

REPORT NUMBER: R&D-CAL-15-001

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

2015 Subaru Forester

90.1KPH, 15 DEGREE ANGLE, 35% OVERLAP

TEST DATE: 09/11/2015

NHTSA No: R20155509

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



FINAL REPORT SUBMITTED:

May 19, 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: May 19, 2016

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

Date: May 19, 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-15-001	2. Government Accession No.		3. Recipient's Catalog No.																																					
4. Title and Subtitle Report for Frontal Oblique Offset Program Testing of a 2015 Subaru Forester SUV NHTSA No.: R20155509			5. Report Date 5/19/2016																																					
			6. Performing Organization Code CAL																																					
7. Author(s) Vanessa Hansen, Test Engineer Ed Dutton, Operations Manager			8. Performing Organization Report No. CAL-DOT-2015-001																																					
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, 5/19/2016																																					
			14. Sponsoring Agency Code NVS-321																																					
15. Supplementary Notes																																								
16. Abstract A test was conducted in accordance with Contract DTNH22-14-D-00359. The Test consisted of a Oblique Moving Deformable Barrier (OMDB) traveling at a target speed of 90.12 kph into a stationary 2015 Subaru Forester SUV. The struck vehicle was positioned 15 degrees relative to the moving barrier and impacted 35% of the right 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 September 11, 2015. The OMDB impact velocity was 89.93 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 745 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>252.91</td> <td>328.63</td> </tr> <tr> <td>Brain Injury Criteria (BrIC)</td> <td>N/A</td> <td>1.11</td> <td>1.29</td> </tr> <tr> <td>Peak Neck Tension</td> <td>mm</td> <td>1861.01</td> <td>3257.57</td> </tr> <tr> <td>Peak Resultant Chest Deflection</td> <td>N/A</td> <td>48.14</td> <td>QD</td> </tr> <tr> <td>Peak Abdomen Deflection</td> <td>N</td> <td>-63.35</td> <td>QD</td> </tr> <tr> <td>Peak Resultant Acetabulum force</td> <td>N</td> <td>3605.75</td> <td>2204.09</td> </tr> <tr> <td>Peak Femur Force</td> <td>N</td> <td>-4375.63</td> <td>-4957.48</td> </tr> <tr> <td>Right Tibia Index</td> <td>N</td> <td>0.75</td> <td>0.60</td> </tr> </tbody> </table>					Measurement Description	Units	Driver THOR	Pass. THOR	Head Injury Criteria (HIC ₁₅)	N/A	252.91	328.63	Brain Injury Criteria (BrIC)	N/A	1.11	1.29	Peak Neck Tension	mm	1861.01	3257.57	Peak Resultant Chest Deflection	N/A	48.14	QD	Peak Abdomen Deflection	N	-63.35	QD	Peak Resultant Acetabulum force	N	3605.75	2204.09	Peak Femur Force	N	-4375.63	-4957.48	Right Tibia Index	N	0.75	0.60
Measurement Description	Units	Driver THOR	Pass. THOR																																					
Head Injury Criteria (HIC ₁₅)	N/A	252.91	328.63																																					
Brain Injury Criteria (BrIC)	N/A	1.11	1.29																																					
Peak Neck Tension	mm	1861.01	3257.57																																					
Peak Resultant Chest Deflection	N/A	48.14	QD																																					
Peak Abdomen Deflection	N	-63.35	QD																																					
Peak Resultant Acetabulum force	N	3605.75	2204.09																																					
Peak Femur Force	N	-4375.63	-4957.48																																					
Right Tibia Index	N	0.75	0.60																																					
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: May 19, 2016

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

Date: May 19, 2016

TABLE OF CONTENTS

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

<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

SECTION 1
PURPOSE OF TEST

Test Vehicle: 2015 Subaru Forester SUV
Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
Test Date: 9/11/2015

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.

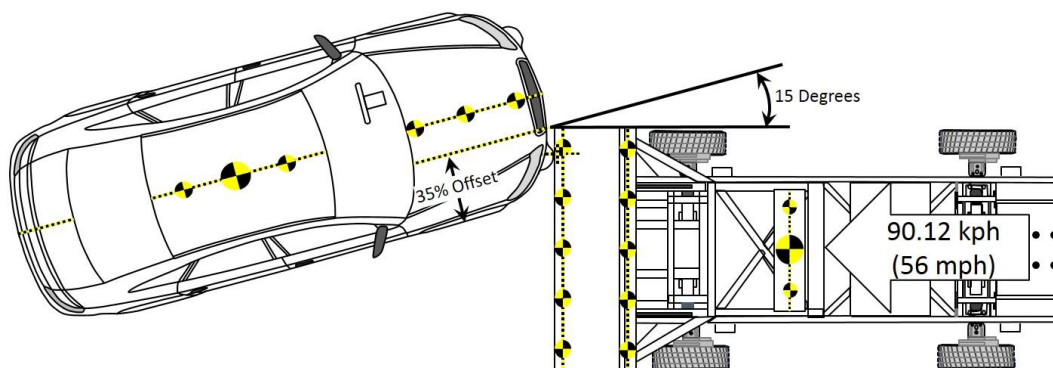
This test was conducted in accordance with the instructions set forth for a 15° angle, 35% offset moving barrier to vehicle impact, outlined in Contract No. DTNH22-14-D-00359, Task Order 0001. Data was obtained indicant of Federal Motor Vehicle Safety Standard FMVSS 208- Occupant Crash Protection, FMVSS 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: 2015 Subaru Forester SUV
Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
Test Date: 9/11/2015

A 2015 Subaru Forester SUV was impacted on the right 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 1,803 kg (3,974.9 lbs), and the OMDB's mass was 2519 kg (5,552 lbs). The test was conducted by Calspan Corporation on September 11, 2015.



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. 015) was seated in the left, front (P1 -Driver's) seating position and one 50% adult male THOR-NT adult male ATD (Serial No. 016) 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 and knee airbag. The passenger was restrained with a 3 – point seat belt, a frontal, curtain, and torso airbags. The driver's curtain and torso airbags were disabled.

SECTION 2 (CONTINUED)

SUMMARY OF TEST

Test Vehicle: 2015 Subaru Forester SUV
Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
Test Date: 9/11/2015

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 98.9% total windshield retention, with 100% and 97.7% retention on the left and right sides, respectively. 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 745 mm at C6 to the right of the vehicle's centerline. The maximum crush of the structural bumper beam was 528 mm at B7, to the right 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 passenger side.
- The B-Pillar Buckled during impact
- Hood bent inwards and exposed part of the engine compartment
- Right front window shattered during impact

The driver ATD's visible contact points were:

- Head contacted the frontal airbag and his right shoulder
- Torso contacted the frontal airbag
- Left Knee contacted the knee bolster and knee airbag
- Right Knee contacted the knee airbag

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

- Head contacted the frontal and curtain airbag and visor
- Torso contacted the frontal airbag, and right shoulder/arm contacted the torso airbag and passenger door
- Knees contacted the glove box

SECTION 2 (CONTINUED)
CRASH VEHICLE SUMMARY

Test Vehicle: 2015 Subaru Forester SUV
Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
Test Date: 9/11/2015

Primary Impact Data

Measured Parameter	Units	Value
OMDB Velocity at Impact	kph	89.93
OMDB Test Weight	kg	2519
OMDB Maximum Static Crush	mm	407
Vehicle Test Weight	kg	1803
Actual Vehicle Angle	degrees	15
Vehicle Maximum Static Crush	mm	745
Vertical Offset from Target Point (+ down / - up)*	mm	-9
Lateral Offset from Target Point (+ left / - right)*	mm	+11
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: 015		THOR, S/N: 016	
Head Contact	Frontal Airbag & Right Shoulder	A49-A51	Frontal & Curtain Airbag, Visor	A70-A72
Upper Torso Contact	Frontal Airbag	N/A	Frontal Airbag	N/A
Lower Torso Contact	None	N/A	None	N/A
Side Torso Contact	Center Console	N/A	Driver Door	N/A
Left Knee Contact	Knee Bolster & Knee Airbag	A28	Glove Box	A52
Right Knee Contact	Knee Airbag	A28	Glove Box	A52

Data Anamolies

CHANNEL DESCRIPTION	EXPLANATION
11TIBILE00THACXP,Tibia Left X Acceleration	Questionable spike at 81 ms
11TIBILE00THACYP,Tibia Left Y Acceleration	Questionable spike at 18.7 ms & 81 ms
13THSP0100THACYP,T1 Y Acceleration	Questionable Spike at 130 ms
13THSP0100THACZP,T1 Z Acceleration	Questionable Spike at 130 ms
13THSP1200THMOXP,Spine Moment X	Questionable data 68.4ms to 81 ms, 104 ms, and 279 ms
13CHSTRIUPTHVO0P,DGIR Upper Right X Displacement	Questionable Spikes at 27-31 ms
13ABDORI00THVO0P,Abdomen Right DGIR X Displacement	Questionable Data 27-31 ms
13CHSTRILOTHANZP,DGIR Lower Right Z Rotation	Questionable Spikes throughout
13ABDOLE00THANYP,Abdomen Left DGIR Y Rotation	Questionable magnitude from 193-294 ms
13TIBIRILOTHFOYP,Tibia Lower Right Y Force	Questionable spike from 51.9 – 74.9 ms
10SEBELE00B1DS0P,Driver Shoulder Belt Displacement	Channel saturated from 70 ms

PRELIMINARY INJURY SUMMARY: Driver

Test Vehicle: R20155509 - 2015 Subaru Forester NHTSA No.: R20155509
 Test Program: NHTSA R&D Right Oblique Offset 15deg/35% Test Date: 9/11/2015

Driver: THOR Serial No. 015 Injury Summary

Location	Description	Unit	Source	Max	Min
Head	HIC 15ms		Compute	252.91	
	Brain Injury Criteria (BrIC)		Compute	1.11	
	Head Rotational Velocity X	Deg/s	60	2434.13	-961.40
	Head Rotational Velocity Y	Deg/s	60	562.37	-1621.65
	Head Rotational Velocity Z	Deg/s	60	564.57	-1845.73
Neck	Upper Neck Z-axis Force	N	1000	1861.01	-182.99
	Upper Neck Y-axis Moment	Nm	Thortest	24.14	-10.93
Chest	Upper Left Resultant Chest Deflection	mm	Thortest	21.94	
	Upper Right Resultant Chest Deflection	mm	Thortest	48.14	
	Lower Left Resultant Chest Deflection	mm	Thortest	29.95	
	Lower Right Resultant Chest Deflection	mm	Thortest	36.66	
Abdomen	Lower Left X-axis Deflection	mm	Thortest	0.13	-62.11
	Lower Right X-axis Deflection	mm	Thortest	0.01	-63.35
Acetabulum	Left Acetabulum Resultant Force	N	Compute	3605.75	0.07
	Right Acetabulum Resultant Force	N	Compute	3139.27	0.06
Femur	Left Femur Force, FZ	N	600	1351.66	-620.95
	Right Femur Force, FZ	N	600	309.16	-4375.63
Tibia	Left Upper Tibia, FZ	N	600	192.21	-1172.68
	Left Upper Tibia Index		Compute	0.58	
	Right Upper Tibia, FZ	N	600	145.26	-2362.02
	Right Upper Tibia Index		Compute	0.75	
	Left Lower Tibia, FZ	N	600	273.63	-2304.36
	Left Lower Tibia Index		Compute	0.50	
	Right Lower Tibia, FZ	N	600	472.97	-6097.42
	Right Lower Tibia Index		Compute	0.70	
Ankle	Left Ankle Rotation, RX	Deg	180	7.29	-21.30
	Left Ankle Rotation, RY	Deg	180	16.30	-13.68
	Left Ankle Dorsiflexion Moment, MY	Nm	Compute	38.19	-64.66
	Left Ankle In/Eversion Moment, MX	Nm	Compute	15.03	-162.38
	Right Ankle Rotation, RX	Deg	180	3.22	-36.22
	Right Ankle Rotation, RY	Deg	180	6.23	-8.31
	Right Ankle Dorsiflexion Moment, MY	Nm	Compute	95.32	-70.82
	Right Ankle In/Eversion Moment, MX	Nm	Compute	122.40	-25.17
Anomalies: None					

PRELIMINARY INJURY SUMMARY: Right Front Passenger

Test Vehicle: R20155509 - 2015 Subaru Forester NHTSA No.: R20155509
 Test Program: NHTSA R&D Right Oblique Offset 15deg/35% Test Date: 9/11/2015

Right Front Passenger: THOR Serial No. 016 Injury Summary

Location	Description	Unit	Source	Max	Min
Head	HIC 15ms		Compute	328.63	
	Brain Injury Criteria (BrIC)		Compute	1.29	
	Head Rotational Velocity X	Deg/s	60	332.01	-1387.21
	Head Rotational Velocity Y	Deg/s	60	449.13	-3734.45
	Head Rotational Velocity Z	Deg/s	60	694.95	-1082.19
Neck	Upper Neck Z-axis Force	N	1000	3257.57	-122.36
	Upper Neck Y-axis Moment	Nm	Thortest	26.90	-39.53
Chest	Upper Left Resultant Chest Deflection	mm	Thortest	49.62	
	Upper Right Resultant Chest Deflection	mm	Thortest	24.93 ⁽¹⁾	
	Lower Left Resultant Chest Deflection	mm	Thortest	41.55	
	Lower Right Resultant Chest Deflection	mm	Thortest	101.55 ⁽²⁾	
Abdomen	Lower Left X-axis Deflection	mm	Thortest	0.06 ⁽³⁾	-241.74 ⁽³⁾
	Lower Right X-axis Deflection	mm	Thortest	1.71 ⁽⁴⁾	-39.34 ⁽⁴⁾
Acetabulum	Left Acetabulum Resultant Force	N	Compute	2021.68	0.06
	Right Acetabulum Resultant Force	N	Compute	2204.09	0.05
Femur	Left Femur Force, FZ	N	600	606.72	-4011.06
	Right Femur Force, FZ	N	600	705.78	-4957.48
Tibia	Left Upper Tibia, FZ	N	600	82.16	-2738.51
	Left Upper Tibia Index		Compute	0.58	
	Right Upper Tibia, FZ	N	600	26.63	-1283.80
	Right Upper Tibia Index		Compute	0.46	
	Left Lower Tibia, FZ	N	600	18.14	-4435.12
	Left Lower Tibia Index		Compute	0.68	
	Right Lower Tibia, FZ	N	600	21.34	-2697.51
	Right Lower Tibia Index		Compute	0.60	
Ankle	Left Ankle Rotation, RX	Deg	180	38.55	-0.53
	Left Ankle Rotation, RY	Deg	180	28.32	-24.37
	Left Ankle Dorsiflexion Moment, MY	Nm	Compute	52.47	-85.28
	Left Ankle In/Eversion Moment, MX	Nm	Compute	73.28	-3.03
	Right Ankle Rotation, RX	Deg	180	12.57	-38.96
	Right Ankle Rotation, RY	Deg	180	24.23	-25.91
	Right Ankle Dorsiflexion Moment, MY	Nm	Compute	53.42	-48.07
	Right Ankle In/Eversion Moment, MX	Nm	Compute	109.69	-18.90

Anomalies:

- | | |
|--|---|
| 1) Questionable spikes at 27ms to 31ms | 3) Questionable magnitude from 193ms to 294ms |
| 2) Questionable spikes throughout | 4) Questionable data from 27ms to 31ms |

SECTION 3 DATA SHEETS

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

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: 2015 Subaru Forester SUV
Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
Test Date: 9/11/2015

VEHICLE INFORMATION

NHTSA No.	R20155509
Model Year	2015
Make	Subaru
Model	Forester
Body Style	SUV
VIN	JF2SJADCXFH816483
Body Color	Blue
Odometer Reading (km/mi)	283.2 km / 176 mi
Engine Displacement. (L)	2.5
Type/No. Cylinders	I4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	CVT
Overdrive	Yes
Final Drive	AWD
Roof Rack	No
Sunroof/T-Top	Yes
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
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)	No
Power Window Auto-Reverse	No
Other Optional Feature	-
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	Yes
Driver Torso/Pelvis Airbag	No
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Pass. Front Airbag	Yes
Pass. Curtain Airbag	Yes
Pass. Head/Torso Airbag	No
Pass. Torso Airbag	Yes
Pass. Torso/Pelvis Airbag	No
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?

N/A

DATA FROM CERTIFICATION LABEL

Manufactured By	FUJI Heavy Industries LTD.
Date of Manufacture	04/15

GVWR (kg)	2032
GAWR Front (kg)	1048
GAWR Rear (kg)	1093

VEHICLE SEATING AND WEIGHT CAPACITY

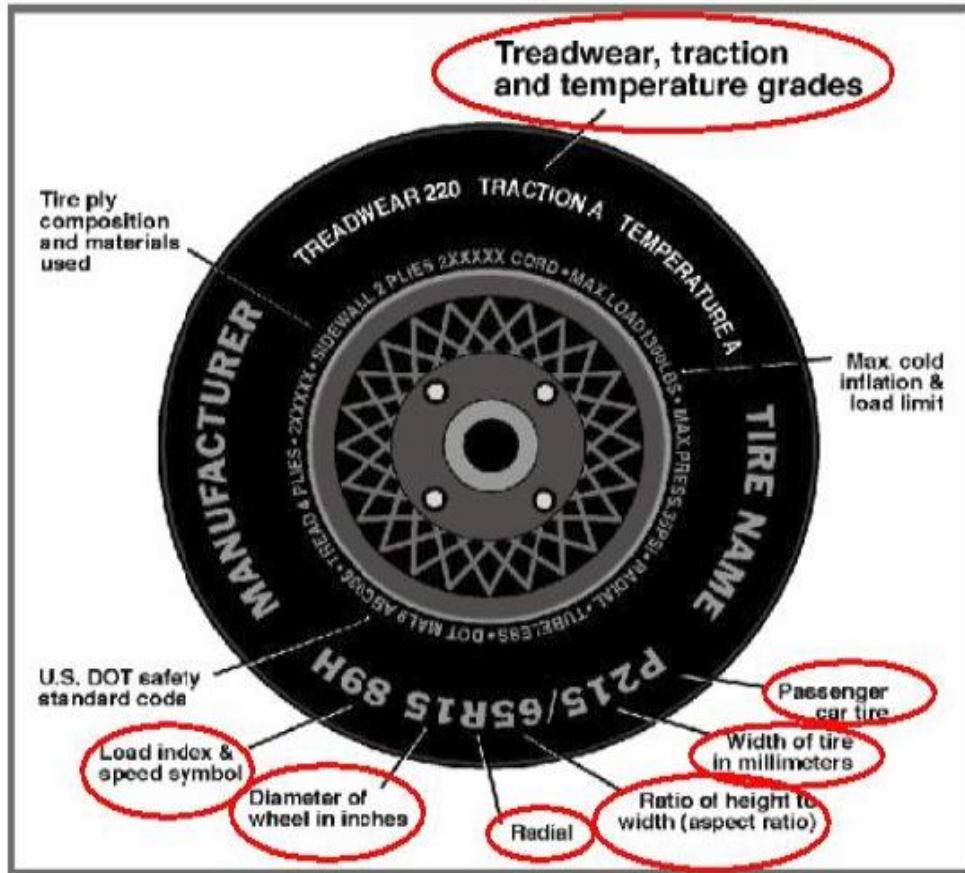
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	--	
Number of Occupants	2	3	--	5
Capacity Wt. (VCW) (kg)				408
Cargo Wt. (RCLW) (kg)				67.8

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

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

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



Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	210	200
Recommended Tire Size	P225/60R17	P225/60R17
Tire Size on Vehicle	P225/60R17	P225/60R17
Tire Manufacturer	Yokohama	Yokohama
Tire Model	Geolander G91	Geolander G91
Treadwear	320	320
Traction	B	B
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel	2 Polyester, 2 Steel
Load Index/Speed Symbol	98H	98H
Tire Material	Rubber	Rubber
DOT Safety Code Right	FDFCPE20615	FDFCPE20615
DOT Safety Code Left	FDFCPE20615	FDFCPE20615

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

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	444	345		509	402	
Right	kg	443	313		470	422	
Ratio	%	57%	43%		54%	46%	
Totals	kg	887	658	1545	979	824	1803

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1545
Weight of 2 THOR ATDs	kg	198
Rated Cargo/Luggage Weight (RCLW)	kg	67.8
Calculated Vehicle Target Weight (TVTW)	kg	1810.8

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	777	774	800	804	1125
As Tested	mm	763	760	770	774	1207
Post Test	mm	766	772	839	683	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2642
Total Vehicle Length at Left Side	mm	4536
Total Vehicle Length at Centerline	mm	4594
Total Vehicle Length at Right Side	mm	4532
Weight of Ballast in Cargo Area	kg	0
Weight of Vehicle Components Removed	kg	85
Amount of Stoddard Solvent in Fuel Tank	L	19.6

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:

Trunk carpeting, spare tire, tail light, rear seats, rear panels, rear bumper skin, muffler,
 Rear door skin, side view mirrors,

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

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements		Pre-Test
1	Total Length	mm	4594
2	Total Width	mm	1785
3*	Bumper Top Height	mm	620
4*	Bumper Bottom Height	mm	501
5*	Longitudinal Member Top Height	mm	606
6	Distance Between Longitudinal Members	mm	978
7	Longitudinal Member Width	mm	59
8*	Engine Top Height	mm	902
9*	Engine Bottom Height	mm	278
10	Engine and Gearbox Width	mm	737
11	Front Bumper-Engine Distance	mm	511
12*	Front Shock Absorber Fixing Height	mm	931
13*	Bonnet Leading Edge Height	mm	943
14	Front Shock Absorber Fixing Width	mm	1115
15	Front Bumper – Front Axle Distance	mm	954
16	Front Axle – A Pillar Distance	mm	414
17	A-Pillar – B-Pillar Distance	mm	1199
18	B-Pillar – Rear Axle Distance	mm	1031
19	B-Pillar – C-Pillar Distance	mm	907
20*	Roof Sill Bottom Height	mm	1545
21*	Roof Sill Top Height	mm	1593
22*	Floor Sill Bottom Height	mm	446
23*	Floor Sill Top Height	mm	453

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

DATA SHEET NO. 2

SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

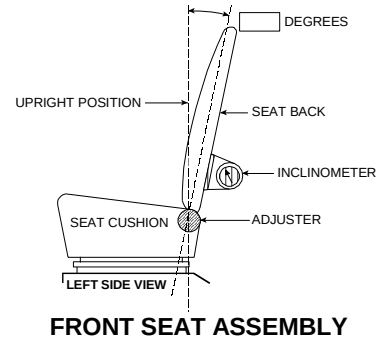
NHTSA No.: R20155509
 Test Date: 9/11/2015

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

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



	UNIT	FORM 1 POSITION	AFTER ATD POSITIONING
Driver Seat Back Angle	deg	-4.5	-1.1
Passenger Seat Back Angle	deg	-4.5	-0.6

SEAT FORE/AFT POSITIONS

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

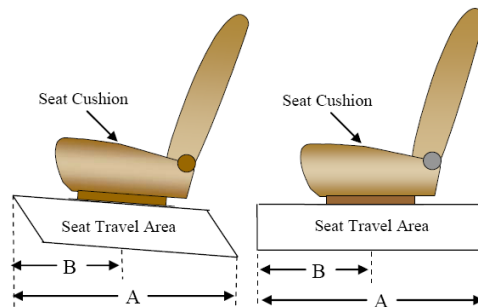
The driver's seat was positioned at its mid height position and at the mid-point of fore/aft travel. The passenger's seat was positioned at the mid-point of fore/aft travel.

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	258	129
Passenger Seat	27 (0-26)	13

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	1
Passenger Seat	4	1



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

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

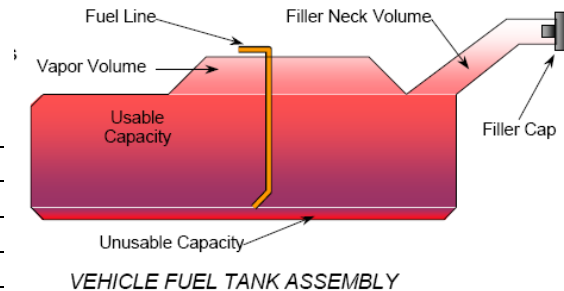
FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	59
Usable Capacity of "Optional Tank"	
93% of Usable Capacity	54.9
Actual Amount of Solvent Used	19.6
1/3 of Usable Capacity	19.6

FUEL PUMP

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

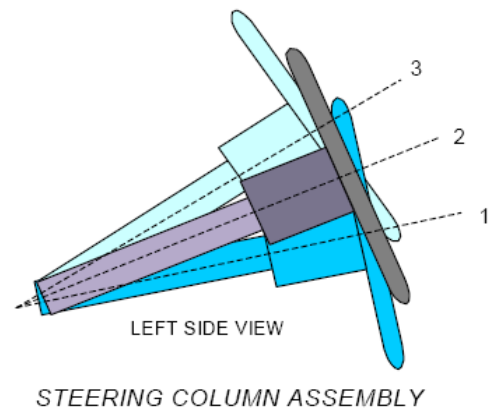
Fuel evacuated according to the specifications provided by the manufacturer in Form 1. Electric fuel pump operates when the ignition is in the 'on' position and the engine is running. The fuel filler neck is located above the right rear wheel.



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



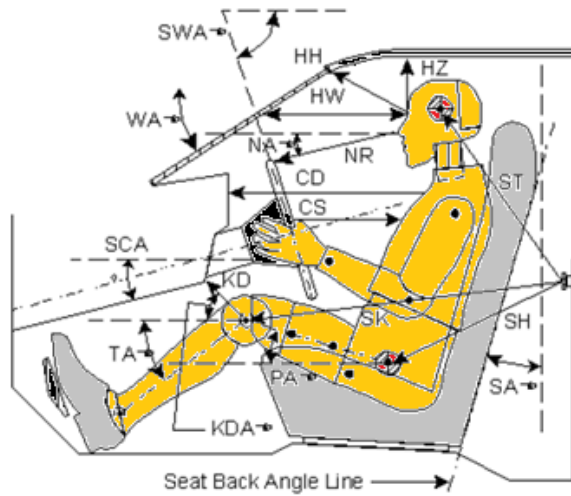
STEERING COLUMN POSITIONS

	Tilt (degrees)	Fore/Aft Position (mm)
Lowermost position No. 1	25.3	
Geometric center position No. 2	26.8	
Uppermost position No. 3	28.3	
Telescoping Steering Wheel Travel		40
Test Position	26.8	20

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

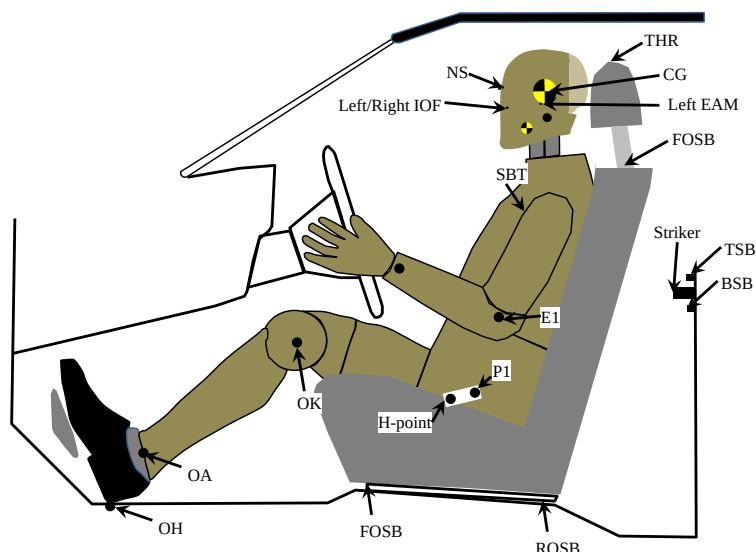


Code	Measurement Description	Driver (Serial # THOR 015)		Passenger (Serial # THOR 016)	
		Length (mm)	Angle(°)	Length (mm)	Angle (°)
WA°	Windshield Angle		31.5		
SWA°	Steering Wheel Angle		26.8		
SCA°	Steering Column Angle		63.2		
SA°	Seat Back Angle (on headrest post)		-1.1		-0.6
SA°	Seat Back Angle		18.6		18.2
HZ	Head to Roof (Z)	221	90	201	90
HH	Head to Header	475	21.6	473	16.8
HW	Head to Windshield	765	0	733	0
NR	Nose to Rim	525	17.9	750	32.9
CD	Chest to Dash	601		609	
CS	Chest to Steering Hub	403	4.8		
RA	Rim to Abdomen	201	0		
KDL	Left Knee to Dash	158	20.1	120	31.9
KDR	Right Knee to Dash	128	39.6	136	29.1
PA°	Pelvic Angle		-32.0		31.1
TA°	Tibia Angle		45.2		45.6
SK	Striker to Knee	644	-9.0	657	-8.6
ST	Striker to Head	466	-85.2	495	-87.3
SH	Striker to H-Point	304	-40.1	278	-36.2
HAX°	Head Angle (X)		-3.5		-3.1
HAY°	Head Angle (Y)		-0.3		-0.2
TAX°	T6 Angle (X)		-0.6		0.2
TAY°	T6 Angle (Y)		22.4		22.4
TAX°	T1 (X)		0.2		0.6
TAY°	T1 (Y)		-0.2		-0.7
TAX°	T12 (X)		0.7		-1.5
TAY°	T12 (Y)		30.2		31.7

DATA SHEET NO.3 (CONTINUED) DUMMY CMM MEASUREMENTS

Test Vehicle: 2015 Subaru Forester SUV
Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
Test Date: 9/11/2015



Description	Units	Driver			Passenger		
		X	Y	Z	X	Y	Z
Head CG	mm	2163	-436	-681	2147	428	-711
Nasion	mm	2255	-355	-684	2242	351	-715
Tip of Nose	mm	2254	-356	-648	2243	350	-678
Tip of Chin	mm	2243	-355	-549	2233	350	-578
Left EAM	mm	2168	-432	-653	2158	274	-681
Right EAM	mm	2163	-285	-652	2154	424	-682
Left IOF	mm	2251	-387	-647	2239	318	-677
Right IOF	mm	2249	-323	-646	2238	383	-677
Outboard Elbow	mm	2390	-573	-245	2292	636	-187
H-Point	mm	2357	-553	-21	2348	552	-52
H-Point Tool	mm	2284	-601	-52	2274	597	-85
Outboard Knee Bolt	mm	2760	-574	-116	2774	516	-118
Inboard Knee Bolt	mm	2775	-288	-102	2777	290	-127
Outboard Ankle Bolt	mm	3064	-581	175	3063	528	180
Outer Heel Point	mm	3079	-564	312	3019	493	313
Inboard Heel Point	mm	3094	-258	171	3025	260	311
Striker Top Bolt	mm	2091	-787	-231	2091	788	-229
Striker Bottom Bolt	mm	2093	-786	-199	2093	788	-197
Center Tip of Striker	mm	2124	-786	-217	-27	8	-860
Front Outboard Seat Anchor Bolt	mm	2609	-567	279	2608	570	278
Rear Outboard Seat Anchor Bolt	mm	2156	-566	327	2160	568	325
Outboard Head Restraint Post	mm	1959	-420	-527	1943	415	-556
Top of Head Restraint	mm	2008	-355	-825	1987	351	-854
Center of Steering Wheel	mm	2668	-344	-381			

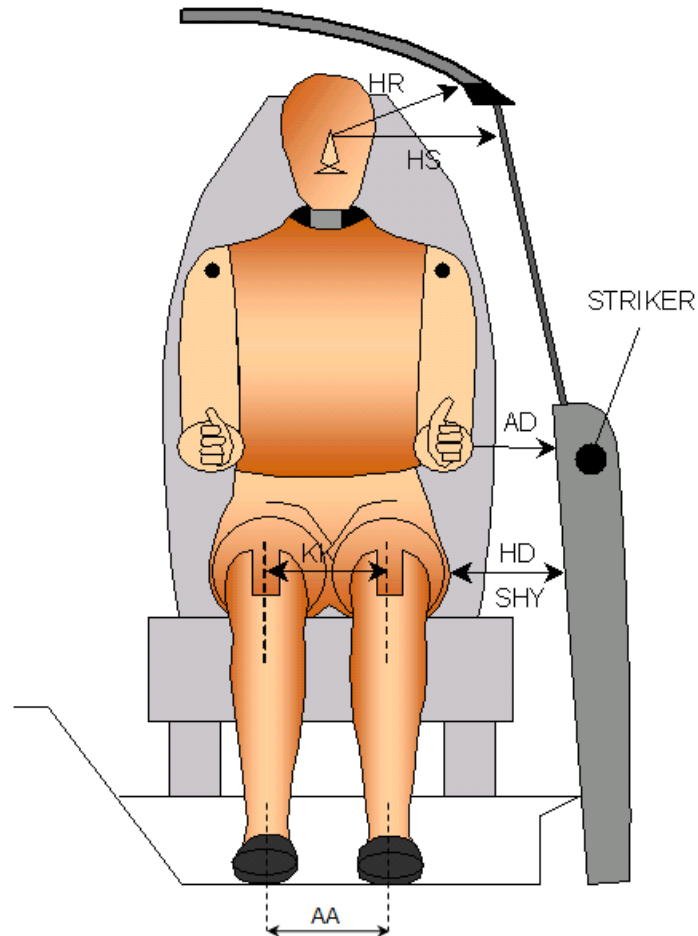
Reference point:

- +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: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

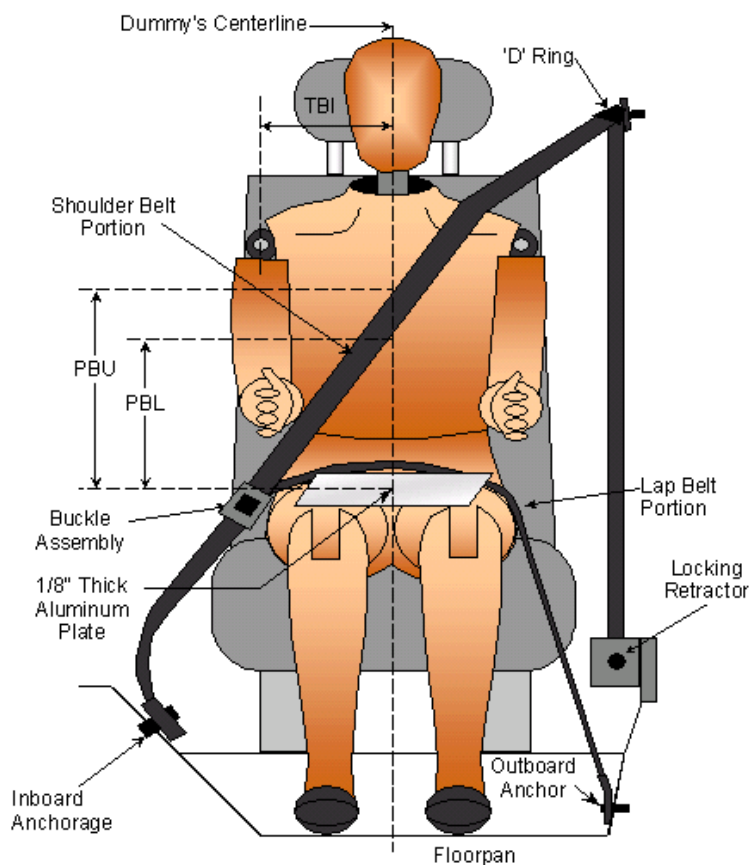


Code	Description	Units	Driver	Passenger
AD	Arm to Door	mm	143	34
HD	H-Point to Door	mm	131	130
HR	Head to Side Header	mm	244	228
HS	Head to Side Window	mm	352	348
KK	Knee to Knee	mm	332	270
SHY	Striker to H-Point (Y Direction)	mm	230	245
AA	Ankle to Ankle	mm	324	238

DATA SHEET NO. 5 SEAT BELT POSITIONING DATA

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of reference to belt upper edge	mm	380	385
PBL — Top surface of reference to belt lower edge	mm	305	310

BELT LENGTH DATA

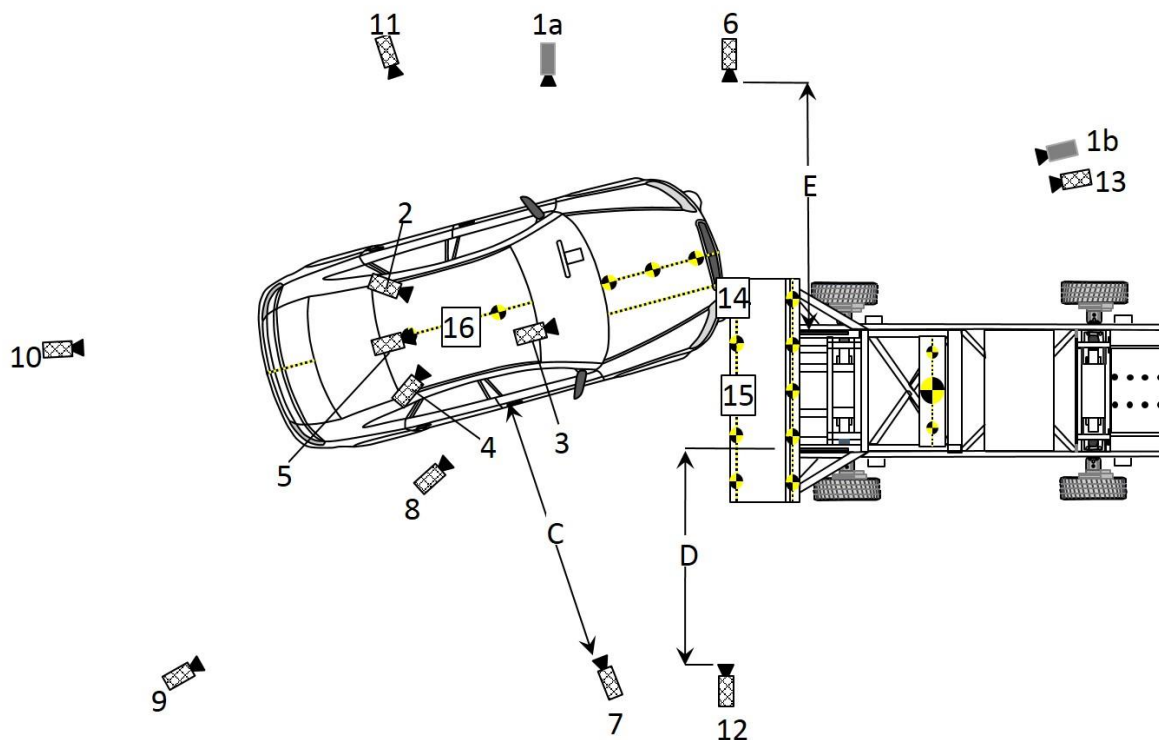
Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	830	850
Lap Belt Length as measured on ATD	mm	870	765
Remainder of belt on reel	mm	930	915
Total belt length for continuous webbing systems	mm	2630	2530

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

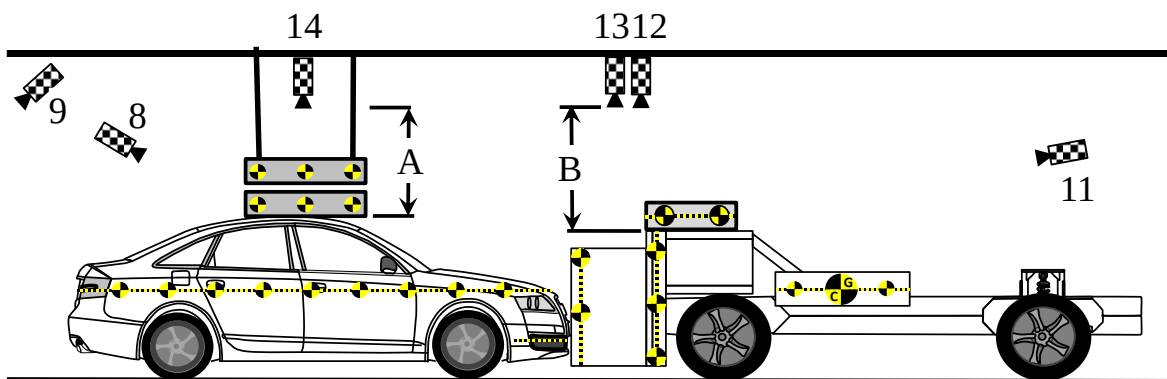
Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

HORIZONTAL LOCATION



VERTICAL LOCATION



A	mm	3642
B	mm	4140
C	mm	7876
D	mm	8162
E	mm	8164

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

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

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	7570	878	1337	12.5	1000
3	Onboard Passenger Lower Leg	6640	474	385	6.5	1000
4	Onboard Driver Movement	7549	394	1337	12.5	1000
5	Onboard Centerline	8035	778	1348	12.5	1000
6	Passenger Interaction	4920	9211	1068	20	1000
7	Driver Interaction	5539	7725	1457	28	1000
8	Target Vehicle Left Side Perpendicular (High)	8308	2288	3595	28	1000
9	Target Vehicle Driver Motion	12938	-6939	2520	24-70	1000
10	Rear View of Vehicle and OMDB	28750	0	3421	14	1000
11	Right Side Target Vehicle and OMDB	11155	9121	2714	24-70	1000
12	Front of Vehicle and OMDB	4907	-9247	1072	24	1000
13	Close-Up Impact Point	1242	3722	1251	28	1000
14	Overhead Impact Point View	4865	-1115	4733	28	1000
15	Overhead Vehicle View	7369	0	5327	15	1000
16	Overhead OMDB View	4678	0	5327	15	1000

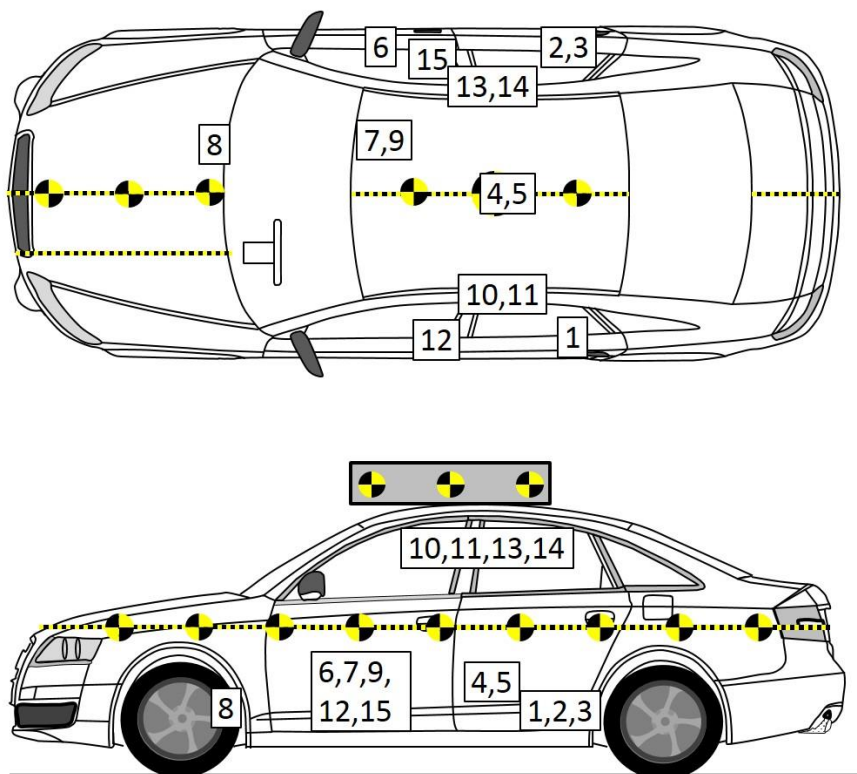
Reference Point:

- +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: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015



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	1871	-717	236
2	Right Rear Sill	X,Y	mm	1866	725	233
3	Right Rear Sill Redundant	X,Y	mm	1868	724	233
4	Vehicle CG	X,Y,Z	mm	1925	-1	199
5	Vehicle CG Angular Displacement	X	mm	1933	0	205
		Y	mm	1923	10	204
		Z	mm	1922	1	200
6	Right Side Seat Track	X,Y,Z	mm	2352	534	243
8	Right Side Toe Pan	X,Y,Z	mm	3391	355	126
7	Right Side String Pot	N/A	mm	3310	370	174

Reference point:

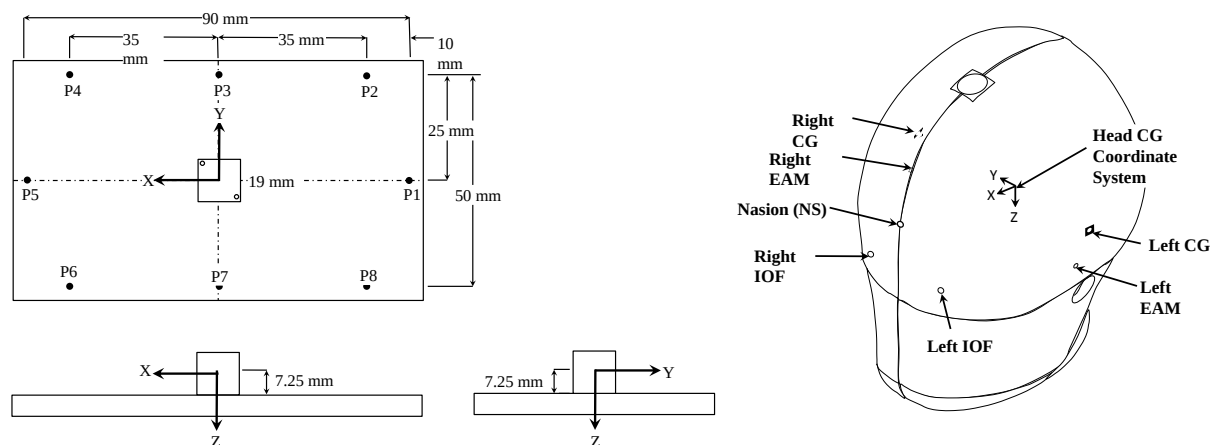
- +X – From the rear of the vehicle to the front of the vehicle
- +Y – From the left side of the vehicle to the right side of the vehicle
- +Z – From the top of the vehicle to the bottom of the vehicle

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

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

ANGULAR RATE SENSOR MOUNTING PLATE & THOR HEAT POINT DEFINITIONS



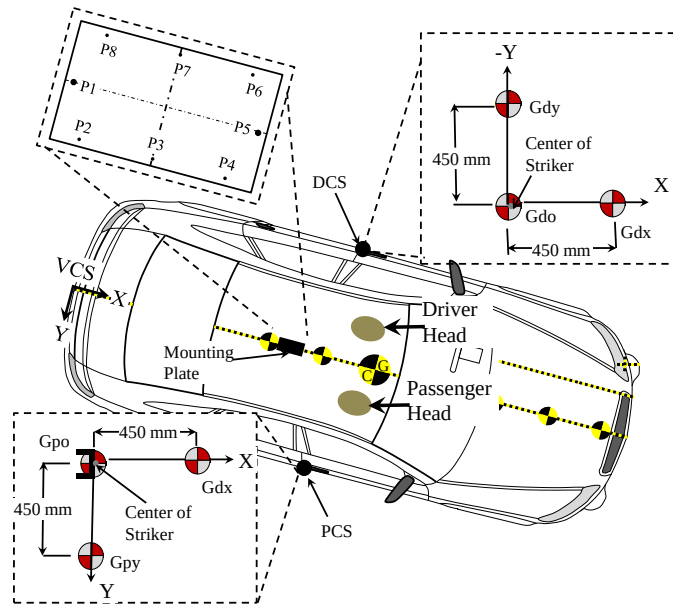
ARS MOUNTING PLATE - VEHICLE COORDINATE SYSTEM					
No.	Description	Units	Measurements (mm)		
			X	Y	Z
P1	Plate Point 1	mm	1877	-2	216
P2	Plate Point 2	mm	1887	23	216
P3	Plate Point 3	mm	1922	24	216
P4	Plate Point 4	mm	1957	24	216
P5	Plate Point 5	mm	1967	-1	216
P6	Plate Point 6	mm	1957	-26	216
P7	Plate Point 7	mm	1922	-26	215
P8	Plate Point 8	mm	1888	-27	215

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: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015



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

DESCRIPTION	DRIVER DCS			PASS. PCS		
	X	Y	Z	X	Y	Z
G _o	0	0	0	0	0	0
G _x	450	0	0	-452	0	0
G _y	1	-452	0	0	-448	0
P1	-7	814	-429	416	704	-429
P2	9	835	-429	400	683	-429
P3	43	826	-429	367	692	-429
P4	77	817	-428	333	700	-429
P5	80	791	-428	329	727	-429
P6	64	769	-428	345	749	-429
P7	30	778	-429	379	740	-429
P8	-3	787	-429	413	731	-429
Left CG	154	319	-1326			
Right CG				43	360	-1356
Left EAM	161	322	-1297			
Right EAM				38	366	-1326
Left IOF	253	343	-1291	-17	490	-1322
Right IOF	267	406	-1291	-32	427	-1321
Nasion	265	373	-1329	-28	459	-1360

DATA SHEET NO. 7 (CONTINUED)
VEHICLE INSTRUMENTATION DATA

Test Vehicle: 2015 Subaru Forester SUV
Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
Test Date: 9/11/2015

No.	Description	Axes	Units	Positive Direction		Negative Direction	
				Max	Time (ms)	Max	Time (ms)
1	Left Rear Sill	X	g	4.38	14.30	-47.28	46.35
		Y	g	3.92	72.20	-27.62	46.80
2	Right Rear Sill	X	g	10.83	12.60	-38.56	33.75
		Y	g	5.41	73.10	-32.64	47.35
3	Impact Side Rear Sill Redundant	X	g	10.90	12.65	-38.52	33.75
		Y	g	3.72	72.55	-32.29	47.20
4	Vehicle CG Acceleration	X	g	11.27	12.75	-43.45	44.55
		Y	g	13.86	52.35	-24.73	44.30
		Z	g	25.78	42.30	-36.91	51.40
5	Impact Side Seat Track	X	g	24.41	13.80	-46.16	44.15
		Y	g	15.62	69.90	-41.26	48.75
		Z	g	18.28	40.75	-19.88	74.30
6	Impact Side Seat Crossmember	X	g	38.35	14.85	-49.88	44.60
		Z	g	43.25	51.10	-38.42	77.15
7	Impact Side Toe Pan	X	g	29.88	11.25	-92.09	40.50
		Y	g	15.18	67.20	-76.00	43.30
		Z	g	26.51	34.50	-29.07	45.95
8	Angular Rate Sensors	X	Deg/s	136.37	91.90	-445.99	45.15
		Y	Deg/s	179.64	46.65	-251.63	56.20
		Z	Deg/s	31.58	8.20	-168.16	44.05
9	Driver Shoulder Displacement		mm	84.77	29.55	-56.73	72.25
10	Driver Shoulder Belt		N	5486.03	53.10	-15.71	12.95
11	Driver Lap Belt		N	7533.84	61.70	-0.27	4.80
12	Passenger Shoulder Displacement		mm	55.33	26.05	-196.19	103.95
13	Passenger Shoulder Belt		N	4094.48	52.85	-20.26	12.80
14	Passenger Lap Belt		N	5296.83	60.60	-1.39	1.70
15	Impact Side Floor String Pot		mm	0.07	2.25	-66.33	60.95

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	13.65
2	Driver Air Bag Squib 2	*	A	13.65
3	Driver Curtain Airbag	*	A	23.60
4	Driver Torso Airbag	*	A	23.60
5	Driver Knee Airbag	*	A	13.65
6	Driver Pretensioner	*	A	13.65
7	Passenger Air Bag Squib 1	*	A	13.65
8	Passenger Air Bag Squib 2	*	A	23.60
9	Passenger Curtain Airbag	*	A	23.60
10	Passenger Torso Airbag	*	A	23.60
11	Passenger Knee Airbag	*	A	N/A
12	Passenger Pretensioner	*	A	13.65

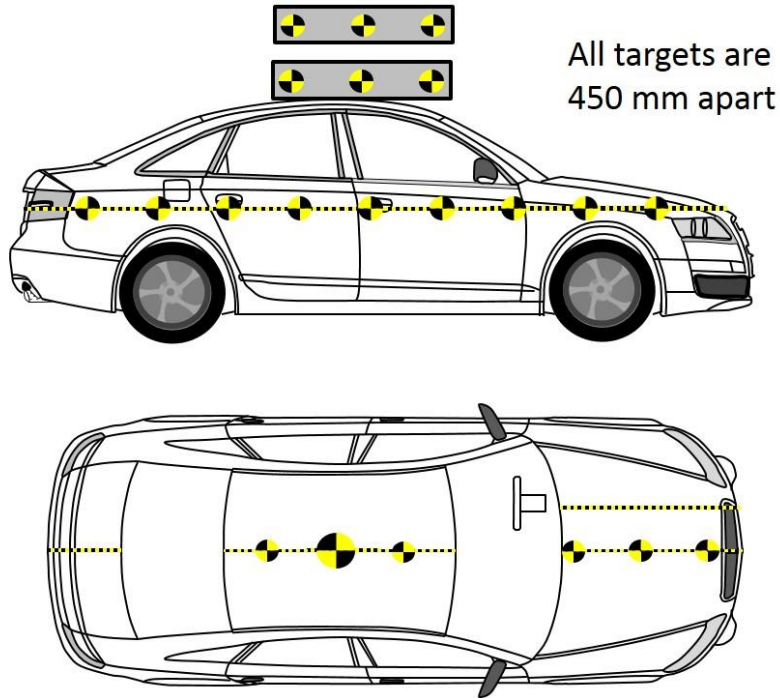
* The measurement indicates the time the voltage changed

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

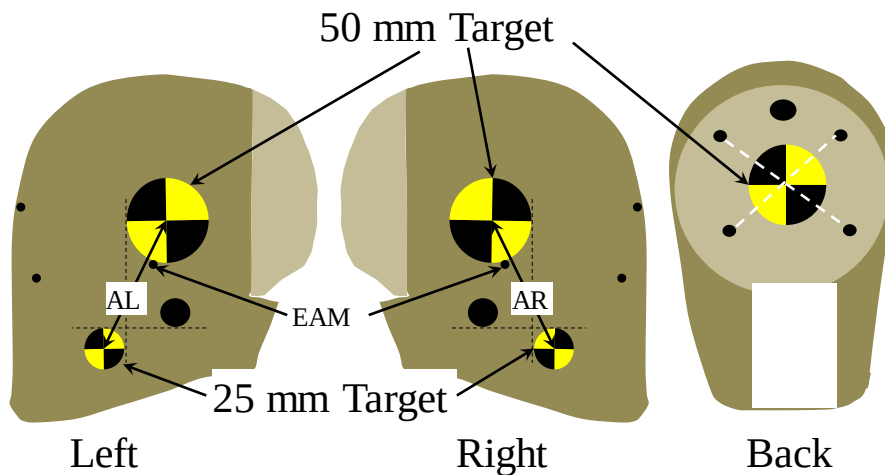
Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

VEHICLE TARGETS



ATD HEAD TARGETS



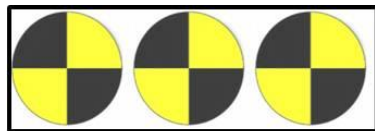
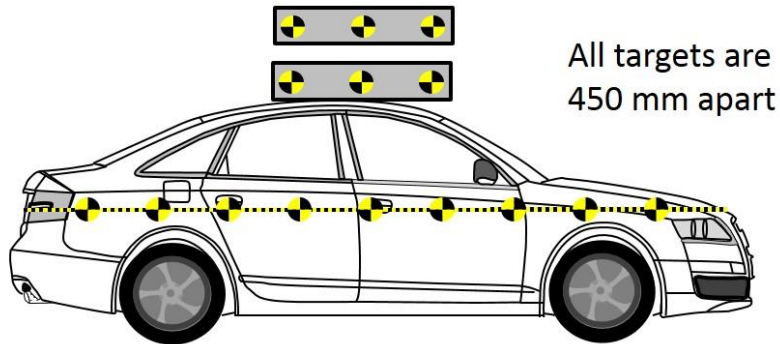
Target	Measurement
AL	82 mm
AR	82 mm

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

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

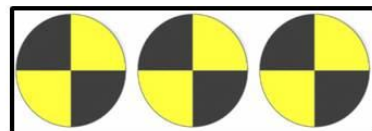
NHTSA No.: R20155509
 Test Date: 9/11/2015

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	2695	-383	-1341
2	mm	2239	-386	-1344
3	mm	1789	-380	-1340
4	mm	2719	358	-1339
5	mm	2270	366	-1336
6	mm	1815	375	-1335

Reference point:

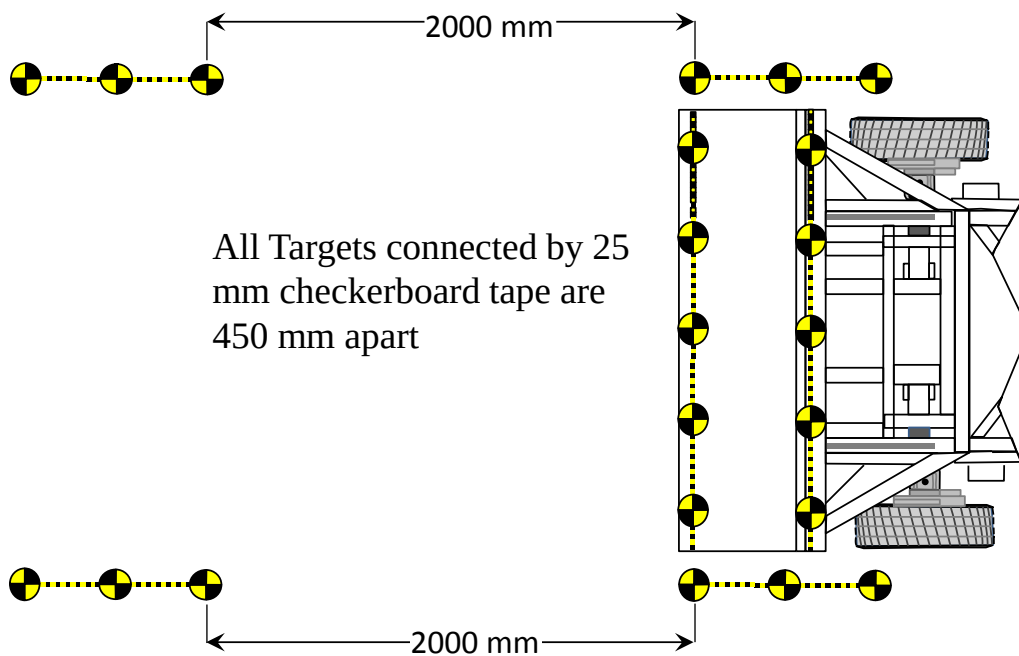
- +X – From the rear of the vehicle to the front of the vehicle
- +Y – From the left side of the vehicle to the right side of the vehicle
- +Z – From the top of the vehicle to the bottom of the vehicle

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

Test Vehicle: 2015 Subaru Forester SUV
Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
Test Date: 9/11/2015

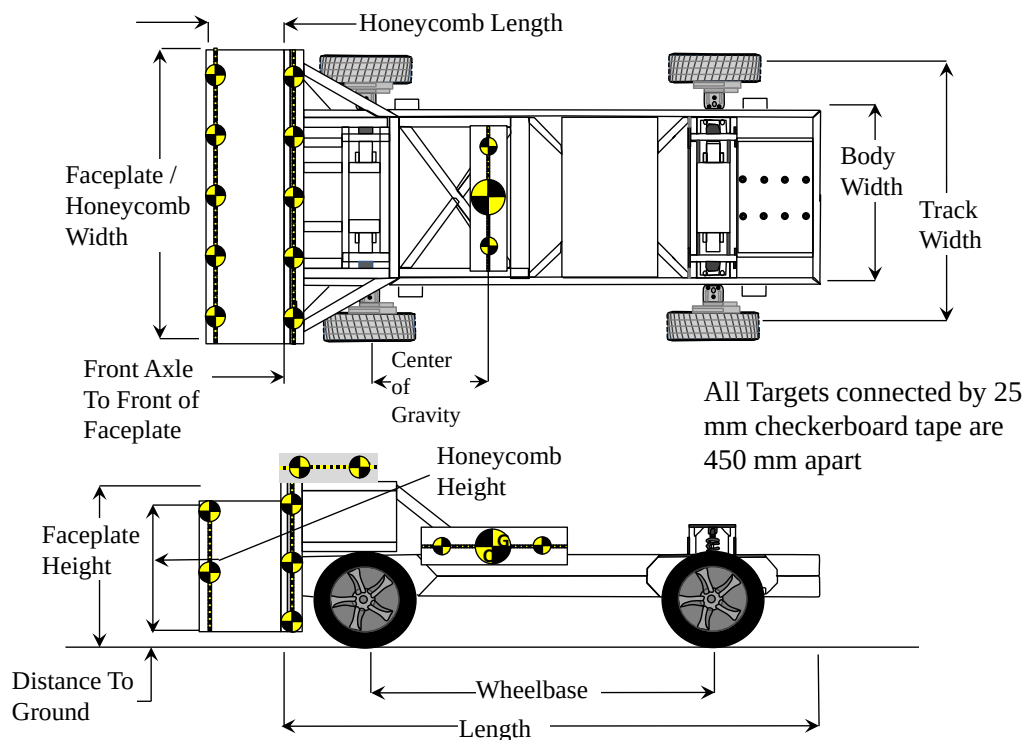
GROUND TARGETS LOCATED IN REFERENCE TO OMDB



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

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015



Item	Units	Value	Item	Units	Value
Honeycomb Width	mm	2205	Faceplate Height	mm	1185
Honeycomb Length	mm	605	Faceplate to Ground	mm	85
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	826	434	1260
Right	kg	792	467	1259
Ratio	%	64%	36%	
Total	kg	1618	901	2519
CG Aft of Front Axle	mm			926

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

DATA SHEET NO. 9
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

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: 2015 Subaru Forester SUV
Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
Test Date: 9/11/2015

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Right Front Passenger
Dummy Type/Serial No.	THOR015	THOR016
Lower Leg Type	LX	LX
Lower Leg Serial No.	LX0038/LX0039	LX0018/ LX0019
Head Contact	Frontal Airbag, Right Shoulder	Frontal & Curtain Airbag, Visor
Upper Torso Contact	Frontal Airbag	Frontal Airbag, Arm & Side Torso Contact Passenger Door & Torso Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Bolster & Knee Airbag	Glove Box
Right Knee Contact	Knee Airbag	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)	None	None
Seat Back Failure	No	No
Glazing Damage	None	Window shattered

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions	Photo Taken (Y/N)
Pillar Performance	B-Pillar Buckled	Y
Windshield Damage	Cracks throughout with minor separation	Y
Window Damage	Right front passenger window shattered	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	Disabled	Yes	Yes
Torso Airbag	Yes	Disabled	Yes	Yes
Knee Airbag	Yes	Yes	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: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	mm	4594	4340	253
2	Rear Surface of Vehicle (RSOV) to Front of Engine	mm	4083	3917	166
3	RSOV to Firewall	mm	3502	3446	56
4	RSOV to Upper Leading Edge of Right Door	mm	3159	3152	8
5	RSOV to Upper Leading Edge of Left Door	mm	3160	3158	2
6	RSOV to Lower Leading Edge of Right Door	mm	3123	3120	3
7	RSOV to Lower Leading Edge of Left Door	mm	3124	3124	0
8	RSOV to Upper Trailing Edge of Right Door	mm	2036	2028	8
9	RSOV to Upper Trailing Edge of Left Door	mm	2037	2035	2
10	RSOV to Lower Trailing Edge of Right Door	mm	2071	2067	4
11	RSOV to Lower Trailing Edge of Left Door	mm	2073	2070	3
12	RSOV to Bottom of "A" Post of Right Side	mm	3220	3209	10
13	RSOV to Bottom of "A" Post of Left Side	mm	3219	3218	1
14	RSOV to Firewall, Right Side	mm	3593	3471	122
15	RSOV to Firewall, Left Side	mm	3594	3593	2
16	RSOV to Steering Column	mm	2679	2709	-30
17	Center of Steering Column to "A" Post	mm	309	313	-3
18	Center of Steering Column to Headliner	mm	462	504	-43
19	RSOV to Right Side of Front Bumper	mm	4580	3993	587
20	RSOV to Left Side of Front Bumper	mm	4583	4633	-50
21	Length of Engine Block	mm	350	358	-8
RD	RSOV to Right Side of Dash Panel	mm	2887	2868	19
CD	RSOV to Center of Dash Panel	mm	2890	2879	11
LD	RSOV to Left Side of Dash Panel	mm	2887	2881	6

UR* = Unrecoverable Data Point

DATA SHEET NO. 12
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2015 Subaru Forester SUV
Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
Test Date: 9/11/2015

VEHICLE INFORMATION

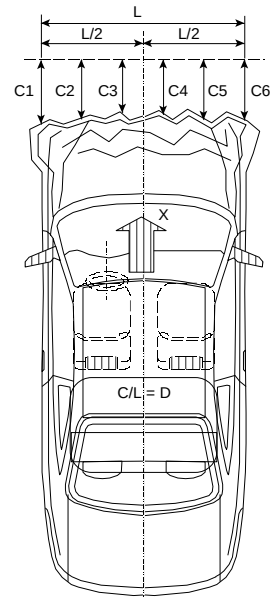
VIN: JF2SJADCXFH816483 Wheelbase (mm): 2642
Vehicle Size Category: Passenger Test Weight (kg): 1,803

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): 89.93
Velocity Change (kph): 89.93

CRUSH PROFILE

Collision Deformation Classification: 12FZEW4
Midpoint of Damage: C5
Damage Region Length (mm): 1475
Impact Mode: Frontal 15° Angle, 35% Right Offset



Crush Measurements: Bumper Cover

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4419	4639	-220
C2	Crush zone 2 at left side	mm	4565	4603	-38
C3	Crush zone 3 at left side	mm	4582	4427	155
C4	Crush zone 4 at right side	mm	4582	4234	348
C5	Crush zone 5 at right side	mm	4565	4074	491
C6	Crush zone 6 at right side	mm	4421	3676	745
L	C1 to C6	mm	1475	1143	333

Crush Measurements: Bumper Cover Removed

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
B1	Bumper Beam 1 at left side	mm	4525	4504	-21
B2	Bumper Beam 2 at left side	mm	4565	4482	-83
B3	Bumper Beam 3 at left side	mm	4575	4420	-155
B4	Bumper Beam 4 at left side	mm	4578	4341	-237
B5	Bumper Beam 5 at right side	mm	4579	4258	-321
B6	Bumper Beam 6 at right side	mm	4578	4169	-409
B7	Bumper Beam 7 at right side	mm	4574	4046	-528
B8	Bumper Beam 8 at right side	mm	4565	4038	-527
B9	Bumper Beam 9 at right side	mm	4524	4021	-503
L	B1 to B9	mm	1081	864	-217

DATA SHEET NO. 13
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2015 Subaru Forester SUV
Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

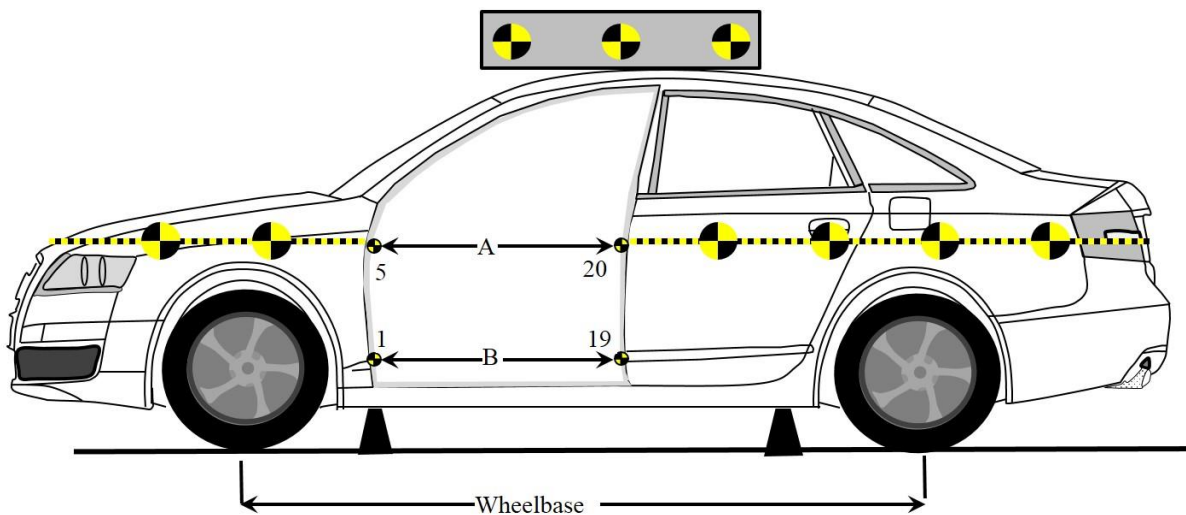
NHTSA No.: R20155509
Test Date: 9/11/2015

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	937	937	0
B	Left Side Lower	mm	821	820	-1
D	Right Side Upper	mm	934	911	-23
E	Right Side Lower	mm	821	802	-19

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2642	2739	97
F	Right Side Wheelbase	mm	2642	2676	34



DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

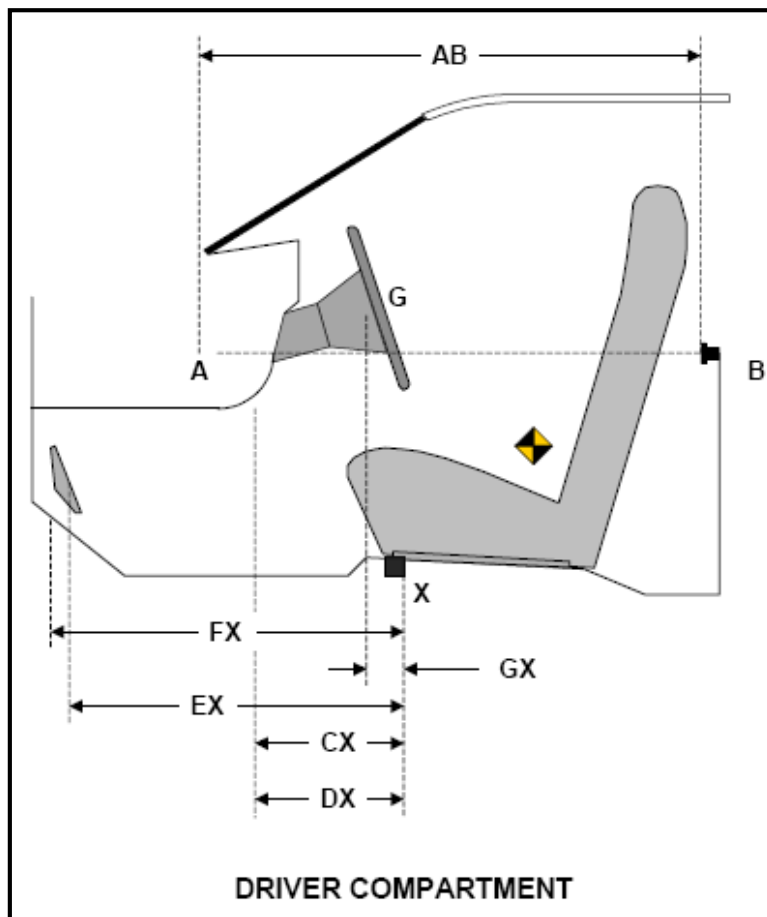
Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	955	954	-1
CX	Left Knee Bolster to X	mm	273	286	13
DX	Right Knee Bolster to X	mm	265	266	1
EX	Brake Pedal to X	mm	566	568	2
FX	Foot Rest to X	mm	647	648	1
GX	Center of Steering Column Wheel Hub to X	mm	59	93	34

X = Front of Seat Track (Stationary)

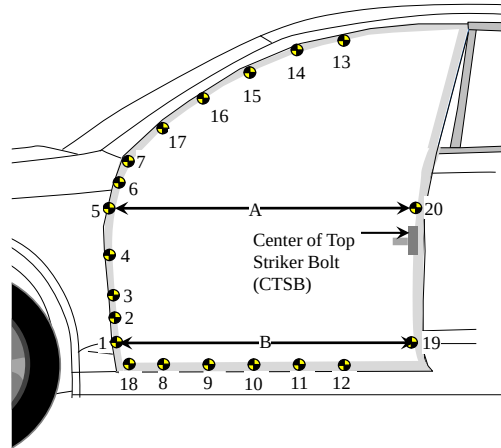


DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

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

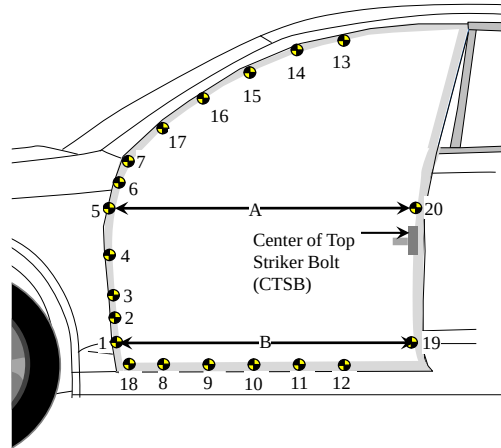
Point	Pre-Test			Post-Test			Difference		
	X	Y	Z	X	Y	Z	X	Y	Z
1	3060	-732	125	3054	-747	127	-6	-15	2
2	3058	-728	54	3052	-741	56	-6	-13	2
3	3038	-724	-26	3033	-736	-23	-5	-12	3
4	2992	-721	-173	2986	-729	-172	-6	-8	1
5	3071	-718	-327	3067	-725	-328	-4	-7	-1
6	3085	-717	-400	3079	-724	-398	-6	-7	2
7	3055	-720	-476	3051	-726	-474	-4	-6	2
17	2967	-707	-553	2964	-713	-550	-3	-6	3
16	2870	-687	-623	2867	-692	-619	-3	-5	4
15	2770	-665	-690	2767	-669	-686	-3	-4	4
14	2668	-643	-750	2665	-646	-746	-3	-3	4
13	2572	-624	-795	2569	-627	-791	-3	-3	4
20	2131	-740	-324	2130	-744	-324	-1	-4	0
19	2236	-737	123	2234	-745	124	-2	-8	1
12	2426	-737	238	2422	-747	236	-4	-10	-2
11	2576	-738	237	2572	-749	237	-4	-11	0
10	2726	-738	237	2722	-751	237	-4	-13	0
9	2874	-737	238	2871	-752	239	-3	-15	1
8	3025	-736	190	3020	-751	191	-5	-15	1
18	3046	-735	163	3039	-750	163	-7	-15	0

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

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

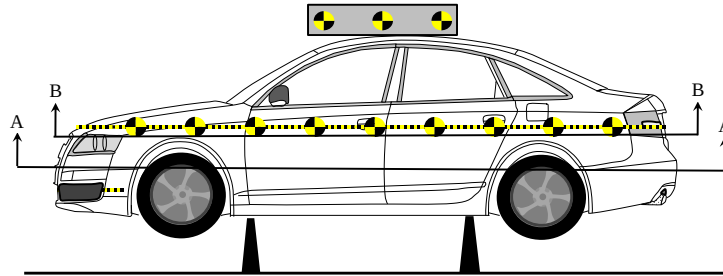
Point	Pre-Test			Post-Test			Difference		
	X	Y	Z	X	Y	Z	X	Y	Z
1	3059	737	124	3041	731	123	-18	-6	-1
2	3057	732	49	3034	734	47	-23	2	-2
3	3038	729	-27	3015	736	-29	-23	7	-2
4	2991	726	-176	2971	752	-180	-20	26	-4
5	3065	724	-325	3042	731	-329	-23	7	-4
6	3083	723	-401	3065	723	-406	-18	0	-5
7	3056	726	-476	3044	723	-482	-12	-3	-6
17	2973	715	-551	2965	712	-559	-8	-3	-8
16	2876	695	-619	2872	692	-631	-4	-3	-12
15	2777	673	-684	2775	670	-700	-2	-3	-16
14	2676	650	-745	2677	648	-767	1	-2	-22
13	2575	630	-794	2579	625	-809	4	-5	-15
20	2131	744	-326	2131	737	-325	0	-7	1
19	2239	740	126	2239	730	128	0	-10	2
12	2425	741	235	2423	730	234	-2	-11	-1
11	2575	741	237	2574	730	236	-1	-11	-1
10	2724	742	236	2724	730	236	0	-12	0
9	2874	742	237	2872	728	238	-2	-14	1
8	3026	740	186	3017	732	188	-9	-8	2
18	3048	739	153	3035	731	153	-13	-8	0

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

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	2066	-886	104	1	2060	-893	104
2	2213	-886	105	2	2212	-894	104
3	2301	-886	104	3	2411	-893	105
4	2481	-884	105	4	2660	-891	104
5	2701	-880	104	5	2786	-889	104
6	2971	-874	104	6	2963	-887	105
7	3140	-886	105	7	3102	-893	105
8	3238	-900	105	8	3200	-911	104
9	4004	-890	103	9	3245	-912	104
10	4177	-844	105	10	3421	-886	105
11	4368	-787	104	11	3470	-960	105
12	4477	-652	104	12	3510	-998	104
13	4552	-514	105	13	3645	-922	105
14	4575	-402	105	14	3756	-838	105
15	4582	-172	104	15	3984	-882	105
16	4581	3	105	16	4148	-764	105
17	4583	7	104	17	4167	-668	105
18	4584	124	104	18	4190	-547	104
19	4581	327	105	19	4221	-483	104
20	4560	500	105	20	4309	-487	104
21	4491	639	104	21	4424	-525	105
22	4386	780	105	22	4491	-801	105
23	4236	836	104	23	4562	-705	104
24	4117	866	105	24	4619	-529	105
25	4004	895	105	25	4616	-414	104

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

VEHICLE EXTERIOR CRUSH PROFILE
SECTION A-A (Continued)

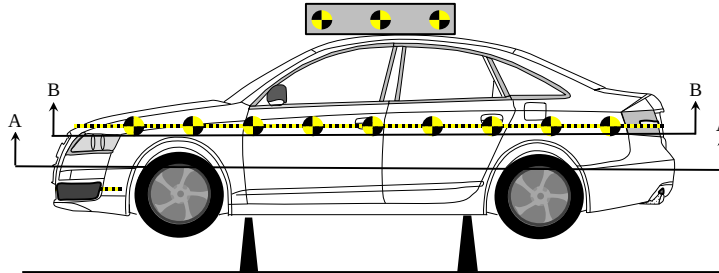
Point	Pre-Test			Point	Post-Test		
	X	Y	Z		X	Y	Z
26	3240	901	105	26	4591	-324	105
27	3007	875	105	27	4517	-200	104
28	2682	881	104	28	4456	-121	105
29	2454	884	104	29	4363	-10	104
30	2308	887	104	30	4260	97	104
31	2147	888	105	31	4185	169	105
32	2067	887	105	32	4038	247	104
				33	3977	397	104
				34	3903	547	105
				35	3969	634	104
				36	4018	750	105
				37	4029	791	105
				38	3884	782	104
				39	3729	843	104
				40	3584	920	104
				41	3415	1021	105
				42	3372	1019	104
				43	3124	945	104
				44	3045	935	104
				45	3025	884	104
				46	2849	884	104
				47	2612	887	104
				48	2357	887	104
				49	2291	887	104
				50	2160	887	104
				51	2051	887	104

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

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	2159	-890	-157	1	2057	-896	-158
2	2280	-890	-157	2	2185	-898	-157
3	2377	-890	-157	3	2363	-898	-158
4	2462	-889	-157	4	2558	-897	-157
5	2579	-888	-157	5	2776	-894	-158
6	2714	-885	-158	6	2786	-894	-158
7	2827	-883	-157	7	2917	-892	-157
8	2956	-881	-157	8	3076	-890	-157
9	3084	-878	-158	9	3234	-892	-157
10	3207	-878	-157	10	3415	-909	-158
11	3366	-890	-157	11	3662	-909	-158
12	3539	-894	-158	12	3928	-873	-158
13	3645	-894	-158	13	4142	-786	-158
14	3805	-891	-158	14	4129	-631	-157
15	3986	-851	-157	15	4147	-594	-158
16	4125	-817	-157	16	4242	-371	-157
17	4208	-797	-158	17	4317	-348	-157
18	4350	-687	-157	18	4172	-171	-157
19	4421	-536	-157	19	4135	-98	-156
20	4478	-430	-157	20	4135	-53	-157
21	4464	-437	-157	21	4082	23	-158
22	4462	-184	-157	22	4019	99	-157
23	4454	-79	-158	23	3936	223	-157
24	4470	92	-157	24	3945	310	-157
25	2159	-890	-157	25	3890	386	-157

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

VEHICLE EXTERIOR CRUSH PROFILE
SECTION B-B (Continued)

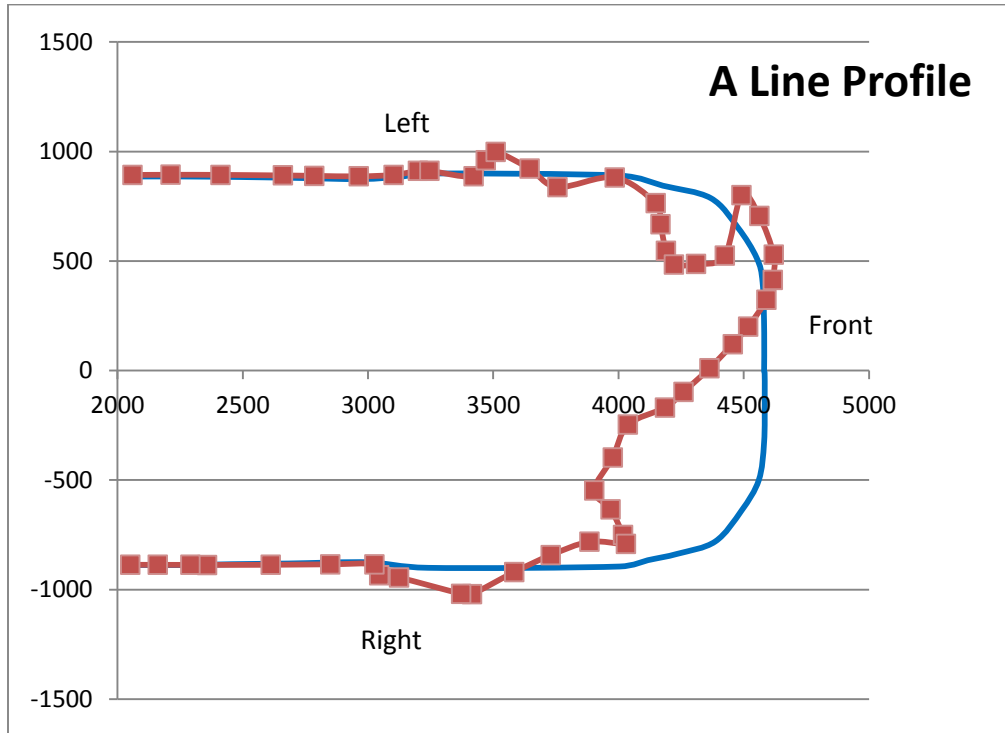
Point	Pre-Test			Point	Post-Test		
	X	Y	Z		X	Y	Z
26	4462	193	-157	26	3756	419	-157
27	4455	250	-157	27	3661	544	-158
28	4455	328	-157	28	3602	661	-157
29	4451	375	-158	29	3576	767	-157
30	4487	404	-158	30	3527	844	-157
31	4460	455	-157	31	3268	772	-157
32	4424	519	-157	32	3160	892	-157
33	4386	610	-157	33	3061	893	-157
34	4332	714	-158	34	2906	895	-158
35	4304	752	-158	35	2704	898	-157
36	4217	799	-158	36	2424	901	-158
37	4132	818	-158	37	2192	901	-158
38	4007	845	-157	38	2058	900	-158
39	3832	890	-158				
40	3628	898	-158				
41	3451	900	-157				
42	3244	883	-158				
43	3080	883	-158				
44	2925	886	-157				
45	2910	885	-157				
46	2815	887	-158				
47	2631	890	-158				
48	2467	893	-157				
49	2369	894	-157				
50	2185	895	-157				
51	2070	894	-157				

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

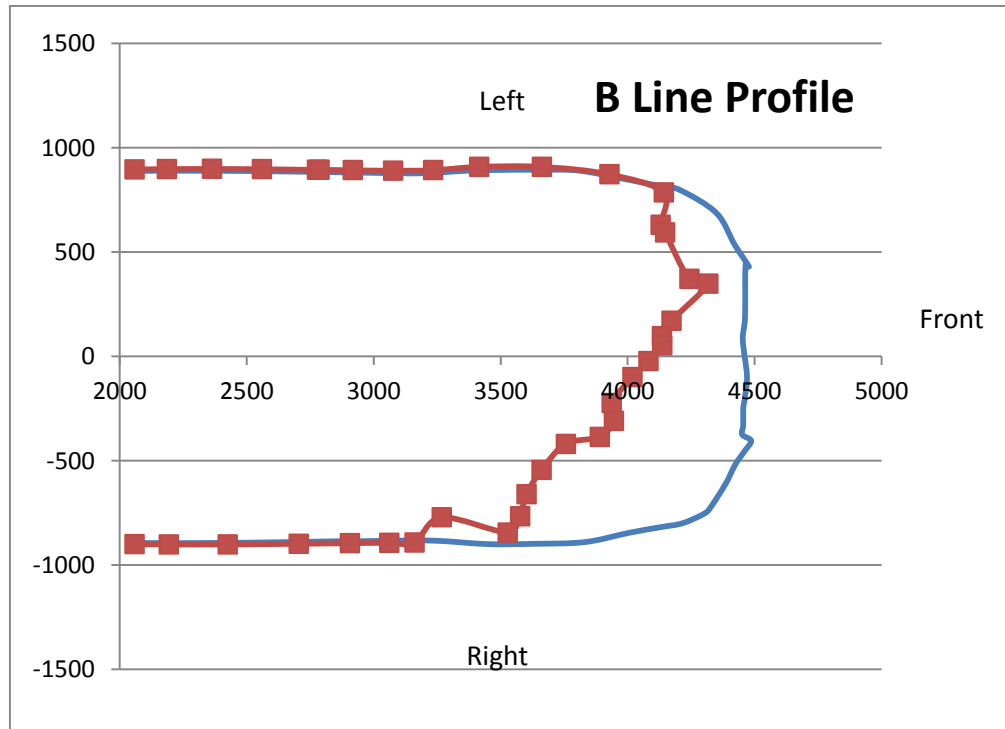
Test Vehicle: 2015 Subaru Forester SUV
Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
Test Date: 9/11/2015

VEHICLE EXTERIOR CRUSH PROFILE
SECTION A-A



SECTION B-B



DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

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	4525	-539	105	4504	-405	103	-21	134	-2
	B2	4565	-409	105	4482	-270	84	-83	139	-21
	B3	4575	-272	105	4420	-156	67	-155	116	-38
	B4	4578	-134	105	4341	-44	53	-237	90	-52
	B5	4579	4	105	4258	65	39	-321	61	-66
	B6	4578	140	104	4169	167	28	-409	27	-76
	B7	4574	278	104	4046	210	23	-528	-68	-81
	B8	4565	411	104	4038	332	5	-527	-79	-99
	B9	4524	542	105	4021	460	-8	-503	-82	-113

Reference point:

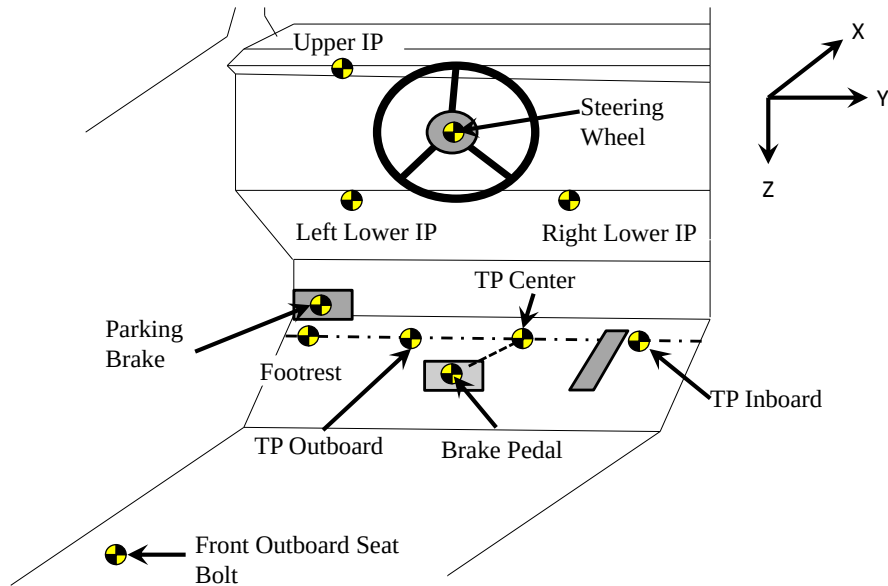
- +X – From the rear of the vehicle to the front of the vehicle
- +Y – From the left side of the vehicle to the right side of the vehicle
- +Z – From the top of the vehicle to the bottom of the vehicle

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

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

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	3365	-222	125	3337	-250	130	-28	-28	5
TP Center	3389	-371	125	3384	-389	131	-5	-18	6
TP Outboard	3311	-520	123	3304	-541	130	-7	-21	7
TP Footrest	3237	-621	125	3235	-641	130	-2	-20	5
Brake Pedal	3175	-372	128	3174	-412	141	-1	-40	13
Left Lower IP	2882	-495	-195	2892	-499	-184	10	-4	11
Right Lower IP	2873	-194	-197	2872	-196	-168	-1	-2	29
Upper IP	2906	-596	-178	2907	-601	-170	1	-5	8
Steering Wheel	2668	-344	-381	2699	-341	-337	31	3	44
Front Outboard Bolt	2609	-567	279	2606	-580	285	-3	-13	6
Emergency Brake									

Reference point:

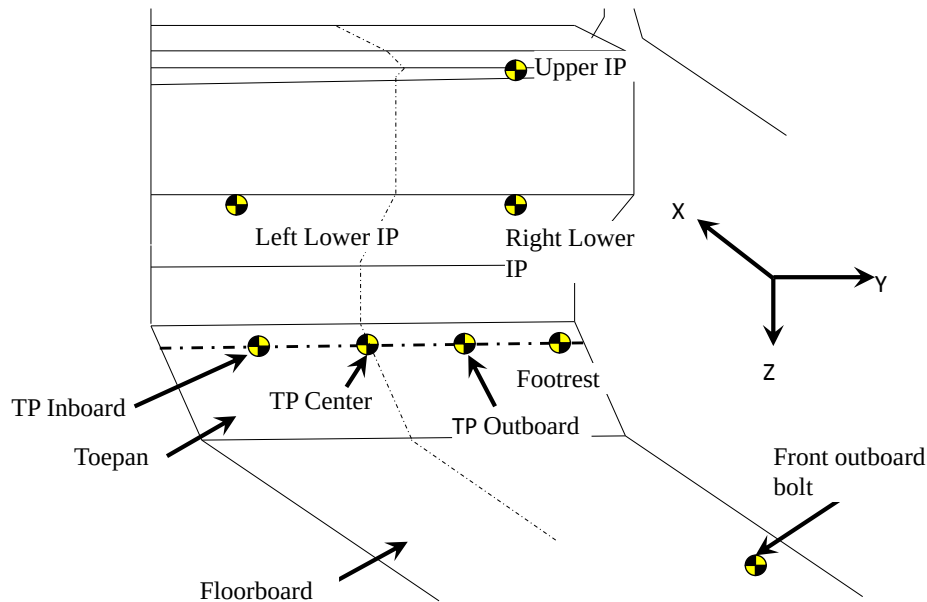
- +X – From the rear of the vehicle to the front of the vehicle
- +Y – From the left side of the vehicle to the right side of the vehicle
- +Z – From the top of the vehicle to the bottom of the vehicle

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

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

PASSENGER FLOOR PAN MEASUREMENTS



Intrusion Location	Pre-Test (mm)			Post-Test (mm)			Difference (mm)		
	X	Y	Z	X	Y	Z	X	Y	Z
TP Inboard	3323	207	124	3241	162	119	-82	-45	-5
TP Center	3326	319	163	3283	317	86	-43	-3	-77
TP Outboard	3326	510	125	3234	471	91	-92	-39	-34
TP Footrest	3245	610	130	3195	592	117	-50	-18	-13
Left Lower IP	2906	207	-144	2885	214	-125	-21	7	19
Right Lower IP	2928	510	-143	2911	514	-143	-17	4	0
Upper IP	2872	609	-249	2856	604	-253	-16	-5	-4
Front Outboard Bolt	2608	570	278	2608	560	280	0	-10	2

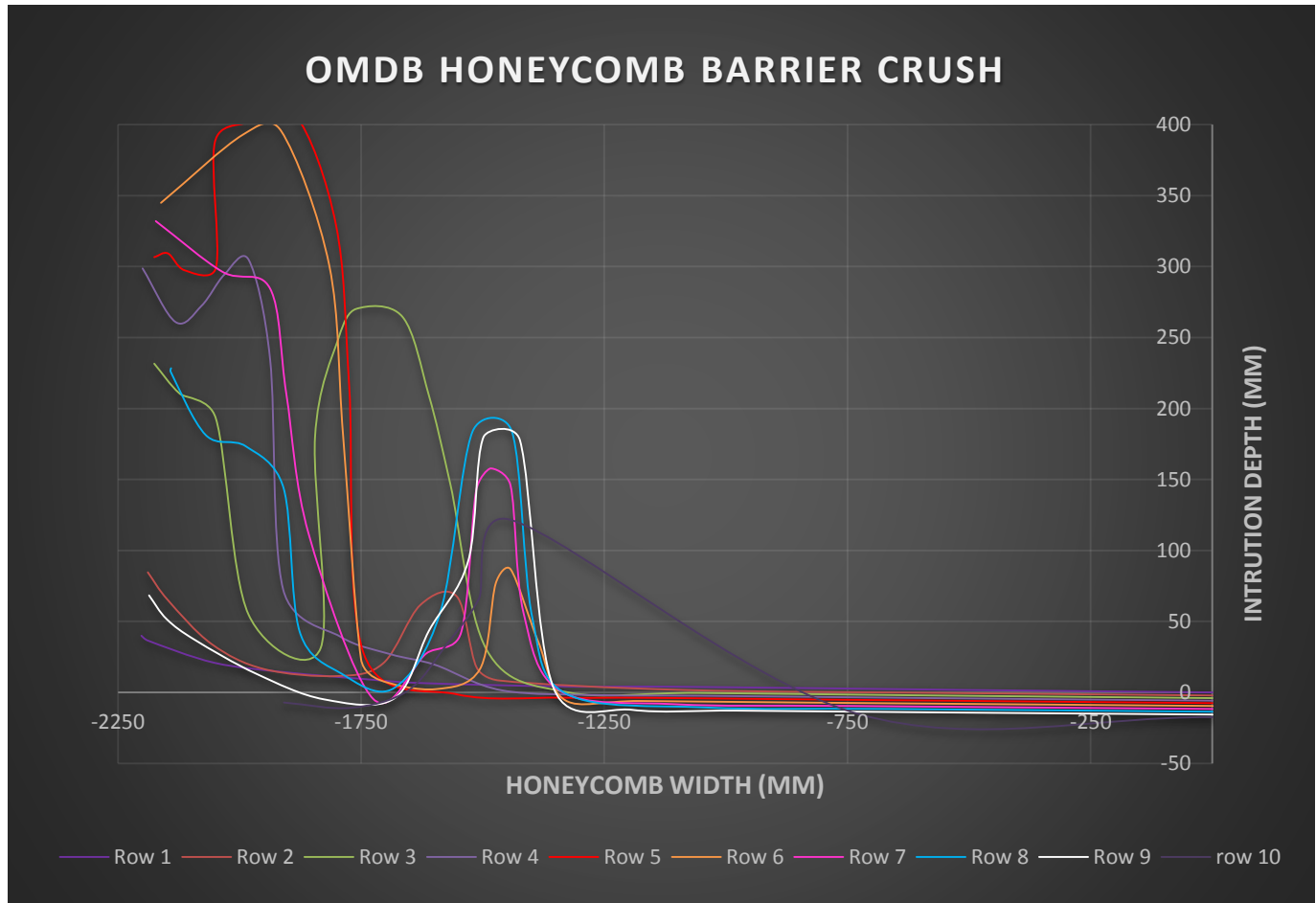
Reference point:

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

DATA SHEET NO.14
OMDB CRUSH MEASUREMENTS

Test Vehicle: 2015 Subaru Forester SUV
Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
Test Date: 9/11/2015



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

Test Vehicle: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015

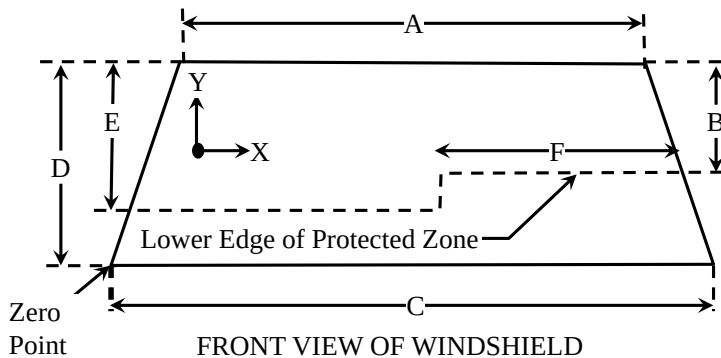
Please provide windshield mounting details. A 0.8 mm trim surrounds the top and side of windshield while a plastic shroud is on the bottom.

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	2195	2195	100%
Right Side	2195	2145	97.7%
Total	4390	4340	98.9%



Item	Units	Value
A	mm	1220
B	mm	575
C	mm	1500
D	mm	835
E	mm	565
F	mm	500

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: 2015 Subaru Forester SUV
Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
Test Date: 9/11/2015

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Ambient Temperature at Test Vehicle Time of Impact: 20° C

Test Time: 3:48 PM

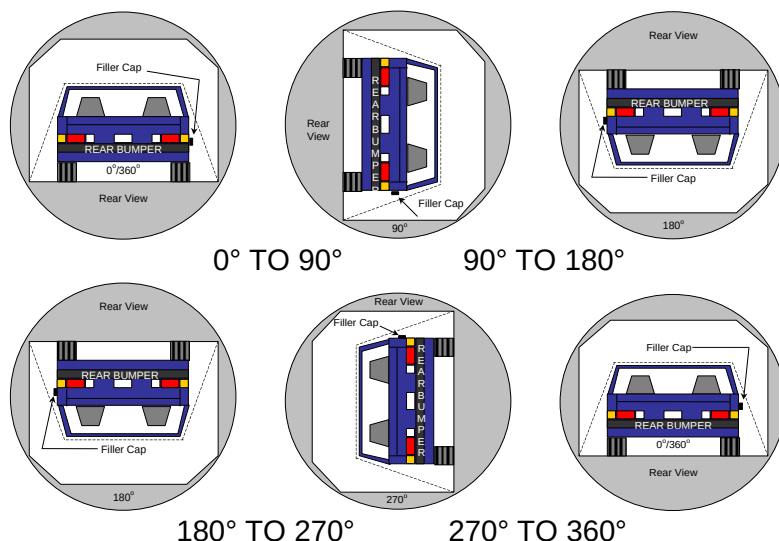
Stoddard Solvent Spillage Measurements

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: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015



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°	71	300	371
90° to 180°	62	300	362
180° to 270°	61	300	361
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	

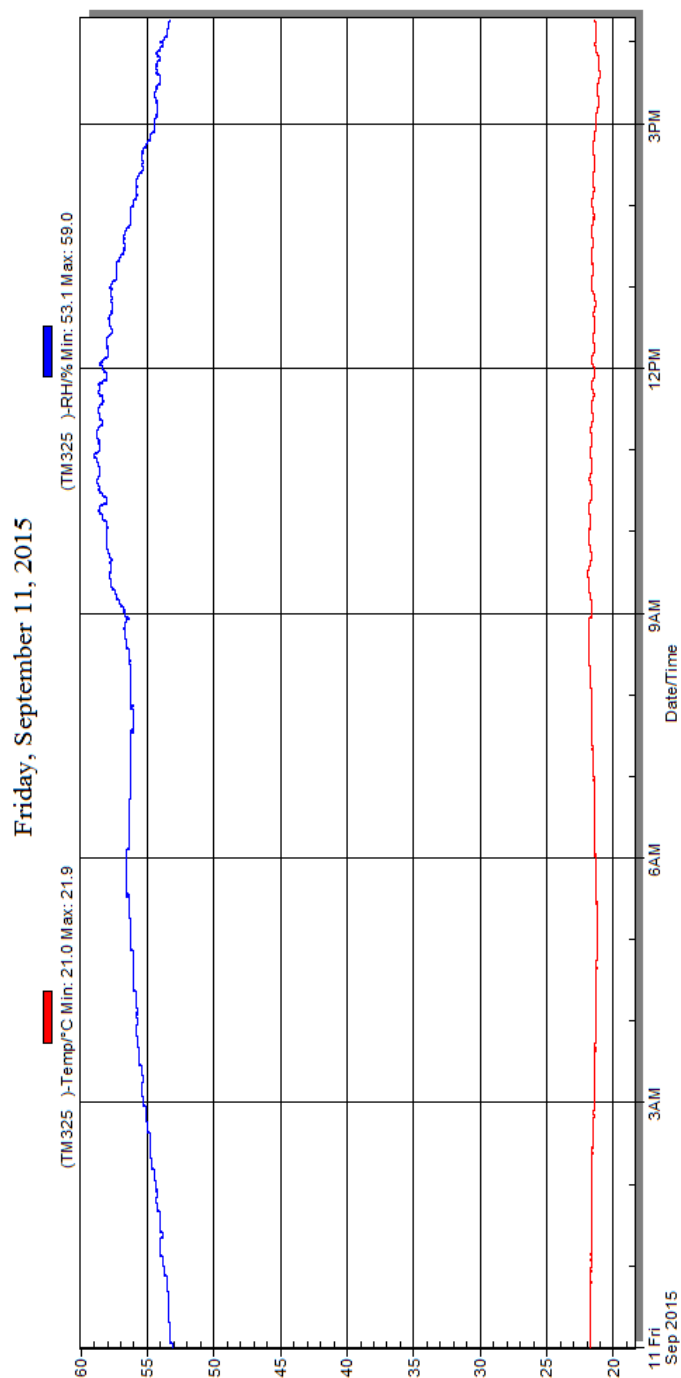
SOLVENT SPILLAGE LOCATION TABLE

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: 2015 Subaru Forester SUV
 Test Program: R&D 90.1kph, 15° / 35% Right Oblique Offset

NHTSA No.: R20155509
 Test Date: 9/11/2015



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

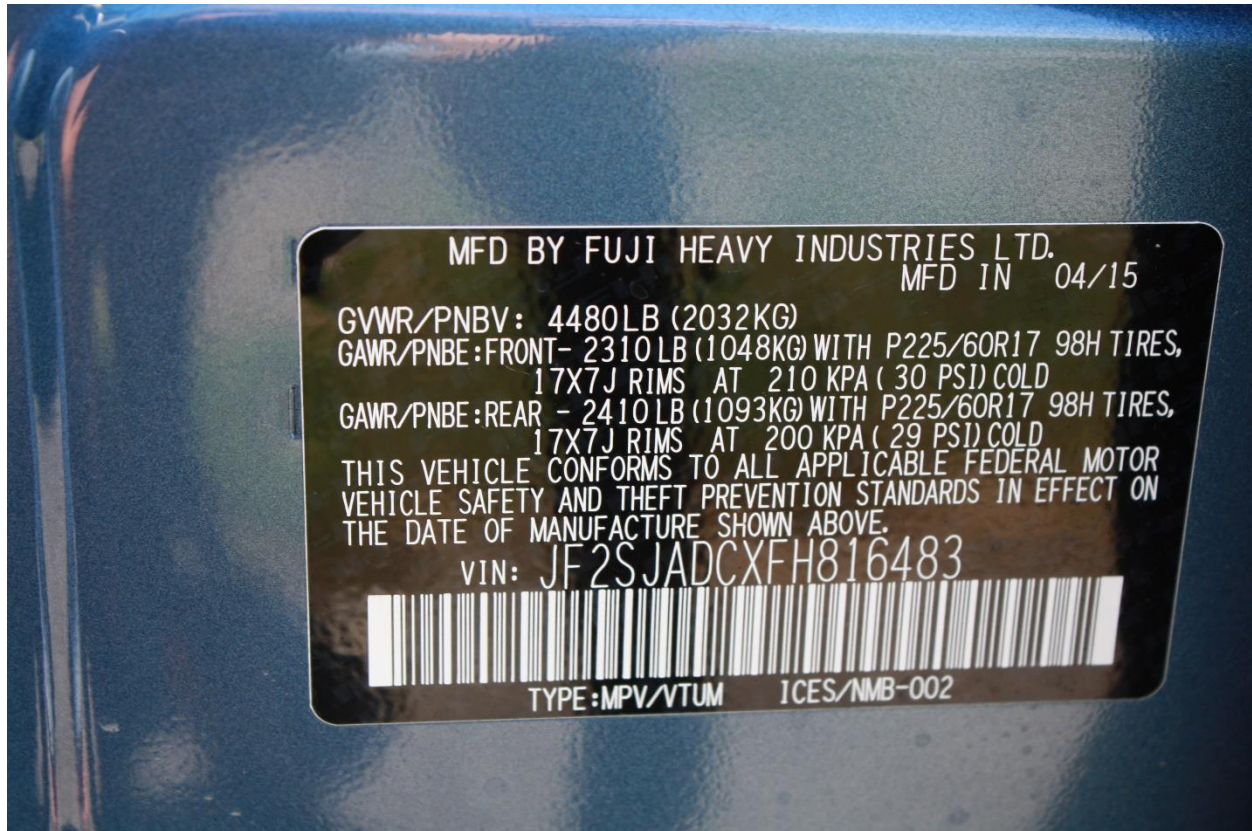
TABLE OF PHOTOGRAPHS (Continued)		
No.	Description	Page
180	Post-Test Right Side View of OMDB	A-100
181	Pre-Test Left Side View of OMDB	A-101
182	Post-Test Left Side View of OMDB	A-101
183	Pre-Test OMDB & Vehicle, Right Side	A-102
184	Post-Test OMDB & Vehicle, Right Side	A-102
185	Pre-Test OMDB & Vehicle, 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



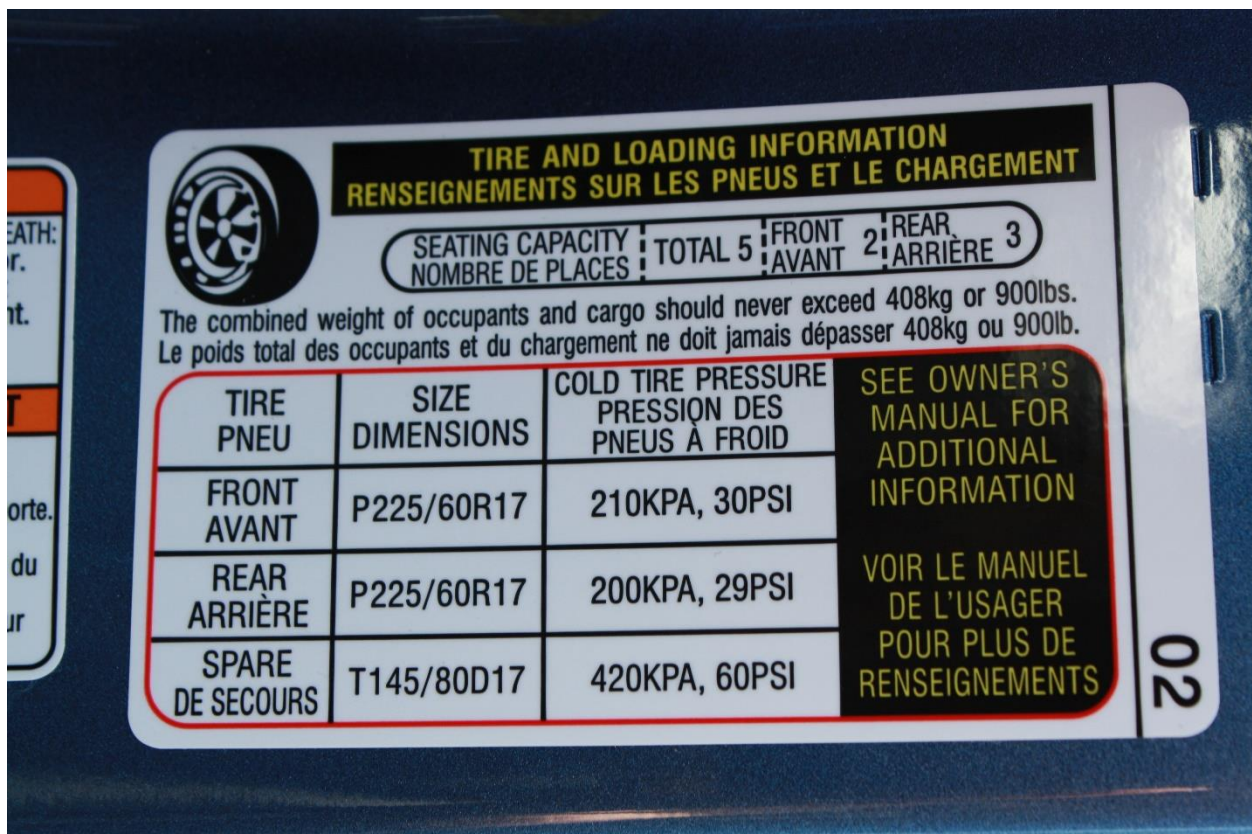
No. 001 As Delivered Right Front 3-4 View of Test Vehicle



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



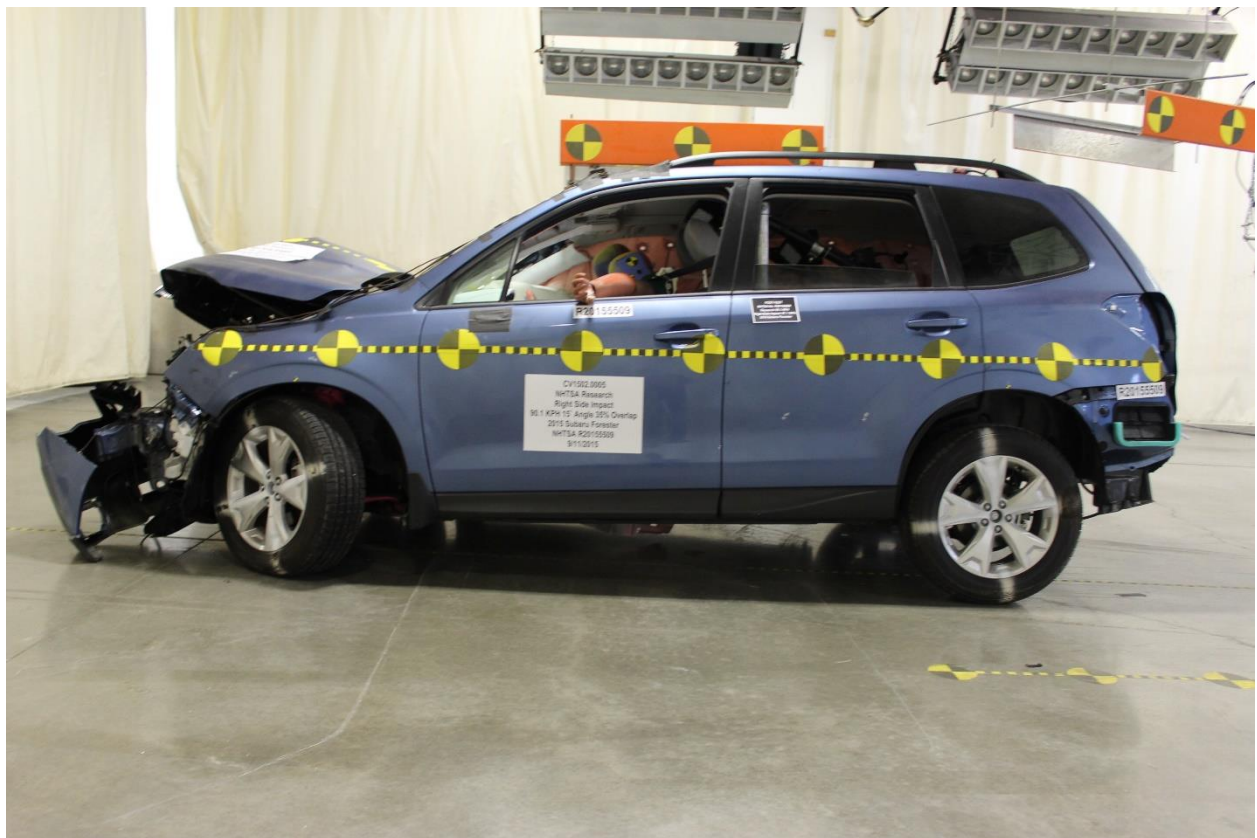
No. 007 Pre-Test Left Front 3-4 View of Test Vehicle



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



No. 019 Pre-Test Right Front 3-4 View of Test Vehicle



No. 020 Post-Test Right Front 3-4 View of Test Vehicle

FORESTER

VIN: JF2SJADCKFH616483
 Model Code: 2015 Subaru Forester 2.5i
 Premium/FF
 Exterior Color: Quartz Blue Pearl
 Port / Assembly: Boston, MA
 Delivery by / Carrier: Diversified Automotive, Inc.

SHIP TO: 020206
 Maguire Cars, LLC
 320 Elmira Road
 Ithaca, NY 14850

SOLD TO: 020206
 Maguire Cars, LLC
 320 Elmira Road
 Ithaca, NY 14850



STANDARD EQUIPMENT

SAFETY

Symmetrical All-Wheel Drive (AWD)
 Vehicle Dynamics Control (VDC)
 4-Wheel Disc Brakes w/Brake Assist
 Anti-Lock Braking System (ABS)
 Electronic Brake-Force Distribution
 Brake Override System
 Driver's Side Knee Airbag
 Subaru Advanced Frontal Air Bag System
 Front Seat Side (Pelvic/Torso) Airbags
 Side Curtain Air Bags w/Rollover Sensor
 Anti-Theft Alarm & Immobilizer System
 Daytime Running Lights

Whiplash Protection Front Seats
 Safety Pedal System

PERFORMANCE AND EXTERIOR

2.5L Horizontally-Opposed DOHC Engine
 17-inch Aluminum Alloy Wheels
 Privacy Glass & Panoramic Power Moonroof
 Roof Rails

COMFORT, CONVENIENCE AND INTERIOR

Air Conditioning w/Air Filtration System
 AM/FM Stereo HD Radio w/ CD Player
 USB Port with iPod Connectivity

Steering Wheel: Bluetooth & Audio Switches
 Bluetooth Hands-Free Phone Connectivity
 Bluetooth Audio Streaming Connectivity
 Power Door Locks & Dual Power Mirrors
 Reclining Rear Seatback Function
 Power Windows w/ Driver's Auto Up/Down
 10-Way Power Driver's Seat/Power Lumbar
 60/40 Split Fold-Down Rear Seatback
 Color Multi-Function Display
 Rear Vision Camera
 12V Outlet in Dash, Console & Cargo Area

LIMITED WARRANTY/ROADSIDE ASSISTANCE

3 Years / 36,000 Miles Basic
 5 Years / 60,000 Miles Powertrain
 5 Yrs/Unlimited Mileage Rust Perforation
 3 Yrs / 36,000 24/7 Roadside Assistance
 See Owner Info Kit & Warranty For Details

OPTIONAL EQUIPMENT AND OTHER ITEMS

Manufacturer's Suggested Retail Price	\$25,095.00
Option Package: 12	
Full Tank of Gas	INCLD
Partial Zero Emission (Pzev)	
Super-Ultra Low Emission Veh	
Pzev Certified Where Required	
Pzev Warranty State Specific	\$72.00
Floor Mats, All Weather	\$199.00
Auto-Dim Mirror Compass	\$95.00
Rear Bumper Cover	\$152.00
Splash Guards	

GOVERNMENT 5-STAR SAFETY RATINGS

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

Crash Type	Rating
Frontal Crash	★★★★★
Driver Passenger	★★★★★
Side Crash	★★★★★
Front Seat	★★★★★
Rear Seat	★★★★★

Rollover ★★★★★
 Based on the risk of rollover in a side-impact crash.

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

Scan this code to learn more about this model or visit subaru.com/learnmore

EPA DOT Fuel Economy and Environment Gasoline Vehicle

Fuel Economy
27 MPG
 combined city/hwy
 24 city 32 highway

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

Annual fuel cost \$1,950

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

1 7 10 1 6 10 Best

This vehicle emits 328 grams CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also creates emissions. www.epa.gov

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 24.8 mpg in the city and 32.4 mpg on the highway. Cost estimates are based on 14,000 miles per year at \$3.50 per gallon. Fuel economy and emissions are a significant cause of climate change and smog.

fuelconomy.gov
 Calculate personalized estimates and compare vehicles

PARTS CONTENT INFORMATION
 FOR VEHICLES IN THIS COUNTRY:
 U.S./CANADIAN PARTS CONTENT: 0%
 MAJOR SOURCES OF FOREIGN PARTS CONTENT: JAPAN 90%

FOR THIS VEHICLE:
 FINAL ASSEMBLY POINT: OTA, GUNMA, JAPAN
 COUNTRY OF ORIGIN:
 ENGINE: JAPAN TRANSMISSION: JAPAN

Note: Parts content does not include final assembly, distribution, or other non-parts costs.

Transportation \$855.00
 (Inland Freight Charge & Handling Charge)

Total Suggested Retail Price \$26,458.00

Additional protection is available on this vehicle from Subaru

Always Insist on Genuine Subaru Products

- Added Security* protects your investment
- Mechanical and Maintenance plans available
- Coverage up to 100,000 miles
- Genuine Subaru replacement parts
- Towing & Rental car benefits
- Trip Interruption and Tire Hazard benefits available
- Transferable

THE ONLY EXTENDED SERVICE PLAN BACKED AND ENDORSED BY SUBARU FOR OVER 30 YEARS!

No. 021 Monroney Label Photograph



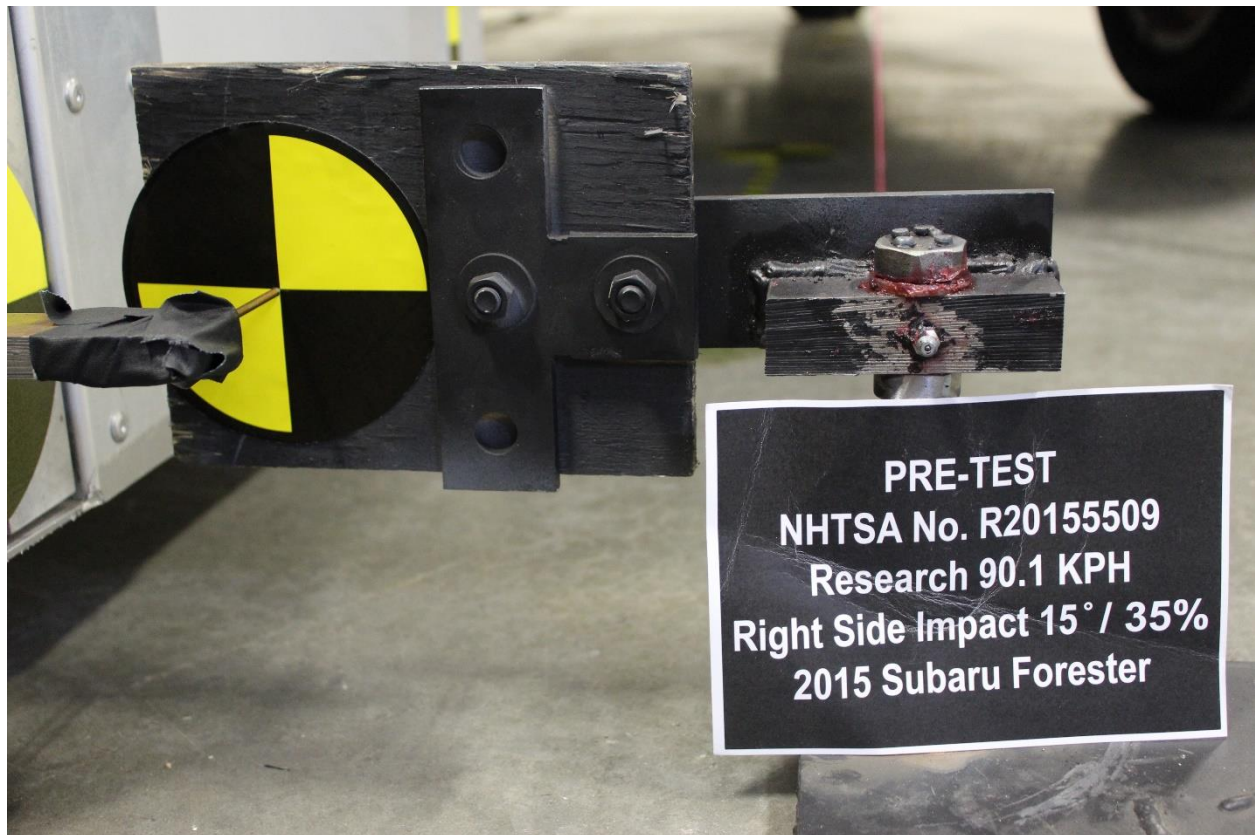
No. 022 Pre-Test Overhead View of OMDB against target vehicle at ideal Impact Point



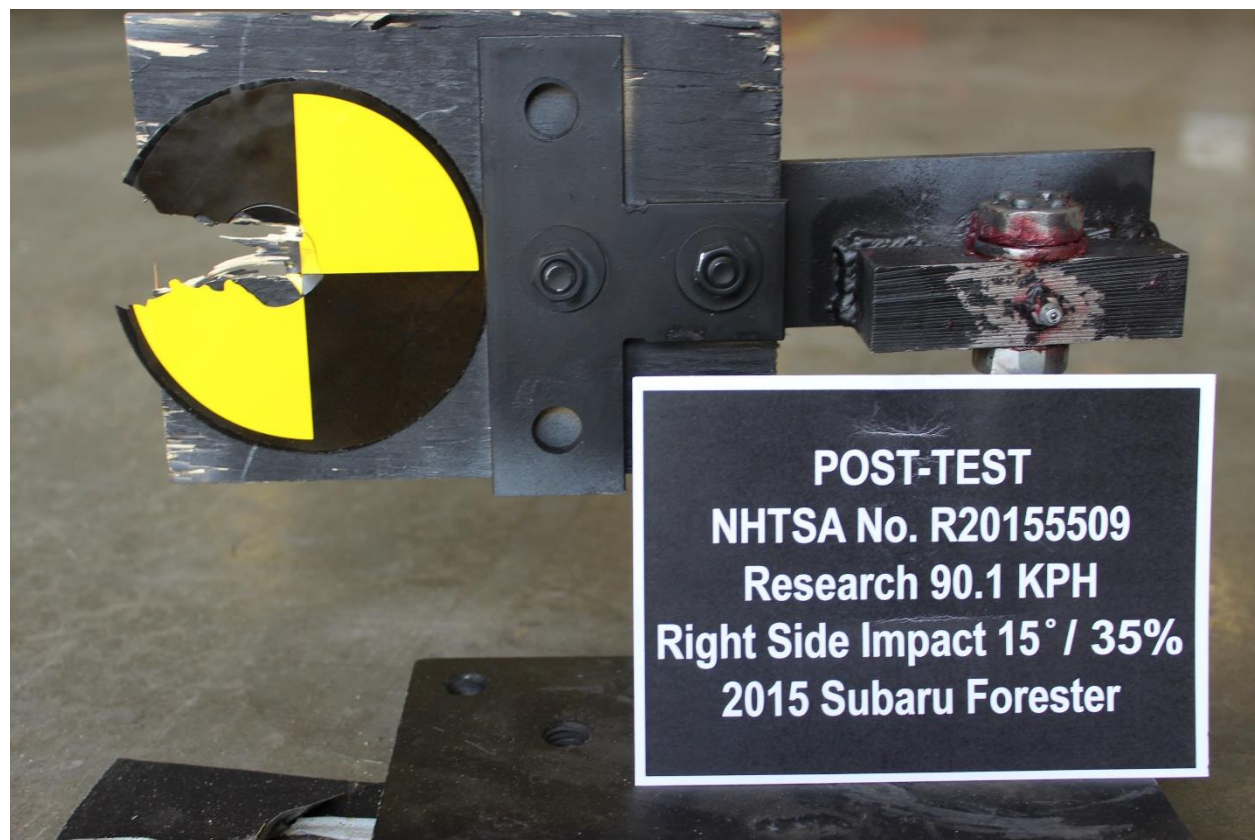
No. 023 Pre-Test Left Side View of OMDB against target vehicle at ideal Impact Point



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



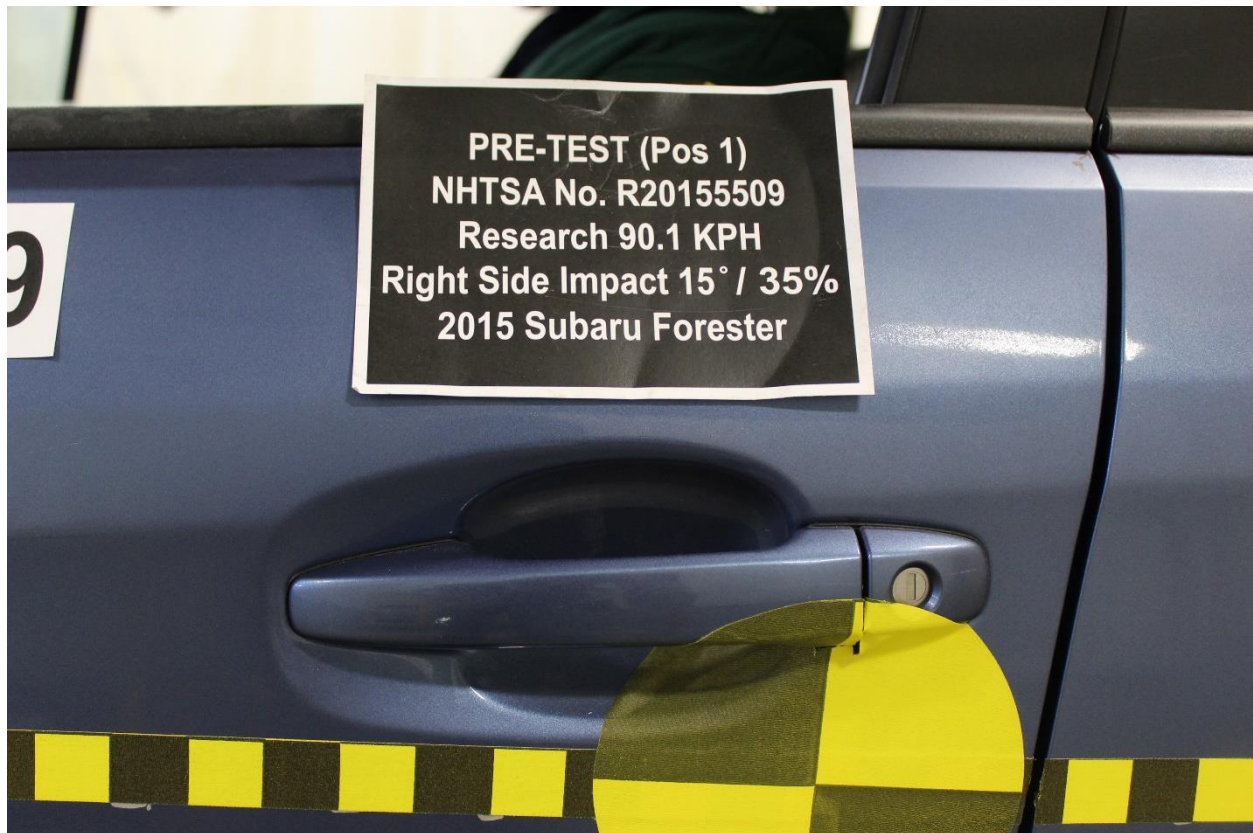
No. 025 Pre-Test Close-up View of Impact Point



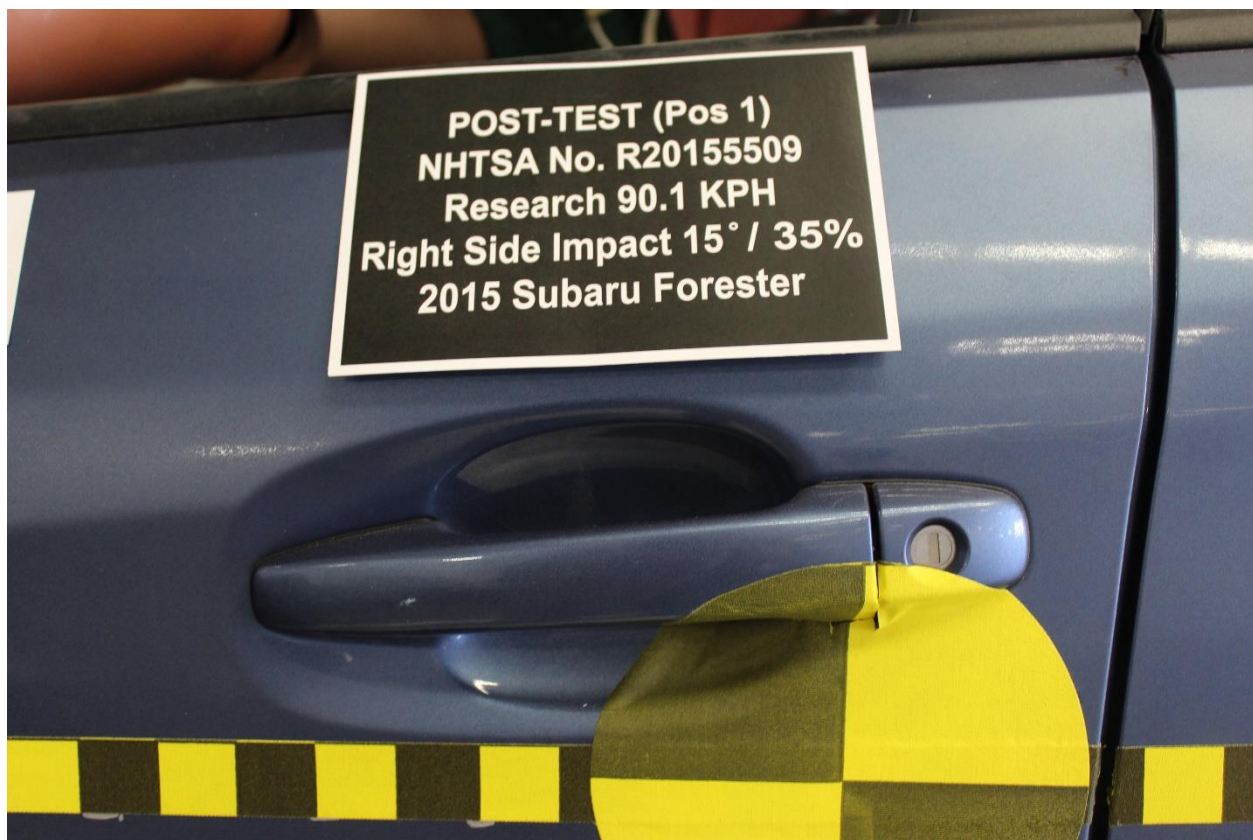
No. 026 Post-Test Close-up View of Impact Point



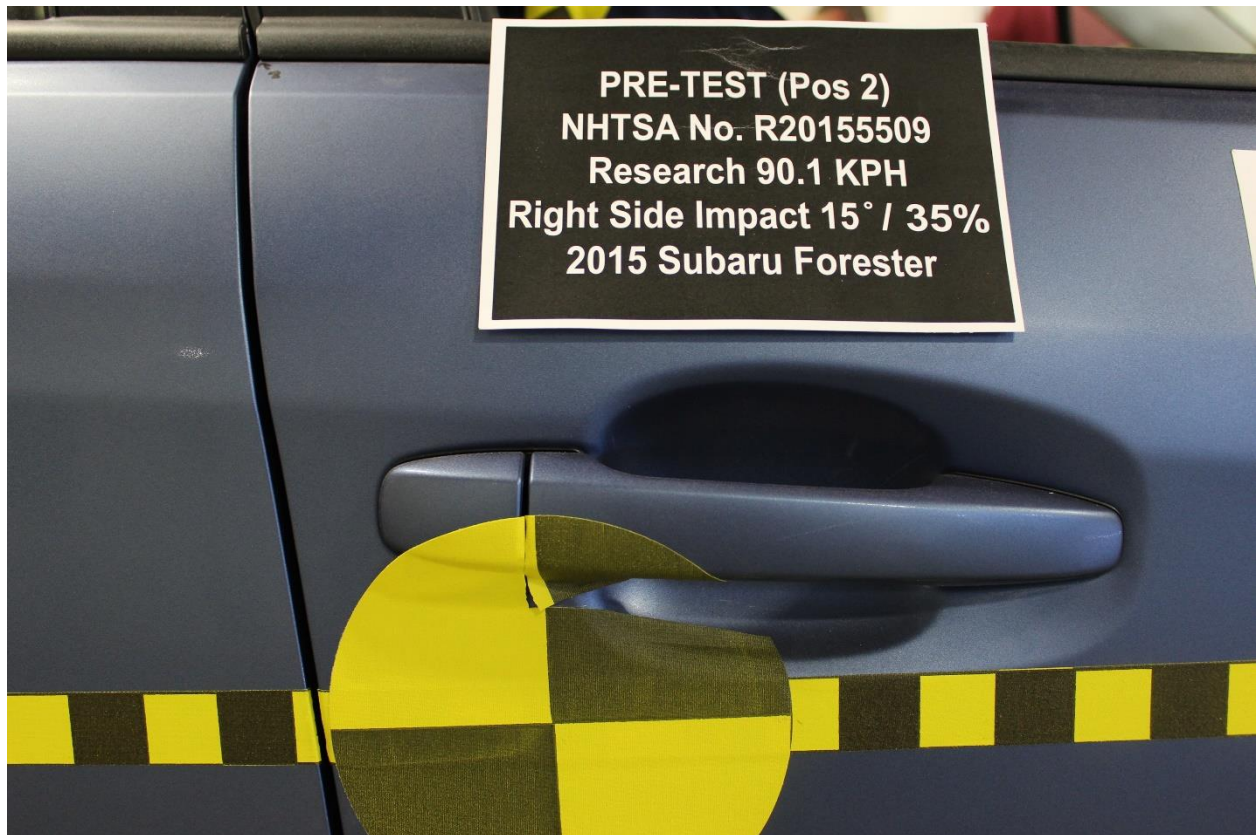
No. 027 Post-Test Vehicle Overhead View



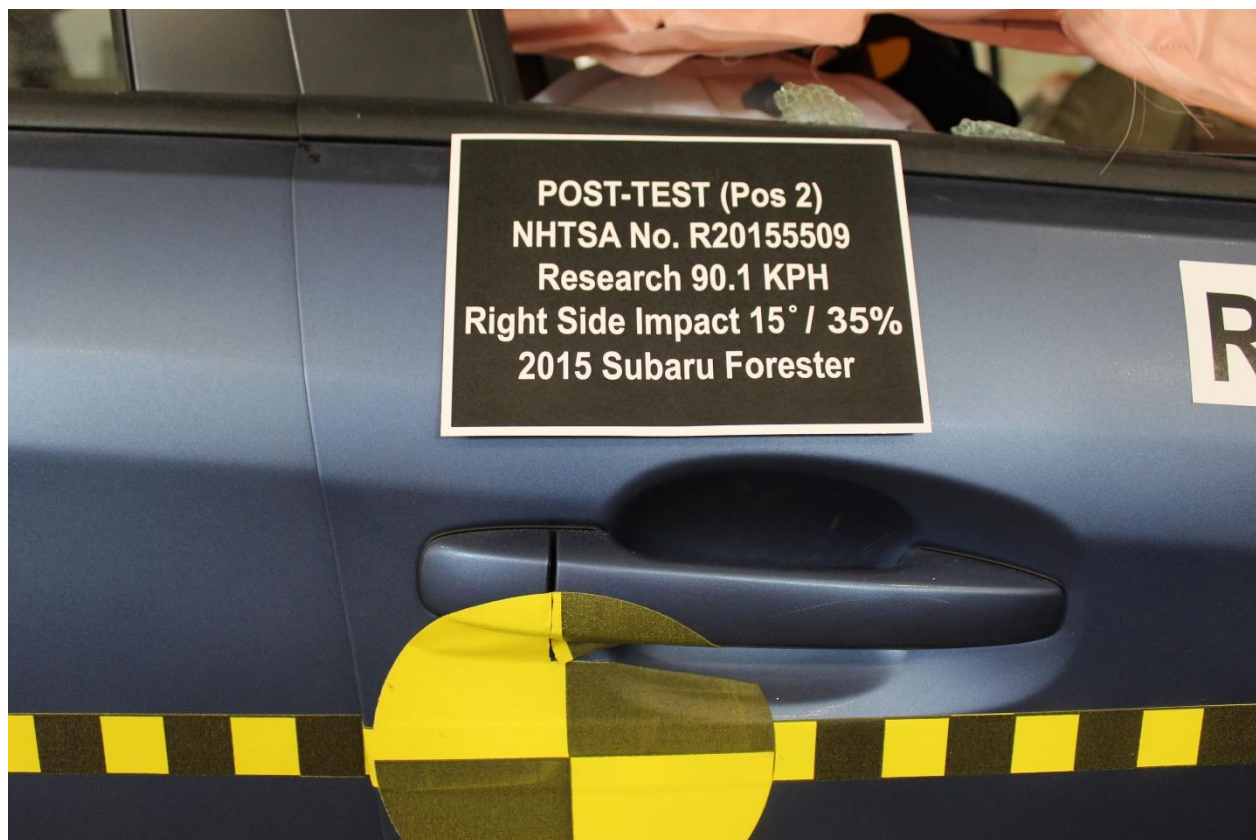
No. 028 Pre-Test Close-up View of Driver Door Latch



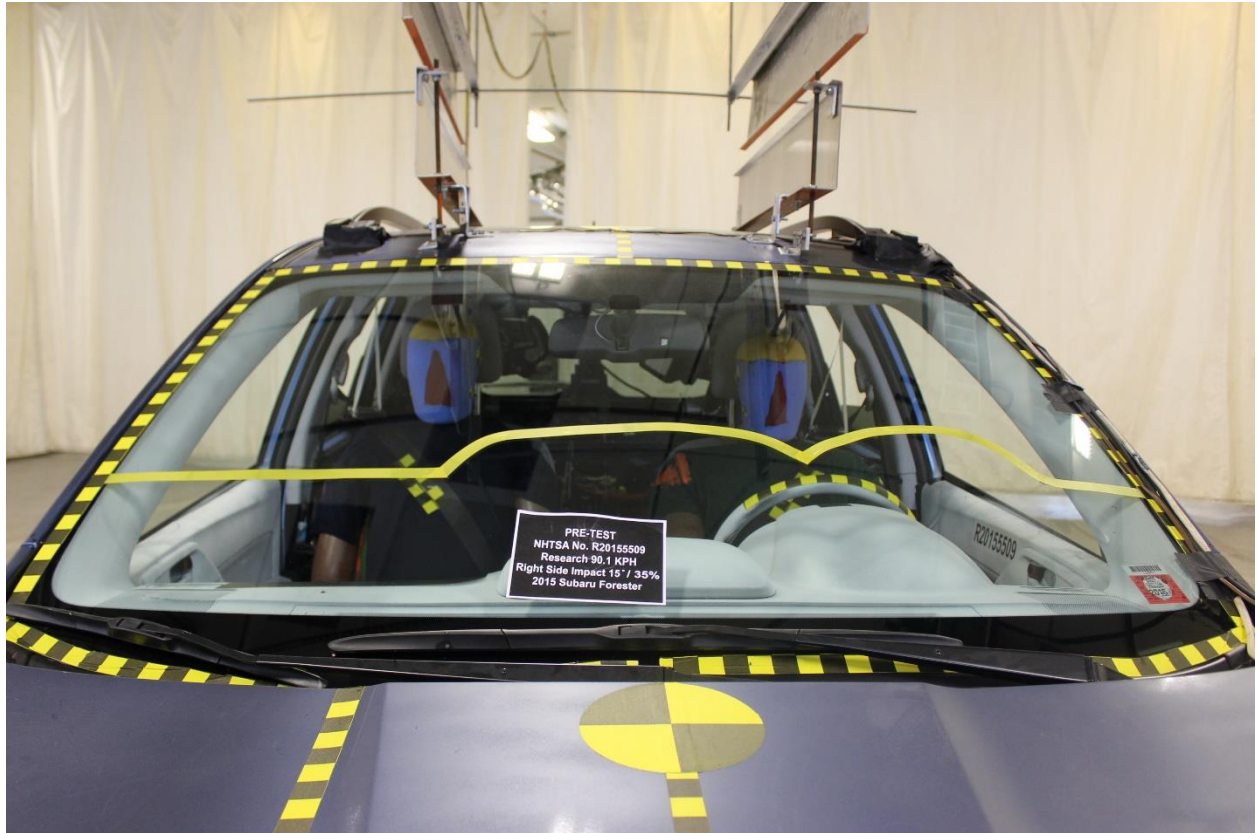
No. 029 Post-Test Close-up View of Driver Door Latch



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



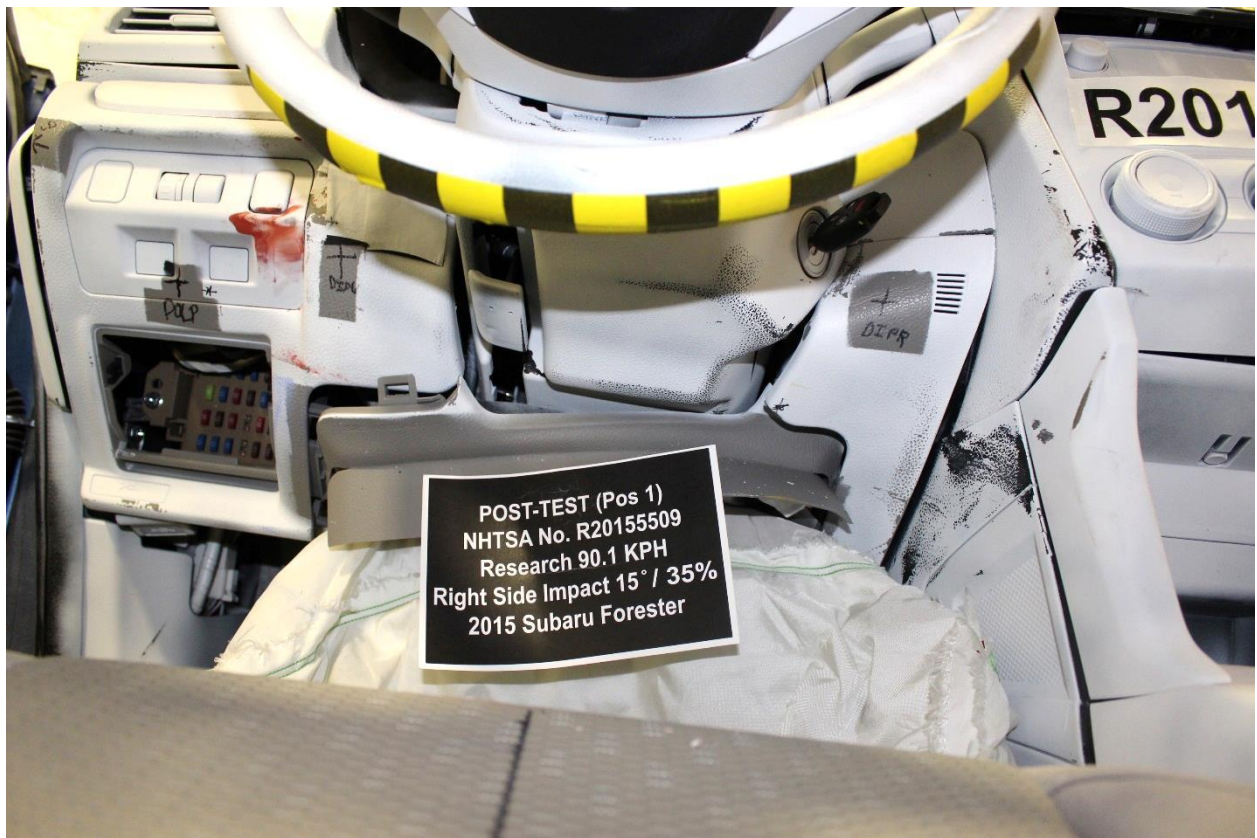
No. 036 Pre-Test View of Passenger Inner Door Panel



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



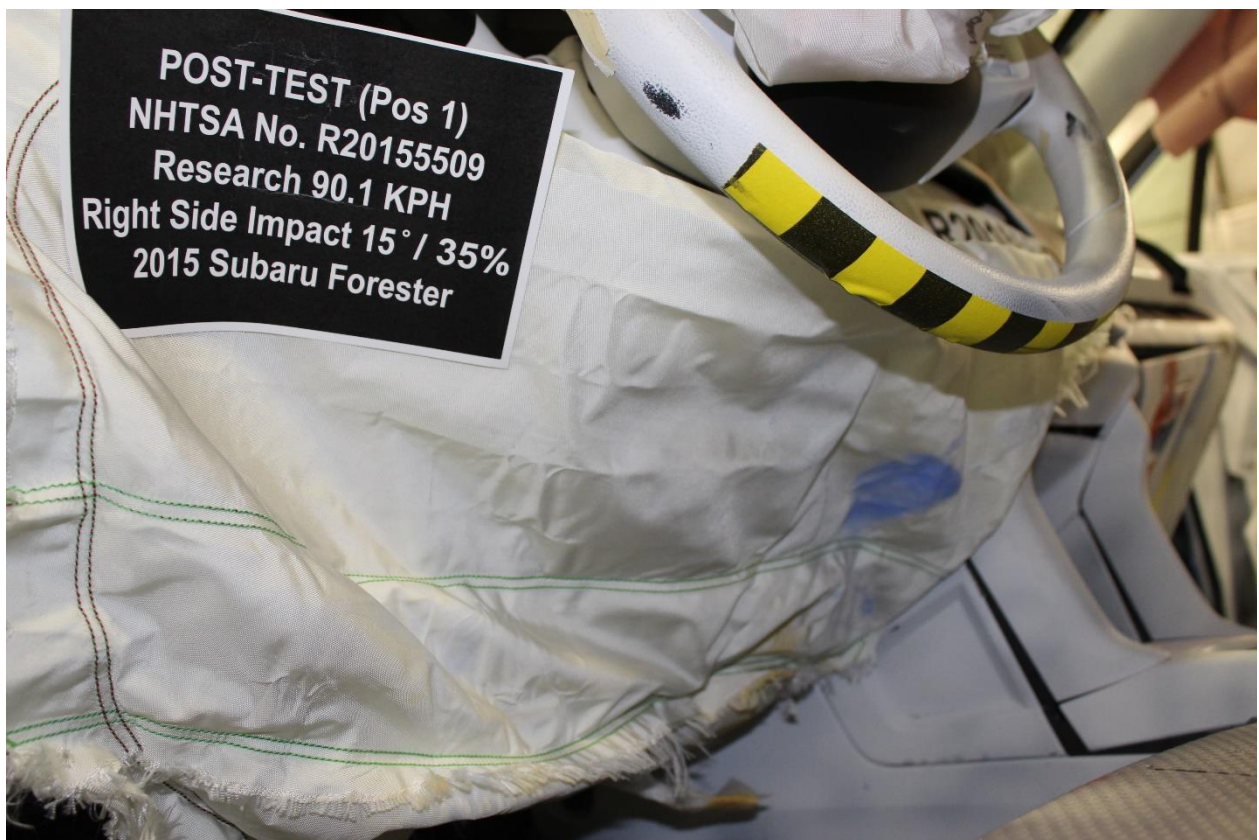
No. 038 Pre-Test Overall View of Driver Knee Bolsters



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



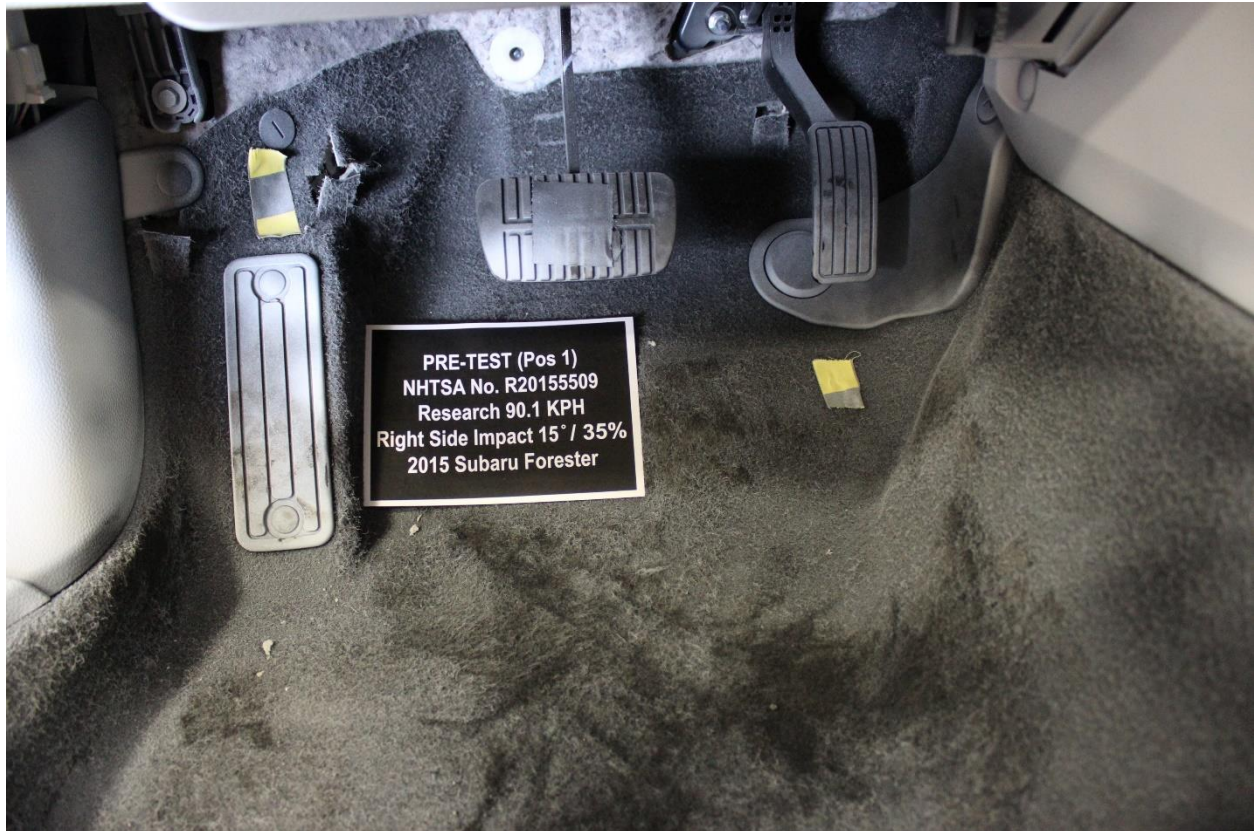
No. 043 Post-Test Right Side View of Driver Knee Bolsters



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



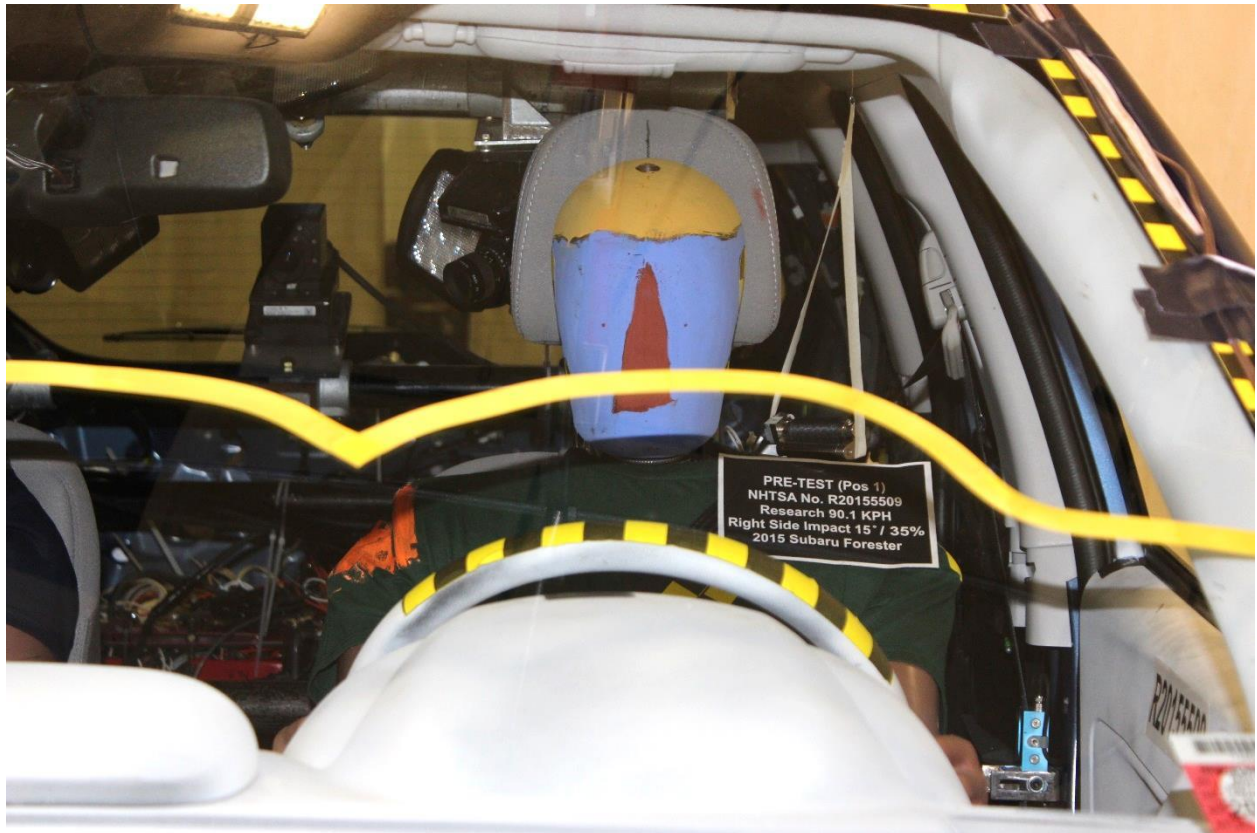
No. 047 Post-Test view of Driver Floor pan at Mid seat level, w/carpet



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



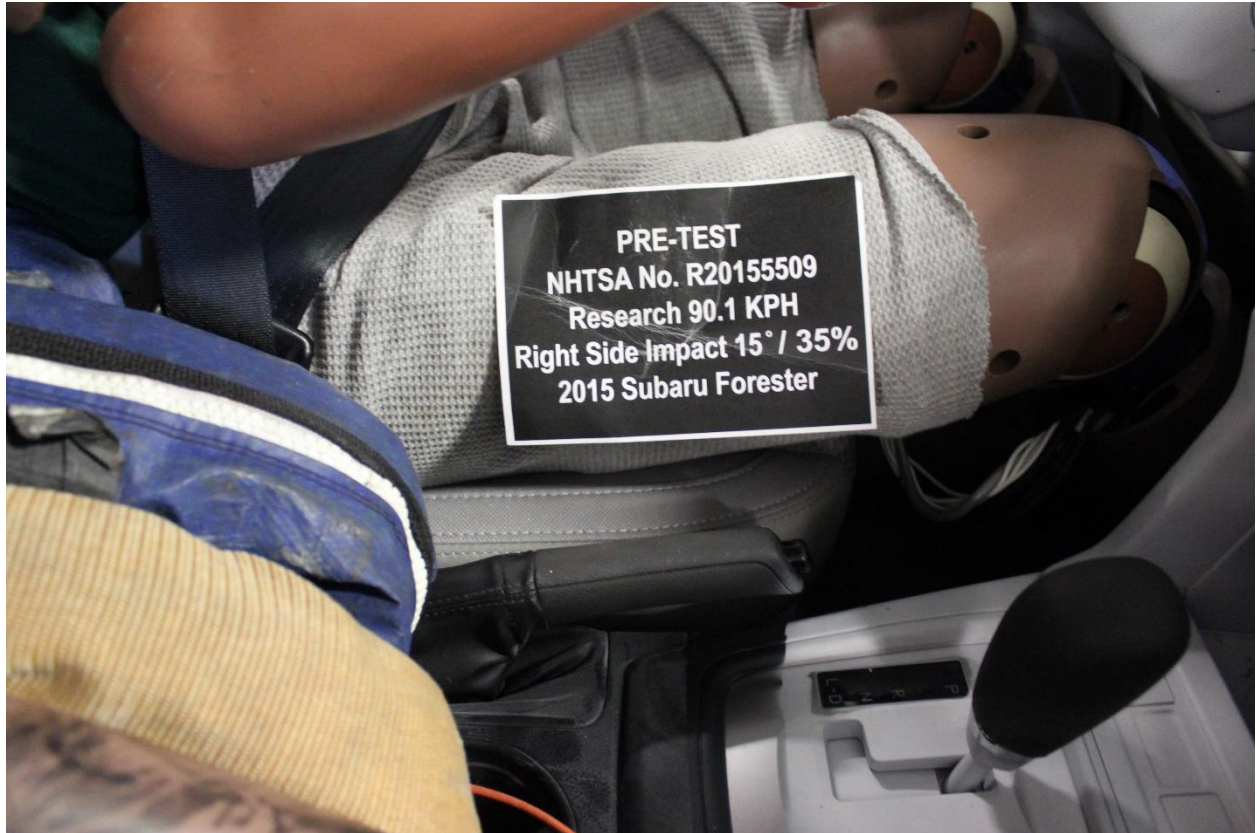
No. 057 Post-Test Right Side View of Driver and Interior



