

REPORT NUMBER: R&D-CAL-12-008

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

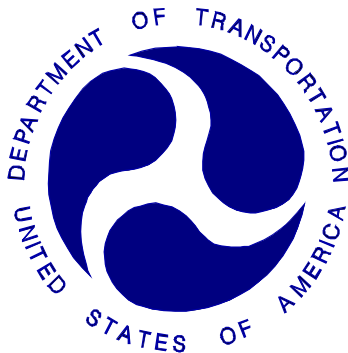
2012 HONDA ODYSSEY

90.1KPH, 15 DEGREE ANGLE, 35% OVERLAP

TEST DATE: 1/4/2013

NHTSA No: RC5370

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



FINAL REPORT SUBMITTED:

March 5, 2015

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 Walsh
Vanessa Walsh, Project Engineer

Date: March 5, 2015

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

Date: March 5, 2015

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-12-008	2. Government Accession No.		3. Recipient's Catalog No.																																																					
4. Title and Subtitle Report for Frontal Oblique Offset Program Testing of a 2012 Honda Odyssey Van NHTSA No.: RC5370			5. Report Date 3/5/2015																																																					
			6. Performing Organization Code CAL																																																					
7. Author(s) Vanessa Walsh, Project Engineer Edward Dutton, Senior Test Engineer			8. Performing Organization Report No. CAL-DOT-2012-008																																																					
9. Performing Organization Name and Address Calspan Corporation 4455 Genesee Street Buffalo, New York 14225			10. Work Unit No.																																																					
			11. Contract or Grant No. DTNH22-10-D-00155																																																					
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, 3/5/2015																																																					
			14. Sponsoring Agency Code NVS-321																																																					
15. Supplementary Notes																																																								
16. Abstract A test was conducted in accordance with Task Order 0001 of Contract DTNH22-10-D-00155. The Test consisted of a Research Moving Deformable Barrier (RMDB) traveling at a target speed of 90.12 kph into a stationary 2012 Honda Odyssey. The struck vehicle was positioned 15 degrees relative to the moving barrier and impacted 35% of the left side of the vehicle. The test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The test was conducted at the Calspan Corporation's Transportation Test Operation's facility in Buffalo, New York on January 4, 2013. The RMDB impact velocity was 89.95 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 614 mm. The test vehicle's performance was as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD</th> <th colspan="2">Pass. ATD</th> </tr> <tr> <th>Threshold</th> <th>Result</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td>N/A</td> <td>700</td> <td>95.61</td> <td>700</td> <td>621.62</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-39.91</td> <td>63</td> <td>39.39</td> </tr> <tr> <td>Neck Injury Criteria (Nij)</td> <td>N/A</td> <td>1</td> <td>0.24</td> <td>1</td> <td>0.34</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4,170</td> <td>1536.74</td> <td>4,170</td> <td>1977.80</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4,000</td> <td>-134.37</td> <td>4,000</td> <td>-212.09</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10,008</td> <td>-3271.24</td> <td>10,008</td> <td>-4255.75</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10,008</td> <td>-2898.46</td> <td>10,008</td> <td>-4297.42</td> </tr> </tbody> </table>					Measurement Description	Units	Driver ATD		Pass. ATD		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)	N/A	700	95.61	700	621.62	Maximum Chest Compression	mm	63	-39.91	63	39.39	Neck Injury Criteria (Nij)	N/A	1	0.24	1	0.34	Neck Tension	N	4,170	1536.74	4,170	1977.80	Neck Compression	N	4,000	-134.37	4,000	-212.09	Left Femur Force	N	10,008	-3271.24	10,008	-4255.75	Right Femur Force	N	10,008	-2898.46	10,008	-4297.42
Measurement Description	Units	Driver ATD		Pass. ATD																																																				
		Threshold	Result	Threshold	Result																																																			
Head Injury Criteria (HIC ₁₅)	N/A	700	95.61	700	621.62																																																			
Maximum Chest Compression	mm	63	-39.91	63	39.39																																																			
Neck Injury Criteria (Nij)	N/A	1	0.24	1	0.34																																																			
Neck Tension	N	4,170	1536.74	4,170	1977.80																																																			
Neck Compression	N	4,000	-134.37	4,000	-212.09																																																			
Left Femur Force	N	10,008	-3271.24	10,008	-4255.75																																																			
Right Femur Force	N	10,008	-2898.46	10,008	-4297.42																																																			
17. Key Words THOR ATD 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 339	22. Price																																																					

TABLE OF CONTENTS

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

<u>Section</u>	<u>Page No.</u>
1 Purpose of Test	1-1
2 Summary of Test	2-1
Crash Vehicle Summary	2-3
Injury Summary: Driver THOR Male	2-4
Injury Summary: Driver THOR Male Legs	2-6
Injury Summary: Front Passenger THOR Male	2-7
Injury Summary: Front Passenger THOR Male Legs	2-9
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	3-17
9 Test Vehicle Summary of Results	3-24
10 Post-Test Observations	3-25
11 Vehicle Profile Measurements	3-26
12 Accident Investigation Division Data	3-28
13 Vehicle Intrusion Measurements	3-29
14 RMDB Crush Measurements	3-47
15 Summary of FMVSS 212, 219 (Partial), and 301 Data	
Windshield Periphery Measurements	3-48
Fuel System Integrity Post Impact Data	3-49
16 FMVSS 301 Static Rollover Results	3-50
17 Dummy / Vehicle Temperature Stabilization	3-51

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

SECTION 1
PURPOSE OF TEST

Test Vehicle: 2012 Honda Odyssey Van
Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
Test Date: 1/4/2013

This 90.12 kph (56 mph) Research Moving Deformable Barrier (RMDB) into a vehicle test is part of the Frontal Offset Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-10-D-00155. The purpose of this test is to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

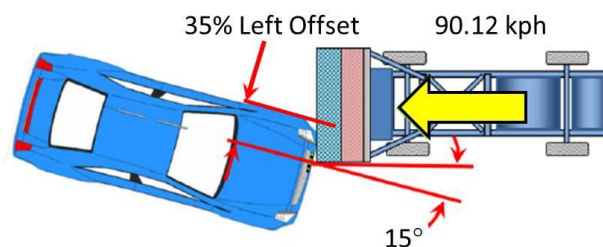
This test was conducted in accordance with the instructions set forth by NHTSA in which the vehicle was placed at a 15° angle, 35% offset relative to the RMDB as outlined in Task Order (TO-1) DTNH22-10-D00155. Data was obtained indicant of Federal Motor Vehicle Safety Standard FMVSS 208-Occupant Crash Protection, FMVSS 212 – Windshield Mounting, FMVSS 219 (partial) – Windshield Zone Intrusion, and FMVSS 301 – Fuel System Integrity, in addition to the requirements of TO-1 of DTNH22-10-D-00155.

SECTION 2 SUMMARY OF TEST

Test Vehicle: 2012 Honda Odyssey Van
Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
Test Date: 1/4/2013

A 2012 Honda Odyssey Van was impacted on the left front corner by a Research Moving Deformable Barrier (RMDB). 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 RMDB. The RMDB 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 2,209.5 kg (4,871 lbs), and the RMDB's mass was 2490.7 kg (5491 lbs). The test was conducted by Calspan Corporation on January 4, 2013.



The test was documented by one (1) real time and fourteen (14) 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, RMDB, 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 with MOD KIT (TK) Anthropomorphic Test Device (ATD) (Serial No. 007) was seated in the left, front (P1 -Driver's) seating position and one 50% adult male THOR-NT with MOD KIT (TK) ATD (Serial No. 016) was seated in the right front passenger seating position (P2). The THOR TK driver and passenger were positioned according to instructions specified in laboratory test procedures FMVSS 208-14, "Occupant Crash Protection", TP208-14, July 27, 2006.

The driver was restrained with a 3 – point seat belt, a front airbag, and a curtain airbag. The passenger was restrained with a 3 – point seat belt, and a front airbag. The passenger's curtain and torso airbags were disabled.

SECTION 2 (CONTINUED)
SUMMARY OF TEST

Test Vehicle: 2012 Honda Odyssey Van
Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
Test Date: 1/4/2013

Two hundred and thirty (230) channels of data from the two ATD's, test vehicle and RMDB were collected using Kayser – Threde and DTS data acquisition systems. Appendix B contains dummy data plots, as well as vehicle and RMDB response data plots.

There was 92% total windshield retention, with 84% and 100% 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 614 mm at C1 to the left of the vehicle's centerline. The maximum crush of the structural bumper beam was 568 mm at B1, to the left of the vehicle's centerline. Additional information pertaining to static crush measurements can be found on Data Sheet No.12 of this report.

All four vehicle doors remained closed and latched during the test. The left front door was deformed as a result of the impact causing it to be non-operational. The remaining doors all remained operational after the test.

Structure observations include the following:

- Driver's side A-Pillar buckled rearward. Resulting in separation between the top of the door and roof sill. (See Photo No.061 in Appendix A)
- Windshield cracks throughout, however there was no penetration observed in the protected zone.
- The hood of the vehicle remained latched during the event, however bent upwards exposing part of the engine compartment.

The driver ATD's visible contact points were:

- Head Contact: Front & Curtain Airbag
- Torso Contact: Front, Curtain & Torso/Pelvis Airbag
- Knee Contact: Dash Panel

The passenger ATD's visible contact points were:

- Head Contact: Front Airbag, Center Dash Panel & Head Liner
- Torso Contact: Front Airbag & Center Dash Panel
- Knee Contact: Glove Box

SECTION 2 (CONTINUED) CRASH VEHICLE SUMMARY

Test Vehicle: 2012 Honda Odyssey Van
Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
Test Date: 1/4/2013

Primary Impact Data

Measured Parameter	Units	Value
RMDB Velocity at Impact	kph	89.95
RMDB Test Weight	kg	2490.7
RMDB Maximum Static Crush	mm	312.5
Vehicle Test Weight	kg	2209.5
Actual Vehicle Angle	degrees	15
Vehicle Maximum Static Crush	mm	614
Vertical Offset from Target Point (+ down / - up)*	mm	-9
Lateral Offset from Target Point (+ left / - right)*	mm	-11
Number of Data Channels		230
Number of Real-Time Cameras		1
Number of High-Speed Cameras		14

*Offsets are in relation to the vehicle coordinate system.

Dummy Contacts

	Driver	Picture Ref.	Passenger	Picture Ref.
Dummy Type	50% Male, Thor 007		50% Male, Thor 016	
Head Contact	Front & Curtain Airbags	A49-A51	Front Airbag, Center Dash Panel & Head Liner	A70-A72
Upper Torso Contact	Front, Curtain & Torso/Pelvis Airbags	NA	Front Airbag & Center Dash Panel	NA
Lower Torso Contact	None	NA	None	NA
Left Knee Contact	Knee Bolster	A28	Glove Box	A52
Right Knee Contact	Knee Bolster	A28	Glove Box	A52

Data Anomalies:

- V2P1 CHLL DX had a spike at 160 ms
- V2P1 SPNL MX had a spike at 111ms
- V2P1 FOTL AZ had a spike at 59 ms
- V2P1 TBRL FZ had spikes at 15 & 64 ms
- V2P2 HDCG AX had a spike at 116 ms
- V2P2 NEKL MZ had a spike at 164 ms
- V2P2 ANKL RX had questionable data
- V2P2 ANKL RY had questionable data
- V2P2 FOTL AZ failed
- V2P2 ANKR RX had questionable data
- V2P2 ANKR RY had questionable data

SECTION 2 (CONTINUED)
PRELIMINARY INJURY SUMMARY: Driver

Test Vehicle: 2012 Honda Odyssey - Van NHTSA No.: RC5370
 Test Program: Research and Development Left Oblique Offset Test Date: 1/4/2013

Driver: Thor Serial No. 007 Injury Summary

	Nomenclature	Units	Source	Max	Min
Head	Head CG X	g	1000	6.50	-24.76
	Head CG Y	g	1000	18.07	-5.51
	Head CG Z	g	1000	29.09	-2.67
	Head Resultant	g	Compute	36.75	
	36 ms HIC		Compute	138.66	
	15 ms HIC		Compute	95.61	
	Head Resultant CG Acceleration, 3 ms Clip	g	Compute	35.17	
	Head Rotational Velocity X	deg/s	60	394.70	-760.36
	Head Rotational Velocity Y	deg/s	60	250.15	-1329.58
	Head Rotational Velocity Z	deg/s	60	1050.04	-582.43
	Head Rotational Velocity Resultant	deg/s	Compute	1459.60	
	Brain Injury Criteria		Compute	0.63	
Neck	UNLC Transferred to OC, Neck System, FX	N	1000	62.69	-691.51
	UNLC Neck System Tension, FZ	N	1000	1536.74	
	UNLC Neck System Compression, FZ	N	1000		-134.37
	UNLC Transferred to OC, Neck System Flexion, MY	N-m	Thortest	0.91	
	UNLC Transferred to OC, Neck System Extension, MY	N-m	Thortest		-9.94
	NIJ		Compute	0.24	
	On head acting through total neck section, FX	N	Thortest	301.69	-473.87
	On head acting through total neck section, FY	N	Thortest	286.06	-94.46
	On head acting through total neck section, FZ	N	Thortest	1703.76	-72.60
	On head acting through total neck section, MX	N-m	Thortest	21.16	-18.04
	On head acting through total neck section, MY	N-m	Thortest	26.97	-14.58
	On head acting through total neck section, MZ	N-m	Thortest	17.57	-13.89
	On head acting through O.C. joint only, FX	N	Thortest	181.80	-723.11
	On head acting through O.C. joint only, FZ	N	Thortest	1529.73	-211.27
	On head acting through O.C. joint only, MY	N-m	Thortest	0.91	-9.94
Chest	Upper Left IR-TRACC X - deflection	mm	Thortest	2.47	-10.93
	Upper Left IR-TRACC Y - deflection	mm	Thortest	0.28	-5.77
	Upper Left IR-TRACC Z - deflection	mm	Thortest	12.05	-7.50
	Upper Left IR-TRACC D - deflection	mm	Thortest	1.92	-10.07
	Upper Right IR-TRACC X - deflection	mm	Thortest	0.10	-31.36
	Upper Right IR-TRACC Y - deflection	mm	Thortest	1.12	-7.08
	Upper Right IR-TRACC Z - deflection	mm	Thortest	18.42	-9.71
	Upper Right IR-TRACC D - deflection	mm	Thortest	0.10	-27.33
	Lower Left IR-TRACC X - deflection	mm	Thortest	7.66 ⁽¹⁾	-19.91 ⁽¹⁾
	Lower Left IR-TRACC Y - deflection	mm	Thortest	1.56	-18.89

SECTION 2 (CONTINUED)
PRELIMINARY INJURY SUMMARY: Driver

Test Vehicle: 2012 Honda Odyssey - Van NHTSA No.: RC5370
Test Program: Research and Development Left Oblique Offset Test Date: 1/4/2013

Driver: Thor Serial No. 007 Injury Summary

	Nomenclature	Units	Source	Max	Min
Chest (Con't)	Lower Left IR-TRACC Z - deflection	mm	Thortest	15.24	-0.14
	Lower Left IR-TRACC D - deflection	mm	Thortest	5.74	-22.01
	Lower Right IR-TRACC X - deflection	mm	Thortest	0.33	-42.24
	Lower Right IR-TRACC Y - deflection	mm	Thortest	0.28	-20.70
	Lower Right IR-TRACC Z - deflection	mm	Thortest	0.57	-17.65
	Lower Right IR-TRACC D - deflection	mm	Thortest	0.36	-39.91
	Chest CG Acceleration, 3 ms clip	g	Compute	34.85	
Abdomen	Lower Left IR-TRACC X - deflection	mm	Thortest	0.82	-63.49
	Lower Left IR-TRACC Y - deflection	mm	Thortest	0.22 ⁽²⁾	-22.40 ⁽²⁾
	Lower Left IR-TRACC Z - deflection	mm	Thortest	18.20	-2.35
	Lower Left IR-TRACC D - deflection	mm	Thortest	0.82	-64.06
	Left Viscous Criterion Based on X - deflection		Compute	1.96	
	Lower Right IR-TRACC X - deflection	mm	Thortest	0.72	-54.62
	Lower Right IR-TRACC Y - deflection	mm	Thortest	7.34	-5.69
	Lower Right IR-TRACC Z - deflection	mm	Thortest	25.26	-0.27
	Lower Right IR-TRACC D - deflection	mm	Thortest	0.77	-59.37
	Right Viscous Criterion Based on X - deflection		Compute	1.03	
Spine	Upper Spine (T1) AX	g	180	6.92	-39.10
	Upper Spine (T1) AY	g	180	15.22	-2.45
	Upper Spine (T1) AZ	g	180	27.07	-14.33
	Upper Spine (T1) Resultant	g	Compute	43.94	
	Middle Spine (T6) AX	g	180	6.13	-35.81
	Middle Spine (T6) AY	g	180	22.44	-3.21
	Middle Spine (T6) AZ	g	180	8.52	-14.27
	Middle Spine (T6) Resultant	g	Compute	36.62	
Pelvis	Pelvis CG Resultant Acceleration	g	Compute	44.29	
Acetabulum	Left FX force	N	600	869.48	-1087.05
	Left FY force	N	600	247.56	-918.01
	Left FZ force	N	600	427.38	-1630.40
	Left Acetabulum Resultant	N	Compute	1637.79	
	Right FX force	N	600	867.09	-1052.31
	Right FY force	N	600	151.95	-1689.69
	Right FZ force	N	600	666.70	-363.44
	Right Acetabulum Resultant	N	Compute	1715.78	

Anomalies

- (1) Questionable spike at 160 ms
- (2) Questionable data from 88 to 116 ms

SECTION 2 (CONTINUED)
PRELIMINARY INJURY SUMMARY: Driver Legs

Test Vehicle: 2012 Honda Odyssey - Van NHTSA No.: RC5370
Test Program: Research and Development Left Oblique Offset Test Date: 1/4/2013

Driver: Thor Serial No. 007 Injury Summary

	Nomenclature	Units	Source	Max	Min
Knee	Left Knee Displacement, DX	mm	180	2.04	-9.44
	Right Knee Displacement, DX	mm	180	2.27	-3.91
Femur	Left Femur Force, FZ	N	600	329.63	-3271.25
	Left Femur Moment, MX	N-m	600	21.40	-173.15
	Left Femur Moment, MY	N-m	600	34.85	-81.79
	Left Femur Res (MX / MY only, not MZ)	N-m	Compute	178.04	
	Right Femur Force, FZ	N	600	278.10	-2898.46
	Right Femur Moment, MX	N-m	600	23.00	-186.24
	Right Femur Moment, MY	N-m	600	37.19	-61.44
	Right Femur Res (MX / MY only, not MZ)	N-m	Compute	189.36	
Tibia	Left Upper Tibia, FZ	N	600	906.09	-1179.42
	Left Upper Tibia, MY	N-m	600	43.04	-163.52
	Left Upper Tibia, Index		Compute	0.68	
	Right Upper Tibia, FZ	N	600	166.50	-1690.31
	Right Upper Tibia, MY	N-m	600	6.61	-171.57
	Right Upper Tibia, Index		Compute	0.76	
	Left Lower Tibia, FZ	N	600	258.05	-1619.18
	Left Lower Tibia, MY	N-m	600	58.49	-166.66
	Left Lower Tibia, Index		Compute	0.81	
	Right Lower Tibia, FZ	N	600	404.05 ⁽³⁾	-1987.80 ⁽³⁾
	Right Lower Tibia, MY	N-m	600	5.05	-138.46
	Right Lower Tibia, Index		Compute	0.65 ⁽³⁾	
Ankle	Left Ankle Rotation, RX	Deg	180	15.09	-7.51
	Left Ankle Rotation, RY	Deg	180	26.69	-5.58
	Right Ankle Rotation, RX	Deg	180	18.64	-35.77
	Right Ankle Rotation, RY	Deg	180	12.71	-14.84
Anomalies					
(3) Questionable spikes at 15 and 64 ms					

SECTION 2 (CONTINUED)
PRELIMINARY INJURY SUMMARY: Right Front Passenger

Test Vehicle: 2012 Honda Odyssey - Van NHTSA No.: RC5370
Test Program: Research and Development Left Oblique Offset Test Date: 1/4/2013

Right Front Passenger: Thor Serial No. 016 Injury Summary

	Nomenclature	Units	Source	Max	Min
Head	Head CG X	g	1000	13.33	-18.20
	Head CG Y	g	1000	89.36	-4.52
	Head CG Z	g	1000	43.81	-2.70
	Head Resultant	g	Compute	92.85	
	36 ms HIC		Compute	627.69	
	15 ms HIC		Compute	621.62	
	Head Resultant CG Acceleration, 3 ms Clip	g	Compute	83.35	
	Head Rotational Velocity X	deg/s	60	582.55	
	Head Rotational Velocity Y	deg/s	60	567.23	-1312.10
	Head Rotational Velocity Z	deg/s	60	2365.37	-1149.70
	Head Rotational Velocity Resultant	deg/s	Compute	3146.47	
	Brain Injury Criteria		Compute	1.21	
	Neck	UNLC Transferred to OC, Neck System, FX	N	1000	251.34
UNLC Neck System Tension, FZ		N	1000	1977.80	
UNLC Neck System Compression, FZ		N	1000		-212.09
UNLC Transferred to OC, Neck System Flexion, MY		N-m	Thortest	10.85	
UNLC Transferred to OC, Neck System Extension, MY		N-m	Thortest		-2.80
NIJ			Compute	0.35	
On head acting through total neck section, FX		N	Thortest	422.15	-117.19
On head acting through total neck section, FY		N	Thortest	907.71	-82.21
On head acting through total neck section, FZ		N	Thortest	2072.38	-43.01
On head acting through total neck section, MX		N-m	Thortest	24.78	-27.02
On head acting through total neck section, MY		N-m	Thortest	11.45	-15.47
On head acting through total neck section, MZ		N-m	Thortest	11.89	-22.60
On head acting through O.C. joint only, FX		N	Thortest	398.62	-69.70
On head acting through O.C. joint only, FZ		N	Thortest	1949.95	-221.52
On head acting through O.C. joint only, MY		N-m	Thortest	10.85	-2.80
Chest		Upper Left IR-TRACC X - deflection	mm	Thortest	0.15
	Upper Left IR-TRACC Y - deflection	mm	Thortest	7.81	-30.74
	Upper Left IR-TRACC Z - deflection	mm	Thortest	1.24	-21.41
	Upper Left IR-TRACC D - deflection	mm	Thortest	0.16	-23.92
	Upper Right IR-TRACC X - deflection	mm	Thortest	0.19	-15.33
	Upper Right IR-TRACC Y - deflection	mm	Thortest	4.76	-22.89
	Upper Right IR-TRACC Z - deflection	mm	Thortest	7.44	-4.87
	Upper Right IR-TRACC D - deflection	mm	Thortest	0.19	-13.81
	Lower Left IR-TRACC X - deflection	mm	Thortest	0.45	-27.58
	Lower Left IR-TRACC Y - deflection	mm	Thortest	7.03	-2.80

SECTION 2 (CONTINUED)

PRELIMINARY INJURY SUMMARY: Right Front Passenger

Test Vehicle: 2012 Honda Odyssey - Van NHTSA No.: RC5370

Test Program: Research and Development Left Oblique Offset Test Date: 1/4/2013

Right Front Passenger: Thor Serial No. 016 Injury Summary

	Nomenclature	Units	Source	Max	Min
Chest (Con't)	Lower Left IR-TRACC Z - deflection	mm	Thortest	12.78	-7.23
	Lower Left IR-TRACC D - deflection	mm	Thortest	0.54	-25.98
	Lower Right IR-TRACC X - deflection	mm	Thortest	38.86	-6.74
	Lower Right IR-TRACC Y - deflection	mm	Thortest	5.77	-16.84
	Lower Right IR-TRACC Z - deflection	mm	Thortest	12.64	-12.15
	Lower Right IR-TRACC D - deflection	mm	Thortest	39.39	-5.12
	Chest CG Acceleration, 3 ms clip	g	Compute	22.18	
Abdomen	Lower Left IR-TRACC X - deflection	mm	Thortest	0.44	-57.06
	Lower Left IR-TRACC Y - deflection	mm	Thortest	15.16	-3.15
	Lower Left IR-TRACC Z - deflection	mm	Thortest	16.46	-4.50
	Lower Left IR-TRACC D - deflection	mm	Thortest	0.45	-56.86
	Left Viscous Criterion Based on X - deflection		Compute	0.55	
	Lower Right IR-TRACC X - deflection	mm	Thortest	0.62	-40.43
	Lower Right IR-TRACC Y - deflection	mm	Thortest	19.01	-0.18
	Lower Right IR-TRACC Z - deflection	mm	Thortest	13.50	-4.33
	Lower Right IR-TRACC D - deflection	mm	Thortest	0.62	-40.87
	Right Viscous Criterion Based on X - deflection		Compute	0.36	
Spine	Upper Spine (T1) AX	g	180	6.00	-19.13
	Upper Spine (T1) AY	g	180	30.23	-3.45
	Upper Spine (T1) AZ	g	180	44.18	-23.66
	Upper Spine (T1) Resultant	g	Compute	44.25	
	Middle Spine (T6) AX	g	180	5.21	-21.80
	Middle Spine (T6) AY	g	180	12.18	-2.61
	Middle Spine (T6) AZ	g	180	15.02	-7.90
	Middle Spine (T6) Resultant	g	Compute	22.80	
Pelvis	Pelvis CG Resultant Acceleration	g	Compute	58.25	
Acetabulum	Left FX force	N	600	844.39	-636.33
	Left FY force	N	600	1548.47	-289.77
	Left FZ force	N	600	269.23	-1656.70
	Left Acetabulum Resultant	N	Compute	1717.97	
	Right FX force	N	600	2183.15	-2739.22
	Right FY force	N	600	670.31	-510.27
	Right FZ force	N	600	770.35	-667.11
	Right Acetabulum Resultant	N	Compute	2777.15	
Anomalies					
None					

SECTION 2 (CONTINUED)

PRELIMINARY INJURY SUMMARY: Right Front Passenger Legs

Test Vehicle: 2012 Honda Odyssey - Van NHTSA No.: RC5370

Test Program: Research and Development Left Oblique Offset Test Date: 1/4/2013

Right Front Passenger: Thor Serial No. 016 Injury Summary

	Nomenclature	Units	Source	Max	Min
Knee	Left Knee Displacement, DX	mm	180	1.23	-6.00
	Right Knee Displacement, DX	mm	180	1.43	-10.20
Femur	Left Femur Force, FZ	N	600	271.06	-4255.75
	Left Femur Moment, MX	N-m	600	131.78	-74.30
	Left Femur Moment, MY	N-m	600	74.53	-63.16
	Left Femur Res (MX / MY only, not MZ)	N-m	Compute	136.75	
	Right Femur Force, FZ	N	600	610.38	-4297.42
	Right Femur Moment, MX	N-m	600	146.26	-205.23
	Right Femur Moment, MY	N-m	600	103.64	-27.55
	Right Femur Res (MX / MY only, not MZ)	N-m	Compute	205.68	
Tibia	Left Upper Tibia, FZ	N	600	134.48	-3293.83
	Left Upper Tibia, MY	N-m	600	57.85	-36.29
	Left Upper Tibia, Index		Compute	0.59	
	Right Upper Tibia, FZ	N	600	557.52	-1465.19
	Right Upper Tibia, MY	N-m	600	105.55	-23.98
	Right Upper Tibia, Index		Compute	0.55	
	Left Lower Tibia, FZ	N	600	155.69	-4048.35
	Left Lower Tibia, MY	N-m	600	23.59	-50.05
	Left Lower Tibia, Index		Compute	0.73	
	Right Lower Tibia, FZ	N	600	603.15	-1717.78
	Right Lower Tibia, MY	N-m	600	41.84	-27.87
	Right Lower Tibia, Index		Compute	0.44	
Ankle	Left Ankle Rotation, RX	Deg	180	42.78 ⁽⁴⁾	-80.66 ⁽⁴⁾
	Left Ankle Rotation, RY	Deg	180	47.62 ⁽⁵⁾	-14.11 ⁽⁵⁾
	Right Ankle Rotation, RX	Deg	180	23.79	-32.31
	Right Ankle Rotation, RY	Deg	180	-2.97	-26.04

Anomalies

(4) Questionable data throughout

(5) Questionable data throughout

SECTION 3 DATA SHEETS

Test Vehicle: 2012 Honda Odyssey Van
Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
Test Date: 1/4/2013

<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	3-17
9	Test Vehicle Summary of Results	3-24
10	Post-Test Observations	3-25
11	Vehicle Profile Measurements	3-26
12	Accident Investigation Division Data	3-28
13	Vehicle Intrusion Measurements	3-29
14	RMDB Crush Measurements	3-47
15	Summary of FMVSS 212, 219 (Partial), and 301 Data	
	Windshield Periphery Measurements	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: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

VEHICLE INFORMATION

NHTSA No.	RC5370
Model Year	2012
Make	Honda
Model	Odyssey
Body Style	Van
VIN	5FNRL5H20CB147135
Body Color	Charcoal gray
Odometer Reading (km/mi)	5 / 3
Engine Displacement. (L)	3.5
Type/No. Cylinders	V6
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	5-Speed
Overdrive	Yes
Final Drive	Front Wheel Drive
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes
All-Wheel Drive (AWD)	No
Traction Control System (TCS)	Yes

VEHICLE OPTIONS

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

Does owner's manual provide instructions to turn off automatic door locks?

Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Honda MFG of Alabama
Date of Manufacture	08/12

GVWR (kg)	2730
GAWR Front (kg)	1320
GAWR Rear (kg)	1450

VEHICLE SEATING AND WEIGHT CAPACITY

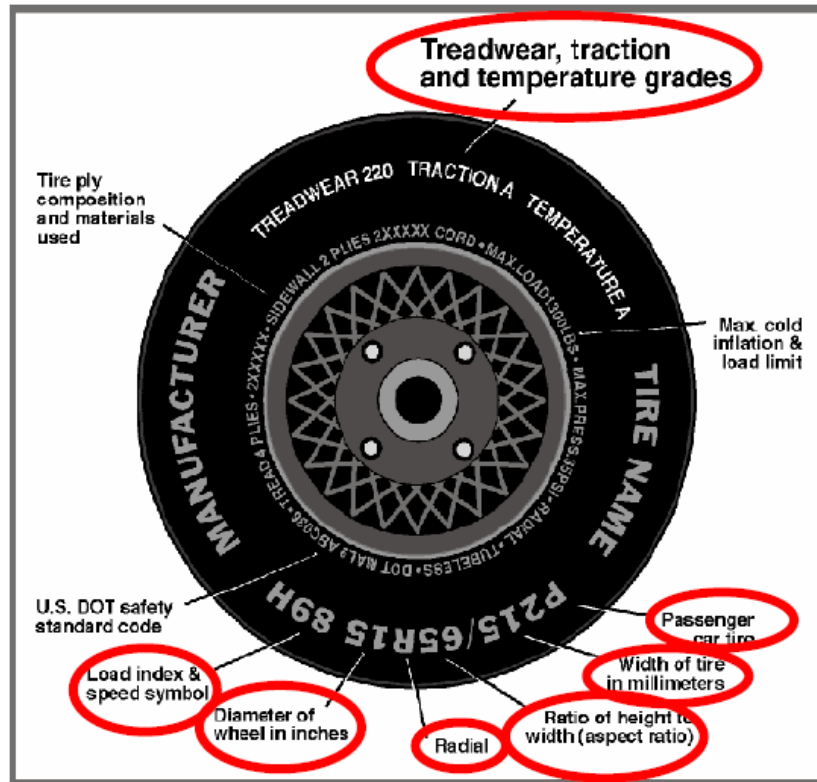
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bucket	Bench	
Number of Occupants	2	2	3	7
Capacity Wt. (VCW) (kg)				608.00
Cargo Wt. (RCLW) (kg)				131.72

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

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

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



Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	230	230
Recommended Tire Size	P235/65R17	P235/65R17
Tire Size on Vehicle	P235/65R17	P235/65R17
Tire Manufacturer	Continental	Continental
Tire Model	Contiprocontact	Contiprocontact
Treadwear	500	500
Traction	AA	AA
Temperature Grades	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Polyamide	1 Polyester, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	103T	103T
Tire Material	Rubber	Rubber
DOT Safety Code Right	A3873VM3312	A3873VM3312
DOT Safety Code Left	A3873VM3312	A3873VM3412

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

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	569.5	424.5		625.5	493	
Right	kg	557.5	416.5		611	480	
Ratio	%	57.3%	42.7%		56.0%	44.0%	
Totals	kg	1,127.0	841.0	1,968.0	1,236.5	973.0	2209.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1,968.00
Weight of 2 P572E ATDs	kg	190.51
Rated Cargo/Luggage Weight (RCLW)	kg	131.72
Calculated Vehicle Target Weight (TVTW)	kg	2,281.23

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	782	782	794	794	1282
As Tested	mm	766	768	774	773	1321
Post Test	mm	855	764	734	826	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	3000
Total Vehicle Length at Left Side	mm	5040
Total Vehicle Length at Centerline	mm	5147
Total Vehicle Length at Right Side	mm	5040
Weight of Ballast in Cargo Area	kg	0
Weight of Vehicle Components Removed	kg	0
Amount of Stoddard Solvent in Fuel Tank	L	73.9

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:

No components were removed in order to meet the required test weight.

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

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements		Pre-Test
1	Total Length	mm	5147
2	Total Width	mm	1983
3	Bumper Top Height	mm	545
4	Bumper Bottom Height	mm	451
5	Longitudinal Member Top Height	mm	548
6	Distance Between Longitudinal Members	mm	1225
7	Longitudinal Member Width	mm	115
8	Engine Top Height	mm	961
9	Engine Bottom Height	mm	254
10	Engine and Gearbox Width	mm	540
11	Front Bumper-Engine Distance	mm	424
12	Front Shock Absorber Fixing Height	mm	1055
13	Bonnet Leading Edge Height	mm	862
14	Front Shock Absorber Fixing Width	mm	1309
15	Front Bumper – Front Axle Distance	mm	936
16	Front Axle – A Pillar Distance	mm	496
17	A-Pillar – B-Pillar Distance	mm	1054
18	B-Pillar – Rear Axle Distance	mm	1454
19	B-Pillar – C-Pillar Distance	mm	1138
20	Roof Sill Bottom Height	mm	1548
21	Roof Sill Top Height	mm	1676
22	Floor Sill Bottom Height	mm	399
23	Floor Sill Top Height	mm	411

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

DATA SHEET NO. 2

SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

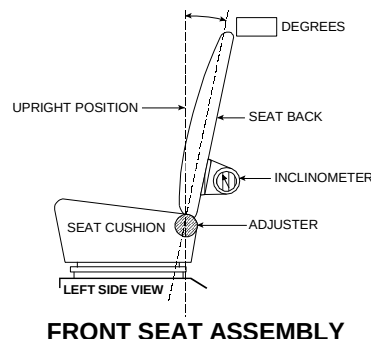
NHTSA No.: RC5370
 Test Date: 1/4/2013

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 to allow for a zero head angle of the passenger dummy



	Deg.
Driver Seat Back Angle	12.4
Passenger Seat Back Angle	12.0

SEAT FORE/AFT POSITIONS

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

The driver's seat was positioned at the mid-point of fore/aft travel.

The passenger's seat was positioned at the most forward position of fore/aft travel.

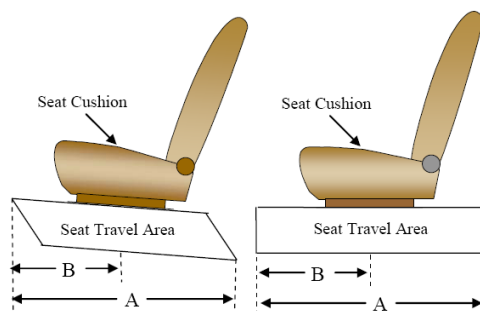
	Total Fore/Aft Travel	Placed in Position #
Driver Seat	255	127.5
Passenger Seat	200	100

SEAT BELT UPPER ANCHORAGES

Describe the method of positioning seat belt upper anchorages. Belt anchorages were moved along the full range of motion, and marked on the B-Pillar to their respective possible positions.

Photographic evidence can be found in Appendix A of this report. Zero is defined as the upper-most position.

	Total # of Positions	Placed in Position #
Driver Seat	4	0-uppermost
Passenger Seat	4	0-uppermost



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

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

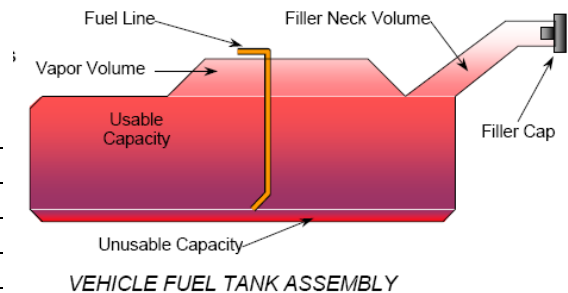
FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	79.5
Usable Capacity of "Optional Tank"	
93% of Usable Capacity	73.9
Actual Amount of Solvent Used	73.9
1/3 of Usable Capacity	26.5

FUEL PUMP

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

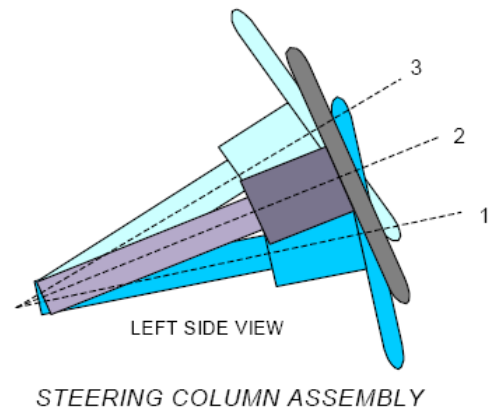
Fuel evacuated according to the specifications provided by the manufacturer in Form 1. Electric fuel pump operates when the ignition is in the 'on' position and the engine is running. The fuel filler neck is located above the left rear wheel.



STEERING COLUMN ADJUSTMENT

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

The steering wheel was adjusted to the midpoint of tilt angle range and the midpoint of the telescoping travel (if applicable)



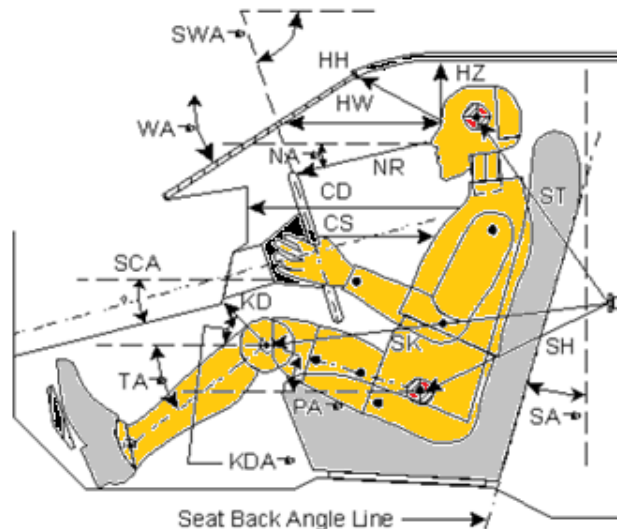
STEERING COLUMN POSITIONS

	Tilt (degrees)	Fore/Aft Position (mm)
Lowermost position No. 1	22.1	
Geometric center position No. 2	25.2	
Uppermost position No. 3	28.3	
Telescoping Steering Wheel Travel		40
Test Position	25.2	20

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013



Code	Measurement Description	Driver (Serial # Thor 007)		Passenger (Serial # Thor 016)	
		Length (mm)	Angle(°)	Length (mm)	Angle (°)
WA°	Windshield Angle		28.1		
SWA°	Steering Wheel Angle		25.4		
SCA°	Steering Column Angle		64.6		
SA°	Seat Back Angle (on headrest post)		12.4		12.0
HZ	Head to Roof (Z)	205	90.0	176	90.0
HH	Head to Header	420	20.4	453	10.5
HW	Head to Windshield	730	0.0	712	0.0
NR	Nose to Rim	478	-14.2	766	-34.5
CD	Chest to Dash	582		612	
CS	Chest to Steering Hub	376	-6.5		
RA	Rim to Abdomen	188	0.0		
KDL	Left Knee to Dash	119	18.2	116	29.3
KDR	Right Knee to Dash	108	23.2	120	20.2
PA°	Pelvic Angle		-24.1		22.4
TA°	Tibia Angle		-54.2		46.5
SK	Striker to Knee	625	9.8	632	6.3
ST	Striker to Head	53	85.4	7	89.4
SH	Striker to H-Point	220	-7.3	213	2.4
HAX°	Head Angle (X)		0.1		0.2
HAY°	Head Angle (Y)		0.3		0.1
NAX°	Neck Angle (X)		3.4		
NAY°	Neck Angle (Y)		-0.2		
TAX°	T6 Angle (X)		20.2		3.7
TAY°	T6 Angle (Y)		-0.2		-1.7
LAX°	Lumbar Angle (X)				-2.1
LAY°	Lumbar Angle (Y)				19.3

DATA SHEET NO.3 (CONTINUED)
DUMMY CMM MEASUREMENTS

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

Description	Units	Driver			Passenger		
		X	Y	Z	X	Y	Z
Striker	mm	2024	-894	939	2025	891	939
Head CG	mm	2110	-507	292	2063	499	260
Bridge of Nose	mm	2206	-431	298	2159	425	260
Tip of Nose	mm	2206	-431	336	2160	423	299
Shoulder Bolt	mm	2153	-615	538	2129	608	530
Tip of Chin	mm	2202	-431	418	2158	423	385
H-Point	mm	2277	-626	978	2269	621	943
Left Knee	mm	2682	-618	841	2693	361	908
Right Knee	mm	2704	-365	876	2688	588	882
Left Ankle	mm	2930	-608	1179	3015	343	1177
Right Ankle	mm	2995	-339	1170	2979	563	1182
Left Heel	mm	2938	-587	1315	2992	282	1302
Right Heel	mm	3013	-293	1305	2976	511	1307
Outboard Seat Anchor Bolt	mm	2524	-633	1334	2542	645	1307
Outboard Head Restraint Post	mm	1896	-518	493	1897	517	466
Top of Head Restraint	mm	1896	-518	493	2015	423	186
Center of Steering Wheel	mm	2545	-449	564			

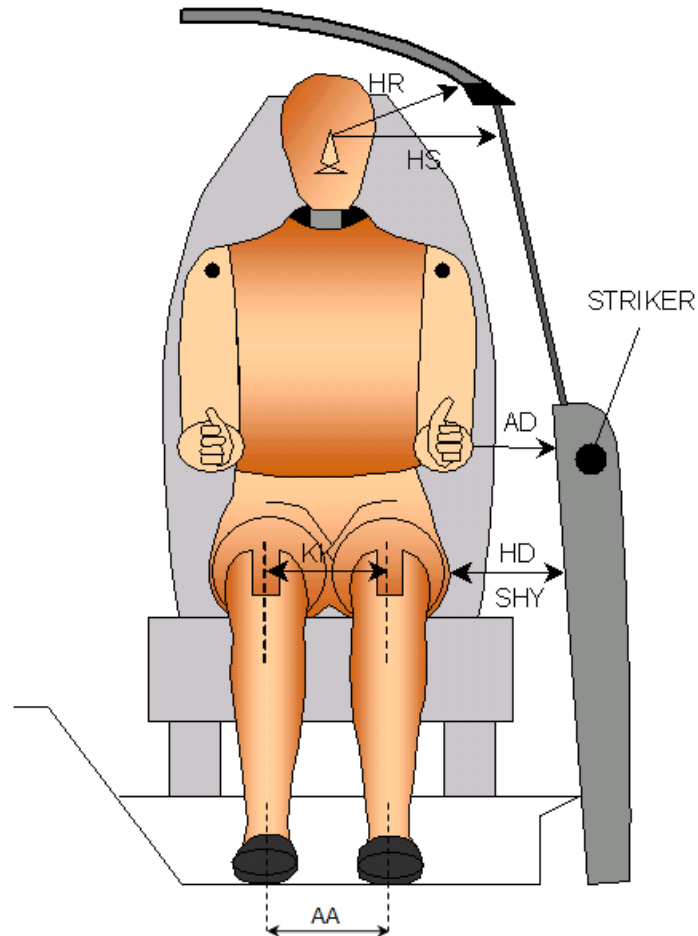
Reference point: 50mm above the center of the rear windshield (See appendix D for procedure to create coordinate system).

- +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: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

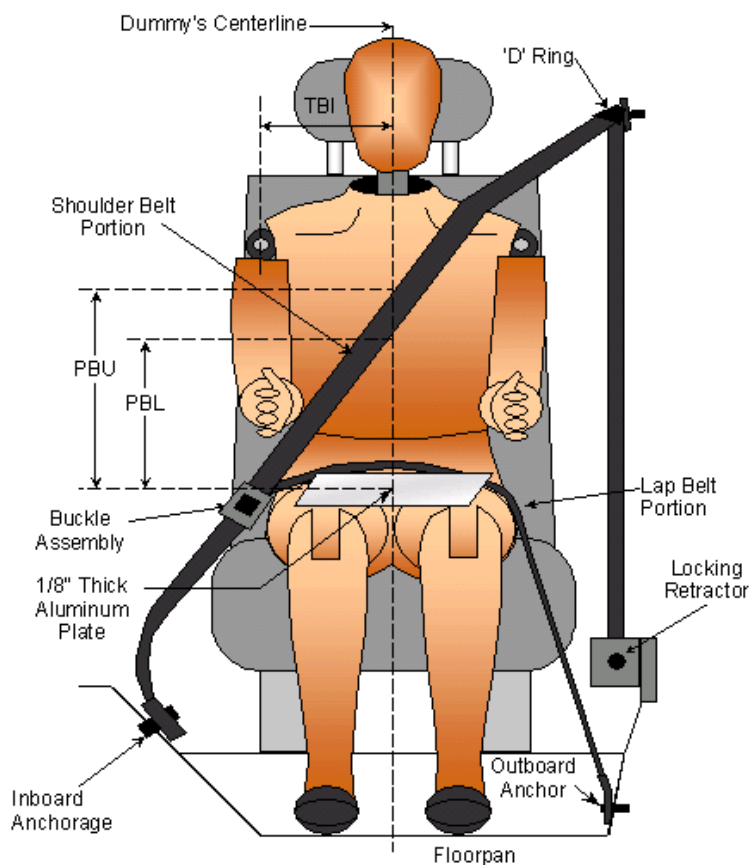


Code	Description	Units	Driver	Passenger
AD	Arm to Door	mm	133	48
HD	H-Point to Door	mm	115	129
HR	Head to Side Header	mm	248	242
HS	Head to Side Window	mm	375	385
KK	Knee to Knee	mm	295	270
SHY	Striker to H-Point (Y Direction)	mm	265	270
AA	Ankle to Ankle	mm	280	228

DATA SHEET NO. 5 SEAT BELT POSITIONING DATA

Test Vehicle: 2012 Honda Odyssey Van
Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
Test Date: 1/4/2013



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of reference to belt upper edge	mm	380	370
PBL — Top surface of reference to belt lower edge	mm	295	285

BELT LENGTH DATA

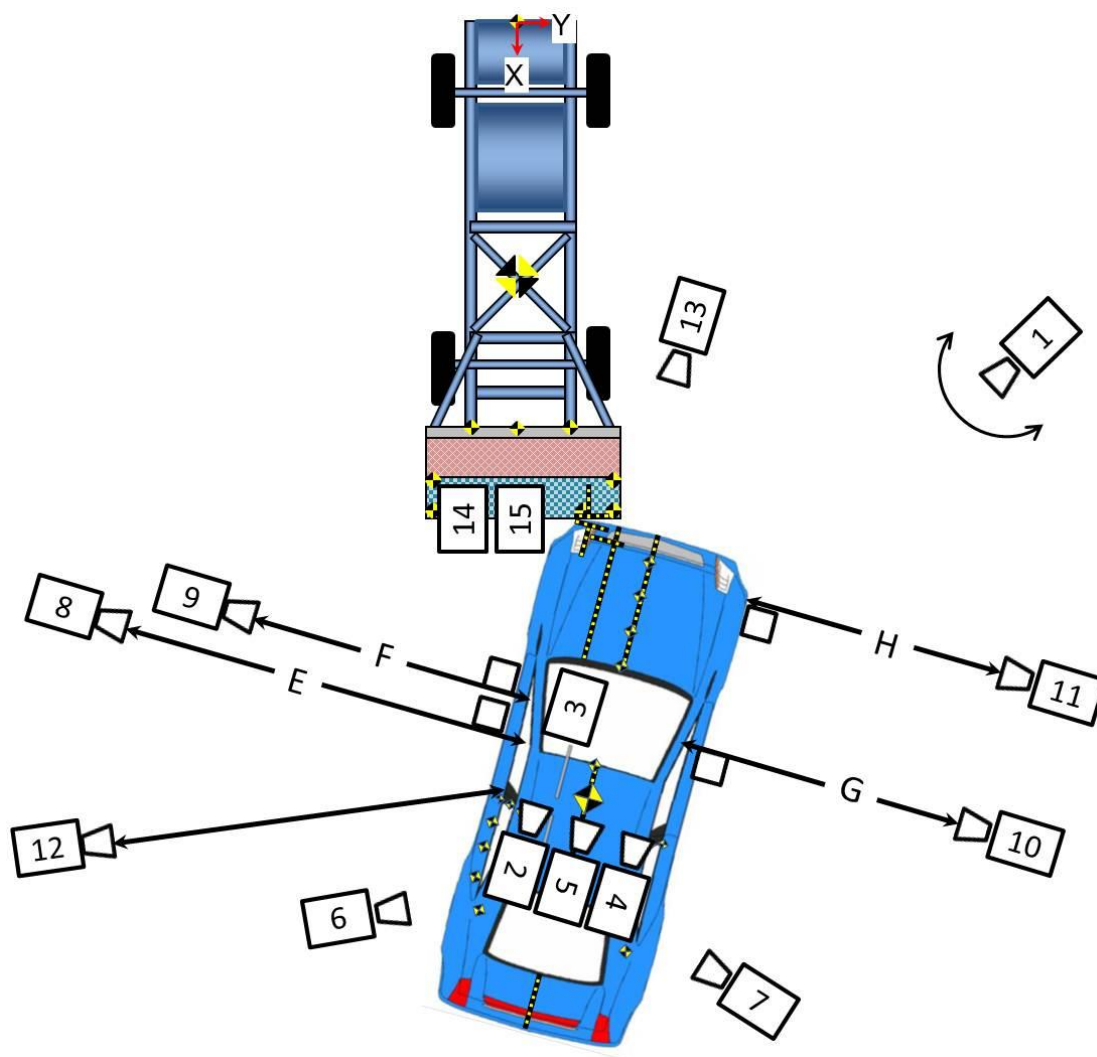
Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	930	870
Lap Belt Length as measured on ATD	mm	770	620
Remainder of belt on reel	mm	900	1,010
Total belt length for continuous webbing systems	mm	2,600	2,500

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

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

HORIZONTAL LOCATION



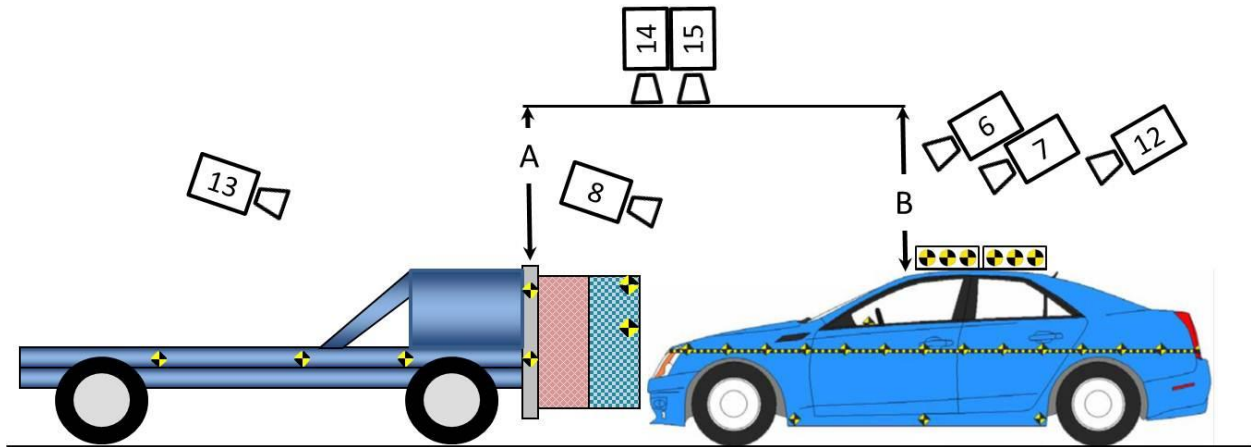
E	mm	9737
F	mm	6471
G	mm	8347
H	mm	8633

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

Test Vehicle: 2012 Honda Odyssey Van
Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
Test Date: 1/4/2013

VERTICAL LOCATION



A	mm	3508
B	mm	3641

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

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

CAMERA LOCATIONS

No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Side	--	--	--	Zoom	30
2	Onboard Passenger Movement	8343	-229	1529	12.5	500
3	Onboard Driver Lower Leg	6353	-440	362	6.5	500
4	Onboard Driver Movement	8315	75	1529	12.5	500
5	Onboard Centerline	8352	-443	1529	12.5	500
6	Driver Interaction	7176	2090	3570	24	1000
7	Passenger Interaction	12253	-10770	2269	50	1000
8	Target Vehicle Left Side Perpendicular (High)	4859	9654	3409	24-70	1000
9	Target Vehicle Driver Motion	5813	6524	954	24	1000
10	Target Vehicle Passenger Motion	9516	-10183	1759	50	1000
11	Target Vehicle Right Side	8555	-10140	1959	24	1000
12	Target Vehicle Left Side (High)	10246	8506	3124	28-70	1000
13	RMDB/Target Vehicle Interaction	3792	1611	2012	13	1000
14	Close-up Impact Point	4840	-1080	4719	28	1000
15	Overall Impact	6269	-585	5317	14	1000

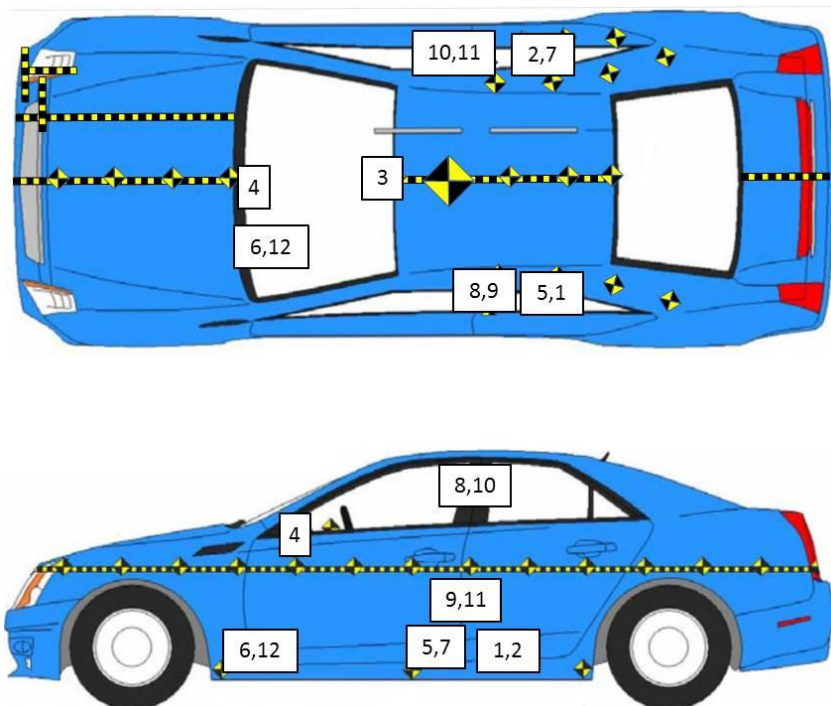
Reference Point: Center most rearward point of the RMDB when in contact with the target vehicle:

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

DATA SHEET NO. 7 **VEHICLE INSTRUMENTATION DATA**

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Axes	Units	Measurements (mm)		
				X	Y	Z
1	Left Rear Sill	X,Y	mm	880	-578	1196
2	Right Rear Sill	X,Y	mm	861	583	1198
3	Vehicle CG	X,Y,Z	mm	2545	2	1312
4	Instrument Panel	X	mm	2643	11	890
5	Driver Seat Track	X,Y,Z	mm	2046	-656	1287
6	Behind Brake Pedal	X,Y,Z	mm	3296	-451	1141
7	Passenger Seat Track	X,Y,Z	mm	2061	653	1294

Reference point: 50mm above the center of the rear windshield (See appendix D for procedure to create coordinate system).

- +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: 2012 Honda Odyssey Van
Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
Test Date: 1/4/2013

VEHICLE INSTRUMENTATION DATA

Loc.	Description	Axes	Units	Positive Direction		Negative Direction	
				Max	Time (ms)	Max	Time (ms)
1	Left Rear Sill	X	g	2.93	99.60	-32.45	49.80
		Y	g	11.48	41.60	-1.79	131.60
2	Right Rear Sill	X	g	3.21	120.35	-40.15	53.90
		Y	g	14.37	51.00	-2.25	122.00
3	Vehicle CG	X	g	3.88	9.75	-39.04	46.20
		Y	g	23.03	45.90	-5.00	63.80
		Z	g	76.56	59.70	-48.79	66.45
4	Instrument Panel	X	g	21.67	130.50	-65.56	51.50
5	Driver Seat Track	X	g	3.23	9.30	-31.00	48.70
		Y	g	19.01	30.15	-5.34	7.30
		Z	g	47.00	44.90	-20.25	10.80
6	Behind Brake Pedal	X	g	174.35	38.20	-49.95	34.65
		Y	g	157.06	40.80	-84.78	53.40
		Z	g	119.63	43.40	-32.07	51.05
7	Passenger Seat Track	X	g	2.83	123.95	-41.44	54.55
		Y	g	26.00	46.85	-3.18	6.60
		Z	g	13.34	44.25	-12.71	57.45
8	Driver Shoulder Belt		N	3,995.27	71.10	-29.19	211.20
9	Driver Lap Belt		N	3,997.20	64.75	-33.81	7.20
10	Passenger Shoulder Belt		N	2,822.60	43.80	-95.52	168.90
11	Passenger Lap Belt		N	5,107.80	64.40	-1.05	5.60
12	Driver Floor Pan String Pot		mm	0.35	-1.25	-41.76	72.90

TIME TO FIRE RESTRAINT TIMING

Loc.	Description	Axes	Units	Time to Fire (ms)
1	Driver Air Bag Squib 1	*	V	5.4
2	Driver Air Bag Squib 2	*	V	10.3
3	Driver Curtain Airbag Squib 1	*	V	38.4
4	Driver Curtain Airbag Squib 2	*	V	38.4
5	Driver Torso Airbag	*	V	26
6	Driver Pretensioner	*	V	5.6
7	Passenger Air Bag Squib 1	*	V	5.4
8	Passenger Air Bag Squib 2	*	V	45.3
9	Passenger Curtain Airbag	*	V	Disabled
10	Passenger Torso Airbag	*	V	Disabled
11	Passenger Knee Airbag	*	V	N/A
12	Passenger Pretensioner	*	V	5.4

* The measurement indicates the time the voltage changed

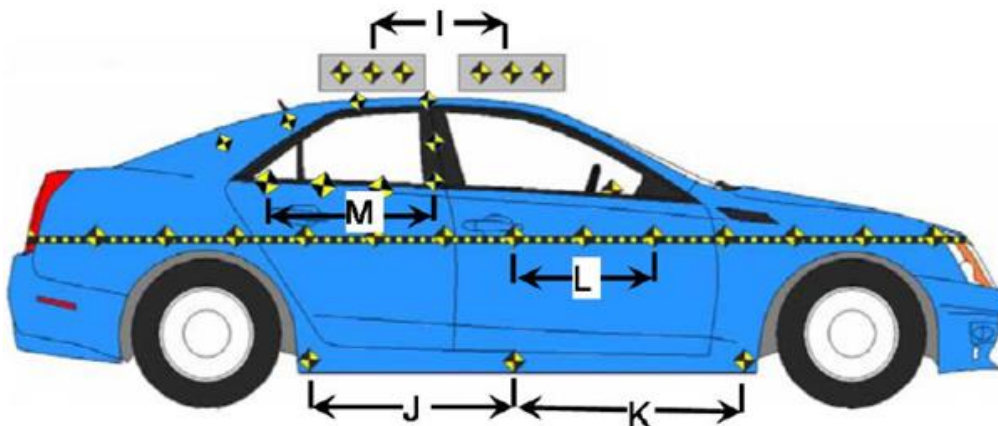
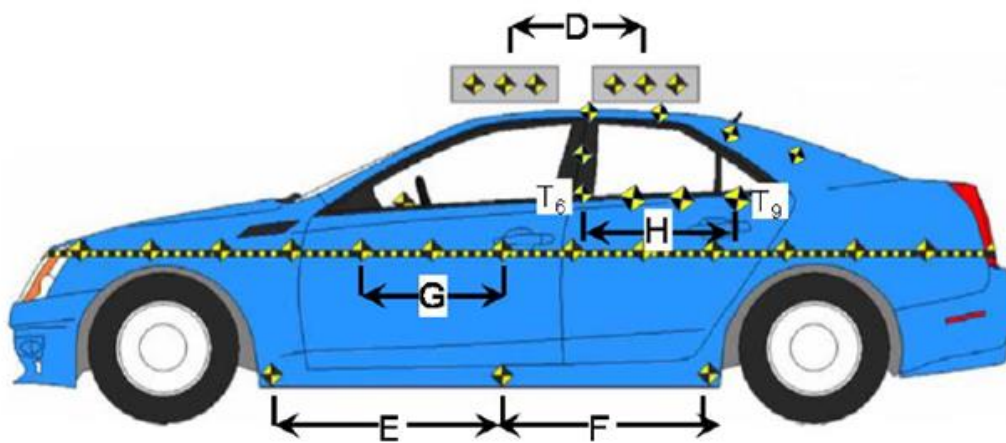
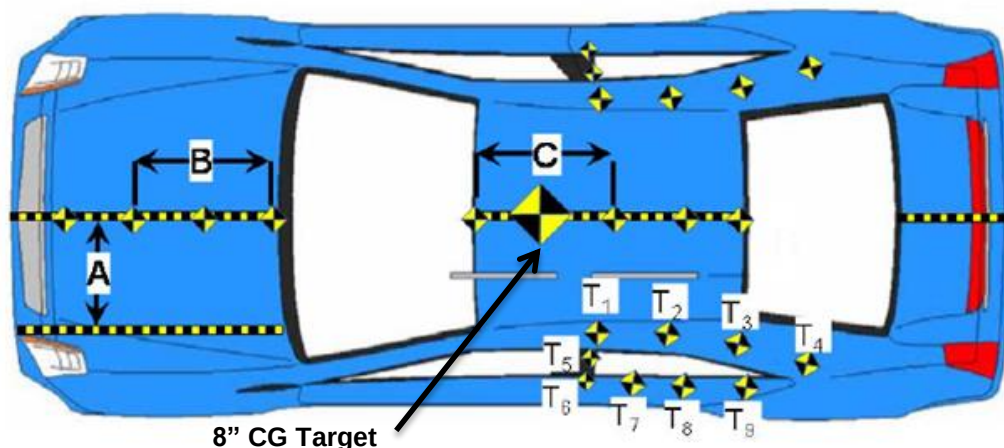
DATA SHEET NO. 8 **PHOTOGRAPHIC REFERENCE TARGET LOCATIONS**

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

Item	Units	Value
A	mm	300
B	mm	1220
C	mm	1220
D	mm	612
E	mm	986
F	mm	985
G	mm	1220
H	mm	1000
I	mm	612
J	mm	986
K	mm	991
L	mm	1220
M	mm	1000

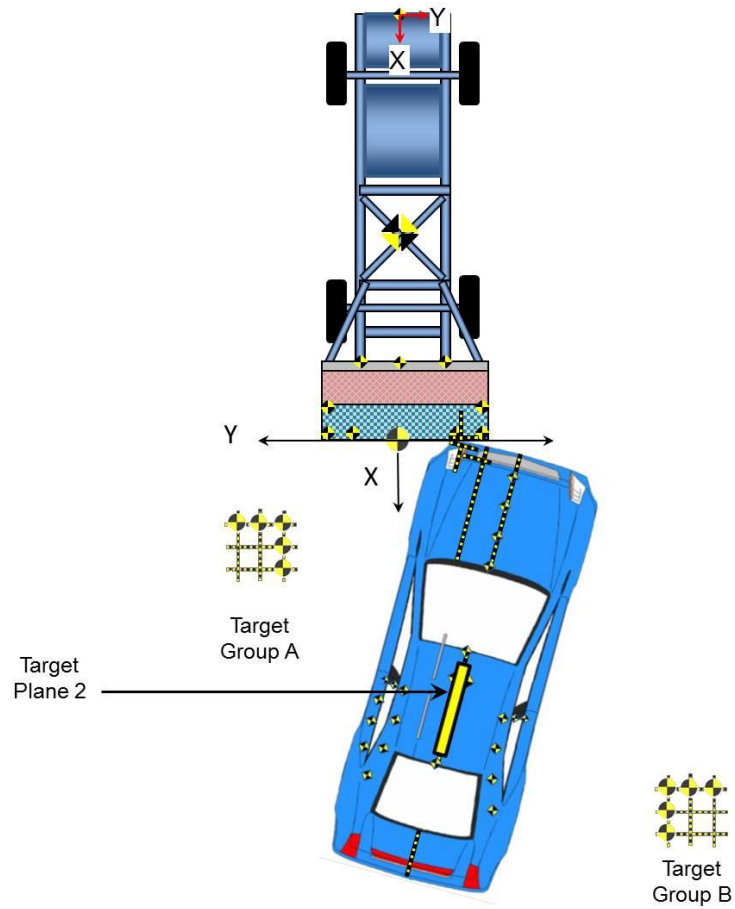
Note: All 6" targets on the centerline of the hood and roof are 610mm apart



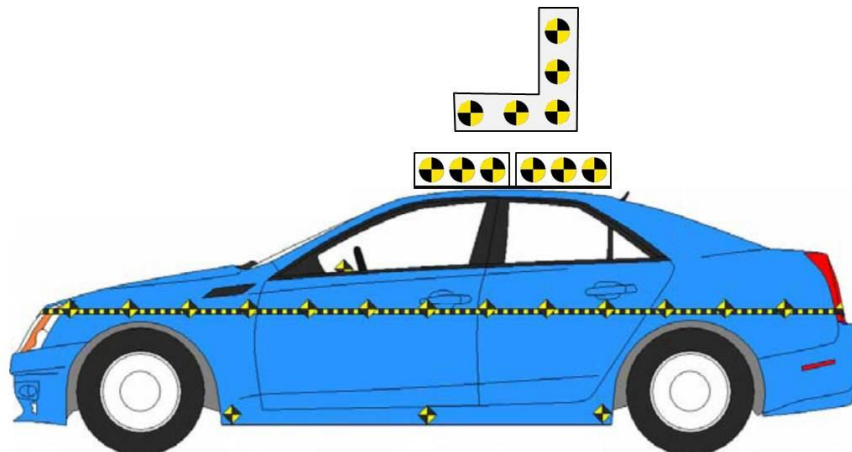
DATA SHEET NO. 8 (CONTINUED)
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2012 Honda Odyssey Van
Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
Test Date: 1/4/2013



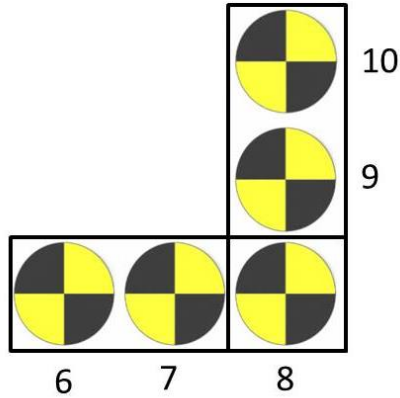
Target Plane 2



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

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013



Vertical Target
 Plane 2
 (Over Roof)

Target	Units	X	Y	Z
1	mm			
2	mm			
3	mm			
4	mm			
5	mm			
6*	mm	2215	-455	-260
7*	mm	1910	-463	-271
8*	mm	1607	-469	-285
9*	mm	1616	-495	-588
10*	mm	1631	-513	-891
11	mm			
12	mm			
13	mm			
14	mm			
15	mm			

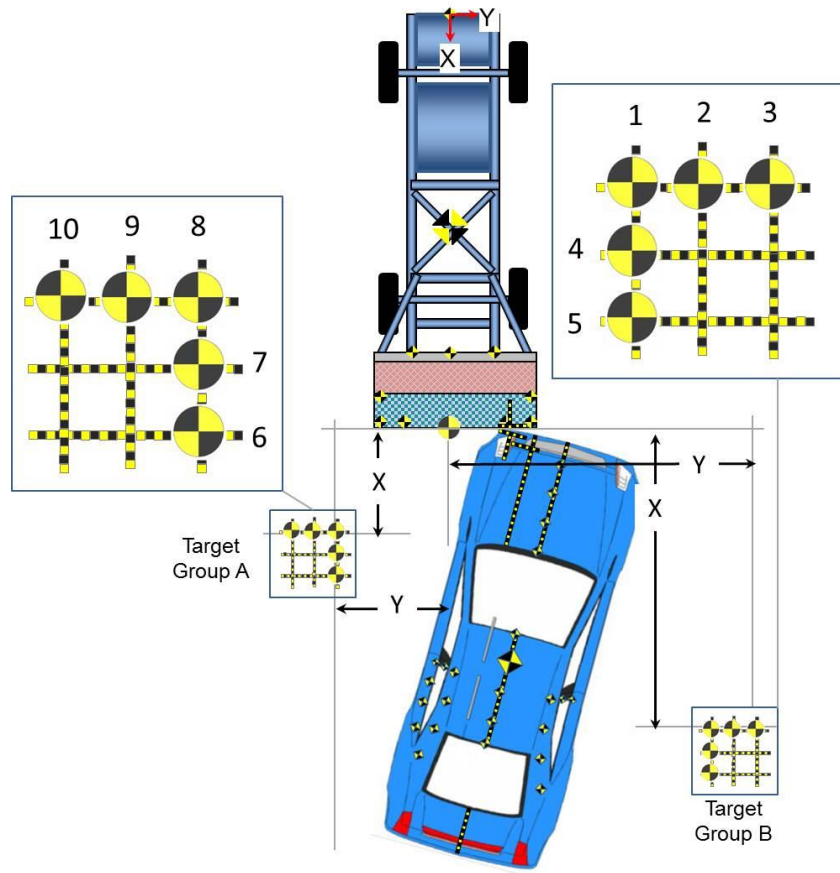
***NOTE:**

- Targets 6-10 are in reference to the vehicle coordinate system
- Vertical Target Plane 1&3 were removed for this test per James Saunders

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

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013



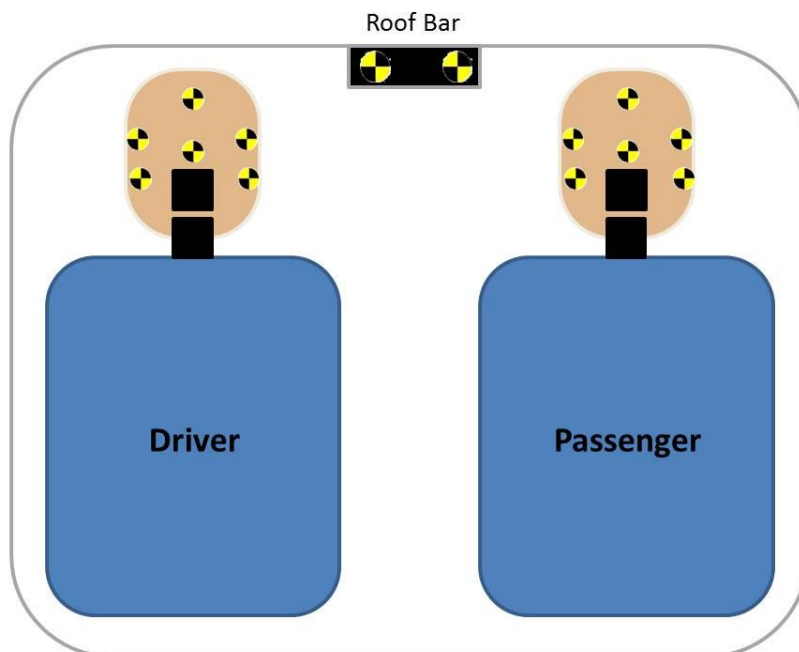
Target	Units	X	Y
1	mm	3198	1820
2	mm	3198	2122
3	mm	3198	2425
4	mm	3500	1820
5	mm	3803	1820
6	mm	1678	615
7	mm	1382	615
8	mm	1068	615
9	mm	1068	923
10	mm	1068	1916

Note: Target Locations are in reference to the front center of RMDB

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

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013



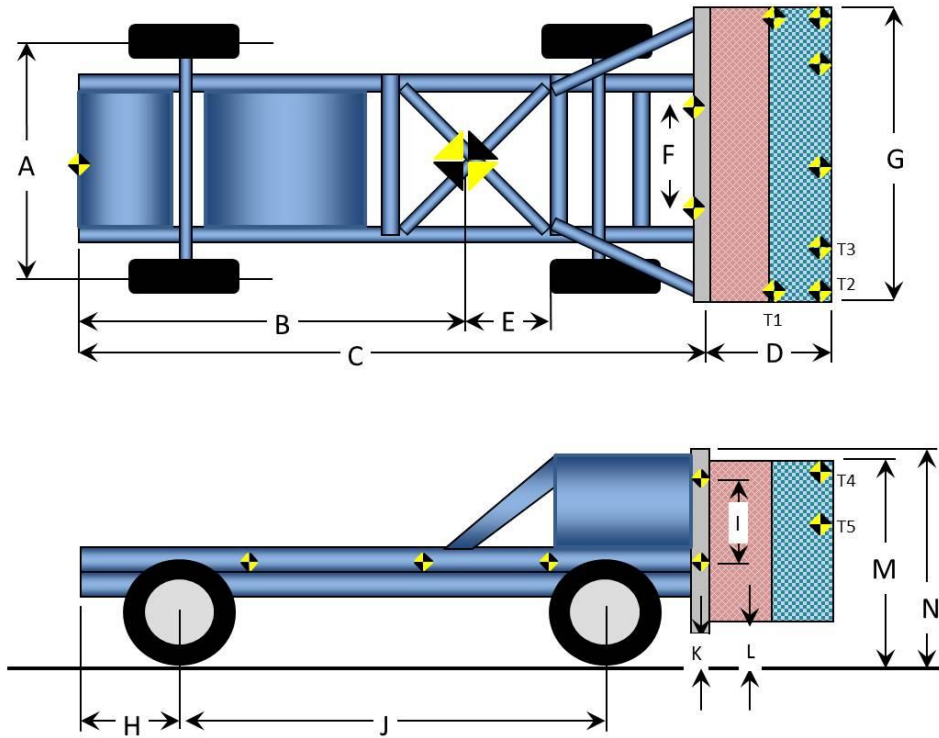
Point	Pre-Test		
	X	Y	Z
Roof Bar Driver	2628	-67	200
Roof Bar Passenger	2628	59	202

Note: Rear target bar was not used for this test per James Saunders.

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

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013



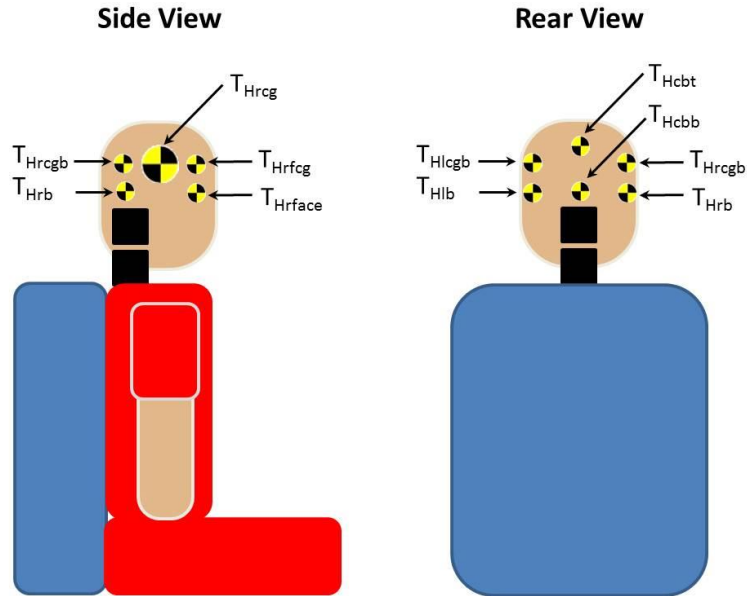
Item	Units	Value	Item	Units	Value
A	mm	1930	H	mm	800
B	mm	2451	I	mm	500
C	mm	3995	J	mm	2555
D	mm	605	K	mm	77
E	mm	904	L	mm	71
F	mm	1123	M	mm	1024
G	mm	2205	N	mm	1177

	Units	Front Axle	Rear Axle	Total
Left	kg	802.0	453.6	1255.6
Right	kg	807.4	427.7	1235.1
Ratio	%	65	35	100
Total	kg	1609.4	881.3	2490.7
CG Aft of Front Axle	mm			904

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

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013



Driver Dummy Head Targets (THOR007)

Measurement	Units	Value
Distance between T _{Hrcg} & T _{Hrfcg}	mm	50
Distance between T _{Hrcg} & T _{Hrcgb}	mm	40
Distance between T _{Hrcgb} & T _{Hrb}	mm	70
Distance between T _{Hrfcg} & T _{Hrfce}	mm	70
Distance between T _{Hlcb} & T _{Hlcbg}	mm	50
Distance between T _{Hlcb} & T _{Hlcbg}	mm	40
Distance between T _{Hlcbg} & T _{Hlb}	mm	70
Distance between T _{Hlcbg} & T _{Hlcbg}	mm	70
Distance between T _{Hlcbg} & T _{Hlcbg}	mm	70
Distance between T _{Hcbt} & T _{Hcbb}	mm	67

Passenger Dummy Head Targets (THOR016)

Measurement	Units	Value
Distance between T _{Hrcg} & T _{Hrfcg}	mm	50
Distance between T _{Hrcg} & T _{Hrcgb}	mm	40
Distance between T _{Hrcgb} & T _{Hrb}	mm	70
Distance between T _{Hrfcg} & T _{Hrfce}	mm	70
Distance between T _{Hlcb} & T _{Hlcbg}	mm	50
Distance between T _{Hlcb} & T _{Hlcbg}	mm	40
Distance between T _{Hlcbg} & T _{Hlb}	mm	70
Distance between T _{Hlcbg} & T _{Hlcbg}	mm	70
Distance between T _{Hlcbg} & T _{Hlcbg}	mm	70
Distance between T _{Hcbt} & T _{Hcbb}	mm	67

DATA SHEET NO. 9
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2012 Honda Odyssey Van
Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
Test Date: 1/4/2013

INSTRUMENTATION

Instrumentation	Number of Channels Collected
Driver Dummy Accelerometers	93
Passenger Dummy Accelerometers	93
Vehicle Structure Accelerometers	38
RMDB Cart Accelerometers	6
Total	230

CAMERA COVERAGE

Type of Camera	Number Used in this Test
High-Speed Vehicle Onboard	4
High-Speed Off-board	10
Real-Time Panning	1
Total	15

DATA SHEET NO. 10 - POST TEST OBSERVATIONS

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Right Front Passenger
Dummy Type/Serial No.	THOR 007	THOR 016
Lower Leg Type	THOR LOWER LEG LX	THOR LOWER LEG LX
Lower Leg Serial No.	LX036 / LX037	LX018 / LX019
Head Contact	Front & Curtain Airbag	Front Airbag, Center Dash Panel & Head Liner
Upper Torso Contact	Front, Curtain & Torso/Pelvis Airbag	Front Airbag & Center Dash Panel
Lower Torso Contact	None	None
Left Knee Contact	Knee Bolster	Glove Box
Right Knee Contact	Knee Bolster	Glove Box

DOOR OPENING AND SEAT TRACK INFORMATION

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

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions	Photo Taken (Y/N)
Pillar Performance	Driver's A-Pillar buckled	Y
Windshield Damage	Cracks throughout & minor separation on driver's side	Y
Window Damage	None	Y
Other Notable Effects	None	--

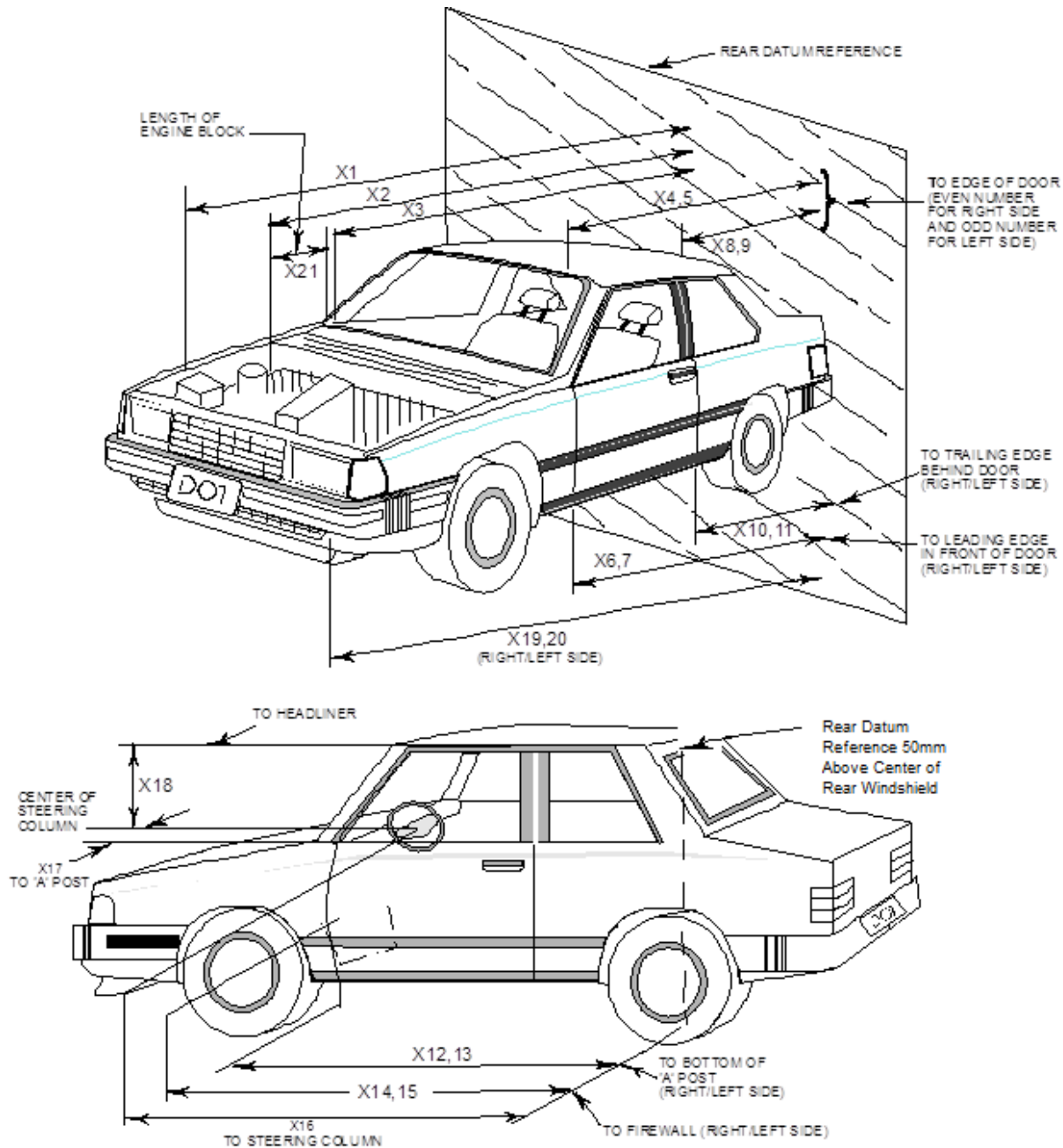
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

DATA SHEET NO. 11 **VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013



DATA SHEET NO. 11 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	mm	4445	4159	286
2	Rear Surface of Vehicle (RSOV) to Front of Engine	mm	4021	3878	143
3	RSOV to Firewall	mm	3654	3529	125
4	RSOV to Upper Leading Edge of Right Door	mm	3015	3014	1
5	RSOV to Upper Leading Edge of Left Door	mm	3013	2994	19
6	RSOV to Lower Leading Edge of Right Door	mm	2989	2986	3
7	RSOV to Lower Leading Edge of Left Door	mm	2989	2976	13
8	RSOV to Upper Trailing Edge of Right Door	mm	1966	1964	2
9	RSOV to Upper Trailing Edge of Left Door	mm	1965	1950	15
10	RSOV to Lower Trailing Edge of Right Door	mm	1972	1968	4
11	RSOV to Lower Trailing Edge of Left Door	mm	1974	1958	16
12	RSOV to Bottom of "A" Post of Right Side	mm	3257	3256	1
13	RSOV to Bottom of "A" Post of Left Side	mm	3262	3244	18
14	RSOV to Firewall, Right Side	mm	3597	3596	1
15	RSOV to Firewall, Left Side	mm	3597	3378	219
16	RSOV to Steering Column	mm	2604	2545	59
17	Center of Steering Column to "A" Post	mm	375	371	4
18	Center of Steering Column to Headliner	mm	417	398	19
19	RSOV to Right Side of Front Bumper	mm	4382	4376	6
20	RSOV to Left Side of Front Bumper	mm	4385	3810	575
21	Length of Engine Block	mm	463	371	92
RD	RSOV to Right Side of Dash Panel	mm	2787	2780	7
CD	RSOV to Center of Dash Panel	mm	2949	2902	47
LD	RSOV to Left Side of Dash Panel	mm	2790	2738	52

DATA SHEET NO. 12
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2012 Honda Odyssey Van
Test Program: R&D 90.1kph, 15° angle, 35% offset

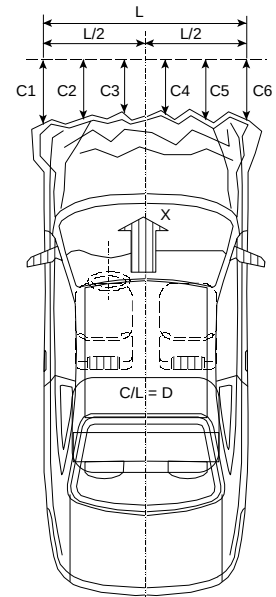
NHTSA No.: RC5370
Test Date: 1/4/2013

VEHICLE INFORMATION

VIN: 5FNRL5H20CB147135 Wheelbase (mm): 3000
Vehicle Size Category: Passenger Test Weight (kg): 2209.5

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): 89.95
Velocity Change (kph): 89.95



CRUSH PROFILE

Collision Deformation Classification: 11FYEW5
Midpoint of Damage: C2
Damage Region Length (mm): 1171
Impact Mode: Frontal 15° Angle, 35% Left Offset

Crush Measurements: Bumper Cover

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4340	3726	614
C2	Crush zone 2 at left side	mm	4419	3907	512
C3	Crush zone 3 at left side	mm	4442	4071	371
C4	Crush zone 4 at right side	mm	4441	4216	225
C5	Crush zone 5 at right side	mm	4418	4335	83
C6	Crush zone 6 at right side	mm	4339	4390	-51
L	C1 to C6	mm	1171	947	224

Crush Measurements: Bumper Cover Removed

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
B1	Bumper Beam 1 at left side	mm	4296	3728	-568
B2	Bumper Beam 2 at left side	mm	4348	3836	-511
B3	Bumper Beam 3 at left side	mm	4385	3937	-448
B4	Bumper Beam 4 at left side	mm	4413	4041	-373
B5	Bumper Beam 5 at right side	mm	4421	4125	-295
B6	Bumper Beam 6 at right side	mm	4414	4198	-216
B7	Bumper Beam 7 at right side	mm	4386	4251	-135
B8	Bumper Beam 8 at right side	mm	4349	4297	-52
B9	Bumper Beam 9 at right side	mm	4298	4332	34
L	B1 to B9	mm	1168	1003	165

DATA SHEET NO. 13
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

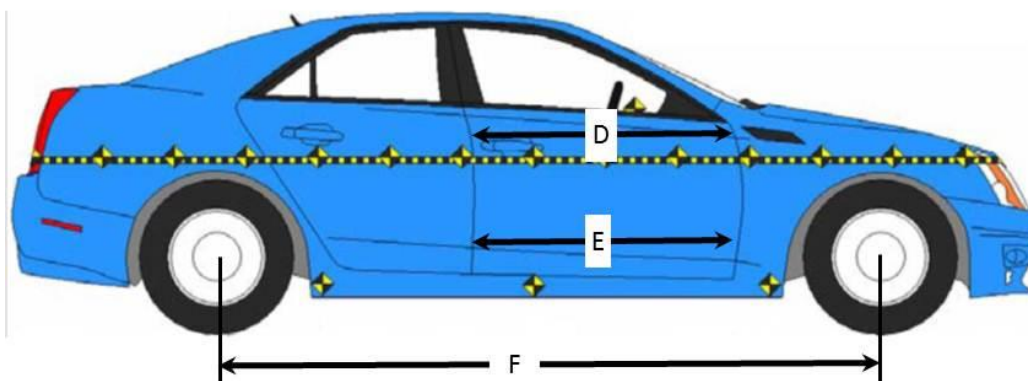
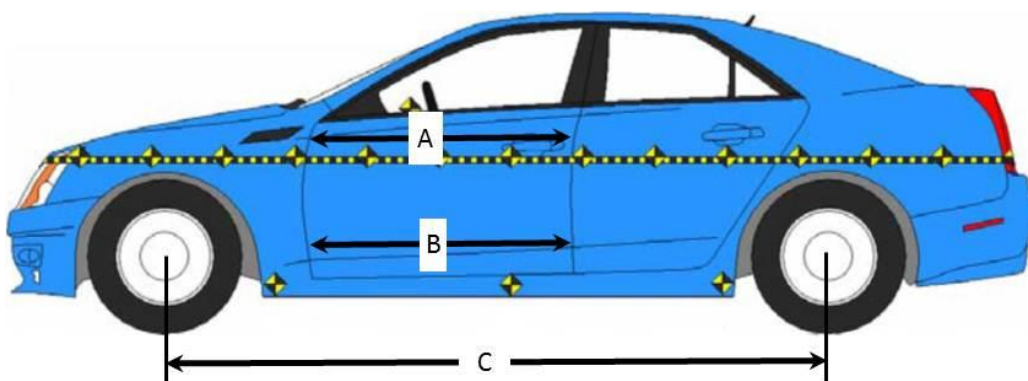
NHTSA No.: RC5370
 Test Date: 1/4/2013

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	952	915	-37
B	Left Side Lower	mm	838	799	-39
D	Right Side Upper	mm	950	950	0
E	Right Side Lower	mm	863	863	0

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	3000	2749	-251
F	Right Side Wheelbase	mm	3000	2968	-32



DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

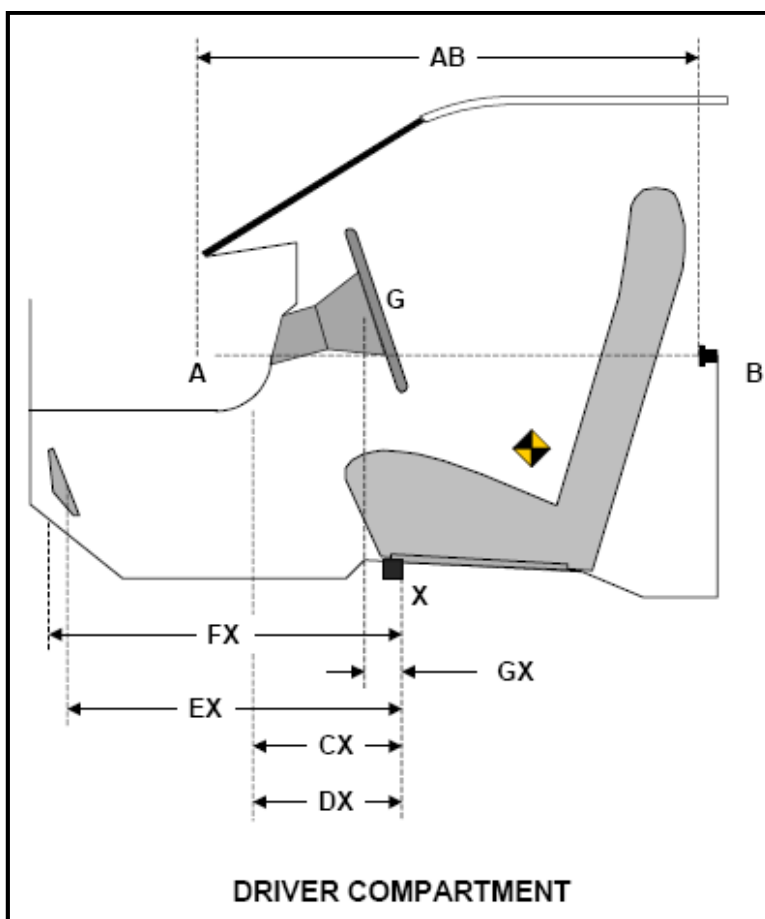
Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	752	746	-6
CX	Left Knee Bolster to X	mm	273	225	-48
DX	Right Knee Bolster to X	mm	263	217	-46
EX	Brake Pedal to X	mm	553	463	-90
FX	Foot Rest to X	mm	552	453	-99
GX	Center of Steering Column Wheel Hub to X	mm	79	21	-58

X = Front of Seat Track (Stationary)



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

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

DRIVER SIDE DOOR SILL INTRUSIONS



Reference point: 50mm above the center of the rear windshield (See appendix D for procedure to create coordinate system).

