

REPORT NUMBER: R&D-CAL-15-046

**MOVING BARRIER TO VEHICLE CRASH TEST IN SUPPORT OF NHTSA'S
FRONTAL OBLIQUE OFFSET PROGRAM
OBLIQUE MOVING DEFORMABLE BARRIER INTO LEFT FRONT OF A**

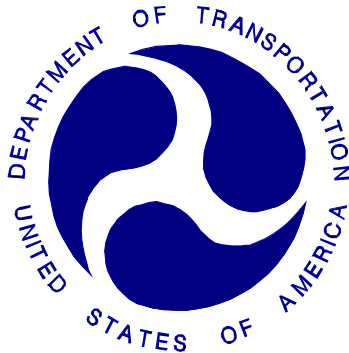
2016 Mazda CX-5

90.1KPH, 15 DEGREE ANGLE, 35% OVERLAP

TEST DATE: 10/7/2016

NHTSA No: M20165404

**CALSPAN CORPORATION
TRANSPORTATION TEST OPERATIONS
P.O. BOX 400
BUFFALO, NEW YORK 14225**



FINAL REPORT SUBMITTED:

December 21, 2016

PREPARED FOR:

**U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Vehicle safety Research
1200 New Jersey Ave, SE
Room W46-446
Washington, DC 20590**

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared by: Vanessa Hansen
Vanessa Hansen, Test Engineer

Date: December 21, 2016

Approved by: Edward J. Dutton
Edward J. Dutton, Operations Manager
Transportation Test Operations

Date: December 21, 2016

FINAL REPORT ACCEPTANCE BY VEHICLE SAFETY RESEARCH, OFFICE OF
STRUCTURAL AND RESTRAINTS RESEARCH DIVISION:

Date: _____

TOM, Vehicle Crash Testing
NHTSA, Office of Structures and Restraints Research

Date: _____

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. R&D-CAL-15-046	2. Government Accession No.		3. Recipient's Catalog No.																																					
4. Title and Subtitle Report for Frontal Oblique Offset Program Testing of a 2016 Mazda CX-5 NHTSA No.: M20165404			5. Report Date 12/21/2016																																					
			6. Performing Organization Code CAL																																					
7. Author(s) Vanessa Hansen, Test Engineer Edward Dutton, Operations Manager			8. Performing Organization Report No. CAL-DOT-2015-046																																					
9. Performing Organization Name and Address Calspan Corporation 4455 Genesee Street Buffalo, New York 14225			10. Work Unit No.																																					
			11. Contract or Grant No. DTNH22-14-D-00359																																					
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Research 1200 New Jersey Ave SE, Room W46-446 Washington, DC 20590			13. Type of Report and Period Covered Final Report, 12/21/2016																																					
			14. Sponsoring Agency Code NVS-321																																					
15. Supplementary Notes																																								
16. Abstract A test was conducted in accordance with Contract DTNH22-14-D-00359, Task Order #001. The Test consisted of an Oblique Moving Deformable Barrier (OMDB) traveling at a target speed of 90.12 kph into a stationary 2016 Mazda CX-5. The struck vehicle was positioned 15 degrees relative to the moving barrier and impacted 35% of the left side of the vehicle. 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 Calspan Corporation's Transportation Test Operation's facility in Buffalo, New York on October 7, 2016. The OMDB impact velocity was 90.39 kph and the ambient temperature at the test vehicle at the time of impact was 21°C. The target vehicle post-test maximum crush was 586 mm. The test vehicle's performance was as follows: <table border="1"> <thead> <tr> <th>Measurement Description</th> <th>Units</th> <th>Driver THOR</th> <th>Pass. THOR</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td>N/A</td> <td>229.84</td> <td>197.88</td> </tr> <tr> <td>Brain Injury Criteria (BrIC)</td> <td>N/A</td> <td>0.99</td> <td>0.57</td> </tr> <tr> <td>Peak Neck Tension</td> <td>N</td> <td>2019.87</td> <td>999.83</td> </tr> <tr> <td>Peak Resultant Chest Deflection</td> <td>mm</td> <td>49.49</td> <td>39.07</td> </tr> <tr> <td>Peak Abdomen Deflection</td> <td>mm</td> <td>-54.33</td> <td>-55.18</td> </tr> <tr> <td>Peak Resultant Acetabulum force</td> <td>N</td> <td>1861.50</td> <td>2515.61</td> </tr> <tr> <td>Peak Femur Force</td> <td>N</td> <td>-3172.50</td> <td>-2926.41</td> </tr> <tr> <td>Right Tibia Index</td> <td>N/A</td> <td>0.77</td> <td>0.85</td> </tr> </tbody> </table>					Measurement Description	Units	Driver THOR	Pass. THOR	Head Injury Criteria (HIC ₁₅)	N/A	229.84	197.88	Brain Injury Criteria (BrIC)	N/A	0.99	0.57	Peak Neck Tension	N	2019.87	999.83	Peak Resultant Chest Deflection	mm	49.49	39.07	Peak Abdomen Deflection	mm	-54.33	-55.18	Peak Resultant Acetabulum force	N	1861.50	2515.61	Peak Femur Force	N	-3172.50	-2926.41	Right Tibia Index	N/A	0.77	0.85
Measurement Description	Units	Driver THOR	Pass. THOR																																					
Head Injury Criteria (HIC ₁₅)	N/A	229.84	197.88																																					
Brain Injury Criteria (BrIC)	N/A	0.99	0.57																																					
Peak Neck Tension	N	2019.87	999.83																																					
Peak Resultant Chest Deflection	mm	49.49	39.07																																					
Peak Abdomen Deflection	mm	-54.33	-55.18																																					
Peak Resultant Acetabulum force	N	1861.50	2515.61																																					
Peak Femur Force	N	-3172.50	-2926.41																																					
Right Tibia Index	N/A	0.77	0.85																																					
17. Key Words THOR Oblique Offset		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Reference Division 1200 New Jersey Ave, SE Washington, DC 20590																																						
19. Security Classif. (of this report) UNCLASSIFIED	20. Security Classif. (of this page) UNCLASSIFIED	21. No. of Pages	22. Price																																					

DISCLAIMER

The contents of this report relate only to the specific product evaluated under the specific test conditions, as defined within this report. The findings and conclusions are those of the author(s) and not necessarily those of Calspan Corporation. For the purposes of this report, Calspan Corporation provided test services only and was not involved with the consulting, design or manufacture of any product. Calspan Corporation does not endorse products or manufacturers. Further, Calspan Corporation (to include: any of its affiliates, parent companies or subsidiaries) assumes no liability associated with the contents of this report or the use of this report.

Prepared by: Vanessa Hansen
Vanessa Hansen, Project Engineer

Date: December 21, 2016

Approved by: Edward J. Dutton
Edward J. Dutton, Test Engineer Director
Transportation Test Operations

Date: December 21, 2016

TABLE OF CONTENTS

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

<u>Section</u>	<u>Page No.</u>
1 Purpose of Test	1-1
2 Summary of Test	2-1
Crash Vehicle Summary	2-3
Preliminary Injury Summary: Driver	2-5
Preliminary Injury Summary: Front Right Passenger	2-6
3 Data Sheets	3-1

<u>Data Sheet No.</u>	<u>Page No.</u>
1 General Test and Vehicle Parameter Data	3-2
2 Seat Adjustment, Fuel System, and Steering Wheel	3-6
3 Dummy Longitudinal Clearance Dimensions	3-8
4 Dummy Lateral Clearance Dimensions	3-10
5 Seat Belt Positioning Data	3-11
6 High-Speed Camera Locations and Data	3-12
7 Vehicle Instrumentation Data	3-15
8 Photographic Reference Target Locations	3-18
9 Test Vehicle Summary of Results	3-25
10 Post-Test Observations	3-26
11 Vehicle Profile Measurements	3-27
12 Accident Investigation Division Data	3-29
13 Vehicle Intrusion Measurements	3-30
14 OMDB Crush Measurements	3-47
15 Summary of FMVSS 212, 219 (Partial), and 301 Data	3-48
Windshield Periphery Measurements	3-48
Areas of Protected Zone Failures	3-48
Fuel System Integrity Post Impact Data	3-49
16 FMVSS 301 Static Rollover Results	3-50
17 Dummy / Vehicle Temperature Stabilization	3-51

<u>Appendix</u>	<u>Page No.</u>
A Photographs	A-1
B Vehicle & Dummy Response Data Traces	B-1
C Part 572 E/O Dummy Calibration and Performance Verification Data Sheets	C-1
D CMM Measurement Procedures	D-1

SECTION 1
PURPOSE OF TEST

Test Vehicle: 2016 Mazda CX-5
Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
Test Date: 10/7/2016

This 90.12 kph (56 mph) Moving Barrier into a test vehicle is part of the Frontal Offset Test outlined in Contract No. DTNH22-14-D-00359, Task Order 0001. The purpose of this test is to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

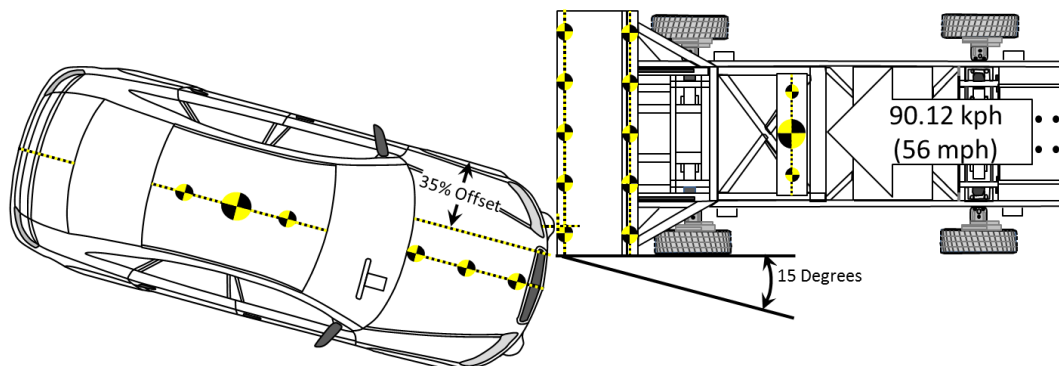
This test was conducted in accordance with the instructions set forth for a 15° angle, 35% offset moving barrier to vehicle impact, outlined in Contract No. DTNH22-14-D-00359, Task Order 0001. Data was obtained indicant of Federal Motor Vehicle Safety Standard FMVSS 208- Occupant Crash Protection, FMVSS 212 – Windshield Mounting, FMVSS 219 (partial) – Windshield Zone Intrusion, and FMVSS 301 – Fuel System Integrity, in addition to the requirements of Contract No. DTNH22-14-D-00359, Task Order 0001.

SECTION 2 SUMMARY OF TEST

Test Vehicle: 2016 Mazda CX-5
Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
Test Date: 10/7/2016

A 2016 Mazda CX-5 was impacted on the left front corner by an Oblique Moving Deformable Barrier (OMDB). This test vehicle was stationary and positioned at a target angle of 15° and at a target offset of 35% to the forward line of motion of the OMDB. The OMDB was towed down the test track in a full forward direction, without any crabbing, and at the targeted impact velocity of 90.12 kph (56.0 mph) into the test vehicle. The test vehicle's mass was 1,767 kg (3,896 lbs), and the OMDB's mass was 2536 kg (5,591 lbs). The test was conducted by Calspan Corporation on October 7, 2016.



The test was documented by two (2) real time and fifteen (15) high-speed video cameras. Camera locations and other pertinent data are located in Data Sheet No. 6 of this report. Pre and post – test photographs of the test vehicle, OMDB, and test setup were taken using a digital still camera. Photographic documentation of the test is presented in Appendix A of this report.

One 50% adult male THOR-NT anthropomorphic test device (ATD) (Serial No. DL9207) was seated in the left, front (P1 -Driver's) seating position and one 50% adult male THOR-NT adult male ATD (Serial No. Do9798) was seated in the right front passenger seating position (P2). The driver and passenger were positioned according to instructions specified in the THOR seating procedures.

The driver was restrained with a 3 – point seat belt, frontal, curtain, and torso airbag. The passenger was restrained with a 3 – point seat belt, frontal, curtain, and torso airbag.

SECTION 2 (CONTINUED)

SUMMARY OF TEST

Test Vehicle: 2016 Mazda CX-5
Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
Test Date: 10/7/2016

Two hundred and fifty eight (258) channels of data from the two ATD's, test vehicle and OMDB were collected using Kayser – Threde data acquisition systems. Appendix B contains dummy data plots, as well as vehicle and OMDB response data plots.

There was 77.5% total windshield retention. There appeared to be no intrusion into the protected zone of the windshield during any portion of the impact event. The maximum static crush of the vehicle was 586 mm at C1 to the left of the vehicle's centerline. The maximum crush of the structural bumper beam was 447 mm at B3, to the left of the vehicle's centerline. Full vehicle measurements are presented in Section 3 of this report.

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

Structure observations include the following:

- Windshield had cracks throughout with minor separation along the bottom.
- The A-Pillar & B-Pillar Buckled during impact
- Hood bent inwards and exposed part of the engine compartment

The driver ATD's visible contact points were:

- Head contacted the frontal & curtain airbags & visor
- Torso contacted the frontal & torso airbag and seatback
- Arm contacted the driver's door
- Left Knee contacted the knee bolster
- Right Knee contacted the knee bolster

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

- Head contacted the frontal airbag
- Torso contacted the frontal airbag
- Knees contacted the glove box

SECTION 2 (CONTINUED)
CRASH VEHICLE SUMMARY

Test Vehicle: 2016 Mazda CX-5
Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
Test Date: 10/7/2016

Primary Impact Data

Measured Parameter	Units	Value
OMDB Velocity at Impact	kph	90.39
OMDB Test Weight	kg	2536
OMDB Maximum Static Crush	mm	415
Vehicle Test Weight	kg	1767
Actual Vehicle Angle	degrees	15
Vehicle Maximum Static Crush	mm	586
Vertical Offset from Target Point (+ down / - up)*	mm	-8
Lateral Offset from Target Point (+ left / - right)*	mm	+13
Number of Data Channels		258
Number of Real-Time Cameras		2
Number of High-Speed Cameras		15

*Offsets are in relation to the vehicle coordinate system.

Dummy Contacts

	Driver	Picture Ref.	Passenger	Picture Ref.
Dummy Type	THOR, S/N: DO9798		THOR, S/N: DL9207	
Head Contact	Front & Curtain Airbag & Visor	A49-A51	Front Airbag	A70-A72
Upper Torso Contact	Front Airbag	N/A	Front Airbag	N/A
Lower Torso Contact	None	N/A	None	N/A
Side Torso Contact	Torso Airbag & Seatback	N/A	None	N/A
Left Knee Contact	Knee Bolster	A28	Glove Box	A52
Right Knee Contact	Knee Bolster	A28	Glove Box	A52

Data Anamolies

CHANNEL DESCRIPTION	EXPLANATION
Driver Thorax Upper Left X Displacement, Questionable spike 18.5ms & 63ms	
Driver Thorax Lower Left X Displacement, Questionable spike 18.5ms	
Driver Abdomen Left X Displacement, Questionable spike 18.5ms & 63ms	
Driver Ankle Right Y Rotation, Questionable spike 45.5ms & 52.5ms	
Passenger Shoulder Belt Displacement, Questionable data after 70ms	

PRELIMINARY INJURY SUMMARY: Driver

Test Vehicle: M20165404 - 2016 Mazda CX-5 NHTSA No.: M20165404
 Test Program: R&D Left Oblique Offset 15deg/35% Test Date: 10/7/2016

Driver: THOR Serial No. DL9207 Injury Summary

Location	Description	Unit	Source	Max	Min
Head	HIC 15ms		Compute	229.84	
	Brain Injury Criteria (BrIC)		Compute	0.99	
	Head Rotational Velocity X	Deg/s	60	991.76	-1747.22
	Head Rotational Velocity Y	Deg/s	60	1114.60	-1574.23
	Head Rotational Velocity Z	Deg/s	60	1120.20	-1777.35
Neck	Upper Neck Z-axis Force	N	1000	2019.87	-501.04
	Upper Neck Y-axis Moment	Nm	Thortest	33.69	-16.38
Chest	Upper Left Resultant Chest Deflection	mm	Compute	42.02 ⁽¹⁾	
	Upper Right Resultant Chest Deflection	mm	Compute	49.49	
	Lower Left Resultant Chest Deflection	mm	Compute	19.00 ⁽²⁾	
	Lower Right Resultant Chest Deflection	mm	Compute	31.68	
Abdomen	Lower Left X-axis Deflection	mm	Compute	6.92 ⁽³⁾	-54.33 ⁽³⁾
	Lower Right X-axis Deflection	mm	Compute	-0.00	-51.39
Acetabulum	Left Acetabulum Resultant Force	N	Compute	1798.18	0.03
	Right Acetabulum Resultant Force	N	Compute	1861.50	0.08
Femur	Left Femur Force, FZ	N	600	546.03	-3172.50
	Right Femur Force, FZ	N	600	537.88	-2277.88
Tibia	Left Upper Tibia, FZ	N	600	146.88	-1708.40
	Left Upper Tibia Index		Compute	0.45	
	Right Upper Tibia, FZ	N	600	122.68	-2103.41
	Right Upper Tibia Index		Compute	0.77	
	Left Lower Tibia, FZ	N	600	392.94	-3296.37
	Left Lower Tibia Index		Compute	0.43	
	Right Lower Tibia, FZ	N	600	398.95	-3326.54
	Right Lower Tibia Index		Compute	0.69	
Ankle	Left Ankle Rotation, RX	Deg	180	23.72	-1.83
	Left Ankle Rotation, RY	Deg	180	31.23	-14.89
	Left Ankle Dorsiflexion Moment, MY	Nm	Compute	38.33	-7.15
	Left Ankle In/Eversion Moment, MX	Nm	Compute	17.19	-85.22
	Right Ankle Rotation, RX	Deg	180	-4.88	-32.94
	Right Ankle Rotation, RY	Deg	180	11.60 ⁽⁴⁾	-16.26 ⁽⁴⁾
	Right Ankle Dorsiflexion Moment, MY	Nm	Compute	91.89	-78.58
	Right Ankle In/Eversion Moment, MX	Nm	Compute	31.06	-275.51

Anomalies:

- (1) Thorax Upper Left X Displacement, Questionable spike 18.5ms & 63ms
- (2) Thorax Lower Left X Displacement, Questionable spike 18.5ms
- (3) Questionable spike 18.5ms & 63ms
- (4) Questionable spike 45.5ms & 52.5ms

PRELIMINARY INJURY SUMMARY: Right Front Passenger

Test Vehicle: M20165404 - 2016 Mazda CX-5 NHTSA No.: M20165404
 Test Program: R&D Left Oblique Offset 15deg/35% Test Date: 10/7/2016

Right Front Passenger: THOR Serial No. DO9798 Injury Summary

Location	Description	Unit	Source	Max	Min
Head	HIC 15ms		Compute	197.88	
	Brain Injury Criteria (BrIC)		Compute	0.57	
	Head Rotational Velocity X	Deg/s	60	815.60	-1106.29
	Head Rotational Velocity Y	Deg/s	60	517.33	-1095.42
	Head Rotational Velocity Z	Deg/s	60	882.23	-124.16
Neck	Upper Neck Z-axis Force	N	1000	999.83	-85.50
	Upper Neck Y-axis Moment	Nm	Thortest	14.54	-28.14
Chest	Upper Left Resultant Chest Deflection	mm	Compute	39.07	
	Upper Right Resultant Chest Deflection	mm	Compute	34.41	
	Lower Left Resultant Chest Deflection	mm	Compute	30.58	
	Lower Right Resultant Chest Deflection	mm	Compute	10.95	
Abdomen	Lower Left X-axis Deflection	mm	Compute	0.31	-45.19
	Lower Right X-axis Deflection	mm	Compute	2.05	-55.18
Acetabulum	Left Acetabulum Resultant Force	N	Compute	1362.43	0.11
	Right Acetabulum Resultant Force	N	Compute	2515.61	0.04
Femur	Left Femur Force, FZ	N	600	501.61	-2926.41
	Right Femur Force, FZ	N	600	525.96	-816.61
Tibia	Left Upper Tibia, FZ	N	600	147.09	-2583.37
	Left Upper Tibia Index		Compute	0.71	
	Right Upper Tibia, FZ	N	600	126.28	-1585.03
	Right Upper Tibia Index		Compute	0.82	
	Left Lower Tibia, FZ	N	600	97.59	-3342.38
	Left Lower Tibia Index		Compute	0.63	
	Right Lower Tibia, FZ	N	600	169.82	-2201.73
	Right Lower Tibia Index		Compute	0.85	
Ankle	Left Ankle Rotation, RX	Deg	180	24.20	-31.63
	Left Ankle Rotation, RY	Deg	180	2.64	-28.01
	Left Ankle Dorsiflexion Moment, MY	Nm	Compute	17.47	-16.04
	Left Ankle In/Eversion Moment, MX	Nm	Compute	69.20	-144.34
	Right Ankle Rotation, RX	Deg	180	29.56	-49.38
	Right Ankle Rotation, RY	Deg	180	-5.16	-29.97
	Right Ankle Dorsiflexion Moment, MY	Nm	Compute	14.98	-30.29
	Right Ankle In/Eversion Moment, MX	Nm	Compute	166.60	-196.58
Anomalies: None					

SECTION 3 DATA SHEETS

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

Data Sheet No.		Page No.
1	General Test and Vehicle Parameter Data	3-2
2	Seat Adjustment, Fuel System, and Steering Wheel	3-6
3	Dummy Longitudinal Clearance Dimensions	3-8
4	Dummy Lateral Clearance Dimensions	3-10
5	Seat Belt Positioning Data	3-11
6	High-Speed Camera Locations and Data	3-12
7	Vehicle Instrumentation Data	3-15
8	Photographic Reference Target Locations	3-18
9	Test Vehicle Summary of Results	3-25
10	Post-Test Observations	3-26
11	Vehicle Profile Measurements	3-27
12	Accident Investigation Division Data	3-29
13	Vehicle Intrusion Measurements	3-30
14	OMDB Crush Measurements	3-47
15	Summary of FMVSS 212, 219 (Partial), and 301 Data	3-48
	Windshield Periphery Measurements	3-48
	Areas of Protected Zone Failures	3-48
	Fuel System Integrity Post Impact Data	3-49
16	FMVSS 301 Static Rollover Results	3-50
17	Dummy / Vehicle Temperature Stabilization	3-51

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

VEHICLE INFORMATION

NHTSA No.	M20165404
Model Year	2016
Make	Mazda
Model	CX-5
Body Style	5 Door Hatchback
VIN	JM3KE4BY5G0825716
Body Color	Charcoal Gray
Odometer Reading (km/mi)	124 km / 77 mi
Engine Displacement. (L)	2.0
Type/No. Cylinders	I4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6-Speed
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
All-Wheel Drive (AWD)	Yes
Traction Control System (TCS)	Yes

VEHICLE OPTIONS

Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
Power Window Auto-Reverse	No
Other Optional Feature	-
Driver Front 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
Pass. Front Airbag	Yes
Pass. Curtain Airbag	Yes
Pass. Head/Torso Airbag	No
Pass. Torso Airbag	No
Pass. Torso/Pelvis Airbag	Yes
Pass. Pelvis Airbag	No
Pass. Knee Airbag	No
Driver Seat Belt Pretensioner	Yes
Pass. Seat Belt Pretensioner	Yes
Driver Load Limiter	Yes
Pass. Load Limiter	Yes
Other Safety Restraint	-

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	06/16

GWR (kg)	2071
GAWR Front (kg)	1056
GAWR Rear (kg)	1018

VEHICLE SEATING AND WEIGHT CAPACITY

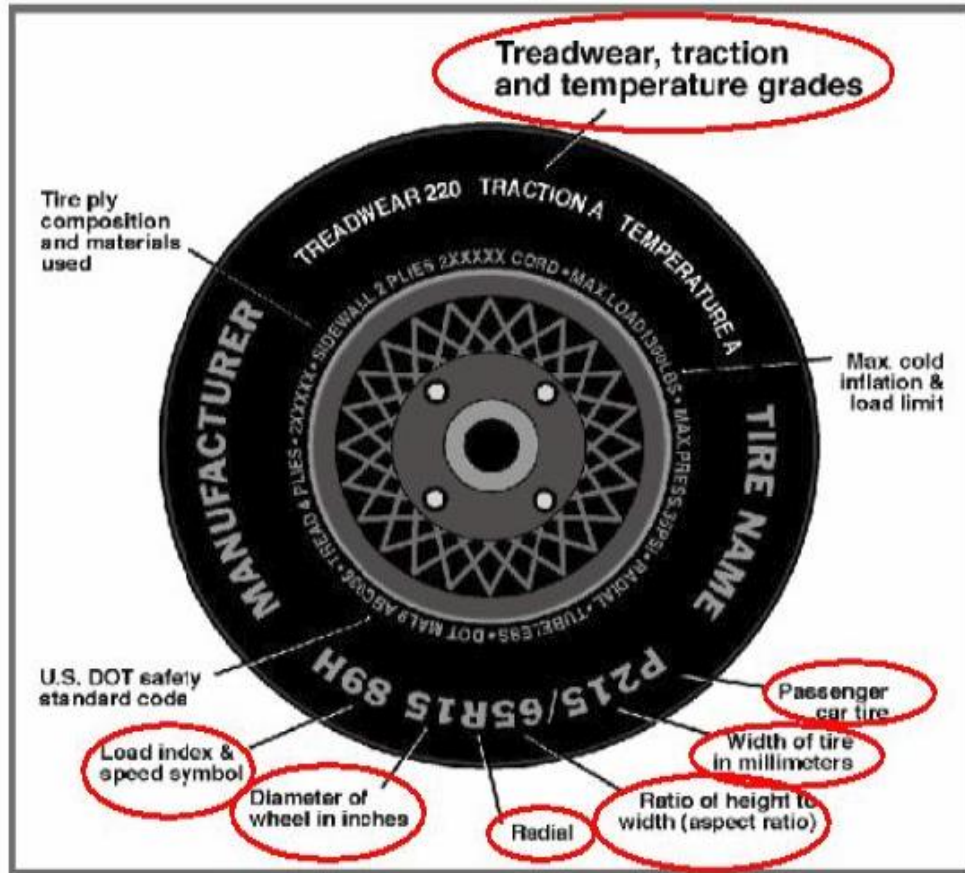
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	-	
Number of Occupants	2	3	-	5
Capacity Wt. (VCW) (kg)				385
Cargo Wt. (RCLW) (kg)				44.8

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

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

Collect items circled in red, tire manufacturer, and tire name.



Measured Parameter	Front	Rear
Maximum 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	Geolandar G91	Geolandar G91
Treadwear	280	280
Traction	B	B
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1Nylon	2 Polyester, 2 Steel, 1Nylon
Load Index/Speed Symbol	100H	100H
Tire Material	Rubber	Rubber
DOT Safety Code Right	FDF5PC52116	FDF5PC52116
DOT Safety Code Left	FDF5PC52116	FDF5PC52116

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

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	446	342		495	402	
Right	kg	445	314		493	377	
Ratio	%	58	42		56	44	
Totals	kg	891	656	1547	988	779	1767

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1547
Weight of 2 THOR ATDs	kg	184
Rated Cargo/Luggage Weight (RCLW)	kg	44.8
Calculated Vehicle Target Weight (TVTW)	kg	1775.8

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	878	875	889	894	1142
As Tested	mm	858	859	863	864	1188
Post Test	mm	856	902	824	937	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2694
Total Vehicle Length at Left Side	mm	4403
Total Vehicle Length at Centerline	mm	4545
Total Vehicle Length at Right Side	mm	4403
Weight of Ballast in Cargo Area	kg	0
Weight of Vehicle Components Removed	kg	93
Amount of Stoddard Solvent in Fuel Tank	L	53.94

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:

Trunk carpeting, spare tire, jack, tail light, rear seats & belts, floor mats, rear hatch
Plastic, rear door skins & internals, rear bumper beam & plastic.

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

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Units	Pre-Test
1	Total Length	mm	4542
2	Total Width	mm	1827
3*	Bumper Top Height	mm	633
4*	Bumper Bottom Height	mm	548
5*	Longitudinal Member Top Height	mm	653
6	Distance Between Longitudinal Members	mm	1005
7	Longitudinal Member Width	mm	56
8*	Engine Top Height	mm	900
9*	Engine Bottom Height	mm	299
10	Engine and Gearbox Width	mm	544
11	Front Bumper-Engine Distance	mm	581
12*	Front Shock Absorber Fixing Height	mm	1033
13*	Bonnet Leading Edge Height	mm	916
14	Front Shock Absorber Fixing Width	mm	1183
15	Front Bumper – Front Axle Distance	mm	937
16	Front Axle – A Pillar Distance	mm	550
17	A-Pillar – B-Pillar Distance	mm	1086
18	B-Pillar – Rear Axle Distance	mm	1056
19	B-Pillar – C-Pillar Distance	mm	912
20*	Roof Sill Bottom Height	mm	1576
21*	Roof Sill Top Height	mm	1632
22*	Floor Sill Bottom Height	mm	380
23*	Floor Sill Top Height	mm	504

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

DATA SHEET NO. 2

SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

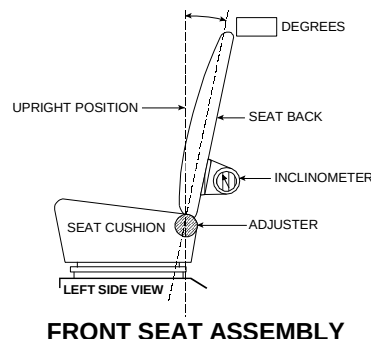
NHTSA No.: M20165404
 Test Date: 10/7/2016

NORMAL DESIGN RIDING POSITION

For adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent, if applicable.

Driver seat: The driver seat back was positioned according to the Nominal Design Riding position listed in FORM 1 and THOR Seating Procedure.

Passenger Seat: The passenger seat back was positioned according to the Nominal Design Riding position listed in FORM 1 and THOR Seating Procedure



	UNIT	FORM 1 POSITION	AFTER ATD POSITIONING
Driver Seat Back Angle	deg	4.2	6.2
Passenger Seat Back Angle	deg	3.8	5.8

SEAT FORE/AFT POSITIONS

Describe the method used of determining seat fore/aft positions.

The driver's seat was positioned at its mid cushion angle and at the mid-point of fore/aft travel per Thor seating procedure.. The passenger's seat was positioned at the mid-point of fore/aft travel per THOR Seating Procedure.

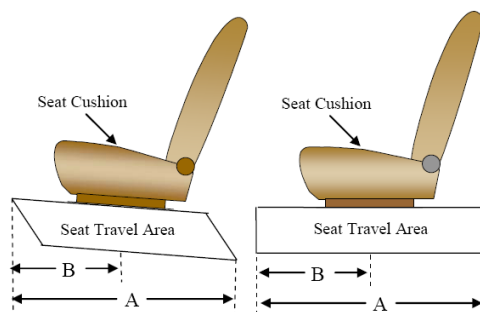
	Total Fore/Aft Travel	Placed in Position #
Driver Seat	27 (0-26)	13
Passenger Seat	27 (0-26)	15*

***Passenger seat was moved 2 detents rearward from center for THOR seating.**

SEAT BELT UPPER ANCHORAGES

Describe the method of positioning seat belt upper anchorages. Belt anchorages were moved along the full range of motion, and marked on the B-Pillar to their respective possible positions. Photographic evidence can be found in Appendix A of this report. Zero is defined as the upper-most position.

	Total # of Positions	Placed in Position #
Driver Seat	4	0 – Uppermost
Passenger Seat	4	0 – Uppermost



DATA SHEET NO. 2 (CONTINUED)
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

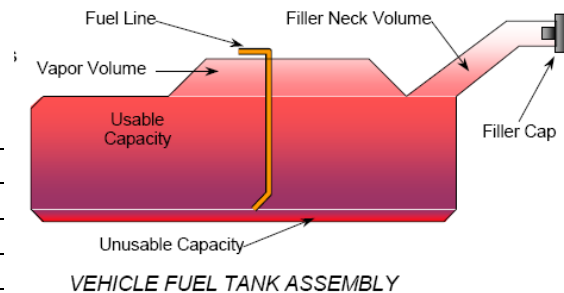
FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	58
Usable Capacity of "Optional Tank"	N/A
93% of Usable Capacity	53.94
Actual Amount of Solvent Used	53.94
1/3 of Usable Capacity	19.33

FUEL PUMP

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

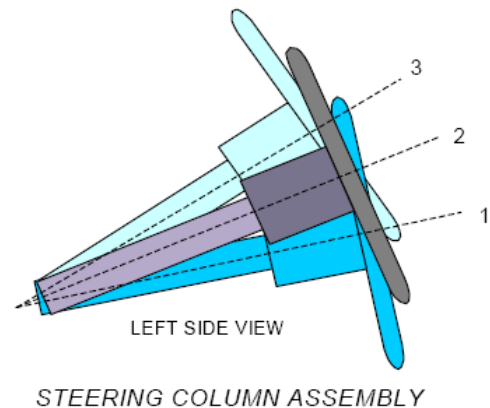
Fuel evacuated according to the specifications provided by the manufacturer in Form 1. Electric fuel pump operates when the ignition is in the 'on' position and the engine is running. The fuel filler neck is located above the left rear wheel.



STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. Describe how this measurement was taken.

The steering wheel was adjusted to the midpoint of tilt angle range and the midpoint of the telescoping travel



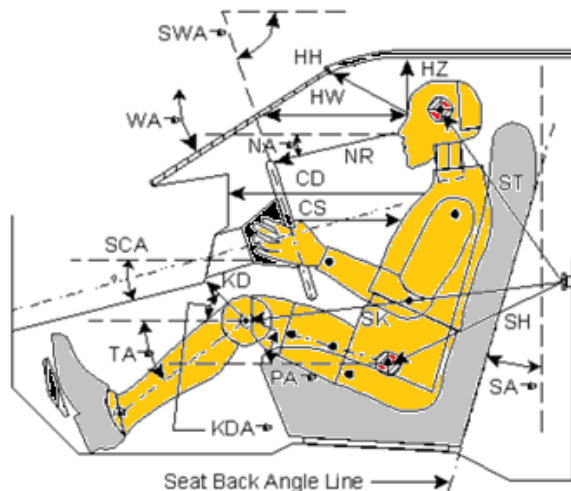
STEERING COLUMN POSITIONS

	Tilt (degrees)	Fore/Aft Position (mm)
Lowermost position No. 1	24.2	
Geometric center position No. 2	26.6	
Uppermost position No. 3	29	
Telescoping Steering Wheel Travel		50
Test Position	26.6	25

DATA SHEET NO. 3 DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2016 Mazda CX-5
Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
Test Date: 10/7/2016

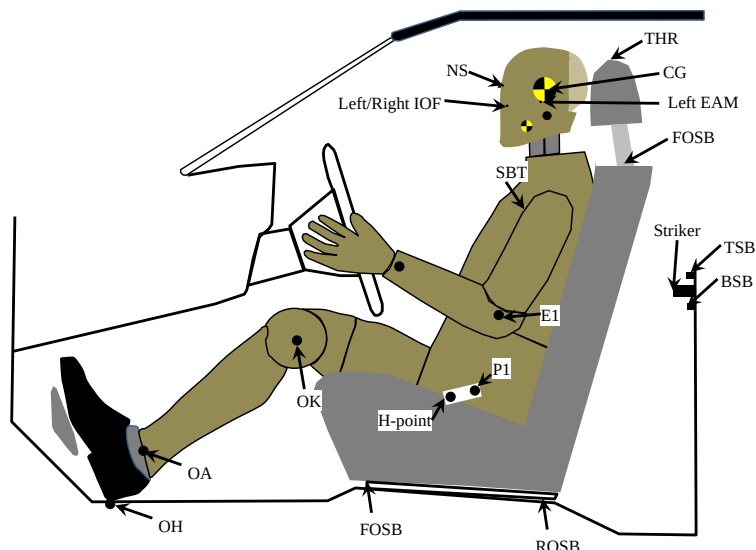


Code	Measurement Description	Driver (Serial#THOR DL9207)		Passenger (Serial#THOR DO9798)	
		Length (mm)	Angle(°)	Length (mm)	Angle (°)
WA°	Windshield Angle		32.3		
SWA°	Steering Wheel Angle		26.3		
SCA°	Steering Column Angle		63.7		
SA°	Seat Back Angle (on headrest post)		6.2		5.8
SA°	Seat Back Angle		19		20.8
HZ	Head to Roof (Z)	204	90	216	90
HH	Head to Header	413	19	441	17.2
HW	Head to Windshield	662	0	701	0
NR	Nose to Rim	505	20.3	690	34.7
CD	Chest to Dash	577		553	
CS	Chest to Steering Hub	364	11.7		
RA	Rim to Abdomen	167	0		
KDL	Left Knee to Dash	108	10.6	87	33.5
KDR	Right Knee to Dash	75	42.6	116	29
PA°	Pelvic Angle		34.3		31.3
TA°	Tibia Angle		53.9		44.5
SK	Striker to Knee	639	2.0	648	5.3
ST	Striker to Head	536	85.8	526	88.3
SH	Striker to H-Point	280	28.1	265	30.1
HAX°	Head Angle (X)		0.5		-0.4
HAY°	Head Angle (Y)		-0.6		-2.7
TAX°	T6 Angle (X)		0.7		-0.6
TAY°	T6 Angle (Y)		22.1		23.3
TAX°	T1 (X)		0.3		-0.3
TAY°	T1 (Y)		0.4		2.9
TAX°	T12 (X)		0.6		-0.6
TAY°	T12 (Y)		30.7		32.9
PAX	Pelvic (X)		0.1		0.5
PAY	Pelvic (Y)		34.3		31.3

DATA SHEET NO.3 (CONTINUED) DUMMY CMM MEASUREMENTS

Test Vehicle: 2016 Mazda CX-5
Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
Test Date: 10/7/2016



Description	Units	Driver			Passenger		
		X	Y	Z	X	Y	Z
Head CG	mm	2115	-443	-768	2092	444	-758
Nasion	mm	2205	-365	-770	2181	362	-765
Tip of Nose	mm	2207	-365	-734	2181	363	-728
Tip of Chin	mm	2202	-366	-632	2172	364	-626
Left EAM	mm	2121	-439	-736	2091	294	-732
Right EAM	mm	2121	-292	-731	2098	439	-730
Left IOF	mm	2204	-396	-734	2176	330	-728
Right IOF	mm	2203	-333	-731	2179	393	-727
Outboard Elbow	mm	2304	-616	-277	2249	629	-262
H-Point	mm	2323	-699	-101	2305	695	-99
H-Point Tool	mm	2249	-626	-133	2231	621	-132
Outboard Knee Bolt	mm	2715	-590	-211	2721	529	-172
Inboard Knee Bolt	mm	2727	-284	-215	2719	305	-174
Outboard Ankle Bolt	mm	2964	-586	129	3013	530	128
Outer Heel Point	mm	2987	-562	268	2984	478	263
Inboard Heel Point	mm	2930	-199	270	2987	256	260
Striker Top Bolt	mm	2043	-800	-249	2043	798	-250
Striker Bottom Bolt	mm	2045	-801	-213	2045	800	-214
Center Tip of Striker	mm	2076	-799	-233	2076	798	-232
Front Outboard Seat Anchor Bolt	mm	2547	-609	169	2549	610	169
Rear Outboard Seat Anchor Bolt	mm	2104	-608	191	2106	609	190
Outboard Head Restraint Post	mm	1910	-449	-624	1891	448	-624
Top of Head Restraint	mm	1963	-365	-888	1930	364	-890
Center of Steering Wheel	mm	2588	-369	-440			

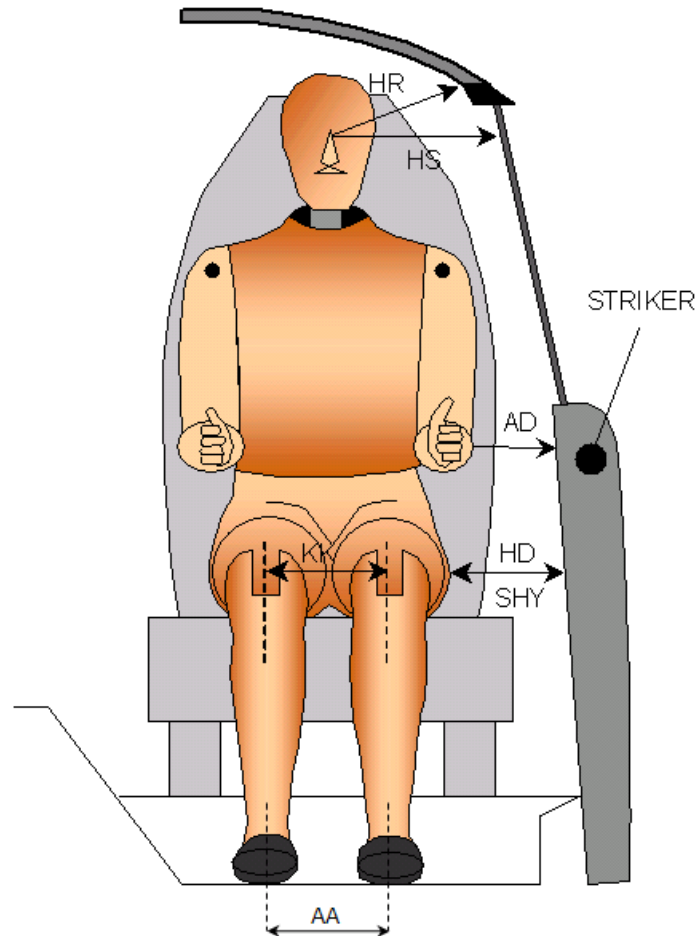
Reference point:

- +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. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

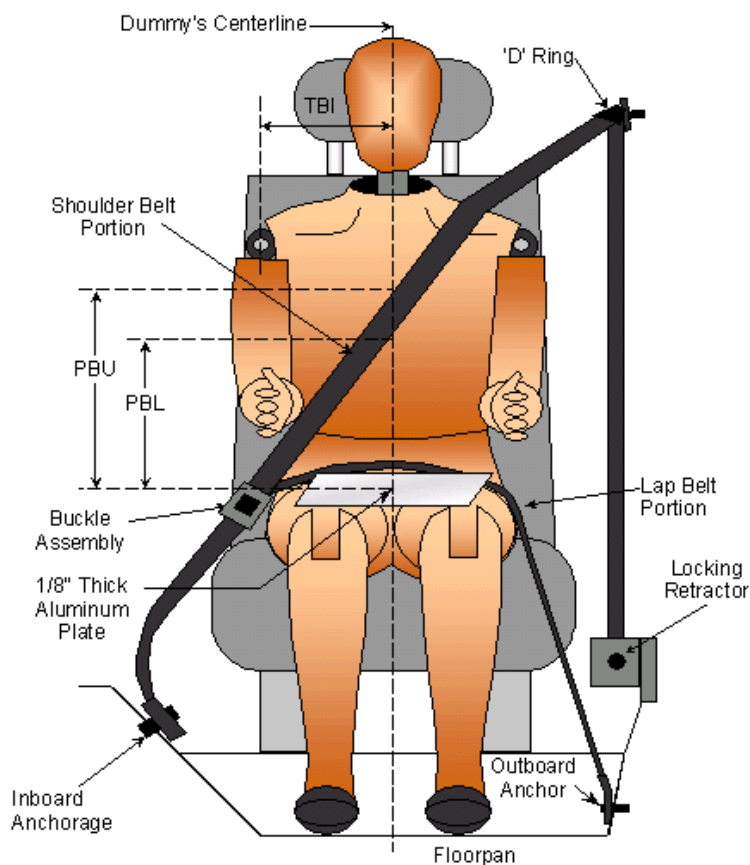


Code	Description	Units	Driver	Passenger
AD	Arm to Door	mm	141	58
HD	H-Point to Door	mm	197	192
HR	Head to Side Header	mm	233	238
HS	Head to Side Window	mm	350	345
KK	Knee to Knee	mm	343	270
SHY	Striker to H-Point (Y Direction)	mm	240	240
AA	Ankle to Ankle	mm	343	220

DATA SHEET NO. 5 SEAT BELT POSITIONING DATA

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of reference to belt upper edge	mm	370	370
PBL — Top surface of reference to belt lower edge	mm	295	295

BELT LENGTH DATA

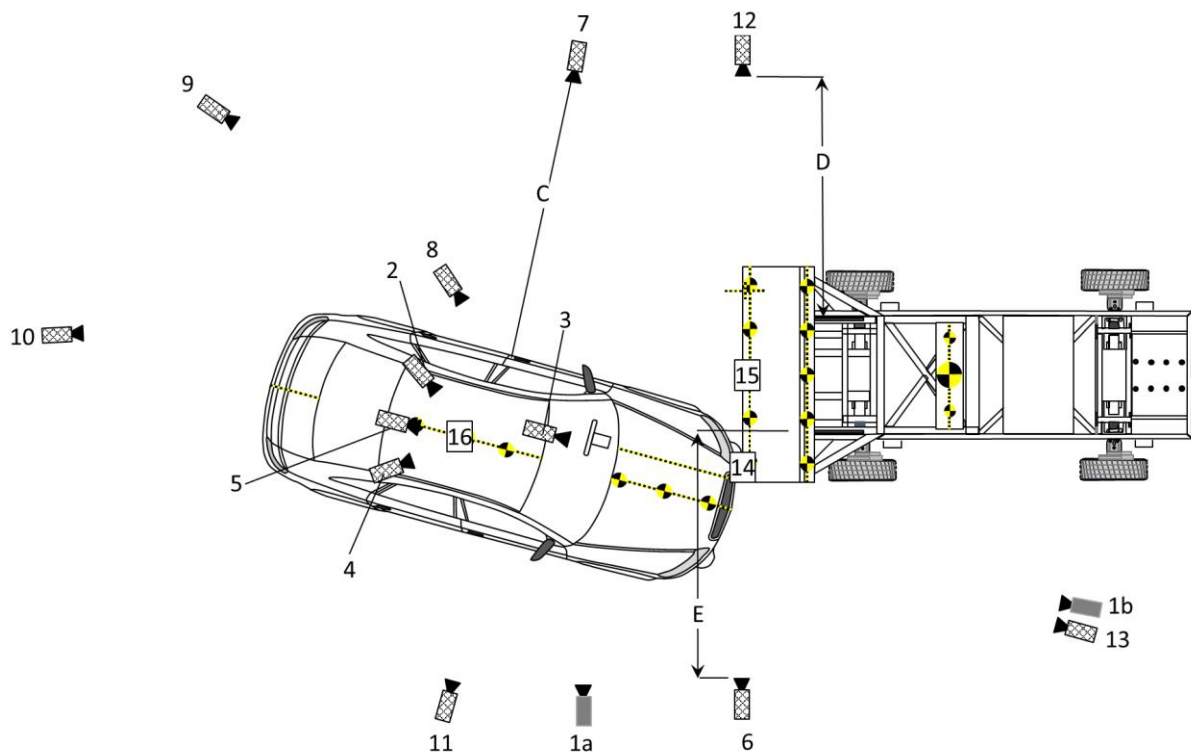
Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	880	880
Lap Belt Length as measured on ATD	mm	830	835
Remainder of belt on reel	mm	910	905
Total belt length for continuous webbing systems	mm	2620	2620

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

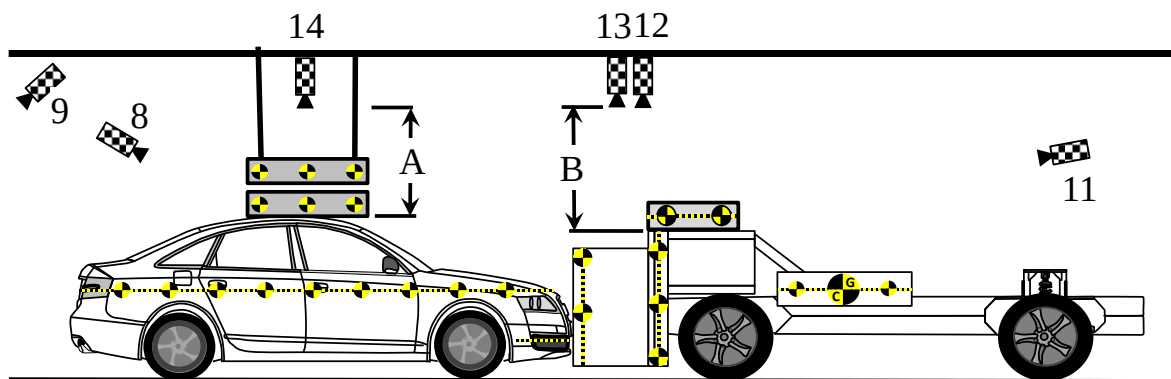
Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

HORIZONTAL LOCATION



VERTICAL LOCATION



A	mm	3695
B	mm	4115
C	mm	8905
D	mm	8283
E	mm	9282

DATA SHEET NO. 6 (CONTINUED)
HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

CAMERA LOCATIONS

No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Side	--	--	--	Zoom	60
2	Onboard Passenger Movement	7598	-424	1445	8	1000
3	Onboard Driver Lower Leg	6624		454	6.5	1000
4	Onboard Driver Movement	7637	-882	1445	8	1000
5	Onboard Centerline	7894	-635	1458	8	1000
6	Right Side of OMDB View	4929	-9413	1219	24	1000
7	Left Side of Test Vehicle	5563	8950	1292	24	1000
8	Target Vehicle Left Side Perpendicular (High)	8437	2230	3660	24	1000
9	Oblique Rear View of Vehicle	13800	6960	2718	28	1000
10	Rear View of Vehicle and OMDB	28750	0	3421	10	1000
11	Right Side Target Vehicle and OMDB	10657	-9983	2696	24	1000
12	Left Side of OMDB View	4908	10402	1200	20	1000
13	Front of Vehicle and OMDB	371	-3477	1196	28	1000
14	Overhead Impact Point View	4929	-1102	4563	28	1000
15	Overhead OMDB View	4675	-100	5328	15	1000
16	Overhead Vehicle View	7365	-100	5328	14	1000

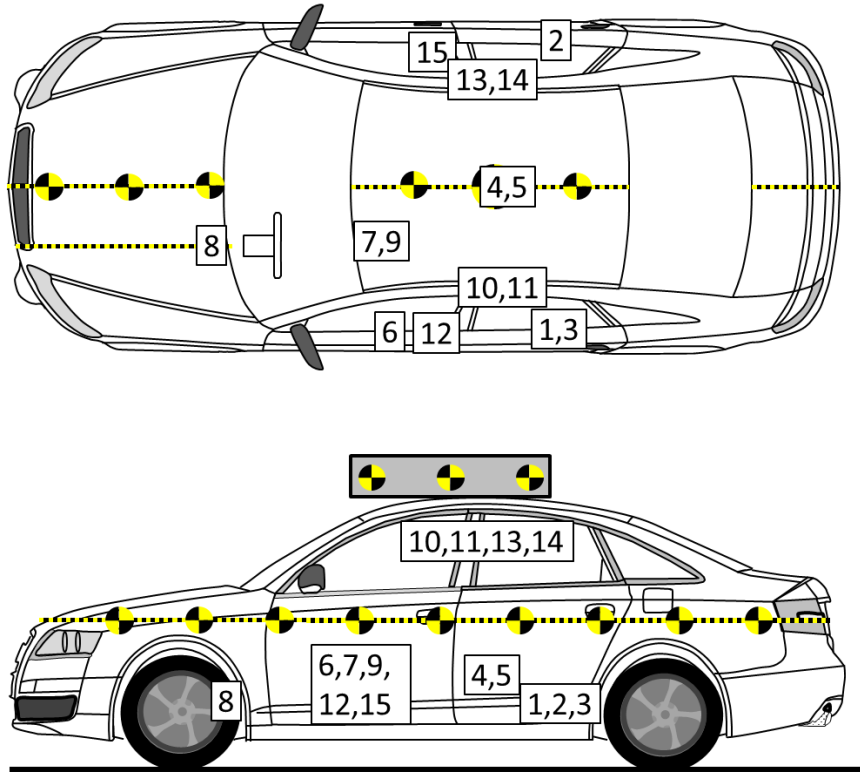
Reference Point:

- +X – From back of OMDB to front of OMDB
- +Y – Right of monorail center
- +Z – Up from ground

DATA SHEET NO. 7
VEHICLE INSTRUMENTATION DATA

Test Vehicle: 2016 Mazda CX-5
Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
Test Date: 10/7/2016



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS RELATIVE TO VCS

No.	Accelerometer Location	Axes	Units	Measurements (mm)		
				X	Y	Z
1	Left Rear Sill	X,Y	mm	1766	-693	184
2	Right Rear Sill	X,Y	mm	1786	697	187
3	Left Rear Sill Redundant	X,Y	mm	1791	-693	184
4	Vehicle CG	X,Y,Z	mm	1789	-1	112
5	Vehicle CG Angular Displacement	X	mm	1802	-2	117
		Y	mm	1788	10	114
		Z	mm	1789	-1	112
6	Left Side Seat Track	X,Y,Z	mm	2217	-583	189
8	Left Side Toe Pan	X,Y,Z	mm	3306	-423	116
7	Left Side String Pot	N/A	mm	3234	-338	215

Reference point:

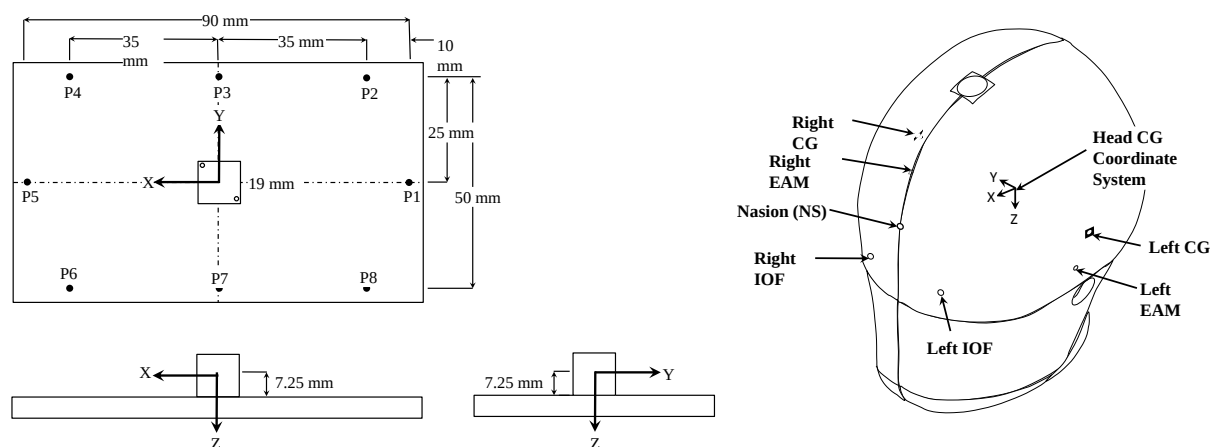
- +X – From the rear of the vehicle to the front of the vehicle
- +Y – From the left side of the vehicle to the right side of the vehicle
- +Z – From the top of the vehicle to the bottom of the vehicle

DATA SHEET NO. 7 (Continued) **VEHICLE INSTRUMENTATION DATA**

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

ANGULAR RATE SENSOR MOUNTING PLATE & THOR HEAT POINT DEFINITIONS



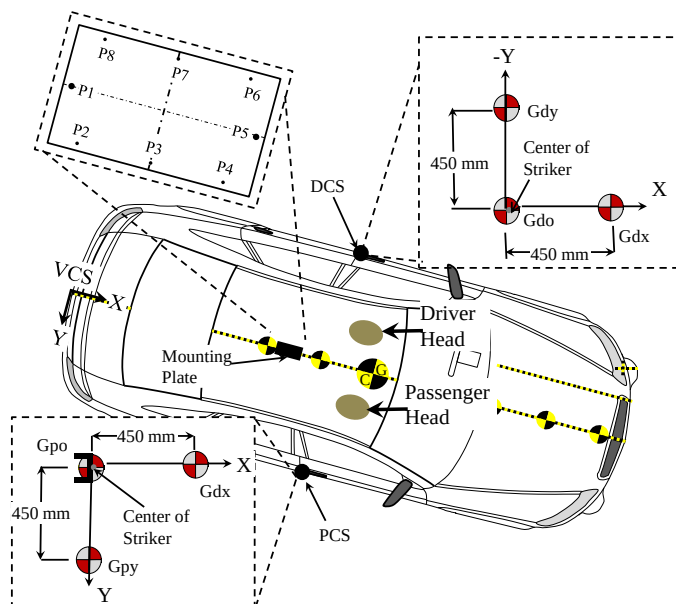
ARS MOUNTING PLATE - VEHICLE COORDINATE SYSTEM					
No.	Description	Units	Measurements (mm)		
			X	Y	Z
P1	Plate Point 1	mm	1744	-1	126
P2	Plate Point 2	mm	1754	24	127
P3	Plate Point 3	mm	1789	24	127
P4	Plate Point 4	mm	1824	24	127
P5	Plate Point 5	mm	1834	-1	127
P6	Plate Point 6	mm	1824	-26	127
P7	Plate Point 7	mm	1789	-26	127
P8	Plate Point 8	mm	1754	-26	127

HEAD POINTS IN RELATION TO HEAD CG COORDINATE SYSTEM					
Description	Units	X	Y	Z	
CG	mm	0	0	0	
Left CG	mm	0	-77	0	
Right CG	mm	0	77	0	
Left EAM	mm	7	-72	27	
Right EAM	mm	7	72	27	
Left IOF	mm	89	-32	28	
Right IOF	mm	89	32	28	
Nasion	mm	92	0	-10	

DATA SHEET NO. 7 (Continued) **VEHICLE INSTRUMENTATION DATA**

Test Vehicle: 2016 Mazda CX-5
Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
Test Date: 10/7/2016



ARS MOUNTING PLATE & ATD'S HEAD POINTS RELATIVE TO GLOBAL COORDINATE SYSTEMS

DESCRIPTION	DRIVER DCS			PASS. PCS		
	X	Y	Z	X	Y	Z
G ₀	0	0	0	0	0	0
G _x	451	0	0	451	0	0
G _y	1	-451	1	0	452	-2
P1	-501	687	-491	-90	-854	-486
P2	-498	713	-491	-87	-827	-485
P3	-464	723	-491	-53	-818	-485
P4	-430	732	-491	-20	-809	-485
P5	-414	711	-490	-3	-830	-485
P6	-417	684	-490	-7	-857	-485
P7	-451	674	-491	-40	-866	-485
P8	-484	665	-491	-74	-876	-485
Left CG	-28	356	-1385			
Right CG				131	-334	-1370
Left EAM	-23	362	-1354			
Right EAM				139	-338	-1342
Left IOF	46	425	-1352	243	-423	-1340
Right IOF	29	485	-1349	229	-361	-1339
Nasion	39	456	-1388	239	-391	-1377

DATA SHEET NO. 7 (CONTINUED)
VEHICLE INSTRUMENTATION DATA

Test Vehicle: 2016 Mazda CX-5
Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
Test Date: 10/7/2016

No.	Description	Axes	Units	Positive Direction		Negative Direction	
				Max	Time (ms)	Max	Time (ms)
1	Left Rear Sill	X	g	3.69	122.45	-41.55	40.30
		Y	g	22.81	43.65	-4.31	69.95
2	Right Rear Sill	X	g	3.26	128.10	-49.08	45.20
		Y	g	16.65	40.30	-3.19	19.25
3	Impact Side Rear Sill Redundant	X	g	2.94	18.45	-42.15	40.55
		Y	g	17.94	43.50	-3.82	70.55
4	Vehicle CG Acceleration	X	g	7.05	20.25	-41.68	43.15
		Y	g	2.68	11.80	-23.01	39.95
		Z	g	24.00	43.40	-19.76	26.55
5	Impact Side Seat Track	X	g	3.71	18.30	-44.43	40.35
		Y	g	23.86	42.75	-2.86	11.85
		Z	g	13.88	55.35	-24.55	69.30
6	Impact Side Seat Crossmember	X	g	9.29	21.50	-42.37	39.90
		Z	g	14.10	49.05	-22.62	87.50
7	Impact Side Toe Pan	X	g	28.28	32.95	-189.02	40.65
		Y	g	50.83	38.00	-15.63	32.95
		Z	g	41.94	37.85	-42.90	41.70
8	Angular Rate Sensors	X	Deg/s	291.68	46.85	-87.34	56.65
		Y	Deg/s	357.86	44.70	-279.82	52.25
		Z	Deg/s	197.18	44.10	-27.12	11.80
9	Driver Shoulder Displacement		mm	85.43	21.10	-1.89	10.15
10	Driver Shoulder Belt		N	4283.19	64.35	-33.57	8.75
11	Driver Lap Belt		N	4591.82	59.10	-8.47	11.65
12	Passenger Shoulder Displacement		mm	98.46	21.45	-112.95	73.30
13	Passenger Shoulder Belt		N	3528.86	64.60	-33.41	268.25
14	Passenger Lap Belt		N	7178.92	60.30	-16.68	11.80
15	Impact Side Floor String Pot		mm	4.90	85.00	-41.82	61.00

Note: See Appendix B for all vehicle data plots.

TIME TO FIRE RESTRAINT TIMING

No.	Description	Axes	Units	Time to Fire (ms)
1	Driver Air Bag Squib 1	*	A	9.50
2	Driver Air Bag Squib 2	*	A	14.50
3	Driver Curtain Airbag	*	A	40.50
4	Driver Torso Airbag	*	A	40.50
5	Driver Knee Airbag	*	A	N/A
6	Driver Pretensioner	*	A	9.50
7	Passenger Air Bag Squib 1	*	A	9.50
8	Passenger Air Bag Squib 2	*	A	29.50
9	Passenger Curtain Airbag	*	A	Did not fire
10	Passenger Torso Airbag	*	A	Did not fire
11	Passenger Knee Airbag	*	A	N/A
12	Passenger Pretensioner	*	A	9.50

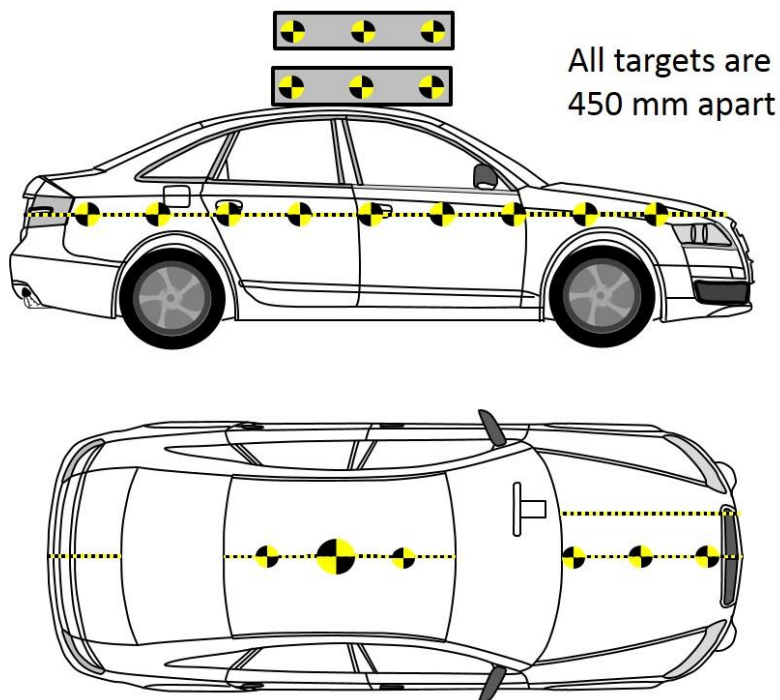
* The measurement indicates the time the voltage changed

DATA SHEET NO. 8 **PHOTOGRAPHIC REFERENCE TARGET LOCATIONS**

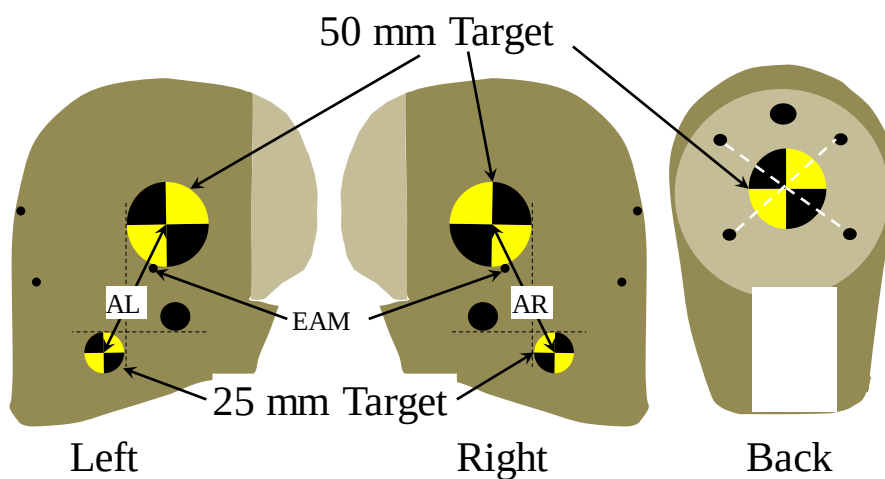
Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

VEHICLE TARGETS



ATD HEAD TARGETS



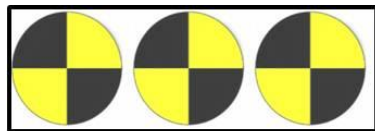
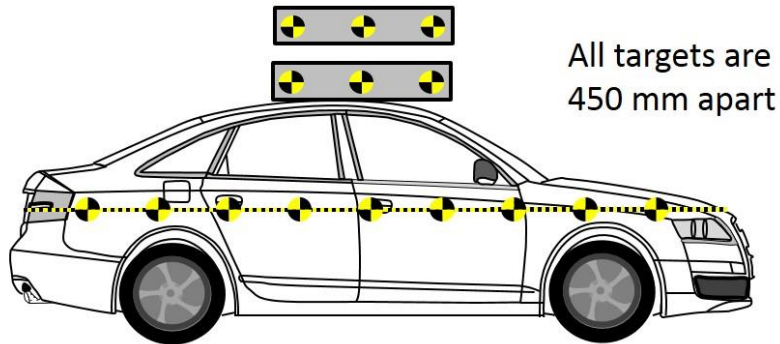
Target	Measurement
AL	91 mm
AR	91 mm

DATA SHEET NO. 8 (CONTINUED)
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

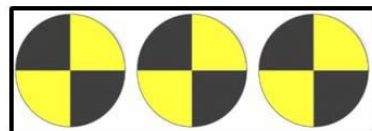
NHTSA No.: M20165404
 Test Date: 10/7/2016

OVERHEAD TARGET BARS



1 2 3

Vertical Target
Plane 1
(Driver's Side)



4 5 6

Vertical Target
Plane 2
(Passenger Side)

Target	Units	X	Y	Z
1	mm	2457	-439	-1378
2	mm	2003	-429	-1383
3	mm	1549	-422	-1382
4	mm	2477	395	-1372
5	mm	2027	400	-1369
6	mm	1573	408	-1368

Reference point:

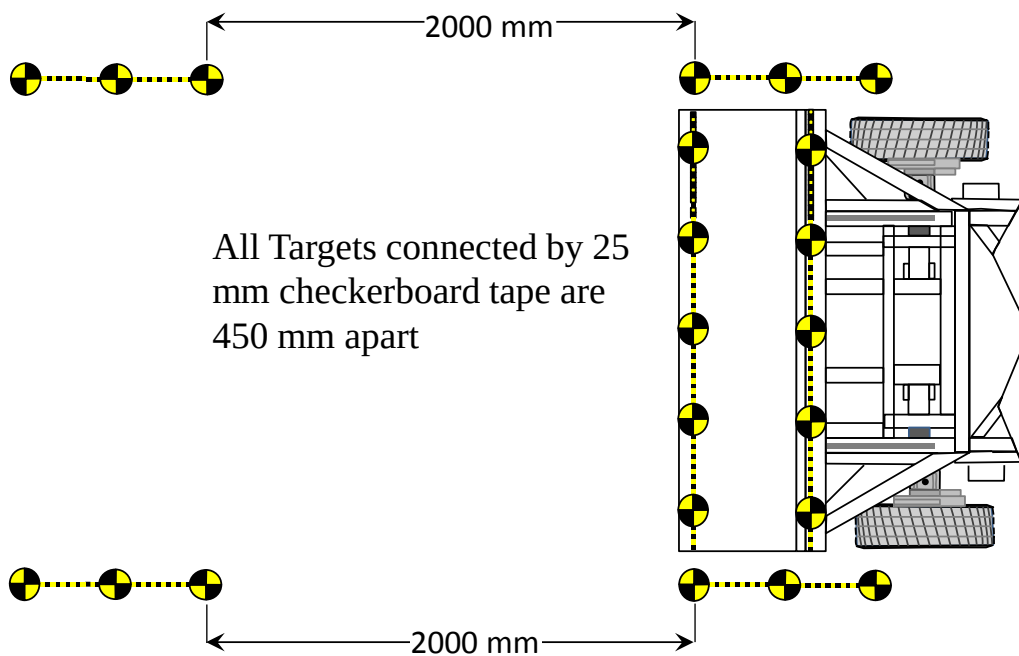
- +X – From the rear of the vehicle to the front of the vehicle
- +Y – From the left side of the vehicle to the right side of the vehicle
- +Z – From the top of the vehicle to the bottom of the vehicle

DATA SHEET NO. 8 (CONTINUED)
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2016 Mazda CX-5
Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
Test Date: 10/7/2016

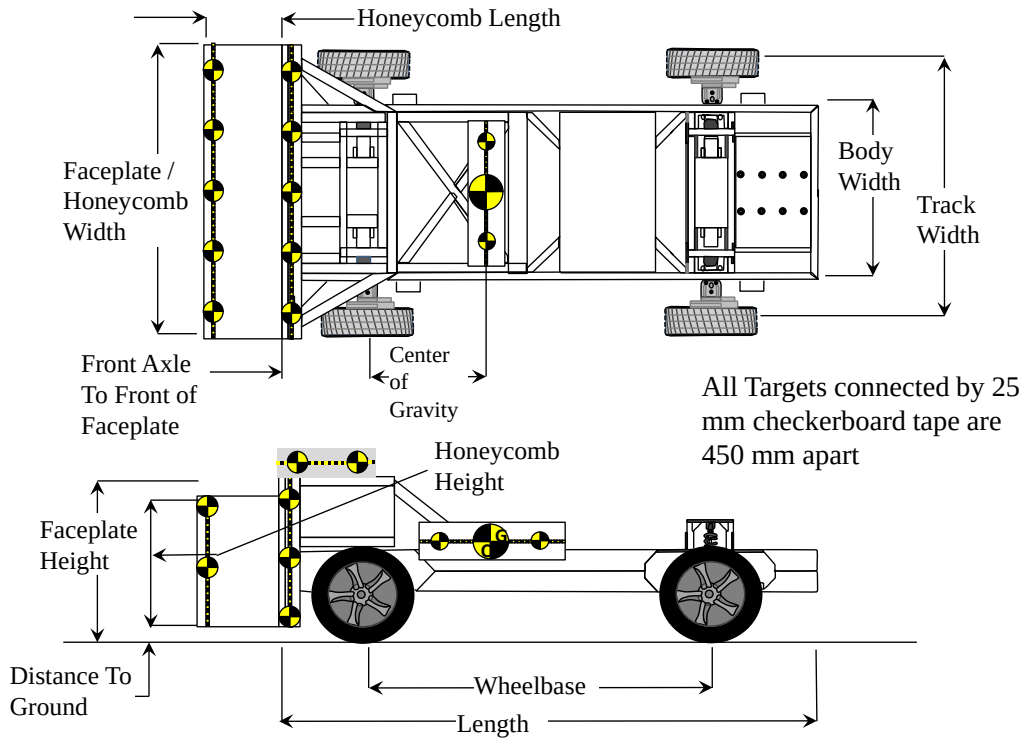
GROUND TARGETS LOCATED IN REFERENCE TO OMDB



DATA SHEET NO. 8 (CONTINUED)
OMDB PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016



Item	Units	Value	Item	Units	Value
Honeycomb Width	mm	2205	Faceplate Height	mm	1183
Honeycomb Length	mm	605	Faceplate to Ground	mm	83
Honeycomb Height	mm	947	Wheelbase	mm	2589
Left Front Axle to Front Faceplate	mm	600	Cart Length	mm	3993
Right Front Axle to Front Faceplate	mm	601	Body Width	mm	1301
Front Axle to CG	mm	926	Track Width	mm	1884

	Units	Front Axle	Rear Axle	Total
Left	kg	856.8	406.7	1263.5
Right	kg	769.4	503.1	1272.5
Ratio	%	64.1%	35.9%	
Total	kg	1626.2	909.8	2536
CG Aft of Front Axle	mm			927

Note: All targets on the OMDB honeycomb are 450mm apart

DATA SHEET NO. 9
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

INSTRUMENTATION

Instrumentation	Number of Channels Collected
Driver Dummy Accelerometers	105
Passenger Dummy Accelerometers	105
Vehicle Structure Accelerometers	27
SRS Inductive Pickups	12
OMDB Cart Accelerometers	9
Total	258

CAMERA COVERAGE

Type of Camera	Number Used in this Test
High-Speed Vehicle Onboard	4
High-Speed Off-board	11
Real-Time Panning	2
Total	17

**DATA SHEET NO. 10
POST TEST OBSERVATIONS**

Test Vehicle: 2016 Mazda CX-5
Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
Test Date: 10/7/2016

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Right Front Passenger
Dummy Type/Serial No.	THOR DL9207	THOR DO9798
Lower Leg Type	LX	LX
Lower Leg Serial No.	LX0045/ LX0046	LX655/LX654
Head Contact	Front & Curtain Airbag & Visor	Front Airbag
Upper Torso Contact	Front & Torso Airbag Arm = Driver's Door	Front Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Bolster	Glove Box
Right Knee Contact	Knee Bolster	Glove Box

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Right Front Passenger
Locked/Unlocked Doors	Unlocked	Unlocked
Front Door Opening	Closed & Operational	Closed & Operational
Rear Door Opening	Closed & Operational	Closed & Operational
Seat Track Shift (mm)	0	0
Seat Back Failure	No	No
Glazing Damage	None	None

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions	Photo Taken (Y/N)
Pillar Performance	A-Pillar & B-Pillar Buckled	Y
Windshield Damage	Cracks throughout with separation along bottom	Y
Window Damage	None	Y
Other Notable Effects	None	--

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

DATA SHEET NO. 11 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	mm	4542	4218	324
2	Rear Surface of Vehicle (RSOV) to Front of Engine	mm	3961	3905	56
3	RSOV to Firewall	mm	3567	3496	71
4	RSOV to Upper Leading Edge of Right Door	mm	3062	3068	-7
5	RSOV to Upper Leading Edge of Left Door	mm	3061	3065	-4
6	RSOV to Lower Leading Edge of Right Door	mm	3082	3084	-2
7	RSOV to Lower Leading Edge of Left Door	mm	3080	3088	-8
8	RSOV to Upper Trailing Edge of Right Door	mm	1975	1983	-8
9	RSOV to Upper Trailing Edge of Left Door	mm	1973	1977	-4
10	RSOV to Lower Trailing Edge of Right Door	mm	2030	2035	-5
11	RSOV to Lower Trailing Edge of Left Door	mm	2028	2037	-9
12	RSOV to Bottom of "A" Post of Right Side	mm	3100	3106	-5
13	RSOV to Bottom of "A" Post of Left Side	mm	3099	3102	-3
14	RSOV to Firewall, Right Side	mm	3640	3651	-11
15	RSOV to Firewall, Left Side	mm	3637	3456	180
16	RSOV to Steering Column	mm	2598	2638	-41
17	Center of Steering Column to "A" Post	mm	309	313	-4
18	Center of Steering Column to Headliner	mm	449	417	33
19	RSOV to Right Side of Front Bumper	mm	4475	4520	-45
20	RSOV to Left Side of Front Bumper	mm	4473	3971	502
21	Length of Engine Block	mm	321	305	16
RD	RSOV to Right Side of Dash Panel	mm	2824	2844	-19
CD	RSOV to Center of Dash Panel	mm	2733	2766	-33
LD	RSOV to Left Side of Dash Panel	mm	2823	2821	2

UR* = Unrecoverable Data Point

DATA SHEET NO. 12
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2016 Mazda CX-5
Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

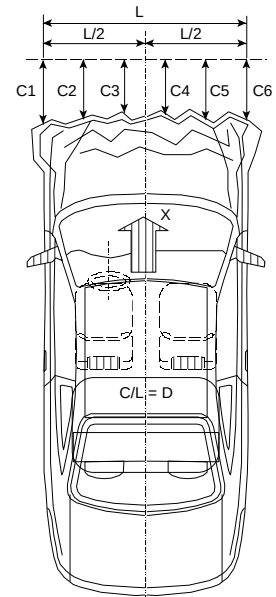
NHTSA No.: M20165404
Test Date: 10/7/2016

VEHICLE INFORMATION

VIN: JM3KE4BY5G0825716 Wheelbase (mm): 2694
Vehicle Size Category: MPV Test Weight (kg): 1,767

ACCELEROMETER DATA

Accelerometer Locations: As Described in Data Sheet No. 7
Cal. Procedure/Interval: Calspan Procedure / 6 month
Integration Algorithm: Trapezoidal
Linearity: > 99%
Impact Velocity (kph): 90.39
Velocity Change (kph): 90.39



CRUSH PROFILE

Collision Deformation Classification: 12FLEW03
Midpoint of Damage: C2
Damage Region Length (mm): 1362
Impact Mode: Frontal 15° Angle, 35% Left Offset

Crush Measurements: Bumper Cover

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4293	3707	586
C2	Crush zone 2 at left side	mm	4458	3938	520
C3	Crush zone 3 at left side	mm	4515	4096	419
C4	Crush zone 4 at right side	mm	4514	4284	230
C5	Crush zone 5 at right side	mm	4457	4422	35
C6	Crush zone 6 at right side	mm	4290	4439	-149
L	C1 to C6	mm	1362	1034	328

Crush Measurements: Bumper Cover Removed

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
B1	Bumper Beam 1 at left side	mm	4349	4016	-333
B2	Bumper Beam 2 at left side	mm	4376	3979	-397
B3	Bumper Beam 3 at left side	mm	4404	3957	-447
B4	Bumper Beam 4 at left side	mm	4416	4056	-360
B5	Bumper Beam 5 at right side	mm	4420	4132	-288
B6	Bumper Beam 6 at right side	mm	4417	4205	-212
B7	Bumper Beam 7 at right side	mm	4402	4269	-133
B8	Bumper Beam 8 at right side	mm	4376	4321	-55
B9	Bumper Beam 9 at right side	mm	4351	4366	15
L	B1 to B9	mm	1003	834	-169

DATA SHEET NO. 13
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

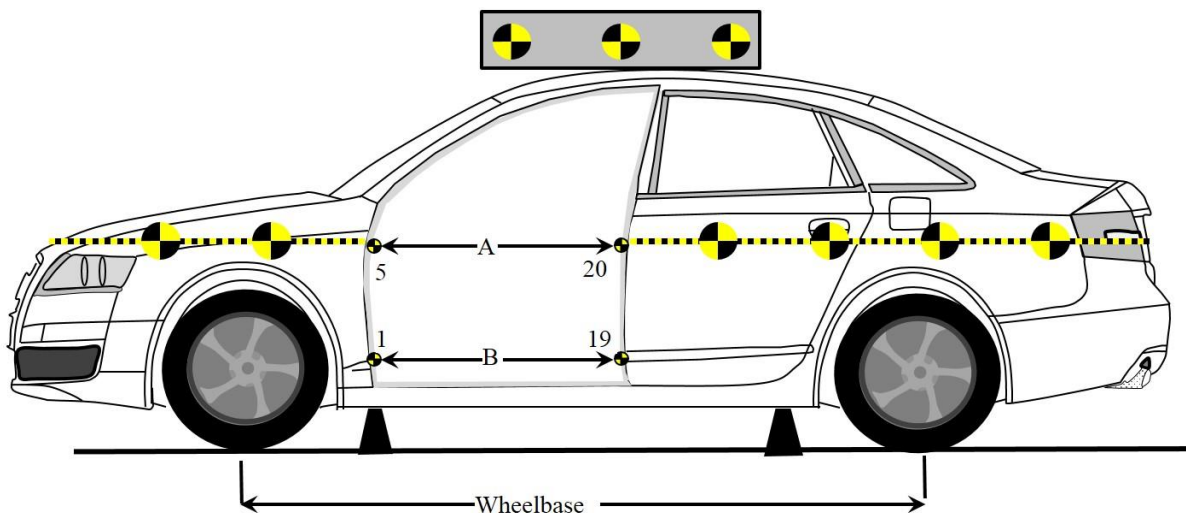
NHTSA No.: M20165404
 Test Date: 10/7/2016

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	850	845	-5
B	Left Side Lower	mm	695	693	-2
D	Right Side Upper	mm	851	850	-1
E	Right Side Lower	mm	691	692	1

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2694	2521	-173
F	Right Side Wheelbase	mm	2694	2737	43



DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

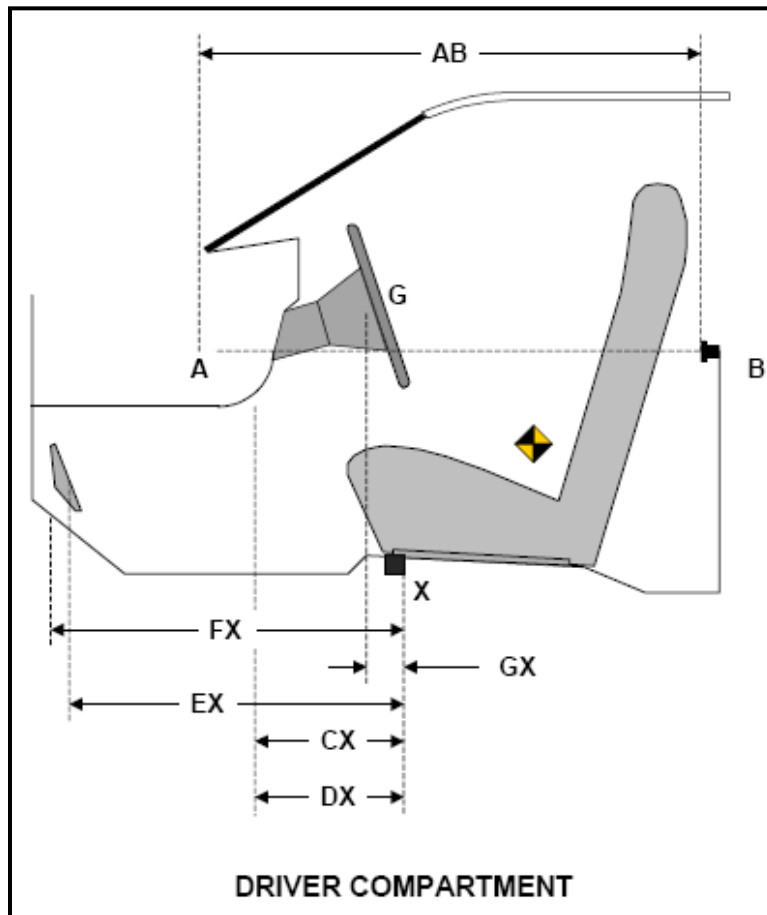
Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	807	805	-2
CX	Left Knee Bolster to X	mm	289	293	4
DX	Right Knee Bolster to X	mm	285	294	9
EX	Brake Pedal to X	mm	527	509	-18
FX	Foot Rest to X	mm	671	639	-32
GX	Center of Steering Column Wheel Hub to X	mm	41	74	33

X = Front of Seat Track (Stationary)

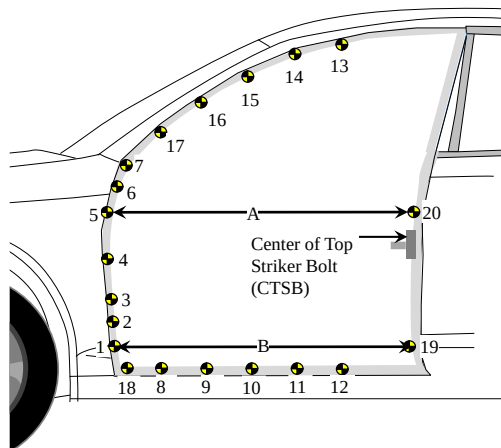


DATA SHEET NO.13 (CONTINUED) **VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

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

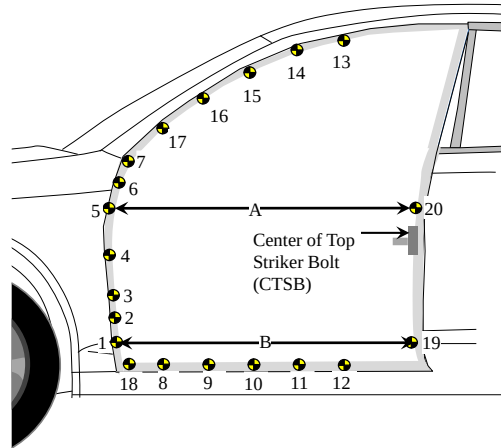
Point	Pre-Test			Post-Test			Difference		
	X	Y	Z	X	Y	Z	X	Y	Z
1	2946	-757	105	2945	-750	101	-1	7	-4
2	2958	-751	30	2955	-747	27	-3	4	-3
3	2954	-748	-46	2948	-750	-50	-6	-2	-4
4	2942	-743	-195	2936	-754	-200	-6	-11	-5
5	2932	-747	-346	2925	-763	-351	-7	-16	-5
6	2926	-750	-420	2921	-767	-425	-5	-17	-5
7	2918	-751	-495	2914	-770	-501	-4	-19	-6
17	2830	-728	-601	2828	-745	-607	-2	-17	-6
16	2717	-702	-679	2716	-717	-685	-1	-15	-6
15	2599	-675	-750	2599	-687	-756	0	-12	-6
14	2475	-649	-810	2476	-658	-816	1	-9	-6
13	2345	-627	-855	2346	-634	-861	1	-7	-6
20	2080	-743	-345	2080	-745	-347	0	-2	-2
19	2251	-756	105	2250	-756	104	-1	0	-1
12	2196	-755	37	2196	-754	37	0	1	0
11	2346	-758	155	2345	-757	154	-1	1	-1
10	2495	-759	167	2496	-756	165	1	3	-2
9	2646	-758	167	2646	-755	166	0	3	-1
8	2796	-758	168	2797	-753	166	1	5	-2
18	2871	-756	164	2872	-751	161	1	5	-3

DATA SHEET NO.13 (CONTINUED) **VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

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

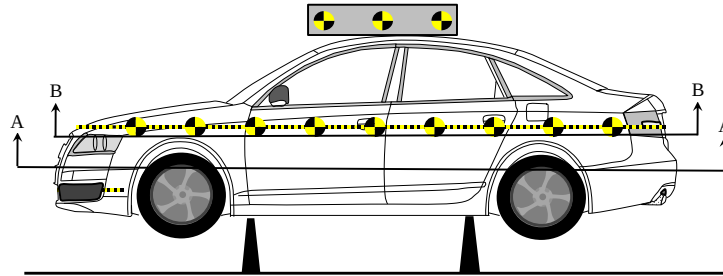
Point	Pre-Test			Post-Test			Difference		
	X	Y	Z	X	Y	Z	X	Y	Z
1	2946	757	105	2940	775	122	-6	18	17
2	2958	752	30	2955	771	45	-3	19	15
3	2954	747	-46	2951	767	-30	-3	20	16
4	2943	741	-195	2939	759	-179	-4	18	16
5	2932	746	-345	2929	761	-329	-3	15	16
6	2927	749	-420	2924	763	-404	-3	14	16
7	2919	749	-495	2915	764	-479	-4	15	16
17	2834	728	-602	2831	738	-586	-3	10	16
16	2720	702	-681	2717	708	-666	-3	6	15
15	2602	675	-752	2600	678	-737	-2	3	15
14	2478	648	-813	2477	648	-797	-1	0	16
13	2345	626	-858	2345	624	-843	0	-2	15
20	2081	744	-345	2079	746	-335	-2	2	10
19	2253	757	106	2249	766	116	-4	9	10
12	2195	754	33	2191	763	45	-4	9	12
11	2345	759	152	2340	770	166	-5	11	14
10	2495	758	165	2489	772	179	-6	14	14
9	2645	759	165	2640	773	180	-5	14	15
8	2796	759	166	2791	775	182	-5	16	16
18	2870	759	162	2866	775	177	-4	16	15

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

VEHICLE EXTERIOR CRUSH PROFILE
SECTION A-A



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

Point	Pre-Test			Point	Post-Test		
	X	Y	Z		X	Y	Z
1	2017	-919	72	1	2015	-902	71
2	2284	-920	73	2	2327	-907	71
3	2570	-915	71	3	2704	-909	72
4	2872	-910	71	4	3077	-917	71
5	3188	-916	72	5	3177	-927	71
6	4005	-911	71	6	3628	-758	72
7	4322	-638	71	7	3721	-722	72
8	4456	-416	72	8	3620	-414	72
9	4508	-160	71	9	3825	-411	71
10	4528	66	71	10	3884	-435	71
11	4501	252	71	11	3937	-356	72
12	4448	469	71	12	3930	-236	71
13	4354	622	71	13	3965	-146	71
14	4155	870	72	14	3979	-97	71
15	4009	909	71	15	4054	27	72
16	3192	913	72	16	4214	173	72
17	2953	905	70	17	4329	396	71
18	2621	909	71	18	4356	460	70
19	2339	913	71	19	4142	604	72
20	2170	915	70	20	4133	806	71
21	2124	914	71	21	4039	917	72
22	2020	911	72	22	3894	924	72
				23	3407	932	71
				24	3189	927	72
				25	3054	915	71

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2016 Mazda CX-5
Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
Test Date: 10/7/2016

VEHICLE EXTERIOR CRUSH PROFILE
SECTION A-A (Continued)

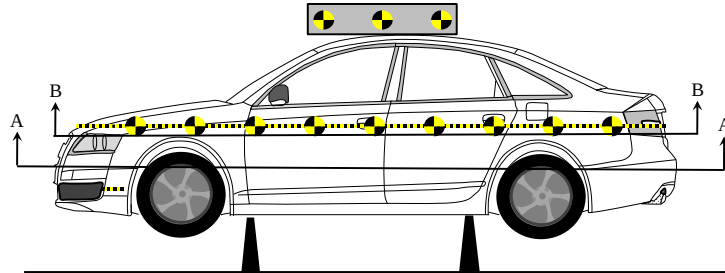
Point	Post-Test		
	X	Y	Z
26	2780	894	71
27	2280	903	71
28	2019	907	71
29	2780	894	71

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

VEHICLE EXTERIOR CRUSH PROFILE
SECTION B-B



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

Point	Pre-Test			Point	Post-Test		
	X	Y	Z		X	Y	Z
1	2008	-918	-200	1	2012	-913	-201
2	2184	-918	-200	2	2297	-919	-200
3	2523	-916	-201	3	2301	-919	-199
4	2864	-912	-200	4	2652	-924	-201
5	3124	-914	-199	5	3077	-934	-200
6	3400	-922	-200	6	3145	-946	-201
7	3780	-914	-199	7	3228	-875	-201
8	4025	-878	-200	8	3335	-709	-201
9	4228	-769	-200	9	3467	-707	-201
10	4457	-379	-200	10	3479	-572	-200
11	4509	-109	-201	11	3551	-444	-200
12	4536	1	-201	12	3779	-351	-202
13	4514	148	-199	13	3810	-174	-200
14	4449	410	-200	14	3958	-59	-200
15	4346	587	-200	15	4061	45	-200
16	4183	819	-201	16	4207	308	-200
17	3901	905	-200	17	4297	480	-200
18	3545	920	-201	18	4327	610	-200
19	3155	911	-200	19	4173	831	-200
20	2717	908	-200	20	3972	906	-200
21	2447	910	-201	21	3810	932	-201
22	2257	910	-200	22	3726	933	-200
23	2158	910	-201	23	3631	935	-202
24	2111	910	-199	24	3366	929	-202
25	2010	909	-201	25	3111	917	-201

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2016 Mazda CX-5
Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
Test Date: 10/7/2016

VEHICLE EXTERIOR CRUSH PROFILE
SECTION B-B (Continued)

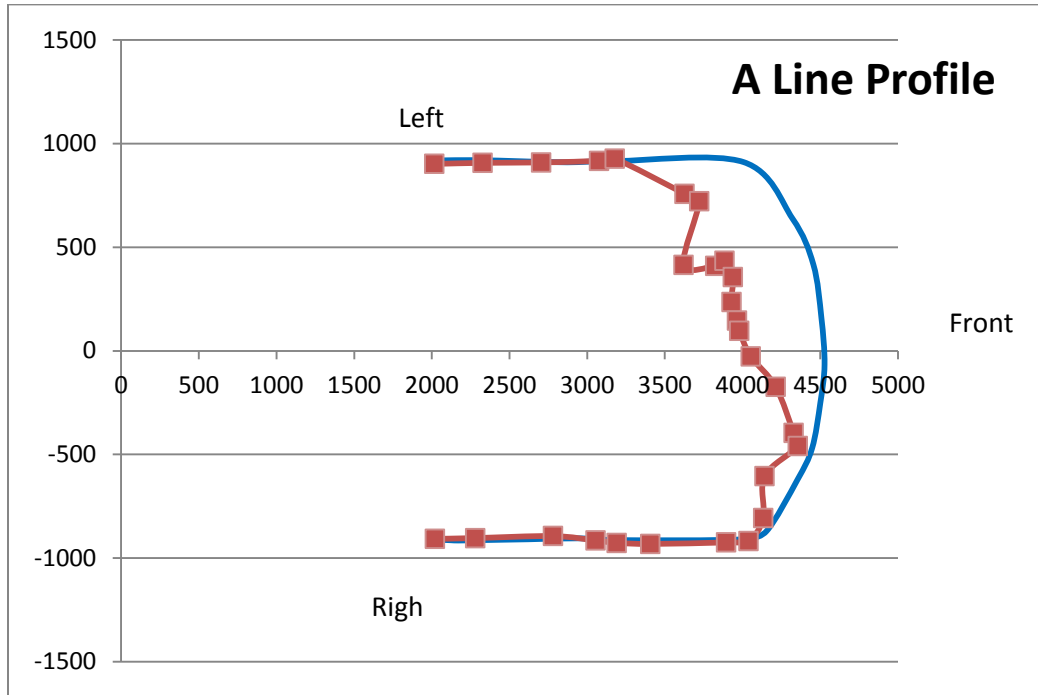
Point	Post-Test		
	X	Y	Z
26	2879	920	-202
27	2567	919	-202
28	2259	912	-202
29	2133	910	-202

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

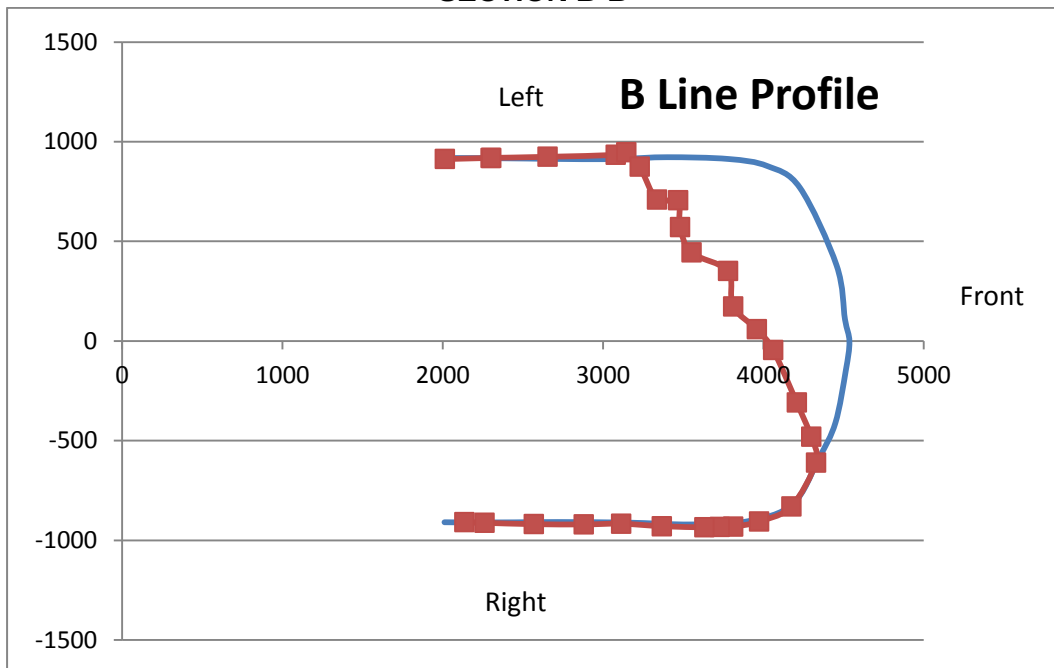
Test Vehicle: 2016 Mazda CX-5
Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
Test Date: 10/7/2016

VEHICLE EXTERIOR CRUSH PROFILE
SECTION A-A



SECTION B-B



DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

STRUCTURAL BUMPER BEAM POINTS

	Point	Pre-Test (mm)			Post-Test (mm)			Difference (mm)		
		X	Y	Z	X	Y	Z	X	Y	Z
Structural Bumper Beam	B1	4349	-503	70	4016	-356	-57	-333	147	-127
	B2	4376	-376	70	3979	-232	-51	-397	144	-121
	B3	4404	-251	71	3957	-132	-50	-447	119	-121
	B4	4416	-124	69	4056	-64	-35	-360	60	-104
	B5	4420	8	72	4132	41	-17	-288	33	-89
	B6	4417	135	71	4205	147	-1	-212	12	-72
	B7	4402	264	70	4269	258	13	-133	-6	-57
	B8	4376	388	70	4321	373	28	-55	-15	-42
	B9	4351	500	69	4366	478	40	15	-22	-29

Reference point:

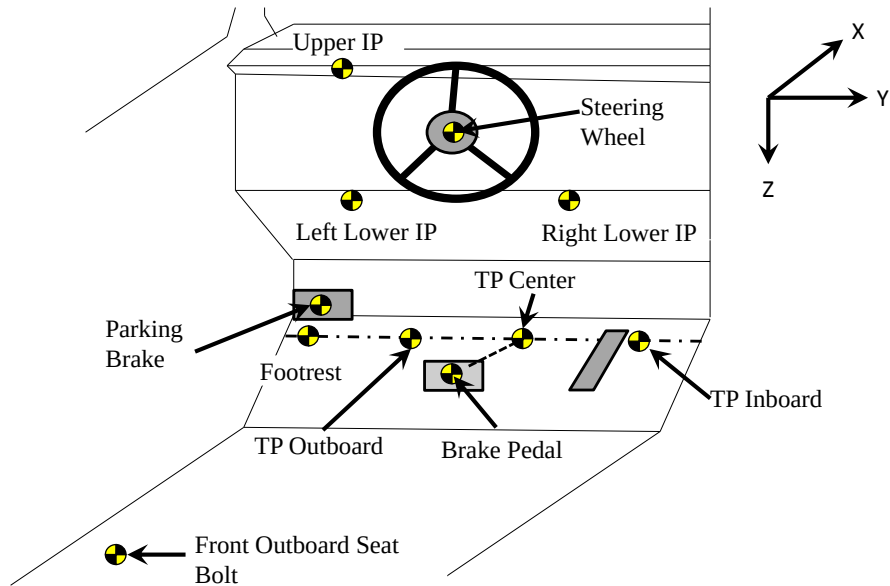
- +X – From the rear of the vehicle to the front of the vehicle
- +Y – From the left side of the vehicle to the right side of the vehicle
- +Z – From the top of the vehicle to the bottom of the vehicle

DATA SHEET NO.13 (CONTINUED) **VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

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	3353	-176	106	3328	-165	94	-25	11	-12
TP Center	3357	-326	106	3283	-304	86	-74	22	-20
TP Outboard	3309	-476	106	3253	-430	84	-56	46	-22
TP Footrest	3218	-576	105	3186	-545	92	-32	31	-13
Brake Pedal	3074	-326	105	3056	-335	134	-18	-9	29
Left Lower IP	2835	-520	-186	2839	-532	-199	4	-12	-13
Right Lower IP	2831	-219	-186	2840	-230	-192	9	-11	-6
Upper IP	2796	-620	-328	2794	-630	-338	-2	-10	-10
Steering Column	2588	-369	-440	2621	-380	-465	33	-11	-25
Front Outboard Bolt	2547	-609	169	2547	-604	166	0	5	-3
Emergency Brake									

Reference point:

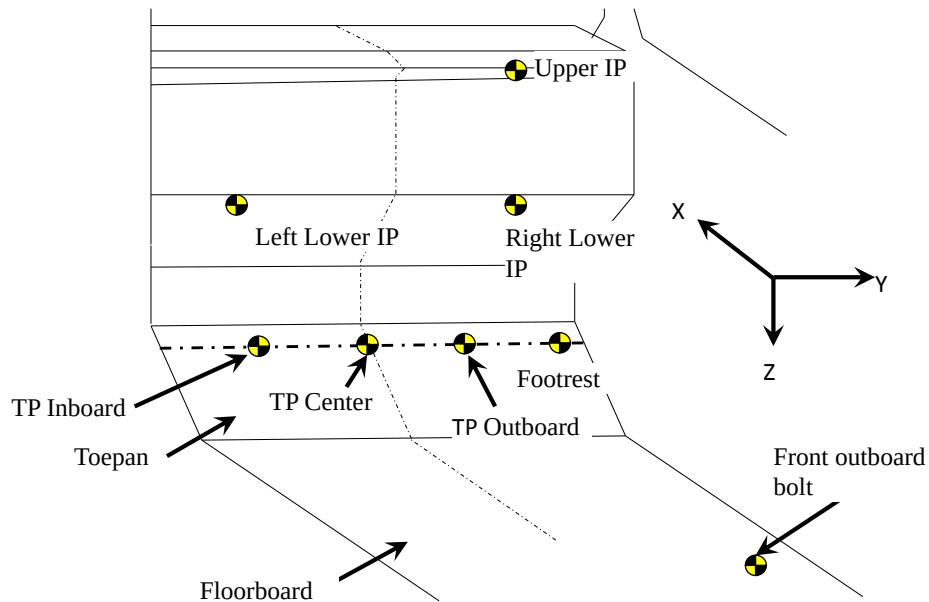
- +X – From the rear of the vehicle to the front of the vehicle
- +Y – From the left side of the vehicle to the right side of the vehicle
- +Z – From the top of the vehicle to the bottom of the vehicle

DATA SHEET NO.13 (CONTINUED) **VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

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	3333	217	105	3271	287	79	-62	70	-26
TP Center	3360	369	106	3359	394	117	-1	25	11
TP Outboard	3256	518	105	3255	542	118	-1	24	13
TP Footrest	3201	617	105	3201	641	119	0	24	14
Left Lower IP	2802	216	-191	2849	197	-189	47	-19	2
Right Lower IP	2842	518	-191	2869	501	-180	27	-17	11
Upper IP	2797	618	-373	2814	607	-369	17	-11	4
Front Outboard Bolt	2549	610	169	2547	622	180	-2	12	11

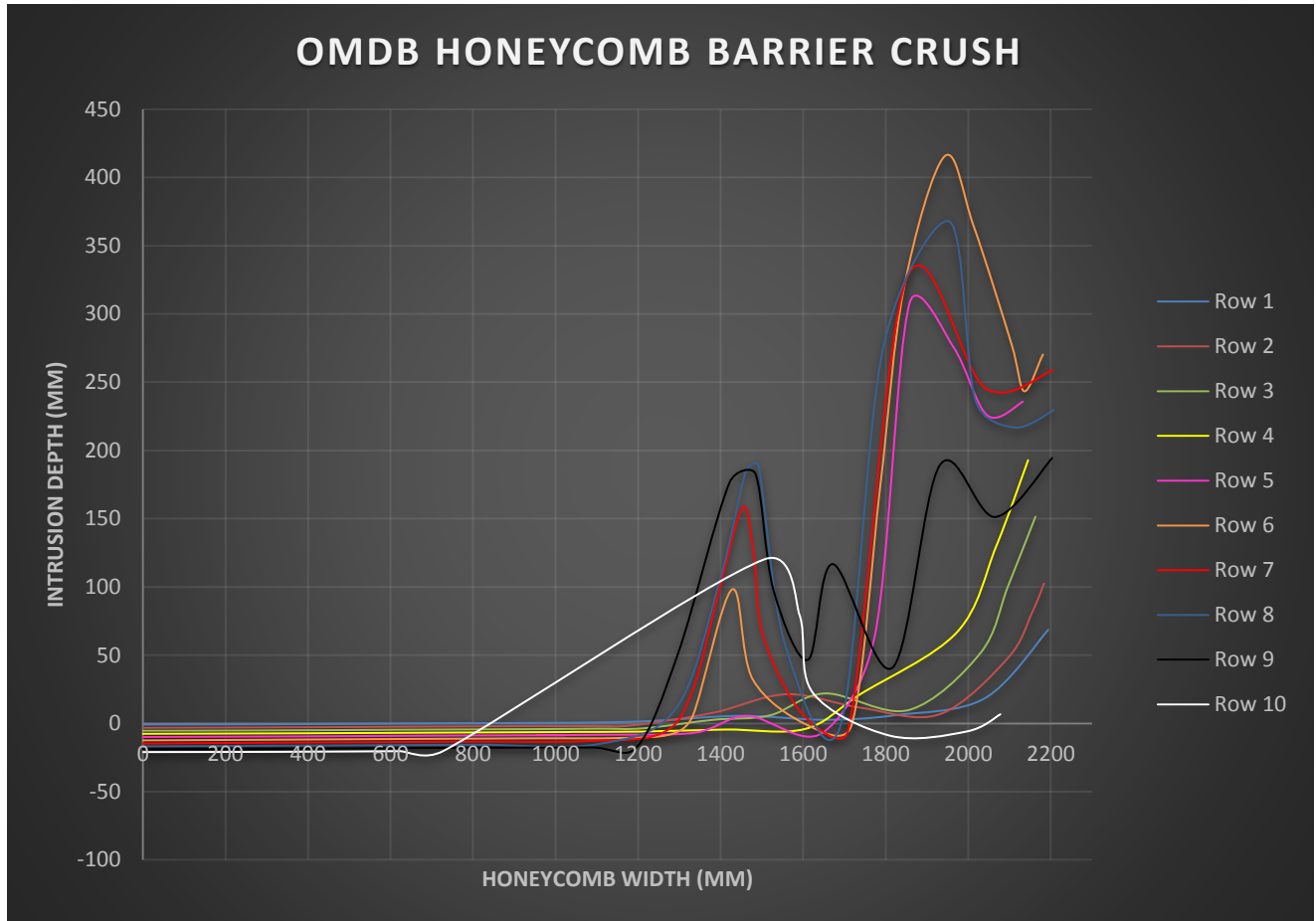
Reference point:

- +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.14
OMDB CRUSH MEASUREMENTS

Test Vehicle: 2016 Mazda CX-5
Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
Test Date: 10/7/2016



DATA SHEET NO. 15
SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016

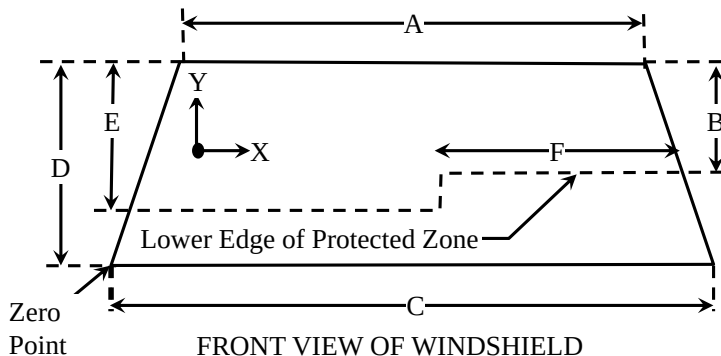
Please provide windshield mounting details. A 0.8 mm trim surrounds the top and side of windshield while a plastic shroud is on the bottom.

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°C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2239	1523	68
Right Side	2239	1948	87
Total	4478	3471	77.5



Item	Units	Value
A	mm	1246
B	mm	549
C	mm	1502
D	mm	865
E	mm	541
F	mm	472

AREAS OF PROTECTED ZONE FAILURES

A. Provide coordinates of the area that the protected zone was penetrated more than .25 inches by a vehicle component other than one that is normally in contact with the windshield.

- No penetration

X	Y

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

- No Penetration

X	Y

DATA SHEET NO. 15 (CONTINUED)
SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle: 2016 Mazda CX-5
Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
Test Date: 10/7/2016

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Ambient Temperature at Test Vehicle Time of Impact: 21.1° C

Test Time: 10:29 AM

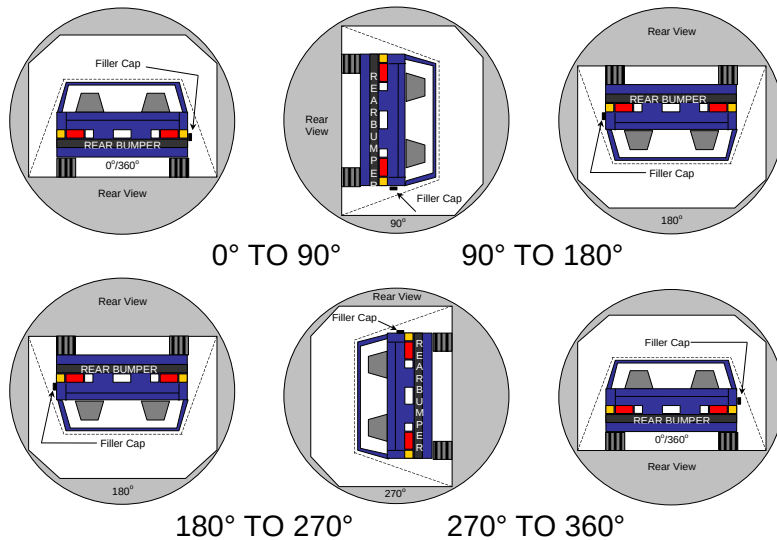
Stoddard Solvent Spillage Measurements

A.	From impact until vehicle motion ceases: (Maximum allowable = 1 oz.)	<u>0</u>	oz
B.	For the 5-minute period after motion ceases: (Maximum allowable = 5 oz.)	<u>0</u>	oz
C.	For the following 25 minutes: (Maximum allowable = 1 oz./minute)	<u>0</u>	oz
D.	Spillage	<u>0</u>	oz

DATA SHEET NO. 16
FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016



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: None

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	70	300	370
90° to 180°	64	300	364
180° to 270°	62	300	362
270° to 360°	69	300	369

FMVSS 301 SPILLAGE TABLE

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

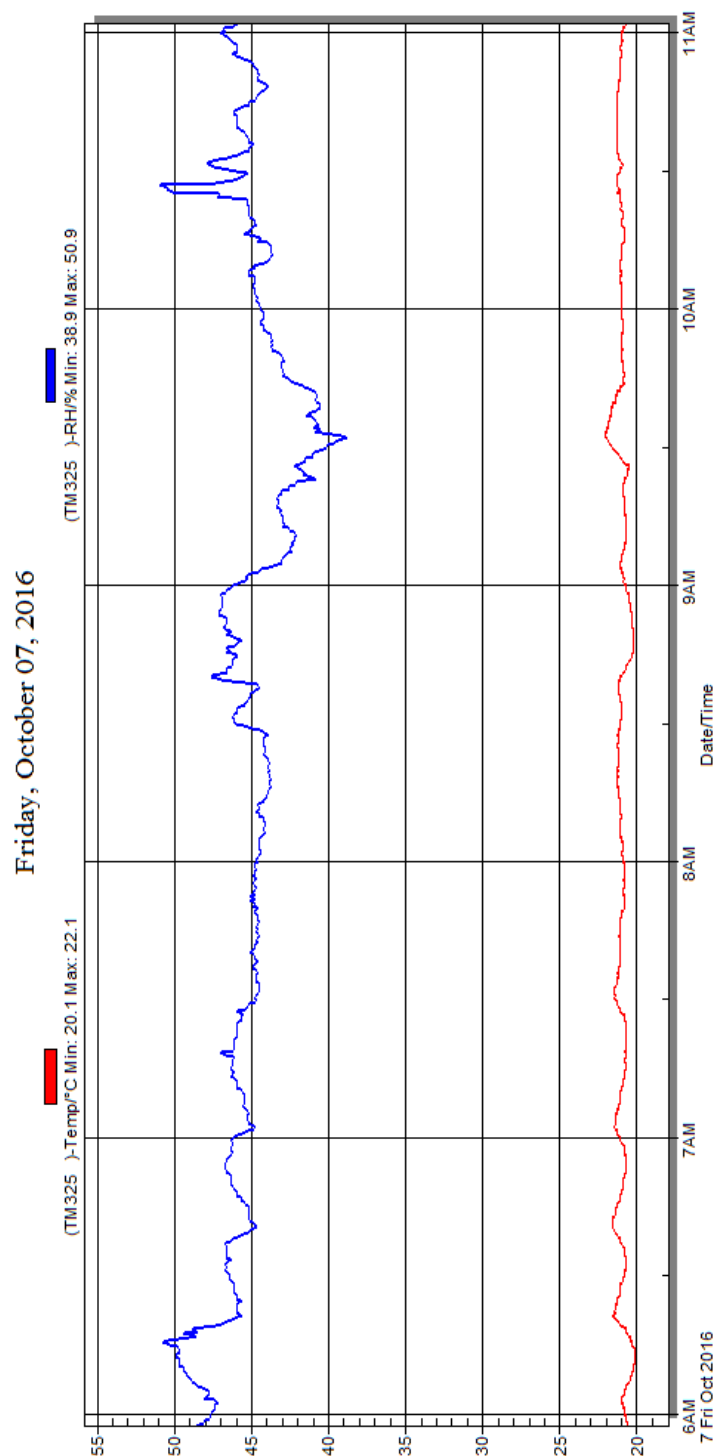
SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° to 90°	None
90° to 180°	None
180° to 270°	None
270° to 360°	None

DATA SHEET NO. 17 **DUMMY/VEHICLE TEMPERATURE STABILIZATION**

Test Vehicle: 2016 Mazda CX-5
 Test Program: R&D 90.1kph, 15° / 35% Left Oblique Offset

NHTSA No.: M20165404
 Test Date: 10/7/2016



Temperature Stabilization Chart/Data

APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS		
No.	Description	Page
1	As Delivered Right Front 3-4 View of Test Vehicle	A-9
2	As Delivered Left Rear 3-4 View of Test Vehicle	A-9
3	Test Vehicle Certification Label	A-10
4	Test Vehicle Tire Placard	A-10
5	Pre-Test Front View of Test Vehicle	A-11
6	Post-Test Front View of Test Vehicle	A-11
7	Pre-Test Left Front 3-4 View of Test Vehicle	A-12
8	Post-Test Left Front 3-4 View of Test Vehicle	A-12
9	Pre-Test Left Side View of Test Vehicle	A-13
10	Post-Test Left Side View of Test Vehicle	A-13
11	Pre-Test Left Rear 3-4 View of Test Vehicle	A-14
12	Post-Test Left Rear 3-4 View of Test Vehicle	A-14
13	Pre-Test Rear View of Test Vehicle	A-15
14	Post-Test Rear View of Test Vehicle	A-15
15	Pre-Test Right Rear 3-4 View of Test Vehicle	A-16
16	Post-Test Right Rear 3-4 View of Test Vehicle	A-16
17	Pre-Test Right Side View of Test Vehicle	A-17
18	Post-Test Right Side View of Test Vehicle	A-17
19	Pre-Test Right Front 3-4 View of Test Vehicle	A-18
20	Post-Test Right Front 3-4 View of Test Vehicle	A-18
21	Monroney Label Photograph	A-19
22	Pre-Test Overhead View of OMDB against target vehicle at ideal Impact Point	A-19
23	Pre-Test Left Side View of OMDB against target vehicle at ideal Impact Point	A-20
24	Pre-Test Right Side View of OMDB against target vehicle at ideal Impact Point	A-20
25	Pre-Test Close-up View of Impact Point	A-21
26	Post-Test Close-up View of Impact Point	A-21
27	Post-Test Vehicle Overhead View	A-22
28	Pre-Test Close-up View of Driver Door Latch	A-23
29	Post-Test Close-up View of Driver Door Latch	A-23
30	Pre-Test Close-up View of Passenger Door Latch	A-24

TABLE OF PHOTOGRAPHS (Continued)		
No.	Description	Page
31	Post-Test Close-up View of Passenger Door Latch	A-24
32	Pre-Test Windshield View	A-25
33	Post-Test Windshield View	A-25
34	Pre-Test View of Driver Inner Door Panel	A-26
35	Post-Test View of Driver Inner Door Panel	A-26
36	Pre-Test View of Passenger Inner Door Panel	A-27
37	Post-Test View of Passenger Inner Door Panel	A-27
38	Pre-Test Overall View of Driver Knee Bolsters	A-28
39	Post-Test Overall View of Driver Knee Bolsters	A-28
40	Pre-Test Left Side View of Driver Knee Bolsters	A-29
41	Post-Test Left Side View of Driver Knee Bolsters	A-29
42	Pre-Test Right Side View of Driver Knee Bolsters	A-30
43	Post-Test Right Side View of Driver Knee Bolsters	A-30
44	Pre-Test View of Driver Floor pan at Left sill level, w/carpet	A-31
45	Post-Test View of Driver Floor pan at Left sill level, w/carpet	A-31
46	Pre-Test View of Driver Floor pan at Mid seat level, w/carpet	A-32
47	Post-Test view of Driver Floor pan at Mid seat level, w/carpet	A-32
48	Pre-Test View of Driver Floor pan at Right sill level, w/carpet	A-33
49	Post-Test View of Driver Floor pan at Right sill level, w/carpet	A-33
50	Pre-Test Driver Front Windshield View	A-34
51	Post-Test Driver Front Windshield View	A-34
52	Pre-Test Left Side View of Driver and Interior	A-35
53	Post-Test Left Side View of Driver and Interior	A-35
54	Pre-Test Left Side Driver Window View	A-36
55	Post-Test Left Side Driver Window View	A-36
56	Pre-Test Right Side View of Driver and Interior	A-37
57	Post-Test Right Side View of Driver and Interior	A-37
58	Pre-Test View of Driver Door Clearance	A-38
59	Post-Test View of Driver Door Clearance	A-38

TABLE OF PHOTOGRAPHS (Continued)		
No.	Description	Page
60	Pre-Test View of Parking Brake	A-39
61	Pre-Test Driver Seat Fore Aft Markings	A-40
62	Post-Test Driver Seat Fore Aft Markings	A-40
63	Pre-Test Driver Seat Back Markings	A-41
64	Pre-Test Overhead View of Driver Thighs on Seat	A-41
65	Pre-Test Driver Adjustable D-ring	A-42
66	Post-Test Driver Adjustable D-ring	A-42
67	Pre-Test Driver Feet	A-43
68	Post-Test Driver Feet	A-43
69	Pre-Test View of Driver Right Knee and Bolster	A-44
70	Post-Test View of Driver Right Knee and Bolster	A-44
71	Pre-Test View of Driver Left Knee and Bolster	A-45
72	Post-Test View of Driver Left Knee and Bolster	A-45
73	Pre-Test View of Driver Abdomen	A-46
74	Post-Test View of Driver Abdomen	A-46
75	Pre-Test Left Side View of Steering Wheel set position	A-47
76	Post-Test Left Side View of Steering Wheel set position	A-47
77	Post-Test View of Driver Head Contact with Airbag – Front	A-48
78	Post-Test View of Driver Head Contact with Airbag – Curtain	A-48
79	Post-Test View of Driver Head Contact with Vehicle Interior – A	A-49
80	Post-Test View of Driver Head Contact with Vehicle Interior – B	A-49
81	Post-Test View of Driver Head Contact with Vehicle Interior – C	A-50
82	Pre-Test Overall View of Passenger Knee Bolsters	A-51
83	Post-Test Overall View of Passenger Knee Bolsters	A-51
84	Pre-Test Left Side View of Passenger Knee Bolsters	A-52
85	Post-Test Left Side View of Passenger Knee Bolsters	A-52
86	Pre-Test Right Side View of Passenger Knee Bolsters	A-53
87	Post-Test Right Side View of Passenger Knee Bolsters	A-53
88	Pre-Test View of Passenger Floor pan at Right sill level, w/carpet	A-54
89	Post-Test View of Passenger Floor pan at Right sill level, w/carpet	A-54

TABLE OF PHOTOGRAPHS (Continued)		
No.	Description	Page
90	Pre-Test View of Passenger Floor pan at Mid seat level, w/carpet	A-55
91	Post-Test view of Passenger Floor pan at Mid seat level, w/carpet	A-55
92	Pre-Test View of Passenger Floor pan at Left View, w/carpet	A-56
93	Post-Test View of Passenger Floor pan at Left View, w/carpet	A-56
94	Pre-Test Passenger Front Close-up View, Windshield	A-57
95	Post-Test Passenger Front Close-up View, Windshield	A-57
96	Pre-Test Left Side Passenger and Interior View	A-58
97	Post-Test Left Side Passenger and Interior View	A-58
98	Pre-Test Right Side Passenger Window View	A-59
99	Post-Test Right Side Passenger Window View	A-59
100	Pre-Test Right Side Passenger and Interior View	A-60
101	Post-Test Right Side Passenger and Interior View	A-60
102	Pre-Test View of Passenger Door Clearance	A-61
103	Post-Test View of Passenger Door Clearance	A-61
104	Pre-Test Passenger Seat Fore-Aft Markings	A-62
105	Post-Test Passenger Seat Fore-Aft Markings	A-62
106	Pre-Test Passenger Seat Back Markings	A-63
107	Pre-Test Overhead View of Passenger Thighs on seat	A-63
108	Pre-Test Passenger Adjustable D-ring	A-64
109	Post-Test Passenger Adjustable D-ring	A-64
110	Pre-Test View of Passenger Feet	A-65
111	Post-Test View of Passenger Feet	A-65
112	Pre-Test View of Passenger Right Knee and Bolster	A-66
113	Post-Test View of Passenger Right Knee and Bolster	A-66
114	Pre-Test View of Passenger Left Knee and Bolster	A-67
115	Post-Test View of Passenger Left Knee and Bolster	A-67
116	Pre-Test View of Passenger Abdomen	A-68
117	Post-Test View of Passenger Abdomen	A-68
118	Post-Test View of Passenger Head contact with Airbag – Front	A-69
119	Post-Test View of Passenger Head contact with Airbag – Curtain	A-69

TABLE OF PHOTOGRAPHS (Continued)		
No.	Description	Page
120	Post-Test View of Passenger Head contact with Interior	A-70
121	Post-Test View of Passenger Body contact with Interior	A-70
122	Post-Test View of Passenger Head contact with Interior	A-71
123	Post-Test Passenger Contact With Glovebox	A-71
124	Pre-Test Ballast Locations	A-72
125	Post-Test Speed Trap Readout	A-72
126	Pre-Test View of Fuel Filler Cap	A-73
127	Post-Test View of Fuel Filler Cap	A-73
128	Pre-Test Engine Compartment View	A-74
129	Post-Test Engine Compartment View	A-74
130	Pre-Test Right Side Engine Compartment View	A-75
131	Post-Test Right Side Engine Compartment View	A-75
132	Pre-Test Left Side Engine Compartment View	A-76
133	Post-Test Left Side Engine Compartment View	A-76
134	Pre-Test View of Front Underbody (perpendicular to vehicle)	A-77
135	Post-Test View of Front Underbody (perpendicular to vehicle)	A-77
136	Pre-Test View of Mid Underbody (perpendicular to vehicle)	A-78
137	Post-Test View of Mid Underbody (perpendicular to vehicle)	A-78
138	Pre-Test View of Rear Underbody (perpendicular to vehicle)	A-79
139	Post-Test View of Rear Underbody (perpendicular to vehicle)	A-79
140	Pre-Test View of Steering rack and or sway bar	A-80
141	Post-Test View of Steering rack and or sway bar	A-80
142	Pre-Test Bumper to Rail Attachments and Crush Initiators	A-81
143	Post-Test Bumper to Rail Attachments and Crush Initiators	A-81
144	Post-Test View of Front Sub-Frame Deformation	A-82
145	Pre-Test Frame Rail with tire removed	A-83
146	Post-Test Frame Rail with tire removed	A-83
147	Pre-Test View of Front Driver Wheel Well with tire removed	A-84
148	Post-Test ¾ View of Front Driver Wheel Well w/ tire removed	A-84
149	Post-Test Side View of Front Driver Wheel Well w/ tire removed	A-85

TABLE OF PHOTOGRAPHS (Continued)		
No.	Description	Page
150	Post-Test Right Side 3/4 Rear View of the Front Driver Wheel Well w/ tire removed	A-85
151	Post-Test Looking Down at the Front Driver Shotgun	A-86
152	Post-Test Right Side ¾ View of Front Driver Shotgun	A-86
153	Post-Test Front Driver Close up View of Suspension w/ tire removed	A-87
154	Post-Test ¾ View of Front Passenger Wheel Well w/ tire removed	A-87
155	Post-Test Side View of Front Passenger Wheel Well w/ tire removed	A-88
156	Post-Test Right Side 3/4 Rear View of the Front Passenger Wheel Well w/ tire removed	A-88
157	Post-Test Looking Down at the Front Passenger Shotgun	A-89
158	Post-Test Right Side ¾ View of Front Passenger Shotgun	A-89
159	Post-Test Front Passenger Close up View of Suspension w/ tire removed	A-90
160	Post-Test View of Door Sill with door open-Struck Side	A-90
161	Post-Test View of Deformation of A pillar-Struck Side	A-91
162	Post-Test View of Deformation of B pillar-Struck Side	A-91
163	Post-Test View of Deformation of C pillar-Struck Side	A-92
164	Post-Test View of Wheel and/or Tire Deformation-Struck Side	A-92
165	Post-Test View of Deformation of Rocker or Post-Struck Side	A-93
166	Post-Test View of Windshield Separation	A-93
167	Pre-Test Left Side View of OMDB	A-94
168	Post-Test Left Side View of OMDB	A-94
169	Pre-Test Right Side View of OMDB	A-95
170	Post-Test Right Side View of OMDB	A-95
171	Pre-Test Top View of OMDB	A-96
172	Post-Test Top View of OMDB	A-96
173	Pre-Test Front View of OMDB	A-97
174	Post-Test Front View of OMDB	A-97
175	Pre-Test Left Front ¾ View of OMDB	A-98
176	Post-Test Left Front ¾ View of OMDB	A-98
177	Pre-Test Right Front ¾ View of OMDB	A-99
178	Post-Test Right Front ¾ View of OMDB	A-99
179	Pre-Test Right Side View of OMDB	A-100

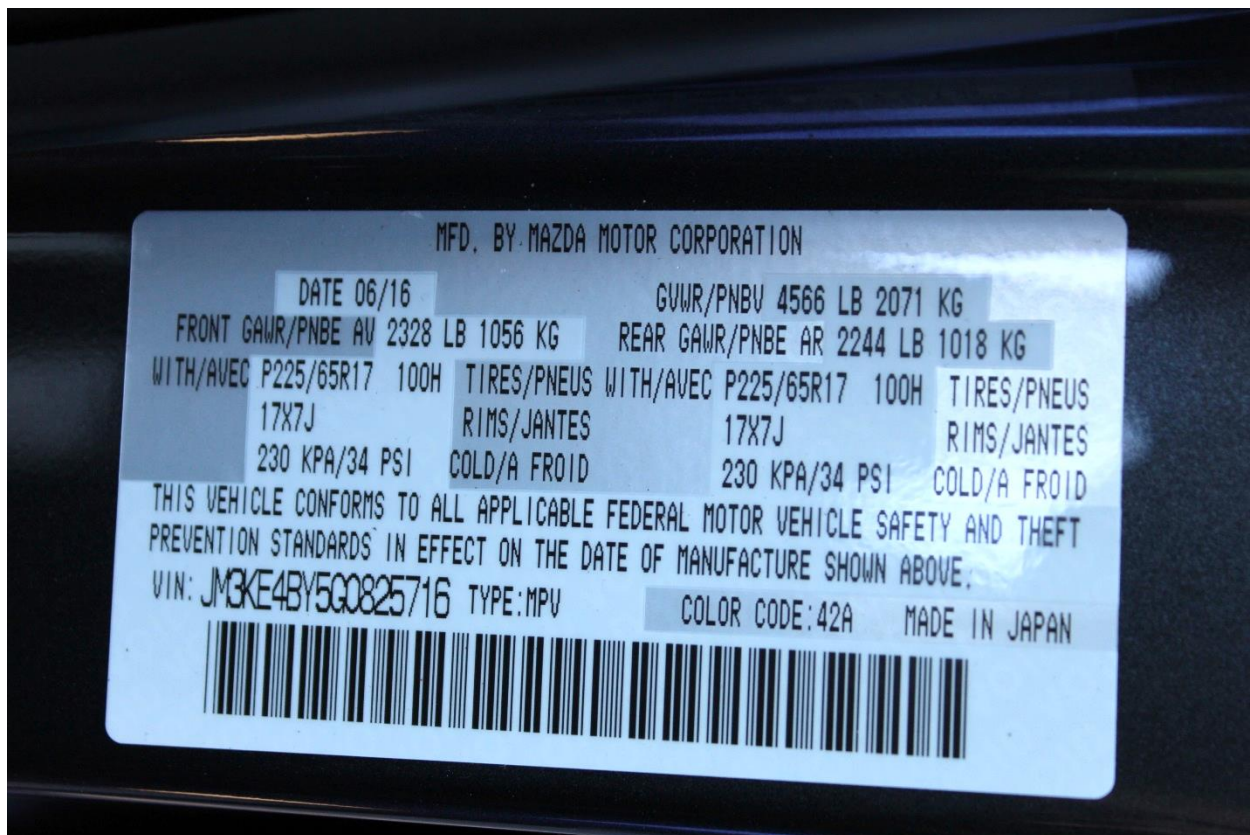
TABLE OF PHOTOGRAPHS (Continued)		
No.	Description	Page
180	Post-Test Right Side View of OMDB	A-100
181	Pre-Test Left Side View of OMDB	A-101
182	Post-Test Left Side View of OMDB	A-101
183	Pre-Test OMDB & Vehicle, Right Side	A-102
184	Post-Test OMDB & Vehicle, Right Side	A-102
185	Pre-Test OMDB & Vehicle, Left Side	A-103
186	Post-Test OMDB & Vehicle, Left Side	A-103
187	Pre-Test OMDB & Vehicle, Top View	A-104
188	Post-Test OMDB & Vehicle, Top View	A-104
189	Pre-Test OMDB & Vehicle, Rear View	A-105
190	Post-Test OMDB & Vehicle, Rear View	A-105
191	Pre-Test OMDB & Vehicle, Front View	A-106
192	Post-Test OMDB & Vehicle, Front View	A-106
193	Pre-Test OMDB & Vehicle Alignment View	A-107
194	Vehicle at 0 Degrees on Static Rollover Device	A-107
195	Vehicle at 90 Degrees on Static Rollover Device	A-108
196	Vehicle at 180 Degrees on Static Rollover Device	A-108
197	Vehicle at 270 Degrees on Static Rollover Device	A-109
198	Vehicle at 360 Degrees on Static Rollover Device	A-109
199	Impact Photo	A-110
200	Pre-Test Vehicle Bumper Left Side View	A-111
201	Post-Test Vehicle Bumper Left Side View	A-111
202	Pre-Test Vehicle Bumper Left Front View	A-112
203	Post-Test Vehicle Bumper Left Front View	A-112
204	Pre-Test Vehicle Bumper Front View	A-113
205	Post-Test Vehicle Bumper Front View	A-113
206	Pre-Test Vehicle Bumper Right Side View	A-114
207	Post-Test Vehicle Bumper Right Side View	A-114
208	Pre-Test Vehicle Bumper Right Front View	A-115
209	Post-Test Vehicle Bumper Right Front View	A-115



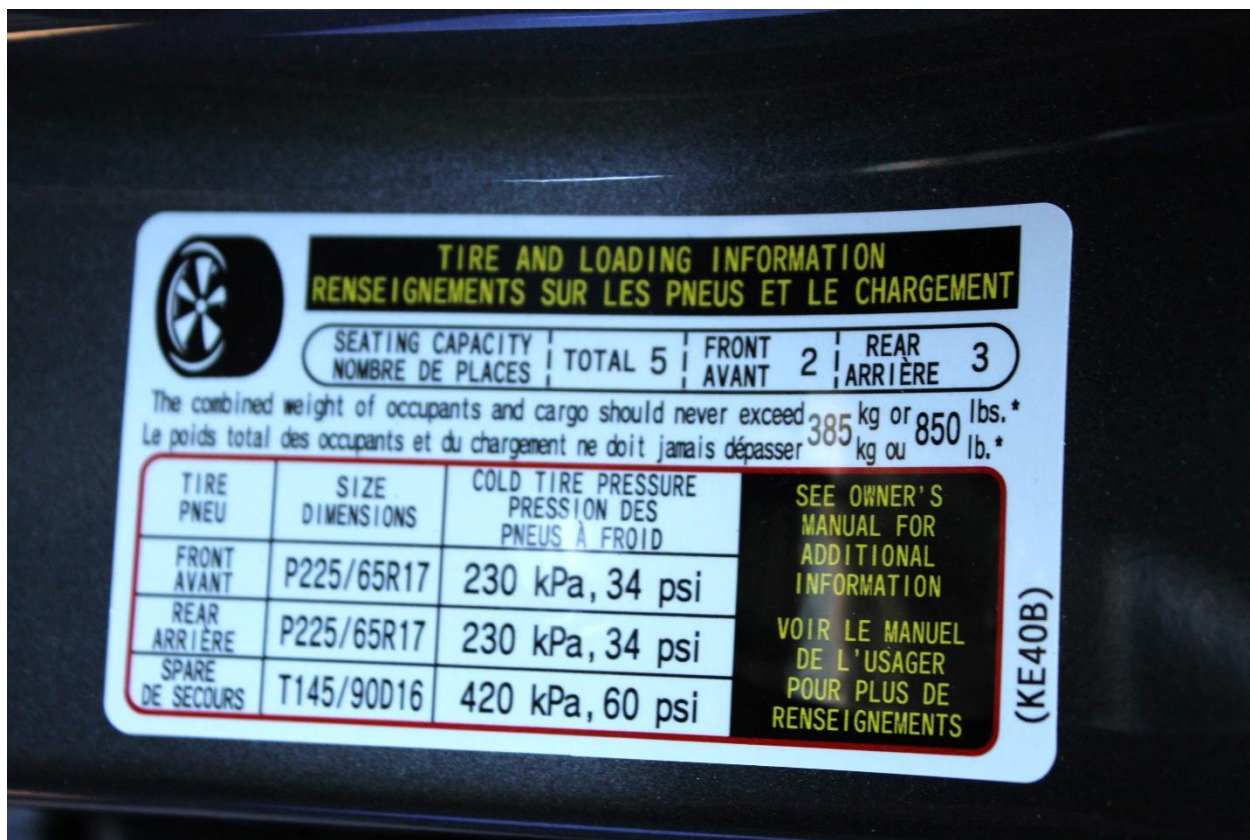
No. 001 As Delivered Right Front 3-4 View of Test Vehicle



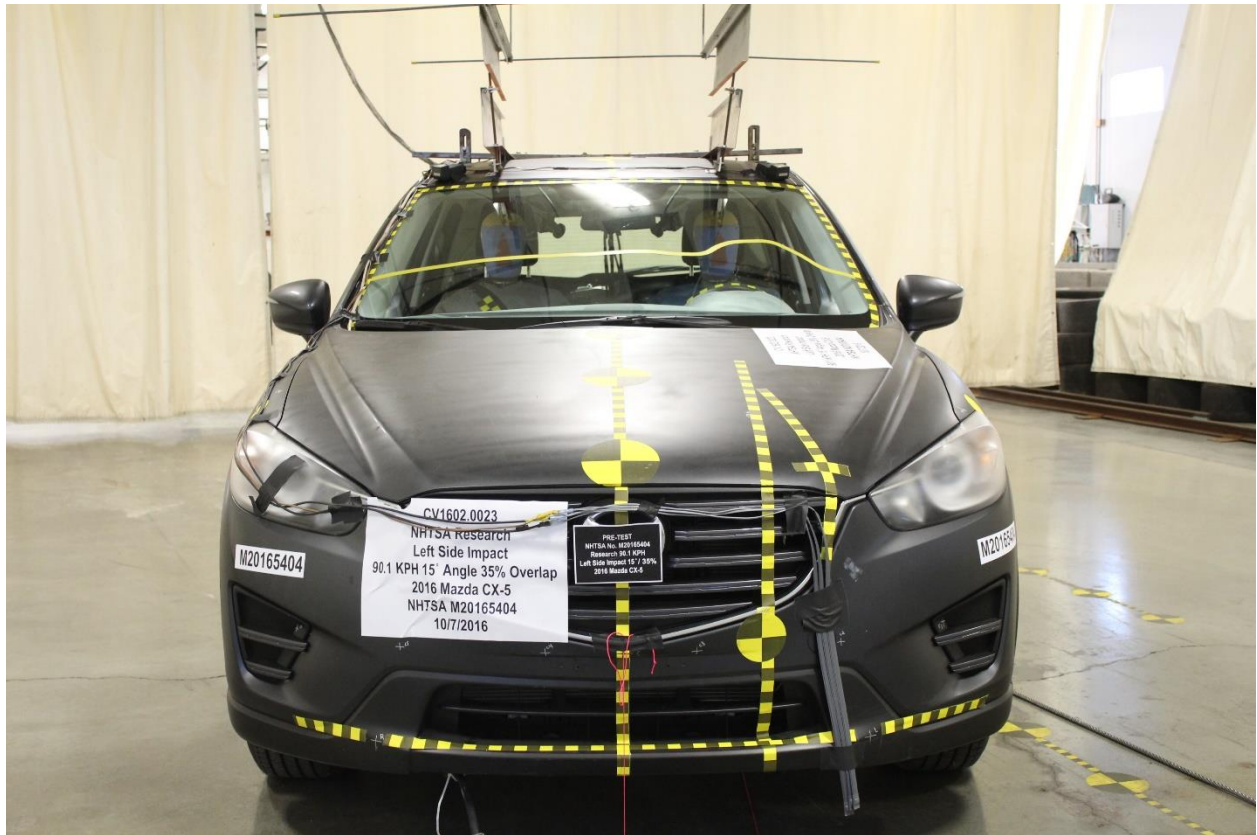
No. 002 As Delivered Left Rear 3-4 View of Test Vehicle



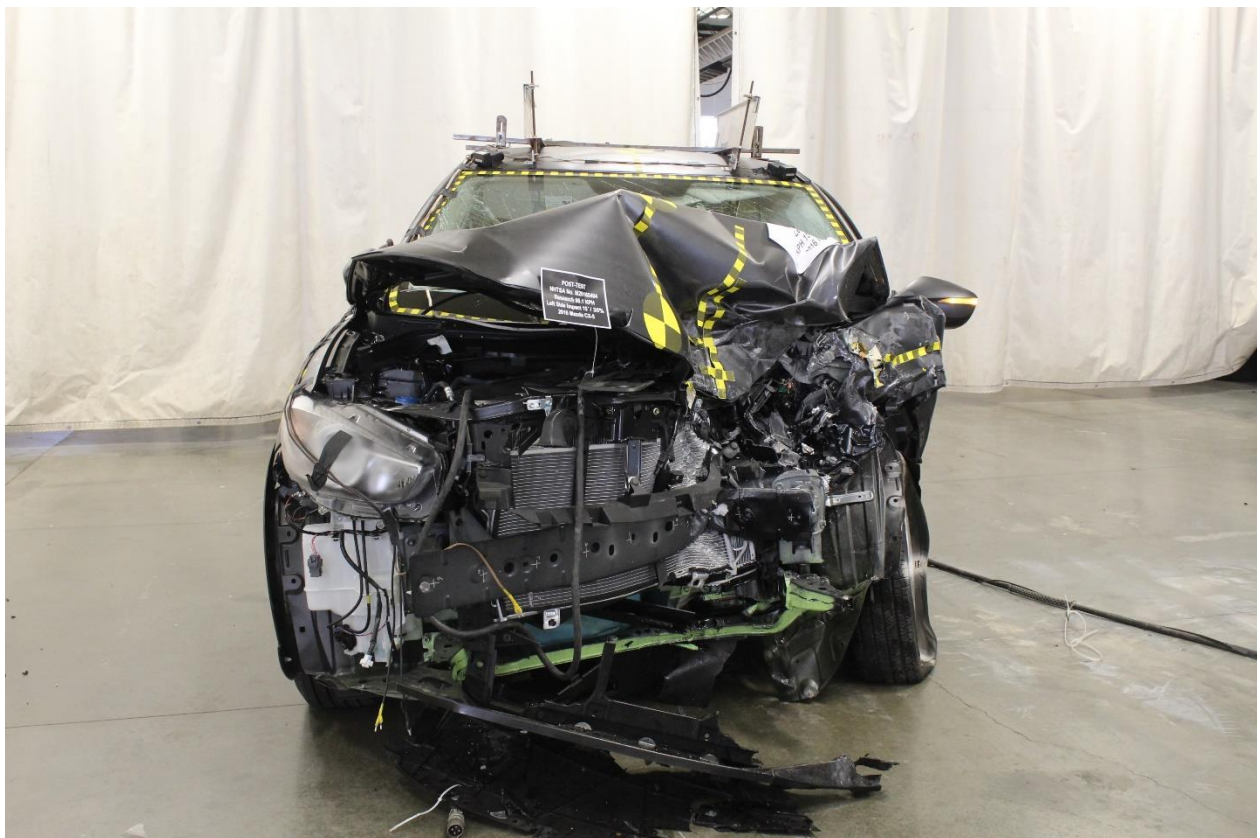
No. 003 Test Vehicle Certification Label



No. 004 Test Vehicle Tire Placard



No. 005 Pre-Test Front View of Test Vehicle



No. 006 Post-Test Front View of Test Vehicle



No. 007 Pre-Test Left Front 3-4 View of Test Vehicle



No. 008 Post-Test Left Front 3-4 View of Test Vehicle



No. 009 Pre-Test Left Side View of Test Vehicle



No. 010 Post-Test Left Side View of Test Vehicle



No. 011 Pre-Test Left Rear 3-4 View of Test Vehicle



No. 012 Post-Test Left Rear 3-4 View of Test Vehicle



No. 013 Pre-Test Rear View of Test Vehicle



No. 014 Post-Test Rear View of Test Vehicle



No. 015 Pre-Test Right Rear 3-4 View of Test Vehicle



No. 016 Post-Test Right Rear 3-4 View of Test Vehicle



No. 017 Pre-Test Right Side View of Test Vehicle



No. 018 Post-Test Right Side View of Test Vehicle



Photo Not Available

No. 021 Monroney Label Photograph



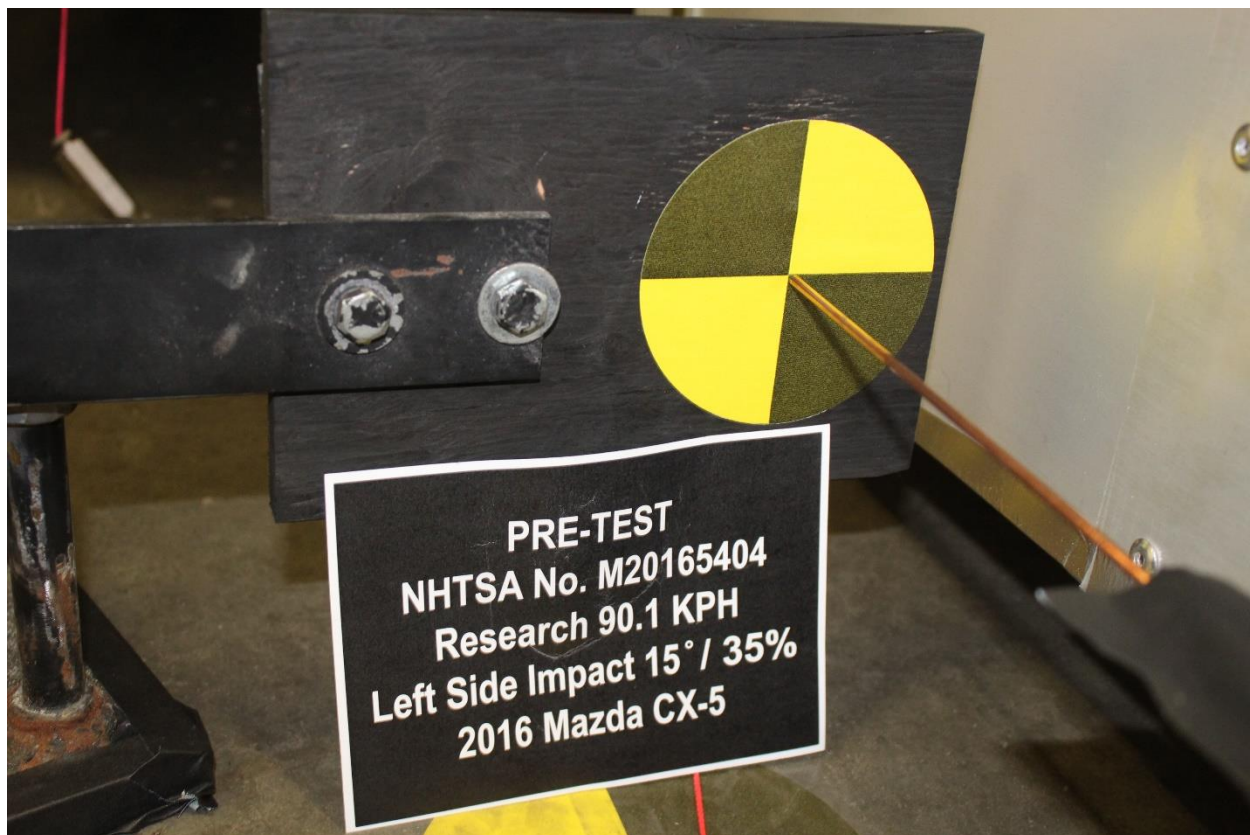
No. 022 Pre-Test Overhead View of OMDB against target vehicle at ideal Impact Point



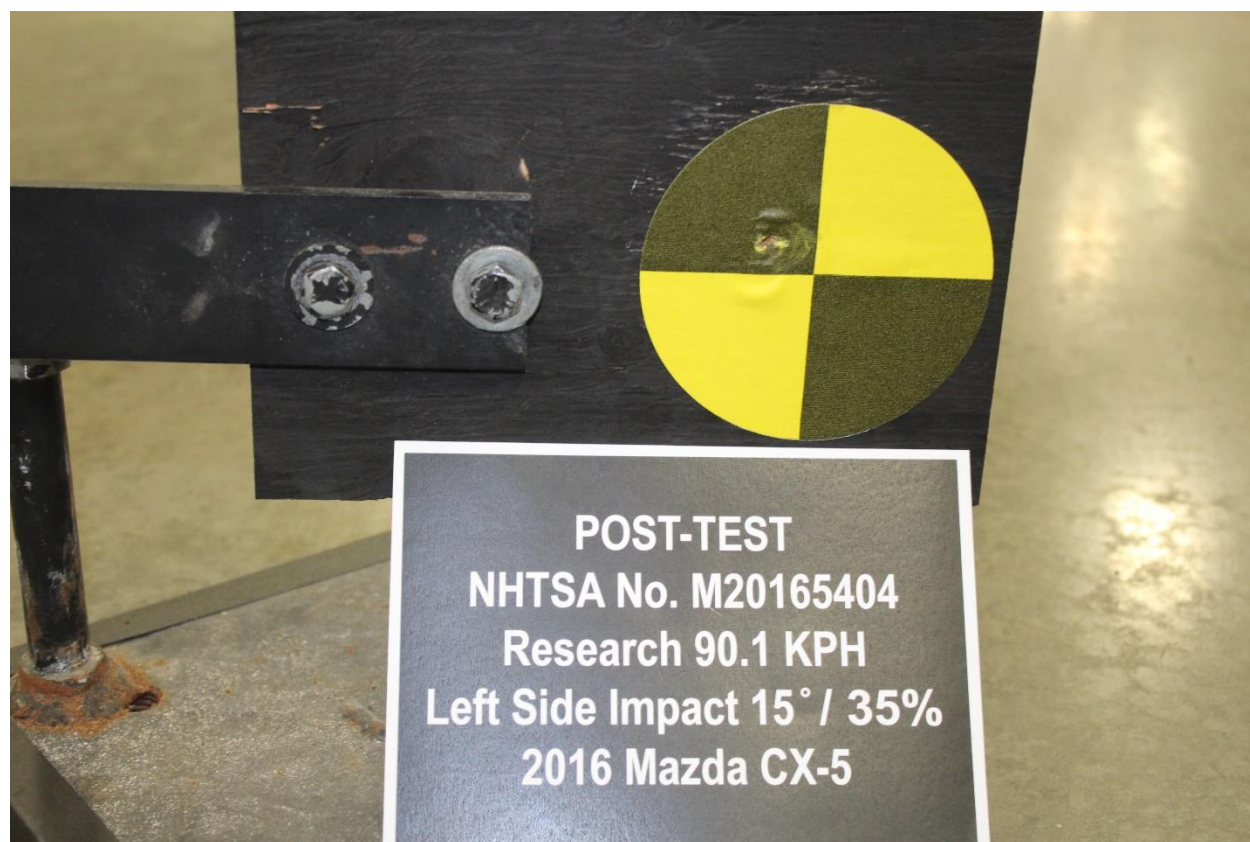
No. 023 Pre-Test Left Side View of OMDB against target vehicle at ideal Impact Point



No. 024 Pre-Test Right Side View of OMDB against target vehicle at ideal Impact Point



No. 025 Pre-Test Close-up View of Impact Point



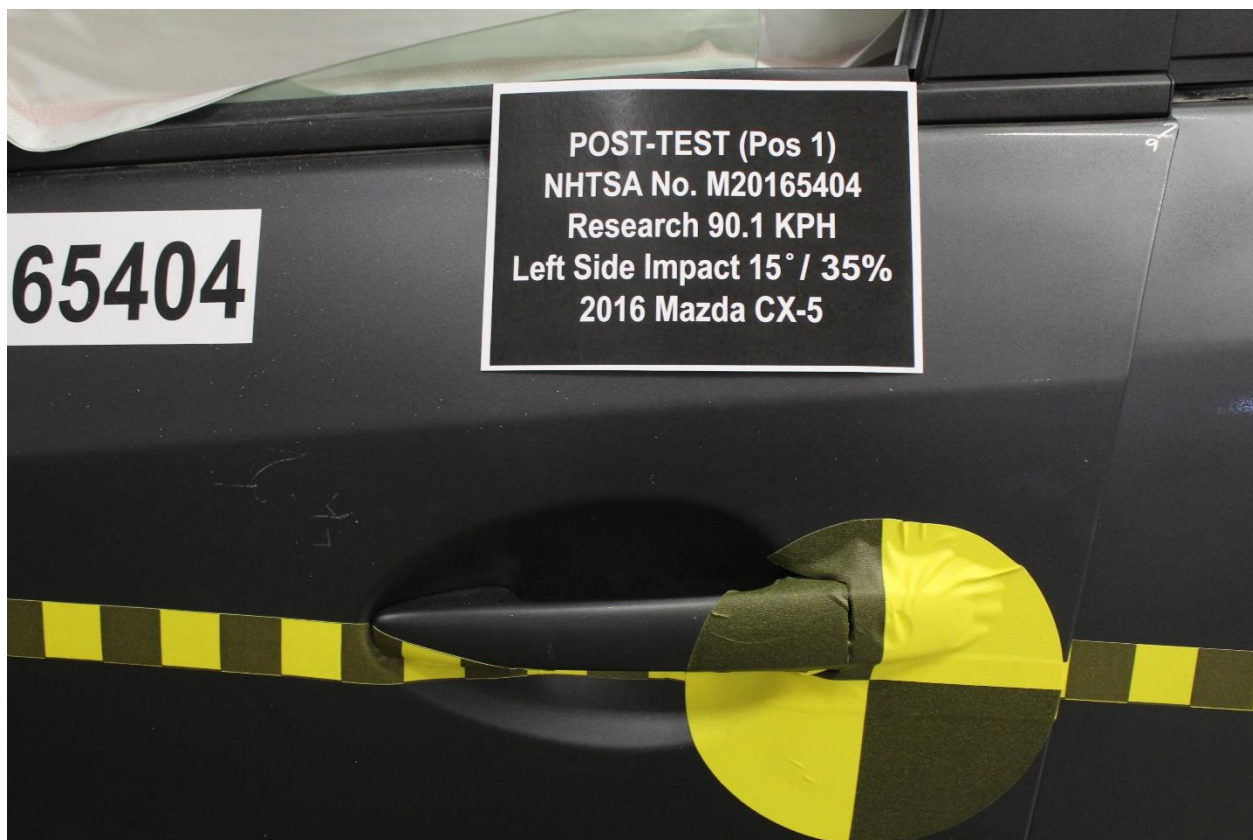
No. 026 Post-Test Close-up View of Impact Point



No. 027 Post-Test Vehicle Overhead View



No. 028 Pre-Test Close-up View of Driver Door Latch



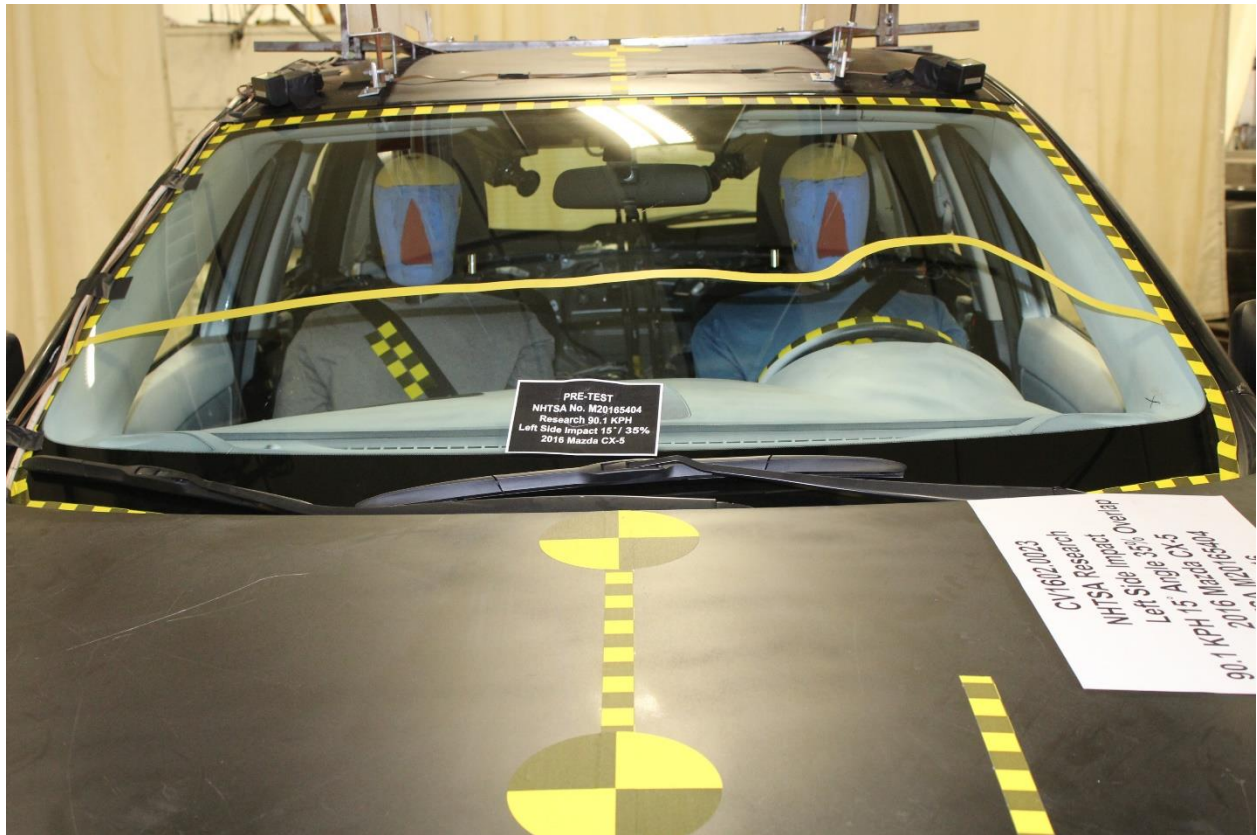
No. 029 Post-Test Close-up View of Driver Door Latch



No. 030 Pre-Test Close-up View of Passenger Door Latch



No. 031 Post-Test Close-up View of Passenger Door Latch



No. 032 Pre-Test Windshield View



No. 033 Post-Test Windshield View



No. 034 Pre-Test View of Driver Inner Door Panel



No. 035 Post-Test View of Driver Inner Door Panel



No. 036 Pre-Test View of Passenger Inner Door Panel



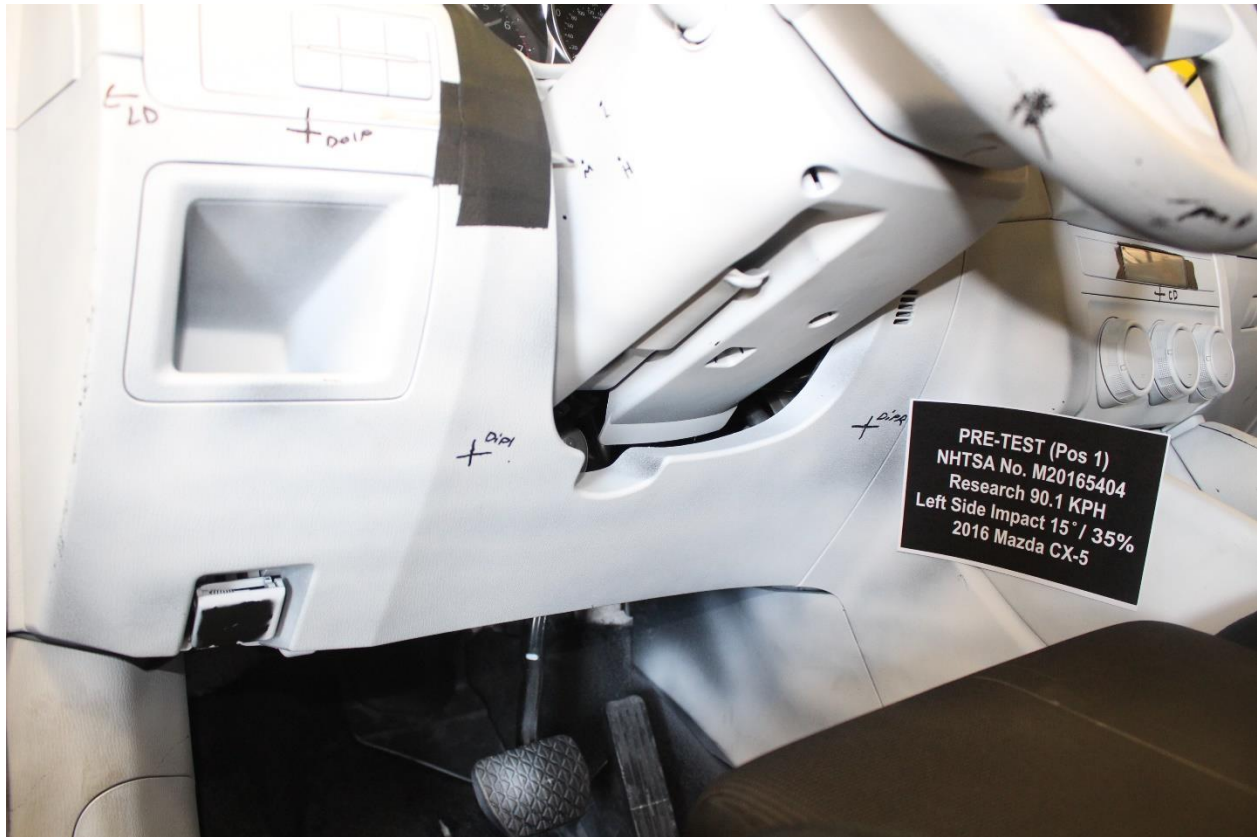
No. 037 Post-Test View of Passenger Inner Door Panel



No. 038 Pre-Test Overall View of Driver Knee Bolsters



No. 039 Post-Test Overall View of Driver Knee Bolsters



No. 040 Pre-Test Left Side View of Driver Knee Bolsters



No. 041 Post-Test Left Side View of Driver Knee Bolsters



No. 042 Pre-Test Right Side View of Driver Knee Bolsters



No. 043 Post-Test Right Side View of Driver Knee Bolsters



No. 044 Pre-Test View of Driver Floor pan at Left sill level, w/carpet



No. 045 Post-Test View of Driver Floor pan at Left sill level, w/carpet



No. 046 Pre-Test View of Driver Floor pan at Mid seat level, w/carpet



No. 047 Post-Test view of Driver Floor pan at Mid seat level, w/carpet



No. 048 Pre-Test View of Driver Floor pan at Right Side



No. 049 Post-Test View of Driver Floor pan at Right Side



No. 050 Pre-Test Driver Front Windshield View



No. 051 Post-Test Driver Front Windshield View



No. 052 Pre-Test Left Side View of Driver and Interior



No. 053 Post-Test Left Side View of Driver and Interior



No. 054 Pre-Test Left Side Driver Window View



No. 055 Post-Test Left Side Driver Window View



No. 056 Pre-Test Right Side View of Driver and Interior



No. 057 Post-Test Right Side View of Driver and Interior



No. 058 Pre-Test View of Driver Door Clearance



No. 059 Post-Test View of Driver Door Clearance



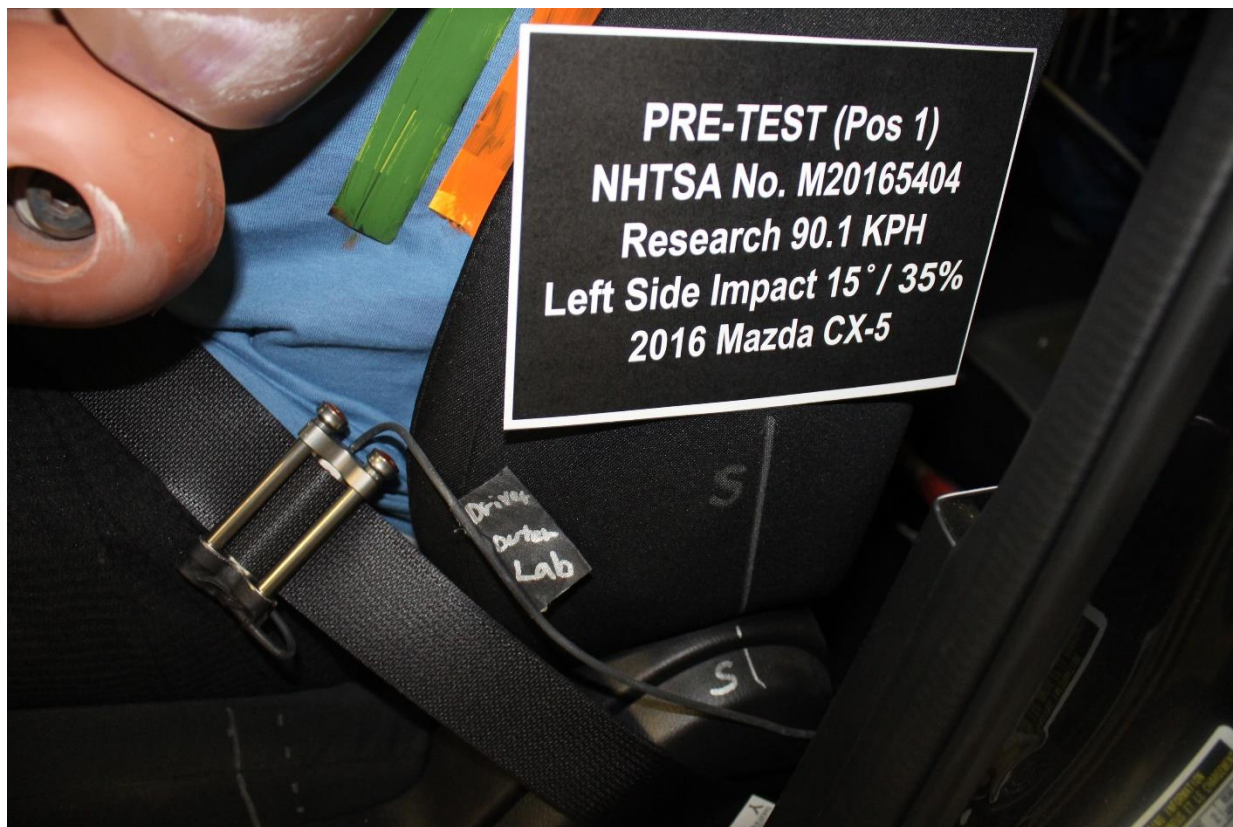
No. 060 Pre-Test View of Parking Brake



No. 061 Pre-Test Driver Seat Fore Aft Markings



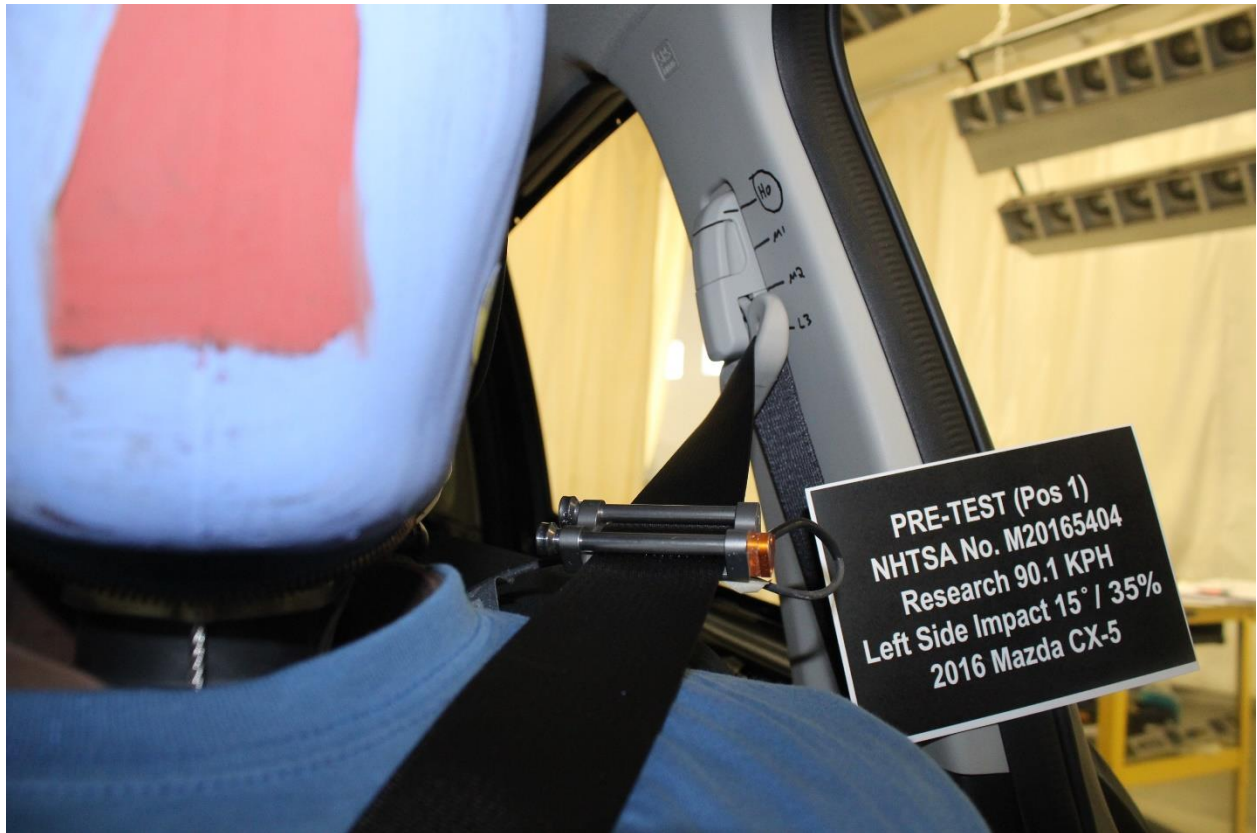
No. 062 Post-Test Driver Seat Fore Aft Markings



No. 063 Pre-Test Driver Seat Back Markings



No. 064 Pre-Test Overhead View of Driver Thighs on Seat



No. 065 Pre-Test Driver Adjustable D-Ring



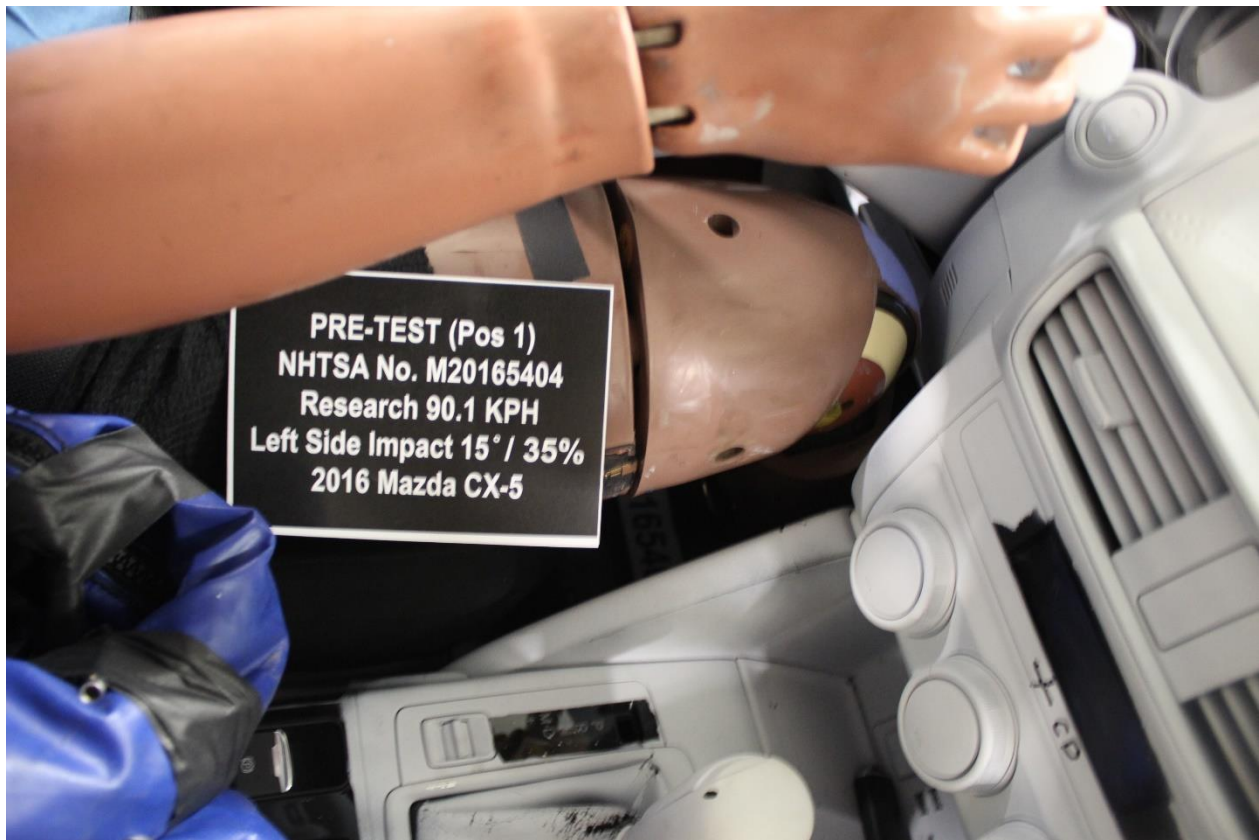
No. 066 Post-Test Driver Adjustable D-Ring



