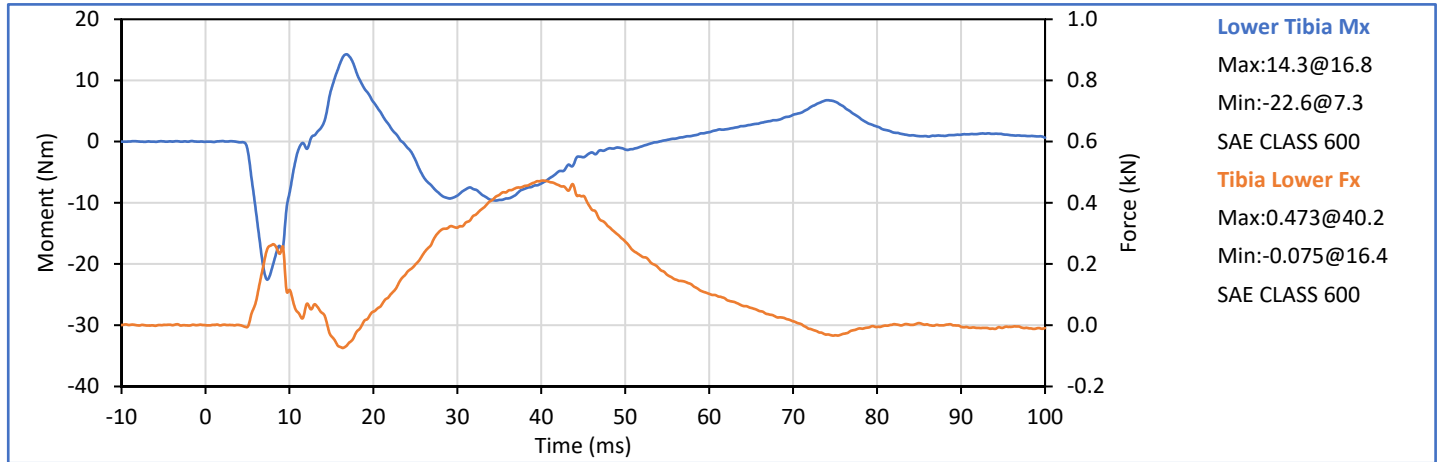
Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	22.1	Pass
Laboratory Relative Humidity	%	10	70	29	Pass
Pendulum Velocity	m/s	1.95	2.05	2.04	Pass
Peak Ankle Rx	deg	-32.5	-26.6	-29.5	Pass
Peak Ankle Resistive Mx	Nm	38.7	47.3	44.6	Pass
Peak Lower Tibia Fz	kN	-0.629	-0.514	-0.581	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass





Technician: _____

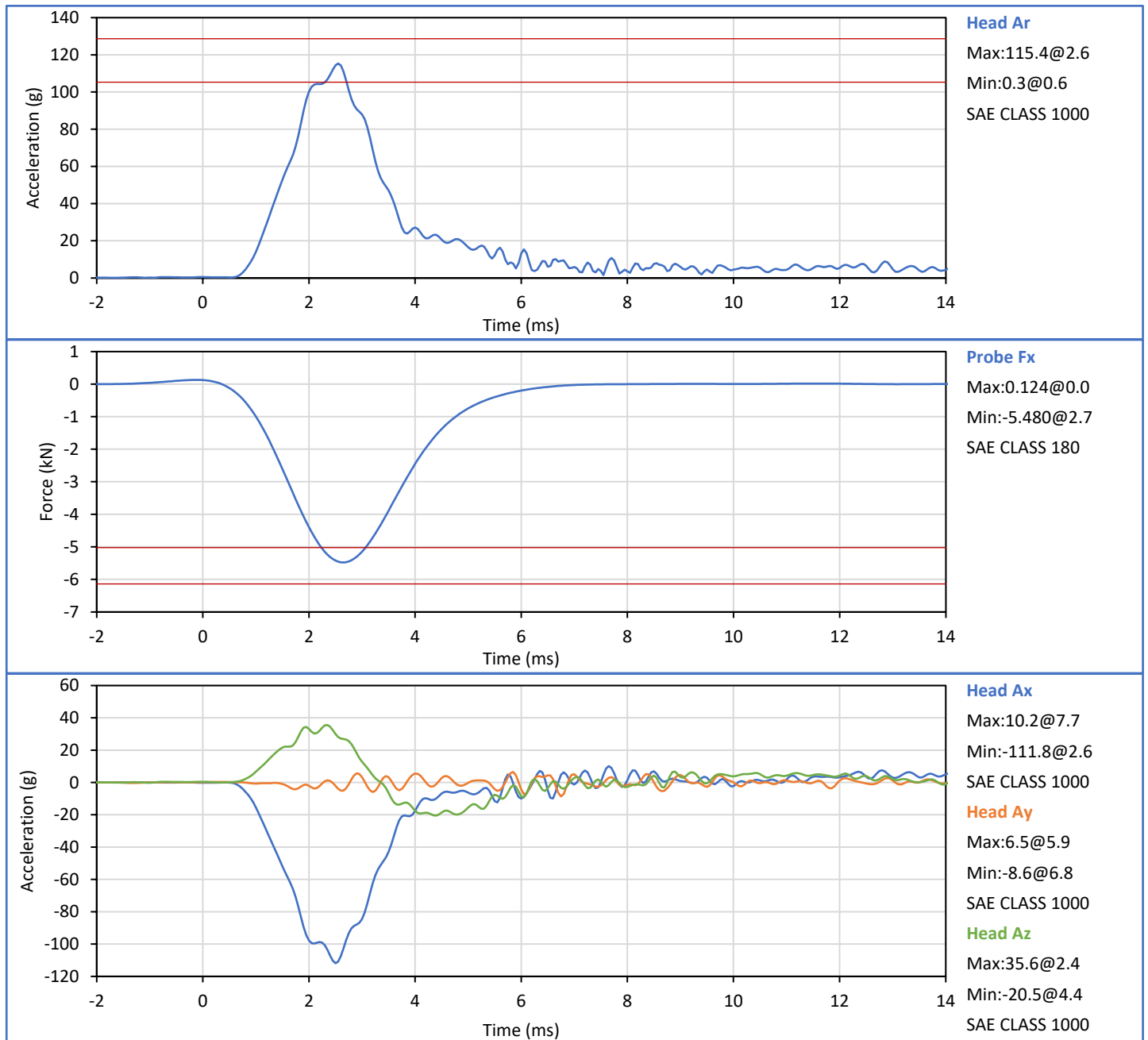
J. Hernandez

Approved By: _____

P. Puzzuto

APPENDIX D
ATD Configuration and Performance Verification Data
THOR-50M 50th Percentile Male ATD
Post-Test Qualification (Full) S/N: D09799

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.5	Pass
Laboratory Relative Humidity	%	10	70	30	Pass
Velocity	m/s	1.95	2.05	1.98	Pass
Peak Probe Fx	kN	-6.138	-5.022	-5.480	Pass
Peak Head Resultant Acceleration	g	105.3	128.7	115.4	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



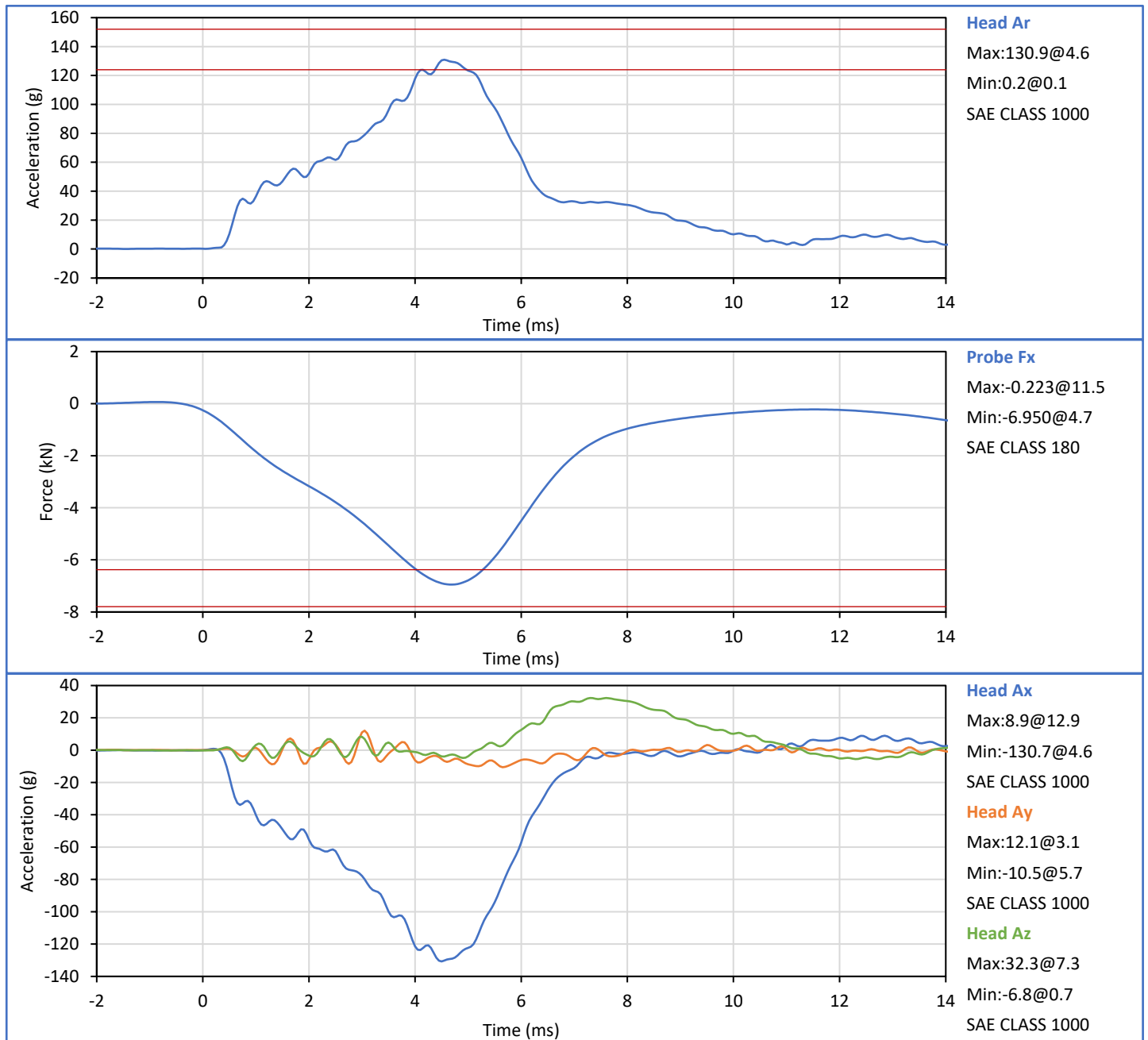
Technician:

J. Hernandez

Approved By:

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Relative Humidity	%	10	70	31	Pass
Velocity	m/s	6.68	6.78	6.70	Pass
Peak Probe Fx	kN	-7.796	-6.378	-6.950	Pass
Peak Head Resultant Acceleration	g	124.0	152.0	130.9	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



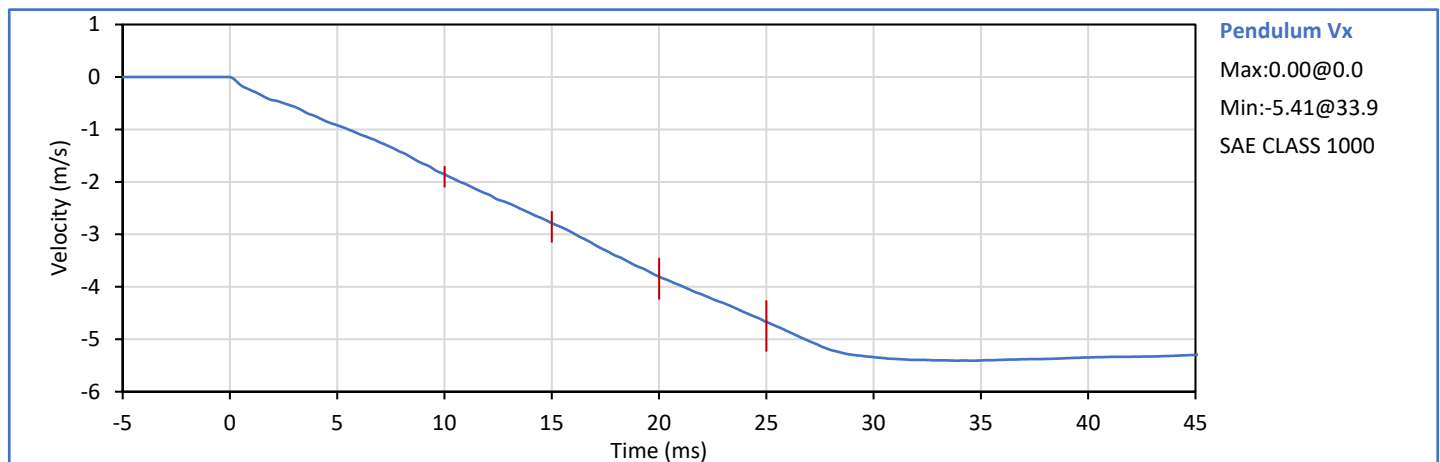
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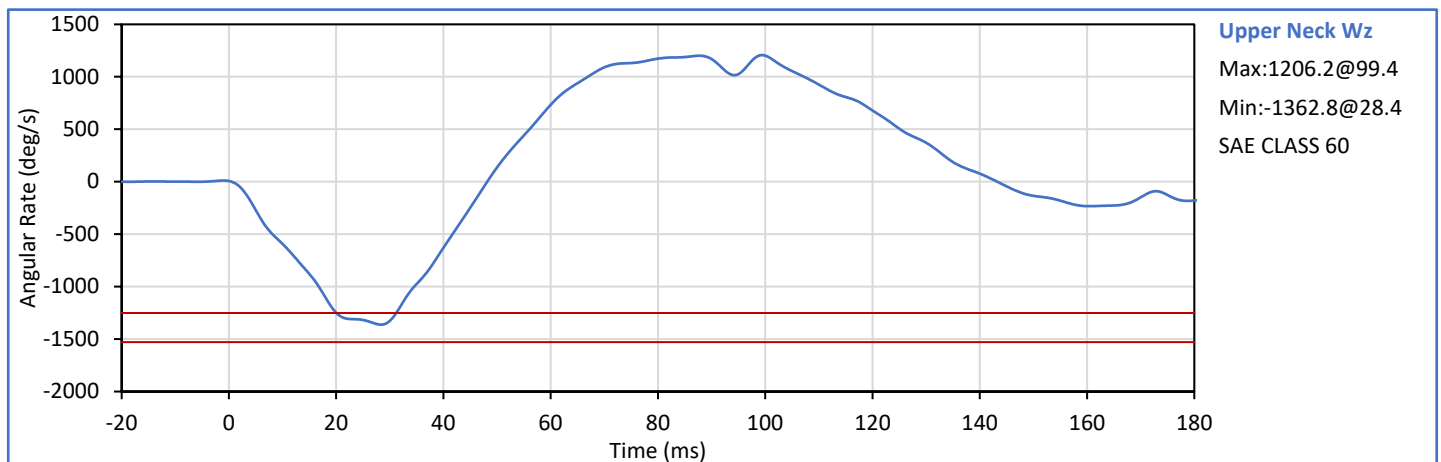
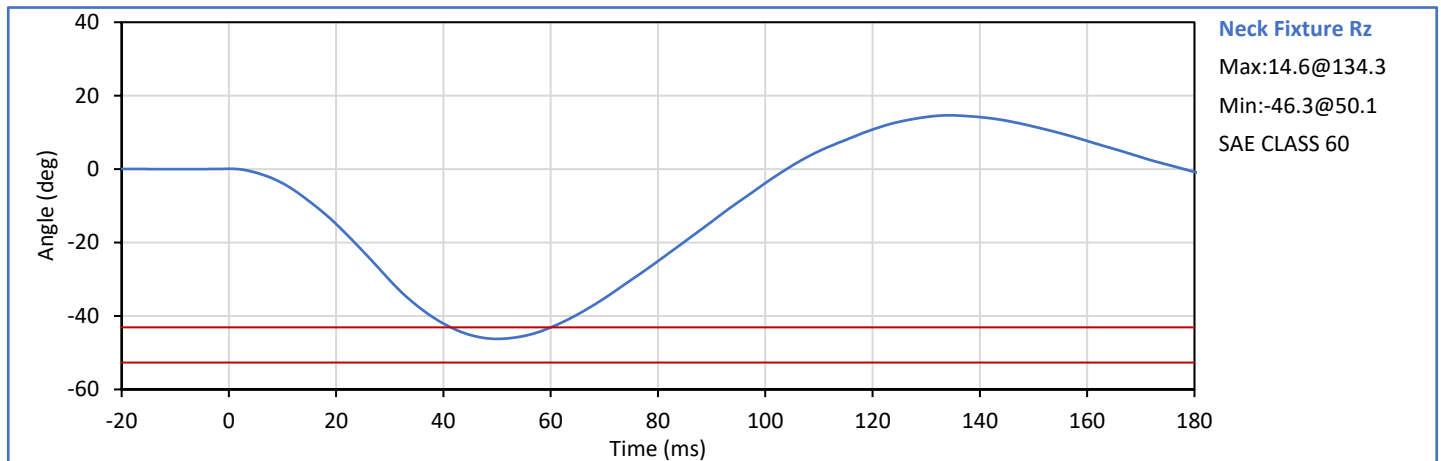
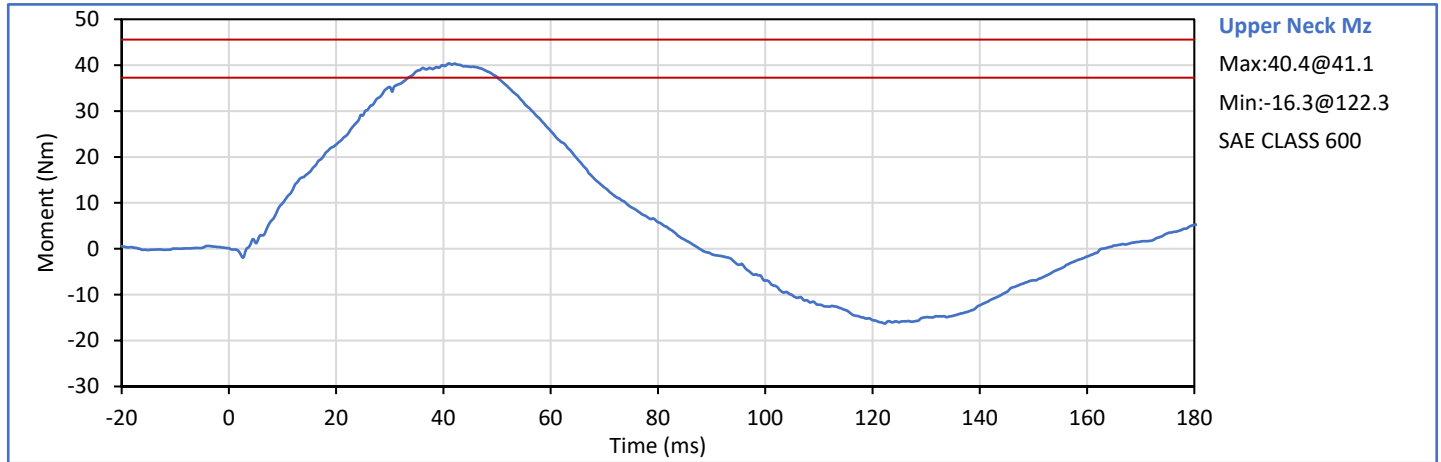
J. Hernandez

Approved By:

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.8	Pass
Laboratory Relative Humidity	%	10	70	26	Pass
Pendulum Velocity	m/s	4.95	5.05	5.03	Pass
Pendulum Velocity at 10 ms	m/s	-2.09	-1.71	-1.86	Pass
Pendulum Velocity at 15 ms	m/s	-3.14	-2.57	-2.79	Pass
Pendulum Velocity at 20 ms	m/s	-4.23	-3.46	-3.81	Pass
Pendulum Velocity at 25 ms	m/s	-5.22	-4.27	-4.67	Pass
Peak Upper Neck Mz	Nm	37.3	45.6	40.4	Pass
Peak Head Wz	deg/s	-1529	-1251	-1363	Pass
Peak Neck Fixture Rotation	deg	-52.7	-43.1	-46.3	Pass
NHTSA 2019-05 Corridor				Overall Test Results	Pass





Technician: _____

J. Hernandez

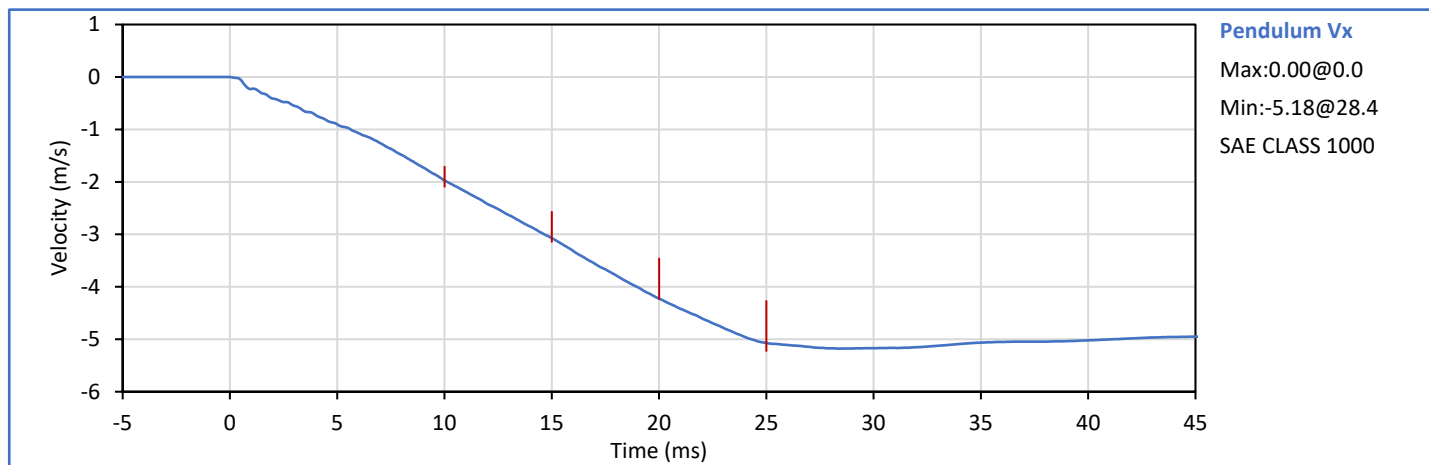
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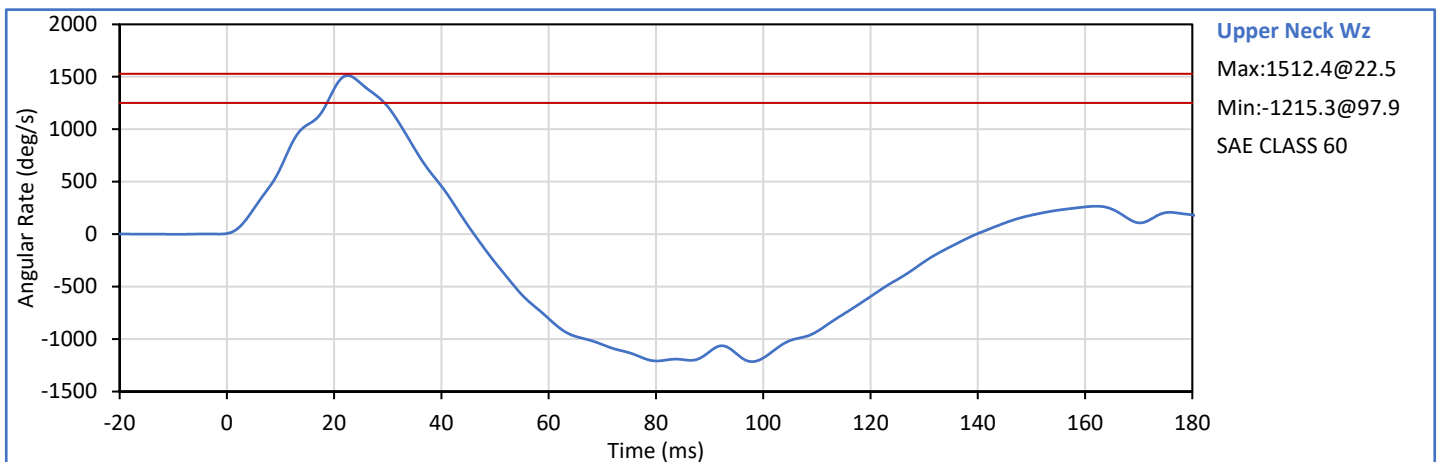
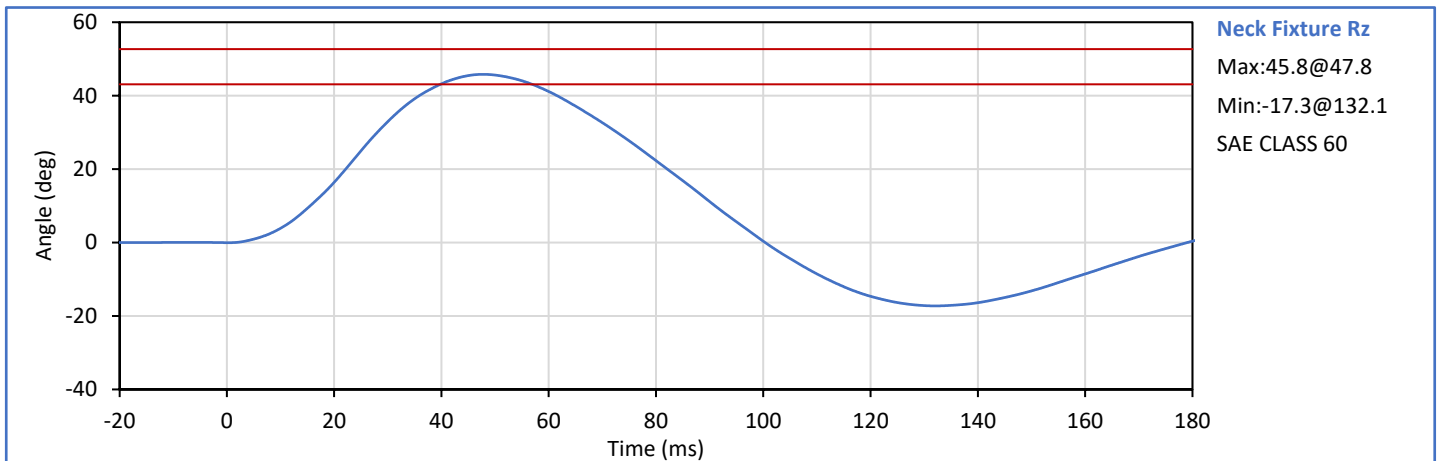
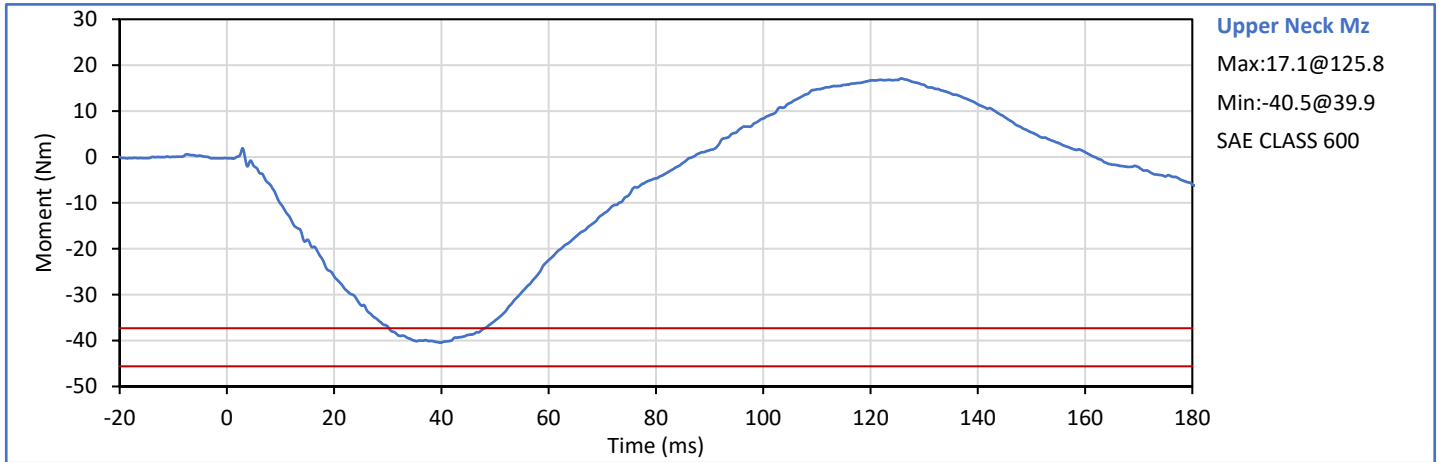
Approved By: _____

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.8	Pass
Laboratory Humidity	%	10	70	26	Pass
Pendulum Velocity	m/s	4.95	5.05	5.03	Pass
Pendulum Velocity at 10 ms	m/s	-2.09	-1.71	-1.97	Pass
Pendulum Velocity at 15 ms	m/s	-3.14	-2.57	-3.07	Pass
Pendulum Velocity at 20 ms	m/s	-4.23	-3.46	-4.23	Pass
Pendulum Velocity at 25 ms	m/s	-5.22	-4.27	-5.07	Pass
Peak Upper Neck Mz	Nm	-45.6	-37.3	-40.5	Pass
Peak Head Wz	deg/s	1251	1529	1512	Pass
Peak Neck Fixture Rotation	deg	43.1	52.7	45.8	Pass
NHTSA 2019-05 Corridor				Overall Test Results	Pass