- +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	2968	-848	1134	2921	-854	1133	-47	-6	-1
2	2970	-849	1060	2924	-855	1060	-46	-6	0
3	2971	-846	985	2925	-855	984	-46	-9	-1
4	2957	-862	684	2921	-880	684	-36	-18	0
5	2938	-874	611	2915	-890	606	-23	-16	-5
6	2910	-858	535	2896	-870	529	-14	-12	-6
7	2880	-852	1333	2873	-831	1345	-7	21	12
8	2730	-851	1350	2729	-829	1367	-1	22	17
9	2580	-853	1347	2579	-834	1359	-1	19	12
10	2940	-851	1283	2920	-839	1285	-20	12	2
11	2966	-849	1213	2926	-849	1209	-40	0	-4
12	2971	-842	889	2927	-853	889	-44	-11	0
13	2974	-850	785	2933	-862	787	-41	-12	2
14	2880	-837	454	2874	-844	447	-6	-7	-7
15	2847	-814	375	2851	-813	368	4	1	-7
16	2772	-800	329	2776	-801	323	4	-1	-6

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

Point	Pre-Test			Post-Test			Difference		
	X	Y	Z	X	Y	Z	X	Y	Z
17	2694	-788	287	2697	-789	283	3	-1	-4
18	2615	-776	249	2618	-777	246	3	-1	-3
19	2535	-766	216	2538	-767	213	3	-1	-3
20	2453	-756	187	2456	-757	185	3	-1	-2
21	2370	-749	164	2372	-749	163	2	0	-1
22	2284	-743	145	2286	-743	145	2	0	0
23	2197	-739	131	2199	-739	132	2	0	1
24	2109	-736	120	2110	-736	121	1	0	1
25	2020	-734	112	2021	-735	114	1	-1	2
26	1933	-735	106	1935	-735	109	2	0	3
27	2526	-852	1347	2526	-834	1357	0	18	10
28	2470	-853	1347	2470	-834	1355	0	19	8
29	2414	-853	1349	2414	-836	1357	0	17	8
30	2358	-853	1354	2358	-836	1360	0	17	6
31	2302	-853	1347	2302	-837	1351	0	16	4
32	2247	-853	1329	2248	-839	1333	1	14	4

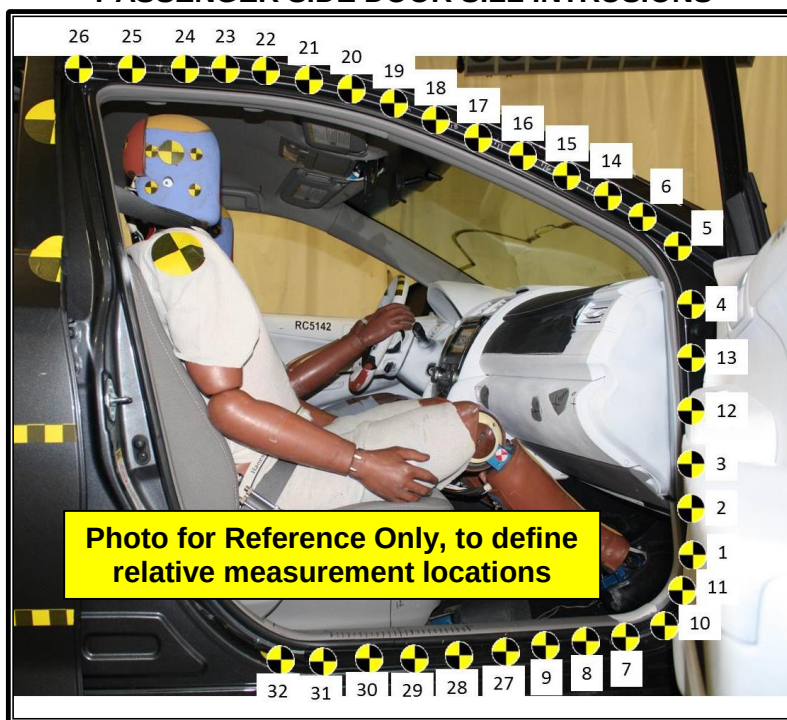
Note: See Appendix D for detailed procedure on how to measure the required door sill intrusions.

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

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

PASSENGER SIDE DOOR SILL INTRUSIONS



Reference point: 50mm above the center of the rear windshield (See appendix D for procedure to create coordinate system).

- +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	2968	845	1133	2968	869	1128	0	24	-5
2	2969	845	1059	2970	866	1054	1	21	-5
3	2970	842	986	2971	862	981	1	20	-5
4	2956	857	685	2956	869	679	0	12	-6
5	2938	870	609	2938	881	603	0	11	-6
6	2910	854	534	2911	864	529	1	10	-5
7	2877	850	1335	2877	878	1329	0	28	-6
8	2728	851	1353	2729	877	1347	1	26	-6
9	2580	851	1347	2580	874	1341	0	23	-6
10	2935	847	1287	2934	874	1282	-1	27	-5
11	2965	846	1214	2965	871	1209	0	25	-5
12	2970	837	885	2971	855	879	1	18	-6
13	2973	845	785	2974	859	779	1	14	-6
14	2878	833	452	2879	841	448	1	8	-4
15	2846	811	372	2847	817	368	1	6	-4
16	2769	797	329	2770	801	324	1	4	-5

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

Point	Pre-Test			Post-Test			Difference		
	X	Y	Z	X	Y	Z	X	Y	Z
17	2693	785	289	2694	788	284	1	3	-5
18	2613	773	250	2615	775	246	2	2	-4
19	2533	763	216	2535	764	212	2	1	-4
20	2451	754	188	2453	754	184	2	0	-4
21	2364	746	164	2367	746	160	3	0	-4
22	2278	740	146	2280	741	141	2	1	-5
23	2191	737	131	2193	737	127	2	0	-4
24	2103	734	121	2105	734	116	2	0	-5
25	2015	732	113	2017	733	109	2	1	-4
26	1926	734	108	1928	734	104	2	0	-4
27	2522	851	1348	2523	873	1342	1	22	-6
28	2465	851	1348	2465	873	1343	0	22	-5
29	2407	852	1351	2407	873	1345	0	21	-6
30	2351	853	1356	2351	873	1351	0	20	-5
31	2295	853	1348	2294	872	1342	-1	19	-6
32	2247	852	1329	2247	870	1324	0	18	-5

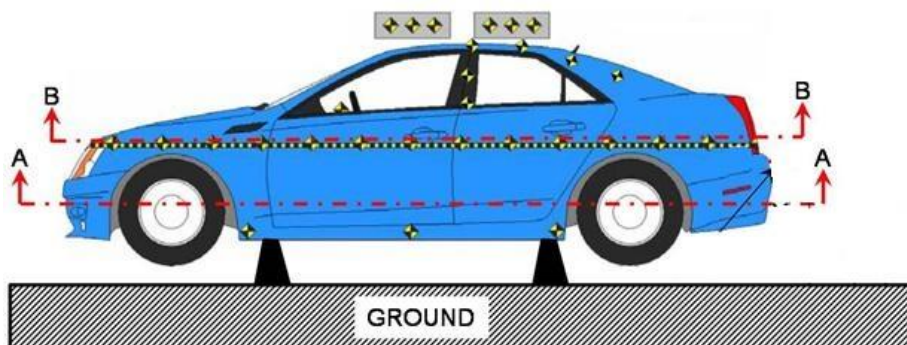
Note: See Appendix D for detailed procedure on how to measure the required door sill intrusions.

DATA SHEET NO.13 (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013



Reference point: 50mm above the center of the rear windshield (See appendix D for procedure to create coordinate system).

- +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

VEHICLE EXTERIOR CRUSH PROFILE SECTION A-A

Point	Pre-Test			Point	Post-Test		
	X	Y	Z		X	Y	Z
1	3938	-985	1217	1	3037	-970	1218
2	3985	-971	1218	2	3212	-865	1217
3	4052	-938	1218	3	3356	-835	1217
4	4126	-894	1218	4	3546	-808	1217
5	4212	-803	1218	5	3551	-636	1217
6	4276	-707	1219	6	3567	-544	1217
7	4320	-627	1218	7	3714	-455	1217
8	4365	-533	1218	8	3841	-350	1218
9	4401	-441	1218	9	3936	-255	1217
10	4428	-285	1219	10	3975	-172	1219
11	4440	-142	1218	11	4031	-106	1217
12	4445	-14	1219	12	4084	-34	1217
13	4443	76	1219	13	4153	76	1217
14	4438	170	1220	14	4217	196	1218
15	4429	266	1219	15	4257	316	1218
16	4411	400	1218	16	4303	466	1218
17	4371	515	1216	17	4329	580	1218
18	4317	629	1216	18	4342	650	1218
19	4239	764	1217	19	4121	825	1217
20	4176	848	1219	20	4099	858	1218
21	4114	902	1219	21	4044	870	1218
22	4032	949	1218	22	3838	1010	1217
23	3971	977	1217	23	3798	1072	1217
24	3930	985	1218	24	3565	1056	1218
25	3073	986	1218	25	3343	1036	1217

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

VEHICLE EXTERIOR CRUSH PROFILE
SECTION A-A (Continued)

Point	Pre-Test			Point	Post-Test		
	X	Y	Z		X	Y	Z
26	2989	981	1218	26	3075	1018	1218
27	2808	978	1218	27	2872	1005	1218
28	2604	979	1217	28	2663	1003	1218
29	2409	981	1219	29	2432	1003	1218
30	2219	982	1218	30	2255	1002	1218
31	2003	983	1218	31	2008	1001	1219
32	1810	982	1217	32	1789	993	1220
33	1627	981	1218	33	1601	989	1219
34	1515	980	1218	34	1408	985	1219
35	1439	979	1217	35	1190	983	1219
36	1297	977	1219	36	1038	986	1219
37	1179	979	1218	37	943	989	1219
38	1077	982	1218	38	72	982	1218
39	1002	985	1218	39	72	982	1218
40	941	987	1217	40	-17	969	1217
41	84	987	1219	41	-142	951	1217
42	-36	968	1218	42	-265	932	1217
43	-138	954	1218	43	-368	913	1217
44	-246	937	1218	44	-442	895	1218
45	-343	920	1218	45	-505	864	1217
46	-451	894	1219	46	-553	801	1218
47	-509	863	1217	47	-591	715	1217
48	-550	812	1218	48	-620	625	1218
49	-575	762	1218	49	-645	520	1217
50	-603	690	1216	50	-677	336	1217
51	-629	599	1218	51	-692	175	1218
52	-646	525	1218	52	-697	-97	1217
53	-661	447	1219	53	-689	-236	1217
54	-678	341	1219	54	-677	-351	1217
55	-686	271	1218	55	-656	-478	1218
56	-694	161	1219	56	-627	-607	1218
57	-698	39	1219	57	-594	-715	1216
58	-698	-51	1218	58	-548	-816	1217
59	-695	-156	1217	59	-477	-882	1217
60	-686	-268	1217	60	-355	-916	1217
61	-674	-372	1217	61	-186	-945	1217
62	-658	-467	1217	62	-50	-967	1218
63	-635	-574	1218	63	78	-987	1218
64	-607	-672	1218	64	943	-986	1218
65	-575	-758	1218	65	1103	-978	1218
66	-543	-821	1217	66	1285	-973	1217

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

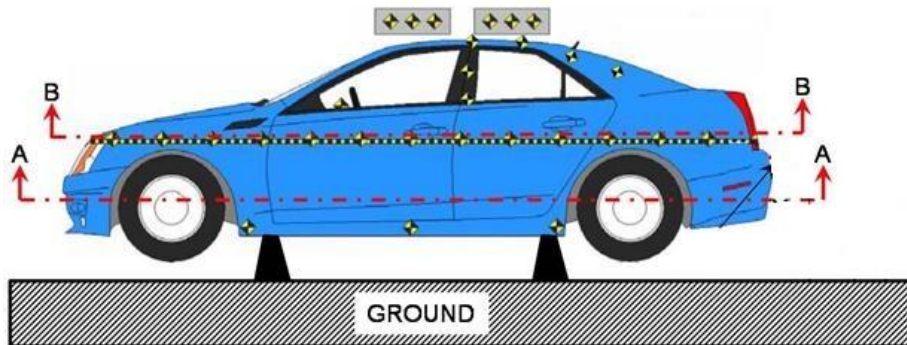
VEHICLE EXTERIOR CRUSH PROFILE
SECTION A-A (Continued)

Point	Pre-Test			Point	Post-Test		
	X	Y	Z		X	Y	Z
67	-485	-876	1218	67	1463	-973	1217
68	-433	-896	1219	68	1564	-973	1217
69	-361	-913	1219	69	1716	-973	1217
70	-296	-925	1218	70	1875	-972	1217
71	-221	-939	1217	71	1951	-972	1217
72	-140	-952	1217	72	2035	-982	1217
73	-71	-962	1217	73	2232	-982	1217
74	2	-972	1218	74	2448	-982	1218
75	80	-985	1219	75	2688	-980	1217
76	943	-988	1217	76	2854	-978	1217
77	1065	-983	1217	77	2986	-981	1216
78	1203	-979	1217	78	3023	-972	1217
79	1356	-979	1218				
80	1476	-980	1219				
81	1596	-981	1218				
82	1730	-982	1218				
83	1853	-983	1218				
84	1963	-983	1217				
85	2087	-984	1217				
86	2204	-984	1217				
87	2332	-983	1219				
88	2453	-982	1219				
89	2598	-981	1219				
90	2738	-981	1218				
91	2881	-981	1217				
92	2990	-985	1217				
93	3081	-990	1218				
94	3938	-985	1217				

DATA SHEET NO.13 (CONTINUED) VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Honda Odyssey Van
Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
Test Date: 1/4/2013



Reference point: 50mm above the center of the rear windshield (See appendix D for procedure to create coordinate system).

- +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

VEHICLE EXTERIOR CRUSH PROFILE SECTION B-B

Point	Pre-Test			Point	Post-Test		
	X	Y	Z		X	Y	Z
1	3521	-974	833	1	3167	-976	832
2	3562	-970	833	2	3256	-900	833
3	3647	-956	833	3	3309	-796	833
4	3737	-935	832	4	3381	-698	832
5	3826	-912	833	5	3447	-587	832
6	3889	-895	833	6	3494	-455	833
7	3961	-860	833	7	3594	-329	833
8	4042	-815	833	8	3661	-191	833
9	4101	-753	833	9	3734	-94	833
10	4159	-660	832	10	3865	52	833
11	4204	-567	832	11	4158	429	833
12	4236	-455	833	12	4107	628	833
13	4252	-352	832	13	4036	795	833
14	4268	-222	833	14	3855	887	833
15	4276	-105	833	15	3670	952	832
16	4278	-6	832	16	3503	986	832
17	4276	92	832	17	3439	990	833
18	4269	224	833	18	3375	991	833
19	4260	314	833	19	3232	989	833
20	4250	391	833	20	3069	985	833
21	4237	468	834	21	2900	986	833
22	4215	543	833	22	2739	989	834
23	4185	611	833	23	2535	990	833
24	4148	680	832	24	2327	990	833
25	4107	750	834	25	2211	991	833

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

VEHICLE EXTERIOR CRUSH PROFILE
SECTION B-B (Continued)

Point	Pre-Test			Point	Post-Test		
	X	Y	Z		X	Y	Z
26	4056	805	833	26	1987	990	833
27	3999	842	832	27	1822	989	834
28	3925	876	833	28	1641	988	835
29	3847	907	834	29	1461	986	834
30	3757	931	833	30	1269	983	836
31	3661	953	832	31	1039	978	835
32	3586	967	832	32	917	977	835
33	3520	974	833	33	733	984	835
34	3440	977	833	34	557	989	836
35	3409	975	834	35	65	951	832
36	3304	970	834	36	65	951	832
37	3207	966	834	37	-39	944	832
38	3078	965	834	38	-155	935	833
39	2948	966	834	39	-268	923	832
40	2819	969	835	40	-394	883	832
41	2647	972	834	41	-472	769	833
42	2485	975	833	42	-521	651	832
43	2294	978	833	43	-560	483	832
44	2148	976	833	44	-583	369	832
45	1991	975	833	45	-575	211	832
46	1877	978	833	46	-576	76	832
47	1719	981	833	47	-578	-2	832
48	1658	981	833	48	-577	-102	832
49	1490	981	833	49	-575	-235	833
50	1341	980	832	50	-579	-342	832
51	1191	979	833	51	-561	-481	832
52	1047	977	832	52	-530	-604	832
53	915	976	832	53	-491	-733	831
54	796	979	832	54	-413	-866	832
55	641	983	832	55	-312	-919	833
56	517	984	833	56	-120	-941	831
57	356	976	833	57	66	-955	832
58	218	965	833	58	232	-968	832
59	89	955	832	59	263	-971	832
60	63	955	832	60	306	-972	832
61	-15	949	831	61	434	-980	832
62	-95	943	832	62	575	-982	833
63	-180	935	832	63	742	-977	833
64	-245	928	833	64	879	-976	832
65	-303	920	833	65	1093	-977	832
66	-354	908	833	66	1261	-977	832
67	-413	868	831	67	1426	-976	833

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

VEHICLE EXTERIOR CRUSH PROFILE
SECTION B-B (Continued)

Point	Pre-Test			Point	Post-Test		
	X	Y	Z		X	Y	Z
68	-452	812	833	68	1559	-976	833
69	-486	743	832	69	1737	-975	831
70	-507	695	832	70	1858	-968	832
71	-527	628	834	71	1979	-972	833
72	-541	567	833	72	2103	-976	833
73	-566	465	834	73	2226	-993	833
74	-584	367	834	74	2447	-994	833
75	-574	274	831	75	2617	-993	832
76	-577	158	833	76	2752	-991	833
77	-579	47	832	77	2913	-983	832
78	-577	-136	832	78	2996	-977	833
79	-576	-217	832	79	3012	-1015	833
80	-574	-287	833	80	3064	-1035	833
81	-582	-349	831	81	3138	-1020	833
82	-572	-431	831				
83	-547	-539	832				
84	-516	-666	834				
85	-491	-733	831				
86	-459	-799	832				
87	-403	-873	831				
88	-359	-904	833				
89	-299	-919	833				
90	-196	-931	831				
91	-71	-943	833				
92	52	-952	832				
93	172	-961	833				
94	263	-969	833				
95	306	-974	834				
96	428	-982	832				
97	555	-985	833				
98	700	-983	833				
99	813	-979	833				
100	984	-977	833				
101	1161	-979	833				
102	1309	-980	834				
103	1469	-981	834				
104	1648	-982	834				
105	1775	-982	833				
106	1875	-979	832				
107	1967	-977	834				
108	2203	-980	833				
109	2340	-979	833				

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

VEHICLE EXTERIOR CRUSH PROFILE
SECTION B-B (Continued)

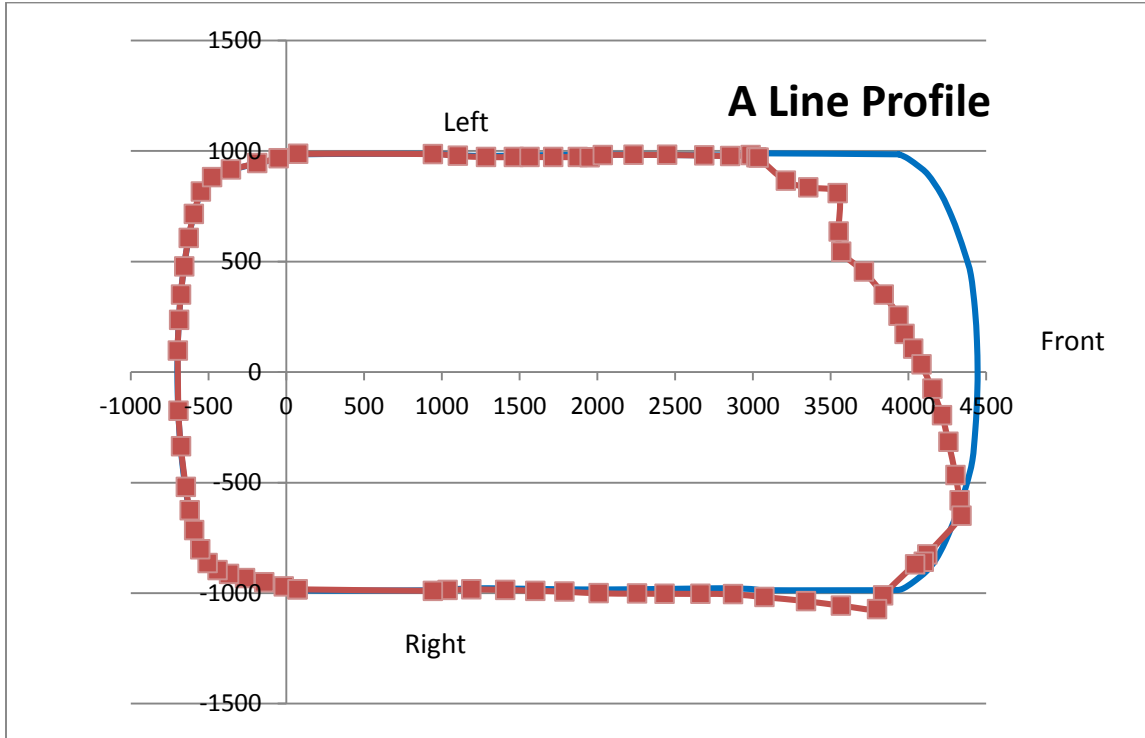
Point	Pre-Test		
	X	Y	Z
110	2468	-977	833
111	2612	-976	832
112	2751	-974	832
113	2912	-971	833
114	3019	-969	833
115	3150	-968	834
116	3274	-971	834
117	3386	-977	832
118	3480	-978	832
119	3521	-974	833

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

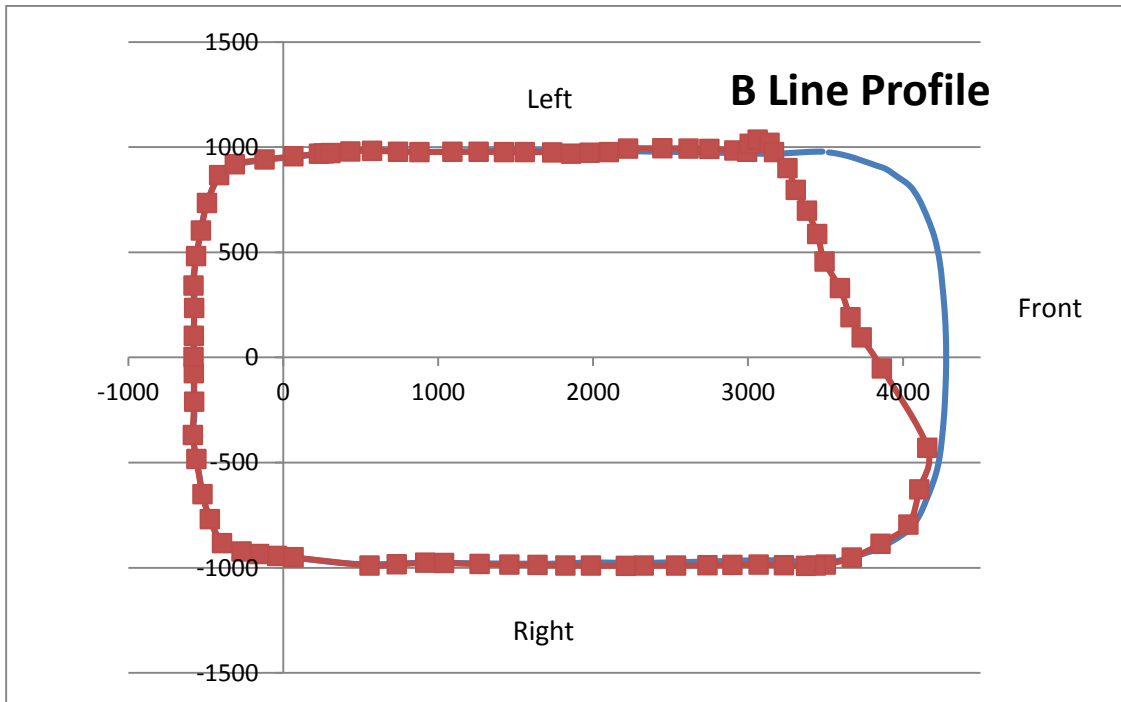
Test Vehicle: 2012 Honda Odyssey Van
Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
Test Date: 1/4/2013

VEHICLE EXTERIOR CRUSH PROFILE
SECTION A-A



SECTION B-B



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

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013



STRUCTURAL BUMPER BEAM POINTS

	Point	Pre-Test (mm)			Post-Test (mm)			Difference (mm)		
		X	Y	Z	X	Y	Z	X	Y	Z
Redundant Structural Bumper Beam	B10	4306	-591	1192	3736	-422	1178	-570	169	-14
	B11	4358	-449	1193	3847	-321	1188	-511	128	-5
	B12	4395	-303	1192	3948	-213	1192	-447	90	0
	B13	4419	-156	1192	4046	-102	1193	-373	54	1
	B14	4427	-7	1193	4132	21	1197	-295	28	4
	B15	4420	143	1193	4205	152	1199	-215	9	6
	B16	4396	292	1194	4263	291	1202	-133	-1	8
	B17	4359	438	1192	4310	434	1199	-49	-4	7
	B18	4307	585	1191	4344	586	1196	37	1	5
Center Structural Bumper Beam	B1	4296	-587	1217	3728	-416	1202	-568	171	-15
	B2	4348	-445	1217	3836	-311	1210	-512	134	-7
	B3	4385	-301	1218	3937	-203	1216	-448	98	-2
	B4	4413	-155	1217	4041	-97	1218	-372	58	1
	B5	4421	-6	1216	4125	26	1220	-296	32	4
	B6	4414	143	1216	4198	156	1223	-216	13	7
	B7	4386	289	1220	4251	295	1226	-135	6	6
	B8	4349	435	1218	4297	438	1223	-52	3	5
	B9	4298	581	1218	4332	587	1221	34	6	3
Upper Radiator Support	1	4150	-492	853	3593	-261	861	-557	231	8
	2	4145	-369	850	3615	-176	842	-530	193	-8
	3	4124	-247	840	3678	-84	813	-446	163	-27
	4	4129	-125	830	3765	-14	773	-364	111	-57
	5	4110	-1	832	3829	93	771	-281	94	-61
	6	4129	120	831	3920	180	784	-209	60	-47
	7	4127	243	845	3988	276	820	-139	33	-25
	8	4145	365	851	4069	365	846	-76	0	-5
	9	4149	488	853	4115	474	854	-34	-14	1

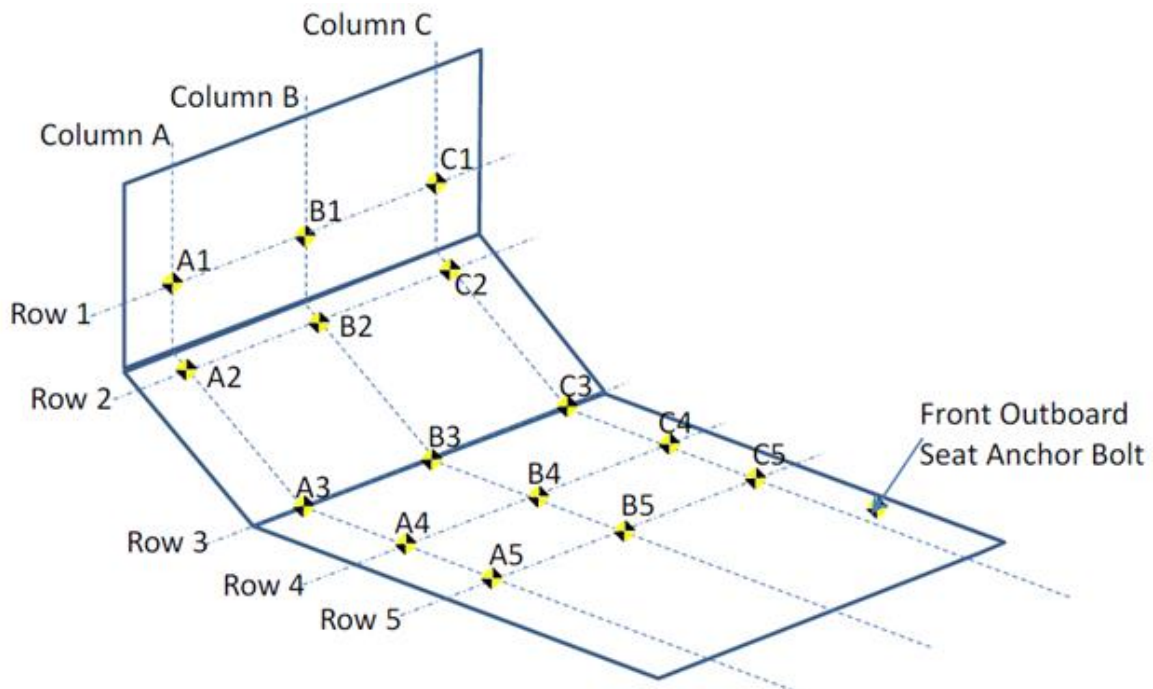
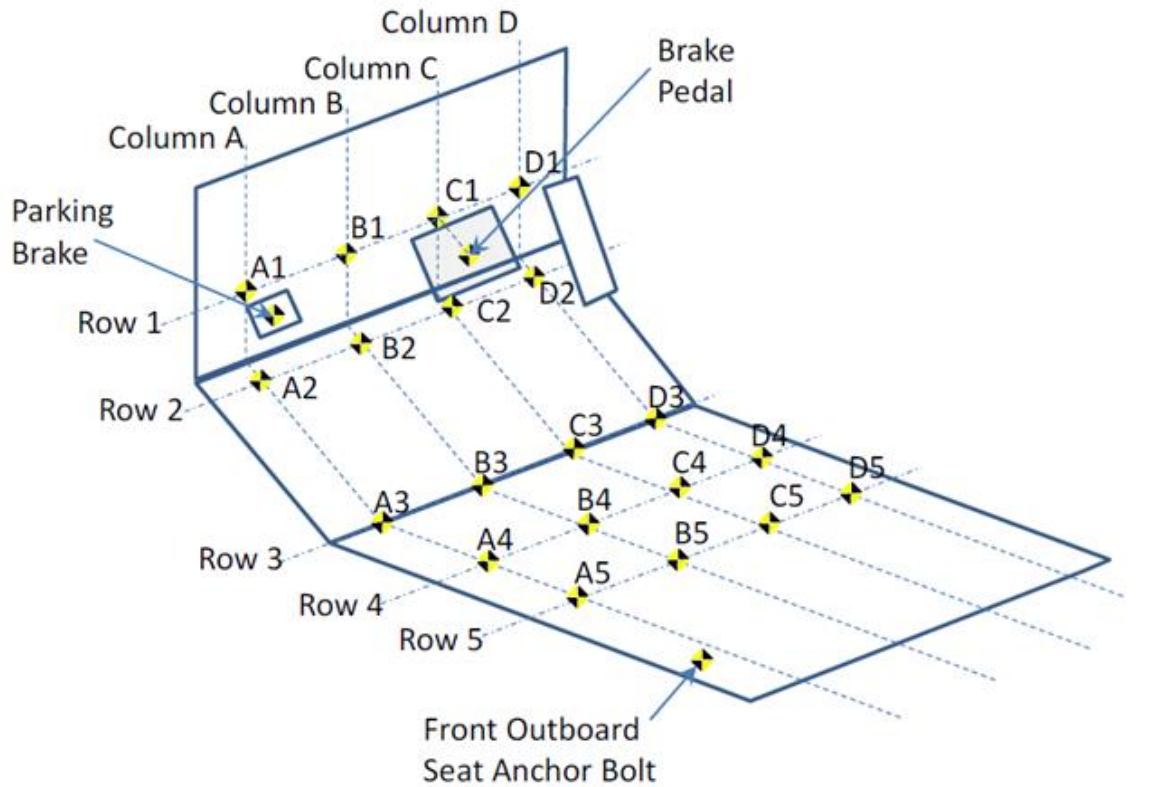
Reference point: 50mm above the center of the rear windshield (See appendix D for procedure to create coordinate system).

- +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: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013



Note: See Appendix D for toe pan measuring procedure

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Honda Odyssey Van
Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
Test Date: 1/4/2013

DRIVER FLOOR PAN MEASUREMENTS

Intrusion Location	Pre-Test (mm)			Post-Test (mm)			Difference (mm)		
	X	Y	Z	X	Y	Z	X	Y	Z
A1	3134	-655	1134	3005	-604	1125	-129	51	-9
B1	3223	-554	1134	3075	-489	1108	-148	64	-26
C1	3294	-402	1134	3164	-348	1107	-130	55	-27
D1	3273	-256	1135	3177	-212	1134	-96	44	-1
A2	3116	-653	1202	3016	-611	1192	-100	42	-10
B2	3202	-553	1199	3093	-506	1174	-109	48	-25
C2	3256	-404	1201	3186	-375	1178	-71	30	-24
D2	3260	-254	1200	3197	-218	1195	-63	36	-5
A3	3077	-655	1326	3028	-618	1327	-49	37	2
B3	3081	-552	1318	3059	-530	1305	-21	22	-13
C3	3081	-402	1303	3069	-371	1300	-12	31	-2
D3	3081	-252	1313	3065	-225	1322	-16	26	9
A4	3031	-653	1337	3003	-619	1337	-28	34	0
B4	3031	-553	1324	3015	-527	1315	-16	26	-9
C4	3033	-401	1315	3024	-373	1323	-9	28	8
D4	3028	-255	1321	3017	-227	1331	-11	28	10
A5	2981	-653	1334	2971	-625	1327	-9	28	-7
B5	2982	-552	1324	2977	-524	1332	-5	28	8
C5	2981	-405	1318	2974	-374	1334	-7	31	16
D5	2983	-256	1321	2972	-227	1322	-11	29	1
Brake Pedal	3078	-404	1134	2987	-449	1146	-91	-45	13
Driver IP Left	2798	-585	820	2750	-598	810	-49	-12	-11
Driver IP Right	2788	-288	819	2742	-299	812	-46	-11	-6
DOLP	2801	-685	835	2750	-698	824	-50	-13	-11
Steering Column	2604	-435	584	2545	-449	564	-59	-14	-20
Front Outboard Bolt	2525	-648	1313	2524	-633	1334	-1	16	21

Reference point: 50mm above the center of the rear windshield (See appendix D for procedure to create coordinate system).

- +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: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

PASSENGER FLOOR PAN MEASUREMENTS

Intrusion Location	Pre-Test (mm)			Post-Test (mm)			Difference (mm)		
	X	Y	Z	X	Y	Z	X	Y	Z
A1	3287	274	1138	3277	304	1136	-10	29	-2
B1	3298	425	1133	3296	452	1135	-2	27	2
C1	3196	575	1134	3198	602	1133	2	27	-1
A2	3254	277	1200	3230	314	1185	-24	37	-15
B2	3258	426	1199	3257	453	1202	-1	27	3
C2	3173	577	1199	3174	604	1196	1	27	-2
A3	3080	273	1310	3087	301	1325	7	28	15
B3	3081	425	1305	3085	455	1313	4	30	8
C3	3080	574	1316	3082	604	1318	2	30	2
A4	3033	273	1322	3038	299	1331	5	26	9
B4	3031	426	1317	3034	453	1326	4	27	9
C4	3034	574	1328	3037	604	1331	2	30	4
A5	2980	274	1322	2985	299	1327	5	25	5
B5	2979	424	1326	2983	449	1335	4	24	9
C5	2981	575	1327	2983	604	1331	2	28	3
Pass IP Left	2772	279	835	2787	269	838	16	-10	2
Pass IP Right	2800	577	839	2803	567	845	4	-10	6
PORP	2797	675	835	2796	665	845	-1	-11	10
Front Outboard Bolt	2541	645	1306	2543	666	1311	1	21	4

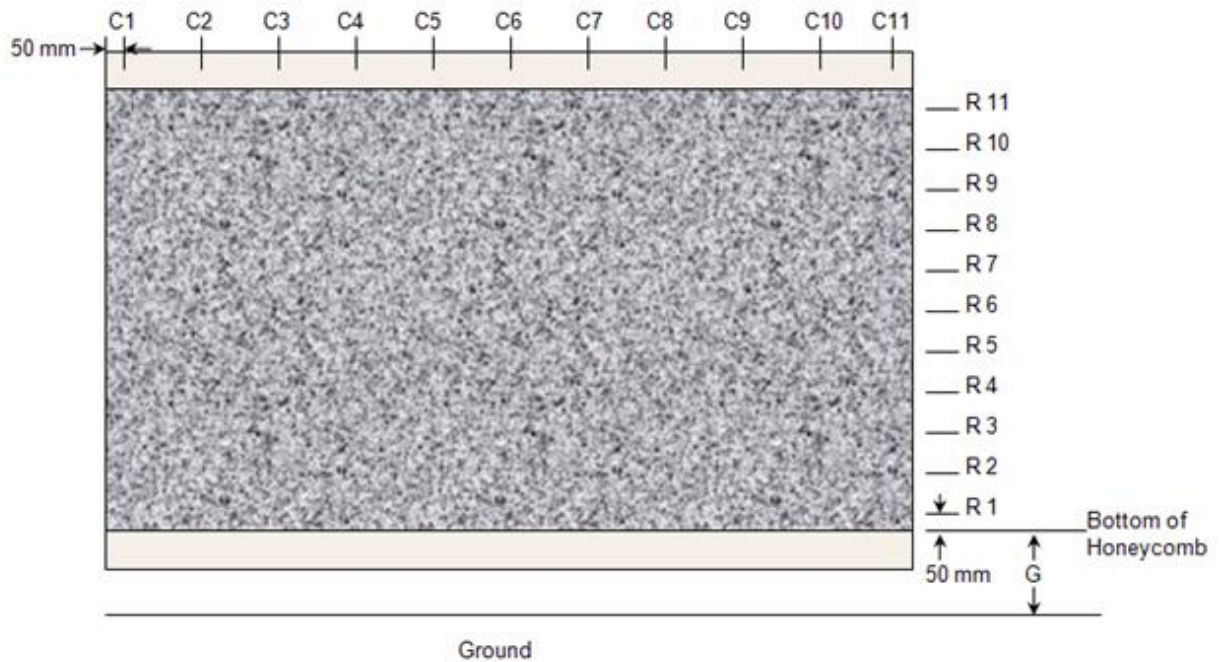
Reference point: 50mm above the center of the rear windshield (See appendix D for procedure to create coordinate system).

- +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 **RMDB CRUSH MEASUREMENTS**

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013



		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
		50 mm	260 mm	470 mm	680 mm	890 mm	1100 mm	1310 mm	1520 mm	1730 mm	1940 mm	2150 mm
R11	910mm	-2.4	0.5	1.2	1.6	2.8	4.1	20.4	44.4	5.4	4.9	14.5
R10	824mm	-2.8	-1.8	-1.2	-0.7	0.3	1.4	15.2	54.0	4.3	5.5	34.5
R9	738mm	-3.3	-2.8	-2.4	-1.2	-0.5	1.1	2.0	37.3	5.3	19.9	55.8
R8	652mm	-3.4	-3.5	-2.8	-1.5	-0.7	0.6	1.3	19.6	14.7	34.9	78.9
R7	566mm	-4.0	-4.0	-3.1	-2.1	-1.0	0.2	1.2	7.9	15.1	52.2	129.4
R6	480mm	-4.6	-4.2	-3.4	-2.4	-1.1	0.0	16.6	36.6	78.5	93.6	185.5
R5	384mm	-5.0	-4.4	-3.7	-2.6	-1.4	-0.1	30.7	72.2	91.2	223.4	312.5
R4	308mm	-5.6	-5.0	-4.1	-2.9	-1.8	-0.5	33.0	88.5	70.2	212.4	301.6
R3	222mm	-6.1	-5.4	-4.4	-3.0	-2.1	-0.5	37.5	100.6	52.2	201.4	251.1
R2	136mm	-6.8	-5.7	-4.3	-3.0	-1.9	-0.6	42.0	104.3	39.4	180.7	256.1
R1	50mm	-7.0	-5.7	-4.2	-2.8	*	*	26.8	100.9	36.6	138.1	231.4

*Barrier was cut to accommodate the rail, therefore these points were un-measurable.

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

Test Vehicle: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013

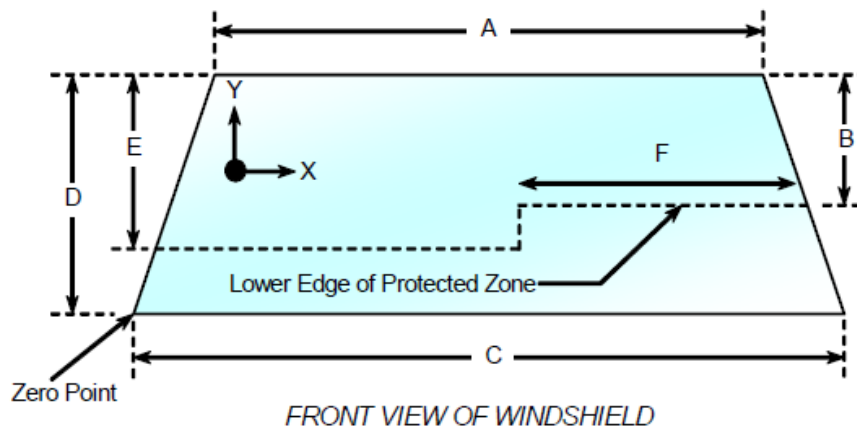
Please provide windshield mounting details. A 0.8 mm trim surrounds the top and side of windshield while a plastic shroud is on the bottom.

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	2496	2096	84%
Right Side	2496	2496	100%
Total	4992	4592	92%



Item	Units	Value
A	mm	1434
B	mm	647
C	mm	1710
D	mm	924
E	mm	648
F	mm	364

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: 2012 Honda Odyssey Van
Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
Test Date: 1/4/2013

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Ambient Temperature of Test Vehicle at Time of Impact: 21° C

Test Time: 1:41 PM

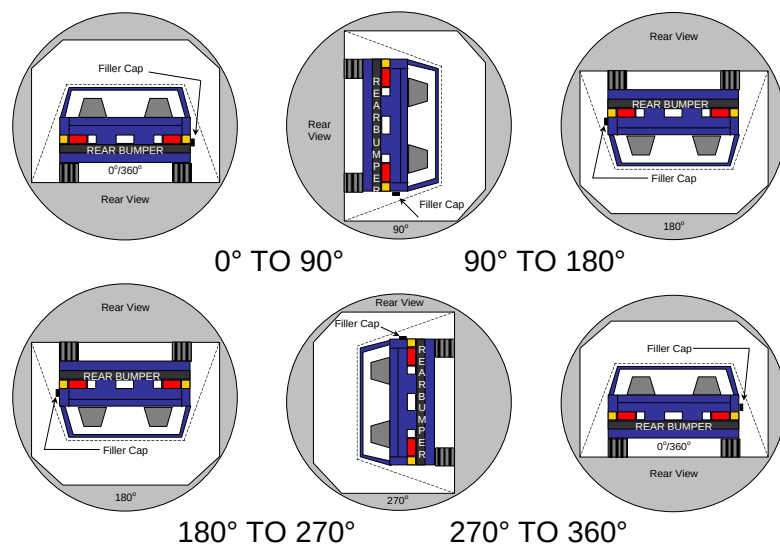
Stoddard Solvent Spillage Measurements

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: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013



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°	73	300	373
90° to 180°	64	300	364
180° to 270°	61	300	361
270° to 360°	68	300	368

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	

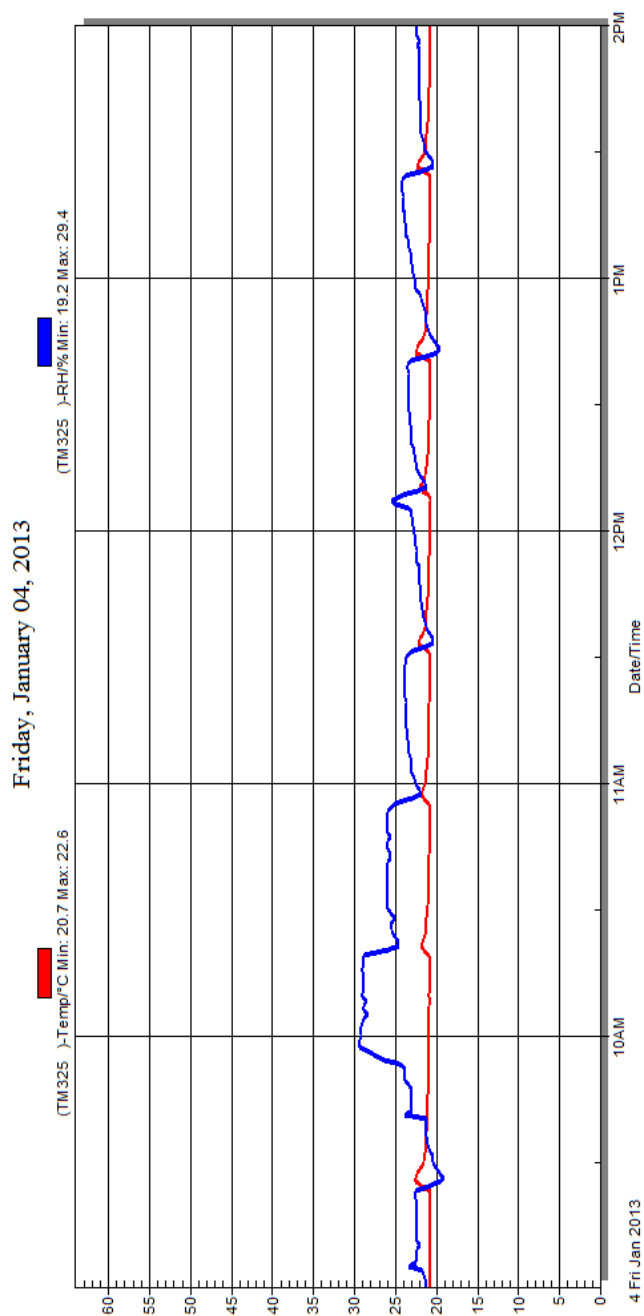
SOLVENT SPILLAGE LOCATION TABLE

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: 2012 Honda Odyssey Van
 Test Program: R&D 90.1kph, 15° angle, 35% offset

NHTSA No.: RC5370
 Test Date: 1/4/2013



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 RMDB against target vehicle at ideal Impact Point	A-19
23	Pre-Test Left Side View of RMDB against target vehicle at ideal Impact Point	A-20
24	Pre-Test Right Side View of RMDB 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 Left sill level, w/o carpet	A-33
49	Post-Test View of Driver Floor pan at Left sill level, w/o carpet	A-33
50	Pre-Test View of Driver Floor pan at Mid seat level, w/o carpet	A-34
51	Post-Test view of Driver Floor pan at Mid seat level, w/o carpet	A-34
52	Pre-Test Driver Front Windshield View	A-35
53	Post-Test Driver Front Windshield View	A-35
54	Pre-Test Left Side View of Driver and Interior	A-36
55	Post-Test Left Side View of Driver and Interior	A-36
56	Pre-Test Left Side Driver Window View	A-37
57	Post-Test Left Side Driver Window View	A-37
58	Pre-Test Right Side View of Driver and Interior	A-38
59	Post-Test Right Side View of Driver and Interior	A-38
60	Pre-Test View of Driver Door Clearance	A-39

TABLE OF PHOTOGRAPHS (Continued)		
No.	Description	Page
61	Post-Test View of Driver Door Clearance	A-39
62	Pre-Test View of Parking Brake	A-40
63	Pre-Test Driver Seat Fore Aft Markings	A-41
64	Post-Test Driver Seat Fore Aft Markings	A-41
65	Pre-Test Driver Seat Back Markings	A-42
66	Pre-Test Overhead View of Driver Thighs on Seat	A-42
67	Pre-Test Driver Adjustable D-ring	A-43
68	Post-Test Driver Adjustable D-ring	A-43
69	Pre-Test Driver Feet	A-44
70	Post-Test Driver Feet	A-44
71	Pre-Test View of Driver Right Knee and Bolster	A-45
72	Post-Test View of Driver Right Knee and Bolster	A-45
73	Pre-Test View of Driver Left Knee and Bolster	A-46
74	Post-Test View of Driver Left Knee and Bolster	A-46
75	Pre-Test View of Driver Abdomen	A-47
76	Post-Test View of Driver Abdomen	A-47
77	Pre-Test Left Side View of Steering Wheel set position	A-48
78	Post-Test Left Side View of Steering Wheel set position	A-48
79	Post-Test View of Driver Head Contact with Airbag – Front	A-49
80	Post-Test View of Driver Head Contact with Airbag – Curtain	A-49
81	Post-Test View of Driver Head Contact with Vehicle Interior – A	A-50
81a	Post-Test View of Driver Head Contact with Vehicle Interior – B	A-50
81b	Post-Test View of Driver Head Contact with Vehicle Interior – C	A-51
82	Pre-Test Overall View of Passenger Knee Bolsters	A-52
83	Post-Test Overall View of Passenger Knee Bolsters	A-52
84	Pre-Test Left Side View of Passenger Knee Bolsters	A-53
85	Post-Test Left Side View of Passenger Knee Bolsters	A-53
86	Pre-Test Right Side View of Passenger Knee Bolsters	A-54
87	Post-Test Right Side View of Passenger Knee Bolsters	A-54
88	Pre-Test View of Passenger Floor pan at Left sill level, w/carpet	A-55

TABLE OF PHOTOGRAPHS (Continued)		
No.	Description	Page
89	Post-Test View of Passenger Floor pan at Left sill level, w/carpet	A-55
90	Pre-Test View of Passenger Floor pan at Mid seat level, w/carpet	A-56
91	Post-Test view of Passenger Floor pan at Mid seat level, w/carpet	A-56
92	Pre-Test View of Passenger Floor pan at Left sill level, w/o carpet	A-57
93	Post-Test View of Passenger Floor pan at Left sill level, w/o carpet	A-57
94	Pre-Test View of Passenger Floor pan at Mid seat level, w/o carpet	A-58
95	Post-Test view of Passenger Floor pan at Mid seat level, w/o carpet	A-58
96	Pre-Test Passenger Front Close-up View, Windshield	A-59
97	Post-Test Passenger Front Close-up View, Windshield	A-59
98	Pre-Test Left Side Passenger and Interior View	A-60
99	Post-Test Left Side Passenger and Interior View	A-60
100	Pre-Test Right Side Passenger Window View	A-61
101	Post-Test Right Side Passenger Window View	A-61
102	Pre-Test Right Side Passenger and Interior View	A-62
103	Post-Test Right Side Passenger and Interior View	A-62
104	Pre-Test View of Passenger Door Clearance	A-63
105	Post-Test View of Passenger Door Clearance	A-63
106	Pre-Test Passenger Seat Fore-Aft Markings	A-64
107	Post-Test Passenger Seat Fore-Aft Markings	A-64
108	Pre-Test Passenger Seat Back Markings	A-65
109	Pre-Test Overhead View of Passenger Thighs on seat	A-65
110	Pre-Test Passenger Adjustable D-ring	A-66
111	Post-Test Passenger Adjustable D-ring	A-66
112	Pre-Test View of Passenger Feet	A-67
113	Post-Test View of Passenger Feet	A-67
114	Pre-Test View of Passenger Right Knee and Bolster	A-68
115	Post-Test View of Passenger Right Knee and Bolster	A-68
116	Pre-Test View of Passenger Left Knee and Bolster	A-69
117	Post-Test View of Passenger Left Knee and Bolster	A-69
118	Pre-Test View of Passenger Abdomen	A-70

TABLE OF PHOTOGRAPHS (Continued)		
No.	Description	Page
119	Post-Test View of Passenger Abdomen	A-70
120	Post-Test View of Passenger Head contact with Airbag – Front	A-71
120a	Post-Test View of Passenger Head contact with Airbag – Curtain	A-71
121	Post-Test View of Passenger Head contact with Interior – A	A-72
121a	Post-Test View of Passenger Head contact with Interior – B	A-72
121b	Post-Test View of Passenger Head contact with Interior – C	A-73
122	Post-Test Passenger Contact With Glovebox	A-73
123	Pre-Test Ballast Locations	A-74
124	Post-Test Speed Trap Readout	A-74
125	Pre-Test View of Fuel Filler Cap	A-75
126	Post-Test View of Fuel Filler Cap	A-75
127	Pre-Test Engine Compartment View	A-76
128	Post-Test Engine Compartment View	A-76
129	Pre-Test View of Front Underbody (perpendicular to vehicle)	A-77
130	Post-Test View of Front Underbody (perpendicular to vehicle)	A-77
131	Pre-Test View of Mid Underbody (perpendicular to vehicle)	A-78
132	Post-Test View of Mid Underbody (perpendicular to vehicle)	A-78
133	Pre-Test View of Rear Underbody (perpendicular to vehicle)	A-79
134	Post-Test View of Rear Underbody (perpendicular to vehicle)	A-79
135	Pre-Test View of Steering rack and or sway bar	A-80
136	Post-Test View of Steering rack and or sway bar	A-80
137	Pre-Test Bumper to Rail Attachments and Crush Initiators	A-81
138	Post-Test Bumper to Rail Attachments and Crush Initiators	A-82
139	Post-Test View of Front Sub-Frame Deformation	A-82
140	Pre-Test Frame Rail with tire removed	A-83
141	Post-Test Frame Rail with tire removed	A-83
142	Pre-Test View of Front Driver Wheel Well with tire removed	A-84
143	Post-Test ¾ View of Front Driver Wheel Well w/ tire removed	A-84
144	Post-Test Side View of Front Driver Wheel Well w/ tire removed	A-85
145	Post-Test Right Side 3/4 Rear View of the Front Driver Wheel Well w/ tire removed	A-85

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

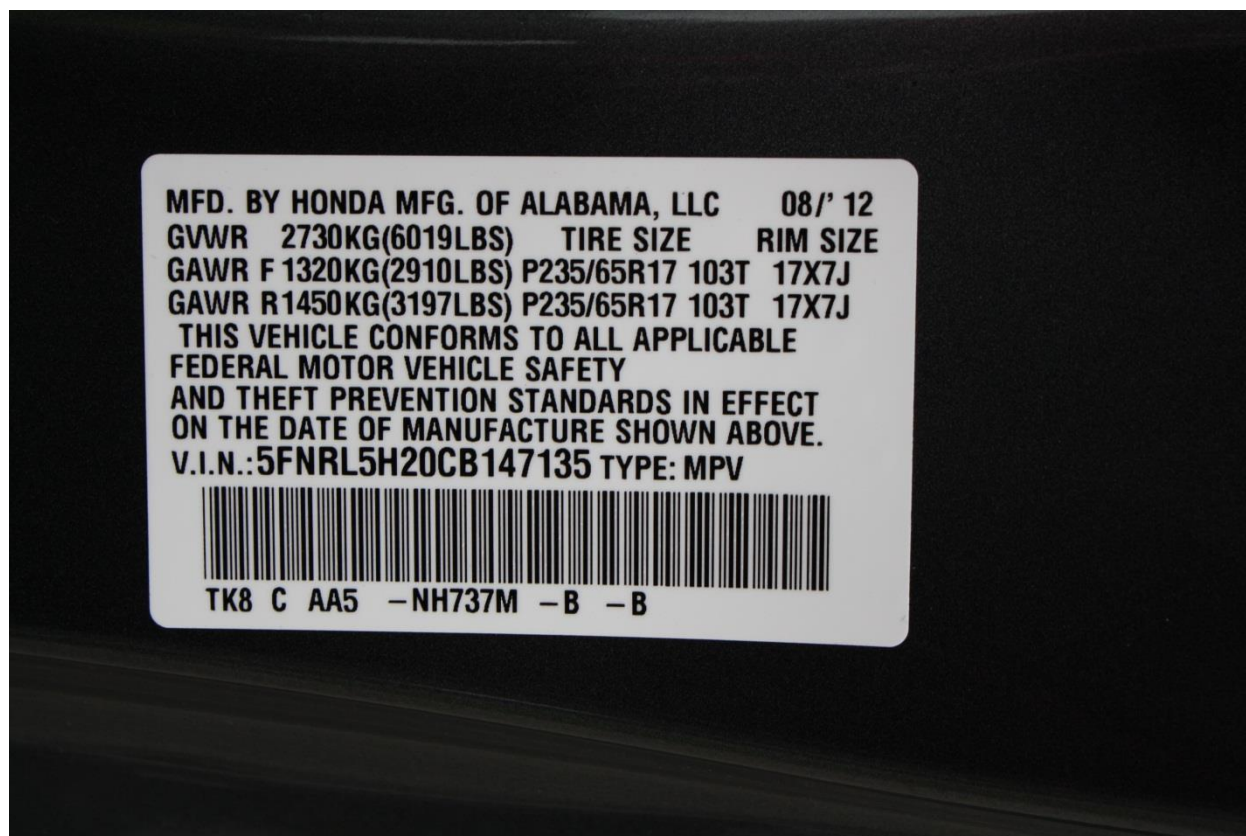
TABLE OF PHOTOGRAPHS (Continued)		
No.	Description	Page
176	Pre-Test RMDB & Vehicle, Rear View	A-101
177	Post-Test RMDB & Vehicle, Rear View	A-101
178	Pre-Test RMDB & Vehicle, Front View	A-102
179	Post-Test RMDB & Vehicle, Front View	A-102
180	Vehicle at 0 Degrees on Static Rollover Device	A-103
181	Vehicle at 90 Degrees on Static Rollover Device	A-103
182	Vehicle at 180 Degrees on Static Rollover Device	A-104
183	Vehicle at 270 Degrees on Static Rollover Device	A-104
184	Vehicle at 360 Degrees on Static Rollover Device	A-105
185	Impact Photo	A-105



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



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



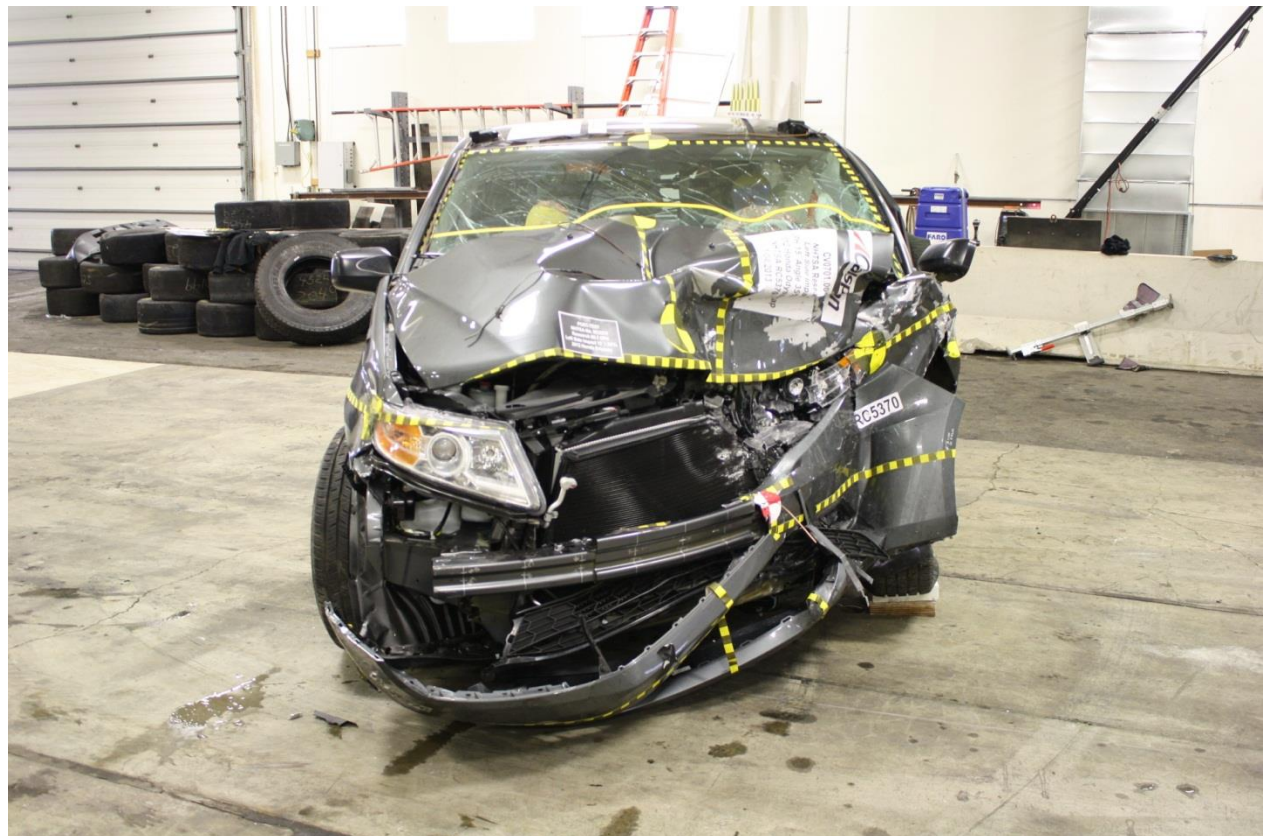
No. 003 Test Vehicle Certification Label



No. 004 Test Vehicle Tire Placard



No. 005 Pre-Test Front View of Test Vehicle



No. 006 Post-Test Front View of Test Vehicle



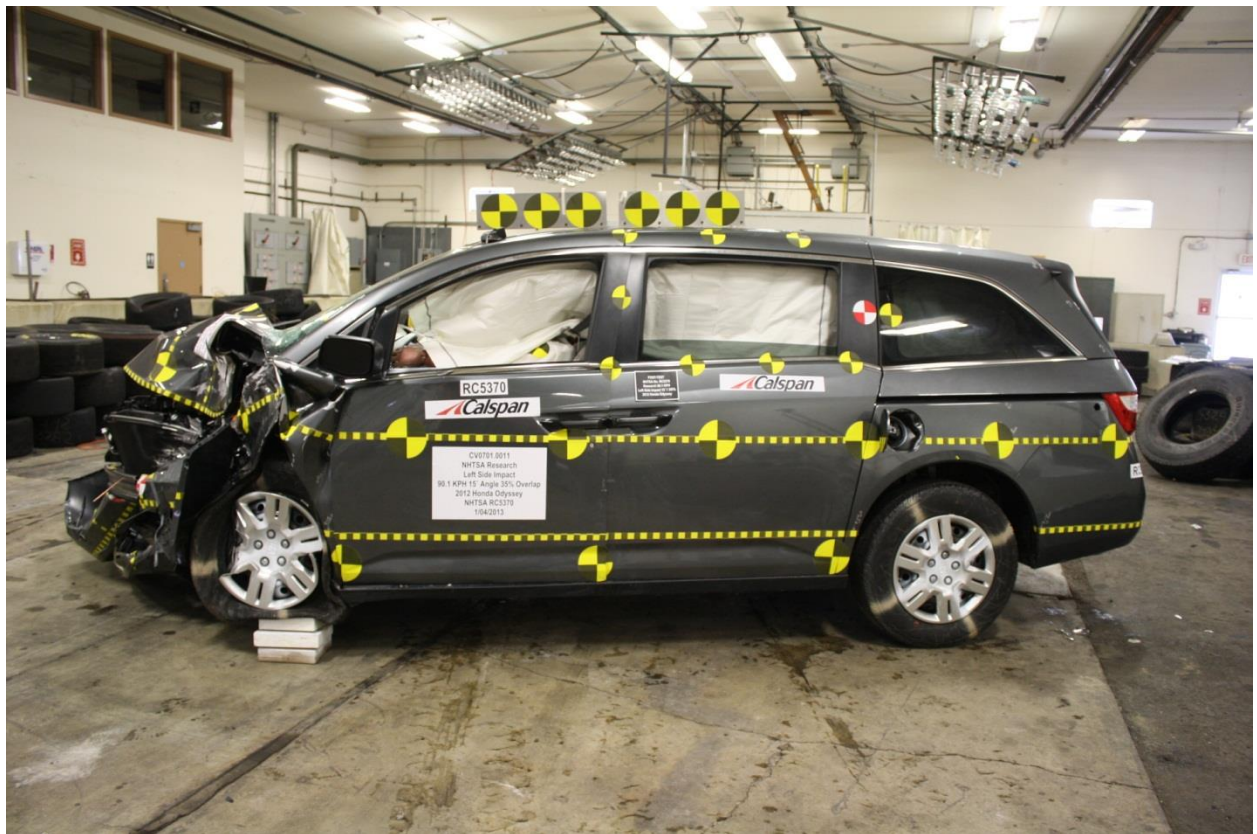
No. 007 Pre-Test Left Front 3-4 View of Test Vehicle



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



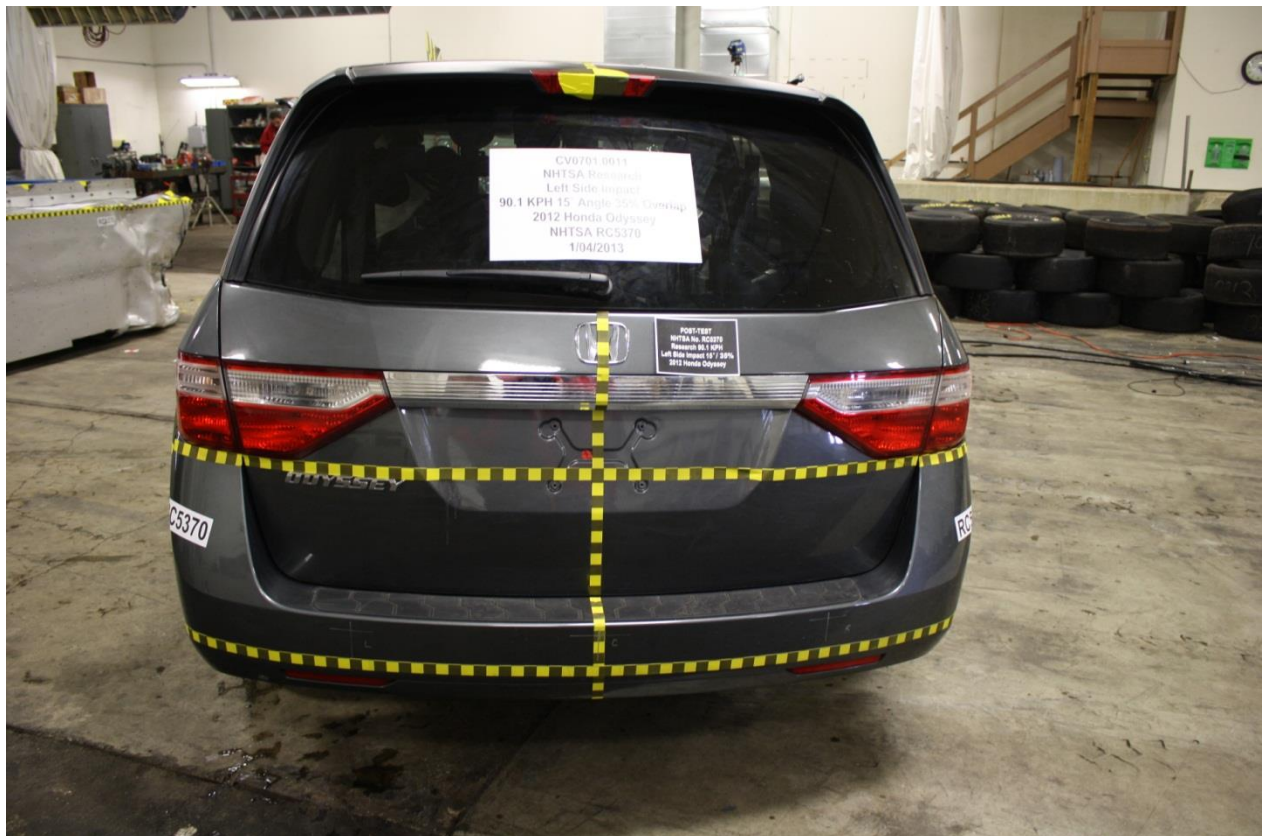
No. 011 Pre-Test Left Rear 3-4 View of Test Vehicle



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



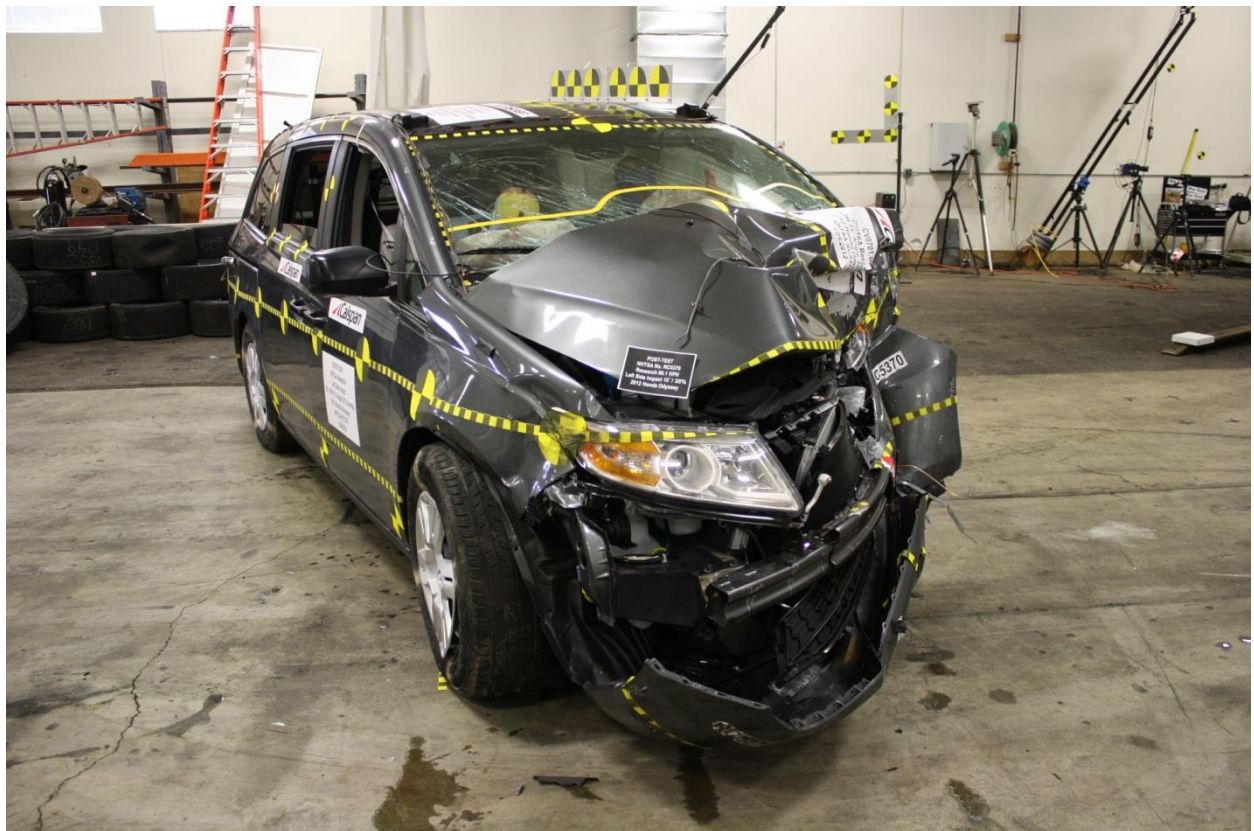
No. 017 Pre-Test Right Side View of Test Vehicle



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



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

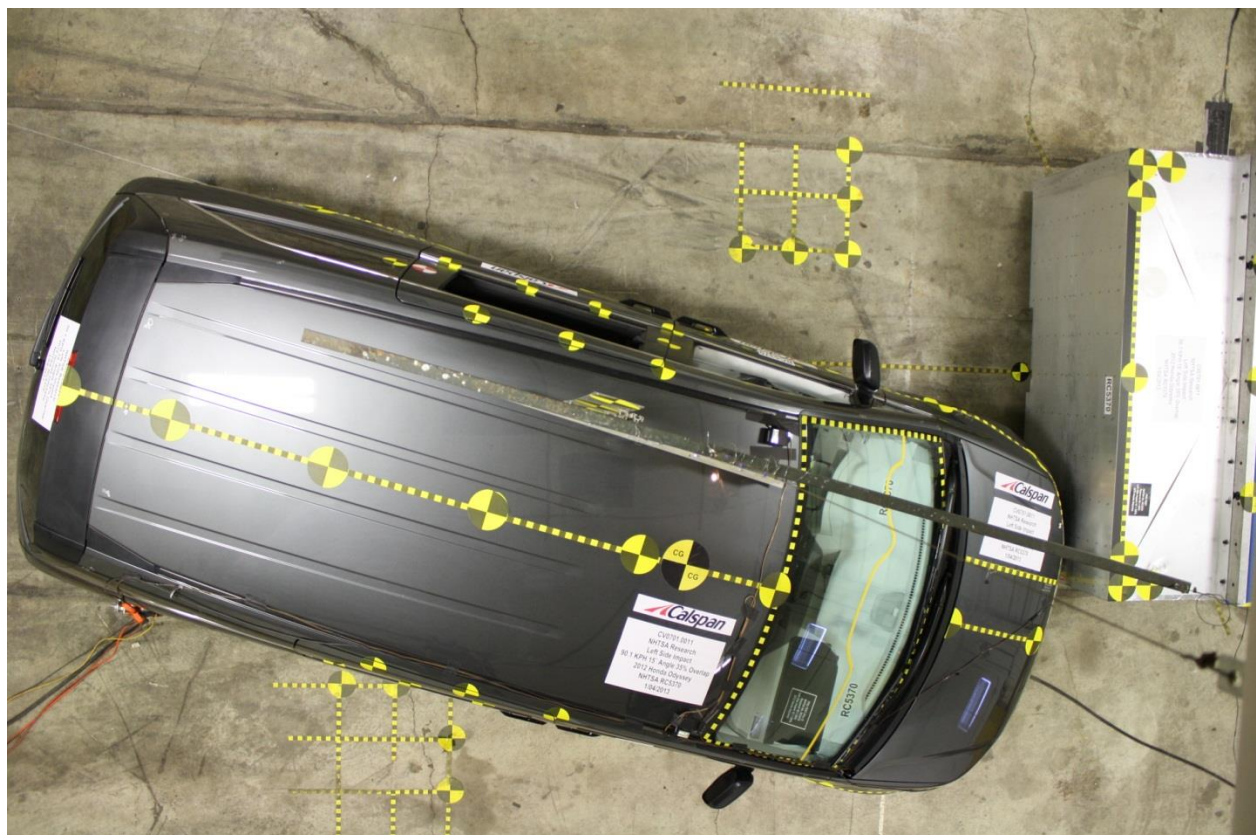


No. 020 Post-Test Right Front 3-4 View of Test Vehicle

HONDA		2012 ODYSSEY 5DR LX EXT: POLISHED METAL M. ENGINE NUMBER: J35Z8-2164282 INT: GRAY	
STANDARD EQUIPMENT AT NO EXTRA COST * TECHNICAL FEATURES * 240hp 3.5-Liter SOHC 24-Valve i-VTEC V6 Engine with Variable Cylinder Management (VCM) 5-Speed Automatic Transmission with Grade Logic Control 4-Wheel Disc Brakes - Front MacPherson Strut Suspension - Rear Double-Wishbone Suspension - Variable-Assist Rack-and-Pinion Power Steering - Immobilizer Theft-Deterrent System * SAFETY FEATURES * - Driver's and Front Passenger's Dual-Stage Airbags (SRS) - Driver's and Front Passenger's Side Airbags - Side Curtain Airbags with Rollover Sensor - Active Front Head Restraints - Vehicle Stability Assist (VSA) - Anti-Lock Braking System (ABS) - Brake Assist - Electronic Brake Distribution (EBD) - Tire Pressure Monitoring System 3-Point Seat Belts - Front Seat Belts with Automatic Tensioning System - ACE Body Structure - Daytime Running Lights (DRL) - LATCH System for Child Seats		* INTERIOR FEATURES * - AM/FM/CD Audio System w/ 5 Speakers Incl. MP3/WMA Playback - MP3/Auxiliary Input Jack - Tilt & Telescopic Steering Column - Front and Rear Air Conditioning - Driver's 8-Way Power Seat - One-Motion 60/40 Split Folding 3rd-Row Magic Seat - Two-Row Power Windows - Driver's Auto Up/Down Window - Power Door and Tailgate Locks - Sunglasses Holder 12-Volt Power Outlets - Floor Mats - Maintenance Minder System * EXTERIOR FEATURES * 17" x 7.5" Steel Wheels with Full Wheel Covers 235/65 R17 All-Season Tires - Dual Sliding Doors - Power Door Mirrors - Remote Entry System	
Manufacturer's Suggested Retail Price \$28,375.00 Full Tank of Fuel No Charge		Destination and Handling 830.00	
TOTAL VEHICLE PRICE (Includes Pre-Delivery Service) \$29,205.00 License and title fees, state and local taxes and dealer options and accessories are not included in the manufacturer's suggested retail price.		ORIG. DLR: 207853 REF. NO.: 40574 HN CODE: HN-0561 EMISSION: 50 STATE CONTROL NO.: 574891 DEALER: 207853 	
ROSEN HONDA 7000 GRAND AVENUE GURNEE, IL 60031 PORT OF ENTRY: ALABAMA DELIVERY POINT: SCHAUMBURG SHIPW. ROW/SPACE: 753-035 TRANS METHOD: N90 ELWOOD VIN: 5FNRL5H20CB147135 		FOR THIS VEHICLE Final Assembly Point: LINCOLN, ALABAMA USA Country of Origin: Engine: U.S.A. Transmission: U.S.A.	