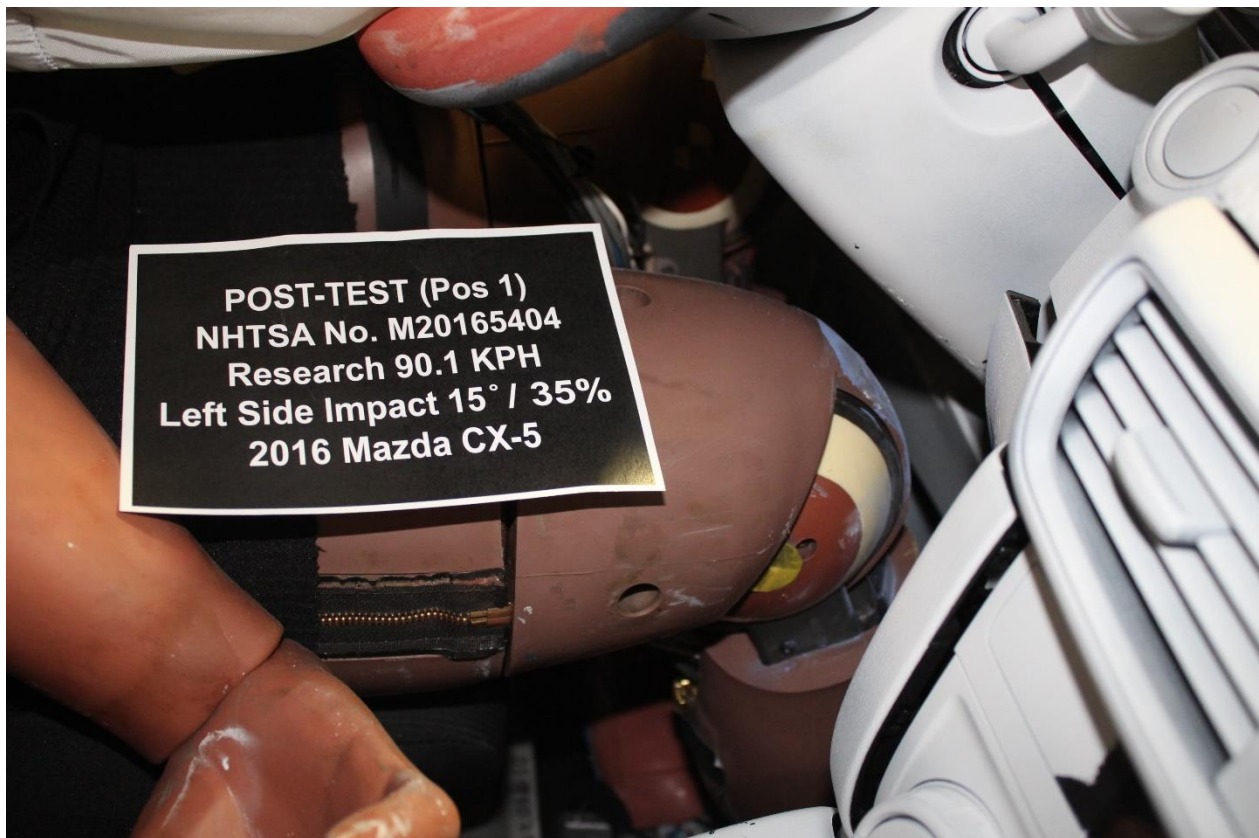
No. 067 Pre-Test Driver Feet



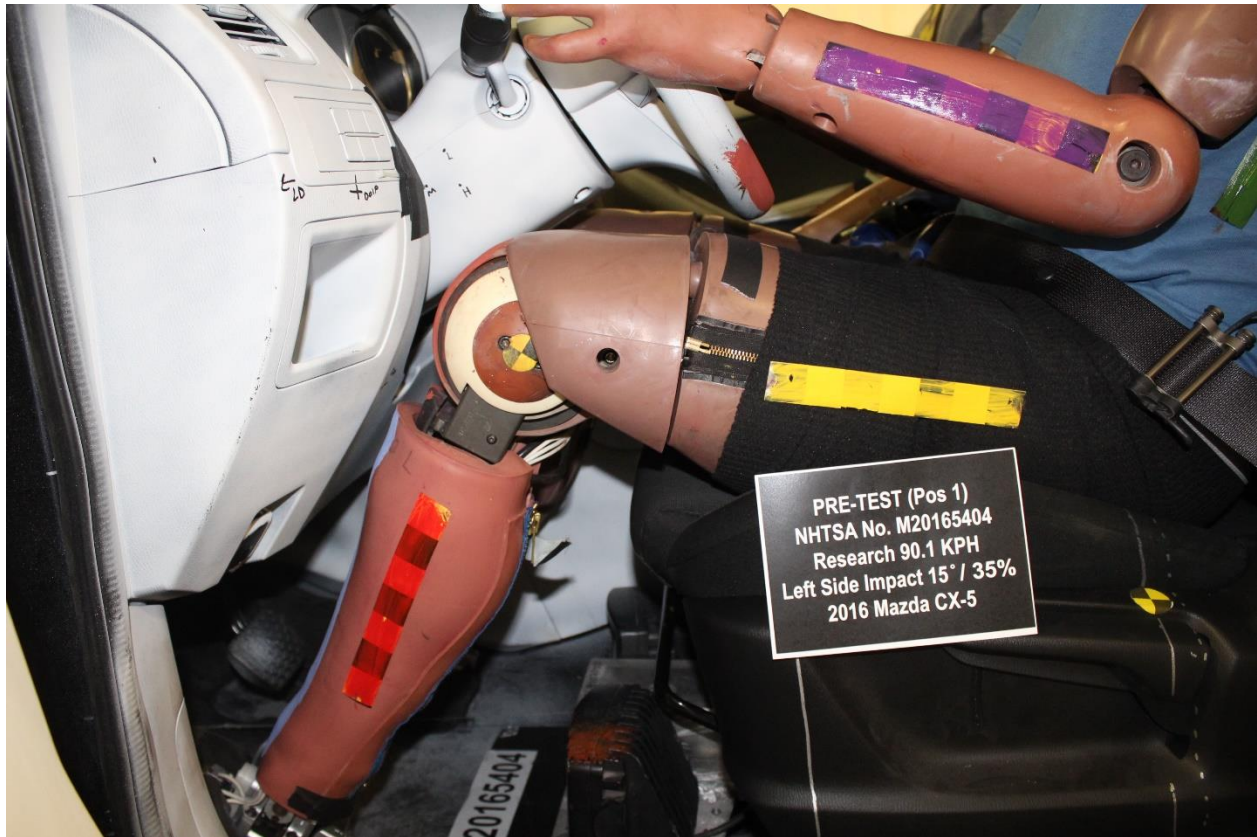
No. 068 Post-Test Driver Feet



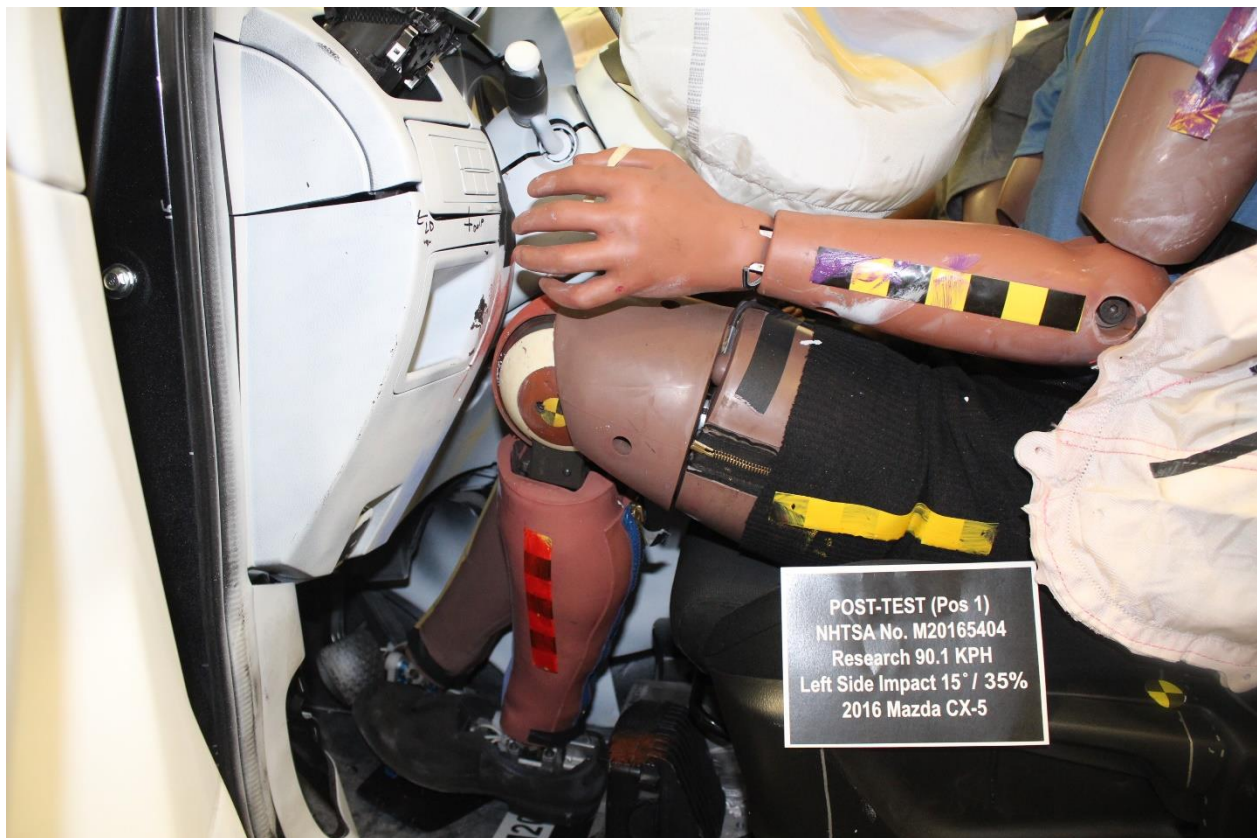
No. 069 Pre-Test View of Driver Right Knee and Bolster



No. 070 Post-Test View of Driver Right Knee and Bolster



No. 071 Pre-Test View of Driver Left Knee and Bolster



No. 072 Post-Test View of Driver Left Knee and Bolster



No. 073 Pre-Test View of Driver Abdomen



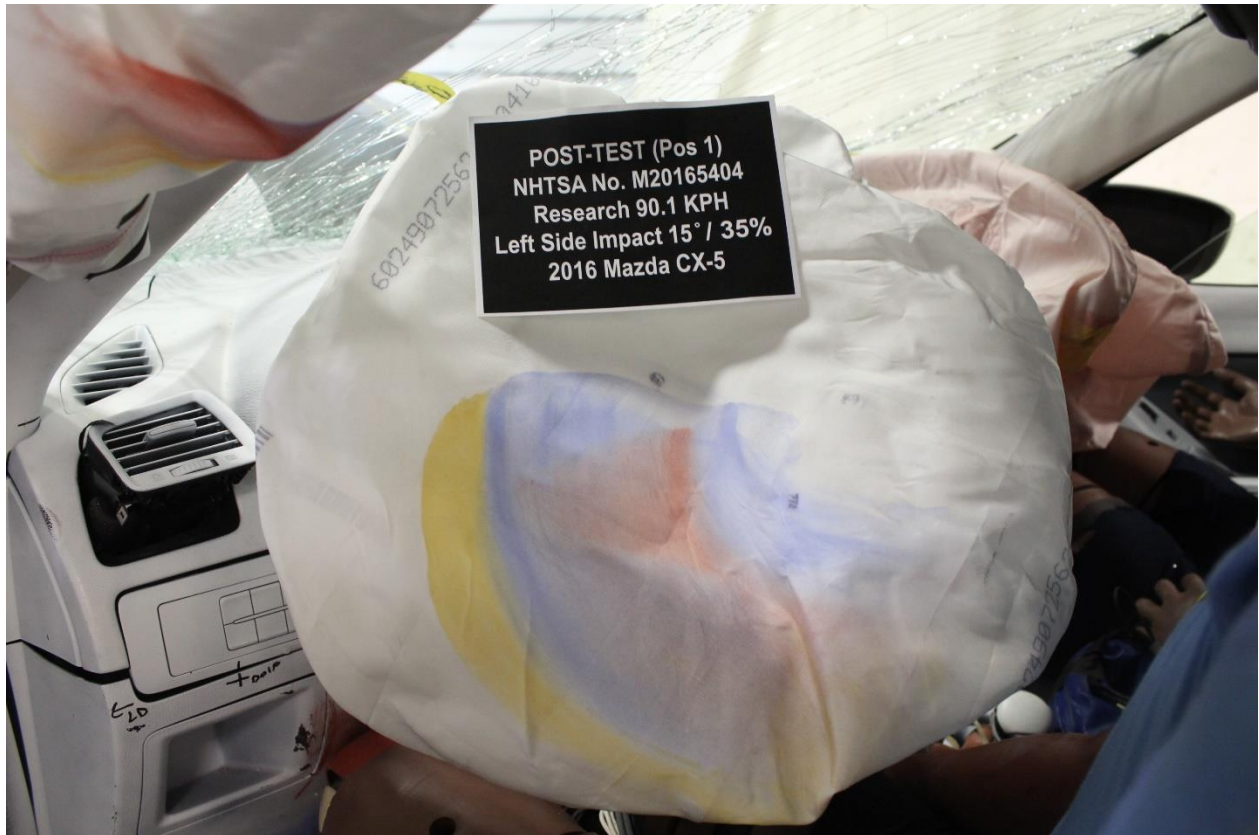
No. 074 Post-Test View of Driver Abdomen



No. 075 Pre-Test Left Side View of Steering Wheel set position



No. 076 Post-Test Left Side View of Steering Wheel set position



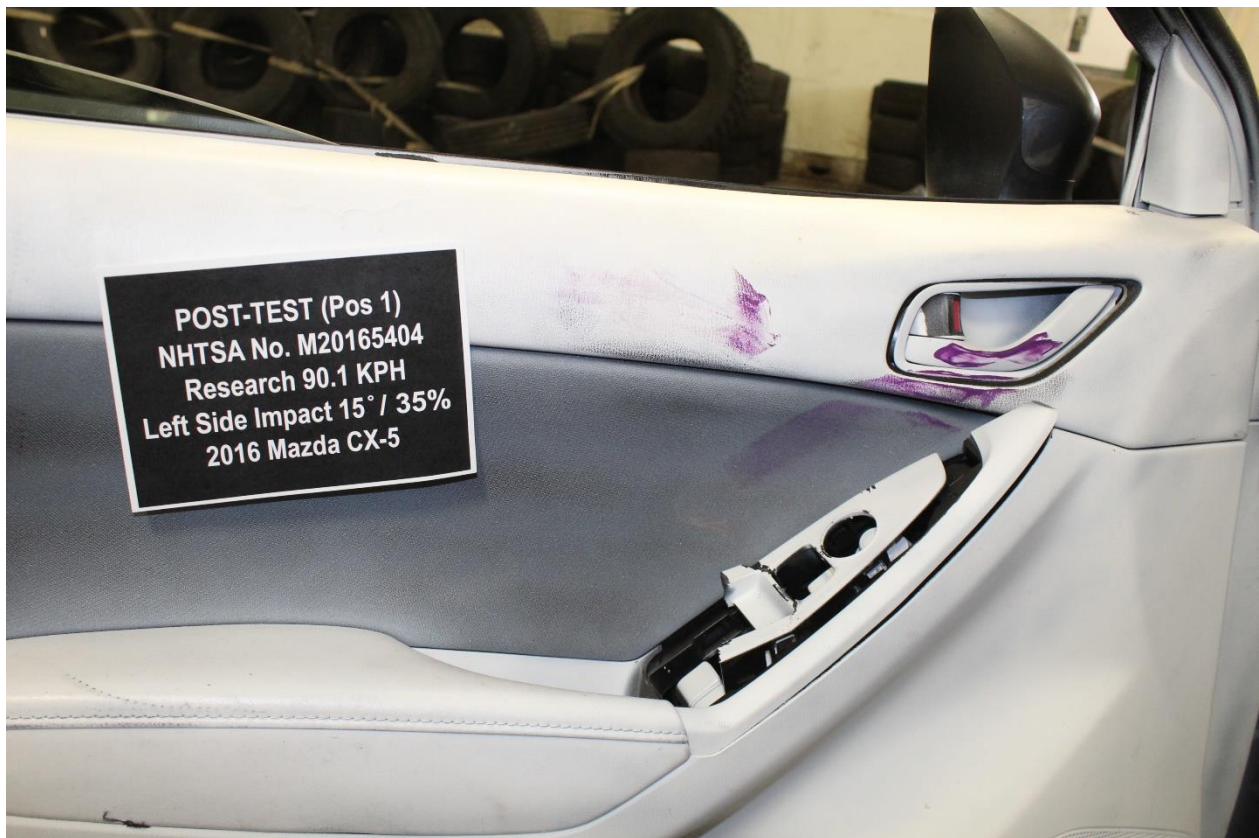
No. 077 Post-Test View of Driver Head Contact with Front Airbag



No. 078 Post-Test View of Driver Head Contact with Curtain Airbag

Photo Not Applicable

No. 079 Post-Test View of Driver Head Contact with Vehicle Interior – A



No. 080: Post-Test View of Driver Body Contact with Vehicle Interior - B



No. 081: Post-Test View of Driver Body Contact with Vehicle Interior - C



No. 082: Pre-Test Overall View of Passenger Knee Bolsters



No. 083: Post-Test Overall View of Passenger Knee Bolsters



No. 084: Pre-Test Left Side View of Passenger Knee Bolsters



No. 085: Post-Test Left Side View of Passenger Knee Bolsters



No. 086: Pre-Test Right Side View of Passenger Knee Bolsters



No. 087: Post-Test Right Side View of Passenger Knee Bolsters



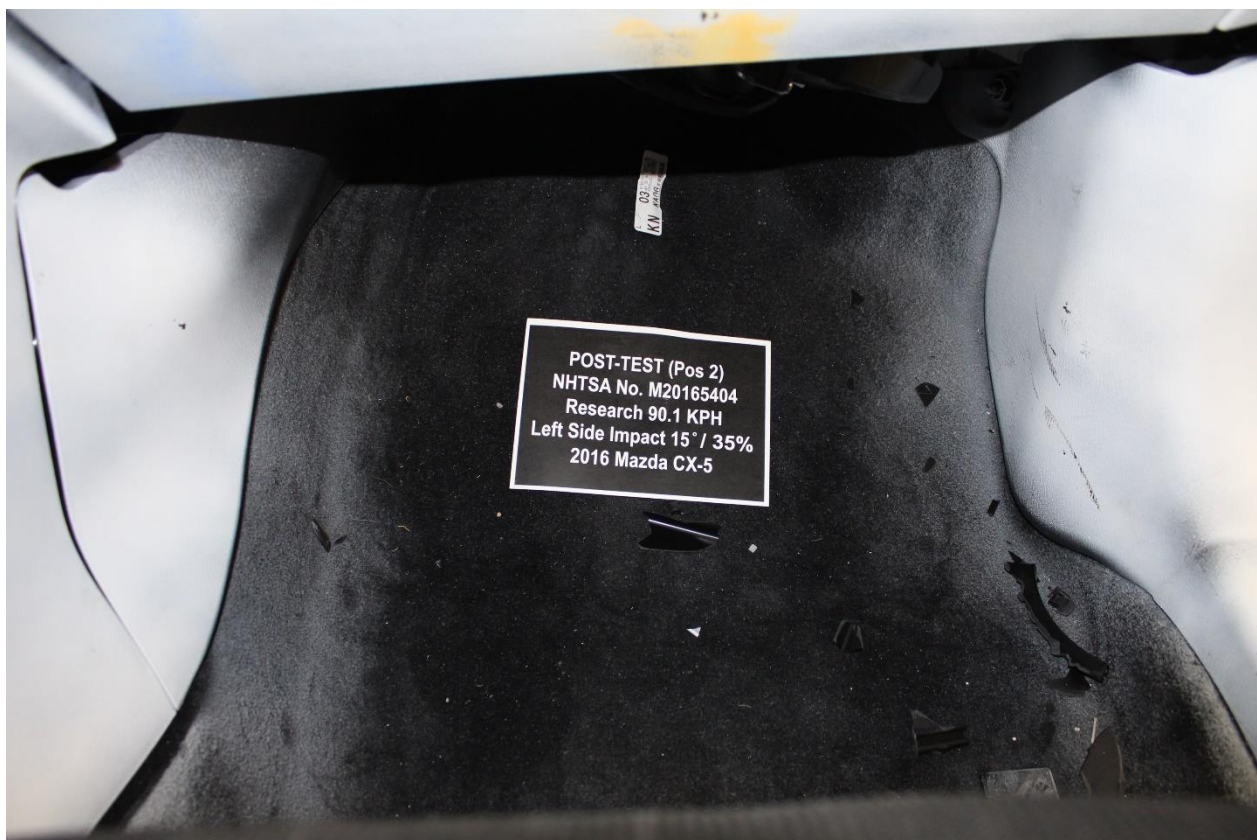
No. 088: Pre-Test View of Passenger Floor pan at Right sill level, w/carpet



No. 089: Post-Test View of Passenger Floor pan at Right sill level, w/carpet



No. 090: Pre-Test View of Passenger Floor pan at Mid seat level, w/carpet



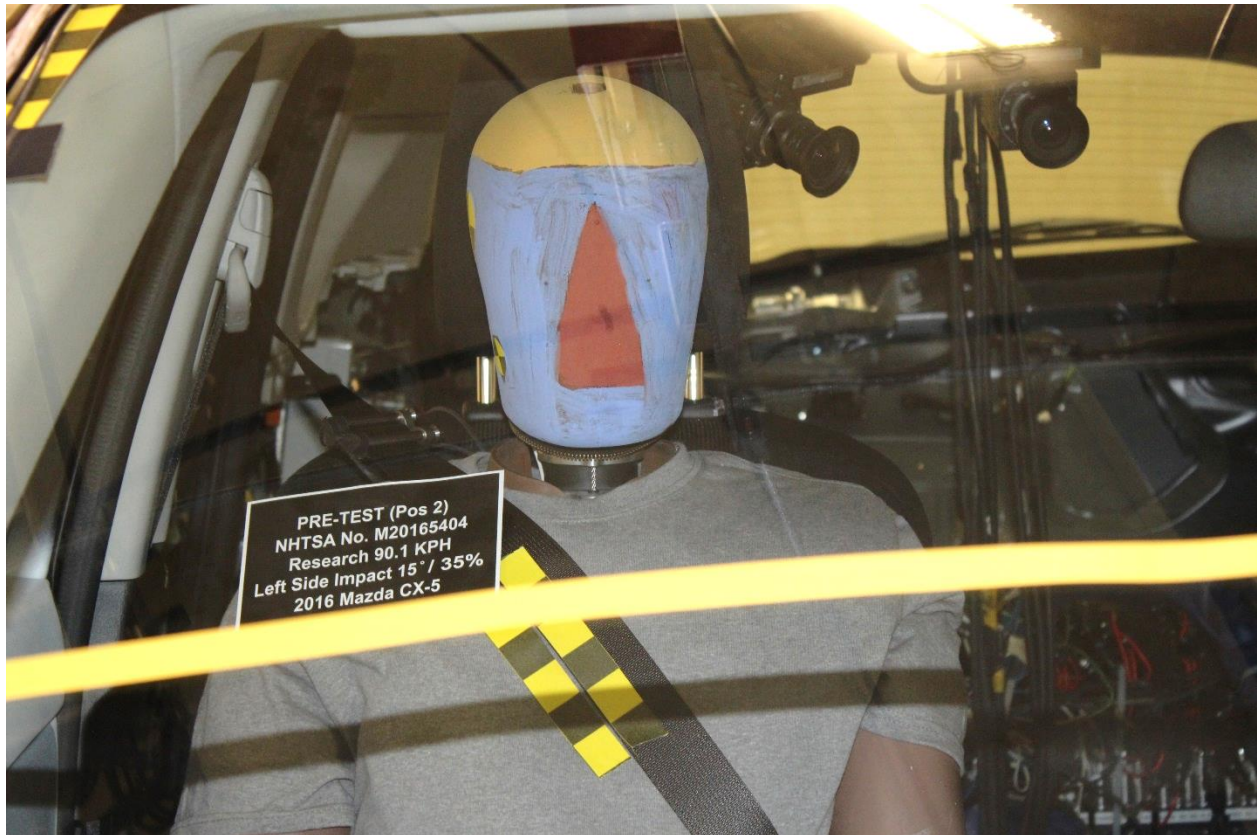
No. 091: Post-Test view of Passenger Floor pan at Mid seat level, w/carpet



No. 092: Pre-Test View of Passenger Floor pan at Left view



No. 093: Post-Test View of Passenger Floor pan at Left View



No. 094: Pre-Test Passenger Front Close-up View, Windshield



No. 095: Post-Test Passenger Front Close-up View, Windshield



No. 096: Pre-Test Left Side Passenger and Interior View



No. 097: Post-Test Left Side Passenger and Interior View



No. 98: Pre-Test Right Side Passenger Window View



No. 99: Post-Test Right Side Passenger Window View



No. 100: Pre-Test Right Side Passenger and Interior View



No. 101: Post-Test Right Side Passenger and Interior View



No. 102: Pre-Test View of Passenger Door Clearance



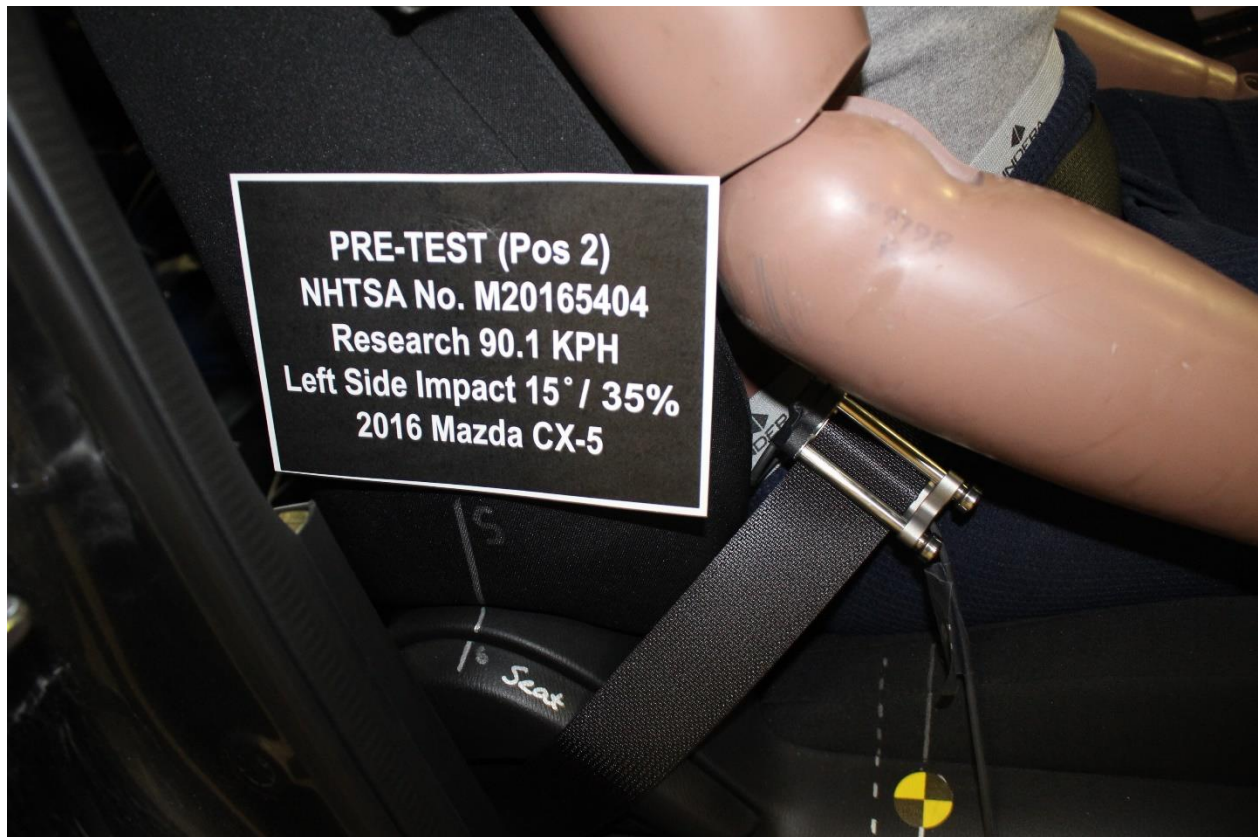
No. 103: Post-Test View of Passenger Door Clearance



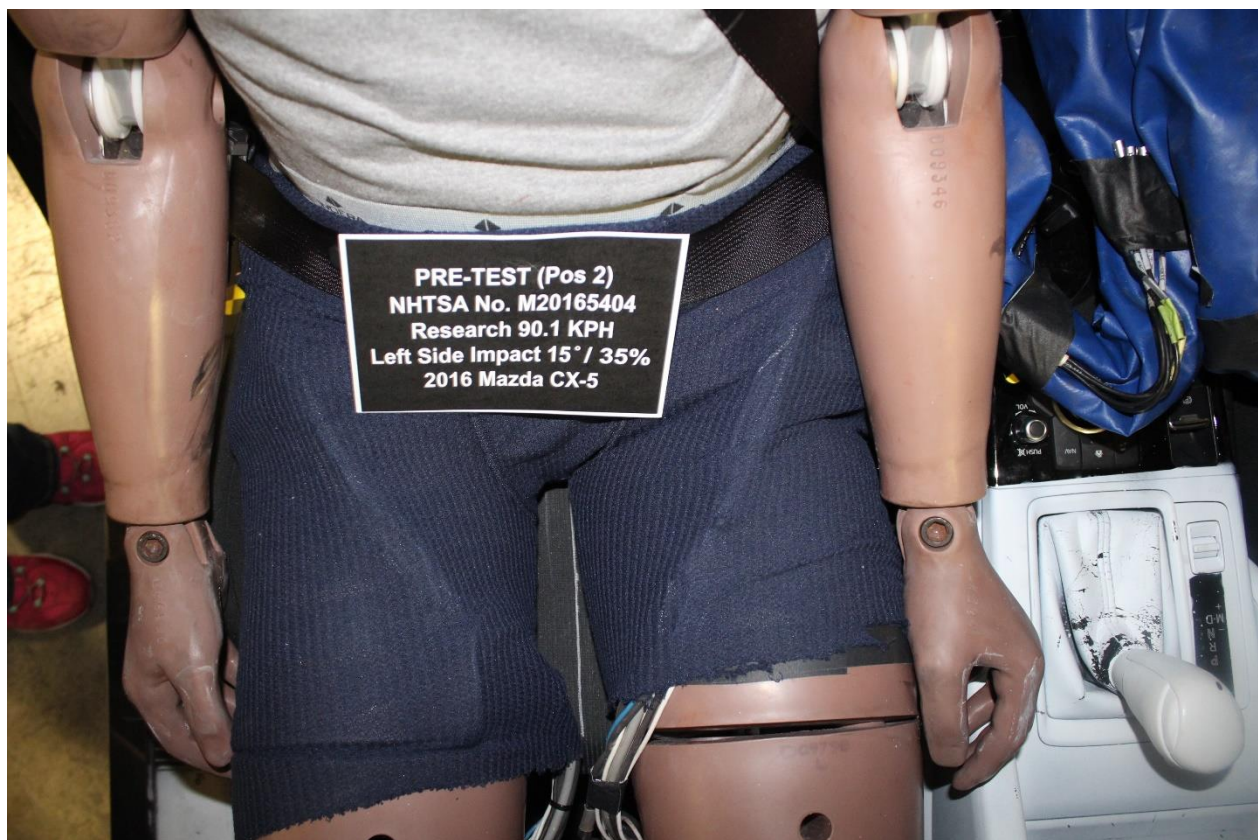
No. 104: Pre-Test Passenger Seat Fore-Aft Markings



No. 105: Post-Test Passenger Seat Fore-Aft Markings (plastic moved not seat)



No. 106: Pre-Test Passenger Seat Back Markings



No. 107: Pre-Test Overhead View of Passenger Thighs on seat



No. 108: Pre-Test Passenger Adjustable D-ring



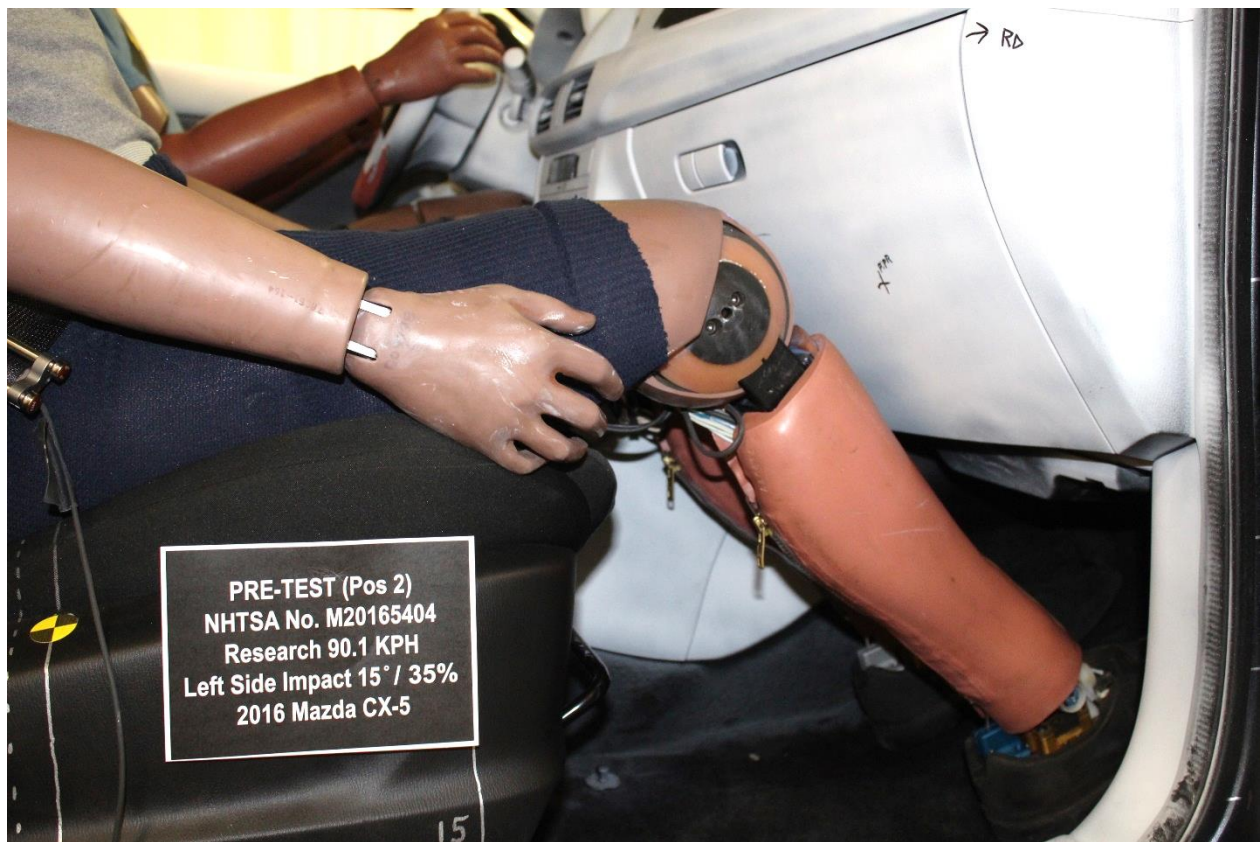
No. 109: Post-Test Passenger Adjustable D-ring



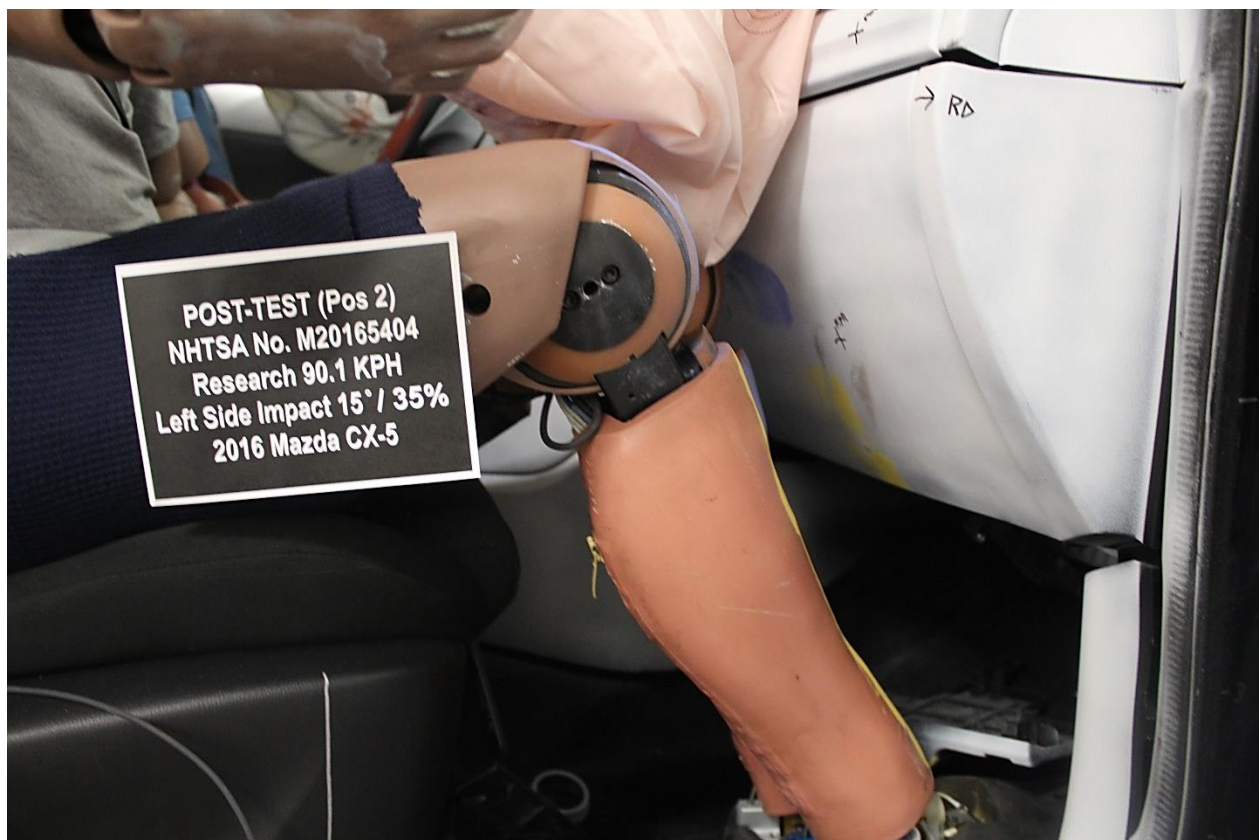
No. 110: Pre-Test View of Passenger Feet



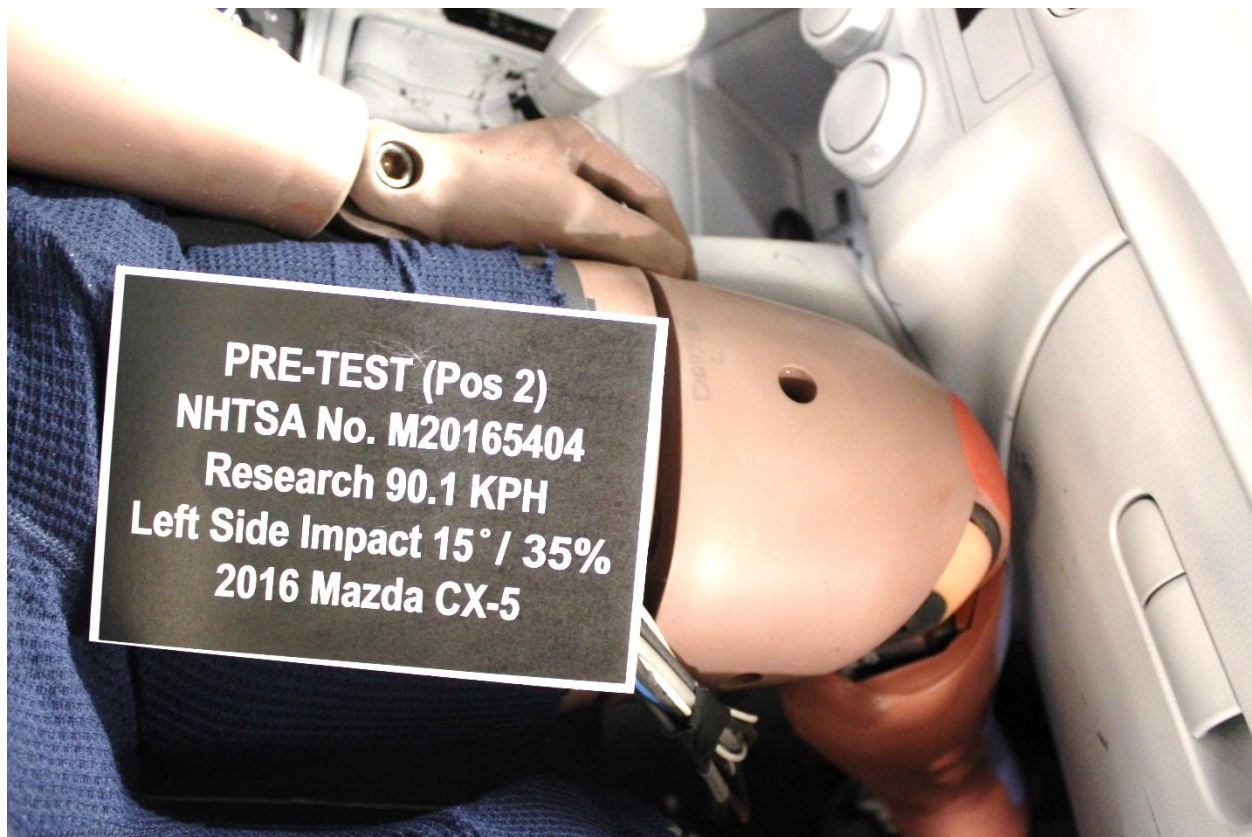
No. 111: Post-Test View of Passenger Feet



No. 112: Pre-Test View of Passenger Right Knee and Bolster



No. 113: Post-Test View of Passenger Right Knee and Bolster



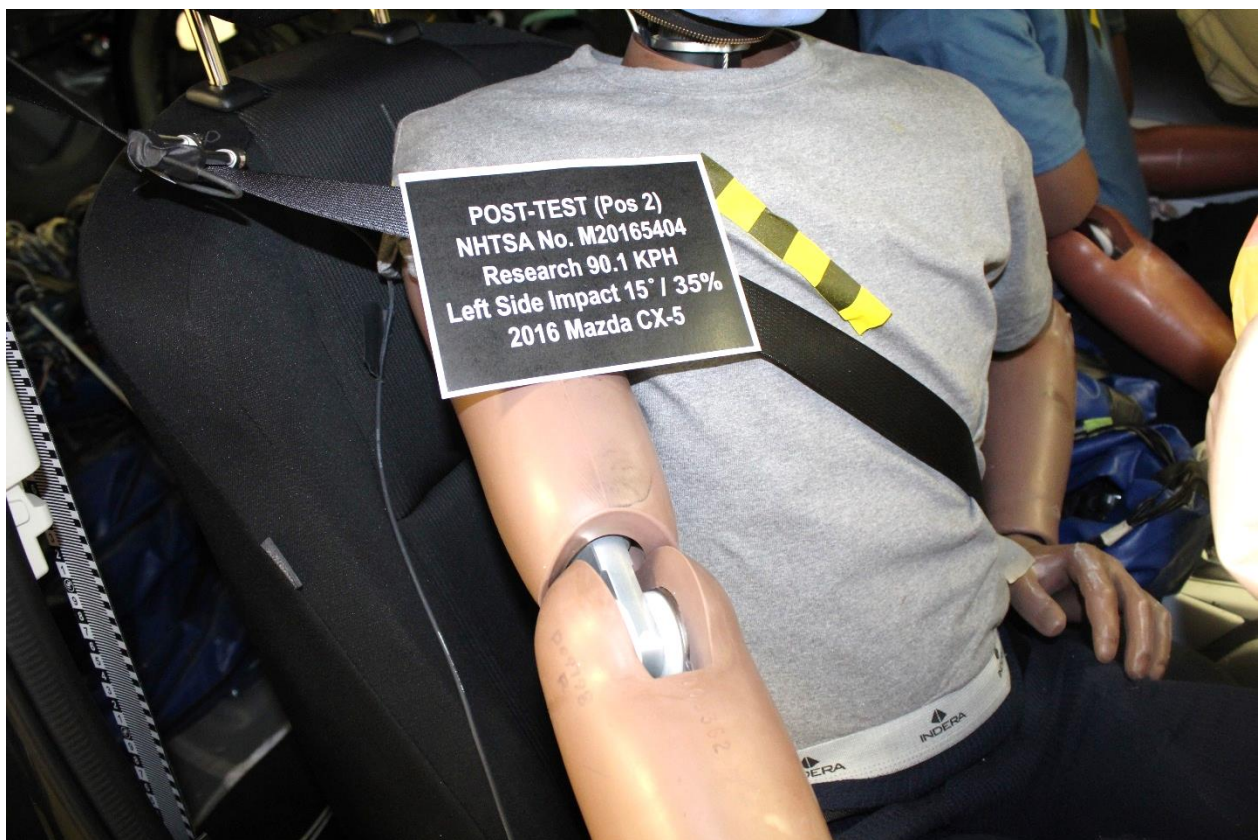
No. 114: Pre-Test View of Passenger Left Knee and Bolster



No. 115: Post-Test View of Passenger Left Knee and Bolster



No. 116: Pre-Test View of Passenger Abdomen



No. 117: Post-Test View of Passenger Abdomen



No. 118: Post-Test View of Passenger Head contact with Airbag – Front

Photo Not Applicable

No. 119: Post-Test View of Passenger Head contact with Airbag - Curtain

Photo Not Applicable

No. 120: Post-Test View of Passenger Head contact with Interior

Photo Not Applicable

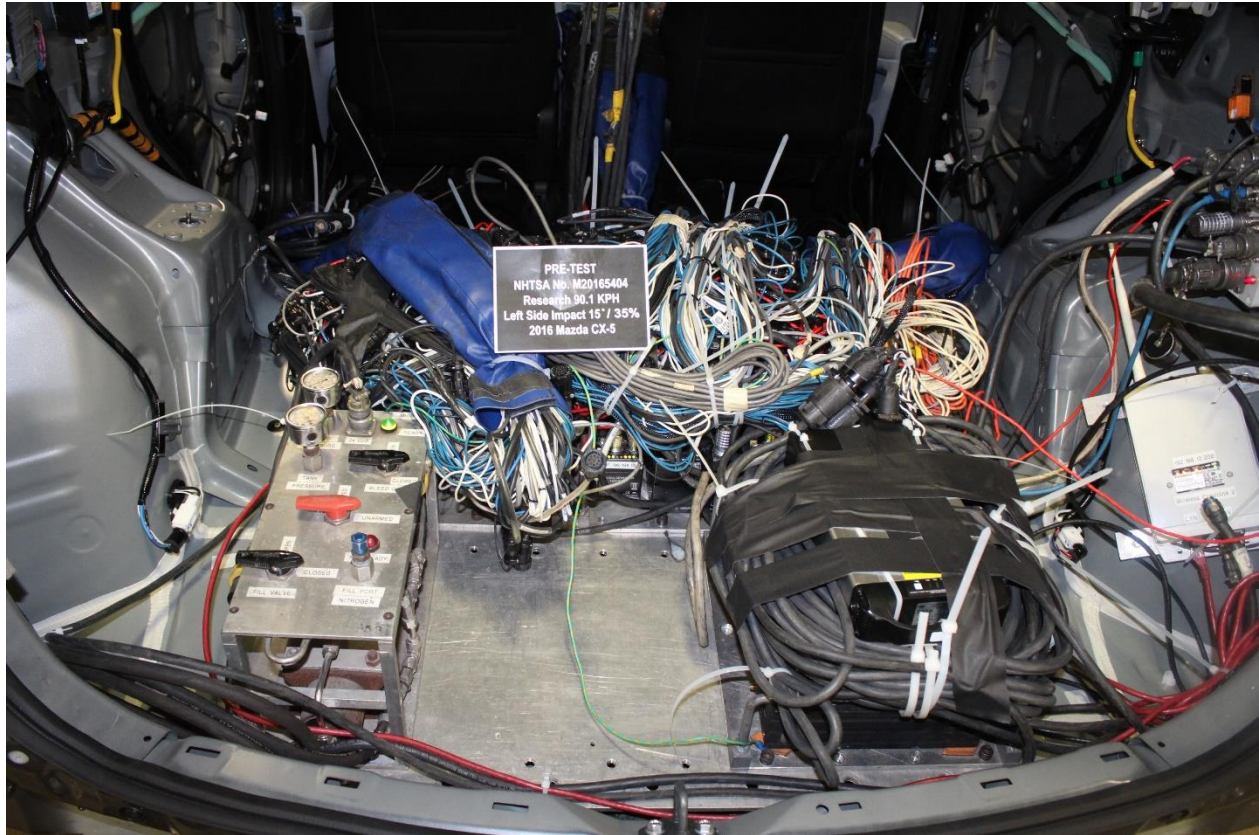
No. 121: Post-Test View of Passenger Body contact with Interior

Photo Not Applicable

No. 122: Post-Test View of Passenger Head contact with Interior



No. 123: Post-Test Passenger Contact With Glovebox



No. 124: Pre-Test Ballast Locations



No. 125: Post-Test Speed Trap Readout



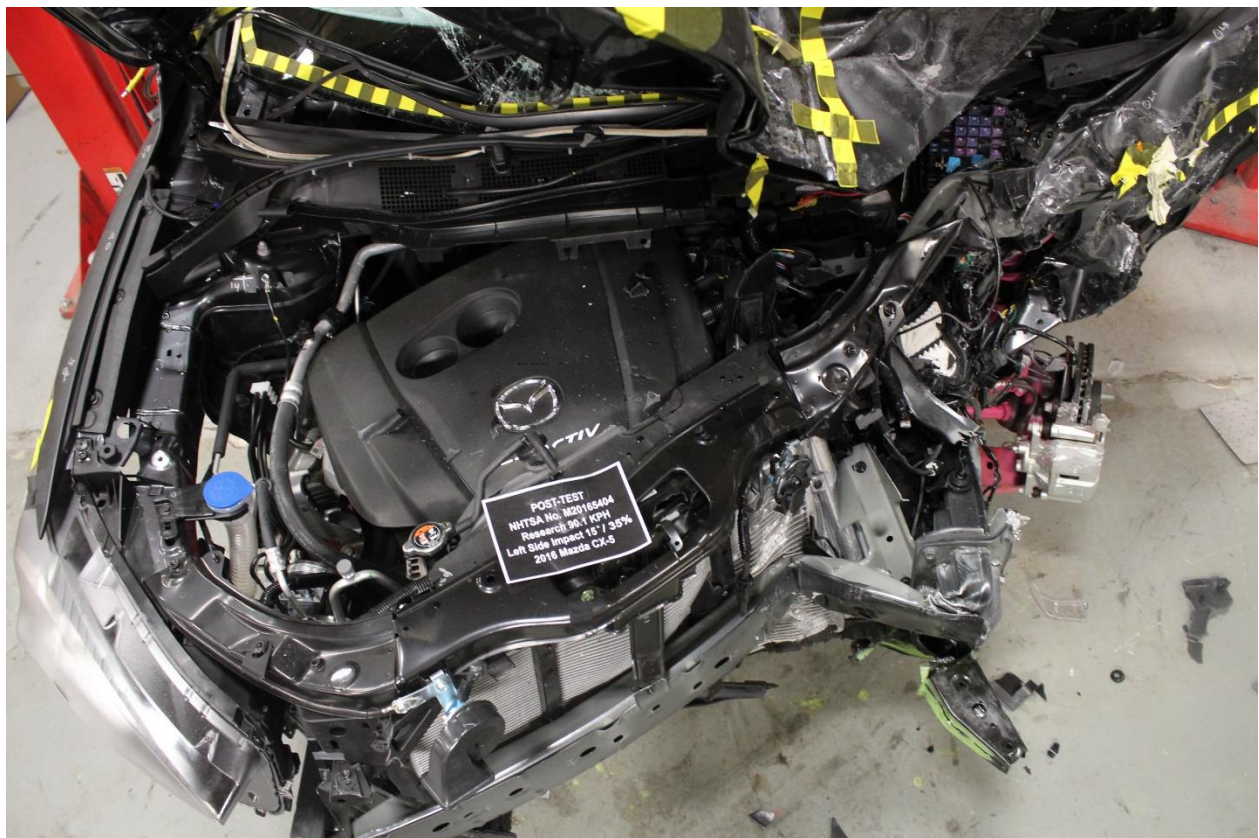
No. 126: Pre-Test View of Fuel Filler Cap



No. 127: Post-Test View of Fuel Filler Cap



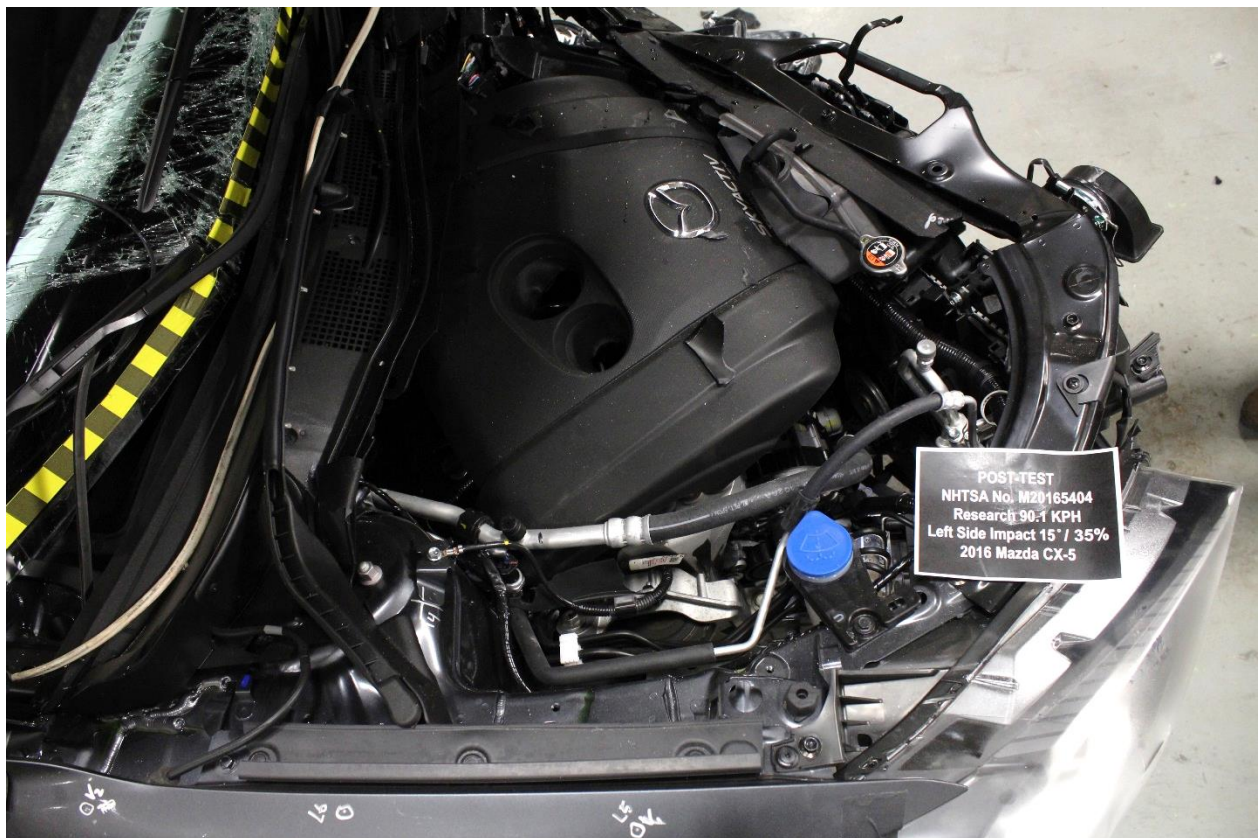
No. 128: Pre-Test Engine Compartment View



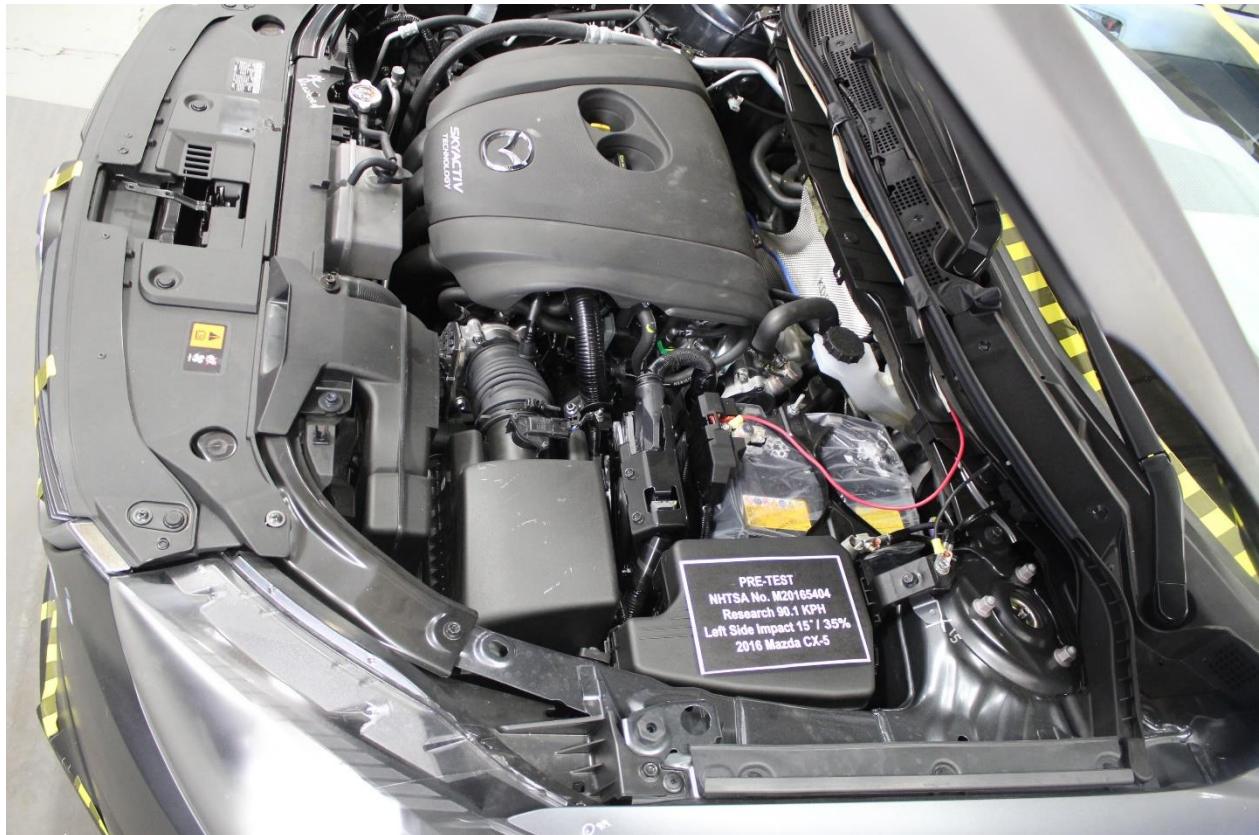
No. 129: Post-Test Engine Compartment View



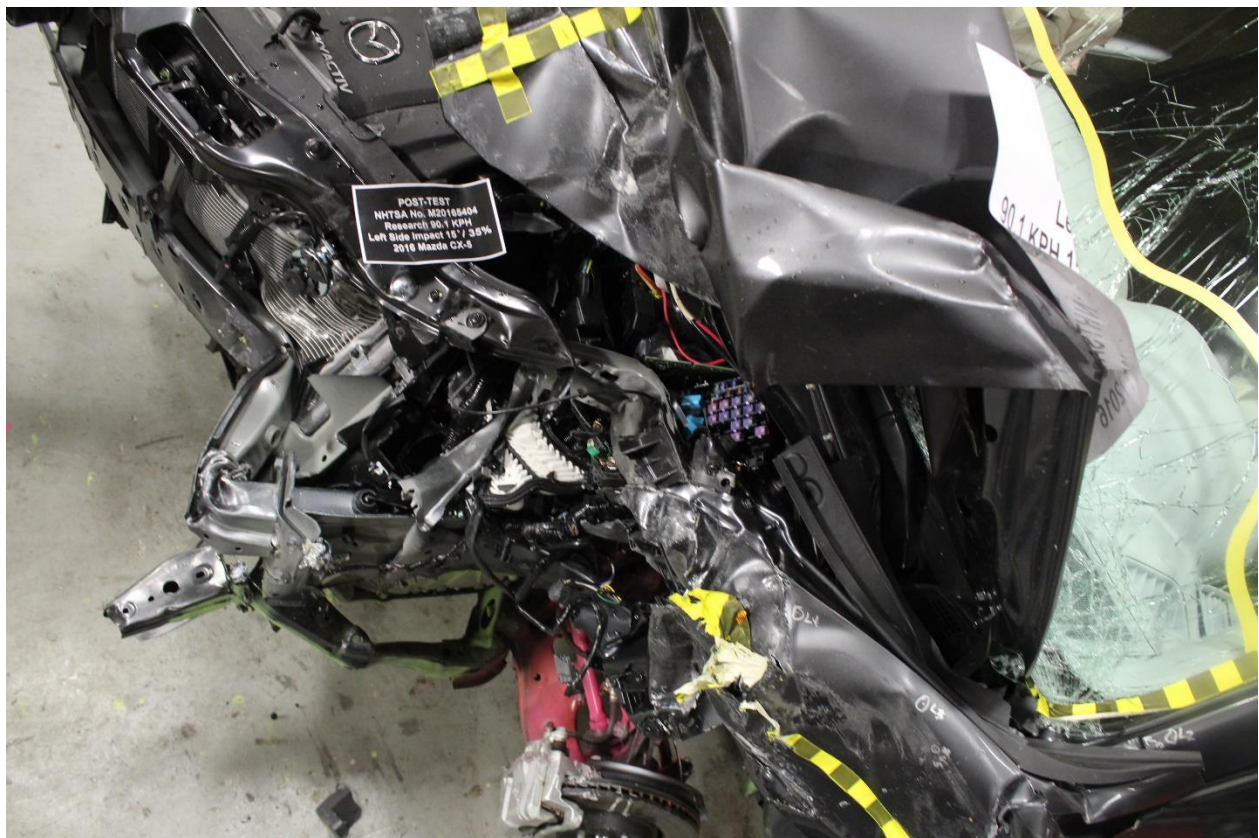
No. 130: Pre-Test Right Side Engine Compartment View



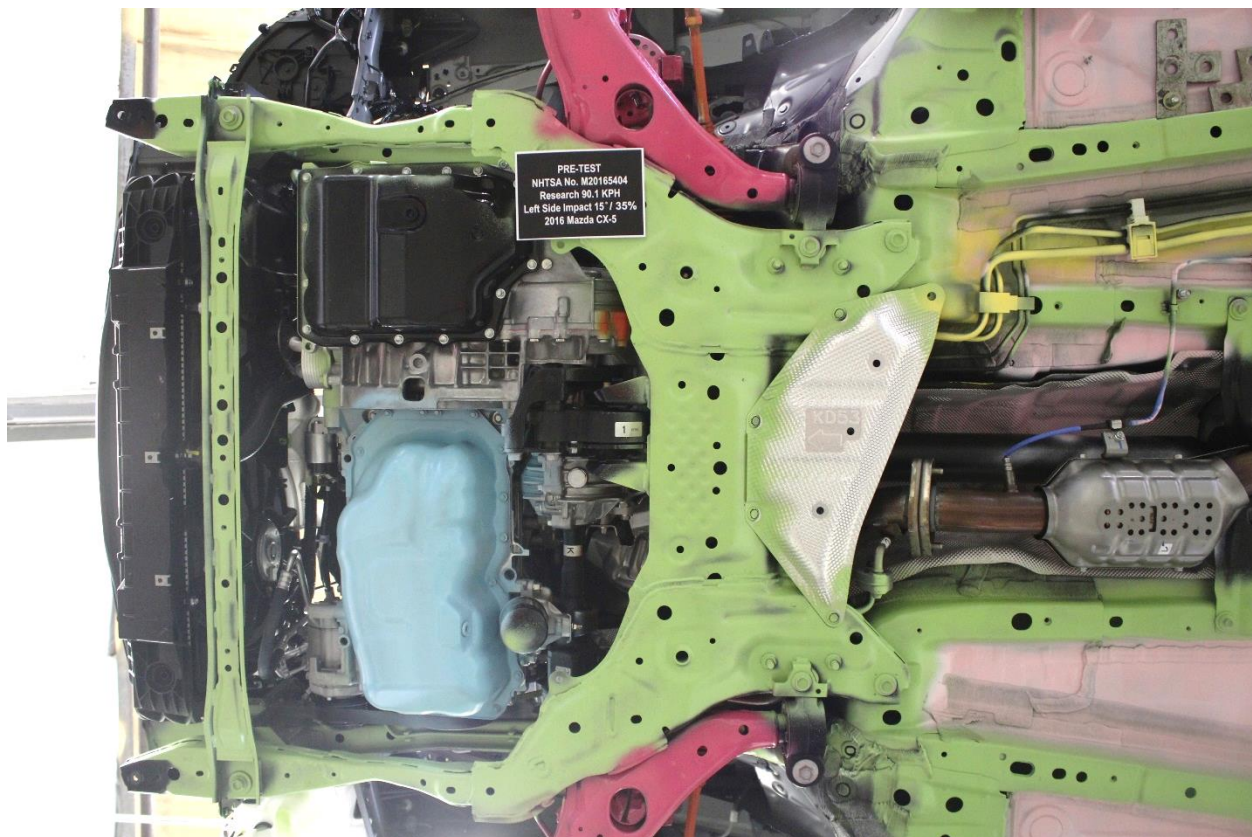
No. 131: Post-Test Right Side Engine Compartment View



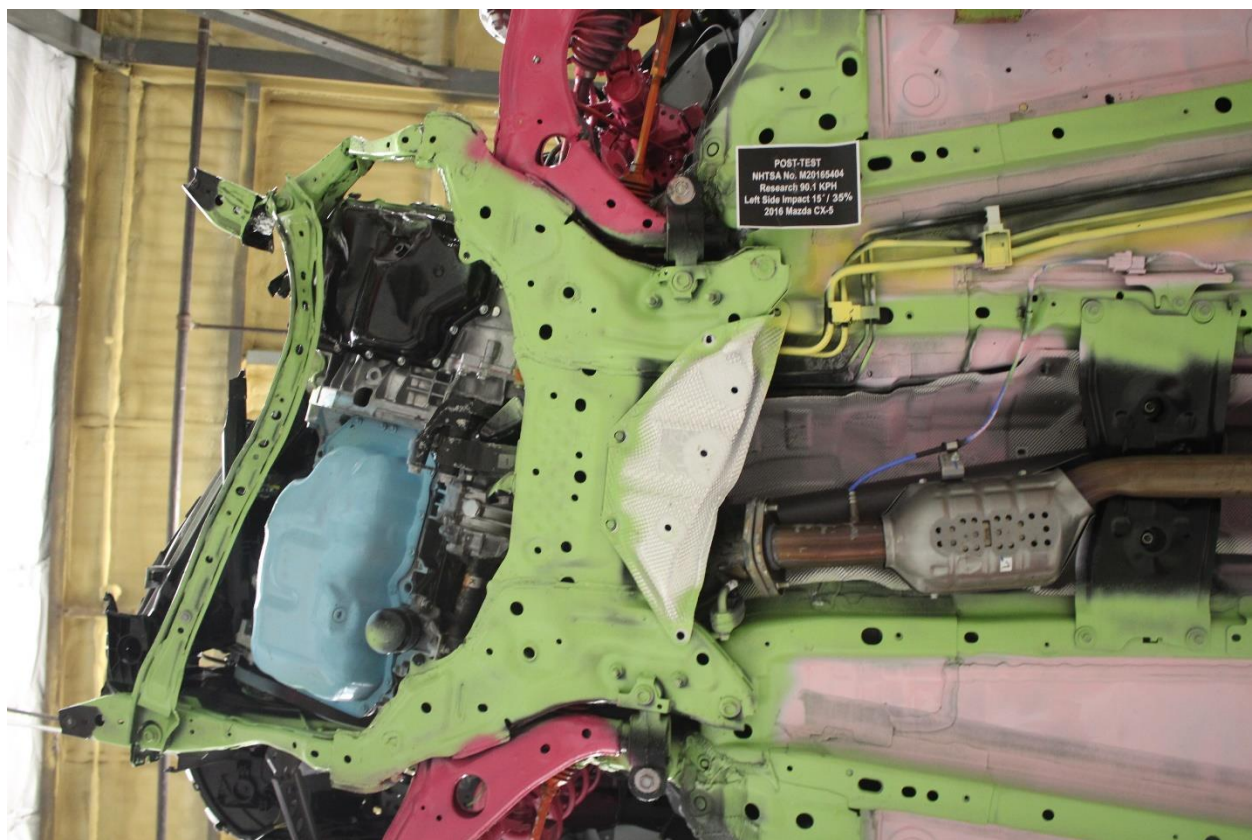
No. 132: Pre-Test Left Side Engine Compartment View



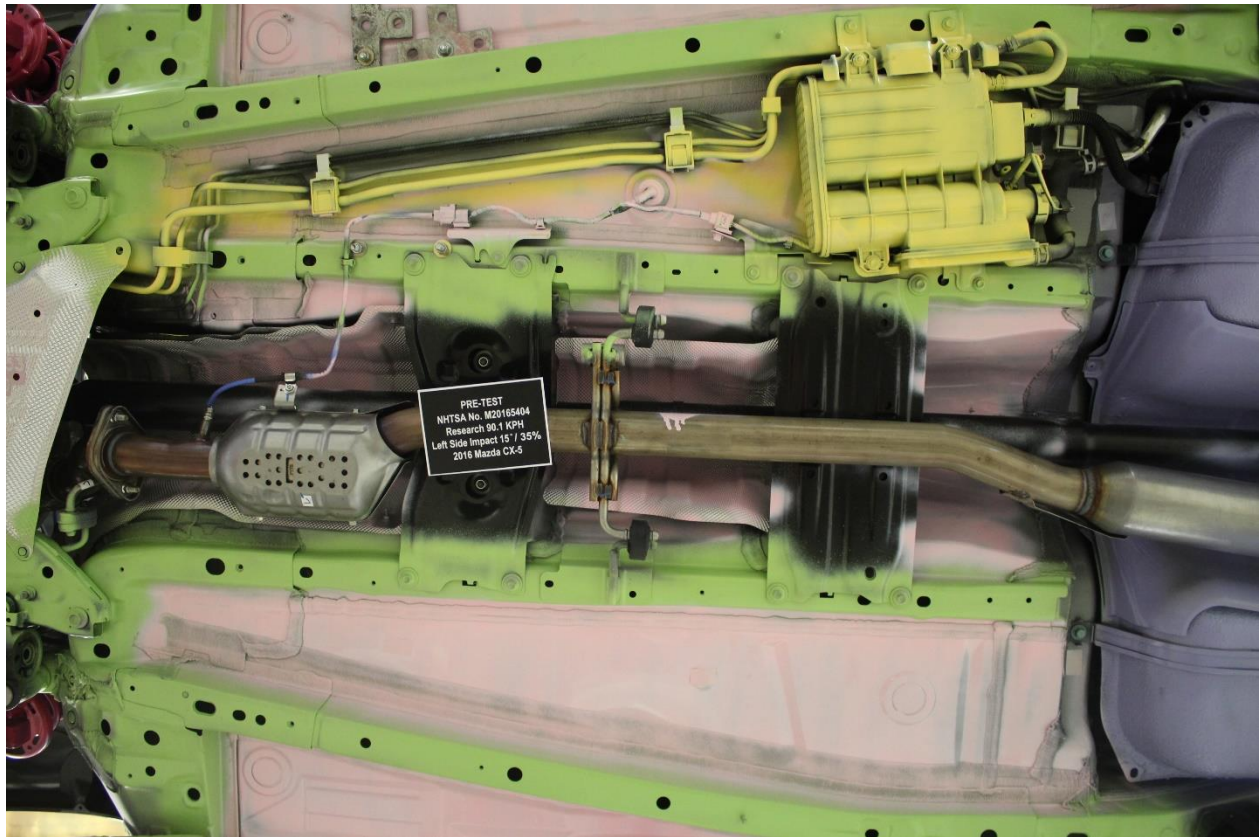
No. 133: Post-Test Left Side Engine Compartment View



No. 134: Pre-Test View of Front Underbody (perpendicular to vehicle)



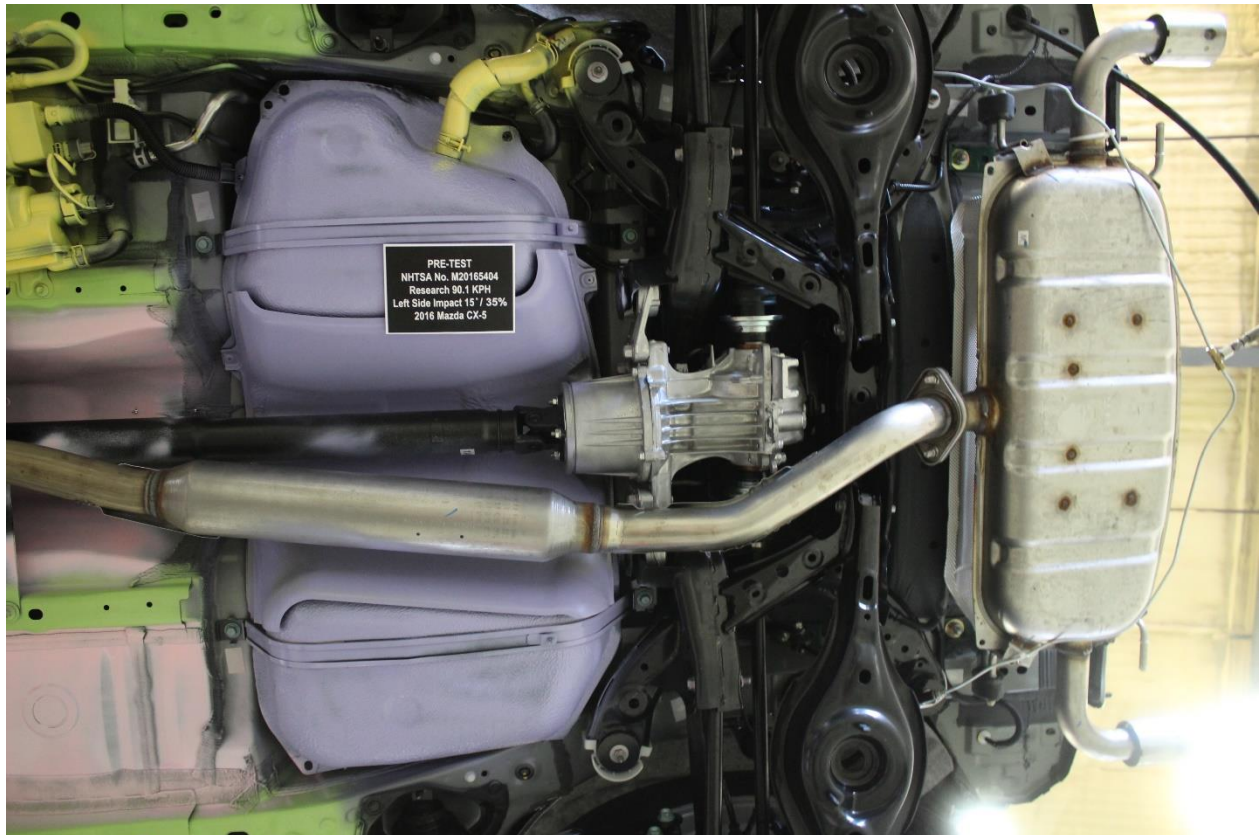
No. 135: Post-Test View of Front Underbody (perpendicular to vehicle)



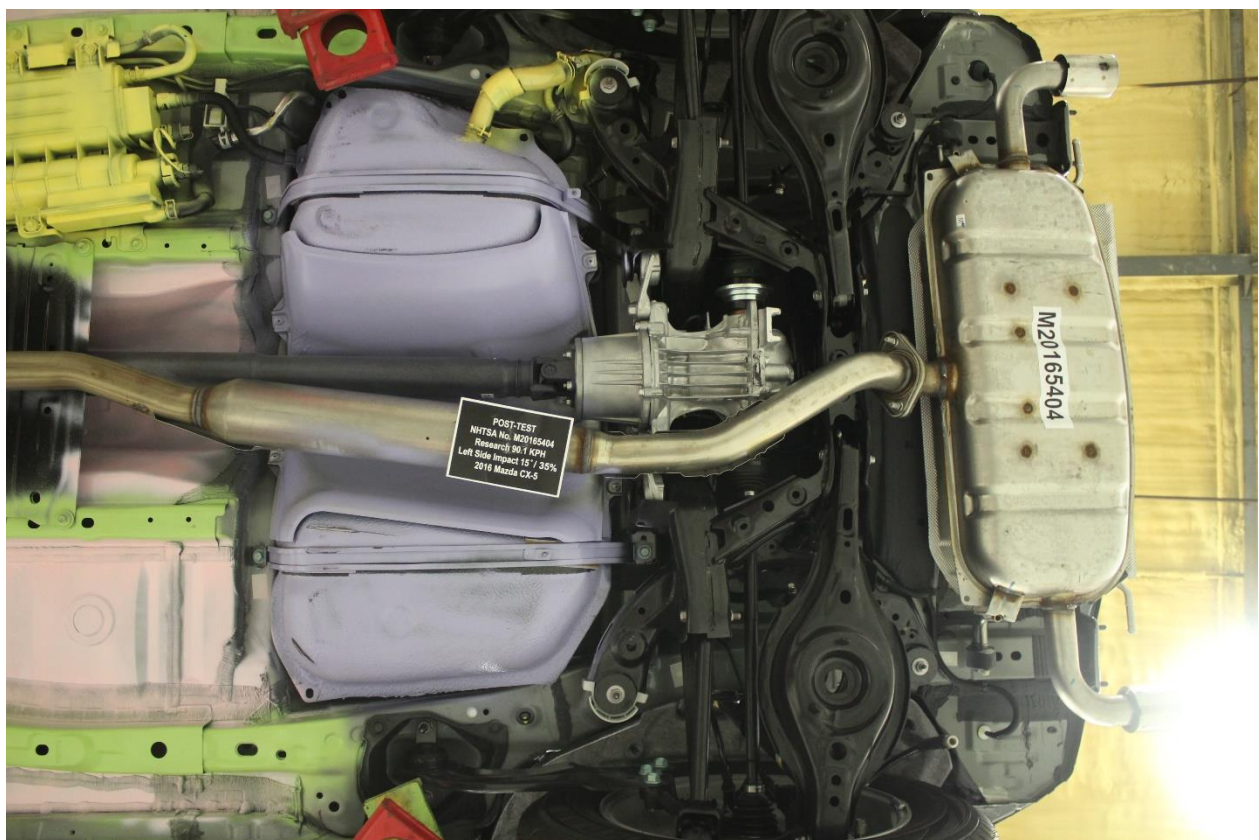
No. 136: Pre-Test View of Mid Underbody (perpendicular to vehicle)



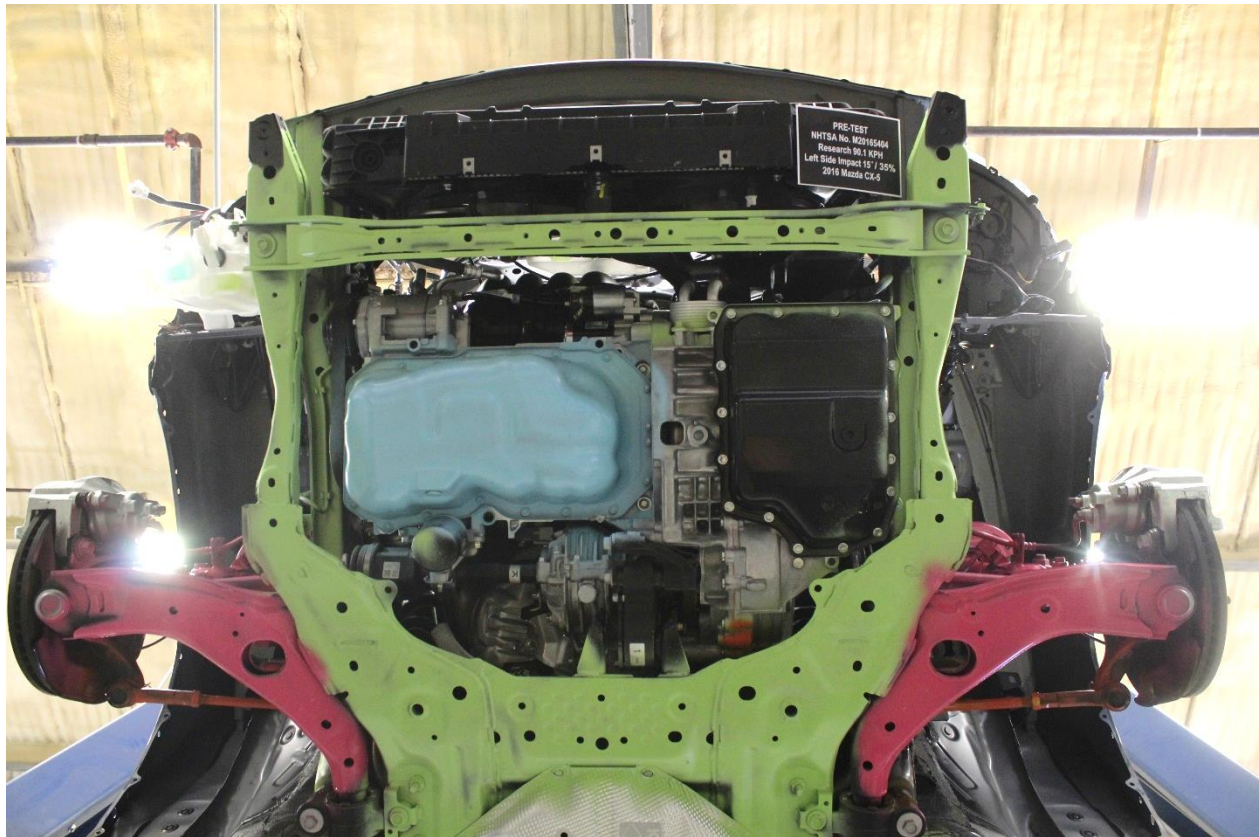
No. 137: Post-Test View of Mid Underbody (perpendicular to vehicle)



No. 138: Pre-Test View of Rear Underbody (perpendicular to vehicle)



No. 139: Post-Test View of Rear Underbody (perpendicular to vehicle)



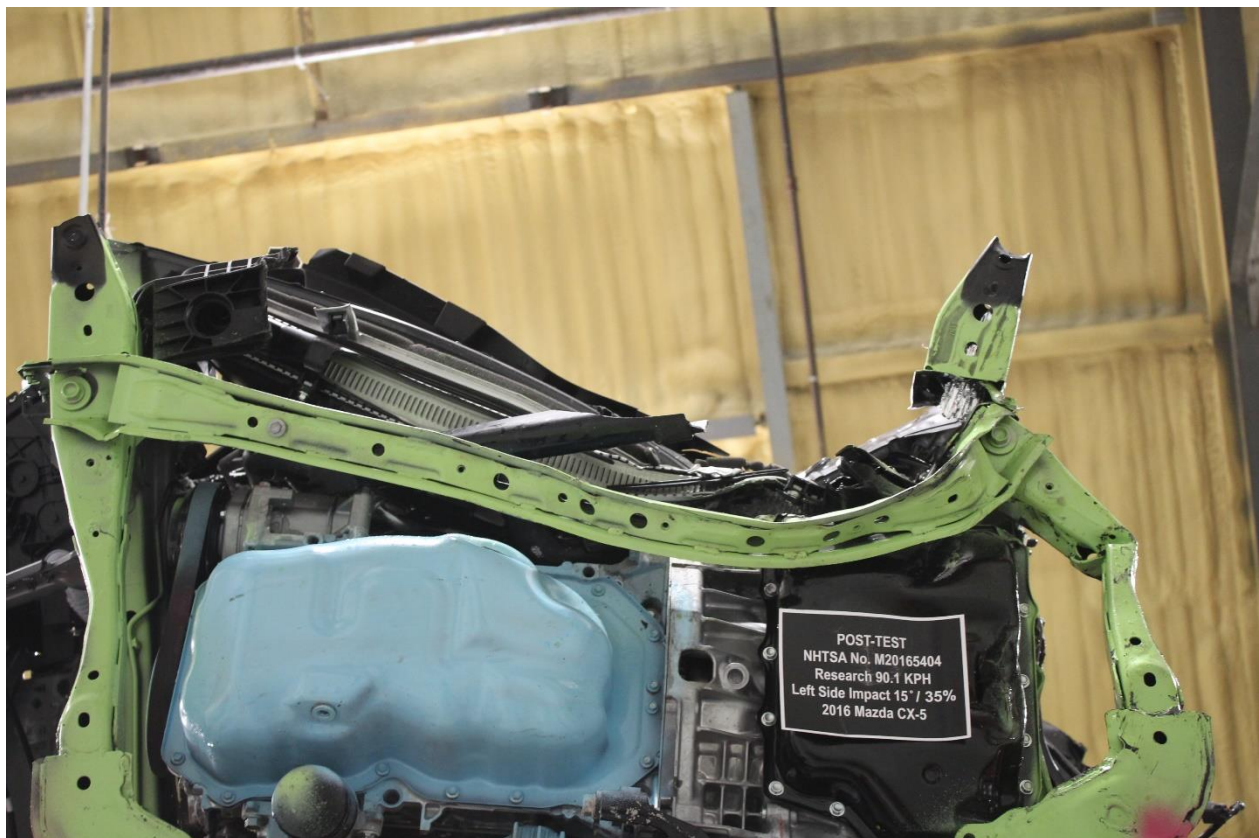
No. 140: Pre-Test View of Steering rack and or sway bar



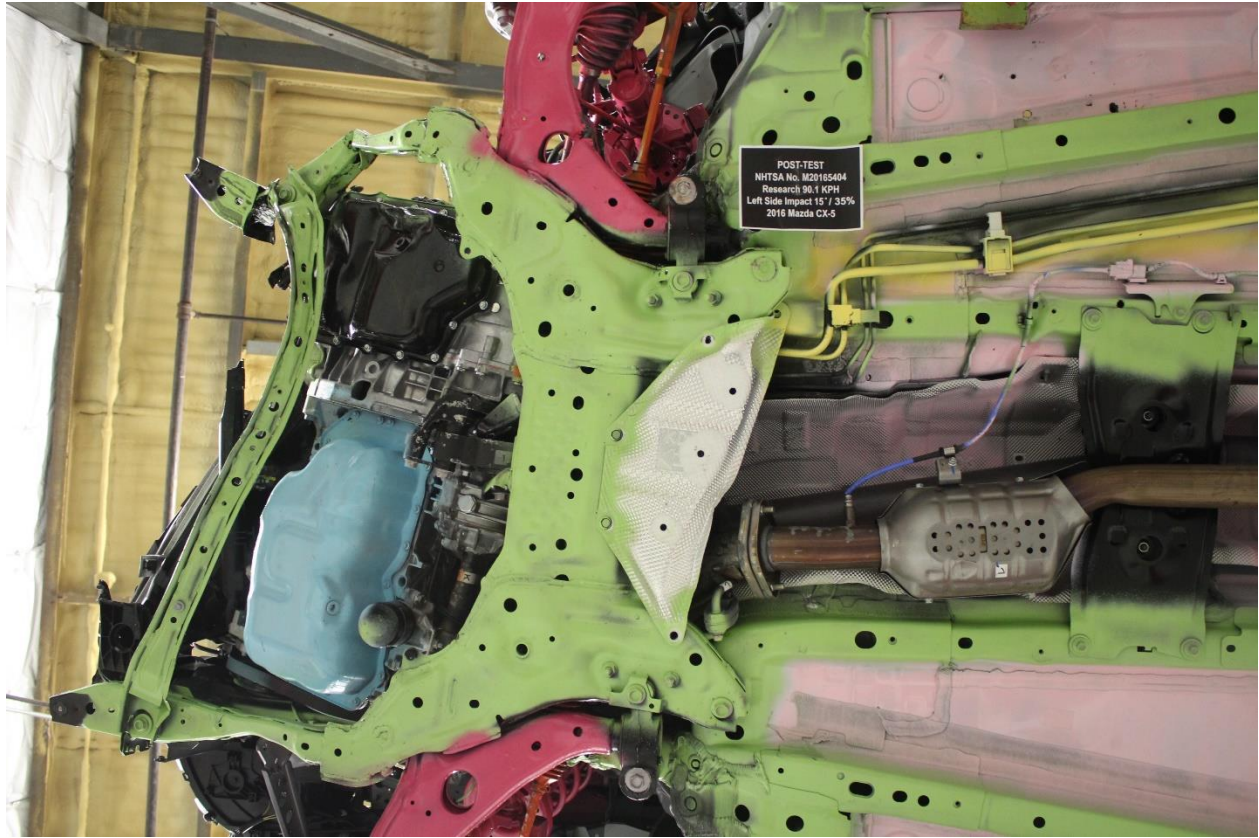
No. 141: Post-Test View of Steering rack and or sway bar



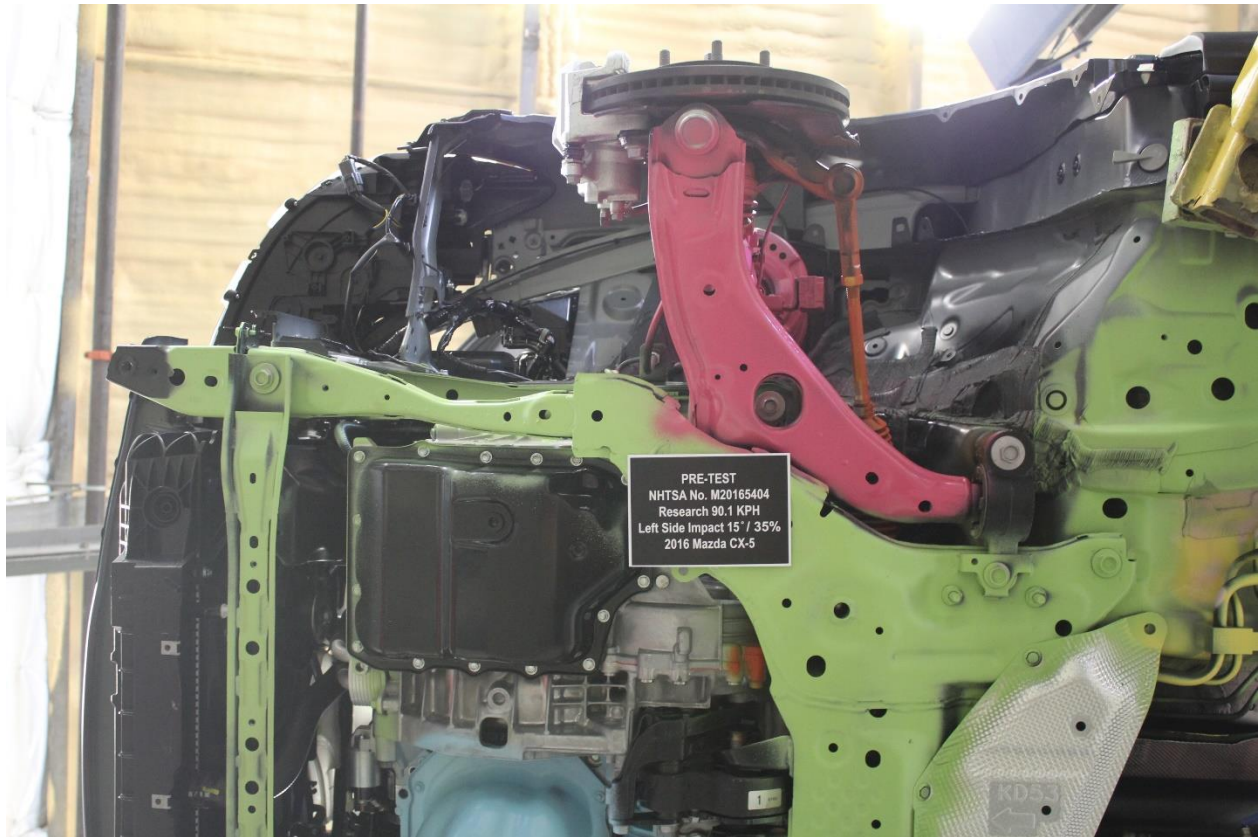
No. 142: Pre-Test Bumper to Rail Attachments and Crush Initiators



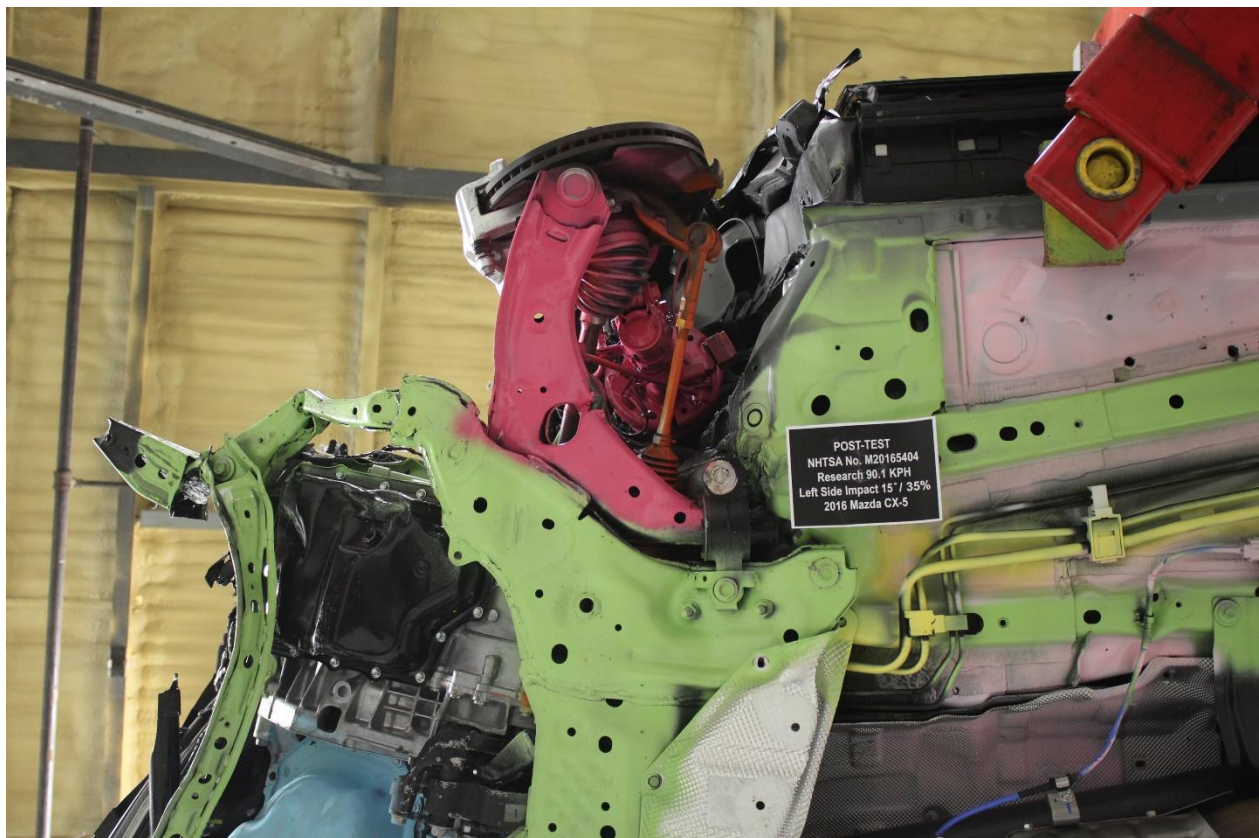
No. 143: Post-Test Bumper to Rail Attachments and Crush Initiators



No. 144: Post-Test View of Front Sub-Frame Deformation



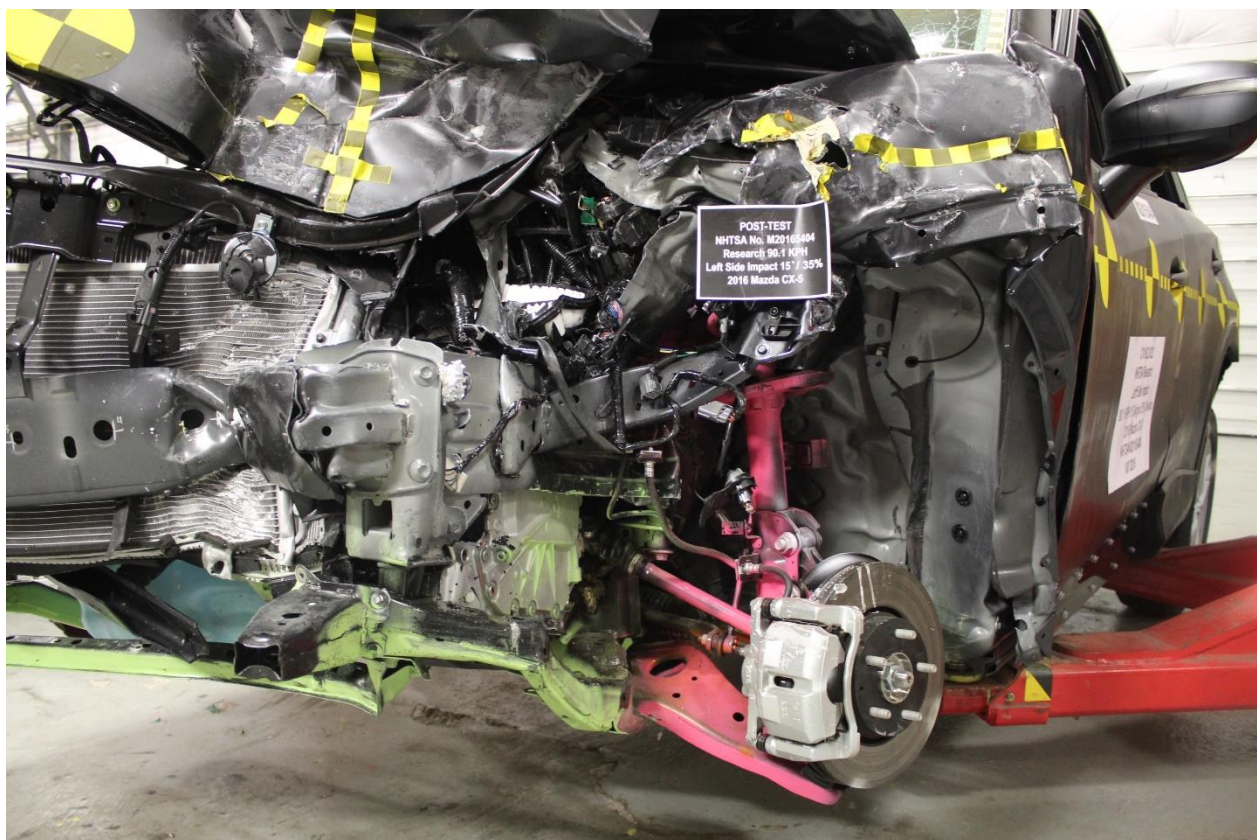
No. 145: Pre-Test Frame Rail with tire removed



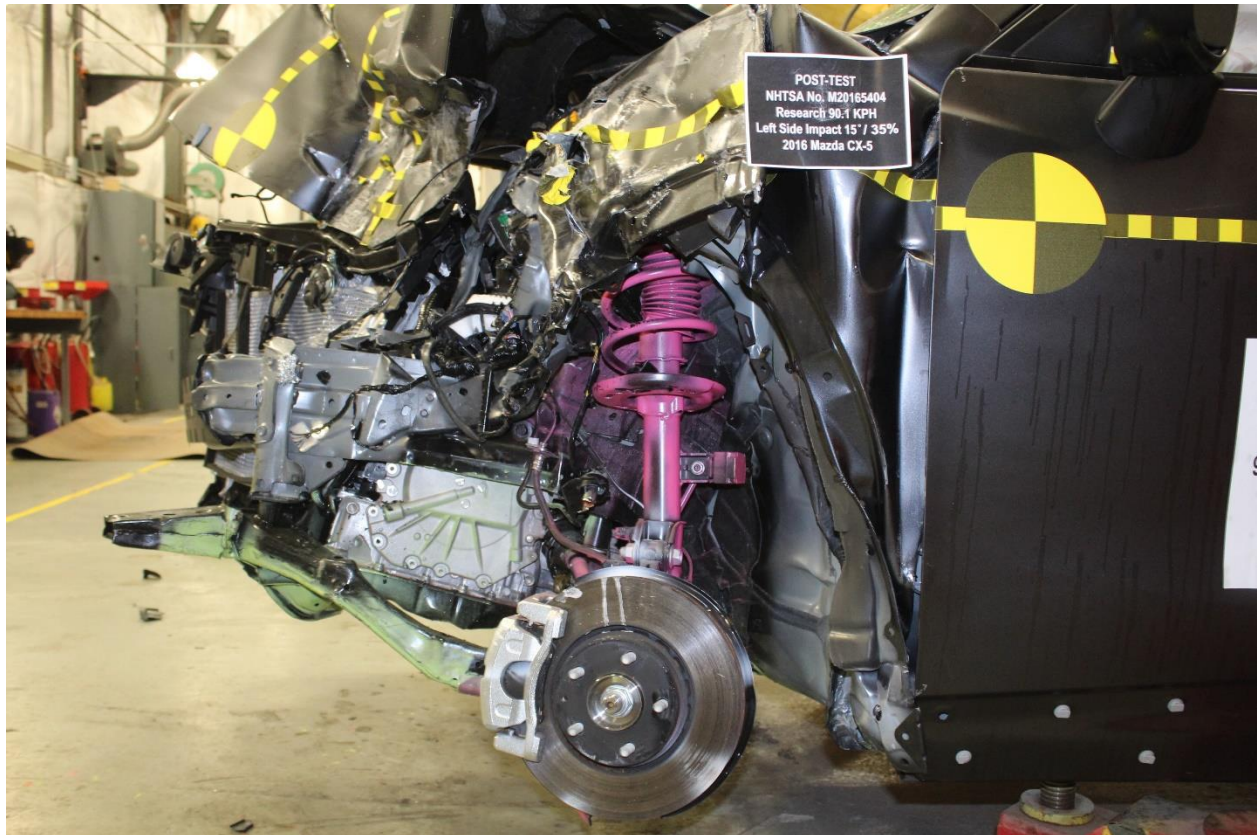
No. 146: Post-Test Frame Rail with tire removed



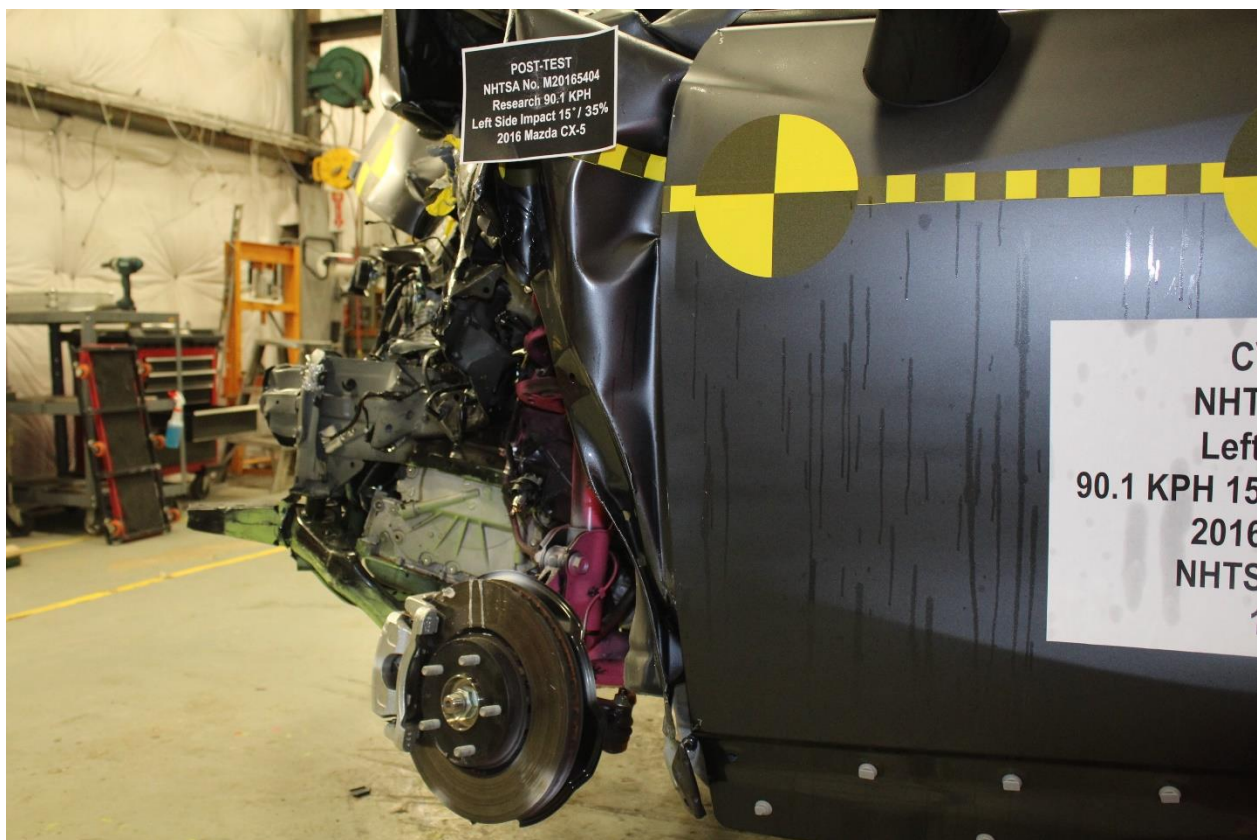
No. 147: Pre-Test View of Front Driver Wheel Well w/ Tire Removed



No. 148: Post-Test ¾ View of Front Driver Wheel Well w/ Tire Removed



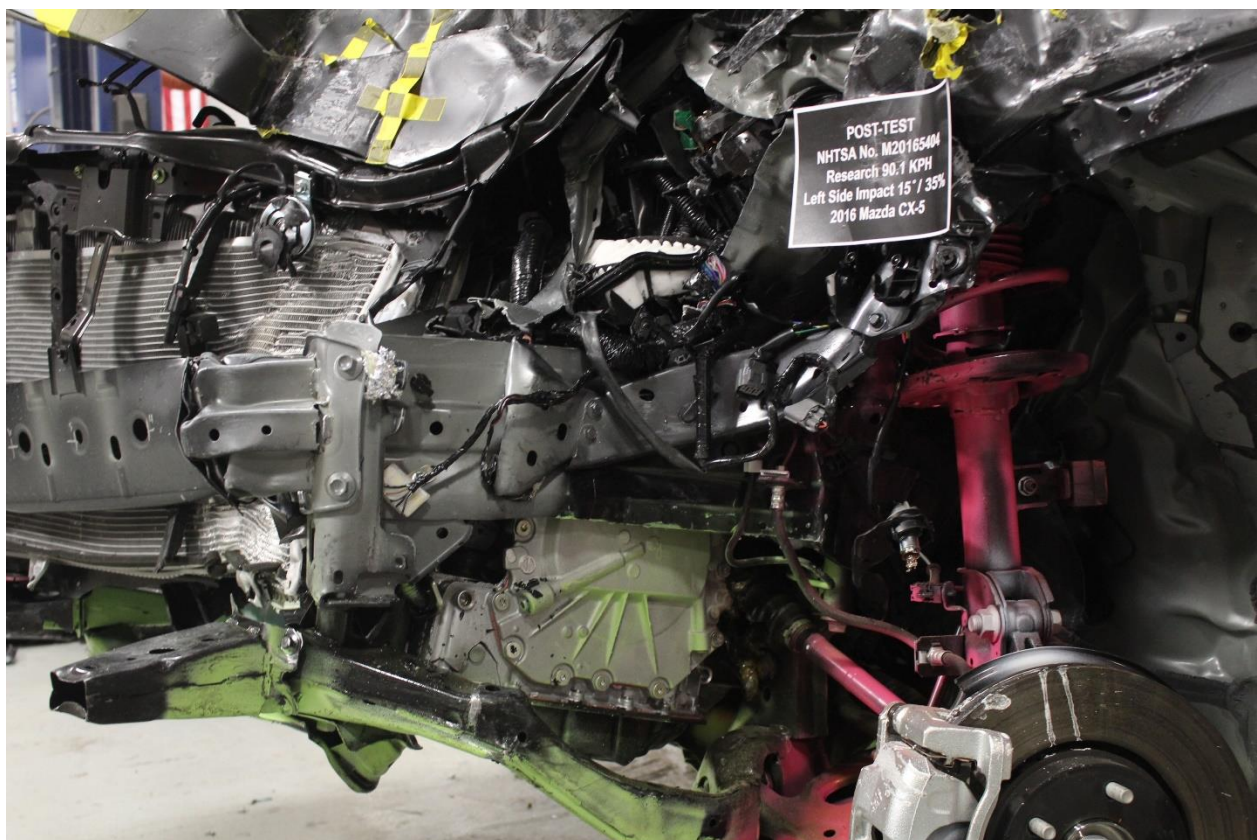
No. 149: Post-Test Side View of Front Driver Wheel Well w/ Tire Removed



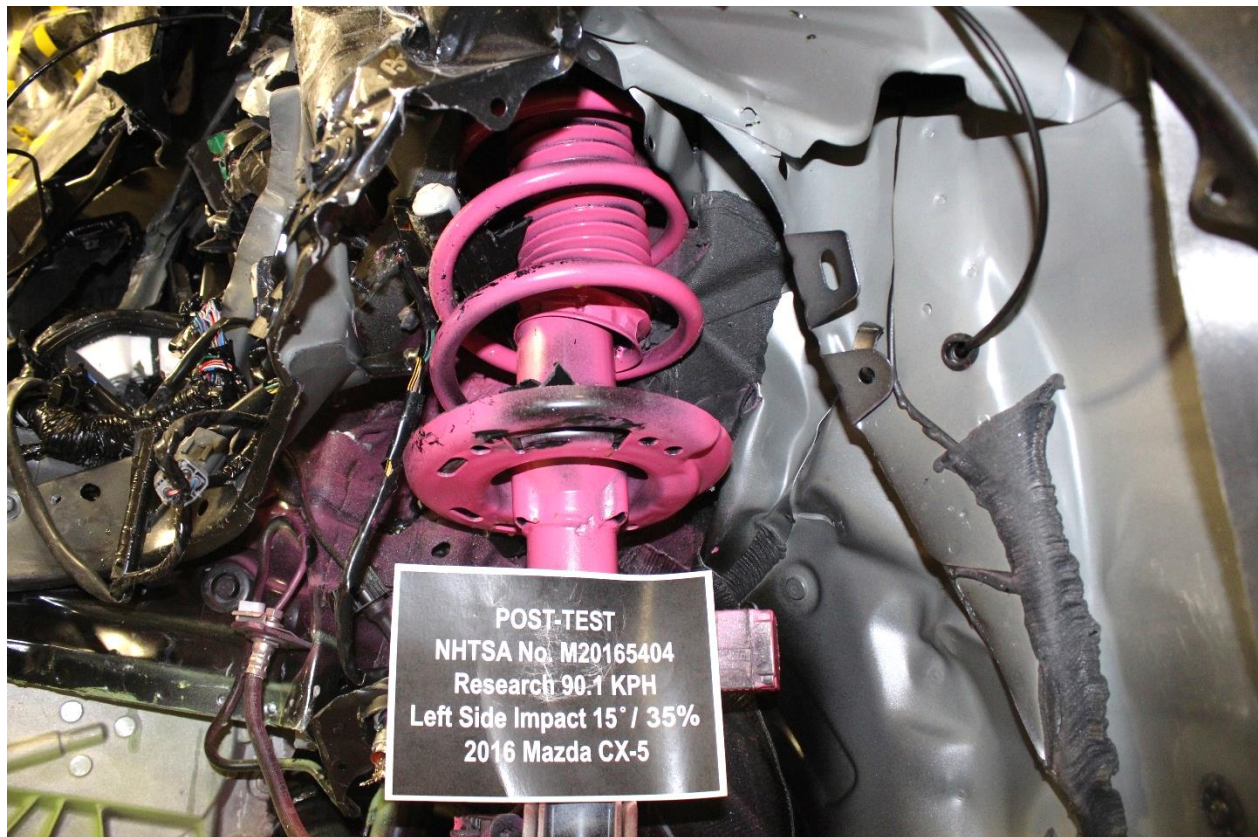
No. 150: Post-Test Right Side 3/4 Rear View of the Front Driver Wheel Well w/ Tire Removed



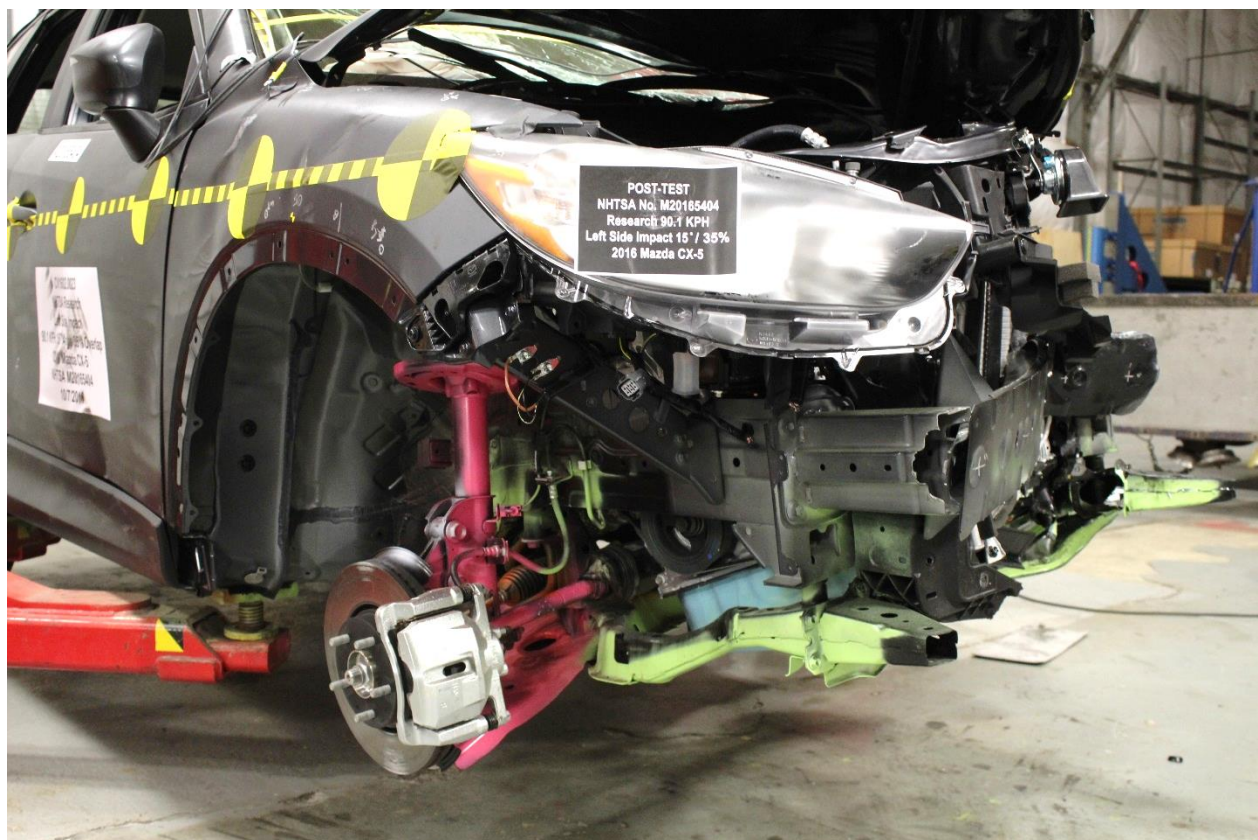
No. 151: Post-Test Looking Down at the Front Driver Shotgun



No. 152: Post-Test Right Side $\frac{3}{4}$ View of Front Driver Shotgun



No. 153: Post-Test Front Driver Close up View of Suspension w/ Tire Removed



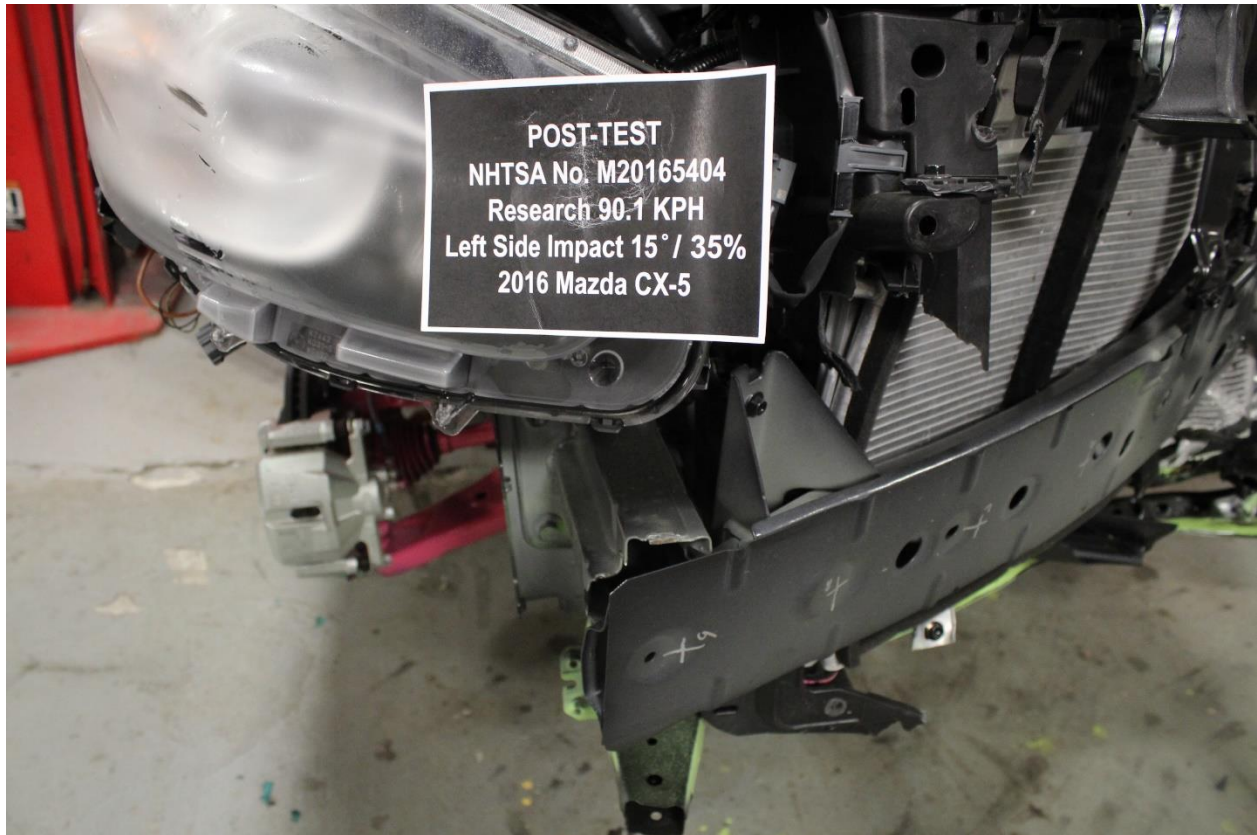
No. 154: Post-Test ¾ View of Front Passenger Wheel Well w/ Tire Removed



No. 155: Post-Test Side View of Front Passenger Wheel Well w/ Tire Removed



No. 156: Post-Test Right Side 3/4 Rear View of the Front Passenger Wheel Well w/ Tire Removed



No. 157: Post-Test Looking Down at the Front Passenger Shotgun



No. 158: Post-Test Right Side $\frac{3}{4}$ View of Front Passenger Shotgun



No. 159: Post-Test Front Passenger Close up View of Suspension w/ Tire Removed



No. 160: Post-Test View of Door Sill with Door Open- Struck Side



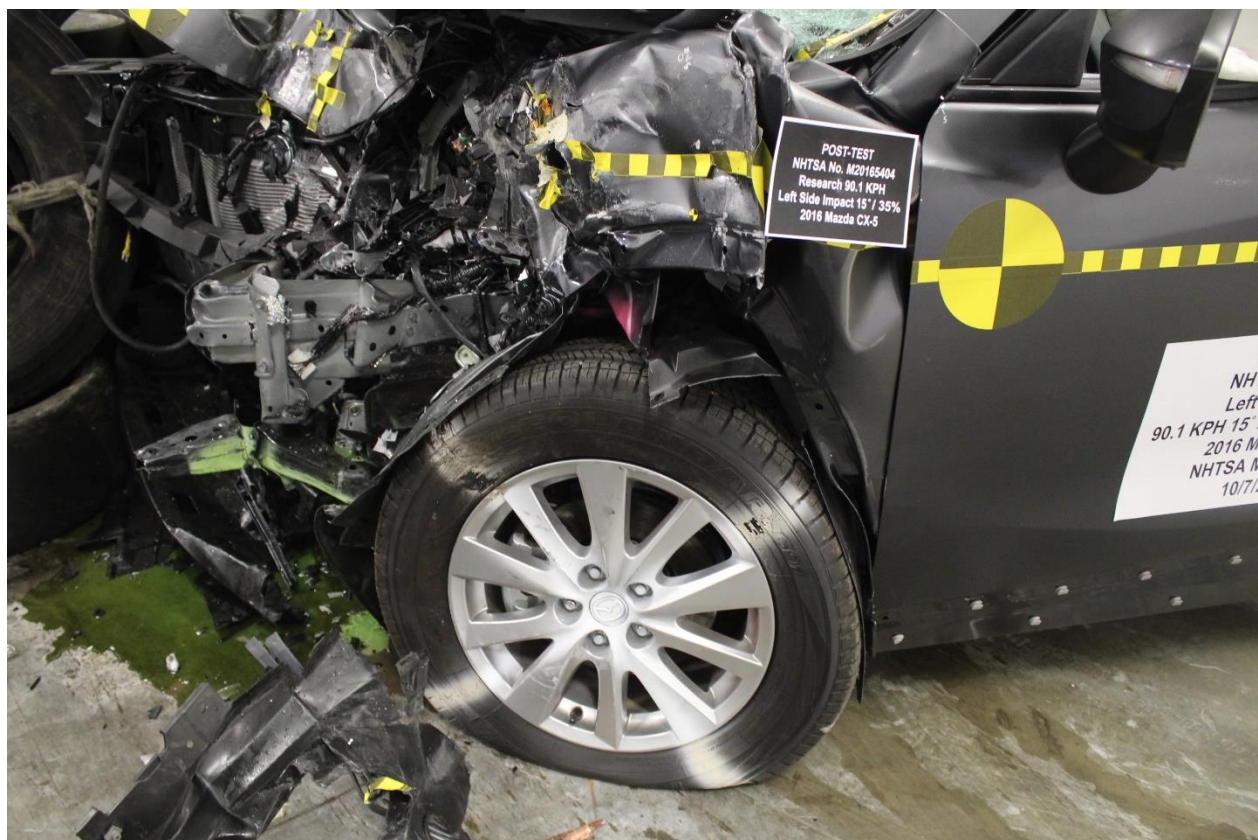
No. 161: Post-Test View of Deformation of A pillar-Struck Side



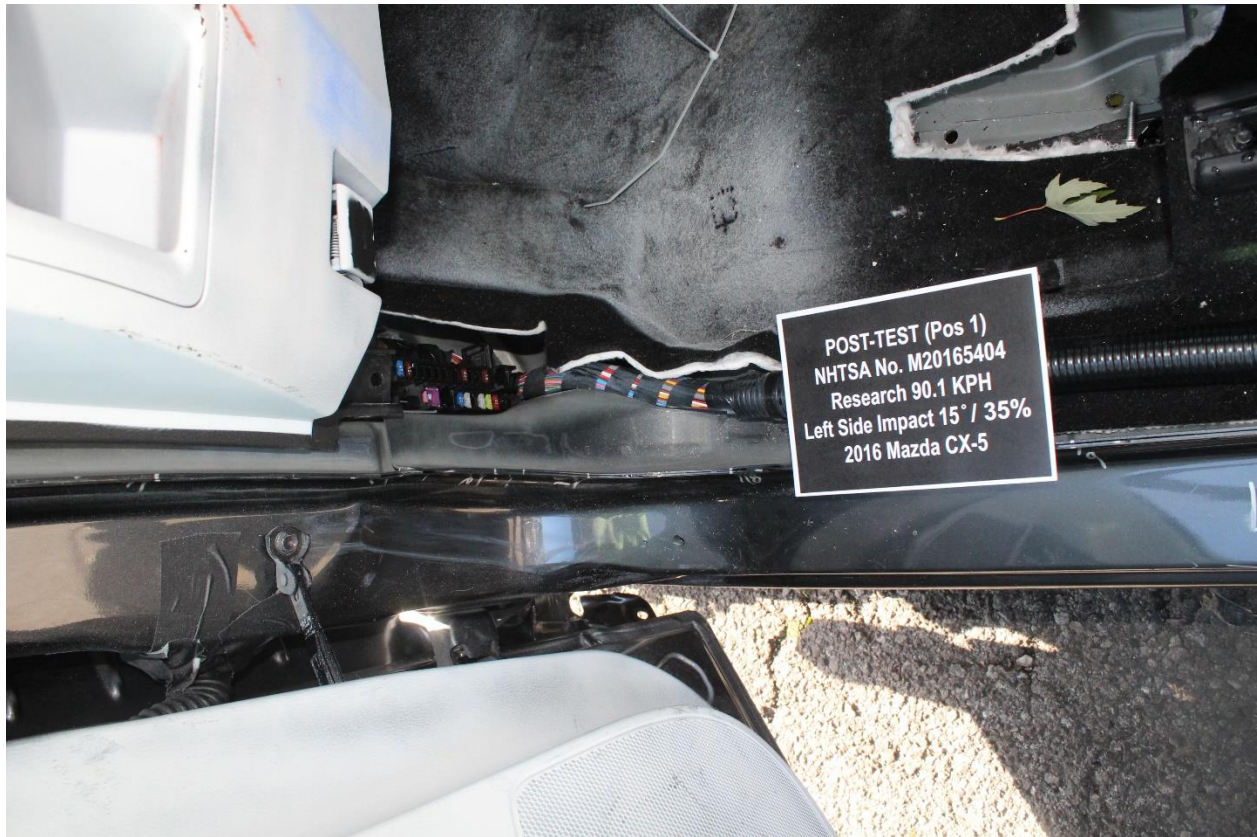
No. 162: Post-Test View of Deformation of B pillar-Struck Side



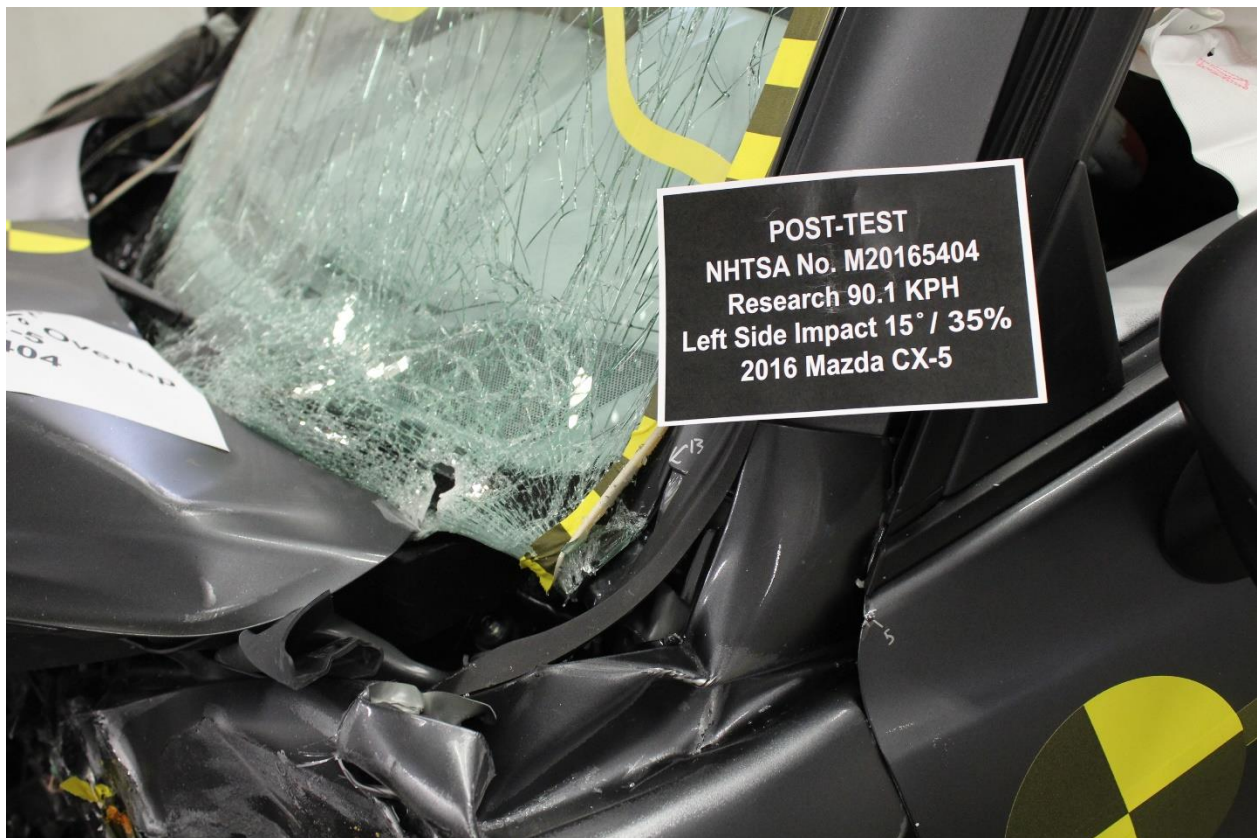
No. 163: Post-Test View of Deformation of C pillar-Struck Side



No. 164: Post-Test View of Wheel and/or Tire Deformation-Struck Side



No. 165: Post-Test View of Deformation of Rocker or Post-Struck Side



No. 166: Post-Test View of Windshield Separation



No. 167: Pre-Test Left Side View of OMDB



No. 168: Post-Test Left Side View of OMDB



No. 169: Pre-Test Right Side View of OMDB



No. 170: Post-Test Right Side View of OMDB



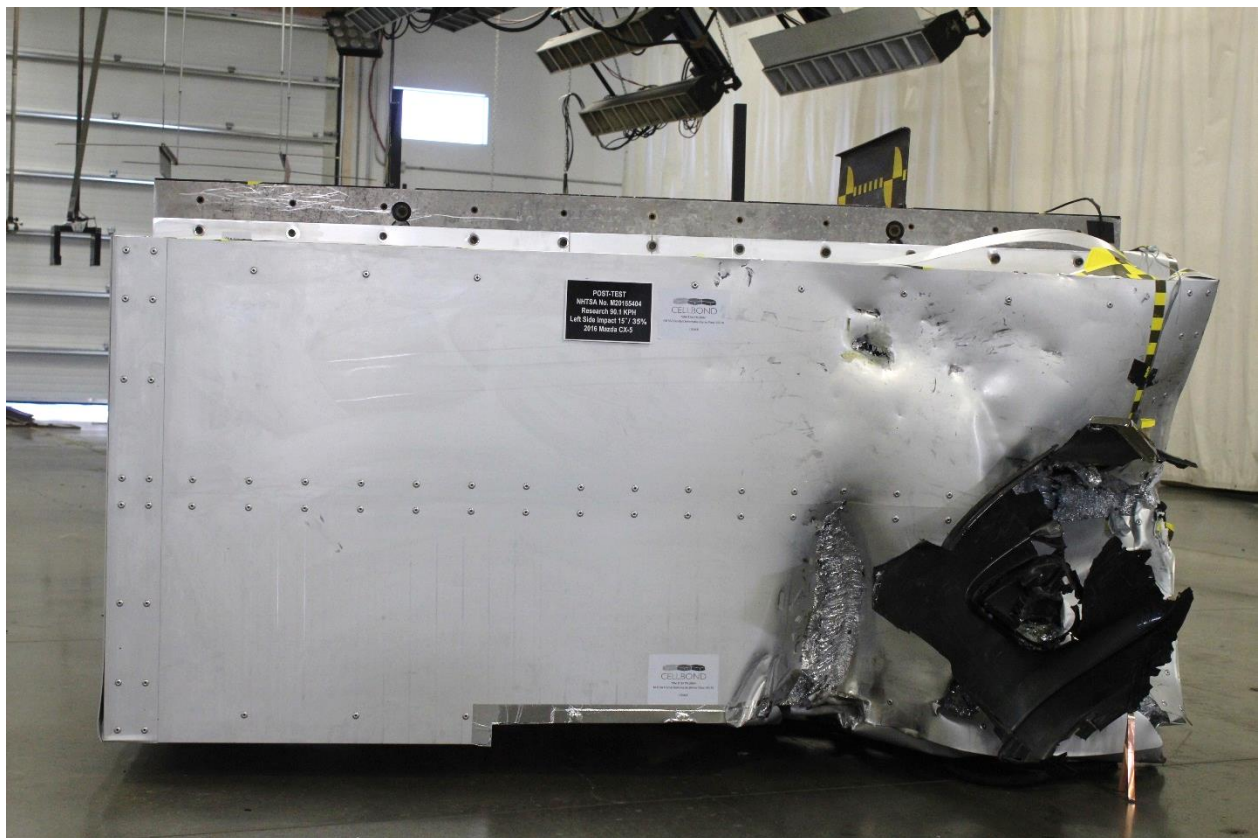
No. 171: Pre-Test Top View of OMDB



No. 172: Post-Test Top View of OMDB



No. 173: Pre-Test Front View of OMDB



No. 174: Post-Test Front View of OMDB



No. 175: Pre-Test Left Front $\frac{3}{4}$ View of OMDB



No. 176: Post-Test Left Front $\frac{3}{4}$ View of OMDB



No. 177: Pre-Test Right Front $\frac{3}{4}$ View of OMDB



No. 178: Post-Test Right Front $\frac{3}{4}$ View of OMDB



No. 179: Pre-Test Right Side View of OMDB



No. 180: Post-Test Right Side View of OMDB



No. 181: Pre-Test Left Side View of OMDB



No. 182: Post-Test Left Side View of OMDB



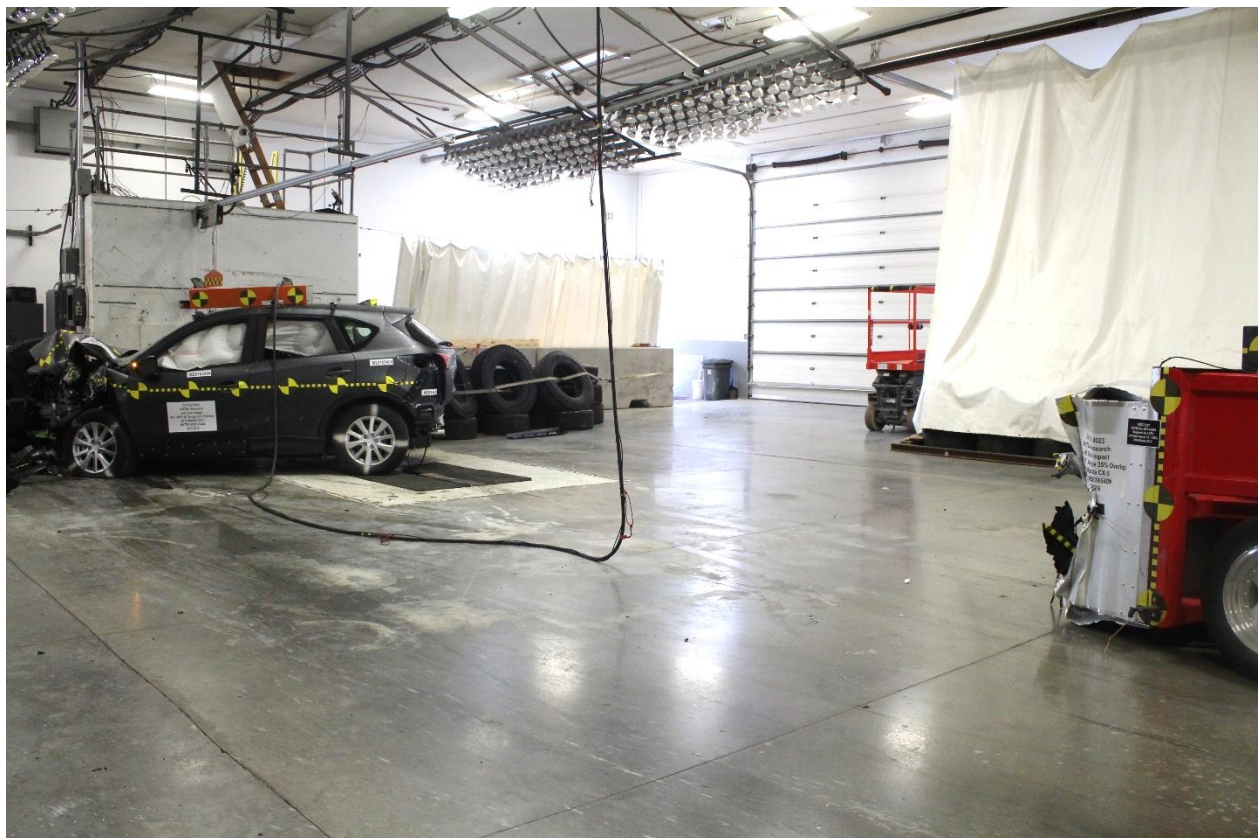
No. 183: Pre-Test OMDB & Vehicle, Right Side



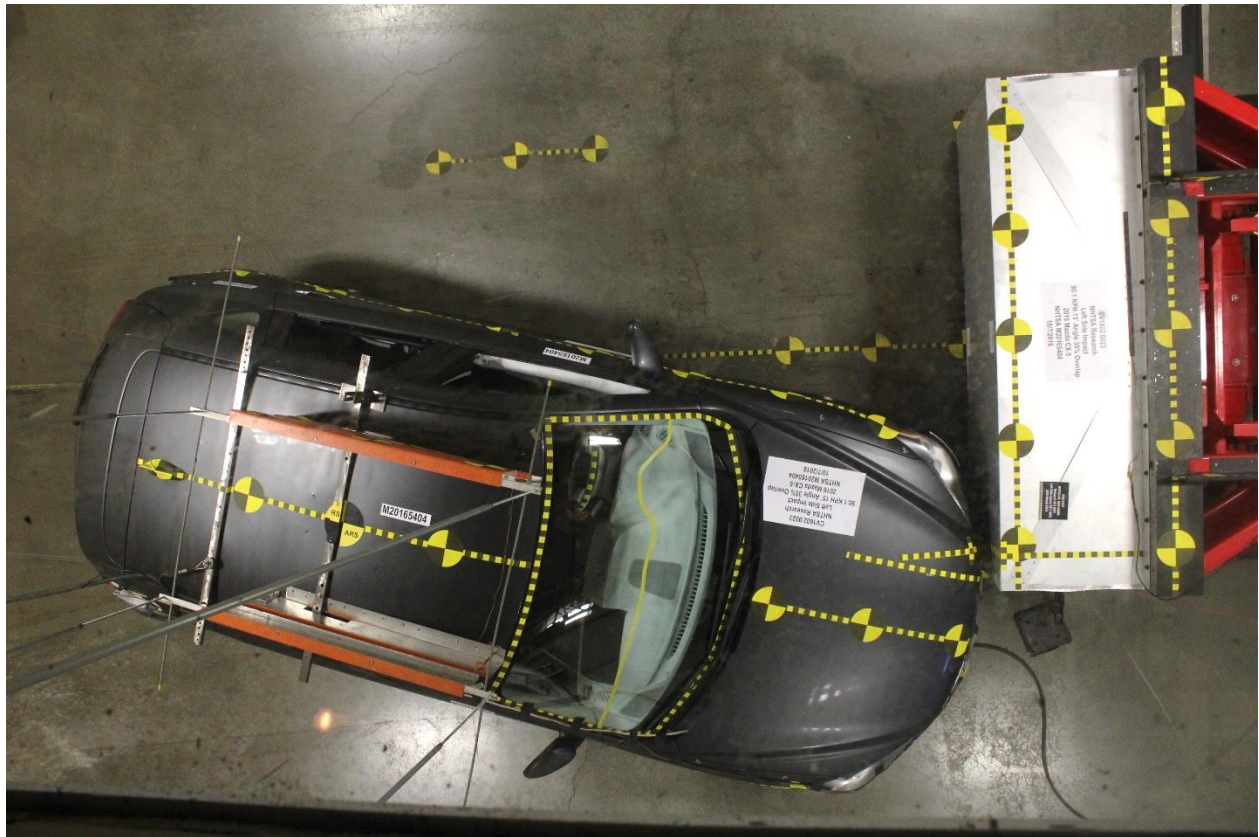
No. 184: Post-Test OMDB & Vehicle, Right Side



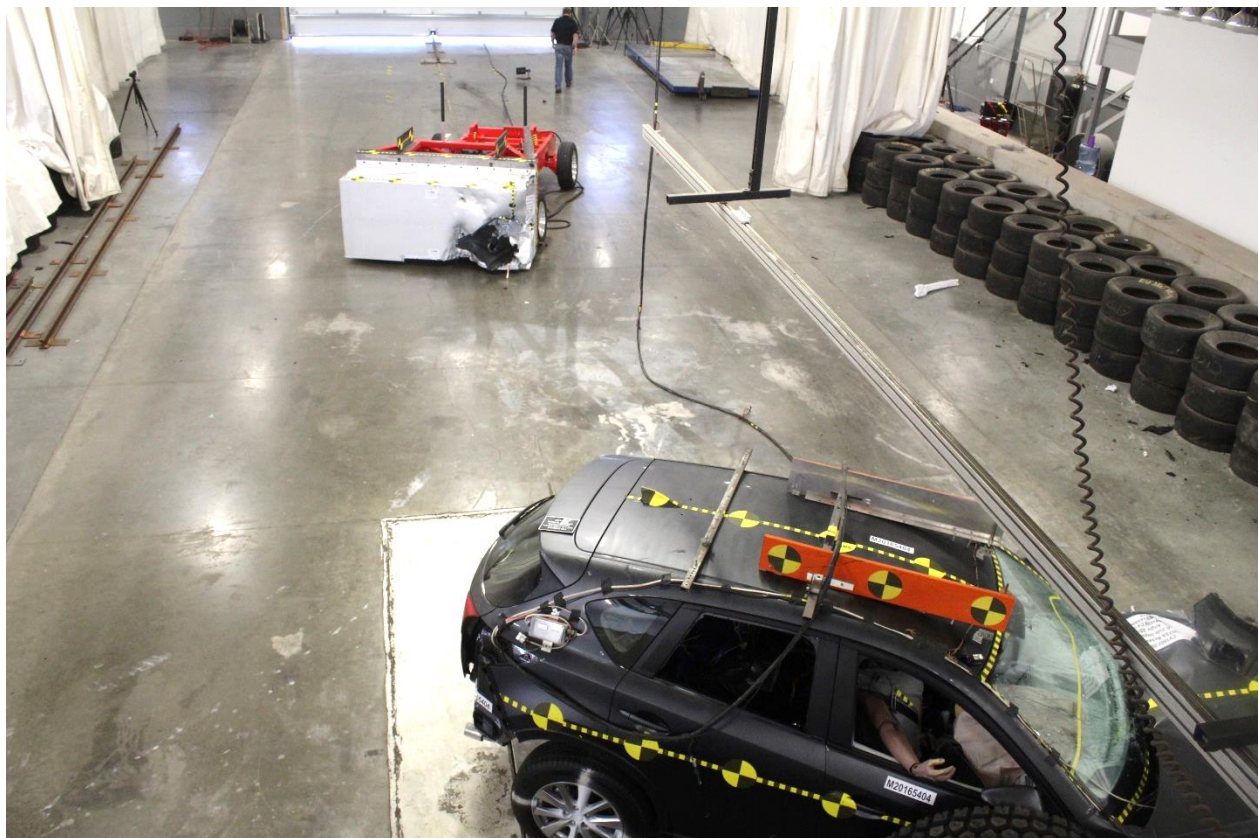
No. 185: Pre-Test OMDB & Vehicle, Left Side



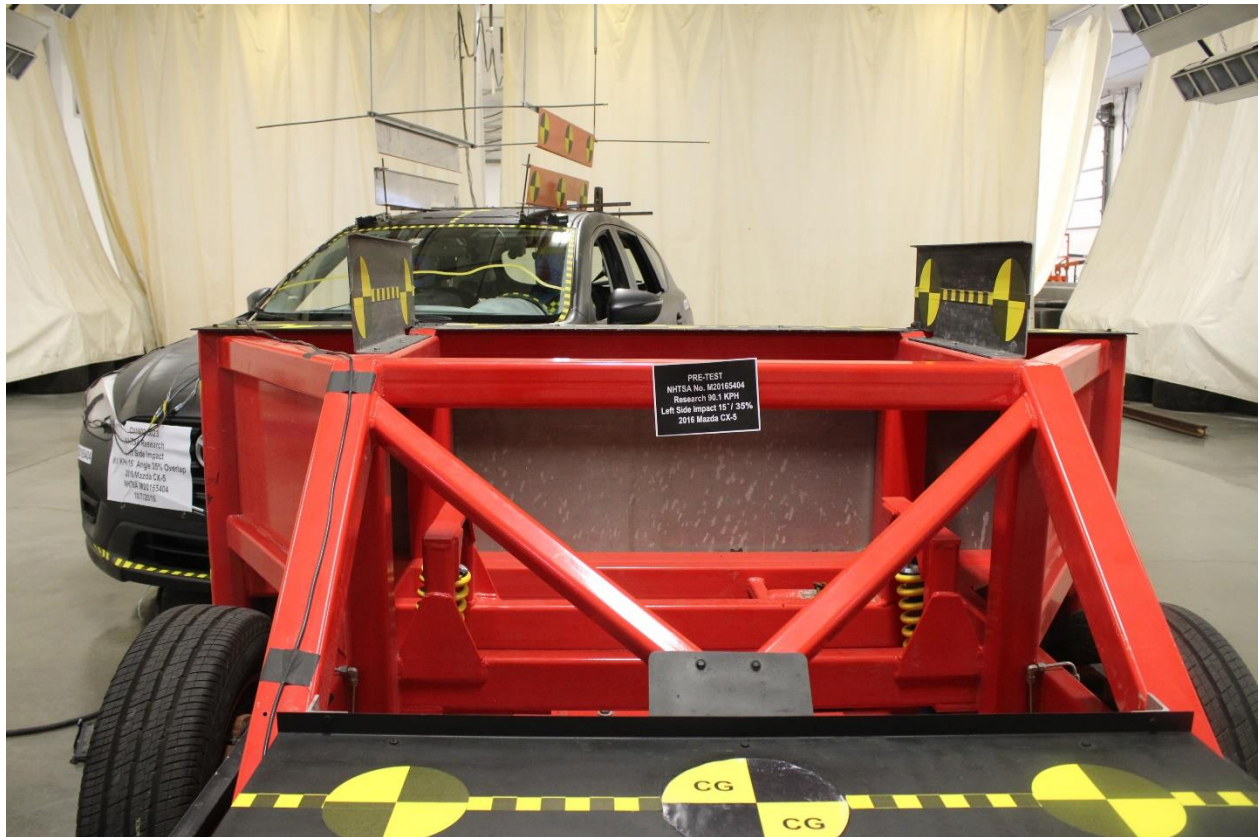
No. 186: Post-Test OMDB & Vehicle, Left Side



No. 187: Pre-Test OMDB & Vehicle, Top View



No. 188: Post-Test OMDB & Vehicle, Top View



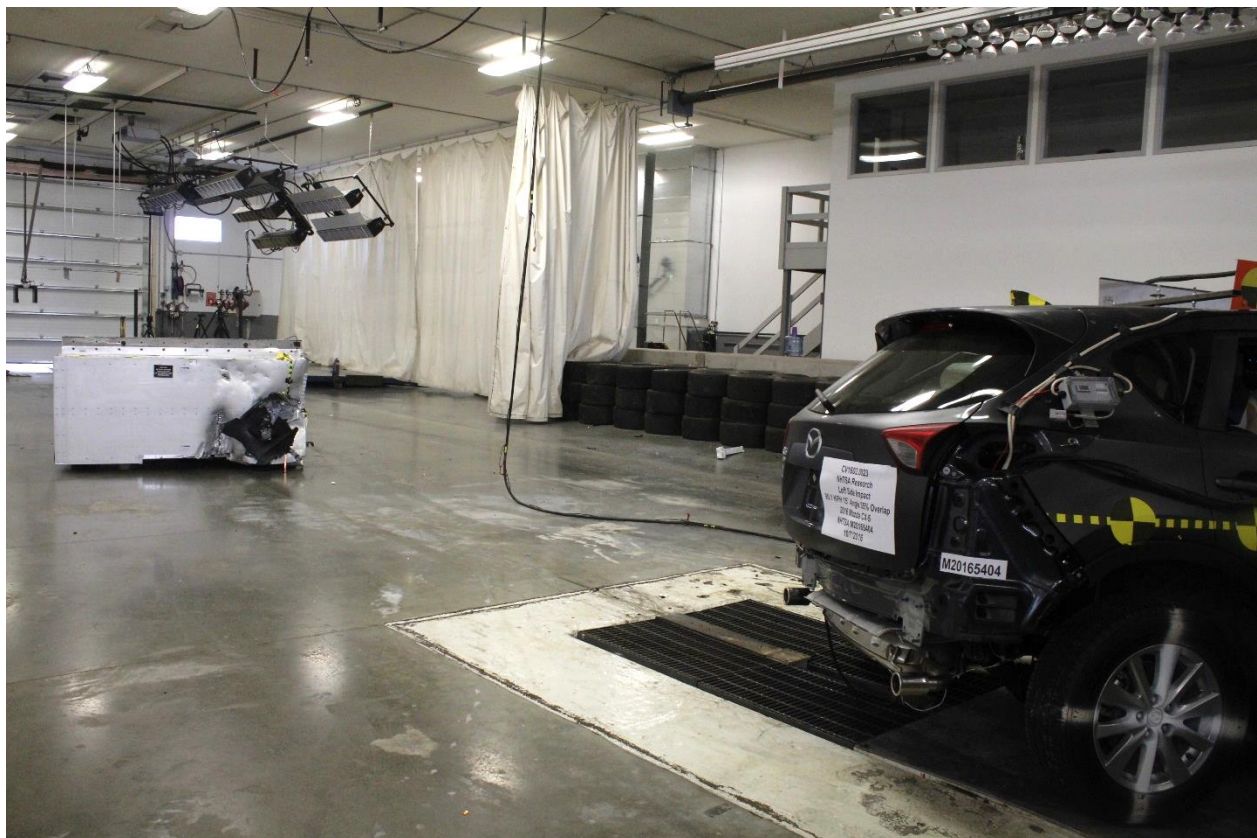
No. 189: Pre-Test O MDB & Vehicle, Rear View



No. 190: Post-Test O MDB & Vehicle, Rear View



No. 191: Pre-Test OMDB & Vehicle, Front View



No. 192: Post-Test OMDB & Vehicle, Front View



No. 193: Pre-Test OMDB & Vehicle Alignment



No. 194: Vehicle at 0 Degrees on Static Rollover Device



No. 195: Vehicle at 90 Degrees on Static Rollover Device



No. 196: Vehicle at 180 Degrees on Static Rollover Device



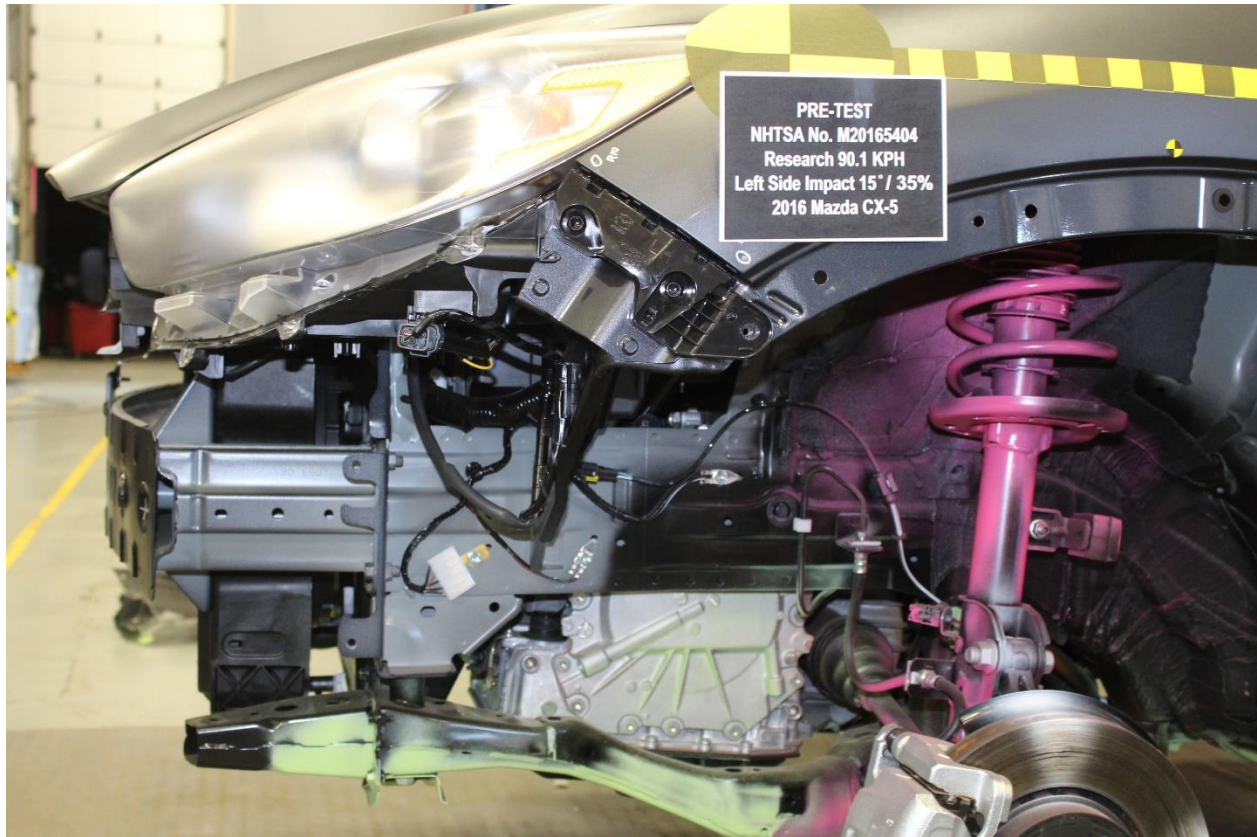
No. 197: Vehicle at 270 Degrees on Static Rollover Device



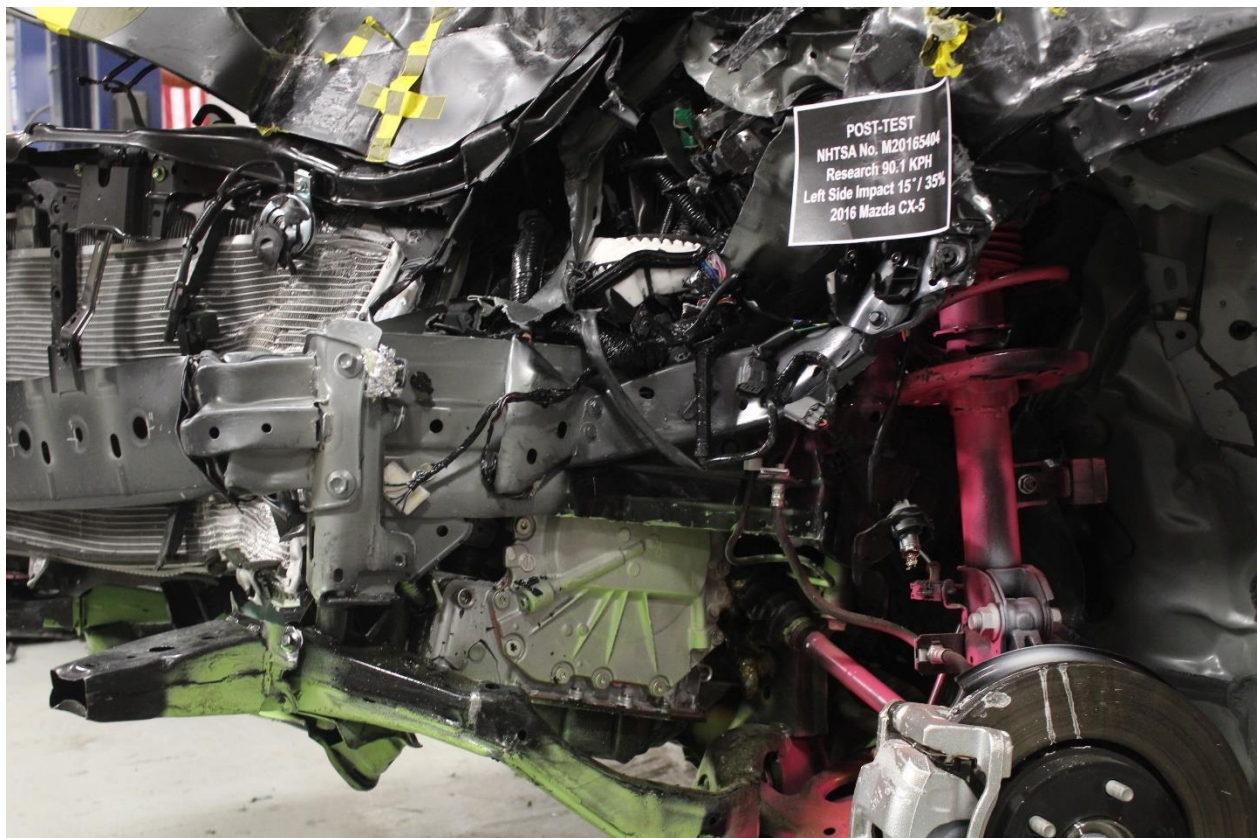
No. 198: Vehicle at 360 Degrees on Static Rollover Device



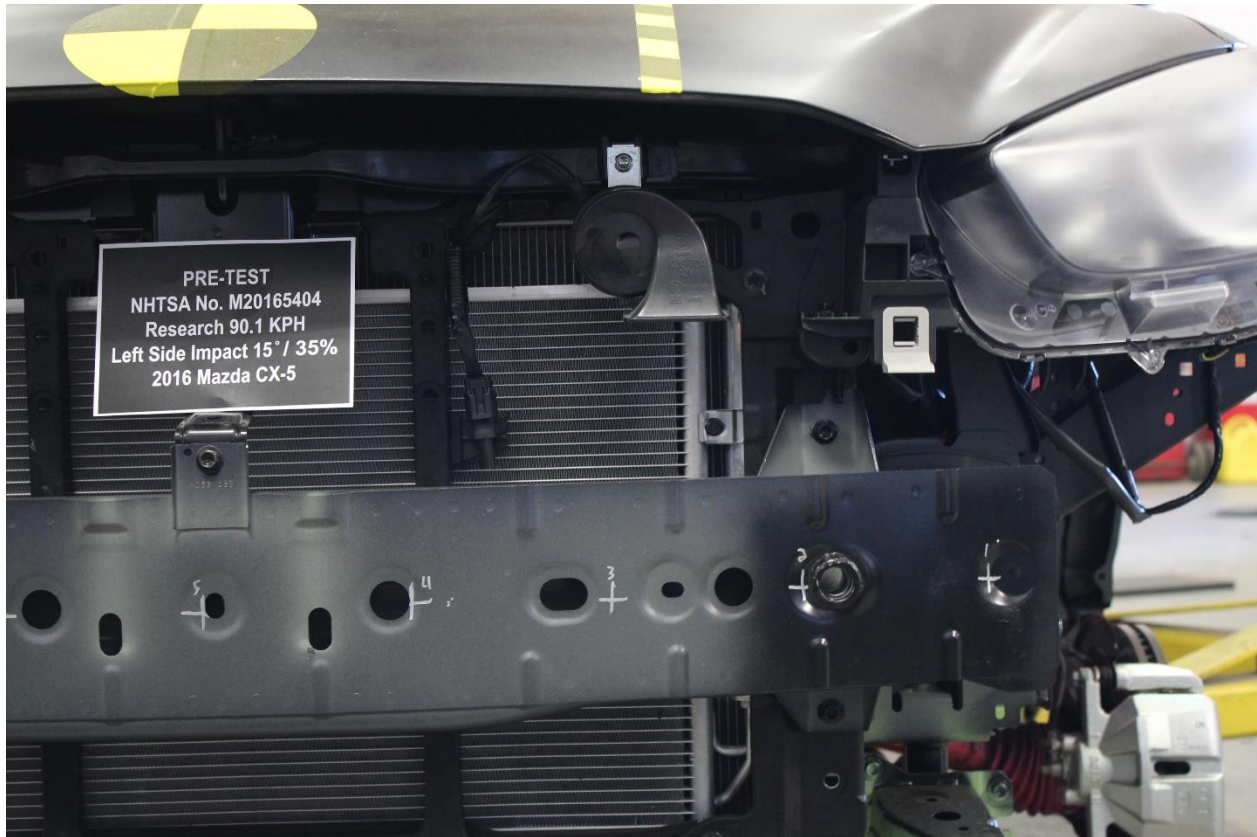
No. 199: Impact Photo



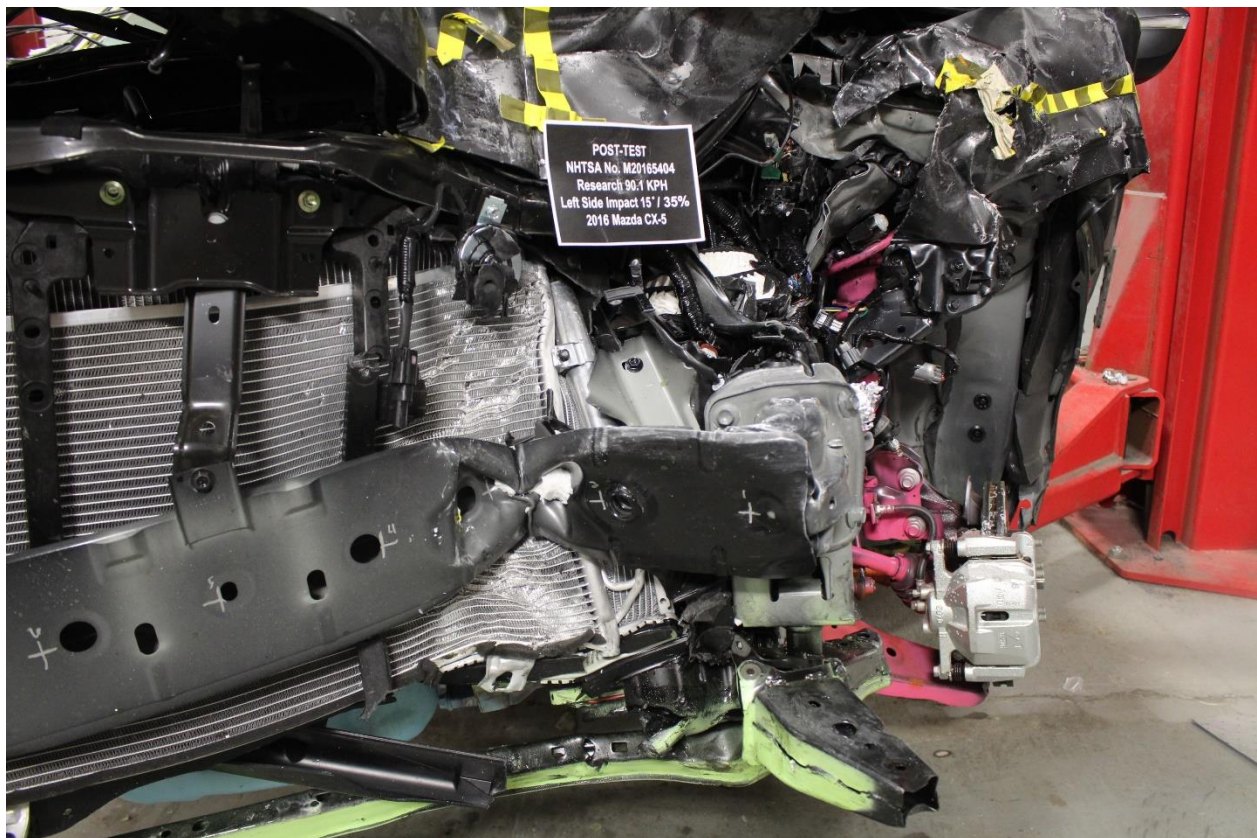
No. 200: Pre-Test Vehicle Bumper Left Side View



No. 201 Post-Test Vehicle Bumper Left View



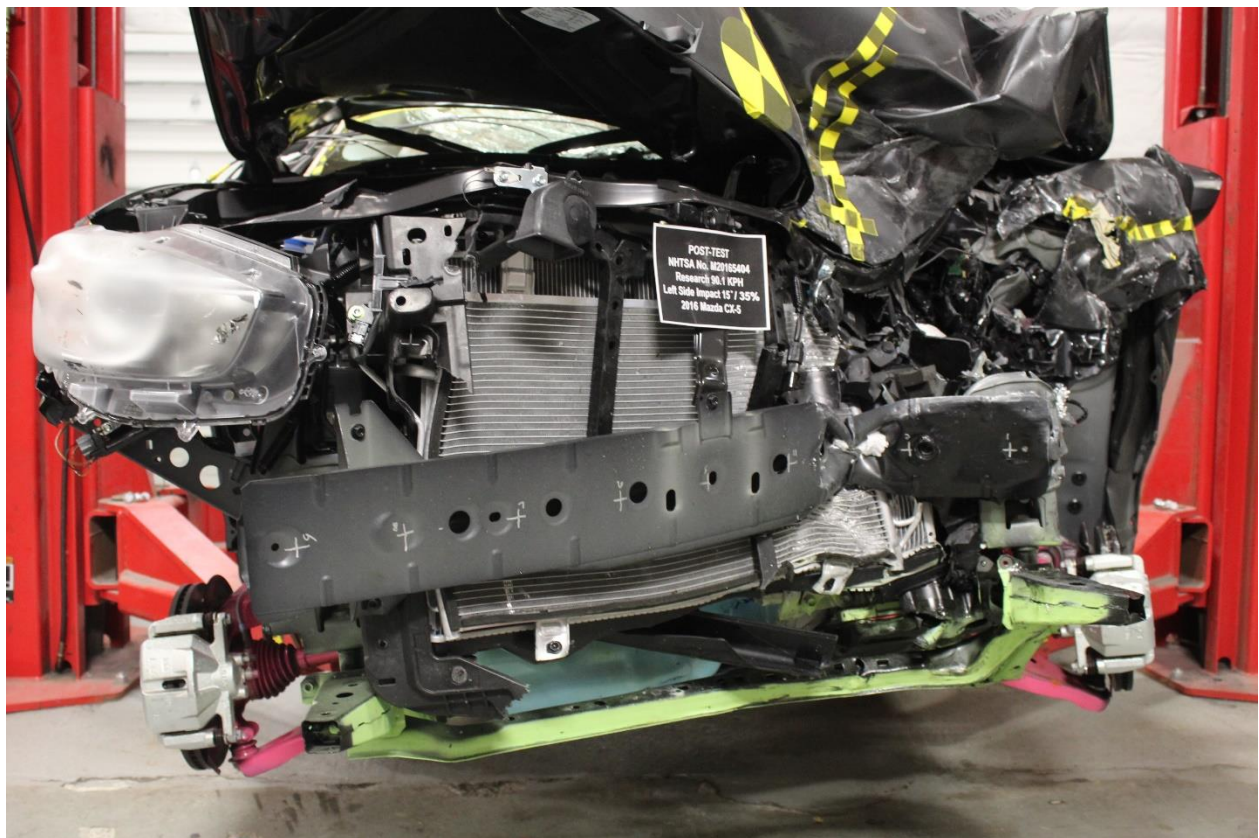
No. 202 Pre-Test Vehicle Bumper Left Front View



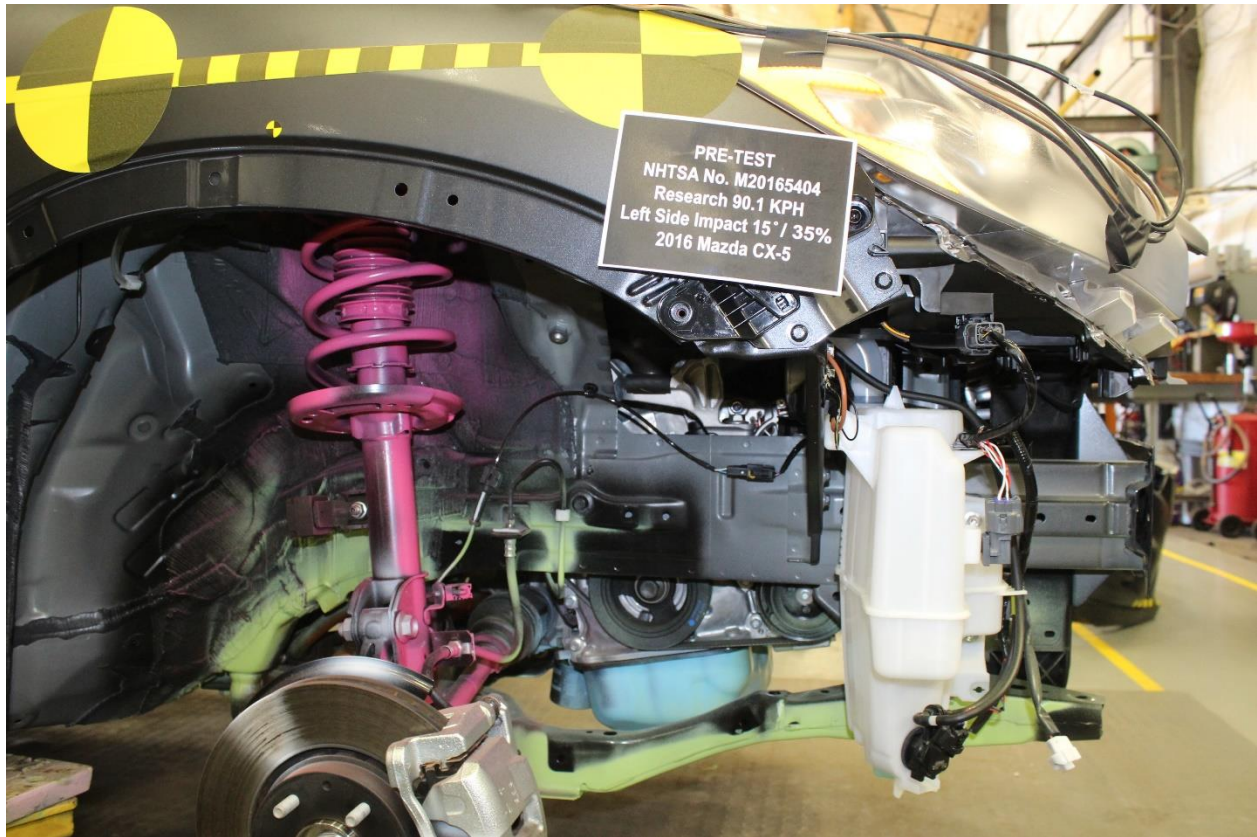
No. 203 Post-Test Vehicle Bumper Left Front View



No. 204 Pre-Test Vehicle Bumper Front View



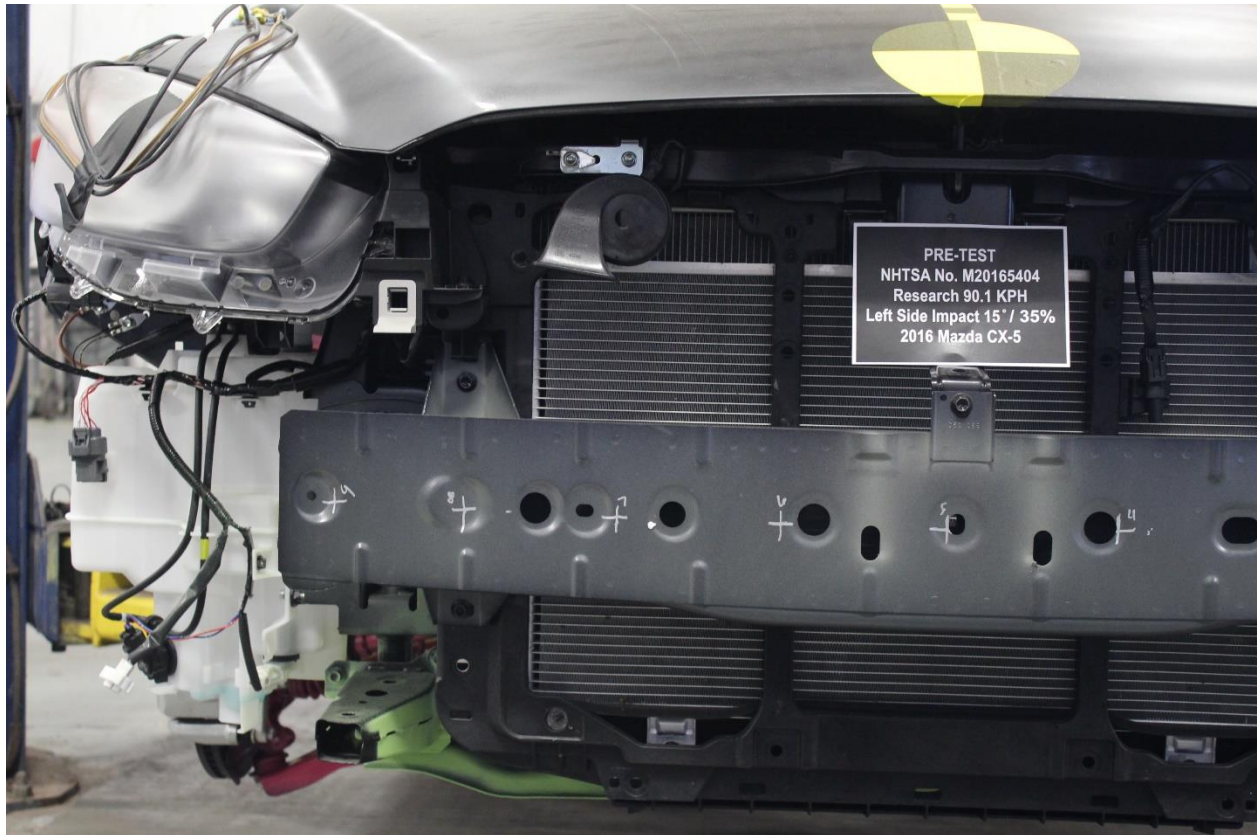
No. 205 Post-Test Vehicle Bumper Front View