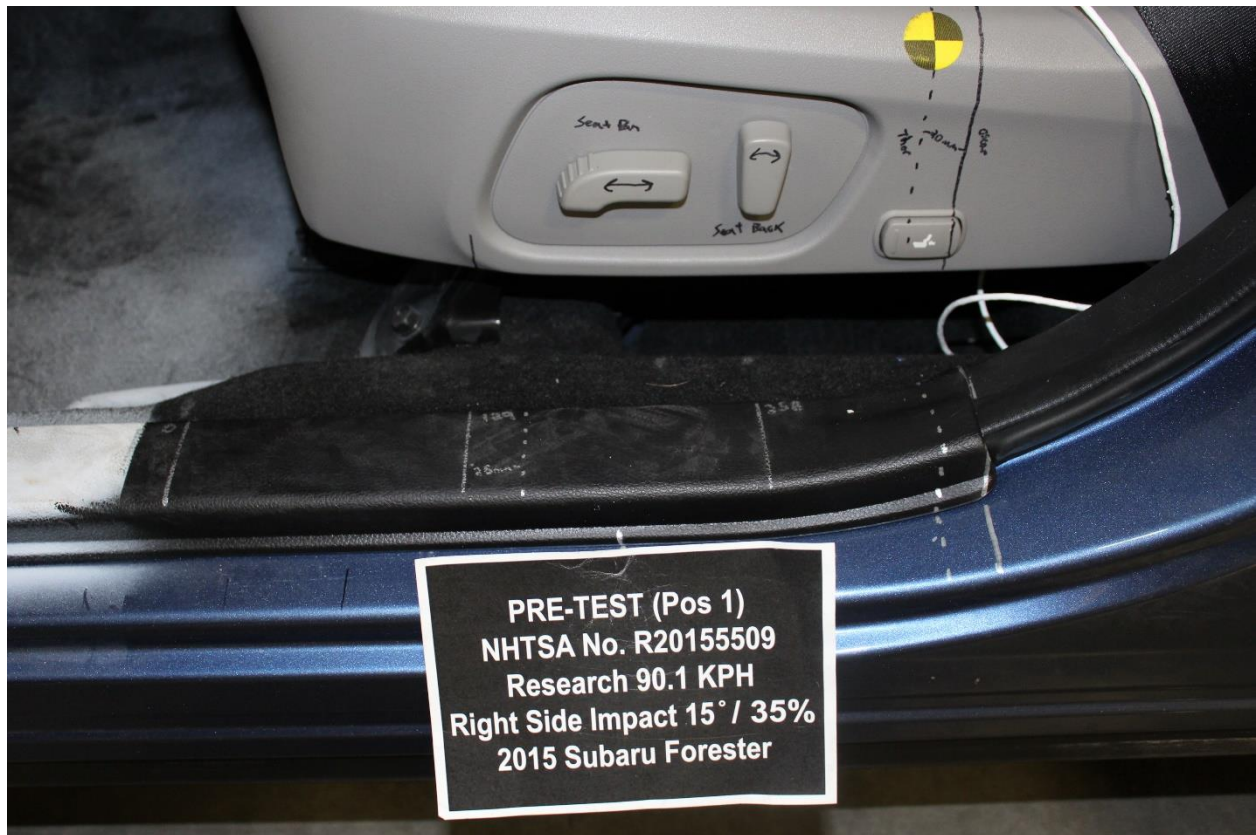
No. 058 Pre-Test View of Driver Door Clearance



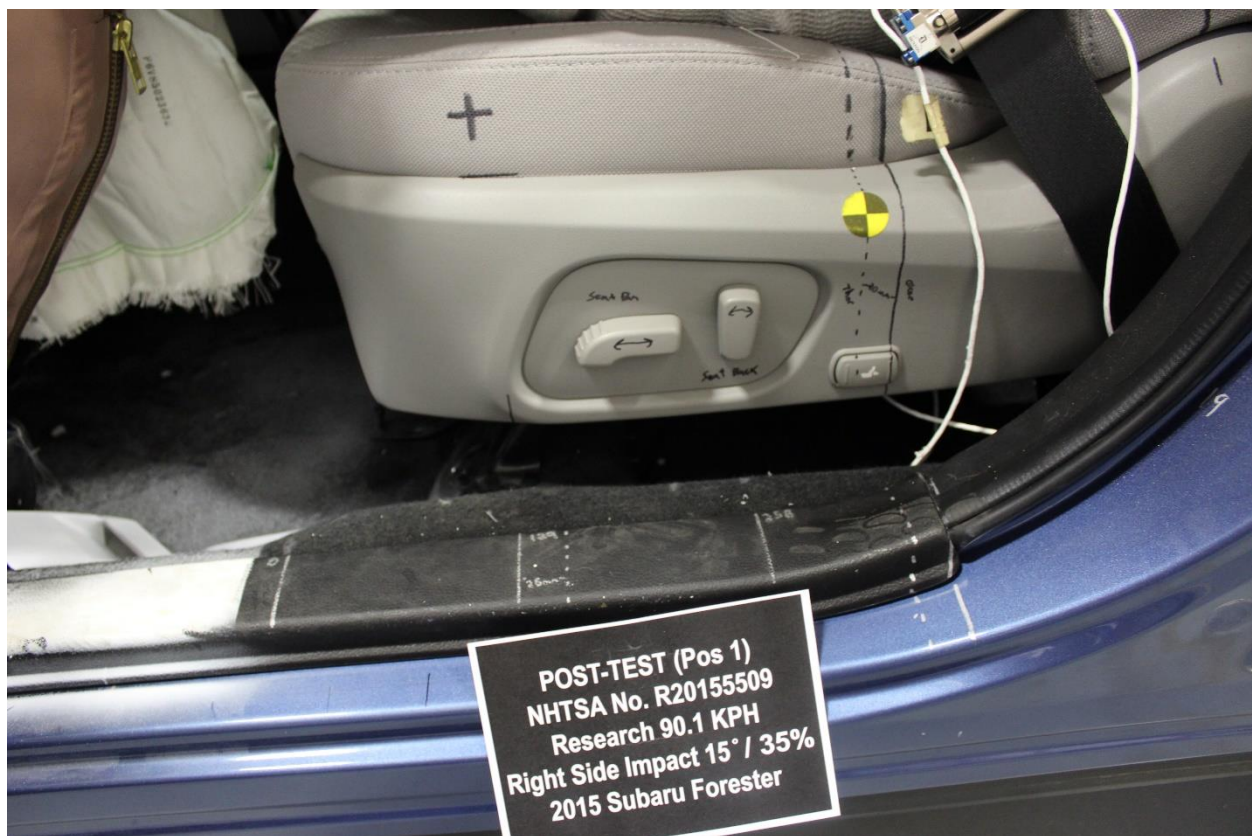
No. 059 Post-Test View of Driver Door Clearance



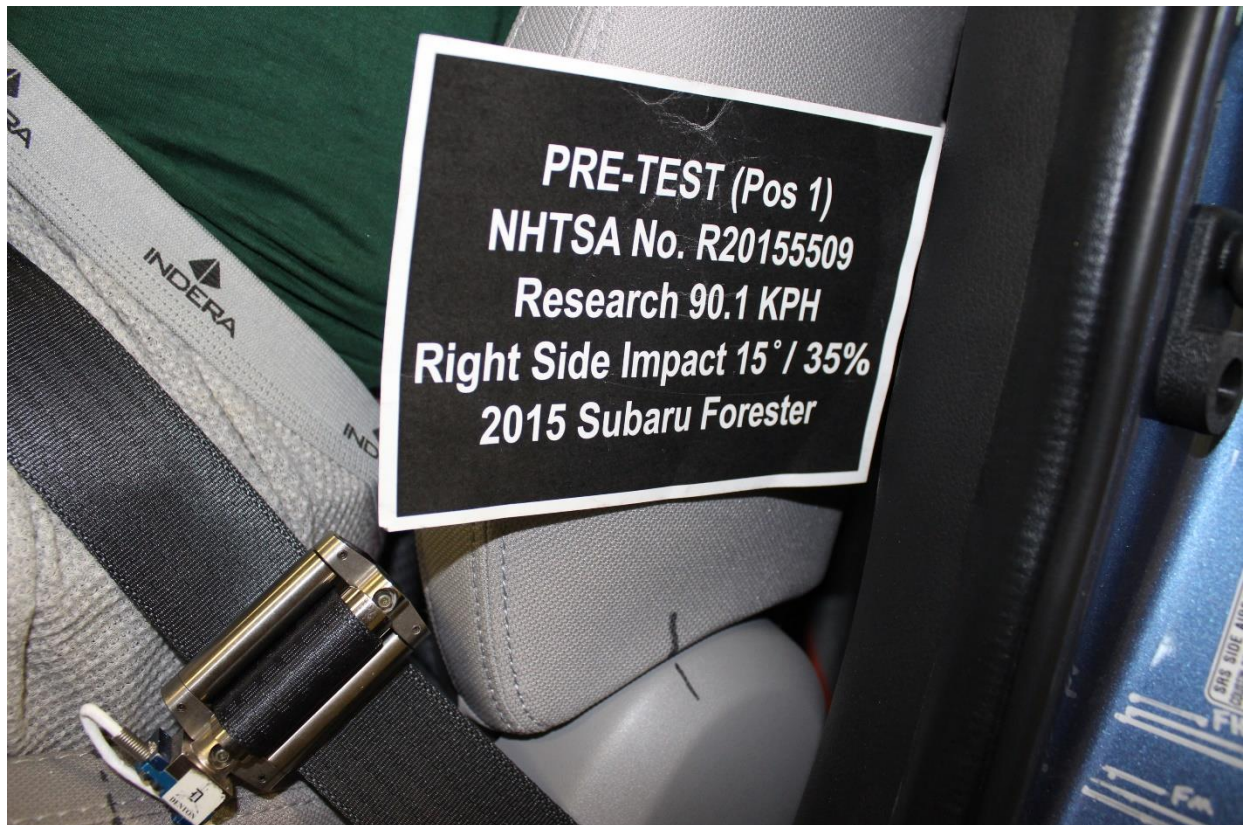
No. 060 Pre-Test View of Parking Brake



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



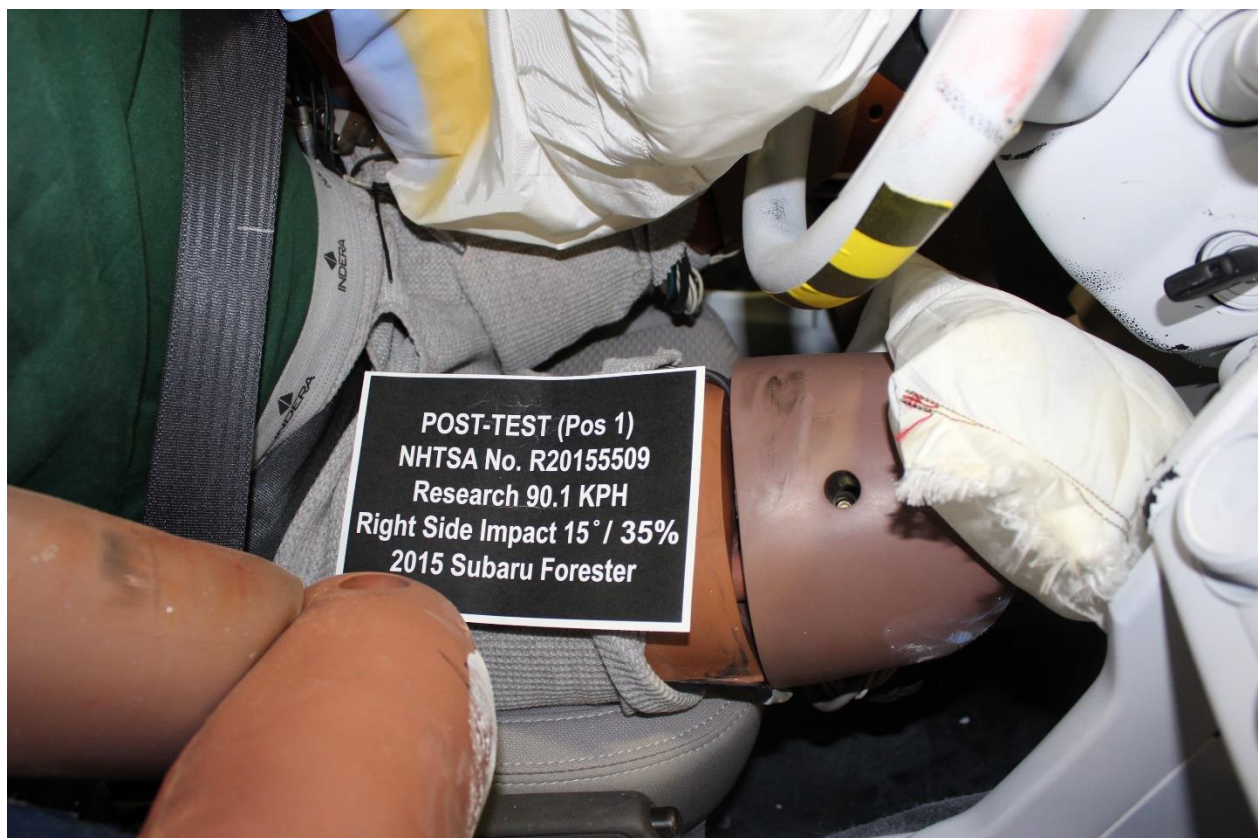
No. 067 Pre-Test Driver Feet



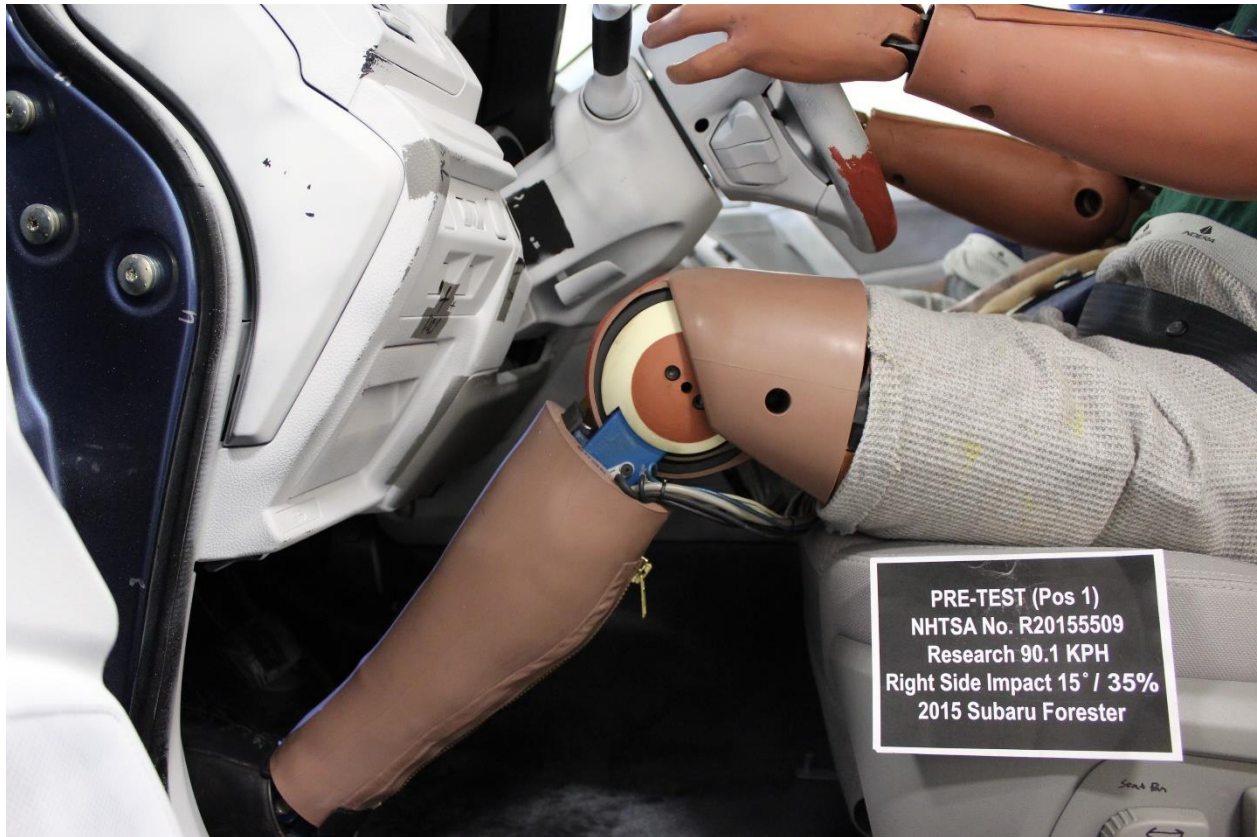
No. 068 Post-Test Driver Feet



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



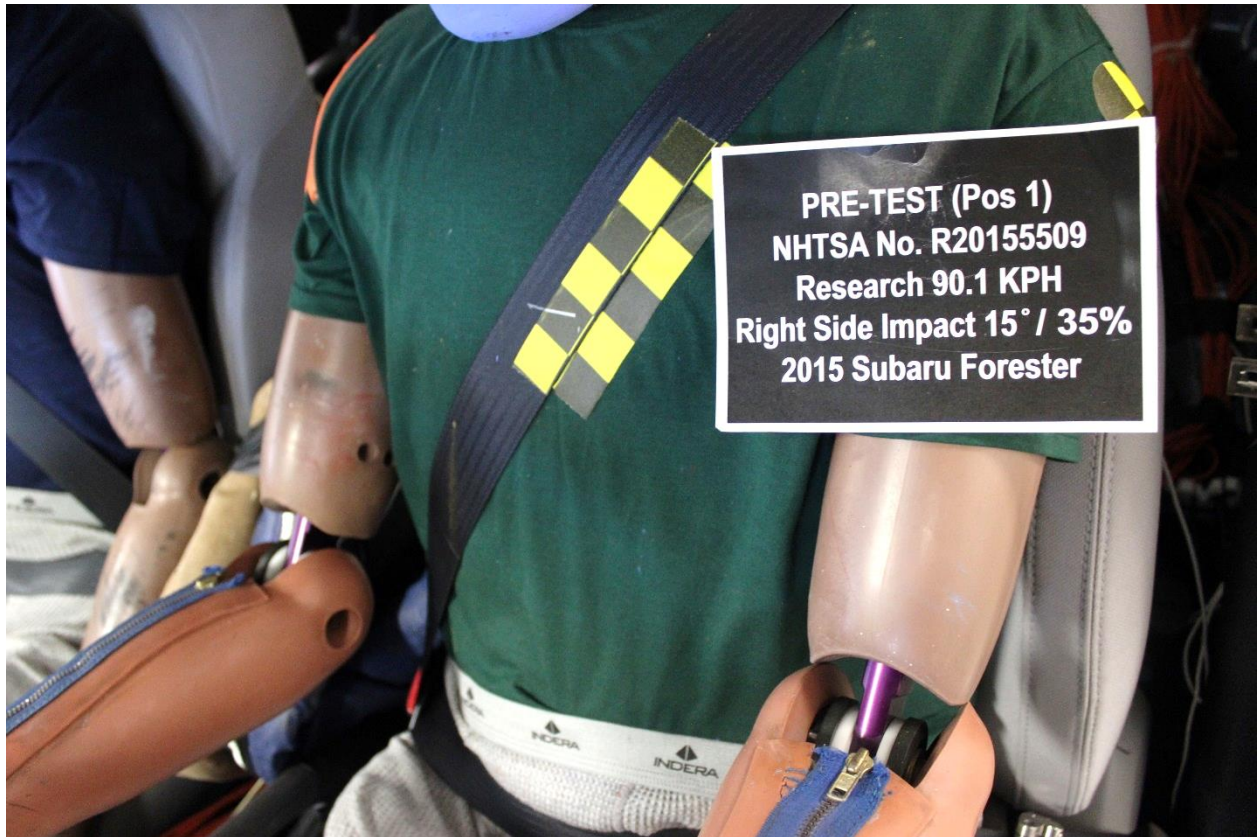
No. 070 Post-Test View of Driver Right Knee and Bolster



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



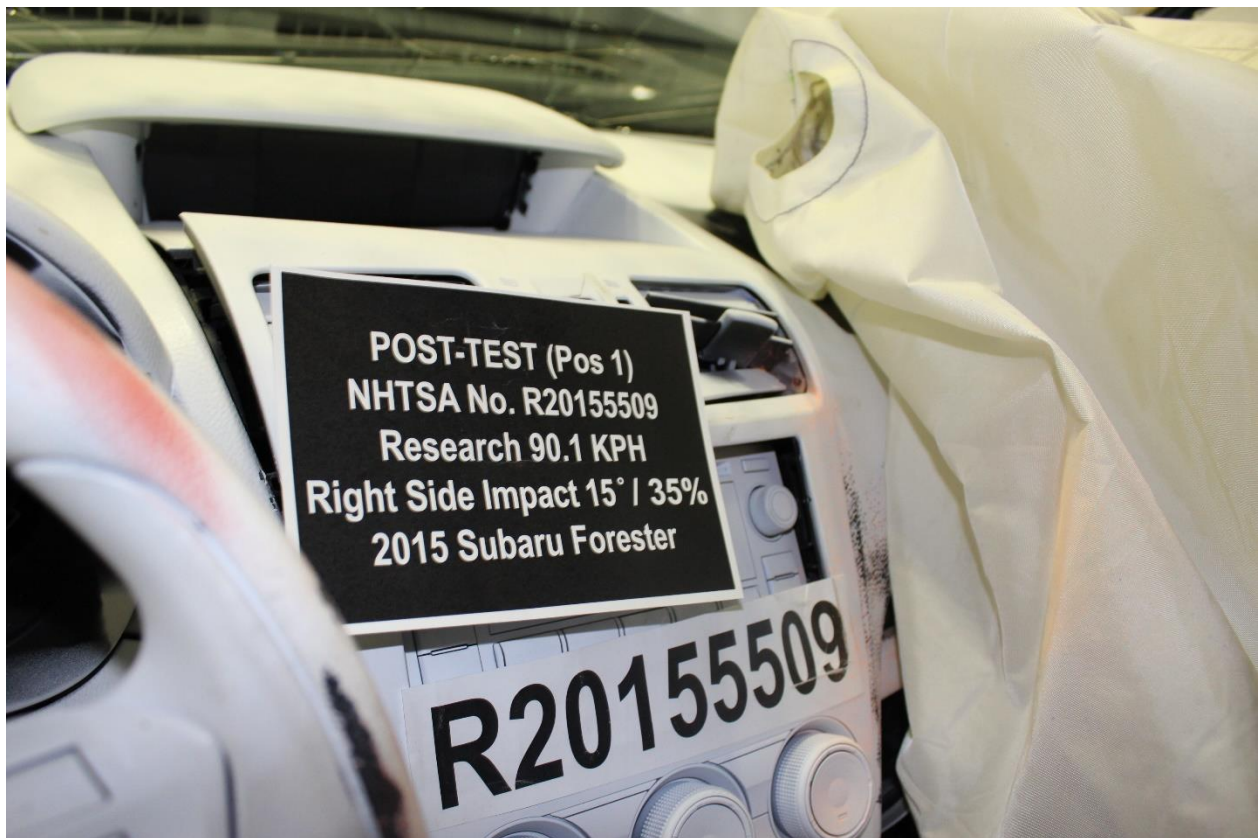
No. 077 Post-Test View of Driver Head Contact with Front Airbag

Photo Not Applicable

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

Photo Not Applicable

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



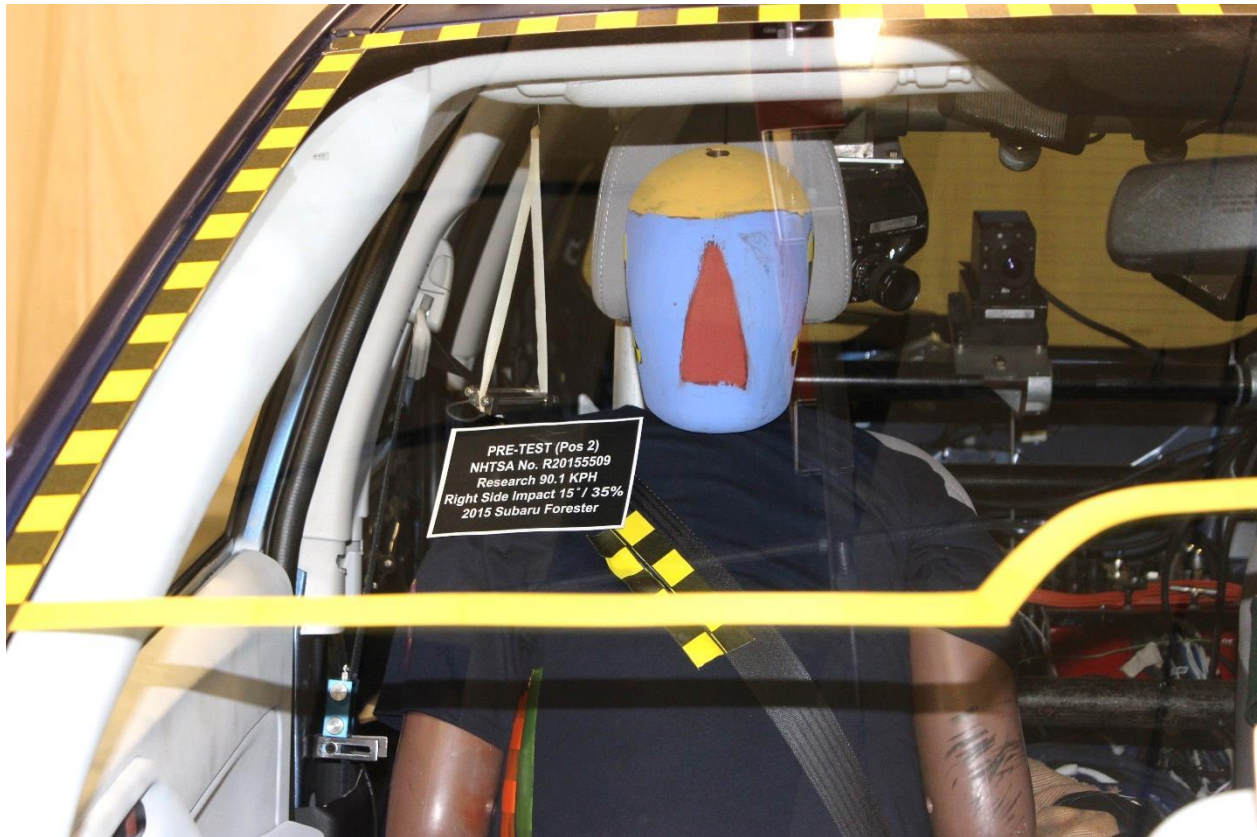
No. 091: Post-Test view of Passenger Floor pan at Mid seat level, w/carpet



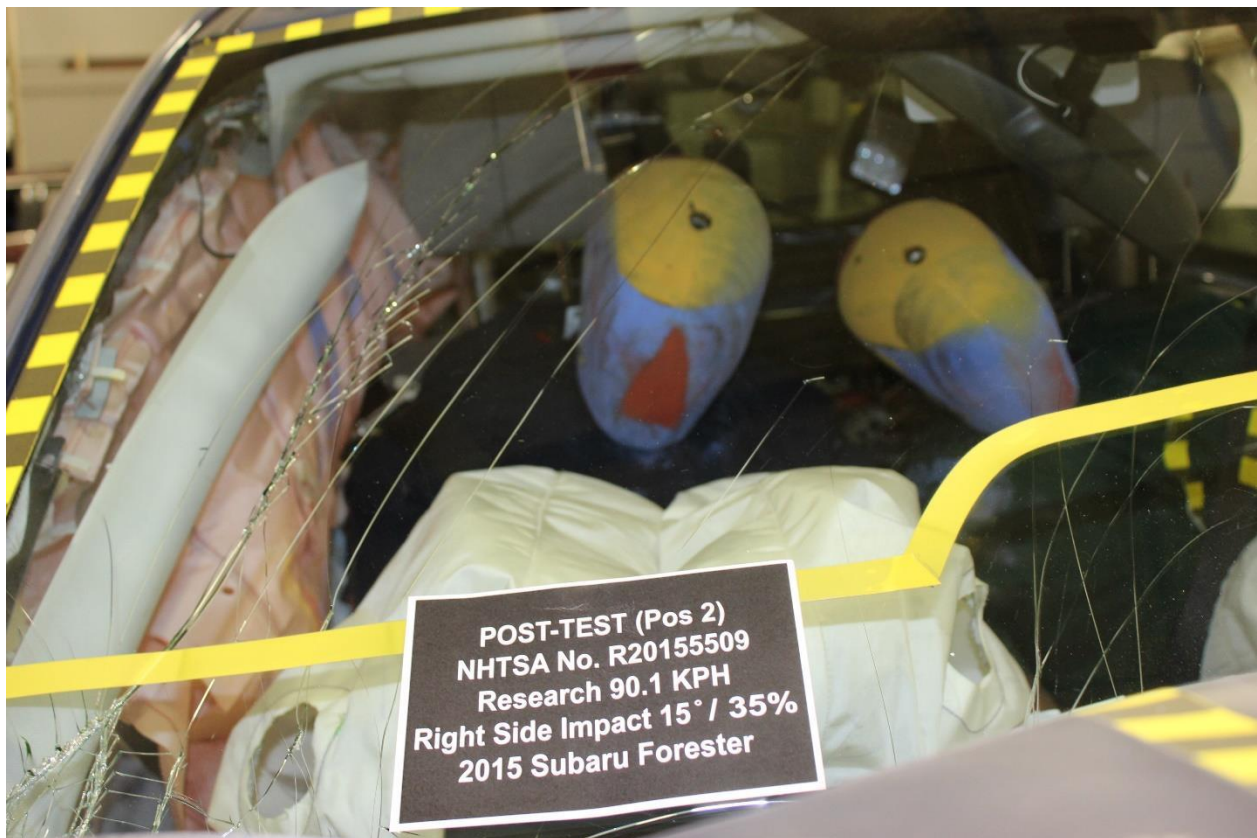
No. 092: Pre-Test View of Passenger Floor pan at Left view



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



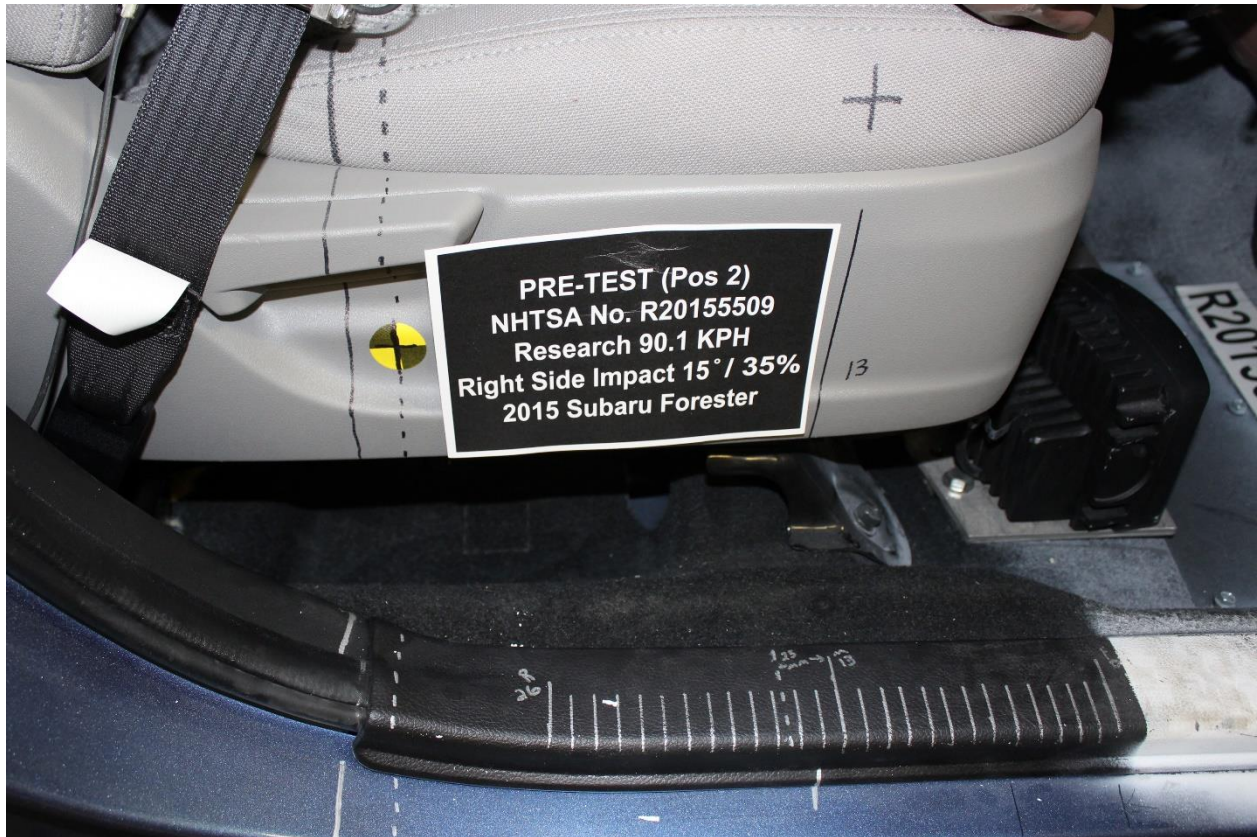
No. 101: Post-Test Right Side Passenger and Interior View



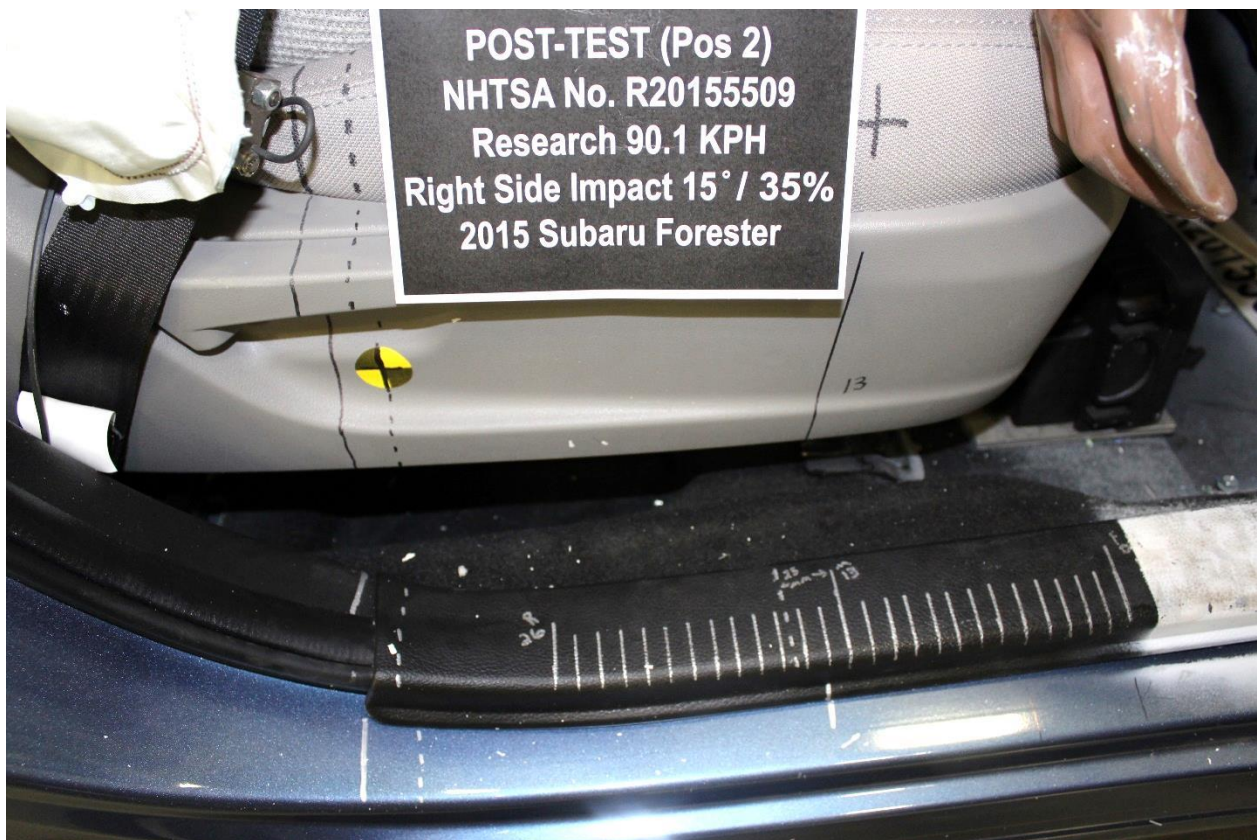
No. 102: Pre-Test View of Passenger Door Clearance



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



PRE-TEST (Pos 2)
NHTSA No. R20155509
Research 90.1 KPH
Right Side Impact 15° / 35%
2015 Subaru Forester

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



POST-TEST (Pos 2)
NHTSA No. R20155509
Research 90.1 KPH
Right Side Impact 15° / 35%
2015 Subaru Forester

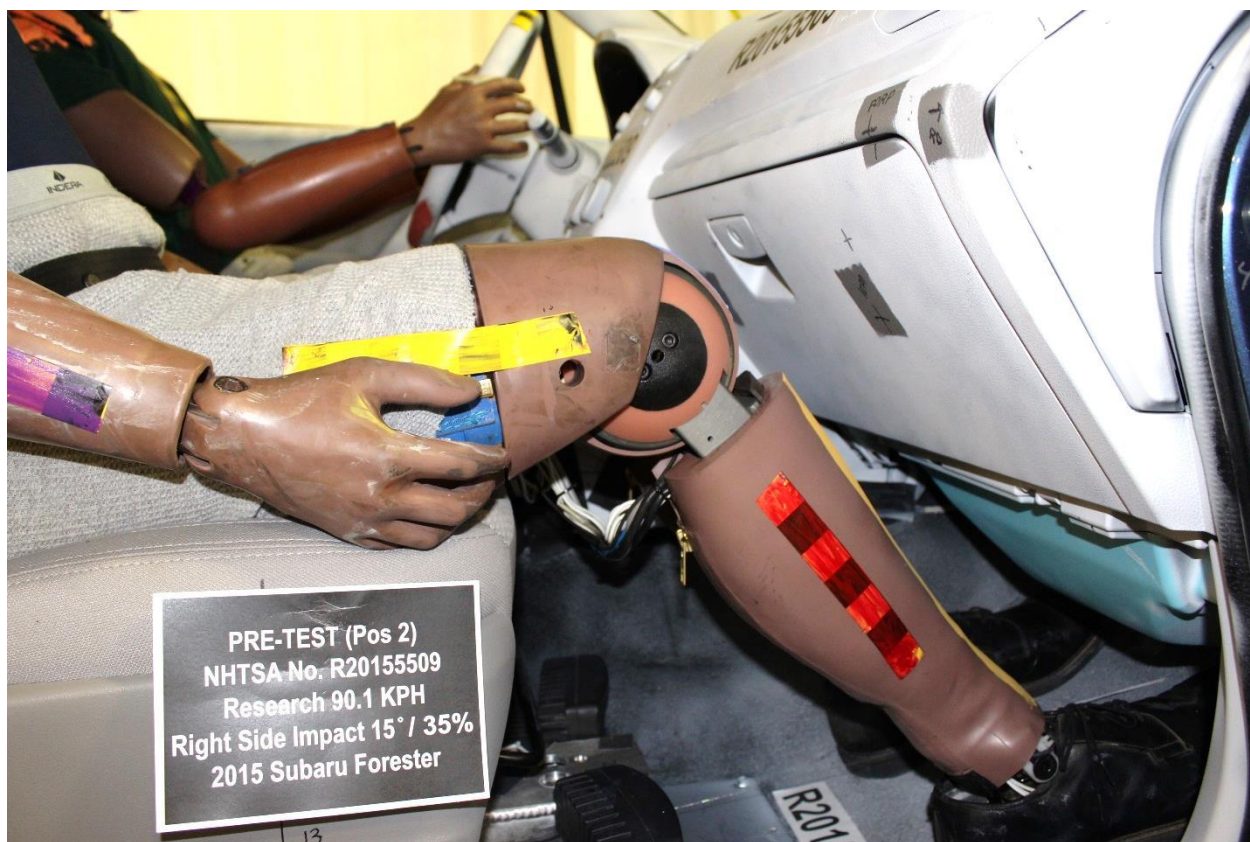
No. 109: Post-Test Passenger Adjustable D-ring



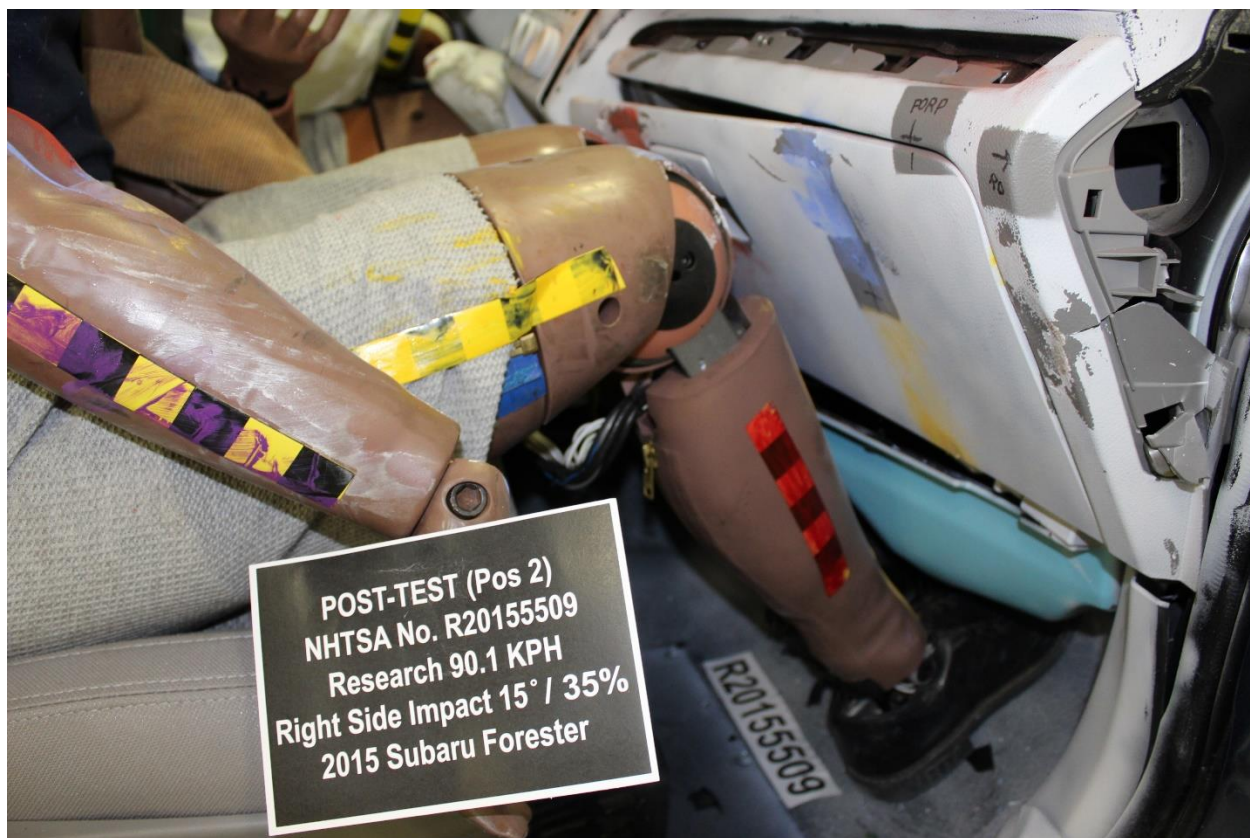
No. 110: Pre-Test View of Passenger Feet



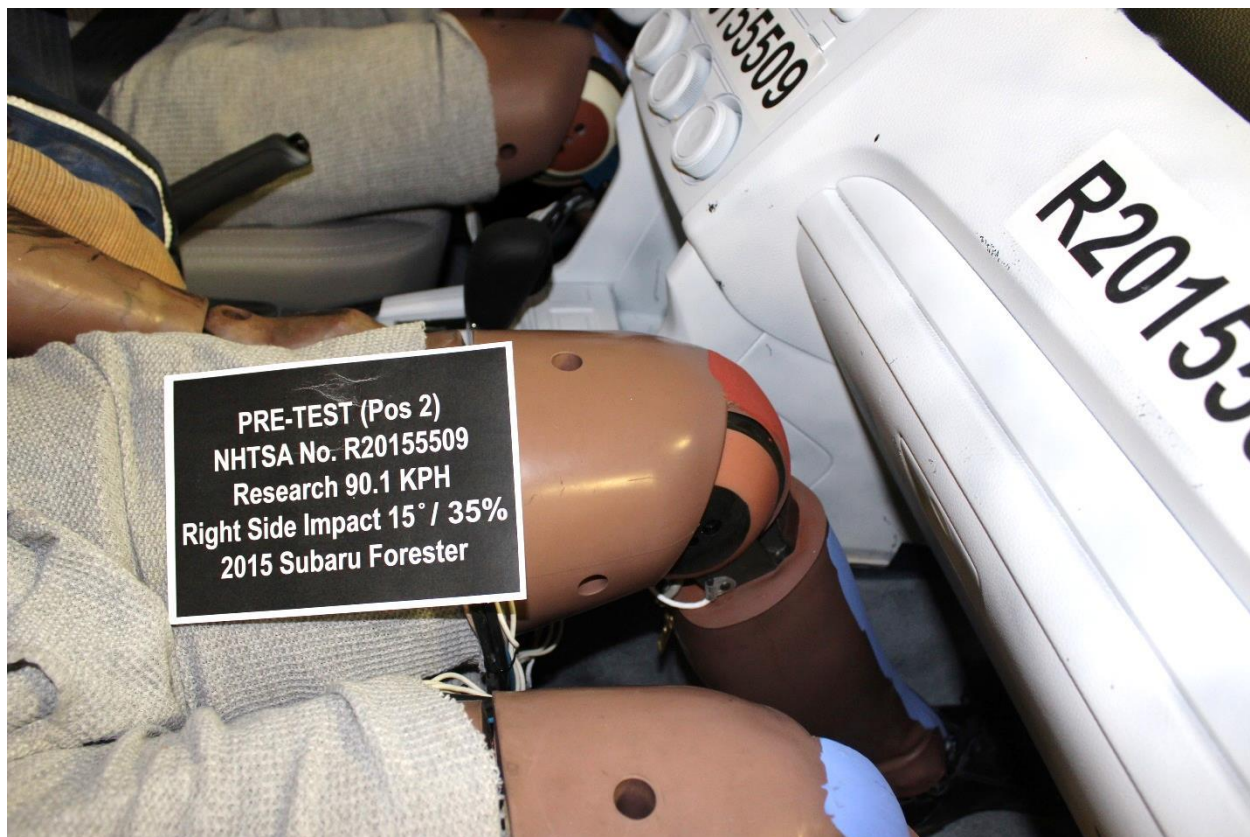
No. 111: Post-Test View of Passenger Feet



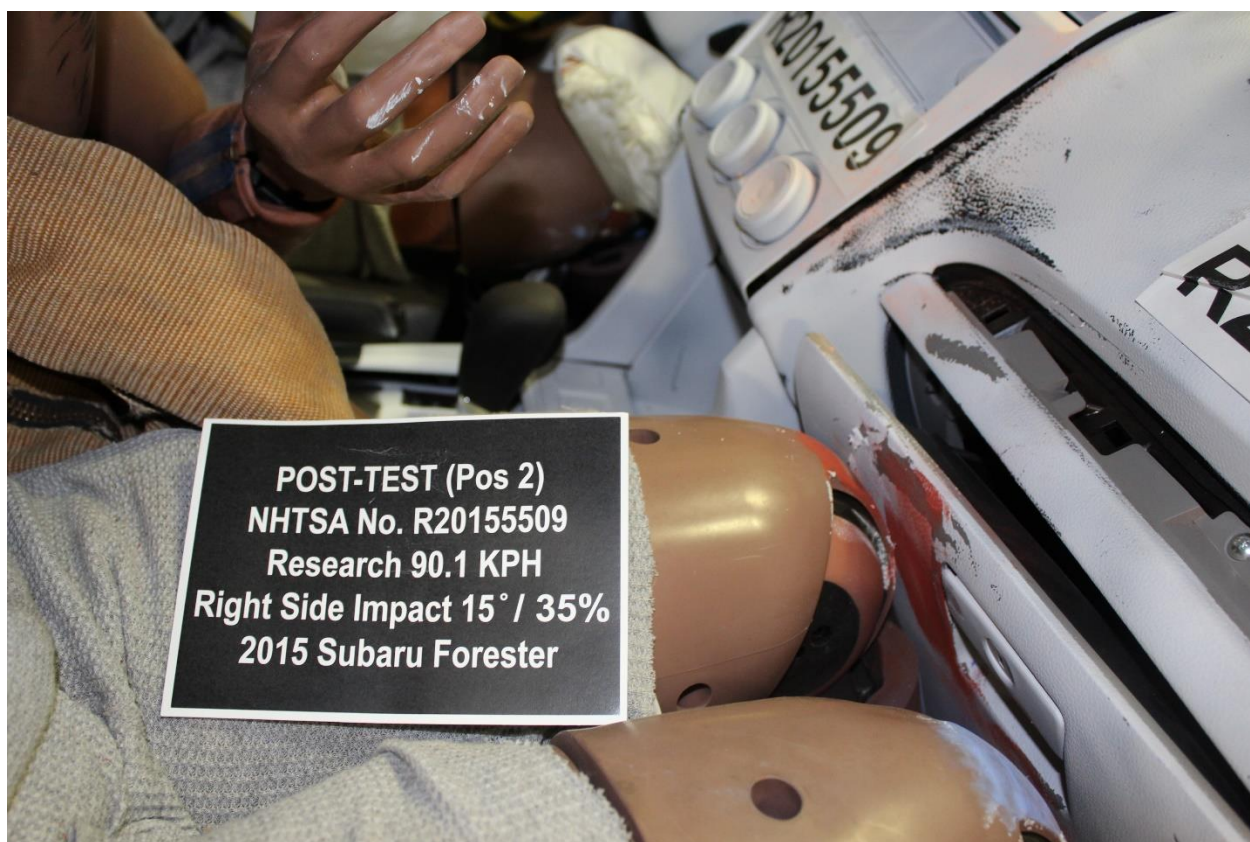
No. 112: Pre-Test View of Passenger Right Knee and Bolster



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



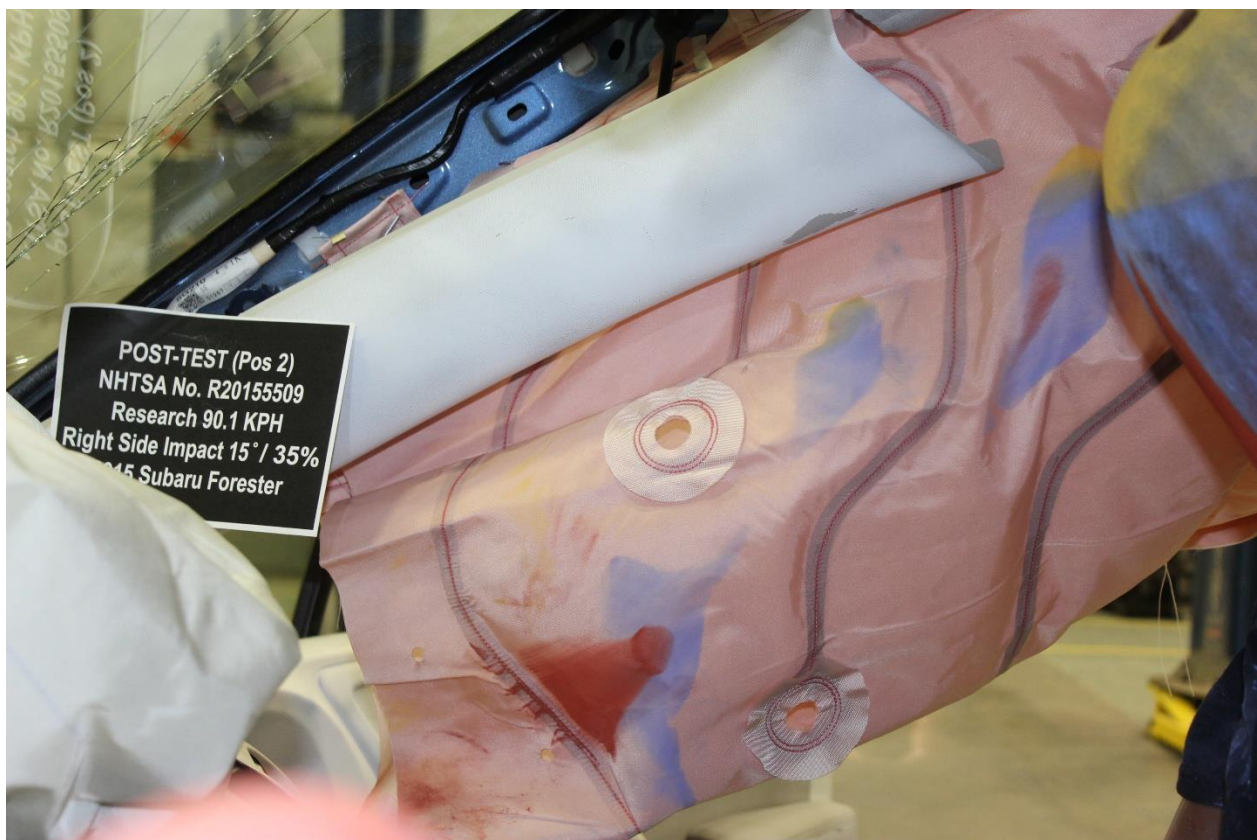
No. 116: Pre-Test View of Passenger Abdomen



No. 117: Post-Test View of Passenger Abdomen



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



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



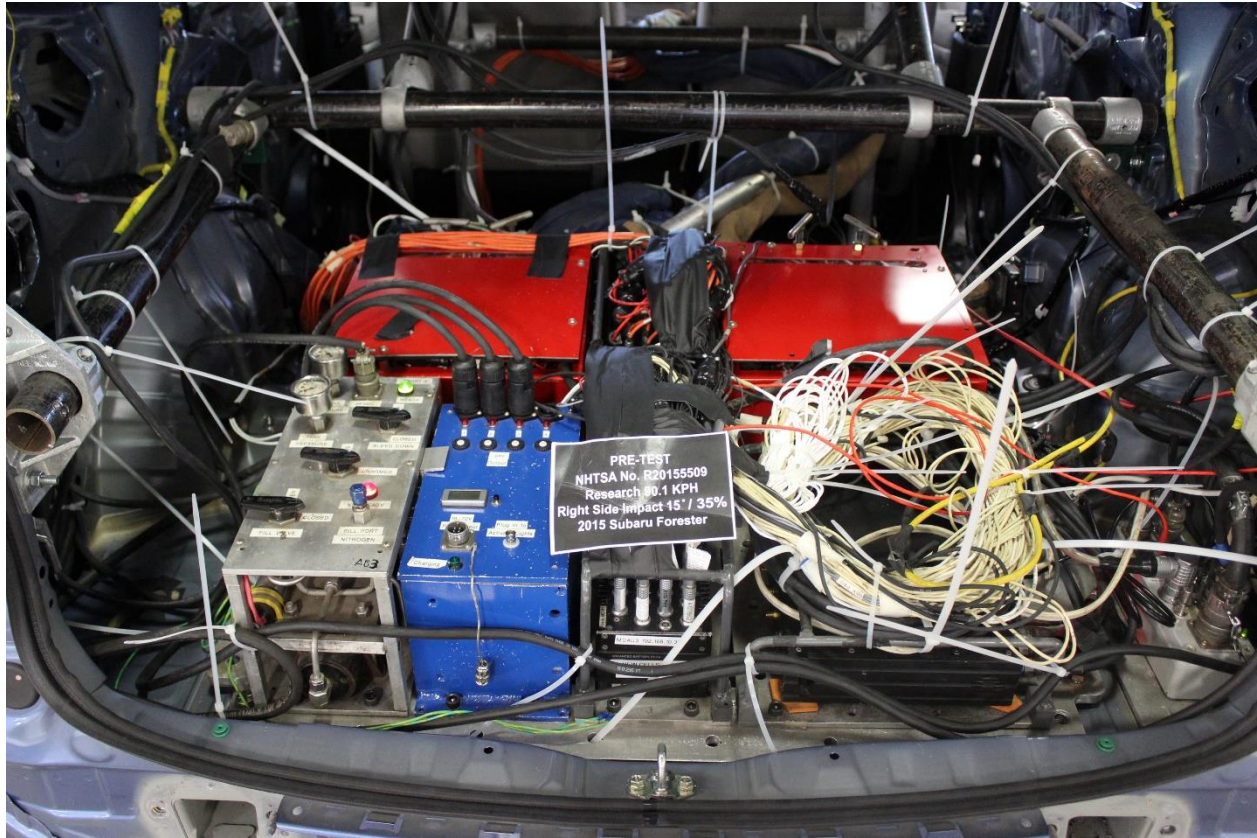
No. 121: Post-Test View of Passenger Body contact with Interior

Photo Not Applicable

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



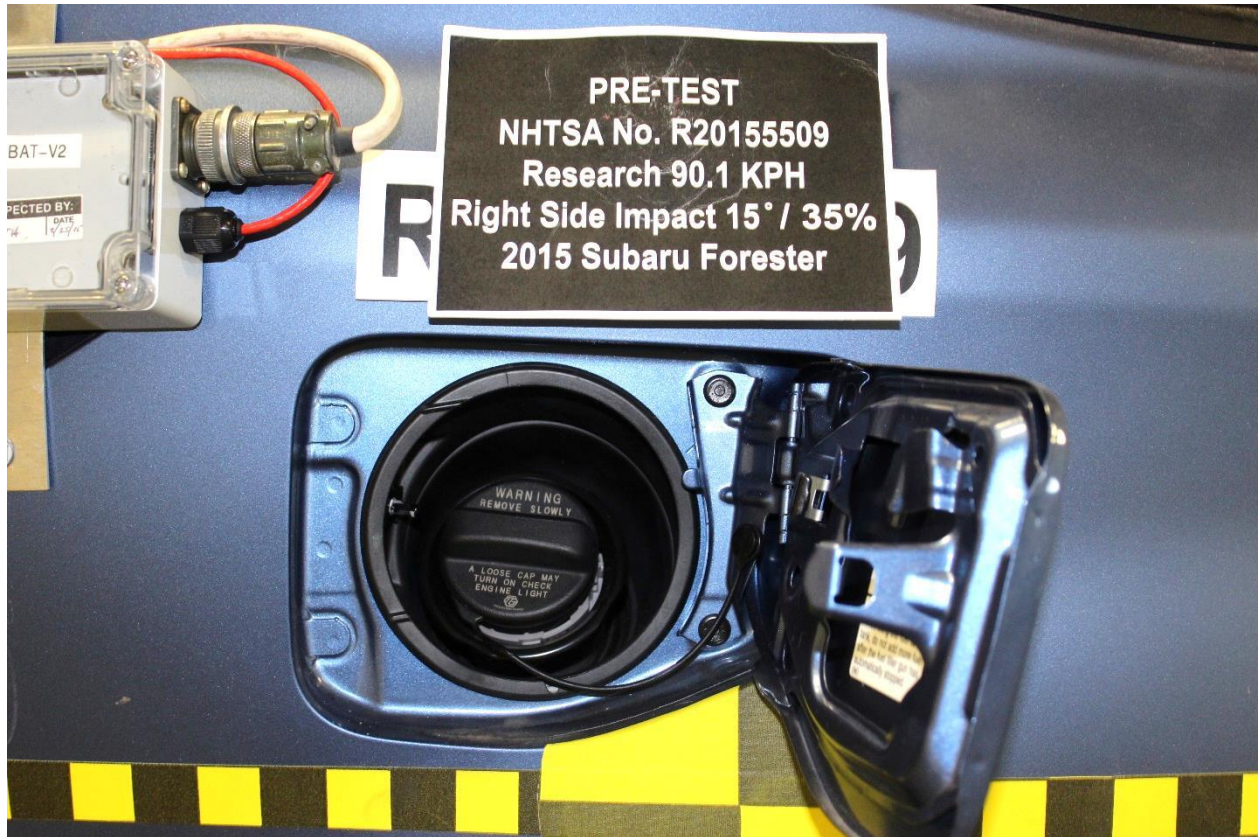
No. 123: Post-Test Passenger Contact With Glovebox



No. 124: Pre-Test Ballast Locations



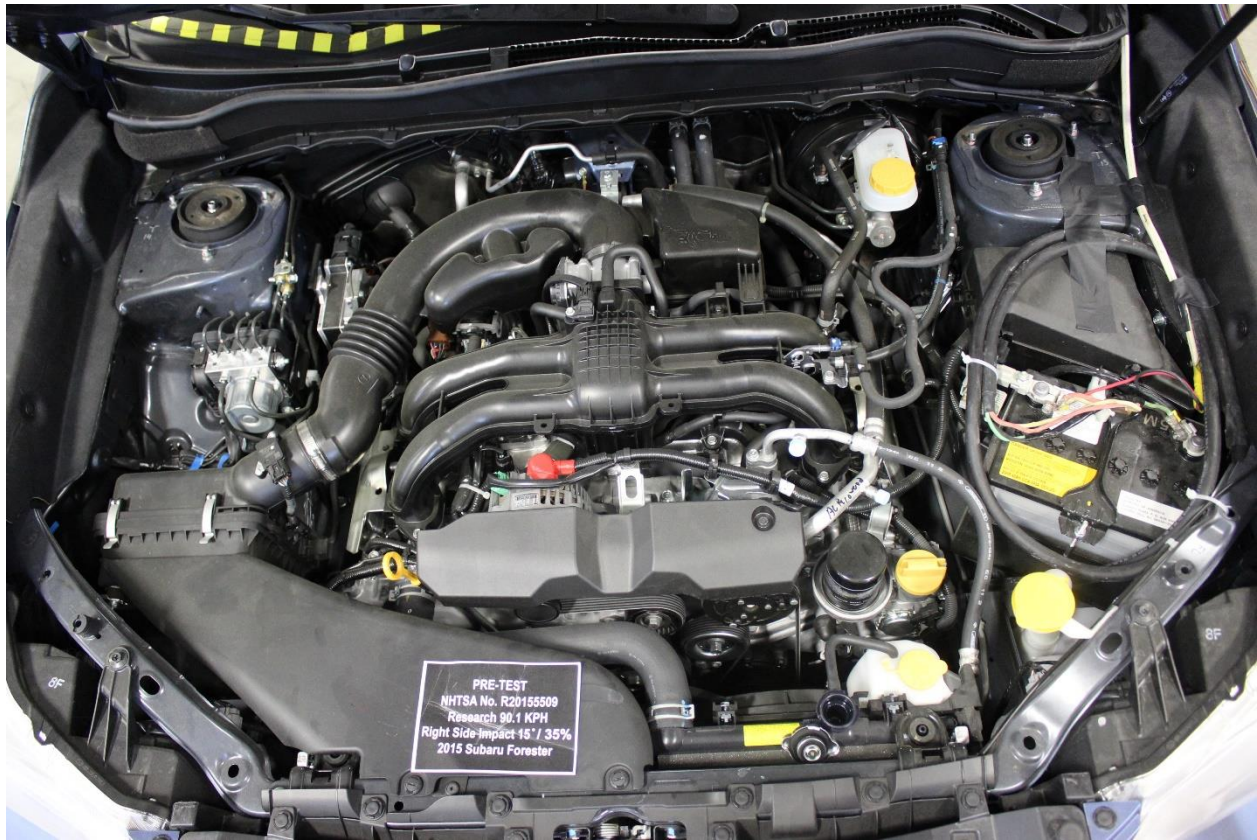
No. 125: Post-Test Speed Trap Readout



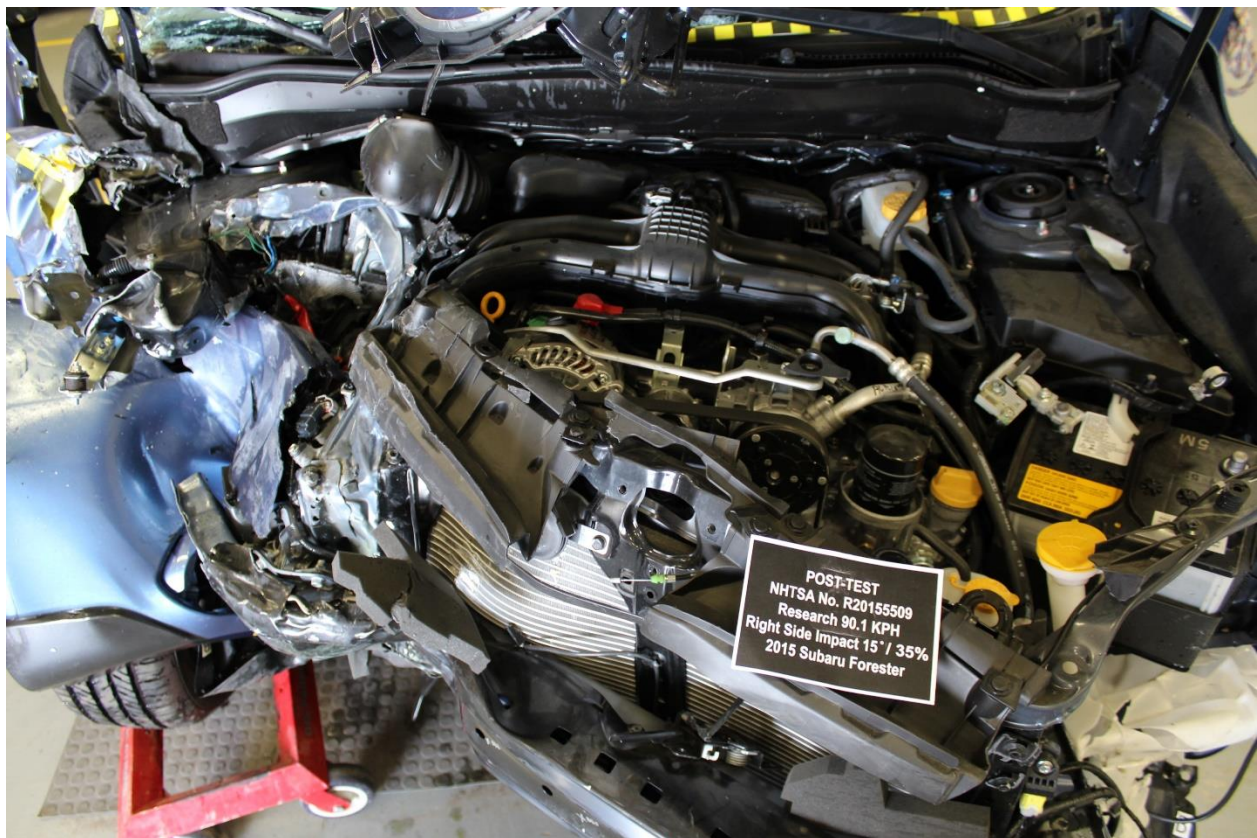
No. 126: Pre-Test View of Fuel Filler Cap



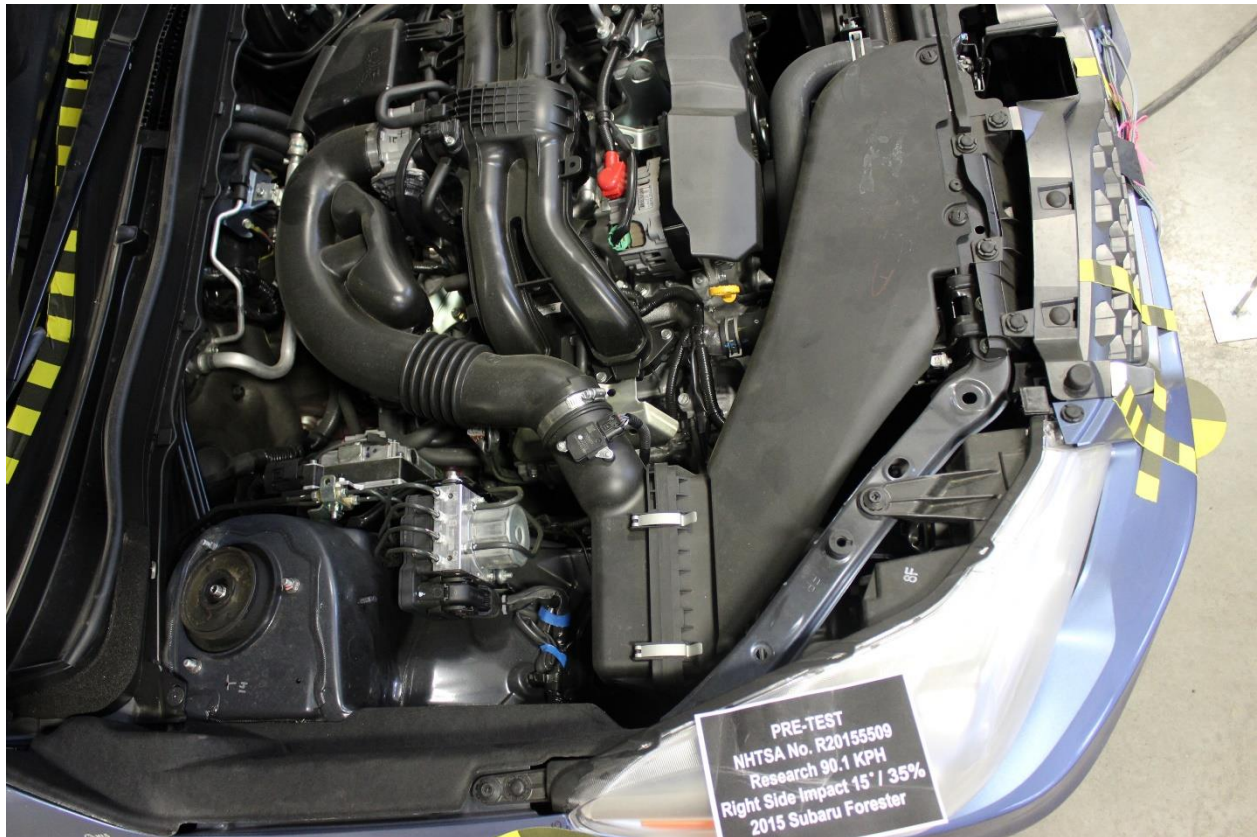
No. 127: Post-Test View of Fuel Filler Cap



No. 128: Pre-Test Engine Compartment View



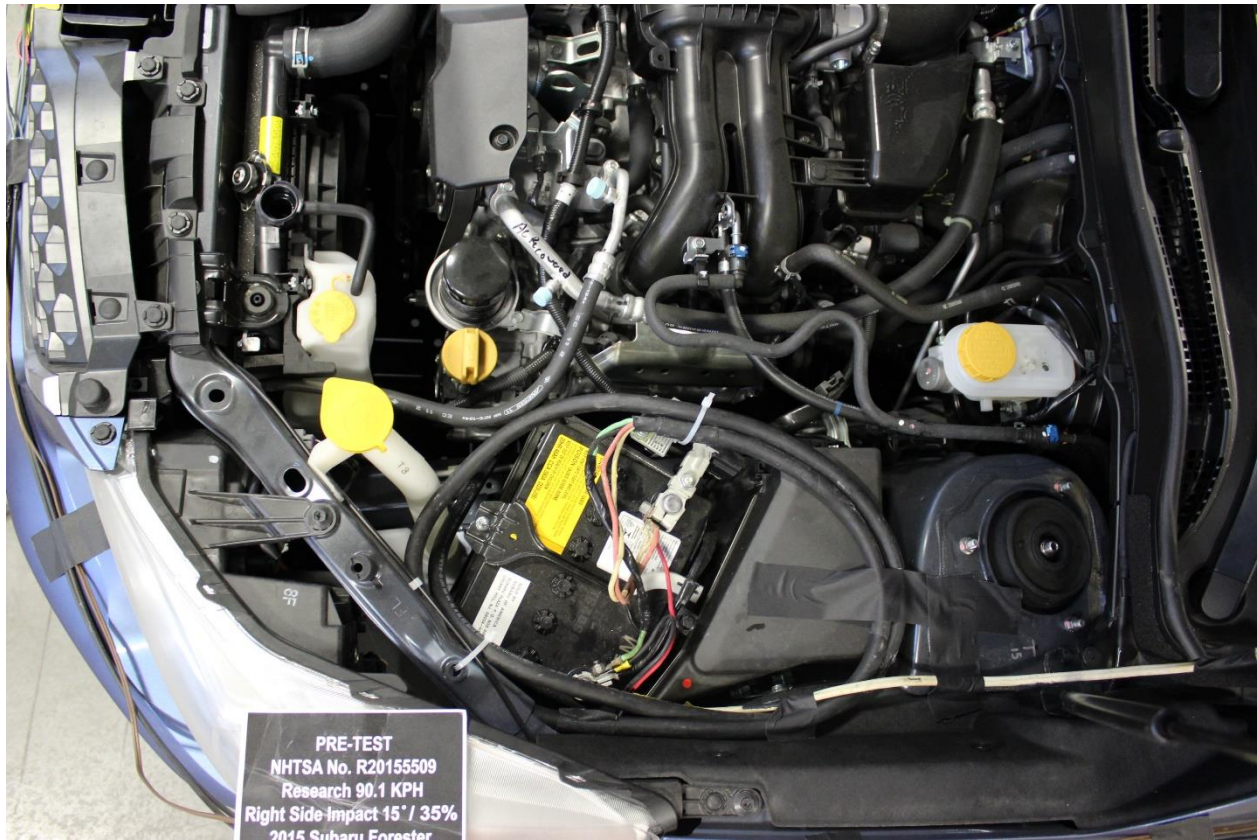
No. 129: Post-Test Engine Compartment View



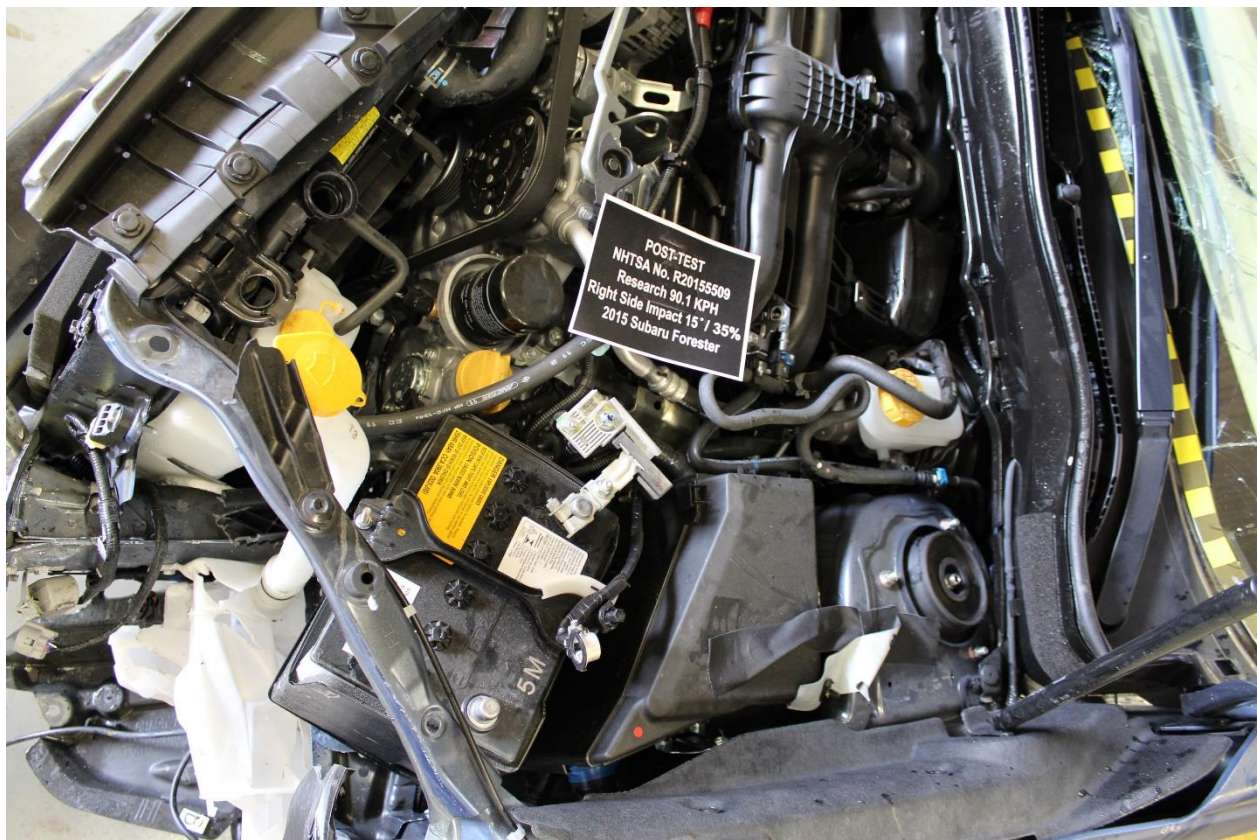
No. 130: Pre-Test Right Side Engine Compartment View



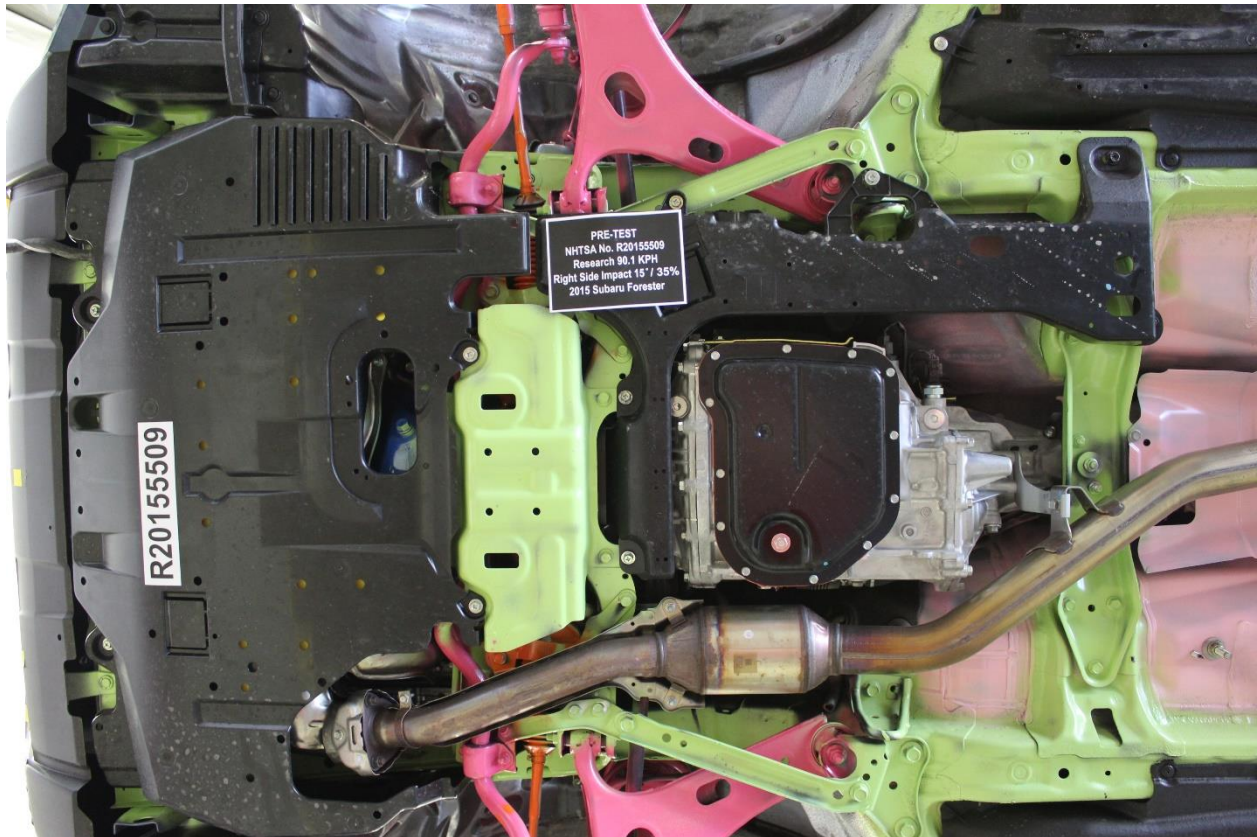
No. 131: Post-Test Right Side Engine Compartment View



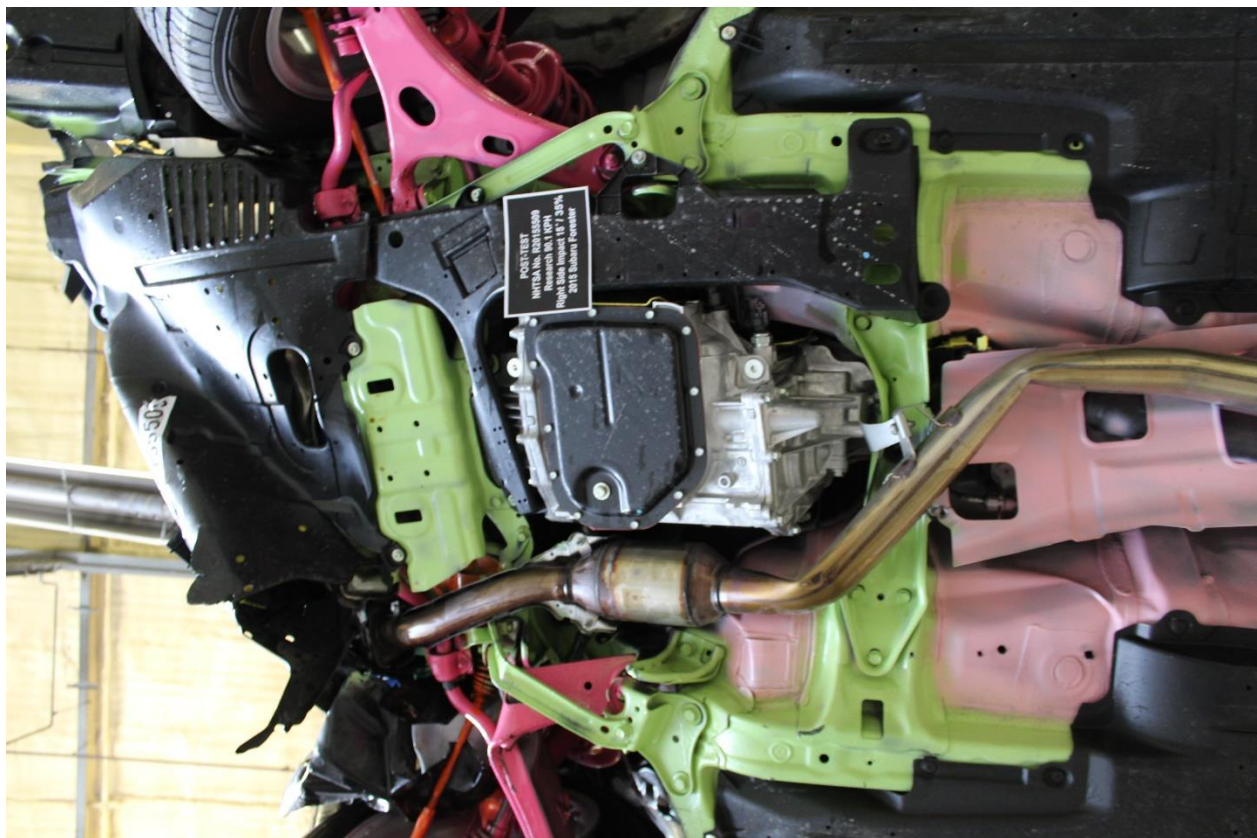
No. 132: Pre-Test Left Side Engine Compartment View



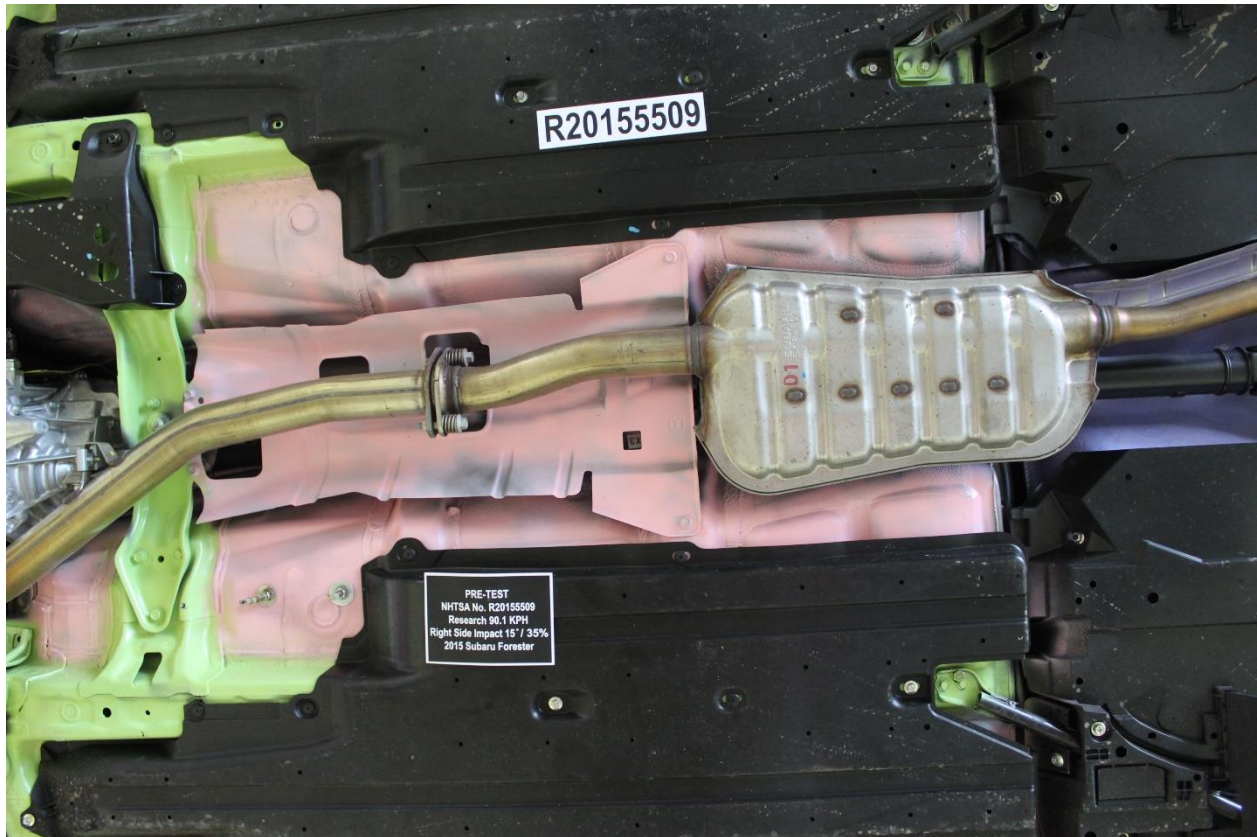
No. 133: Post-Test Left Side Engine Compartment View



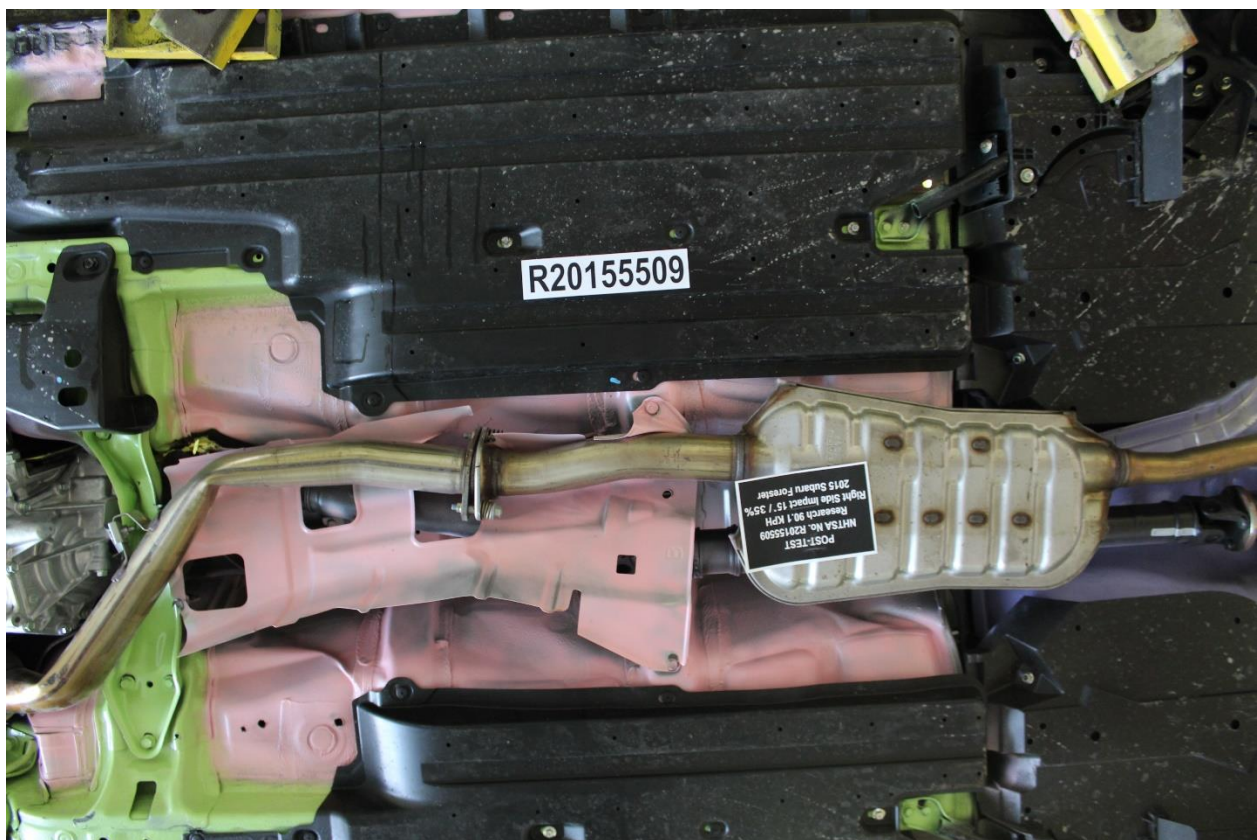
No. 134: Pre-Test View of Front Underbody (perpendicular to vehicle)



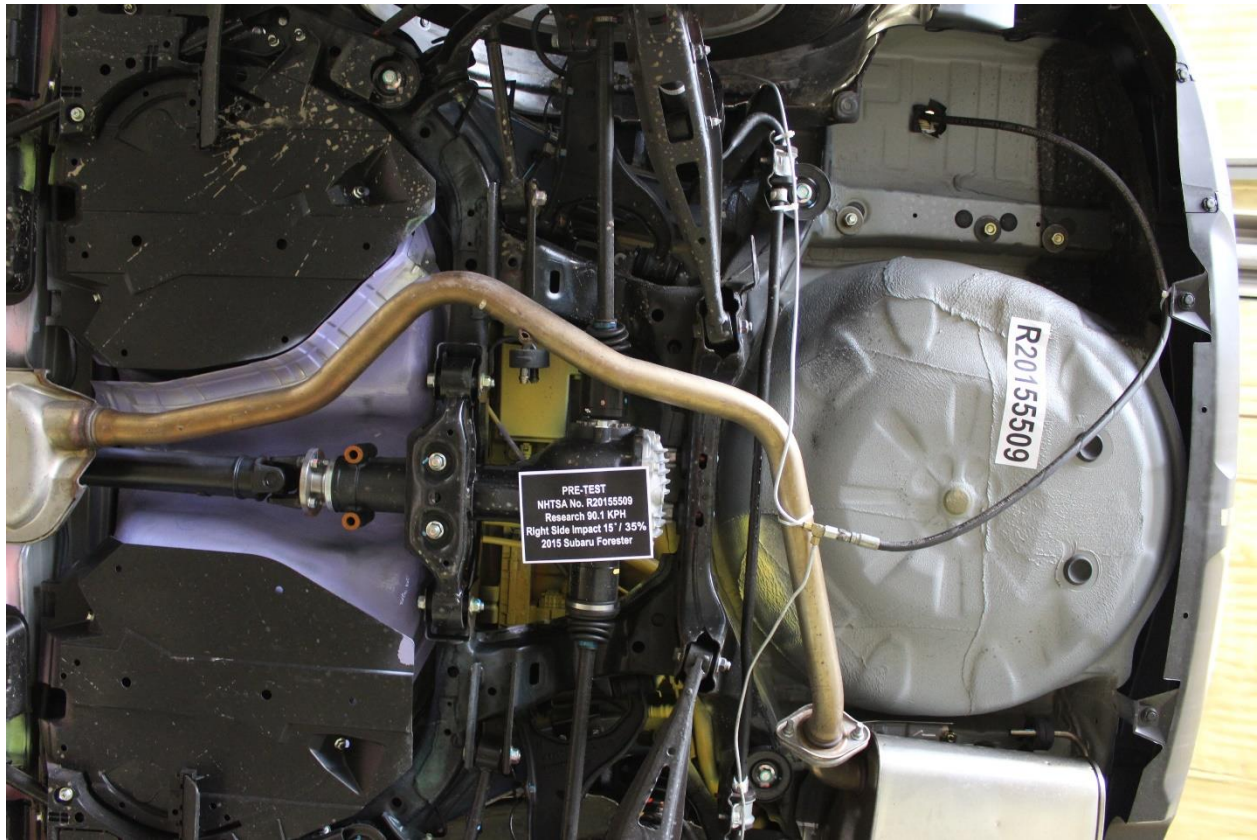
No. 135: Post-Test View of Front Underbody (perpendicular to vehicle)



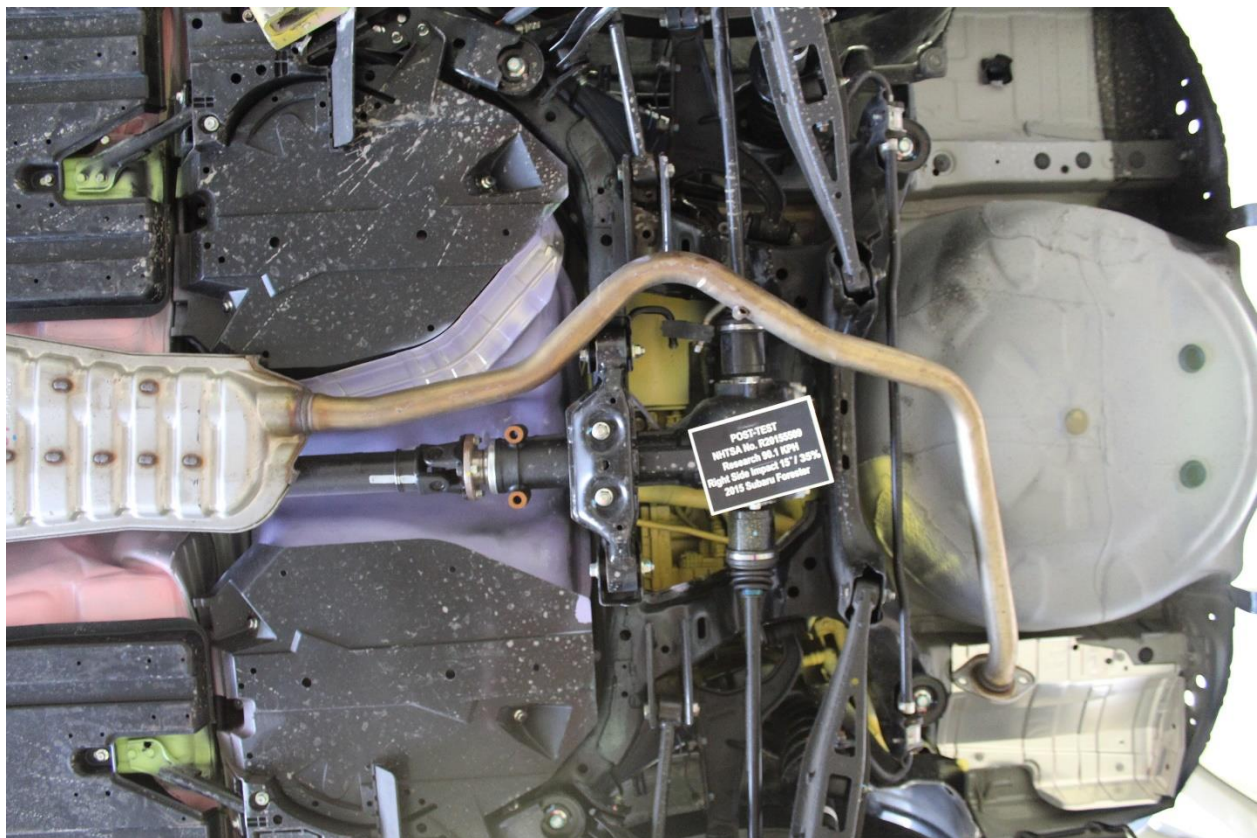
No. 136: Pre-Test View of Mid Underbody (perpendicular to vehicle)



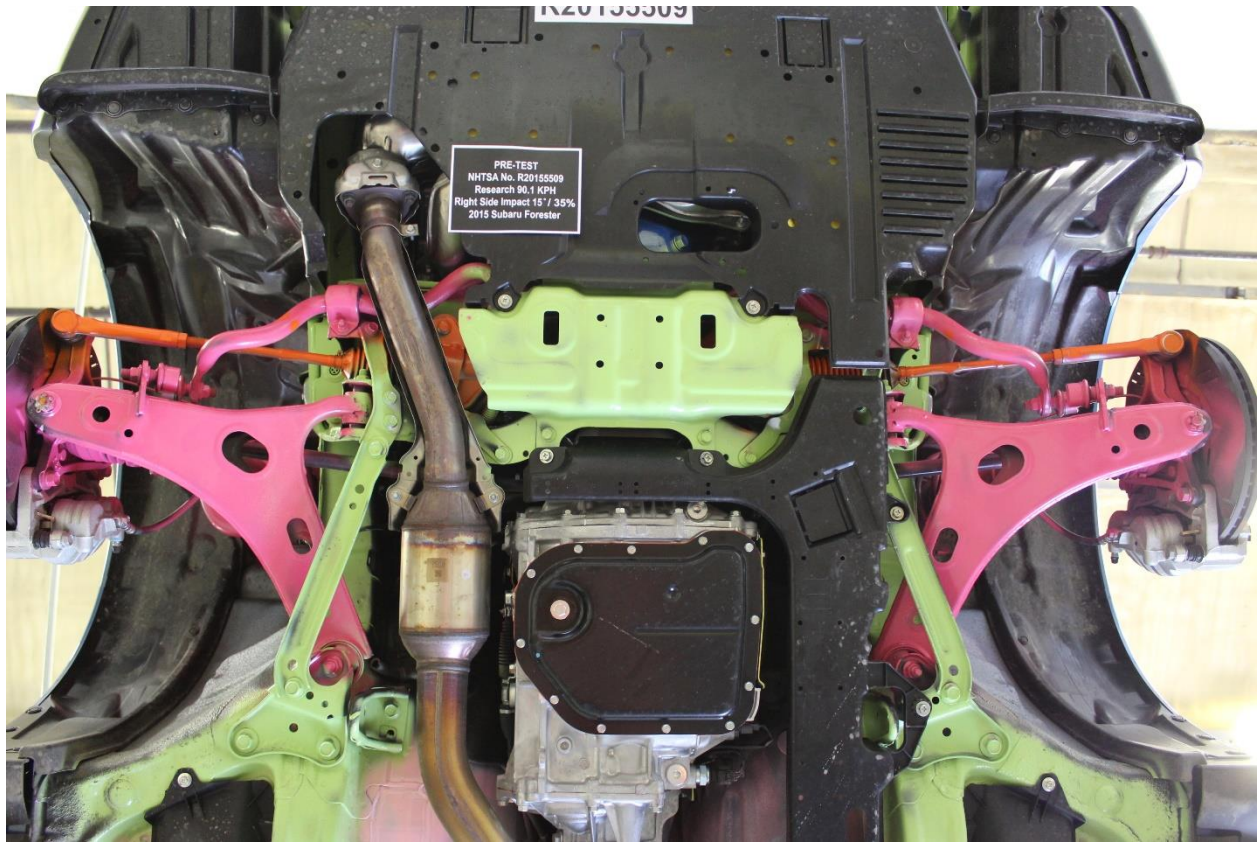
No. 137: Post-Test View of Mid Underbody (perpendicular to vehicle)



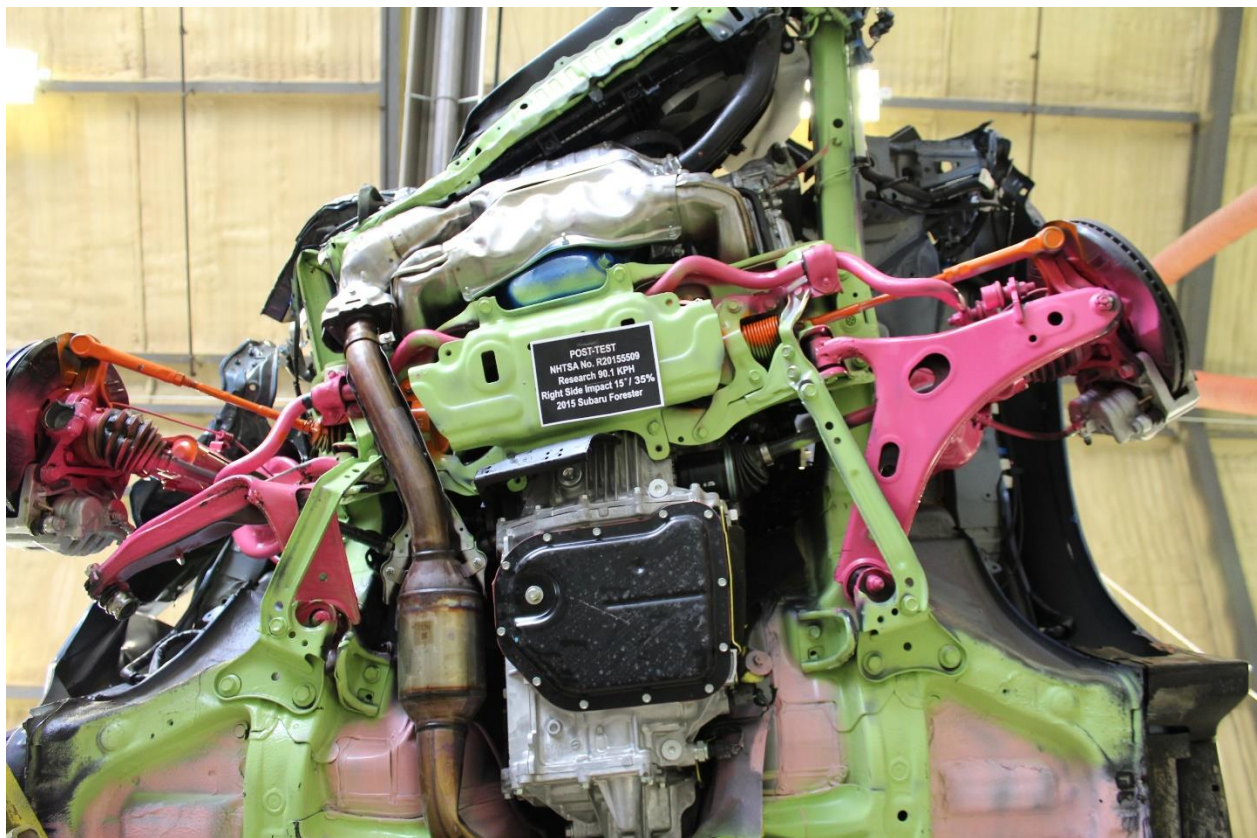
No. 138: Pre-Test View of Rear Underbody (perpendicular to vehicle)



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



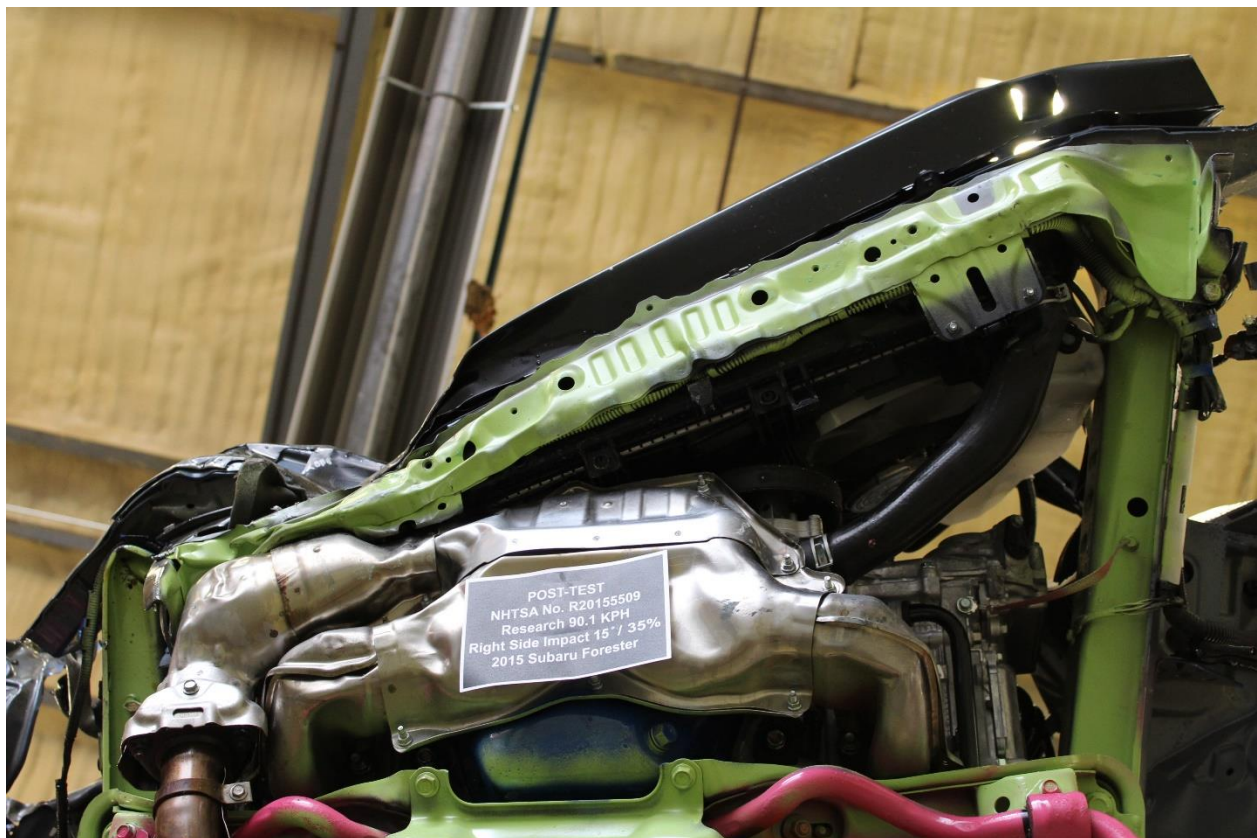
No. 140: Pre-Test View of Steering rack and or sway bar



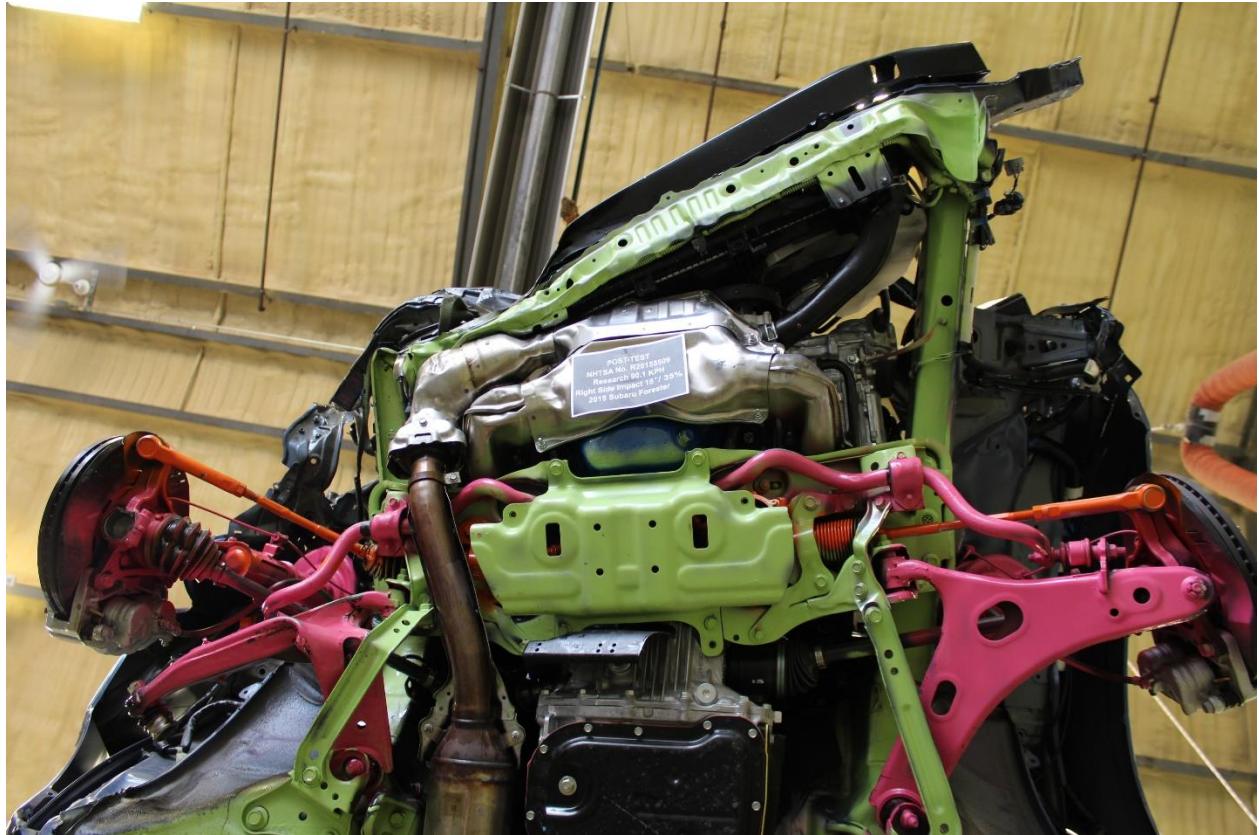
No. 141: Post-Test View of Steering rack and or sway bar



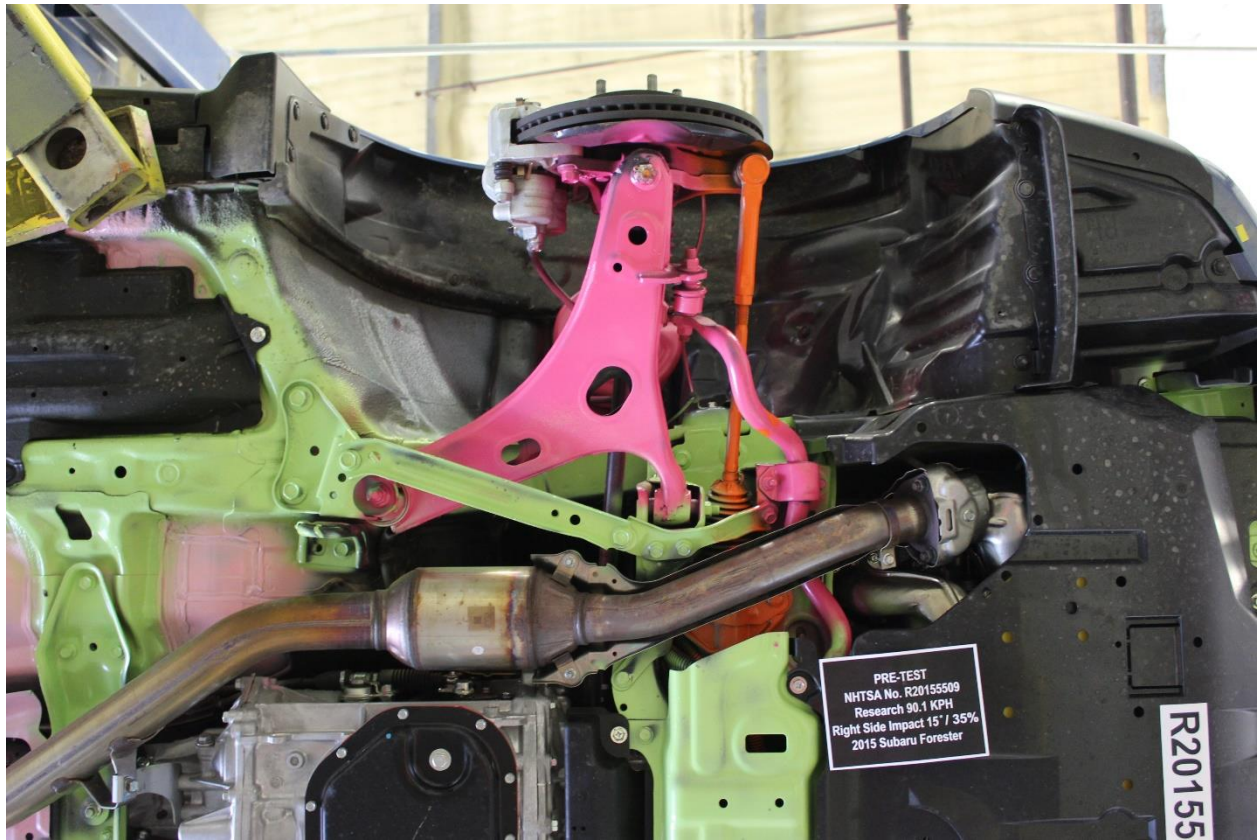
No. 142: Pre-Test Bumper to Rail Attachments and Crush Initiators



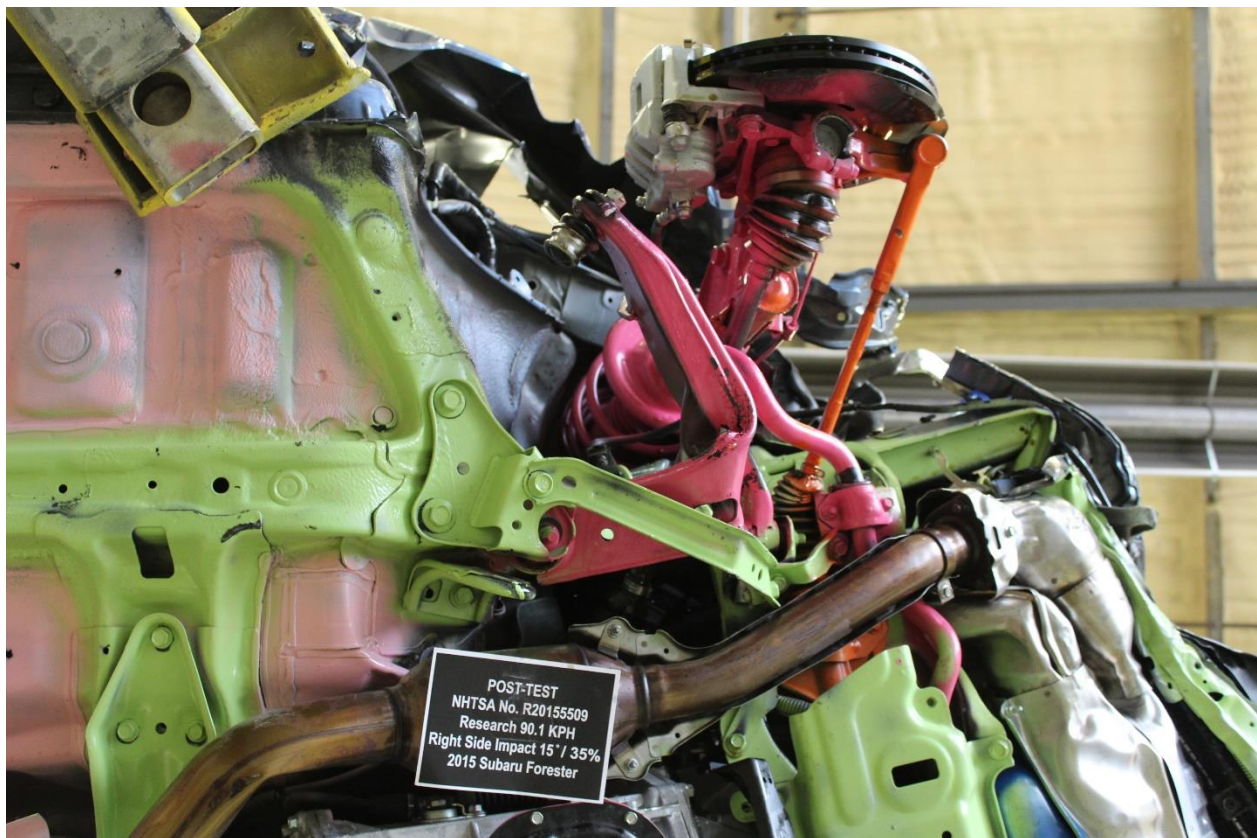
No. 143: Post-Test Bumper to Rail Attachments and Crush Initiators



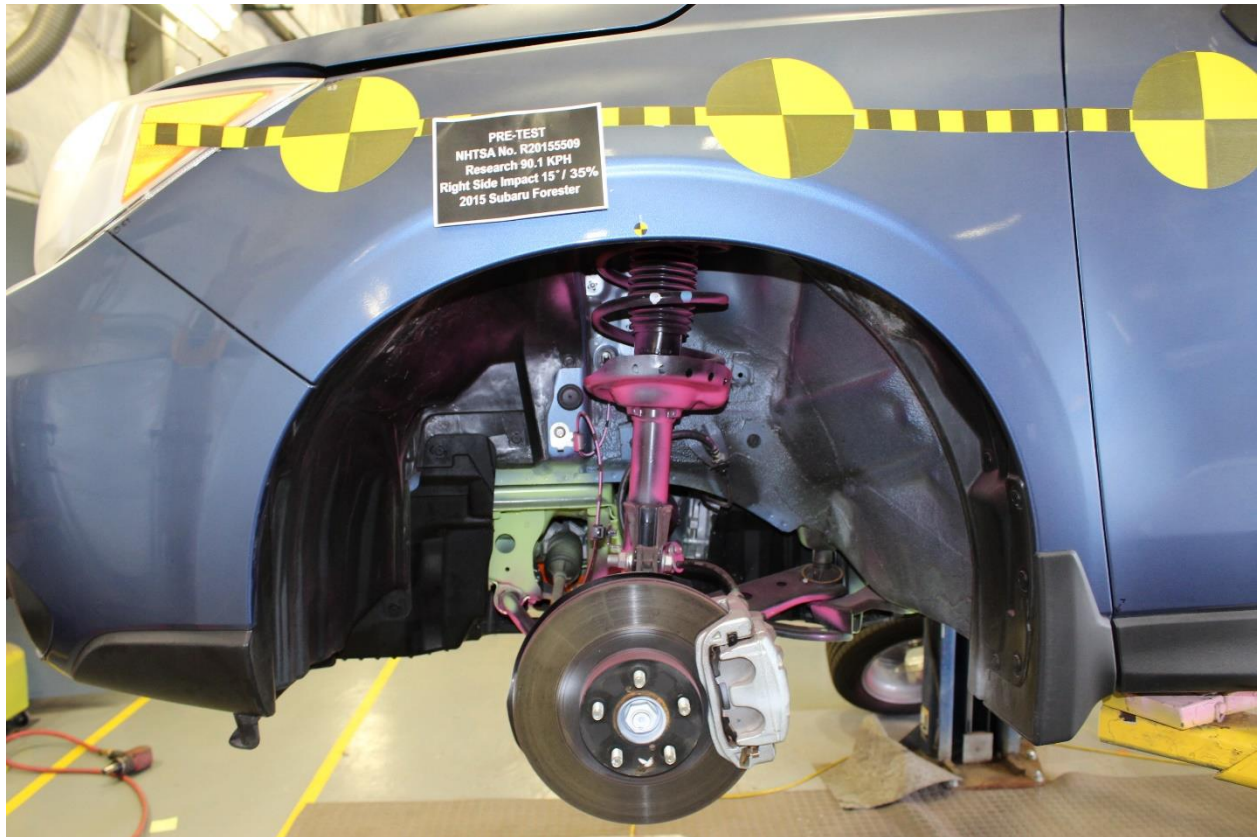
No. 144: Post-Test View of Front Sub-Frame Deformation



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



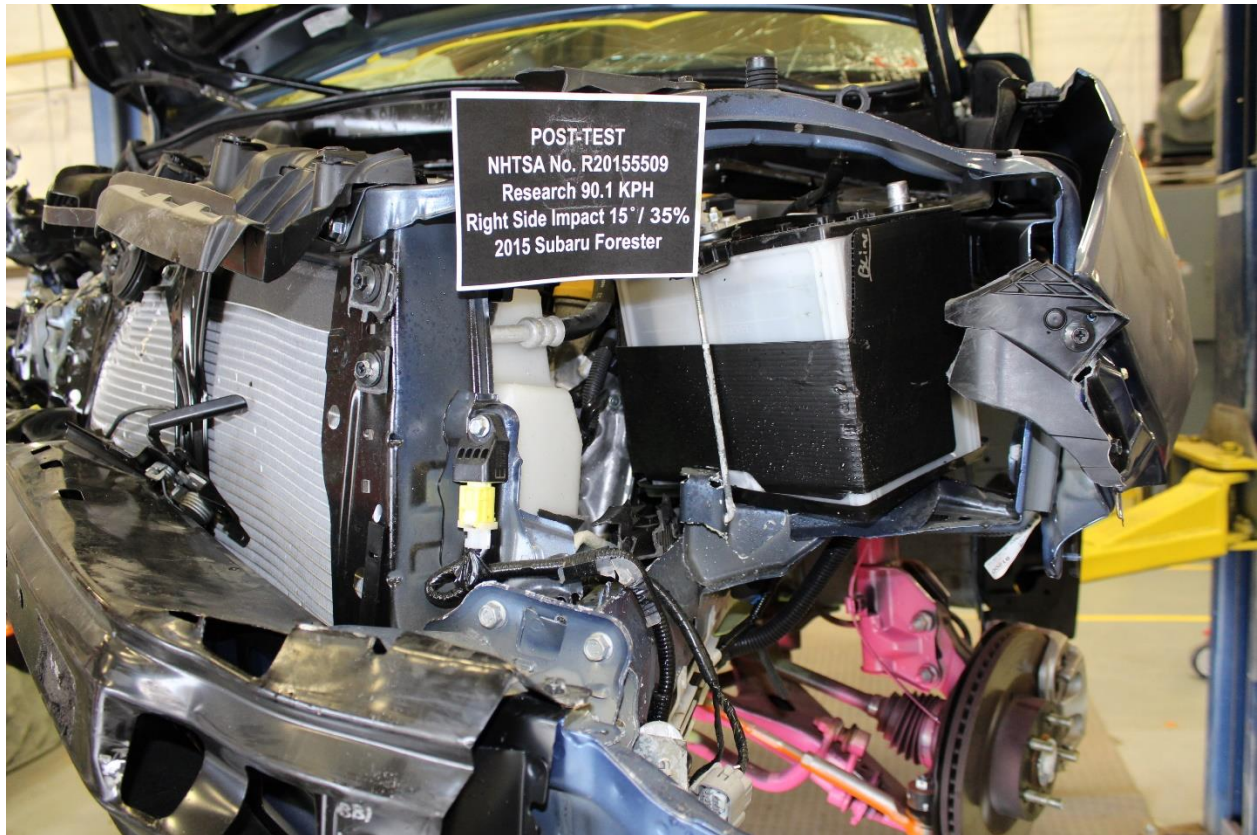
No. 148: Post-Test $\frac{3}{4}$ View of Front Driver Wheel Well w/ Tire Removed



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



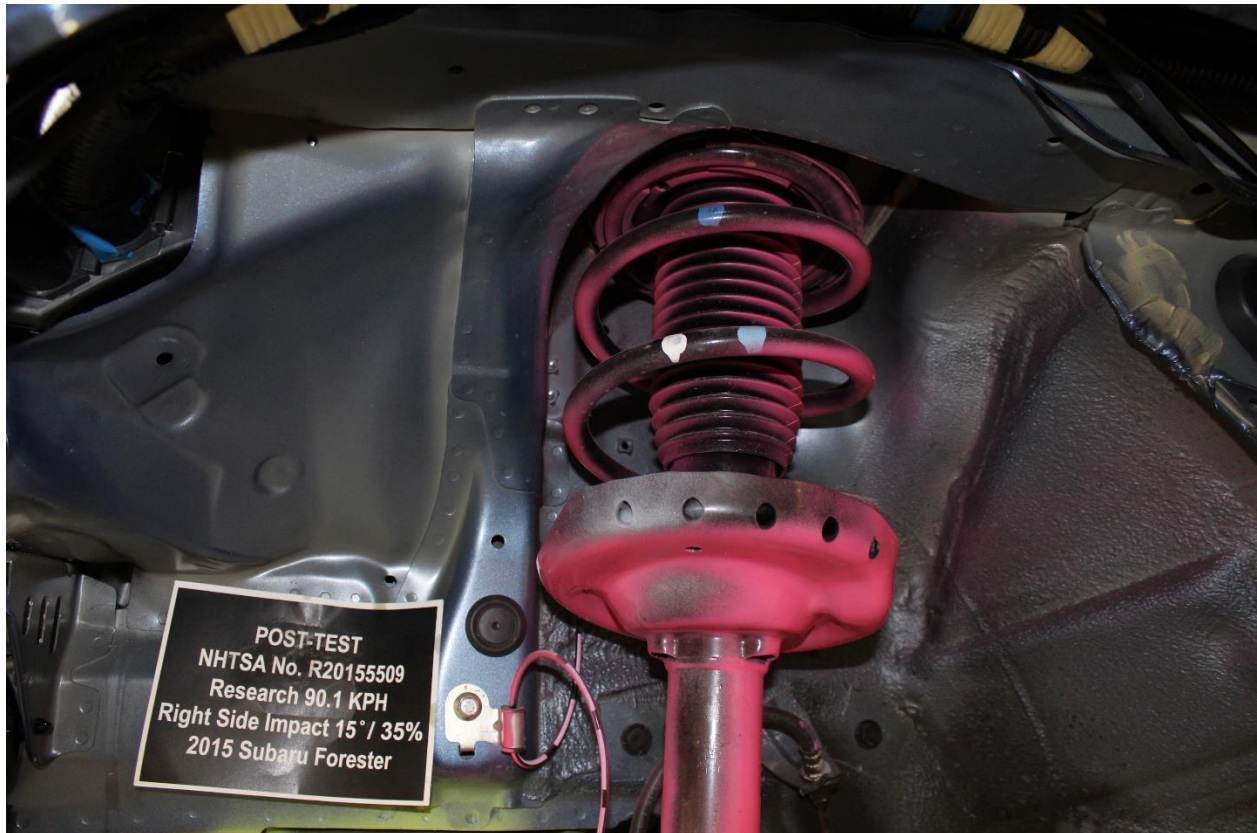
No. 150: Post-Test Right Side 3/4 Rear View of the Front Driver Wheel Well w/ Tire Removed



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



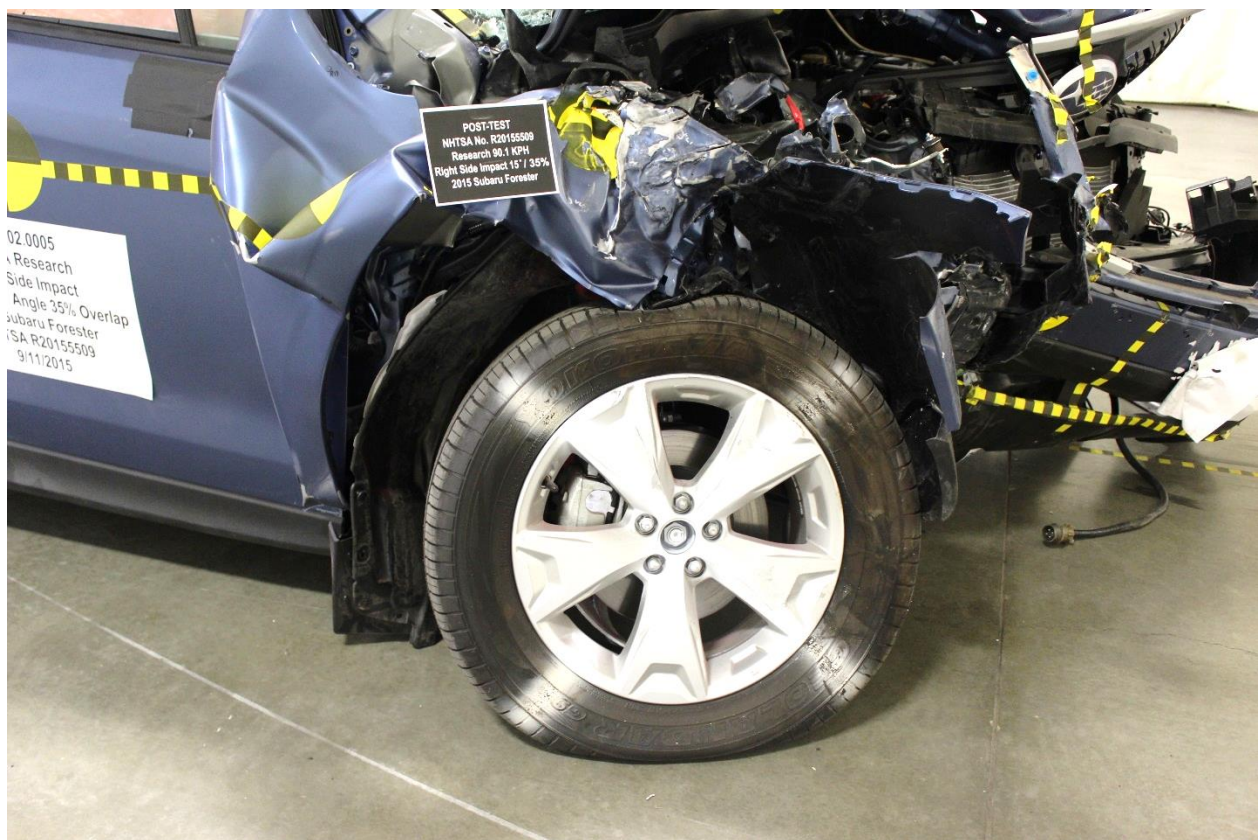
No. 161: Post-Test View of Deformation of A pillar-Struck Side



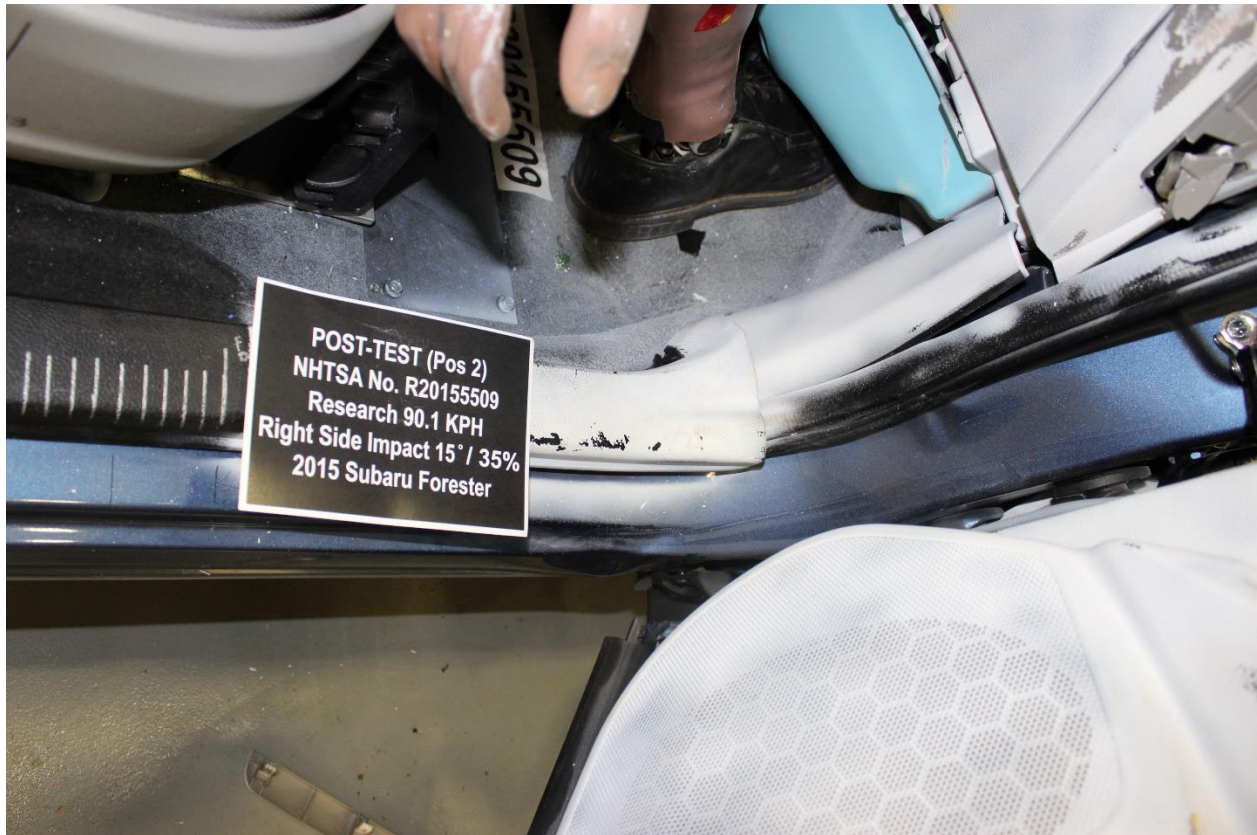
No. 162: Post-Test View of Deformation of B pillar-Struck Side



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



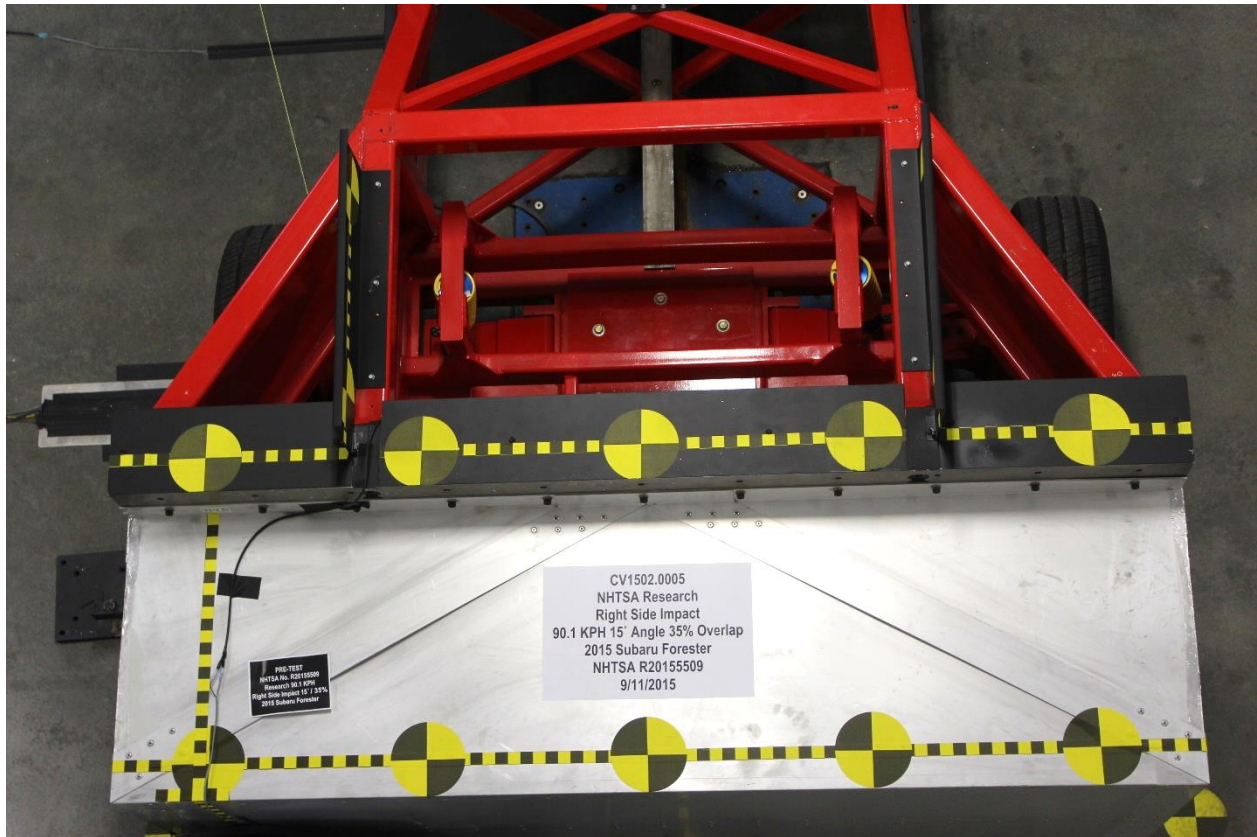
No. 168: Post-Test Left Side View of OMDB



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



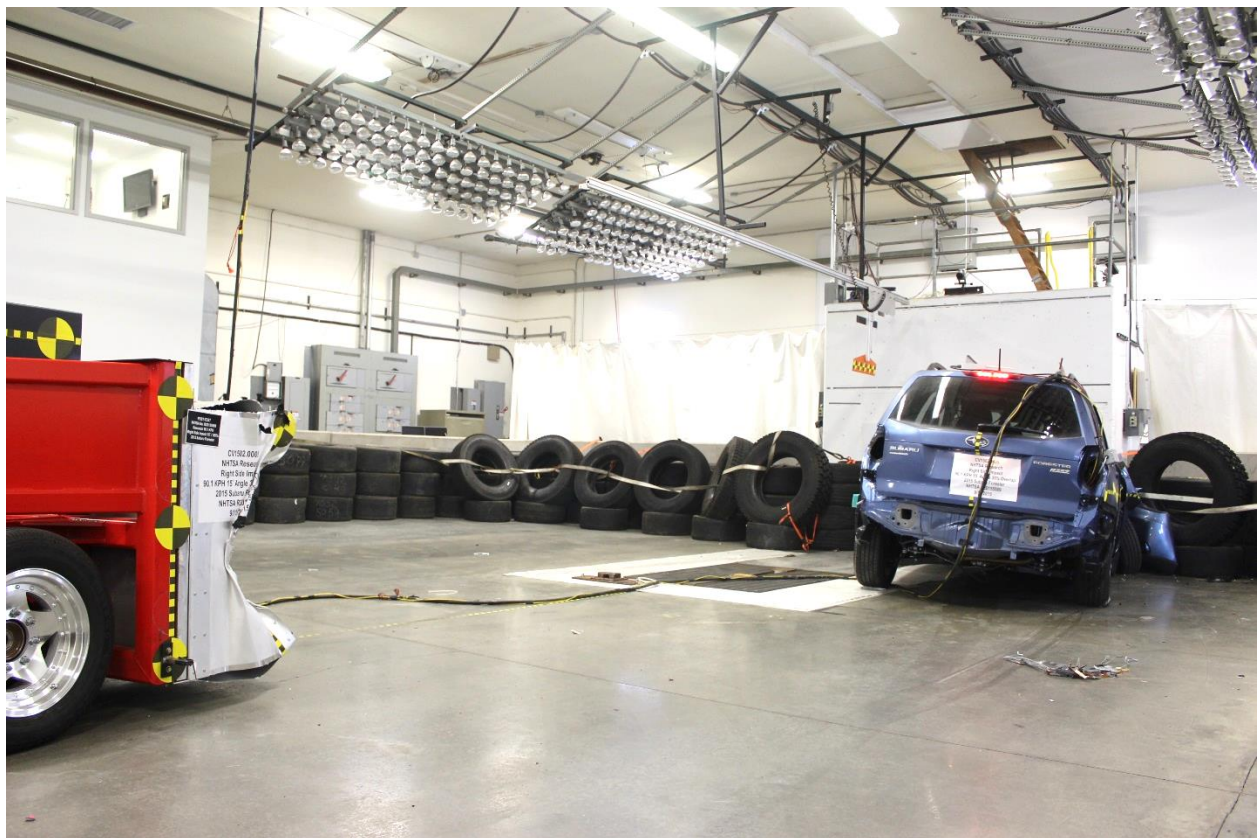
No. 181: Pre-Test Left Side View of OMDB



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



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



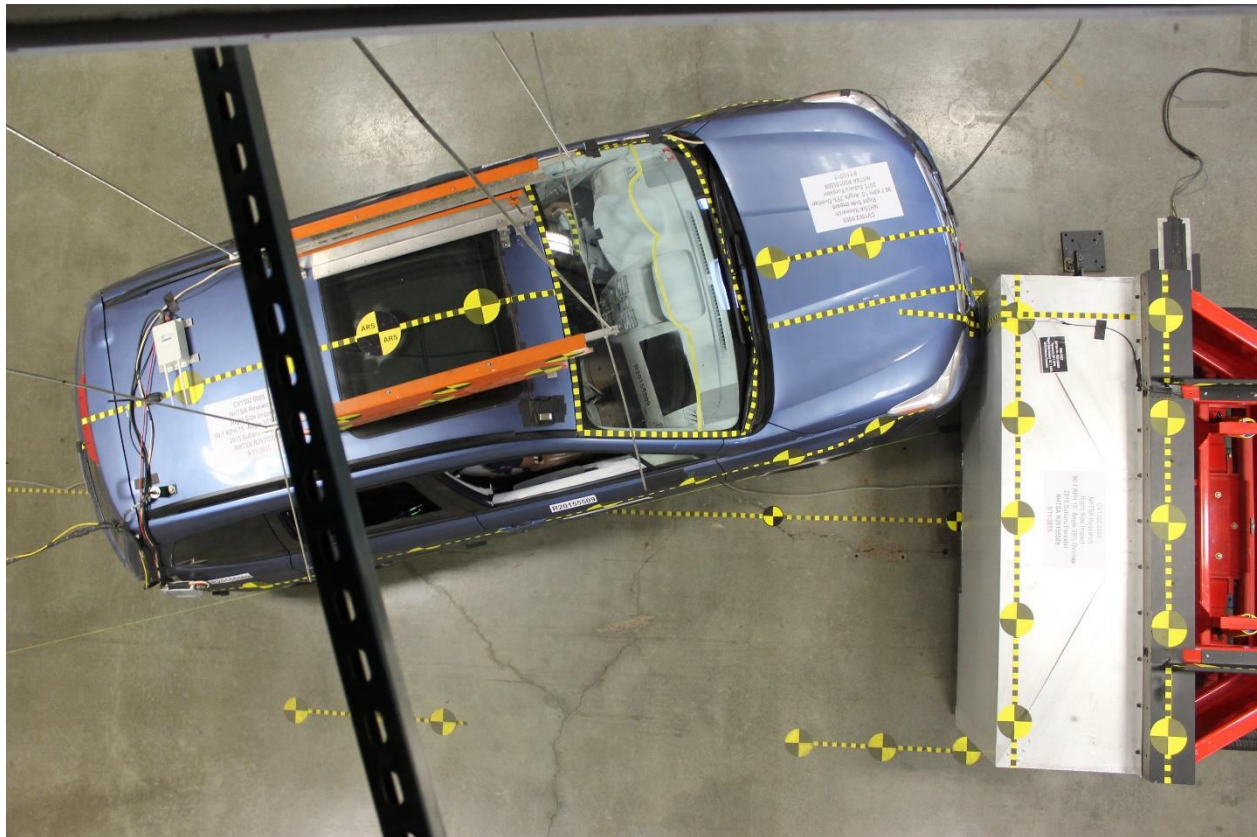
No. 184: Post-Test OMDB & Vehicle, Right Side



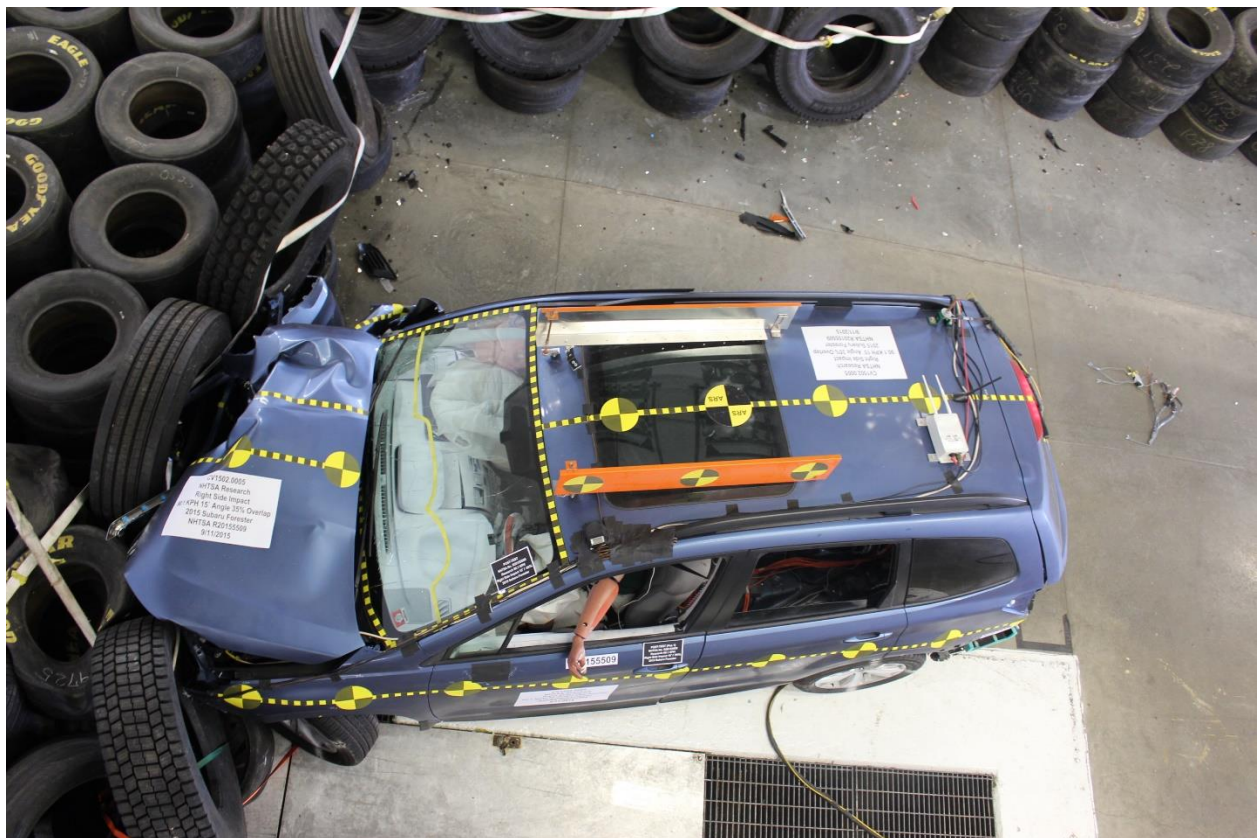
No. 185: Pre-Test OMDB & Vehicle, Left Side



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



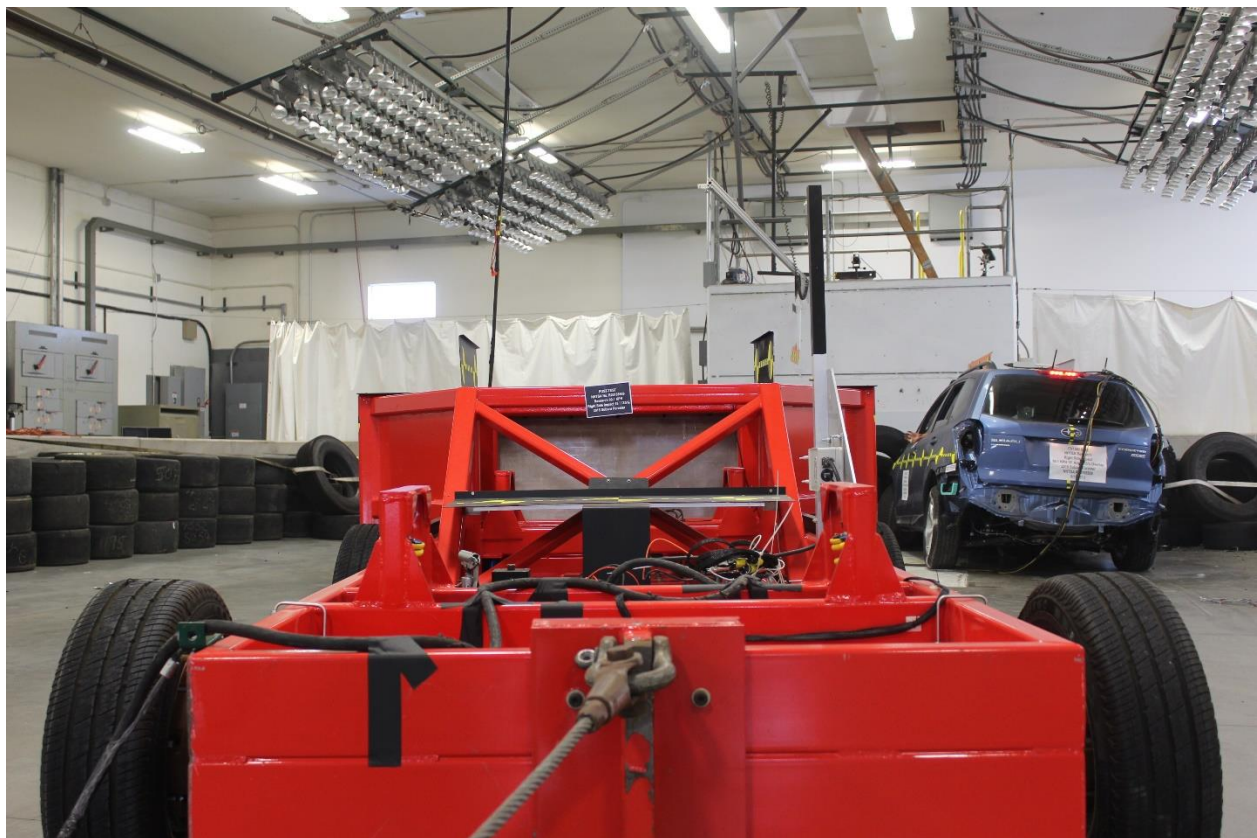
No. 187: Pre-Test OMDB & Vehicle, Top View



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



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



No. 190: Post-Test OMDB & 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



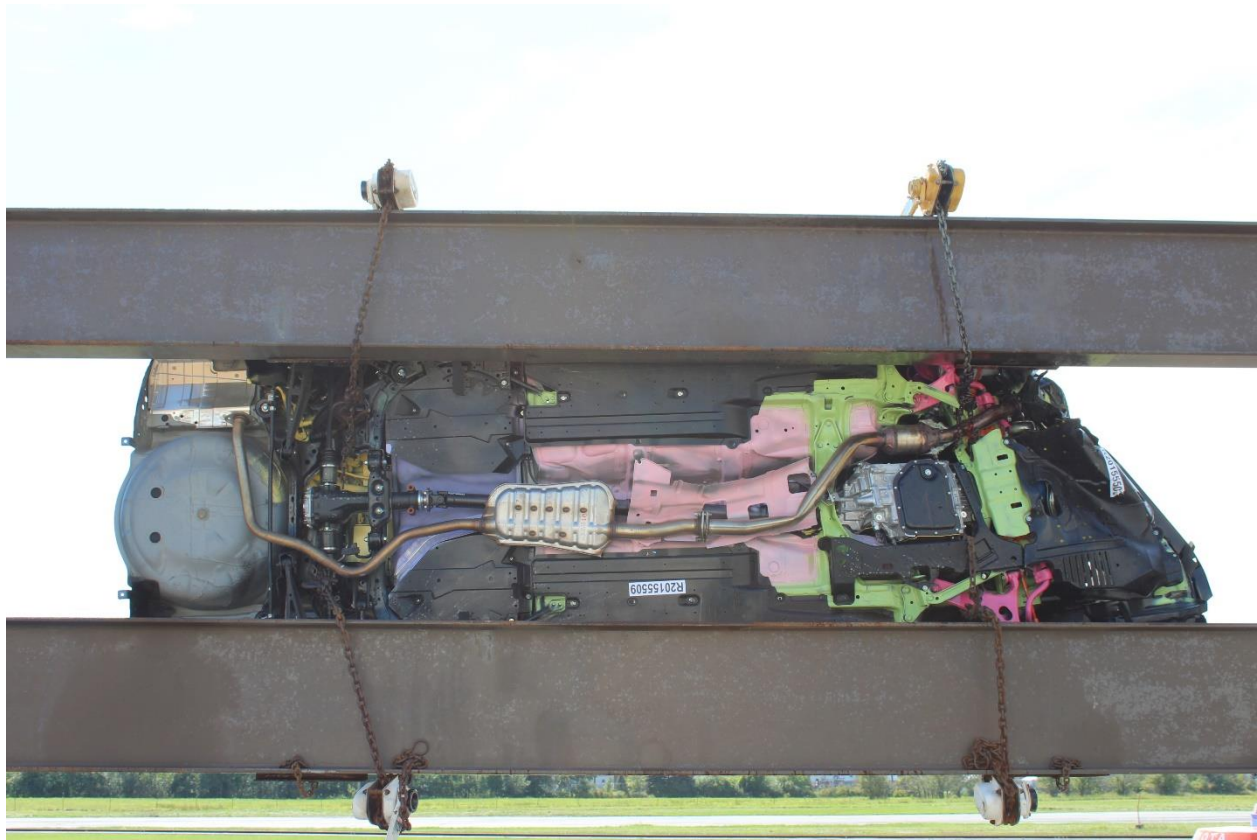
No. 194: Vehicle at 0 Degrees on Static Rollover Device



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



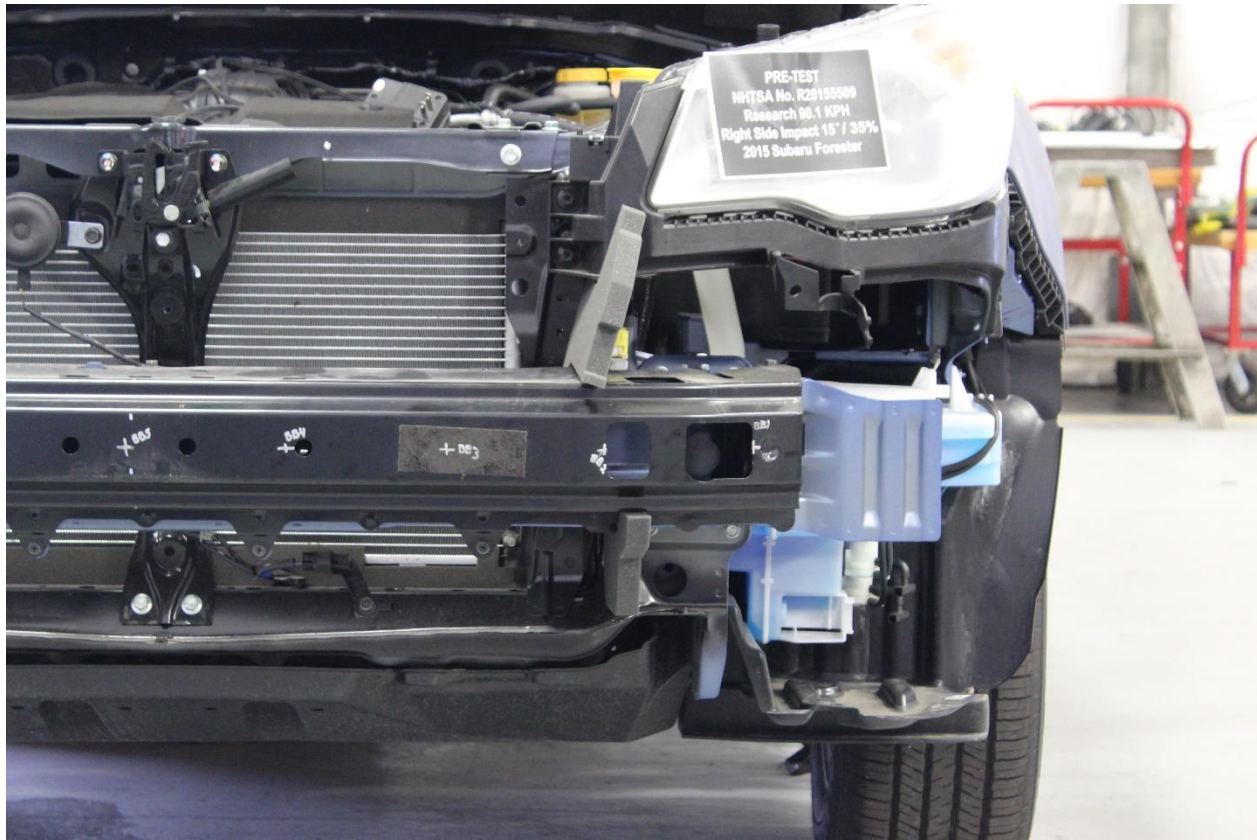
No. 199: Impact Photo



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



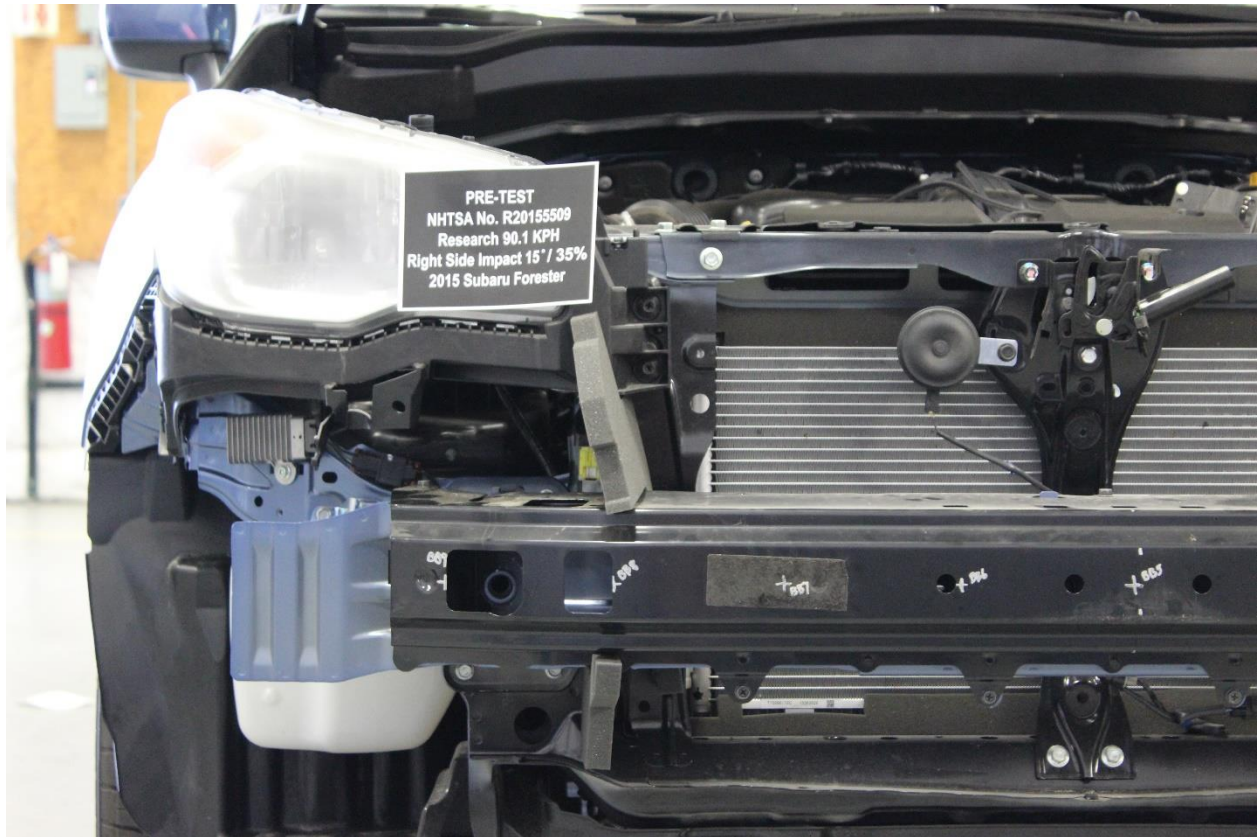
No. 205 Post-Test Vehicle Bumper Front View