EPA DOT Fuel Economy and Environment Gasoline Vehicle	
Fuel Economy 21 MPG combined city/hwy 4.7 gallons per 100 miles	Midrange range from 14 to 24 MPG. The best vehicle rates 99 MPG.
You spend \$650 more in fuel costs over 5 years compared to the average new vehicle.	
Annual fuel COST \$2,650	Fuel Economy & Greenhouse Gas Rating (tailpipe only) Smog Rating (tailpipe only) 1 5 10 Best This vehicle emits 423 grams CO ₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions. Learn more at fuelconomy.gov
Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 22 MPG and costs \$12,600 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.70 per gallon. MPG is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.	
partscontentinformation FOR VEHICLES IN THIS CARLINE U.S./Canadian Parts Content: 70 % Major Sources of Foreign Parts Content: JAPAN 15 % NOTE: Parts content does not include final assembly, distribution or other non-parts costs.	
GOVERNMENT 5-STAR SAFETY RATINGS Overall Vehicle Score ★★★★★ Based on the combine ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.	
Frontal Crash Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.	Driver ★★★★★ Passenger ★★★★★
Side Crash Based on the risk of injury in a side impact.	Front seat ★★★★★ Rear seat ★★★★★
Rollover ★★★★★ Based on the risk of rollover in a single vehicle crash.	
Star Ratings range from 1 to 5 stars (★★★★★) with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA) www.safercar.gov or 1-888-327-4236	

No. 021 Monroney Label Photograph



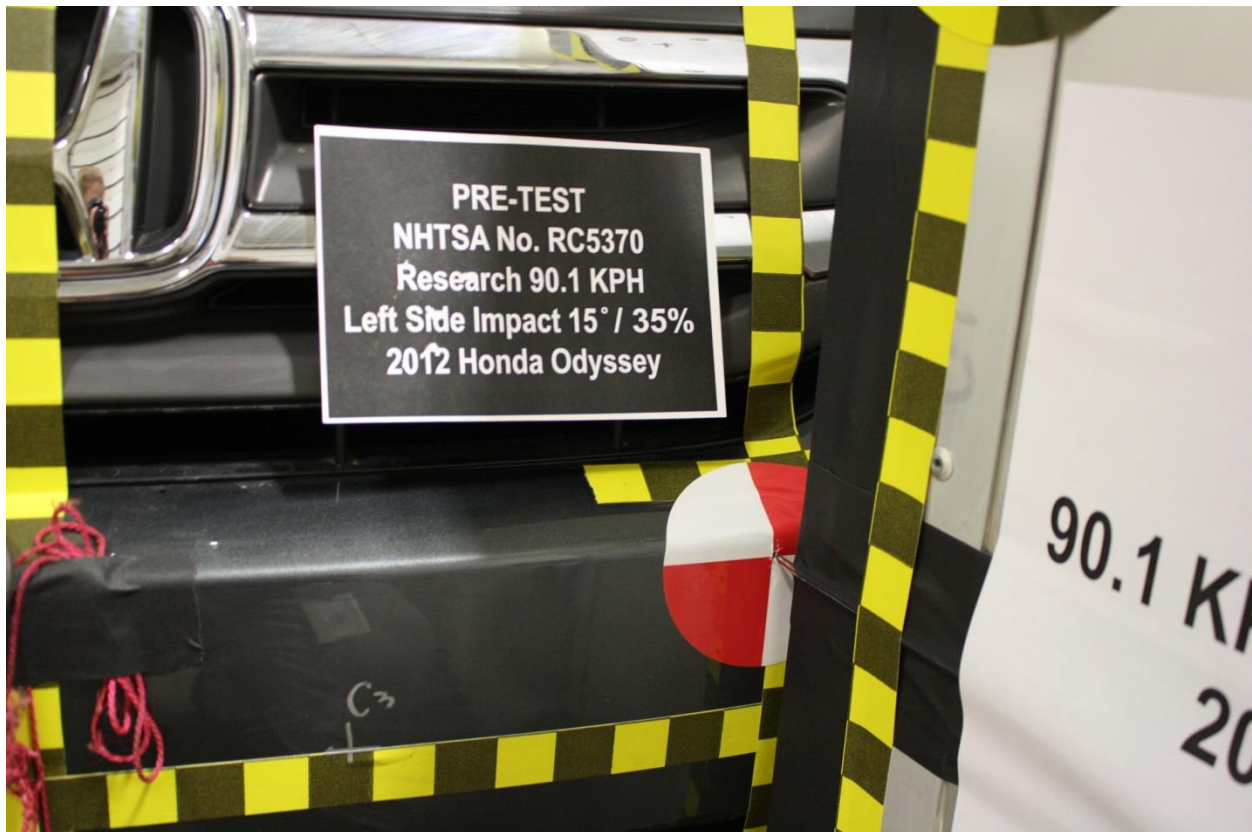
No. 022 Pre-Test Overhead View of RMDB against target vehicle at ideal Impact Point



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



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



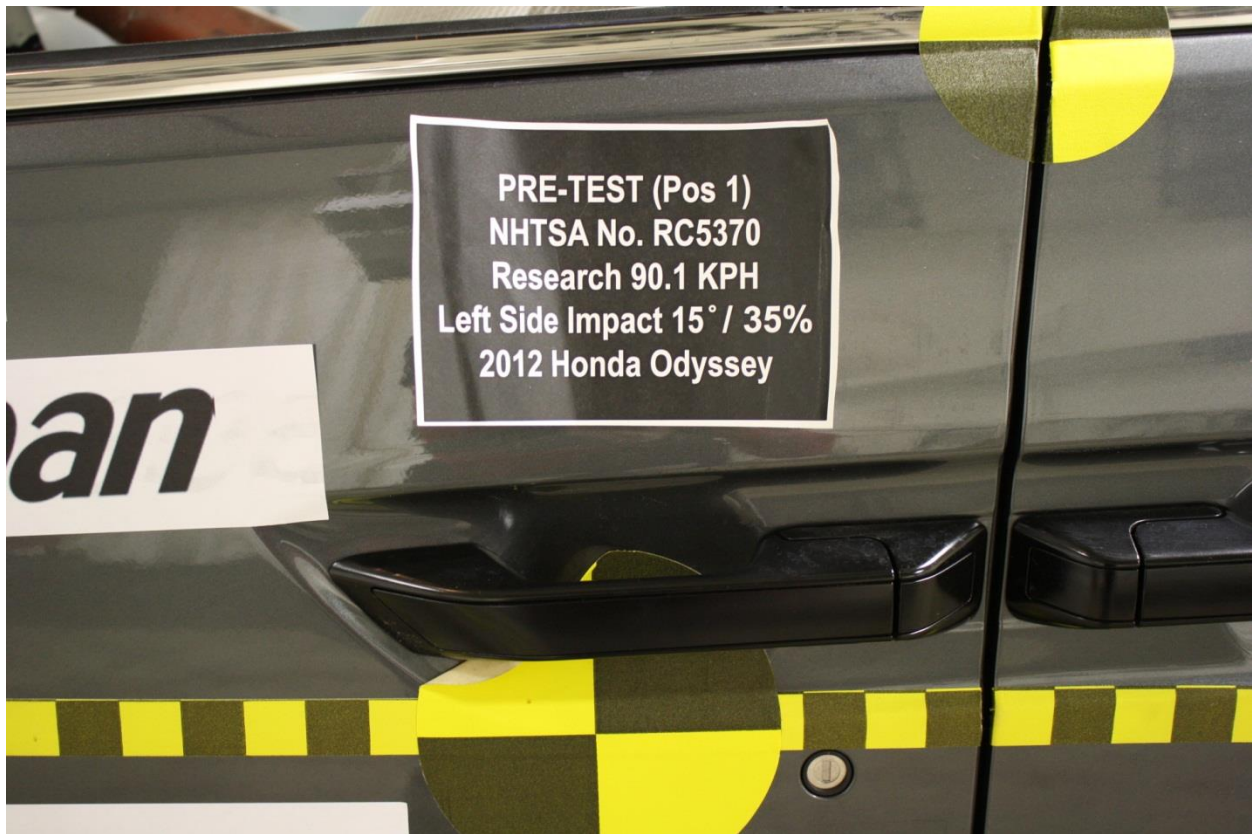
No. 025 Pre-Test Close-up View of Impact Point



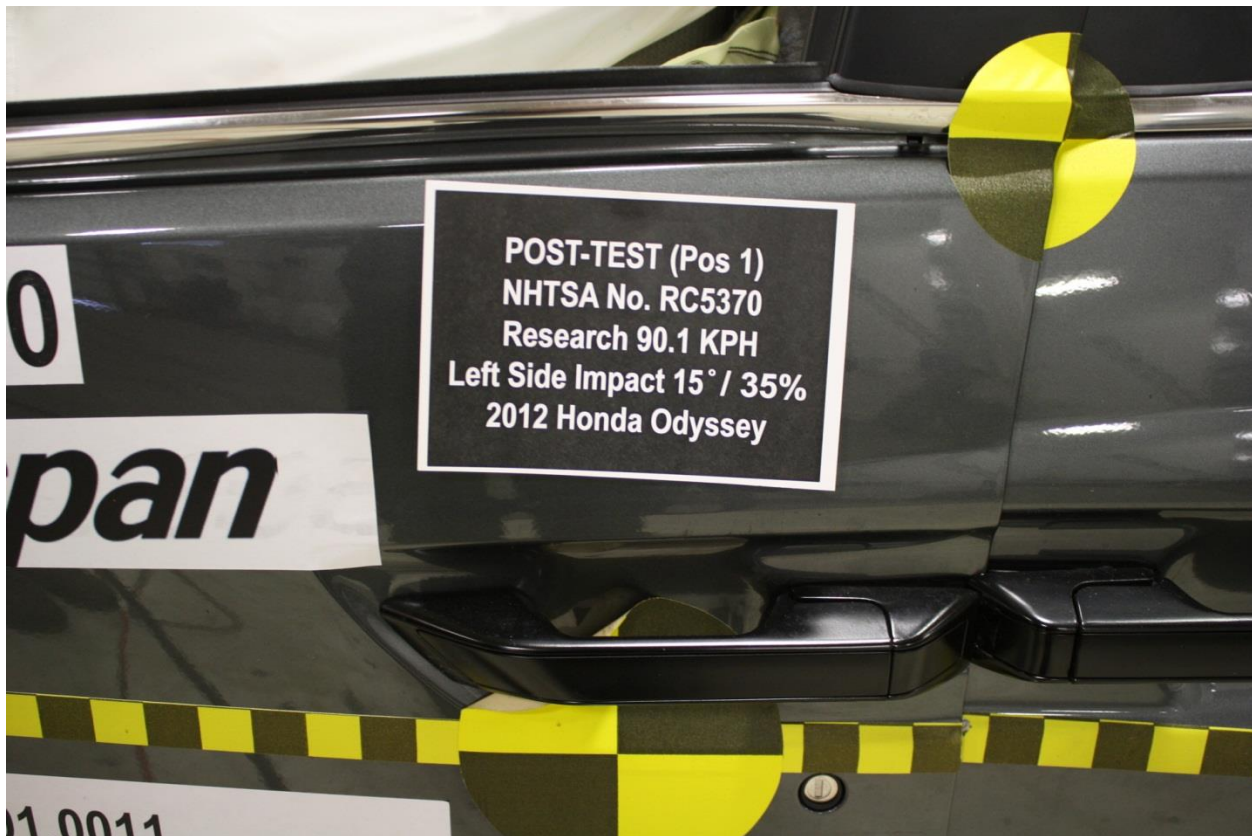
No. 026 Post-Test Close-up View of Impact Point



No. 027 Post-Test Vehicle Overhead View



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



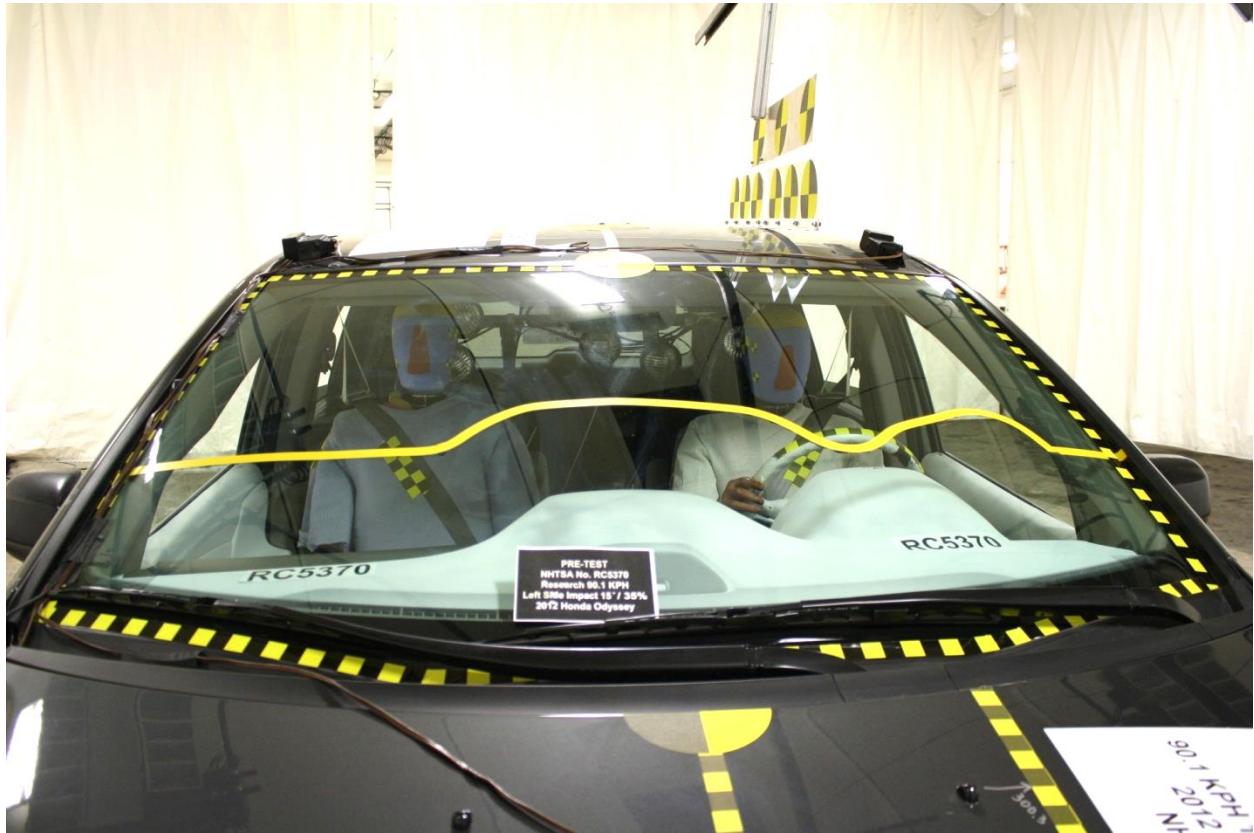
No. 029 Post-Test Close-up View of Driver Door Latch



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



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



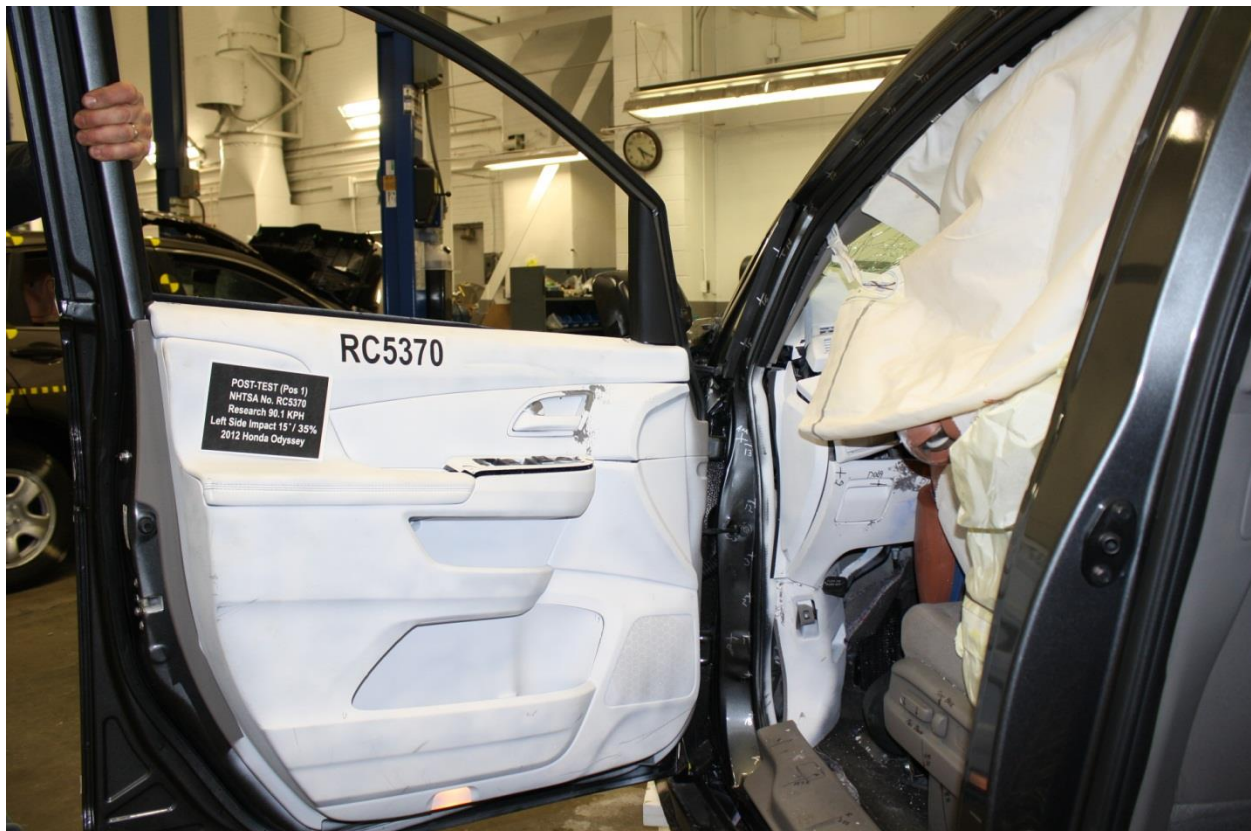
No. 032 Pre-Test Windshield View



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



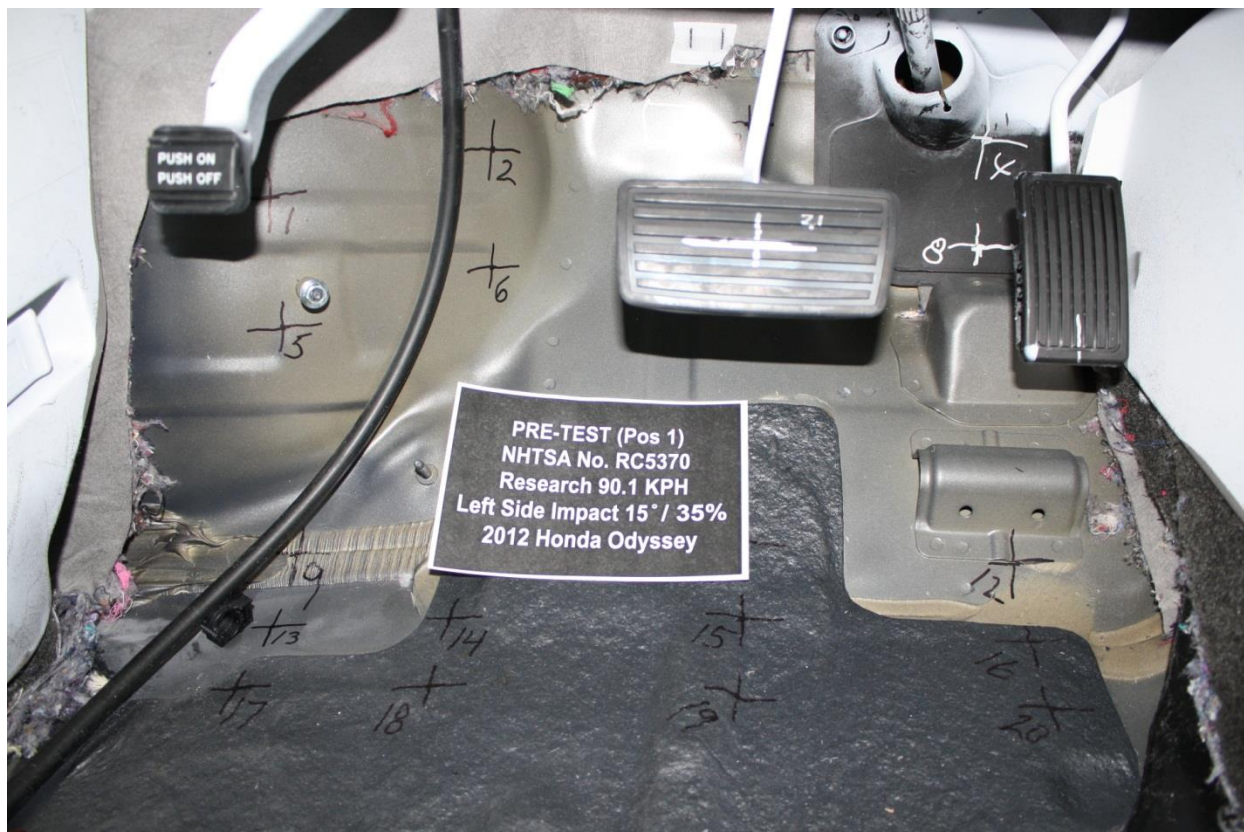
No. 047 Post-Test view of Driver Floor pan at Mid seat level, w/carpet



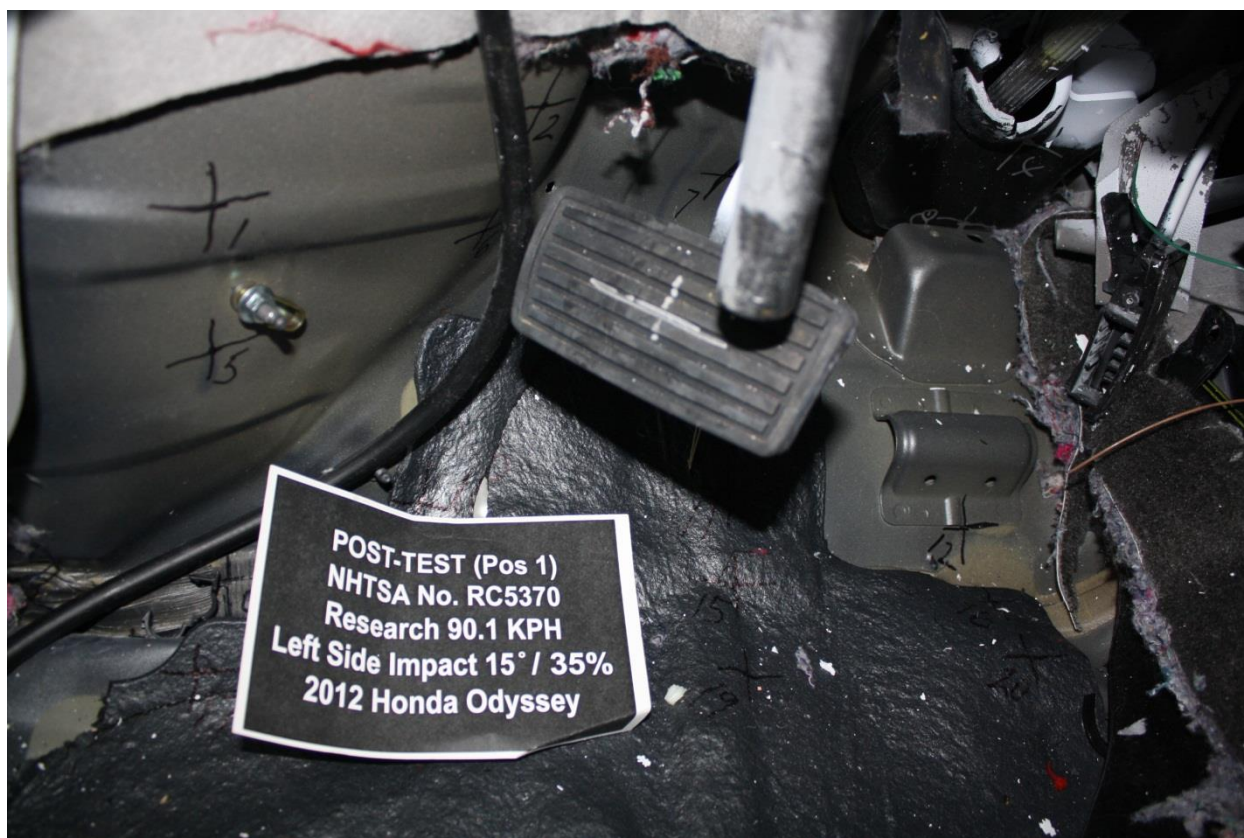
No. 048 Pre-Test View of Driver Floor pan at Left sill level, w/o carpet



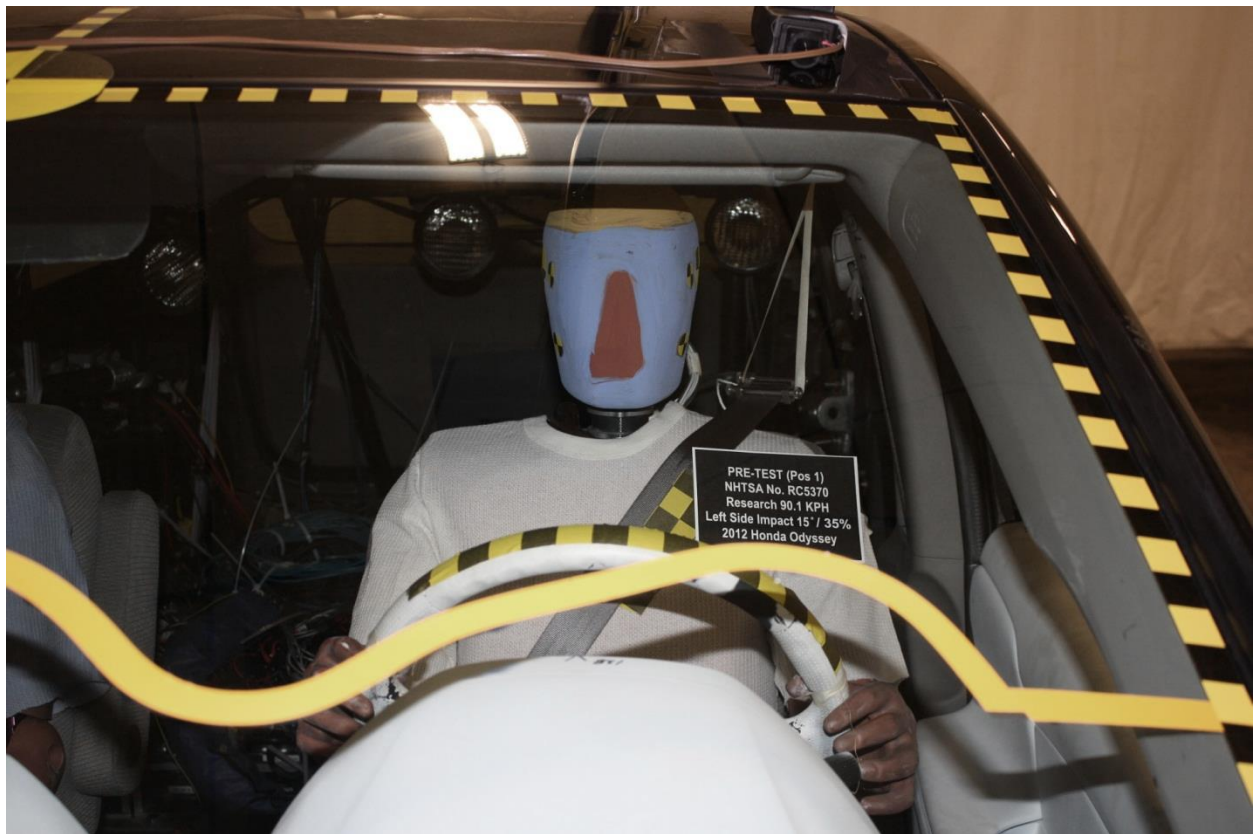
No. 049 Post-Test View of Driver Floor pan at Left sill level, w/o carpet



No. 050 Pre-Test View of Driver Floor pan at Mid seat level, w/o carpet



No. 051 Post-Test view of Driver Floor pan at Mid seat level, w/o carpet



No. 052 Pre-Test Driver Front Windshield View



No. 053 Post-Test Driver Front Windshield View



No. 054 Pre-Test Left Side View of Driver and Interior



No. 055 Post-Test Left Side View of Driver and Interior



No. 056 Pre-Test Left Side Driver Window View



No. 057 Post-Test Left Side Driver Window View



No. 058 Pre-Test Right Side View of Driver and Interior



No. 059 Post-Test Right Side View of Driver and Interior



No. 060 Pre-Test View of Driver Door Clearance



No. 061 Post-Test View of Driver Door Clearance



No. 062 Pre-Test View of Parking Brake



No. 063 Pre-Test Driver Seat Fore Aft Markings



No. 064 Post-Test Driver Seat Fore Aft Markings



No. 065 Pre-Test Driver Seat Back Markings



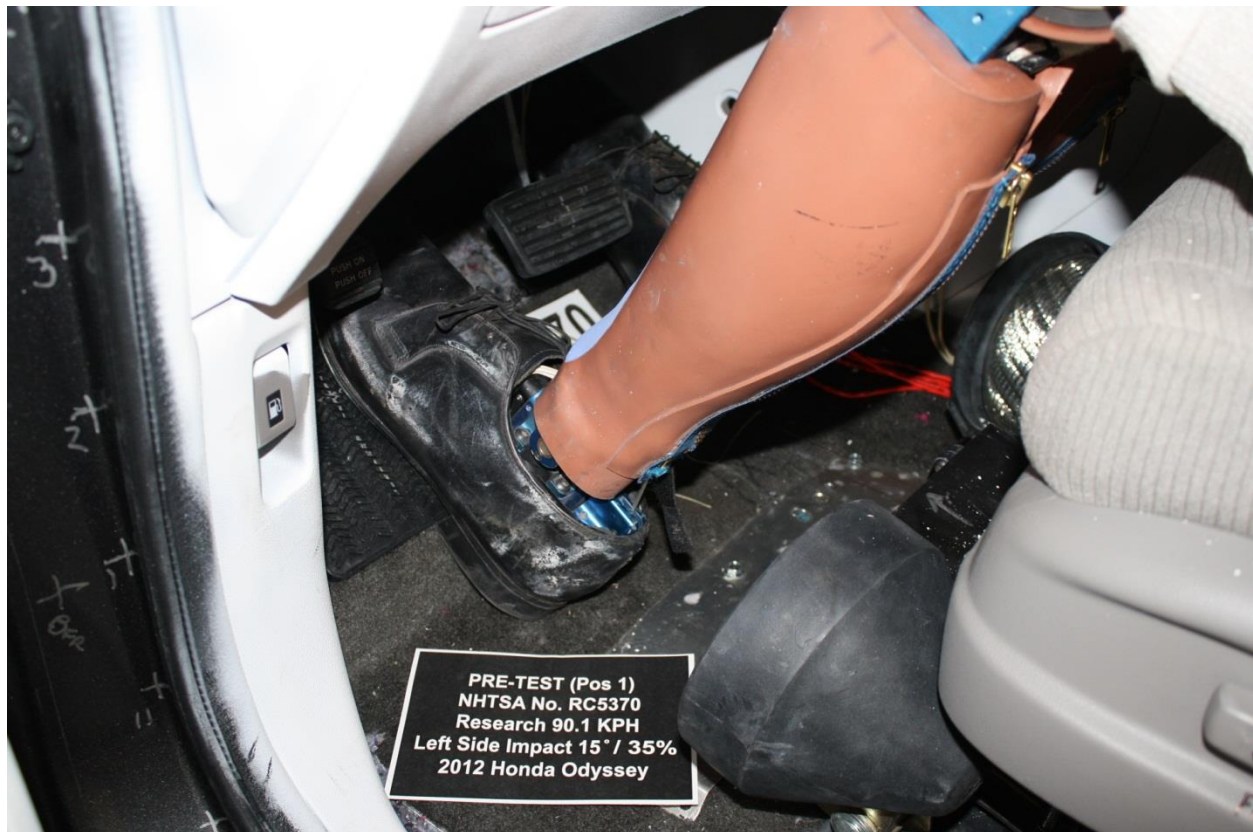
No. 066 Pre-Test Overhead View of Driver Thighs on Seat



No. 067 Pre-Test Driver Adjustable D-Ring



No. 068 Post-Test Driver Adjustable D-Ring



No. 069 Pre-Test Driver Feet



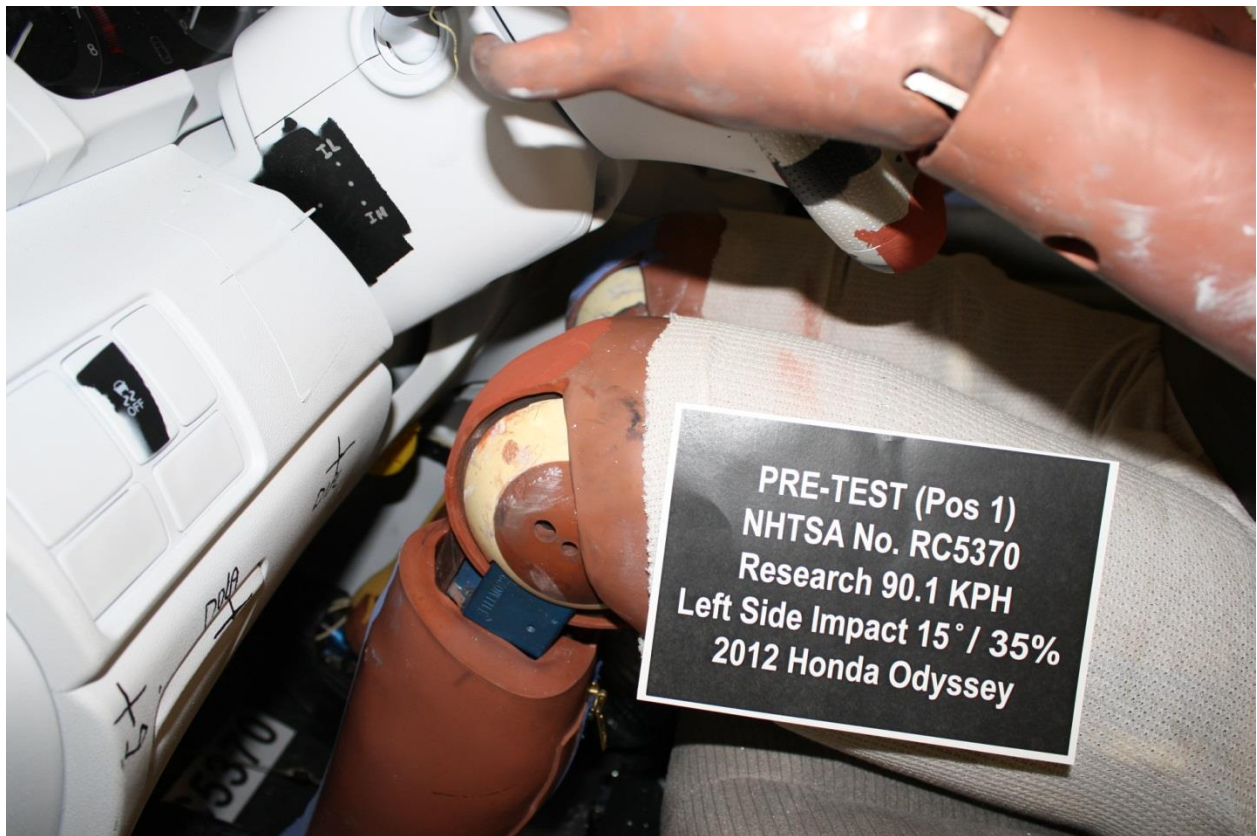
No. 070 Post-Test Driver Feet



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



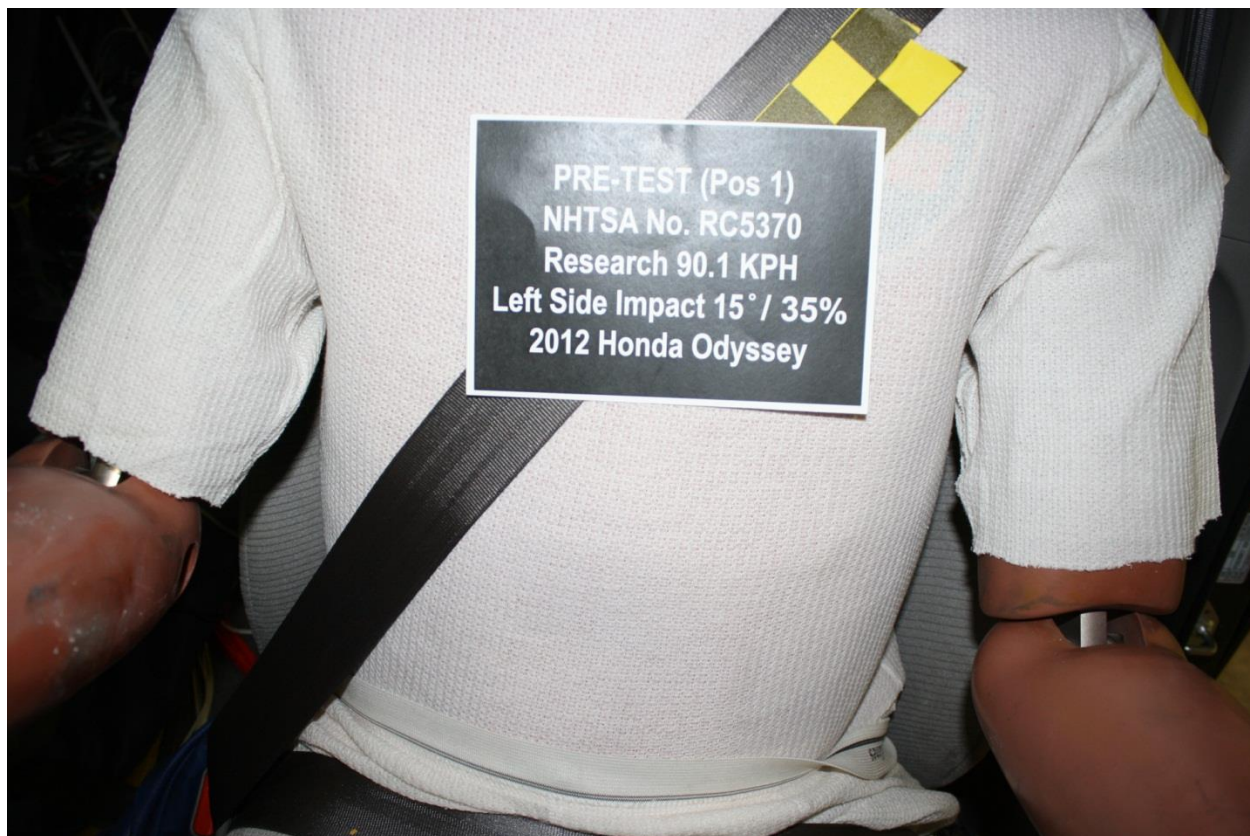
No. 072 Post-Test View of Driver Right Knee and Bolster



No. 073 Pre-Test View of Driver Left Knee and Bolster



No. 074 Post-Test View of Driver Left Knee and Bolster



No. 075 Pre-Test View of Driver Abdomen



No. 076 Post-Test View of Driver Abdomen



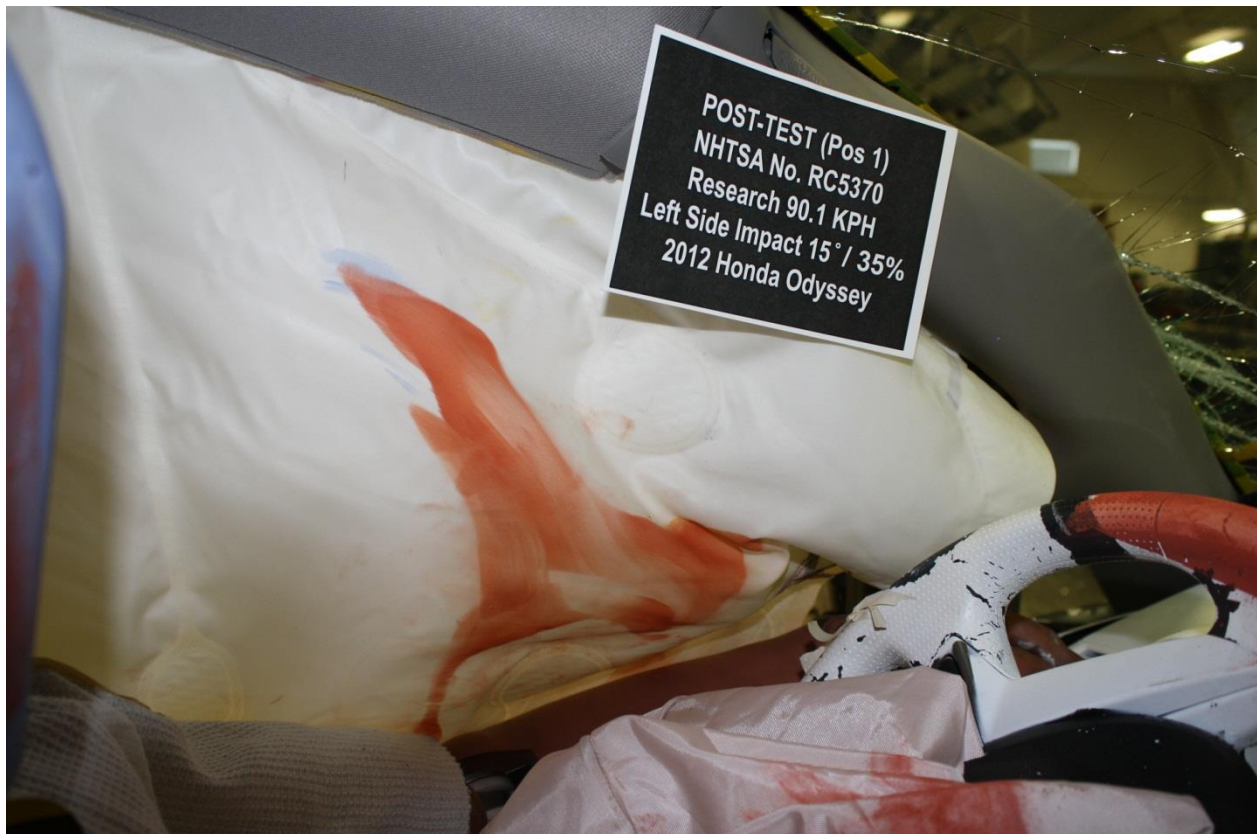
No. 077 Pre-Test Left Side View of Steering Wheel set position



No. 078 Post-Test Left Side View of Steering Wheel set position



No. 079 Post-Test View of Driver Head Contact with Front Airbag



No. 080 Post-Test View of Driver Head Contact with Curtain Airbag

Photo Not Applicable

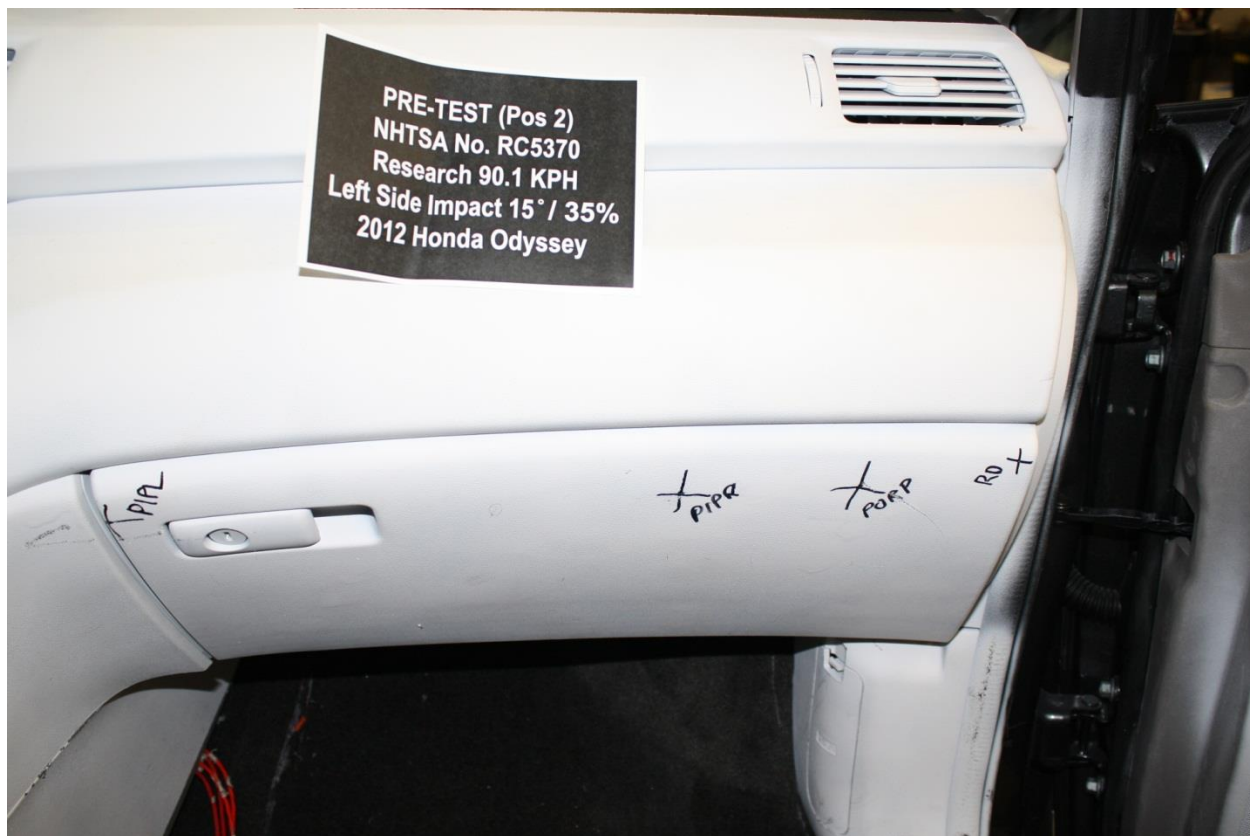
No. 081 Post-Test View of Driver Head Contact with Vehicle Interior – A

Photo Not Applicable

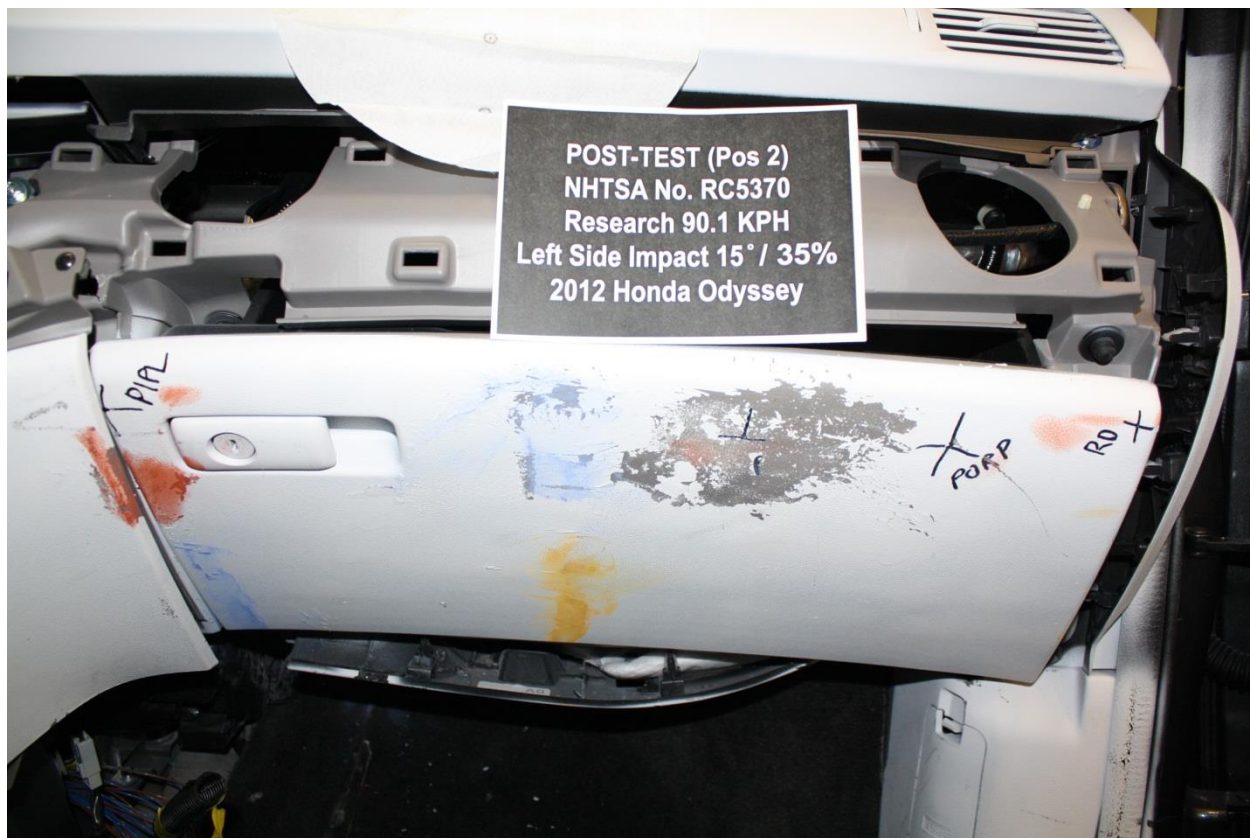
No. 081a Post-Test View of Driver Head Contact with Vehicle Interior - B

Photo Not Applicable

No. 081b Post-Test View of Driver Head 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 Left sill level, w/carpet



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



No. 093 Post-Test View of Passenger Floor pan at Left sill level, w/o carpet



No. 094 Pre-Test View of Passenger Floor pan at Mid seat level, without carpet



No. 095 Post-Test view of Passenger Floor pan at Mid seat level, wo carpet



No. 096 Pre-Test Passenger Front Close-up View, Windshield



No. 097 Post-Test Passenger Front Close-up View, Windshield



No. 098 Pre-Test Left Side Passenger and Interior View



No. 099 Post-Test Left Side Passenger and Interior View



No. 100 Pre-Test Right Side Passenger Window View



No. 101 Post-Test Right Side Passenger Window View



No. 102 Pre-Test Right Side Passenger and Interior View



No. 103 Post-Test Right Side Passenger and Interior View



No. 104 Pre-Test View of Passenger Door Clearance



No. 105 Post-Test View of Passenger Door Clearance



No. 106 Pre-Test Passenger Seat Fore-Aft Markings



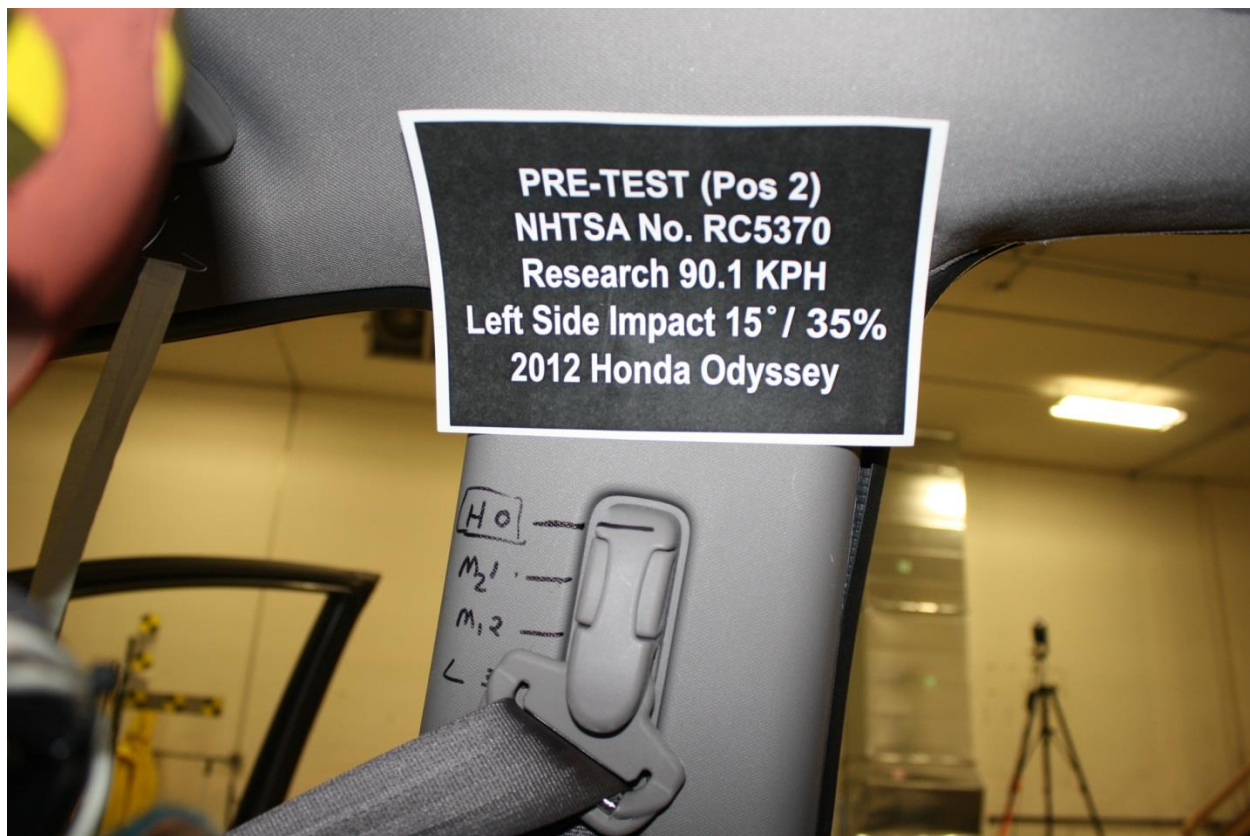
No. 107 Post-Test Passenger Seat Fore-Aft Markings



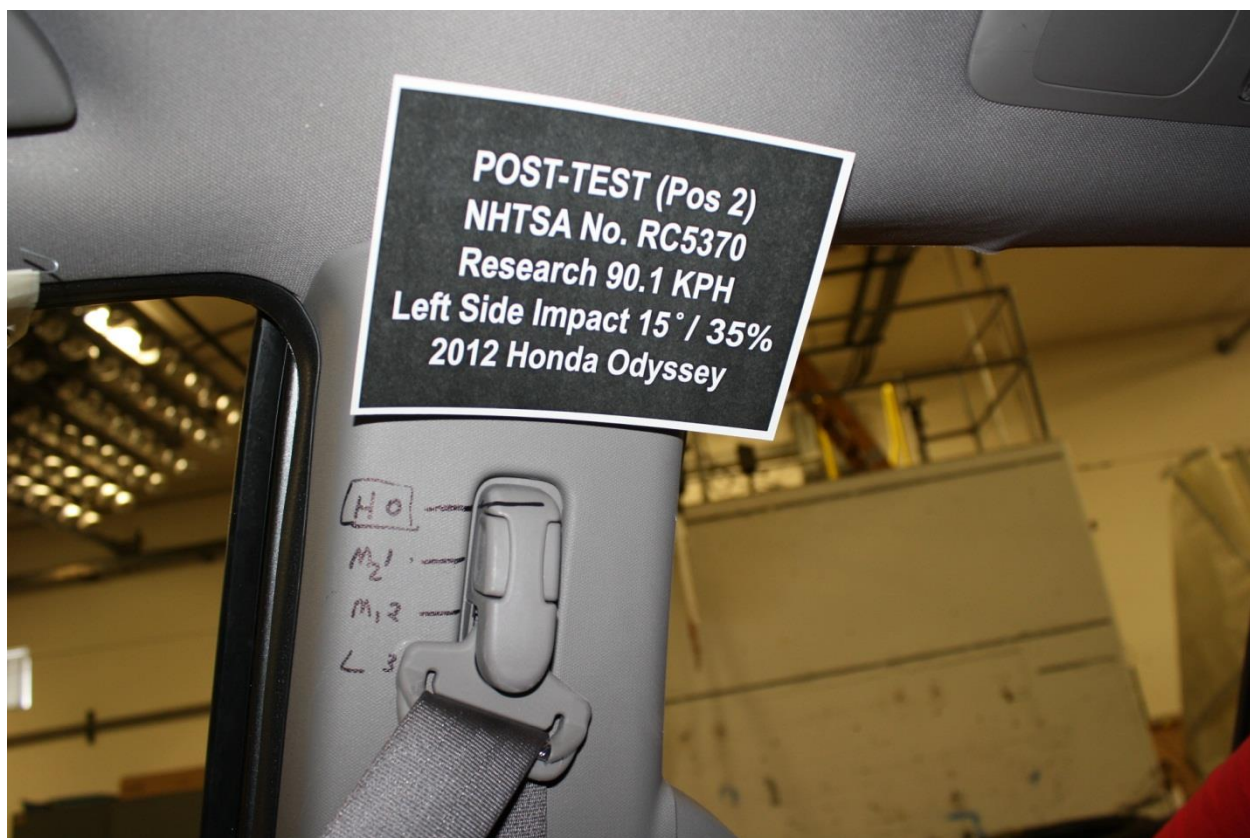
No. 108 Pre-Test Passenger Seat Back Markings



No. 109 Pre-Test Overhead View of Passenger Thighs on seat



No. 110 Pre-Test Passenger Adjustable D-ring



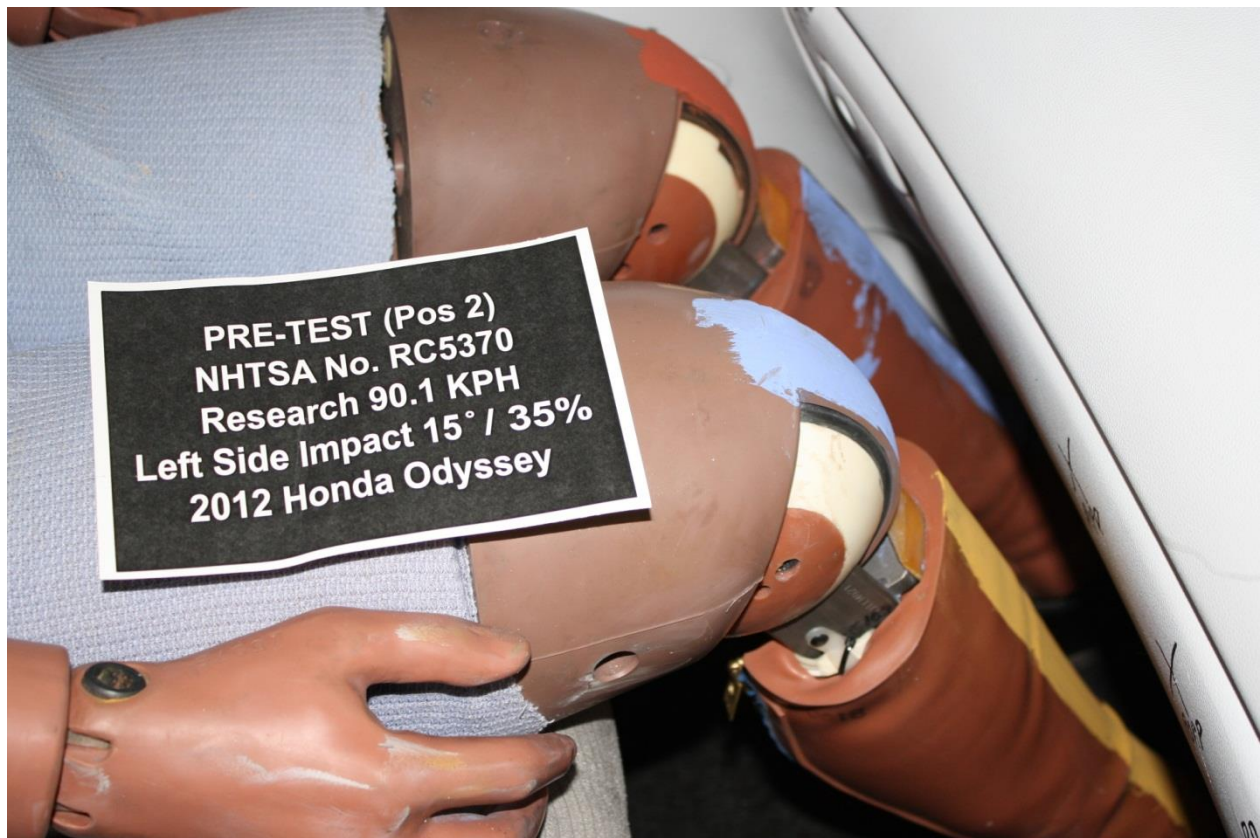
No. 111 Post-Test Passenger Adjustable D-ring



No. 112 Pre-Test View of Passenger Feet



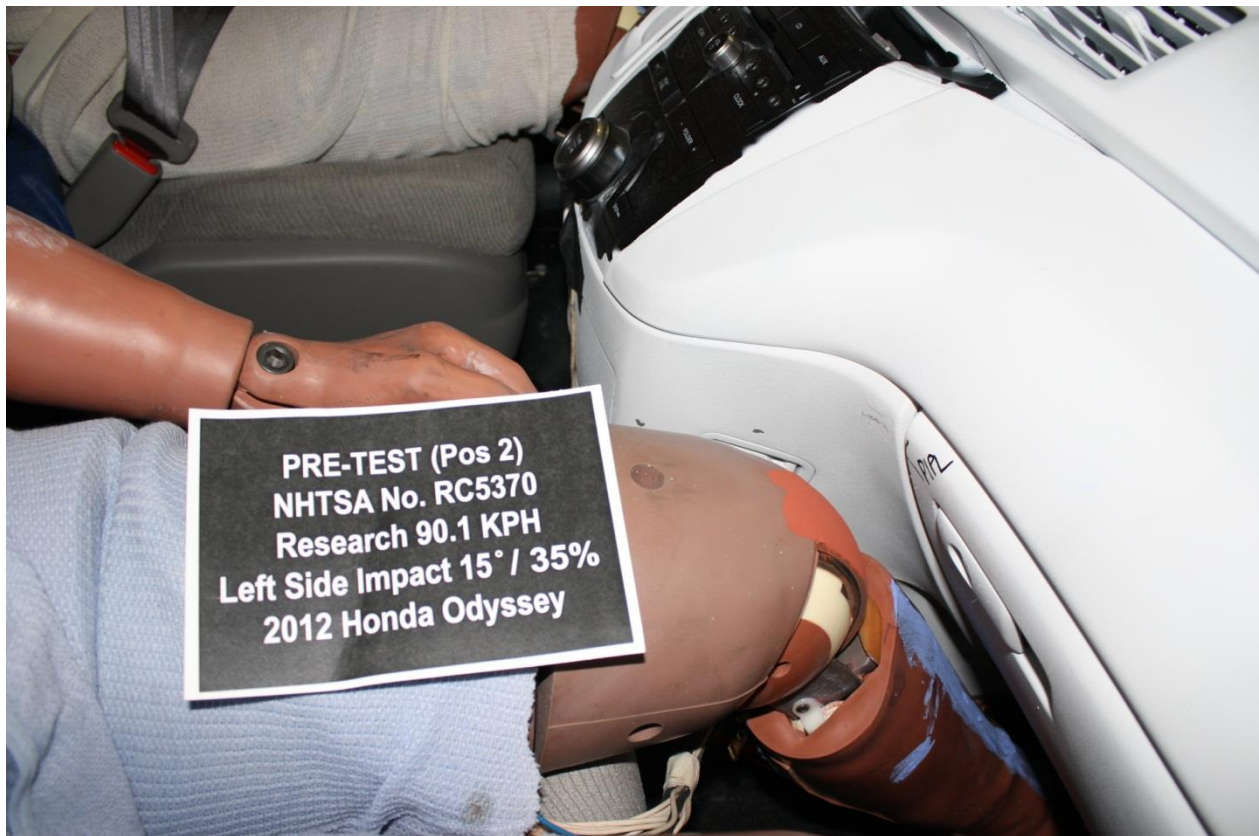
No. 113 Post-Test View of Passenger Feet



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



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



No. 116 Pre-Test View of Passenger Left Knee and Bolster



No. 117 Post-Test View of Passenger Left Knee and Bolster



No. 118 Pre-Test View of Passenger Abdomen



No. 119 Post-Test View of Passenger Abdomen



No. 120 Post-Test View of Passenger Head contact with Airbag – Front

Photo Not Applicable

No. 120a Post-Test View of Passenger Head contact with Airbag - Curtain



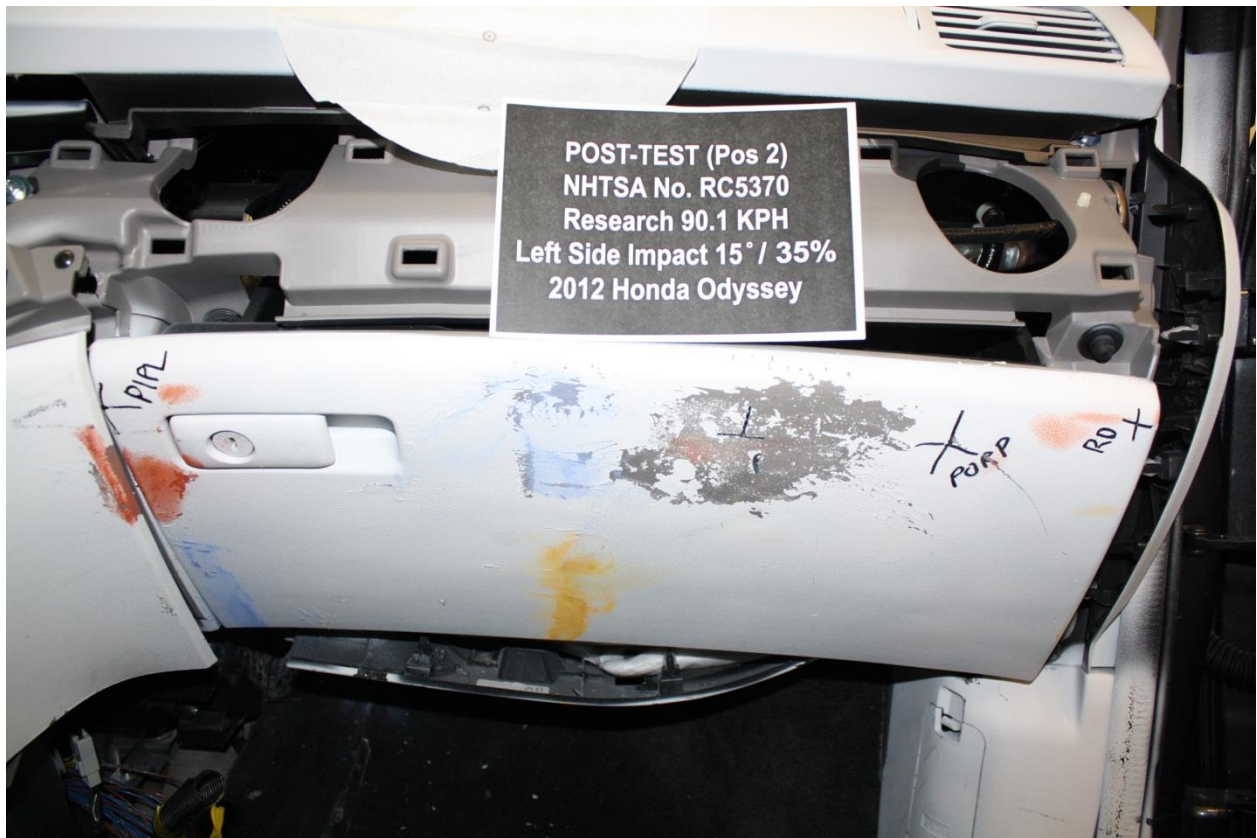
No. 121 Post-Test View of Passenger Head contact with Interior



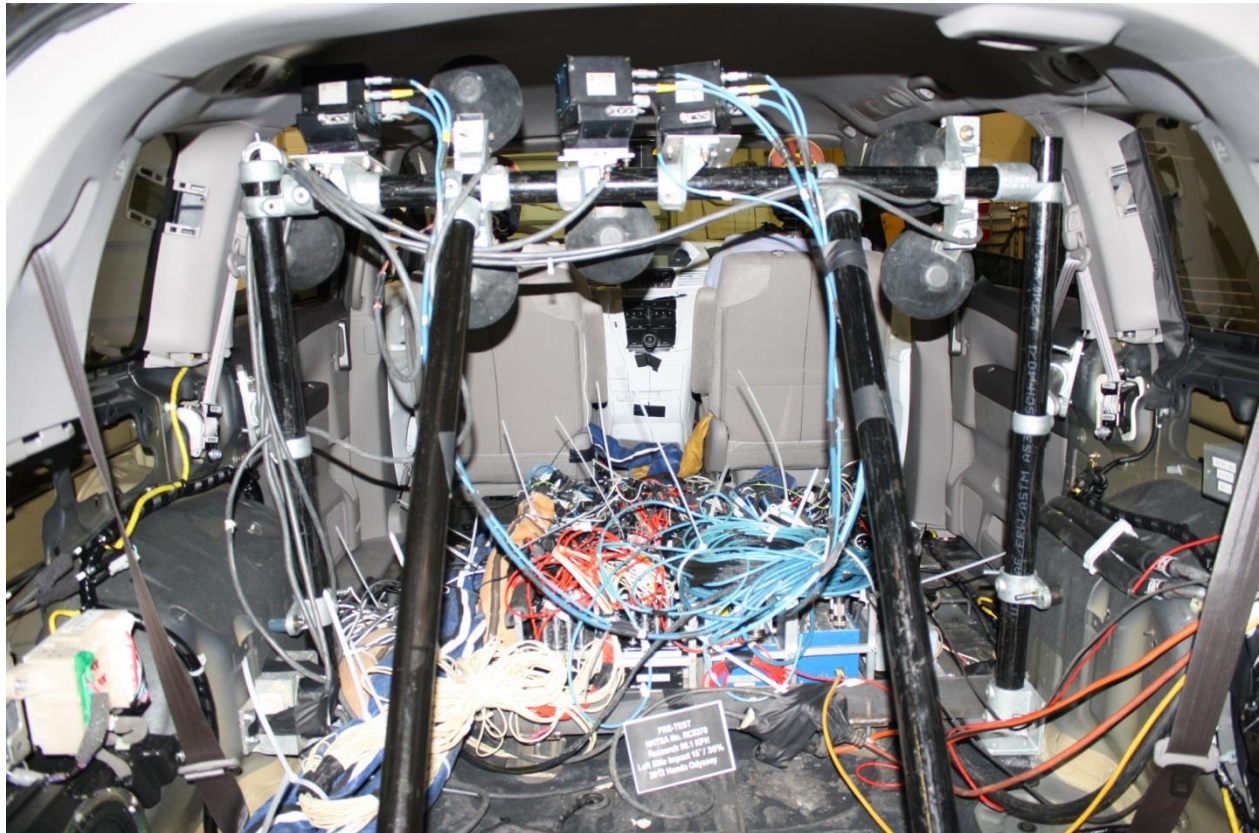
No. 121a Post-Test View of Passenger Head contact with Interior

Photo Not Applicable

No. 121b Post-Test View of Passenger Head contact with Interior



No. 122 Post-Test Passenger Contact With Glovebox



No. 123 Pre-Test Ballast Locations



No. 124 Post-Test Speed Trap Readout



No. 125 Pre-Test View of Fuel Filler Cap



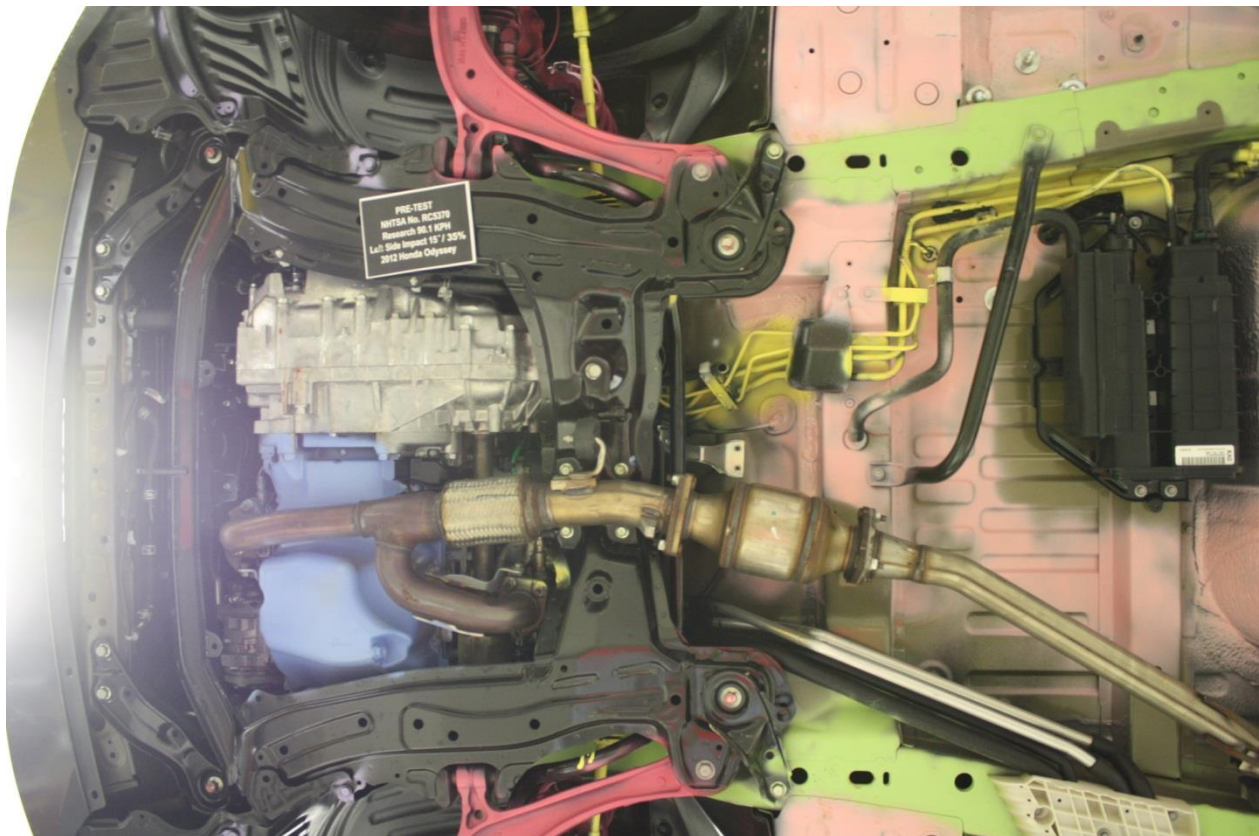
No. 126 Post-Test View of Fuel Filler Cap



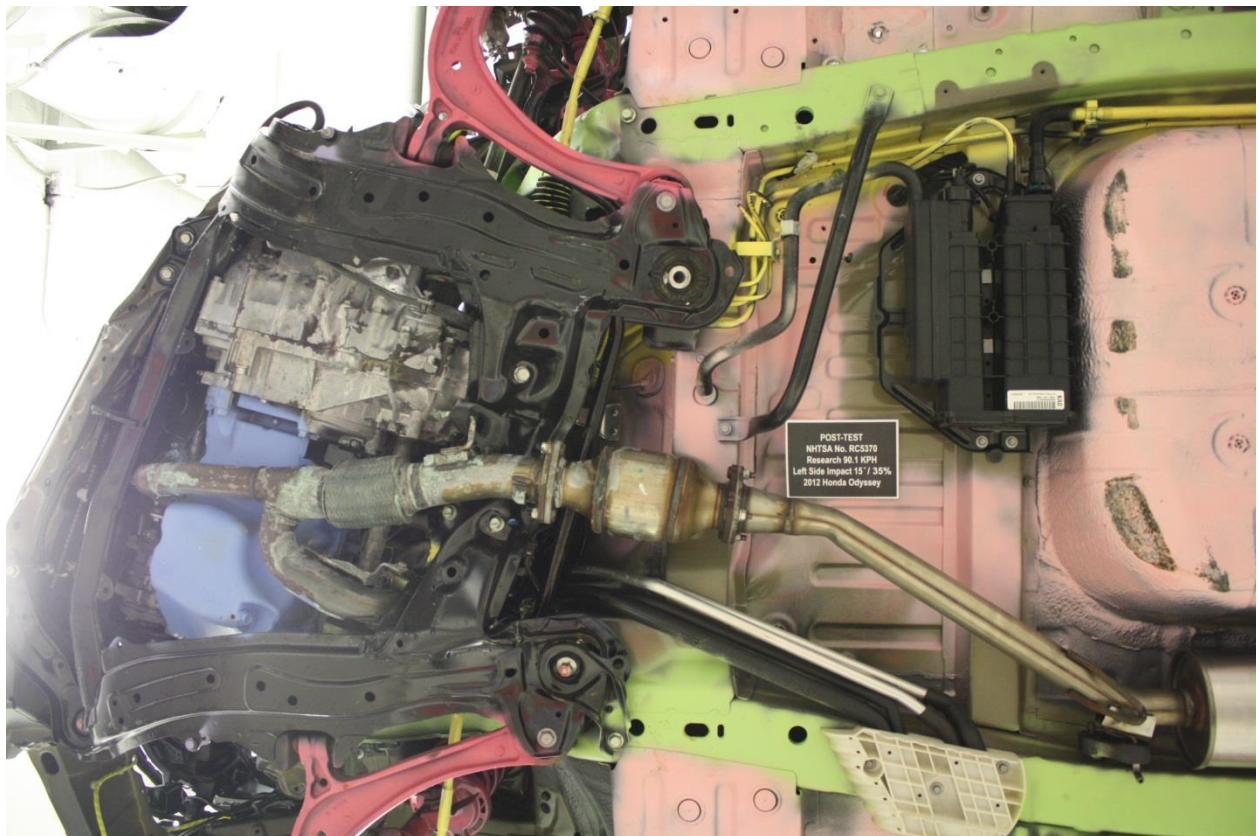
No. 127 Pre-Test Engine Compartment View



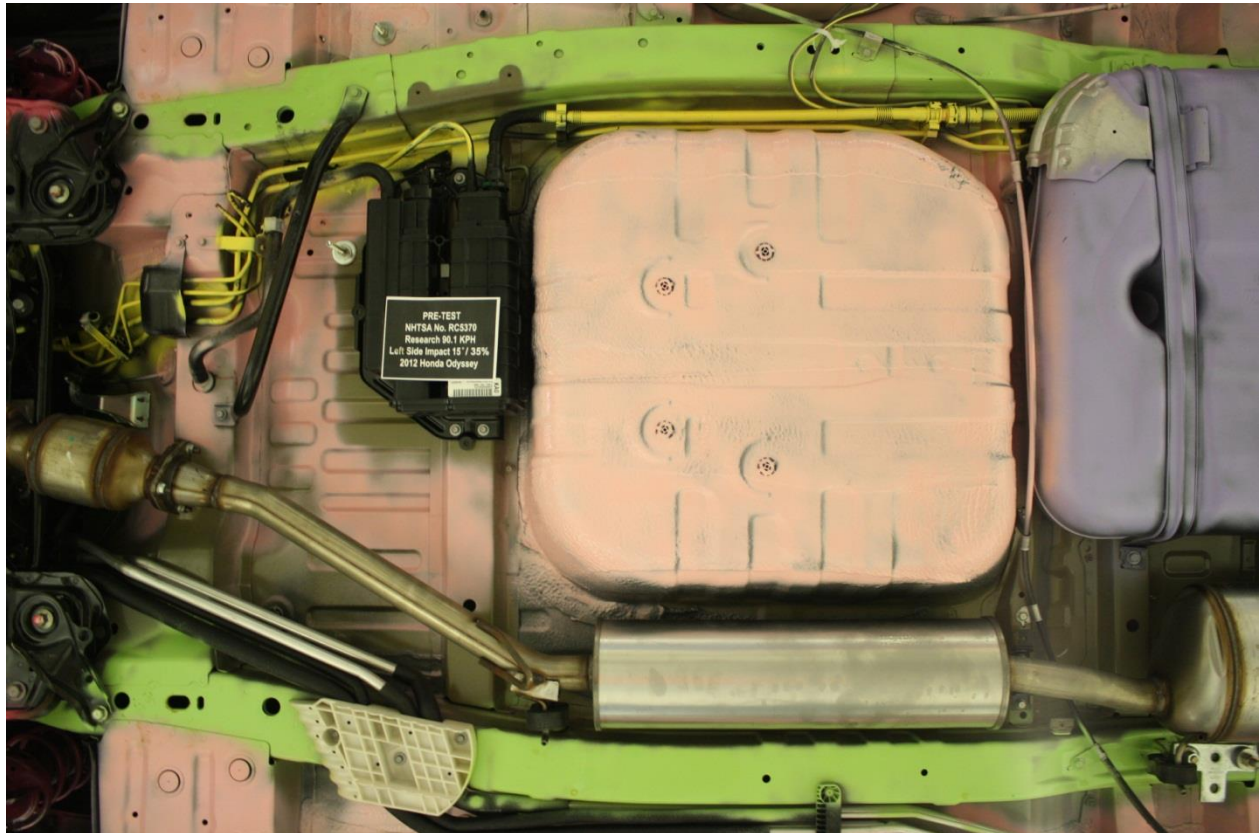
No. 128 Post-Test Engine Compartment View



No. 129 Pre-Test View of Front Underbody (perpendicular to vehicle)



No. 130 Post-Test View of Front Underbody (perpendicular to vehicle)



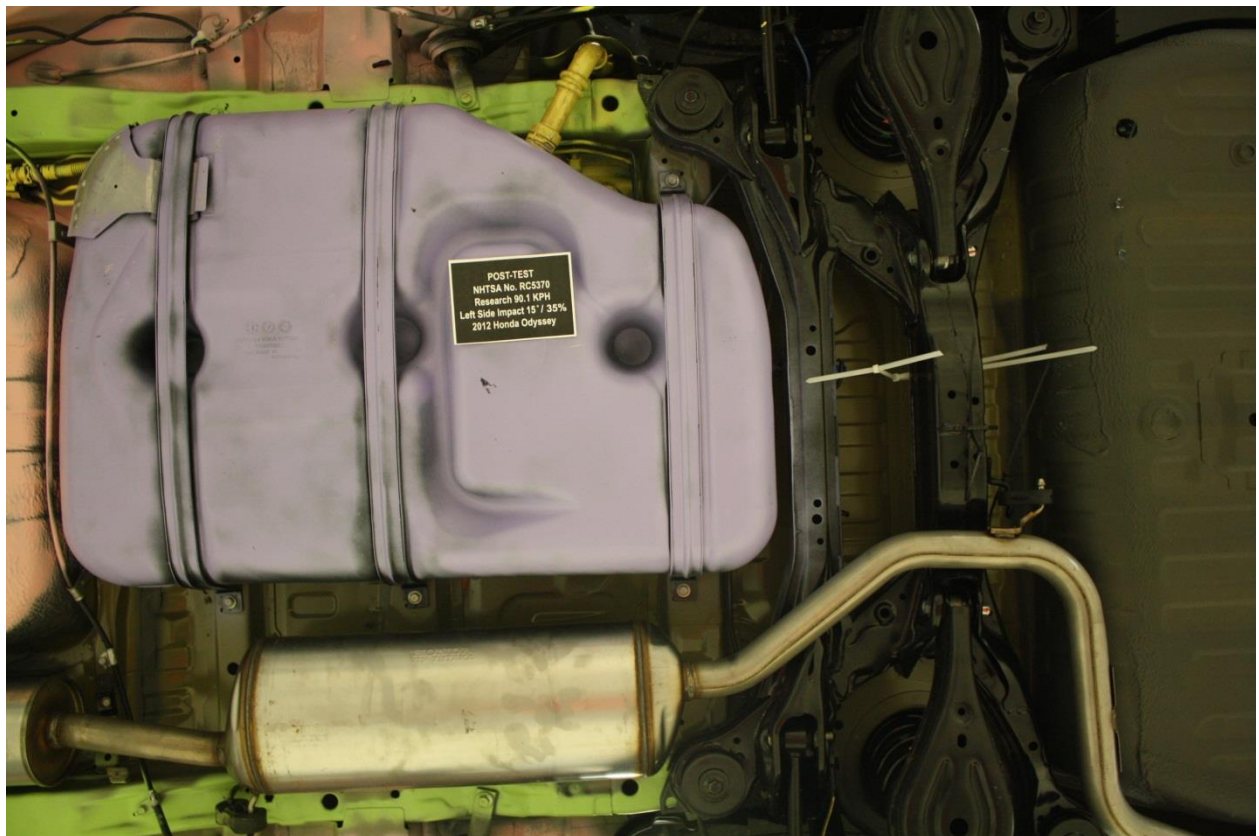
No. 131 Pre-Test View of Mid Underbody (perpendicular to vehicle)



No. 132 Post-Test View of Mid Underbody (perpendicular to vehicle)



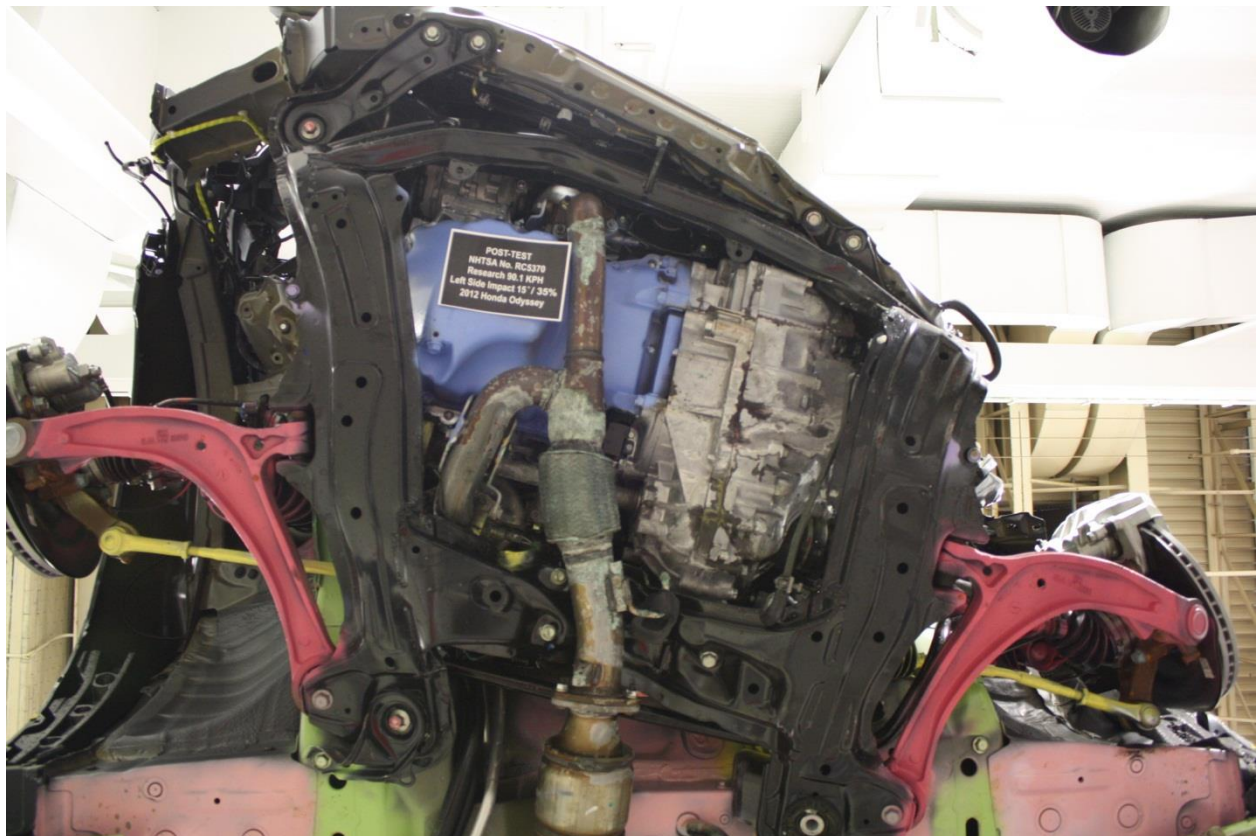
No. 133 Pre-Test View of Rear Underbody (perpendicular to vehicle)



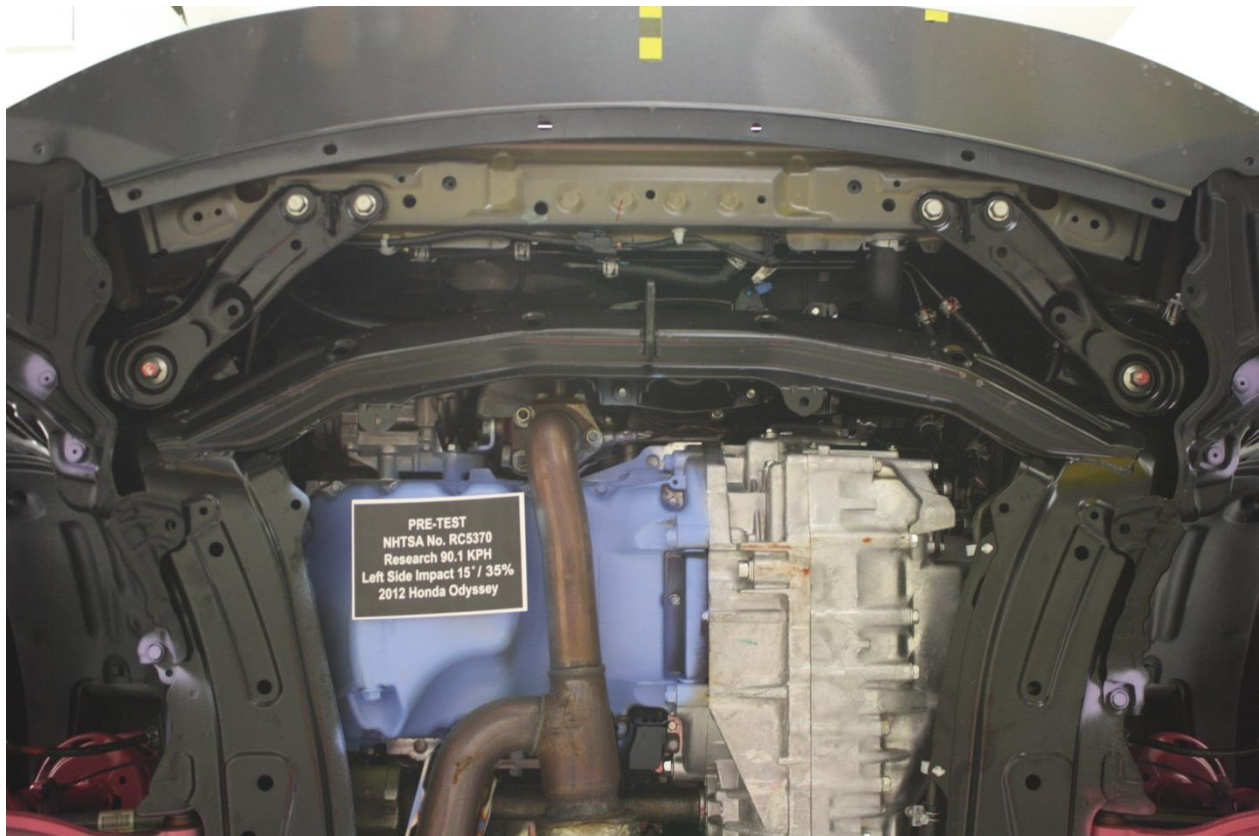
No. 134 Post-Test View of Rear Underbody (perpendicular to vehicle)



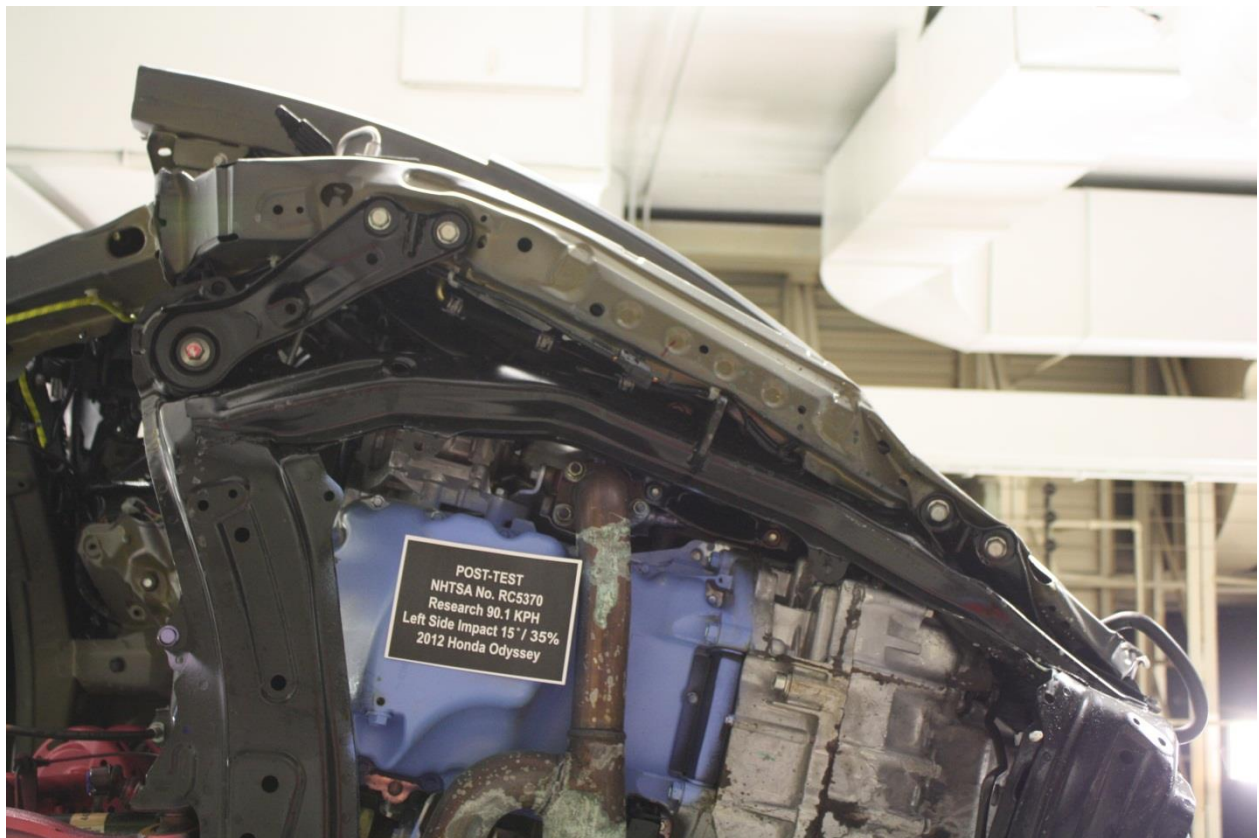
No. 135 Pre-Test View of Steering rack and or sway bar