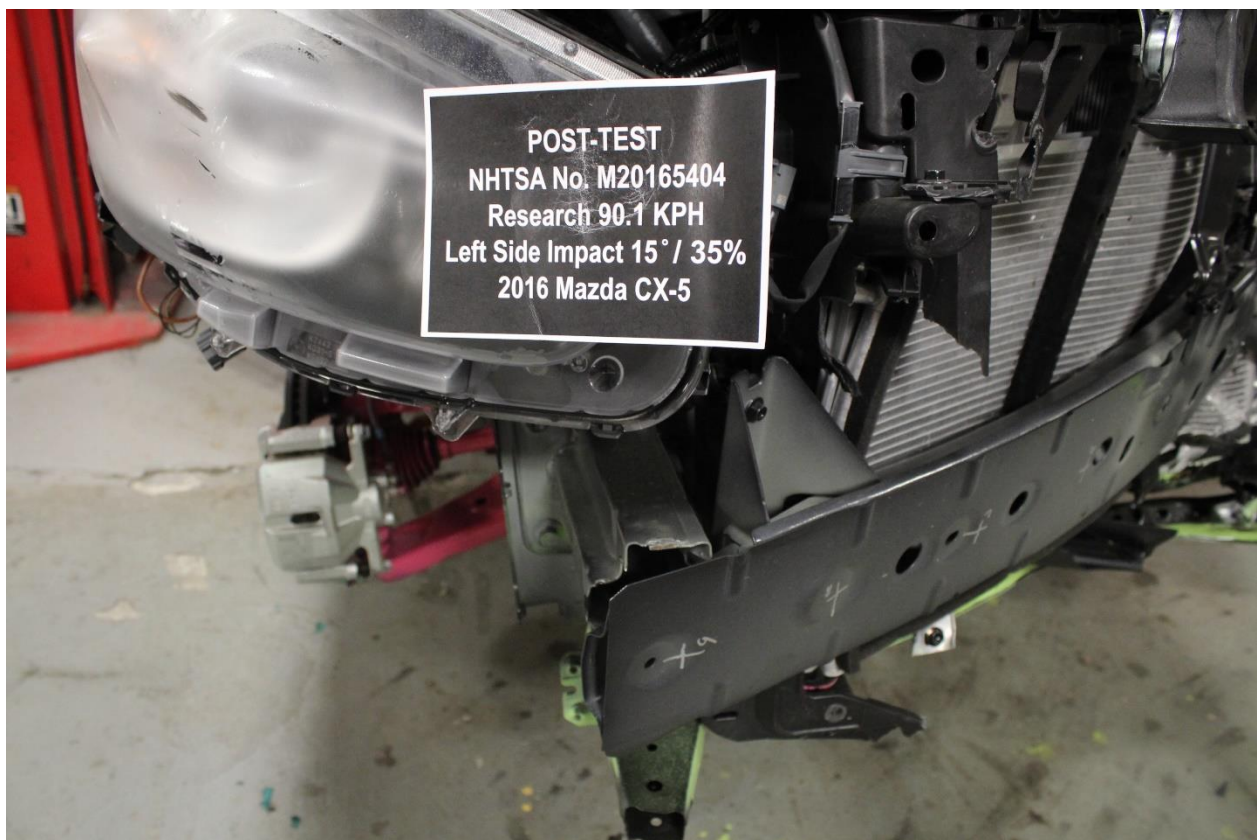
No. 206 Pre-Test Vehicle Bumper Right Side View



No. 207 Post-Test Vehicle Bumper Right View



No. 208 Pre-Test Vehicle Bumper Right Front View



No. 209 Post-Test Vehicle Bumper Right Front View

APPENDIX B
VEHICLE & DUMMY RESPONSE DATA TRACES

Table of Data Plots

No.	Description	Page
Plot 1	V2P1 Head CG X Acceleration	B-9
Plot 2	V2P1 Head CG Y Acceleration	B-9
Plot 3	V2P1 Head CG Z Acceleration	B-9
Plot 4	V2P1 Head CG Angular Velocity About X	B-9
Plot 5	V2P1 Head CG Angular Velocity About Y	B-10
Plot 6	V2P1 Head CG Angular Velocity About Z	B-10
Plot 7	V2P1 Upper Neck X Force	B-10
Plot 8	V2P1 Upper Neck Y Force	B-10
Plot 9	V2P1 Upper Neck Z Force	B-11
Plot 10	V2P1 Upper Neck X Moment	B-11
Plot 11	V2P1 Upper Neck Y Moment	B-11
Plot 12	V2P1 Upper Neck Z Moment	B-11
Plot 13	V2P1 Lower Neck X Force	B-12
Plot 14	V2P1 Lower Neck Y Force	B-12
Plot 15	V2P1 Lower Neck Z Force	B-12
Plot 16	V2P1 Lower Neck X Moment	B-12
Plot 17	V2P1 Lower Neck Y Moment	B-13
Plot 18	V2P1 Lower Neck Z Moment	B-13
Plot 19	V2P1 Front Neck Spring Tower Load Cell	B-13
Plot 20	V2P1 Rear Neck Spring Tower Load Cell	B-13
Plot 21	V2P1 Occipital Condyle Rotation Potentiometer	B-14
Plot 22	V2P1 Upper Left DGIR X Displacement	B-14
Plot 23	V2P1 Upper Left DGIR Y Rotation	B-14
Plot 24	V2P1 Upper Left DGIR Z Rotation	B-14
Plot 25	V2P1 Upper Right DGIR X Displacement	B-15
Plot 26	V2P1 Upper Right DGIR Y Rotation	B-15
Plot 27	V2P1 Upper Right DGIR Z Rotation	B-15
Plot 28	V2P1 Lower Left DGIR X Displacement	B-15
Plot 29	V2P1 Lower Left DGIR Y Rotation	B-16
Plot 30	V2P1 Lower Left DGIR Z Rotation	B-16
Plot 31	V2P1 Lower Right DGIR X Displacement	B-16
Plot 32	V2P1 Lower Right DGIR Y Rotation	B-16
Plot 33	V2P1 Lower Right DGIR Z Rotation	B-17
Plot 34	V2P1 Spine Force X	B-17
Plot 35	V2P1 Spine Force Y	B-17
Plot 36	V2P1 Spine Force Z	B-17
Plot 37	V2P1 Spine Moment X	B-18
Plot 38	V2P1 Spine Moment Y	B-18
Plot 39	V2P1 T6 X Acceleration	B-18
Plot 40	V2P1 T6 Y Acceleration	B-18
Plot 41	V2P1 T6 Z Acceleration	B-19
Plot 42	V2P1 T1 X Acceleration	B-19
Plot 43	V2P1 T1 Y Acceleration	B-19
Plot 44	V2P1 T1 Z Acceleration	B-19
Plot 45	V2P1 Abdomen Left DGIR X Displacement	B-20
Plot 46	V2P1 Abdomen Left DGIR Y Rotation	B-20
Plot 47	V2P1 Abdomen Left DGIR Z Rotation	B-20
Plot 48	V2P1 Abdomen Right DGIR X Displacement	B-20

Plot 49	V2P1 Abdomen Right DGIR Y Rotation	B-21
Plot 50	V2P1 Abdomen Right DGIR Z Rotation	B-21
Plot 51	V2P1 Pelvis Acetabulum Left X Force	B-21
Plot 52	V2P1 Pelvis Acetabulum Left Y Force	B-21
Plot 53	V2P1 Pelvis Acetabulum Left Z Force	B-22
Plot 54	V2P1 Pelvis Acetabulum Right X Force	B-22
Plot 55	V2P1 Pelvis Acetabulum Right Y Force	B-22
Plot 56	V2P1 Pelvis Acetabulum Right Z Force	B-22
Plot 57	V2P1 Pelvis X Acceleration	B-23
Plot 58	V2P1 Pelvis Y Acceleration	B-23
Plot 59	V2P1 Pelvis Z Acceleration	B-23
Plot 60	V2P1 ASIS Left X Force	B-23
Plot 61	V2P1 Left ASIS Y Moment	B-24
Plot 62	V2P1 ASIS Right X Force	B-24
Plot 63	V2P1 Right ASIS Y Moment	B-24
Plot 64	V2P1 Femur Left X Force	B-24
Plot 65	V2P1 Femur Left Y Force	B-25
Plot 66	V2P1 Femur Left Z Force	B-25
Plot 67	V2P1 Femur Left X Moment	B-25
Plot 68	V2P1 Femur Left Y Moment	B-25
Plot 69	V2P1 Femur Right X Force	B-26
Plot 70	V2P1 Femur Right Y Force	B-26
Plot 71	V2P1 Femur Right Z Force	B-26
Plot 72	V2P1 Femur Right X Moment	B-26
Plot 73	V2P1 Femur Right Y Moment	B-27
Plot 74	V2P1 Knee Left X Displacement	B-27
Plot 75	V2P1 Knee Right X Displacement	B-27
Plot 76	V2P1 Upper Tibia Left Z Force	B-27
Plot 77	V2P1 Upper Tibia Left X Moment	B-28
Plot 78	V2P1 Upper Tibia Left Y Moment	B-28
Plot 79	V2P1 Upper Tibia Right Z Force	B-28
Plot 80	V2P1 Upper Tibia Right X Moment	B-28
Plot 81	V2P1 Upper Tibia Right Y Moment	B-29
Plot 82	V2P1 Lower Tibia Left X Force	B-29
Plot 83	V2P1 Lower Tibia Left Y Force	B-29
Plot 84	V2P1 Lower Tibia Left Z Force	B-29
Plot 85	V2P1 Lower Tibia Left X Moment	B-30
Plot 86	V2P1 Lower Tibia Left Y Moment	B-30
Plot 87	V2P1 Lower Tibia Right X Force	B-30
Plot 88	V2P1 Lower Tibia Right Y Force	B-30
Plot 89	V2P1 Lower Tibia Right Z Force	B-31
Plot 90	V2P1 Lower Tibia Right X Moment	B-31
Plot 91	V2P1 Lower Tibia Right Y Moment	B-31
Plot 92	V2P1 Left Mid Tibia X Acceleration	B-31
Plot 93	V2P1 Left Mid Tibia Y Acceleration	B-32
Plot 94	V2P1 Right Mid Tibia X Acceleration	B-32
Plot 95	V2P1 Right Mid Tibia Y Acceleration	B-32
Plot 96	V2P1 Foot Left X Acceleration	B-32
Plot 97	V2P1 Foot Left Z Acceleration	B-33
Plot 98	V2P1 Foot Right X Acceleration	B-33

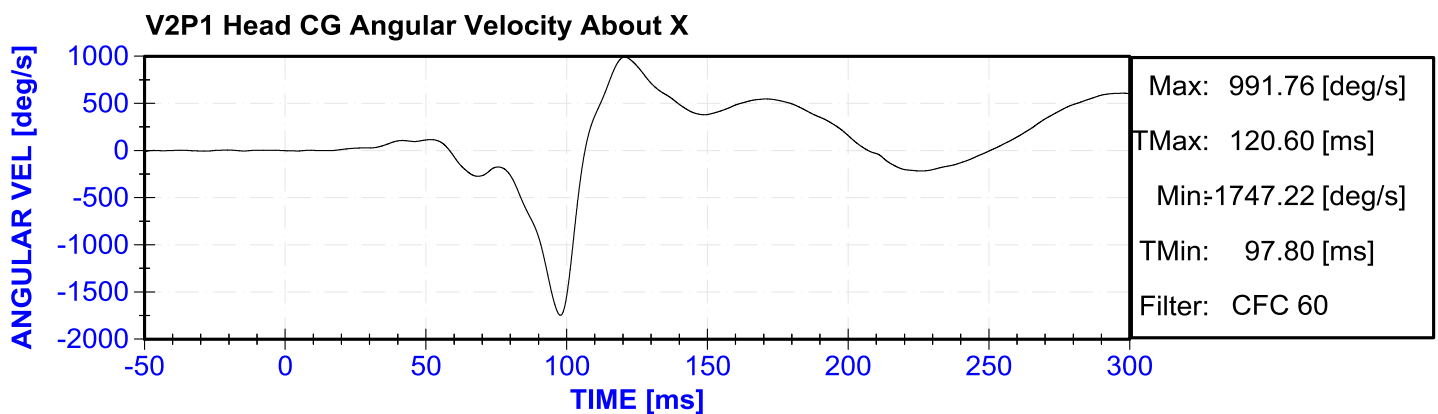
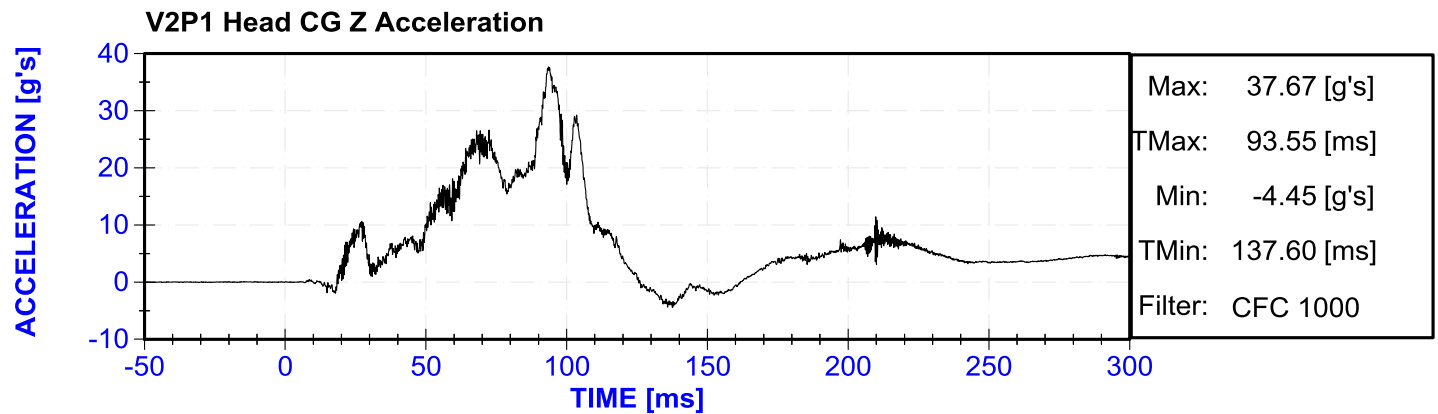
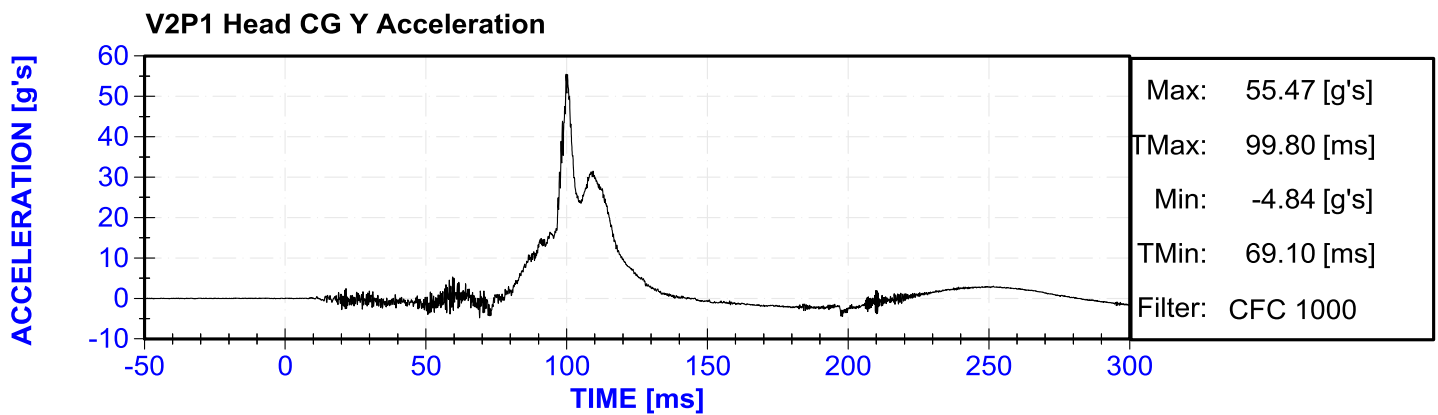
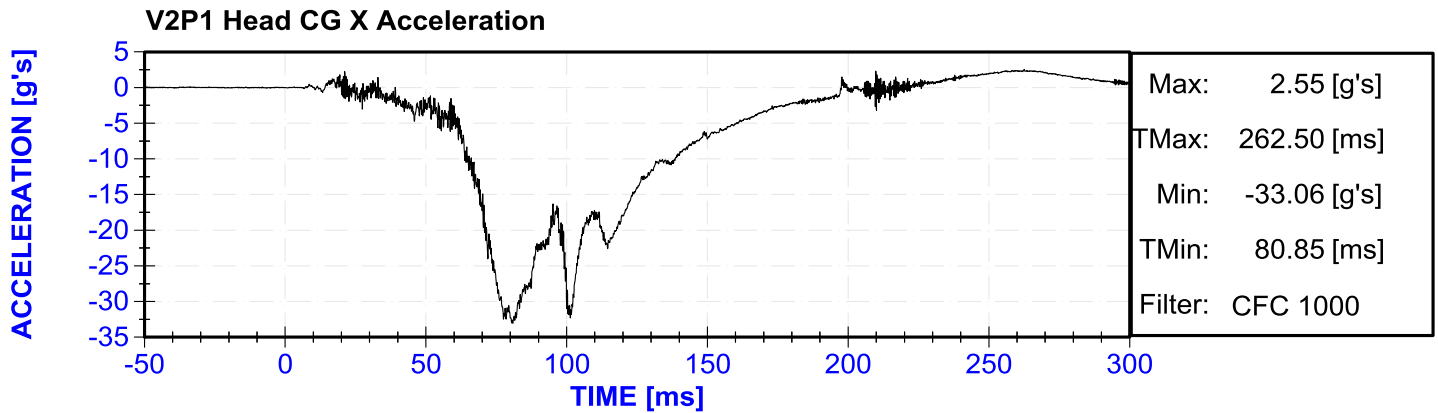
Plot 99	V2P1 Foot Right Z Acceleration	B-33
Plot 100	V2P1 Ankle Left X Rotation	B-33
Plot 101	V2P1 Ankle Left Y Rotation	B-34
Plot 102	V2P1 Ankle Left Z Rotation	B-34
Plot 103	V2P1 Ankle Right X Rotation	B-34
Plot 104	V2P1 Ankle Right Y Rotation	B-34
Plot 105	V2P1 Ankle Right Z Rotation	B-35
Plot 106	V2 Driver Lap Belt Force	B-35
Plot 107	V2 Driver Shoulder Belt Upper Force	B-35
Plot 108	V2 Driver Shoulder Belt Displacement	B-35
Plot 109	V2P2 Head CG X Acceleration	B-36
Plot 110	V2P2 Head CG Y Acceleration	B-36
Plot 111	V2P2 Head CG Z Acceleration	B-36
Plot 112	V2P2 Head CG Angular Velocity About X	B-36
Plot 113	V2P2 Head CG Angular Velocity About Y	B-37
Plot 114	V2P2 Head CG Angular Velocity About Z	B-37
Plot 115	V2P2 Upper Neck X Force	B-37
Plot 116	V2P2 Upper Neck Y Force	B-37
Plot 117	V2P2 Upper Neck Z Force	B-38
Plot 118	V2P2 Upper Neck X Moment	B-38
Plot 119	V2P2 Upper Neck Y Moment	B-38
Plot 120	V2P2 Upper Neck Z Moment	B-38
Plot 121	V2P2 Lower Neck X Force	B-39
Plot 122	V2P2 Lower Neck Y Force	B-39
Plot 123	V2P2 Lower Neck Z Force	B-39
Plot 124	V2P2 Lower Neck X Moment	B-39
Plot 125	V2P2 Lower Neck Y Moment	B-40
Plot 126	V2P2 Lower Neck Z Moment	B-40
Plot 127	V2P2 Front Neck Spring Tower Load Cell	B-40
Plot 128	V2P2 Rear Neck Spring Tower Load Cell	B-40
Plot 129	V2P2 Occipital Condyle Rotation Potentiometer	B-41
Plot 130	V2P2 Upper Left DGIR X Displacement	B-41
Plot 131	V2P2 Upper Left DGIR Y Rotation	B-41
Plot 132	V2P2 Upper Left DGIR Z Rotation	B-41
Plot 133	V2P2 Upper Right DGIR X Displacement	B-42
Plot 134	V2P2 Upper Right DGIR Y Rotation	B-42
Plot 135	V2P2 Upper Right DGIR Z Rotation	B-42
Plot 136	V2P2 Lower Left DGIR X Displacement	B-42
Plot 137	V2P2 Lower Left DGIR Y Rotation	B-43
Plot 138	V2P2 Lower Left DGIR Z Rotation	B-43
Plot 139	V2P2 Lower Right DGIR X Displacement	B-43
Plot 140	V2P2 Lower Right DGIR Y Rotation	B-43
Plot 141	V2P2 Lower Right DGIR Z Rotation	B-44
Plot 142	V2P2 Spine Force X	B-44
Plot 143	V2P2 Spine Force Y	B-44
Plot 144	V2P2 Spine Force Z	B-44
Plot 145	V2P2 Spine Moment X	B-45
Plot 146	V2P2 Spine Moment Y	B-45
Plot 147	V2P2 T6 X Acceleration	B-45
Plot 148	V2P2 T6 Y Acceleration	B-45

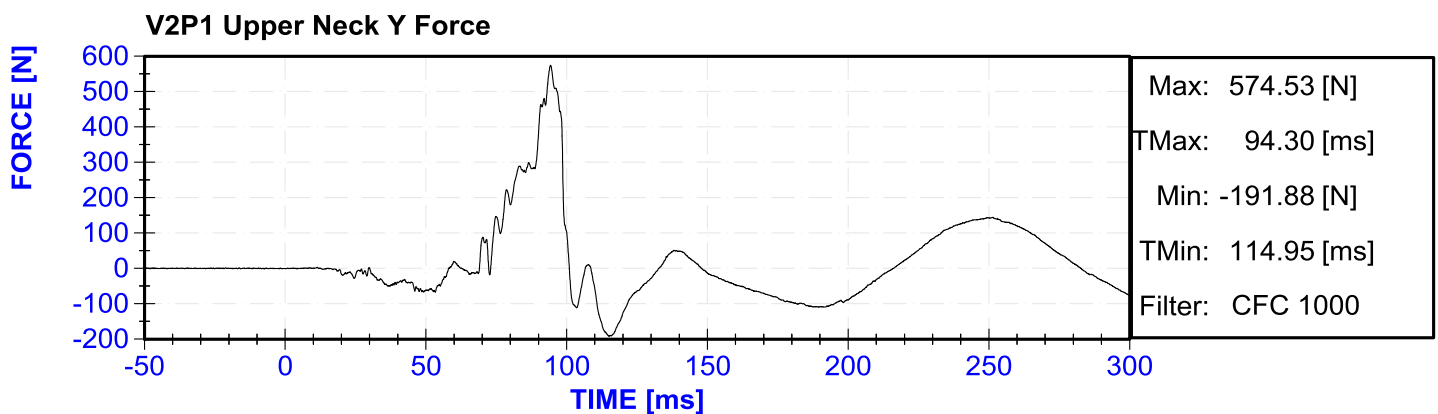
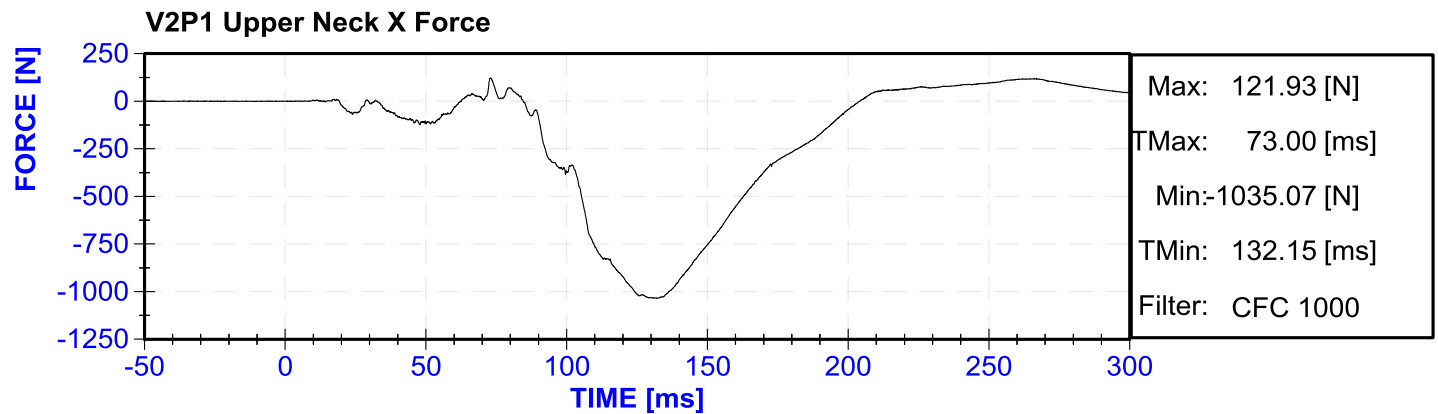
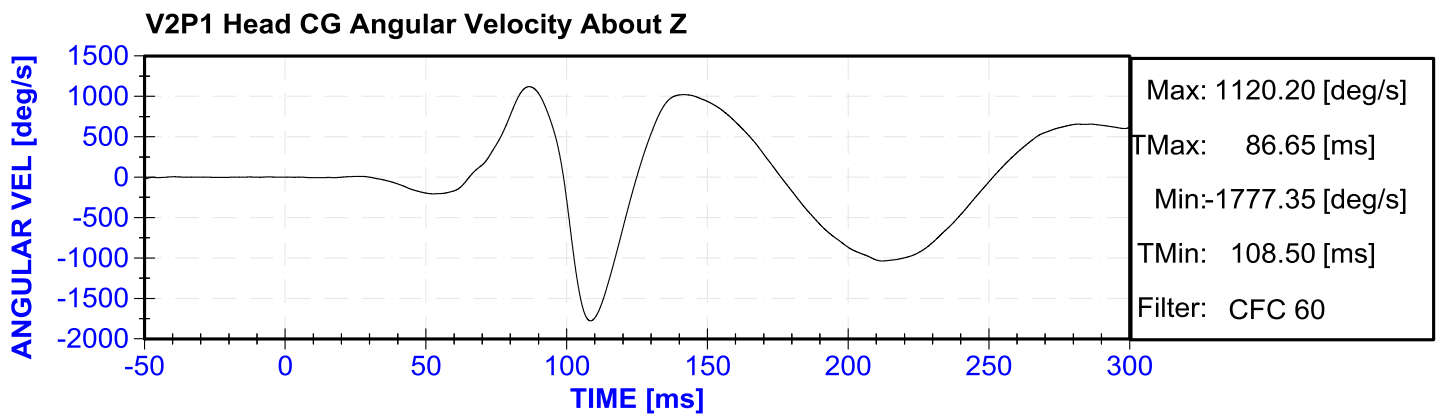
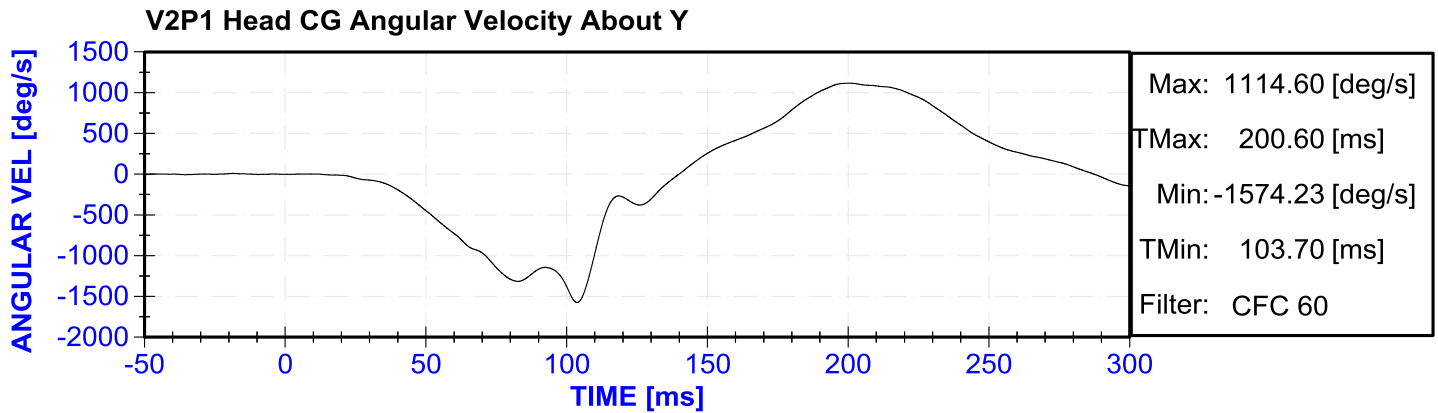
Plot 149	V2P2 T6 Z Acceleration	B-46
Plot 150	V2P2 T1 X Acceleration	B-46
Plot 151	V2P2 T1 Y Acceleration	B-46
Plot 152	V2P2 T1 Z Acceleration	B-46
Plot 153	V2P2 Abdomen Left DGIR X Displacement	B-47
Plot 154	V2P2 Abdomen Left DGIR Y Rotation	B-47
Plot 155	V2P2 Abdomen Left DGIR Z Rotation	B-47
Plot 156	V2P2 Abdomen Right DGIR X Displacement	B-47
Plot 157	V2P2 Abdomen Right DGIR Y Rotation	B-48
Plot 158	V2P2 Abdomen Right DGIR Z Rotation	B-48
Plot 159	V2P2 Pelvis Acetabulum Left X Force	B-48
Plot 160	V2P2 Pelvis Acetabulum Left Y Force	B-48
Plot 161	V2P2 Pelvis Acetabulum Left Z Force	B-49
Plot 162	V2P2 Pelvis Acetabulum Right X Force	B-49
Plot 163	V2P2 Pelvis Acetabulum Right Y Force	B-49
Plot 164	V2P2 Pelvis Acetabulum Right Z Force	B-49
Plot 165	V2P2 Pelvis X Acceleration	B-50
Plot 166	V2P2 Pelvis Y Acceleration	B-50
Plot 167	V2P2 Pelvis Z Acceleration	B-50
Plot 168	V2P2 ASIS Left X Force	B-50
Plot 169	V2P2 Left ASIS Y Moment	B-51
Plot 170	V2P2 ASIS Right X Force	B-51
Plot 171	V2P2 Right ASIS Y Moment	B-51
Plot 172	V2P2 Femur Left X Force	B-51
Plot 173	V2P2 Femur Left Y Force	B-52
Plot 174	V2P2 Femur Left Z Force	B-52
Plot 175	V2P2 Femur Left X Moment	B-52
Plot 176	V2P2 Femur Left Y Moment	B-52
Plot 177	V2P2 Femur Right X Force	B-53
Plot 178	V2P2 Femur Right Y Force	B-53
Plot 179	V2P2 Femur Right Z Force	B-53
Plot 180	V2P2 Femur Right X Moment	B-53
Plot 181	V2P2 Femur Right Y Moment	B-54
Plot 182	V2P2 Knee Left X Displacement	B-54
Plot 183	V2P2 Knee Right X Displacement	B-54
Plot 184	V2P2 Upper Tibia Left Z Force	B-54
Plot 185	V2P2 Upper Tibia Left X Moment	B-55
Plot 186	V2P2 Upper Tibia Left Y Moment	B-55
Plot 187	V2P2 Upper Tibia Right Z Force	B-55
Plot 188	V2P2 Upper Tibia Right X Moment	B-55
Plot 189	V2P2 Upper Tibia Right Y Moment	B-56
Plot 190	V2P2 Lower Tibia Left X Force	B-56
Plot 191	V2P2 Lower Tibia Left Y Force	B-56
Plot 192	V2P2 Lower Tibia Left Z Force	B-56
Plot 193	V2P2 Lower Tibia Left X Moment	B-57
Plot 194	V2P2 Lower Tibia Left Y Moment	B-57
Plot 195	V2P2 Lower Tibia Right X Force	B-57
Plot 196	V2P2 Lower Tibia Right Y Force	B-57
Plot 197	V2P2 Lower Tibia Right Z Force	B-58
Plot 198	V2P2 Lower Tibia Right X Moment	B-58

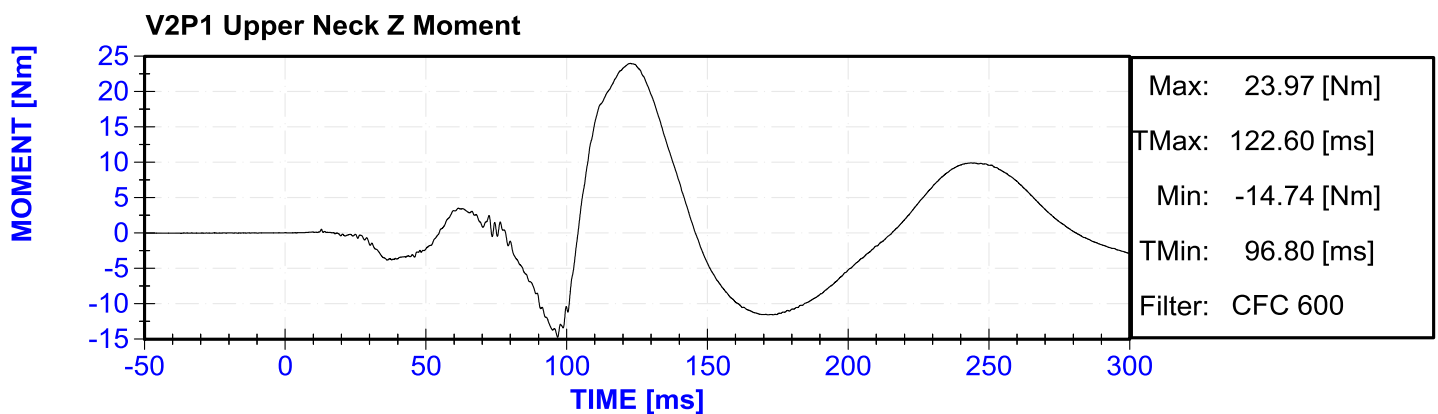
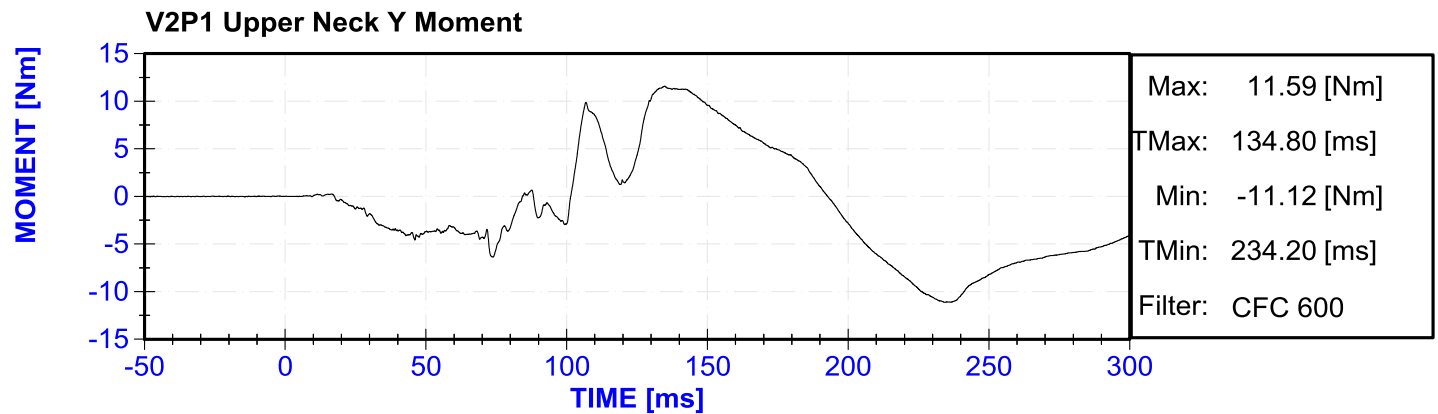
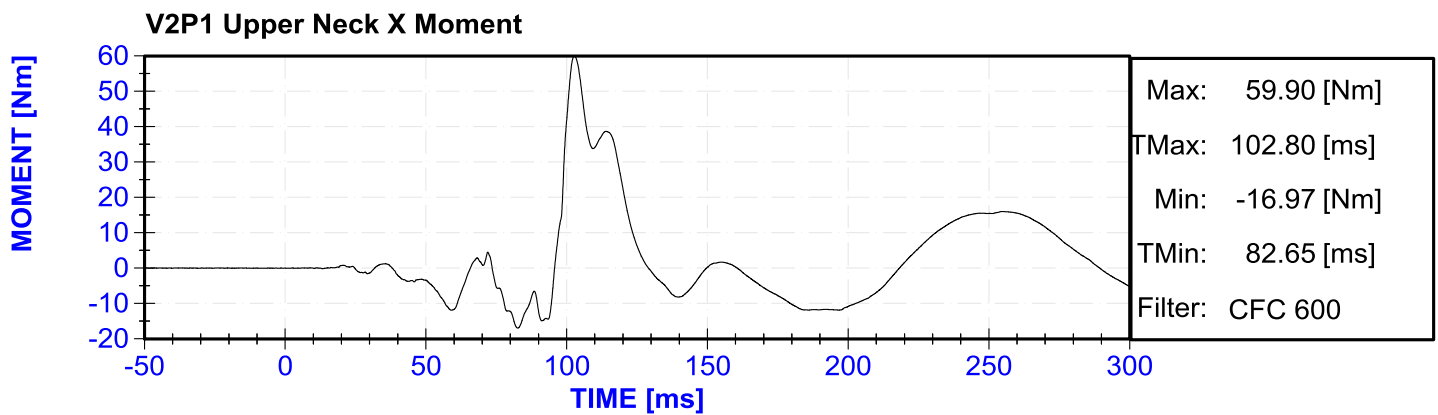
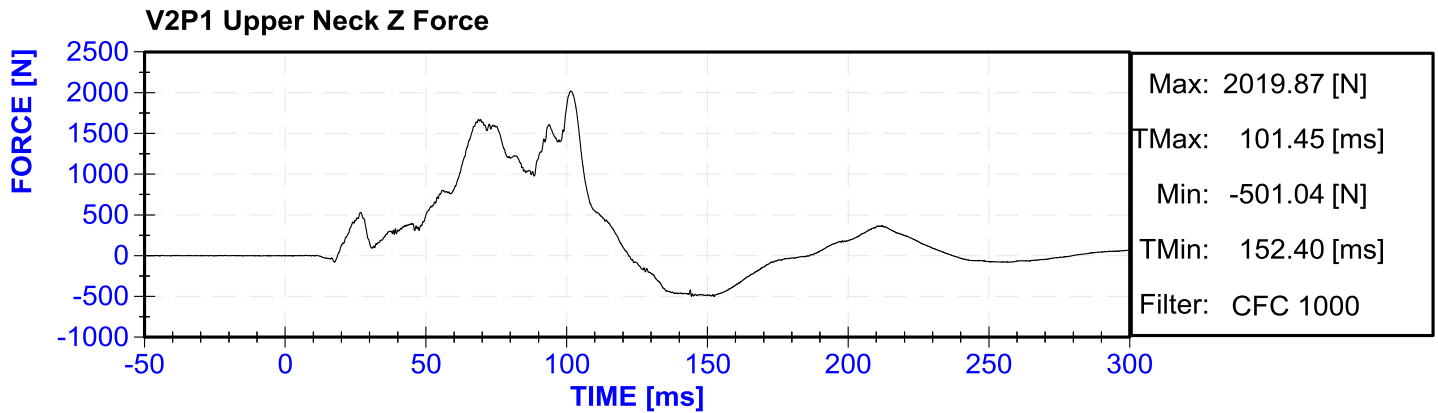
Plot 199	V2P2 Lower Tibia Right Y Moment	B-58
Plot 200	V2P2 Left Mid Tibia X Acceleration	B-58
Plot 201	V2P2 Left Mid Tibia Y Acceleration	B-59
Plot 202	V2P2 Right Mid Tibia X Acceleration	B-59
Plot 203	V2P2 Right Mid Tibia Y Acceleration	B-59
Plot 204	V2P2 Foot Left X Acceleration	B-59
Plot 205	V2P2 Foot Left Z Acceleration	B-60
Plot 206	V2P2 Foot Right X Acceleration	B-60
Plot 207	V2P2 Foot Right Z Acceleration	B-60
Plot 208	V2P2 Ankle Left X Rotation	B-60
Plot 209	V2P2 Ankle Left Y Rotation	B-61
Plot 210	V2P2 Ankle Left Z Rotation	B-61
Plot 211	V2P2 Ankle Right X Rotation	B-61
Plot 212	V2P2 Ankle Right Y Rotation	B-61
Plot 213	V2P2 Ankle Right Z Rotation	B-62
Plot 214	V2 Passenger Lap Belt Force	B-62
Plot 215	V2 Passenger Shoulder Belt Upper Force	B-62
Plot 216	V2 Passenger Shoulder Belt Displacement	B-62
Plot 217	V2 Left Rear Sill X Acceleration	B-63
Plot 218	V2 Left Rear Sill Y Acceleration	B-63
Plot 219	V2 Left Rear Sill Redundant X Acceleration	B-63
Plot 220	V2 Left Rear Sill Redundant Y Acceleration	B-63
Plot 221	V2 Right Rear Sill X Acceleration	B-64
Plot 222	V2 Right Rear Sill Y Acceleration	B-64
Plot 223	V2 Vehicle CG X Acceleration	B-64
Plot 224	V2 Vehicle CG Y Acceleration	B-64
Plot 225	V2 Vehicle CG Z Acceleration	B-65
Plot 226	V2 Vehicle CG Angular Rate X	B-65
Plot 227	V2 Vehicle CG Angular Rate Y	B-65
Plot 228	V2 Vehicle CG Angular Rate Z	B-65
Plot 229	V2 Driver Seat Track X Acceleration	B-66
Plot 230	V2 Driver Seat Track Y Acceleration	B-66
Plot 231	V2 Driver Seat Track Z Acceleration	B-66
Plot 232	V2 Driver Seat Thigh Bar X Acceleration	B-66
Plot 233	V2 Driver Seat Thigh Bar Z Acceleration	B-67
Plot 234	V2 Driver Floor Pan X Acceleration	B-67
Plot 235	V2 Driver Floor Pan Y Acceleration	B-67
Plot 236	V2 Driver Floor Pan Z Acceleration	B-67
Plot 237	V2 Driver Floor Pan X Deflection	B-68
Plot 238	Driver Front Airbag Stage 1 Monitor	B-68
Plot 239	Driver Front Airbag Stage 2 Monitor	B-68
Plot 240	Driver Curtain Airbag Monitor	B-68
Plot 241	Driver Seat Torso Airbag Monitor	B-69
Plot 242	Driver Retractor Pretensioner Monitor	B-69
Plot 243	Driver Anchor Pretensioner Monitor	B-69
Plot 244	Passenger Front Airbag Stage 1 Monitor	B-69
Plot 245	Passenger Front Airbag Stage 2 Monitor	B-70
Plot 246	Passenger Curtain Airbag Monitor	B-70
Plot 247	Passenger Seat Torso Airbag Monitor	B-70
Plot 248	Passenger Retractor Pretensioner Monitor	B-70

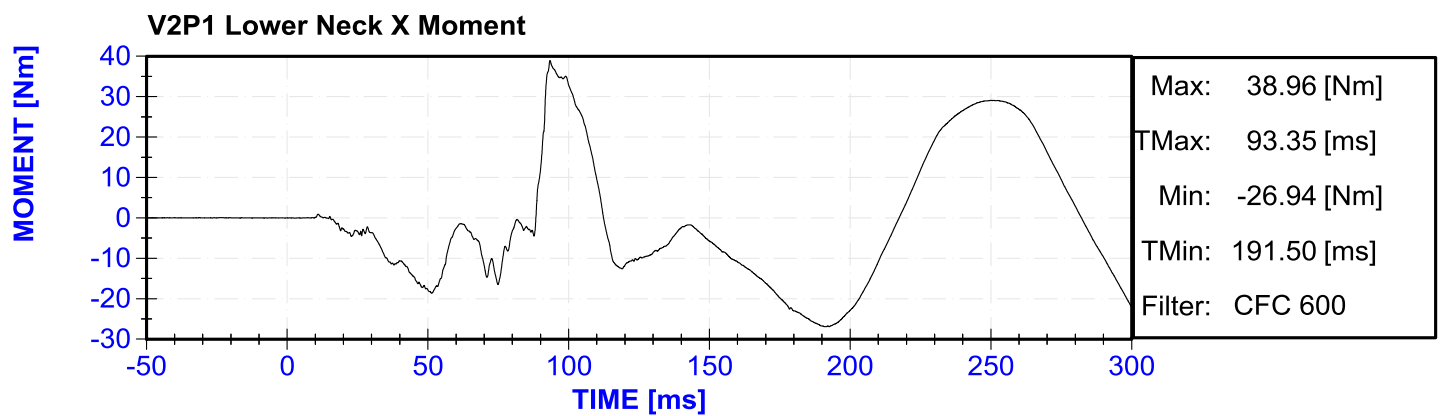
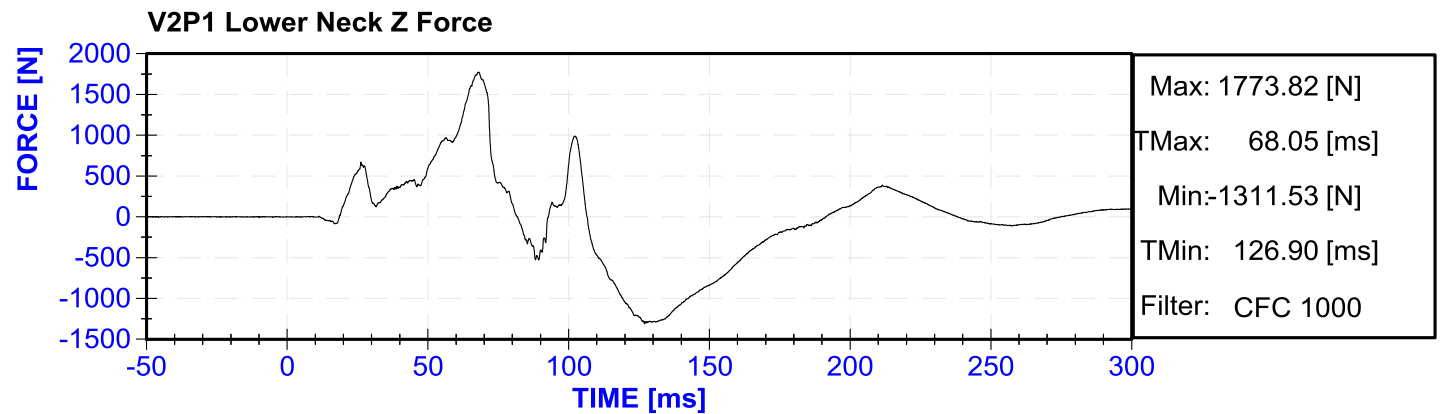
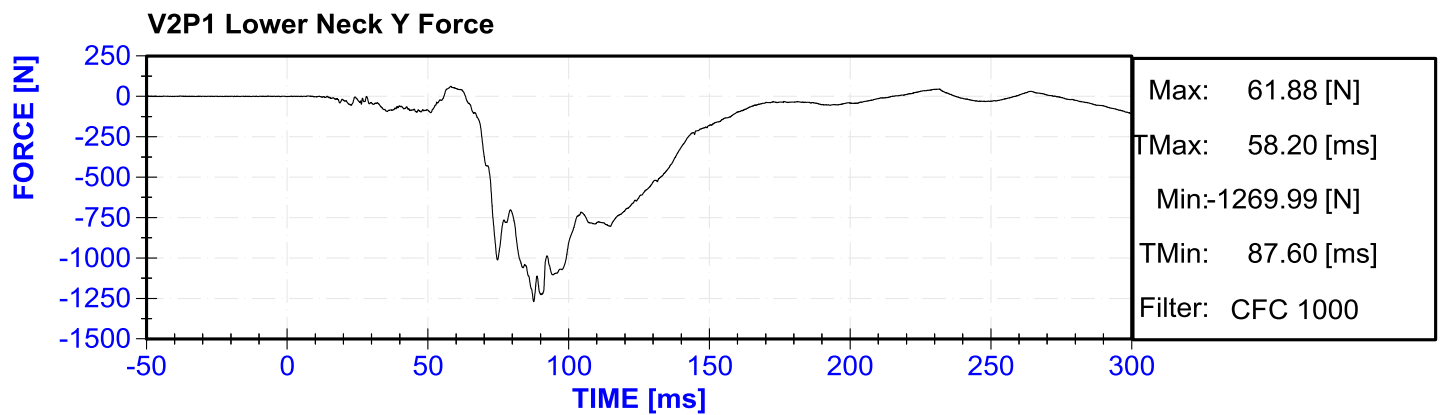
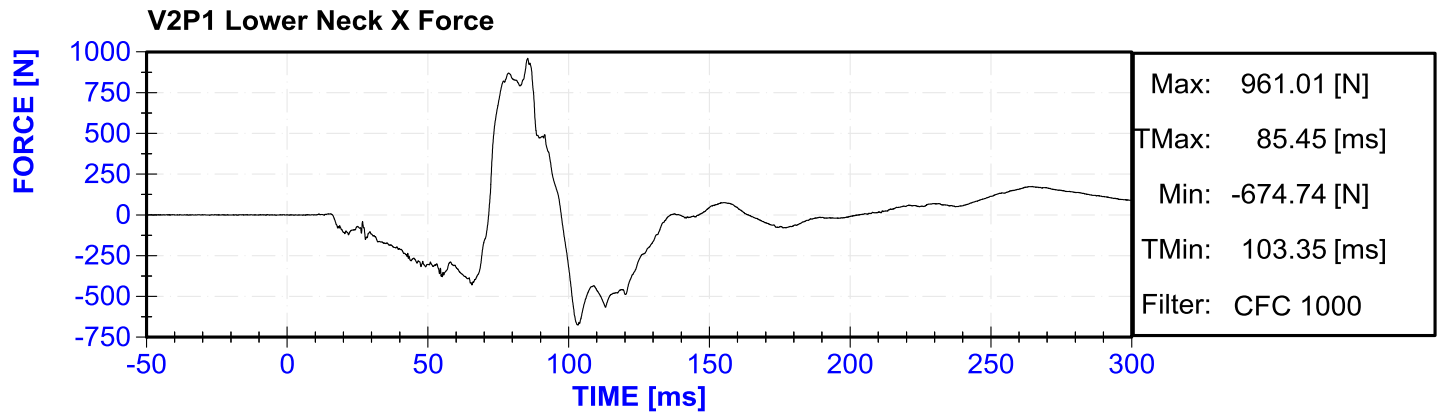
Plot 249	Passenger Anchor Pretensioner Monitor	B-71
Plot 250	V1 OMDB CG X Acceleration	B-71
Plot 251	V1 OMDB CG Y Acceleration	B-71
Plot 252	V1 OMDB CG Z Acceleration	B-71
Plot 253	V1 OMDB CG Angular Rate X	B-72
Plot 254	V1 OMDB CG Angular Rate Y	B-72
Plot 255	V1 OMDB CG Angular Rate Z	B-72
Plot 256	V1 OMDB Rear C/L X Acceleration	B-72
Plot 257	V1 OMDB Rear C/L Y Acceleration	B-73
Plot 258	V1 OMDB Rear C/L Z Acceleration	B-73
Plot 259	V2P1 Fx on head acting through the O.C. joint only	B-73
Plot 260	V2P1 Fz on head acting through the O.C. joint only	B-73
Plot 261	V2P1 My on head acting through the O.C. joint only	B-74
Plot 262	V2P1 Fx on head acting through the total neck section	B-74
Plot 263	V2P1 Fy on head acting through the total neck section	B-74
Plot 264	V2P1 Fz on head acting through the total neck section	B-74
Plot 265	V2P1 Mx on head acting through the total neck section	B-75
Plot 266	V2P1 My on head acting through the total neck section	B-75
Plot 267	V2P1 Mz on head acting through the total neck section	B-75
Plot 268	V2P1 Chest Left Upper Dx	B-75
Plot 269	V2P1 Chest Left Upper Dy	B-76
Plot 270	V2P1 Chest Left Upper Dz	B-76
Plot 271	V2P1 Chest Left Upper Resultant	B-76
Plot 272	V2P1 Chest Right Upper Dx	B-76
Plot 273	V2P1 Chest Right Upper Dy	B-77
Plot 274	V2P1 Chest Right Upper Dz	B-77
Plot 275	V2P1 Chest Right Upper Resultant	B-77
Plot 276	V2P1 Chest Left Lower Dx	B-77
Plot 277	V2P1 Chest Left Lower Dy	B-78
Plot 278	V2P1 Chest Left Lower Dz	B-78
Plot 279	V2P1 Chest Left Lower Resultant	B-78
Plot 280	V2P1 Chest Right Lower Dx	B-78
Plot 281	V2P1 Chest Right Lower Dy	B-79
Plot 282	V2P1 Chest Right Lower Dz	B-79
Plot 283	V2P1 Chest Right Lower Resultant	B-79
Plot 284	V2P1 Abdomen Left Lower Dx	B-79
Plot 285	V2P1 Abdomen Left Lower Dy	B-80
Plot 286	V2P1 Abdomen Left Lower Dz	B-80
Plot 287	V2P1 Abdomen Left Lower Resultant	B-80
Plot 288	V2P1 Abdomen Right Lower Dx	B-80
Plot 289	V2P1 Abdomen Right Lower Dy	B-81
Plot 290	V2P1 Abdomen Right Lower Dz	B-81
Plot 291	V2P1 Abdomen Right Lower Resultant	B-81
Plot 292	V2P2 Fx on head acting through the O.C. joint only	B-81
Plot 293	V2P2 Fz on head acting through the O.C. joint only	B-82
Plot 294	V2P2 My on head acting through the O.C. joint only	B-82
Plot 295	V2P2 Fx on head acting through the total neck section	B-82
Plot 296	V2P2 Fy on head acting through the total neck section	B-82
Plot 297	V2P2 Fz on head acting through the total neck section	B-83
Plot 298	V2P2 Mx on head acting through the total neck section	B-83

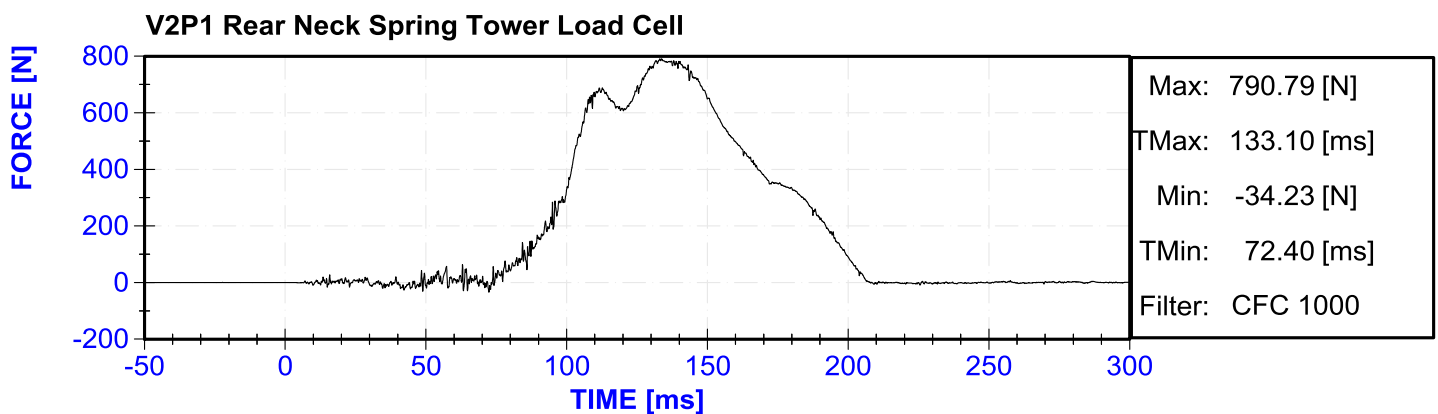
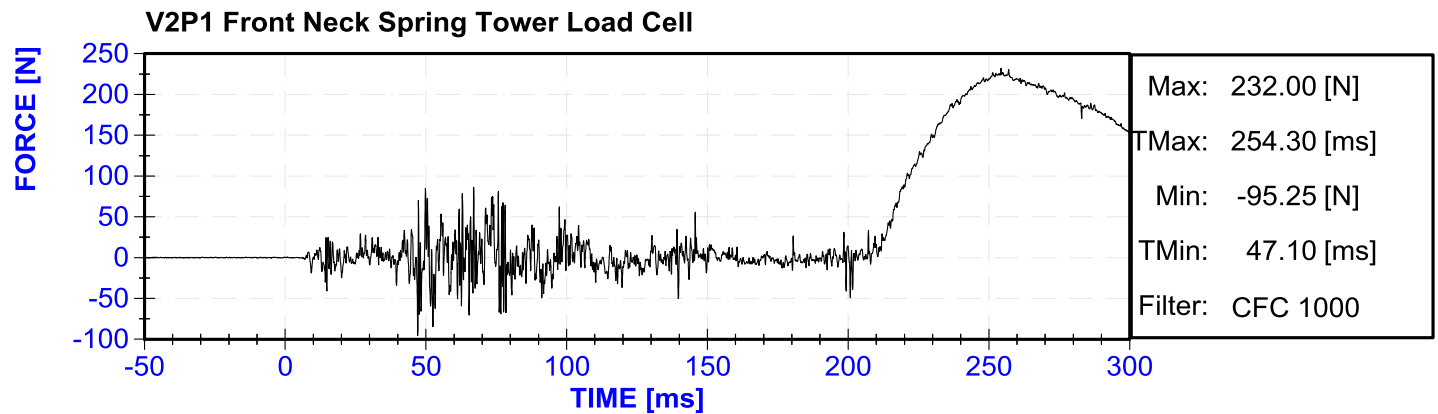
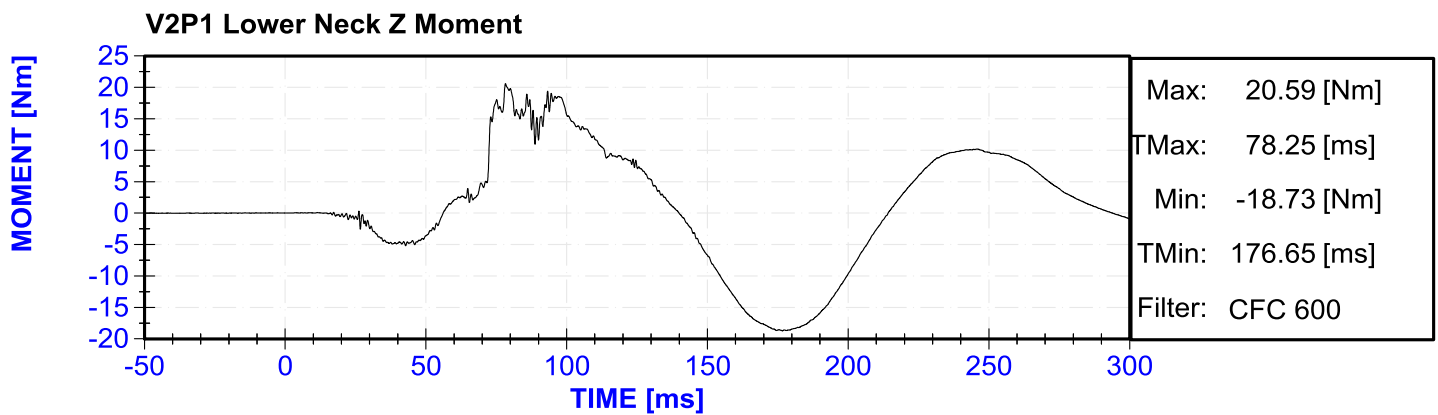
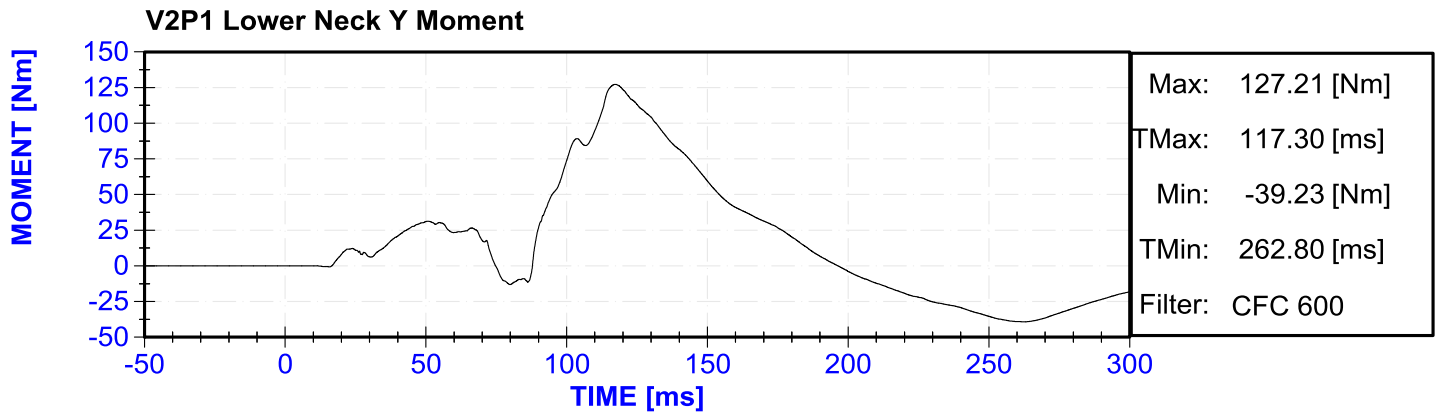
Plot 299	V2P2 My on head acting through the total neck section	B-83
Plot 300	V2P2 Mz on head acting through the total neck section	B-83
Plot 301	V2P2 Chest Left Upper Dx	B-84
Plot 302	V2P2 Chest Left Upper Dy	B-84
Plot 303	V2P2 Chest Left Upper Dz	B-84
Plot 304	V2P2 Chest Left Upper Resultant	B-84
Plot 305	V2P2 Chest Right Upper Dx	B-85
Plot 306	V2P2 Chest Right Upper Dy	B-85
Plot 307	V2P2 Chest Right Upper Dz	B-85
Plot 308	V2P2 Chest Right Upper Resultant	B-85
Plot 309	V2P2 Chest Left Lower Dx	B-86
Plot 310	V2P2 Chest Left Lower Dy	B-86
Plot 311	V2P2 Chest Left Lower Dz	B-86
Plot 312	V2P2 Chest Left Lower Resultant	B-86
Plot 313	V2P2 Chest Right Lower Dx	B-87
Plot 314	V2P2 Chest Right Lower Dy	B-87
Plot 315	V2P2 Chest Right Lower Dz	B-87
Plot 316	V2P2 Chest Right Lower Resultant	B-87
Plot 317	V2P2 Abdomen Left Lower Dx	B-88
Plot 318	V2P2 Abdomen Left Lower Dy	B-88
Plot 319	V2P2 Abdomen Left Lower Dz	B-88
Plot 320	V2P2 Abdomen Left Lower Resultant	B-88
Plot 321	V2P2 Abdomen Right Lower Dx	B-89
Plot 322	V2P2 Abdomen Right Lower Dy	B-89
Plot 323	V2P2 Abdomen Right Lower Dz	B-89
Plot 324	V2P2 Abdomen Right Lower Resultant	B-89

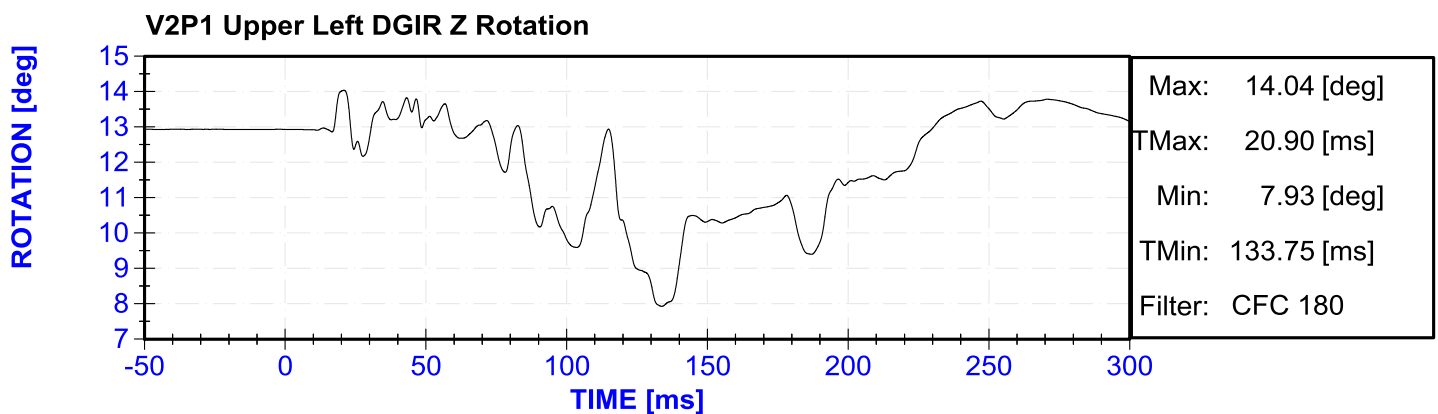
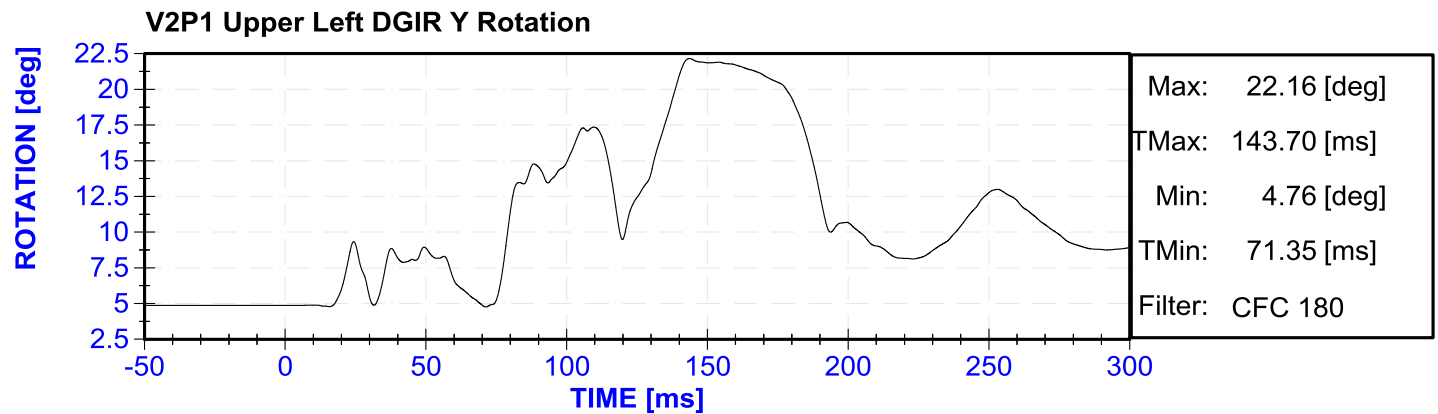
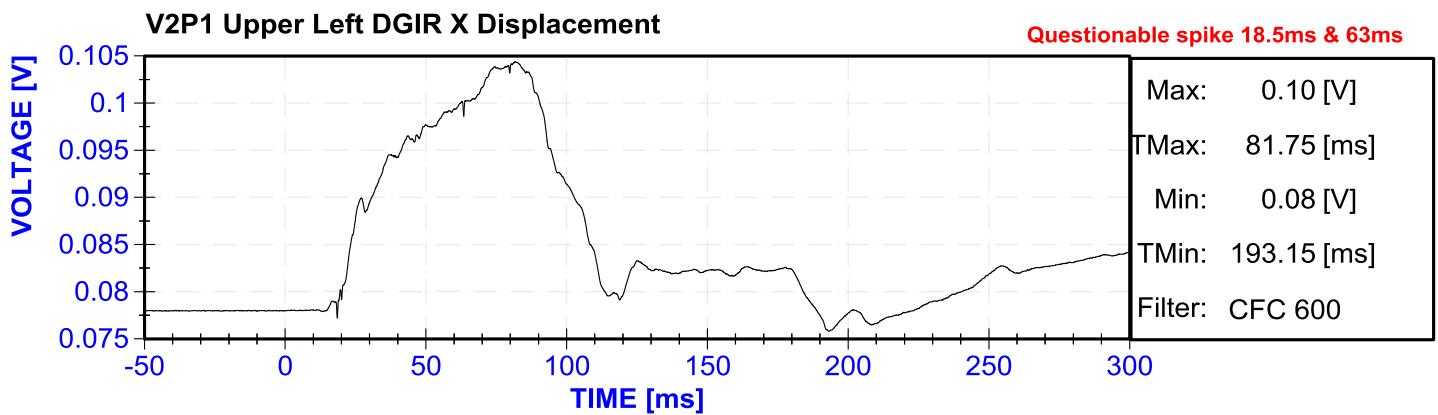
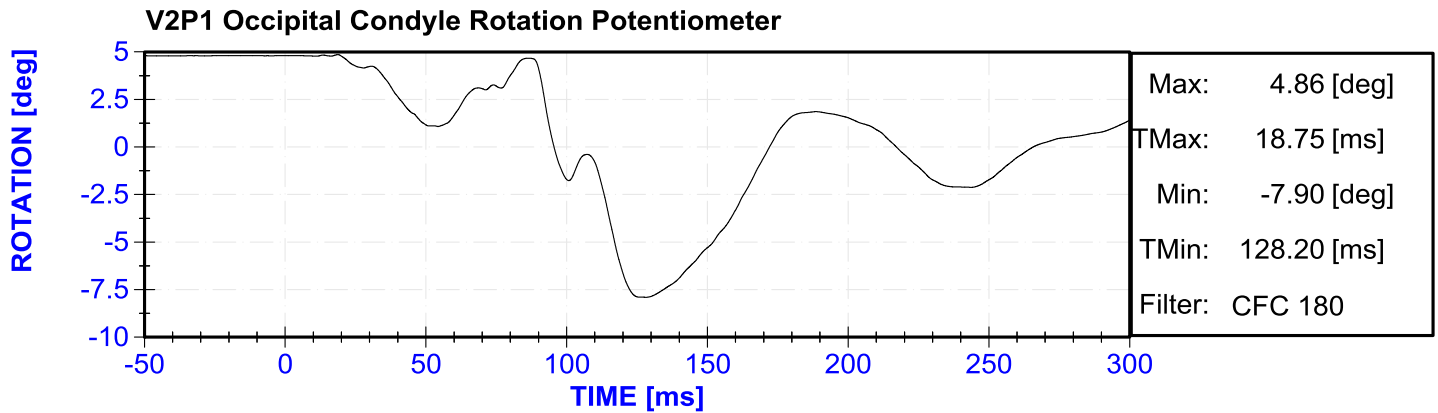




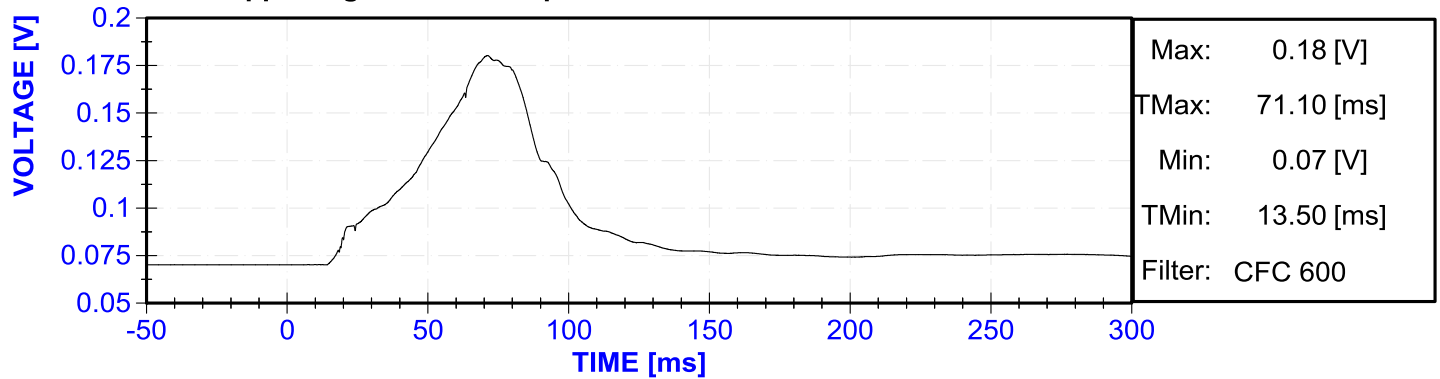




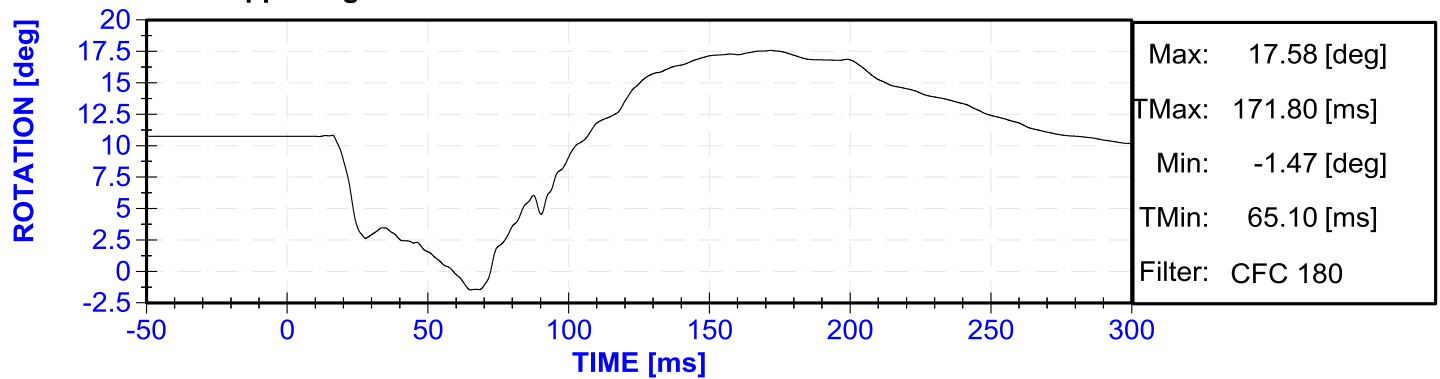




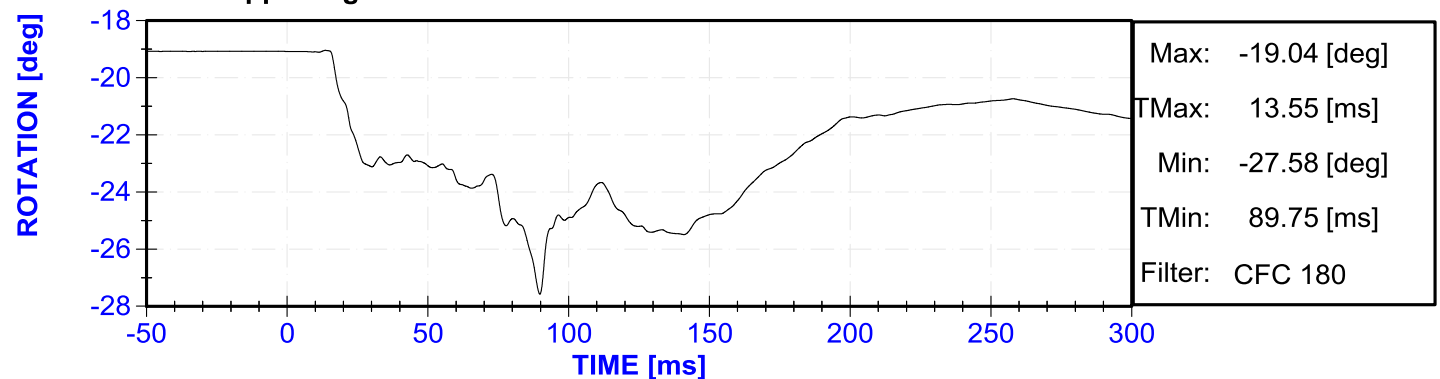
V2P1 Upper Right DGIR X Displacement



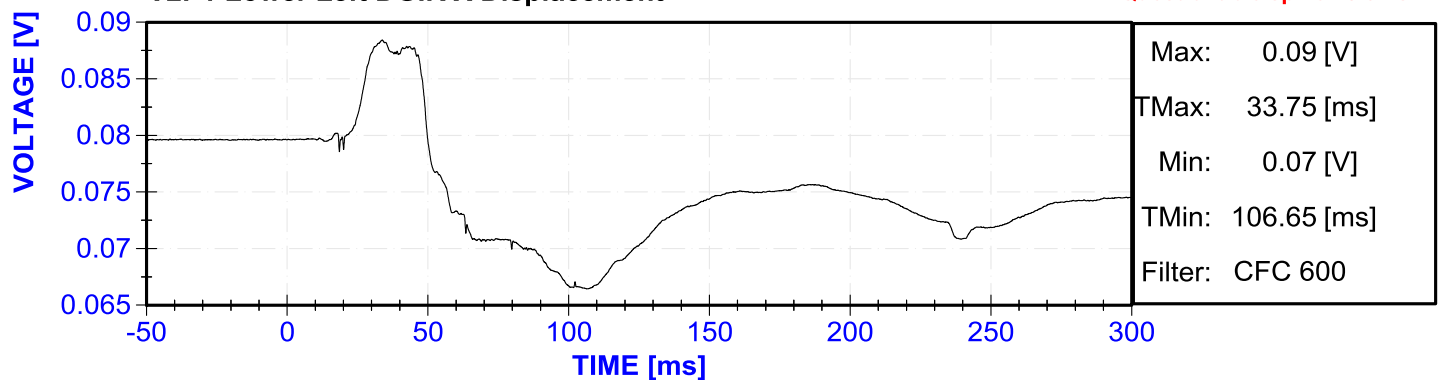
V2P1 Upper Right DGIR Y Rotation

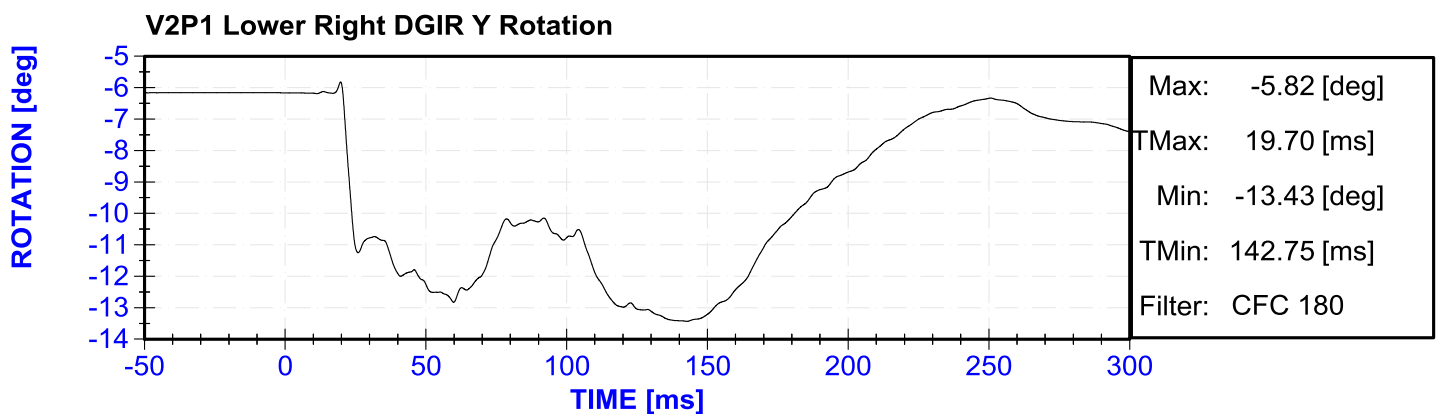
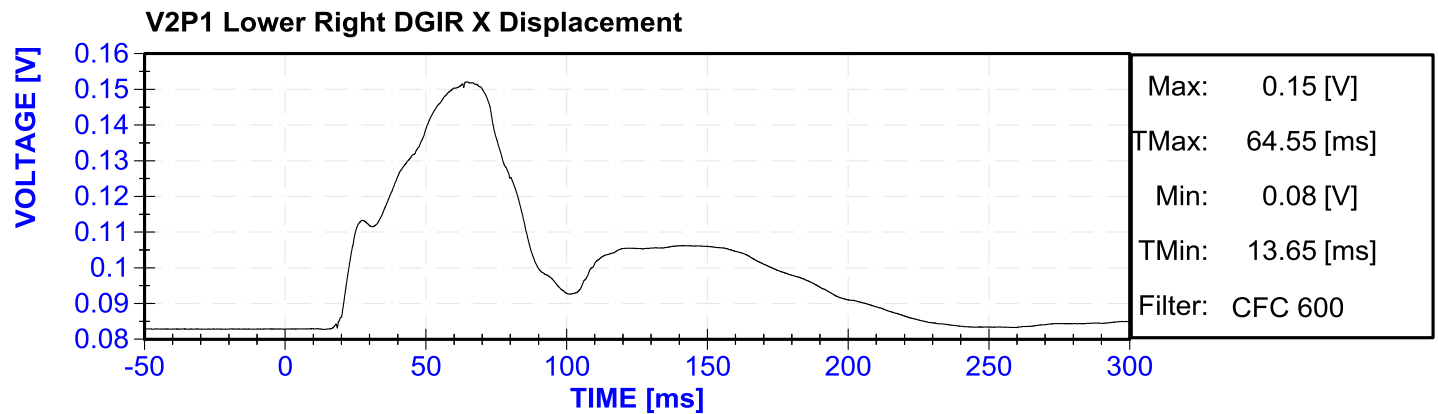
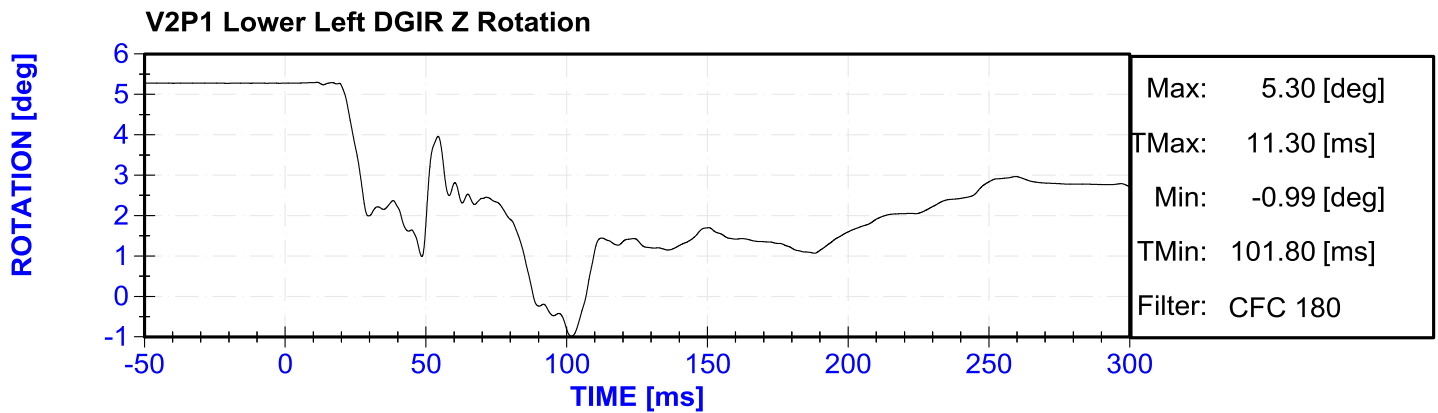
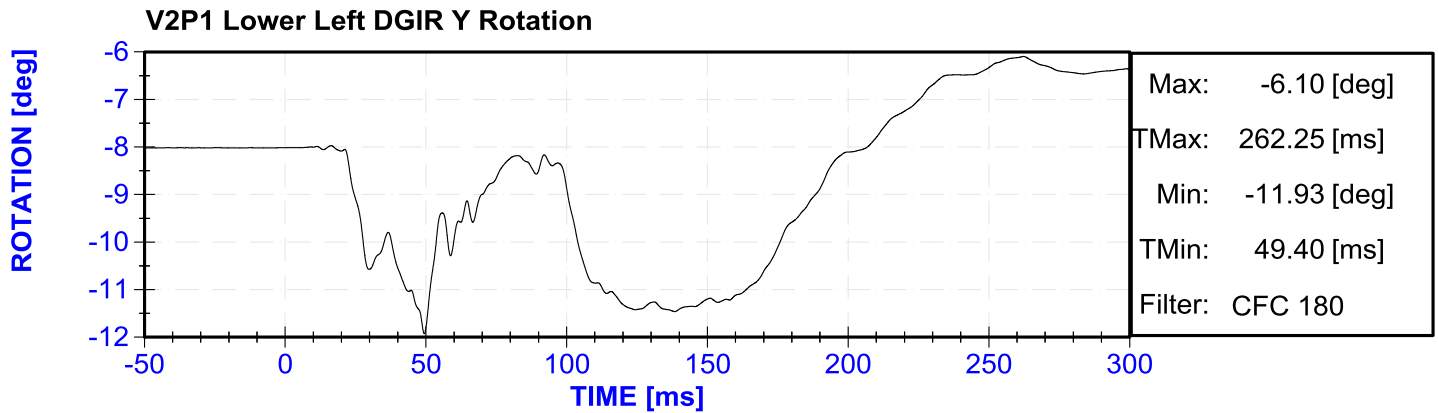


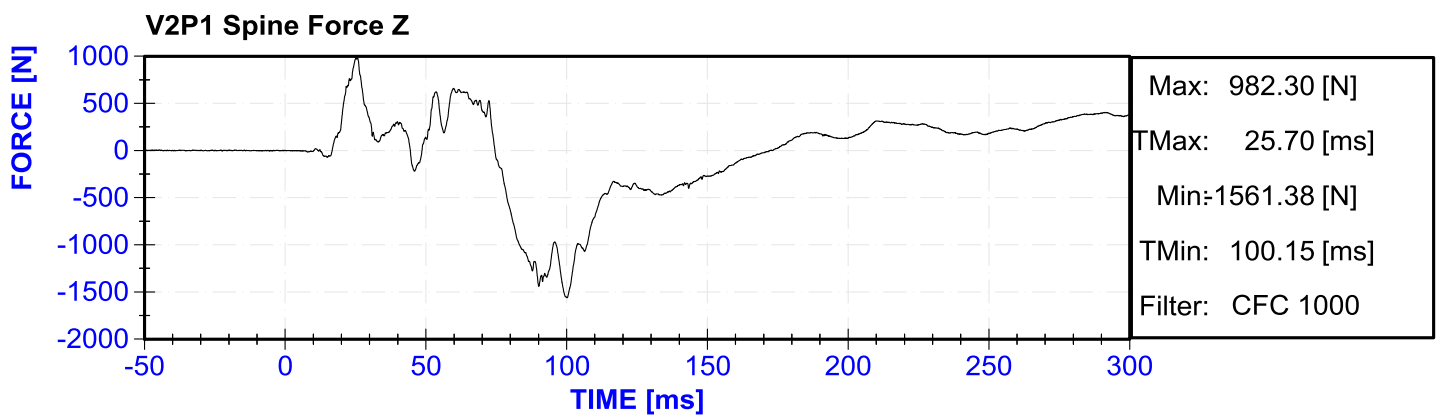
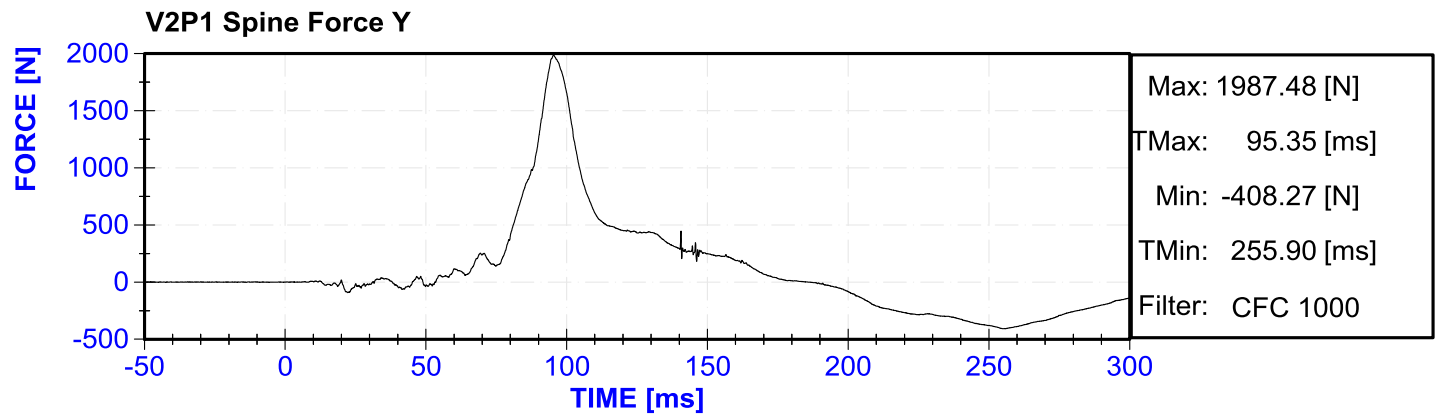
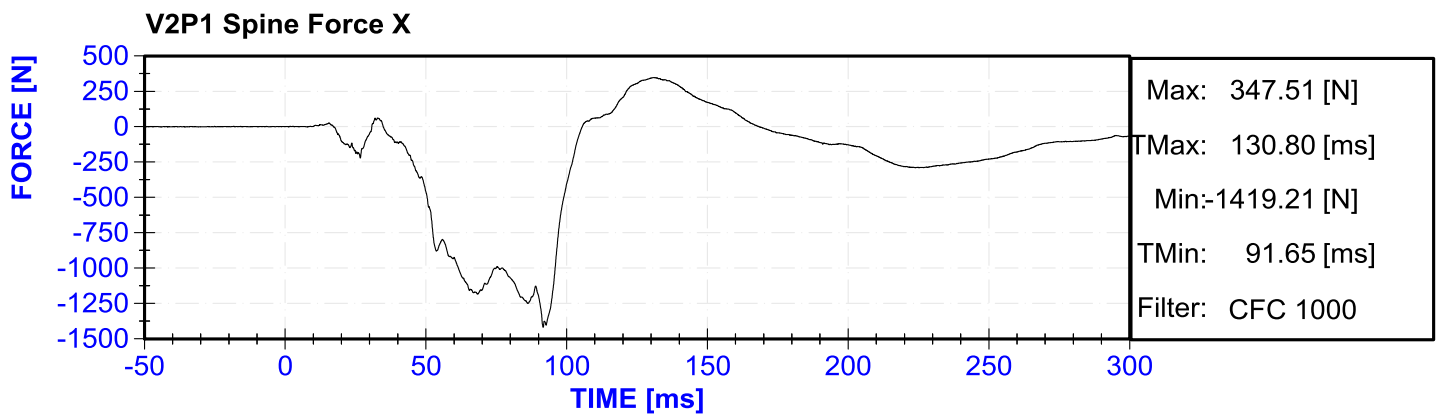
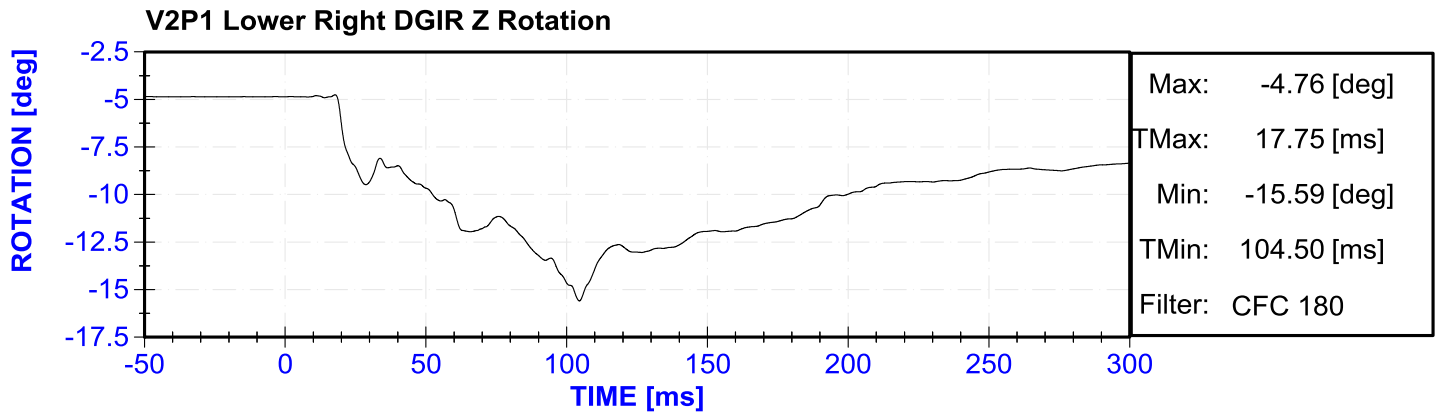
V2P1 Upper Right DGIR Z Rotation

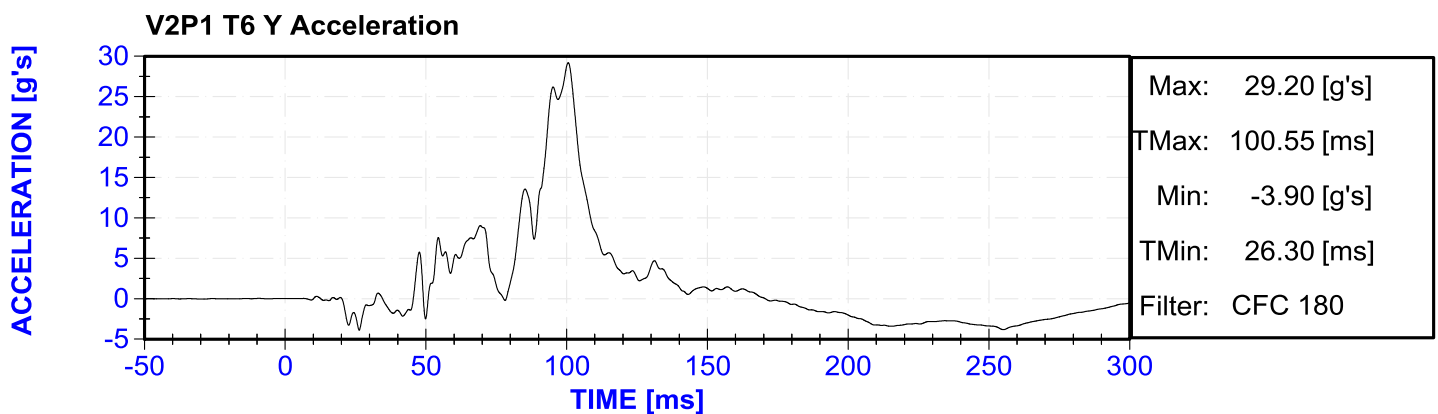
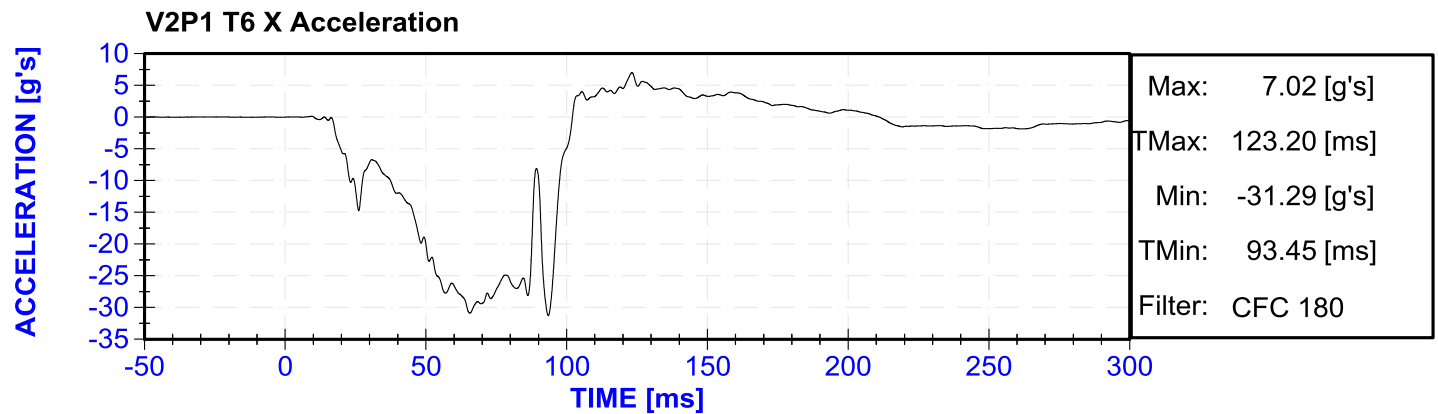
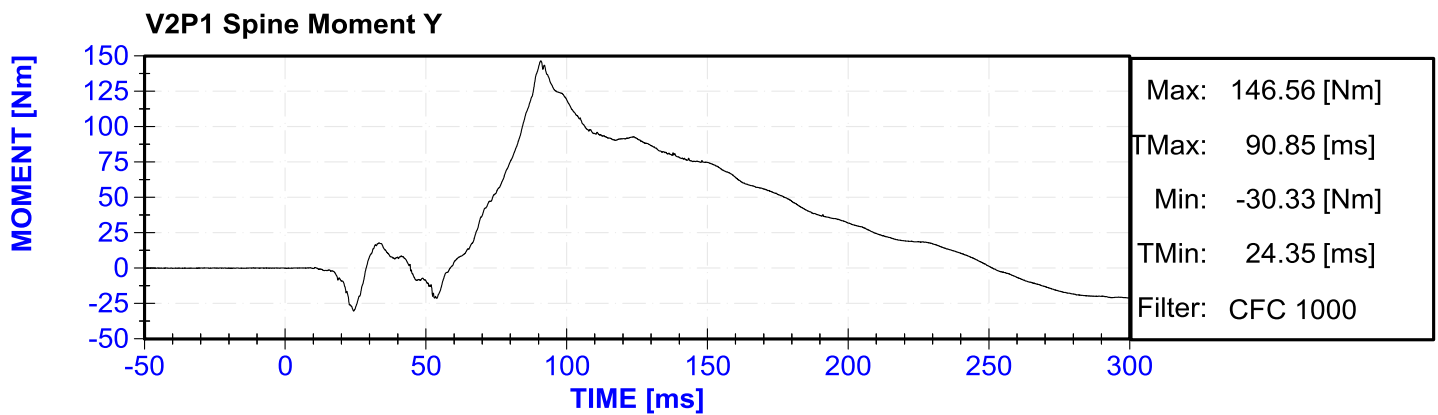
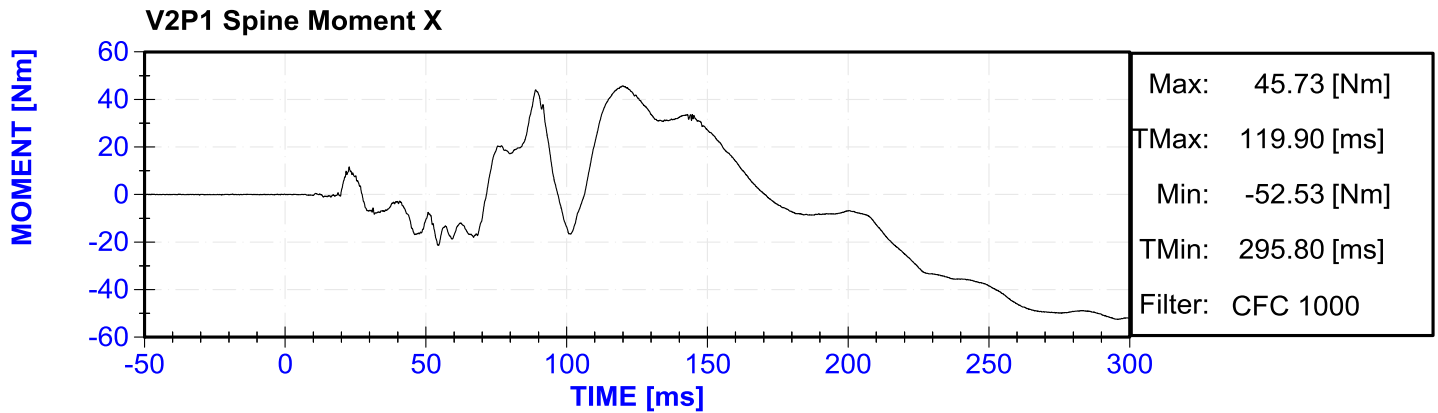


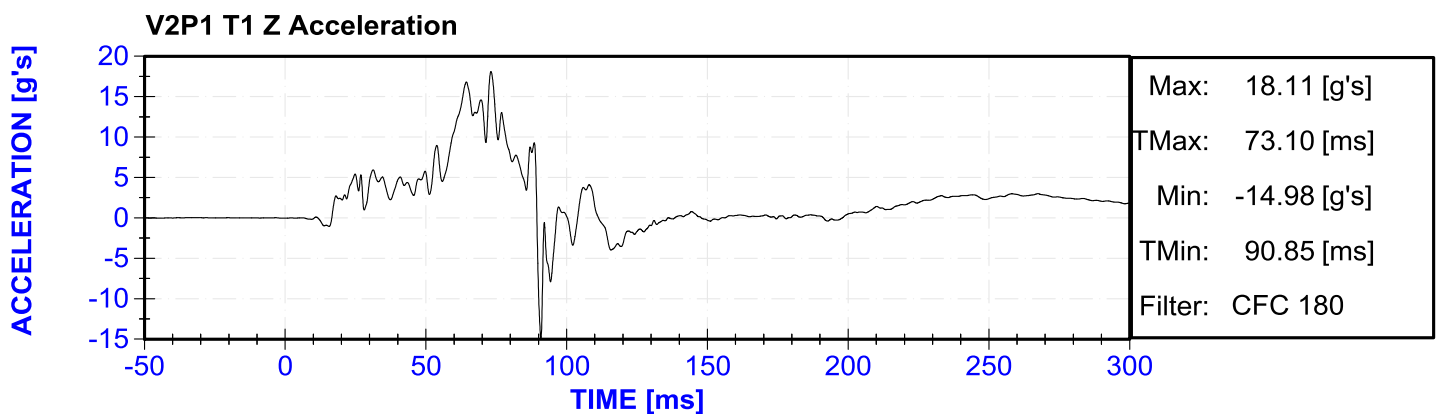
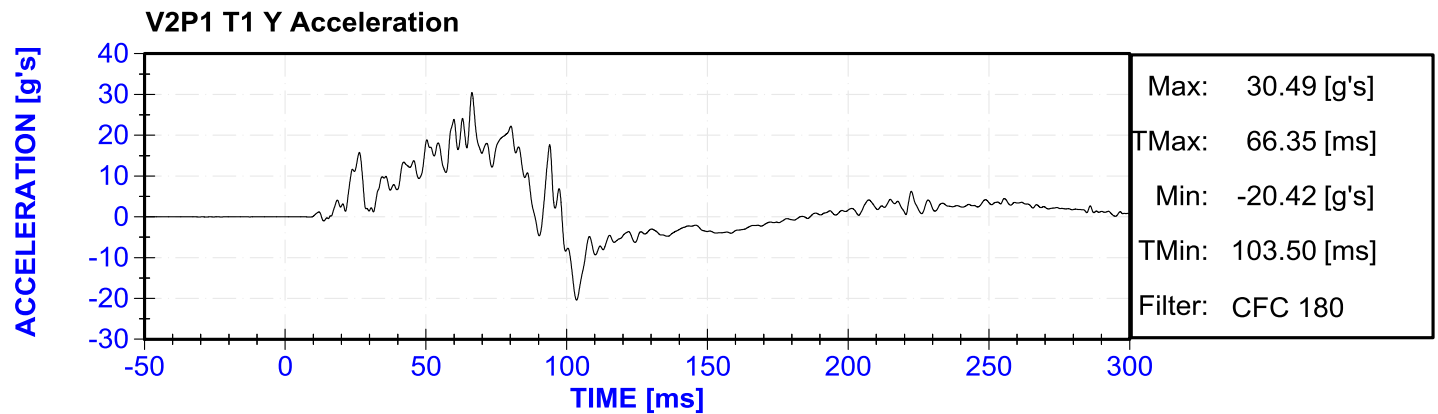
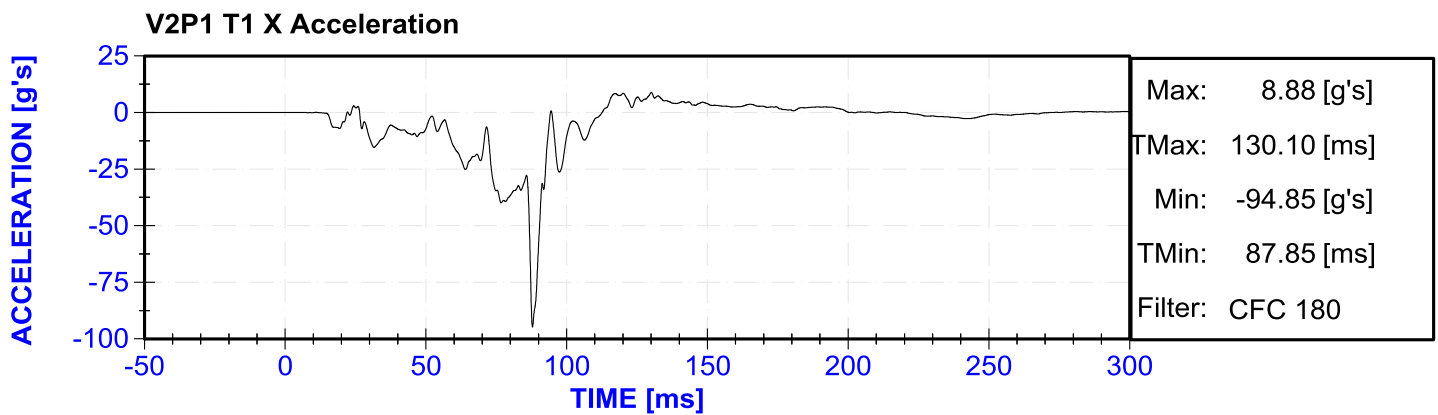
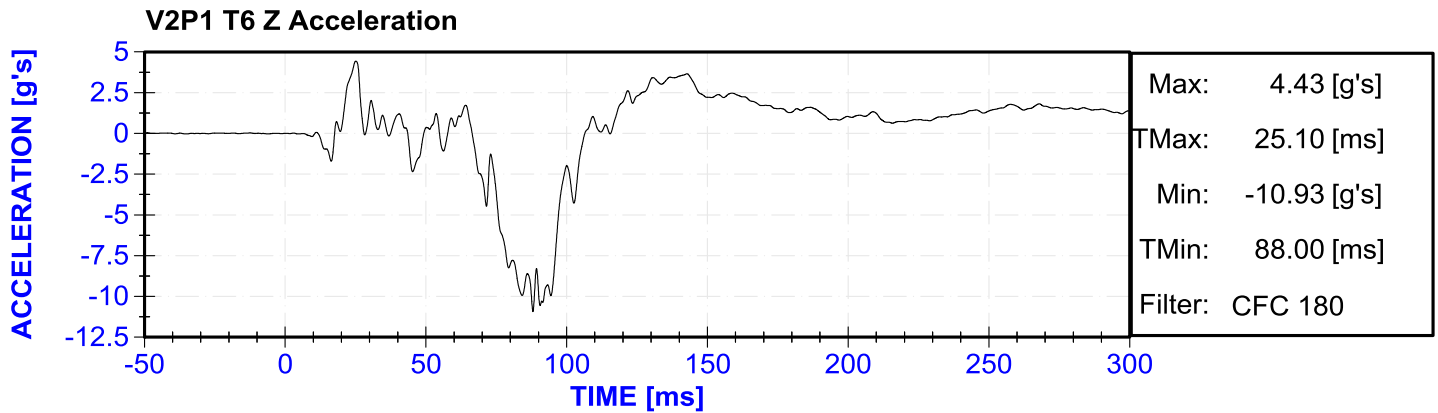
V2P1 Lower Left DGIR X Displacement





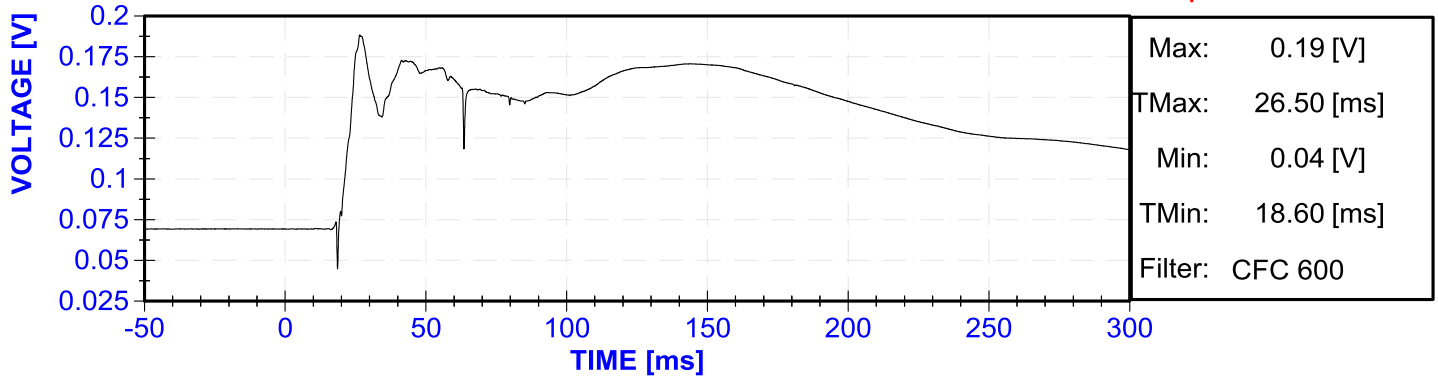




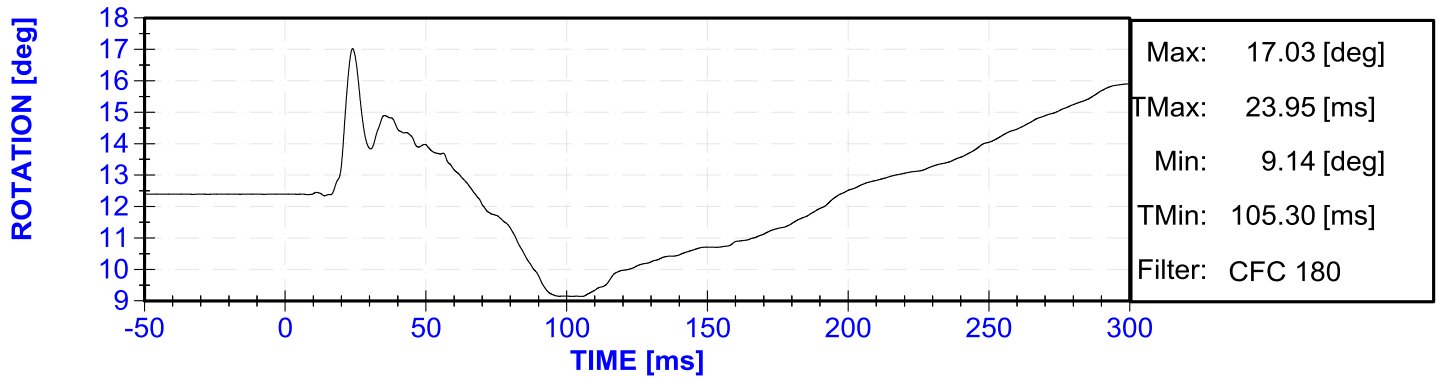


V2P1 Abdomen Left DGIR X Displacement

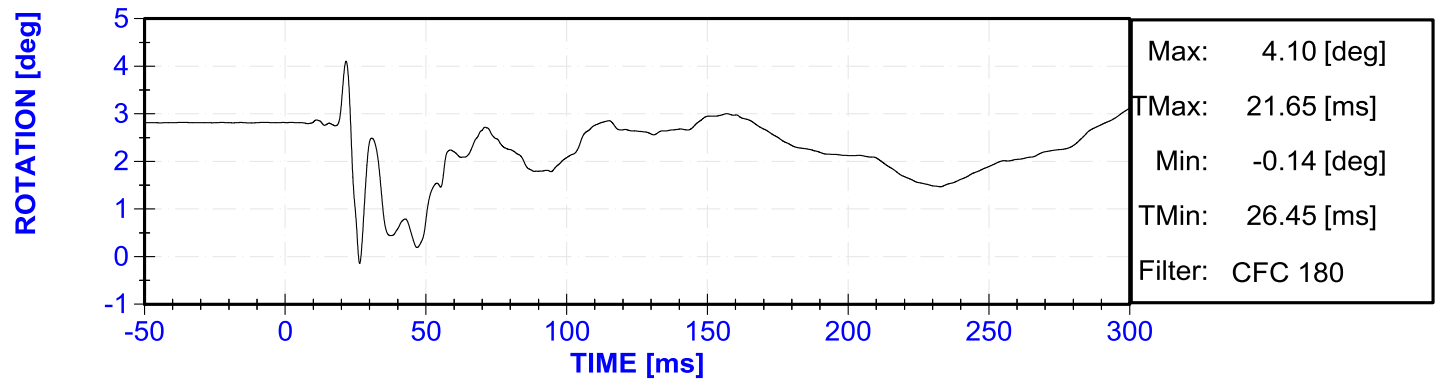
Questionable spike 18.5ms & 63ms



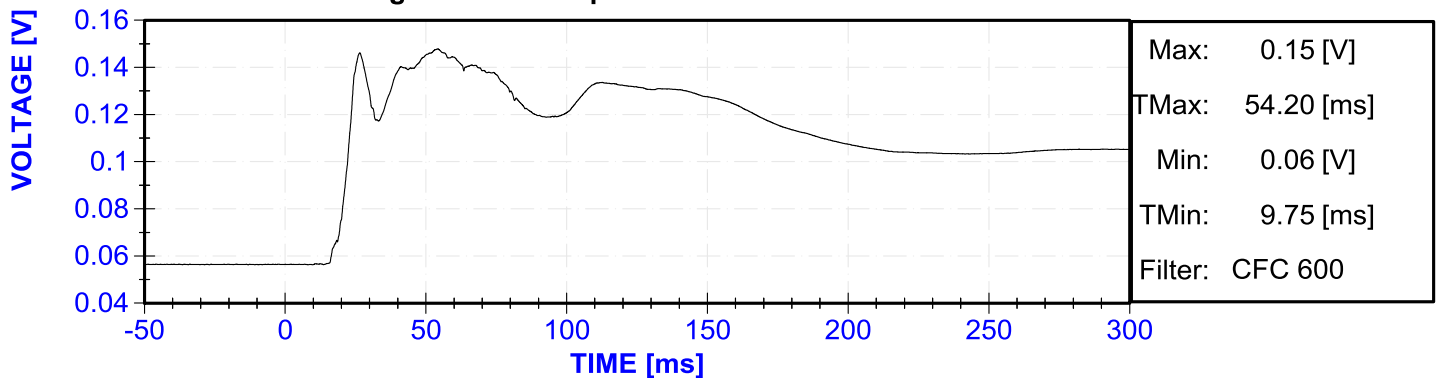
V2P1 Abdomen Left DGIR Y Rotation

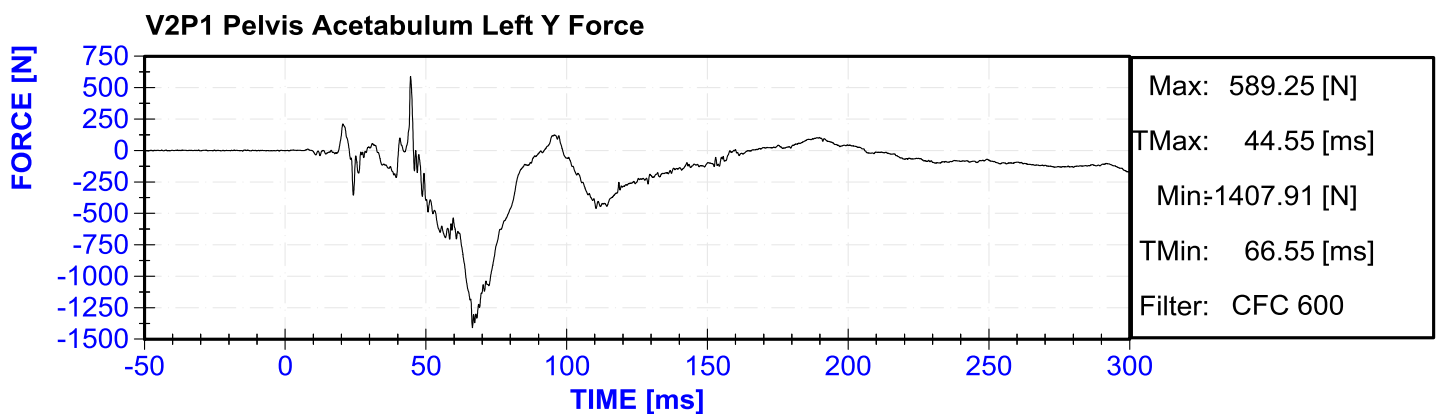
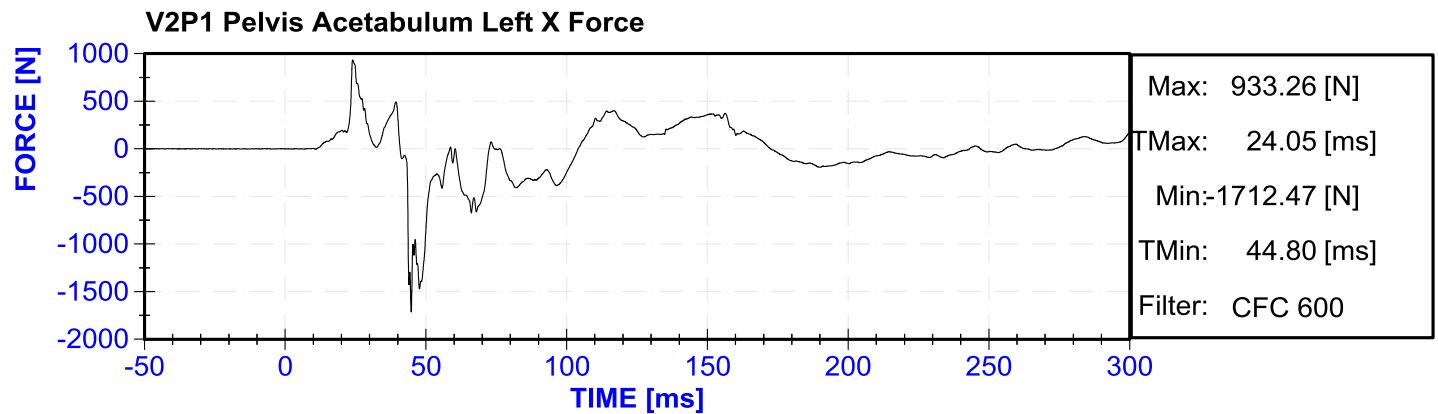
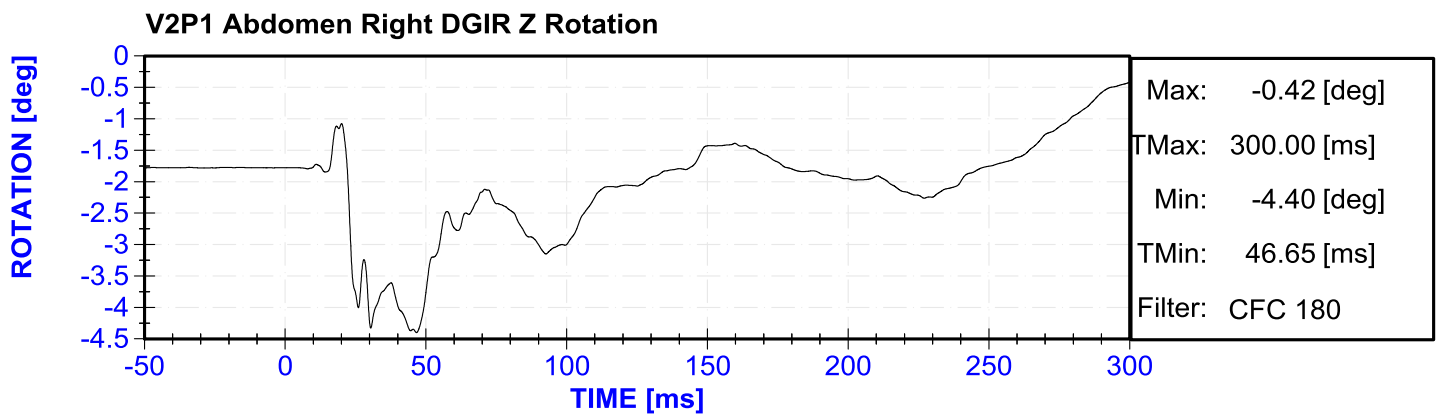
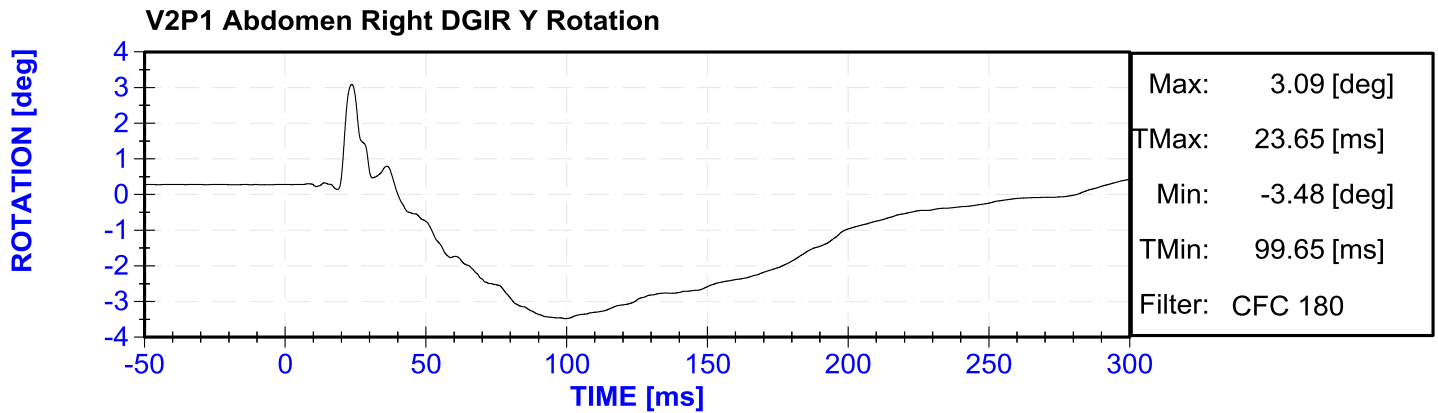


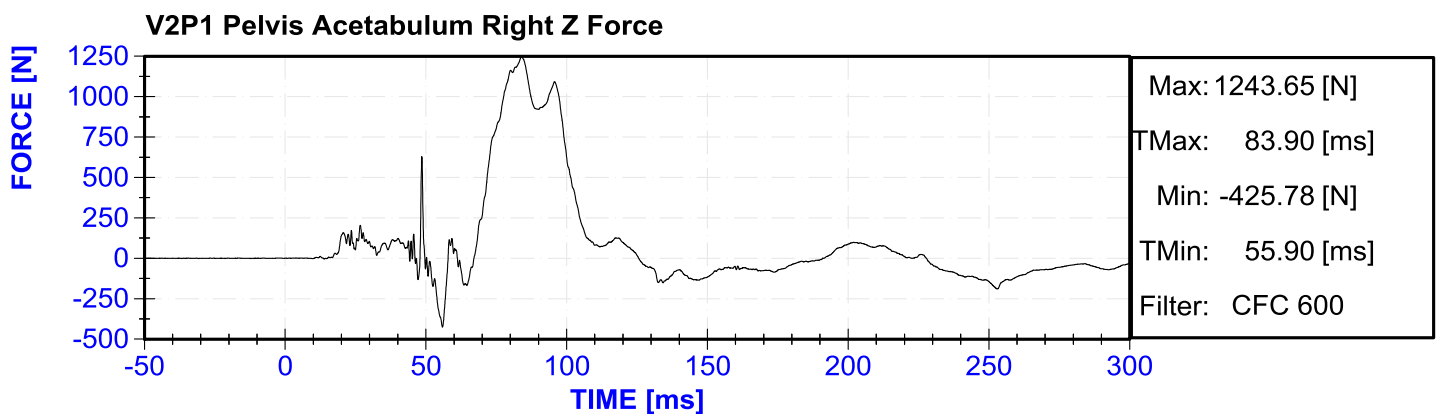
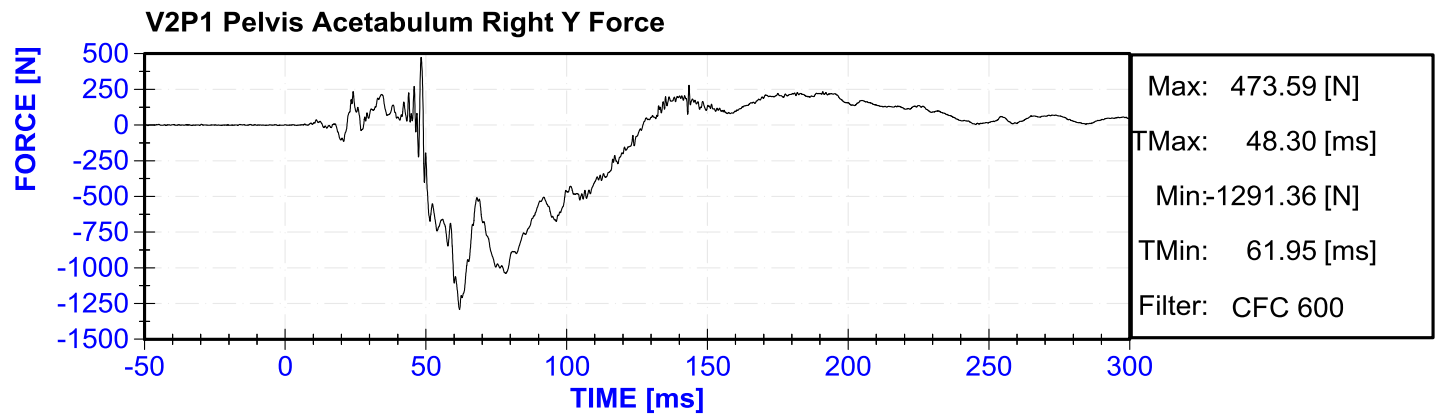
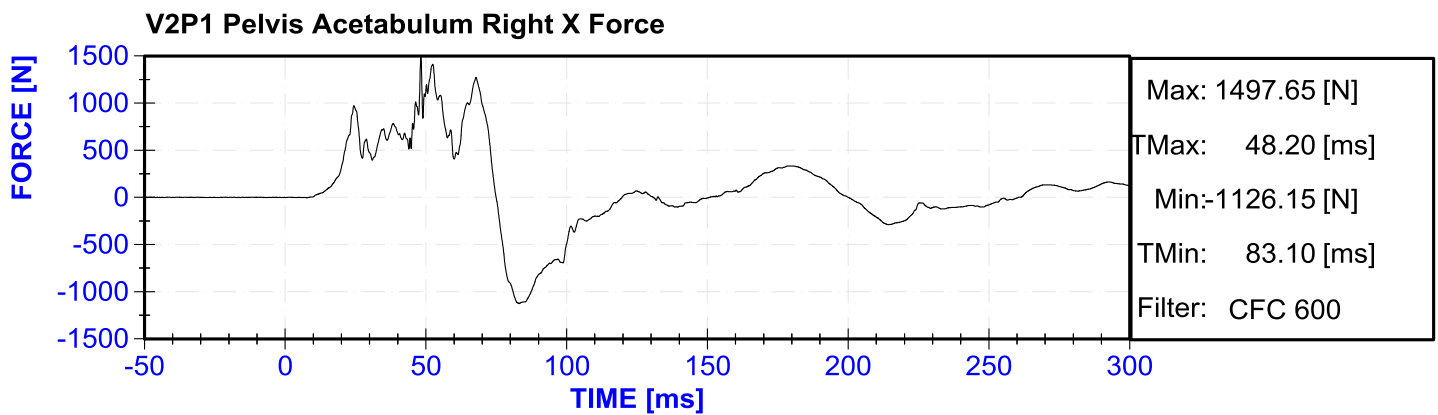
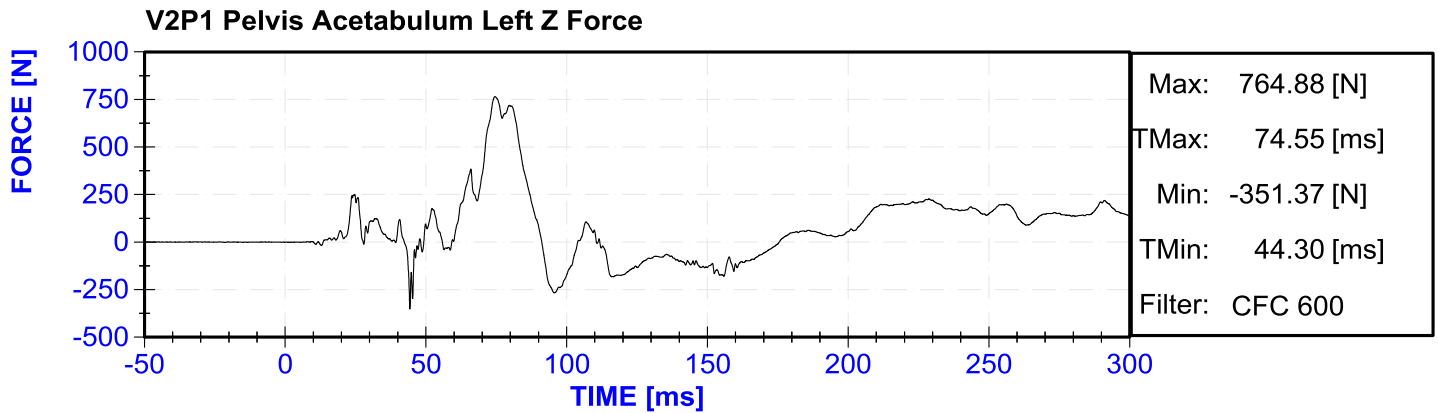
V2P1 Abdomen Left DGIR Z Rotation

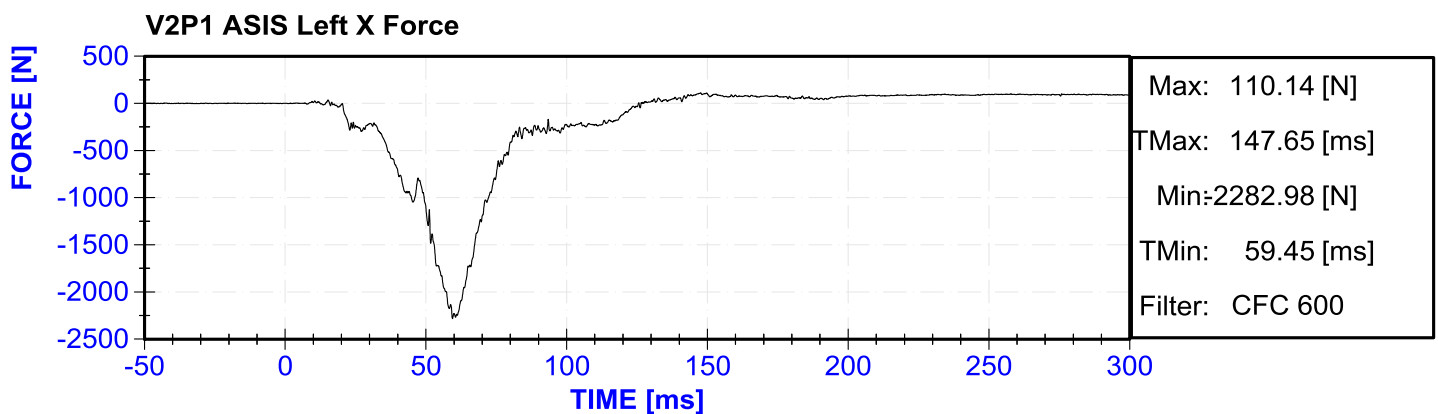
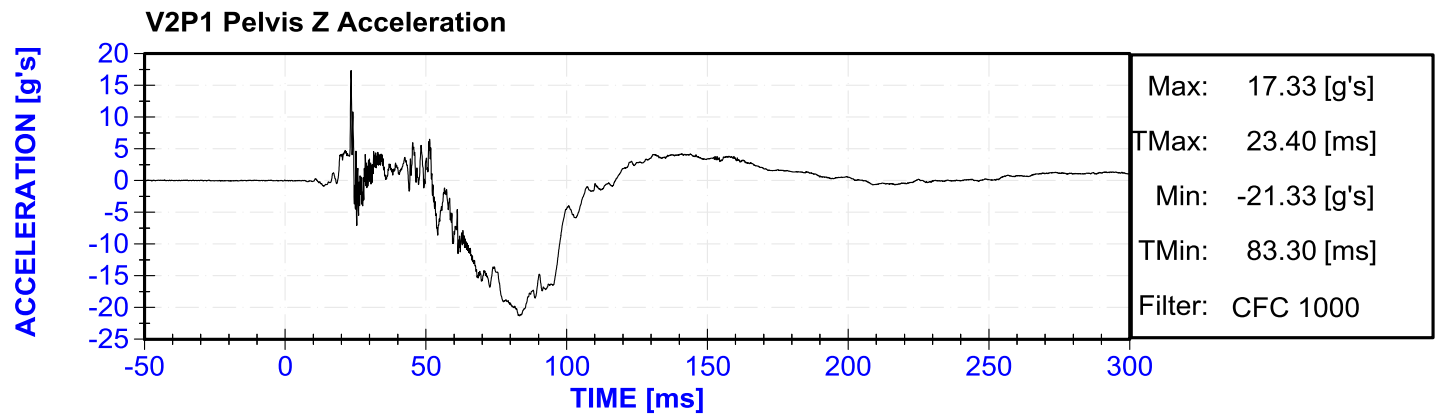
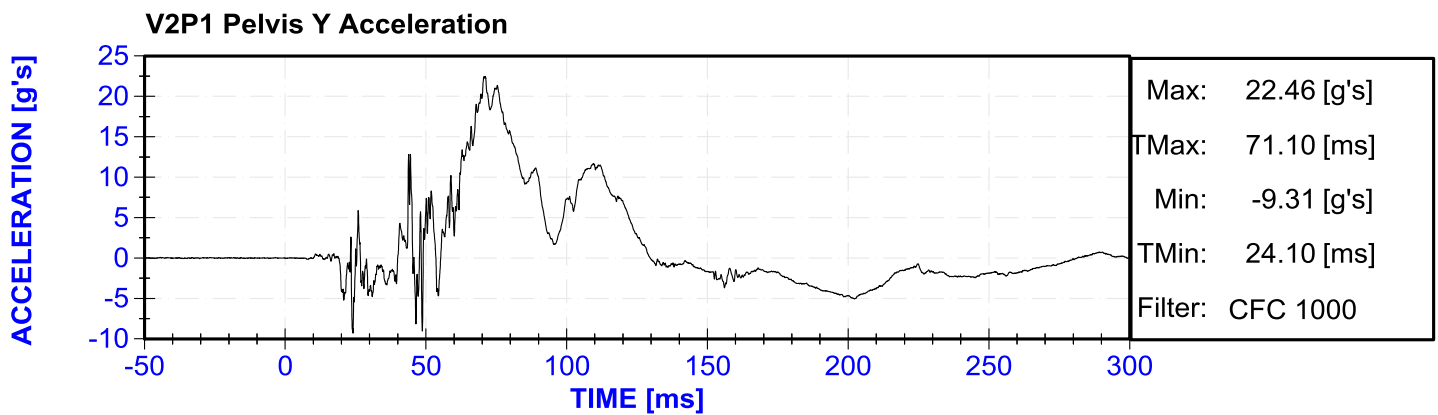
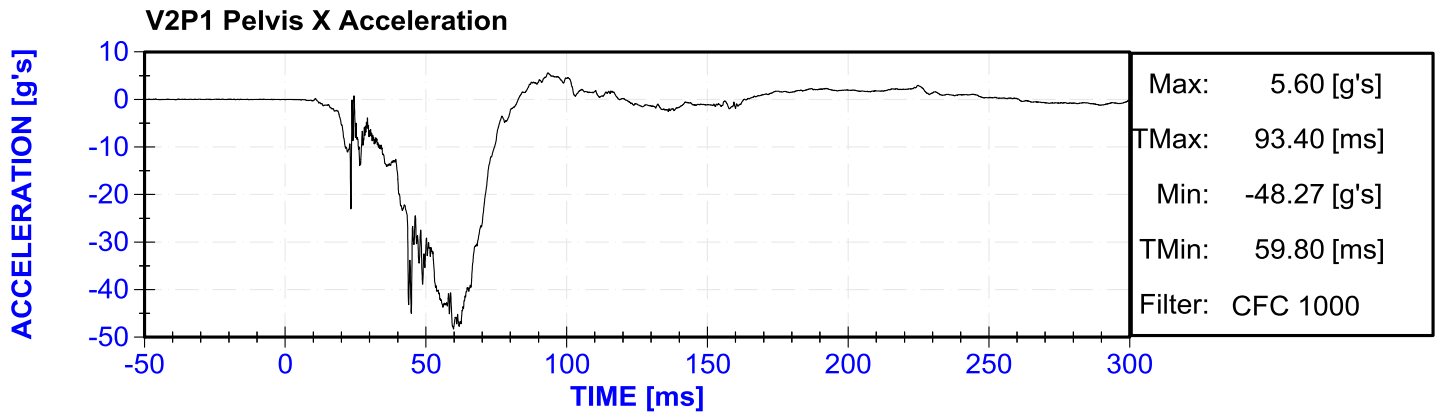


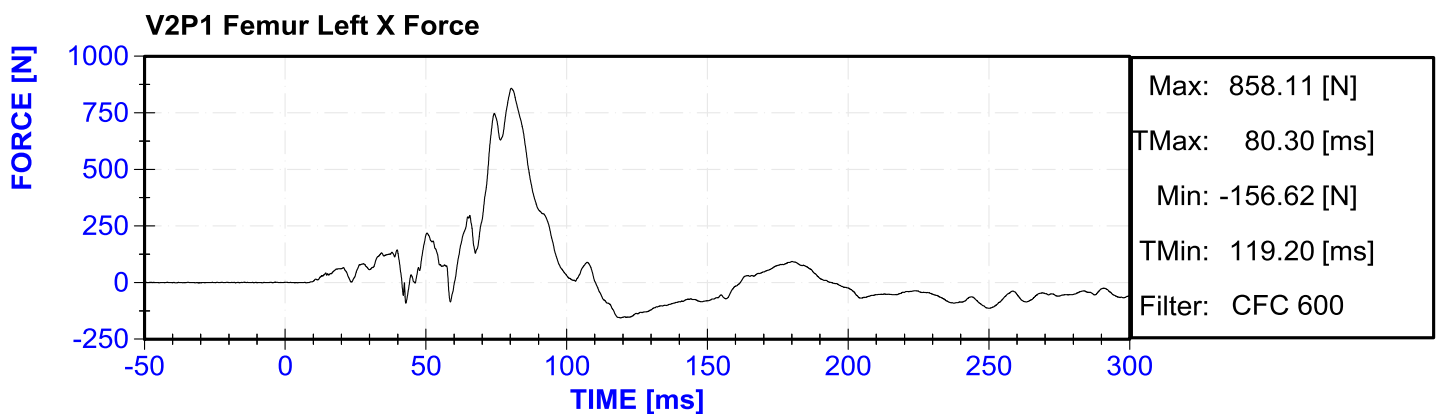
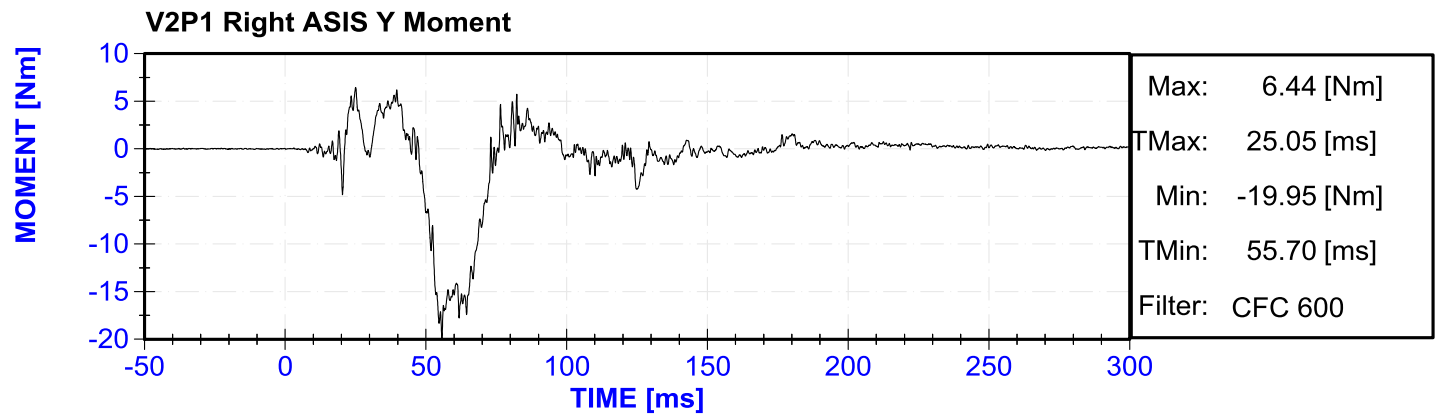
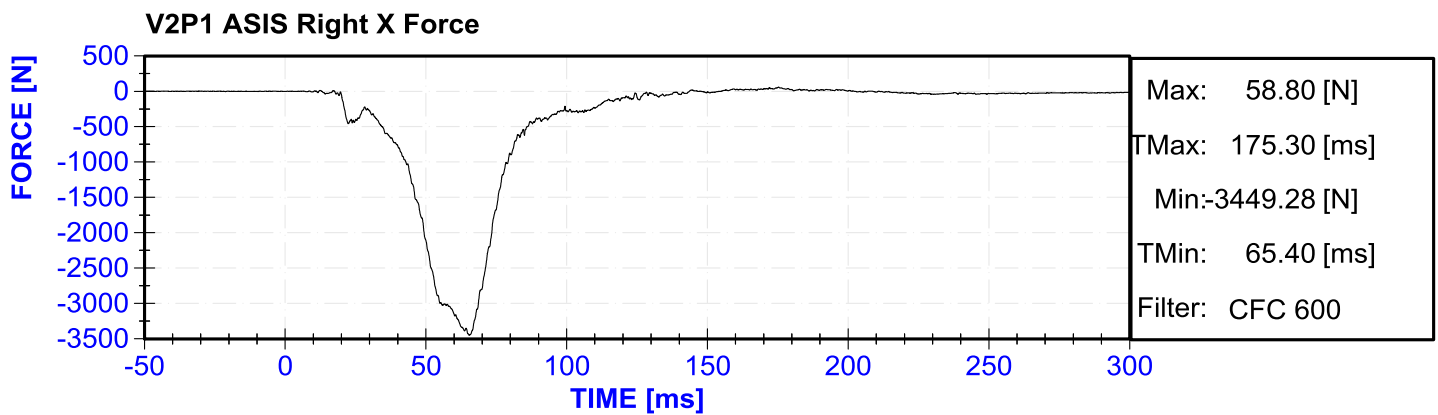
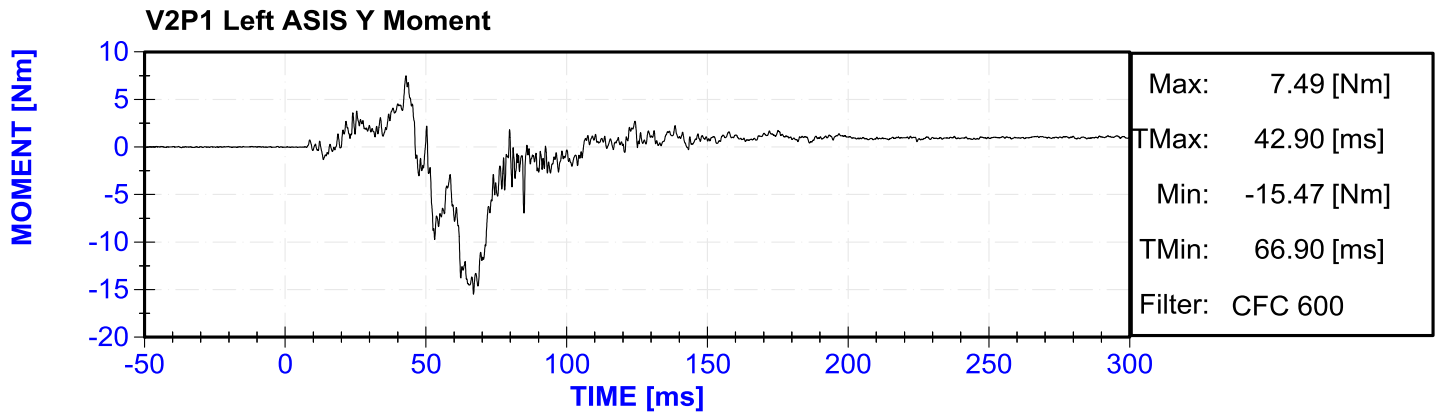
V2P1 Abdomen Right DGIR X Displacement

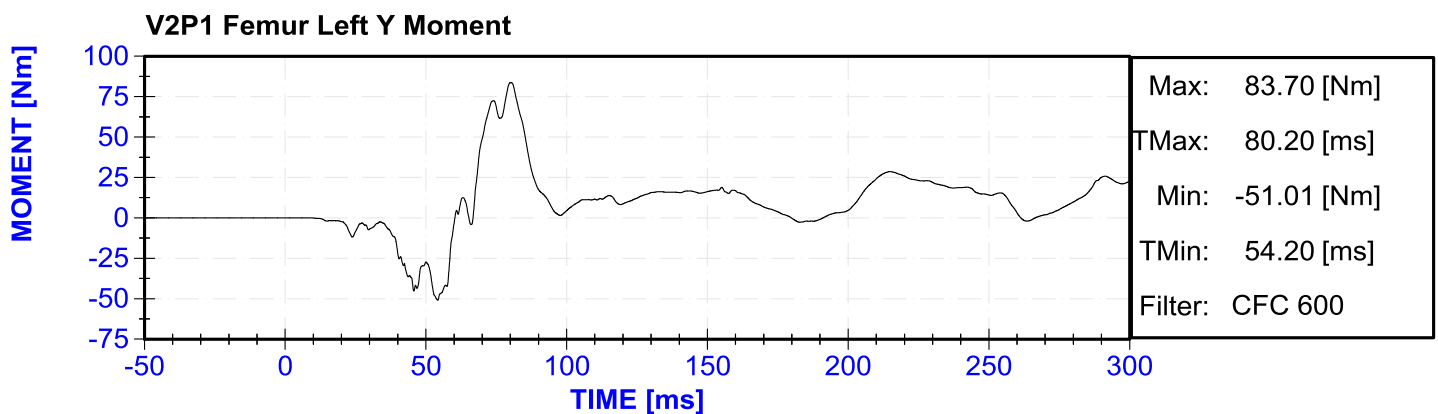
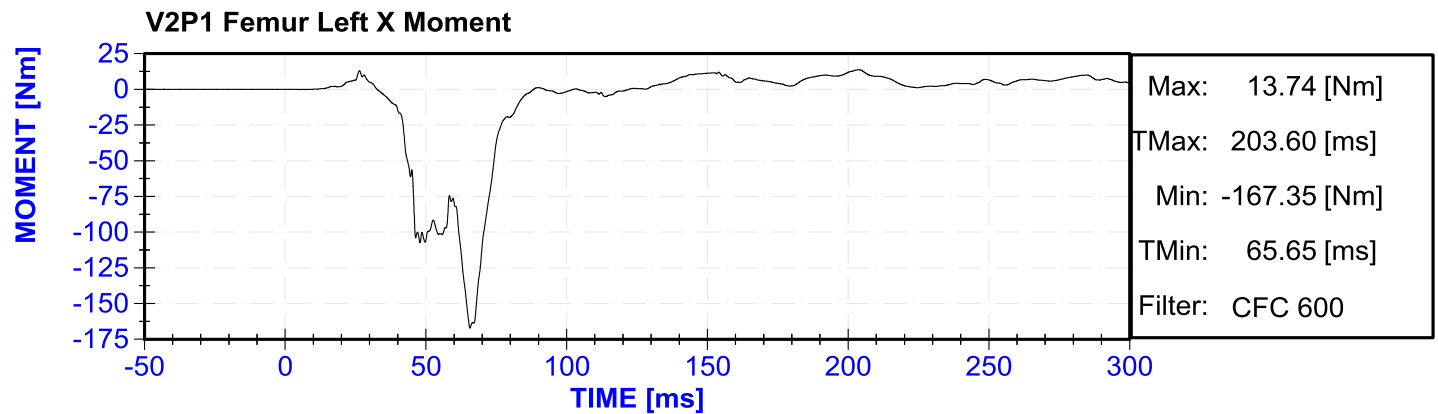
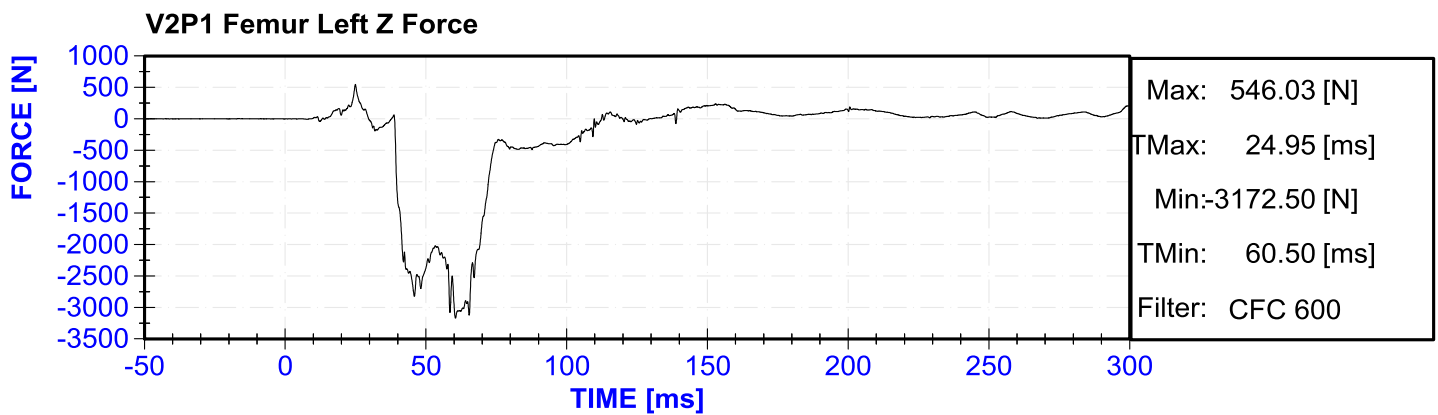
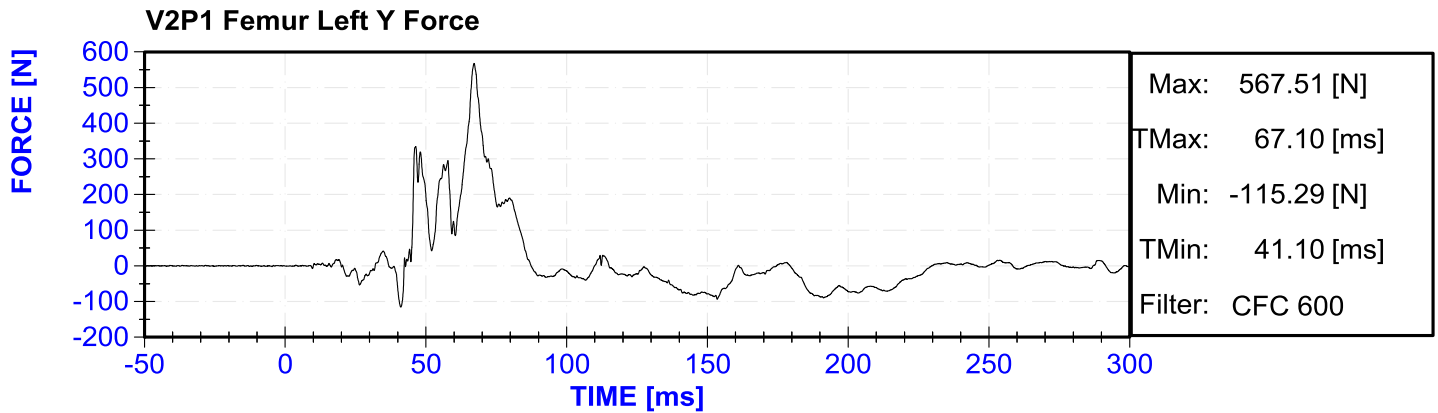


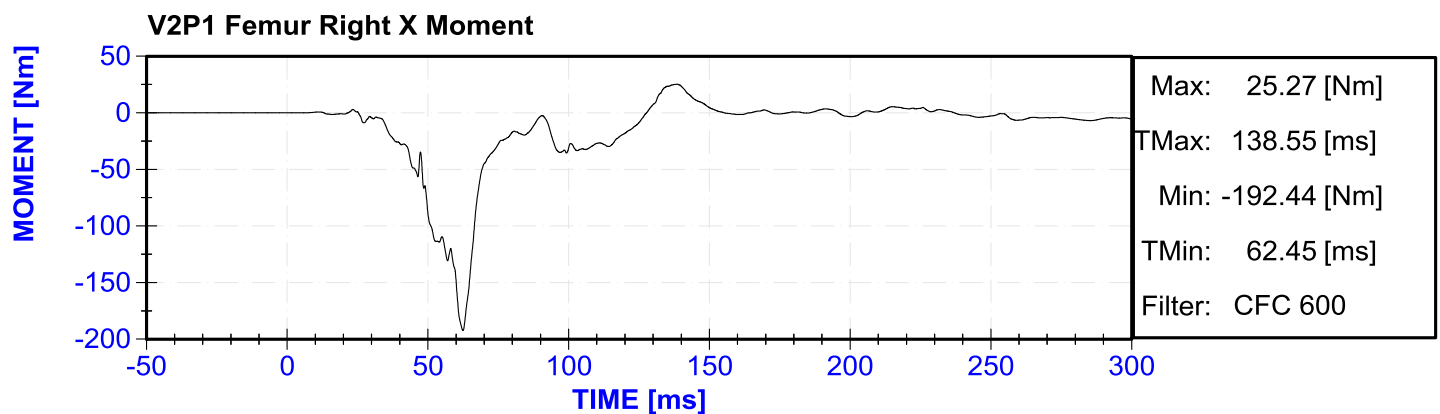
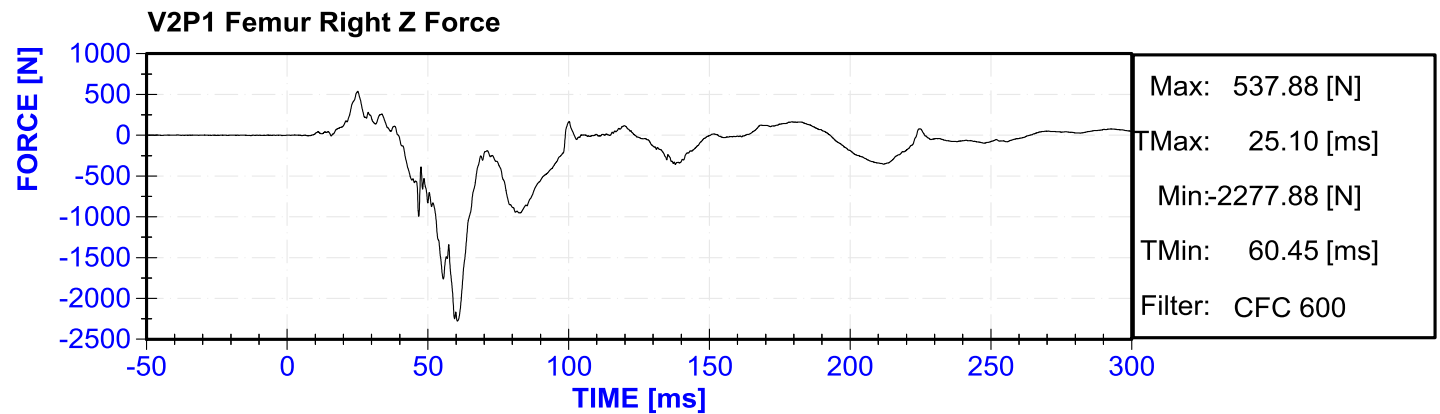
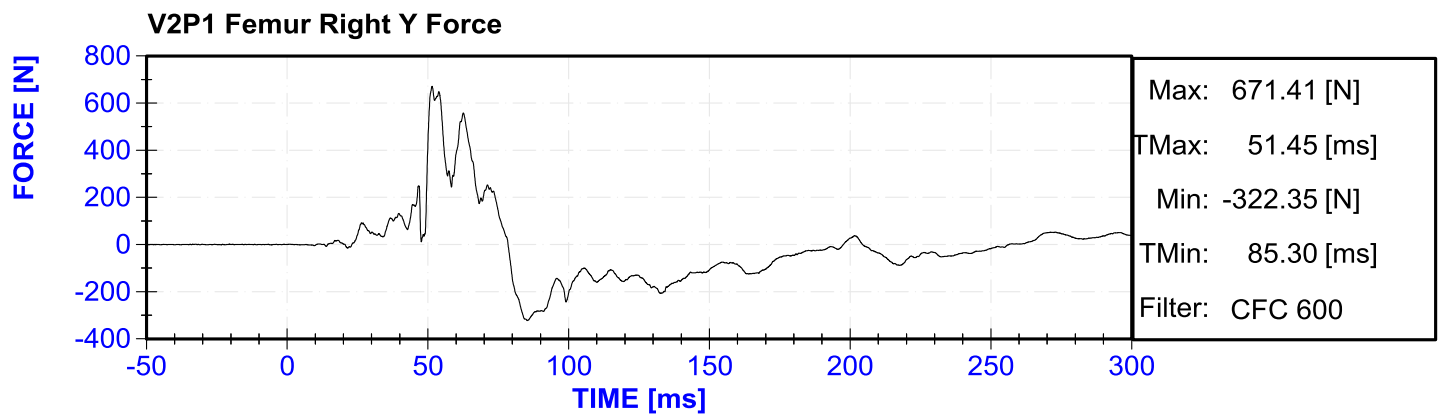
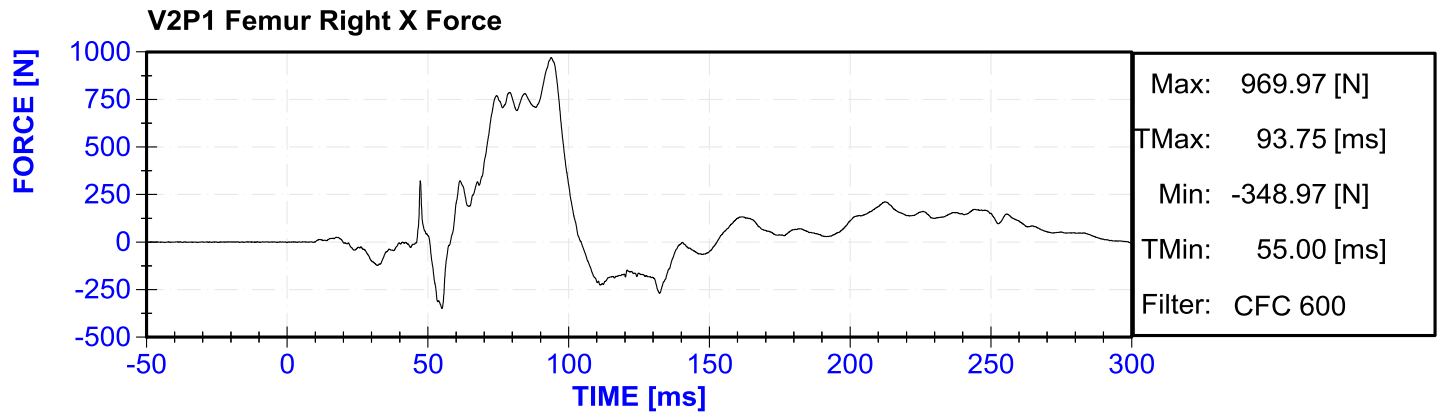


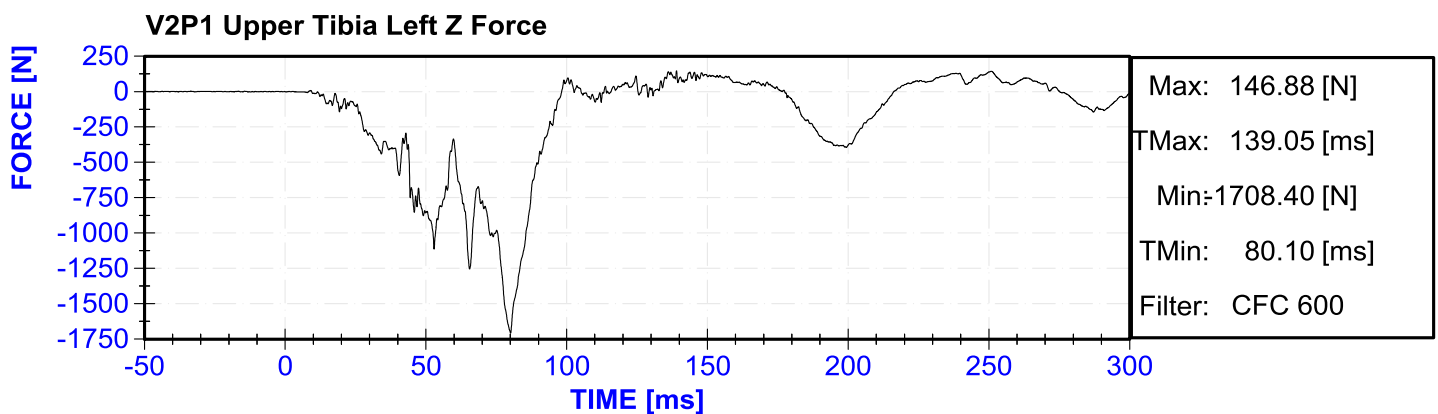
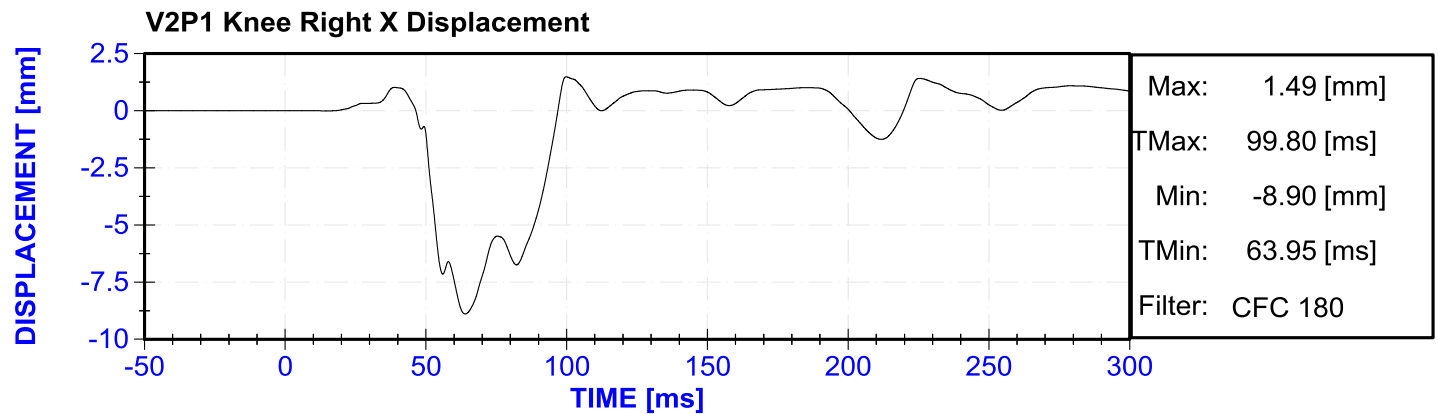
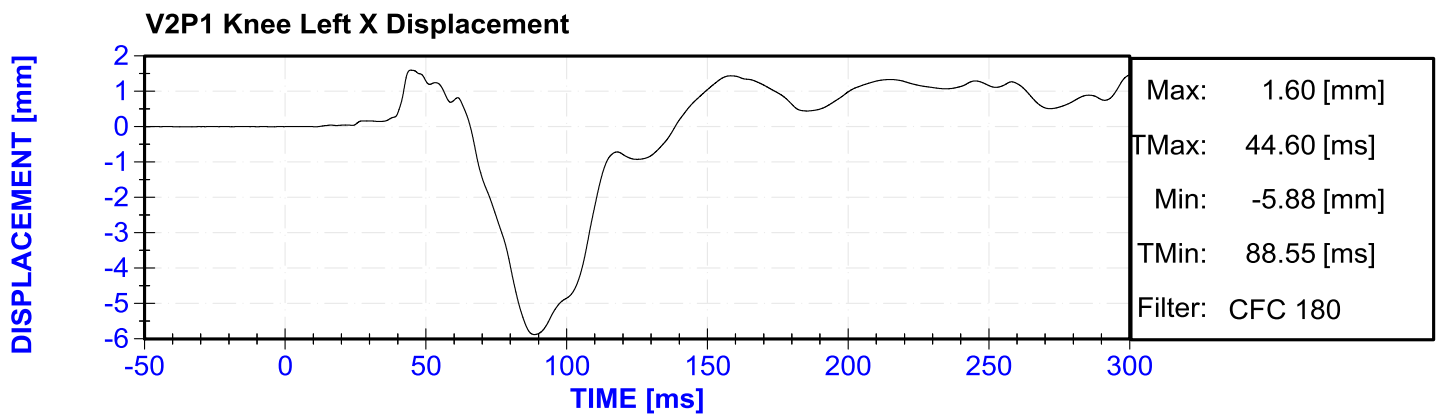
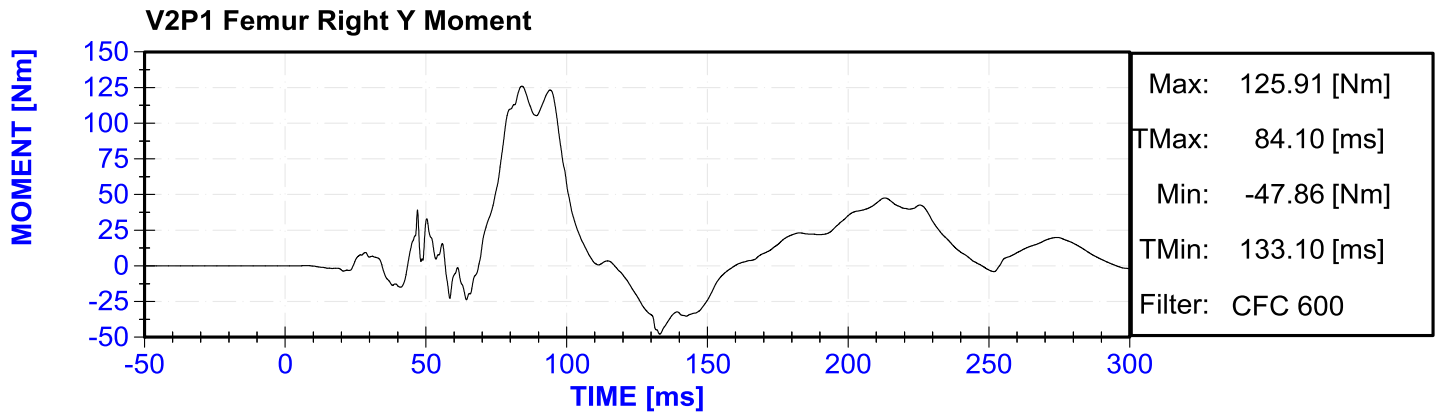


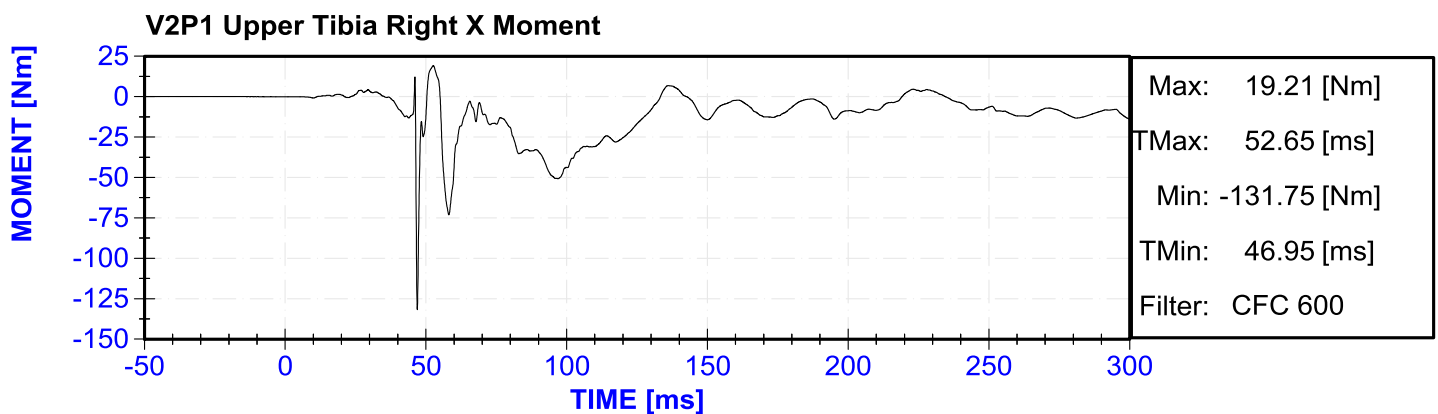
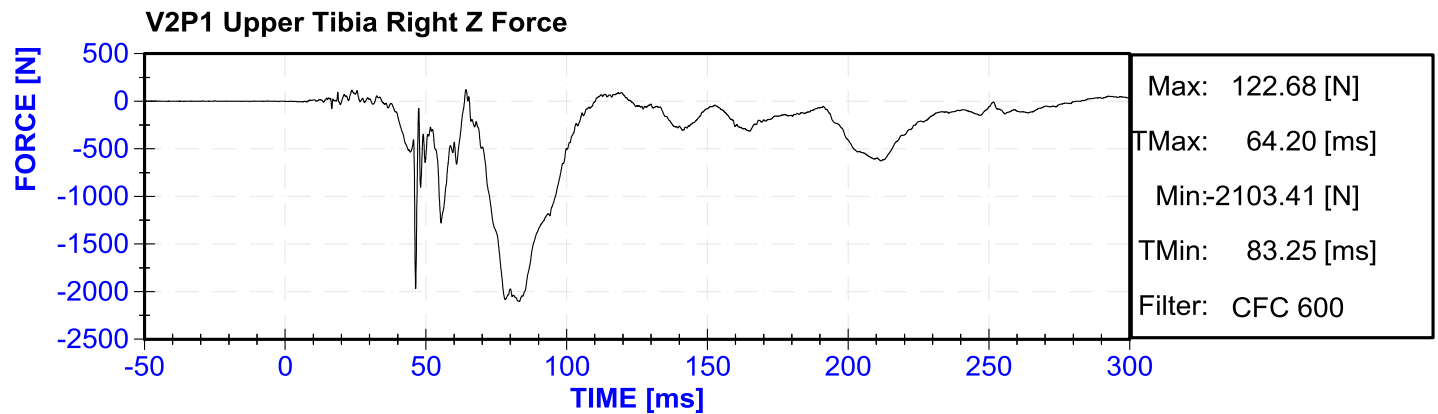
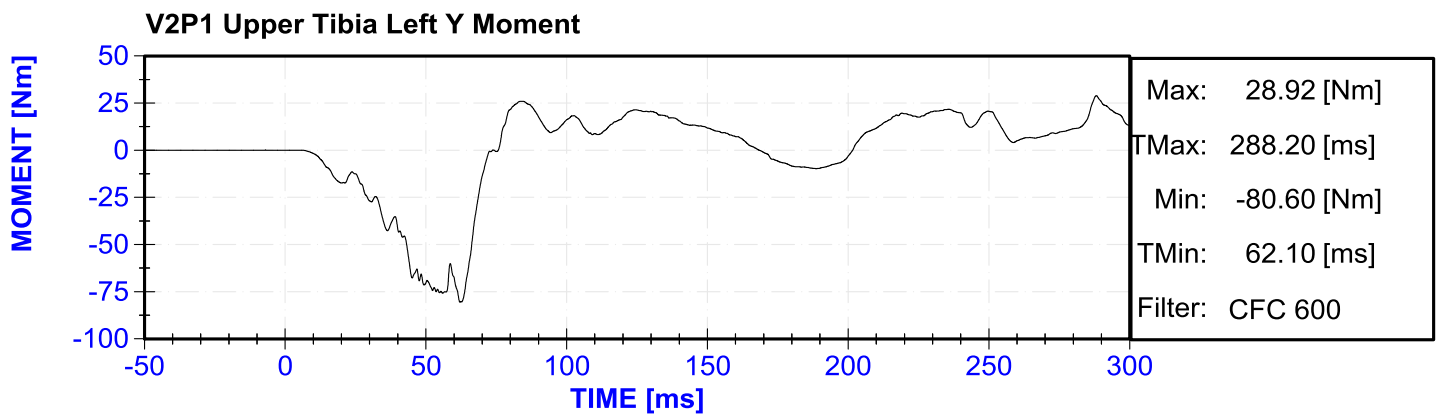
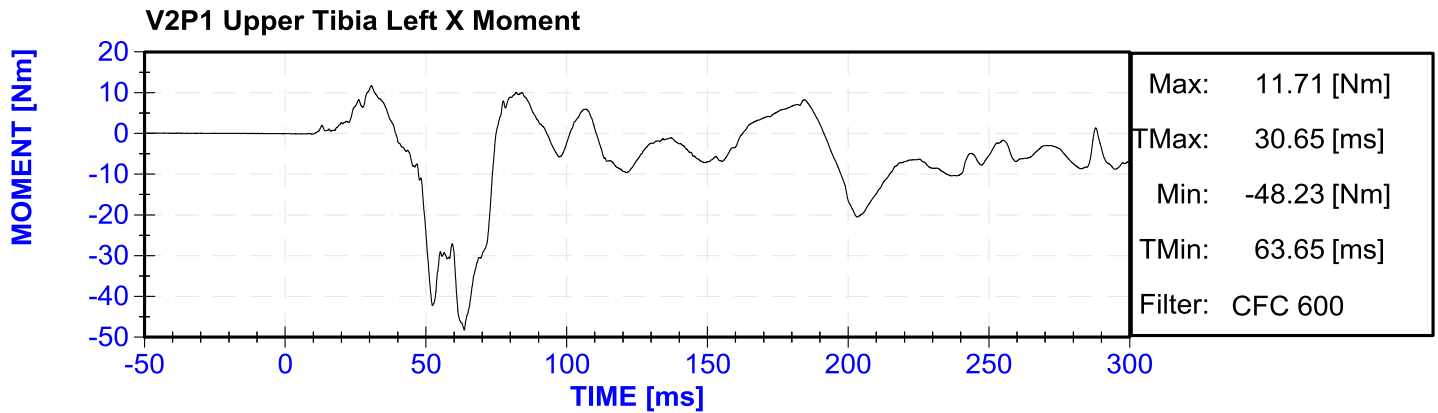