Technician: _____

J. Hernandez

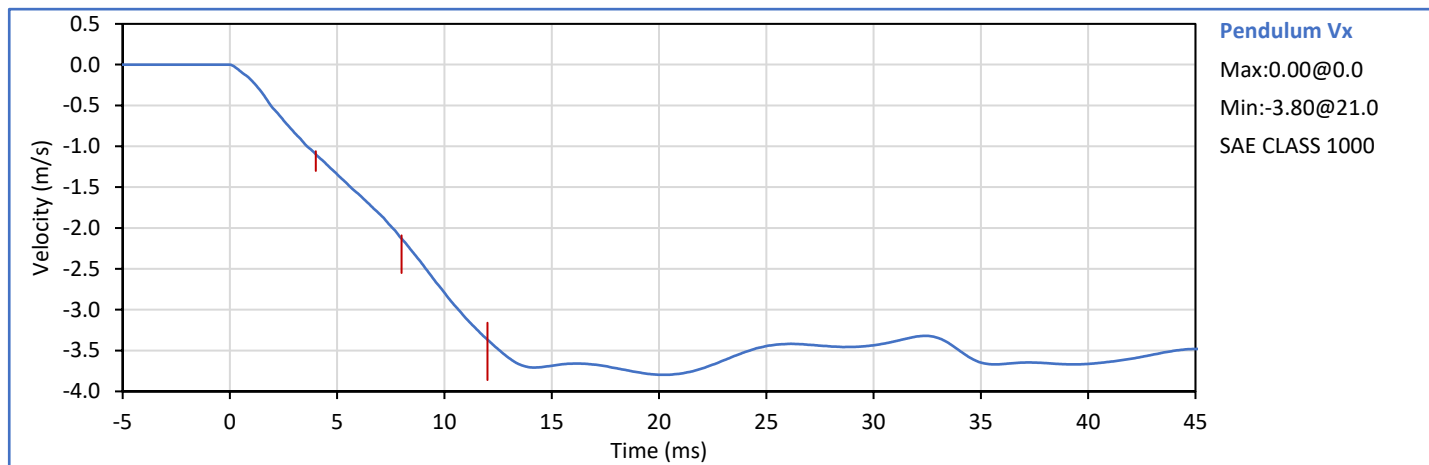
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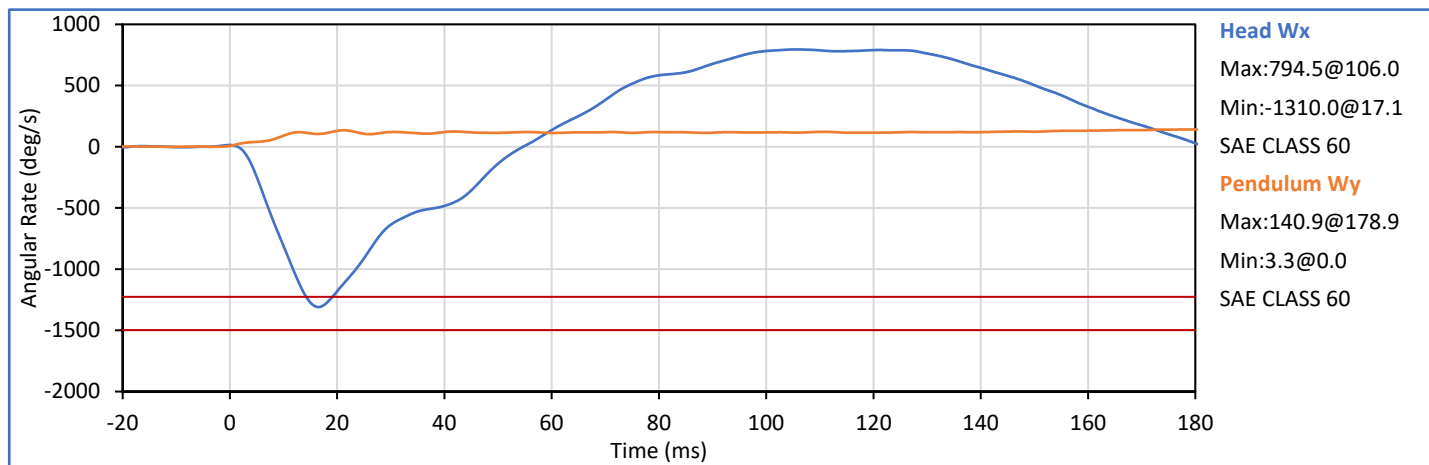
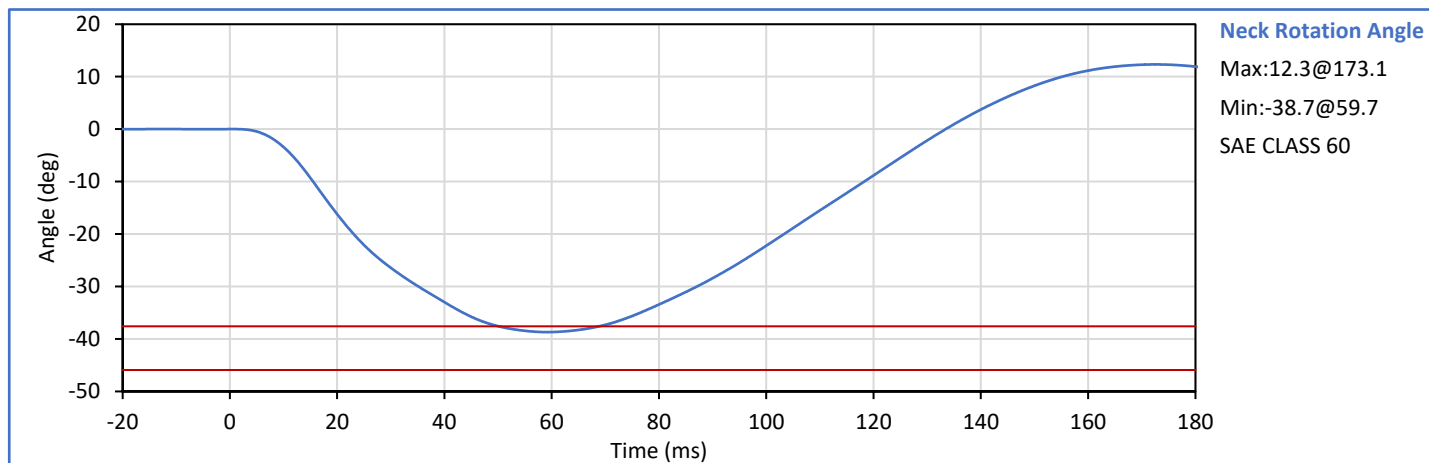
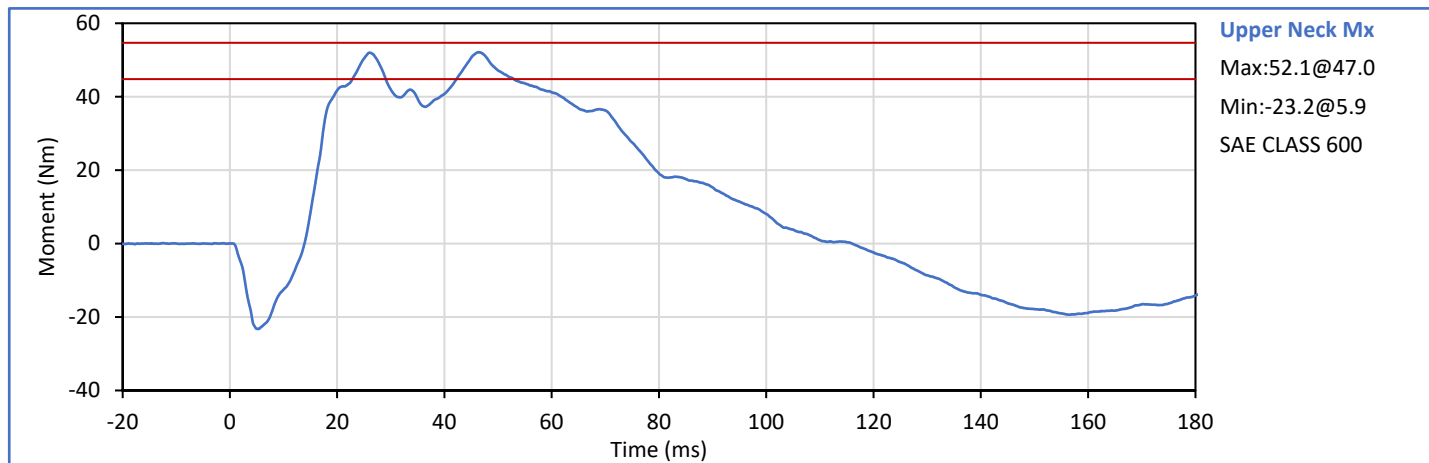
Approved By: _____

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.8	Pass
Laboratory Humidity	%	10	70	28	Pass
Pendulum Velocity	m/s	3.35	3.45	3.40	Pass
Pendulum Velocity at 4 ms	m/s	-1.30	-1.06	-1.10	Pass
Pendulum Velocity at 8 ms	m/s	-2.55	-2.09	-2.13	Pass
Pendulum Velocity at 12 ms	m/s	-3.86	-3.16	-3.37	Pass
Peak Upper Neck Mx after 40 ms	Nm	44.8	54.7	52.1	Pass
Peak Head Wx	deg/s	-1498	-1226	-1310	Pass
Peak Head Relative Rotation	deg	-45.9	-37.6	-38.7	Pass
NHTSA 2019-05 Corridor			Overall Test Results	Pass	





Technician:

J. Hernandez

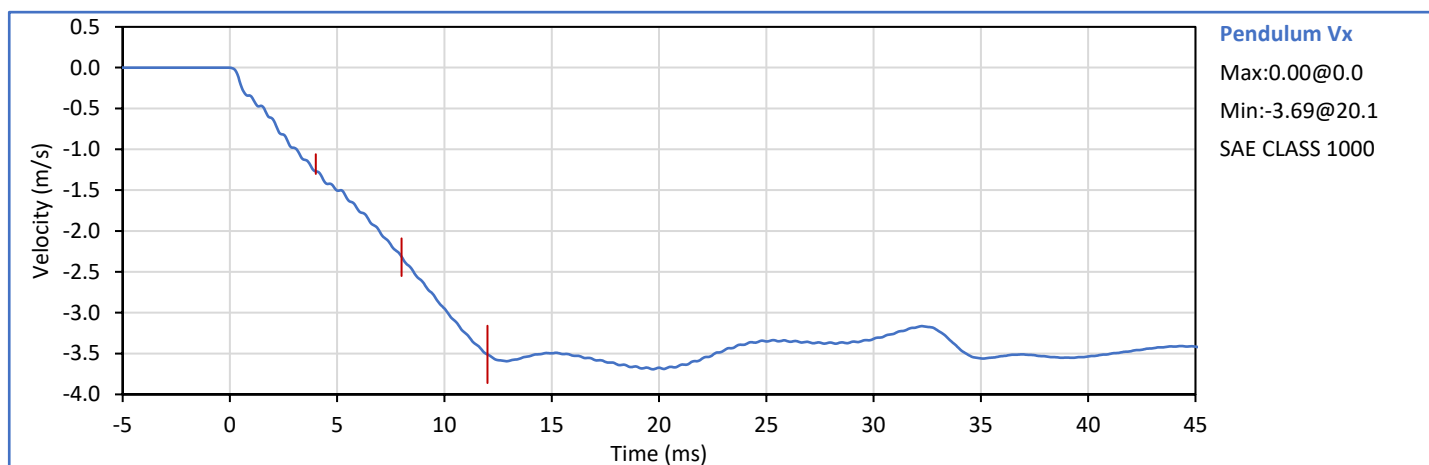
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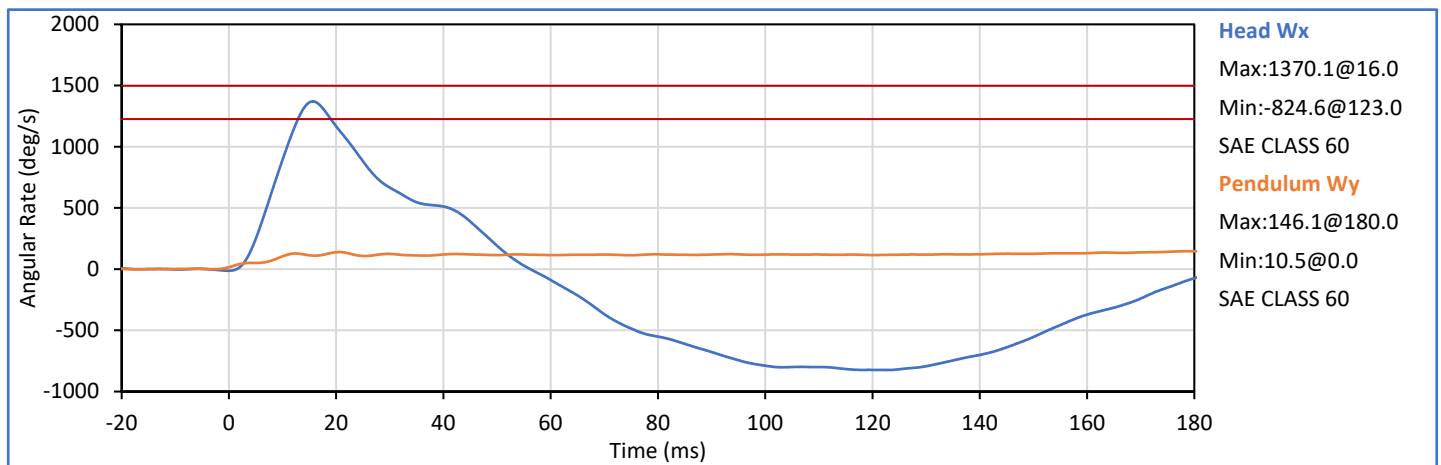
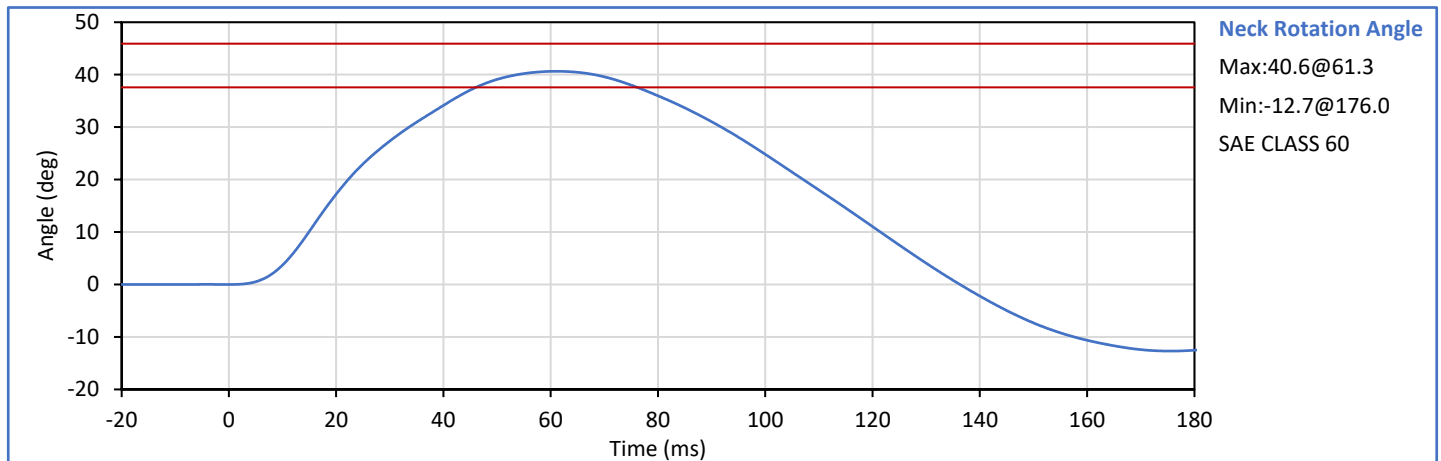
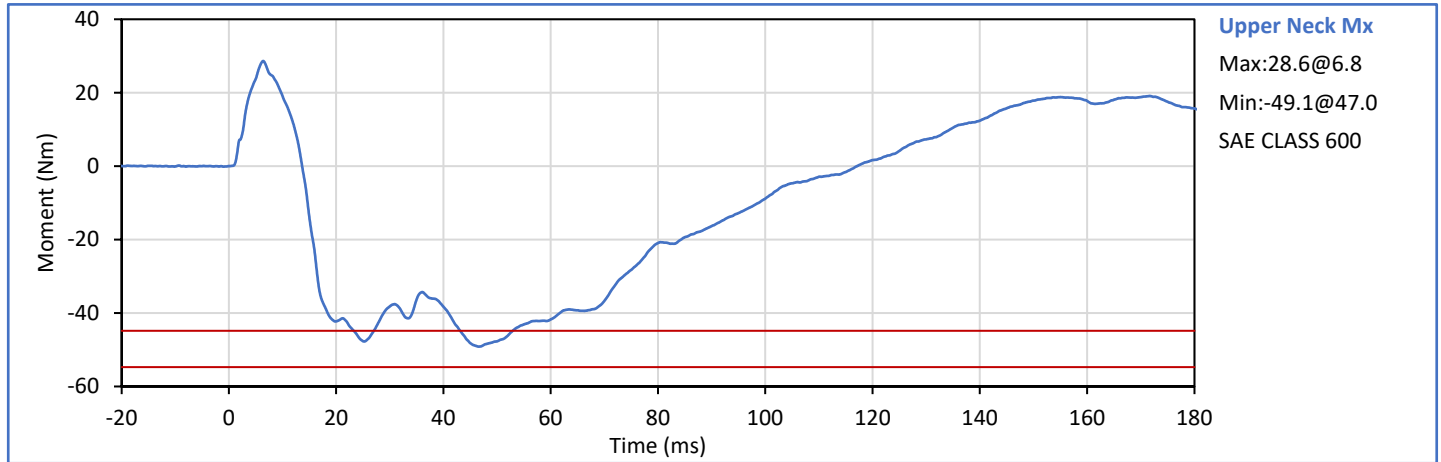
Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Humidity	%	10	70	28	Pass
Pendulum Velocity	m/s	3.35	3.45	3.41	Pass
Pendulum Velocity at 4 ms	m/s	-1.30	-1.06	-1.27	Pass
Pendulum Velocity at 8 ms	m/s	-2.55	-2.09	-2.31	Pass
Pendulum Velocity at 12 ms	m/s	-3.86	-3.16	-3.51	Pass
Peak Upper Neck Mx after 40 ms	Nm	-54.7	-44.8	-49.1	Pass
Peak Head Wx	deg/s	1226	1498	1370	Pass
Peak Head Relative Rotation	deg	37.6	45.9	40.6	Pass
NHTSA 2019-05 Corridor				Overall Test Results	Pass





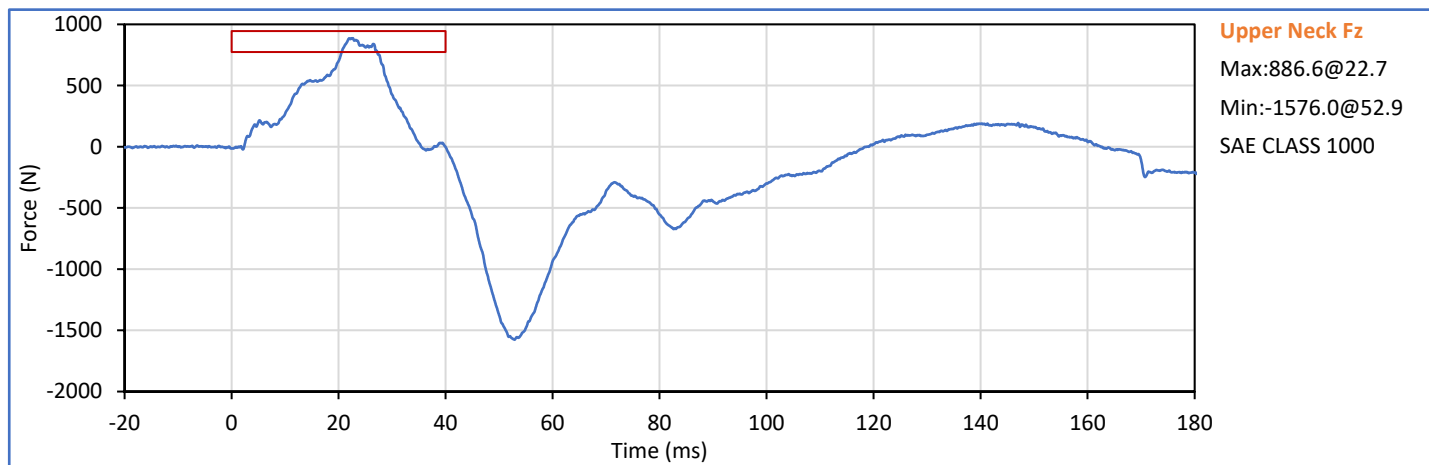
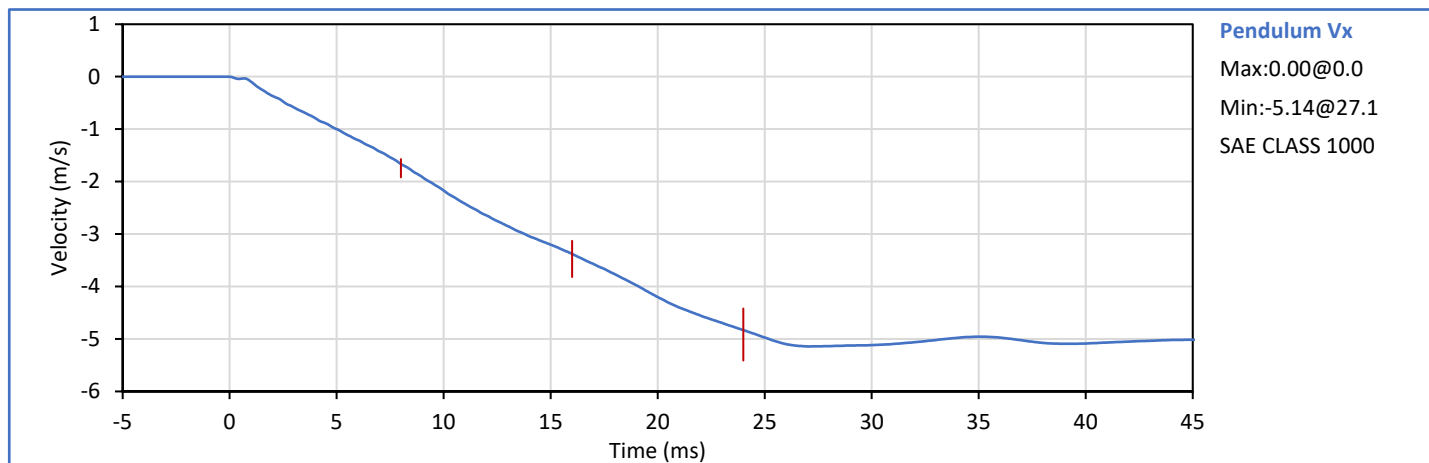
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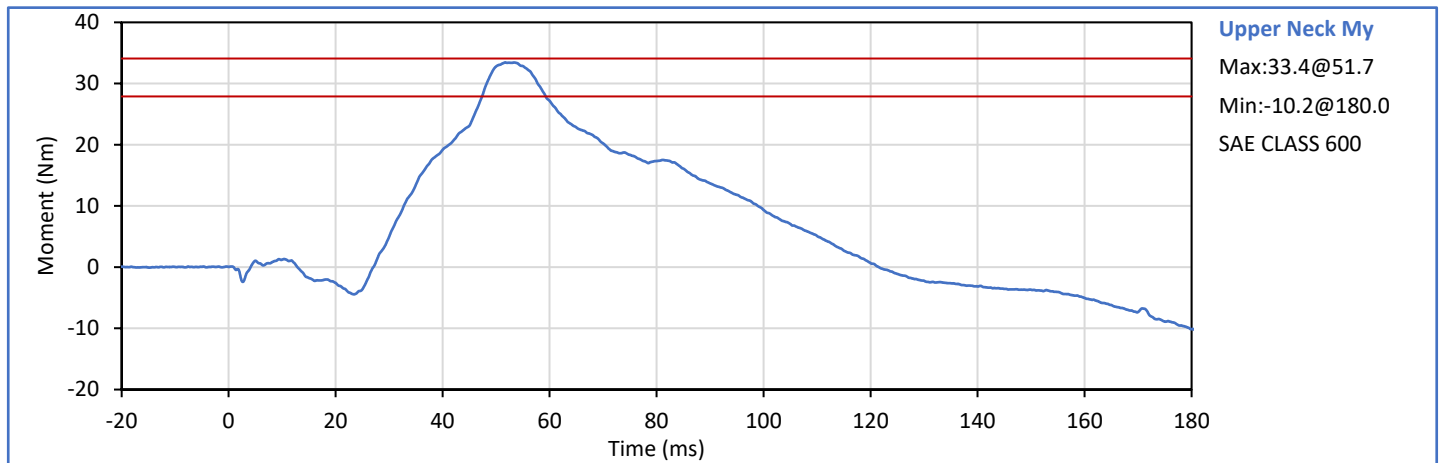
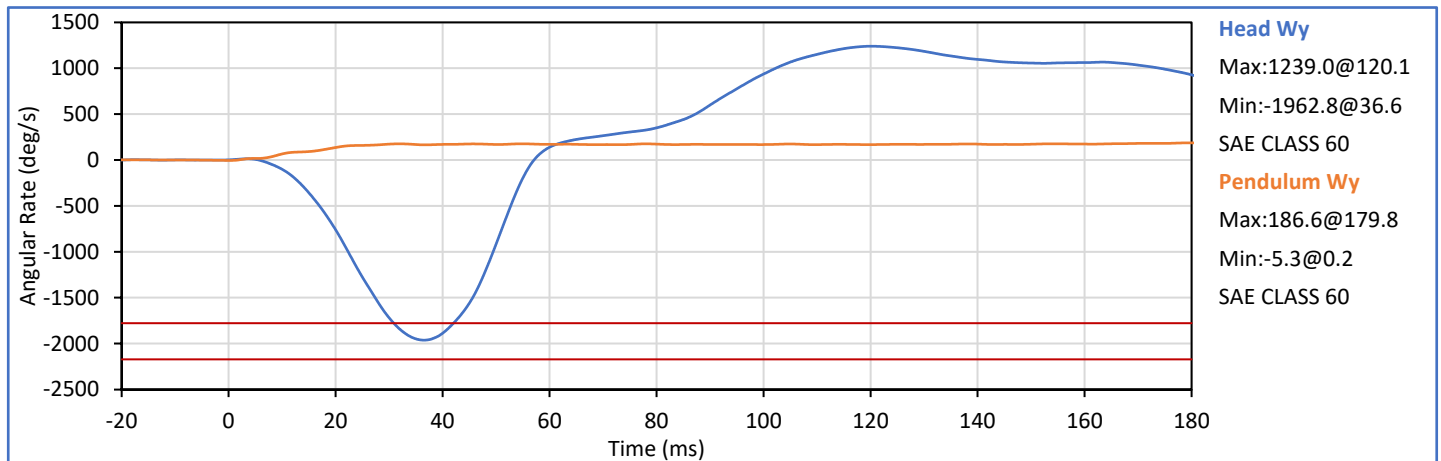
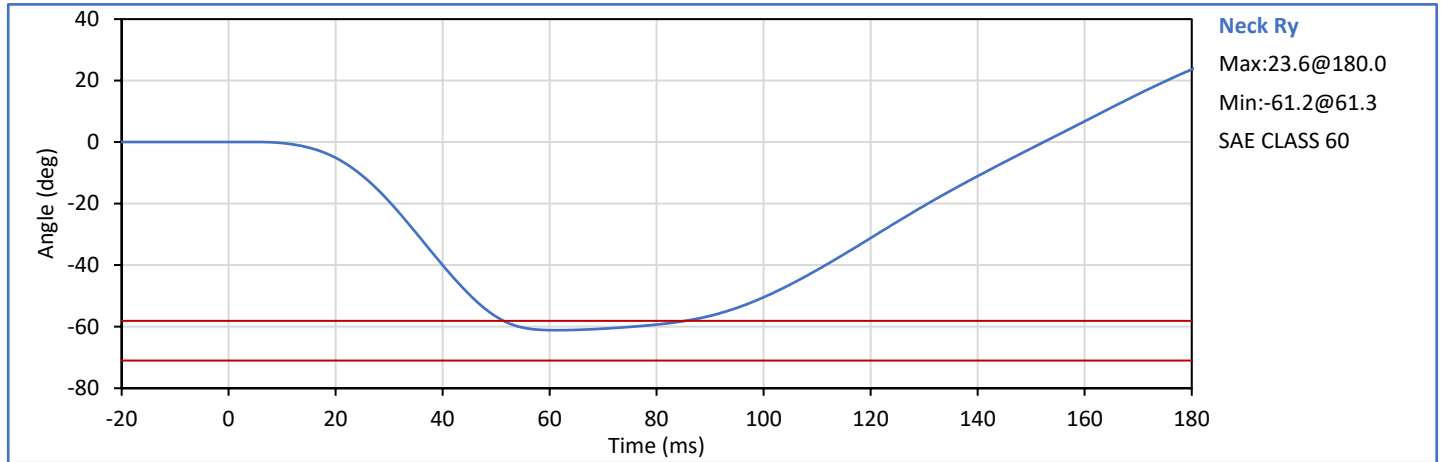
J. Hernandez

Approved By: _____

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.7	Pass
Laboratory Relative Humidity	%	10	70	24	Pass
Pendulum Velocity	m/s	4.95	5.05	4.99	Pass
Pendulum Velocity at 8 ms	m/s	-1.92	-1.57	-1.67	Pass
Pendulum Velocity at 16 ms	m/s	-3.82	-3.13	-3.38	Pass
Pendulum Velocity at 24 ms	m/s	-5.41	-4.42	-4.83	Pass
Peak Upper Neck My	Nm	27.9	34.1	33.4	Pass
Peak Upper Neck Fz (before 40 ms)	N	774	946	887	Pass
Peak Head Wy	deg/s	-2172	-1777	-1963	Pass
Peak Head Relative Rotation	deg	-71.0	-58.1	-61.2	Pass
NHTSA 2019-05 Corridor				Overall Test Results	Pass





Technician:

J. Hernandez

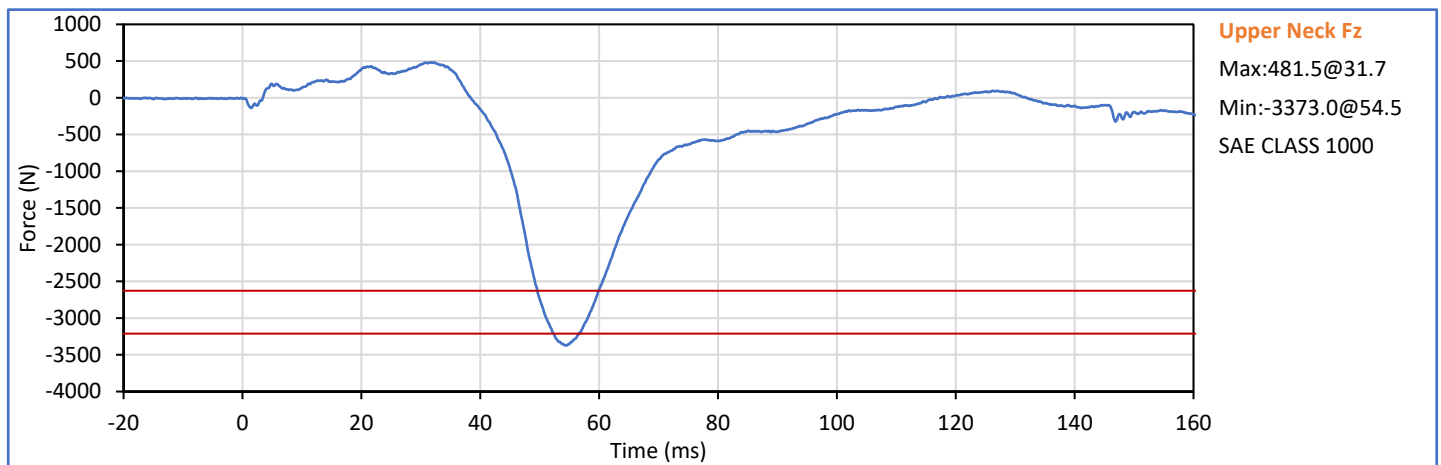
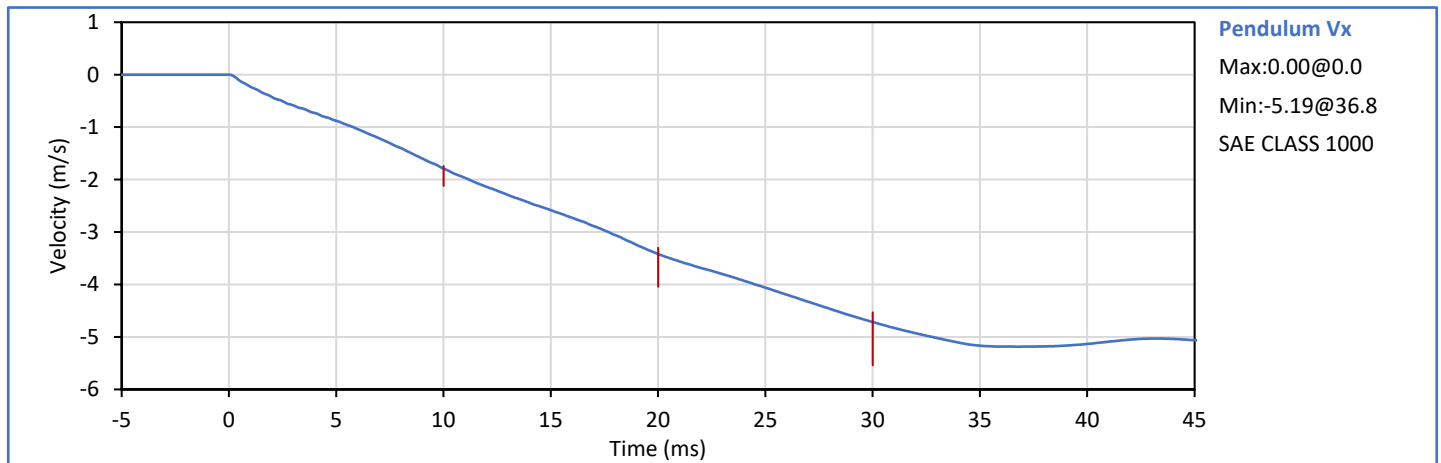
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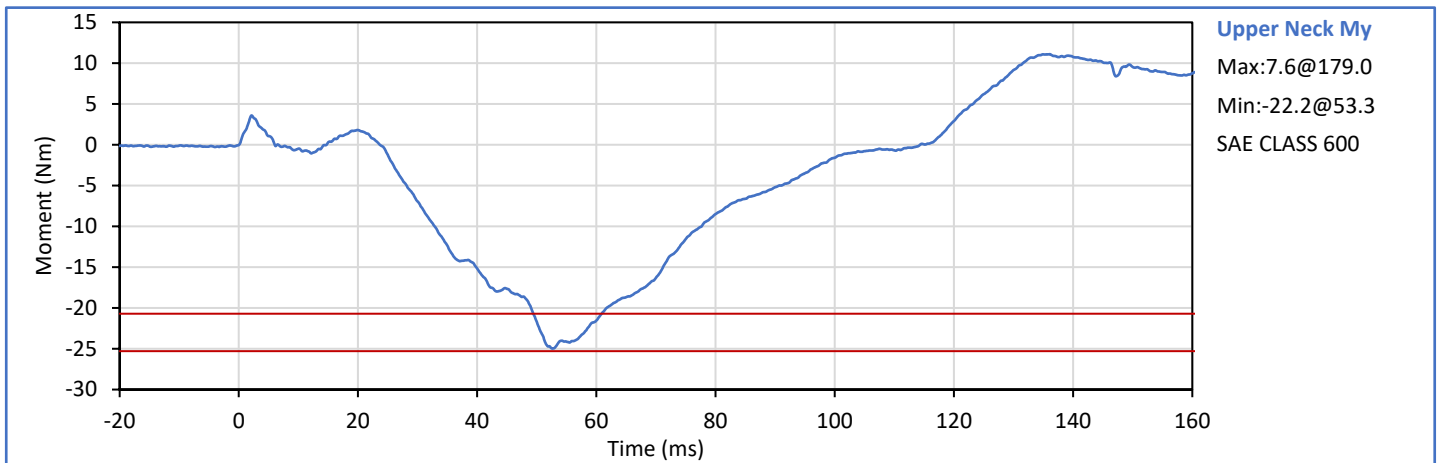
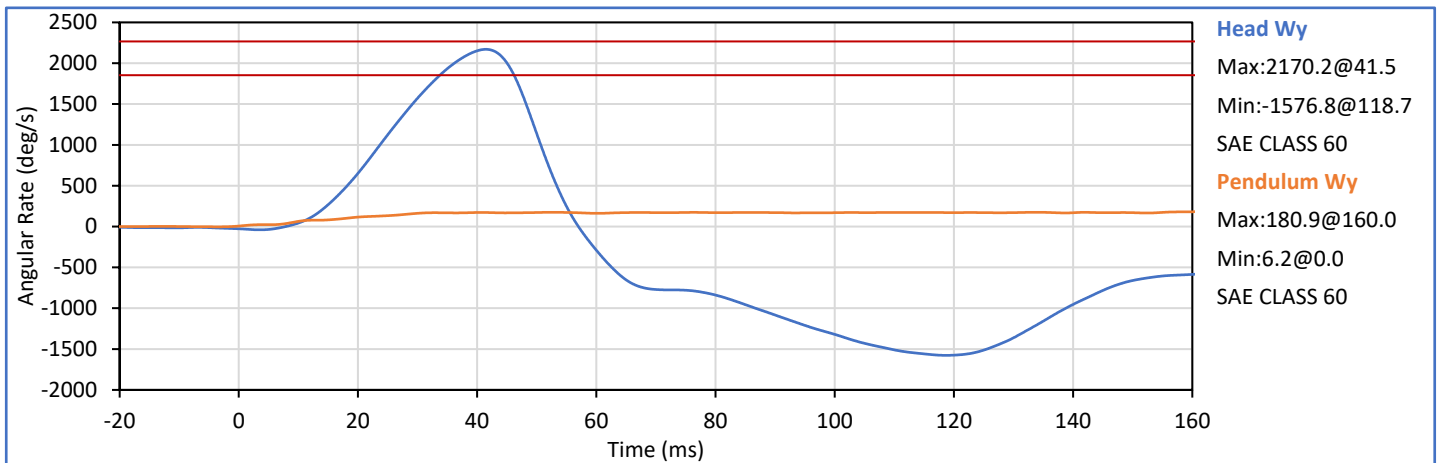
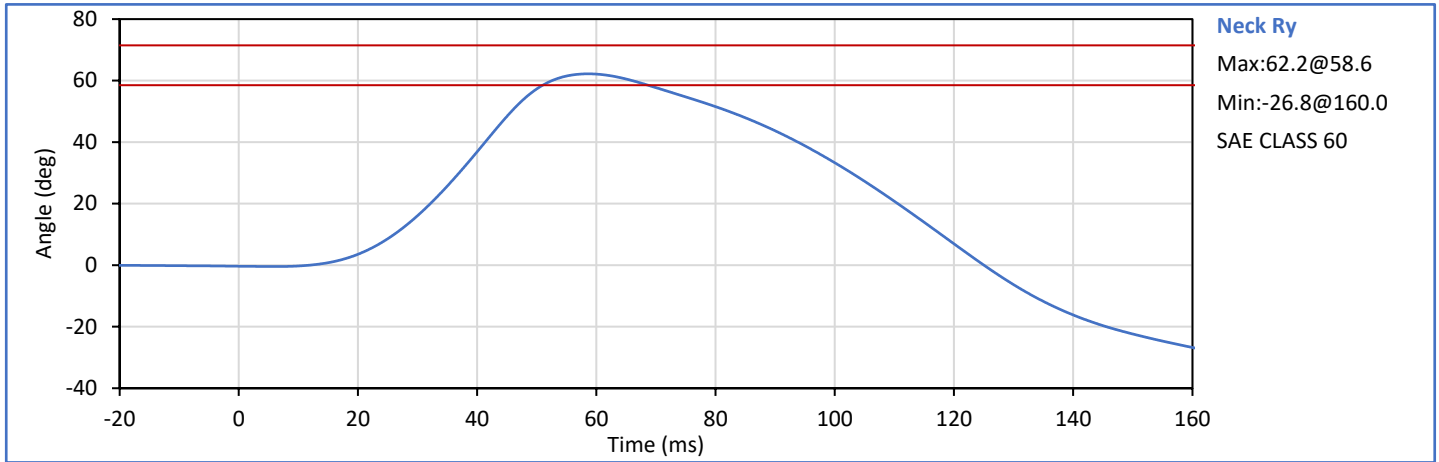
Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	26	Pass
Pendulum Velocity	m/s	4.95	5.05	5.01	Pass
Pendulum Velocity at 10 ms	m/s	-2.12	-1.74	-1.80	Pass
Pendulum Velocity at 20 ms	m/s	-4.04	-3.30	-3.43	Pass
Pendulum Velocity at 30 ms	m/s	-5.54	-4.53	-4.72	Pass
Peak Upper Neck My	Nm	-25.3	-20.7	-25.0	Pass
Peak Upper Neck Fz	N	-3210	-2626	-3373	Fail
Peak Head Wy	deg/s	1855	2267	2170	Pass
Peak Head Relative Rotation	deg	58.5	71.5	62.2	Pass
NHTSA 2019-05 Corridor				Overall Test Results	Fail





Technician:

J. Hernandez

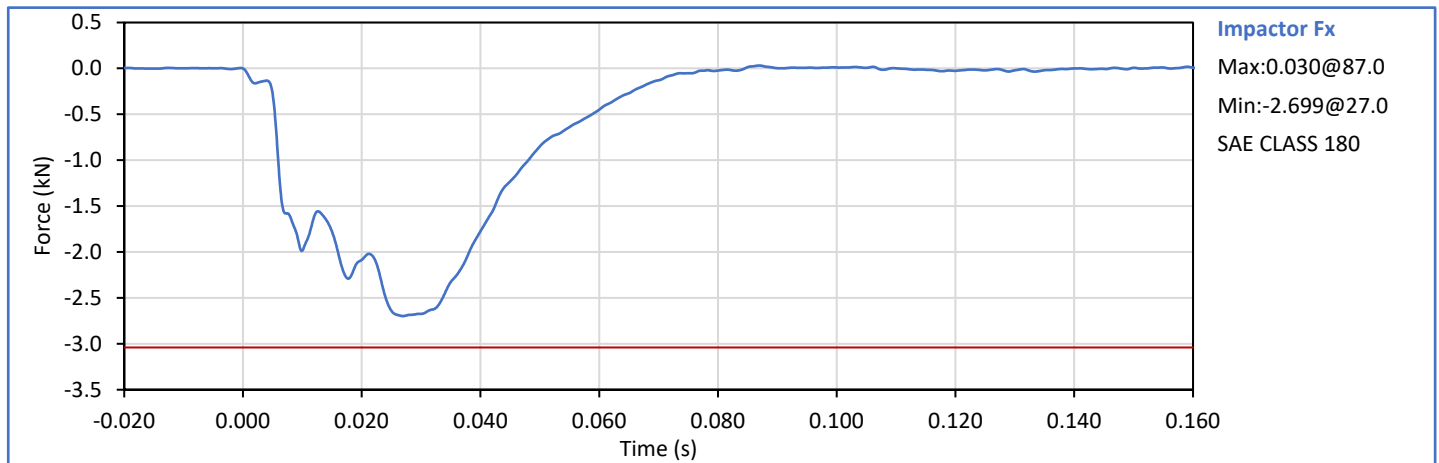
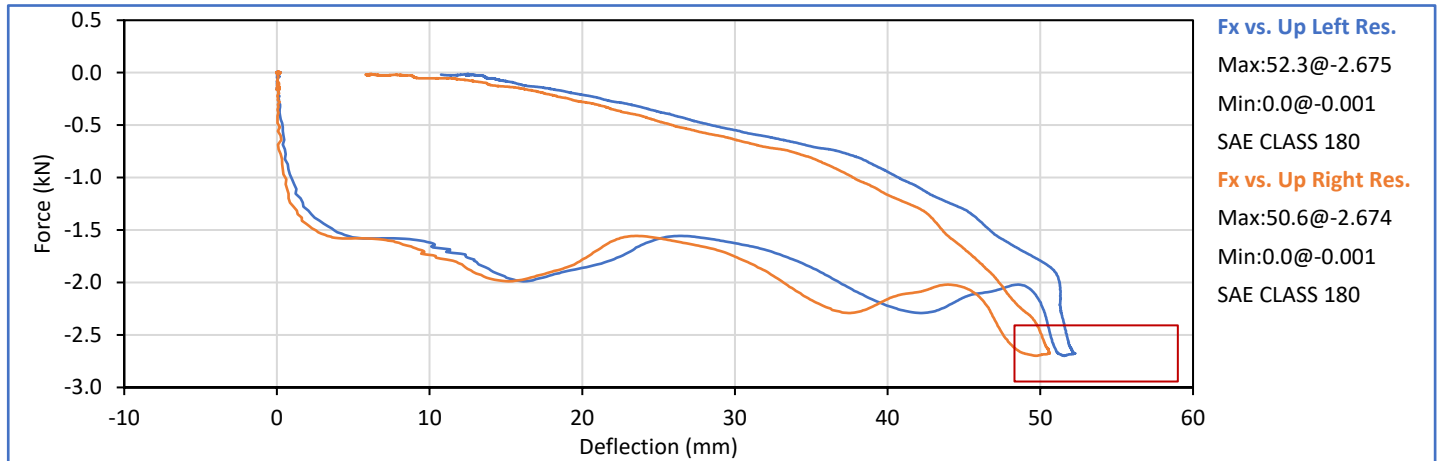
J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.9	Pass
Laboratory Relative Humidity	%	10	70	29	Pass
Probe Velocity	m/s	4.25	4.35	4.29	Pass
Peak Probe Force	kN	-3.039		-2.699	Pass
Peak Upper Left Deflection Res.	mm	48.3	59.0	52.3	Pass
Peak Upper Right Deflection Res.	mm			50.6	Pass
Absolute Difference L/R Defl. Res.	mm	0.0	5.0	1.7	Pass
Force at Peak Upper Left Res.	mm	-2.944	-2.409	-2.675	Pass
Force at Peak Upper Right Res.	mm			-2.674	Pass
NHTSA Corridor 2019-05			Overall Test Results		Pass



Technician:

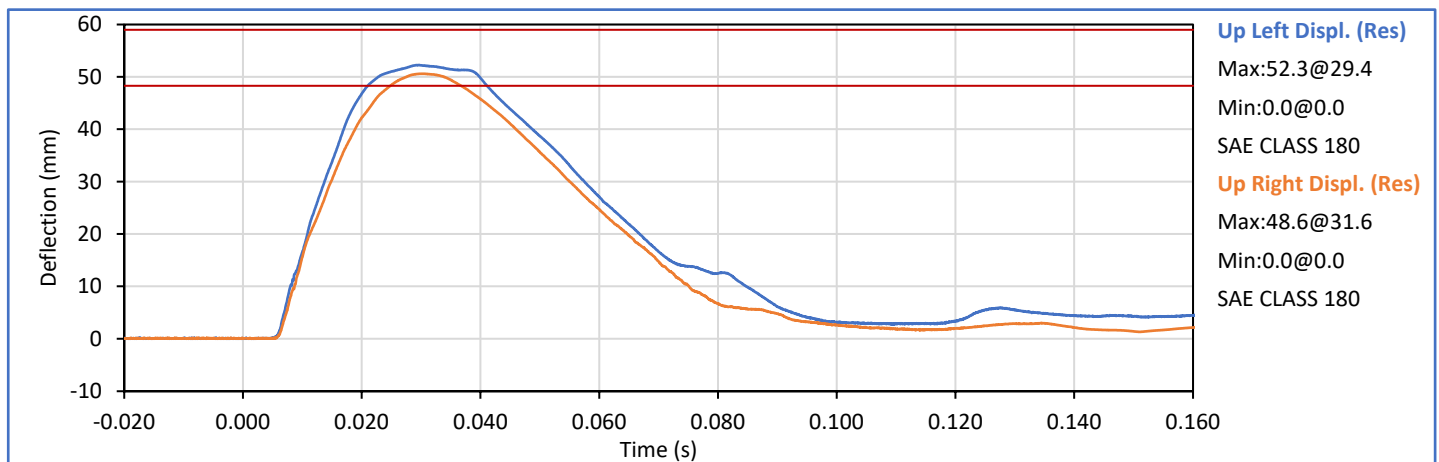
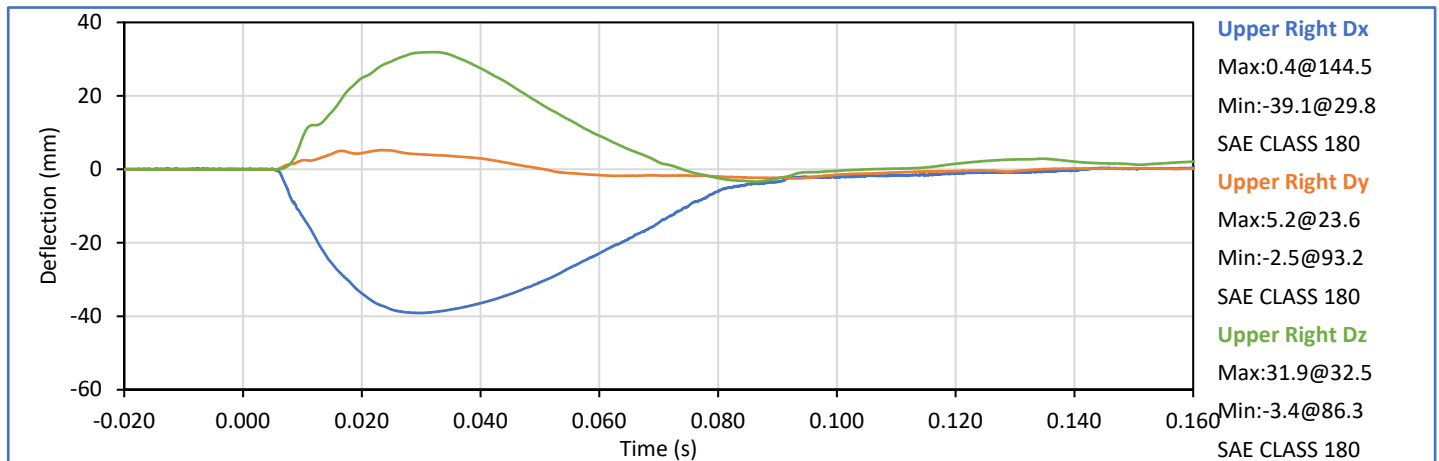
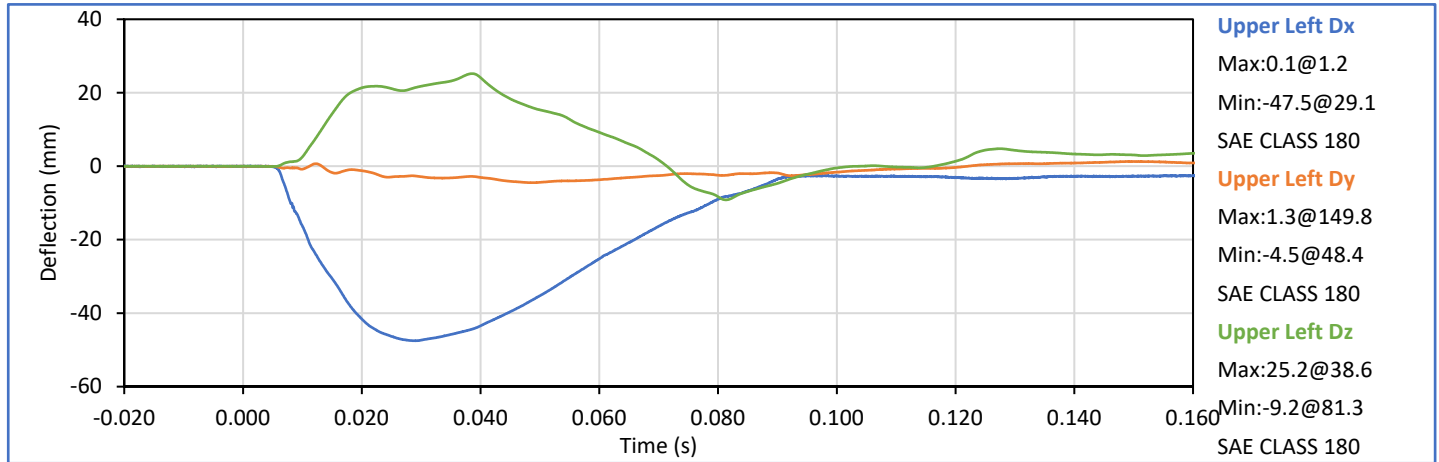
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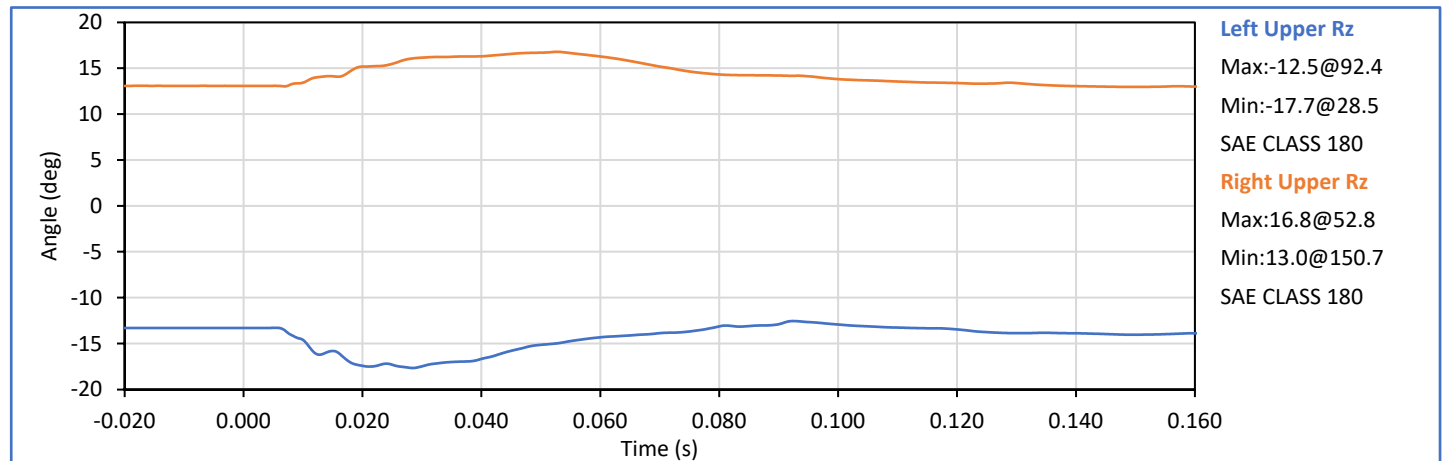
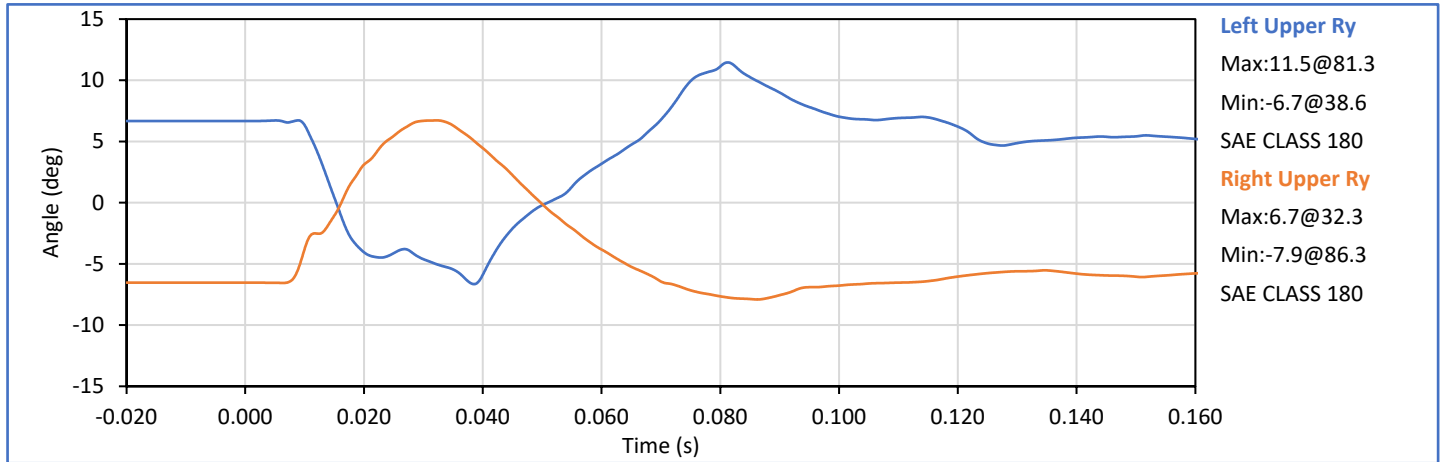
J. Hernandez

Approved By:

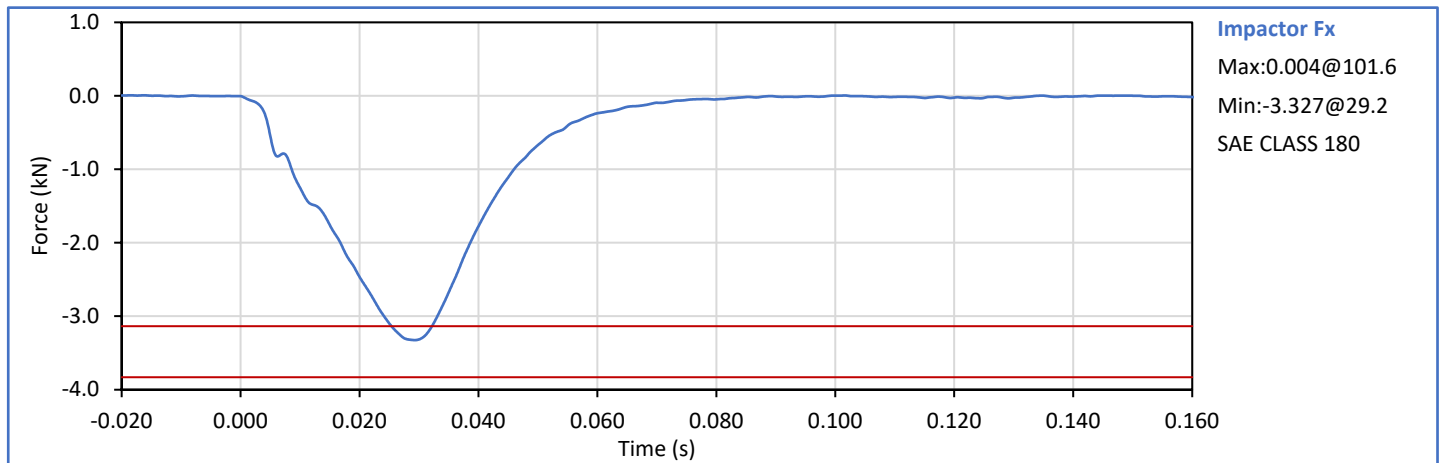
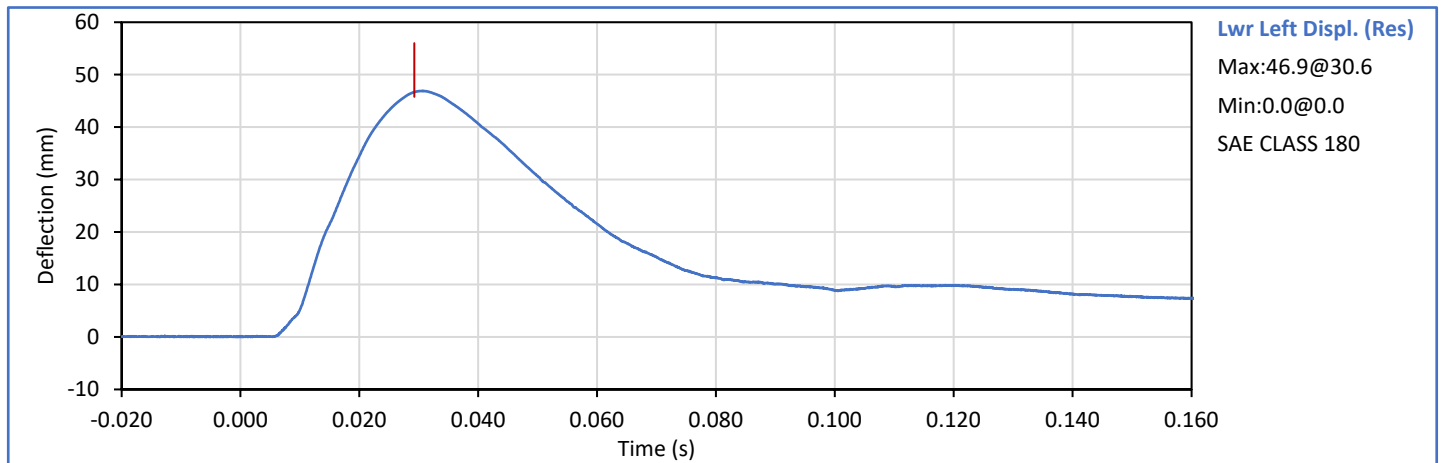
P. Puzzuto

P. Puzzuto





Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	28	Pass
Probe Velocity	m/s	4.25	4.35	4.34	Pass
Peak Probe Force	kN	-3.832	-3.136	-3.327	Pass
Lower Left Defl. Res. at Peak Fx	mm	45.8	56.0	46.7	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



Technician:

J. Hernandez

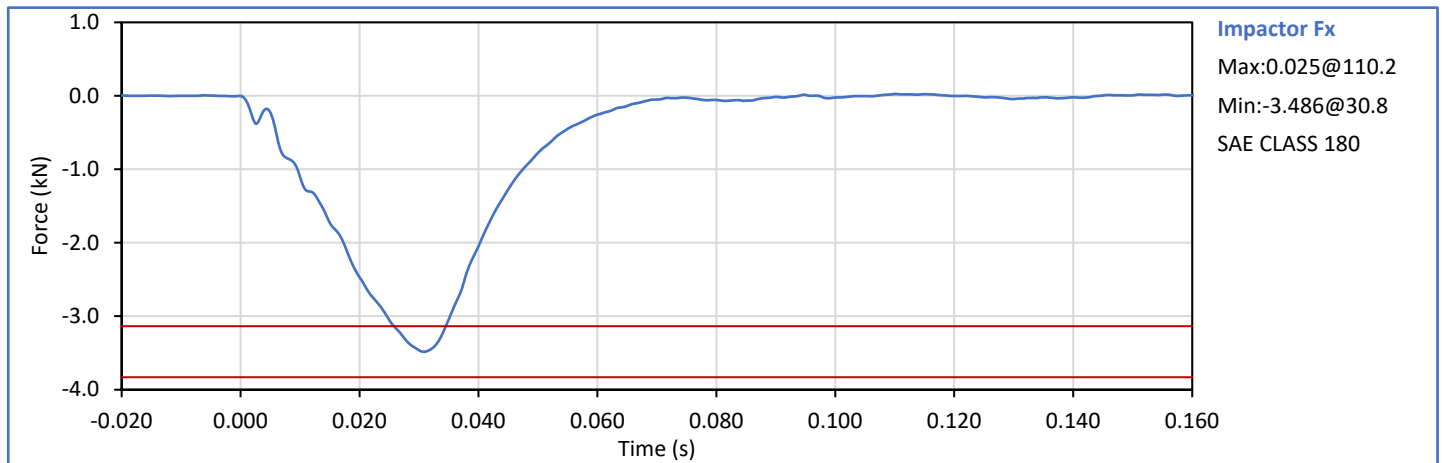
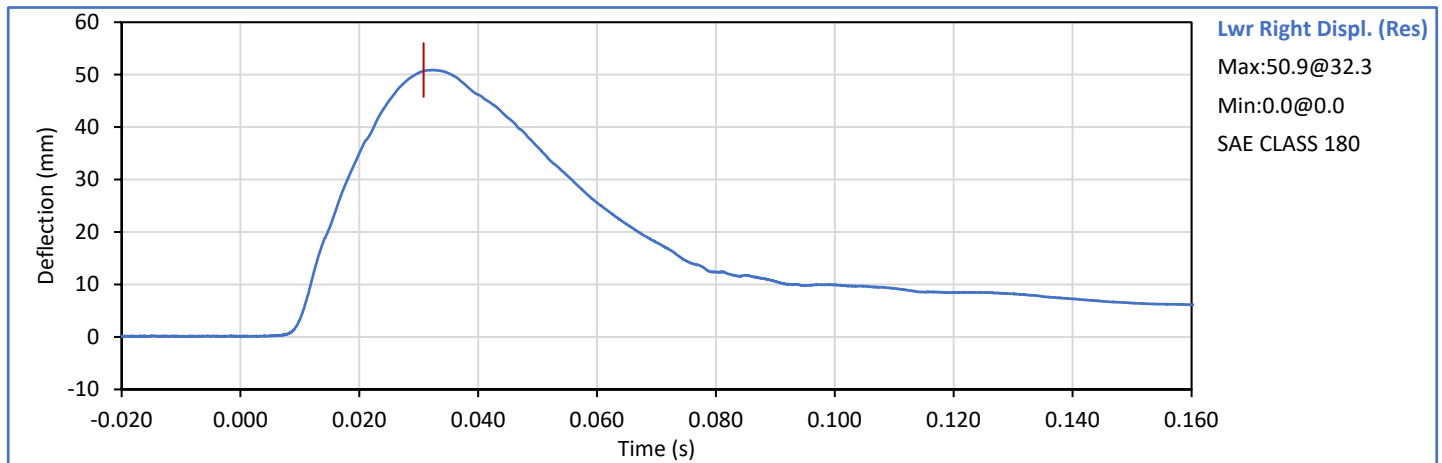
J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.5	Pass
Laboratory Relative Humidity	%	10	70	28	Pass
Probe Velocity	m/s	4.25	4.35	4.32	Pass
Peak Probe Force	kN	-3.832	-3.136	-3.486	Pass
Lower Left Defl. Res. at Peak Fx	mm	45.8	56.0	50.7	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



Technician:

J. Hernandez

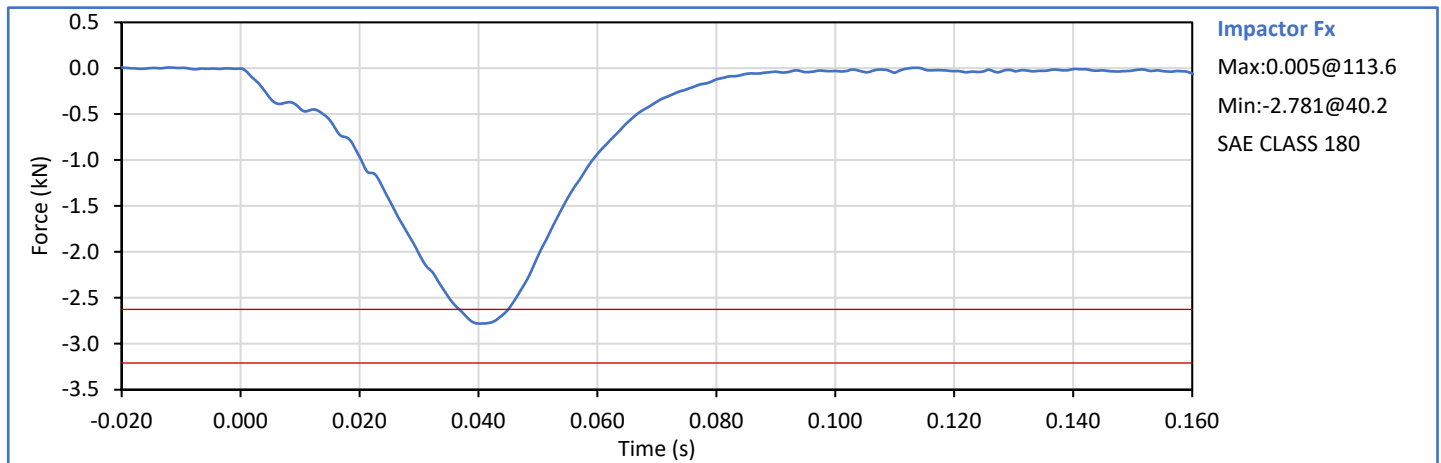
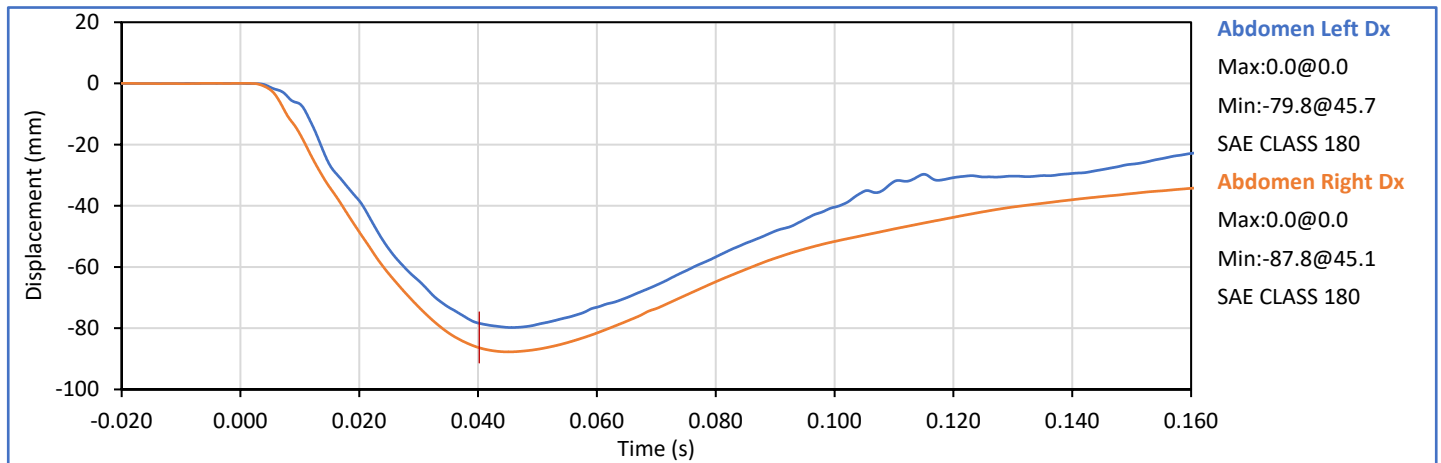
J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	35	Pass
Probe Velocity	m/sec	3.25	3.35	3.32	Pass
Peak Probe Force	kN	-3.210	-2.626	-2.781	Pass
Lower Left Dx at Time of Peak Force	mm	-91.3	-74.7	-78.4	Pass
Lower Right Dx at Time of Peak Force	mm			-86.4	Pass
Absolute Difference of Left/Right Dx	mm	0.0	8.0	8.0	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



Technician:

J. Hernandez

J. Hernandez

Approved By:

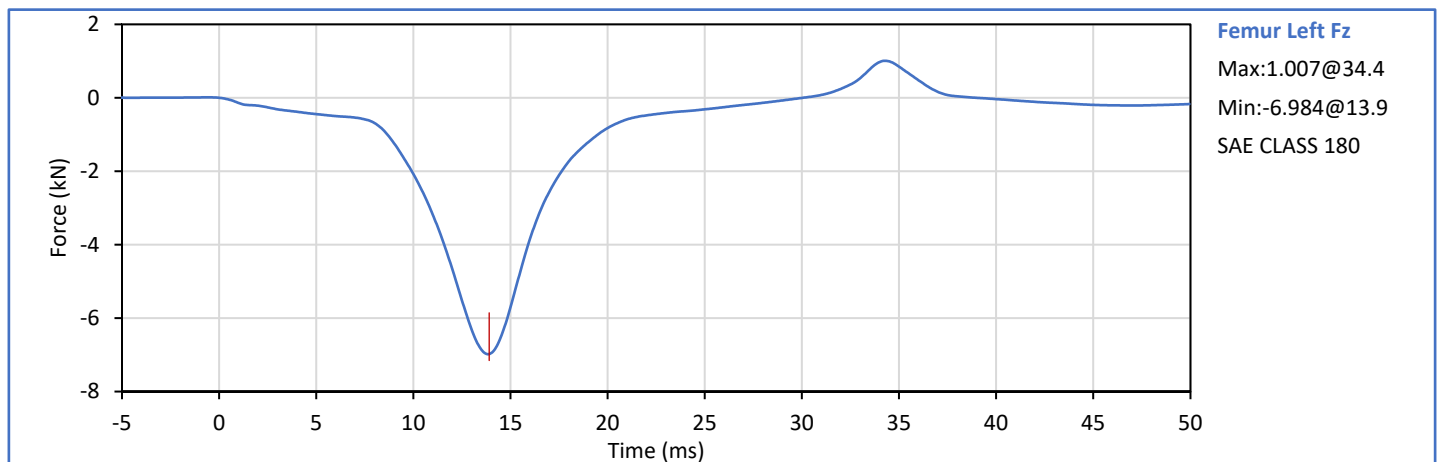
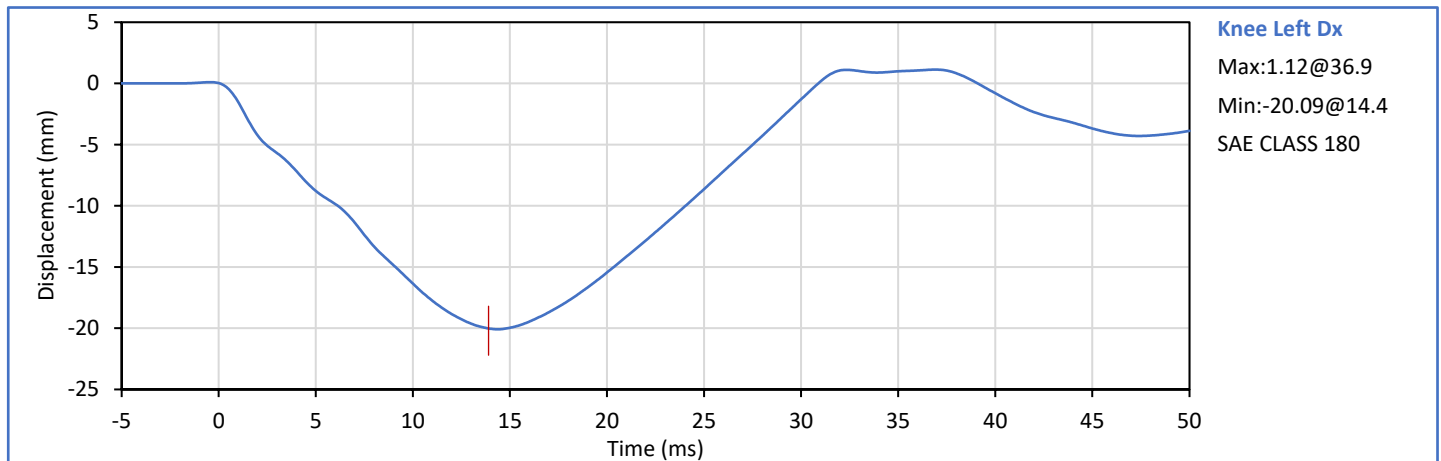
P. Puzzuto

P. Puzzuto

ATD Serial No.: DO9799

Test Date: 2021-10-14

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	20.9	Pass
Laboratory Relative Humidity	%	10	70	21	Pass
Pendulum Velocity	m/s	2.15	2.25	2.20	Pass
Peak Femur Fz	kN	-7.156	-5.855	-6.984	Pass
Knee Dx at Peak Femur Fz	mm	-22.20	-18.20	-20.01	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



Technician:

J. Hernandez

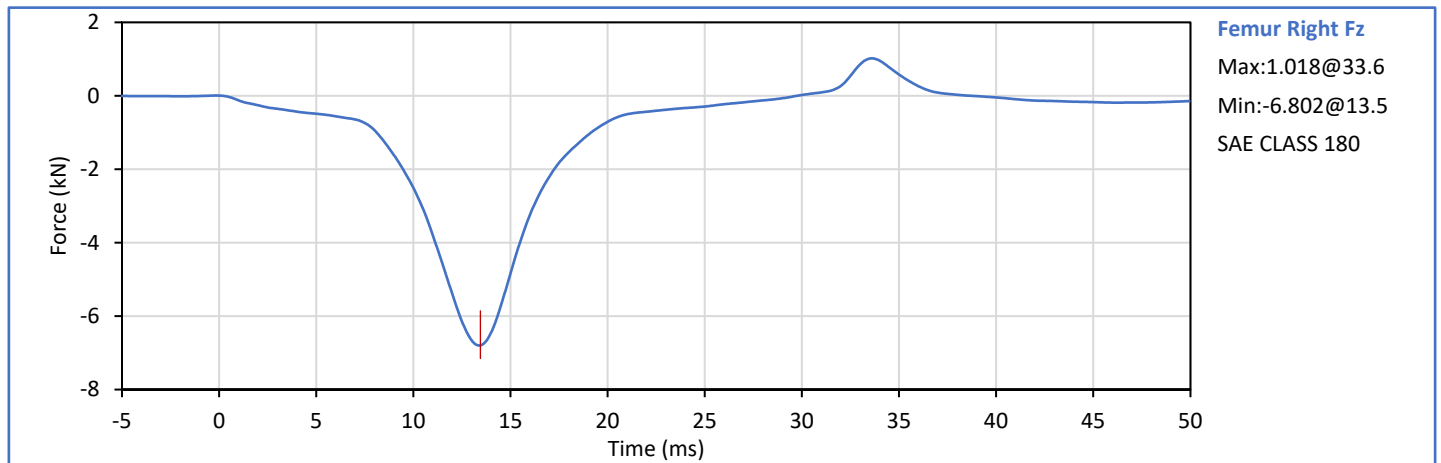
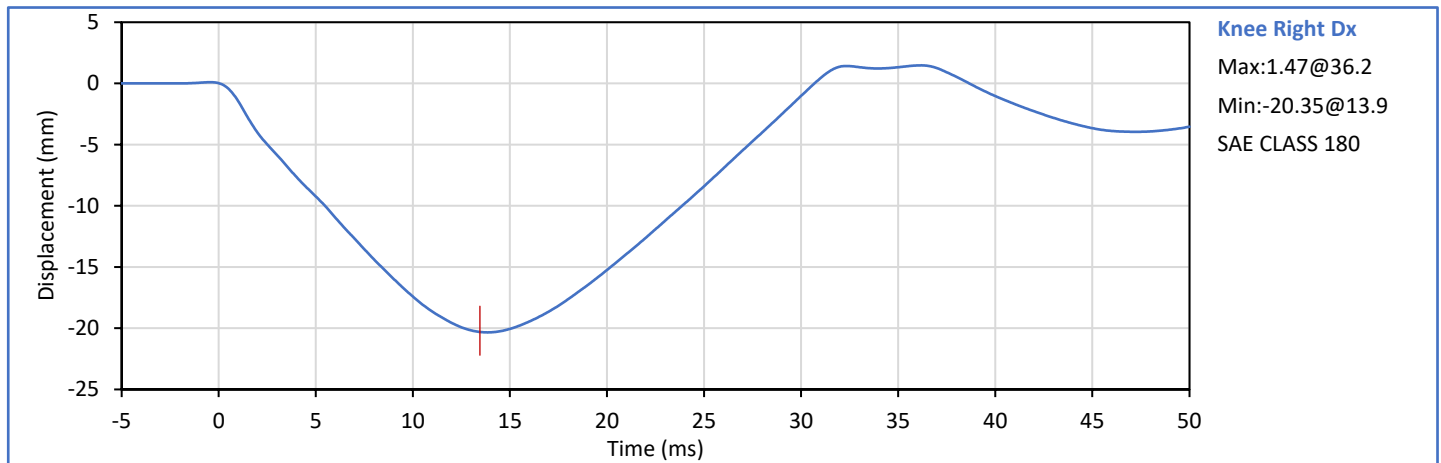
J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.2	Pass
Laboratory Relative Humidity	%	10	70	23	Pass
Pendulum Velocity	m/s	2.15	2.25	2.21	Pass
Peak Femur Fz	kN	-7.156	-5.855	-6.802	Pass
Knee Dx at Peak Femur Fz	mm	-22.20	-18.20	-20.30	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



Technician:

J. Hernandez

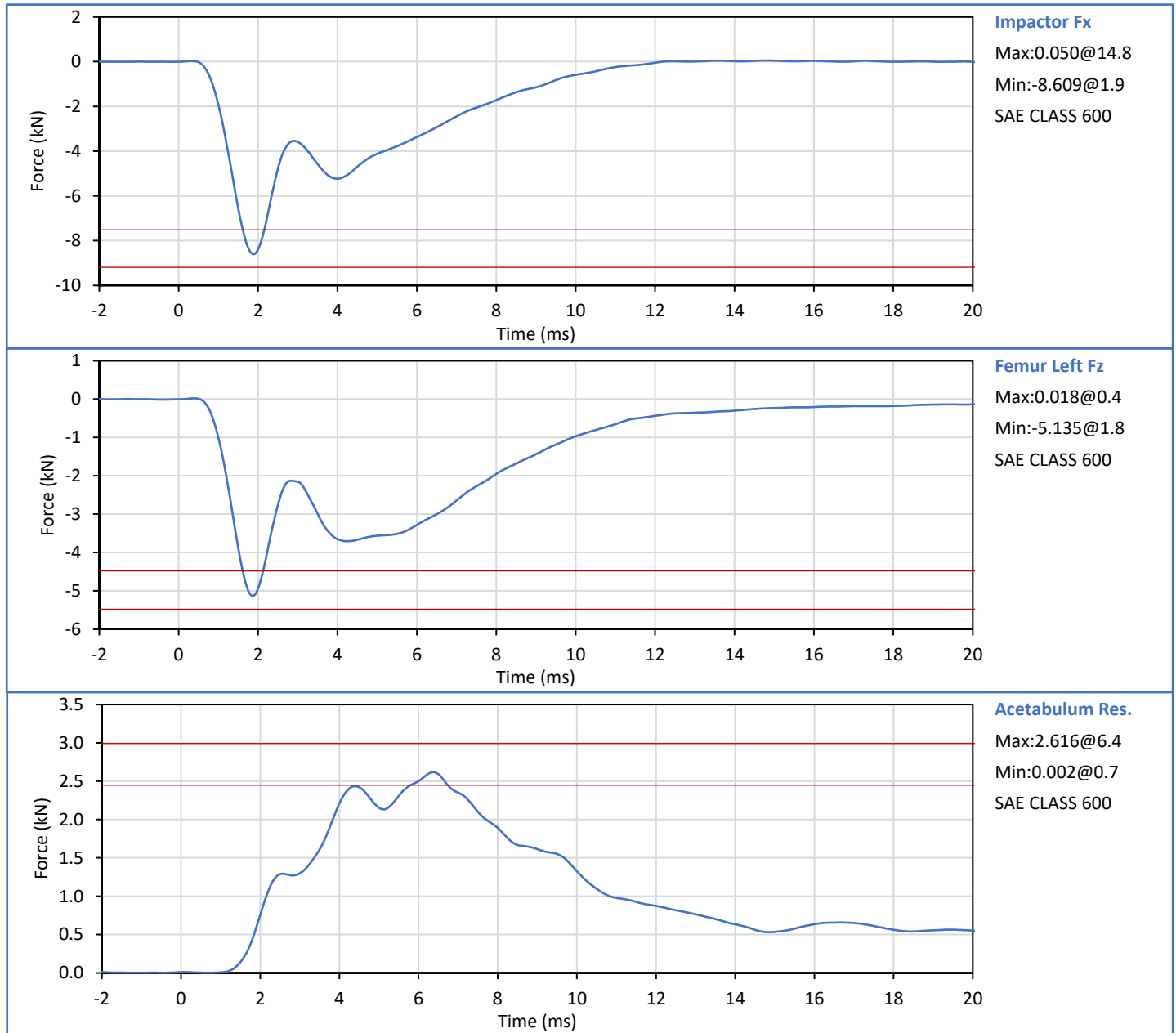
J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

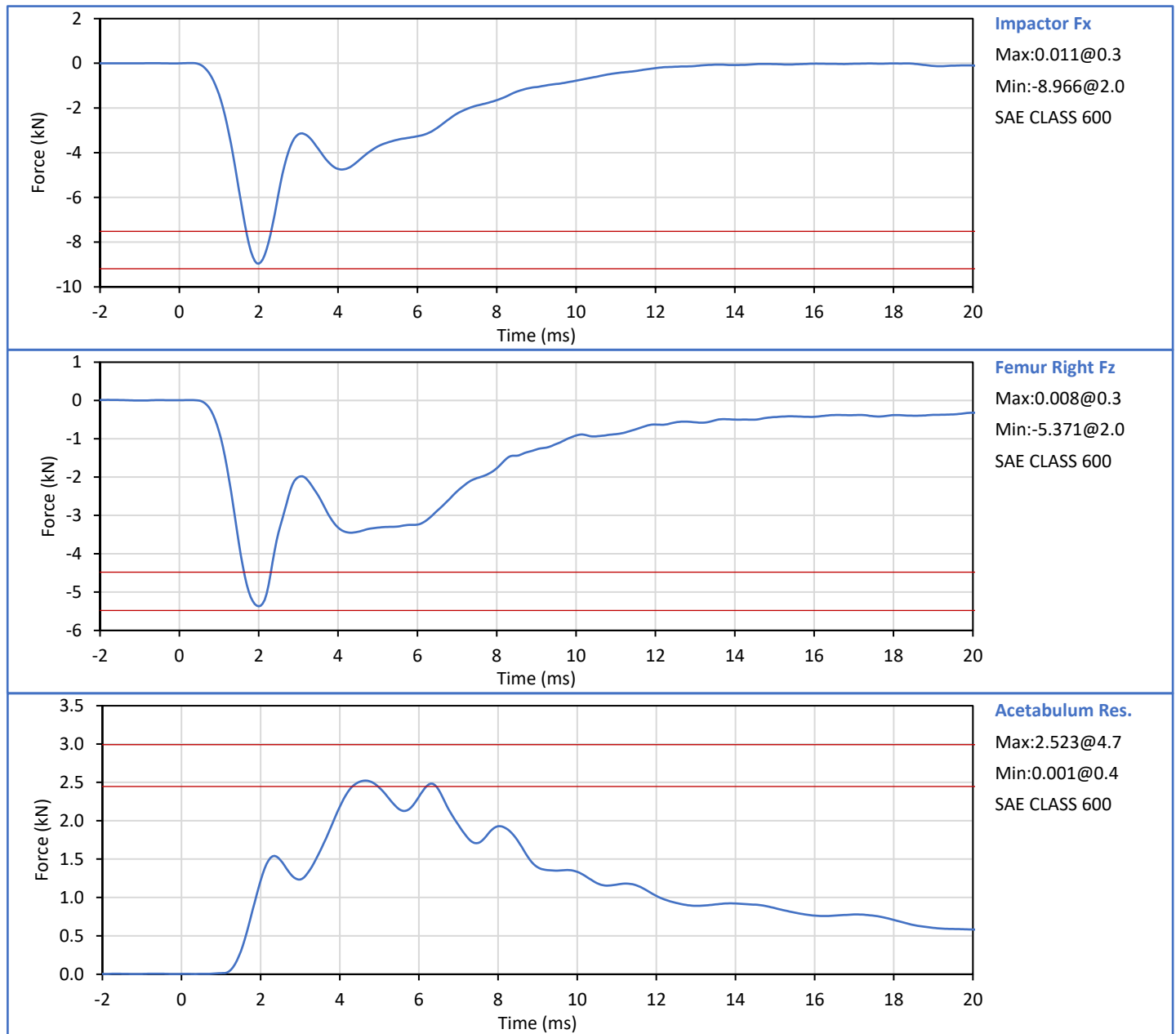
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Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	37	Pass
Pendulum Velocity	m/s	3.25	3.35	3.31	Pass
Peak Impactor Fx	kN	-9.188	-7.517	-8.609	Pass
Peak Femur Fz	kN	-5.478	-4.482	-5.135	Pass
Acetabulum Force Resultant	kN	2.447	2.991	2.616	Pass
¹ NHTSA Corridor 2020-03 (Preliminary Corridor)				Overall Test Results	Pass



Technician: J. Hernandez

Approved By: P. Puzzuto

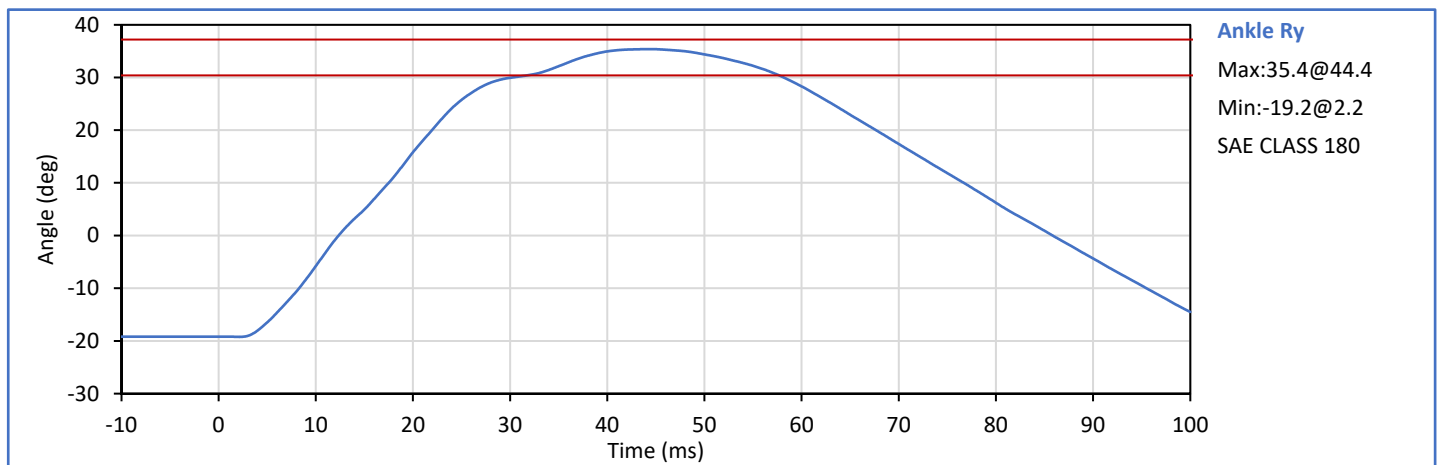
Tested Parameter	Units	Spec. Low ¹	Spec. High ¹	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	37	Pass
Pendulum Velocity	m/s	3.25	3.35	3.30	Pass
Peak Impactor Fx	kN	-9.188	-7.517	-8.966	Pass
Peak Femur Fz	kN	-5.478	-4.482	-5.371	Pass
Acetabulum Force Resultant	kN	2.447	2.991	2.523	Pass
¹ NHTSA Corridor 2020-03 (Preliminary Corridor)				Overall Test Results	Pass