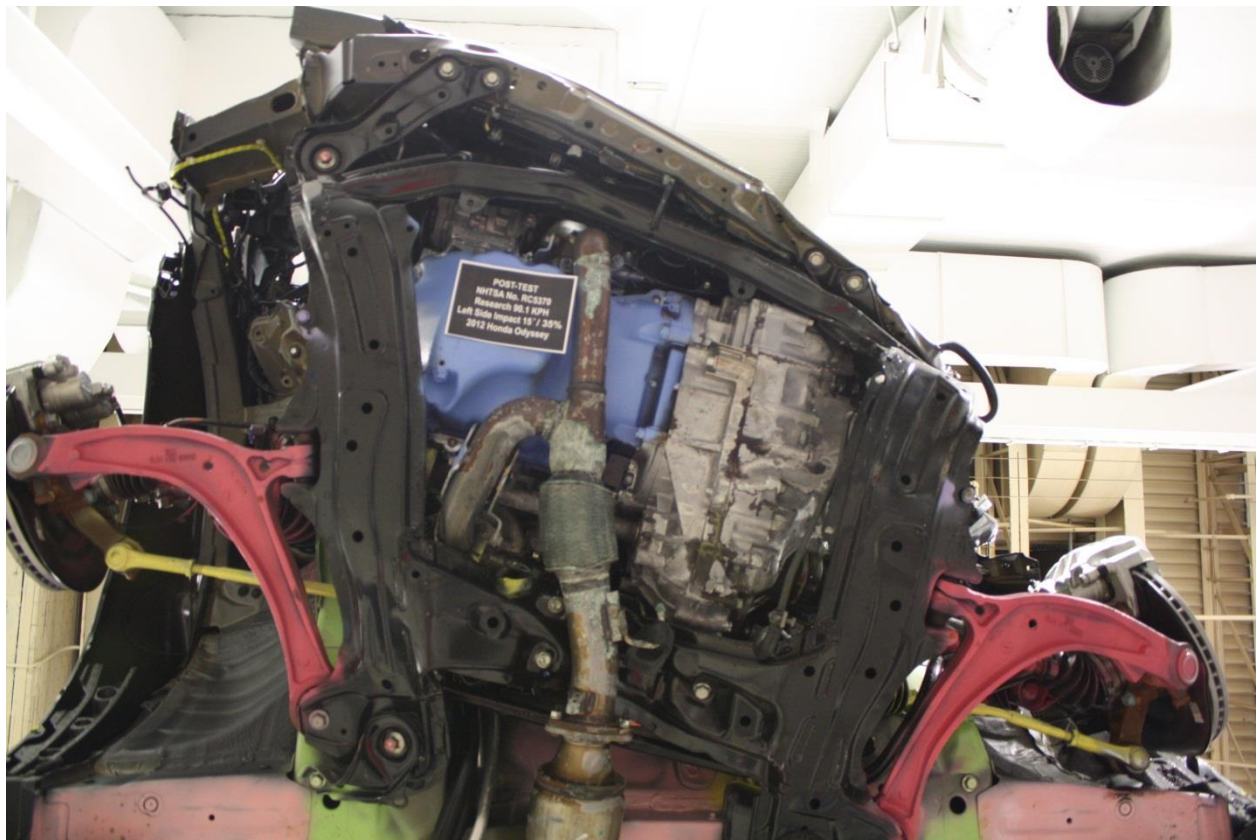
No. 136 Post-Test View of Steering rack and or sway bar



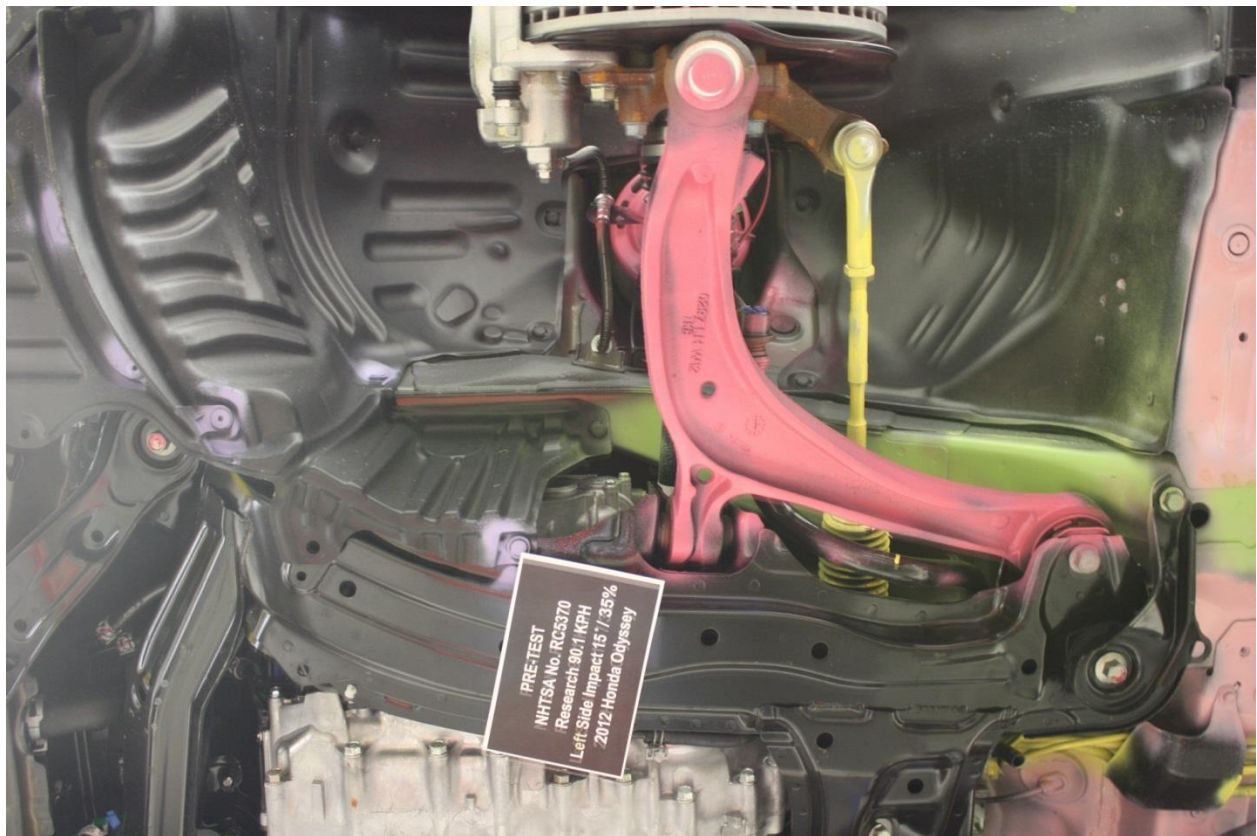
No. 137 Pre-Test Bumper to Rail Attachments and Crush Initiators



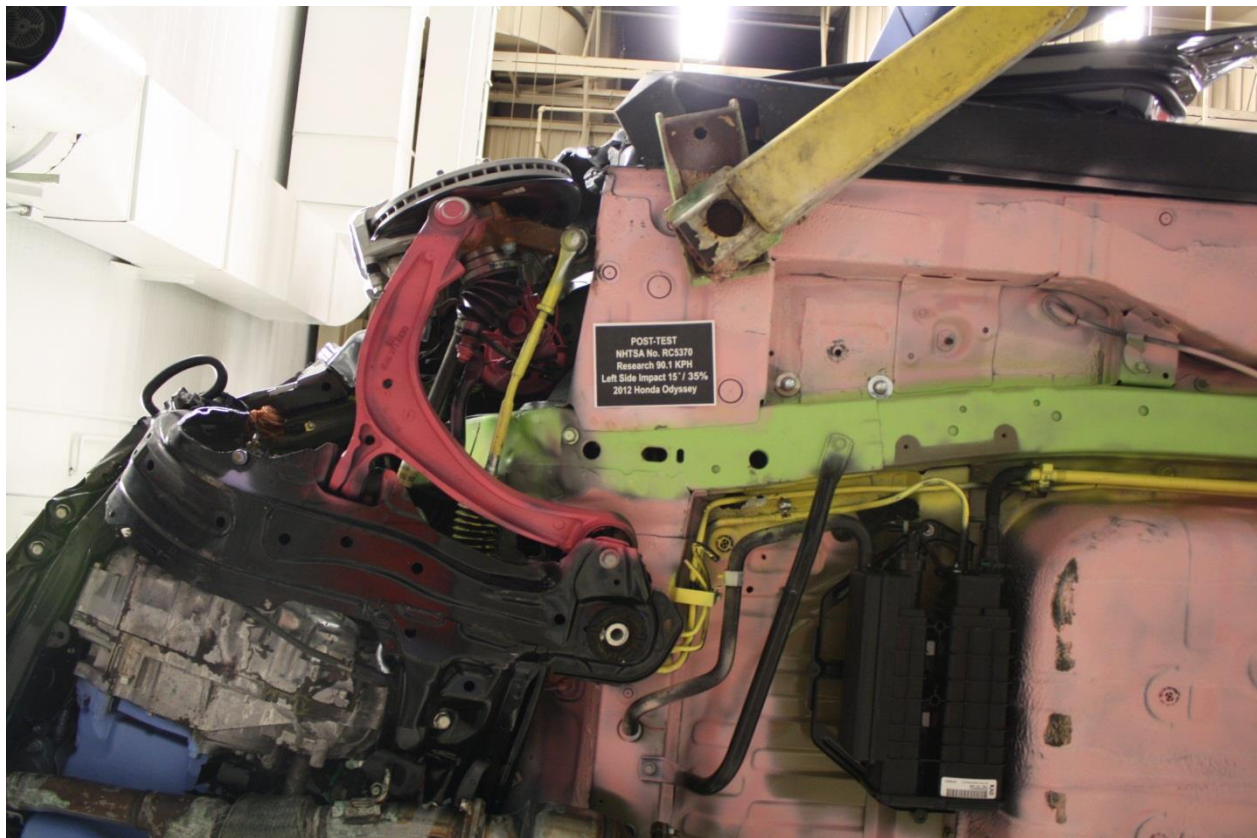
No. 138 Post-Test Bumper to Rail Attachments and Crush Initiators



No. 139 Post-Test View of Front Sub-Frame Deformation



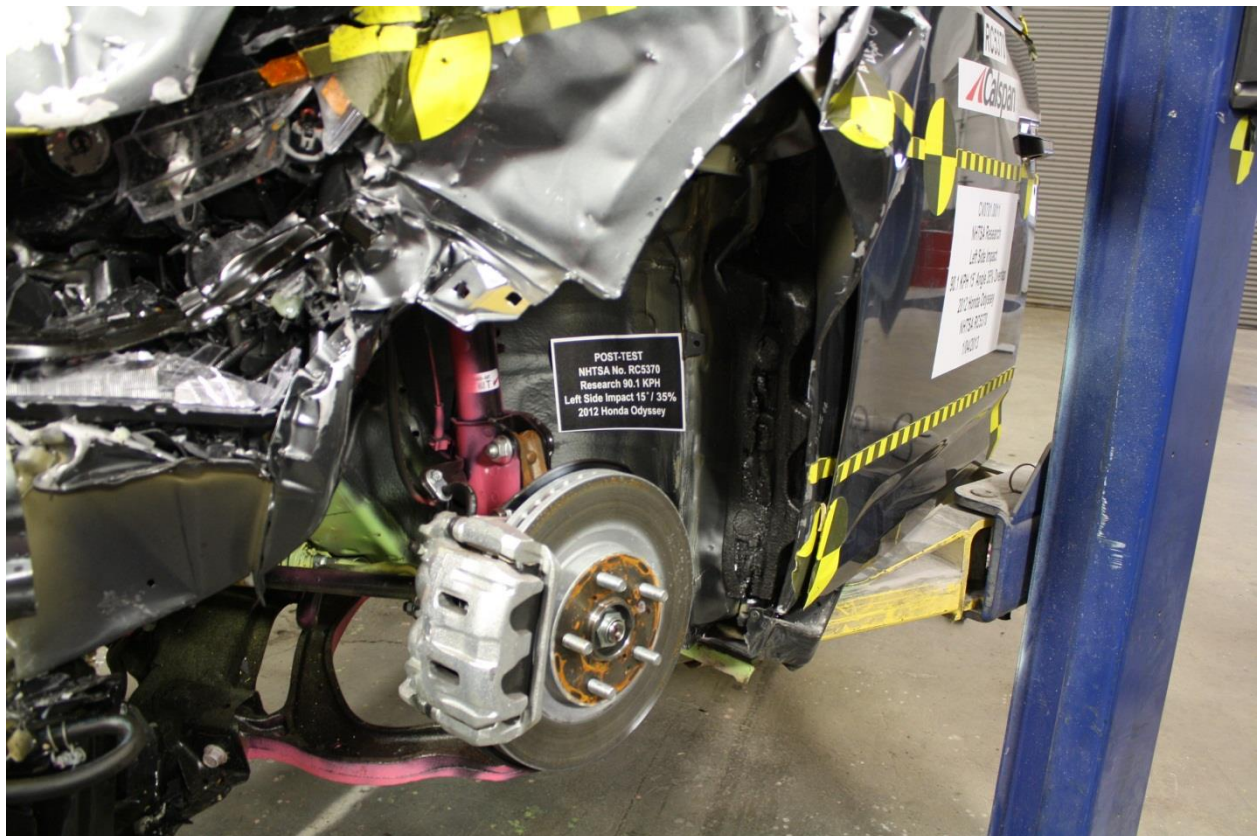
No. 140 Pre-Test Frame Rail with tire removed



No. 141 Post-Test Frame Rail with tire removed



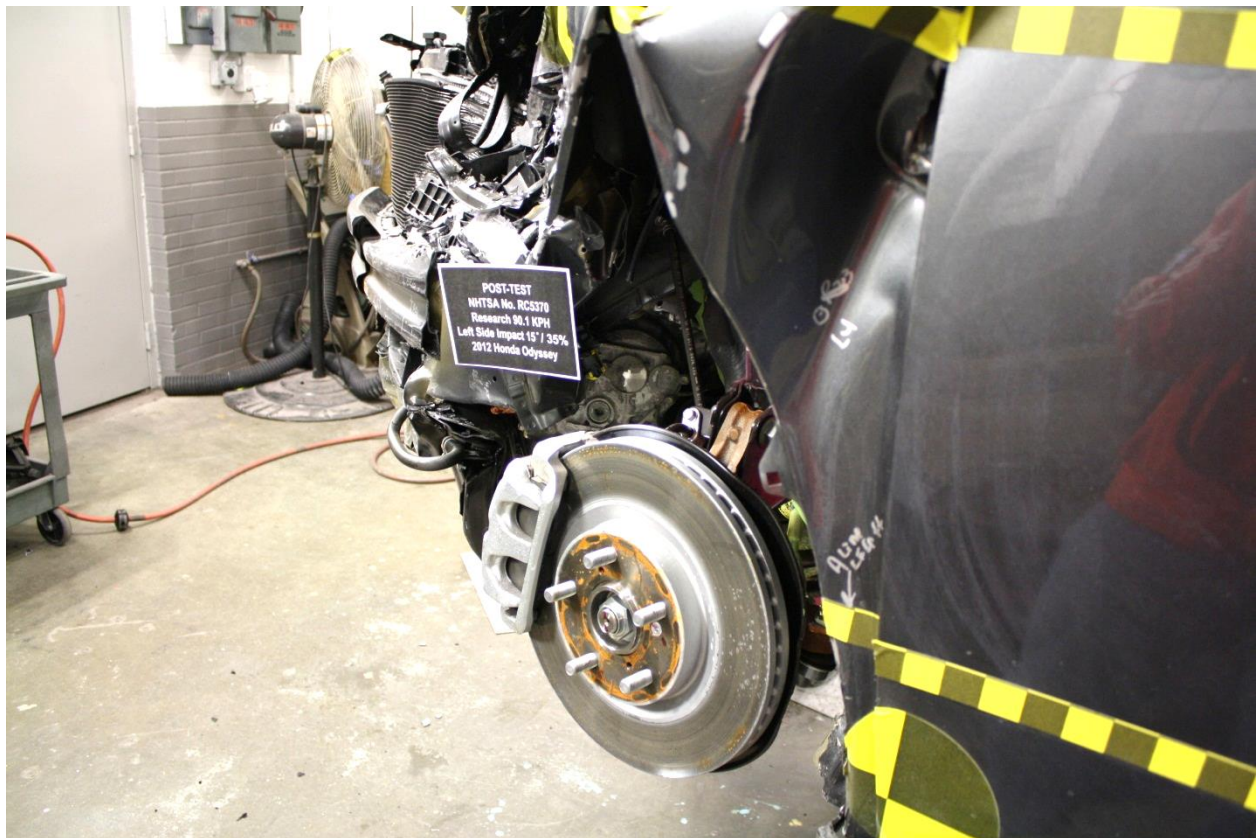
No. 142 Pre-Test View of Front Driver Wheel Well w/ Tire Removed



No. 143 Post-Test $\frac{3}{4}$ View of Front Driver Wheel Well w/ Tire Removed



No. 144 Post-Test Side View of Front Driver Wheel Well w/ Tire Removed



No. 145 Post-Test Right Side 3/4 Rear View of the Front Driver Wheel Well w/ Tire Removed



No. 146 Post-Test Looking Down at the Front Driver Shotgun



No. 147 Post-Test Right Side $\frac{3}{4}$ View of Front Driver Shotgun



No. 148 Post-Test Front Driver Close up View of Suspension w/ Tire Removed



No. 149 Post-Test $\frac{3}{4}$ View of Front Passenger Wheel Well w/ Tire Removed



No. 150 Post-Test Side View of Front Passenger Wheel Well w/ Tire Removed



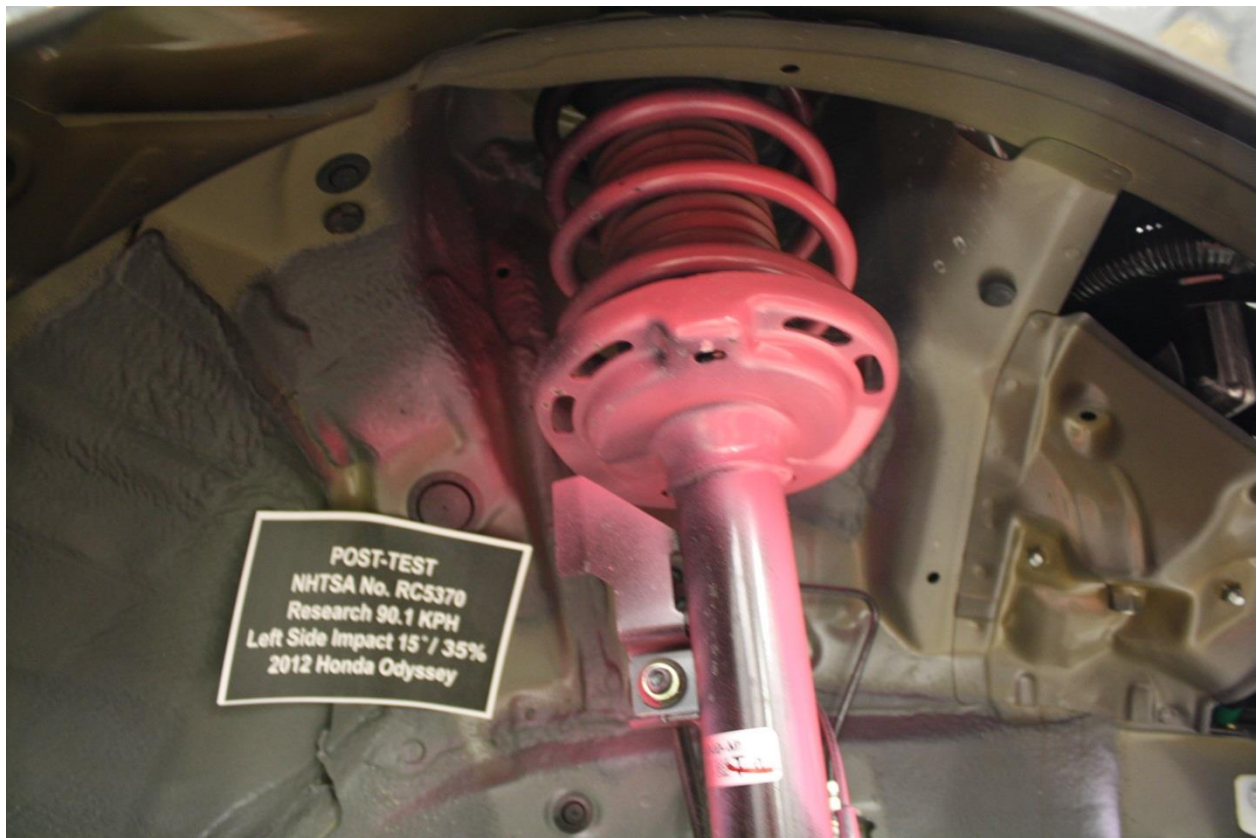
No. 151 Post-Test Right Side 3/4 Rear View of the Front Passenger Wheel Well w/ Tire Removed



No. 152 Post-Test Looking Down at the Front Passenger Shotgun



No. 153 Post-Test Right Side $\frac{3}{4}$ View of Front Passenger Shotgun



No. 154 Post-Test Front Passenger Close up View of Suspension w/ Tire Removed



No. 155 Post-Test View of Door Sill with Door Open- Struck Side



No. 156 Post-Test View of Deformation of A pillar-Struck Side



No. 157 Post-Test View of Deformation of B pillar-Struck Side



No. 158 Post-Test View of Deformation of C pillar-Struck Side



No. 159 Post-Test View of Wheel and/or Tire Deformation-Struck Side



No. 160 Post-Test View of Deformation of Rocker or Post-Struck Side



No. 161 Post-Test View of Windshield Separation



No. 162 Pre-Test Left Side View of RMDB



No. 163 Post-Test Left Side View of RMDB



No. 164 Pre-Test Right Side View of RMDB



No. 165 Post-Test Right Side View of RMDB



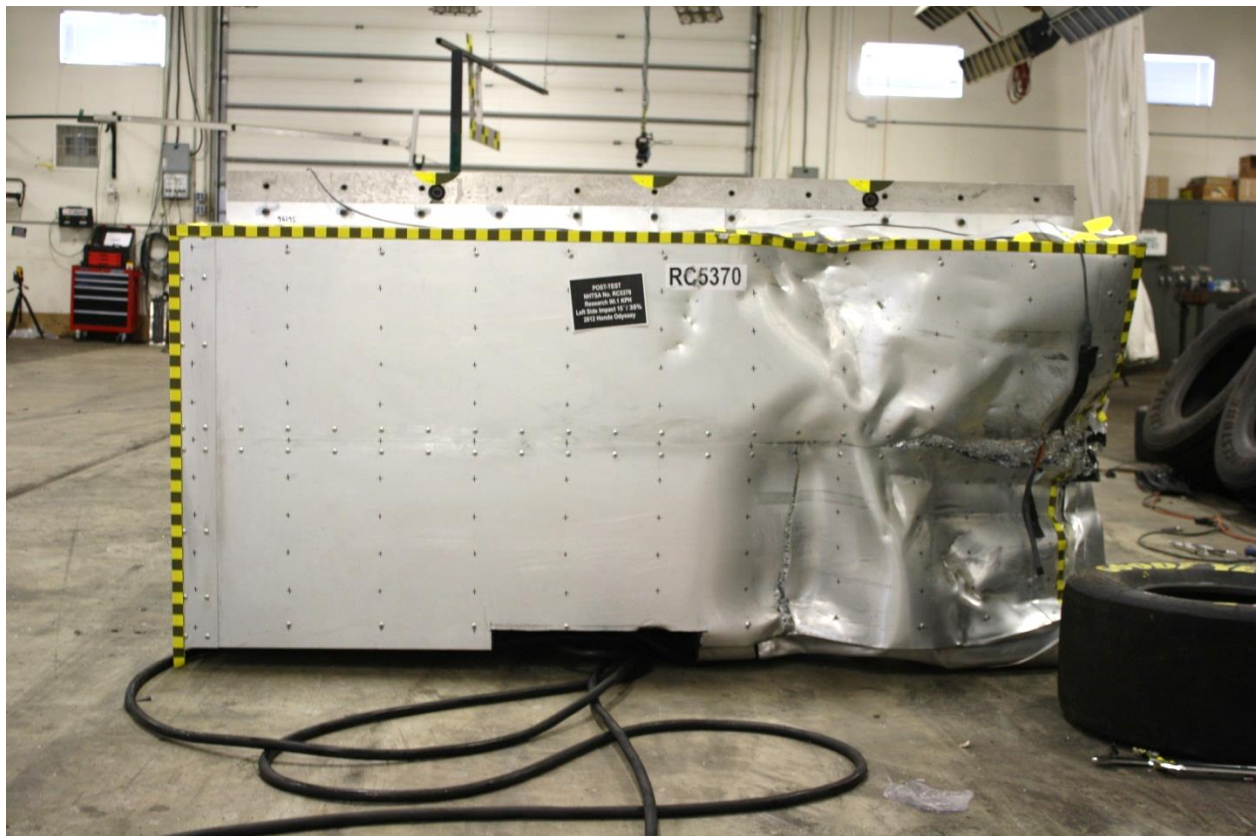
No. 166 Pre-Test Top View of RMDB



No. 167 Post-Test Top View of RMDB



No. 168 Pre-Test Front View of RMDB



No. 169 Post-Test Front View of RMDB



No. 170 Pre-Test RMDB & Vehicle, Right Side



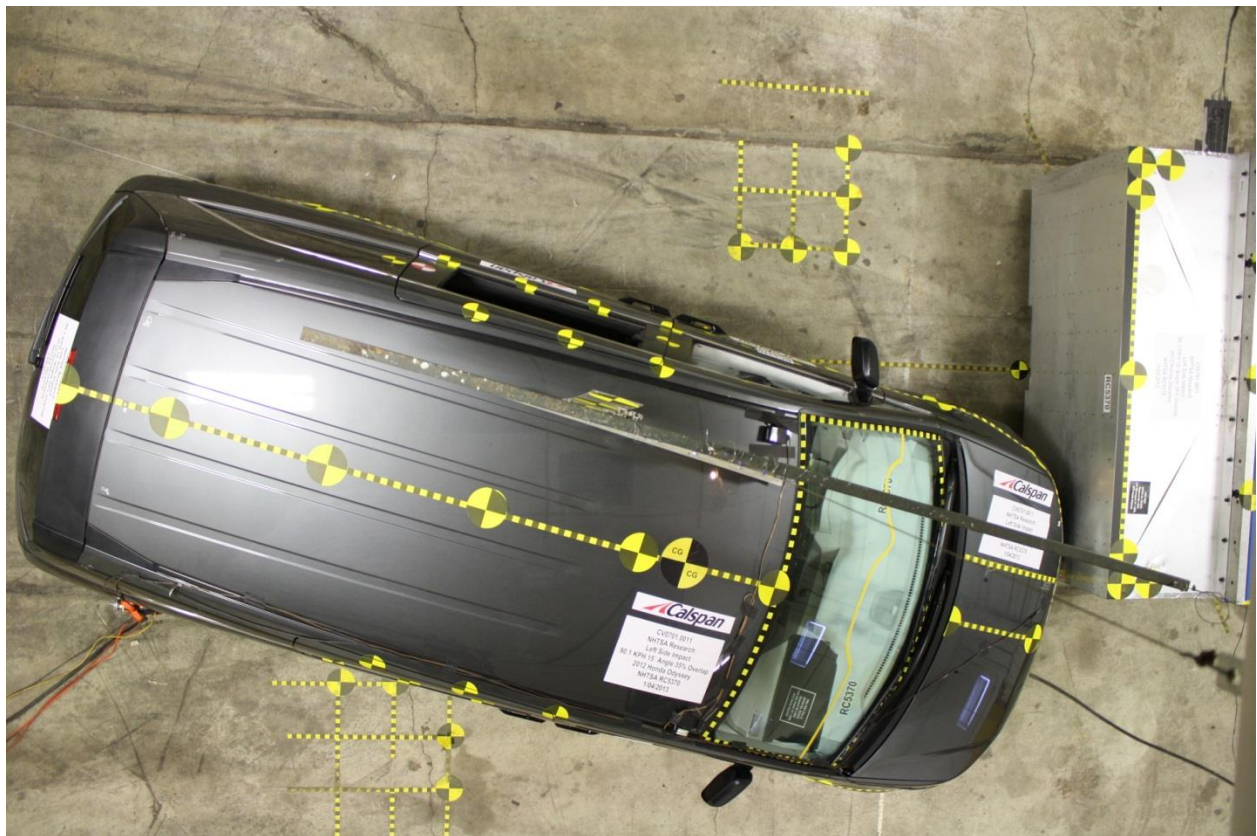
No. 171 Post-Test RMDB & Vehicle, Right Side



No. 172 Pre-Test RMDB & Vehicle, Left Side



No. 173 Post-Test RMDB & Vehicle, Left Side



No. 174 Pre-Test RMDB & Vehicle, Top View



No. 175 Post-Test RMDB & Vehicle, Top View



No. 176 Pre-Test RMDB & Vehicle, Rear View



No. 177 Post-Test RMDB & Vehicle, Rear View



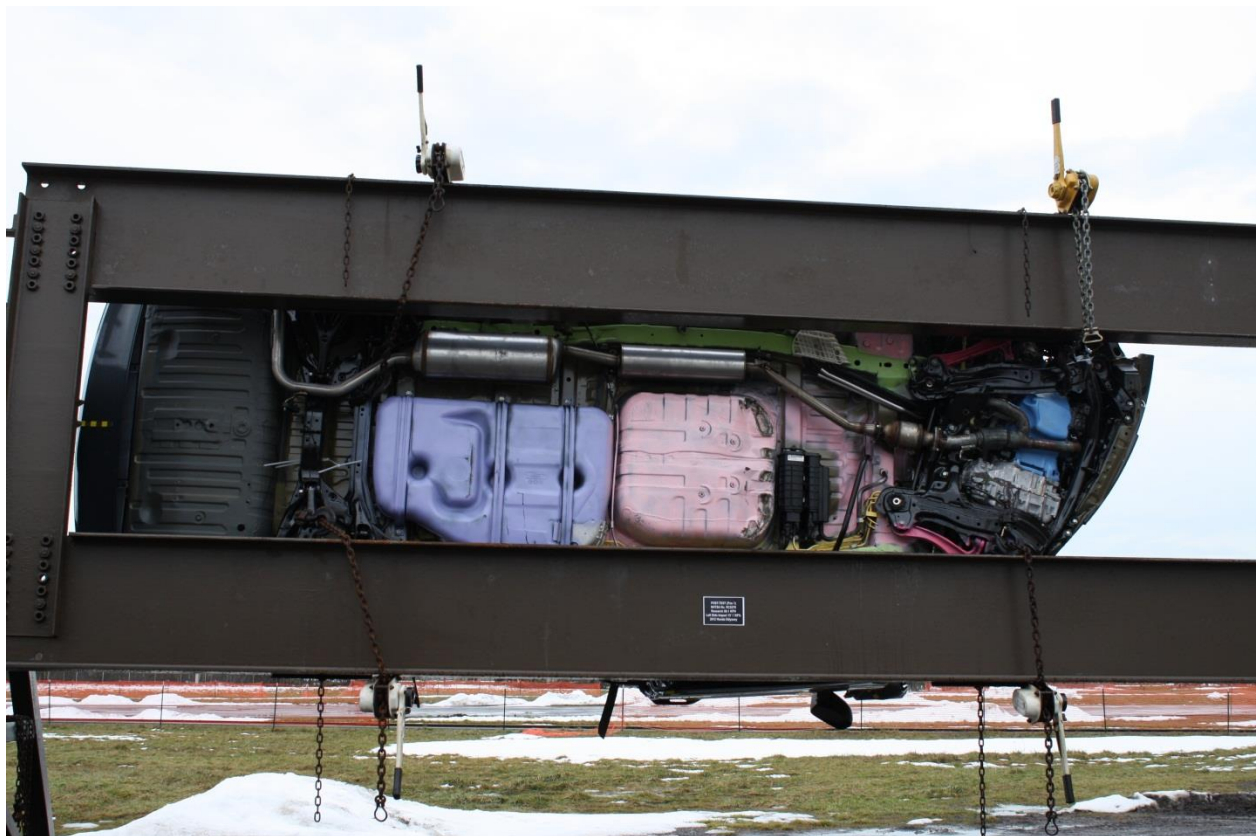
No. 178 Pre-Test RMDB & Vehicle, Front View



No. 179 Post-Test RMDB & Vehicle, Front View



No. 180 Vehicle at 0 Degrees on Static Rollover Device



No. 181 Vehicle at 90 Degrees on Static Rollover Device



No. 182 Vehicle at 180 Degrees on Static Rollover Device



No. 183 Vehicle at 270 Degrees on Static Rollover Device



No. 184 Vehicle at 360 Degrees on Static Rollover Device



No. 185 Impact Photo

APPENDIX B
VEHICLE & DUMMY RESPONSE DATA TRACES

Table of Data Plots

No.	Description	Page
Plot 1	V2P1 HEAD CG X	B-8
Plot 2	V2P1 HEAD CG Y	B-8
Plot 3	V2P1 HEAD CG Z	B-8
Plot 4	V2P1 HEAD CG WX	B-8
Plot 5	V2P1 HEAD CG WY	B-9
Plot 6	V2P1 HEAD CG WZ	B-9
Plot 7	V2P1 NECK UPPER FX	B-9
Plot 8	V2P1 NECK UPPER FY	B-9
Plot 9	V2P1 NECK UPPER FZ	B-10
Plot 10	V2P1 NECK UPPER MX	B-10
Plot 11	V2P1 NECK UPPER MY	B-10
Plot 12	V2P1 NECK UPPER MZ	B-10
Plot 13	V2P1 NECK LOWER FX	B-11
Plot 14	V2P1 NECK LOWER FY	B-11
Plot 15	V2P1 NECK LOWER FZ	B-11
Plot 16	V2P1 NECK LOWER MX	B-11
Plot 17	V2P1 NECK LOWER MY	B-12
Plot 18	V2P1 NECK LOWER MZ	B-12
Plot 19	V2P1 NECK SPRING LOAD CELL - FRONT	B-12
Plot 20	V2P1 NECK SPRING LOAD CELL - REAR	B-12
Plot 21	V2P1 OC ANGLE RY	B-13
Plot 22	V2P1 T1 ACCEL AX	B-13
Plot 23	V2P1 T1 ACCEL AY	B-13
Plot 24	V2P1 T1 ACCEL AZ	B-13
Plot 25	V2P1 T6 ACCEL AX	B-14
Plot 26	V2P1 T6 ACCEL AY	B-14
Plot 27	V2P1 T6 ACCEL AZ	B-14
Plot 28	V2P1 UL CHEST IRTRACC D	B-14
Plot 29	V2P1 UL CHEST RY	B-15
Plot 30	V2P1 UL CHEST RZ	B-15
Plot 31	V2P1 UR CHEST IRTRACC D	B-15
Plot 32	V2P1 UR CHEST RY	B-15
Plot 33	V2P1 UR CHEST RZ	B-16
Plot 34	V2P1 LL CHEST IRTRACC D	B-16
Plot 35	V2P1 LL CHEST RY	B-16
Plot 36	V2P1 LL CHEST RZ	B-16
Plot 37	V2P1 LR CHEST IRTRACC D	B-17
Plot 38	V2P1 LR CHEST RY	B-17
Plot 39	V2P1 LR CHEST RZ	B-17
Plot 40	V2P1 ABDOMEN LEFT IRTRACC D	B-17
Plot 41	V2P1 ABDOMEN LEFT RY	B-18
Plot 42	V2P1 ABDOMEN LEFT RZ	B-18
Plot 43	V2P1 ABDOMEN RIGHT IRTRACC D	B-18
Plot 44	V2P1 ABDOMEN RIGHT RY	B-18
Plot 45	V2P1 ABDOMEN RIGHT RZ	B-19
Plot 46	V2P1 SPINE LOWER FX	B-19
Plot 47	V2P1 SPINE LOWER FY	B-19
Plot 48	V2P1 SPINE LOWER FZ	B-19
Plot 49	V2P1 SPINE LOWER MX	B-20
Plot 50	V2P1 SPINE LOWER MY	B-20
Plot 51	V2P1 PELVIS CG AX	B-20
Plot 52	V2P1 PELVIS CG AY	B-20
Plot 53	V2P1 PELVIS CG AZ	B-21
Plot 54	V2P1 PELVIS ACETABULUM LEFT FX	B-21
Plot 55	V2P1 PELVIS ACETABULUM LEFT FY	B-21
Plot 56	V2P1 PELVIS ACETABULUM LEFT FZ	B-21

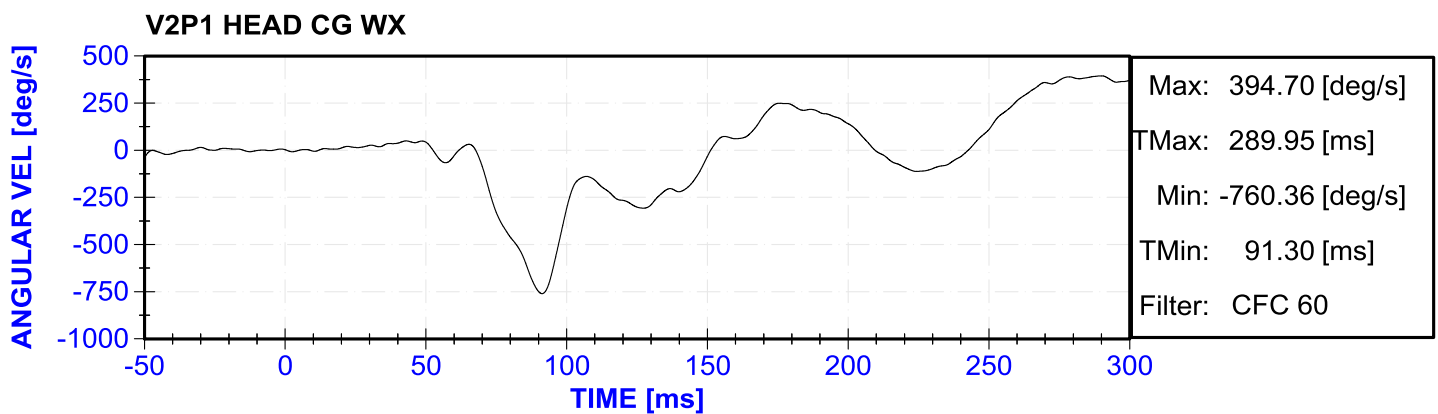
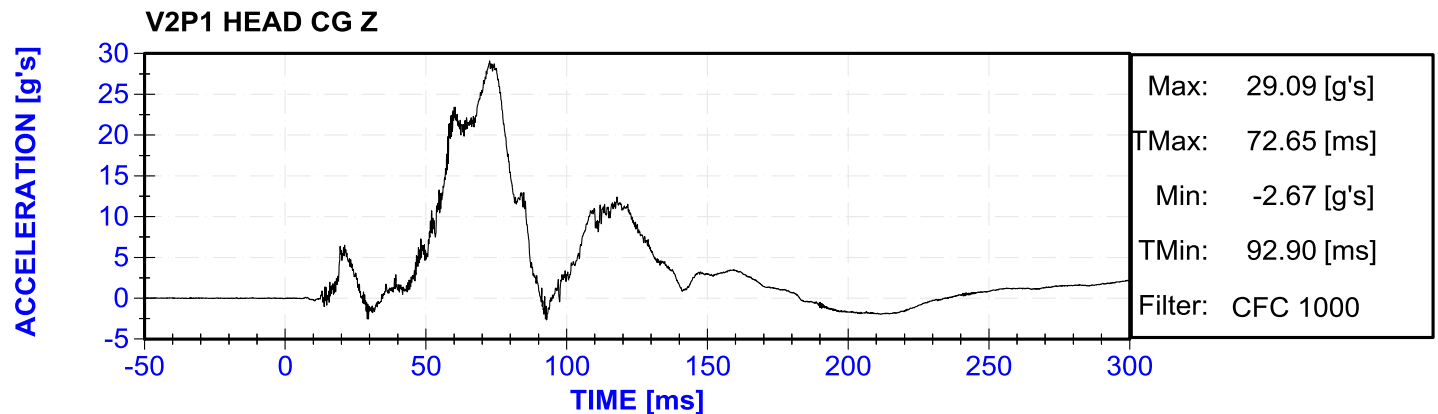
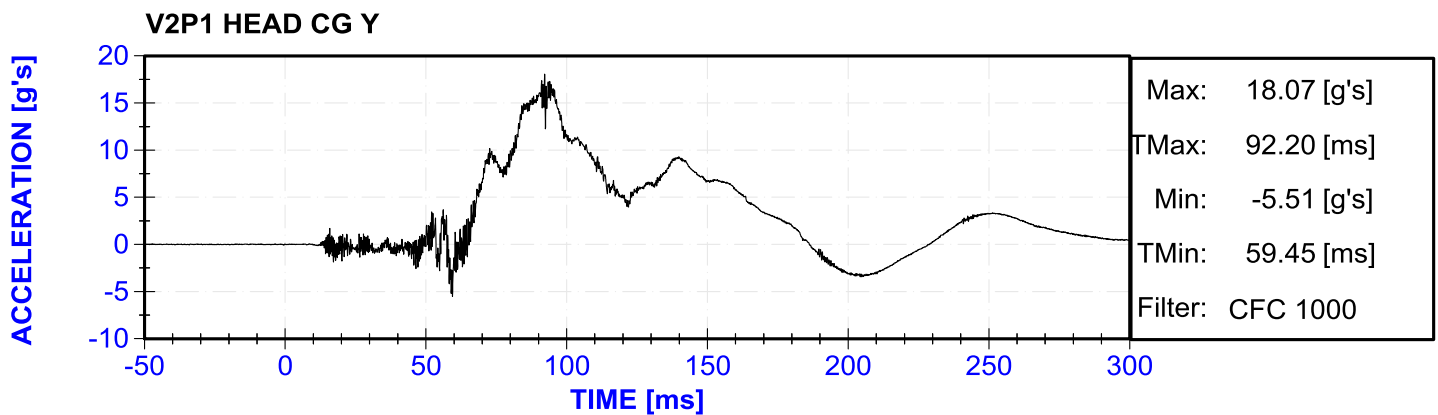
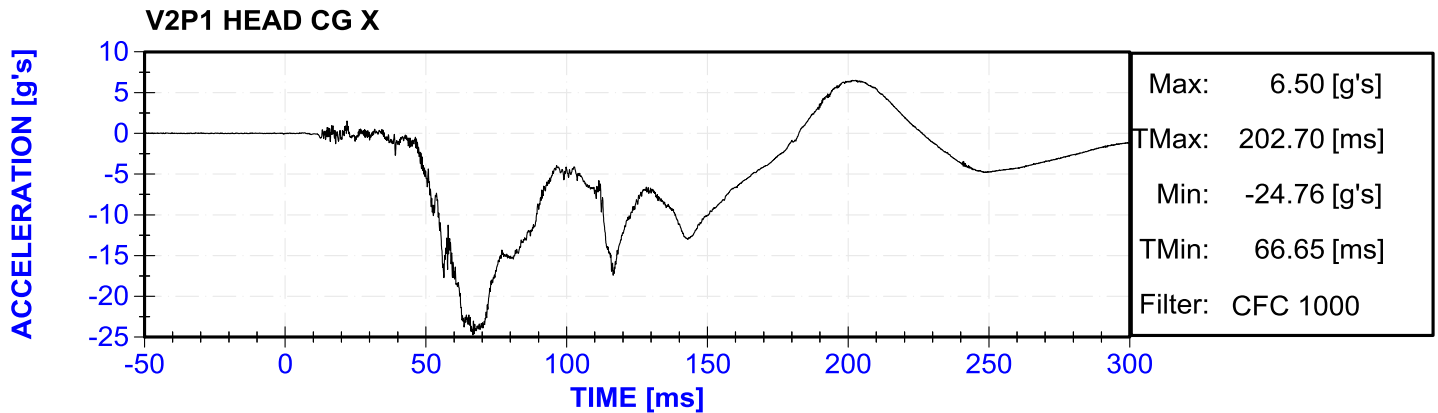
Plot 57	V2P1 PELVIS ACETABULUM RIGHT FX	B-22
Plot 58	V2P1 PELVIS ACETABULUM RIGHT FY	B-22
Plot 59	V2P1 PELVIS ACETABULUM RIGHT FZ	B-22
Plot 60	V2P1 LEFT ASIS FX	B-22
Plot 61	V2P1 RIGHT ASIS FX	B-23
Plot 62	V2P1 LEFT FEMUR FX	B-23
Plot 63	V2P1 LEFT FEMUR FY	B-23
Plot 64	V2P1 LEFT FEMUR FZ	B-23
Plot 65	V2P1 LEFT FEMUR MX	B-24
Plot 66	V2P1 LEFT FEMUR MY	B-24
Plot 67	V2P1 LEFT FEMUR MZ	B-24
Plot 68	V2P1 RIGHT FEMUR FX	B-24
Plot 69	V2P1 RIGHT FEMUR FY	B-25
Plot 70	V2P1 RIGHT FEMUR FZ	B-25
Plot 71	V2P1 RIGHT FEMUR MX	B-25
Plot 72	V2P1 RIGHT FEMUR MY	B-25
Plot 73	V2P1 RIGHT FEMUR MZ	B-26
Plot 74	V2P1 KNEE LEFT DX	B-26
Plot 75	V2P1 TIBIA LEFT UPPER FZ	B-26
Plot 76	V2P1 TIBIA LEFT UPPER MX	B-26
Plot 77	V2P1 TIBIA LEFT UPPER MY	B-27
Plot 78	V2P1 TIBIA LEFT LOWER FZ	B-27
Plot 79	V2P1 TIBIA LEFT LOWER MX	B-27
Plot 80	V2P1 TIBIA LEFT LOWER MY	B-27
Plot 81	V2P1 ANKLE LEFT POT RX	B-28
Plot 82	V2P1 ANKLE LEFT POT RY	B-28
Plot 83	V2P1 FOOT LEFT AZ	B-28
Plot 84	V2P1 KNEE RIGHT DX	B-28
Plot 85	V2P1 TIBIA RIGHT UPPER FZ	B-29
Plot 86	V2P1 TIBIA RIGHT UPPER MX	B-29
Plot 87	V2P1 TIBIA RIGHT UPPER MY	B-29
Plot 88	V2P1 TIBIA RIGHT LOWER FZ	B-29
Plot 89	V2P1 TIBIA RIGHT LOWER MX	B-30
Plot 90	V2P1 TIBIA RIGHT LOWER MY	B-30
Plot 91	V2P1 ANKLE RIGHT POT RX	B-30
Plot 92	V2P1 ANKLE RIGHT POT RY	B-30
Plot 93	V2P1 FOOT RIGHT AZ	B-31
Plot 94	V2 P1 DRIVER LAP BELT	B-31
Plot 95	V2 P1 DRIVER SHOULDER BELT	B-31
Plot 96	V2P2 HEAD CG X	B-31
Plot 97	V2P2 HEAD CG Y	B-32
Plot 98	V2P2 HEAD CG Z	B-32
Plot 99	V2P2 HEAD CG WX	B-32
Plot 100	V2P2 HEAD CG WY	B-32
Plot 101	V2P2 HEAD CG WZ	B-33
Plot 102	V2P2 NECK UPPER FX	B-33
Plot 103	V2P2 NECK UPPER FY	B-33
Plot 104	V2P2 NECK UPPER FZ	B-33
Plot 105	V2P2 NECK UPPER MX	B-34
Plot 106	V2P2 NECK UPPER MY	B-34
Plot 107	V2P2 NECK UPPER MZ	B-34
Plot 108	V2P2 NECK LOWER FX	B-34
Plot 109	V2P2 NECK LOWER FY	B-35
Plot 110	V2P2 NECK LOWER FZ	B-35
Plot 111	V2P2 NECK LOWER MX	B-35
Plot 112	V2P2 NECK LOWER MY	B-35
Plot 113	V2P2 NECK LOWER MZ	B-36
Plot 114	V2P2 NECK SPRING LOAD CELL - FRONT	B-36

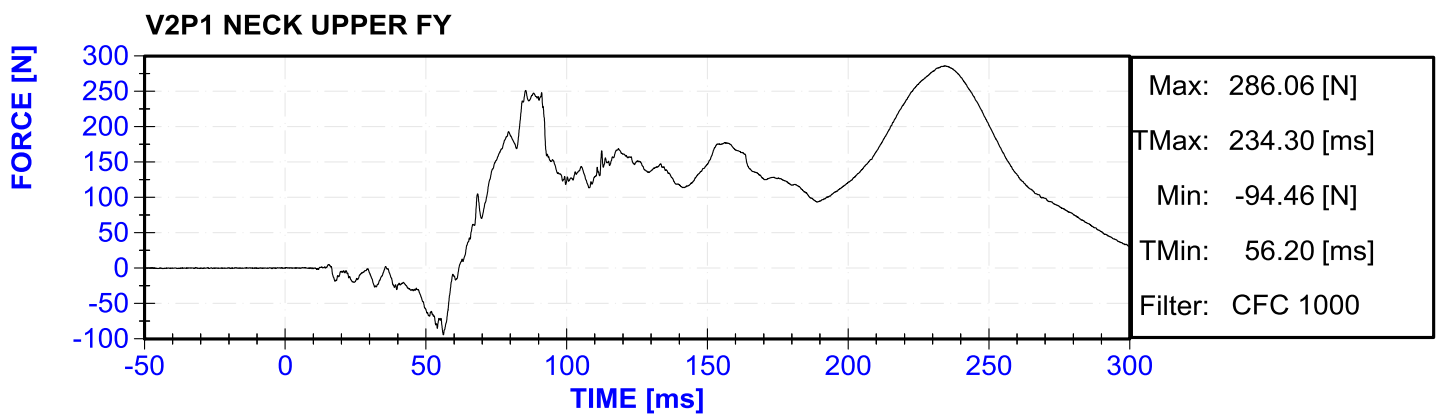
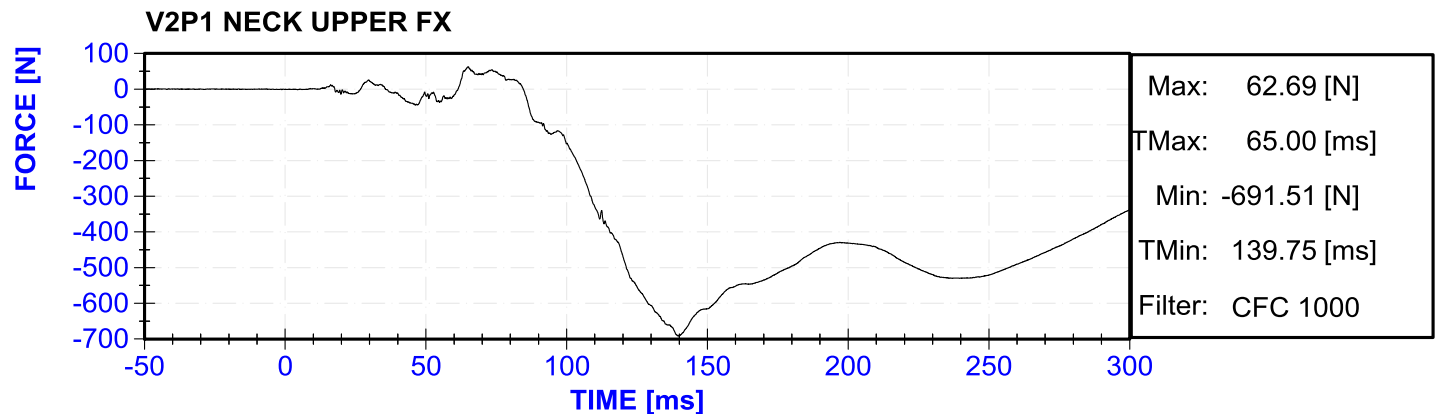
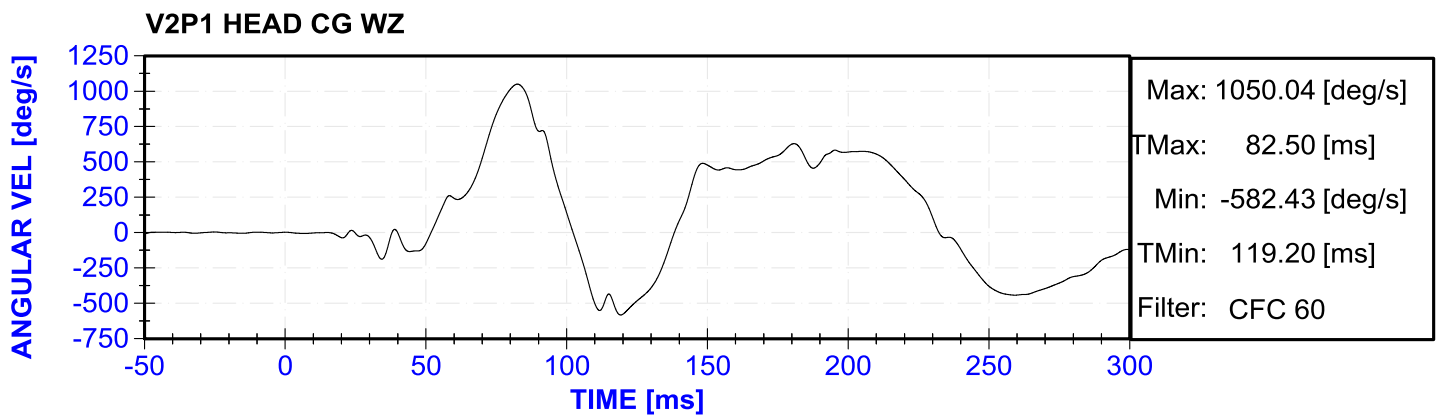
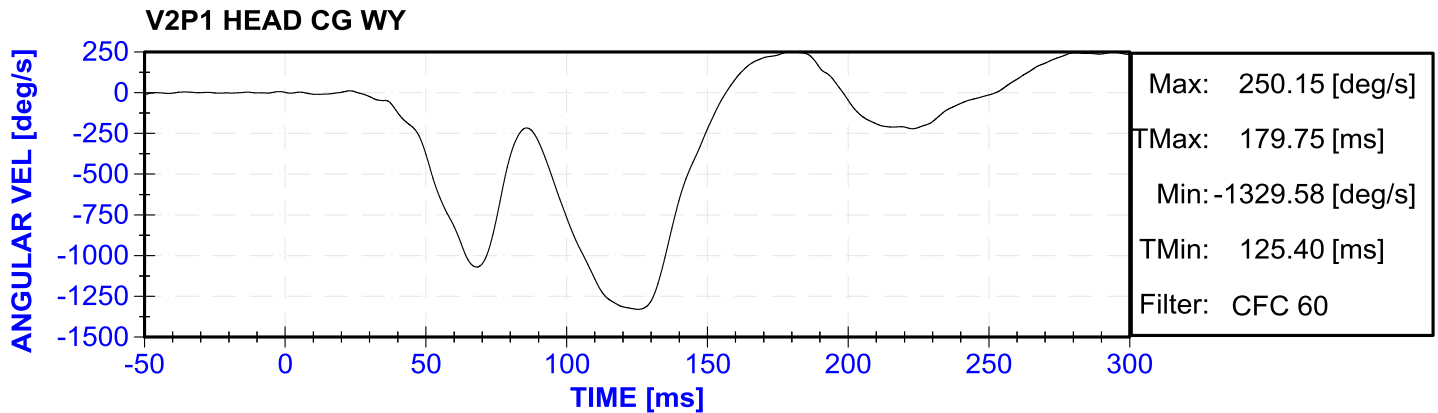
Plot 115	V2P2 NECK SPRING LOAD CELL - REAR	B-36
Plot 116	V2P2 OC ANGLE RY	B-36
Plot 117	V2P2 T1 ACCEL AX	B-37
Plot 118	V2P2 T1 ACCEL AY	B-37
Plot 119	V2P2 T1 ACCEL AZ	B-37
Plot 120	V2P2 T6 ACCEL AX	B-37
Plot 121	V2P2 T6 ACCEL AY	B-38
Plot 122	V2P2 T6 ACCEL AZ	B-38
Plot 123	V2P2 UL CHEST IRTACC D	B-38
Plot 124	V2P2 UL CHEST RY	B-38
Plot 125	V2P2 UL CHEST RZ	B-39
Plot 126	V2P2 UR CHEST IRTACC D	B-39
Plot 127	V2P2 UR CHEST RY	B-39
Plot 128	V2P2 UR CHEST RZ	B-39
Plot 129	V2P2 LL CHEST IRTACC D	B-40
Plot 130	V2P2 LL CHEST RY	B-40
Plot 131	V2P2 LL CHEST RZ	B-40
Plot 132	V2P2 LR CHEST IRTACC D	B-40
Plot 133	V2P2 LR CHEST RY	B-41
Plot 134	V2P2 LR CHEST RZ	B-41
Plot 135	V2P2 ABDOMEN LEFT IRTACC D	B-41
Plot 136	V2P2 ABDOMEN LEFT RY	B-41
Plot 137	V2P2 ABDOMEN LEFT RZ	B-42
Plot 138	V2P2 ABDOMEN RIGHT IRTACC D	B-42
Plot 139	V2P2 ABDOMEN RIGHT RY	B-42
Plot 140	V2P2 ABDOMEN RIGHT RZ	B-42
Plot 141	V2P2 SPINE LOWER FX	B-43
Plot 142	V2P2 SPINE LOWER FY	B-43
Plot 143	V2P2 SPINE LOWER FZ	B-43
Plot 144	V2P2 SPINE LOWER MX	B-43
Plot 145	V2P2 SPINE LOWER MY	B-44
Plot 146	V2P2 PELVIS CG AX	B-44
Plot 147	V2P2 PELVIS CG AY	B-44
Plot 148	V2P2 PELVIS CG AZ	B-44
Plot 149	V2P2 PELVIS ACETABULUM LEFT FX	B-45
Plot 150	V2P2 PELVIS ACETABULUM LEFT FY	B-45
Plot 151	V2P2 PELVIS ACETABULUM LEFT FZ	B-45
Plot 152	V2P2 PELVIS ACETABULUM RIGHT FX	B-45
Plot 153	V2P2 PELVIS ACETABULUM RIGHT FY	B-46
Plot 154	V2P2 PELVIS ACETABULUM RIGHT FZ	B-46
Plot 155	V2P2 LEFT ASIS FX	B-46
Plot 156	V2P2 RIGHT ASIS FX	B-46
Plot 157	V2P2 LEFT FEMUR FX	B-47
Plot 158	V2P2 LEFT FEMUR FY	B-47
Plot 159	V2P2 LEFT FEMUR FZ	B-47
Plot 160	V2P2 LEFT FEMUR MX	B-47
Plot 161	V2P2 LEFT FEMUR MY	B-48
Plot 162	V2P2 LEFT FEMUR MZ	B-48
Plot 163	V2P2 RIGHT FEMUR FX	B-48
Plot 164	V2P2 RIGHT FEMUR FY	B-48
Plot 165	V2P2 RIGHT FEMUR FZ	B-49
Plot 166	V2P2 RIGHT FEMUR MX	B-49
Plot 167	V2P2 RIGHT FEMUR MY	B-49
Plot 168	V2P2 RIGHT FEMUR MZ	B-49
Plot 169	V2P2 KNEE LEFT DX	B-50
Plot 170	V2P2 TIBIA LEFT UPPER FZ	B-50
Plot 171	V2P2 TIBIA LEFT UPPER MX	B-50
Plot 172	V2P2 TIBIA LEFT UPPER MY	B-50

Plot 173	V2P2 TIBIA LEFT LOWER FZ	B-51
Plot 174	V2P2 TIBIA LEFT LOWER MX	B-51
Plot 175	V2P2 TIBIA LEFT LOWER MY	B-51
Plot 176	V2P2 ANKLE LEFT POT RX [W/ OFFSET]	B-51
Plot 177	V2P2 ANKLE LEFT POT RY [W/ OFFSET]	B-52
Plot 178	V2P2 FOOT LEFT AZ	B-52
Plot 179	V2P2 KNEE RIGHT DX	B-52
Plot 180	V2P2 TIBIA RIGHT UPPER FZ	B-52
Plot 181	V2P2 TIBIA RIGHT UPPER MX	B-53
Plot 182	V2P2 TIBIA RIGHT UPPER MY	B-53
Plot 183	V2P2 TIBIA RIGHT LOWER FZ	B-53
Plot 184	V2P2 TIBIA RIGHT LOWER MX	B-53
Plot 185	V2P2 TIBIA RIGHT LOWER MY	B-54
Plot 186	V2P2 ANKLE RIGHT POT RX [W/ OFFSET]	B-54
Plot 187	V2P2 ANKLE RIGHT POT RY [W/ OFFSET]	B-54
Plot 188	V2P2 FOOT RIGHT AZ	B-54
Plot 189	V2 P2 PASSENGER LAP BELT	B-55
Plot 190	V2 P2 PASSENGER SHOULDER BELT	B-55
Plot 191	V2 LEFT REAR SILL X	B-55
Plot 192	V2 LEFT REAR SILL Y	B-55
Plot 193	V2 LEFT REAR SILL RX	B-56
Plot 194	V2 LEFT REAR SILL RY	B-56
Plot 195	V2 RIGHT REAR SILL X	B-56
Plot 196	V2 RIGHT REAR SILL Y	B-56
Plot 197	V2 VEHICLE CG X	B-57
Plot 198	V2 VEHICLE CG Y	B-57
Plot 199	V2 VEHICLE CG Z	B-57
Plot 200	V2 VEHICLE CG RX	B-57
Plot 201	V2 VEHICLE CG RY	B-58
Plot 202	V2 VEHICLE CG RZ	B-58
Plot 203	V2 INSTRUMENT PANEL X	B-58
Plot 204	V2 DRIVER SEAT TRACK X	B-58
Plot 205	V2 DRIVER SEAT TRACK Y	B-59
Plot 206	V2 DRIVER SEAT TRACK Z	B-59
Plot 207	V2 PASSENGER SEAT TRACK X	B-59
Plot 208	V2 PASSENGER SEAT TRACK Y	B-59
Plot 209	V2 PASSENGER SEAT TRACK Z	B-60
Plot 210	V2 DRIVER FLOOR PAN X	B-60
Plot 211	V2 DRIVER FLOOR PAN Y	B-60
Plot 212	V2 DRIVER FLOOR PAN Z	B-60
Plot 213	V2 DRIVER FLOOR PAN STRING POT	B-61
Plot 214	V2 DRIVER SW AIRBAG STAGE 1	B-61
Plot 215	V2 DRIVER SW AIRBAG STAGE 2	B-61
Plot 216	V2 DRIVER HEAD CURTAIN STAGE 1	B-61
Plot 217	V2 DRIVER HEAD CURTAIN STAGE 2	B-62
Plot 218	V2 DRIVER SEAT HEAD/TORSO/PELVIS	B-62
Plot 219	V2 DRIVER KNEE	B-62
Plot 220	V2 DRIVER TORSO BELT PRETENTIONER	B-62
Plot 221	V2 PASSENGER FRT AIRBAG STAGE 1	B-63
Plot 222	V2 PASSENGER FRT AIRBAG STAGE 2	B-63
Plot 223	V2 PASSENGER HEAD CURTAIN	B-63
Plot 224	V2 PASSENGER HEAD/TORSO/PELVIS	B-63
Plot 225	V2 PASSENGER TORSO BELT PRETENTIONER	B-64
Plot 226	V1 CG AX	B-64
Plot 227	V1 CG AY	B-64
Plot 228	V1 CG AZ	B-64
Plot 229	V1 REAR C/L AX	B-65
Plot 230	V1 REAR C/L AY	B-65

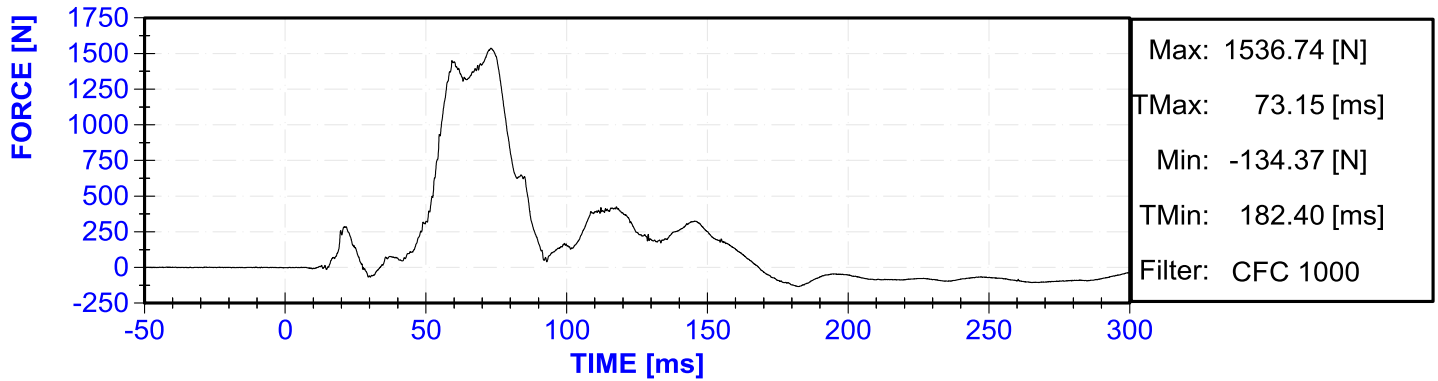
Plot 231	V1 REAR C/L AZ	B-65
Plot 232	V2P1 NECK OCCIPITAL CONDYLE FORCE X [THORTEST]	B-65
Plot 233	V2P1 NECK OCCIPITAL CONDYLE FORCE Z [THORTEST]	B-66
Plot 234	V2P1 NECK OCCIPITAL CONDYLE MY [THORTEST]	B-66
Plot 235	V2P1 NECK UPPER FORCE X [THORTEST]	B-66
Plot 236	V2P1 NECK UPPER FORCE Y [THORTEST]	B-66
Plot 237	V2P1 NECK UPPER FORCE Z [THORTEST]	B-67
Plot 238	V2P1 NECK UPPER MOMENT X [THORTEST]	B-67
Plot 239	V2P1 NECK UPPER MOMENT Y [THORTEST]	B-67
Plot 240	V2P1 NECK UPPER MOMENT Z [THORTEST]	B-67
Plot 241	V2P1 CHEST UPPER LEFT X [CFC_180]	B-68
Plot 242	V2P1 CHEST UPPER LEFT Y [CFC_180]	B-68
Plot 243	V2P1 CHEST UPPER LEFT Z [CFC_180]	B-68
Plot 244	V2P1 CHEST UPPER LEFT D [CFC_180]	B-68
Plot 245	V2P1 CHEST UPPER RIGHT X [CFC_180]	B-69
Plot 246	V2P1 CHEST UPPER RIGHT Y [CFC_180]	B-69
Plot 247	V2P1 CHEST UPPER RIGHT Z [CFC_180]	B-69
Plot 248	V2P1 CHEST UPPER RIGHT D [CFC_180]	B-69
Plot 249	V2P1 CHEST LOWER LEFT X [CFC_180]	B-70
Plot 250	V2P1 CHEST LOWER LEFT Y [CFC_180]	B-70
Plot 251	V2P1 CHEST LOWER LEFT Z [CFC_180]	B-70
Plot 252	V2P1 CHEST LOWER LEFT D [CFC_180]	B-70
Plot 253	V2P1 CHEST LOWER RIGHT X [CFC_180]	B-71
Plot 254	V2P1 CHEST LOWER RIGHT Y [CFC_180]	B-71
Plot 255	V2P1 CHEST LOWER RIGHT Z [CFC_180]	B-71
Plot 256	V2P1 CHEST LOWER RIGHT D [CFC_180]	B-71
Plot 257	V2P1 ABDOMEN LEFT LOWER X [CFC_180]	B-72
Plot 258	V2P1 ABDOMEN LEFT LOWER Y [CFC_180]	B-72
Plot 259	V2P1 ABDOMEN LEFT LOWER Z [CFC_180]	B-72
Plot 260	V2P1 ABDOMEN LEFT LOWER D [CFC_180]	B-72
Plot 261	V2P1 ABDOMEN RIGHT LOWER X [CFC_180]	B-73
Plot 262	V2P1 ABDOMEN RIGHT LOWER Y [CFC_180]	B-73
Plot 263	V2P1 ABDOMEN RIGHT LOWER Z [CFC_180]	B-73
Plot 264	V2P1 ABDOMEN RIGHT LOWER D [CFC_180]	B-73
Plot 265	V2P2 NECK OCCIPITAL CONDYLE FORCE X [THORTEST]	B-74
Plot 266	V2P2 NECK OCCIPITAL CONDYLE FORCE Z [THORTEST]	B-74
Plot 267	V2P2 NECK OCCIPITAL CONDYLE MY [THORTEST]	B-74
Plot 268	V2P2 NECK UPPER FORCE X [THORTEST]	B-74
Plot 269	V2P2 NECK UPPER FORCE Y [THORTEST]	B-75
Plot 270	V2P2 NECK UPPER FORCE Z [THORTEST]	B-75
Plot 271	V2P2 NECK UPPER MOMENT X [THORTEST]	B-75
Plot 272	V2P2 NECK UPPER MOMENT Y [THORTEST]	B-75
Plot 273	V2P2 NECK UPPER MOMENT Z [THORTEST]	B-76
Plot 274	V2P2 CHEST UPPER LEFT X [CFC_180]	B-76
Plot 275	V2P2 CHEST UPPER LEFT Y [CFC_180]	B-76
Plot 276	V2P2 CHEST UPPER LEFT Z [CFC_180]	B-76
Plot 277	V2P2 CHEST UPPER LEFT D [CFC_180]	B-77
Plot 278	V2P2 CHEST UPPER RIGHT X [CFC_180]	B-77
Plot 279	V2P2 CHEST UPPER RIGHT Y [CFC_180]	B-77
Plot 280	V2P2 CHEST UPPER RIGHT Z [CFC_180]	B-77
Plot 281	V2P2 CHEST UPPER RIGHT D [CFC_180]	B-78
Plot 282	V2P2 CHEST LOWER LEFT X [CFC_180]	B-78
Plot 283	V2P2 CHEST LOWER LEFT Y [CFC_180]	B-78
Plot 284	V2P2 CHEST LOWER LEFT Z [CFC_180]	B-78
Plot 285	V2P2 CHEST LOWER LEFT D [CFC_180]	B-79
Plot 286	V2P2 CHEST LOWER RIGHT X [CFC_180]	B-79
Plot 287	V2P2 CHEST LOWER RIGHT Y [CFC_180]	B-79
Plot 288	V2P2 CHEST LOWER RIGHT Z [CFC_180]	B-79

Plot 289	V2P2 CHEST LOWER RIGHT D [CFC_180]	B-80
Plot 290	V2P2 ABDOMEN LEFT LOWER X [CFC_180]	B-80
Plot 291	V2P2 ABDOMEN LEFT LOWER Y [CFC_180]	B-80
Plot 292	V2P2 ABDOMEN LEFT LOWER Z [CFC_180]	B-80
Plot 293	V2P2 ABDOMEN LEFT LOWER D [CFC_180]	B-81
Plot 294	V2P2 ABDOMEN RIGHT LOWER X [CFC_180]	B-81
Plot 295	V2P2 ABDOMEN RIGHT LOWER Y [CFC_180]	B-81
Plot 296	V2P2 ABDOMEN RIGHT LOWER Z [CFC_180]	B-81
Plot 297	V2P2 ABDOMEN RIGHT LOWER D [CFC_180]	B-82

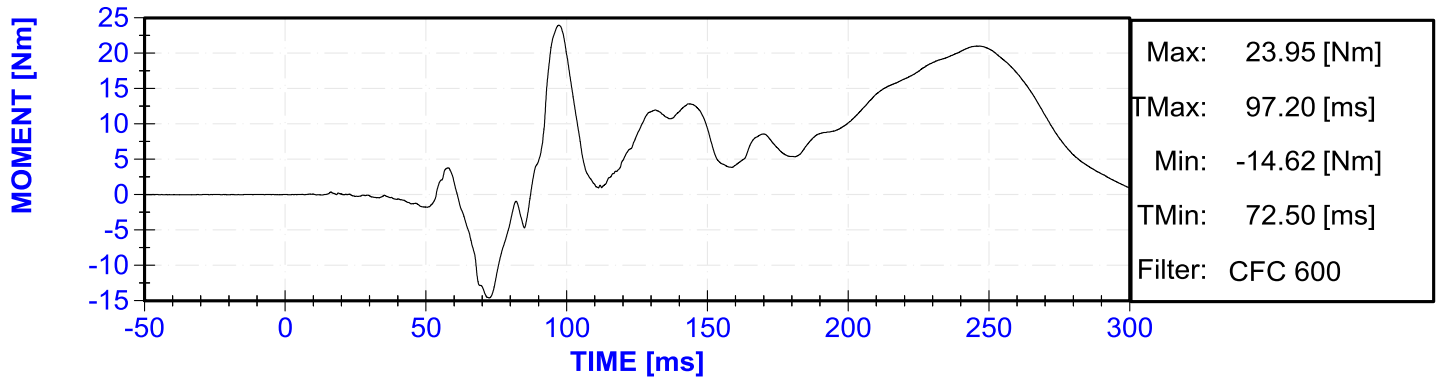




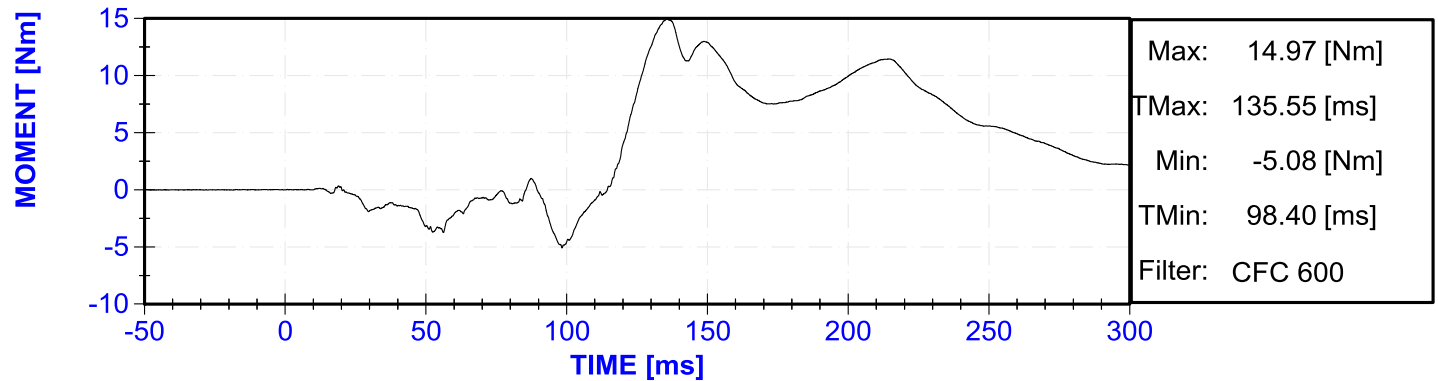
V2P1 NECK UPPER FZ



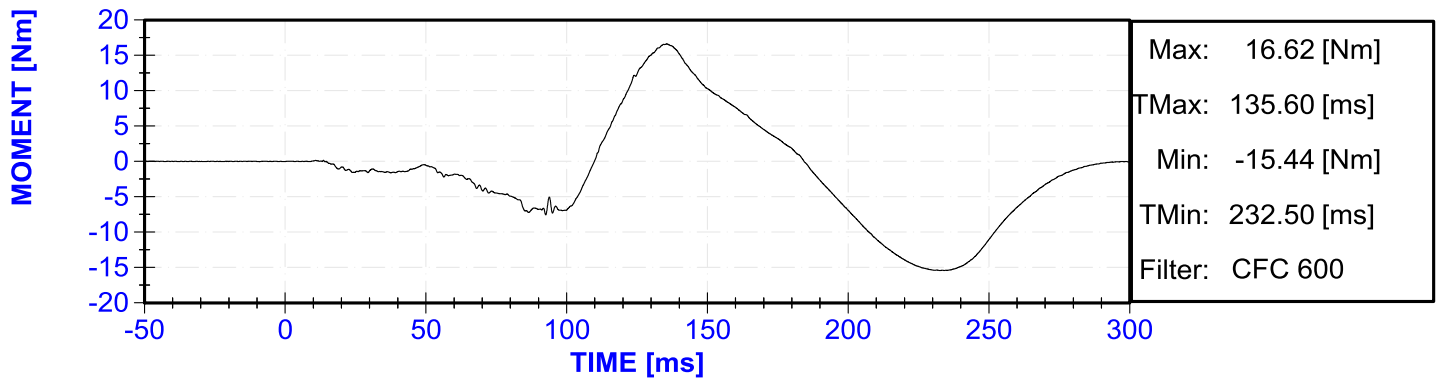
V2P1 NECK UPPER MX

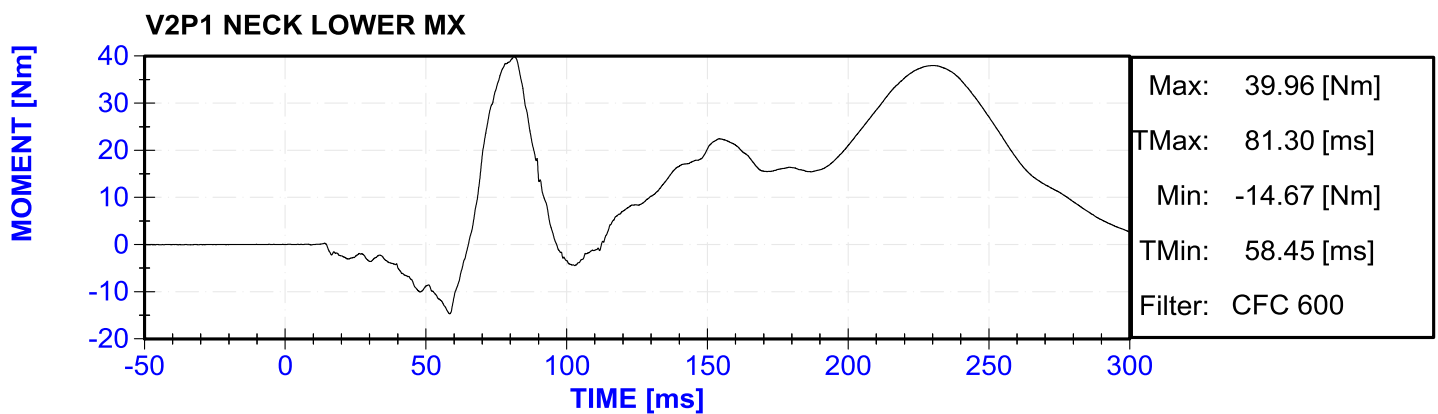
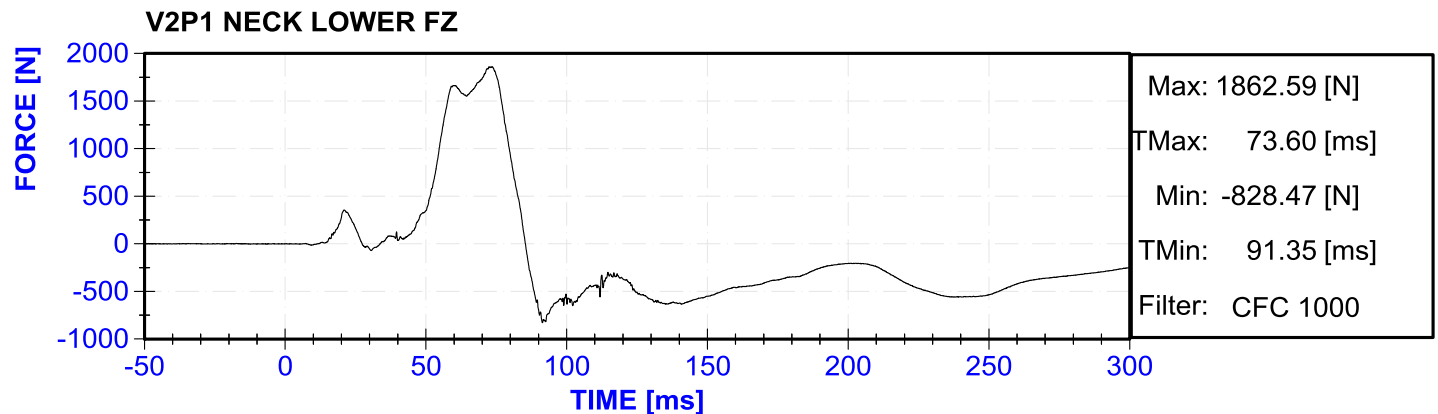
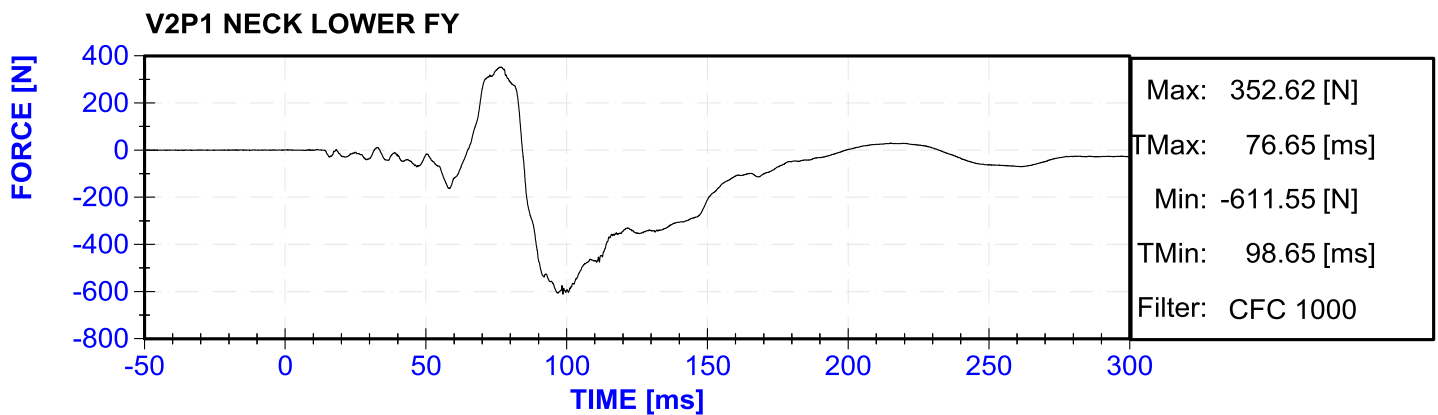
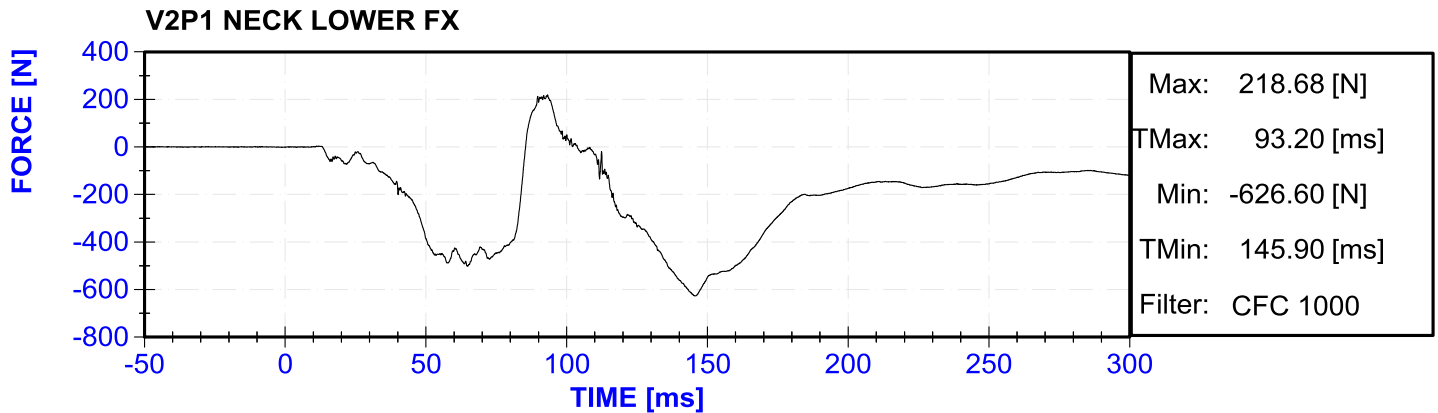


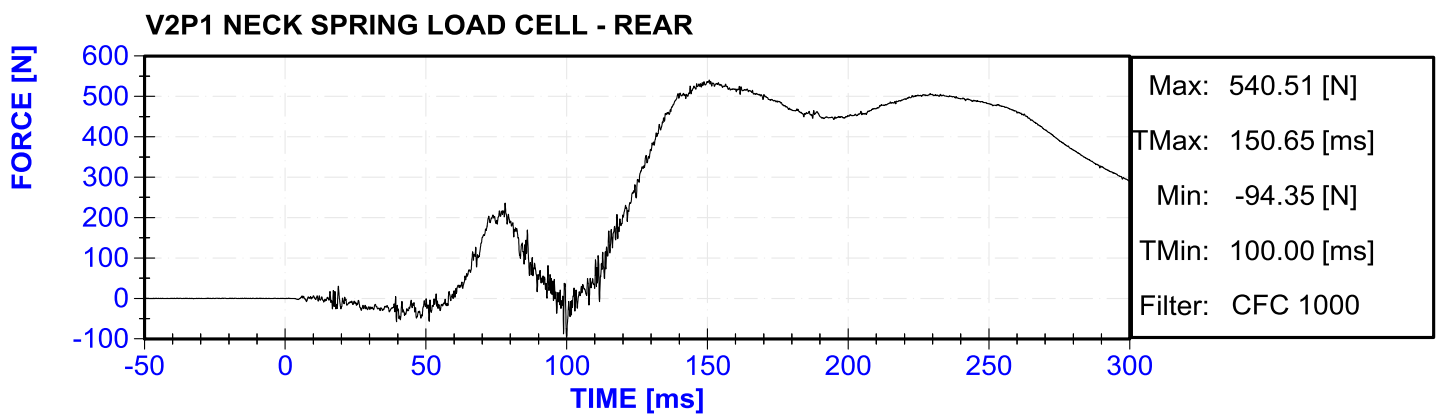
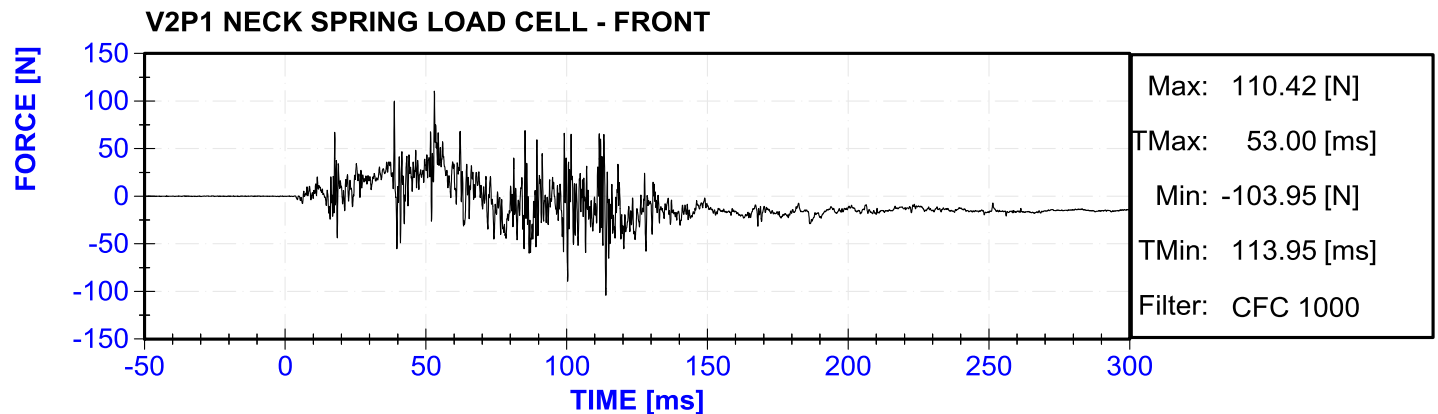
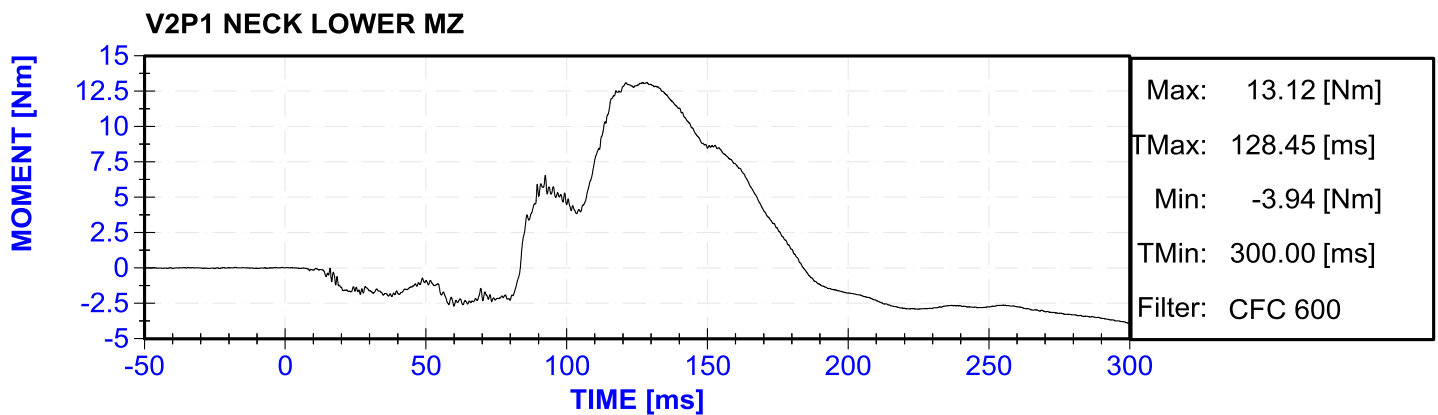
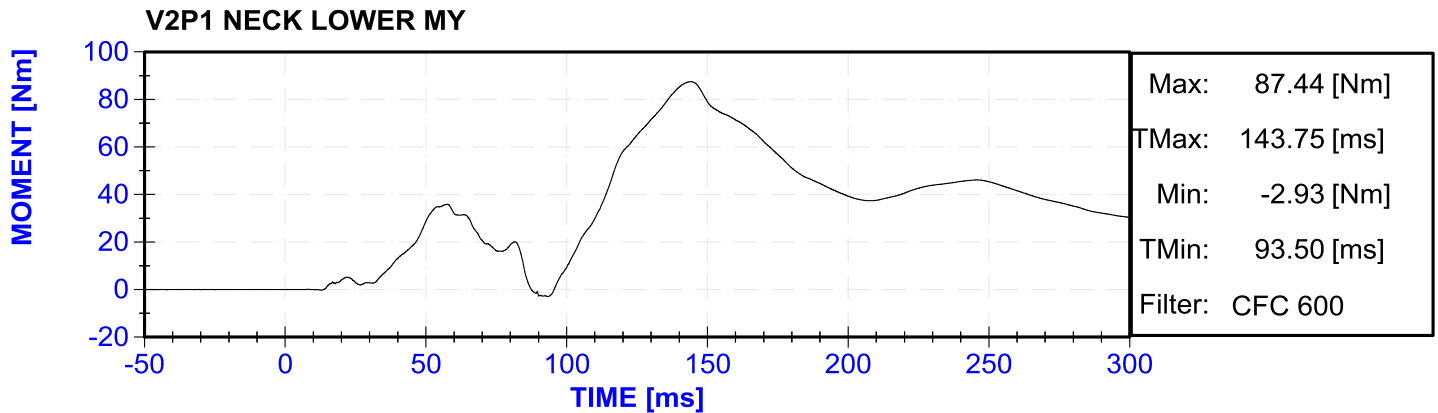
V2P1 NECK UPPER MY