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

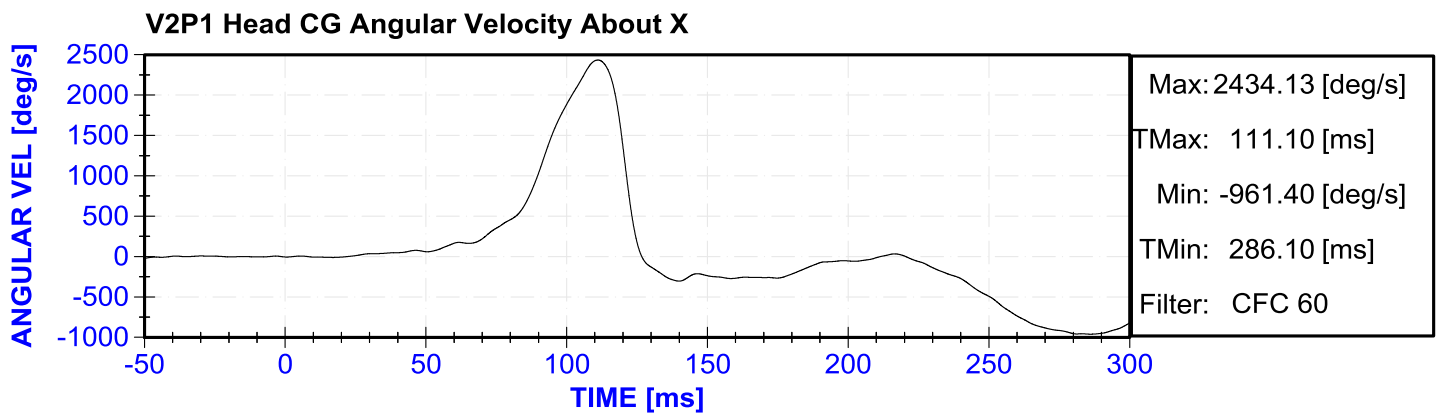
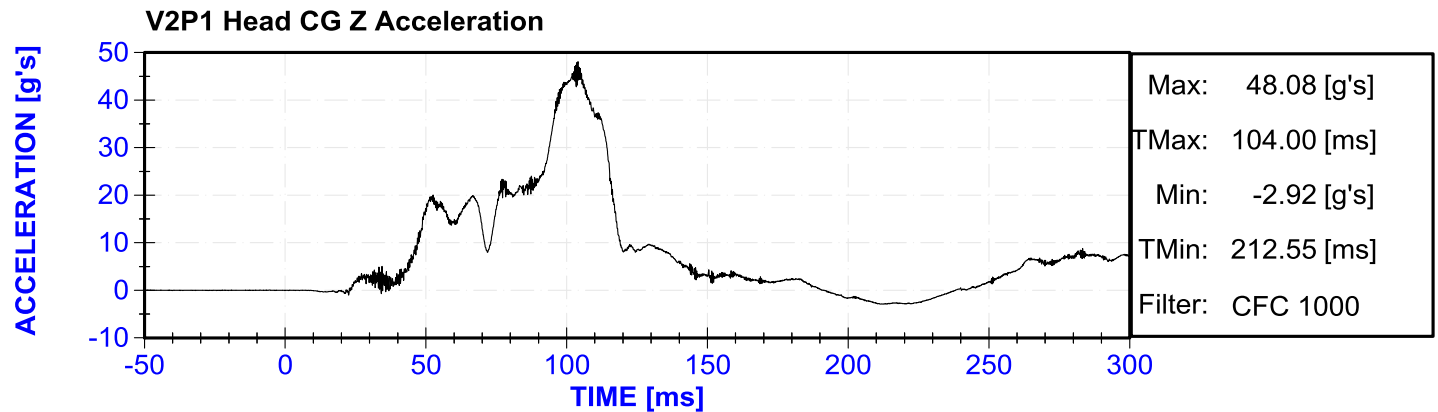
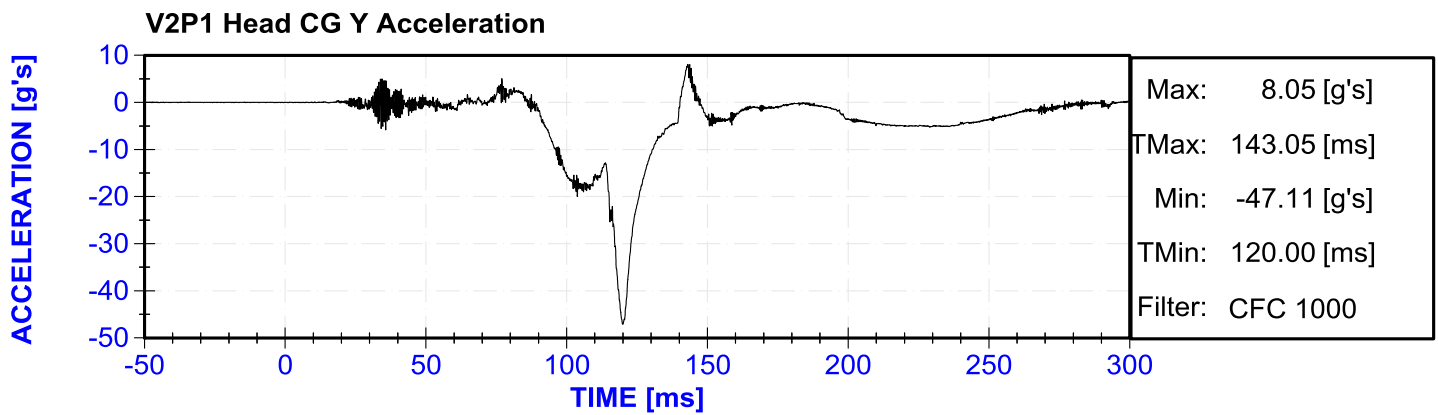
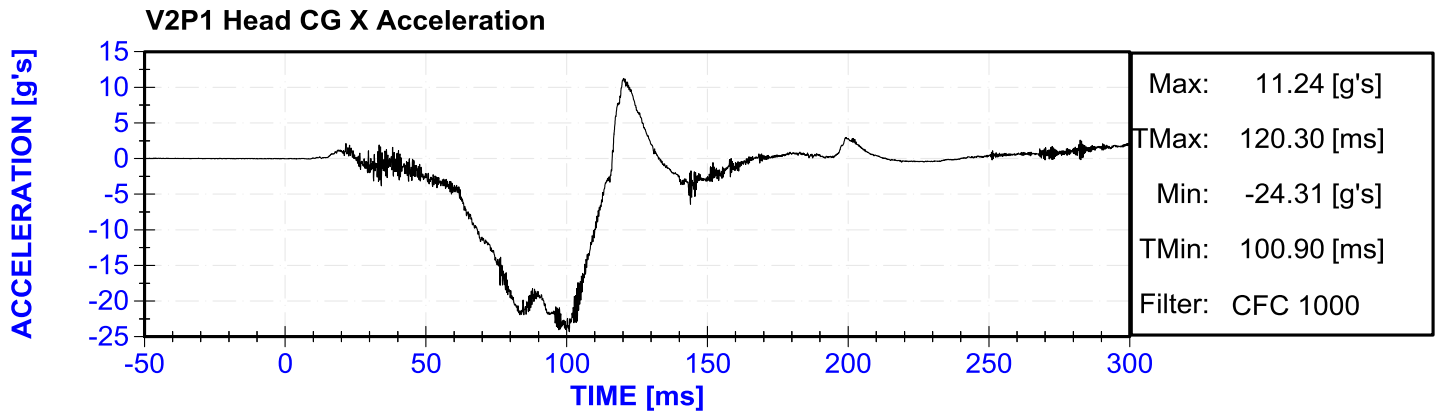
Plot 107	V2 Driver Shoulder Belt Upper Force	B-35
Plot 108	V2 Driver Shoulder Belt Displacement	B-35
Plot 109	V2P2 Head CG X Acceleration	B-36
Plot 110	V2P2 Head CG Y Acceleration	B-36
Plot 111	V2P2 Head CG Z Acceleration	B-36
Plot 112	V2P2 Head CG Angular Velocity About X	B-36
Plot 113	V2P2 Head CG 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

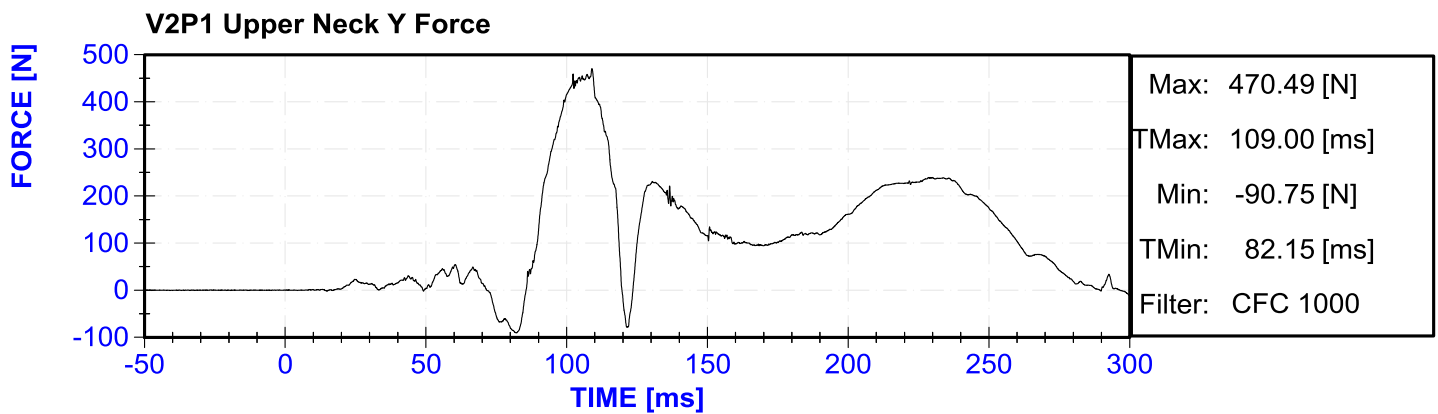
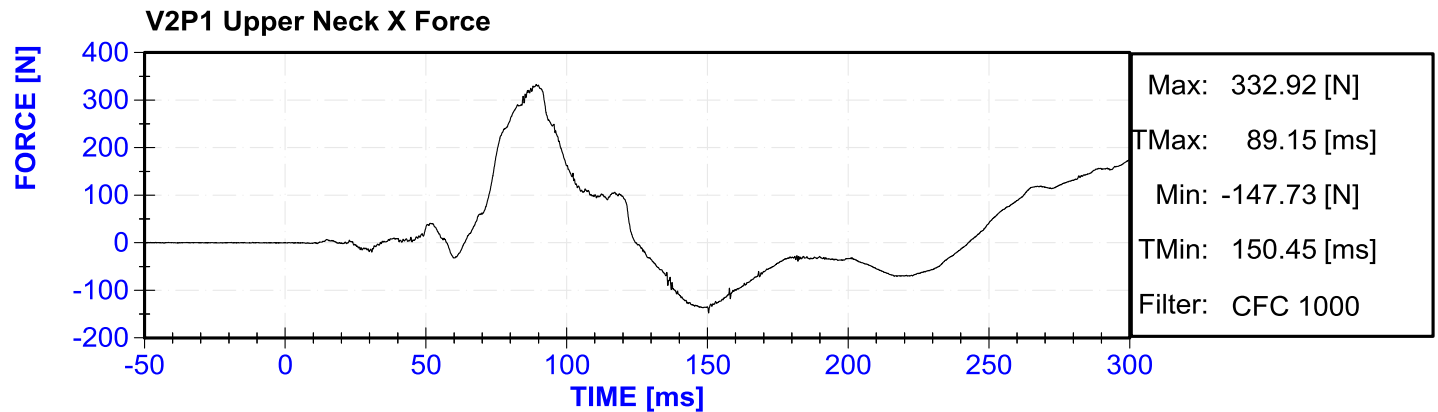
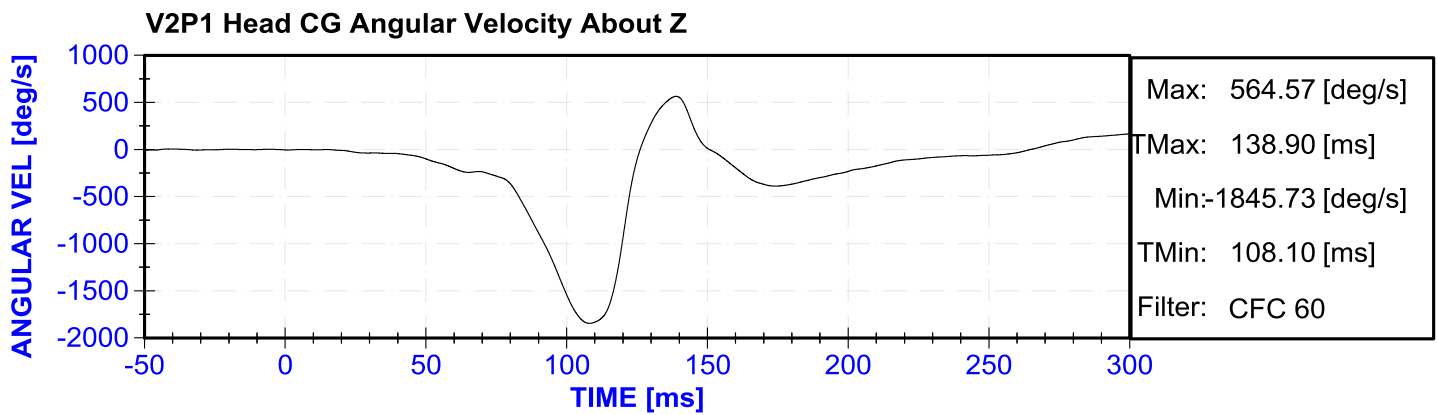
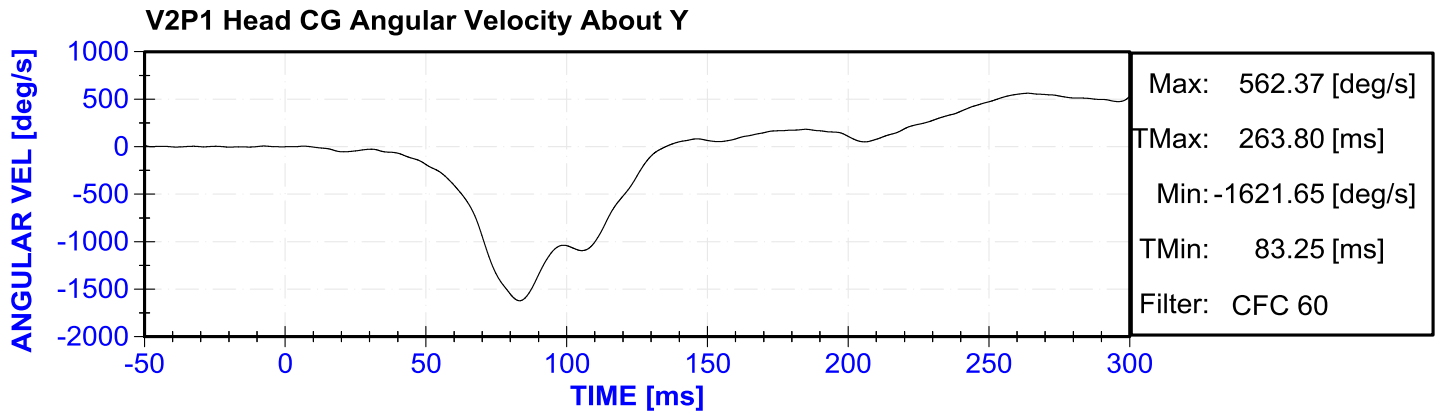
Plot 161	V2P2 Pelvis Acetabulum Left Z Force	B-49
Plot 162	V2P2 Pelvis Acetabulum Right X Force	B-49
Plot 163	V2P2 Pelvis Acetabulum Right Y Force	B-49
Plot 164	V2P2 Pelvis Acetabulum Right Z Force	B-49
Plot 165	V2P2 Pelvis X Acceleration	B-50
Plot 166	V2P2 Pelvis Y Acceleration	B-50
Plot 167	V2P2 Pelvis 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

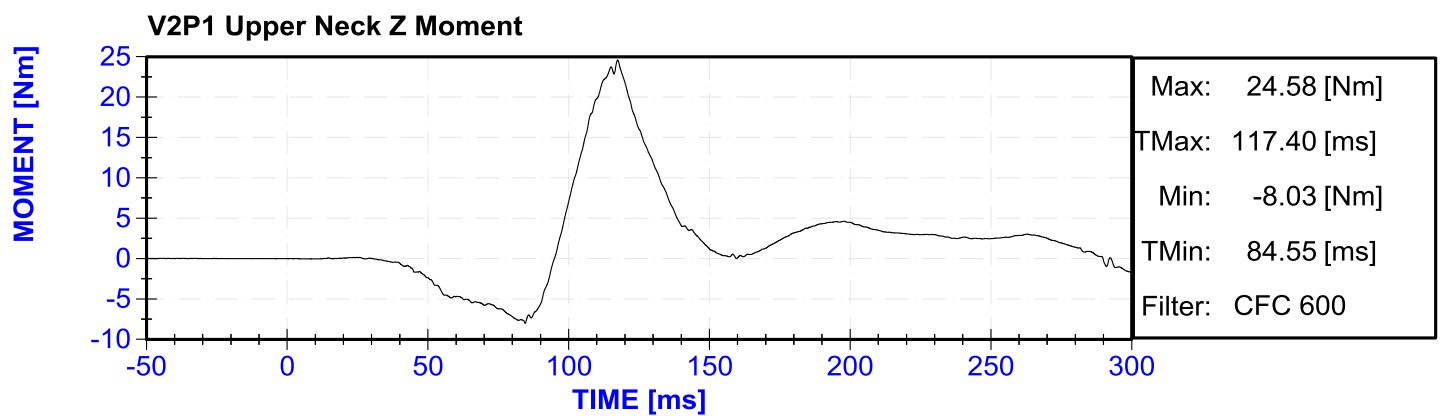
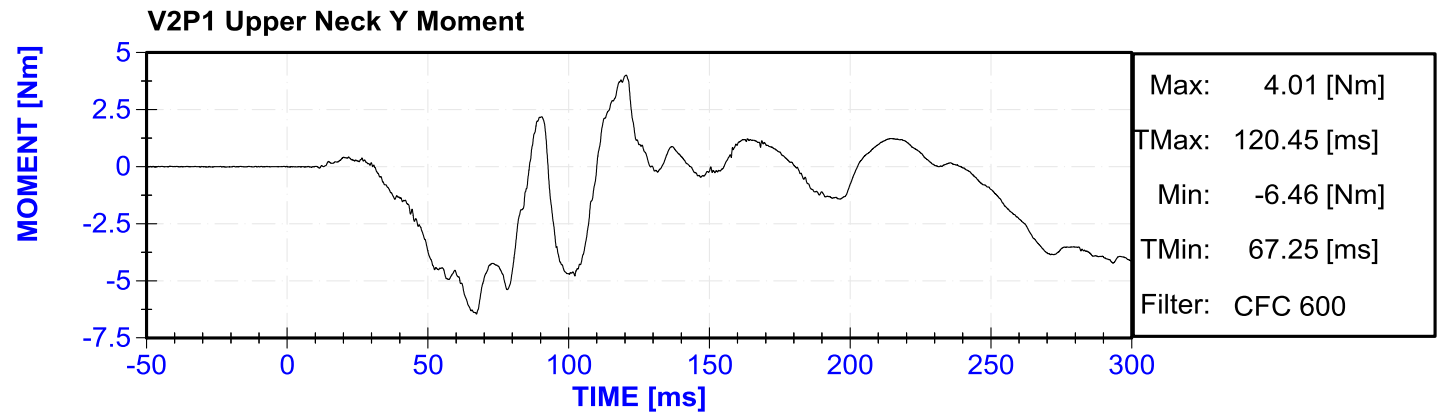
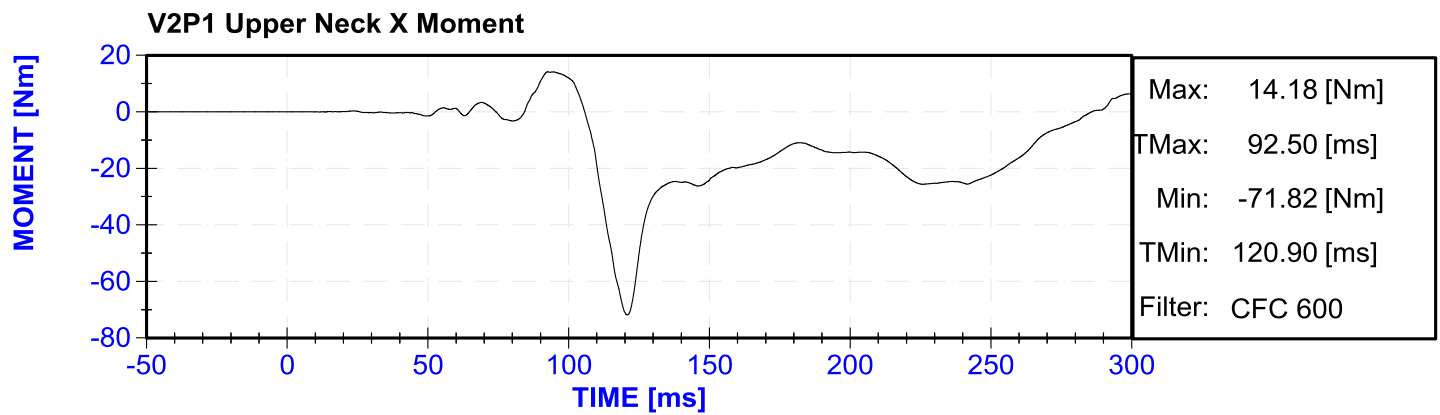
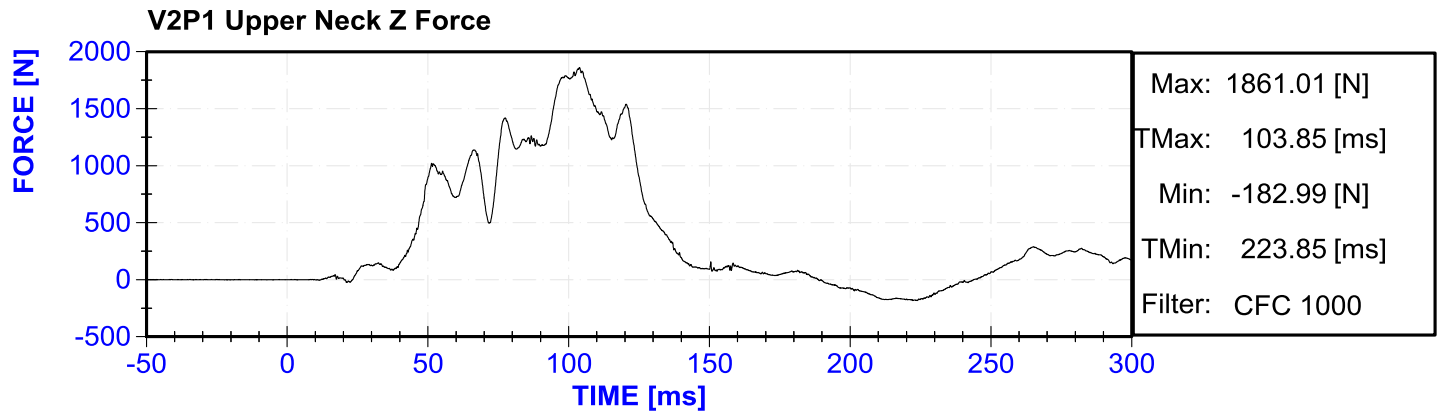
Plot 215	V2 Passenger Shoulder Belt Upper Force	B-62
Plot 216	V2 Passenger Shoulder Belt Displacement	B-62
Plot 217	V2 Left Rear Sill X Acceleration	B-63
Plot 218	V2 Left Rear Sill Y Acceleration	B-63
Plot 219	V2 Right Rear Sill X Acceleration	B-63
Plot 220	V2 Right Rear Sill Y Acceleration	B-63
Plot 221	V2 Right Rear Sill Redundant X Acceleration	B-64
Plot 222	V2 Right Rear Sill Redundant 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 Passenger Seat Track X Acceleration	B-66
Plot 230	V2 Passenger Seat Track Y Acceleration	B-66
Plot 231	V2 Passenger Seat Track Z Acceleration	B-66
Plot 232	V2 Passenger Seat Thigh Bar X Acceleration	B-66
Plot 233	V2 Passenger Seat Thigh Bar Z Acceleration	B-67
Plot 234	V2 Passenger Floor Pan X Acceleration	B-67
Plot 235	V2 Passenger Floor Pan Y Acceleration	B-67
Plot 236	V2 Passenger Floor Pan Z Acceleration	B-67
Plot 237	V2 Passenger 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 Knee Airbag Monitor	B-69
Plot 243	Driver Retractor 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

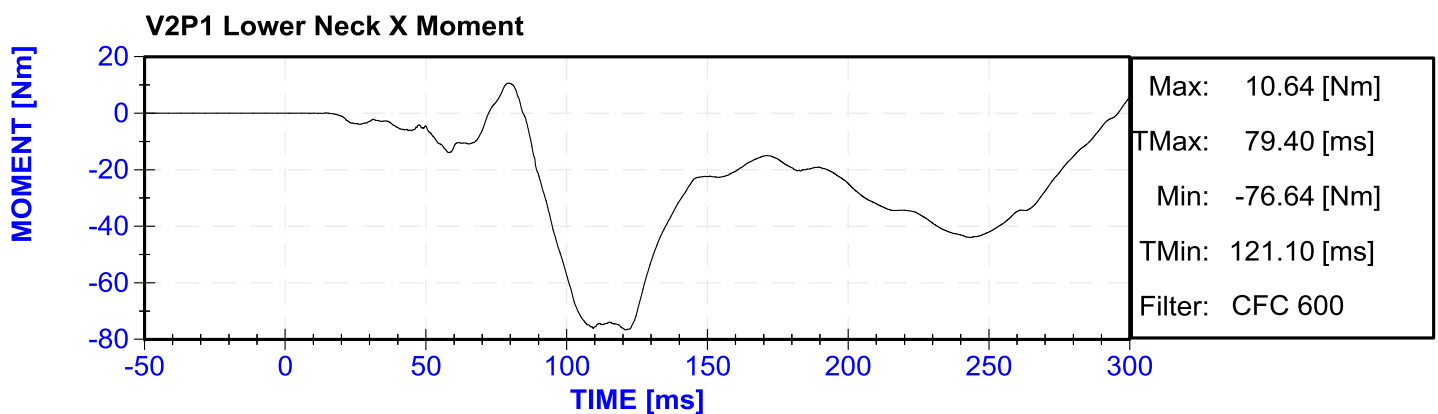
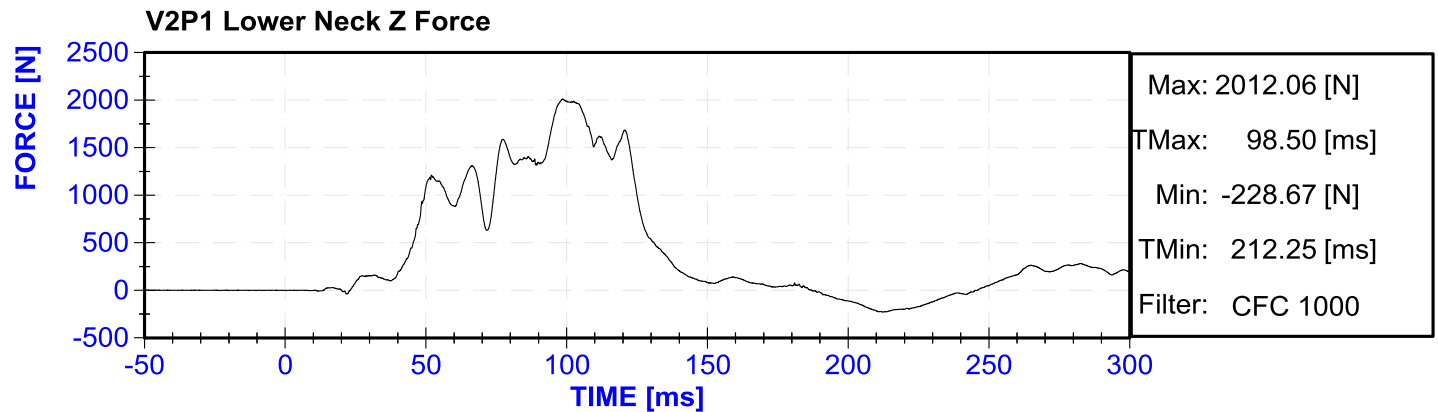
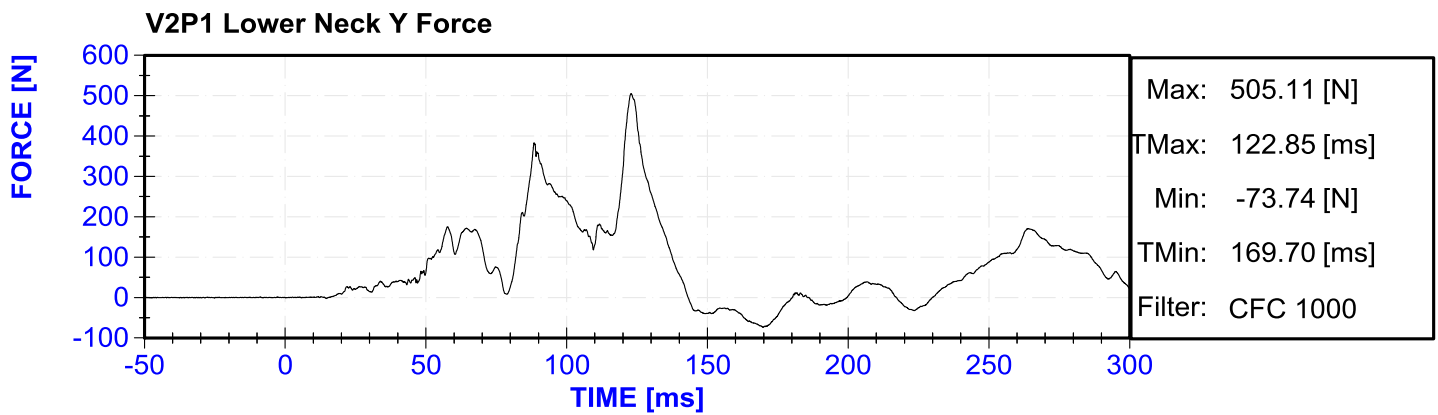
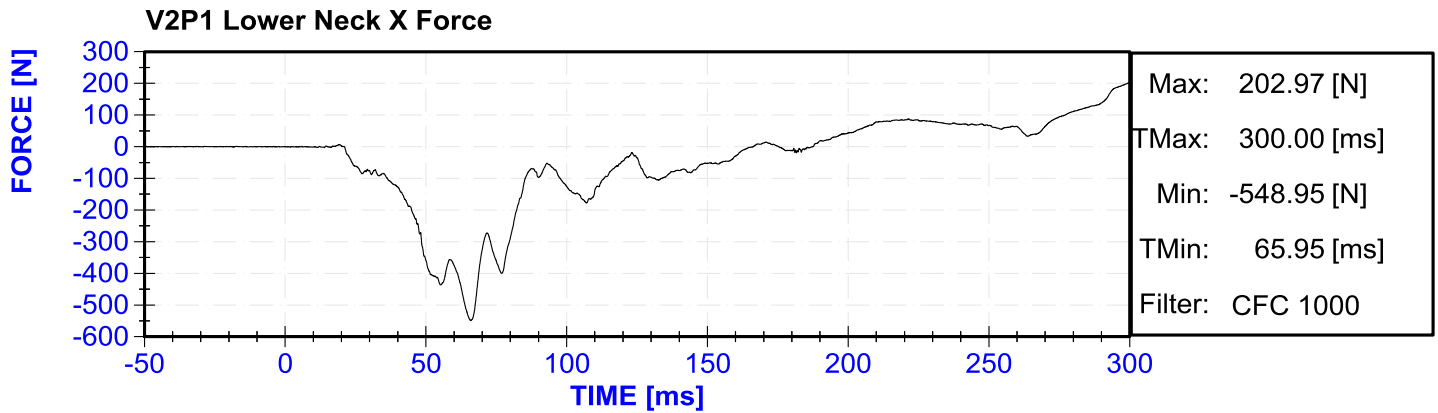
Plot 269	V2P1 Chest Left Upper Dy	B-76
Plot 270	V2P1 Chest Left Upper Dz	B-76
Plot 271	V2P1 Chest Left Upper Resultant	B-76
Plot 272	V2P1 Chest Right Upper Dx	B-76
Plot 273	V2P1 Chest Right Upper Dy	B-77
Plot 274	V2P1 Chest Right Upper Dz	B-77
Plot 275	V2P1 Chest Right Upper Resultant	B-77
Plot 276	V2P1 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

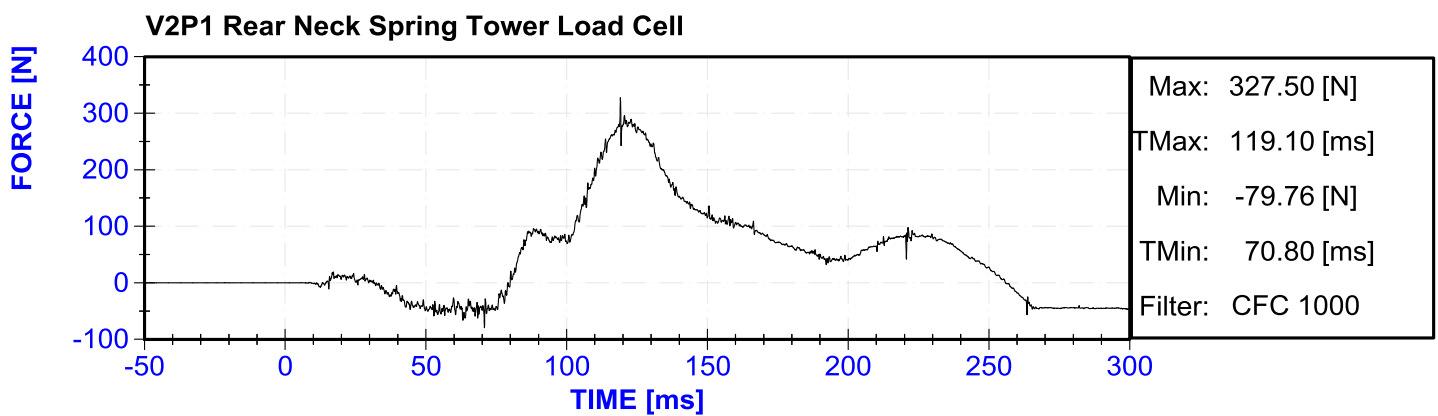
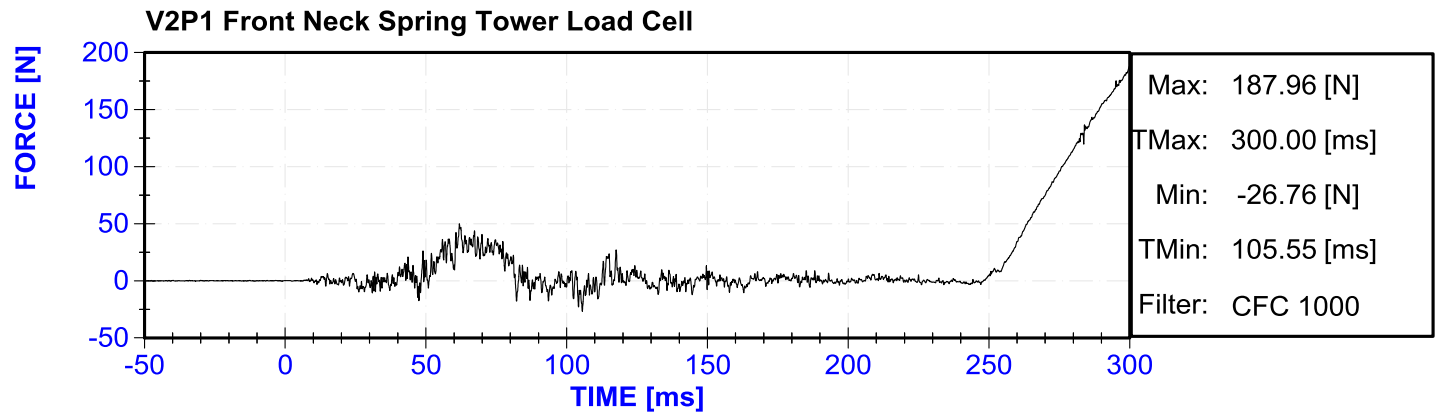
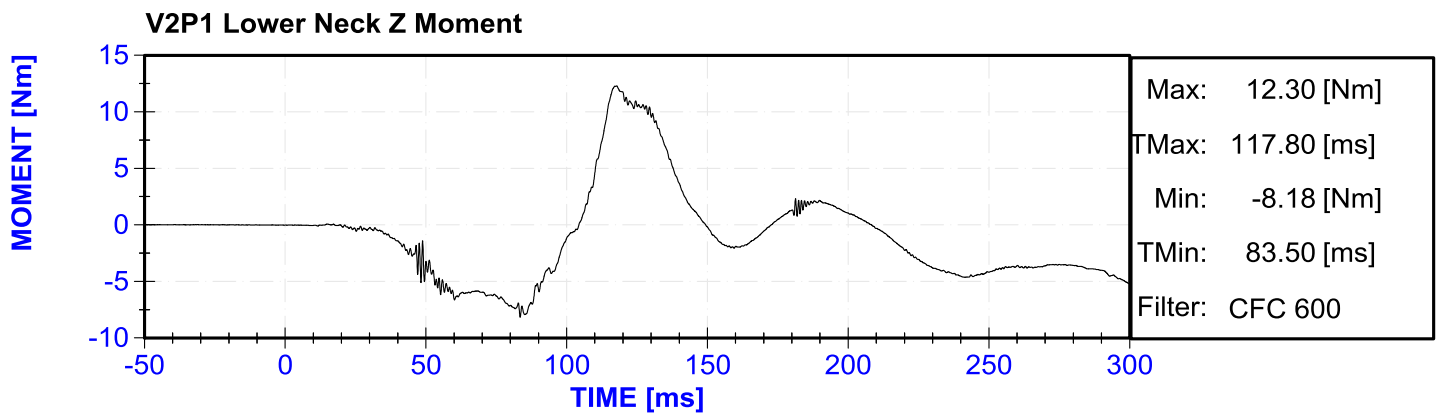
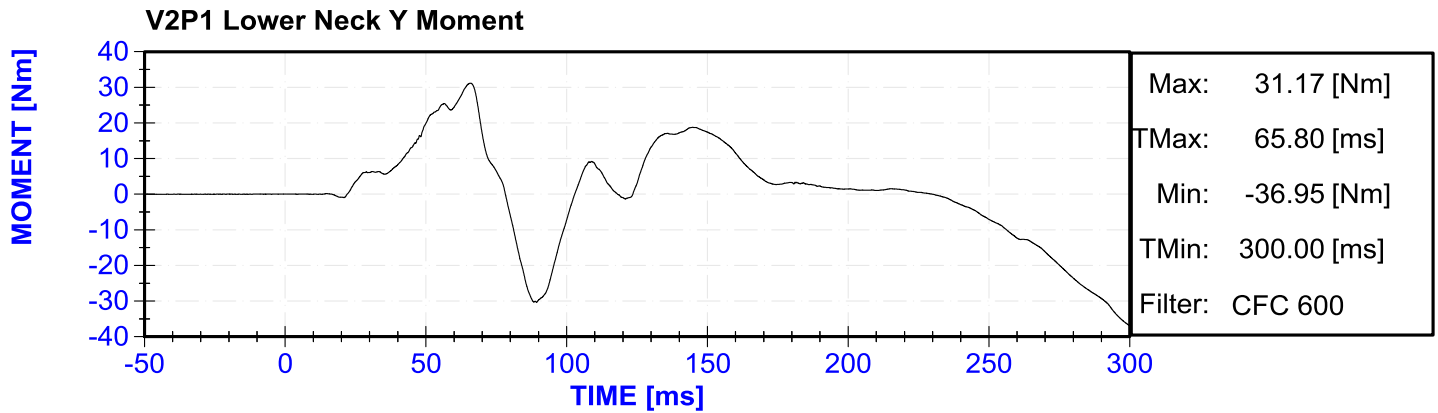
Plot 323	V2P2 Abdomen Right Lower Dz	B-89
Plot 324	V2P2 Abdomen Right Lower Resultant	B-89



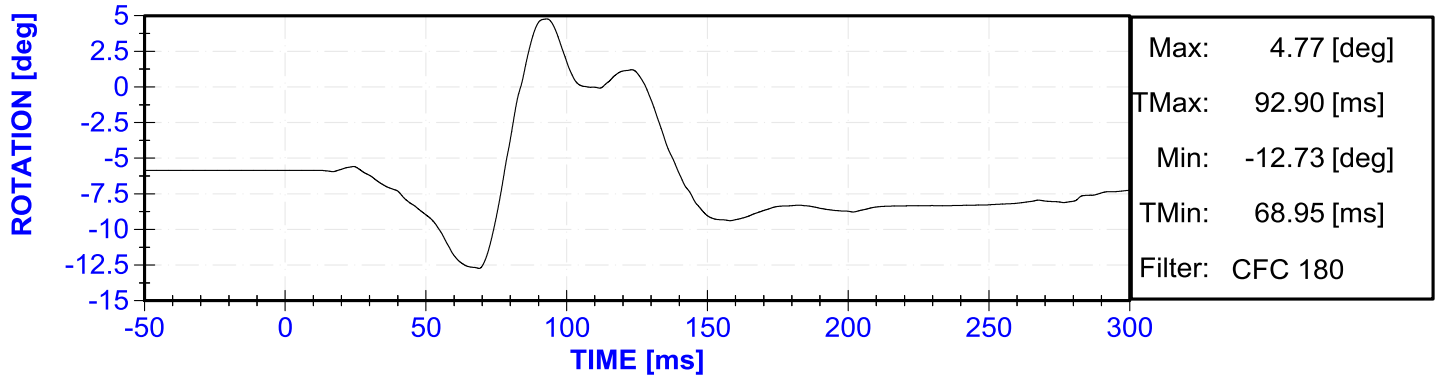




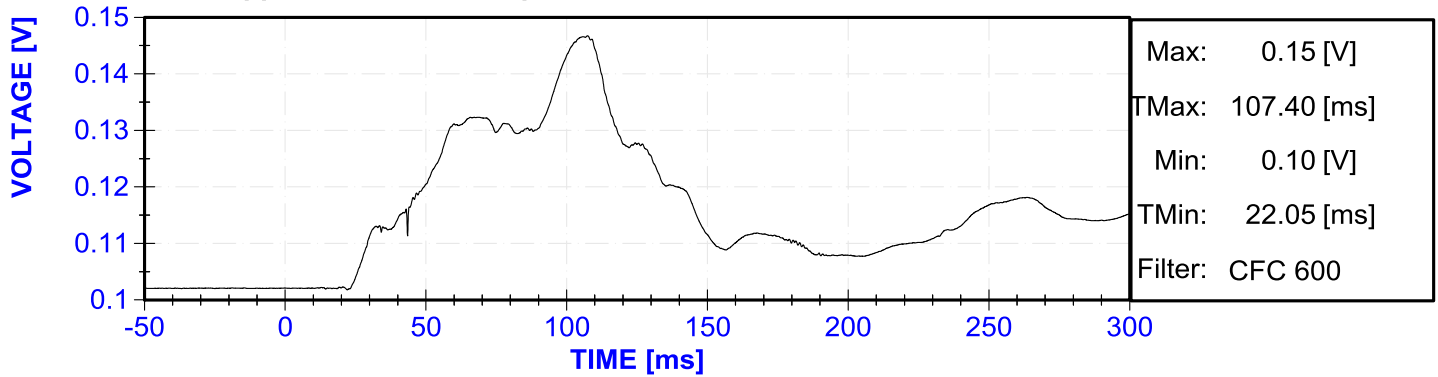




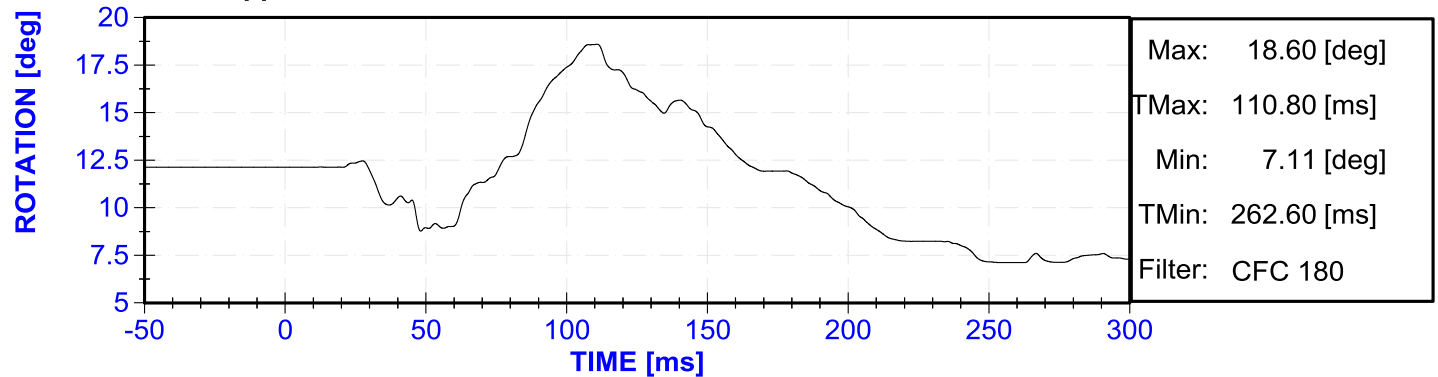
V2P1 Occipital Condyle Rotation Potentiometer



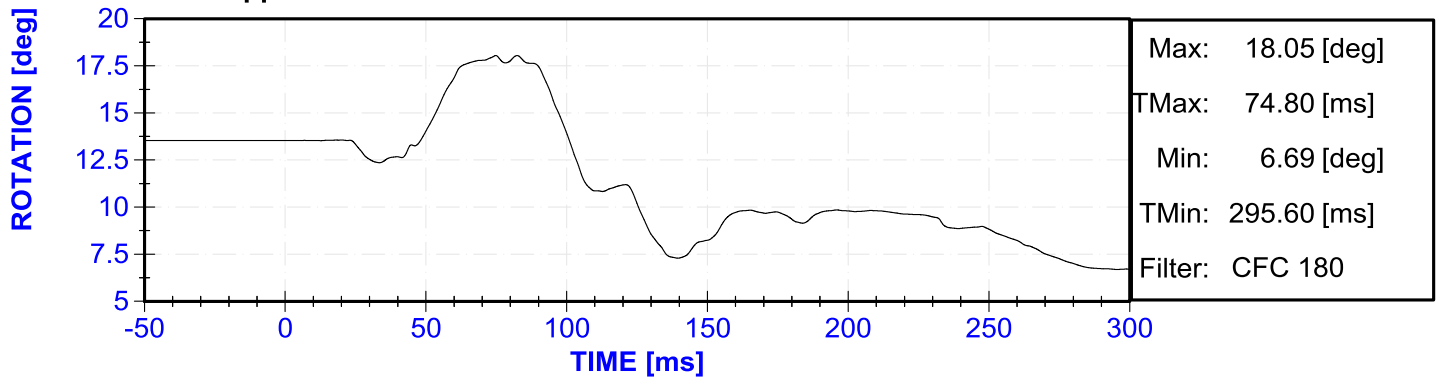
V2P1 Upper Left DGIR X Displacement

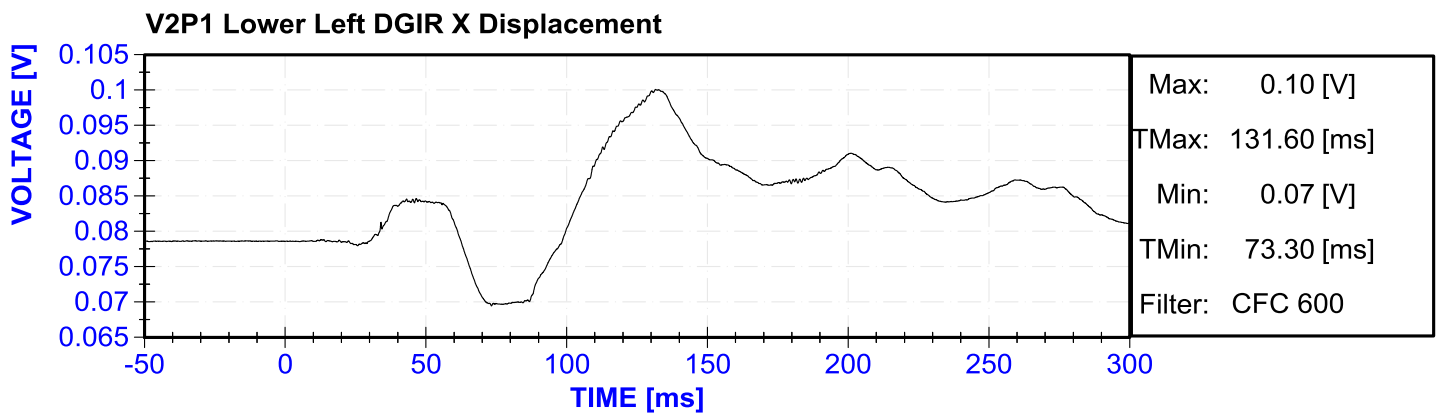
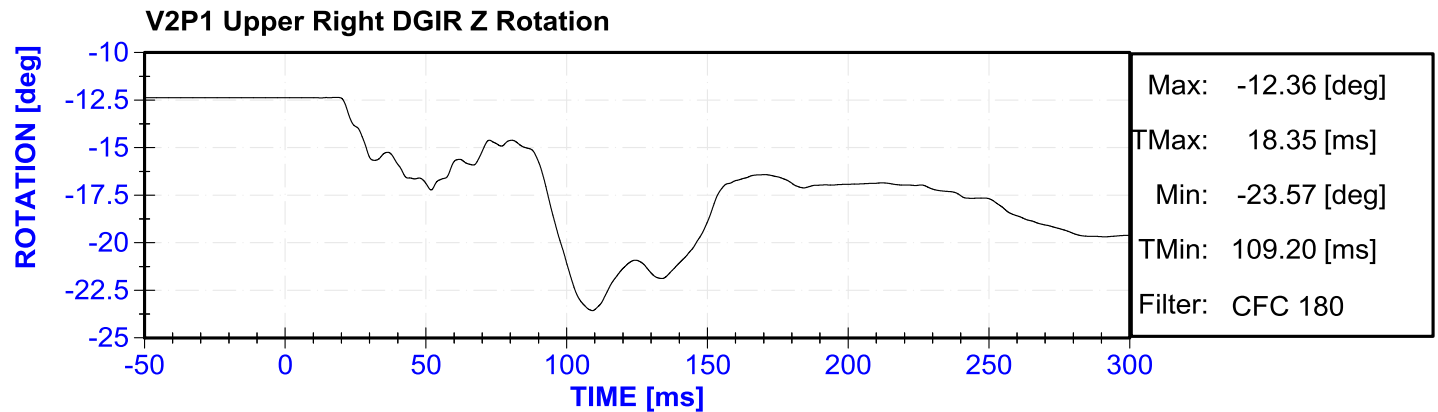
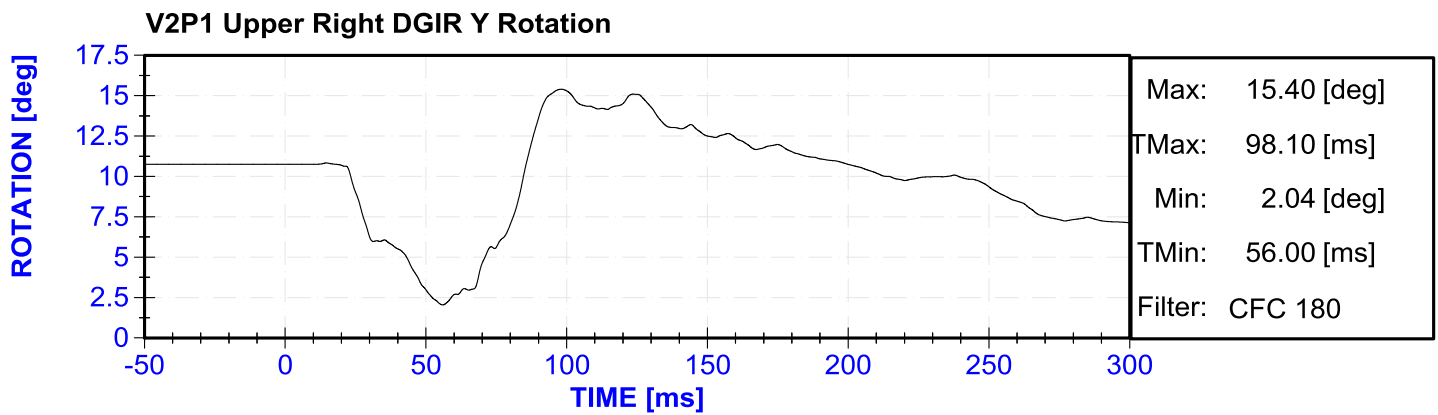
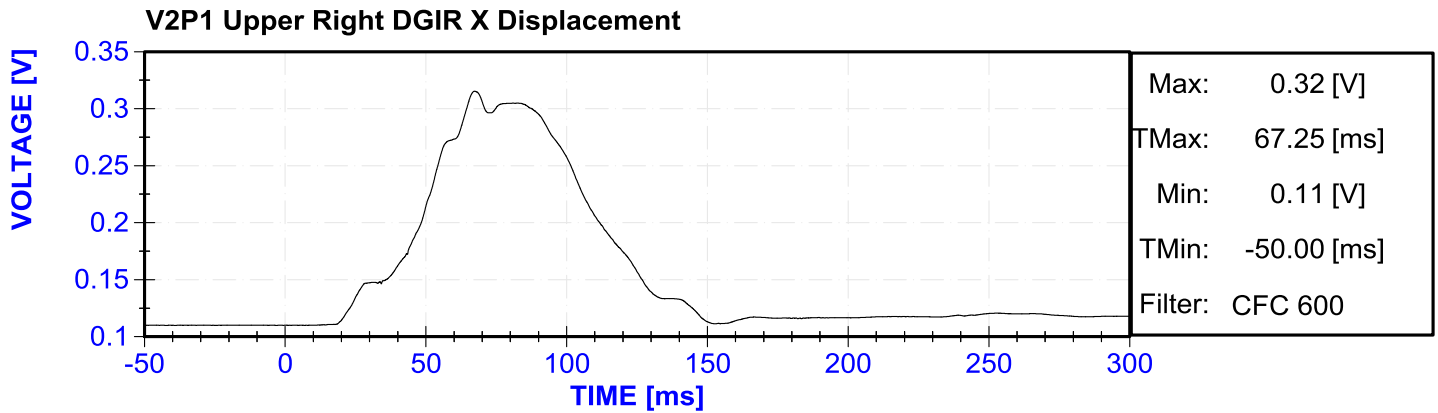


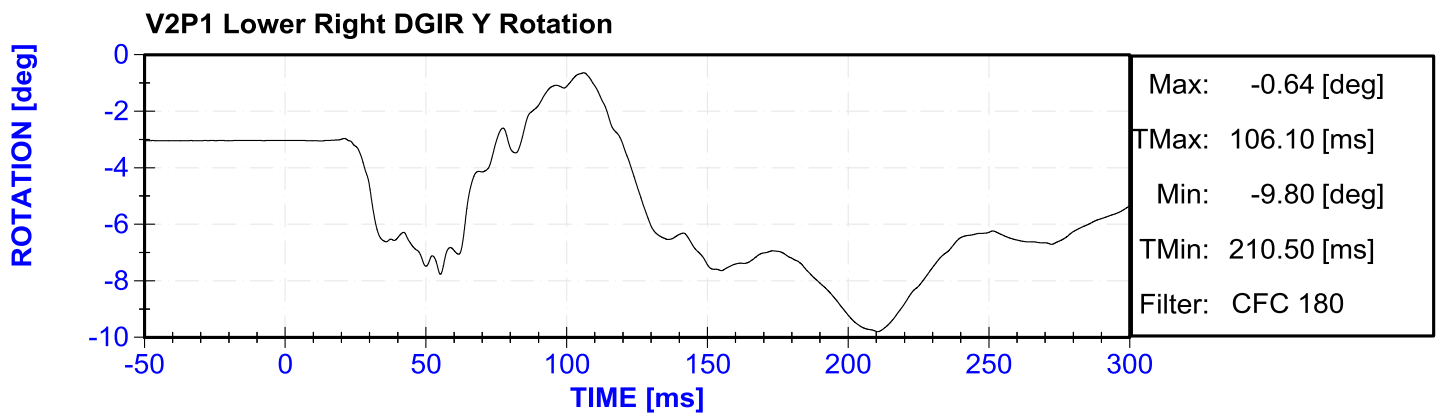
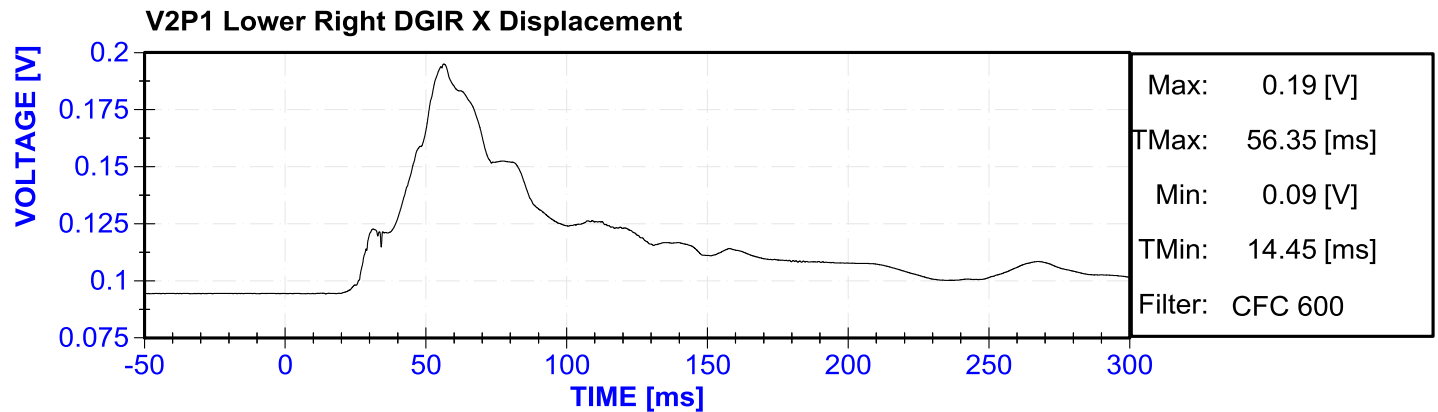
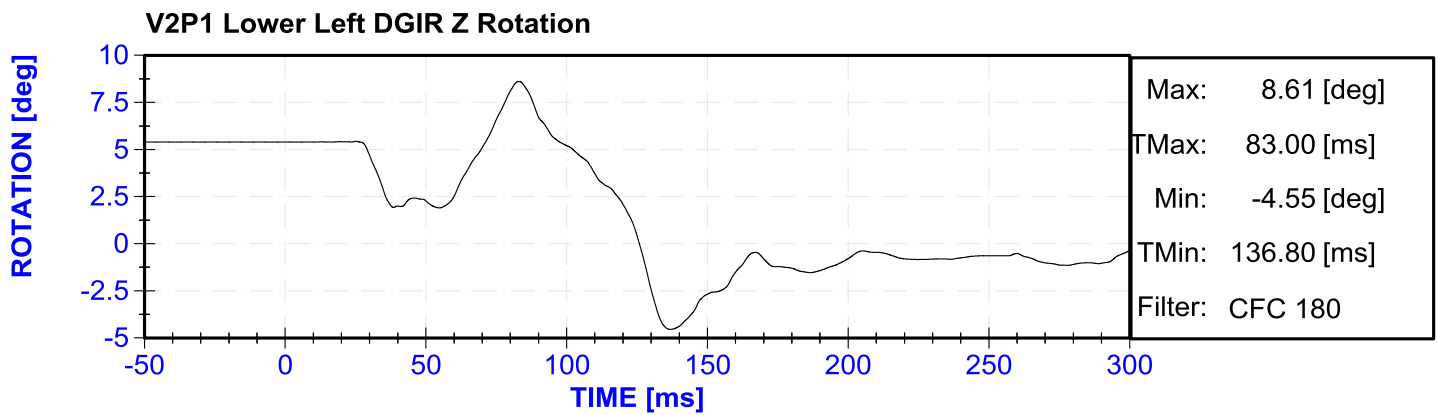
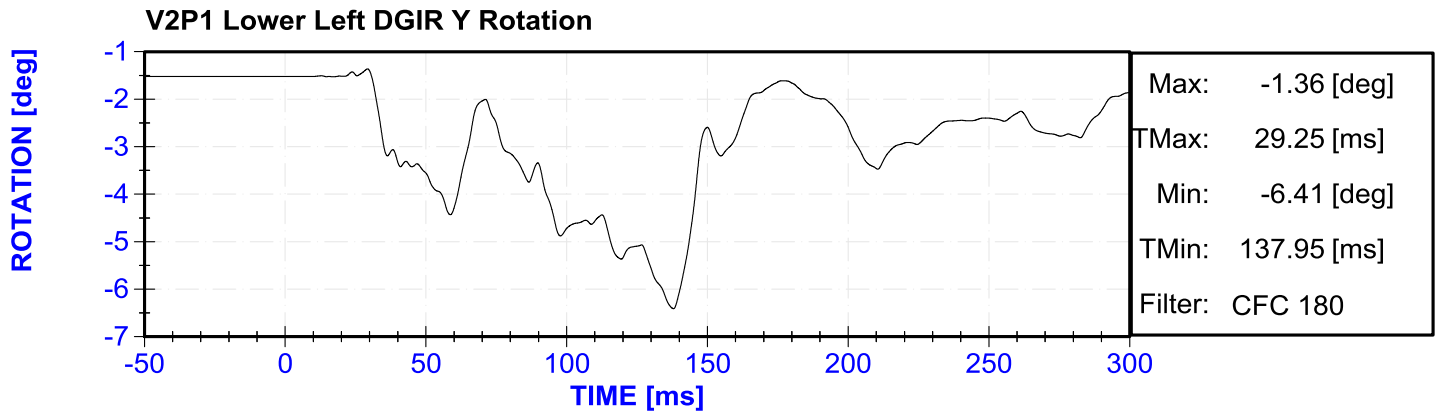
V2P1 Upper Left DGIR Y Rotation

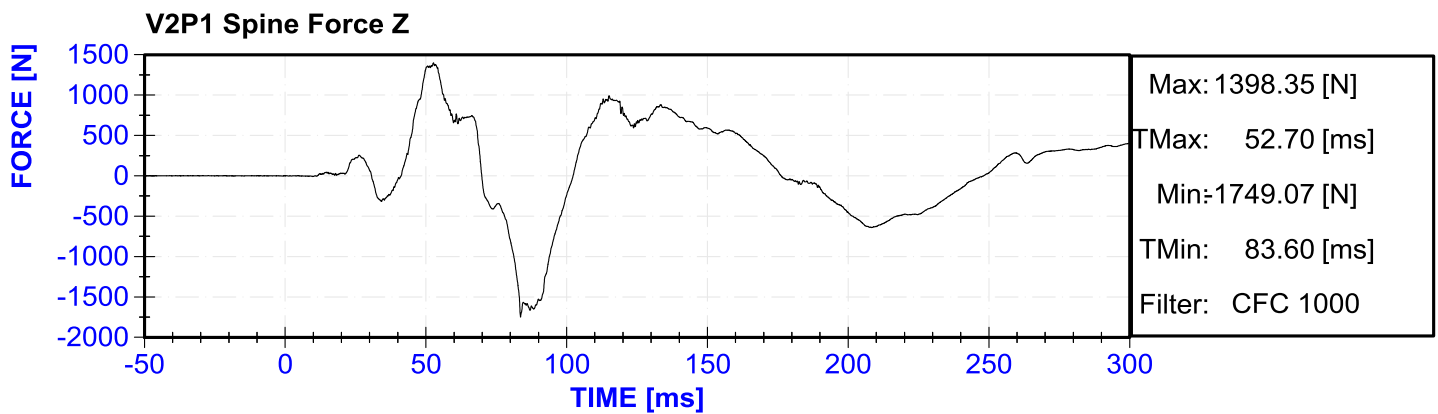
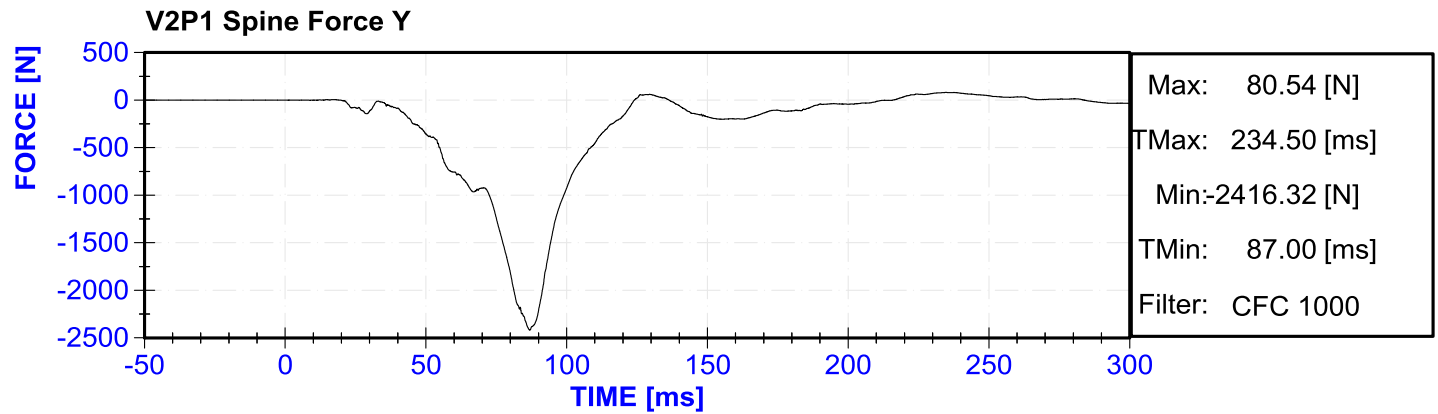
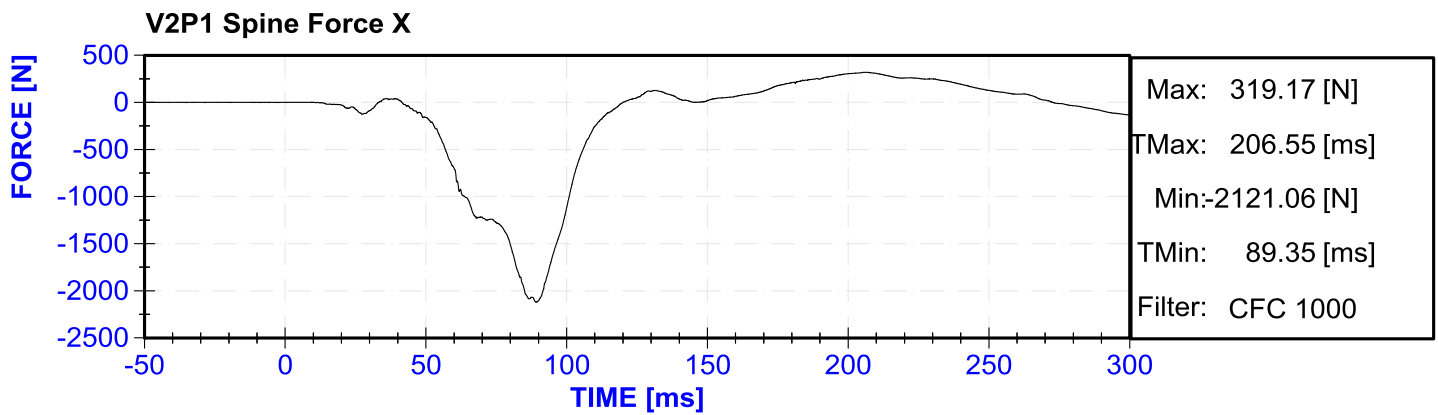
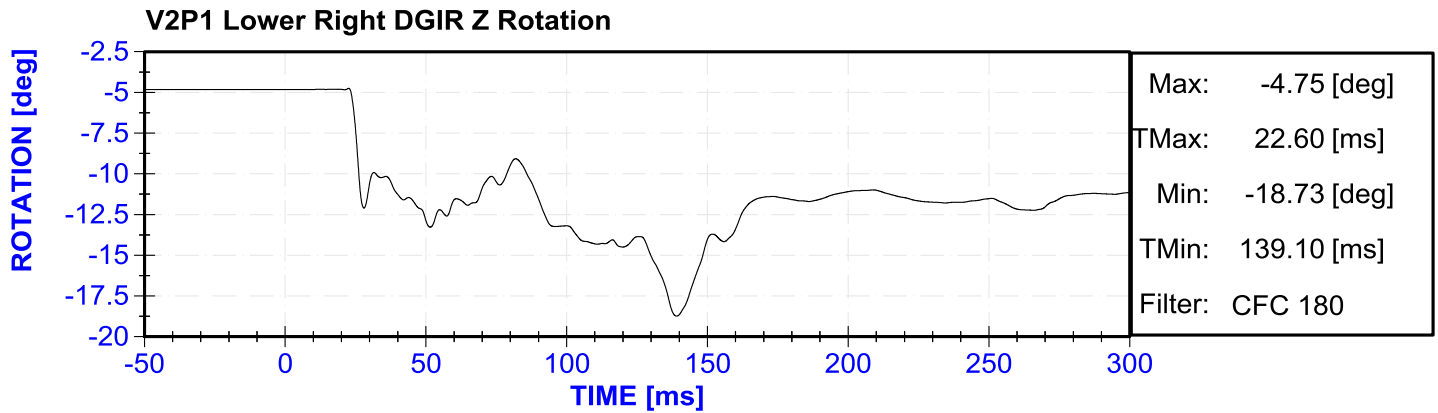


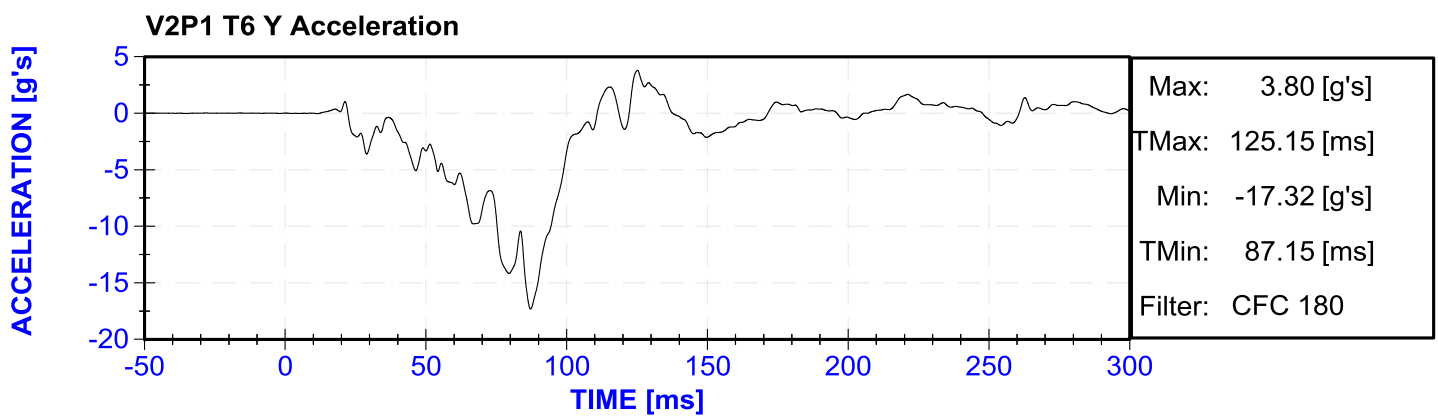
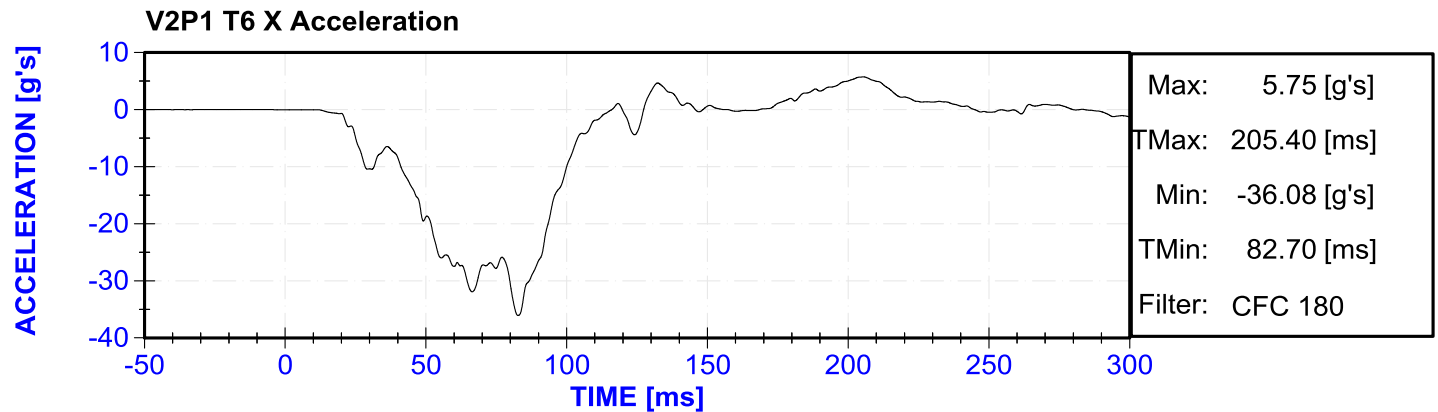
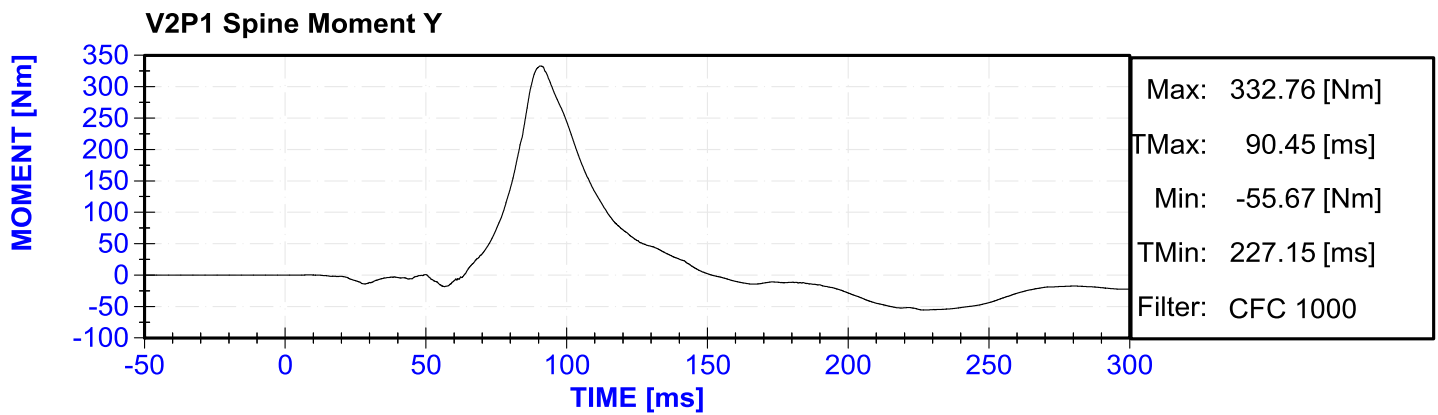
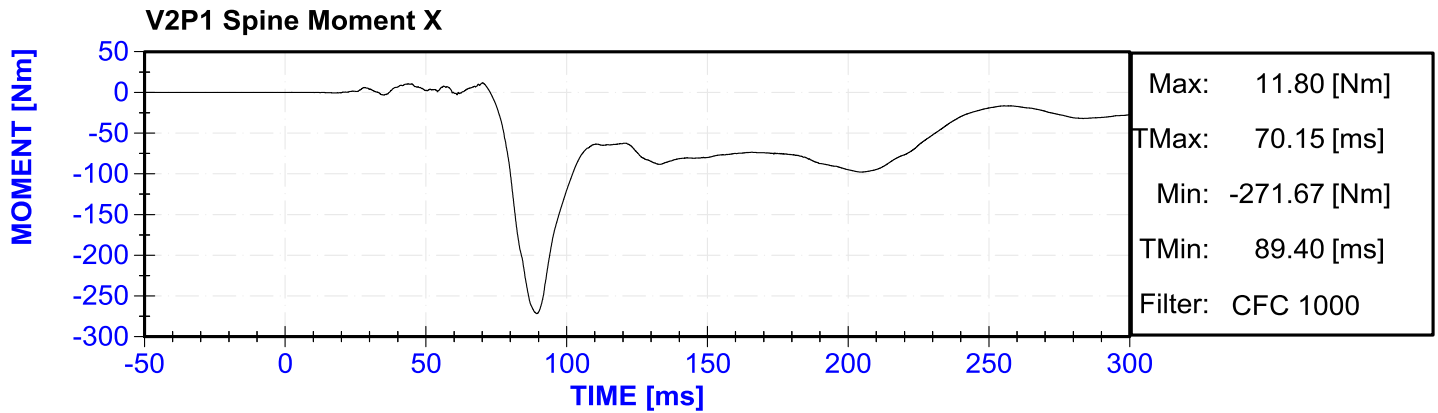
V2P1 Upper Left DGIR Z Rotation

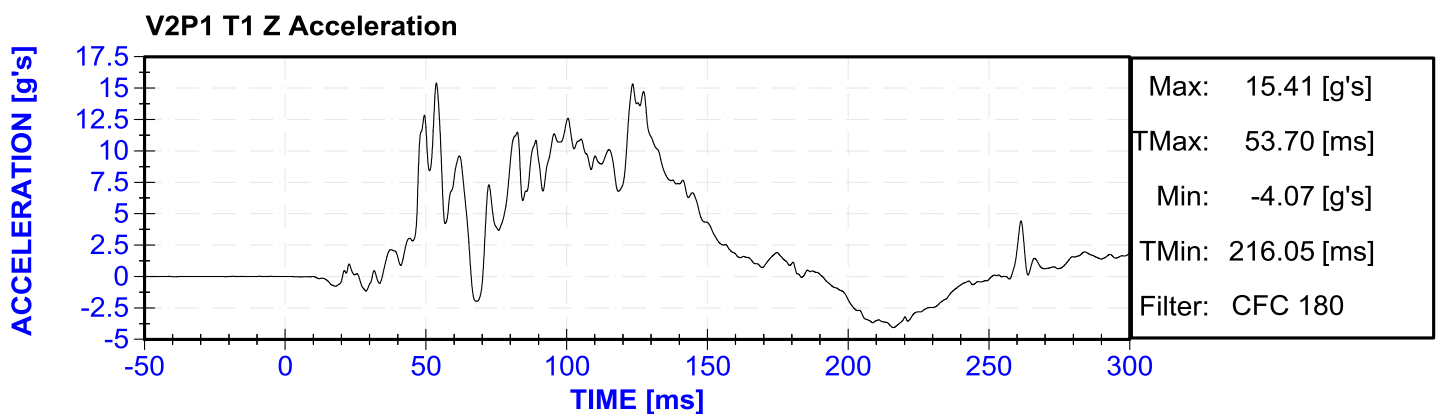
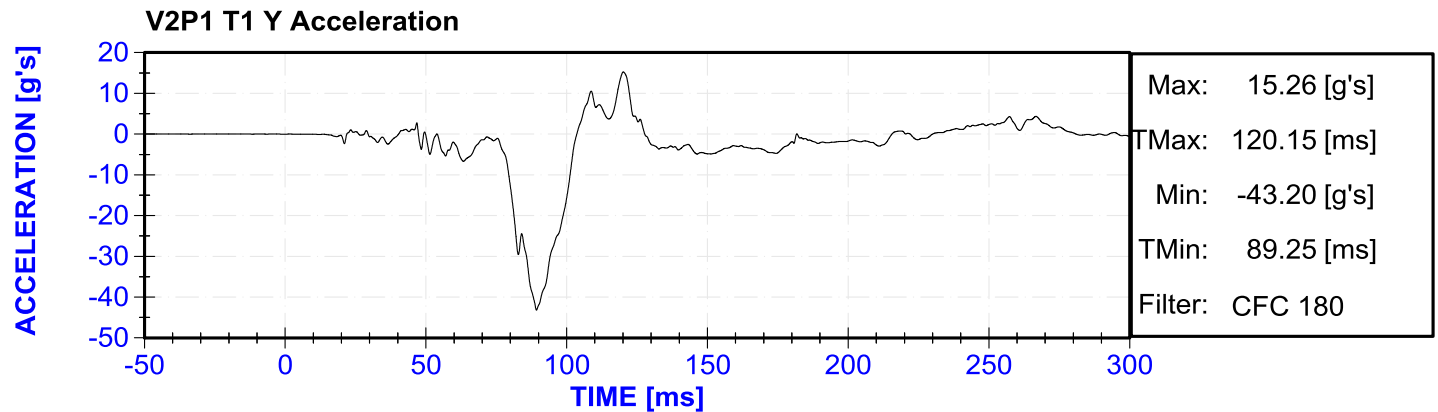
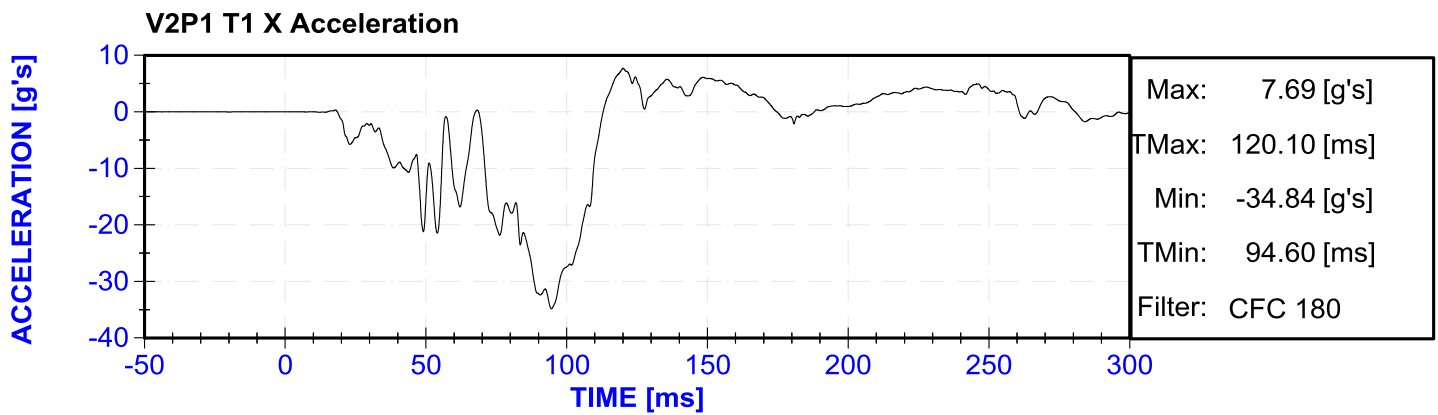
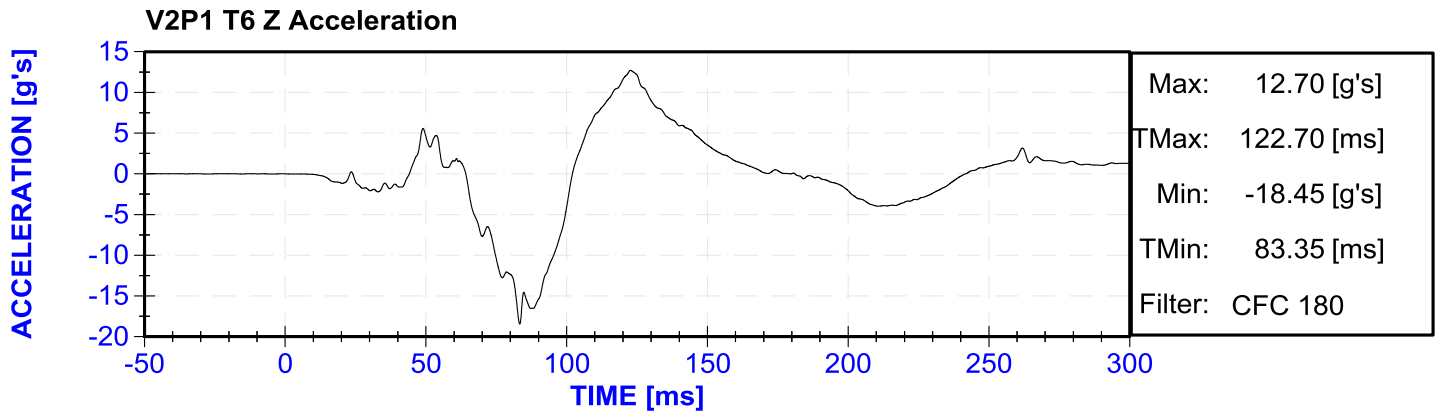




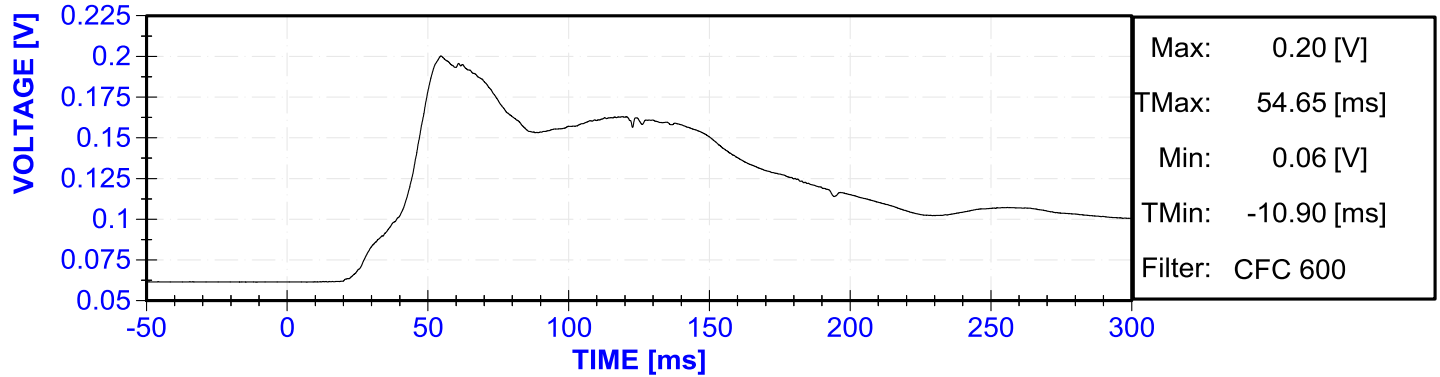




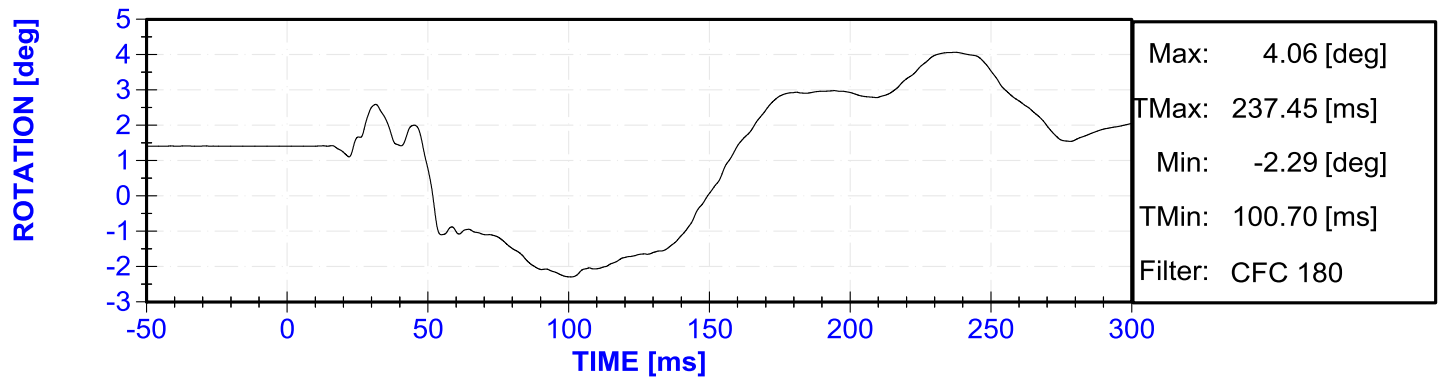




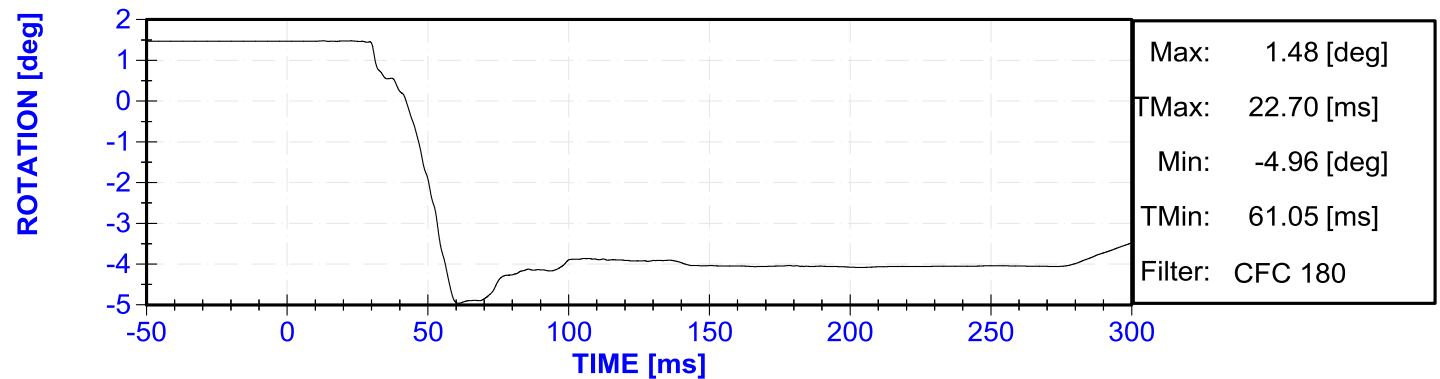
V2P1 Abdomen Left DGIR X Displacement



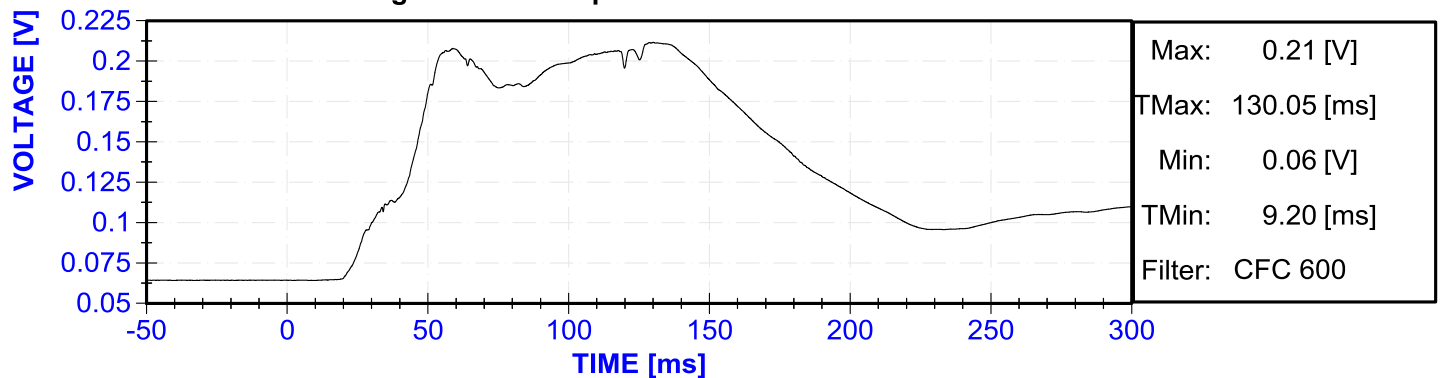
V2P1 Abdomen Left DGIR Y Rotation

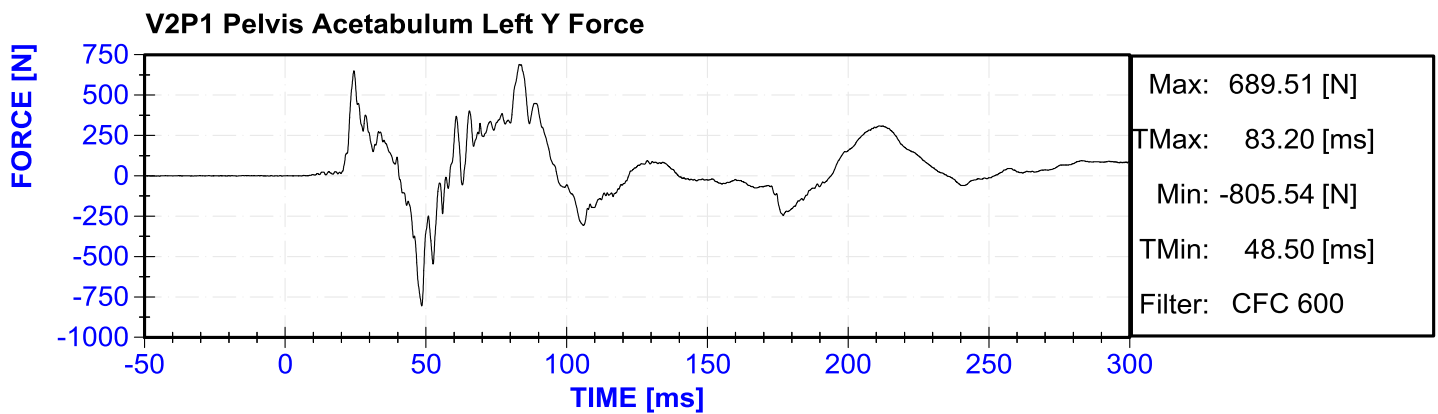
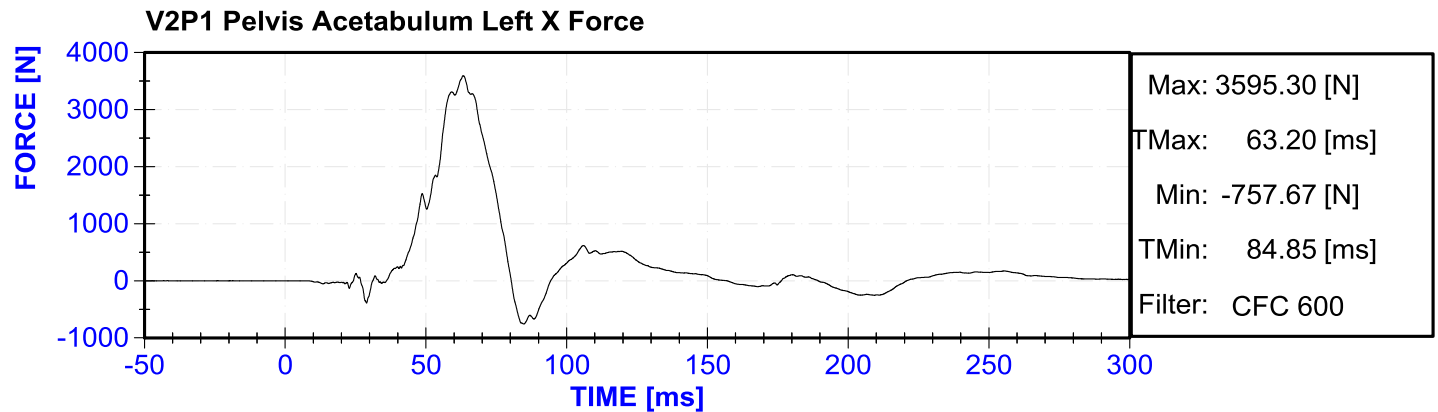
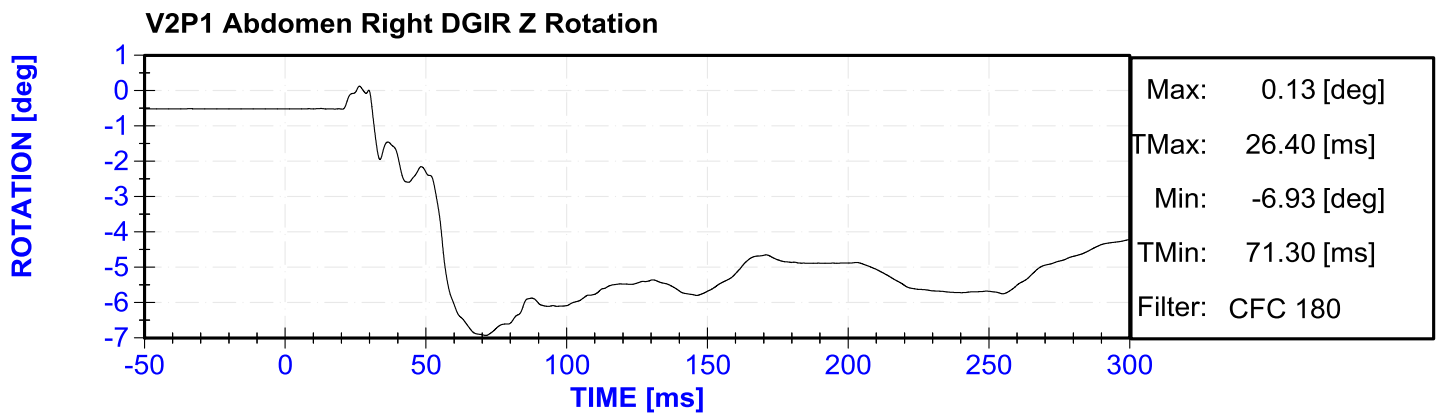
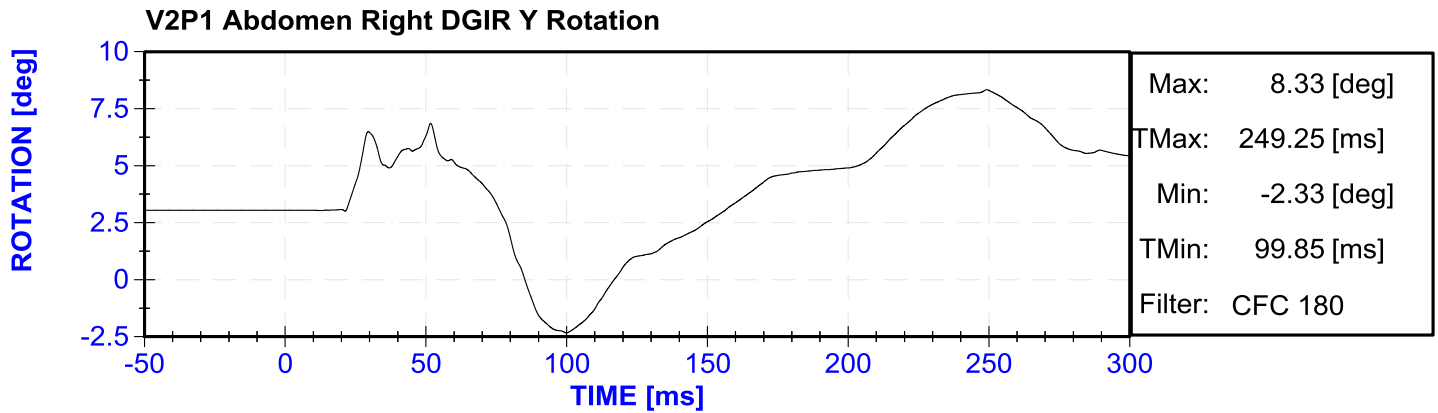


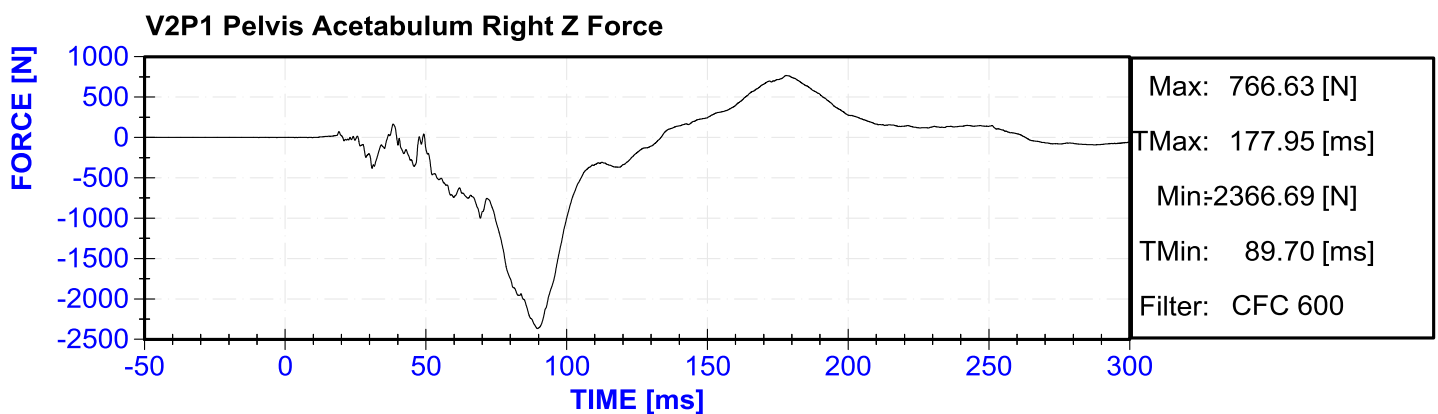
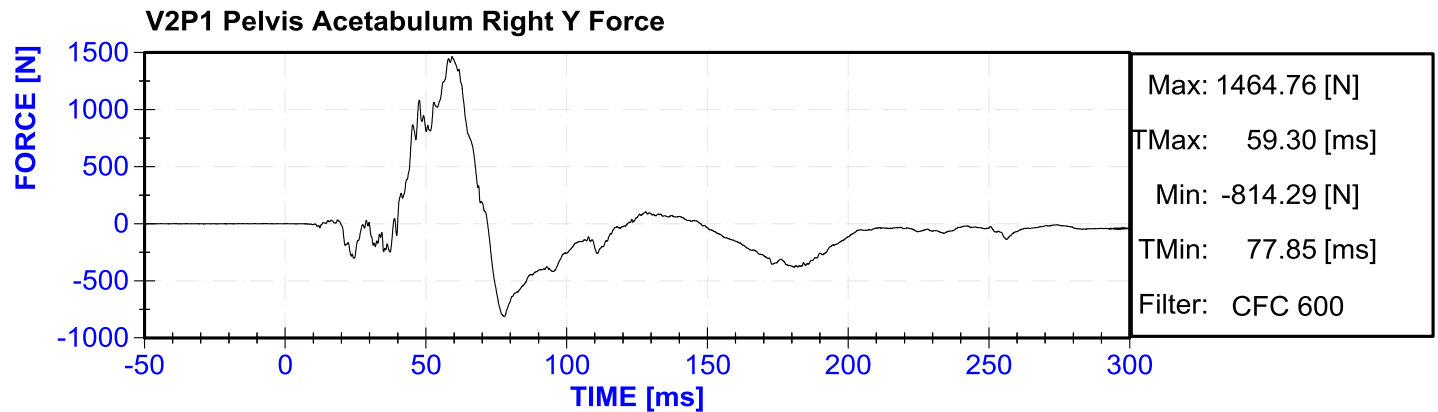
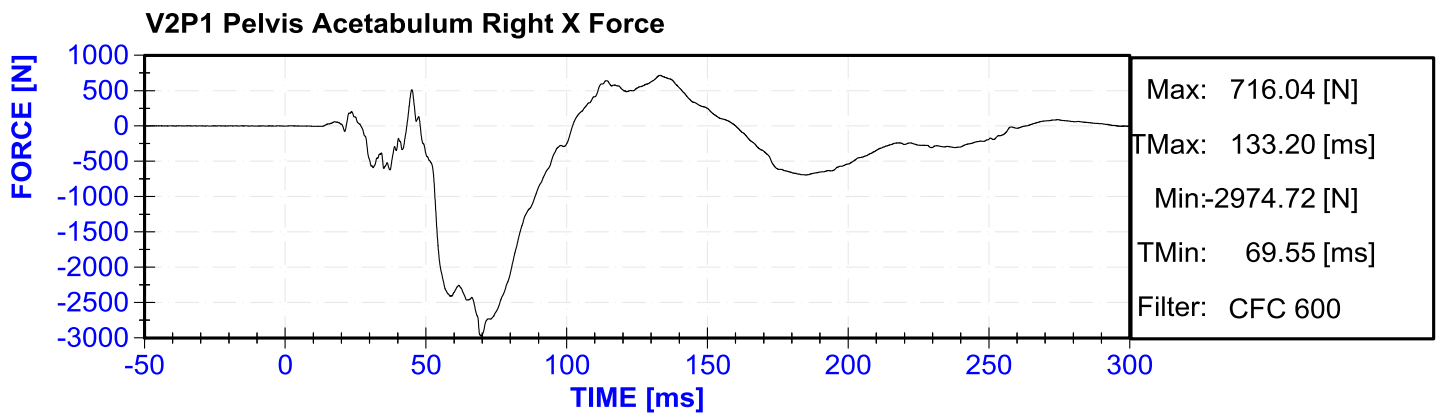
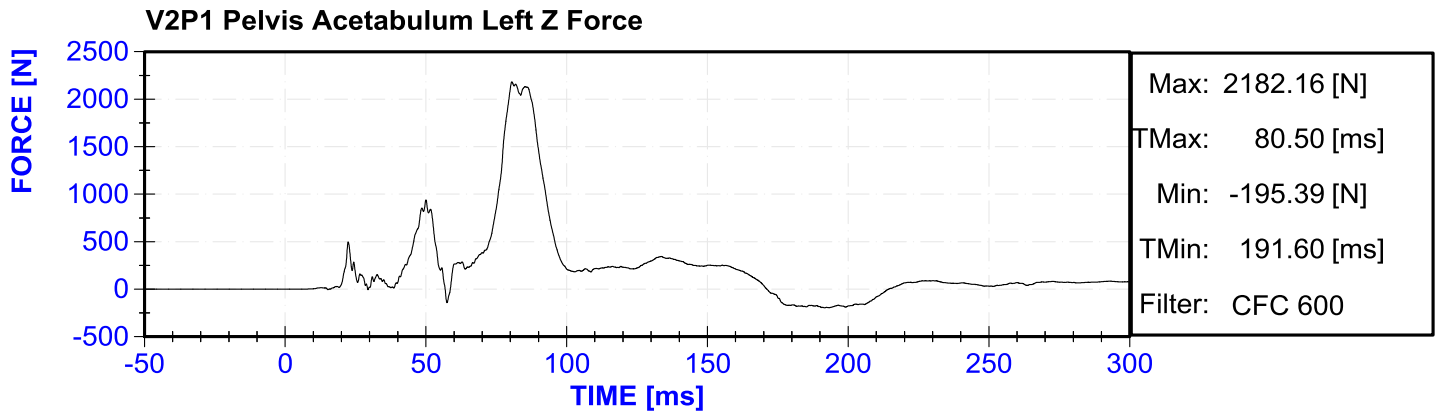
V2P1 Abdomen Left DGIR Z Rotation

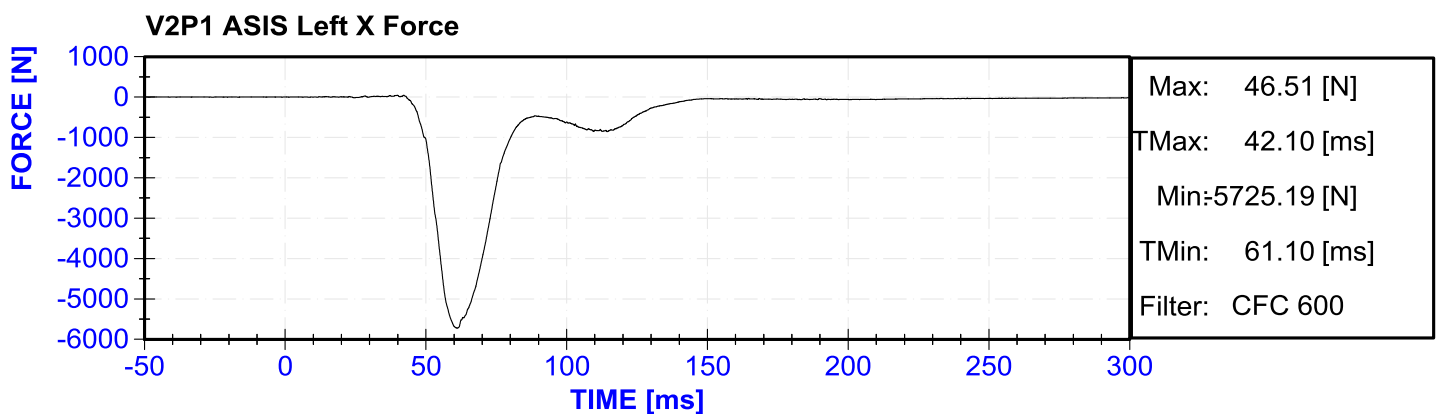
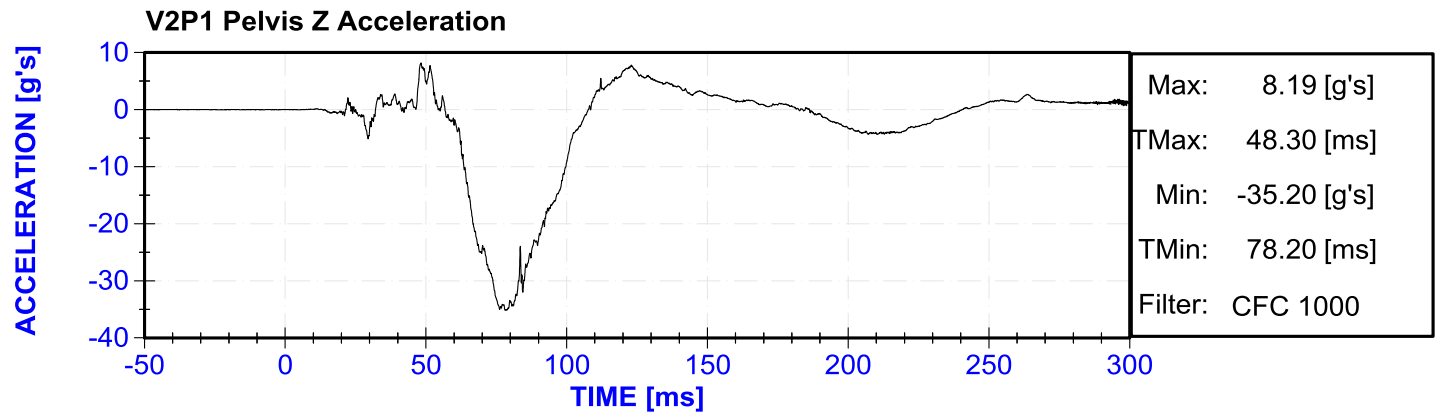
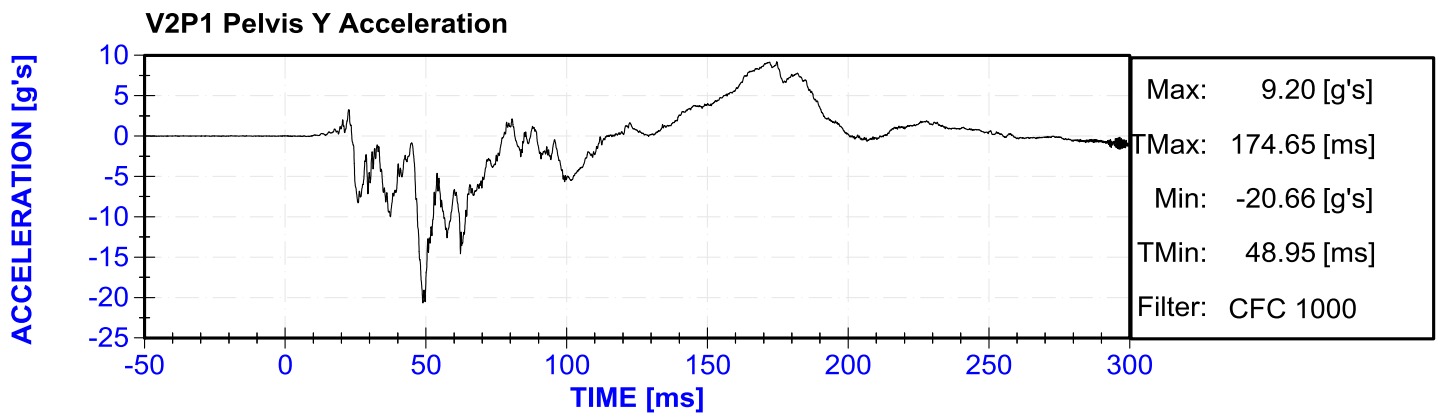
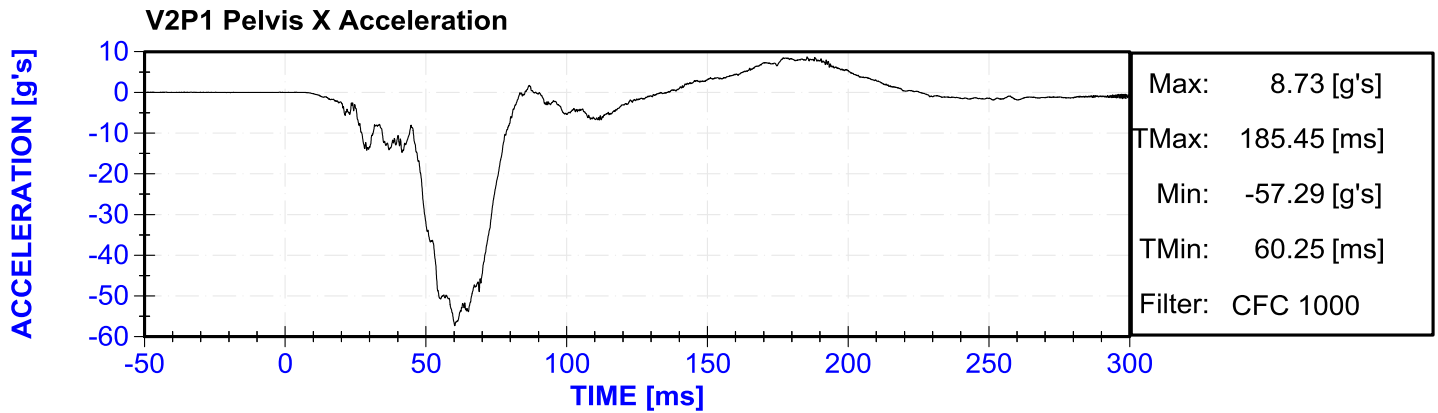


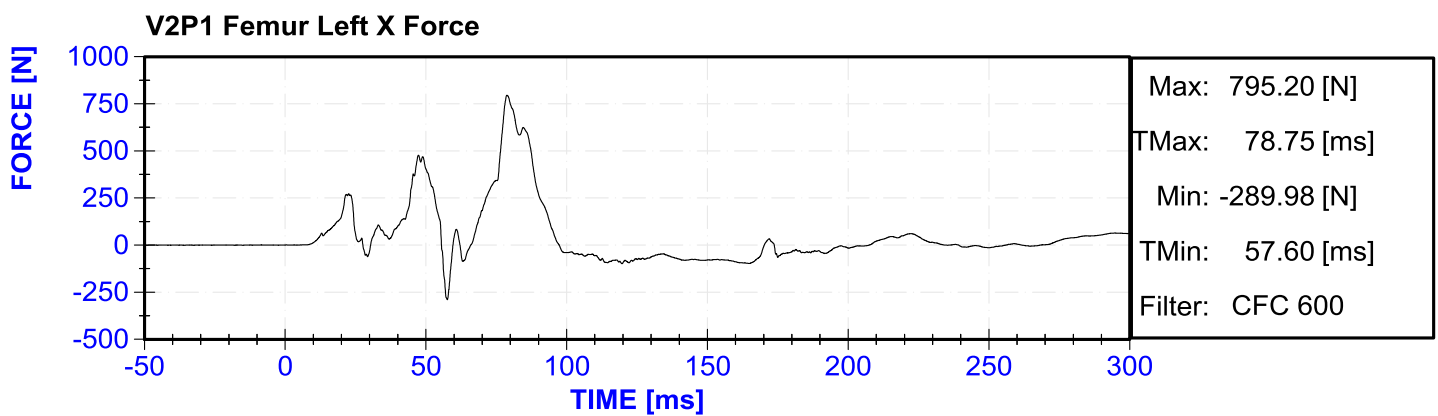
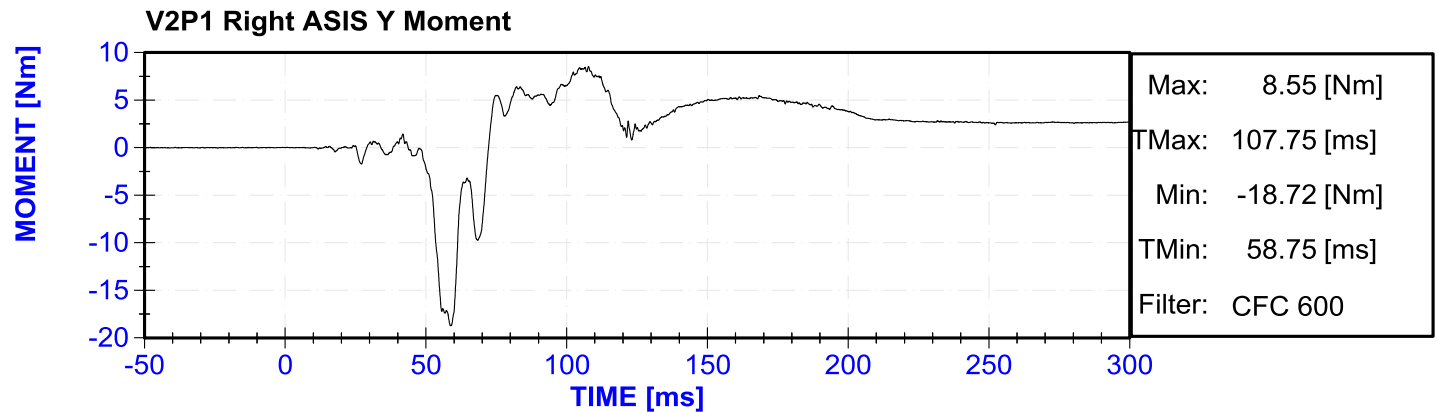
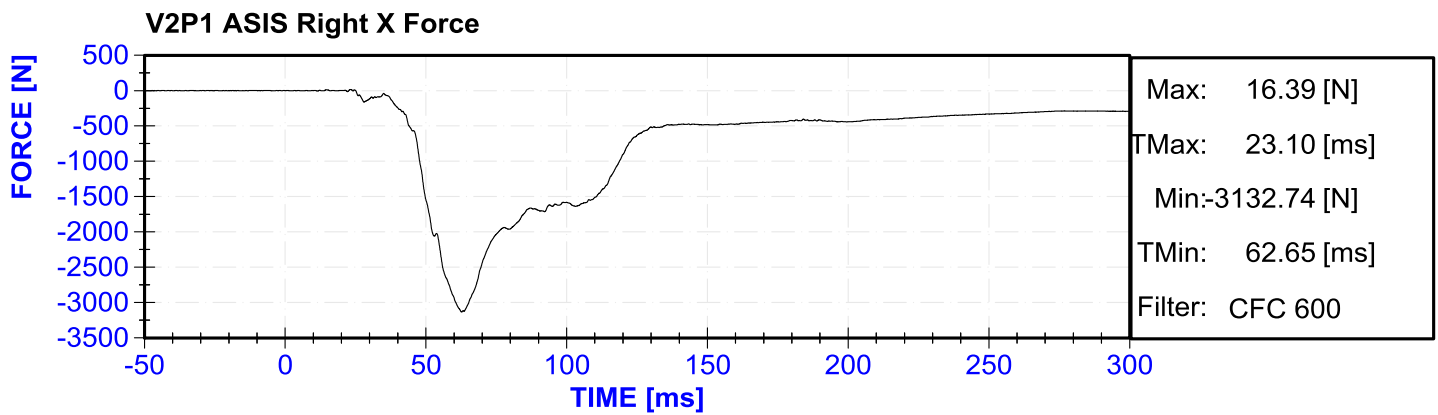
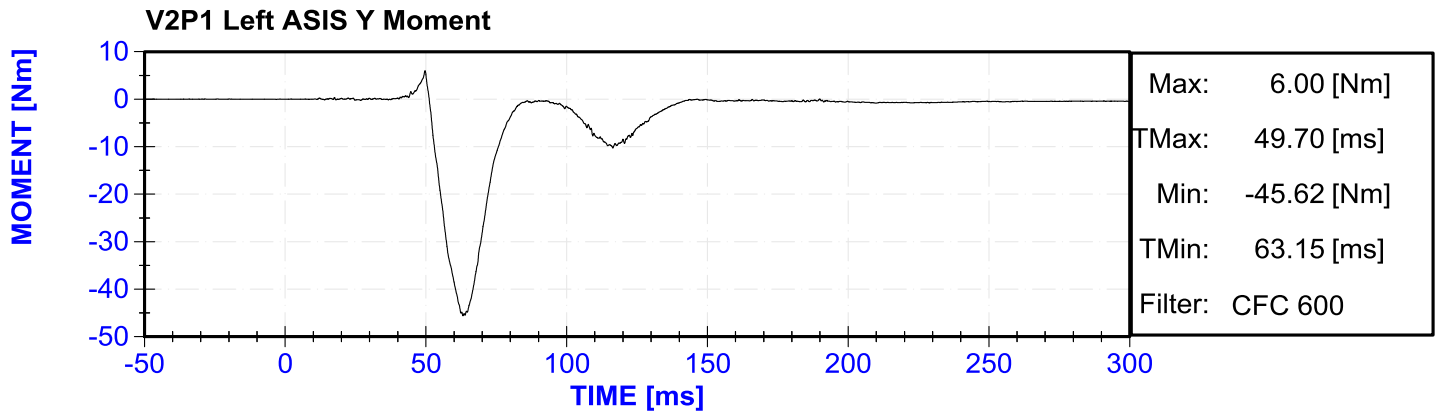
V2P1 Abdomen Right DGIR X Displacement

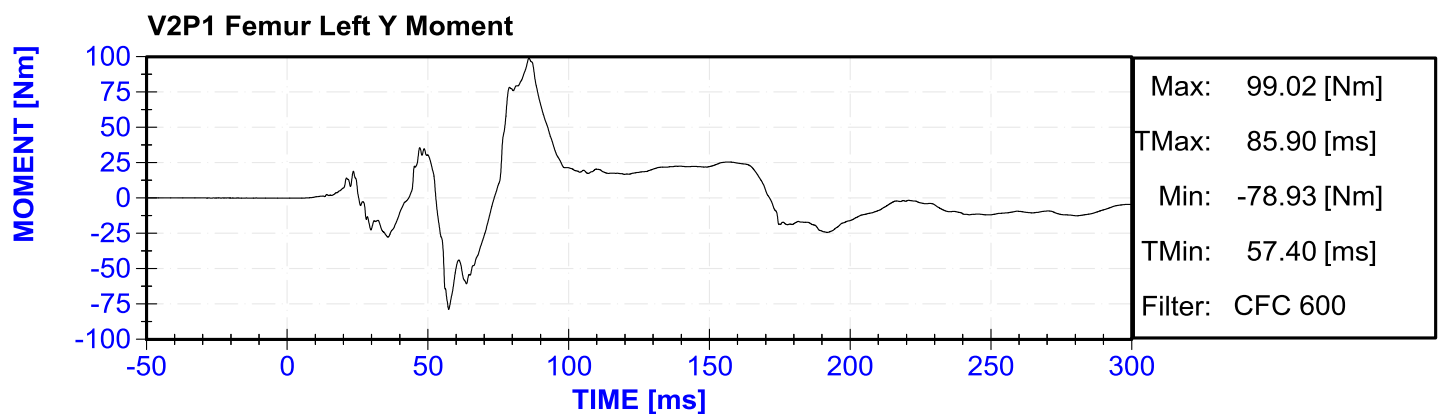
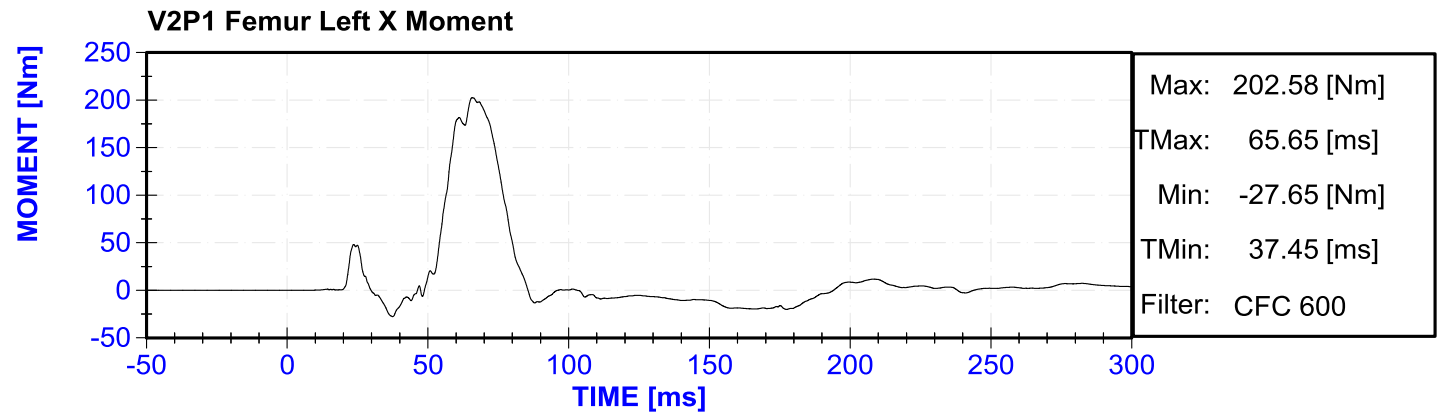
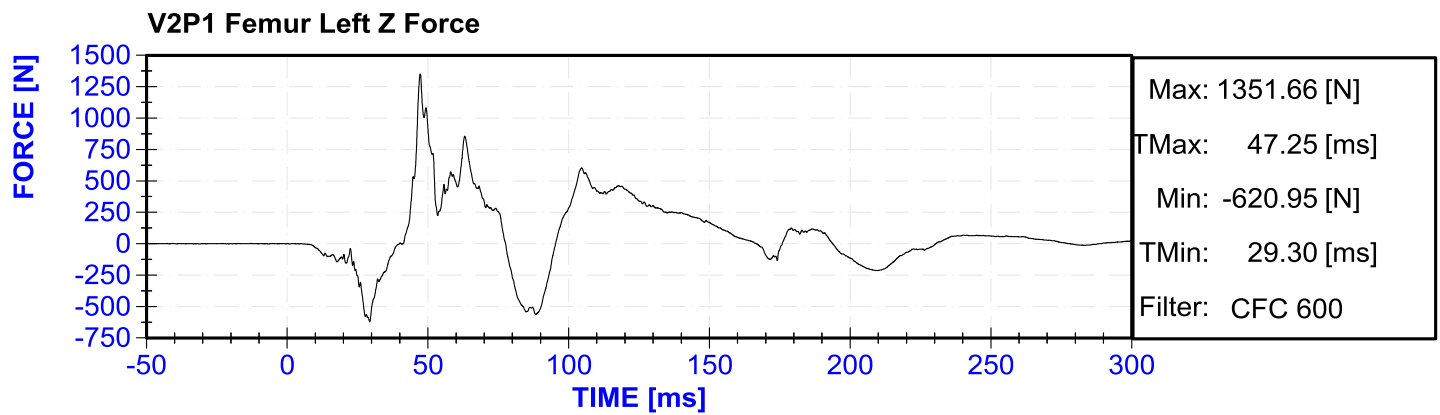
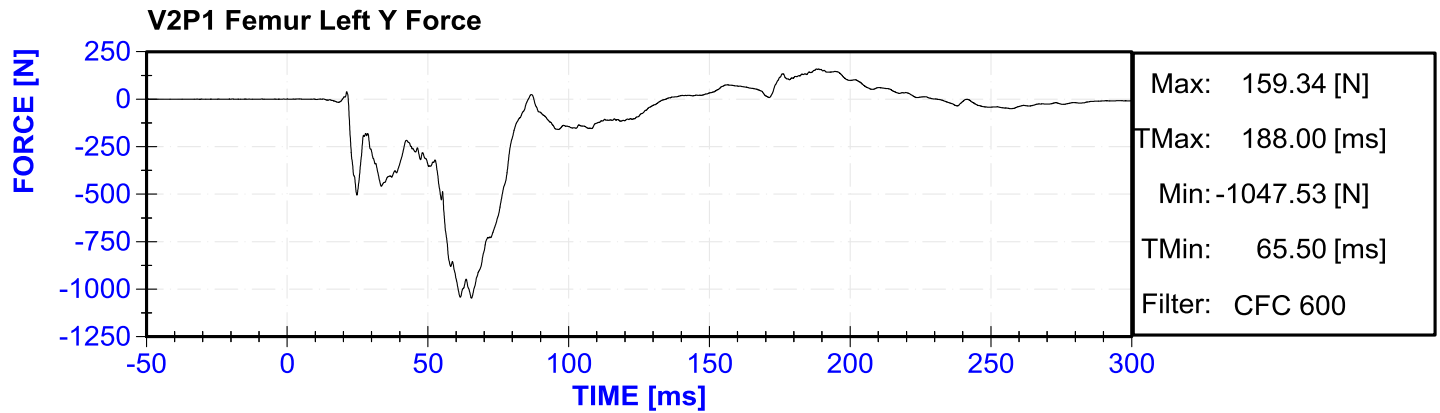


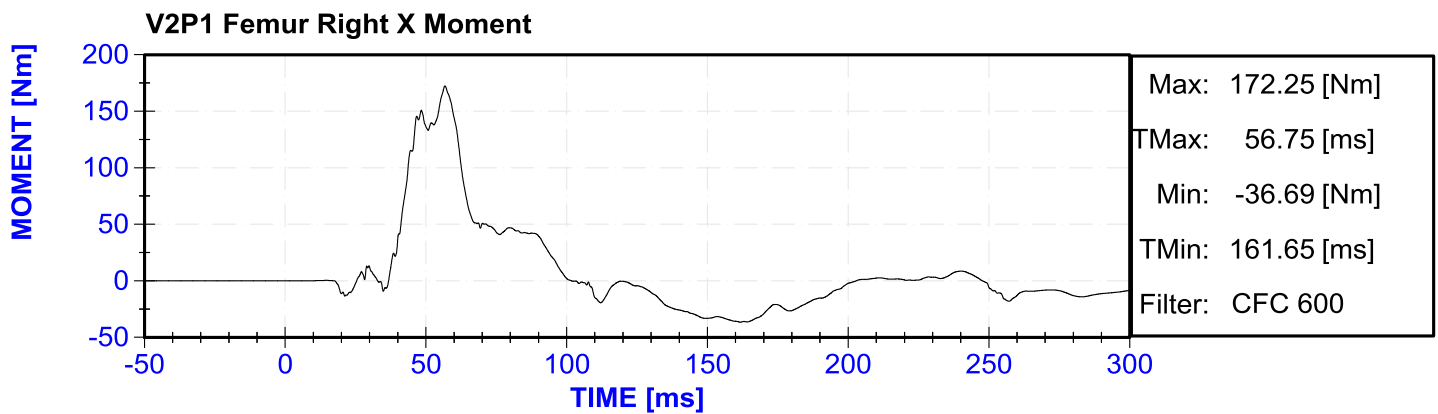
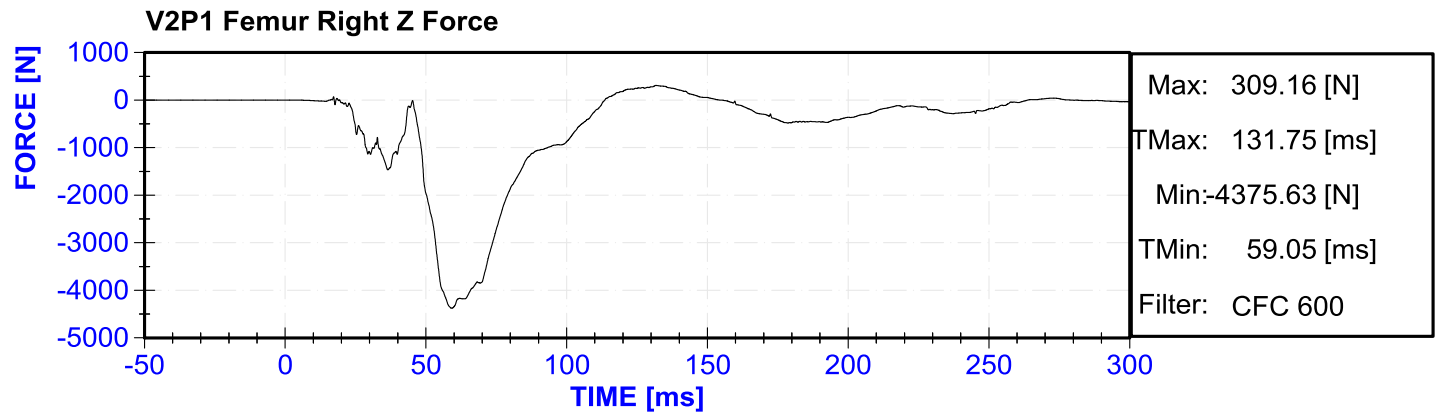
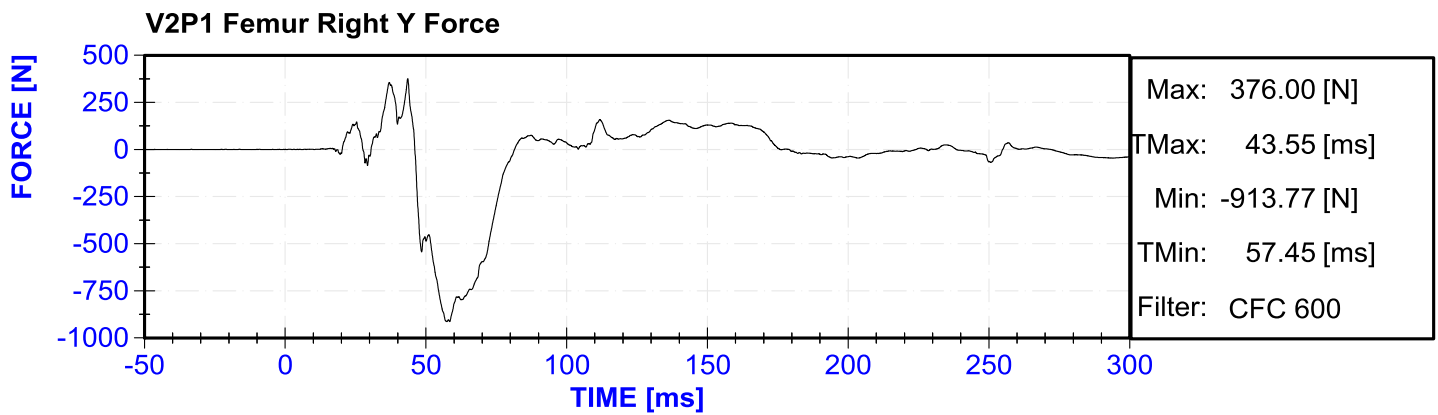
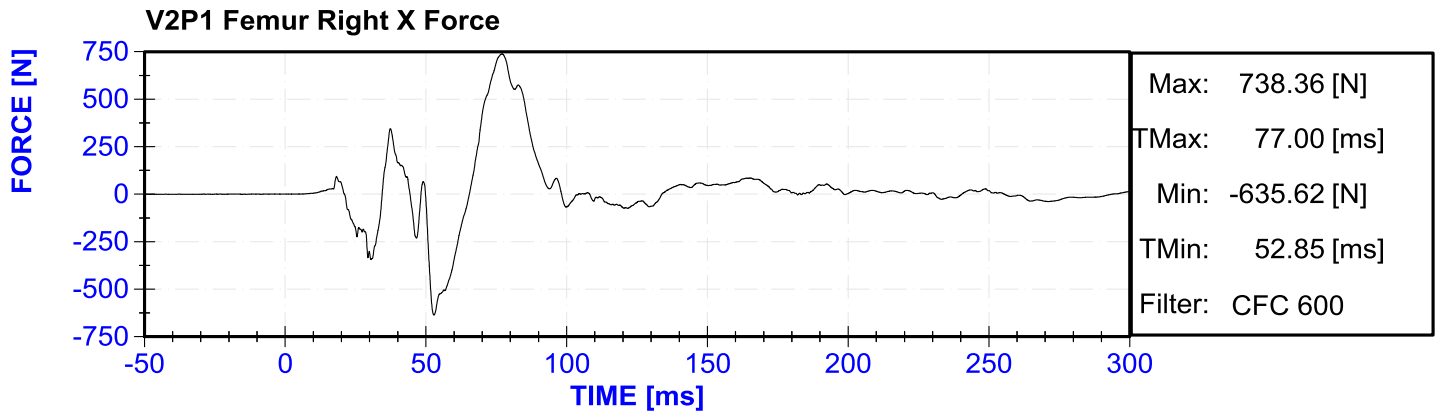


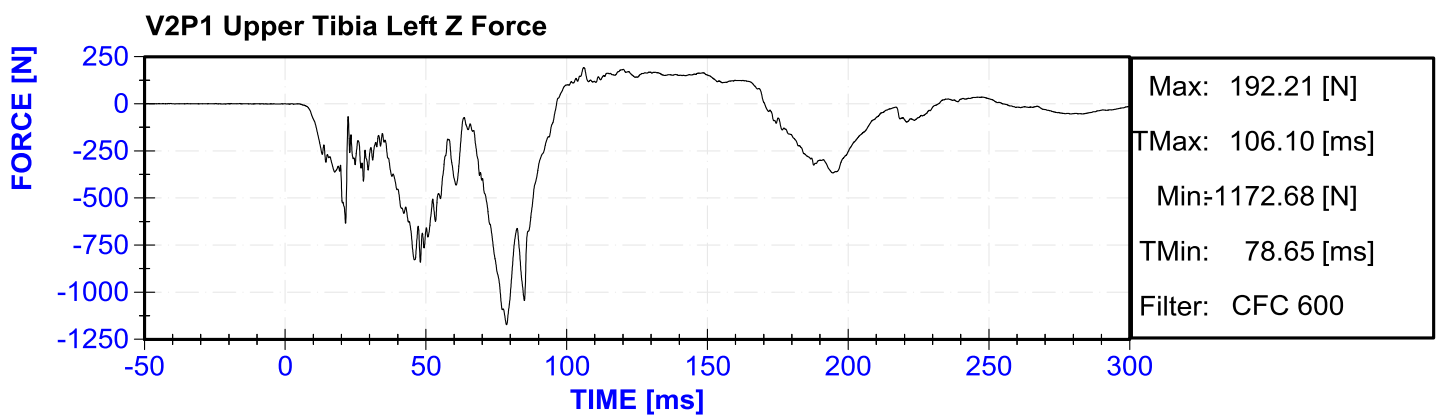
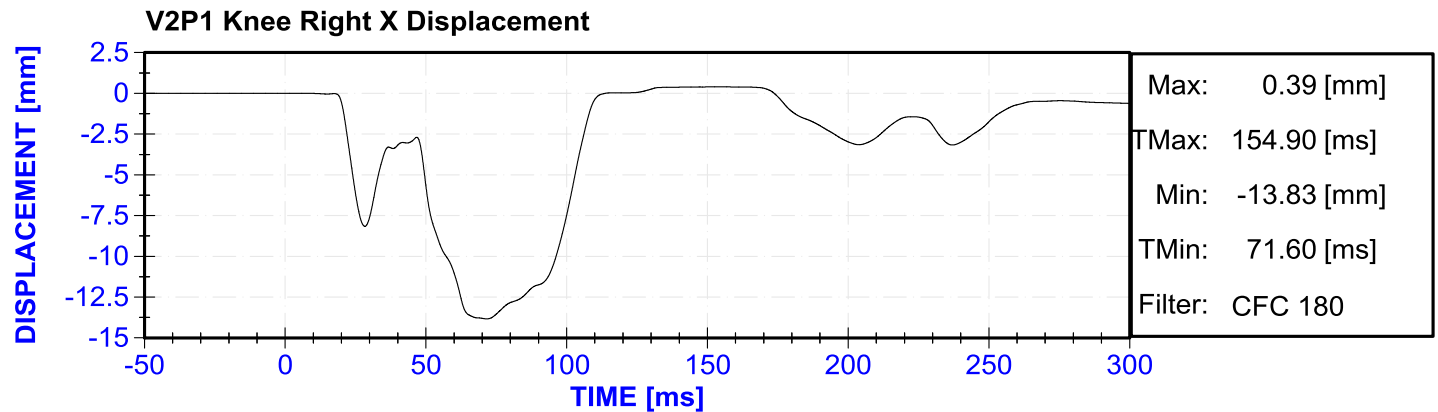
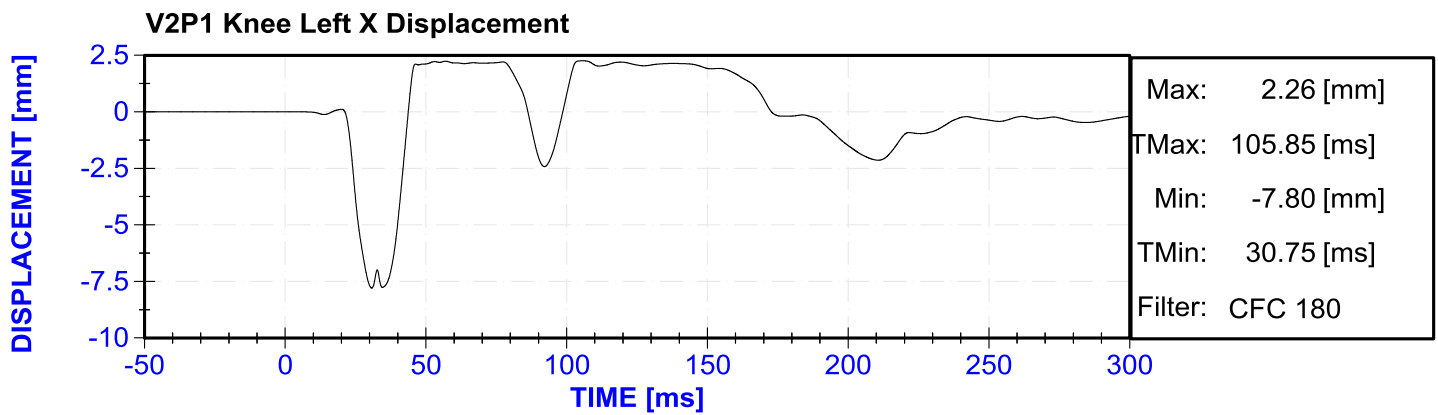
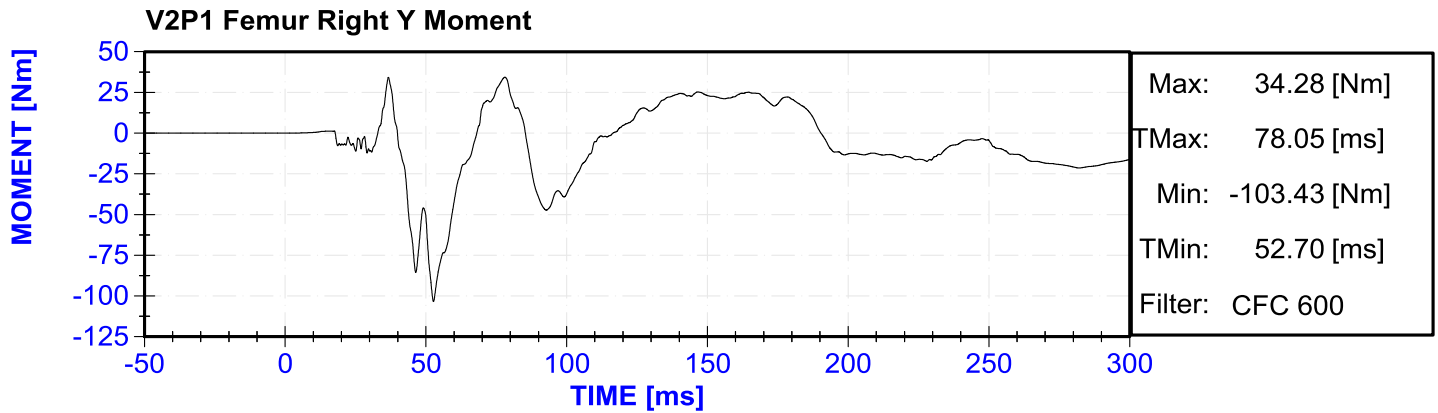


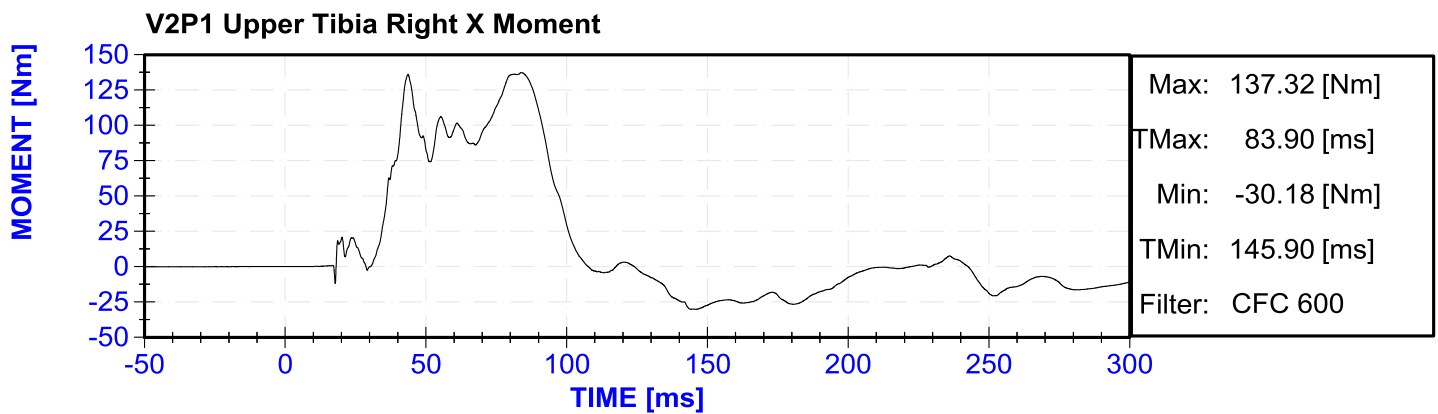
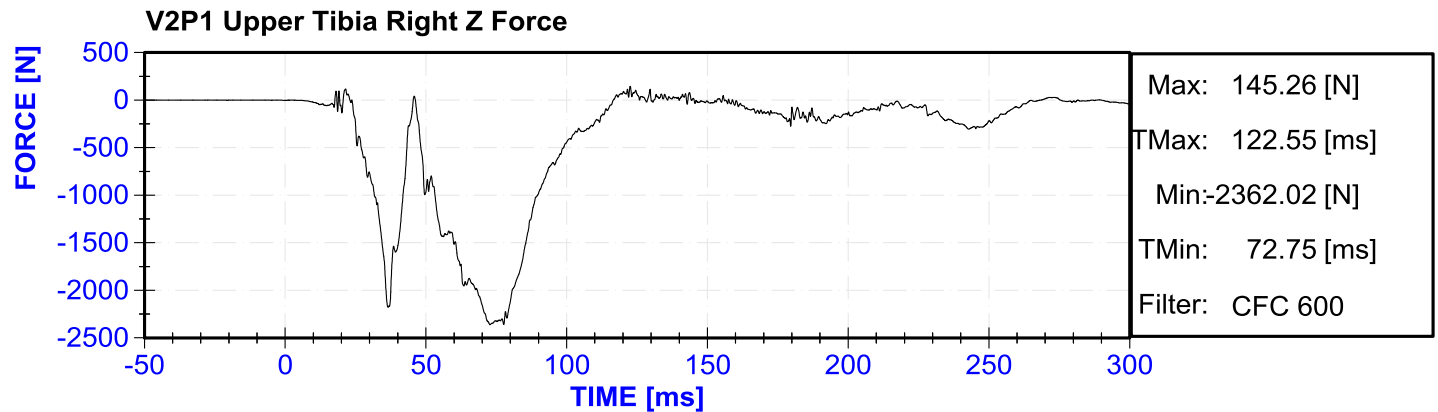
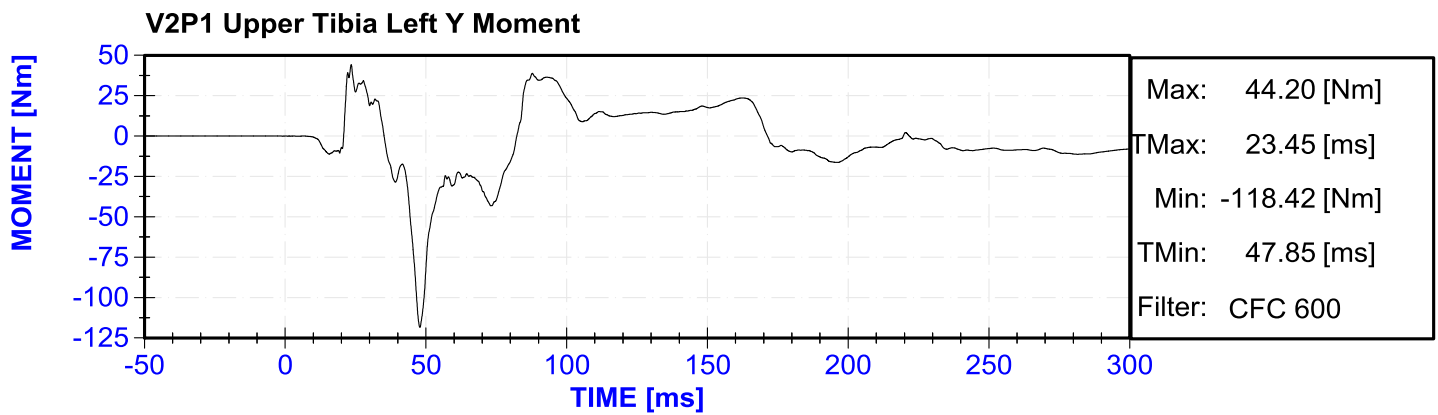
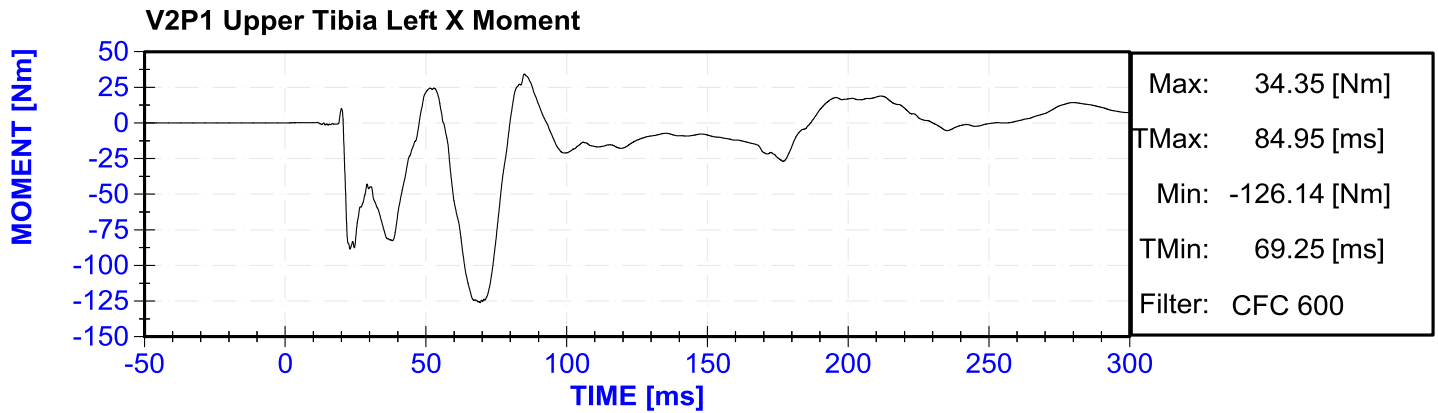