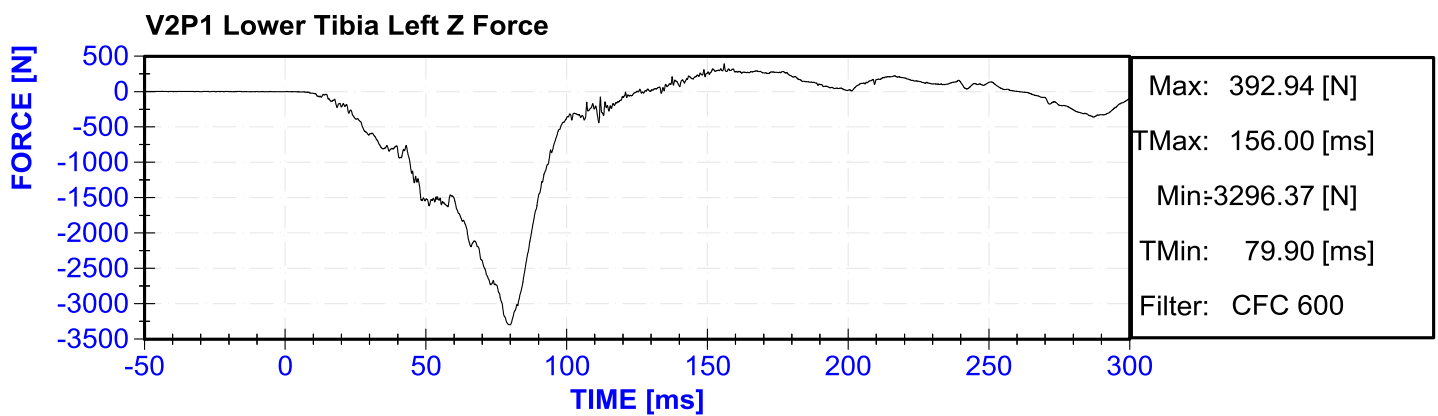
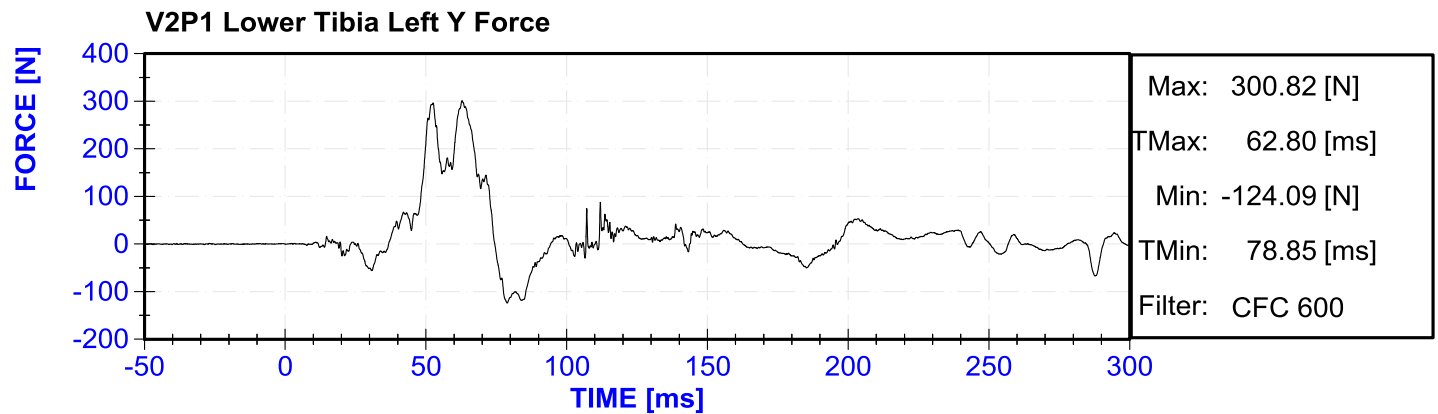
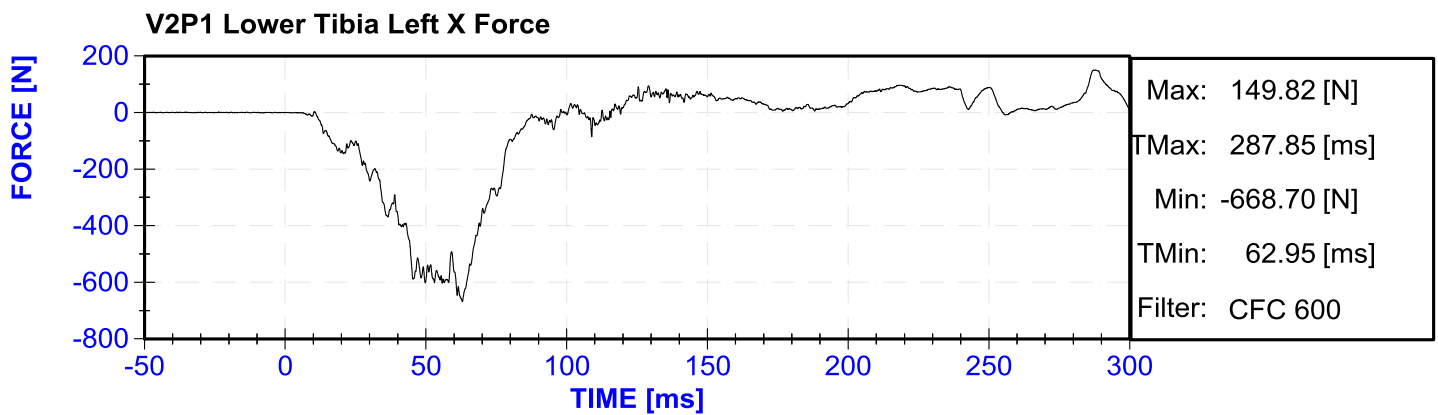
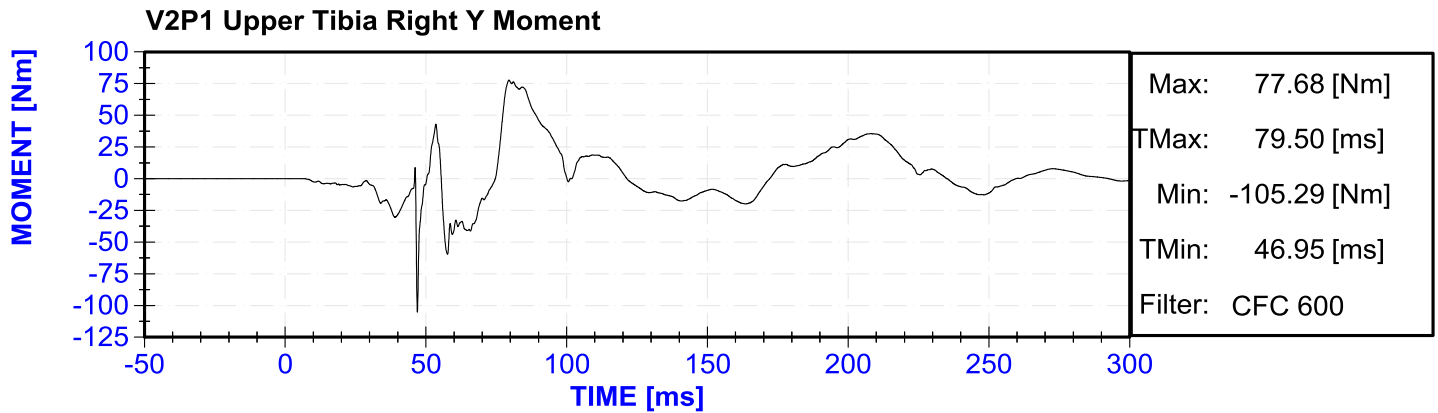


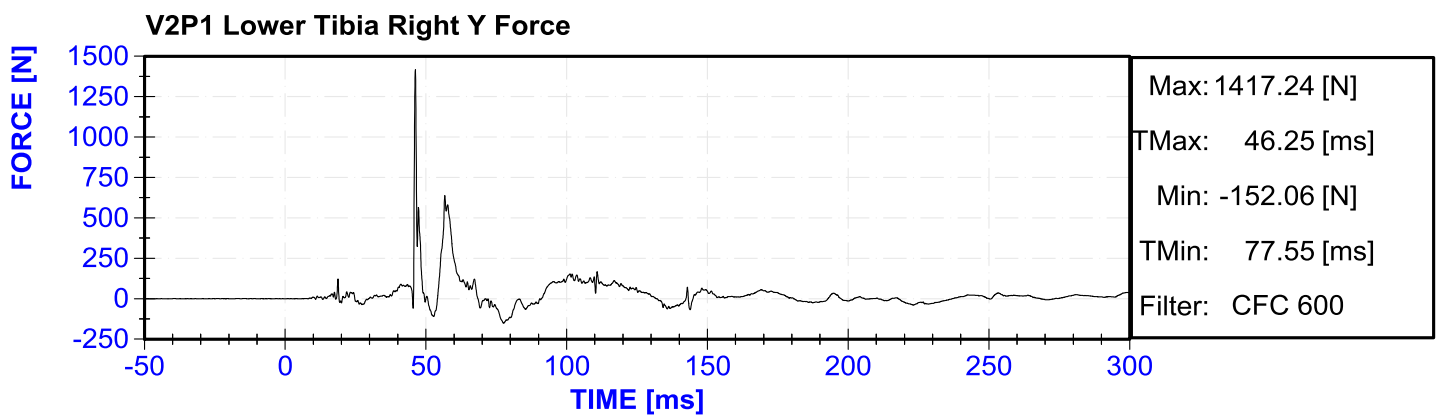
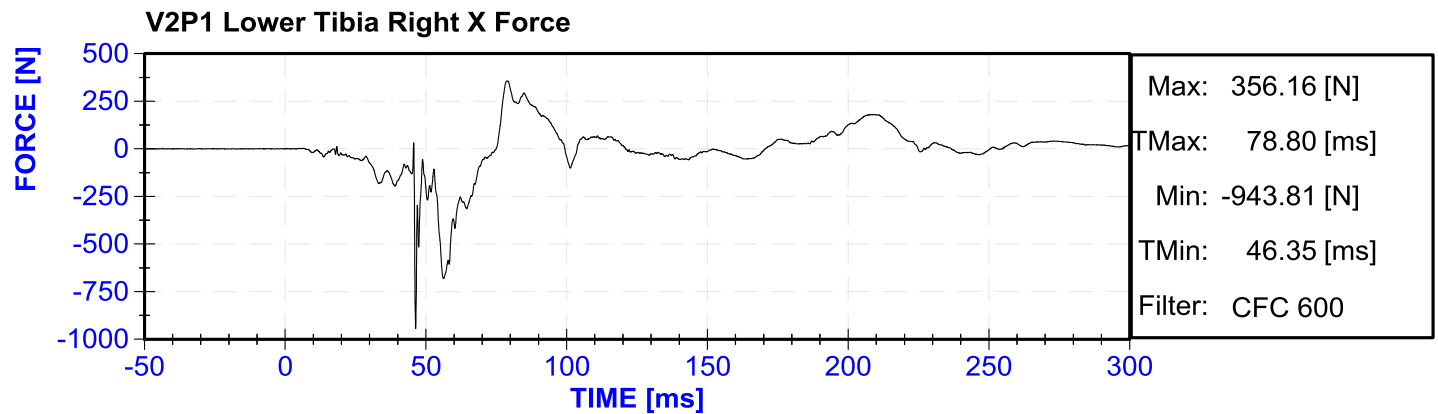
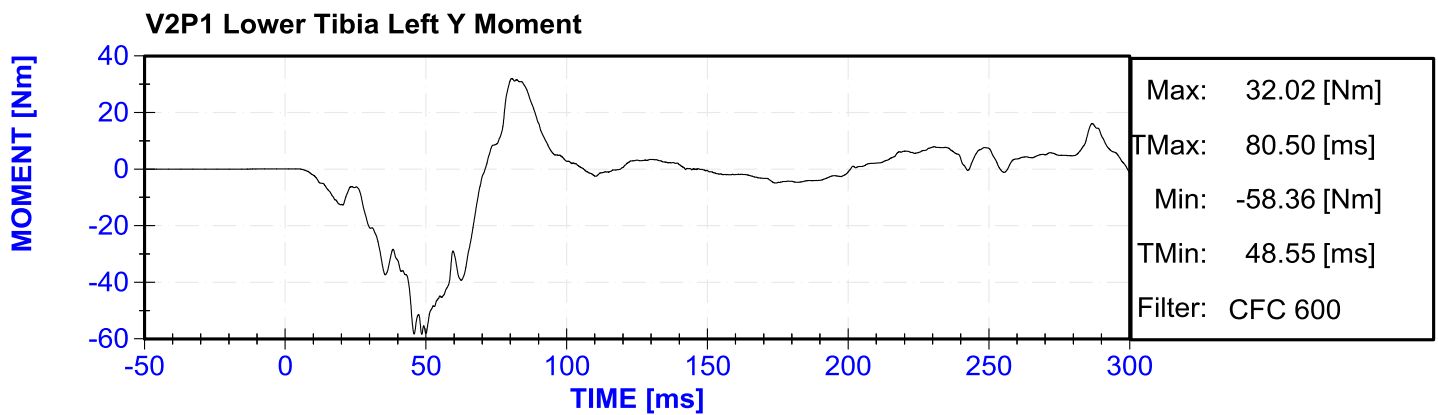
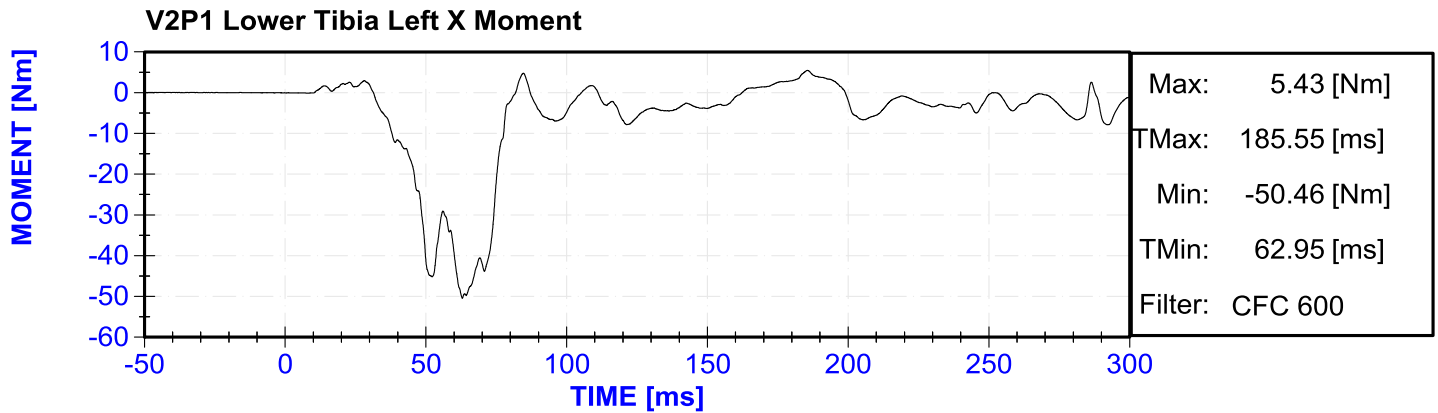


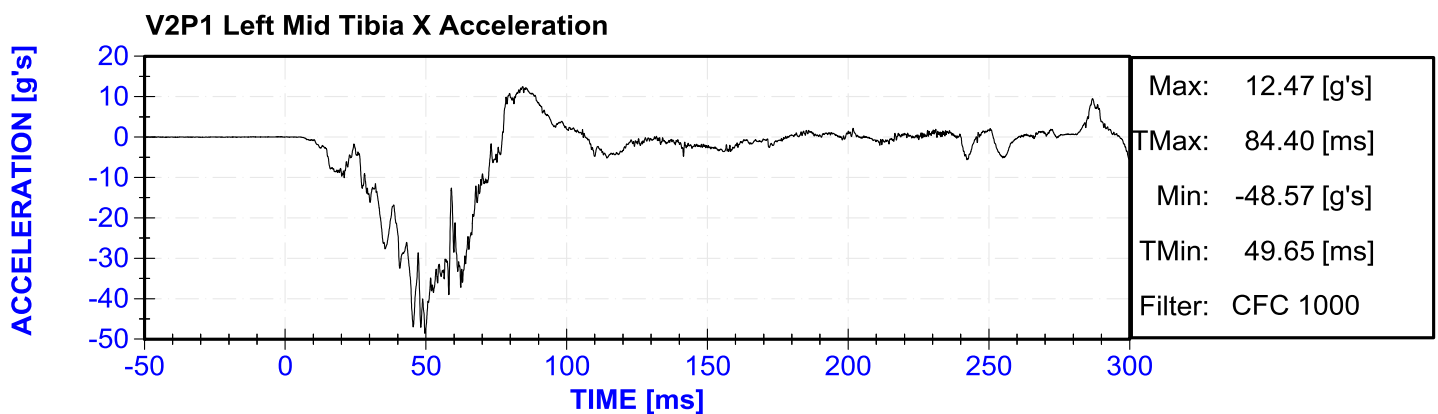
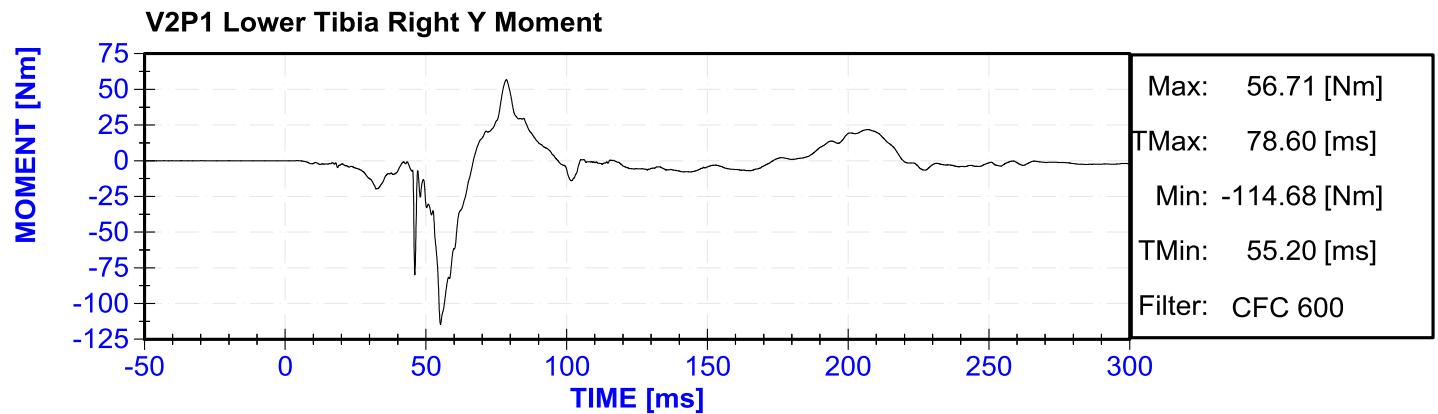
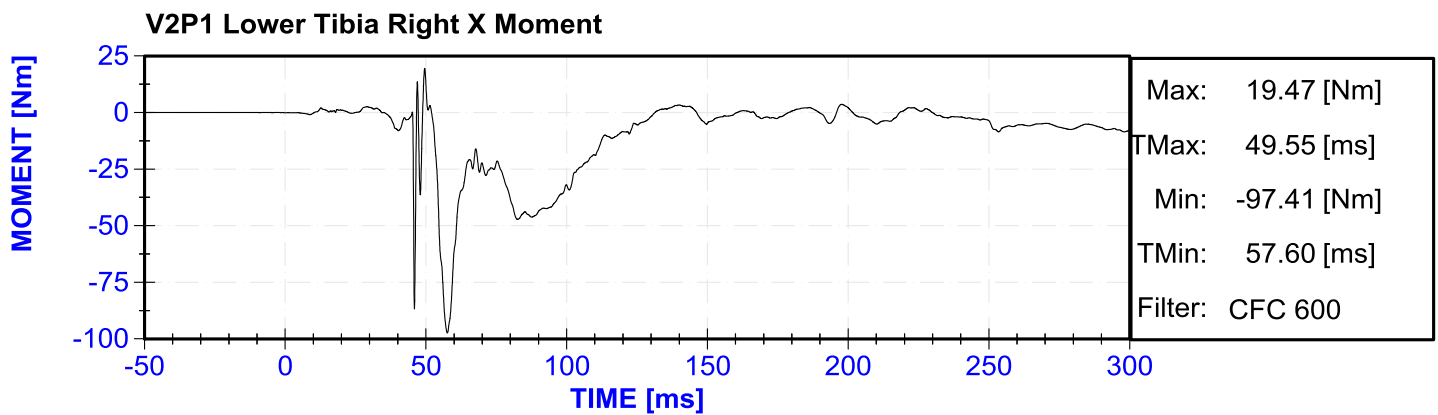
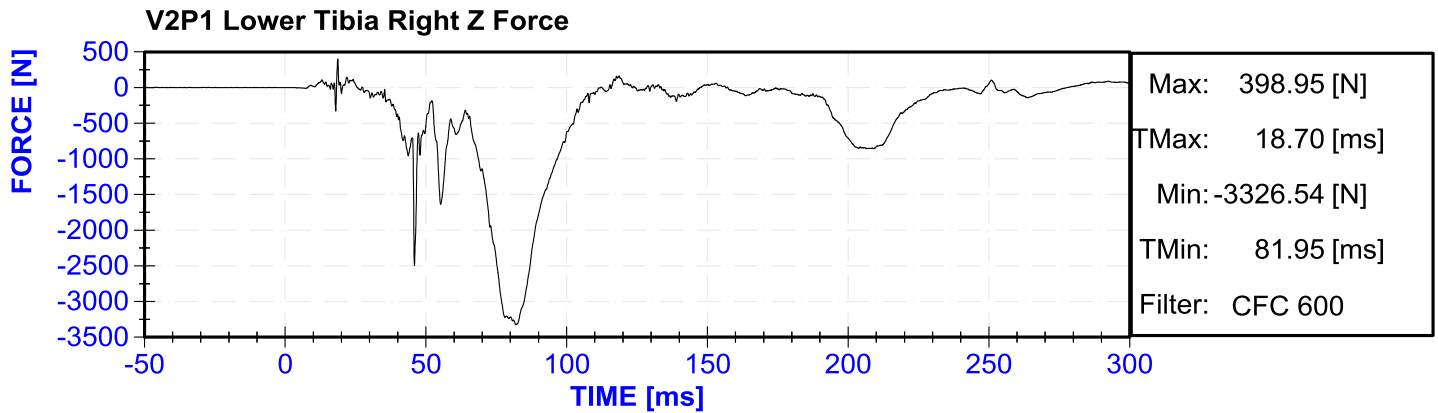


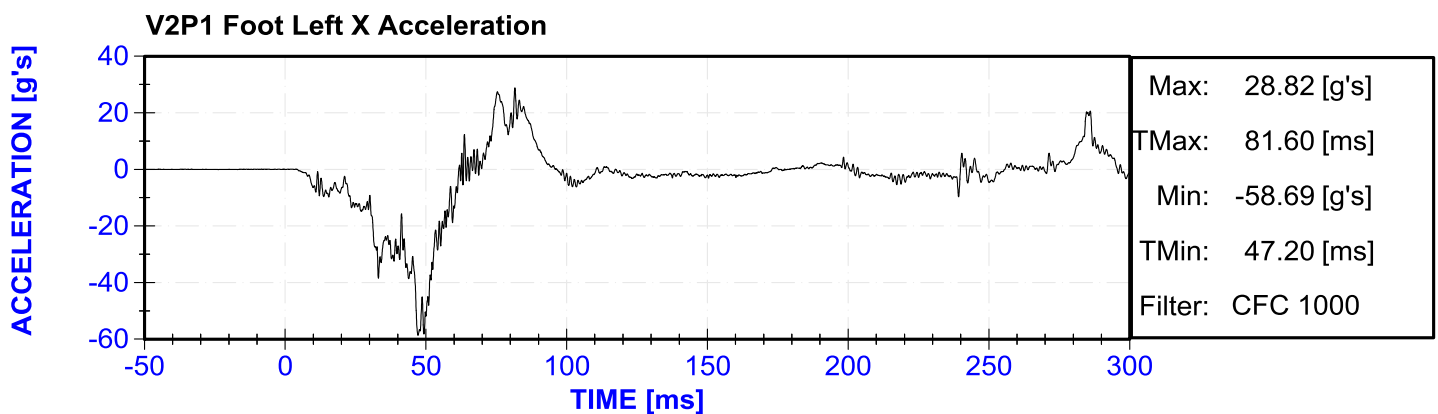
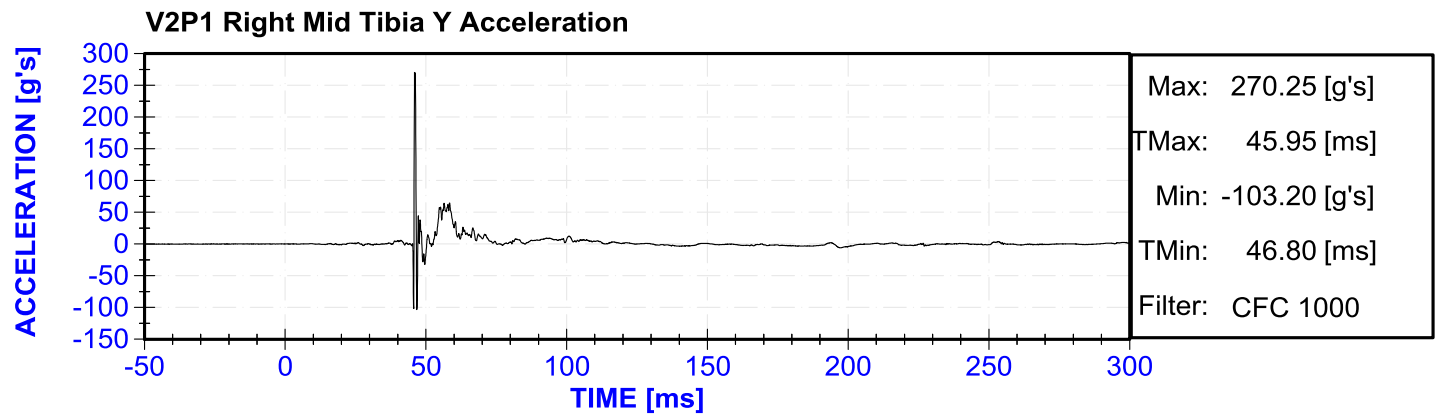
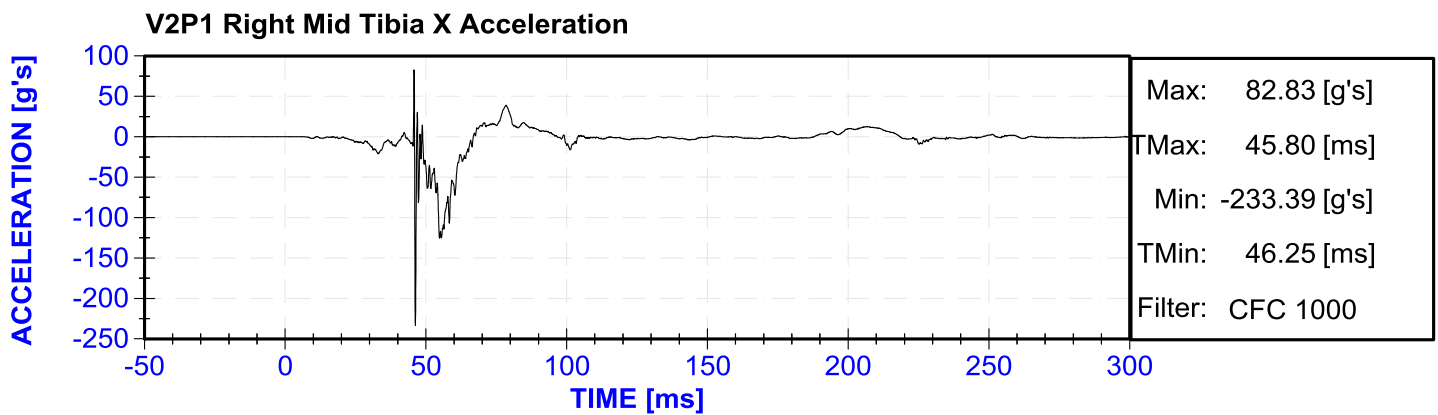
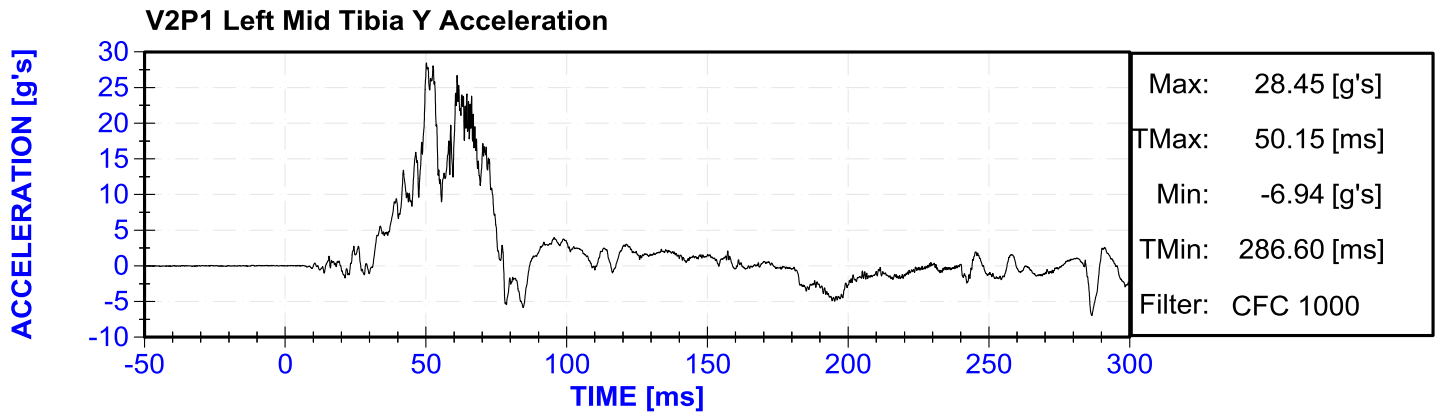


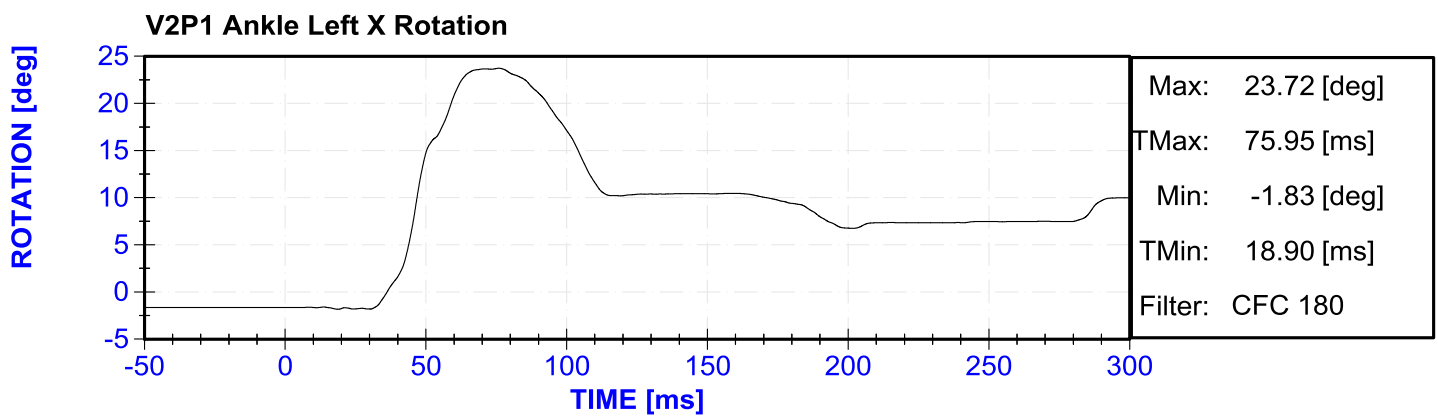
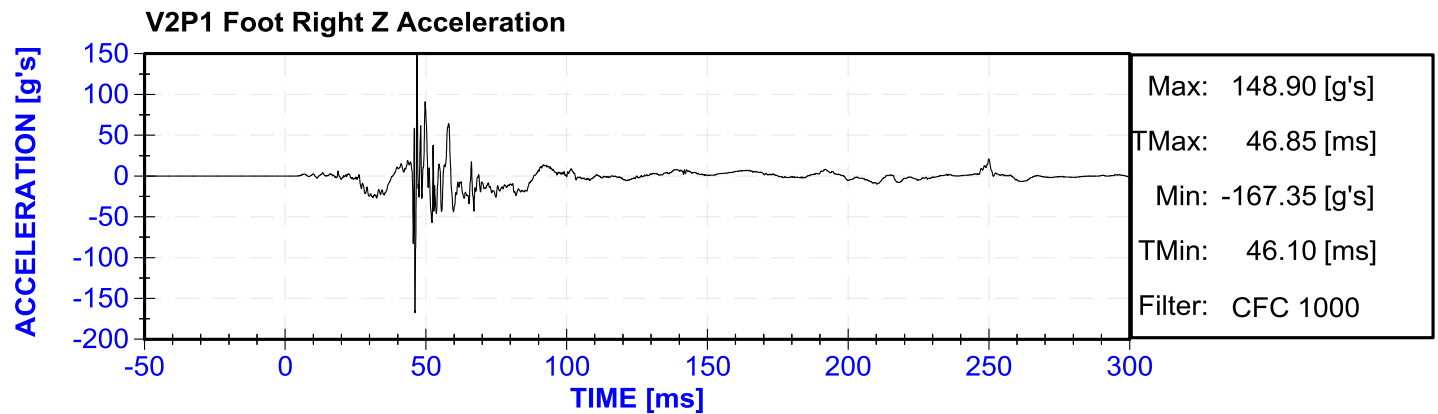
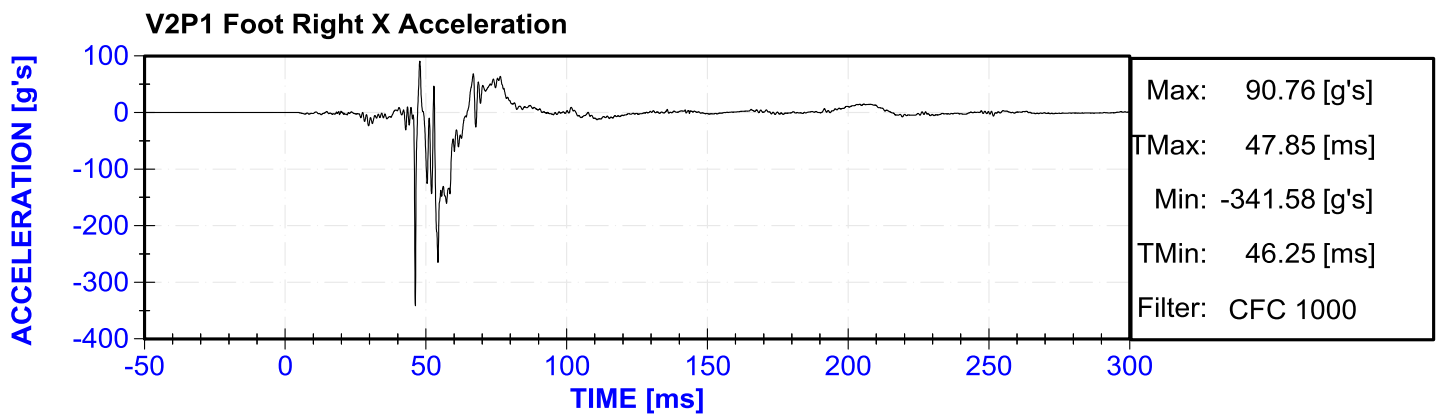
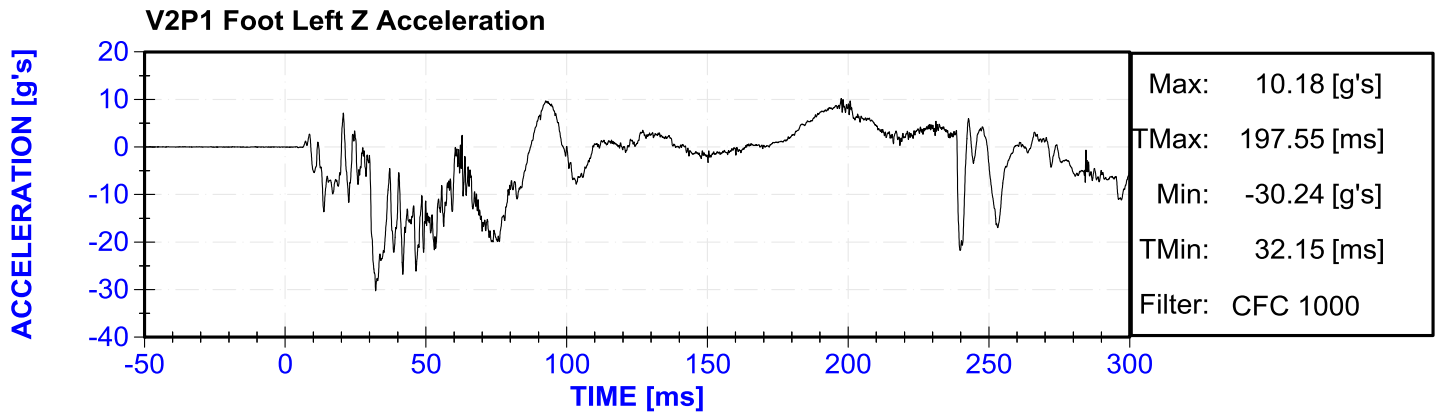


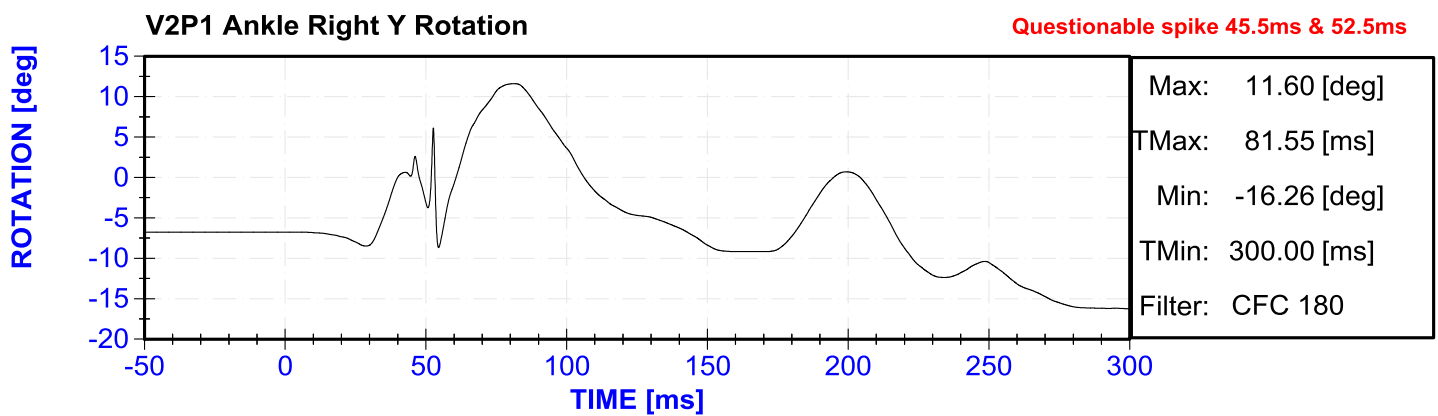
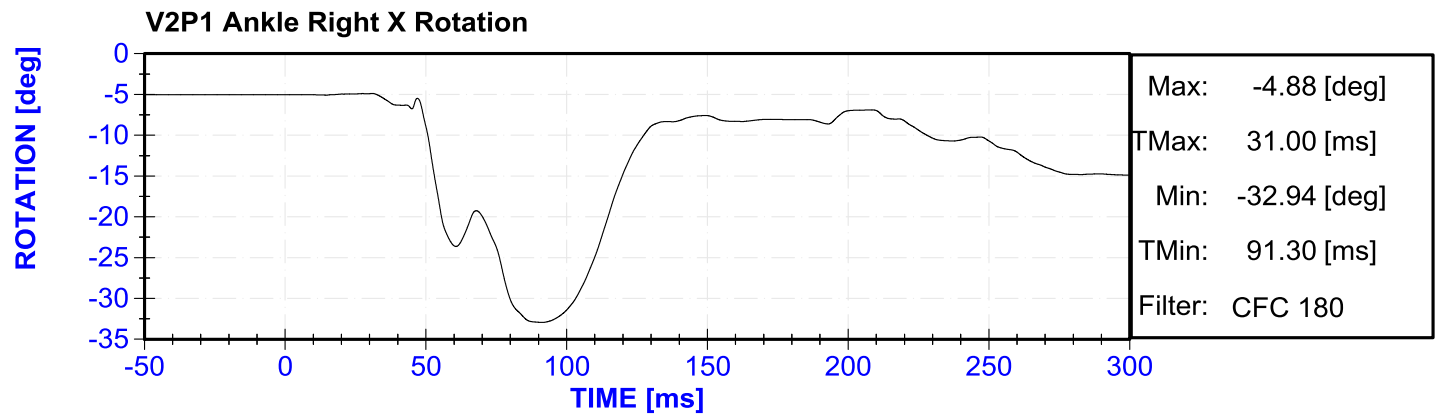
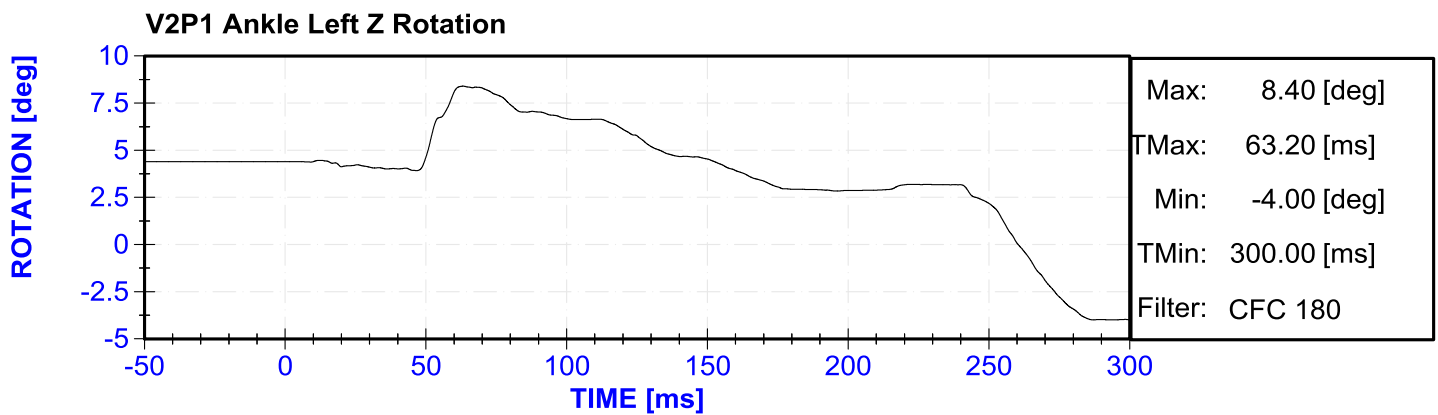
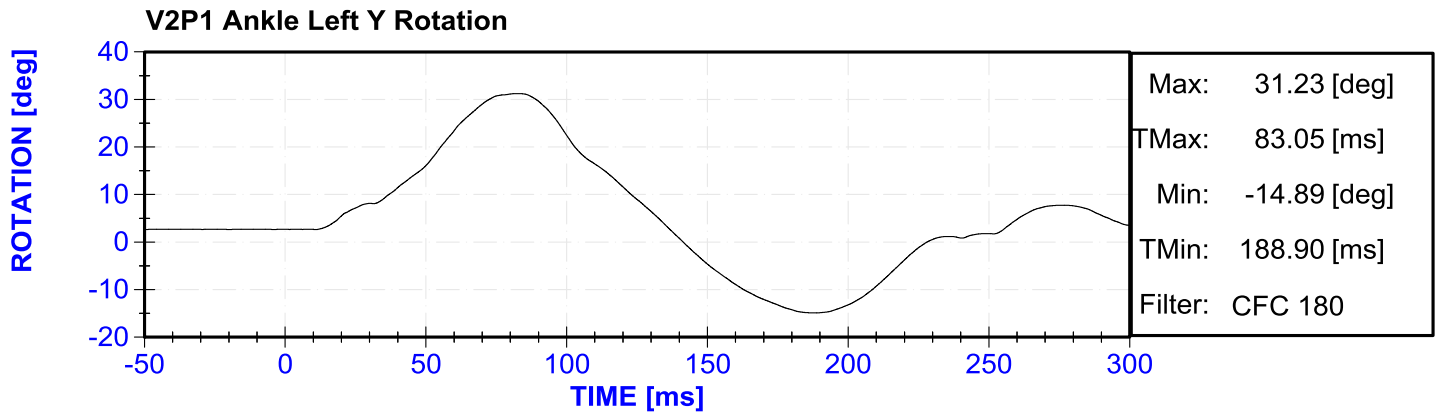


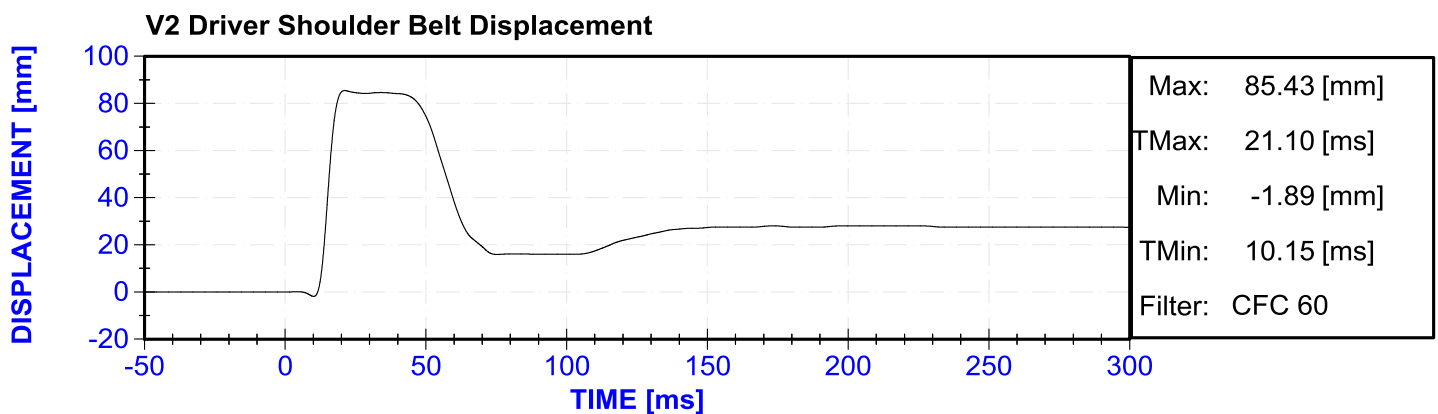
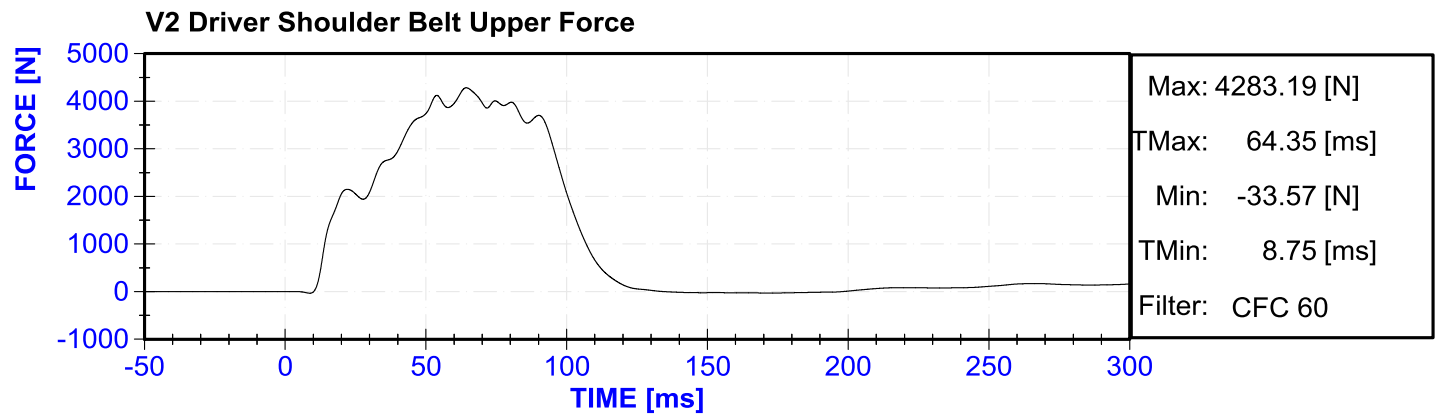
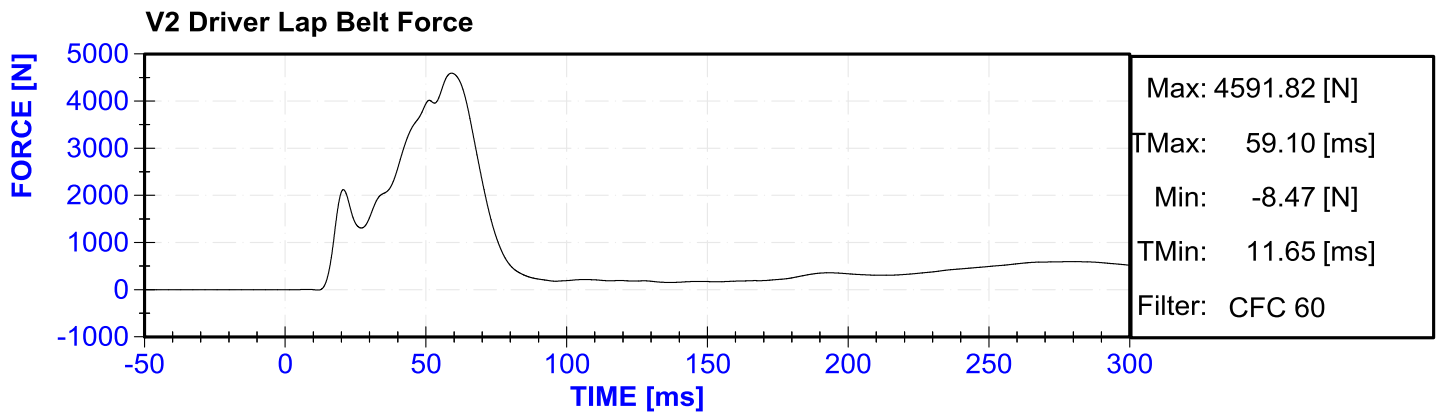
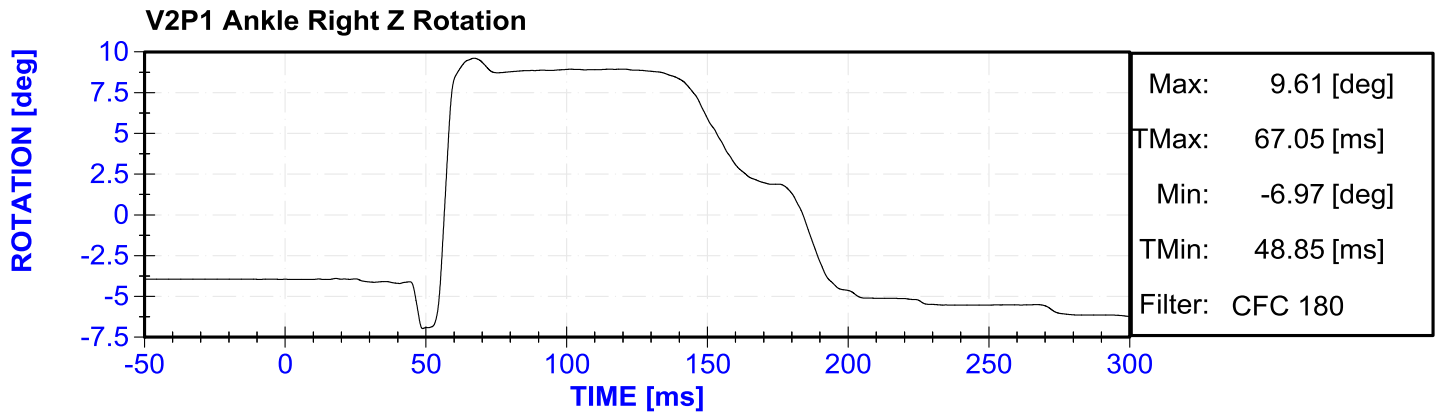


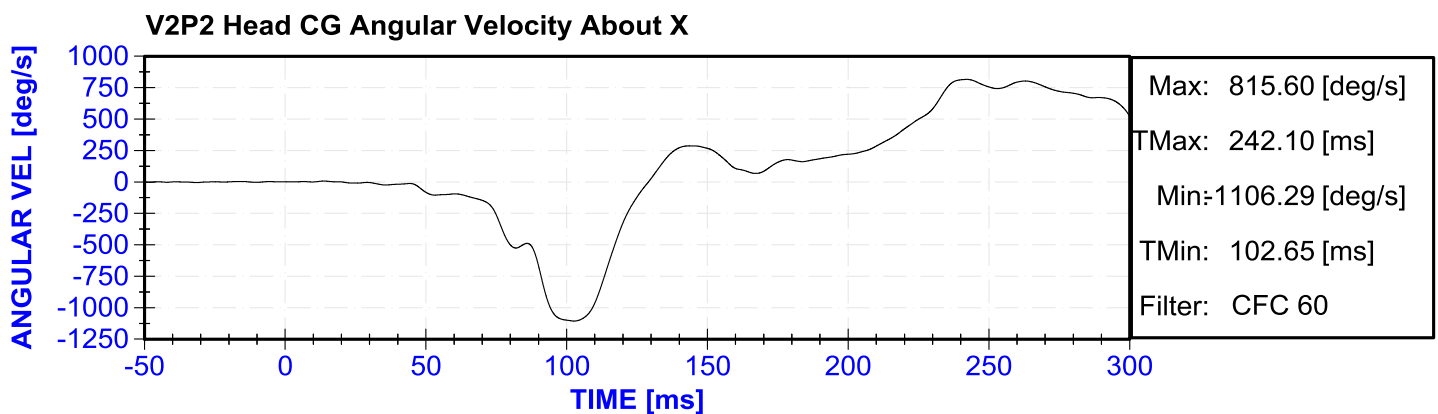
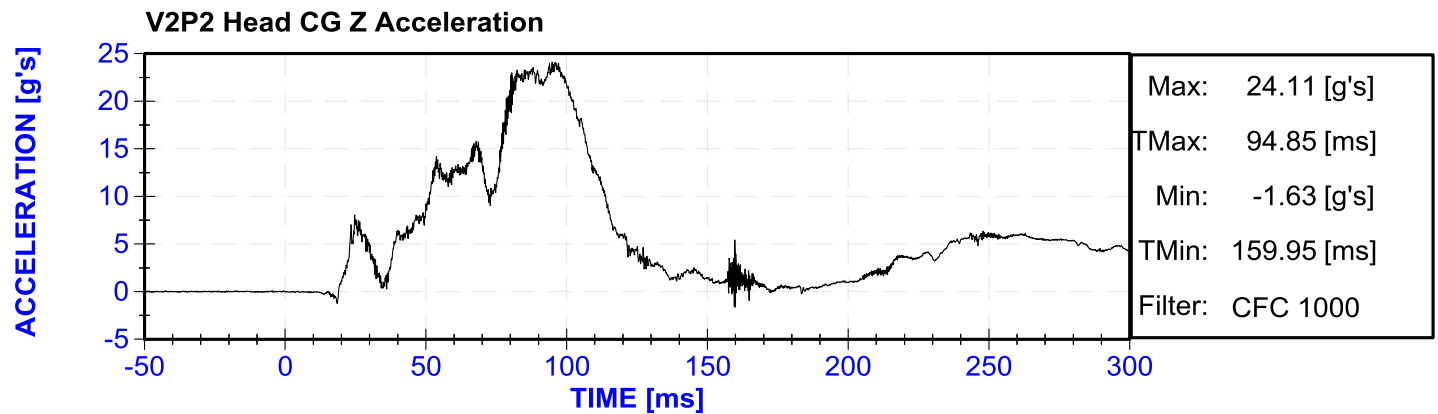
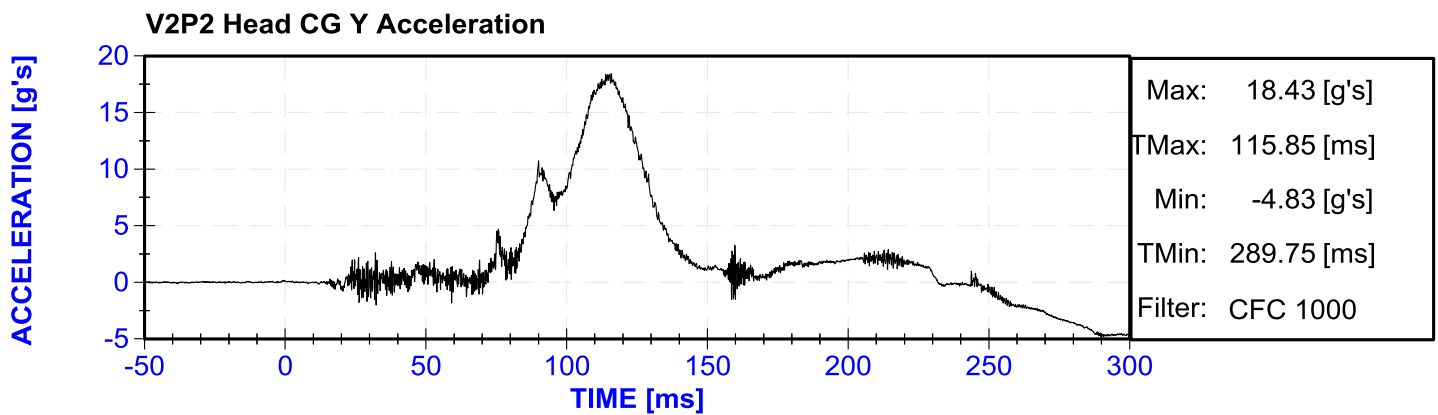
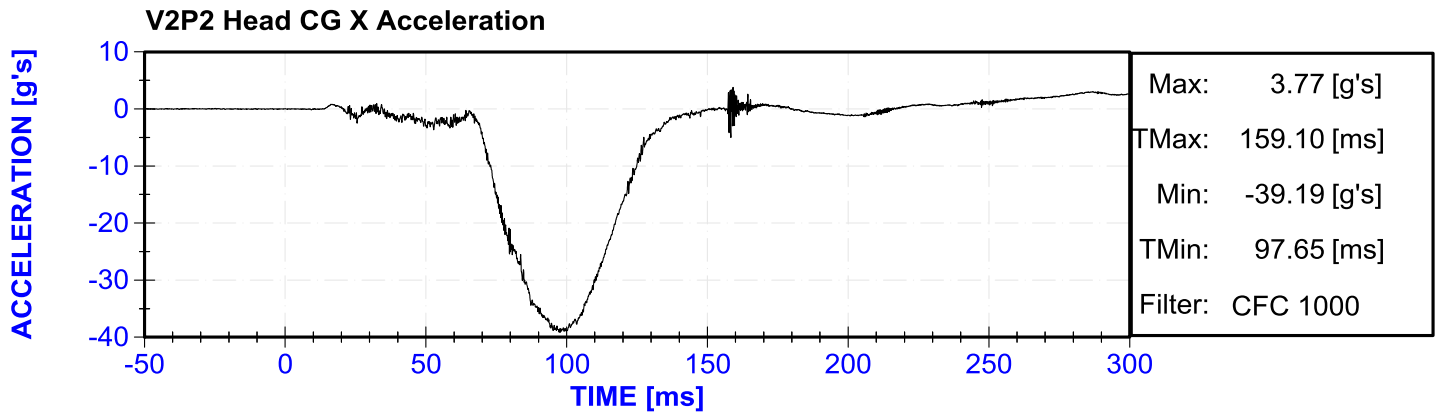


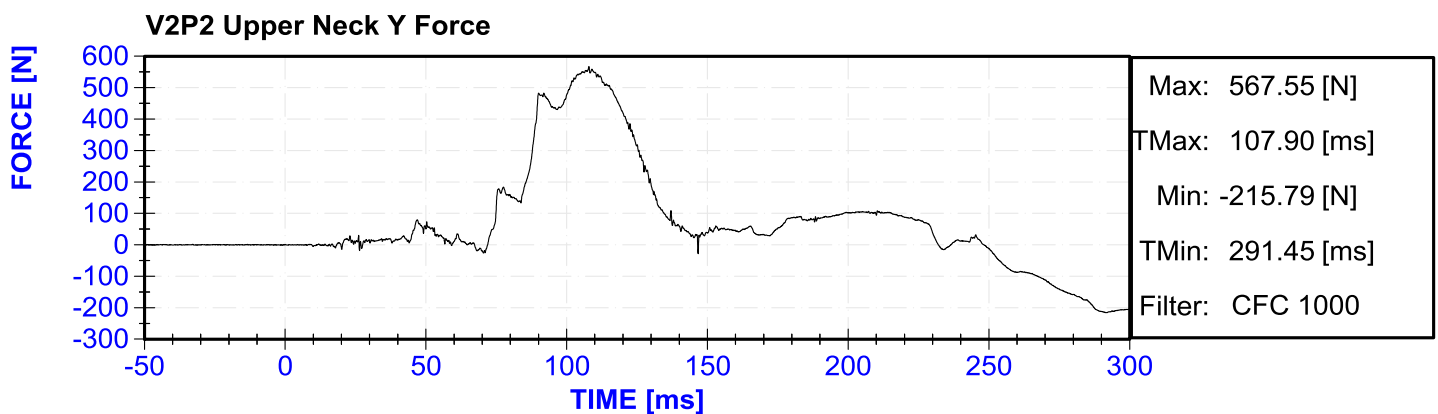
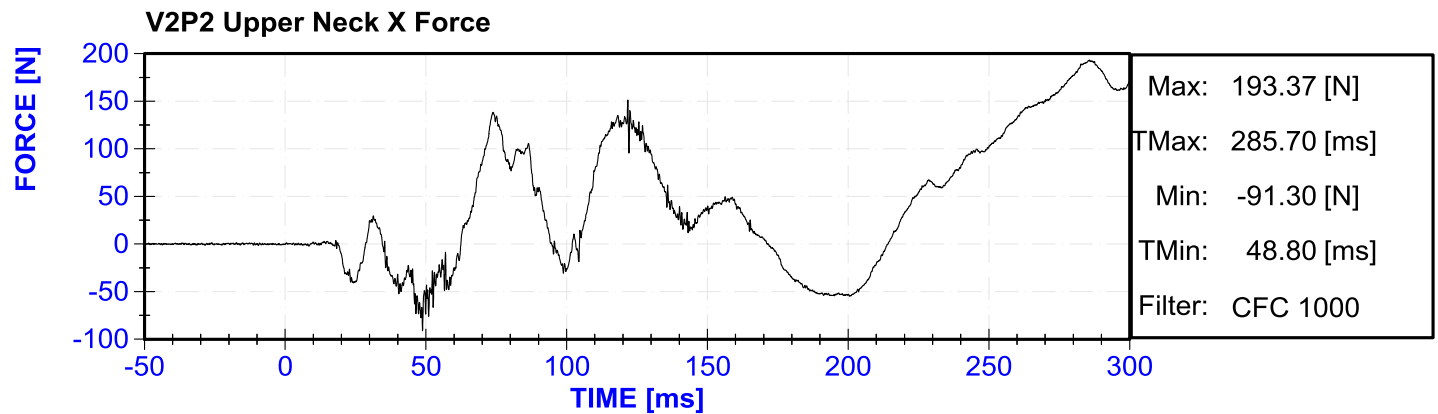
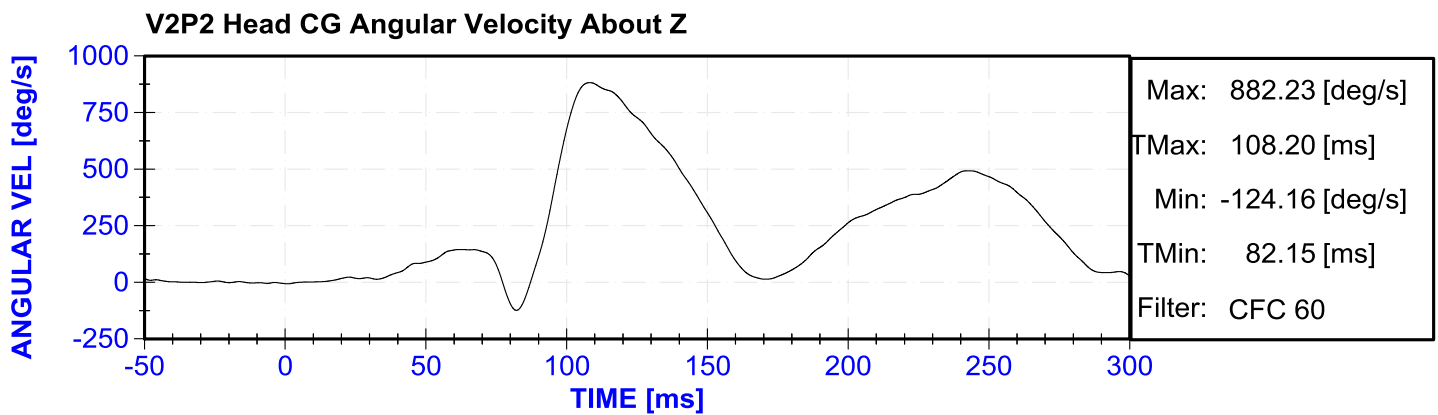
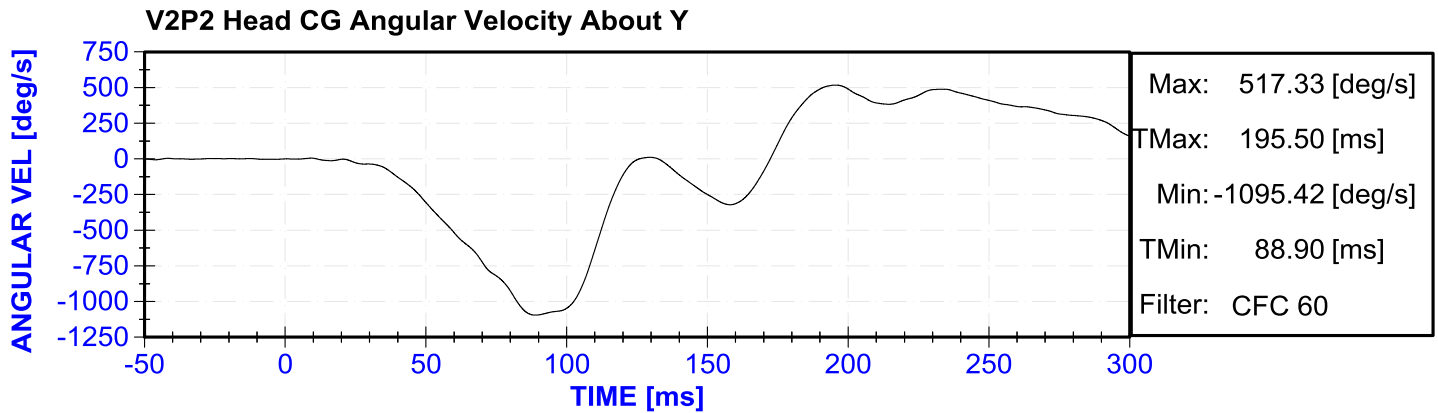


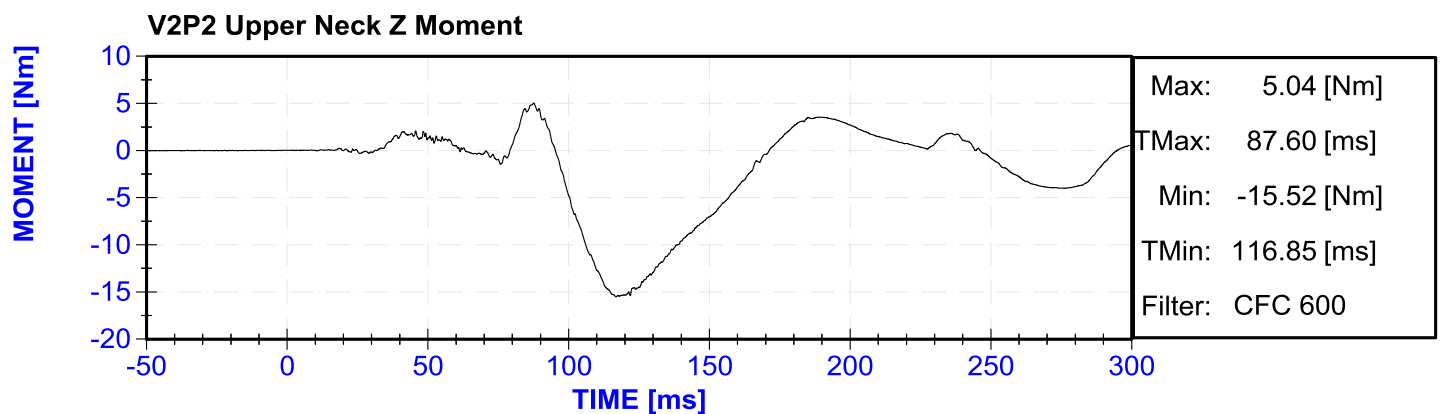
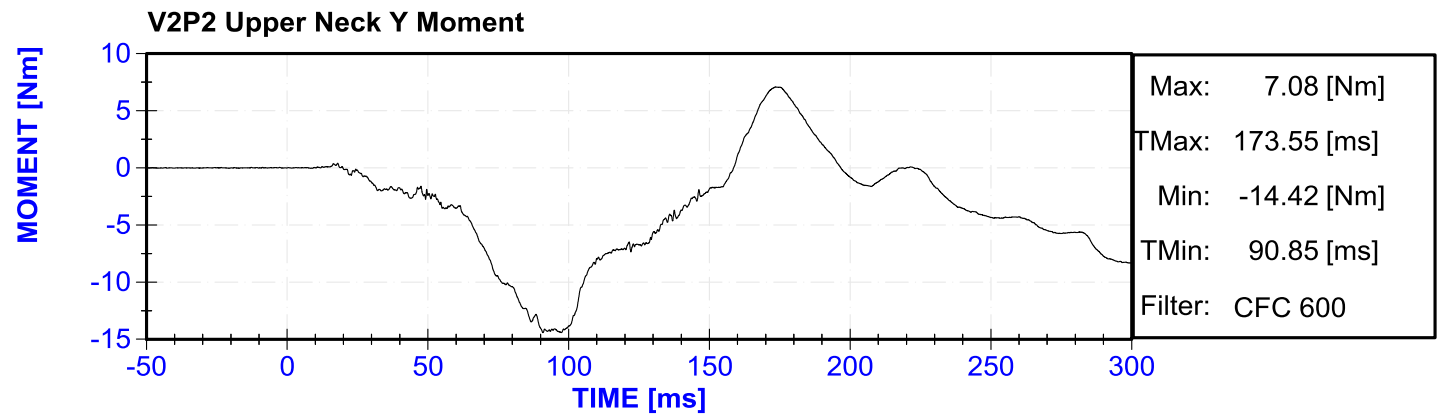
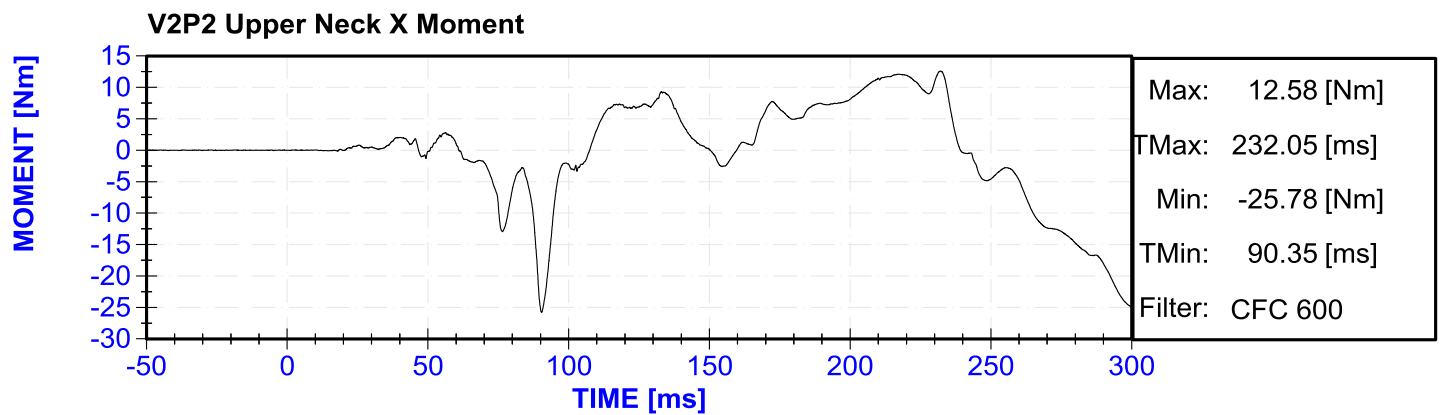
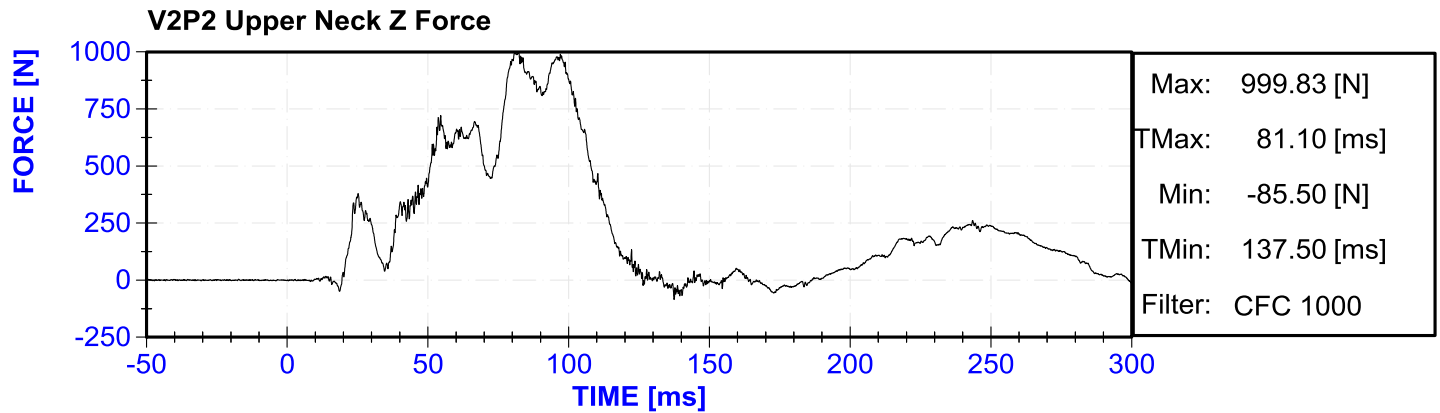


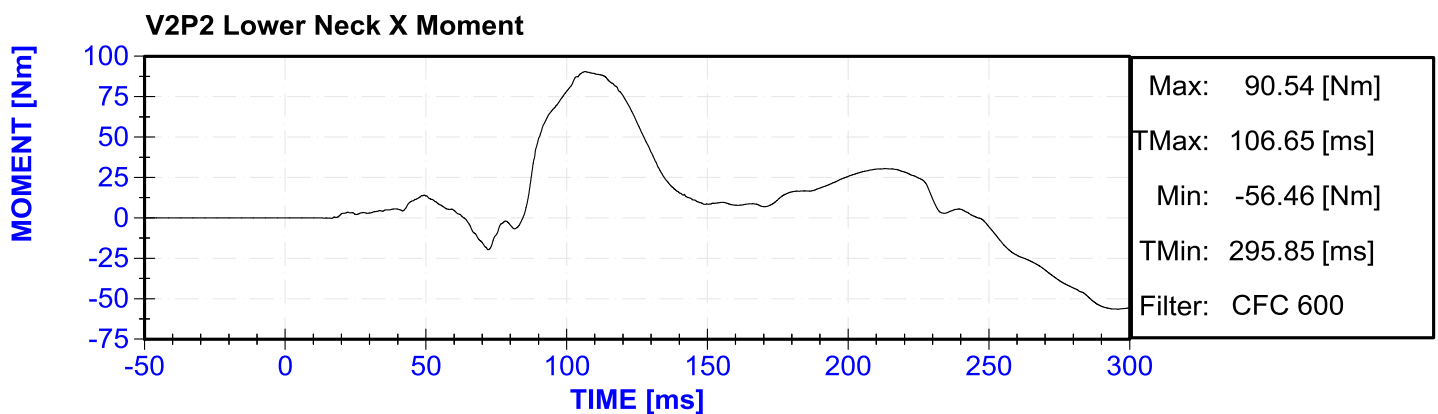
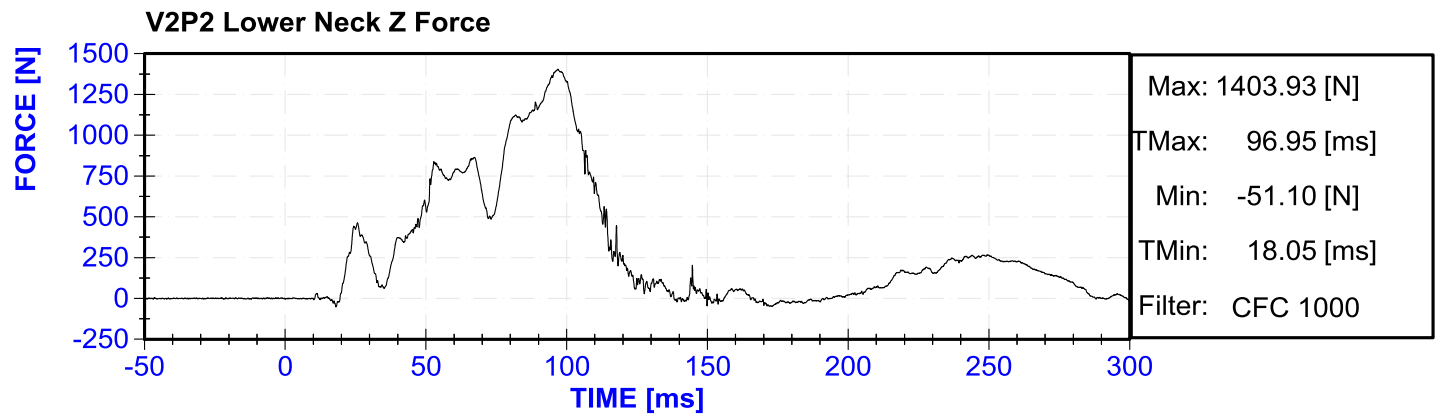
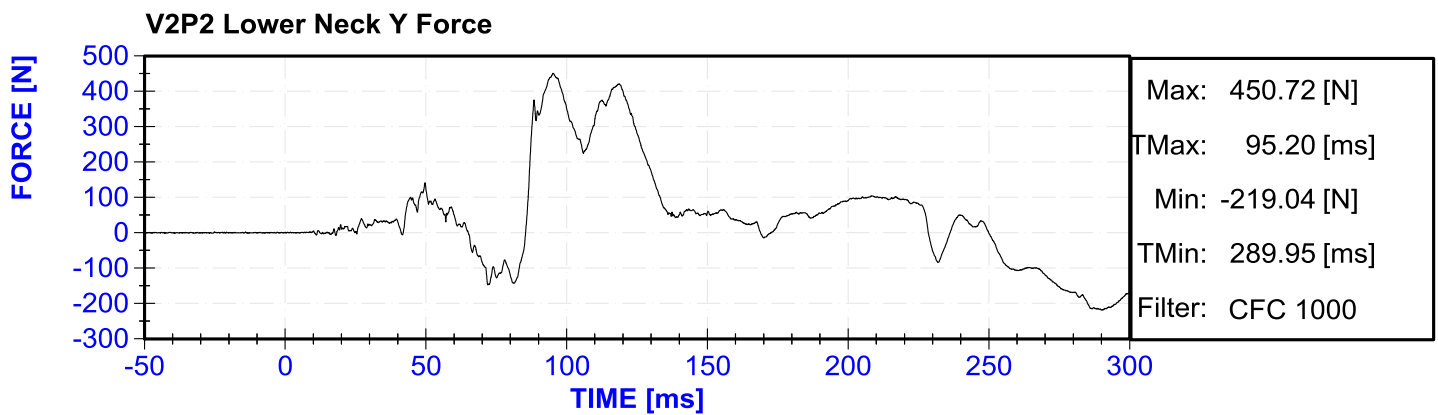
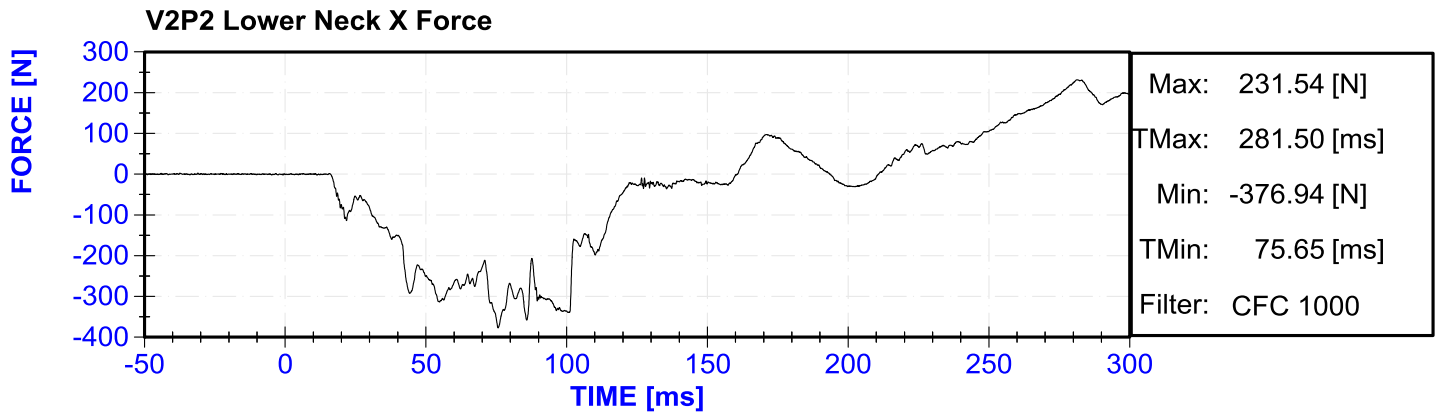


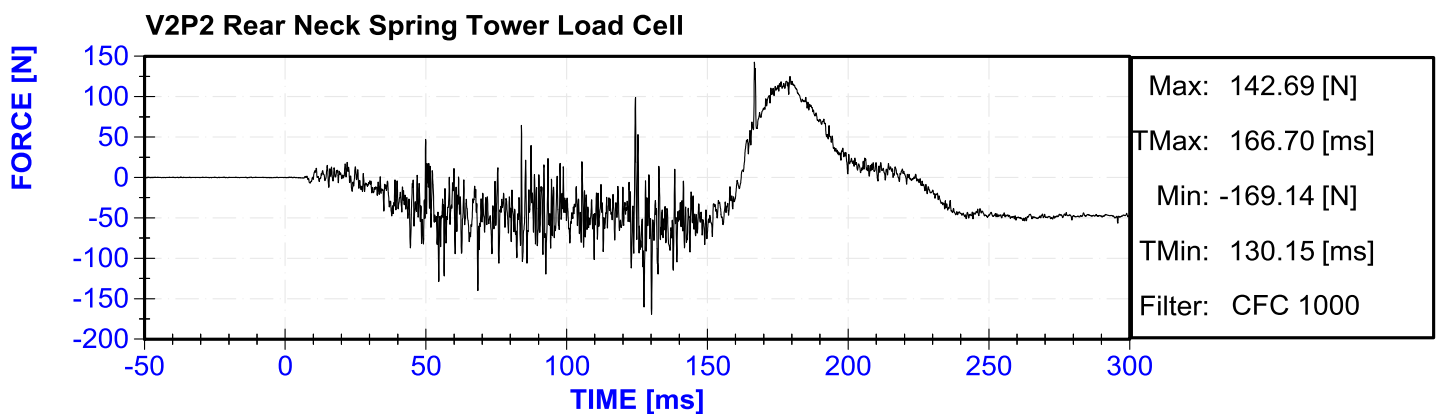
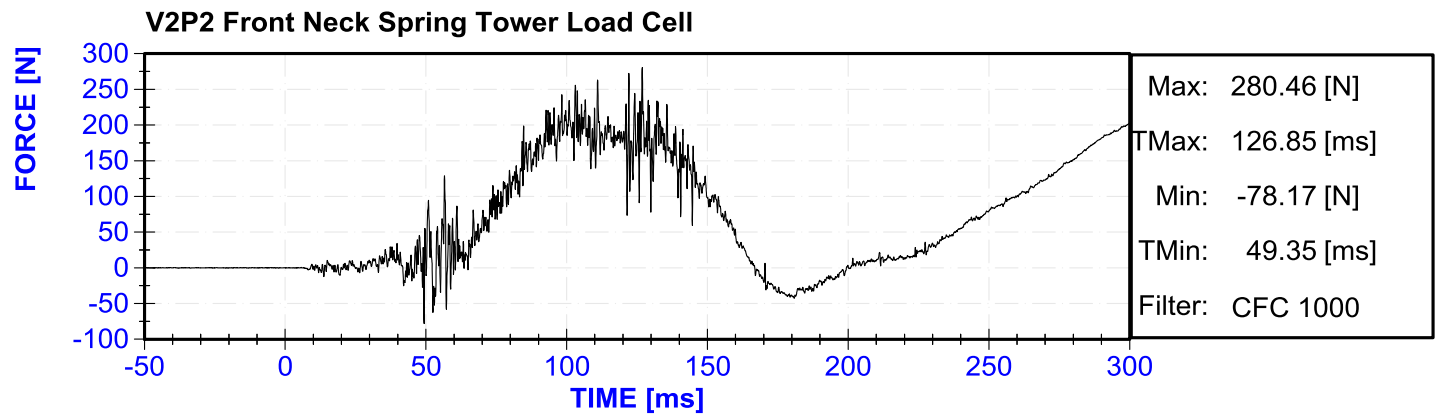
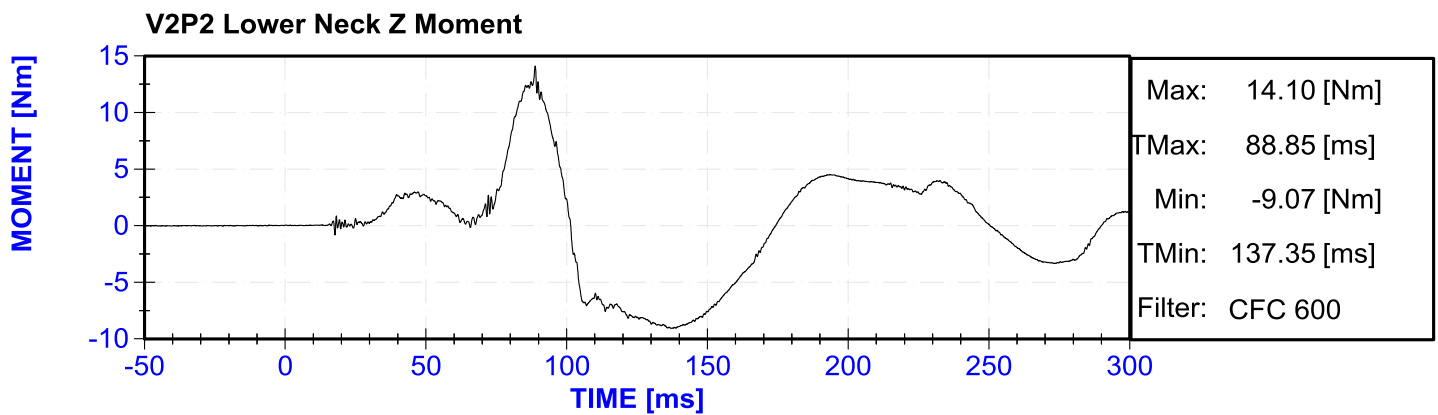
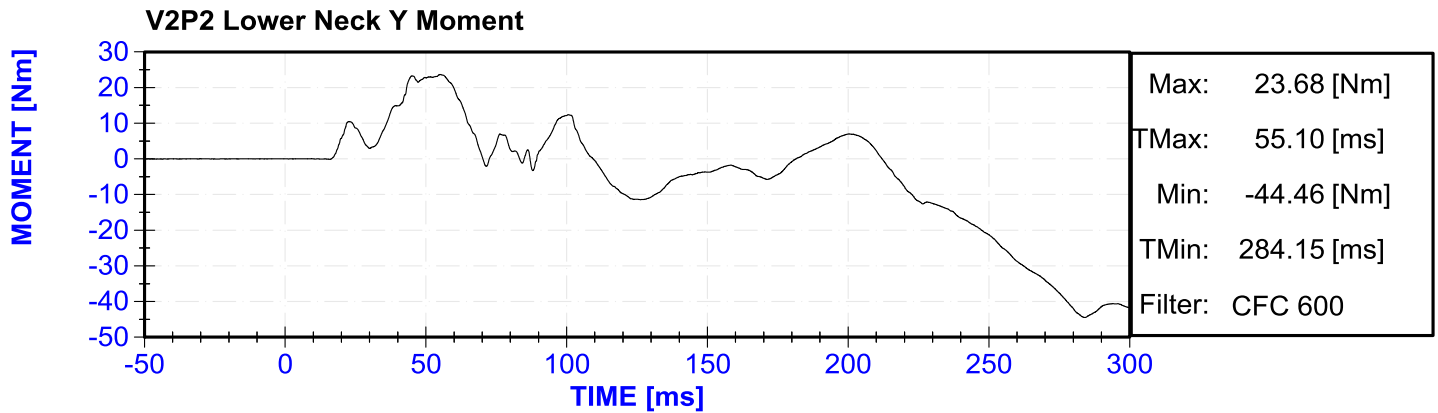




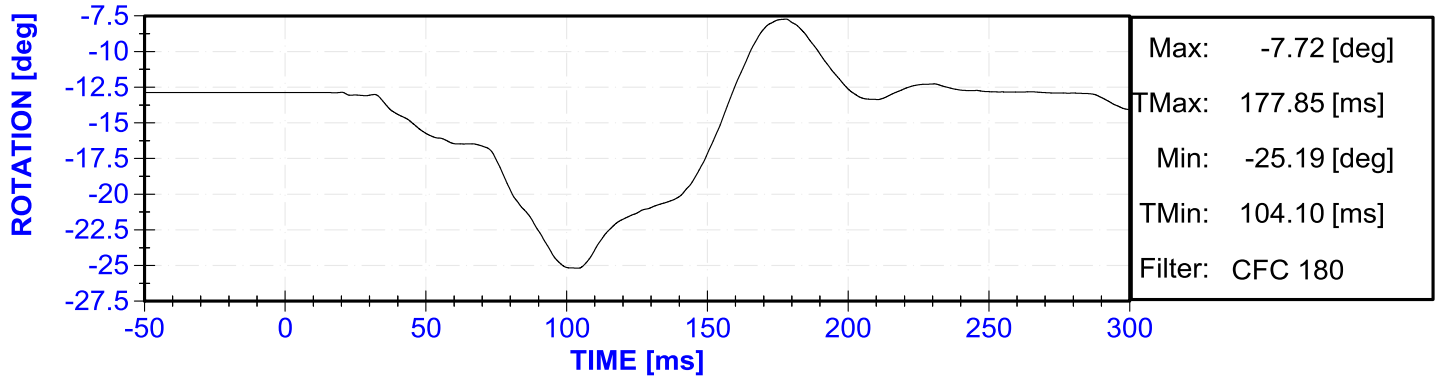




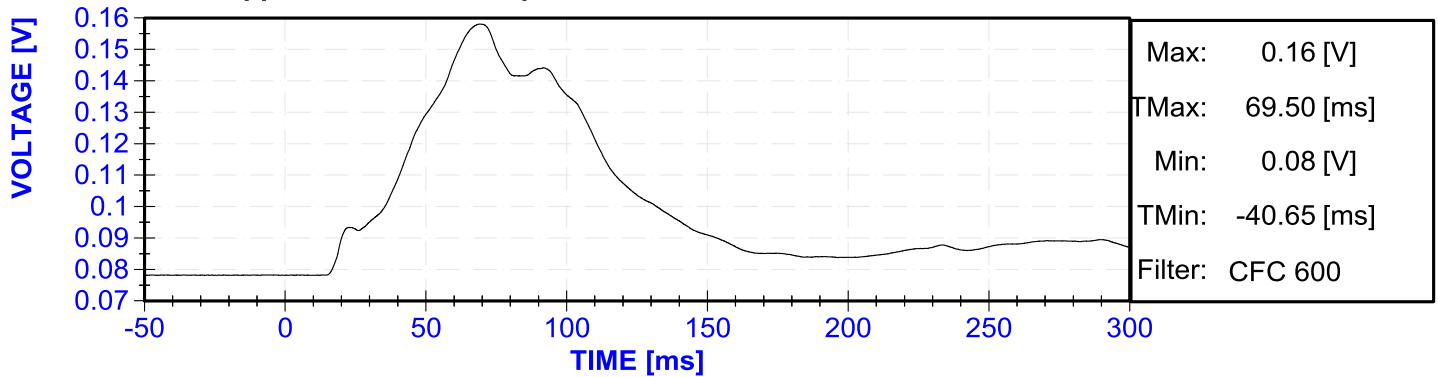




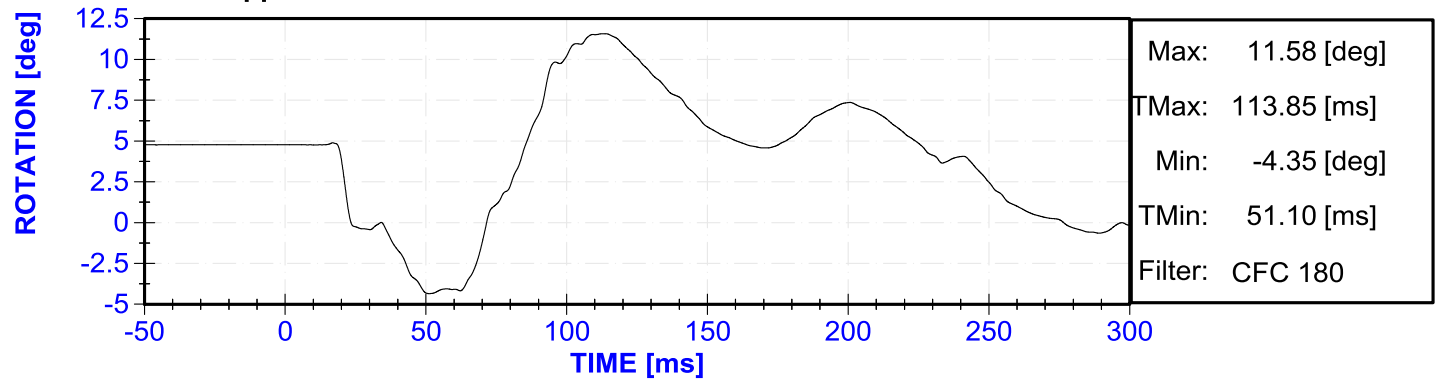
V2P2 Occipital Condyle Rotation Potentiometer



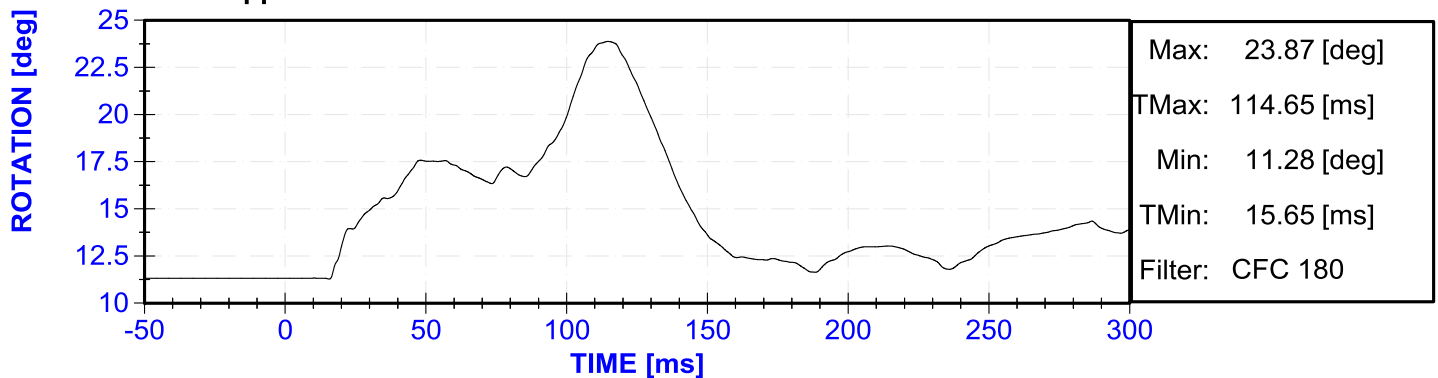
V2P2 Upper Left DGIR X Displacement



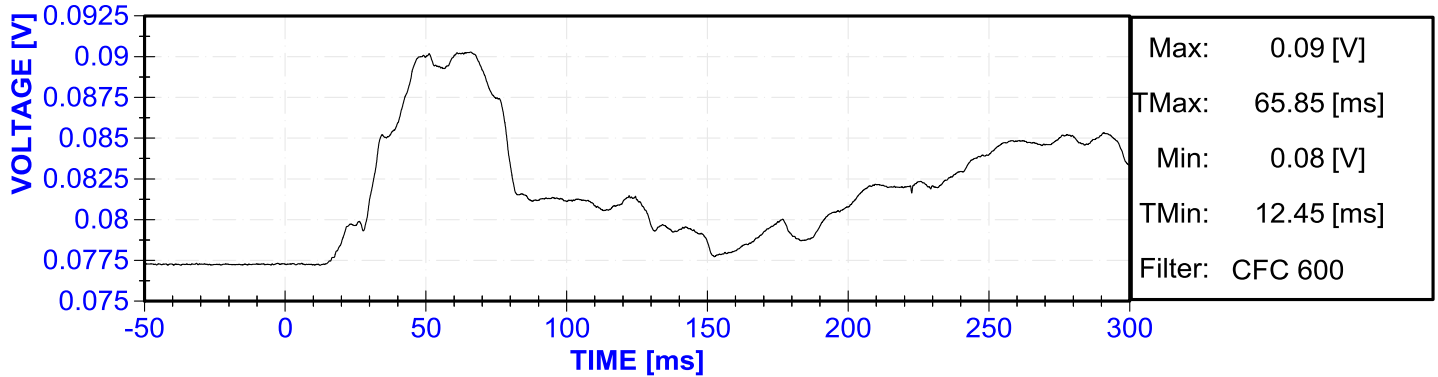
V2P2 Upper Left DGIR Y Rotation



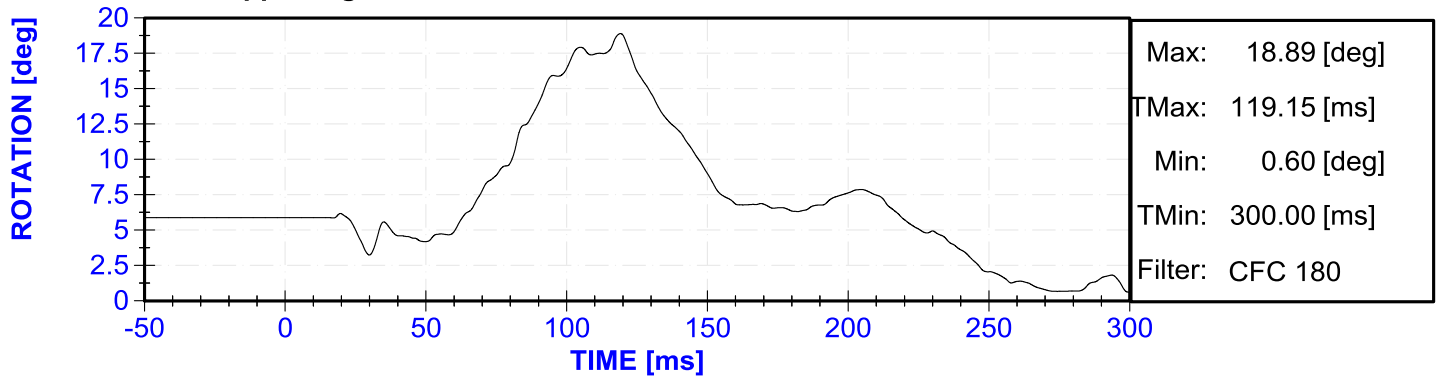
V2P2 Upper Left DGIR Z Rotation



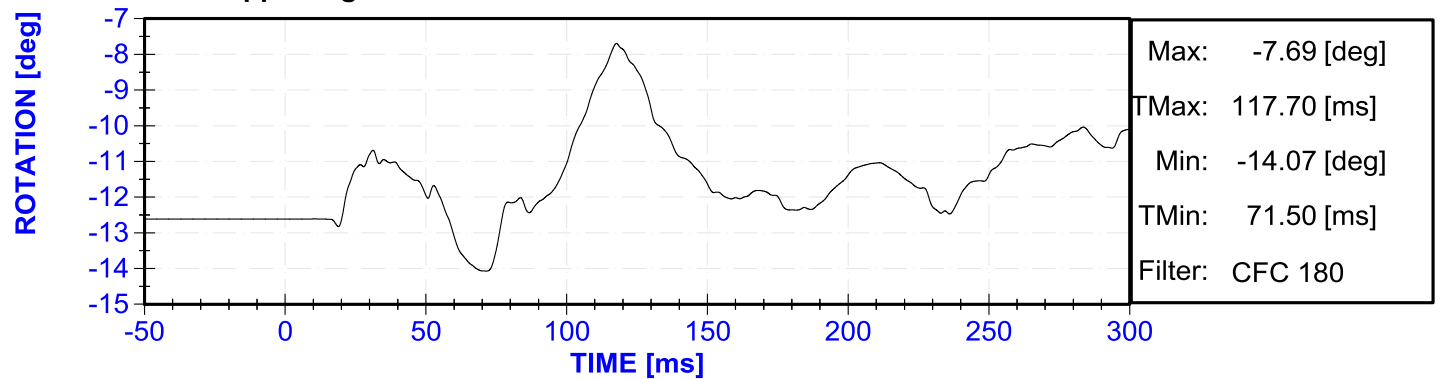
V2P2 Upper Right DGIR X Displacement



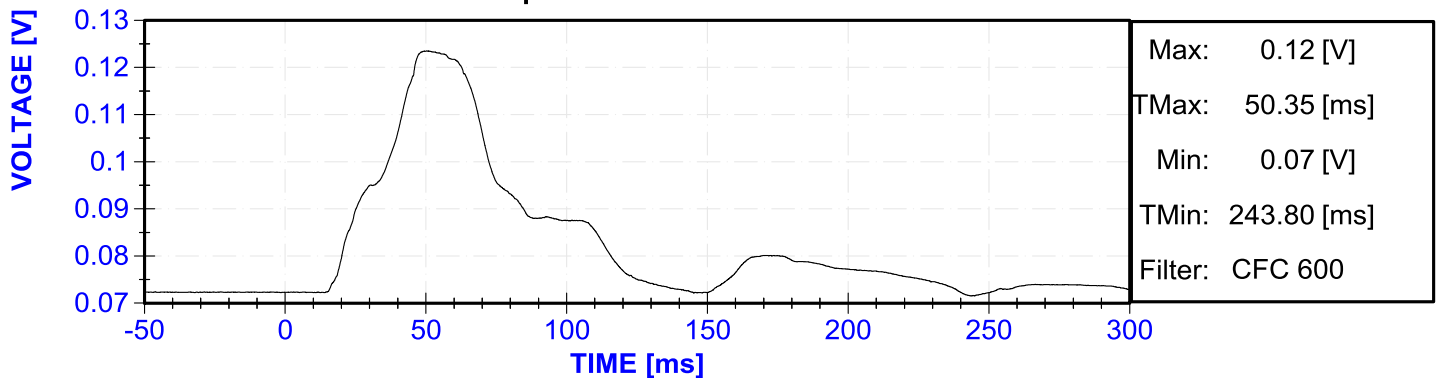
V2P2 Upper Right DGIR Y Rotation

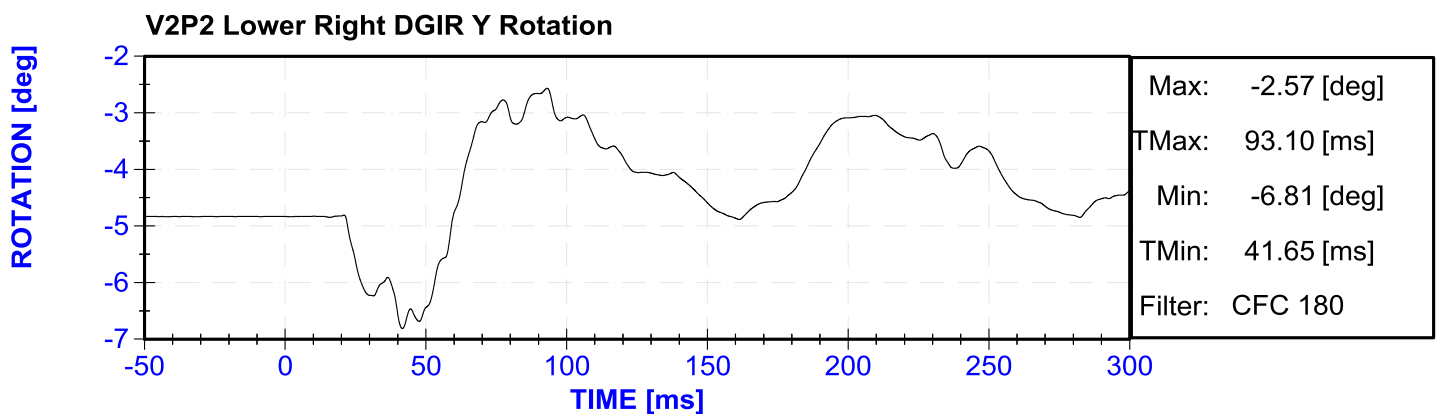
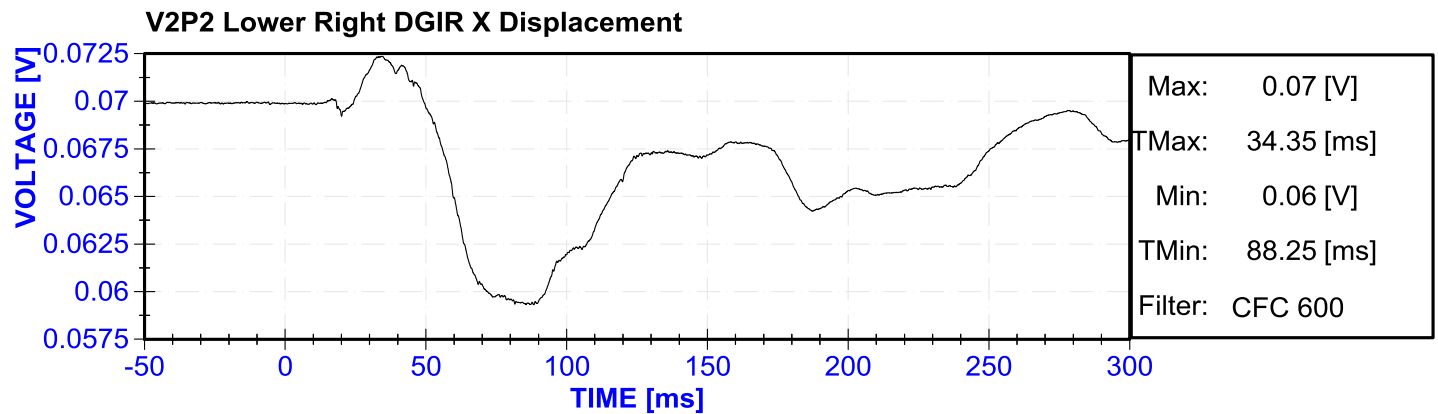
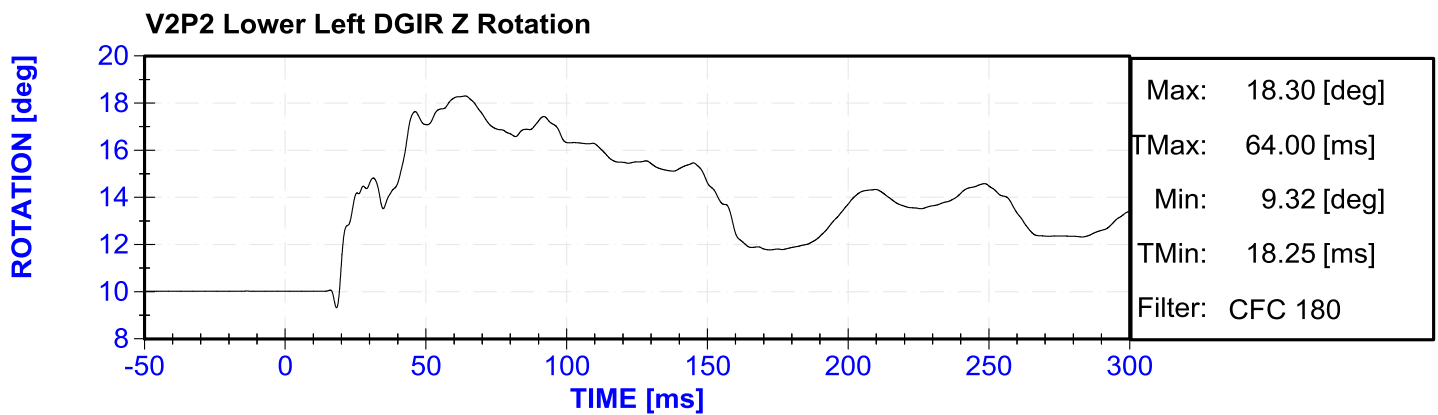
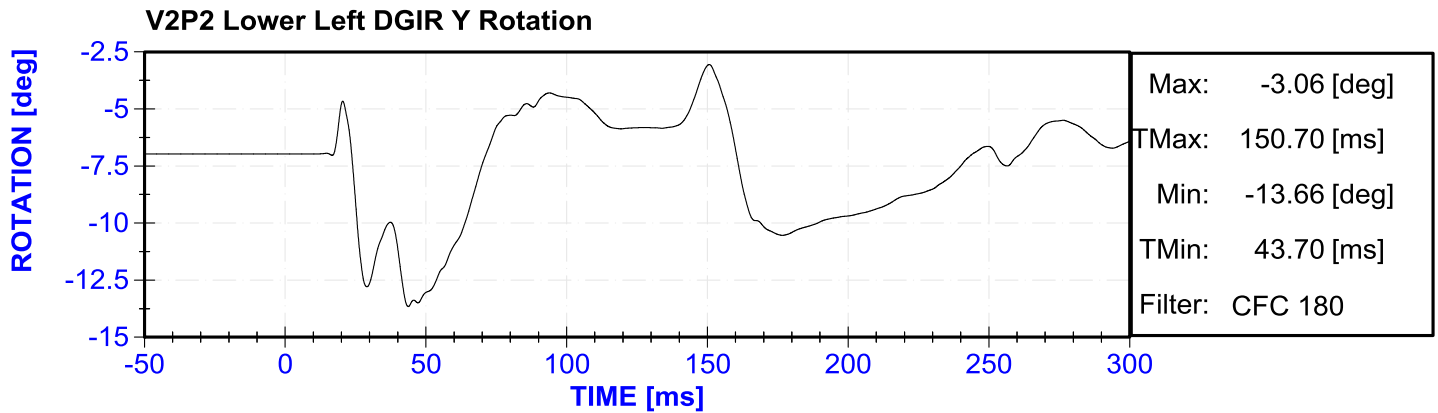


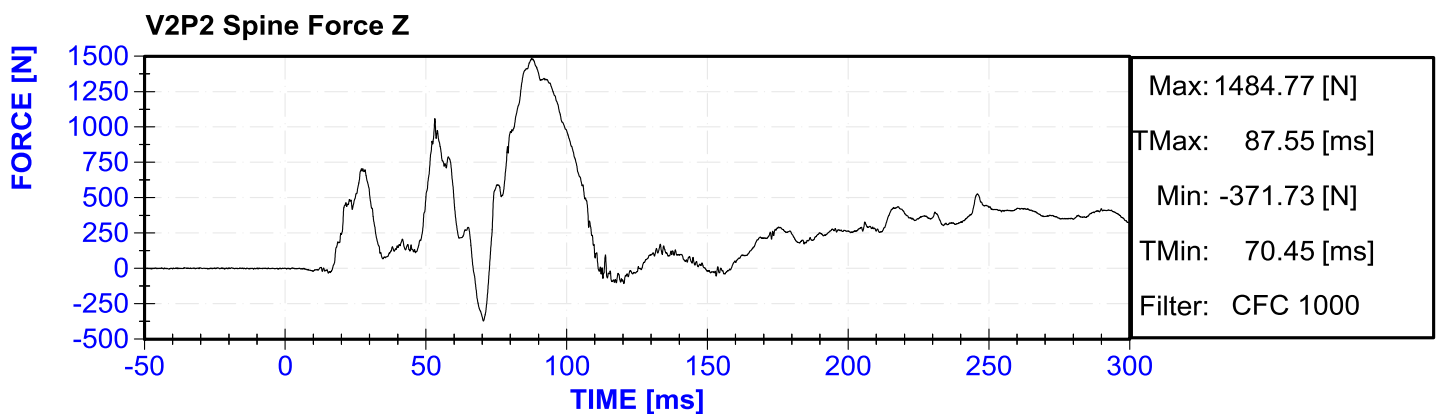
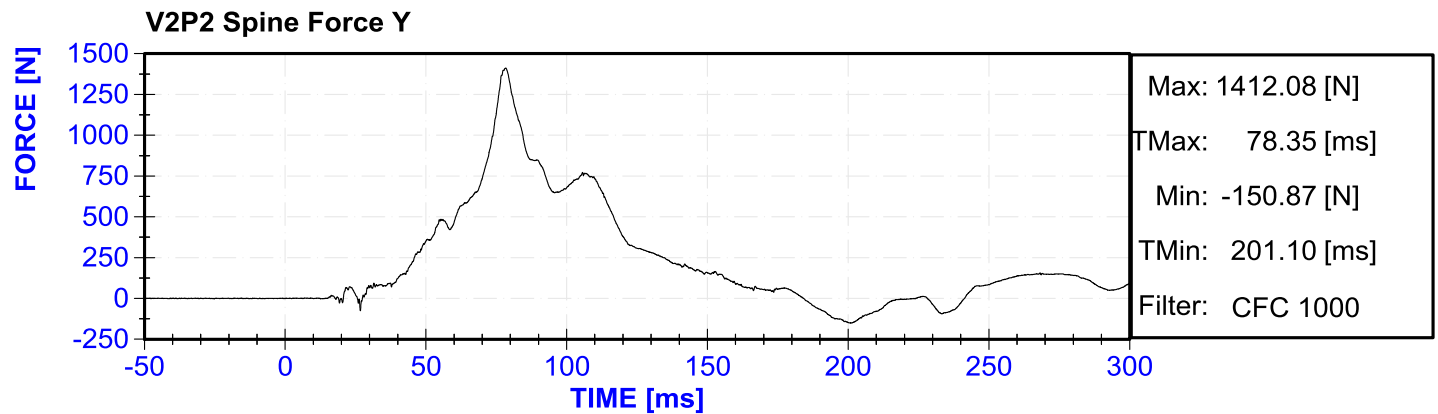
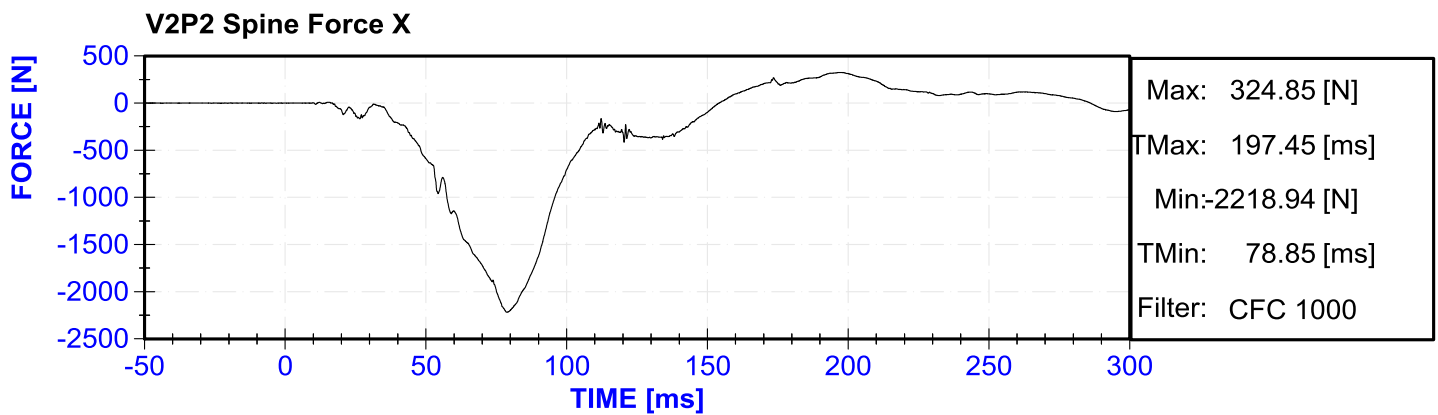
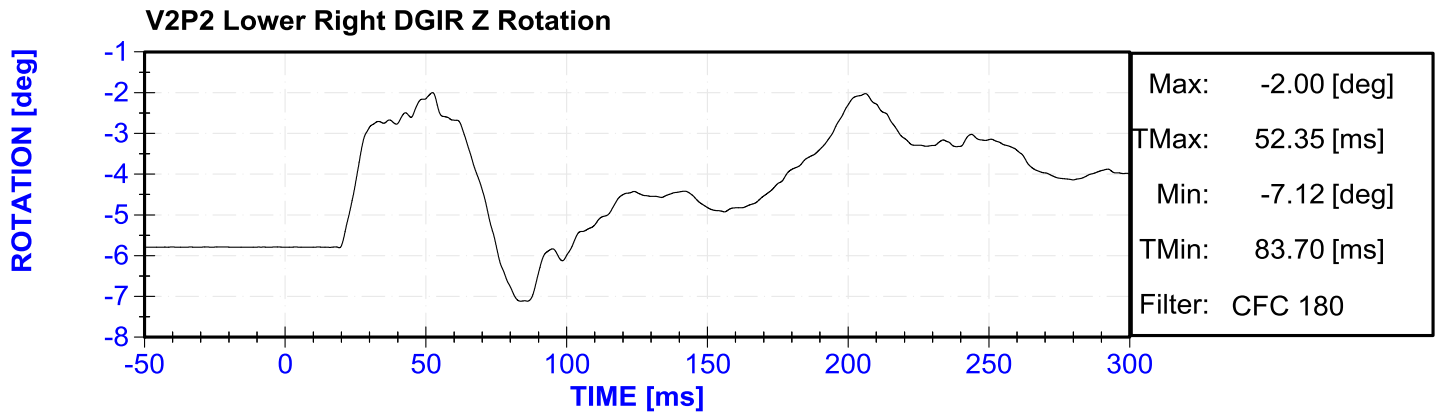
V2P2 Upper Right DGIR Z Rotation

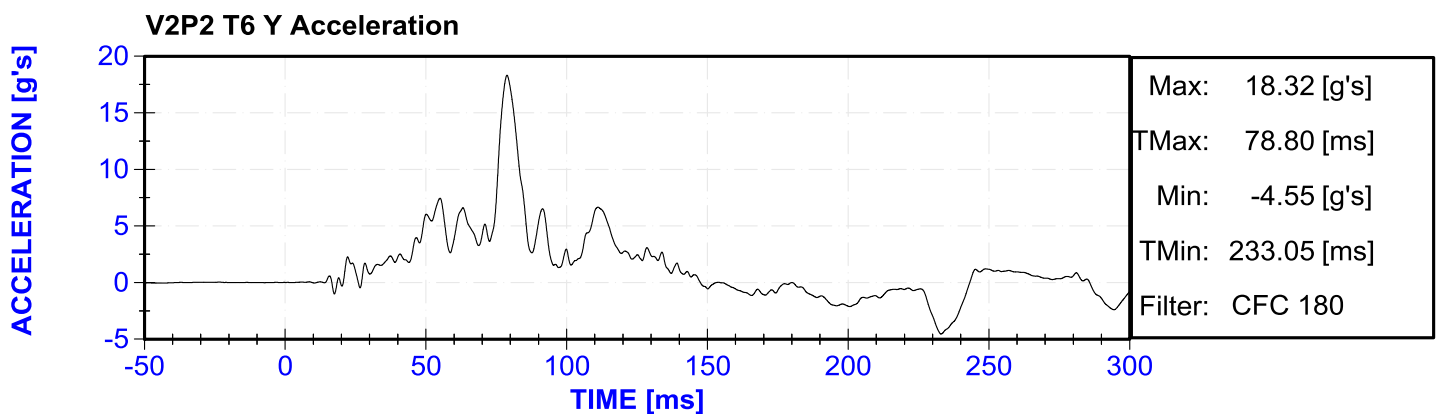
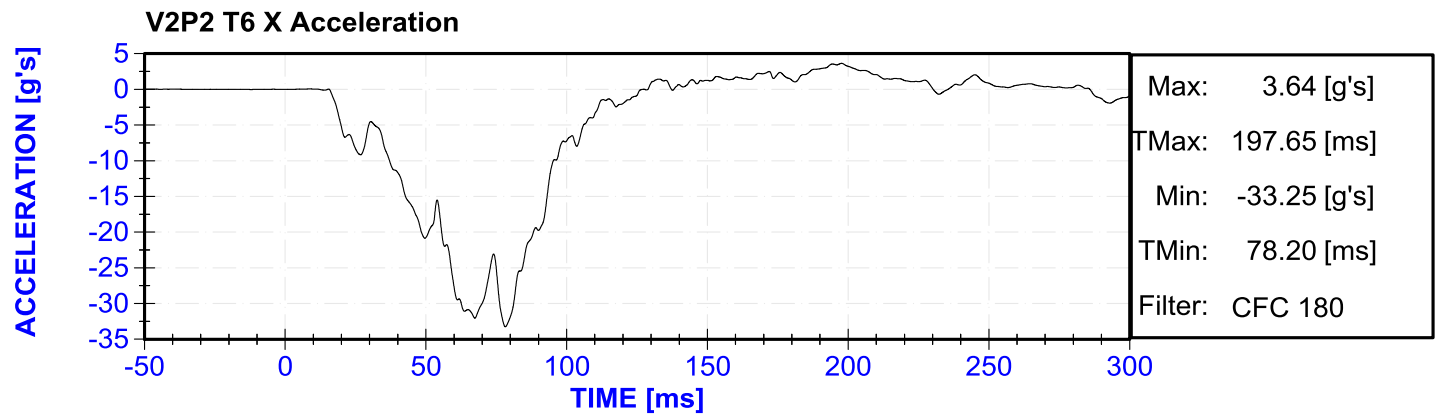
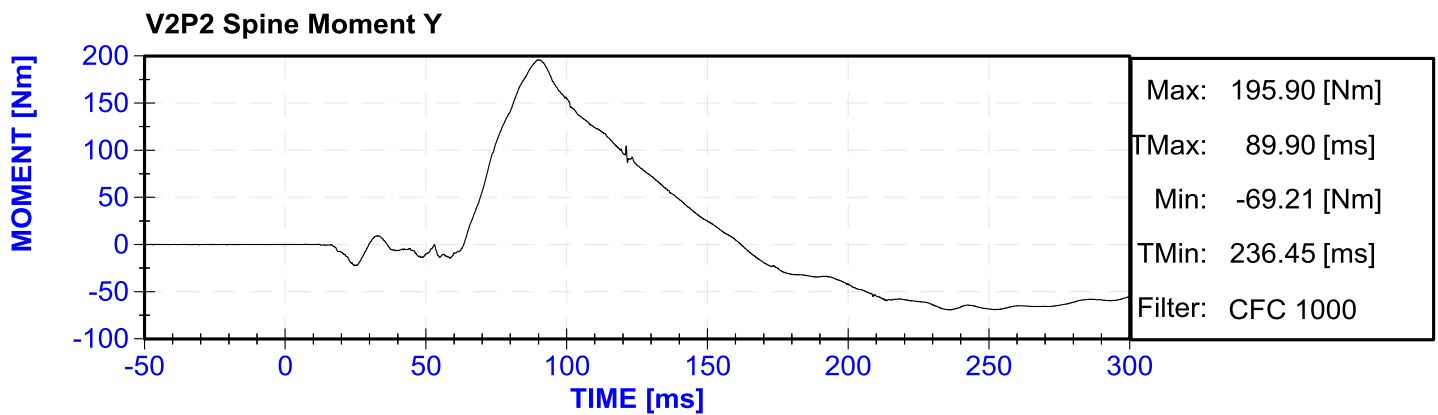
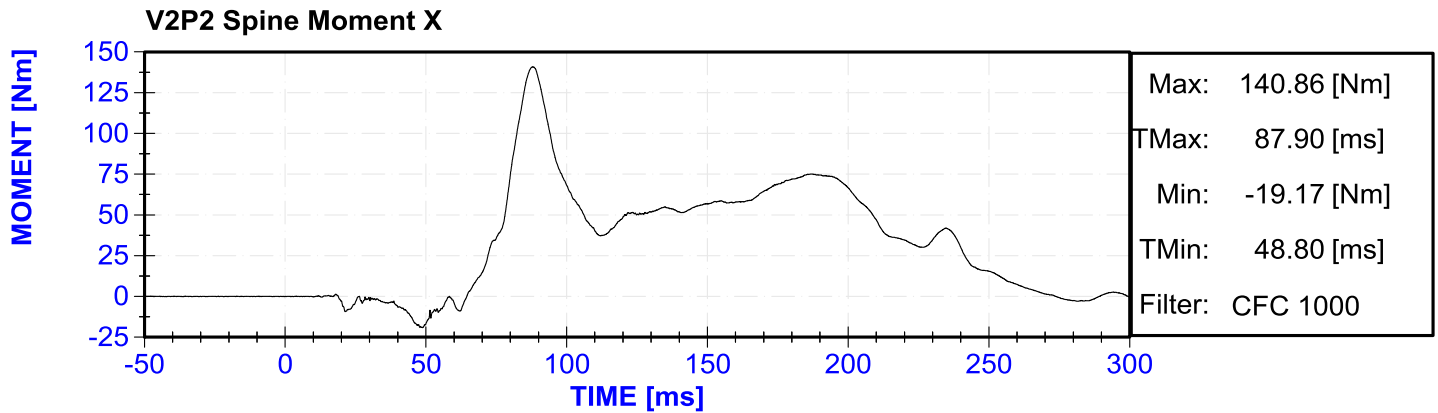


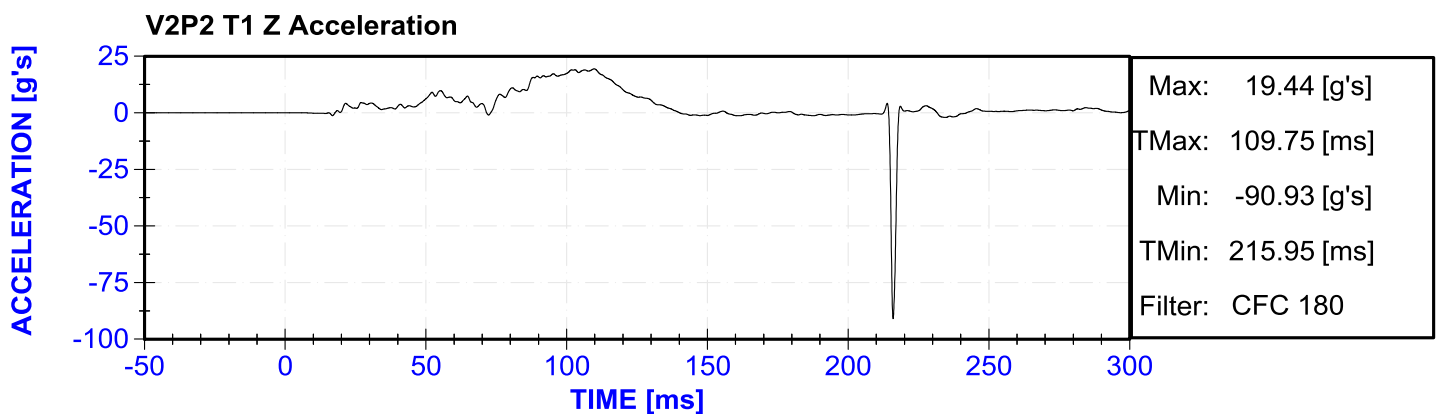
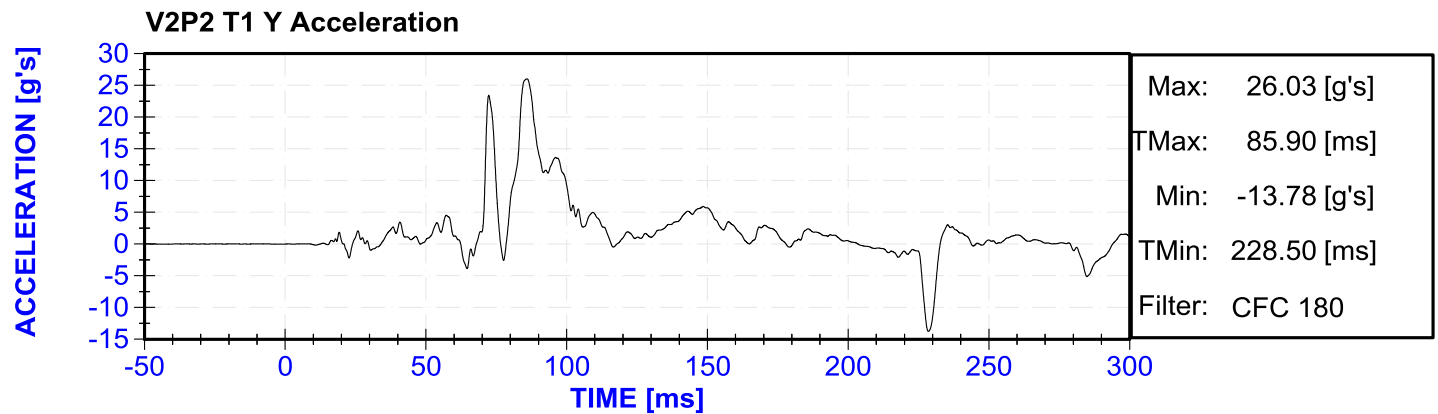
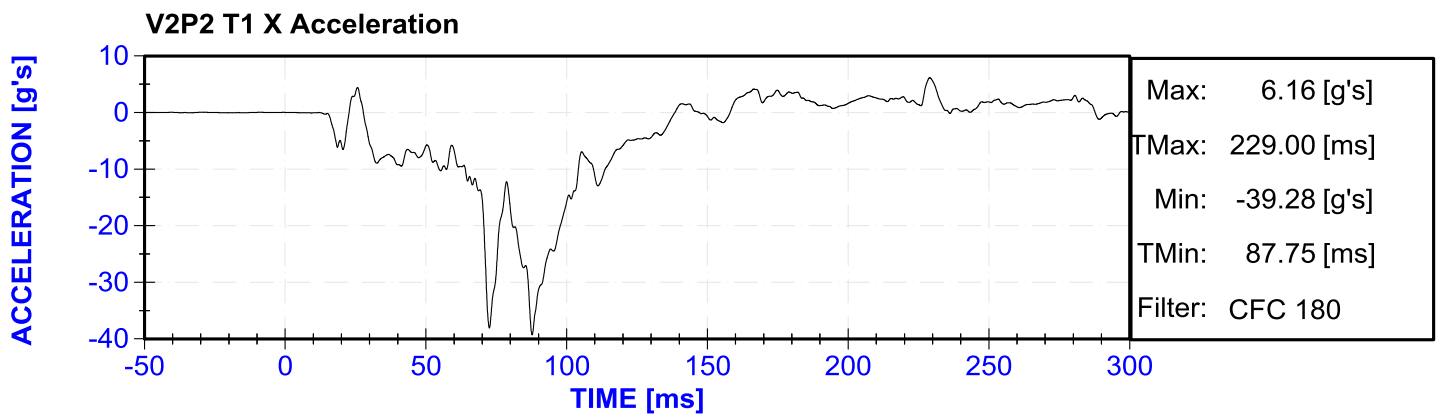
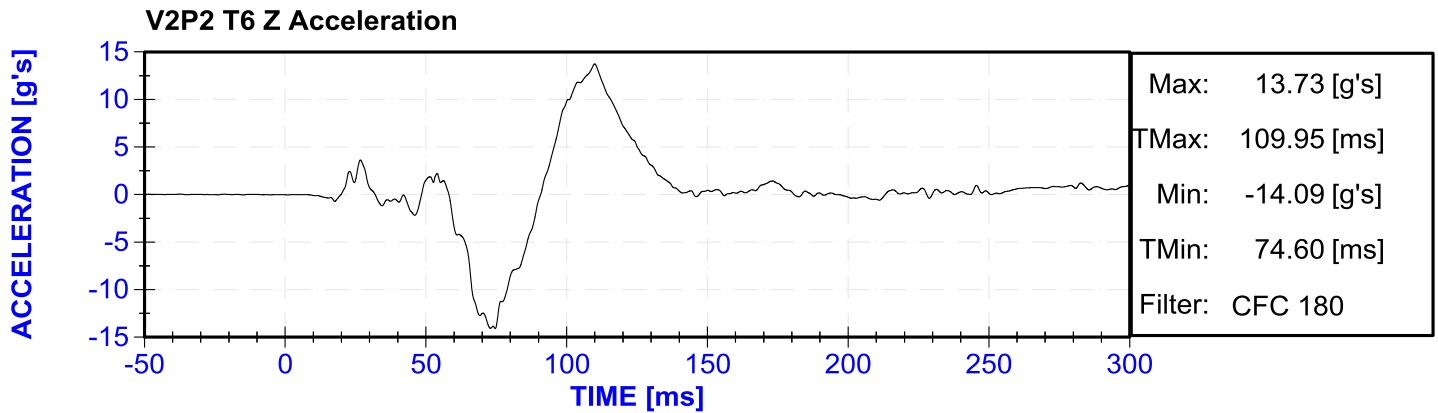
V2P2 Lower Left DGIR X Displacement



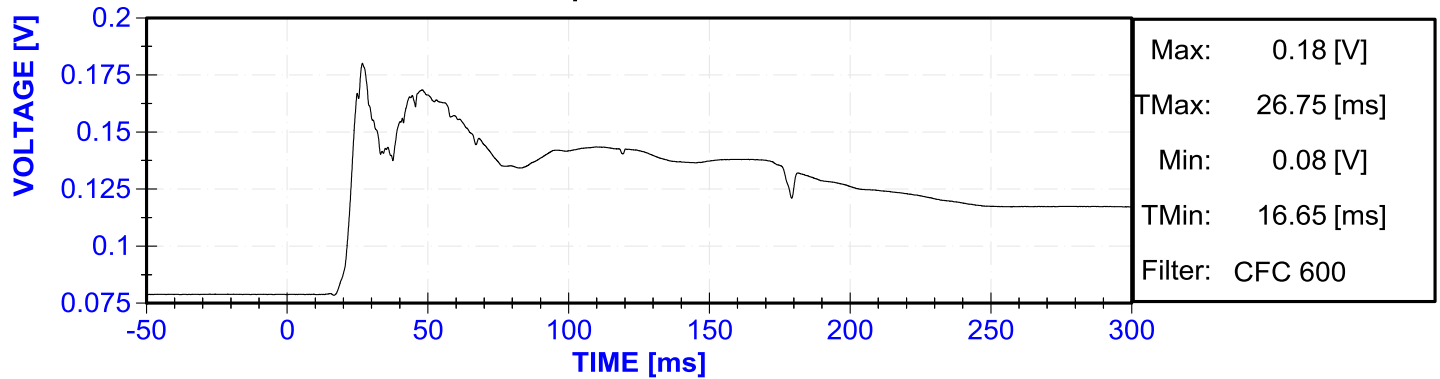




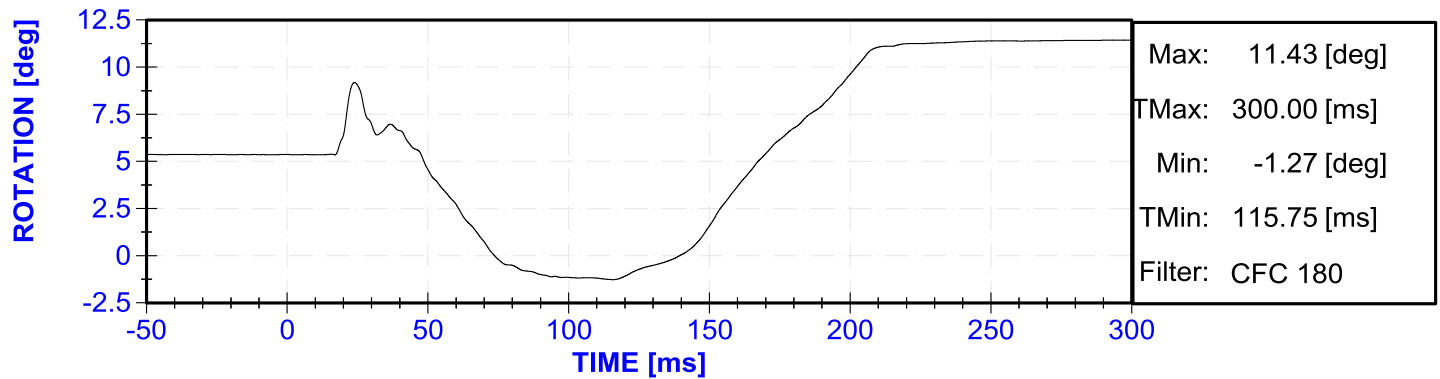




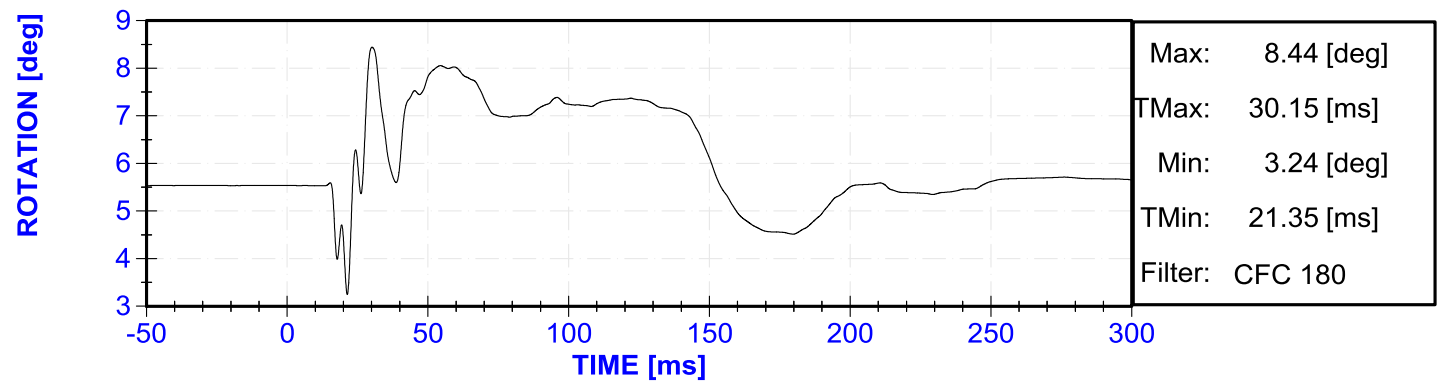
V2P2 Abdomen Left DGIR X Displacement



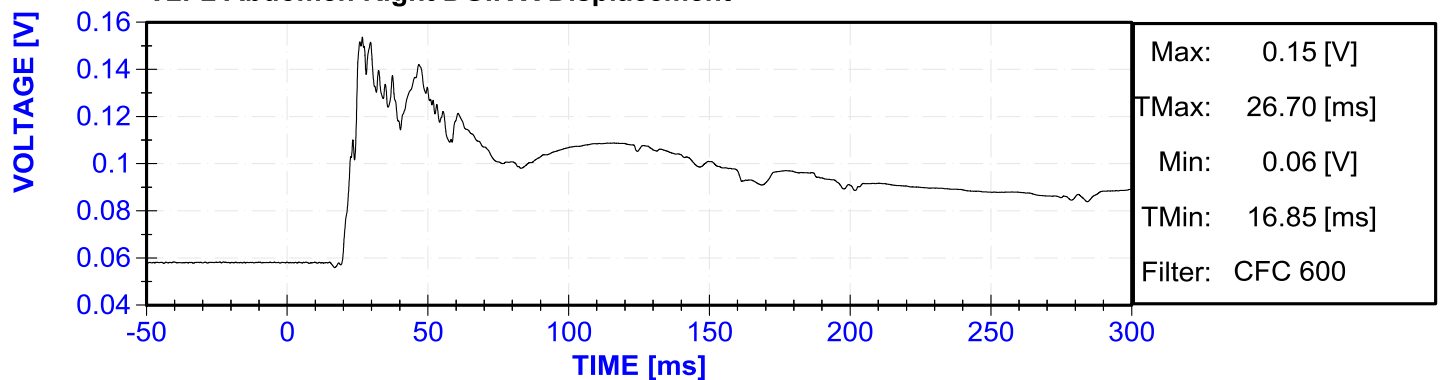
V2P2 Abdomen Left DGIR Y Rotation

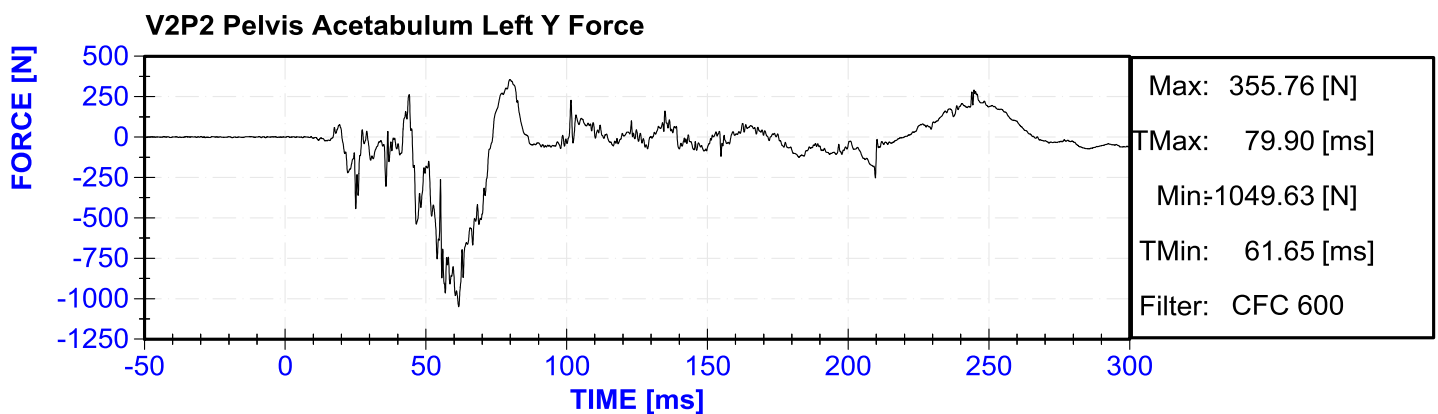
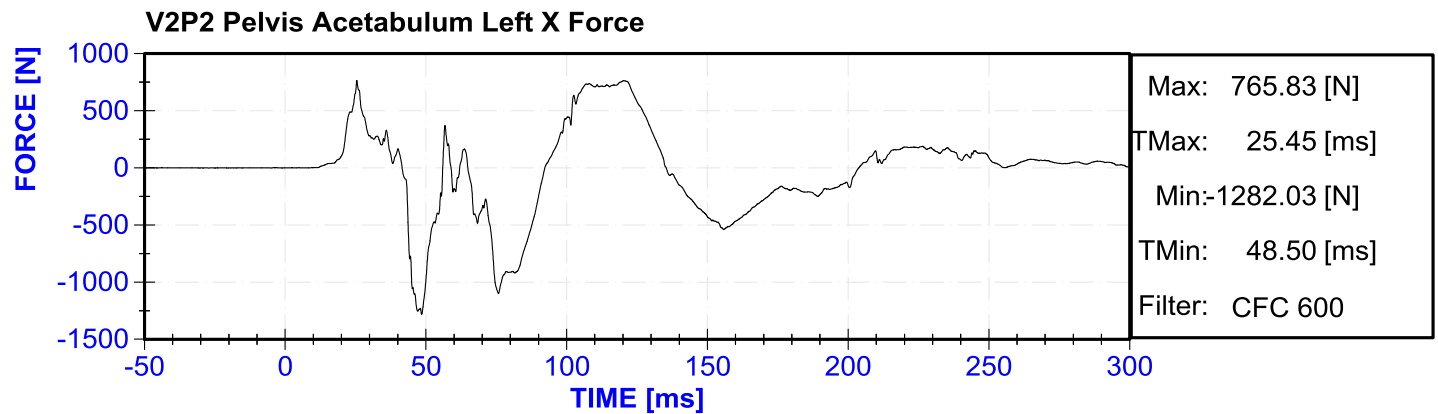
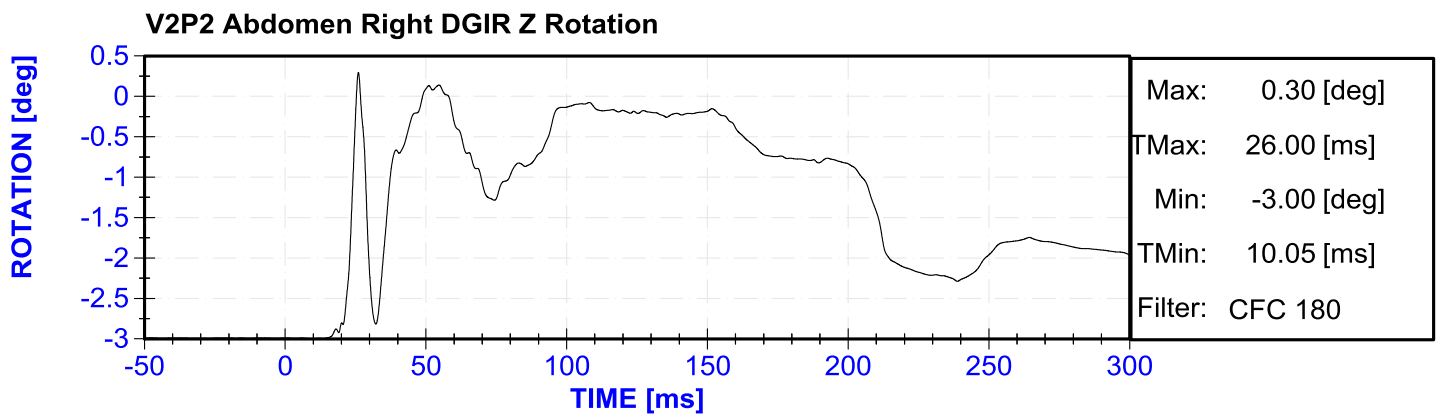
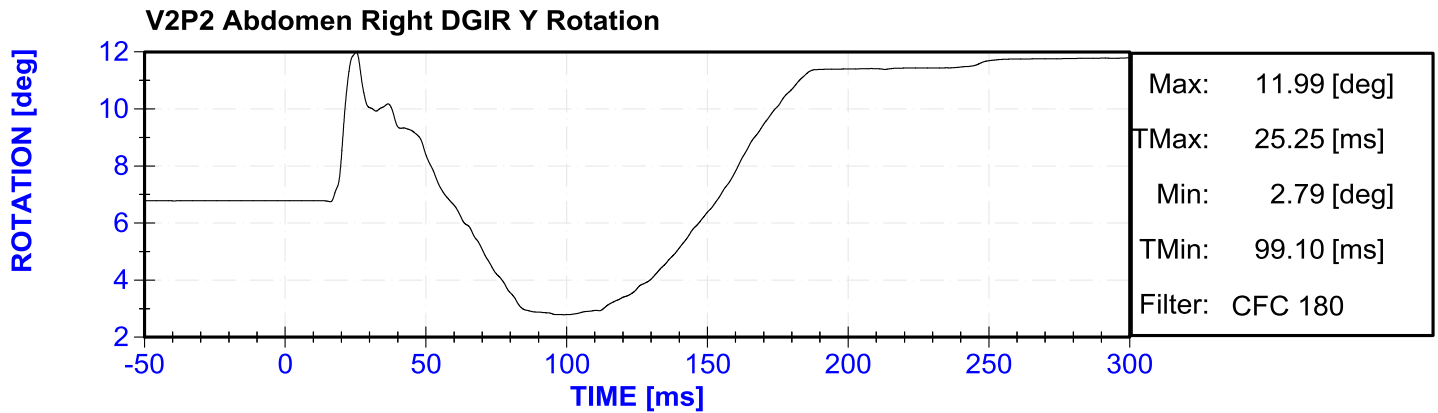


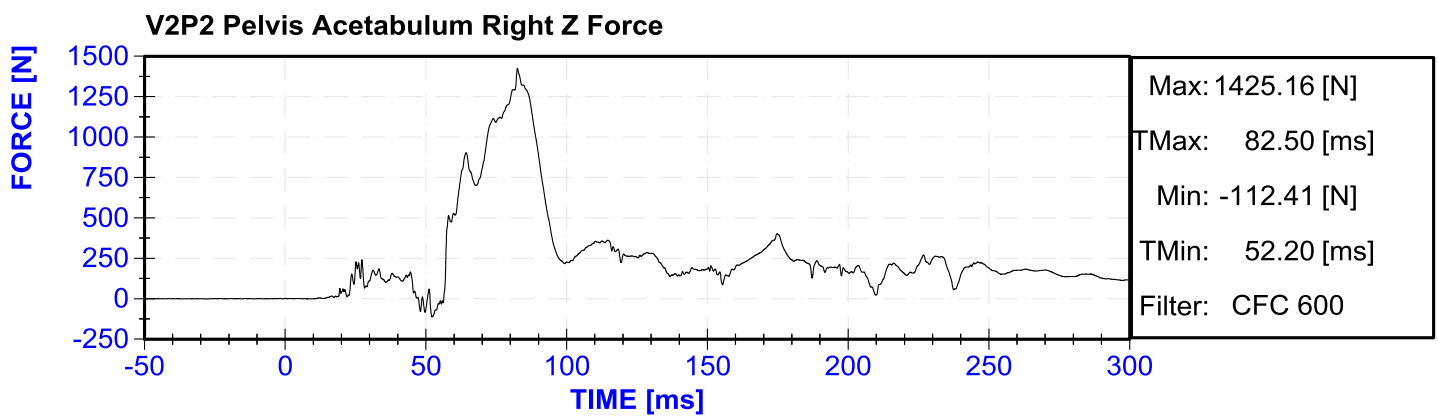
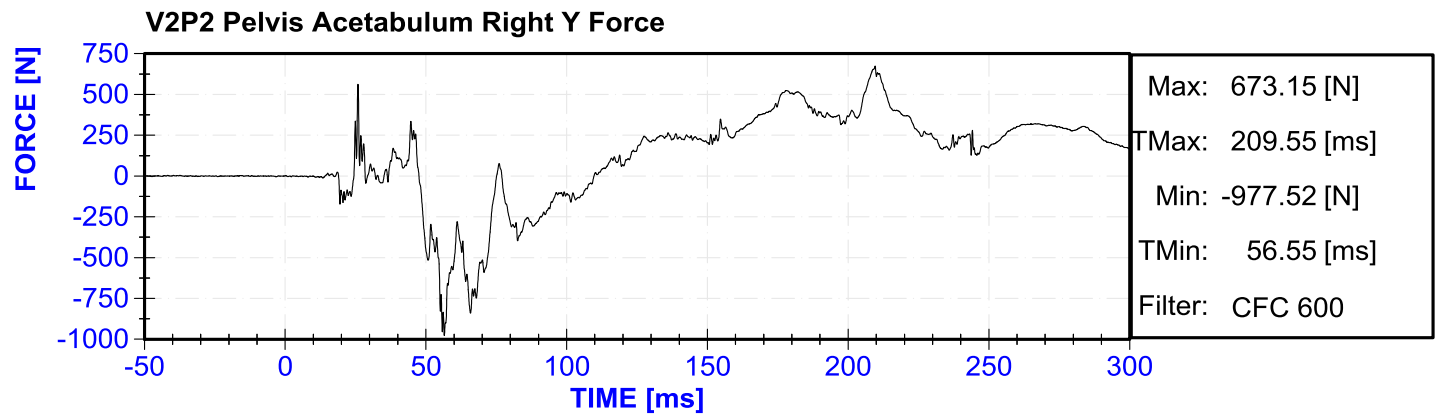
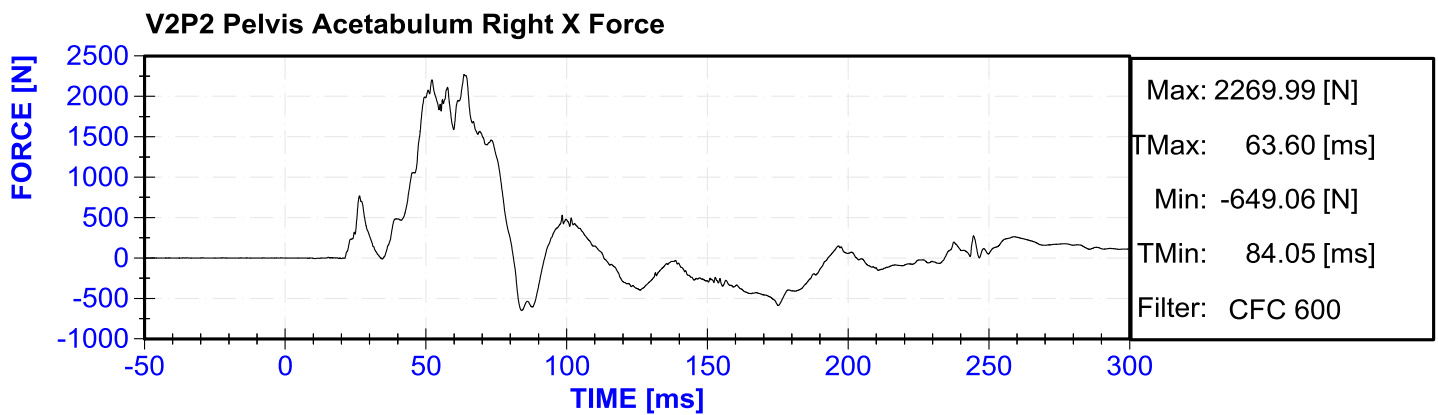
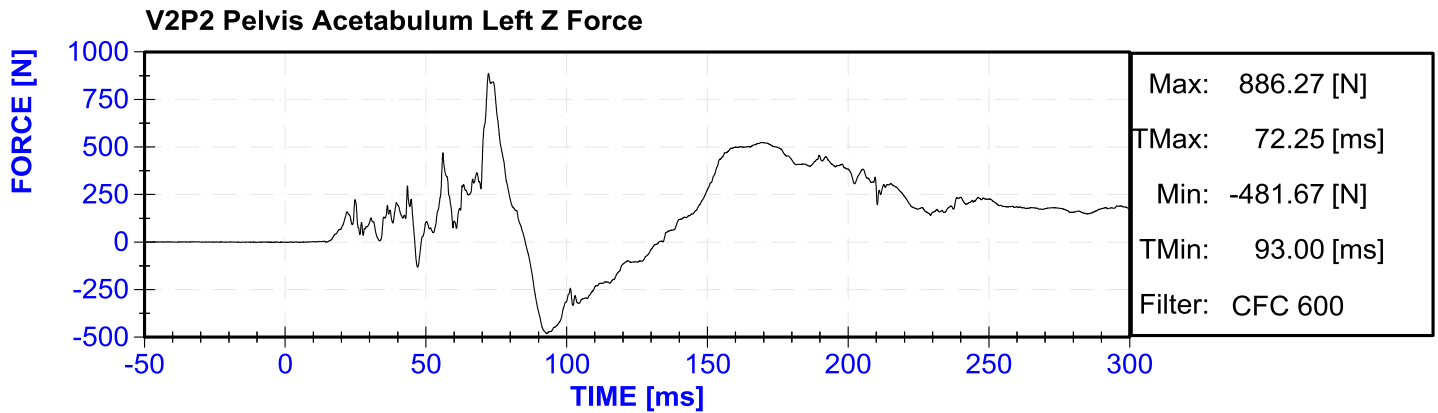
V2P2 Abdomen Left DGIR Z Rotation

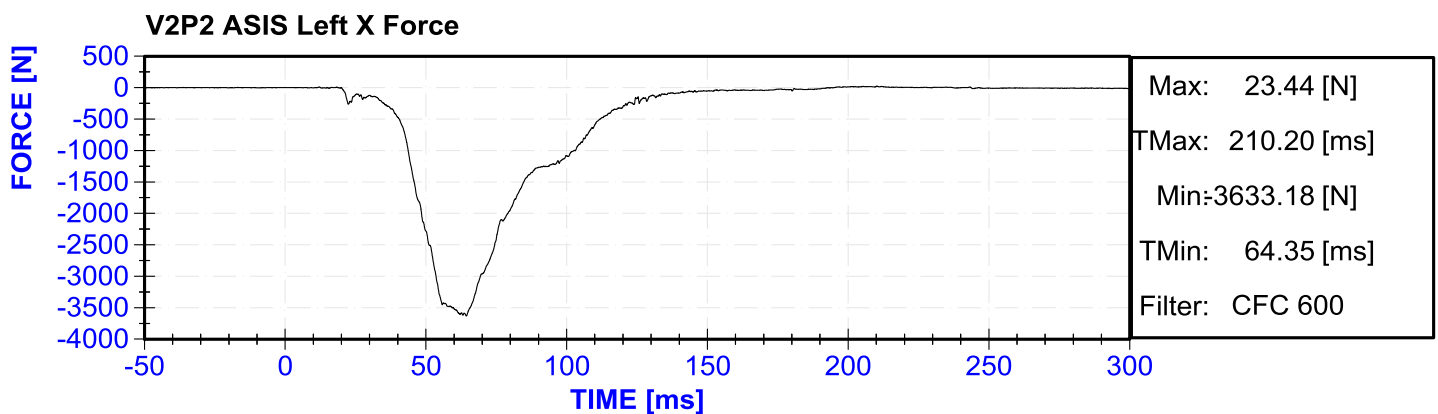
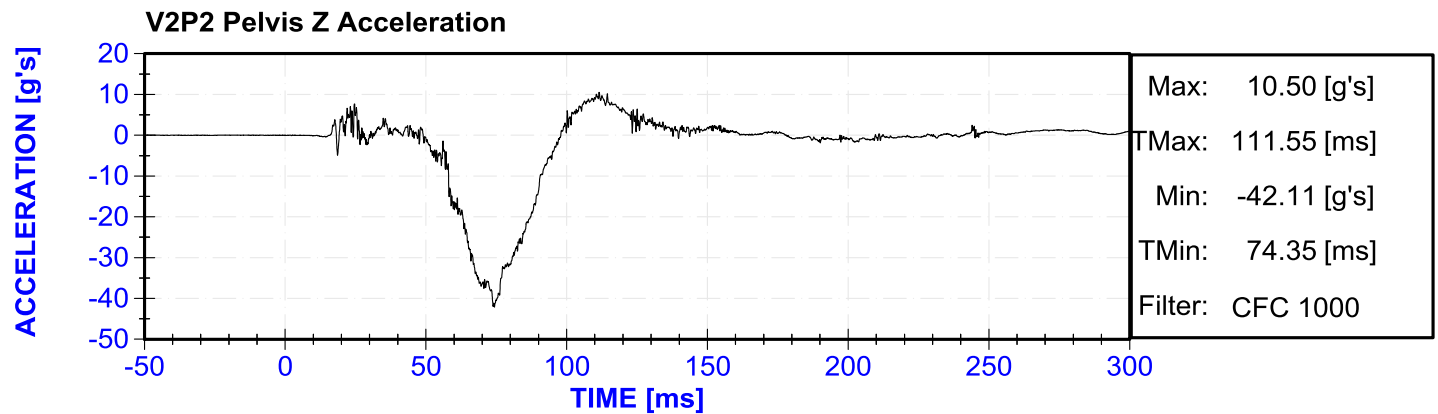
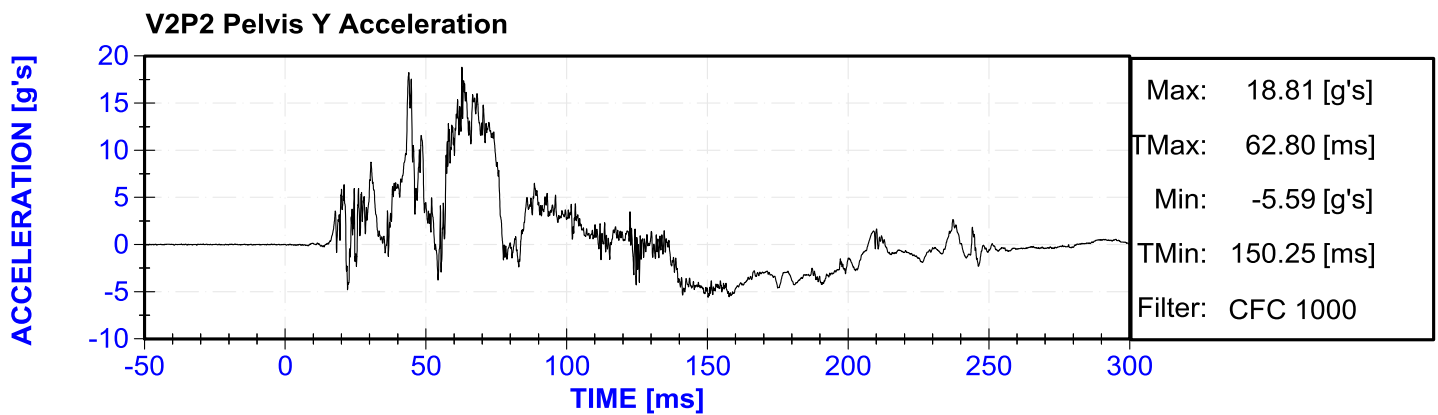
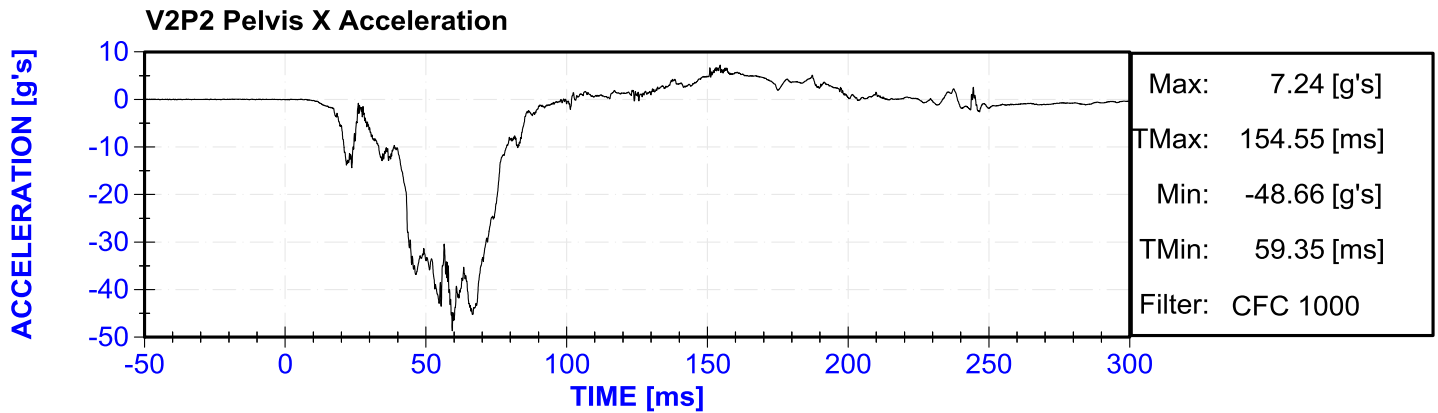


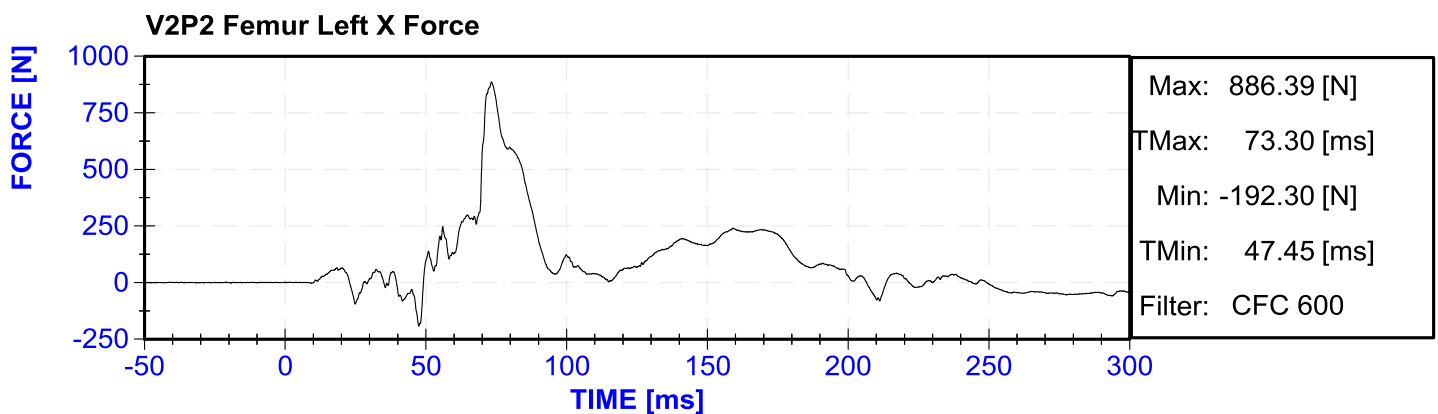
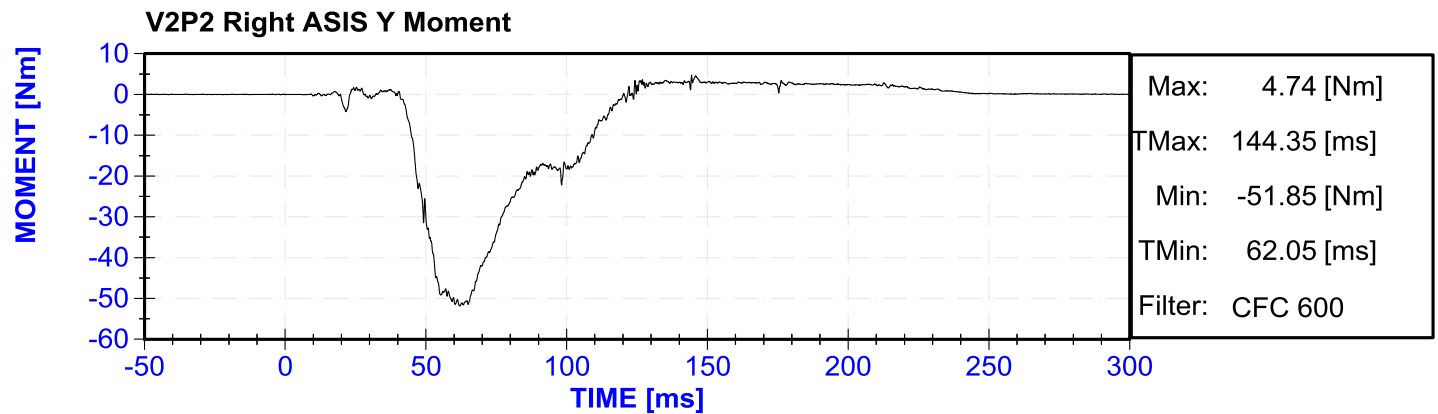
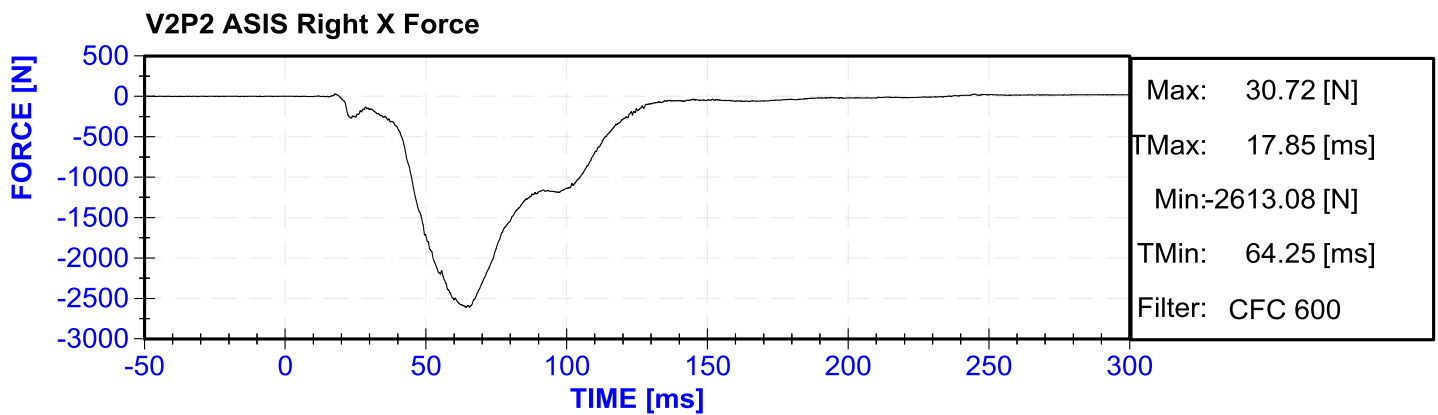
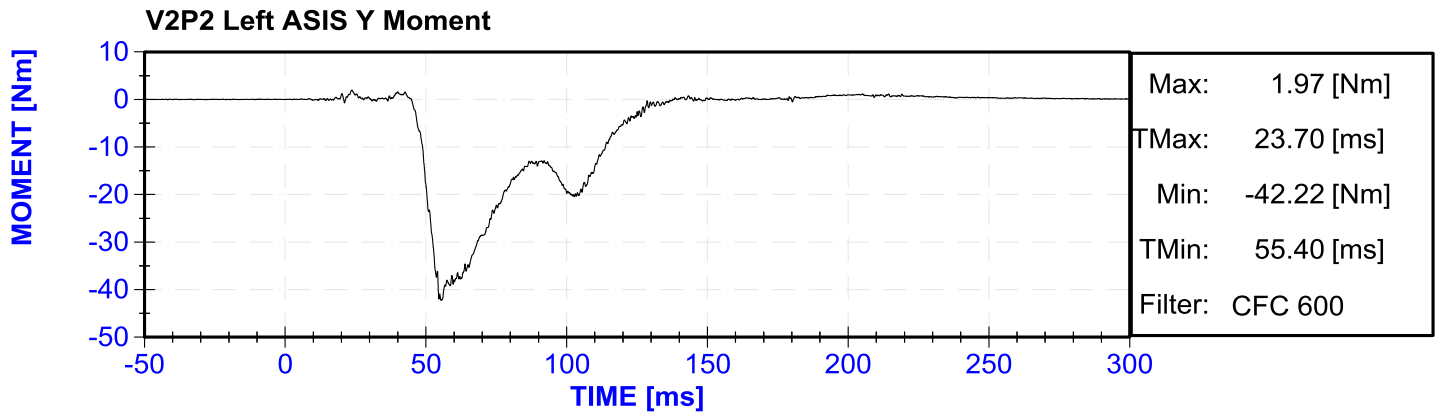
V2P2 Abdomen Right DGIR X Displacement