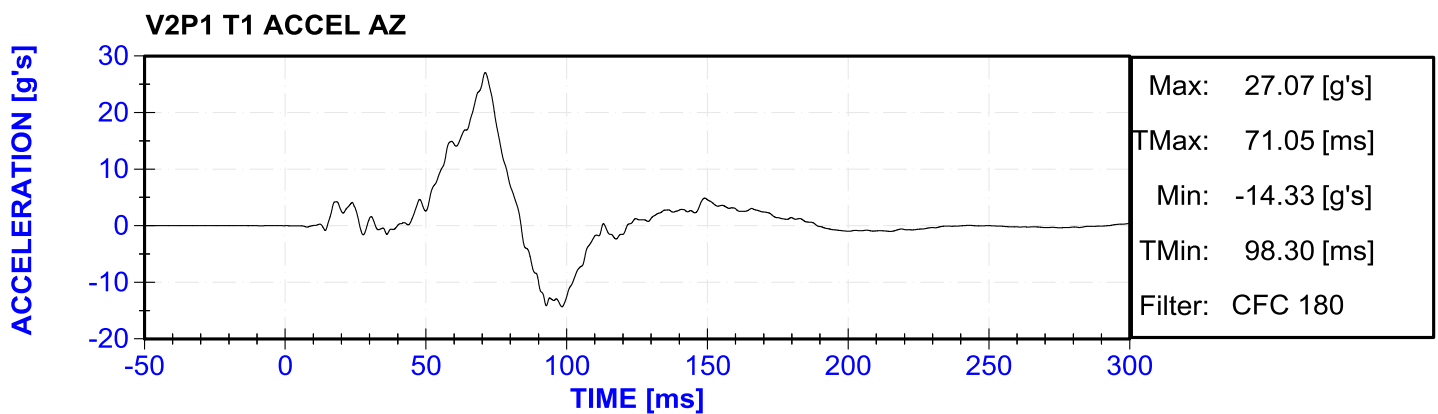
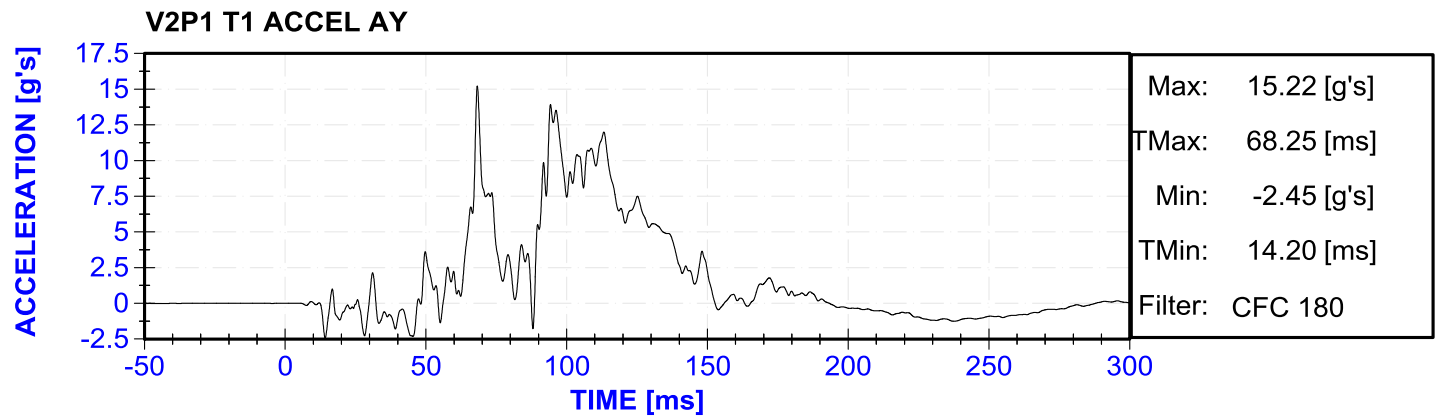
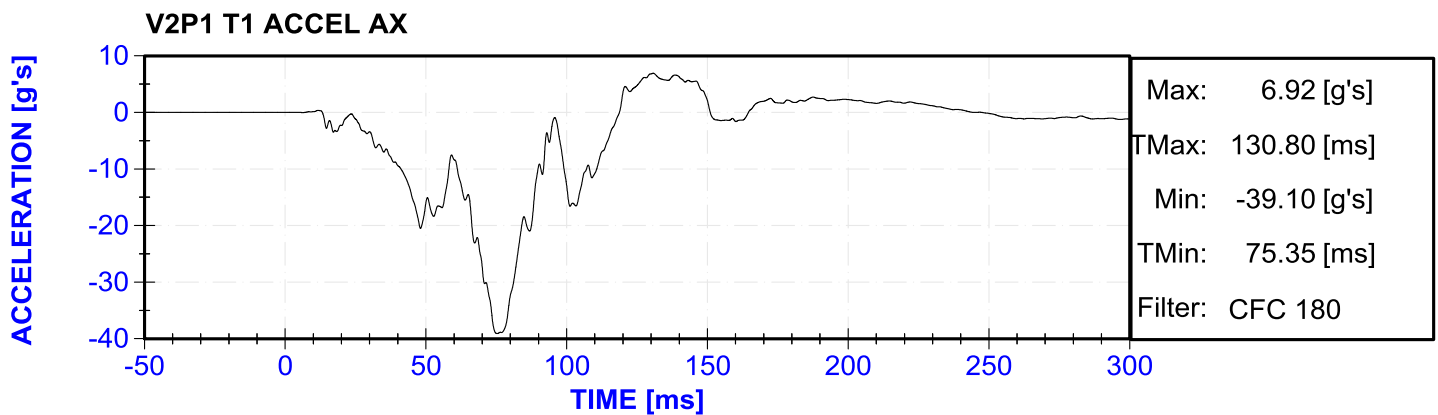
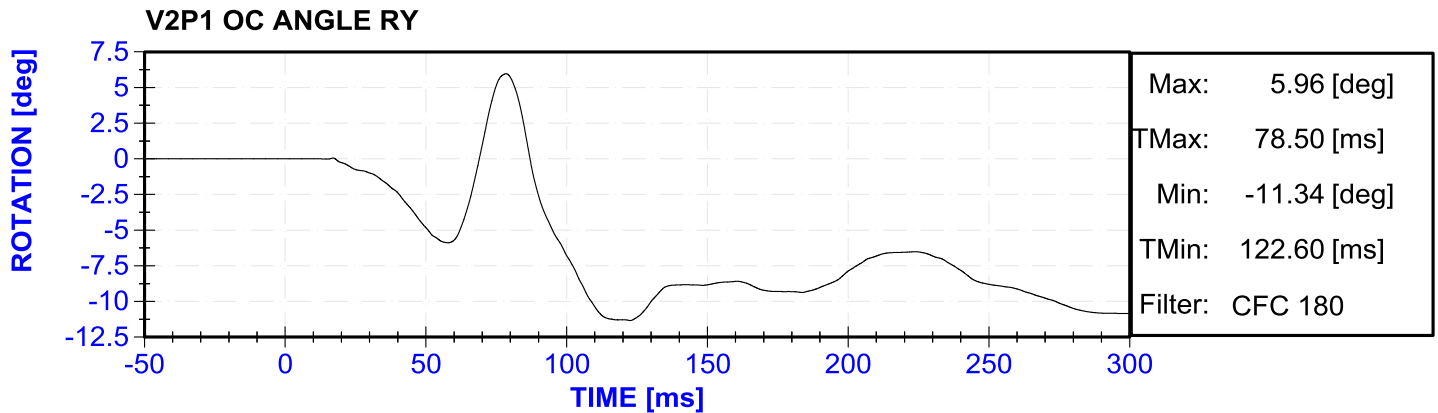


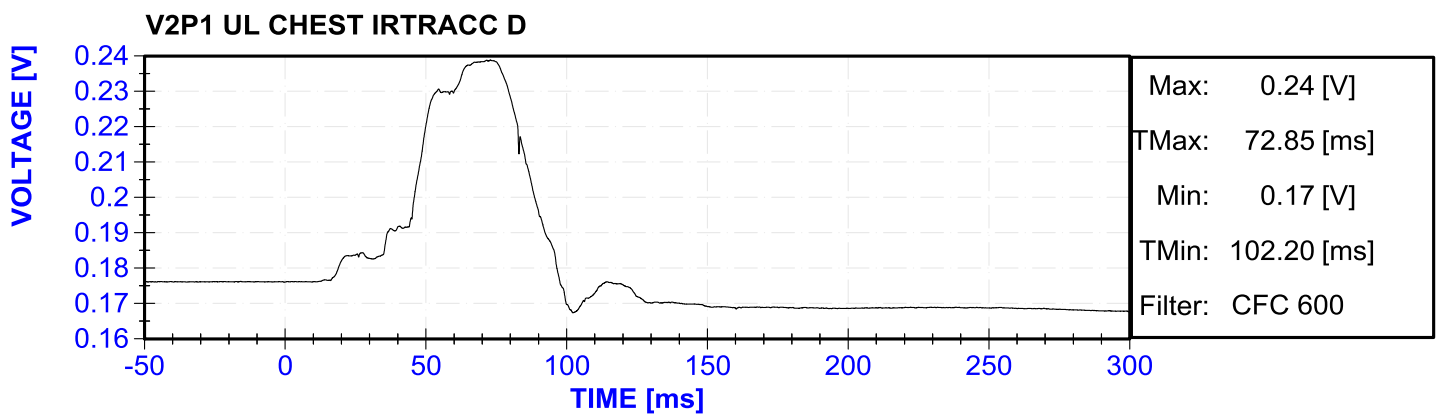
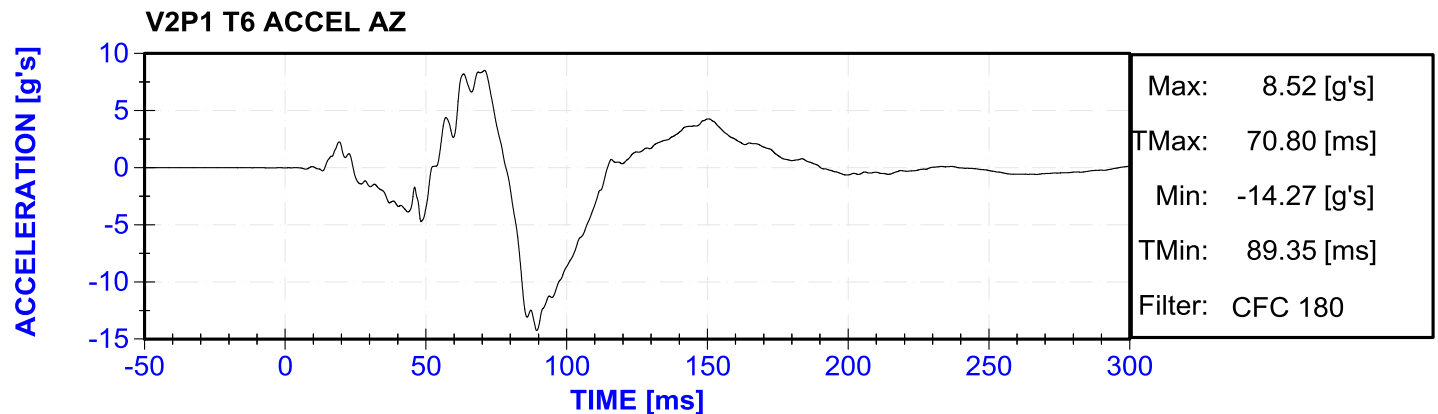
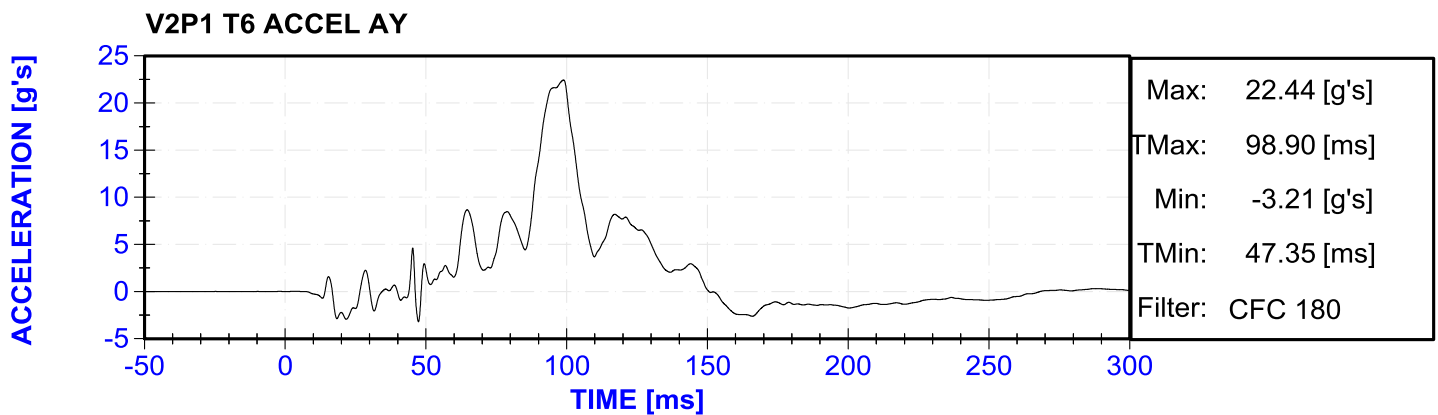
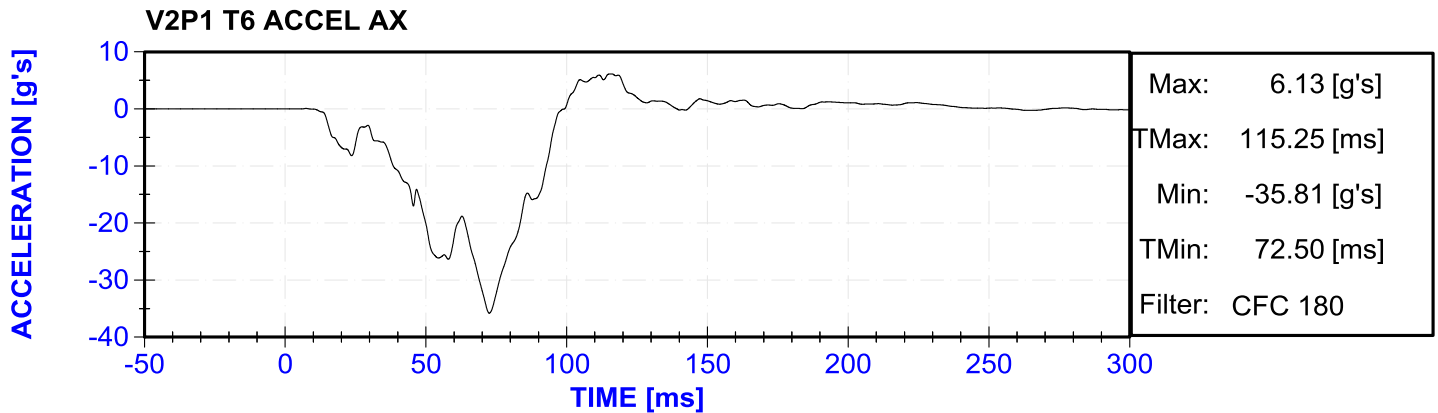
V2P1 NECK UPPER MZ

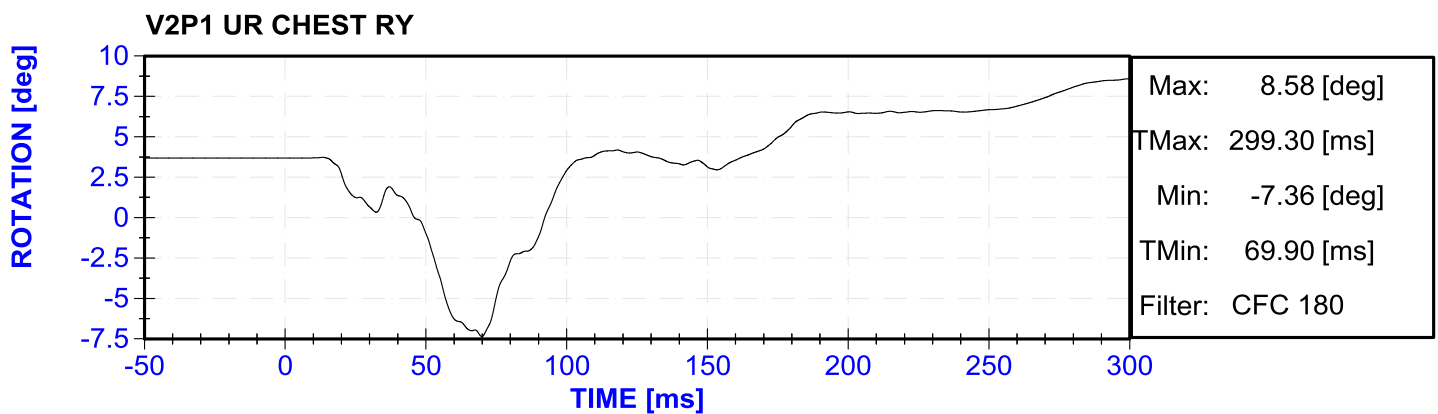
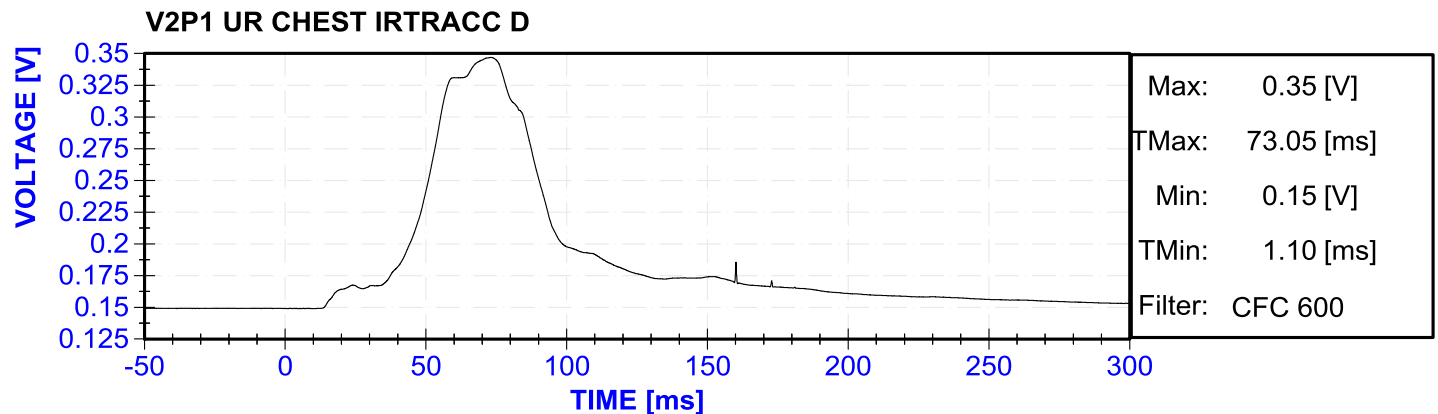
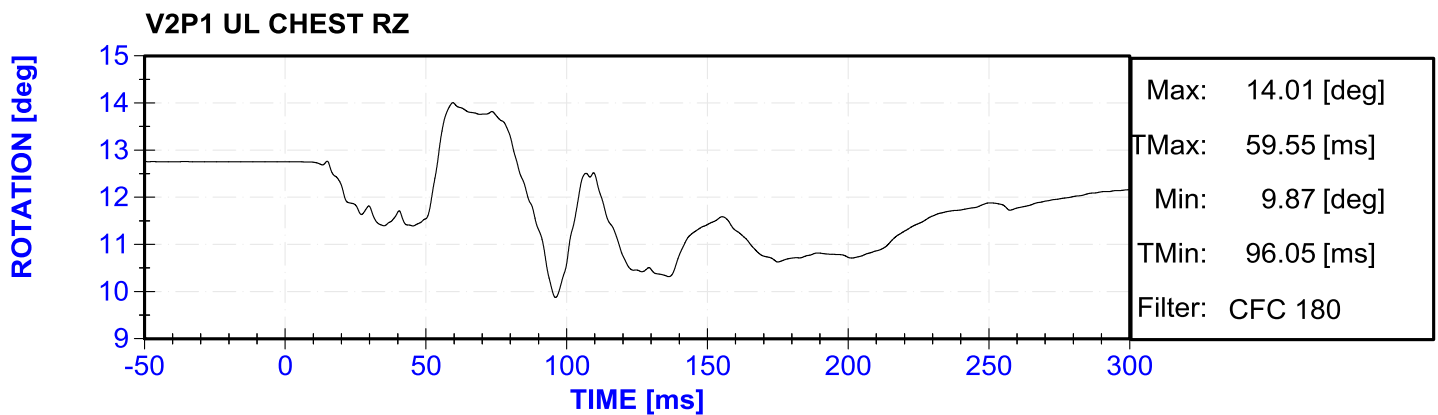
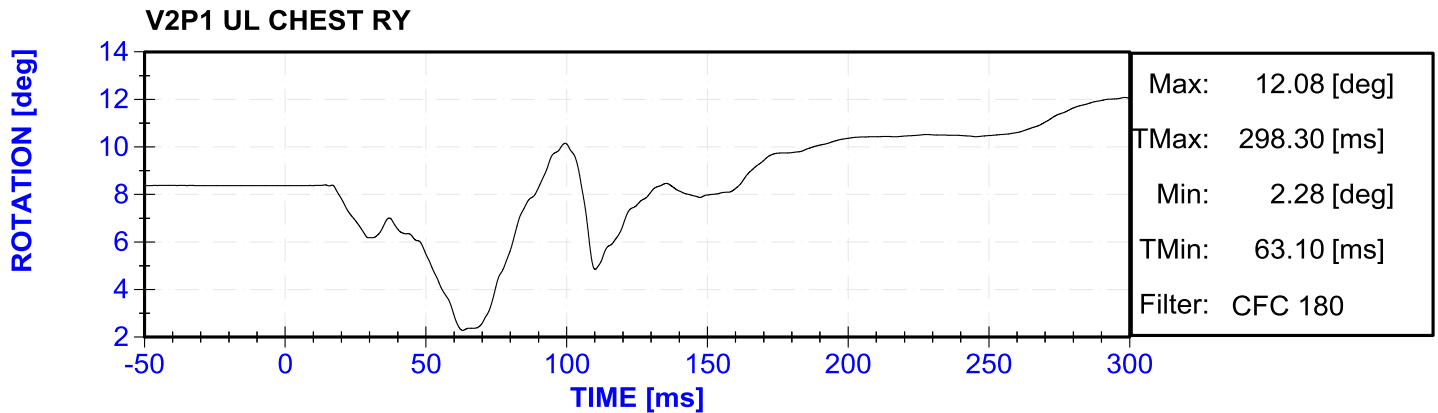




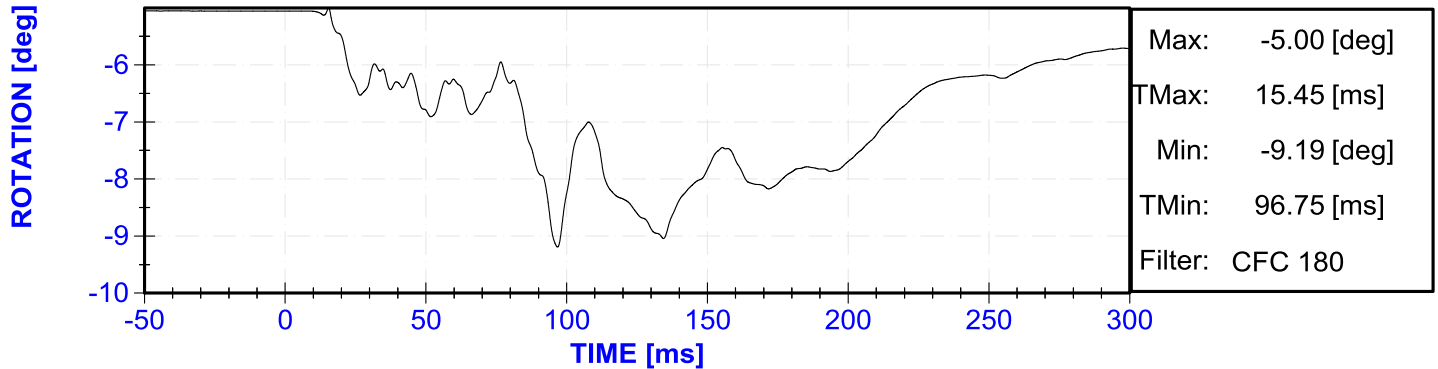




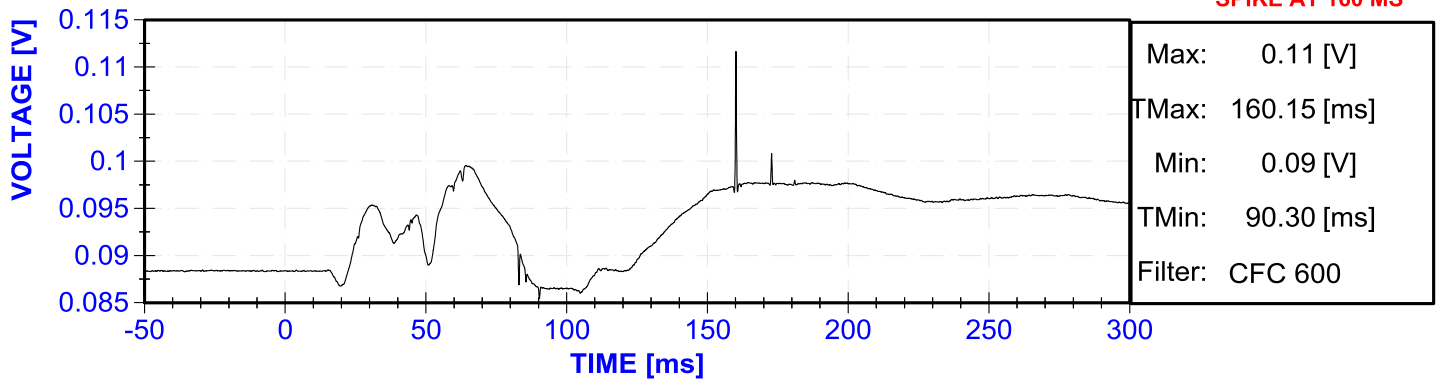




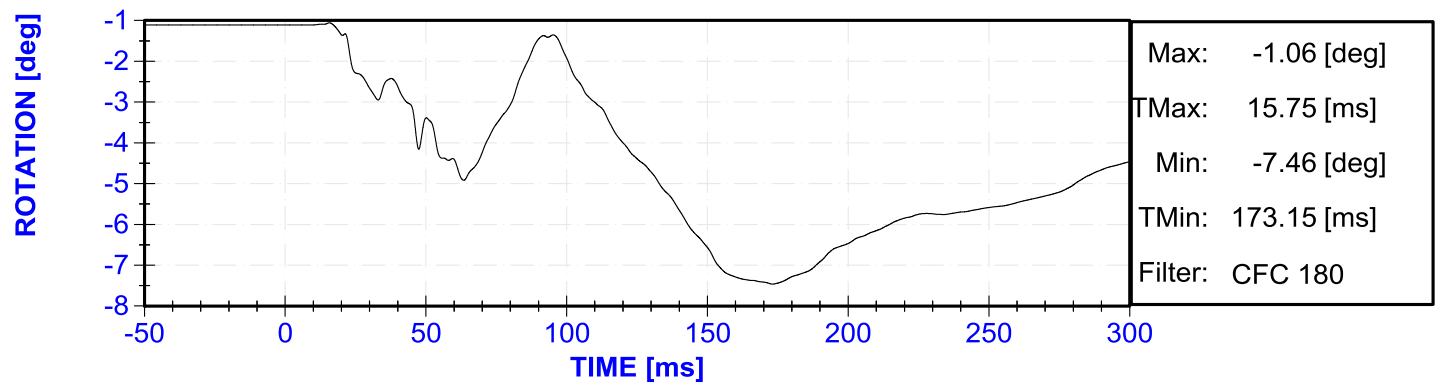
V2P1 UR CHEST RZ



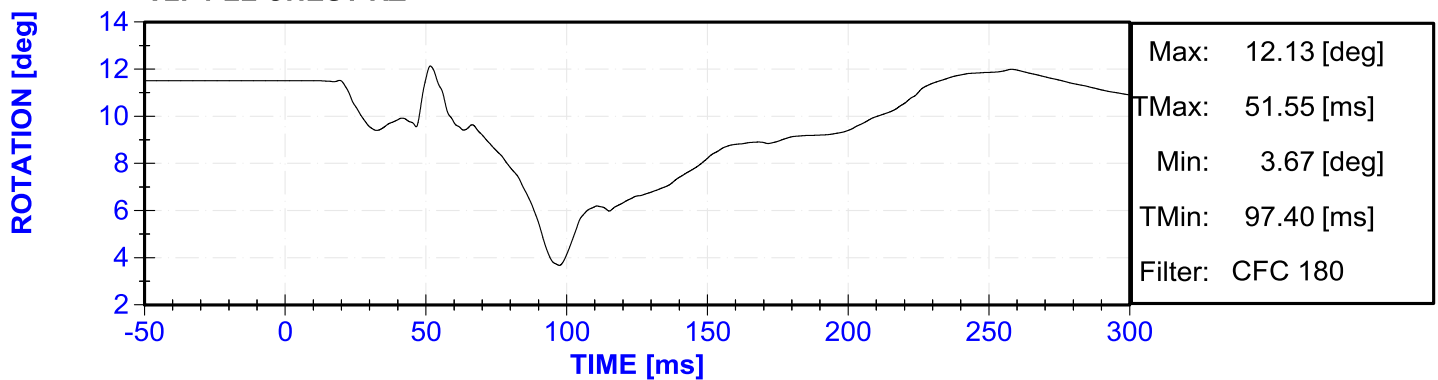
V2P1 LL CHEST ITRACC D



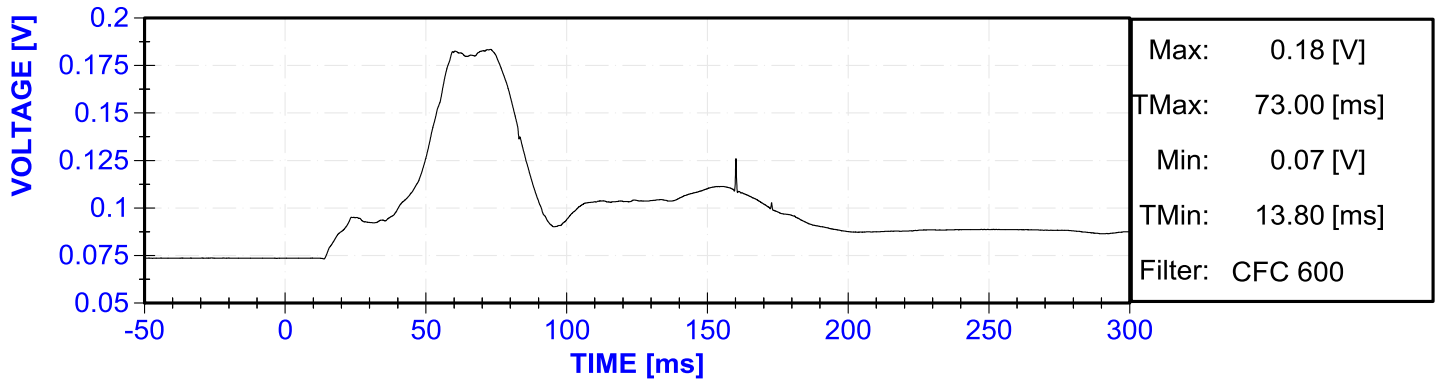
V2P1 LL CHEST RY



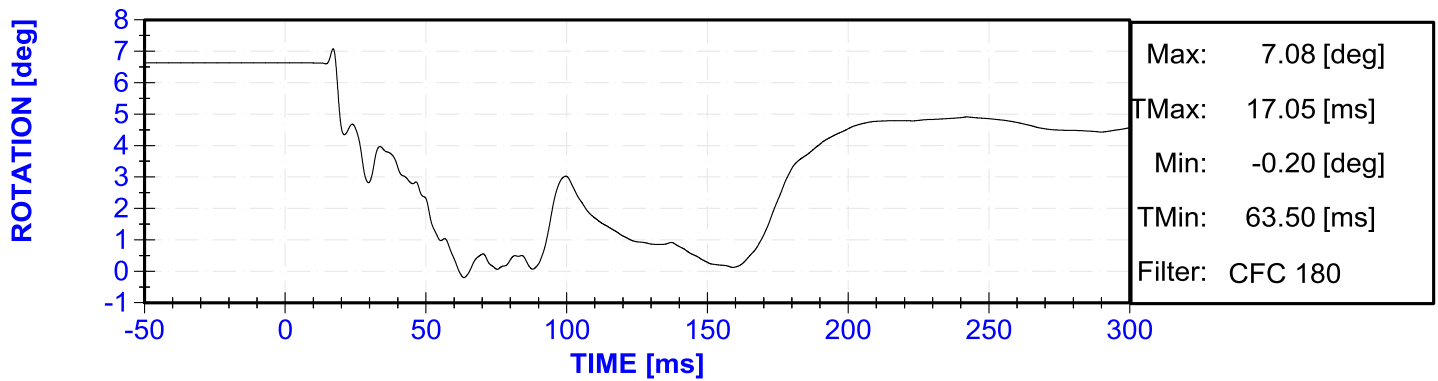
V2P1 LL CHEST RZ



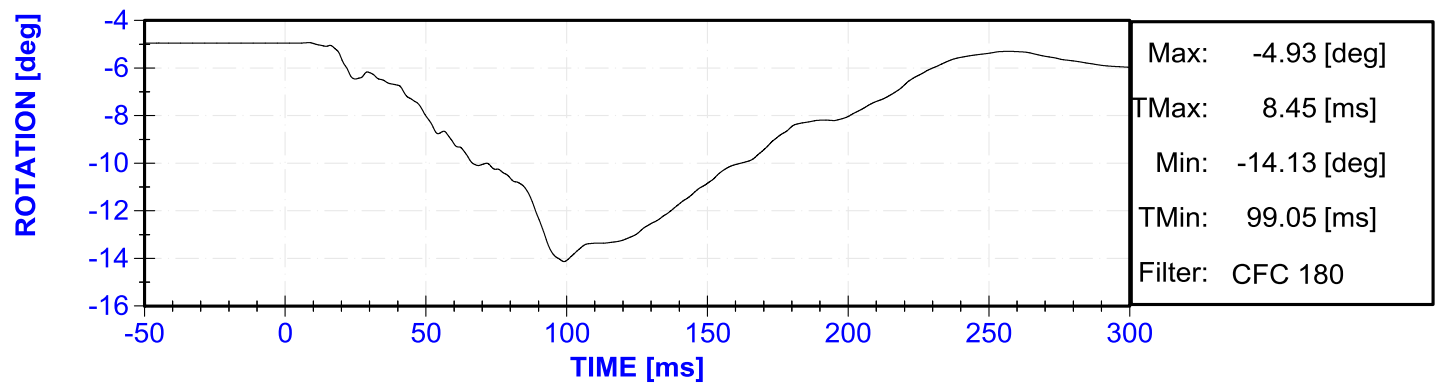
V2P1 LR CHEST IRTRACC D



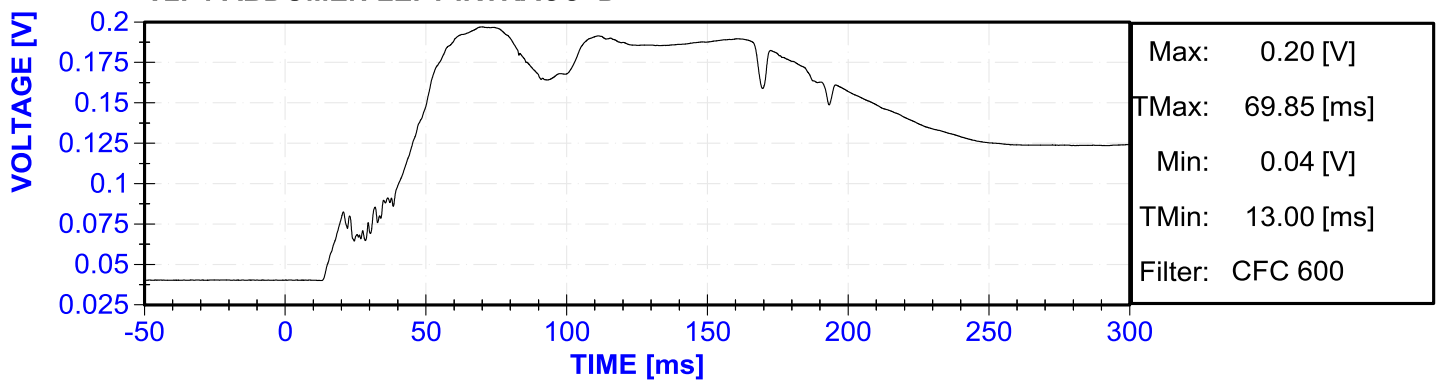
V2P1 LR CHEST RY

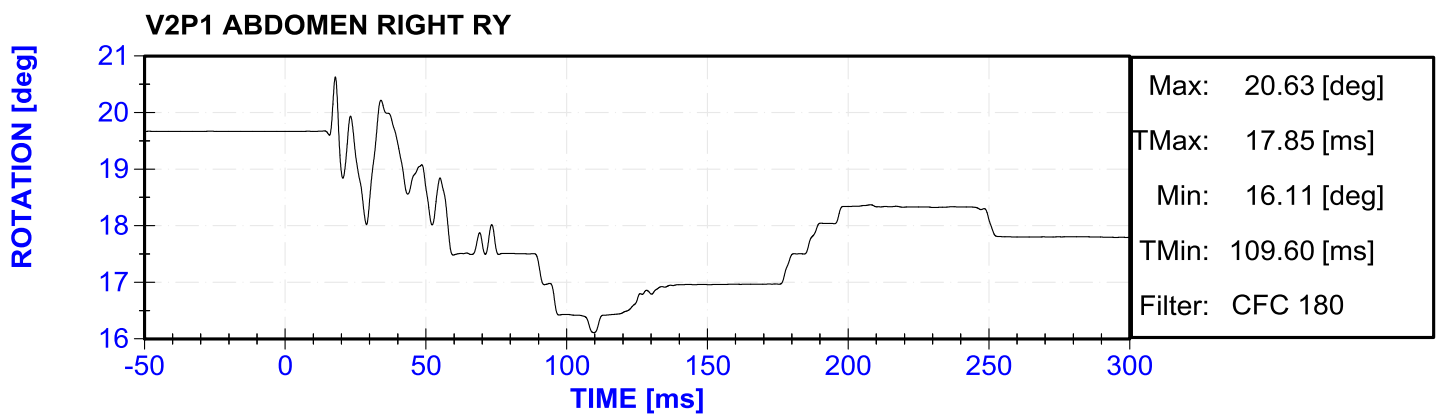
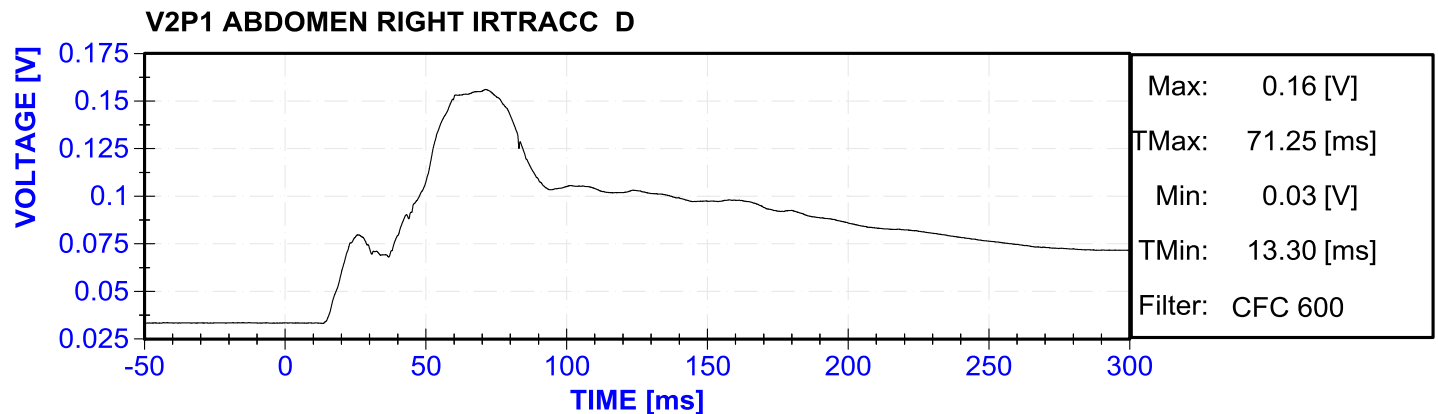
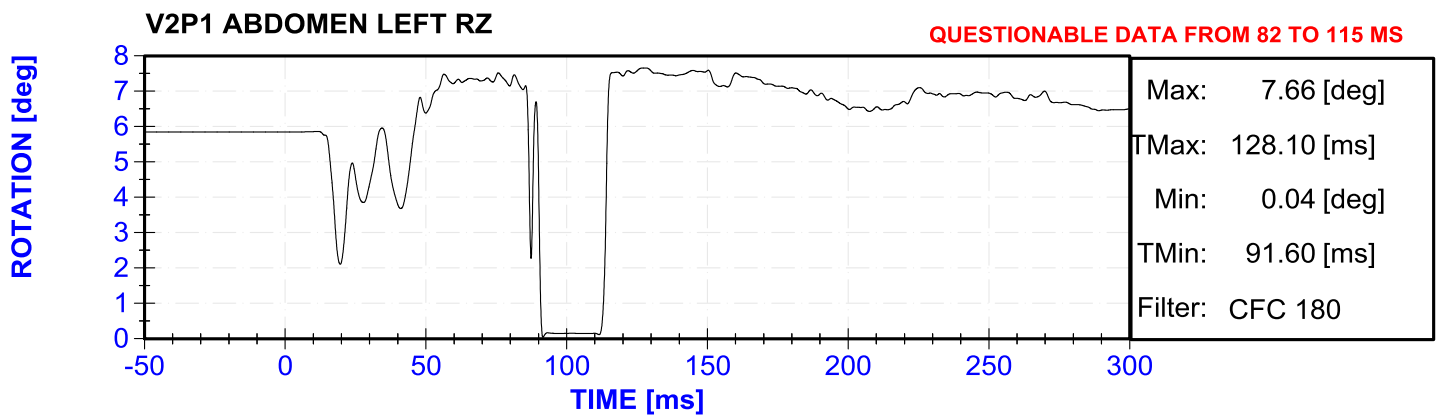
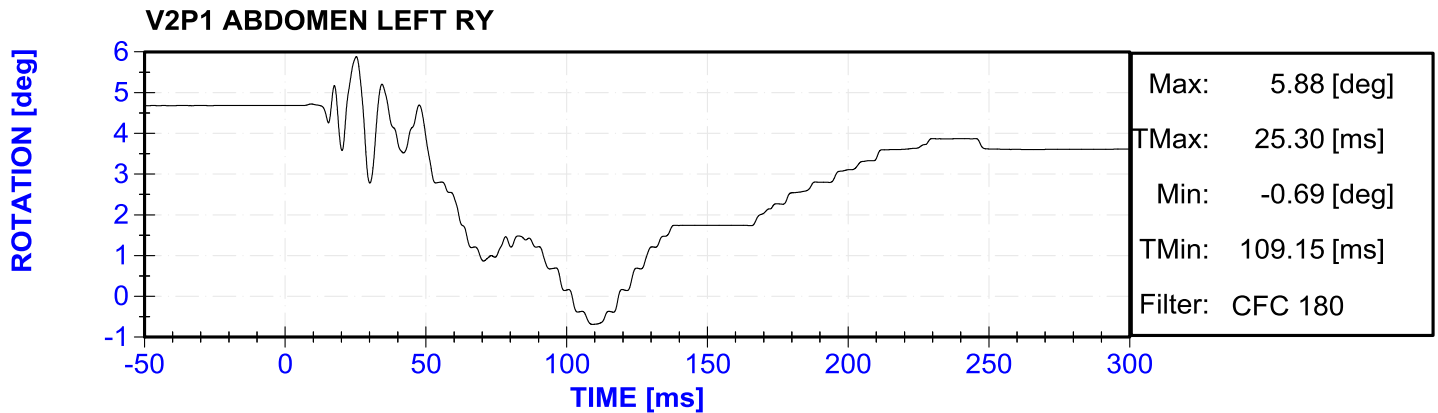


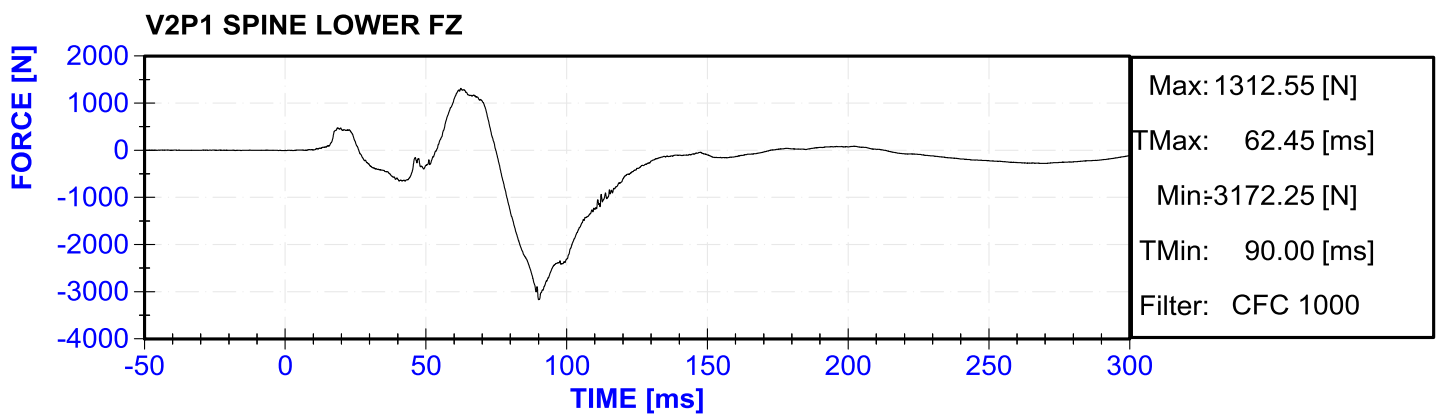
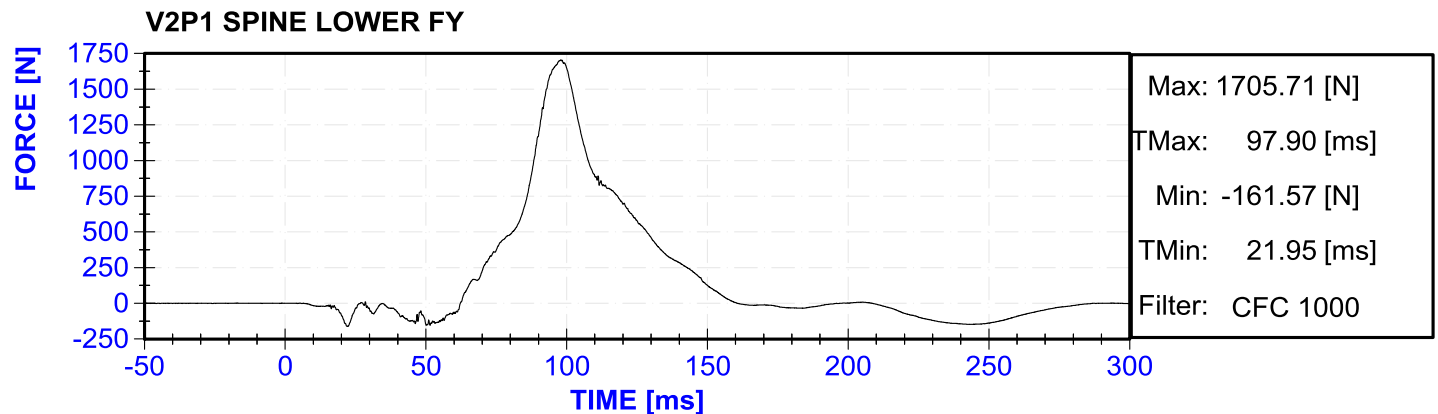
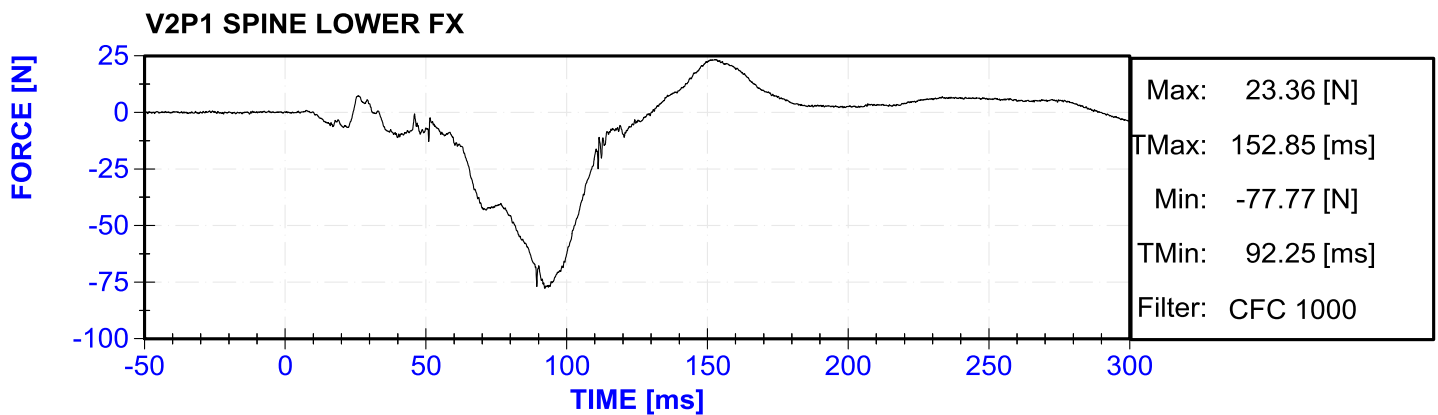
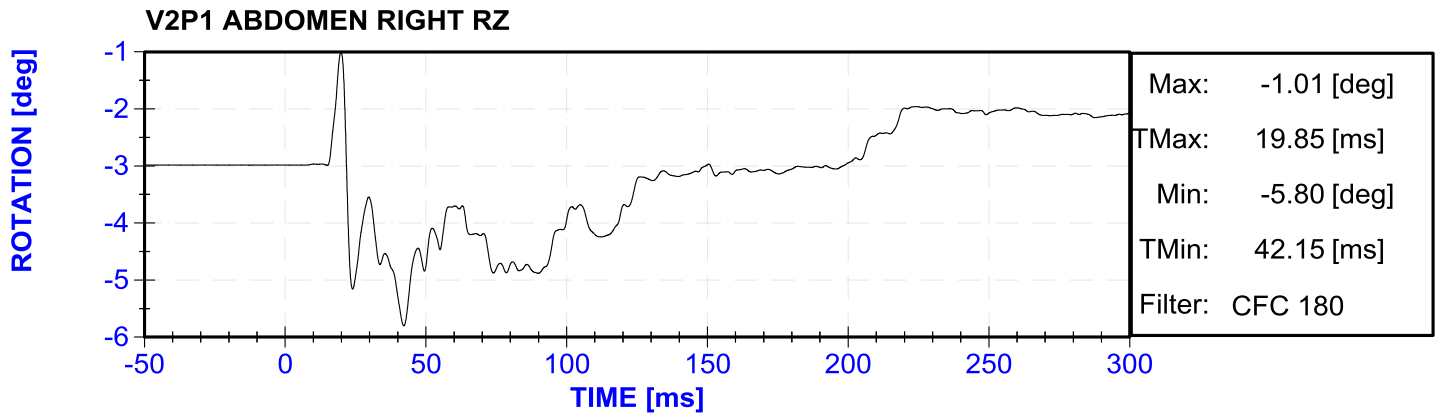
V2P1 LR CHEST RZ

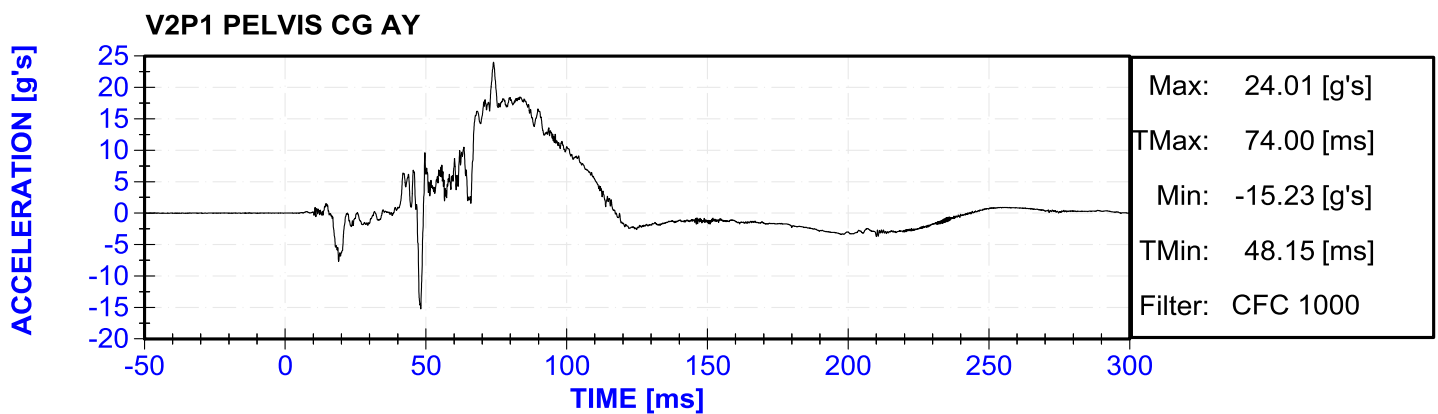
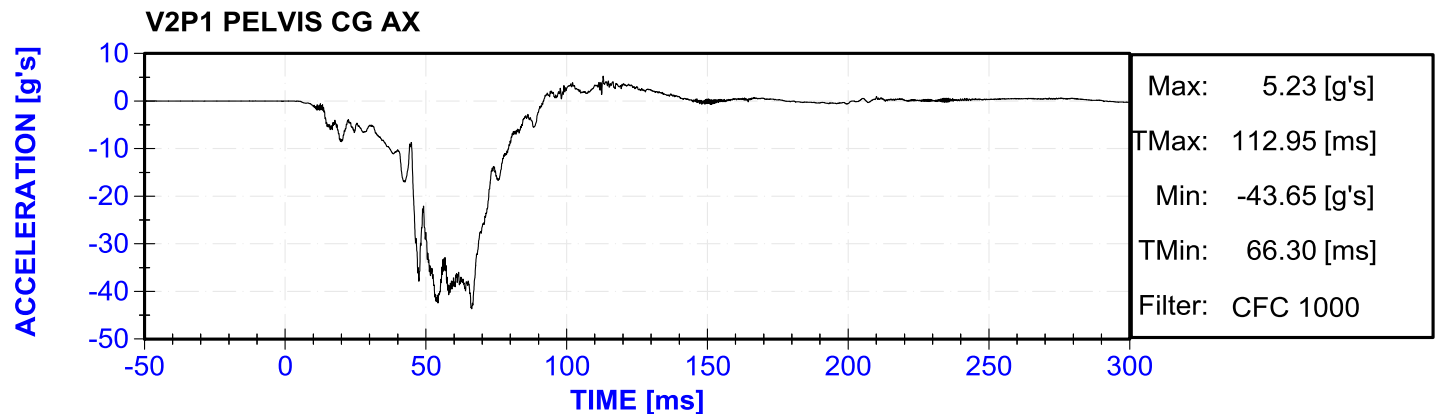
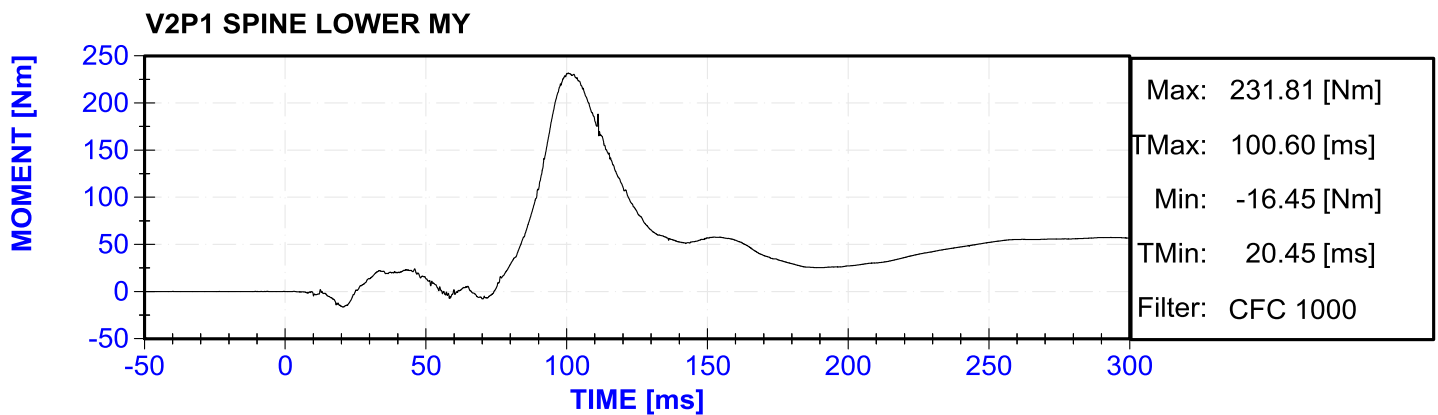
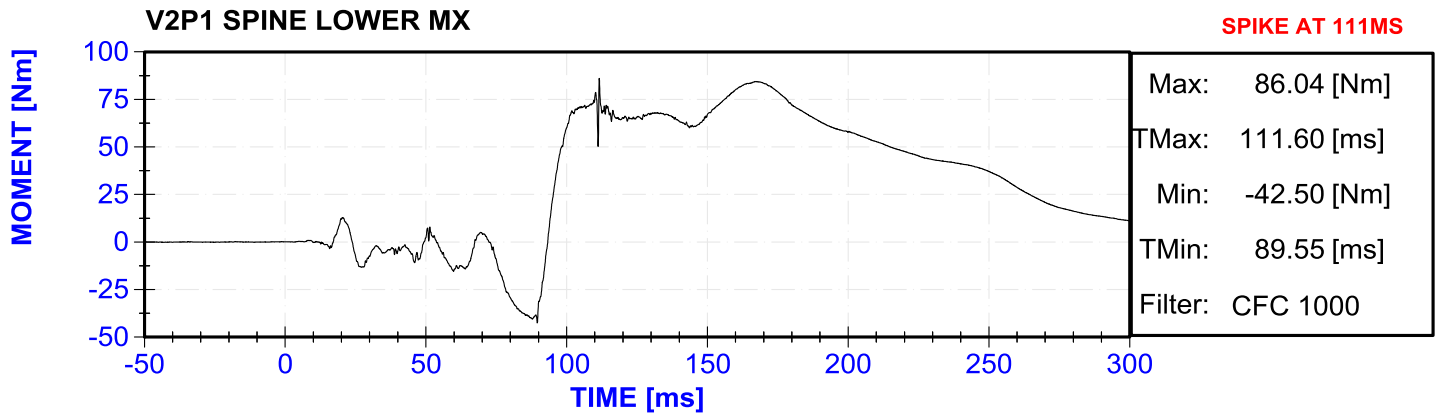


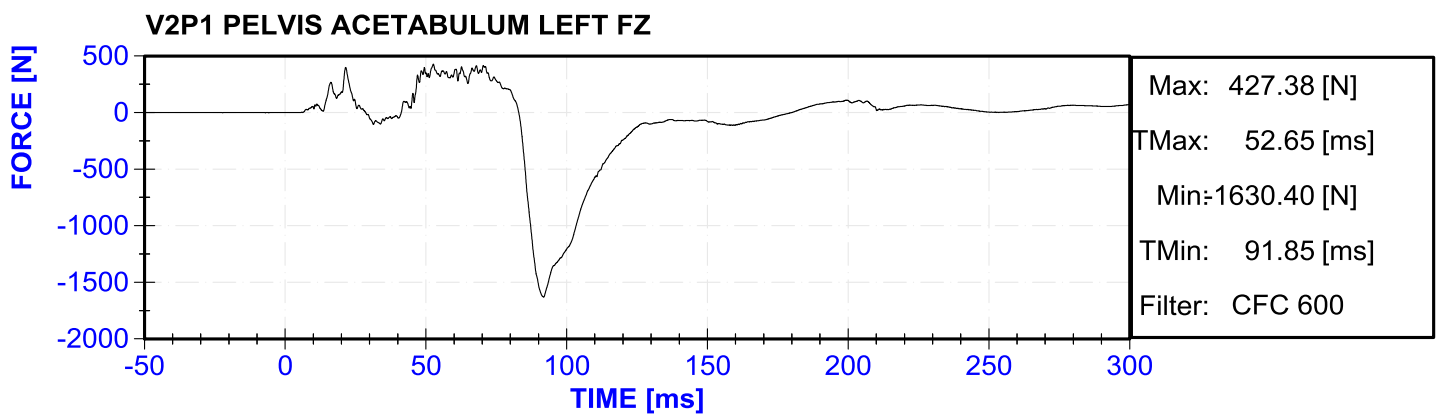
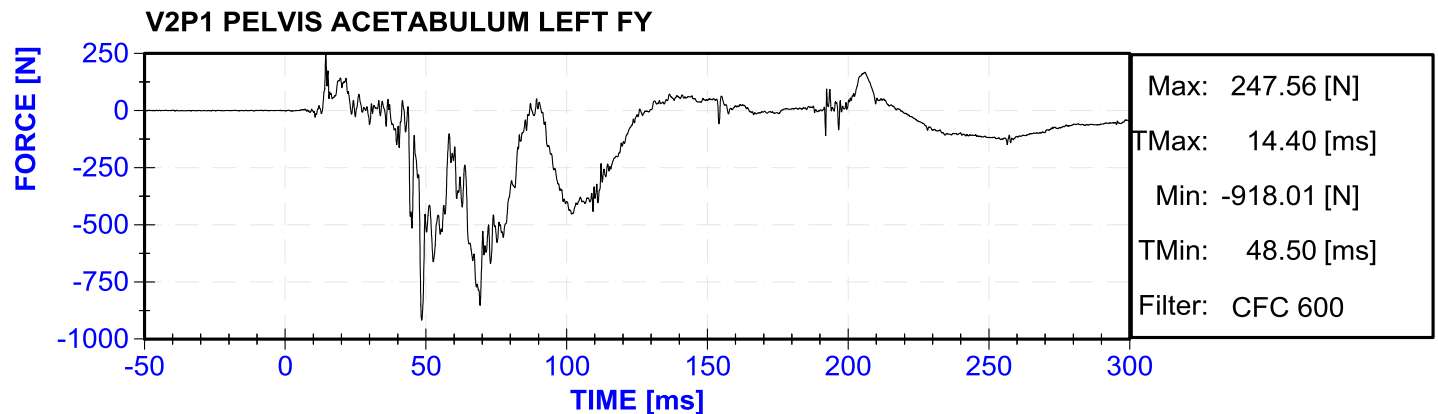
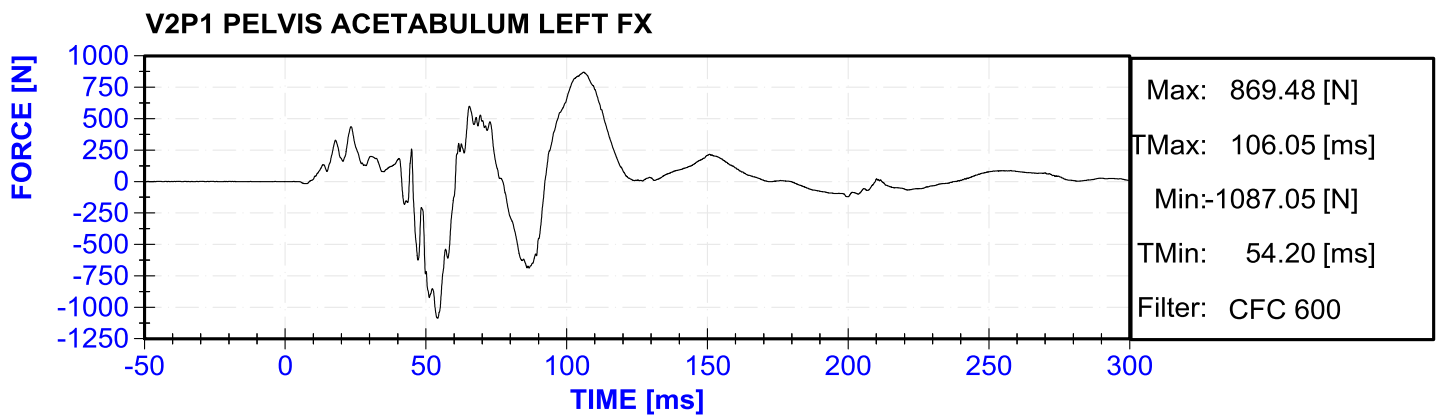
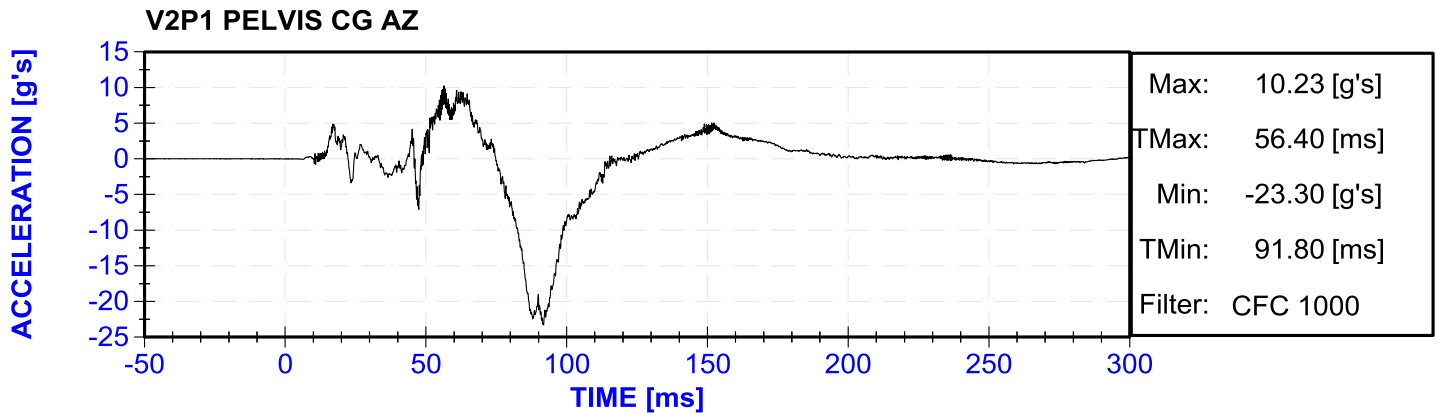
V2P1 ABDOMEN LEFT IRTRACC D



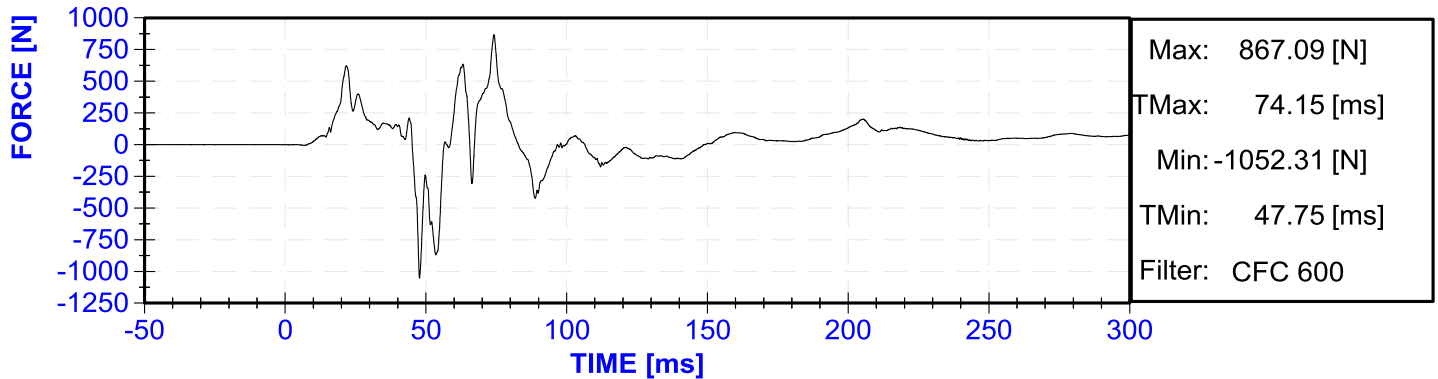




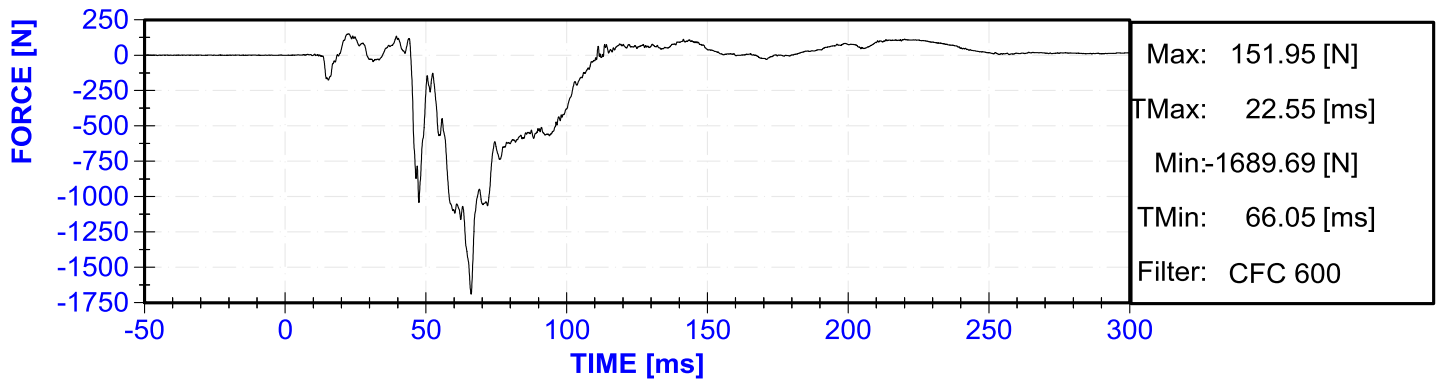




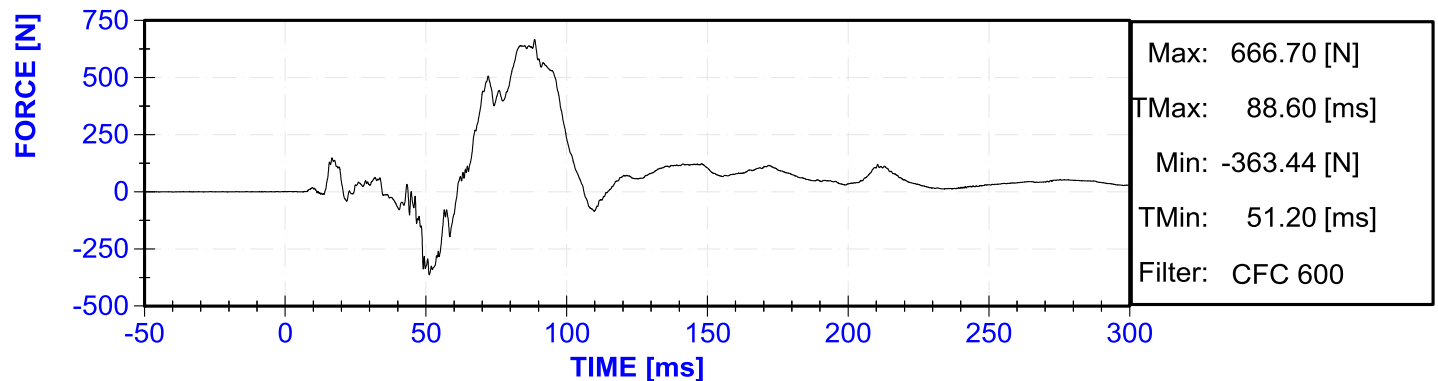
V2P1 PELVIS ACETABULUM RIGHT FX



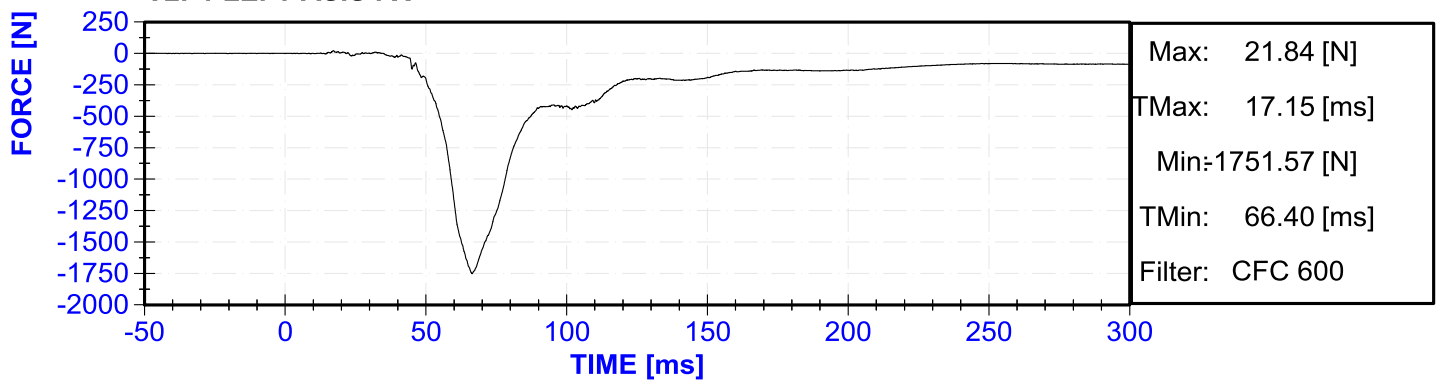
V2P1 PELVIS ACETABULUM RIGHT FY

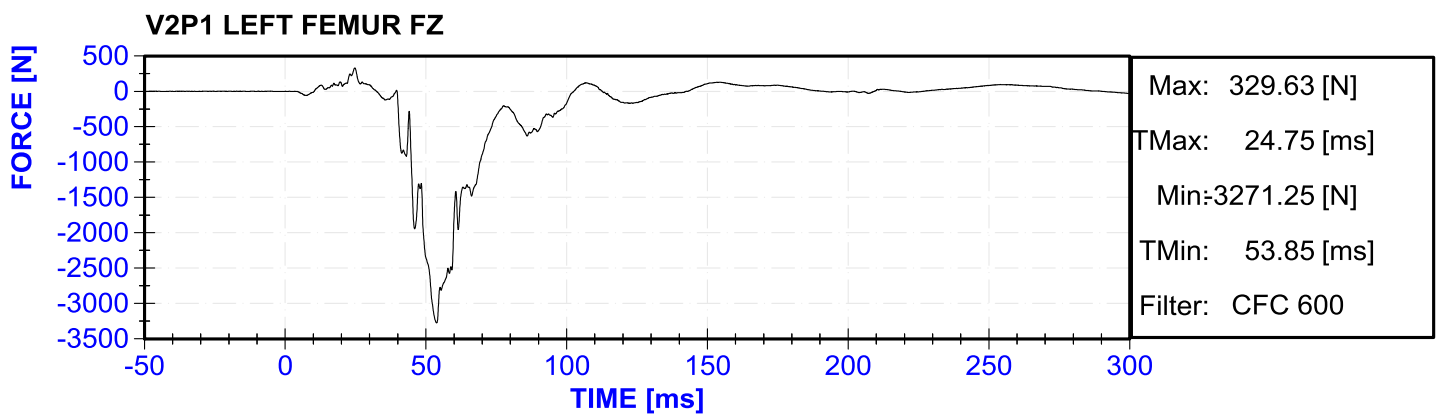
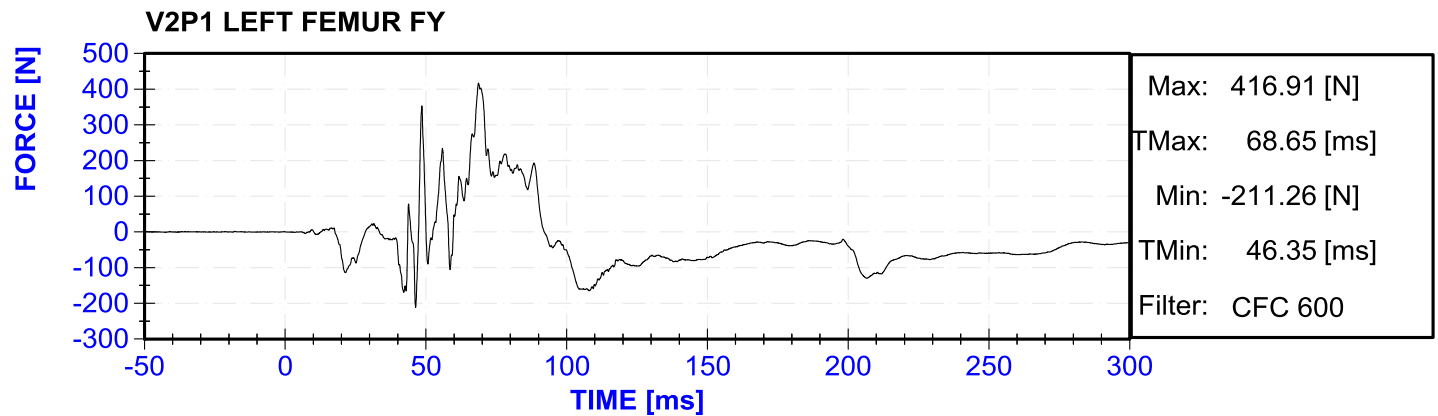
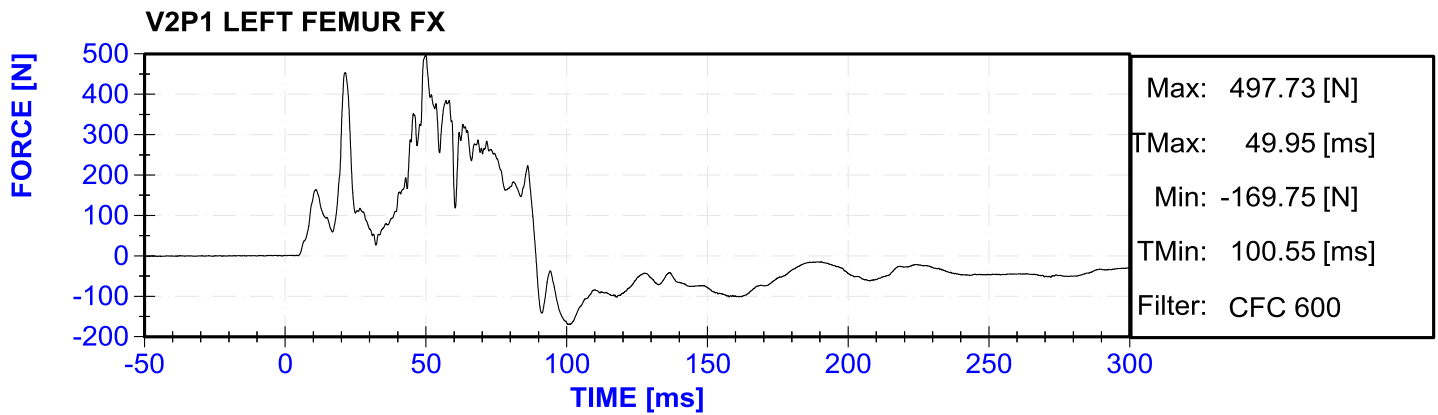
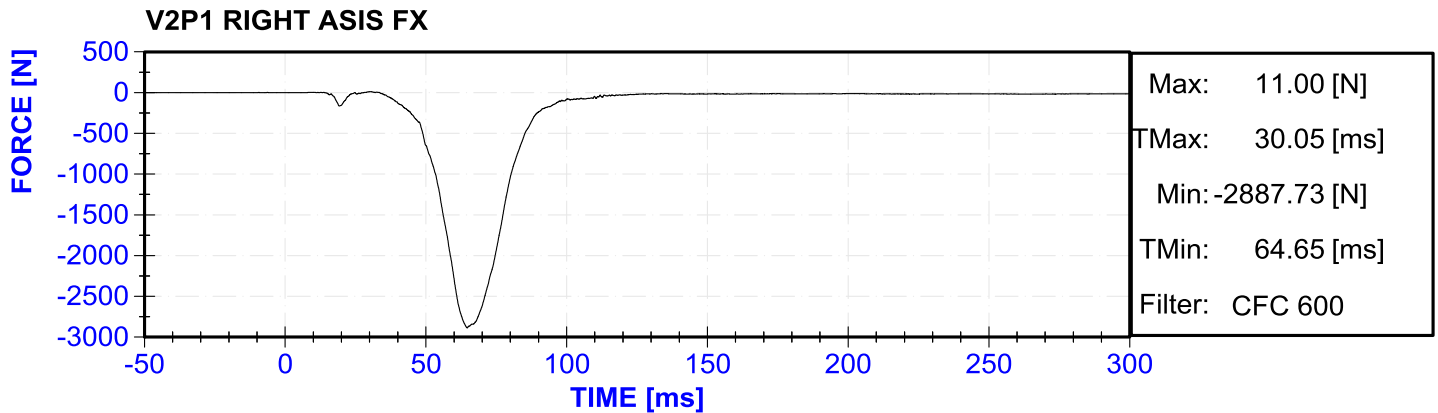


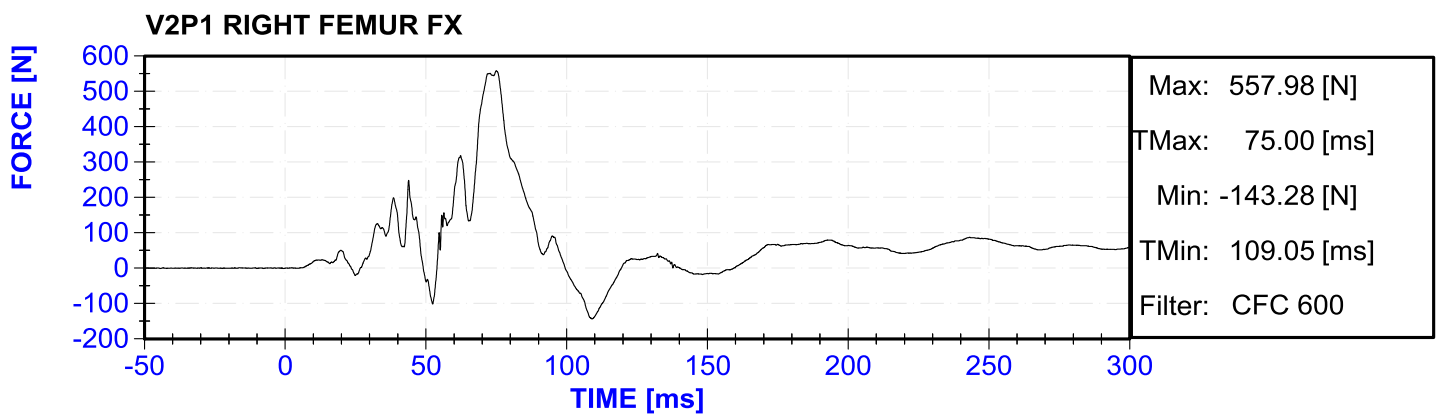
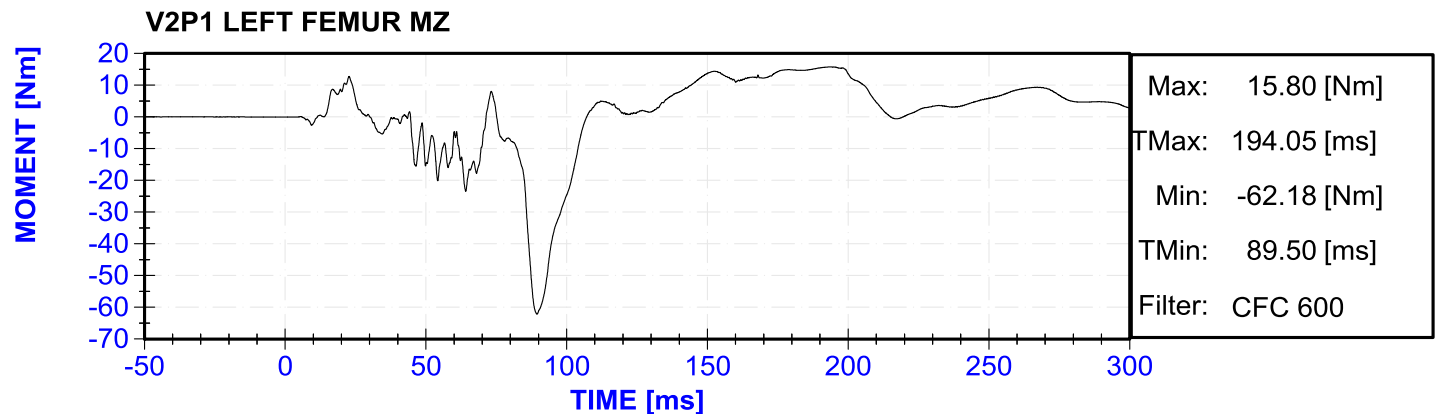
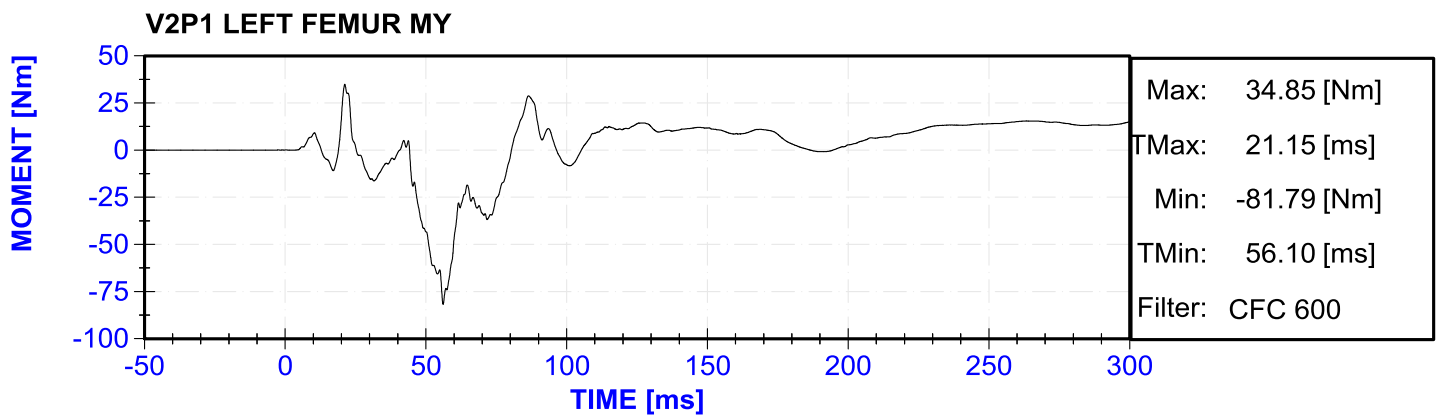
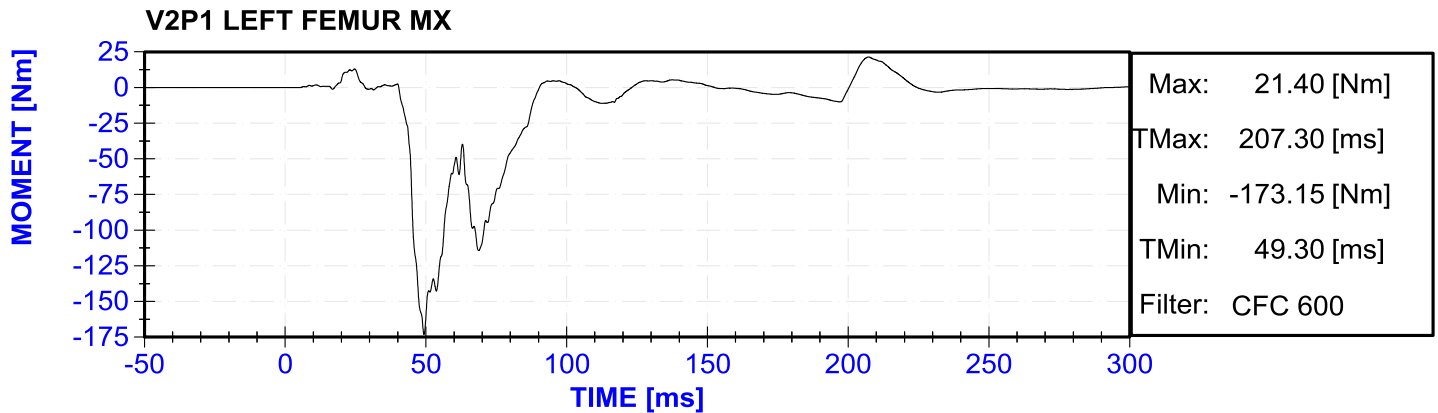
V2P1 PELVIS ACETABULUM RIGHT FZ