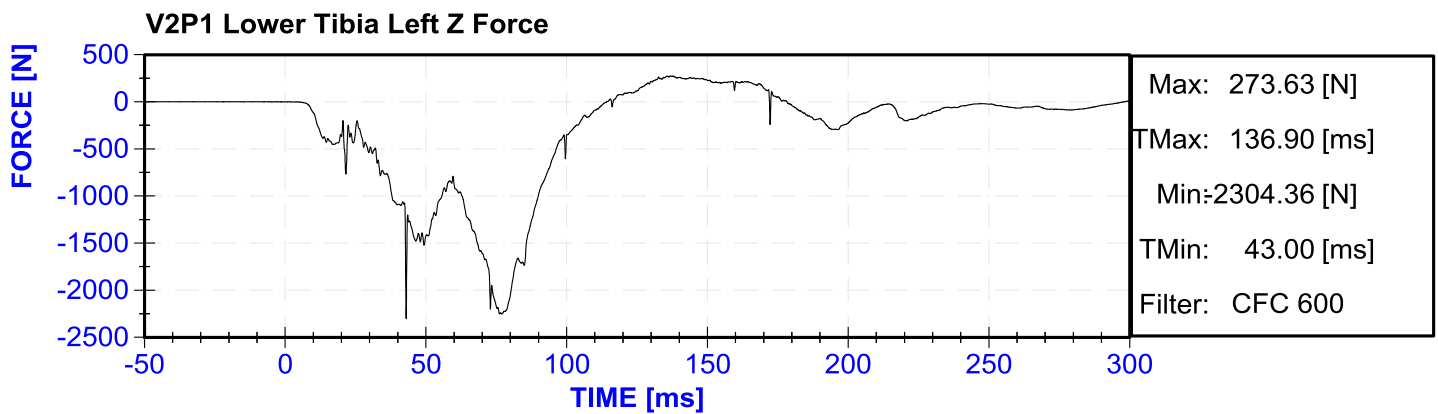
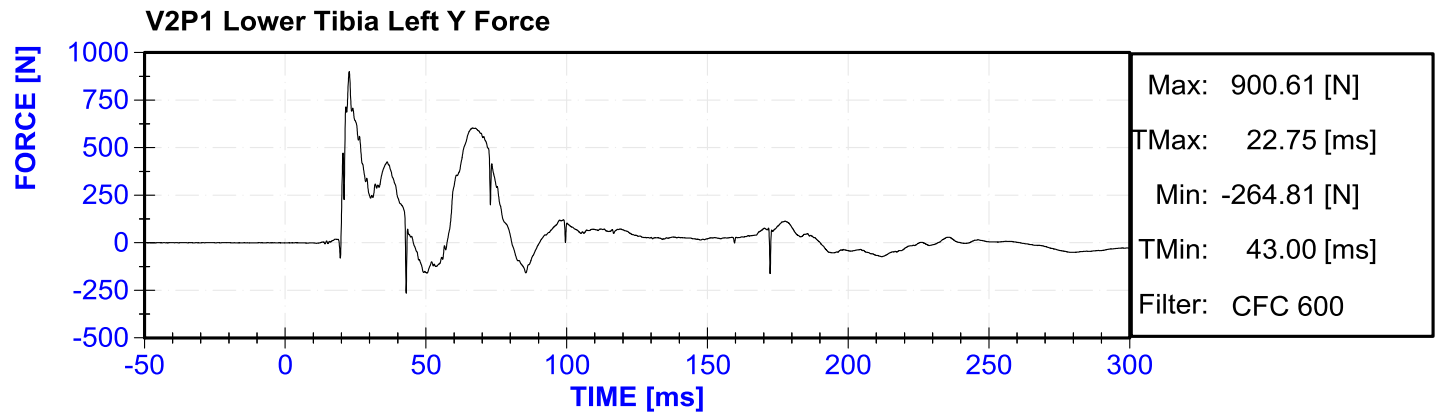
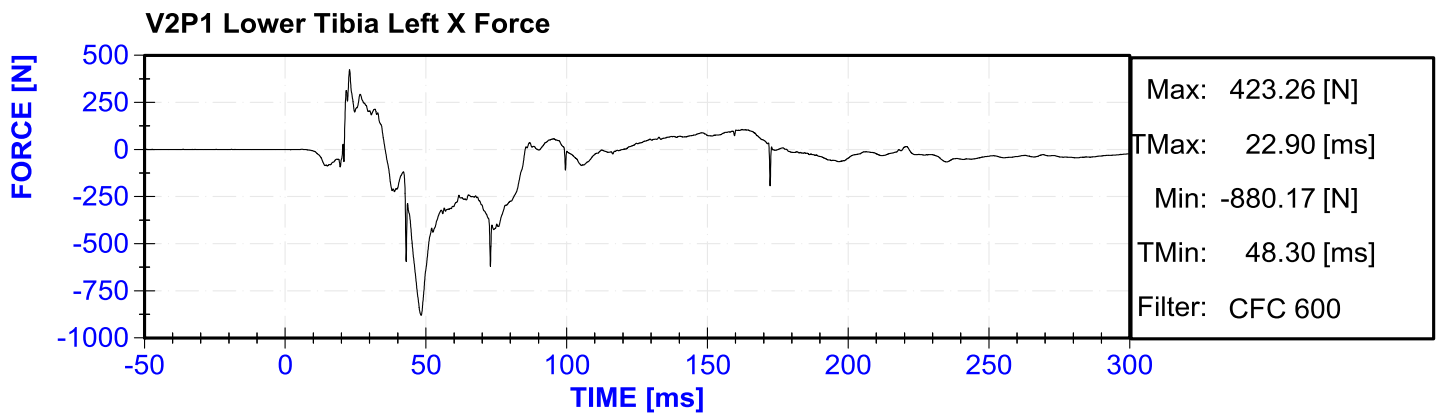
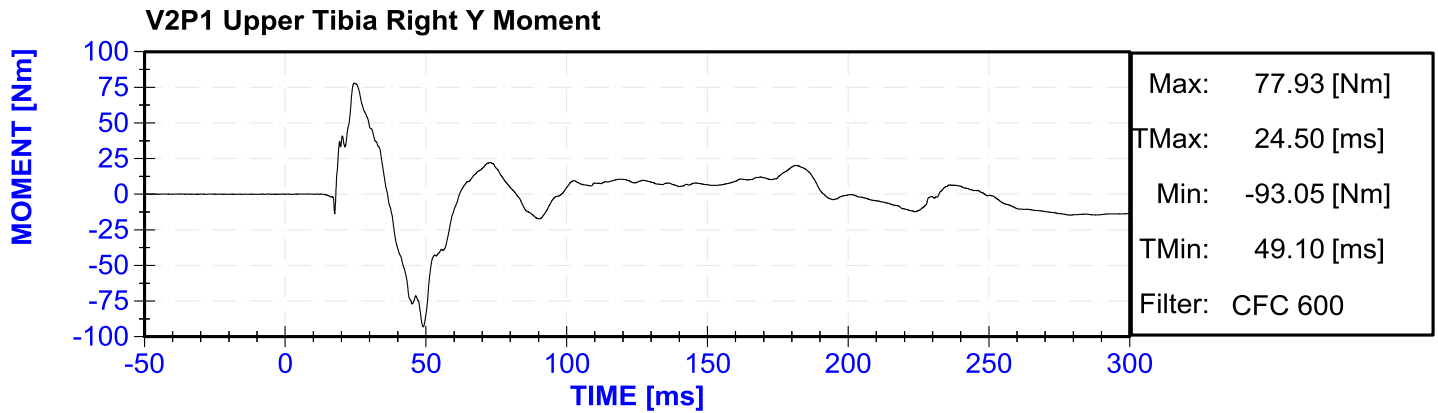


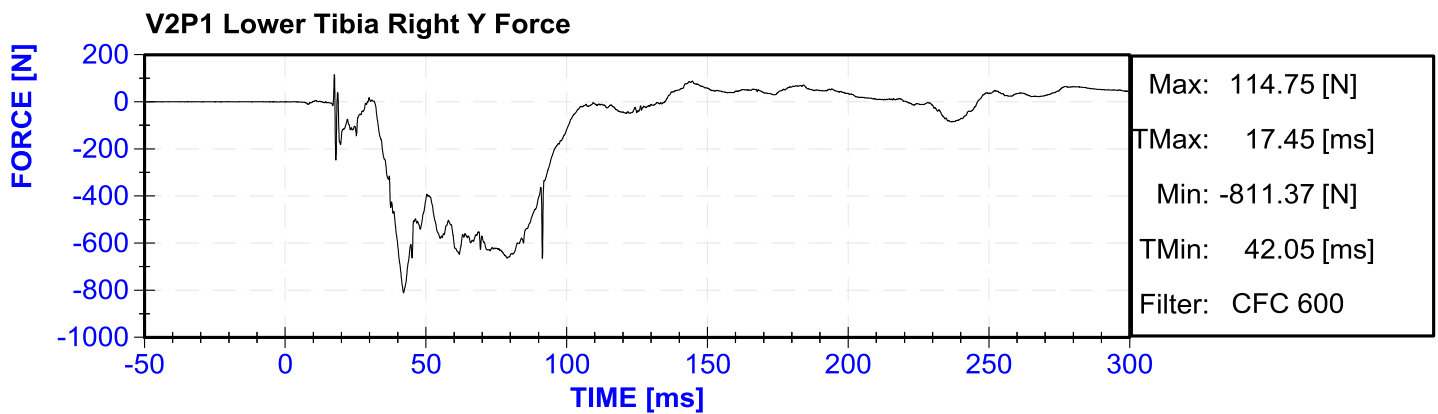
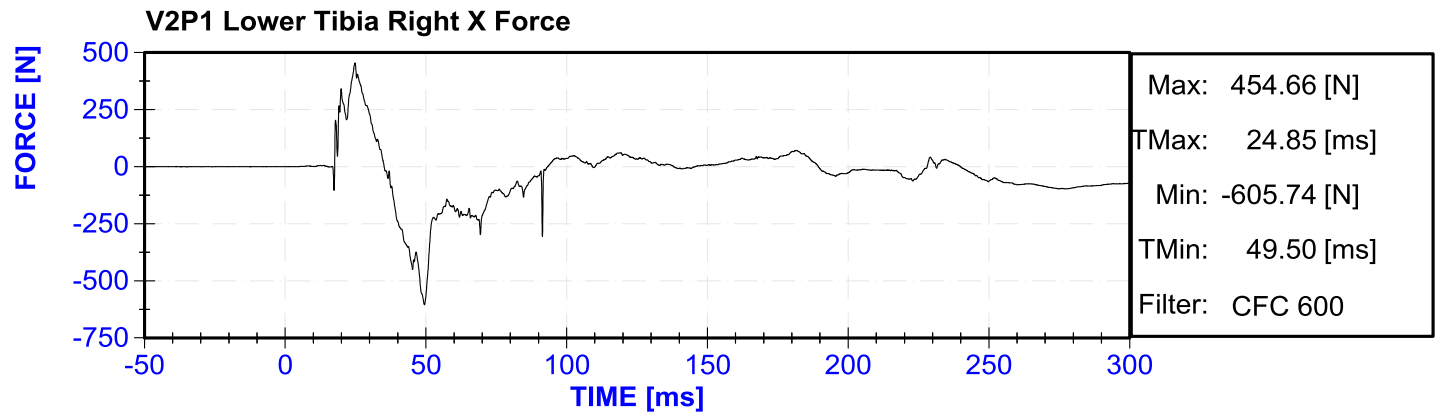
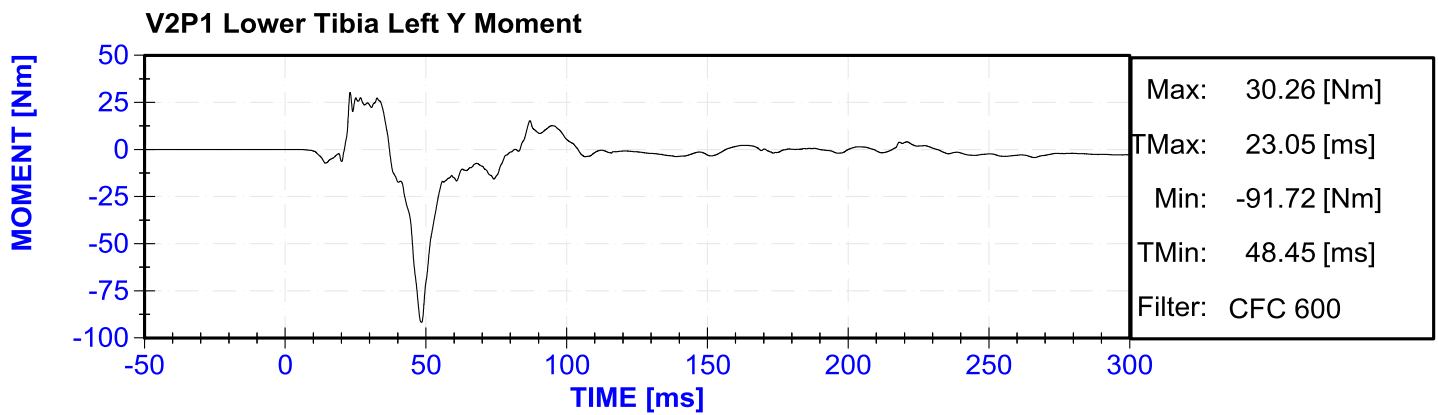
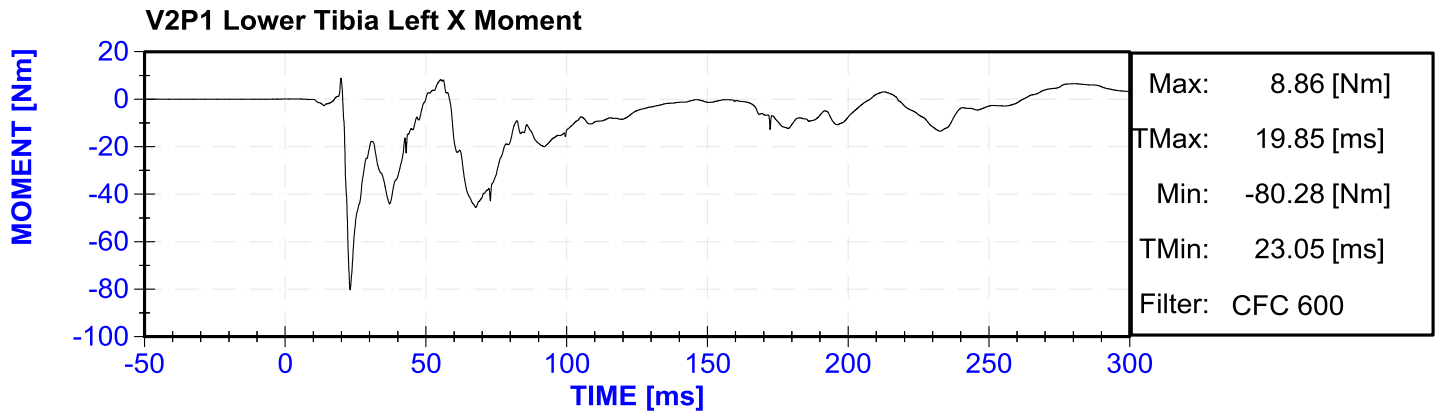


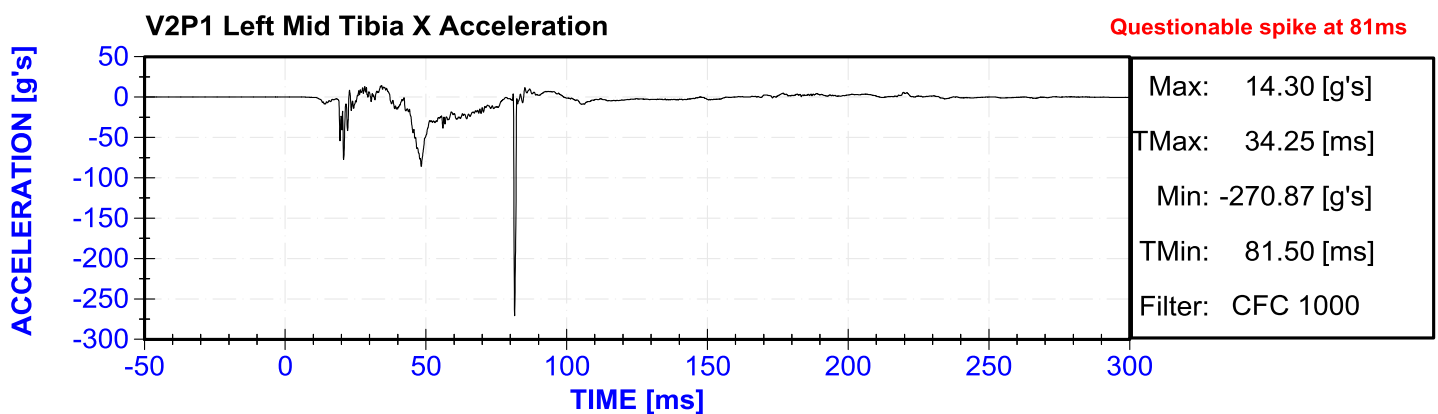
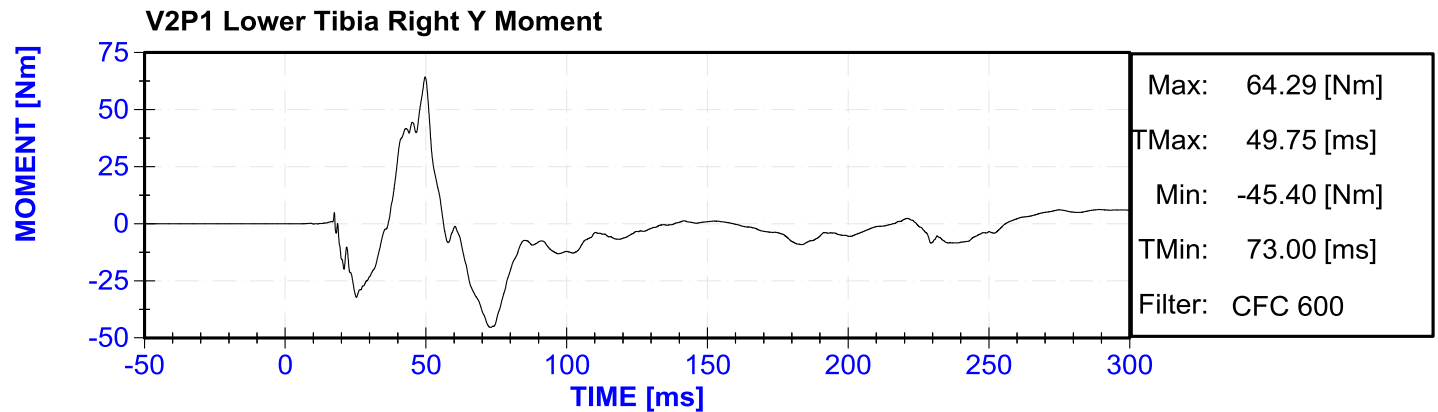
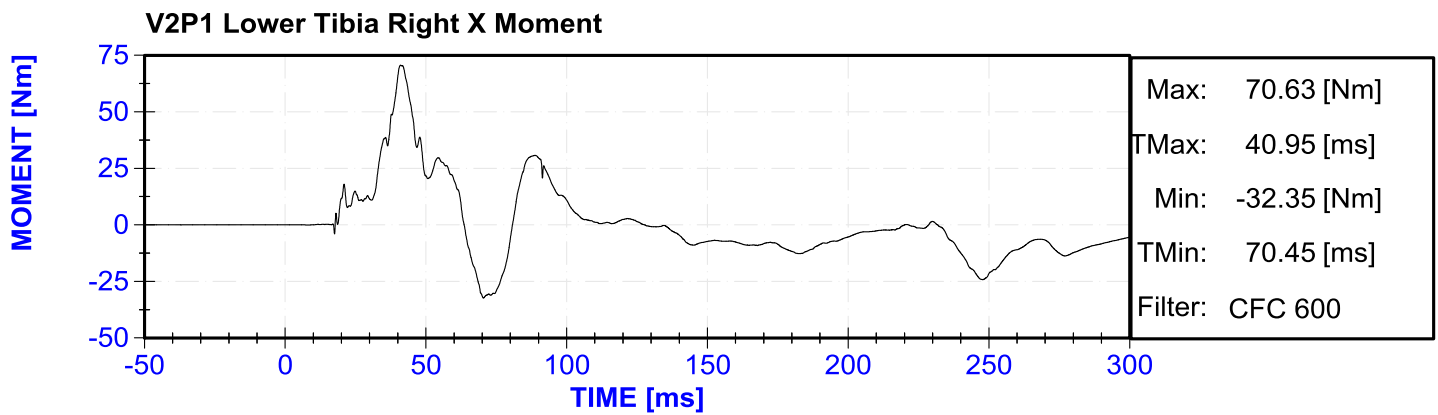
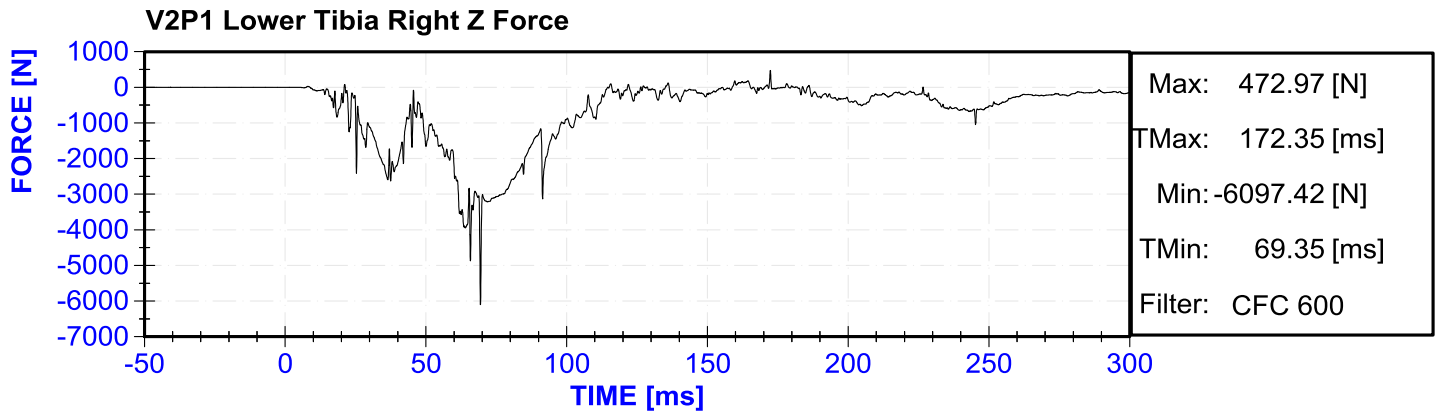


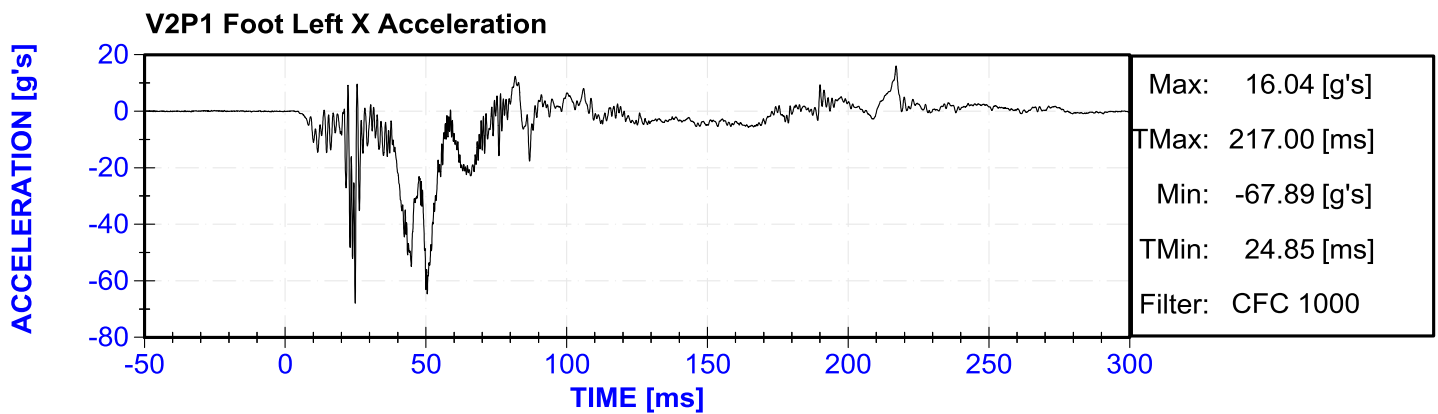
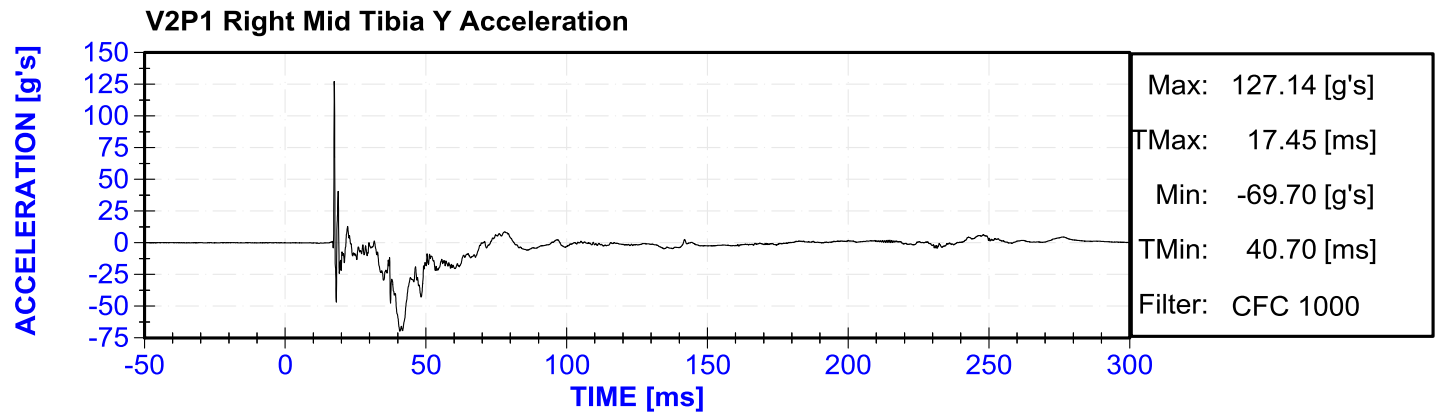
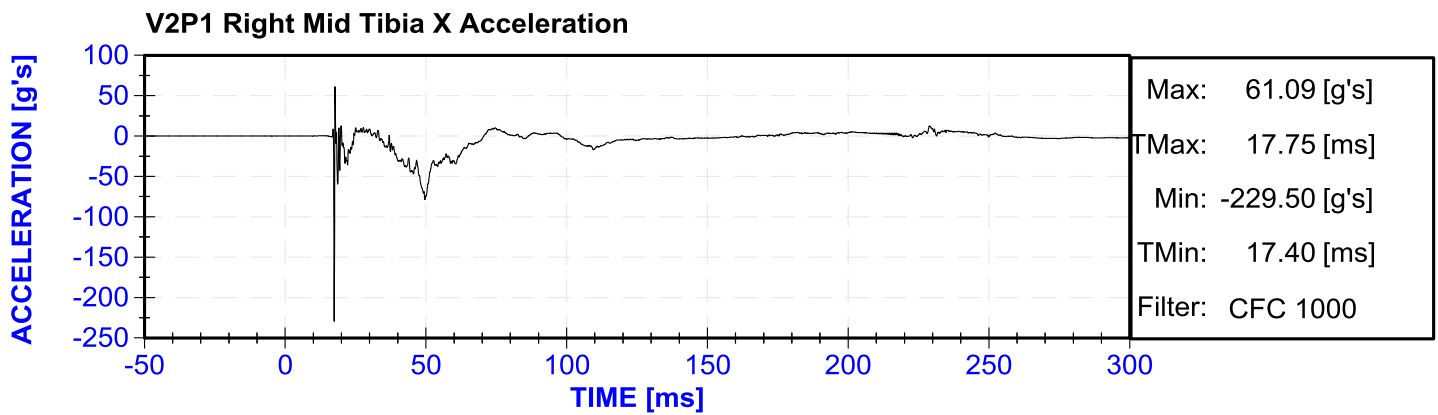
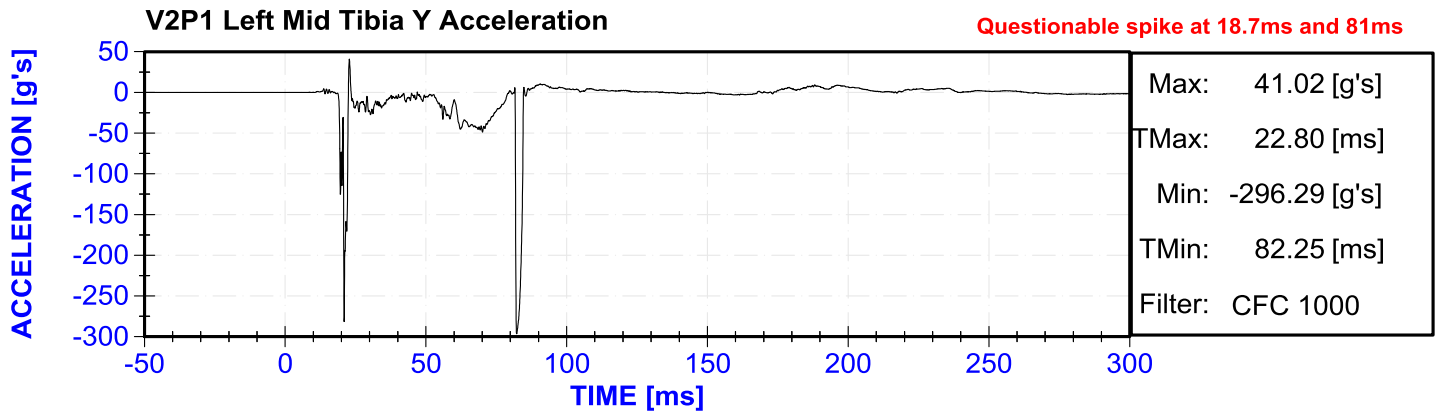


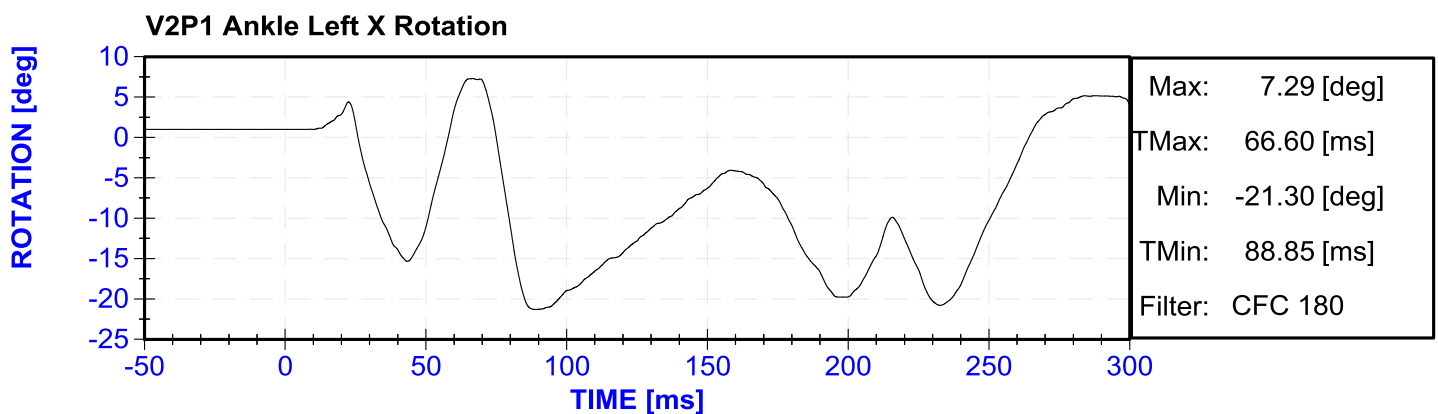
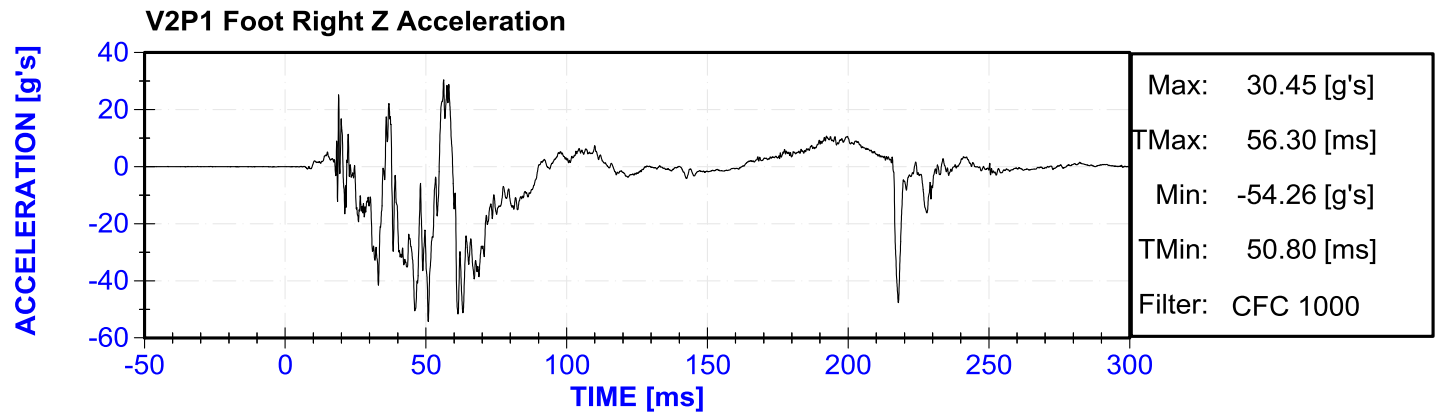
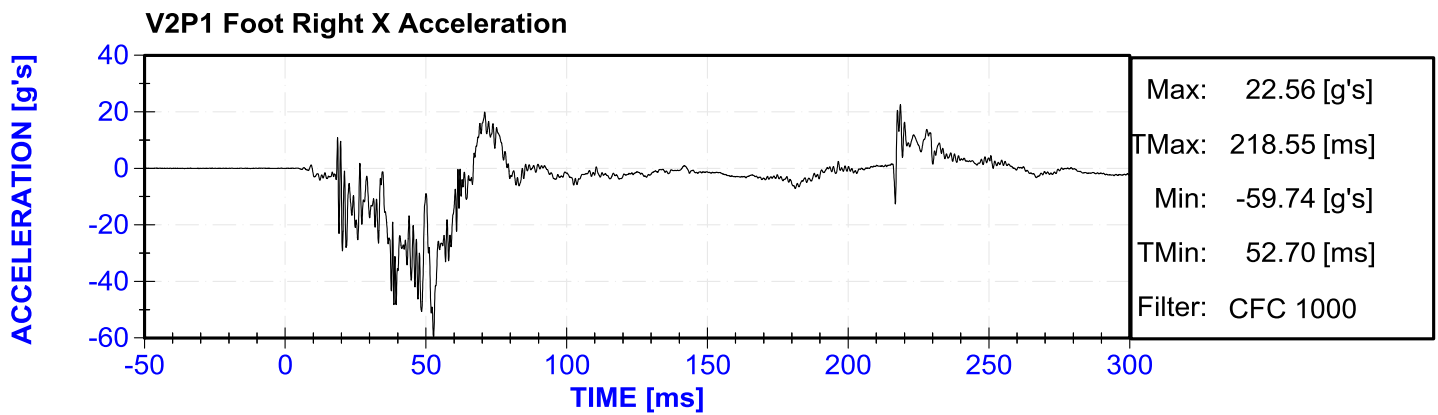
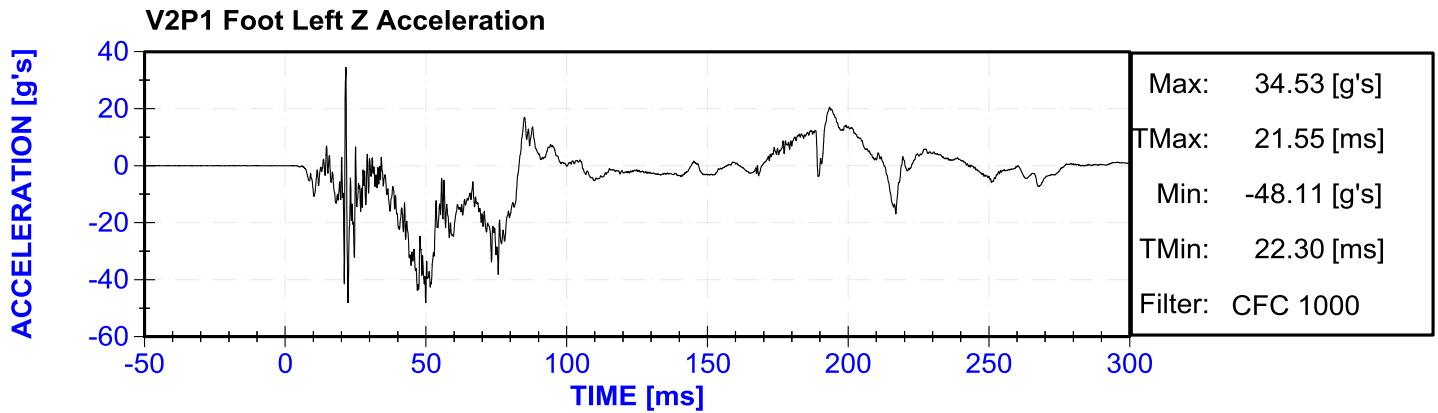


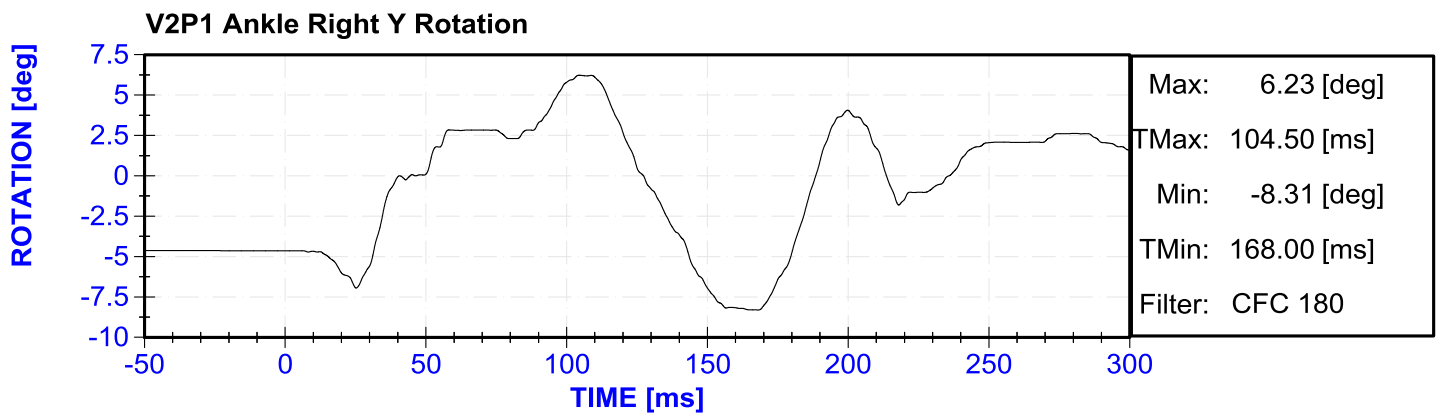
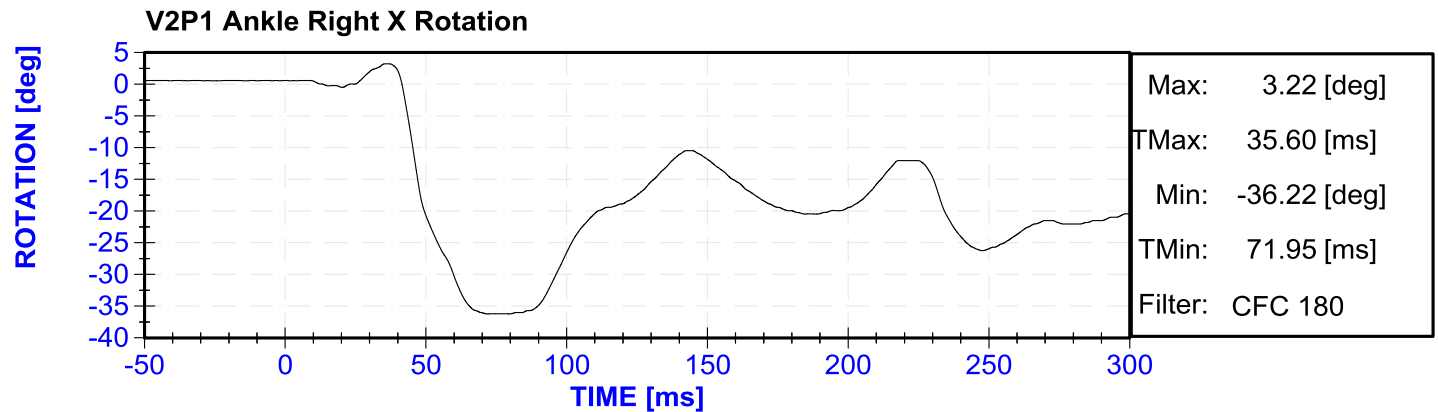
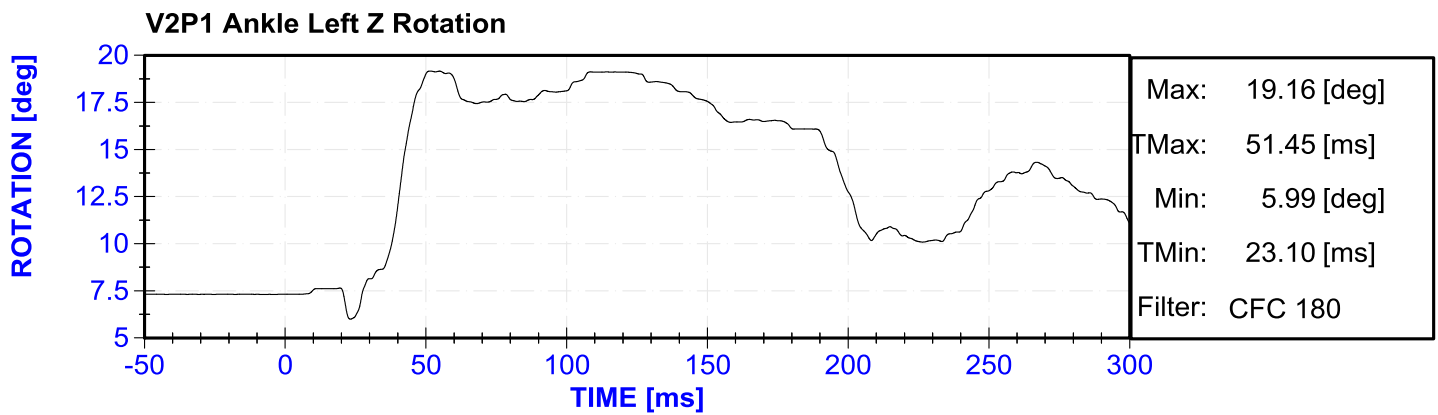
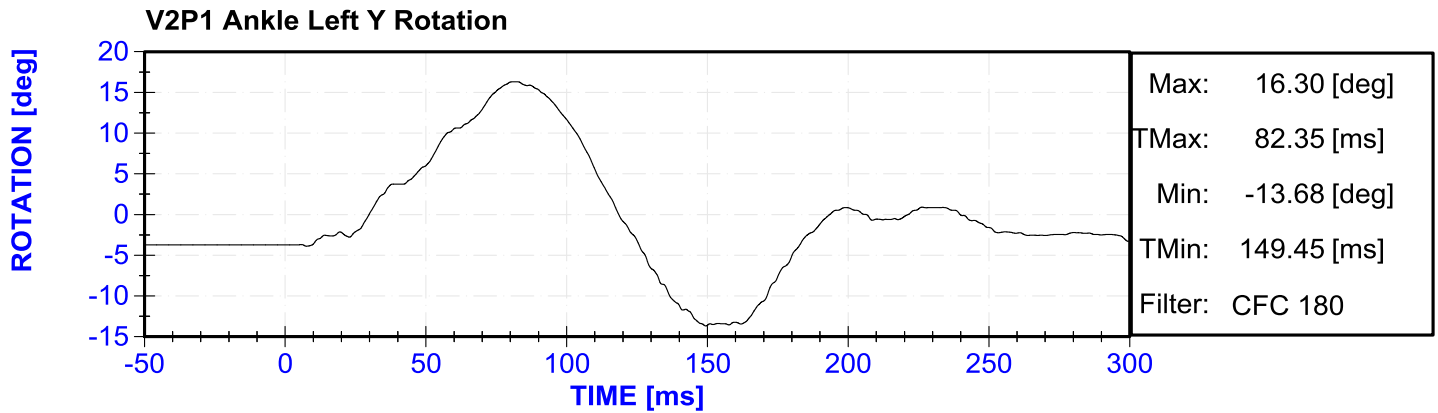


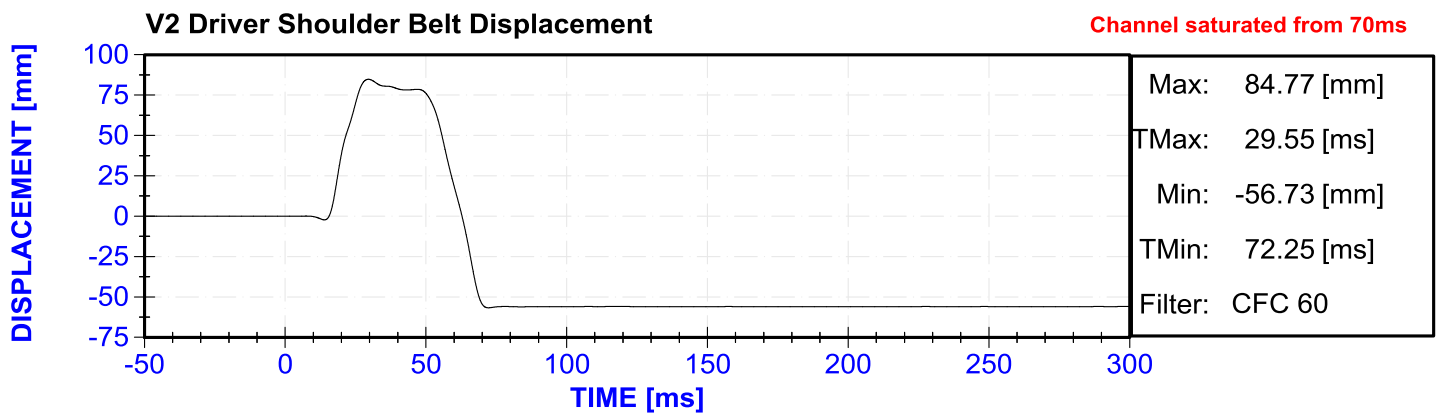
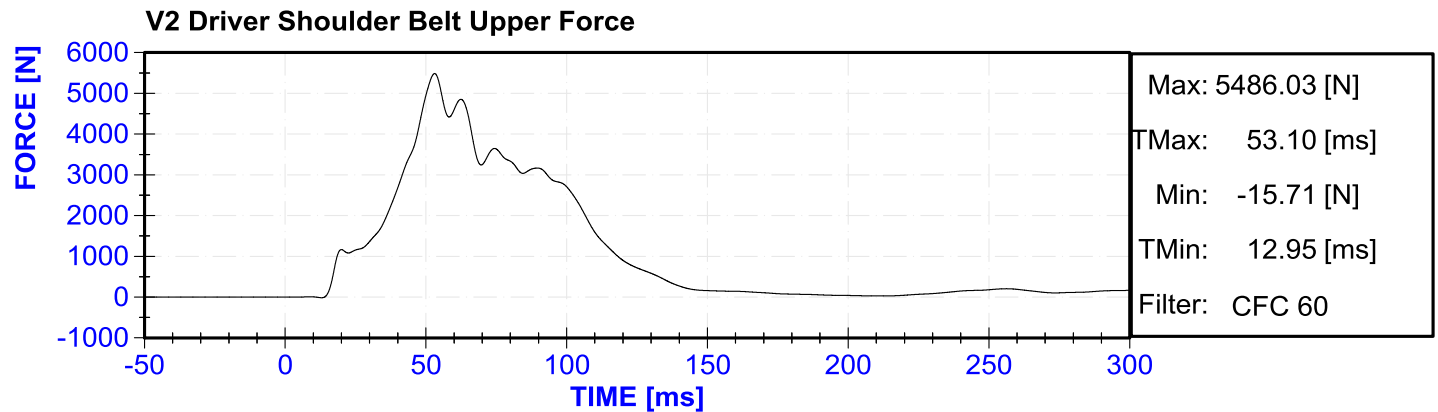
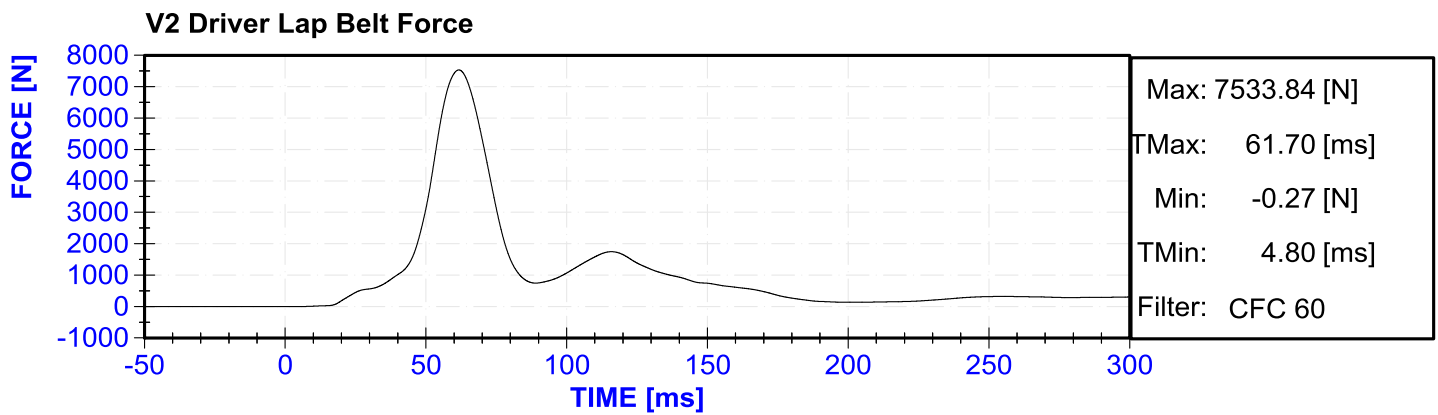
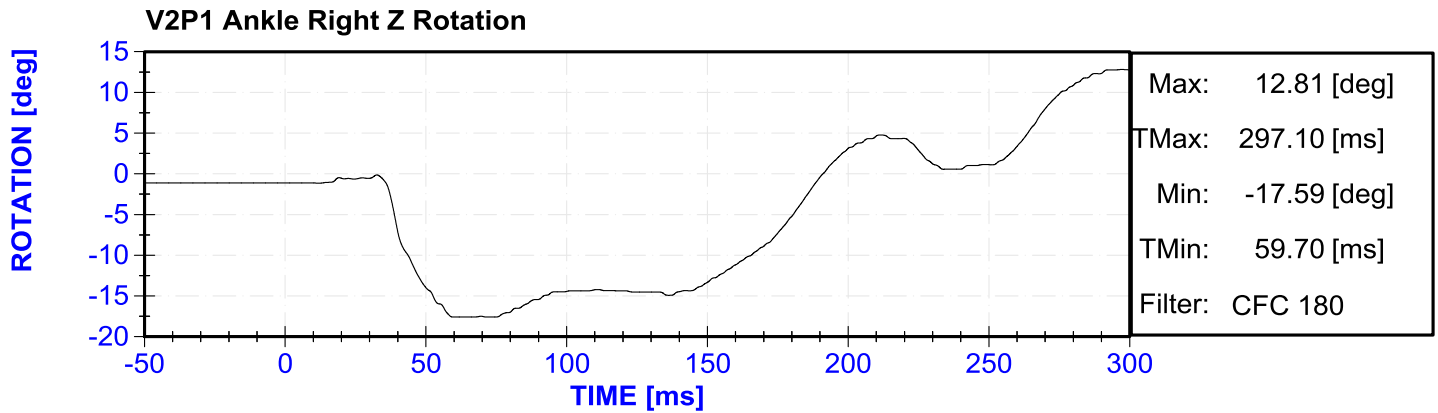


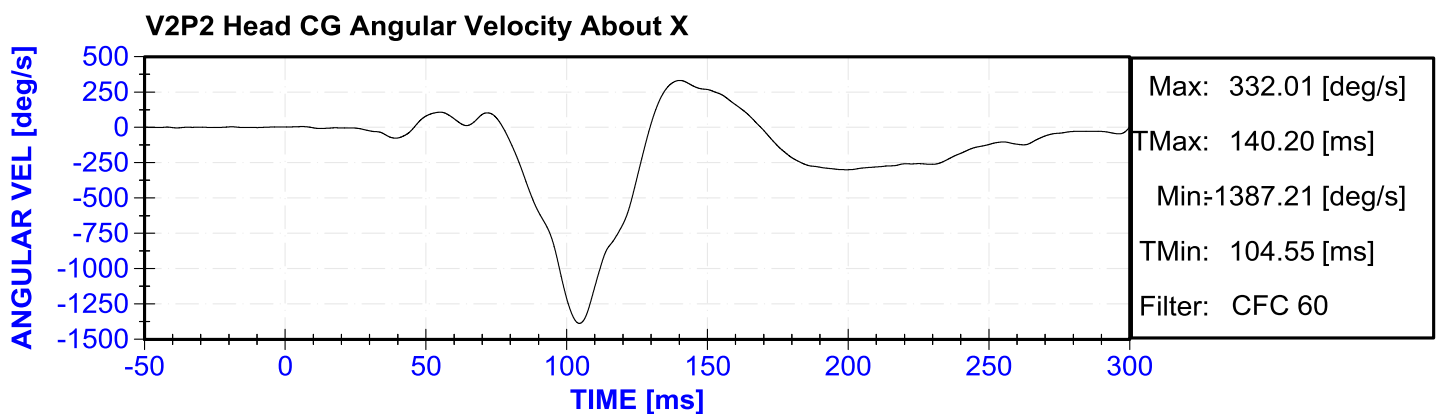
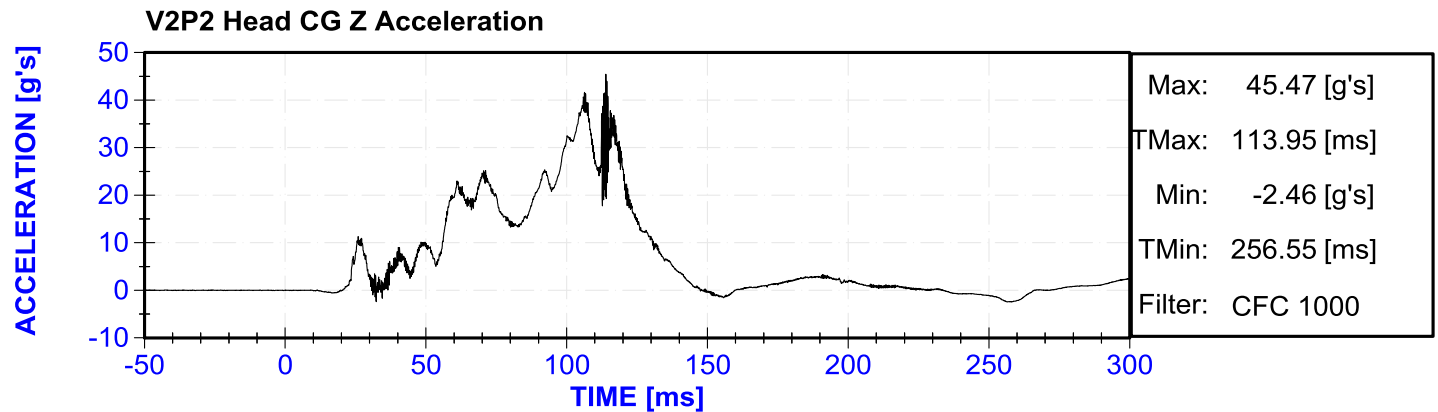
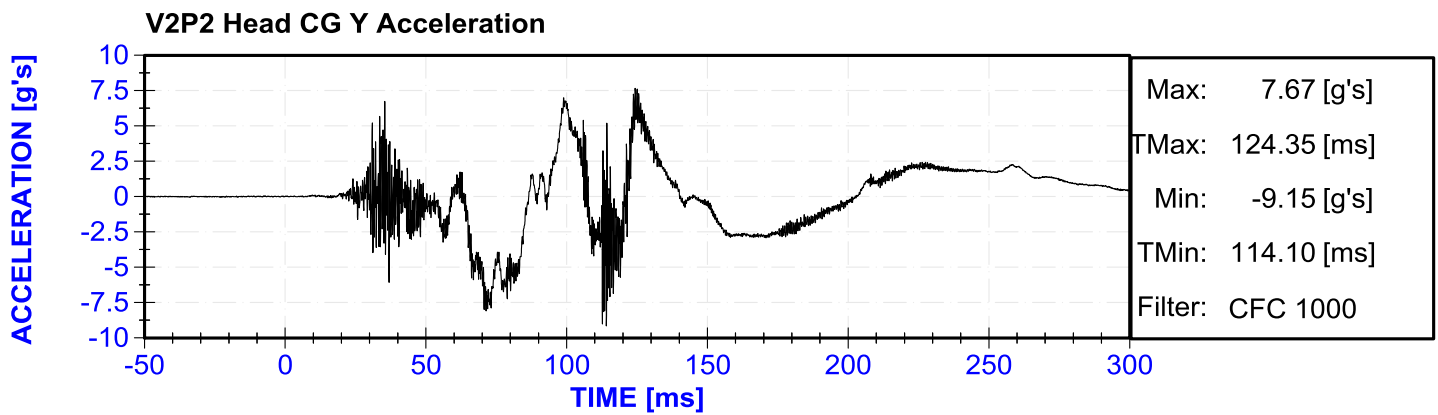
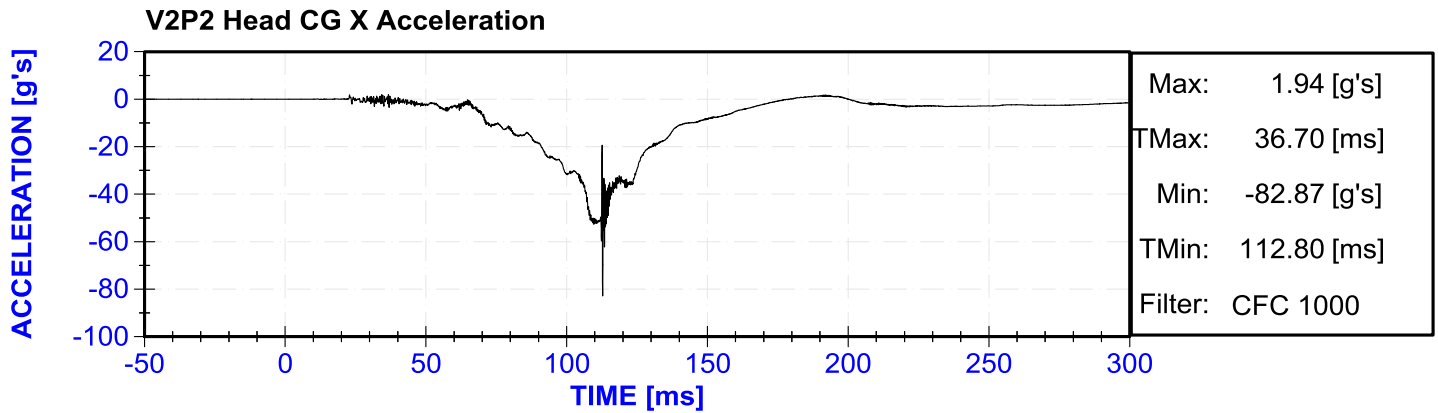


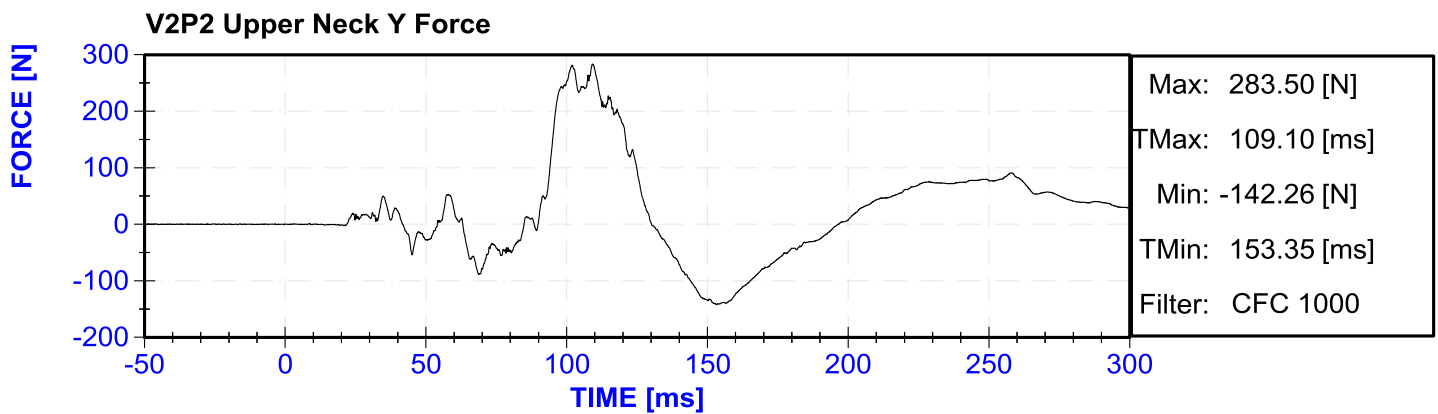
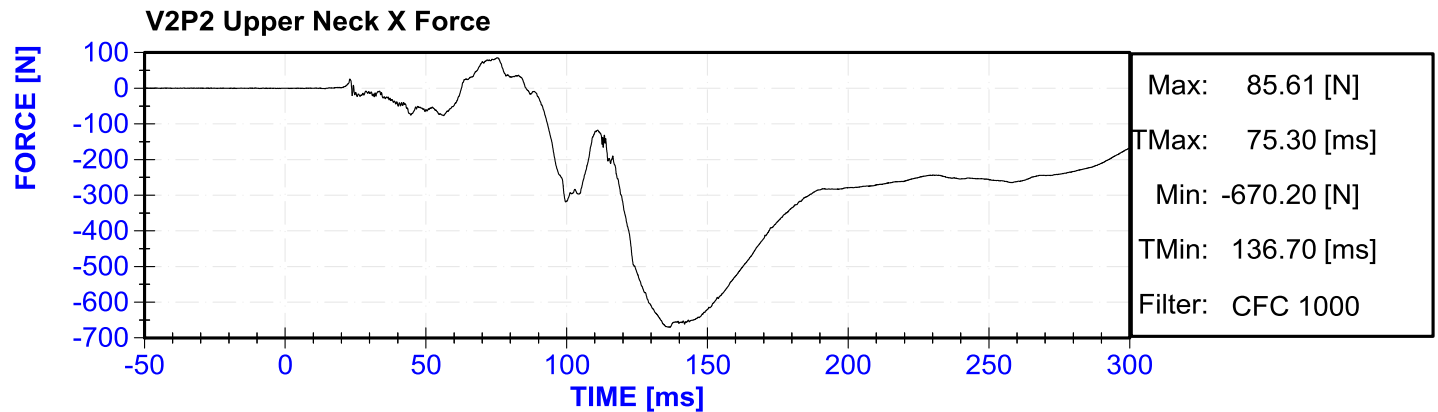
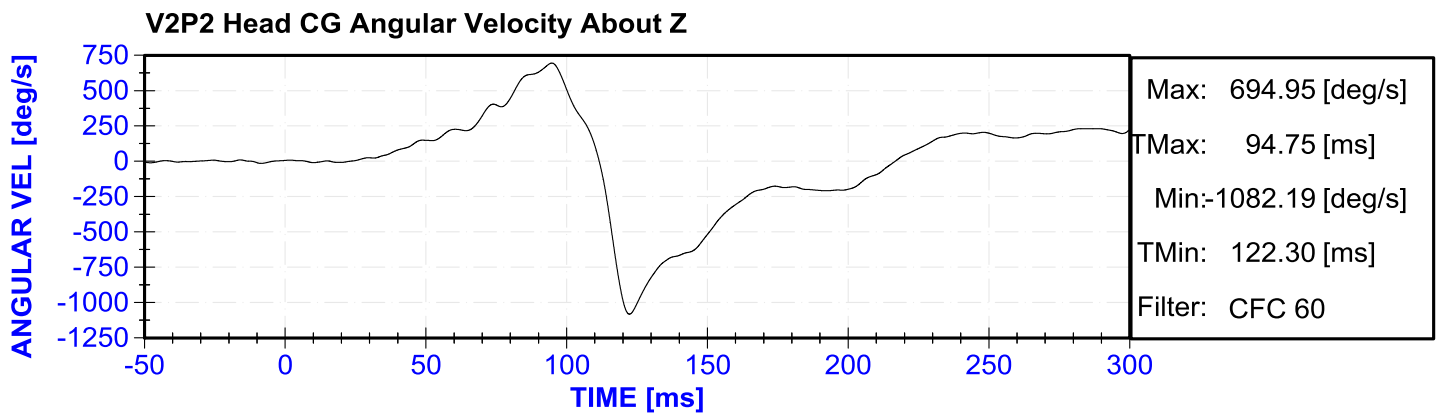
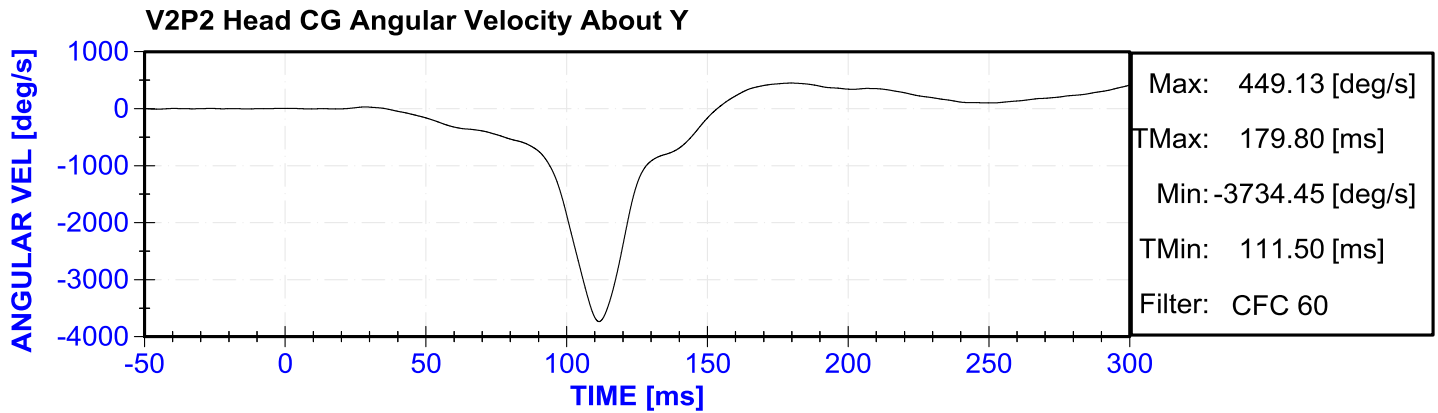


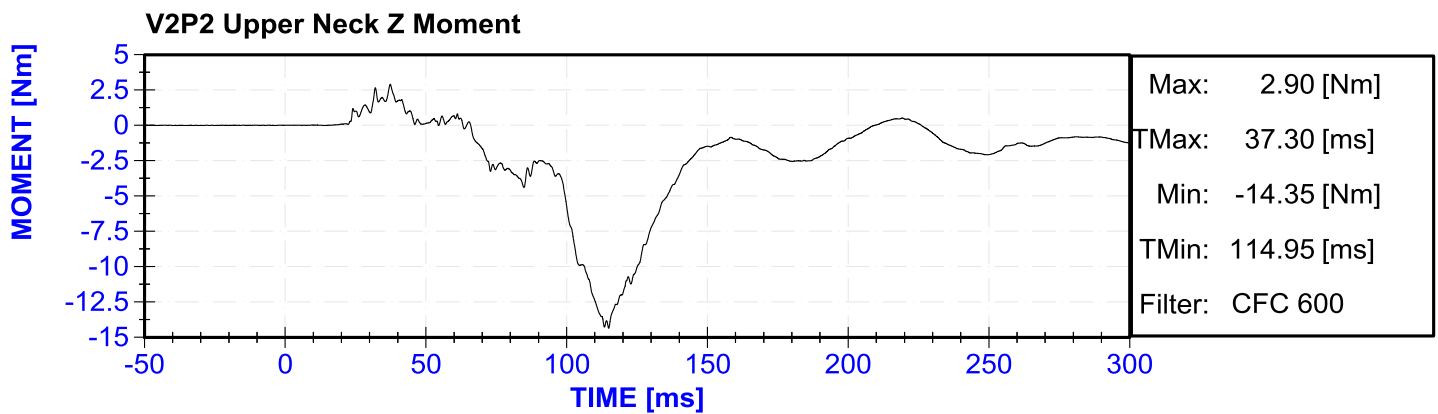
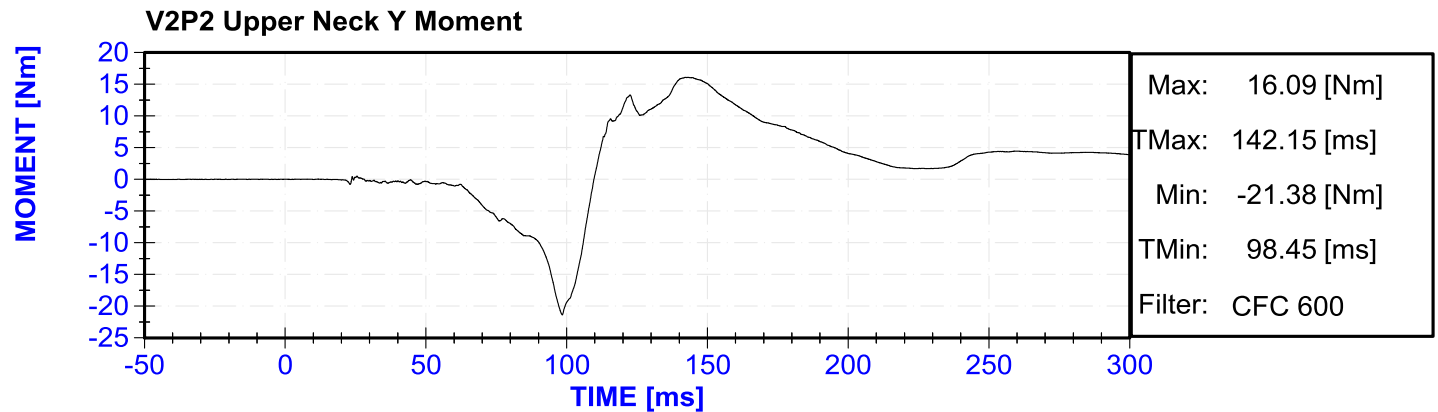
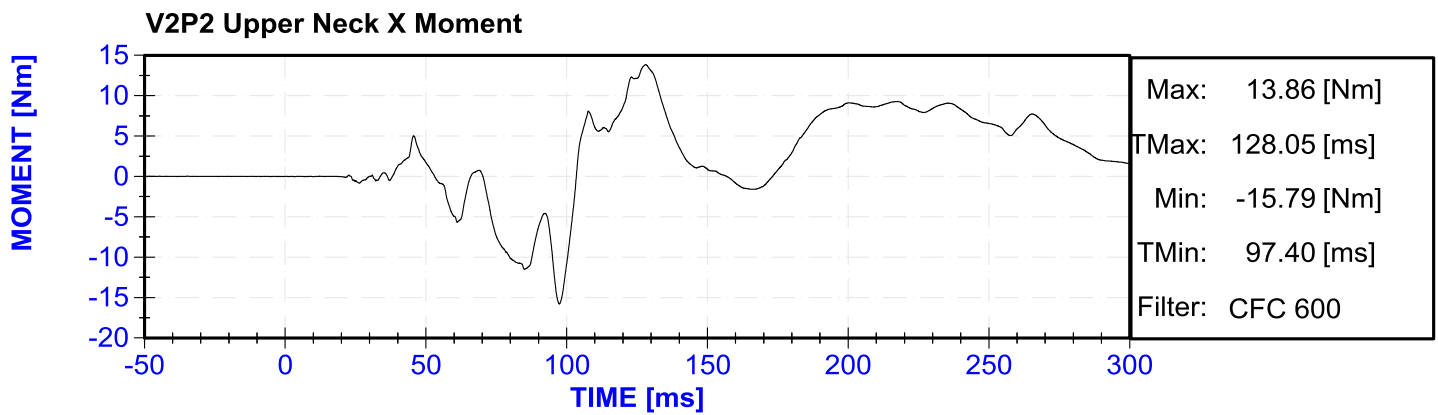
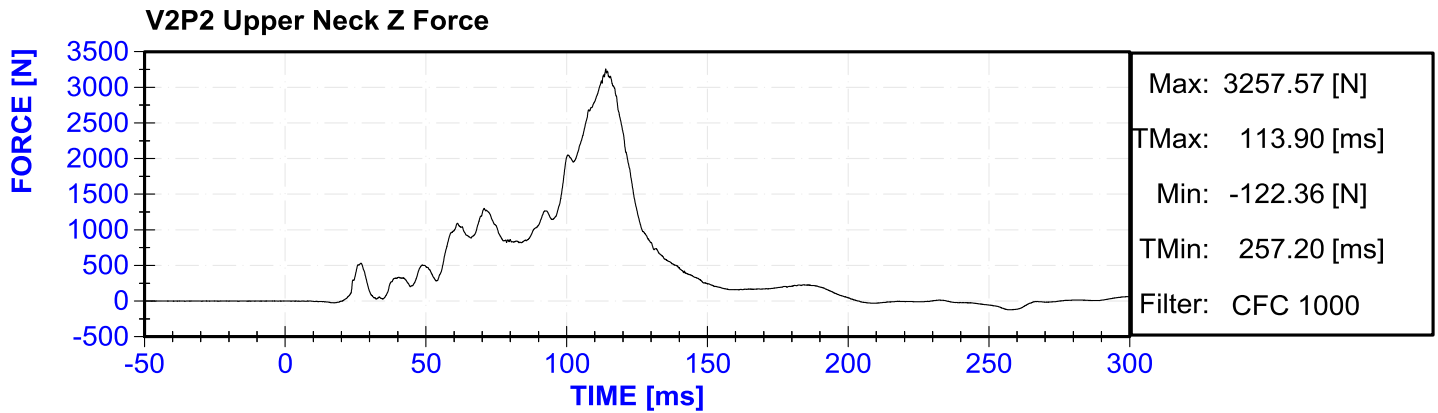


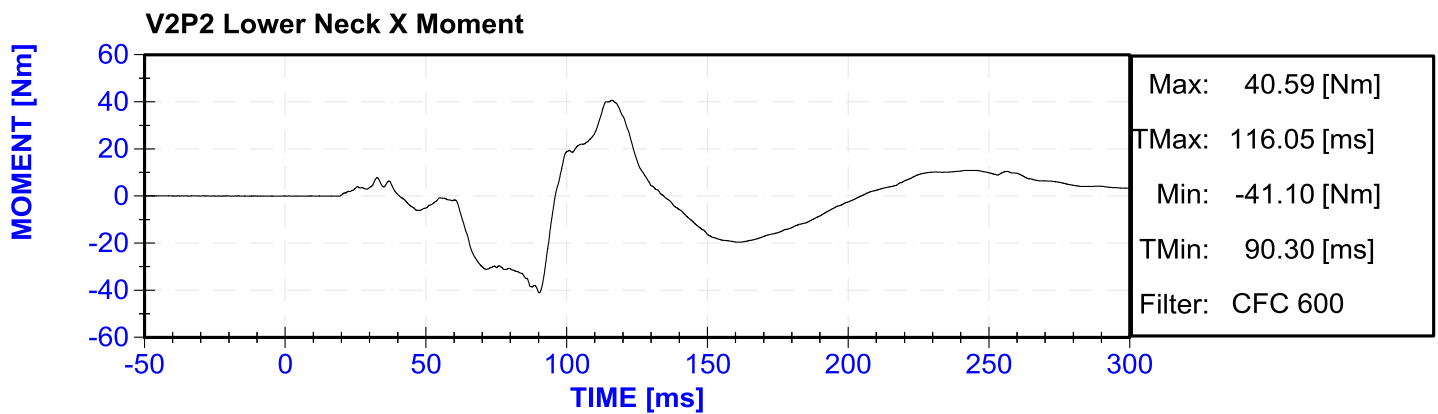
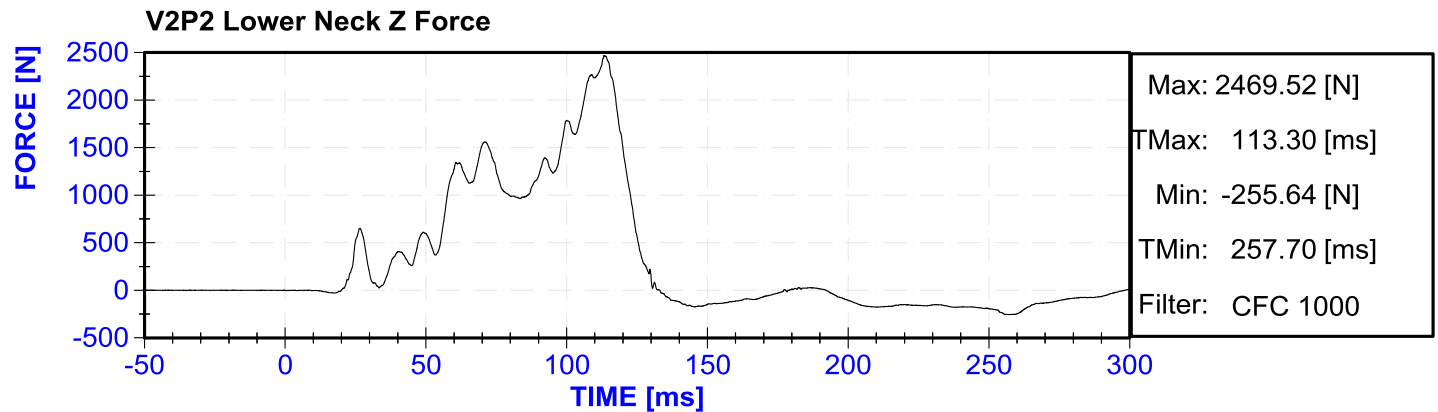
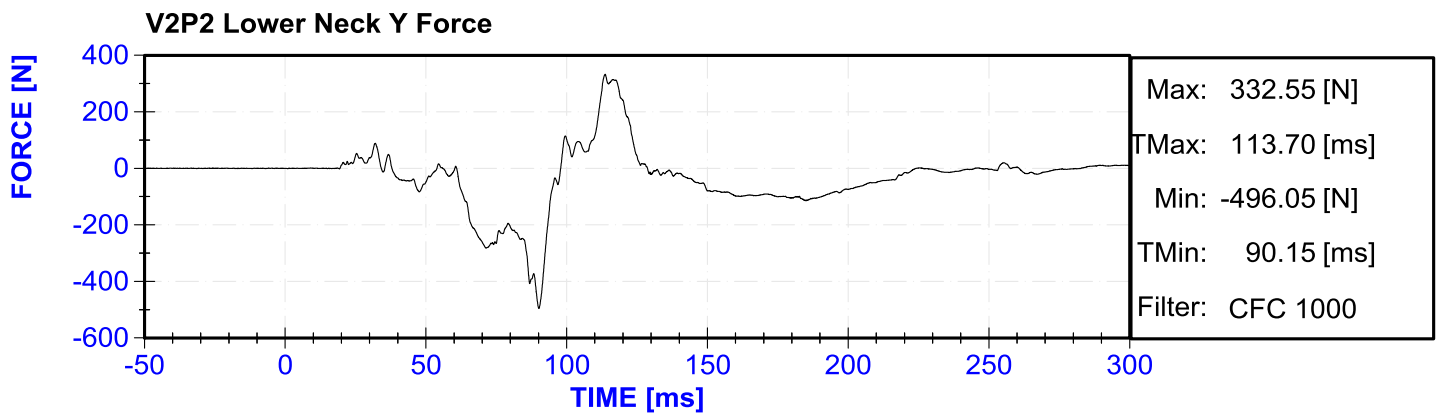
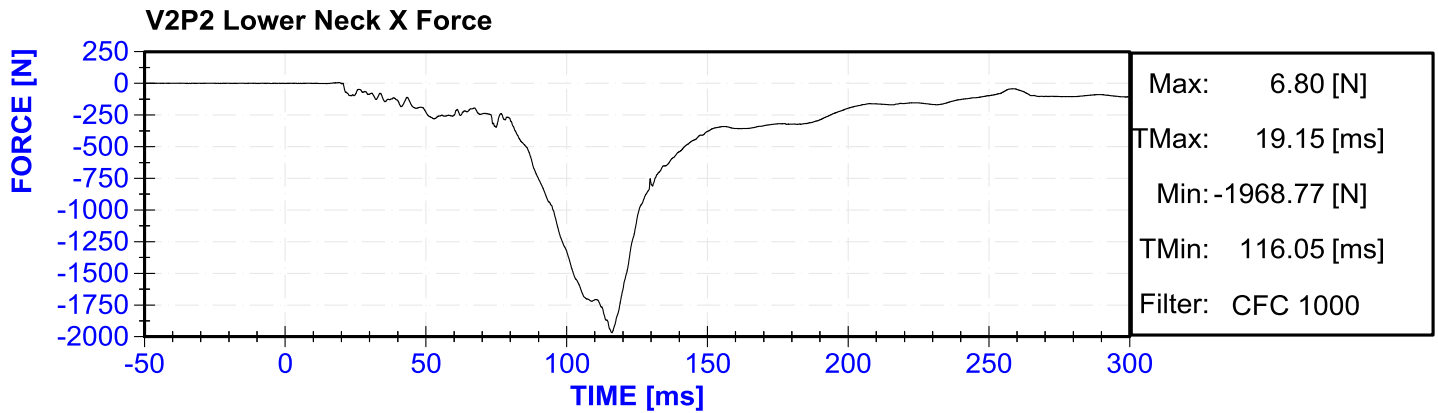


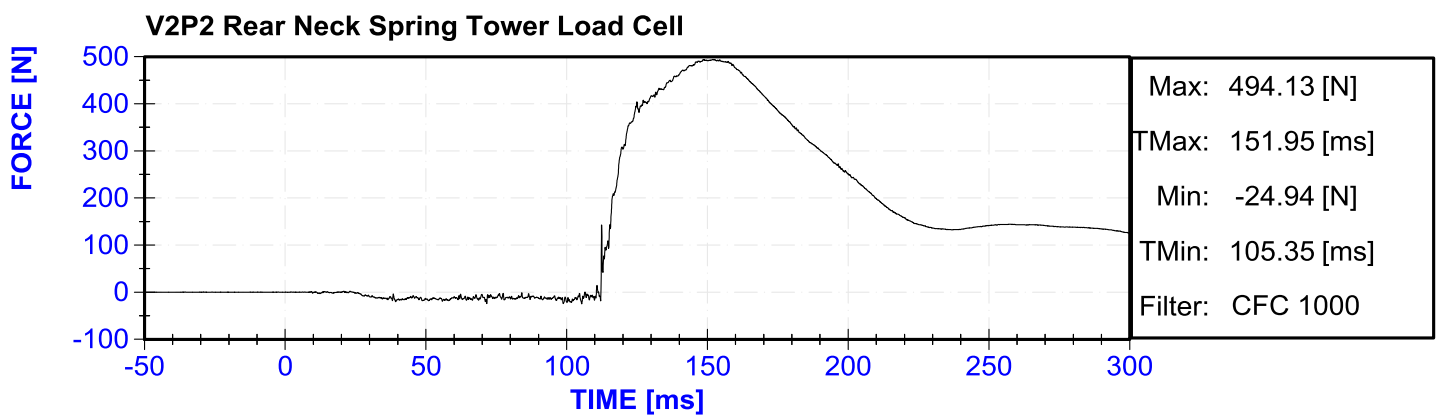
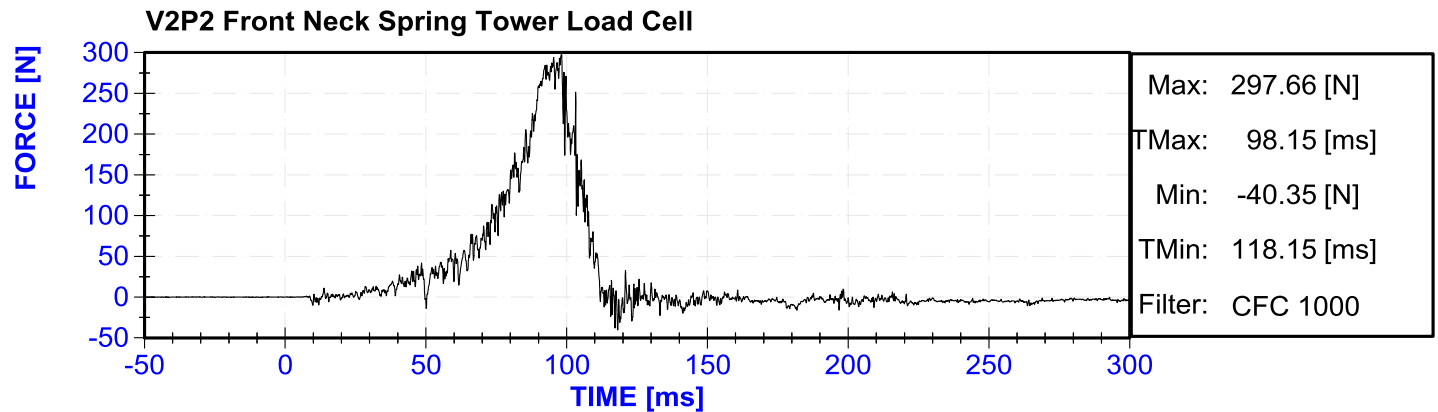
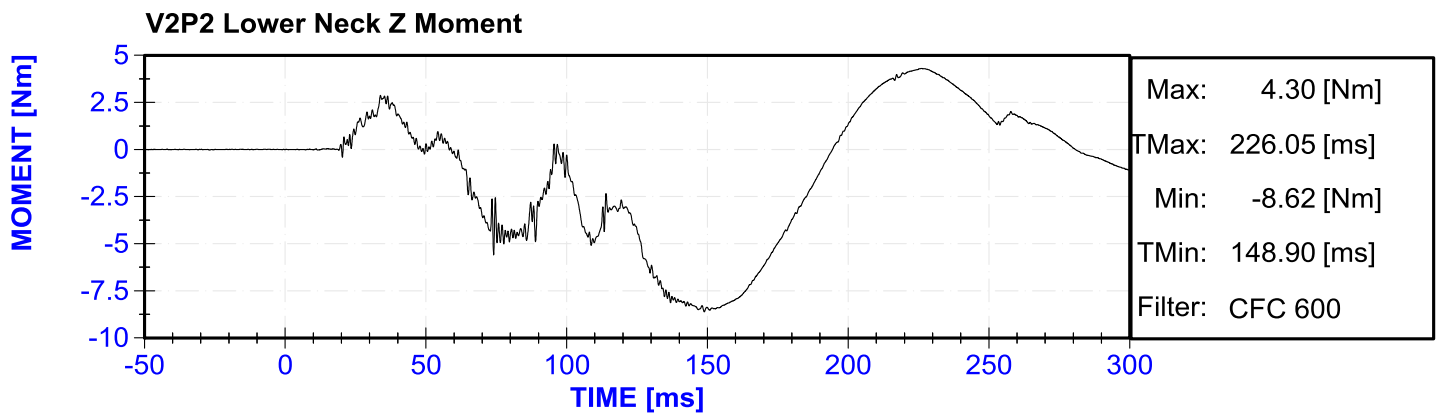
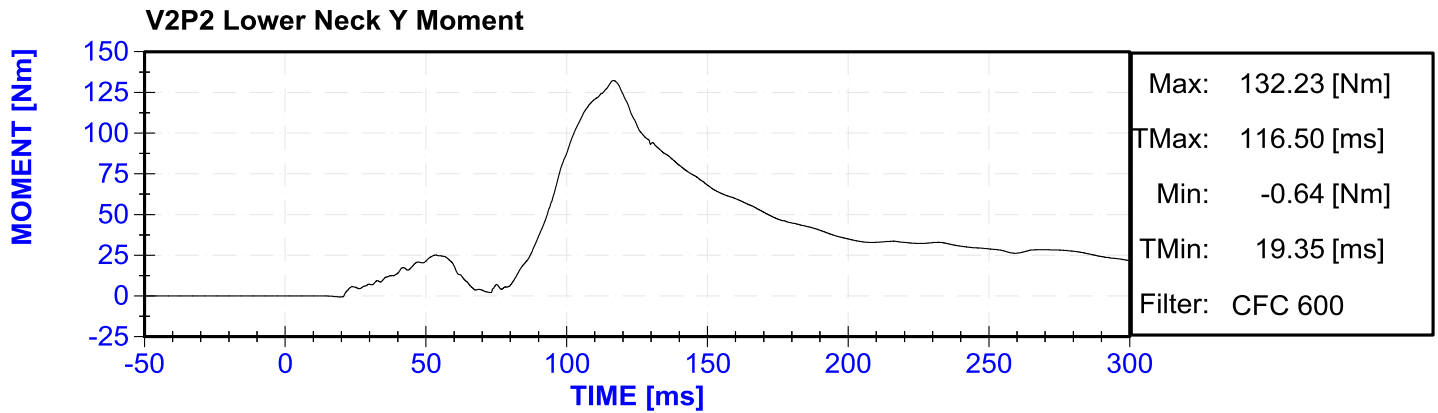


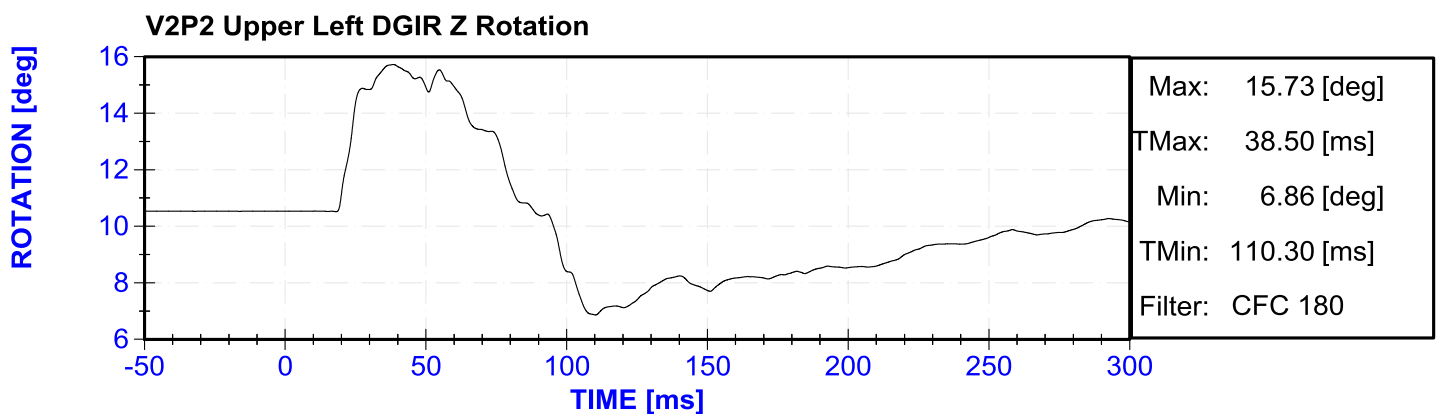
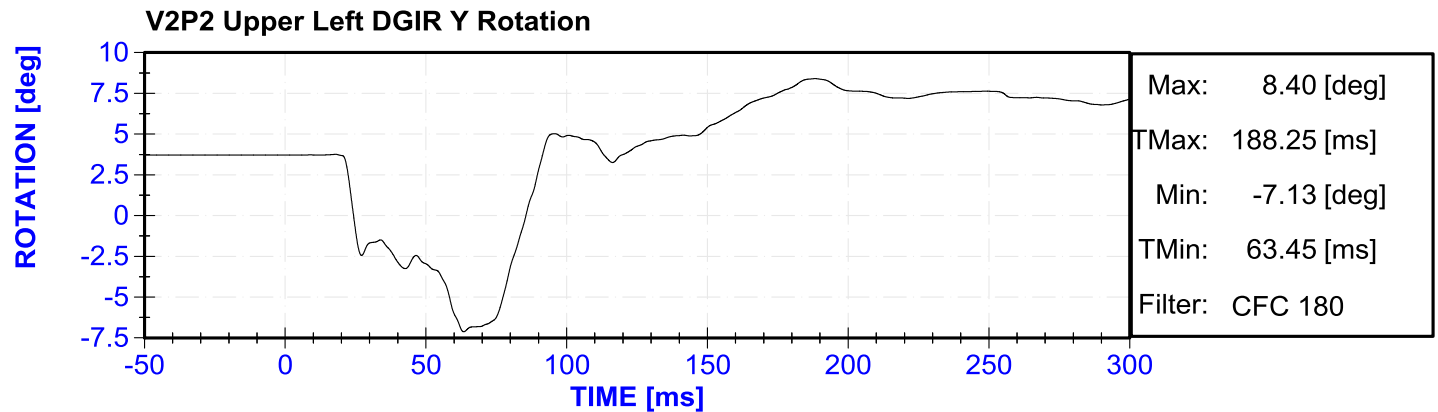
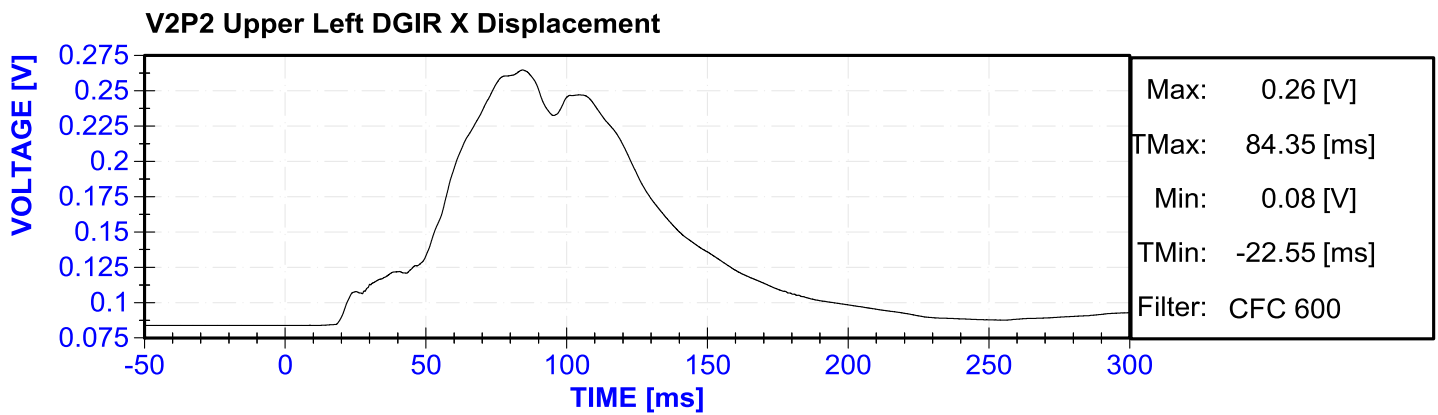
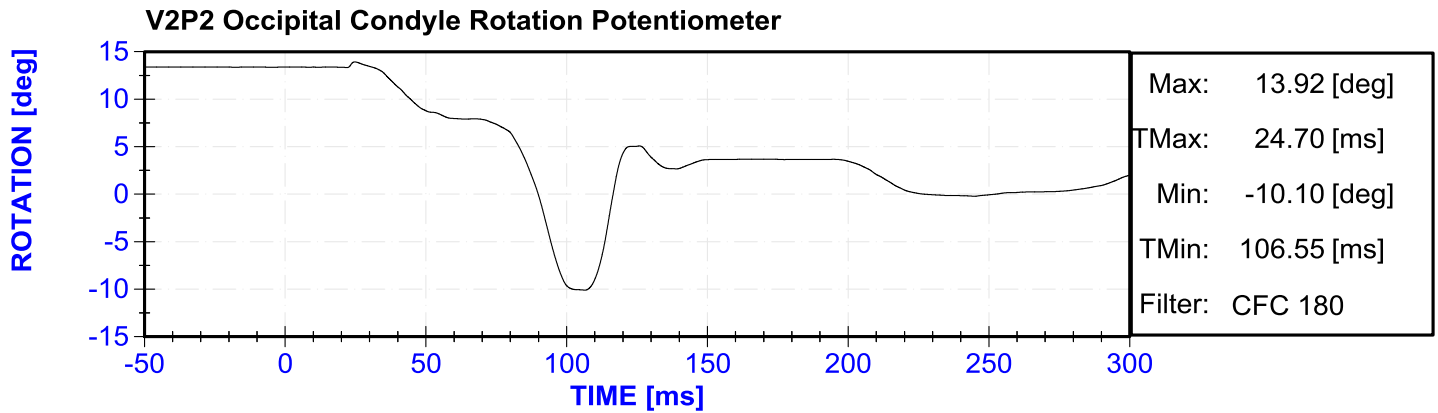






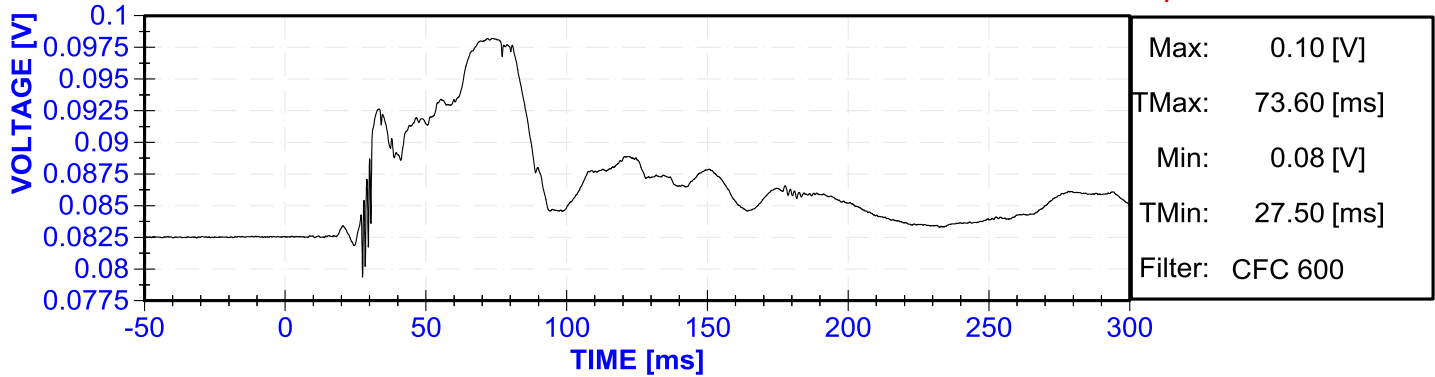




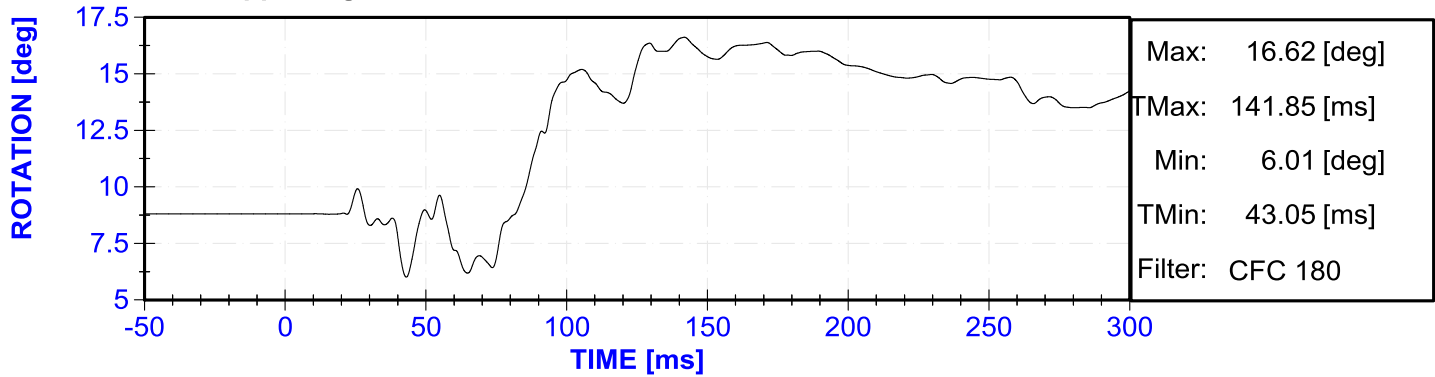


V2P2 Upper Right DGIR X Displacement

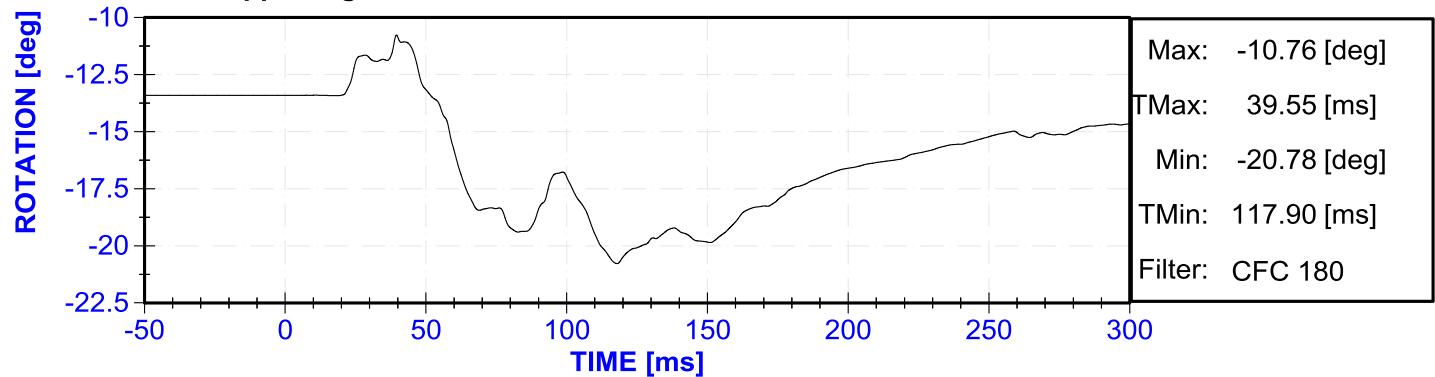
Questionable Spikes at 27ms to 31ms



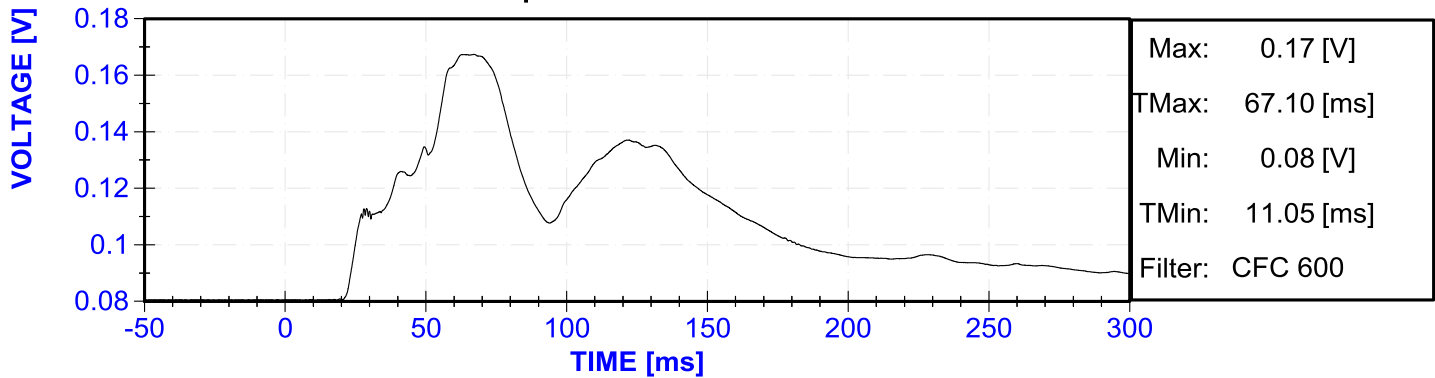
V2P2 Upper Right DGIR Y Rotation

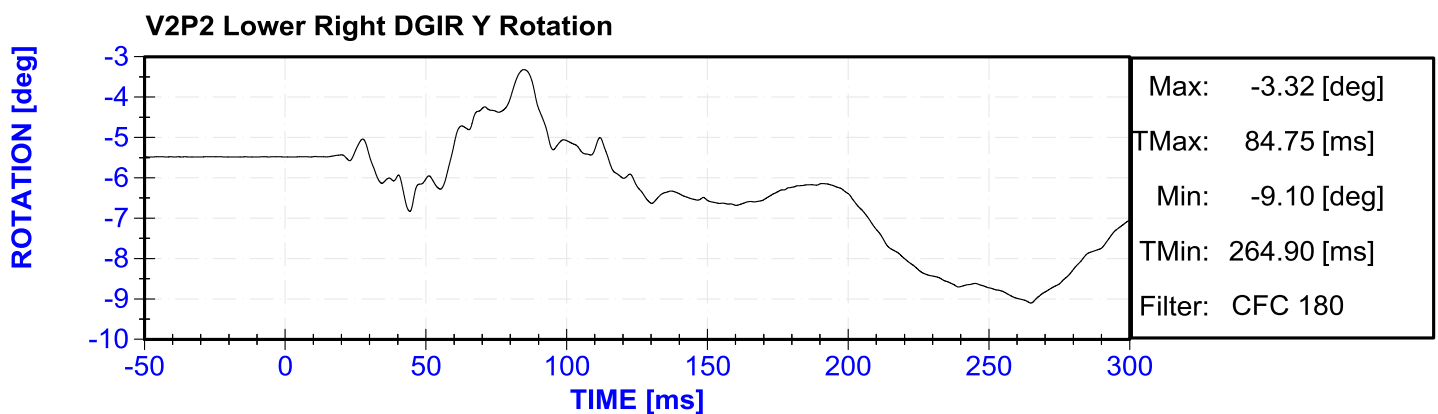
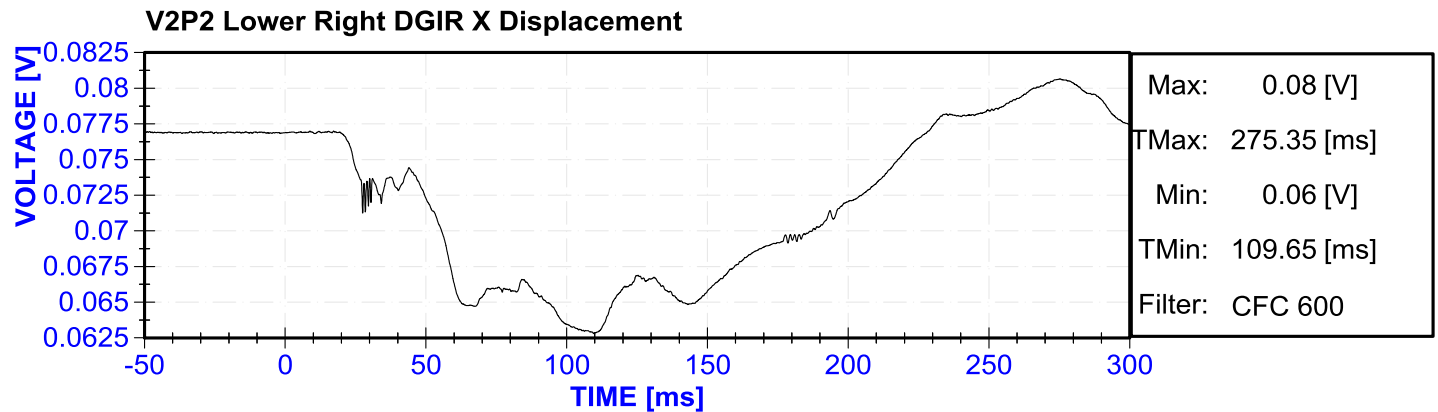
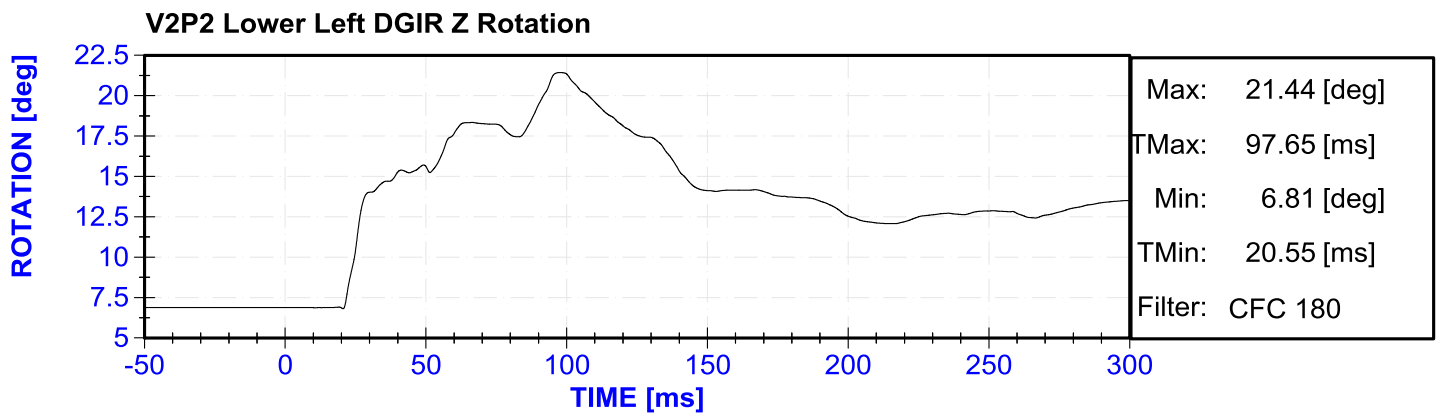
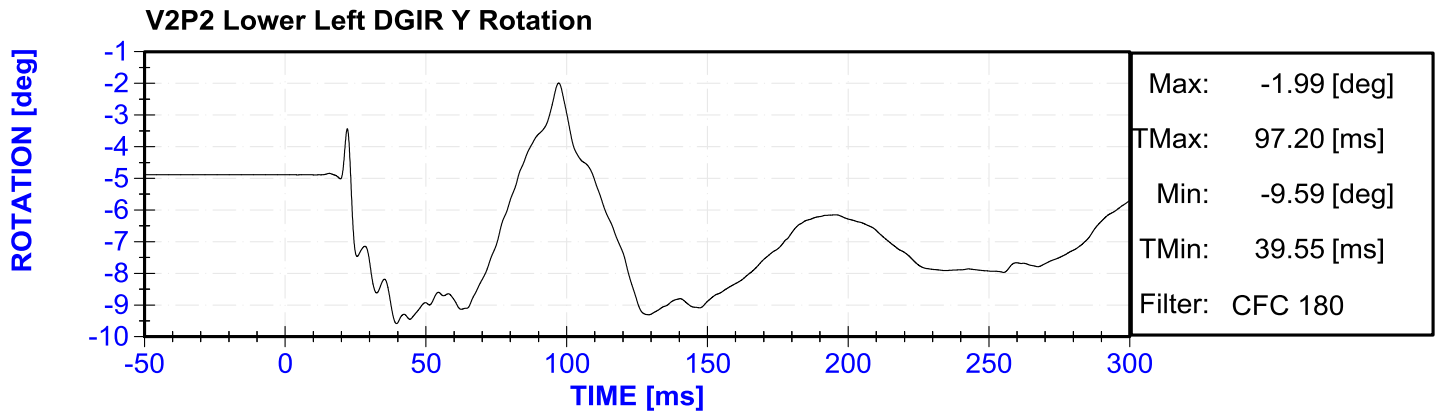


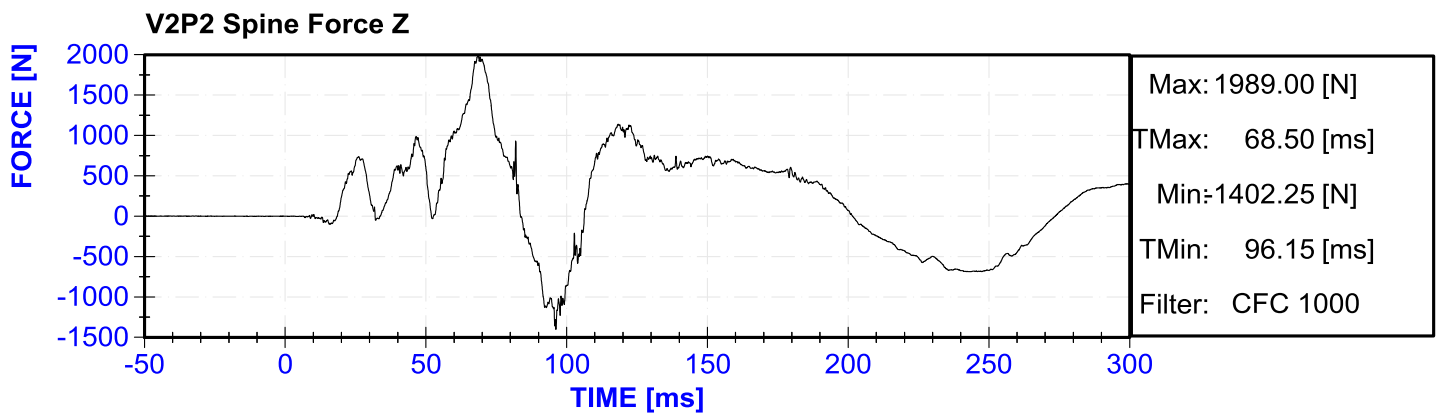
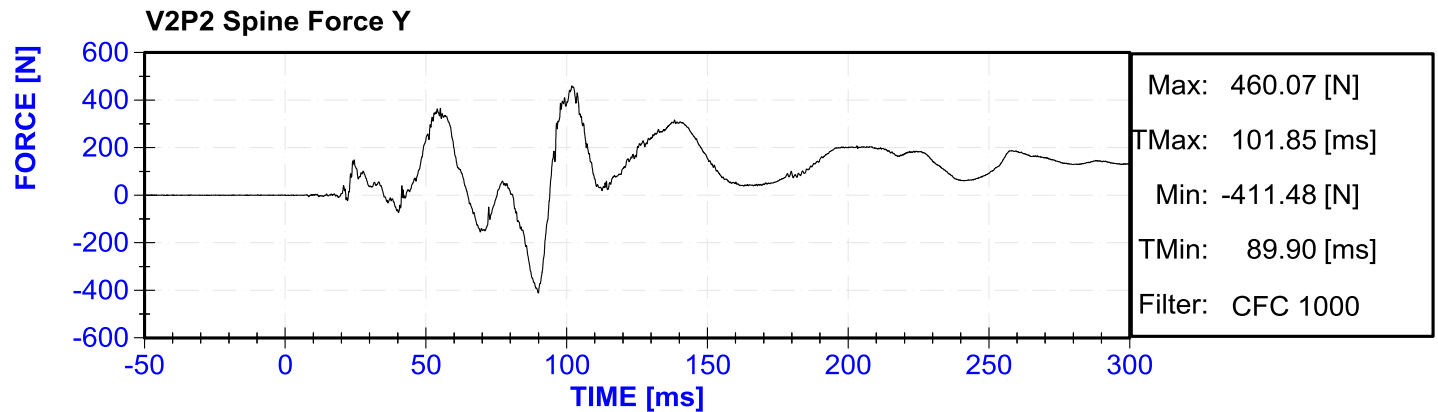
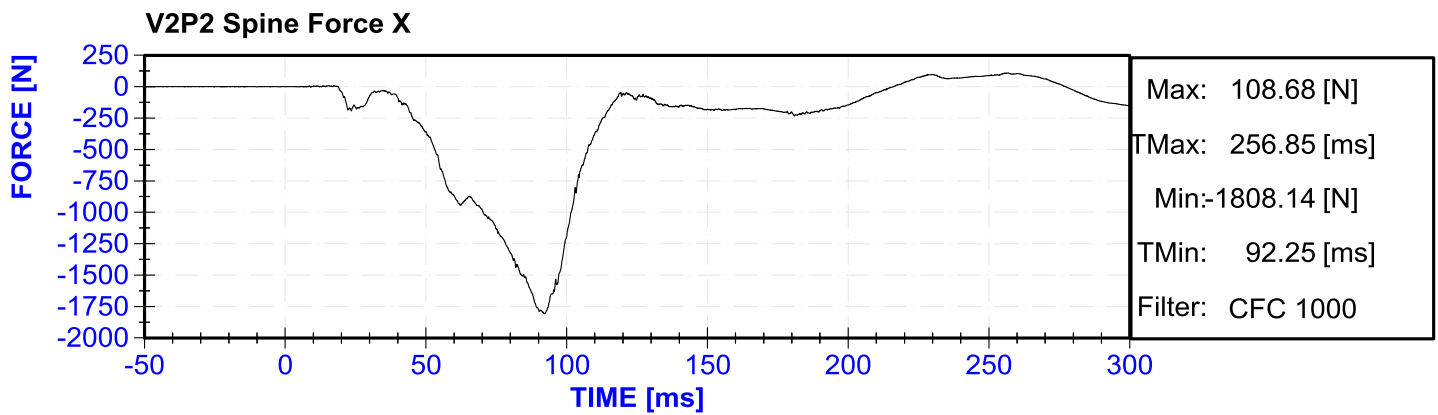
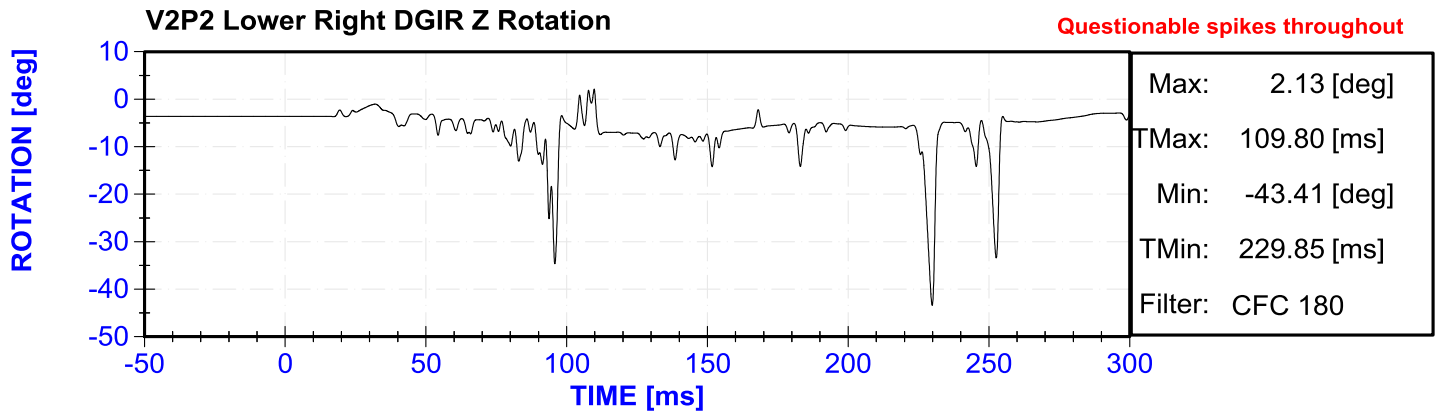
V2P2 Upper Right DGIR Z Rotation

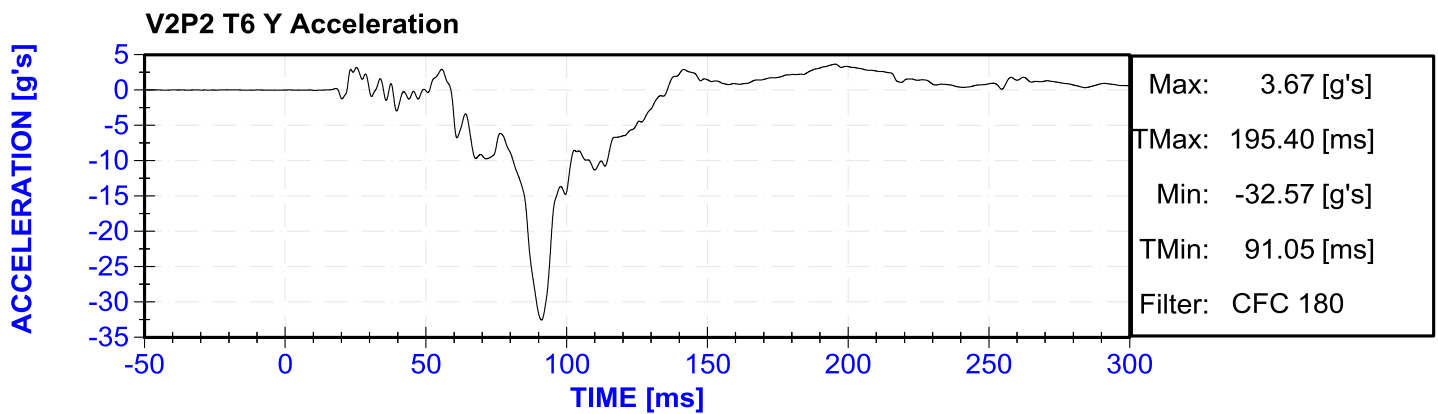
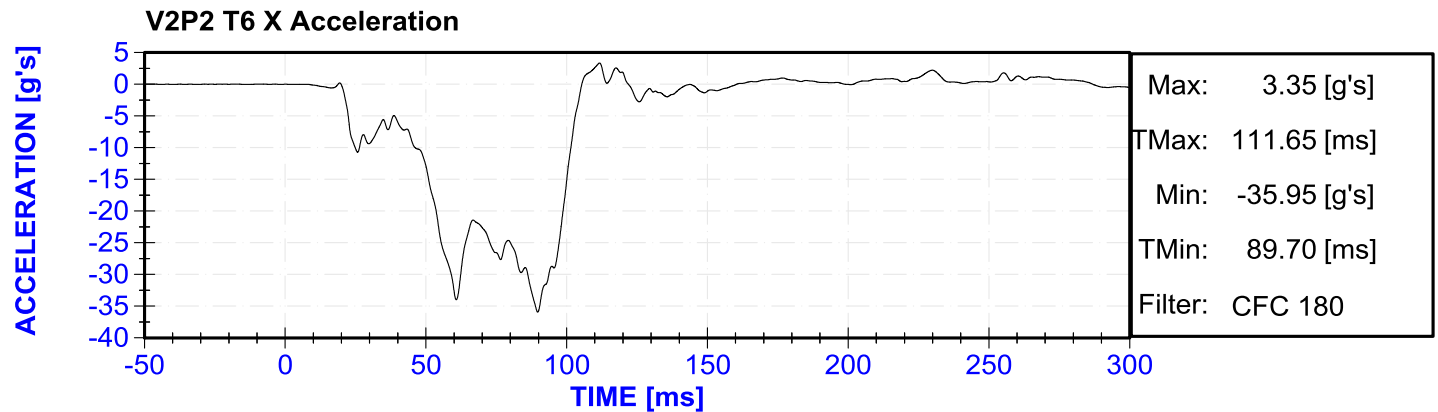
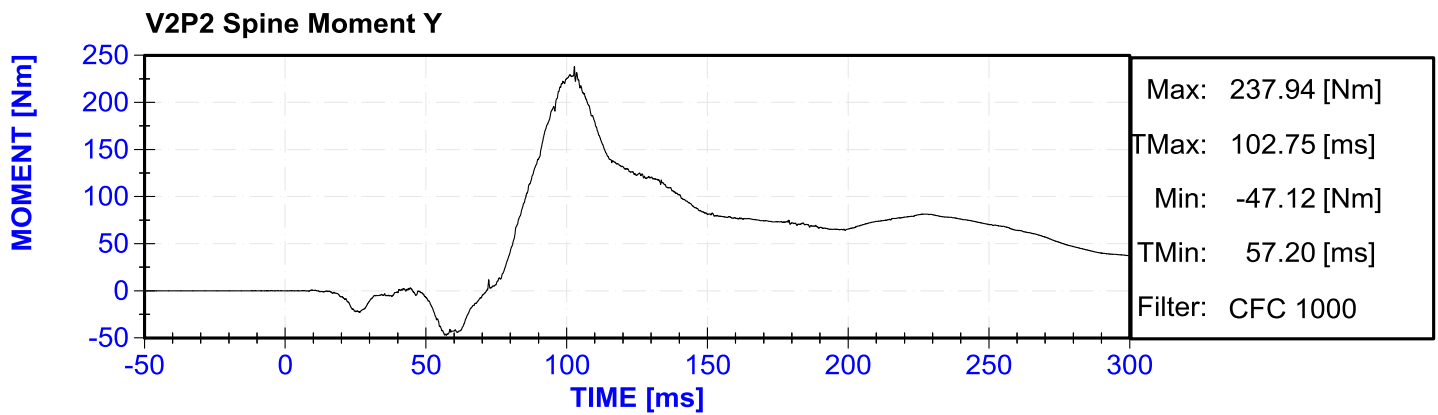
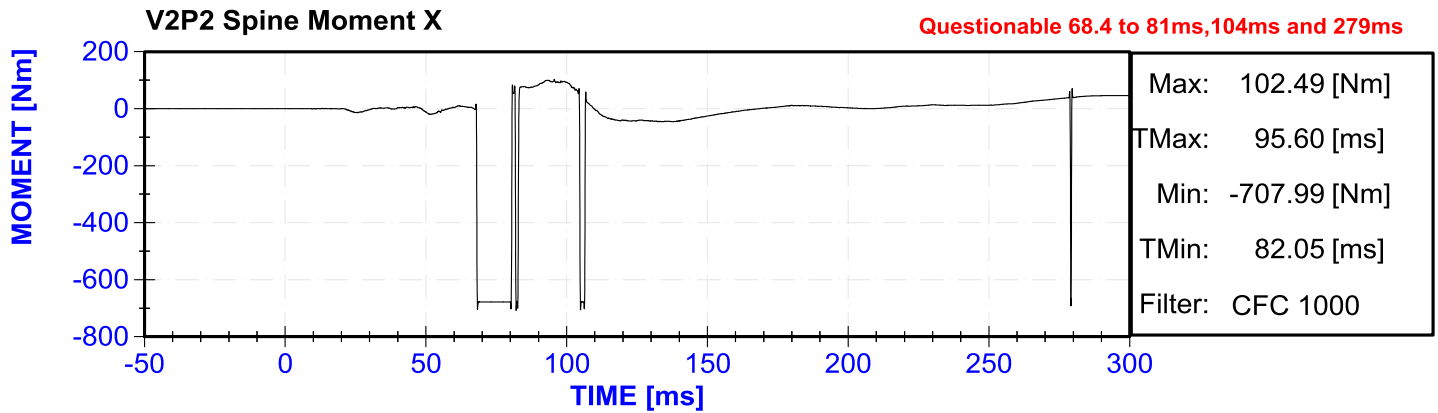


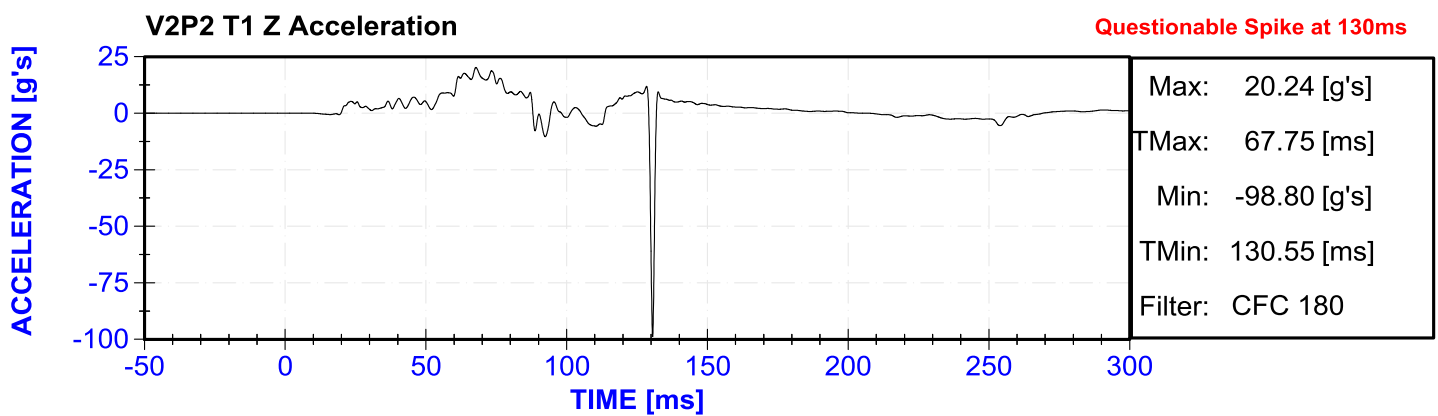
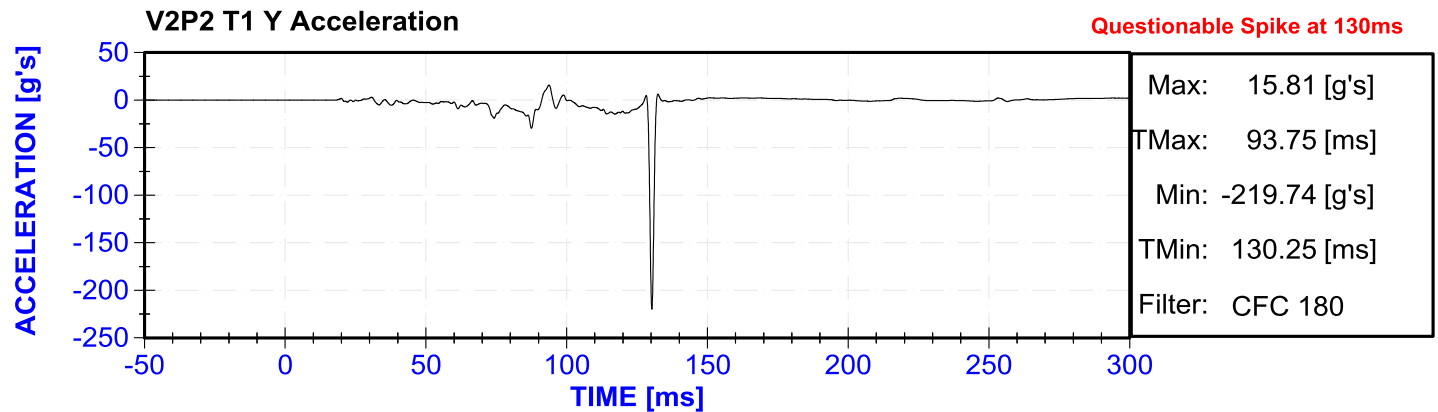
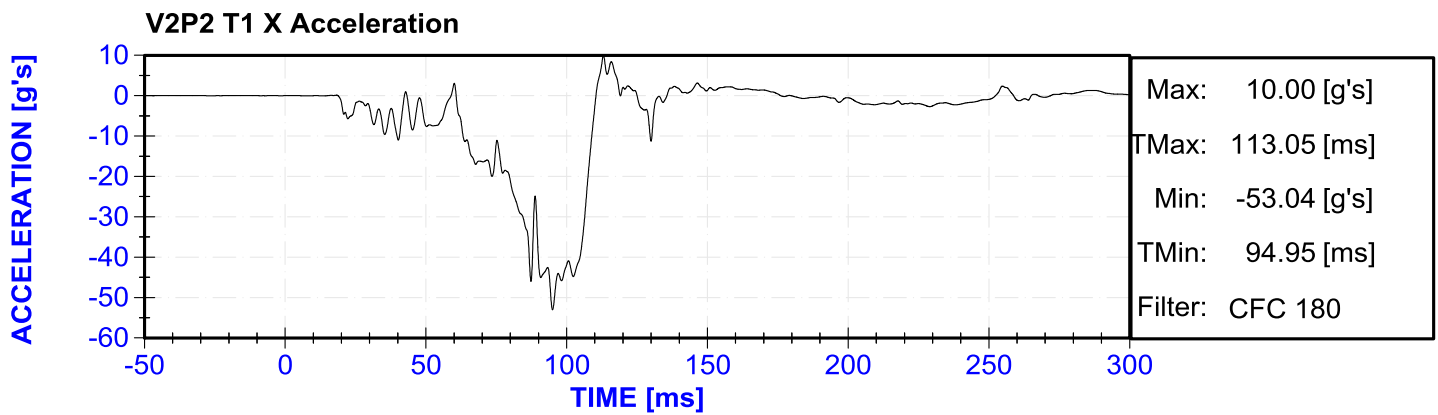
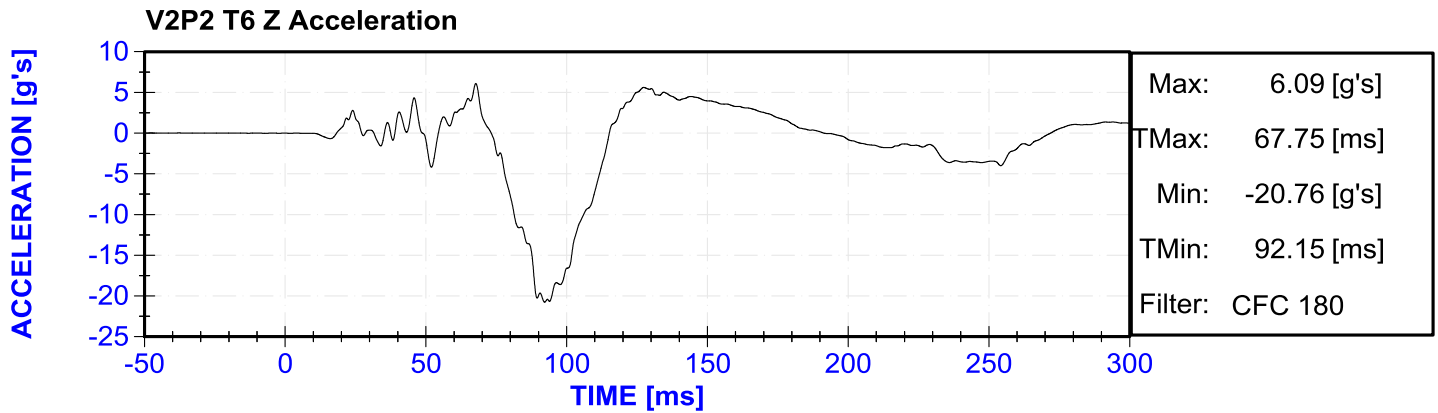
V2P2 Lower Left DGIR X Displacement

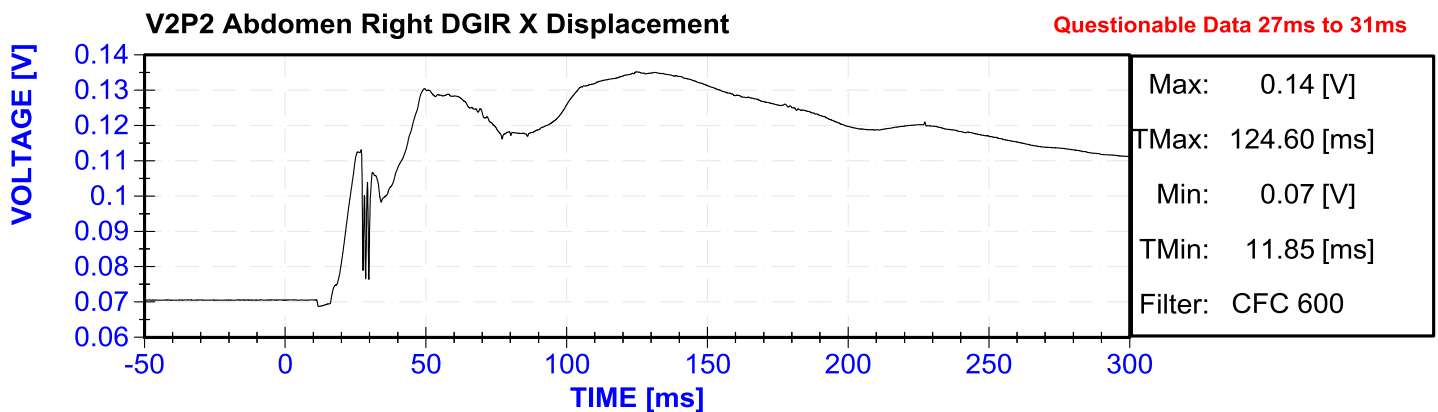
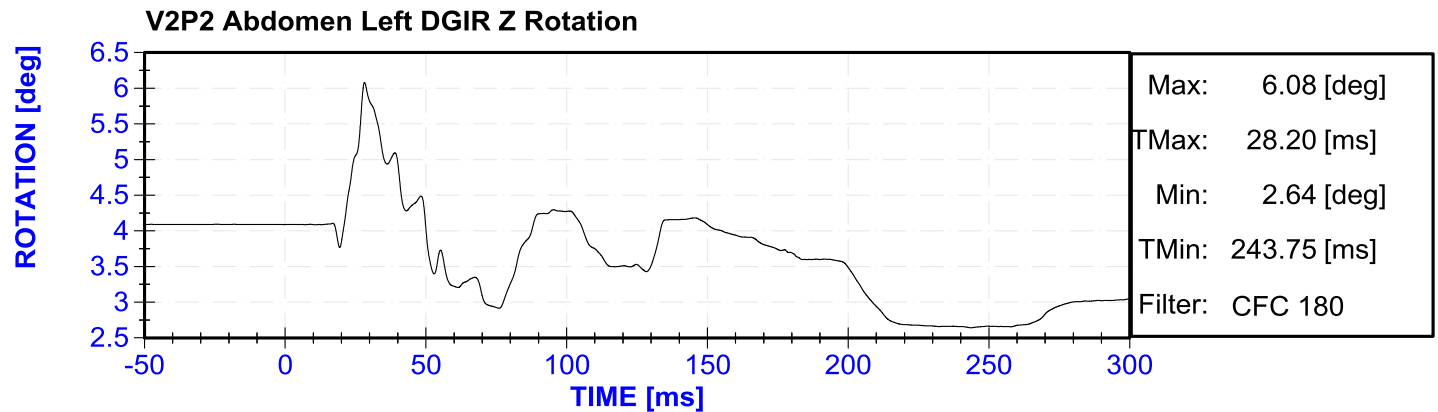
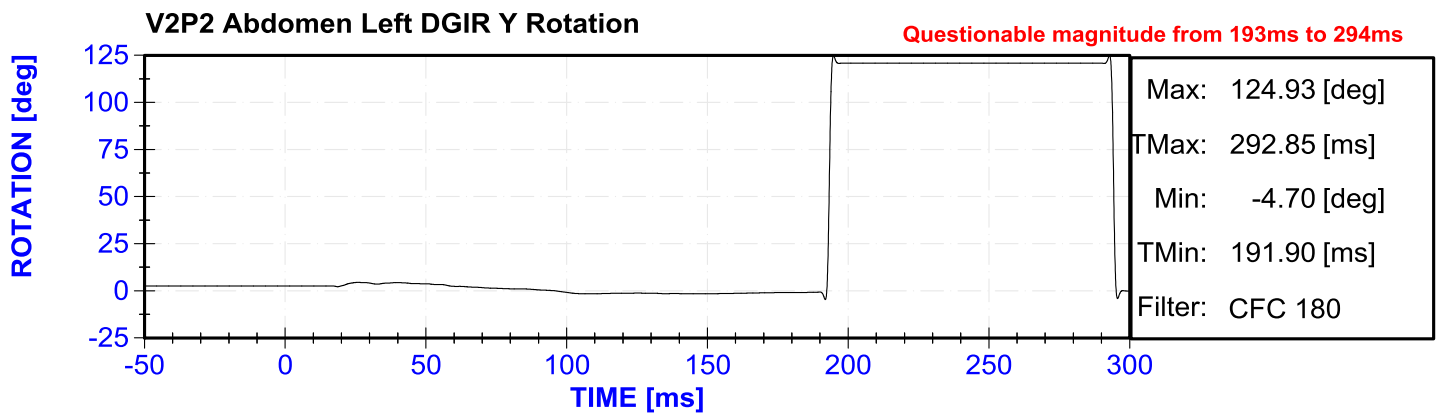
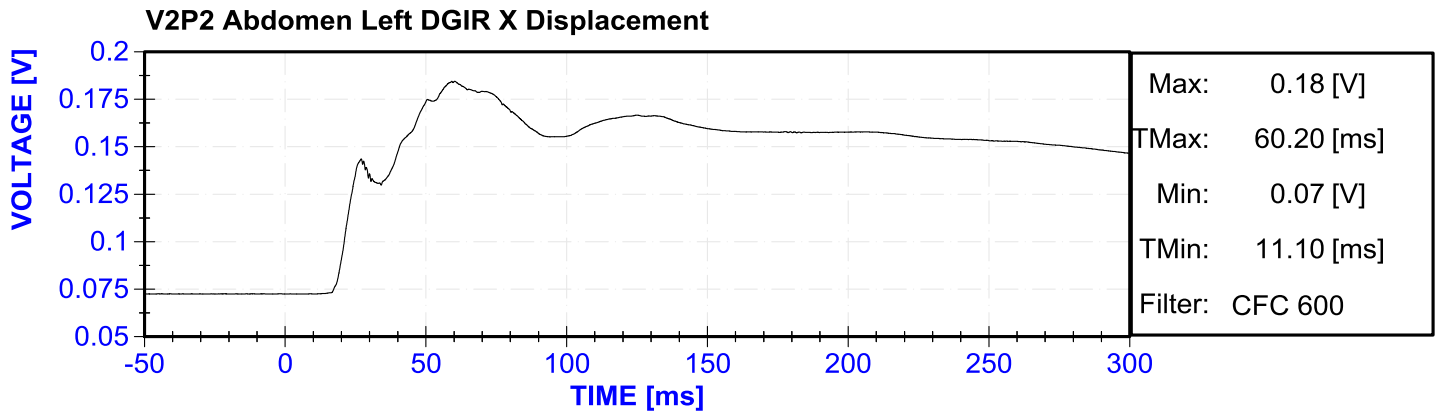


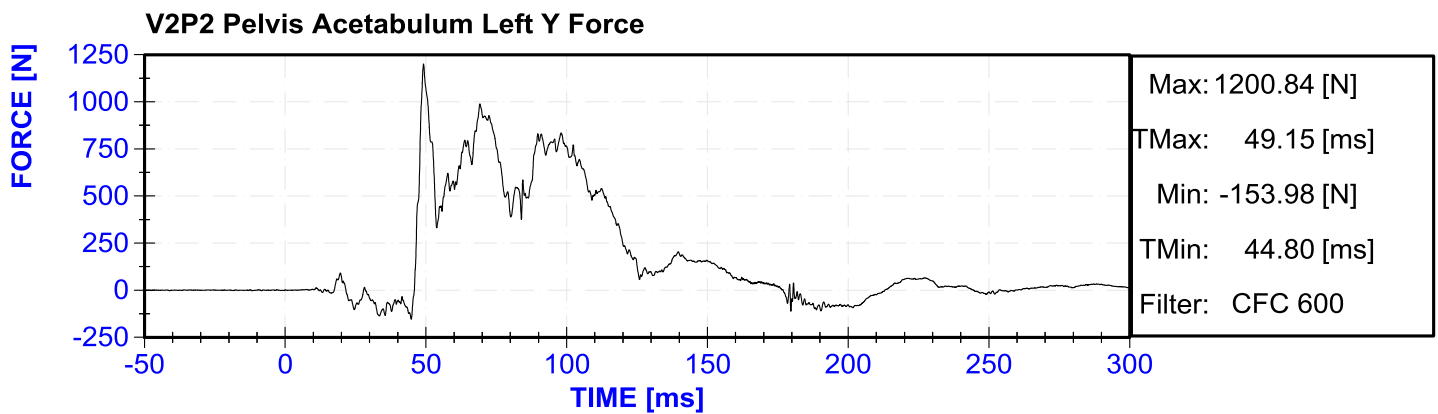
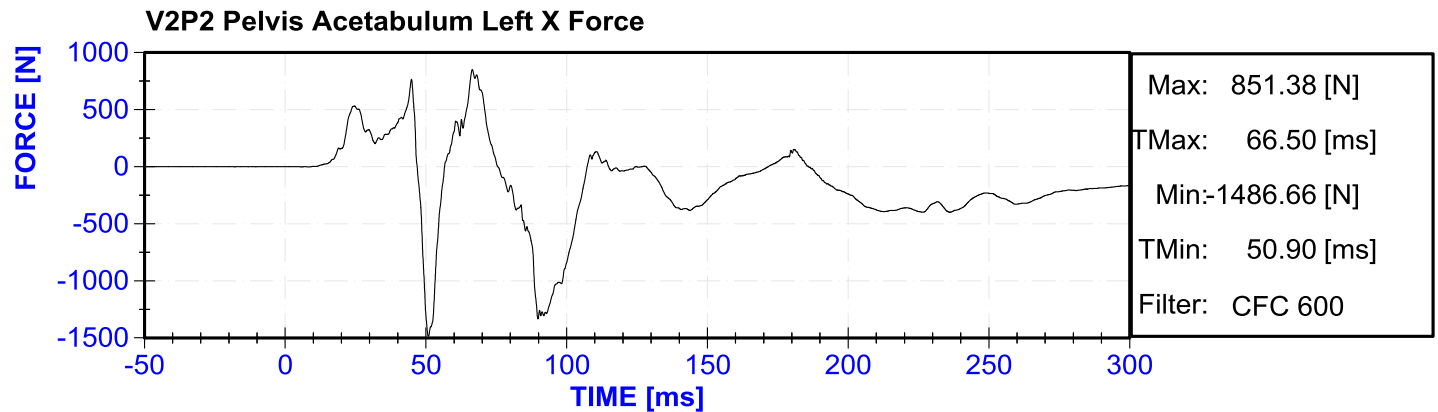
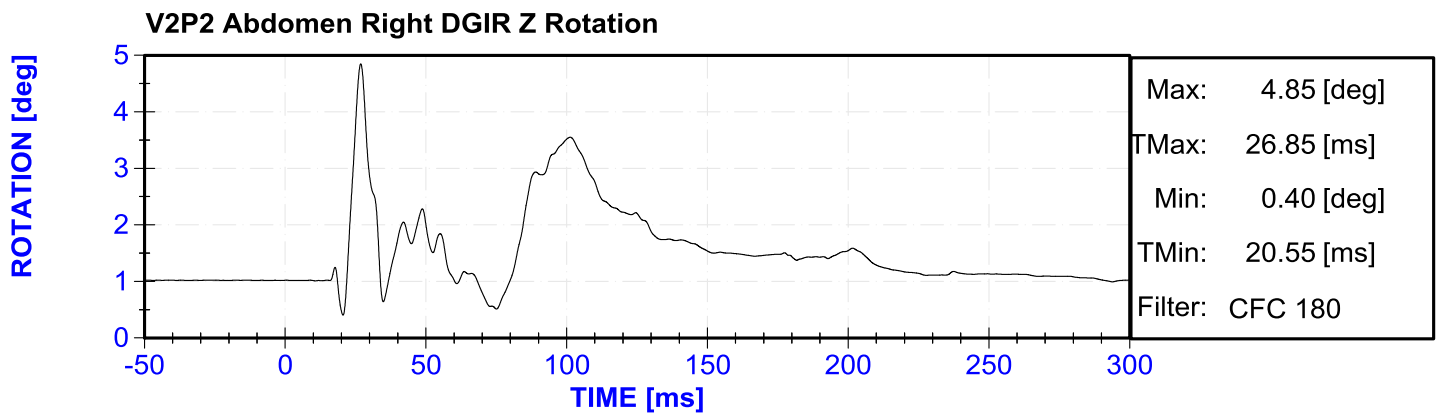
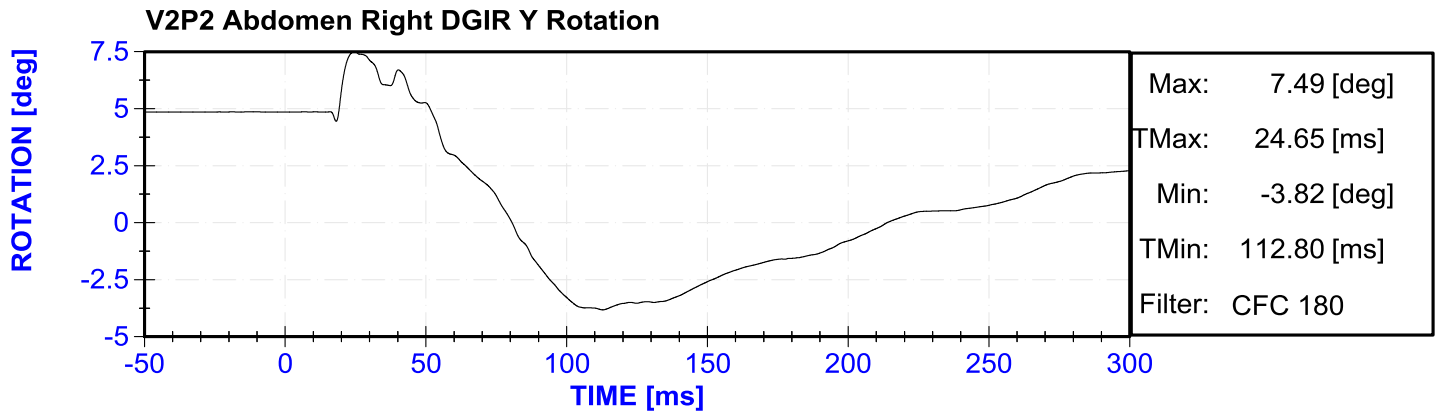


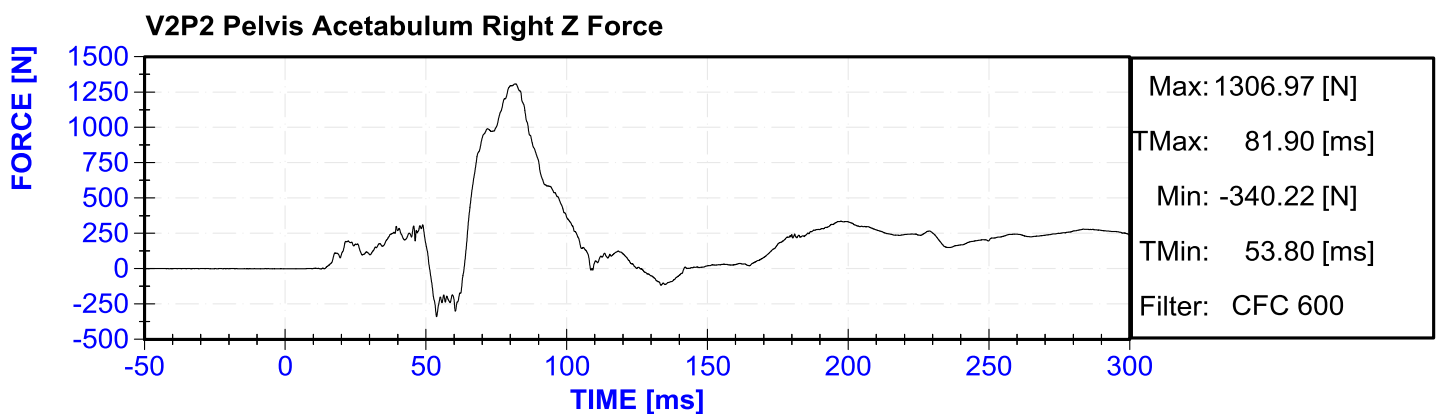
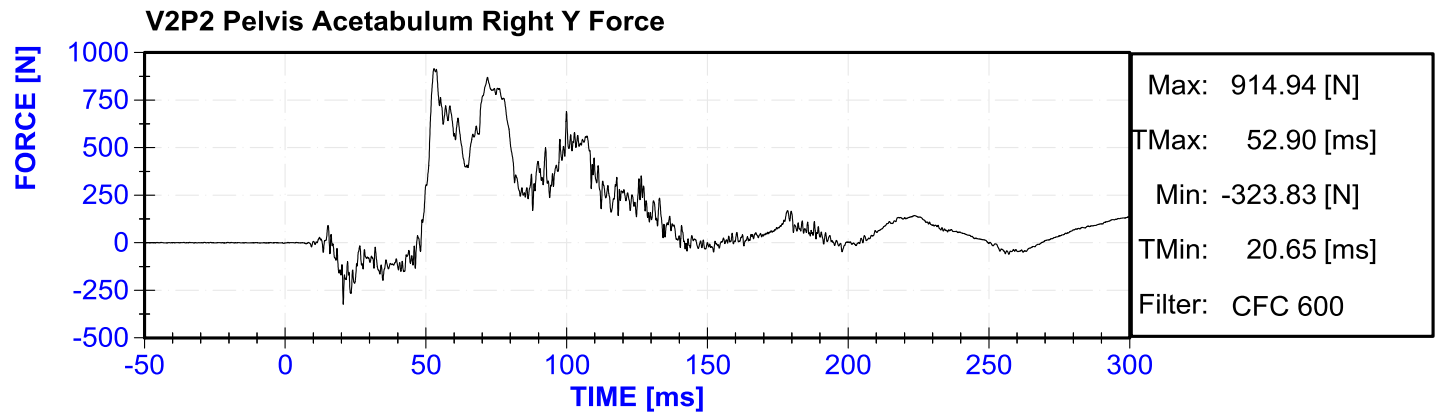
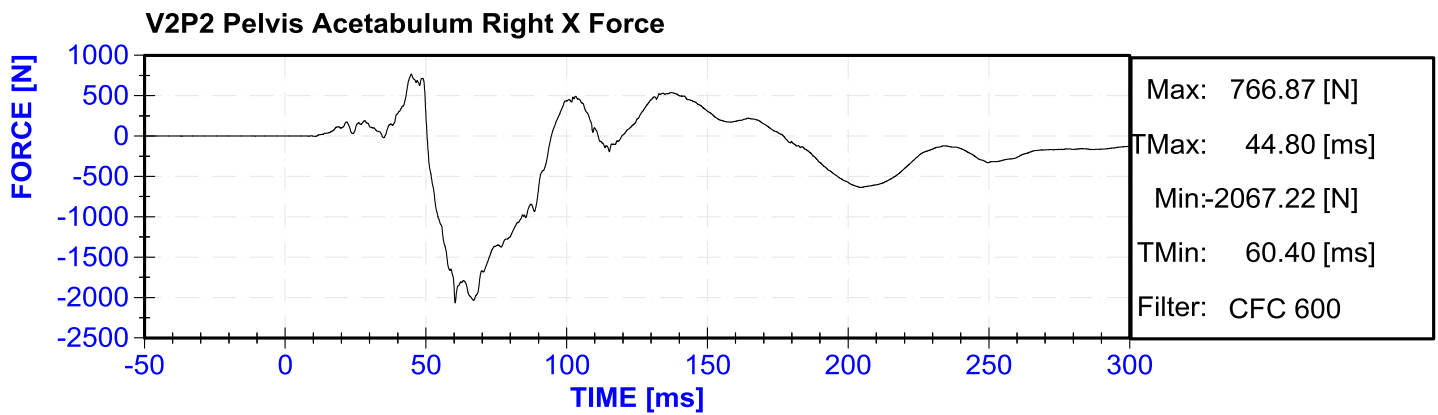
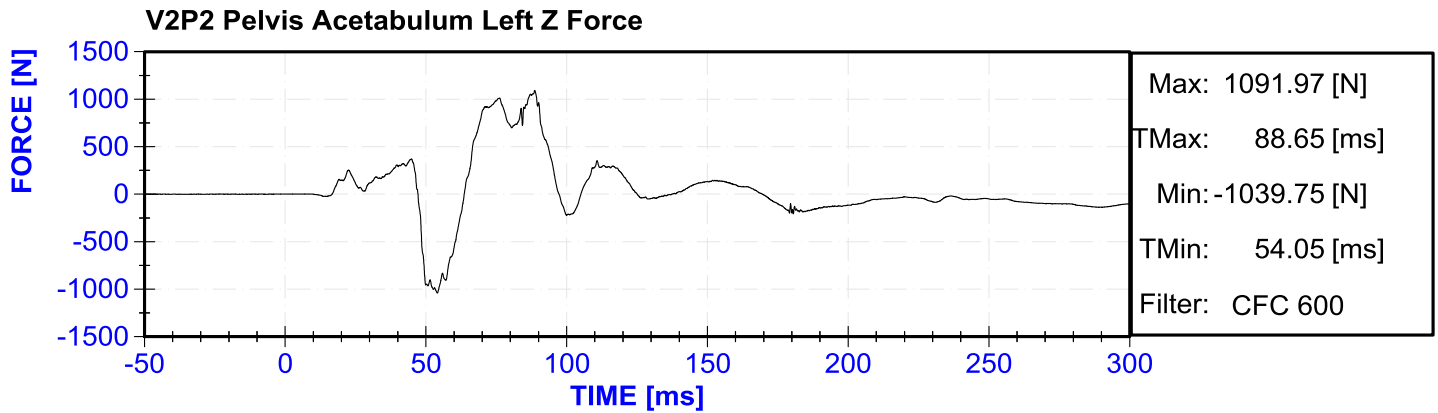