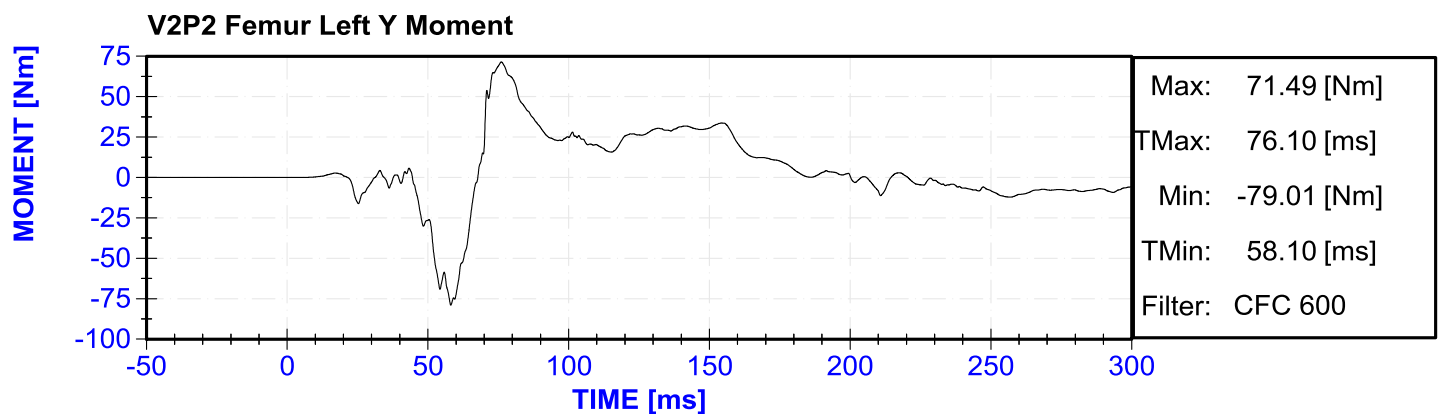
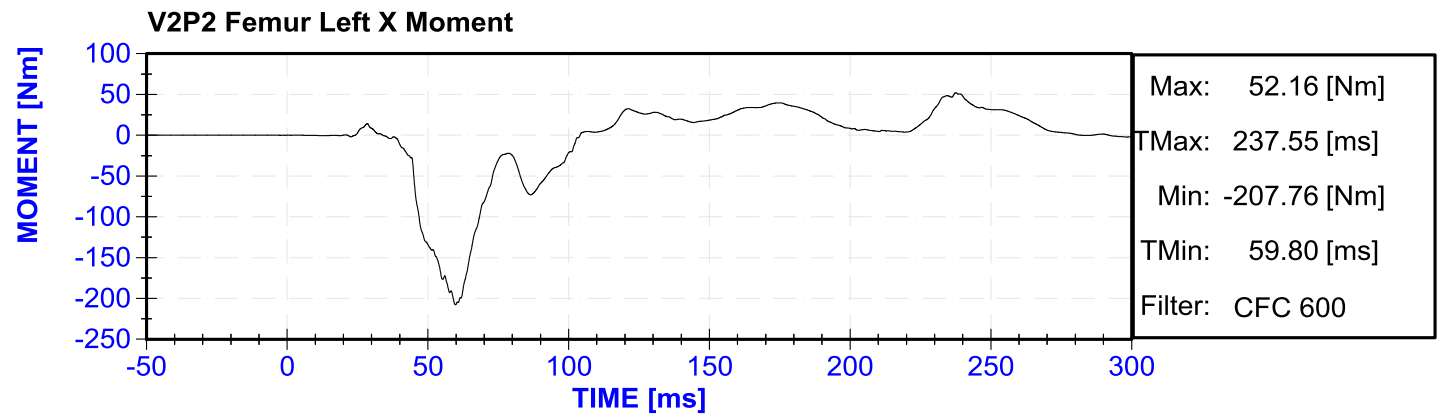
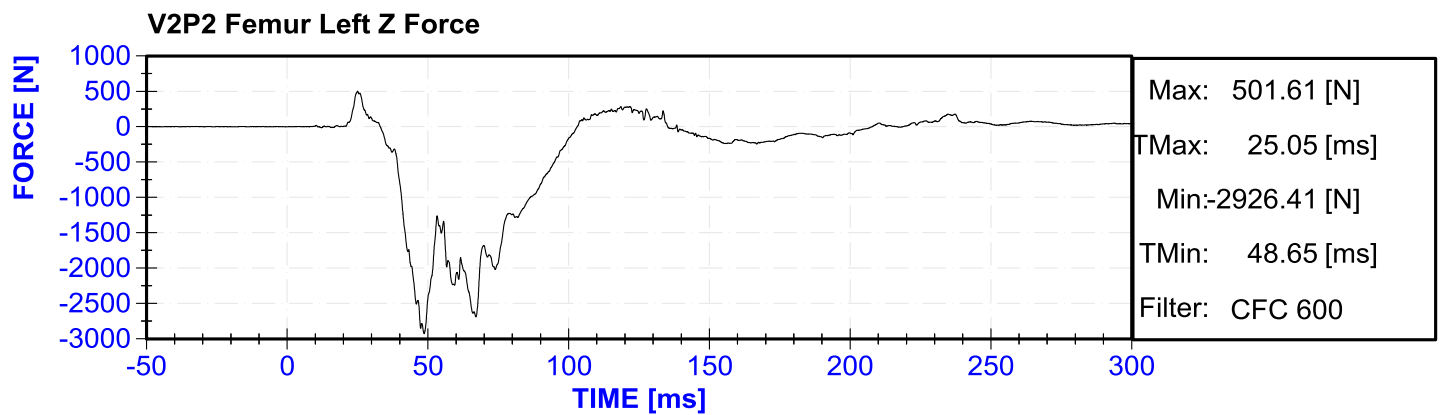
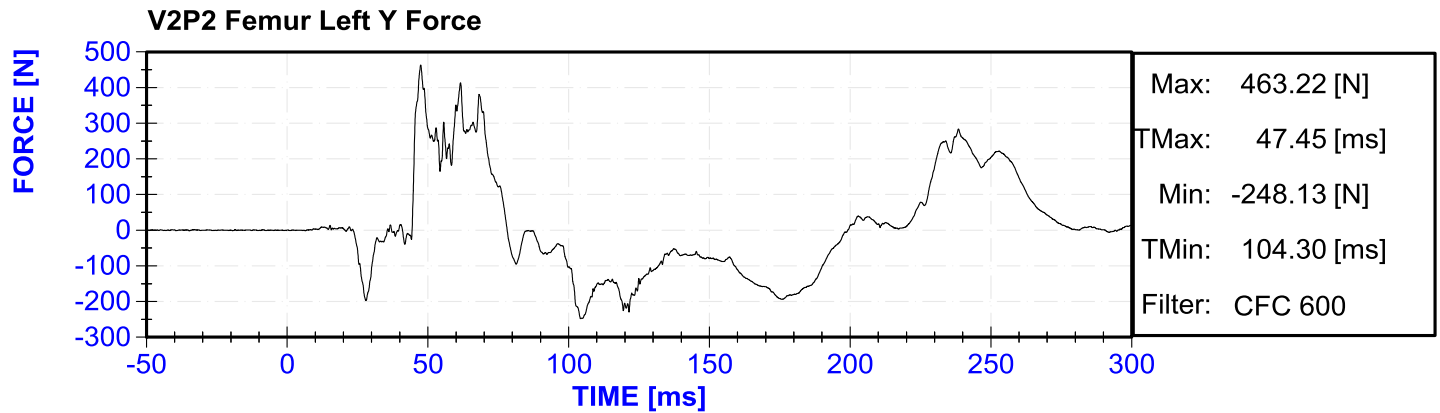


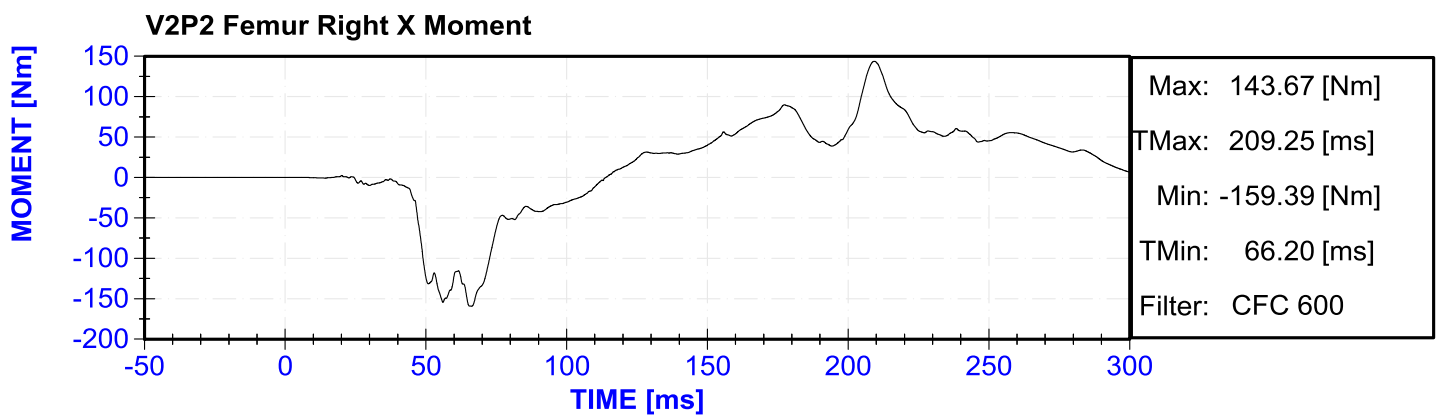
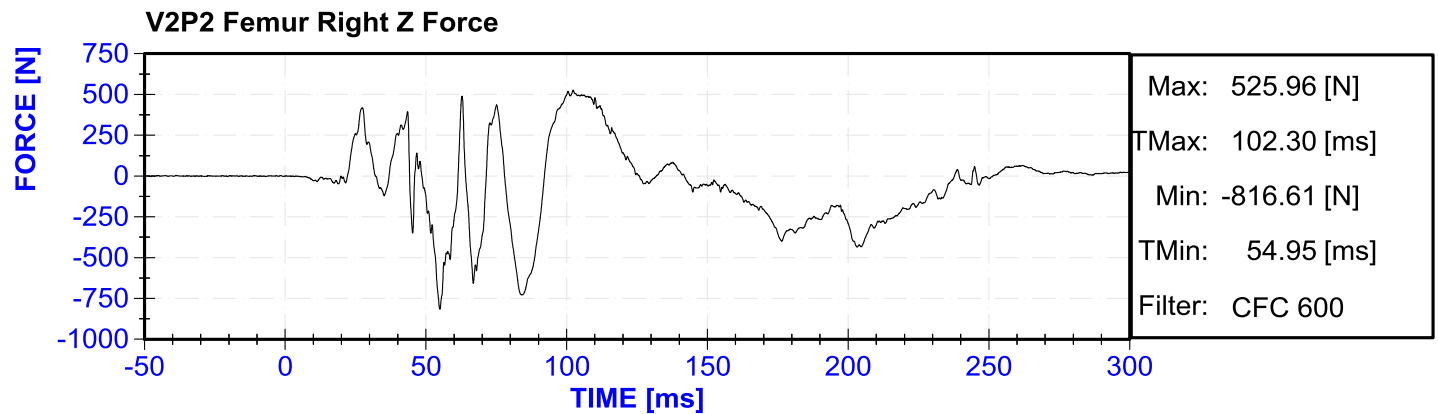
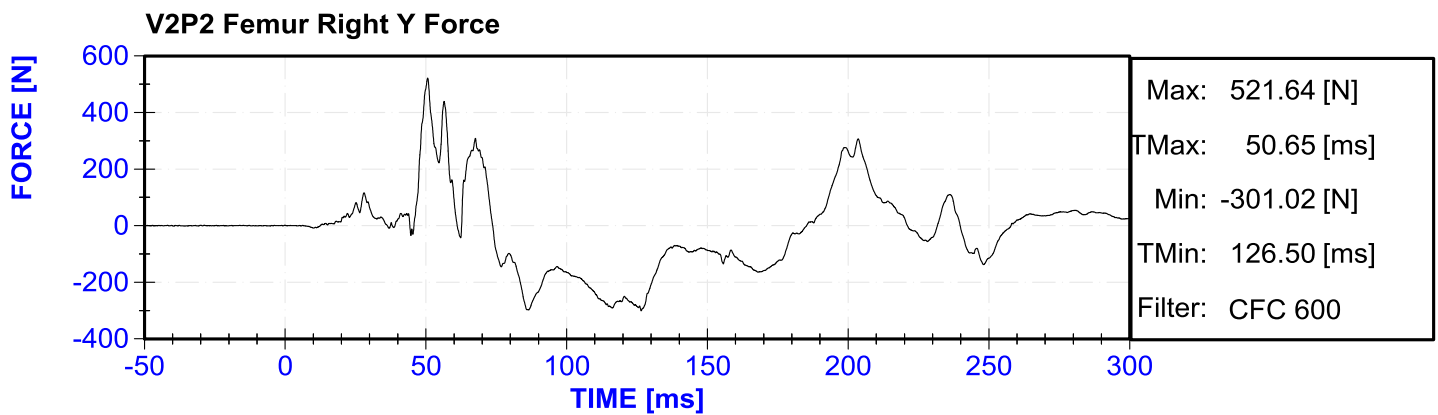
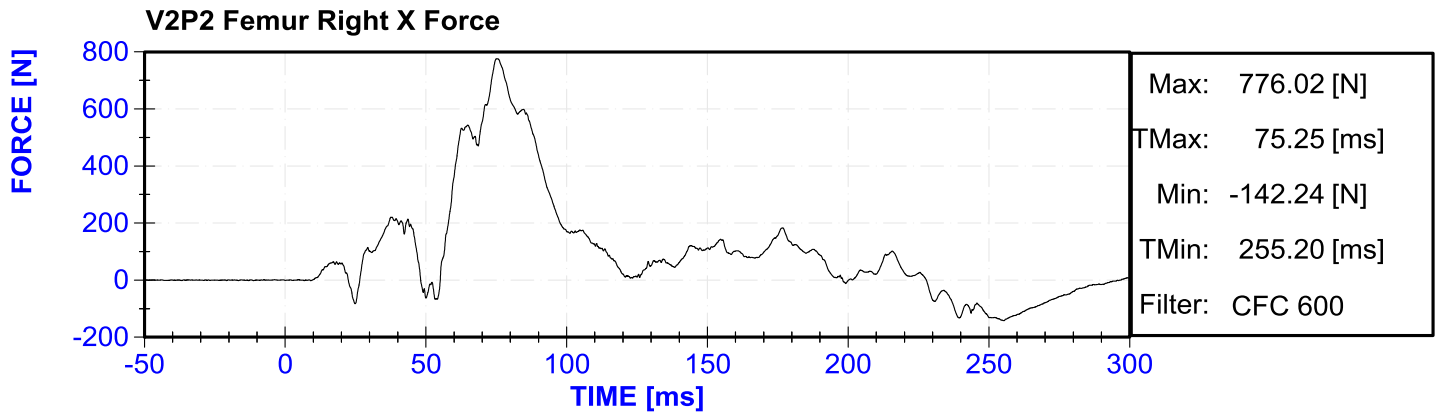


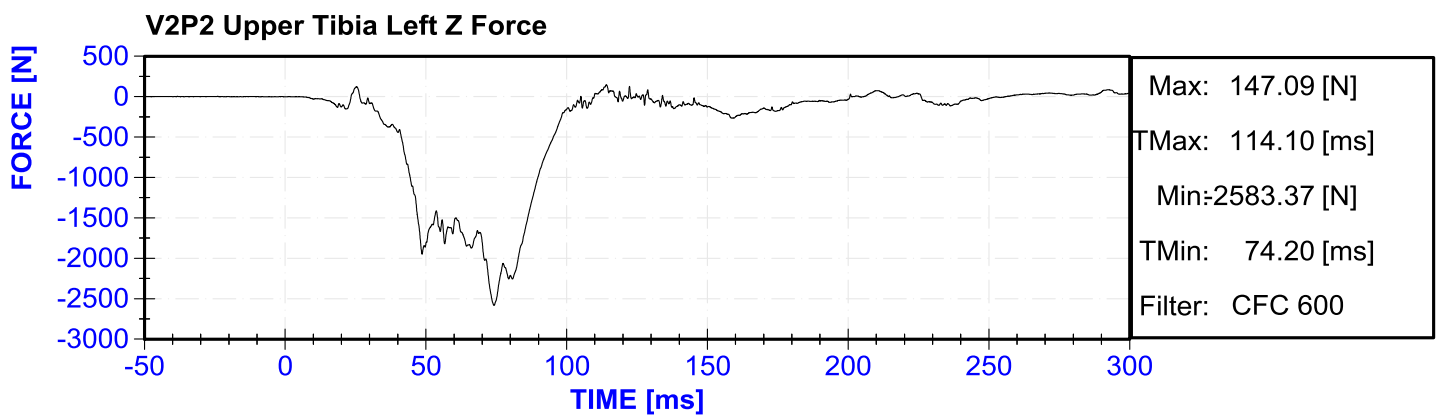
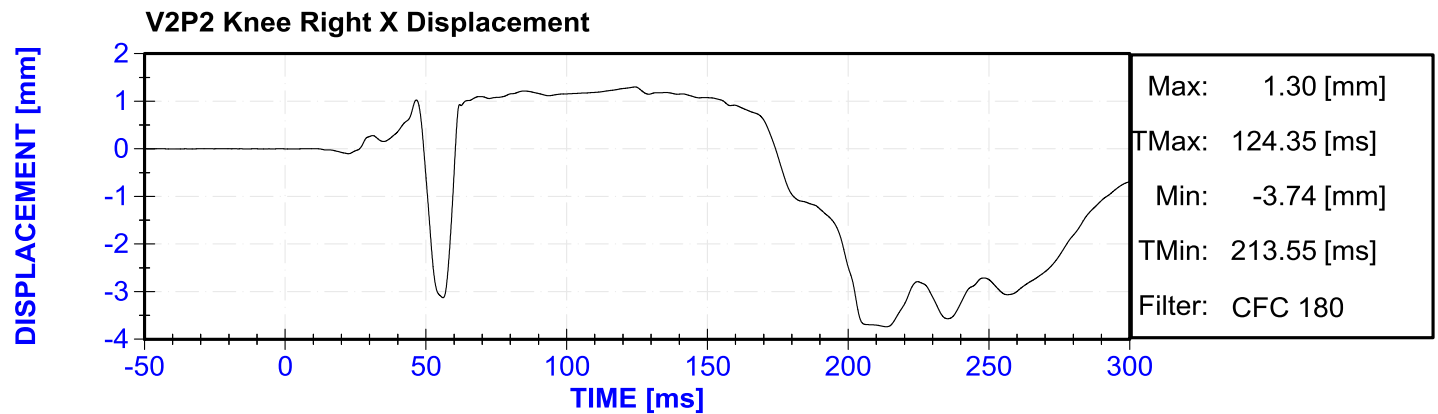
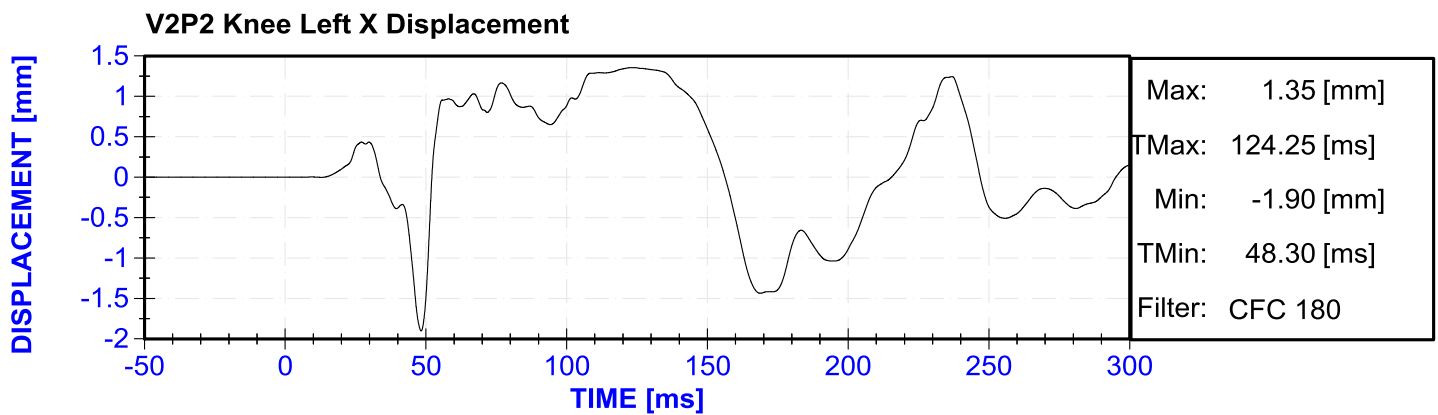
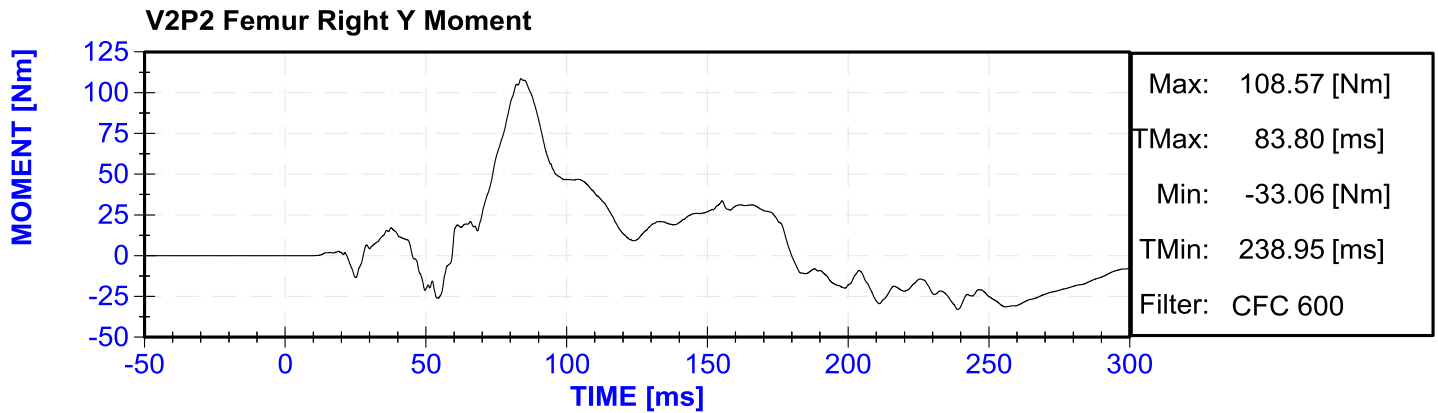


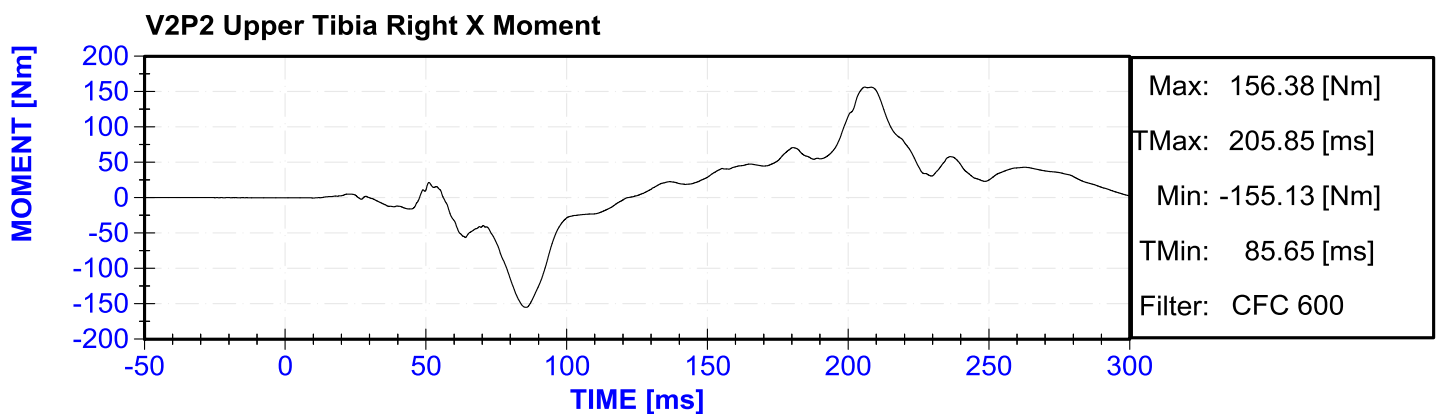
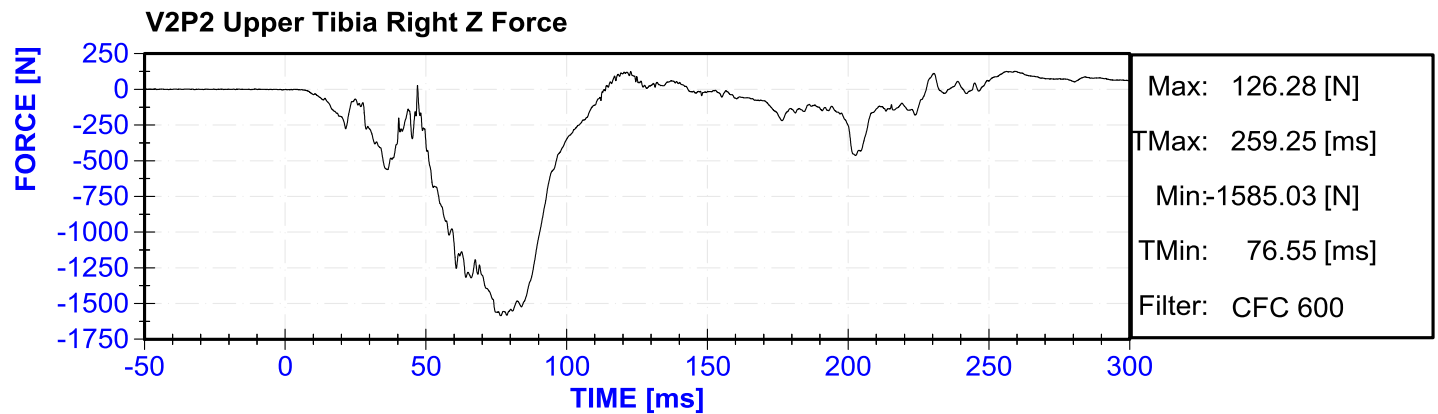
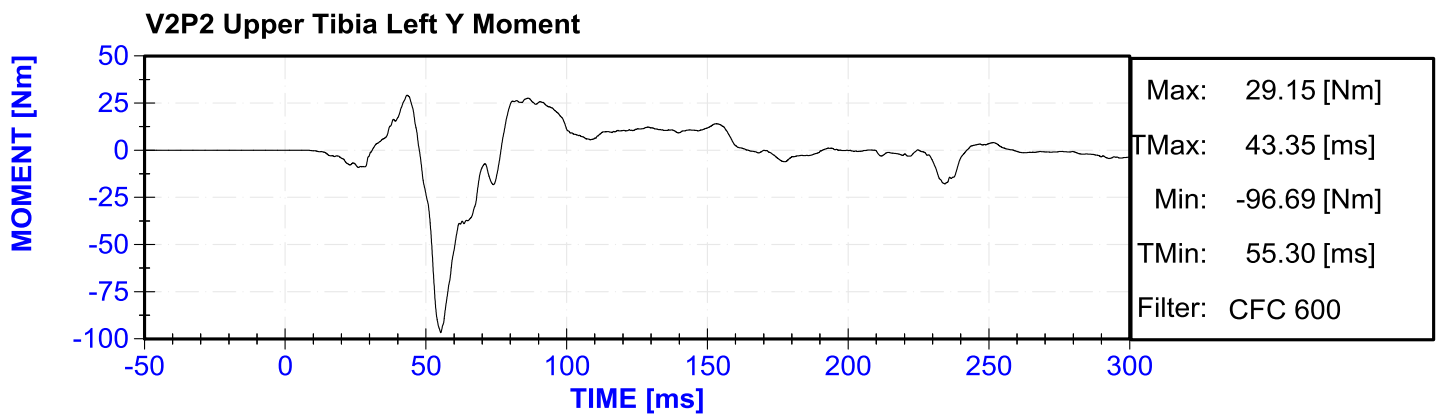
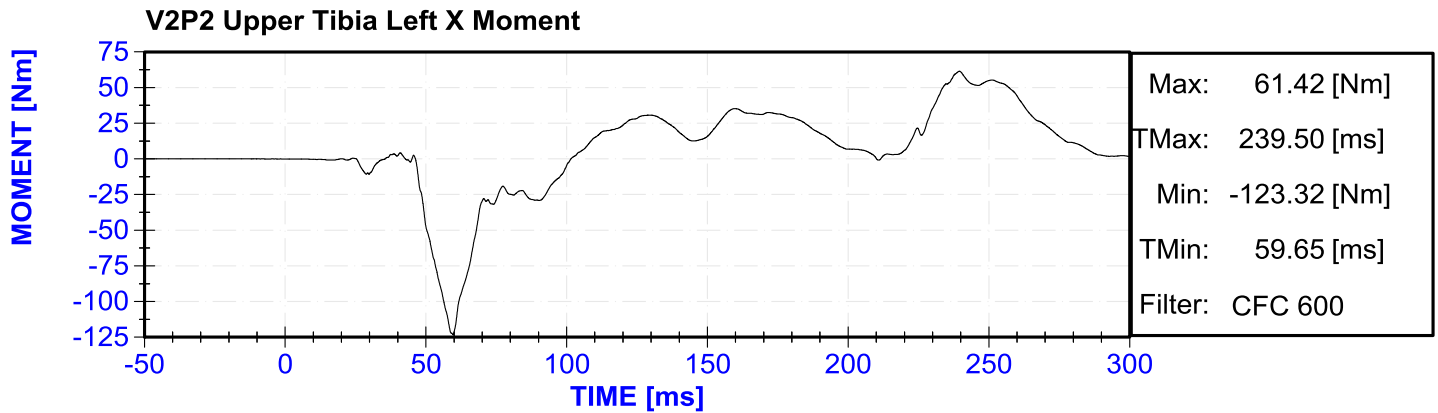


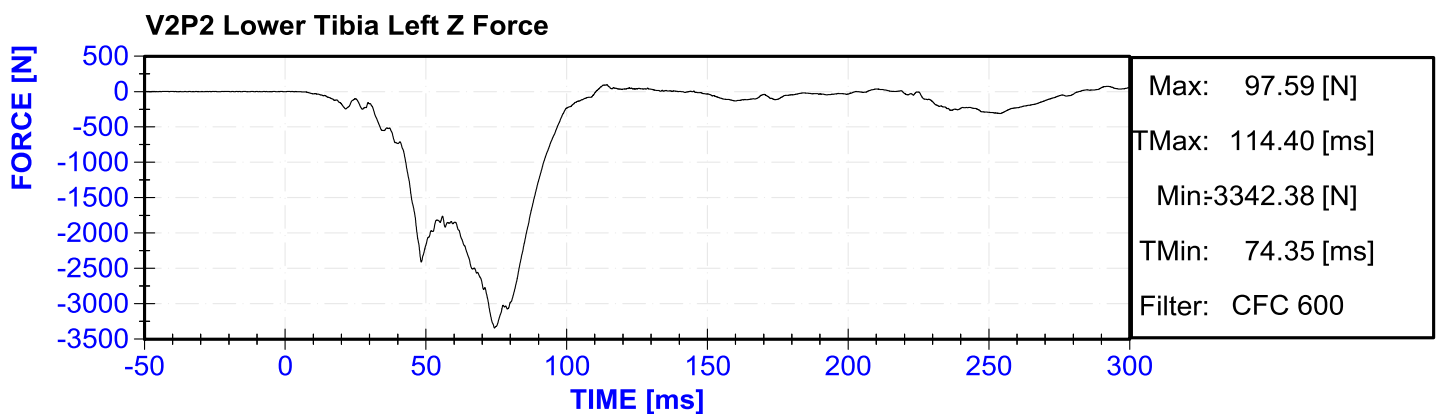
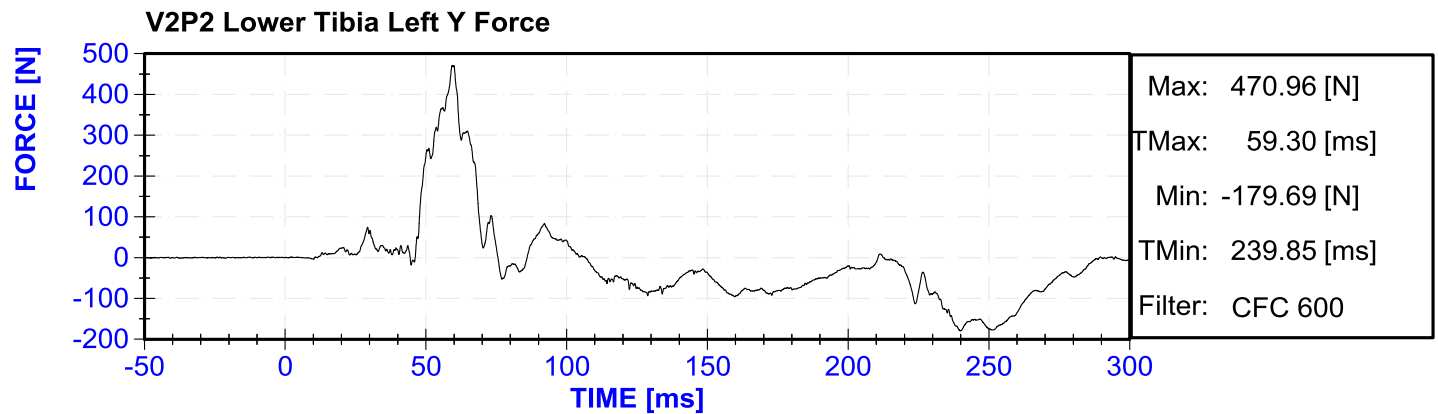
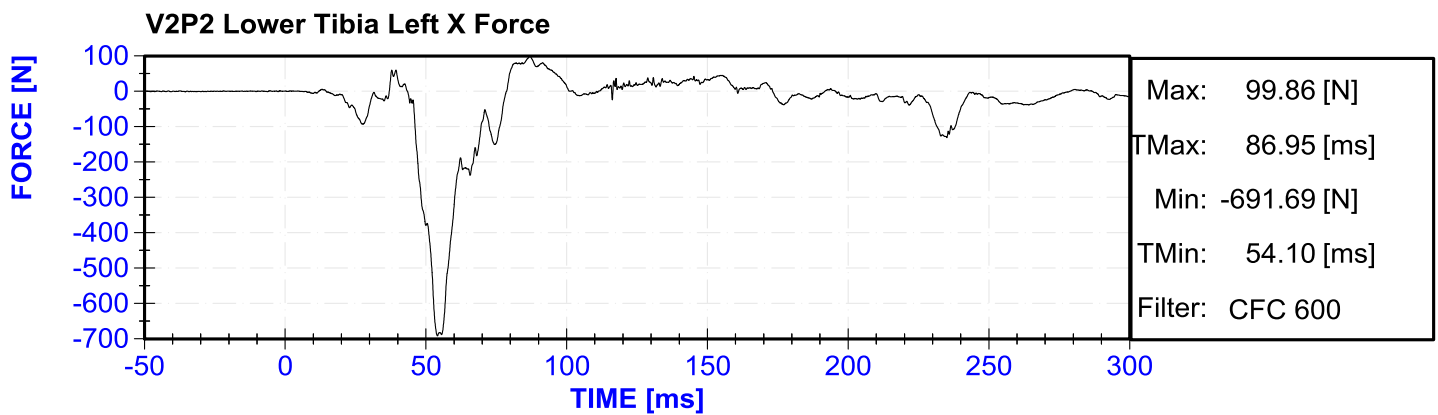
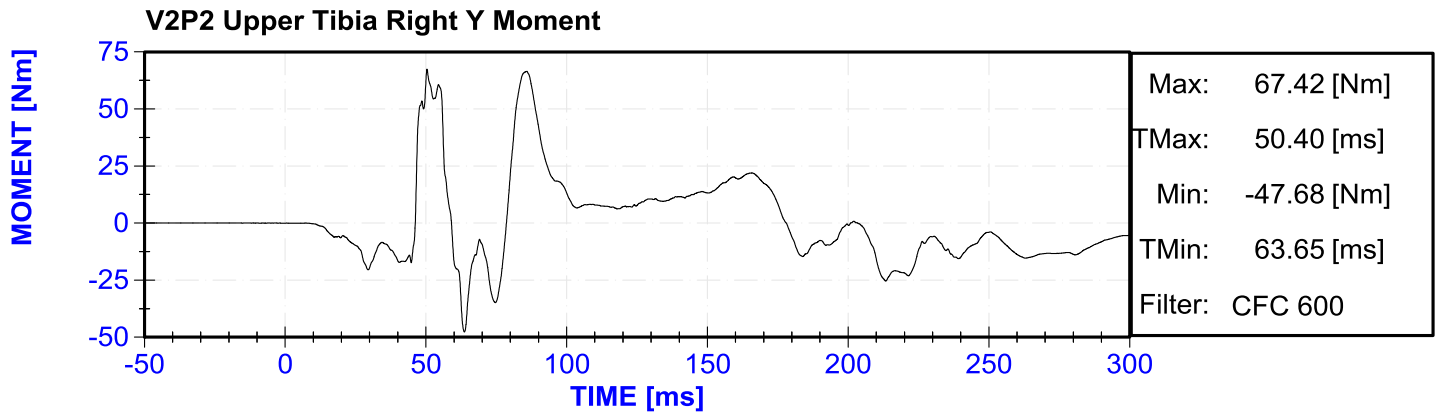


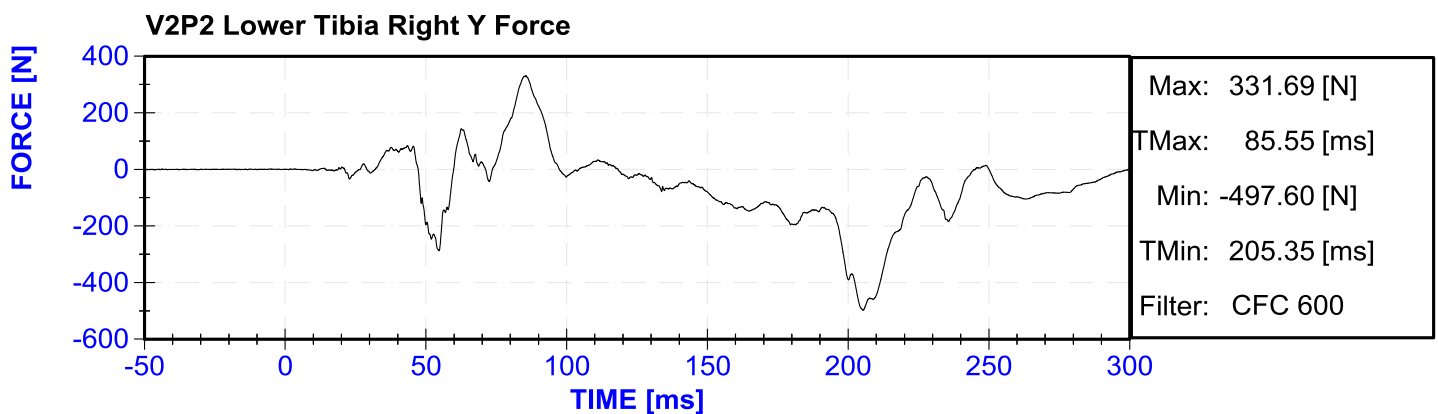
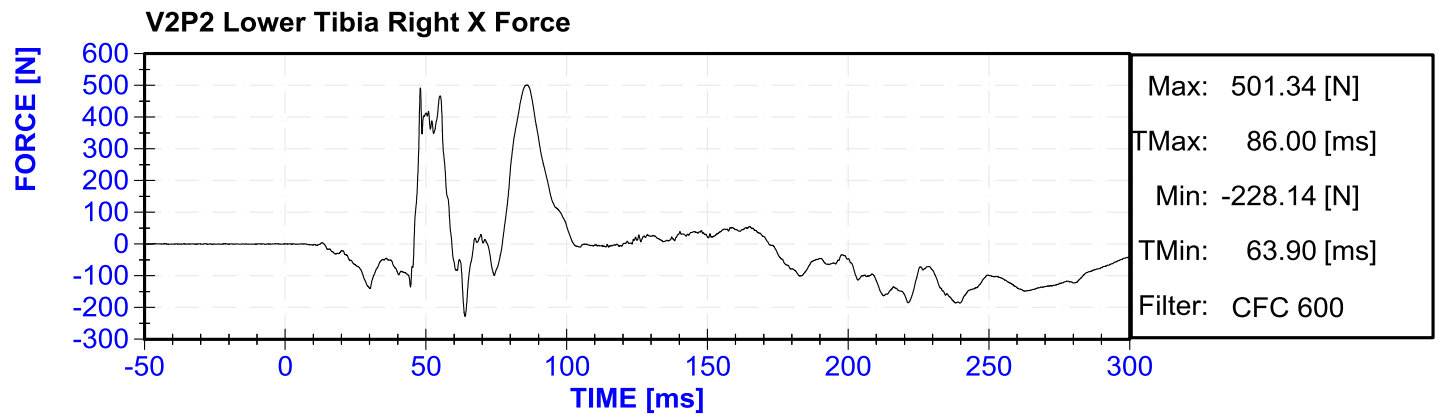
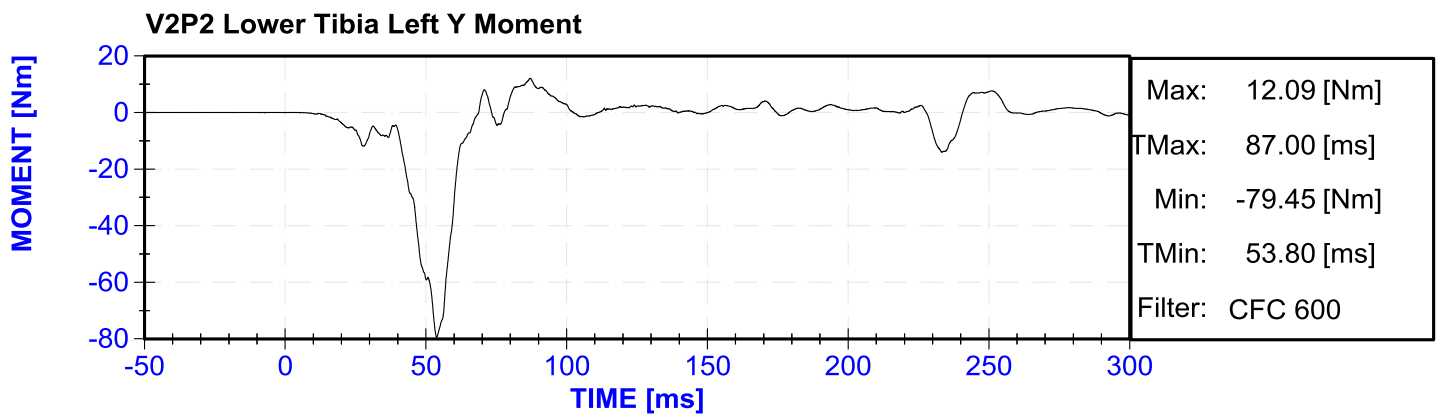
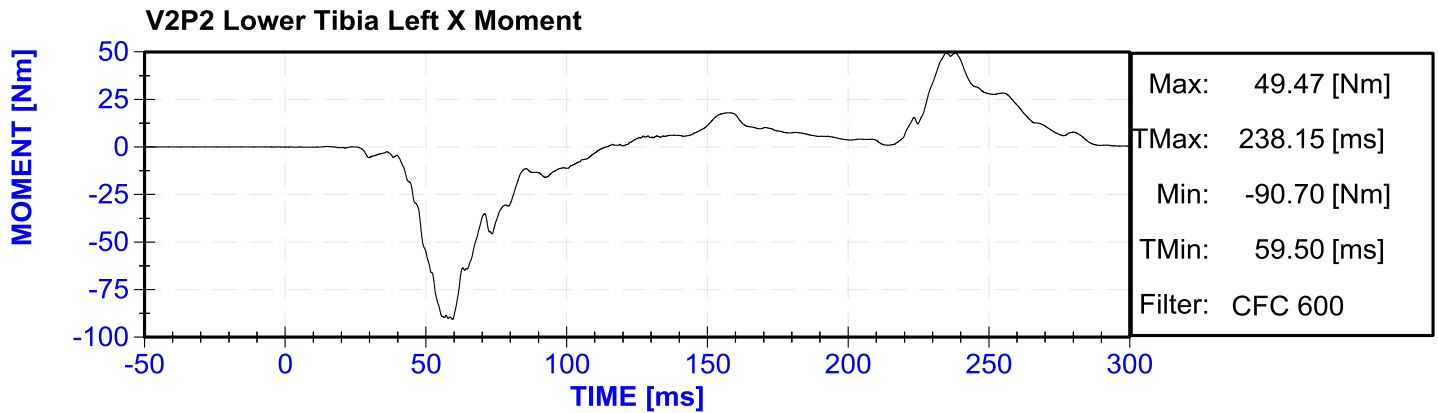


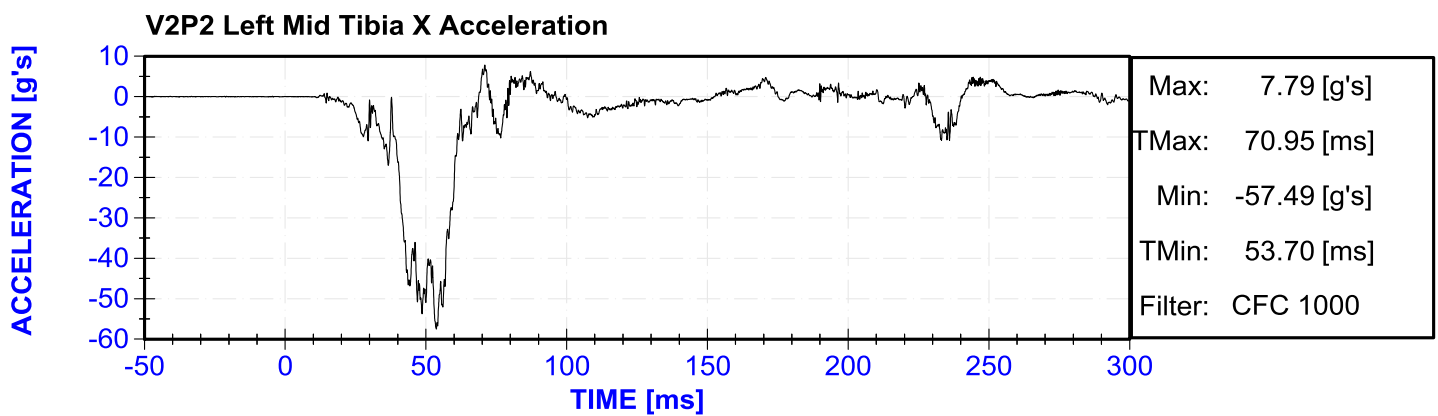
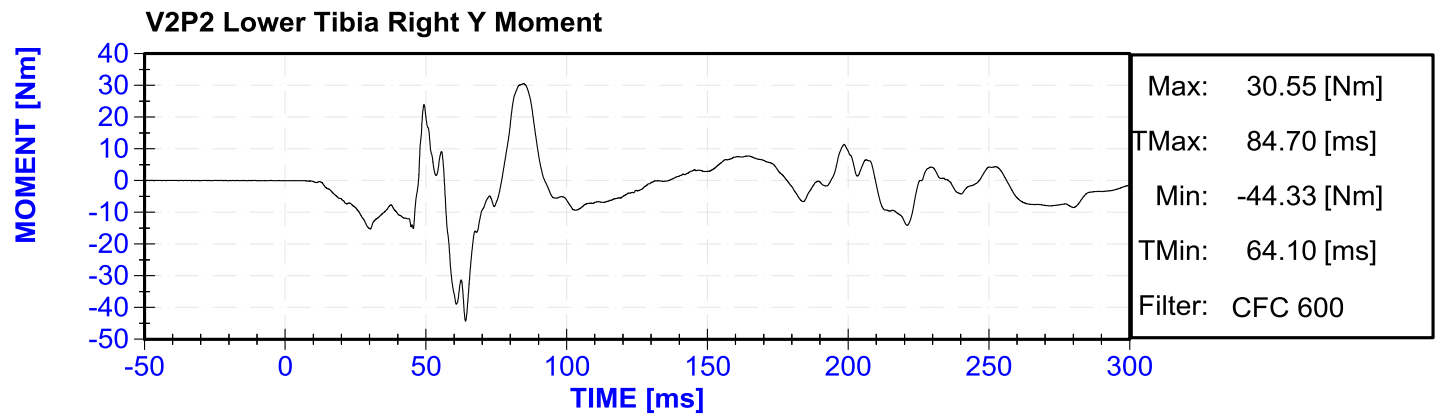
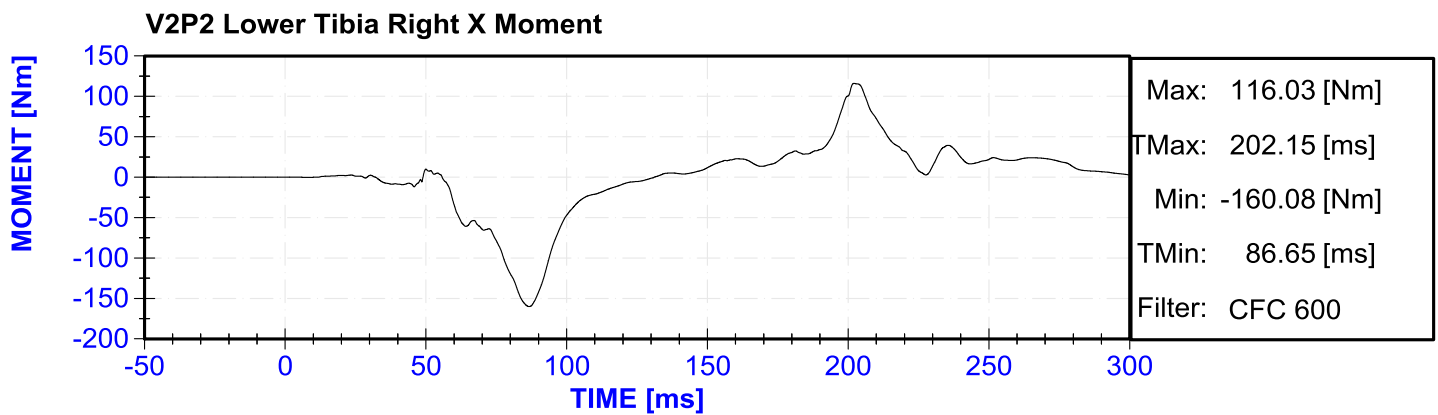
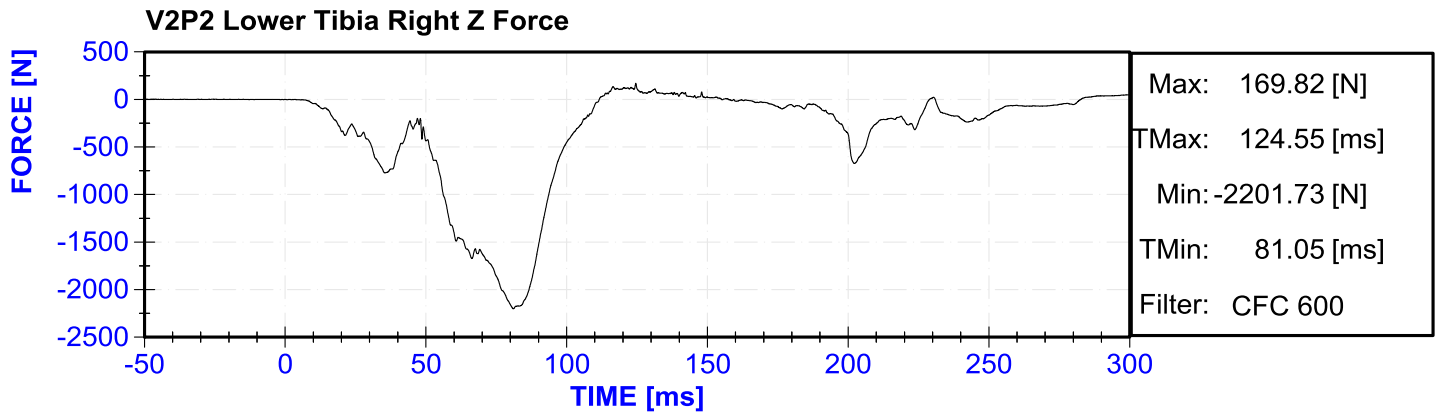


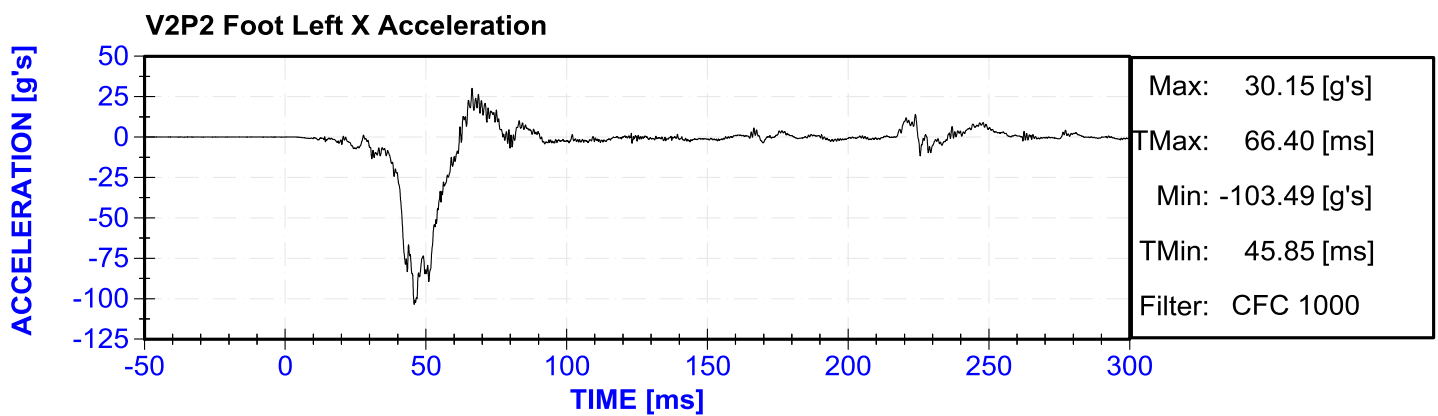
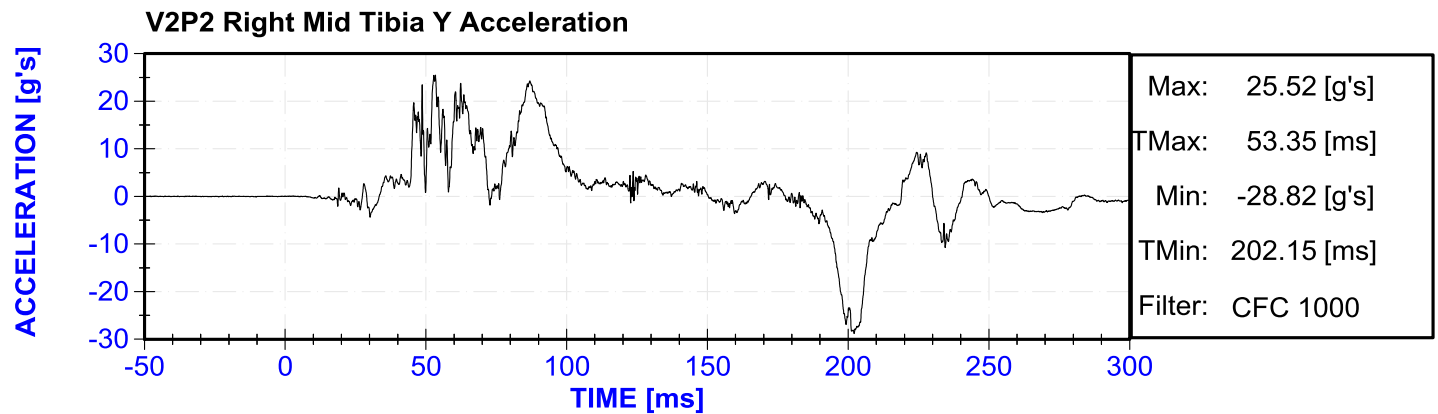
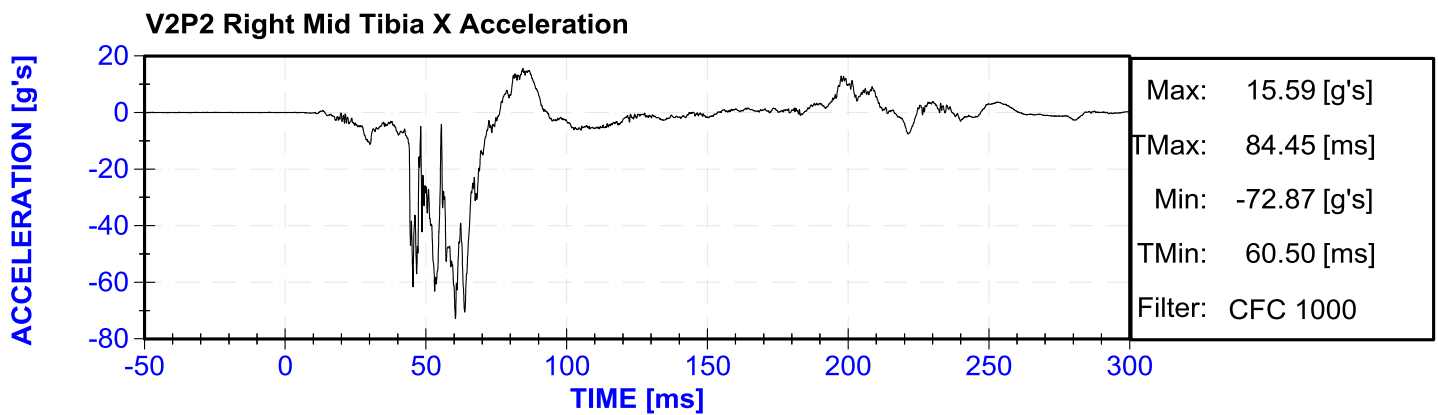
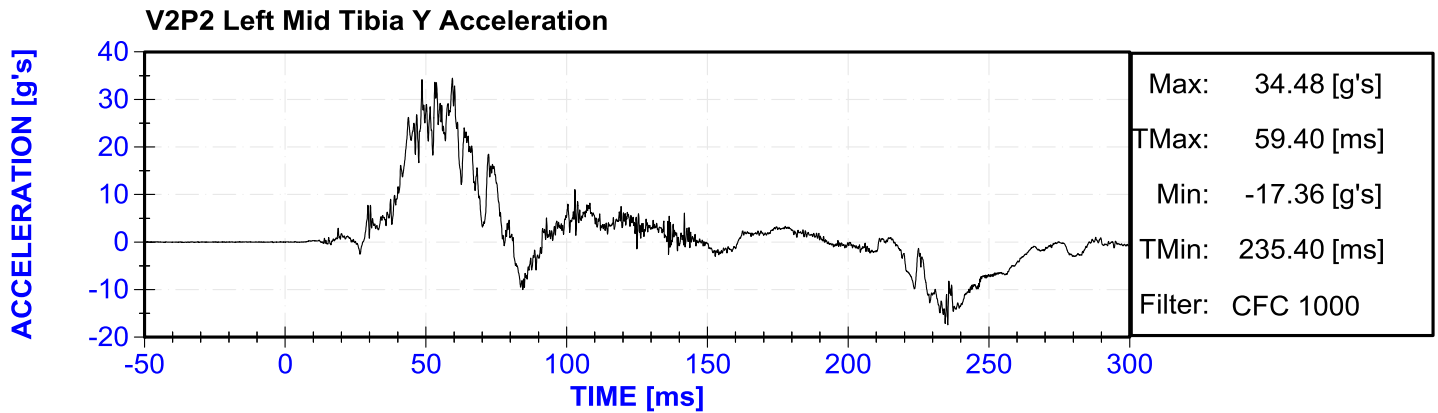


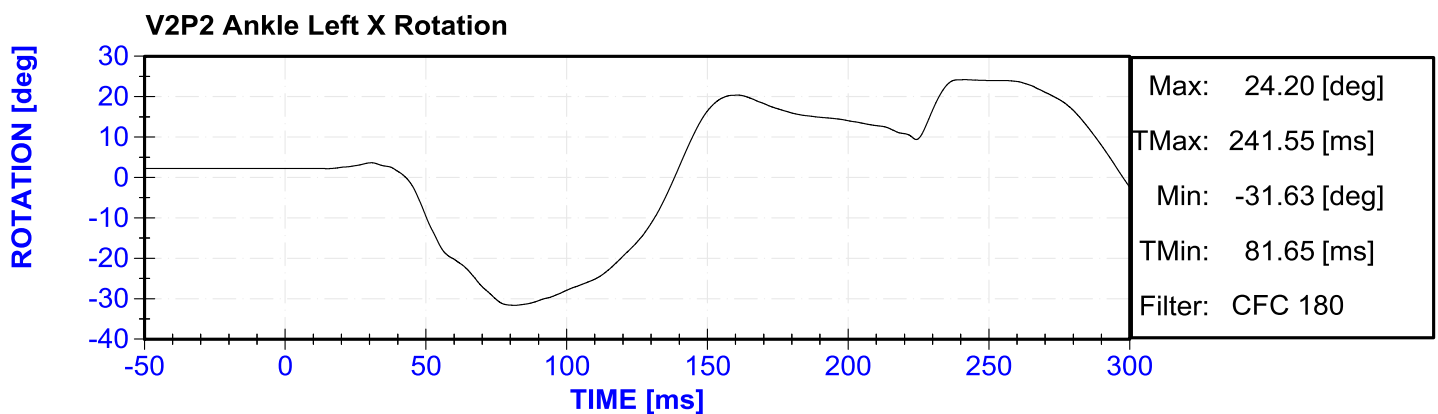
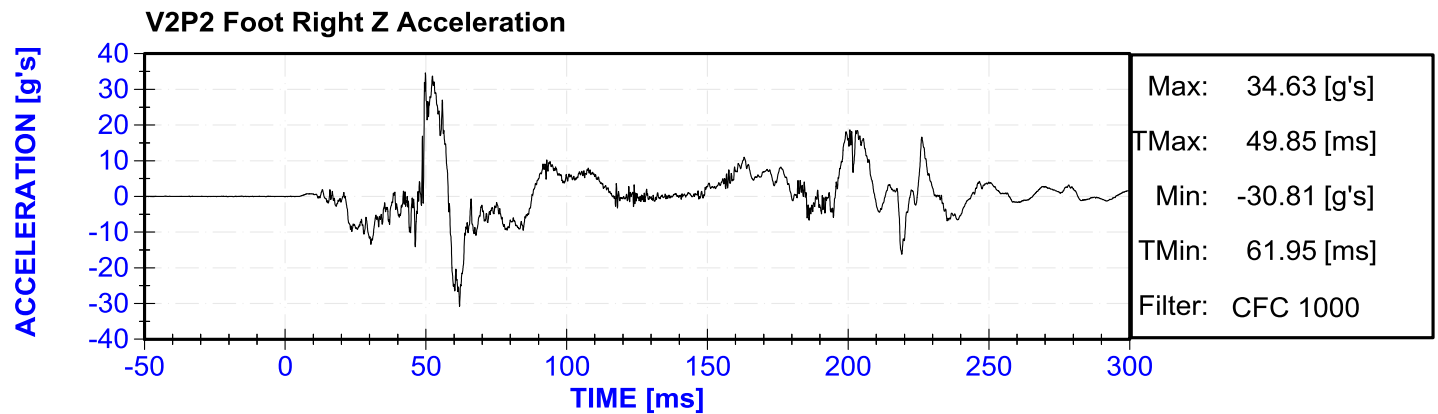
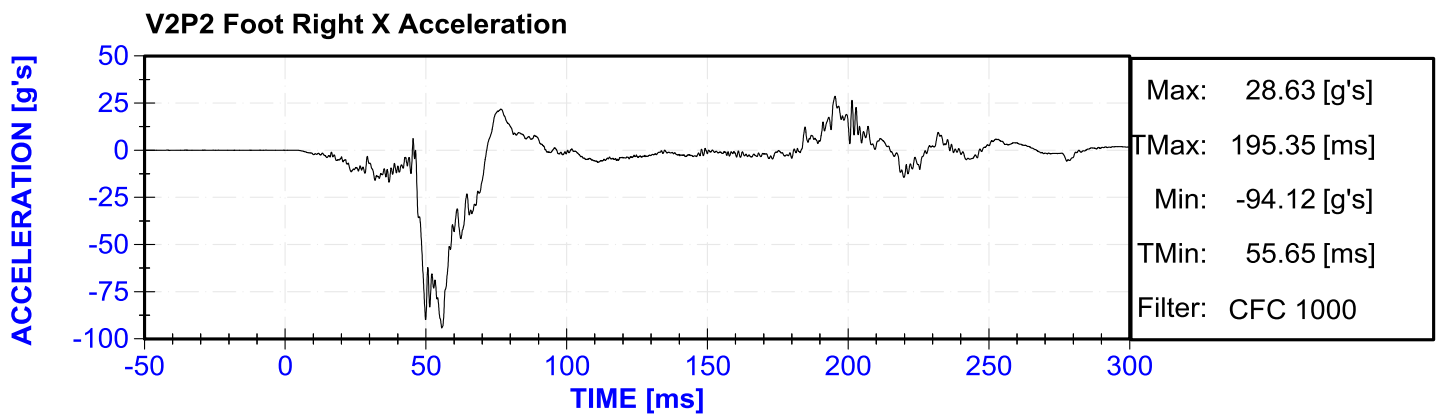
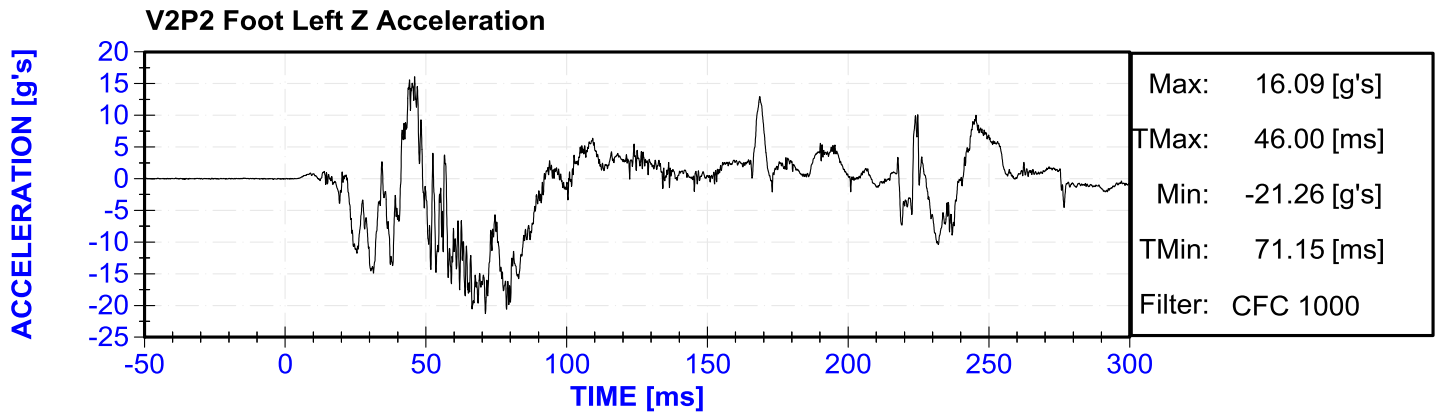


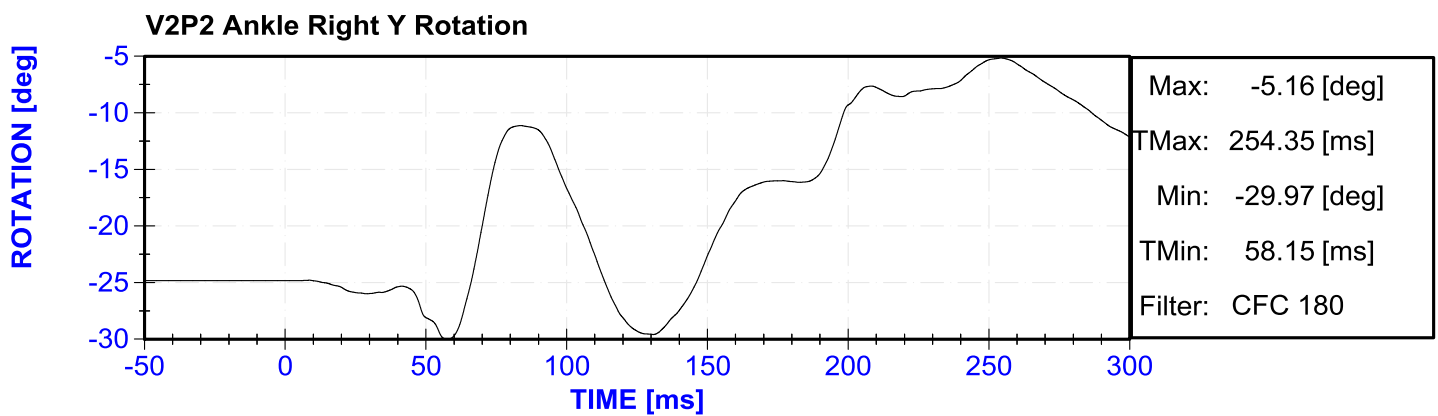
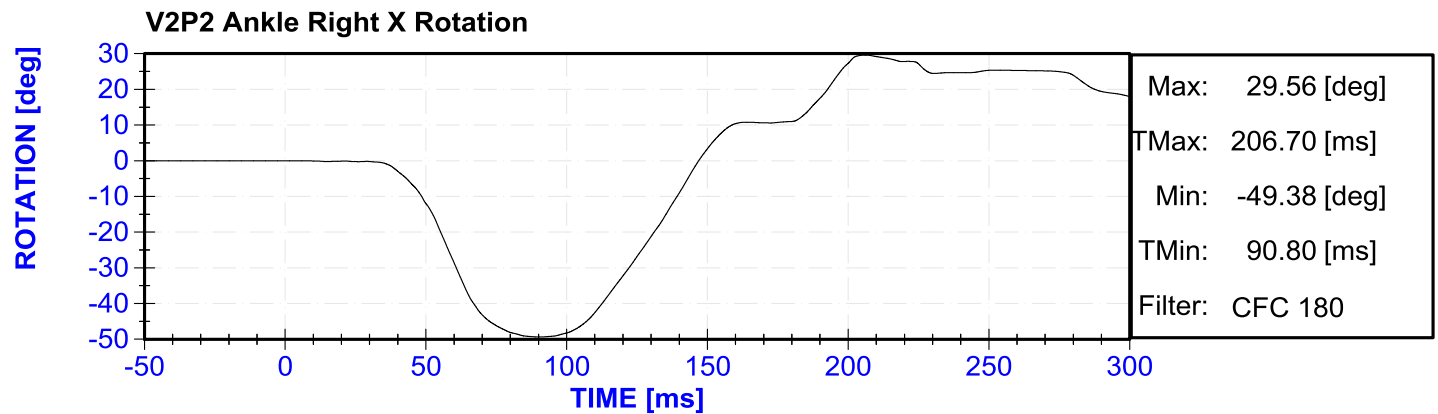
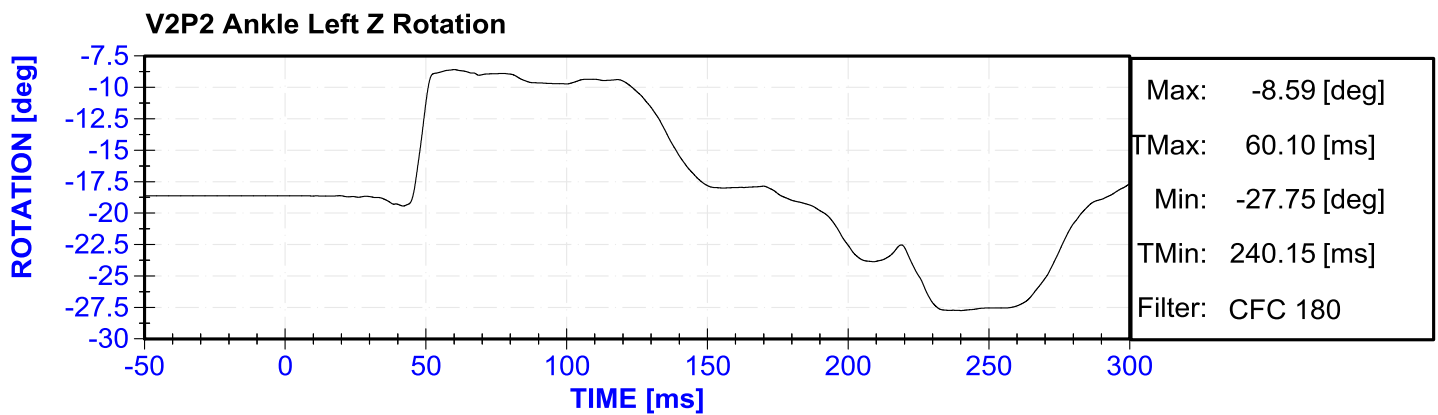
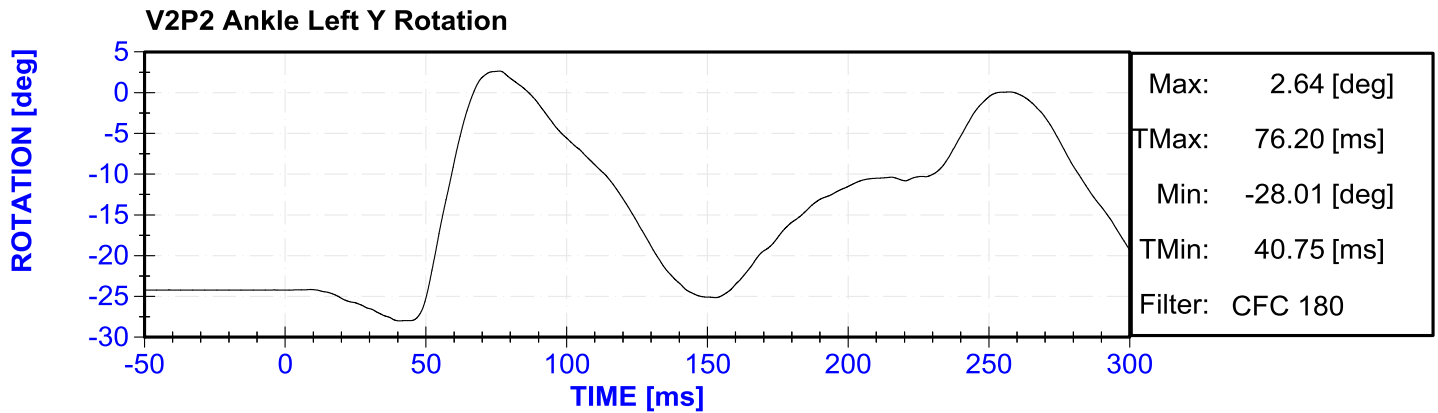


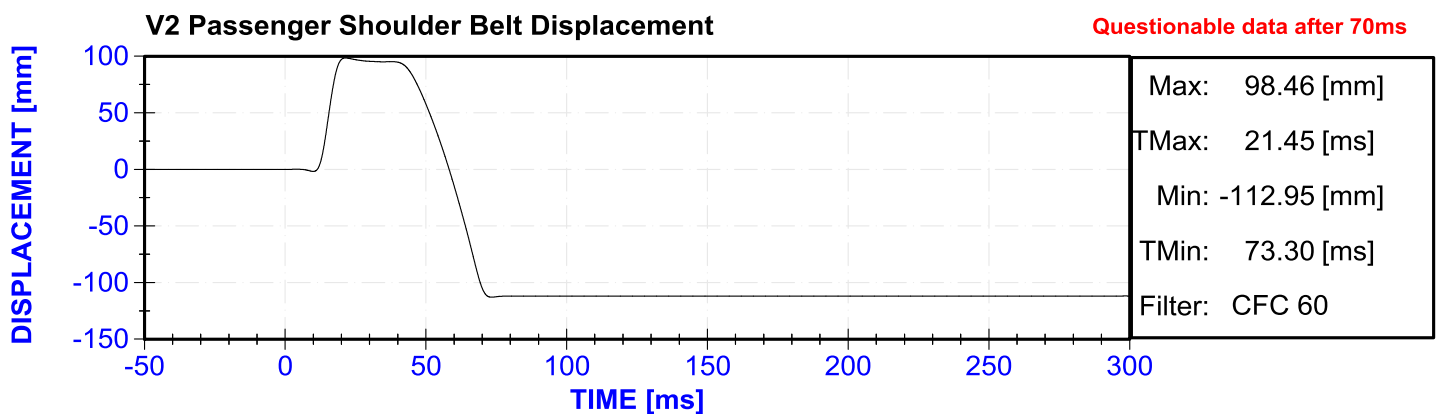
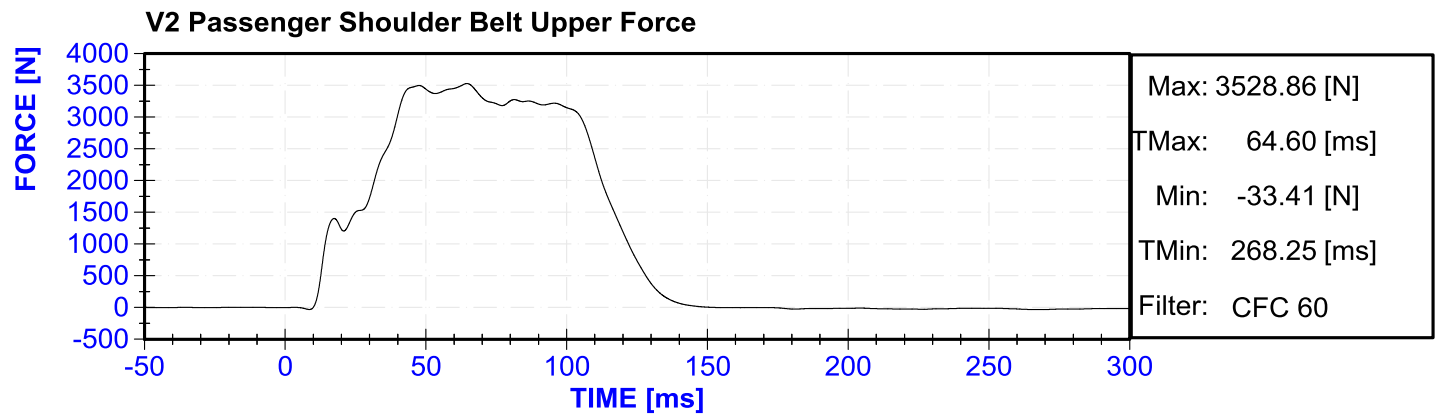
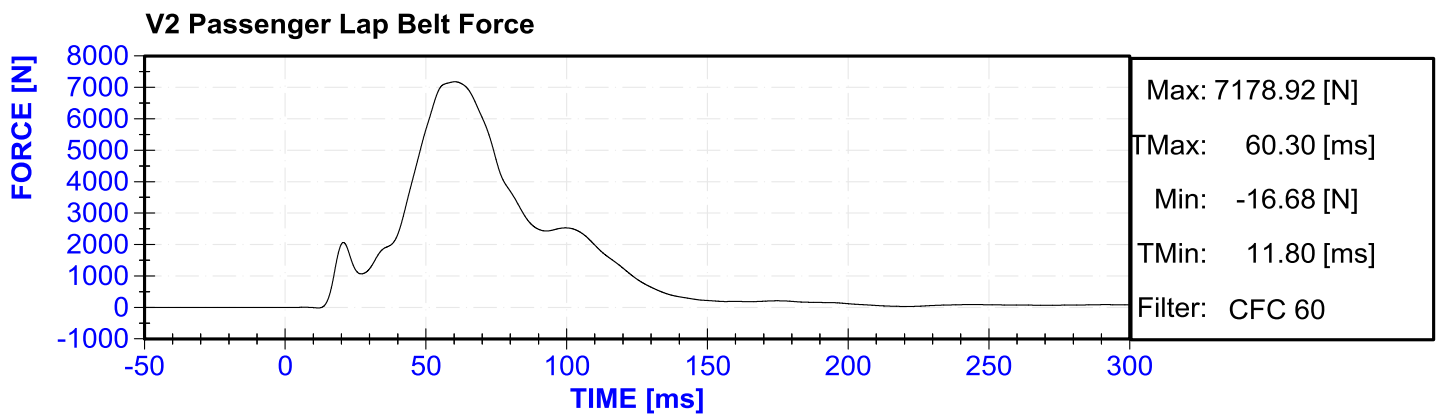
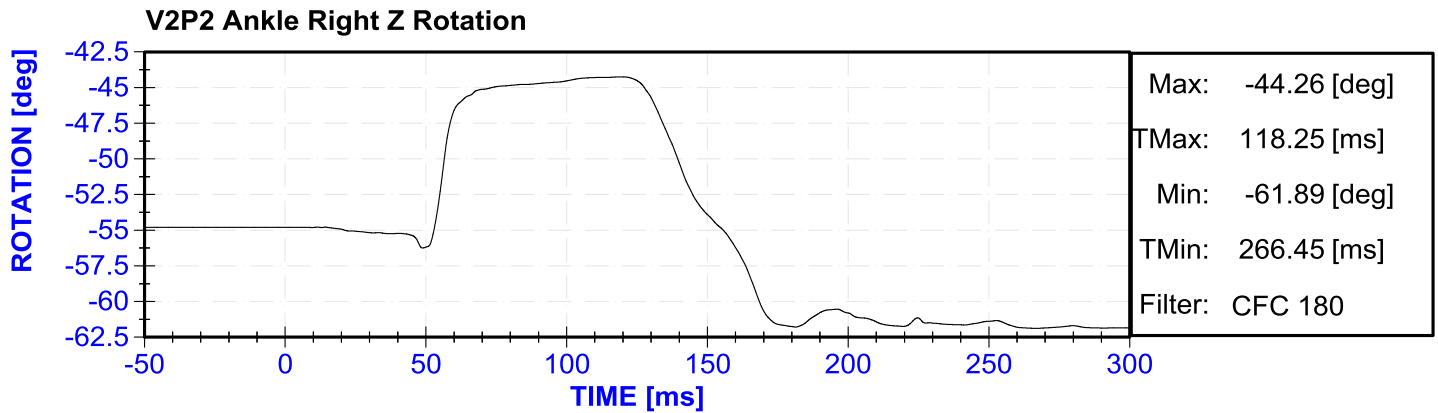


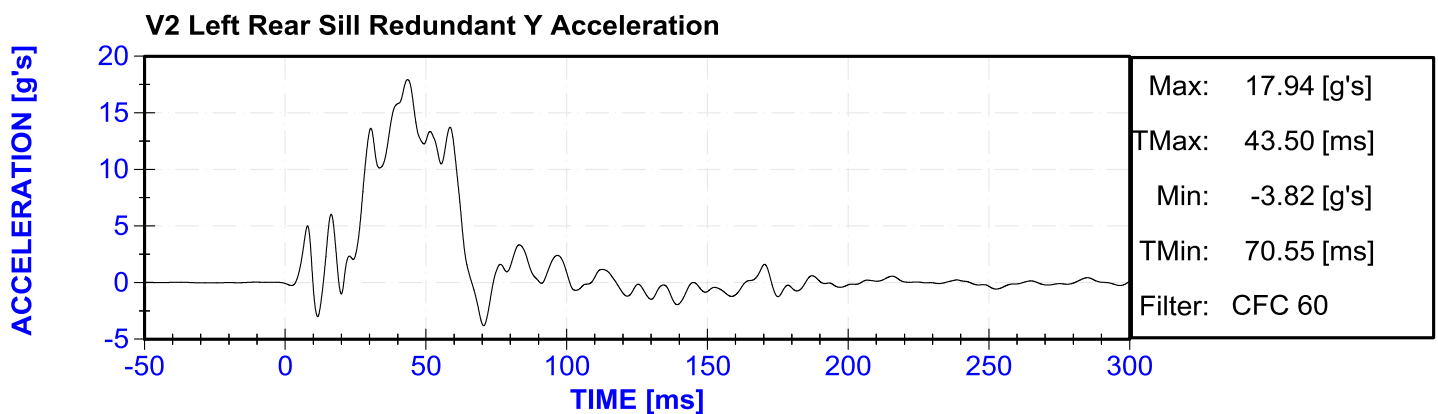
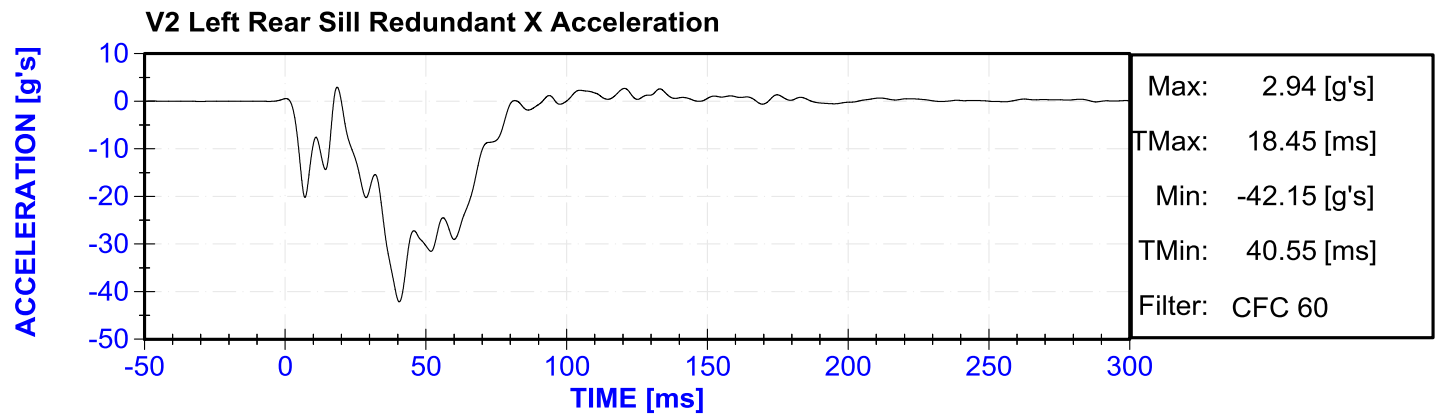
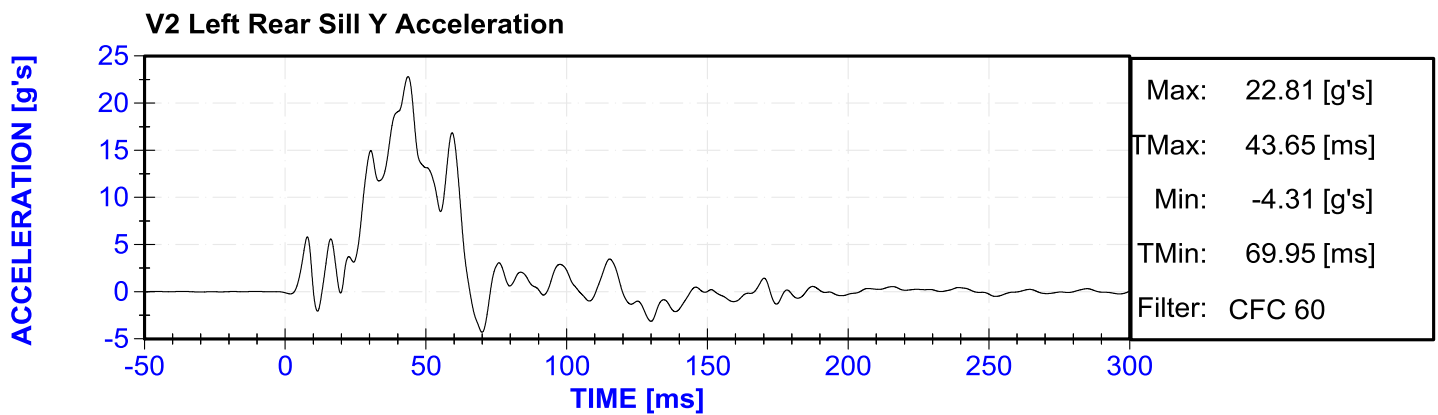
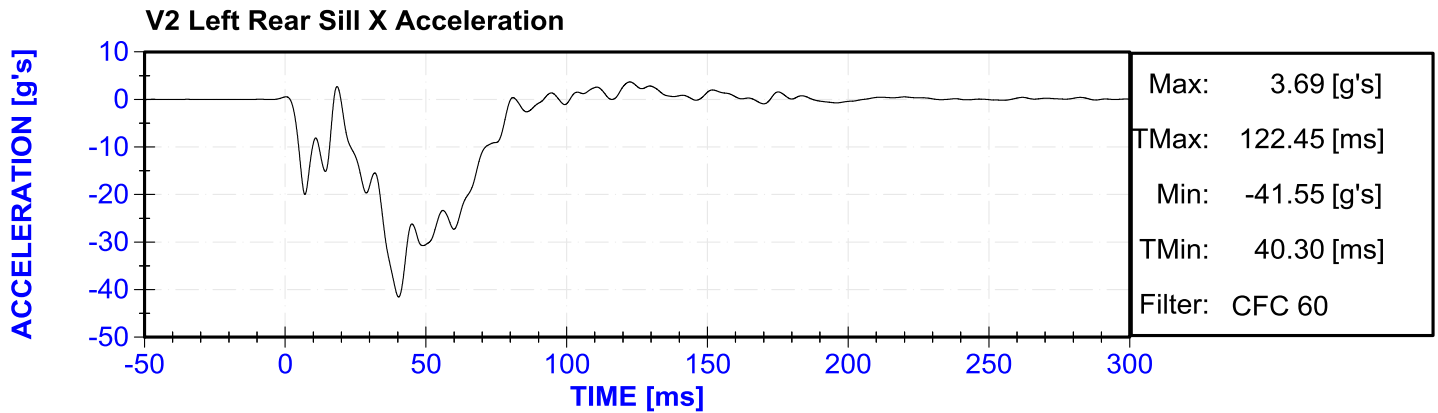


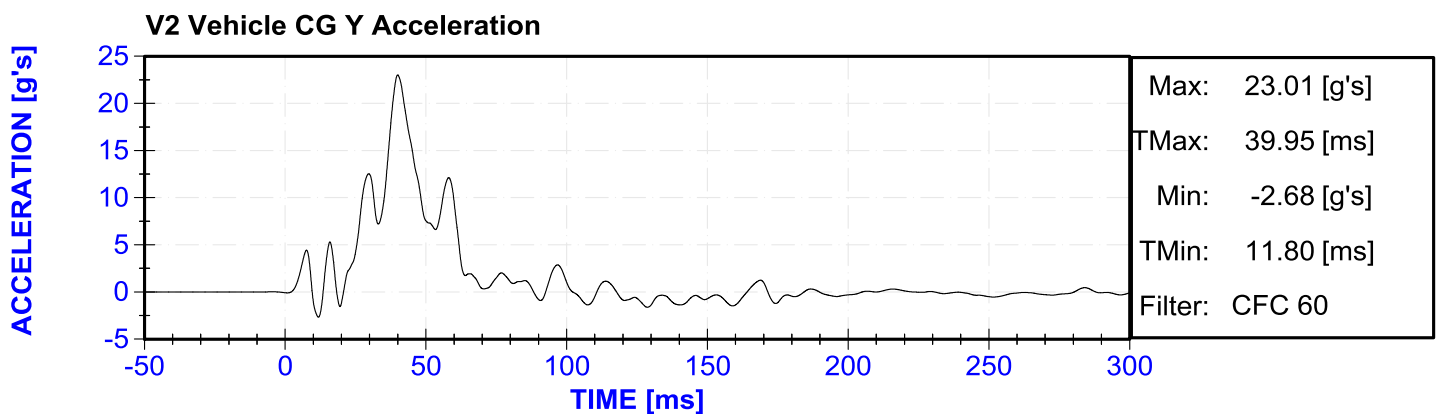
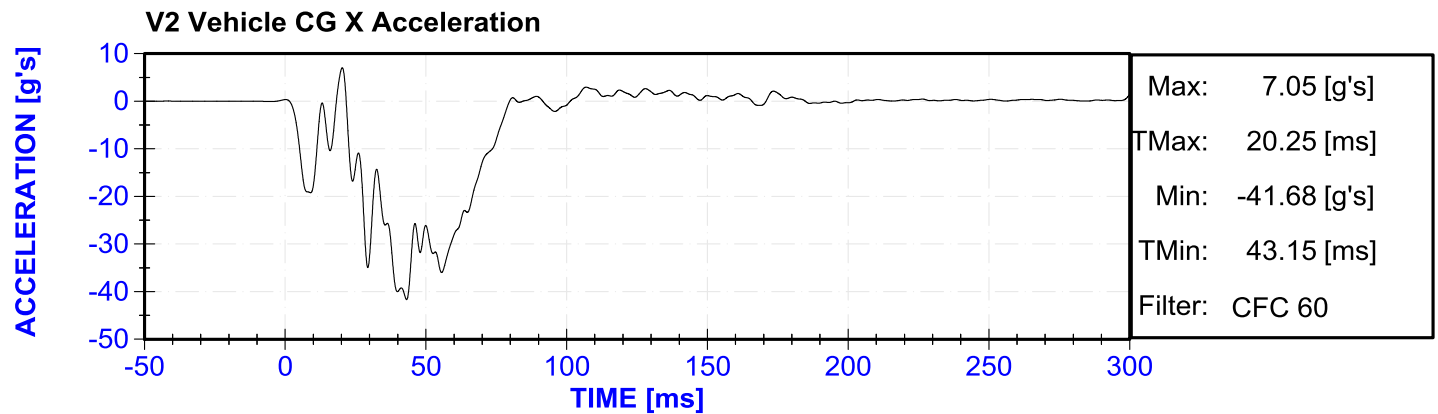
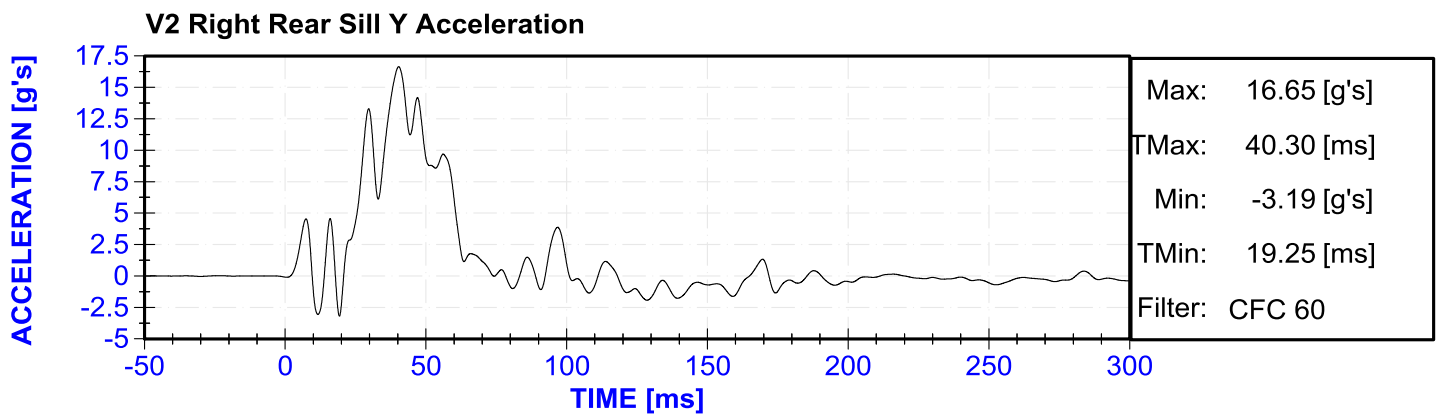
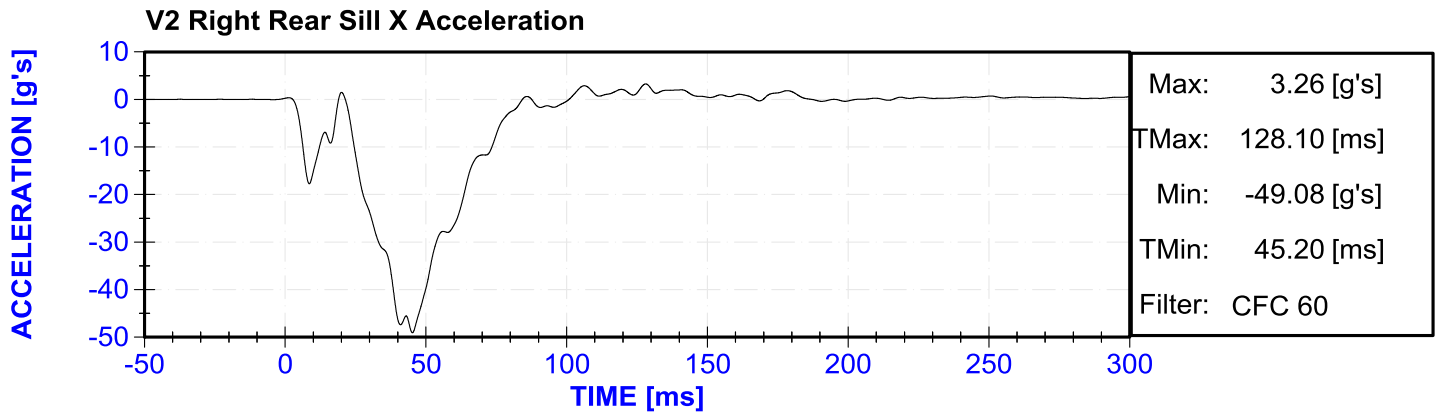


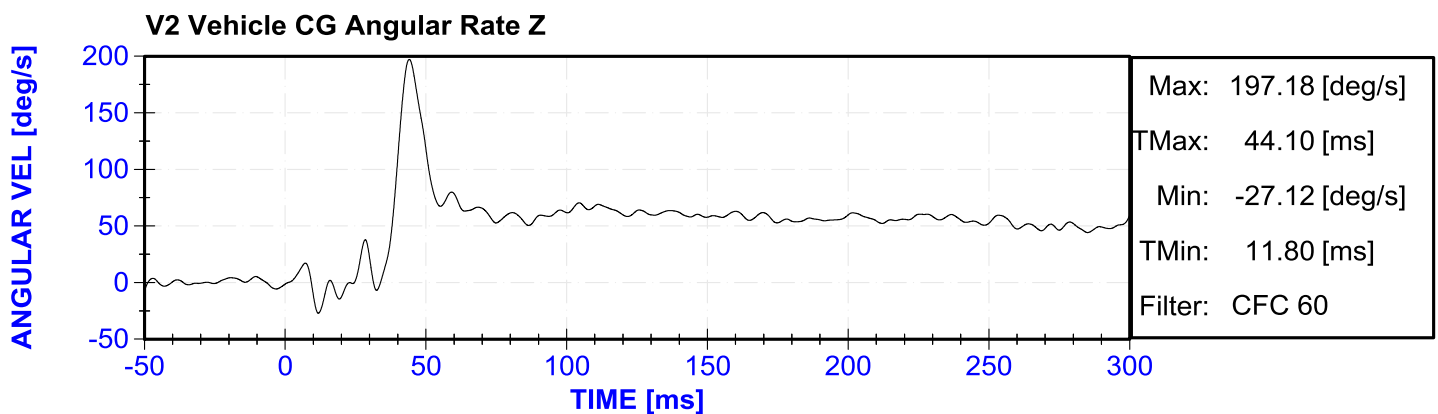
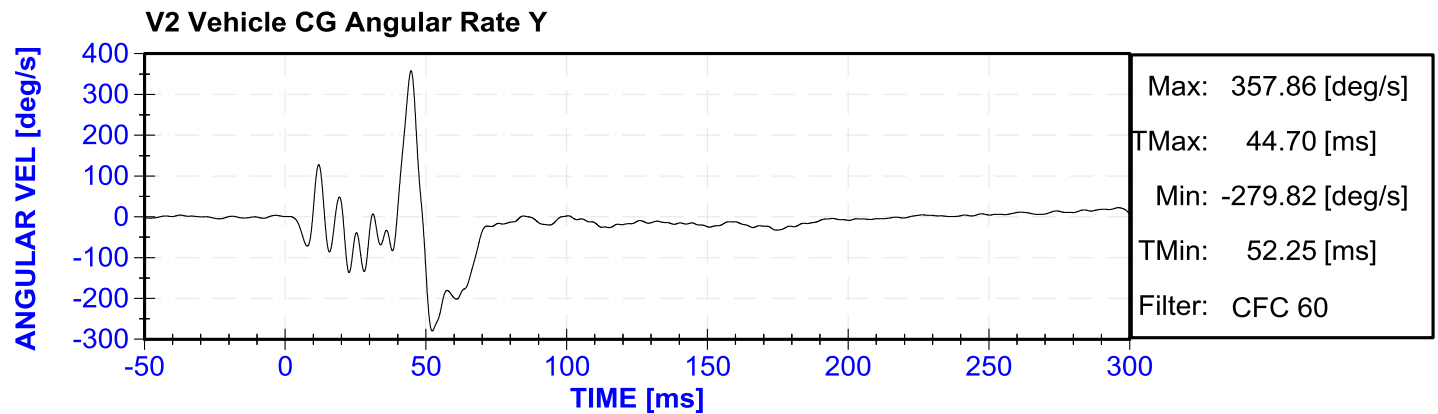
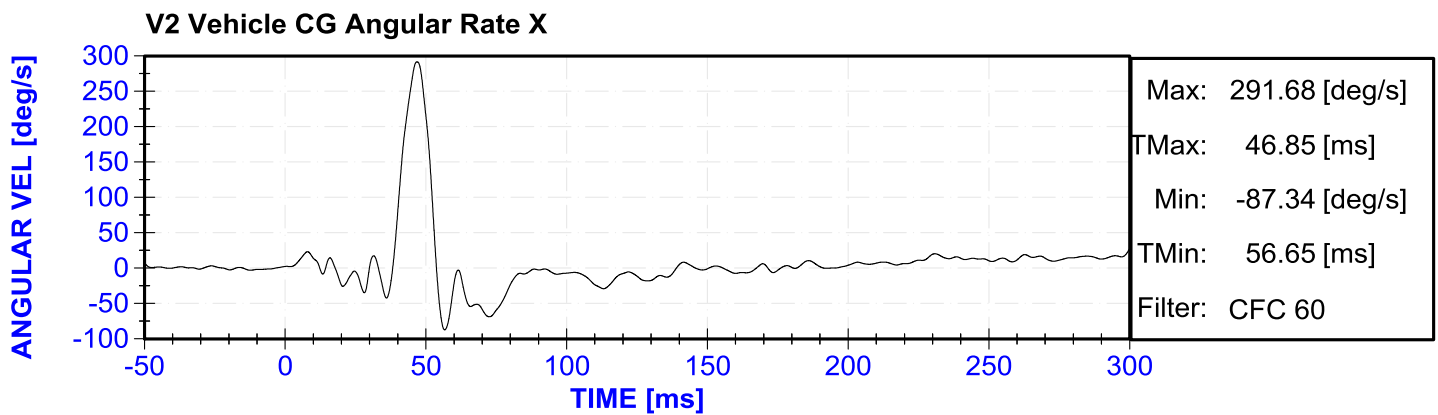
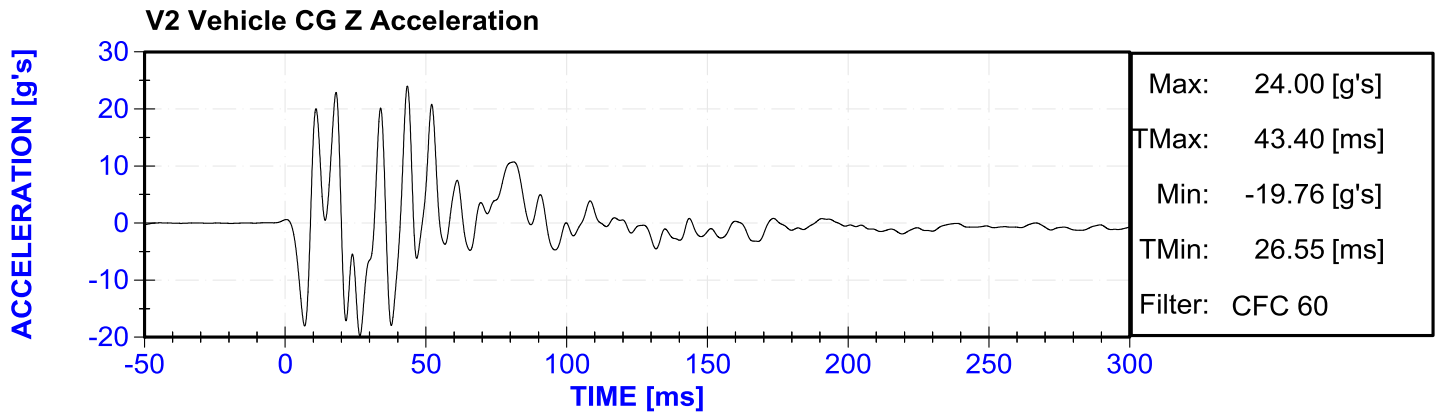


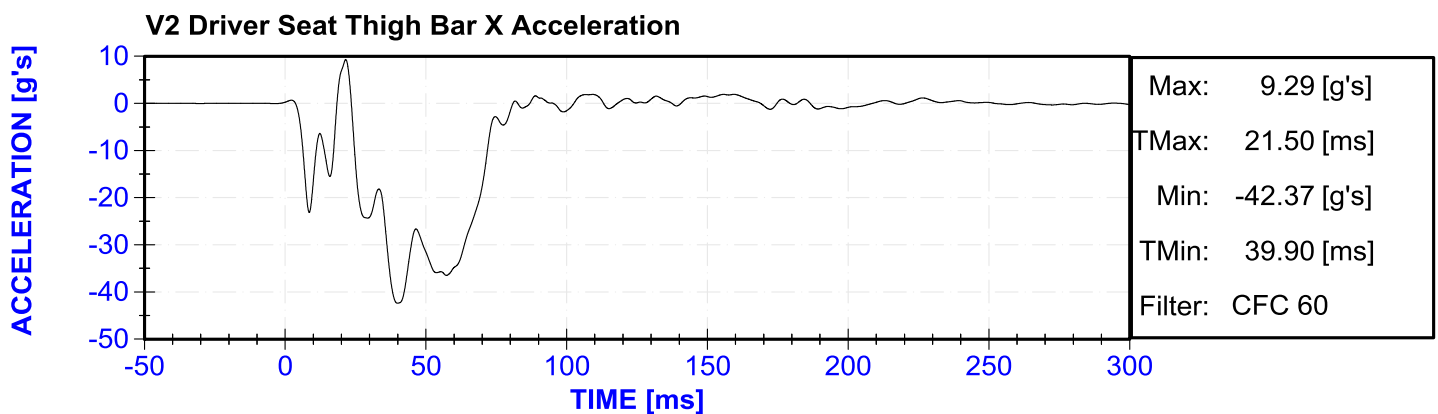
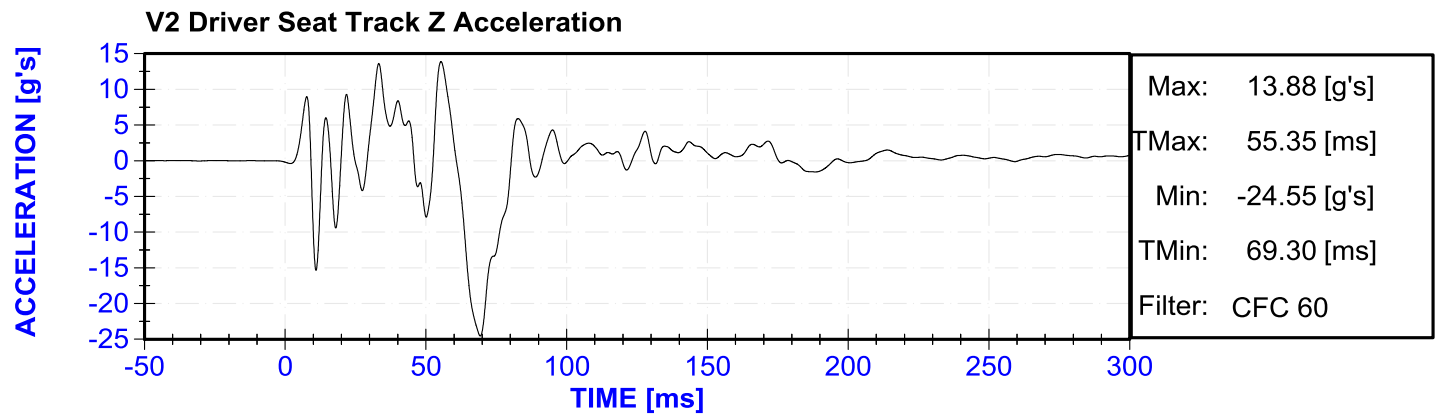
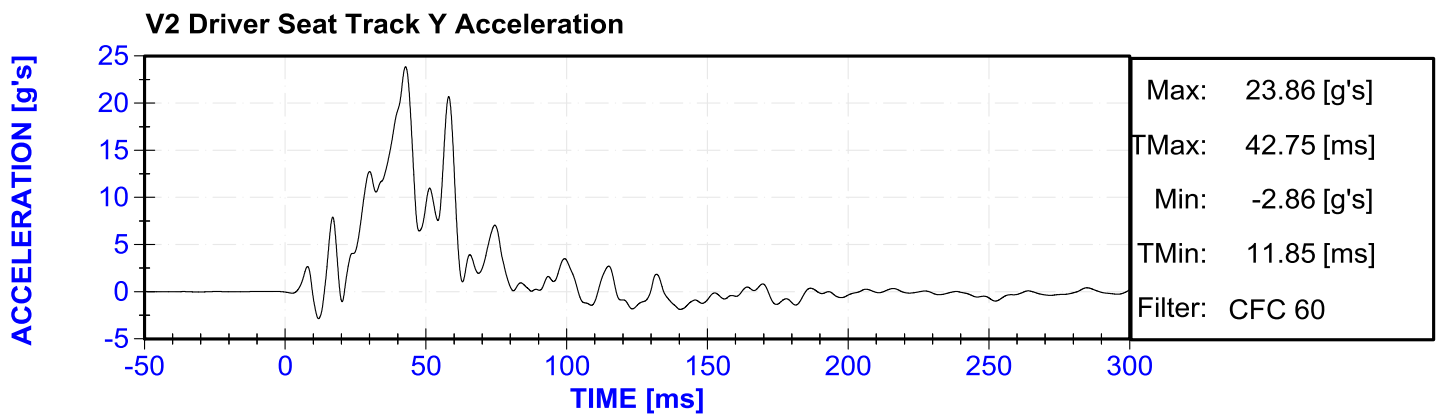
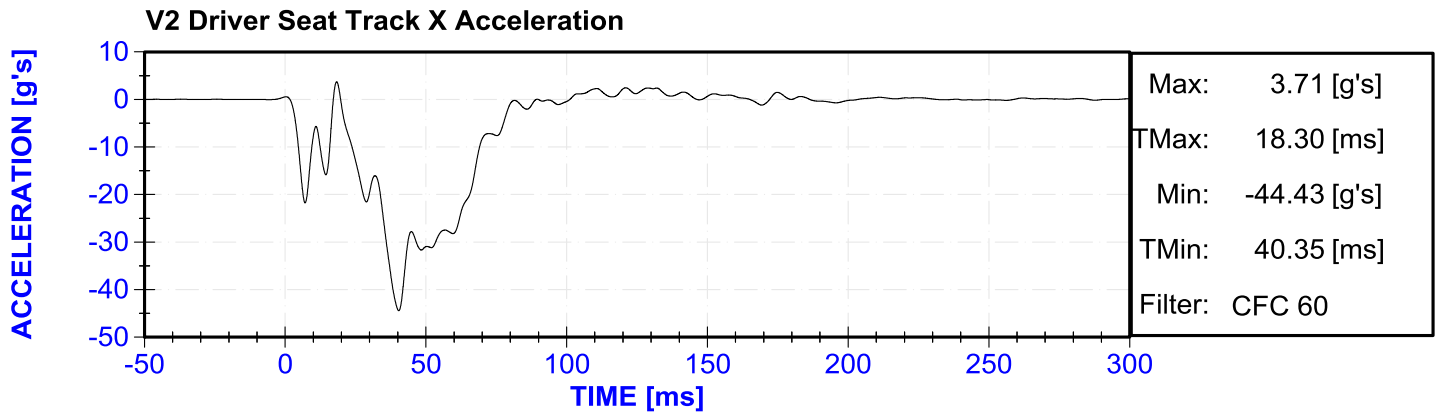


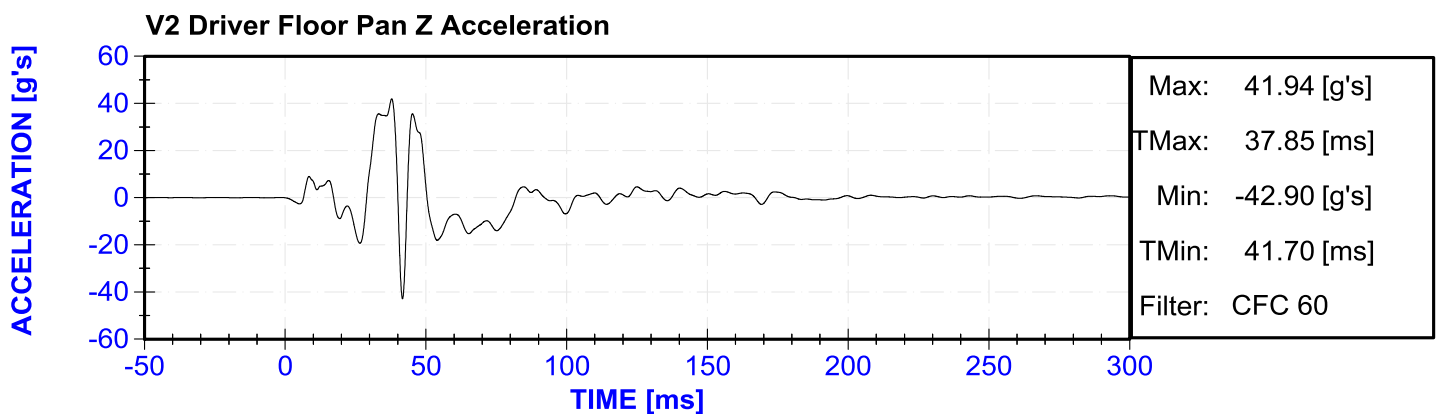
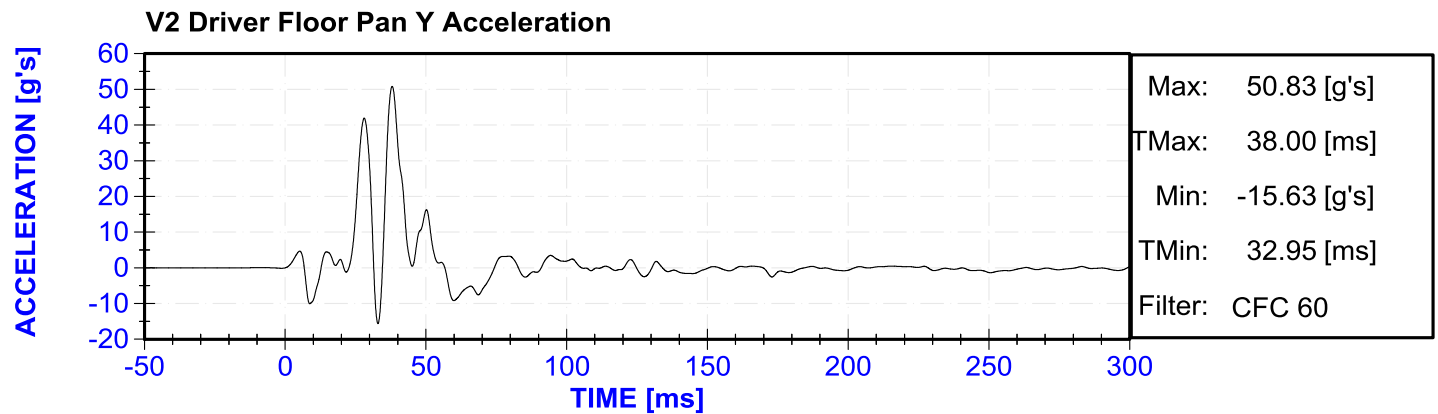
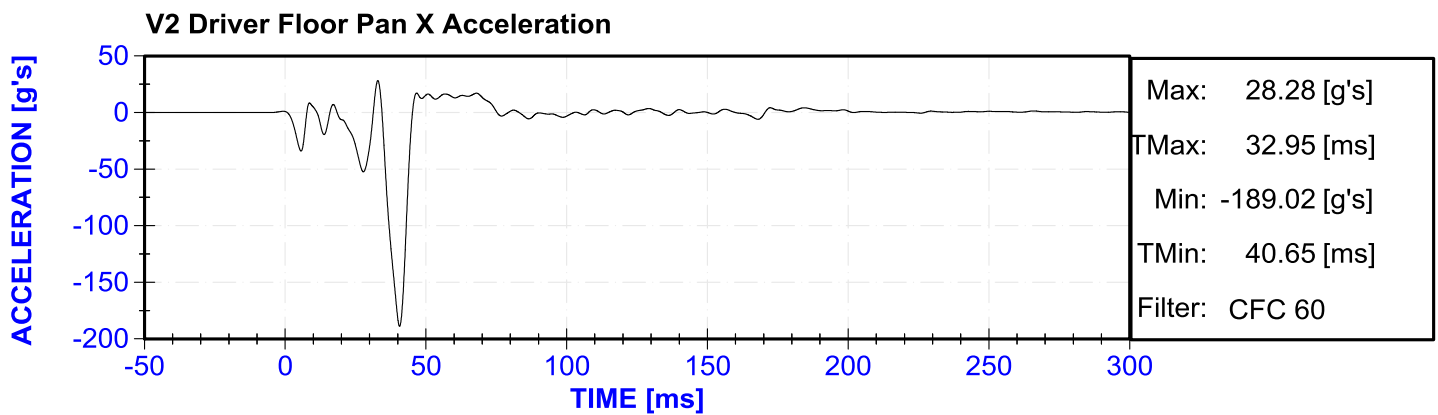
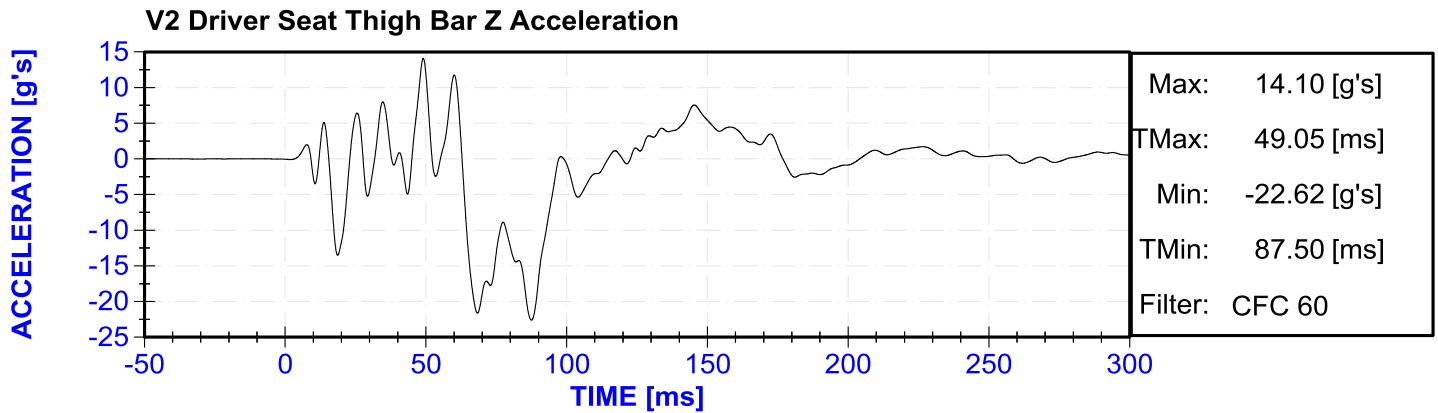


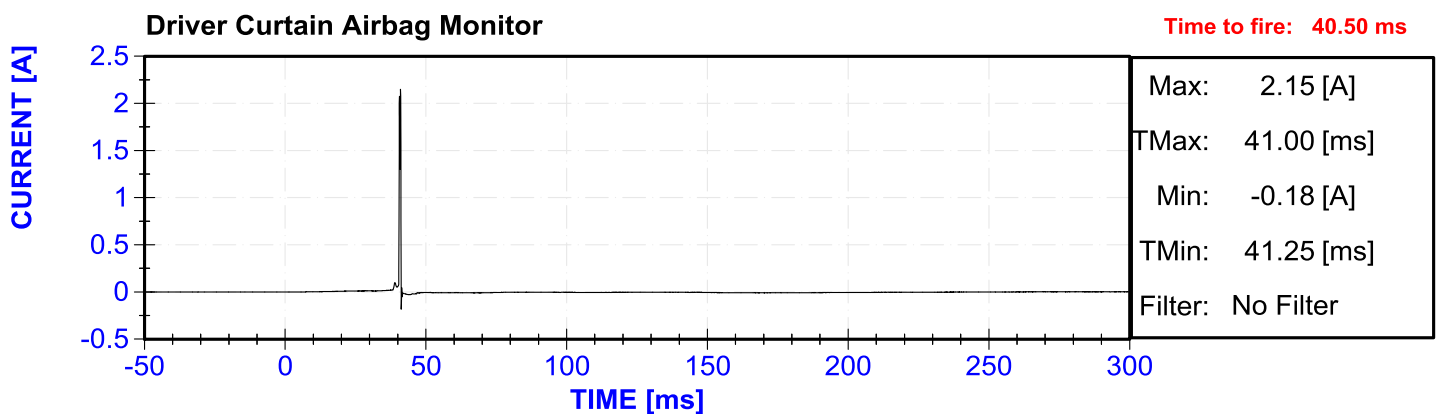
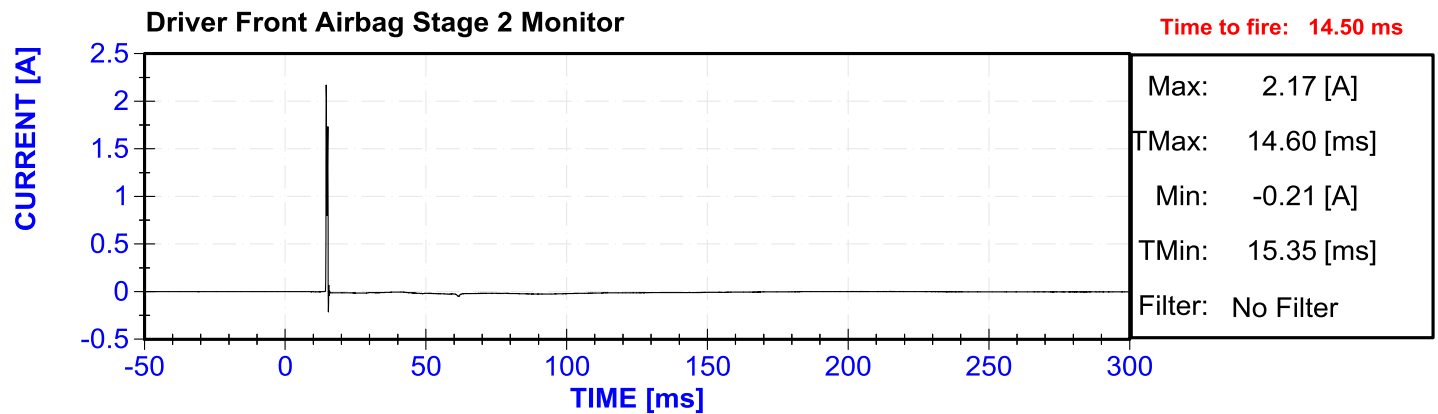
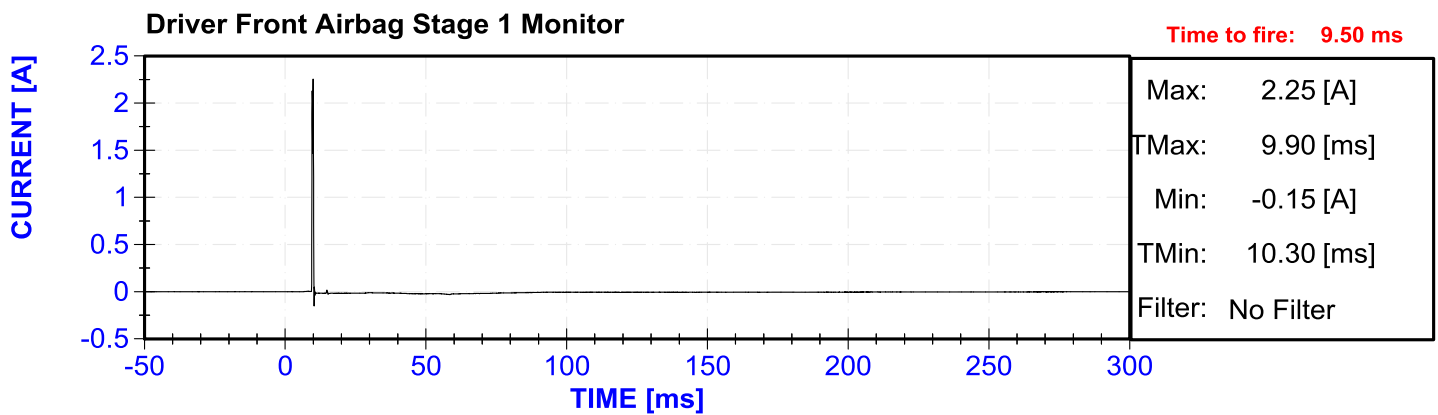
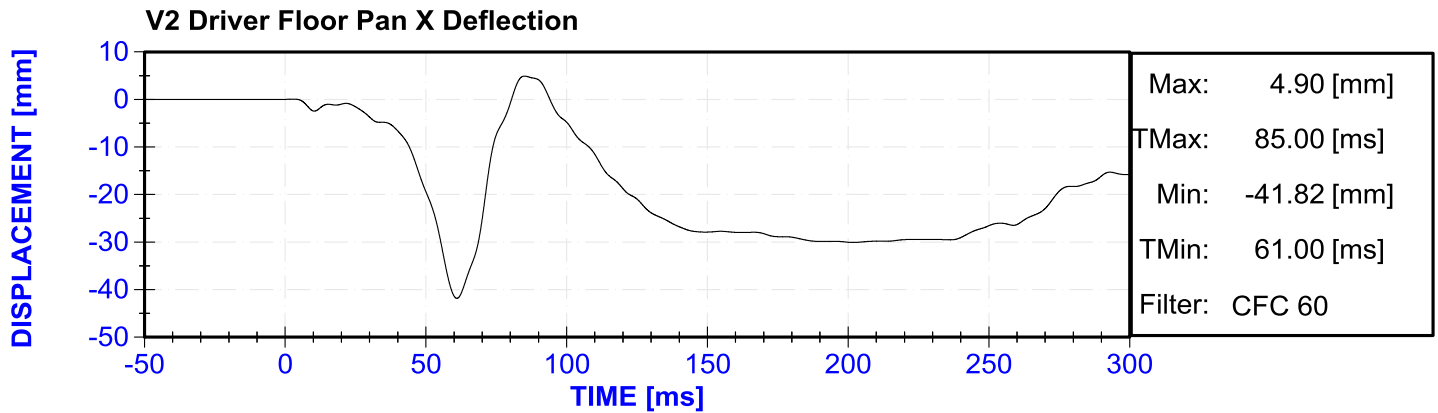


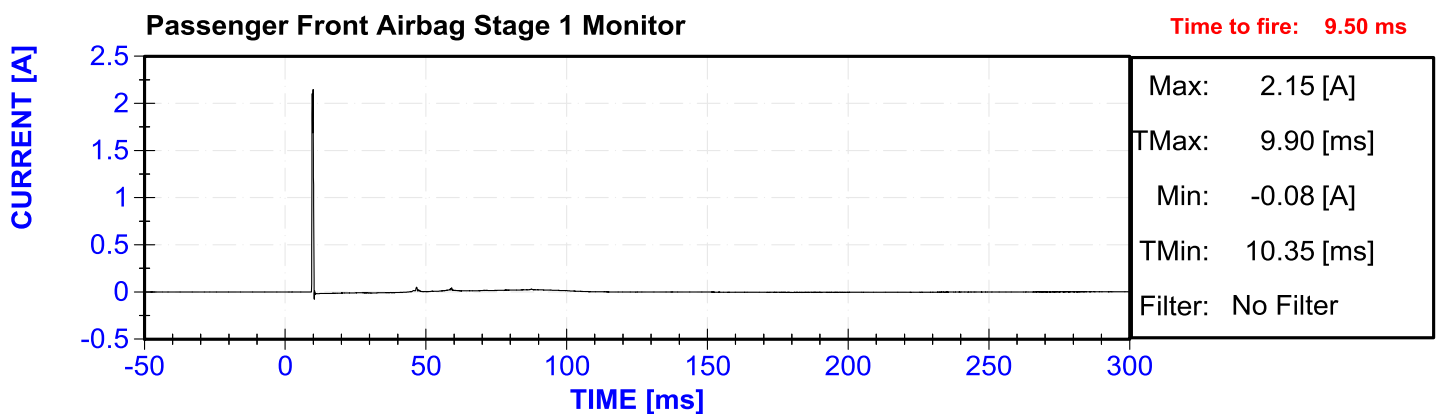
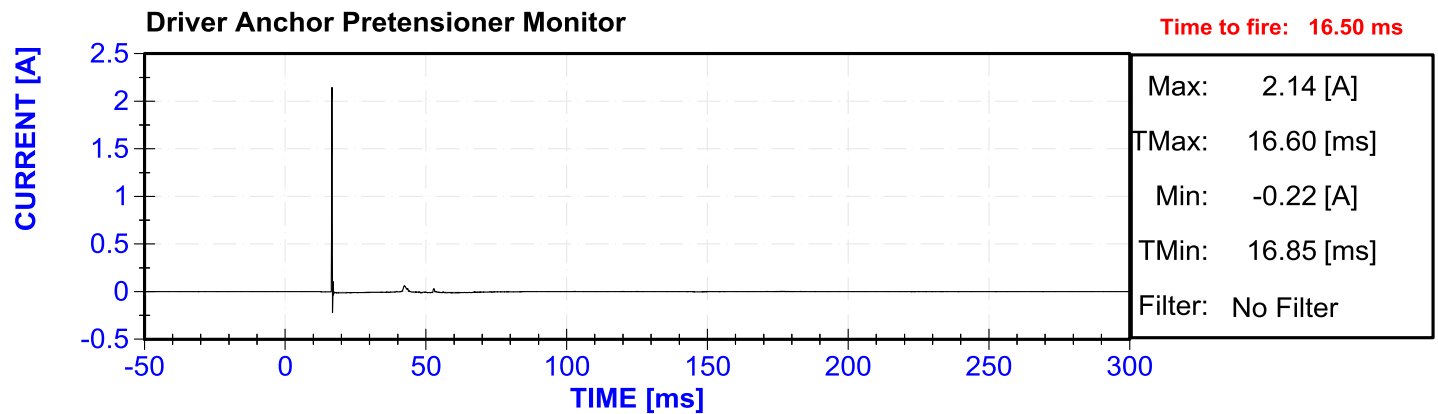
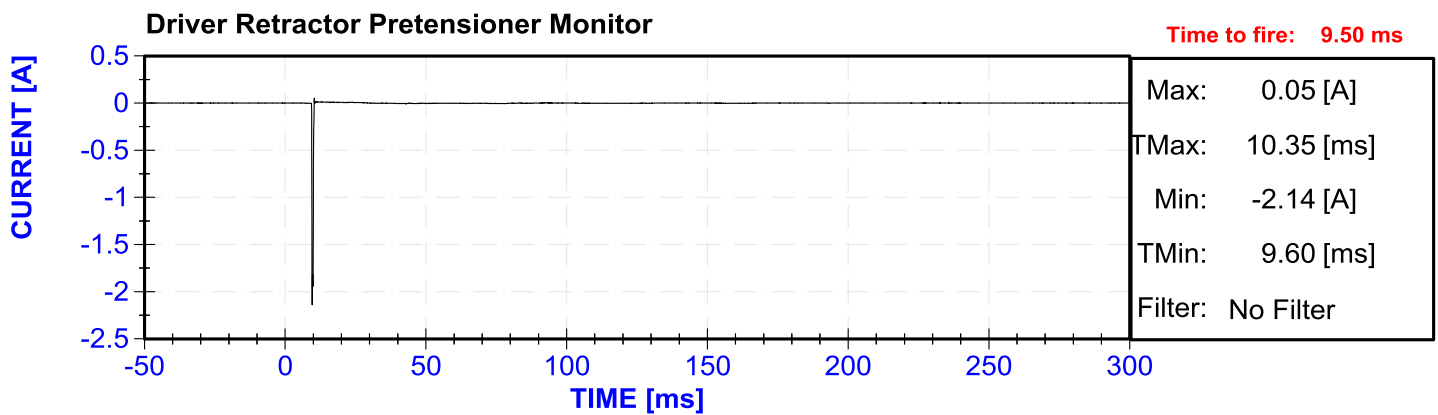
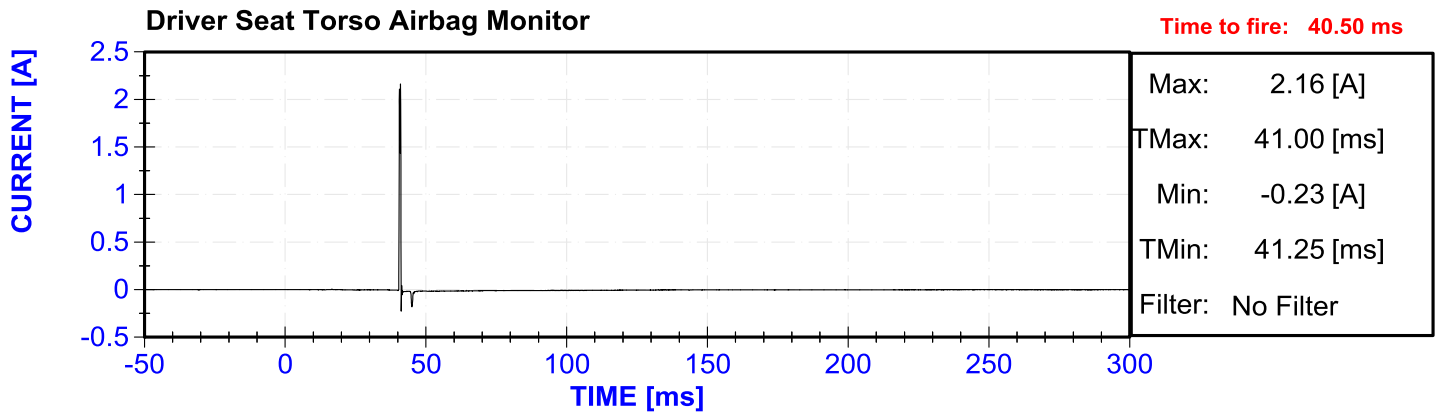






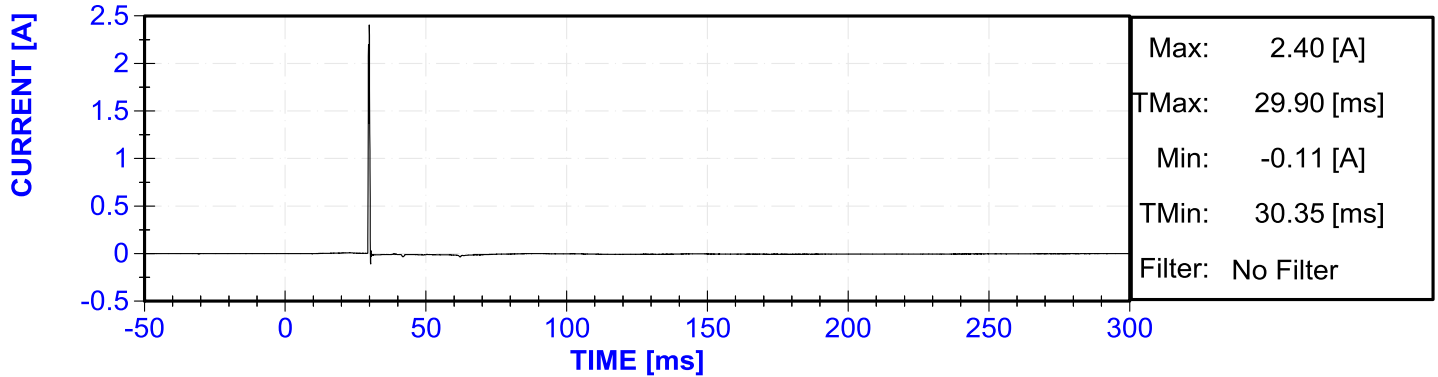






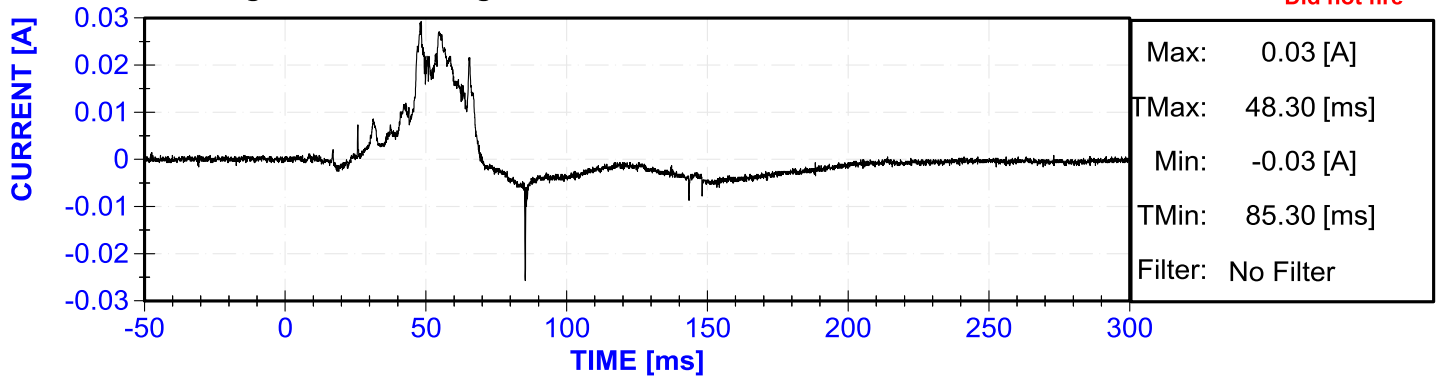
Passenger Front Airbag Stage 2 Monitor

Time to fire: 29.50 ms



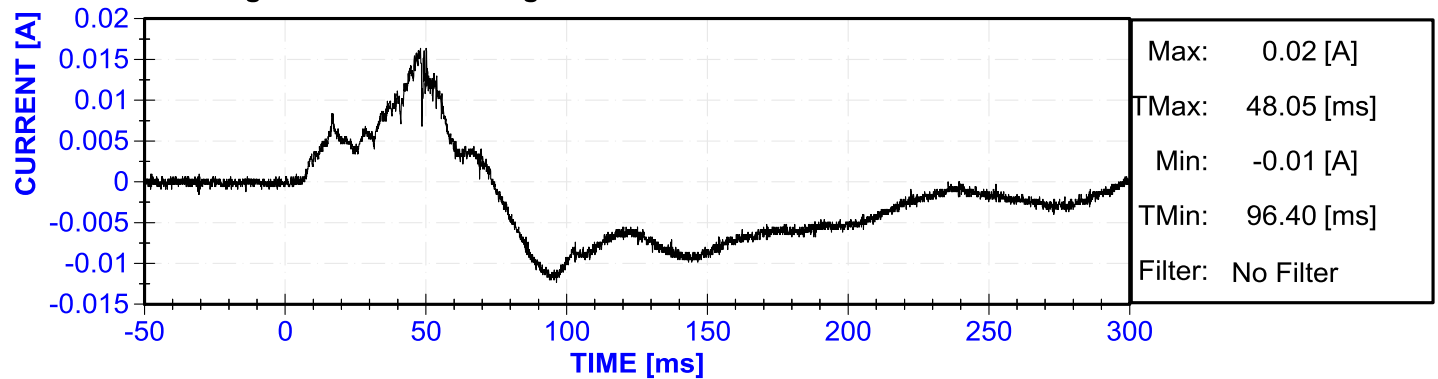
Passenger Curtain Airbag Monitor

Did not fire



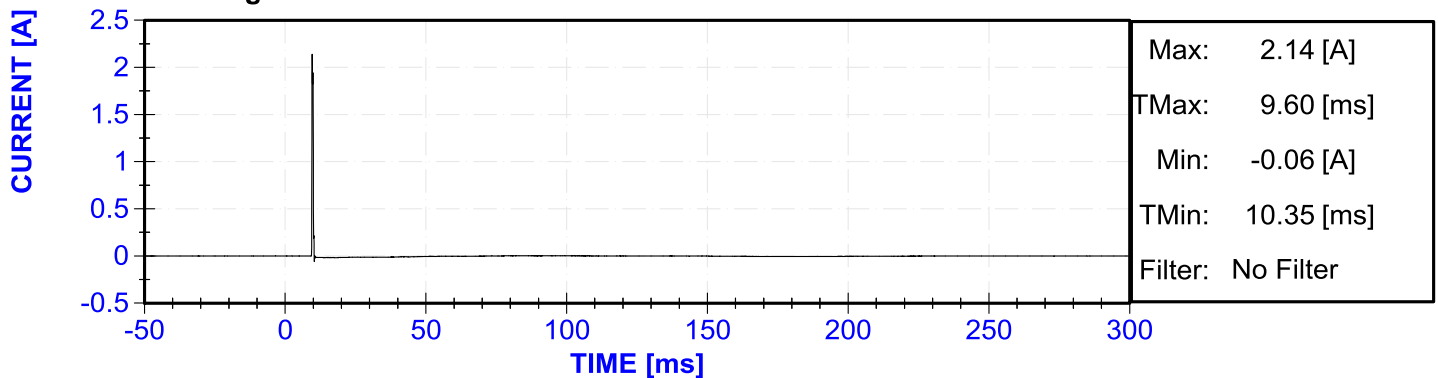
Passenger Seat Torso Airbag Monitor

Did not fire



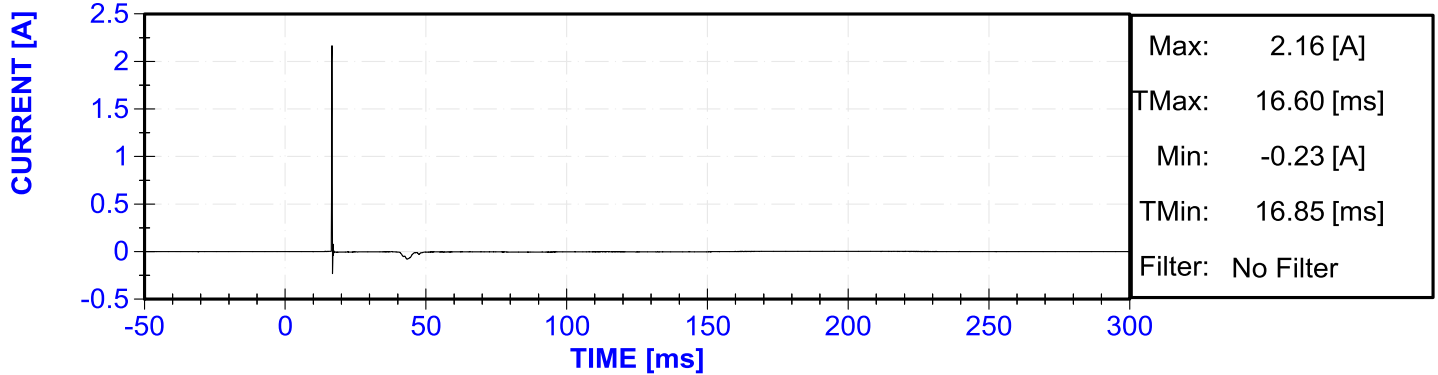
Passenger Retractor Pretensioner Monitor

Time to fire: 9.50 ms

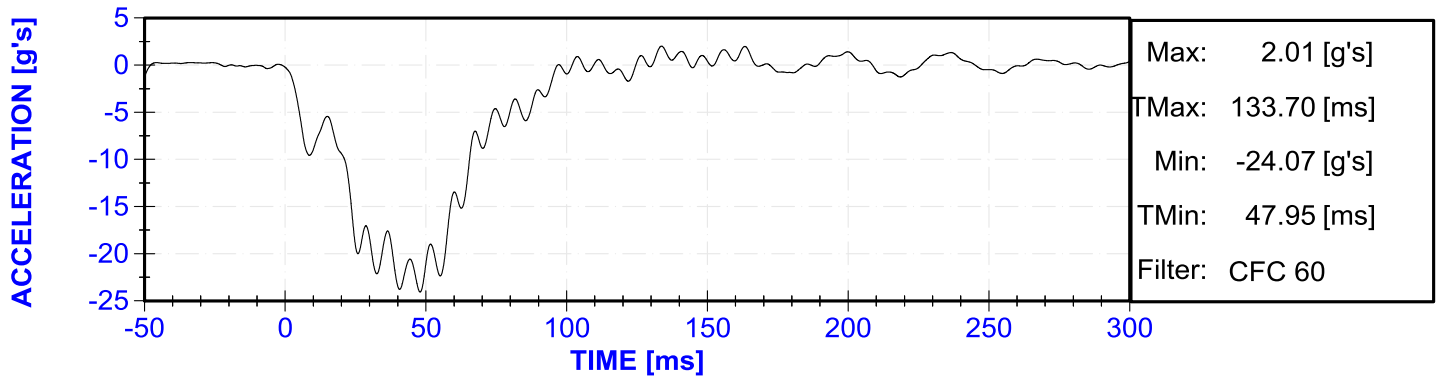


Passenger Anchor Pretensioner Monitor

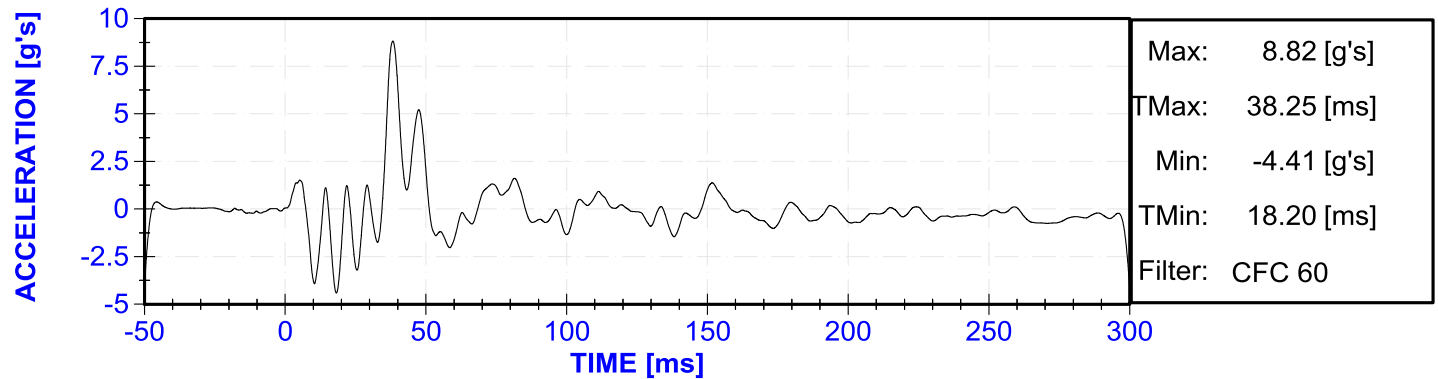
Time to fire: 16.50 ms



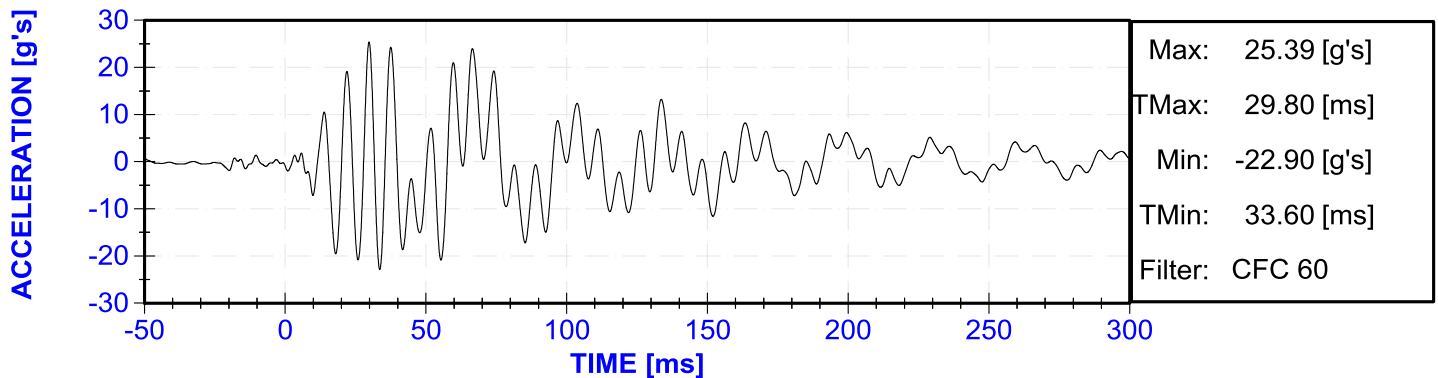
V1 OMDB CG X Acceleration

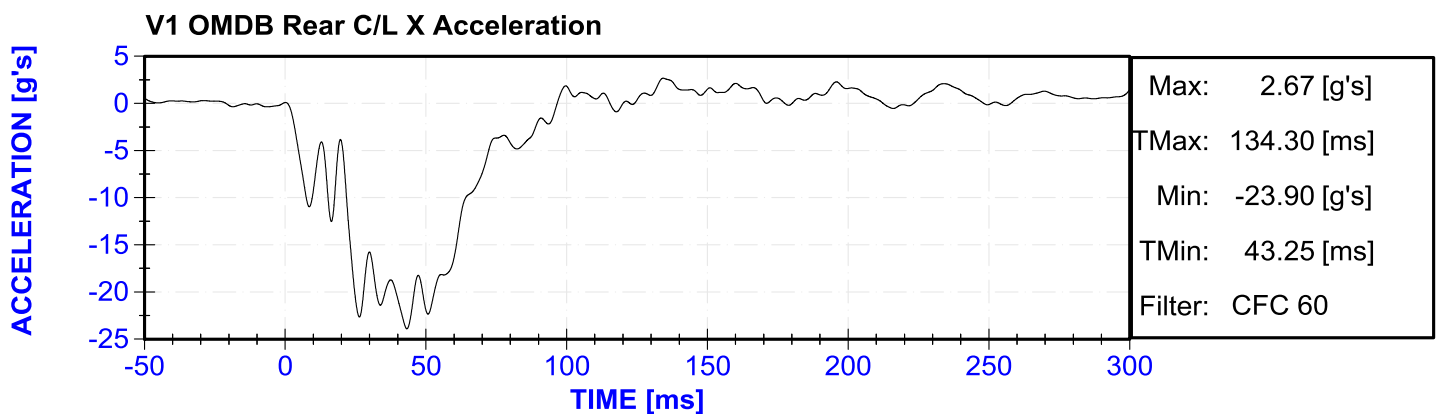
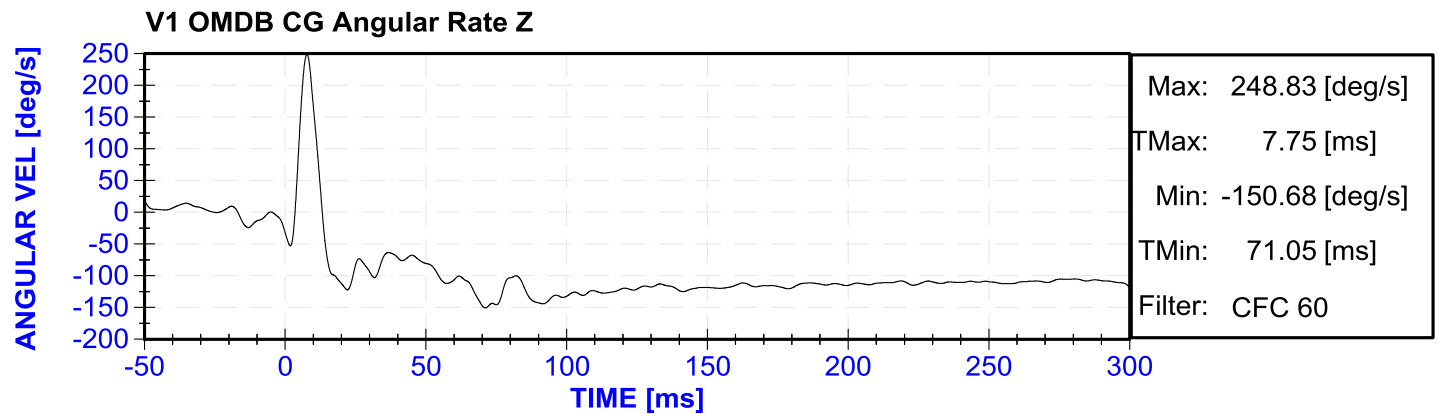
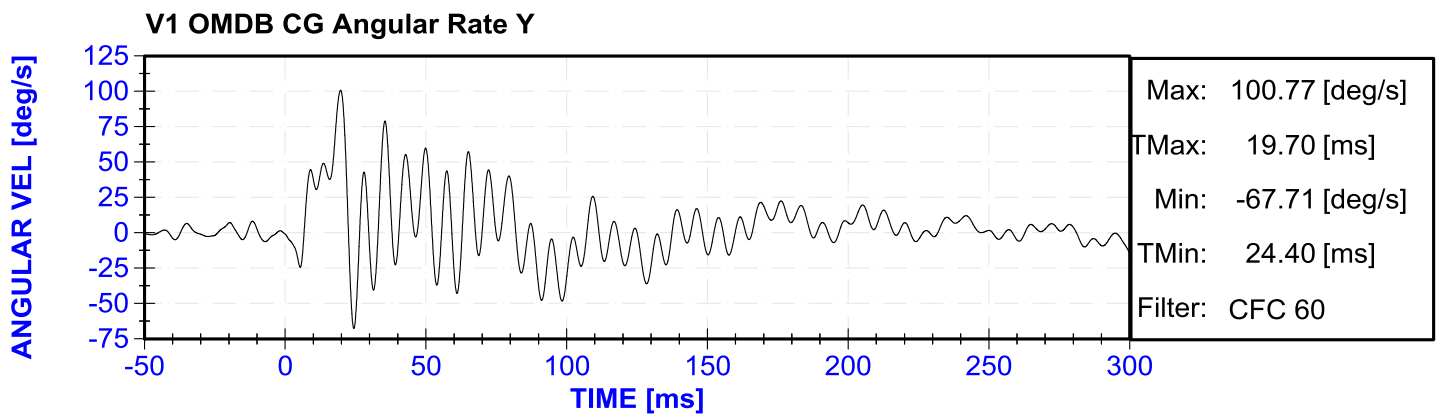
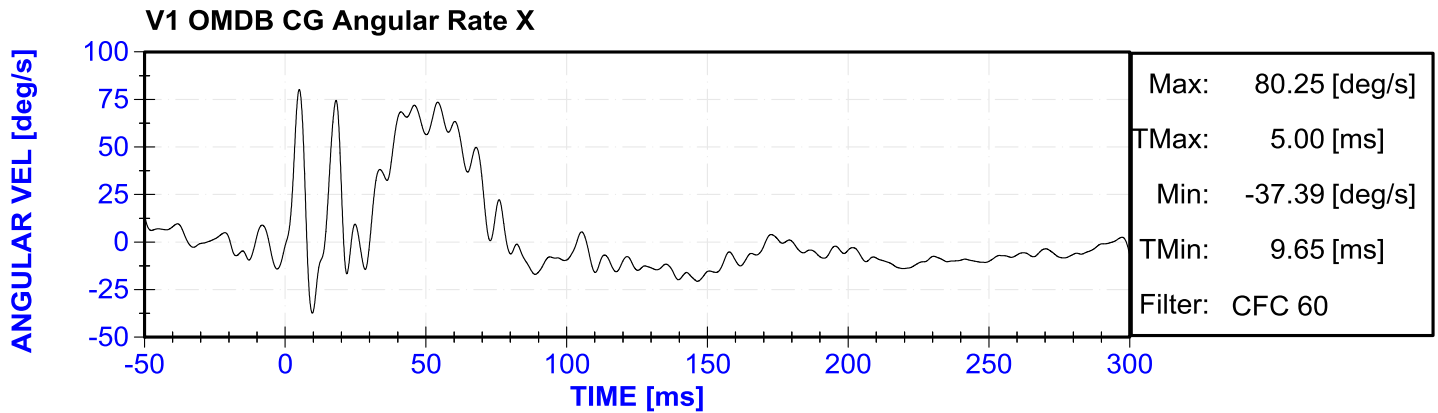


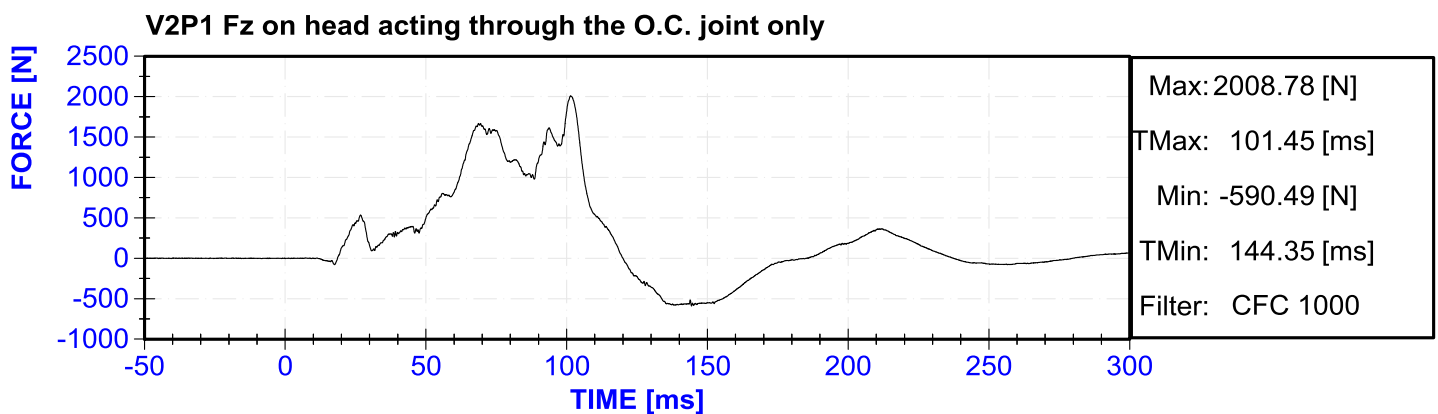
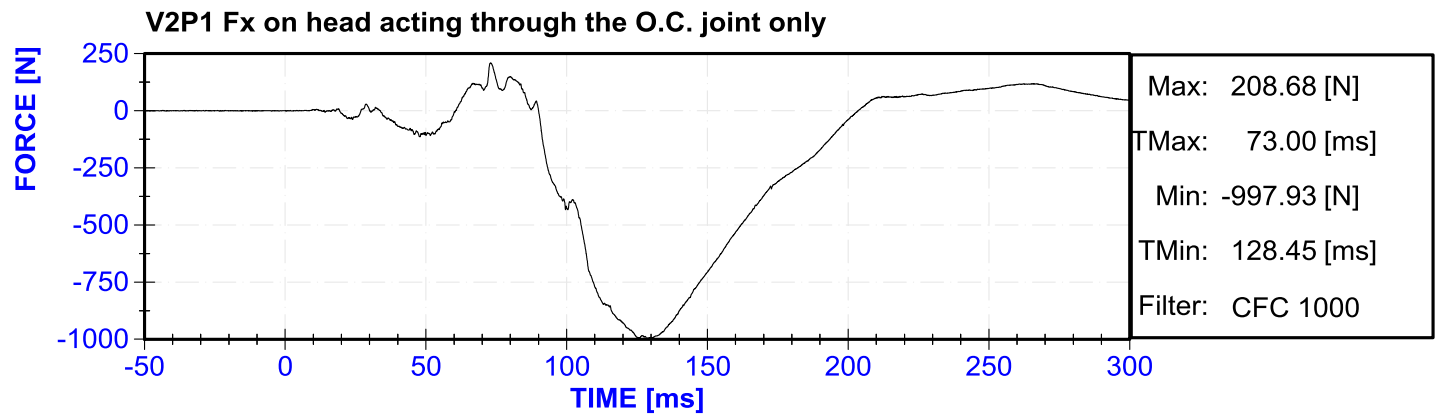
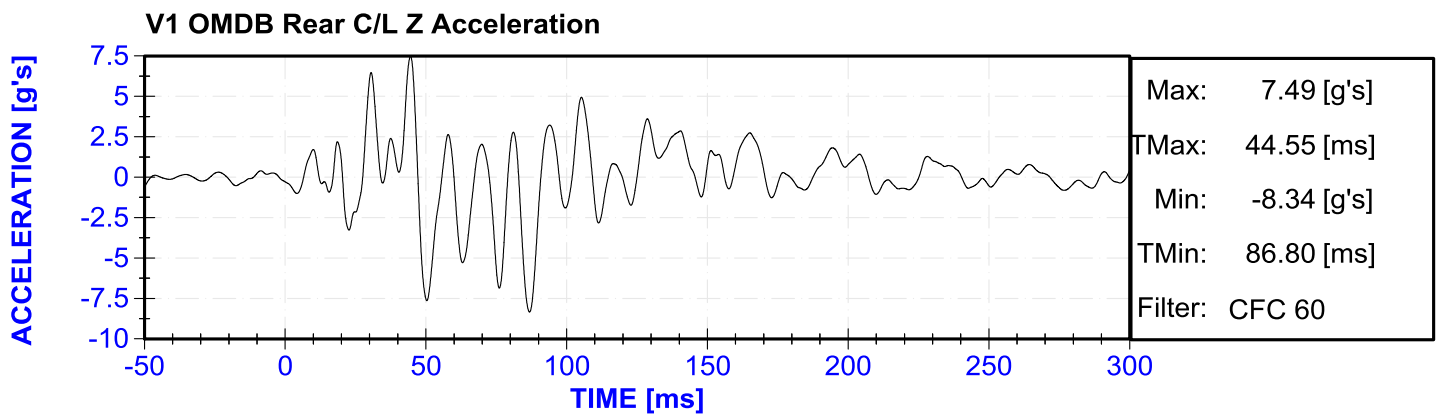
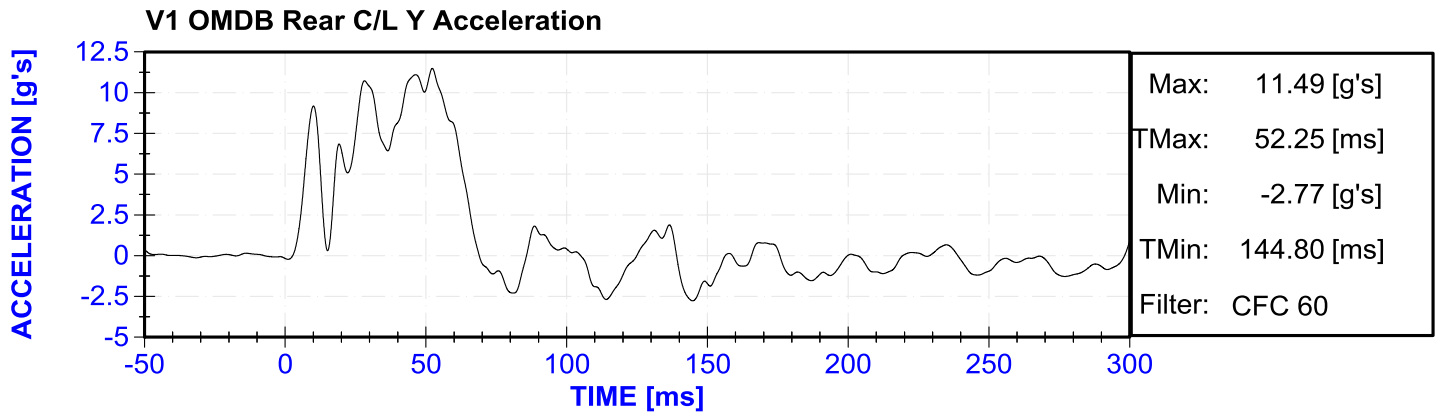
V1 OMDB CG Y Acceleration



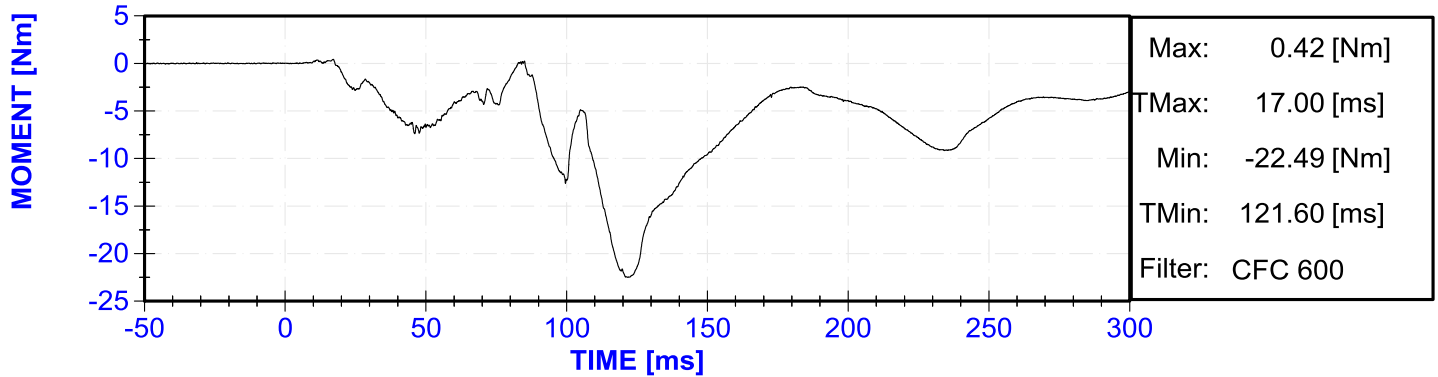
V1 OMDB CG Z Acceleration



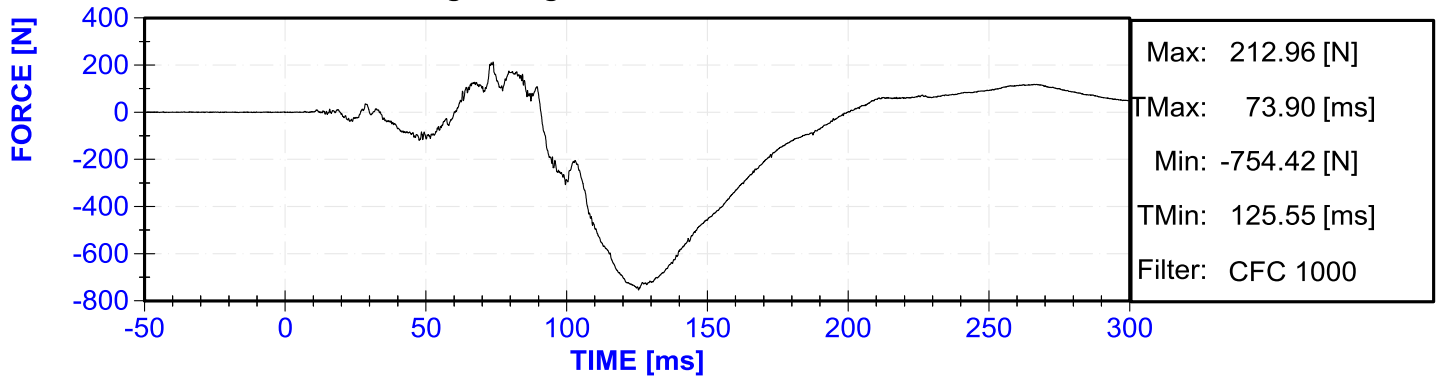




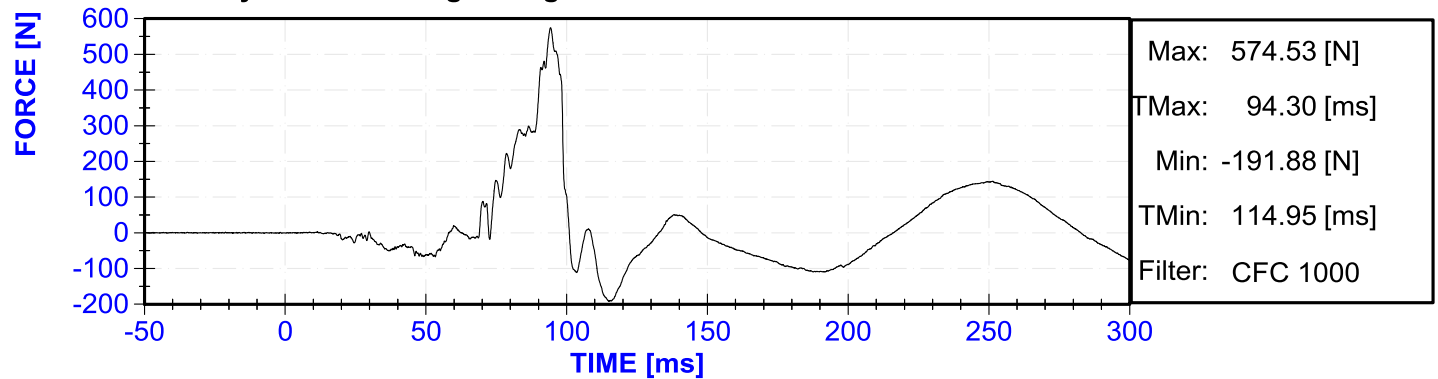
V2P1 My on head acting through the O.C. joint only



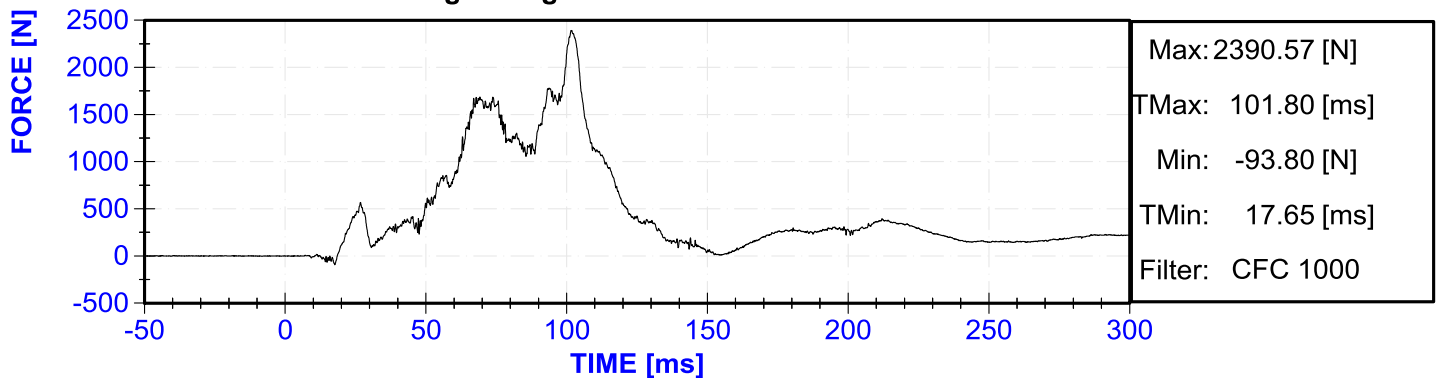
V2P1 Fx on head acting through the total neck section