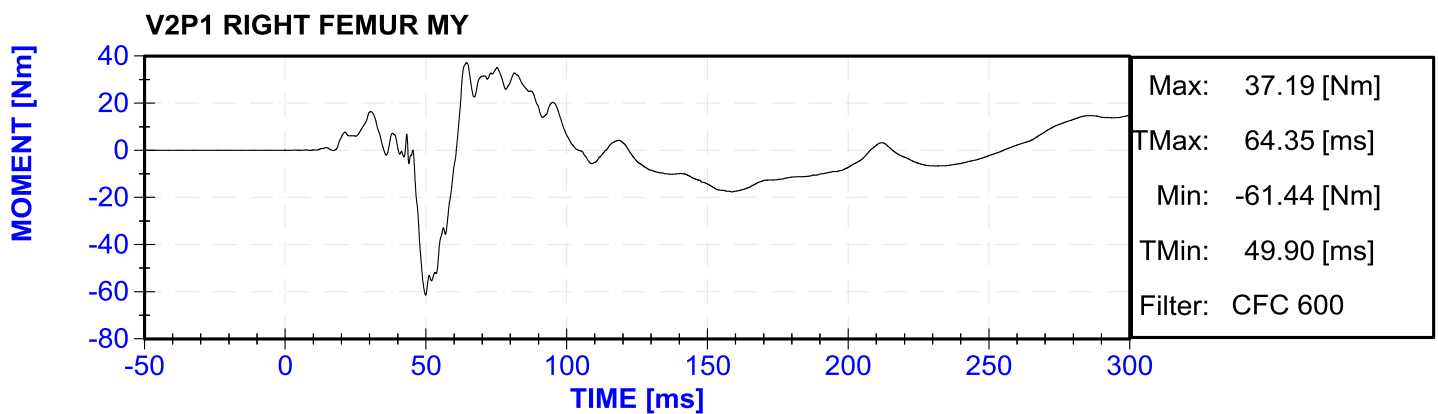
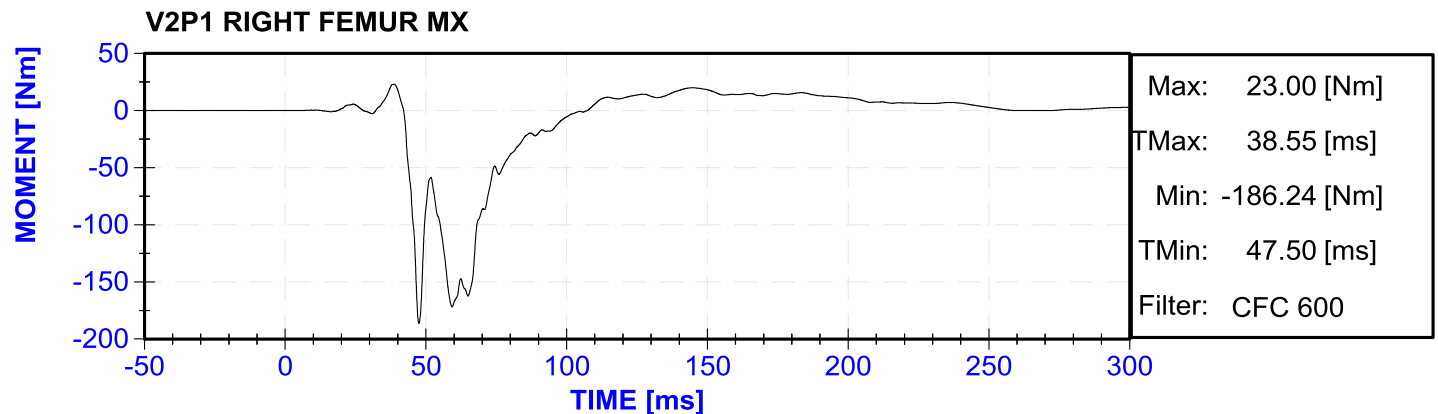
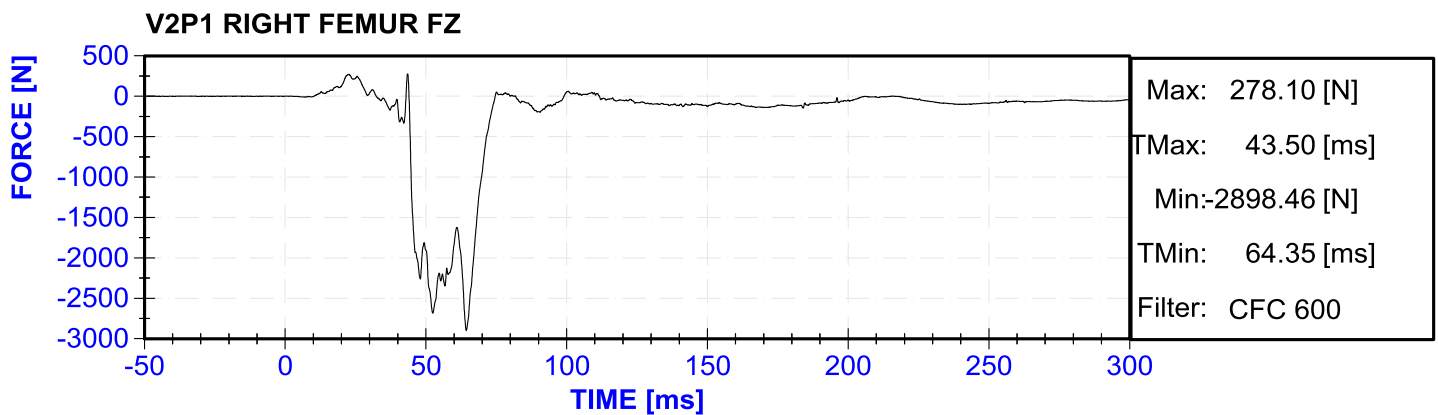
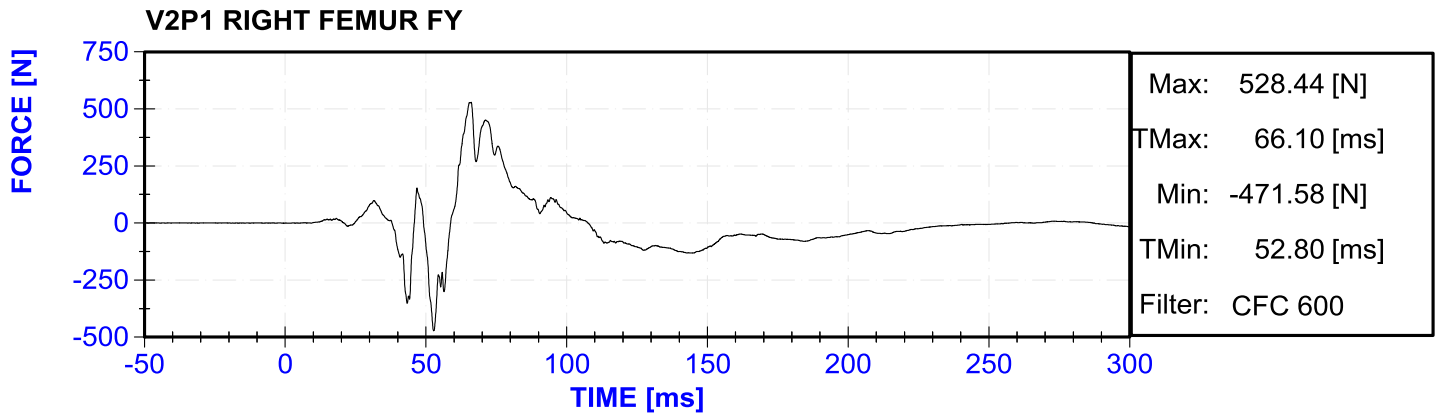


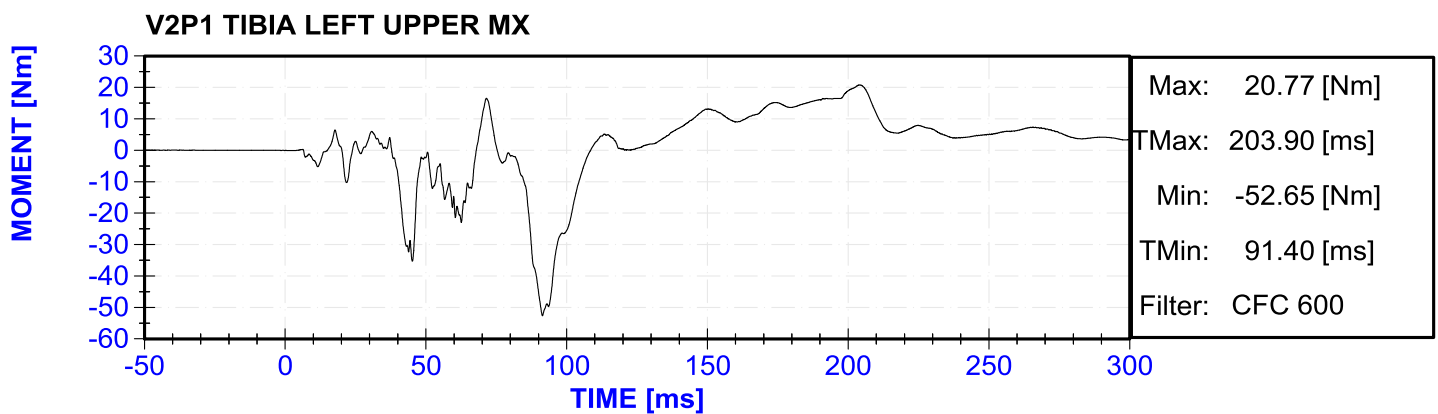
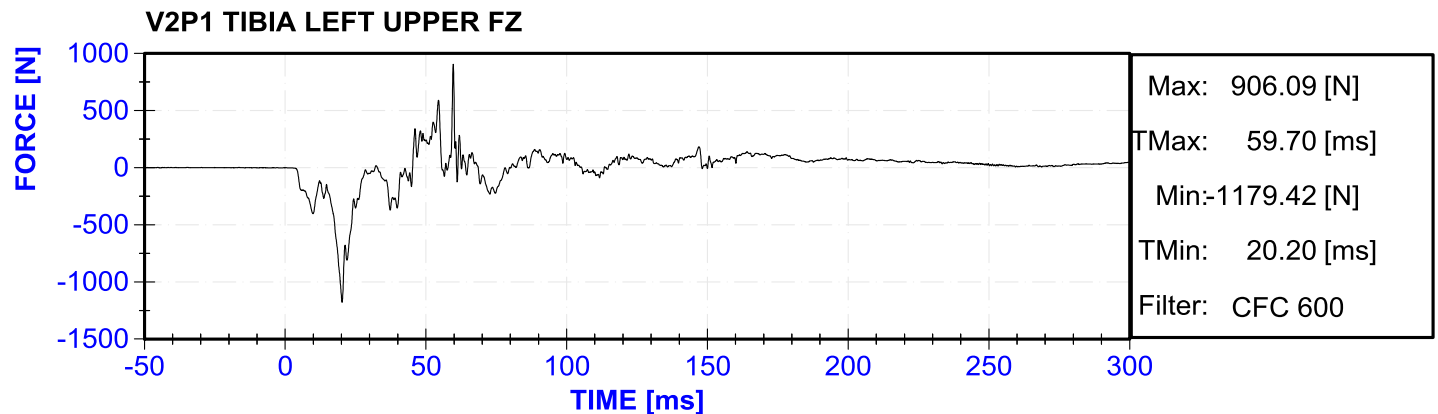
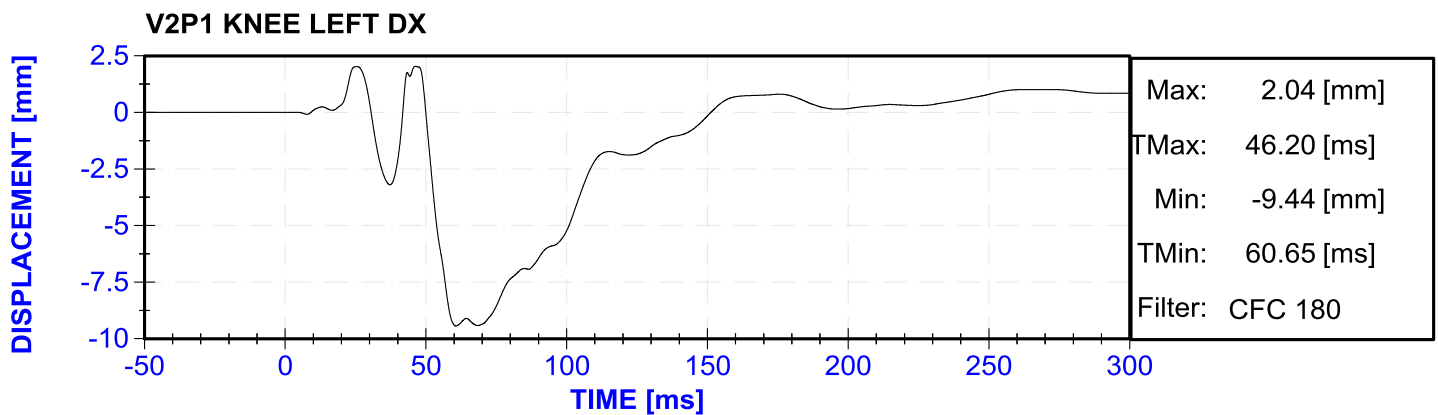
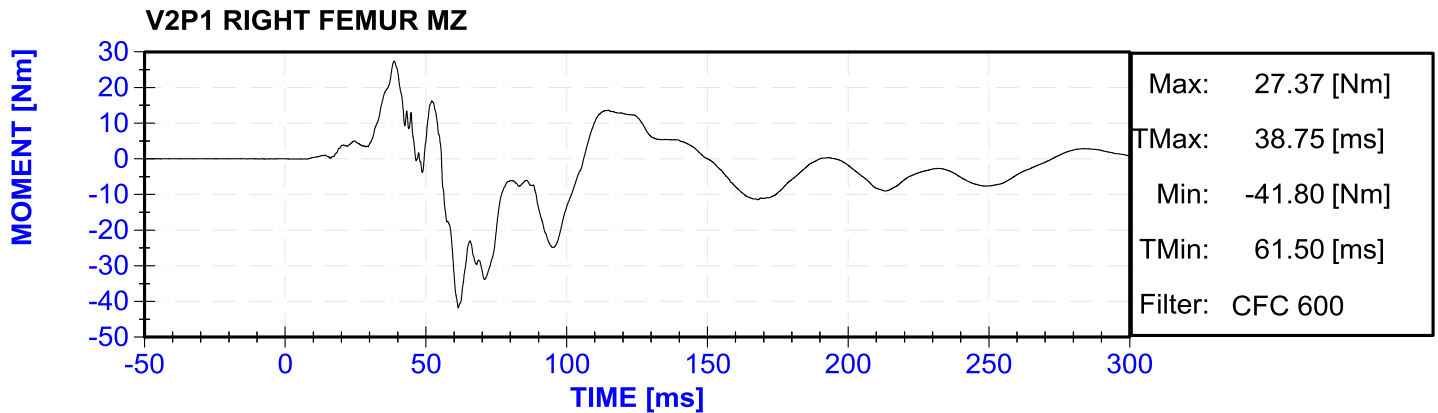
V2P1 LEFT ASIS FX

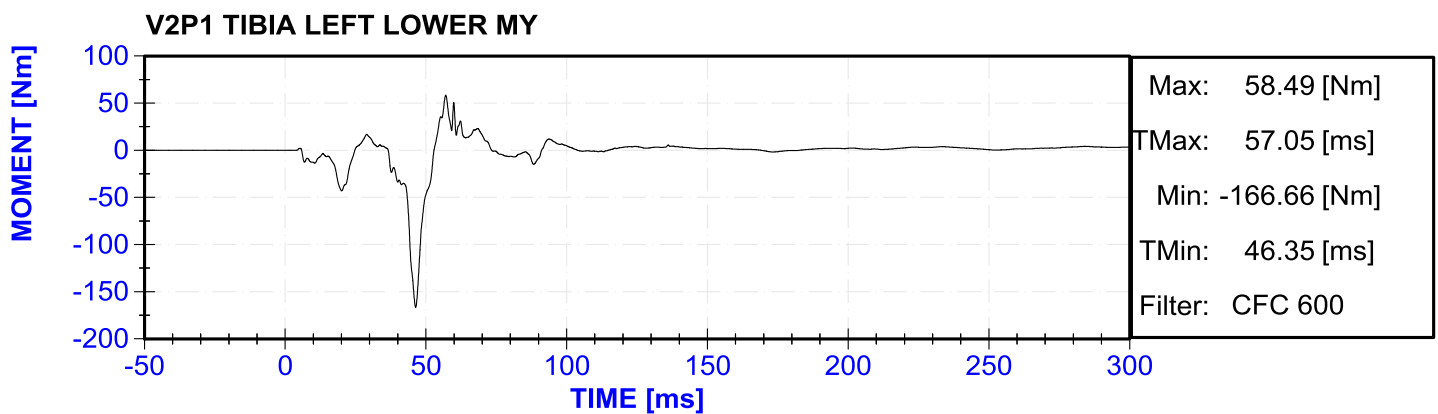
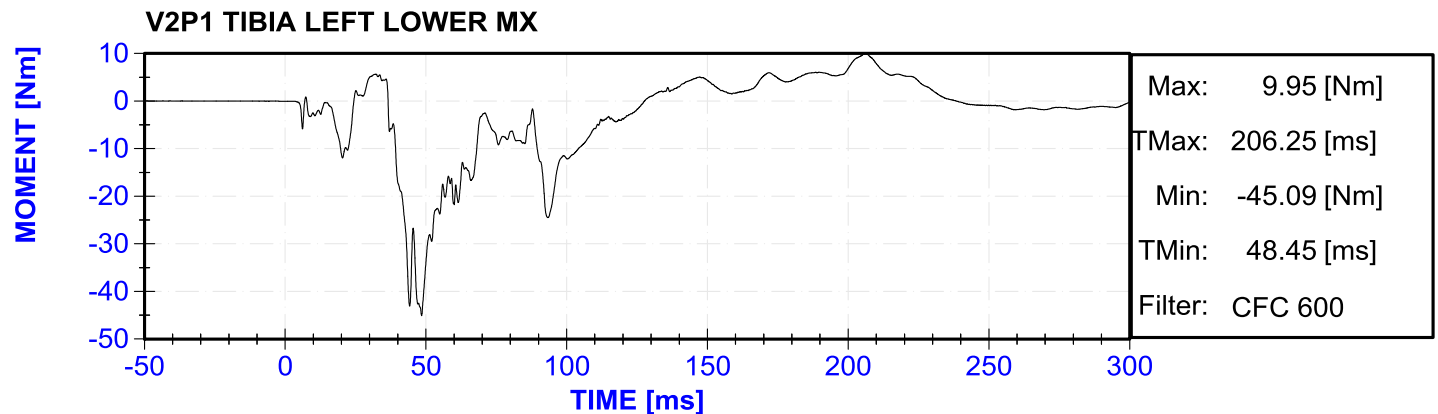
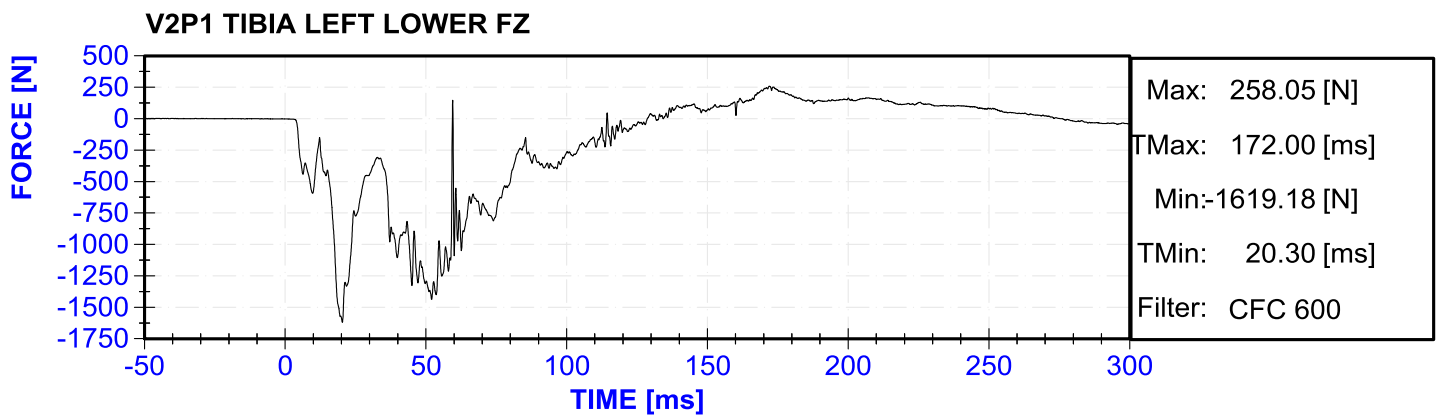
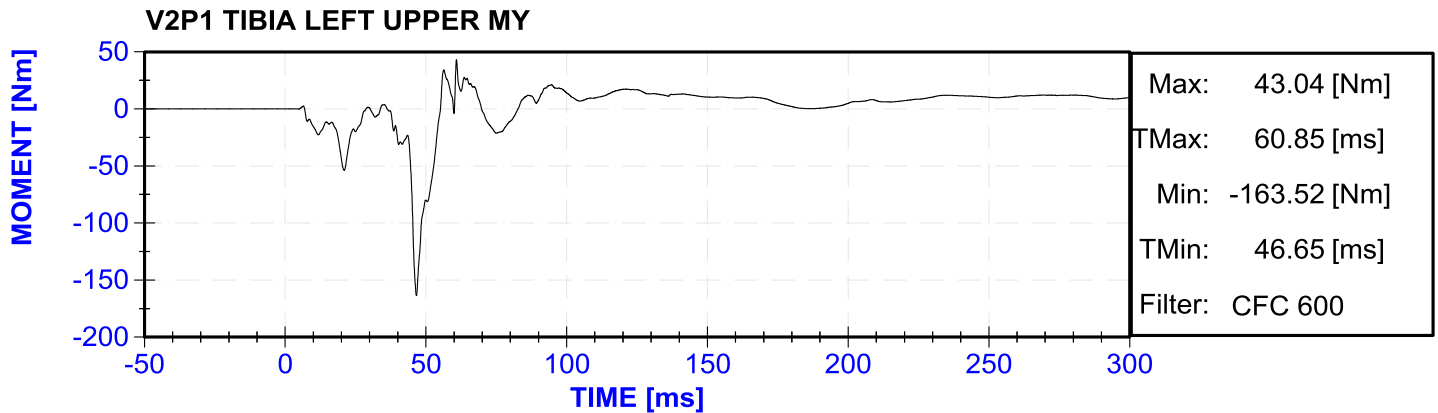


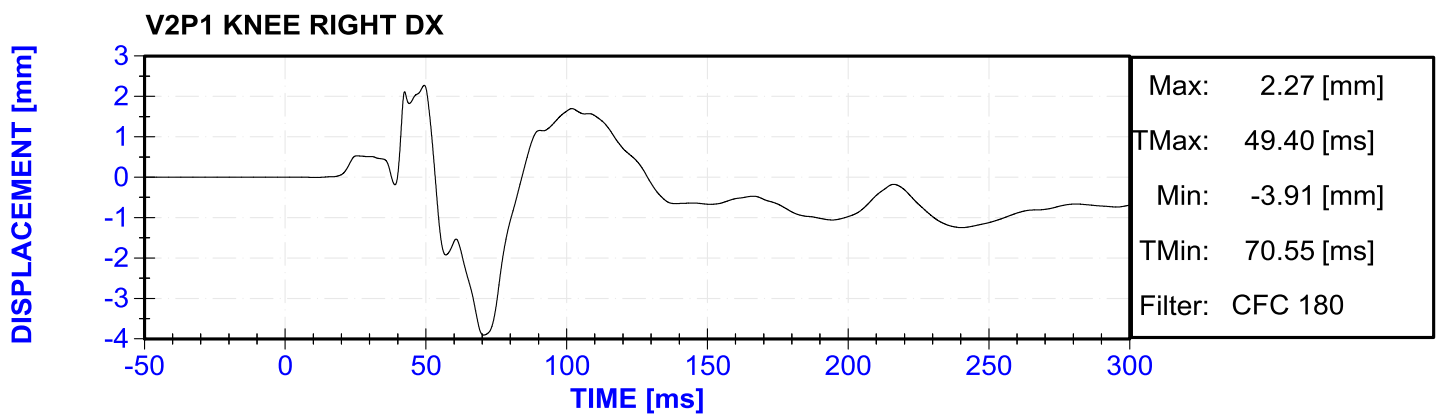
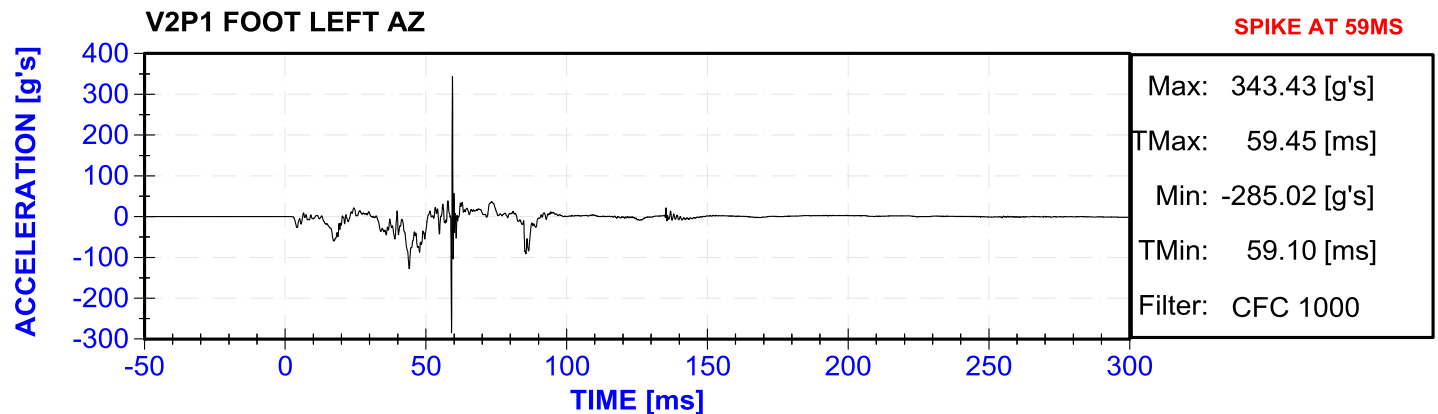
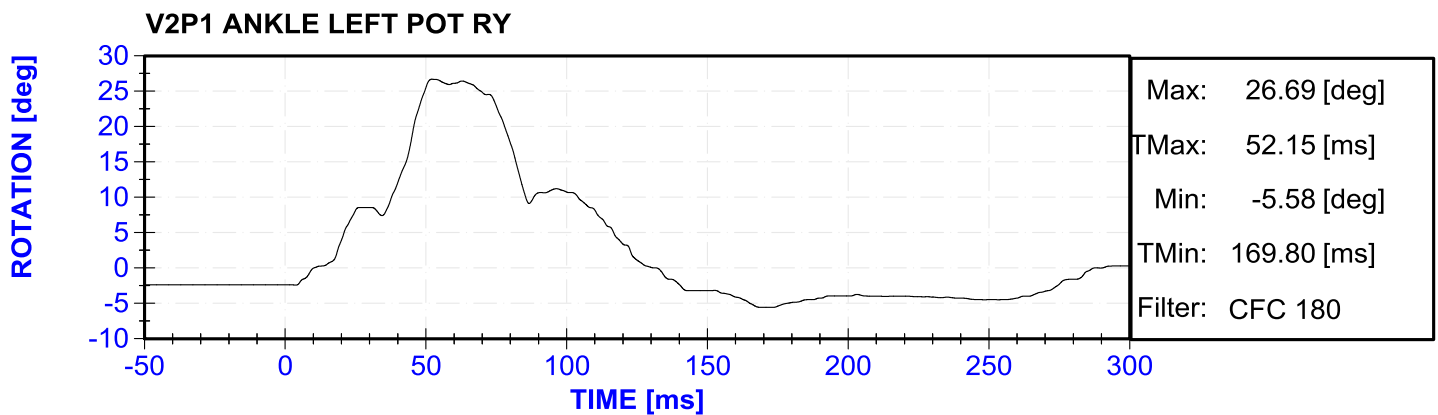
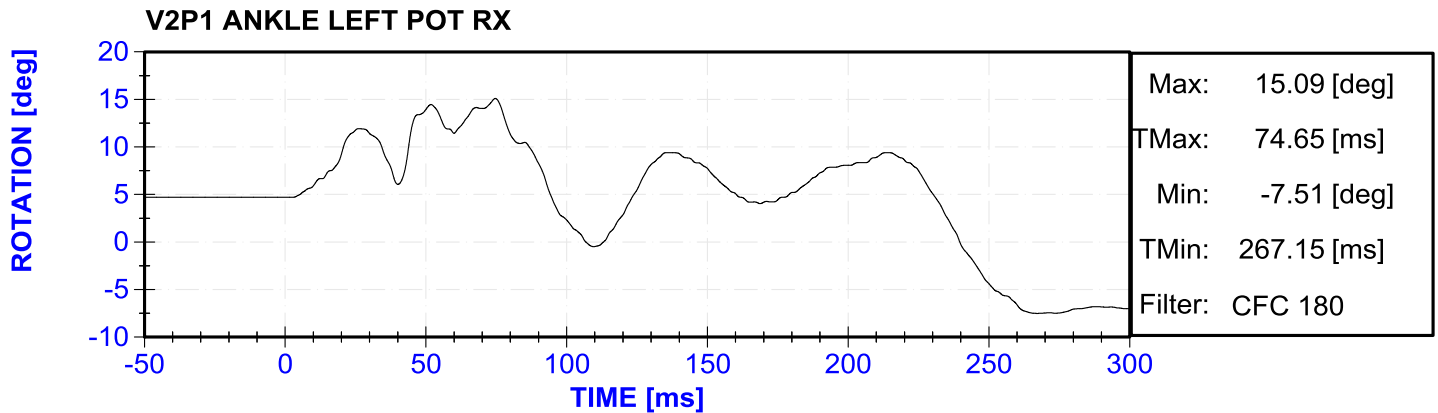


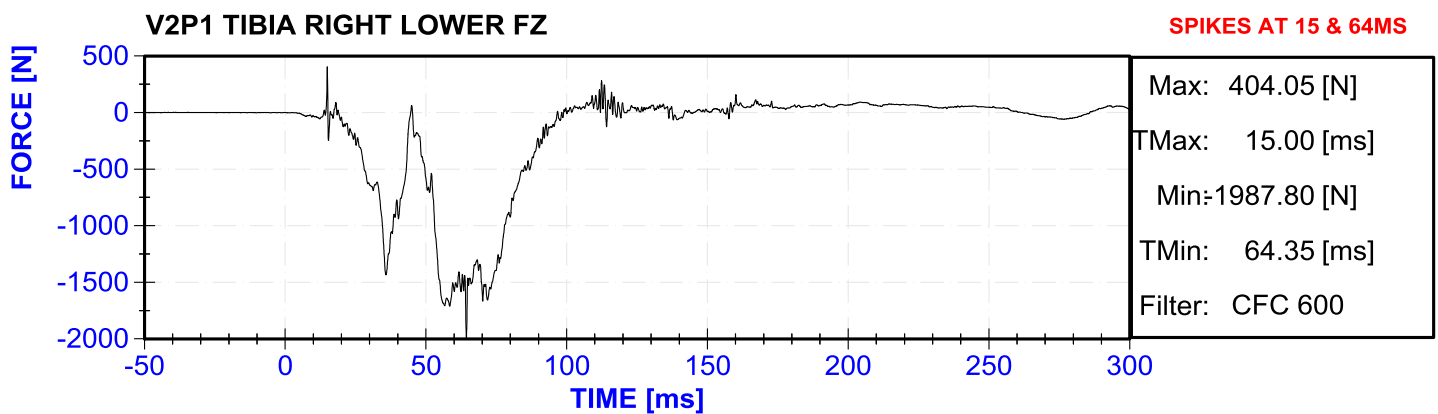
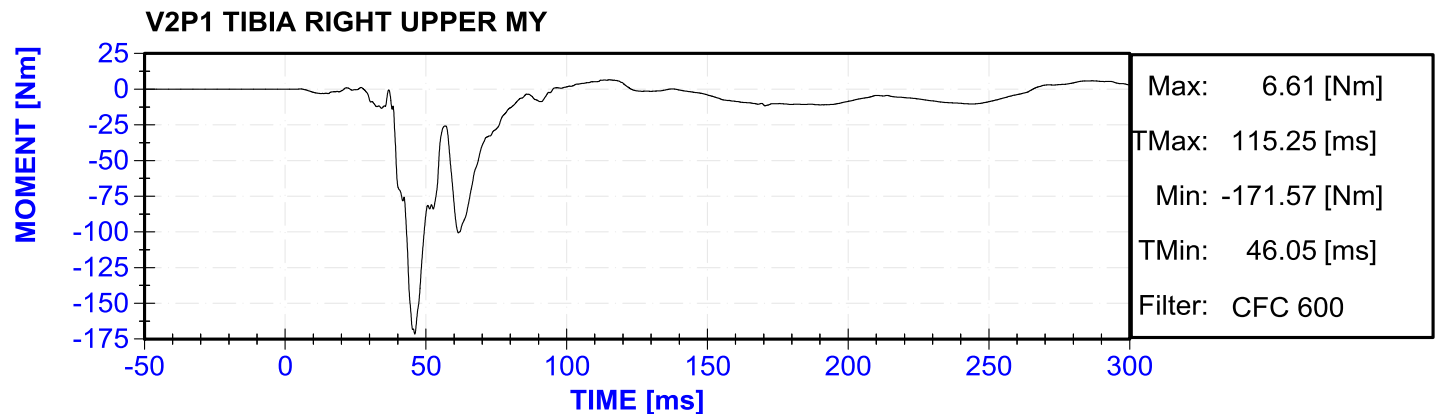
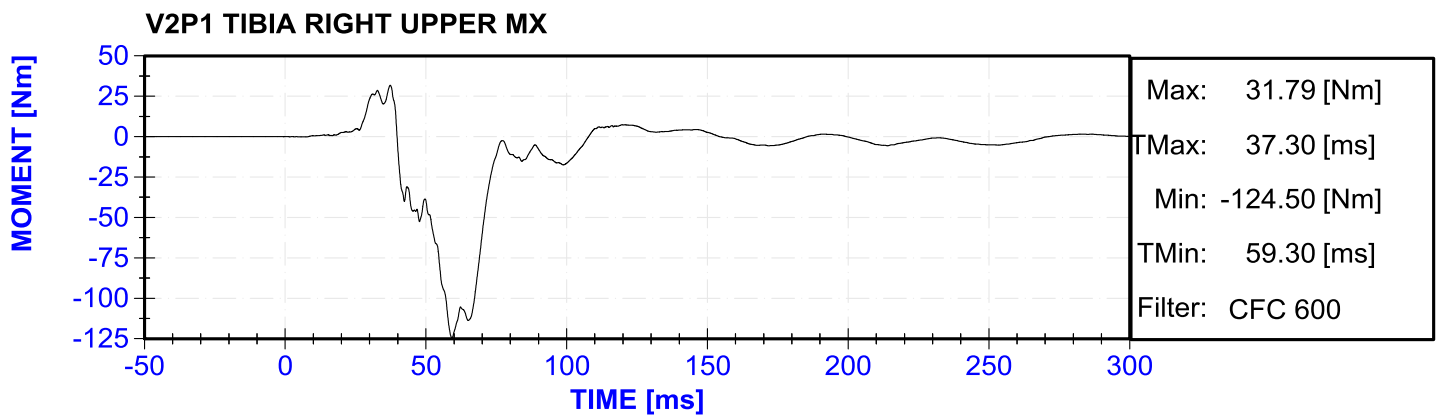
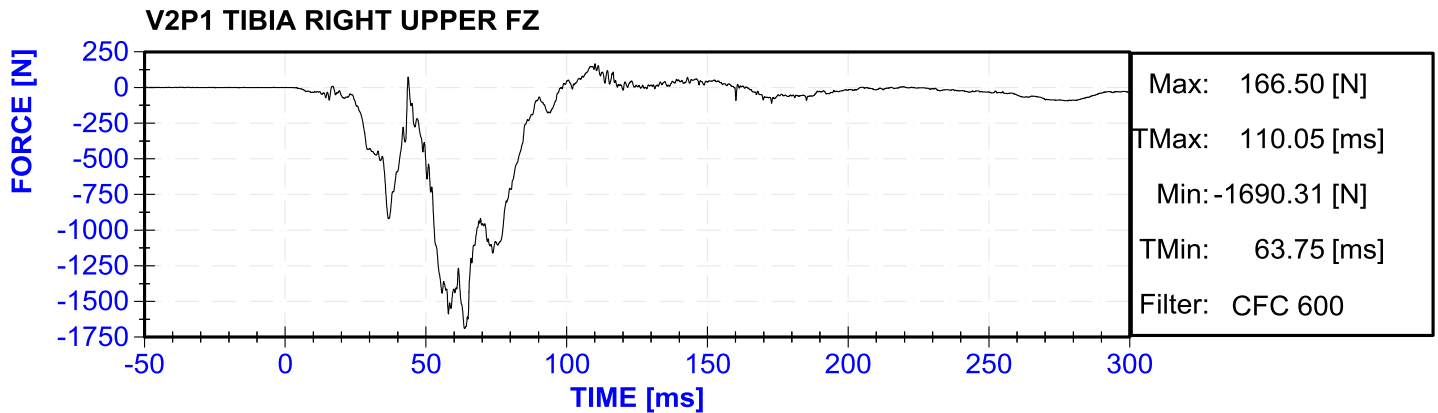


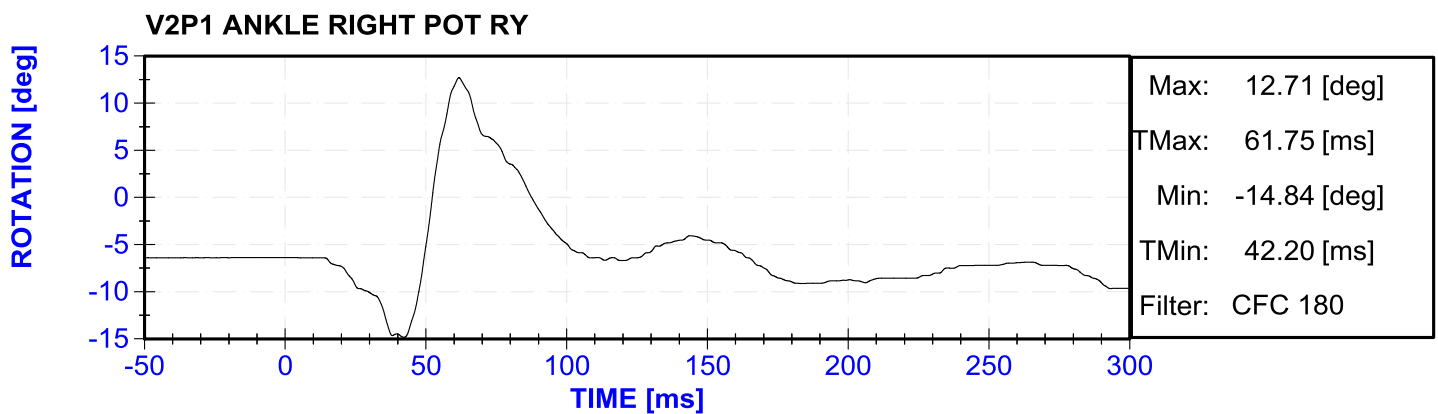
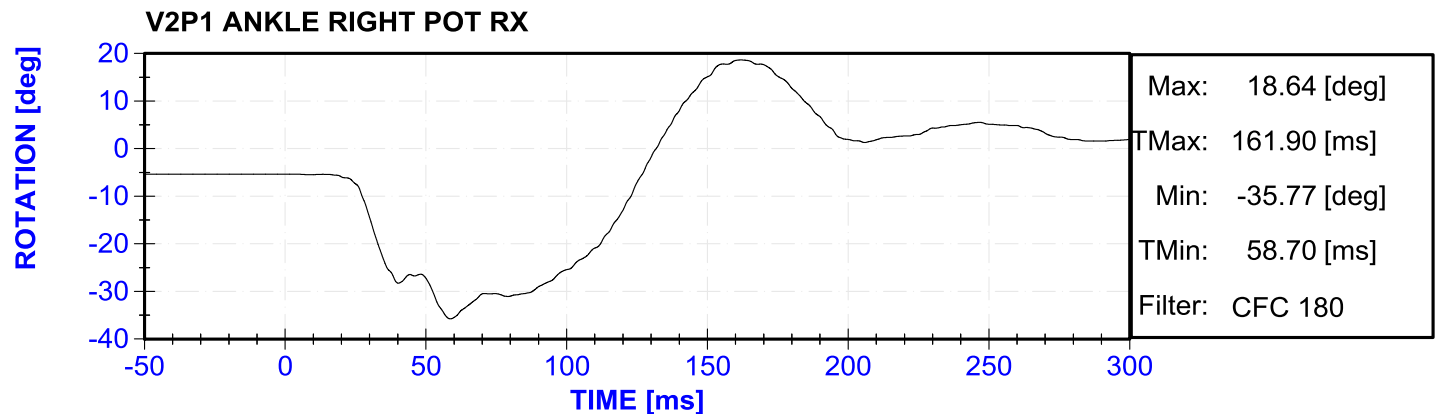
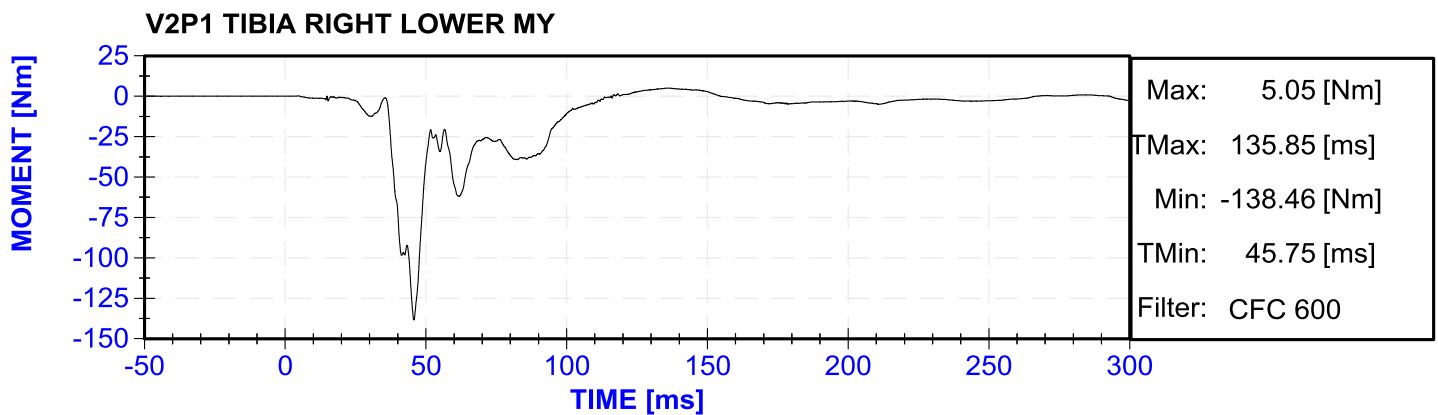
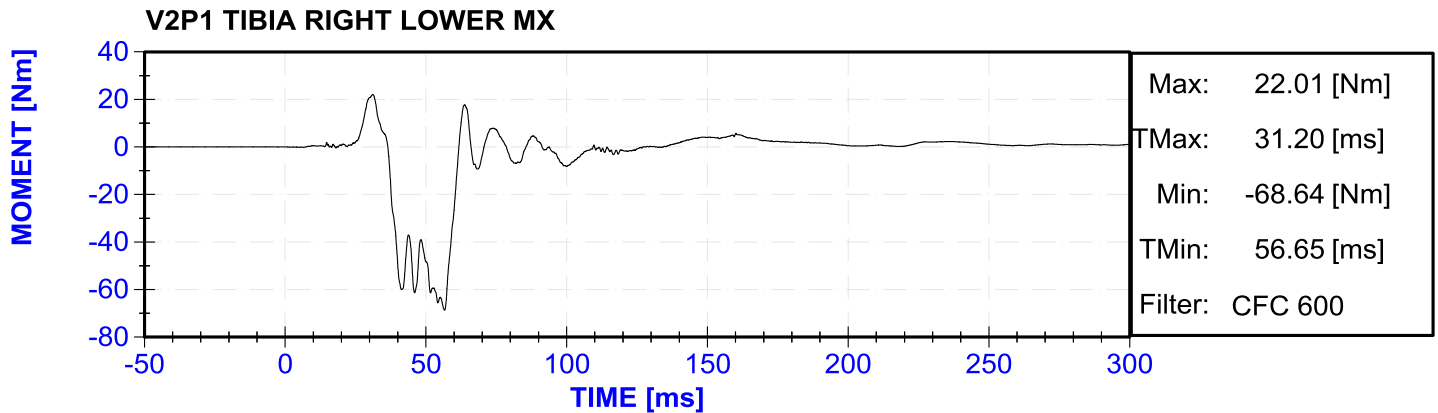


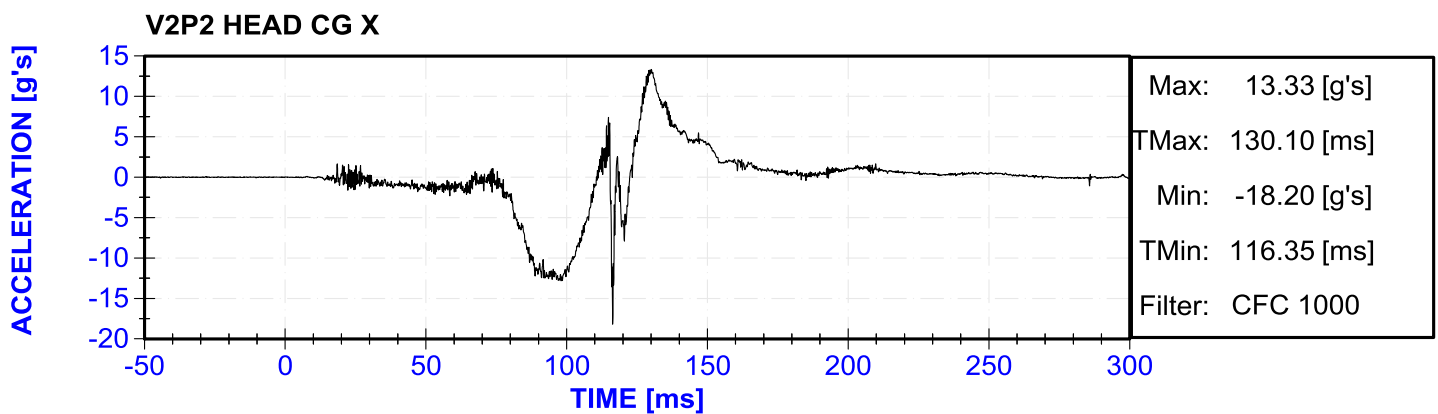
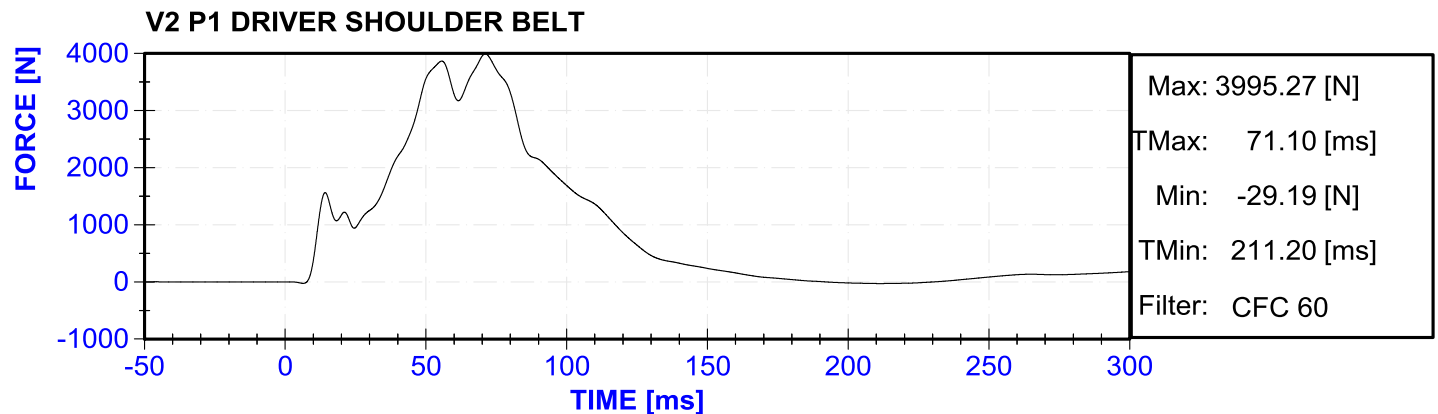
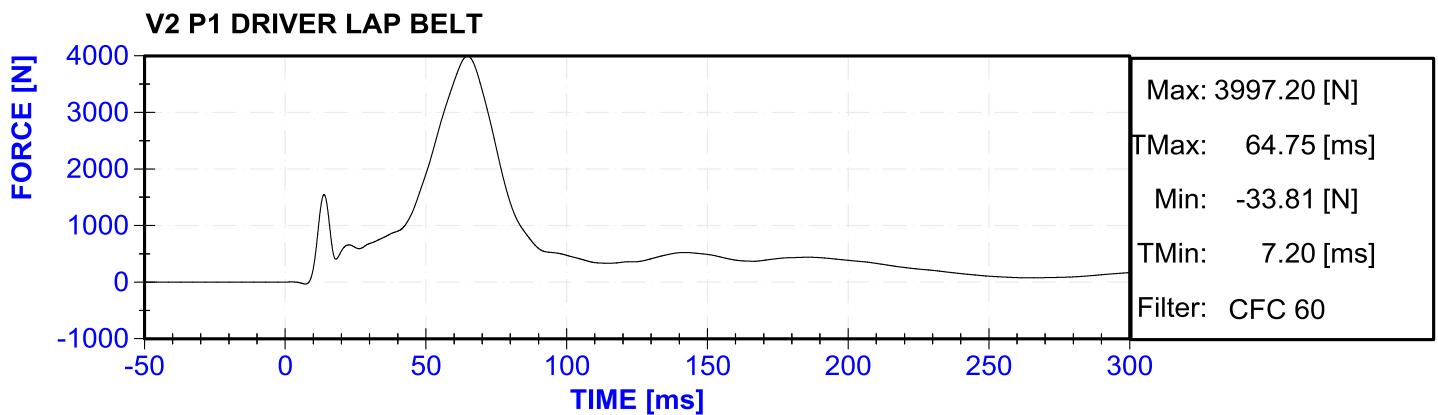
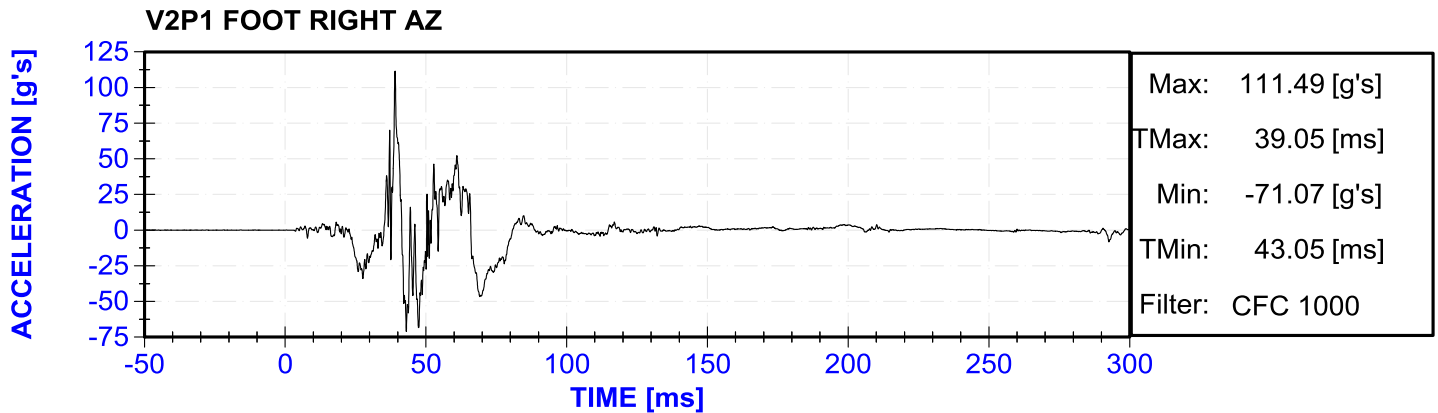


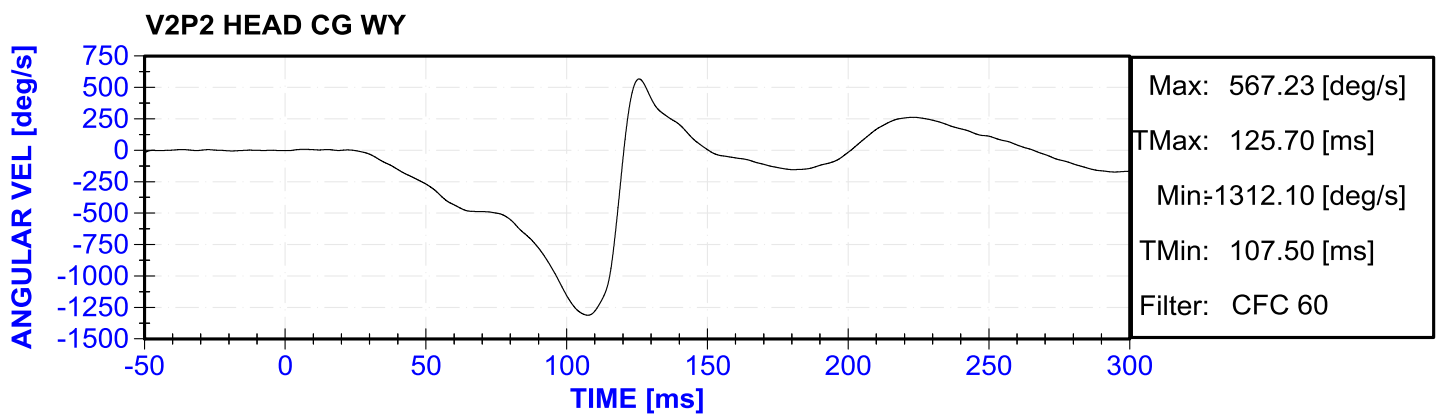
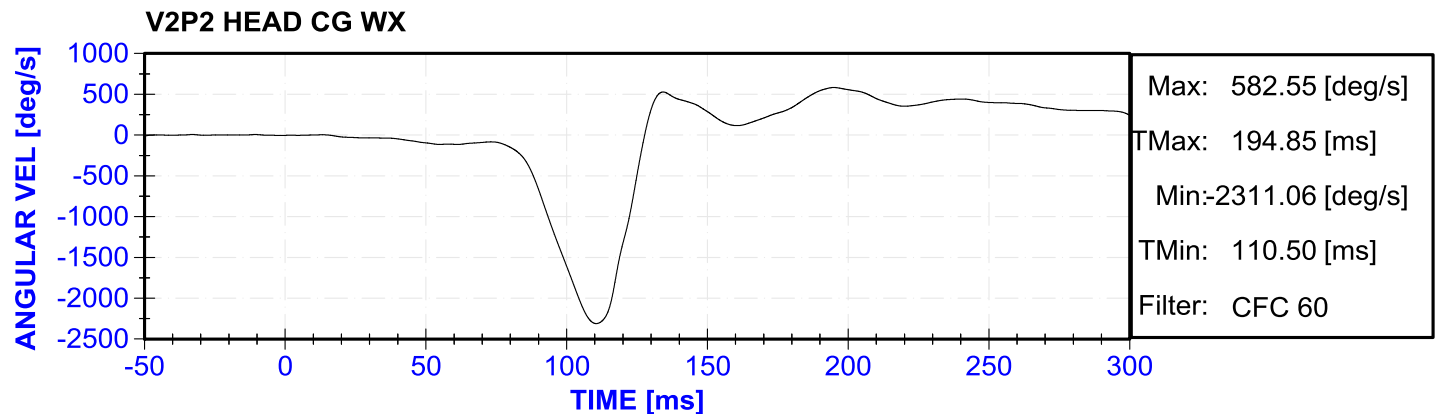
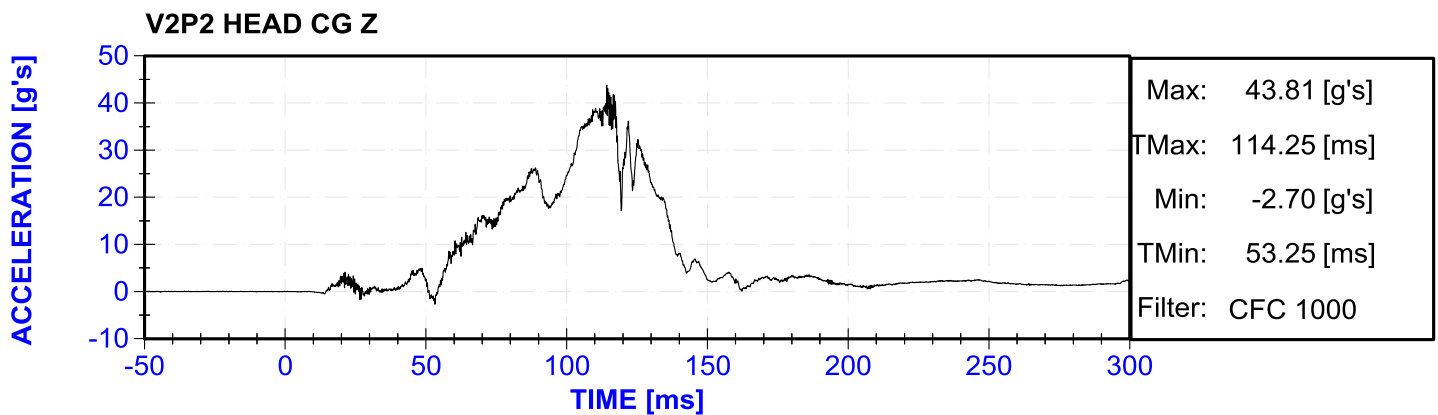
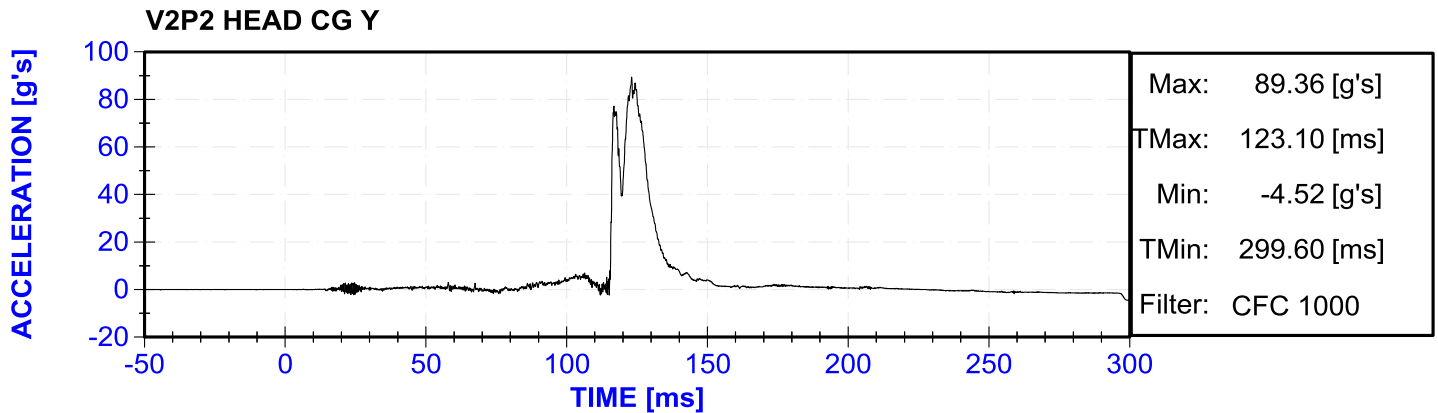


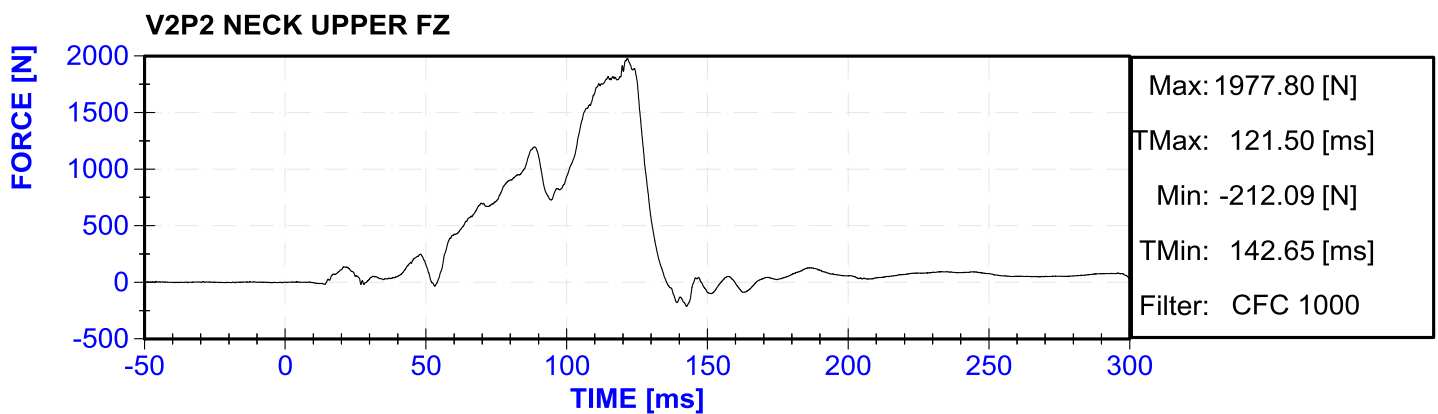
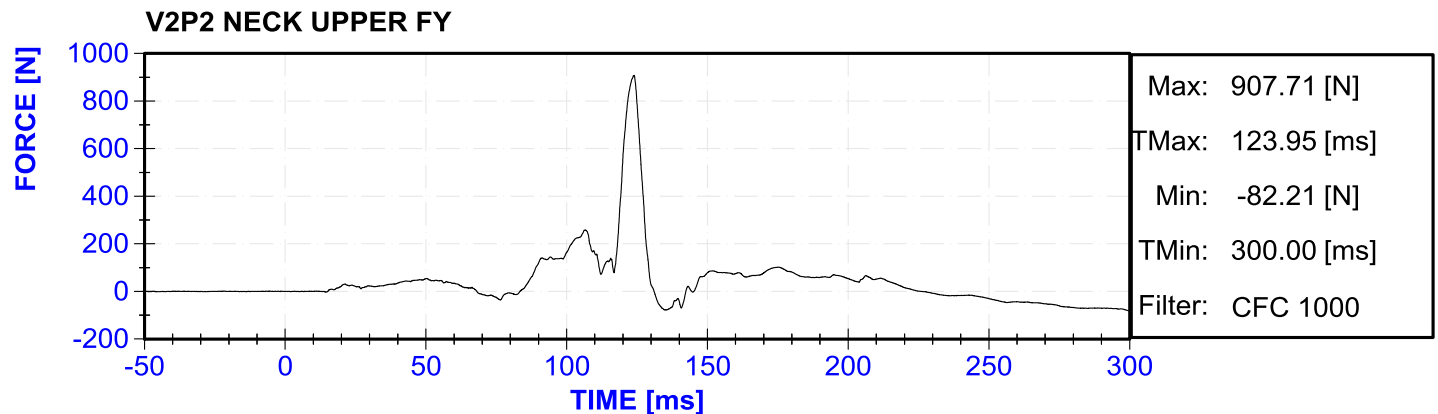
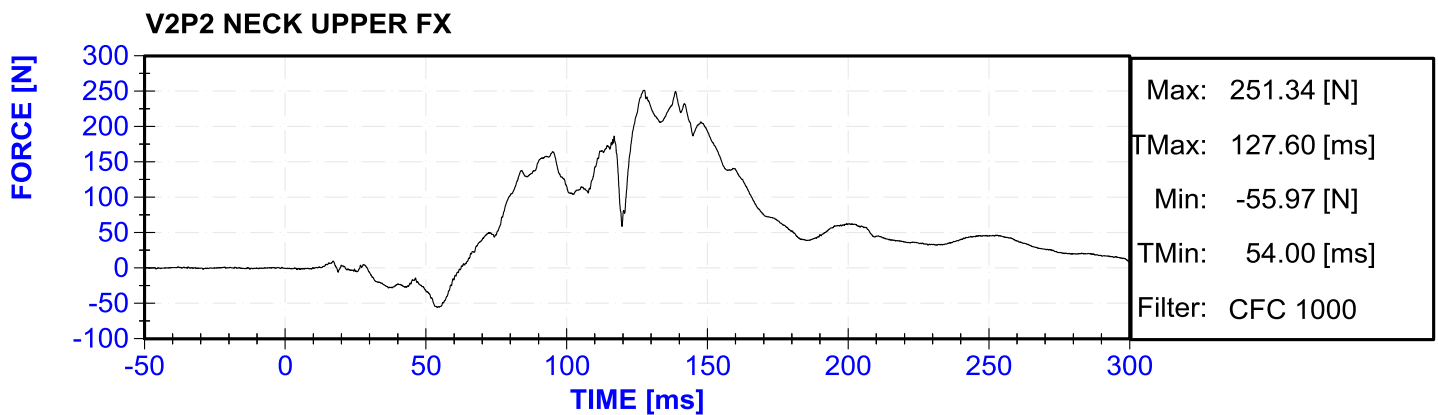
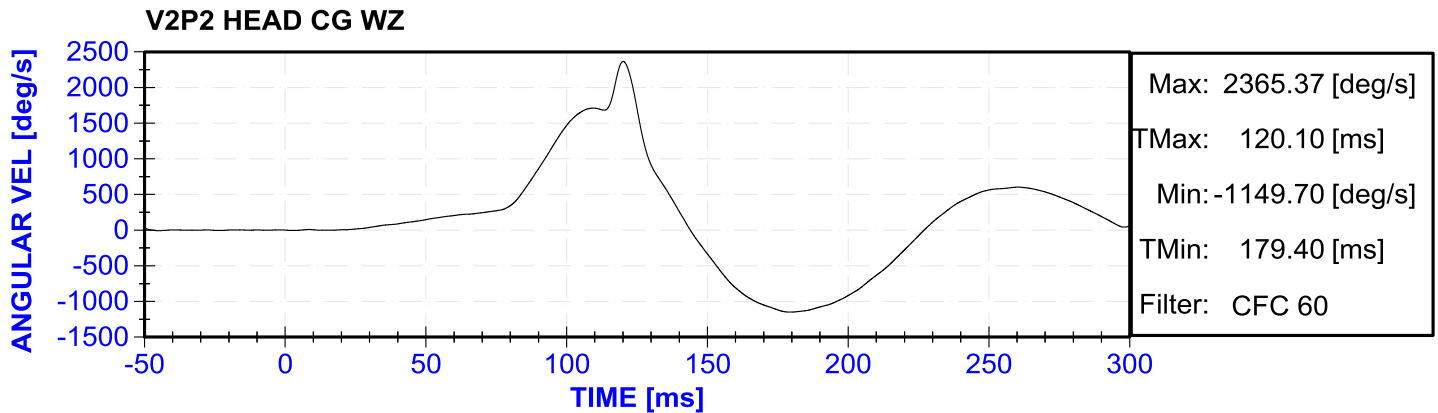


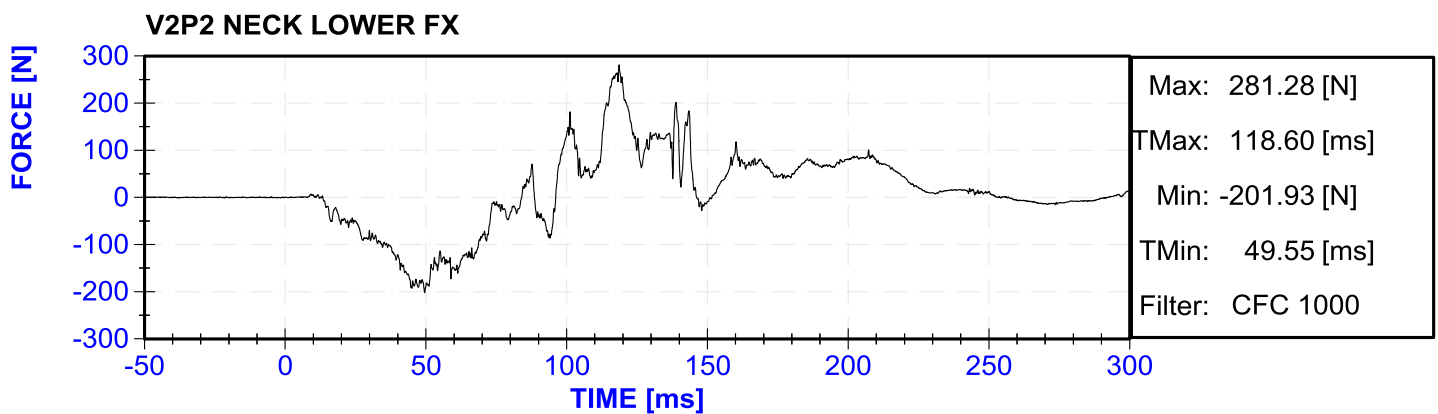
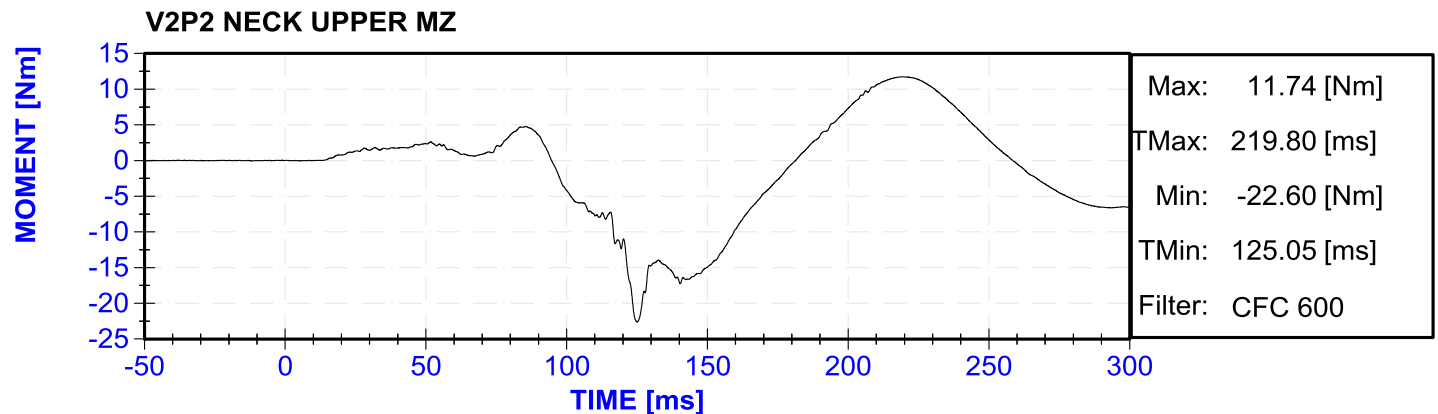
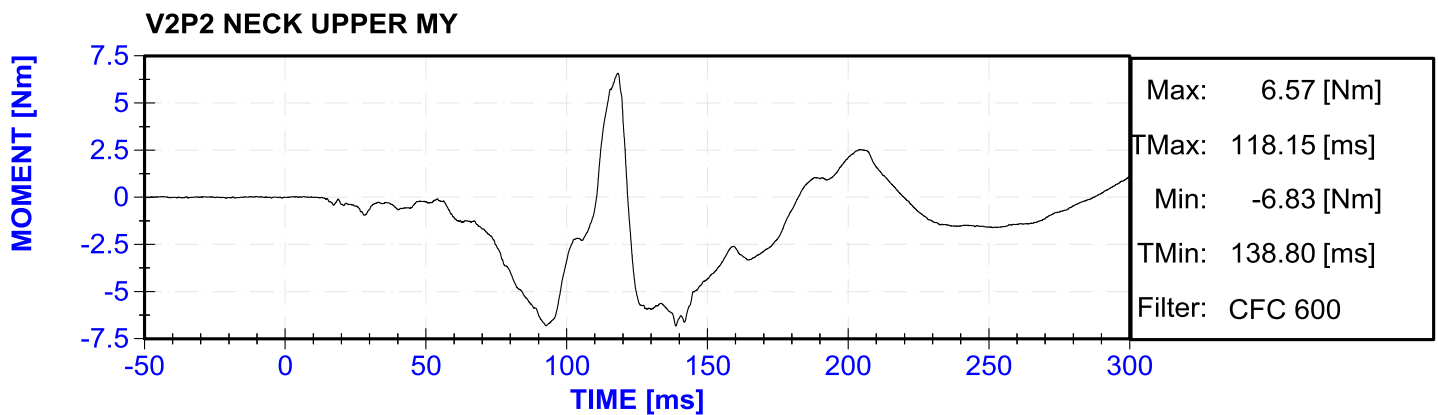
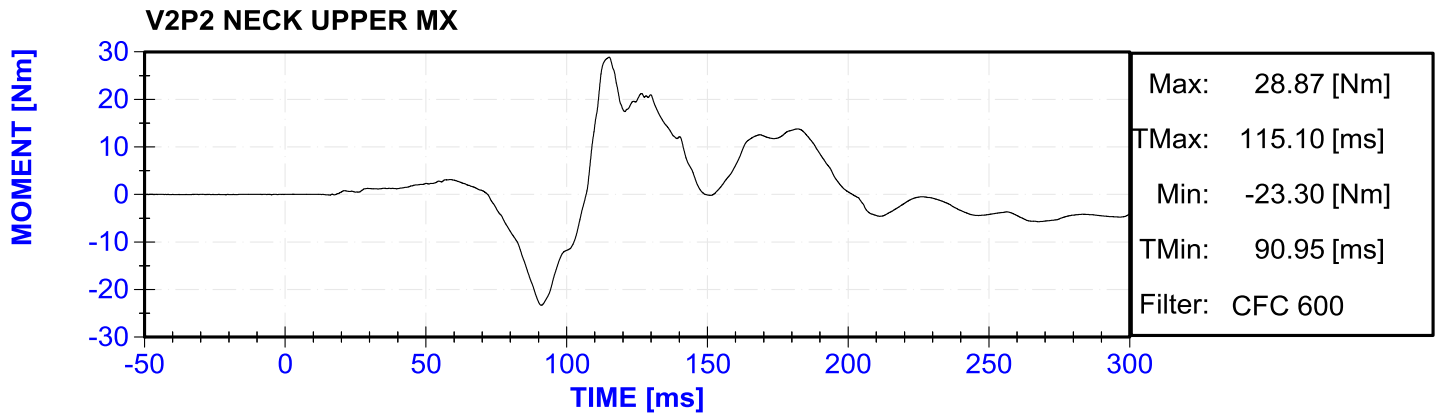


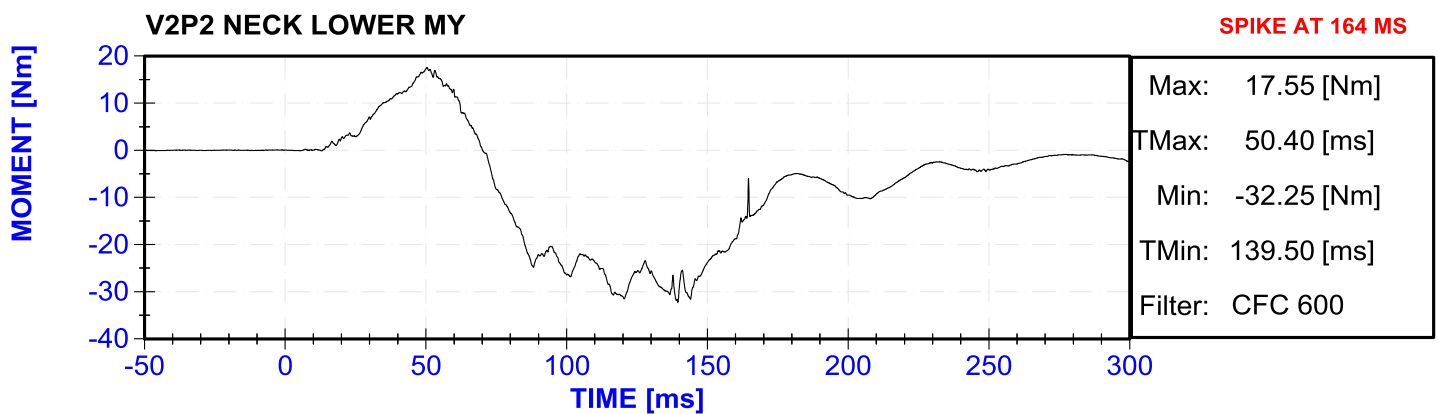
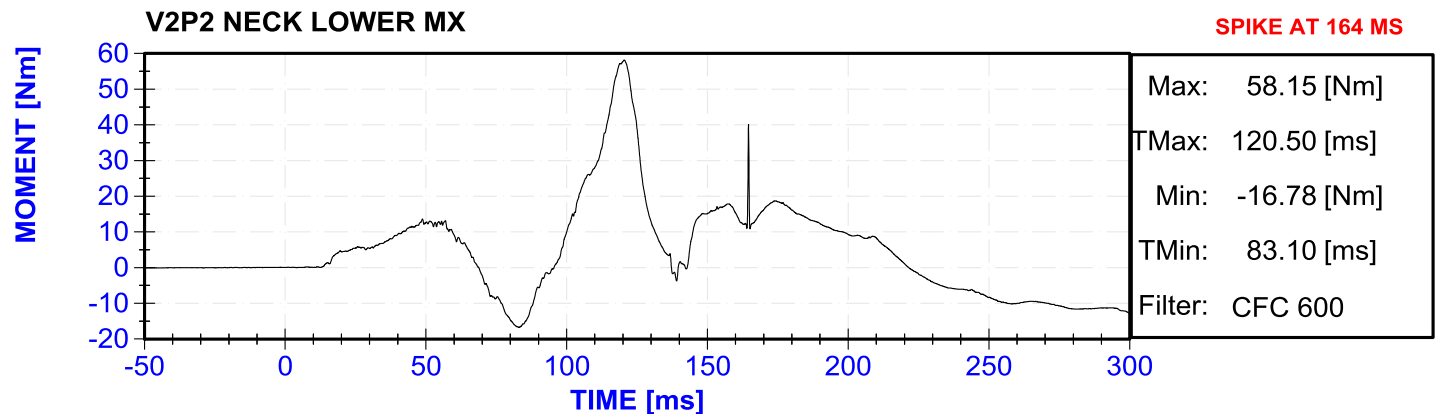
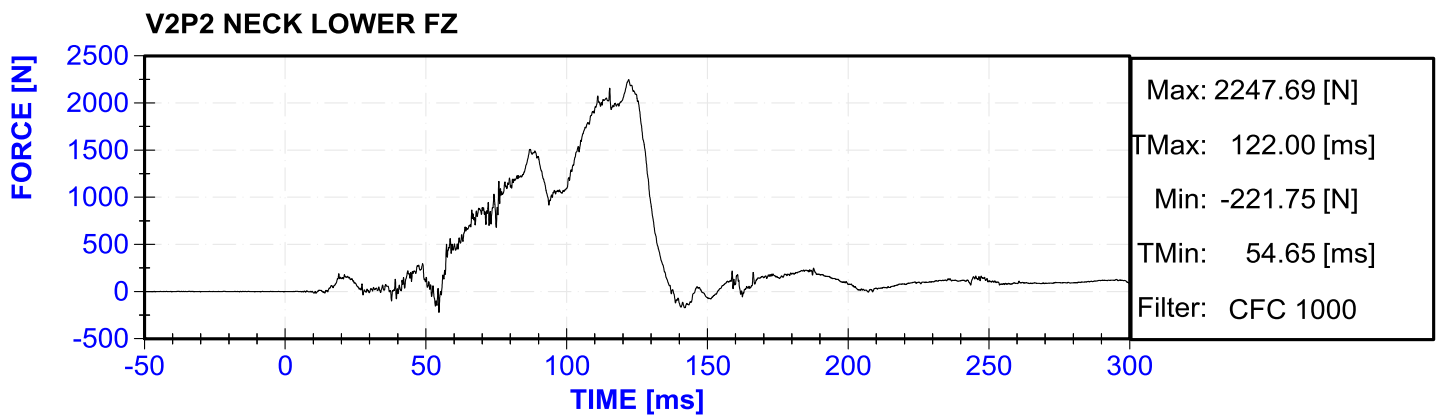
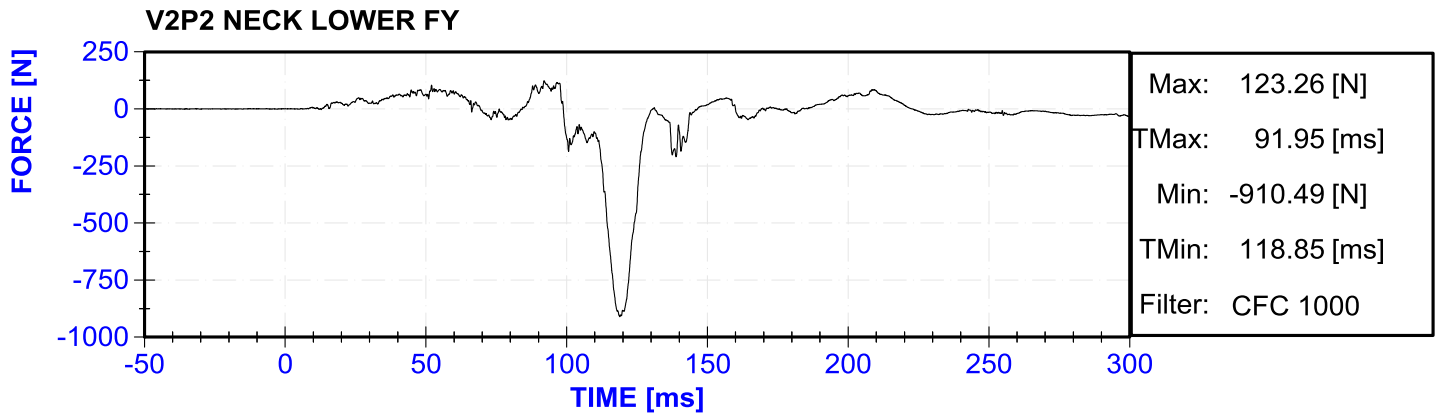