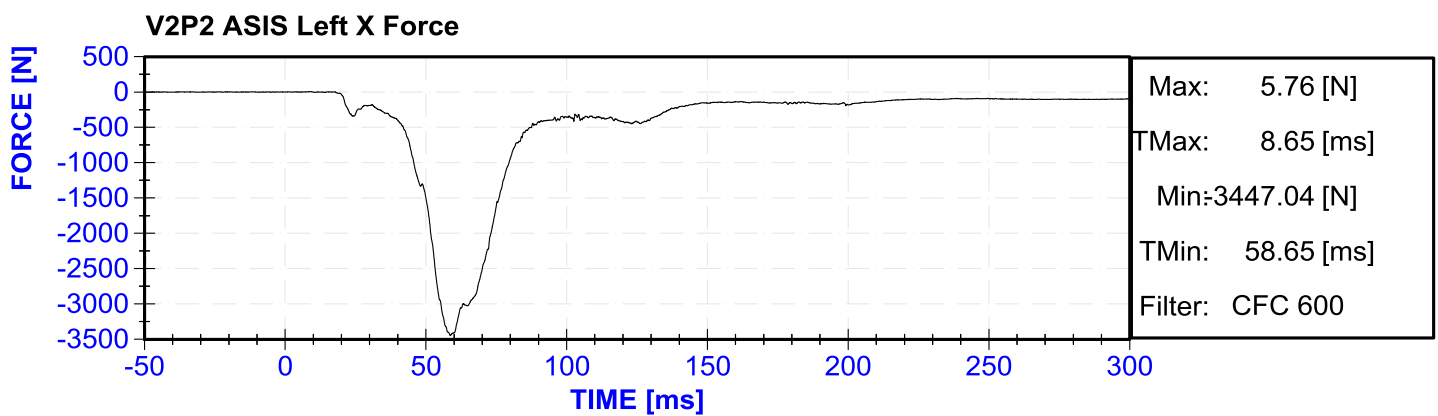
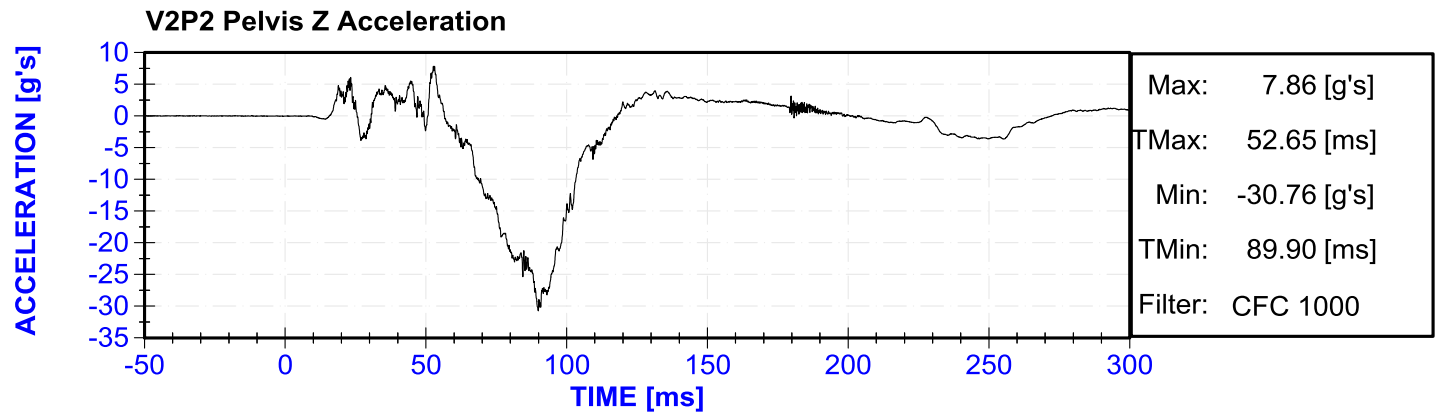
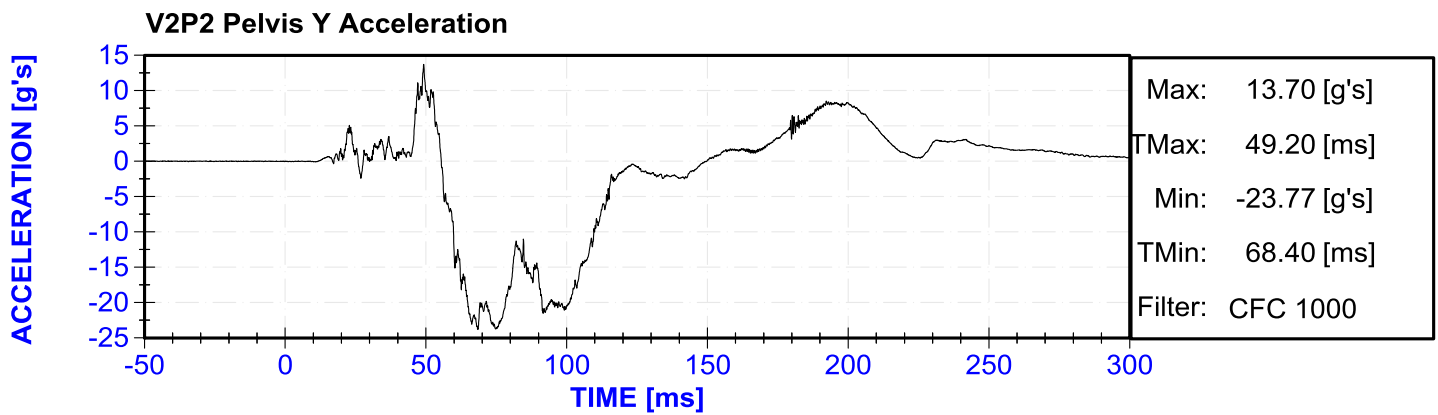
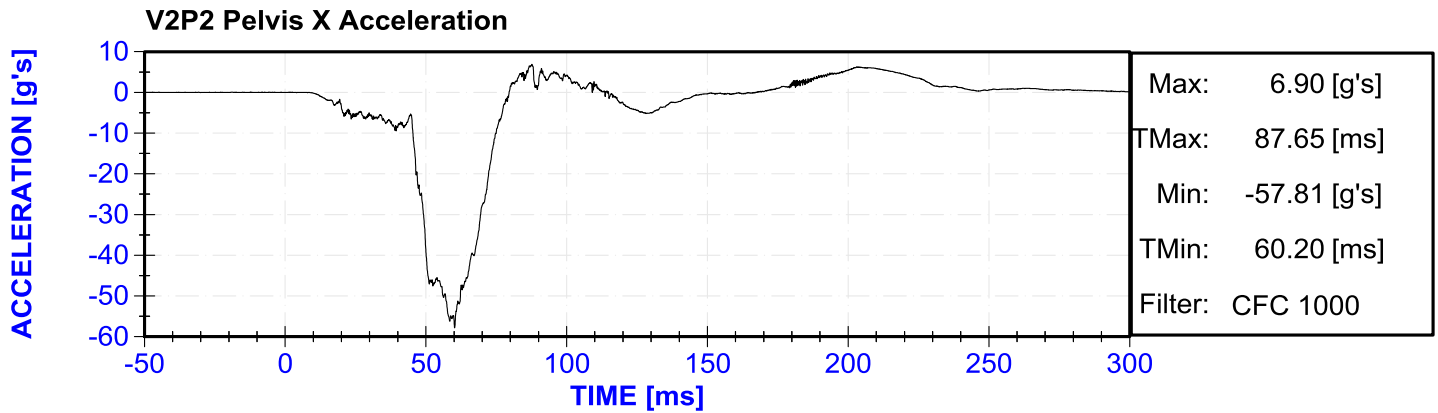


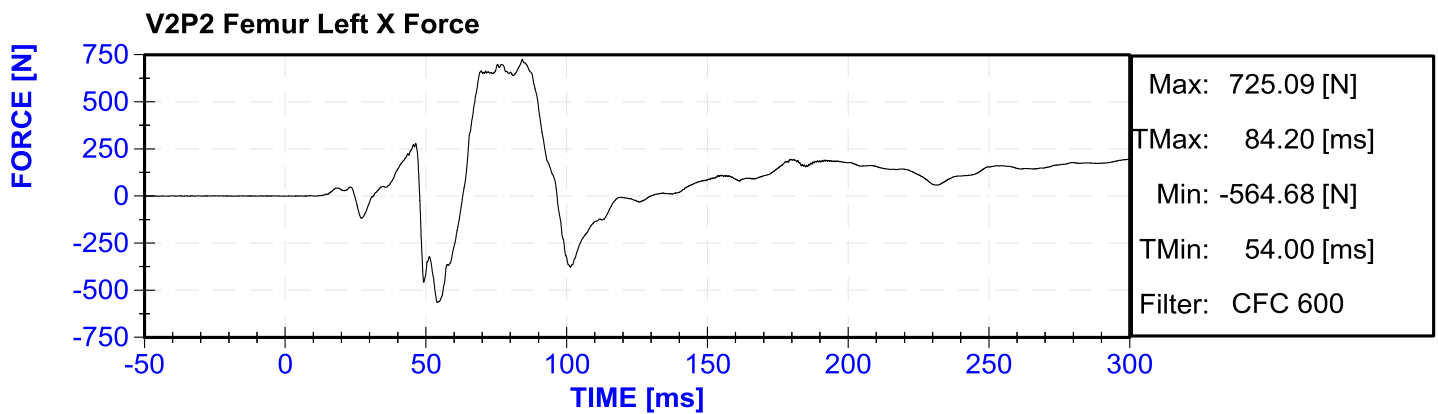
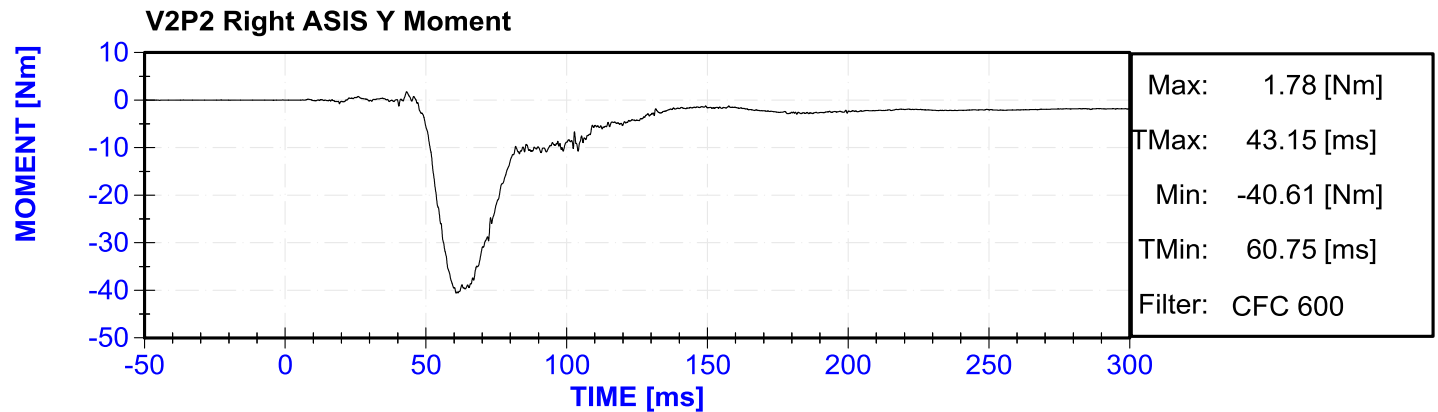
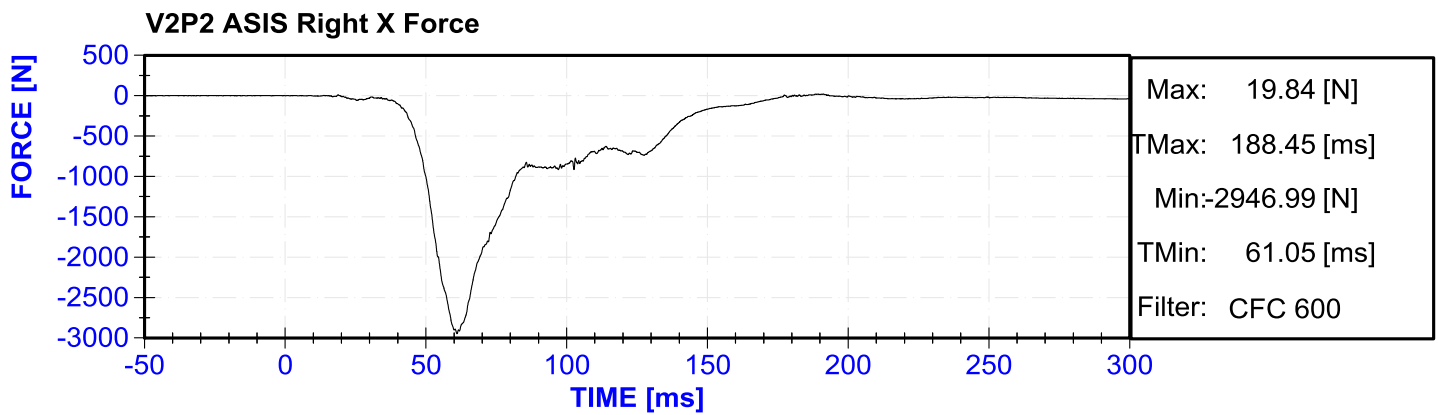
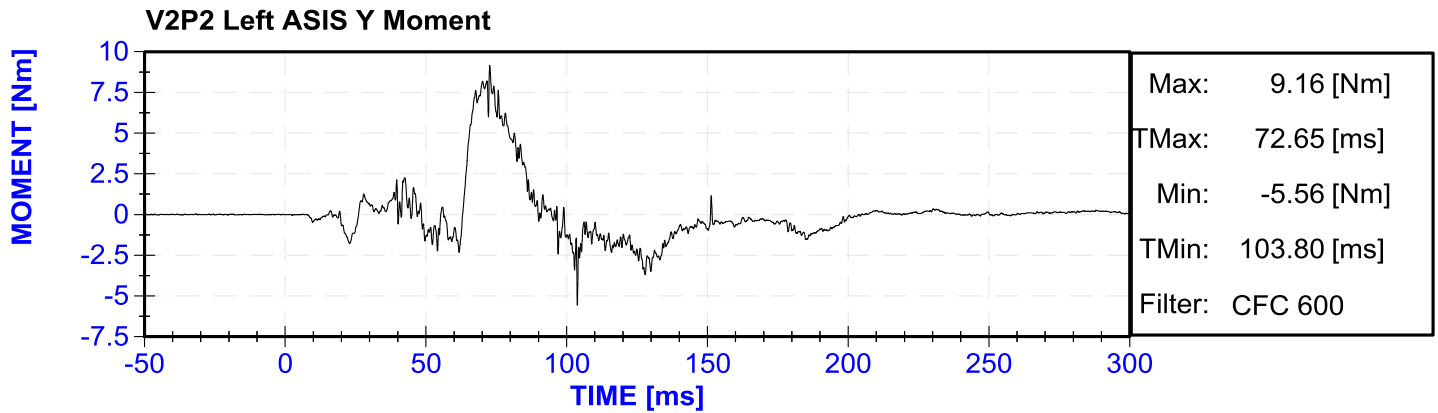


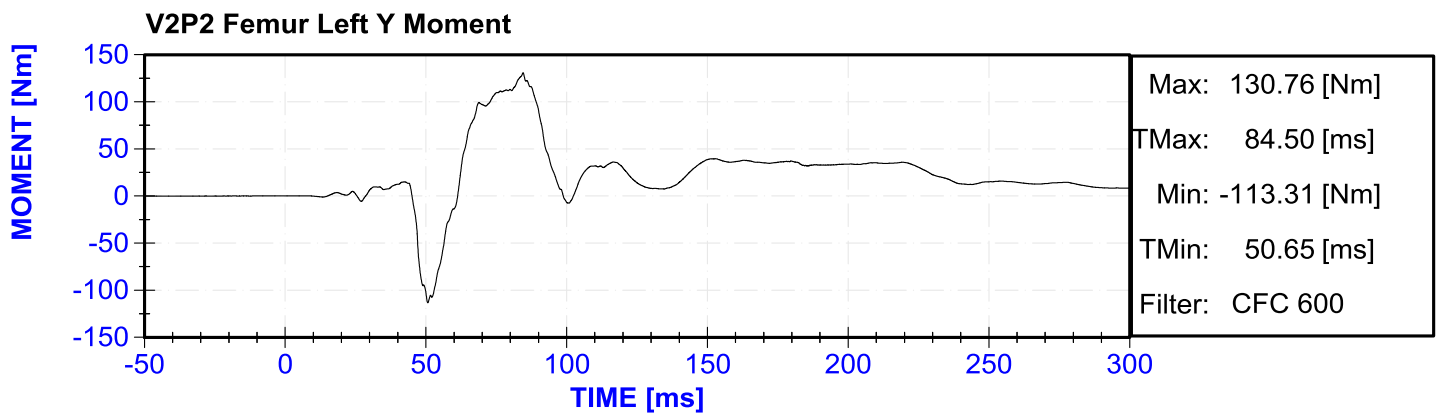
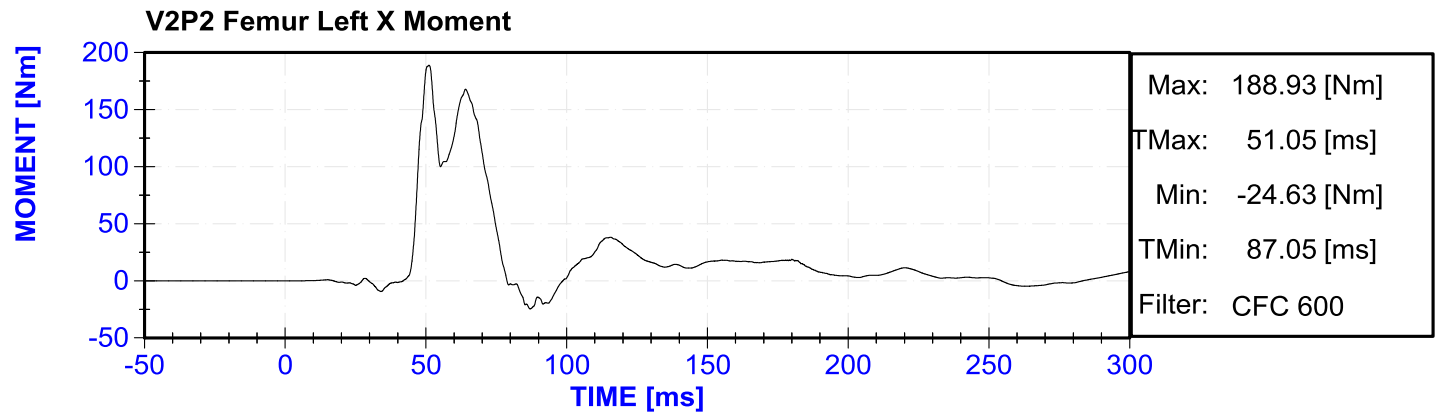
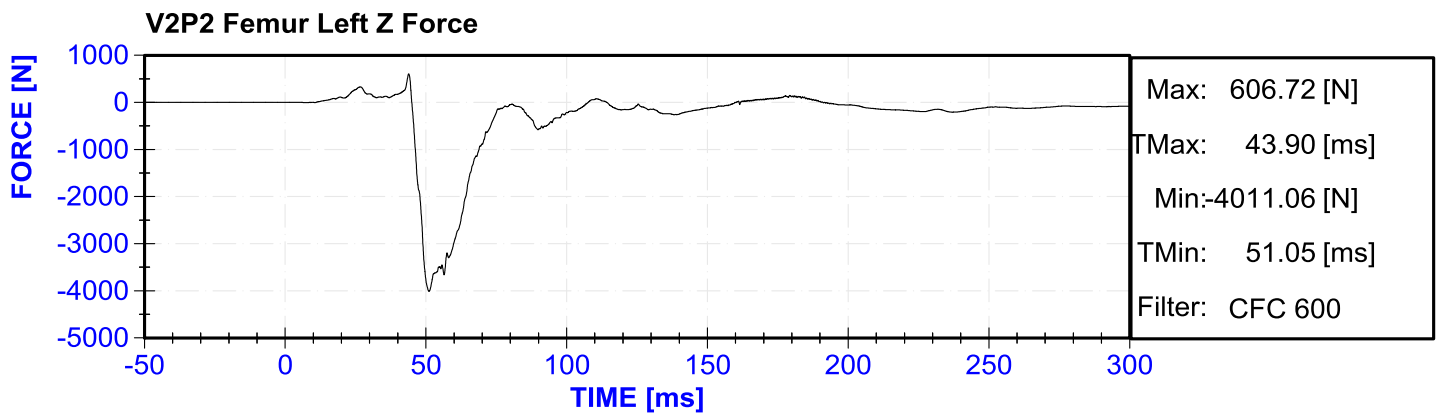
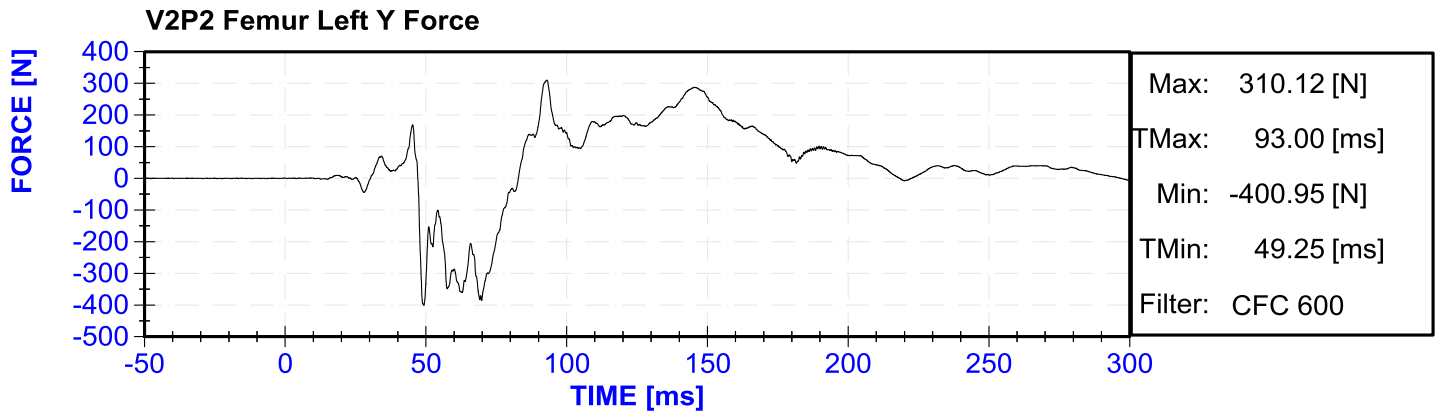


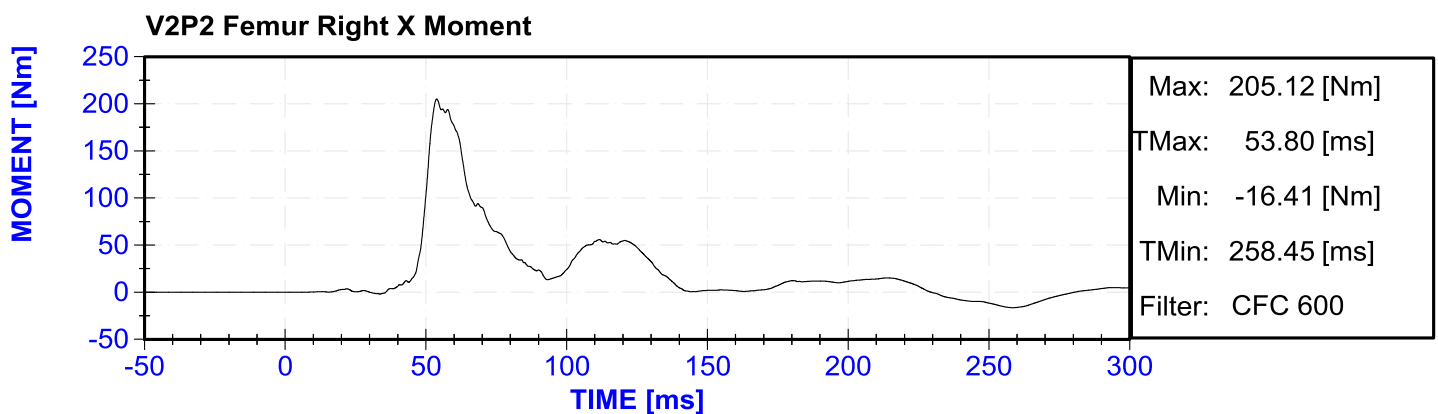
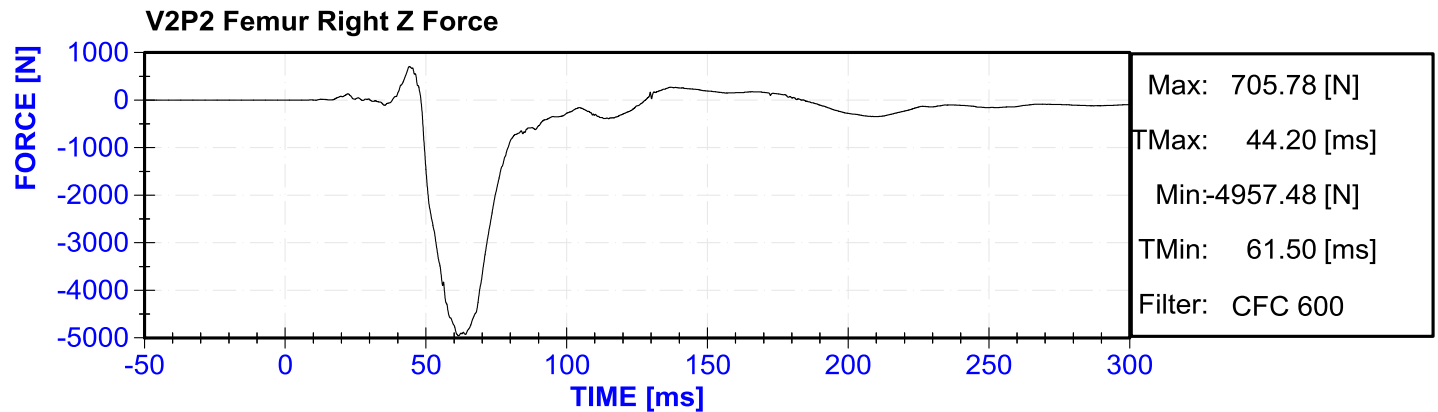
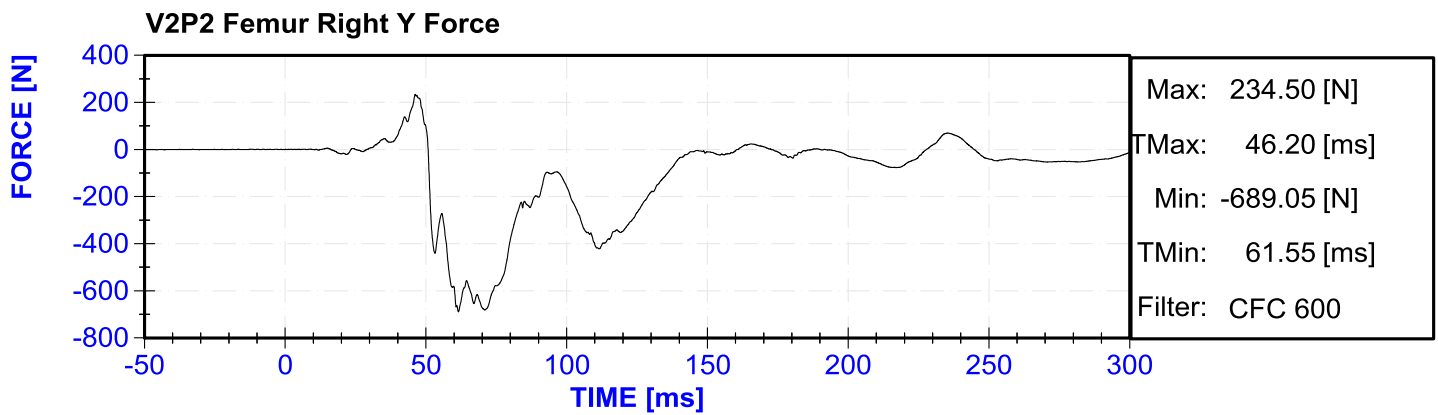
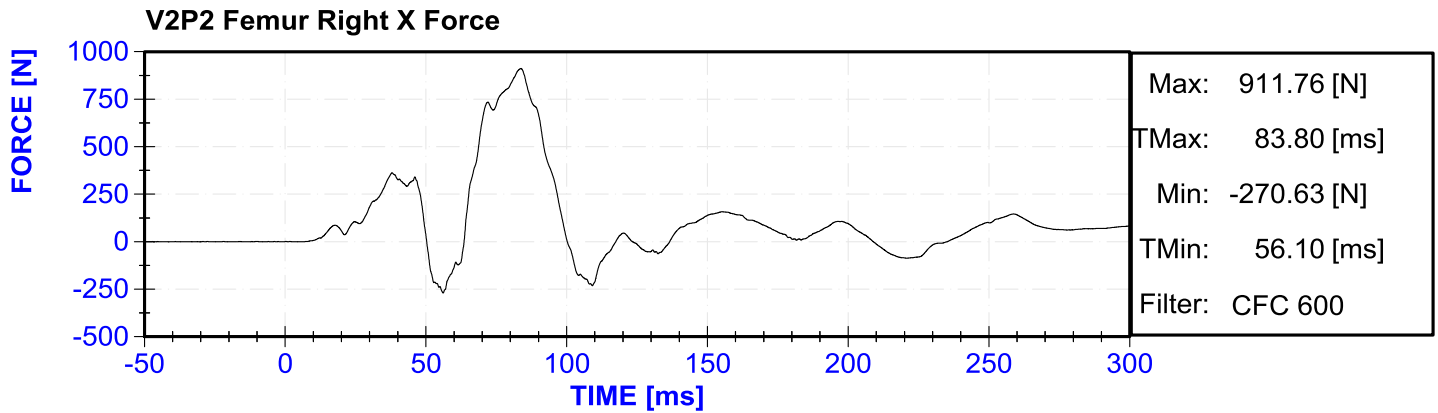


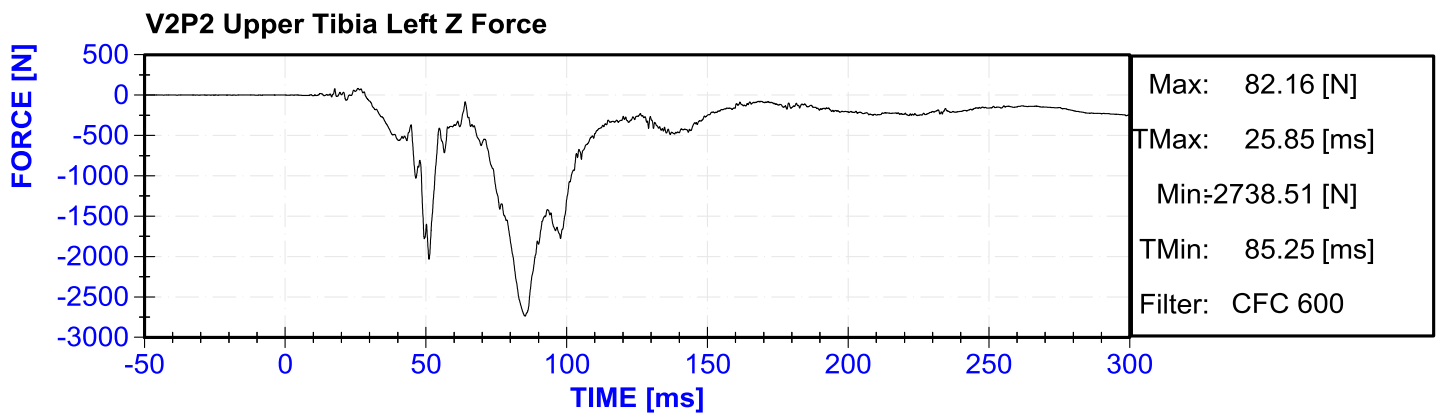
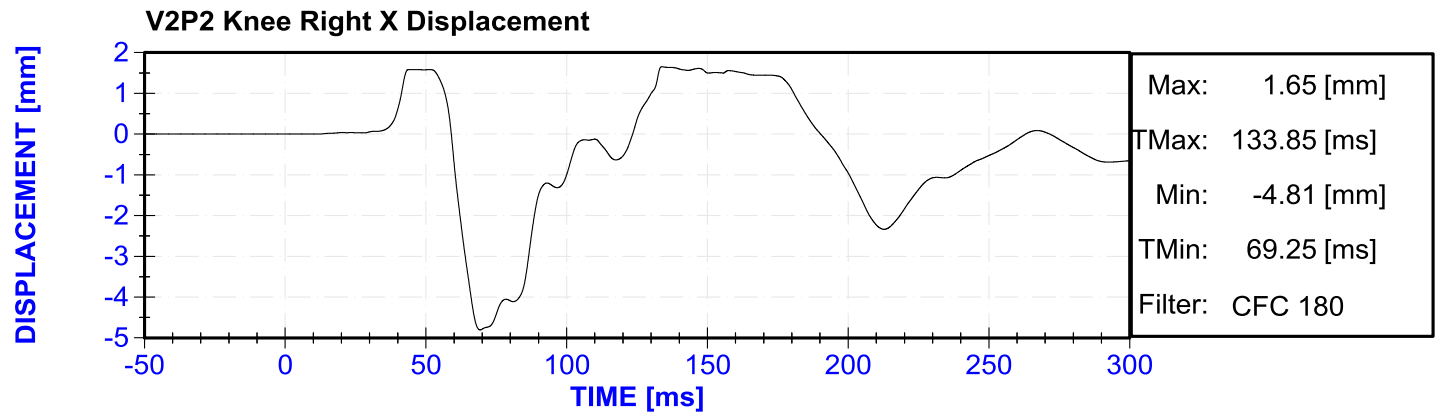
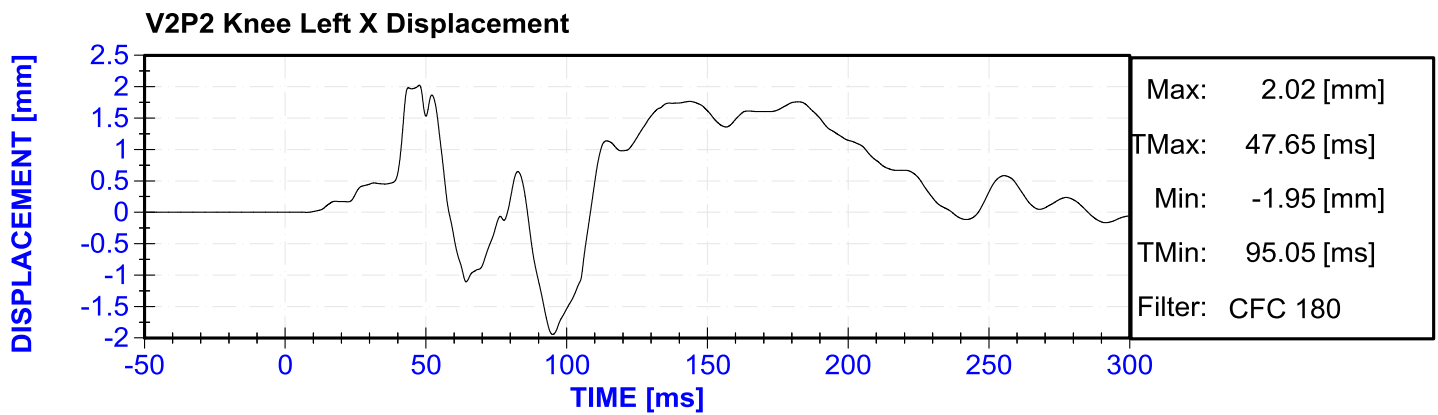
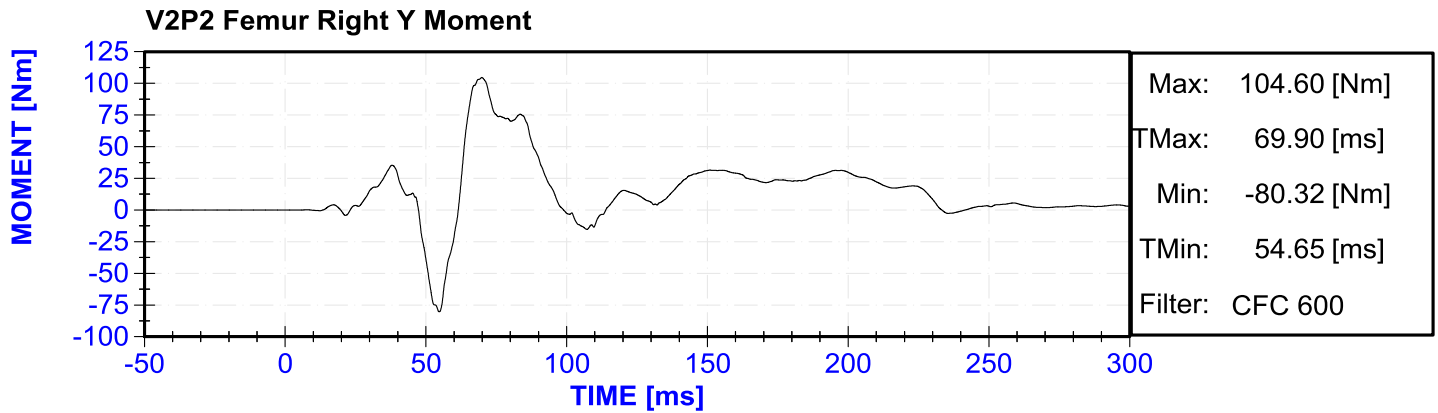


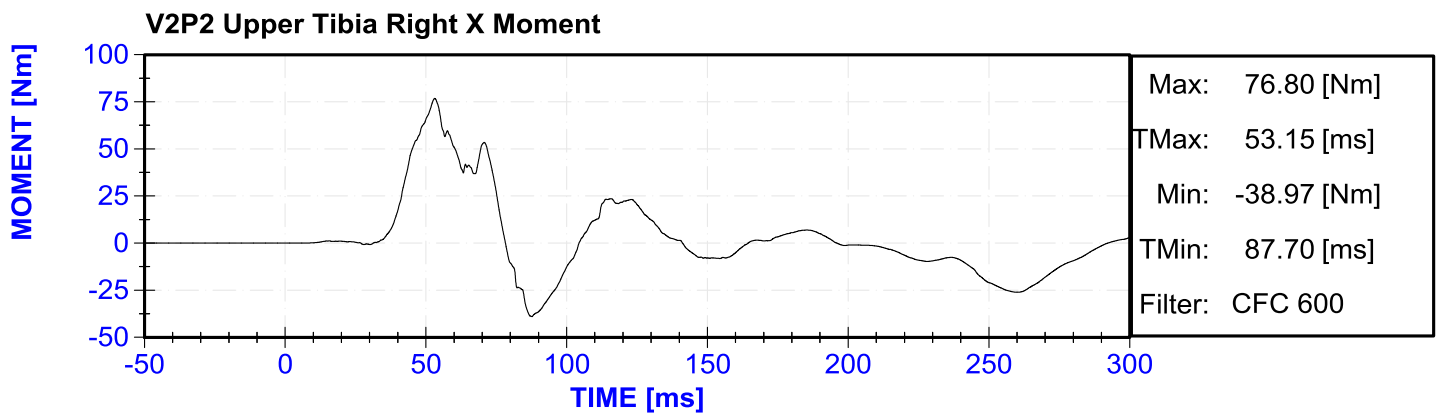
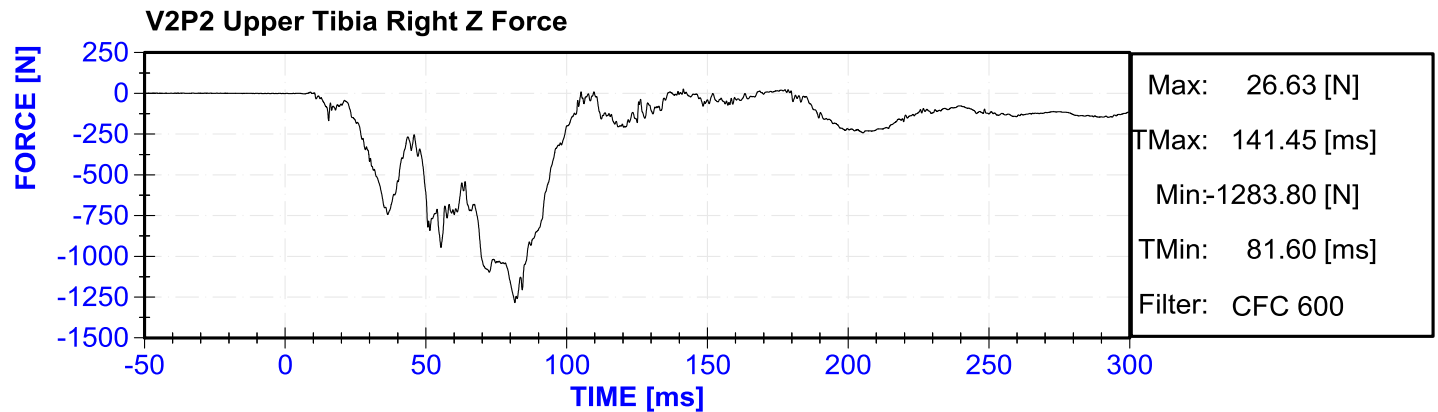
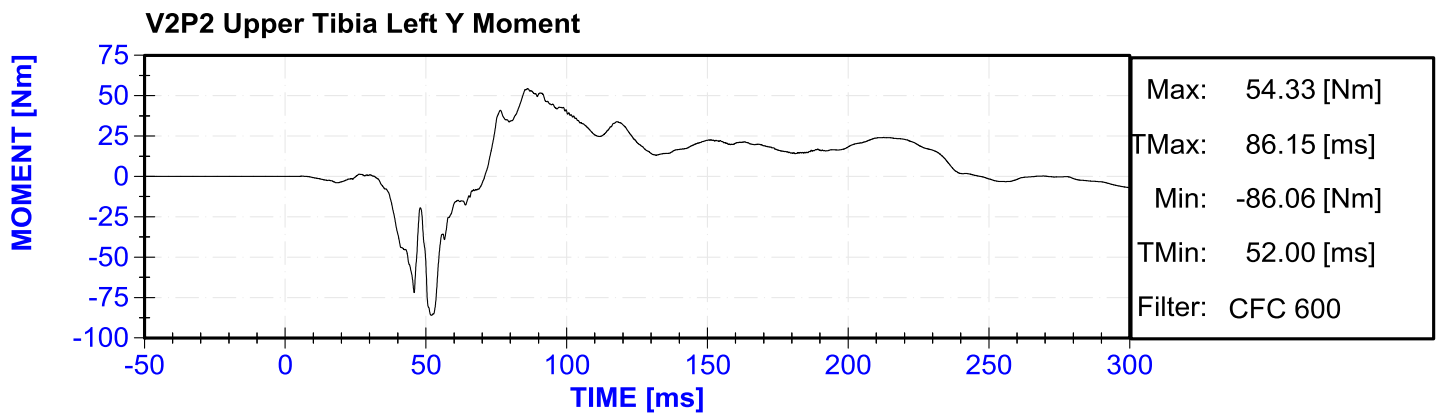
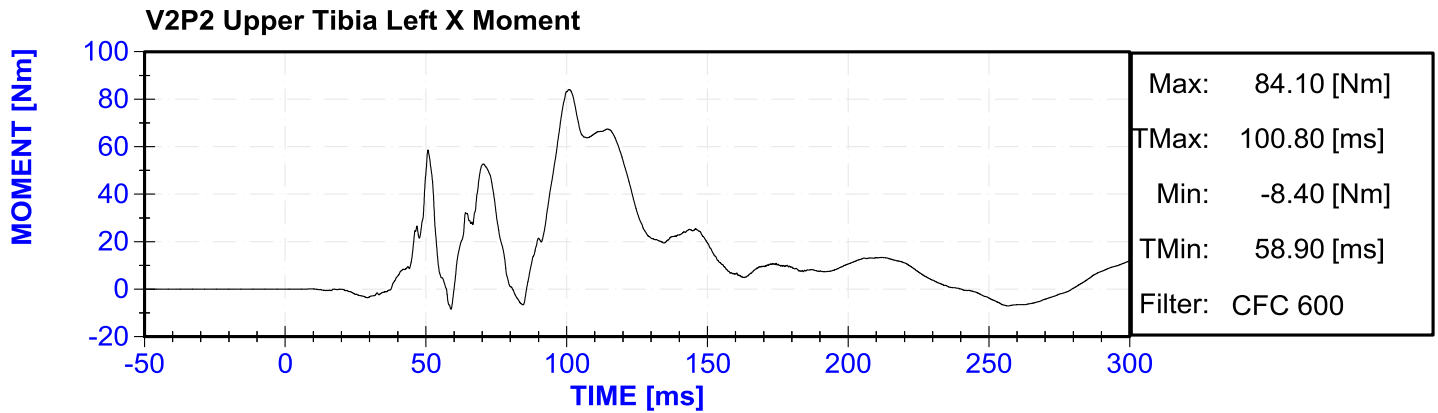


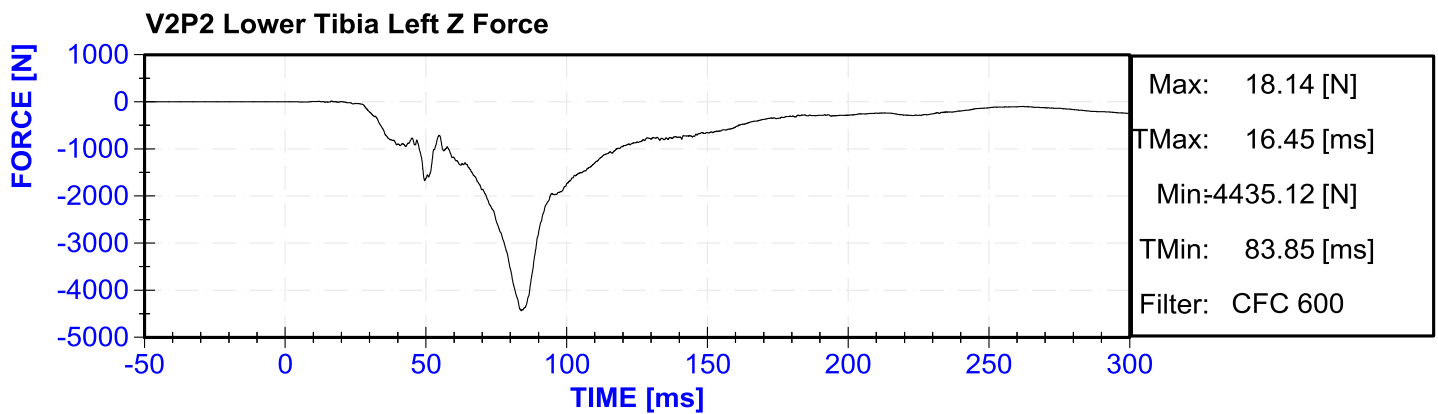
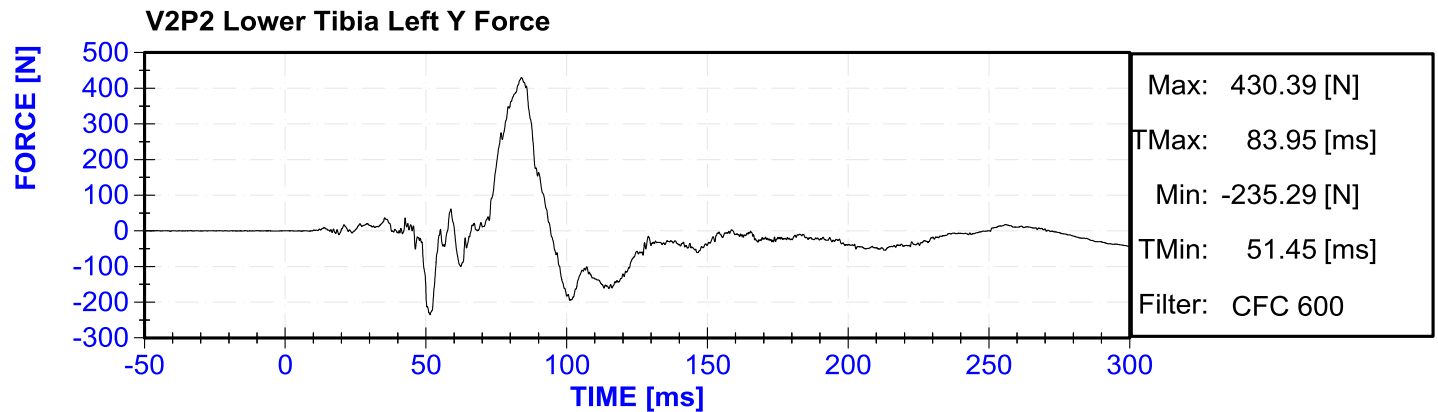
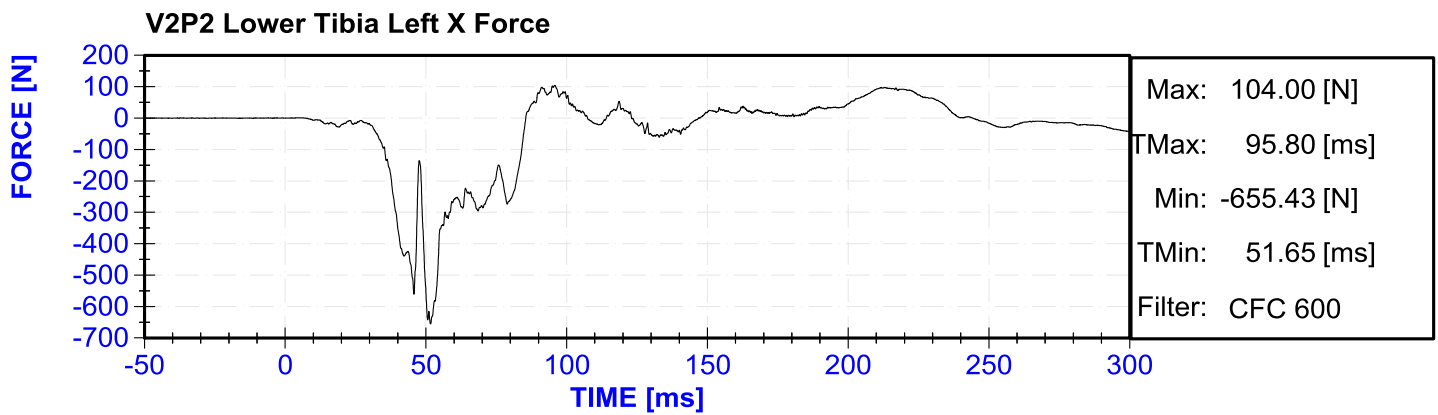
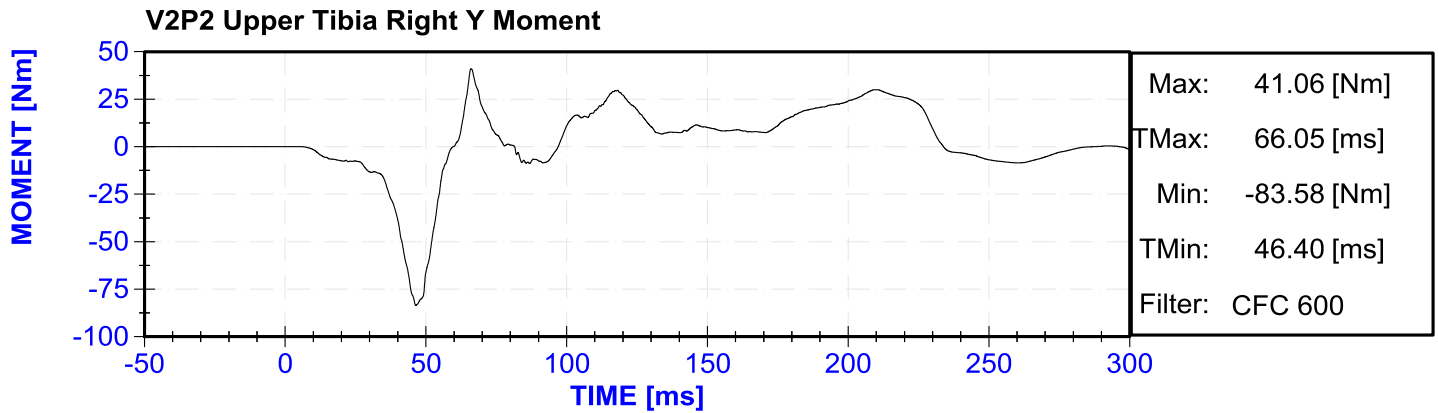


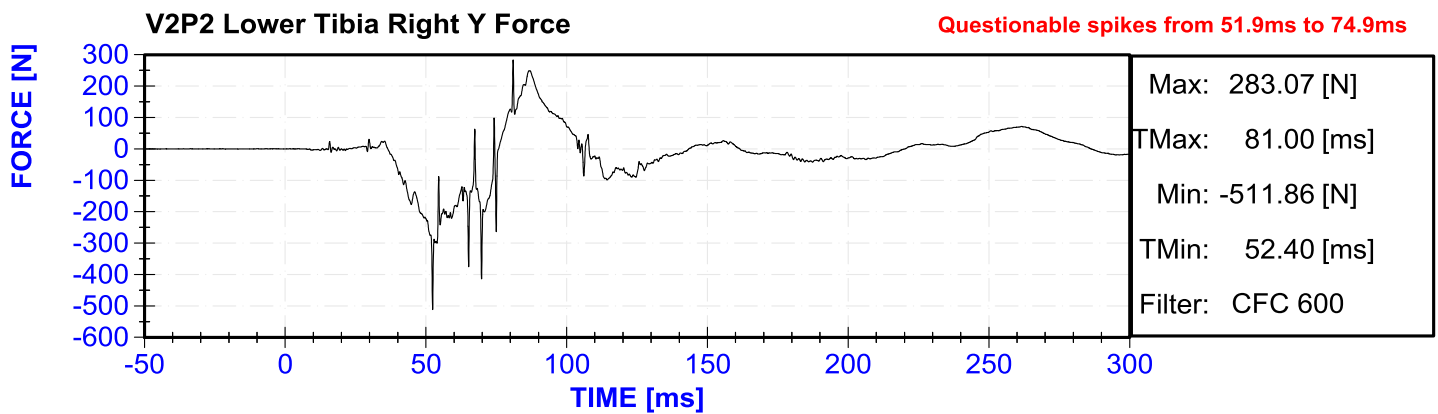
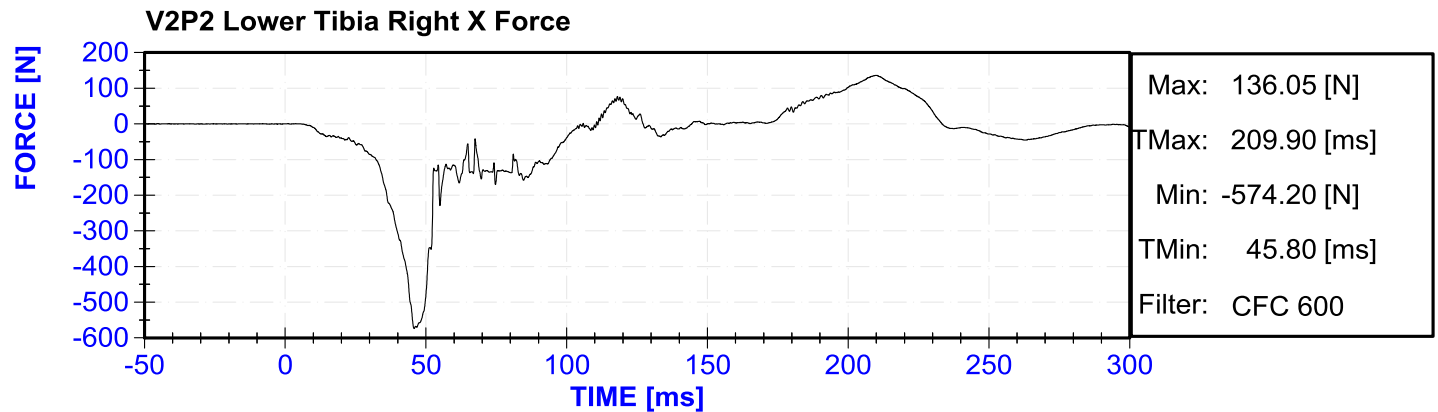
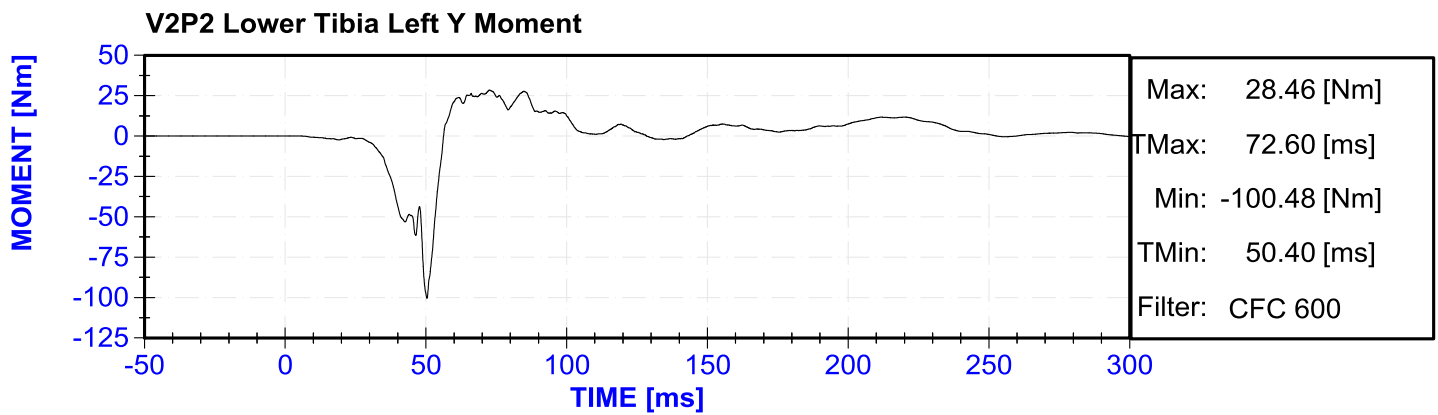
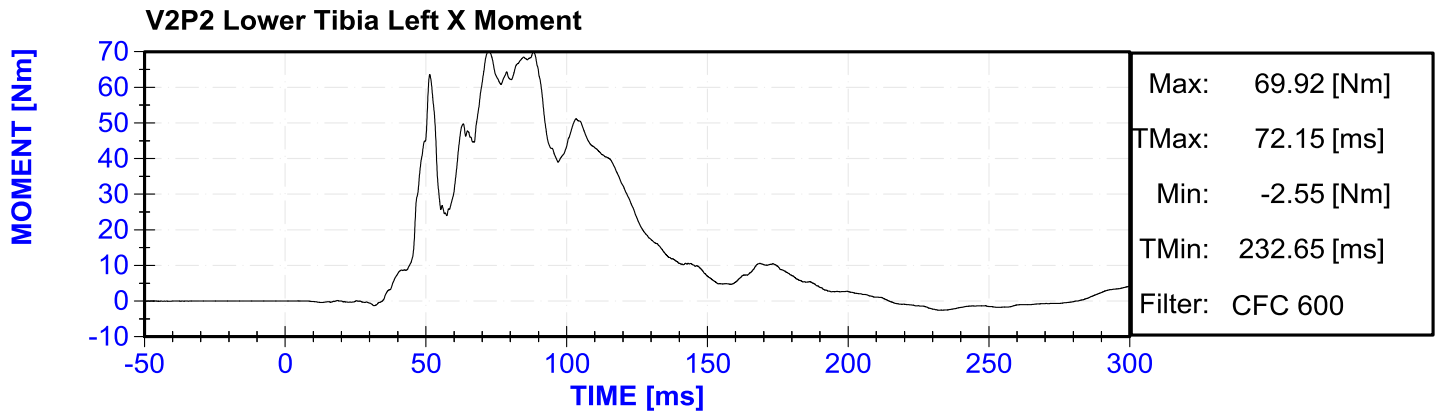


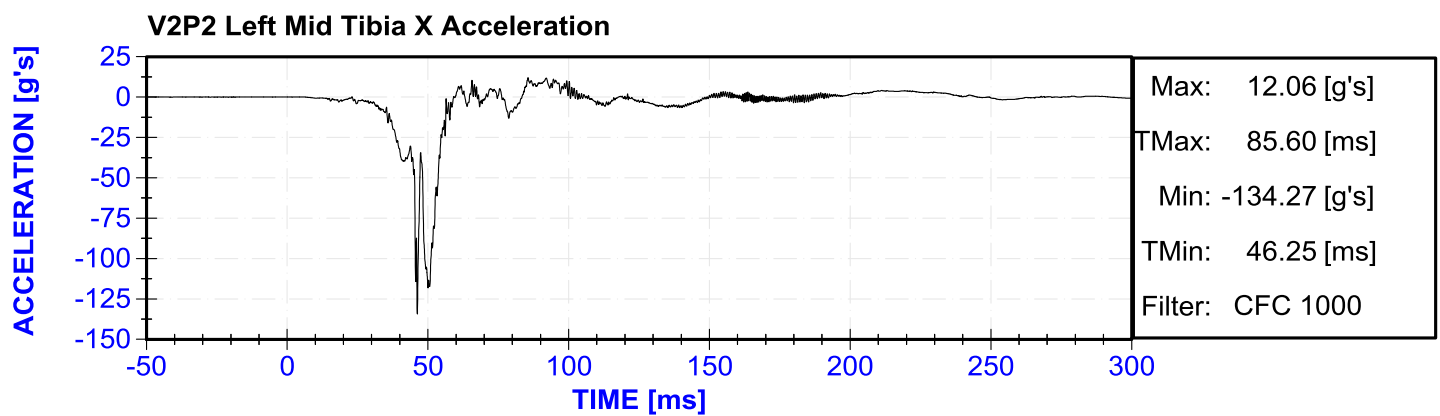
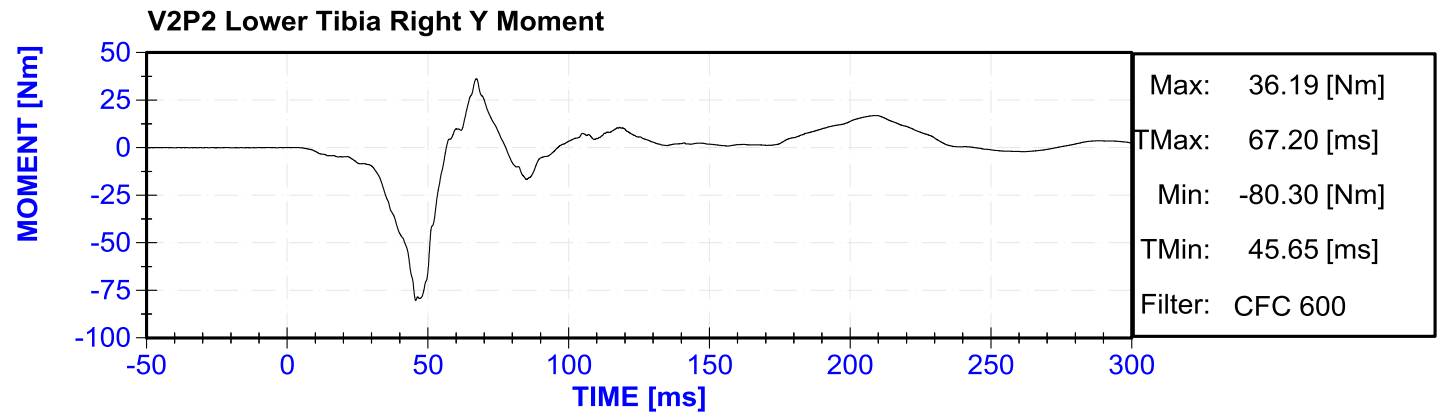
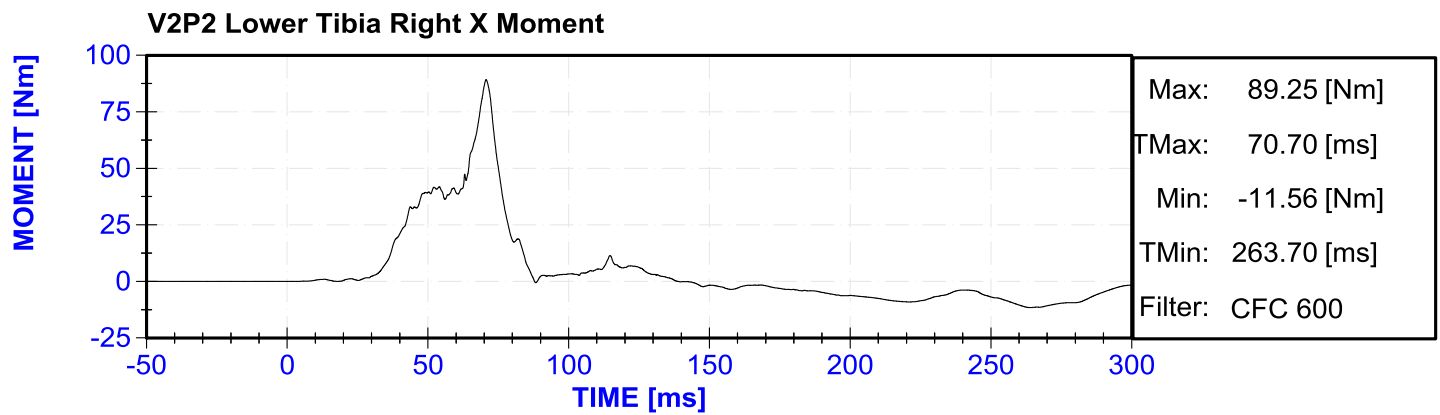
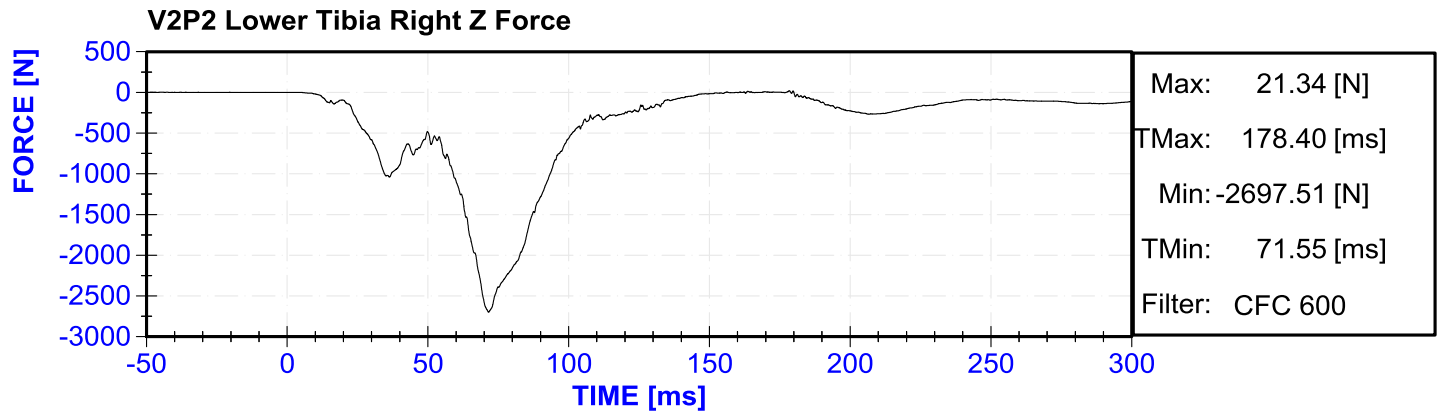


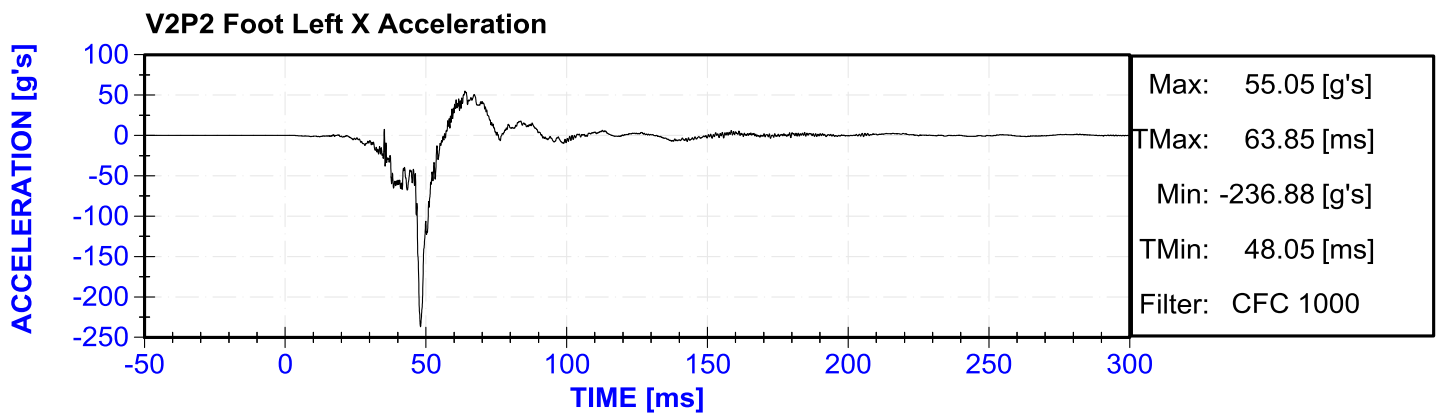
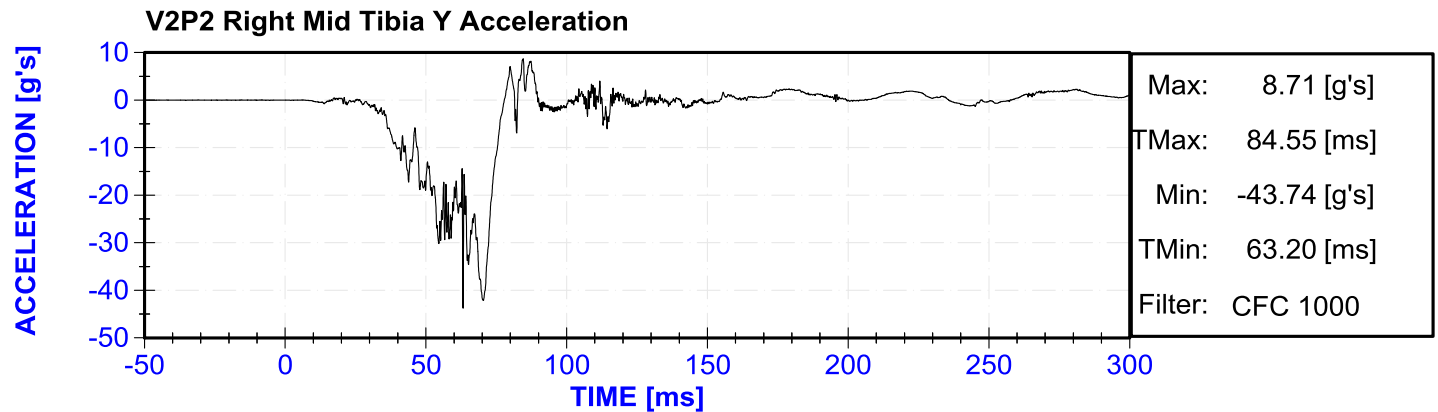
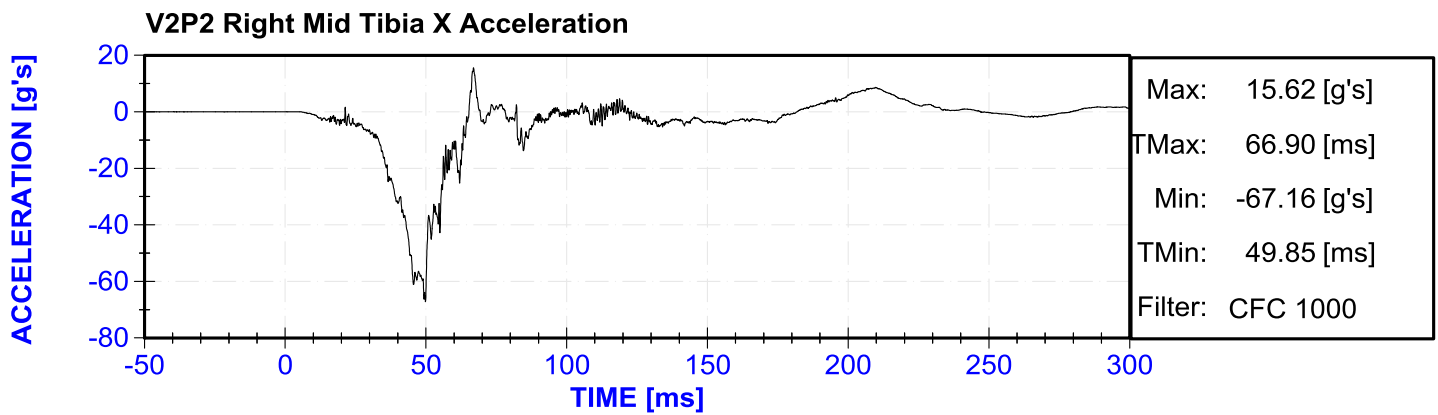
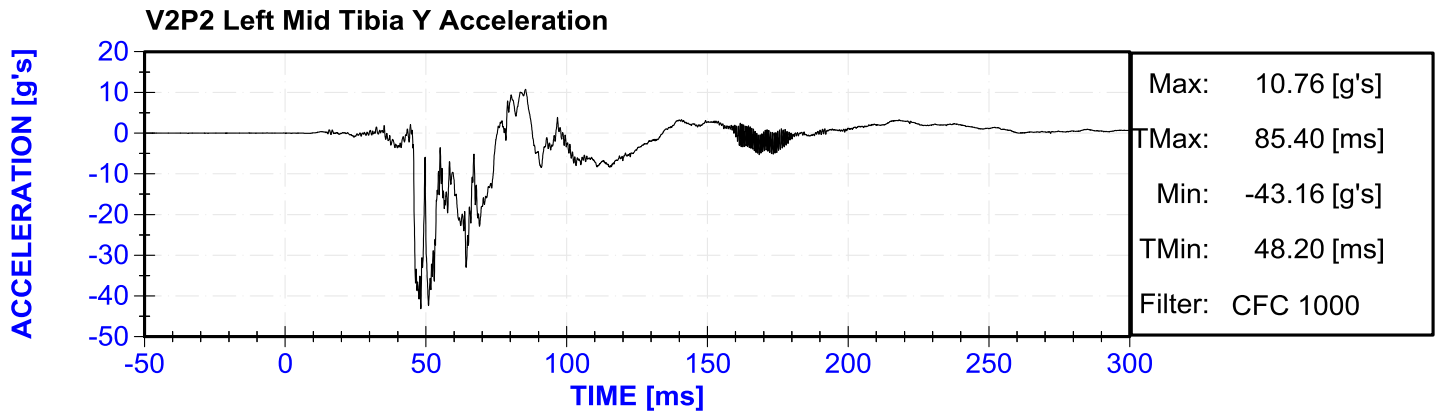


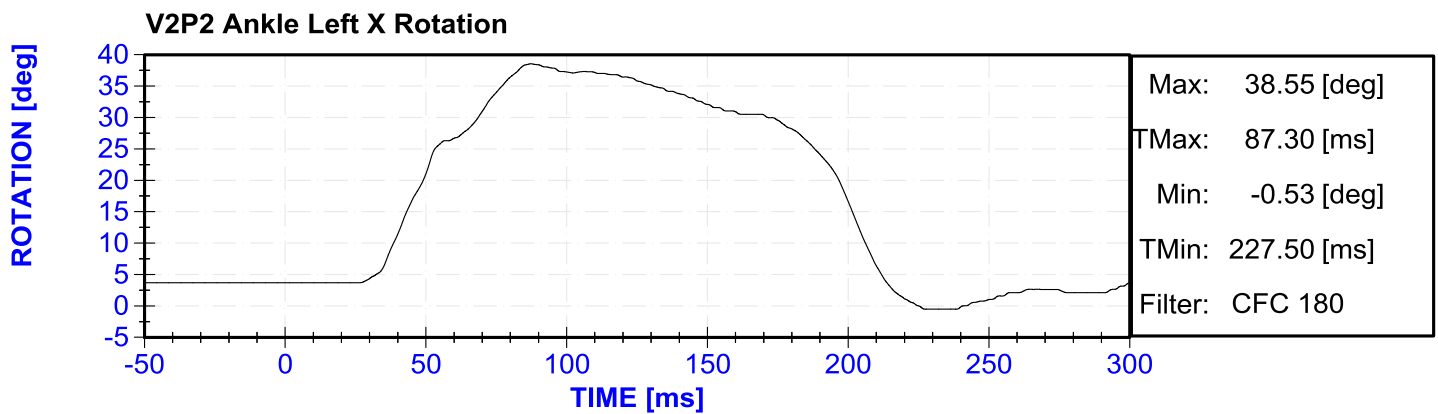
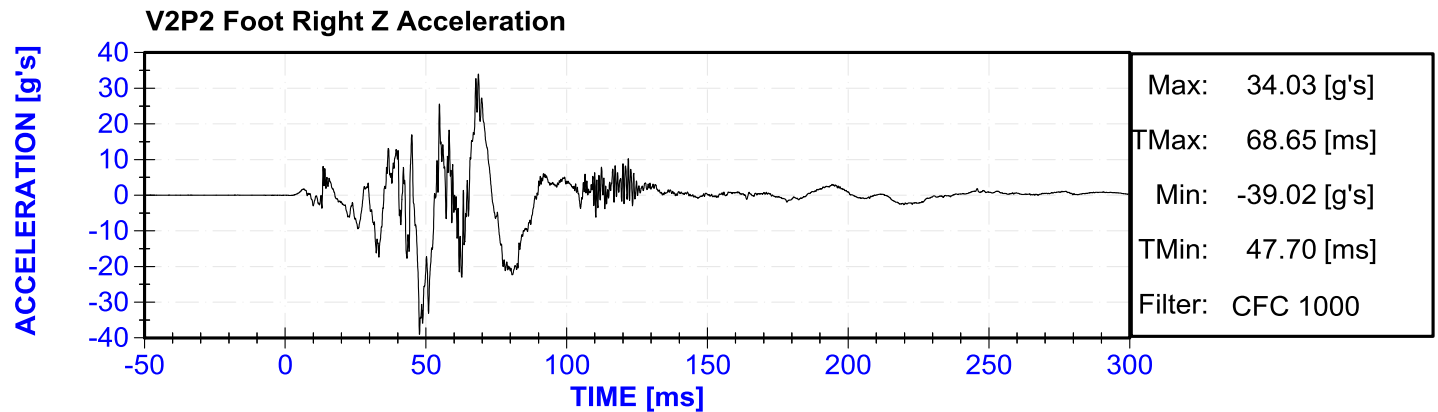
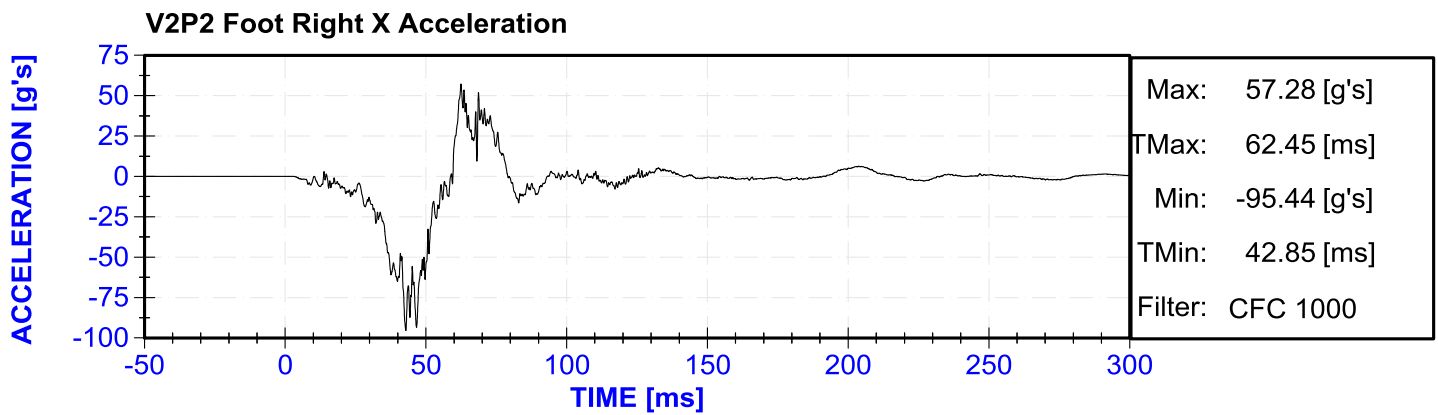
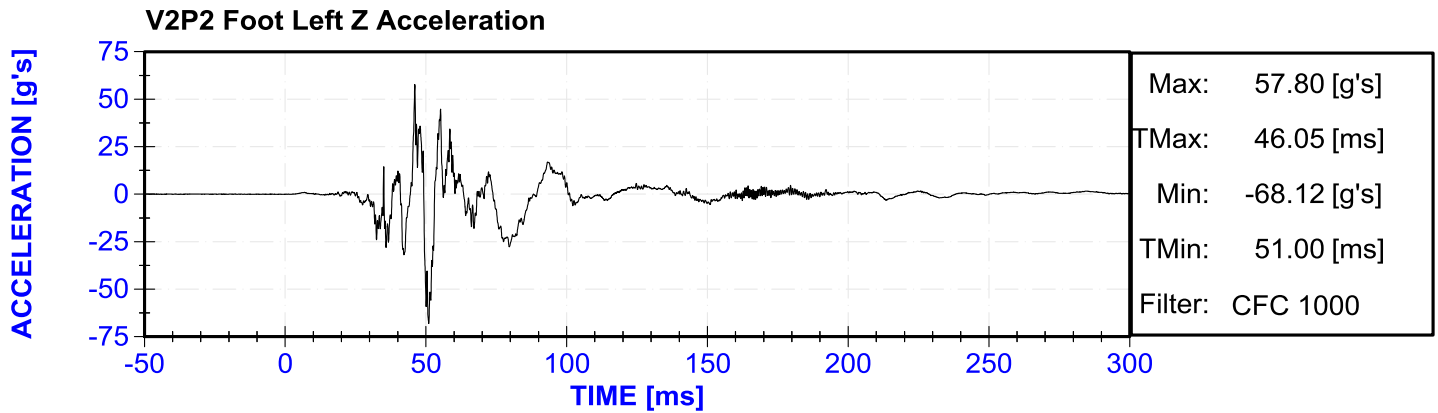


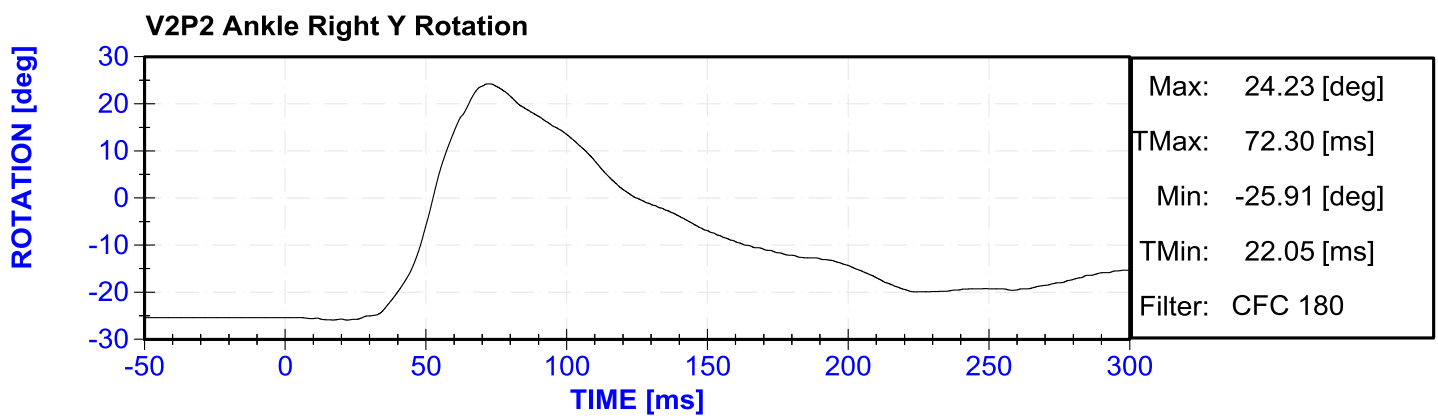
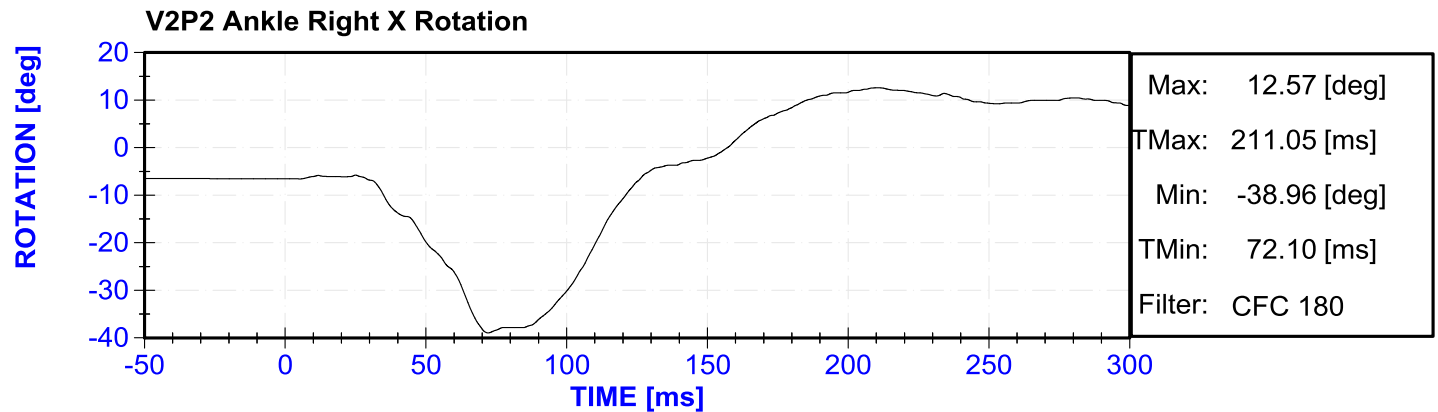
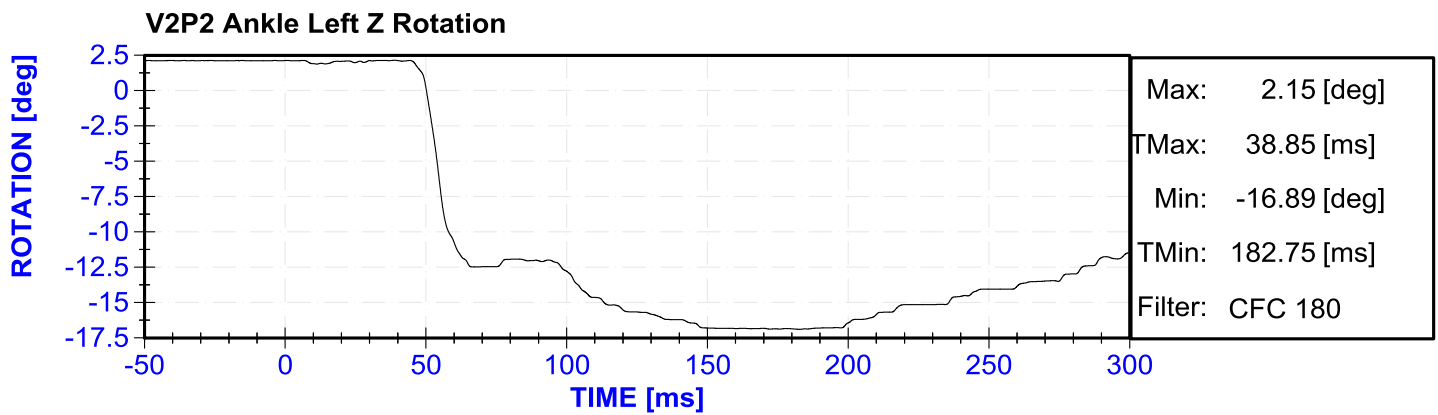
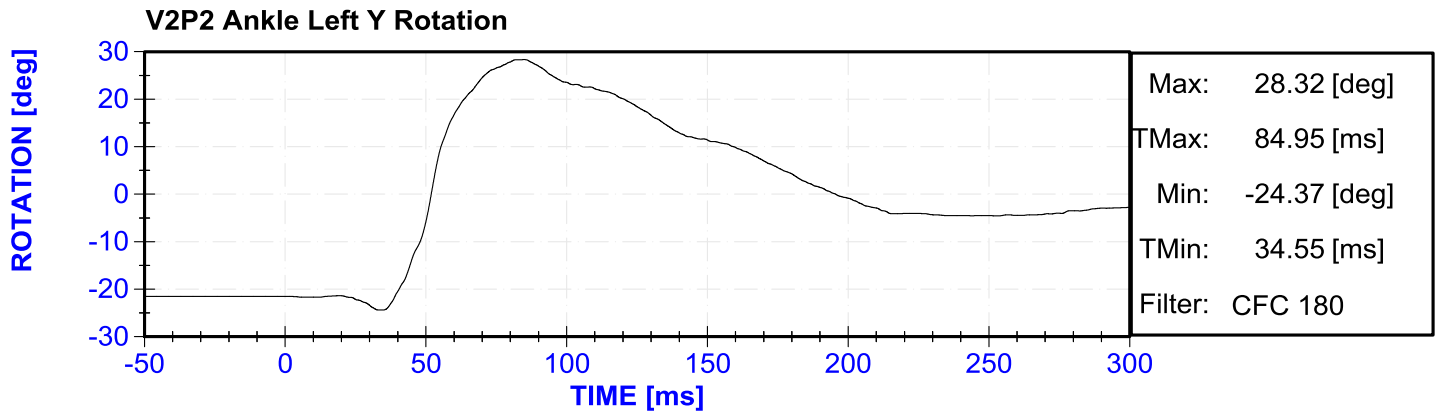


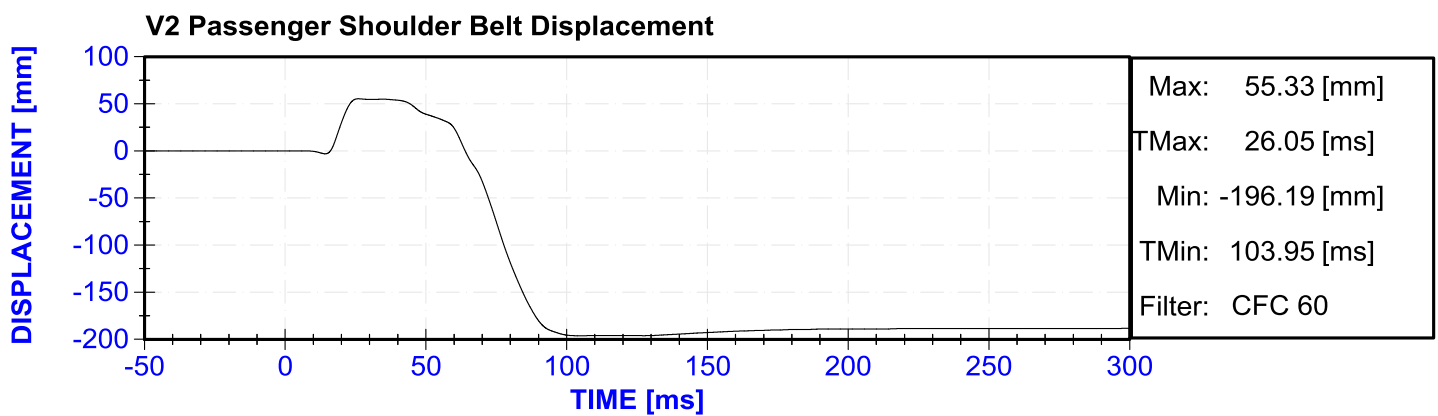
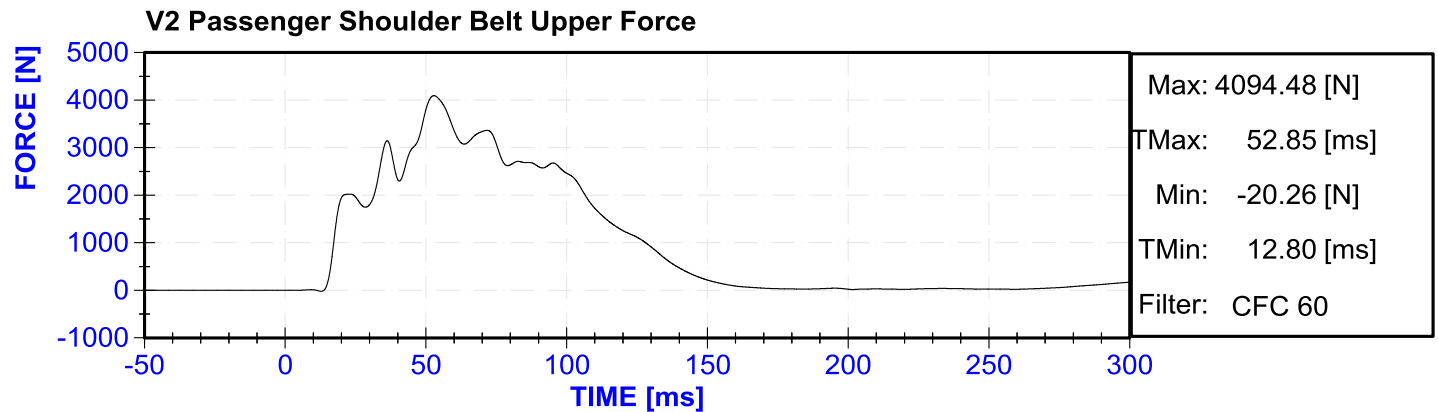
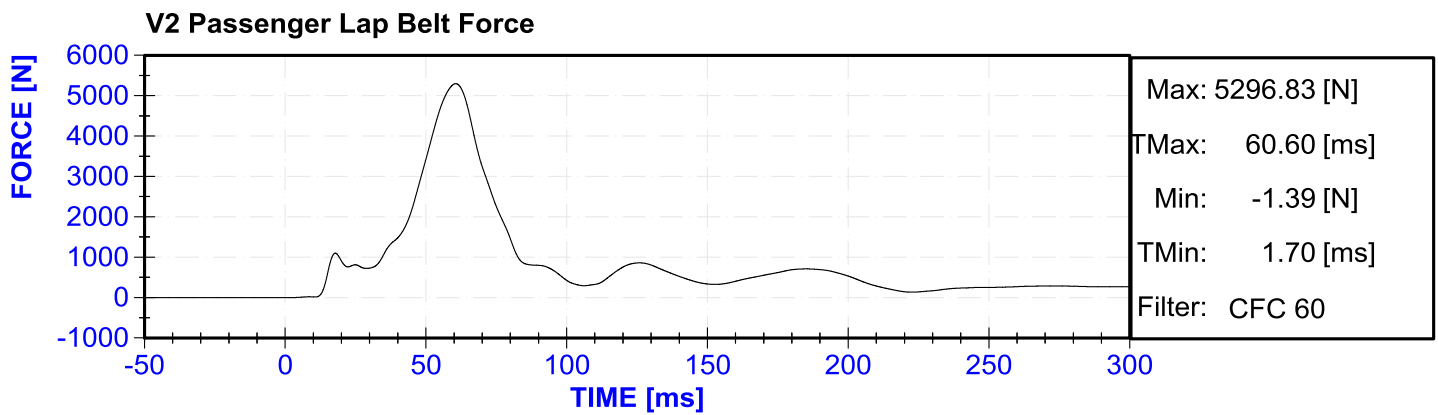
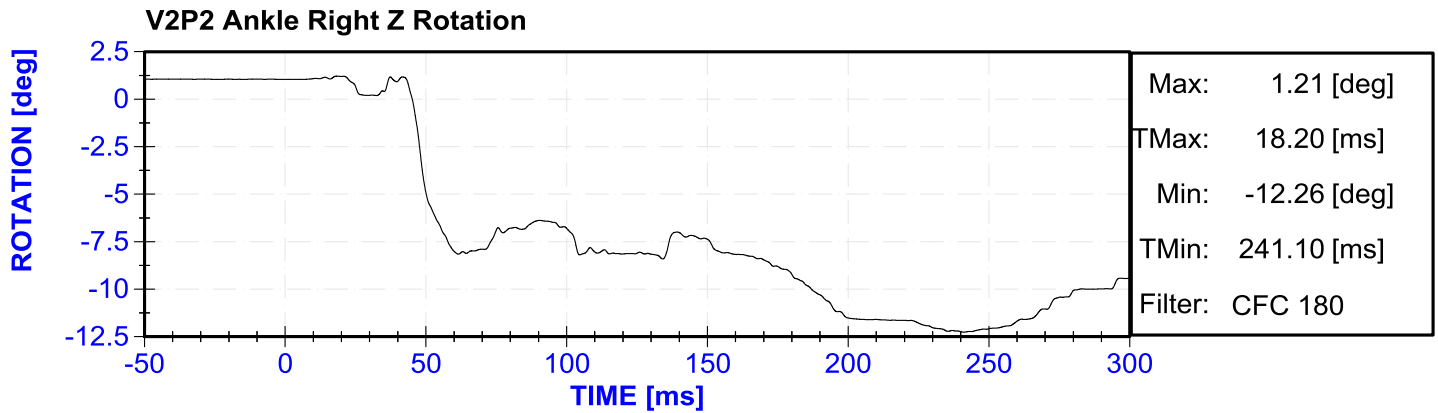


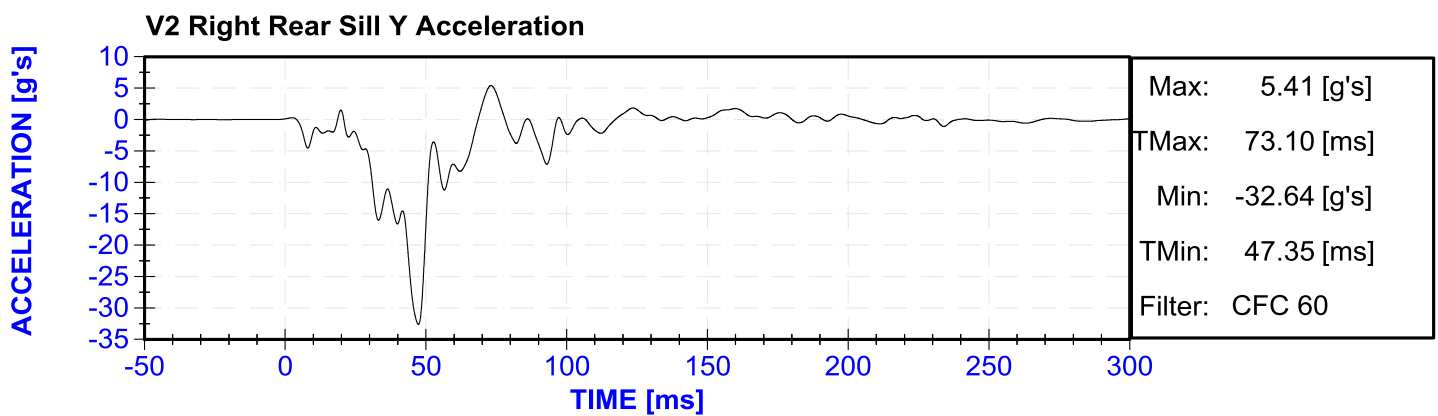
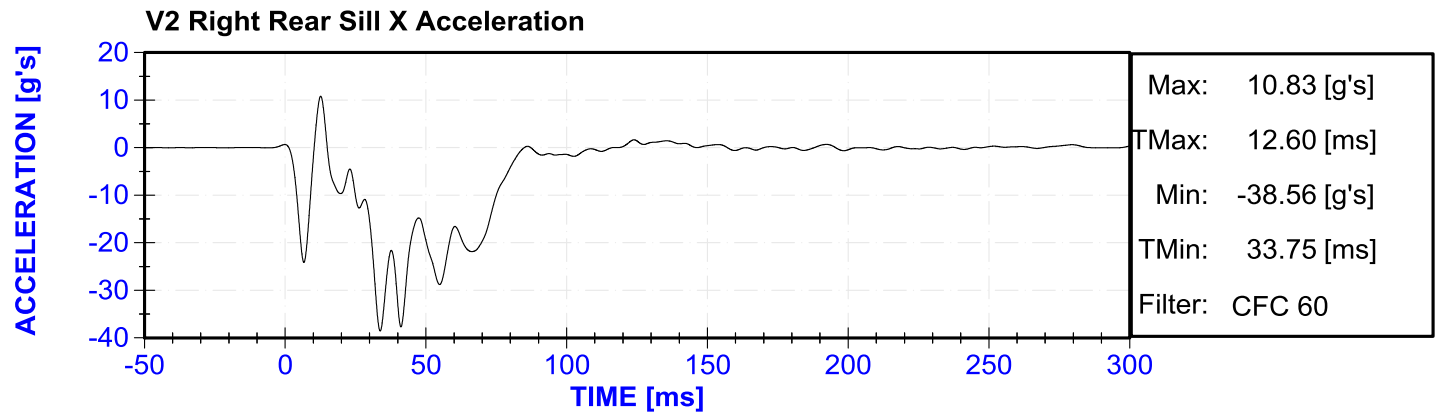
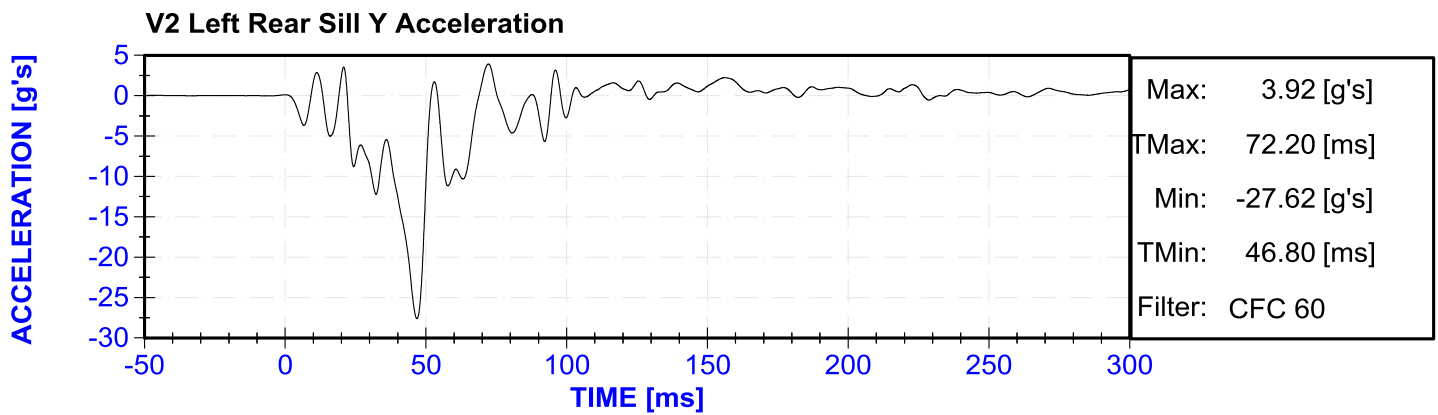
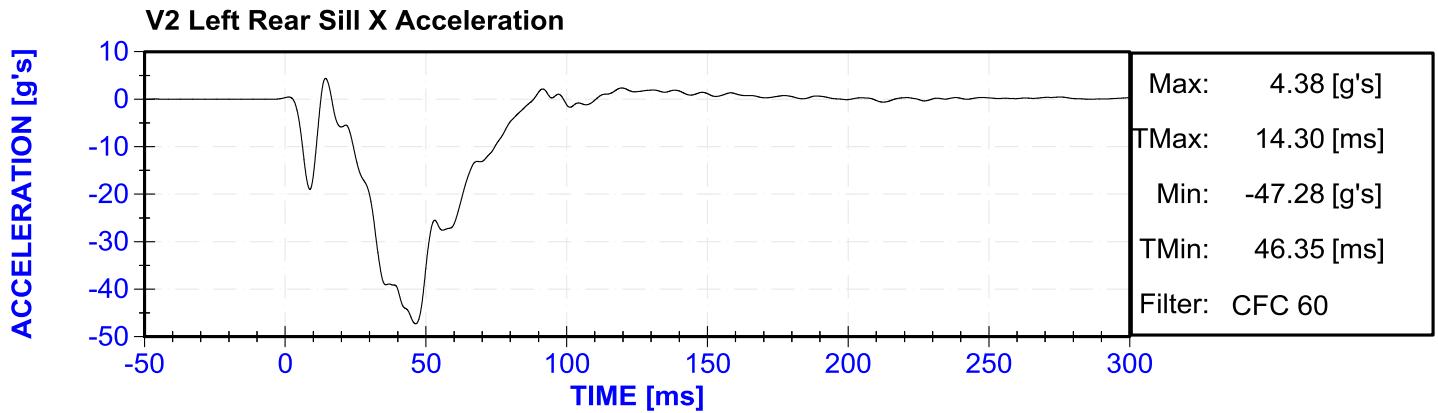


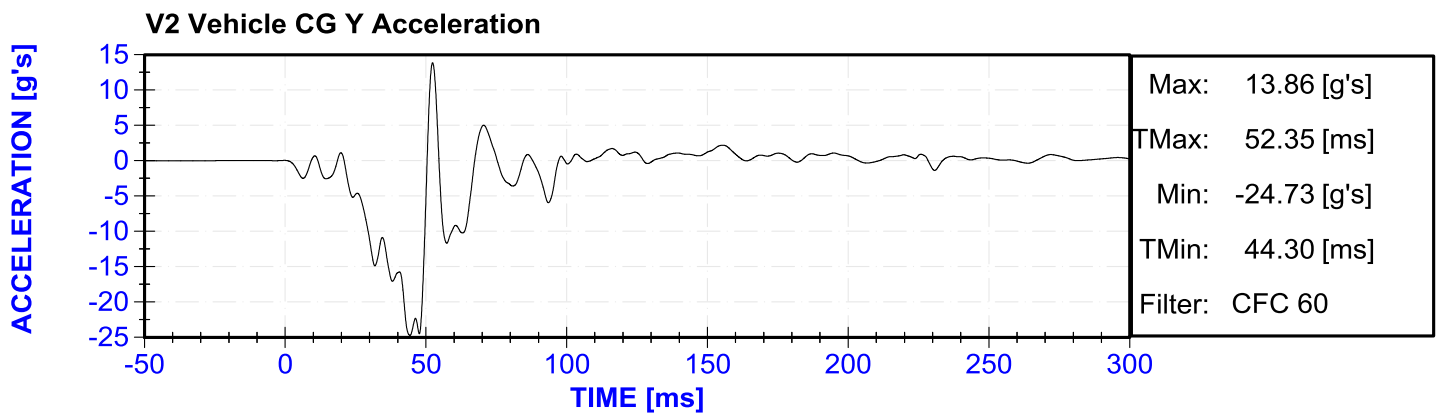
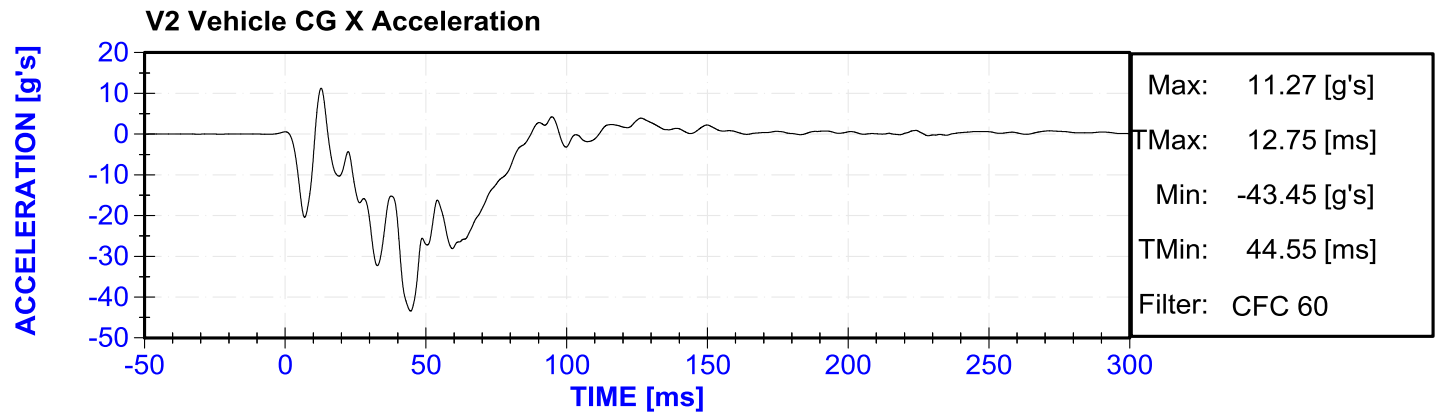
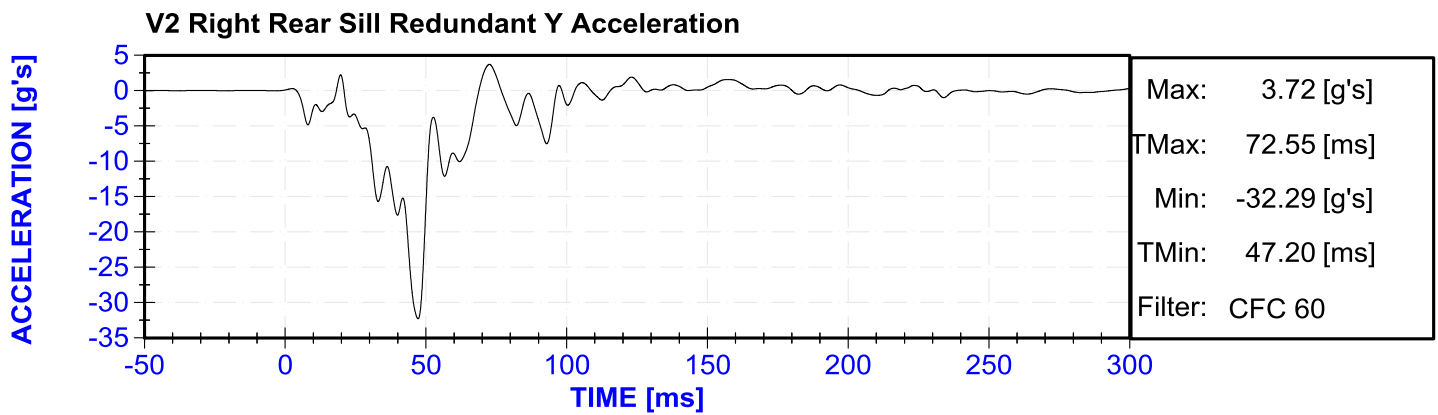
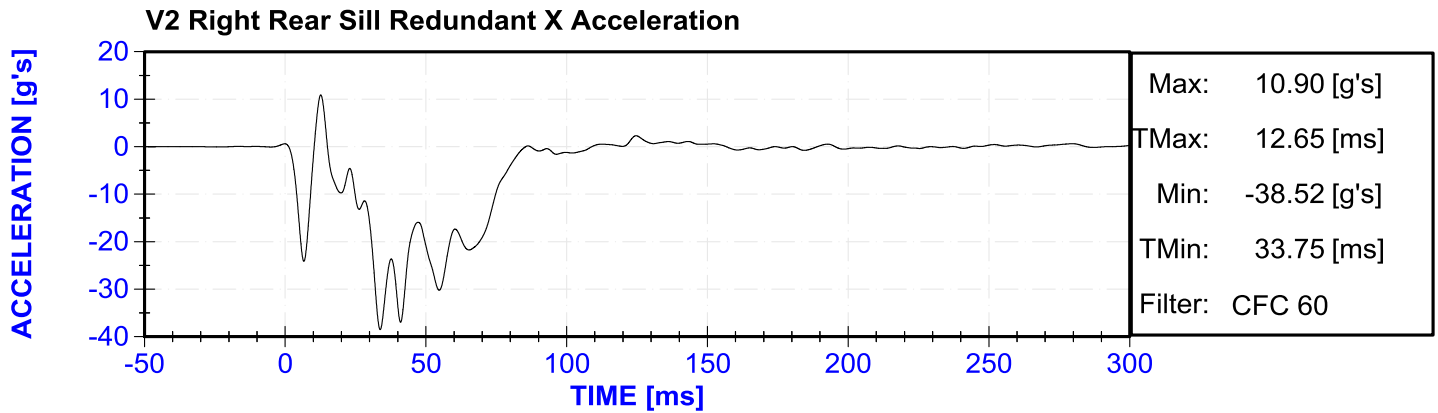


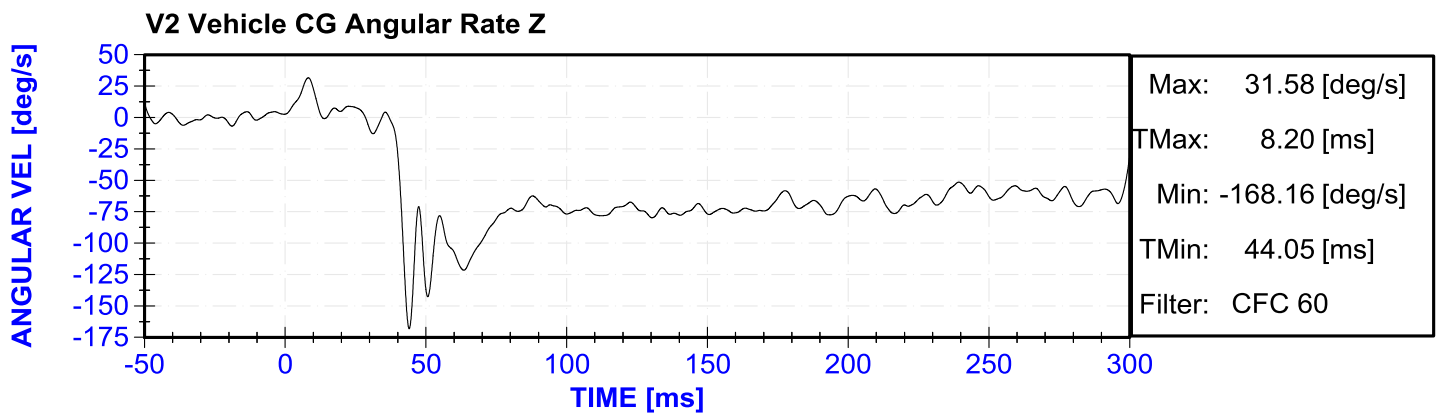
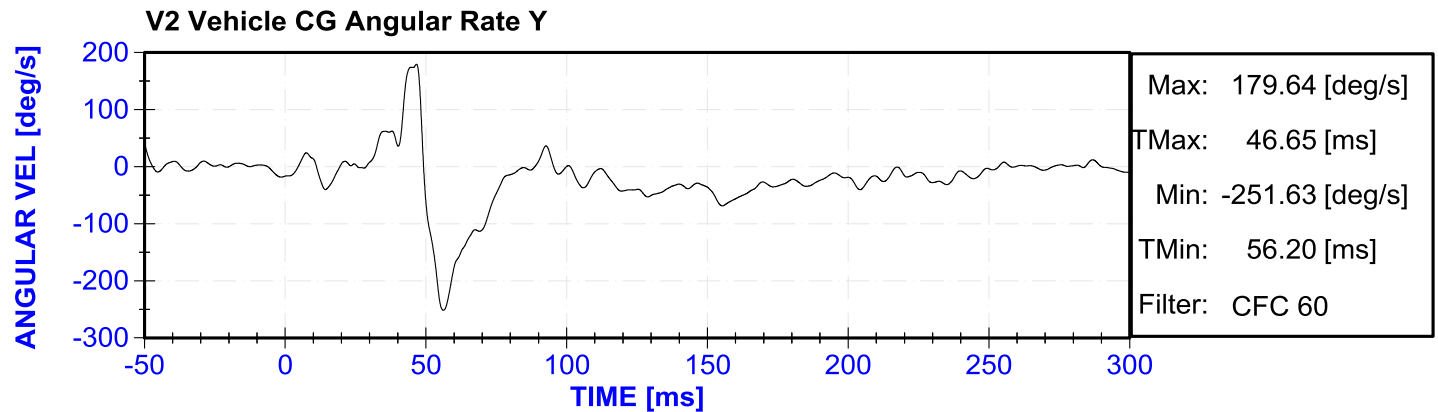
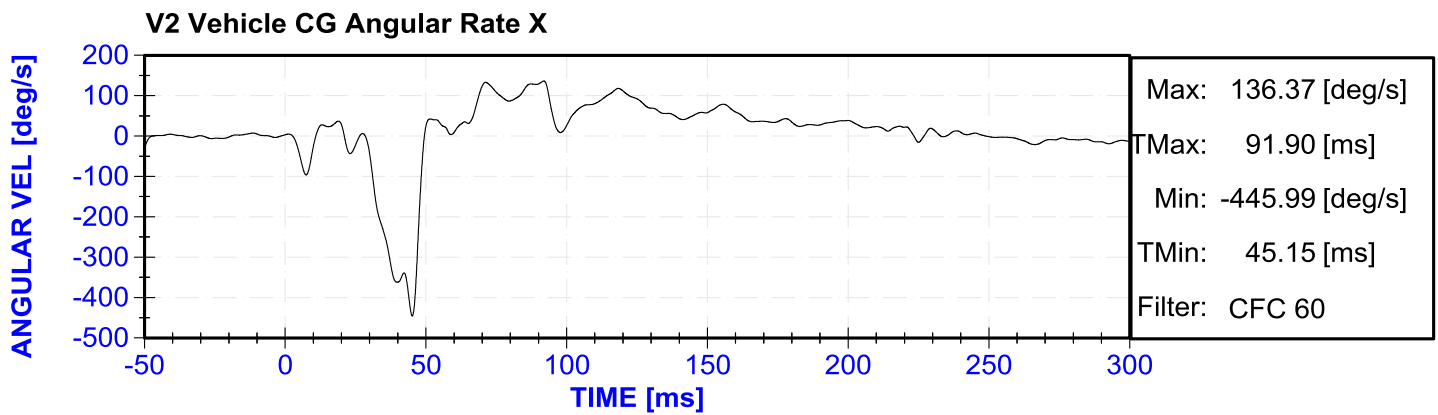
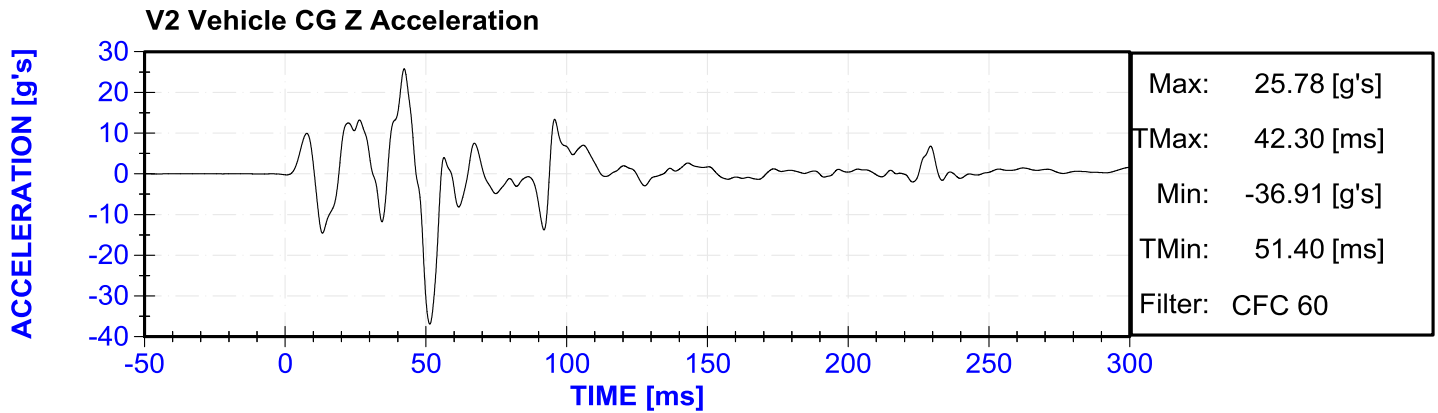


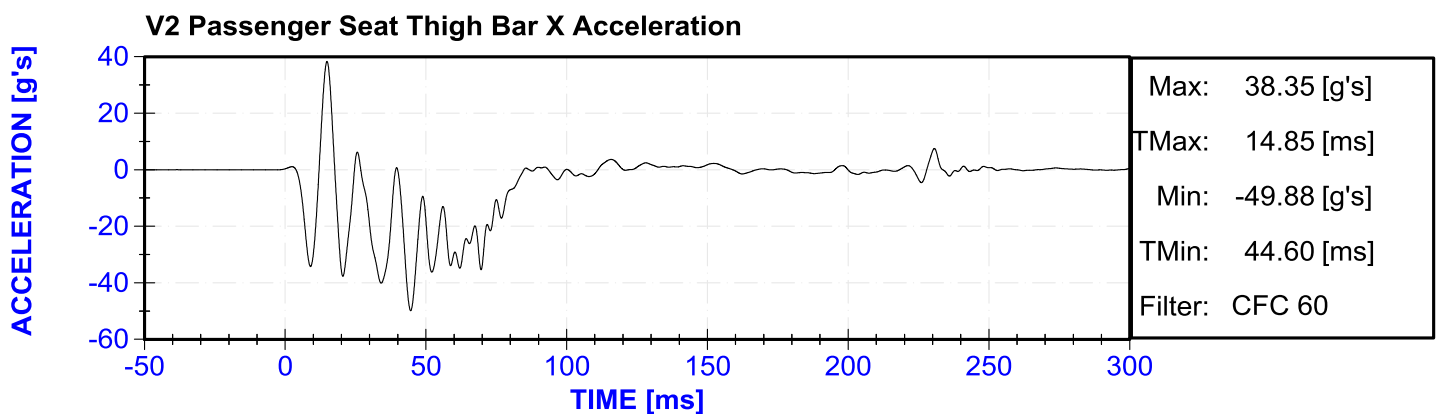
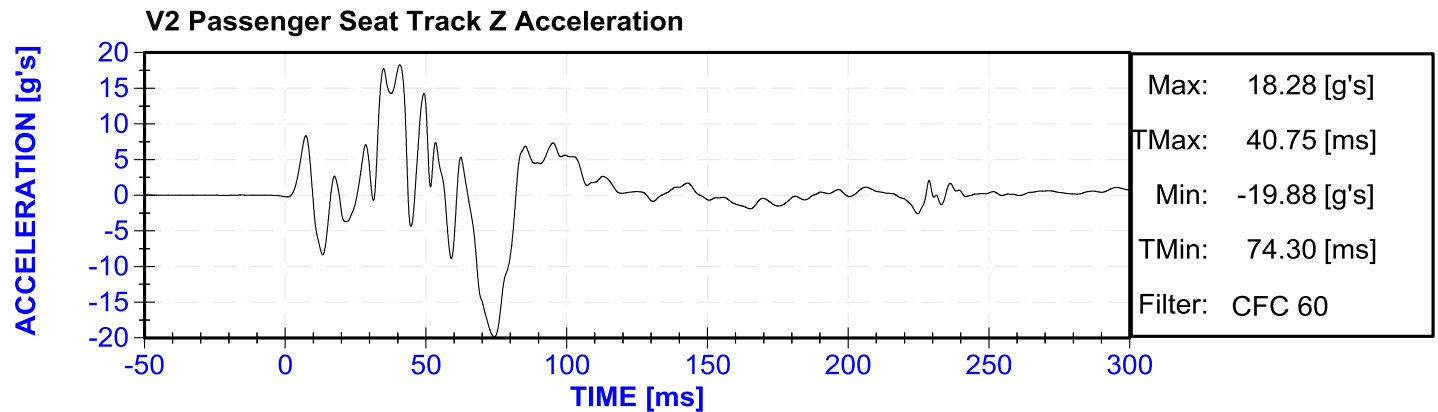
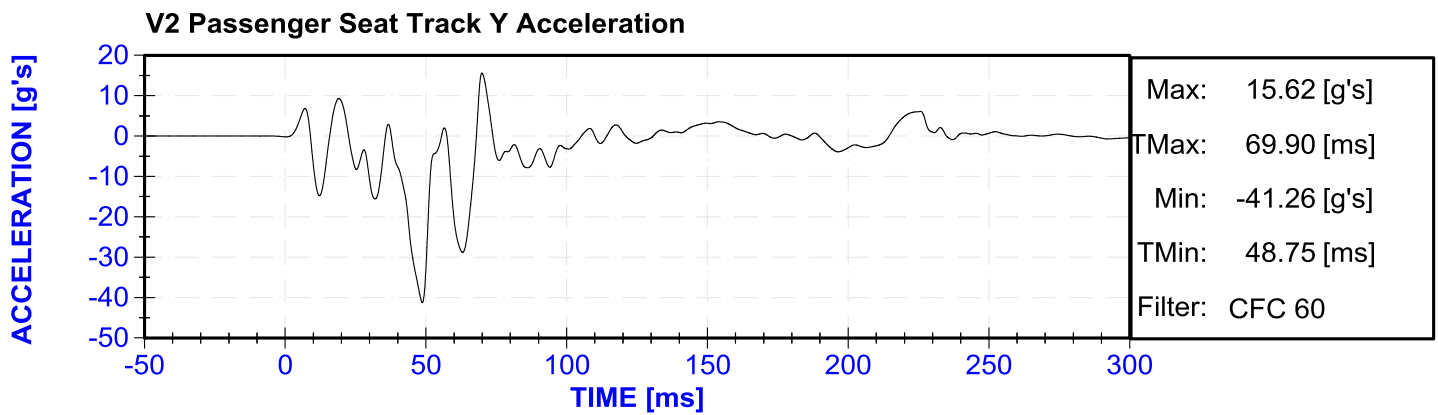
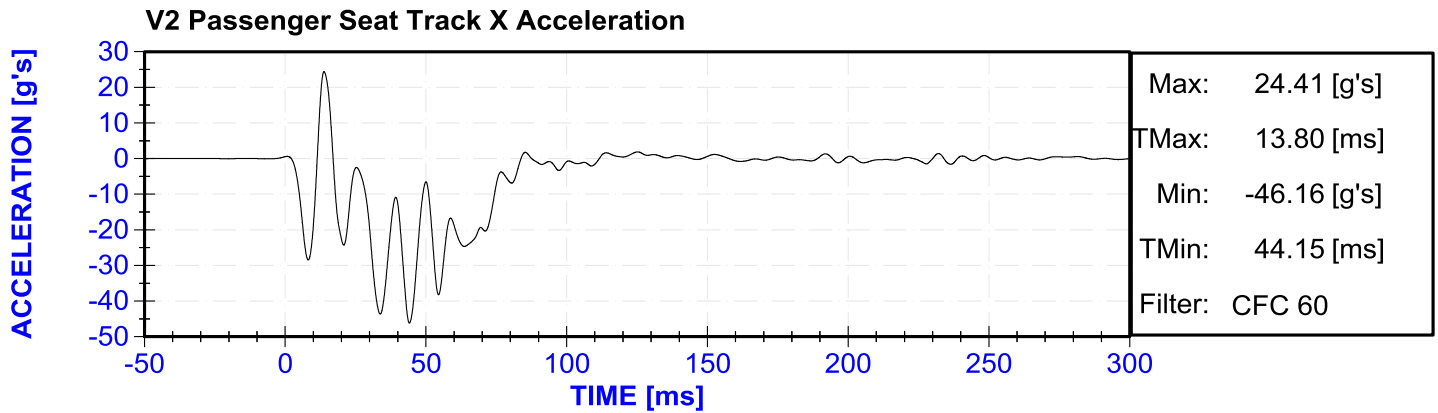


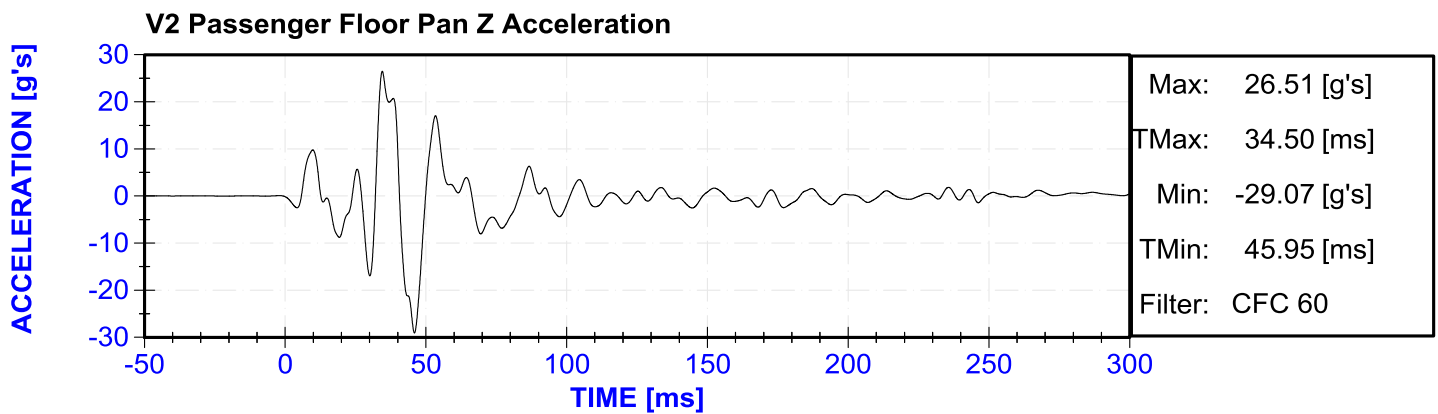
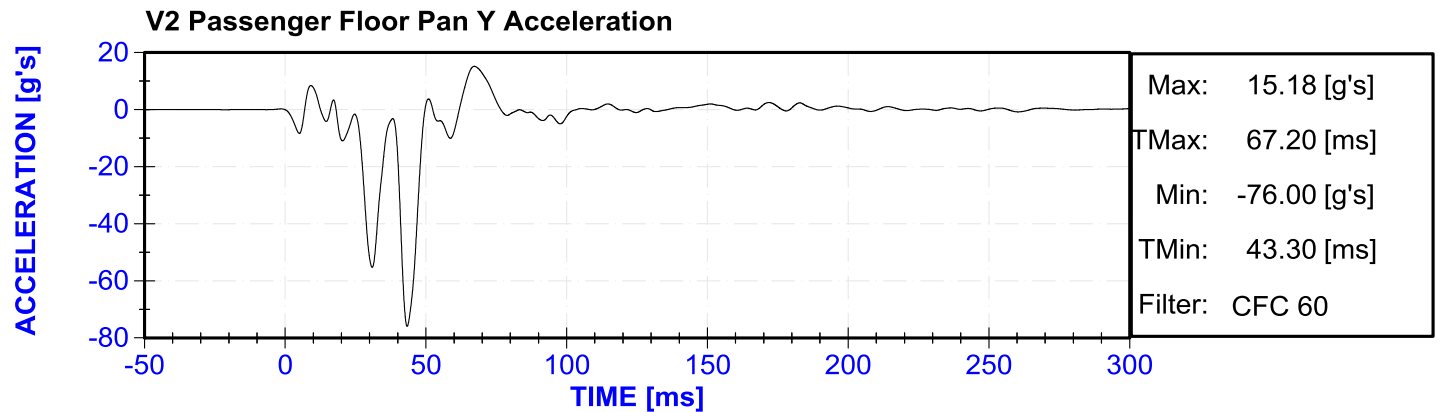
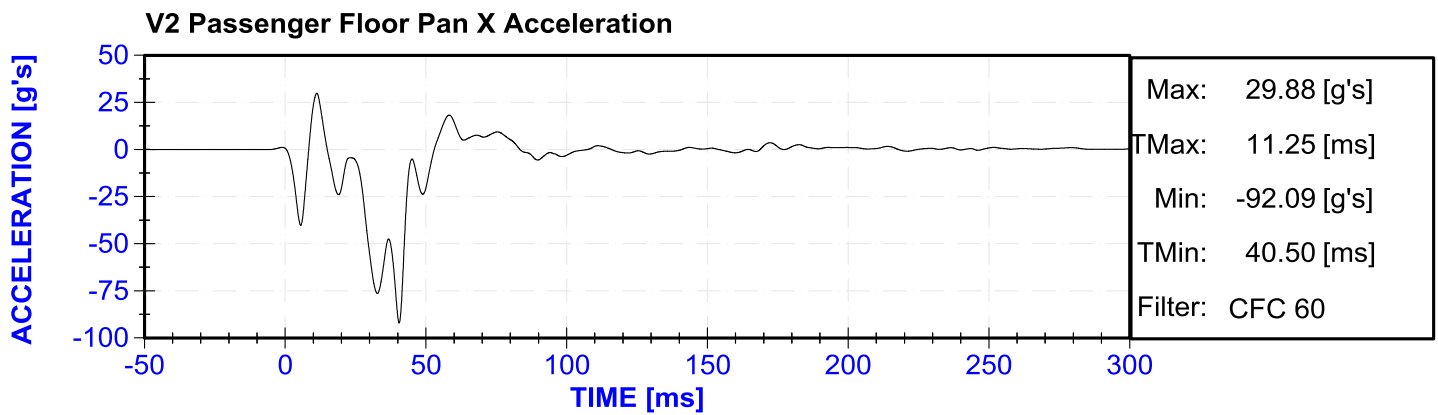
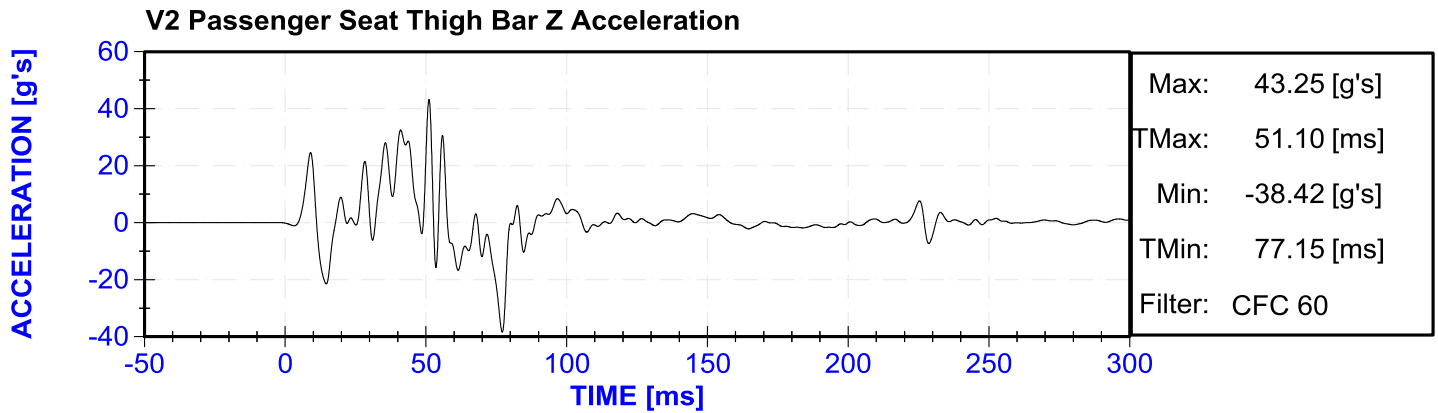


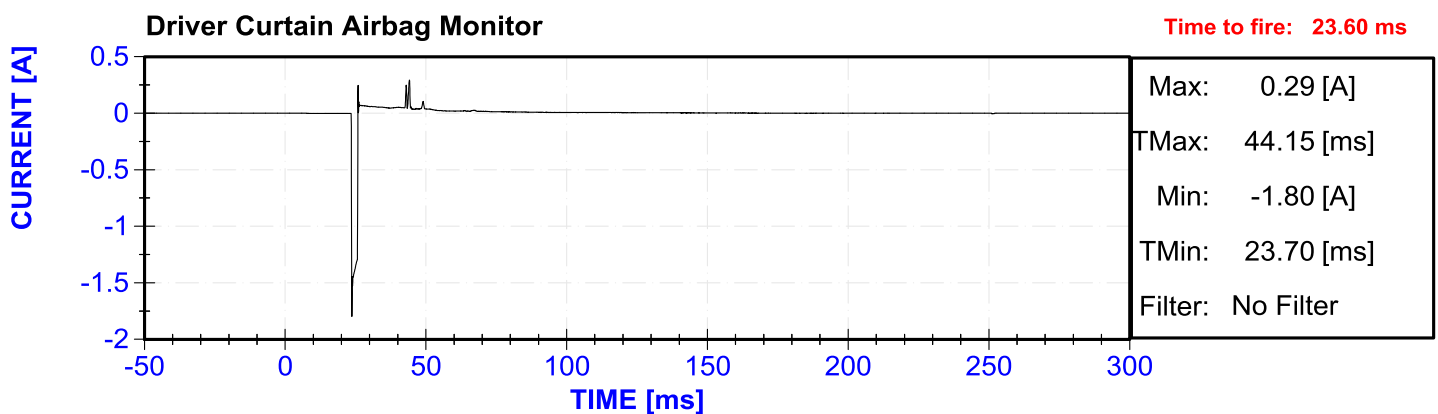
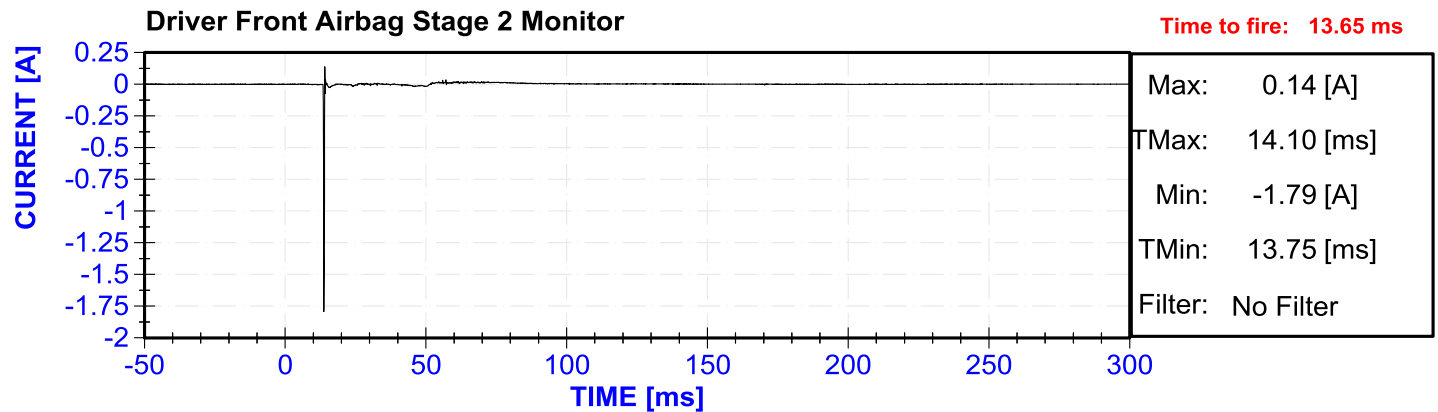
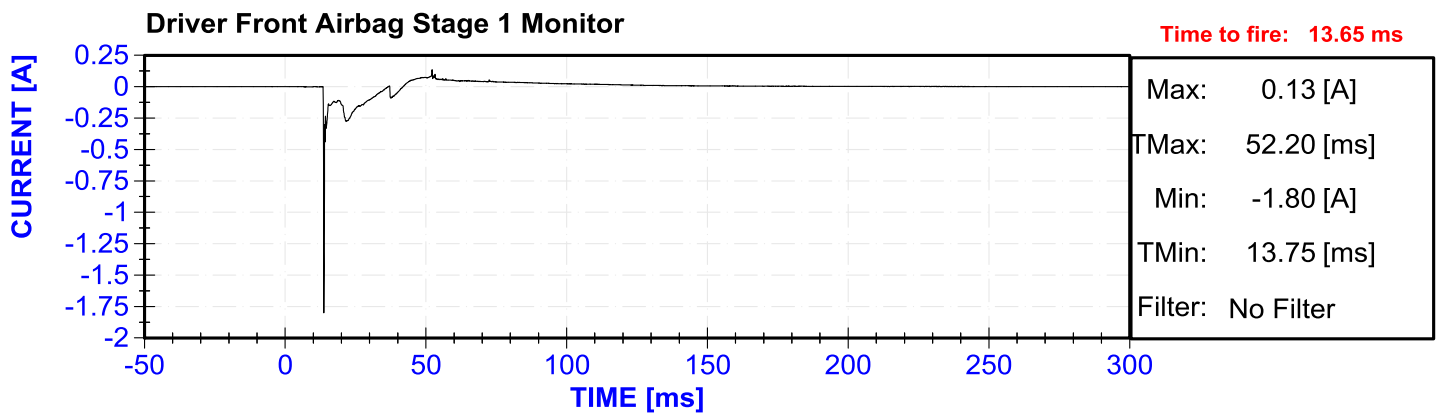
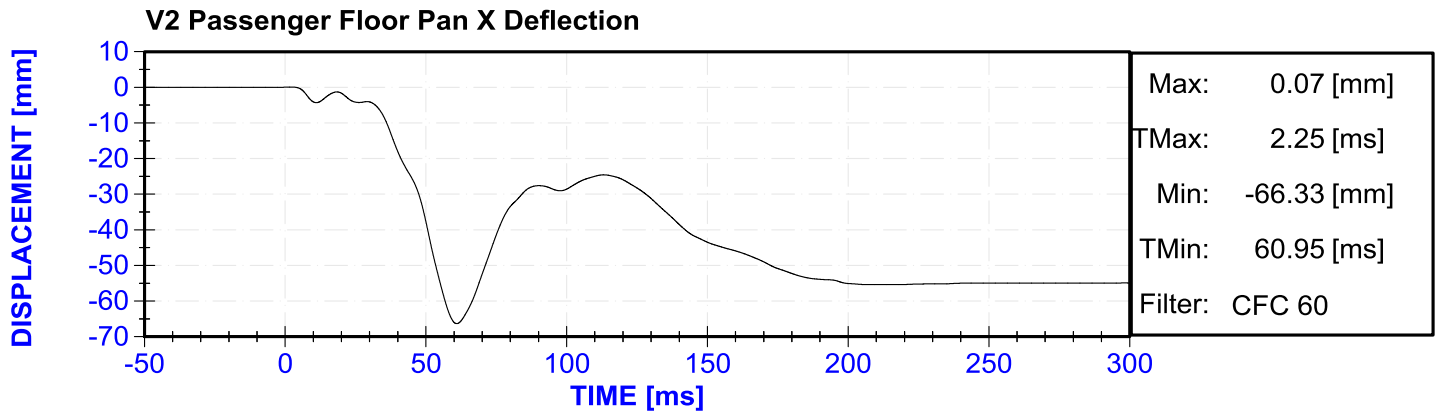


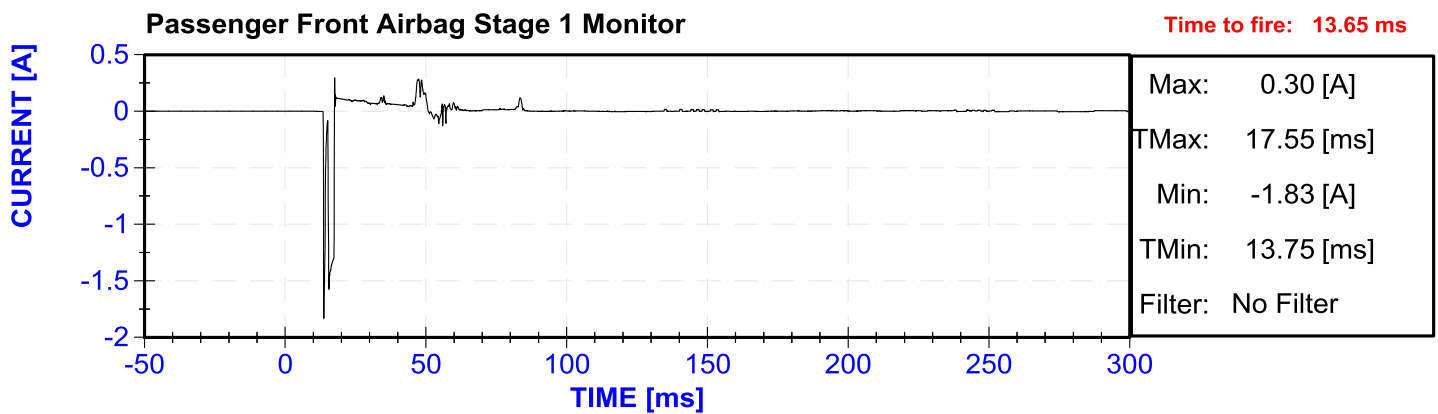
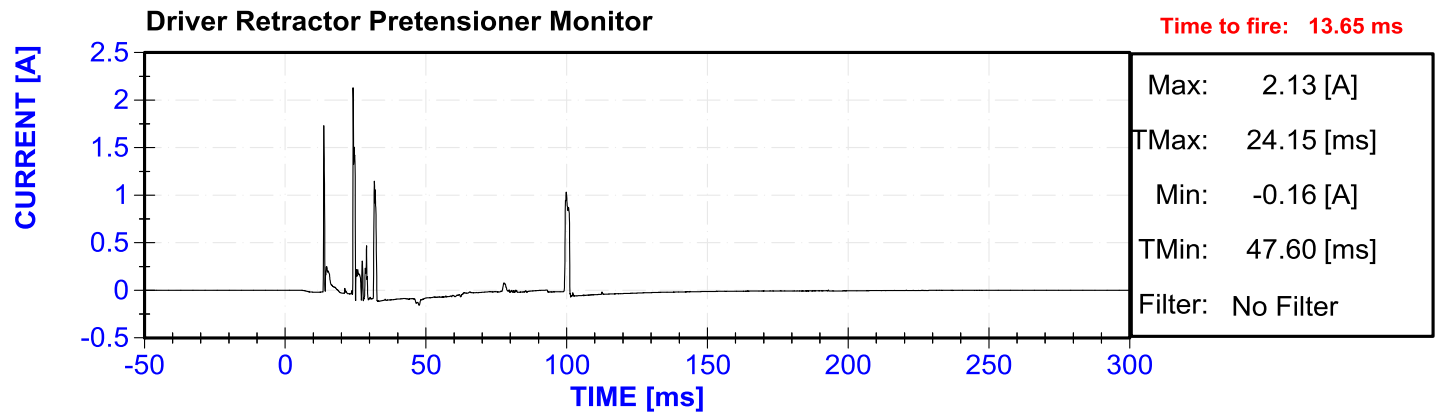
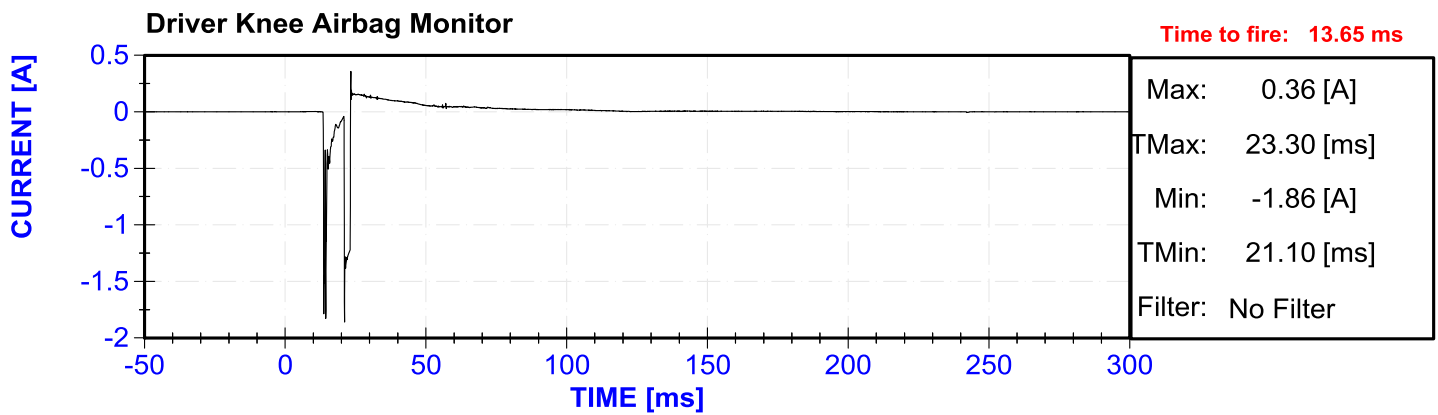
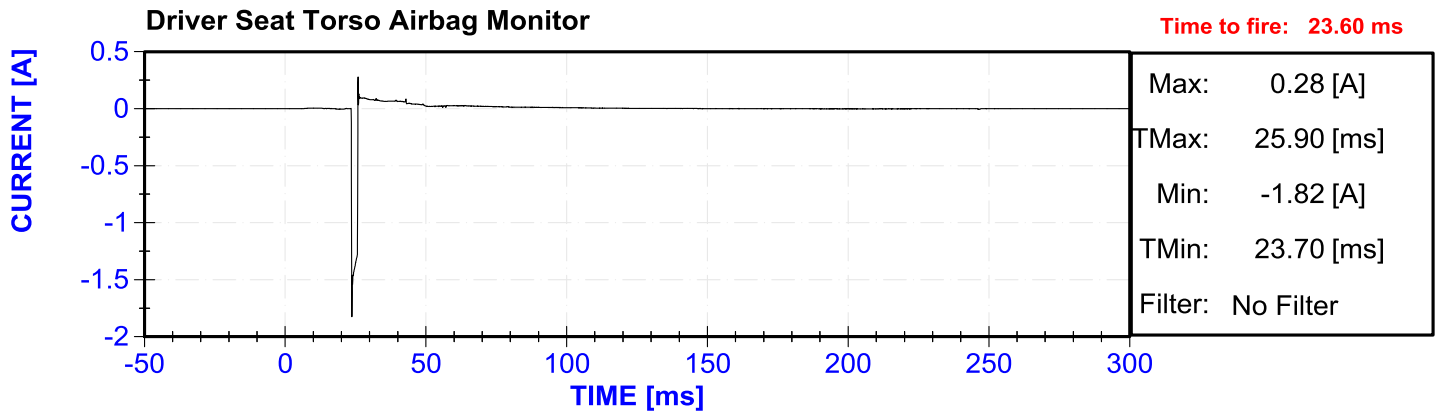


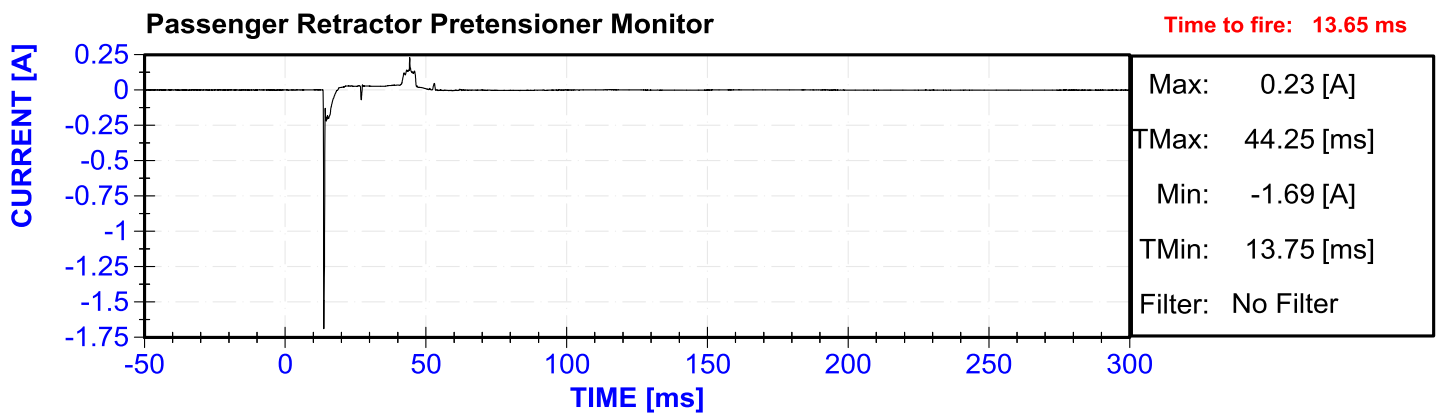
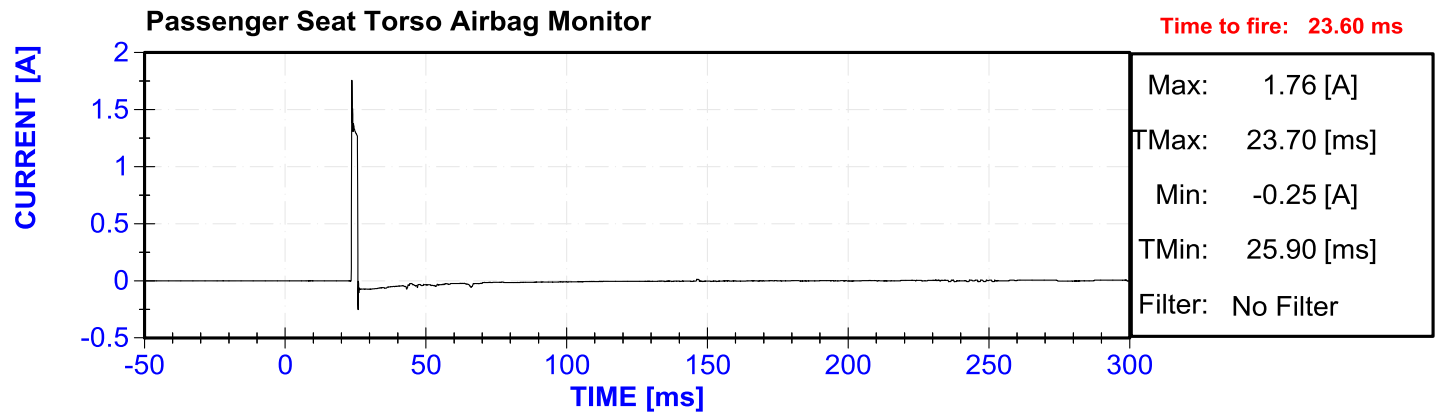
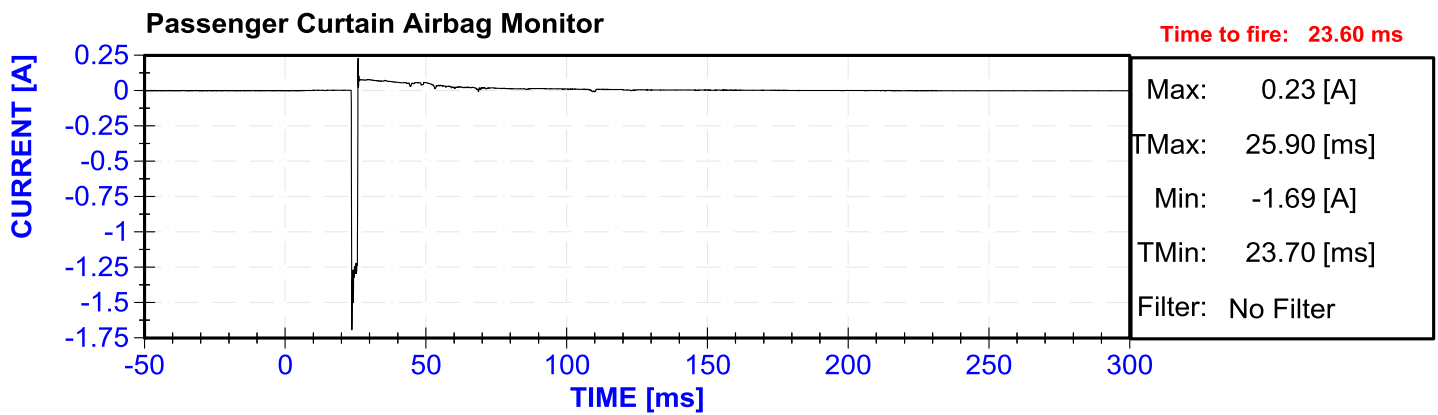
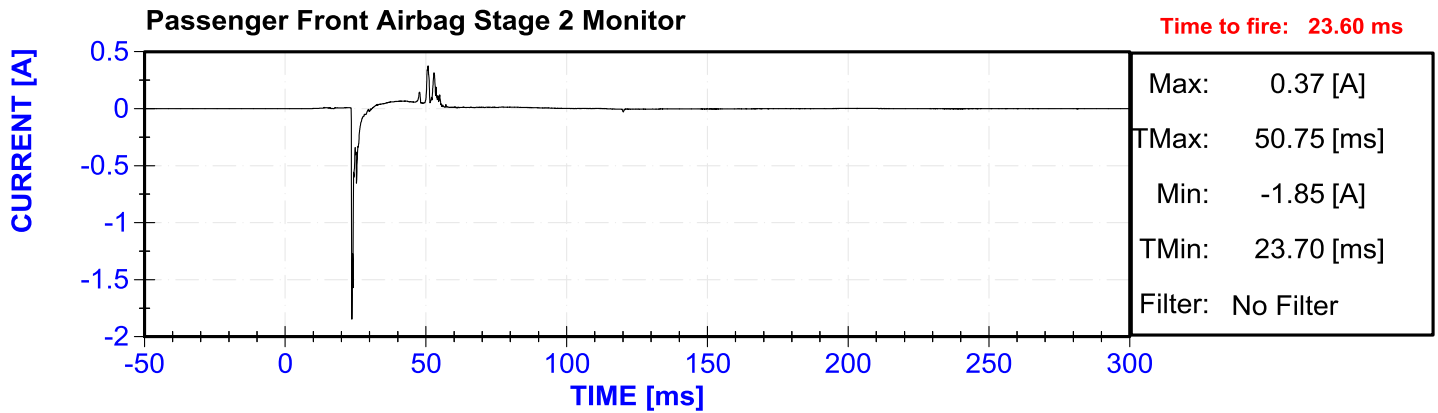