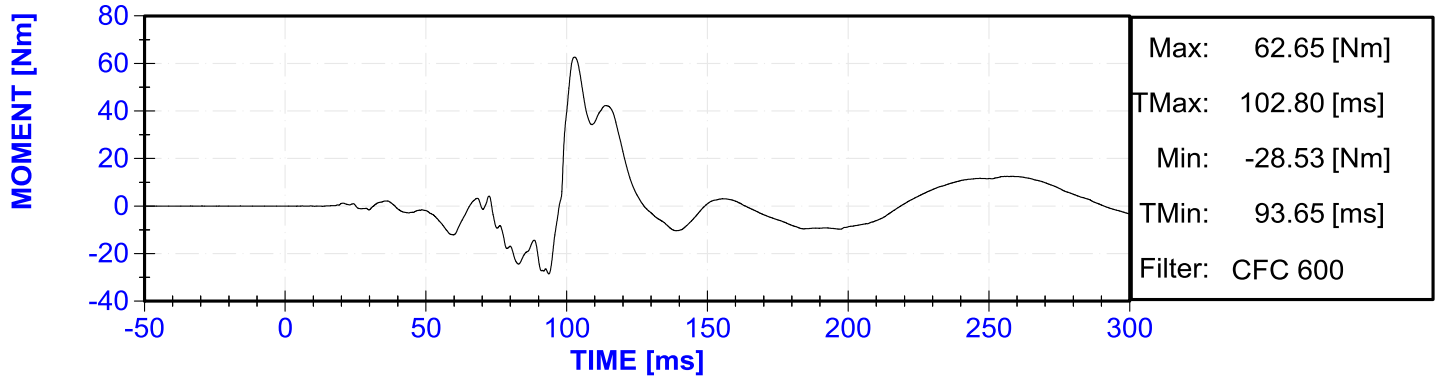
V2P1 Fy on head acting through the total neck section



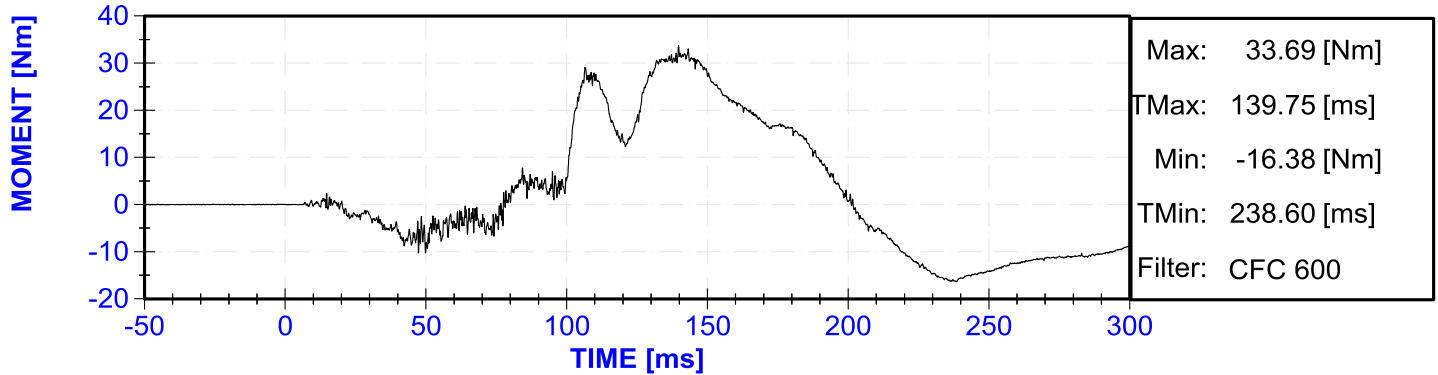
V2P1 Fz on head acting through the total neck section



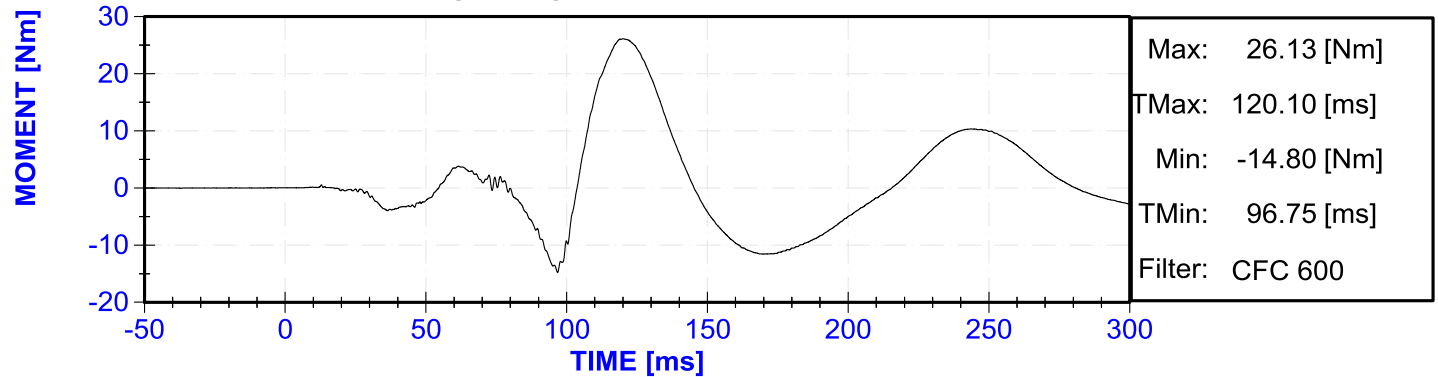
V2P1 Mx on head acting through the total neck section



V2P1 My on head acting through the total neck section

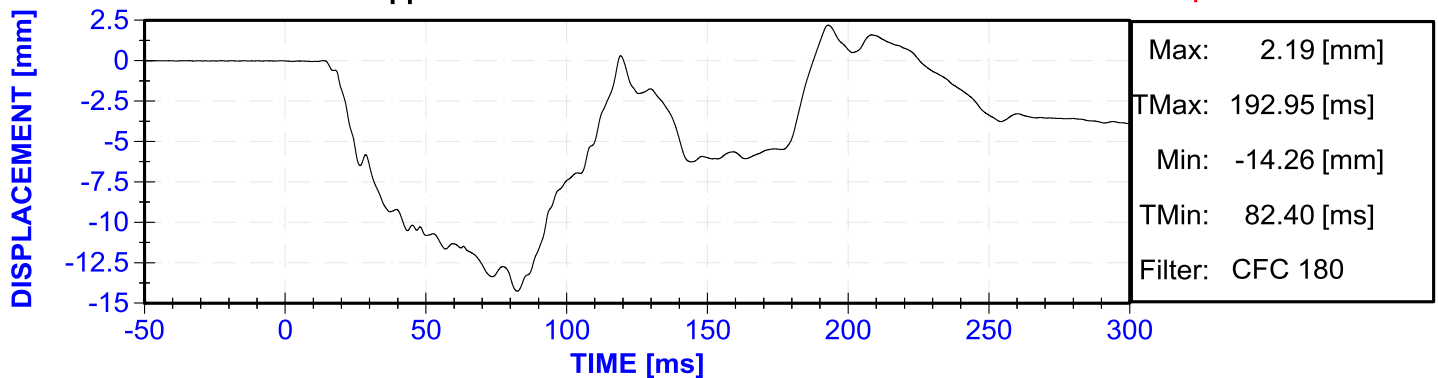


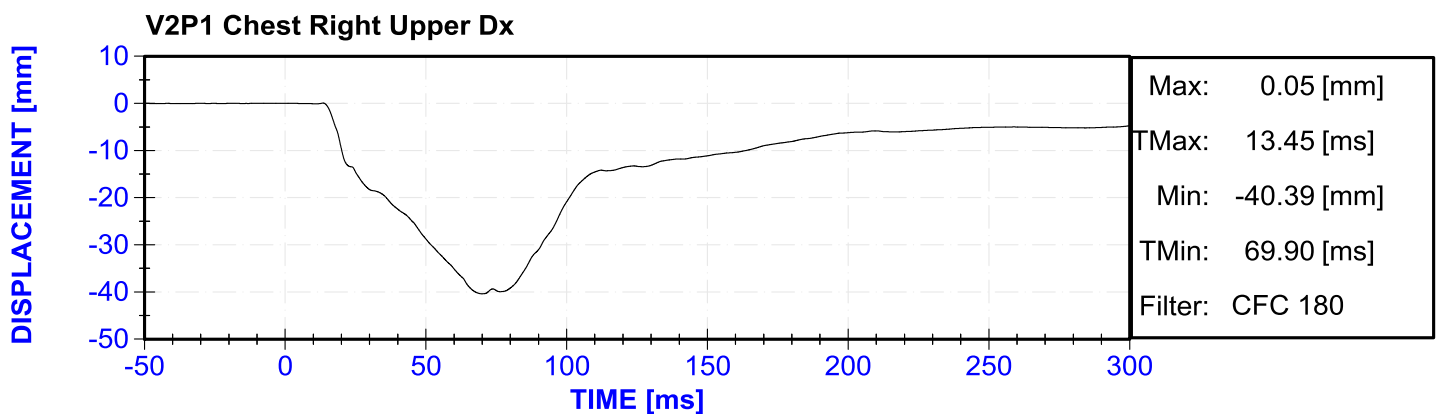
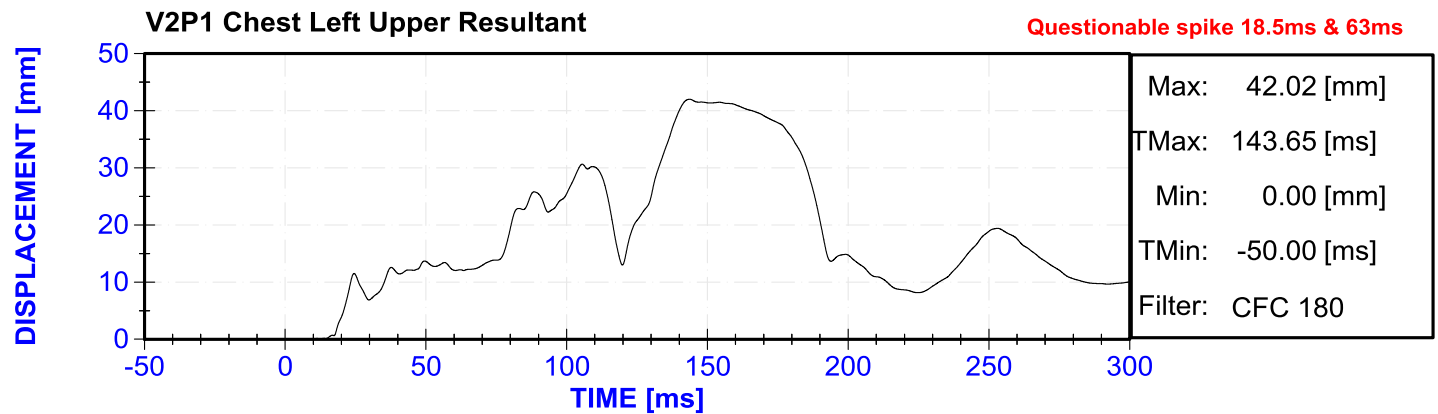
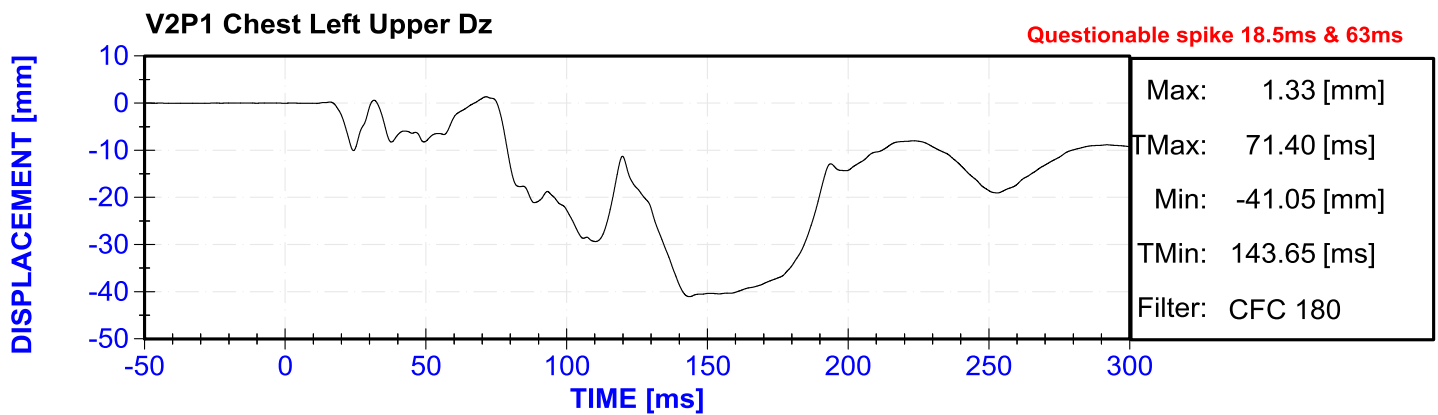
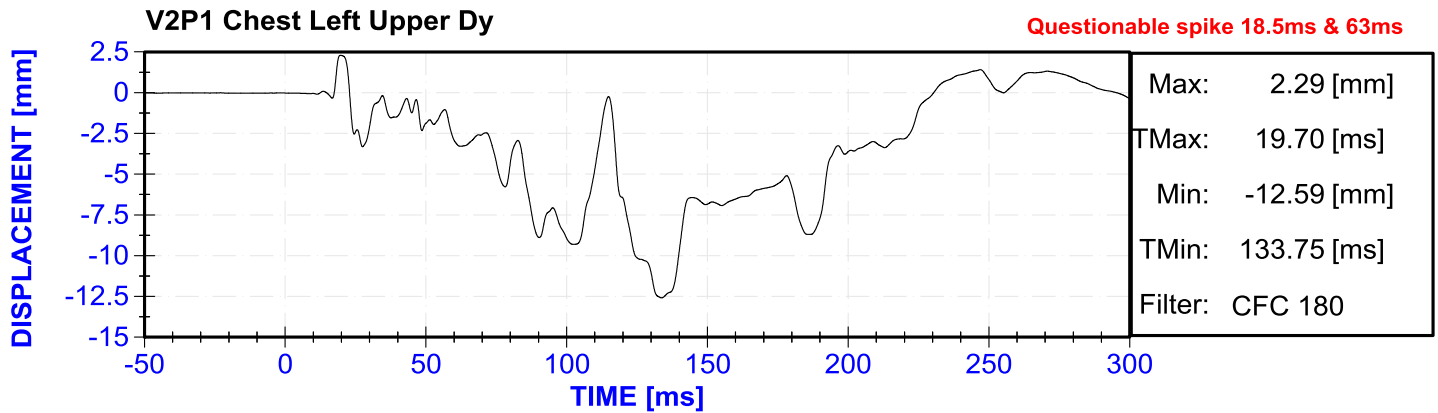
V2P1 Mz on head acting through the total neck section

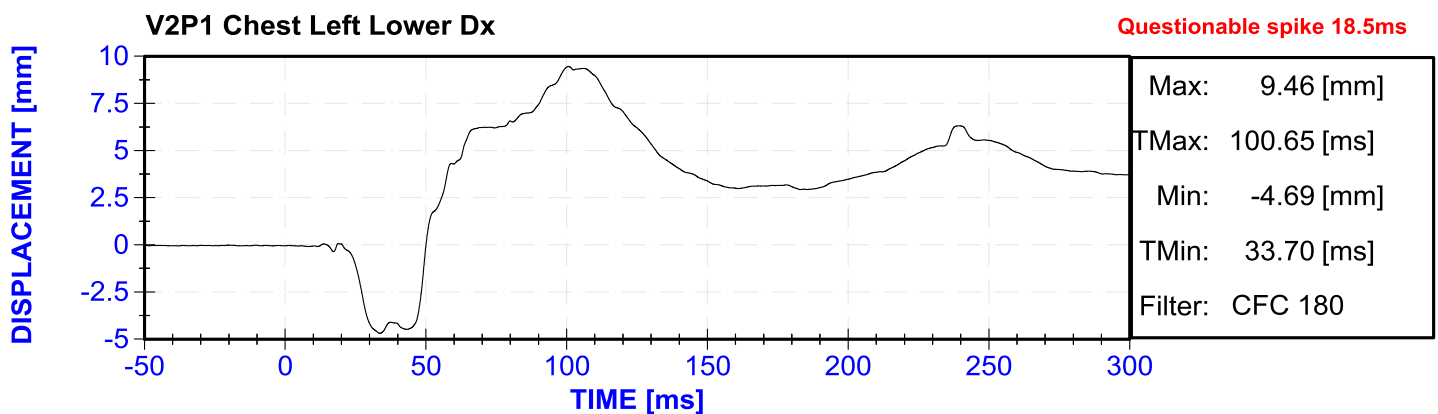
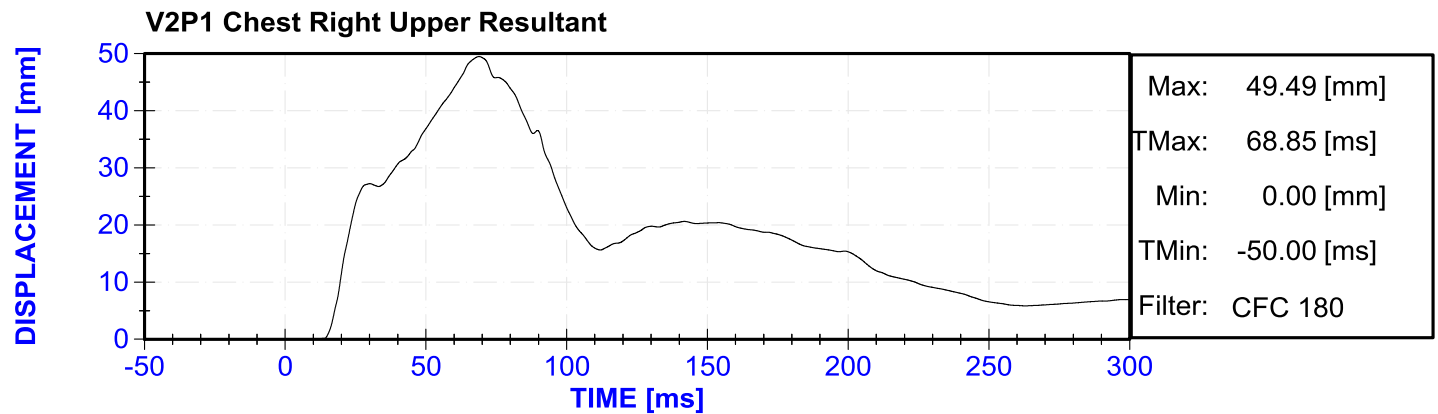
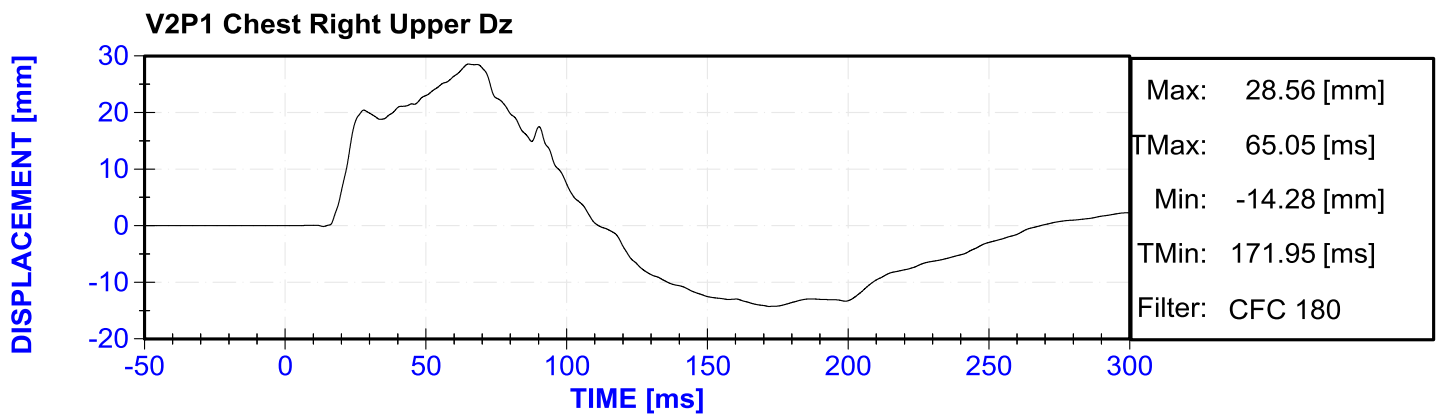
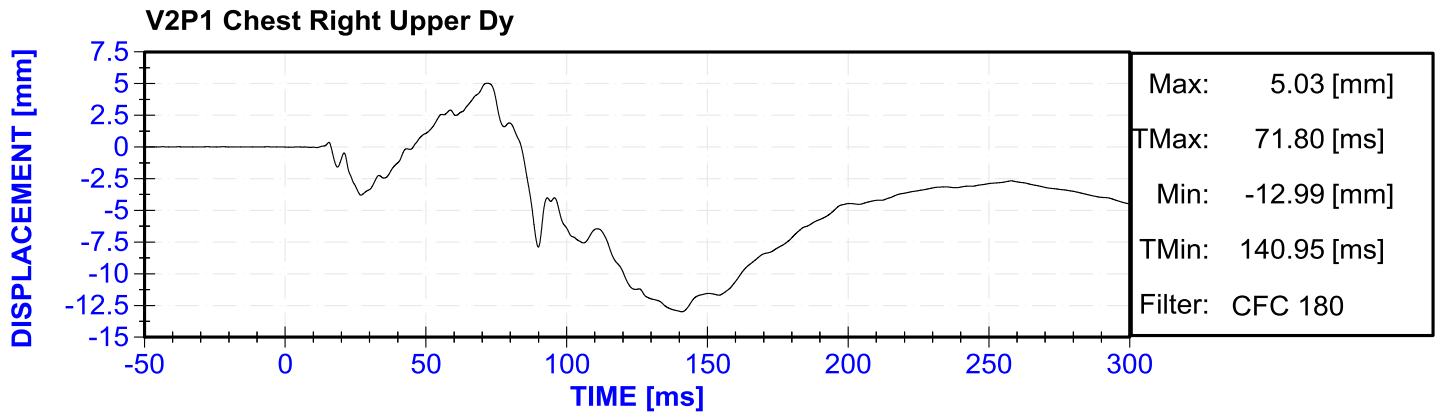


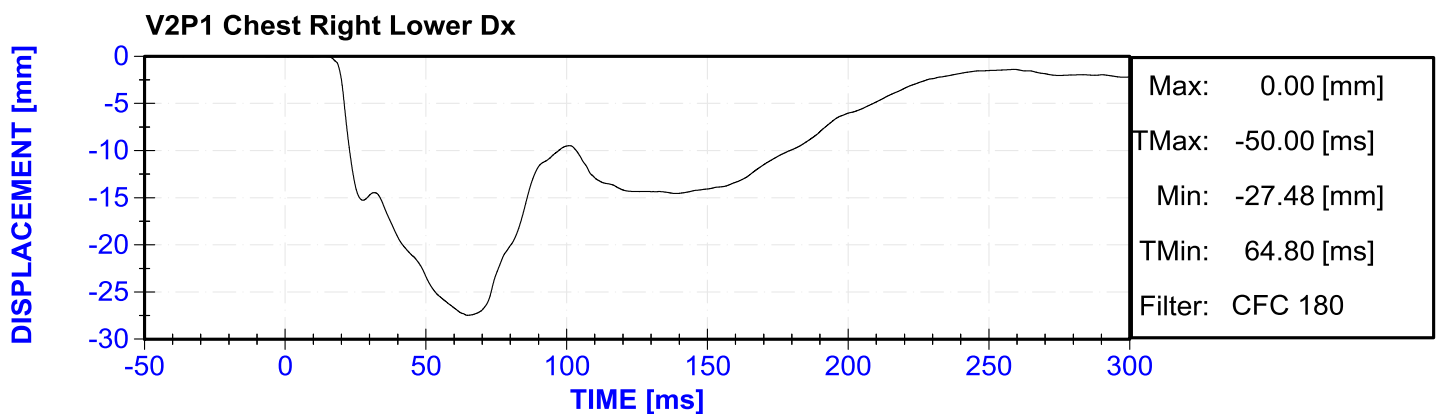
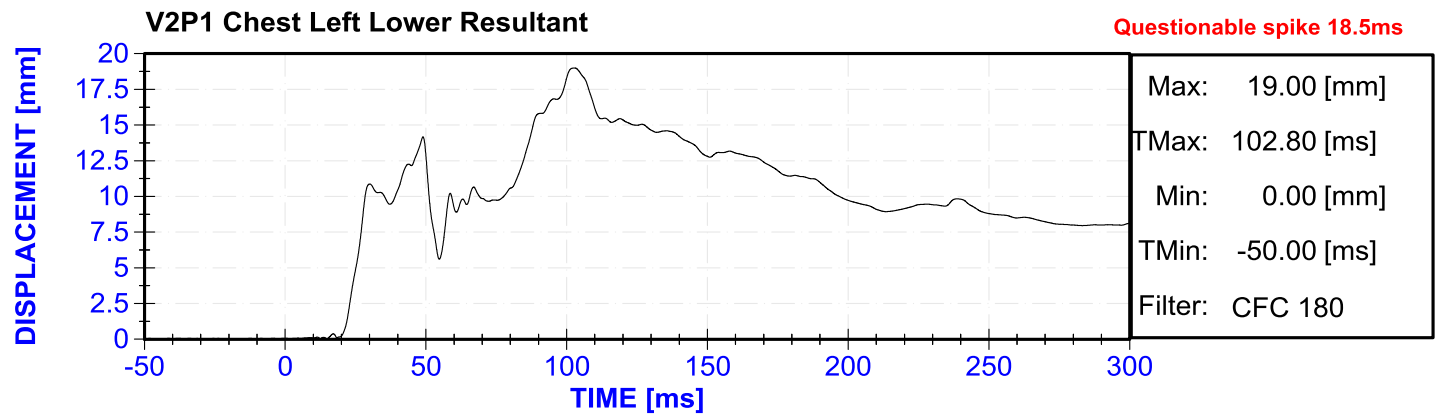
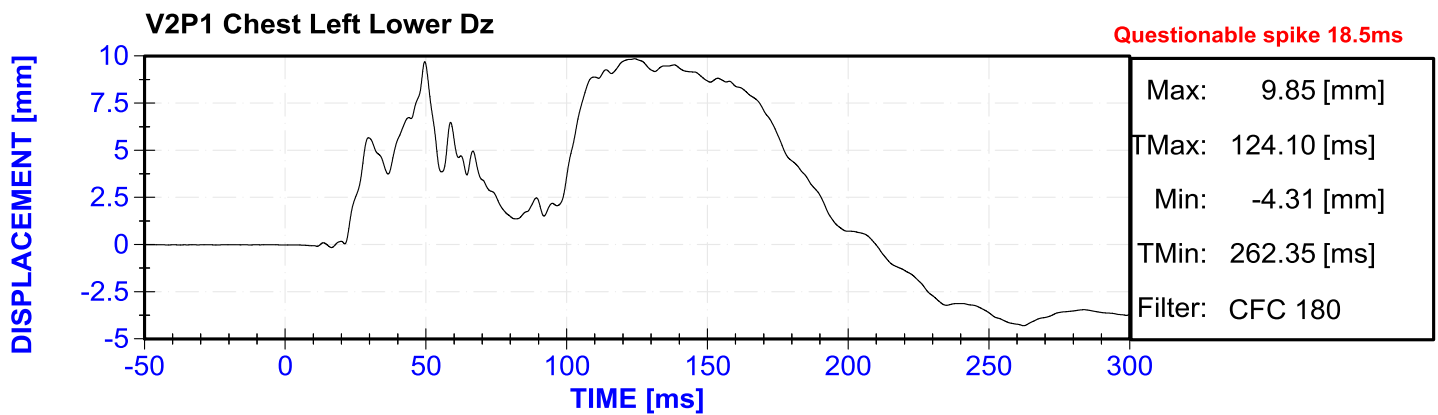
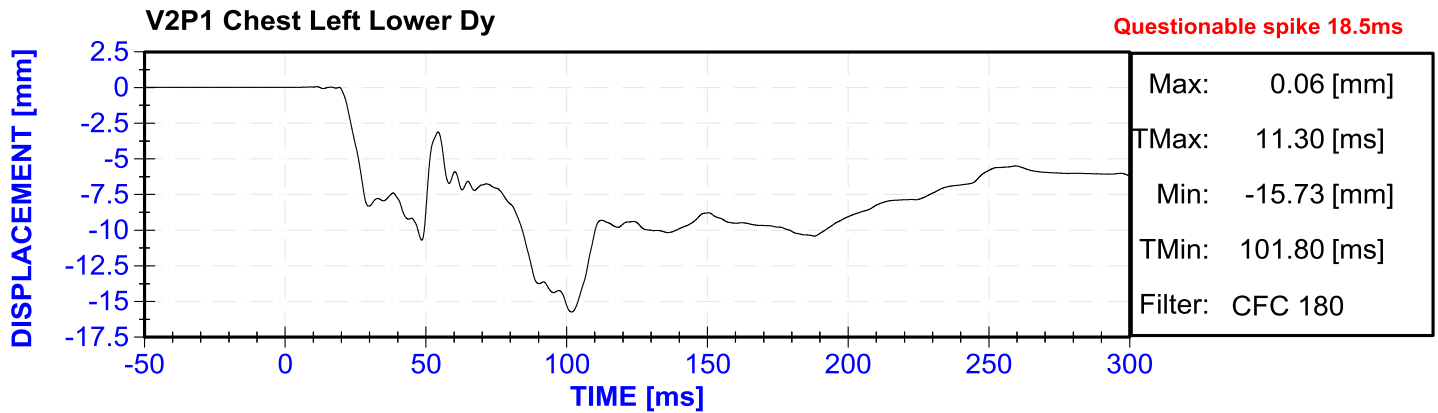
V2P1 Chest Left Upper Dx

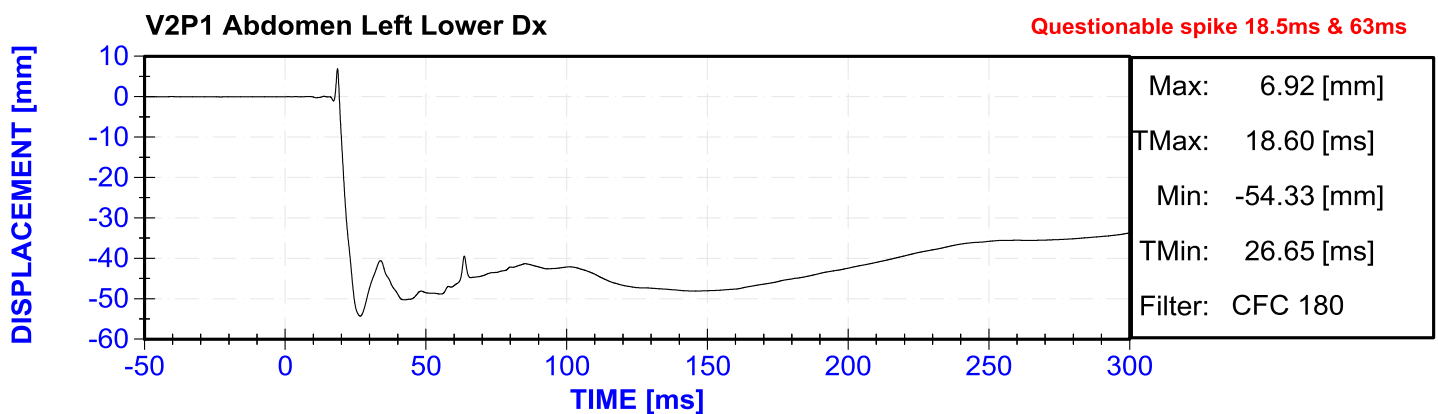
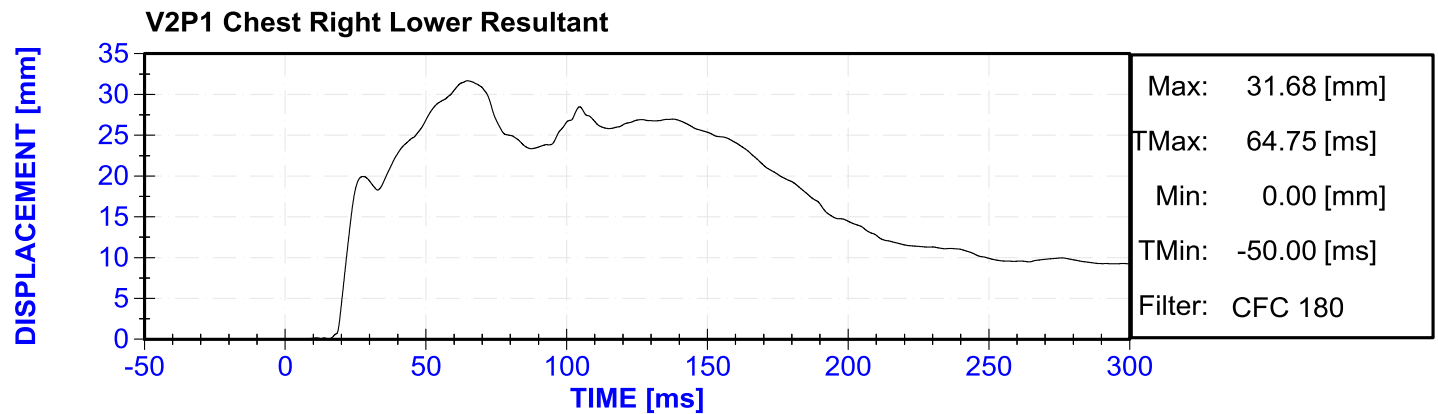
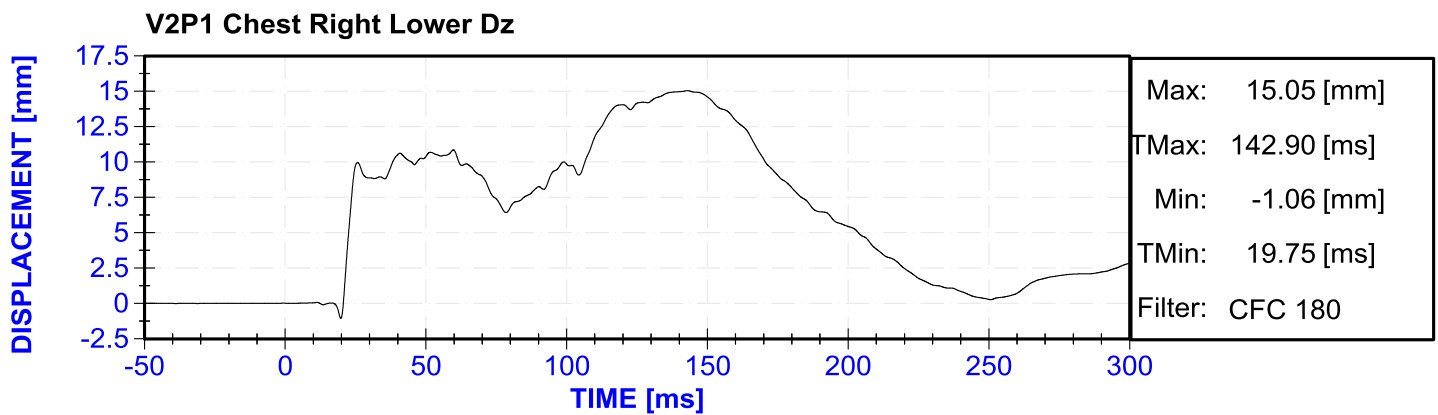
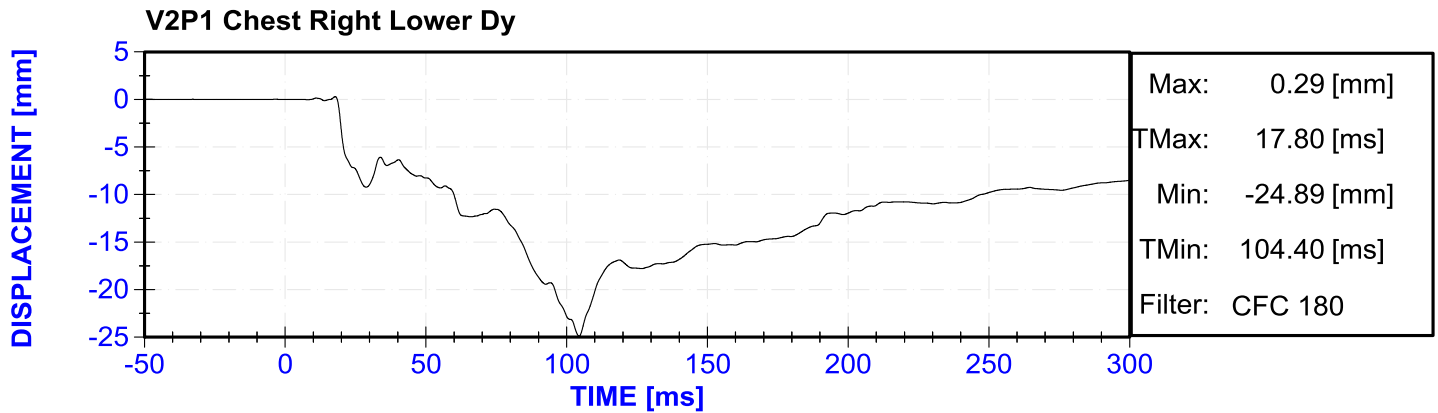
Questionable spike 18.5ms & 63ms

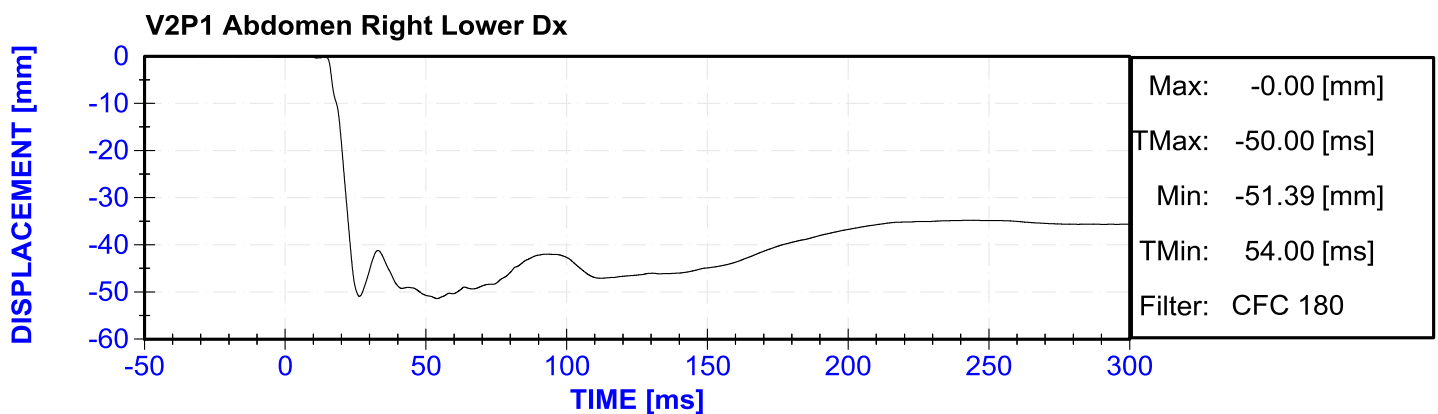
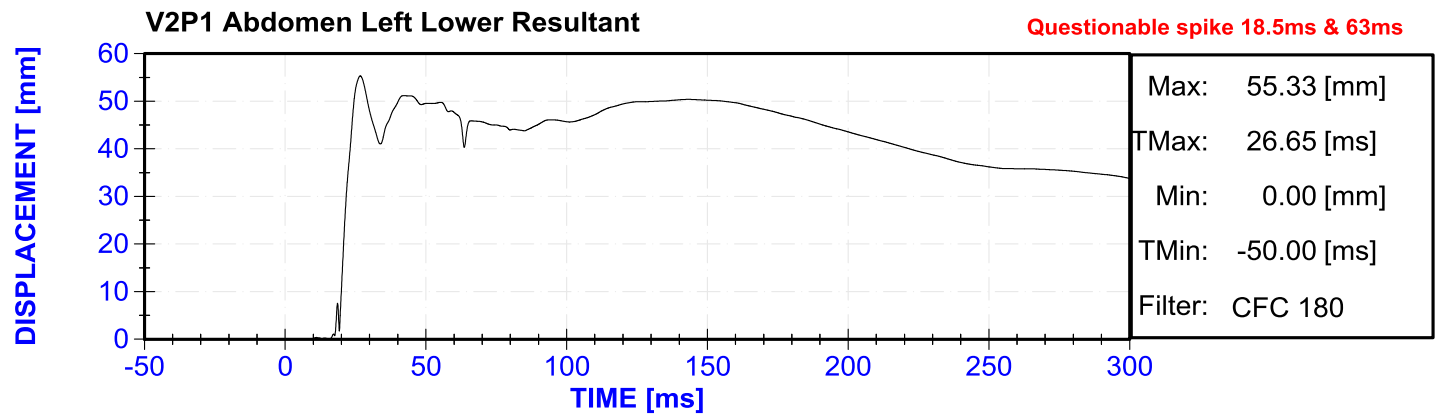
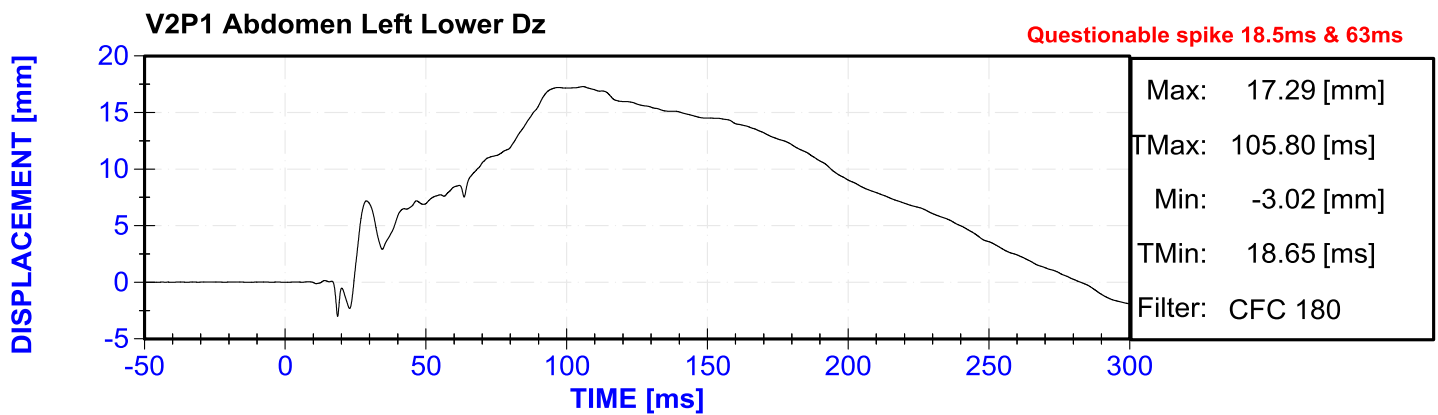
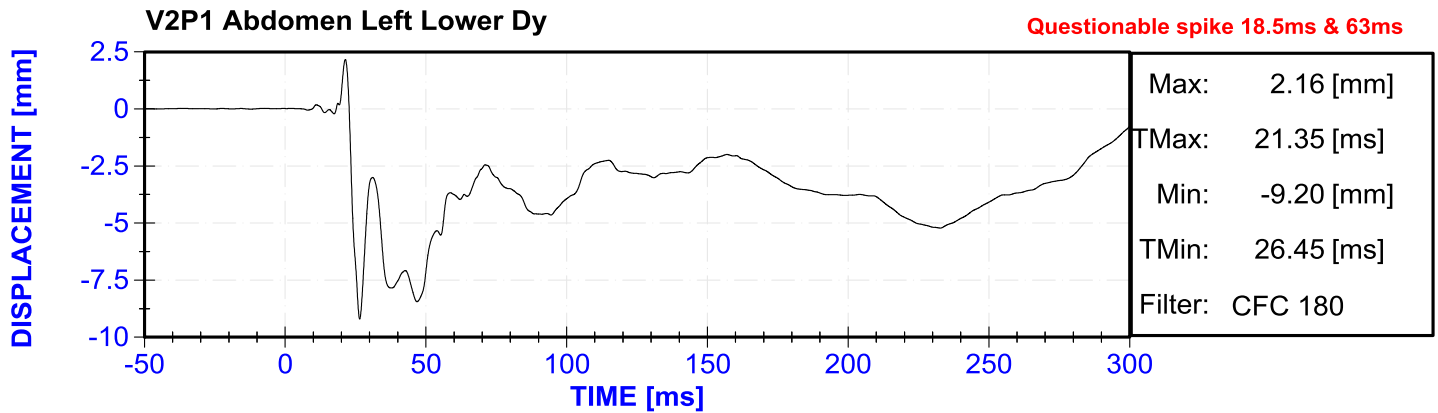


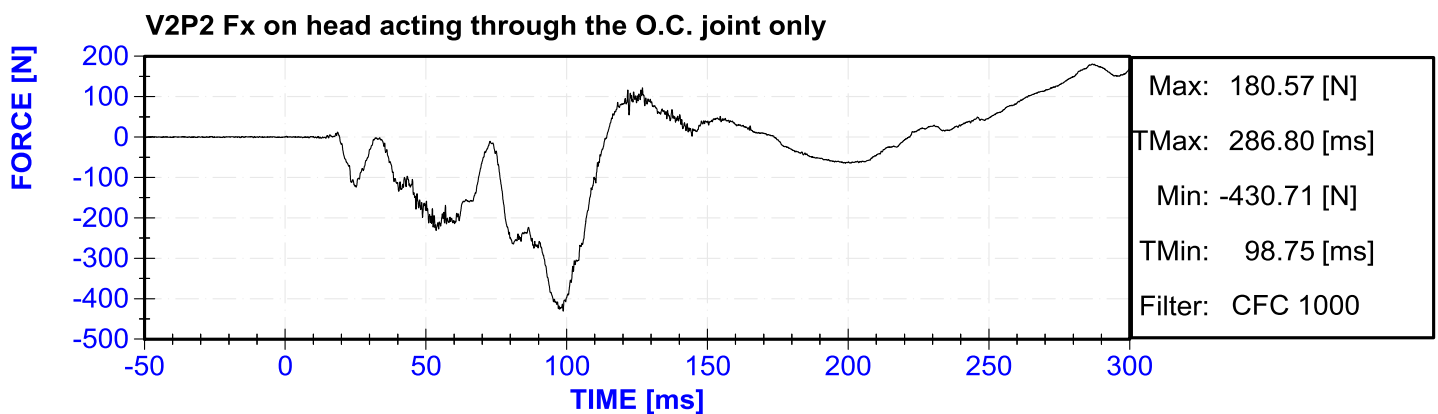
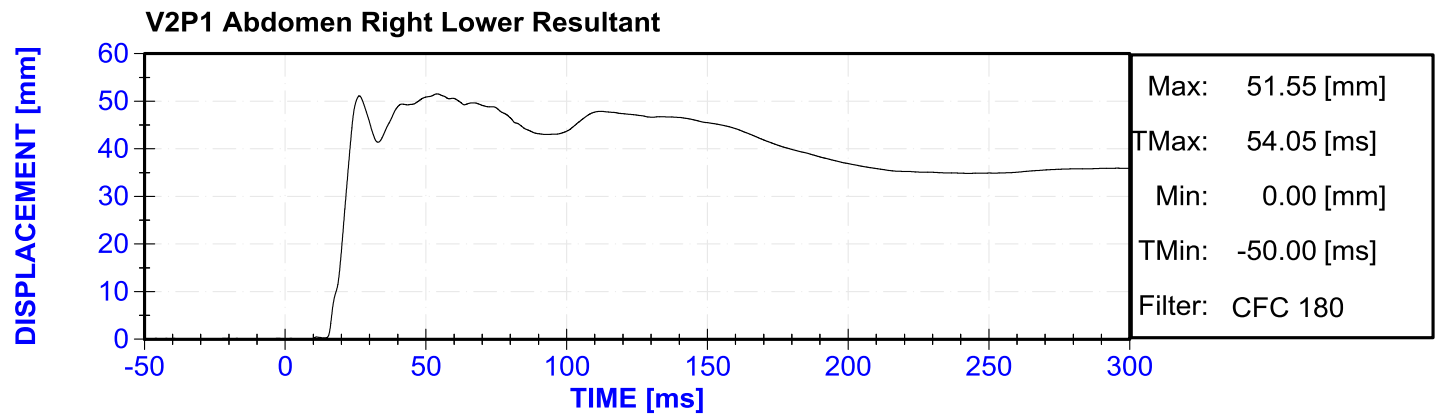
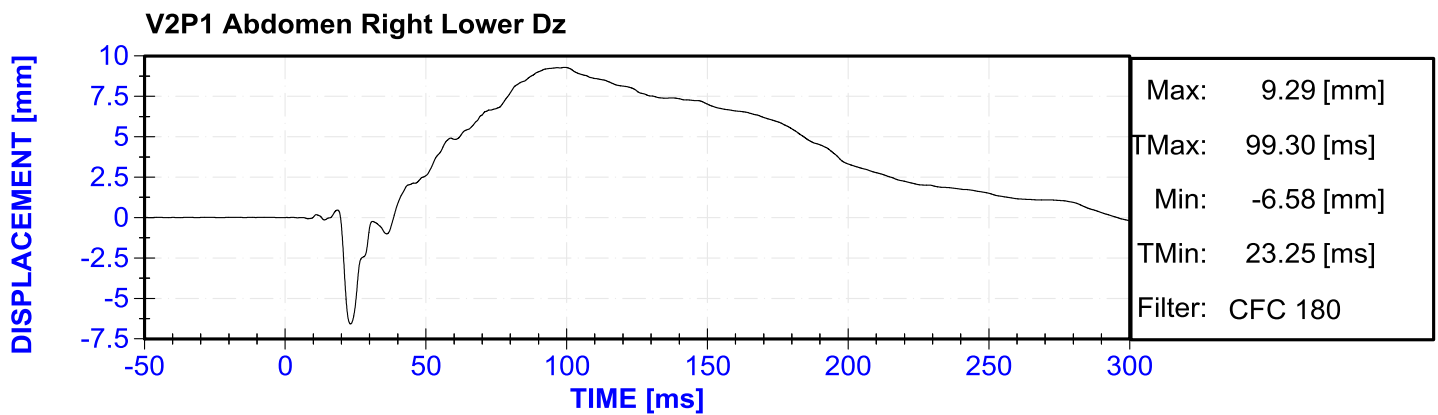
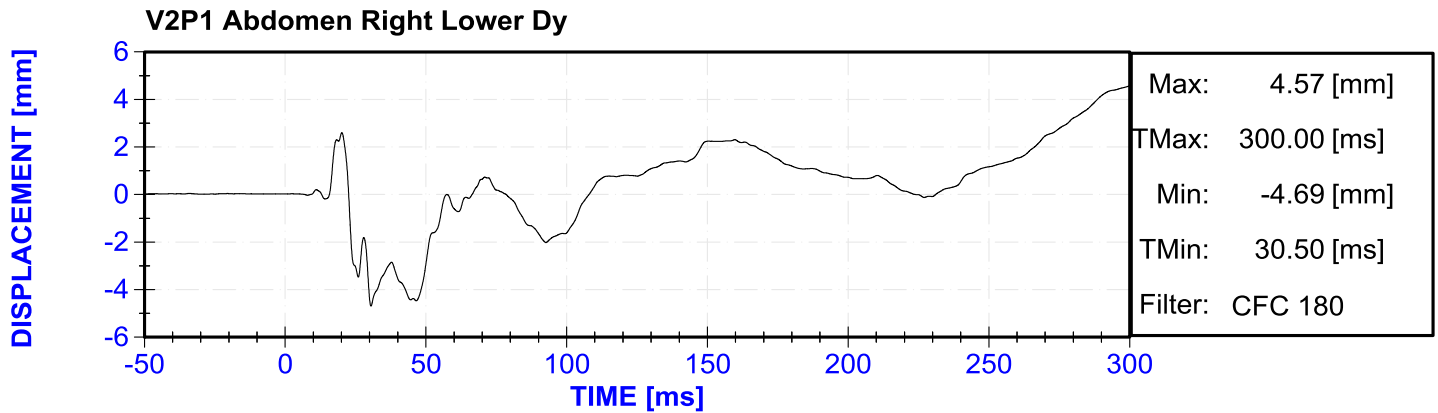


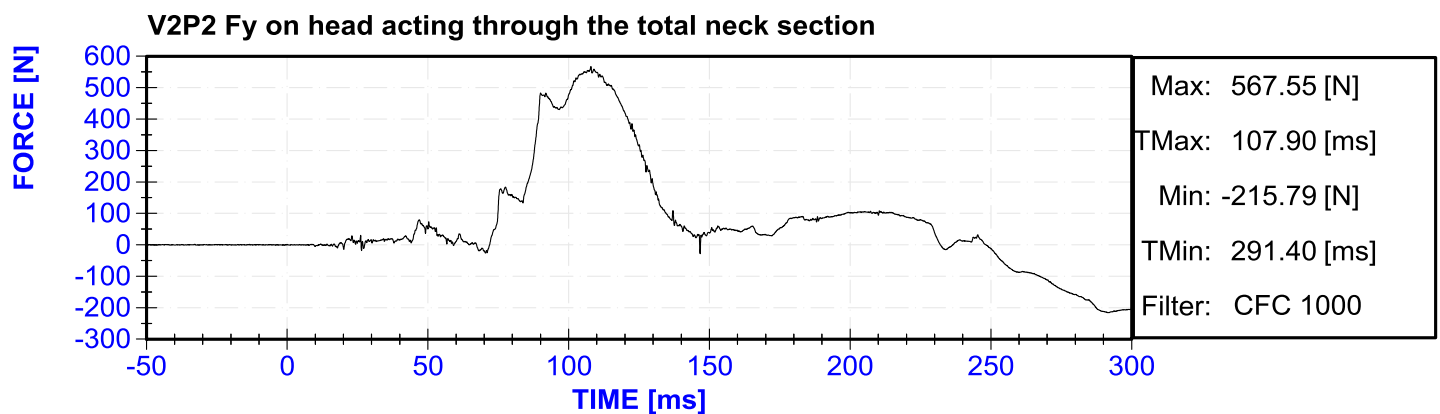
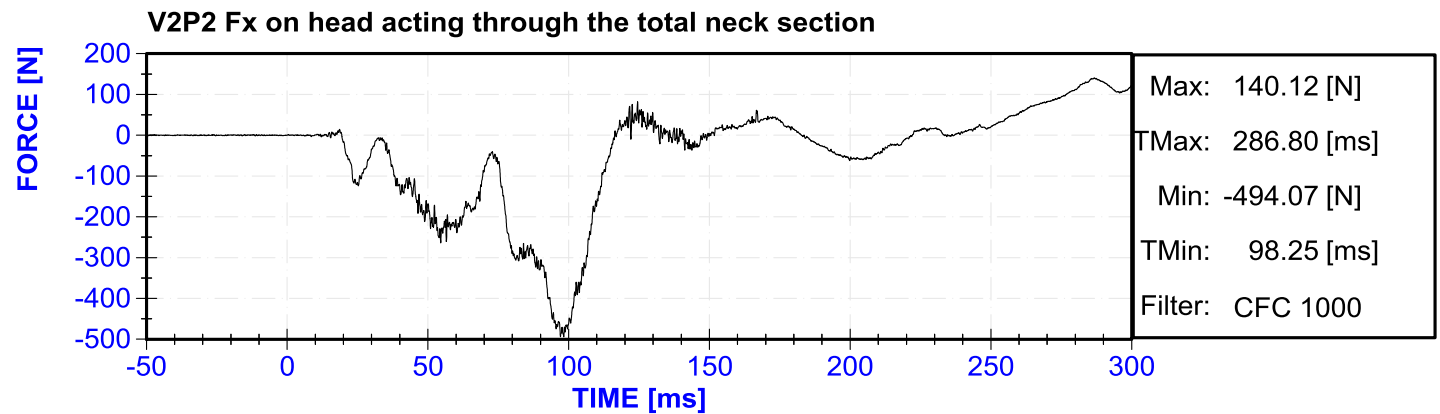
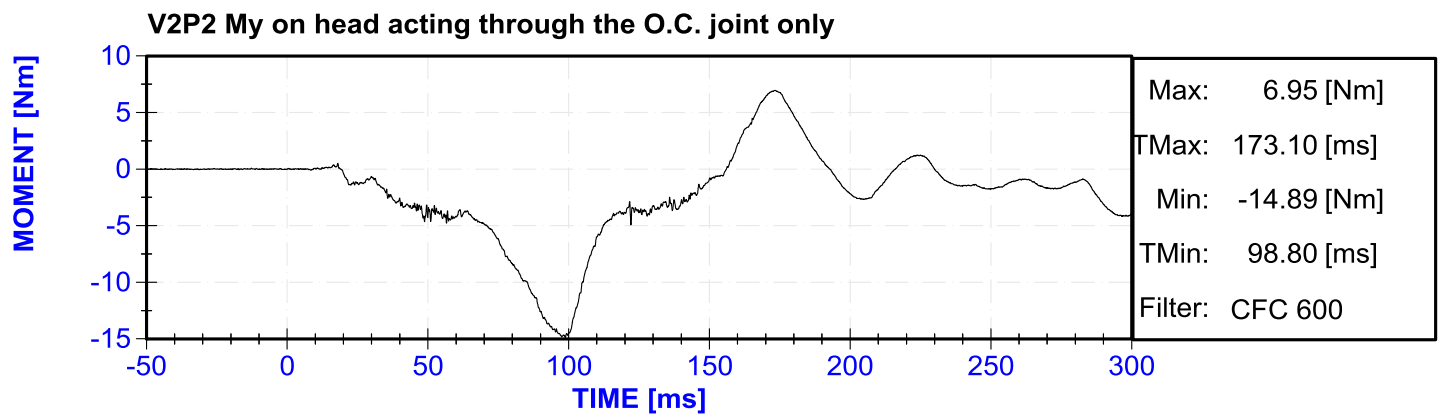
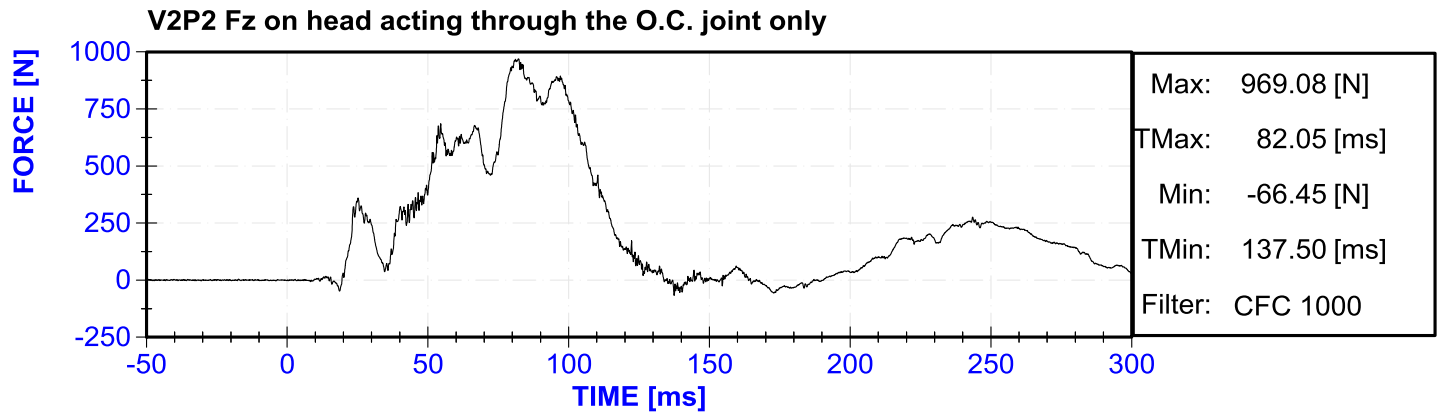


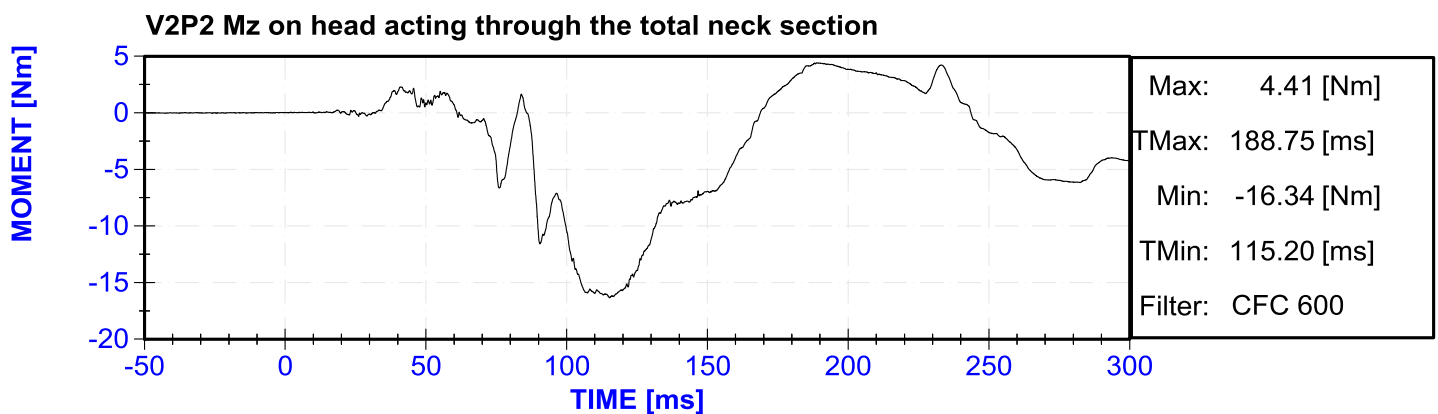
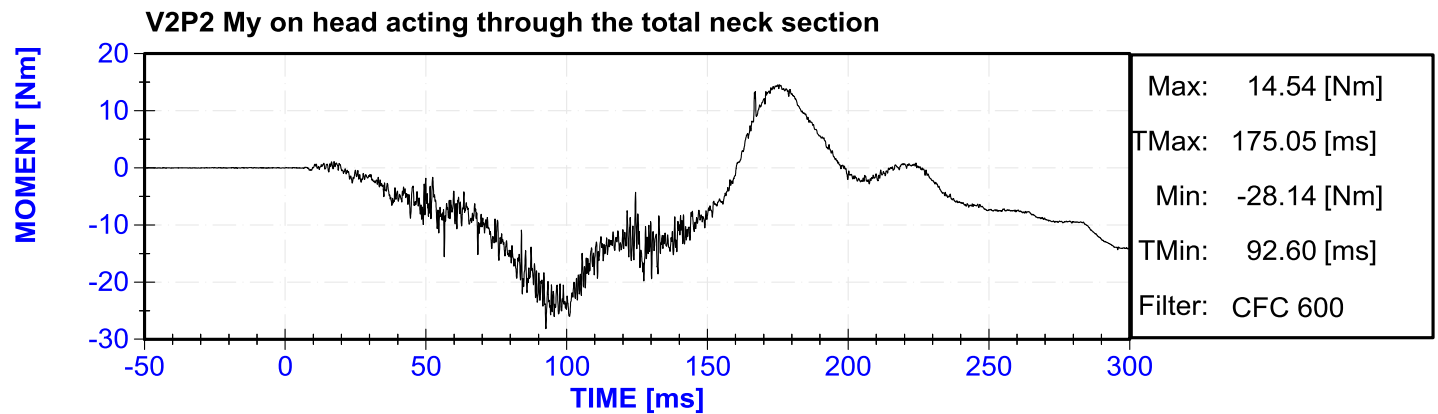
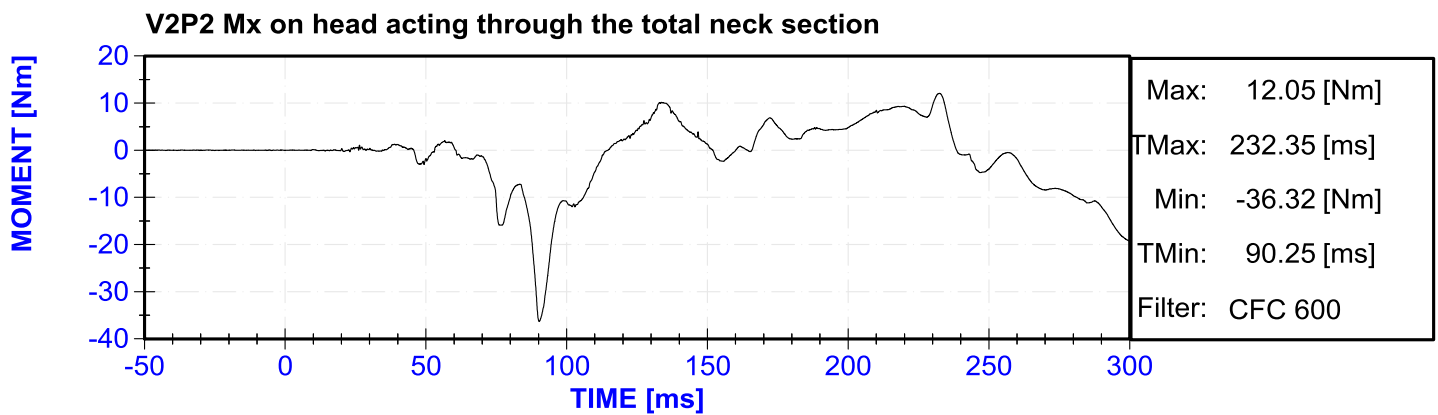
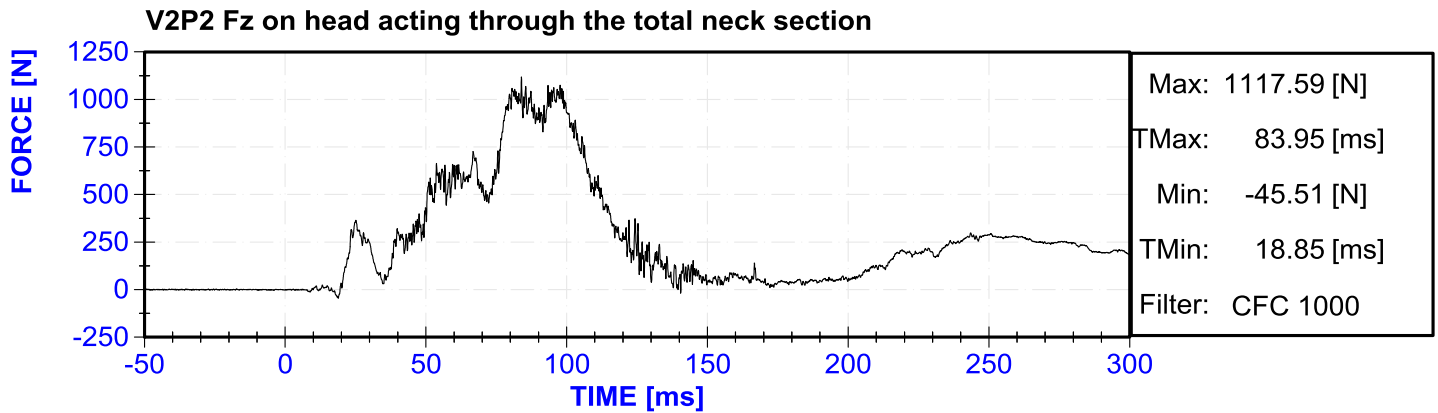


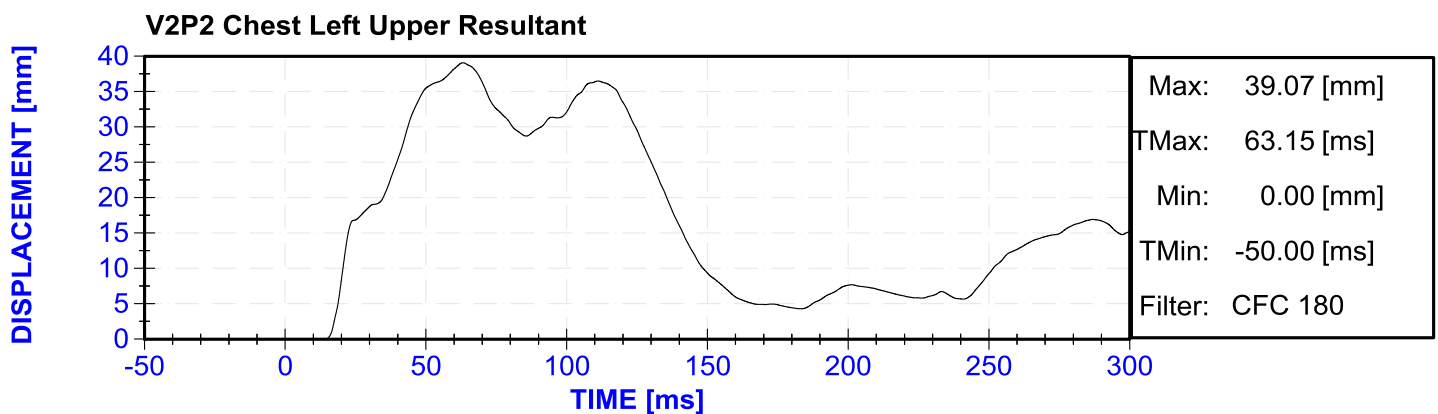
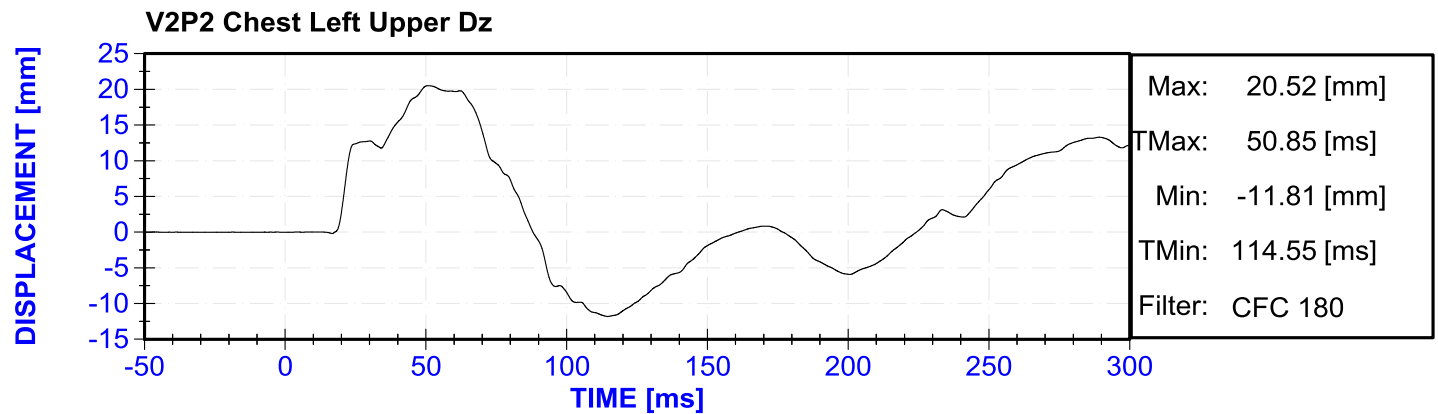
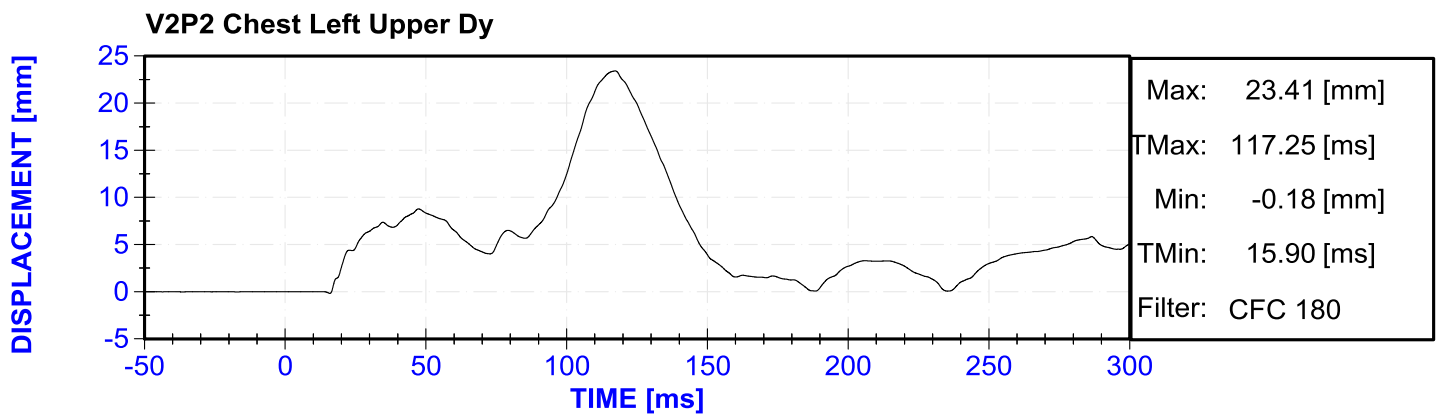
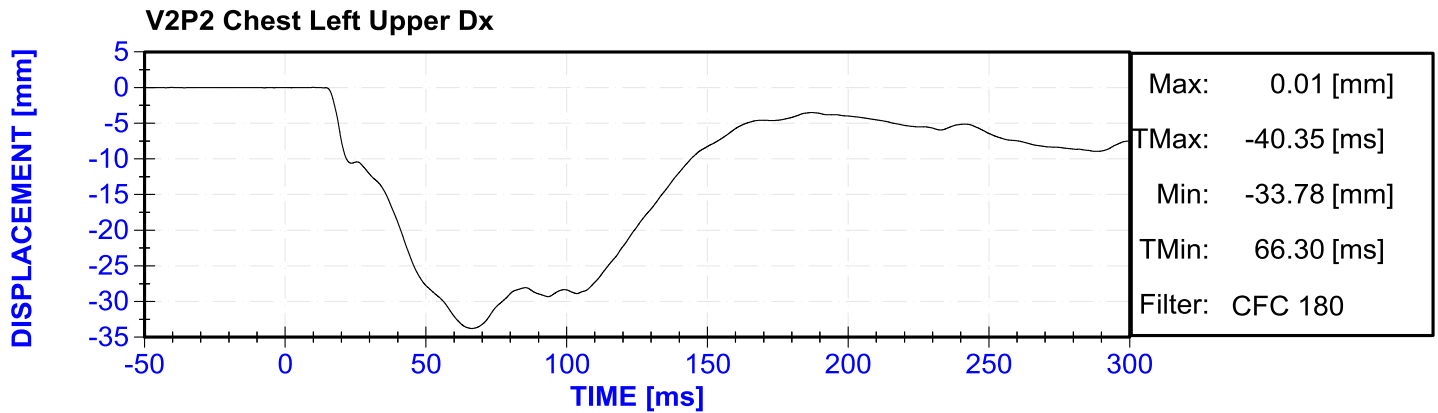


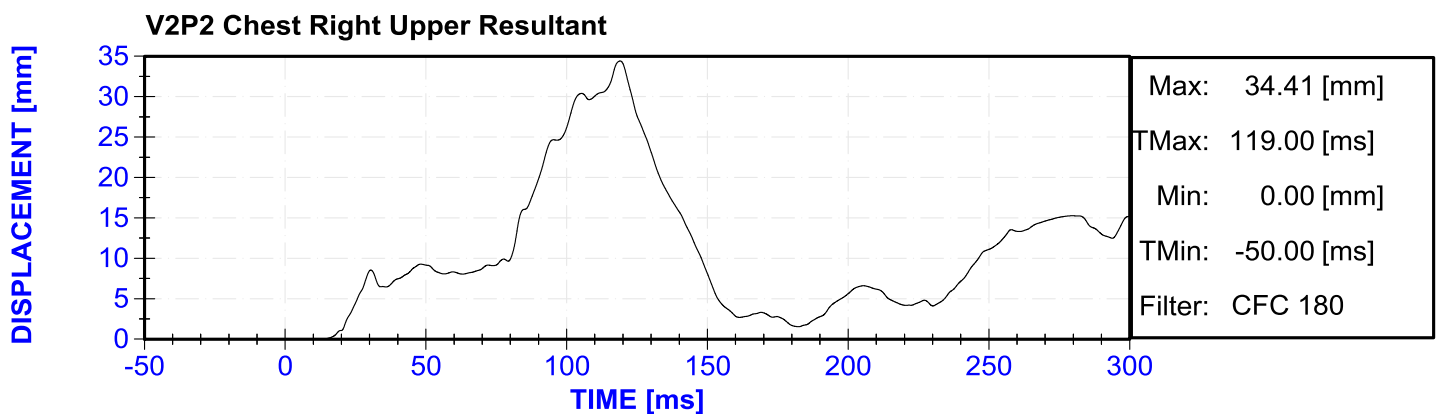
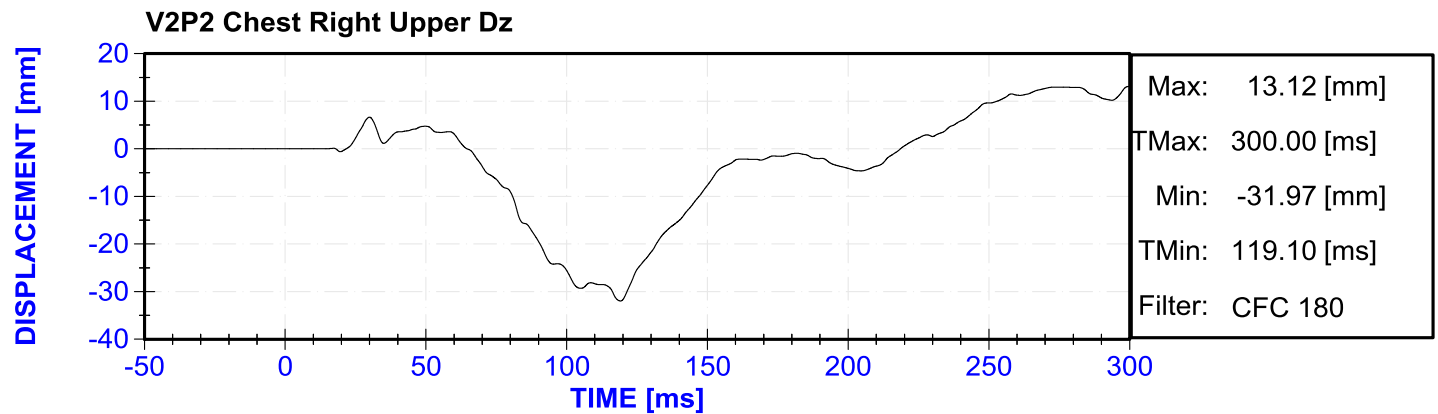
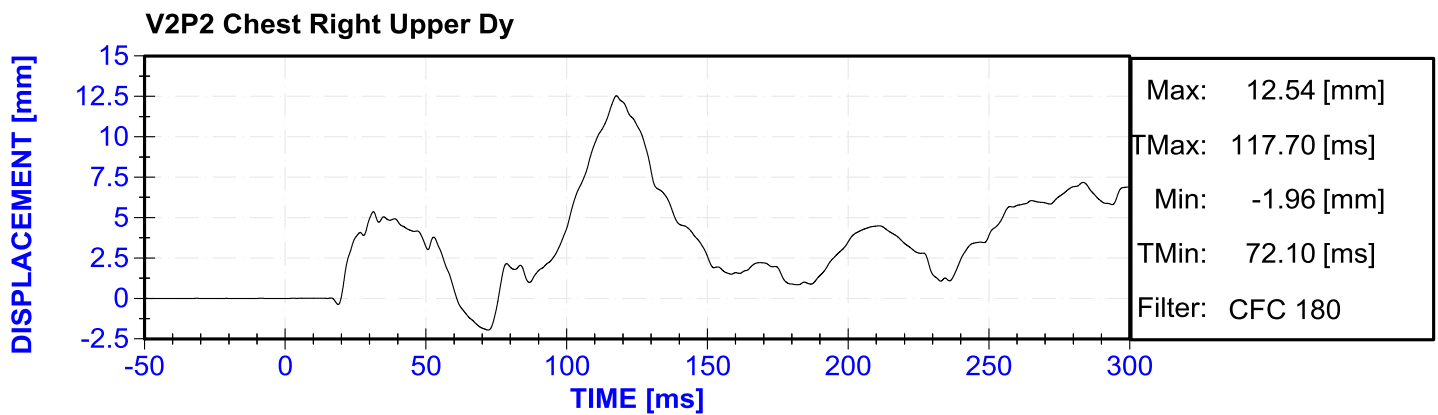
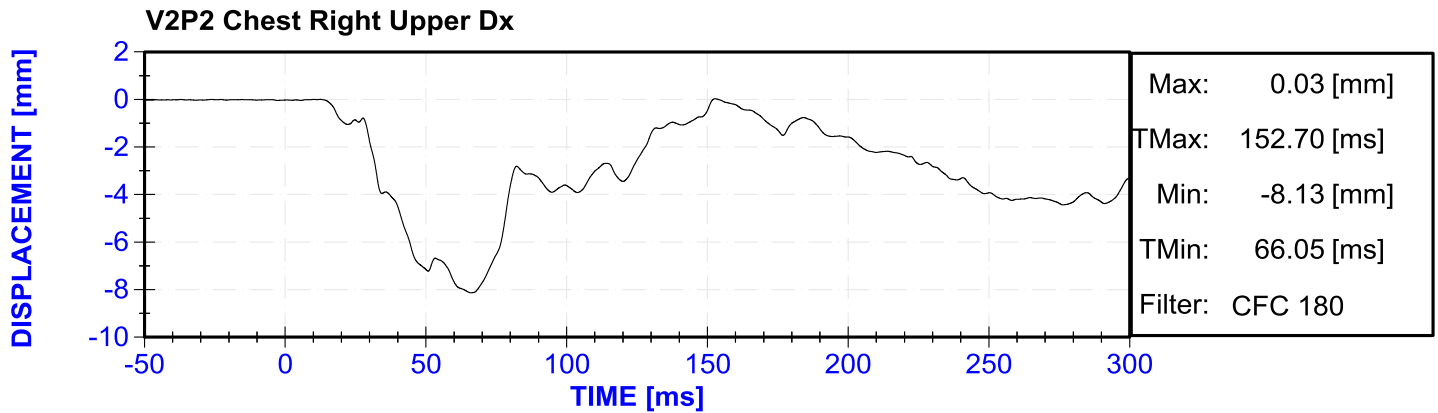


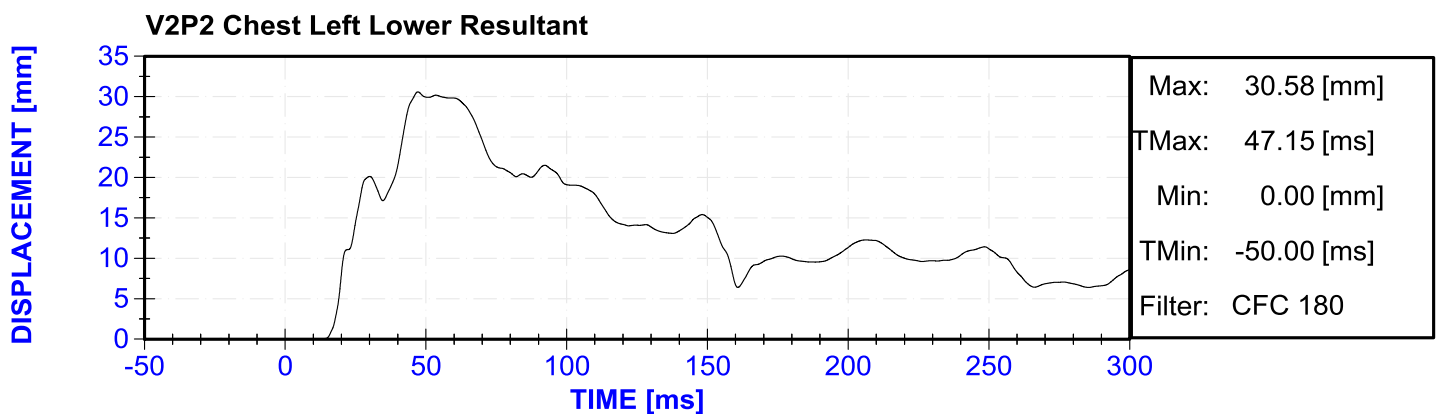
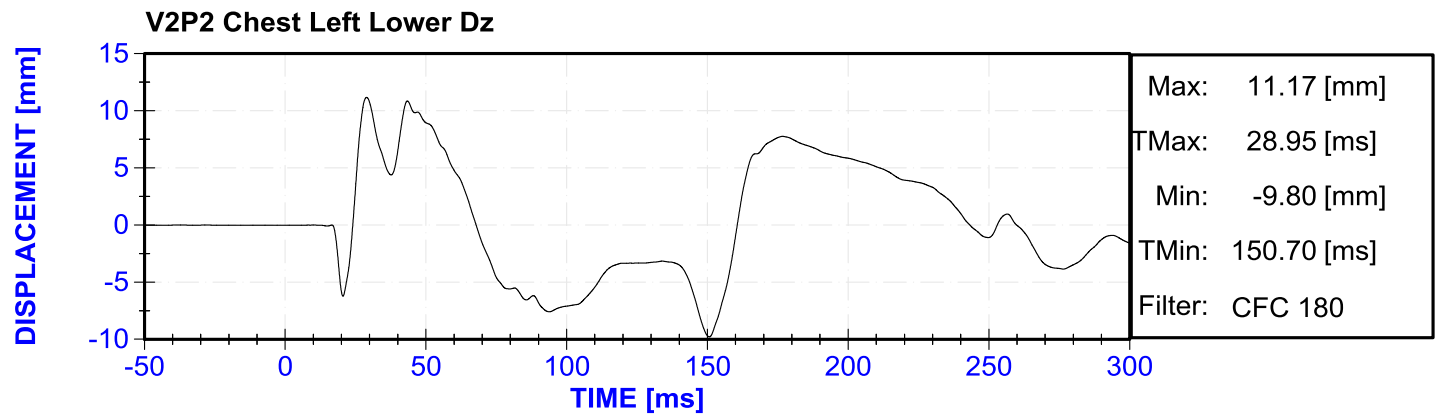
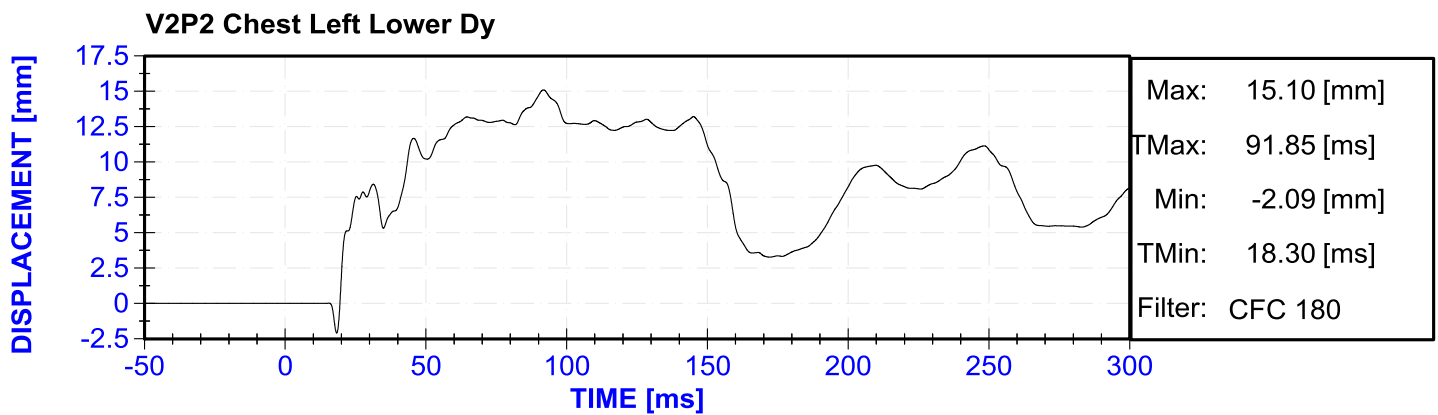
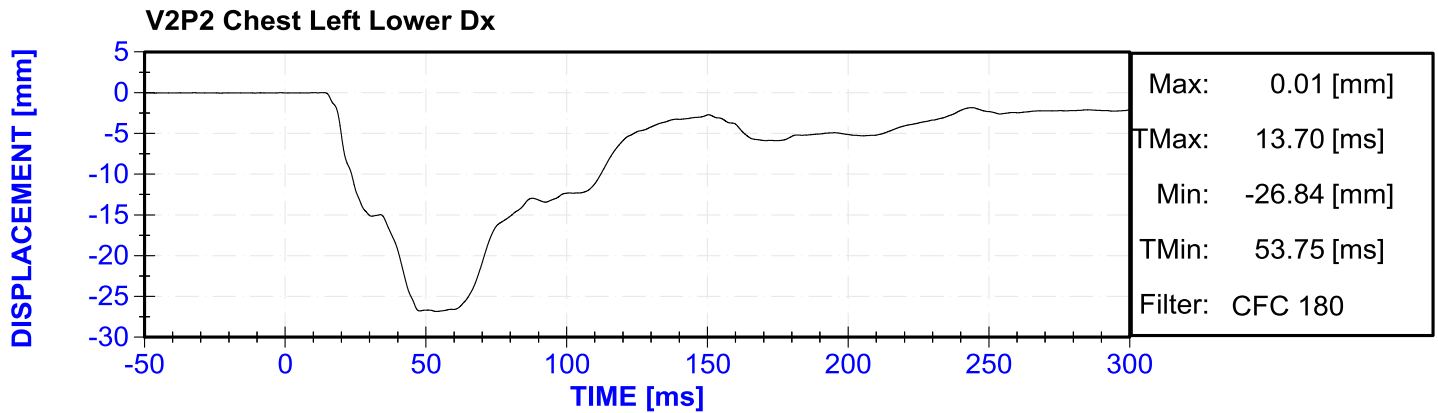


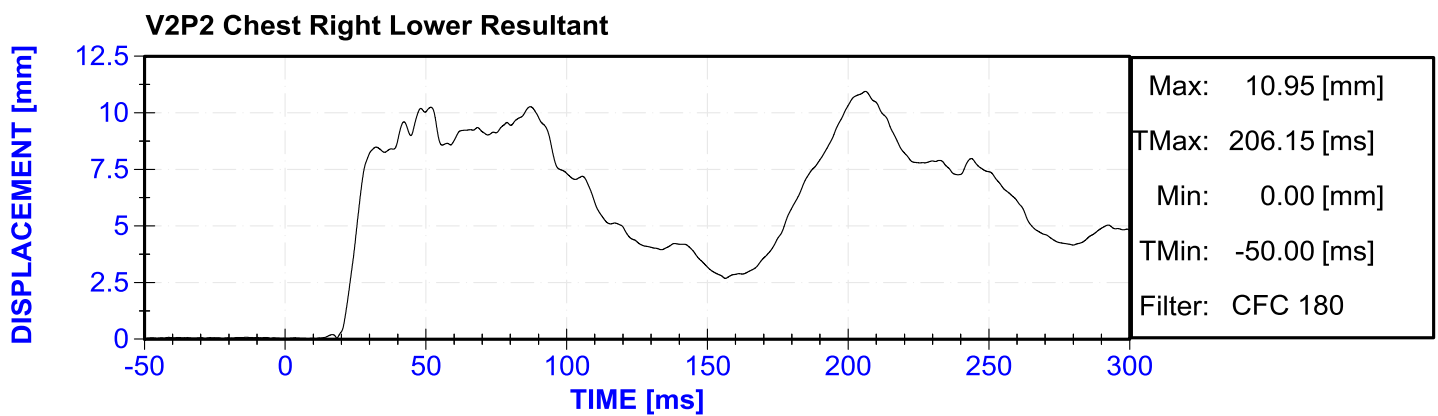
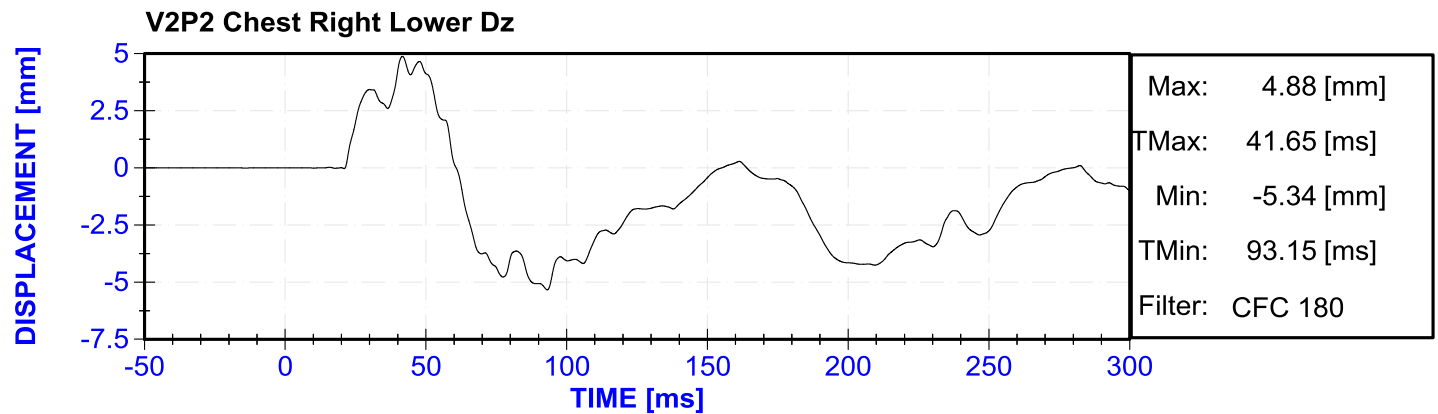
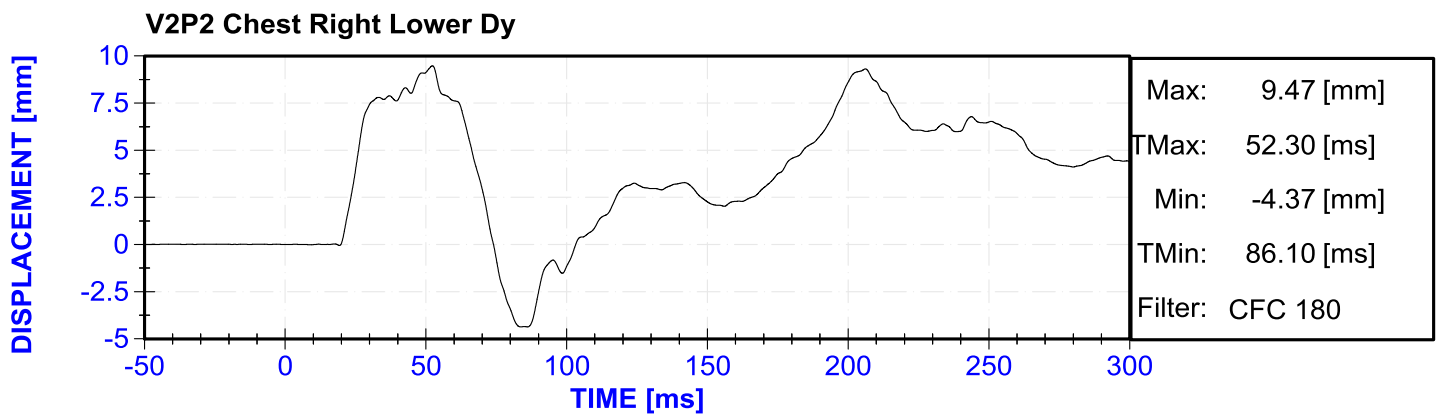
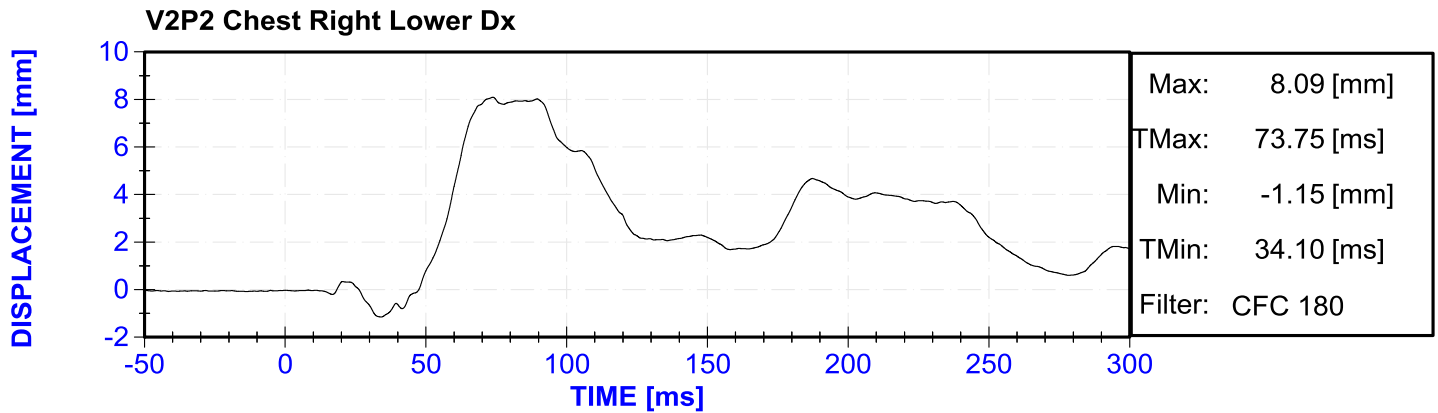


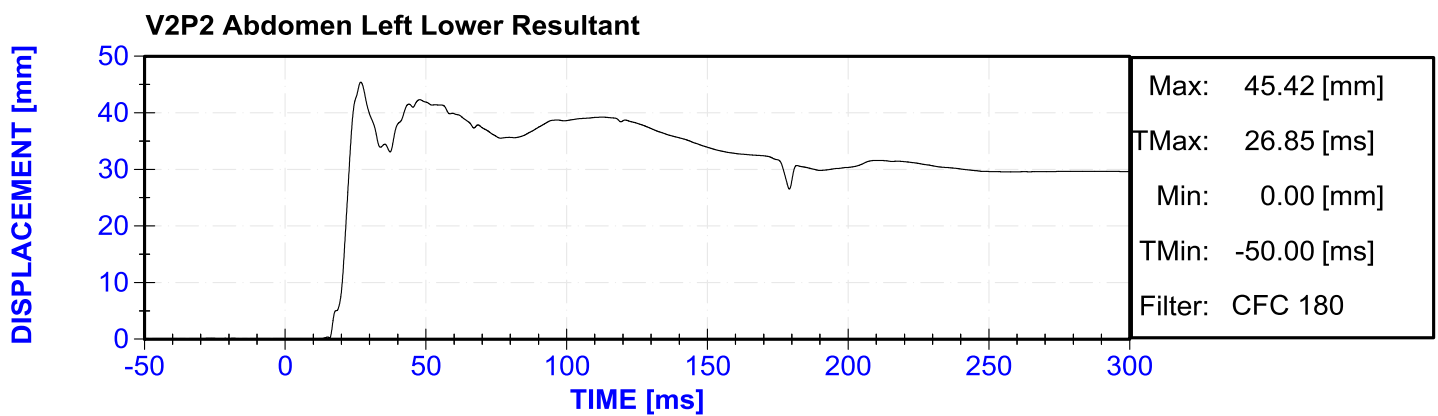
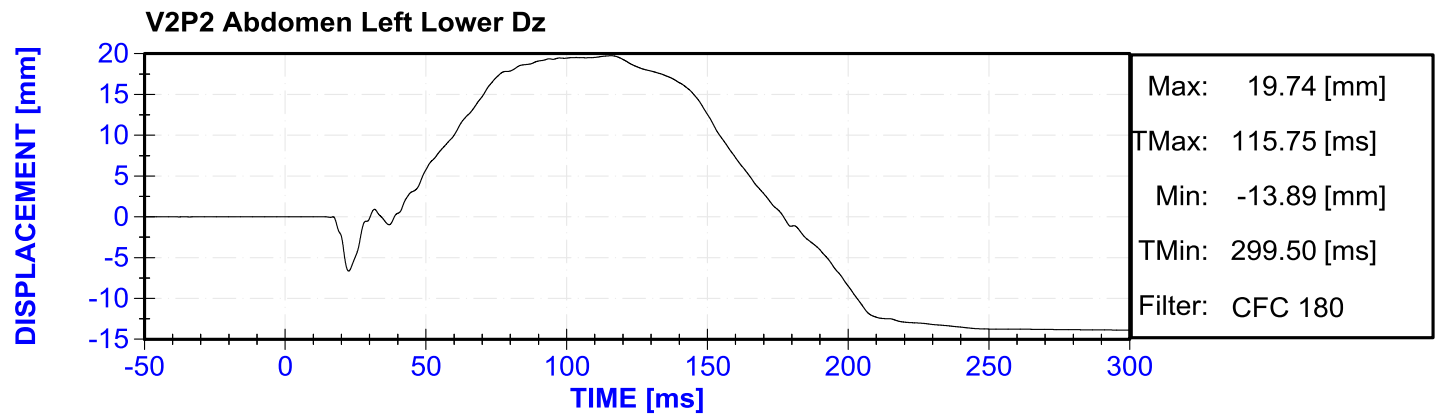
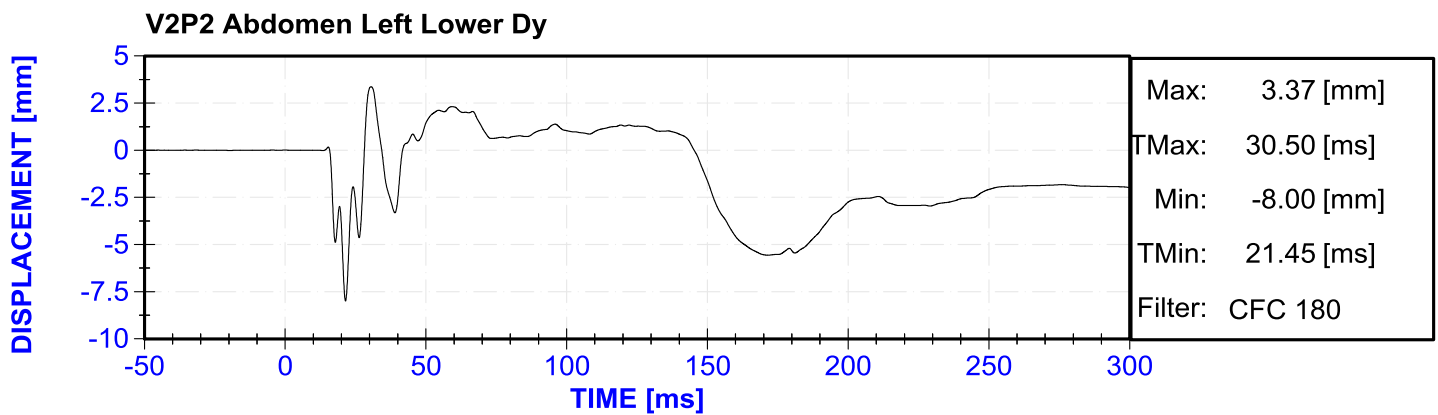
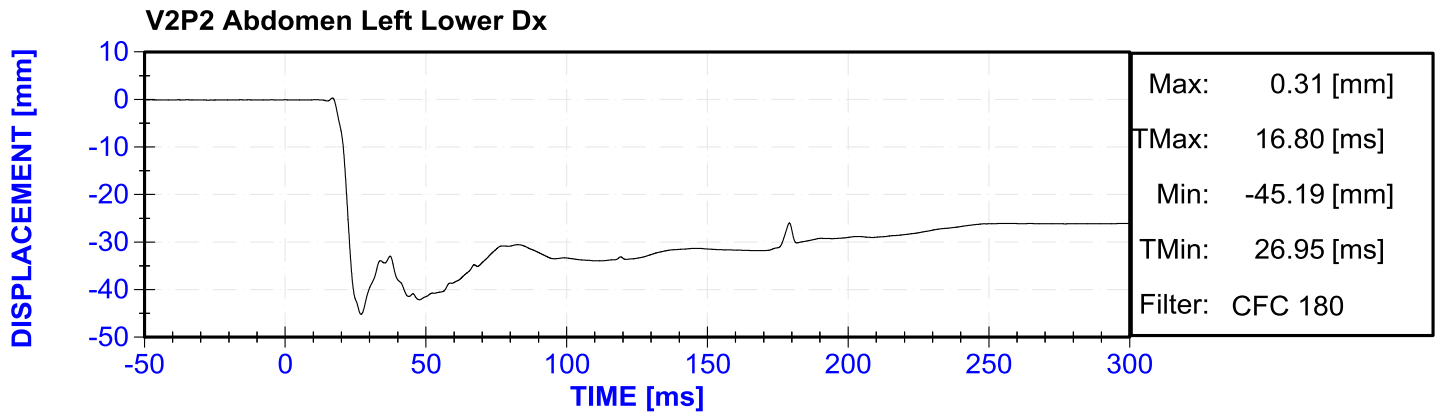


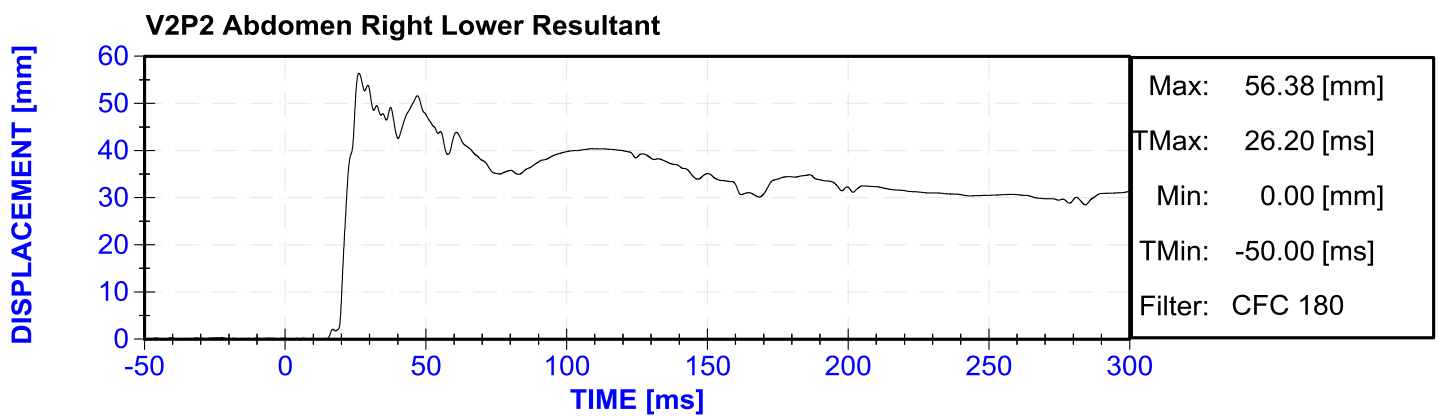
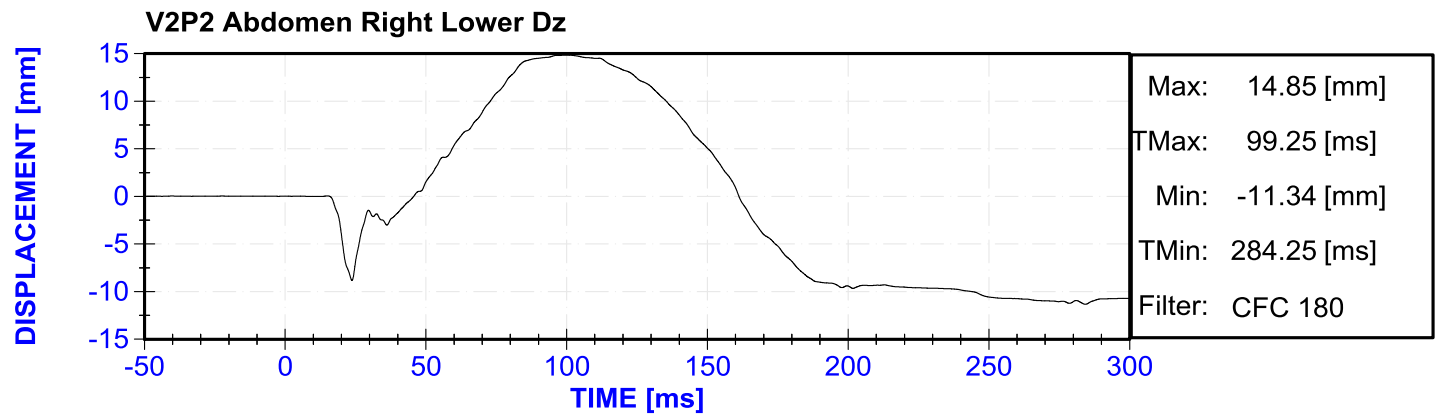
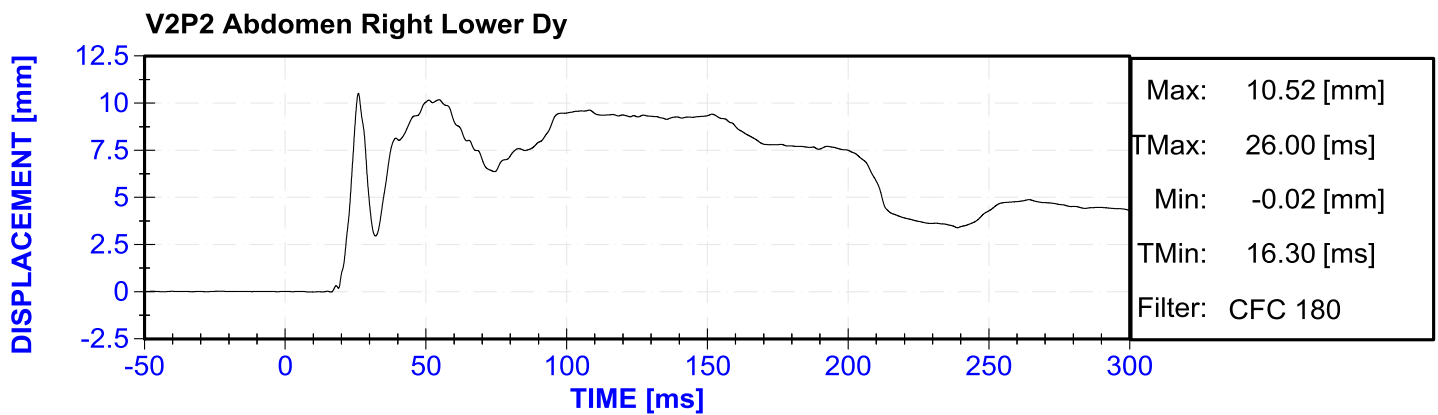
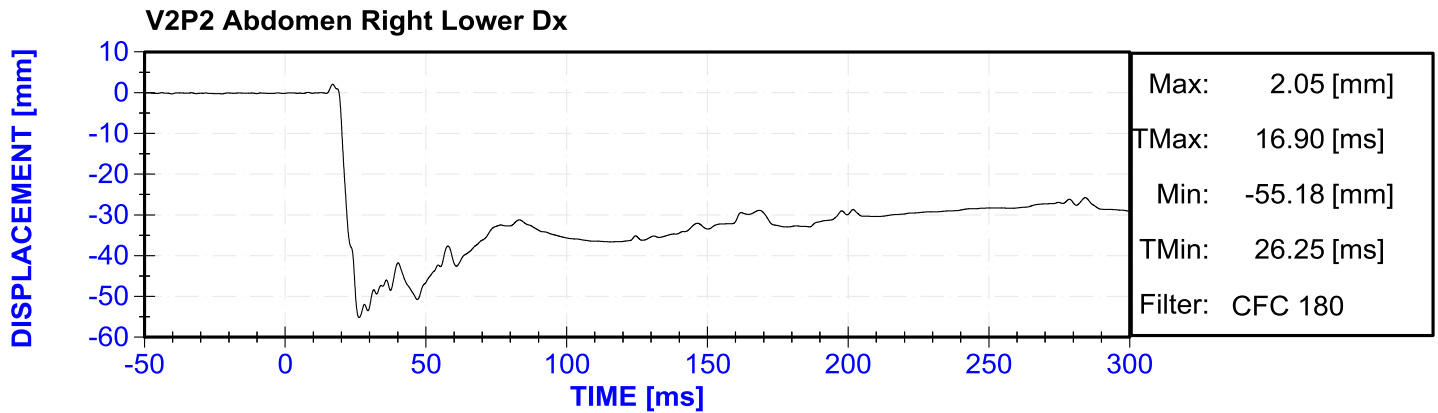












APPENDIX C

PART 572 E/O DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA SHEETS

Table C-1: Dummy Information

TYPE	SERIAL NUMBER
THOR-M 50 TH Male	DL9207
THOR-M 50 TH Male	DO9798

Table C-2: THOR IR-TRACC Initial Set-Up Information

THOR – M S/N: DL9207		
IR-TRACC Location	IR-TRACC Exponent	IR-TRACC Slope
Upper Left Thorax Dx	-0.48734243	-30.7183006
Upper Right Thorax Dx	-0.46745135	-31.2867692
Lower Left Thorax Dx	-0.45723606	-33.7038235
Lower Right Thorax Dx	-0.44121574	-35.8806593
Left Abdomen Dx	-0.49600021	-37.0005057
Right Abdomen Dx	-0.45463419	-39.0250054

THOR – M S/N: DO9798		
IR-TRACC Location	IR-TRACC Exponent	IR-TRACC Slope
Upper Left Thorax Dx	-0.46744159	-32.5093629
Upper Right Thorax Dx	-0.48506218	-30.4904461
Lower Left Thorax Dx	-0.46799780	-30.8741325
Lower Right Thorax Dx	-0.48997700	-28.2690009
Left Abdomen Dx	-0.47981270	-40.5878908
Right Abdomen Dx	-0.48895948	-35.5683710

Table C- 3: THOR Dummy Initial Set-Up Information

THOR – M S/N: DL9207					
Sensor	Manufacturer	Serial Number	Range	Sensitivity	Sensitivity Units
Head CG Ax	Endevco	AC-P52122	2004.7	0.0170270	mV/V/g
Head CG Ay	Entran	AC-P49215	2015.6	0.0169342	mV/V/g
Head CG Az	Entran	AC-P49229	2034.3	0.0179777	mV/V/g
Head Wx	DTS	ARS4734	19254.2	0.0949700	mV/deg/s
Head Wy	DTS	ARS6653	18158.0	0.0939900	mV/deg/s
Head Wz	DTS	ARS5928	18235.6	0.0935900	mV/deg/s
Skull Spring Front Fz	Humanetics	LC-DI7617FZ	4460.0	0.0005013	mV/V/N

THOR – M S/N: DL9207					
Sensor	Manufacturer	Serial Number	Range	Sensitivity	Sensitivity Units
Skull Spring Rear Fz	Humanetics	LC-80FZ	4475.0	0.0008801	mV/V/N
Condyle Pot Ry	Sfernice	DS-DK5911	121.0	3.0219001	mV/V/deg
Upper Neck Fx	Humanetics	LC-DN4324FX	8930.8	0.0002266	mV/V/N
Upper Neck Fy	Humanetics	LC-DN4324FY	8899.4	0.0002274	mV/V/N
Upper Neck Fz	Humanetics	LC-DN4324FZ	13359.8	0.0000871	mV/V/N
Upper Neck Mx	Humanetics	LC-DN4324MX	283.2	0.0057385	mV/V/Nm
Upper Neck My	Humanetics	LC-DN4324MY	282.8	0.0058599	mV/V/Nm
Upper Neck Mz	Humanetics	LC-DN4324MZ	283.6	0.0098647	mV/V/Nm
Lower Neck Fx	Humanetics	LC-DT0991FX	13346.7	0.0001728	mV/V/N
Lower Neck Fy	Humanetics	LC-DT0991FY	13385.4	0.0001723	mV/V/N
Lower Neck Fz	Humanetics	LC-DT0991FZ	13354.2	0.0000710	mV/V/N
Lower Neck Mx	Humanetics	LC-DT0991MX	452.5	0.0041601	mV/V/Nm
Lower Neck My	Humanetics	LC-DT0991MY	453.2	0.0041838	mV/V/Nm
Lower Neck Mz	Humanetics	LC-DT0991MZ	226.4	0.0068744	mV/V/Nm
T1 Ax	Endevco	AC-P51674	2150.4	0.0216452	mV/V/g
T1 Ay	Endevco	AC-P64002	2133.4	0.0199993	mV/V/g
T1 Az	Endevco	AC-P51982	2012.8	0.0195668	mV/V/g
Upper Left Thorax Dx	Humanetics	DS-AC2287	2.3	1000	mV/V
Upper Left Thorax Ry	Sfernice	DS-DI2383	91.2	3.0360001	mV/V/deg
Upper Left Thorax Rz	Sfernice	DS-DI2382	91.1	3.0383000	mV/V/deg
Upper Right Thorax Dx	Humanetics	DS-DJ2613	2.3	1000	mV/V
Upper Right Thorax Ry	Sfernice	DS-DI7753	91.8	3.0137999	mV/V/deg
Upper Right Thorax Rz	Sfernice	DS-DI7752	91.6	3.0229001	mV/V/deg
Lower Left Thorax Dx	Humanetics	DS-DS6353	2.3	1000	mV/V
Lower Left Thorax Ry	Sfernice	DS-DM4781	92.1	3.0044999	mV/V/deg
Lower Left Thorax Rz	Sfernice	DS-DS4092	90.7	3.0530000	mV/V/deg
Lower Right Thorax Dx	Humanetics	DS-DS6354	2.3	1000	mV/V
Lower Right Thorax Ry	Sfernice	DS-DM4776	91.1	3.0395000	mV/V/deg
Lower Right Thorax Rz	Sfernice	DS-DM4777	90.9	3.0455000	mV/V/deg
T4 Ax	Endevco	AC-P78880	2153.1	0.0198166	mV/V/g
T4 Ay	Endevco	AC-P79630	2041.8	0.0208965	mV/V/g
T4 Az	Endevco	AC-P82758	2117.6	0.0185983	mV/V/g
Thoracic Spine Fx	Humanetics	LC-DP2983FX	13359.8	0.0001474	mV/V/N
Thoracic Spine Fy	Humanetics	LC-DP2983FY	13377.9	0.0001472	mV/V/N
Thoracic Spine Fz	Humanetics	LC-DP2983FZ	13346.4	0.0000607	mV/V/N
Thoracic Spine Mx	Humanetics	LC-DP2983MX	678.0	0.0021452	mV/V/Nm
Thoracic Spine My	Humanetics	LC-DP2983MY	905.3	0.0019236	mV/V/Nm
Abdomen Left Dx	Humanetics	DS-176	2.3	1000	mV/V
Abdomen Left Ry	Sfernice	DS-DO7284	91.0	3.0398001	mV/V/deg
Abdomen Left Rz	Sfernice	DS-DO7283	91.2	3.0352001	mV/V/deg
Abdomen Right Dx	Humanetics	DS-DO7216	2.3	1000	mV/V
Abdomen Right Ry	Sfernice	DS-DO7270	91.5	3.0261001	mV/V/deg
Abdomen Right Rz	Sfernice	DS-DK5910	91.4	3.0280000	mV/V/deg

THOR – M S/N: DL9207					
Sensor	Manufacturer	Serial Number	Range	Sensitivity	Sensitivity Units
Acetabulum Right Fx	Humanetics	LC-DP3835FX	22349.2	0.0001187	mV/V/N
Acetabulum Right Fy	Humanetics	LC-DP3835FY	13346.7	0.0000592	mV/V/N
Acetabulum Right Fz	Humanetics	LC-DP3835FZ	13385.0	0.0001614	mV/V/N
Acetabulum Left Fx	Humanetics	LC-DP4639FX	22259.6	0.0001217	mV/V/N
Acetabulum Left Fy	Humanetics	LC-DP4639FY	13363.6	0.0000594	mV/V/N
Acetabulum Left Fz	Humanetics	LC-DP4639FZ	13388.1	0.0001670	mV/V/N
Pelvis Ax	Endevco	AC-P83434	2089.0	0.0175063	mV/V/g
Pelvis Ay	Endevco	AC-P82752	2151.7	0.0183038	mV/V/g
Pelvis Az	Endevco	AC-P80296	2031.5	0.0193871	mV/V/g
ASIS Right Fx	Humanetics	LC-DP5091FX	13019.7	0.0000715	mV/V/N
ASIS Right My	Humanetics	LC-DP5091MY	325.2	0.0035859	mV/V/Nm
ASIS Left Fx	Humanetics	LC-DP5092FX	13017.8	0.0000727	mV/V/N
ASIS Left My	Humanetics	LC-DP5092MY	325.6	0.0036311	mV/V/Nm
Femur Left Fx	Humanetics	LC-DT1833FX	15020.0	0.0001463	mV/V/N
Femur Left Fy	Humanetics	LC-DT1833FY	15017.4	0.0001457	mV/V/N
Femur Left Fz	Humanetics	LC-DT1833FZ	15016.6	0.0000738	mV/V/N
Femur Left Mx	Humanetics	LC-DT1833MX	351.6	0.0066499	mV/V/Nm
Femur Left My	Humanetics	LC-DT1833MY	350.2	0.0066146	mV/V/Nm
Femur Right Fx	Humanetics	LC-DP3958FX	15054.5	0.0001423	mV/V/N
Femur Right Fy	Humanetics	LC-DP3958FY	15022.9	0.0001426	mV/V/N
Femur Right Fz	Humanetics	LC-DP3958FZ	15022.9	0.0000713	mV/V/N
Femur Right Mx	Humanetics	LC-DP3958MX	350.5	0.0064069	mV/V/Nm
Femur Right My	Humanetics	LC-DP3958MY	350.8	0.0064295	mV/V/Nm
Upper Tibia Fz	Denton	LC-110FZ	11113.1	0.0000927	mV/V/N
Upper Tibia Mx	Denton	LC-110MX	397.5	0.0074892	mV/V/Nm
Upper Tibia My	Denton	LC-110MY	396.3	0.0074253	mV/V/Nm
Lower Tibia Left Fx	Denton	LC-76FX	11162.2	0.0001771	mV/V/N
Lower Tibia Left Fy	Denton	LC-76FY	11135.9	0.0001735	mV/V/N
Lower Tibia Left Fz	Denton	LC-76FZ	11128.1	0.0001027	mV/V/N
Lower Tibia Left Mx	Denton	LC-76MX	397.3	0.0075362	mV/V/Nm
Lower Tibia Left My	Denton	LC-76MY	397.0	0.0076772	mV/V/Nm
Ankle Rx	Sfernice	DS-43	122.9	3.0602000	mV/V/deg
Ankle Ry	Sfernice	DS-42	122.8	3.0598999	mV/V/deg
Ankle Rz	Sfernice	DS-41	121.4	3.0553001	mV/V/deg
Knee Dx	Space Age	DS-C2102639B	20.3	24.0180995	mV/V/mm
Leg Ax	Endevco	AC-P59011	2053.7	0.0178074	mV/V/g
Leg Ay	Entran	AC-04J06-R14	2105.4	0.0173701	mV/V/g
Foot Ax	Entran	AC-05H06-L14	2171.8	0.0214318	mV/V/g
Foot Az	Entran	AC-02I02I16-A04	2074.5	0.0224372	mV/V/g
Upper Tibia Fz	Denton	LC-133FZ	11115.0	0.0000978	mV/V/N
Upper Tibia Mx	Denton	LC-133MX	396.1	0.0075600	mV/V/Nm

THOR – M S/N: DL9207					
Sensor	Manufacturer	Serial Number	Range	Sensitivity	Sensitivity Units
Upper Tibia My	Denton	LC-133MY	395.6	0.0074386	mV/V/Nm
Lower Tibia Fx	Denton	LC-79FX	11133.3	0.0001762	mV/V/N
Lower Tibia Fy	Denton	LC-79FY	11130.7	0.0001710	mV/V/N
Lower Tibia Fz	Denton	LC-79FZ	11127.1	0.0001018	mV/V/N
Lower Tibia Mx	Denton	LC-79MX	396.0	0.0074299	mV/V/Nm
Lower Tibia My	Denton	LC-79MY	395.9	0.0074761	mV/V/Nm
Ankle Rx	Sfernice	DS-35	120.1	3.0512000	mV/V/deg
Ankle Ry	Sfernice	DS-34	123.6	3.0540000	mV/V/deg
Ankle Rz	Sfernice	DS-36	124.0	3.0577001	mV/V/deg
Knee Dx	Space Age	DS-042745	20.2	24.1446998	mV/V/mm
Foot Ax	Endevco	AC-P52029	2066.6	0.0176961	mV/V/g
Foot Az	Endevco	AC-P51265	2015.7	0.0261868	mV/V/g

THOR – M S/N: DO9798					
Sensor	Manufacturer	Serial Number	Range	Sensitivity	Sensitivity Units
Head CG Ax	Endevco	AC-P58889	2019.5	0.0230477	mV/V/g
Head CG Ay	Endevco	AC-B02A25-N04	2041.9	0.0208956	mV/V/g
Head CG Az	Endevco	AC-02I02I05-F22	2004.3	0.0212877	mV/V/g
Head Wx	DTS	ARS4650	19113.3	0.0956700	mV/deg/sec
Head Wy	DTS	ARS5949	18950.9	0.0964900	mV/deg/sec
Head Wz	DTS	ARS6010	18288.3	0.0933200	mV/deg/sec
Skull Spring Front Fz	Humanetics	LC-77	4473.6	0.0008541	mV/V/N
Skull Spring Rear Fz	Humanetics	LC-76	4469.3	0.0009092	mV/V/N
Condyle Pot Ry	Humanetics	DS-DK5913	120	3.0467000	mV/V/deg
Upper Neck Fx	Humanetics	LC-76 FX	8919.4	0.0002324	mV/V/N
Upper Neck Fy	Humanetics	LC-76 FY	8904.1	0.0002347	mV/V/N
Upper Neck Fz	Humanetics	LC-76 FZ	13361.7	0.0000887	mV/V/N
Upper Neck Mx	Humanetics	LC-76 MX	283	0.0059123	mV/V/Nm
Upper Neck My	Humanetics	LC-76 MY	283.1	0.0059294	mV/V/Nm
Upper Neck Mz	Humanetics	LC-76 MZ	282.9	0.0102831	mV/V/Nm
Lower Neck Fx	Humanetics	LC-DP4780 FX	13405.4	0.0001744	mV/V/N
Lower Neck Fy	Humanetics	LC-DP4780 FY	13367.1	0.0001749	mV/V/N
Lower Neck Fz	Humanetics	LC-DP4780 FZ	13348.3	0.0000709	mV/V/N
Lower Neck Mx	Humanetics	LC-DP4780 MX	453	0.0041246	mV/V/Nm
Lower Neck My	Humanetics	LC-DP4780 MY	453.3	0.0041369	mV/V/Nm
Lower Neck Mz	Humanetics	LC-DP4780 MZ	226	0.0068650	mV/V/Nm
T1 Ax	Endevco	AC-06A04-R06	2039.1	0.0228262	mV/V/g
T1 Ay	Endevco	AC-00L13-F22	2039.8	0.0179288	mV/V/g
T1 Az	Endevco	AC-P83346	2022.5	0.0194737	mV/V/g

THOR – M S/N: DO9798					
Sensor	Manufacturer	Serial Number	Range	Sensitivity	Sensitivity Units
Upper Left Thorax Dx	Humanetics	DS-DQ2255	2.3	1000	
Upper Left Thorax Ry	Humanetics	DS-DM4779	93.8	3.0328000	mV/V/deg
Upper Left Thorax Rz	Humanetics	DS-DM4778	93.6	3.0374001	mV/V/deg
Upper Right Thorax Dx	Humanetics	DS-DQ2254	2.3	1000	
Upper Right Thorax Ry	Humanetics	DS-DM4774	93.8	3.0316000	mV/V/deg
Upper Right Thorax Rz	Humanetics	DS-DM4775	93.2	3.0519001	mV/V/deg
Lower Left Thorax Dx	Humanetics	DS-DK3866	2.3	1000	
Lower Left Thorax Ry	Humanetics	DS-DJ5455	93.2	3.0516000	mV/V/deg
Lower Left Thorax Rz	Humanetics	DS-DJ5454	93.5	3.0429999	mV/V/deg
Lower Right Thorax Dx	Humanetics	DS-DK3865	2.3	1000	
Lower Right Thorax Ry	Humanetics	DS-DJ5453	93.3	3.0491001	mV/V/deg
Lower Right Thorax Rz	Humanetics	DS-DJ5452	92.3	3.0803001	mV/V/deg
T4 Ax	Endevco	AC-P51697	2005.2	0.0222034	mV/V/g
T4 Ay	Endevco	AC-P75155	2026.8	0.0180437	mV/V/g
T4 Az	Endevco	AC-P52001	2069.8	0.0197898	mV/V/g
Thoracic Spine Fx	Humanetics	LC-DS9962 FX	13347.5	0.0001453	mV/V/N
Thoracic Spine Fy	Humanetics	LC-DS9962 FY	13352.3	0.0001458	mV/V/N
Thoracic Spine Fz	Humanetics	LC-DS9962 FZ	17810.2	0.0000611	mV/V/N
Thoracic Spine Mx	Humanetics	LC-DS9962 MX	678	0.0021452	mV/V/Nm
Thoracic Spine My	Humanetics	LC-DS9962 MY	905	0.0019049	mV/V/Nm
Abdomen Left Dx	Humanetics	DS-DP1395	2.2	1000	
Abdomen Left Ry	Humanetics	DS-DJ5443	91	3.0406001	mV/V/deg
Abdomen Left Rz	Humanetics	DS-DJ5444	90.8	3.0465000	mV/V/deg
Abdomen Right Dx	Humanetics	DS-DP1396	2.2	1000	
Abdomen Right Ry	Humanetics	DS-DJ5445	91	3.0404001	mV/V/deg
Abdomen Right Rz	Humanetics	DS-DJ5446	90.9	3.0445000	mV/V/deg
Acetabulum Right Fx	Humanetics	LC-DL9552 FX	22251.8	0.0001183	mV/V/N
Acetabulum Right Fy	Humanetics	LC-DL9552 FY	13345.2	0.0000599	mV/V/N
Acetabulum Right Fz	Humanetics	LC-DL9552 FZ	13365.1	0.0001613	mV/V/N
Acetabulum Left Fx	Humanetics	LC-DM1945 FX	22257.2	0.0001195	mV/V/N
Acetabulum Left Fy	Humanetics	LC-DM1945 FY	13349.3	0.0000604	mV/V/N
Acetabulum Left Fz	Humanetics	LC-DM1945 FZ	13354	0.0001642	mV/V/N
Pelvis Ax	Endevco	AC-P81384	2001.6	0.0176410	mV/V/g
Pelvis Ay	Endevco	AC-J28989	2028.2	0.0280491	mV/V/g
Pelvis Az	Endevco	AC-J27496	2004.6	0.0283796	mV/V/g
ASIS Right Fx	Humanetics	LC-76ASIS FX	13006.8	0.0001297	mV/V/N
ASIS Right My	Humanetics	LC-76ASIS MY	325.1	1000	mV/V/Nm
ASIS Left Fx	Humanetics	LC-DJ5525 FX	13004	3.0328000	mV/V/N
ASIS Left My	Humanetics	LC-DJ5525 MY	325	3.0374001	mV/V/Nm
Femur Left Fx	Denton	LC-DK3608 FX	15023.6	1000	mV/V/N
Femur Left Fy	Denton	LC-DK3608 FY	15002.3	3.0316000	mV/V/N
Femur Left Fz	Denton	LC-DK3608 FZ	15027.7	3.0519001	mV/V/N

THOR – M S/N: DO9798					
Sensor	Manufacturer	Serial Number	Range	Sensitivity	Sensitivity Units
Femur Left Mx	Denton	LC-DK3608 MX	351.3	1000	mV/V/Nm
Femur Left My	Denton	LC-DK3608 MY	350.7	0.0064593	mV/V/Nm
Femur Right Fx	Denton	LC-DK0842 FX	15033.7	0.0001437	mV/V/N
Femur Right Fy	Denton	LC-DK0842 FY	15044.1	0.0001436	mV/V/N
Femur Right Fz	Denton	LC-DK0842 FZ	15025.7	0.0000725	mV/V/N
Femur Right Mx	Denton	LC-DK0842 MX	351.5	0.0065327	mV/V/Nm
Femur Right My	Denton	LC-DK0842 MY	350.6	0.0065782	mV/V/Nm
Upper Tibia Fz	Denton	LC-DS8145 FZ	11111.5	0.0000954	mv/v/N
Upper Tibia Mx	Denton	LC-DS8145 MX	395.5	0.0073983	mv/v/Nm
Upper Tibia My	Denton	LC-DS8145 MY	395.6	0.0074386	mv/v/Nm
Lower Tibia Left Fx	Denton	LC-DQ9685 FX	11154.1	0.0001752	mv/v/N
Lower Tibia Left Fy	Denton	LC-DQ9685 FY	11156.8	0.0001706	mv/v/N
Lower Tibia Left Fz	Denton	LC-DQ9685 FZ	11134.9	0.0000966	mv/v/N
Lower Tibia Left Mx	Denton	LC-DQ9685 MX	396.3	0.0075990	mv/v/Nm
Lower Tibia Left My	Denton	LC-DQ9685 MY	395.7	0.0075659	mv/v/Nm
Ankle Rx	Contelec	DS-004	129.1	3.0439000	mv/v/deg
Ankle Ry	Contelec	DS-005	128.6	3.0577001	mv/v/deg
Ankle Rz	Contelec	DS-006	127.3	3.0340001	mv/v/deg
Knee Dx	Space Age	DS-13073814	20.4	22.8479002	mv/v/mm
Leg Ax	Endevco	AC-P83316	2017.7	0.0195198	mv/v/g
Leg Ay	Endevco	AC-P51641	2034.7	0.0193562	mv/v/g
Foot Ax	Endevco	AC-P52004	2027.7	0.0210424	mv/v/g
Foot Az	Endevco	AC-P58747	2120	0.0185775	mv/v/g
Upper Tibia Fz	Denton	LC-DS8144 FZ	11111.2	0.0000962	mv/v/N
Upper Tibia Mx	Denton	LC-DS8144 MX	397.6	0.0074864	mv/v/Nm
Upper Tibia My	Denton	LC-DS8144 MY	397.3	0.0074497	mv/v/Nm
Lower Tibia Fx	Denton	LC-DQ9684 FX	11155.9	0.0001772	mv/v/N
Lower Tibia Fy	Denton	LC-DQ9684 FY	11161.6	0.0001731	mv/v/N
Lower Tibia Fz	Denton	LC-DQ9684 FZ	11125.6	0.0000975	mv/v/N
Lower Tibia Mx	Denton	LC-DQ9684 MX	395.4	0.0076618	mv/v/Nm
Lower Tibia My	Denton	LC-DQ9684 MY	397.5	0.0076210	mv/v/Nm
Ankle Rx	Contelec	DS-001	129	3.0495999	mv/v/deg
Ankle Ry	Contelec	DS-002	129.2	3.0374001	mv/v/deg
Ankle Rz	Contelec	DS-003	121.9	3.0543001	mv/v/deg
Knee Dx	Space Age	DS-13073811	20.2	23.0272003	mv/v/mm
Foot Ax	Endevco	AC-P82401	2083.7	0.0175513	mv/v/g
Foot Az	Endevco	AC-P51715	2030	0.0180151	mv/v/g

DL9207 IRTACC Summary Sheets

THOR 3D IR-TRACC Calibration Summary

Date	9/7/2016
Technician	J. Orahood

3D IR-TRACC Location in THOR	
Left or Right Side	Left
Upper or Lower (n/a for Abdomen)	Upper
Thorax or Abdomen	Thorax

Calibration Factors					
IR-TRACC Model Number	IF364	Y Pot Model Number	9945	Z Pot Model Number	9945
IR-TRACC Serial Number	AC2287	Y Pot Serial Number	D12383	Z Pot Serial Number	D12382
IR-TRACC Excitation	5	Y Pot Excitation (V)	5	Z Pot Excitation (V)	5
IR-TRACC Sensitivity (mm/V)	29.85	Y Pot Sensitivity (mV/V/°)	3.0398	Z Pot Sensitivity (mV/V/°)	3.0352
IR-TRACC Exponent	-0.4948				

THOR 3D IR-TRACC Setup Fixture Calibration												
Fixture Position	IR-TRACC				Y-Axis Potentiometer				Z-Axis Potentiometer			
	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail
1	0.0990		0		0.0000		0		-0.0390		0	
2	0.1600	-19.82	-20	Pass	-0.0820	-5.40	-5	Pass	-0.1130	-4.88	-5	Pass
3	0.0680	19.15	20	Pass	0.0770	5.07	5	Pass	0.0410	5.27	5	Pass

Processing Software Setup Values				
Transducer	Exponent	Sensitivity (mm/V)	Intercept	
IR-TRACC	-0.4948	29.85	48.16	
Y-Axis Potentiometer			0.00	
Z-Axis Potentiometer			2.57	

IR-TRACC Processing

$$\text{IR-TRACC Length (pivot-to-pivot)} = ((V_{\text{IR-TRACC}})^{\text{Exponent}} * \text{Sensitivity}) + \text{Intercept}$$

Potentiometer Processing

$$Y \text{ Angle}_{(\text{THOR})} = Y \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

$$Z \text{ Angle}_{(\text{THOR})} = Z \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

Data Acquisition System Setup

IR-TRACC and potentiometer channels used in the THOR 3D IR-TRACC assembly should be setup in the DAS so that the transducer bias is not removed prior to testing since initial positions of these transducers are required to calculate X, Y and Z-axis displacements in post-test processing software

THOR 3D IR-TRACC Calibration Summary

Date	9/8/2016
Technician	Josh Orahood

3D IR-TRACC Location in THOR	
Left or Right Side	Right
Upper or Lower (n/a for Abdomen)	Upper
Thorax or Abdomen	Thorax

Calibration Factors					
IR-TRACC Model Number	IF364	Y Pot Model Number	9945	Z Pot Model Number	9945
IR-TRACC Serial Number	DJ2613	Y Pot Serial Number	DI7753	Z Pot Serial Number	DI7752
IR-TRACC Excitation	5	Y Pot Excitation (V)	5	Z Pot Excitation (V)	5
IR-TRACC Sensitivity (mm/V)	31.5033	Y Pot Sensitivity (mV/V/°)	3.0138	Z Pot Sensitivity (mV/V/°)	3.0229
IR-TRACC Exponent	-0.4657				

THOR 3D IR-TRACC Setup Fixture Calibration												
Fixture Position	IR-TRACC				Y-Axis Potentiometer				Z-Axis Potentiometer			
	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail
1	0.0880		0		-0.0250		0		0.0730		0	
2	0.1440	-20.02	-20	Pass	0.0540	5.24	5	Pass	0.1460	4.83	5	Pass
3	0.0600	19.08	20	Pass	-0.1070	-5.44	-5	Pass	-0.0070	-5.29	-5	Pass

Processing Software Setup Values			
Transducer	Exponent	Sensitivity (mm/V)	Intercept
IR-TRACC	-0.4657	31.5033	44.20
Y-Axis Potentiometer			1.66
Z-Axis Potentiometer			-4.83

IR-TRACC Processing

$$\text{IR-TRACC Length (pivot-to-pivot)} = ((V_{\text{IR-TRACC}})^{\text{Exponent}} * \text{Sensitivity}) + \text{Intercept}$$

Potentiometer Processing

$$Y \text{ Angle}_{(\text{THOR})} = Y \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

$$Z \text{ Angle}_{(\text{THOR})} = Z \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

Data Acquisition System Setup

IR-TRACC and potentiometer channels used in the THOR 3D IR-TRACC assembly should be setup in the DAS so that the transducer bias is not removed prior to testing since initial positions of these transducers are required to calculate X, Y and Z-axis displacements in post-test processing software

THOR 3D IR-TRACC Calibration Summary

Date	9/8/2016
Technician	J. Orahood

3D IR-TRACC Location in THOR	
Left or Right Side	Left
Upper or Lower (n/a for Abdomen)	Lower
Thorax or Abdomen	Thorax

Calibration Factors					
IR-TRACC Model Number	IF364	Y Pot Model Number	9945	Z Pot Model Number	9945
IR-TRACC Serial Number	DS6353	Y Pot Serial Number	DM4781	Z Pot Serial Number	DS4092
IR-TRACC Excitation	5	Y Pot Excitation (V)	5	Z Pot Excitation (V)	5
IR-TRACC Sensitivity (mm/V)	33.7881	Y Pot Sensitivity (mV/V/°)	3.0045	Z Pot Sensitivity (mV/V/°)	3.053
IR-TRACC Exponent	-0.4566				

THOR 3D IR-TRACC Setup Fixture Calibration												
Fixture Position	IR-TRACC				Y-Axis Potentiometer				Z-Axis Potentiometer			
	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail
1	0.0890		0		-0.0670		0		-0.0300		0	
2	0.1430	-19.85	-20	Pass	0.0100	5.13	5	Pass	0.0520	5.37	5	Pass
3	0.0610	19.20	20	Pass	-0.1450	-5.19	-5	Pass	-0.1060	-4.98	-5	Pass

Processing Software Setup Values			
Transducer	Exponent	Sensitivity (mm/V)	Intercept
IR-TRACC	-0.4566	33.7881	39.93
Y-Axis Potentiometer			4.46
Z-Axis Potentiometer			1.97

IR-TRACC Processing

$$\text{IR-TRACC Length (pivot-to-pivot)} = ((V_{\text{IR-TRACC}})^{\text{Exponent}} * \text{Sensitivity}) + \text{Intercept}$$

Potentiometer Processing

$$Y \text{ Angle}_{(\text{THOR})} = Y \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

$$Z \text{ Angle}_{(\text{THOR})} = Z \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

Data Acquisition System Setup

IR-TRACC and potentiometer channels used in the THOR 3D IR-TRACC assembly should be setup in the DAS so that the transducer bias is not removed prior to testing since initial positions of these transducers are required to calculate X, Y and Z-axis displacements in post-test processing software

THOR 3D IR-TRACC Calibration Summary

Date	9/7/2016
Technician	Josh Orahood

3D IR-TRACC Location in THOR	
Left or Right Side	Right
Upper or Lower (n/a for Abdomen)	Lower
Thorax or Abdomen	Thorax

Calibration Factors					
IR-TRACC Model Number	IF364	Y Pot Model Number	9945	Z Pot Model Number	9945
IR-TRACC Serial Number	DS6354	Y Pot Serial Number	DM4776	Z Pot Serial Number	DM4777
IR-TRACC Excitation	5	Y Pot Excitation (V)	5	Z Pot Excitation (V)	5
IR-TRACC Sensitivity (mm/V)	34.2663	Y Pot Sensitivity (mV/V/°)	3.0395	Z Pot Sensitivity (mV/V/°)	3.0455
IR-TRACC Exponent	-0.4531				

THOR 3D IR-TRACC Setup Fixture Calibration												
Fixture Position	IR-TRACC				Y-Axis Potentiometer				Z-Axis Potentiometer			
	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail
1	0.0940		0		0.0160		0		0.0040		0	
2	0.1530	-19.81	-20	Pass	-0.0610	-5.07	-5	Pass	-0.0720	-4.99	-5	Pass
3	0.0630	19.89	20	Pass	0.0970	5.33	5	Pass	0.0860	5.38	5	Pass

Processing Software Setup Values			
Transducer	Exponent	Sensitivity (mm/V)	Intercept
IR-TRACC	-0.4531	34.2663	41.87
Y-Axis Potentiometer			-1.05
Z-Axis Potentiometer			-0.26

IR-TRACC Processing

$$\text{IR-TRACC Length (pivot-to-pivot)} = ((V_{\text{IR-TRACC}})^{\text{Exponent}} * \text{Sensitivity}) + \text{Intercept}$$

Potentiometer Processing

$$Y \text{ Angle}_{(\text{THOR})} = Y \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

$$Z \text{ Angle}_{(\text{THOR})} = Z \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

Data Acquisition System Setup

IR-TRACC and potentiometer channels used in the THOR 3D IR-TRACC assembly should be setup in the DAS so that the transducer bias is not removed prior to testing since initial positions of these transducers are required to calculate X, Y and Z-axis displacements in post-test processing software

THOR 3D IR-TRACC Calibration Summary

Date	9/6/2016
Technician	P. Biondillo

3D IR-TRACC Location in THOR	
Left or Right Side	Left
Upper or Lower (n/a for Abdomen)	n/a
Thorax or Abdomen	Abdomen

Calibration Factors					
IR-TRACC Model Number	9910	Y Pot Model Number	9945	Z Pot Model Number	9945
IR-TRACC Serial Number	176	Y Pot Serial Number	DO7284	Z Pot Serial Number	DO7283
IR-TRACC Excitation	5	Y Pot Excitation (V)	5	Z Pot Excitation (V)	5
IR-TRACC Sensitivity (mm/V)	36.4738	Y Pot Sensitivity (mV/V/°)	3.0398	Z Pot Sensitivity (mV/V/°)	3.0352
IR-TRACC Exponent	-0.5				

THOR 3D IR-TRACC Setup Fixture Calibration												
Fixture Position	IR-TRACC				Y-Axis Potentiometer				Z-Axis Potentiometer			
	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail
1	0.1200		0		0.0920		0		0.0080		0	
2	0.1840	-20.26	-21.6	Pass	0.1620	4.61	4.3	Pass	-0.0540	-4.09	-4.3	Pass
3	0.0850	19.81	21.6	Pass	0.0260	-4.34	-4.3	Pass	0.0770	4.55	4.3	Pass

Processing Software Setup Values			
Transducer	Exponent	Sensitivity (mm/V)	Intercept
IR-TRACC	-0.5	36.4738	48.91
Y-Axis Potentiometer			-6.05
Z-Axis Potentiometer			-0.53

IR-TRACC Processing

$$\text{IR-TRACC Length (pivot-to-pivot)} = ((V_{\text{IR-TRACC}})^{\text{Exponent}} * \text{Sensitivity}) + \text{Intercept}$$

Potentiometer Processing

$$Y \text{ Angle}_{(\text{THOR})} = Y \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

$$Z \text{ Angle}_{(\text{THOR})} = Z \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

Data Acquisition System Setup

IR-TRACC and potentiometer channels used in the THOR 3D IR-TRACC assembly should be setup in the DAS so that the transducer bias is not removed prior to testing since initial positions of these transducers are required to calculate X, Y and Z-axis displacements in post-test processing software

THOR 3D IR-TRACC Calibration Summary

Date	9/6/2016
Technician	P. Biondillo

3D IR-TRACC Location in THOR	
Left or Right Side	Right
Upper or Lower (n/a for Abdomen)	n/a
Thorax or Abdomen	Abdomen

Calibration Factors					
IR-TRACC Model Number	4750	Y Pot Model Number	9945	Z Pot Model Number	9945
IR-TRACC Serial Number	DO7216	Y Pot Serial Number	DO7270	Z Pot Serial Number	DK5910
IR-TRACC Excitation	5	Y Pot Excitation (V)	5	Z Pot Excitation (V)	5
IR-TRACC Sensitivity (mm/V)	39.5833	Y Pot Sensitivity (mV/V/°)	3.0261	Z Pot Sensitivity (mV/V/°)	3.028
IR-TRACC Exponent	-0.4511				

THOR 3D IR-TRACC Setup Fixture Calibration												
Fixture Position	IR-TRACC				Y-Axis Potentiometer				Z-Axis Potentiometer			
	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail
1	0.0941		0		0.0632		0		0.0065		0	
2	0.1490	-21.52	-21.6	Pass	-0.0228	-5.68	-4.3	Pass	0.0741	4.46	4.3	Pass
3	0.0641	21.74	21.6	Pass	0.1066	2.87	4.3	Pass	-0.0590	-4.33	-4.3	Pass

Processing Software Setup Values			
Transducer	Exponent	Sensitivity (mm/V)	Intercept
IR-TRACC	-0.4511	39.5833	39.24
Y-Axis Potentiometer			-4.18
Z-Axis Potentiometer			-0.43

IR-TRACC Processing

$$\text{IR-TRACC Length (pivot-to-pivot)} = ((V_{\text{IR-TRACC}})^{\text{Exponent}} * \text{Sensitivity}) + \text{Intercept}$$

Potentiometer Processing

$$Y \text{ Angle}_{(\text{THOR})} = Y \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

$$Z \text{ Angle}_{(\text{THOR})} = Z \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

Data Acquisition System Setup

IR-TRACC and potentiometer channels used in the THOR 3D IR-TRACC assembly should be setup in the DAS so that the transducer bias is not removed prior to testing since initial positions of these transducers are required to calculate X, Y and Z-axis displacements in post-test processing software

DO9798 ITRACC Summary Sheets

THOR 3D IR-TRACC Calibration Summary

Date	8/23/2016
Technician	Rick Waldeck

3D IR-TRACC Location in THOR	
Left or Right Side	Left
Upper or Lower (n/a for Abdomen)	Upper
Thorax or Abdomen	Thorax

Calibration Factors					
IR-TRACC Model Number	IF-364-C	Y Pot Model Number	9945	Z Pot Model Number	9945
IR-TRACC Serial Number	DQ2255	Y Pot Serial Number	DM4779	Z Pot Serial Number	DM4778
IR-TRACC Excitation	5	Y Pot Excitation (V)	5	Z Pot Excitation (V)	5
IR-TRACC Sensitivity (mm/V)	33.7101	Y Pot Sensitivity (mV/V/°)	3.0328	Z Pot Sensitivity (mV/V/°)	3.0374
IR-TRACC Exponent	-0.4581				

THOR 3D IR-TRACC Setup Fixture Calibration												
Fixture Position	IR-TRACC				Y-Axis Potentiometer				Z-Axis Potentiometer			
	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail
1	0.0915		0		-0.0387		0		0.0305		0	
2	0.1480	-19.93	-20	Pass	-0.1132	-4.91	-5	Pass	-0.0471	-5.11	-5	Pass
3	0.0622	19.50	20	Pass	0.0423	5.34	5	Pass	0.1111	5.31	5	Pass

Processing Software Setup Values			
Transducer	Exponent	Sensitivity (mm/V)	Intercept
IR-TRACC	-0.4581	33.7101	41.08
Y-Axis Potentiometer			2.55
Z-Axis Potentiometer			-2.01

IR-TRACC Processing

$$\text{IR-TRACC Length (pivot-to-pivot)} = ((V_{\text{IR-TRACC}})^{\text{Exponent}} * \text{Sensitivity}) + \text{Intercept}$$

Potentiometer Processing

$$Y \text{ Angle}_{(\text{THOR})} = Y \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

$$Z \text{ Angle}_{(\text{THOR})} = Z \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

Data Acquisition System Setup

IR-TRACC and potentiometer channels used in the THOR 3D IR-TRACC assembly should be setup in the DAS so that the transducer bias is not removed prior to testing since initial positions of these transducers are required to calculate X, Y and Z-axis displacements in post-test processing software

THOR 3D IR-TRACC Calibration Summary

Date	8/23/2016
Technician	Rick Waldeck

3D IR-TRACC Location in THOR	
Left or Right Side	Right
Upper or Lower (n/a for Abdomen)	Upper
Thorax or Abdomen	Thorax

Calibration Factors					
IR-TRACC Model Number	IF-364-C	Y Pot Model Number	9945	Z Pot Model Number	9945
IR-TRACC Serial Number	DQ2254	Y Pot Serial Number	DM4774	Z Pot Serial Number	DM4775
IR-TRACC Excitation	5	Y Pot Excitation (V)	5	Z Pot Excitation (V)	5
IR-TRACC Sensitivity (mm/V)	30.4515	Y Pot Sensitivity (mV/V/°)	3.0316	Z Pot Sensitivity (mV/V/°)	3.0519
IR-TRACC Exponent	-0.4854				

THOR 3D IR-TRACC Setup Fixture Calibration												
Fixture Position	IR-TRACC				Y-Axis Potentiometer				Z-Axis Potentiometer			
	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail
1	0.0920		0		0.0246		0		-0.0017		0	
2	0.1491	-20.26	-20	Pass	0.1033	5.19	5	Pass	0.0699	4.69	5	Pass
3	0.0629	19.65	20	Pass	-0.0513	-5.01	-5	Pass	-0.0792	-5.08	-5	Pass

Processing Software Setup Values			
Transducer	Exponent	Sensitivity (mm/V)	Intercept
IR-TRACC	-0.4854	30.4515	44.94
Y-Axis Potentiometer			-1.62
Z-Axis Potentiometer			0.11

IR-TRACC Processing

$$\text{IR-TRACC Length (pivot-to-pivot)} = ((V_{\text{IR-TRACC}})^{\text{Exponent}} * \text{Sensitivity}) + \text{Intercept}$$

Potentiometer Processing

$$Y \text{ Angle}_{(\text{THOR})} = Y \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

$$Z \text{ Angle}_{(\text{THOR})} = Z \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

Data Acquisition System Setup

IR-TRACC and potentiometer channels used in the THOR 3D IR-TRACC assembly should be setup in the DAS so that the transducer bias is not removed prior to testing since initial positions of these transducers are required to calculate X, Y and Z-axis displacements in post-test processing software

THOR 3D IR-TRACC Calibration Summary

Date	8/23/2016
Technician	Rick Waldeck

3D IR-TRACC Location in THOR	
Left or Right Side	Left
Upper or Lower (n/a for Abdomen)	Lower
Thorax or Abdomen	Thorax

Calibration Factors					
IR-TRACC Model Number	IF-364-C	Y Pot Model Number	9945	Z Pot Model Number	9945
IR-TRACC Serial Number	DK3866	Y Pot Serial Number	DJ5455	Z Pot Serial Number	DJ5454
IR-TRACC Excitation	5	Y Pot Excitation (V)	5	Z Pot Excitation (V)	5
IR-TRACC Sensitivity (mm/V)	30.874	Y Pot Sensitivity (mV/V/°)	3.0516	Z Pot Sensitivity (mV/V/°)	3.043
IR-TRACC Exponent	-0.468				

THOR 3D IR-TRACC Setup Fixture Calibration												
Fixture Position	IR-TRACC				Y-Axis Potentiometer				Z-Axis Potentiometer			
	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail
1	0.0844		0		-0.0415		0		0.0911		0	
2	0.1377	-20.10	-20	Pass	0.0339	4.94	5	Pass	0.1708	5.24	5	Pass
3	0.0582	18.66	20	Pass	-0.1157	-4.86	-5	Pass	0.0144	-5.04	-5	Pass

Processing Software Setup Values				
Transducer	Exponent	Sensitivity (mm/V)		Intercept
IR-TRACC	-0.468	30.874		43.71
Y-Axis Potentiometer				2.72
Z-Axis Potentiometer				-5.99

IR-TRACC Processing

$$\text{IR-TRACC Length (pivot-to-pivot)} = ((V_{\text{IR-TRACC}})^{\text{Exponent}} * \text{Sensitivity}) + \text{Intercept}$$

Potentiometer Processing

$$Y \text{ Angle}_{(\text{THOR})} = Y \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

$$Z \text{ Angle}_{(\text{THOR})} = Z \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

Data Acquisition System Setup

IR-TRACC and potentiometer channels used in the THOR 3D IR-TRACC assembly should be setup in the DAS so that the transducer bias is not removed prior to testing since initial positions of these transducers are required to calculate X, Y and Z-axis displacements in post-test processing software

THOR 3D IR-TRACC Calibration Summary

Date	8/23/2016
Technician	Rick Waldeck

3D IR-TRACC Location in THOR	
Left or Right Side	Right
Upper or Lower (n/a for Abdomen)	Lower
Thorax or Abdomen	Thorax

Calibration Factors					
IR-TRACC Model Number	IF-364-C	Y Pot Model Number	9945	Z Pot Model Number	9945
IR-TRACC Serial Number	DK3865	Y Pot Serial Number	DJ5453	Z Pot Serial Number	DJ5452
IR-TRACC Excitation	5	Y Pot Excitation (V)	5	Z Pot Excitation (V)	5
IR-TRACC Sensitivity (mm/V)	27.1972	Y Pot Sensitivity (mV/V/°)	3.0491	Z Pot Sensitivity (mV/V/°)	3.0803
IR-TRACC Exponent	-0.5				

THOR 3D IR-TRACC Setup Fixture Calibration												
Fixture Position	IR-TRACC				Y-Axis Potentiometer				Z-Axis Potentiometer			
	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail
1	0.0823		0		-0.0060		0		0.0457		0	
2	0.1341	-20.53	-20	Pass	-0.0824	-5.01	-5	Pass	-0.0307	-4.96	-5	Pass
3	0.0575	18.62	20	Pass	0.0721	5.12	5	Pass	0.1230	5.02	5	Pass

Processing Software Setup Values			
Transducer	Exponent	Sensitivity (mm/V)	Intercept
IR-TRACC	-0.5	27.1972	47.10
Y-Axis Potentiometer			0.39
Z-Axis Potentiometer			-2.97

IR-TRACC Processing

$$\text{IR-TRACC Length (pivot-to-pivot)} = ((V_{\text{IR-TRACC}})^{\text{Exponent}} * \text{Sensitivity}) + \text{Intercept}$$

Potentiometer Processing

$$Y \text{ Angle}_{(\text{THOR})} = Y \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

$$Z \text{ Angle}_{(\text{THOR})} = Z \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

Data Acquisition System Setup

IR-TRACC and potentiometer channels used in the THOR 3D IR-TRACC assembly should be setup in the DAS so that the transducer bias is not removed prior to testing since initial positions of these transducers are required to calculate X, Y and Z-axis displacements in post-test processing software

THOR 3D IR-TRACC Calibration Summary

Date	8/23/2016
Technician	Rick Waldeck

3D IR-TRACC Location in THOR	
Left or Right Side	Left
Upper or Lower (n/a for Abdomen)	n/a
Thorax or Abdomen	Abdomen

Calibration Factors					
IR-TRACC Model Number	472-4750	Y Pot Model Number	9945	Z Pot Model Number	9945
IR-TRACC Serial Number	DP1395	Y Pot Serial Number	DJ5443	Z Pot Serial Number	DJ5444
IR-TRACC Excitation	5	Y Pot Excitation (V)	5	Z Pot Excitation (V)	5
IR-TRACC Sensitivity (mm/V)	40.0978	Y Pot Sensitivity (mV/V/°)	3.0406	Z Pot Sensitivity (mV/V/°)	3.0465
IR-TRACC Exponent	-0.4832				

THOR 3D IR-TRACC Setup Fixture Calibration												
Fixture Position	IR-TRACC				Y-Axis Potentiometer				Z-Axis Potentiometer			
	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail
1	0.1267		0		-0.0070		0		0.0563		0	
2	0.1957	-20.62	-21.6	Pass	0.0561	4.15	4.3	Pass	-0.0255	-5.37	-4.3	Pass
3	0.0873	21.46	21.6	Pass	-0.0726	-4.31	-4.3	Pass	0.1070	3.33	4.3	Pass

Processing Software Setup Values				
Transducer	Exponent	Sensitivity (mm/V)	Intercept	
IR-TRACC	-0.4832	40.0978	45.39	
Y-Axis Potentiometer			0.46	
Z-Axis Potentiometer			-3.70	

IR-TRACC Processing

$$\text{IR-TRACC Length (pivot-to-pivot)} = ((V_{\text{IR-TRACC}})^{\text{Exponent}} * \text{Sensitivity}) + \text{Intercept}$$

Potentiometer Processing

$$Y \text{ Angle}_{(\text{THOR})} = Y \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

$$Z \text{ Angle}_{(\text{THOR})} = Z \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

Data Acquisition System Setup

IR-TRACC and potentiometer channels used in the THOR 3D IR-TRACC assembly should be setup in the DAS so that the transducer bias is not removed prior to testing since initial positions of these transducers are required to calculate X, Y and Z-axis displacements in post-test processing software

THOR 3D IR-TRACC Calibration Summary

Date	8/23/2016
Technician	Rick Waldeck

3D IR-TRACC Location in THOR	
Left or Right Side	Right
Upper or Lower (n/a for Abdomen)	n/a
Thorax or Abdomen	Abdomen

Calibration Factors					
IR-TRACC Model Number	472-4750	Y Pot Model Number	9945	Z Pot Model Number	9945
IR-TRACC Serial Number	DP1396	Y Pot Serial Number	DJ5445	Z Pot Serial Number	DJ5446
IR-TRACC Excitation	5	Y Pot Excitation (V)	5	Z Pot Excitation (V)	5
IR-TRACC Sensitivity (mm/V)	36.27	Y Pot Sensitivity (mV/V/°)	3.0404	Z Pot Sensitivity (mV/V/°)	3.0445
IR-TRACC Exponent	-0.4837				

THOR 3D IR-TRACC Setup Fixture Calibration												
Fixture Position	IR-TRACC				Y-Axis Potentiometer				Z-Axis Potentiometer			
	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail	Out (V)	Actual	Expected	Pass/Fail
1	0.1033		0		0.0166		0		-0.0236		0	
2	0.1679	-22.77	-21.6	Pass	-0.0446	-4.03	-4.3	Pass	0.0450	4.51	4.3	Pass
3	0.0708	21.80	21.6	Pass	0.0858	4.55	4.3	Pass	-0.0768	-3.49	-4.3	Pass

Processing Software Setup Values			
Transducer	Exponent	Sensitivity (mm/V)	Intercept
IR-TRACC	-0.4837	36.27	45.45
Y-Axis Potentiometer			-1.09
Z-Axis Potentiometer			1.55

IR-TRACC Processing

$$\text{IR-TRACC Length (pivot-to-pivot)} = ((V_{\text{IR-TRACC}})^{\text{Exponent}} * \text{Sensitivity}) + \text{Intercept}$$

Potentiometer Processing

$$Y \text{ Angle}_{(\text{THOR})} = Y \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

$$Z \text{ Angle}_{(\text{THOR})} = Z \text{ Angle}_{(\text{recorded by DAS})} + \text{Intercept}$$

Data Acquisition System Setup

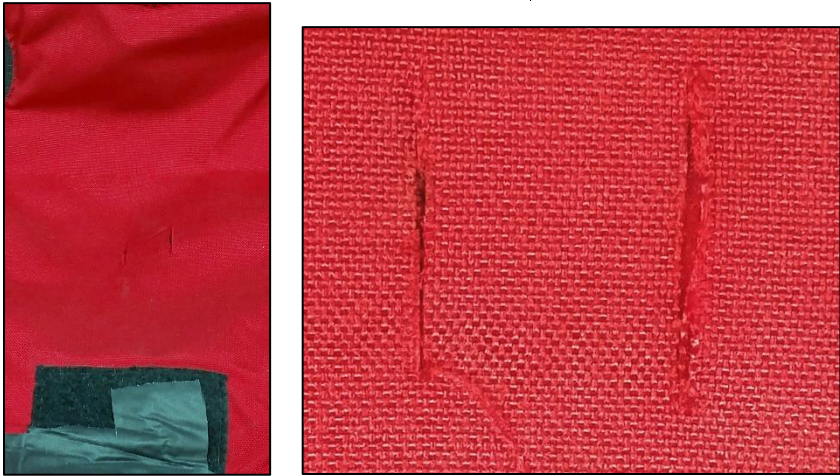
IR-TRACC and potentiometer channels used in the THOR 3D IR-TRACC assembly should be setup in the DAS so that the transducer bias is not removed prior to testing since initial positions of these transducers are required to calculate X, Y and Z-axis displacements in post-test processing software

THOR Inspection Checklist

Date: 10/5/2016	
NHTSA Representative: James Saunders	
Inspection Reporter: Steve Keller	
Inspection type (check one): ☒ Pre-Test ☐ Post-Test	
Dummy S/N: DL9207	Legs S/N: LX0045/LX0046
Dummy Description: THOR-M 50th Male	
Date of last Certification: 9/20/2016	
<u>Tests conducted since last inspection:</u> M20165121 - Toyota Scion iA M20165116 - Toyota Prius	<u>Since last certification:</u> M20165121 - Toyota Scion iA M20165116 - Toyota Prius
<u>Known errors in data channels (no data, clipping, unexpected drops):</u> 11NECKUP00THFOXP, Upper Neck X Force, Questionable spikes 51ms to 59ms & 80ms, SN:LC-DN4324FX 10380JI4 11NECKUP00THFOZP, Upper Neck Z Force, Questionable spikes 51ms to 59ms & 80ms, SN:LC-DN4324FZ 10380JI4 11CHSTLEUPTHVO0P, Thorax Upper Left X Displacement, Questionable spikes 20ms to 46ms & 70ms to 82ms, SN:DS-AC2287 IF-364-C-R3 11CHSTRIUPTHVO0P, Thorax Upper Right X Displacement, Questionable spikes 20ms to 46ms & 70ms to 82ms, SN:DS-DJ2613 IF-364-C-R3 11CHSTLELOTHVO0P, Thorax Lower Left X Displacement, Questionable spikes 20ms to 46ms & 70ms to 82ms, SN:DS-DS6353 IF-364-C-R3 11ABDOLE00THVO0P, Abdomen Left X Displacement, Questionable spikes 19ms to 83ms, SN:DS-176 472-4750 11FOOTRI00THACZP, Foot Right Z Acceleration, Questionable data after 46ms, SN:AC-J32884 7264C	
<u>Physical evidence of damage:</u> Left and Right knee cut	
<u>Anecdotal evidence of damage:</u> None	
<u>Equipment delivered to Borrower:</u> THOR DL9207 ATD 26 Accelerometers 3 Angular Rate Sensors 2 Skull Spring LC 1 Condyle Pot 1 Upper Neck LC 6 IRTraccs 12 Rotational Pots 1 Spine LC 2 Acetabulum LC 2 ASIS LC 2 Femur LC	<i>Continued</i> 2 LX Leg Assemblies 2 Upper Tibia LC 2 Lower Tibia LC 6 Ank1e Potentiometers 2 Knee Sliders 1 Neck Skin 1 Neck Foam 1 Tiltview Interface Cable 4 Tilt Sensors 1 H-Point Tool 1 Tool Box 1 Laptop

Note: New Damage is Noted in Red

HEAD	
Y / N	Rear head cap mounts securely to head
Y / N	Head skin fits securely over skull
Y / N	Head skin shows no sign of tears or damage
Y / N	Interior components of skull cavity (ballast, accelerometer mount, accelerometers) securely attached
Y / N	Head securely mounted to OC joint
OTHER	
NECK	
Y / N	Neck cables slide freely through holes in neck plates
Y / N	Neck cables show no sign of fraying, broken strands, or kinking
Y / N	No evidence of de-bonding between neck pucks and plates
Y / N	No evidence of de-bonding or permanent compression in neck soft stop assemblies
Y / N	Neck securely attached to upper neck load cell
Y / N	Neck securely attached to lower neck load cell
Y / N	Neck pitch change joint mechanism mating teeth are engaged
OTHER	
SHOULDER	
Y / N	Urethane shoulder pads show no evidence of contact
Y / N	Clavicles securely attached to sternum and shoulder
Y / N	No evidence of de-bonding, tearing, or permanent compression of posterior soft stops
OTHER	
SPINE	
Y / N	No evidence of de-bonding between thoracic spine flex joint and metal plates
Y / N	No evidence of de-bonding between lumbar spine flex joint and metal plates
Y / N	Lumbar spine pitch change joint mechanism mating teeth are engaged
OTHER	
THORAX	
Y / N	No evidence of contact at top, bottom, or interior faces of rib damping material
Y / N	No evidence of de-bonding between rib damping material and ribs
Y / N	IRTRACCs securely attached to anterior ribs
Y / N	IRTRACCs securely attached to double gimbals, spine
Y / N	Urethane bib is securely attached to ribs with no sign of tearing or washer penetration
Y / N	Ribs securely attached to posterior spine
Y / N	Rib stiffeners show no evidence of bending (no gaps between ribs and stiffeners)
OTHER	
ABDOMEN	
Y / N	No evidence of tearing, cuts, or broken stitches in upper abdomen bag and zipper
Y / N	Upper abdomen insert securely attached to spine
Y / N	Upper abdomen insert shows no evidence of permanent set
Y / N	No evidence of tearing, cuts, or broken stitches in lower abdomen bag and zipper
Y / N	Lower abdomen insert securely attached to spine
Y / N	Lower abdomen insert shows no evidence of permanent set
OTHER	
PELVIS	
Y / N	Pelvis flesh fits securely over pelvis bones
Y / N	H-point tool fits securely into hole on both sides of pelvis
OTHER	
FEMUR	
Y / N	Acetabular load cells firmly attached
Y / N	Femur load cells firmly attached
Y / N	No evidence of deformation of knee slider bump stop
Y / N	No cuts, tears, or scuffing of knee flesh Right knee flesh cut Left knee flesh scuff

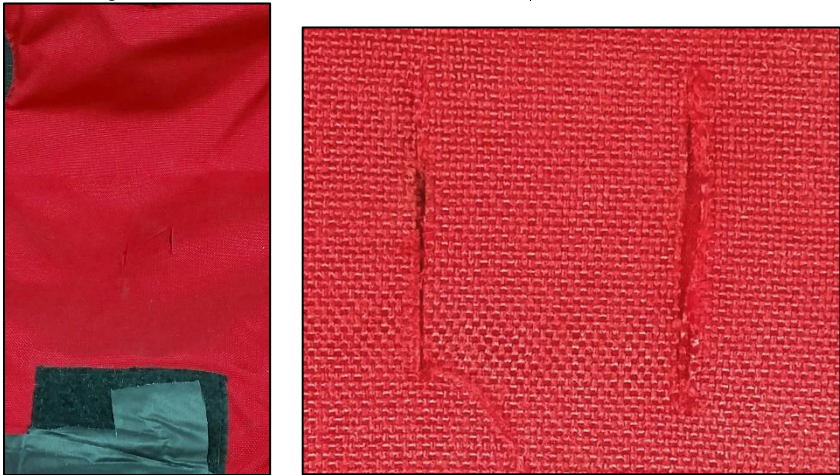
		
OTHER	Left femur flesh is separating from zipper. We placed gaffer's tape across zipper to prevent further damage. 	
LOWER EXTREMITY (LX)		
Y / N	Rotational potentiometers in ankle securely attached	
Y / N	Achilles tendon provides resistance to dorsiflexion	
Y / N	No evidence of de-bonding, tearing, or permanent compression of ankle soft stops	
Y / N	No cuts, tears, or scuffing of leg flesh	
OTHER		
JACKET		
Y / N	Rib stiffeners show no sign of permanent deformation	
Y / N	No evidence of tears or holes in jacket fabric, Velcro, or zippers The chest jacket has two tears near the middle: 	
OTHER		

THOR Inspection Checklist

Date: 10/7/2016	
NHTSA Representative: James Saunders	
Inspection Reporter: Steve Keller	
Inspection type (check one): ☐ Pre-Test ☒ Post-Test	
Dummy S/N: DL9207	Legs S/N: LX0045/LX0046
Dummy Description: THOR-M 50th Male	
Date of last Certification: 9/20/2016	
<u>Tests conducted since last inspection:</u> M20165404 - Mazda CX-5	<u>Since last certification:</u> M20165121 - Toyota Scion iA M20165116 - Toyota Prius M20165404 - Mazda CX-5
<u>Known errors in data channels (no data, clipping, unexpected drops):</u> 11CHSTLEUPTHVO0P, Thorax Upper Left X Displacement, Questionable spike 18.5ms & 63ms 11CHSTLELOTHVO0P, Thorax Lower Left X Displacement, Questionable spike 18.5ms 11ABDOLE00THVO0P, Abdomen Left X Displacement, Questionable spike 18.5ms & 63ms 11ANKLRI00THANYP, Ankle Right Y Rotation, Questionable spike 45.5ms & 52.5ms	
<u>Physical evidence of damage:</u> None New	
<u>Anecdotal evidence of damage:</u> None	
<u>Equipment delivered to Borrower:</u> THOR DL9207 ATD 26 Accelerometers 3 Angular Rate Sensors 2 Skull Spring LC 1 Condyle Pot 1 Upper Neck LC 6 IRTraccs 12 Rotational Pots 1 Spine LC 2 Acetabulum LC 2 ASIS LC 2 Femur LC	<i>Continued</i> 2 LX Leg Assemblies 2 Upper Tibia LC 2 Lower Tibia LC 6 Ank1e Potentiometers 2 Knee Sliders 1 Neck Skin 1 Neck Foam 1 Tiltview Interface Cable 4 Tilt Sensors 1 H-Point Tool 1 Tool Box 1 Laptop