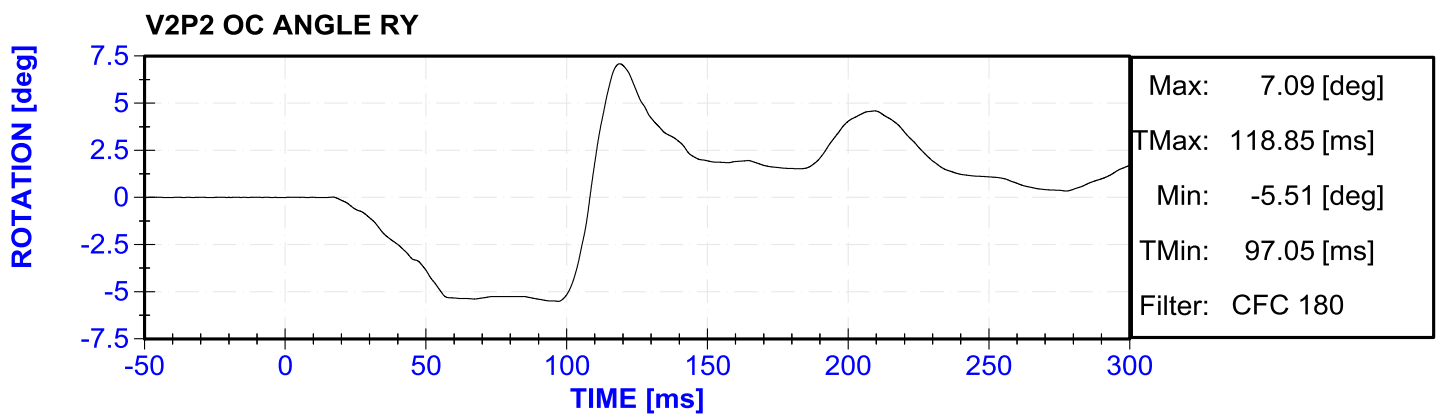
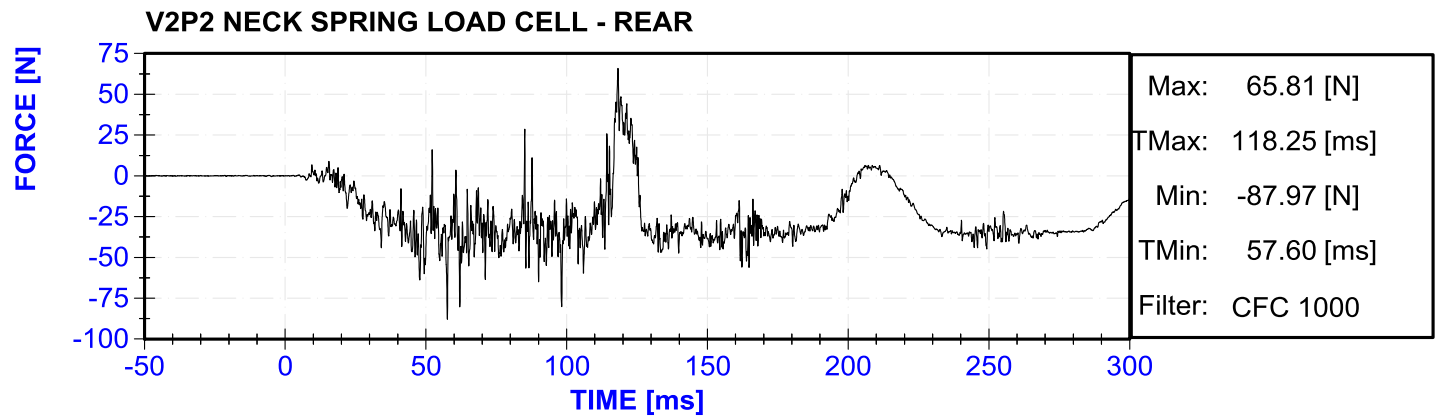
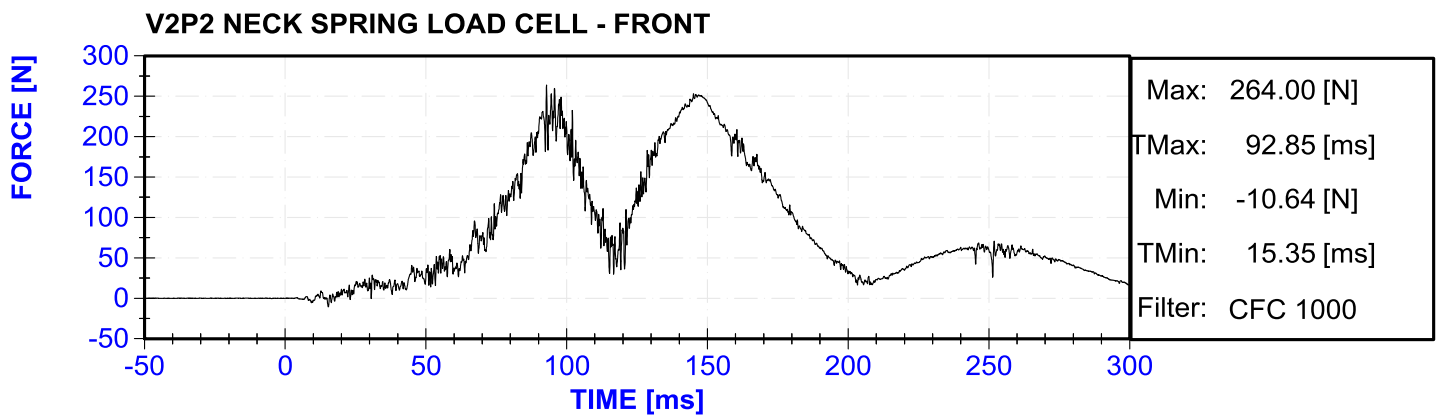
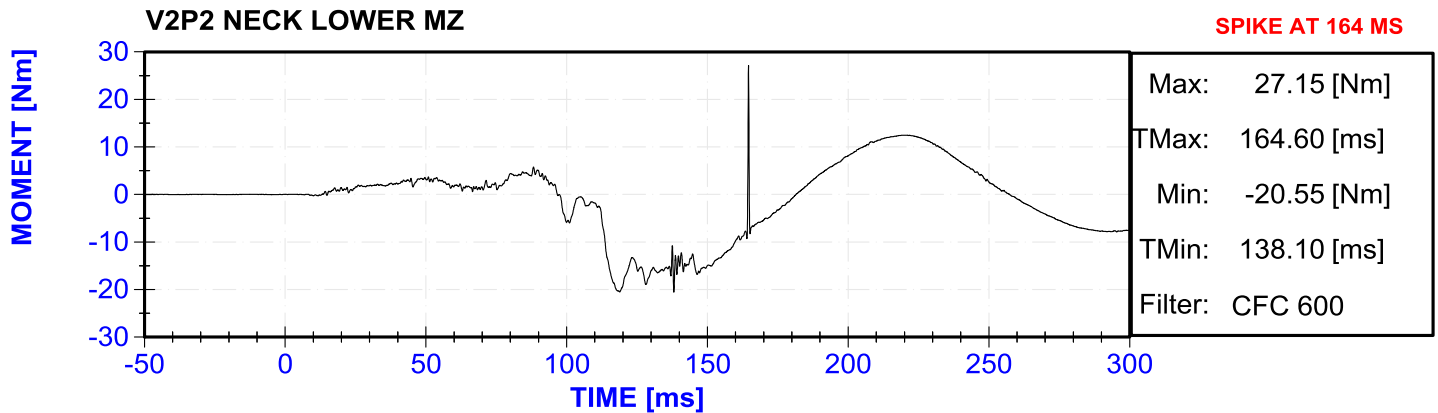


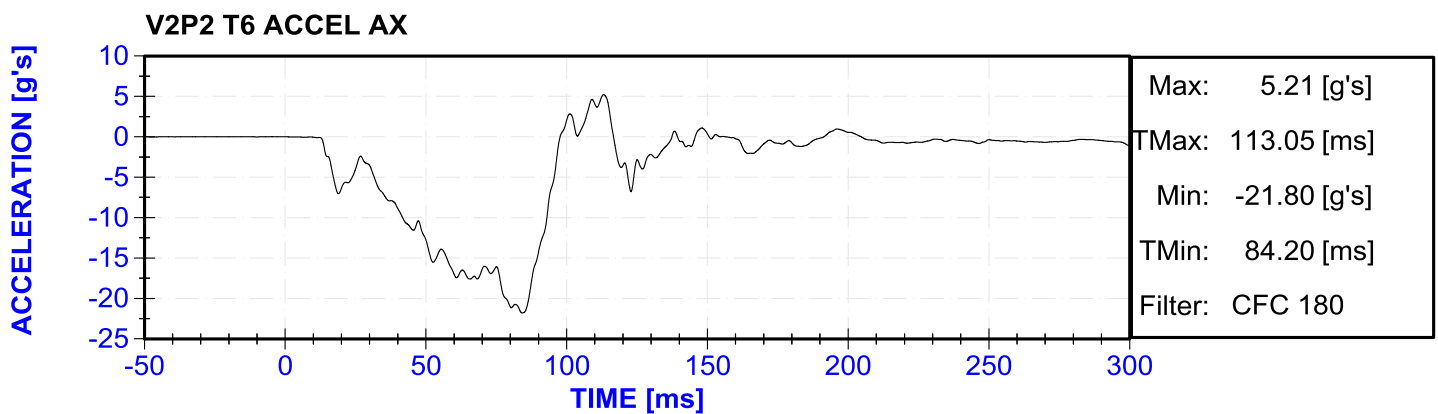
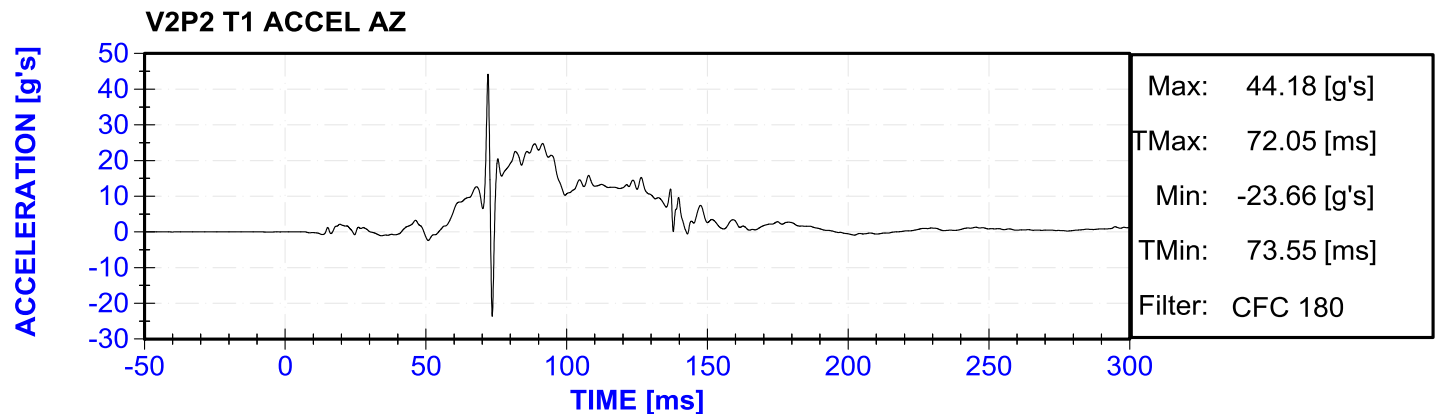
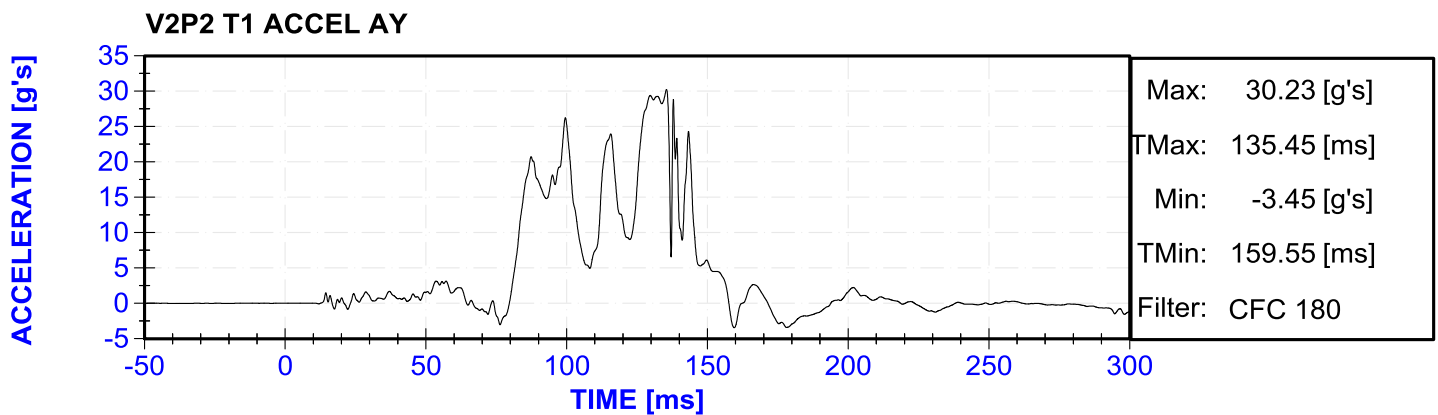
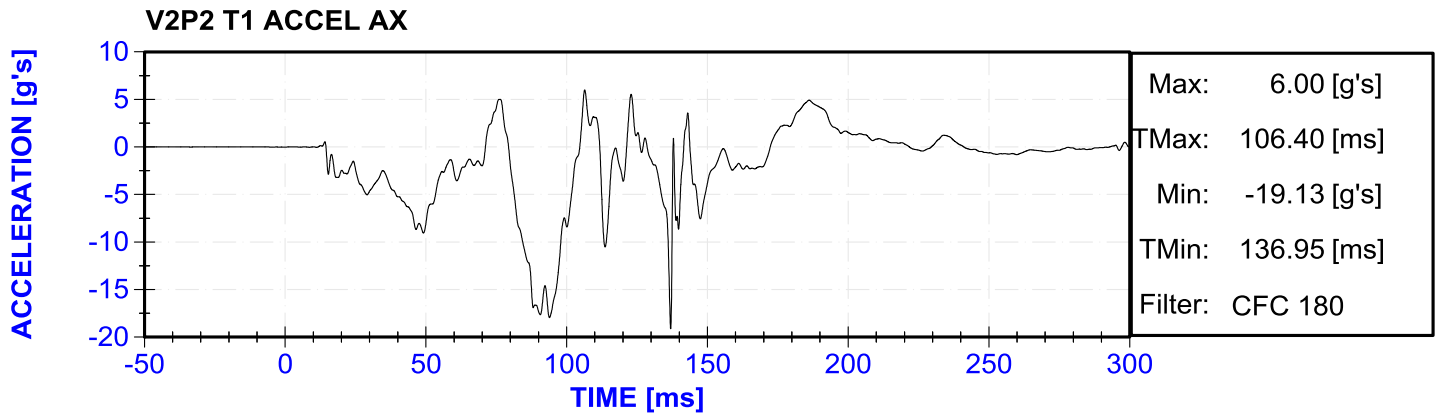


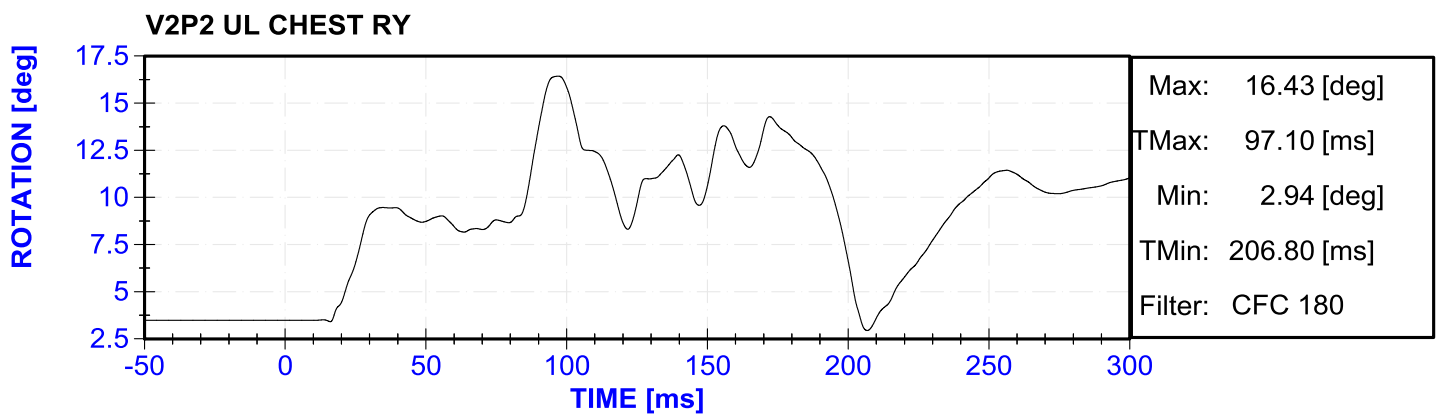
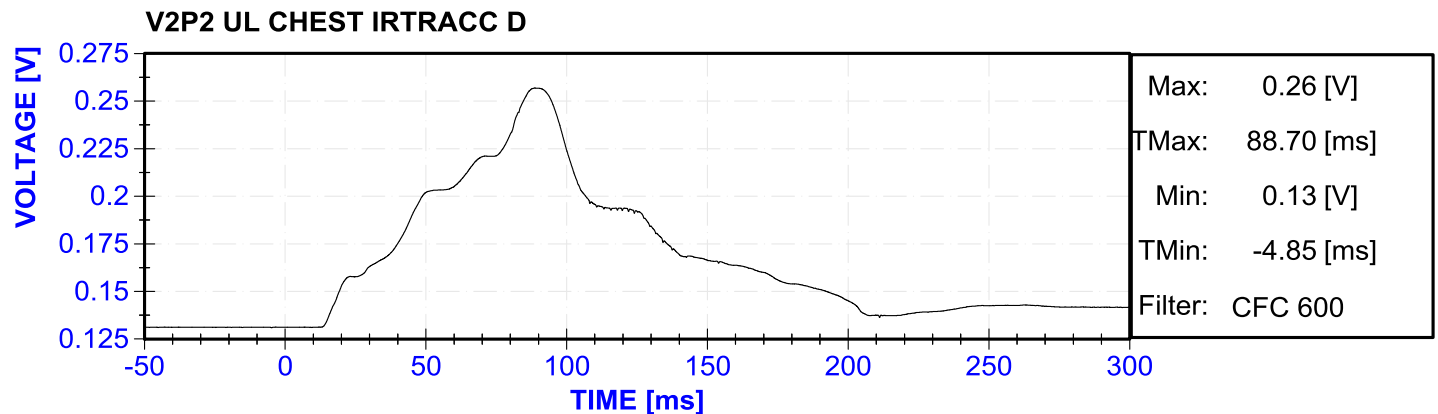
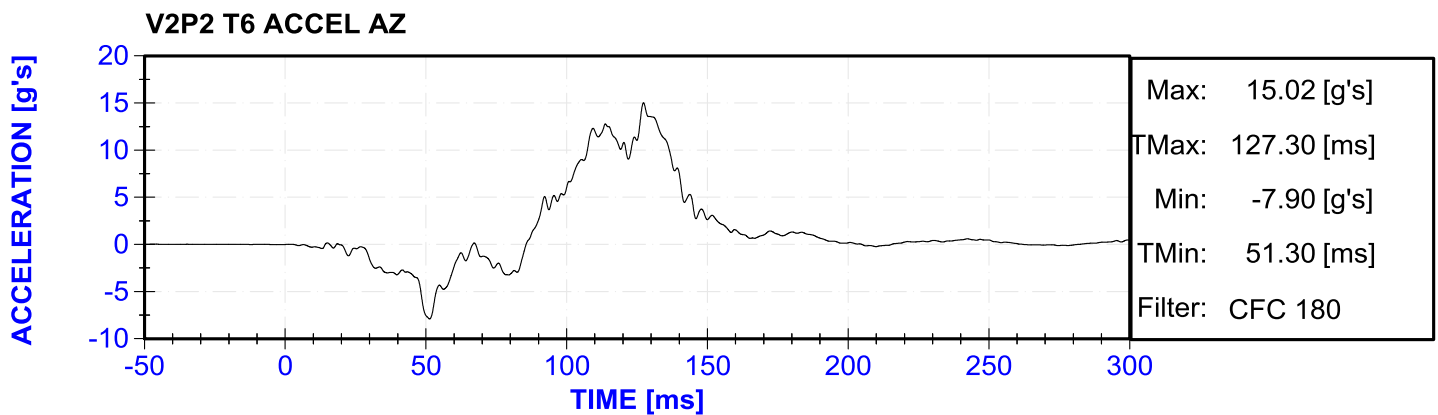
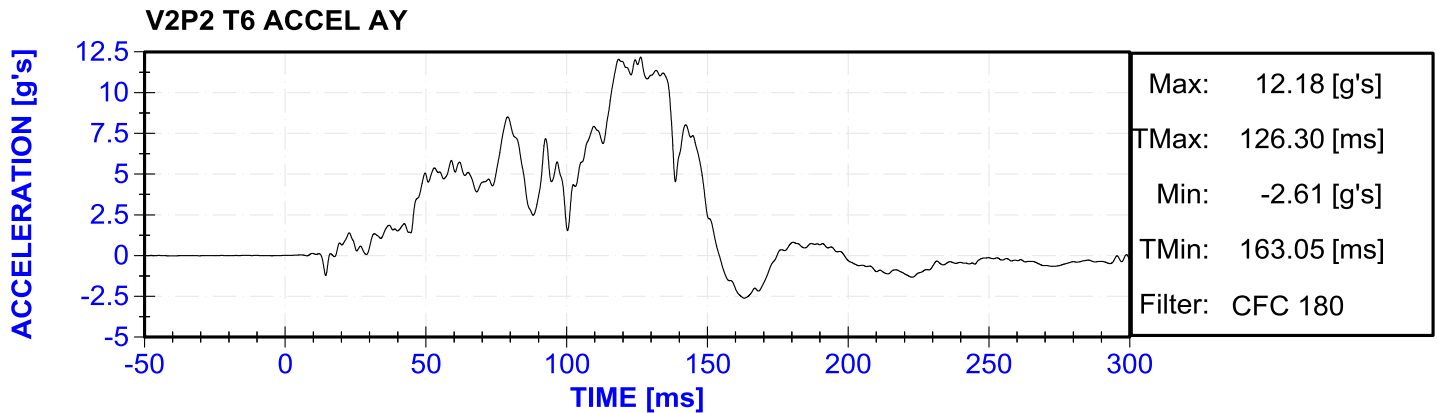


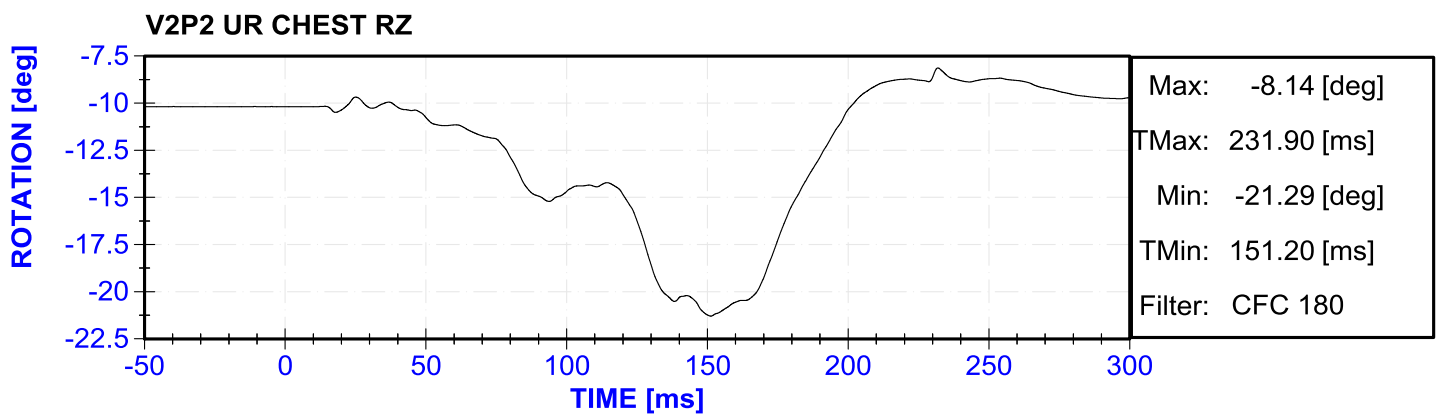
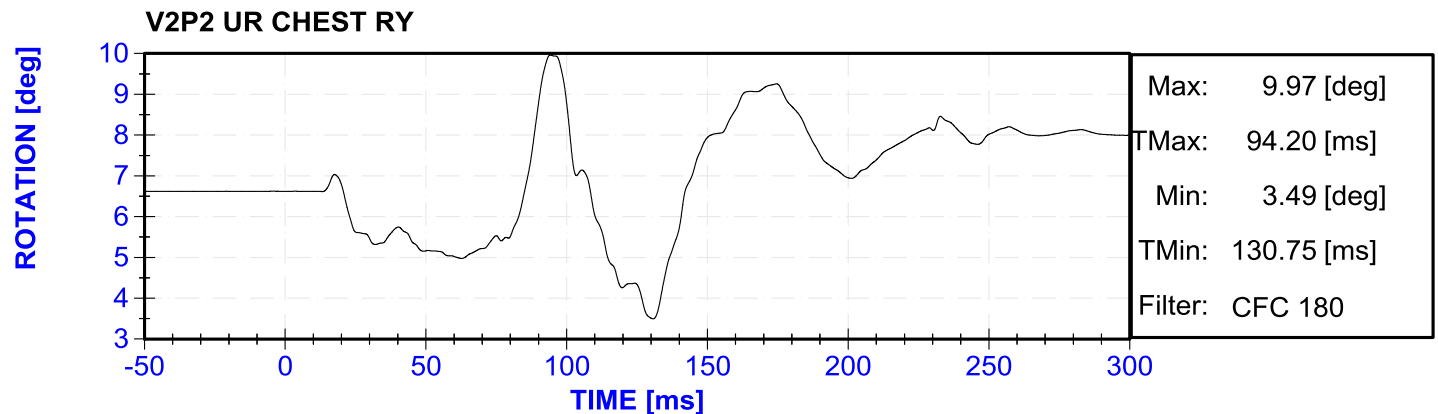
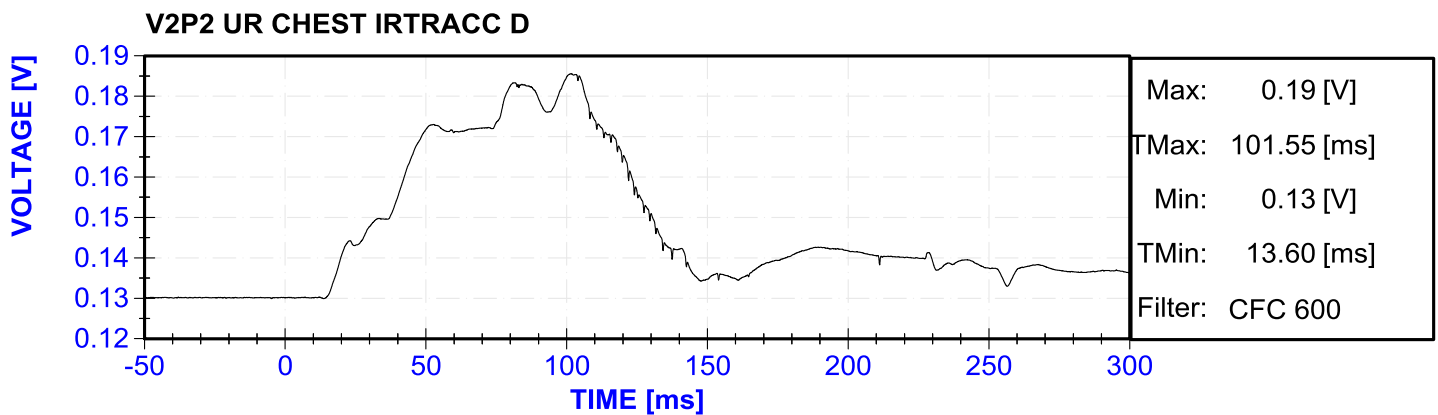
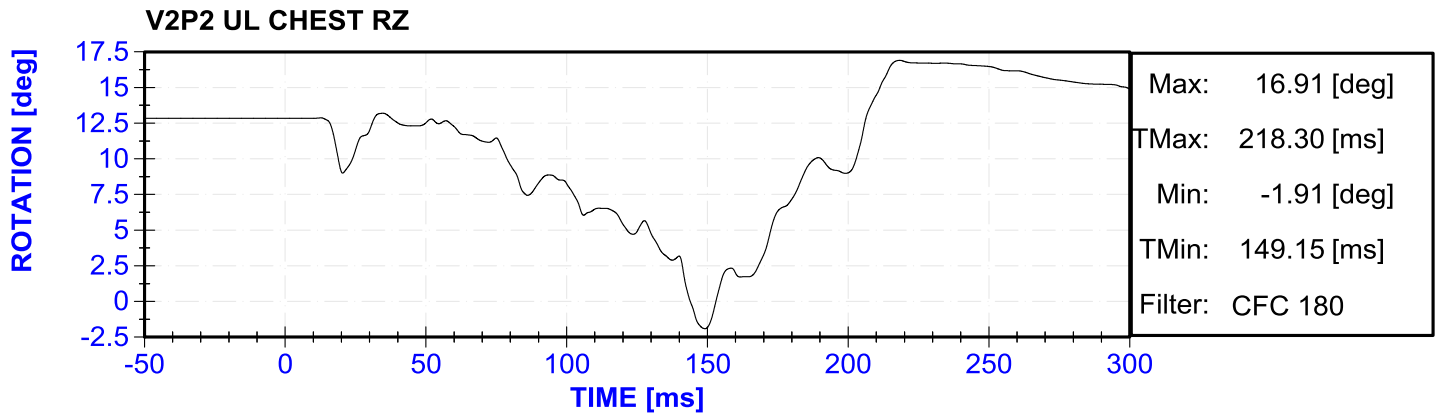


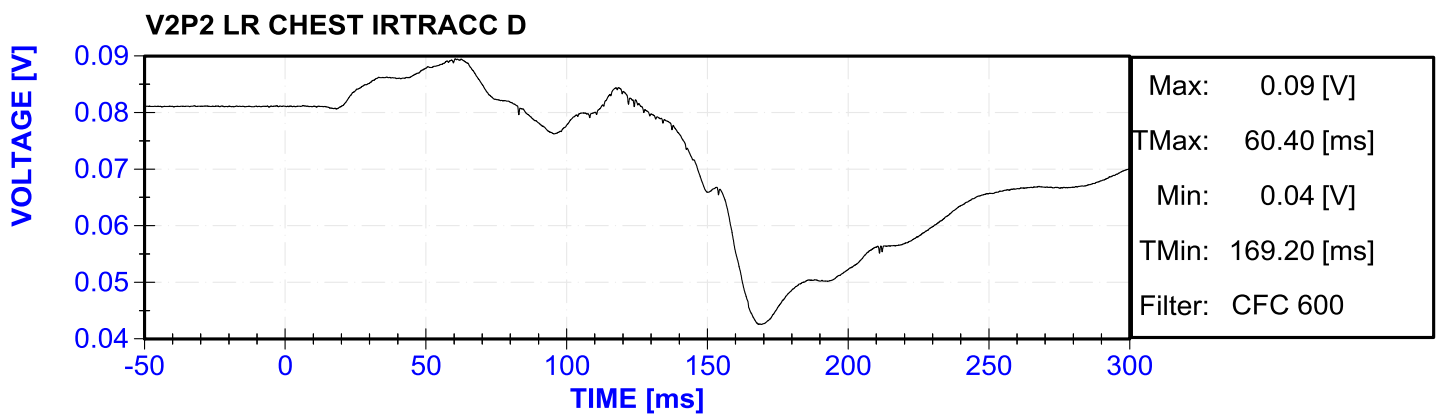
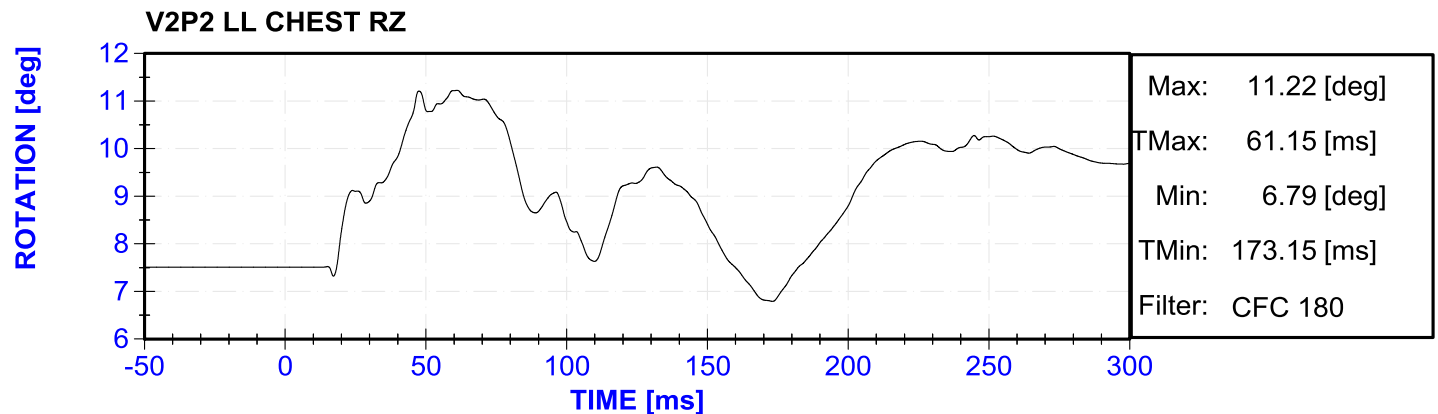
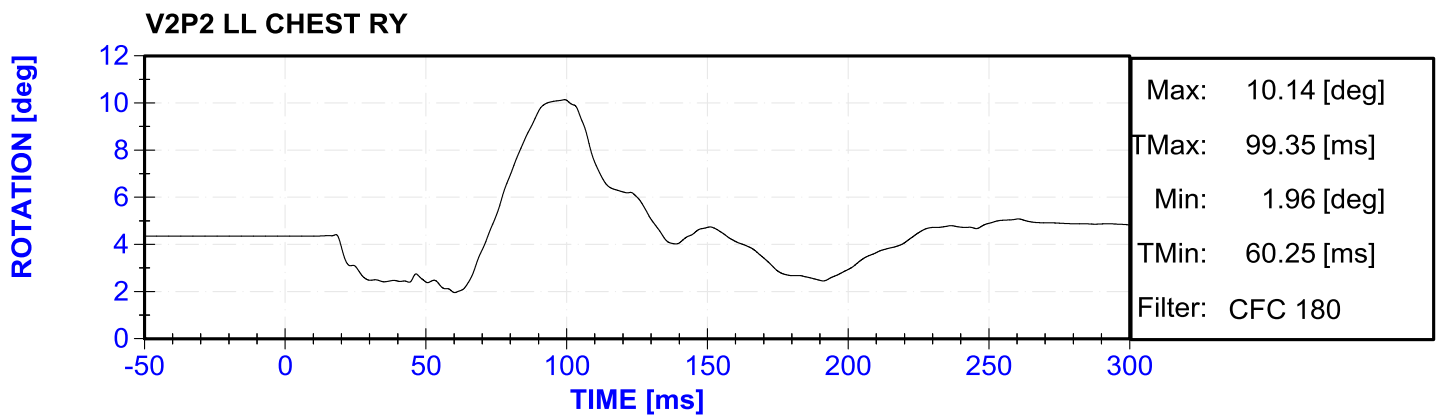
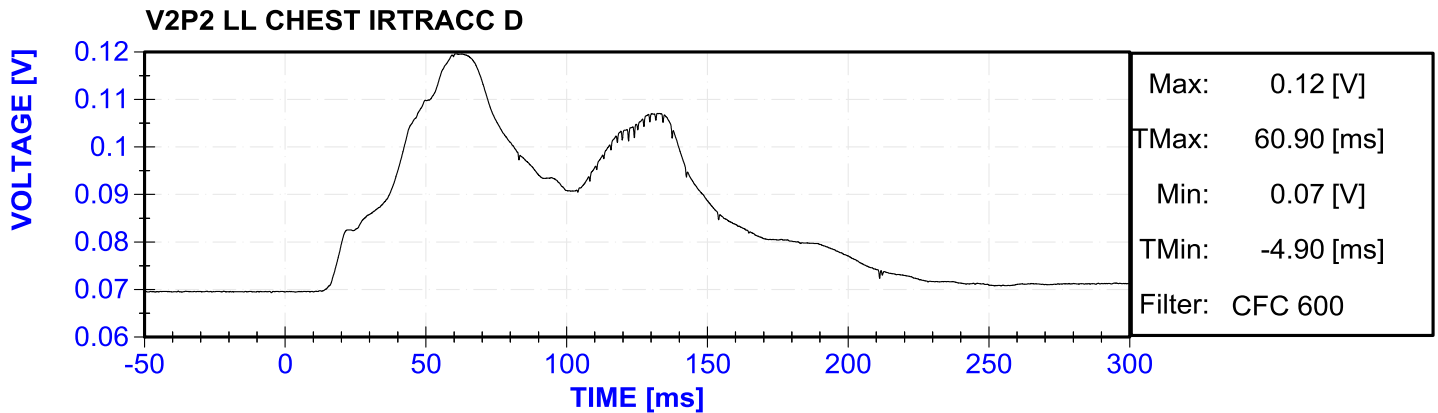


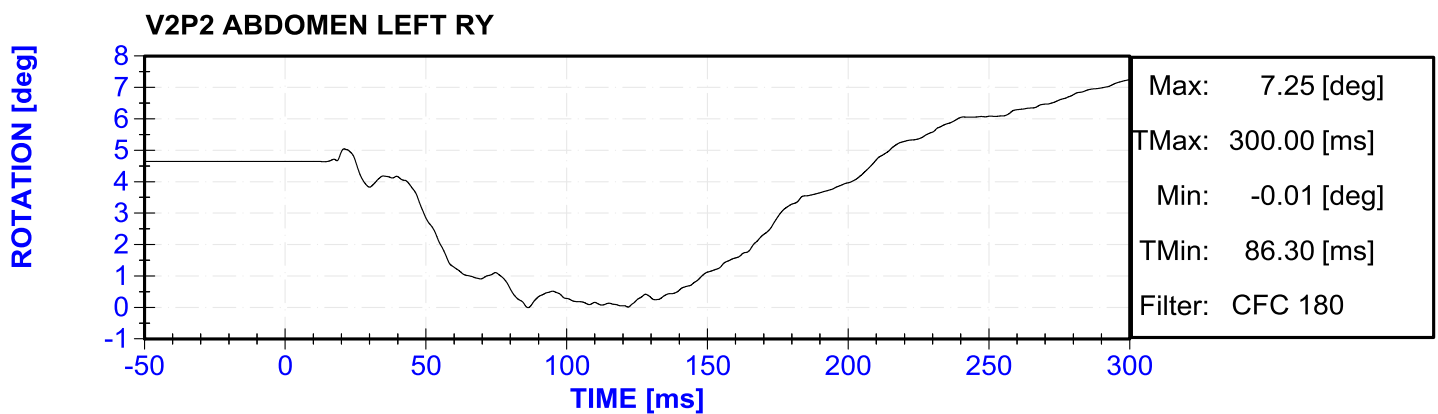
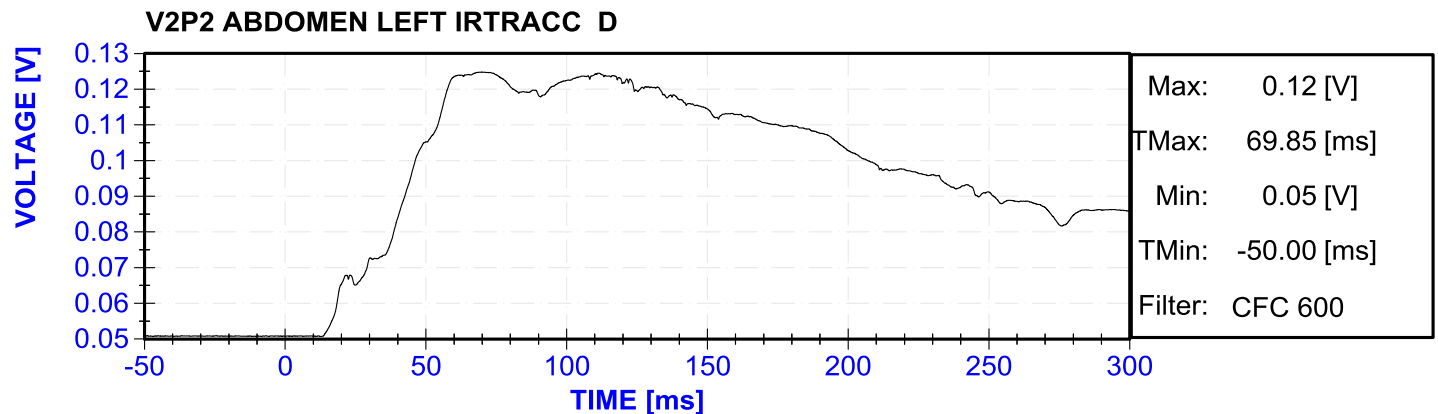
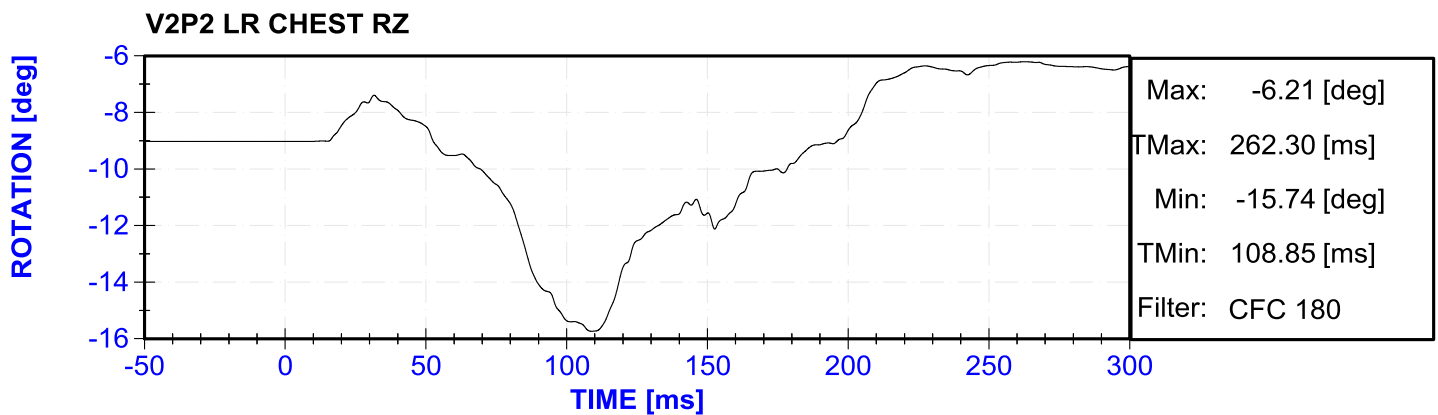
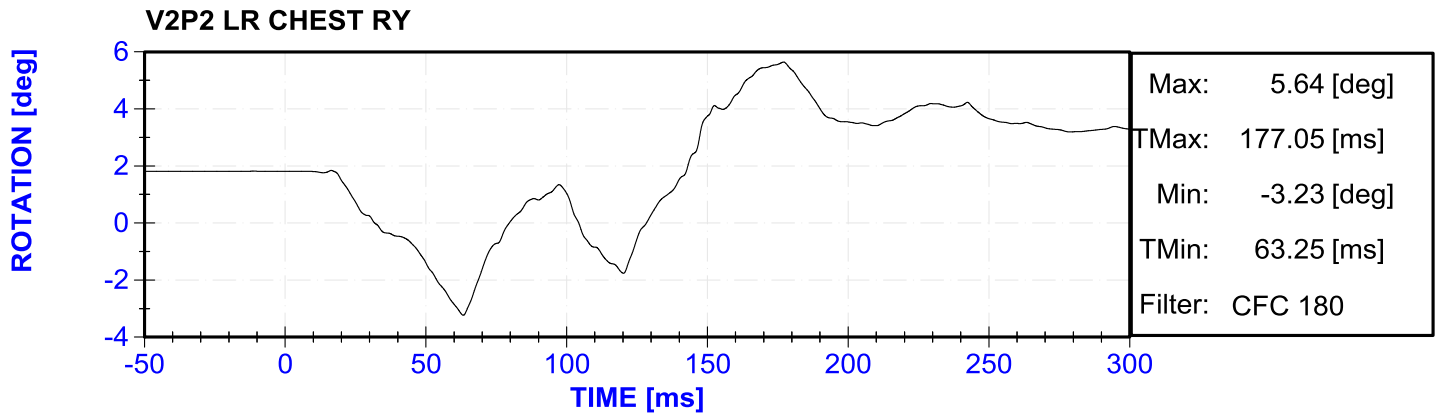


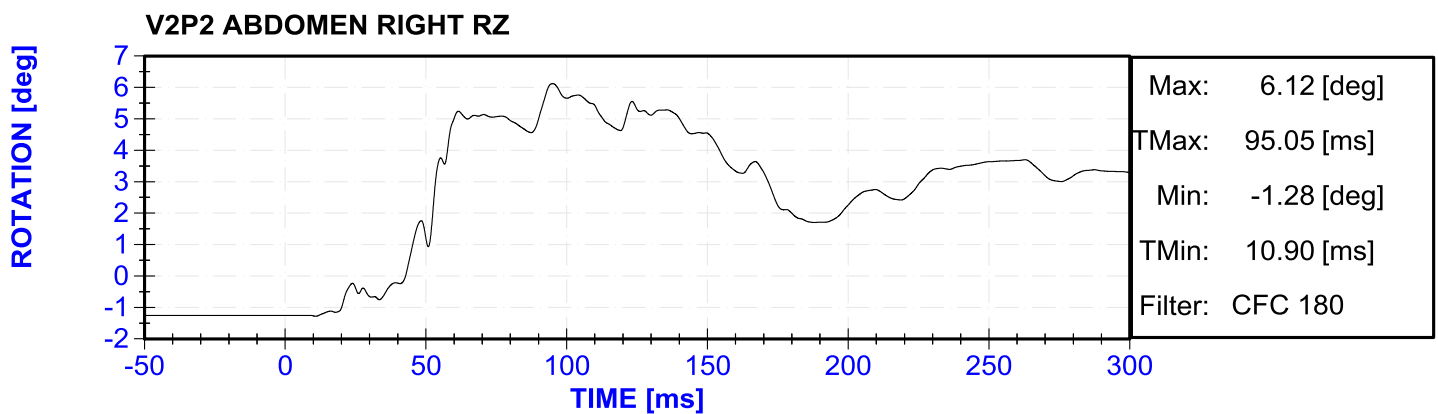
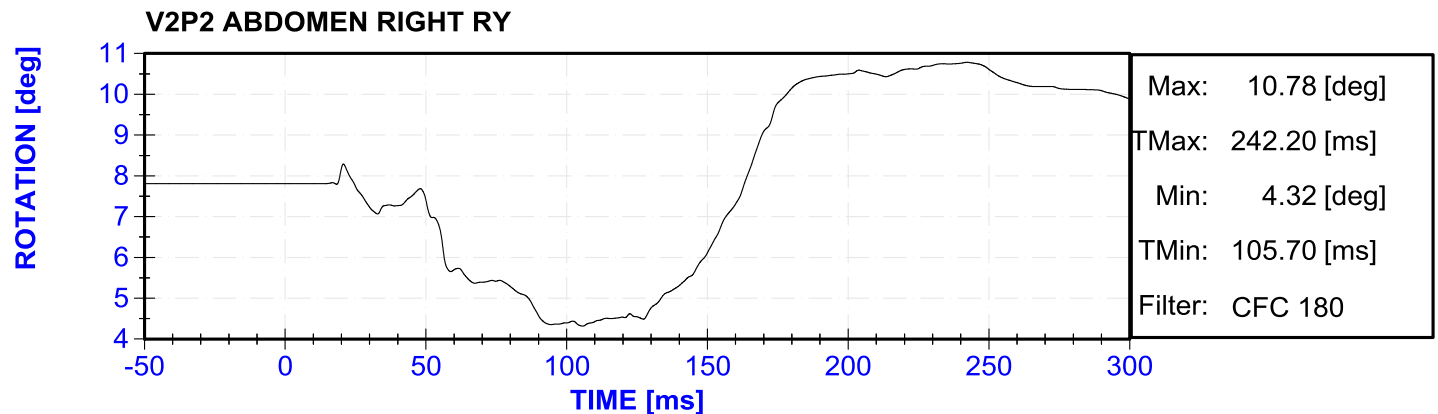
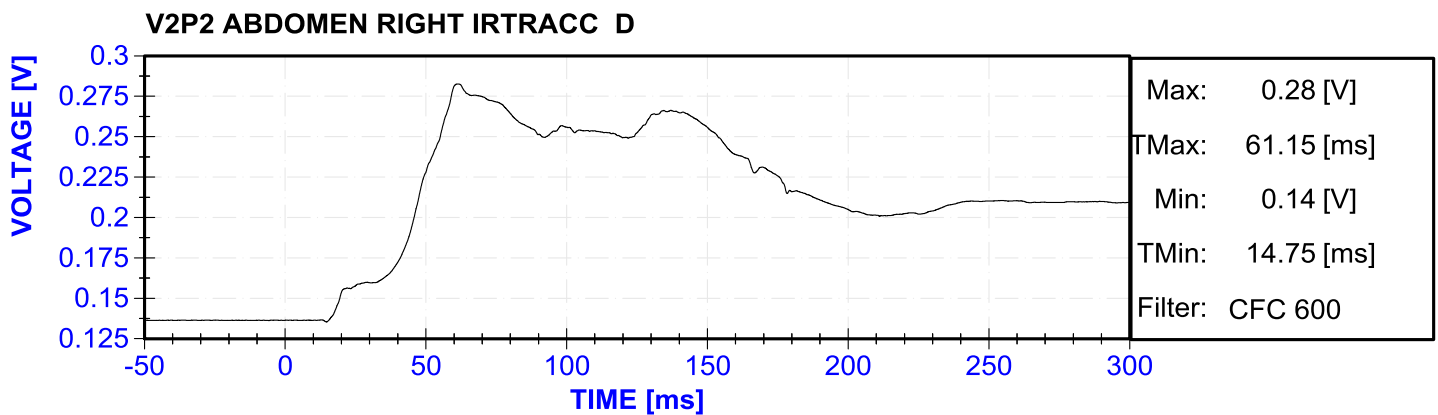
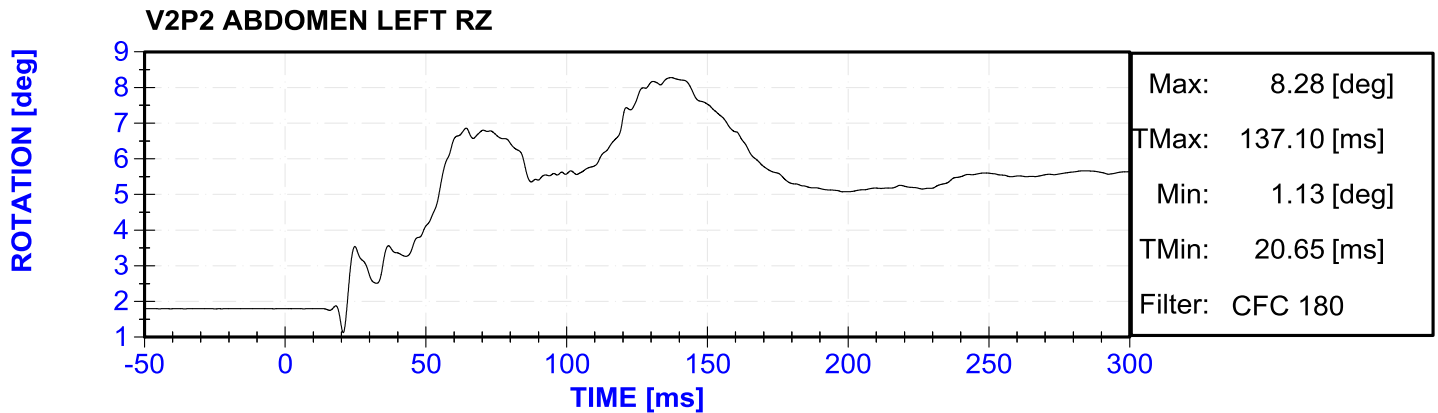


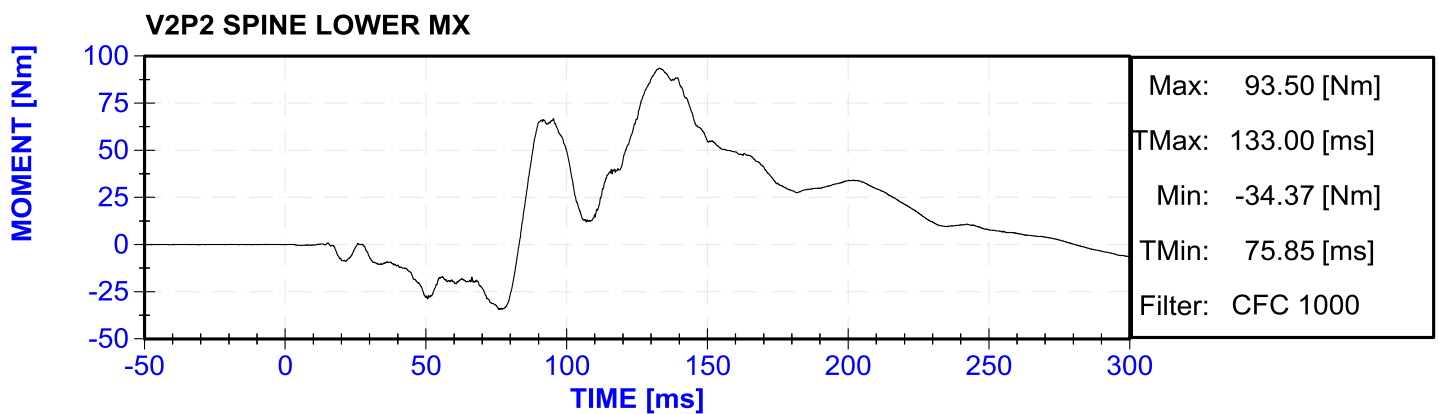
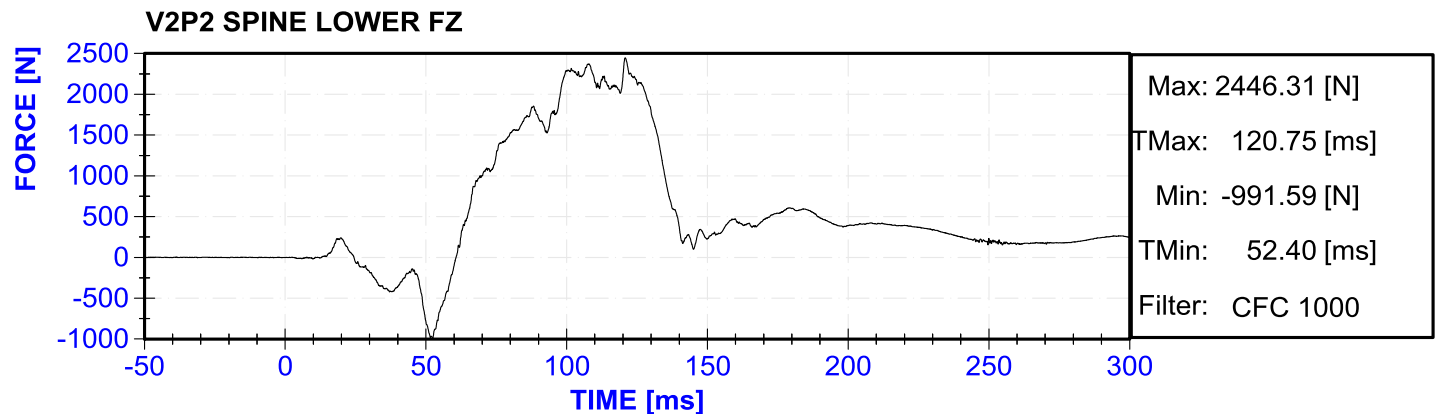
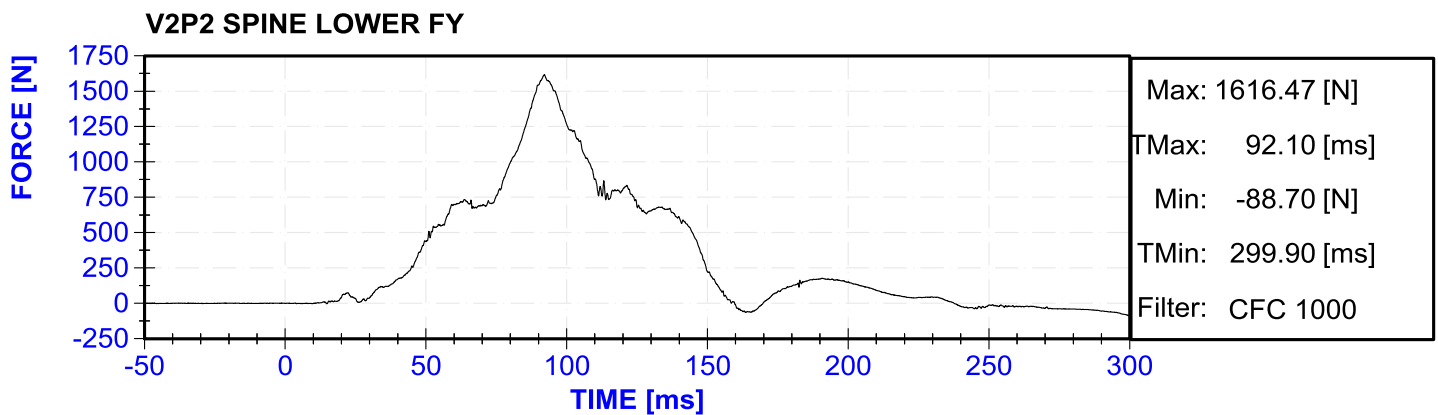
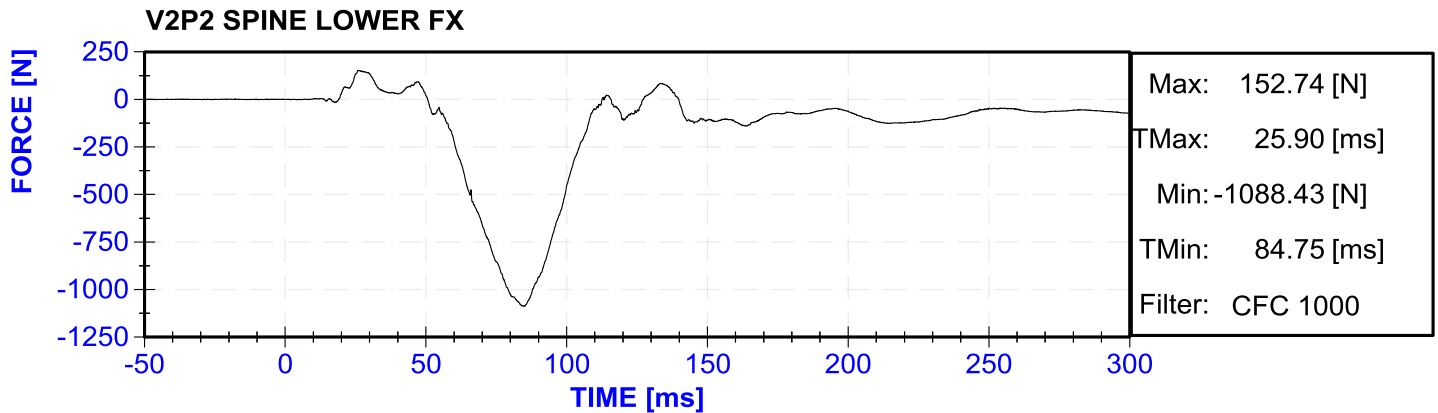


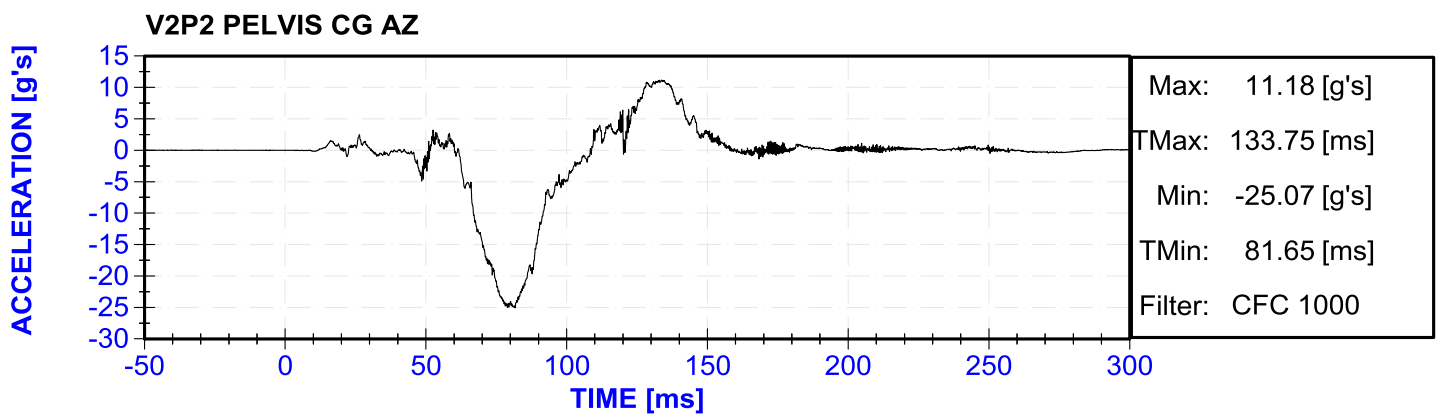
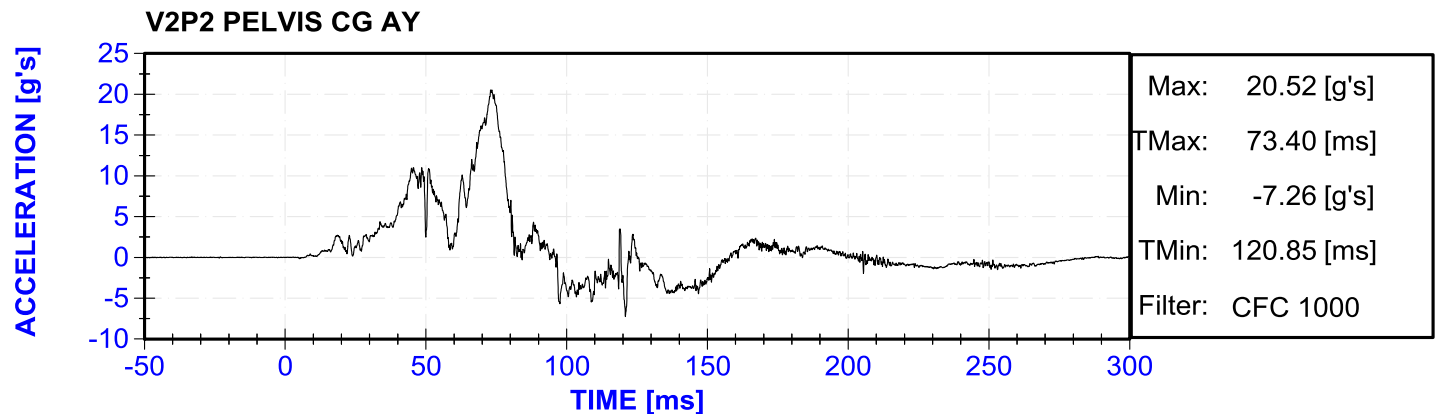
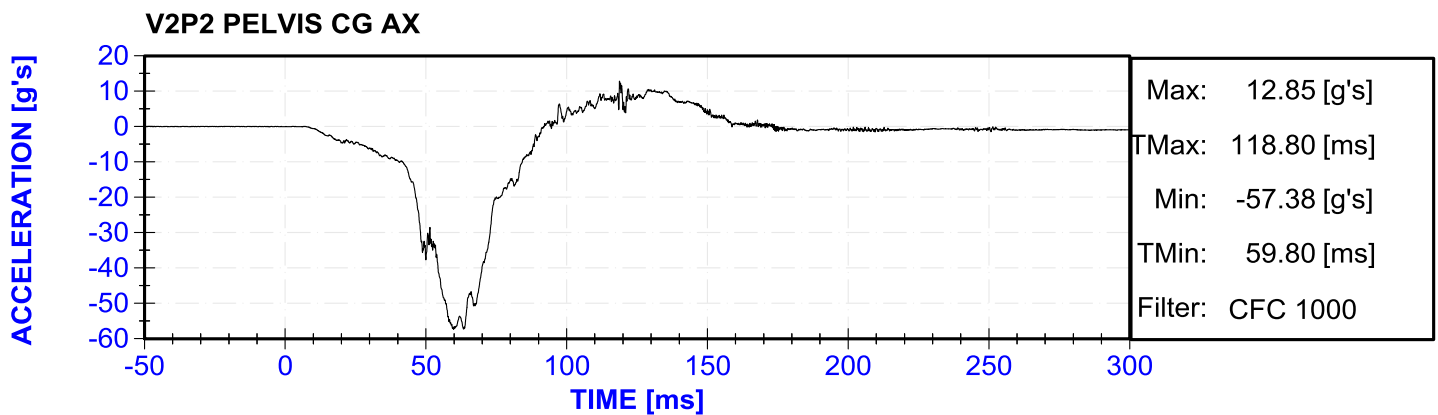
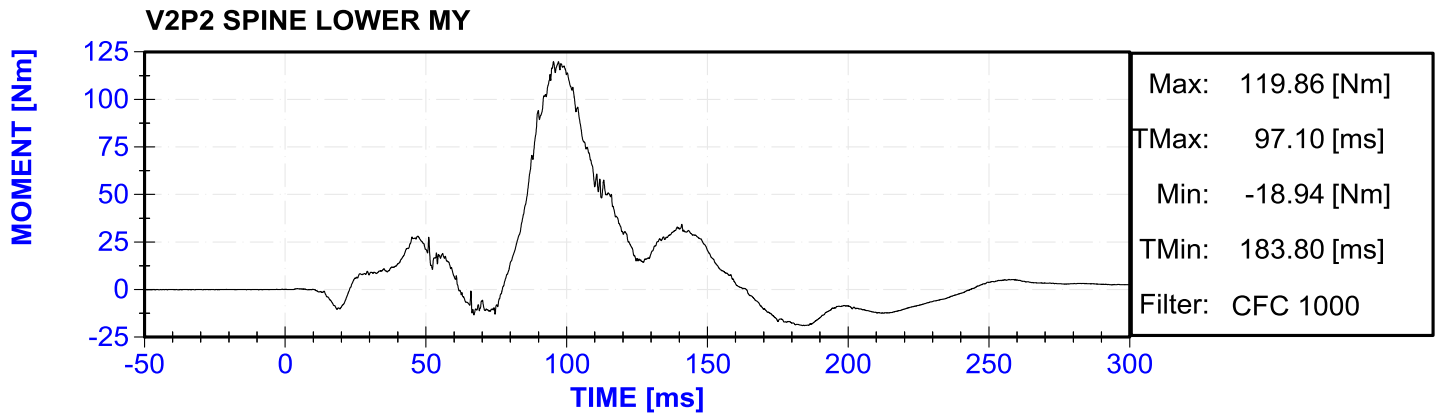




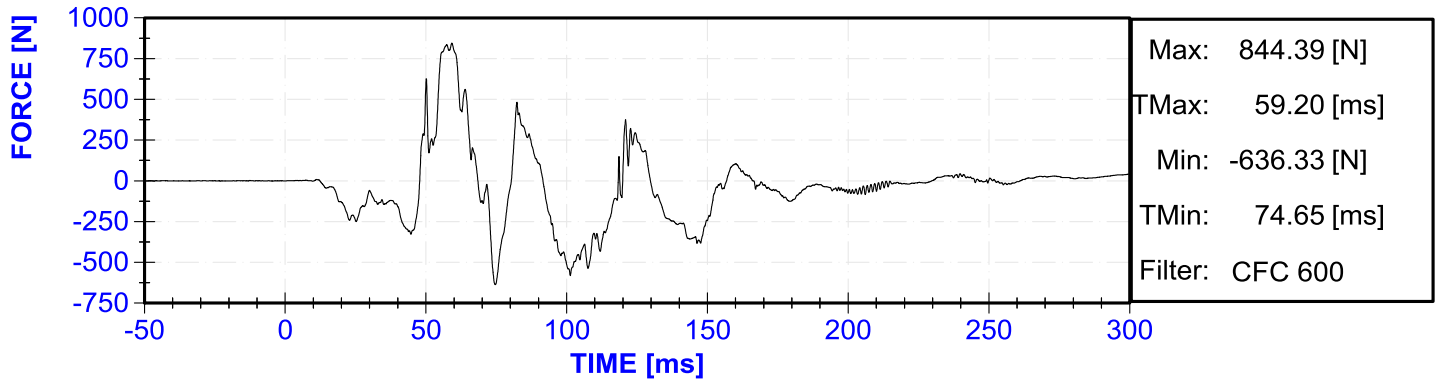




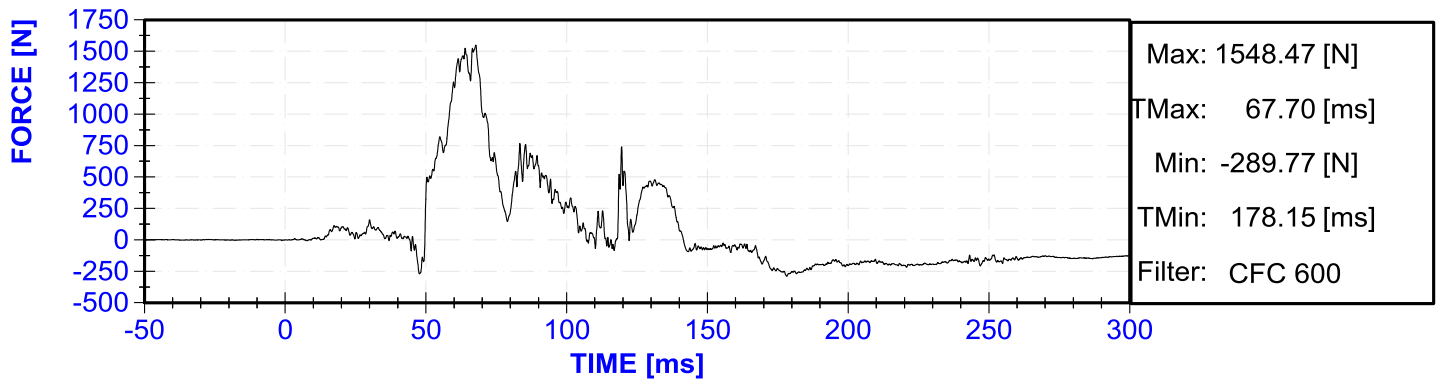




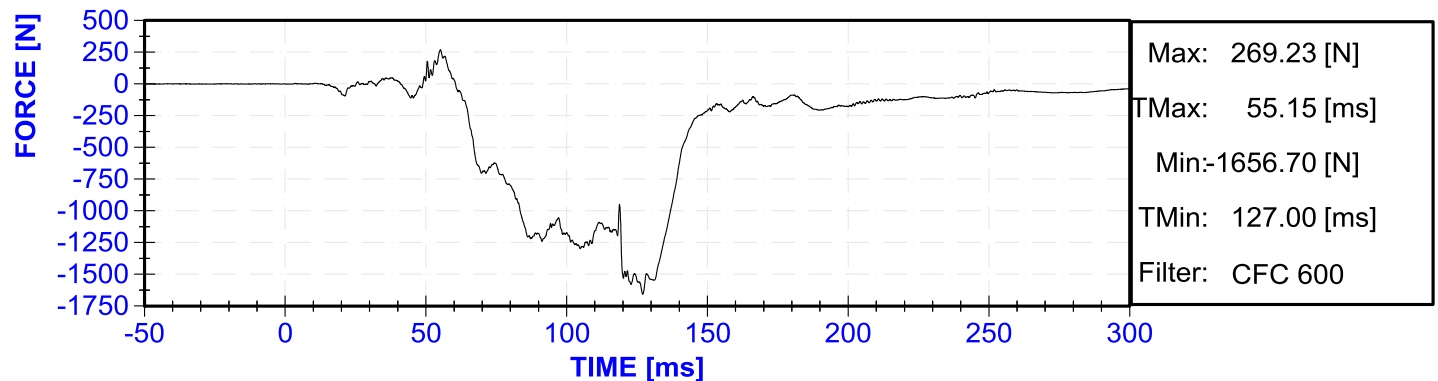
V2P2 PELVIS ACETABULUM LEFT FX



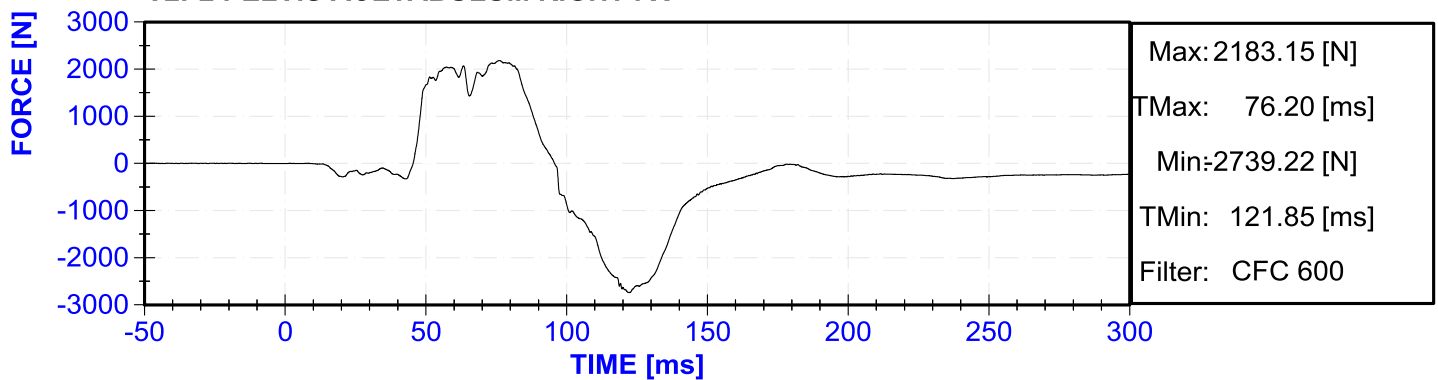
V2P2 PELVIS ACETABULUM LEFT FY



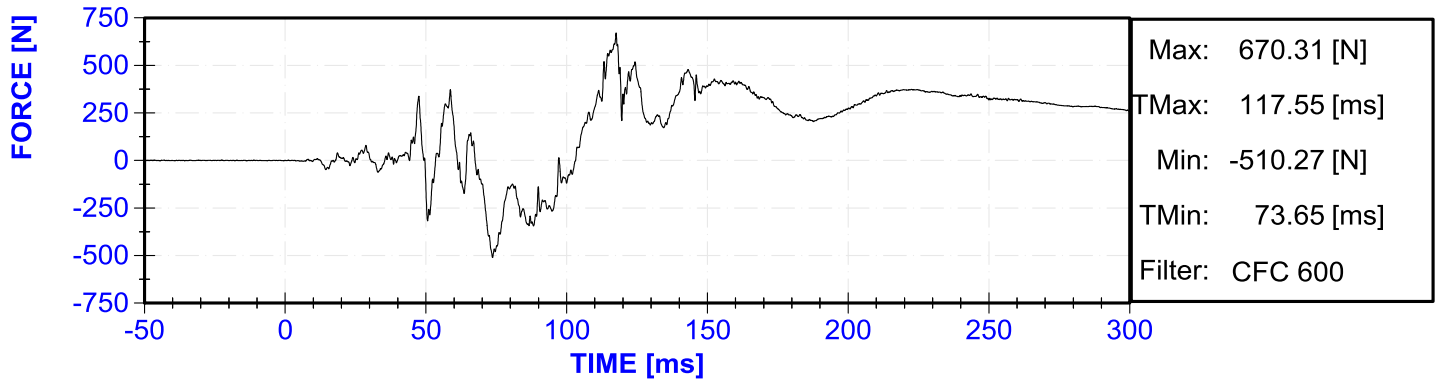
V2P2 PELVIS ACETABULUM LEFT FZ



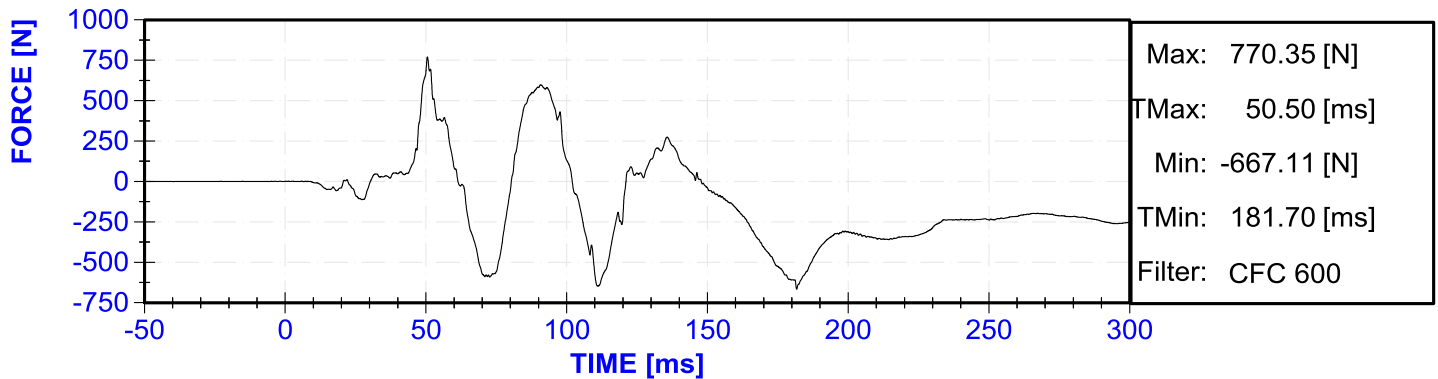
V2P2 PELVIS ACETABULUM RIGHT FX



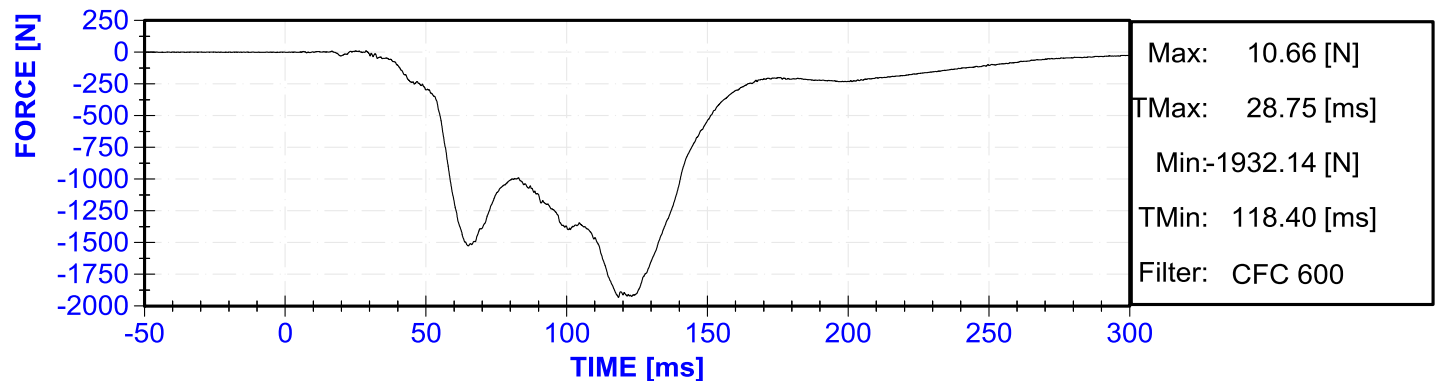
V2P2 PELVIS ACETABULUM RIGHT FY



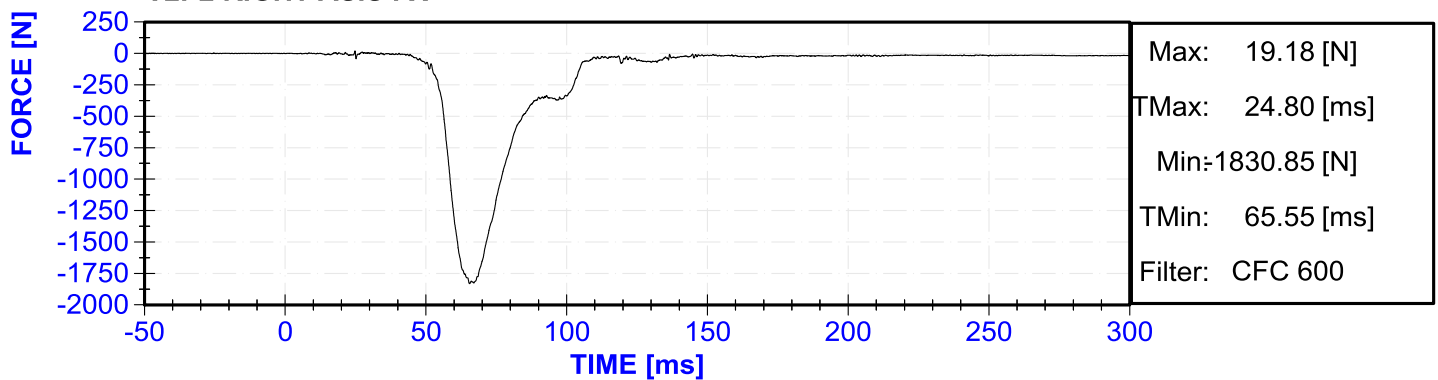
V2P2 PELVIS ACETABULUM RIGHT FZ

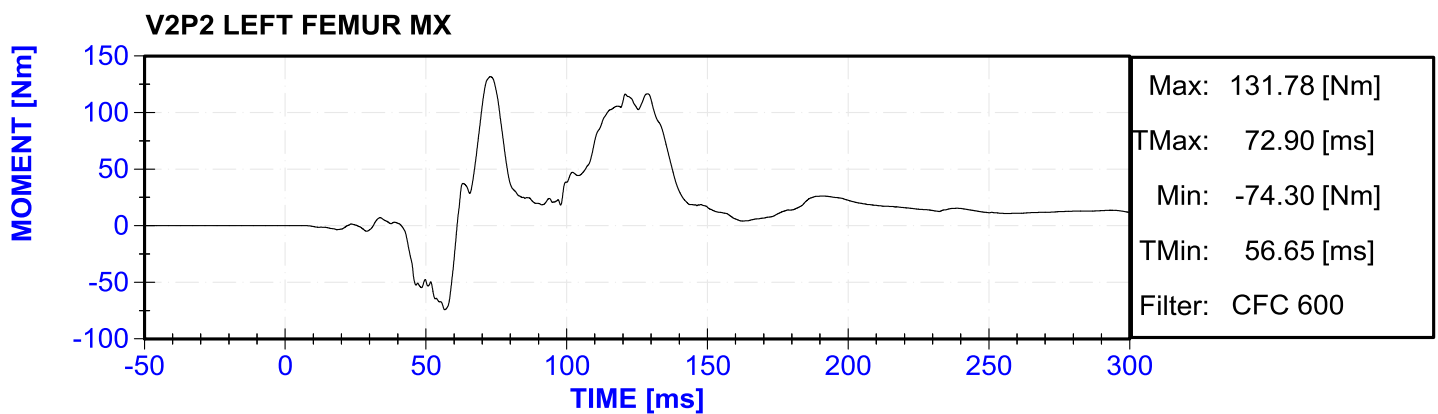
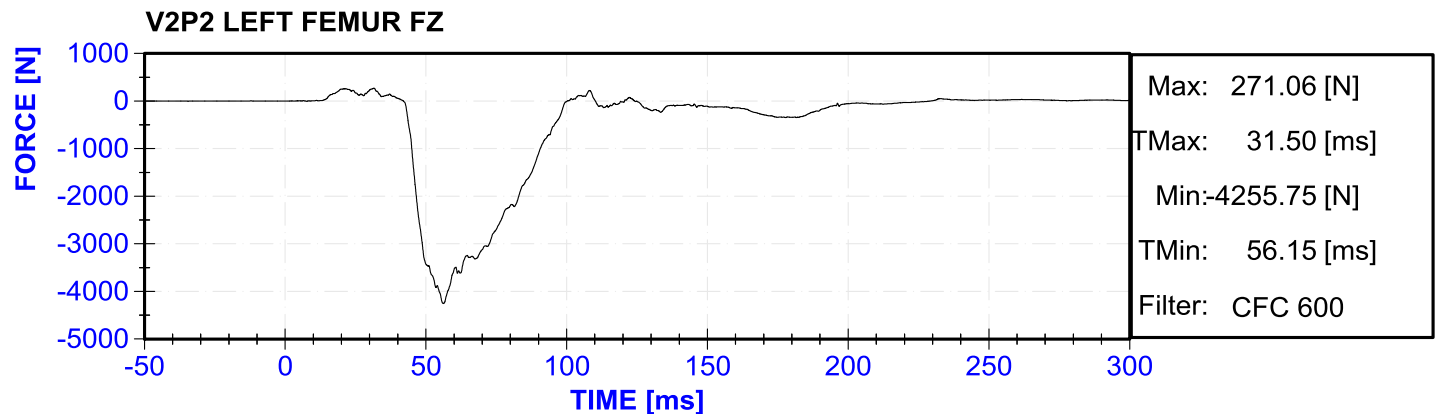
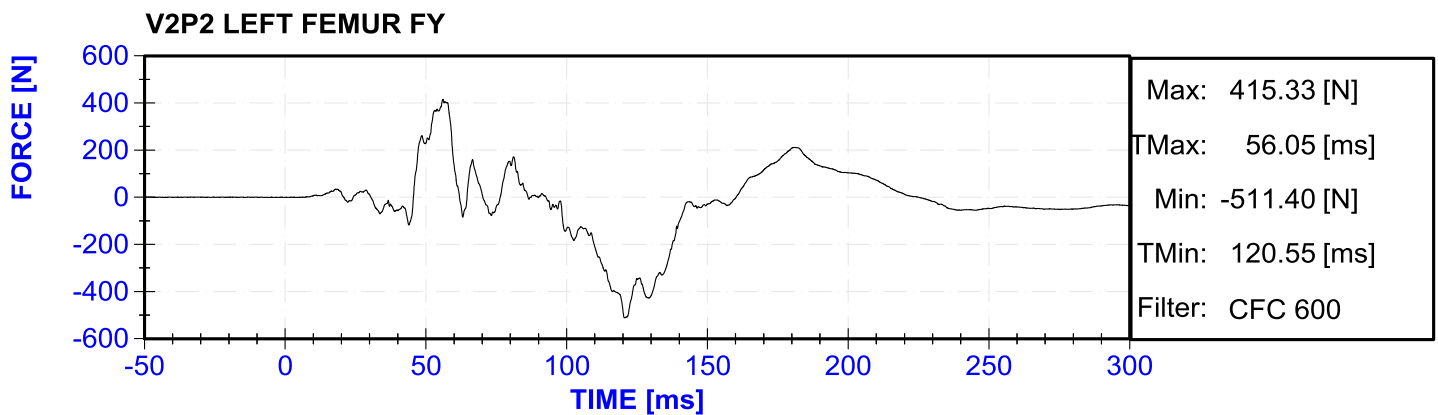
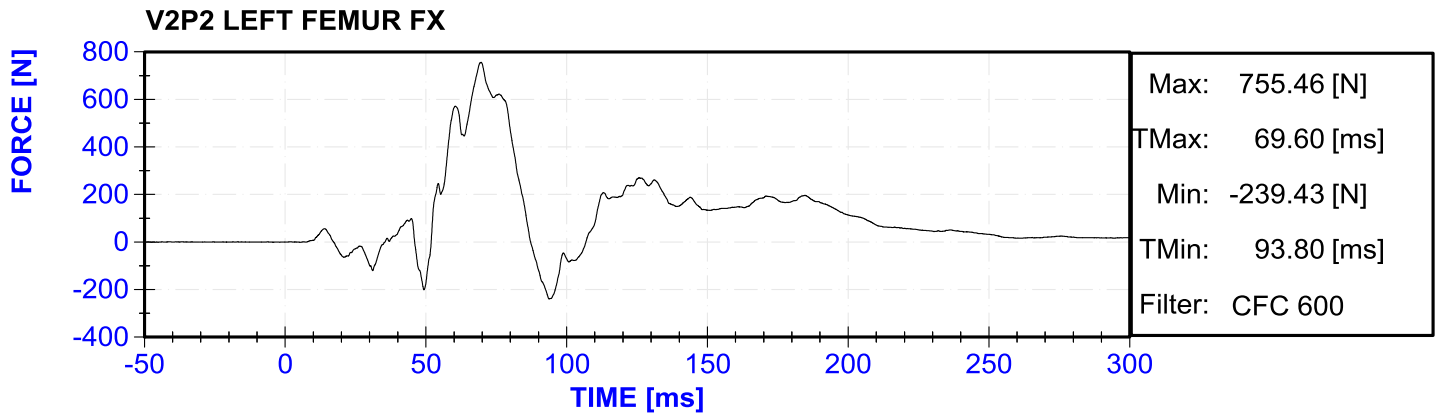