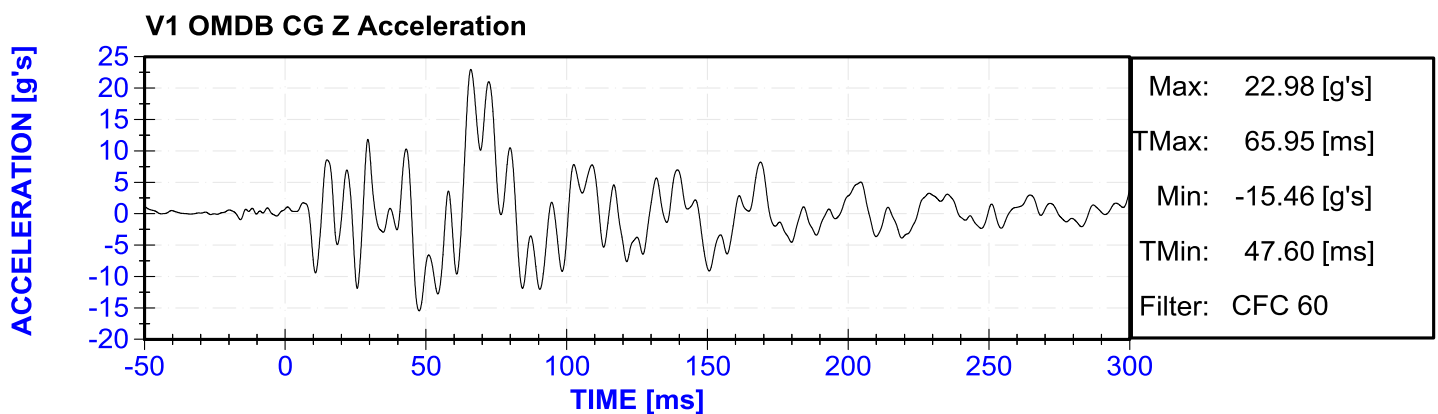
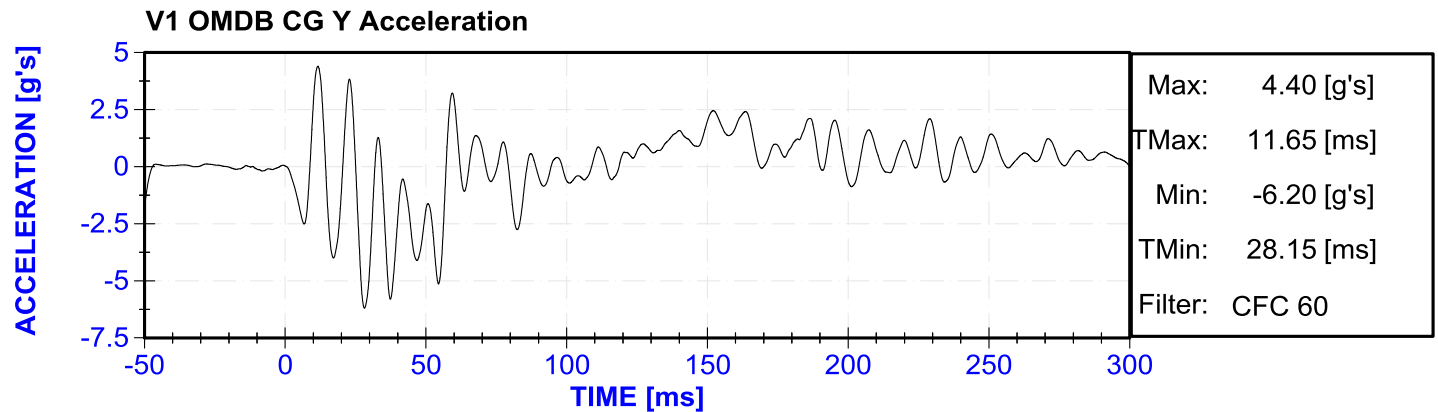
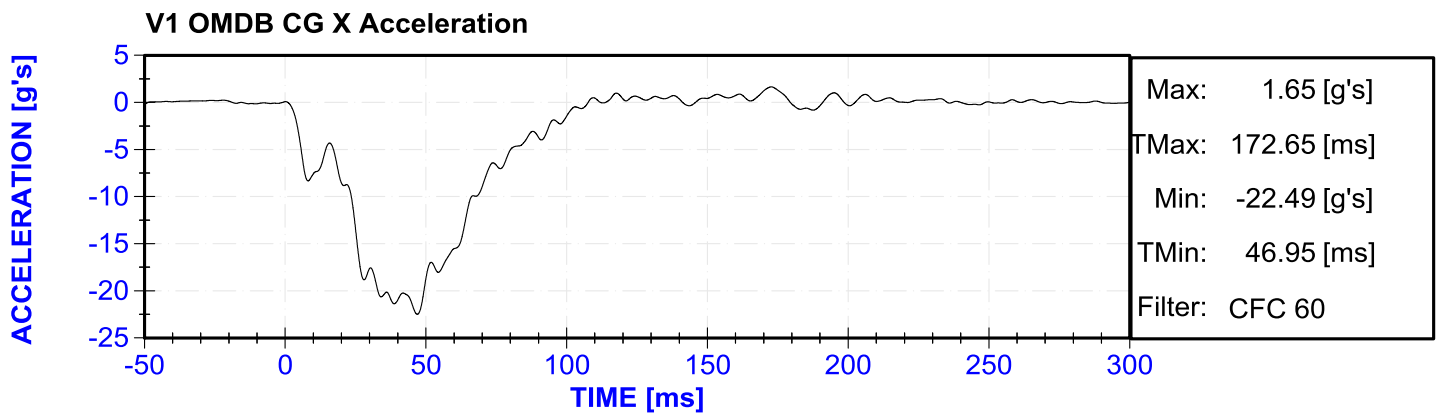
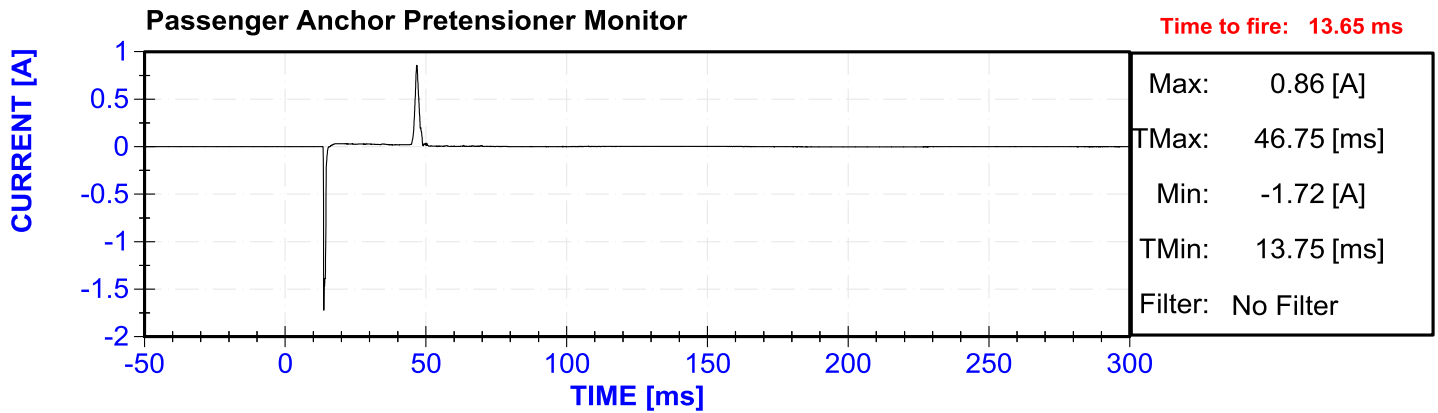


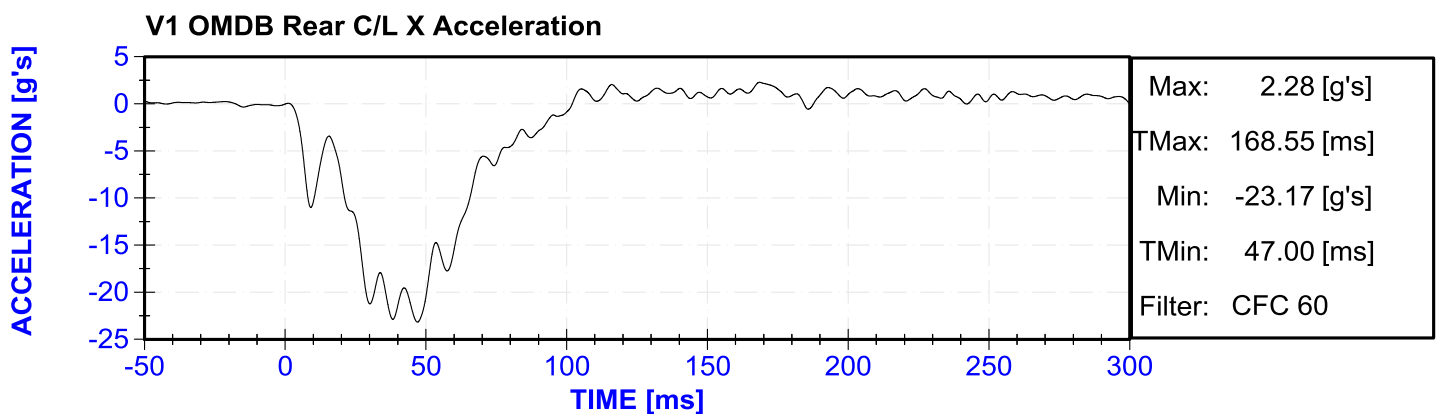
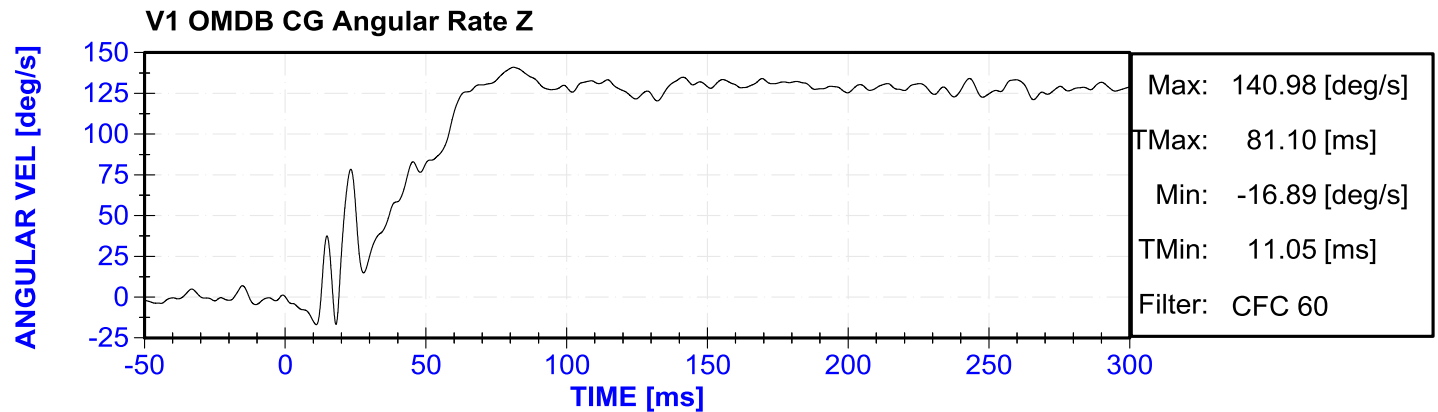
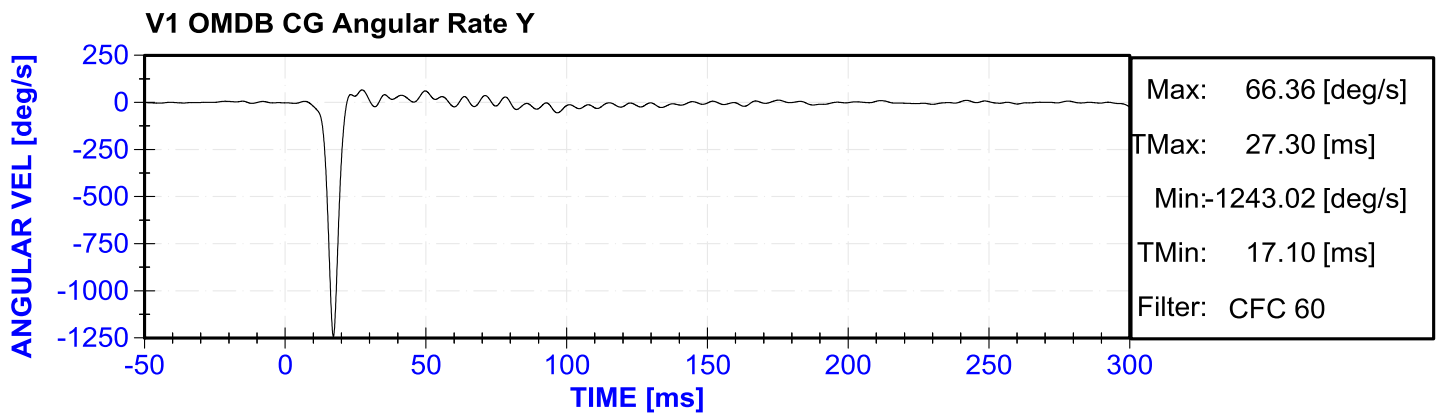
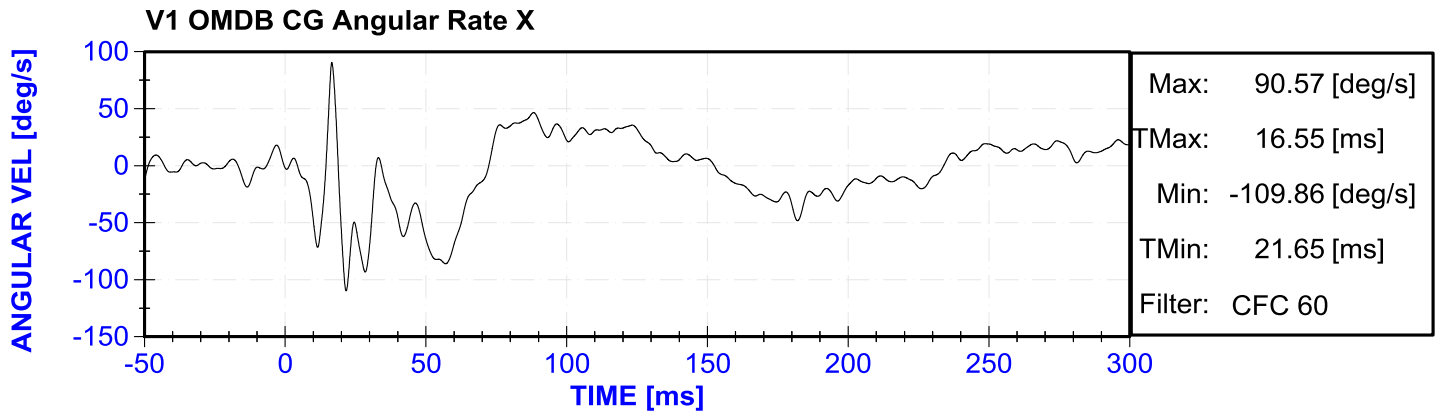


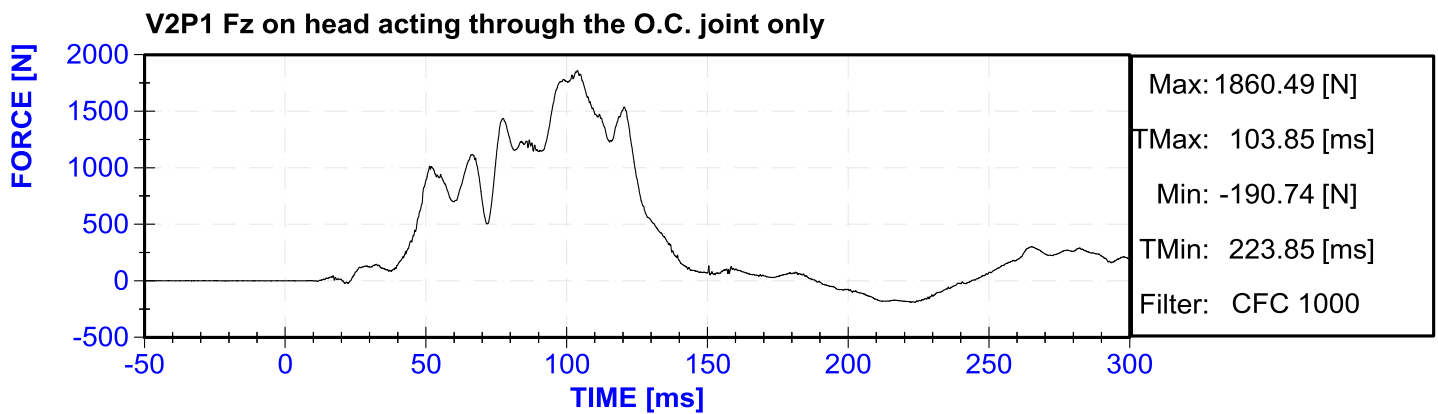
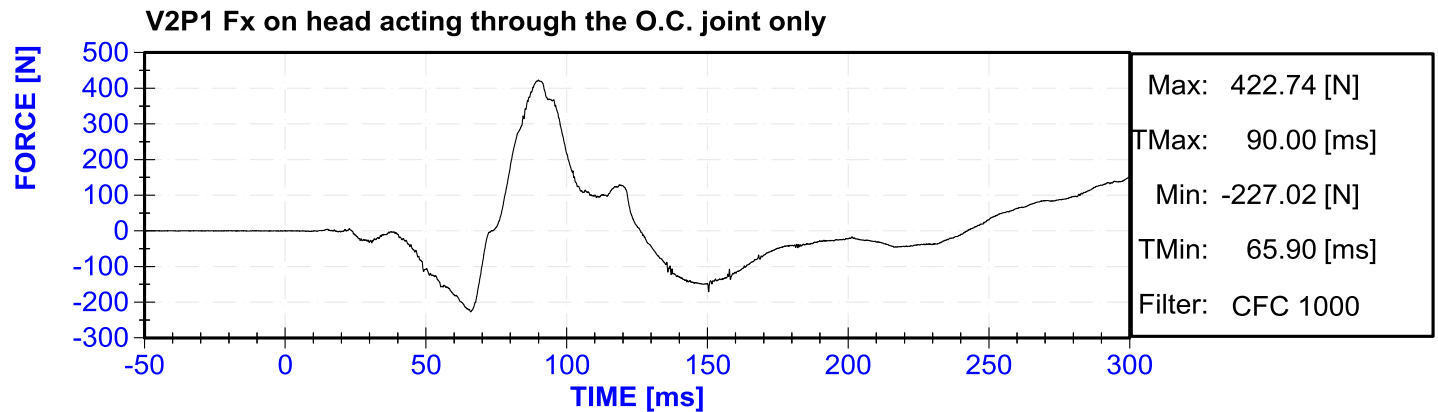
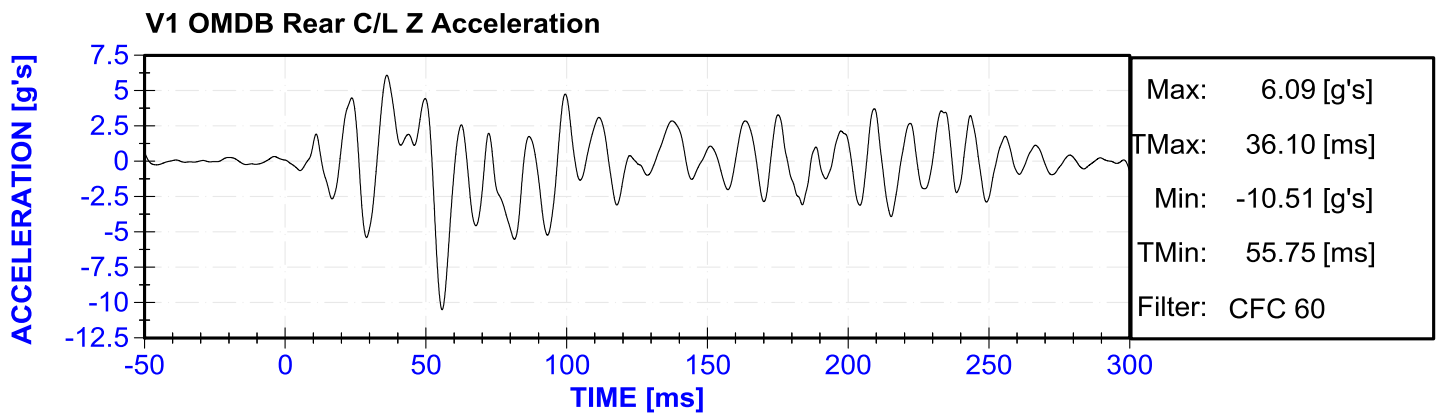
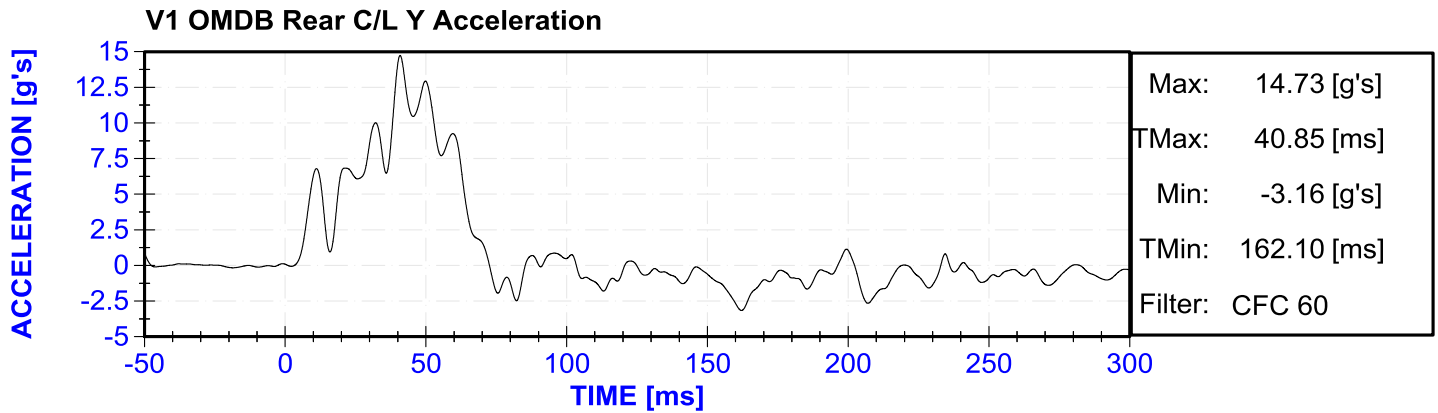




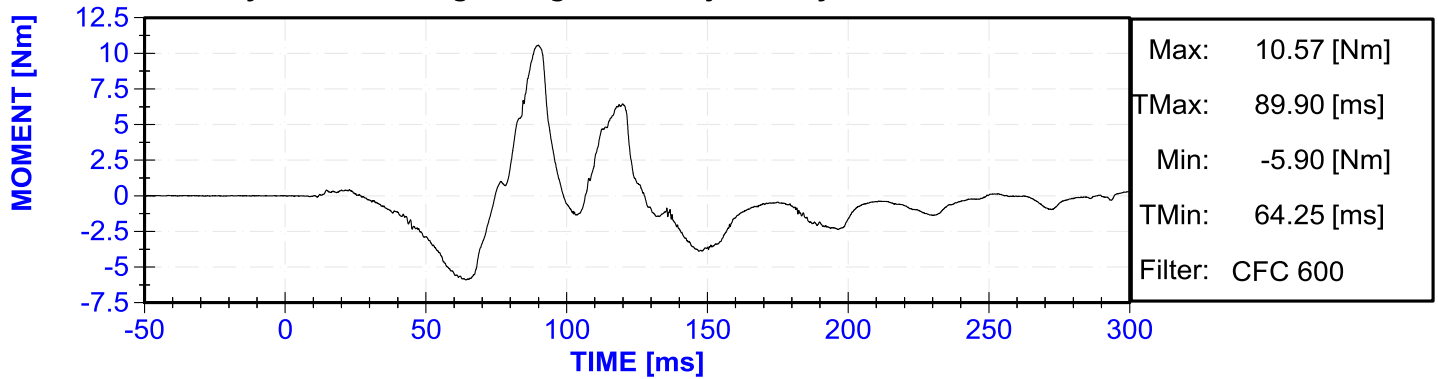




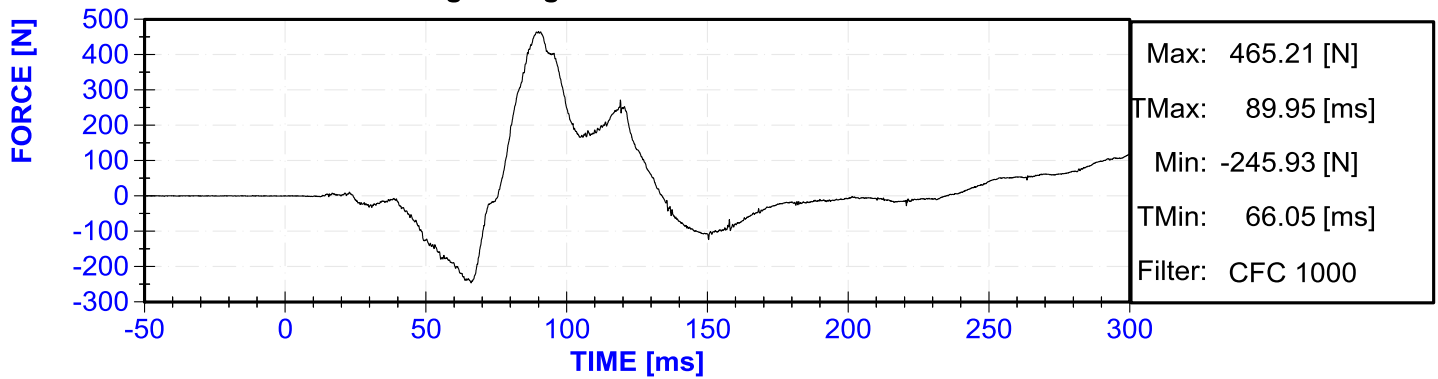




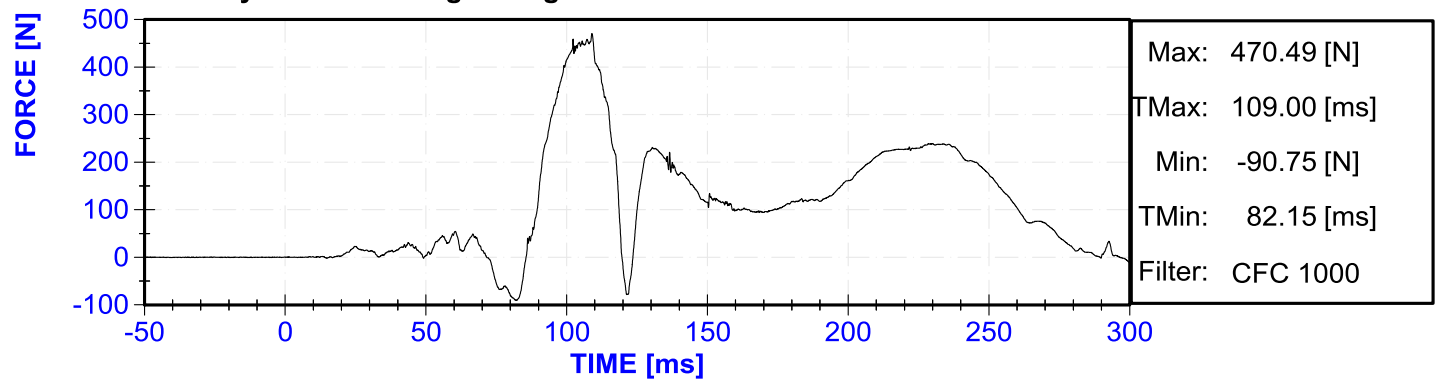
V2P1 My on head acting through the O.C. joint only



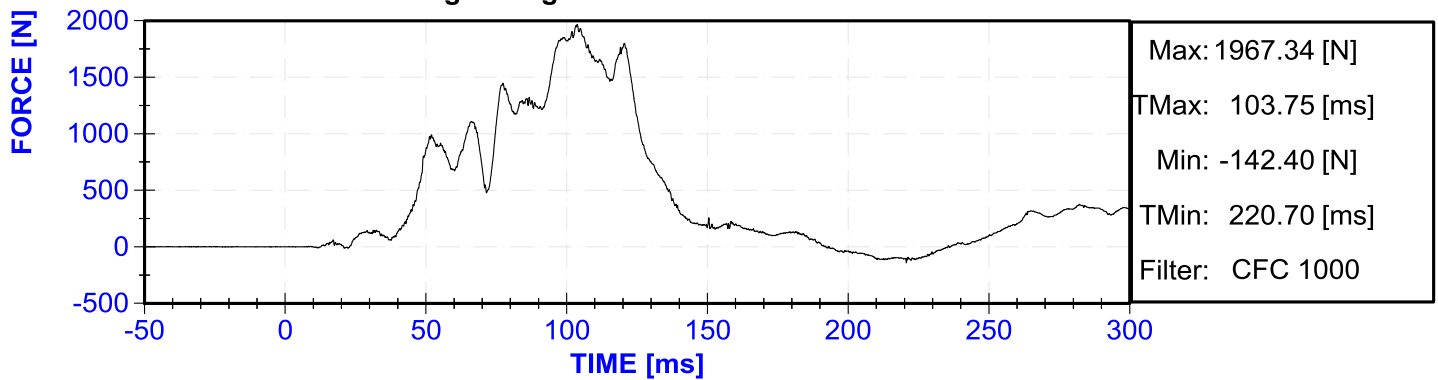
V2P1 Fx on head acting through the total neck section

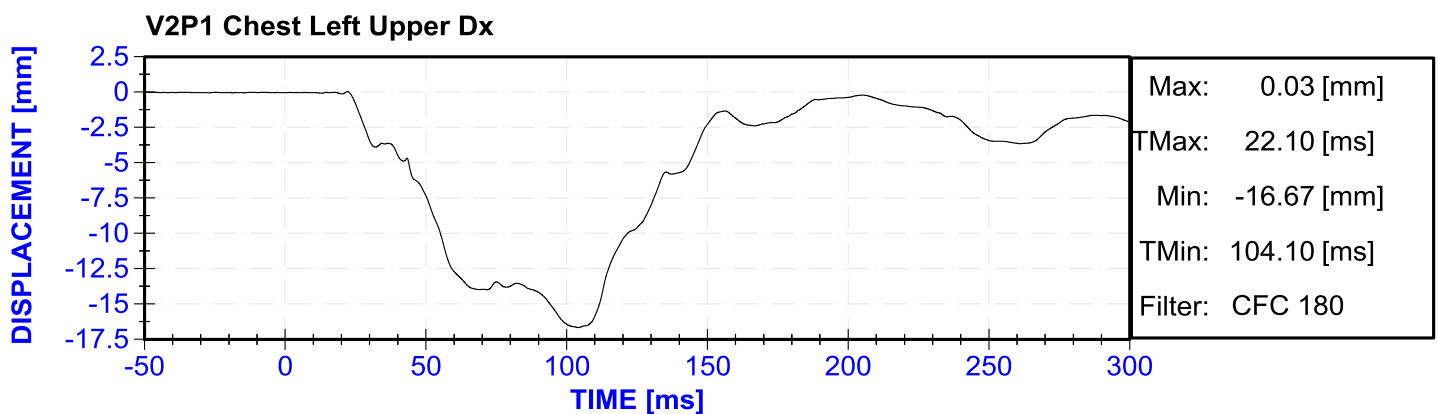
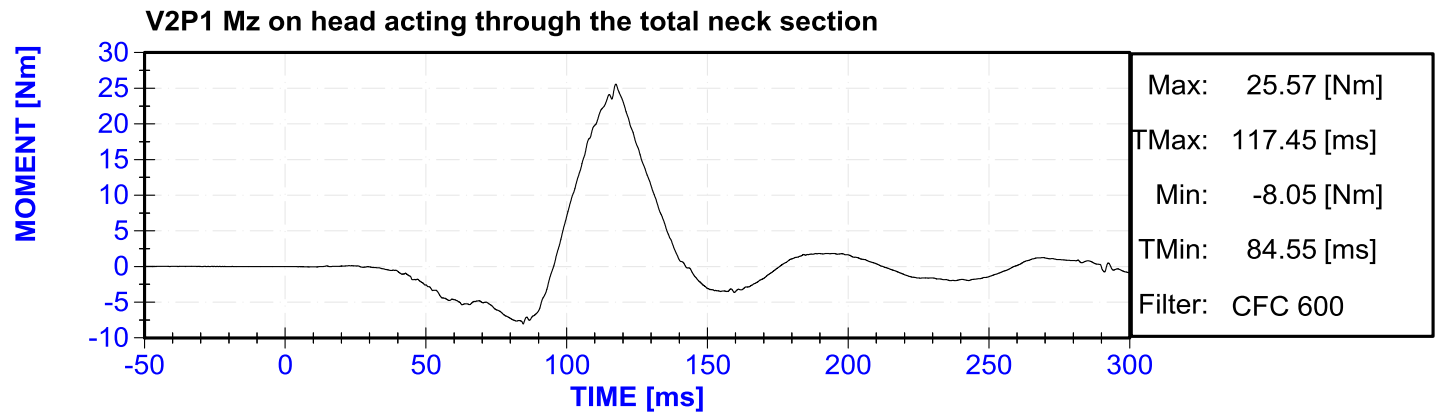
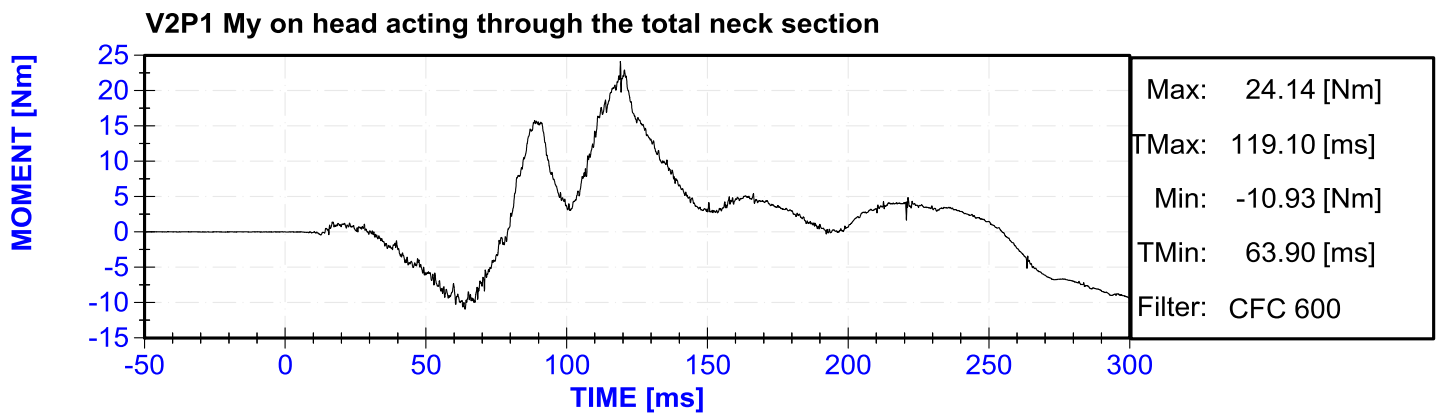
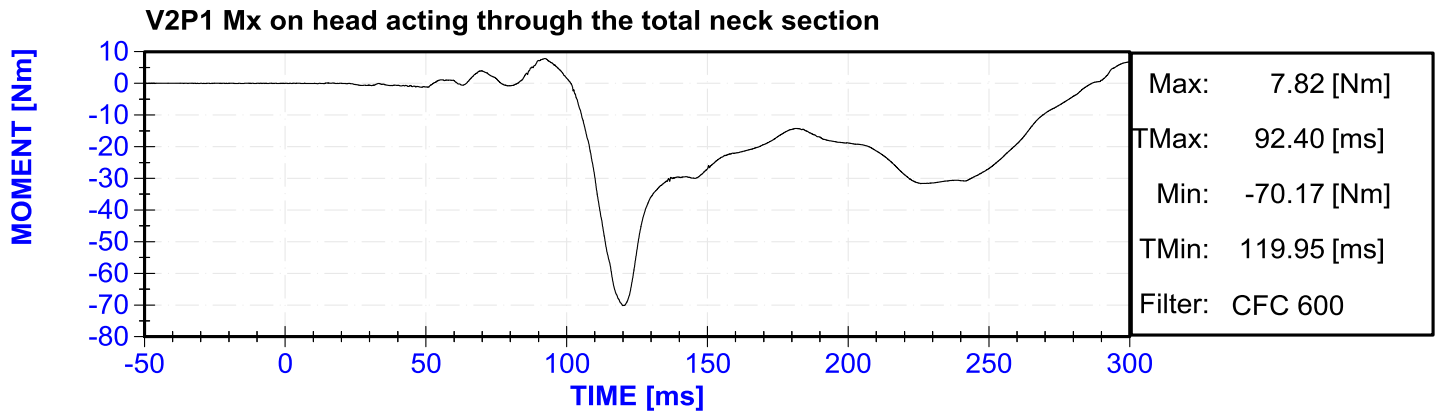


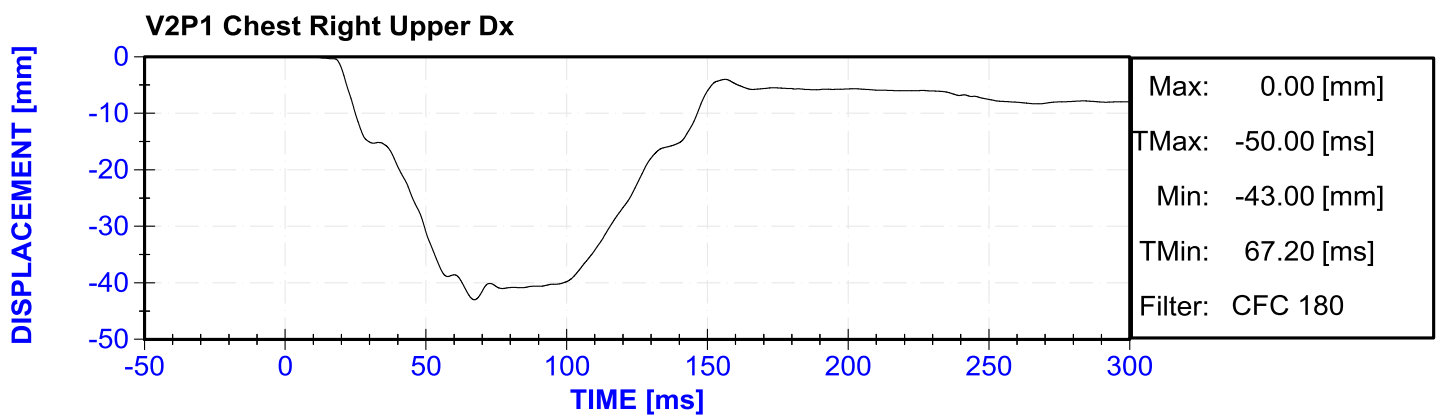
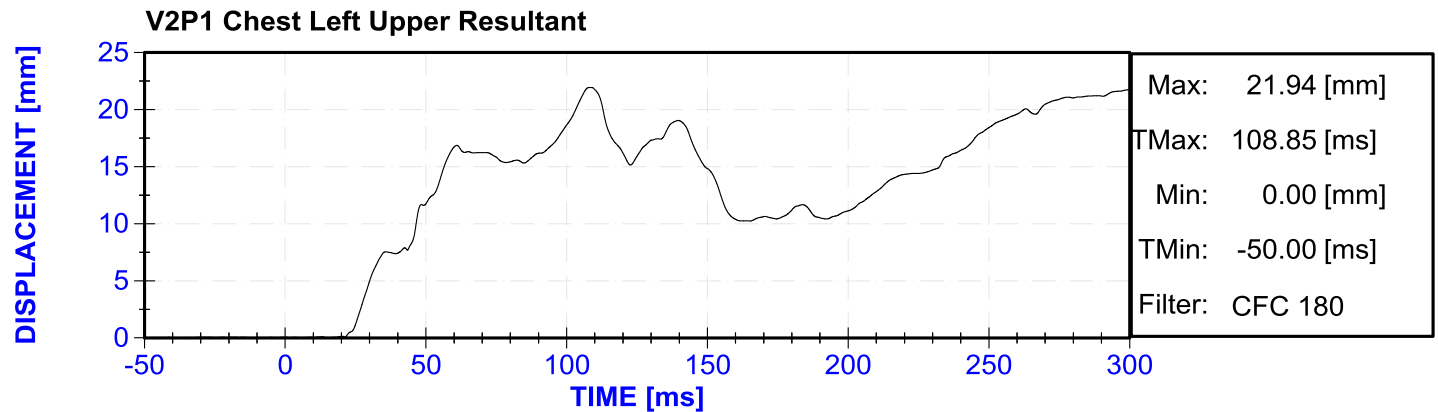
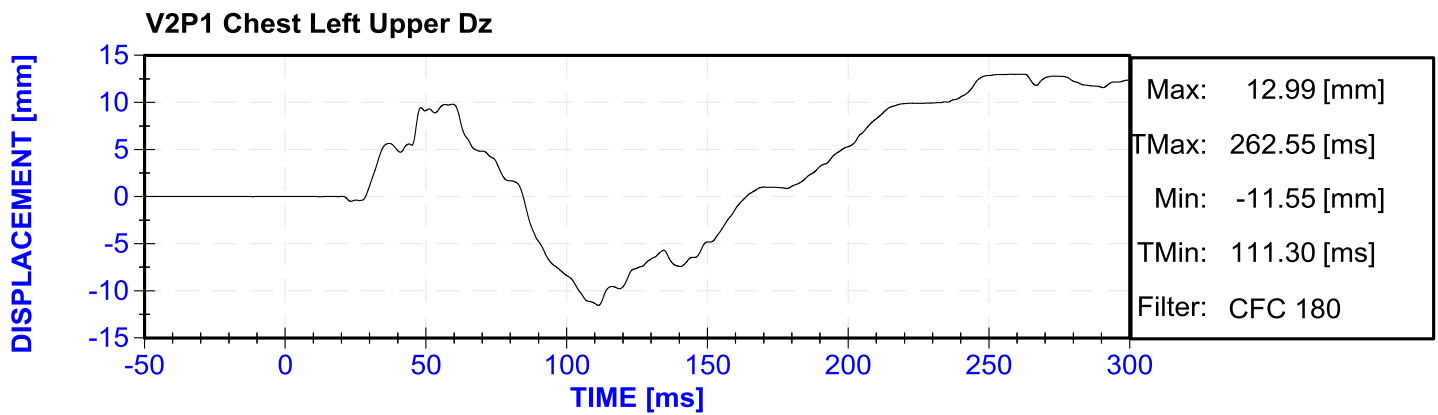
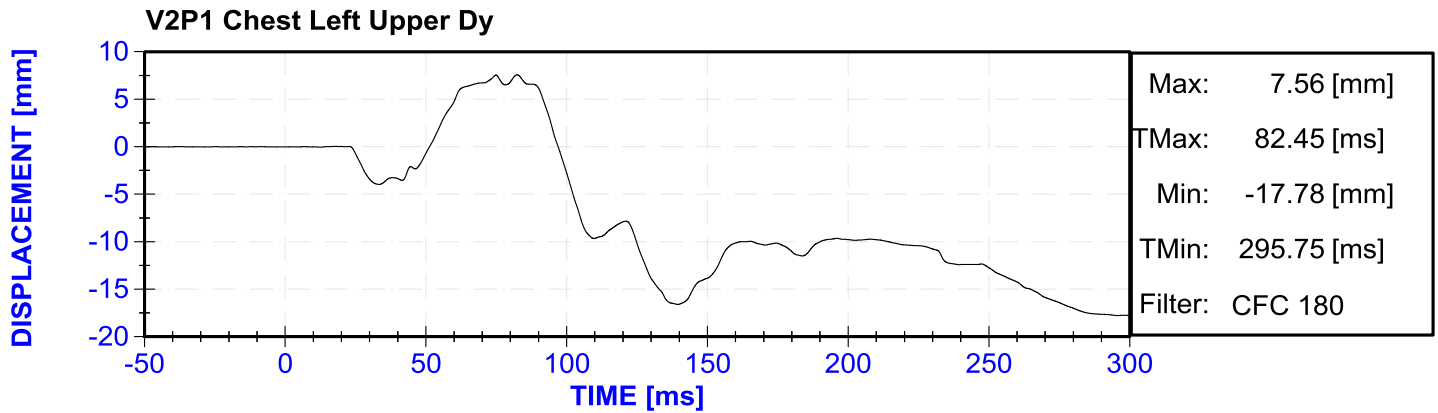
V2P1 Fy on head acting through the total neck section

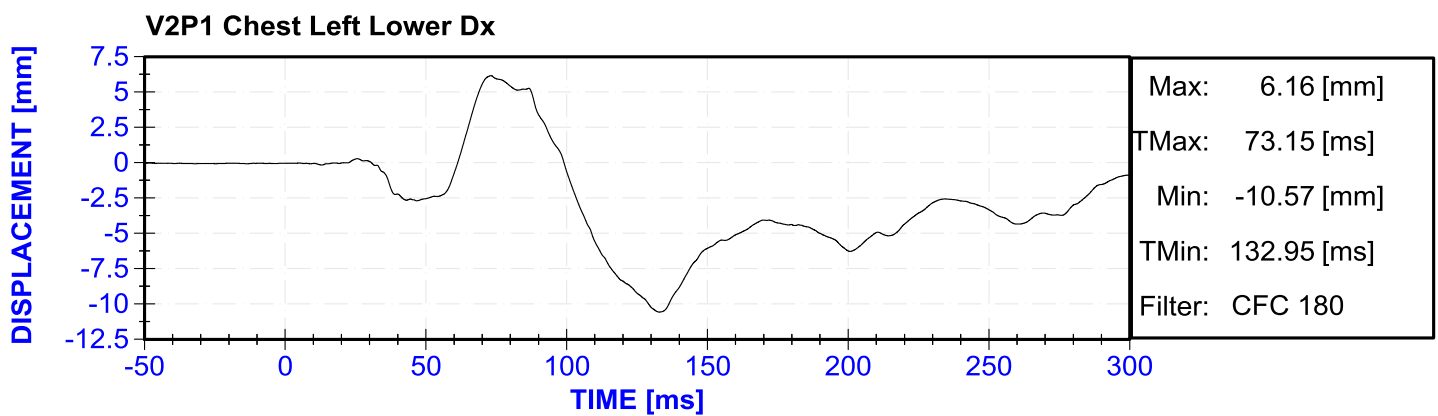
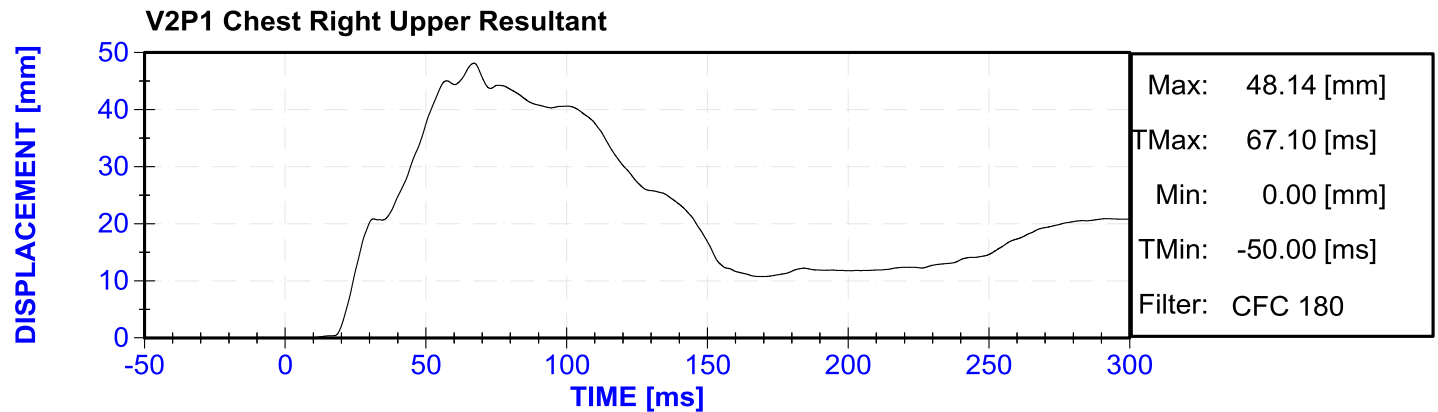
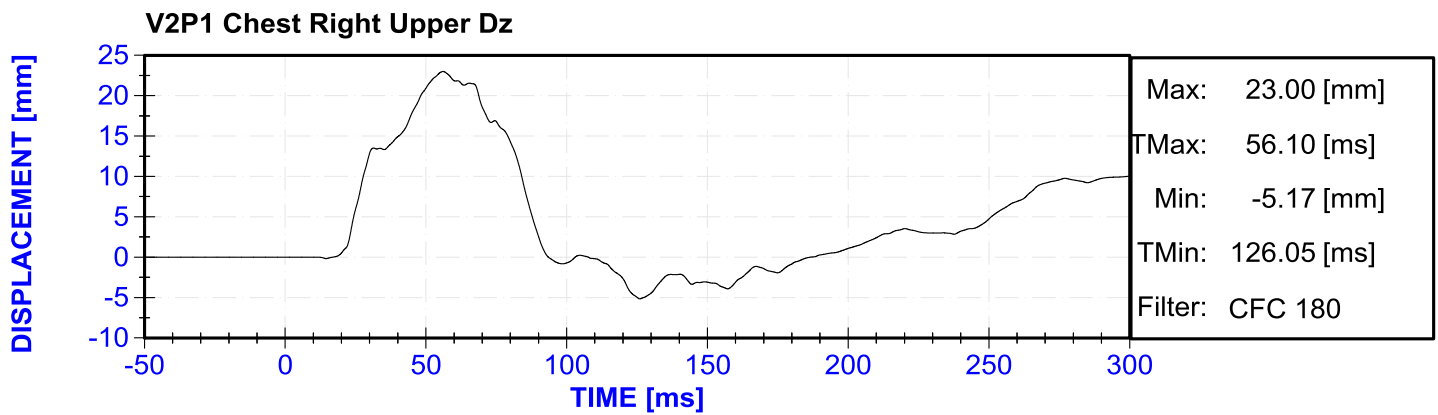
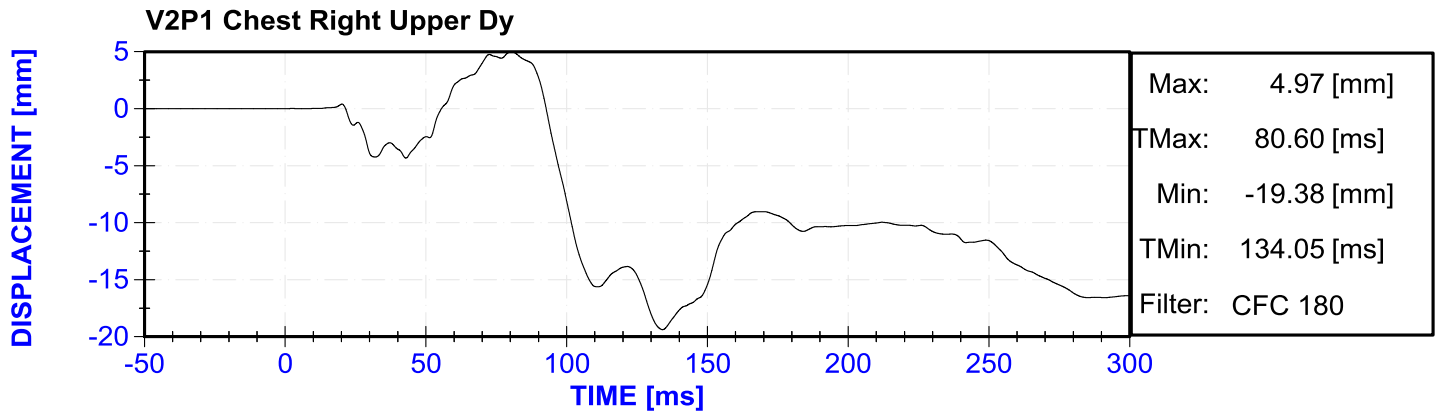


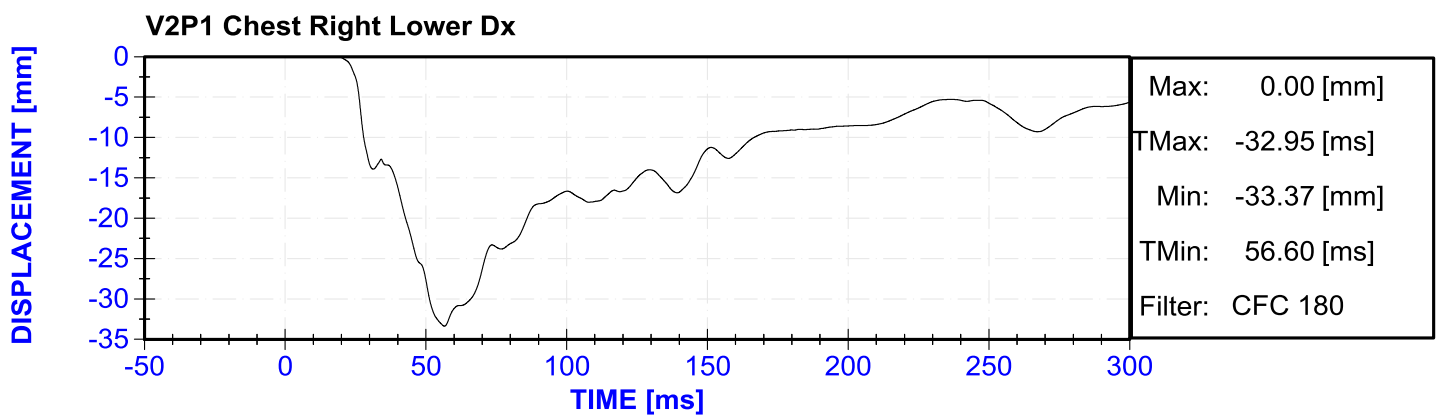
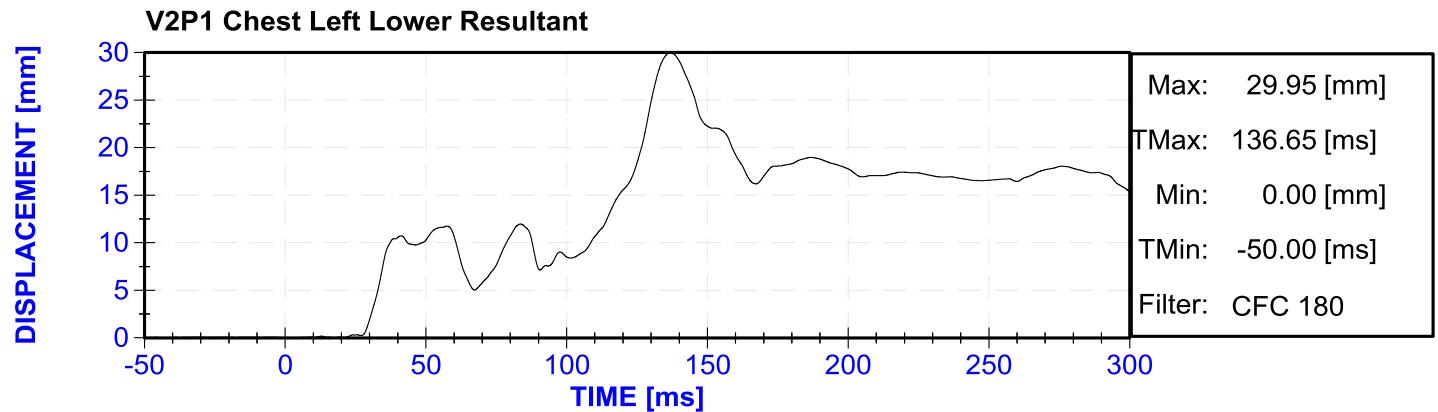
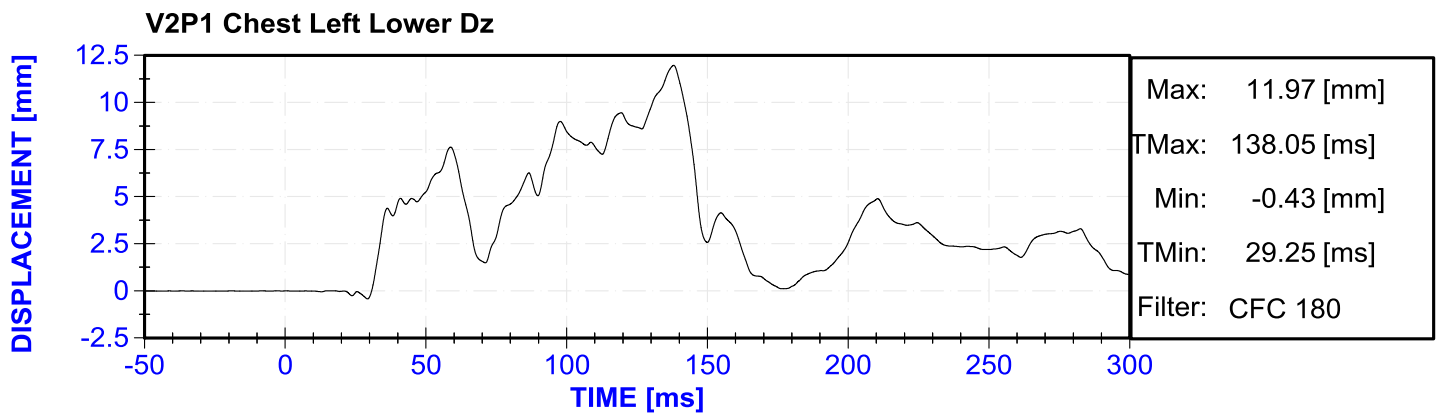
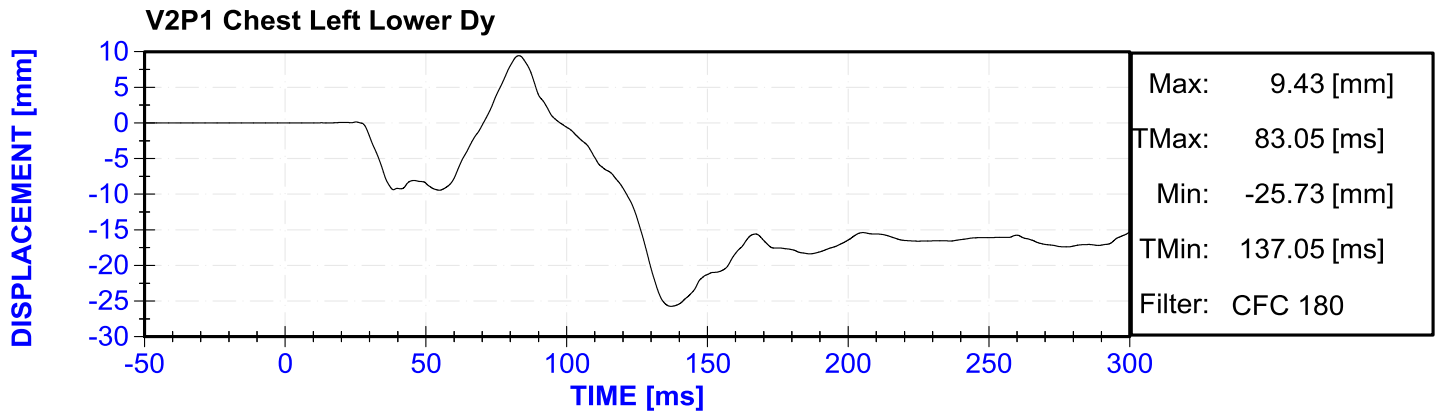
V2P1 Fz on head acting through the total neck section

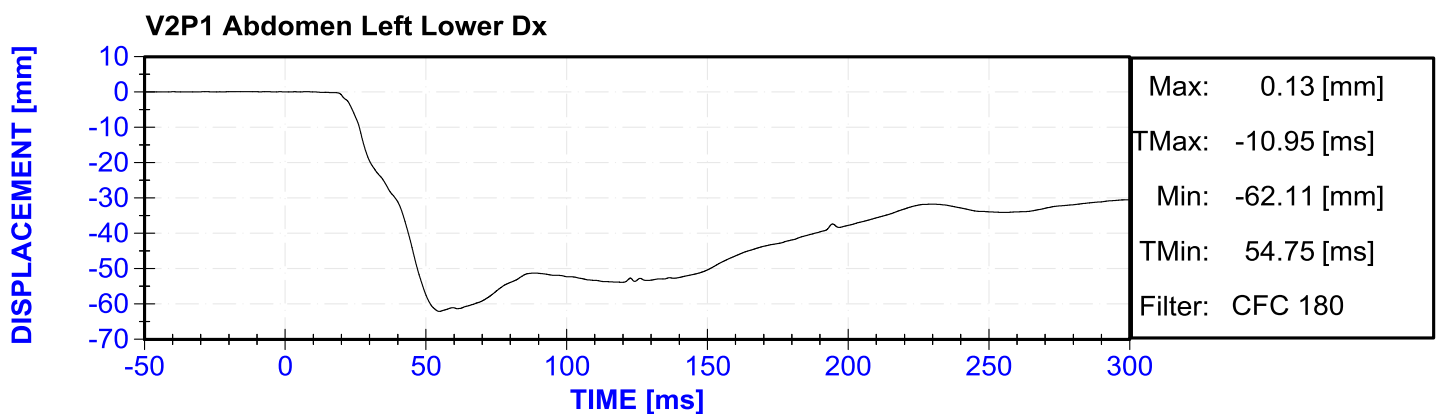
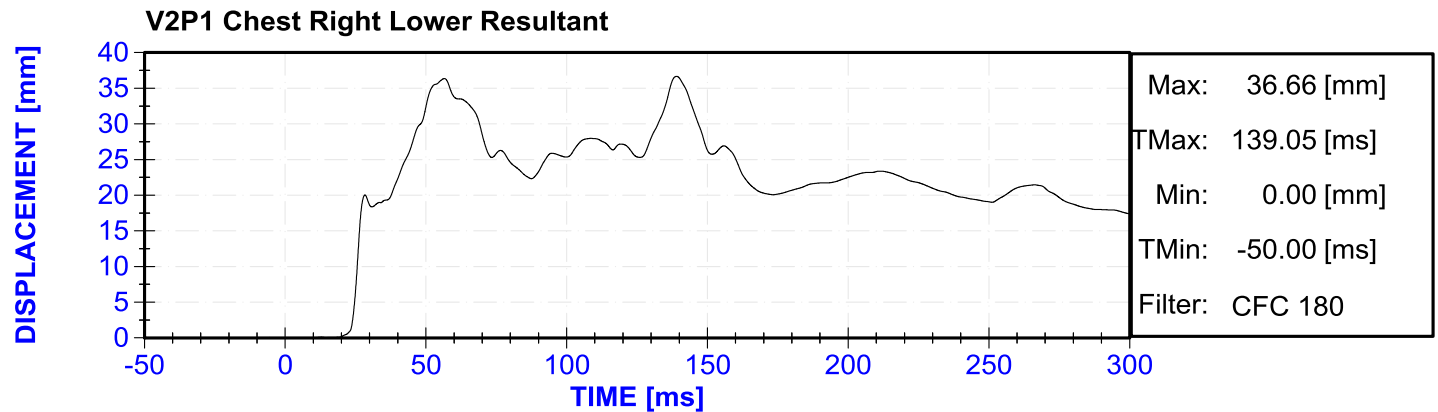
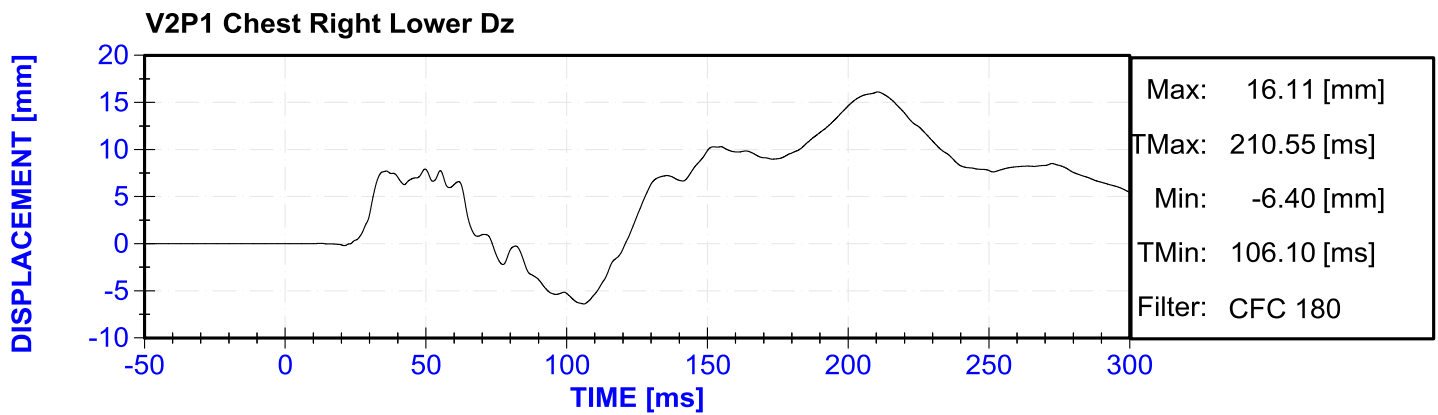
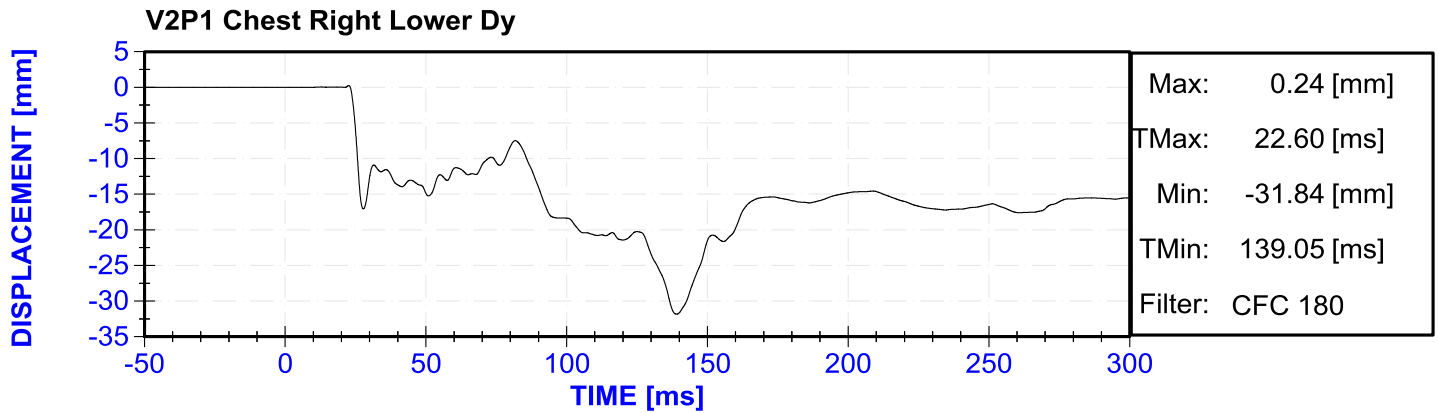


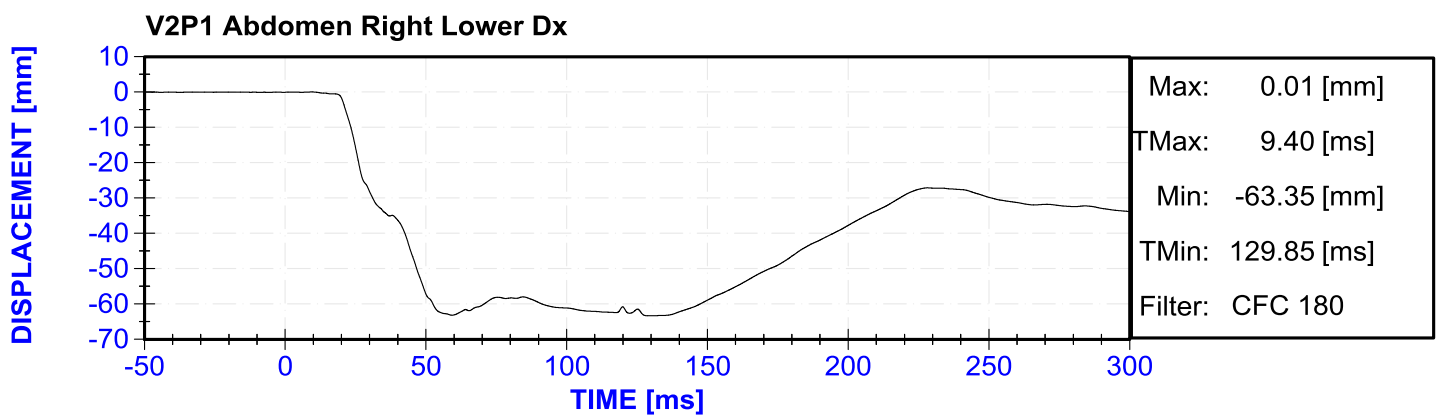
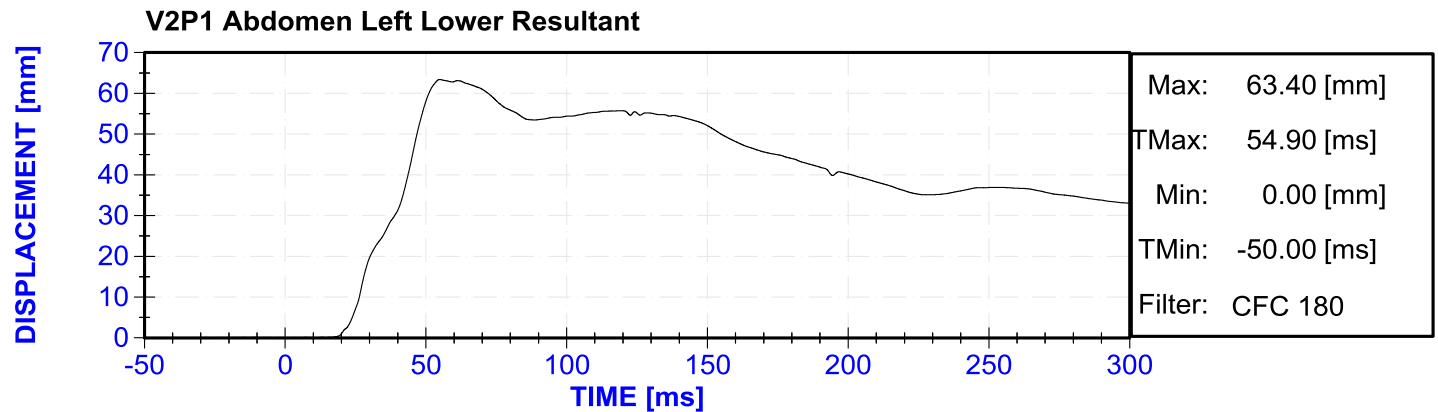
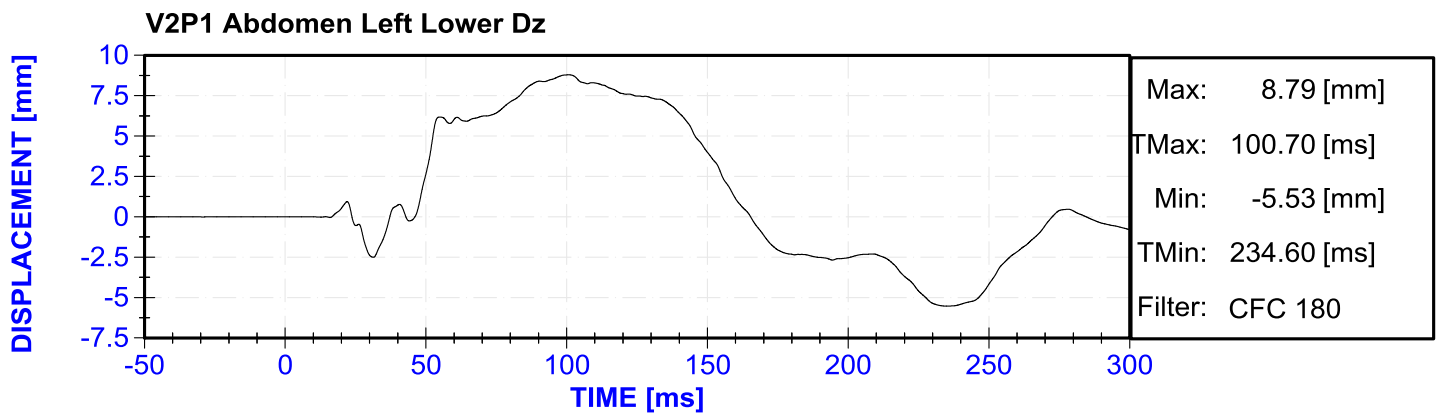
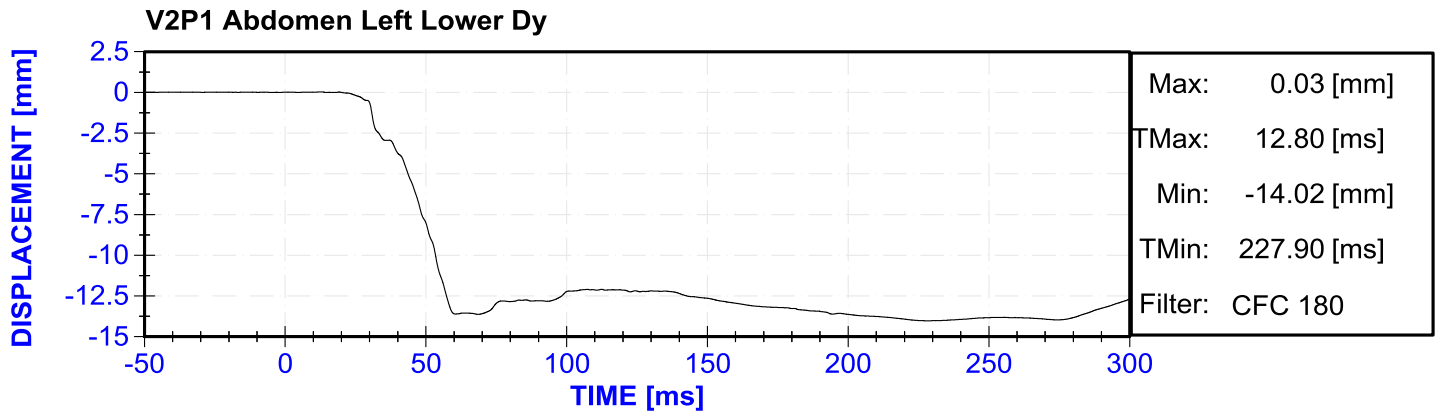


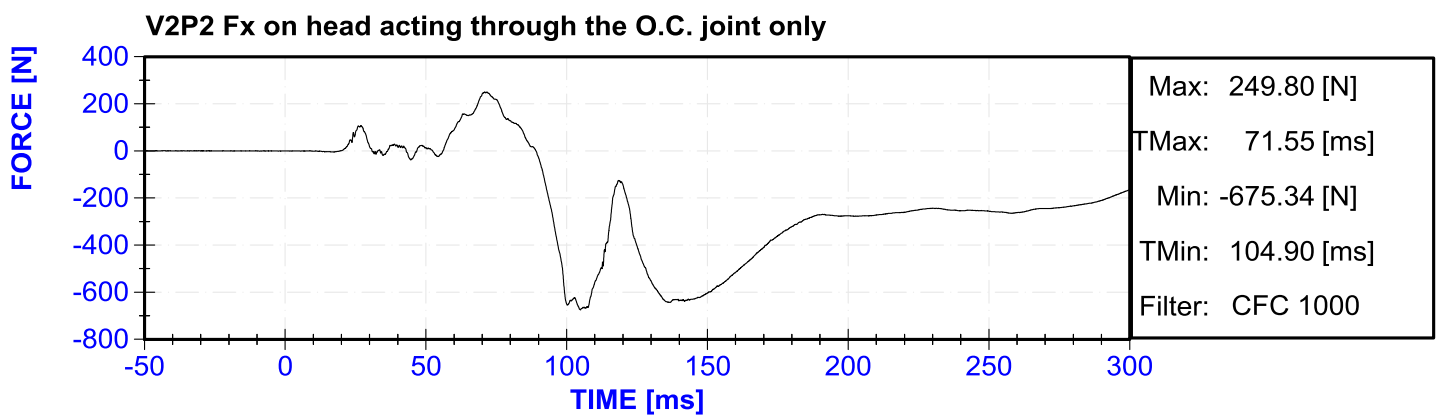
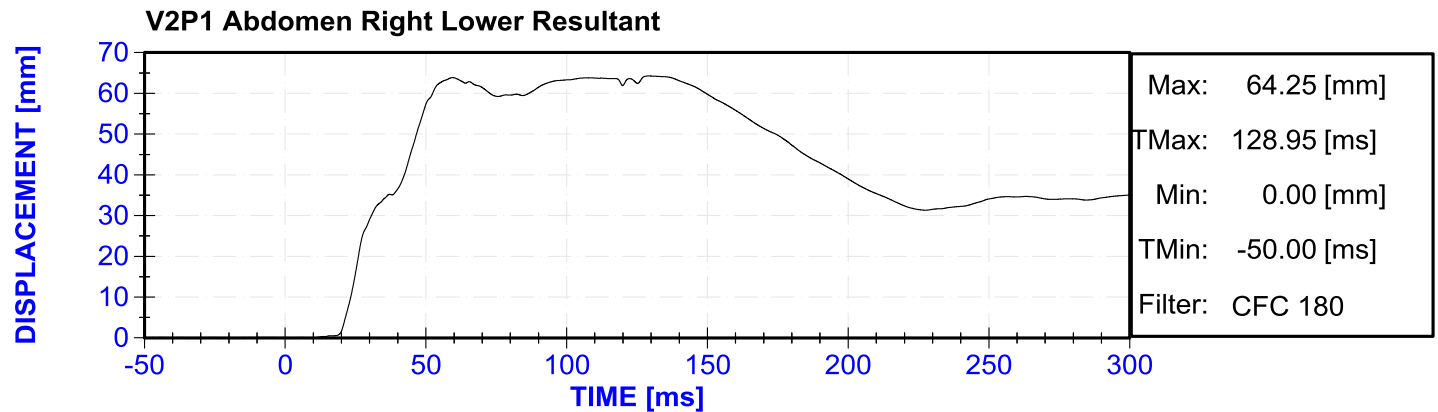
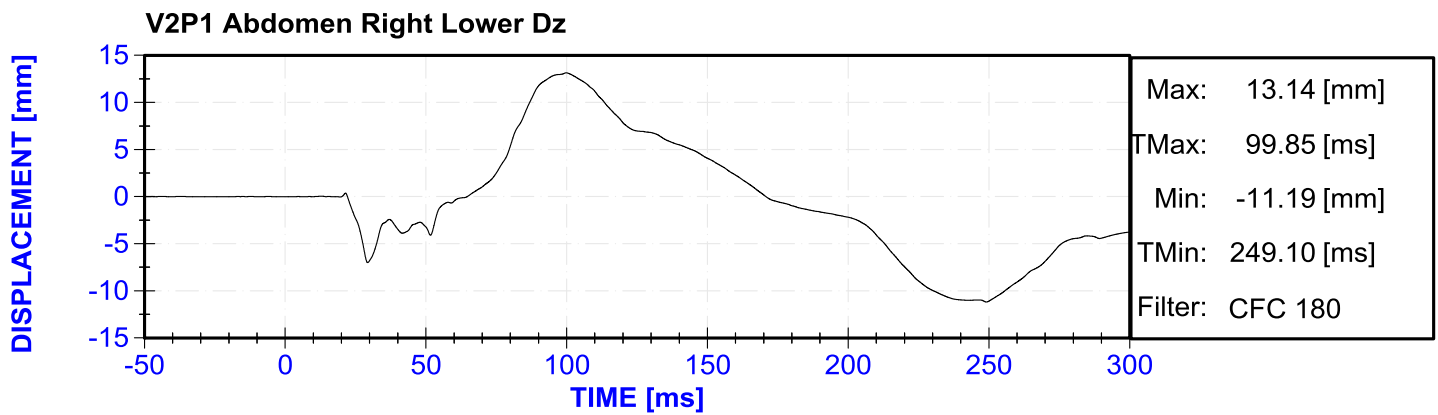
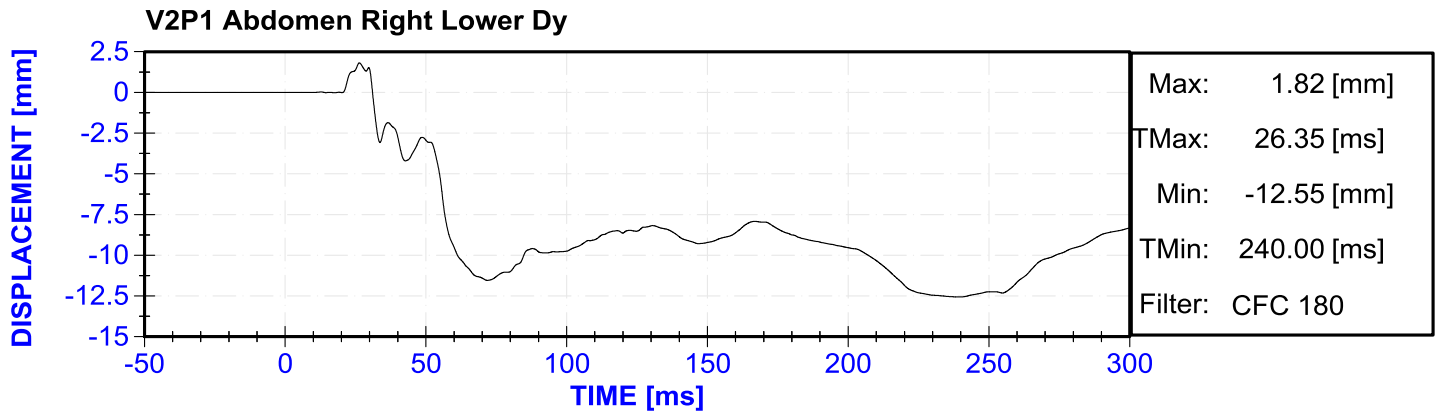


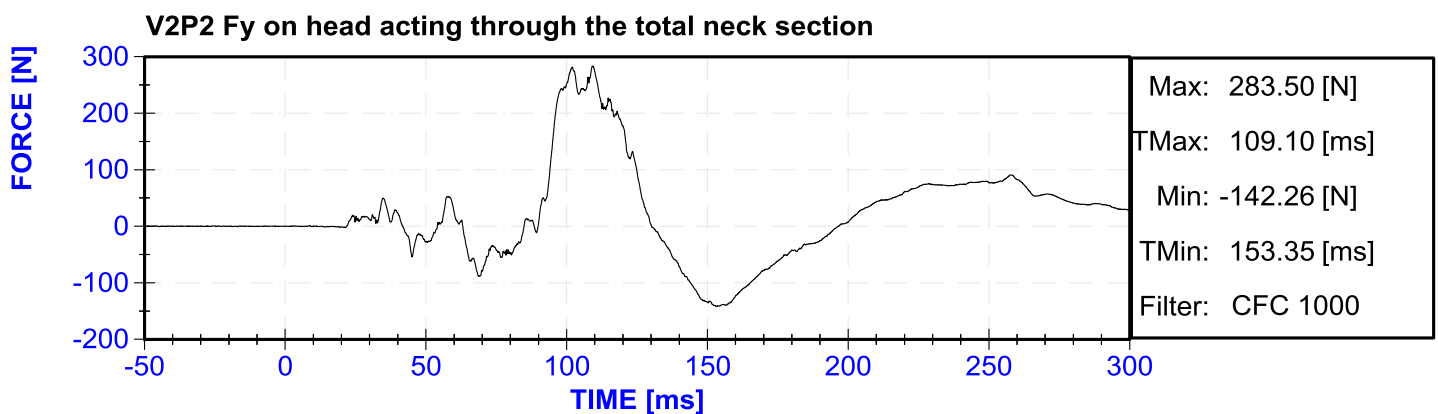
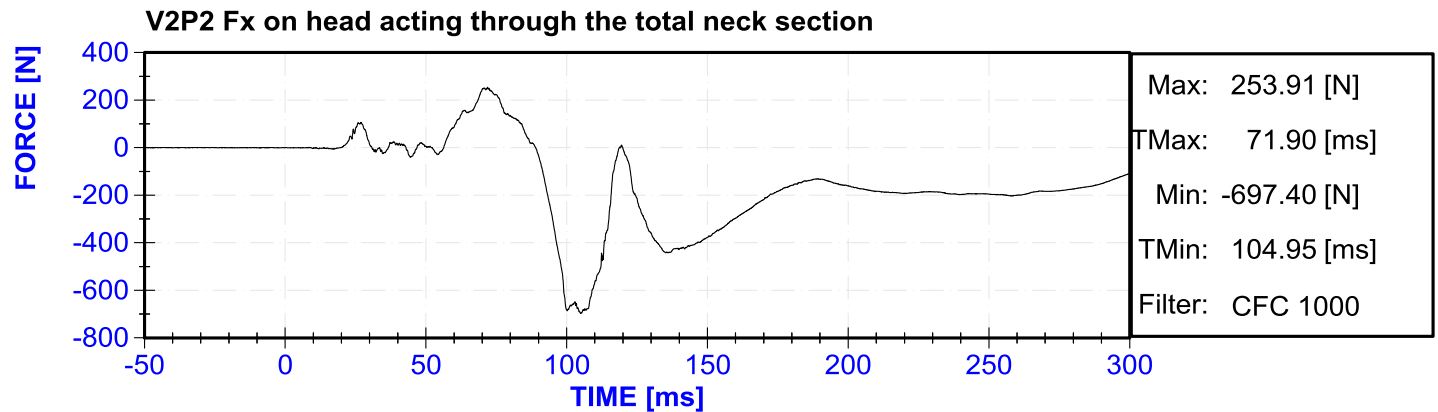
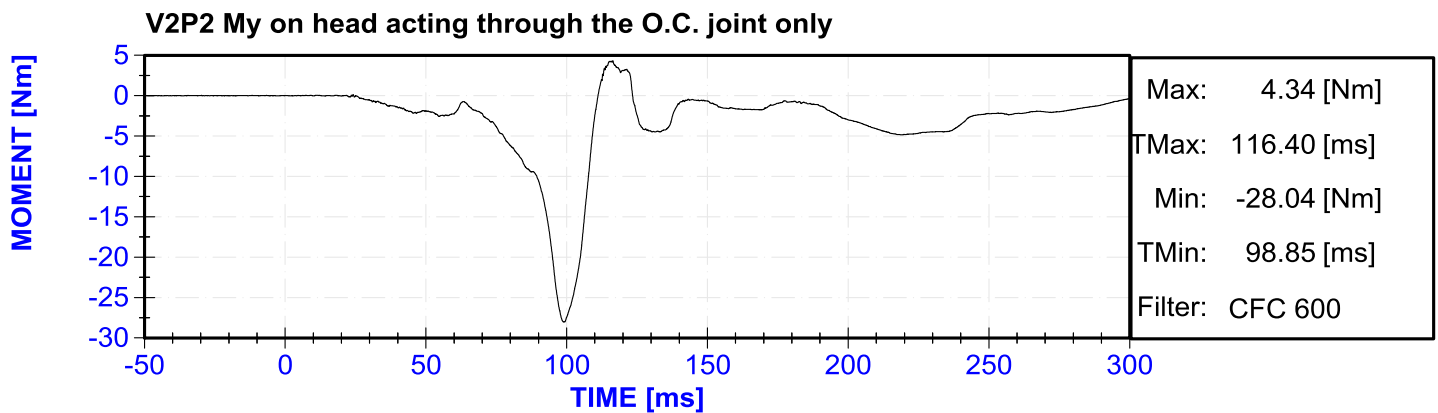
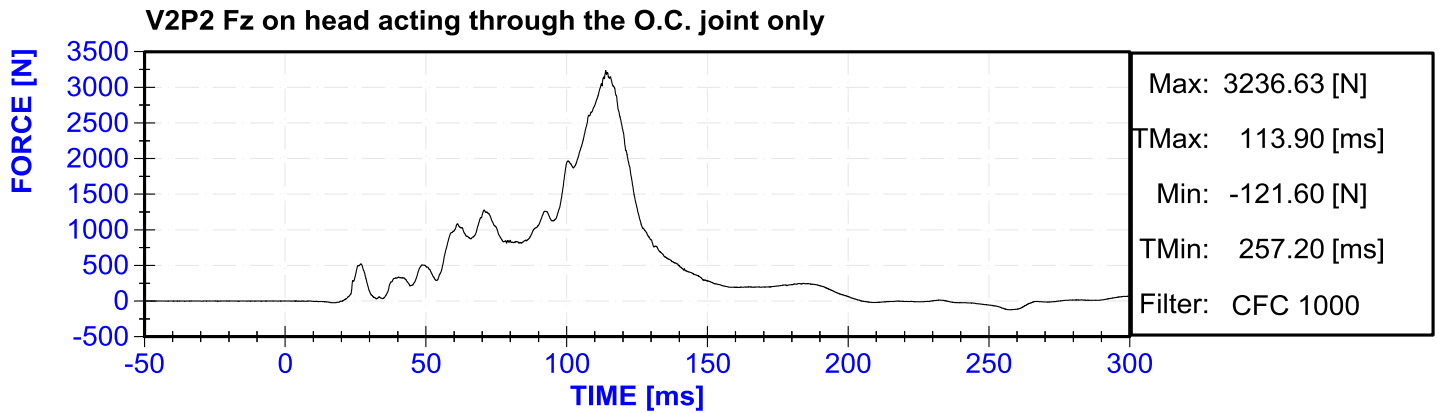


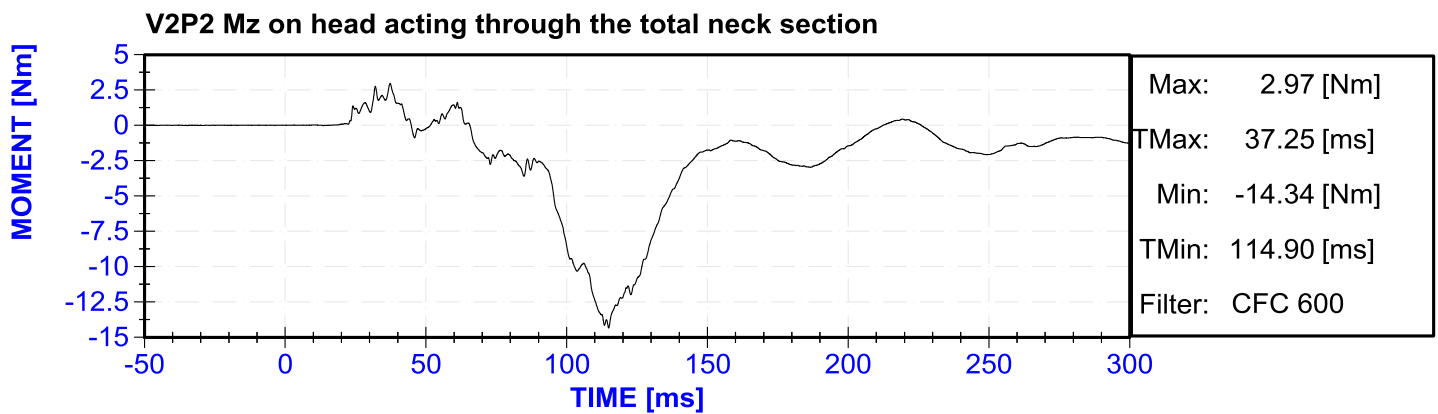
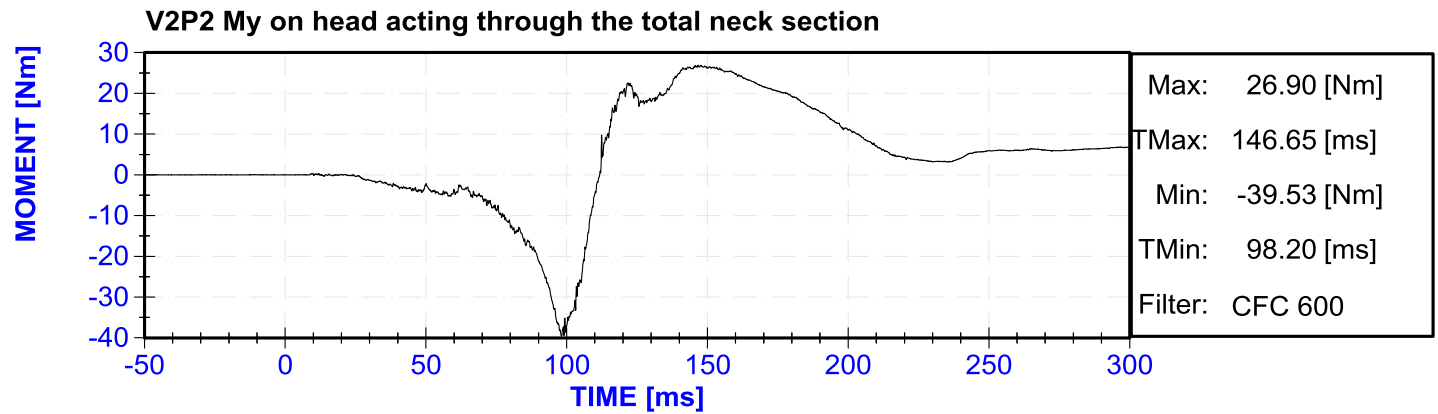
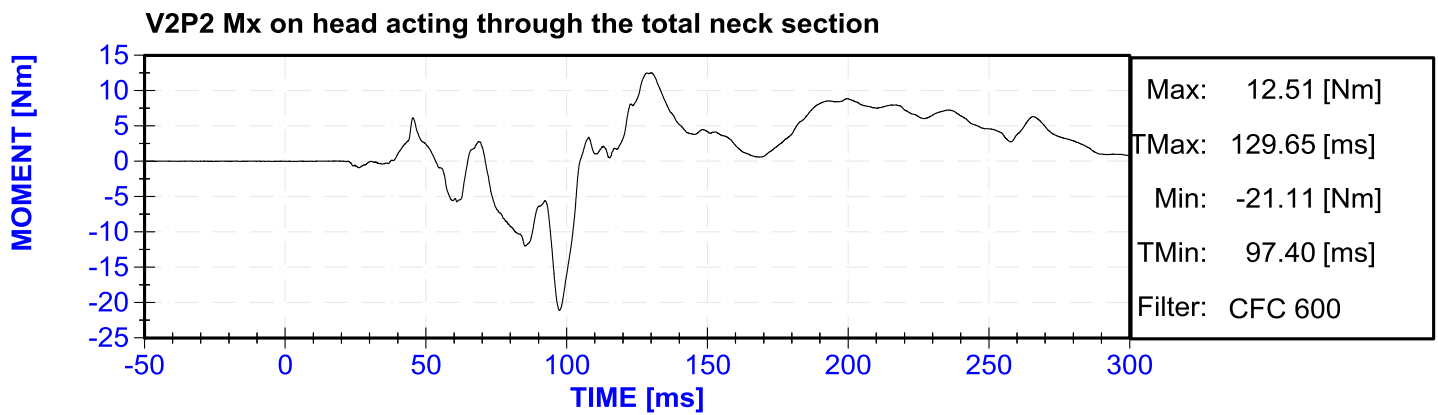
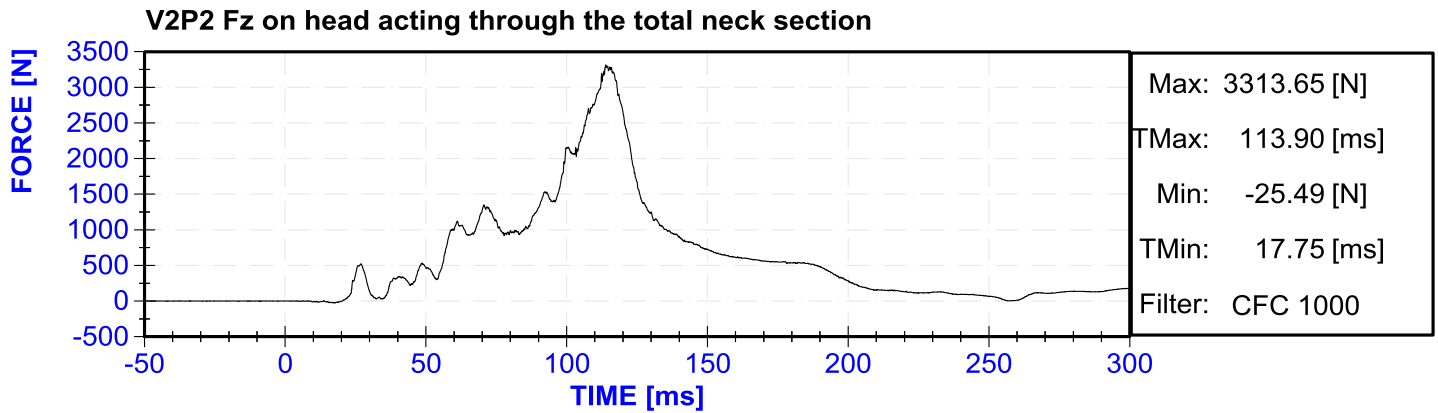


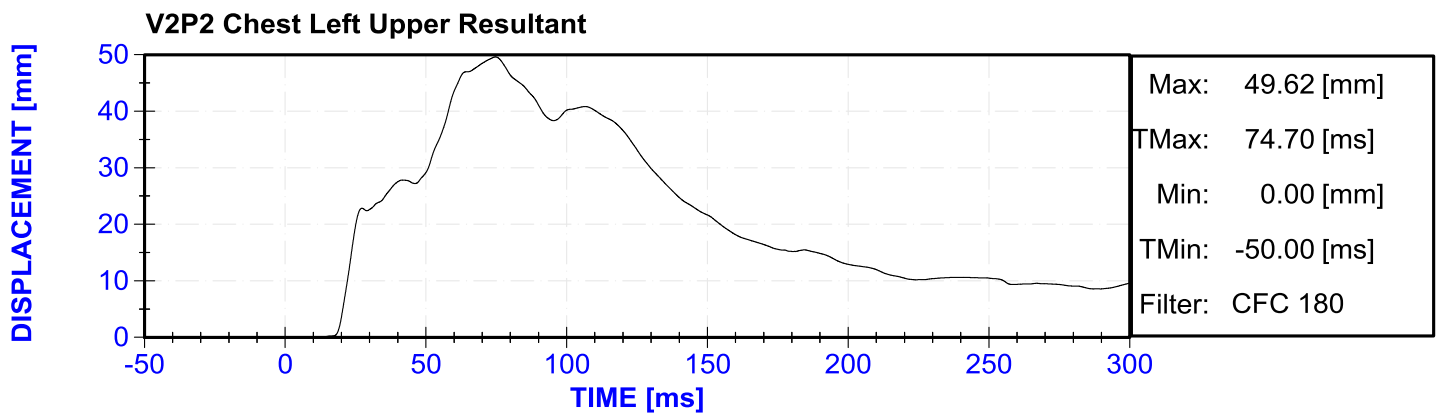
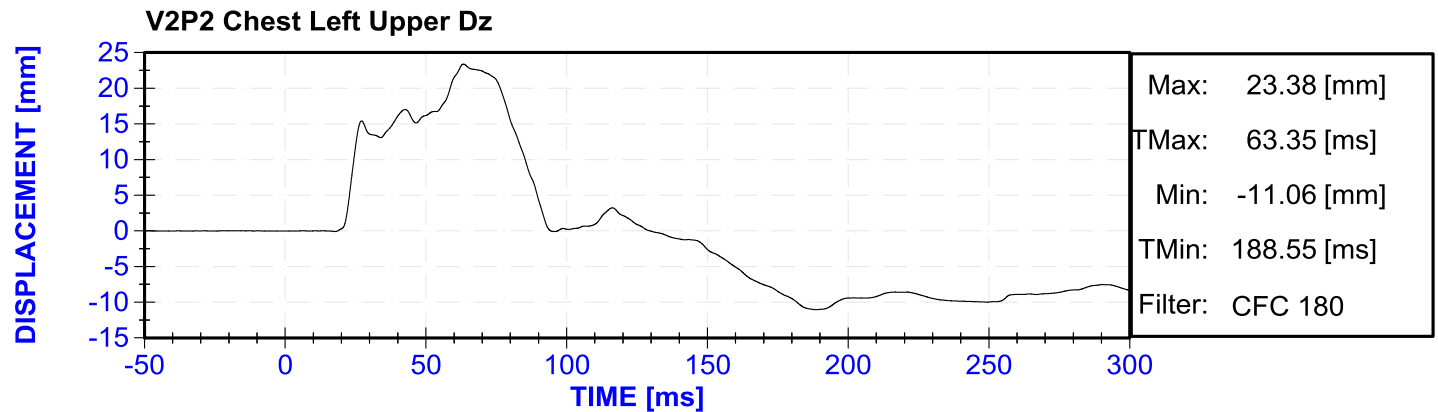
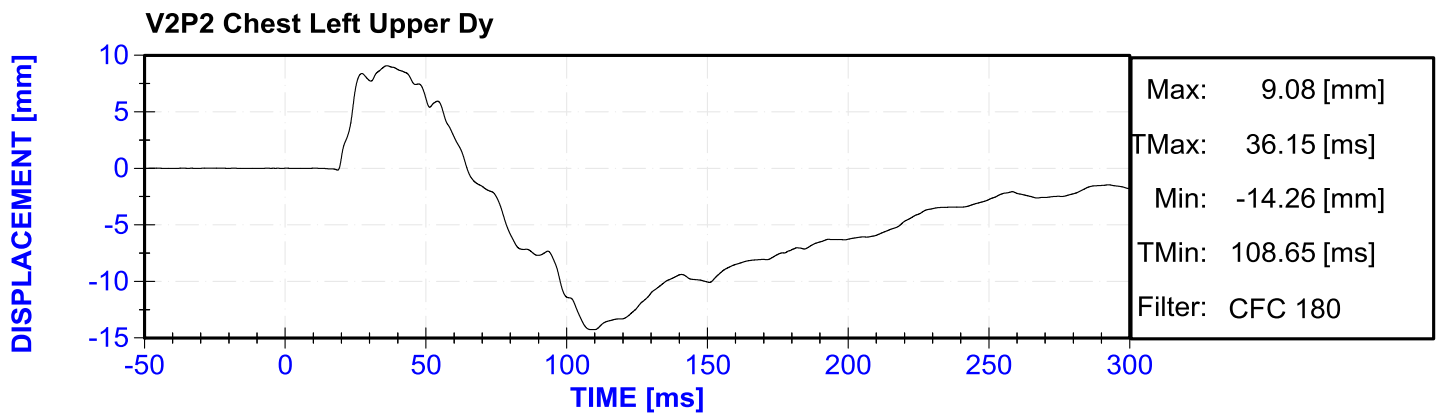
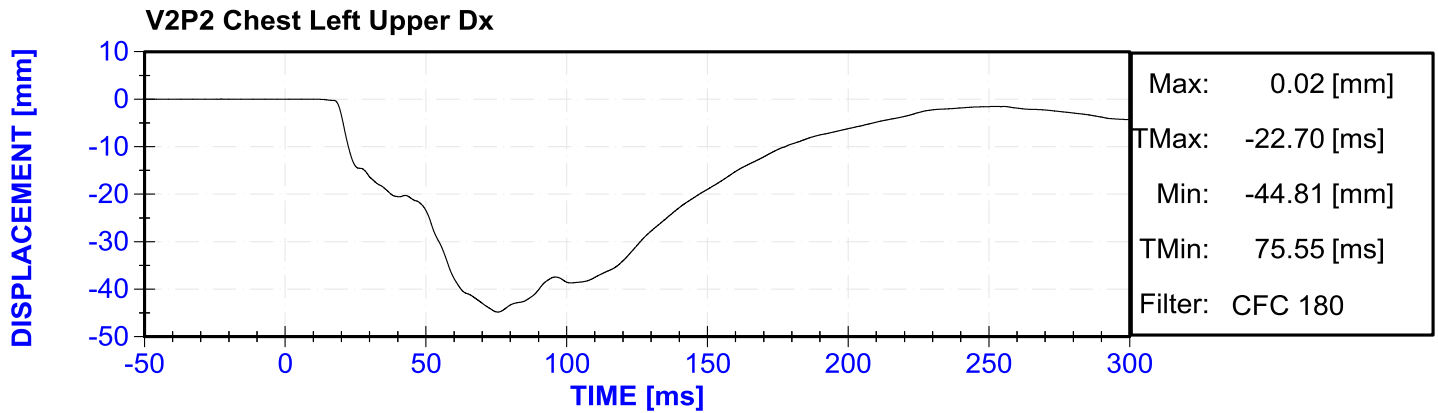


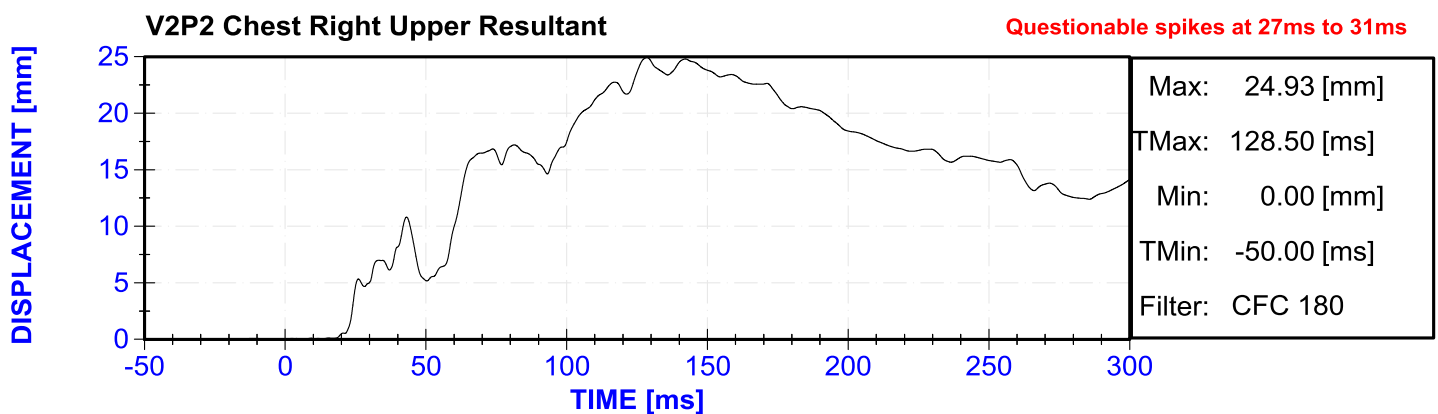
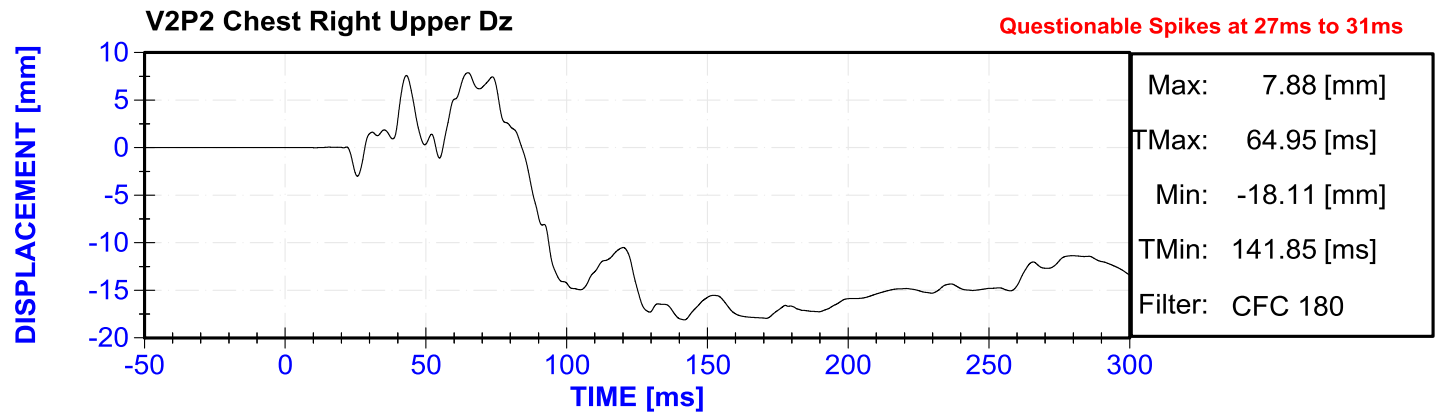
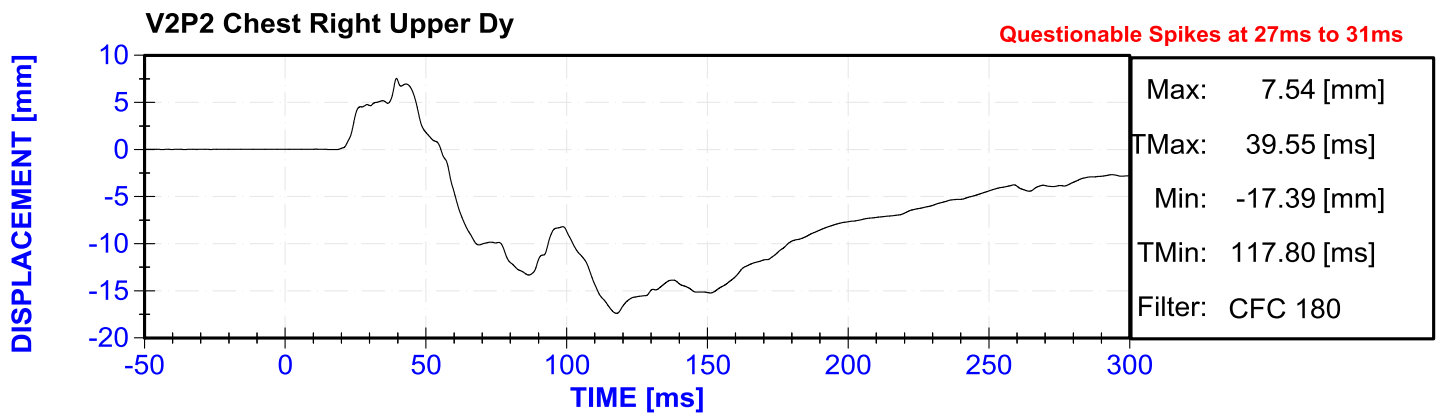
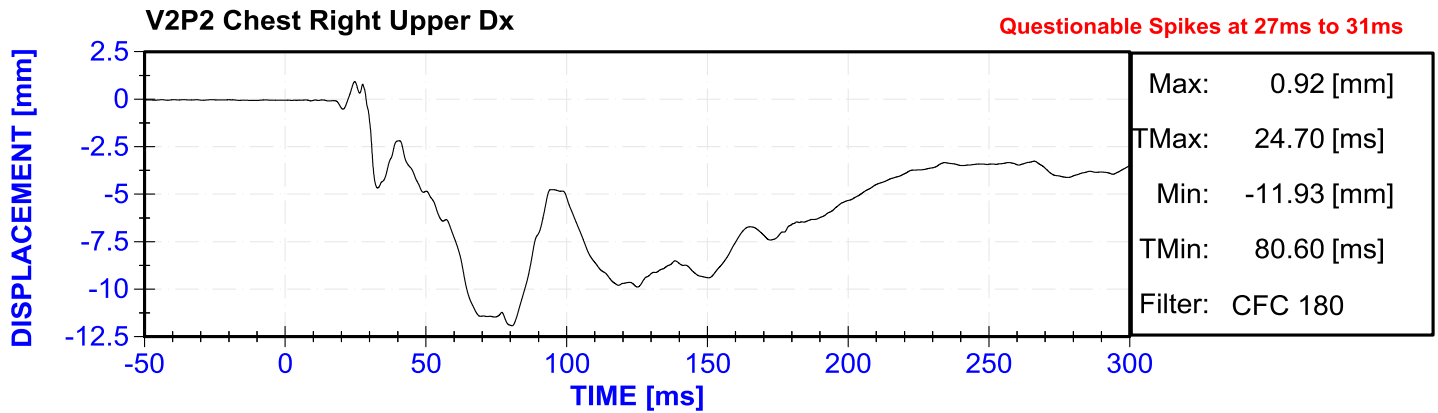


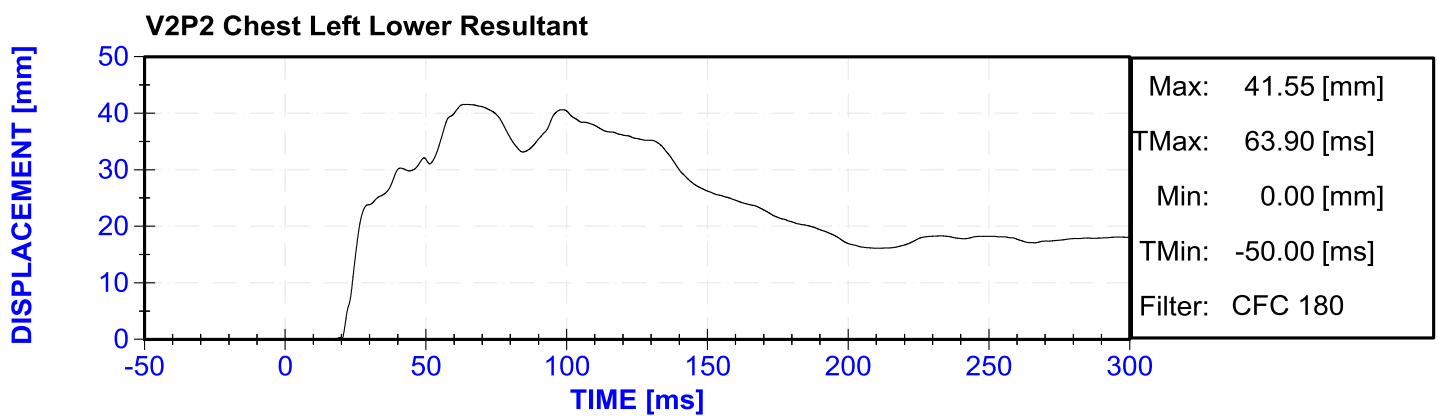
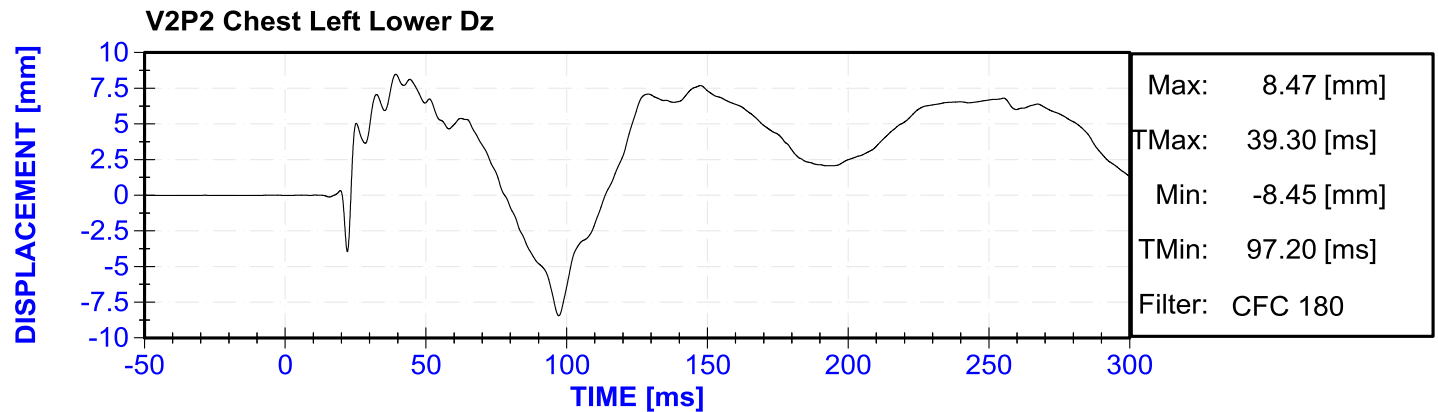
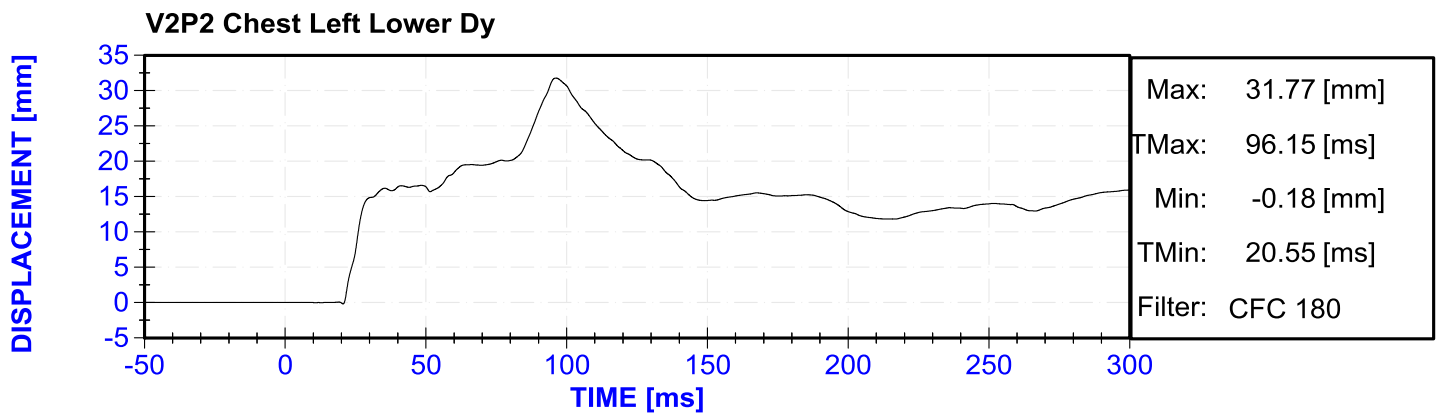
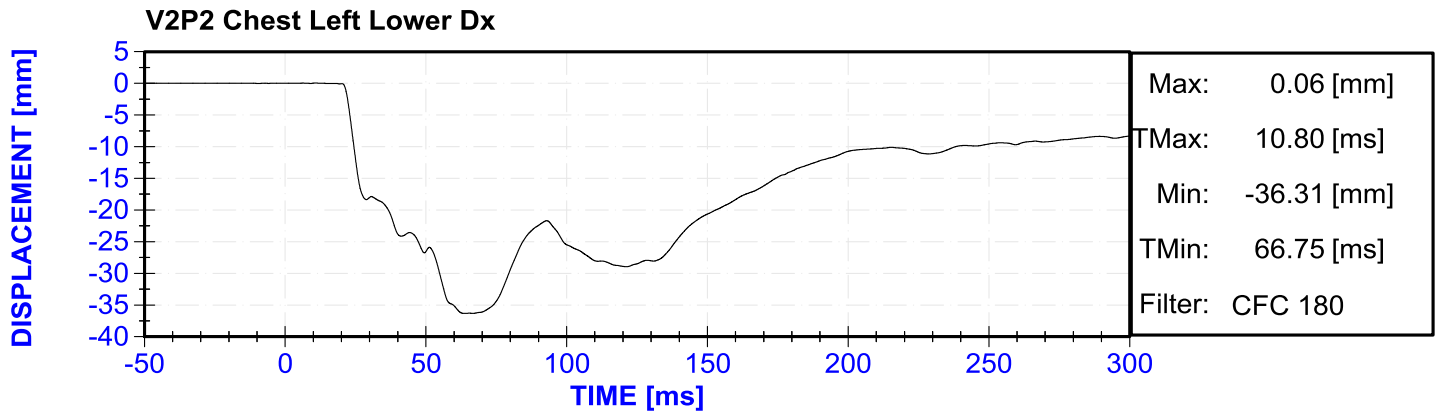


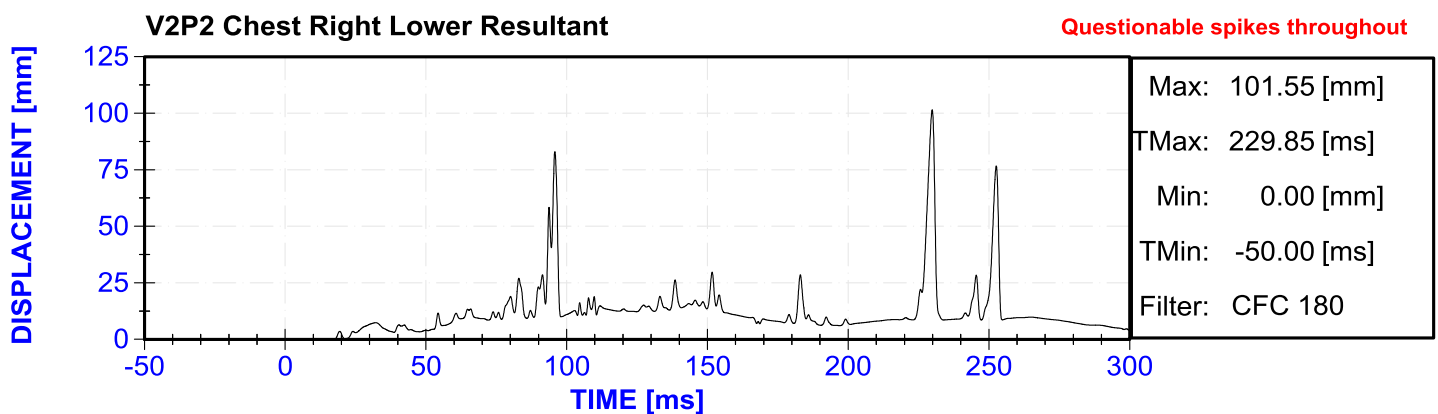
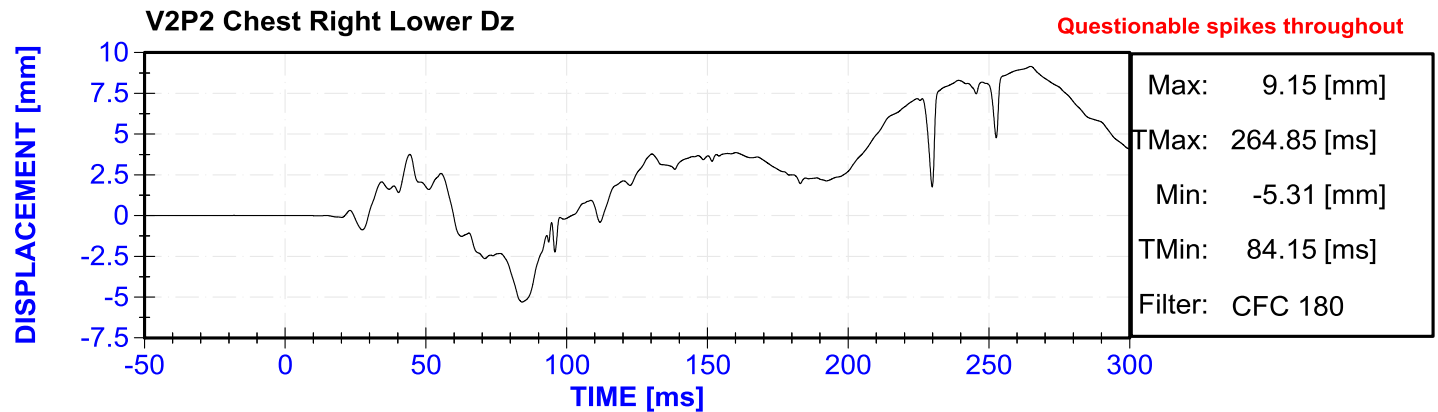
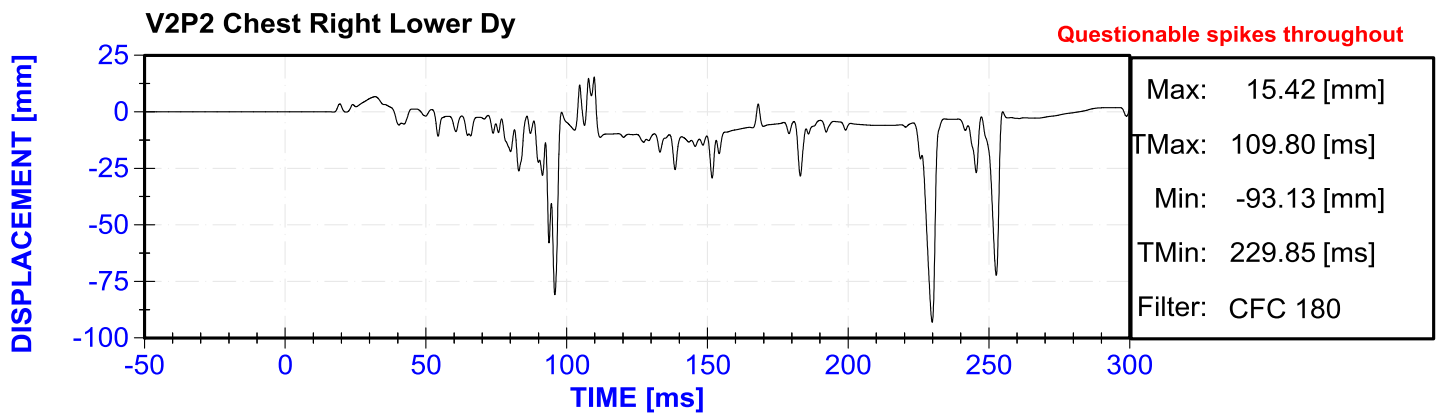
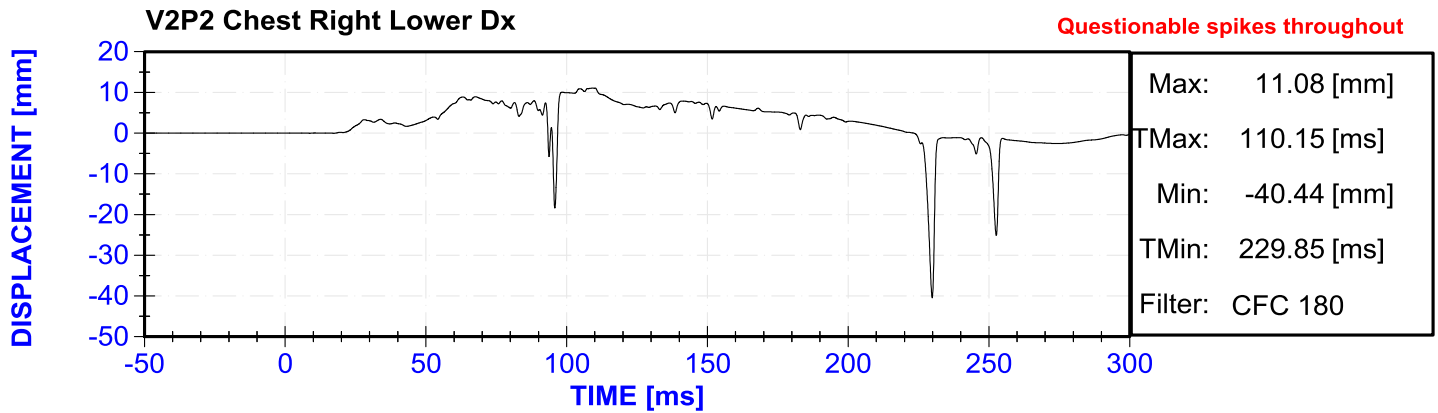


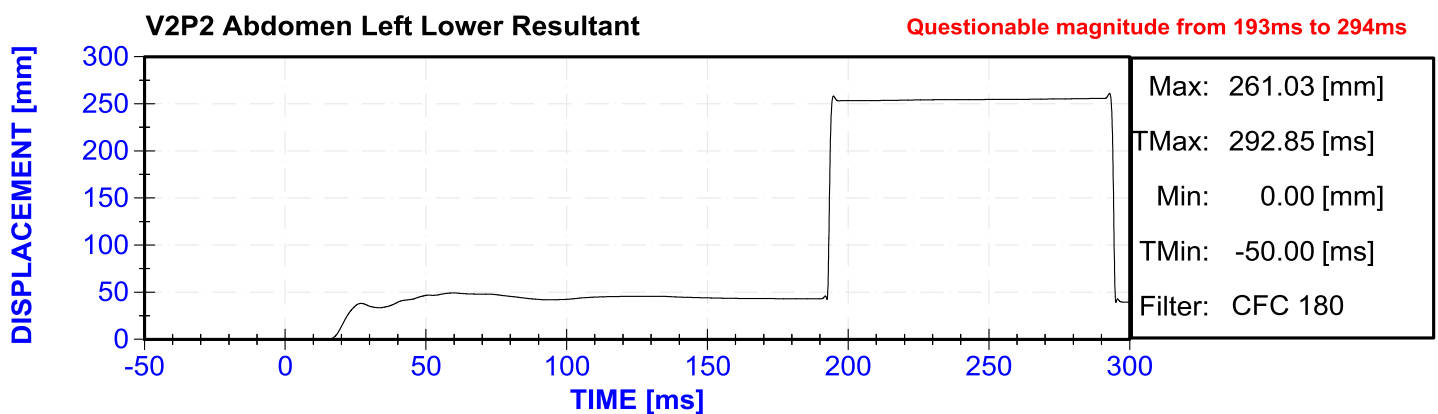
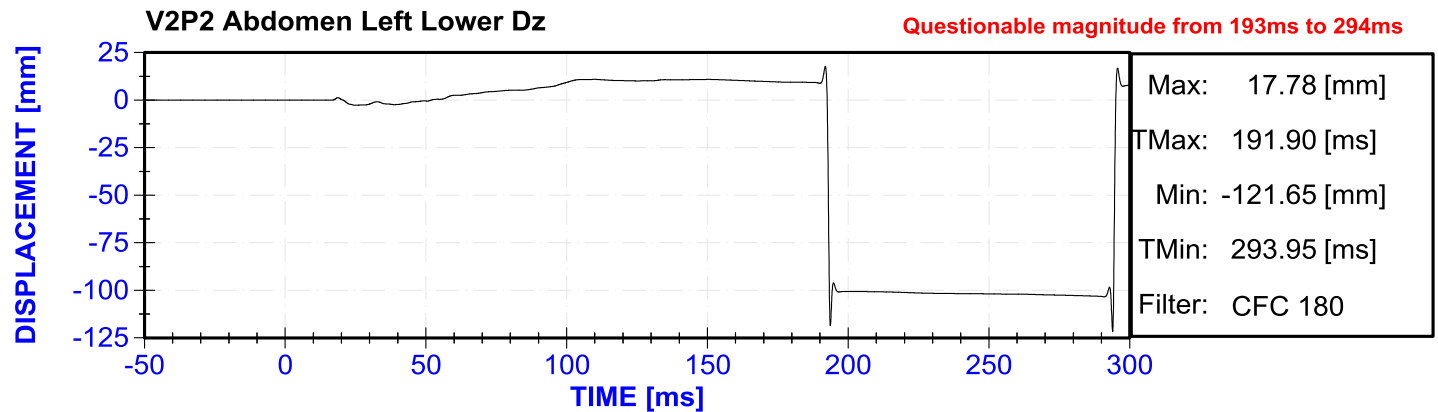
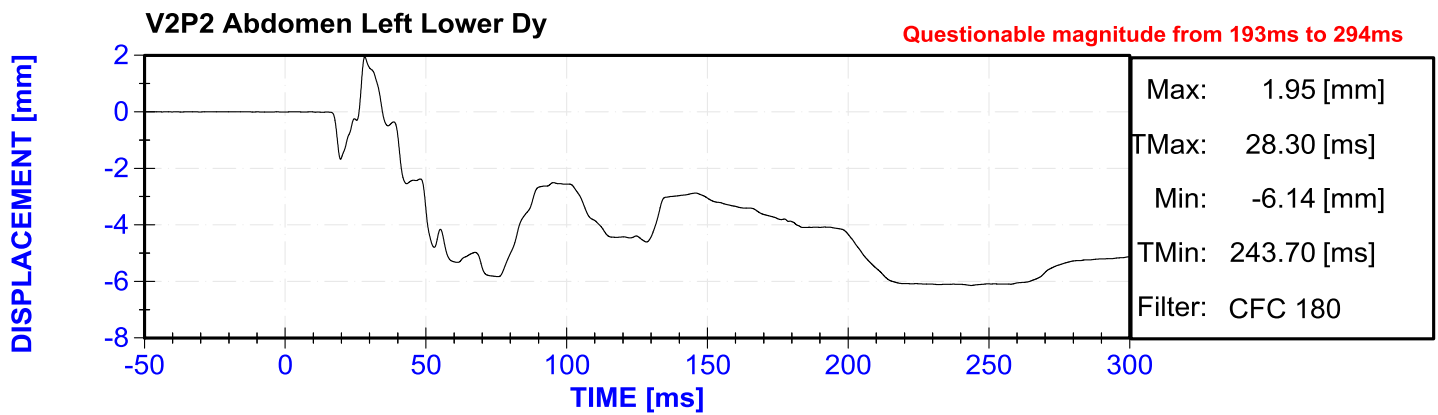
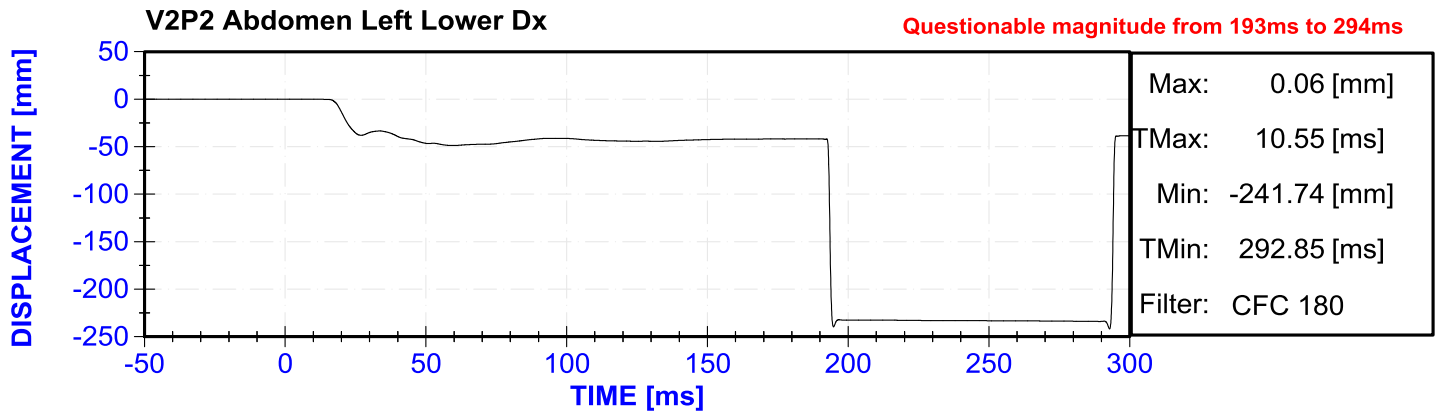


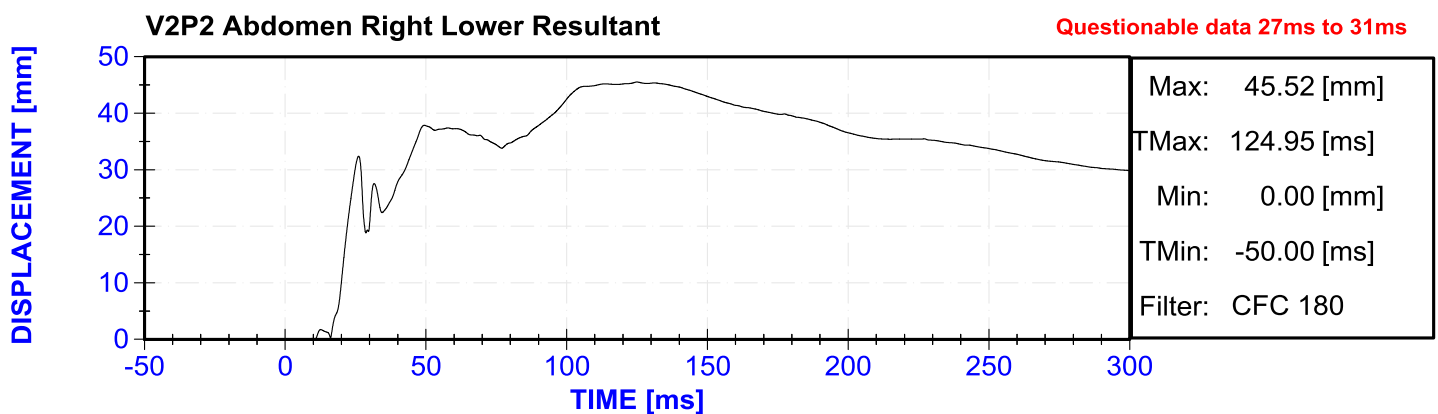
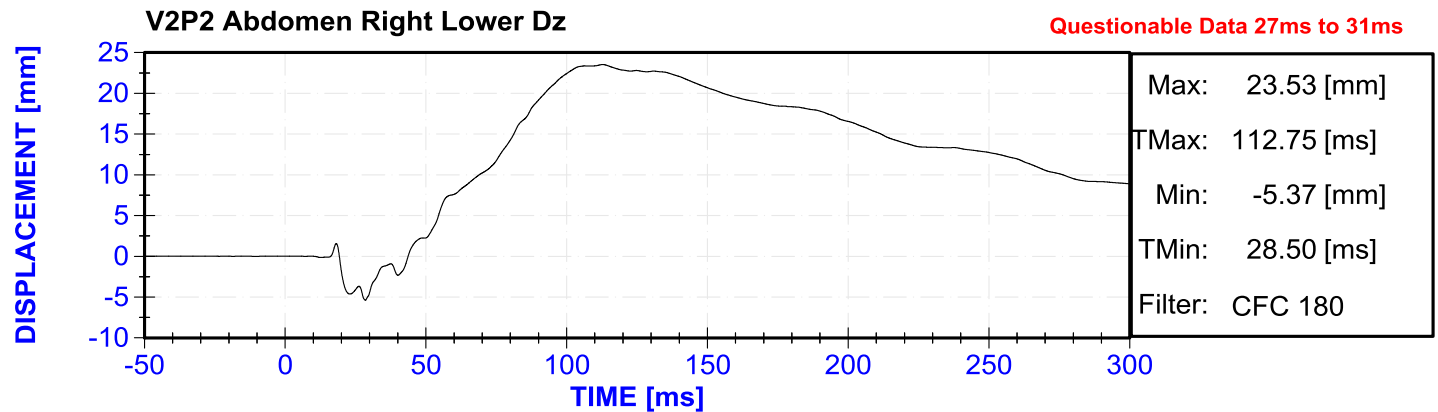
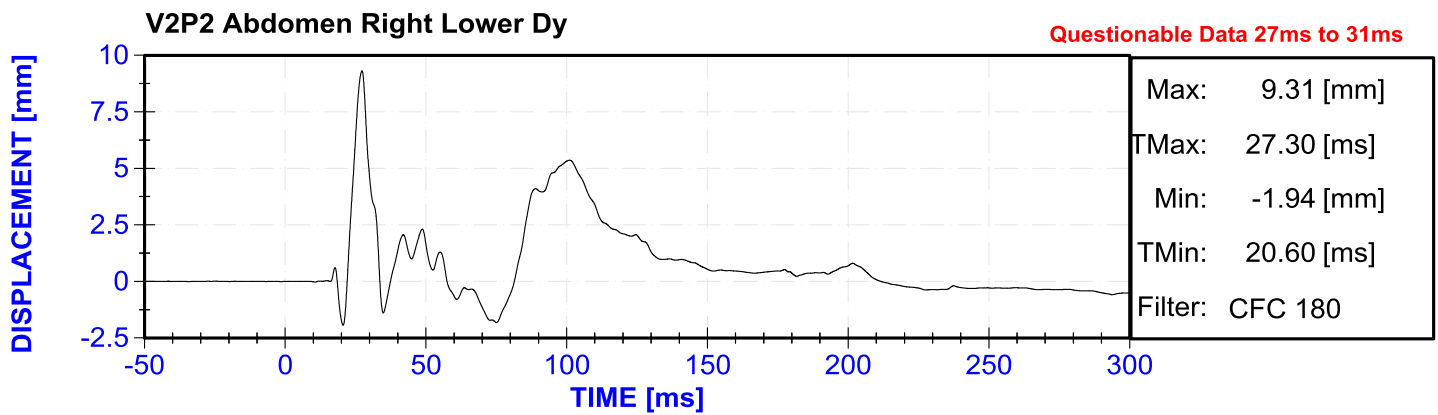
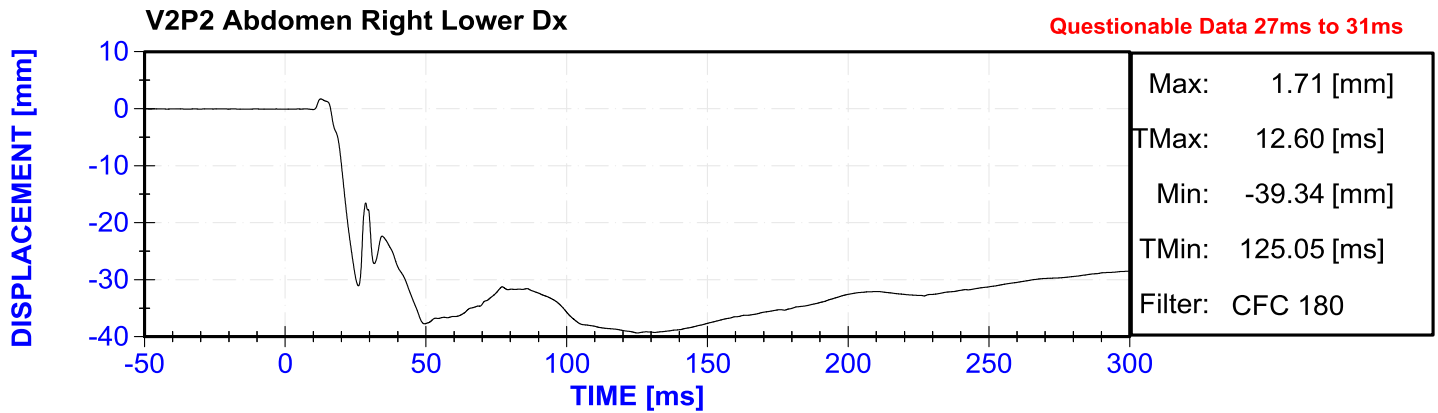












APPENDIX C

DUMMY CALIBRATION DATA

Table C-1: Dummy Information

TYPE	SERIAL NUMBER
THOR 50 TH Male	015
THOR 50 TH Male	016

Table C-2: THOR Ankle Zero Offset Information

THOR 50 th Male S/N: 015					
LFTX Left Ankle X	LFTY Left Ankle Y	LFTZ Left Ankle Z	RFTX Right Ankle X	RFTY Right Ankle Y	RFTZ Right Ankle Z
0.00893 deg	-15.7295 deg	-49.551 deg	-2.40521 deg	-12.1317 deg	-88.5479 deg
THOR 50 th Male S/N: 016					
LFTX Left Ankle X	LFTY Left Ankle Y	LFTZ Left Ankle Z	RFTX Right Ankle X	RFTY Right Ankle Y	RFTZ Right Ankle Z
2.16286 deg	-16.3445 deg	-44.58 deg	-3.53702 deg	-15.8108 deg	-46.565 deg

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

THOR 50 th Male S/N: 015					
Sensor	Manufacturer	Serial Number	Range	Sensitivity	Sensitivity Units
Head CG Ax	Endevco	AC-P63993	2000	0.020850001	mV/V/g
Head CG Ay	Endevco	AC-P51641	2000	0.019360001	mV/V/g
Head CG Az	Endevco	AC-P52011	2000	0.019339999	mV/V/g
Head Wx	DTS	ARS-5921	18000	0.094919997	mV/deg/sec
Head Wy	DTS	ARS-6120	18000	0.093950002	mV/deg/sec
Head Wz	DTS	ARS-6640	18000	0.094540002	mV/deg/sec
Upper Neck Fx	Humanetics	LC-76Fx	8896.4	0.000231699	mV/V/N
Upper Neck Fy	Humanetics	LC-76Fy	8896.4	0.000234116	mV/V/N
Upper Neck Fz	Humanetics	LC-76Fz	13344.7	8.84E-05	mV/V/N
Upper Neck Mx	Humanetics	LC-76Mx	282.5	0.005946997	mV/V/Nm
Upper Neck My	Humanetics	LC-76My	282.5	0.005957618	mV/V/Nm
Upper Neck Mz	Humanetics	LC-76Mz	282.5	0.009966654	mV/V/Nm
Lower Neck Fx	Humanetics	LC-DM4552Fx	13344.7	0.00017042	mV/V/N
Lower Neck Fy	Humanetics	LC-DM4552Fy	13344.7	0.000169911	mV/V/N
Lower Neck Fz	Humanetics	LC-DM4552Fz	13344.7	7.10E-05	mV/V/N
Lower Neck Mx	Humanetics	LC-DM4552Mx	451.9	0.004082851	mV/V/Nm
Lower Neck My	Humanetics	LC-DM4552My	451.9	0.004110952	mV/V/Nm
Lower Neck Mz	Humanetics	LC-DM4552Mz	226	0.006743385	mV/V/Nm
Skull Spring Front Fz	Humanetics	LC-DI7617 Fz	4448.2	0.000498224	mV/V/N
Skull Spring Rear Fz	Humanetics	LC-80 Fz	4448.2	0.000868662	mV/V/N
Condyle Pot Ry	Sfernice	LC-DI7189	180	3.035299946	mV/V/deg
T1 Ax	Endevco	AC-P80336	2000	0.016559999	mV/V/g
T1 Ay	Endevco	AC-P80338	2000	0.01672	mV/V/g
T1 Az	Endevco	AC-P72696	2000	0.02044	mV/V/g

THOR 50 th Male (Continued) S/N: 015					
Sensor	Manufacturer	Serial Number	Range	Sensitivity	Sensitivity Units
T4 Ax	Endevco	AC-P80288	2000	0.020150001	mV/V/g
T4 Ay	Endevco	AC-P82328	2000	0.018279999	mV/V/g
T4 Az	Endevco	AC-P78985	2000	0.01835	mV/V/g
Thoracic Spine Fx	Denton	LC-92Fx	13344.7	0.000137193	mV/V/N
Thoracic Spine Fy	Denton	LC-92Fy	13344.7	0.000137958	mV/V/N
Thoracic Spine Fz	Denton	LC-92Fz	17792.9	5.26E-05	mV/V/N
Thoracic Spine Mx	Denton	LC-92Mx	677.9	0.002160616	mV/V/Nm
Thoracic Spine My	Denton	LC-92My	903.9	0.001779222	mV/V/Nm
Upper Left Thorax Dx	Humanetics	DS-DP1394	160 mm	Non-linear Scale	
Upper Left Thorax Ry	Sfernice	DS-DO7273	180	3.04979994	mV/V/deg
Upper Left Thorax Rz	Sfernice	DS-DP3884	180	3.048900049	mV/V/deg
Upper Right Thorax Dx	Humanetics	DS-DP1387	160 mm	Non-linear Scale	
Upper Right Thorax Ry	Sfernice	DS-DO7282	180	3.034099936	mV/V/deg
Upper Right Thorax Rz	Sfernice	DS-DO7285	180	3.021700075	mV/V/deg
Lower Left Thorax Dx	Humanetics	DS-DM1151	160 mm	Non-linear Scale	
Lower Left Thorax Ry	Sfernice	DS-DI2386	180	2.952900017	mV/V/deg
Lower Left Thorax Rz	Sfernice	DS-DI6129	180	3.087900113	mV/V/deg
Lower Right Thorax Dx	Humanetics	DS-DI4717	160 mm	Non-linear Scale	
Lower Right Thorax Ry	Sfernice	DS-DI2385	180	2.602899913	mV/V/deg
Lower Right Thorax Rz	Sfernice	DS-DO7286	180	3.08299996	mV/V/deg
Abdomen Left Dx	Humanetics	DS-DJ5441	192 mm	Non-linear Scale	
Abdomen Left Ry	Sfernice	DS-VR31	150	3.035200061	mV/V/deg
Abdomen Left Rz	Sfernice	DS-VR30	150	3.023399971	mV/V/deg
Abdomen Right Dx	Humanetics	DS-DI4778	192 mm	Non-linear Scale	
Abdomen Right Ry	Sfernice	DS-DI7754	150	3.015900031	mV/V/deg
Abdomen Right Rz	Sfernice	DS-DI7902	150	3.029200016	mV/V/deg
Pelvis Ax	Endevco	AC-P52130	2000	0.017099999	mV/V/g
Pelvis Ay	Endevco	AC-P51678	2000	0.020879999	mV/V/g
Pelvis Az	Endevco	AC-P63840	2000	0.0222	mV/V/g
Acetabulum Left Fx	Humanetics	LC-DM5055Fx	22241.1	0.000121887	mV/V/N
Acetabulum Left Fy	Humanetics	LC-DM5055Fy	13344.7	5.93E-05	mV/V/N
Acetabulum Left Fz	Humanetics	LC-DM5055Fz	13344.7	0.000163534	mV/V/N
Acetabulum Right Fx	Denton	LC-87Fx	22241.1	0.000124068	mV/V/N
Acetabulum Right Fy	Denton	LC-87Fy	13344.7	6.08E-05	mV/V/N
Acetabulum Right Fz	Denton	LC-87Fz	13344.7	0.000167363	mV/V/N
ASIS Left Fx	Humanetics	LC-DI4774 Fx	13000	6.84E-05	mV/V/N
ASIS Left My	Humanetics	LC-DI4774 My	325	0.003740923	mV/V/Nm
ASIS Right Fx	Humanetics	LC-DI4775 Fx	13000	6.77E-05	mV/V/N
ASIS Right My	Humanetics	LC-DI4775 My	325	0.003728923	mV/V/Nm
Femur Left Fx	Humanetics	LC-DT1833Fx	15000	0.000146287	mV/V/N
Femur Left Fy	Humanetics	LC-DT1833Fy	15000	0.000145733	mV/V/N
Femur Left Fz	Humanetics	LC-DT1833Fz	15000	7.36E-05	mV/V/N
Femur Left Mx	Humanetics	LC-DT1833Mx	350	0.006617429	mV/V/Nm
Femur Left My	Humanetics	LC-DT1833My	350	0.006614857	mV/V/Nm
Femur Right Fx	Humanetics	LC-DT1830Fx	15000	0.00014712	mV/V/N
Femur Right Fy	Humanetics	LC-DT1830Fy	15000	0.000147193	mV/V/N
Femur Right Fz	Humanetics	LC-DT1830Fz	15000	7.29E-05	mV/V/N
Femur Right Mx	Humanetics	LC-DT1830Mx	350	0.006648857	mV/V/Nm

THOR 50 th Male (Continued) S/N: 015					
Sensor	Manufacturer	Serial Number	Range	Sensitivity	Sensitivity Units
Femur Right My	Humanetics	LC-DT1830My	350	0.006598	mV/V/Nm
Knee Dx	Space Age	DS-D2103665B	33	23.88590015	mv/v/mm
Upper Tibia Fz	Denton	LC-DS8145 Fz	11120	9.56E-05	mv/v/N
Upper Tibia Mx	Denton	LC-DS8145 Mx	395	0.0074603	mv/v/Nm
Upper Tibia My	Denton	LC-DS8145 My	395	0.0074283	mv/v/Nm
Lower Tibia Fx	Denton	LC-78 Fx	11100	0.0001747	mv/v/N
Lower Tibia Fy	Denton	LC-78 Fy	11100	0.0001706	mv/v/N
Lower Tibia Fz	Denton	LC-78 Fz	11100	9.64E-05	mv/v/N
Lower Tibia Mx	Denton	LC-78 Mx	395	0.0074895	mv/v/Nm
Lower Tibia My	Denton	LC-78 My	395	0.007513	mv/v/Nm
Leg Ax	Endevco	AC-P74940	2000	0.016620001	mv/v/g
Leg Ay	Endevco	AC-P51732	2000	0.01896	mv/v/g
Ankle Rx	Contelec	DS-0382	180	3.178999992	mv/v/deg
Ankle Ry	Contelec	DS-0386	180	3.176100086	mv/v/deg
Ankle Rz	Contelec	DS-0543	180	3.198399907	mv/v/deg
Foot Ax	Endevco	AC-P68071	2000	0.02365	mv/v/g
Foot Az	Endevco	AC-P51294	2000	0.02195	mv/v/g
Knee Dx	Space Age	DS-D2103657B	30	24.01199937	mv/v/mm
Upper Tibia Fz	Denton	LC-DS8144 Fz	11120	9.63E-05	mv/v/N
Upper Tibia Mx	Denton	LC-DS8144 Mx	395	0.0074676	mv/v/Nm
Upper Tibia My	Denton	LC-DS8144 My	395	0.0074022	mv/v/Nm
Lower Tibia Fx	Denton	LC-77 Fx	11100	0.0001737	mv/v/N
Lower Tibia Fy	Denton	LC-77 Fy	11100	0.0001715	mv/v/N
Lower Tibia Fz	Denton	LC-77 Fz	11100	9.61E-05	mv/v/N
Lower Tibia Mx	Denton	LC-77 Mx	395	0.0074698	mv/v/Nm
Lower Tibia My	Denton	LC-77 My	395	0.0073378	mv/v/Nm
Leg Ax	Endevco	AC-P79622	2000	0.02118	mv/v/g
Leg Ay	Endevco	AC-P83316	2000	0.01946	mv/v/g
Ankle Rx	Contelec	DS-0385	180	3.178199986	mv/v/deg
Ankle Ry	Contelec	DS-0383	180	3.153099911	mv/v/deg
Ankle Rz	Contelec	DS-0401	180	3.186699934	mv/v/deg
Foot Ax	Endevco	AC-P72691	2000	0.02014	mv/v/g
Foot Az	Endevco	AC-P83310	2000	0.01946	mv/v/g

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

THOR 50 th Male S/N: 016					
Sensor	Manufacturer	Serial Number	Range	Sensitivity	Sensitivity Units
Head CG Ax	Endevco	AC-P81382	2000	0.01759	mV/V/g
Head CG Ay	Endevco	AC-P80275	2000	0.020490001	mV/V/g
Head CG Az	Endevco	AC-P74947	2000	0.016690001	mV/V/g
Head Wx	DTS	ARS-6629	18000	0.094080002	mV/deg/sec
Head Wy	DTS	ARS-4735	18000	0.095700001	mV/deg/sec

THOR 50 th Male (Continued) S/N: 016					
Sensor	Manufacturer	Serial Number	Range	Sensitivity	Sensitivity Units
Head Wz	DTS	ARS-4069	18000	0.09311	mV/deg/sec
Upper Neck Fx	Humanetics	LC-75Fx	8896.4	0.000228159	mV/V/N
Upper Neck Fy	Humanetics	LC-75Fy	8896.4	0.000229418	mV/V/N
Upper Neck Fz	Humanetics	LC-75Fz	13344.7	8.76E-05	mV/V/N
Upper Neck Mx	Humanetics	LC-75Mx	282.5	0.005912656	mV/V/Nm
Upper Neck My	Humanetics	LC-75My	282.5	0.005966114	mV/V/Nm
Upper Neck Mz	Humanetics	LC-75Mz	282.5	0.009657586	mV/V/Nm
Lower Neck Fx	Humanetics	LC-79Fx	13344.7	0.000168262	mV/V/N
Lower Neck Fy	Humanetics	LC-79Fy	13344.7	0.000168472	mV/V/N
Lower Neck Fz	Humanetics	LC-79Fz	13344.7	7.02E-05	mV/V/N
Lower Neck Mx	Humanetics	LC-79Mx	451.9	0.003947435	mV/V/Nm
Lower Neck My	Humanetics	LC-79My	451.9	0.00396934	mV/V/Nm
Lower Neck Mz	Humanetics	LC-79Mz	226	0.006685855	mV/V/Nm
Skull Spring Front Fz	Humanetics	LC-130 Fz	4448.2	0.000493186	mV/V/N
Skull Spring Rear Fz	Humanetics	LC-DM2829Fz	4448.2	0.000514633	mV/V/N
Condyle Pot Ry	Sfernice	DS-0007	180	3.052179934	mV/V/deg
T1 Ax	Endevco	AC-P74948	2000	0.01686	mV/V/g
T1 Ay	Endevco	AC-P83429	2000	0.018139999	mV/V/g
T1 Az	Endevco	AC-P83430	2000	0.0177	mV/V/g
T4 Ax	Endevco	AC-P80268	2000	0.020920001	mV/V/g
T4 Ay	Endevco	AC-P81791	2000	0.01917	mV/V/g
T4 Az	Endevco	AC-P80269	2000	0.021170001	mV/V/g
Thoracic Spine Fx	Denton	LC-123Fx	13344.7	0.000139239	mV/V/N
Thoracic Spine Fy	Denton	LC-123Fy	13344.7	0.000140453	mV/V/N
Thoracic Spine Fz	Denton	LC-123Fz	17792.9	5.33E-05	mV/V/N
Thoracic Spine Mx	Denton	LC-123Mx	677.9	0.002083467	mV/V/Nm
Thoracic Spine My	Denton	LC-123My	903.9	0.001837305	mV/V/Nm
Upper Left Thorax Dx	Humanetics	DS-DS6356	160 mm	Non-linear Scale	
Upper Left Thorax Ry	Sfernice	DS-DJ4106	180	3.059499897	mV/V/deg
Upper Left Thorax Rz	Sfernice	DS-DJ4108	180	3.046100028	mV/V/deg
Upper Right Thorax Dx	Humanetics	DS-DM3232	160 mm	Non-linear Scale	
Upper Right Thorax Ry	Sfernice	DS-DI2381	180	3.058299888	mV/V/deg
Upper Right Thorax Rz	Sfernice	DS-DI2380	180	3.06040002	mV/V/deg
Lower Left Thorax Dx	Humanetics	DS-DP1389	160 mm	Non-linear Scale	
Lower Left Thorax Ry	Sfernice	DS-DP1972	180	3.044900019	mV/V/deg
Lower Left Thorax Rz	Sfernice	DS-DO7288	180	3.039200092	mV/V/deg
Lower Right Thorax Dx	Humanetics	DS-DP1393	160 mm	Non-linear Scale	
Lower Right Thorax Ry	Sfernice	DS-DO7275	180	3.038000083	mV/V/deg
Lower Right Thorax Rz	Sfernice	DS-DO7276	180	3.021999961	mV/V/deg
Abdomen Left Dx	Humanetics	DS-DJ5440	192 mm	Non-linear Scale	
Abdomen Left Ry	Sfernice	DS-DI7755	150	3.025599988	mV/V/deg
Abdomen Left Rz	Sfernice	DS-DI7901	150	3.057899885	mV/V/deg
Abdomen Right Dx	Humanetics	DS-DQ2304	192 mm	Non-linear Scale	
Abdomen Right Ry	Sfernice	DS-218	150	3.012799891	mV/V/deg
Abdomen Right Rz	Sfernice	DS-DI6580	150	2.744599944	mV/V/deg
Pelvis Ax	Endevco	AC-P82402	2000	0.01788	mV/V/g
Pelvis Ay	Endevco	AC-P82403	2000	0.01799	mV/V/g
Pelvis Az	Endevco	AC-P82332	2000	0.01715	mV/V/g

THOR 50 th Male (Continued) S/N: 016					
Sensor	Manufacturer	Serial Number	Range	Sensitivity	Sensitivity Units
Acetabulum Left Fx	Humanetics	LC-83Fx	22241.1	0.000120471	mV/V/N
Acetabulum Left Fy	Humanetics	LC-83Fy	13344.7	5.91E-05	mV/V/N
Acetabulum Left Fz	Humanetics	LC-83Fz	13344.7	0.000162964	mV/V/N
Acetabulum Right Fx	Denton	LC-84Fx	22241.1	0.000122579	mV/V/N
Acetabulum Right Fy	Denton	LC-84Fy	13344.7	5.82E-05	mV/V/N
Acetabulum Right Fz	Denton	LC-84Fz	13344.7	0.000165272	mV/V/N
ASIS Left Fx	Humanetics	LC-DT1000Fx	13000	6.88E-05	mV/V/N
ASIS Left My	Humanetics	LC-DT1000My	325	0.003827634	mV/V/Nm
ASIS Right Fx	Humanetics	LC-DT1001Fx	13000	6.94E-05	mV/V/N
ASIS Right My	Humanetics	LC-DT1001My	325	0.003849914	mV/V/Nm
Femur Left Fx	Humanetics	LC-DP4630Fx	15000	0.000142	mV/V/N
Femur Left Fy	Humanetics	LC-DP4630Fy	15000	0.0001419	mV/V/N
Femur Left Fz	Humanetics	LC-DP4630Fz	15000	7.16E-05	mV/V/N
Femur Left Mx	Humanetics	LC-DP4630Mx	350	0.0064409	mV/V/Nm
Femur Left My	Humanetics	LC-DP4630My	350	0.0064306	mV/V/Nm
Femur Right Fx	Humanetics	LC-DP3959Fx	15000	0.000142	mV/V/N
Femur Right Fy	Humanetics	LC-DP3959Fy	15000	0.0001422	mV/V/N
Femur Right Fz	Humanetics	LC-DP3959Fz	15000	7.24E-05	mV/V/N
Femur Right Mx	Humanetics	LC-DP3959Mx	350	0.006592	mV/V/Nm
Femur Right My	Humanetics	LC-DP3959My	350	0.0064729	mV/V/Nm
Knee Dx	Space Age	DS-017169	33	22.93870039	mv/v/mm
Upper Tibia Fz	Denton	LC-95 Fz	11120	9.60E-05	mv/v/N
Upper Tibia Mx	Denton	LC-95 Mx	395	0.0074226	mv/v/Nm
Upper Tibia My	Denton	LC-95 My	395	0.0073786	mv/v/Nm
Lower Tibia Fx	Denton	LC-139 Fx	11100	0.00017407	mv/v/N
Lower Tibia Fy	Denton	LC-139 Fy	11100	0.00017491	mv/v/N
Lower Tibia Fz	Denton	LC-139 Fz	11100	9.63E-05	mv/v/N
Lower Tibia Mx	Denton	LC-139 Mx	395	0.0074679	mv/v/Nm
Lower Tibia My	Denton	LC-139 My	395	0.007503	mv/v/Nm
Leg Ax	Endevco	AC-P67924	2000	0.02107	mv/v/g
Leg Ay	Endevco	AC-P51711	2000	0.01915	mv/v/g
Ankle Rx	Contelec	DS-0544	180	3.173100064	mv/v/deg
Ankle Ry	Contelec	DS-0527	180	3.160400083	mv/v/deg
Ankle Rz	Contelec	DS-0541	180	3.15340003	mv/v/deg
Foot Ax	Endevco	AC-P63979	2000	0.020310001	mv/v/g
Foot Az	Endevco	AC-P82182	2000	0.018090001	mv/v/g
Knee Dx	Space Age	DS-12070382	30	24.1260007	mv/v/mm
Upper Tibia Fz	Denton	LC-88 Fz	11120	9.33E-05	mv/v/N
Upper Tibia Mx	Denton	LC-88 Mx	395	0.0072837	mv/v/Nm
Upper Tibia My	Denton	LC-88 My	395	0.0071822	mv/v/Nm
Lower Tibia Fx	Denton	LC-140 Fx	11100	0.0001784	mv/v/N
Lower Tibia Fy	Denton	LC-140 Fy	11100	0.0001764	mv/v/N
Lower Tibia Fz	Denton	LC-140 Fz	11100	9.65E-05	mv/v/N
Lower Tibia Mx	Denton	LC-140 Mx	395	0.0076118	mv/v/Nm
Lower Tibia My	Denton	LC-140 My	395	0.0076405	mv/v/Nm
Leg Ax	Endevco	AC-P50100	2000	0.017660001	mv/v/g

THOR 50 th Male (Continued) S/N: 016					
Sensor	Manufacturer	Serial Number	Range	Sensitivity	Sensitivity Units
Leg Ay	Endevco	AC-P80922	2000	0.018160001	mv/v/g
Ankle Rx	Contelec	DS-0254	180	3.179399995	mv/v/deg
Ankle Ry	Contelec	DS-0525-1	180	3.179399995	mv/v/deg
Ankle Rz	Contelec	DS-0256	180	3.160899971	mv/v/deg
Foot Ax	Endevco	AC-P58836	2000	0.01903	mv/v/g
Foot Az	Endevco	AC-P72351	2000	0.021059999	mv/v/g

Table 4 – THOR IR-TRACC Polarity

In order to reduce the risk of damage to instrumentation, it is recommended that the 3D IR-TRACC units are not disconnected from the rib cage to conduct the polarity test. An alternate procedure for checking the IR-TRACC polarity is described below.