Note: New Damage is Noted in Red

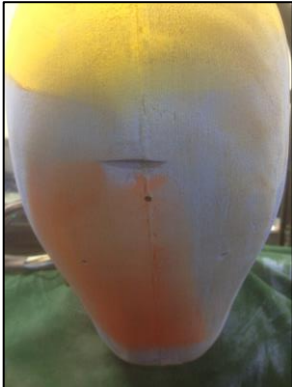
HEAD	
Y / N	Rear head cap mounts securely to head
Y / N	Head skin fits securely over skull
Y / N	Head skin shows no sign of tears or damage
Y / N	Interior components of skull cavity (ballast, accelerometer mount, accelerometers) securely attached
Y / N	Head securely mounted to OC joint
OTHER	
NECK	
Y / N	Neck cables slide freely through holes in neck plates
Y / N	Neck cables show no sign of fraying, broken strands, or kinking
Y / N	No evidence of de-bonding between neck pucks and plates
Y / N	No evidence of de-bonding or permanent compression in neck soft stop assemblies
Y / N	Neck securely attached to upper neck load cell
Y / N	Neck securely attached to lower neck load cell
Y / N	Neck pitch change joint mechanism mating teeth are engaged
OTHER	
SHOULDER	
Y / N	Urethane shoulder pads show no evidence of contact
Y / N	Clavicles securely attached to sternum and shoulder
Y / N	No evidence of de-bonding, tearing, or permanent compression of posterior soft stops
OTHER	
SPINE	
Y / N	No evidence of de-bonding between thoracic spine flex joint and metal plates
Y / N	No evidence of de-bonding between lumbar spine flex joint and metal plates
Y / N	Lumbar spine pitch change joint mechanism mating teeth are engaged
OTHER	
THORAX	
Y / N	No evidence of contact at top, bottom, or interior faces of rib damping material
Y / N	No evidence of de-bonding between rib damping material and ribs
Y / N	IRTRACCs securely attached to anterior ribs
Y / N	IRTRACCs securely attached to double gimbals, spine
Y / N	Urethane bib is securely attached to ribs with no sign of tearing or washer penetration
Y / N	Ribs securely attached to posterior spine
Y / N	Rib stiffeners show no evidence of bending (no gaps between ribs and stiffeners)
OTHER	
ABDOMEN	
Y / N	No evidence of tearing, cuts, or broken stitches in upper abdomen bag and zipper
Y / N	Upper abdomen insert securely attached to spine
Y / N	Upper abdomen insert shows no evidence of permanent set
Y / N	No evidence of tearing, cuts, or broken stitches in lower abdomen bag and zipper
Y / N	Lower abdomen insert securely attached to spine
Y / N	Lower abdomen insert shows no evidence of permanent set
OTHER	
PELVIS	
Y / N	Pelvis flesh fits securely over pelvis bones
Y / N	H-point tool fits securely into hole on both sides of pelvis
OTHER	
FEMUR	
Y / N	Acetabular load cells firmly attached
Y / N	Femur load cells firmly attached
Y / N	No evidence of deformation of knee slider bump stop
Y / N	No cuts, tears, or scuffing of knee flesh Right knee flesh cut Left knee flesh scuff

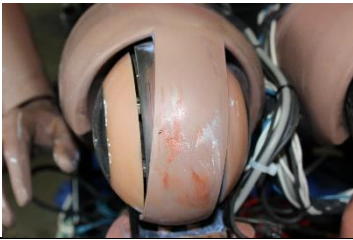
	
OTHER	Left femur flesh is separating from zipper. We placed gaffer's tape across zipper to prevent further damage. 
LOWER EXTREMITY (LX)	
Y / N	Rotational potentiometers in ankle securely attached
Y / N	Achilles tendon provides resistance to dorsiflexion
Y / N	No evidence of de-bonding, tearing, or permanent compression of ankle soft stops
Y / N	No cuts, tears, or scuffing of leg flesh
OTHER	
JACKET	
Y / N	Rib stiffeners show no sign of permanent deformation
Y / N	No evidence of tears or holes in jacket fabric, Velcro, or zippers The chest jacket has two tears near the middle: 
OTHER	

THOR Inspection Checklist

Date: 10/5/2016	
NHTSA Representative: James Saunders	
Inspection Reporter: Steve Keller	
Inspection type (check one): ☒ Pre-Test ☐ Post-Test	
Dummy S/N: DO9798	
Dummy Description: THOR-M 50th Male	
Date of last Certification: 9/27/2016	
<u>Tests conducted since last inspection:</u> M20165121 - Toyota Scion iA M20165116 - Toyota Prius	<u>Since last certification:</u> M20165121 - Toyota Scion iA M20165116 - Toyota Prius
<u>Known errors in data channels (no data, clipping, unexpected drops):</u> 13CHSTLELOTHVO0P, Thorax Lower Left X Displacement, Questionable spike 20ms, SN:DS-DK3866 13CHSTRILOTHVO0P, Thorax Lower Right X Displacement, Questionable spike 20ms, SN:DS-DK3865	
<u>Physical evidence of damage</u> Right knee scuff	
<u>Anecdotal evidence of damage:</u> None	
<u>Equipment delivered to Borrower:</u> THOR DO9798 ATD 26 Accelerometers 3 Angular Rate Sensors 2 Skull Spring LC 1 Condyle Pot 1 Upper Neck LC 6 IRTraccs 12 Rotational Pots 1 Spine LC 2 Acetabulum LC 2 ASIS LC 2 Femur LC	<i>Continued</i> 2 LX Leg Assemblies 2 Upper Tibia LC 2 Lower Tibia LC 6 Ank1e Potentiometers 2 Knee Sliders 1 Neck Skin 1 Neck Foam 1 Tiltview Interface Cable with 3 channel hub 4 Tilt Sensors 1 H-Point Tool 1 Tool Box 1 Laptop

Note: New Damage is Noted in Red

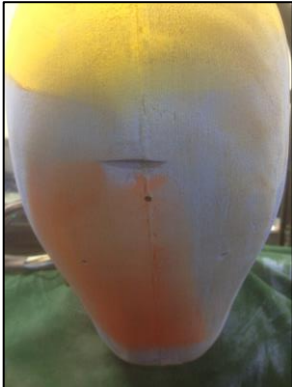
HEAD	
Y / N	Rear head cap mounts securely to head
Y / N	Head skin fits securely over skull
Y / N	Head skin shows no sign of tears or damage Small cut in center of face above Nasion 
Y / N	Interior components of skull cavity (ballast, accelerometer mount, accelerometers) securely attached
Y / N	Head securely mounted to OC joint
OTHER	
NECK	
Y / N	Neck cables slide freely through holes in neck plates
Y / N	Neck cables show no sign of fraying, broken strands, or kinking
Y / N	No evidence of de-bonding between neck pucks and plates
Y / N	No evidence of de-bonding or permanent compression in neck soft stop assemblies Missing neck soft stop 
Y / N	Neck securely attached to upper neck load cell
Y / N	Neck securely attached to lower neck load cell
Y / N	Neck pitch change joint mechanism mating teeth are engaged
OTHER	
SHOULDER	
Y / N	Urethane shoulder pads show no evidence of contact
Y / N	Clavicles securely attached to sternum and shoulder
Y / N	No evidence of de-bonding, tearing, or permanent compression of posterior soft stops
OTHER	
SPINE	
Y / N	No evidence of de-bonding between thoracic spine flex joint and metal plates
Y / N	No evidence of de-bonding between lumbar spine flex joint and metal plates
Y / N	Lumbar spine pitch change joint mechanism mating teeth are engaged
OTHER	
THORAX	
Y / N	No evidence of contact at top, bottom, or interior faces of rib damping material
Y / N	No evidence of de-bonding between rib damping material and ribs
Y / N	IRTRACCs securely attached to anterior ribs
Y / N	IRTRACCs securely attached to double gimbals, spine
Y / N	Urethane bib is securely attached to ribs with no sign of tearing or washer penetration
Y / N	Ribs securely attached to posterior spine
Y / N	Rib stiffeners show no evidence of bending (no gaps between ribs and stiffeners)
OTHER	

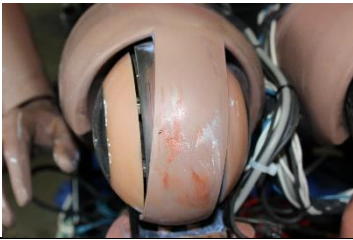
ABDOMEN	
Y / N	No evidence of tearing, cuts, or broken stitches in upper abdomen bag and zipper
Y / N	Upper abdomen insert securely attached to spine
Y / N	Upper abdomen insert shows no evidence of permanent set
Y / N	No evidence of tearing, cuts, or broken stitches in lower abdomen bag and zipper
Y / N	Lower abdomen insert securely attached to spine
Y / N	Lower abdomen insert shows no evidence of permanent set
OTHER	
PELVIS	
Y / N	Pelvis flesh fits securely over pelvis bones
Y / N	H-point tool fits securely into hole on both sides of pelvis
OTHER	
FEMUR	
Y / N	Acetabular load cells firmly attached
Y / N	Femur load cells firmly attached
Y / N	No evidence of deformation of knee slider bump stop
Y / N	No cuts, tears, or scuffing of knee flesh Minor scratches and scuffs
	
OTHER	
LOWER EXTREMITY (LX)	
Y / N	Rotational potentiometers in ankle securely attached
Y / N	Achilles tendon provides resistance to dorsiflexion
Y / N	No evidence of de-bonding, tearing, or permanent compression of ankle soft stops
Y / N	No cuts, tears, or scuffing of leg flesh
OTHER	
JACKET	
Y / N	Rib stiffeners show no sign of permanent deformation
Y / N	No evidence of tears or holes in jacket fabric, Velcro, or zippers
OTHER	

THOR Inspection Checklist

Date: 10/7/2016	
NHTSA Representative: James Saunders	
Inspection Reporter: Steve Keller	
Inspection type (check one): ☐ Pre-Test ☒ Post-Test	
Dummy S/N: DO9798	
Dummy Description: THOR-M 50th Male	
Date of last Certification: 9/27/2016	
<u>Tests conducted since last inspection:</u> M20165404 - Mazda CX-5	<u>Since last certification:</u> M20165121 - Toyota Scion iA M20165116 - Toyota Prius M20165404 - Mazda CX-5
<u>Known errors in data channels (no data, clipping, unexpected drops):</u> None	
<u>Physical evidence of damage</u> None New	
<u>Anecdotal evidence of damage:</u> None	
<u>Equipment delivered to Borrower:</u> THOR DO9798 ATD 26 Accelerometers 3 Angular Rate Sensors 2 Skull Spring LC 1 Condyle Pot 1 Upper Neck LC 6 IRTraccs 12 Rotational Pots 1 Spine LC 2 Acetabulum LC 2 ASIS LC 2 Femur LC	<i>Continued</i> 2 LX Leg Assemblies 2 Upper Tibia LC 2 Lower Tibia LC 6 Ank1e Potentiometers 2 Knee Sliders 1 Neck Skin 1 Neck Foam 1 Tiltview Interface Cable with 3 channel hub 4 Tilt Sensors 1 H-Point Tool 1 Tool Box 1 Laptop

Note: New Damage is Noted in Red

HEAD	
Y / N	Rear head cap mounts securely to head
Y / N	Head skin fits securely over skull
Y / N	Head skin shows no sign of tears or damage Small cut in center of face above Nasion 
Y / N	Interior components of skull cavity (ballast, accelerometer mount, accelerometers) securely attached
Y / N	Head securely mounted to OC joint
OTHER	
NECK	
Y / N	Neck cables slide freely through holes in neck plates
Y / N	Neck cables show no sign of fraying, broken strands, or kinking
Y / N	No evidence of de-bonding between neck pucks and plates
Y / N	No evidence of de-bonding or permanent compression in neck soft stop assemblies Missing neck soft stop 
Y / N	Neck securely attached to upper neck load cell
Y / N	Neck securely attached to lower neck load cell
Y / N	Neck pitch change joint mechanism mating teeth are engaged
OTHER	
SHOULDER	
Y / N	Urethane shoulder pads show no evidence of contact
Y / N	Clavicles securely attached to sternum and shoulder
Y / N	No evidence of de-bonding, tearing, or permanent compression of posterior soft stops
OTHER	
SPINE	
Y / N	No evidence of de-bonding between thoracic spine flex joint and metal plates
Y / N	No evidence of de-bonding between lumbar spine flex joint and metal plates
Y / N	Lumbar spine pitch change joint mechanism mating teeth are engaged
OTHER	
THORAX	
Y / N	No evidence of contact at top, bottom, or interior faces of rib damping material
Y / N	No evidence of de-bonding between rib damping material and ribs
Y / N	IRTRACCs securely attached to anterior ribs
Y / N	IRTRACCs securely attached to double gimbals, spine
Y / N	Urethane bib is securely attached to ribs with no sign of tearing or washer penetration
Y / N	Ribs securely attached to posterior spine
Y / N	Rib stiffeners show no evidence of bending (no gaps between ribs and stiffeners)
OTHER	

ABDOMEN	
Y / N	No evidence of tearing, cuts, or broken stitches in upper abdomen bag and zipper
Y / N	Upper abdomen insert securely attached to spine
Y / N	Upper abdomen insert shows no evidence of permanent set
Y / N	No evidence of tearing, cuts, or broken stitches in lower abdomen bag and zipper
Y / N	Lower abdomen insert securely attached to spine
Y / N	Lower abdomen insert shows no evidence of permanent set
OTHER	
PELVIS	
Y / N	Pelvis flesh fits securely over pelvis bones
Y / N	H-point tool fits securely into hole on both sides of pelvis
OTHER	
FEMUR	
Y / N	Acetabular load cells firmly attached
Y / N	Femur load cells firmly attached
Y / N	No evidence of deformation of knee slider bump stop
Y / N	No cuts, tears, or scuffing of knee flesh Minor scratches and scuffs
	
OTHER	
LOWER EXTREMITY (LX)	
Y / N	Rotational potentiometers in ankle securely attached
Y / N	Achilles tendon provides resistance to dorsiflexion
Y / N	No evidence of de-bonding, tearing, or permanent compression of ankle soft stops
Y / N	No cuts, tears, or scuffing of leg flesh
OTHER	
JACKET	
Y / N	Rib stiffeners show no sign of permanent deformation
Y / N	No evidence of tears or holes in jacket fabric, Velcro, or zippers
OTHER	

DUMMY CALIBRATIONS

50% ADULT MALE THOR DL9207 DUMMY CALIBRATIONS

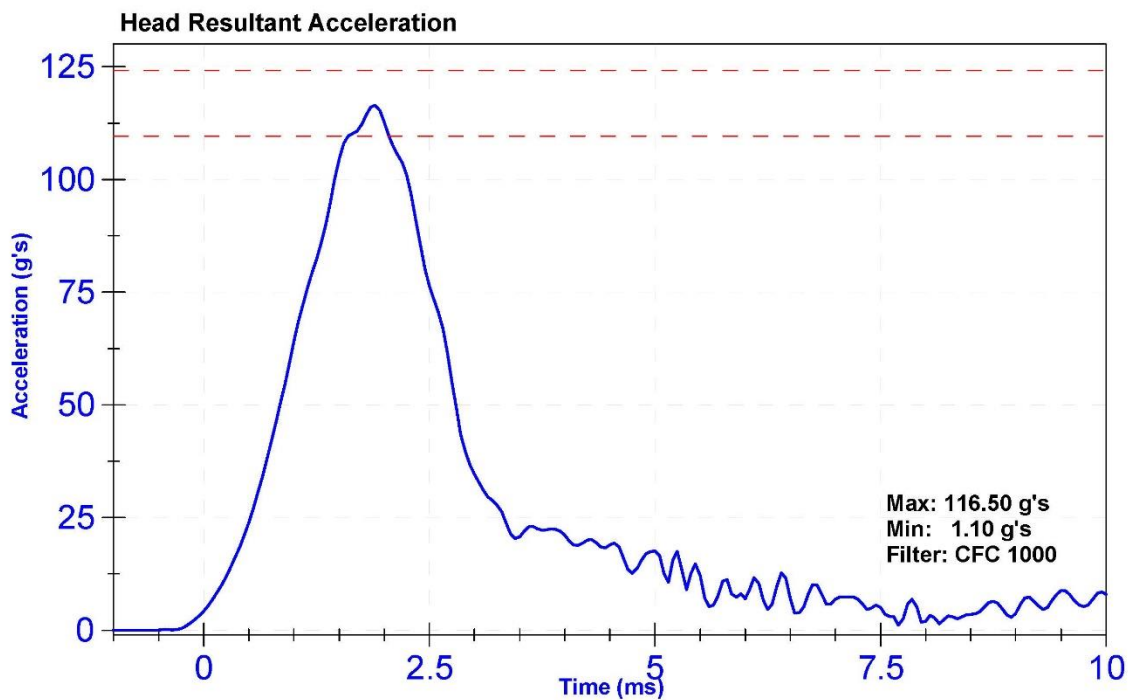
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

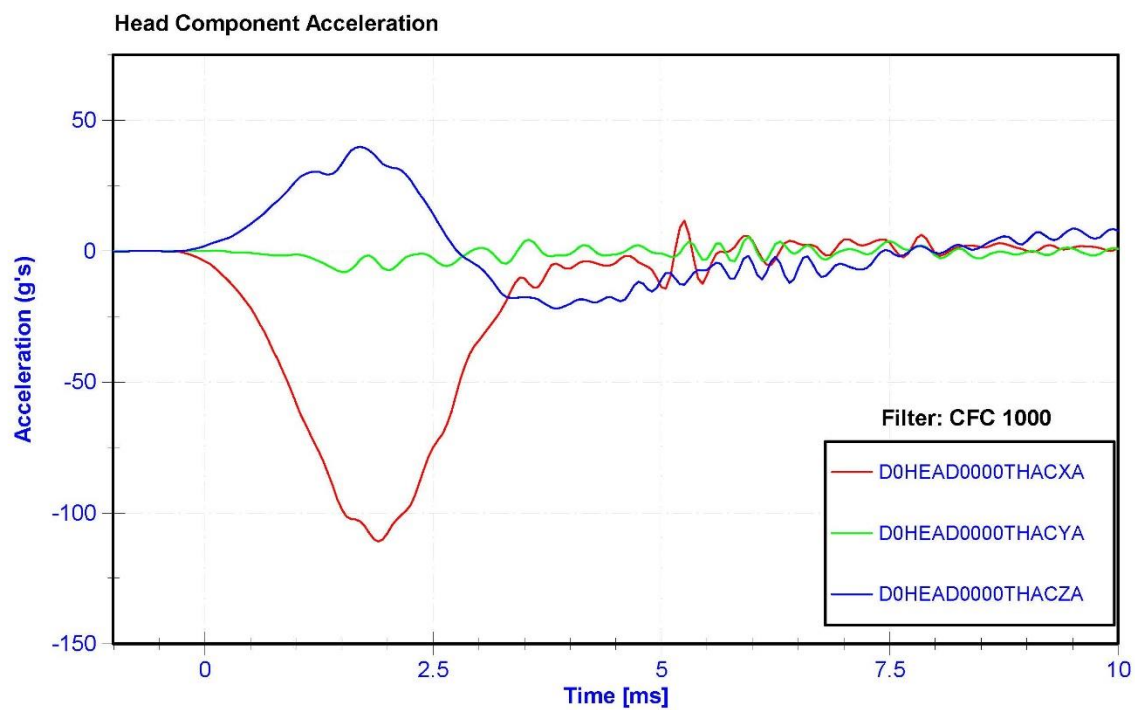
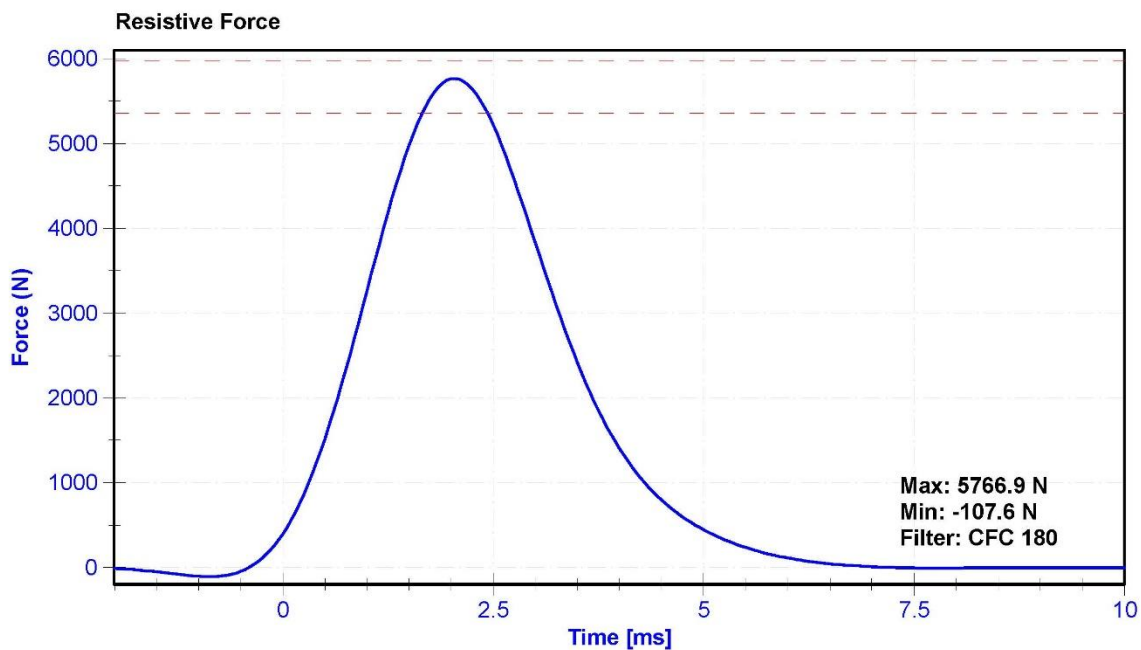
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	42.6	Pass
Impact Velocity	1.95	2.05	m/s	1.984	Pass
Probe Force	5362	5972	N	5766.9	Pass
Resultant Acceleration	109.6	124.2	g's	116.50	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Head X Accel	Endevco 7264	AC-P52122 7264	9/7/2016	3/8/2017
Head Y Accel	Entran 7264	AC-P49215 7264	9/7/2016	3/8/2017
Head Z Accel	Entran 7264	AC-P49229 7264	9/7/2016	3/8/2017
Probe Accel	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017





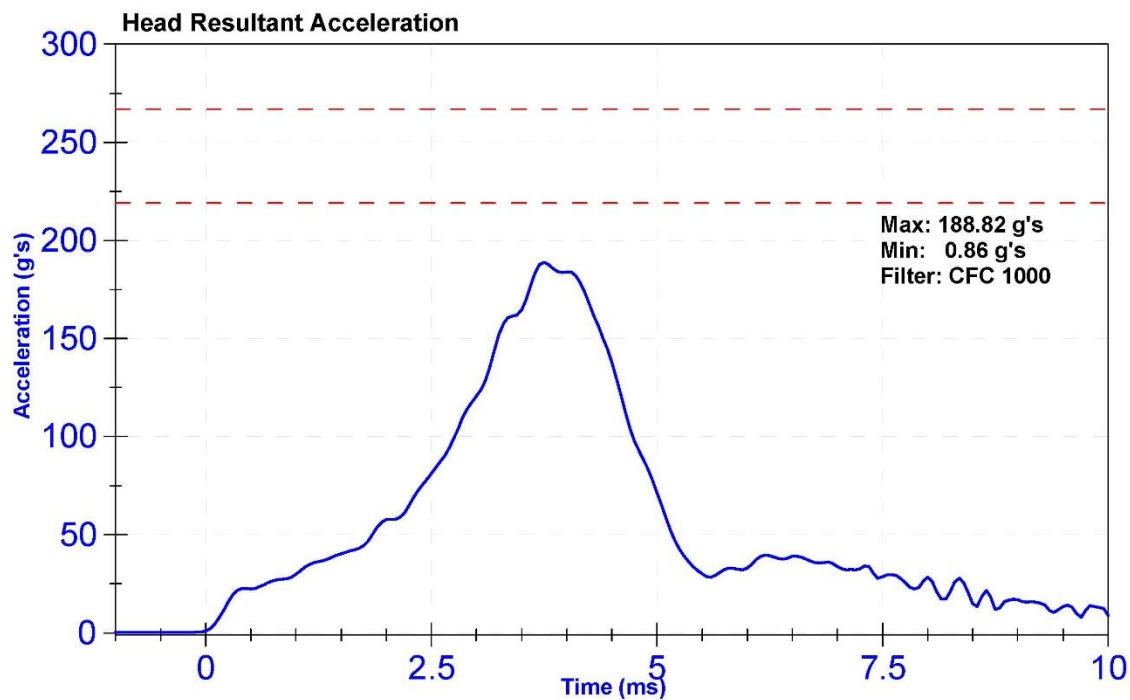
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

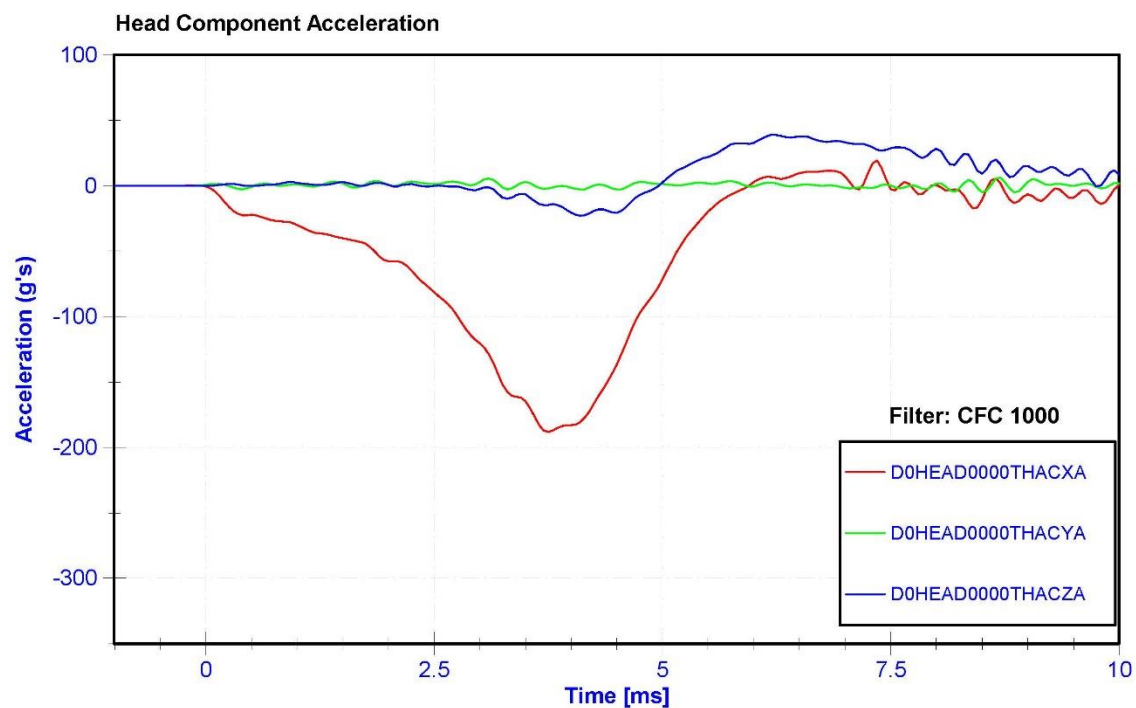
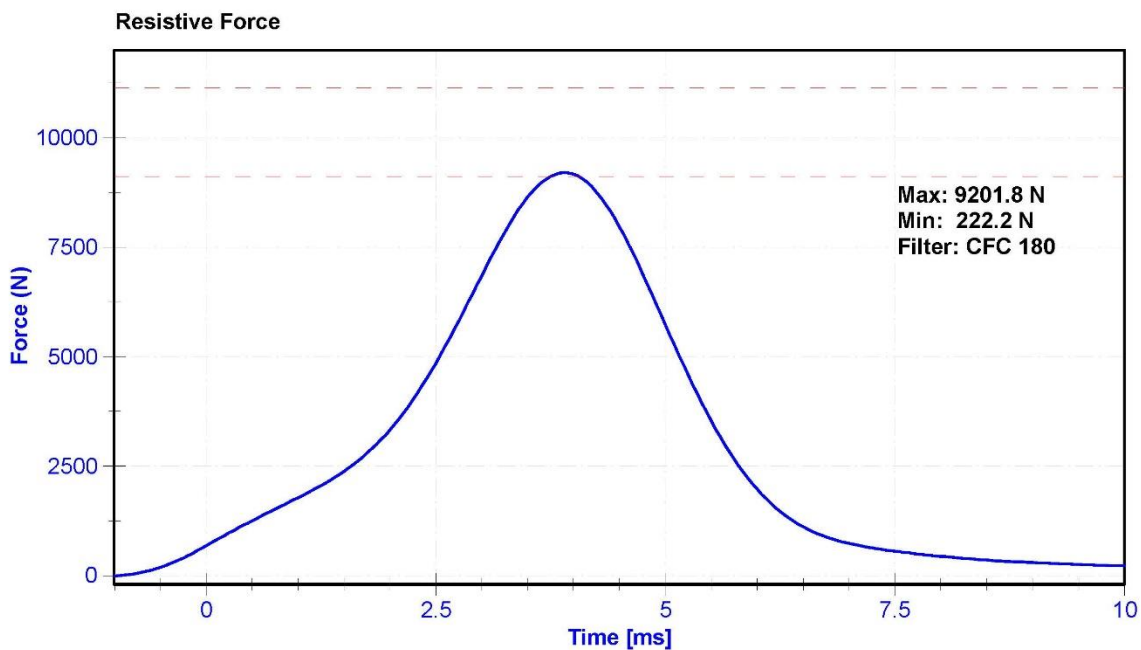
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	39.0	Pass
Impact Velocity	6.68	6.78	m/s	6.699	Pass
Probe Force	9117	11143	N	9201.8	Pass
Resultant Acceleration	219	267	g's	188.8	Fail

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Head X Accel	Endevco 7264	AC-P52122 7264	9/7/2016	3/8/2017
Head Y Accel	Entran 7264	AC-P49215 7264	9/7/2016	3/8/2017
Head Z Accel	Entran 7264	AC-P49229 7264	9/7/2016	3/8/2017
Probe Accel	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017





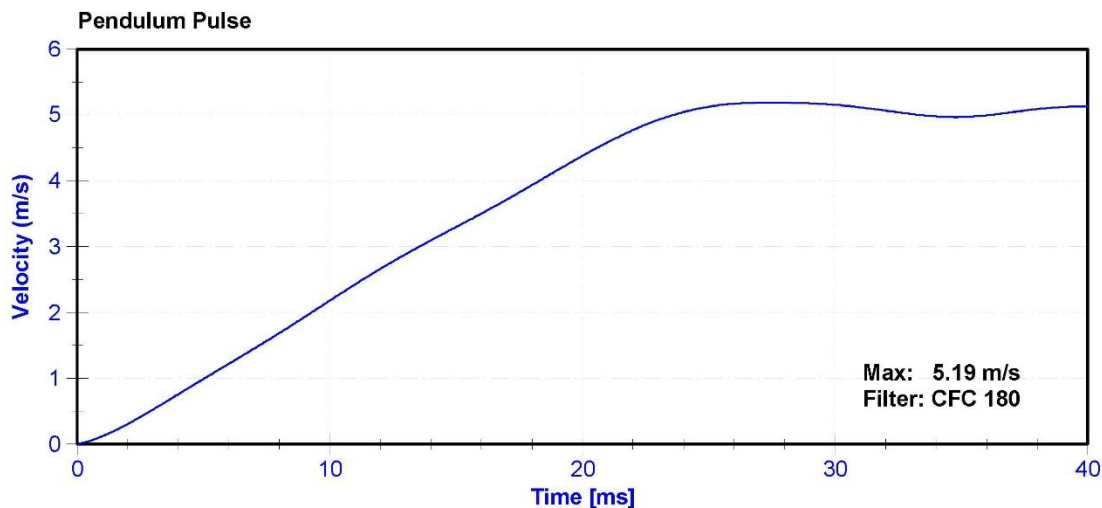
ATD Manufacturer	Humanetics	Test Technician	M. Geesey
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

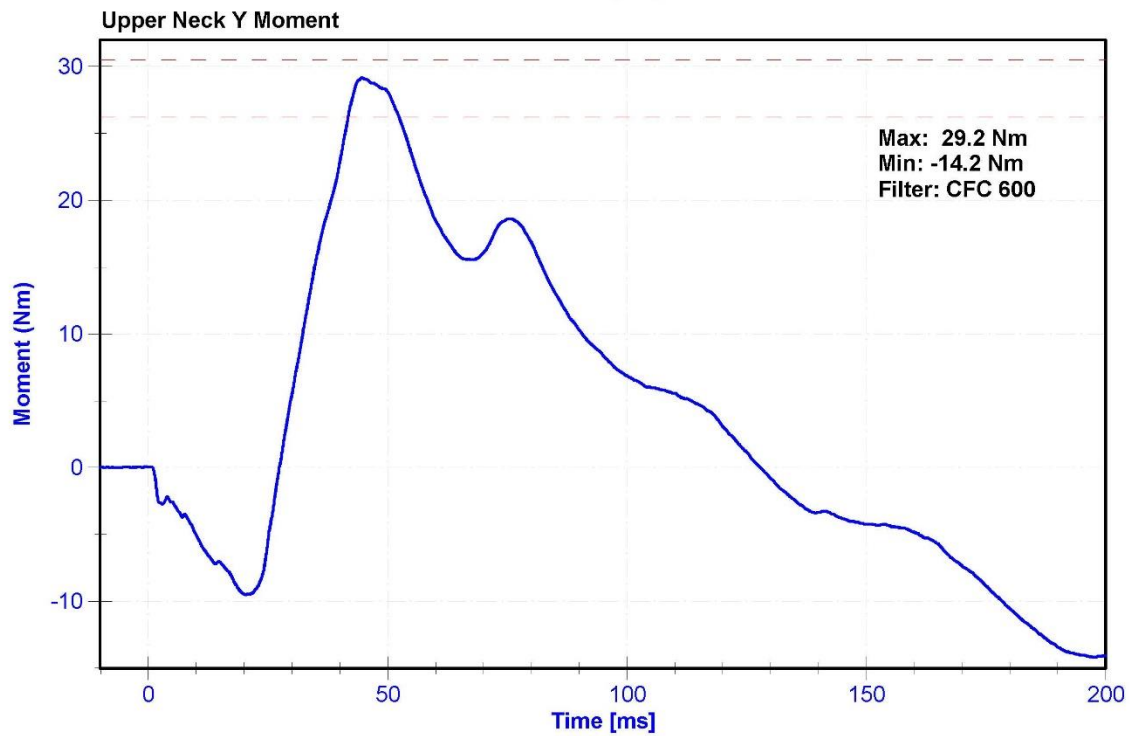
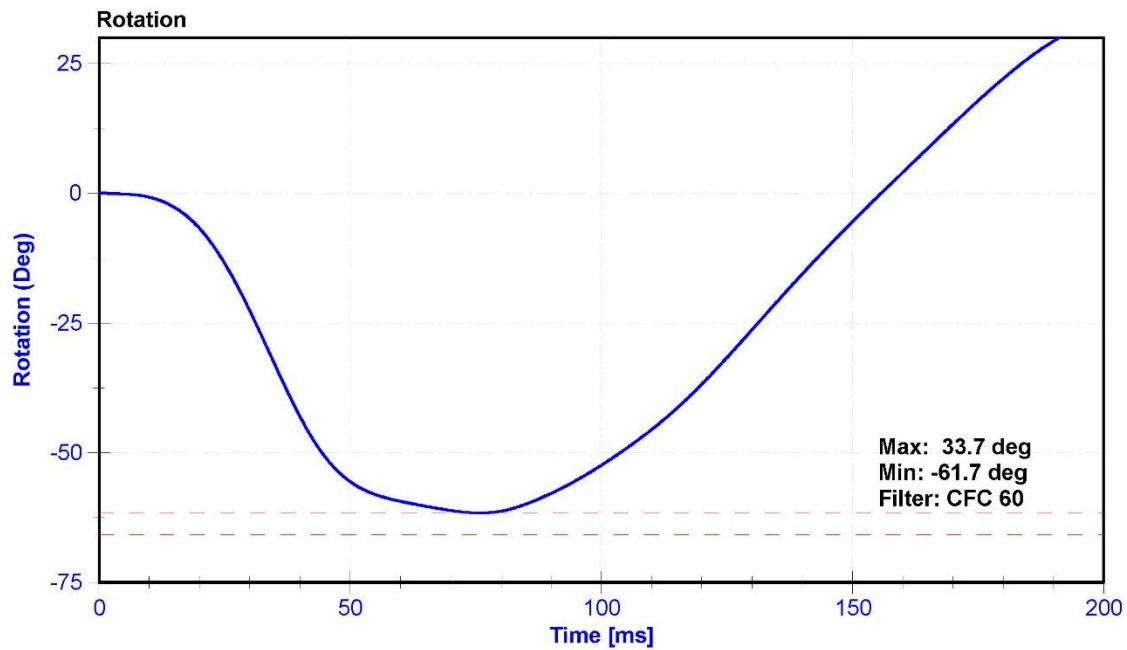
Results

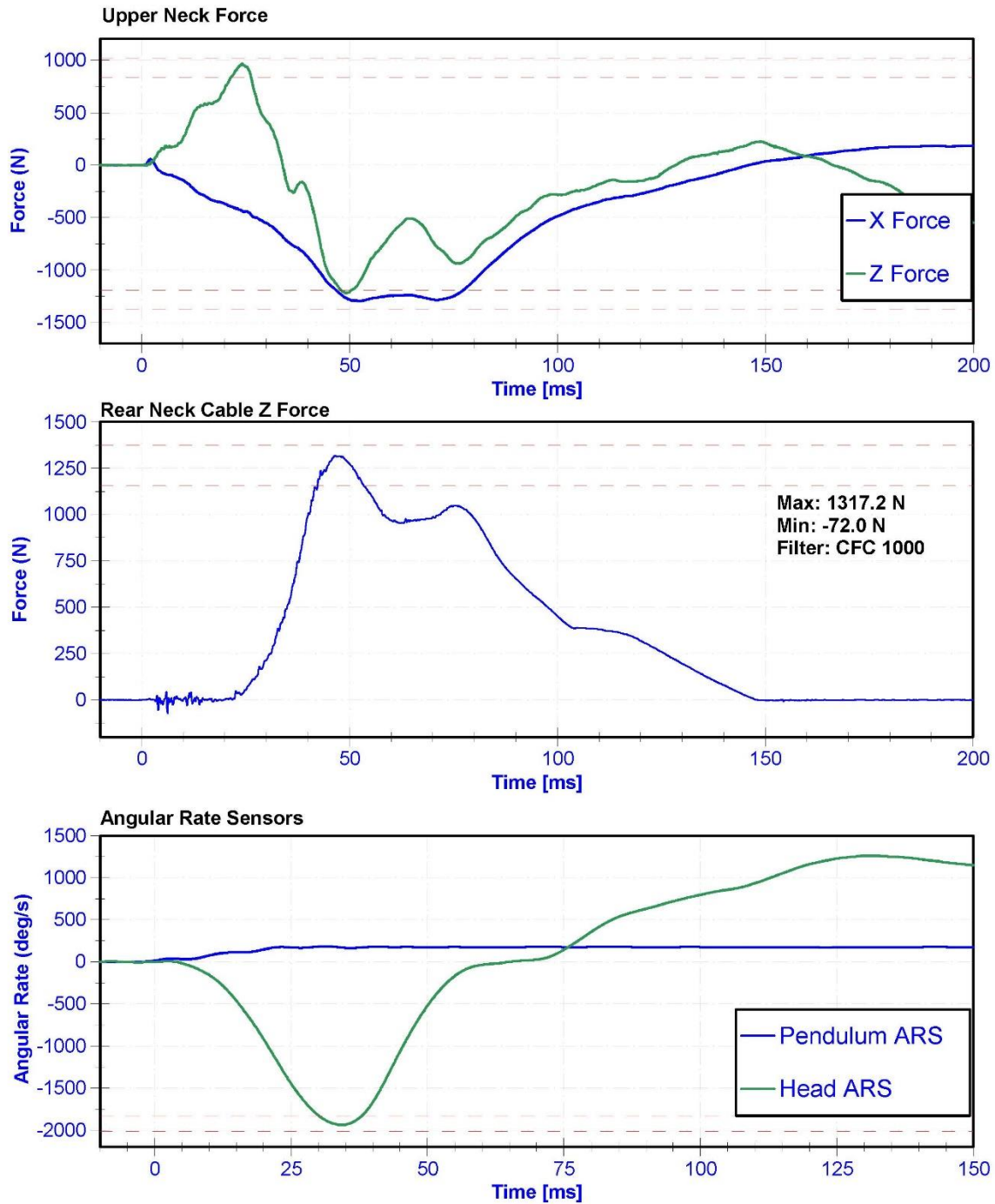
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	41.2	Pass
Velocity	4.95	5.05	m/s	5.015	Pass
Pendulum Impulse at 8ms	1.49	1.85	m/s	1.687	Pass
Pendulum Impulse at 16ms	3.08	3.86	m/s	3.502	Pass
Pendulum Impulse at 24ms	4.48	5.26	m/s	5.043	Pass
Peak Upper Neck Y Moment	26.2	30.5	Nm	29.16	Pass
Peak Upper Neck X Force	-1375	-1195	N	-1295.2	Pass
Maximum Upper Neck Z Force	835	1020	N	967.7	Pass
First Peak Rear Neck Cable Force	1157	1375	N	1317.2	Pass
Peak Head Y Angular Rate	-2017	-1828	deg/s	-1936.0	Pass
Peak Head Y Rotation	-65.8	-61.5	deg	-61.66	Pass
Rotation Decay Time to Zero	77.6	87.2	ms	79.95	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Upper Neck Load Cell	Humanetics 10380J14	LC-DN4324FX	5/18/2016	5/18/2017
Rear Neck Cable Load Cell	Humanetics 6005JFL	LC-80FZ 6005JFL	8/10/2016	8/10/2017
Pendulum ARS	DTS ARS-PRO-8K	ARS-6419	1/19/2016	1/18/2017
Head Y ARS	DTS ARS 18k	ARS6653	8/11/2016	8/11/2017







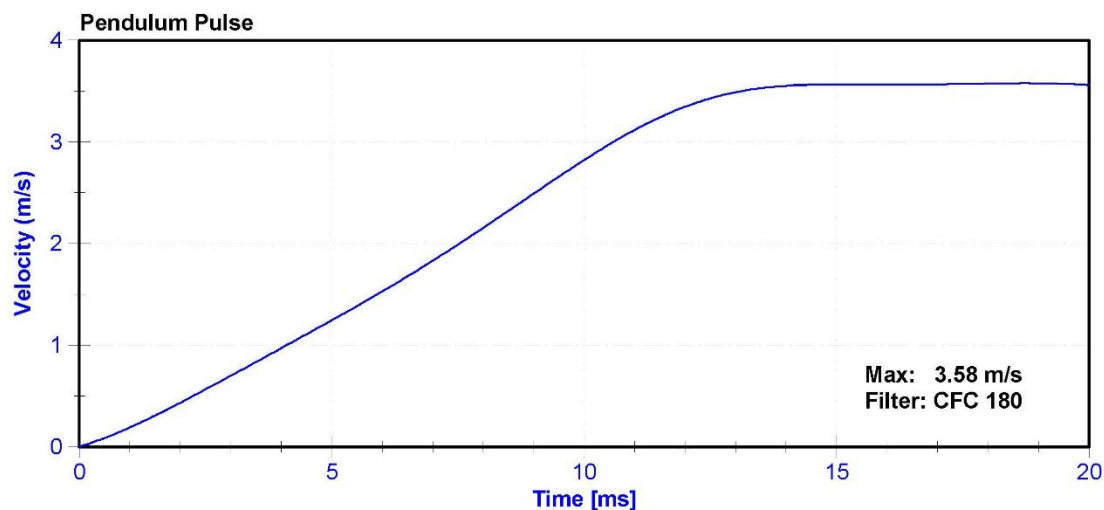
ATD Manufacturer	Humanetics	Test Technician	M. Geesey
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

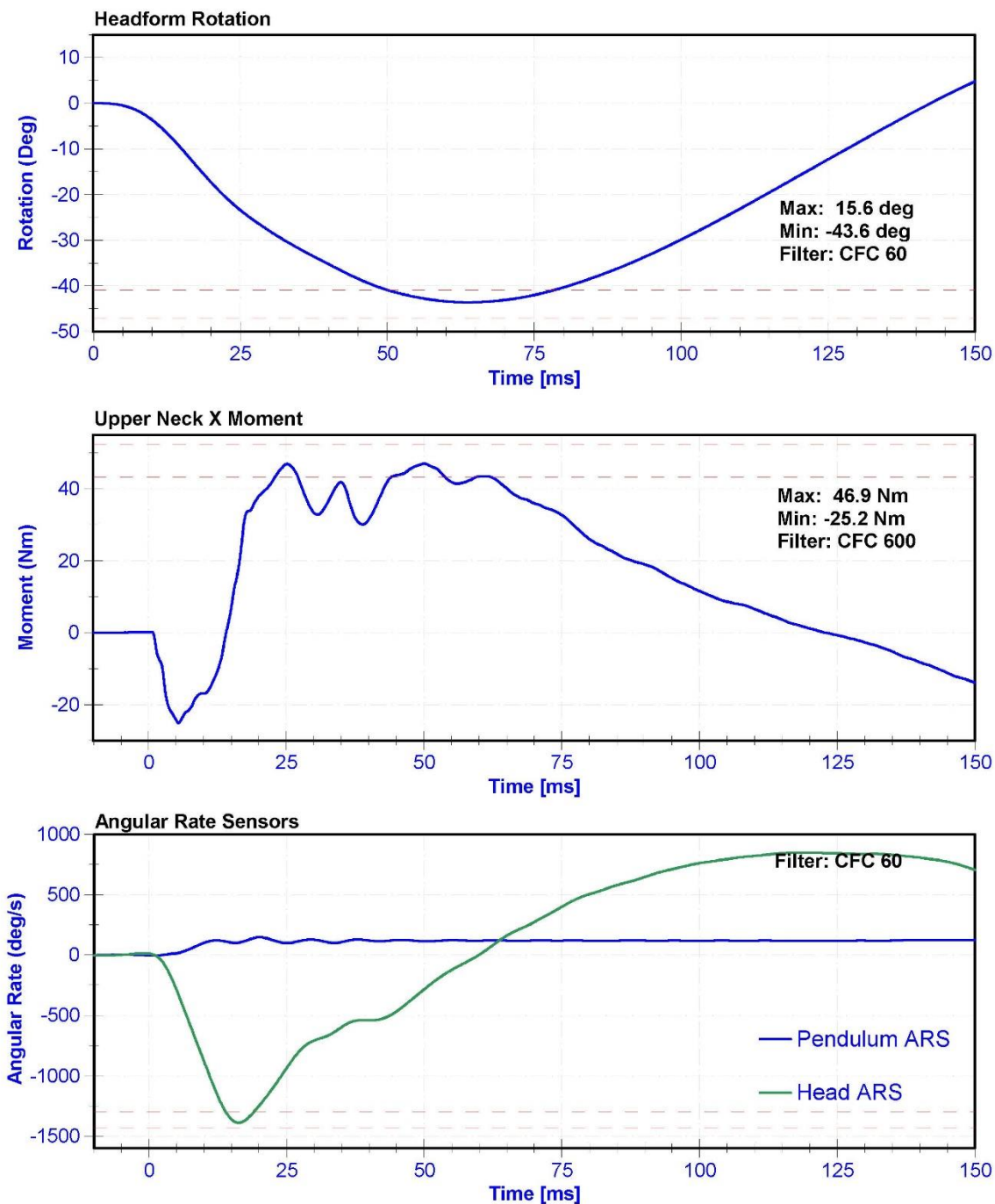
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	47.8	Pass
Velocity	3.35	3.45	m/s	3.446	Pass
Pendulum Impulse at 4ms	0.89	1.08	m/s	0.970	Pass
Pendulum Impulse at 8ms	2.04	2.36	m/s	2.154	Pass
Pendulum Impulse at 12ms	3.21	3.46	m/s	3.347	Pass
Peak Upper Neck X Moment after 40ms	43.2	52.2	Nm	46.90	Pass
Peak Head X Angular Rate	-1434	-1300	deg/s	-1389.0	Pass
Peak Head X Rotation	-47.0	-40.9	deg	-43.61	Pass
Rotational Decay Time to Zero	78.0	83.4	ms	78.80	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Upper Neck Load Cell	Humanetics 10380J14	LC-DN4324MX	5/18/2016	5/18/2017
Pendulum ARS	DTS ARS-PRO-8K	ARS-6419	1/19/2016	1/18/2017
Head X ARS	DTS ARS 18k	ARS4734	8/11/2016	8/11/2017





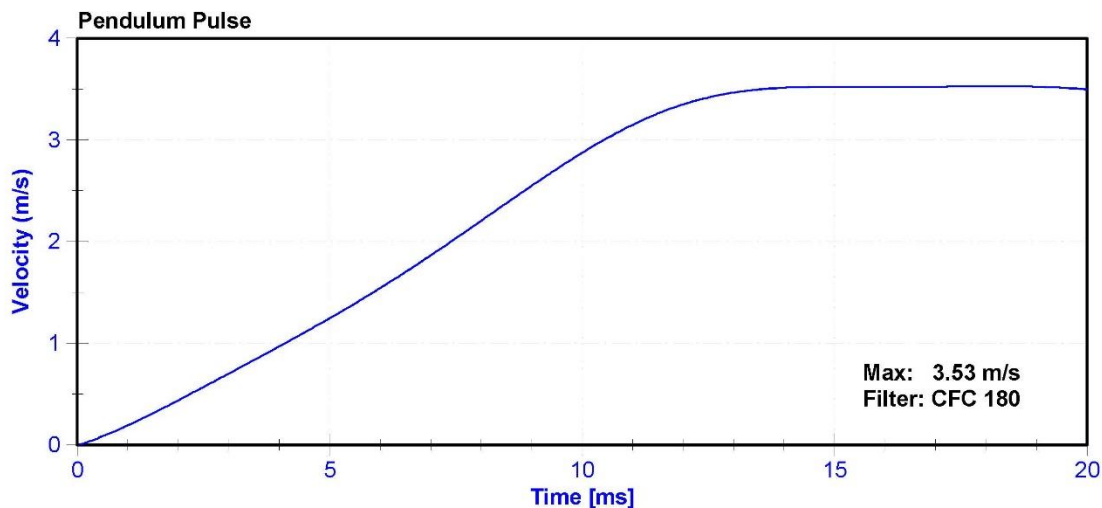
ATD Manufacturer	Humanetics	Test Technician	M. Geesey
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

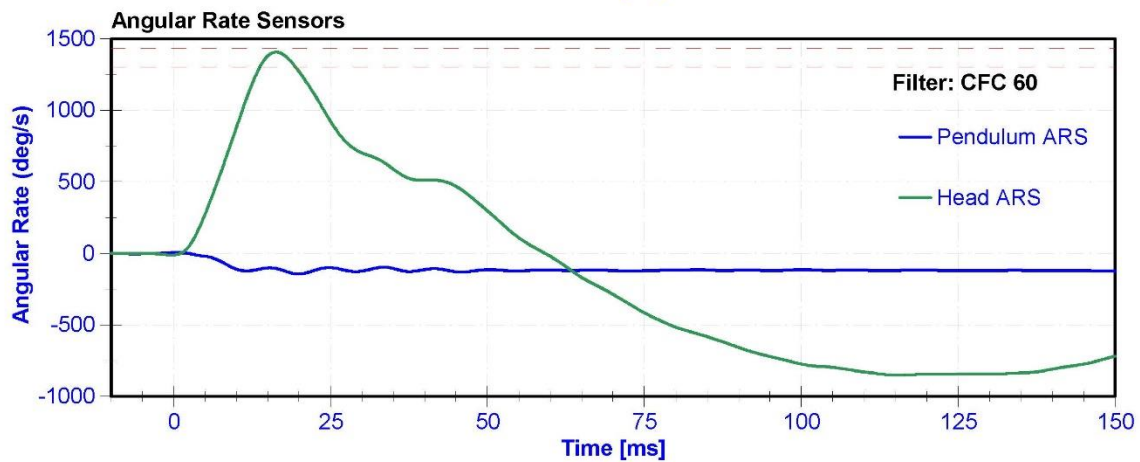
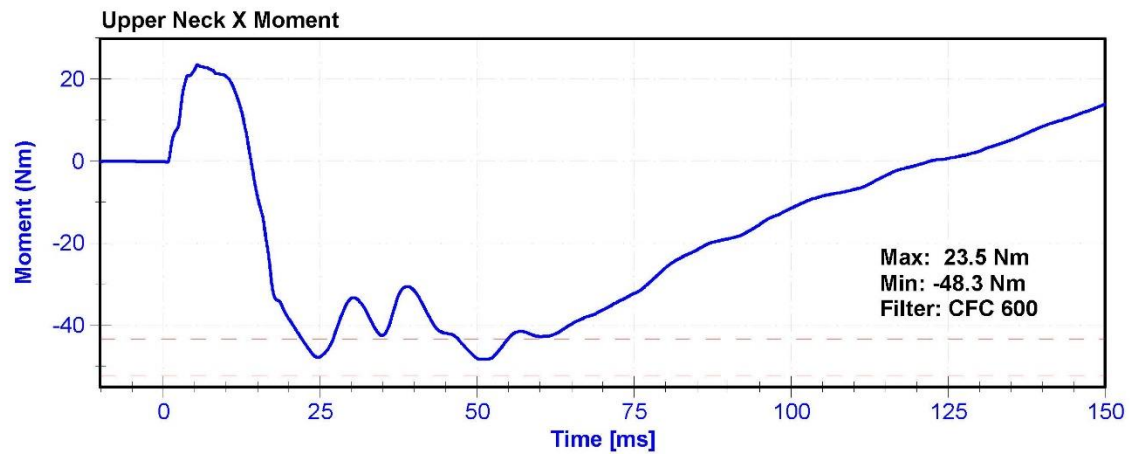
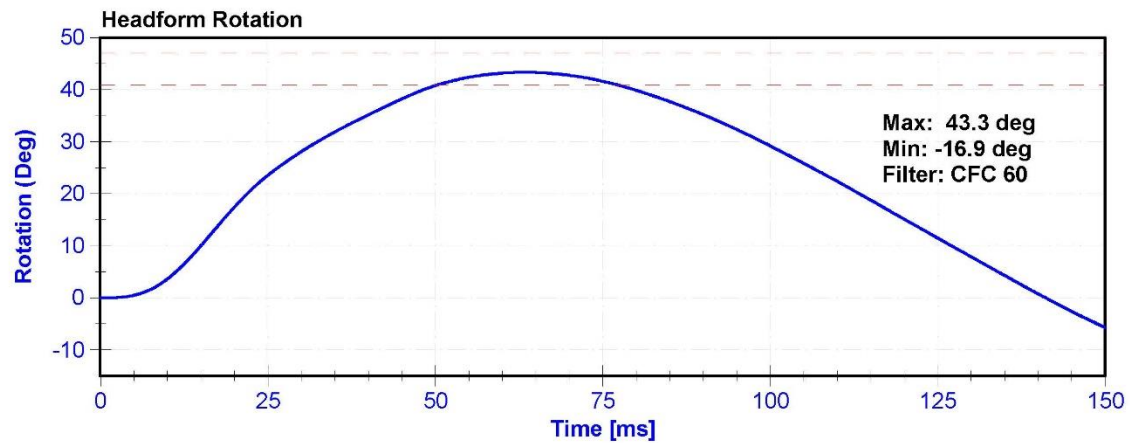
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	47.1	Pass
Velocity	3.35	3.45	m/s	3.42	Pass
Pendulum Impulse at 4ms	0.89	1.08	m/s	0.969	Pass
Pendulum Impulse at 8ms	2.04	2.36	m/s	2.205	Pass
Pendulum Impulse at 12ms	3.21	3.46	m/s	3.350	Pass
Peak Upper Neck X Moment after 40ms	-52.2	-43.2	Nm	-48.31	Pass
Peak Head X Angular Rate	1300	1434	deg/s	1406.9	Pass
Peak Head X Rotation	40.9	47.0	deg	43.33	Pass
Rotation Decay Time to Zero	78.0	83.4	ms	77.75	Fail

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Upper Neck Load Cell	Humanetics 10380J14	LC-DN4324MX	5/18/2016	5/18/2017
Pendulum ARS	DTS ARS-PRO-8K	ARS-6419	1/19/2016	1/18/2017
Head X ARS	DTS ARS 18k	ARS4734	8/11/2016	8/11/2017





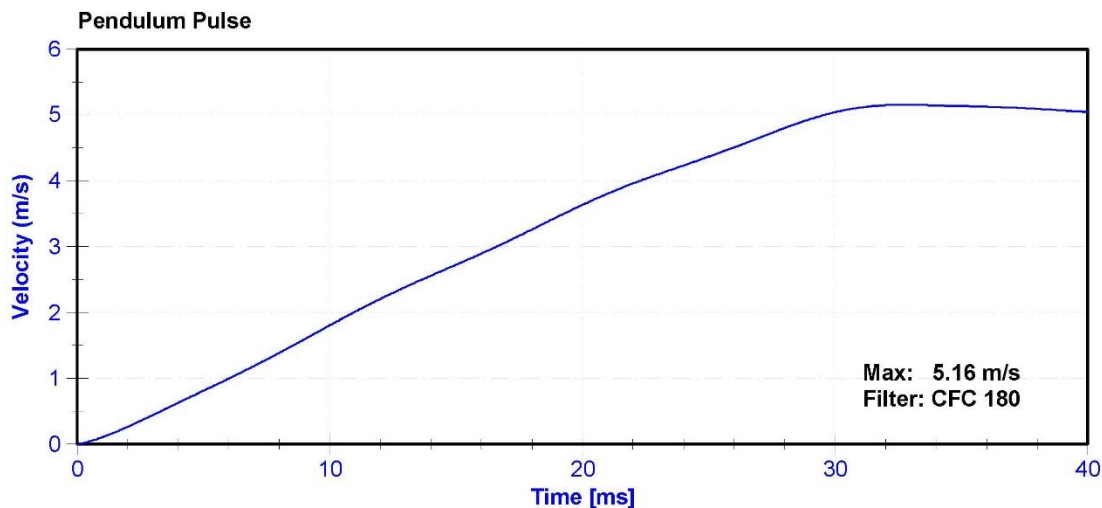
ATD Manufacturer	Humanetics	Test Technician	M. Geesey
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

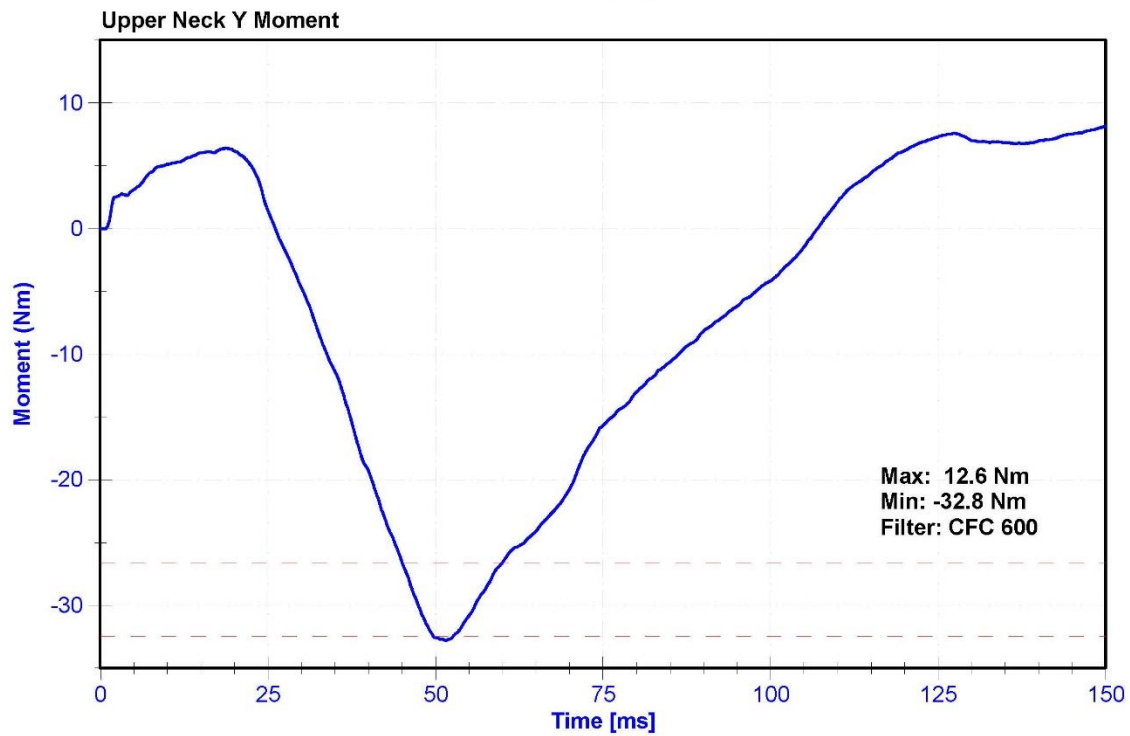
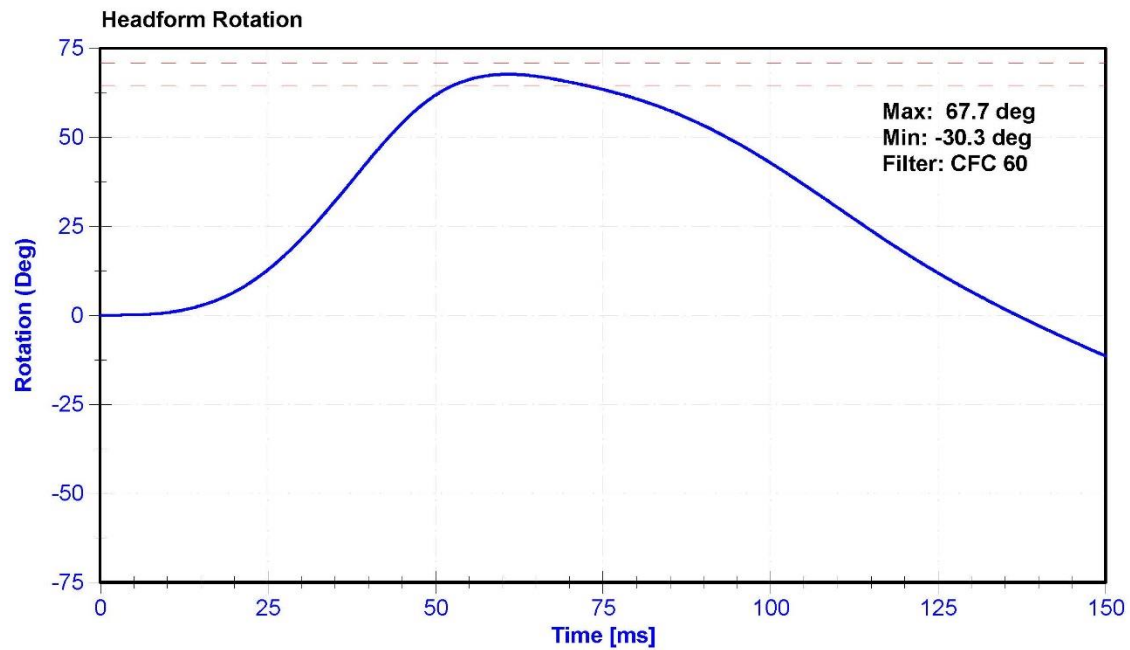
Results

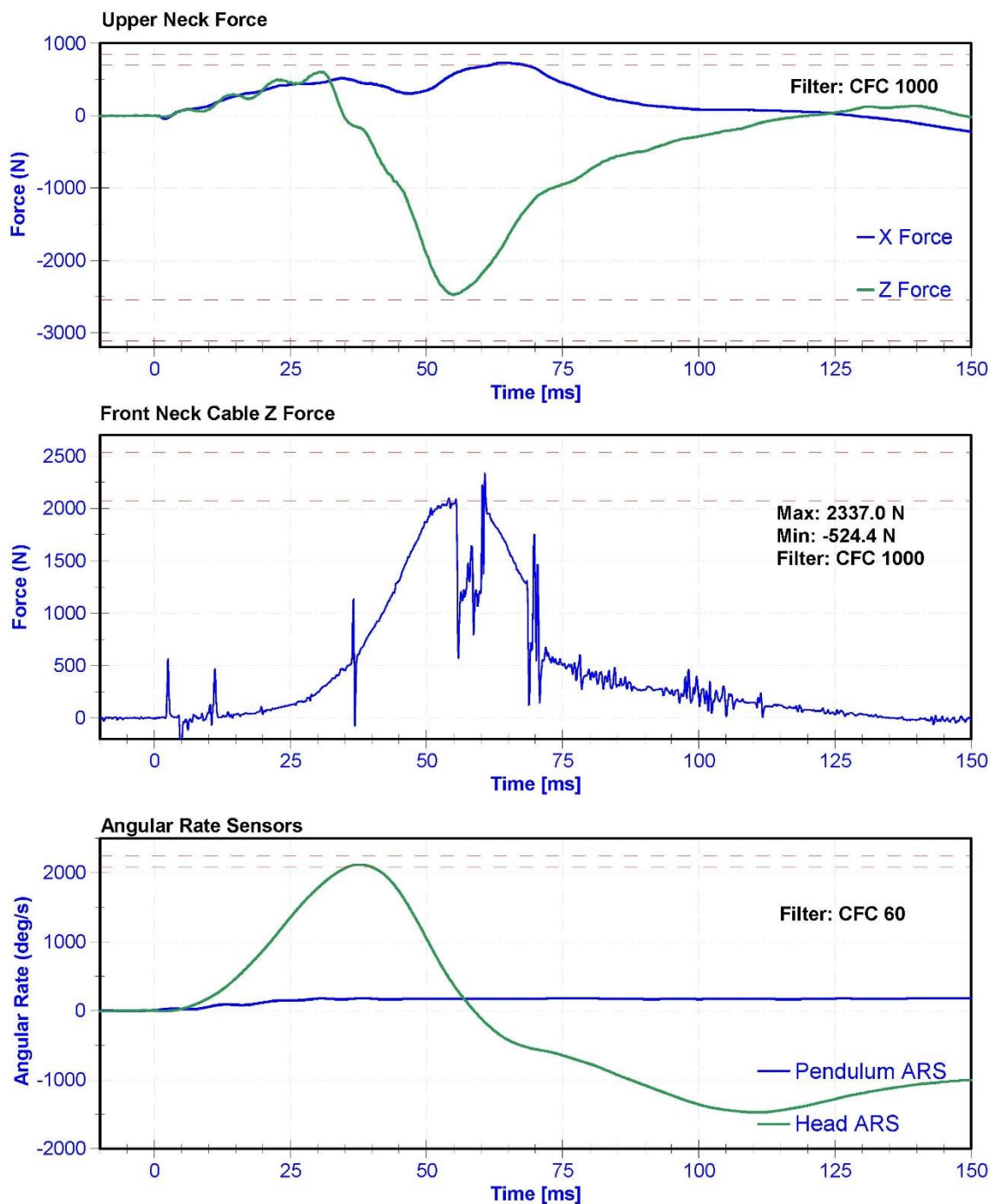
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	46.9	Pass
Velocity	4.95	5.05	m/s	5.015	Pass
Pendulum Impulse at 10ms	1.76	1.91	m/s	1.806	Pass
Pendulum Impulse at 20ms	3.50	3.75	m/s	3.634	Pass
Pendulum Impulse at 30ms	4.88	5.20	m/s	5.041	Pass
Peak Upper Neck Y Moment	-32.5	-26.6	Nm	-32.79	Fail
Peak Upper Neck X Force	699	854	N	730.6	Pass
Peak Upper Neck Z Force	-3115	-2549	N	-2478.4	Fail
Peak Front Neck Cable Force	2074	2535	N	2337.0	Pass
Peak Head Y Angular Rate	2084	2247	deg/s	2120.7	Pass
Peak Head Y Rotation	64.5	70.9	deg	67.70	Pass
Rotational Decay Time to Zero	74.2	78.7	ms	75.95	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Upper Neck Load Cell	Humanetics 10380J14	LC-DN4324FX	5/18/2016	5/18/2017
Fr Neck Cable Load	Humanetics 6005JFL	LC-DI7617FZ	8/10/2016	8/10/2017
Pendulum ARS	DTS ARS-PRO-8K	ARS-6419	1/19/2016	1/18/2017
Head ARS Y-Axis	DTS ARS 18k	ARS6653	8/11/2016	8/11/2017







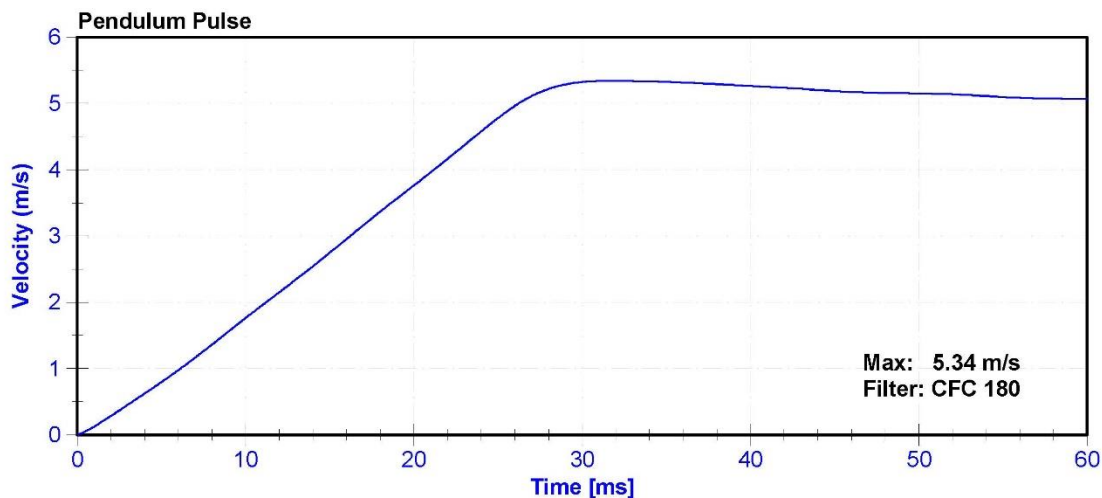
ATD Manufacturer	Humanetics	Test Technician	M. Geesey
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

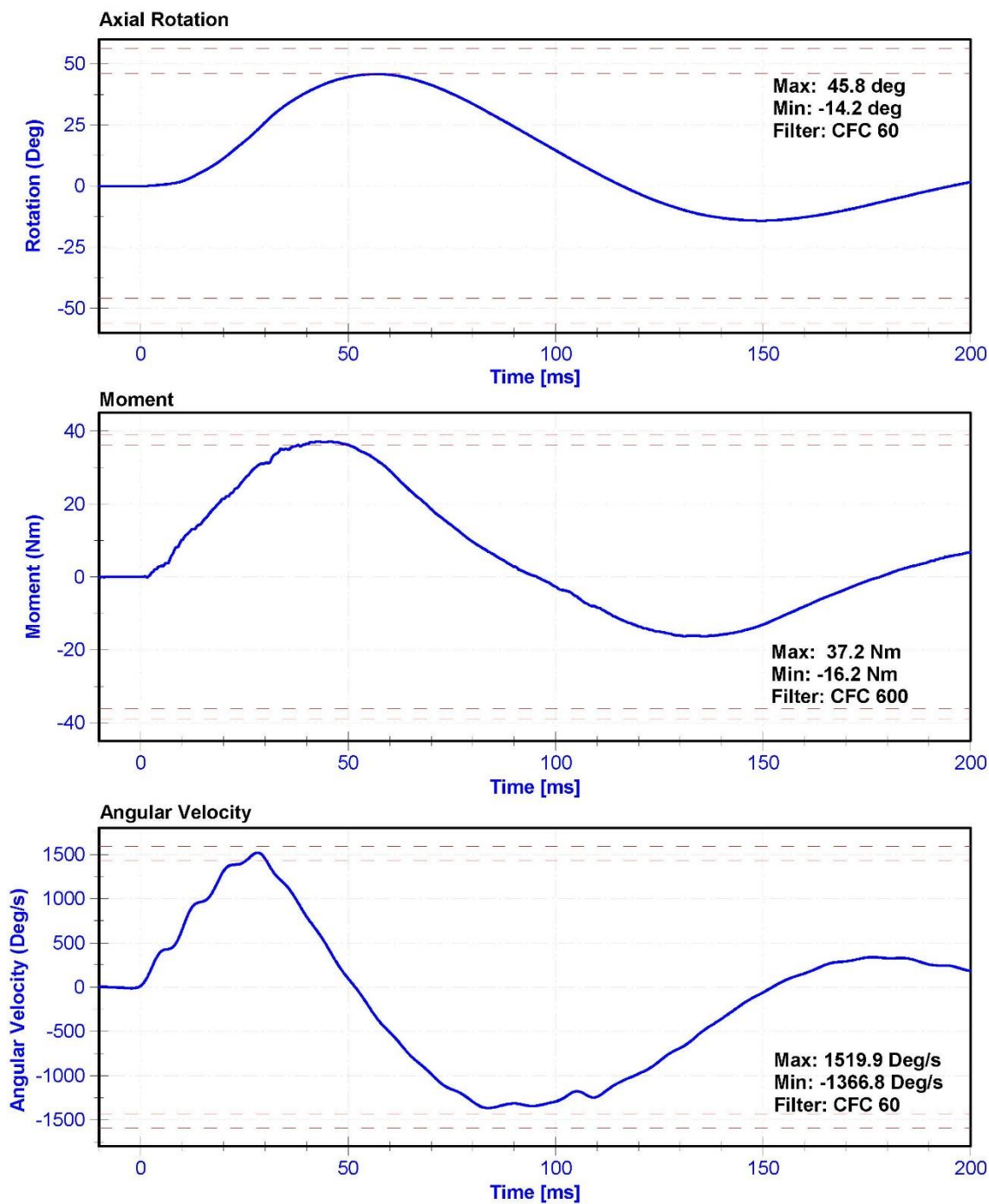
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	47.2	Pass
Velocity	4.95	5.05	m/s	5.045	Pass
Pendulum Impulse at 10ms	1.72	1.98	m/s	1.762	Pass
Pendulum Impulse at 15ms	2.67	2.97	m/s	2.748	Pass
Pendulum Impulse at 20ms	3.59	3.98	m/s	3.764	Pass
Pendulum Impulse at 25ms	4.43	4.92	m/s	4.780	Pass
Peak Upper Neck Z Moment	36.1	39.0	Nm	37.18	Pass
Peak Neck Axial Rotation	46.0	56.3	deg	45.84	Fail
Rotation Decay Time to Zero	50.9	62.2	ms	59.15	Pass
Peak Upper Neck Angular Velocity	1431	1591	deg/s	1519.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Neck Fixture Potentiometer	Servo 14CB1-3615	DS-0001	10/21/2015	10/20/2016
Upper Neck Load Cell	Humanetics 10380JI4	LC-DN4324MZ	5/18/2016	5/18/2017
Upper Neck ARS	DTS ARS-PRO-8K	ARS-6424	1/19/2016	1/18/2017





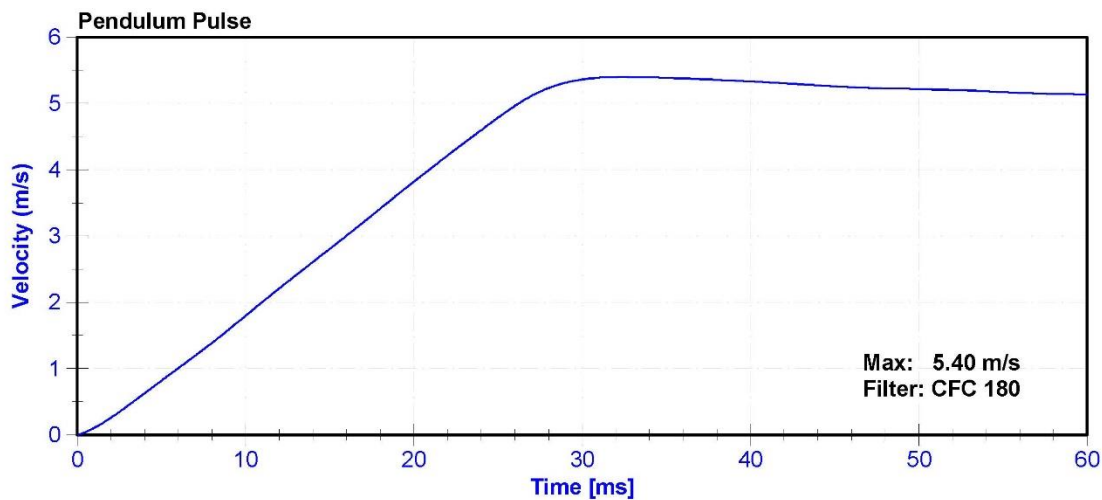
ATD Manufacturer	Humanetics	Test Technician	M. Geesey
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

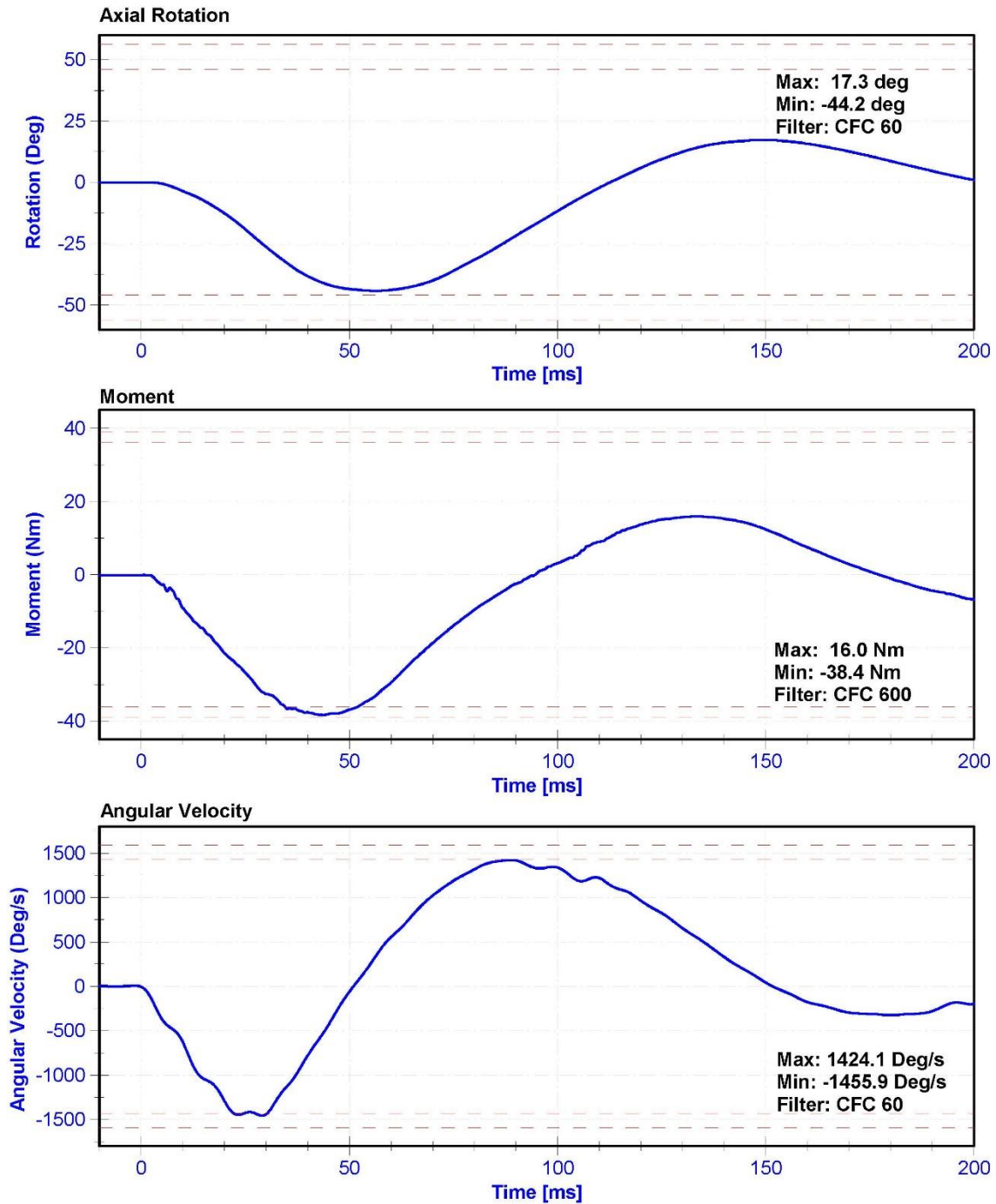
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	46.7	Pass
Velocity	4.95	5.05	m/s	5.045	Pass
Pendulum Impulse at 10ms	1.72	1.98	m/s	1.796	Pass
Pendulum Impulse at 15ms	2.67	2.97	m/s	2.806	Pass
Pendulum Impulse at 20ms	3.59	3.98	m/s	3.820	Pass
Pendulum Impulse at 25ms	4.43	4.92	m/s	4.786	Pass
Peak Upper Neck Z Moment	36.1	39.0	Nm	38.39	Pass
Peak Neck Axial Rotation	46.0	56.3	deg	44.23	Fail
Rotation Decay Time to Zero	50.9	62.2	ms	53.50	Pass
Peak Upper Neck Angular Velocity	1431	1591	deg/s	1455.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Neck Fixture Potentiometer	Servo 14CB1-3615	DS-0001	10/21/2015	10/20/2016
Upper Neck Load Cell	Humanetics 10380JI4	LC-DN4324MZ	5/18/2016	5/18/2017
Upper Neck ARS	DTS ARS-PRO-8K	ARS-6424	1/19/2016	1/18/2017





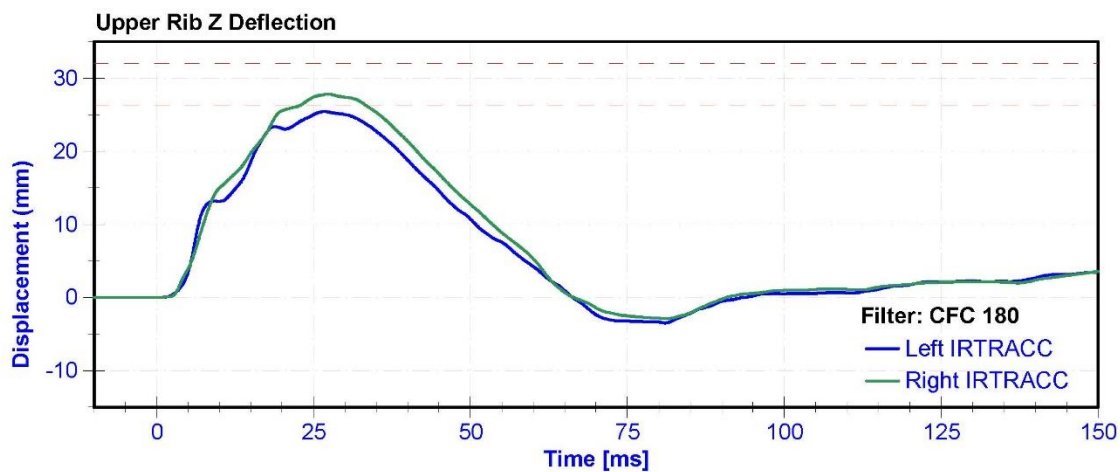
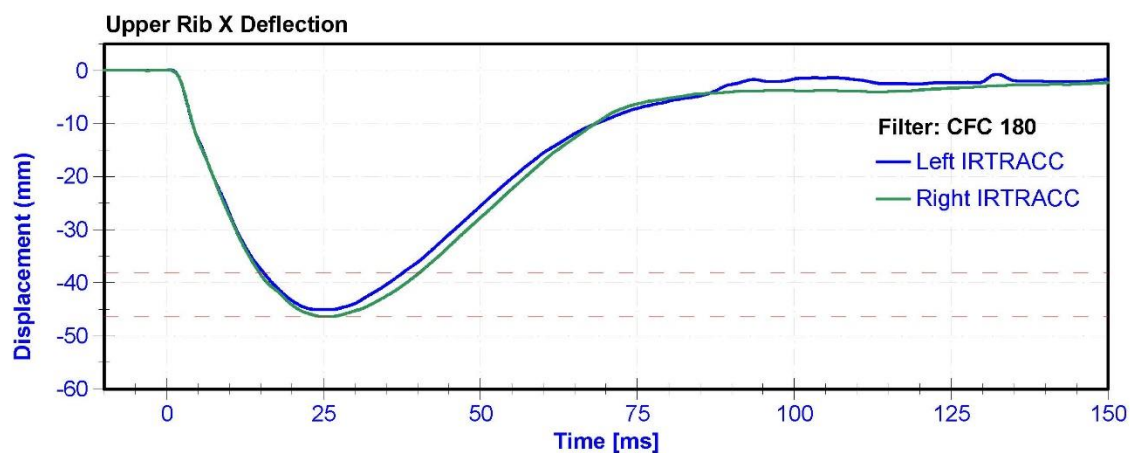
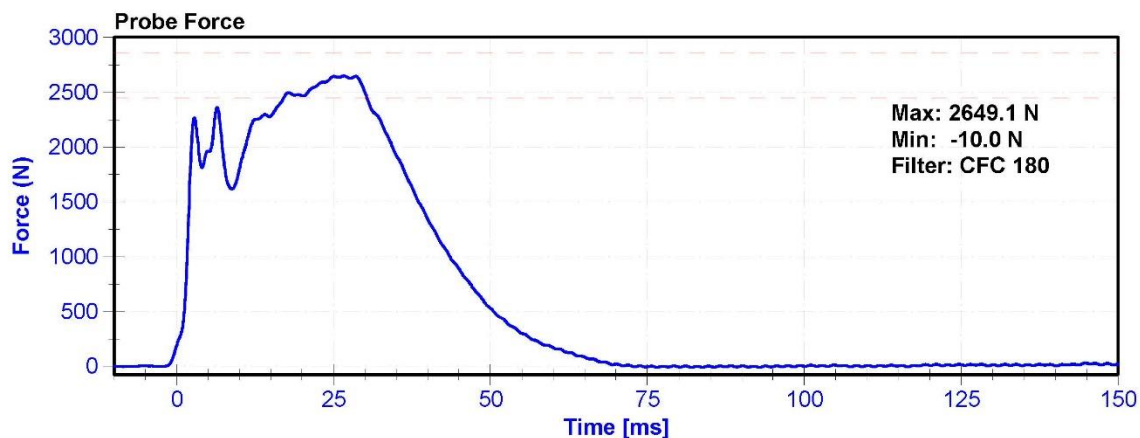
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

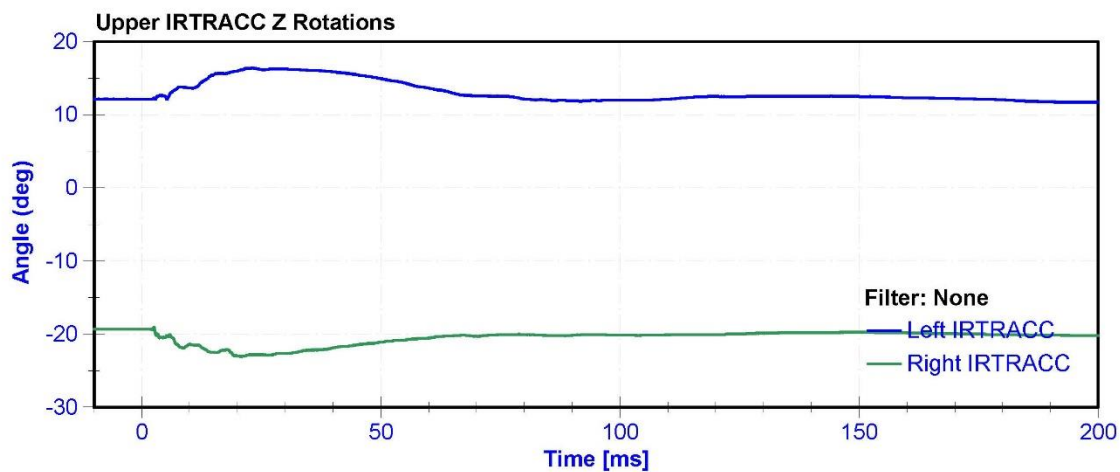
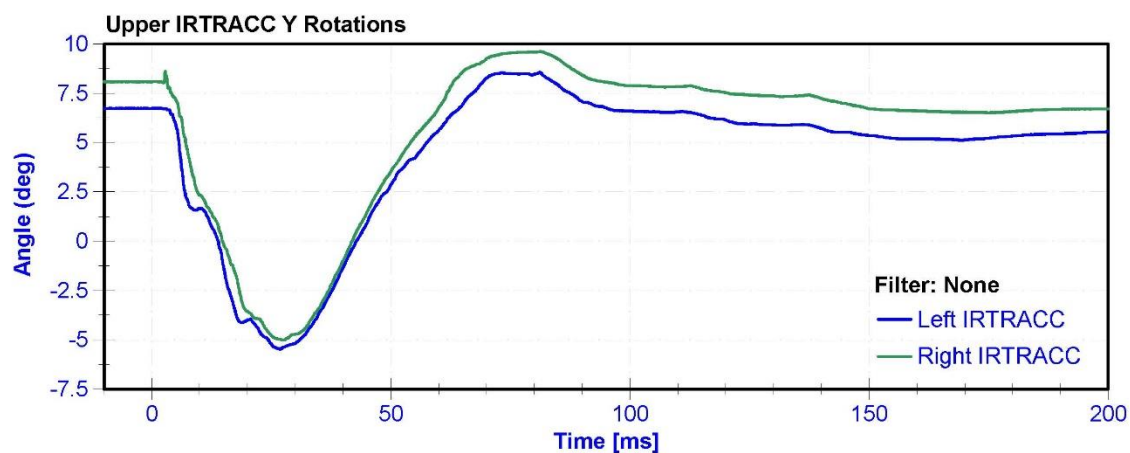
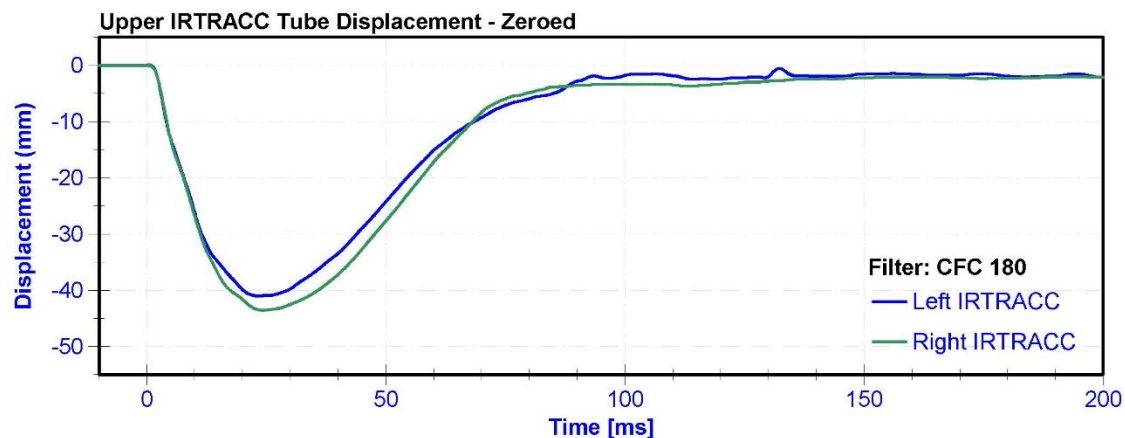
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.3	Pass
Humidity	10	70	%	39.2	Pass
Impact Velocity	4.25	4.35	m/s	4.305	Pass
Probe Force	2449	2855	N	2649.1	Pass
Upper Left X Rib Deflection	-46.4	-38.0	mm	-45.06	Pass
Upper Right X Rib Deflection	-46.4	-38.0	mm	-46.35	Pass
Left/Right X Rib Deviation	-7.00	7.00	mm	1.290	Pass
Upper Left Z Rib Deflection	26.2	32.0	mm	25.41	Fail
Upper Right Z Rib Deflection	26.2	32.0	mm	27.78	Pass
Left/Right Z Rib Deviation	-7	7.00	mm	-2.368	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017
Upper Left IRTRACC	Humanetics IF-364-C-R3	DS-AC2287	9/7/2016	9/7/2017
Upper Left Y Potentiometer	Sfernice 9945	DS-DI2383	9/7/2016	9/7/2017
Upper Left Z Potentiometer	Sfernice 9945	DS-DI2382	9/7/2016	9/7/2017
Upper Right IRTRACC	Humanetics IF-364-C-R3	DS-DJ2613	9/8/2016	9/8/2017
Upper Right Y Potentiometer	Sfernice 9945	DS-DI7753	9/8/2016	9/8/2017
Upper Right Z Potentiometer	Sfernice 9945	DS-DI7752	9/8/2016	9/8/2017





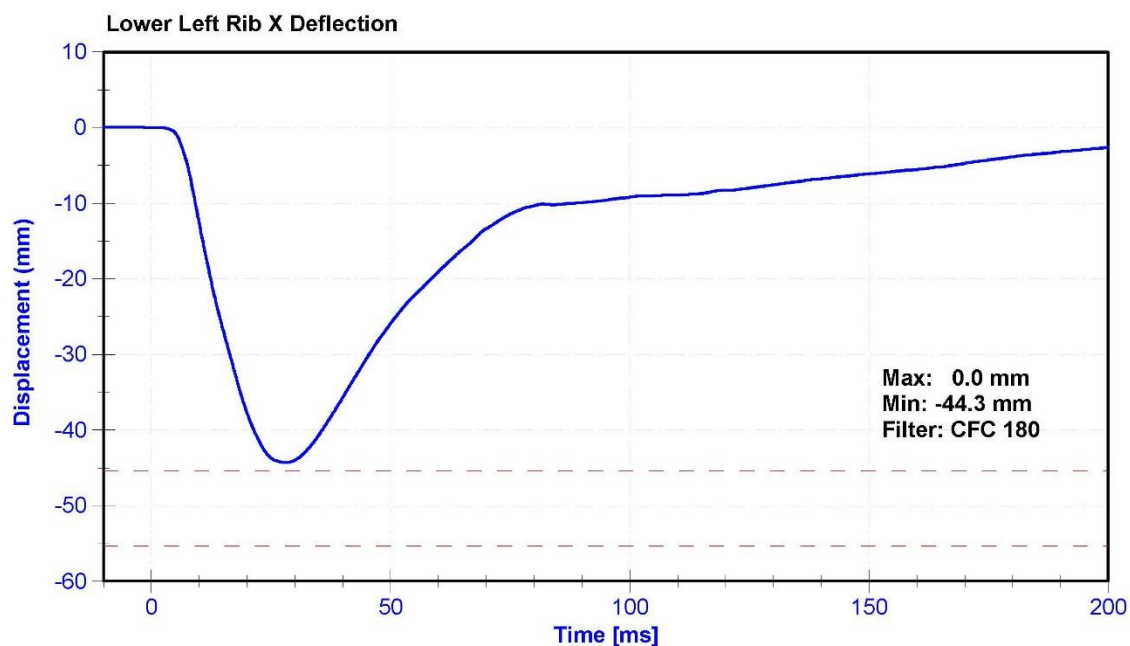
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

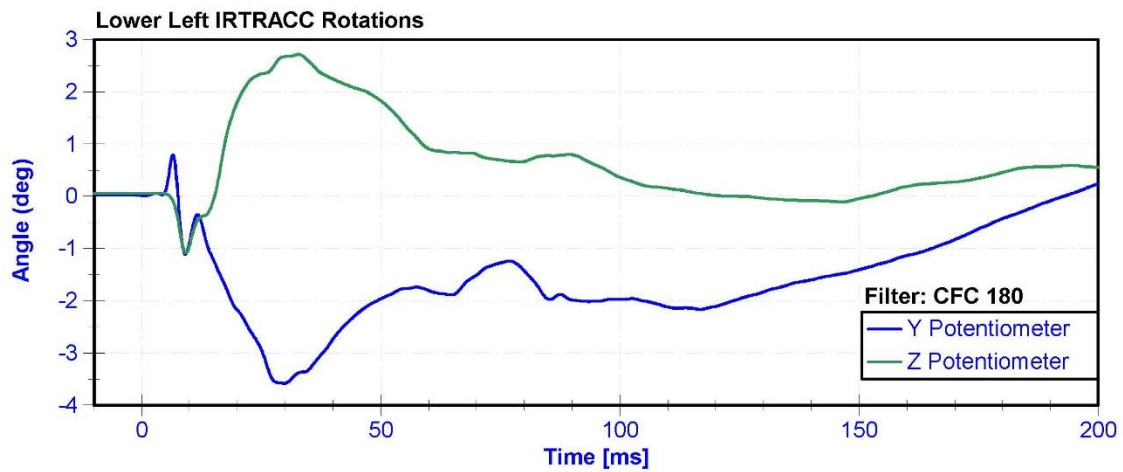
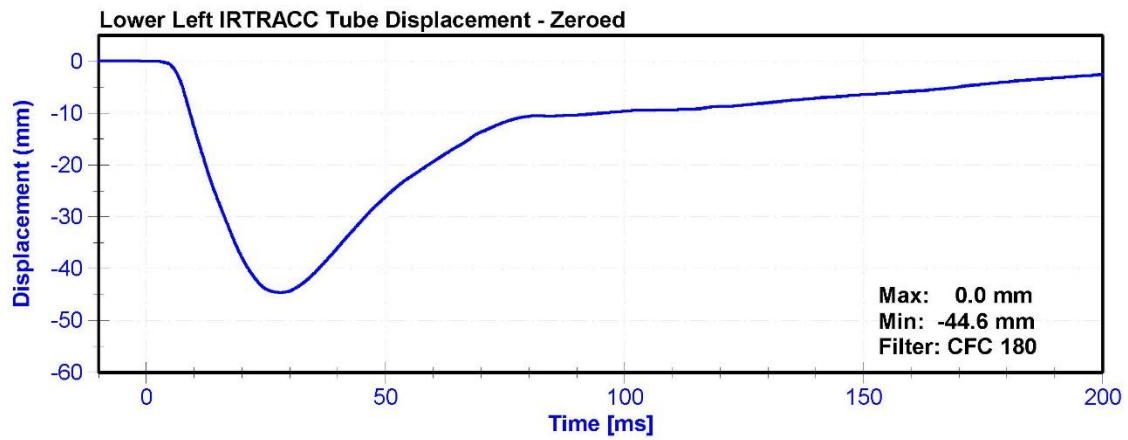
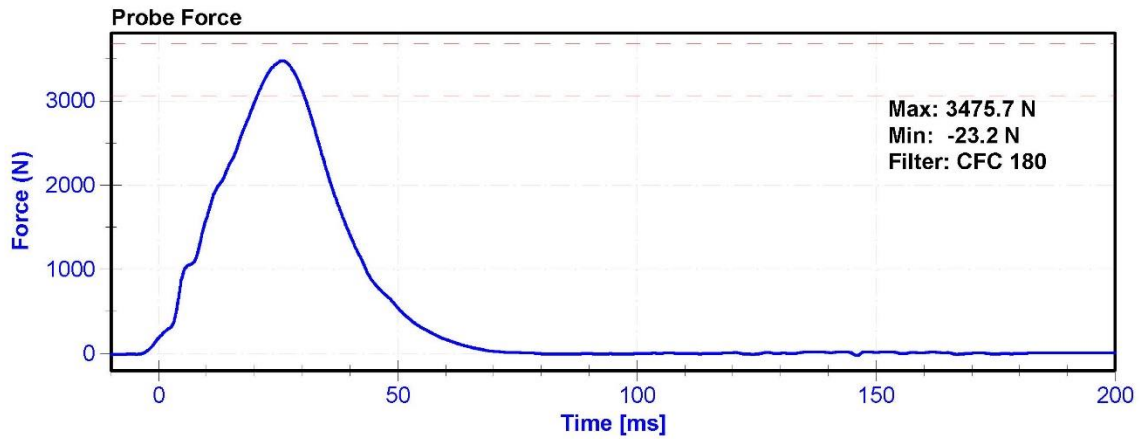
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	51.5	Pass
Impact Velocity	4.25	4.35	m/s	4.348	Pass
Peak Left X Rib Deflection	-55.3	-45.4	mm	-44.30	Fail
Probe Force during Peak Deflection	3058	3680	N	3475.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accel	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017
Lower Left IRTRACC	Humanetics IF-364-C-R3	DS-DS6353	9/8/2016	9/8/2017
Lower Left Y Potentiometer	Sfernice 9945	DS-DM4781	9/8/2016	9/8/2017
Lower Left Z Potentiometer	Sfernice 9945	DS-DS4092	9/8/2016	9/8/2017





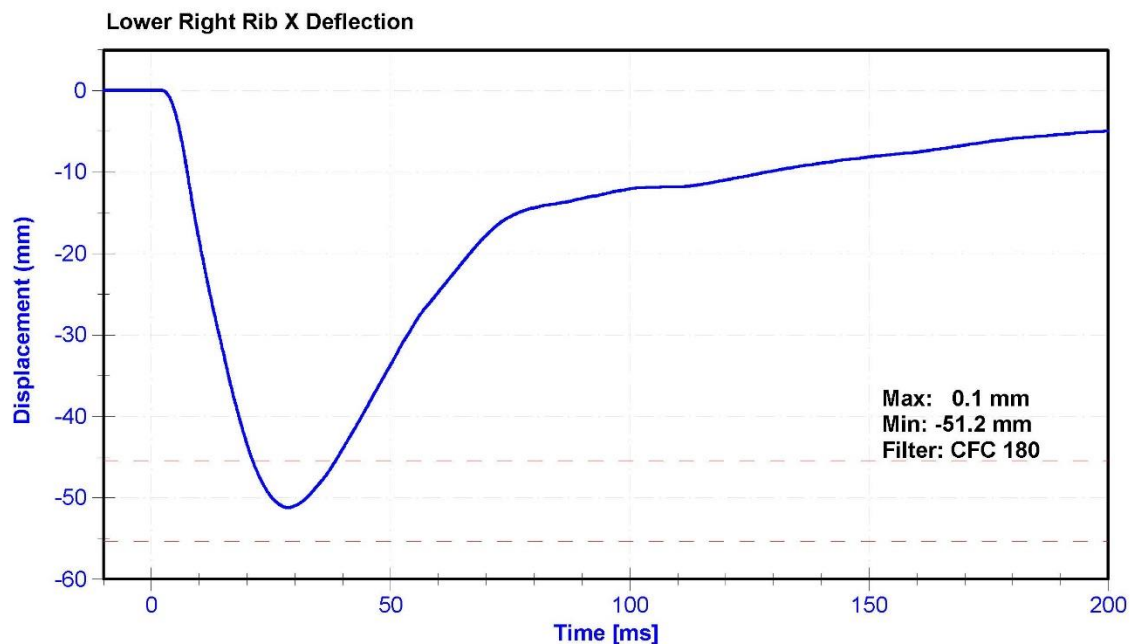
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

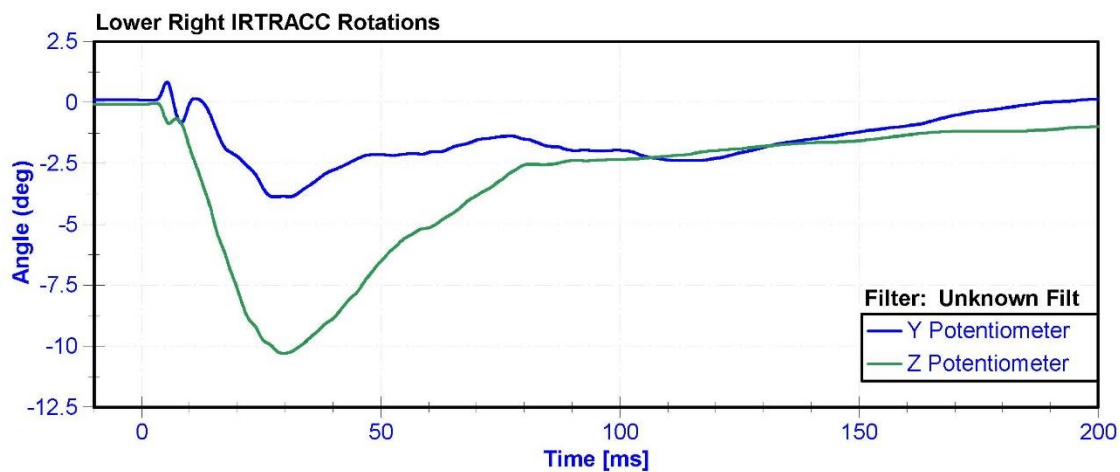
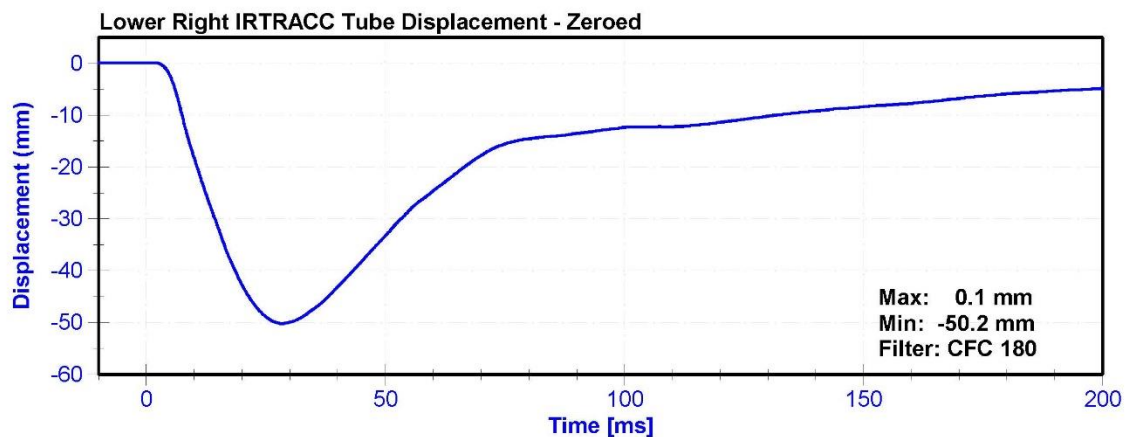
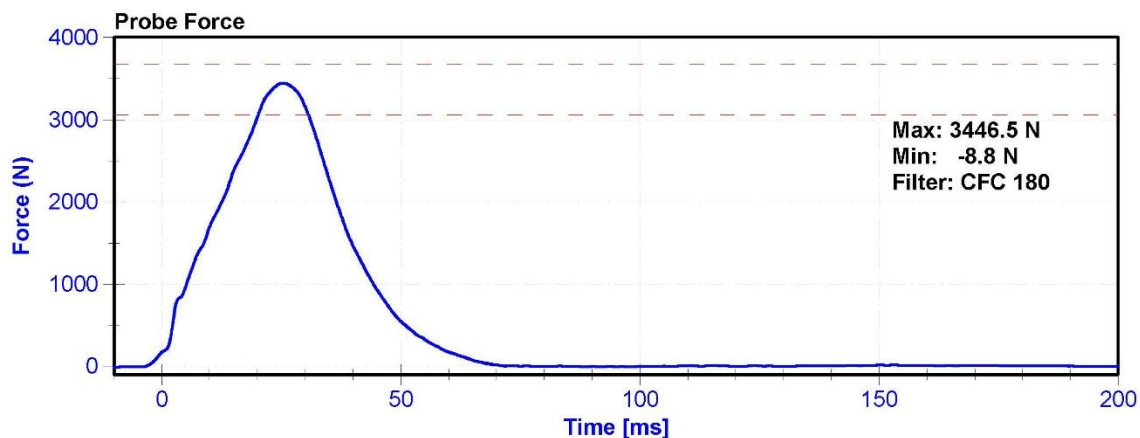
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	51.5	Pass
Impact Velocity	4.25	4.35	m/s	4.348	Pass
Peak Right X Rib Deflection	-55.3	-45.4	mm	-51.18	Pass
Probe Force during Peak Deflection	3058	3680	N	3446.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accel	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017
Lower Right IRTACC	Humanetics IF-364-C-R3	DS-DS6354	9/7/2016	9/7/2017
Lower Right Y Potentiometer	Sfernice 9945	DS-DM4776	9/7/2016	9/7/2017
Lower Right Z Potentiometer	Sfernice 9945	DS-DM4777	9/7/2016	9/7/2017







Certification Report
THOR 50th Abdomen Impact - NHTSA Aug 2016

2016-09-27 09:20:55

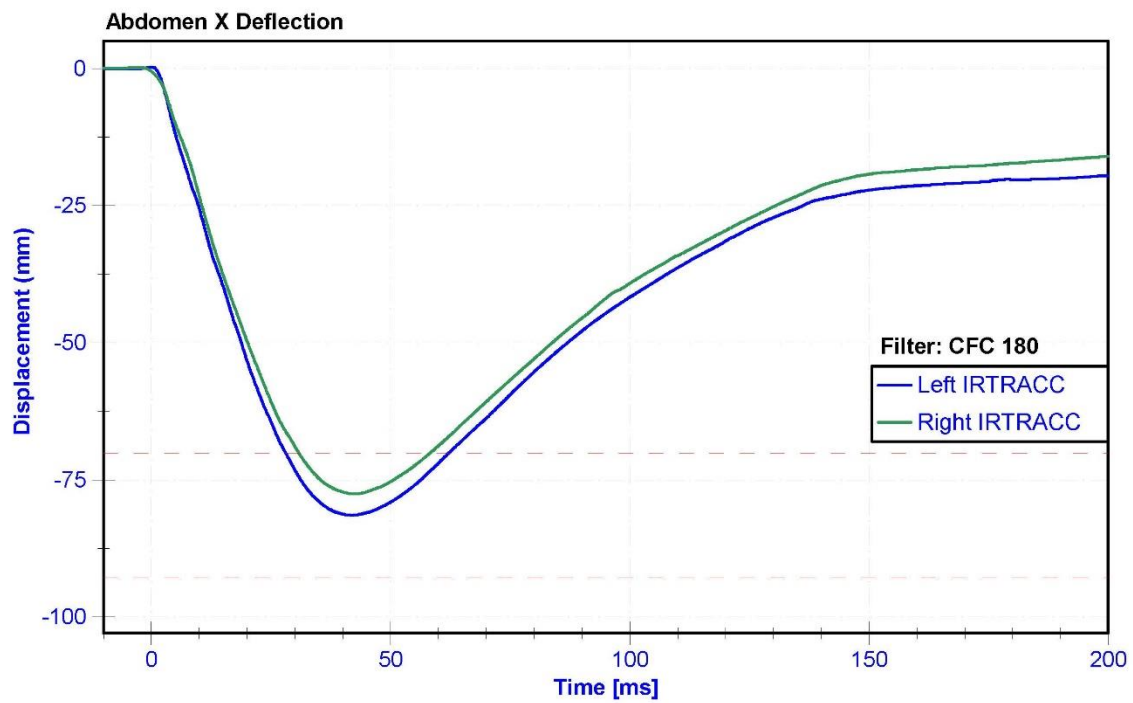
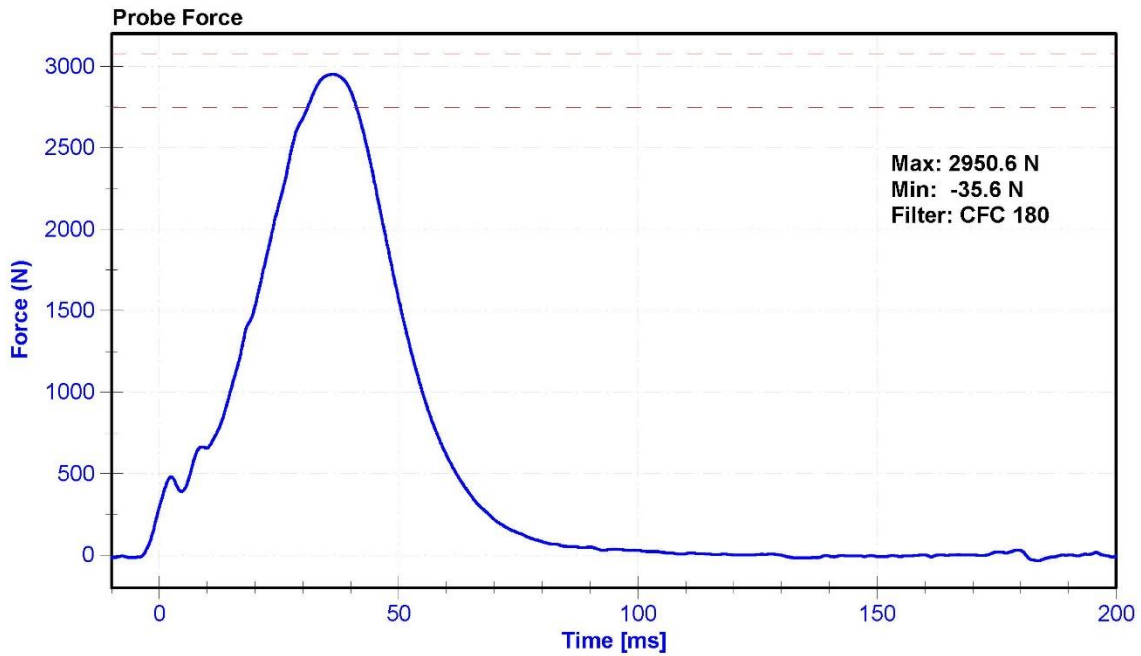
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

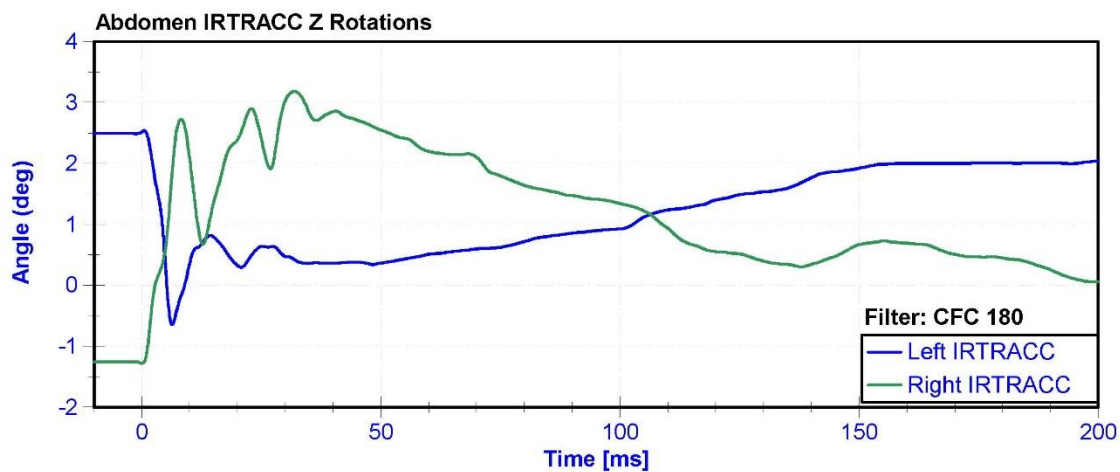
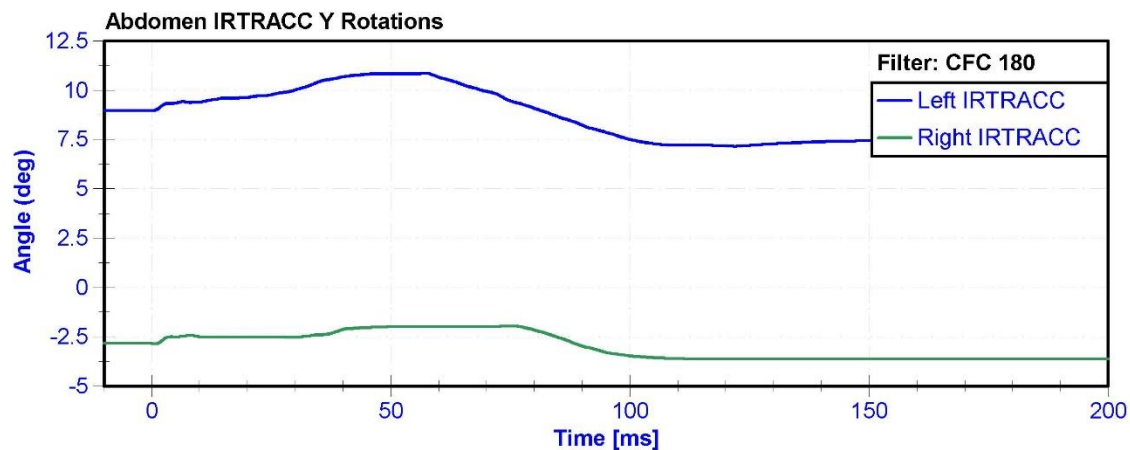
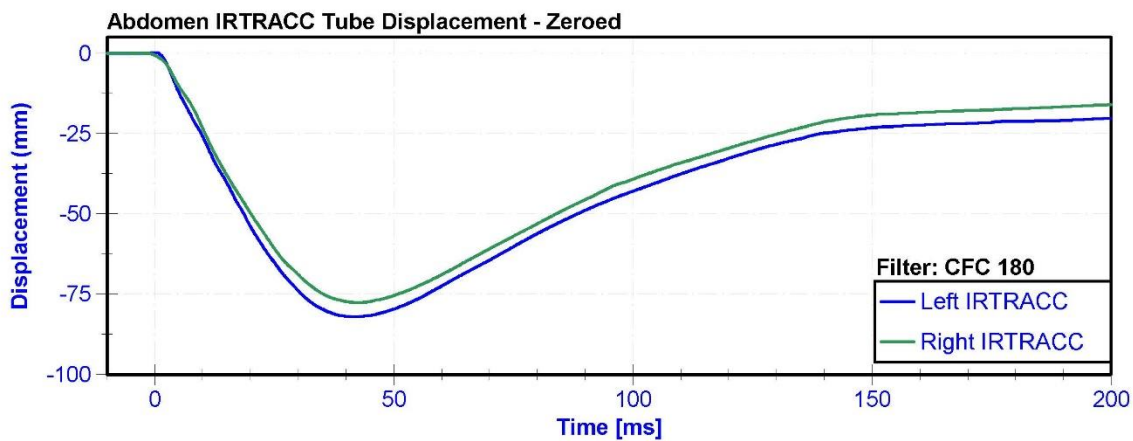
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	48.2	Pass
Impact Velocity	3.25	3.35	m/s	3.309	Pass
Probe Force	2746	3078	N	2950.6	Pass
Left Abdomen X Deflection	-92.9	-70.1	mm	-81.40	Pass
Right Abdomen X Deflection	-92.9	-70.1	mm	-77.52	Pass
Left/Right X Deviation	-12.00	12.00	mm	-3.878	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accel	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017
Abdomen Left IRTRACC	Humanetics	DS-176	9/6/2016	9/6/2017
Abdomen Left Y Potentiometer	Sfernice 9945	DS-DO7284	9/6/2016	9/6/2017
Abdomen Left Z Potentiometer	Sfernice 9945	DS-DO7283	9/6/2016	9/6/2017







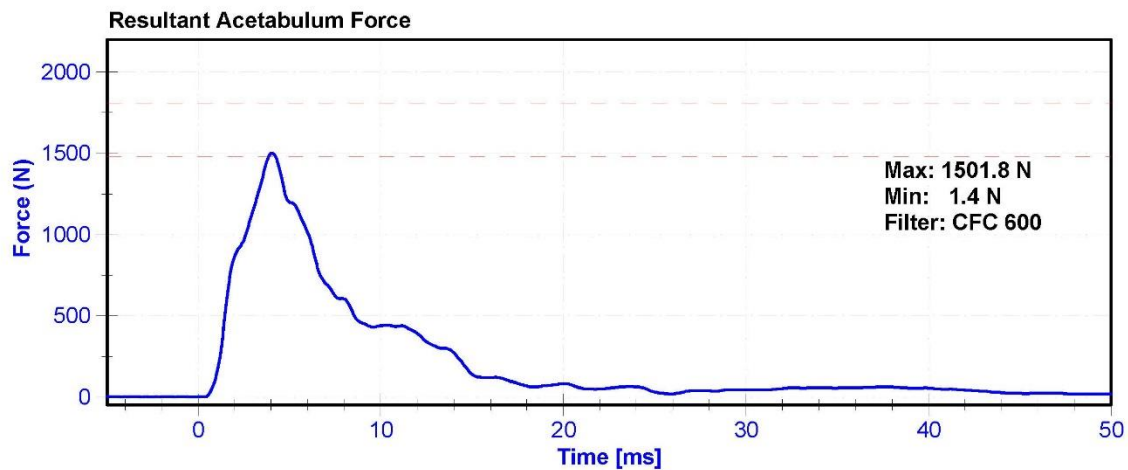
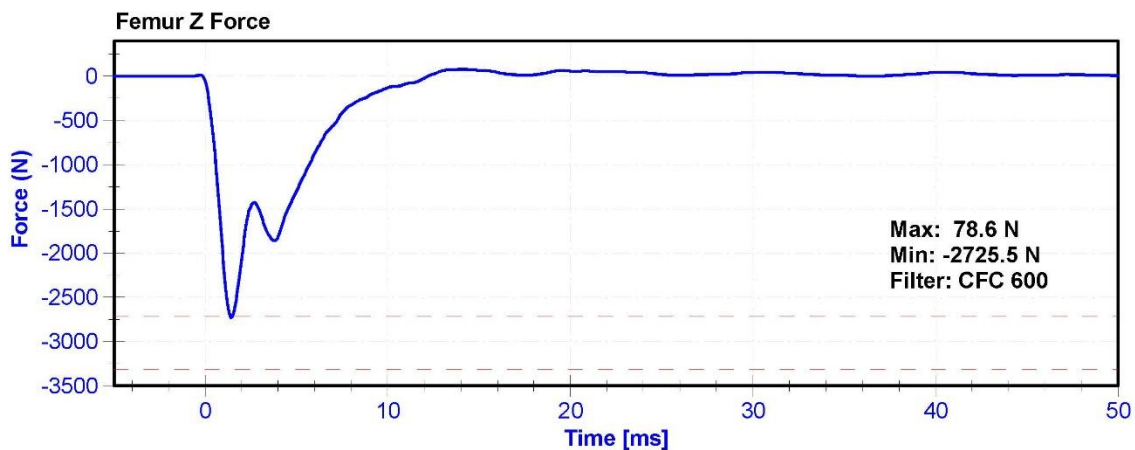
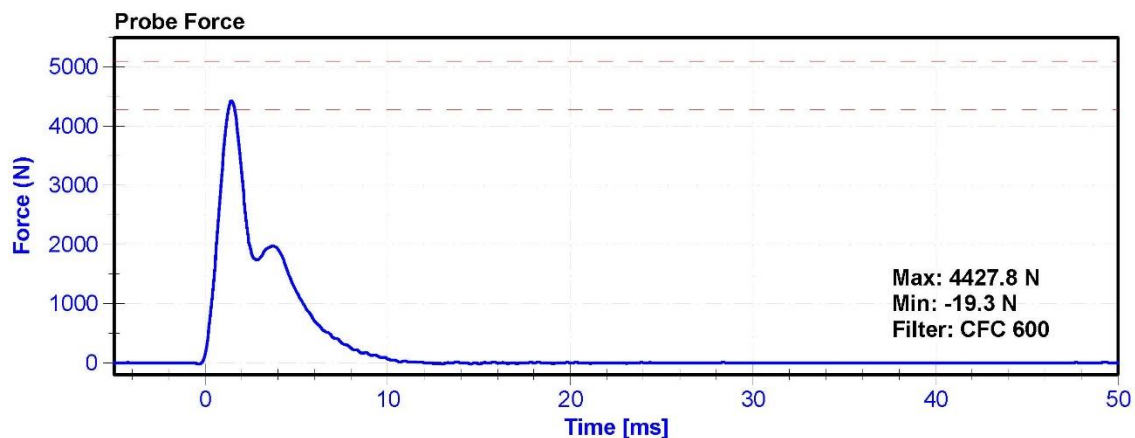
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	41.0	Pass
Impact Velocity	2.55	2.65	m/s	2.625	Pass
Probe Force	4278	5093	N	4427.8	Pass
Peak Femur Z Force	-3314	-2712	N	-2725.45	Pass
Peak Resultant Acetabulum Force	1478	1806	N	1501.84	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accel	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017
Left Femur Load Cell	Humanetics W50-71010	LC-DT1833FZ	8/10/2016	8/10/2017
Left Acetabulum Load Cell	Humanetics 10670Jl4	LC-DP4639FX	9/8/2016	9/8/2017



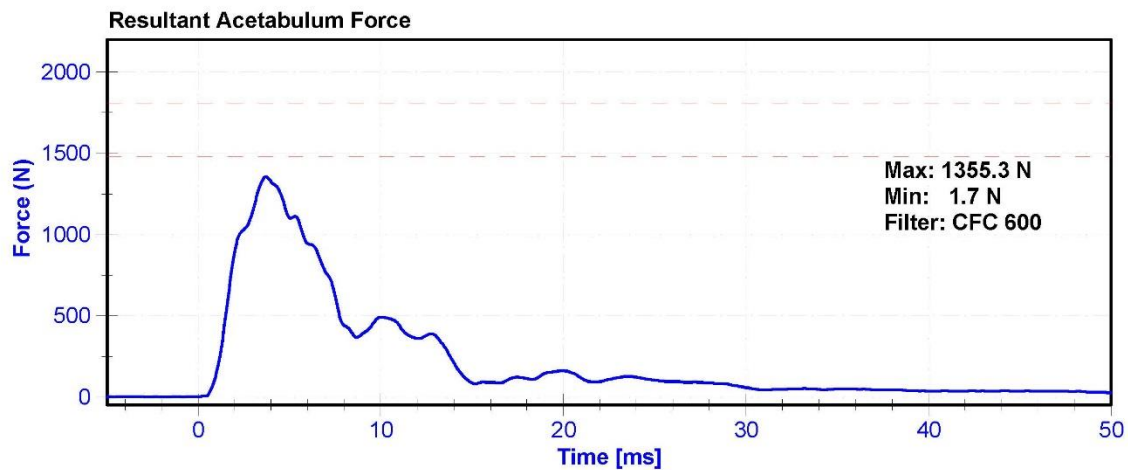
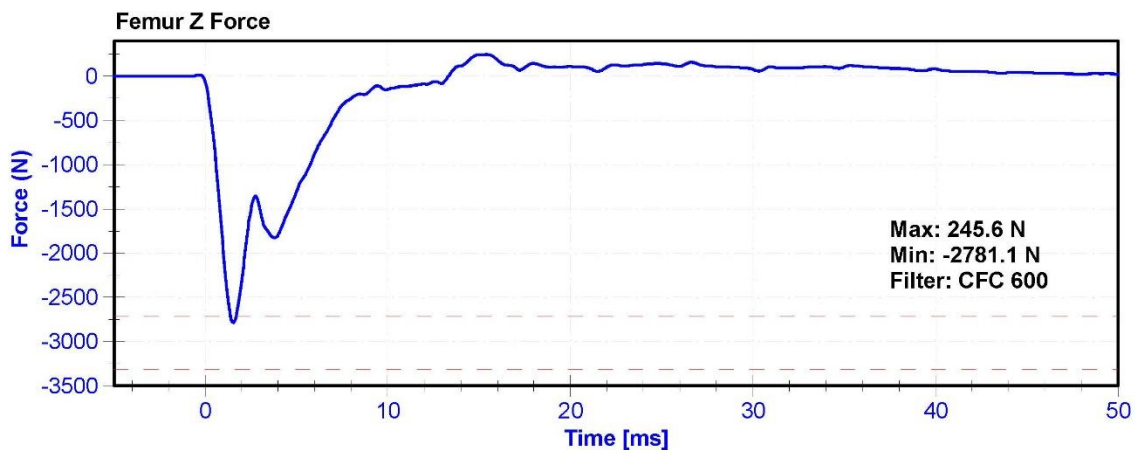
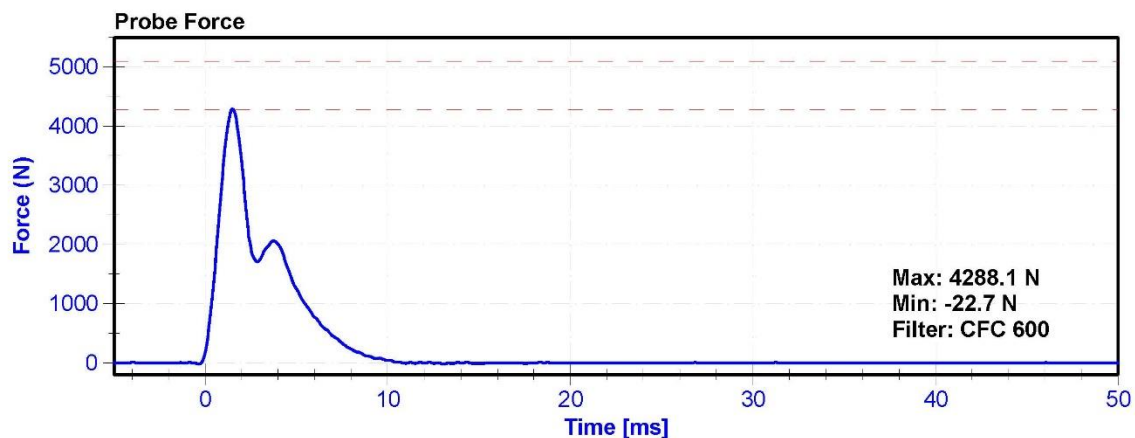
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	50.3	Pass
Impact Velocity	2.55	2.65	m/s	2.625	Pass
Probe Force	4278	5093	N	4288.1	Pass
Peak Femur Z Force	-3314	-2712	N	-2781.06	Pass
Peak Resultant Acetabulum Force	1478	1806	N	1355.27	Fail

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accel	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017
Left Femur Load Cell	Humanetics W50-71010	LC-DP3958FZ	7/19/2016	7/19/2017
Left Acetabulum Load Cell	Humanetics 10530Jl4	LC-DP3835FX	9/8/2016	9/8/2017





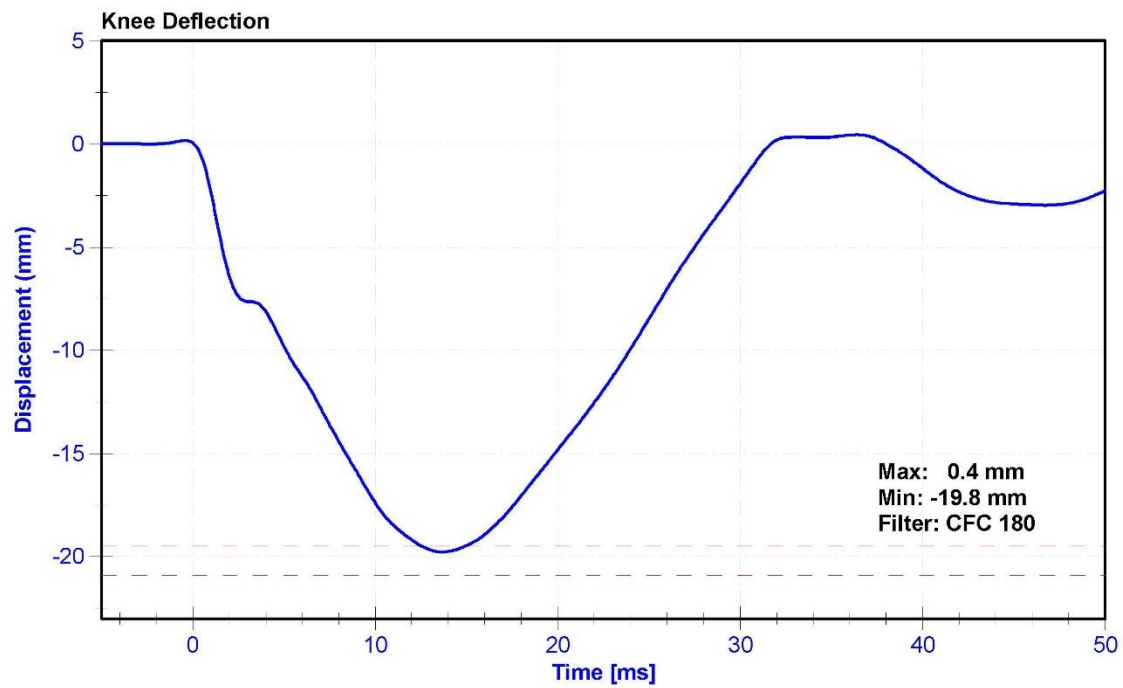
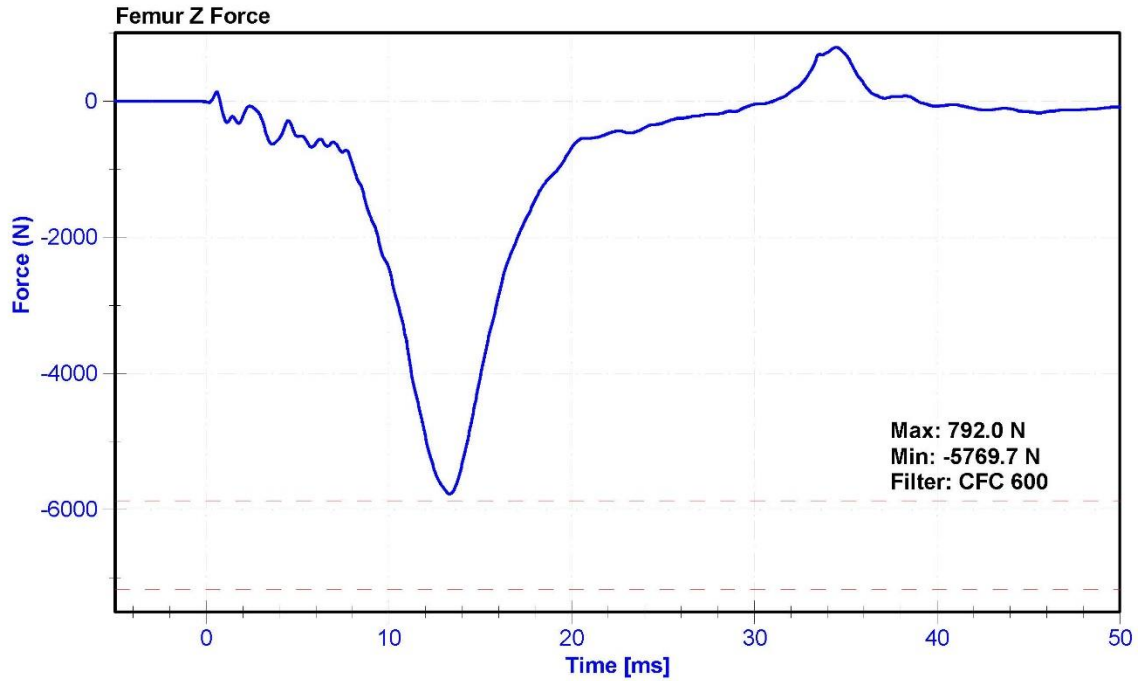
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	59.0	Pass
Impact Velocity	2.15	2.25	m/s	2.214	Pass
Peak Femur Z Force	-7170	-5866	N	-5769.7	Fail
Knee Deflection at Peak Force	-20.9	-19.5	mm	-19.77	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accel	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017
Femur Load Cell	Humanetics W50-71010	LC-DT1833FZ	8/10/2016	8/10/2017
Knee Potentiometer	Space Age 150-0121V	DS-C2102639B	9/14/2016	9/14/2017



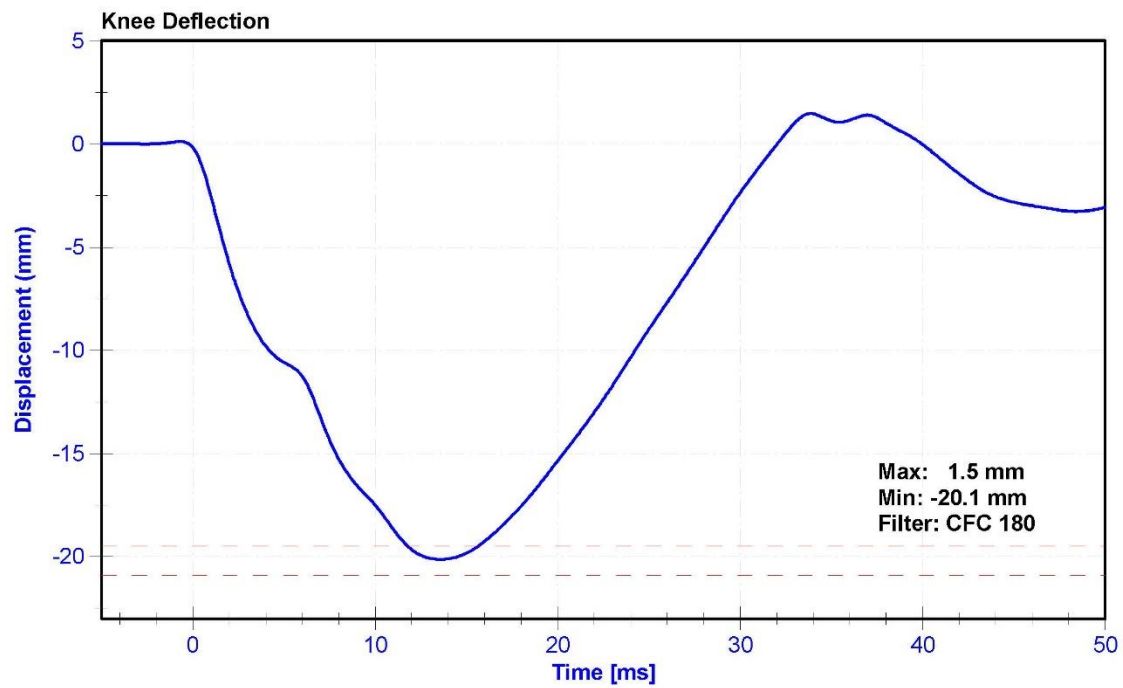
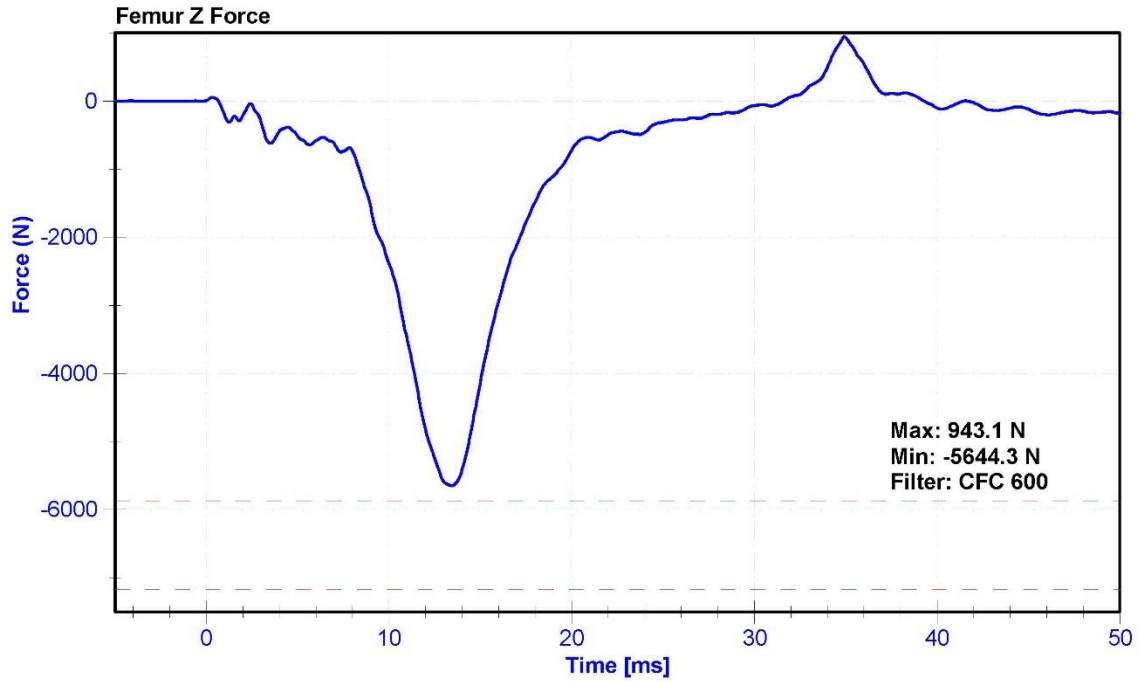
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	59.0	Pass
Impact Velocity	2.15	2.25	m/s	2.199	Pass
Peak Femur Z Force	-7170	-5866	N	-5644.3	Fail
Knee Deflection at Peak Force	-20.9	-19.5	mm	-20.13	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accel	ENDEVCO 7264CT	AC-P16593	4/1/2016	4/1/2017
Femur Load Cell	Humanetics W50-71010	LC-DP3958FZ	7/19/2016	7/19/2017
Knee Potentiometer	Space Age 150-0121V	DS-042745	9/14/2016	9/14/2017





Certification Report
THOR 50th Left Ball of Foot - NHTSA Aug 2016

2016-09-22 12:18:22

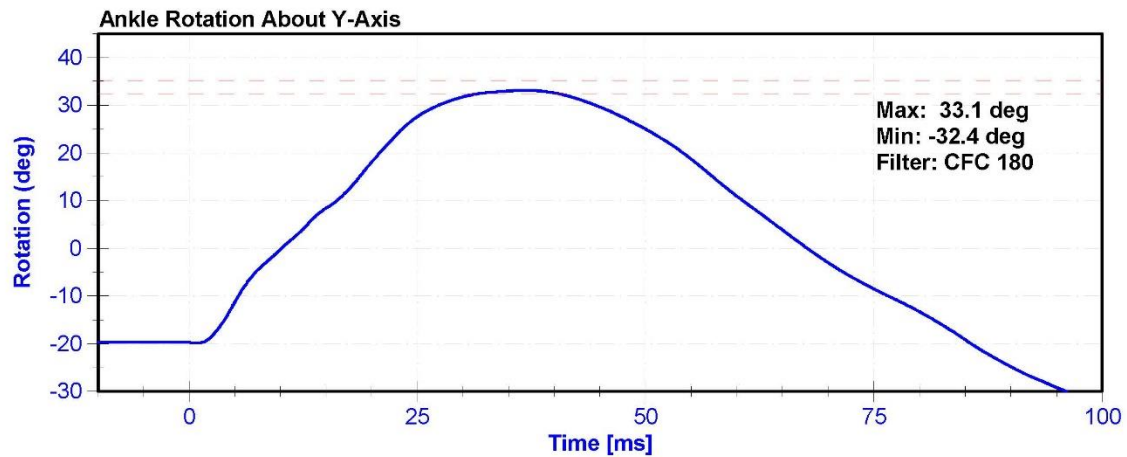
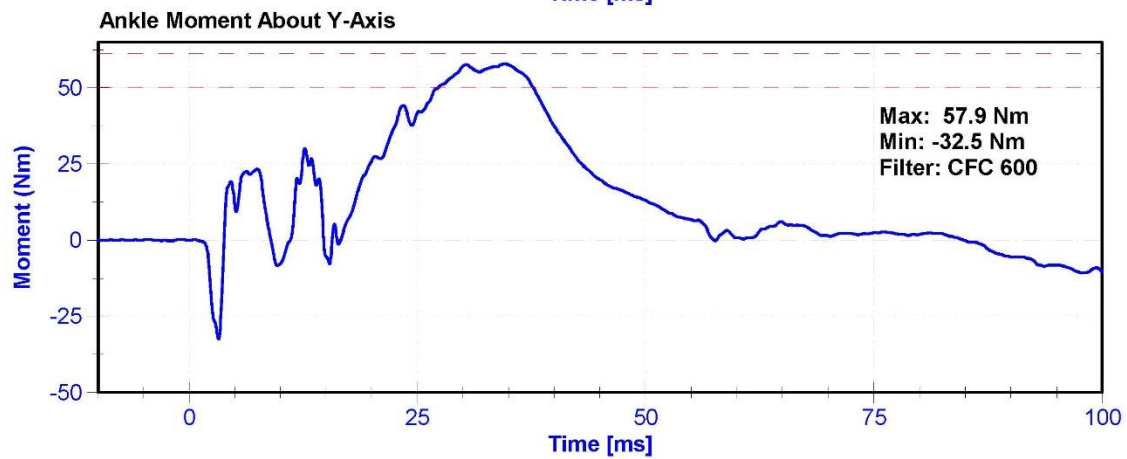
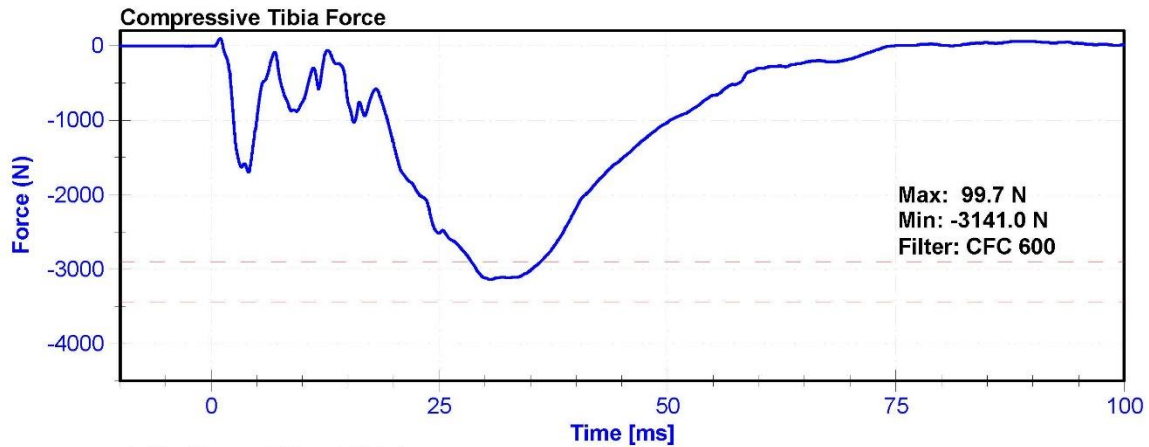
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	49.5	Pass
Velocity	4.9	5.1	m/s	4.961	Pass
Lower Tibia Compressive Force	-3437	-2897	N	-3141.0	Pass
Peak Moment about Y-Axis	50.2	61.3	Nm	57.90	Pass
Peak Rotation about Y-Axis	32.5	35.1	deg	33.10	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32227	9/13/2016	9/13/2017
Lower Tibia Load Cell	Denton 9329J	LC-76FZ	10/21/2015	10/20/2016
Ankle Y Potentiometer	SFERNICE ECO50ESC10	DS-42	10/21/2015	10/20/2016



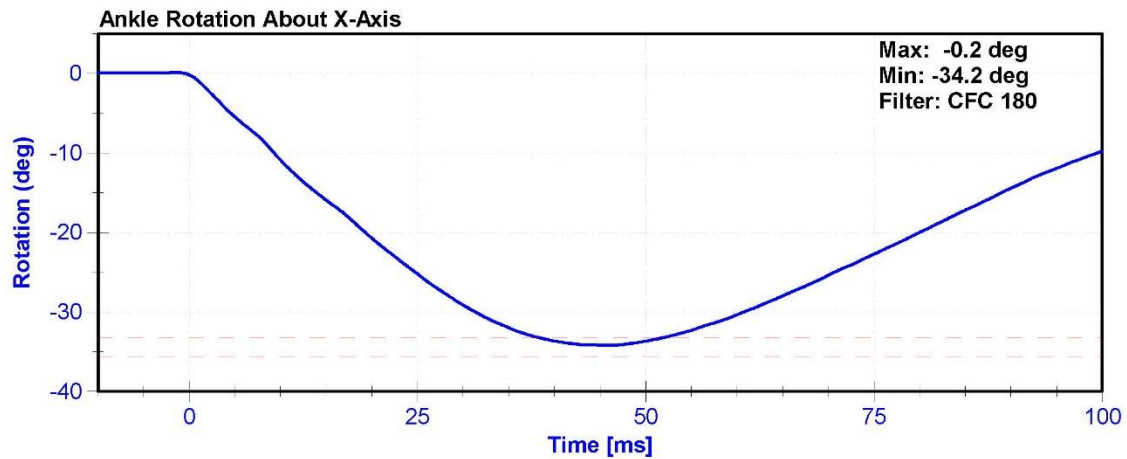
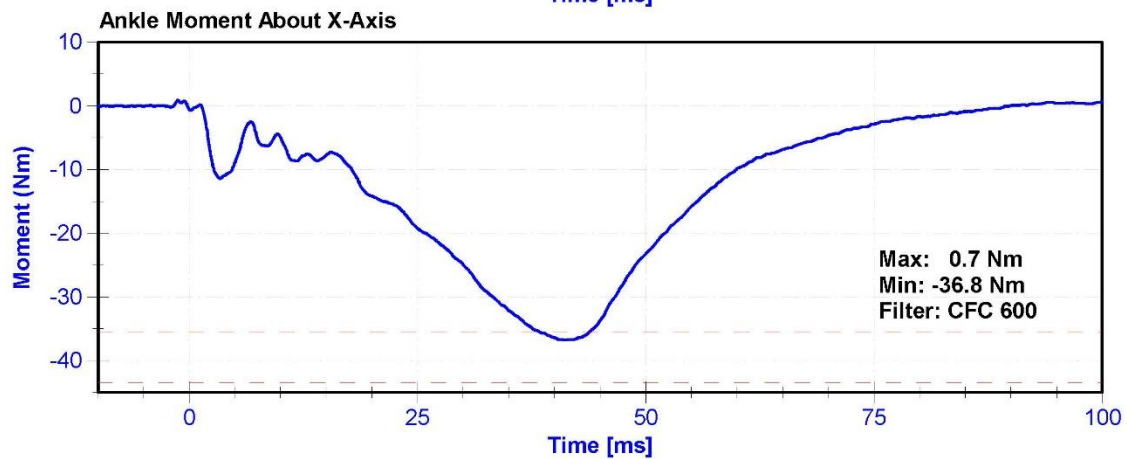
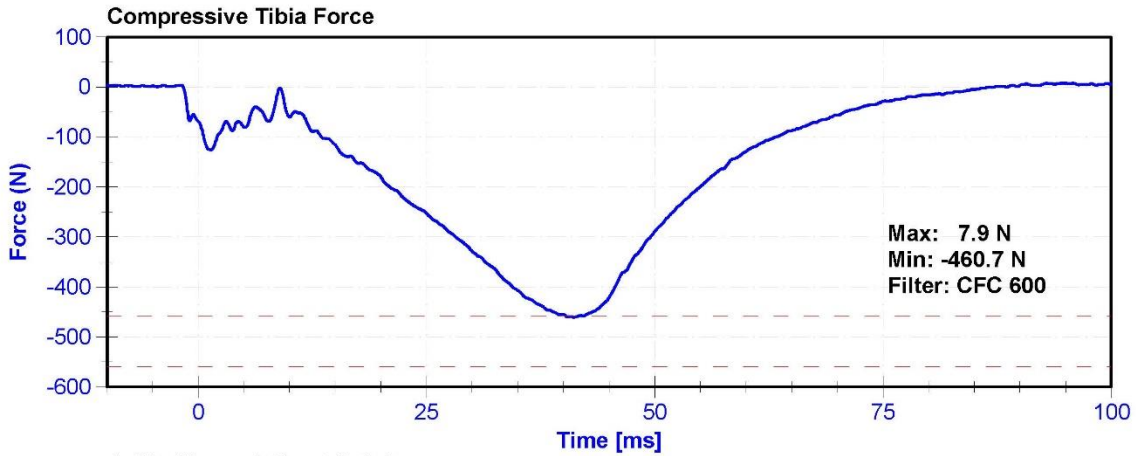
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	46.8	Pass
Velocity	1.9	2.1	m/s	1.936	Pass
Lower Tibia Compressive Force	-560	-458	N	-460.7	Pass
Peak Moment about X-Axis	-43.4	-35.5	Nm	-36.78	Pass
Peak Rotation about X-Axis	-35.6	-33.3	deg	-34.18	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32227	9/13/2016	9/13/2017
Lower Tibia Load Cell	Denton 9329J	LC-76FZ 9329J	10/21/2015	10/20/2016
Ankle Y Potentiometer	SFERNICE ECO50ESC10	DS-43	10/21/2015	10/20/2016





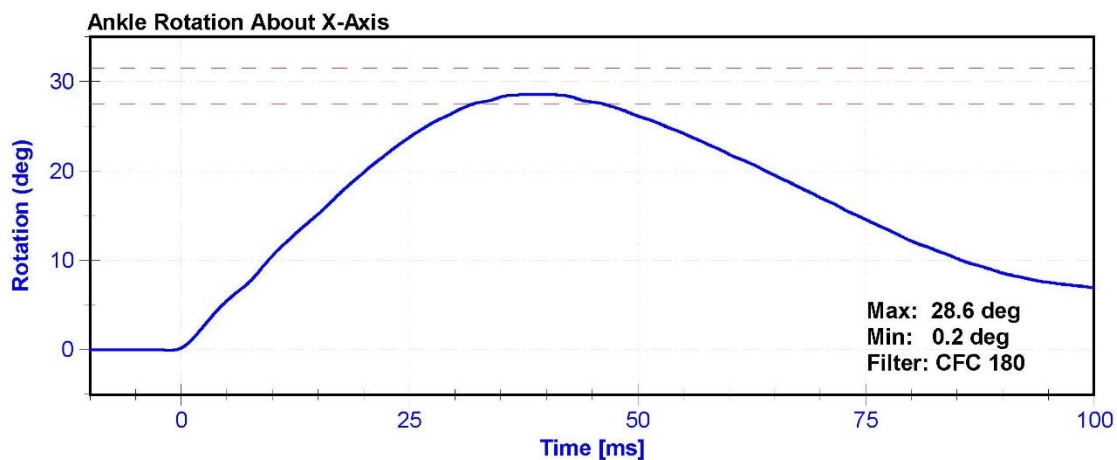
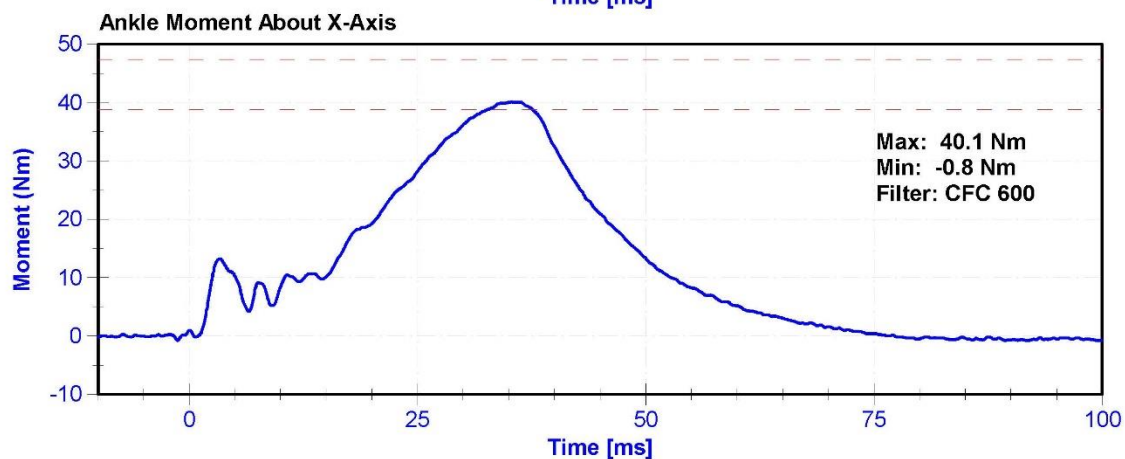
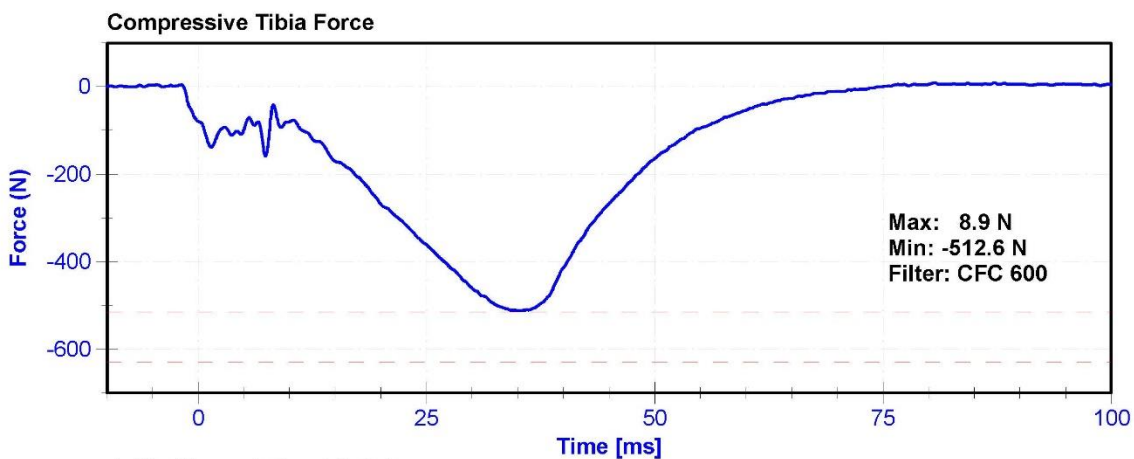
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	47.9	Pass
Velocity	1.9	2.1	m/s	1.940	Pass
Lower Tibia Compressive Force	-629	-515	N	-512.6	Fail
Peak Moment about X-Axis	38.8	47.3	Nm	40.08	Pass
Peak Rotation about X-Axis	27.5	31.5	deg	28.57	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32227	9/13/2016	9/13/2017
Lower Tibia Load Cell	Denton 9329J	LC-76FZ 9329J	10/21/2015	10/20/2016
Ankle Y Potentiometer	SFERNICE ECO50ESC10	DS-43	10/21/2015	10/20/2016



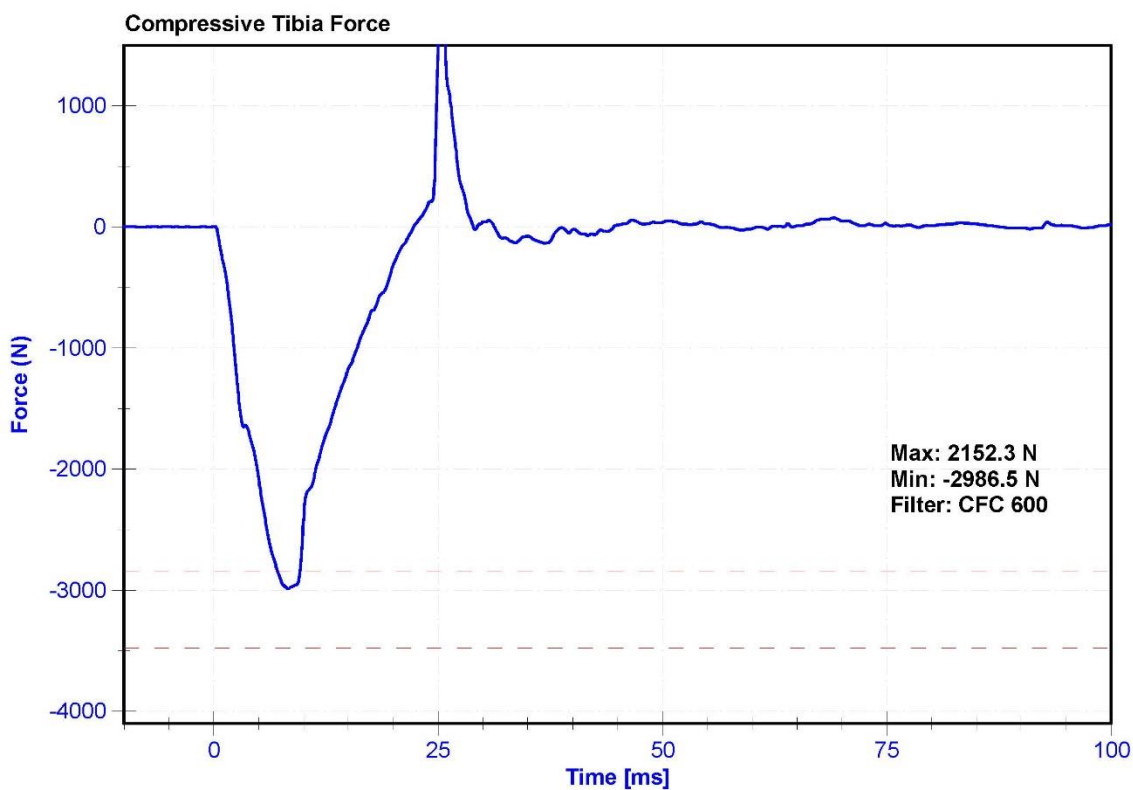
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	47.3	Pass
Velocity	3.9	4.1	m/s	4.019	Pass
Lower Tibia Compressive Force	-3477	-2845	N	-2986.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32227	9/13/2016	9/13/2017
Lower Tibia Load Cell	Denton 9329J	LC-76FZ 9329J	10/21/2015	10/20/2016



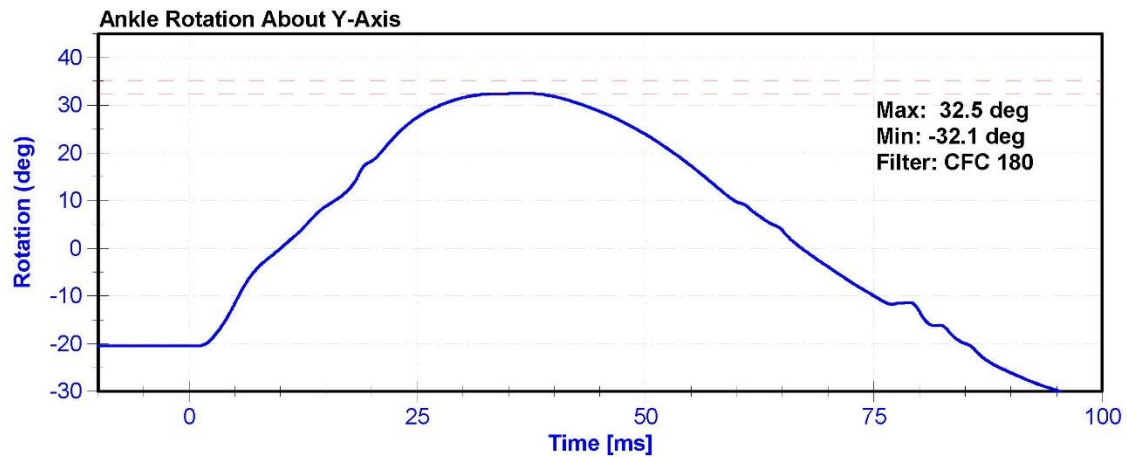
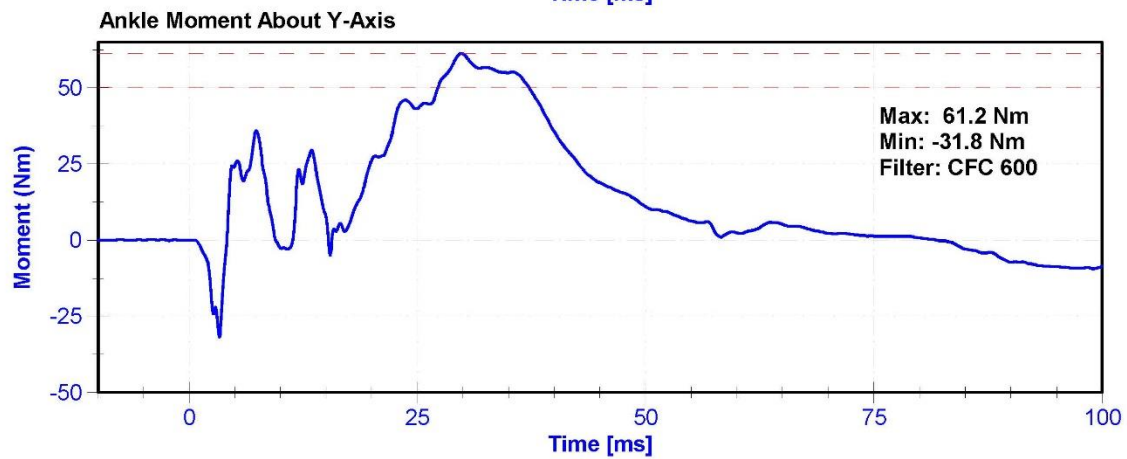
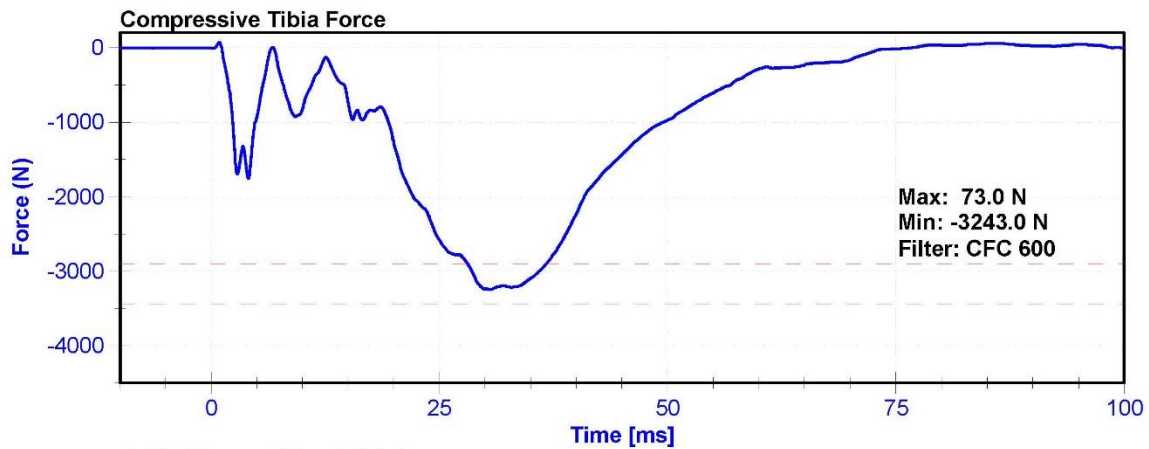
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	58.3	Pass
Velocity	4.9	5.1	m/s	4.961	Pass
Lower Tibia Compressive Force	-3437	-2897	N	-3243.0	Pass
Peak Moment about Y-Axis	50.2	61.3	Nm	61.25	Pass
Peak Rotation about Y-Axis	32.5	35.1	deg	32.47	Fail

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32227	9/13/2016	9/13/2017
Lower Tibia Load Cell	Denton 9329J	LC-79FZ 9329J	10/21/2015	10/20/2016
Ankle Y Potentiometer	SFERNICE ECO50ESC10	DS-34	10/21/2015	10/20/2016





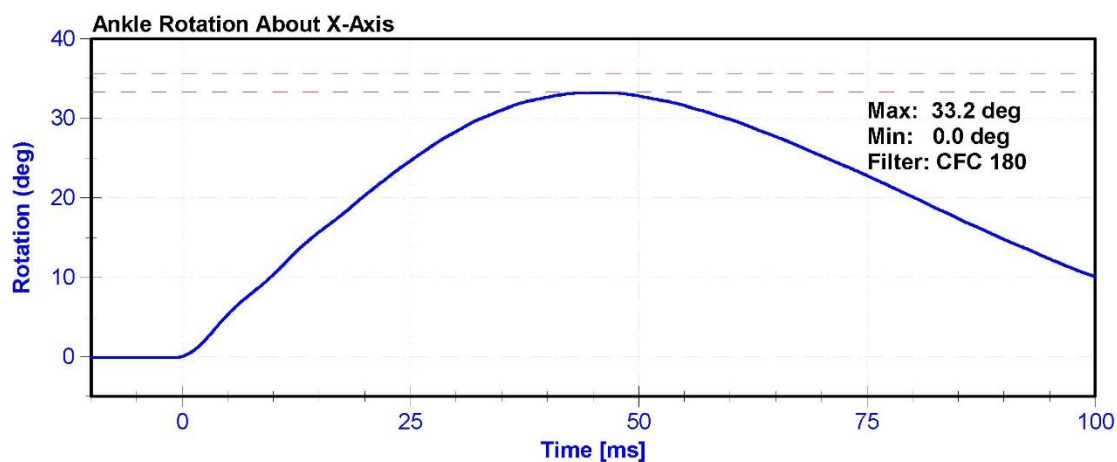
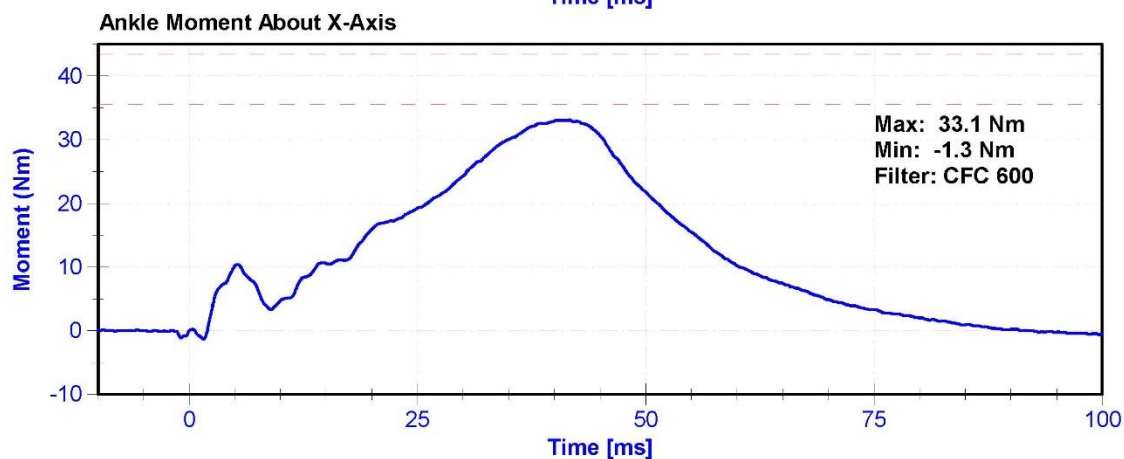
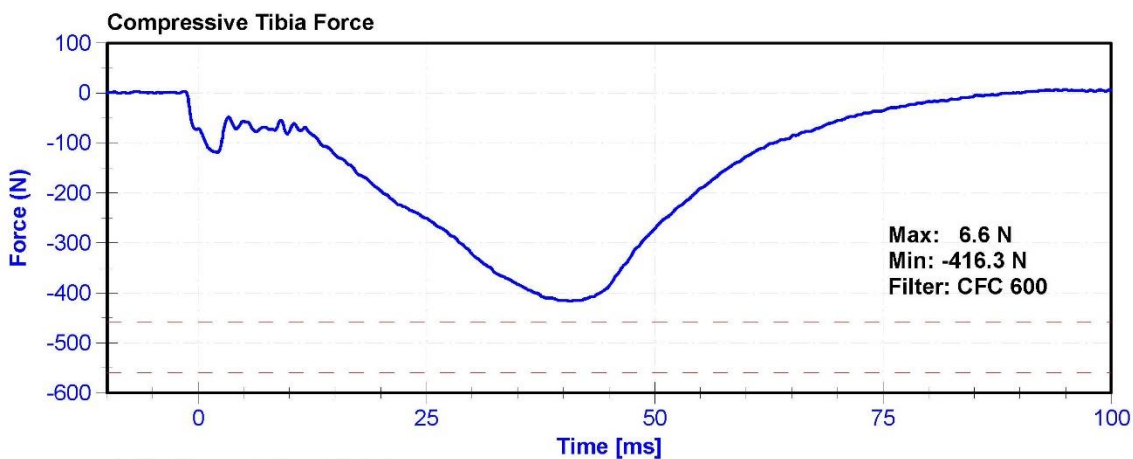
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	54.5	Pass
Velocity	1.9	2.1	m/s	1.913	Pass
Lower Tibia Compressive Force	-560	-458	N	-416.3	Fail
Peak Moment about X-Axis	35.5	43.4	Nm	33.07	Fail
Peak Rotation about X-Axis	33.5	35.6	deg	33.20	Fail

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32227	9/13/2016	9/13/2017
Lower Tibia Load Cell	Denton 9329J	LC-79FZ 9329J	10/21/2015	10/20/2016
Ankle Y Potentiometer	SFERNICE ECO50ESC10	DS-35	10/21/2015	10/20/2016