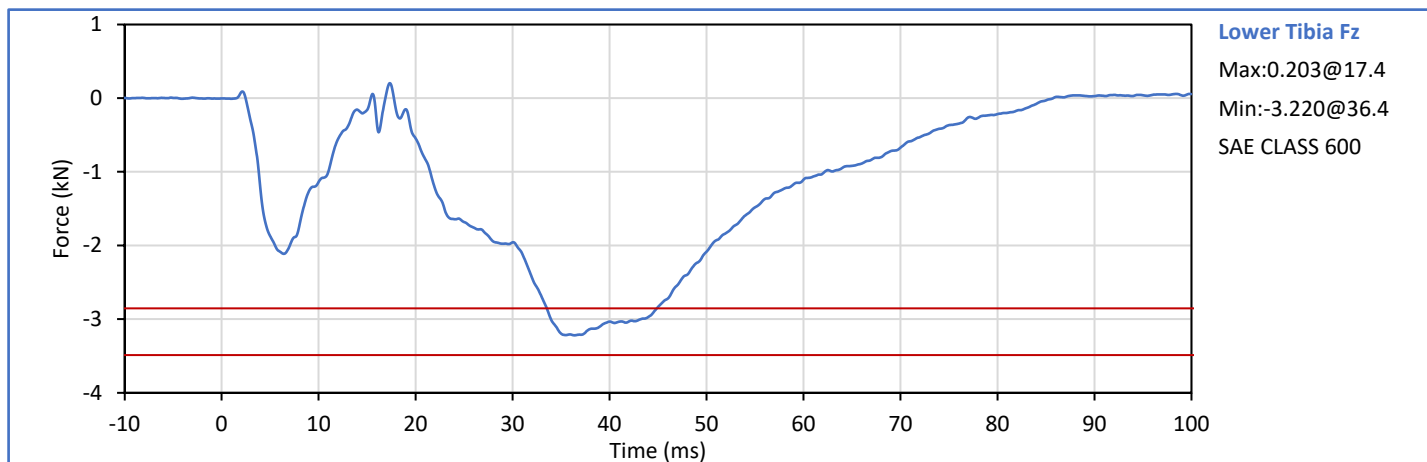
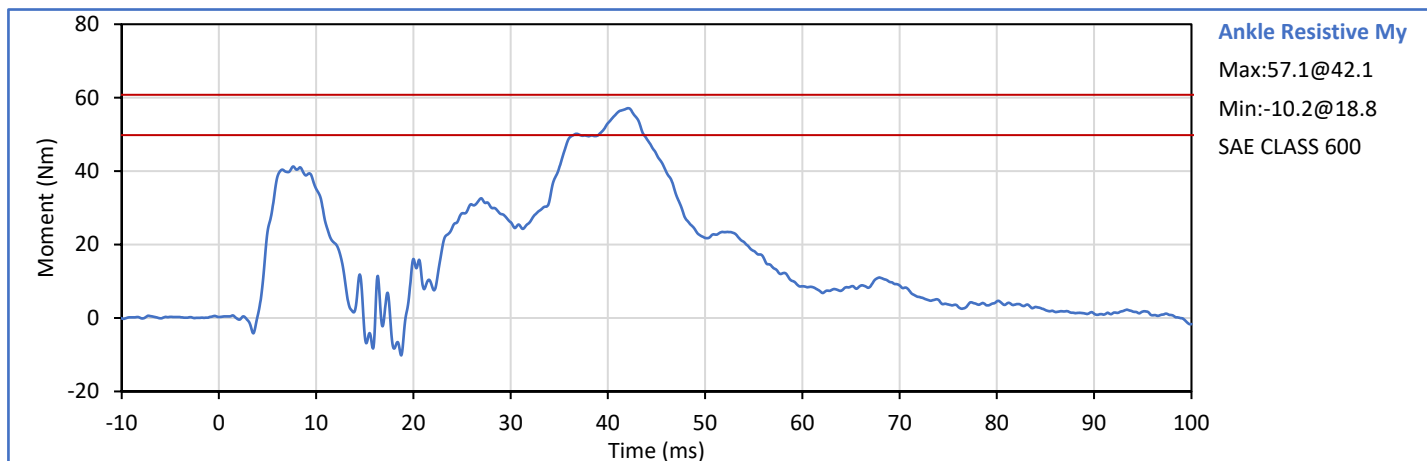
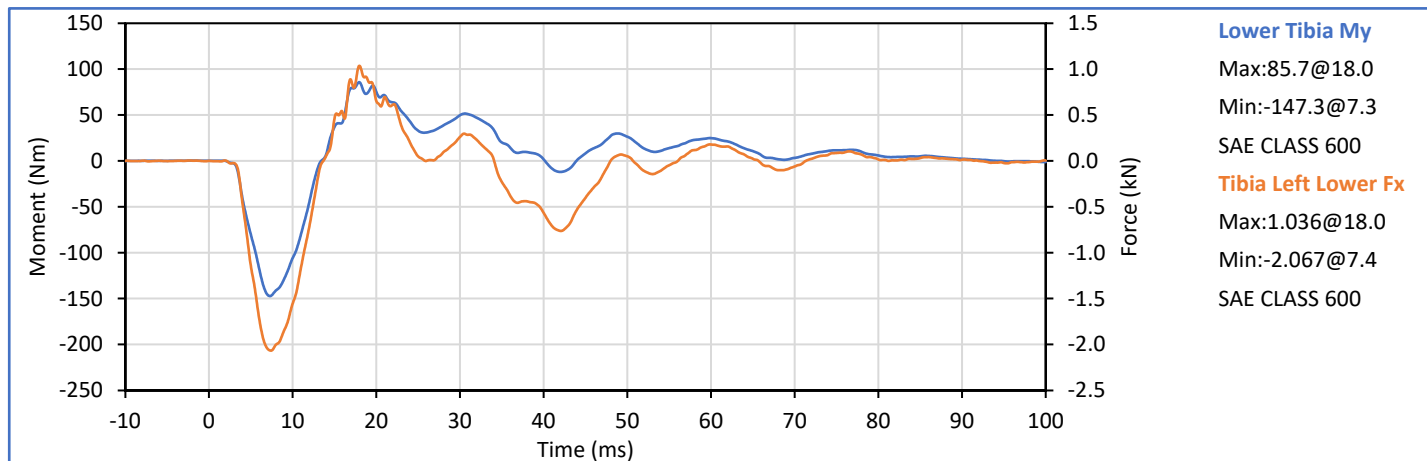


Technician: J. Hernandez

Approved By: P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.8	Pass
Laboratory Relative Humidity	%	10	70	22	Pass
Pendulum Velocity	m/s	4.95	5.05	5.01	Pass
Peak Ankle Ry	deg	30.4	37.2	35.4	Pass
Peak Ankle Resistive My	Nm	49.8	60.8	57.1	Pass
Peak Lower Tibia Fz	kN	-3.487	-2.853	-3.220	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass





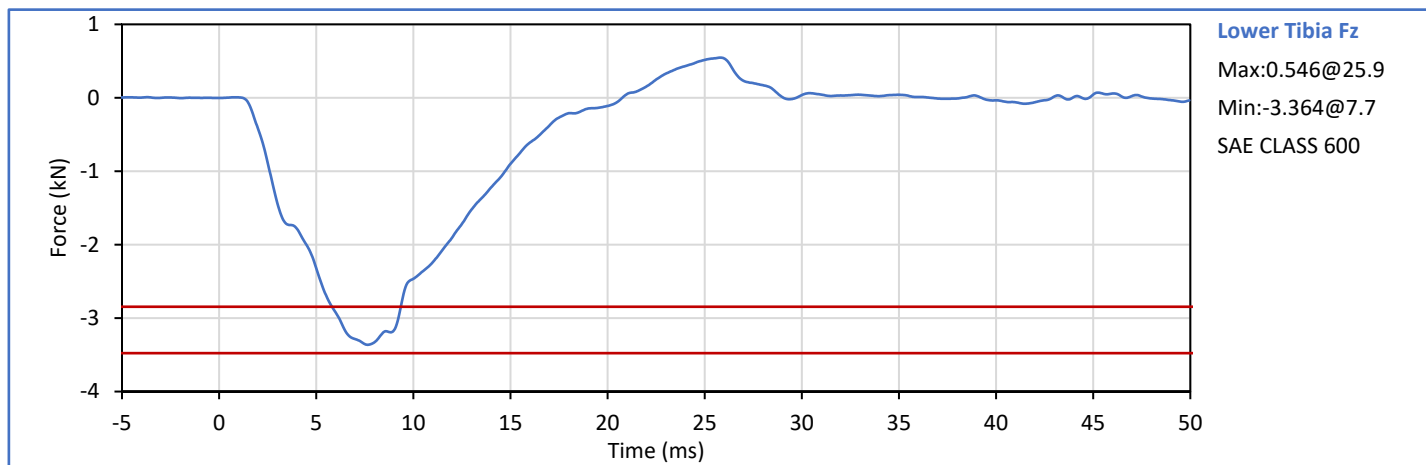
Technician:

J. Hernandez

Approved By:

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.8	Pass
Laboratory Relative Humidity	%	10	70	19	Pass
Pendulum Velocity	m/s	3.95	4.05	4.01	Pass
Peak Lower Tibia Fz	kN	-3.478	-2.846	-3.364	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



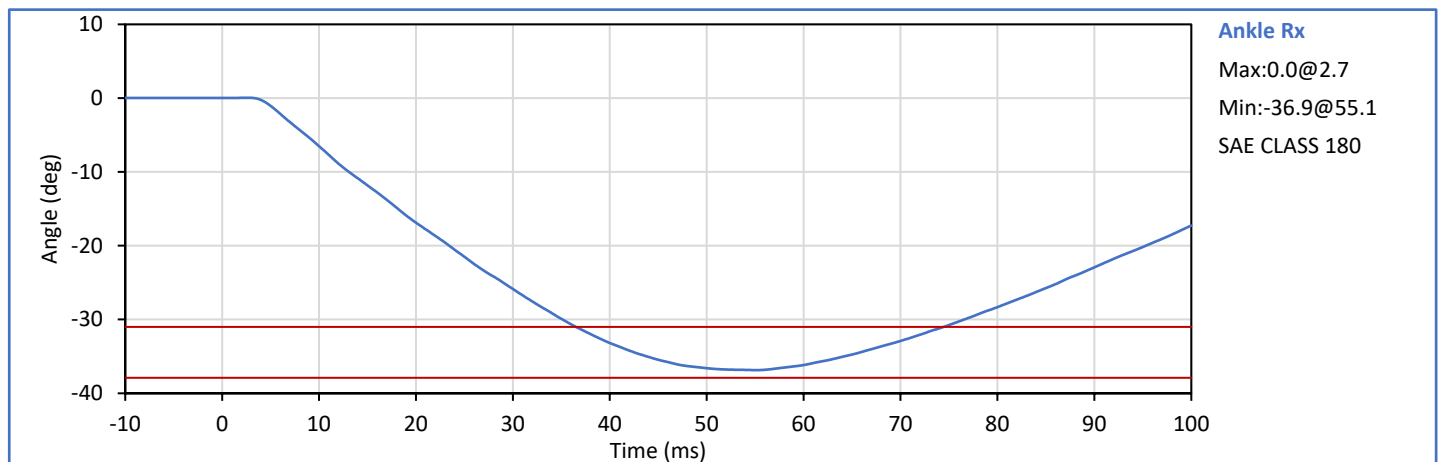
Technician: _____

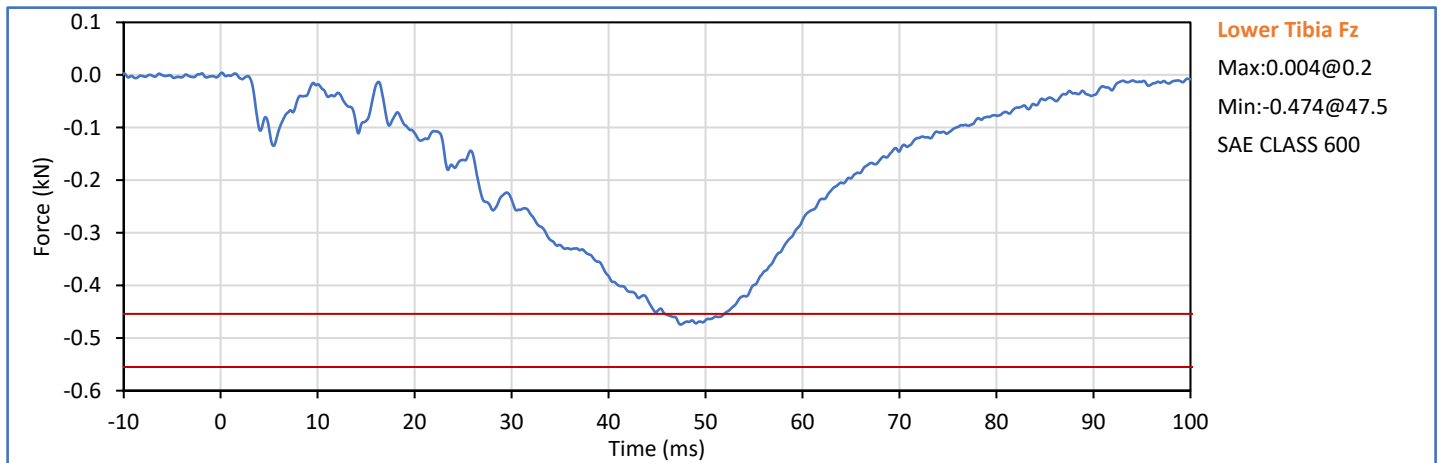
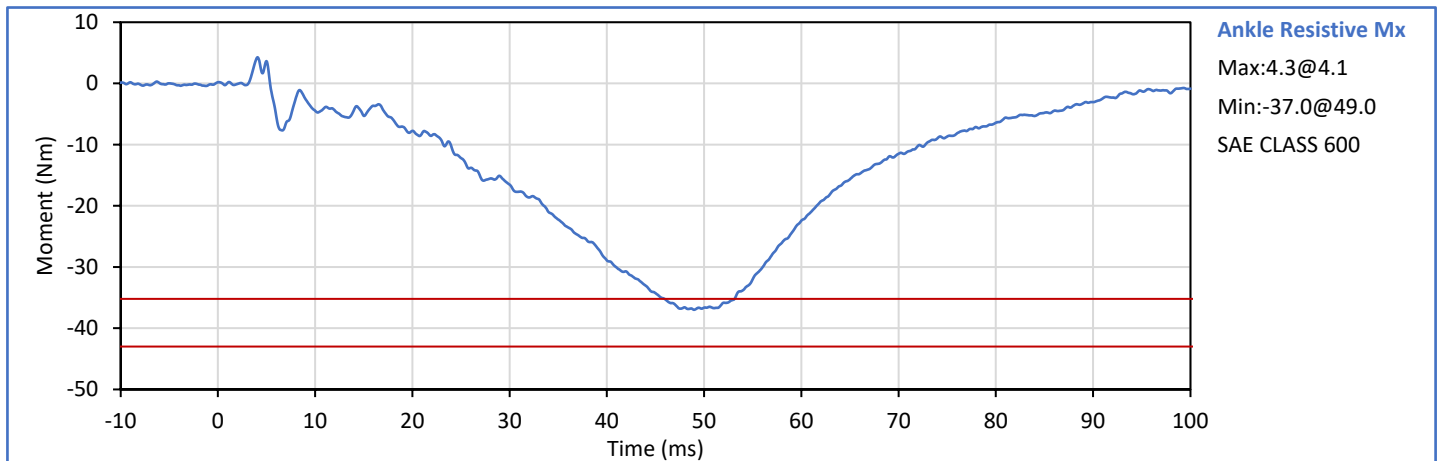
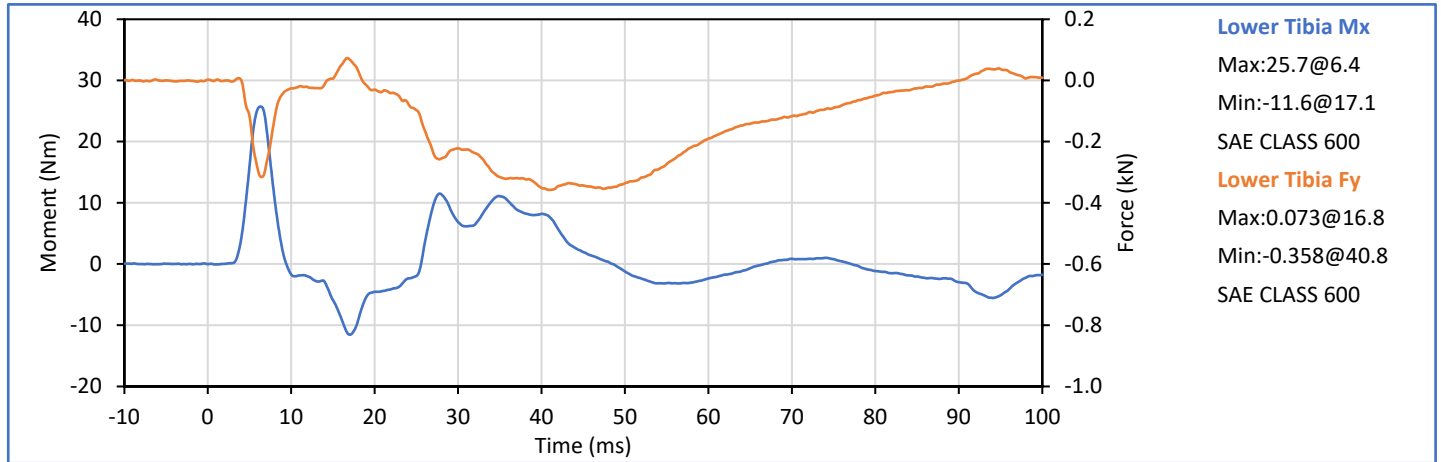
J. Hernandez

Approved By: _____

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.5	Pass
Laboratory Relative Humidity	%	10	70	20	Pass
Pendulum Velocity	m/s	1.95	2.05	2.02	Pass
Peak Ankle Rx	deg	-37.9	-31.0	-36.9	Pass
Peak Ankle Resistive Mx	Nm	-43.0	-35.2	-37.0	Pass
Peak Lower Tibia Fz	kN	-0.555	-0.454	-0.474	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass

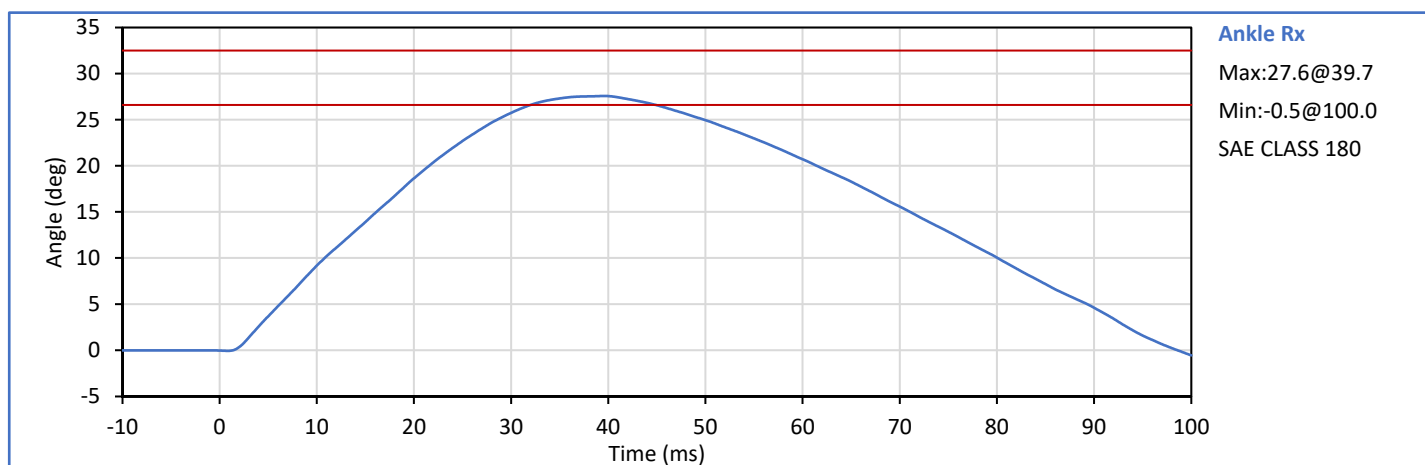


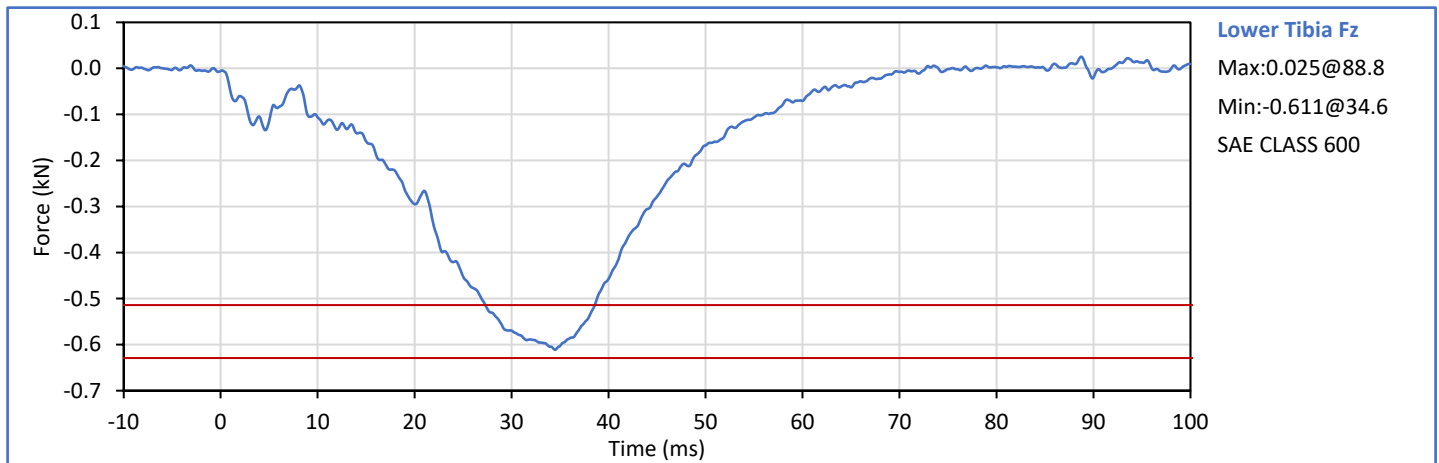
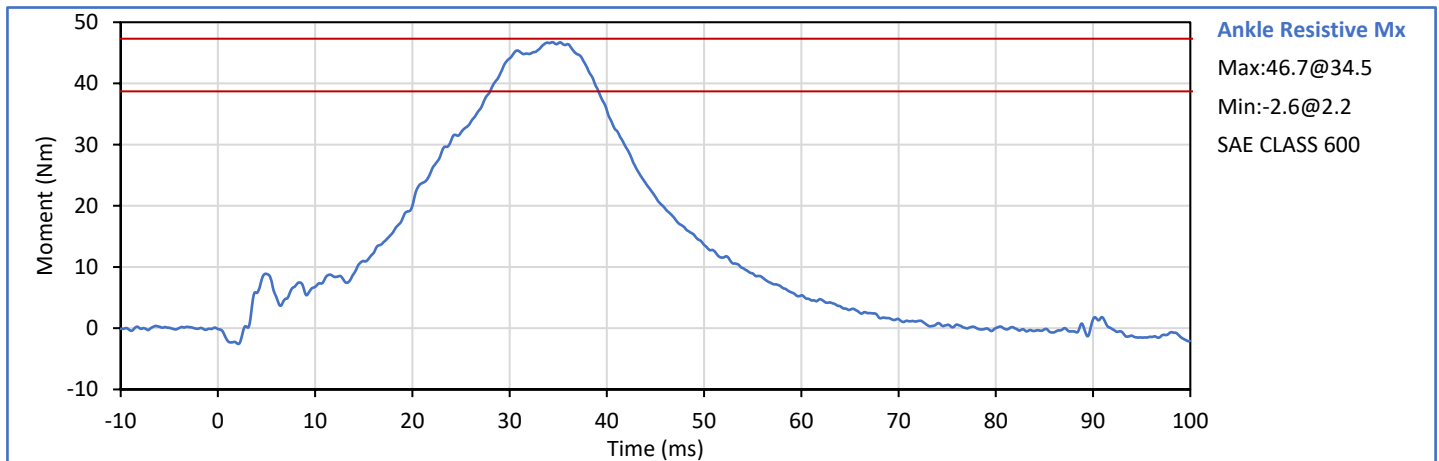
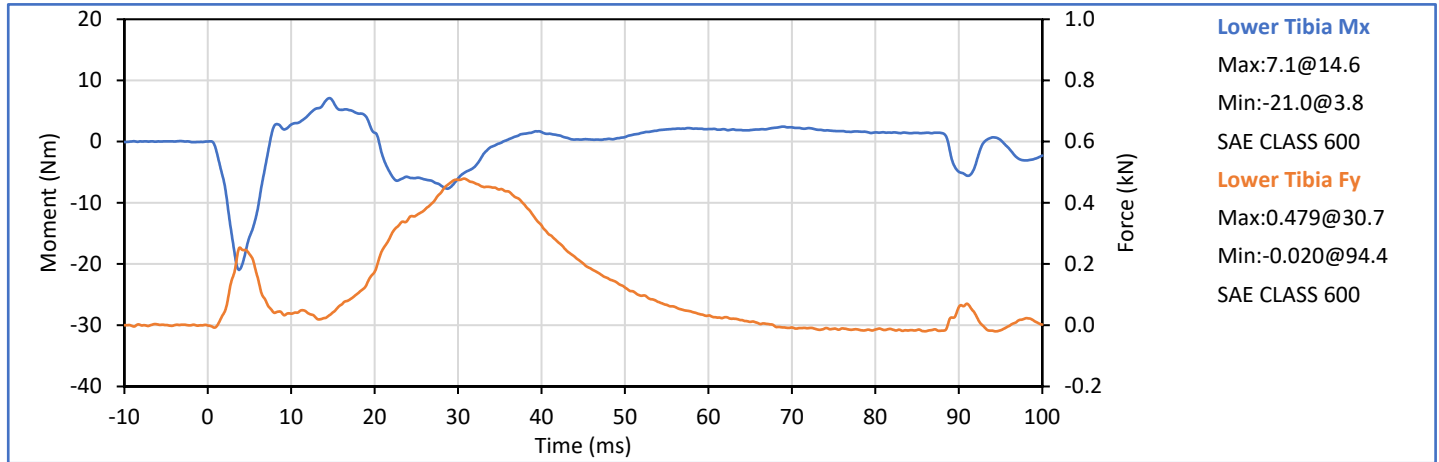


Technician: J. Hernandez

Approved By: P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.6	Pass
Laboratory Relative Humidity	%	10	70	19	Pass
Pendulum Velocity	m/s	1.95	2.05	2.01	Pass
Peak Ankle Rx	deg	26.6	32.5	27.6	Pass
Peak Ankle Resistive Mx	Nm	38.7	47.3	46.7	Pass
Peak Lower Tibia Fz	kN	-0.629	-0.514	-0.611	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass





Technician:

J. Hernandez

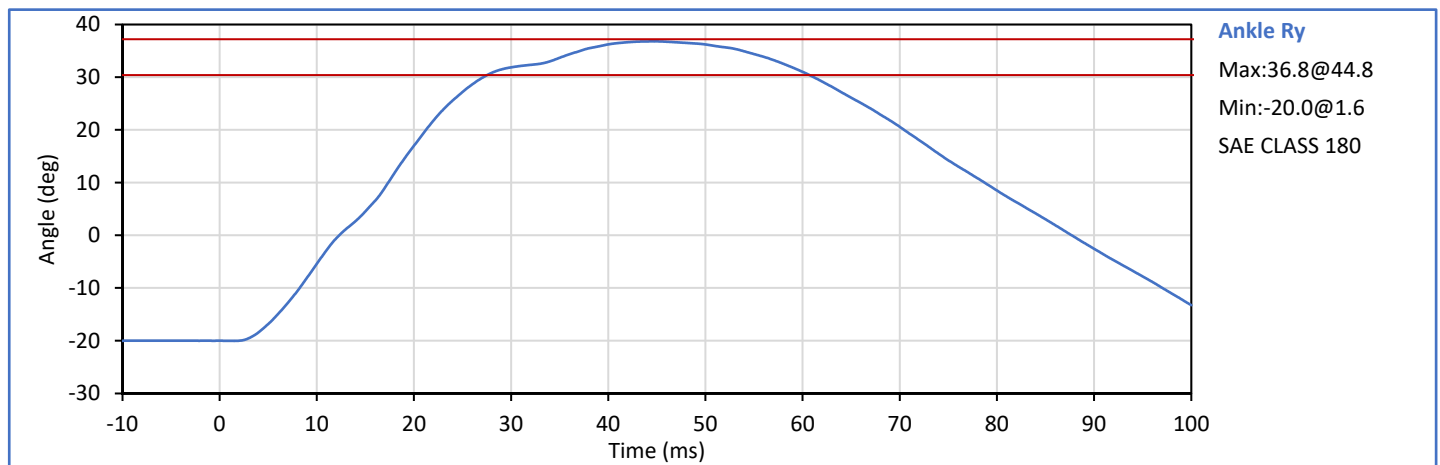
J. Hernandez

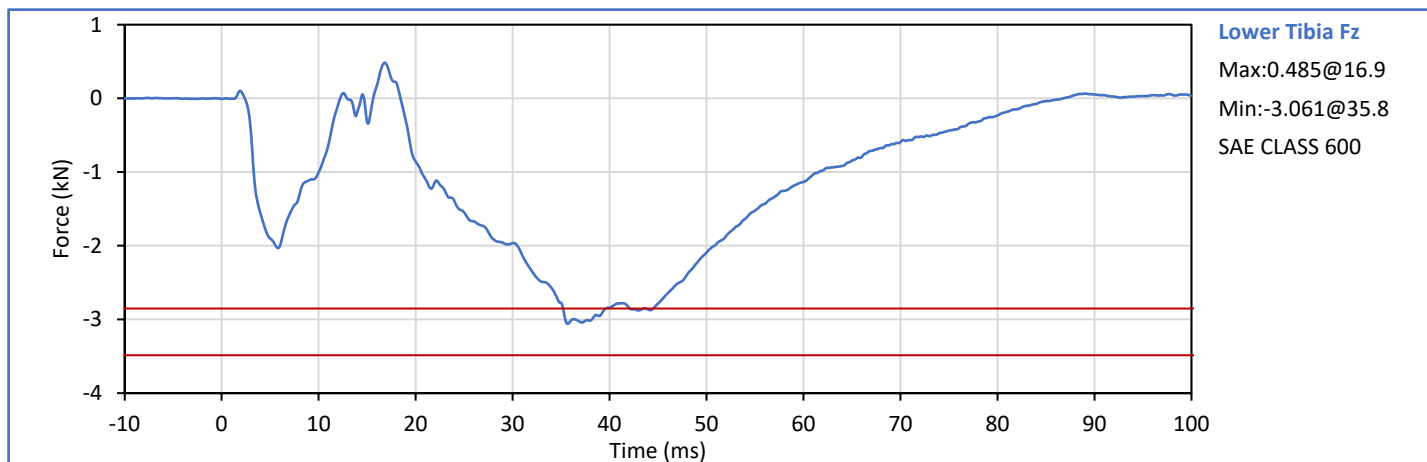
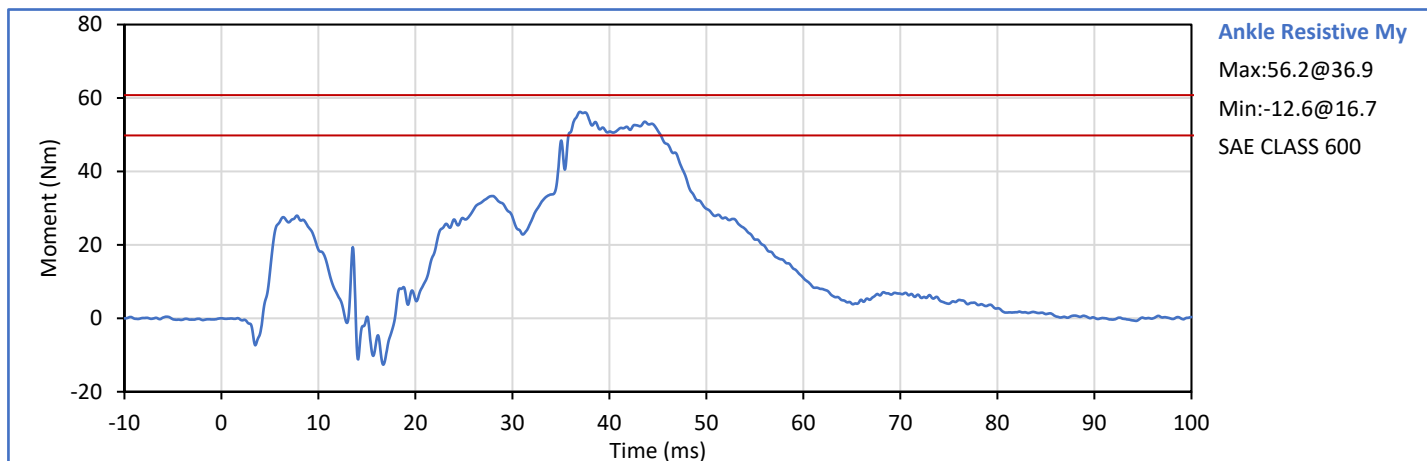
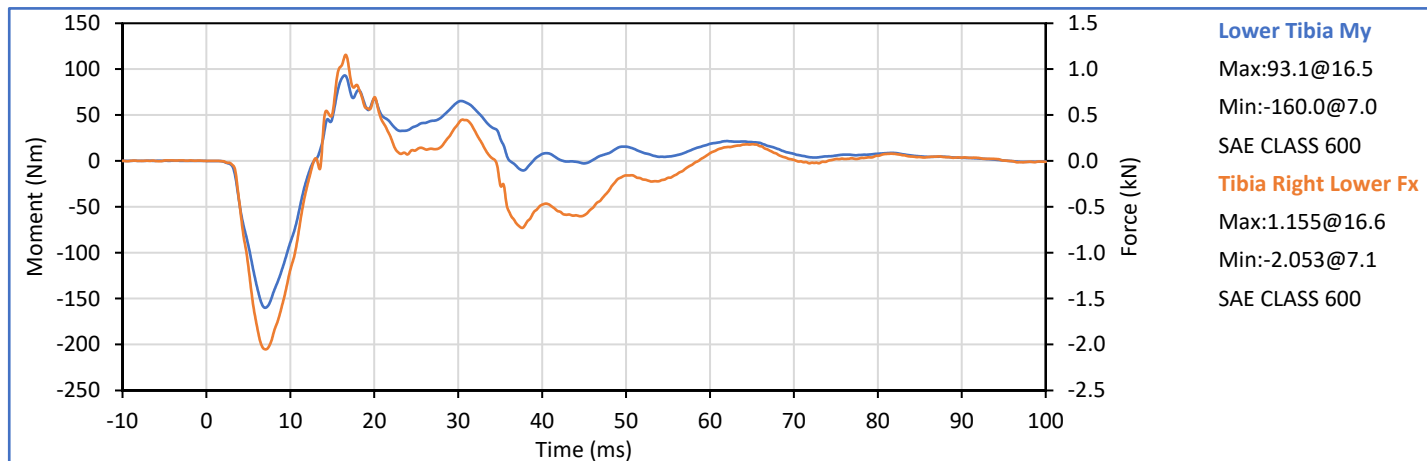
Approved By:

P. Puzzuto

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.8	Pass
Laboratory Relative Humidity	%	10	70	24	Pass
Pendulum Velocity	m/s	4.95	5.05	4.98	Pass
Peak Ankle Ry	deg	30.4	37.2	36.8	Pass
Peak Ankle Resistive My	Nm	49.8	60.8	56.2	Pass
Peak Lower Tibia Fz	kN	-3.487	-2.853	-3.061	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass





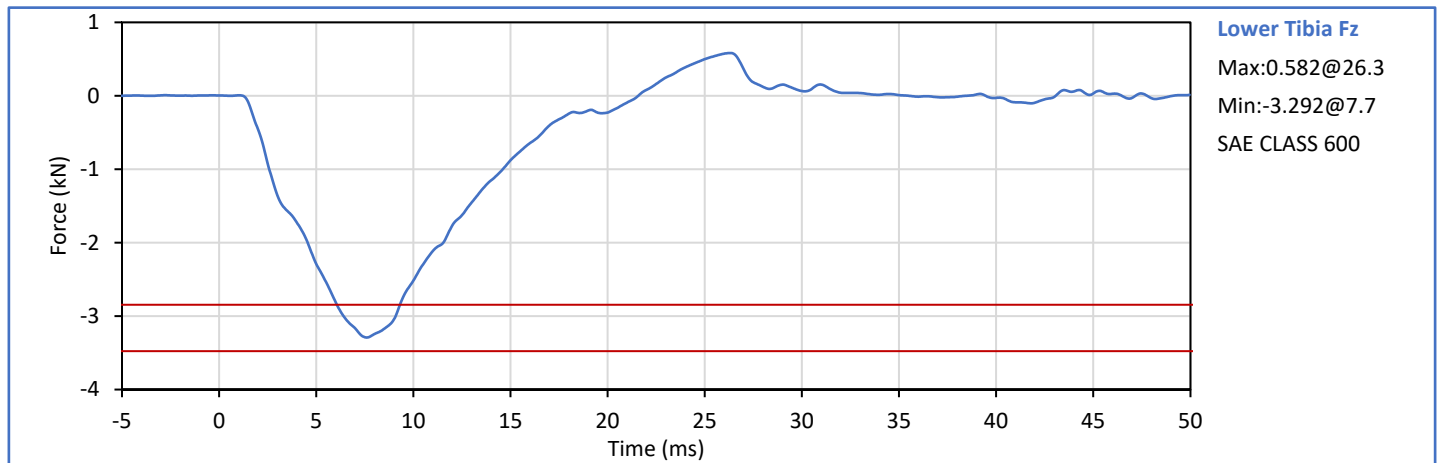
Technician:

J. Hernandez

Approved By:

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	20.6	Pass
Laboratory Relative Humidity	%	10	70	47	Pass
Pendulum Velocity	m/s	3.95	4.05	4.02	Pass
Peak Lower Tibia Fz	kN	-3.478	-2.846	-3.292	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass



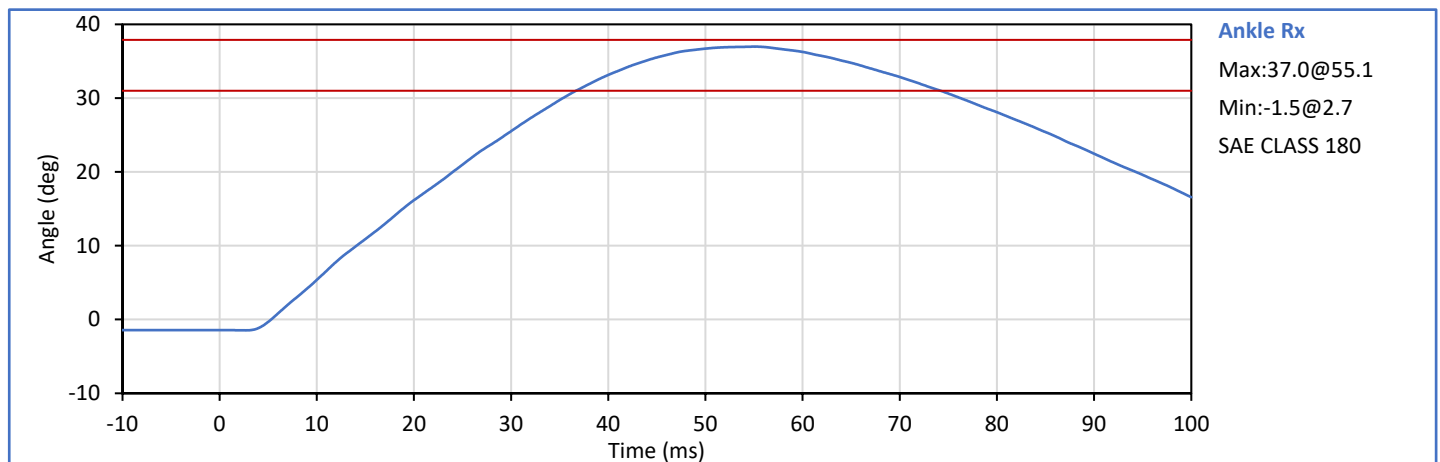
Technician: _____

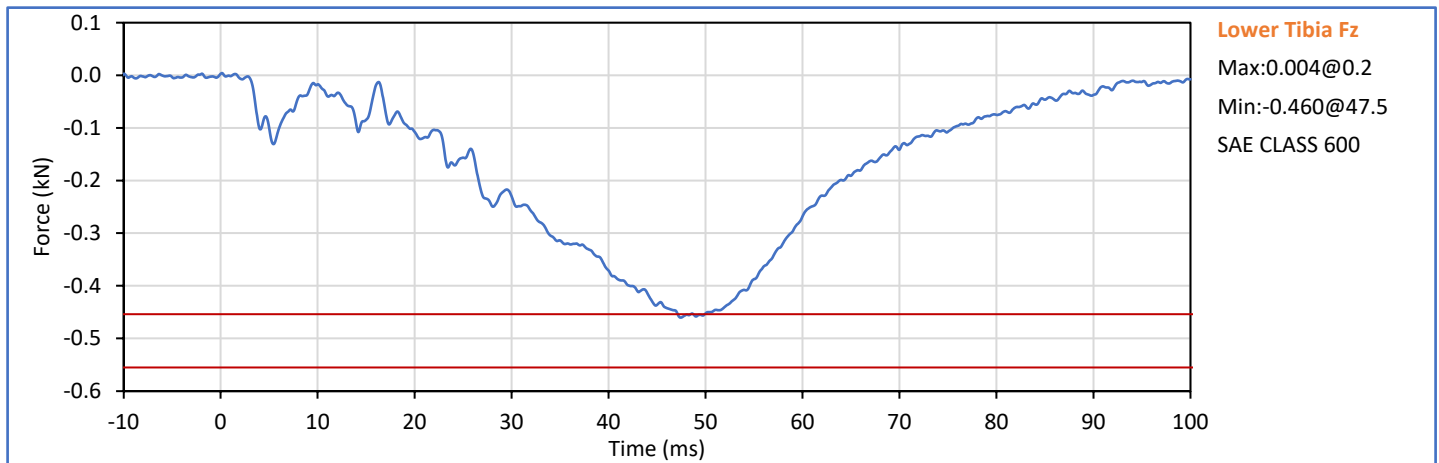
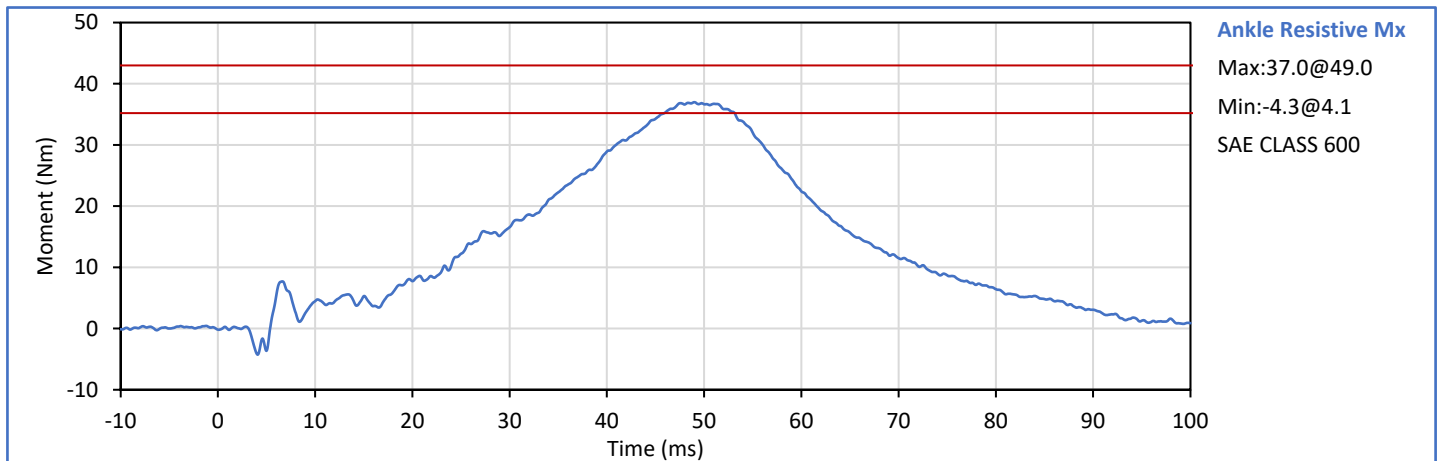
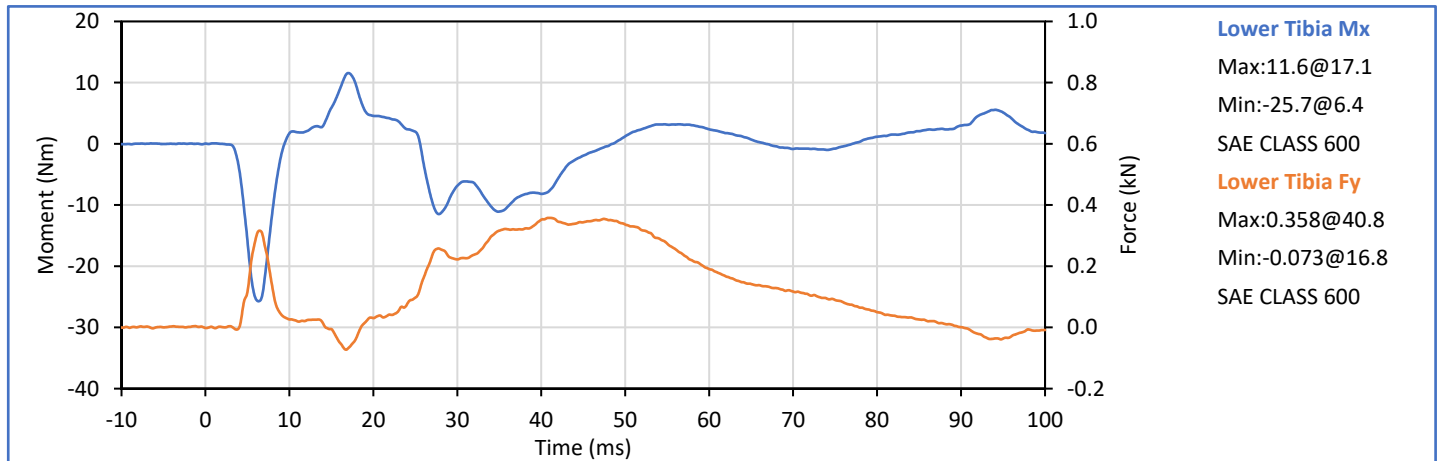
J. Hernandez

Approved By: _____

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	24	Pass
Pendulum Velocity	m/s	1.95	2.05	2.04	Pass
Peak Ankle Rx	deg	31.0	37.9	37.0	Pass
Peak Ankle Resistive Mx	Nm	35.2	43.0	37.0	Pass
Peak Lower Tibia Fz	kN	-0.555	-0.454	-0.460	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass





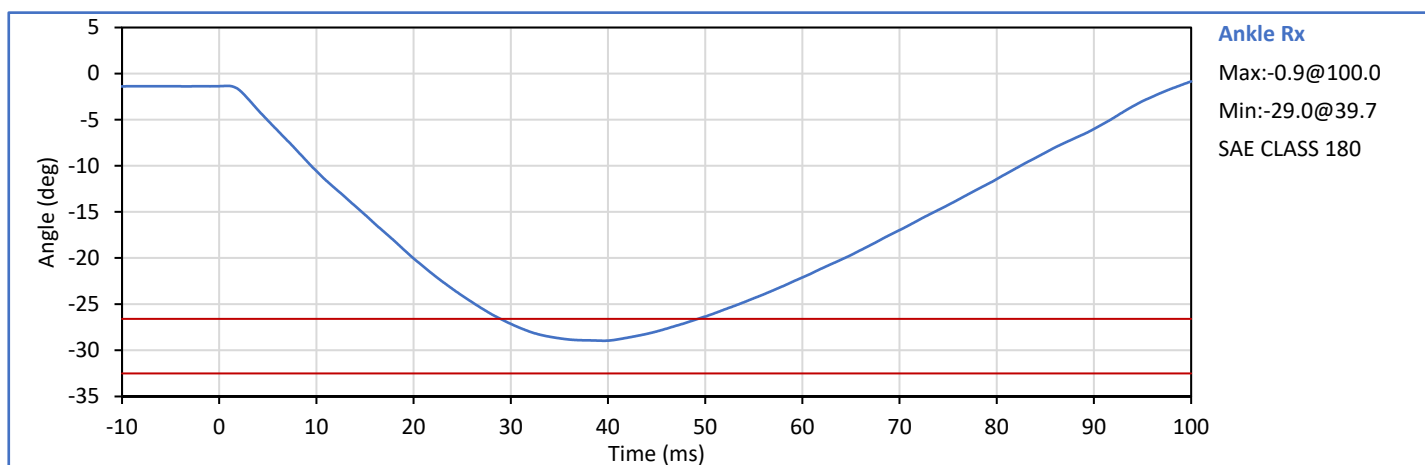
Technician:

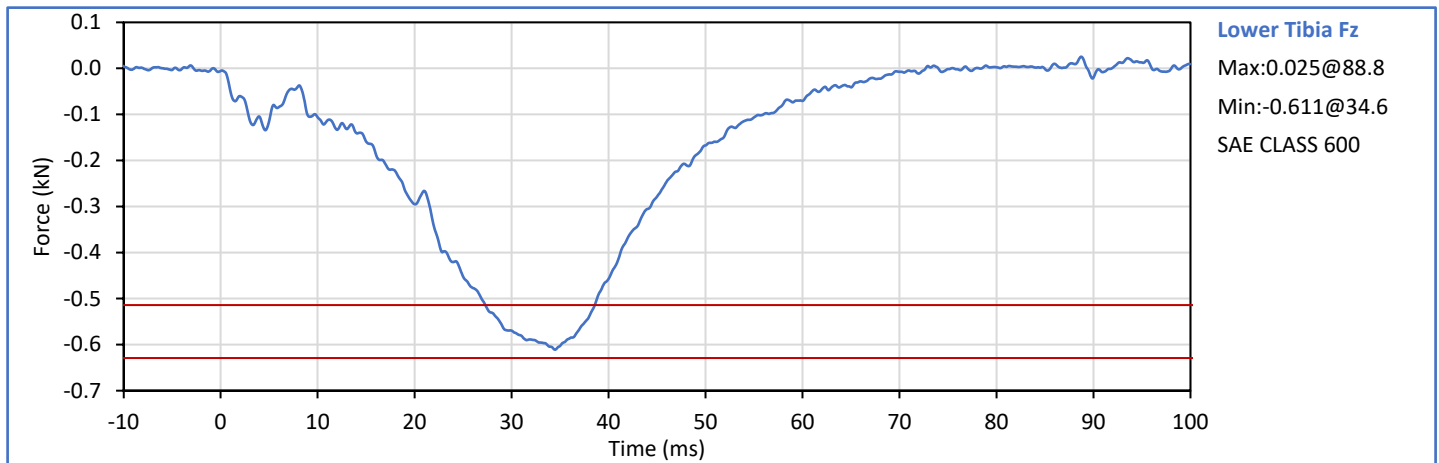
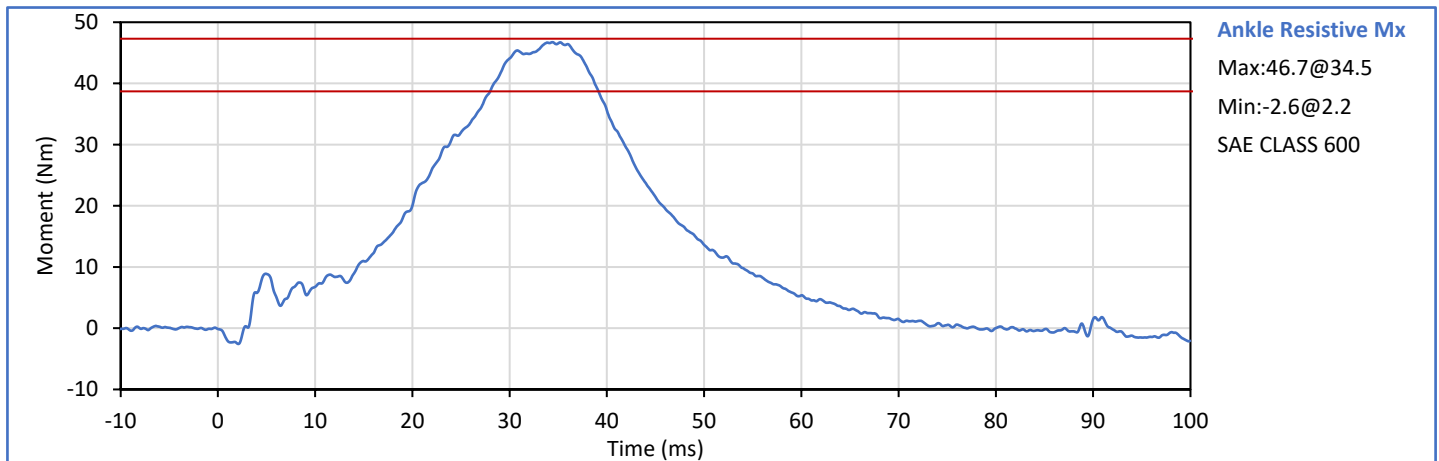
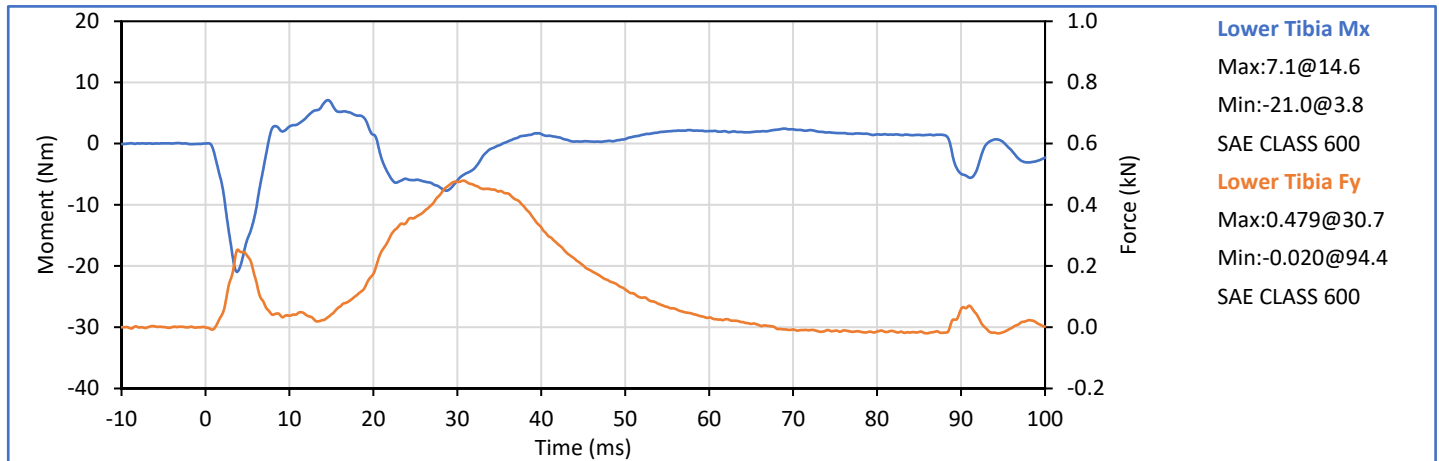
J. Hernandez

Approved By:

P. Puzzuto

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	51	Pass
Pendulum Velocity	m/s	1.95	2.05	2.02	Pass
Peak Ankle Rx	deg	-32.5	-26.6	-29.0	Pass
Peak Ankle Resistive Mx	Nm	38.7	47.3	46.7	Pass
Peak Lower Tibia Fz	kN	-0.629	-0.514	-0.611	Pass
NHTSA Corridor 2019-05				Overall Test Results	Pass





Technician:

J. Hernandez

J. Hernandez

Approved By:

P. Puzzuto

P. Puzzuto

APPENDIX E
THOR-50M 50TH PERCENTILE MALE ATD
PHYSICAL INSPECTION, PRE-TEST

ATD Serial No.: EG2595

Inspection Date: 2021-09-23

Overall Conditon/Functionality	Note
<u>Known errors in data channels (no data, clipping, unexpected drops):</u> Serial Number: DL9552-FX Right Acetabulum Force X bad channel. Serial Number: DW9502 Occipital Condyle Potentiometer not wired. Serial Number: DL9552-FX Right Acetabulum Force X bad channel, no data recorded during the test* Serial Number: DW9502 Occipital Condyle Potentiometer, no data recorded during the test**	
<u>Physical evidence of damage:</u> *Right acetabulum force X was received with bad channel. It was investigated why it was not working and was determined it was not fixable without replacing the loadcell. NHTSA approved running the test without recording this channel. **Occipital Condyle Potentiometer was not wired when received and was required to be recorded. NHTSA approved running the test without recording this channel.	
<u>Anecdotal evidence of damage:</u>	
<u>Equipment delivered to Borrower:</u> THOR-50M S/N EG2595 with DTS SLICE6 Internal DAS Laptop DTS MiniDistributor with cables and PSU	

Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

ATD Serial No.: EG2595

Inspection Date: 2021-09-23

HEAD – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Rear head cap mounts securely to head:	
✓	Head skin fits securely over skull	
✓	Head skin shows no sign of tears or damage	
✓	Interior components of skull (ballast, sensor mounts, sensors) securely attached:	
✓	Head securely mounted to OC joint:	
✗	Other:	See Details Page

Neck – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Neck cables slide freely through holes in neck plates:	
✓	Head can rotate about occipital condyle joint freely until the bump stops are engaged:	
✓	Neck cables show no sign of fraying, broken strands, or kinking	
✓	No evidence of de-bonding between neck pucks and plates. If failure, indicate which interface (i.e.: where plate/puck 1 attach to upper neck load cell):	
✓	No evidence of de-bonding or permanent compression in neck soft stop assemblies:	
✓	Neck securely attached to upper neck load cell:	
✓	Neck securely attached to lower neck load cell	
✓	Neck pitch change joint mechanism mating teeth are engaged	
✓	Other:	

JACKET – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Rib stiffeners show no sign of permanent deformation:	
✓	No evidence of tears or holes in jacket fabric, velcro, or zippers:	
✓	Other:	

LEFT SHOULDER/ARM – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Urethane shoulder pads show no evidence of contact:	
✓	Clavicle securely attached to sternum and shoulder:	
✓	No evidence of debonding, tearing, or permanent compression of posterior soft stops	
✓	Other:	

RIGHT SHOULDER/ARM – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Urethane shoulder pads show no evidence of contact:	
✓	Clavicle securely attached to sternum and shoulder:	
✓	No evidence of debonding, tearing, or permanent compression of posterior soft stops	
✓	Other:	

Spine – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	No evidence of de-bonding between thoracic spine flex joint and metal plates:	
✓	No evidence of de-bonding between lumbar spine flex joint and metal plates:	
✓	Lumbar spine pitch change joint mechanism mating teeth are engaged:	
✓	Other:	

Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

ATD Serial No.: EG2595

Inspection Date: 2021-09-23

THORAX – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	No evidence of contact at top, bottom, or interior faces of rib damping material:	
✓	No evidence of debonding between rib damping material and ribs:	
✓	IR-TRACC tubes securely attached to anterior ribs	
✓	IR-TRACC tubes securely attached to double gimbals, spine:	
✓	Urethane bib is securely attached to ribs with no sign of tearing or washer penetration:	
✓	Ribs securely attached to posterior spine:	
✓	Rib stiffeners show no evidence of bending (no gaps between ribs and stiffeners):	
✓	Other:	

ABDOMEN – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	No evidence of tearing, cuts, or broken stitches in upper abdomen bag and zipper:	
✓	Upper abdomen insert securely attached to spine:	
✓	Upper abdomen insert shows no evidence of permanent set:	
✓	No evidence of tearing, cuts, or broken stitches in lower abdomen bag and zipper:	
✓	Lower abdomen insert securely attached to spine:	
✓	Lower abdomen insert shows no evidence of permanent set:	
✓	Other:	

Pelvis – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Pelvis flesh fits securely over pelvis bones:	
✓	H-point tool fits securely into hole on both sides of pelvis:	
✓	ASIS load cells are secured to the iliac bones and iliac bones are firmly attached to the pelvis	
✓	The iliac bones are free from cracks or fractures	
✓	If welds are present in the iliac bones, the welds are continuous and devoid of cracks	
✓	Other:	

Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

ATD Serial No.: EG2595

Inspection Date: 2021-09-23

LEFT FEMUR – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Acetabular load cells firmly attached:	
✓	Femur load cell firmly attached:	
✓	No evidence of deformation of knee slider bump stop:	
✓	No cuts, tears, or scuffing of knee flesh:	
✓	Other:	

RIGHT FEMUR – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Acetabular load cells firmly attached:	
✓	Femur load cell firmly attached:	
✓	No evidence of deformation of knee slider bump stop:	
✓	No cuts, tears, or scuffing of knee flesh:	
✓	Other:	

LEFT LOWER EXTREMITY (LX) – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Rotational potentiometers in ankle securely attached:	
✓	Achilles tendon provides resistance to dorsiflexion:	
✓	No evidence of debonding, tearing, or permanent compression of ankle soft stops:	
✓	No cuts, tears, or scuffing of leg flesh	
✓	Other:	

RIGHT LOWER EXTREMITY (LX) – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Rotational potentiometers in ankle securely attached:	
✓	Achilles tendon provides resistance to dorsiflexion:	
✓	No evidence of debonding, tearing, or permanent compression of ankle soft stops:	
✓	No cuts, tears, or scuffing of leg flesh	
✓	Other:	

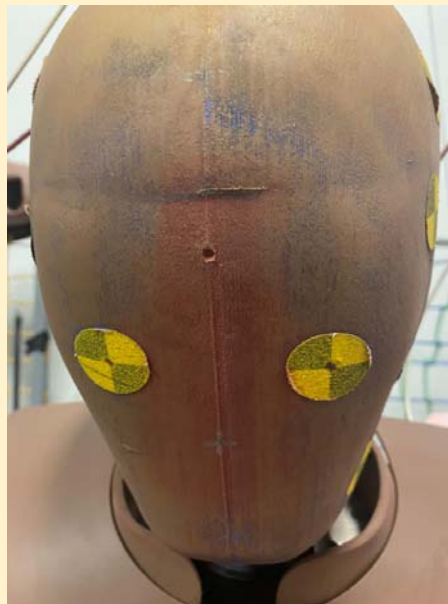
Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

Damage and Discrepancy Details



Cuts in Face Foam



Cut on top of face.