1. Using the data acquisition system control software, open a live view of each channel. If possible, view the DX, RY, and RZ components of a given quadrant simultaneously.
2. Record the initial reading of each channel
3. Perform the following motions on each of the four rib attachment locations and two abdomen attachment locations (specified by the hexagonal bolt attaching the blue ribs).
 - a. DX: Push inward (front-to-back). The IR-TRACC tube voltage should increase.
 - b. RY: Push downward (head-to-pelvis). The Y-axis potentiometer reading should decrease.
 - c. RZ: Push rightward (left-to-right). The Z-axis potentiometer should increase.
4. Record the final reading of each channel
5. If the “Measured” value (increase or decrease) does not match the “Expected” value, the polarity of the channel must be inverted.

THOR 50th Male 015

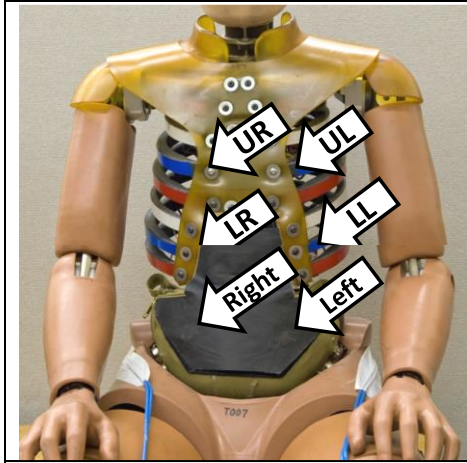


Figure 1. Manipulation to determine thoracic and abdominal IR-TRACC polarity.

Channel	Motion
DX	Push inward
RY	Push upward
RZ	Push rightward

Upper Right Thorax				Upper Left Thorax			
Channel	Initial Value	Expected Polarity	Recorded Polarity	Channel	Initial Value	Expected Polarity	Recorded Polarity
DX (V)	0.11203	+	+	DX (V)	0.10139	+	+
RY (Deg)	10.5792	+	+	RY (Deg)	11.7954	+	+
RZ (Deg)	-12.961	+	+	RZ (Deg)	13.0209	+	+
Lower Right Thorax				Lower Left Thorax			
Channel	Initial Value	Expected Polarity	Recorded Polarity	Channel	Initial Value	Expected Polarity	Recorded Polarity
DX (V)	0.09578	+	+	DX (V)	0.08445	+	+
RY (Deg)	-3.4367	+	+	RY (Deg)	-2.3055	+	+
RZ (Deg)	-5.1227	+	+	RZ (Deg)	5.23523	+	+
Abdomen Right				Abdomen Left			
Channel	Initial Value	Expected Polarity	Recorded Polarity	Channel	Initial Value	Expected Polarity	Recorded Polarity
DX (V)	0.06672	+	+	DX (V)	0.06328	+	+
RY (Deg)	2.86058	+	+	RY (Deg)	1.87899	+	+
RZ (Deg)	-0.8069	+	+	RZ (Deg)	1.53933	+	+

THOR 50th Male 016

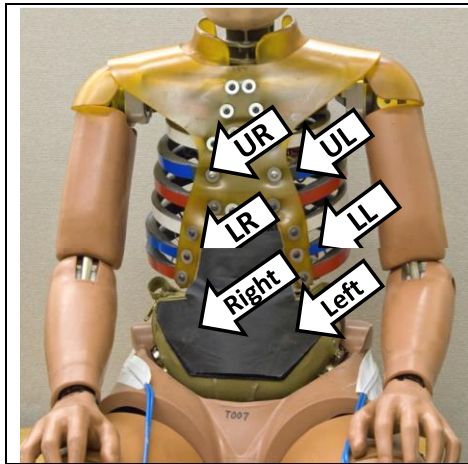


Figure 2. Manipulation to determine thoracic and abdominal IR-TRACC polarity.

Channel	Motion
DX	Push inward
RY	Push upward
RZ	Push rightward

Upper Right Thorax				Upper Left Thorax			
Channel	Initial Value	Expected Polarity	Recorded Polarity	Channel	Initial Value	Expected Polarity	Recorded Polarity
DX (V)	0.08380	+	+	DX (V)	0.85751	+	+
RY (Deg)	10.0137	+	+	RY (Deg)	4.55342	+	+
RZ (Deg)	-11.962	+	+	RZ (Deg)	11.7694	+	+
Lower Right Thorax				Lower Left Thorax			
Channel	Initial Value	Expected Polarity	Recorded Polarity	Channel	Initial Value	Expected Polarity	Recorded Polarity
DX (V)	0.08025	+	+	DX (V)	0.08125	+	+
RY (Deg)	-6.1346	+	+	RY (Deg)	-4.0026	+	+
RZ (Deg)	-2.2819	+	+	RZ (Deg)	7.84761	+	+
Abdomen Right				Abdomen Left			
Channel	Initial Value	Expected Polarity	Recorded Polarity	Channel	Initial Value	Expected Polarity	Recorded Polarity
DX (V)	0.07470	+	+	DX (V)	0.07571	+	+
RY (Deg)	3.52947	+	+	RY (Deg)	3.10074	+	+
RZ (Deg)	1.27844	+	+	RZ (Deg)	5.10226	+	+

Test Data/Sensor Repair Notes

THOR Inspection Checklist

Date: 7/27/2015		
NHTSA Representative: James Saunders		
Inspection Reporter: Mike Hartung		
Inspection type (check one): ☒ Pre-Test ☐ Post-Test		
Dummy S/N: 0015	Legs S/N: LX0038/LX0039	
Dummy Description: THOR-M 50 th Male		
Date of last Certification: TBD		
<u>Tests conducted:</u> <u>Since last inspection:</u> None <u>Since last certification:</u> None		
<u>Known errors in data channels (no data, clipping, unexpected drops):</u> None		
<u>Physical evidence of damage:</u> Abdomen Bag tears, zipper tearing right forearm, zipper tear on left forearm.		
<u>Anecdotal evidence of damage:</u> None		
<u>Equipment delivered to Borrower:</u> THOR 0015 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 Multiple tears and broken stitches in lower abdomen bag.

		
Y / N	Lower abdomen insert securely attached to spine	
Y / N	Lower abdomen insert shows no evidence of permanent set	
OTHER	Torn zippers/flesh on L & R forearms. 	
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	
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: 9/14/2015		
NHTSA Representative: James Saunders		
Inspection Reporter: Mike Hartung		
Inspection type (check one): ☐ Pre-Test ☒ Post-Test		
Dummy S/N: 0015	Legs S/N: LX0038/LX0039	
Dummy Description: THOR-M 50 th Male		
Date of last Certification: July 2015		
<u>Tests conducted:</u> <u>Since last inspection:</u> R20155509- Forester <u>Since last certification:</u> R20155509- Forester		
<u>Known errors in data channels (no data, clipping, unexpected drops):</u> - Tibia Left X Acceleration, Questionable spike at 81ms, SN:AC-P74940 - Tibia Left Y Acceleration, Questionable spike at 18.7ms and 81ms, SN:AC-P51732 - Both accelerometers check out fine. A grounding issue is the suspected cause.		
<u>Physical evidence of damage:</u> Zipper detaching left and right calf.		
<u>Anecdotal evidence of damage:</u> None		
<u>Equipment delivered to Borrower:</u> THOR 0015 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	

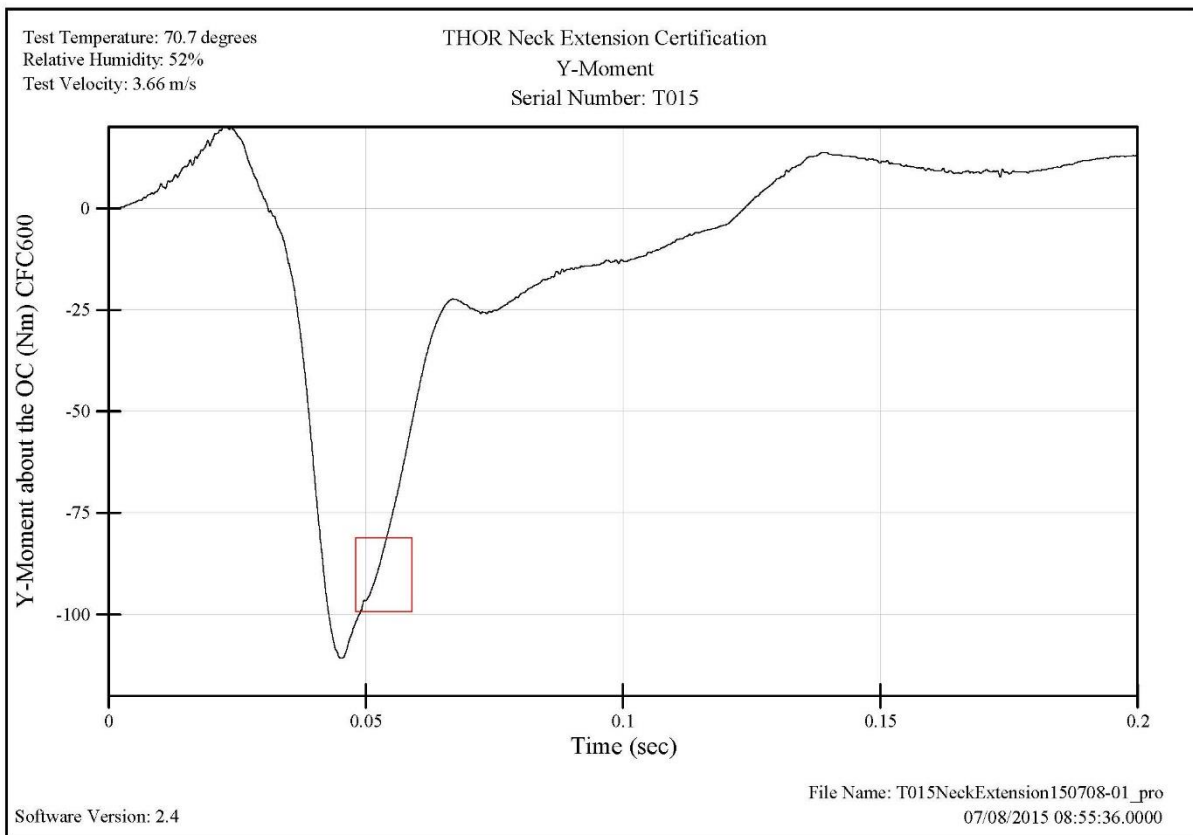
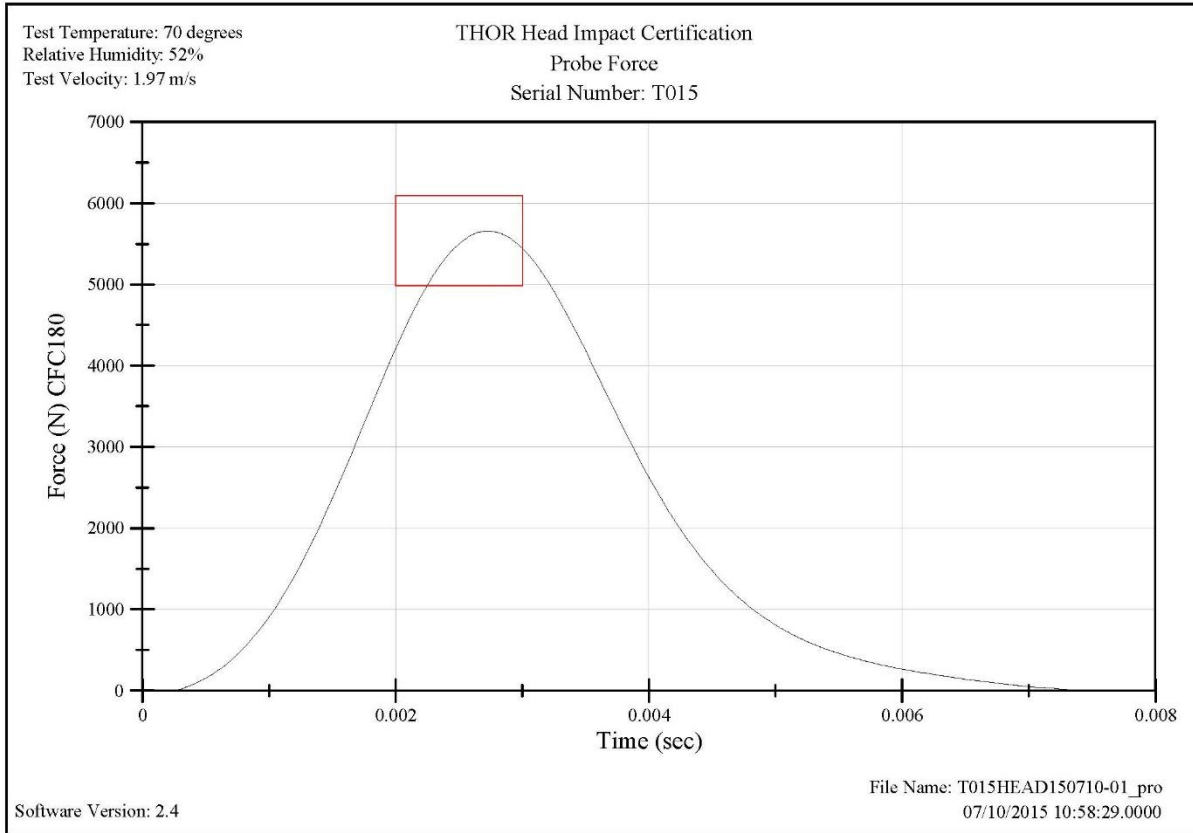
Note: New Damage is Noted in Red

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 Multiple tears and broken stitches in lower abdomen bag.

		
Y / N	Lower abdomen insert securely attached to spine	
Y / N	Lower abdomen insert shows no evidence of permanent set	
OTHER	Zippers detaching on left and right calves. Torn zippers/flesh on L & R forearms.	
		
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	
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		

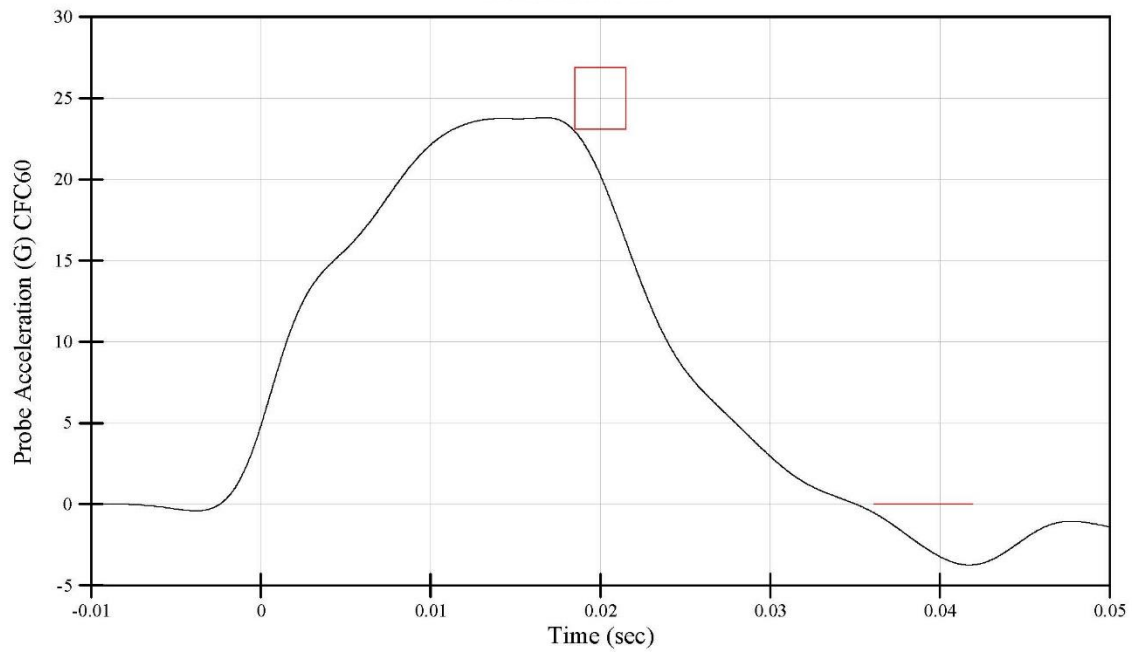
DUMMY CALIBRATIONS

50% ADULT MALE THOR015 DUMMY CALIBRATIONS



Test Temperature: 70.7 degrees
Relative Humidity: 52%
Test Velocity: 3.66 m/s

THOR Neck Extension Certification
Probe Acceleration
Serial Number: T015

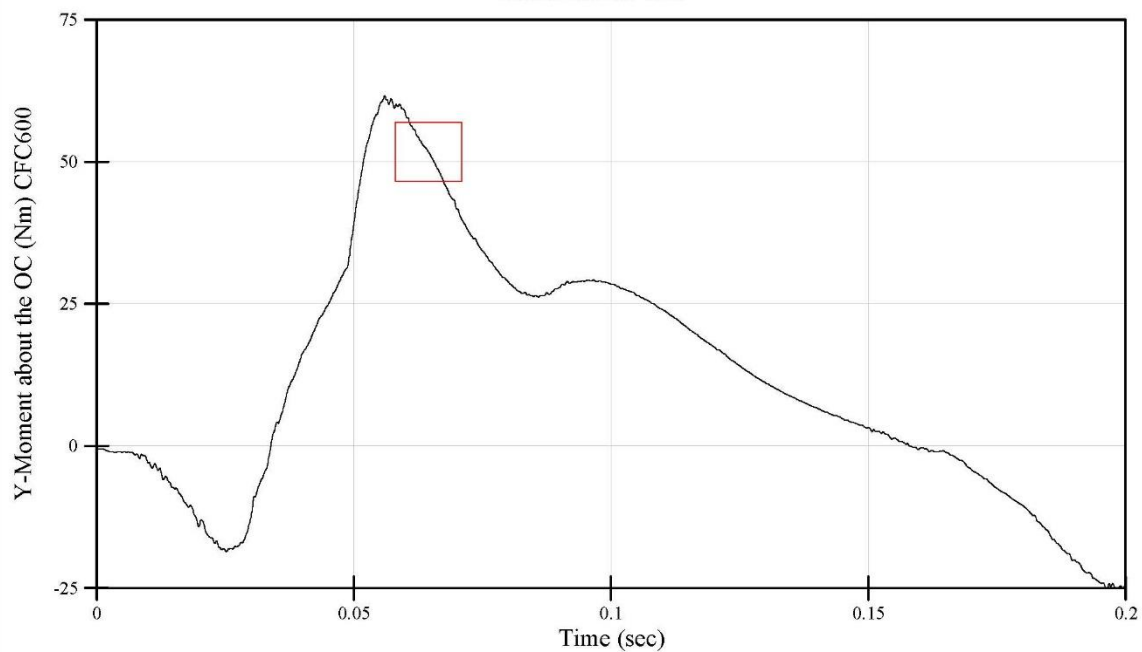


Software Version: 2.4

File Name: T015NeckExtension150708-01_pro
07/08/2015 08:55:36.0000

Test Temperature: 69.6 degrees
Relative Humidity: 51%
Test Velocity: 3.78 m/s

THOR Neck Flexion Certification
Y-Moment
Serial Number: T015

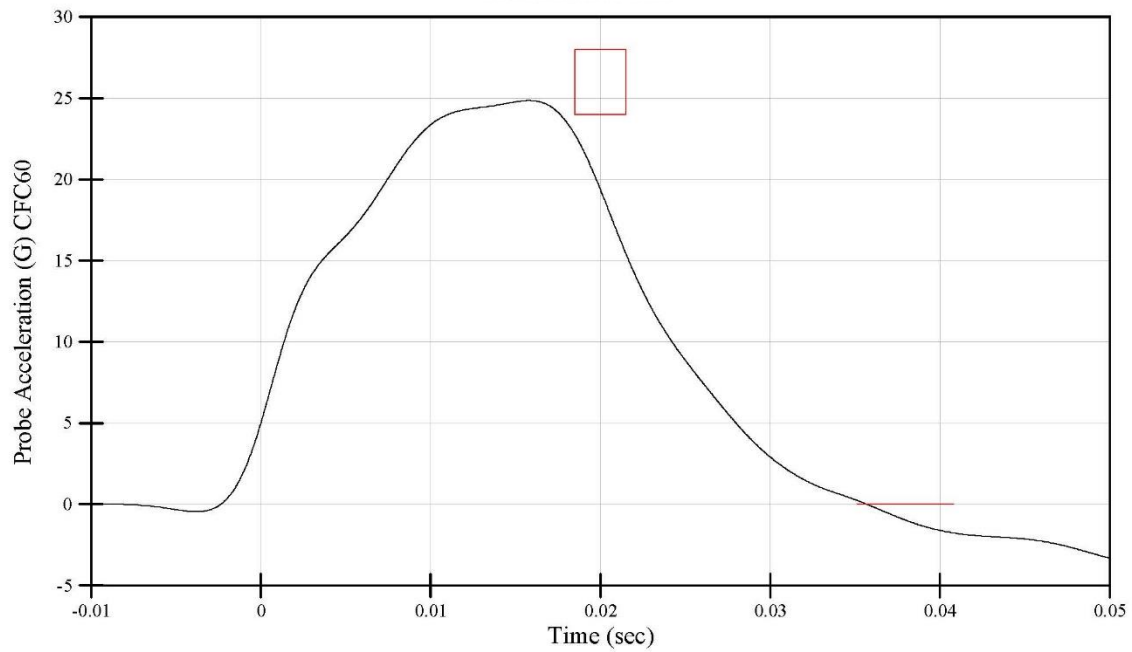


Software Version: 2.4

File Name: T015NeckFlexion150708-02_pro
07/08/2015 08:24:32.0000

Test Temperature: 69.6 degrees
Relative Humidity: 51%
Test Velocity: 3.78 m/s

THOR Neck Flexion Certification
Probe Acceleration
Serial Number: T015

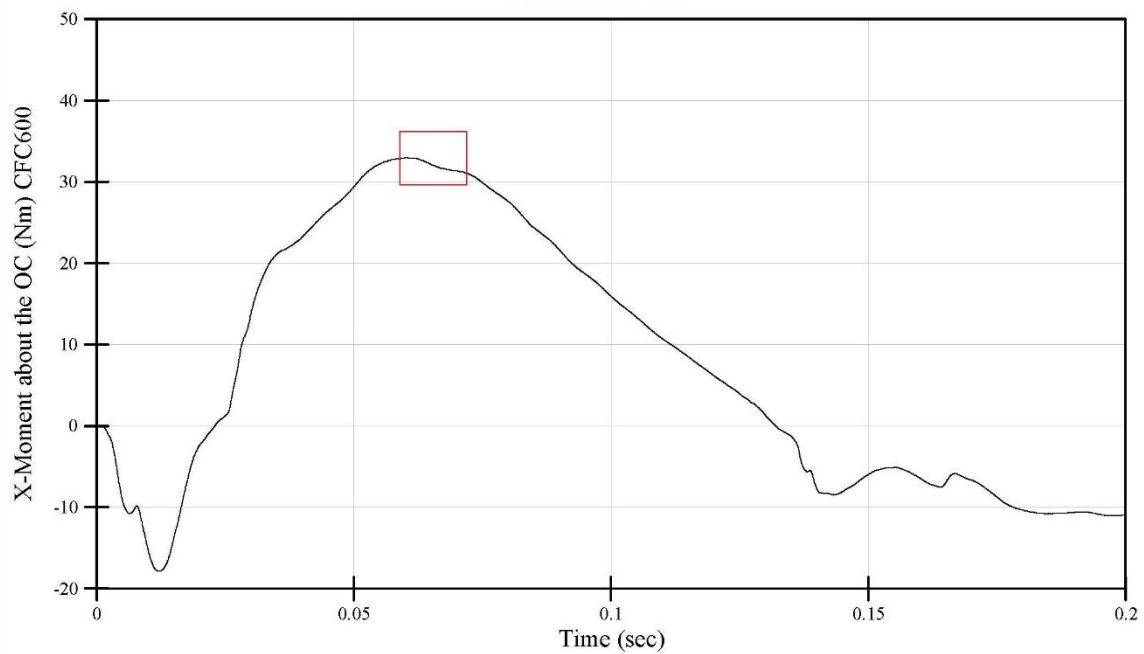


Software Version: 2.4

File Name: T015NeckFlexion150708-02_pro
07/08/2015 08:24:32.0000

Test Temperature: 70.5 degrees
Relative Humidity: 51%
Test Velocity: 2.86 m/s

THOR Neck Left Lateral Flexion Certification
X-Moment
Serial Number: T015



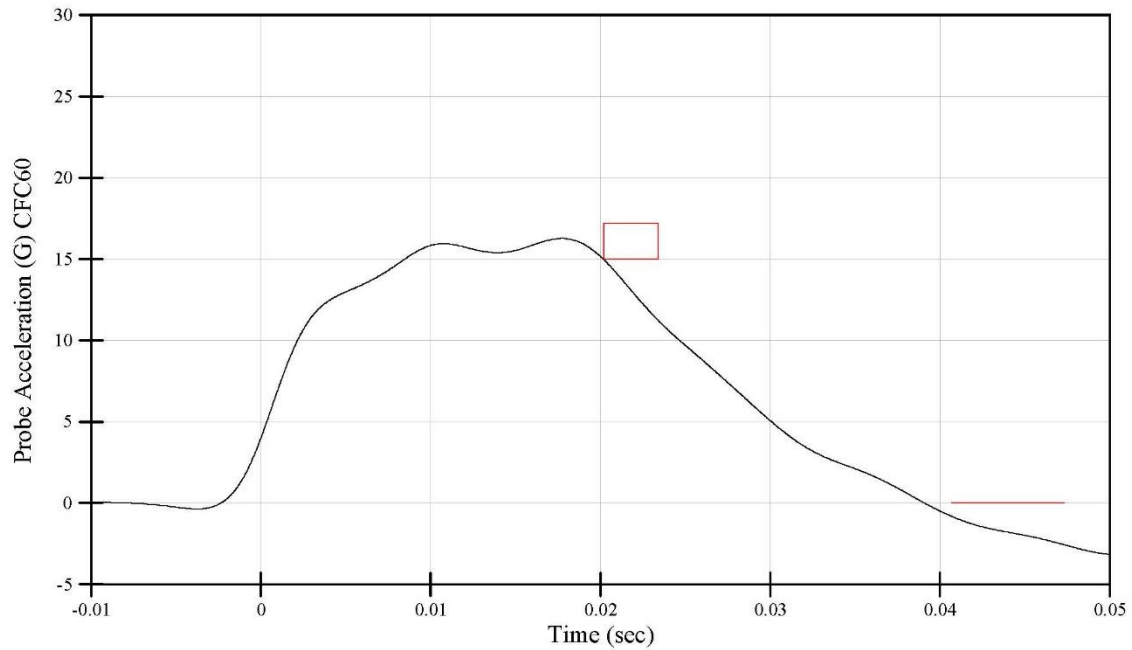
Software Version: 2.4

File Name: T015NeckLeft150708-01_pro
07/08/2015 09:59:03.0000

Test Temperature: 70.5 degrees
Relative Humidity: 51%
Test Velocity: 2.86 m/s

THOR Neck Left Lateral Flexion Certification

Probe Acceleration
Serial Number: T015



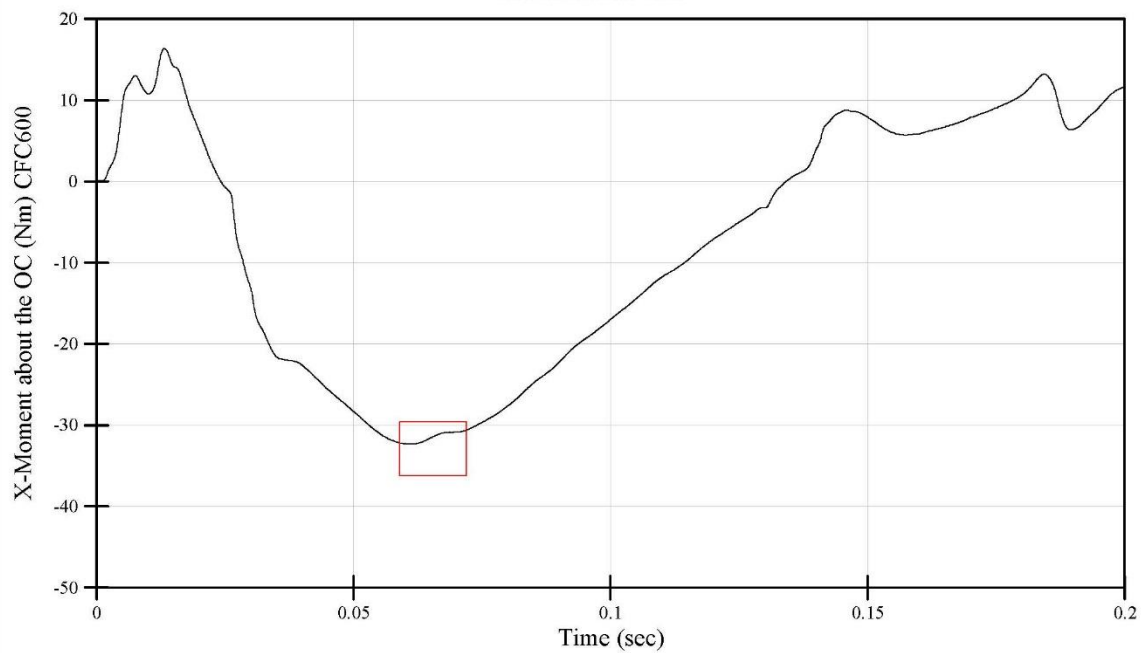
Software Version: 2.4

File Name: T015NeckLeft150708-01_pro
07/08/2015 09:59:03.0000

Test Temperature: 70.3 degrees
Relative Humidity: 52%
Test Velocity: 2.87 m/s

THOR Neck Right Lateral Flexion Certification

X-Moment
Serial Number: T015



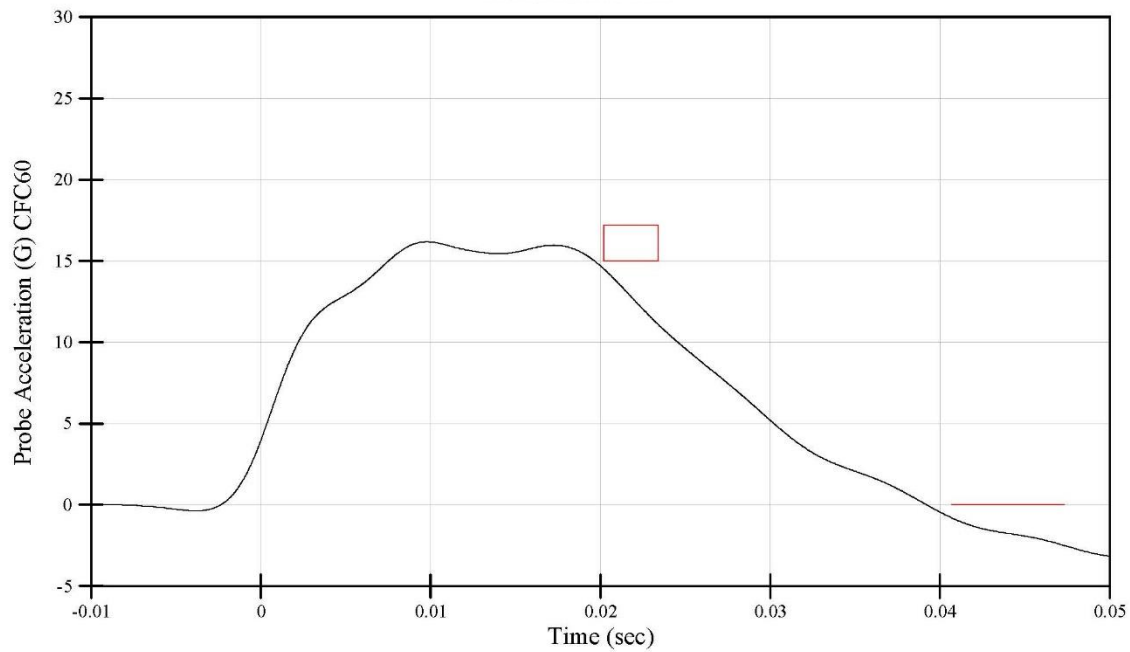
Software Version: 2.4

File Name: T015NeckRight150708-01_pro
07/08/2015 09:27:49.0000

Test Temperature: 70.3 degrees
Relative Humidity: 52%
Test Velocity: 2.87 m/s

THOR Neck Right Lateral Flexion Certification

Probe Acceleration
Serial Number: T015

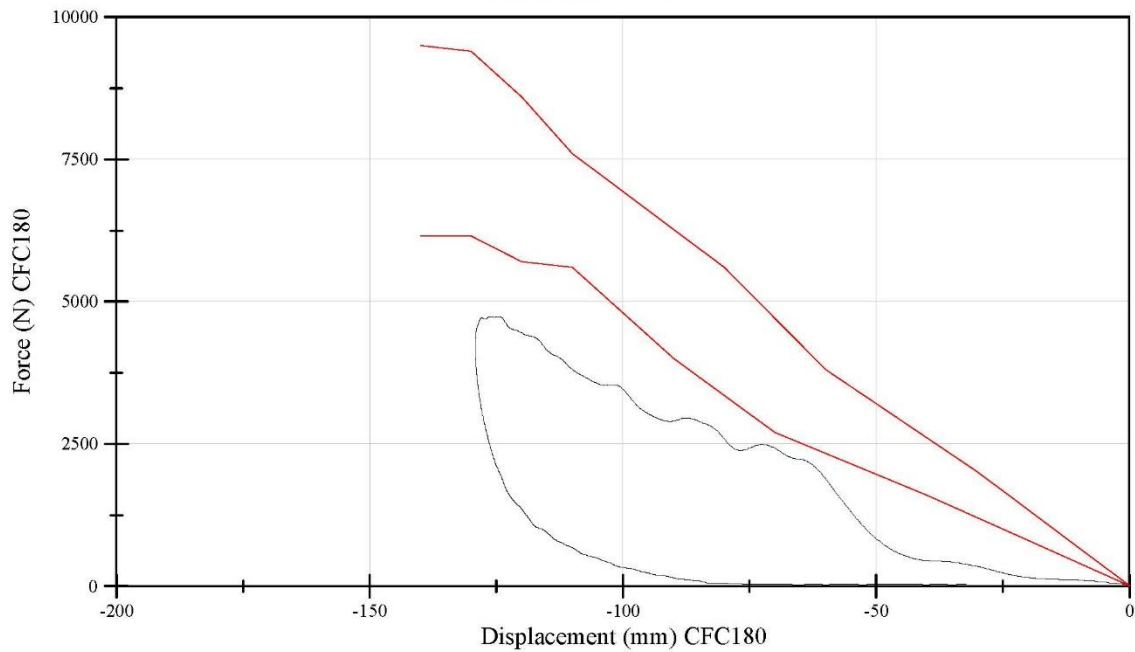


Software Version: 2.4

File Name: T015NeckRight150708-01_pro
07/08/2015 09:27:49.0000

Test Temperature: 70.2 degrees
Relative Humidity: 51%
Test Velocity: 6.63 m/s

THOR Upper Abdomen Certification Abdomen Displacement vs. Probe Force Serial Number: T015

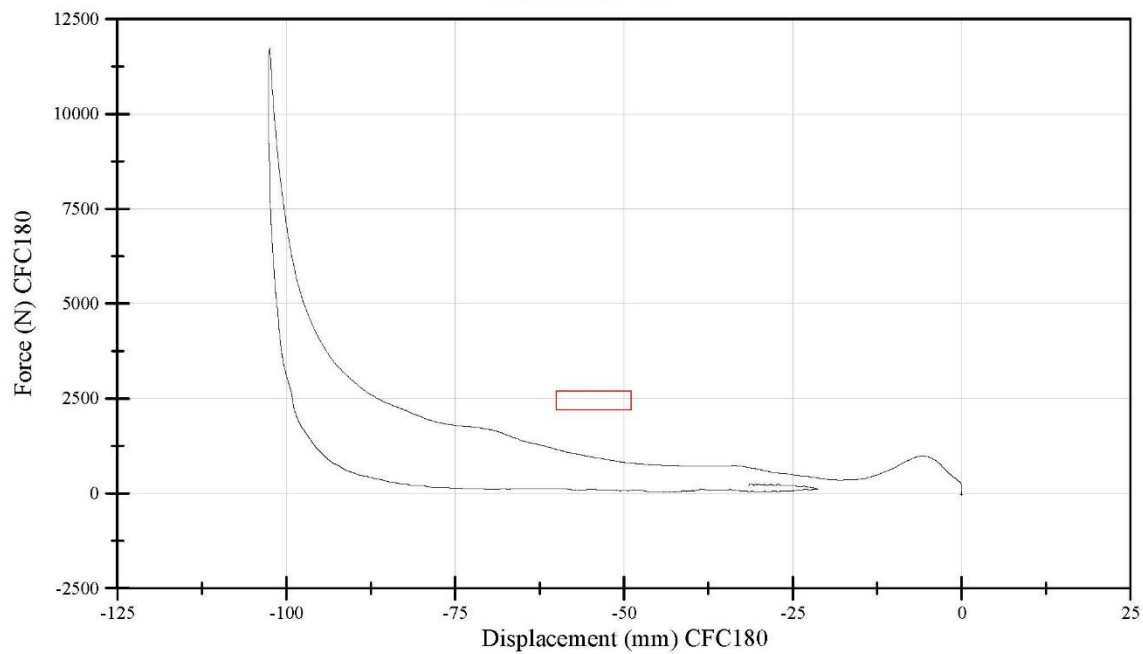


Software Version: 2.4

File Name: T015ABUP150709-01_pro
07/09/2015 15:52:54.0000

Test Temperature: 70.5 degrees
Relative Humidity: 52%
Test Velocity: 6.04 m/s

THOR Lower Abdomen Certification
Abdomen Displacement vs. Probe Force
Serial Number: T015



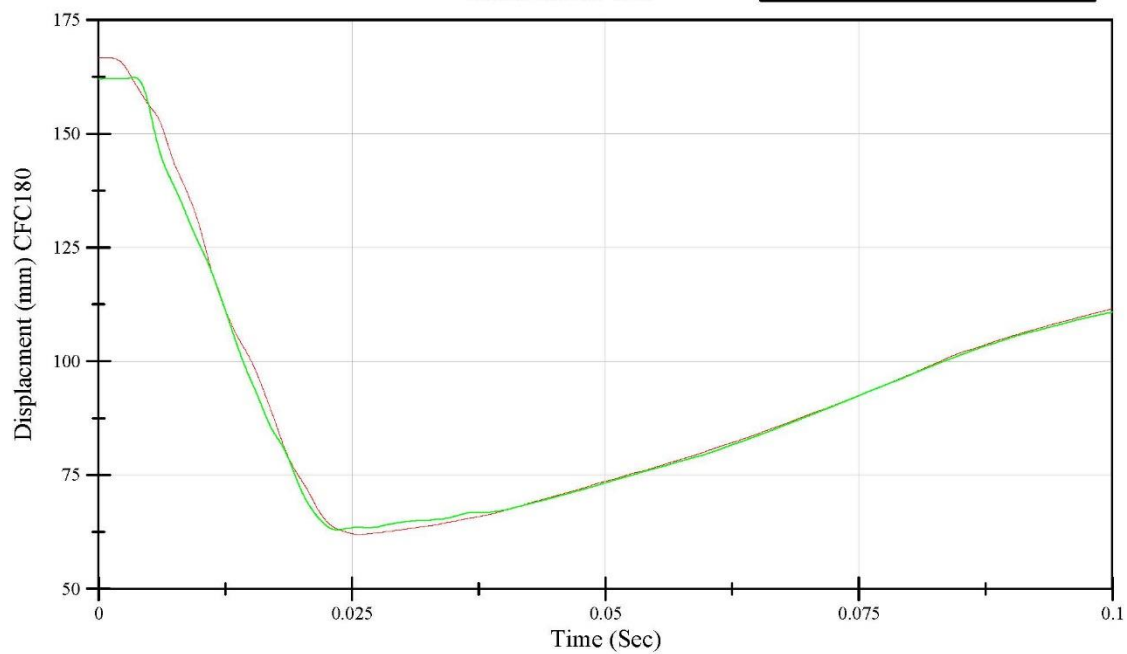
Software Version: 2.4

File Name: T015ABLR150709-04_pro
07/09/2015 14:46:27.0000

Test Temperature: 70.5 degrees
Relative Humidity: 52%
Test Velocity: 6.04 m/s

THOR Lower Abdomen Certification
IRTRACC Displacement
Serial Number: T015

Left Lower IR-TRACC
Right Lower IR-TRACC

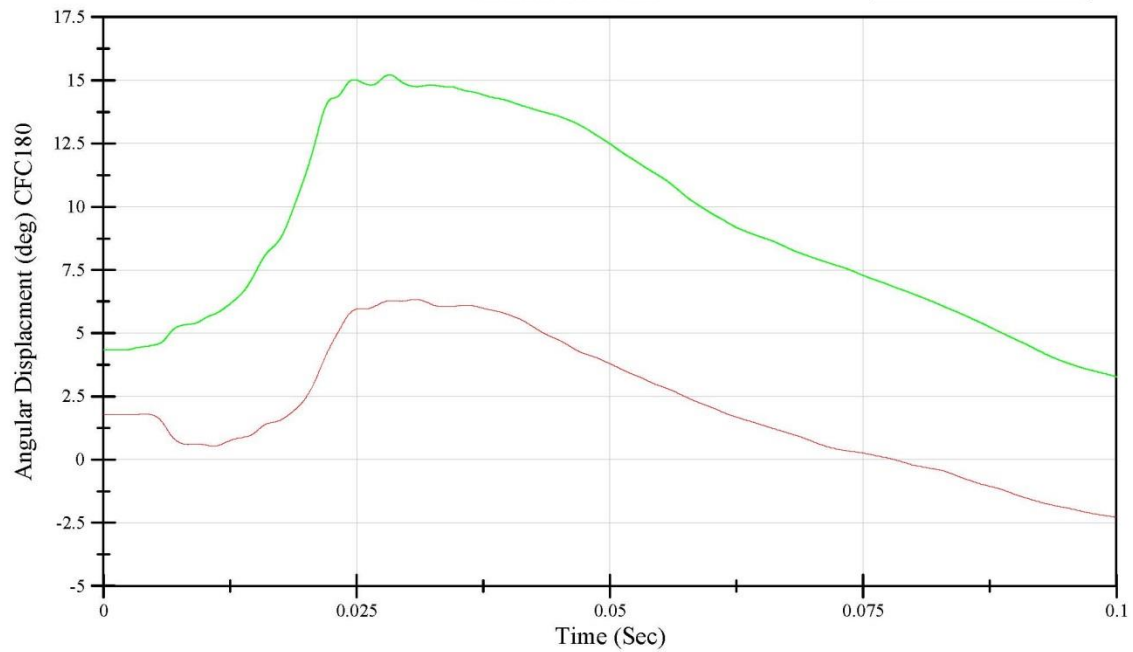


Software Version: 2.4

File Name: T015ABLR150709-04_pro
07/09/2015 14:46:27.0000

Test Temperature: 70.5 degrees
Relative Humidity: 52%
Test Velocity: 6.04 m/s

THOR Lower Abdomen Certification
Y-Pot Displacement
Serial Number: T015

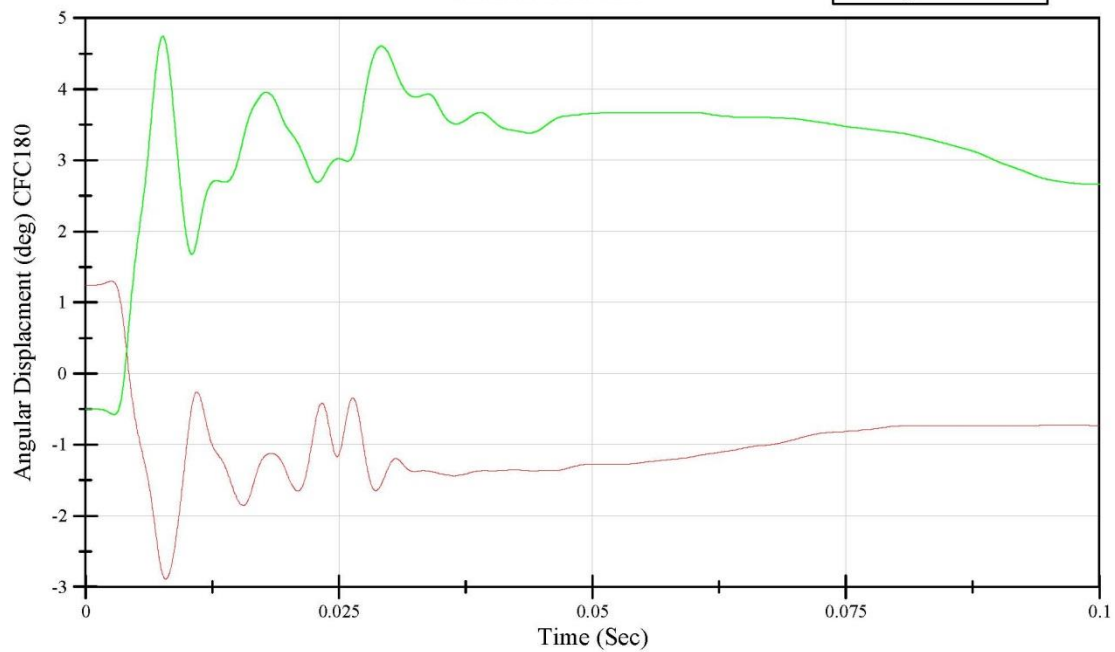


Software Version: 2.4

File Name: T015ABLR150709-04_pro
07/09/2015 14:46:27.0000

Test Temperature: 70.5 degrees
Relative Humidity: 52%
Test Velocity: 6.04 m/s

THOR Lower Abdomen Certification
Z-Potentiometer
Serial Number: T015

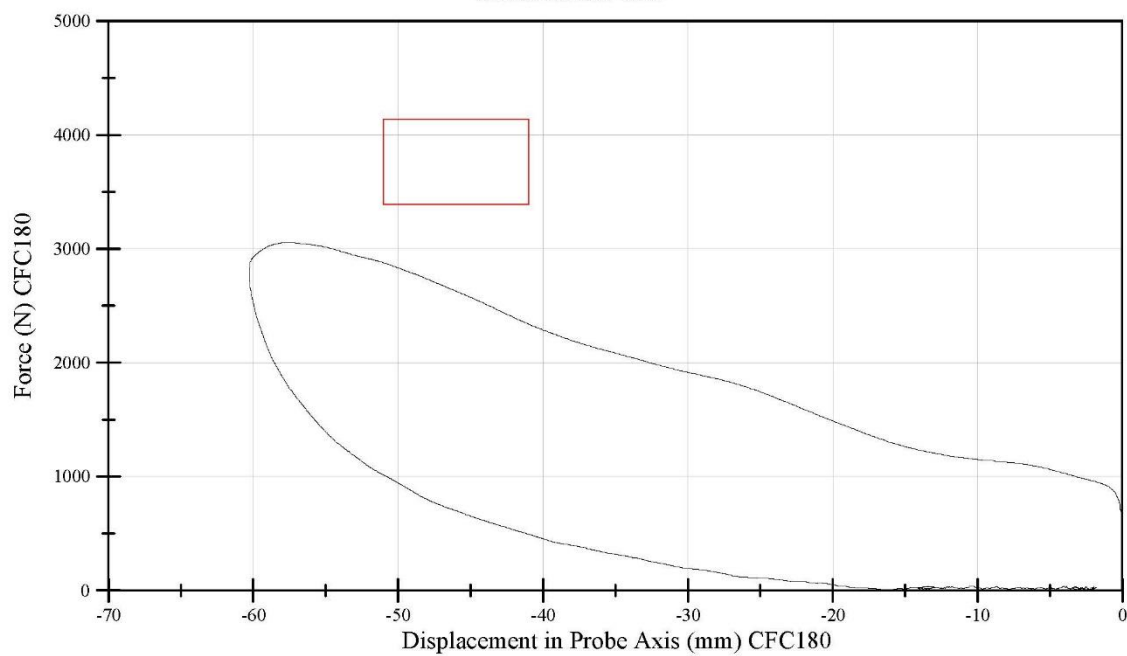


Software Version: 2.4

File Name: T015ABLR150709-04_pro
07/09/2015 14:46:27.0000

Test Temperature: 70.4 degrees
Relative Humidity: 52%
Test Velocity: 4.27 m/s

THOR Lower Left Oblique Thorax Certification
Thorax Displacement vs. Probe Force
Serial Number: T015

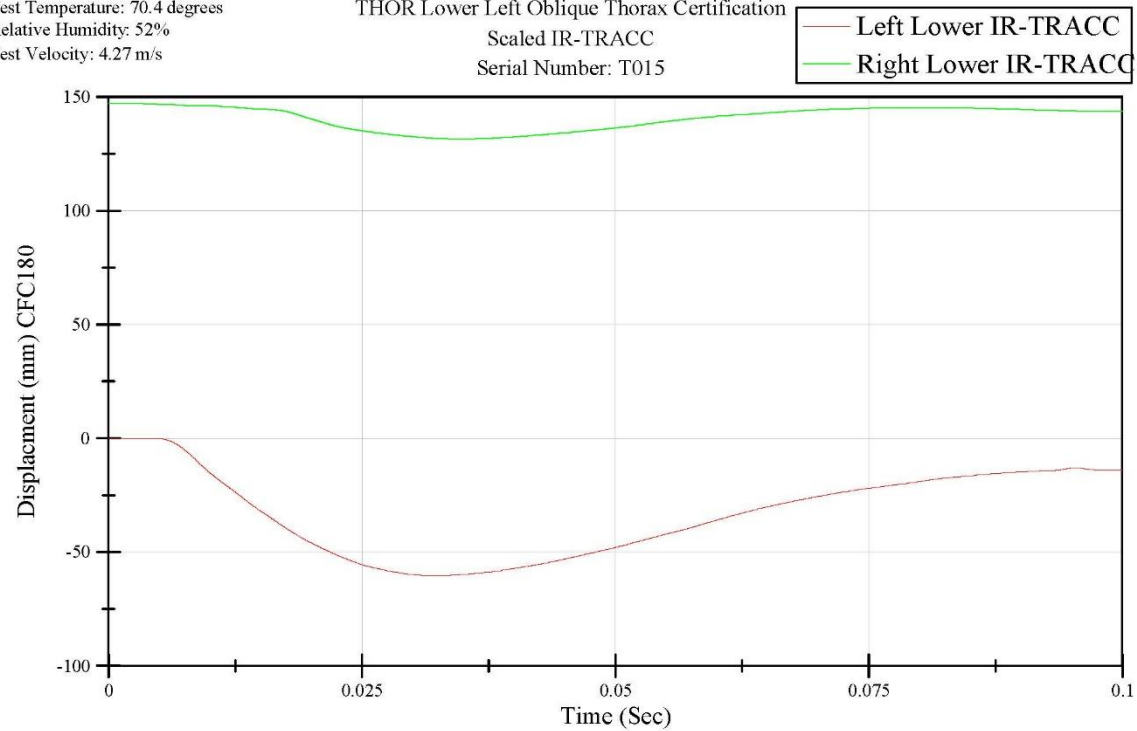


Software Version: 2.4

File Name: T015OBLE150710-01_pro
07/10/2015 14:01:12.0000

Test Temperature: 70.4 degrees
Relative Humidity: 52%
Test Velocity: 4.27 m/s

THOR Lower Left Oblique Thorax Certification
Scaled IR-TRACC
Serial Number: T015

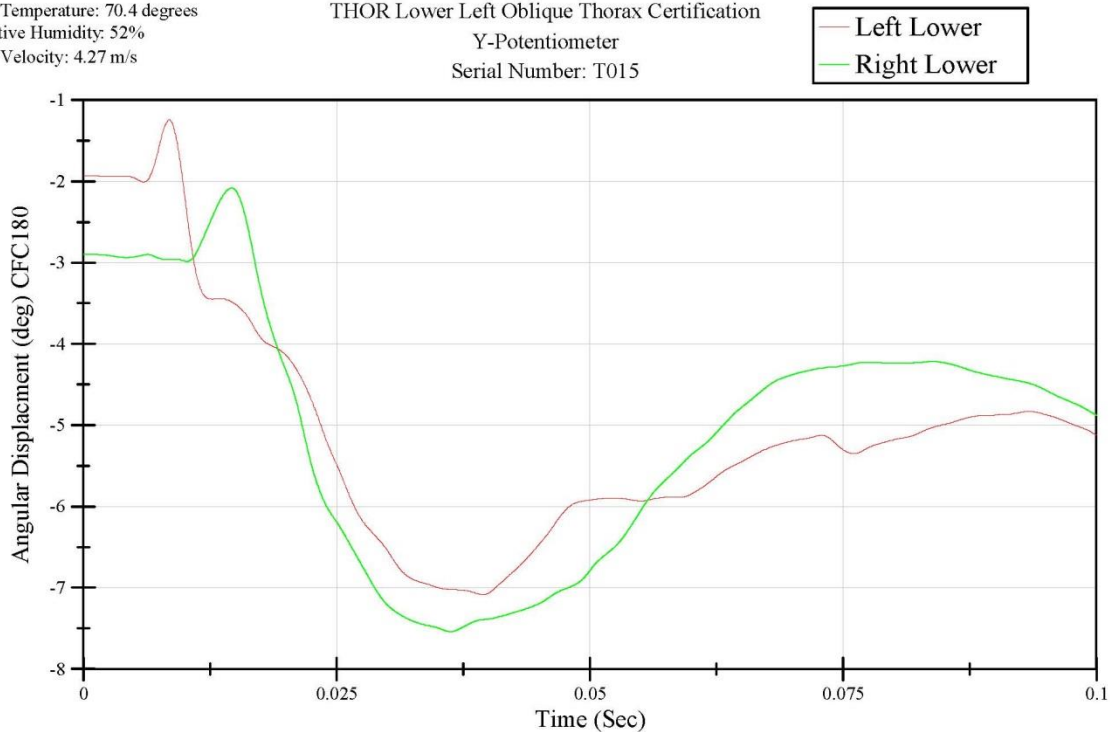


Software Version: 2.4

File Name: T015OBLE150710-01_pro
07/10/2015 14:01:12.0000

Test Temperature: 70.4 degrees
Relative Humidity: 52%
Test Velocity: 4.27 m/s

THOR Lower Left Oblique Thorax Certification
Y-Potentiometer
Serial Number: T015

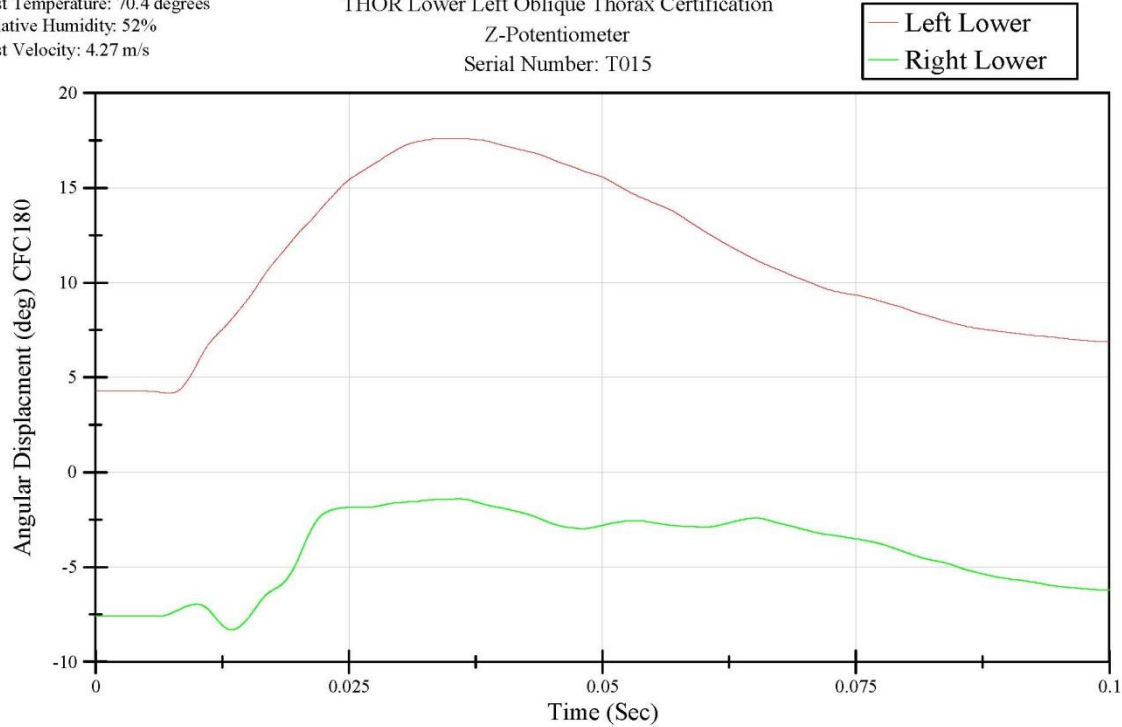


Software Version: 2.4

File Name: T015OBLE150710-01_pro
07/10/2015 14:01:12.0000

Test Temperature: 70.4 degrees
Relative Humidity: 52%
Test Velocity: 4.27 m/s

THOR Lower Left Oblique Thorax Certification
Z-Potentiometer
Serial Number: T015

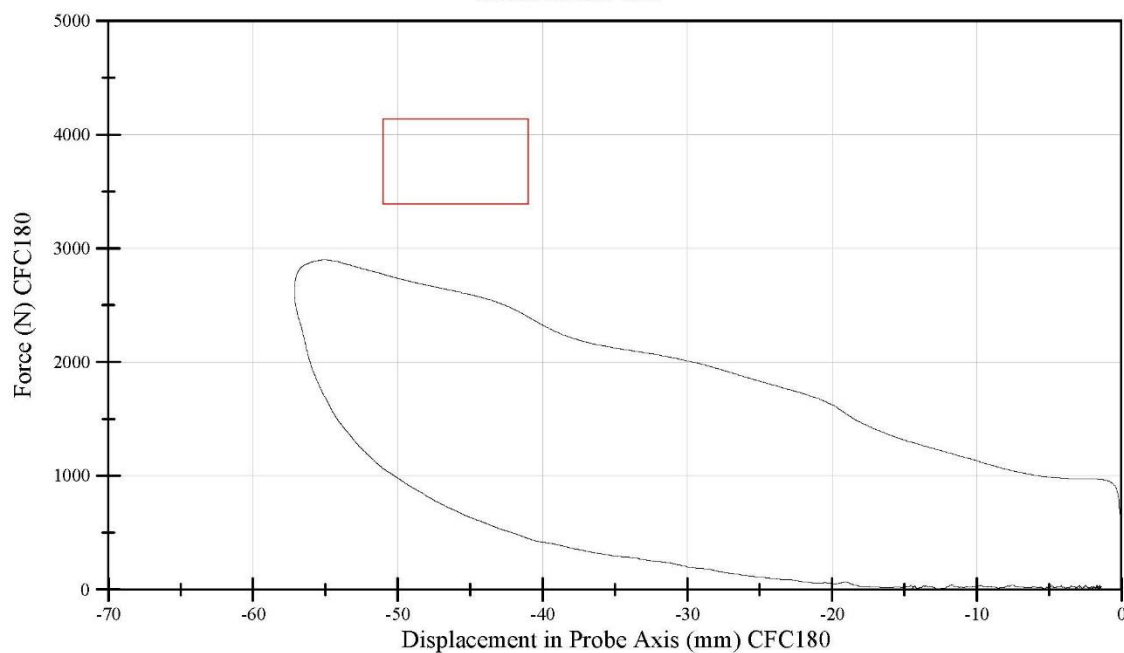


Software Version: 2.4

File Name: T015OBLE150710-01_pro
07/10/2015 14:01:12.0000

Test Temperature: 70.3 degrees
Relative Humidity: 51%
Test Velocity: 4.27 m/s

THOR Lower Right Oblique Thorax Certification
Thorax Displacement vs. Probe Force
Serial Number: T015

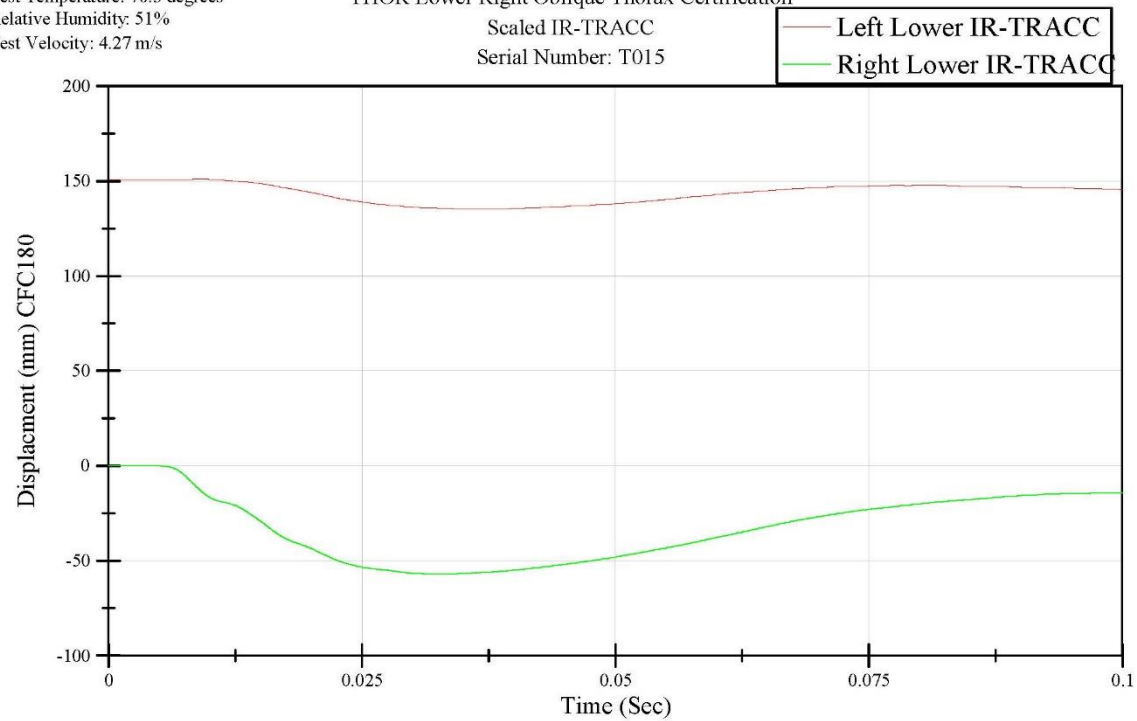


Software Version: 2.4

File Name: T015OBRI150710-01_pro
07/10/2015 12:55:35.0000

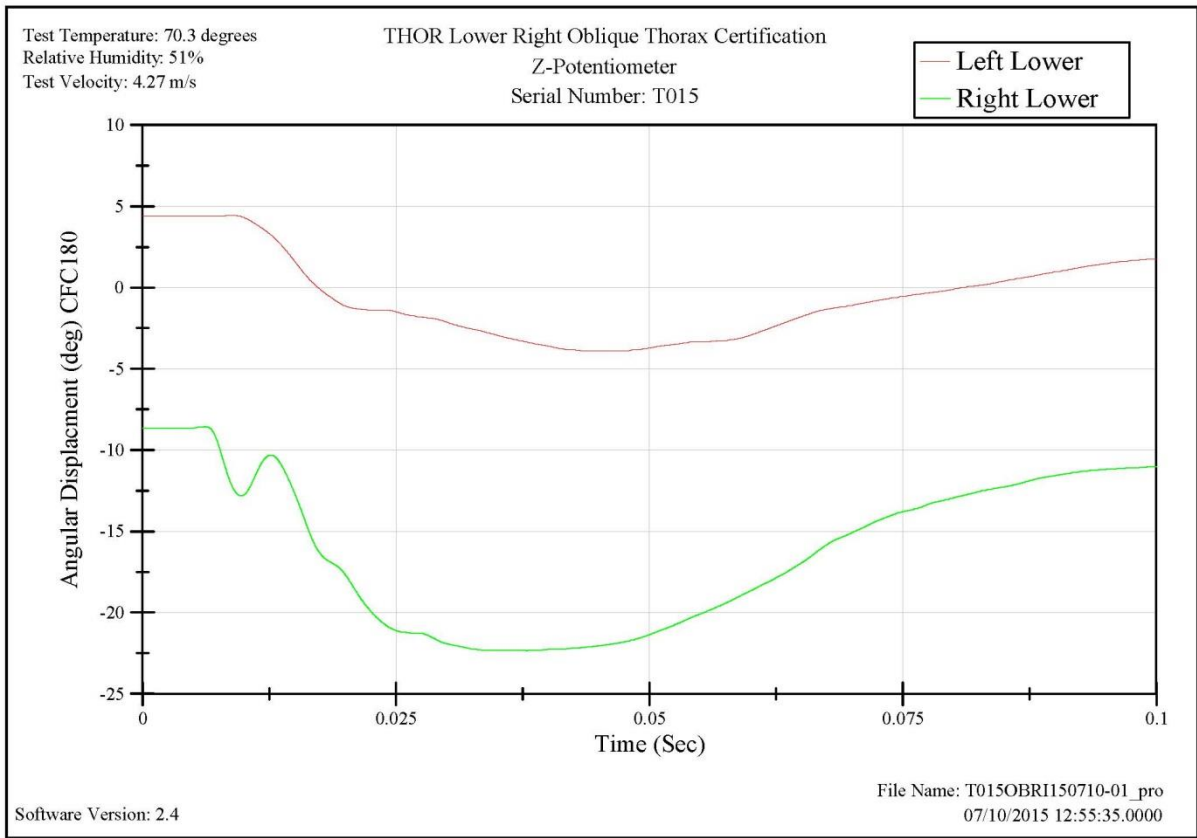
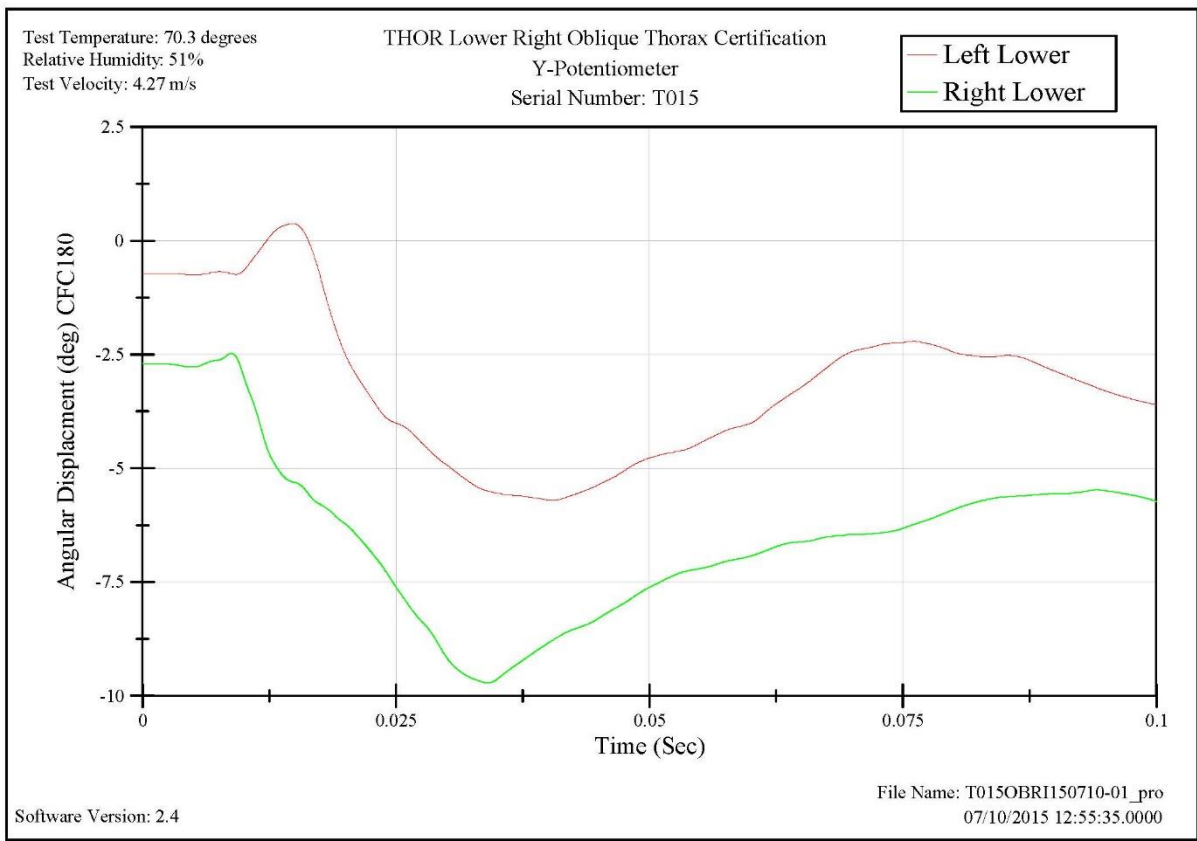
Test Temperature: 70.3 degrees
Relative Humidity: 51%
Test Velocity: 4.27 m/s

THOR Lower Right Oblique Thorax Certification
Scaled IR-TRACC
Serial Number: T015



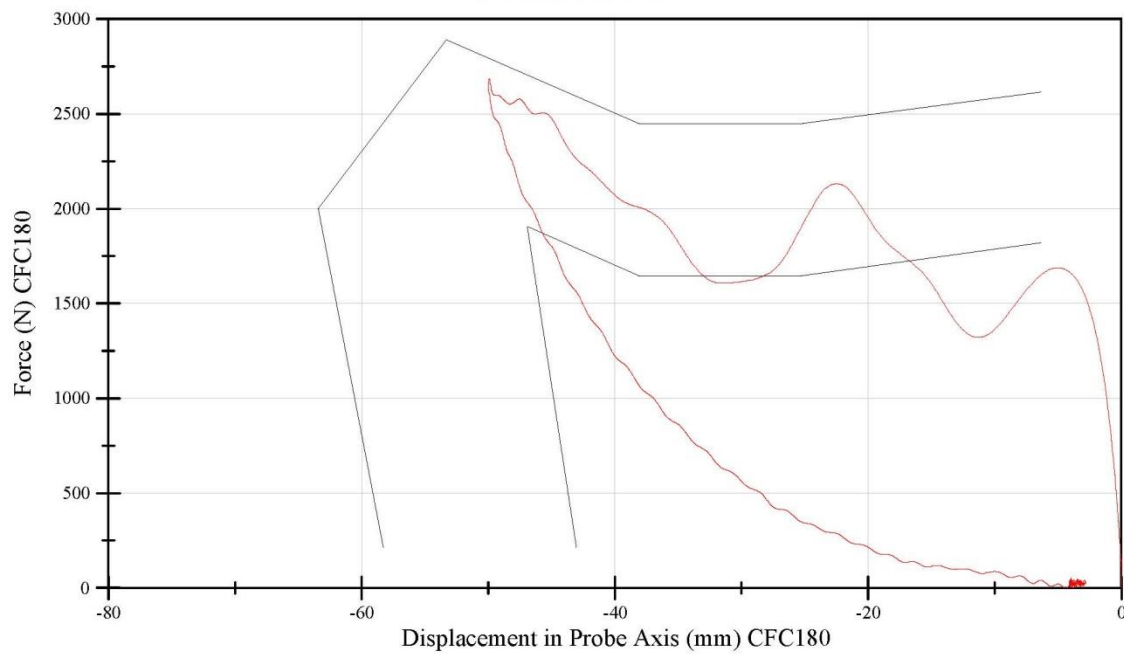
Software Version: 2.4

File Name: T015OBRI150710-01_pro
07/10/2015 12:55:35.0000



Test Temperature: 70.4 degrees
Relative Humidity: 53%
Test Velocity: 4.26 m/s

THOR Upper Thorax Certification
Thorax Response With Kroell Corridor
Serial Number: T015

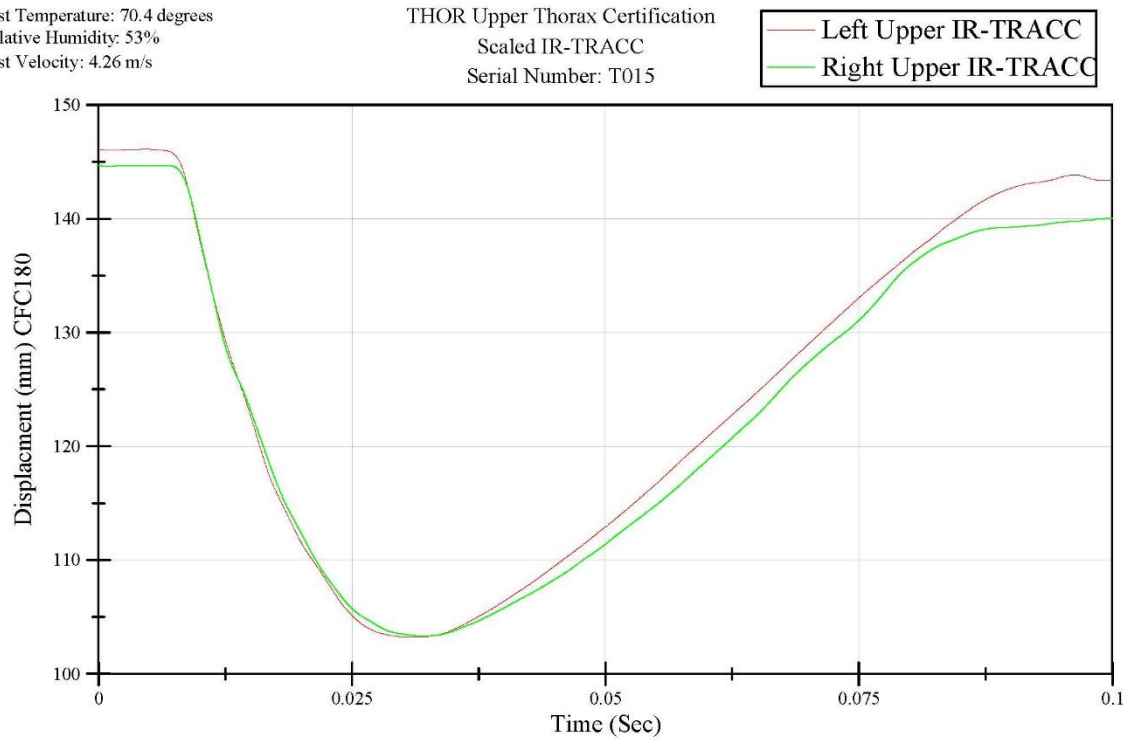


Software Version: 2.4

File Name: T015THUP150710-02_pro.tdms
07/10/2015 09:24:33.0000

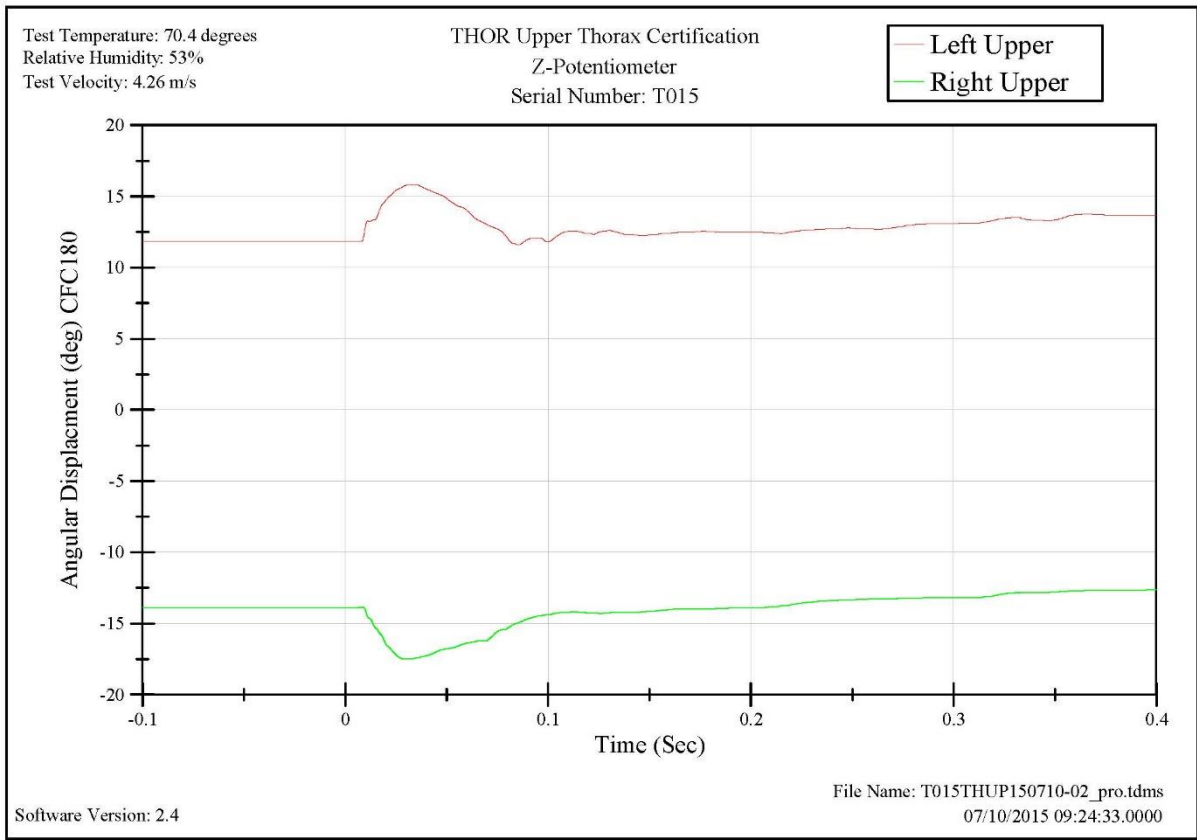
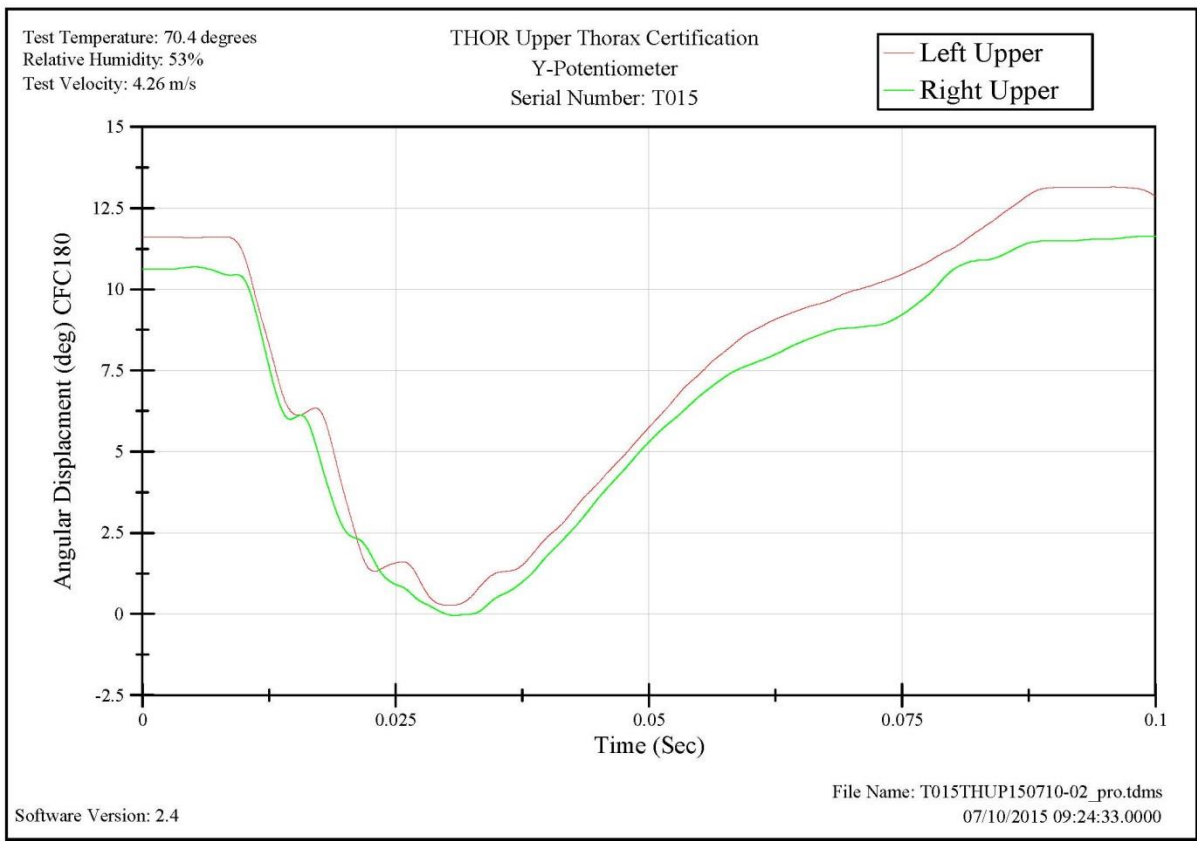
Test Temperature: 70.4 degrees
Relative Humidity: 53%
Test Velocity: 4.26 m/s

THOR Upper Thorax Certification
Scaled IR-TRACC
Serial Number: T015



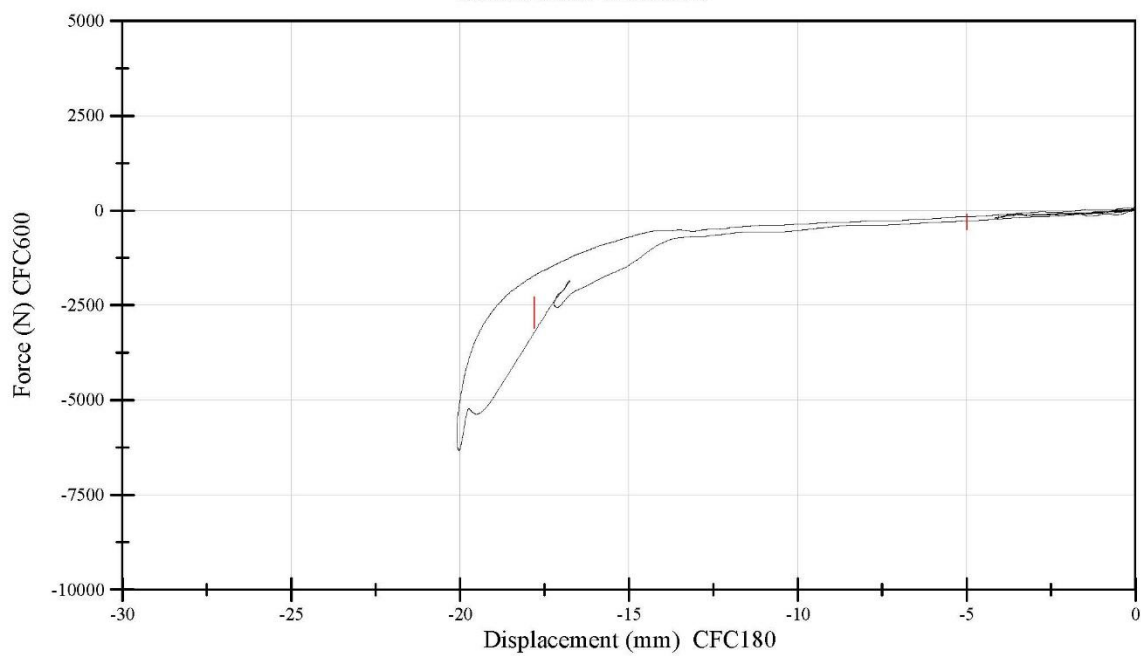
Software Version: 2.4

File Name: T015THUP150710-02_pro.tdms
07/10/2015 09:24:33.0000



Test Temperature: 71.4 degrees
Relative Humidity: 48%
Test Velocity: 2.77 m/s

THOR Right Knee Certification
Femur Force vs. Knee Displacement
Serial Number: D2103657B

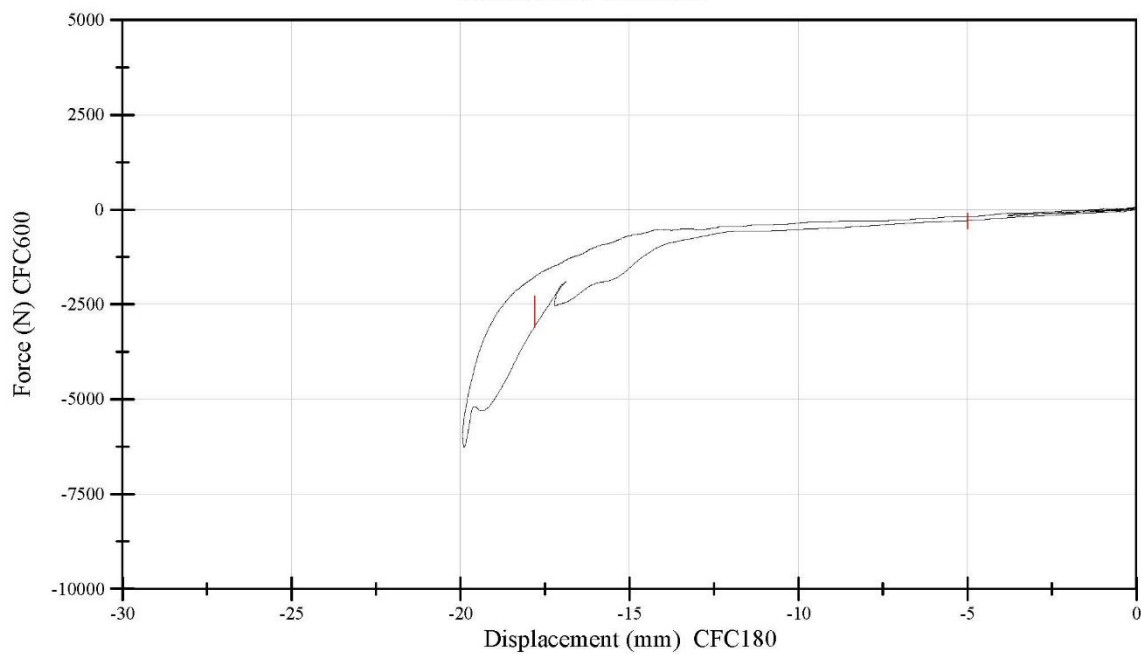


Software Version: 2.4

File Name: D2103657BKnee150407-01
01/01/0000 00:00:00.0000

Test Temperature: 70.2 degrees
Relative Humidity: 49%
Test Velocity: 2.77 m/s

THOR Left Knee Certification
Femur Force vs. Knee Displacement
Serial Number: D2103665B

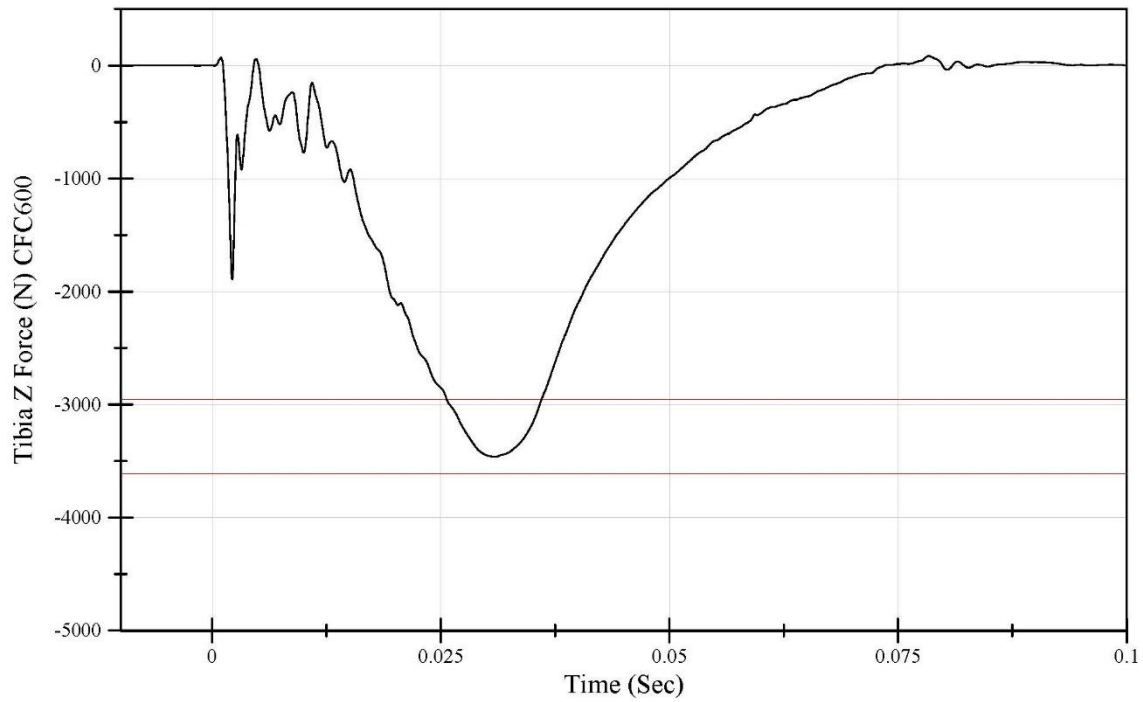


Software Version: 2.4

File Name: D2103665BKnee150407-01processed
04/07/2015 13:14:07.0000

Test Temperature: 71.2 degrees
Relative Humidity: 28.6%
Test Velocity: 5.03 m/s

THOR Right Foot Dorsiflexion Certification
Tibia Load
Serial Number: LX0038

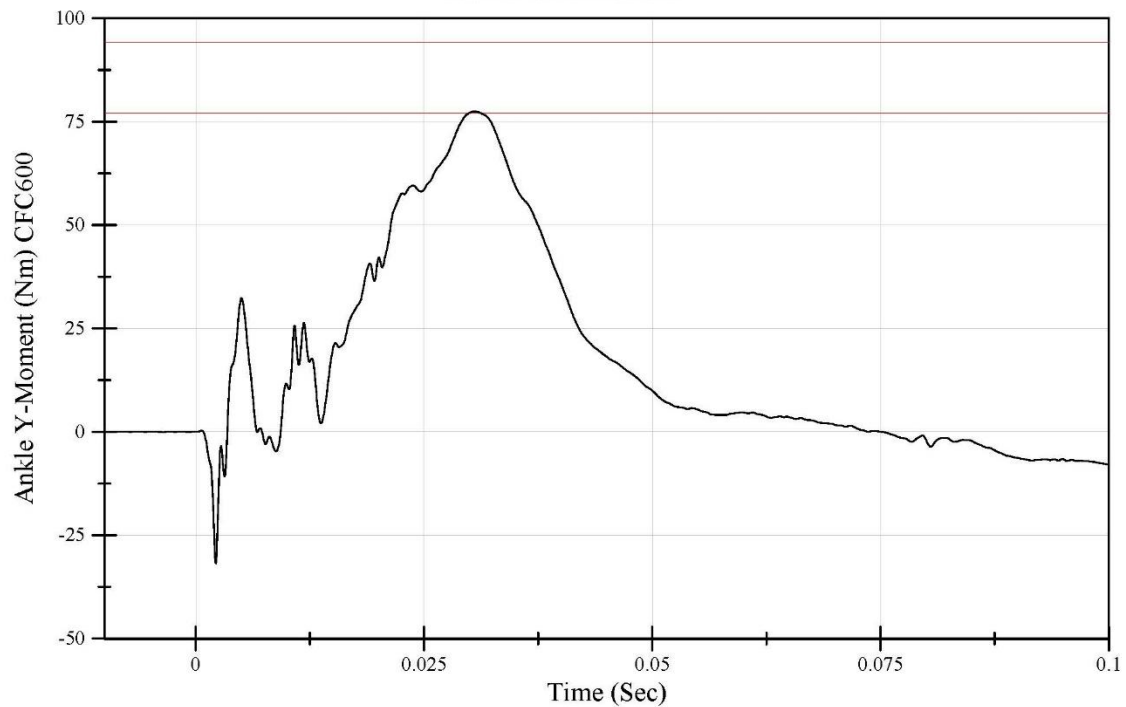


Software Version: 2.4

File Name: LX0038Ball150323_06processed
03/23/2015 09:51:34.0000

Test Temperature: 71.2 degrees
Relative Humidity: 28.6%
Test Velocity: 5.03 m/s

THOR Right Foot Dorsiflexion Certification
Ankle Y-Moment
Serial Number: LX0038

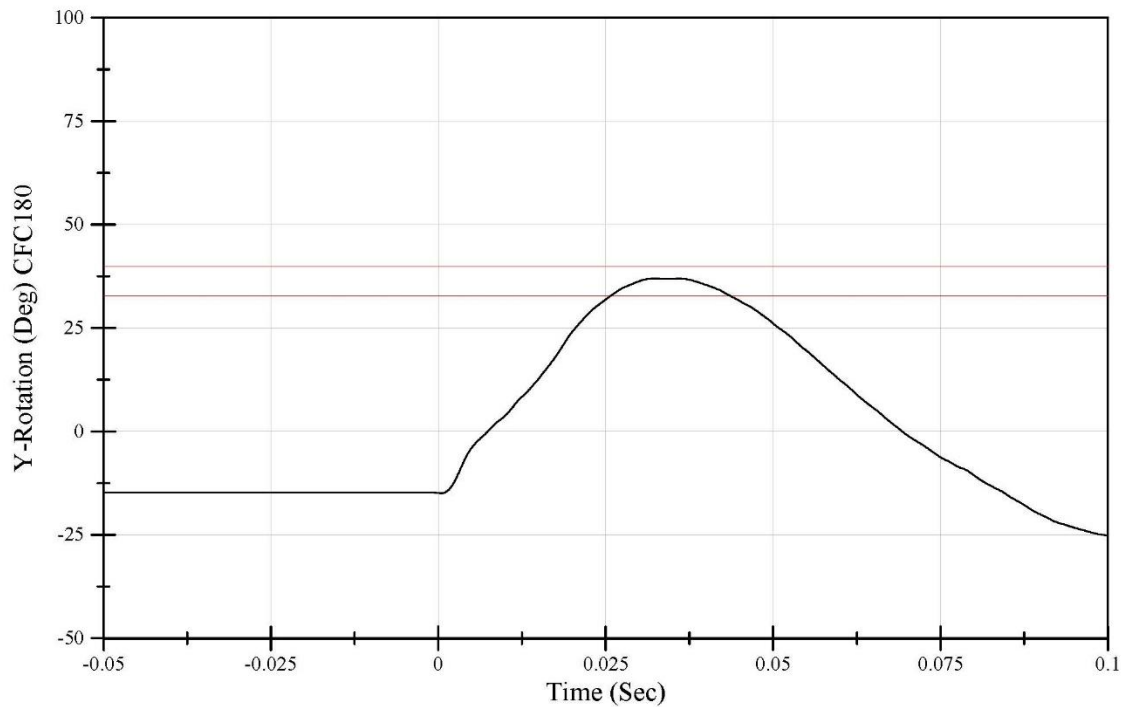


Software Version: 2.4

File Name: LX0038Ball150323_06processed
03/23/2015 09:51:34.0000

Test Temperature: 71.2 degrees
Relative Humidity: 28.6%
Test Velocity: 5.03 m/s

THOR Right Foot Dorsiflexion Certification
Ankle Y-Rotation
Serial Number: LX0038

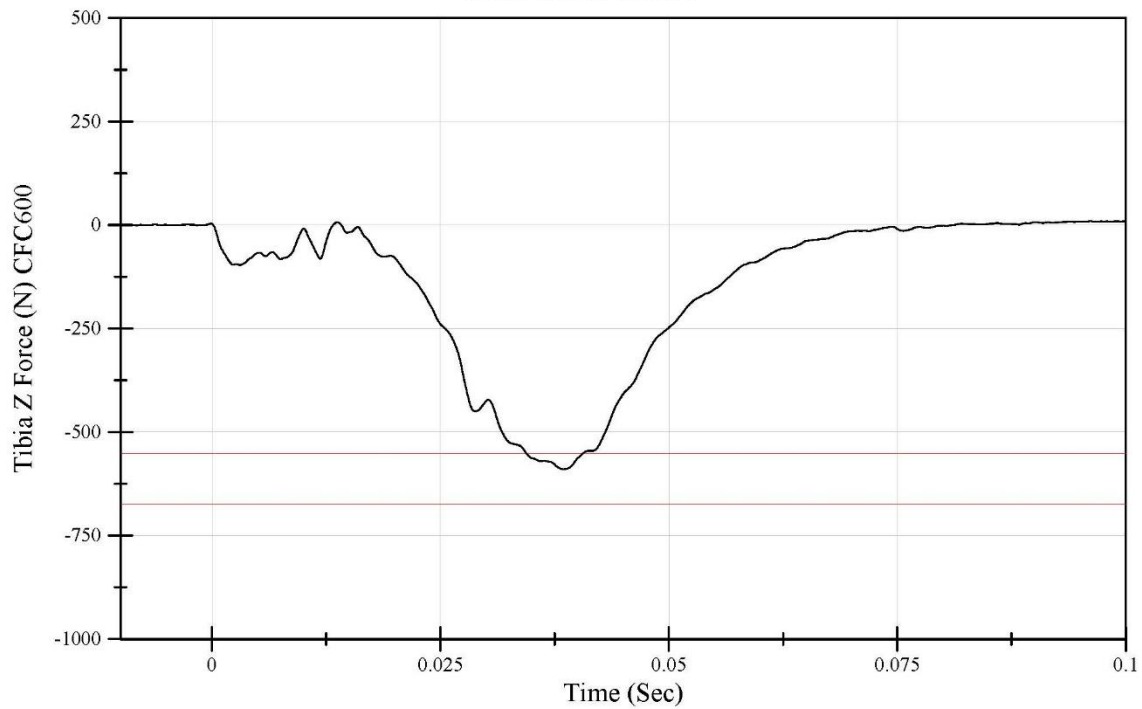


Software Version: 2.4

File Name: LX0038Ball150323_06processed
03/23/2015 09:51:34.0000

Test Temperature: 71 degrees
Relative Humidity: 33.2%
Test Velocity: 1.95 m/s

THOR Right Foot Eversion Certification
Tibia Load
Serial Number: LX0038

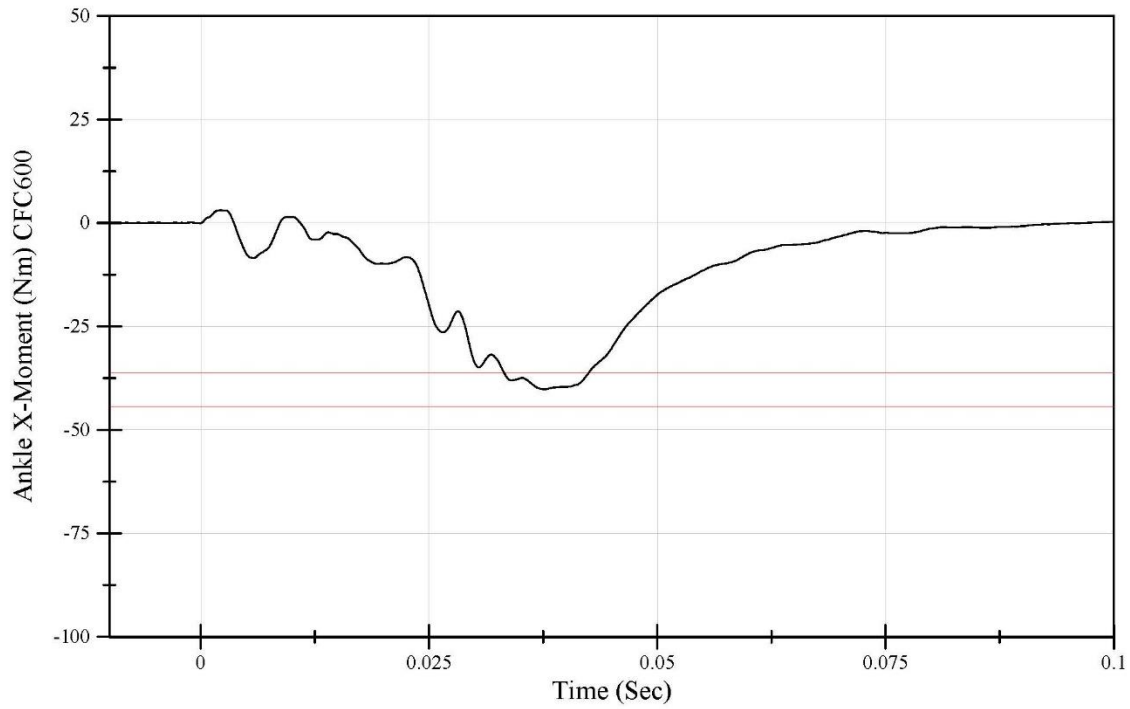


Software Version: 2.4

File Name: LX0038Eversion150319_01processed
03/19/2015 14:01:21.0000

Test Temperature: 71 degrees
Relative Humidity: 33.2%
Test Velocity: 1.95 m/s

THOR Right Foot Eversion Certification
Ankle Moment
Serial Number: LX0038

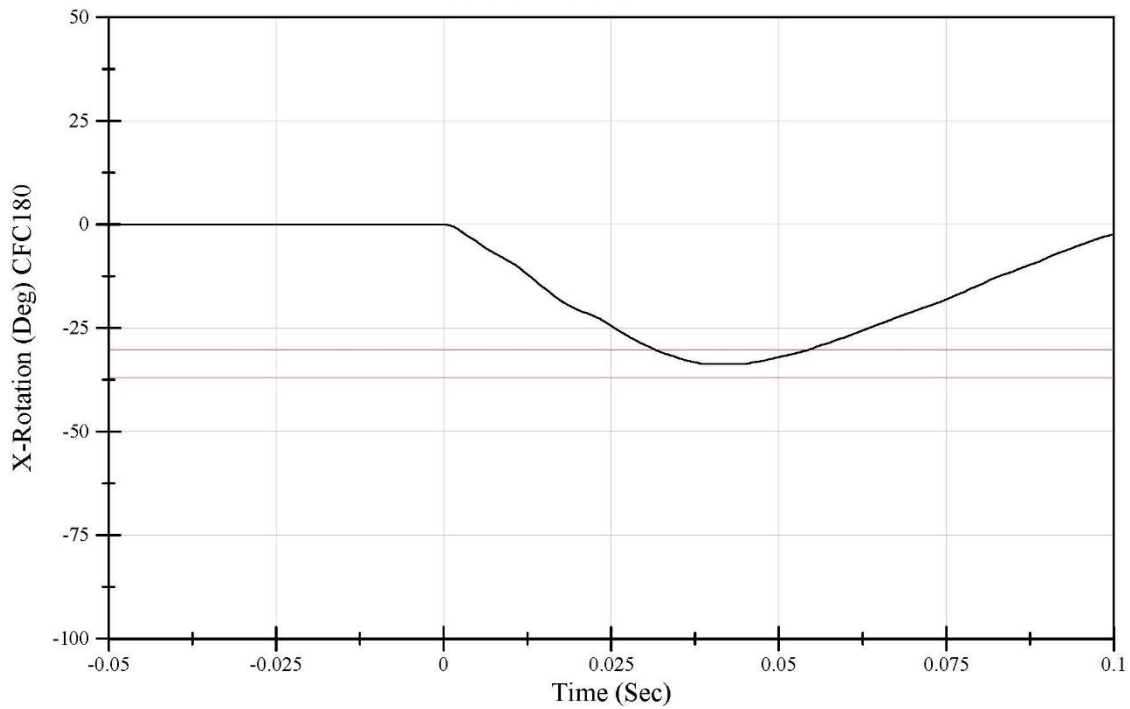


Software Version: 2.4

File Name: LX0038Eversion150319_01processed
03/19/2015 14:01:21.0000

Test Temperature: 71 degrees
Relative Humidity: 33.2%
Test Velocity: 1.95 m/s

THOR Right Foot Eversion Certification
Ankle X-Rotation
Serial Number: LX0038

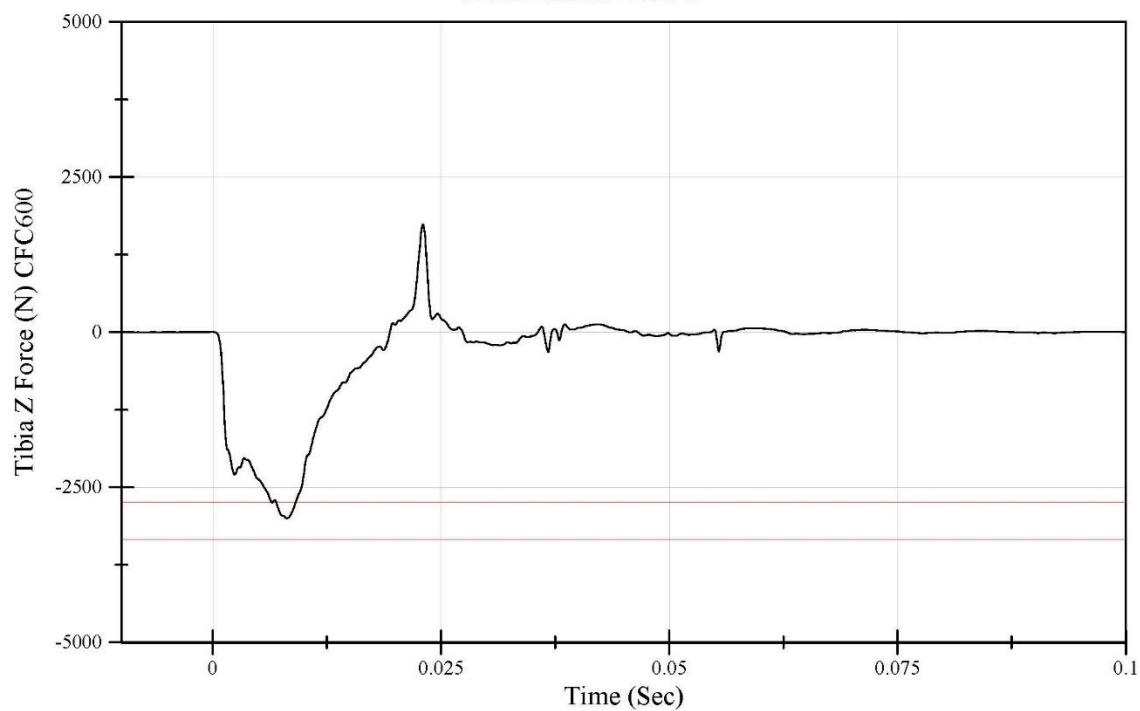


Software Version: 2.4

File Name: LX0038Eversion150319_01processed
03/19/2015 14:01:21.0000

Test Temperature: 71 degrees
Relative Humidity: 28.4%
Test Velocity: 3.91 m/s

THOR Right Foot Heel Certification
Tibia Load
Serial Number: LX0038

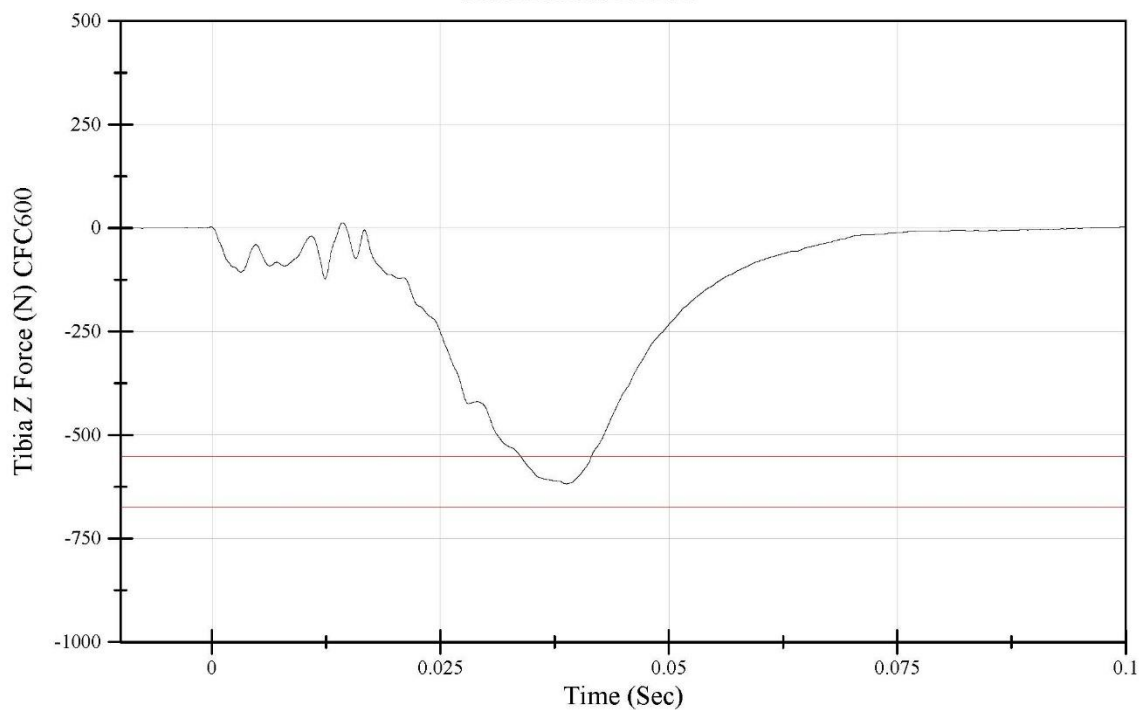


Software Version: 2.4

File Name: LX0038Heel150323_02processed
03/23/2015 13:53:13.0000

Test Temperature: 71.2 degrees
Relative Humidity: 33.1%
Test Velocity: 1.94 m/s

THOR Right Foot Inversion Certification
Tibia Load
Serial Number: LX0038

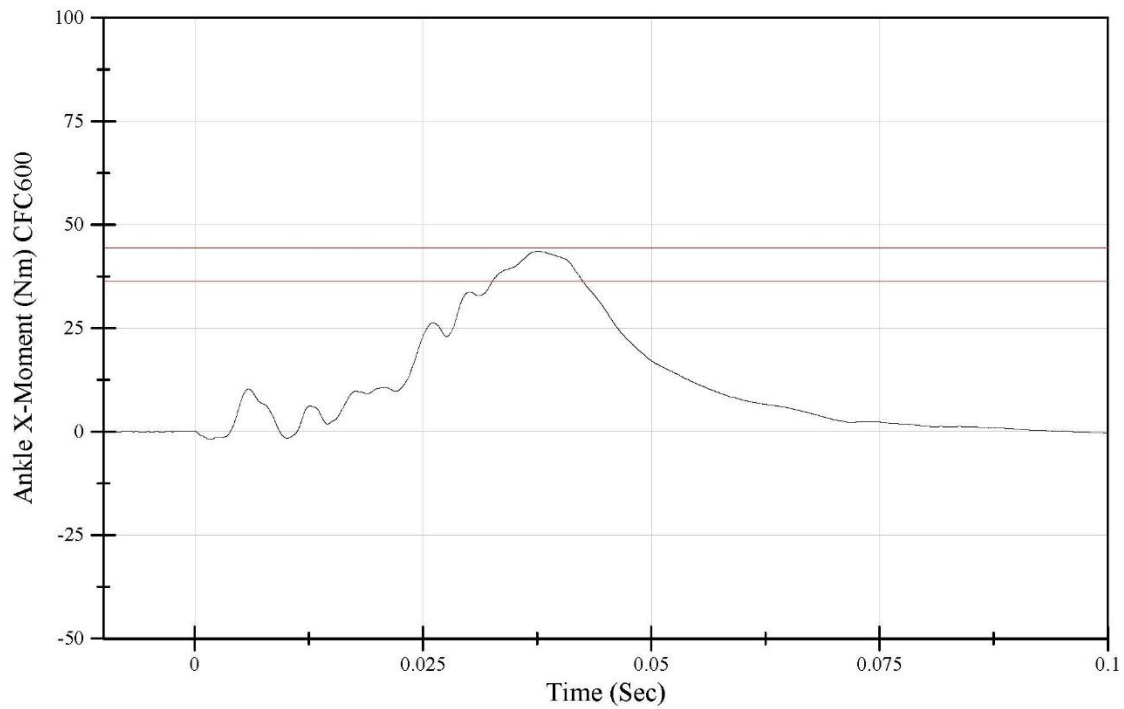


Software Version: 2.4

File Name: LX0038Inversion150319_05processed
03/19/2015 13:27:37.0000

Test Temperature: 71.2 degrees
Relative Humidity: 33.1%
Test Velocity: 1.94 m/s

THOR Right Foot Inversion Certification
Ankle Moment
Serial Number: LX0038

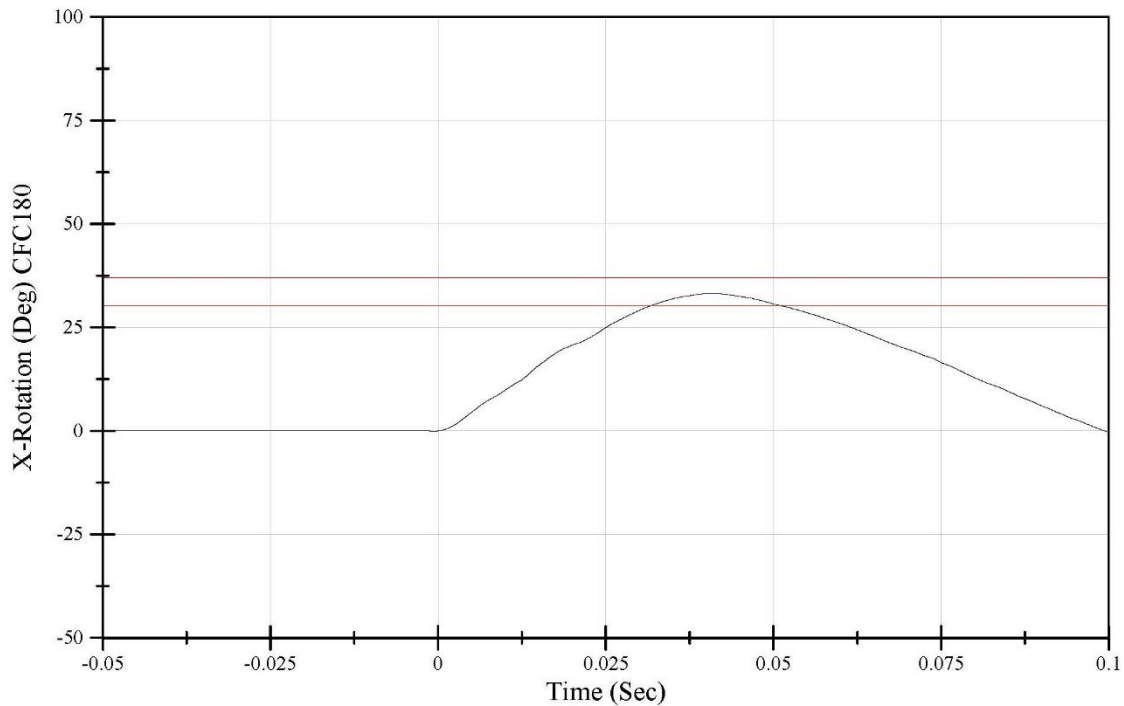


Software Version: 2.4

File Name: LX0038Inversion150319_05processed
03/19/2015 13:27:37.0000

Test Temperature: 71.2 degrees
Relative Humidity: 33.1%
Test Velocity: 1.94 m/s

THOR Right Foot Inversion Certification
Ankle X-Rotation
Serial Number: LX0038

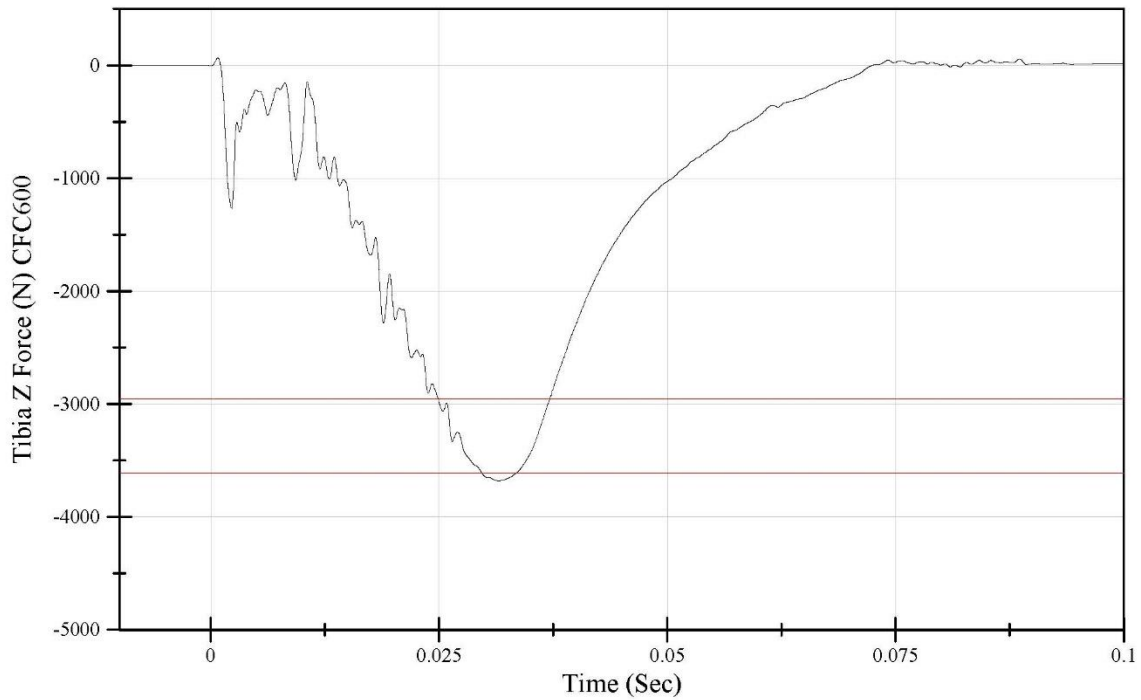


Software Version: 2.4

File Name: LX0038Inversion150319_05processed
03/19/2015 13:27:37.0000

Test Temperature: 71 degrees
Relative Humidity: 26.4%
Test Velocity: 4.98 m/s

THOR Left Foot Dorsiflexion Certification
Tibia Load
Serial Number: LX0039

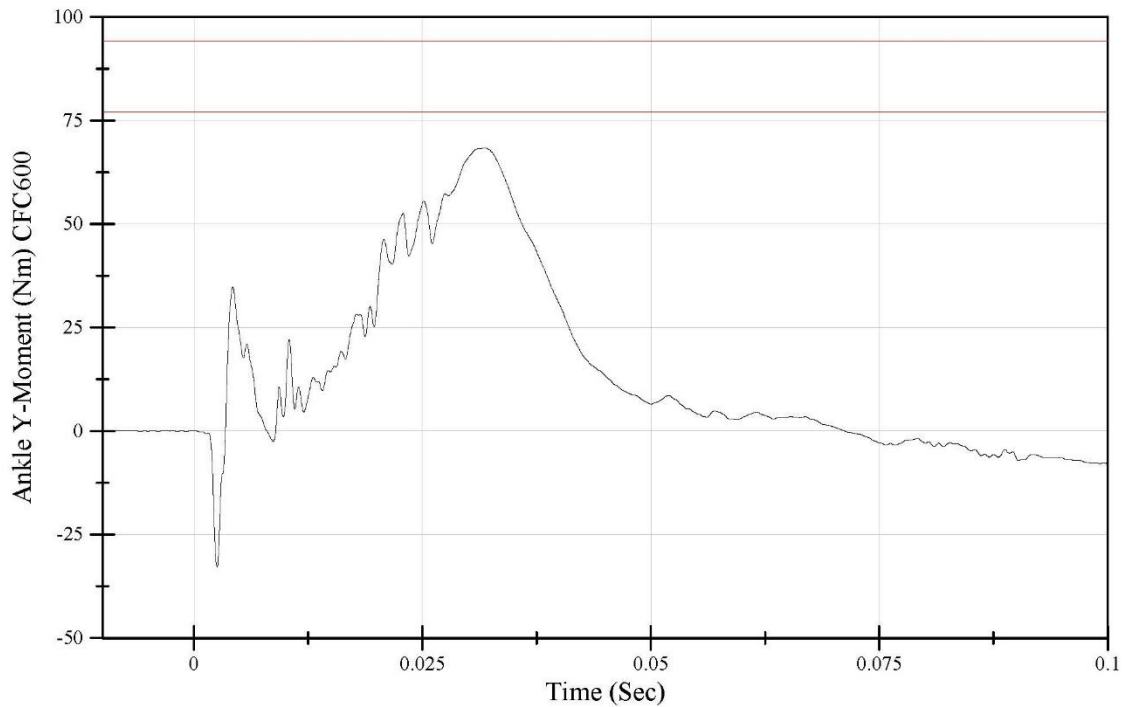


Software Version: 2.4

File Name: LX0039Ball1150324_04processed
03/24/2015 09:40:54.0000

Test Temperature: 71 degrees
Relative Humidity: 26.4%
Test Velocity: 4.98 m/s

THOR Left Foot Dorsiflexion Certification
Ankle Y-Moment
Serial Number: LX0039

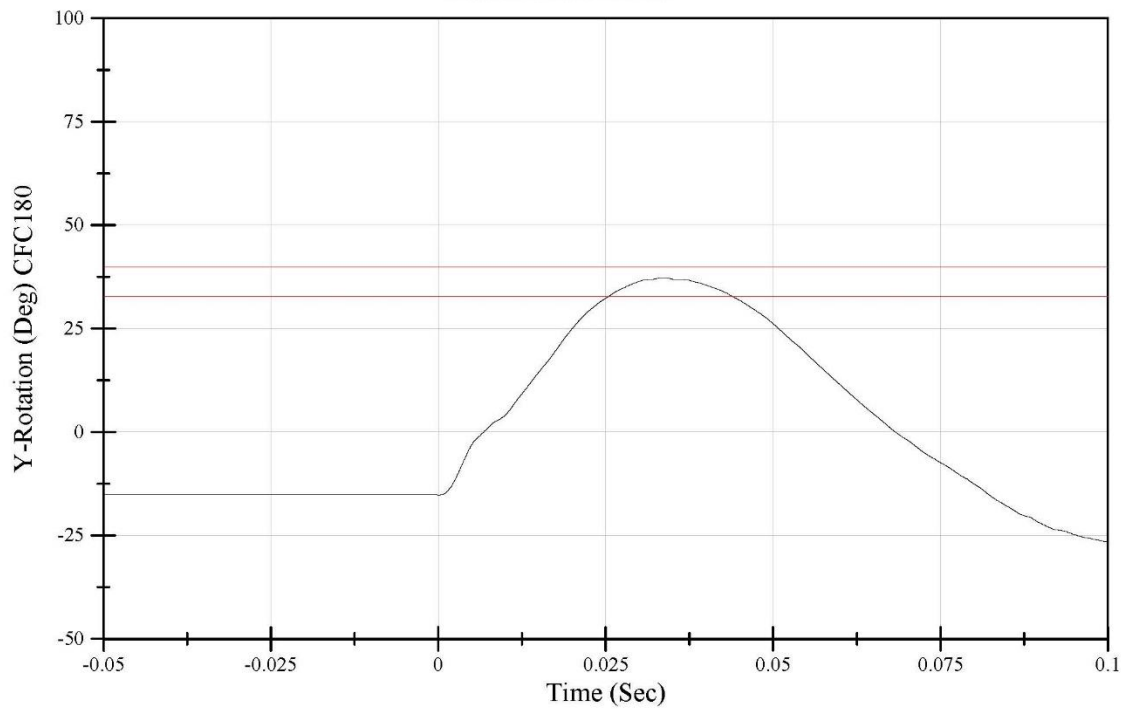


Software Version: 2.4

File Name: LX0039Ball1150324_04processed
03/24/2015 09:40:54.0000

Test Temperature: 71 degrees
Relative Humidity: 26.4%
Test Velocity: 4.98 m/s

THOR Left Foot Dorsiflexion Certification
Ankle Y-Rotation
Serial Number: LX0039

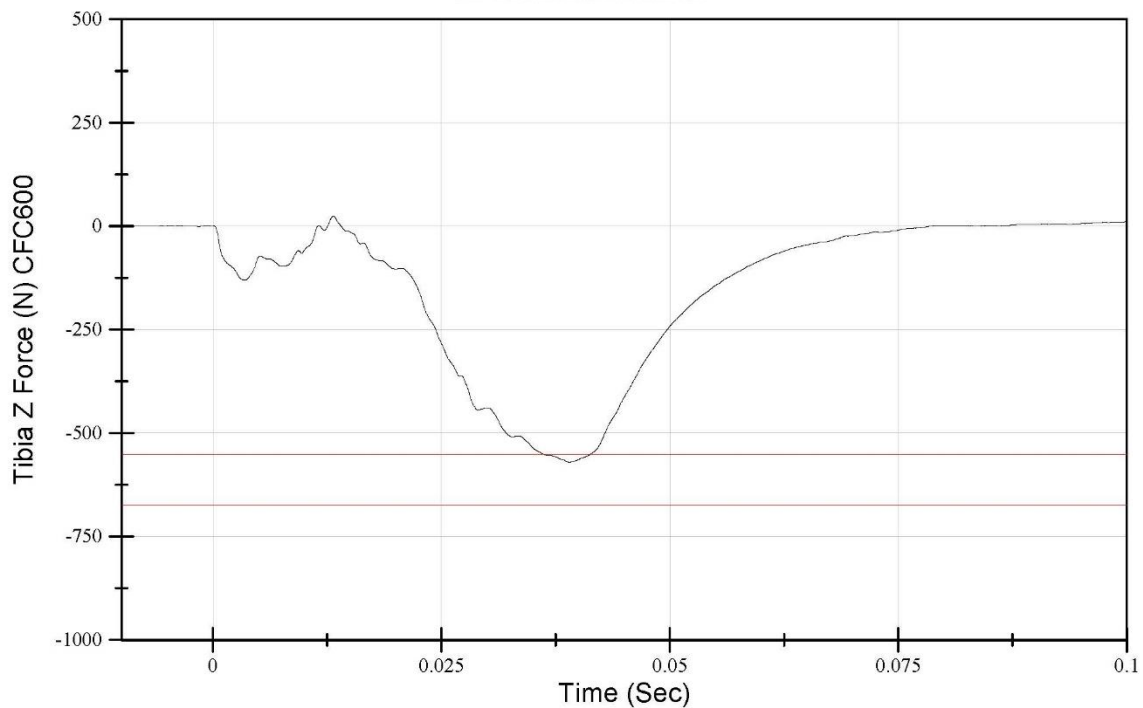


Software Version: 2.4

File Name: LX0039Ball150324_04processed
03/24/2015 09:40:54.0000

Test Temperature: 71 degrees
Relative Humidity: 26.8%
Test Velocity: 2.04 m/s

THOR Left Foot Eversion Certification
Tibia Load
Serial Number: LX0039

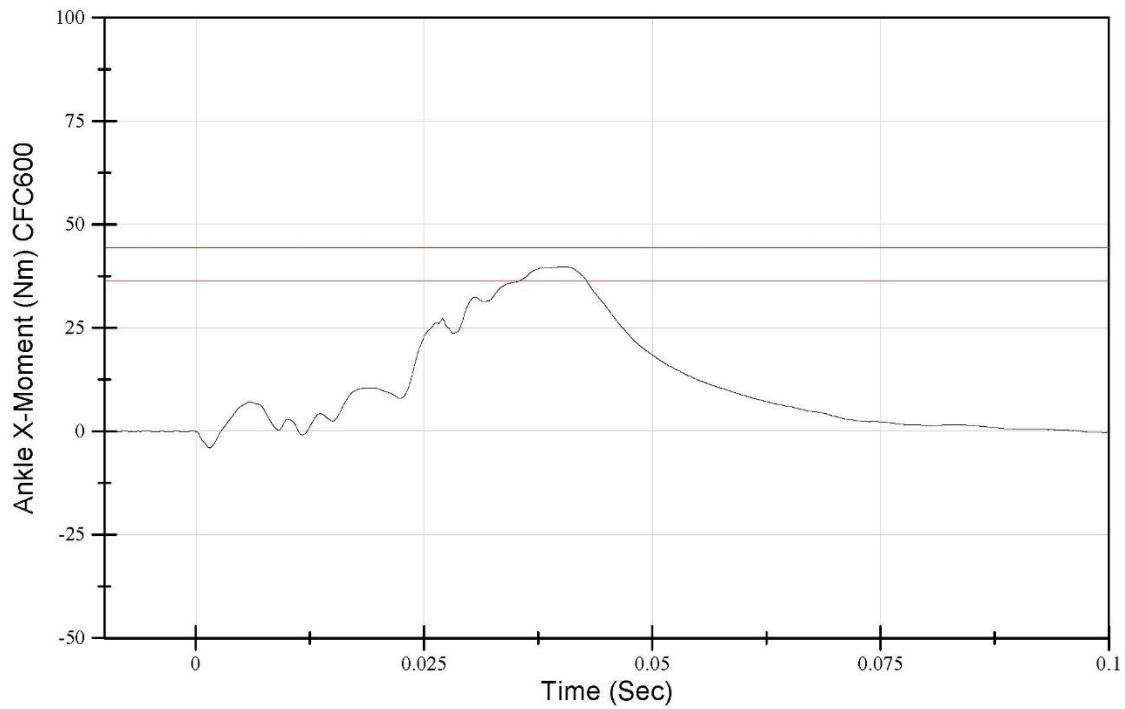


Software Version: 2.4

File Name: LX0039Eversion150324_01processed
03/24/2015 06:43:58.0000

Test Temperature: 71 degrees
Relative Humidity: 26.8%
Test Velocity: 2.04 m/s

THOR Left Foot Eversion Certification
Ankle Moment
Serial Number: LX0039

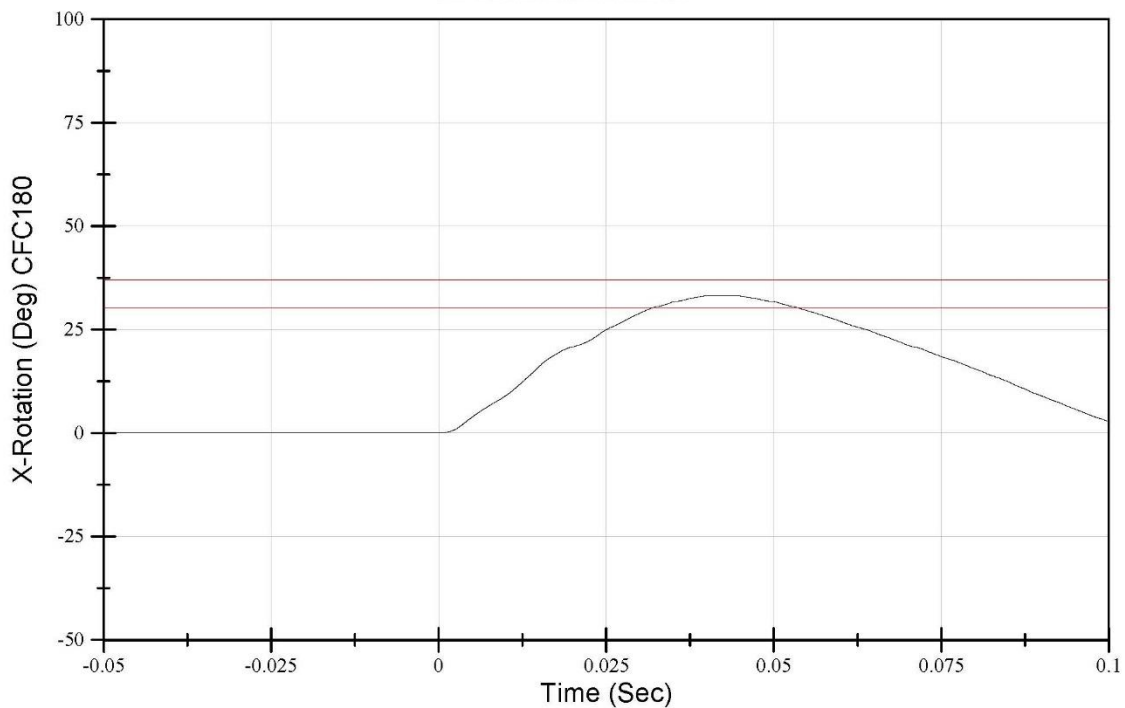


Software Version: 2.4

File Name: LX0039Eversion150324_01processed
03/24/2015 06:43:58.0000

Test Temperature: 71 degrees
Relative Humidity: 26.8%
Test Velocity: 2.04 m/s

THOR Left Foot Eversion Certification
Ankle X-Rotation
Serial Number: LX0039

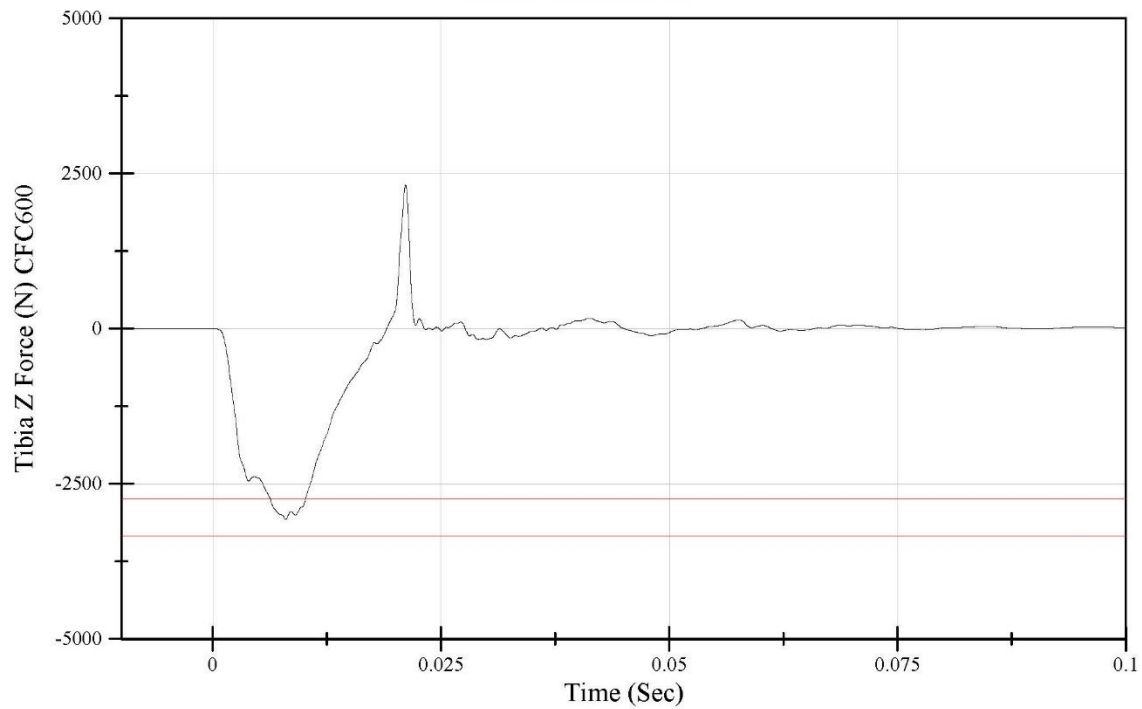


Software Version: 2.4

File Name: LX0039Eversion150324_01processed
03/24/2015 06:43:58.0000

Test Temperature: 71 degrees
Relative Humidity: 26.4%
Test Velocity: 3.96875 m/s

THOR Left Foot Heel Certification
Tibia Load
Serial Number: LX0039

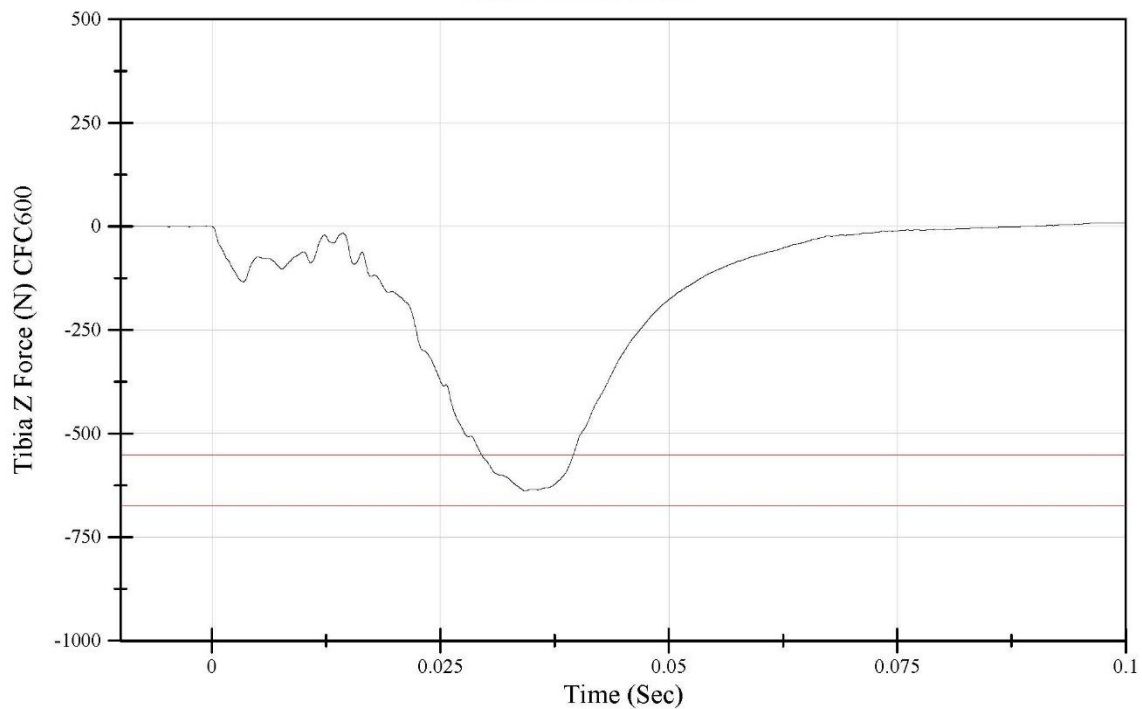


Software Version: 2.4

File Name: LX0039Heel150324_01processed
03/24/2015 10:54:09.0000

Test Temperature: 71 degrees
Relative Humidity: 28.6%
Test Velocity: 2 m/s

THOR Left Foot Inversion Certification
Tibia Load
Serial Number: LX0039

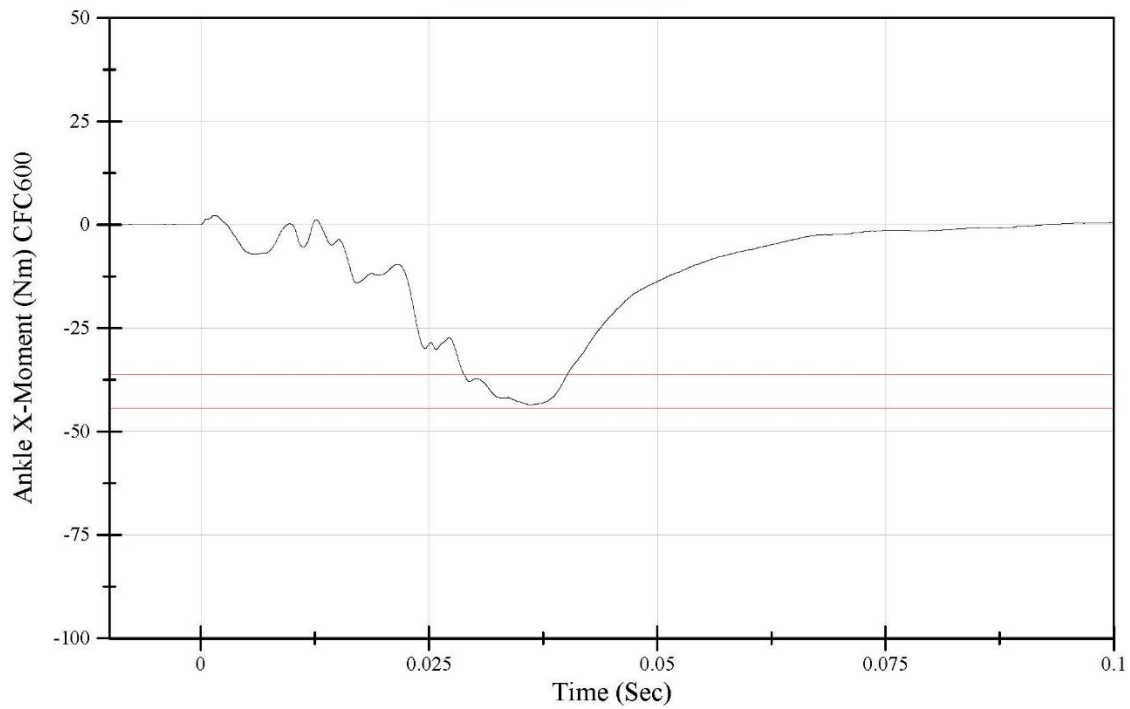


Software Version: 2.4

File Name: LX0039Inversion150323_02processed
03/23/2015 16:18:23.0000

Test Temperature: 71 degrees
Relative Humidity: 28.6%
Test Velocity: 2 m/s

THOR Left Foot Inversion Certification
Ankle Moment
Serial Number: LX0039

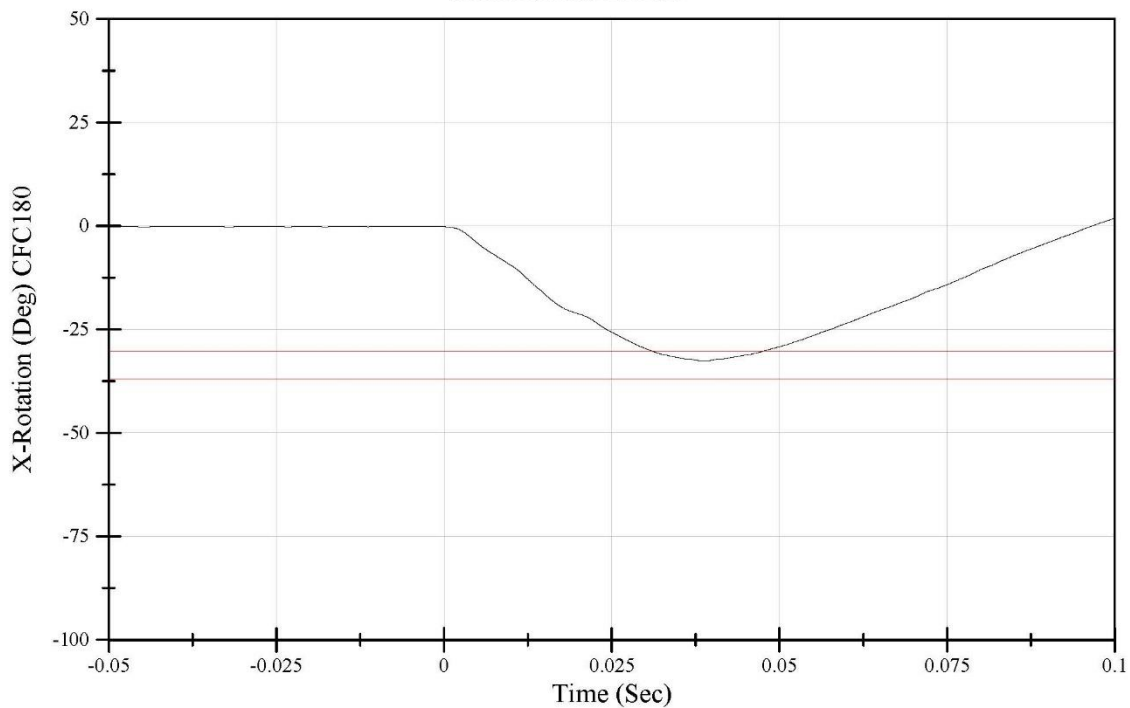


Software Version: 2.4

File Name: LX0039Inversion150323_02processed
03/23/2015 16:18:23.0000

Test Temperature: 71 degrees
Relative Humidity: 28.6%
Test Velocity: 2 m/s

THOR Left Foot Inversion Certification
Ankle X-Rotation
Serial Number: LX0039

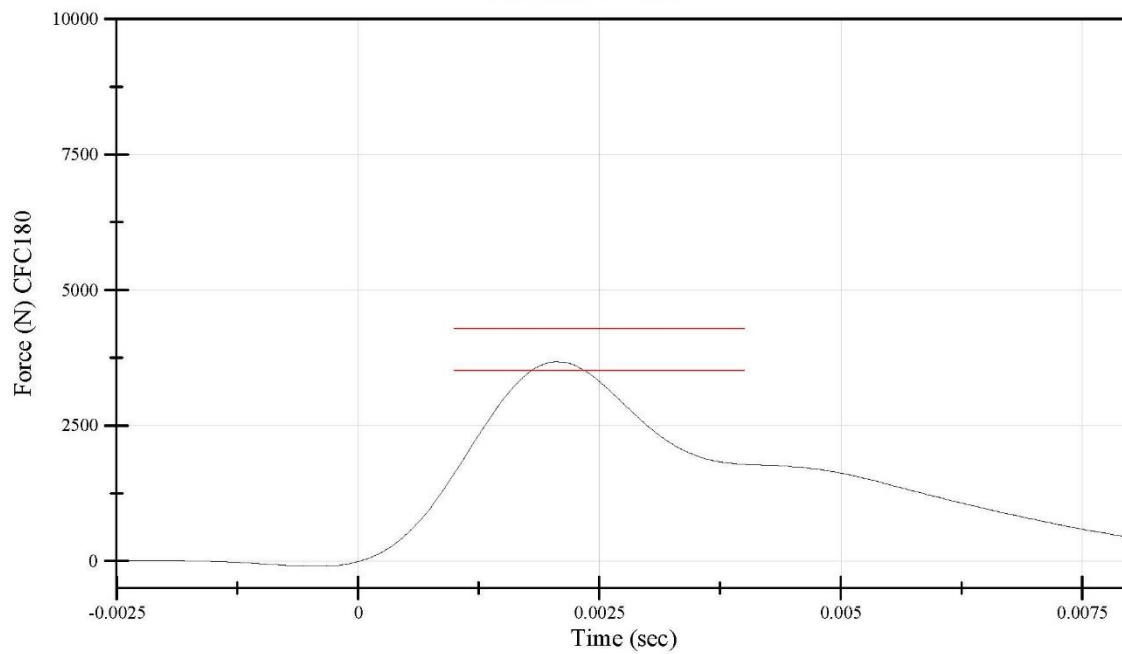


Software Version: 2.4

File Name: LX0039Inversion150323_02processed
03/23/2015 16:18:23.0000

Test Temperature: 70 degrees
Relative Humidity: 52%
Test Velocity: 2.64 m/s

THOR Left Femur Certification
Probe Force
Serial Number: T015

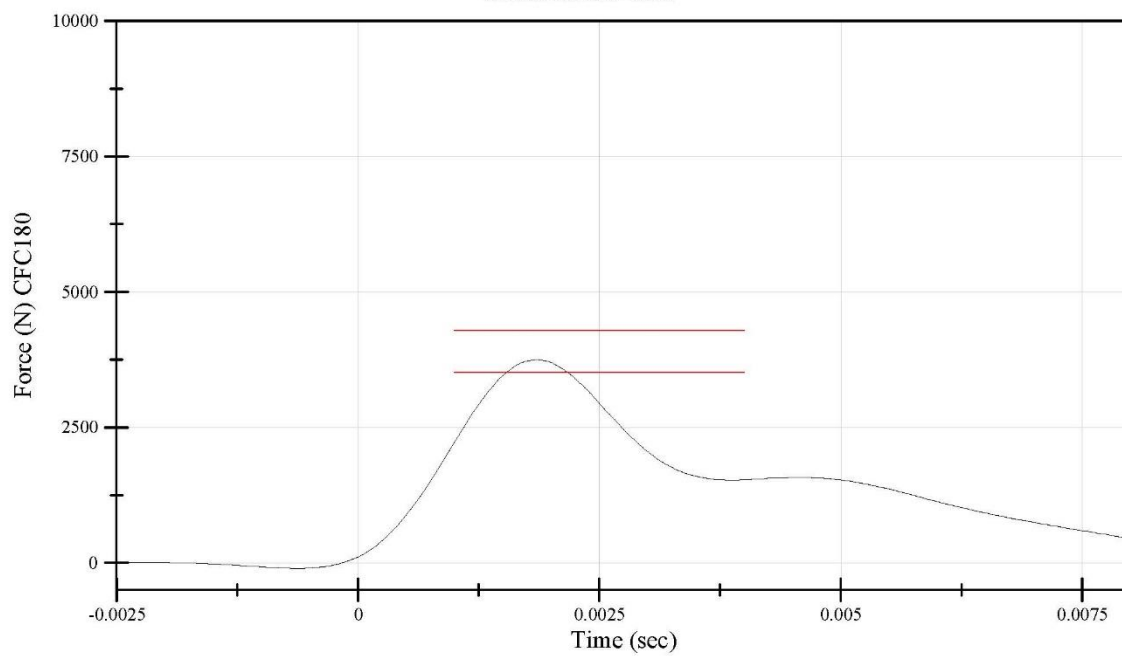


Software Version: 2.4

File Name: T015FELE150713-06_pro
07/13/2015 15:52:51.0000

Test Temperature: 69.9 degrees
Relative Humidity: 52%
Test Velocity: 2.64 m/s

THOR Right Femur Certification
Probe Force
Serial Number: T015

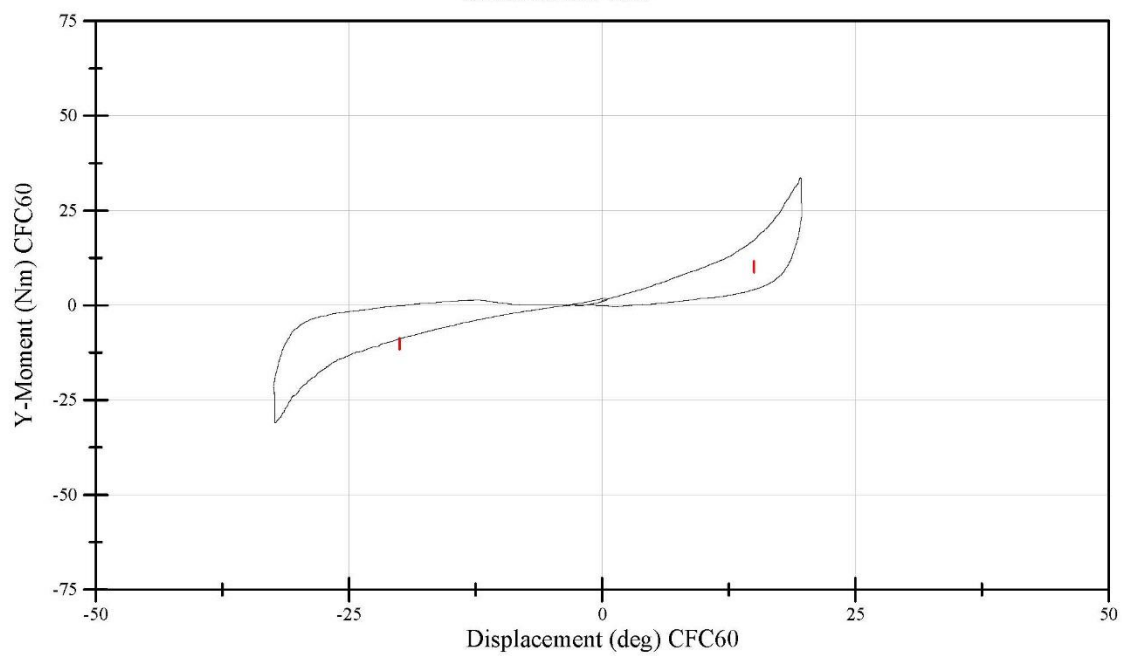


Software Version: 2.4

File Name: T015FERI150713-01_pro
07/13/2015 12:54:56.0000

Test Temperature: 69.6 degrees
Relative Humidity: 52%
Test Velocity: 0 m/s

THOR Occipital Condyle Quasi-Static Certification
Displacement vs. Torque
Serial Number: T015



Software Version: 2.4

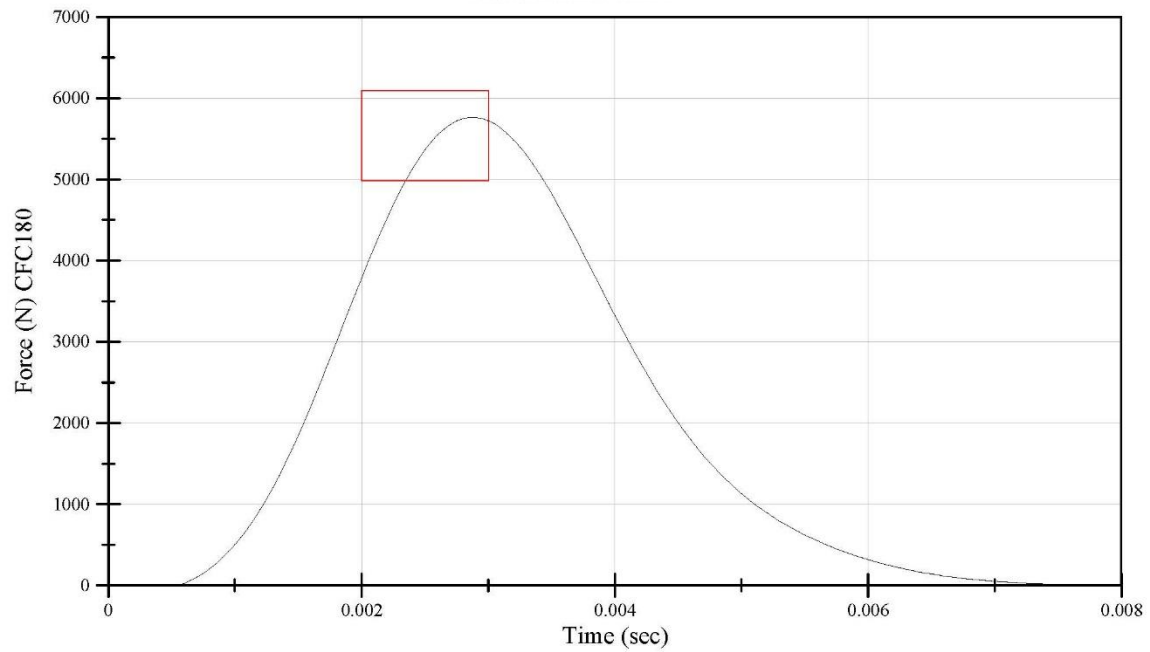
File Name: T015OCPot150701-03_pro
07/01/2015 13:24:58.0000