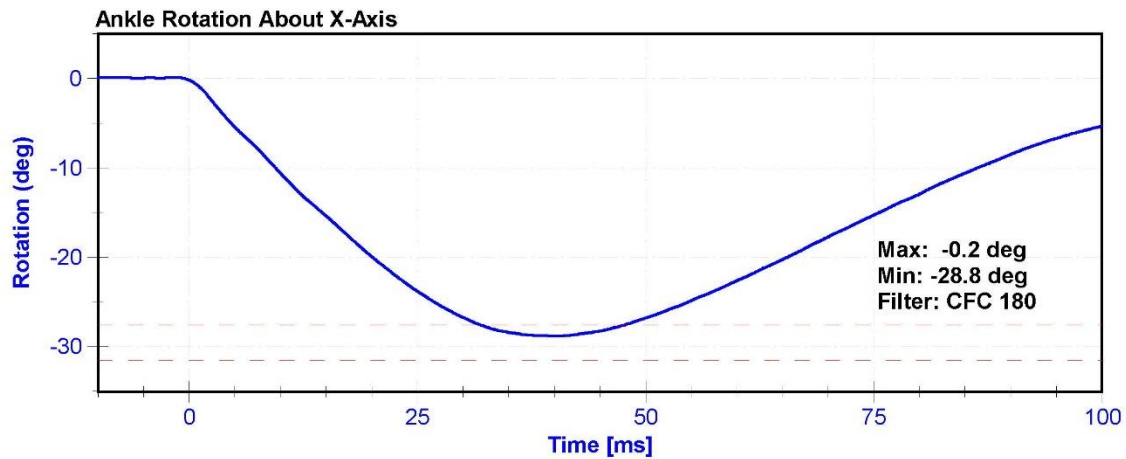
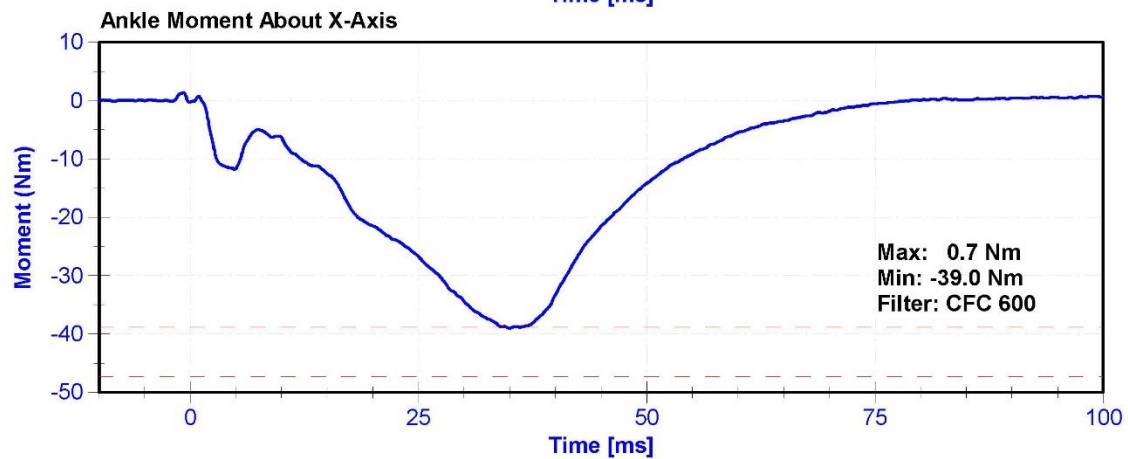
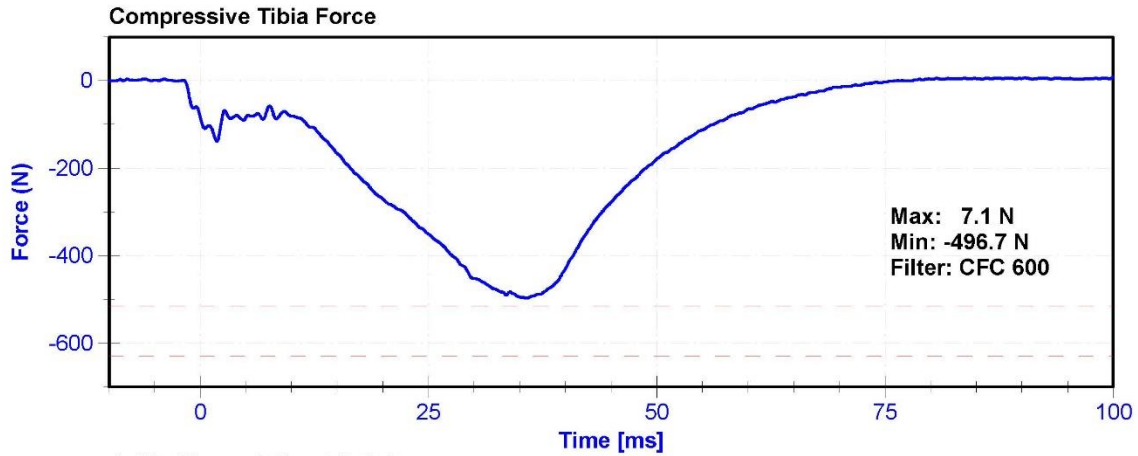
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	54.4	Pass
Velocity	1.9	2.1	m/s	1.936	Pass
Lower Tibia Compressive Force	-629	-515	N	-496.7	Fail
Peak Moment about X-Axis	-47.3	-38.8	Nm	-39.02	Pass
Peak Rotation about X-Axis	-31.5	-27.5	deg	-28.79	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32227	9/13/2016	9/13/2017
Lower Tibia Load Cell	Denton 9329J	LC-79FZ 9329J	10/21/2015	10/20/2016
Ankle Y Potentiometer	SFERNICE ECO50ESC10	DS-35	10/21/2015	10/20/2016



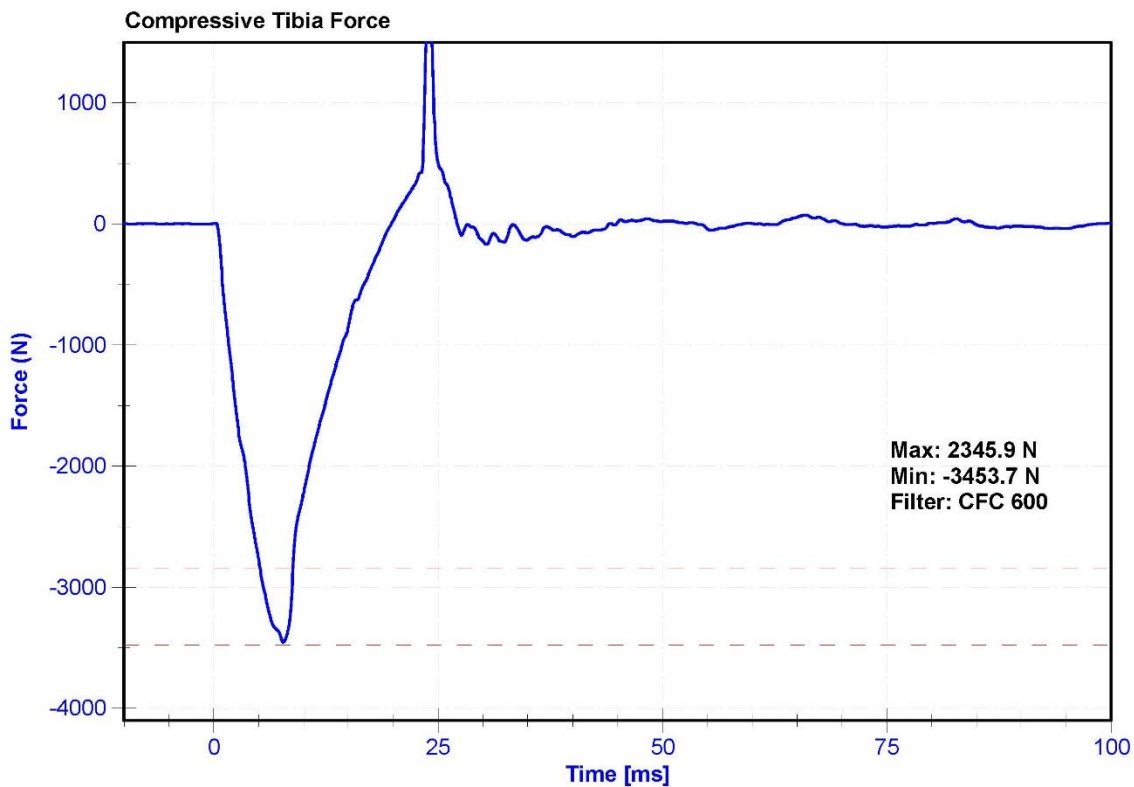
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	55	Pass
Velocity	3.9	4.1	m/s	4.019	Pass
Lower Tibia Compressive Force	-3477	-2845	N	-3453.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32227	9/13/2016	9/13/2017
Lower Tibia Load Cell	Denton 9329J	LC-79FZ 9329J	10/21/2015	10/20/2016



50% ADULT MALE THOR DO9798 DUMMY CALIBRATIONS

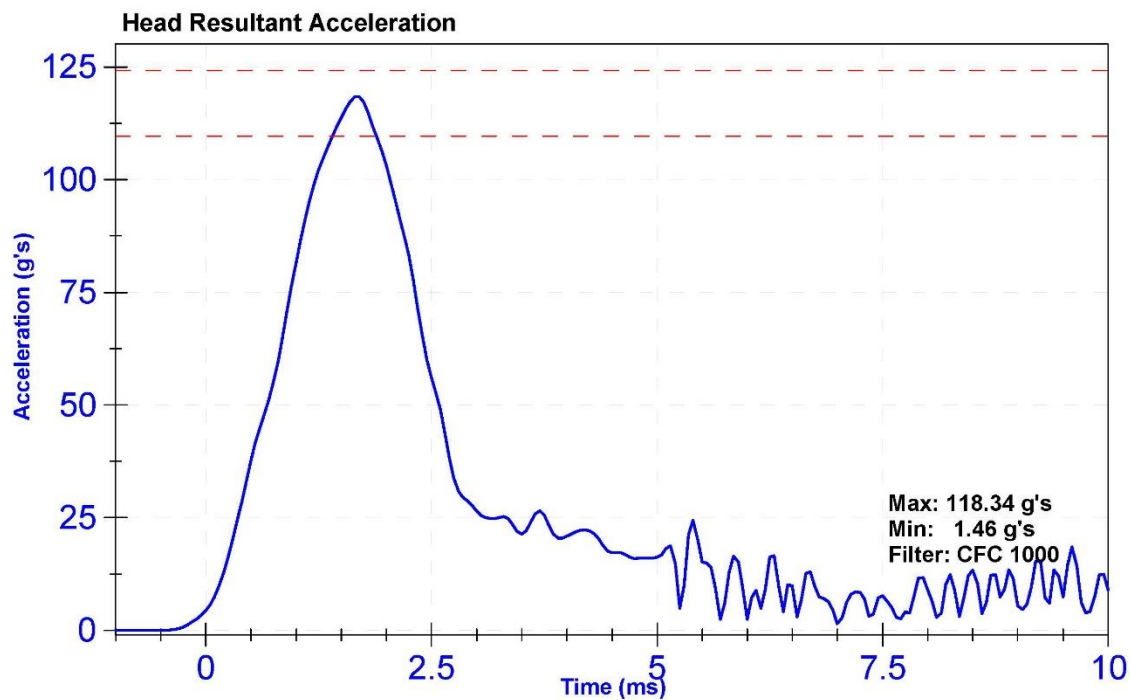
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

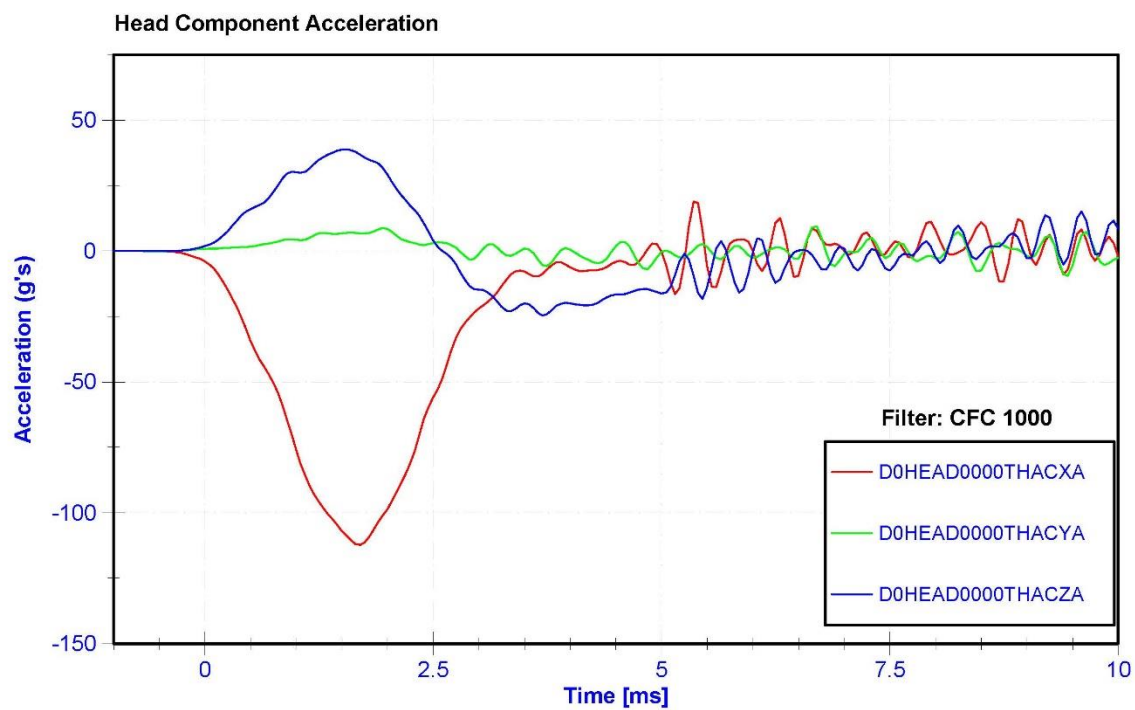
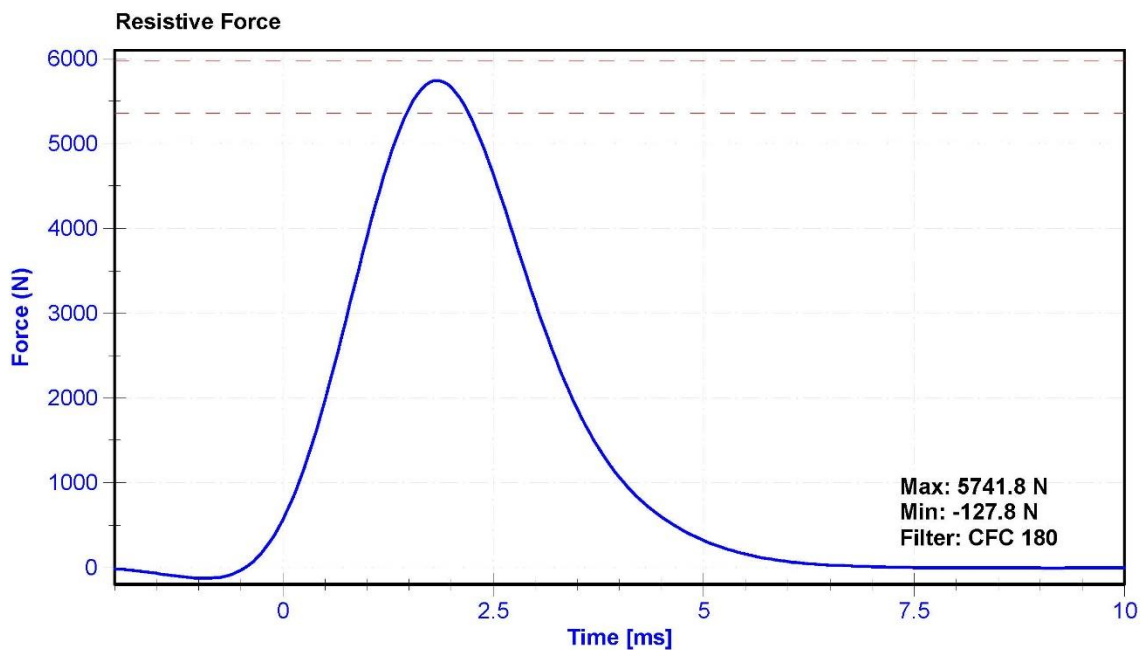
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	42.0	Pass
Impact Velocity	1.95	2.05	m/s	1.981	Pass
Probe Force	5362	5972	N	5741.8	Pass
Resultant Acceleration	109.6	124.2	g's	118.34	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Head X Accel	Endevco 7264	AC-P58889	6/21/2016	12/20/2016
Head Y Accel	Endevco 7264	AC-B02A25-N04	6/21/2016	12/20/2016
Head Z Accel	Endevco 7264	AC-02I02I05-F22	6/21/2016	12/20/2016
Probe Accel	ENDEVCO 7264CT	AC-P16593	9/8/2015	9/7/2016





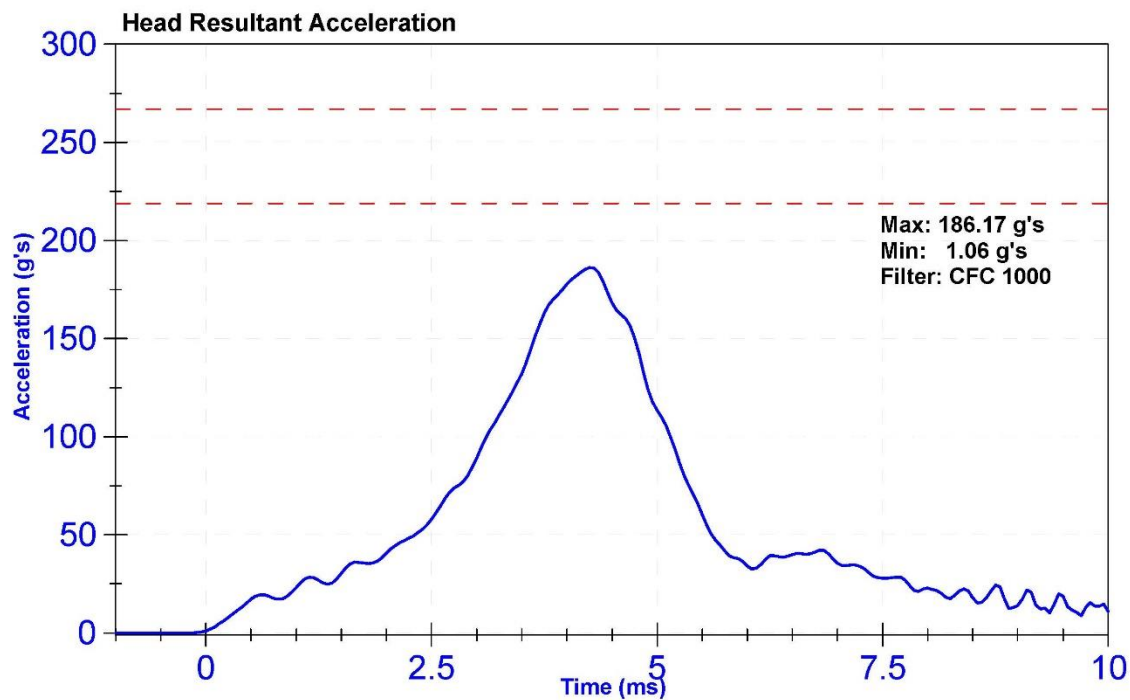
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

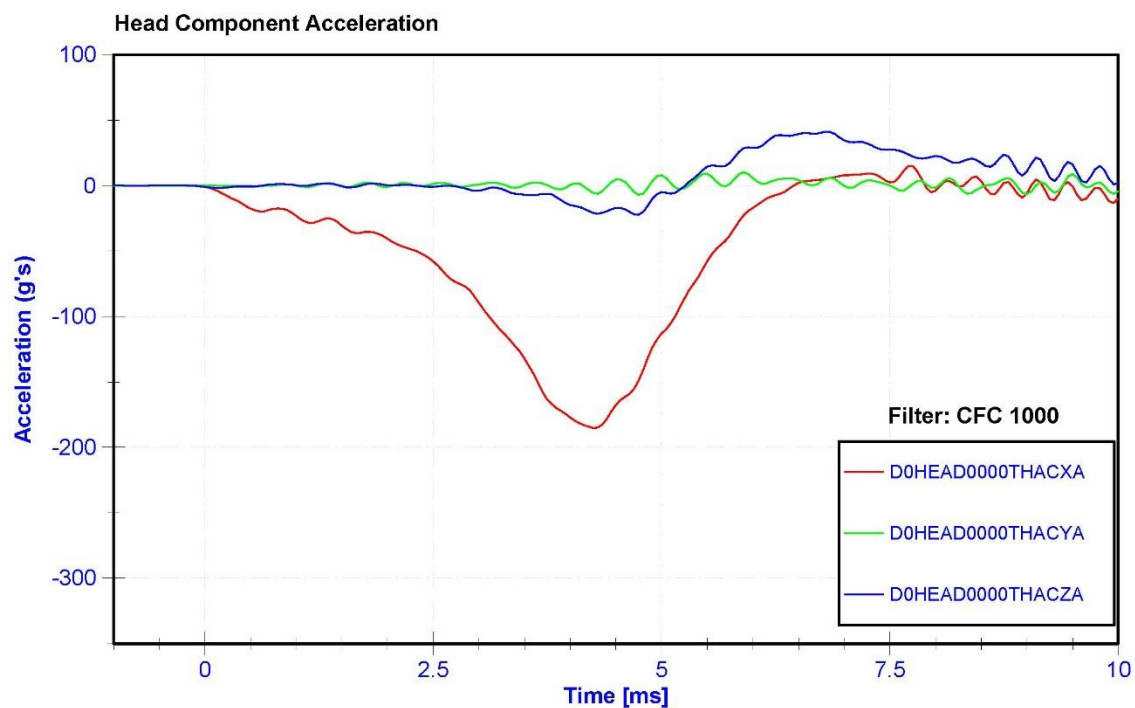
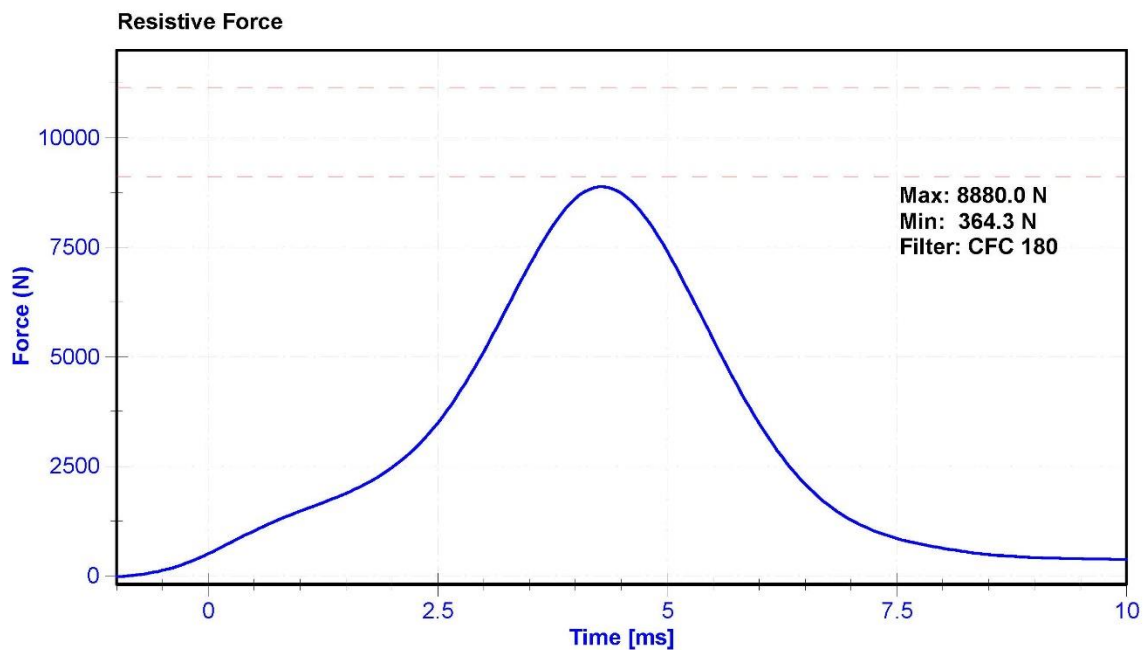
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	43.9	Pass
Impact Velocity	6.68	6.78	m/s	6.728	Pass
Probe Force	9117	11143	N	8880.0	Fail
Resultant Acceleration	219	267	g's	186.2	Fail

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Head X Accel	Endevco 7264	AC-P58889	6/21/2016	12/20/2016
Head Y Accel	Endevco 7264	AC-B02A25-N04	6/21/2016	12/20/2016
Head Z Accel	Endevco 7264	AC-02102105-F22	6/21/2016	12/20/2016
Probe Accel	ENDEVCO 7264CT	AC-P16593	9/8/2015	9/7/2016





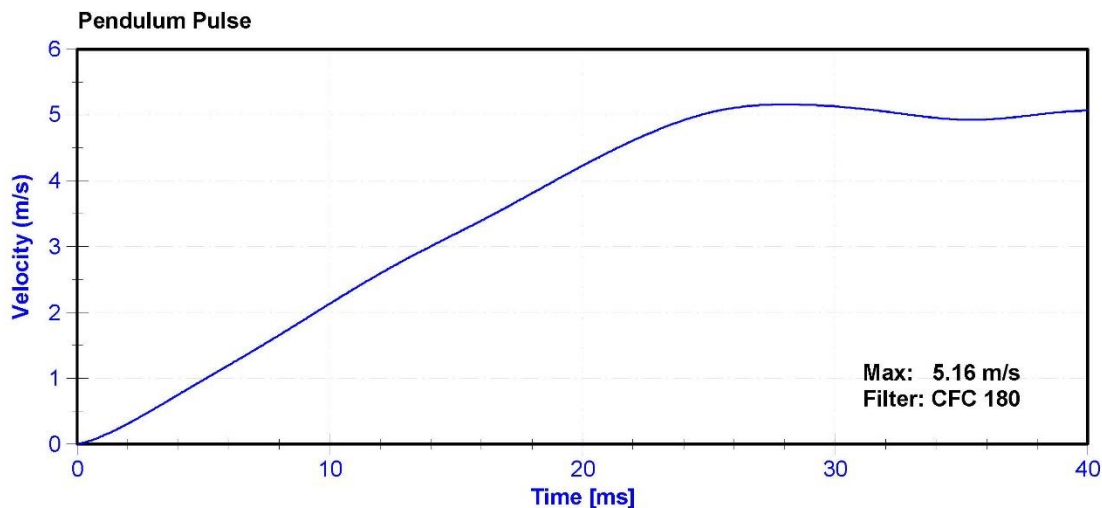
ATD Manufacturer	Humanetics	Test Technician	S. Keller
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

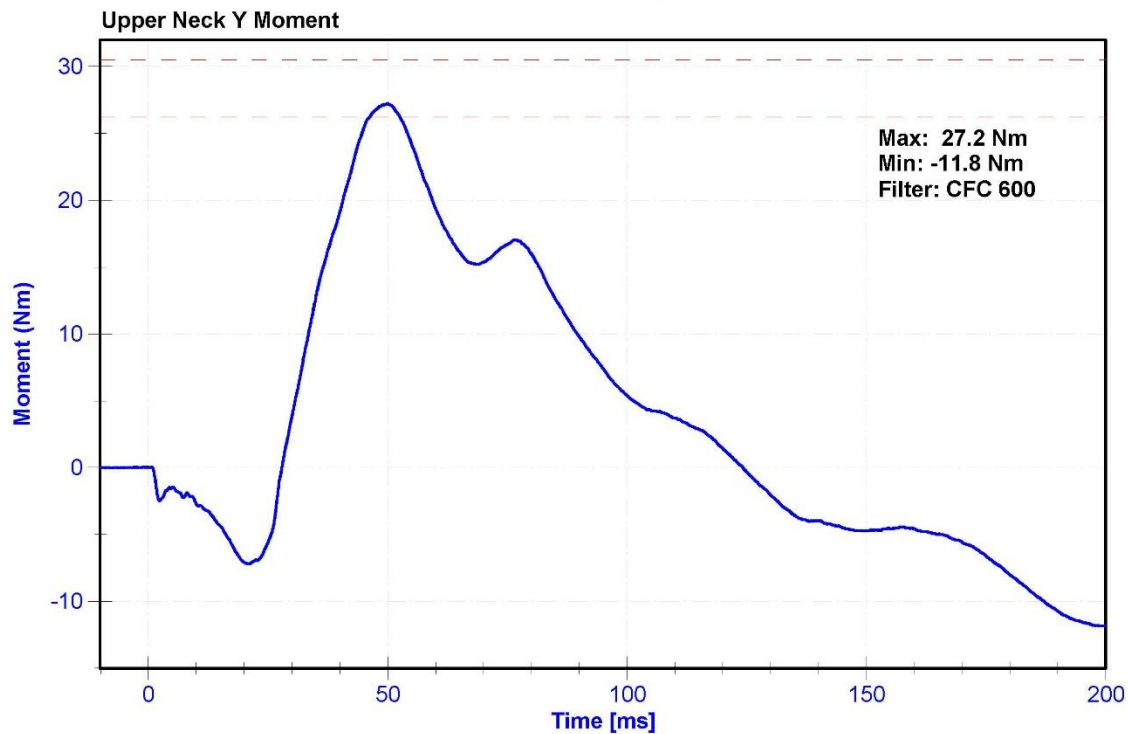
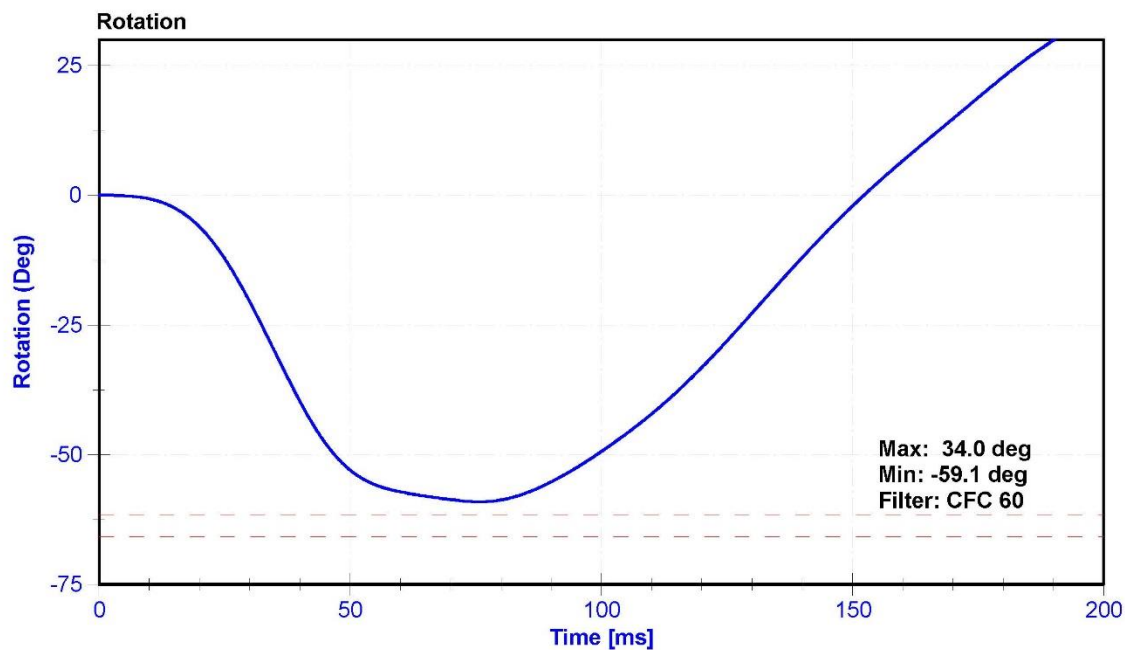
Results

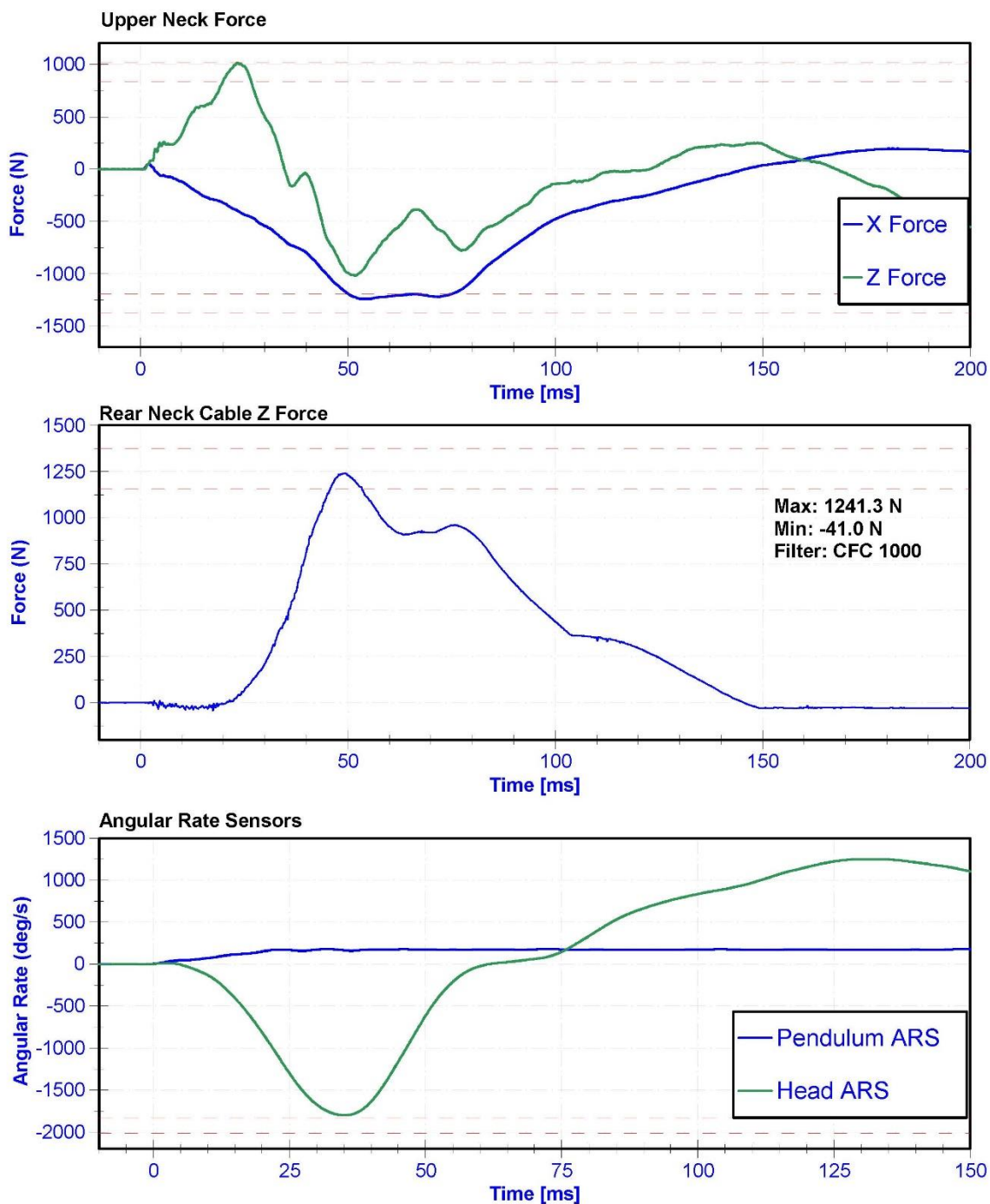
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	44.5	Pass
Velocity	4.95	5.05	m/s	4.985	Pass
Pendulum Impulse at 8ms	1.49	1.85	m/s	1.658	Pass
Pendulum Impulse at 16ms	3.08	3.86	m/s	3.395	Pass
Pendulum Impulse at 24ms	4.48	5.26	m/s	4.919	Pass
Peak Upper Neck Y Moment	26.2	30.5	Nm	27.24	Pass
Peak Upper Neck X Force	-1375	-1195	N	-1239.7	Pass
Maximum Upper Neck Z Force	835	1020	N	1013.2	Pass
First Peak Rear Neck Cable Force	1157	1375	N	1241.3	Pass
Peak Head Y Angular Rate	-2017	-1828	deg/s	-1798.7	Fail
Peak Head Y Rotation	-65.8	-61.5	deg	-59.07	Fail
Rotation Decay Time to Zero	77.6	87.2	ms	76.55	Fail

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Upper Neck Load Cell	Humanetics 10380J14	LC-76 FX	8/10/2016	8/10/2017
Rear Neck Cable Load Cell	Humanetics 6005JFL	LC-76	8/23/2016	8/23/2017
Pendulum ARS	DTS ARS-PRO-8K	ARS-6419	1/19/2016	1/18/2017
Head Y ARS	DTS ARS 18k	ARS5949	1/27/2016	1/26/2017







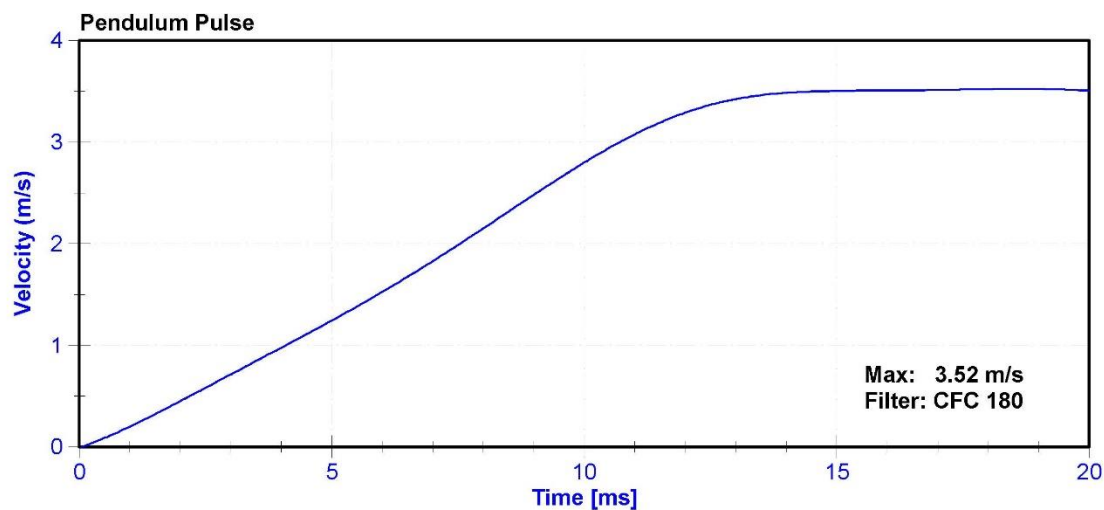
ATD Manufacturer	Humanetics	Test Technician	S. Keller
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

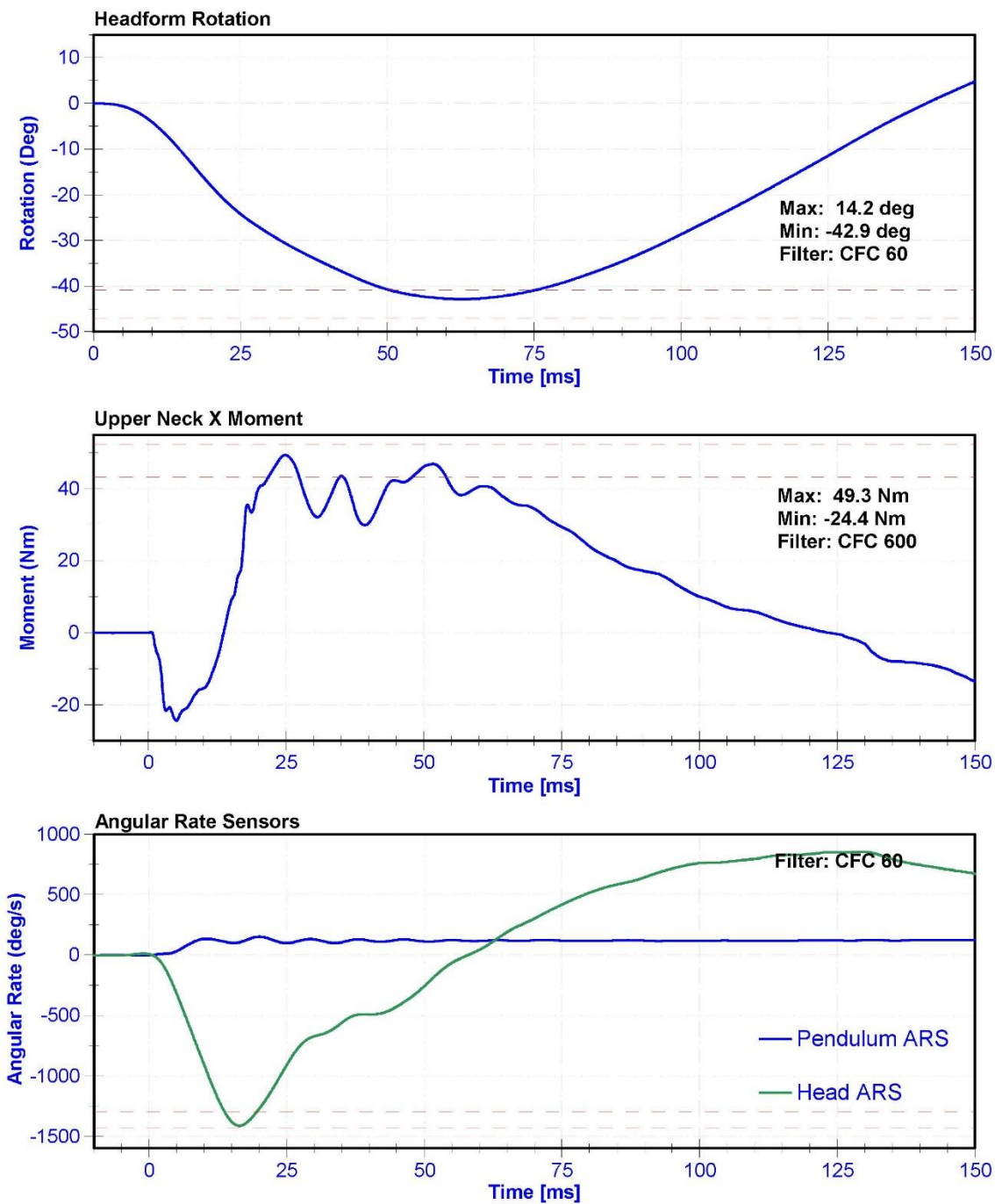
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	44.3	Pass
Velocity	3.35	3.45	m/s	3.432	Pass
Pendulum Impulse at 4ms	0.89	1.08	m/s	0.977	Pass
Pendulum Impulse at 8ms	2.04	2.36	m/s	2.151	Pass
Pendulum Impulse at 12ms	3.21	3.46	m/s	3.290	Pass
Peak Upper Neck X Moment after 40ms	43.2	52.2	Nm	46.87	Pass
Peak Head X Angular Rate	-1434	-1300	deg/s	-1413.0	Pass
Peak Head X Rotation	-47.0	-40.9	deg	-42.86	Pass
Rotational Decay Time to Zero	78.0	83.4	ms	79.00	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Upper Neck Load Cell	Humanetics 10380J14	LC-76 MX	8/10/2016	8/10/2017
Pendulum ARS	DTS ARS-PRO-8K	ARS-6419	1/19/2016	1/18/2017
Head X ARS	DTS ARS 18k	ARS4650	1/27/2016	1/26/2017





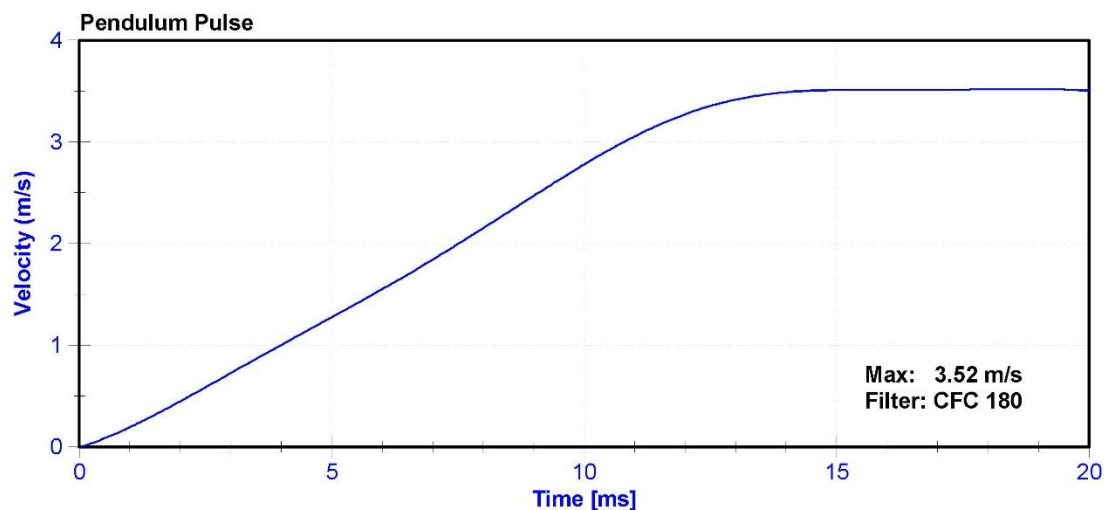
ATD Manufacturer	Humanetics	Test Technician	S. Keller
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

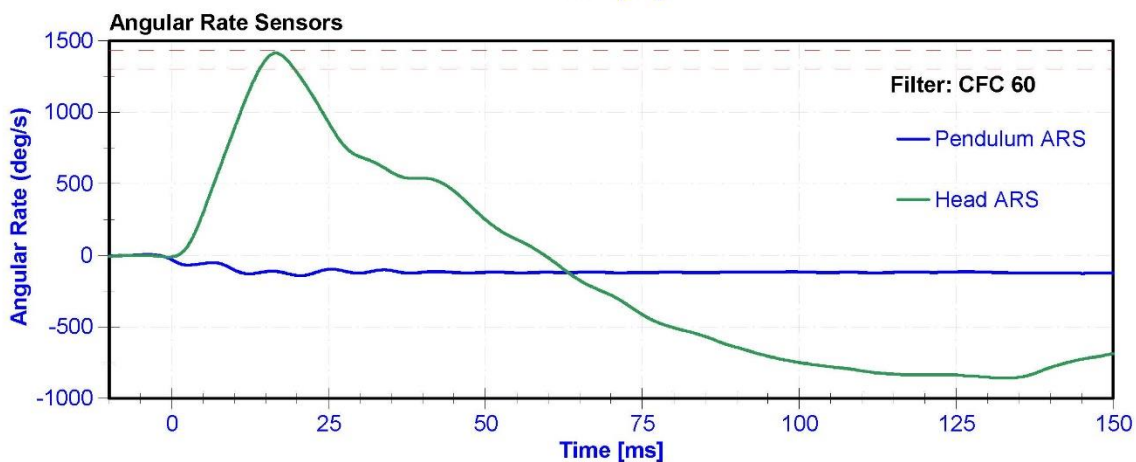
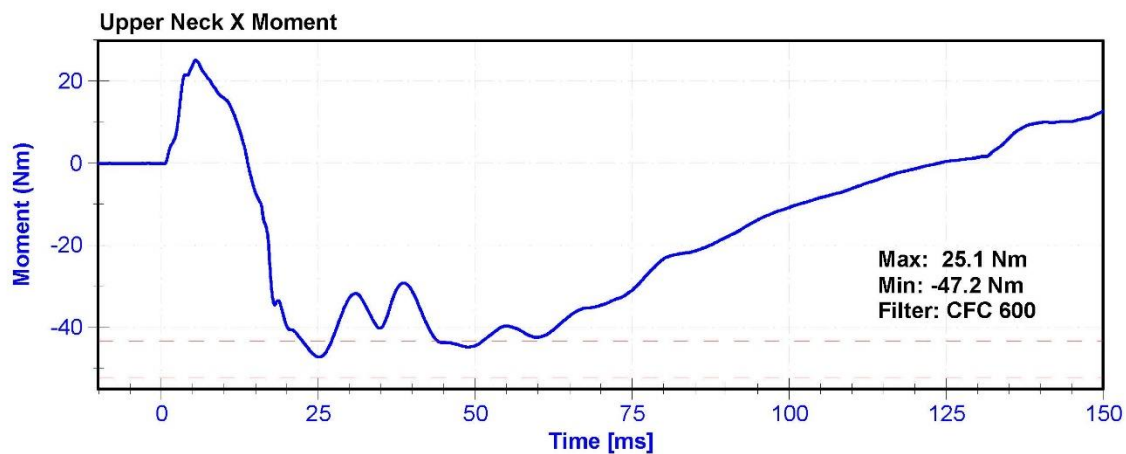
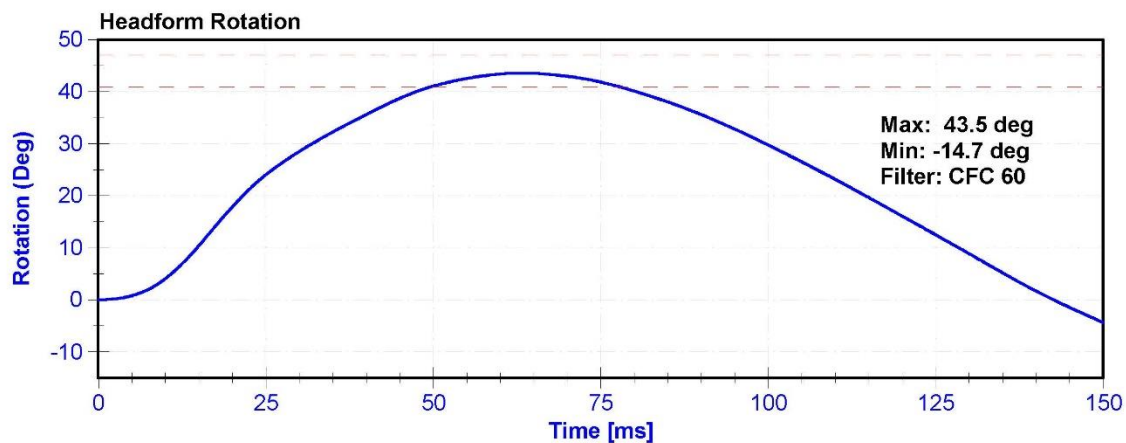
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	41.3	Pass
Velocity	3.35	3.45	m/s	3.42	Pass
Pendulum Impulse at 4ms	0.89	1.08	m/s	1.002	Pass
Pendulum Impulse at 8ms	2.04	2.36	m/s	2.151	Pass
Pendulum Impulse at 12ms	3.21	3.46	m/s	3.272	Pass
Peak Upper Neck X Moment after 40ms	-52.2	-43.2	Nm	-44.81	Pass
Peak Head X Angular Rate	1300	1434	deg/s	1412.8	Pass
Peak Head X Rotation	40.9	47.0	deg	43.55	Pass
Rotation Decay Time to Zero	78.0	83.4	ms	79.40	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Upper Neck Load Cell	Humanetics 10380J14	LC-76 MX	8/10/2016	8/10/2017
Pendulum ARS	DTS ARS-PRO-8K	ARS-6419	1/19/2016	1/18/2017
Head X ARS	DTS ARS 18k	ARS4650	1/27/2016	1/26/2017





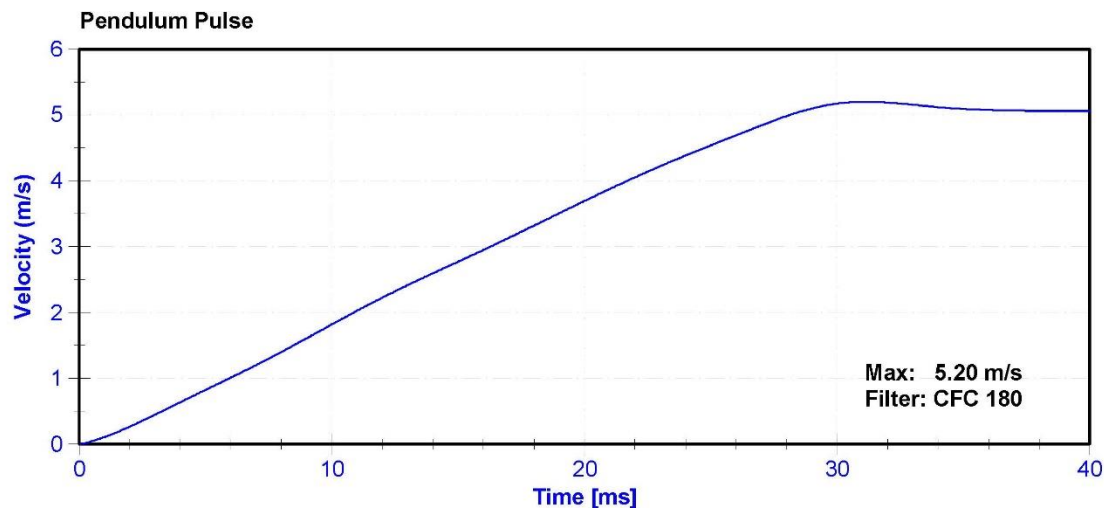
ATD Manufacturer	Humanetics	Test Technician	S. Keller
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

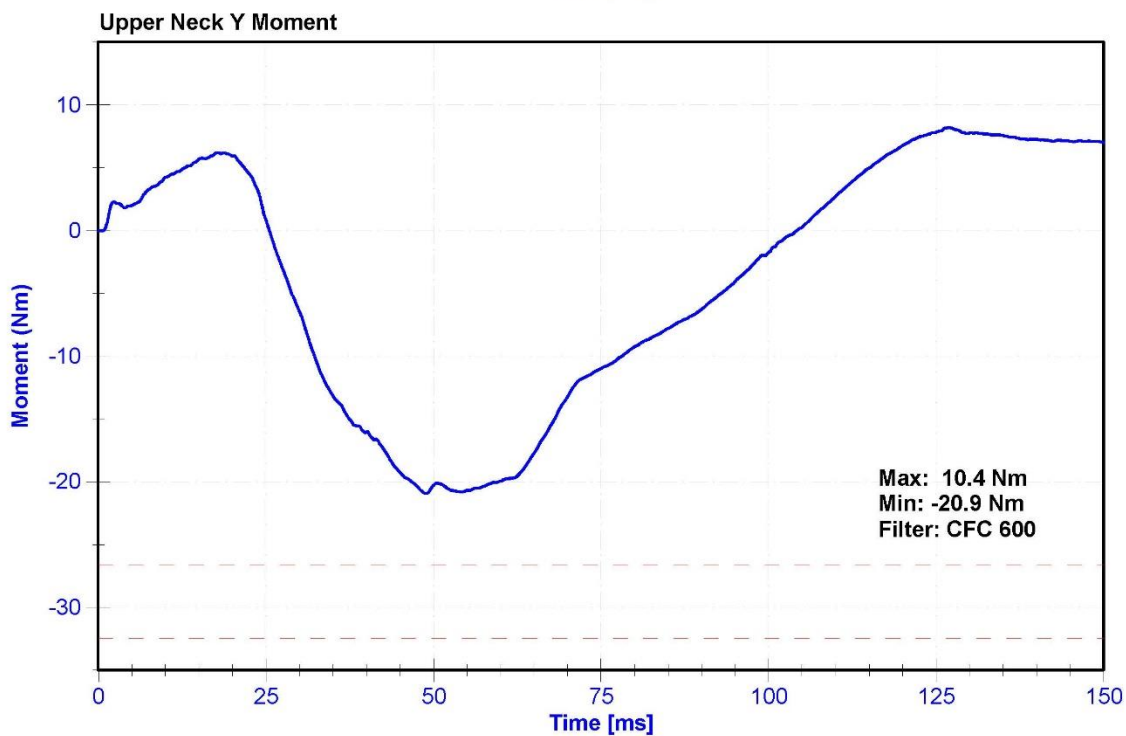
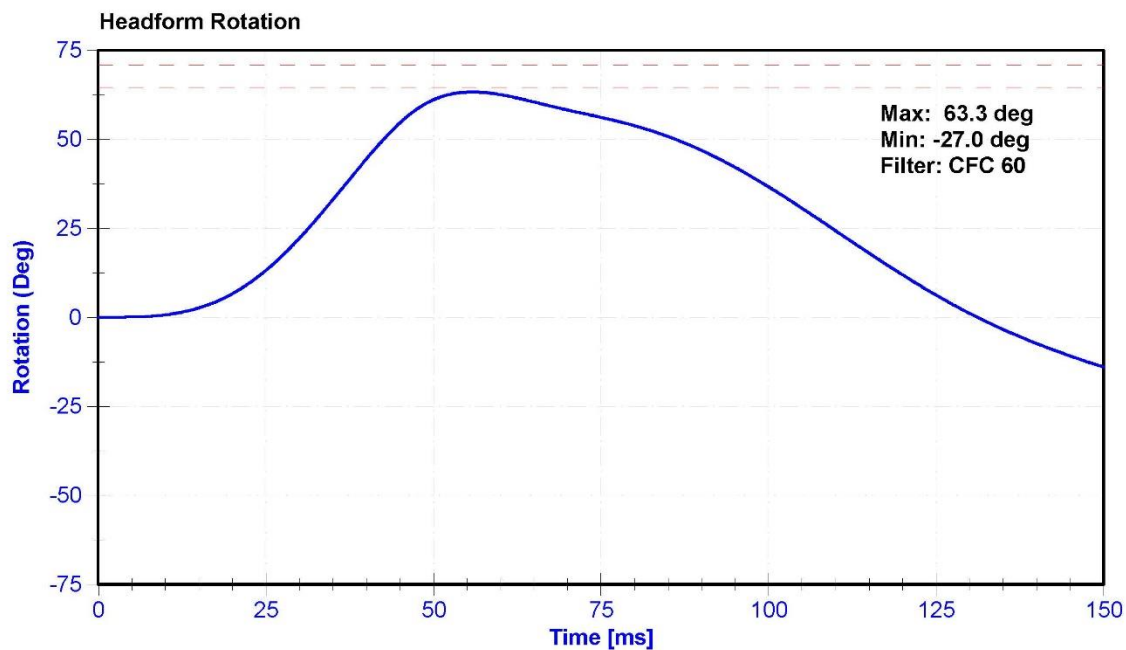
Results

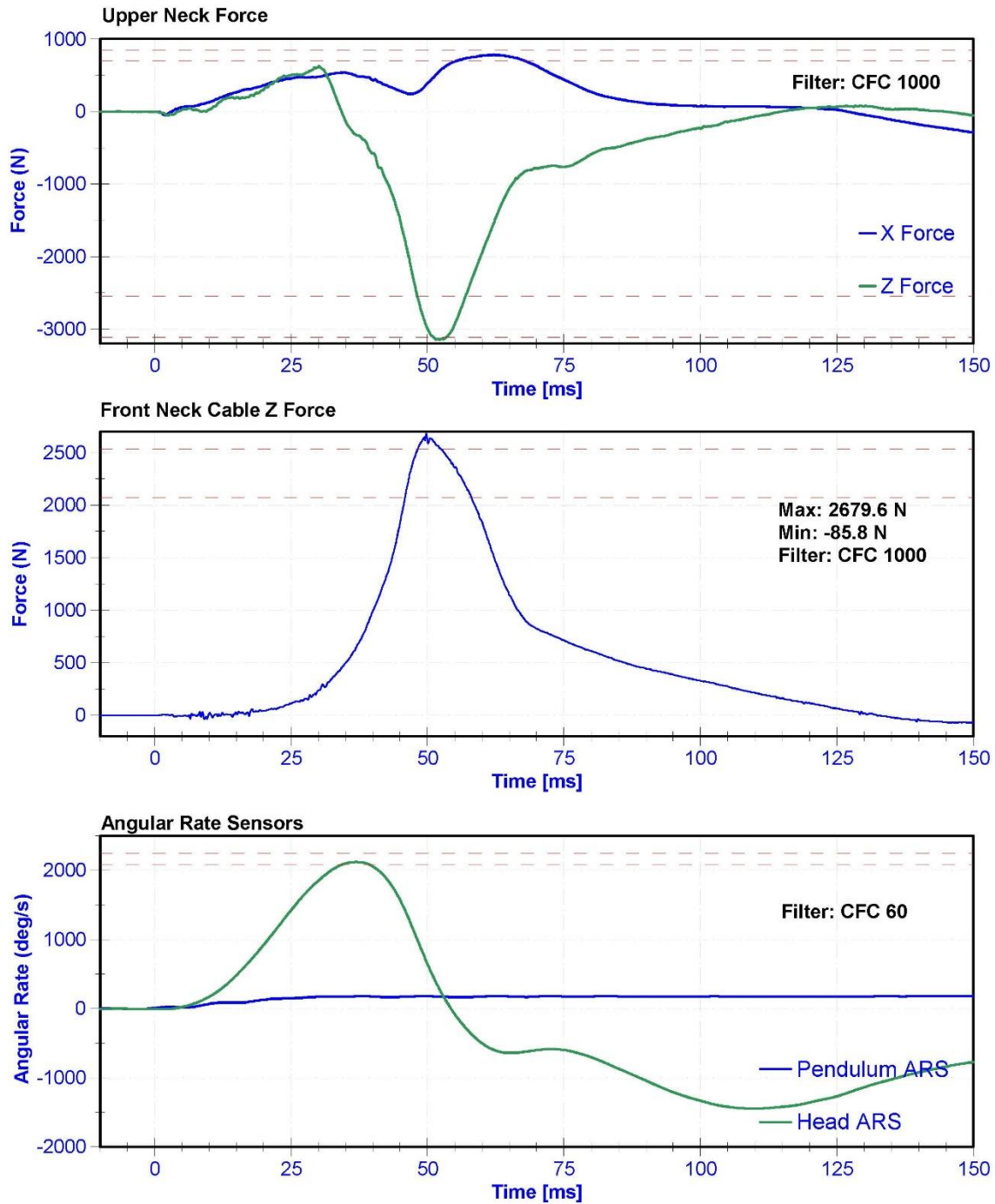
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	46.2	Pass
Velocity	4.95	5.05	m/s	5.045	Pass
Pendulum Impulse at 10ms	1.76	1.91	m/s	1.819	Pass
Pendulum Impulse at 20ms	3.50	3.75	m/s	3.692	Pass
Pendulum Impulse at 30ms	4.88	5.20	m/s	5.171	Pass
Peak Upper Neck Y Moment	-32.5	-26.6	Nm	-20.94	Fail
Peak Upper Neck X Force	699	854	N	783.8	Pass
Peak Upper Neck Z Force	-3115	-2549	N	-3146.6	Fail
Peak Front Neck Cable Force	2074	2535	N	2679.6	Fail
Peak Head Y Angular Rate	2084	2247	deg/s	2121.3	Pass
Peak Head Y Rotation	64.5	70.9	deg	63.30	Fail
Rotational Decay Time to Zero	74.2	78.7	ms	75.35	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Upper Neck Load Cell	Humanetics 10380J14	LC-76 FX	8/10/2016	8/10/2017
Fr Neck Cable Load	Humanetics 6005JFL	LC-77	5/17/2016	5/17/2017
Pendulum ARS	DTS ARS-PRO-8K	ARS-6419	1/19/2016	1/18/2017
Head ARS Y-Axis	DTS ARS 18k	ARS5949	1/27/2016	1/26/2017







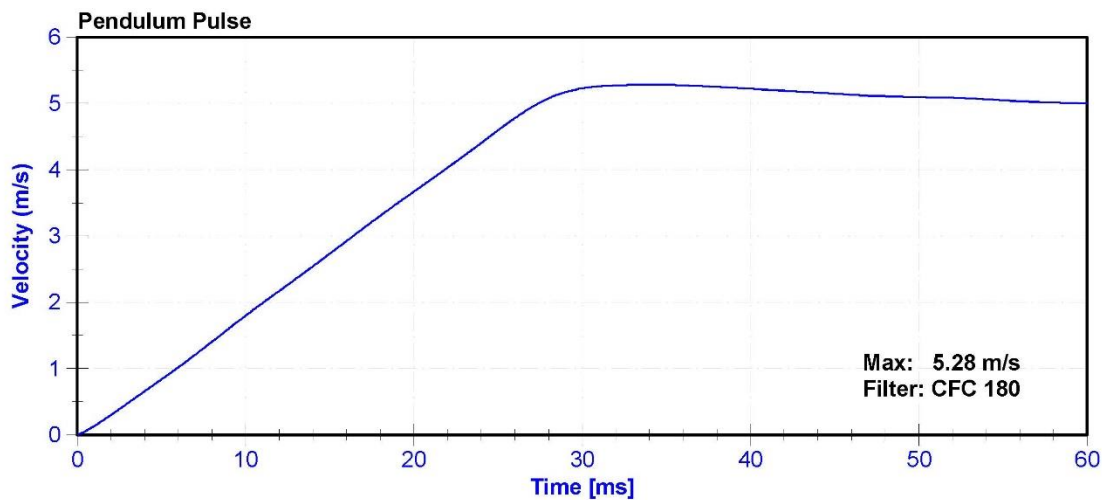
ATD Manufacturer	Humanetics	Test Technician	S. Keller
ATD Serial Number	9798	Laboratory Supervisor	M. Goehle

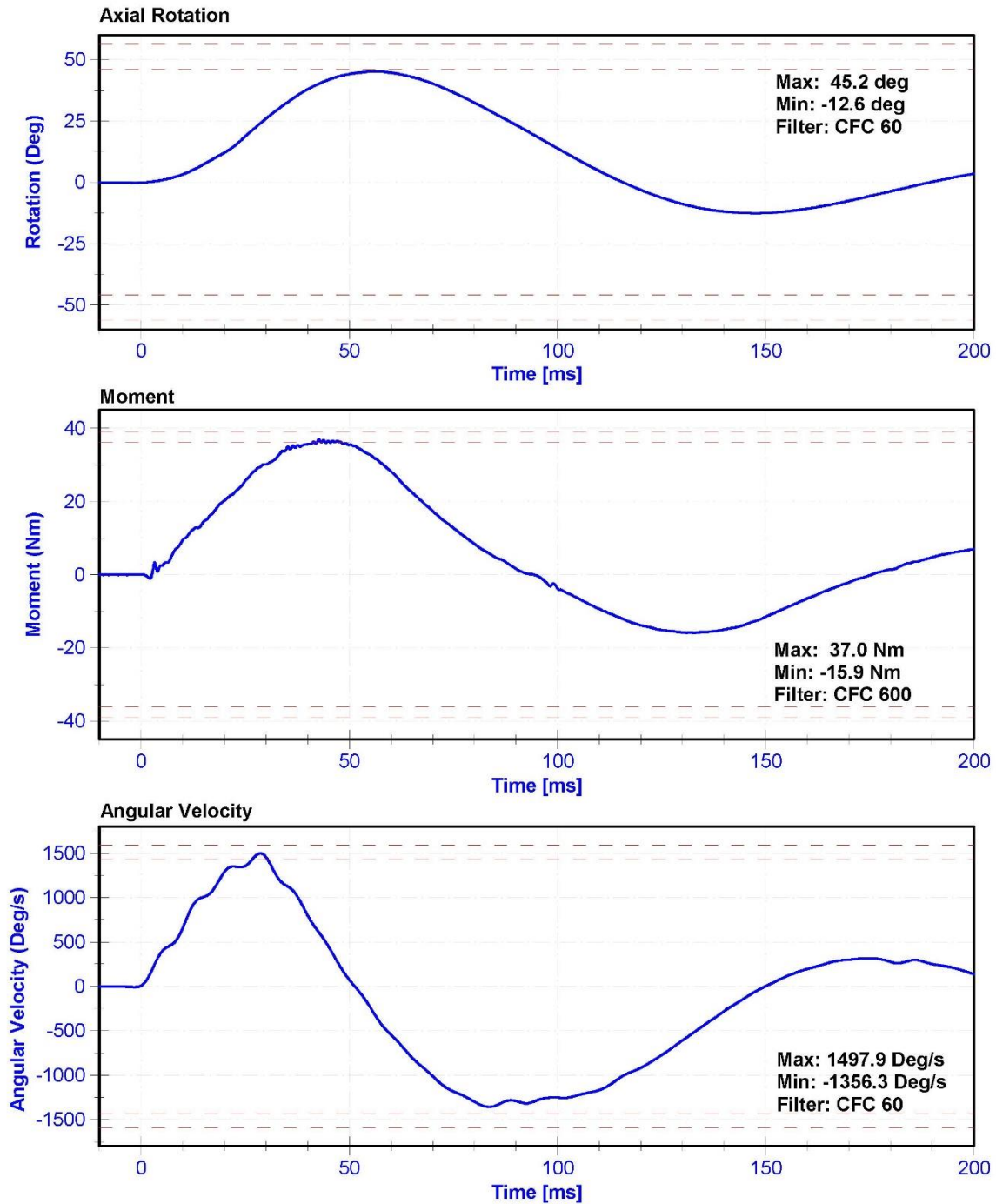
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	45.2	Pass
Velocity	4.95	5.05	m/s	5.045	Pass
Pendulum Impulse at 10ms	1.72	1.98	m/s	1.798	Pass
Pendulum Impulse at 15ms	2.67	2.97	m/s	2.733	Pass
Pendulum Impulse at 20ms	3.59	3.98	m/s	3.670	Pass
Pendulum Impulse at 25ms	4.43	4.92	m/s	4.596	Pass
Peak Upper Neck Z Moment	36.1	39.0	Nm	37.02	Pass
Peak Neck Axial Rotation	46.0	56.3	deg	45.16	Fail
Rotation Decay Time to Zero	50.9	62.2	ms	59.45	Pass
Peak Upper Neck Angular Velocity	1431	1591	deg/s	1497.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Neck Fixture Potentiometer	Servo 14CB1-3615	DS-0001	10/21/2015	10/20/2016
Upper Neck Load Cell	Humanetics 10380J14	LC-76 MZ	8/10/2016	8/10/2017
Upper Neck ARS	DTS ARS-PRO-8K	ARS-6424	1/19/2016	1/18/2017





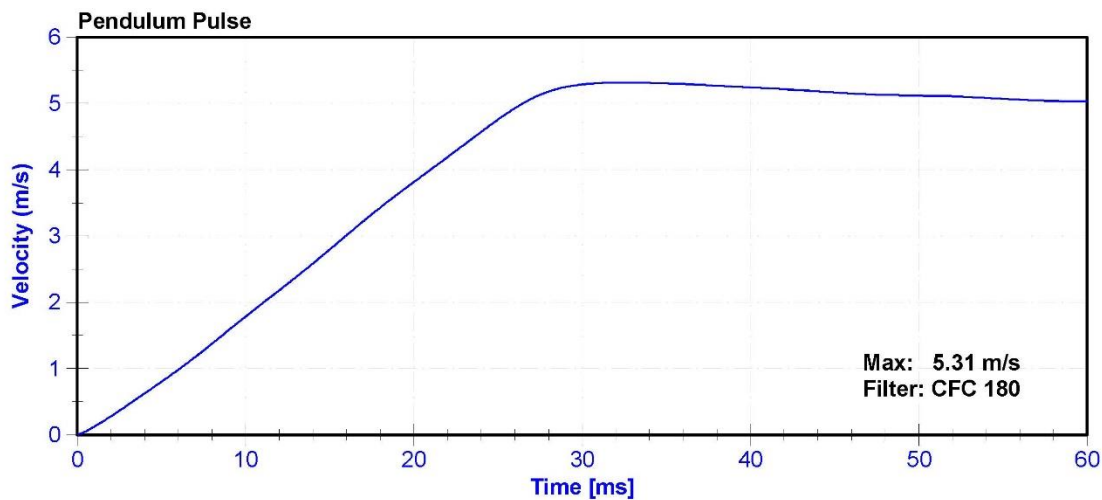
ATD Manufacturer	Humanetics	Test Technician	S. Keller
ATD Serial Number	9798	Laboratory Supervisor	M. Goehle

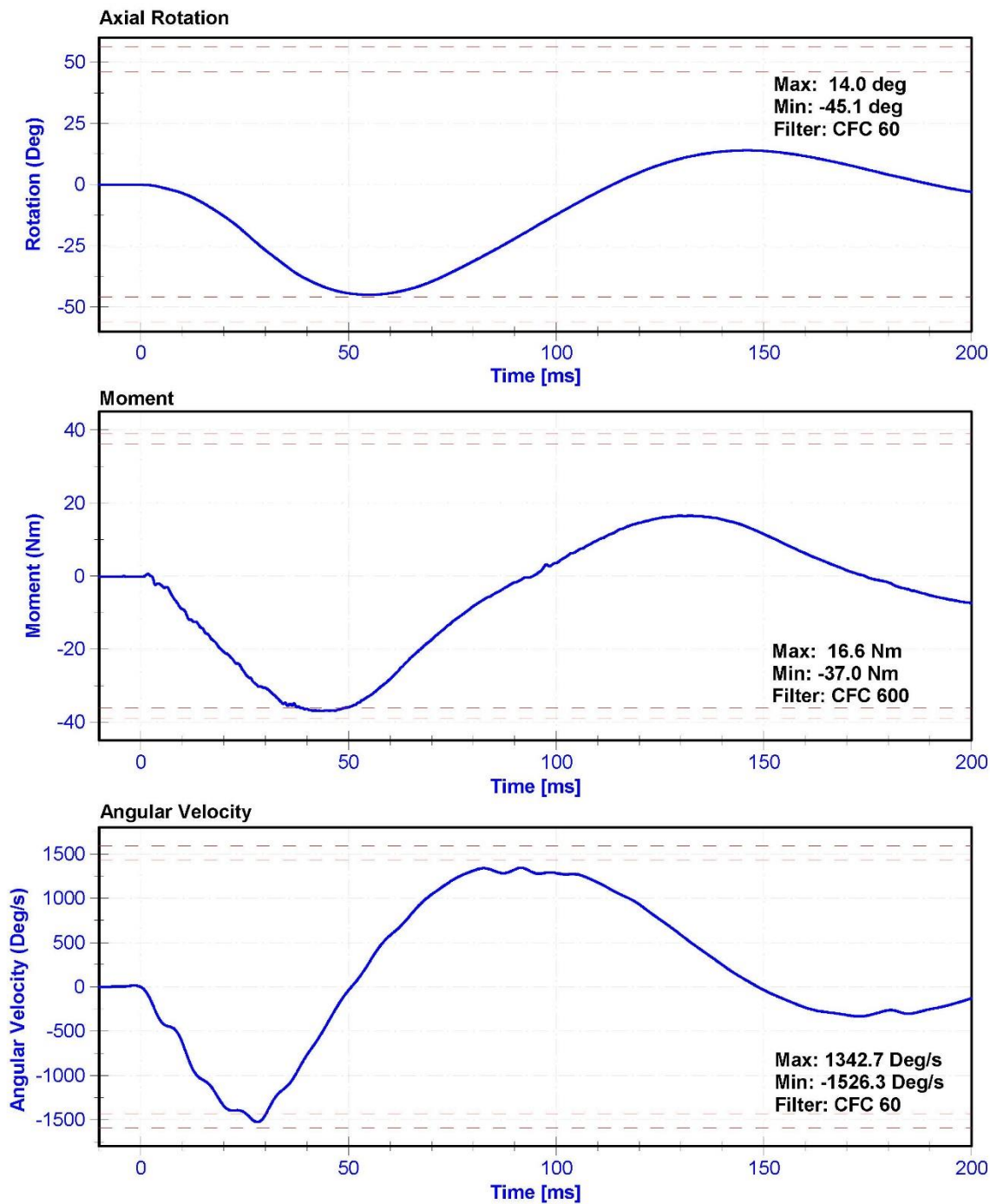
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	48.6	Pass
Velocity	4.95	5.05	m/s	5.045	Pass
Pendulum Impulse at 10ms	1.72	1.98	m/s	1.785	Pass
Pendulum Impulse at 15ms	2.67	2.97	m/s	2.797	Pass
Pendulum Impulse at 20ms	3.59	3.98	m/s	3.816	Pass
Pendulum Impulse at 25ms	4.43	4.92	m/s	4.758	Pass
Peak Upper Neck Z Moment	36.1	39.0	Nm	37.00	Pass
Peak Neck Axial Rotation	46.0	56.3	deg	45.11	Fail
Rotation Decay Time to Zero	50.9	62.2	ms	44.55	Fail
Peak Upper Neck Angular Velocity	1431	1591	deg/s	1526.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/10/2016	5/10/2017
Neck Fixture Potentiometer	Servo 14CB1-3615	DS-0001	10/21/2015	10/20/2016
Upper Neck Load Cell	Humanetics 10380JI4	LC-76 MZ	8/10/2016	8/10/2017
Upper Neck ARS	DTS ARS-PRO-8K	ARS-6424	1/19/2016	1/18/2017





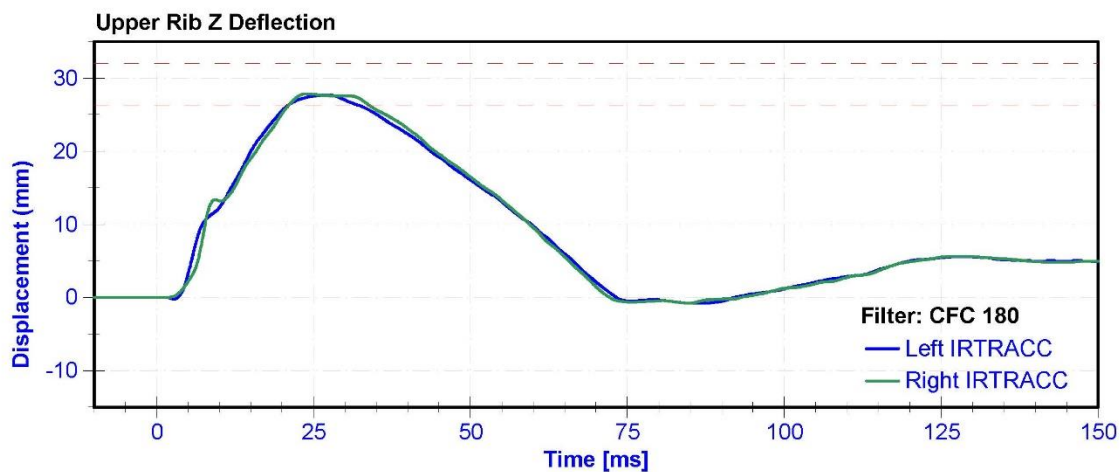
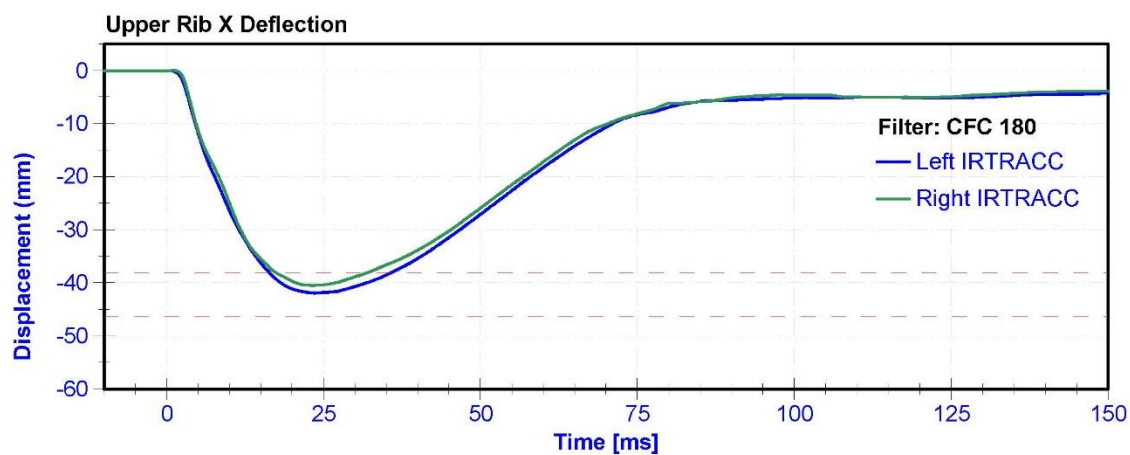
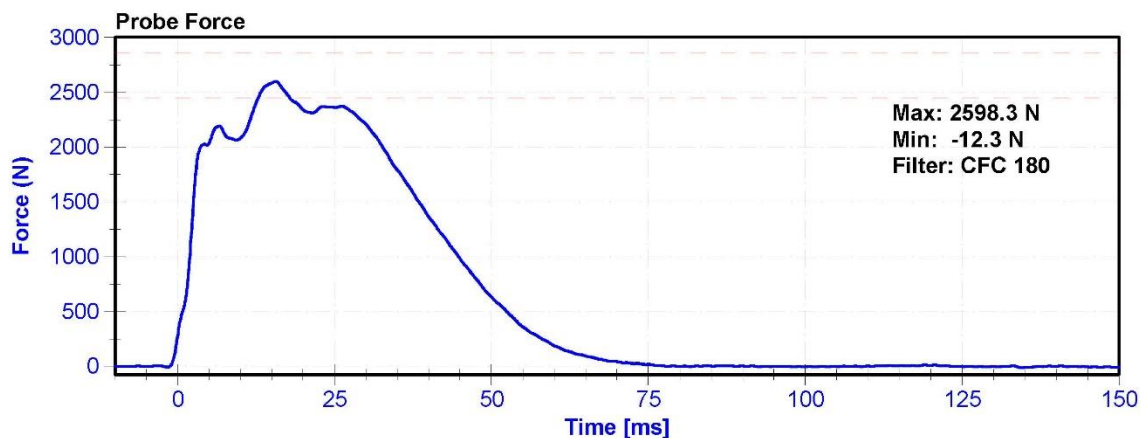
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

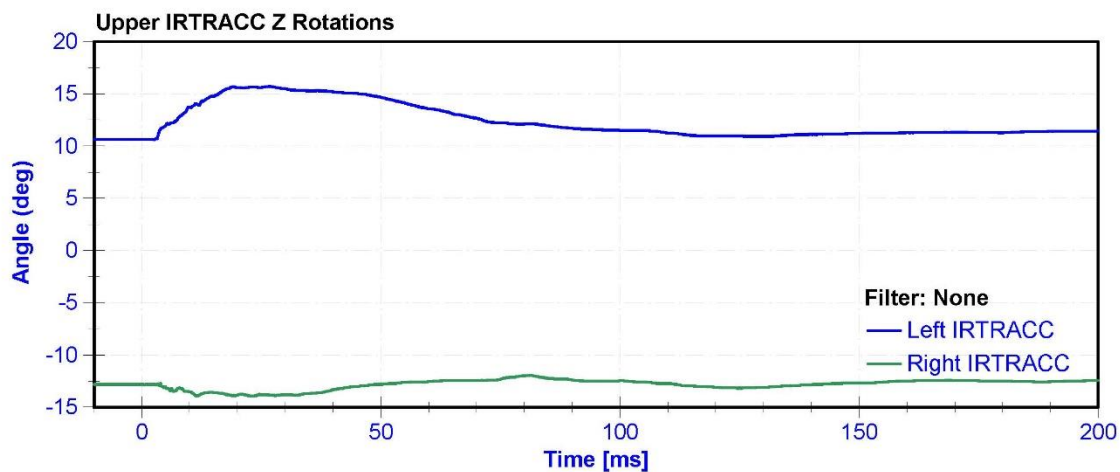
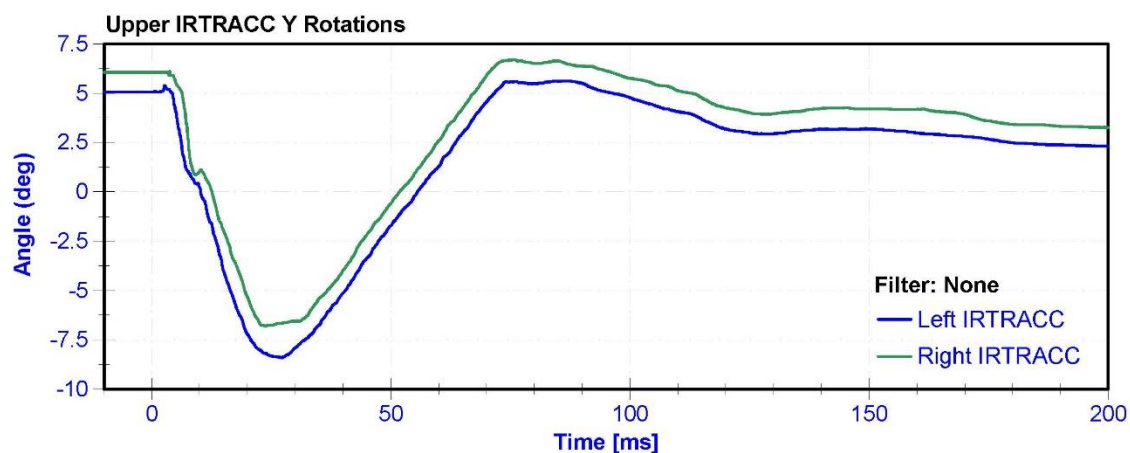
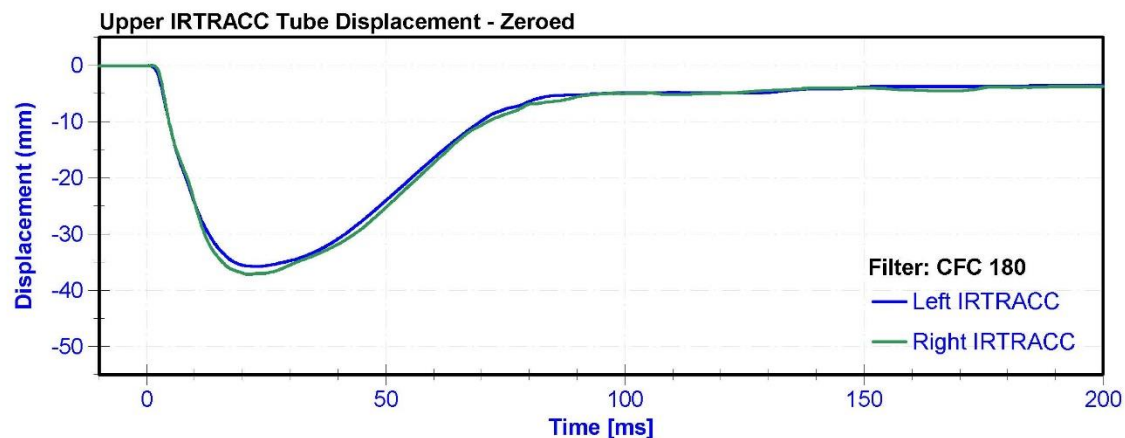
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	22.2	Pass
Humidity	10	70	%	47.6	Pass
Impact Velocity	4.25	4.35	m/s	4.293	Pass
Probe Force	2449	2855	N	2598.3	Pass
Upper Left X Rib Deflection	-46.4	-38.0	mm	-41.95	Pass
Upper Right X Rib Deflection	-46.4	-38.0	mm	-40.50	Pass
Left/Right X Rib Deviation	-7.00	7.00	mm	-1.443	Pass
Upper Left Z Rib Deflection	26.2	32.0	mm	27.74	Pass
Upper Right Z Rib Deflection	26.2	32.0	mm	27.84	Pass
Left/Right Z Rib Deviation	-7	7.00	mm	-0.097	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P16593	9/8/2015	9/7/2016
Upper Left IRTRACC	Humanetics IF-364-C-R3	DS-DQ2255	8/22/2016	8/22/2017
Upper Left Y Potentiometer	Sfernice 9945	DS-DM4779	8/22/2016	8/22/2017
Upper Left Z Potentiometer	Sfernice 9945	DS-DM4778	8/22/2016	8/22/2017
Upper Right IRTRACC	Humanetics IF-364-C-R3	DS-DQ2254	8/23/2016	8/23/2017
Upper Right Y Potentiometer	Sfernice 9945	DS-DM4774	8/23/2016	8/23/2017
Upper Right Z Potentiometer	Sfernice 9945	DS-DM4775	8/23/2016	8/23/2017





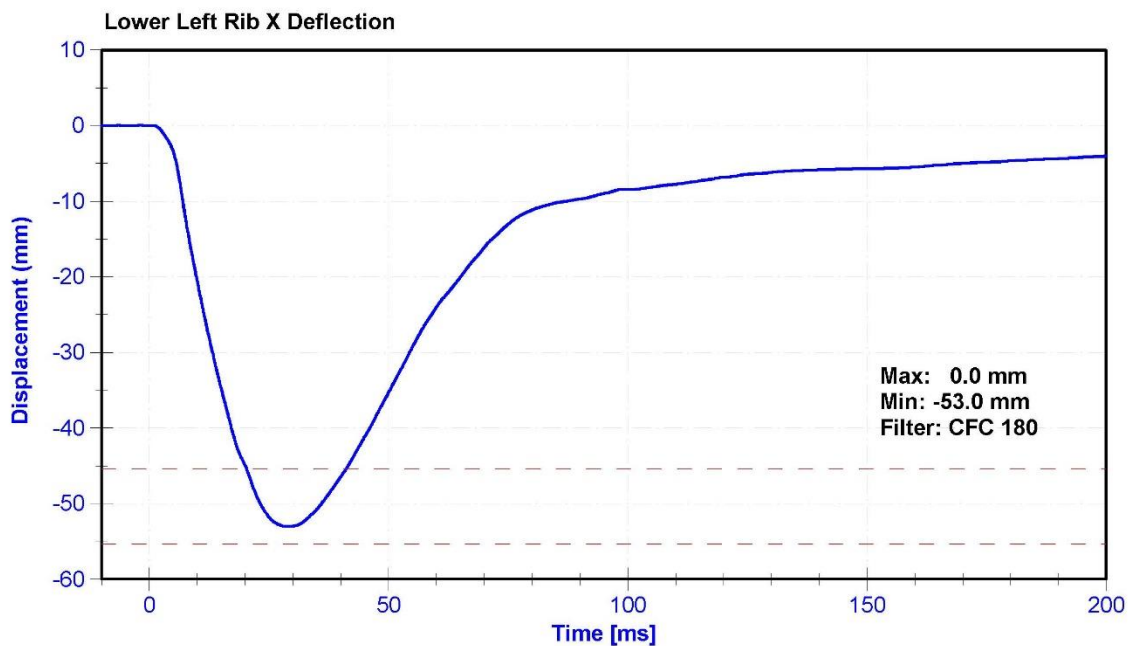
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

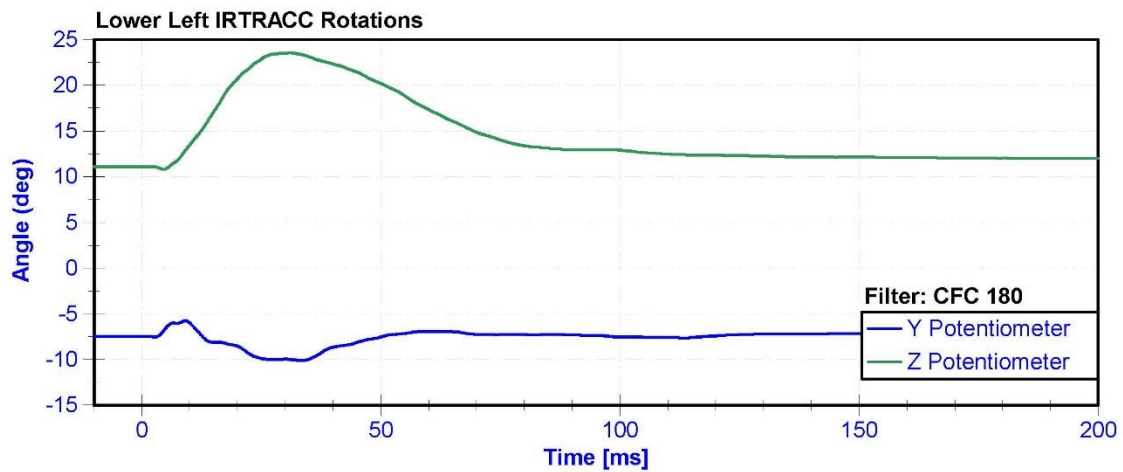
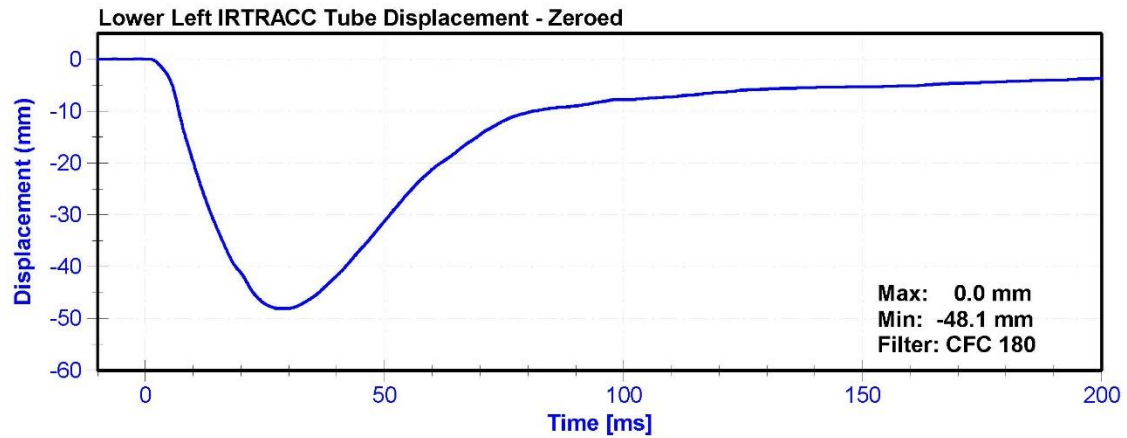
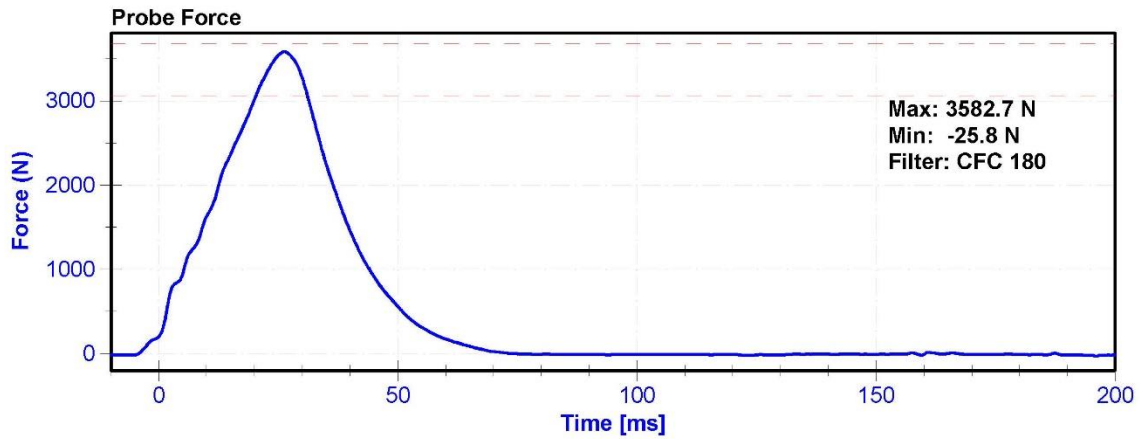
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	44.3	Pass
Impact Velocity	4.25	4.35	m/s	4.287	Pass
Peak Left X Rib Deflection	-55.3	-45.4	mm	-52.99	Pass
Probe Force during Peak Deflection	3058	3680	N	3582.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accel	ENDEVCO 7264CT	AC-P16593	9/8/2015	9/7/2016
Lower Left IRTACC	Humanetics IF-364-C-R3	DS-DK3866	8/17/2016	8/17/2017
Lower Left Y Potentiometer	Sfernice 9945	DS-DJ5455	8/17/2016	8/17/2017
Lower Left Z Potentiometer	Sfernice 9945	DS-DJ5454	8/17/2016	8/17/2017





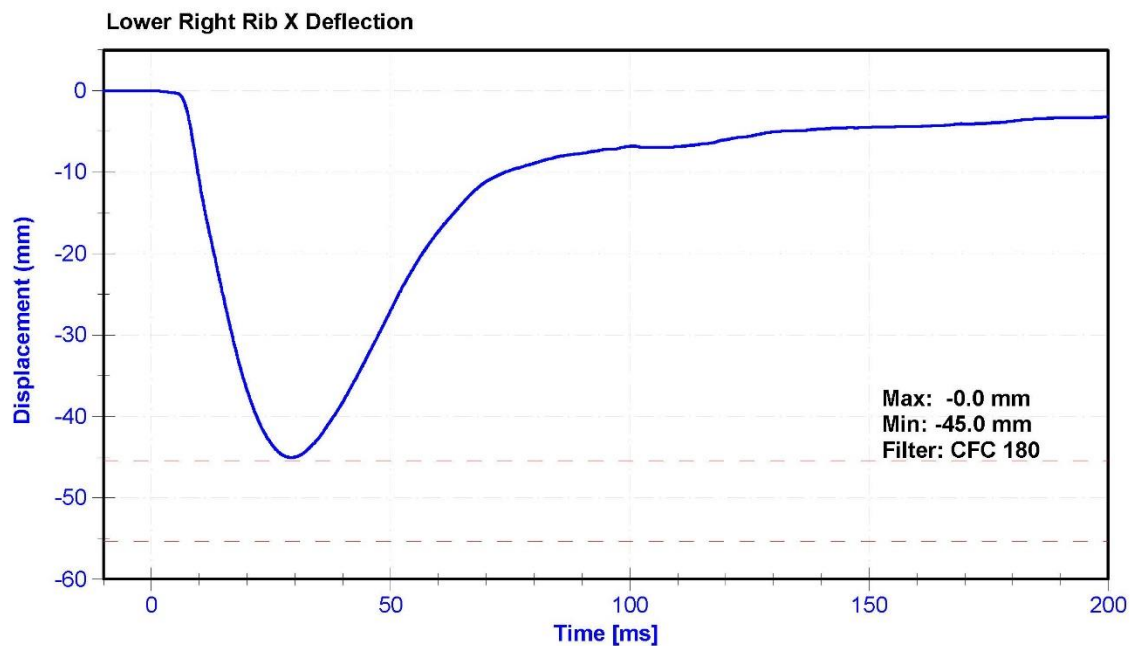
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

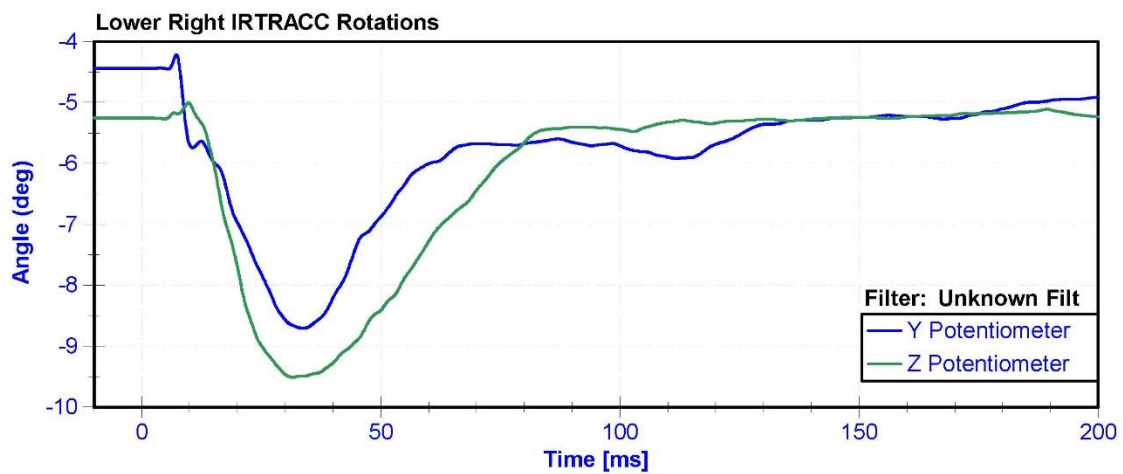
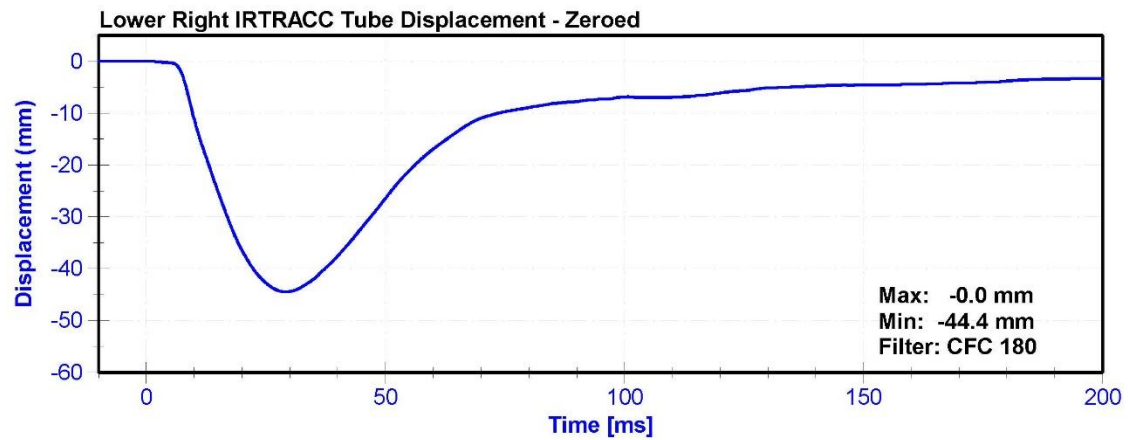
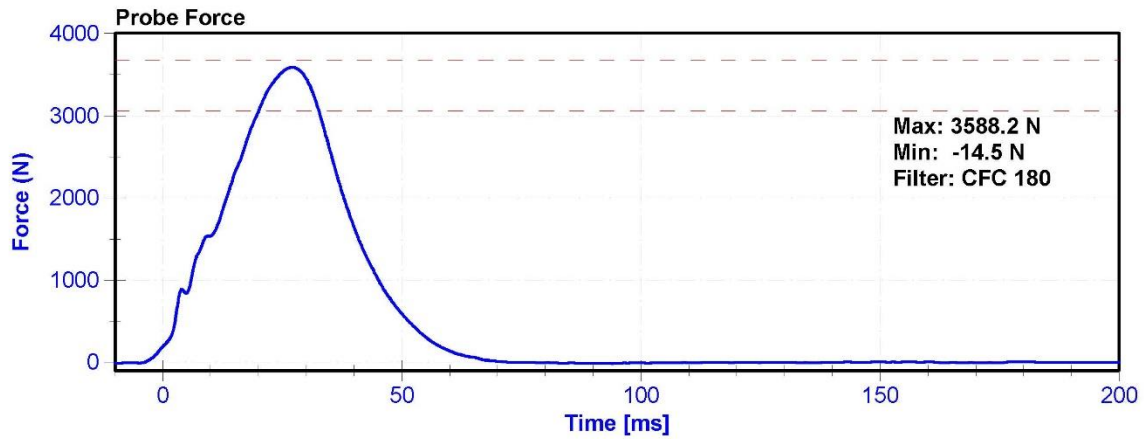
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	42.8	Pass
Impact Velocity	4.25	4.35	m/s	4.293	Pass
Peak Right X Rib Deflection	-55.3	-45.4	mm	-45.04	Fail
Probe Force during Peak Deflection	3058	3680	N	3588.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accel	ENDEVCO 7264CT	AC-P16593	9/8/2015	9/7/2016
Lower Right IRTACC	Humanetics IF-364-C-R3	DS-DK3865	8/22/2016	8/22/2017
Lower Right Y Potentiometer	Sfernice 9945	DS-DJ5453	8/22/2016	8/22/2017
Lower Right Z Potentiometer	Sfernice 9945	DS-DJ5452	8/22/2016	8/22/2017







Certification Report
THOR 50th Abdomen Impact - NHTSA Aug 2016

2016-09-06 16:58:46

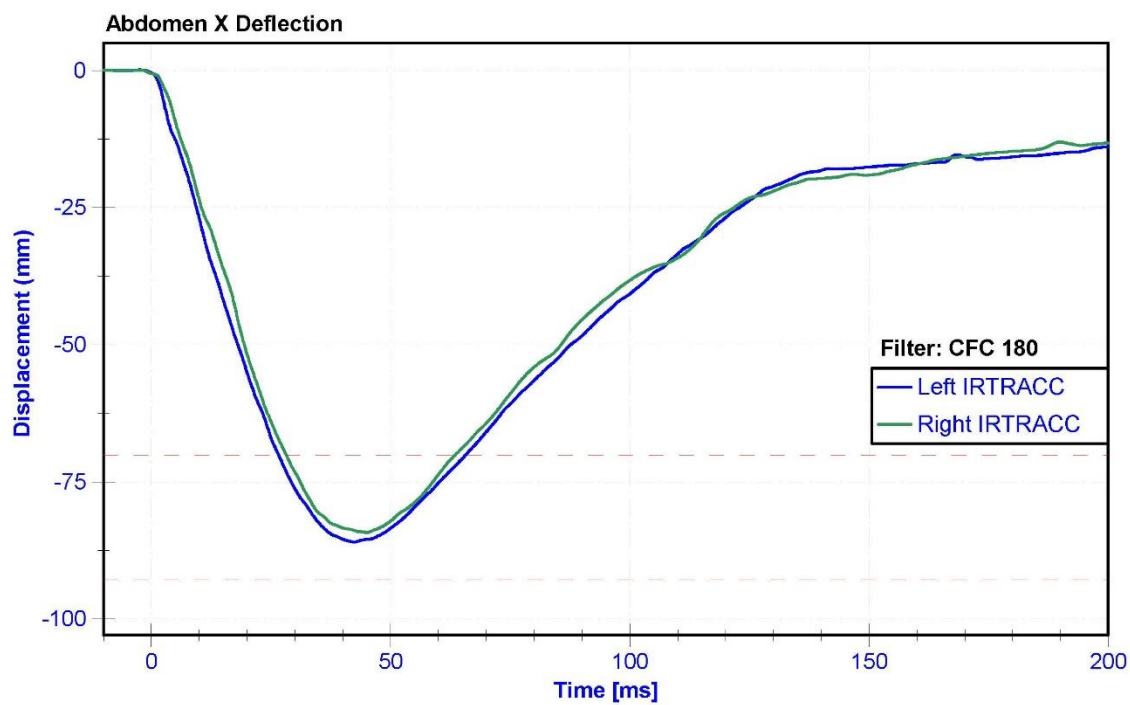
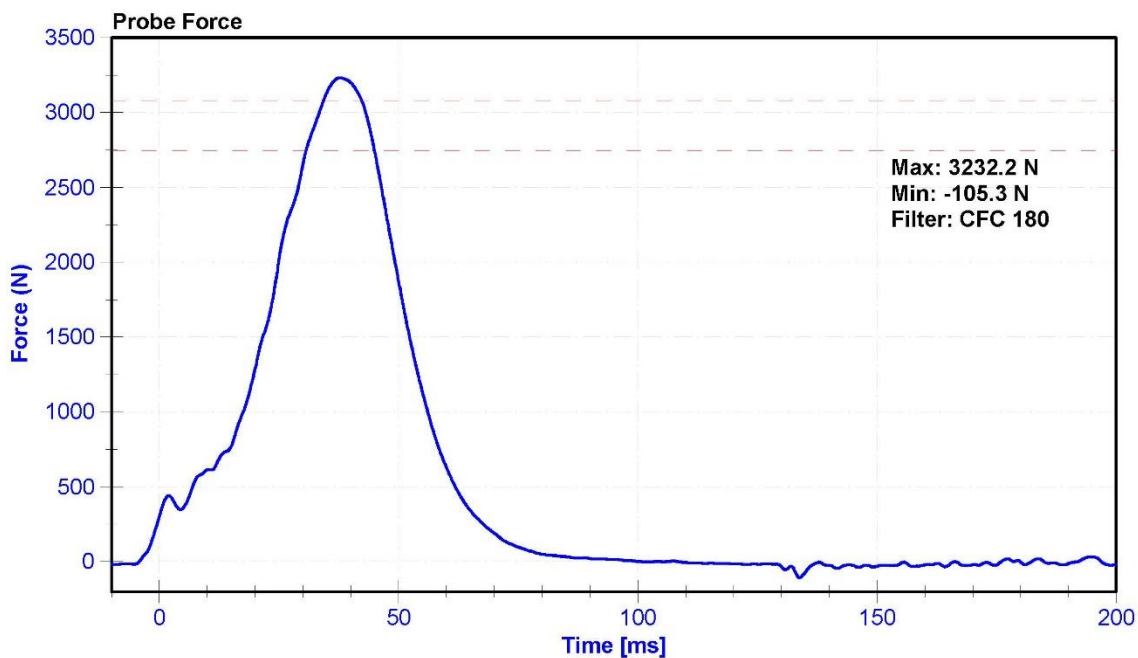
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

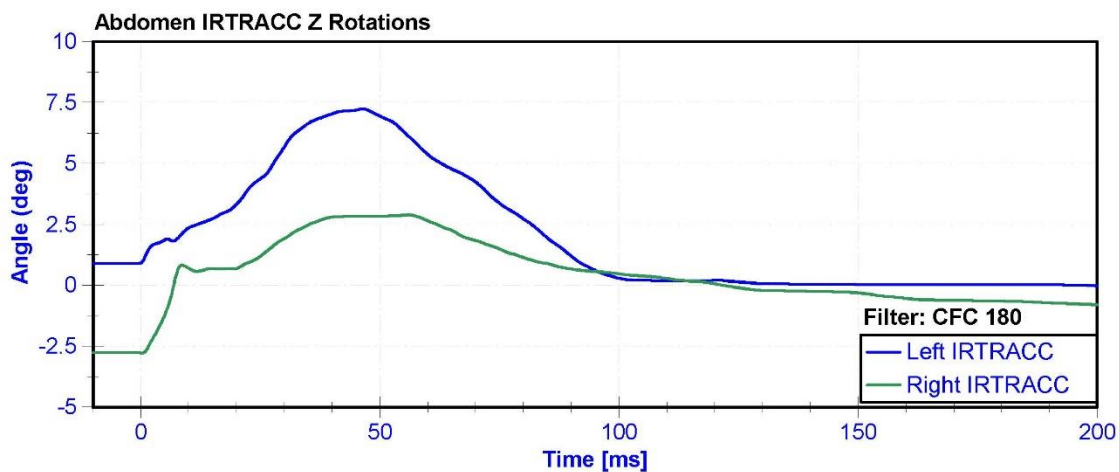
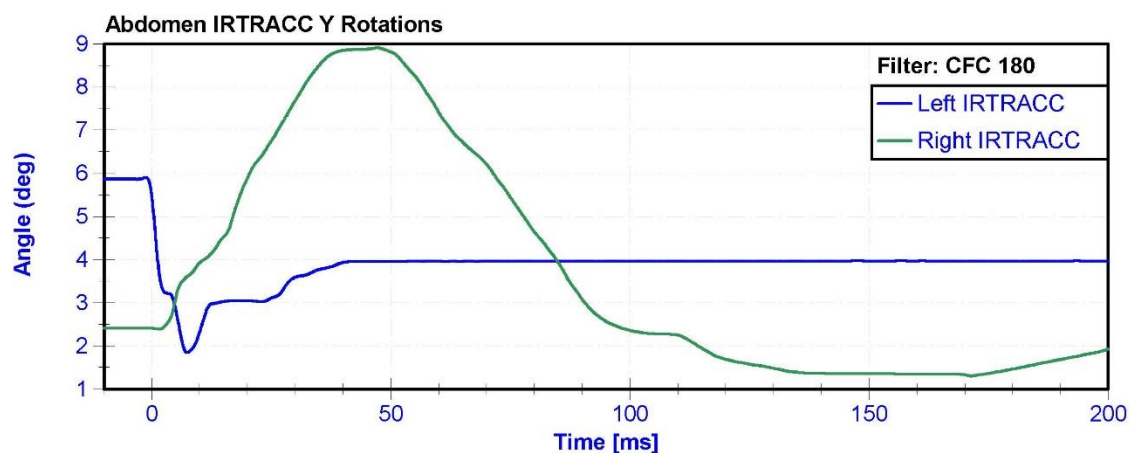
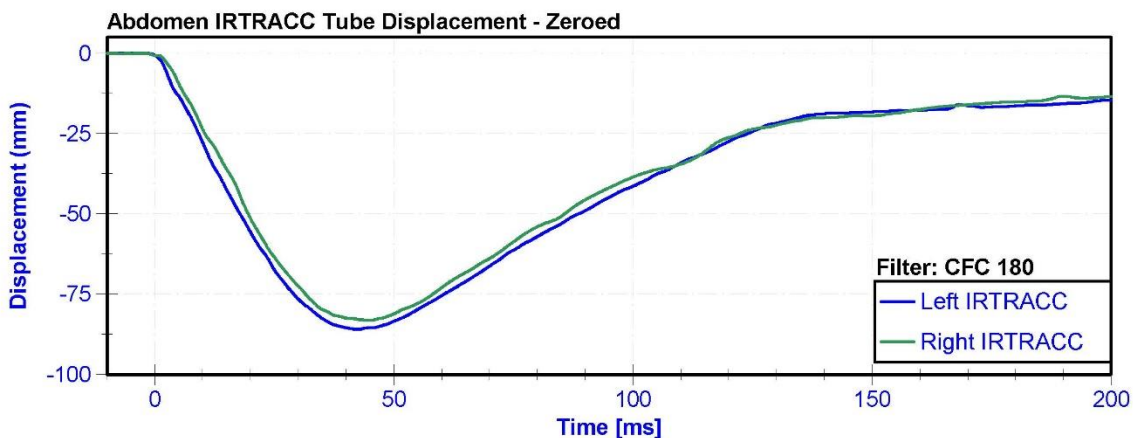
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	51.9	Pass
Impact Velocity	3.25	3.35	m/s	3.288	Pass
Probe Force	2746	3078	N	3232.2	Fail
Left Abdomen X Deflection	-92.9	-70.1	mm	-85.95	Pass
Right Abdomen X Deflection	-92.9	-70.1	mm	-84.20	Pass
Left/Right X Deviation	-12.00	12.00	mm	-1.753	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accel	ENDEVCO 7264CT	AC-P16593	9/8/2015	9/7/2016
Abdomen Left IRTRACC	Humanetics 472-4750	DS-DP1395	8/17/2016	8/17/2017
Abdomen Left Y Potentiometer	Sfernice 9945	DS-DJ5443	8/17/2016	8/17/2017
Abdomen Left Z Potentiometer	Sfernice 9945	DS-DJ5444	8/17/2016	8/17/2017







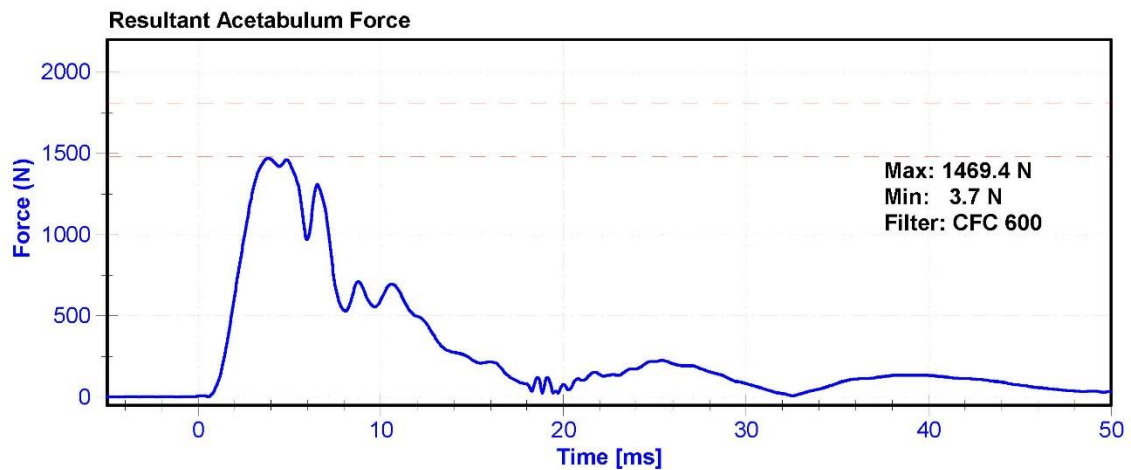
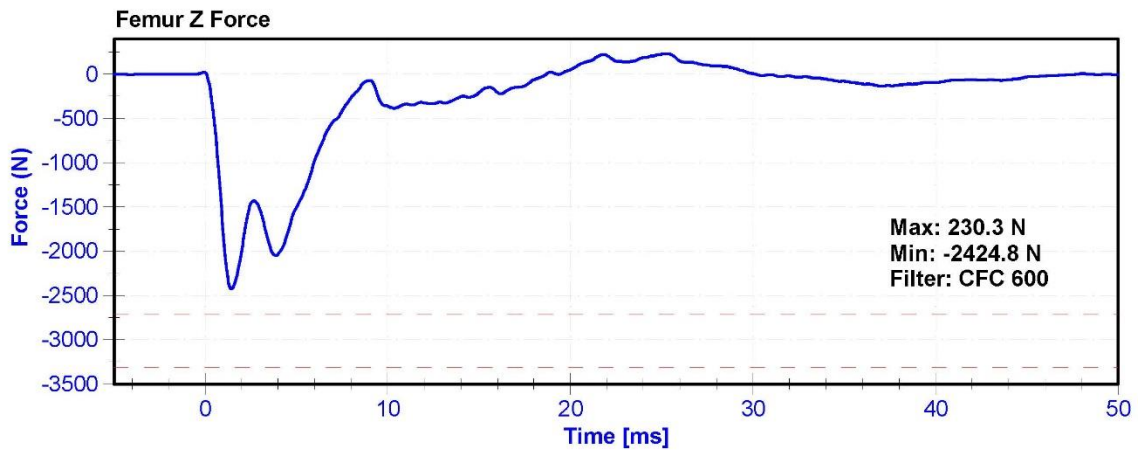
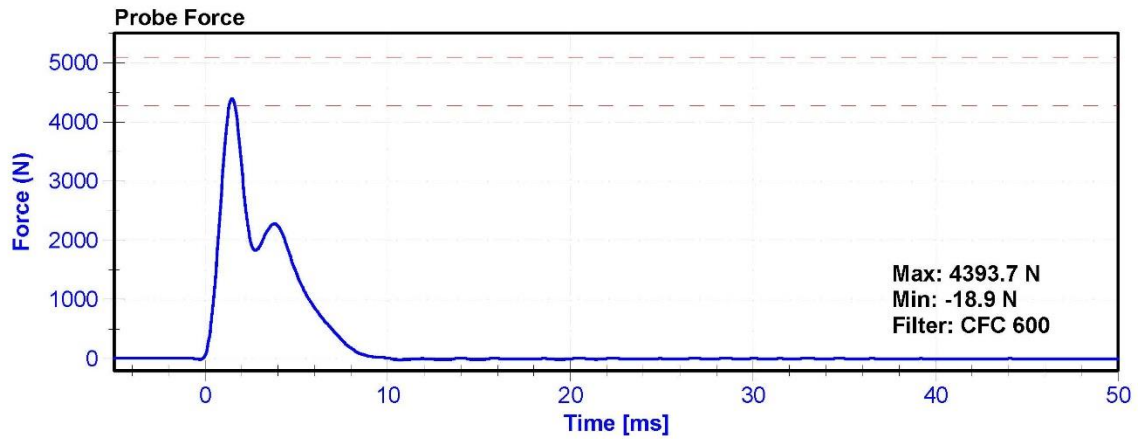
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	59.9	Pass
Impact Velocity	2.55	2.65	m/s	2.636	Pass
Probe Force	4278	5093	N	4393.7	Pass
Peak Femur Z Force	-3314	-2712	N	-2424.77	Fail
Peak Resultant Acetabulum Force	1478	1806	N	1469.36	Fail

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accel	ENDEVCO 7264CT	AC-P16593	9/8/2015	9/7/2016
Left Femur Load Cell	Humanetics W50-71010	LC-DK3608 FZ	8/23/2016	8/23/2017
Left Acetabulum Load Cell	Humanetics 10670JI4	LC-DM1945 FX	8/23/2016	8/23/2017





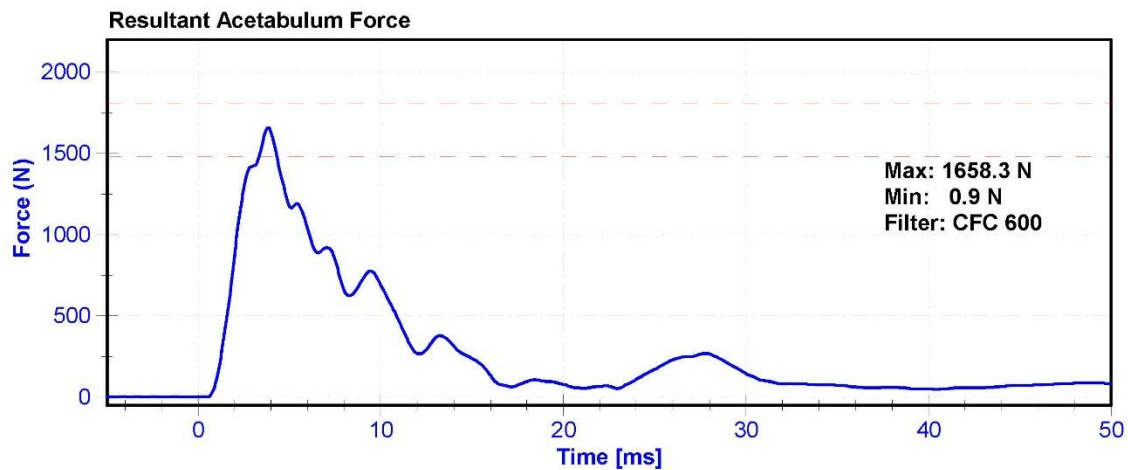
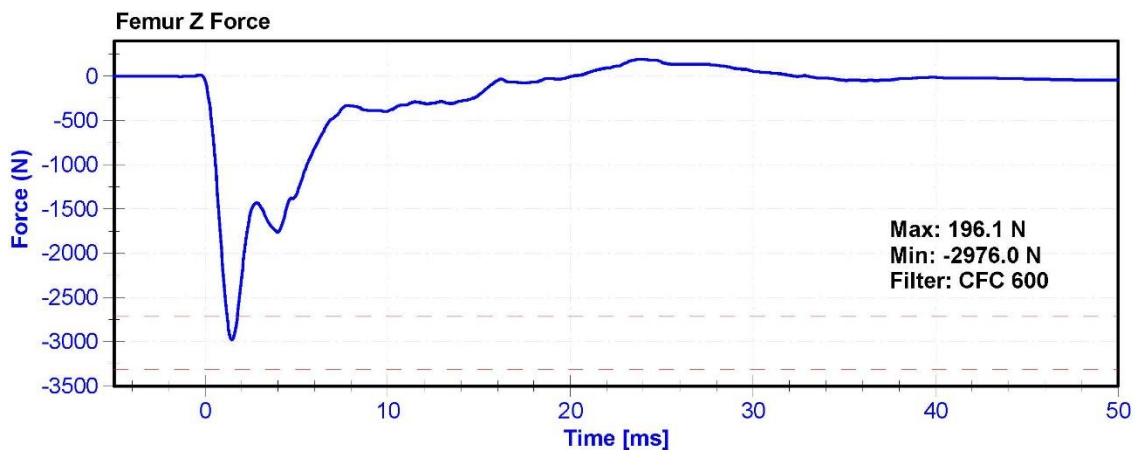
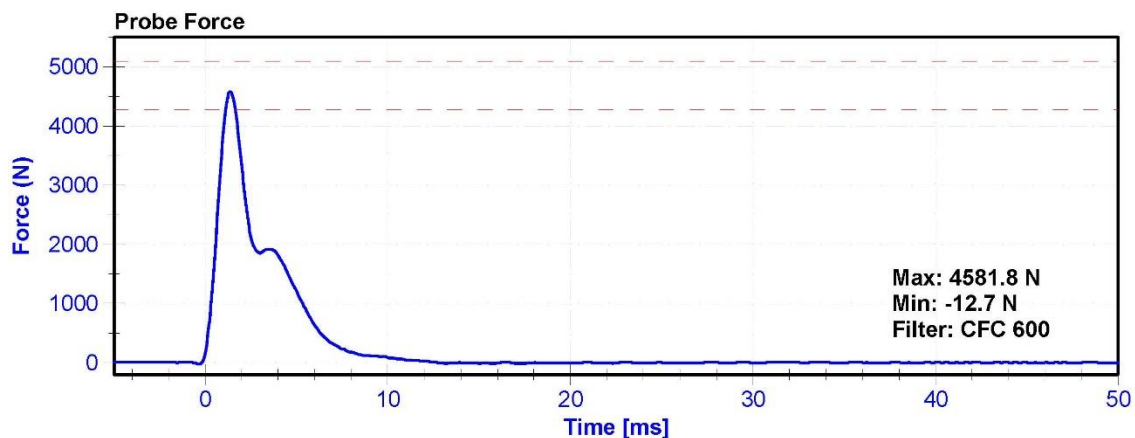
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	59.9	Pass
Impact Velocity	2.55	2.65	m/s	2.636	Pass
Probe Force	4278	5093	N	4581.8	Pass
Peak Femur Z Force	-3314	-2712	N	-2975.98	Pass
Peak Resultant Acetabulum Force	1478	1806	N	1658.25	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accel	ENDEVCO 7264CT	AC-P16593	9/8/2015	9/7/2016
Left Femur Load Cell	Humanetics W50-71010	LC-DK0842 FZ	8/23/2016	8/23/2017
Left Acetabulum Load Cell	Humanetics 10530JI4	LC-DL9552 FX	8/23/2016	8/23/2017





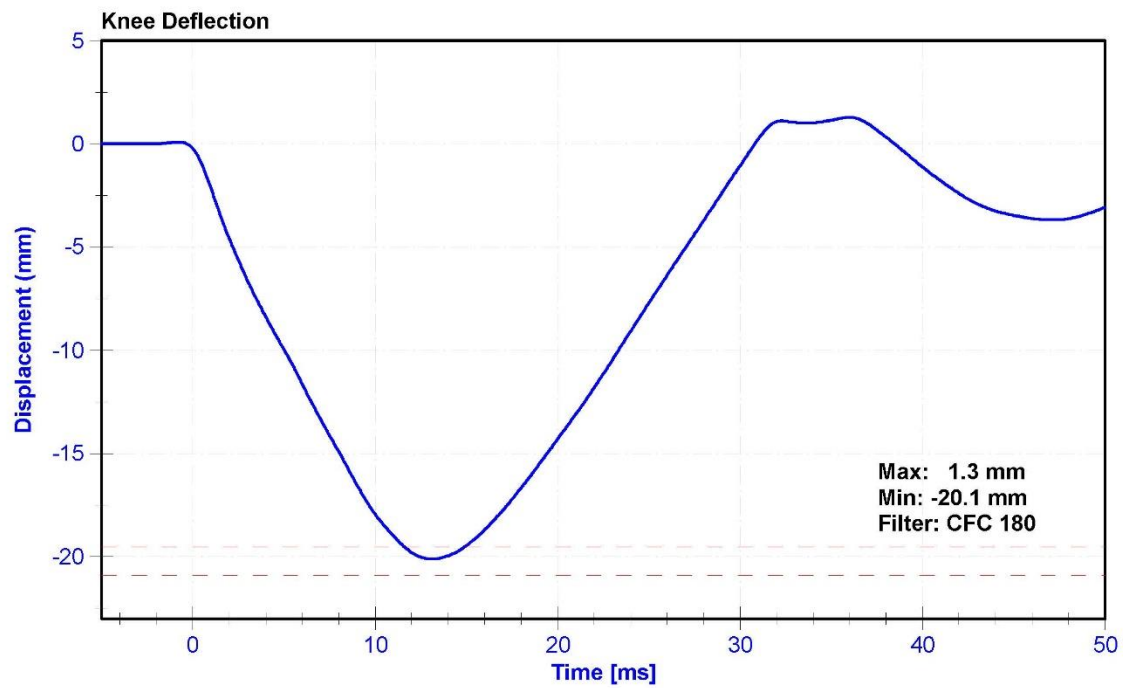
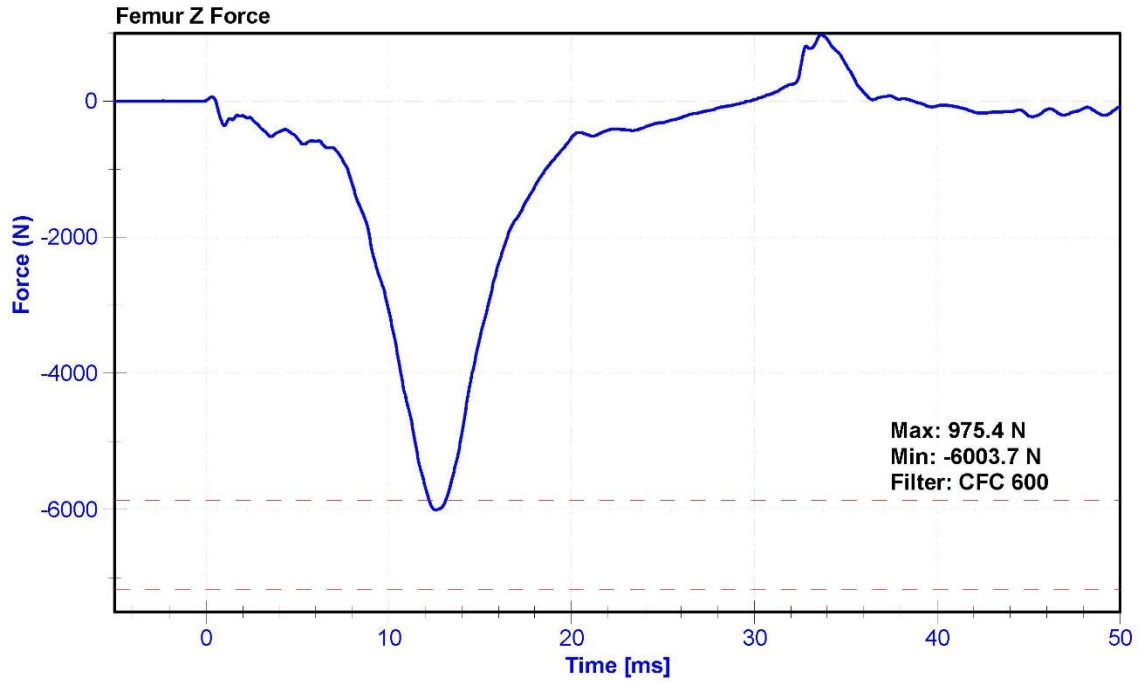
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	53.6	Pass
Impact Velocity	2.15	2.25	m/s	2.238	Pass
Peak Femur Z Force	-7170	-5866	N	-6003.7	Pass
Knee Deflection at Peak Force	-20.9	-19.5	mm	-20.11	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accel	ENDEVCO 7264CT	AC-P16593	9/8/2015	9/7/2016
Femur Load Cell	Humanetics W50-71010	LC-DK3608 FZ	8/23/2016	8/23/2017
Knee Potentiometer	Space Age 150-0121V	DS-13073811	8/23/2016	8/23/2017





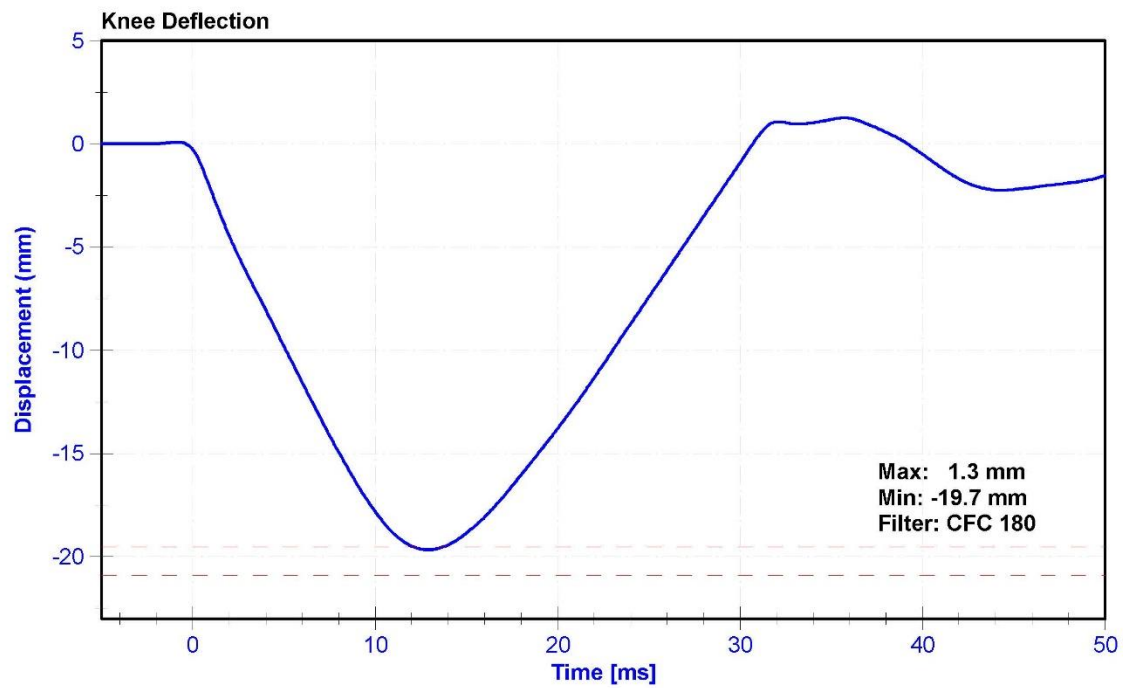
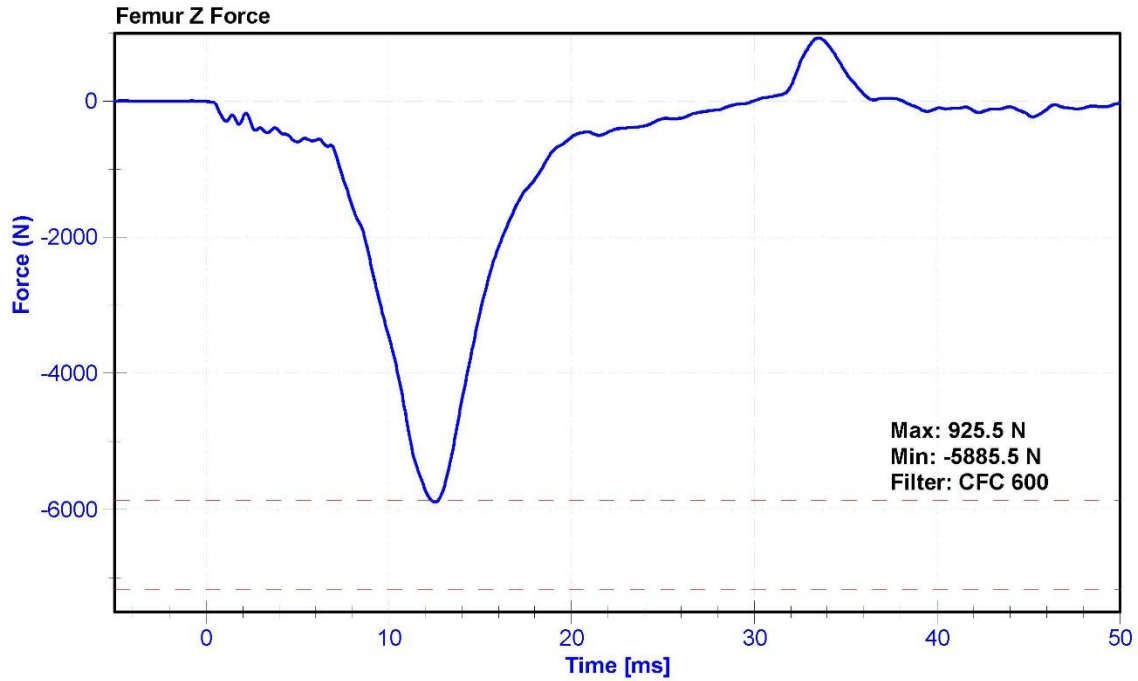
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	50.9	Pass
Impact Velocity	2.15	2.25	m/s	2.214	Pass
Peak Femur Z Force	-7170	-5866	N	-5885.5	Pass
Knee Deflection at Peak Force	-20.9	-19.5	mm	-19.66	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accel	ENDEVCO 7264CT	AC-P16593	9/8/2015	9/7/2016
Femur Load Cell	Humanetics W50-71010	LC-DK0842 FZ	8/23/2016	8/23/2017
Knee Potentiometer	Space Age 150-0121V	DS-13073814	8/23/2016	8/23/2017





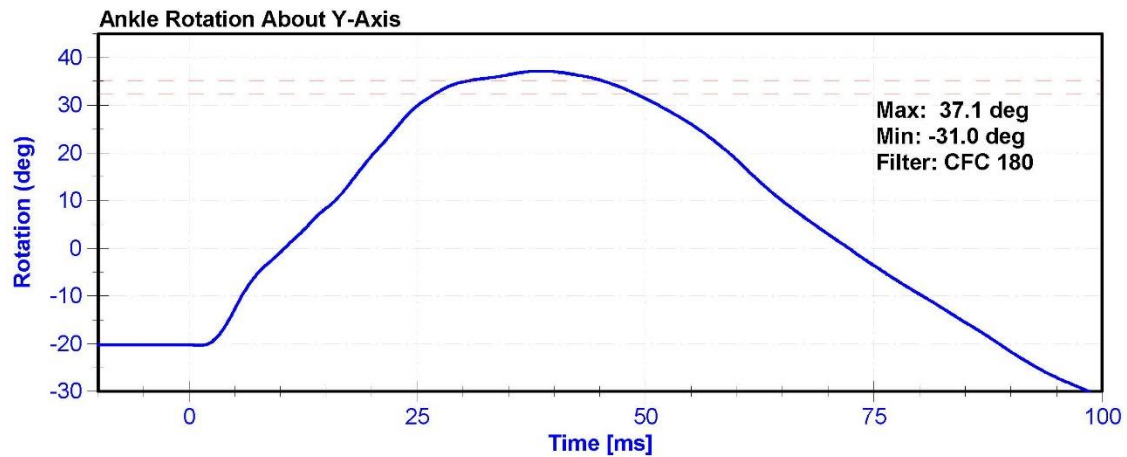
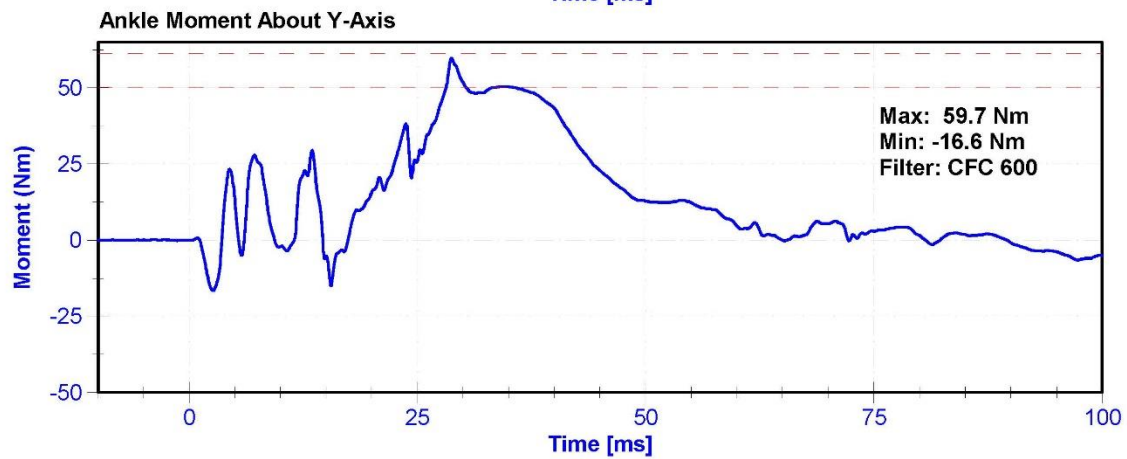
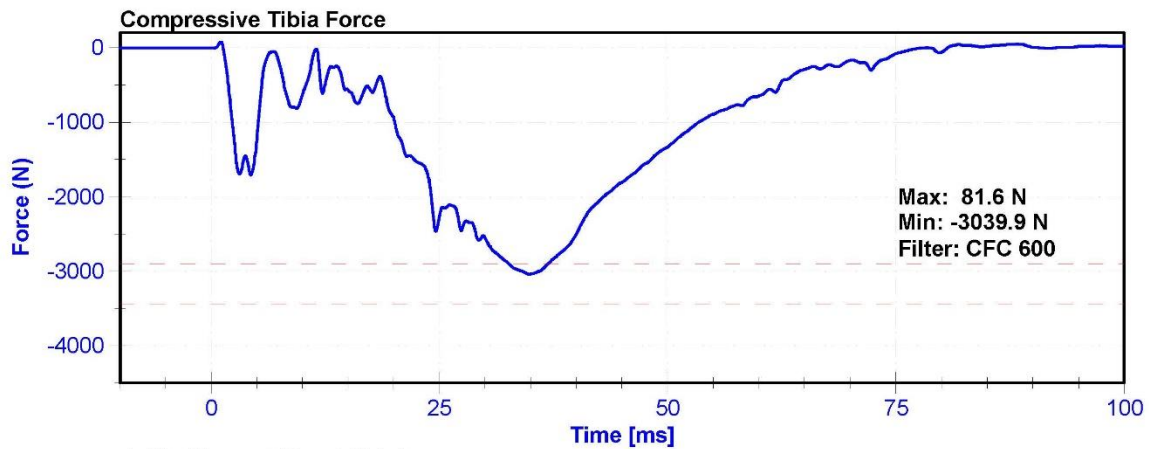
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	55.0	Pass
Velocity	4.9	5.1	m/s	4.961	Pass
Lower Tibia Compressive Force	-3437	-2897	N	-3039.9	Pass
Peak Moment about Y-Axis	50.2	61.3	Nm	59.69	Pass
Peak Rotation about Y-Axis	32.5	35.1	deg	37.13	Fail

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32227	9/13/2016	9/13/2017
Lower Tibia Load Cell	Denton 9329J	LC-DQ9685 FZ	8/23/2016	8/23/2017
Ankle Y Potentiometer	SFERNICE ECO50ESC10	DS-005	8/18/2016	8/18/2017





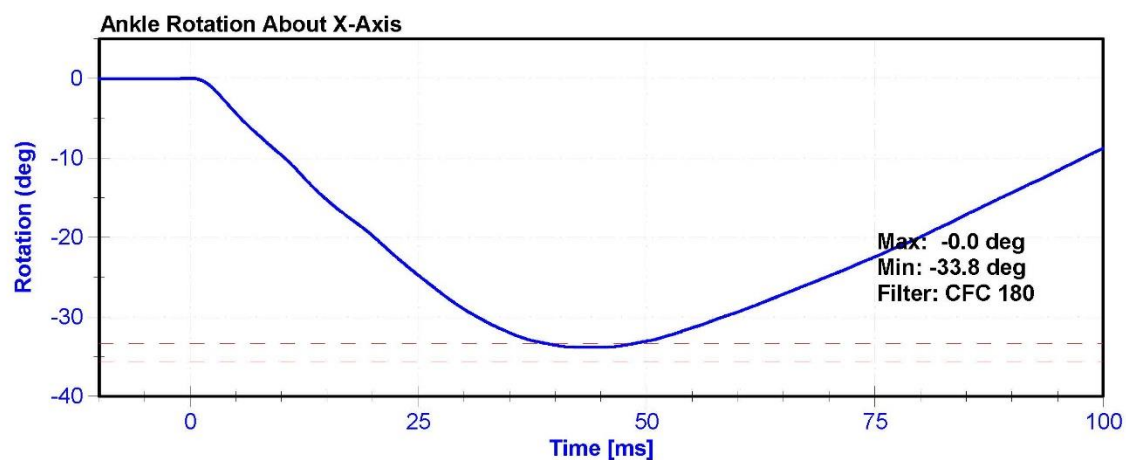
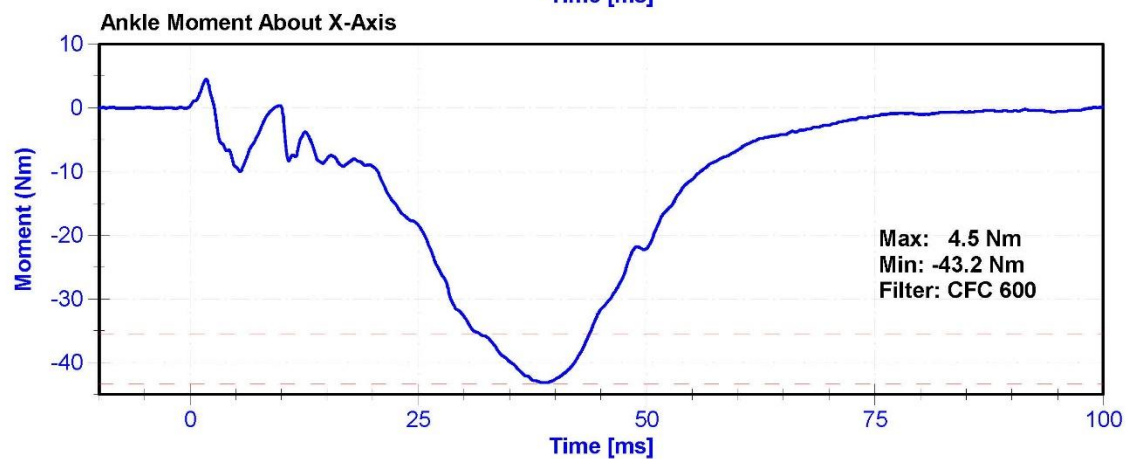
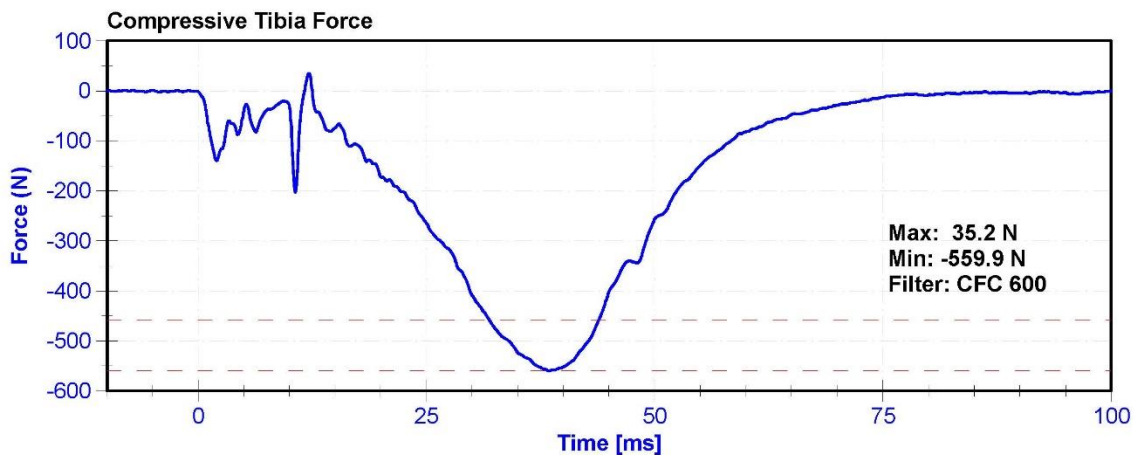
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	54.7	Pass
Velocity	1.9	2.1	m/s	1.997	Pass
Lower Tibia Compressive Force	-560	-458	N	-559.9	Pass
Peak Moment about X-Axis	-43.4	-35.5	Nm	-43.16	Pass
Peak Rotation about X-Axis	-35.6	-33.3	deg	-33.84	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32227	9/13/2016	9/13/2017
Lower Tibia Load Cell	Denton 9329J	LC-DQ9685 FZ	8/23/2016	8/23/2017
Ankle Y Potentiometer	SFERNICE ECO50ESC10	DS-004	8/18/2016	8/18/2017





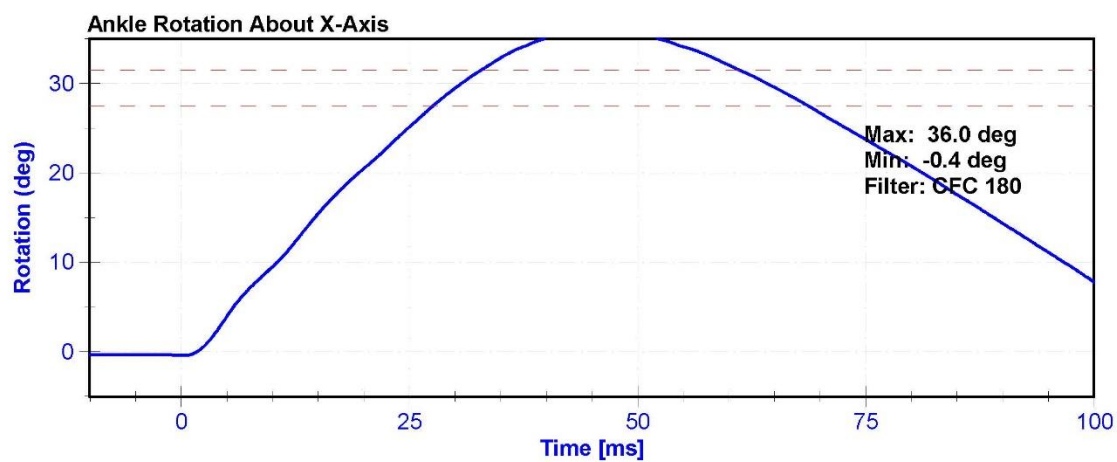
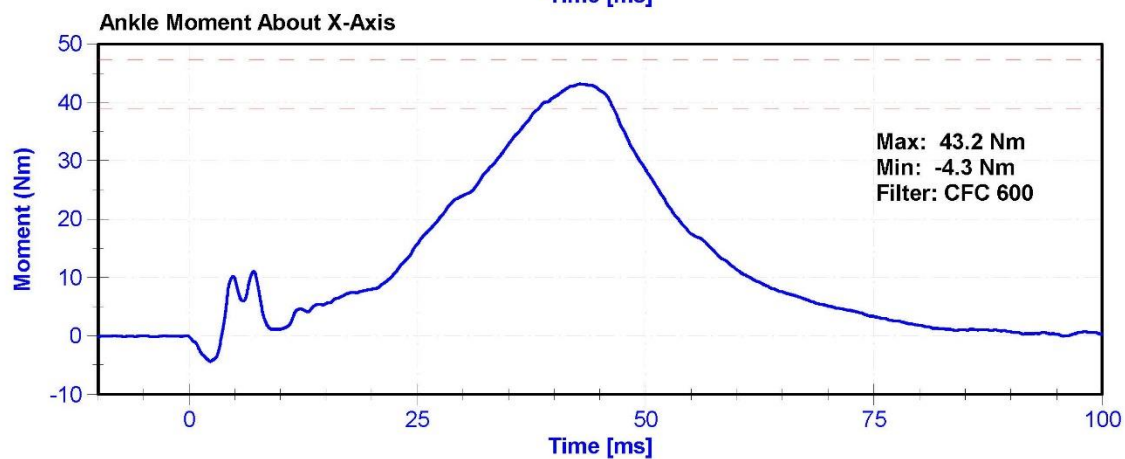
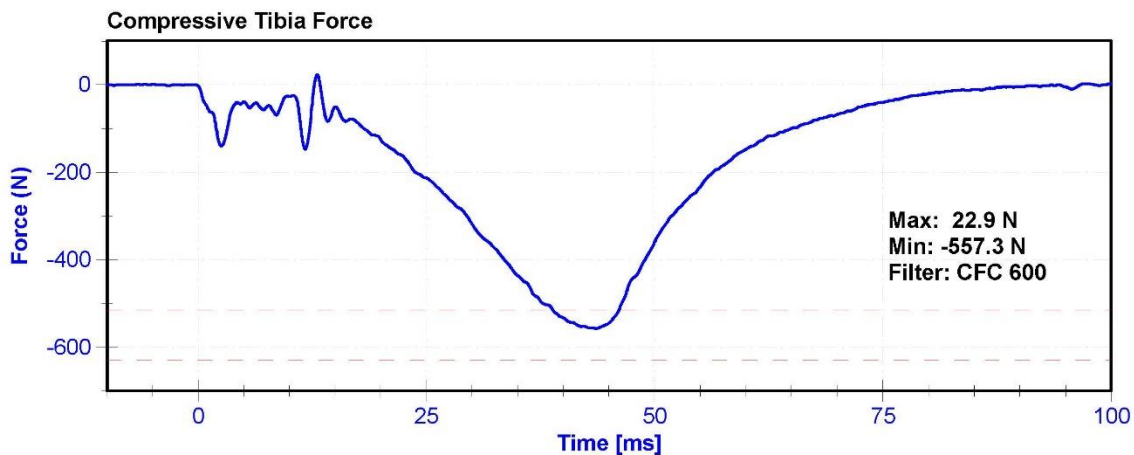
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	49.9	Pass
Velocity	1.9	2.1	m/s	1.972	Pass
Lower Tibia Compressive Force	-629	-515	N	-557.3	Pass
Peak Moment about X-Axis	38.8	47.3	Nm	43.18	Pass
Peak Rotation about X-Axis	27.5	31.5	deg	35.95	Fail

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32227	9/13/2016	9/13/2017
Lower Tibia Load Cell	Denton 9329J	LC-DQ9685 FZ	8/23/2016	8/23/2017
Ankle Y Potentiometer	SFERNICE ECO50ESC10	DS-004	8/18/2016	8/18/2017



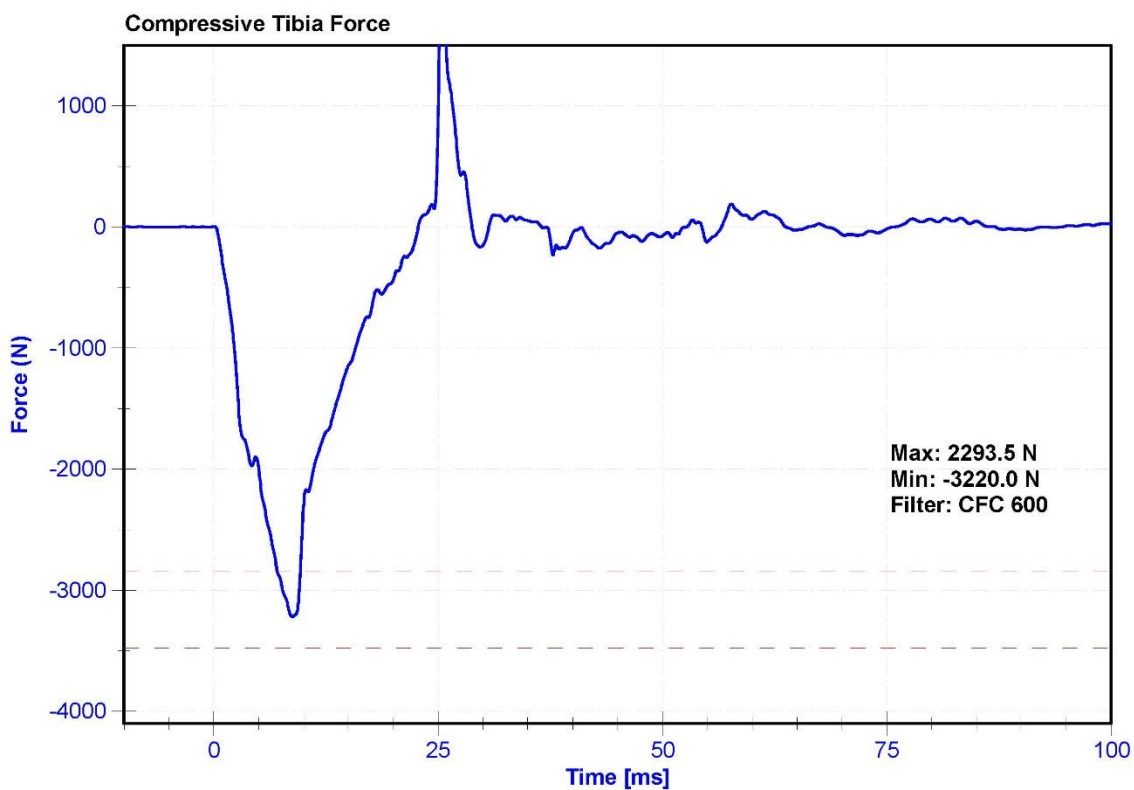
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	47.5	Pass
Velocity	3.9	4.1	m/s	4.071	Pass
Lower Tibia Compressive Force	-3477	-2845	N	-3220.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32227	9/13/2016	9/13/2017
Lower Tibia Load Cell	Denton 9329J	LC-DQ9685 FZ	8/23/2016	8/23/2017



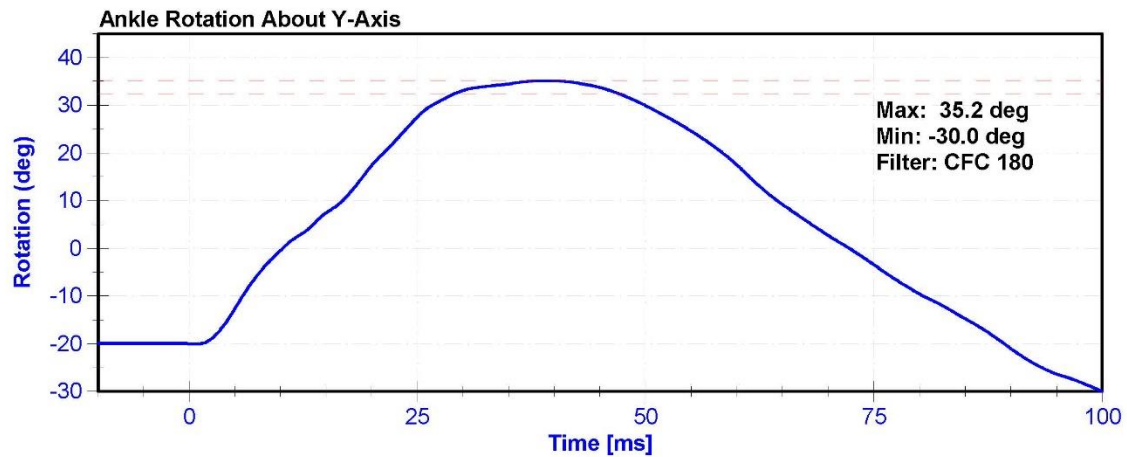
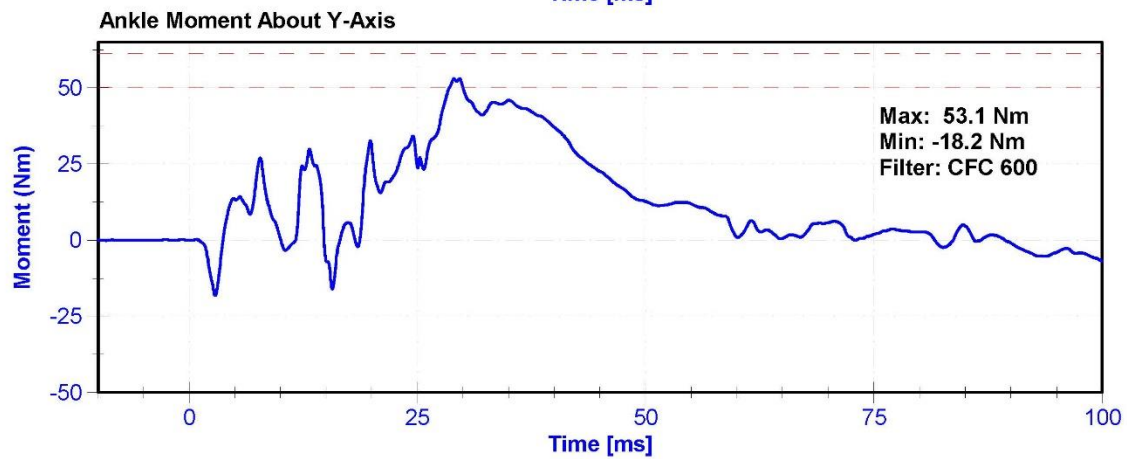
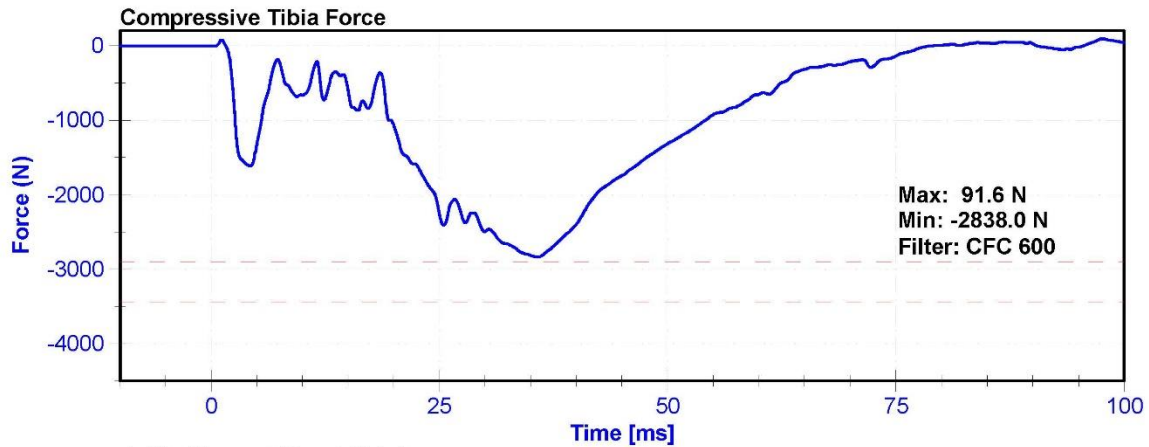
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	52.6	Pass
Velocity	4.9	5.1	m/s	5.000	Pass
Lower Tibia Compressive Force	-3437	-2897	N	-2838.0	Fail
Peak Moment about Y-Axis	50.2	61.3	Nm	53.11	Pass
Peak Rotation about Y-Axis	32.5	35.1	deg	35.16	Fail

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32227	9/13/2016	9/13/2017
Lower Tibia Load Cell	Denton 9329J	LC-DQ9684 FZ	8/23/2016	8/23/2017
Ankle Y Potentiometer	SFERNICE ECO50ESC10	DS-002	8/18/2016	8/18/2017





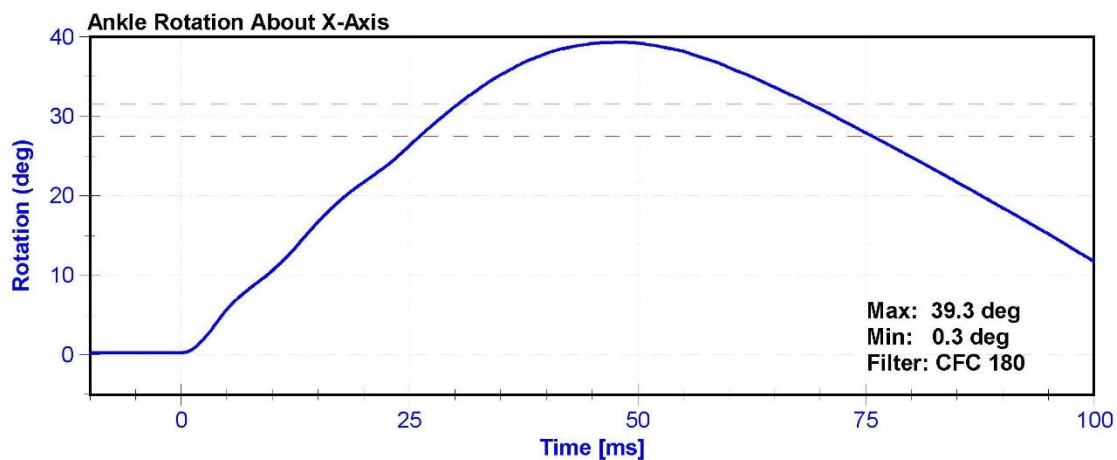
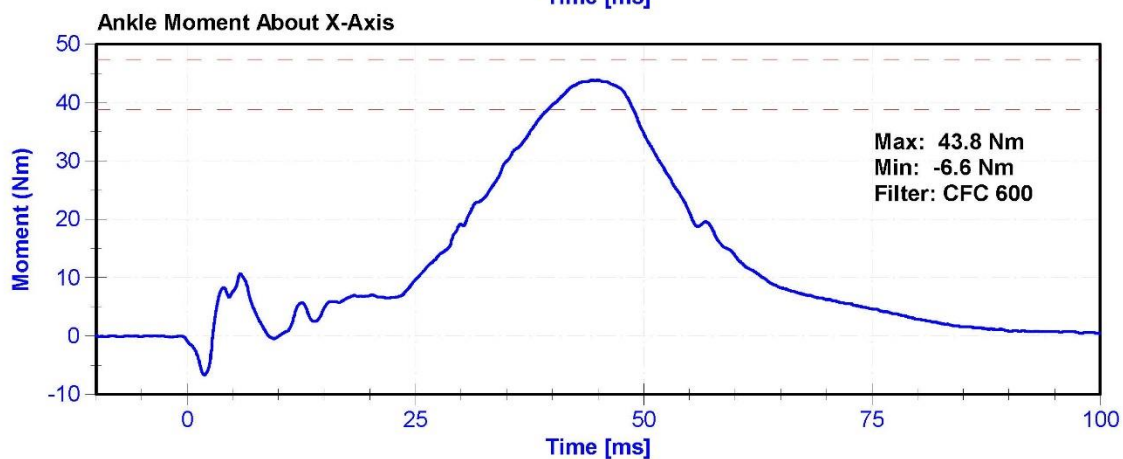
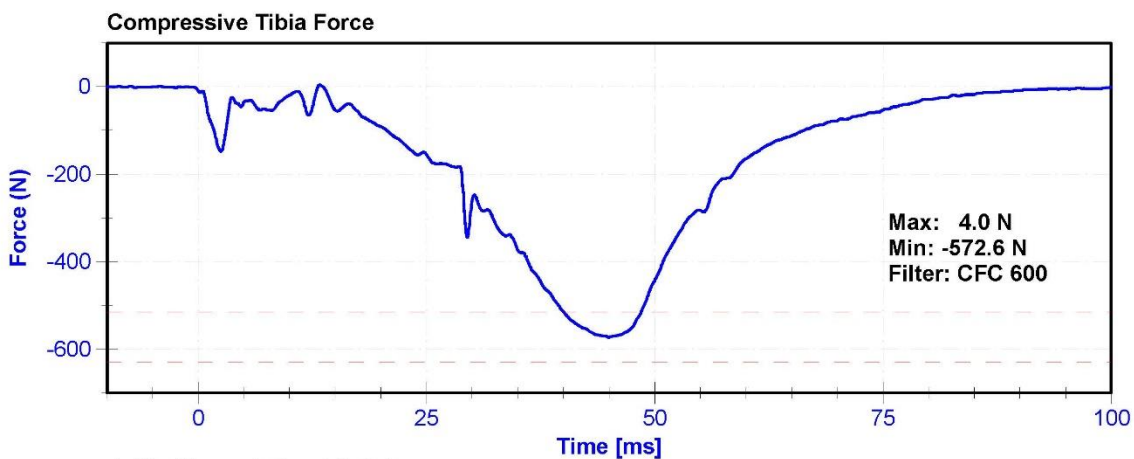
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	49.5	Pass
Velocity	1.9	2.1	m/s	1.972	Pass
Lower Tibia Compressive Force	-629	-515	N	-572.6	Pass
Peak Moment about X-Axis	38.8	47.3	Nm	43.82	Pass
Peak Rotation about X-Axis	27.5	31.5	deg	39.31	Fail

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32227	9/13/2016	9/13/2017
Lower Tibia Load Cell	Denton 9329J	LC-DQ9684 FZ	8/23/2016	8/23/2017
Ankle Y Potentiometer	SFERNICE ECO50ESC10	DS-001	8/18/2016	8/18/2017



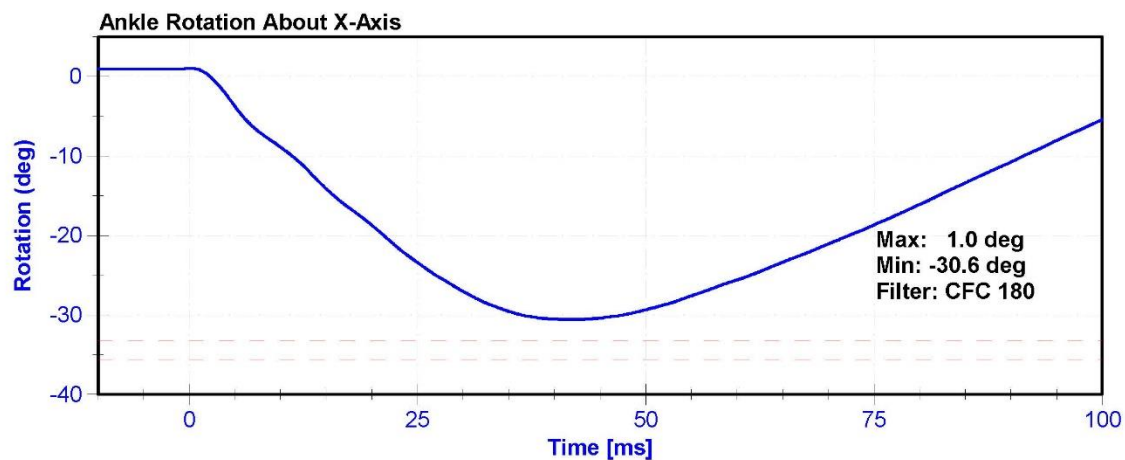
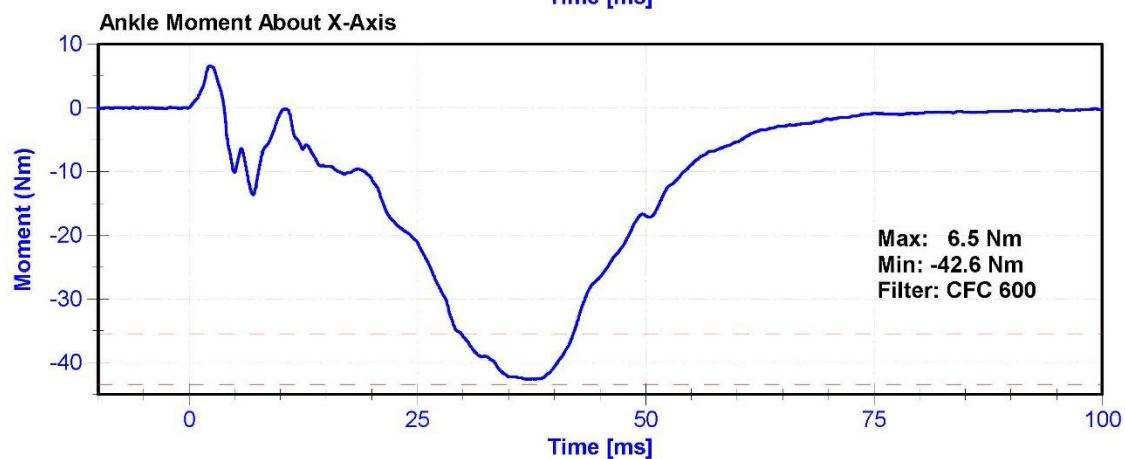
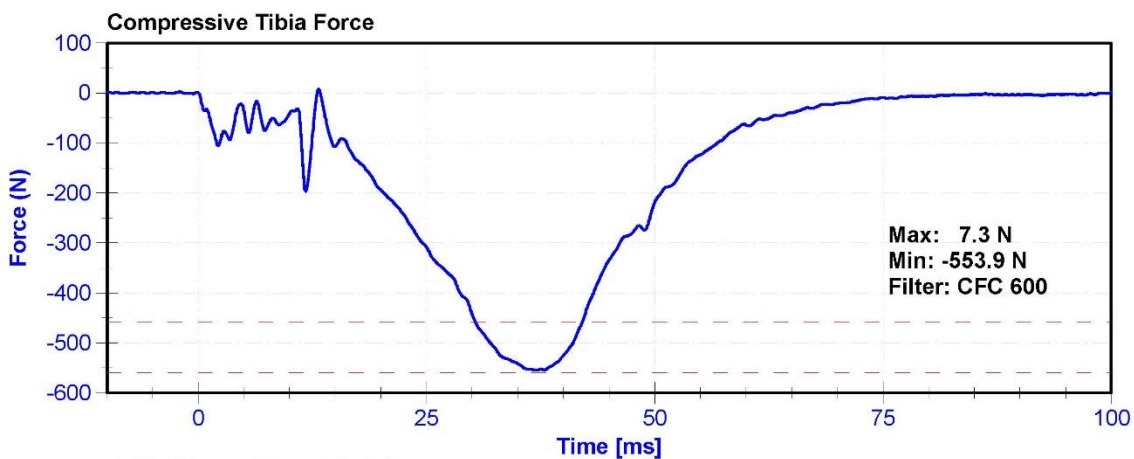
ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	D09798	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	49.6	Pass
Velocity	1.9	2.1	m/s	1.972	Pass
Lower Tibia Compressive Force	-560	-458	N	-553.9	Pass
Peak Moment about X-Axis	-43.4	-35.5	Nm	-42.59	Pass
Peak Rotation about X-Axis	-35.6	-33.3	deg	-30.57	Fail

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32227	9/13/2016	9/13/2017
Lower Tibia Load Cell	Denton 9329J	LC-DQ9684 FZ	8/23/2016	8/23/2017
Ankle Y Potentiometer	SFERNICE ECO50ESC10	DS-001	8/18/2016	8/18/2017



ATD Manufacturer	Humanetics	Test Technician	M.Hartung
ATD Serial Number	DO9798	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	52.6	Pass
Velocity	3.9	4.1	m/s	4.045	Pass
Lower Tibia Compressive Force	-3477	-2845	N	-3208.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32227	9/13/2016	9/13/2017
Lower Tibia Load Cell	Denton 9329J	LC-DQ9684 FZ	8/23/2016	8/23/2017