Additional Notes:

Technician: _____

J. Hernandez

Approved By: _____

P. Puzzuto

ATD Serial No.: DO9799

Inspection Date: 2021-09-23

Overall Conditon/Functionality	Note
<u>Known errors in data channels (no data, clipping, unexpected drops):</u> Serial Number: DP4635-Left A.S.I.S. Moment Y. The channel failed during the last crash test. Intermittant data recorded during the test. Serial Number: DK3608 -Right Femur Mz. Channel failed during the last crash test, signal drop out. Serial Number: 106 Fx - Left Upper Tibia Fx Channel failed between 68.3 to 76.9 msec.	
<u>Physical evidence of damage:</u>	
<u>Anecdotal evidence of damage:</u> Serial Number: DP4635-My Left A.S.I.S. , signal (-) broke off. The connector was resoldered to repair. Serial Number: DK3608 -Right Femur Mz, signal (-) broke off. The connector was resoldered to repair. Serial Number: 106 Fx - Channel was retested with DAS, connector inspected, no evidence of damage was found.	
<u>Equipment delivered to Borrower:</u> Laptop H-Point Tool Tilt Sensor Cables	

Technician: 
J. Hernandez

Approved By: 
P .Puzzuto

ATD Serial No.: DO9799

Inspection Date: 2021-09-23

HEAD – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Rear head cap mounts securely to head:	
✓	Head skin fits securely over skull	
✓	Head skin shows no sign of tears or damage	
✓	Interior components of skull (ballast, sensor mounts, sensors) securely attached:	
✓	Head securely mounted to OC joint:	
✗	Other:	See Details Page

Neck – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Neck cables slide freely through holes in neck plates:	
✓	Head can rotate about occipital condyle joint freely until the bump stops are engaged:	
✓	Neck cables show no sign of fraying, broken strands, or kinking	
✓	No evidence of de-bonding between neck pucks and plates. If failure, indicate which interface (i.e.: where plate/puck 1 attach to upper neck load cell):	
✓	No evidence of de-bonding or permanent compression in neck soft stop assemblies:	
✓	Neck securely attached to upper neck load cell:	
✓	Neck securely attached to lower neck load cell	
✓	Neck pitch change joint mechanism mating teeth are engaged	
✓	Other:	

JACKET – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Rib stiffeners show no sign of permanent deformation:	
✓	No evidence of tears or holes in jacket fabric, velcro, or zippers:	
✓	Other:	

LEFT SHOULDER/ARM – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Urethane shoulder pads show no evidence of contact:	
✓	Clavicle securely attached to sternum and shoulder:	
✓	No evidence of debonding, tearing, or permanent compression of posterior soft stops	
✓	Other:	

RIGHT SHOULDER/ARM – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Urethane shoulder pads show no evidence of contact:	
✓	Clavicle securely attached to sternum and shoulder:	
✓	No evidence of debonding, tearing, or permanent compression of posterior soft stops	
✓	Other:	

Spine – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	No evidence of de-bonding between thoracic spine flex joint and metal plates:	
✓	No evidence of de-bonding between lumbar spine flex joint and metal plates:	
✓	Lumbar spine pitch change joint mechanism mating teeth are engaged:	
✓	Other:	

Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

ATD Serial No.: DO9799

Inspection Date: 2021-09-23

THORAX – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	No evidence of contact at top, bottom, or interior faces of rib damping material:	
✓	No evidence of debonding between rib damping material and ribs:	
✓	IR-TRACC tubes securely attached to anterior ribs	
✓	IR-TRACC tubes securely attached to double gimbals, spine:	
✓	Urethane bib is securely attached to ribs with no sign of tearing or washer penetration:	
✓	Ribs securely attached to posterior spine:	
✓	Rib stiffeners show no evidence of bending (no gaps between ribs and stiffeners):	
✓	Other:	

ABDOMEN – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	No evidence of tearing, cuts, or broken stitches in upper abdomen bag and zipper:	
✓	Upper abdomen insert securely attached to spine:	
✓	Upper abdomen insert shows no evidence of permanent set:	
✓	No evidence of tearing, cuts, or broken stitches in lower abdomen bag and zipper:	
✓	Lower abdomen insert securely attached to spine:	
✓	Lower abdomen insert shows no evidence of permanent set:	
✓	Other:	

Pelvis – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Pelvis flesh fits securely over pelvis bones:	
✓	H-point tool fits securely into hole on both sides of pelvis:	
✓	ASIS load cells are secured to the iliac bones and iliac bones are firmly attached to the pelvis	
✓	The iliac bones are free from cracks or fractures	
✓	If welds are present in the iliac bones, the welds are continuous and devoid of cracks	
✓	Other:	

Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

ATD Serial No.: DO9799

Inspection Date: 2021-09-23

LEFT FEMUR – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Acetabular load cells firmly attached:	
✓	Femur load cell firmly attached:	
✓	No evidence of deformation of knee slider bump stop:	
✓	No cuts, tears, or scuffing of knee flesh:	
✓	Other:	

RIGHT FEMUR – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Acetabular load cells firmly attached:	
✓	Femur load cell firmly attached:	
✓	No evidence of deformation of knee slider bump stop:	
✓	No cuts, tears, or scuffing of knee flesh:	
✓	Other:	

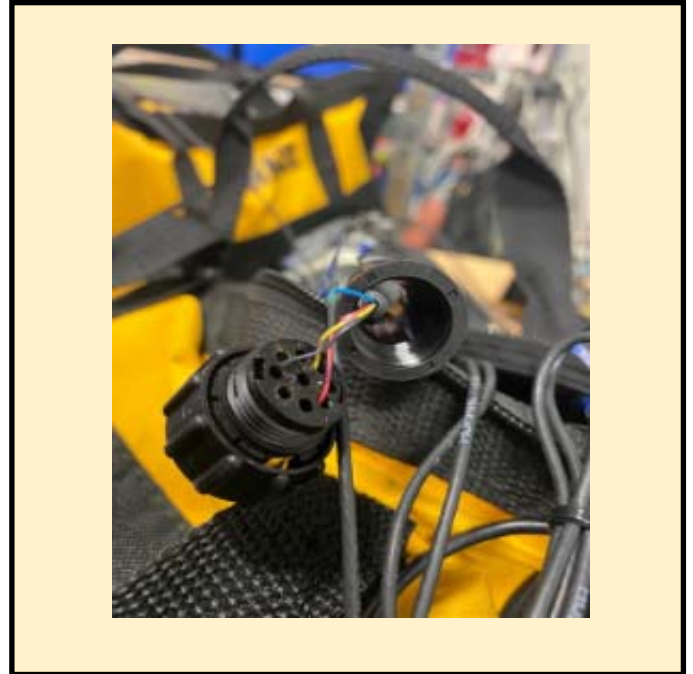
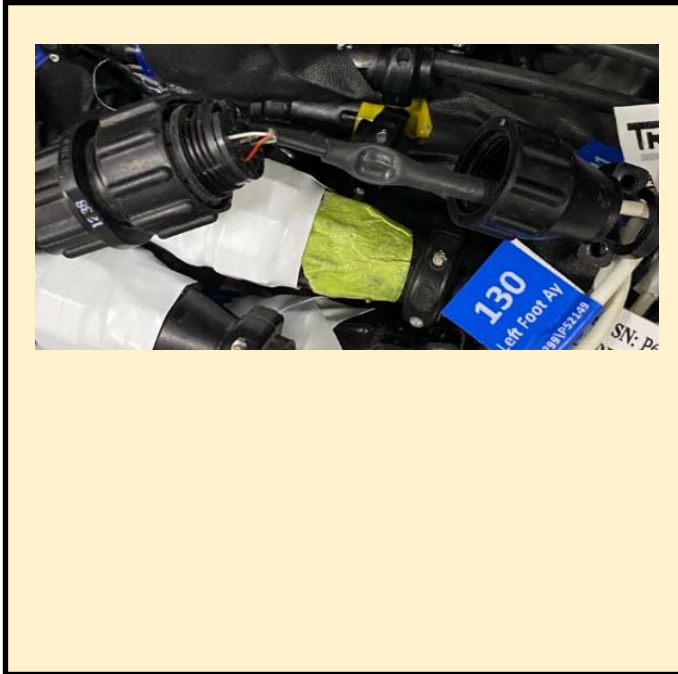
LEFT LOWER EXTREMITY (LX) – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Rotational potentiometers in ankle securely attached:	
✓	Achilles tendon provides resistance to dorsiflexion:	
✓	No evidence of debonding, tearing, or permanent compression of ankle soft stops:	
✓	No cuts, tears, or scuffing of leg flesh	
✓	Other:	

RIGHT LOWER EXTREMITY (LX) – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Rotational potentiometers in ankle securely attached:	
✓	Achilles tendon provides resistance to dorsiflexion:	
✓	No evidence of debonding, tearing, or permanent compression of ankle soft stops:	
✓	No cuts, tears, or scuffing of leg flesh	
✓	Other:	

Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

Damage and Discrepancy Details



Additional Notes:

Technician: _____

J. Hernandez

Approved By: _____

P. Puzzuto

APPENDIX F
THOR-50M 50TH PERCENTILE MALE ATD
PHYSICAL INSPECTION, POST-TEST

ATD Serial No.: EG2595

Inspection Date: 2021-10-11

Overall Conditon/Functionality	Note
<u>Known errors in data channels (no data, clipping, unexpected drops):</u> Serial Number: DL9552-FX Right Acetabulum Force X bad channel. Serial Number: DW9502 Occipital Condyle Potentiometer not wired. Serial Number: DL9552-FX Right Acetabulum Force X bad channel, no data recorded during the test* Serial Number: DW9502 Occipital Condyle Potentiometer, no data recorded during the test**	
<u>Physical evidence of damage:</u> *Right acetabulum force X was received with bad channel. It was investigated why it was not working and was determined it was not fixable without replacing the loadcell. NHTSA approved running the test without recording this channel. **Occipital Condyle Potentiometer was not wired when received and was required to be recorded. NHTSA approved running the test without recording this channel.	
<u>Anecdotal evidence of damage:</u>	
<u>Equipment delivered to Borrower:</u> THOR-50M S/N EG2595 with DTS SLICE6 Internal DAS Laptop DTS MiniDistributor with cables and PSU	

Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

ATD Serial No.: EG2595

Inspection Date: 2021-10-11

HEAD – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Rear head cap mounts securely to head:	
✓	Head skin fits securely over skull	
✓	Head skin shows no sign of tears or damage	
✓	Interior components of skull (ballast, sensor mounts, sensors) securely attached:	
✓	Head securely mounted to OC joint:	
✗	Other:	See Details Page

Neck – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Neck cables slide freely through holes in neck plates:	
✓	Head can rotate about occipital condyle joint freely until the bump stops are engaged:	
✓	Neck cables show no sign of fraying, broken strands, or kinking	
✓	No evidence of de-bonding between neck pucks and plates. If failure, indicate which interface (i.e.: where plate/puck 1 attach to upper neck load cell):	
✓	No evidence of de-bonding or permanent compression in neck soft stop assemblies:	
✓	Neck securely attached to upper neck load cell:	
✓	Neck securely attached to lower neck load cell	
✓	Neck pitch change joint mechanism mating teeth are engaged	
✓	Other:	

JACKET – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Rib stiffeners show no sign of permanent deformation:	
✓	No evidence of tears or holes in jacket fabric, velcro, or zippers:	
✓	Other:	

LEFT SHOULDER/ARM – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Urethane shoulder pads show no evidence of contact:	
✓	Clavicle securely attached to sternum and shoulder:	
✓	No evidence of debonding, tearing, or permanent compression of posterior soft stops	
✓	Other:	

RIGHT SHOULDER/ARM – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Urethane shoulder pads show no evidence of contact:	
✓	Clavicle securely attached to sternum and shoulder:	
✓	No evidence of debonding, tearing, or permanent compression of posterior soft stops	
✓	Other:	

Spine – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	No evidence of de-bonding between thoracic spine flex joint and metal plates:	
✓	No evidence of de-bonding between lumbar spine flex joint and metal plates:	
✓	Lumbar spine pitch change joint mechanism mating teeth are engaged:	
✓	Other:	

Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

ATD Serial No.: EG2595

Inspection Date: 2021-10-11

THORAX – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	No evidence of contact at top, bottom, or interior faces of rib damping material:	
✓	No evidence of debonding between rib damping material and ribs:	
✓	IR-TRACC tubes securely attached to anterior ribs	
✓	IR-TRACC tubes securely attached to double gimbals, spine:	
✓	Urethane bib is securely attached to ribs with no sign of tearing or washer penetration:	
✓	Ribs securely attached to posterior spine:	
✓	Rib stiffeners show no evidence of bending (no gaps between ribs and stiffeners):	
✓	Other:	

ABDOMEN – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	No evidence of tearing, cuts, or broken stitches in upper abdomen bag and zipper:	
✓	Upper abdomen insert securely attached to spine:	
✓	Upper abdomen insert shows no evidence of permanent set:	
✓	No evidence of tearing, cuts, or broken stitches in lower abdomen bag and zipper:	
✓	Lower abdomen insert securely attached to spine:	
✓	Lower abdomen insert shows no evidence of permanent set:	
✓	Other:	

Pelvis – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Pelvis flesh fits securely over pelvis bones:	
✓	H-point tool fits securely into hole on both sides of pelvis:	
✓	ASIS load cells are secured to the iliac bones and iliac bones are firmly attached to the pelvis	
✓	The iliac bones are free from cracks or fractures	
✓	If welds are present in the iliac bones, the welds are continuous and devoid of cracks	
✓	Other:	

Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

ATD Serial No.: EG2595

Inspection Date: 2021-10-11

LEFT FEMUR – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Acetabular load cells firmly attached:	
✓	Femur load cell firmly attached:	
✓	No evidence of deformation of knee slider bump stop:	
✓	No cuts, tears, or scuffing of knee flesh:	
✓	Other:	

RIGHT FEMUR – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Acetabular load cells firmly attached:	
✓	Femur load cell firmly attached:	
✓	No evidence of deformation of knee slider bump stop:	
✓	No cuts, tears, or scuffing of knee flesh:	
✓	Other:	

LEFT LOWER EXTREMITY (LX) – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Rotational potentiometers in ankle securely attached:	
✓	Achilles tendon provides resistance to dorsiflexion:	
✓	No evidence of debonding, tearing, or permanent compression of ankle soft stops:	
✓	No cuts, tears, or scuffing of leg flesh	
✓	Other:	

RIGHT LOWER EXTREMITY (LX) – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Rotational potentiometers in ankle securely attached:	
✓	Achilles tendon provides resistance to dorsiflexion:	
✓	No evidence of debonding, tearing, or permanent compression of ankle soft stops:	
✓	No cuts, tears, or scuffing of leg flesh	
✓	Other:	

Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

Damage and Discrepancy Details



Cuts in Face Foam



Cut on top of face.

Additional Notes:

Technician: _____

J. Hernandez

Approved By: _____

P. Puzzuto

ATD Serial No.: DO9799

Inspection Date: 2021-10-08

Overall Conditon/Functionality	Note
<u>Known errors in data channels (no data, clipping, unexpected drops):</u> Serial Number: DP4635-Left A.S.I.S. Moment Y. The channel failed during the last crash test. Intermittant data recorded during the test. Serial Number: DP3835 Fy -Right Acetabulum Fy. The channel failed during the last crash test. Intermittant data recorded during the test. Serial Number: DK3608 Fy- Right Femur Fy. The channel failed during the last crash test.	
<u>Physical evidence of damage:</u>	
<u>Anecdotal evidence of damage:</u>	
<u>Equipment delivered to Borrower:</u> Laptop H-Point Tool Tilt Sensor Cables	

Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

ATD Serial No.: DO9799

Inspection Date: 2021-10-08

HEAD – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Rear head cap mounts securely to head:	
✓	Head skin fits securely over skull	
✓	Head skin shows no sign of tears or damage	
✓	Interior components of skull (ballast, sensor mounts, sensors) securely attached:	
✓	Head securely mounted to OC joint:	
✓	Other:	

Neck – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Neck cables slide freely through holes in neck plates:	
✓	Head can rotate about occipital condyle joint freely until the bump stops are engaged:	
✓	Neck cables show no sign of fraying, broken strands, or kinking	
✓	No evidence of de-bonding between neck pucks and plates. If failure, indicate which interface (i.e.: where plate/puck 1 attach to upper neck load cell):	
✓	No evidence of de-bonding or permanent compression in neck soft stop assemblies:	
✓	Neck securely attached to upper neck load cell:	
✓	Neck securely attached to lower neck load cell	
✓	Neck pitch change joint mechanism mating teeth are engaged	
✓	Other:	

JACKET – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Rib stiffeners show no sign of permanent deformation:	
✓	No evidence of tears or holes in jacket fabric, velcro, or zippers:	
✓	Other:	

LEFT SHOULDER/ARM – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Urethane shoulder pads show no evidence of contact:	
✓	Clavicle securely attached to sternum and shoulder:	
✓	No evidence of debonding, tearing, or permanent compression of posterior soft stops	
✓	Other:	

RIGHT SHOULDER/ARM – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Urethane shoulder pads show no evidence of contact:	
✓	Clavicle securely attached to sternum and shoulder:	
✓	No evidence of debonding, tearing, or permanent compression of posterior soft stops	
✓	Other:	

Spine – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	No evidence of de-bonding between thoracic spine flex joint and metal plates:	
✓	No evidence of de-bonding between lumbar spine flex joint and metal plates:	
✓	Lumbar spine pitch change joint mechanism mating teeth are engaged:	
✓	Other:	

Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

ATD Serial No.: DO9799

Inspection Date: 2021-10-08

THORAX – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	No evidence of contact at top, bottom, or interior faces of rib damping material:	
✓	No evidence of debonding between rib damping material and ribs:	
✓	IR-TRACC tubes securely attached to anterior ribs	
✓	IR-TRACC tubes securely attached to double gimbals, spine:	
✓	Urethane bib is securely attached to ribs with no sign of tearing or washer penetration:	
✓	Ribs securely attached to posterior spine:	
✓	Rib stiffeners show no evidence of bending (no gaps between ribs and stiffeners):	
✓	Other:	

ABDOMEN – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	No evidence of tearing, cuts, or broken stitches in upper abdomen bag and zipper:	
✓	Upper abdomen insert securely attached to spine:	
✓	Upper abdomen insert shows no evidence of permanent set:	
✓	No evidence of tearing, cuts, or broken stitches in lower abdomen bag and zipper:	
✓	Lower abdomen insert securely attached to spine:	
✓	Lower abdomen insert shows no evidence of permanent set:	
✓	Other:	

Pelvis – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Pelvis flesh fits securely over pelvis bones:	
✓	H-point tool fits securely into hole on both sides of pelvis:	
✓	ASIS load cells are secured to the iliac bones and iliac bones are firmly attached to the pelvis	
✓	The iliac bones are free from cracks or fractures	
✓	If welds are present in the iliac bones, the welds are continuous and devoid of cracks	
✓	Other:	

Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

ATD Serial No.: DO9799

Inspection Date: 2021-10-08

LEFT FEMUR – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Acetabular load cells firmly attached:	
✓	Femur load cell firmly attached:	
✓	No evidence of deformation of knee slider bump stop:	
✓	No cuts, tears, or scuffing of knee flesh:	
✓	Other:	

RIGHT FEMUR – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Acetabular load cells firmly attached:	
✓	Femur load cell firmly attached:	
✓	No evidence of deformation of knee slider bump stop:	
✓	No cuts, tears, or scuffing of knee flesh:	
✓	Other:	

LEFT LOWER EXTREMITY (LX) – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Rotational potentiometers in ankle securely attached:	
✓	Achilles tendon provides resistance to dorsiflexion:	
✓	No evidence of debonding, tearing, or permanent compression of ankle soft stops:	
✓	No cuts, tears, or scuffing of leg flesh	
✓	Other:	

RIGHT LOWER EXTREMITY (LX) – Pass(✓)/Fail(✗). If Fail, explain reason and/or attach picture		Note
✓	Rotational potentiometers in ankle securely attached:	
✓	Achilles tendon provides resistance to dorsiflexion:	
✓	No evidence of debonding, tearing, or permanent compression of ankle soft stops:	
✓	No cuts, tears, or scuffing of leg flesh	
✓	Other:	

Technician: 
J. Hernandez

Approved By: 
P. Puzzuto

ATD Serial No.: DO9799

Inspection Date: 2021-10-08

Damage and Discrepancy Details

Additional Notes: None

Technician: _____

J. Hernandez

Approved By: _____

P. Puzzuto

APPENDIX G
THOR-50M 50TH PERCENTILE MALE ATD
SENSOR POLARITIES

THOR-50M 50th Percentile Male ATD
Sensor Polarities

ATD S/N: EG2595

Date: 5/10/2021

Note 1: Some polarities may appear counter to the specified wiring. The use of wired adapters may influence polarities

Note 2: Highlighted SAE polarity shows a deviation from SAE standard or an expected negative polarity to the mechanical input

Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Head and Neck	Head Accelerometers Primary	Ax	HEAD0000THACXP	Impact back of head	+	-	Yes
		Ay	HEAD0000THACYP	Impact left of head	+	+	No
		Az	HEAD0000THACZP	Impact top of head	+	+	No
	Head Accelerometers Redundant	Ax	HEADRD00THACXP	Impact back of head	+	NA	NA
		Ay	HEADRD00THACYP	Impact left of head	+	NA	NA
		Az	HEADRD00THACZP	Impact top of head	+	NA	NA
	Head ARS	ωx	HEAD0000THAVXP	Rotate right ear toward right shoulder	+	-	Yes
		ωy	HEAD0000THAVYP	Rotate chin away from sternum	+	+	No
		ωz	HEAD0000THAVZP	Rotate chin toward right shoulder	+	-	Yes
	Front Neck Spring	Fz	NECKFR00THFOZP	Rotate head rearward	+	+	No
	Rear Neck Spring	Fz	NECKRE00THFOZP	Rotate chin toward chest	+	+	No
	O.C. Rotary Pot	Ry	NECKUP00THANYP	Rotate chin toward chest	+	NA	NA
	Upper Neck Load	Fx	NECKUP00THFOXP	Move head rear, chest forward	+	+	No
		Fy	NECKUP00THFOYP	Move head left, chest right	+	+	No
		Fz	NECKUP00THFOZP	Move head up, chest down	+	+	No
		Mx	NECKUP00THMOXP	Rotate left ear toward left shoulder	+	+	No
		My	NECKUP00THMOYP	Rotate chin toward sternum	+	+	No
		Mz	NECKUP00THMOZP	Rotate chin toward left shoulder	+	+	No
	Lower Neck Load	Fx	NECKLO00THFOXP	Move head rear, chest forward	+	NA	NA
		Fy	NECKLO00THFOYP	Move head left, chest right	+	NA	NA
		Fz	NECKLO00THFOZP	Move head up, chest down	+	NA	NA
		Mx	NECKLO00THMOXP	Rotate left ear toward left shoulder	+	NA	Yes
		My	NECKLO00THMOYP	Rotate chin toward sternum	+	NA	Yes
		Mz	NECKLO00THMOZP	Rotate chin toward left shoulder	+	NA	Yes
	Face Loads	Fx	NA	Hold back of head, push face rearward	-	NA	NA

THOR-50M 50th Percentile Male ATD
Sensor Polarities

ATD S/N: EG2595

Date: 5/10/2021

Note 1: Some polarities may appear counter to the specified wiring. The use of wired adapters may influence polarities

Note 2: Highlighted SAE polarity shows a deviation from SAE standard or an expected negative polarity to the mechanical input

Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Spine and Thorax	T1 Accelerometer	Ax	THSP0100THACXP	Impact back of T1Spine	+	NA	NA
		Ay	THSP0100THACYP	Impact left of T1Spine	+	NA	NA
		Az	THSP0100THACZP	Impact top of Spine	+	NA	NA
	T1 ARS	ωx	THSP0100THAVXP	Rotate spine sideways to the right	+	NA	NA
		ωy	THSP0100THAVYP	Rotate spine rearward	+	NA	NA
		ωz	THSP0100THAVZP	Left shoulder forward, right shoulder aft	+	NA	NA
	Mid Sternum Accelerometer	Ax	STRN0000THACXP	Rotate dummy back (face up)	+	NA	NA
	T6 Accelerometer (Chest CG)	Ax	THSP0600THACXP	Impact back of T6 Spine	+	-	Yes
		Ay	THSP0600THACYP	Impact left of T6 Spine	+	+	No
		Az	THSP0600THACZP	Impact top of Spine	+	-	Yes
	T6 ARS	ωx	THSP0600THAVXP	Right shoulder down	+	-	Yes
		ωy	THSP0600THAVYP	Shoulders back	+	+	No
		ωz	THSP0600THAVZP	Left shoulder forward, right shoulder back	+	-	Yes
	T12 (Thoracic Spine) Accelerometer	Ax	THSP1200THACXP	Impact back of T12 Spine	+	NA	NA
		Ay	THSP1200THACYP	Impact left of T12 Spine	+	NA	NA
		Az	THSP1200THACZP	Impact top of Spine	+	NA	NA
	T12 (Thoracic Spine) ARS	ωx	THSP1200THAVXP	Impact back of T12 Spine	+	NA	NA
		ωy	THSP1200THAVYP	Impact left of T12 Spine	+	NA	NA
		ωz	THSP1200THAVZP	Impact top of Spine	+	NA	NA
	T12 (Thoracic Spine) Load	Fx	THSP1200THFOXP	Move chest rear, pelvis forward	+	+	No
		Fy	THSP1200THFOYP	Move chest left, pelvis right	+	+	No
		Fz	THSP1200THFOZP	Move chest up, pelvis down	+	+	No
		Mx	THSP1200THMOXP	Rotate left shoulder toward left hip	+	+	No
		My	THSP1200THMOYP	Rotate sternum towards front of legs	+	+	No
	Left Clavicle (Medial) Load	Fx	NA	Pull clavicle forward away from spine	+	NA	NA
		Fz	NA	Push clavicle down towards pelvis	+	NA	NA
	Left Clavicle (Lateral) Load	Fx	NA	Push clavicle forward away from spine	+	NA	NA
		Fz	NA	Push clavicle down towards pelvis	+	NA	NA
	Right Clavicle (Medial) Load	Fx	NA	Push clavicle forward away from spine	+	NA	NA
		Fz	NA	Push clavicle down towards pelvis	+	NA	NA
	Right Clavicle (Lateral) Load	Fx	NA	Push clavicle forward away from spine	+	NA	NA
		Fz	NA	Push clavicle down towards pelvis	+	NA	NA
Abdomen	Upper Abdomen Accel,	Ax	NA	Impact back of Spine	+	NA	NA

THOR-50M 50th Percentile Male ATD
Sensor Polarities

ATD S/N: EG2595

Date: 5/10/2021

Note 1: Some polarities may appear counter to the specified wiring. The use of wired adapters may influence polarities

Note 2: Highlighted SAE polarity shows a deviation from SAE standard or an expected negative polarity to the mechanical input

Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Pelvis	Left ASIS Load (Anterior Superior Iliac Spine)	Fx	ILACLE00THFOXP	Push in towards back of pelvis	-	-	No
		My	ILACLE00THMOYP	Push top of ASIS towards back of pelvis	+	+	No
	Right ASIS Load (Anterior Superior Iliac Spine)	Fx	ILACRI00THFOXP	Push in towards back of pelvis	-	-	No
		My	ILACRI00THMOYP	Push top of ASIS towards back of pelvis	+	+	No
	Left Acetabular Load	Fx	ACTBLE00THFOXP	Move femur forward, pelvis rear	+	-	Yes
		Fy	ACTBLE00THFOYP	Move femur right, pelvis left	+	+	No
		Fz	ACTBLE00THFOZP	Move femur down, pelvis up	+	+	No
	Right Acetabular Load	Fx	ACTBRI00THFOXP	Move femur forward, pelvis rear	+	+	No
		Fy	ACTBRI00THFOYP	Move femur right, pelvis left	+	-	Yes
		Fz	ACTBRI00THFOZP	Move femur down, pelvis up	+	-	Yes
	Pelvis CG Accelerometer	Ax	PELV0000THACXP	Impact back of Pelvis	+	-	Yes
		Ay	PELV0000THACYP	Impact left of Pelvis	+	+	No
		Az	PELV0000THACZP	Impact top of Spine	+	+	No
	Pelvis CG ARS	ωx	PELV0000THAVXP	Right shoulder down	+	-	Yes
		ωy	PELV0000THAVYP	Shoulders back, legs up	+	+	No
		ωz	PELV0000THAVZP	Twist pelvis, body, and legs right	+	+	No
Femurs	Left Femur Load	Fx	FEMRLE00THFOXP	Move knee upward, upper femur down	+	+	No
		Fy	FEMRLE00THFOYP	Move knee right, upper femur left	+	+	No
		Fz	FEMRLE00THFOZP	Move knee forward, femur rear	+	+	No
		Mx	FEMRLE00THMOXP	Rotate knee left, hold upper femur	+	+	No
		My	FEMRLE00THMOYP	Rotate knee up, hold upper femur	+	+	No
		Mz	FEMRLE00THMOZP	Rotate tibia left, hold pelvis	+	+	No
	Right Femur Load	Fx	FEMRRI00THFOXP	Move knee upward, upper femur down	+	+	No
		Fy	FEMRRI00THFOYP	Move knee right, upper femur left	+	+	No
		Fz	FEMRRI00THFOZP	Move knee forward, femur rear	+	+	No
		Mx	FEMRRI00THMOXP	Rotate knee left, hold upper femur	+	+	No
		My	FEMRRI00THMOYP	Rotate knee up, hold upper femur	+	+	No
		Mz	FEMRRI00THMOZP	Rotate tibia left, hold pelvis	+	+	No

THOR-50M 50th Percentile Male ATD
Sensor Polarities

ATD S/N: EG2595

Date: 5/10/2021

Note 1: Some polarities may appear counter to the specified wiring. The use of wired adapters may influence polarities

Note 2: Highlighted SAE polarity shows a deviation from SAE standard or an expected negative polarity to the mechanical input

Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Lower Extremity Left	Knee Shear Displacement	Dx	KNSLLE00THDSXP	Hold femur, move tibia forward	+	+	No
	Upper Tibia Load	Fx	TIBILEUPTHFOXP	Move tibia forward, knee rearward	+	+	No
		Fy	TIBILEUPTHFOYP	Move ankle right, knee left	+	+	No
		Fz	TIBILEUPTHFOZP	Move ankle down, knee up	+	+	No
		Mx	TIBILEUPTHMOXP	Impact left of Tibia	+	+	No
		My	TIBILEUPTHMOYP	Impact front of Tibia	+	+	No
	Lower Tibia Load	Fx	TIBILELOTHFOXP	Move ankle forward, knee rearward	+	+	No
		Fy	TIBILELOTHFOYP	Move ankle right, knee left	+	+	No
		Fz	TIBILELOTHFOZP	Move ankle down, knee up	+	+	No
		Mx	TIBILELOTHMOXP	Impact left of Tibia	+	+	No
		My	TIBILELOTHMOYP	Impact front of Tibia	+	+	No
	Tibia Accelerometer	Ax	TIBILE00THACXP	Impact back of Tibia	+	NA	NA
		Ay	TIBILE00THACYP	Impact left of Tibia	+	NA	NA
	Achilles Load	Fz	ANKLLE00THFOOP	Rotate foot forward	+	NA	NA
	Ankle Rotation	Rx	ANKLLE00THANXP	Hold tibia, rotate foot leftward	+	+	No
		Ry	ANKLLE00THANYP	Hold tibia, push toe upward	+	-	Yes
		Rz	ANKLLE00THANZP	From top, hold tibia, rotate foot CCW	+	-	Yes
	Foot Acceleration	Ax	FOOTLE00THACXP	Impact back of Foot	+	NA	NA
		Ay	FOOTLE00THACYP	Impact left of Foot	+	NA	NA
		Az	FOOTLE00THACZP	Impact top of Foot	+	NA	NA

THOR-50M 50th Percentile Male ATD
Sensor Polarities

ATD S/N: EG2595

Date: 5/10/2021

Note 1: Some polarities may appear counter to the specified wiring. The use of wired adapters may influence polarities

Note 2: Highlighted SAE polarity shows a deviation from SAE standard or an expected negative polarity to the mechanical input

Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Lower Extremity Right	Knee Shear Displacement	Dx	KNSLR100THDSXP	Hold femur, move tibia forward	+	+	No
	Upper Tibia Load	Fx	TIBIRIUPTHFOXP	Move tibia forward, knee rearward	+	+	No
		Fy	TIBIRIUPTHFOYP	Move ankle right, knee left	+	+	No
		Fz	TIBIRIUPTHFOZP	Move ankle down, knee up	+	+	No
		Mx	TIBIRIUPTHMOXP	Impact left of Tibia	+	+	No
		My	TIBIRIUPTHMOYP	Impact front of Tibia	+	+	No
	Lower Tibia Load	Fx	TIBIRILOTHFOXP	Move ankle forward, knee rearward	+	+	No
		Fy	TIBIRILOTHFOYP	Move ankle right, knee left	+	+	No
		Fz	TIBIRILOTHFOZP	Move ankle down, knee up	+	+	No
		Mx	TIBIRILOTHMOXP	Impact left of Tibia	+	+	No
		My	TIBIRILOTHMOYP	Impact front of Tibia	+	+	No
	Tibia Accelerometer	Ax	TIBIRI00THACXP	Impact back of Tibia	+	NA	NA
		Ay	TIBIRI00THACYP	Impact left of Tibia	+	NA	NA
	Achilles Load	Fz	ANKLR100THFOOP	Rotate foot forward	+	NA	NA
	Ankle Rotation	Rx	ANKLR100THANXP	Hold tibia, rotate foot leftward	+	+	No
		Ry	ANKLR100THANYP	Hold tibia, push toe upward	+	-	Yes
		Rz	ANKLR100THANZP	From top, hold tibia, rotate foot CCW	+	-	Yes
	Foot Acceleration	Ax	FOOTRI00THACXP	Impact back of Foot	+	NA	NA
		Ay	FOOTRI00THACYP	Impact left of Foot	+	NA	NA
		Az	FOOTRI00THACZP	Impact top of Foot	+	NA	NA

THOR-50M 50th Percentile Male ATD
Sensor Polarities

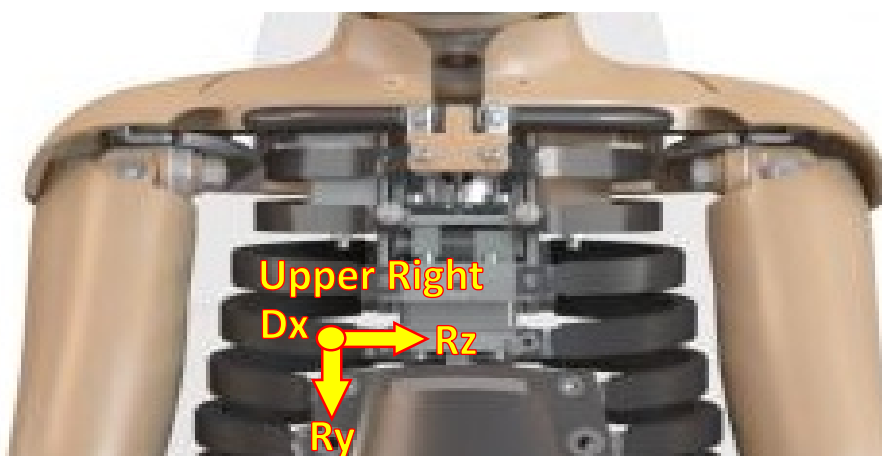
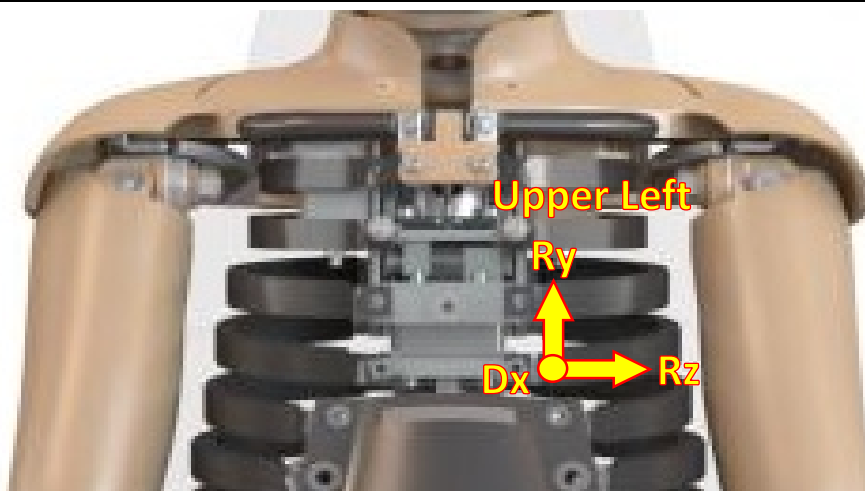
ATD S/N: EG2595

Date: 5/10/2021

Note 1: Some polarities may appear counter to the specified wiring. The use of wired adapters may influence polarities

Note 2: Highlighted SAE polarity shows a deviation from SAE standard or an expected negative polarity to the mechanical input

Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Thorax Upper Left	IRTRACC Raw Voltage	Dx (V)	CHSTLEUPTHVOOP	Push Inward	+	+	No
	Rotation Pitch	Ry	CHSTLEUPTHANYP	Push upward	+	+	No
	Rotation Yaw	Rz	CHSTLEUPTHANZP	Push leftward	+	+	No
Thorax Upper Right	IRTRACC Raw Voltage	Dx (V)	CHSTRIUPTHVOOP	Push Inward	+	+	No
	Rotation Pitch	Ry	CHSTRIUPTHANYP	Push downward	+	+	No
	Rotation Yaw	Rz	CHSTRIUPTHANZP	Push leftward	+	+	No



THOR-50M 50th Percentile Male ATD
Sensor Polarities

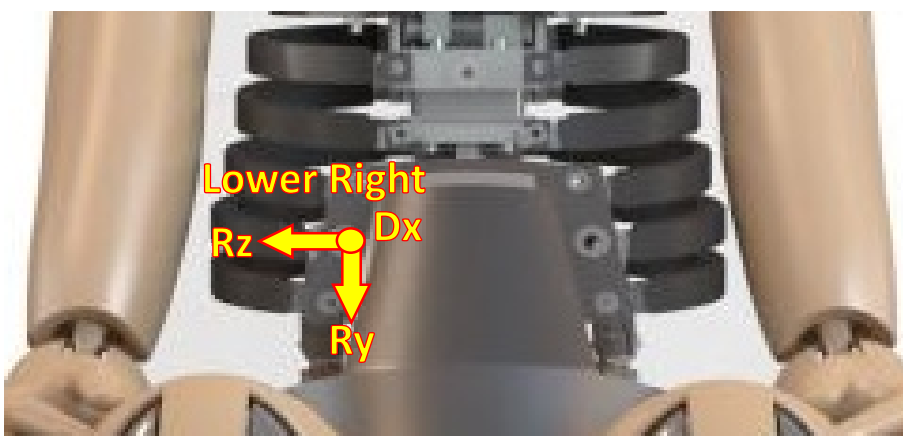
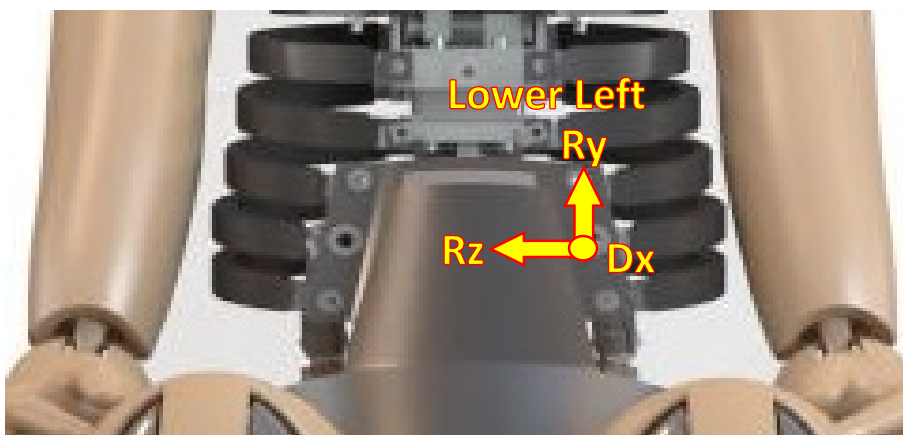
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Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Thorax Lower Left	IRTRACC Raw Voltage	Dx (V)	CHSTLELOTHVO0P	Push Inward	+	+	No
	Rotation Pitch	Ry	CHSTLELOTHANYP	Push upward	+	+	No
	Rotation Yaw	Rz	CHSTLELOTHANZP	Push rightward	+	+	No
Thorax Lower Right	IRTRACC Raw Voltage	Dx (V)	CHSTRILOTHVO0P	Push Inward	+	+	No
	Rotation Pitch	Ry	CHSTRILOTHANYP	Push downward	+	+	No
	Rotation Yaw	Rz	CHSTRILOTHANZP	Push rightward	+	+	No



THOR-50M 50th Percentile Male ATD
Sensor Polarities

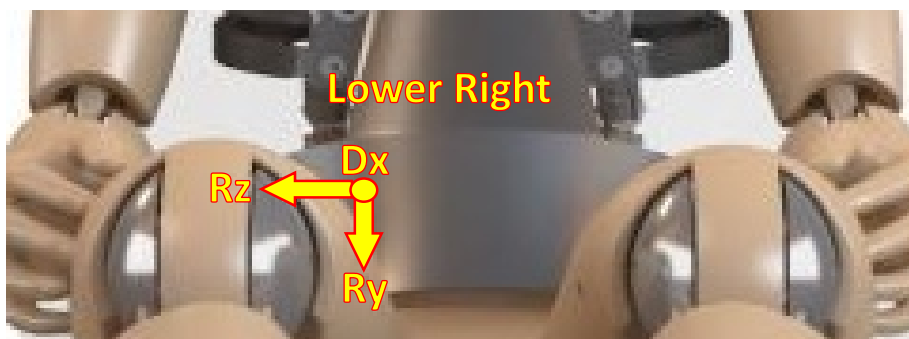
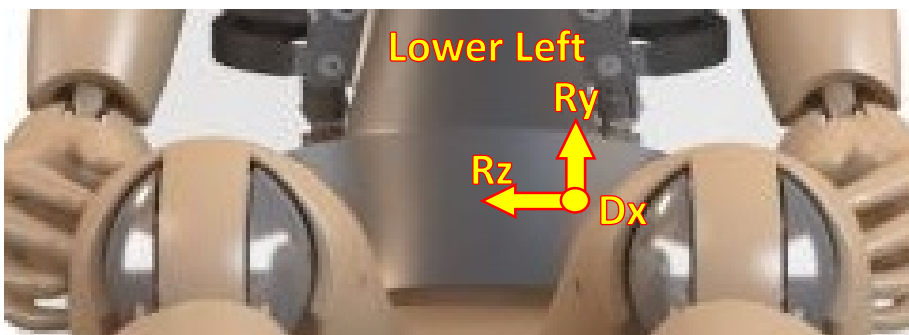
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Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Abdomen Left	IRTRACC Raw Voltage	Dx (V)	ABDOLE00THVO0P	Push Inward	+	+	No
	Rotation Pitch	Ry	ABDOLE00THANYP	Push upward	+	+	No
	Rotation Yaw	Rz	ABDOLE00THANZP	Push rightward	+	+	No
Abdomen Right	IRTRACC Raw Voltage	Dx (V)	ABDORI00THVO0P	Push Inward	+	+	No
	Rotation Pitch	Ry	ABDORI00THANYP	Push downward	+	+	No
	Rotation Yaw	Rz	ABDORI00THANZP	Push rightward	+	+	No



THOR-50M 50th Percentile Male ATD
Sensor Polarities

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Date: 9/10/2021

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Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Head and Neck	Head Accelerometers Primary	Ax	HEAD0000THACXP	Impact back of head	+	+	No
		Ay	HEAD0000THACYP	Impact left of head	+	+	No
		Az	HEAD0000THACZP	Impact top of head	+	+	No
	Head Accelerometers Redundant	Ax	HEADRD00THACXP	Impact back of head	+	+	No
		Ay	HEADRD00THACYP	Impact left of head	+	+	No
		Az	HEADRD00THACZP	Impact top of head	+	+	No
	Head ARS	ωx	HEAD0000THAVXP	Rotate right ear toward right shoulder	+	+	No
		ωy	HEAD0000THAVYP	Rotate chin away from sternum	+	+	No
		ωz	HEAD0000THAVZP	Rotate chin toward right shoulder	+	+	No
	Front Neck Spring	Fz	NECKFR00THFOZP	Rotate head rearward	+	+	No
	Rear Neck Spring	Fz	NECKRE00THFOZP	Rotate chin toward chest	+	+	No
	O.C. Rotary Pot	Ry	NECKUP00THANYP	Rotate chin toward chest	+	+	No
	Upper Neck Load	Fx	NECKUP00THFOXP	Move head rear, chest forward	+	+	No
		Fy	NECKUP00THFOYP	Move head left, chest right	+	+	No
		Fz	NECKUP00THFOZP	Move head up, chest down	+	+	No
		Mx	NECKUP00THMOXP	Rotate left ear toward left shoulder	+	+	No
		My	NECKUP00THMOYP	Rotate chin toward sternum	+	+	No
		Mz	NECKUP00THMOZP	Rotate chin toward left shoulder	+	+	No
	Lower Neck Load	Fx	NECKLO00THFOXP	Move head rear, chest forward	+	+	No
		Fy	NECKLO00THFOYP	Move head left, chest right	+	+	No
		Fz	NECKLO00THFOZP	Move head up, chest down	+	+	No
		Mx	NECKLO00THMOXP	Rotate left ear toward left shoulder	+	+	No
		My	NECKLO00THMOYP	Rotate chin toward sternum	+	+	No
		Mz	NECKLO00THMOZP	Rotate chin toward left shoulder	+	+	No
	Face Loads	Fx	NA	Hold back of head, push face rearward	-	NA	NA

THOR-50M 50th Percentile Male ATD
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Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Spine and Thorax	T1 Accelerometer	Ax	THSP0100THACXP	Impact back of T1Spine	+	+	No
		Ay	THSP0100THACYP	Impact left of T1Spine	+	+	No
		Az	THSP0100THACZP	Impact top of Spine	+	+	No
	T1 ARS	ωx	THSP0100THAVXP	Rotate spine sideways to the right	+	+	No
		ωy	THSP0100THAVYP	Rotate spine rearward	+	+	No
		ωz	THSP0100THAVZP	Left shoulder forward, right shoulder aft	+	+	No
	Mid Sternum Accelerometer	Ax	STRN0000THACXP	Rotate dummy back (face up)	+	-	Yes
	T6 Accelerometer (Chest CG)	Ax	THSP0600THACXP	Impact back of T6 Spine	+	-	Yes
		Ay	THSP0600THACYP	Impact left of T6 Spine	+	+	No
		Az	THSP0600THACZP	Impact top of Spine	+	+	No
	T6 ARS	ωx	THSP0600THAVXP	Right shoulder down	+	+	No
		ωy	THSP0600THAVYP	Shoulders back	+	+	No
		ωz	THSP0600THAVZP	Left shoulder forward, right shoulder back	+	+	No
	T12 (Thoracic Spine) Accelerometer	Ax	THSP1200THACXP	Impact back of T12 Spine	+	+	No
		Ay	THSP1200THACYP	Impact left of T12 Spine	+	+	No
		Az	THSP1200THACZP	Impact top of Spine	+	+	No
	T12 (Thoracic Spine) ARS	ωx	THSP1200THAVXP	Impact back of T12 Spine	+	+	No
		ωy	THSP1200THAVYP	Impact left of T12 Spine	+	+	No
		ωz	THSP1200THAVZP	Impact top of Spine	+	+	No
	T12 (Thoracic Spine) Load	Fx	THSP1200THFOXP	Move chest rear, pelvis forward	+	-	Yes
		Fy	THSP1200THFOYP	Move chest left, pelvis right	+	+	No
		Fz	THSP1200THFOZP	Move chest up, pelvis down	+	+	No
		Mx	THSP1200THMOXP	Rotate left shoulder toward left hip	+	+	No
		My	THSP1200THMOYP	Rotate sternum towards front of legs	+	+	No
	Left Clavicle (Medial) Load	Fx	NA	Pull clavicle forward away from spine	+	NA	NA
		Fz	NA	Push clavicle down towards pelvis	+	NA	NA
	Left Clavicle (Lateral) Load	Fx	NA	Push clavicle forward away from spine	+	NA	NA
		Fz	NA	Push clavicle down towards pelvis	+	NA	NA
	Right Clavicle (Medial) Load	Fx	NA	Push clavicle forward away from spine	+	NA	NA
		Fz	NA	Push clavicle down towards pelvis	+	NA	NA
	Right Clavicle (Lateral) Load	Fx	NA	Push clavicle forward away from spine	+	NA	NA
		Fz	NA	Push clavicle down towards pelvis	+	NA	NA
Abdomen	Upper Abdomen Accel,	Ax	NA	Impact back of Spine	+	NA	NA

THOR-50M 50th Percentile Male ATD
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Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Pelvis	Left ASIS Load (Anterior Superior Iliac Spine)	Fx	ILACLE00THFOXP	Push in towards back of pelvis	-	-	No
		My	ILACLE00THMOYP	Push top of ASIS towards back of pelvis	+	+	No
	Right ASIS Load (Anterior Superior Iliac Spine)	Fx	ILACRI00THFOXP	Push in towards back of pelvis	-	-	No
		My	ILACRI00THMOYP	Push top of ASIS towards back of pelvis	+	+	No
	Left Acetabular Load	Fx	ACTBLE00THFOXP	Move femur forward, pelvis rear	+	+	No
		Fy	ACTBLE00THFOYP	Move femur right, pelvis left	+	-	Yes
		Fz	ACTBLE00THFOZP	Move femur down, pelvis up	+	-	Yes
	Right Acetabular Load	Fx	ACTBRI00THFOXP	Move femur forward, pelvis rear	+	-	Yes
		Fy	ACTBRI00THFOYP	Move femur right, pelvis left	+	+	No
		Fz	ACTBRI00THFOZP	Move femur down, pelvis up	+	+	No
	Pelvis CG Accelerometer	Ax	PELV0000THACXP	Impact back of Pelvis	+	+	No
		Ay	PELV0000THACYP	Impact left of Pelvis	+	+	No
		Az	PELV0000THACZP	Impact top of Spine	+	+	No
	Pelvis CG ARS	ωx	PELV0000THAVXP	Right shoulder down	+	+	No
		ωy	PELV0000THAVYP	Shoulders back, legs up	+	+	No
		ωz	PELV0000THAVZP	Twist pelvis, body, and legs right	+	+	No
Femurs	Left Femur Load	Fx	FEMRLE00THFOXP	Move knee upward, upper femur down	+	+	No
		Fy	FEMRLE00THFOYP	Move knee right, upper femur left	+	+	No
		Fz	FEMRLE00THFOZP	Move knee forward, femur rear	+	+	No
		Mx	FEMRLE00THMOXP	Rotate knee left, hold upper femur	+	+	No
		My	FEMRLE00THMOYP	Rotate knee up, hold upper femur	+	+	No
		Mz	FEMRLE00THMOZP	Rotate tibia left, hold pelvis	+	+	No
	Right Femur Load	Fx	FEMRRI00THFOXP	Move knee upward, upper femur down	+	+	No
		Fy	FEMRRI00THFOYP	Move knee right, upper femur left	+	+	No
		Fz	FEMRRI00THFOZP	Move knee forward, femur rear	+	+	No
		Mx	FEMRRI00THMOXP	Rotate knee left, hold upper femur	+	+	No
		My	FEMRRI00THMOYP	Rotate knee up, hold upper femur	+	+	No
		Mz	FEMRRI00THMOZP	Rotate tibia left, hold pelvis	+	+	No

THOR-50M 50th Percentile Male ATD
Sensor Polarities

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Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Lower Extremity Left	Knee Shear Displacement	Dx	KNSLLE00THDSXP	Hold femur, move tibia forward	+	-	Yes
	Upper Tibia Load	Fx	TIBILEUPTHFOXP	Move tibia forward, knee rearward	+	+	No
		Fy	TIBILEUPTHFOYP	Move ankle right, knee left	+	+	No
		Fz	TIBILEUPTHFOZP	Move ankle down, knee up	+	+	No
		Mx	TIBILEUPTHMOXP	Impact left of Tibia	+	+	No
		My	TIBILEUPTHMOYP	Impact front of Tibia	+	+	No
	Lower Tibia Load	Fx	TIBILELOTHFOXP	Move ankle forward, knee rearward	+	+	No
		Fy	TIBILELOTHFOYP	Move ankle right, knee left	+	+	No
		Fz	TIBILELOTHFOZP	Move ankle down, knee up	+	+	No
		Mx	TIBILELOTHMOXP	Impact left of Tibia	+	+	No
		My	TIBILELOTHMOYP	Impact front of Tibia	+	+	No
	Tibia Accelerometer	Ax	TIBILE00THACXP	Impact back of Tibia	+	+	No
		Ay	TIBILE00THACYP	Impact left of Tibia	+	+	No
	Achilles Load	Fz	ANKLLE00THFOOP	Rotate foot forward	+	+	No
	Ankle Rotation	Rx	ANKLLE00THANXP	Hold tibia, rotate foot leftward	+	+	No
		Ry	ANKLLE00THANYP	Hold tibia, push toe upward	+	-	Yes
		Rz	ANKLLE00THANZP	From top, hold tibia, rotate foot CCW	+	-	Yes
	Foot Acceleration	Ax	FOOTLE00THACXP	Impact back of Foot	+	+	No
		Ay	FOOTLE00THACYP	Impact left of Foot	+	+	No
		Az	FOOTLE00THACZP	Impact top of Foot	+	+	No

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Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Lower Extremity Right	Knee Shear Displacement	Dx	KNSLR100THDSXP	Hold femur, move tibia forward	+	-	Yes
	Upper Tibia Load	Fx	TIBIRIUPTHFOXP	Move tibia forward, knee rearward	+	+	No
		Fy	TIBIRIUPTHFOYP	Move ankle right, knee left	+	+	No
		Fz	TIBIRIUPTHFOZP	Move ankle down, knee up	+	+	No
		Mx	TIBIRIUPTHMOXP	Impact left of Tibia	+	-	Yes
		My	TIBIRIUPTHMOYP	Impact front of Tibia	+	+	No
	Lower Tibia Load	Fx	TIBIRILOTHFOXP	Move ankle forward, knee rearward	+	+	No
		Fy	TIBIRILOTHFOYP	Move ankle right, knee left	+	+	No
		Fz	TIBIRILOTHFOZP	Move ankle down, knee up	+	+	No
		Mx	TIBIRILOTHMOXP	Impact left of Tibia	+	+	No
		My	TIBIRILOTHMOYP	Impact front of Tibia	+	+	No
	Tibia Accelerometer	Ax	TIBIRI00THACXP	Impact back of Tibia	+	+	No
		Ay	TIBIRI00THACYP	Impact left of Tibia	+	+	No
	Achilles Load	Fz	ANKLRI00THFOOP	Rotate foot forward	+	+	No
	Ankle Rotation	Rx	ANKLRI00THANXP	Hold tibia, rotate foot leftward	+	+	No
		Ry	ANKLRI00THANYP	Hold tibia, push toe upward	+	-	Yes
		Rz	ANKLRI00THANZP	From top, hold tibia, rotate foot CCW	+	+	No
	Foot Acceleration	Ax	FOOTRI00THACXP	Impact back of Foot	+	+	No
		Ay	FOOTRI00THACYP	Impact left of Foot	+	+	No
		Az	FOOTRI00THACZP	Impact top of Foot	+	+	No

THOR-50M 50th Percentile Male ATD
Sensor Polarities

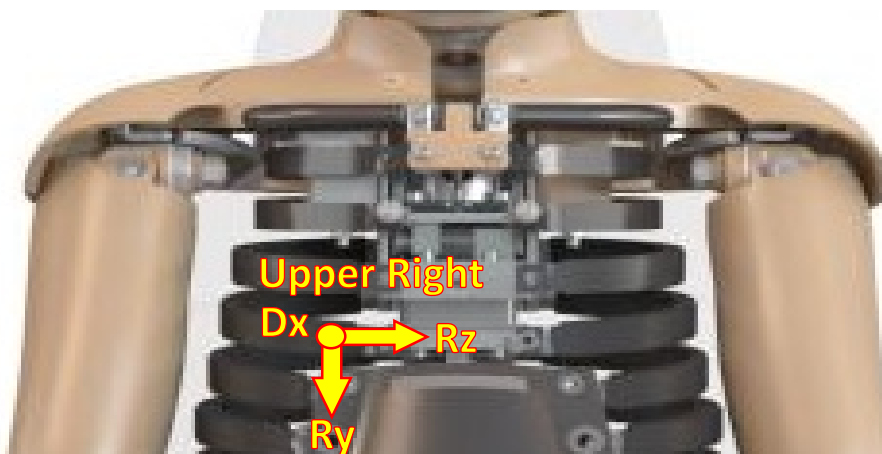
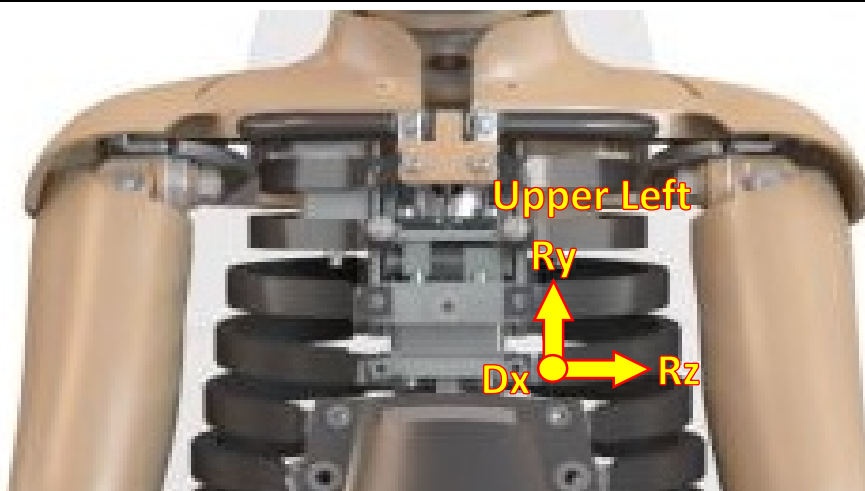
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Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Thorax Upper Left	IRTRACC Raw Voltage	Dx (V)	CHSTLEUPTHVOOP	Push Inward	+	+	No
	Rotation Pitch	Ry	CHSTLEUPTHANYP	Push upward	+	+	No
	Rotation Yaw	Rz	CHSTLEUPTHANZP	Push leftward	+	+	No
Thorax Upper Right	IRTRACC Raw Voltage	Dx (V)	CHSTRIUPTHVOOP	Push Inward	+	+	No
	Rotation Pitch	Ry	CHSTRIUPTHANYP	Push downward	+	+	No
	Rotation Yaw	Rz	CHSTRIUPTHANZP	Push leftward	+	+	No



THOR-50M 50th Percentile Male ATD
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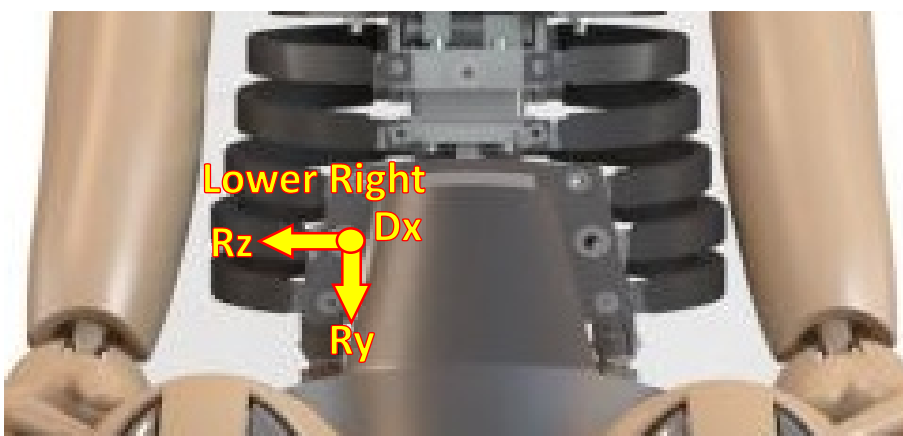
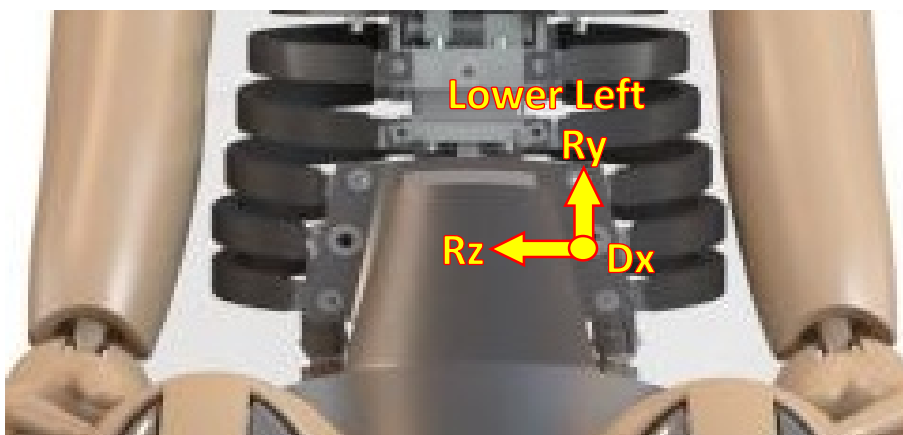
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Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Thorax Lower Left	IRTRACC Raw Voltage	Dx (V)	CHSTLELOTHVO0P	Push Inward	+	+	No
	Rotation Pitch	Ry	CHSTLELOTHANYP	Push upward	+	+	No
	Rotation Yaw	Rz	CHSTLELOTHANZP	Push rightward	+	+	No
Thorax Lower Right	IRTRACC Raw Voltage	Dx (V)	CHSTRILOTHVO0P	Push Inward	+	+	No
	Rotation Pitch	Ry	CHSTRILOTHANYP	Push downward	+	+	No
	Rotation Yaw	Rz	CHSTRILOTHANZP	Push rightward	+	+	No



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Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Abdomen Left	IRTRACC Raw Voltage	Dx (V)	ABDOLE00THVO0P	Push Inward	+	+	No
	Rotation Pitch	Ry	ABDOLE00THANYP	Push upward	+	+	No
	Rotation Yaw	Rz	ABDOLE00THANZP	Push rightward	+	+	No
Abdomen Right	IRTRACC Raw Voltage	Dx (V)	ABDORI00THVO0P	Push Inward	+	+	No
	Rotation Pitch	Ry	ABDORI00THANYP	Push downward	+	+	No
	Rotation Yaw	Rz	ABDORI00THANZP	Push rightward	+	+	No