50% ADULT MALE THOR016 DUMMY CALIBRATIONS

Test Temperature: 69.8 degrees
Relative Humidity: 53%
Test Velocity: 1.98 m/s

THOR Head Impact Certification

Probe Force
Serial Number: T0016



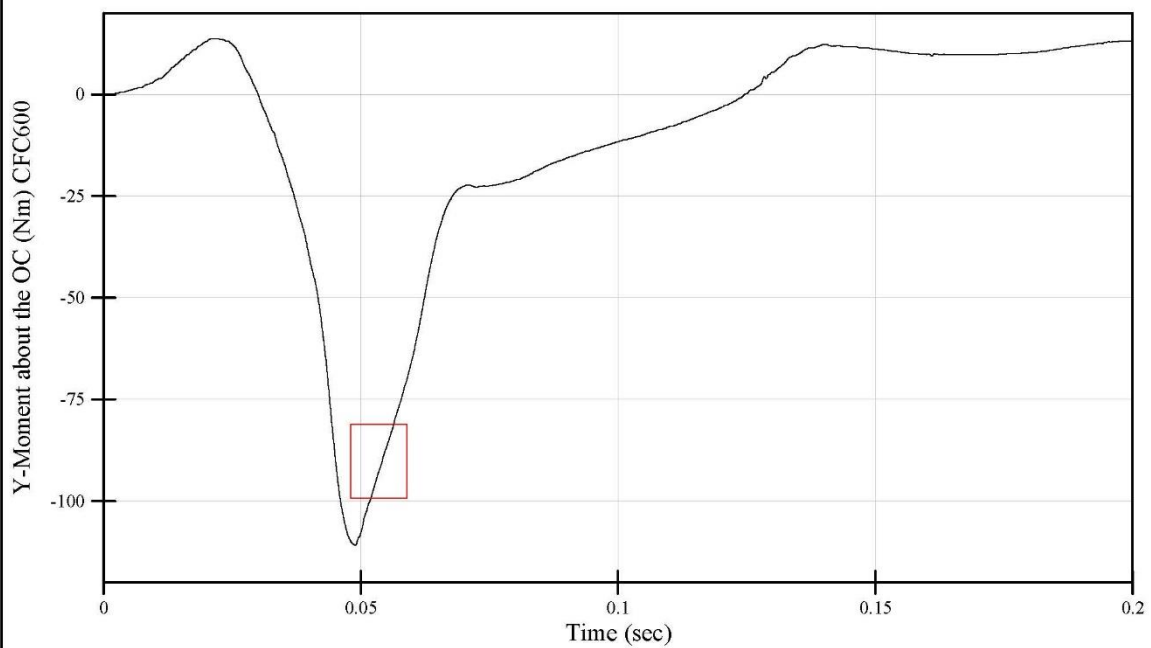
Software Version: 2.4

File Name: T0016HEAD150813-03_pro tdms
08/13/2015 12:52:18.0000

Test Temperature: 70.4 degrees
Relative Humidity: 53%
Test Velocity: 3.69 m/s

THOR Neck Extension Certification

Y-Moment
Serial Number: T0016

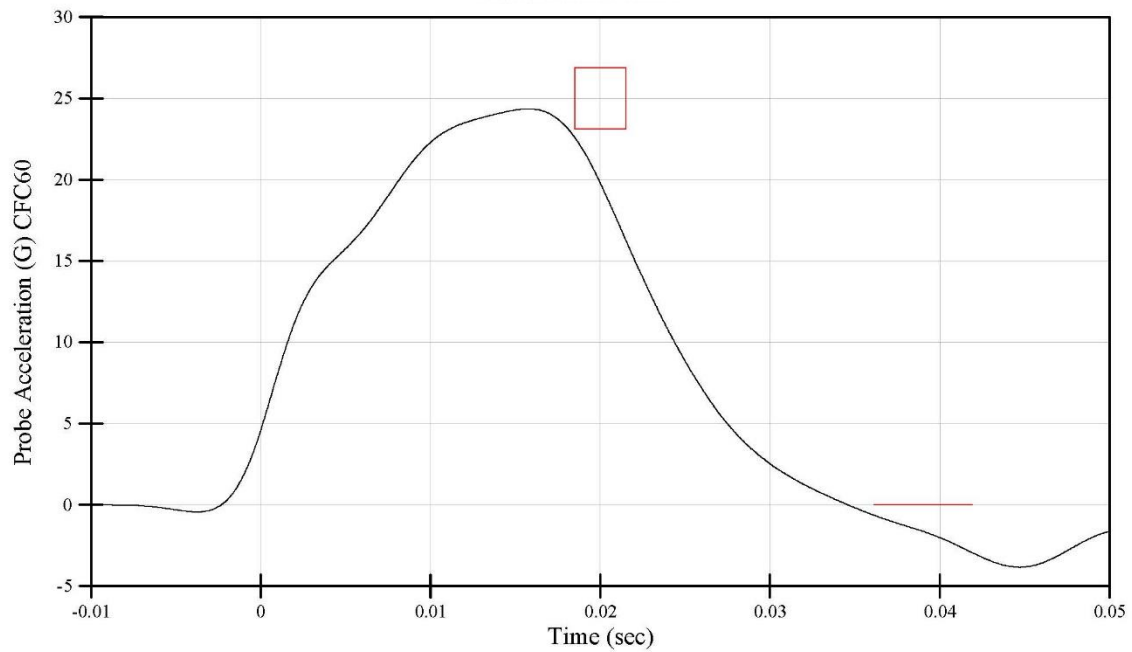


Software Version: 2.4

File Name: T0016NeckExtension150805-01_pro
08/05/2015 10:53:11.0000

Test Temperature: 70.4 degrees
Relative Humidity: 53%
Test Velocity: 3.69 m/s

THOR Neck Extension Certification
Probe Acceleration
Serial Number: T0016

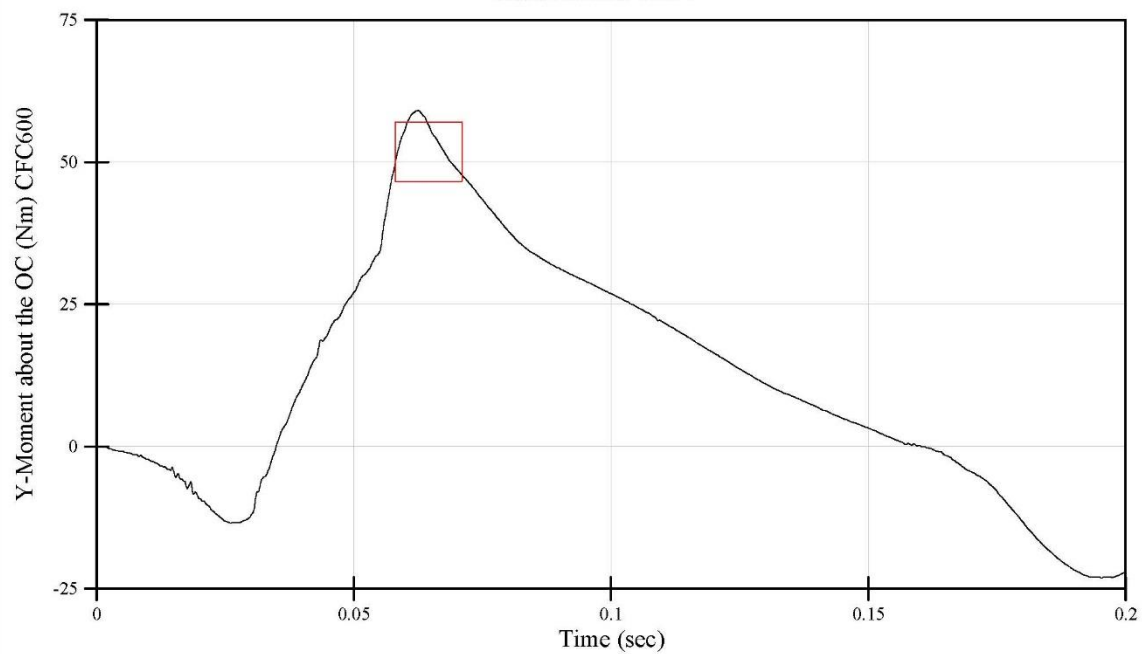


Software Version: 2.4

File Name: T0016NeckExtension150805-01_pro
08/05/2015 10:53:11.0000

Test Temperature: 70.6 degrees
Relative Humidity: 52%
Test Velocity: 3.78 m/s

THOR Neck Flexion Certification
Y-Moment
Serial Number: T0016

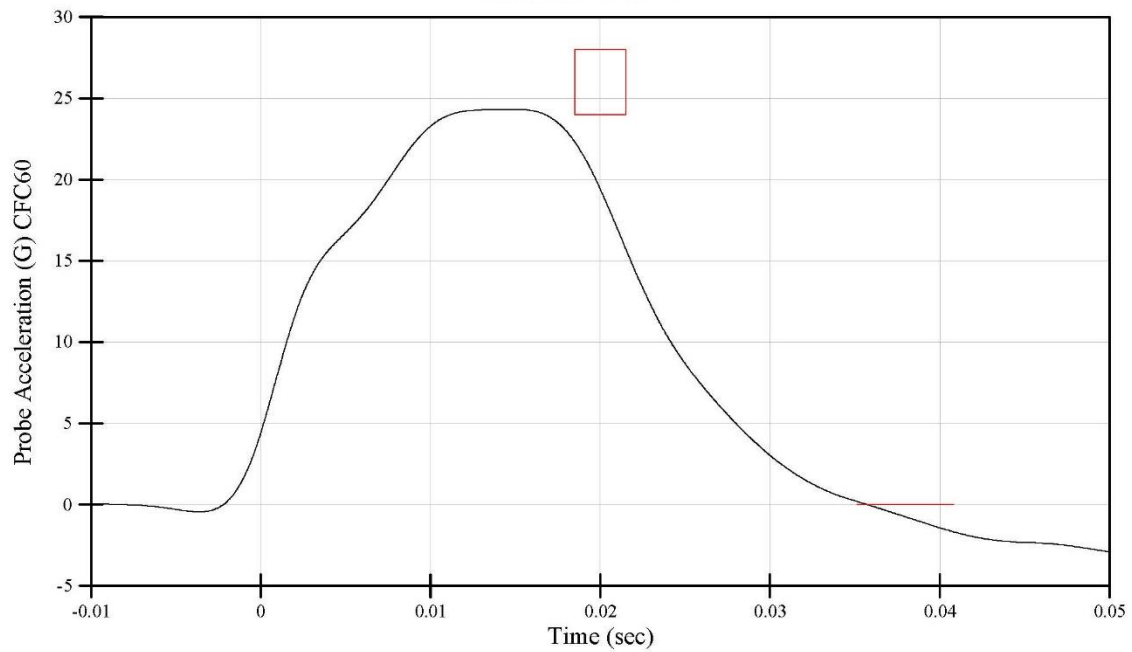


Software Version: 2.4

File Name: T0016NeckFlexion150805-01_pro
08/05/2015 10:24:56.0000

Test Temperature: 70.6 degrees
Relative Humidity: 52%
Test Velocity: 3.78 m/s

THOR Neck Flexion Certification
Probe Acceleration
Serial Number: T0016

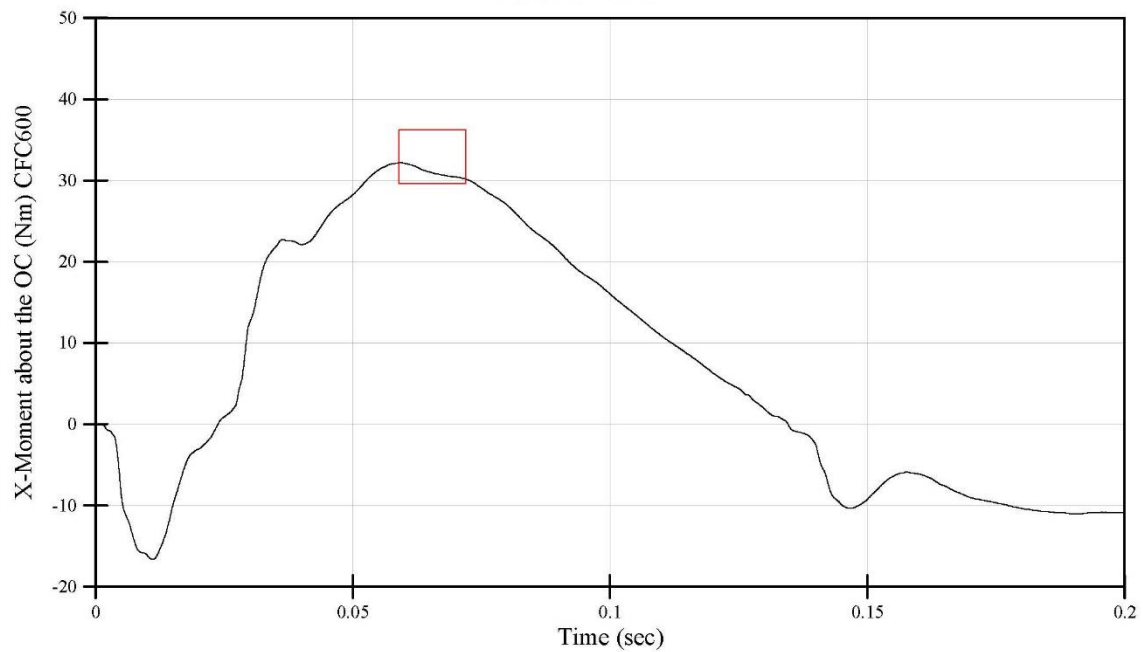


Software Version: 2.4

File Name: T0016NeckFlexion150805-01_pro
08/05/2015 10:24:56.0000

Test Temperature: 70.1 degrees
Relative Humidity: 51%
Test Velocity: 2.86 m/s

THOR Neck Left Lateral Flexion Certification
X-Moment
Serial Number: T0016



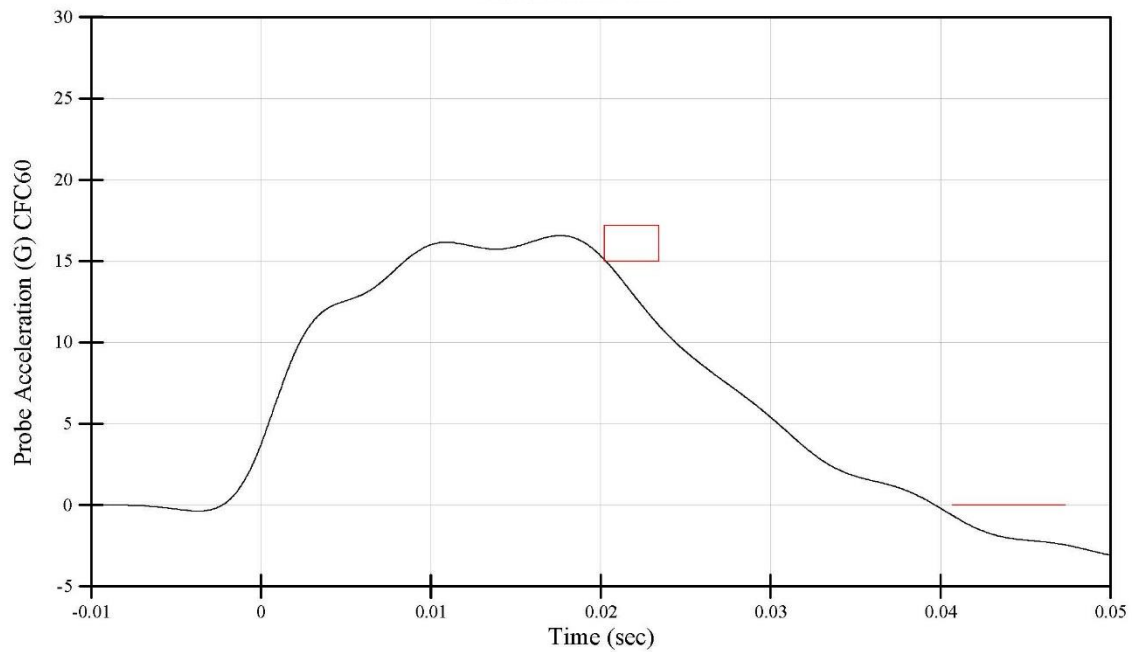
Software Version: 2.4

File Name: T0016NeckLeft150805-01_pro
08/05/2015 11:53:26.0000

Test Temperature: 70.1 degrees
Relative Humidity: 51%
Test Velocity: 2.86 m/s

THOR Neck Left Lateral Flexion Certification

Probe Acceleration
Serial Number: T0016



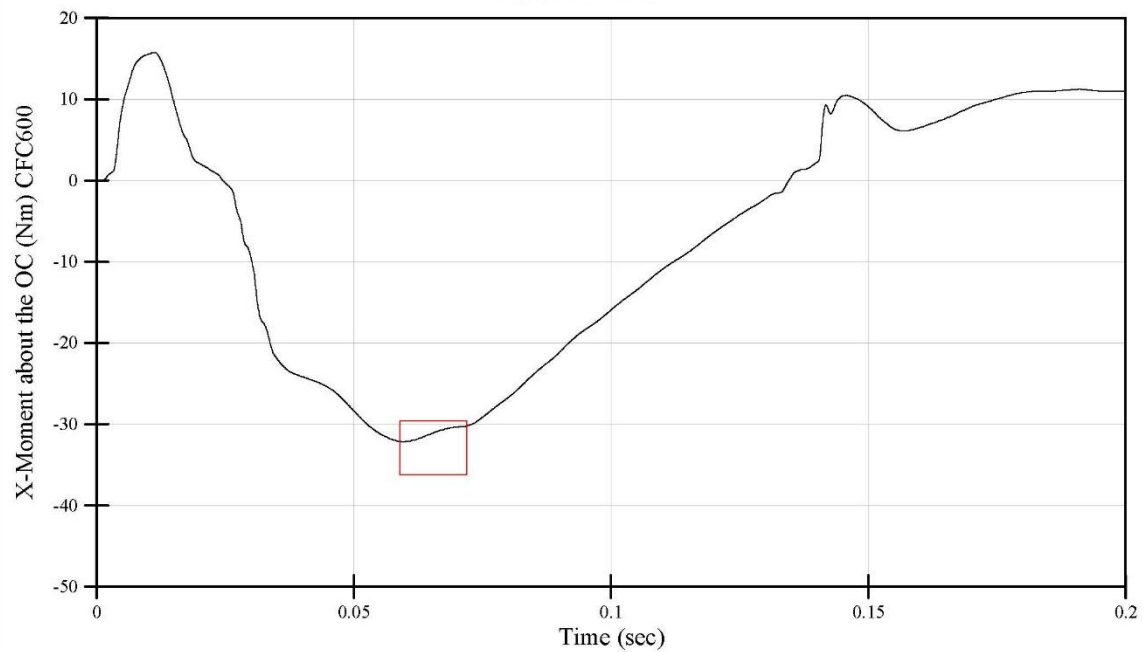
Software Version: 2.4

File Name: T0016NeckLeft150805-01_pro
08/05/2015 11:53:26.0000

Test Temperature: 70.2 degrees
Relative Humidity: 52%
Test Velocity: 2.87 m/s

THOR Neck Right Lateral Flexion Certification

X-Moment
Serial Number: T0016



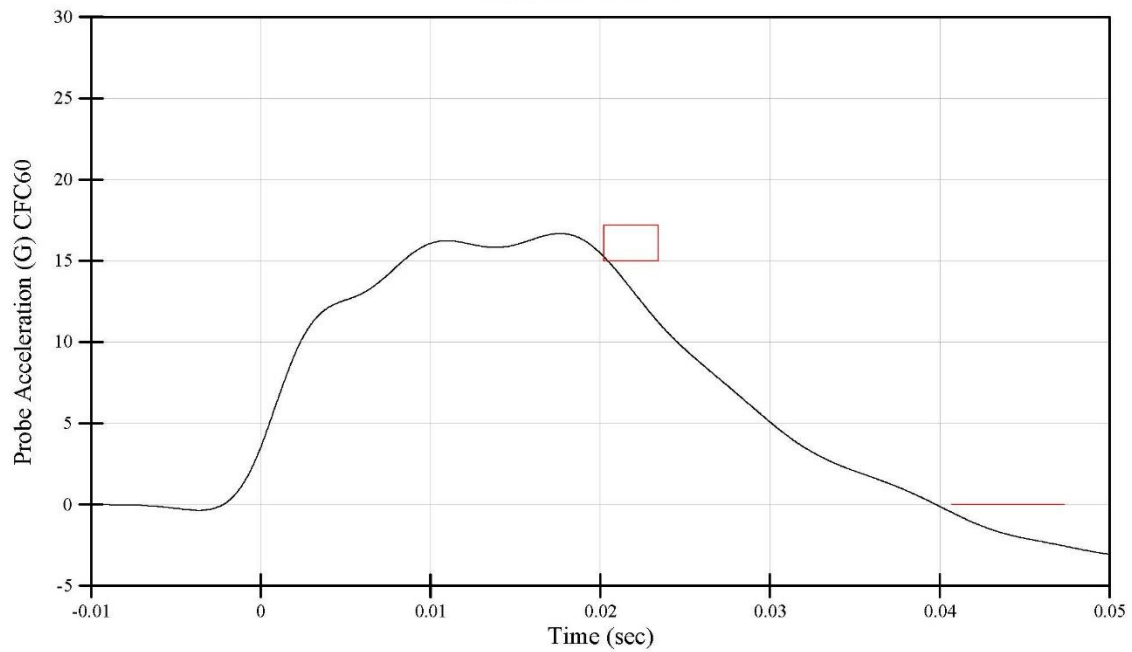
Software Version: 2.4

File Name: T0016NeckRight150805-01_pro
08/05/2015 11:24:43.0000

Test Temperature: 70.2 degrees
Relative Humidity: 52%
Test Velocity: 2.87 m/s

THOR Neck Right Lateral Flexion Certification

Probe Acceleration
Serial Number: T0016

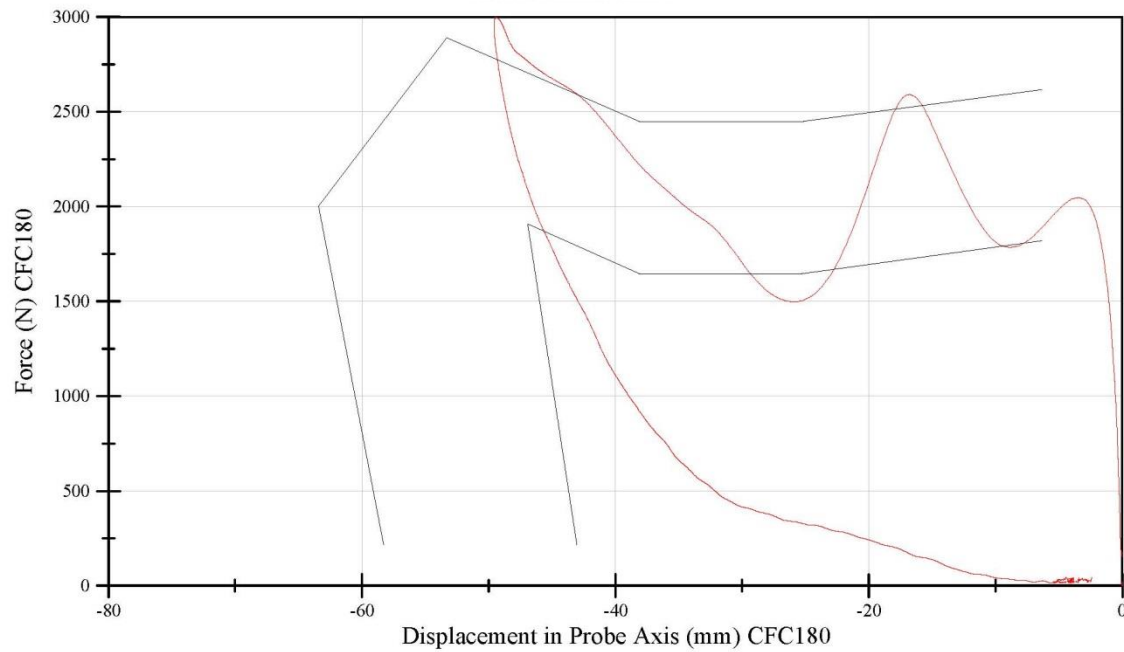


Software Version: 2.4

File Name: T0016NeckRight150805-01_pro
08/05/2015 11:24:43.0000

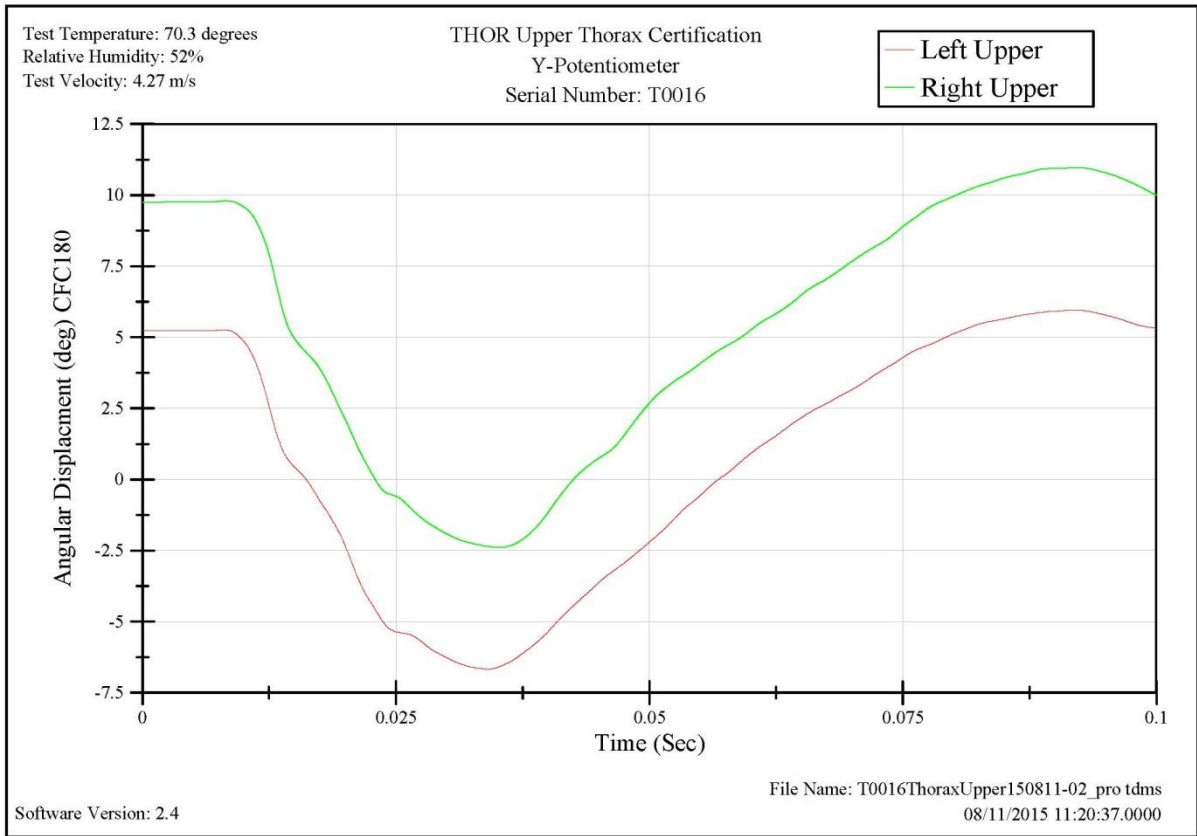
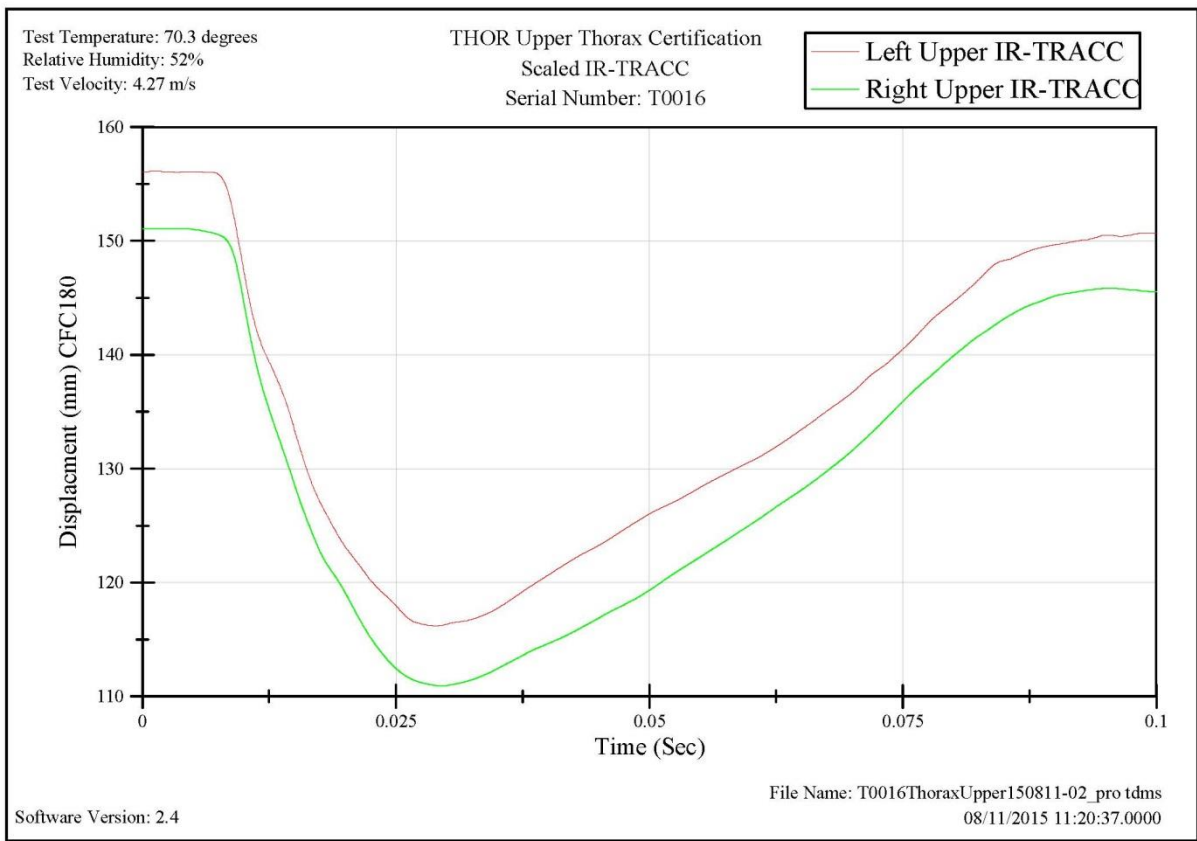
Test Temperature: 70.3 degrees
Relative Humidity: 52%
Test Velocity: 4.27 m/s

THOR Upper Thorax Certification Thorax Response With Kroell Corridor Serial Number: T0016



Software Version: 2.4

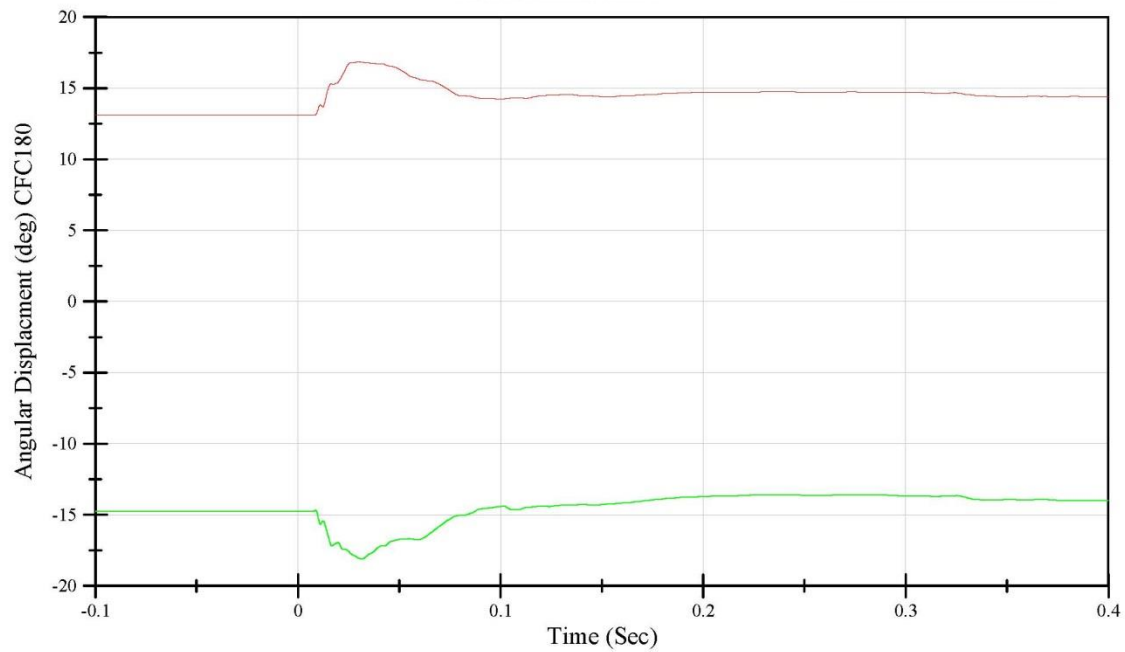
File Name: T0016ThoraxUpper150811-02_pro.tdms
08/11/2015 11:20:37.0000



Test Temperature: 70.3 degrees
Relative Humidity: 52%
Test Velocity: 4.27 m/s

THOR Upper Thorax Certification
Z-Potentiometer
Serial Number: T0016

Left Upper
Right Upper

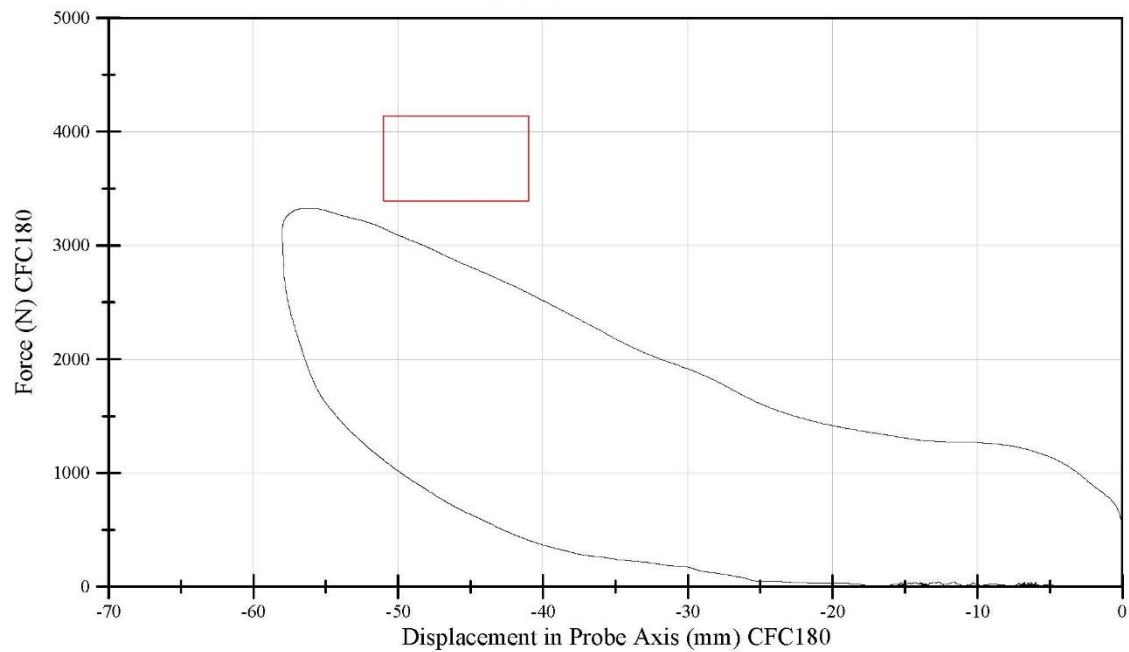


Software Version: 2.4

File Name: T0016ThoraxUpper150811-02_pro tdms
08/11/2015 11:20:37.0000

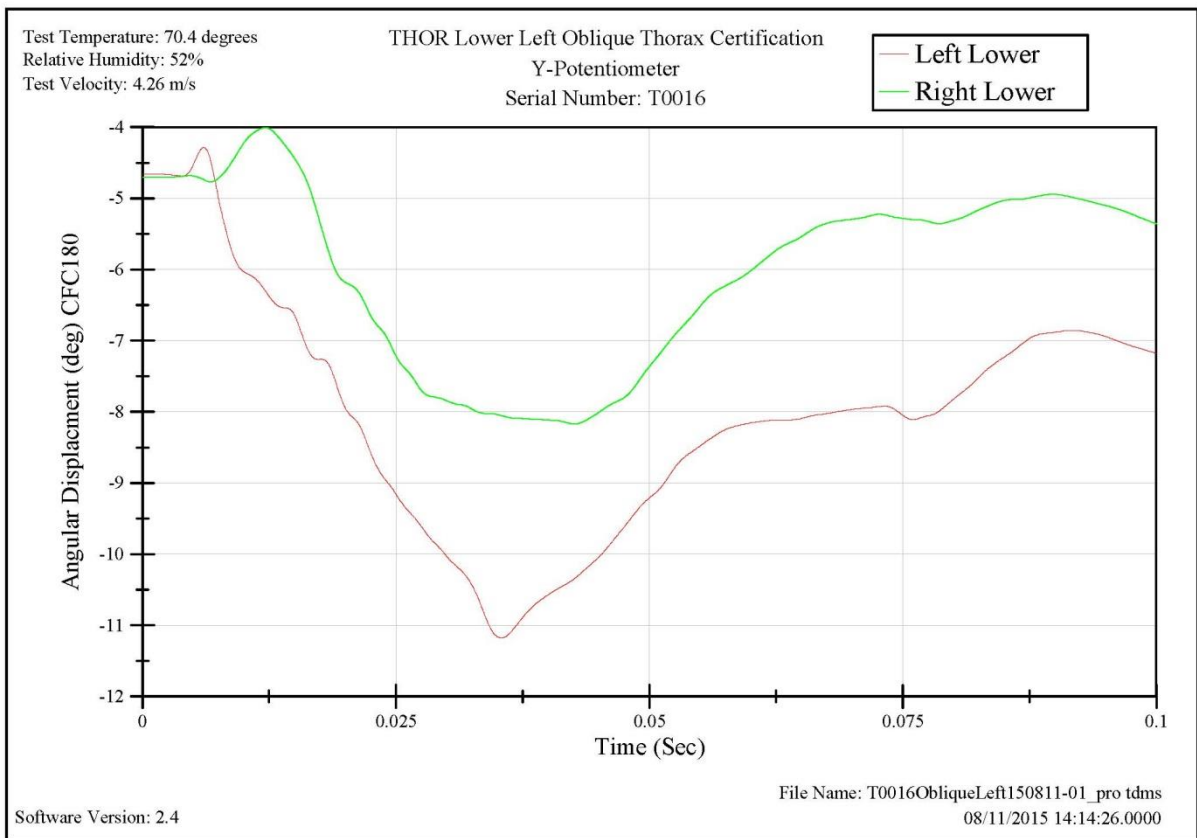
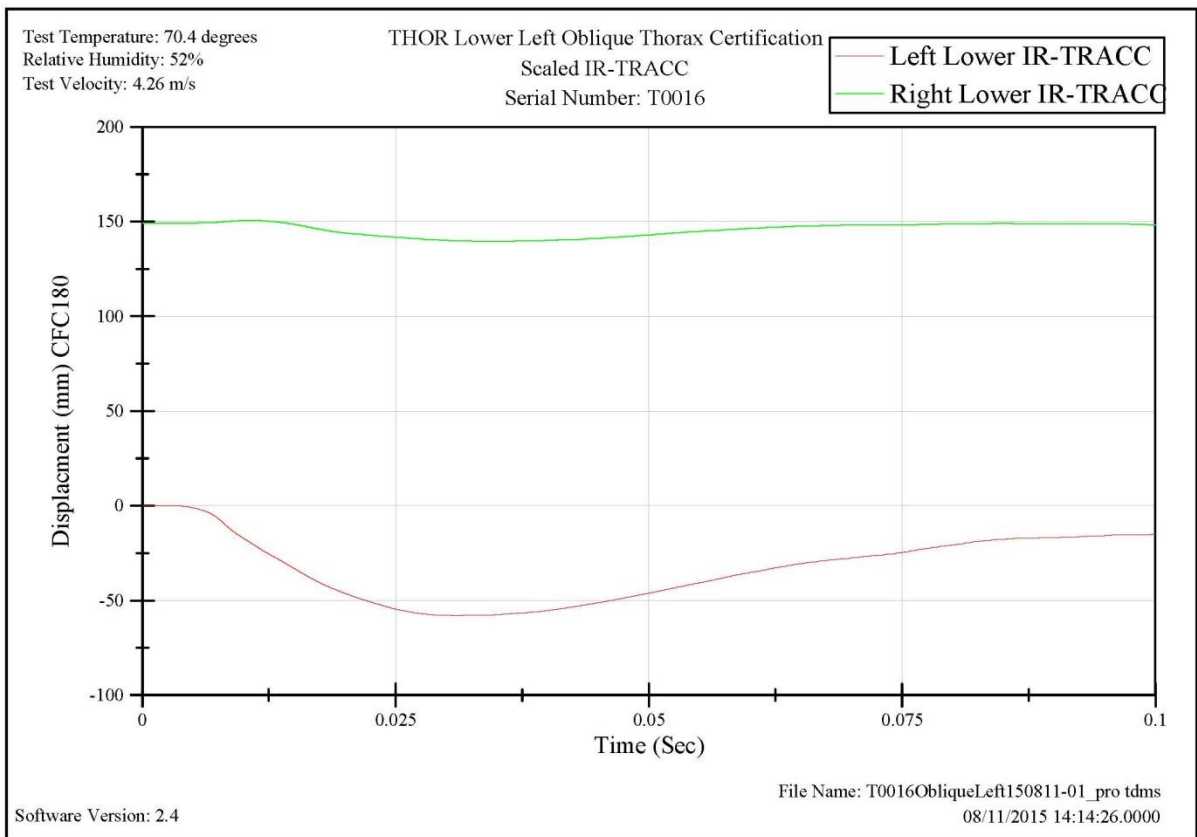
Test Temperature: 70.4 degrees
Relative Humidity: 52%
Test Velocity: 4.26 m/s

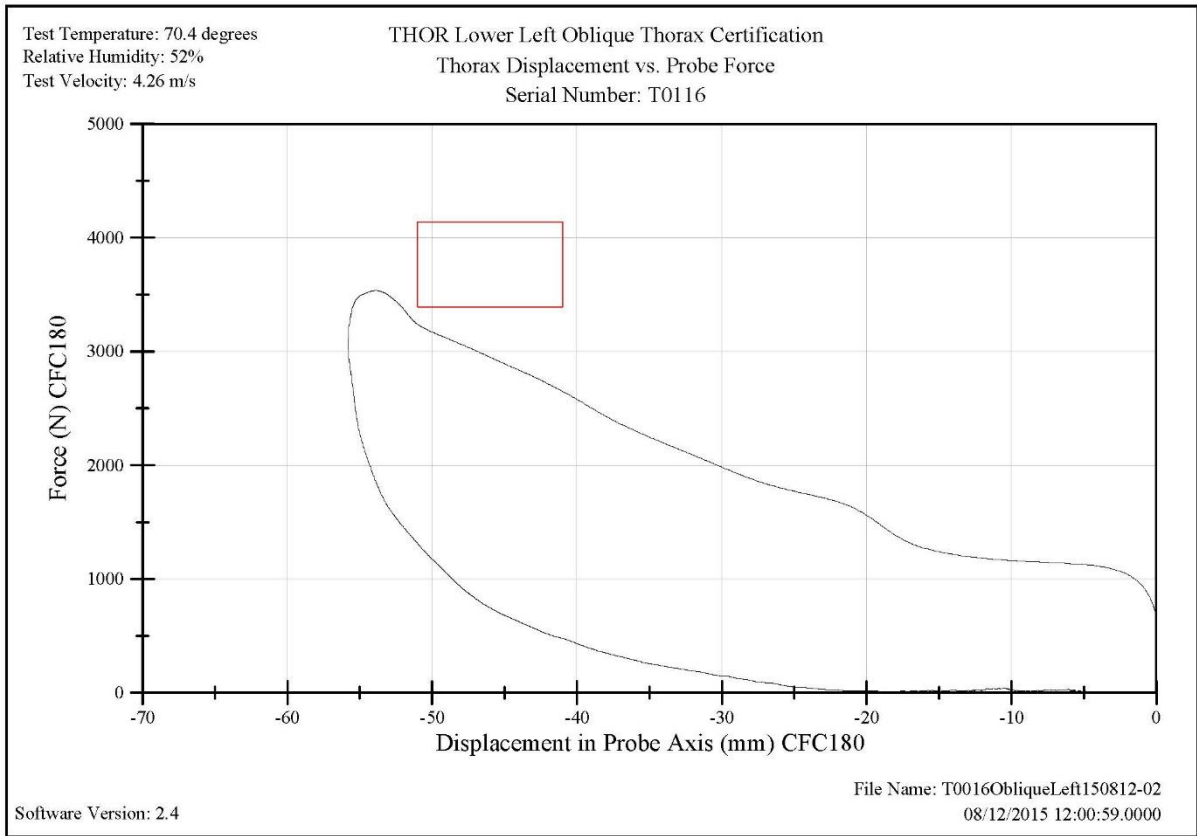
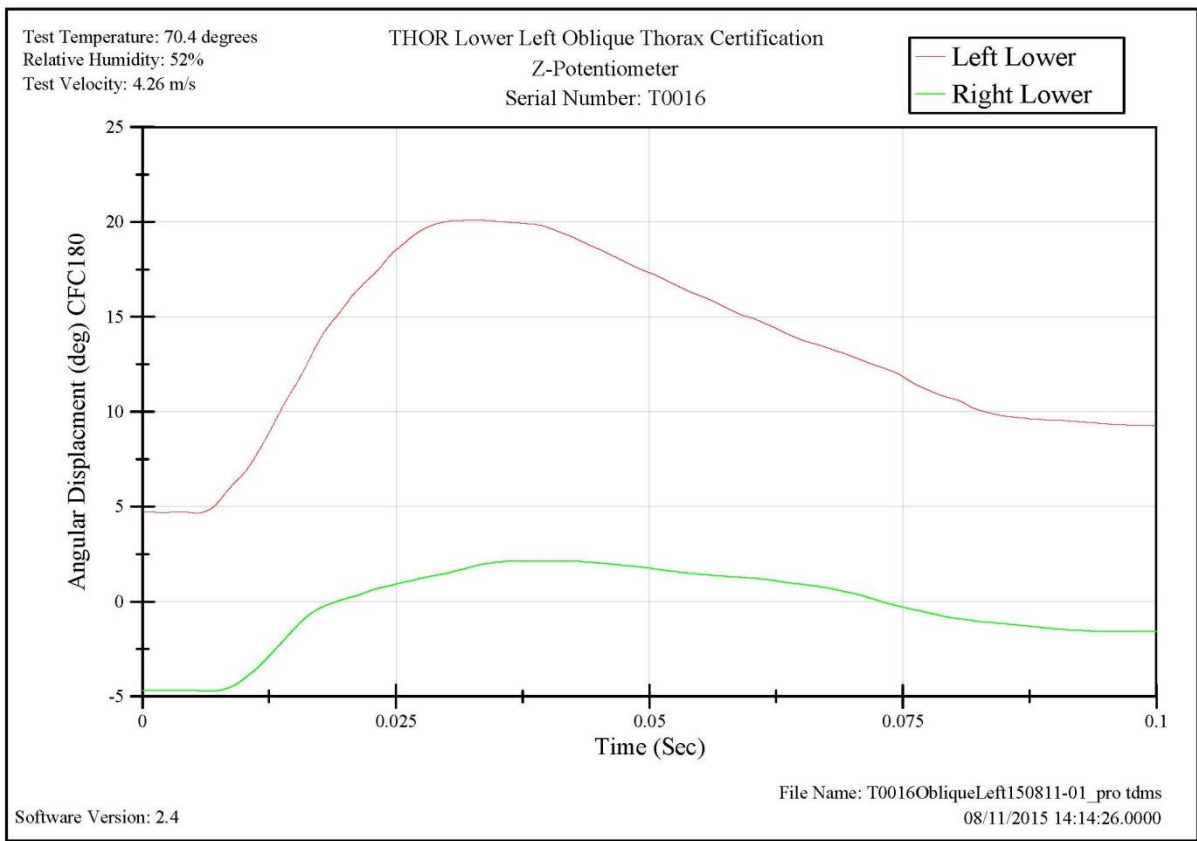
THOR Lower Left Oblique Thorax Certification
Thorax Displacement vs. Probe Force
Serial Number: T0016

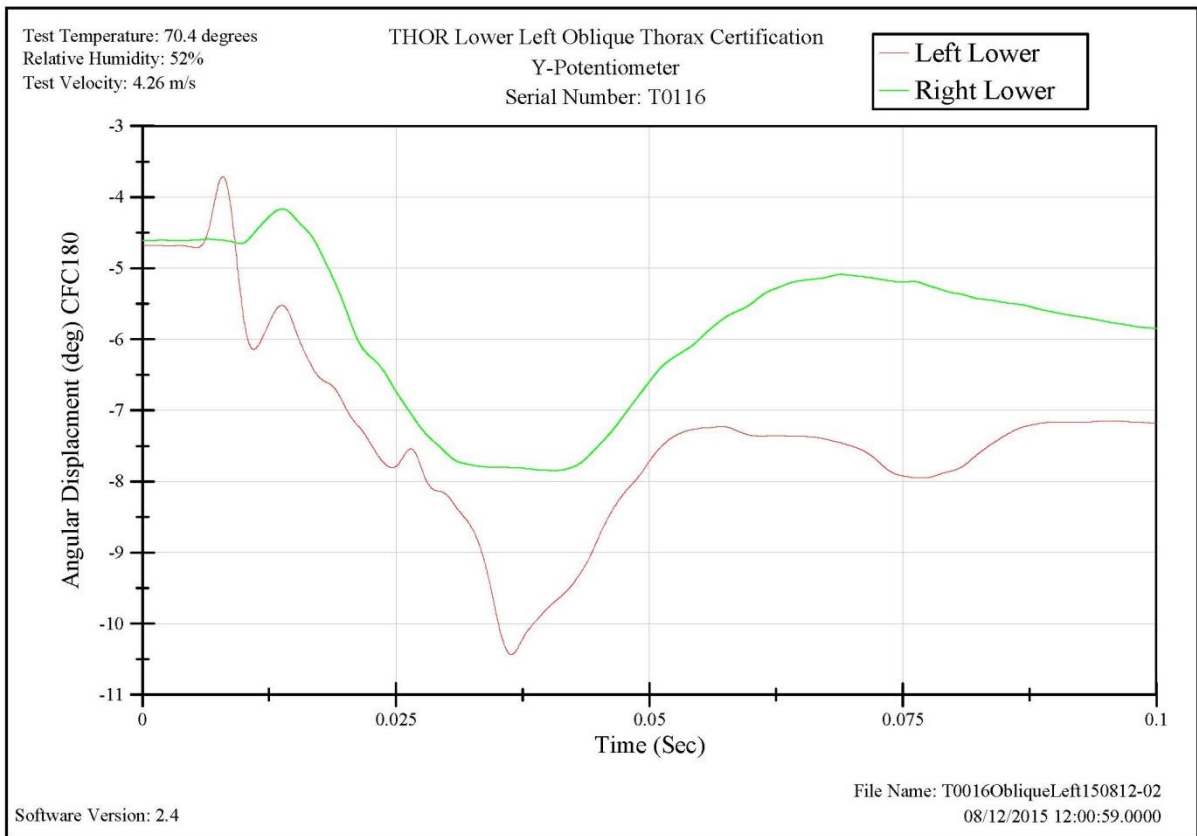
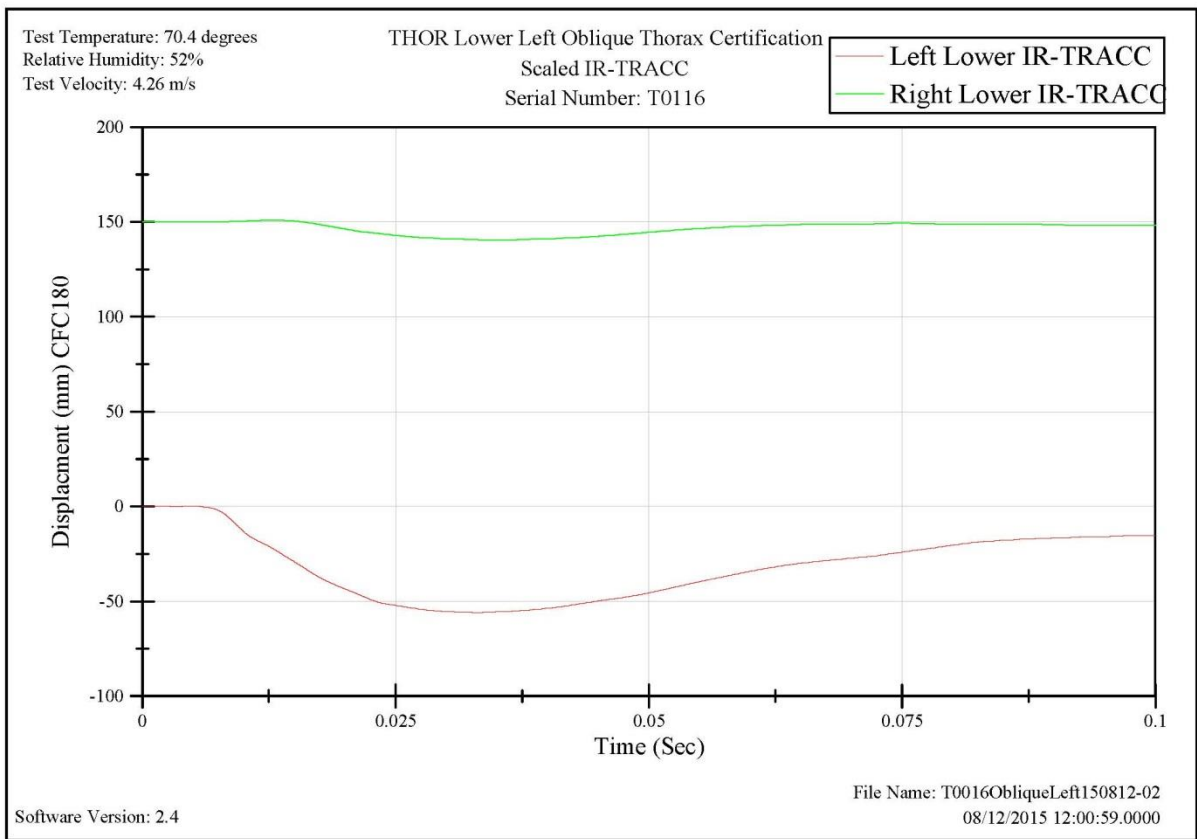


Software Version: 2.4

File Name: T0016ObliqueLeft150811-01_pro tdms
08/11/2015 14:14:26.0000

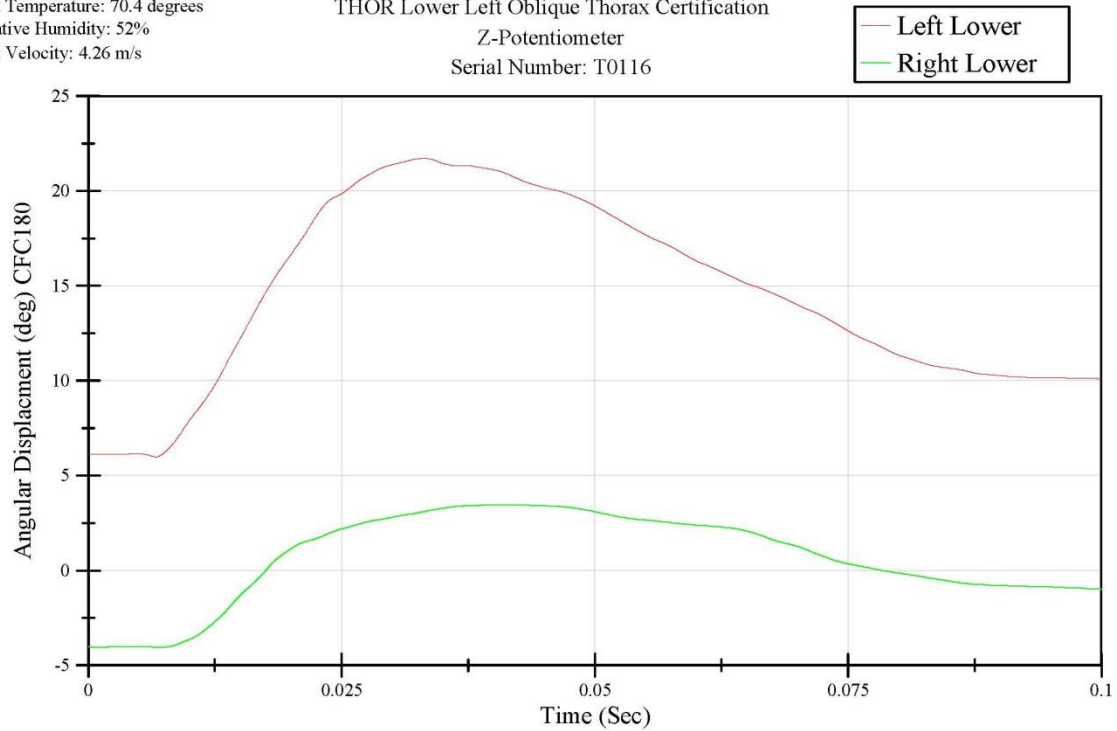






Test Temperature: 70.4 degrees
Relative Humidity: 52%
Test Velocity: 4.26 m/s

THOR Lower Left Oblique Thorax Certification
Z-Potentiometer
Serial Number: T0116

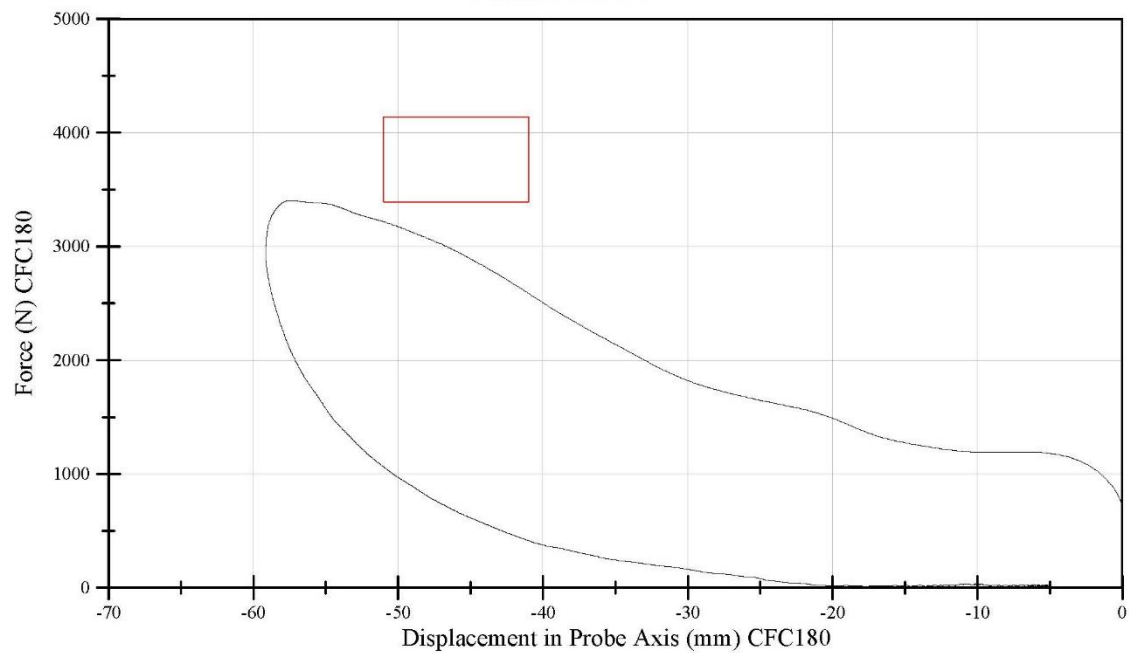


Software Version: 2.4

File Name: T0016ObliqueLeft150812-02
08/12/2015 12:00:59.0000

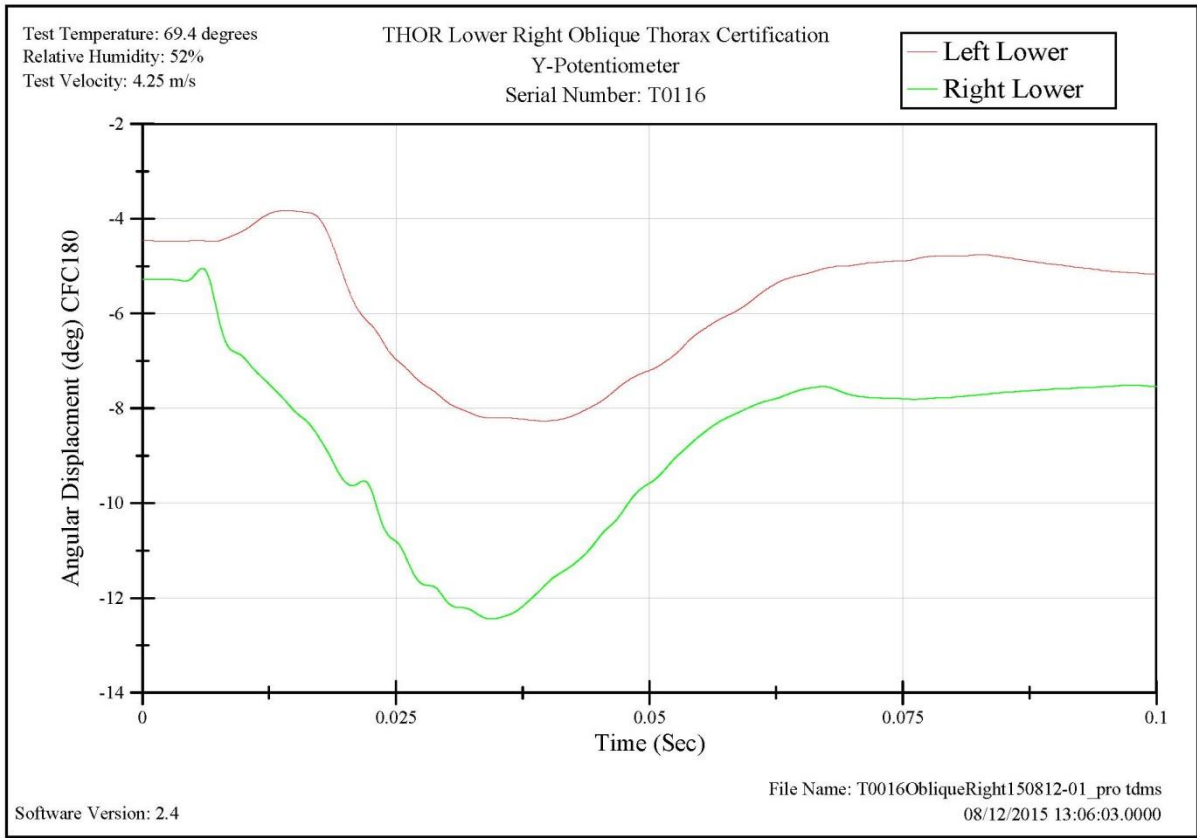
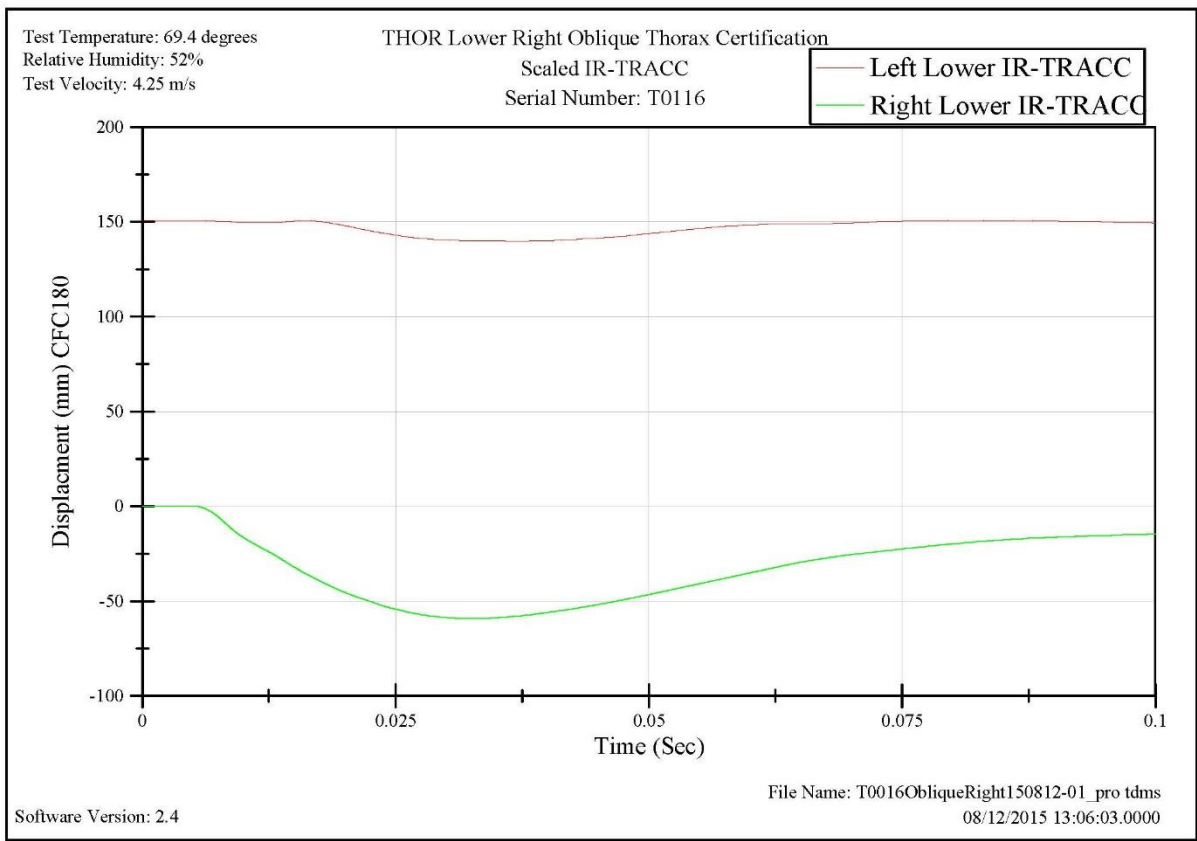
Test Temperature: 69.4 degrees
Relative Humidity: 52%
Test Velocity: 4.25 m/s

THOR Lower Right Oblique Thorax Certification
Thorax Displacement vs. Probe Force
Serial Number: T0116



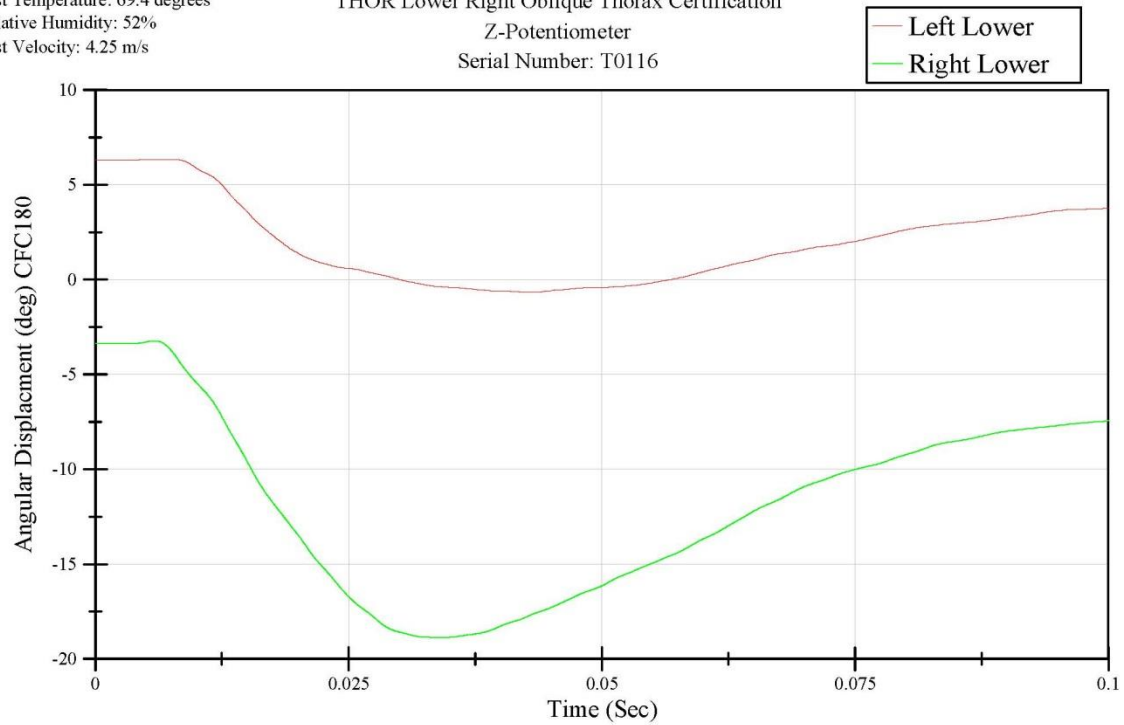
Software Version: 2.4

File Name: T0016ObliqueRight150812-01_pro tdms
08/12/2015 13:06:03.0000



Test Temperature: 69.4 degrees
Relative Humidity: 52%
Test Velocity: 4.25 m/s

THOR Lower Right Oblique Thorax Certification
Z-Potentiometer
Serial Number: T0116

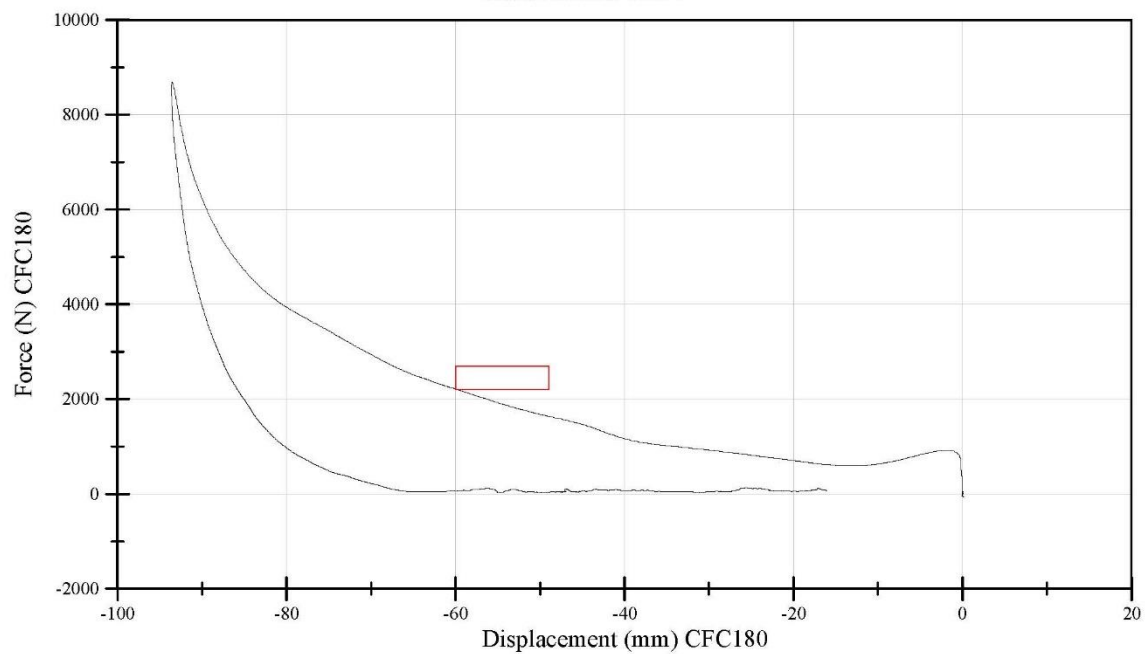


Software Version: 2.4

File Name: T0016ObliqueRight150812-01_pro tdms
08/12/2015 13:06:03.0000

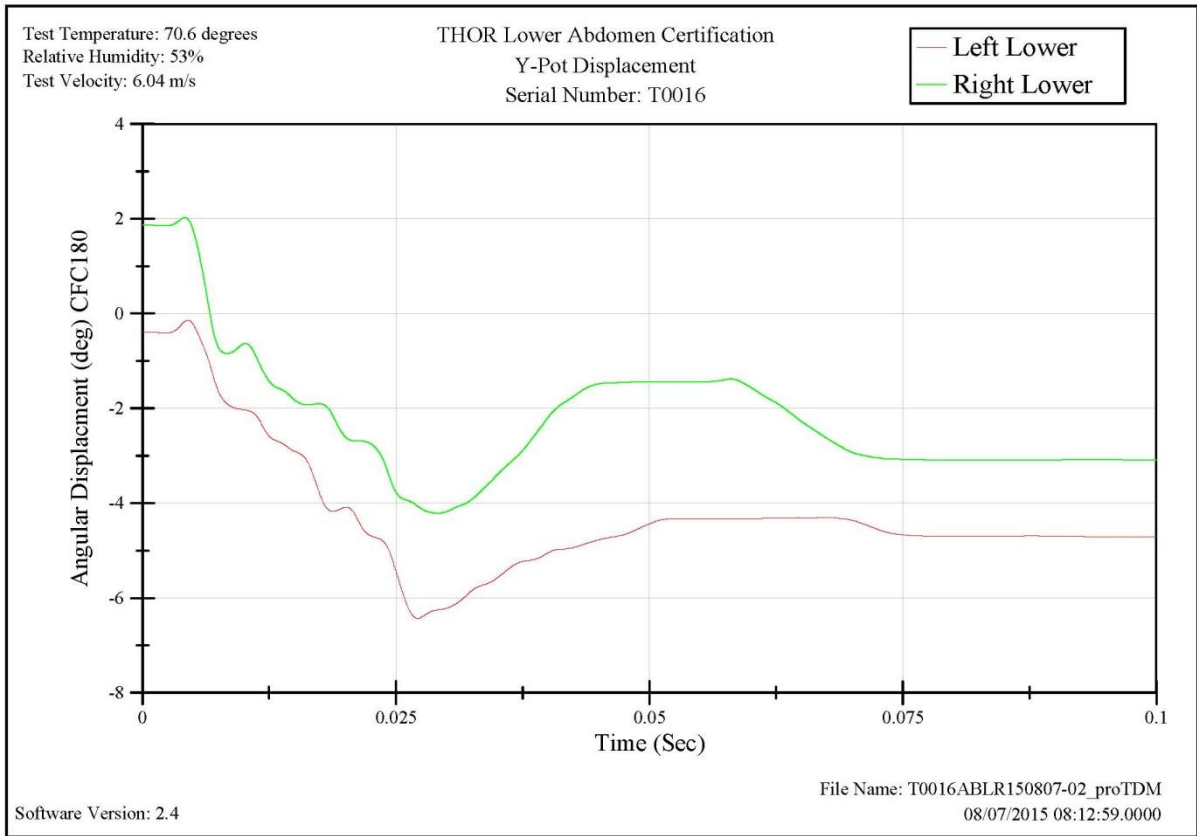
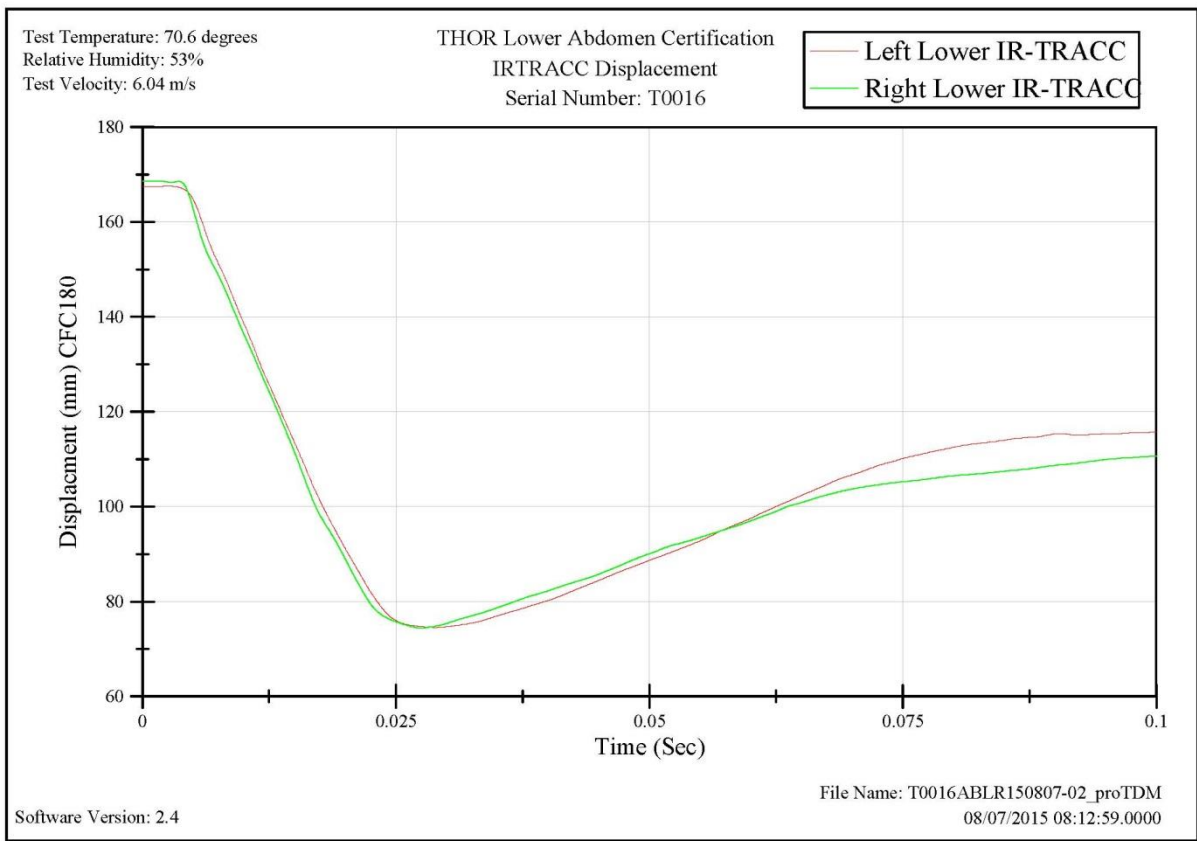
Test Temperature: 70.6 degrees
Relative Humidity: 53%
Test Velocity: 6.04 m/s

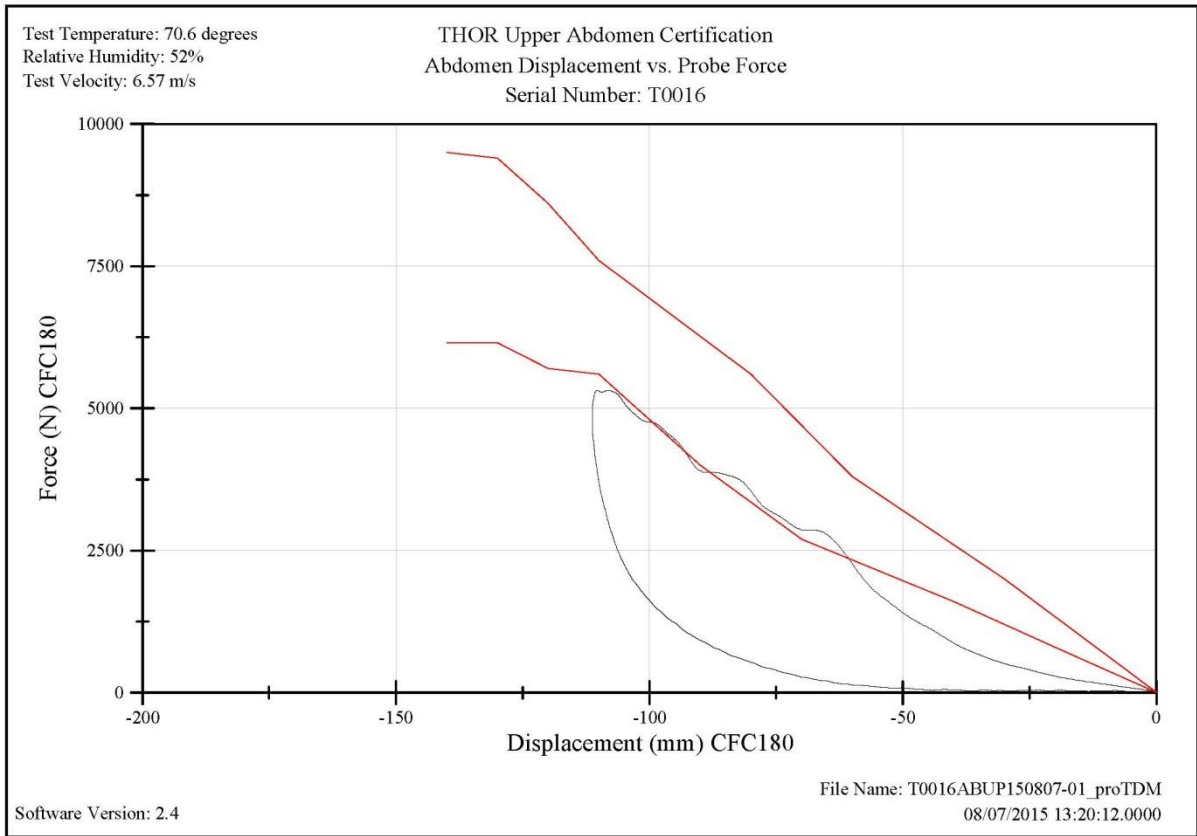
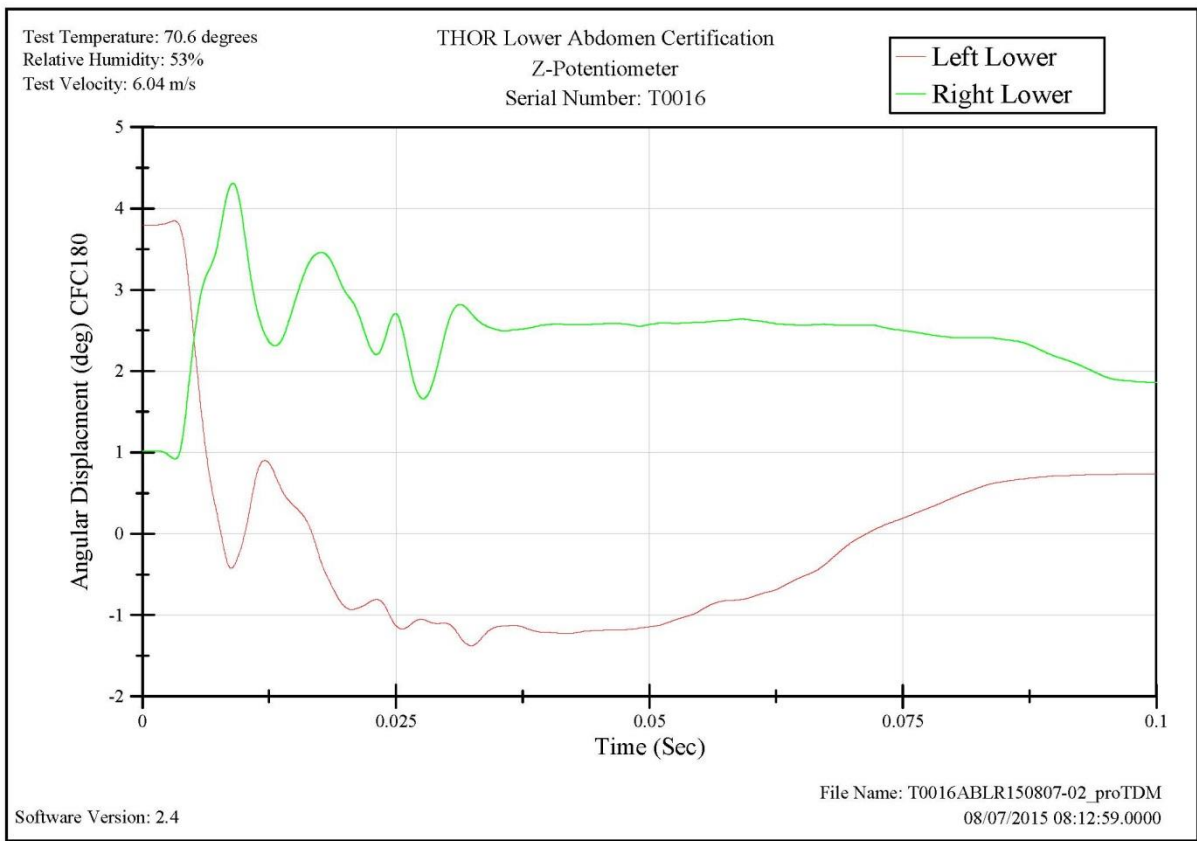
THOR Lower Abdomen Certification
Abdomen Displacement vs. Probe Force
Serial Number: T0016



Software Version: 2.4

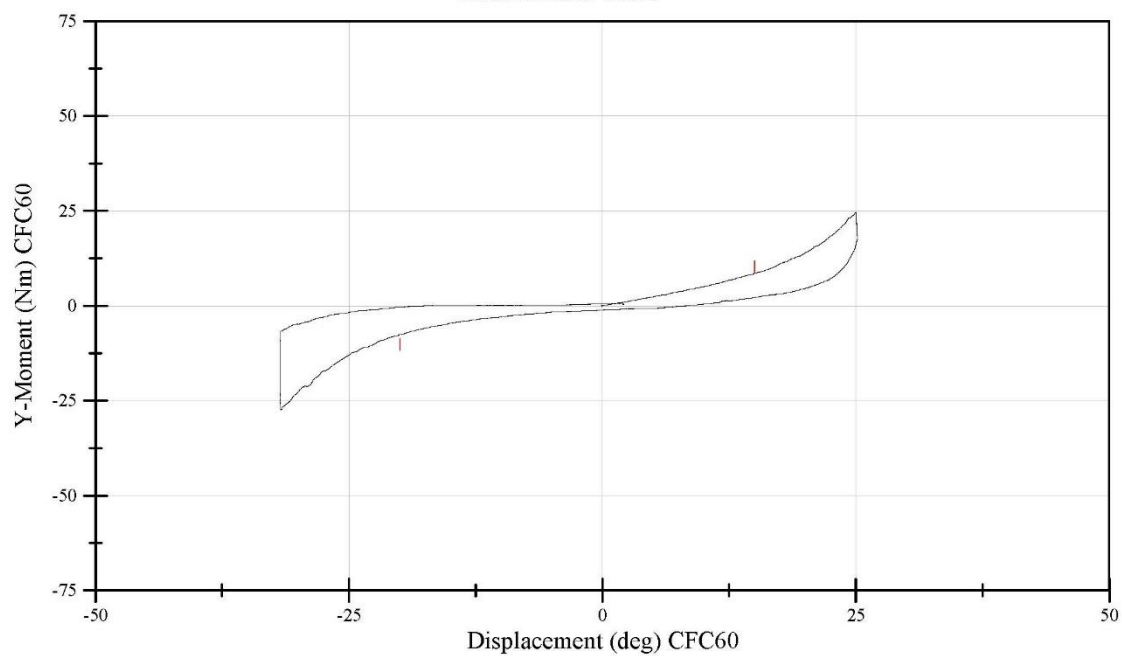
File Name: T0016ABLR150807-02_proTDM
08/07/2015 08:12:59.0000





Test Temperature: 70.1 degrees
Relative Humidity: 53%
Test Velocity: NOVALUE m/s

THOR Occipital Condyle Quasi-Static Certification
Displacement vs. Torque
Serial Number: T0016

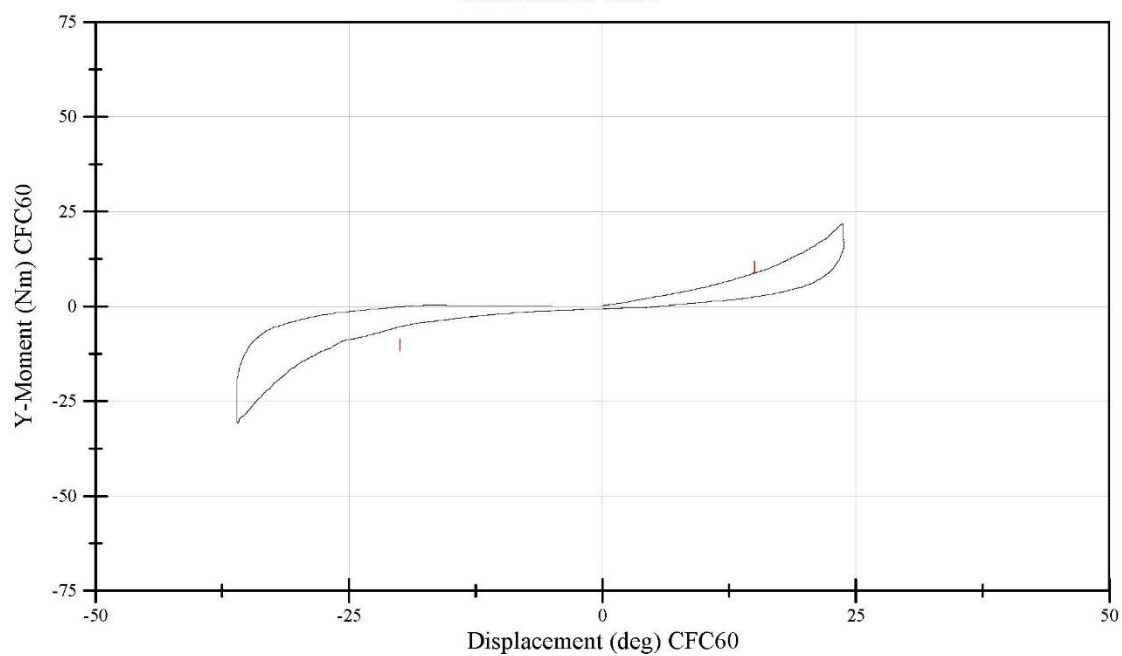


Software Version: 2.4

File Name: T0016OCPot150804-02_pro
08/04/2015 13:15:32.0000

Test Temperature: 70 degrees
Relative Humidity: 52%
Test Velocity: NOVALUE m/s

THOR Occipital Condyle Quasi-Static Certification
Displacement vs. Torque
Serial Number: T0016

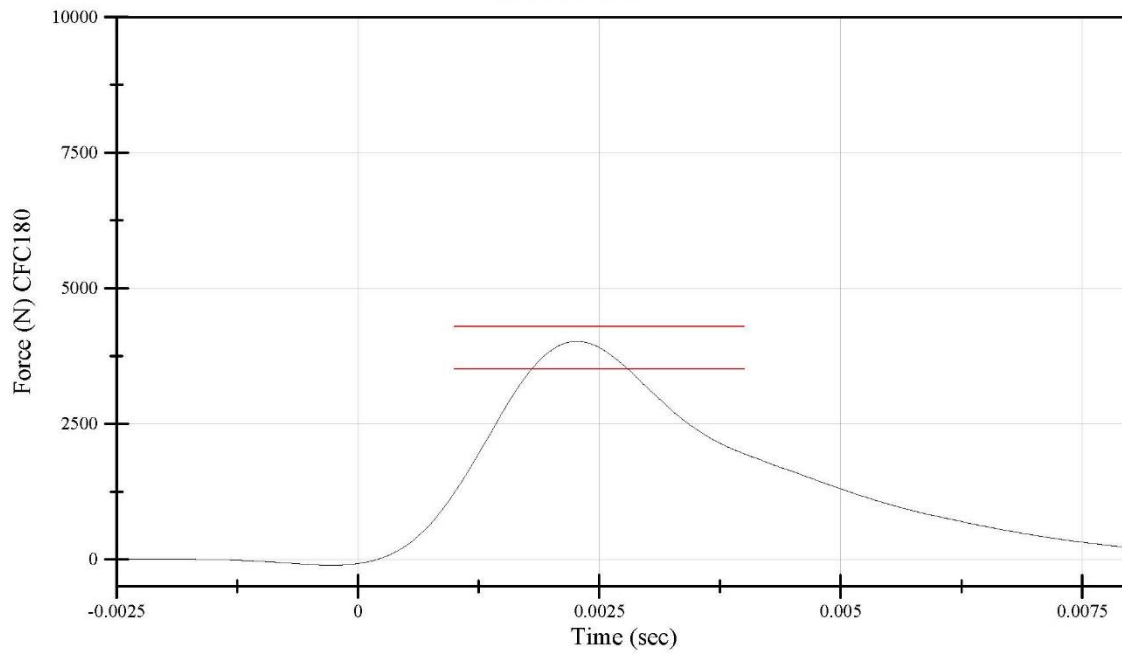


Software Version: 2.4

File Name: T0016OCPot150804-03_pro
08/04/2015 13:40:46.0000

Test Temperature: 70.2 degrees
Relative Humidity: 53%
Test Velocity: 2.63 m/s

THOR Left Femur Certification
Probe Force
Serial Number: T0016

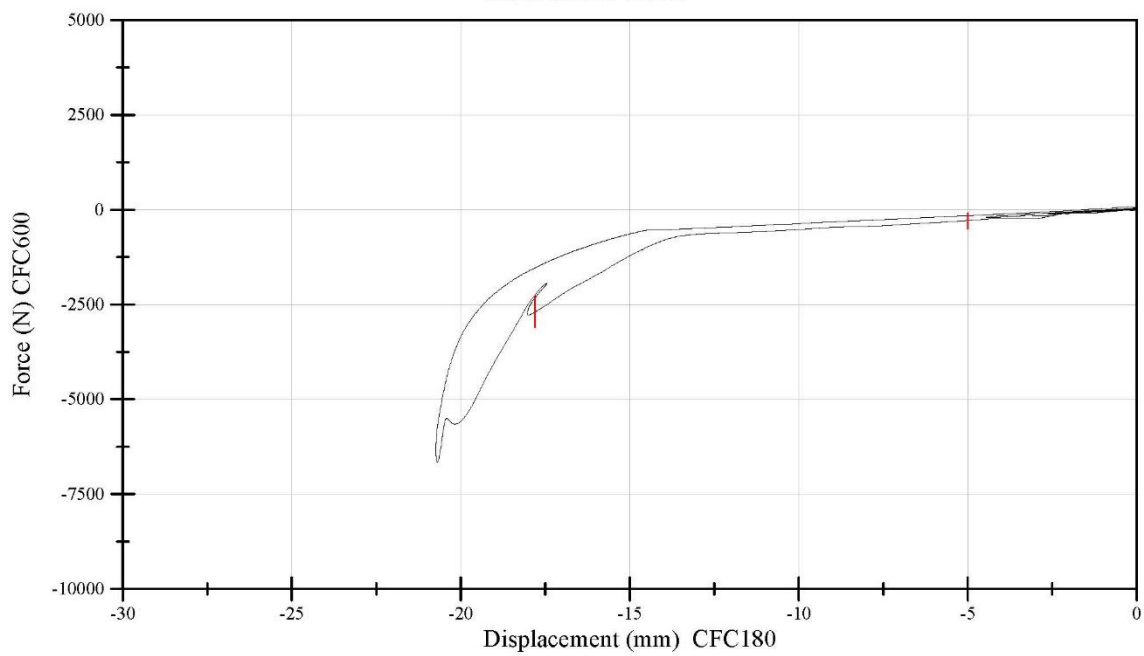


Software Version: 2.4

File Name: T0016LeftKnee150813-02_pro
08/14/2015 07:00:34.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 2.76 m/s

THOR Left Knee Certification
Femur Force vs. Knee Displacement
Serial Number: 017169

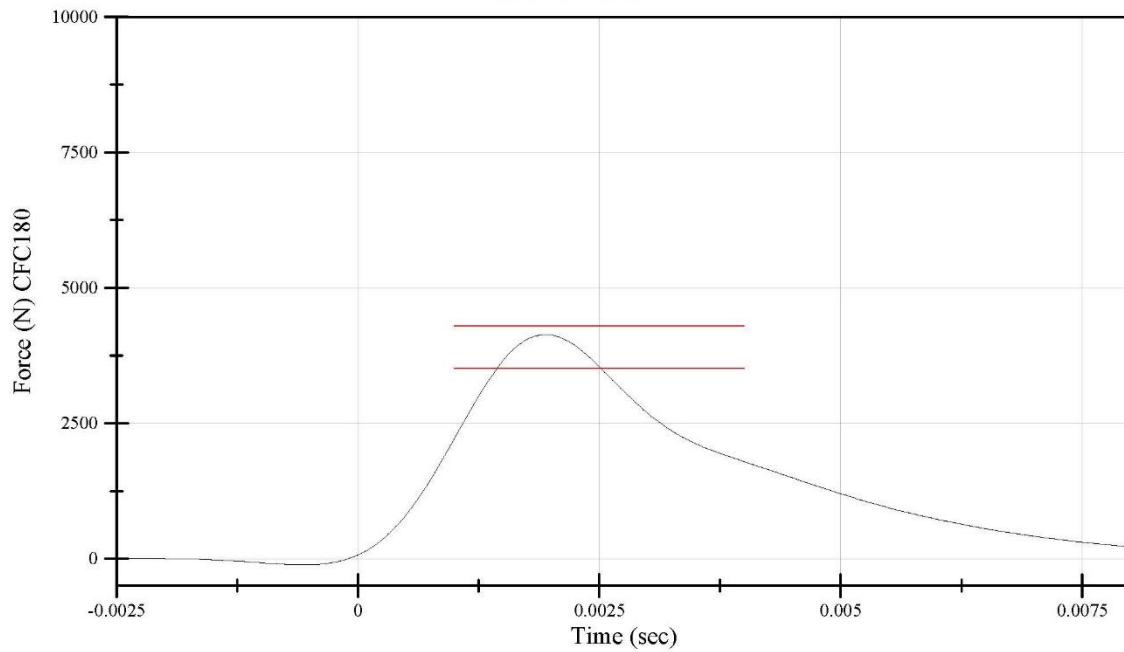


Software Version: 2.4

File Name: 017169Knee150708_01processed
07/08/2015 14:22:57.0000

Test Temperature: 69.7 degrees
Relative Humidity: 52%
Test Velocity: 2.63 m/s

THOR Right Femur Certification
Probe Force
Serial Number: T0016

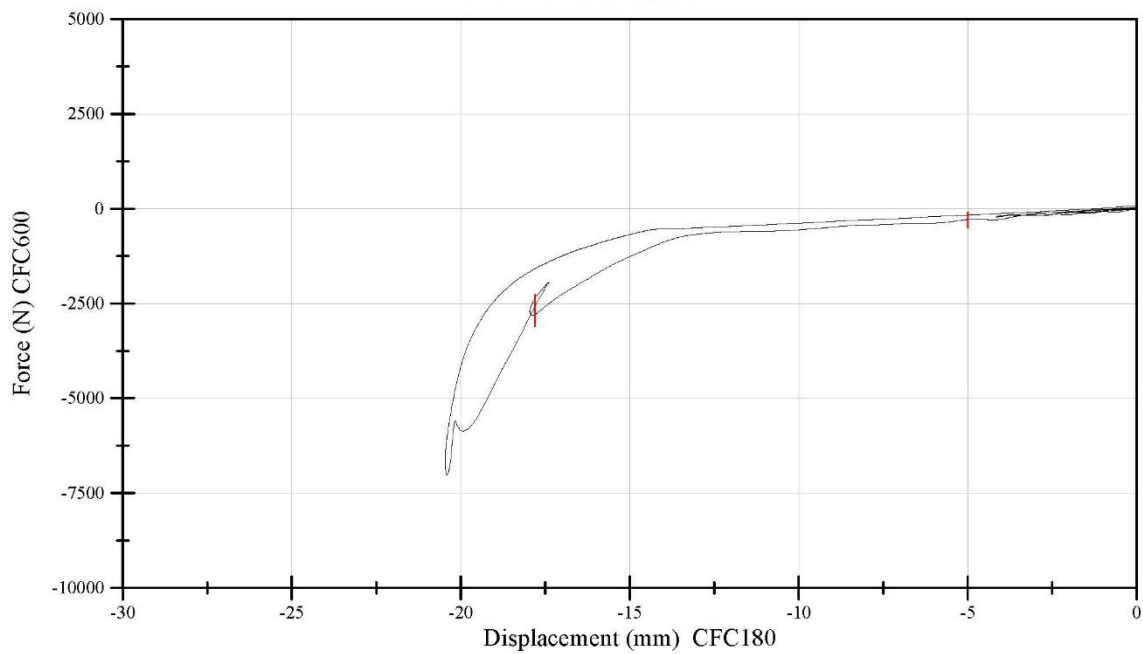


Software Version: 2.4

File Name: T0016RightKnee150814-01_pro
08/14/2015 07:48:52.0000

Test Temperature: 71 degrees
Relative Humidity: 50%
Test Velocity: 2.75 m/s

THOR Right Knee Certification
Femur Force vs. Knee Displacement
Serial Number: 12070382

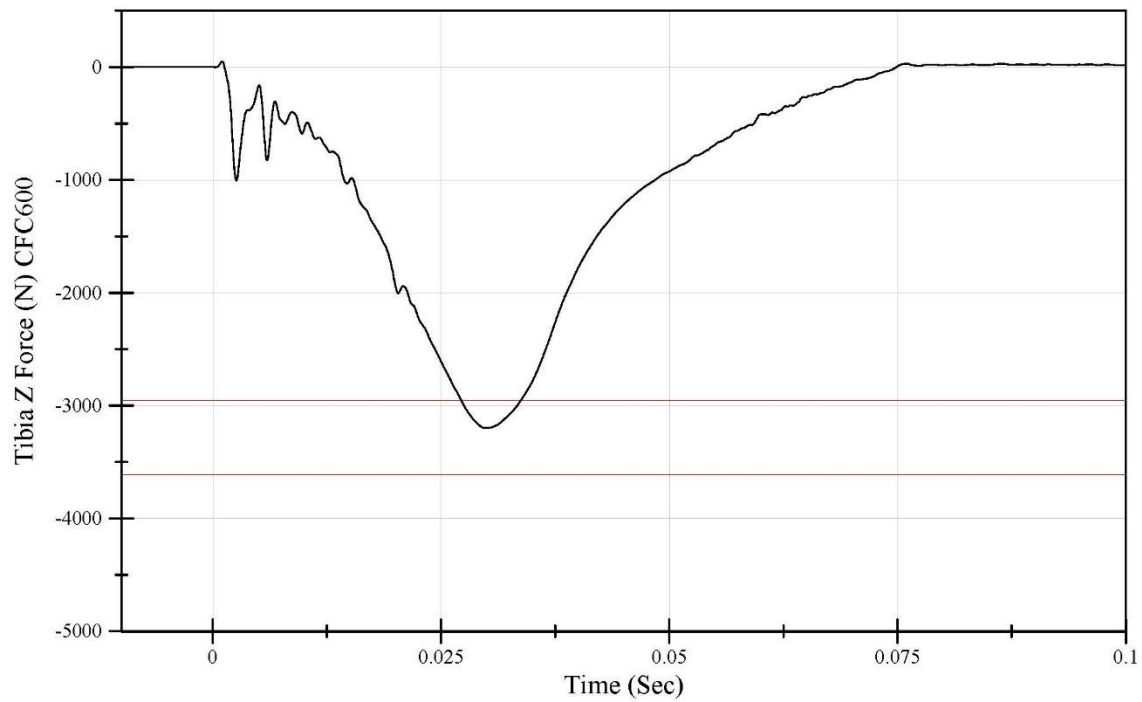


Software Version: 2.4

File Name: 12070382Knee150708_01renamedprocessed
07/09/2015 06:31:18.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 5.03 m/s

THOR Right Foot Dorsiflexion Certification
Tibia Load
Serial Number: LX 0018

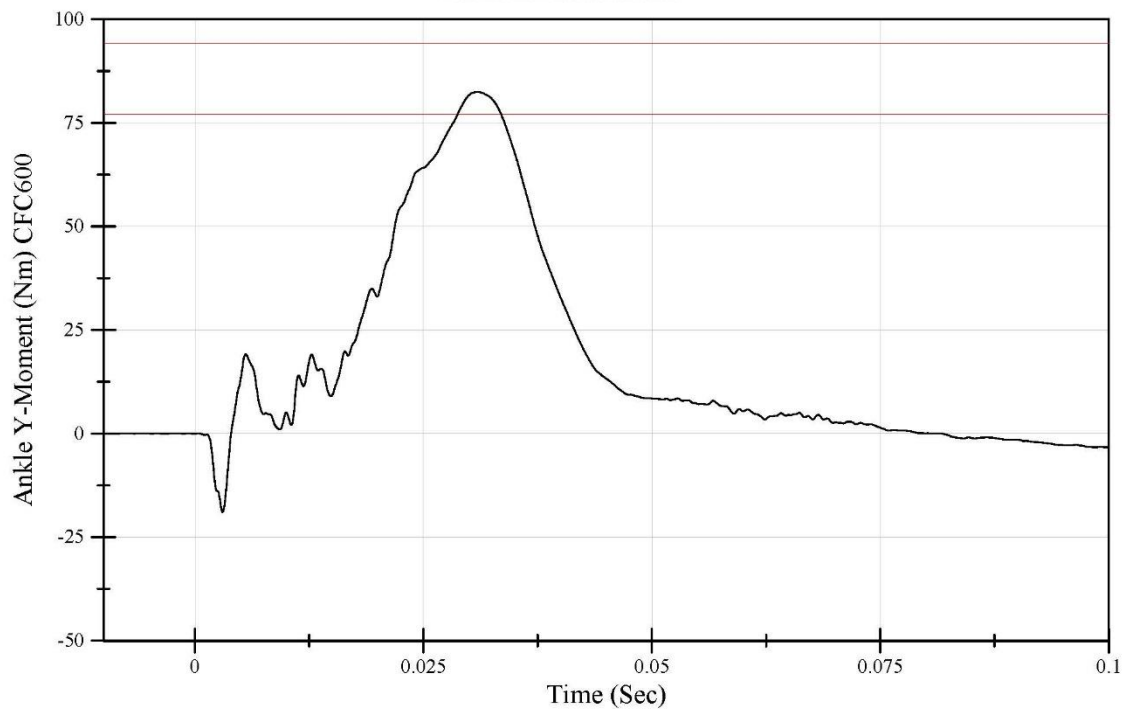


Software Version: 2.4

File Name: LX0018Ball1150707_02processed
07/07/2015 12:41:39.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 5.03 m/s

THOR Right Foot Dorsiflexion Certification
Ankle Y-Moment
Serial Number: LX 0018

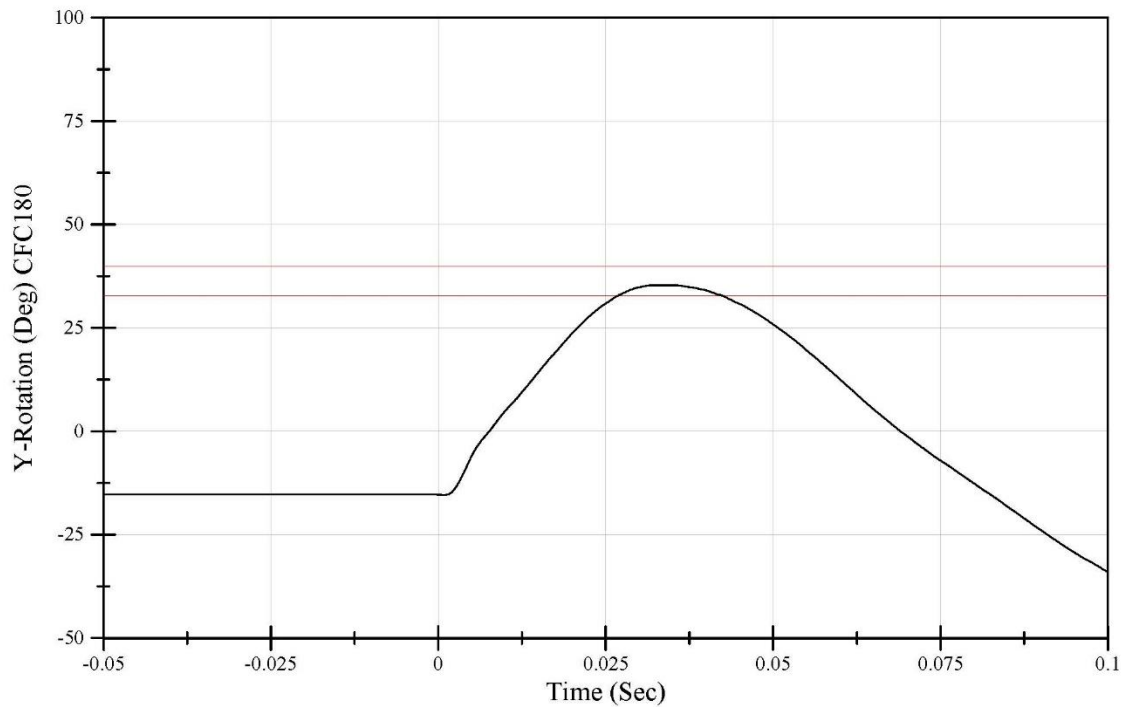


Software Version: 2.4

File Name: LX0018Ball1150707_02processed
07/07/2015 12:41:39.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 5.03 m/s

THOR Right Foot Dorsiflexion Certification
Ankle Y-Rotation
Serial Number: LX 0018

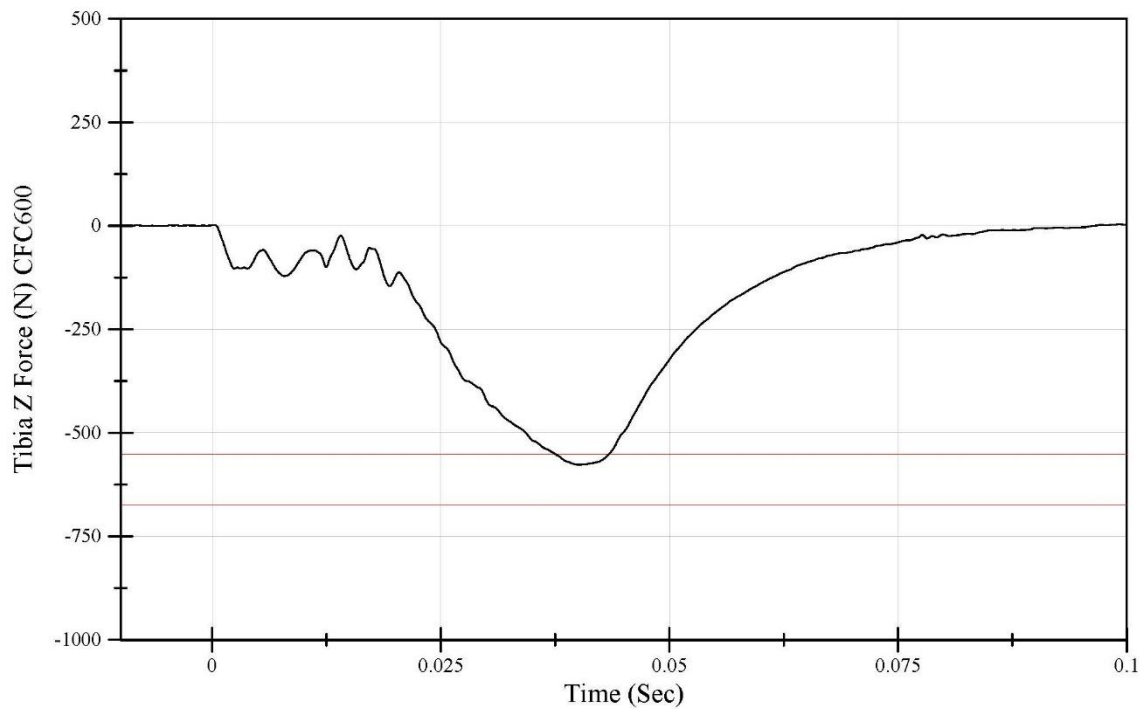


Software Version: 2.4

File Name: LX0018Ball150707_02processed
07/07/2015 12:41:39.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 2 m/s

THOR Right Foot Eversion Certification
Tibia Load
Serial Number: LX 0018

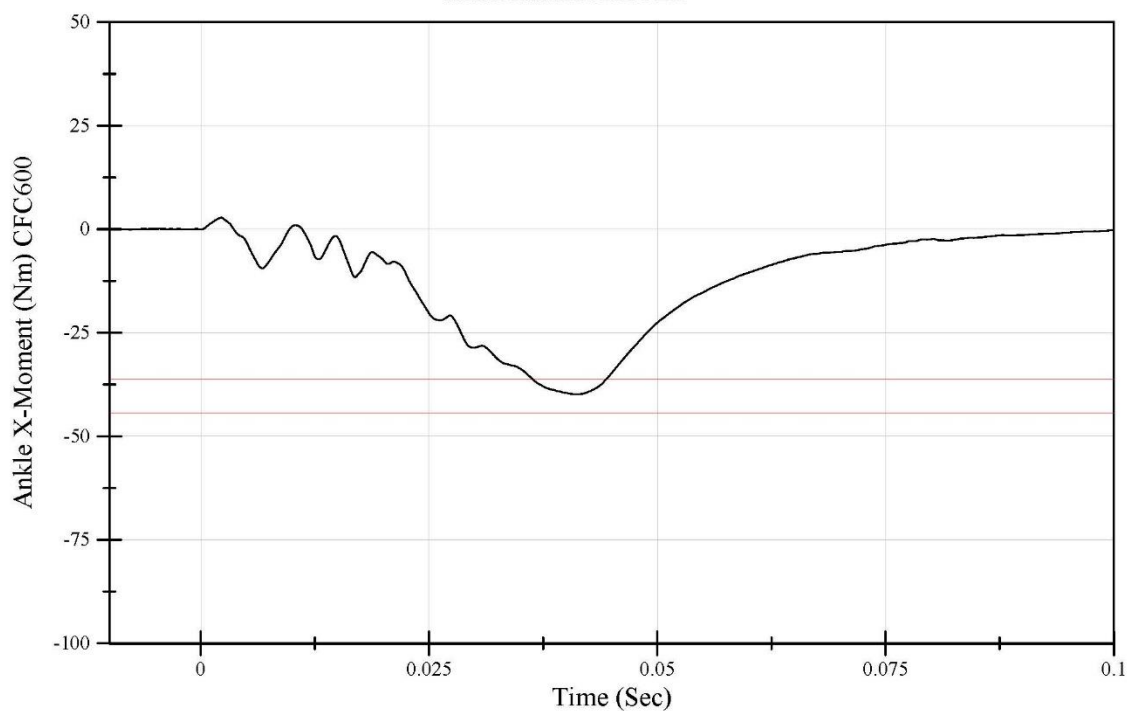


Software Version: 2.4

File Name: LX0018Eversion150707_01processed
07/07/2015 11:02:49.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 2 m/s

THOR Right Foot Eversion Certification
Ankle Moment
Serial Number: LX 0018

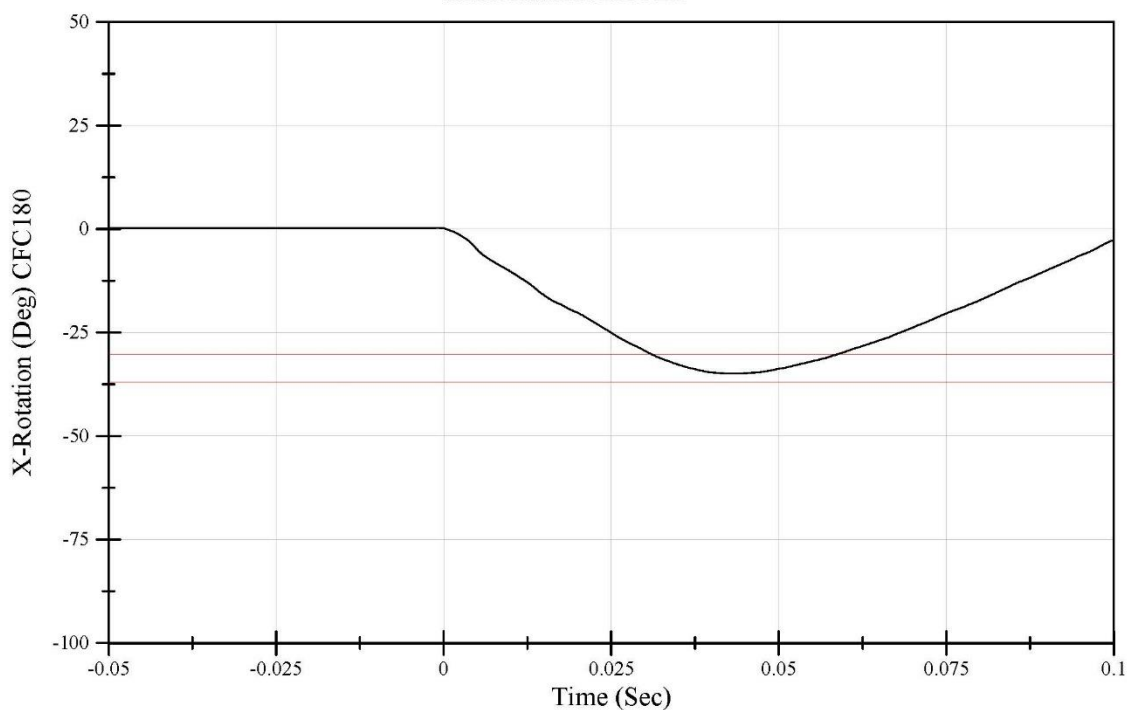


Software Version: 2.4

File Name: LX0018Eversion150707_01processed
07/07/2015 11:02:49.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 2 m/s

THOR Right Foot Eversion Certification
Ankle X-Rotation
Serial Number: LX 0018

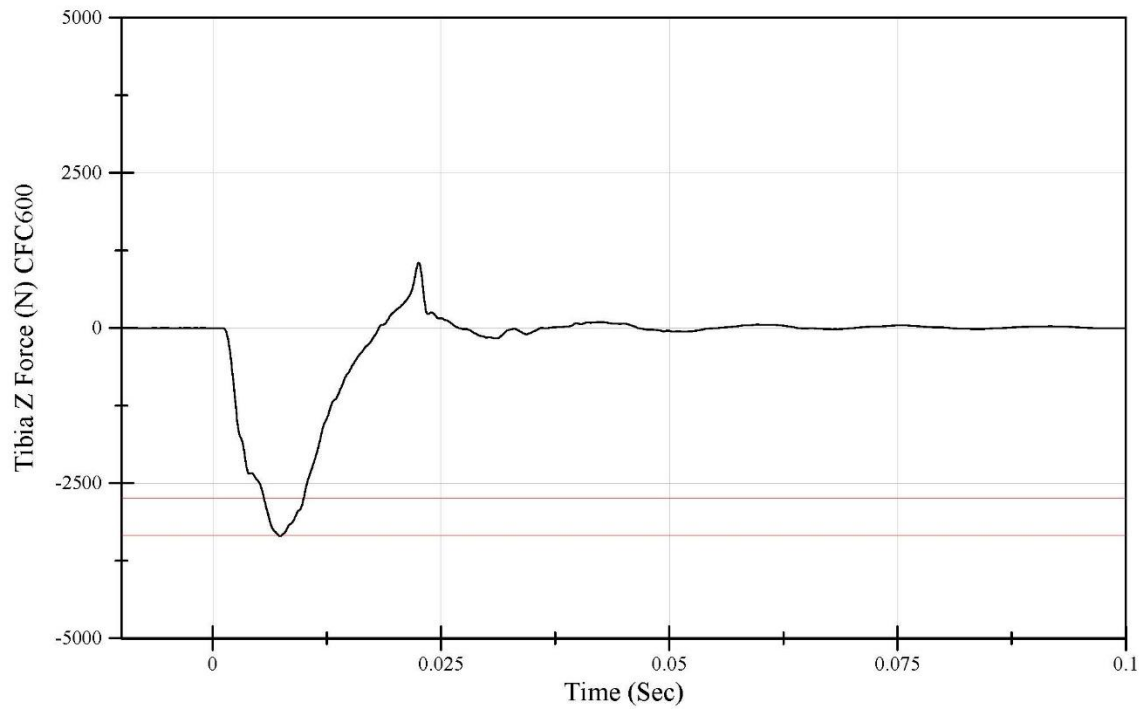


Software Version: 2.4

File Name: LX0018Eversion150707_01processed
07/07/2015 11:02:49.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 3.91 m/s

THOR Right Foot Heel Certification
Tibia Load
Serial Number: LX 0018

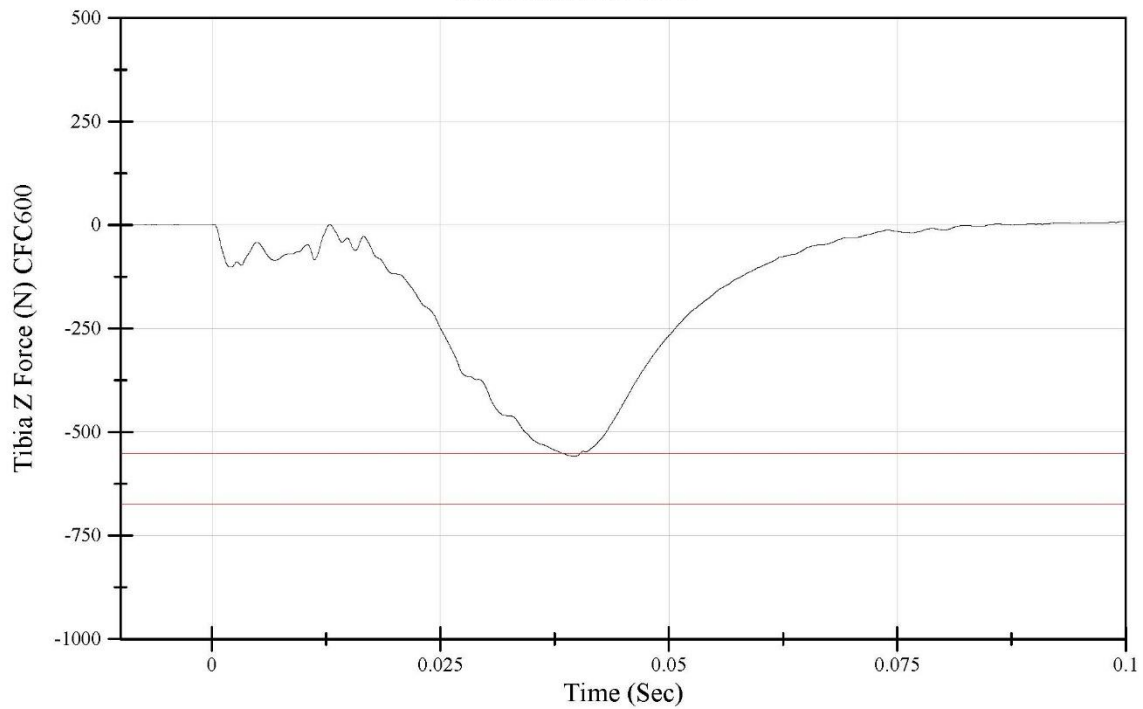


Software Version: 2.4

File Name: LX0018Heel150707_01processed
07/07/2015 13:34:11.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 1.99 m/s

THOR Right Foot Inversion Certification
Tibia Load
Serial Number: LX 0018

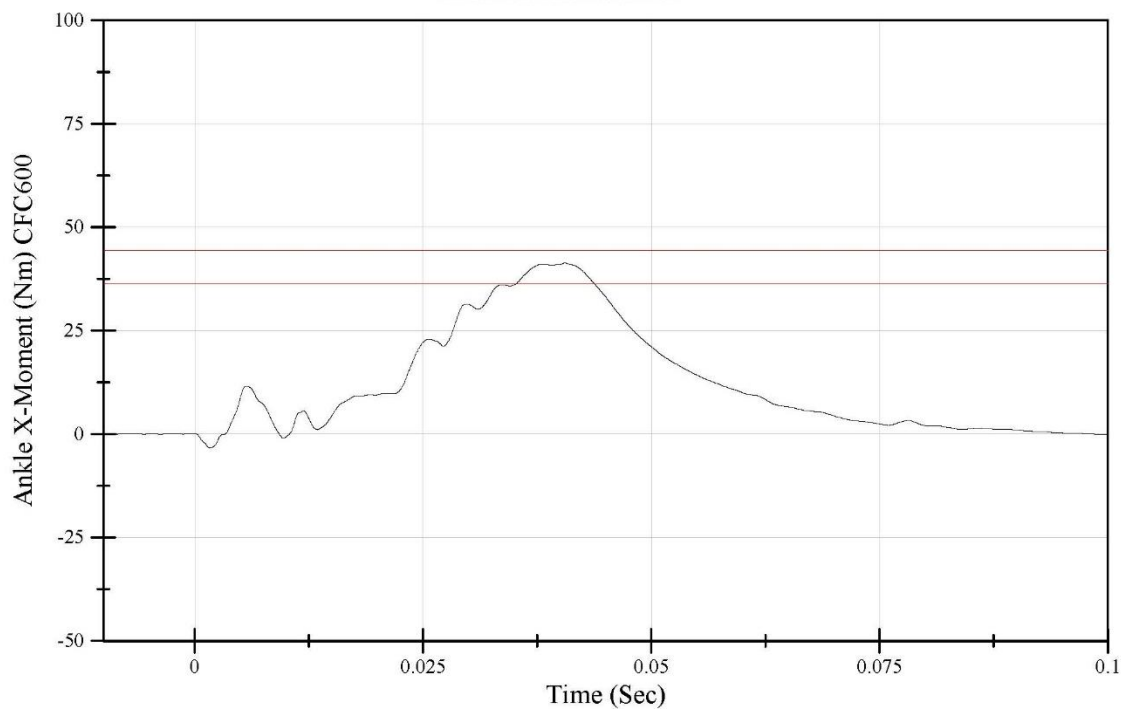


Software Version: 2.4

File Name: LX0018Inversion150707_01renamedprocessed
07/07/2015 10:04:43.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 1.99 m/s

THOR Right Foot Inversion Certification
Ankle Moment
Serial Number: LX 0018

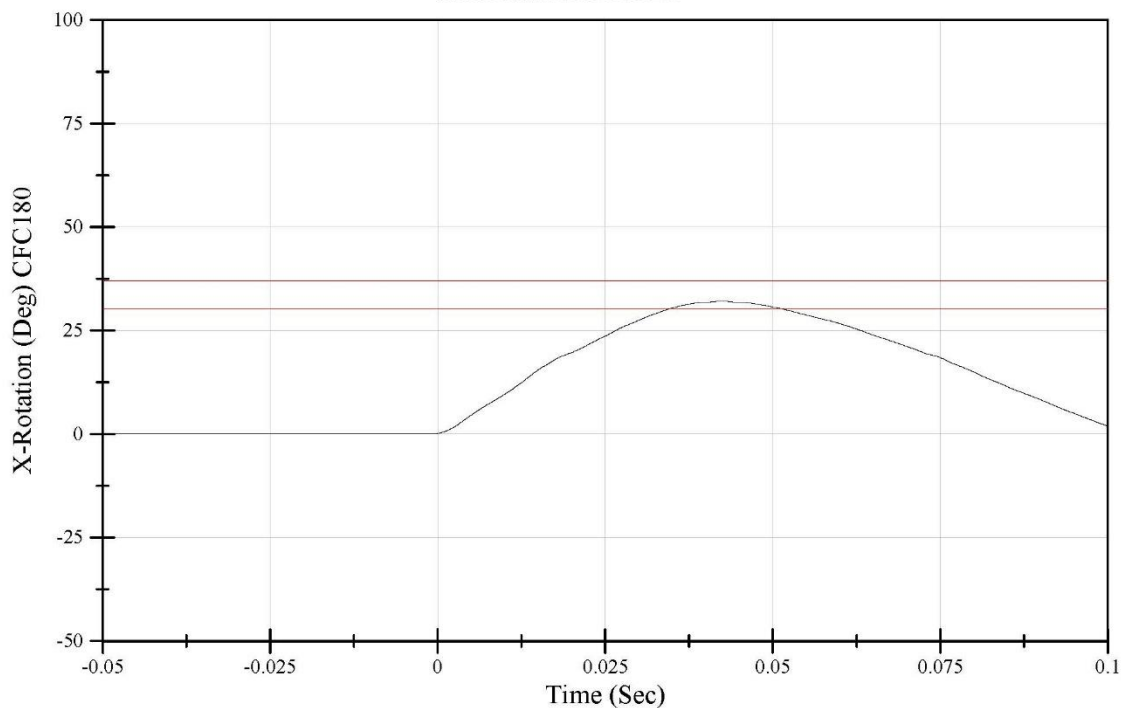


Software Version: 2.4

File Name: LX0018Inversion150707_01renamedprocessed
07/07/2015 10:04:43.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 1.99 m/s

THOR Right Foot Inversion Certification
Ankle X-Rotation
Serial Number: LX 0018

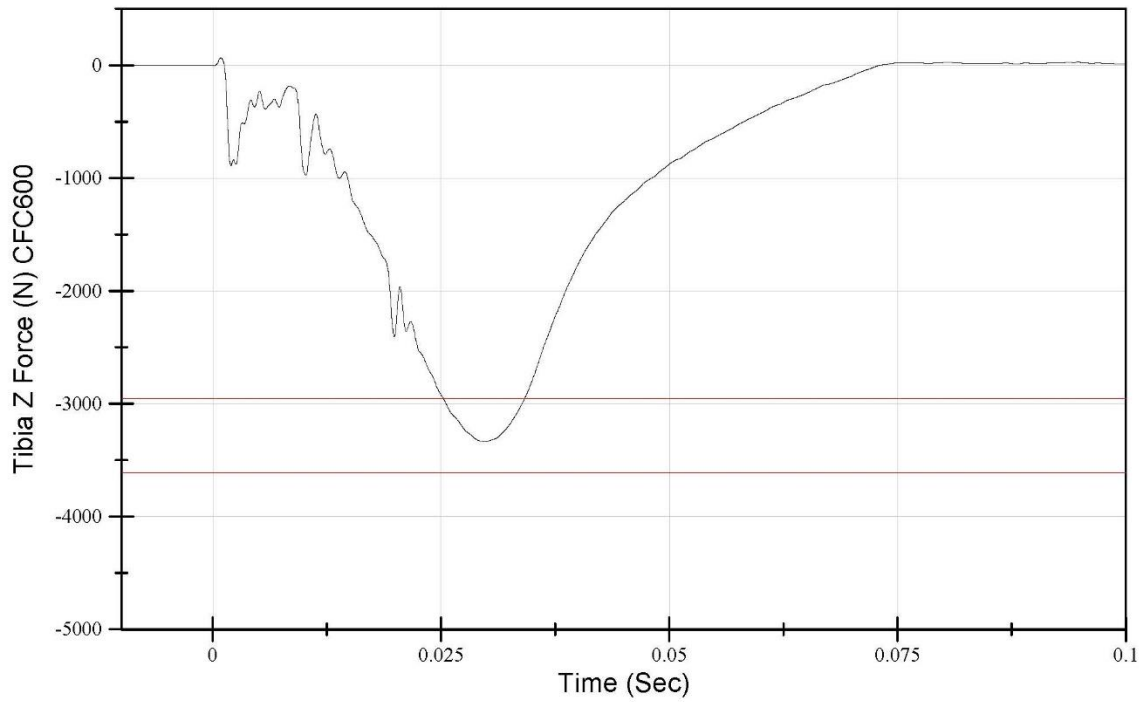


Software Version: 2.4

File Name: LX0018Inversion150707_01renamedprocessed
07/07/2015 10:04:43.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 4.98 m/s

THOR Left Foot Dorsiflexion Certification
Tibia Load
Serial Number: LX 0019

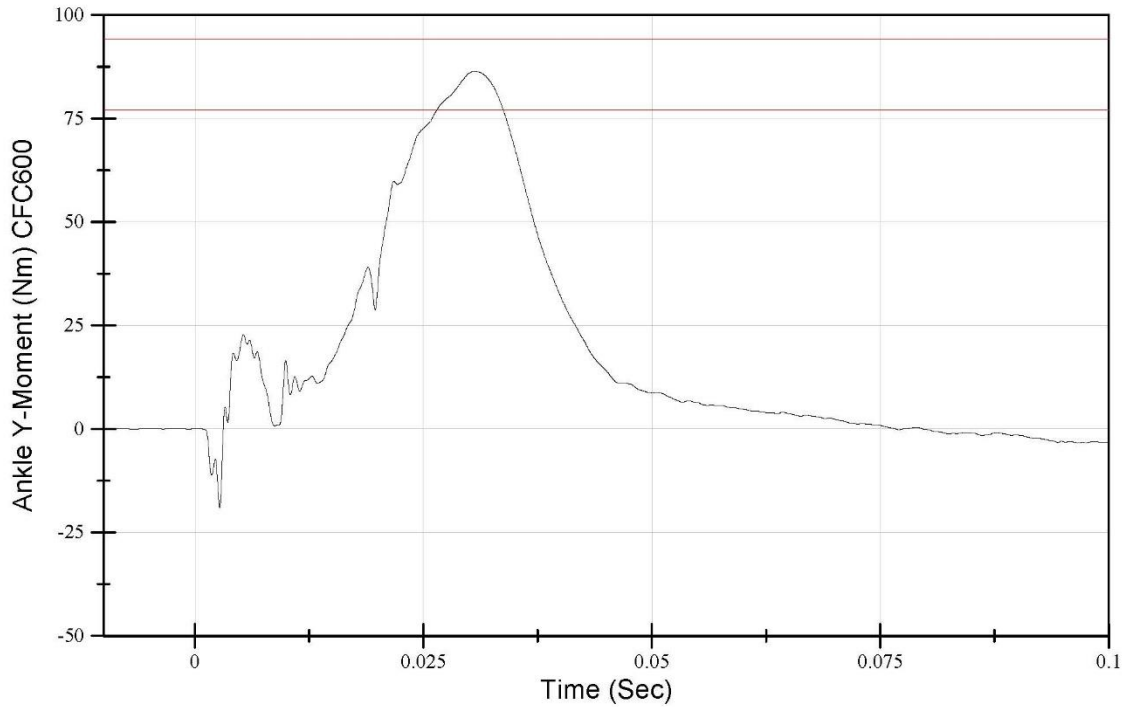


Software Version: 2.4

File Name: LX0019 Ball 150706_01processed
07/06/2015 07:34:13.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 4.98 m/s

THOR Left Foot Dorsiflexion Certification
Ankle Y-Moment
Serial Number: LX 0019

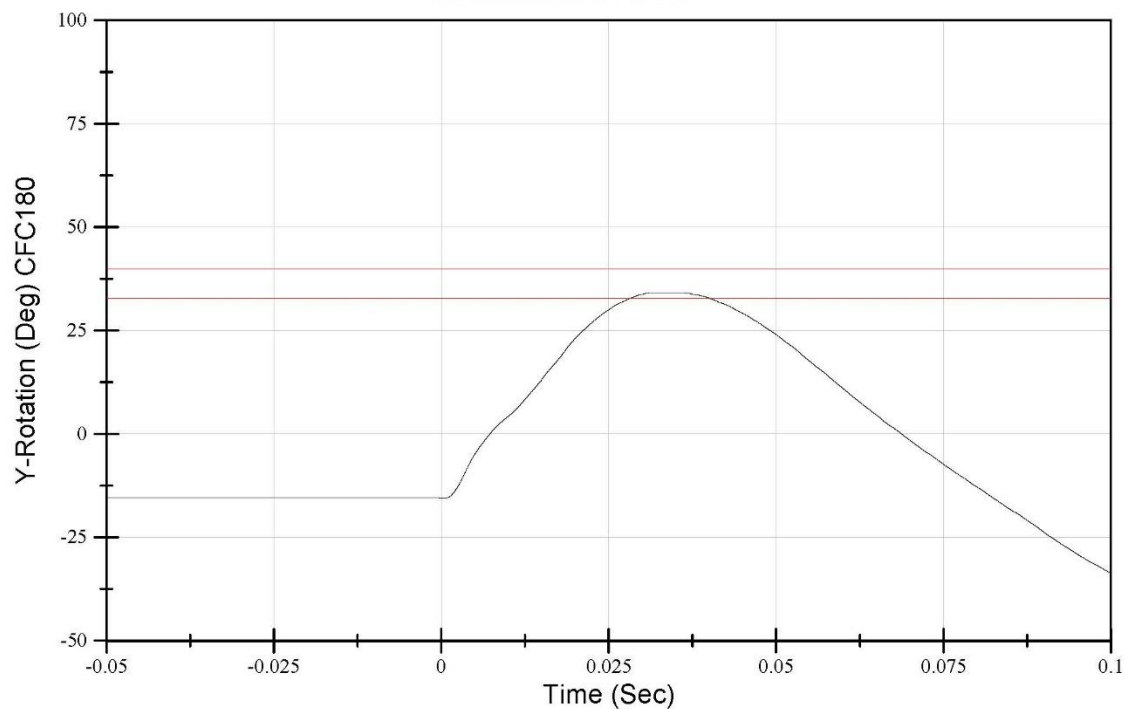


Software Version: 2.4

File Name: LX0019 Ball 150706_01processed
07/06/2015 07:34:13.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 4.98 m/s

THOR Left Foot Dorsiflexion Certification
Ankle Y-Rotation
Serial Number: LX 0019

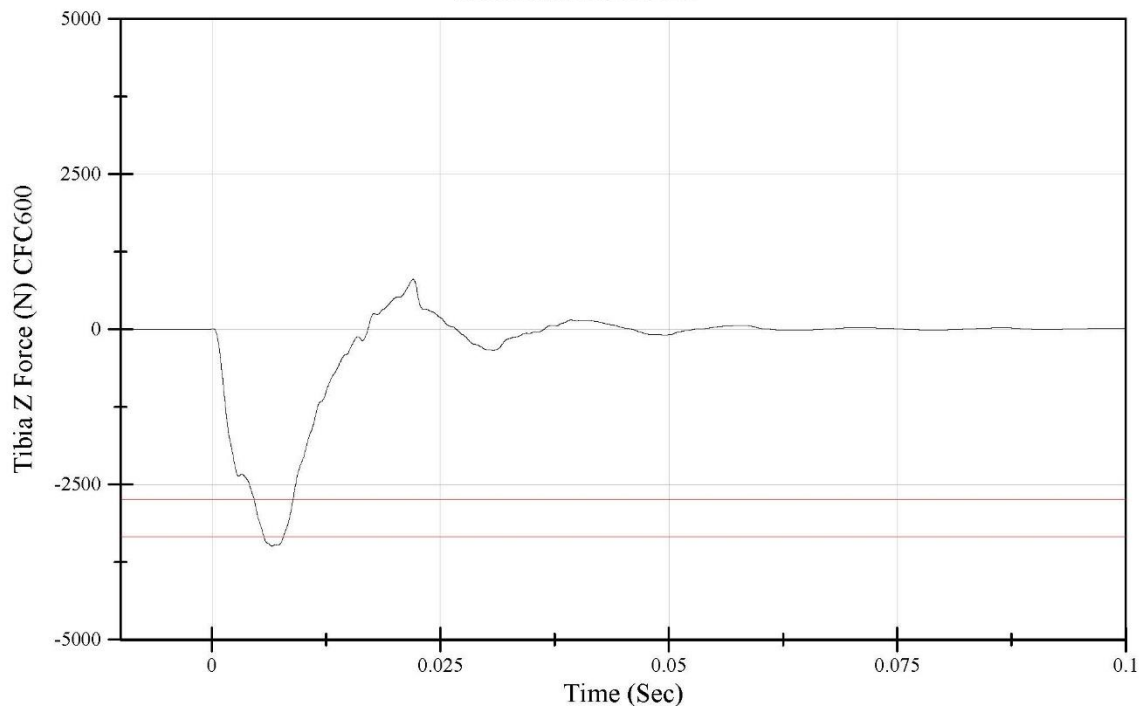


Software Version: 2.4

File Name: LX0019 Ball 150706_01processed
07/06/2015 07:34:13.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 3.91 m/s

THOR Left Foot Heel Certification
Tibia Load
Serial Number: LX 0019

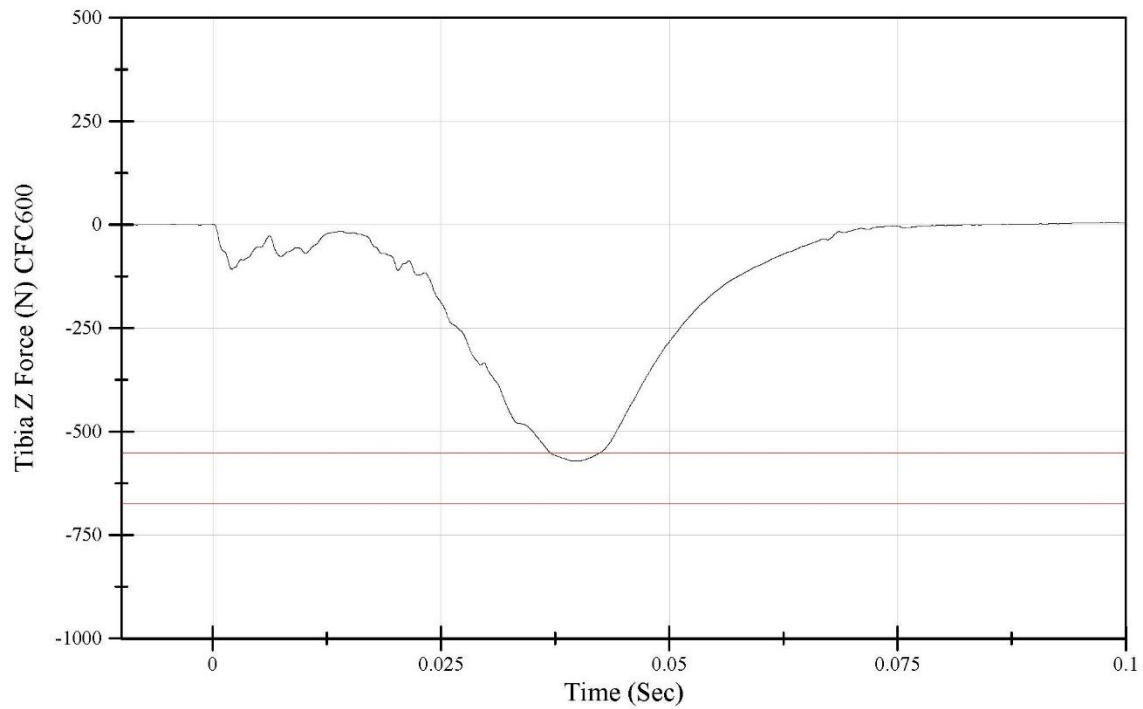


Software Version: 2.4

File Name: LX0019 Heel 150706_01processed
07/06/2015 11:35:49.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 2.06 m/s

THOR Left Foot Eversion Certification
Tibia Load
Serial Number: LX0019

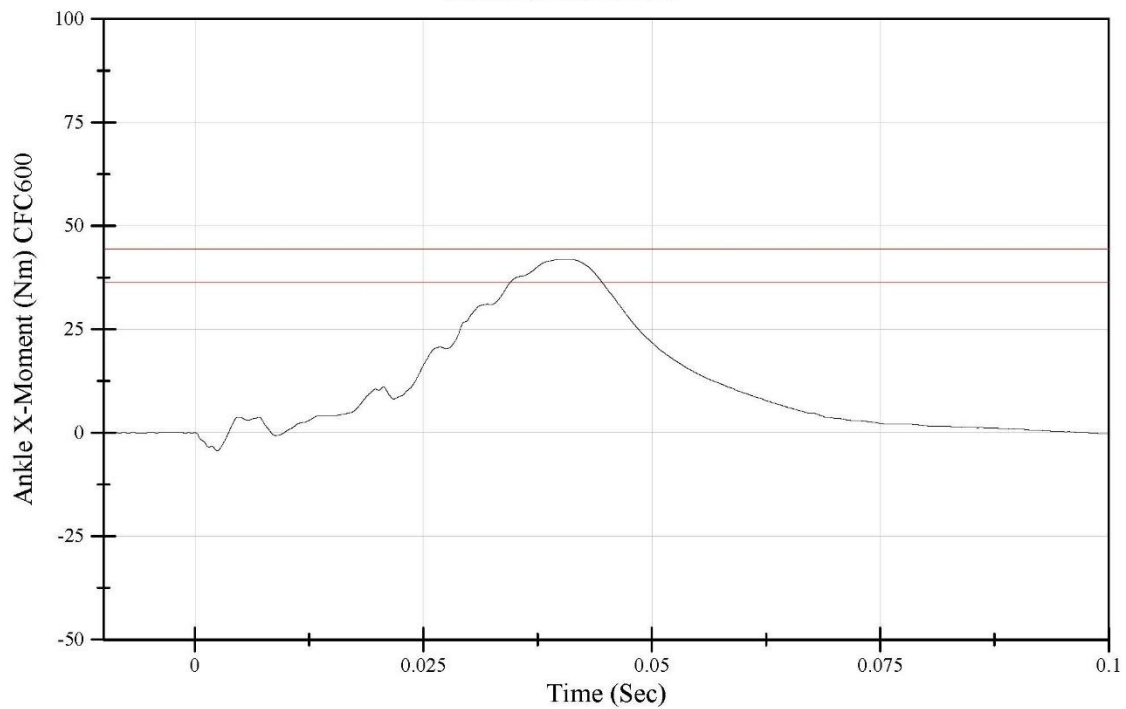


Software Version: 2.4

File Name: LX0019Eversion150702_01processed
07/02/2015 14:35:49.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 2.06 m/s

THOR Left Foot Eversion Certification
Ankle Moment
Serial Number: LX0019

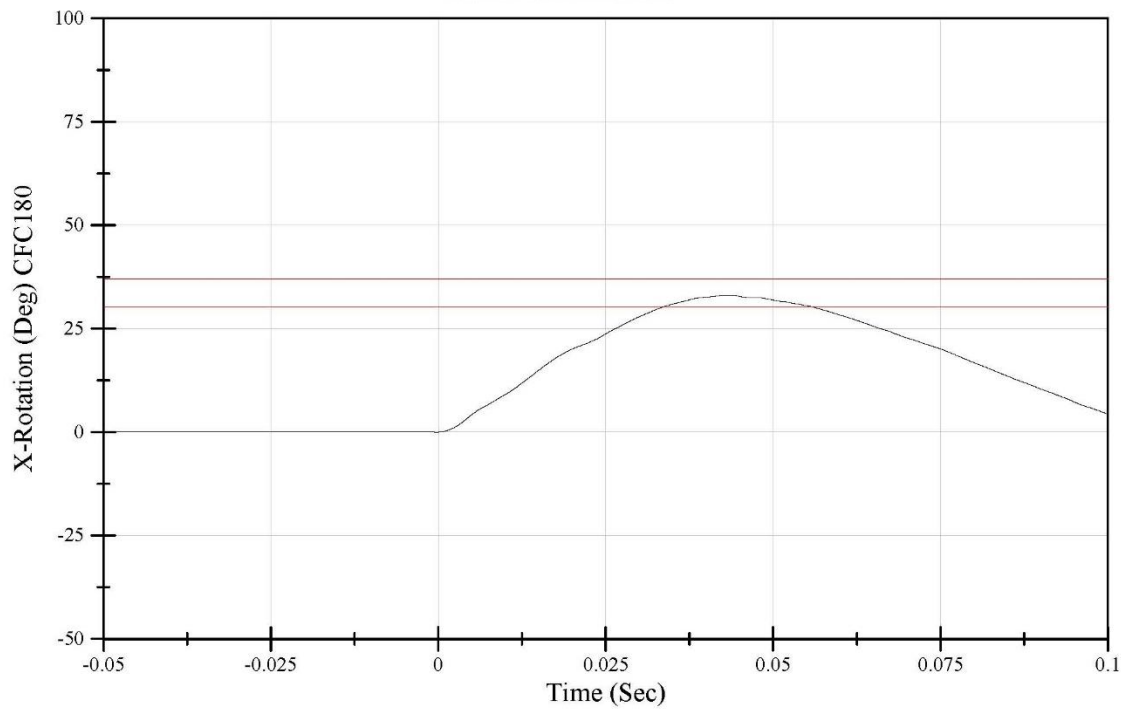


Software Version: 2.4

File Name: LX0019Eversion150702_01processed
07/02/2015 14:35:49.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 2.06 m/s

THOR Left Foot Eversion Certification
Ankle X-Rotation
Serial Number: LX0019

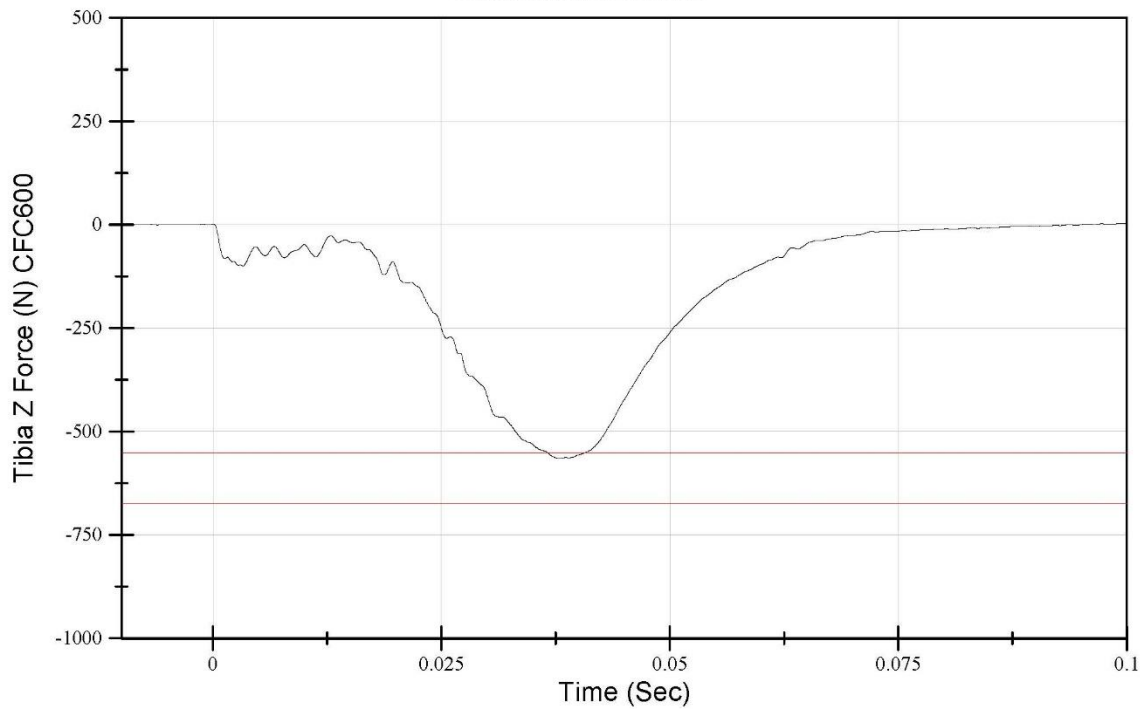


Software Version: 2.4

File Name: LX0019Eversion150702_01processed
07/02/2015 14:35:49.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 1.98 m/s

THOR Left Foot Inversion Certification
Tibia Load
Serial Number: LX0019

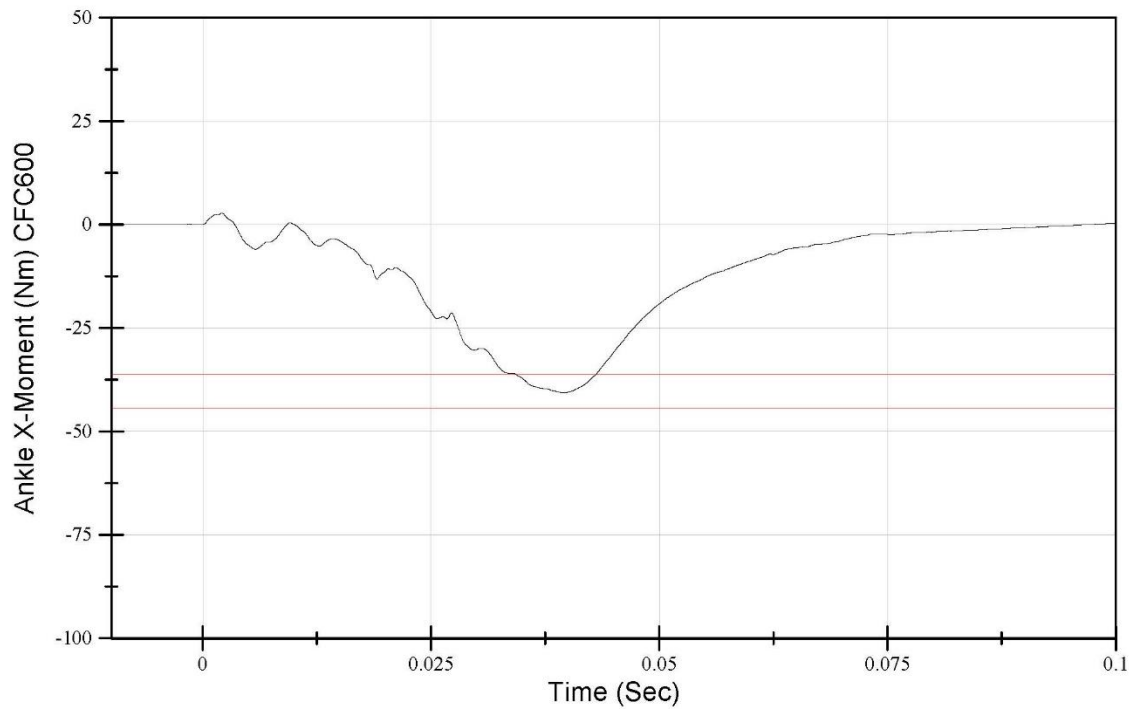


Software Version: 2.4

File Name: LX0019Inversion150702_01processed
07/02/2015 14:04:39.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 1.98 m/s

THOR Left Foot Inversion Certification
Ankle Moment
Serial Number: LX0019

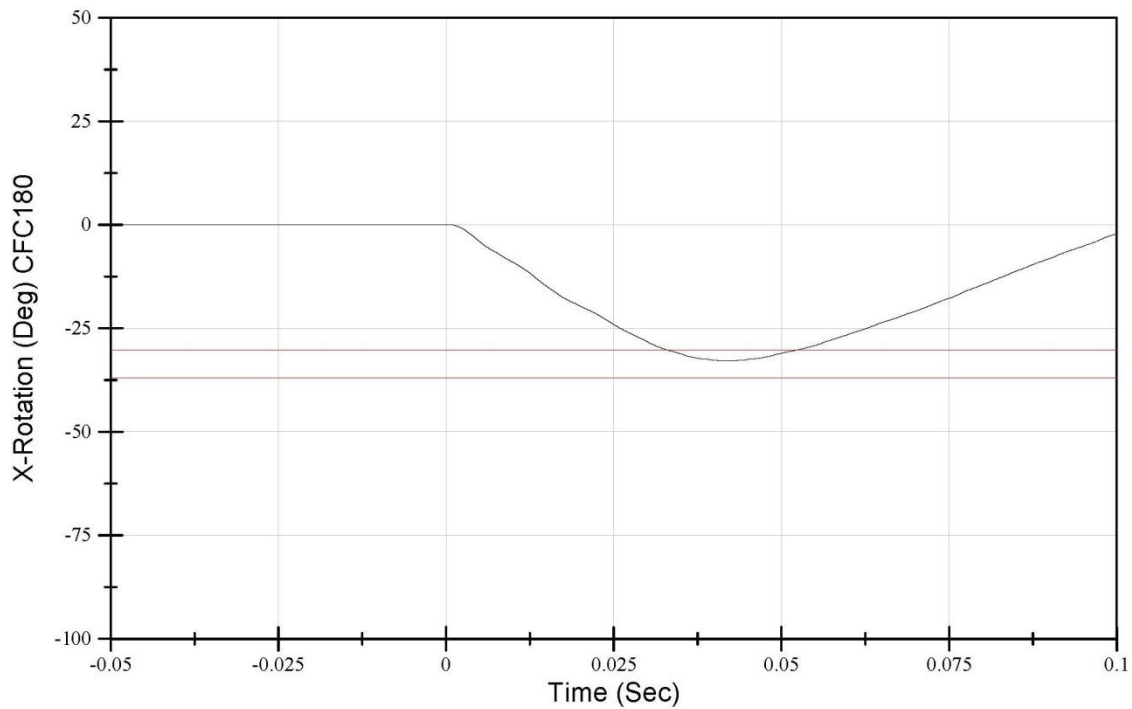


Software Version: 2.4

File Name: LX0019Inversion150702_01processed
07/02/2015 14:04:39.0000

Test Temperature: 71 degrees
Relative Humidity: 51%
Test Velocity: 1.98 m/s

THOR Left Foot Inversion Certification
Ankle X-Rotation
Serial Number: LX0019



Software Version: 2.4

File Name: LX0019Inversion150702_01processed
07/02/2015 14:04:39.0000