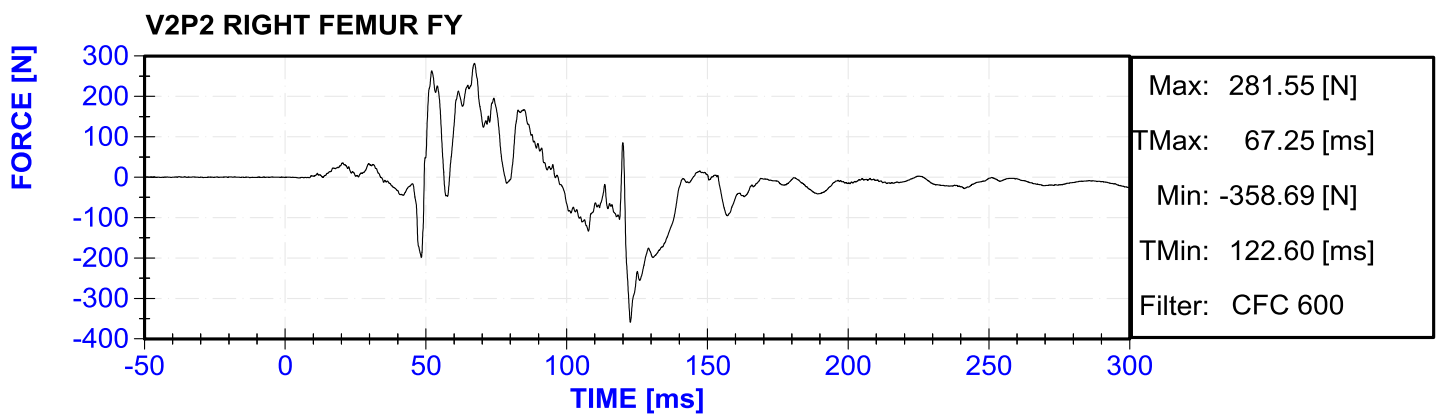
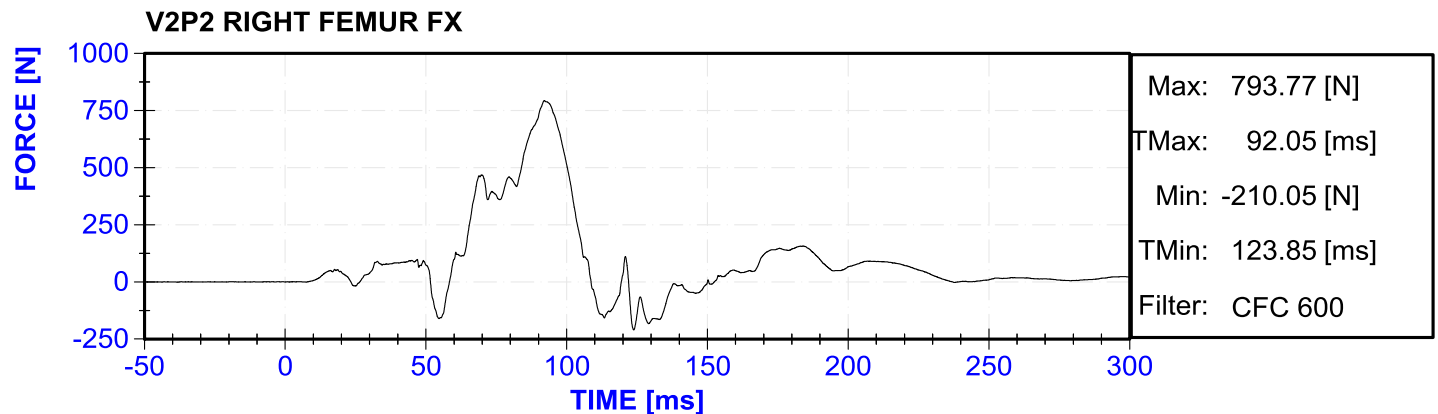
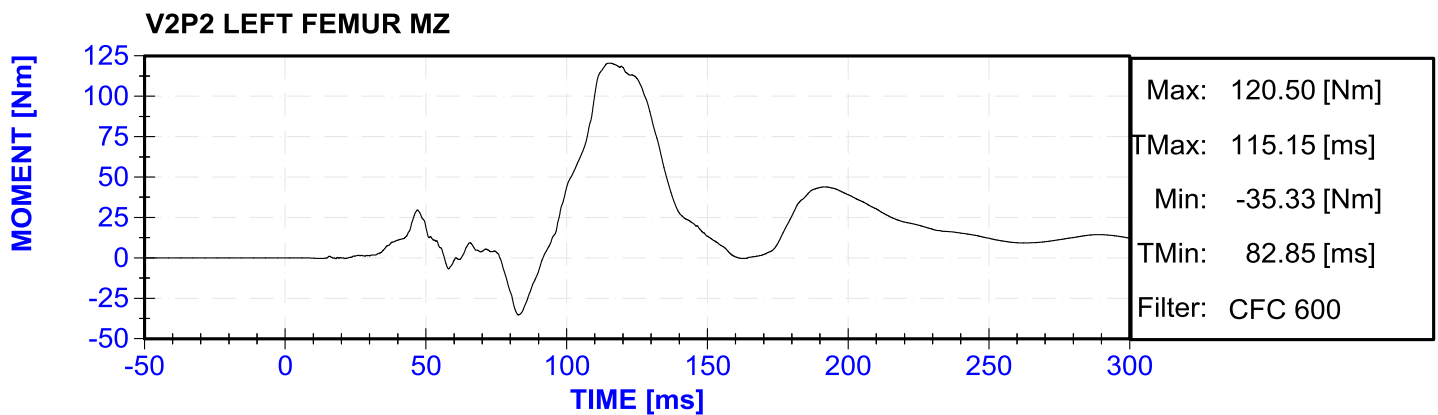
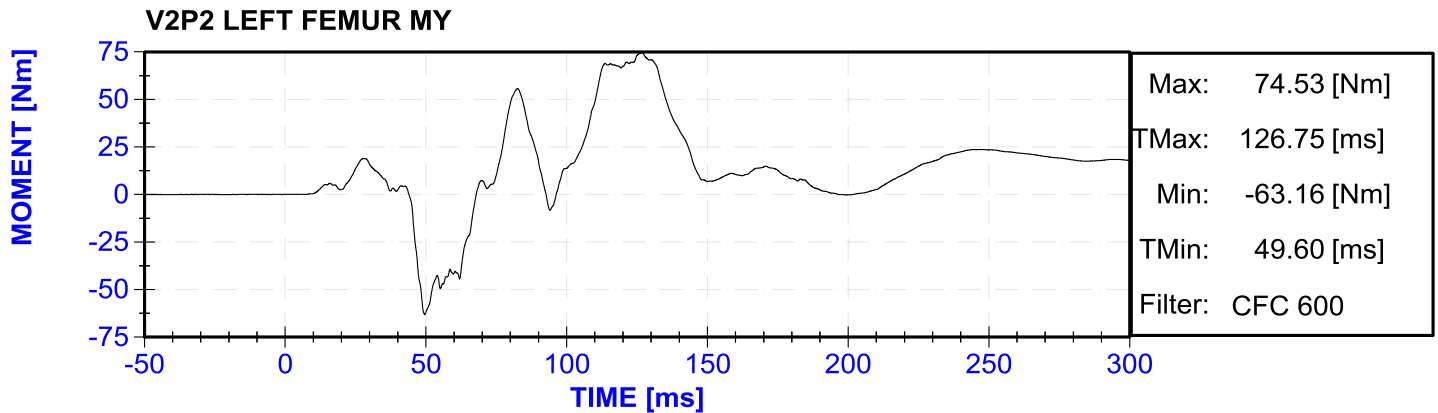
V2P2 LEFT ASIS FX

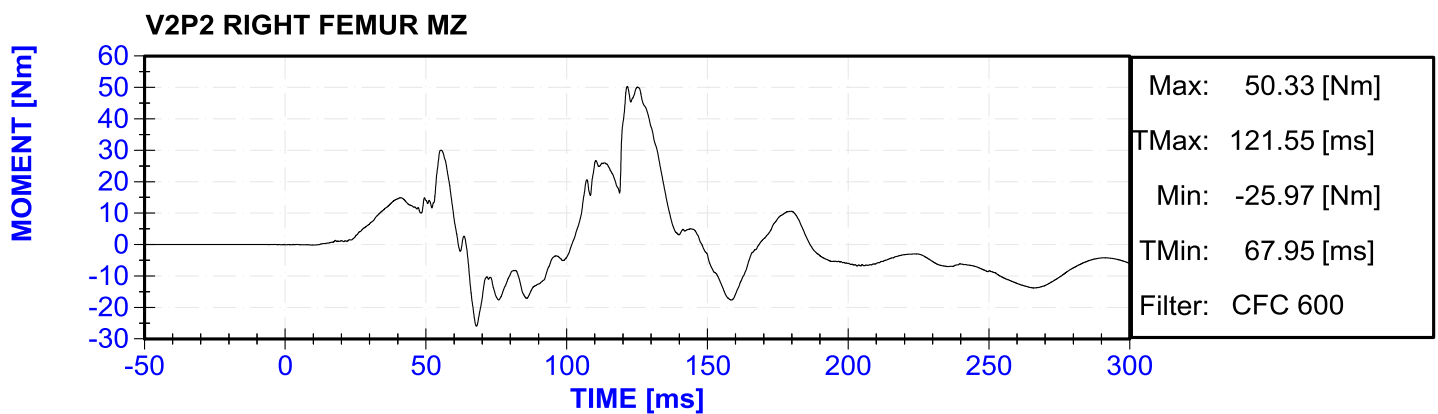
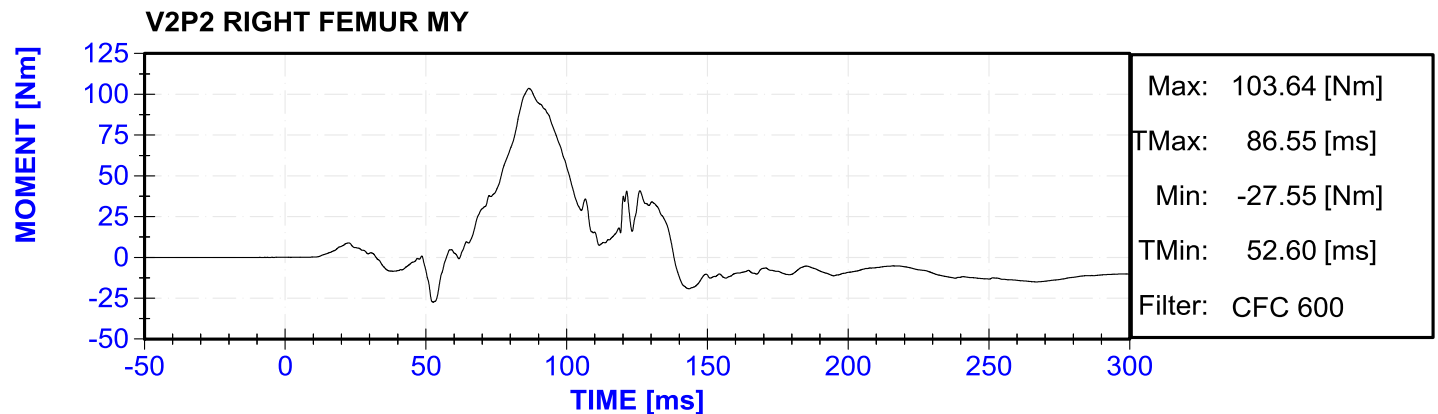
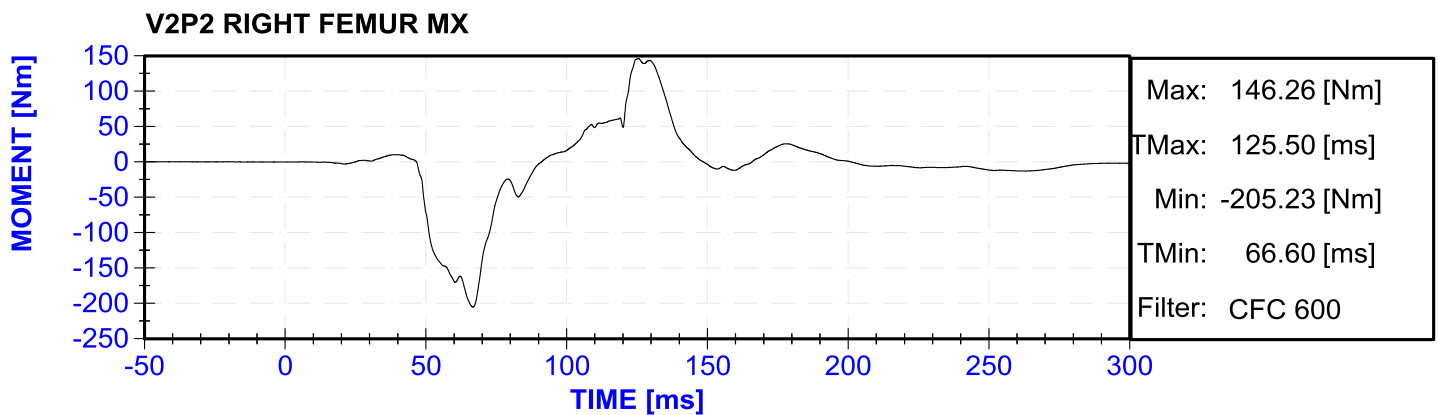
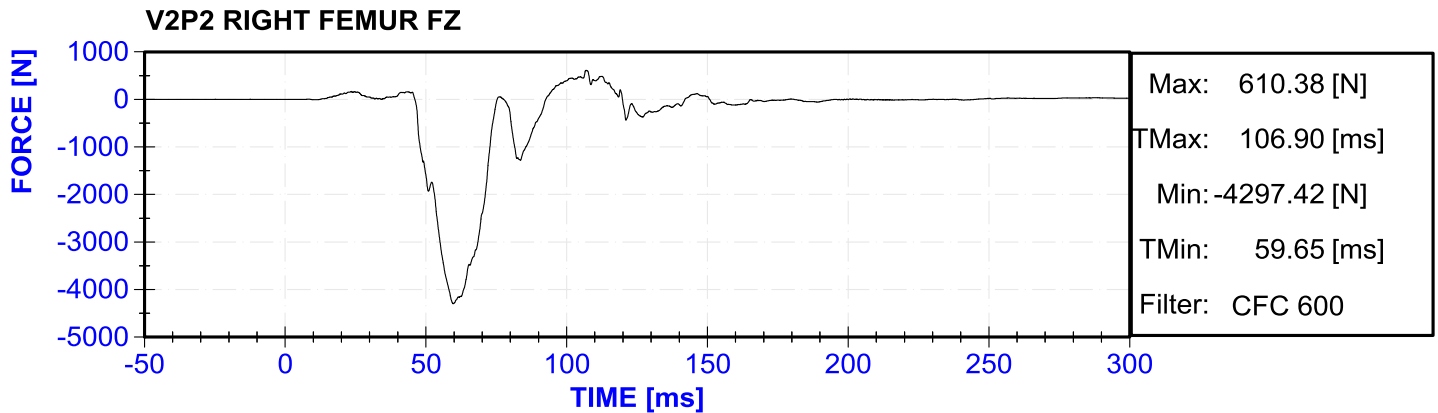


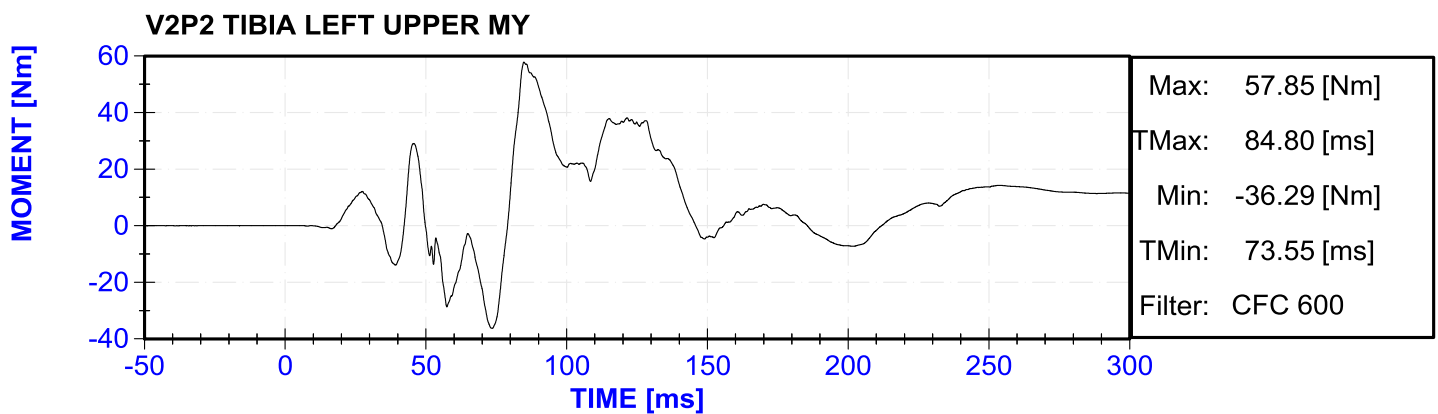
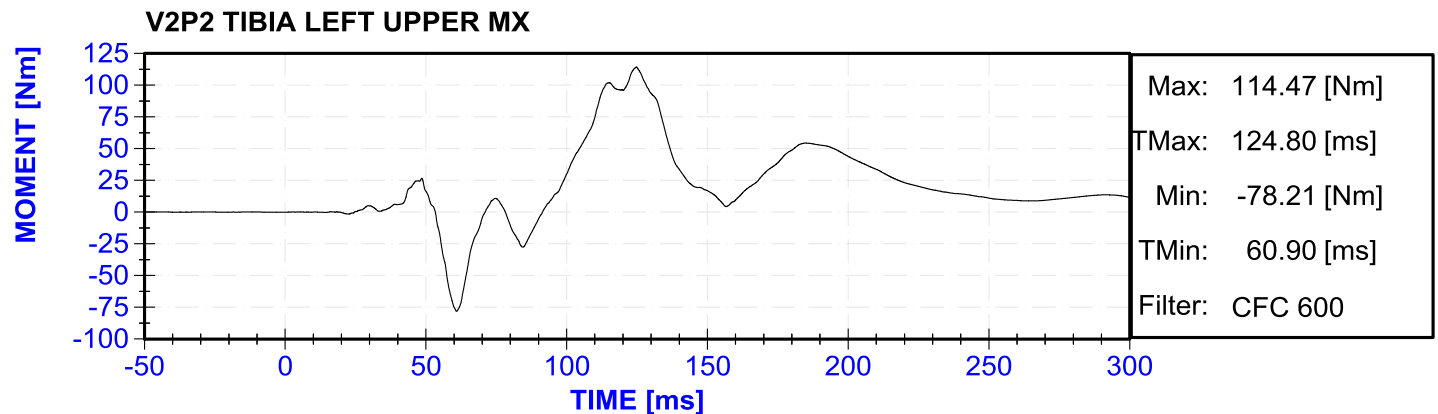
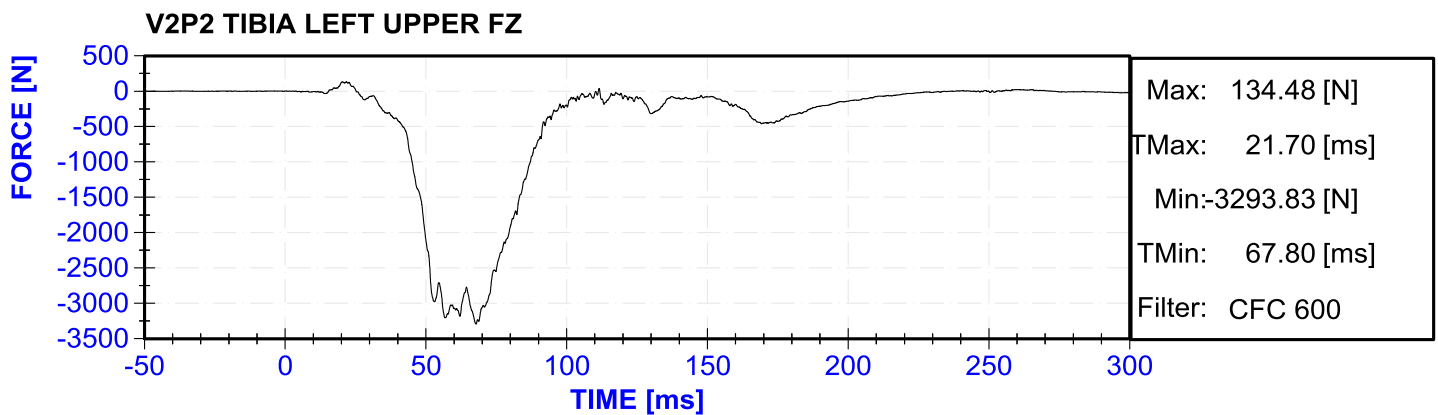
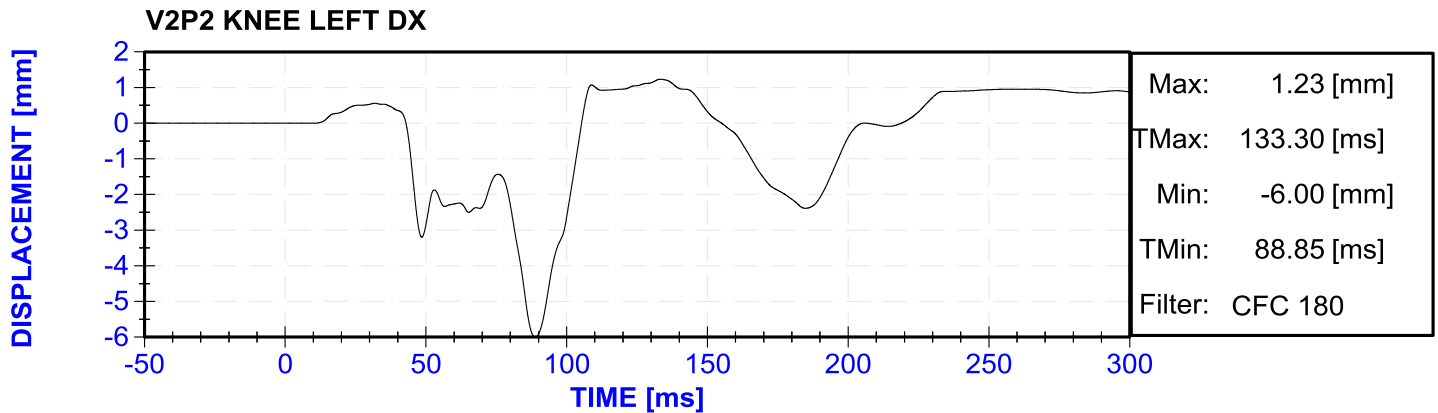
V2P2 RIGHT ASIS FX

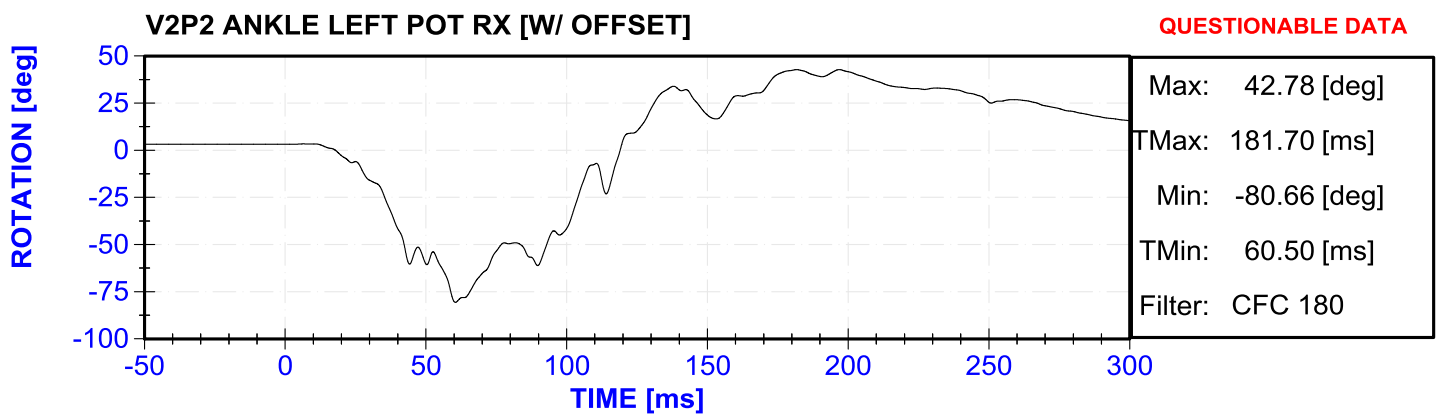
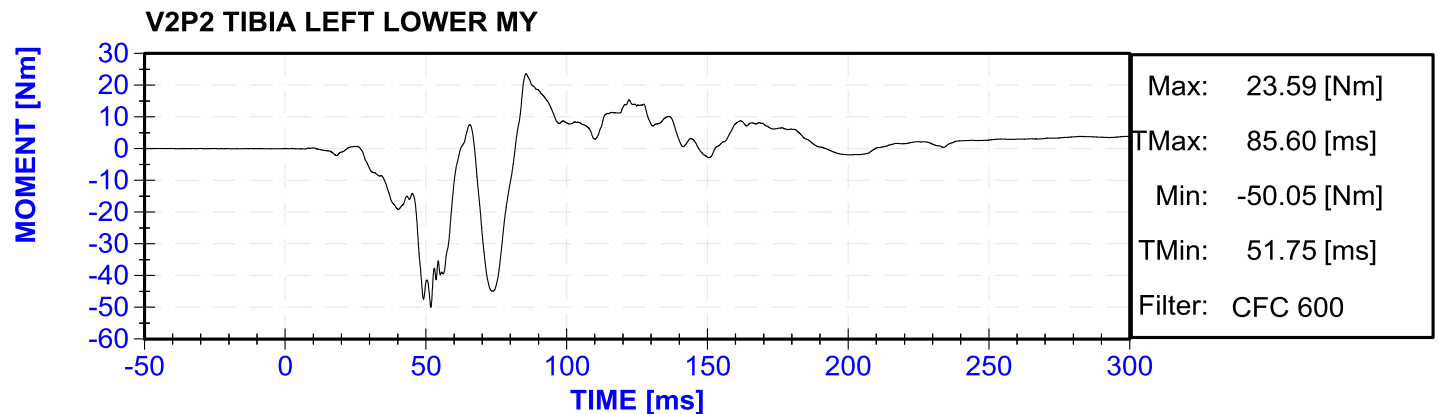
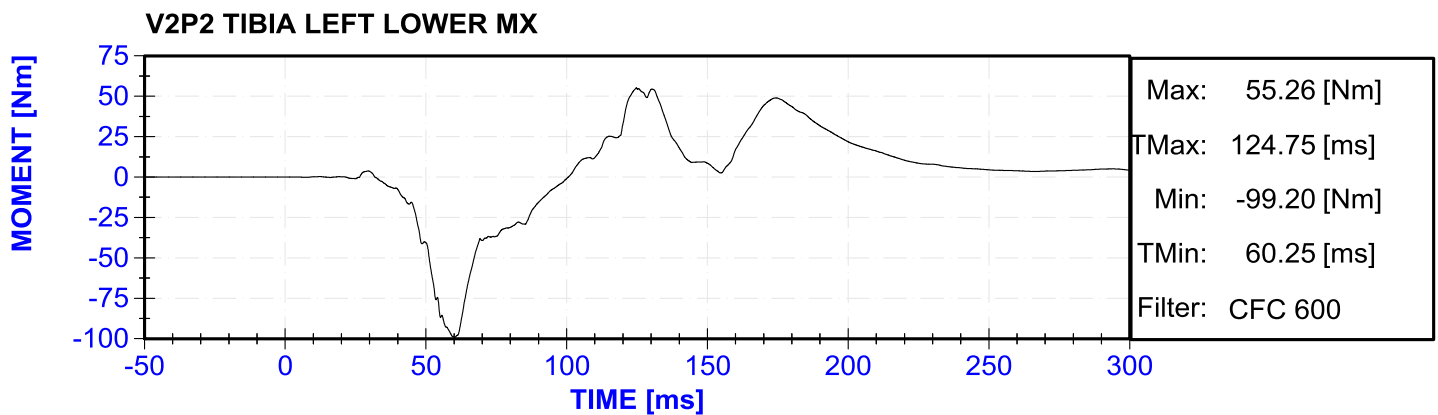
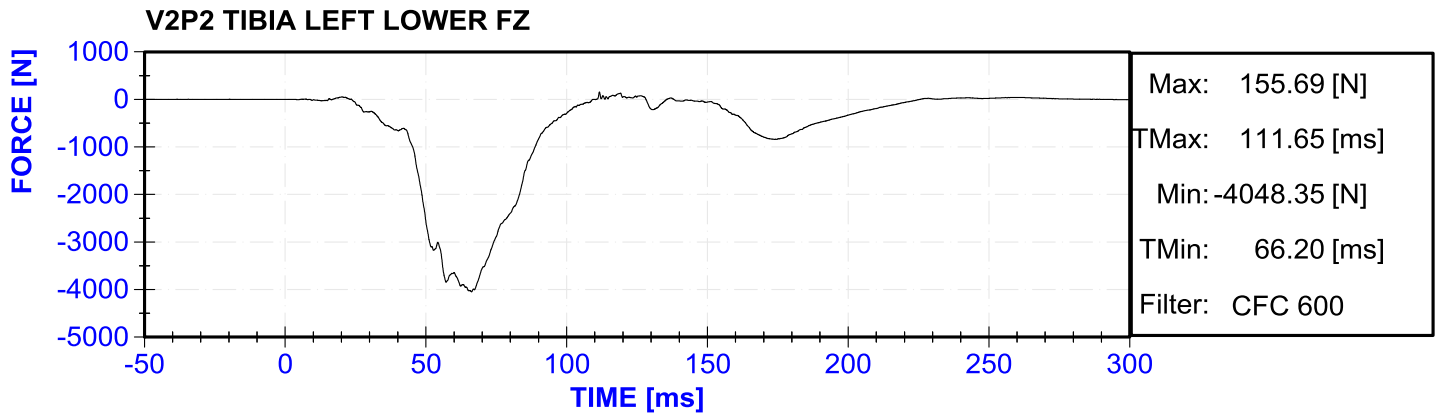


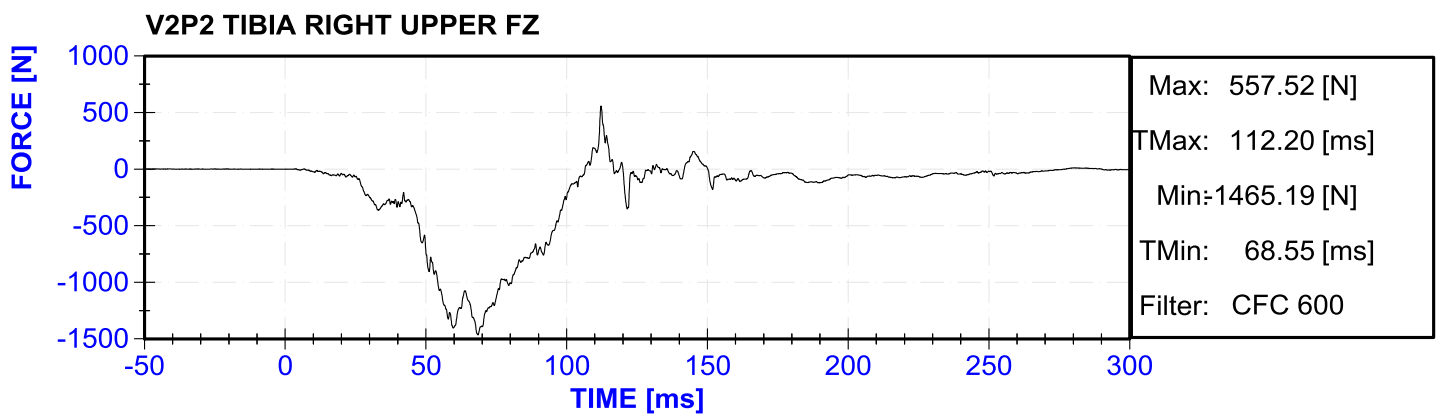
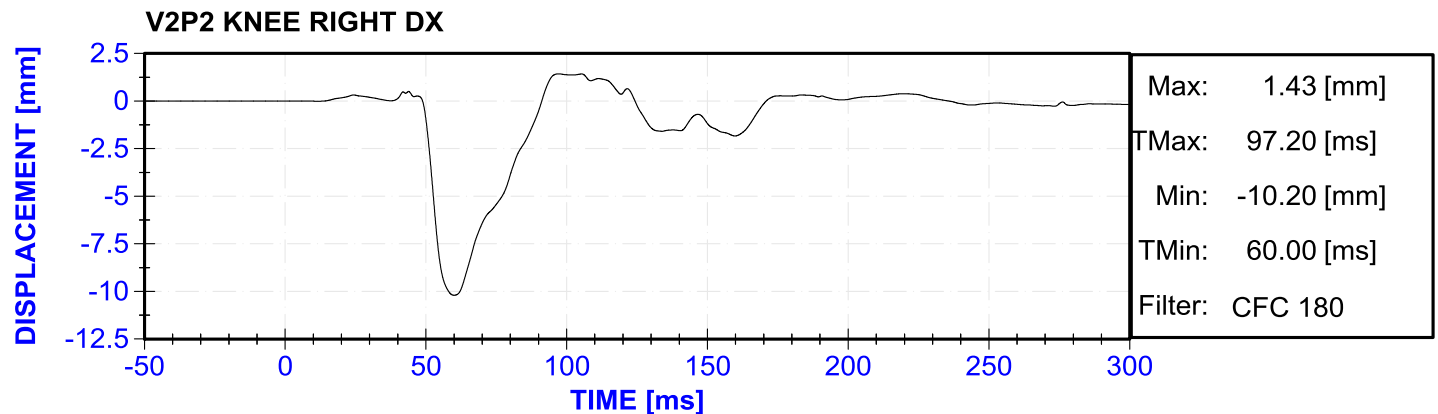
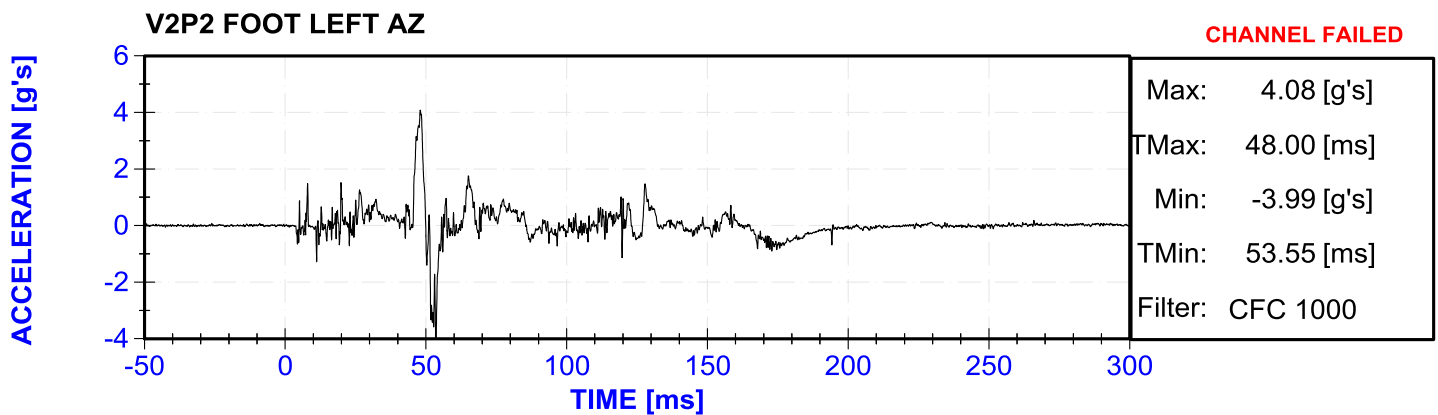
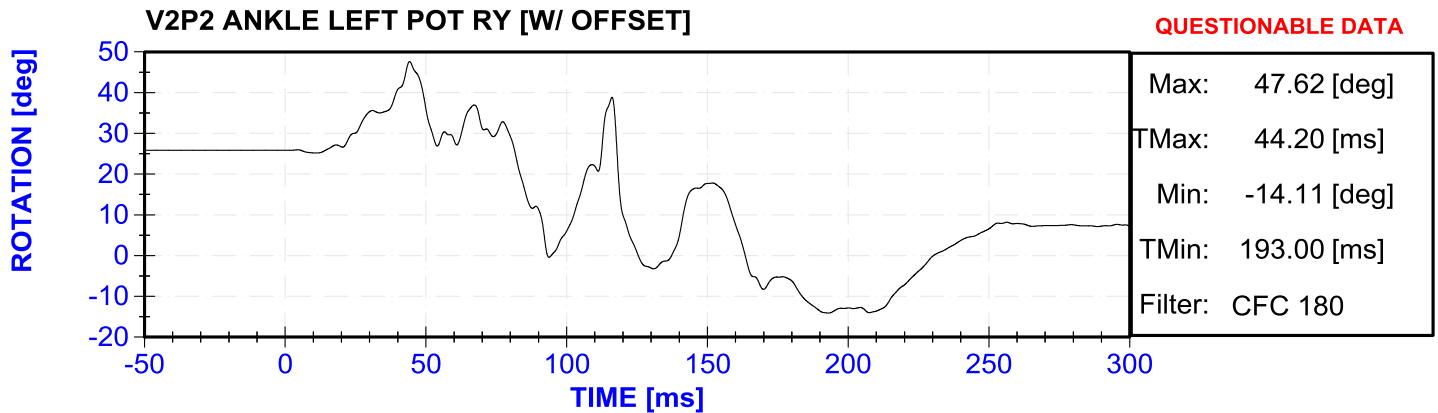


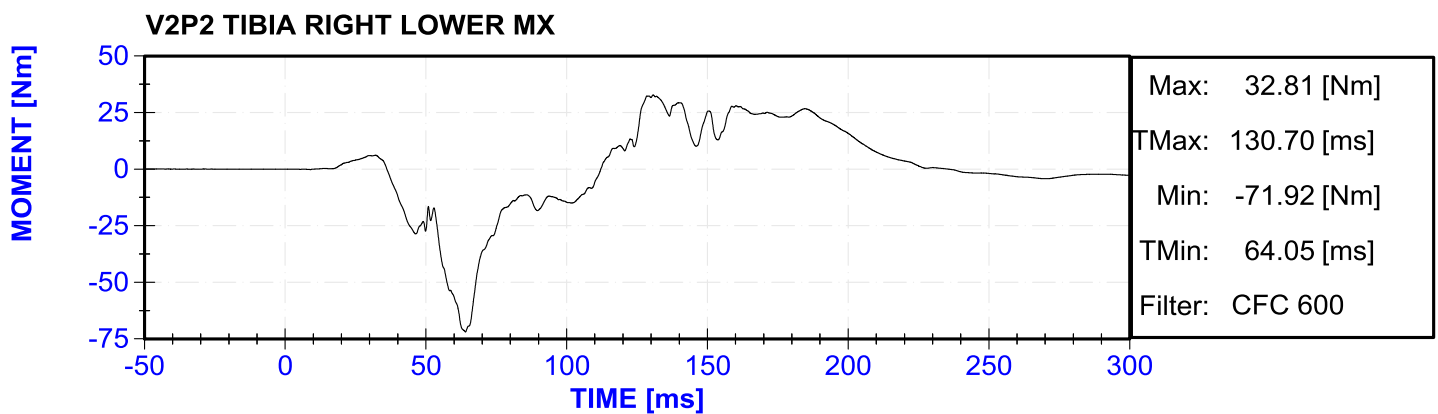
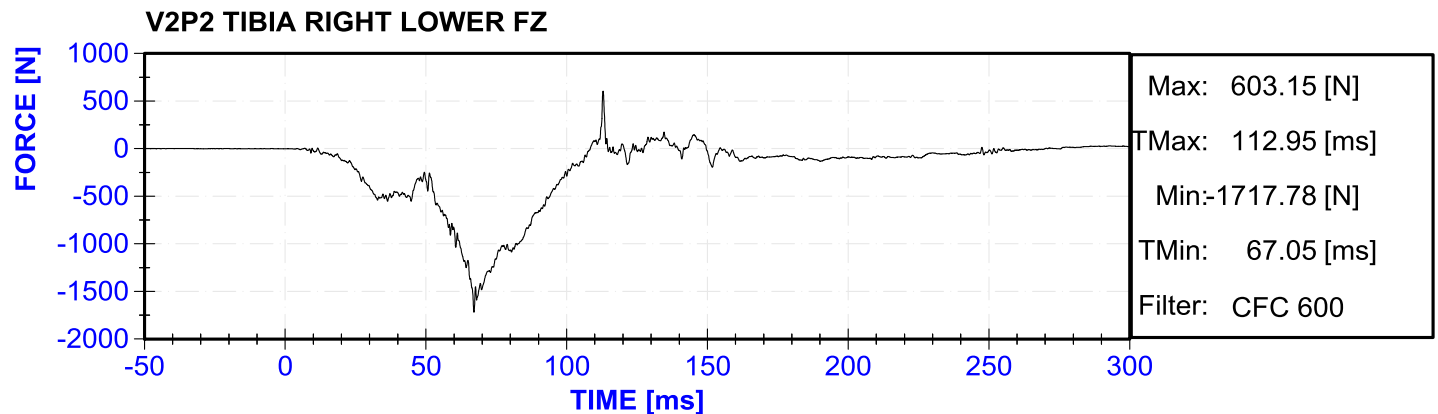
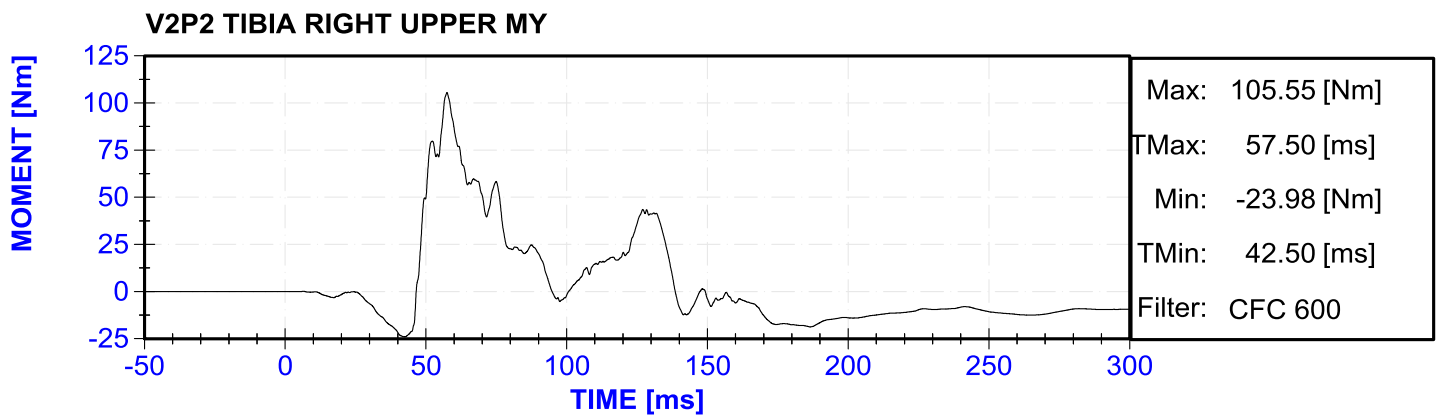
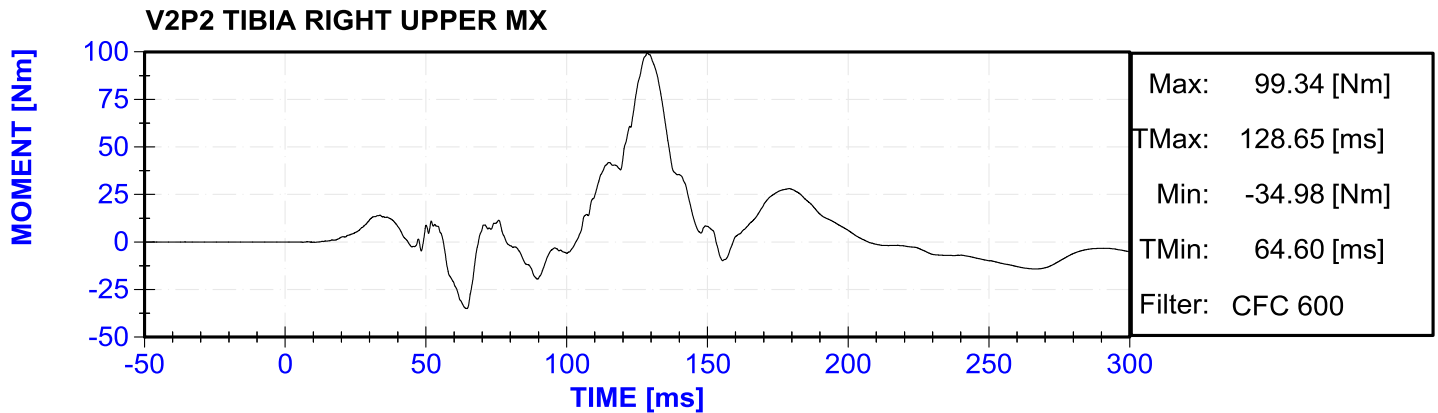


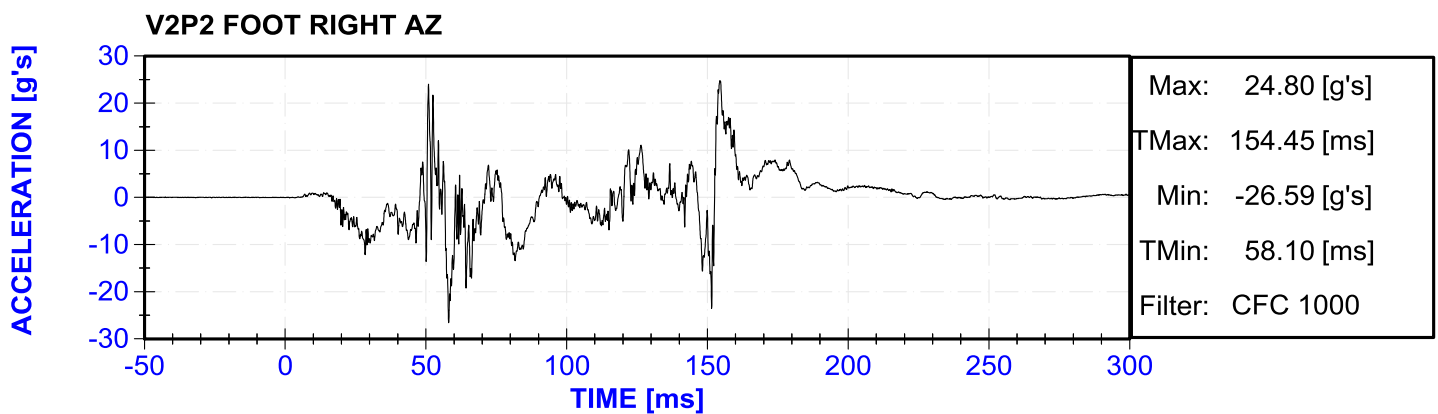
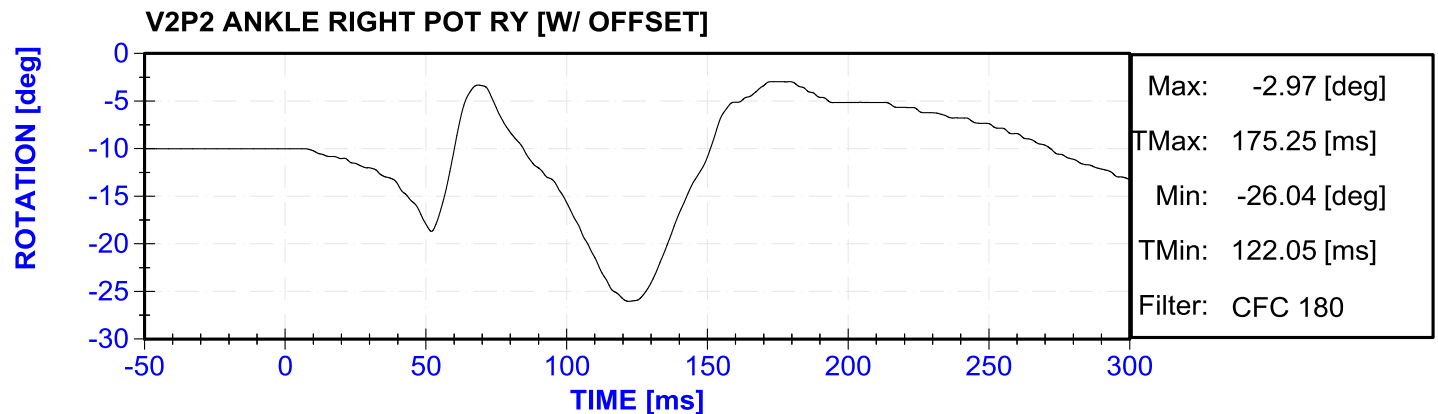
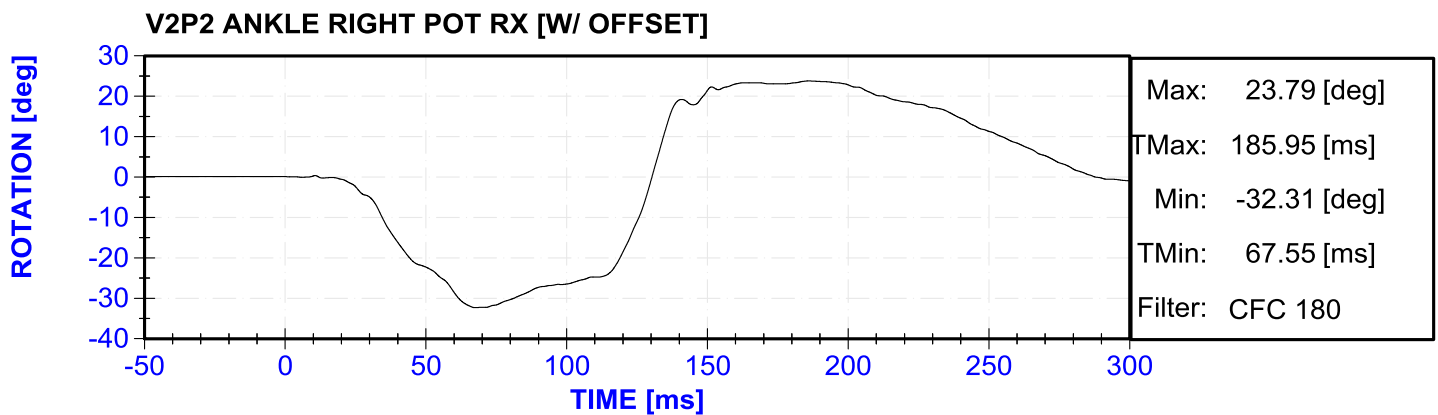
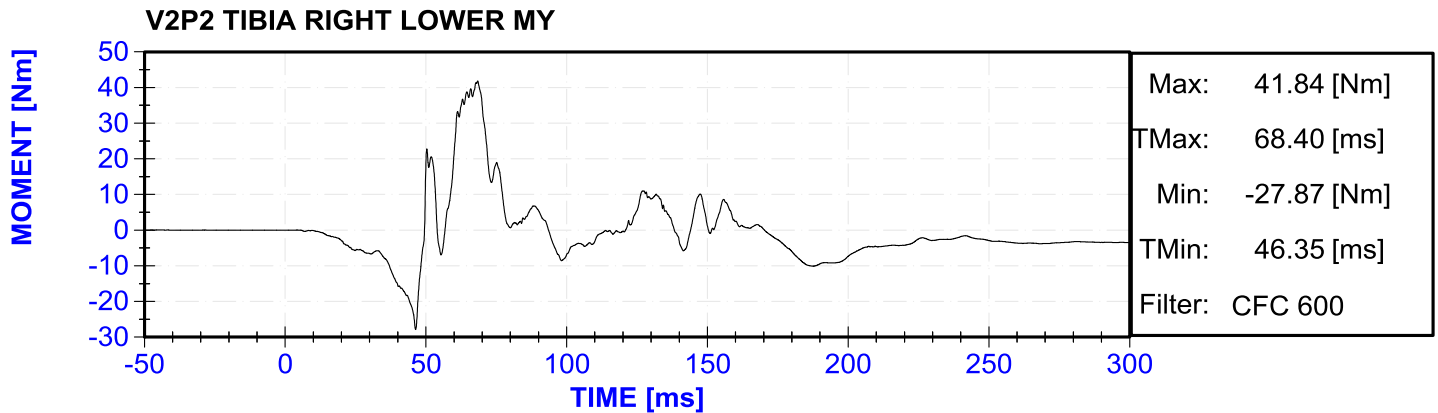




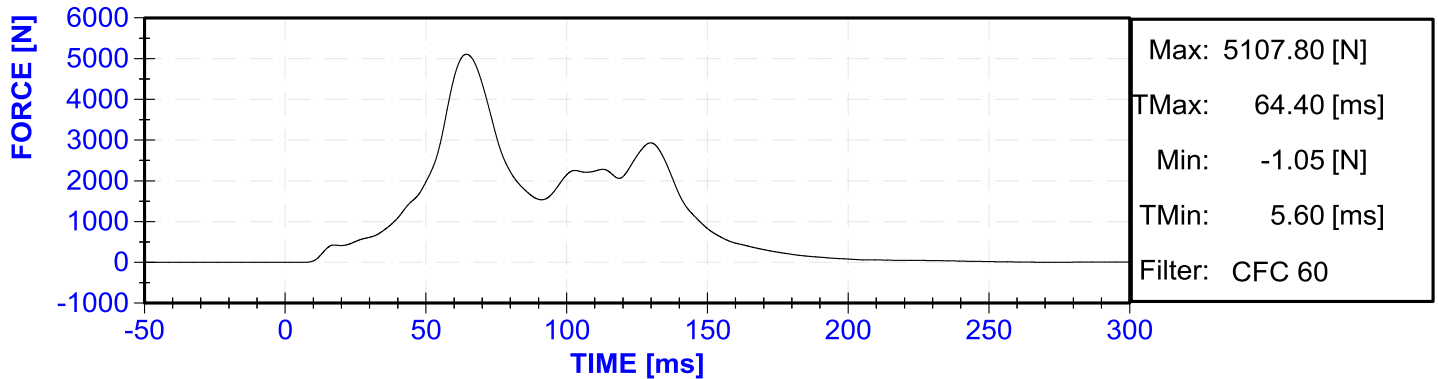




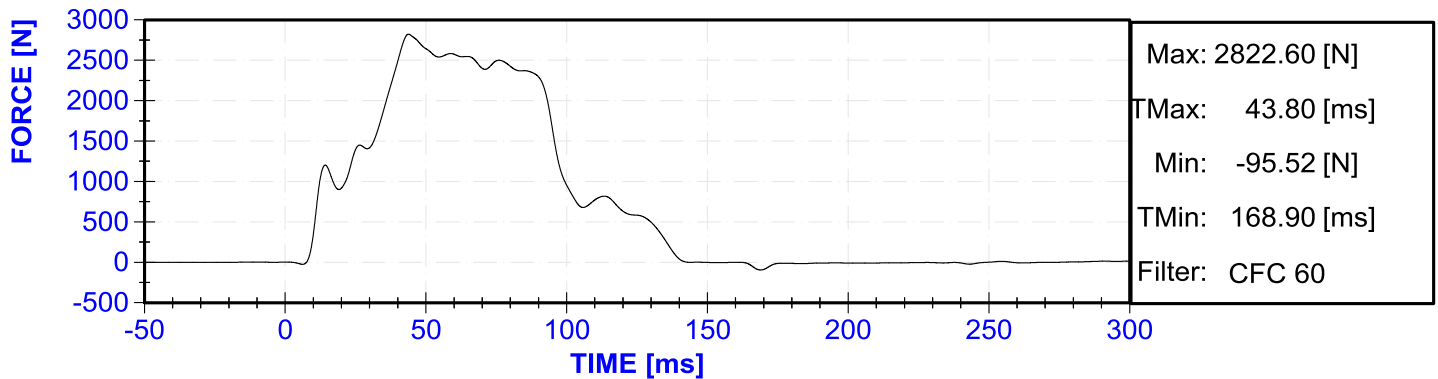




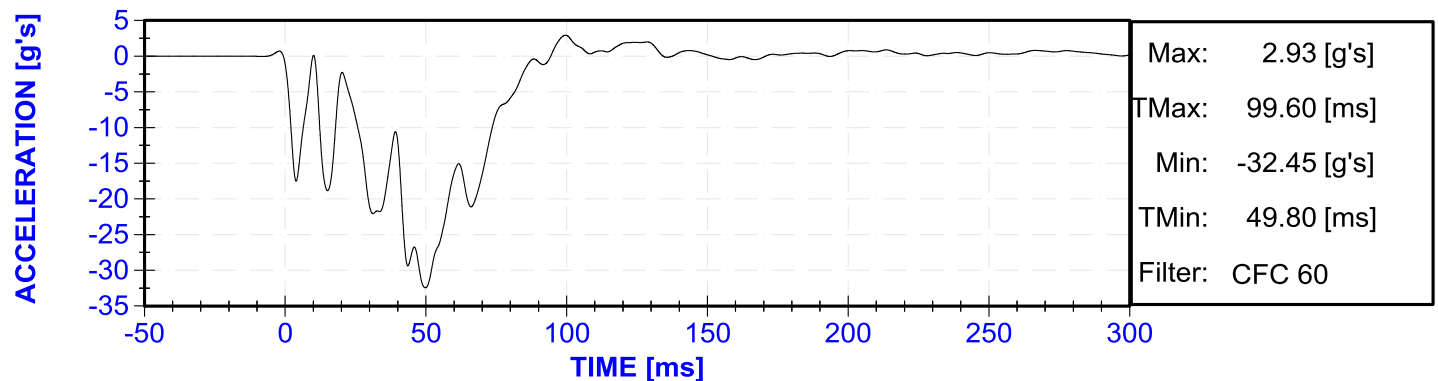
V2 P2 PASSENGER LAP BELT



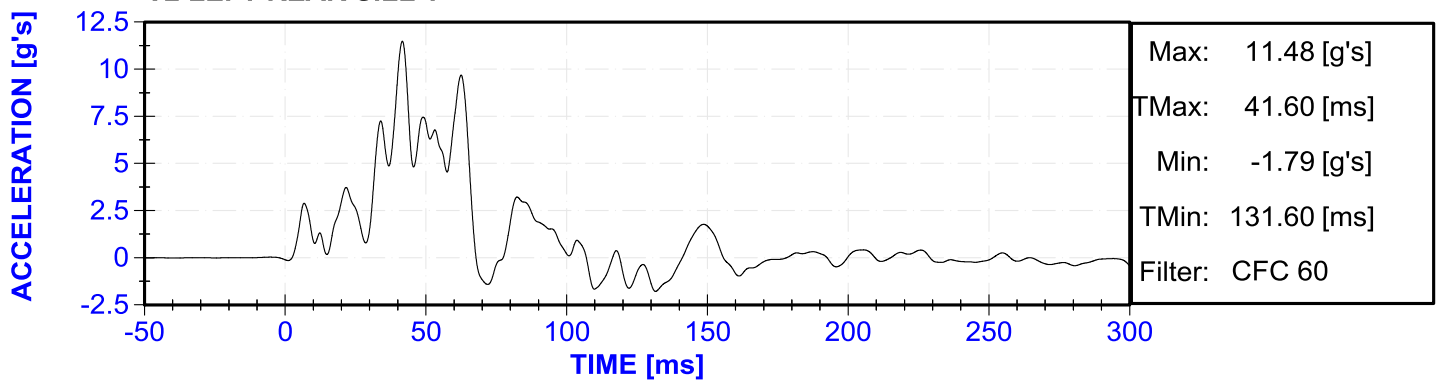
V2 P2 PASSENGER SHOULDER BELT

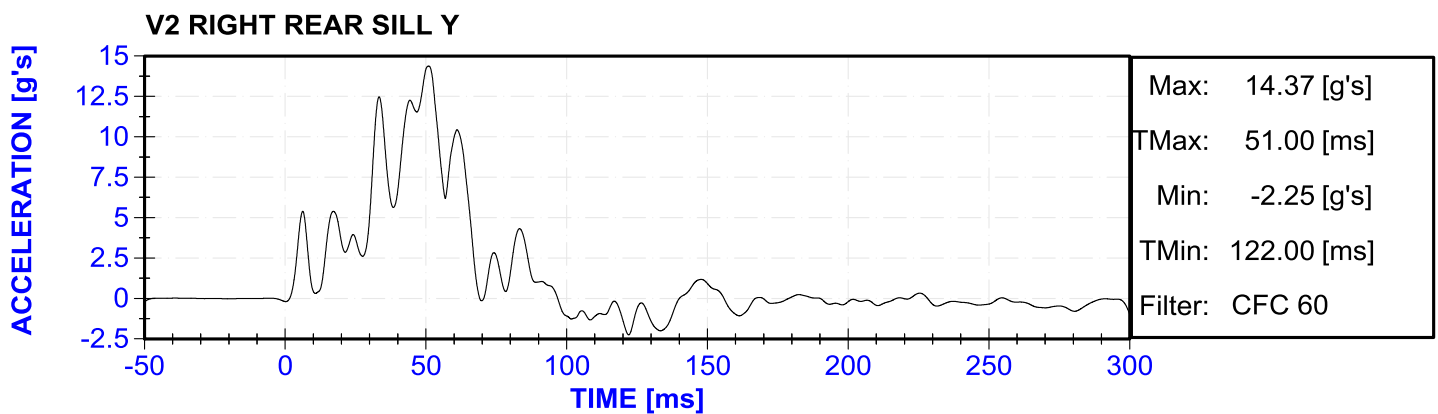
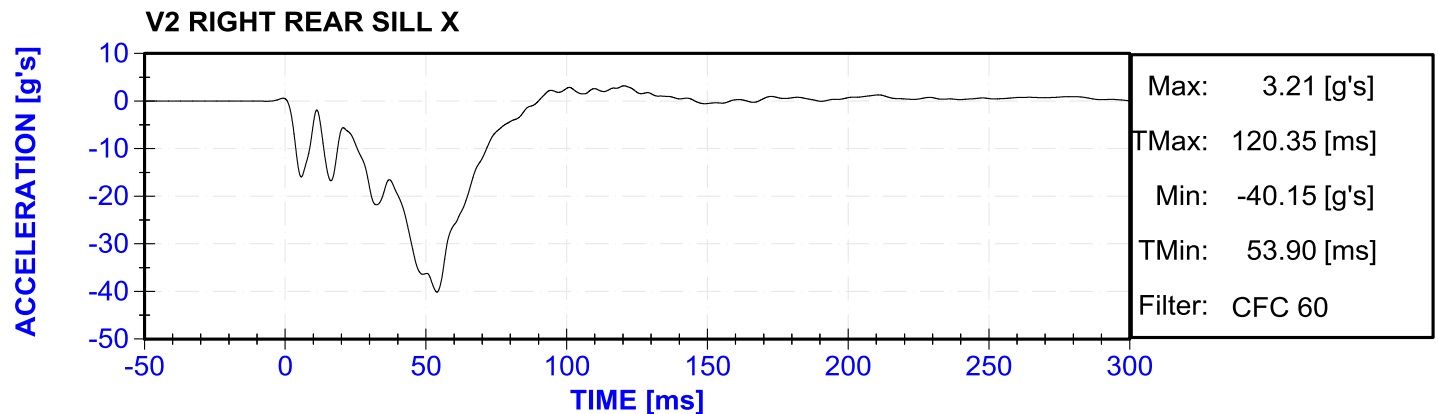
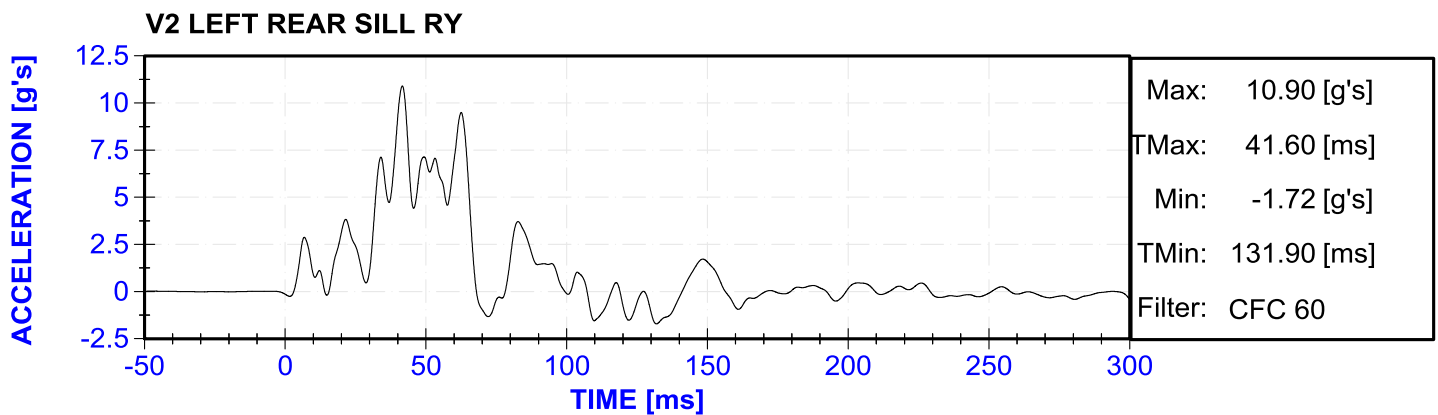
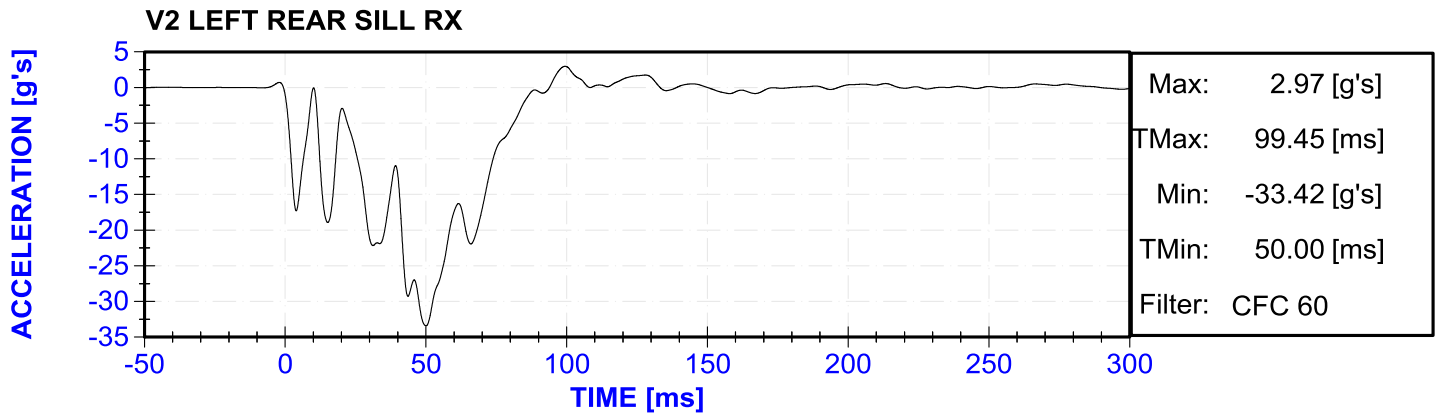


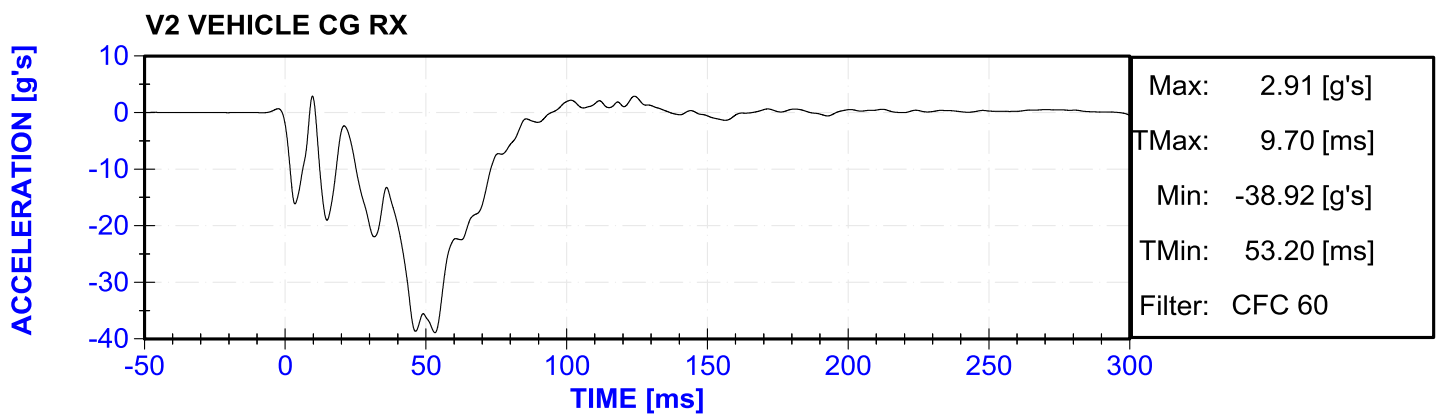
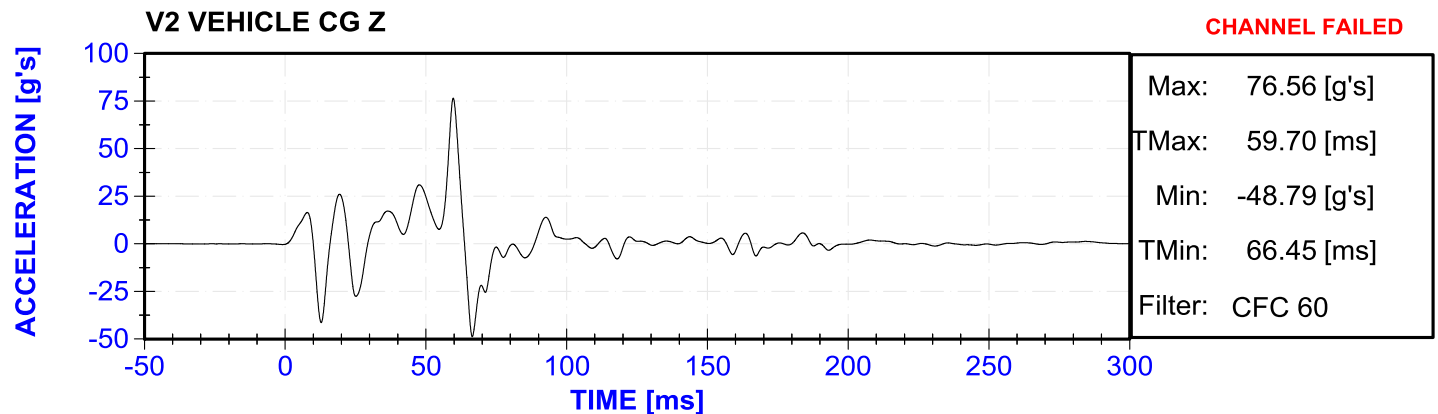
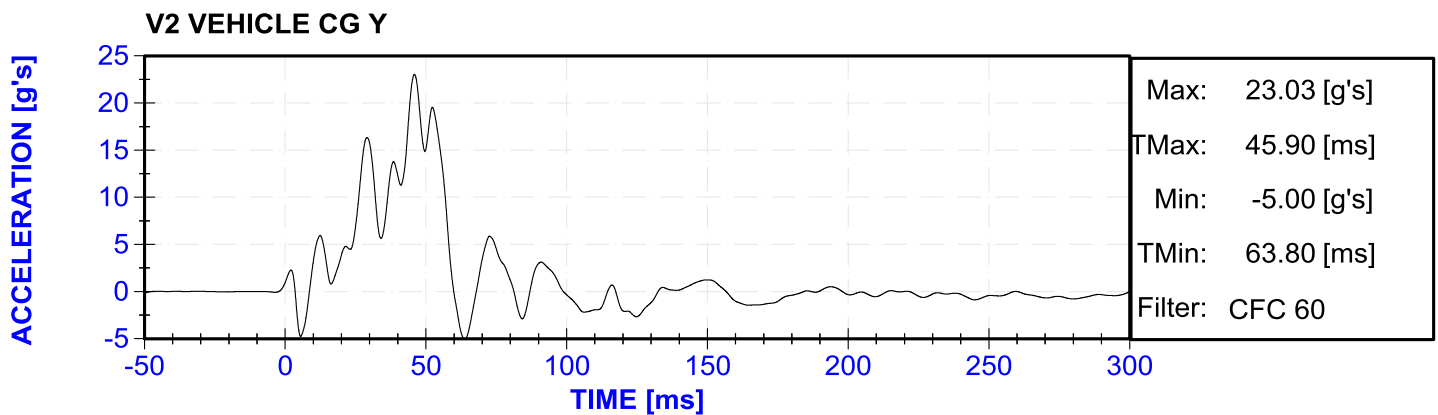
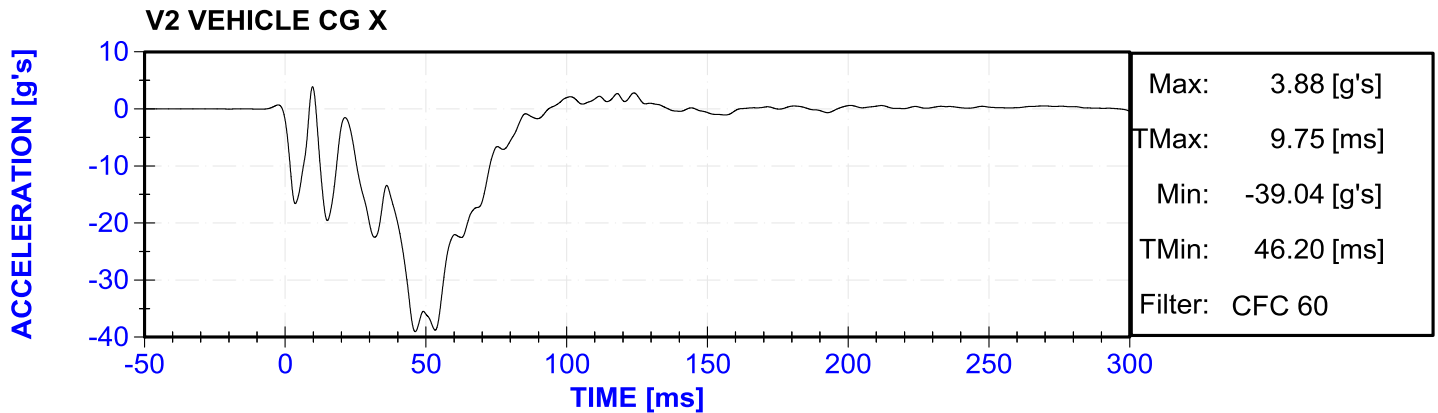
V2 LEFT REAR SILL X

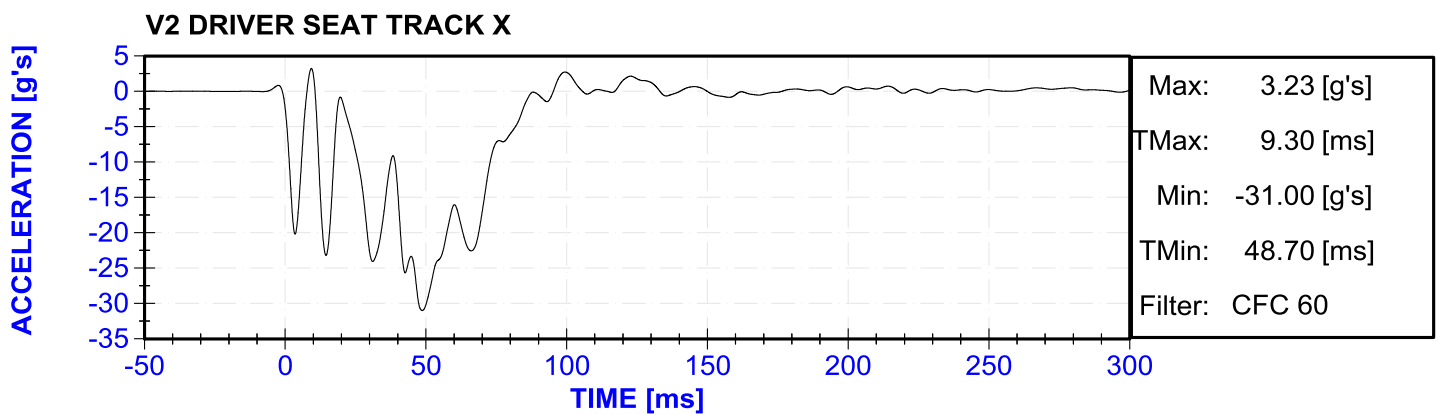
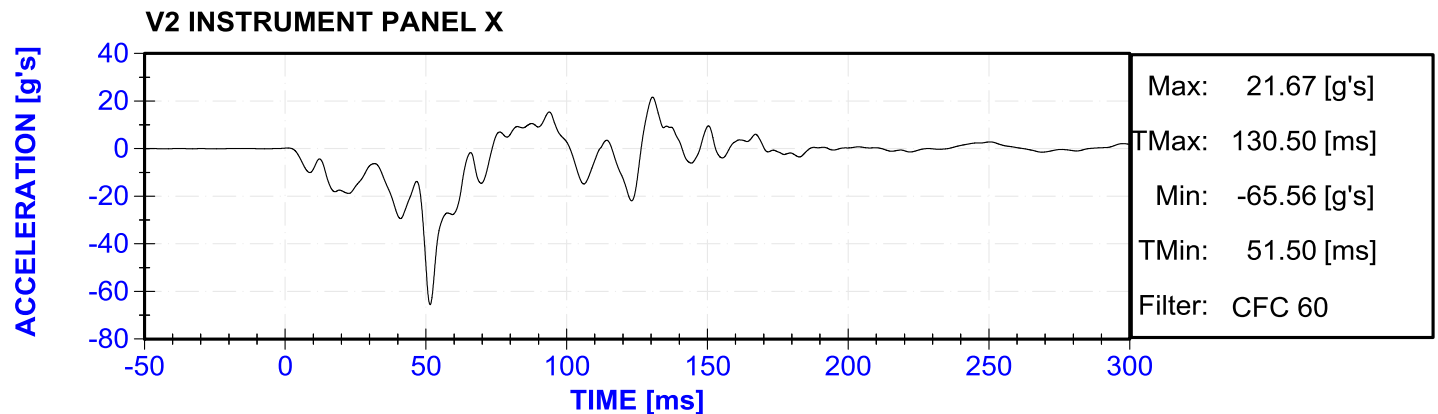
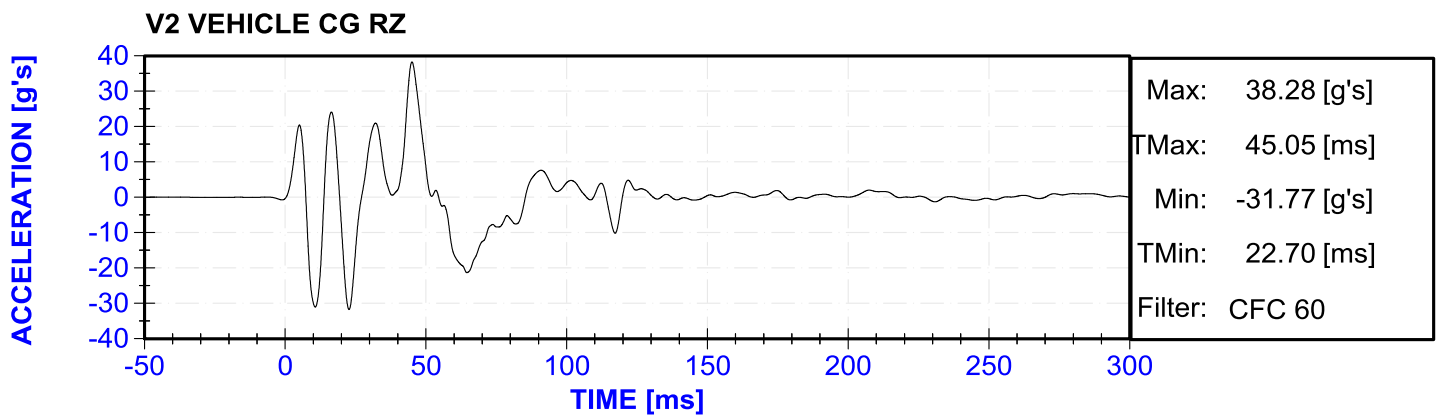
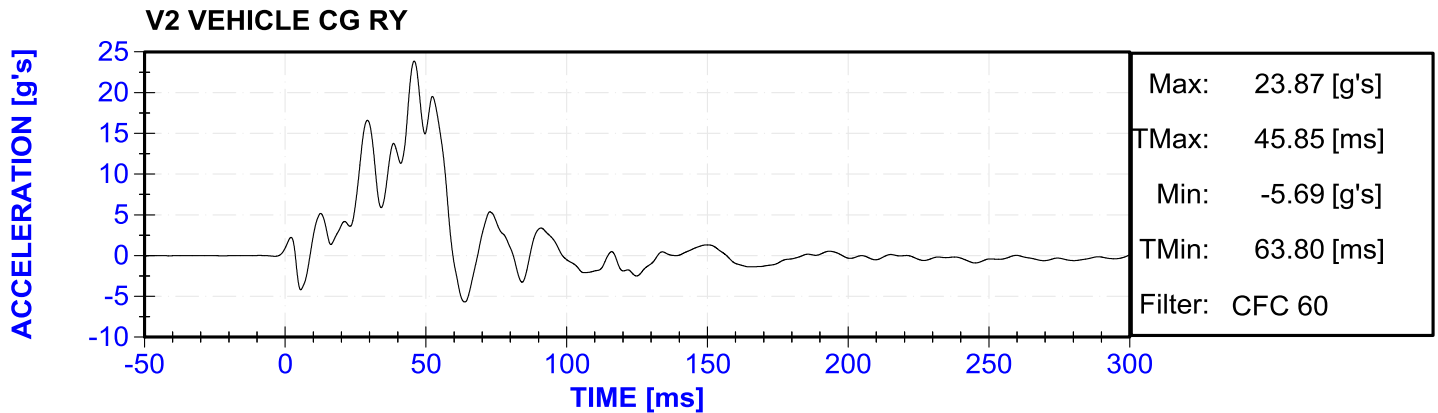


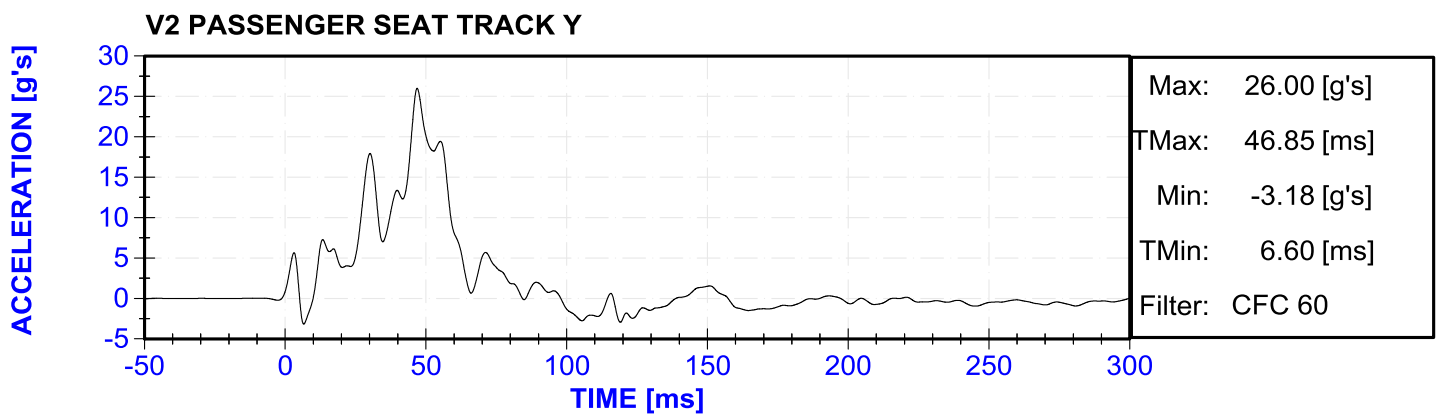
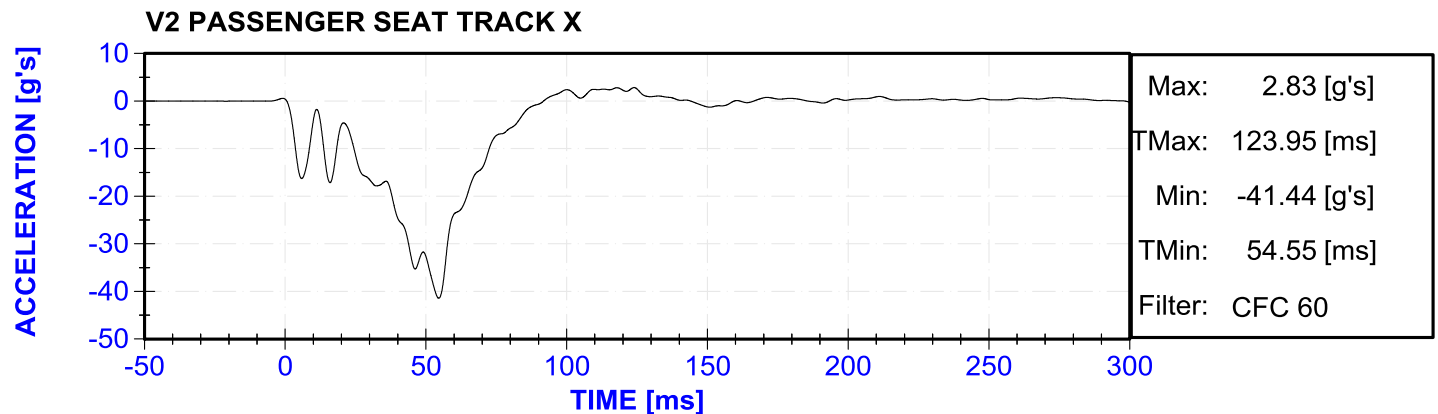
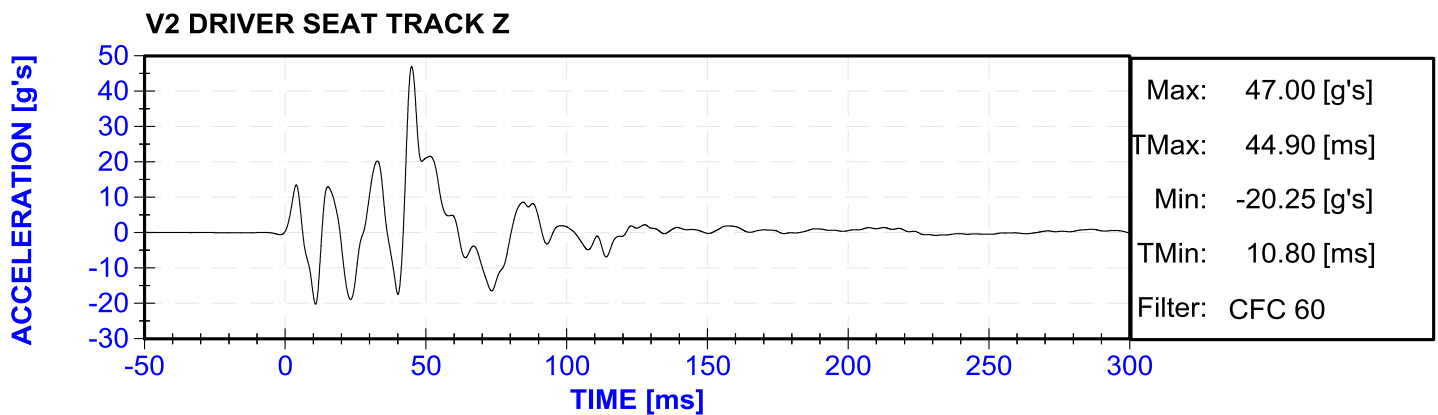
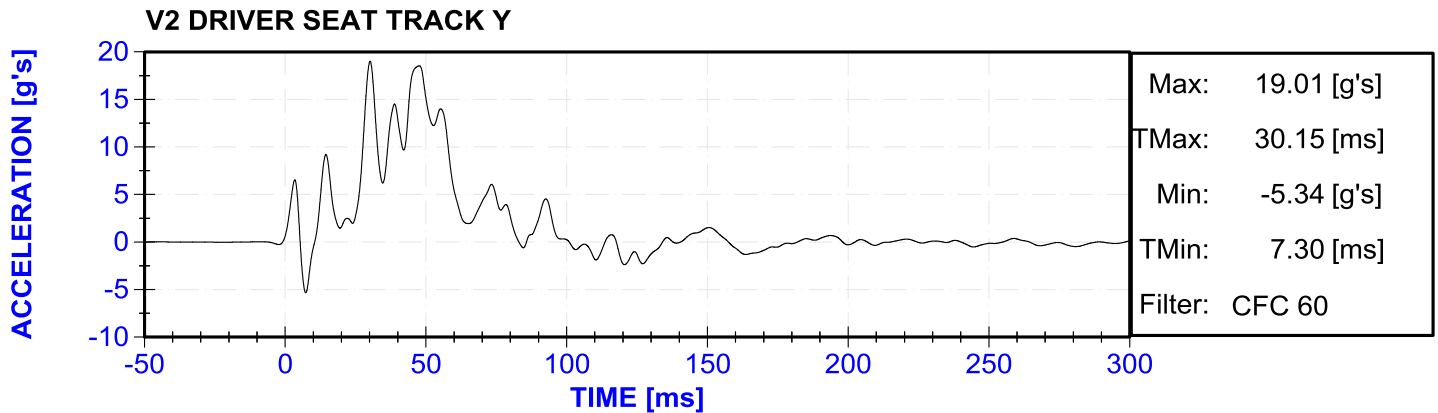
V2 LEFT REAR SILL Y



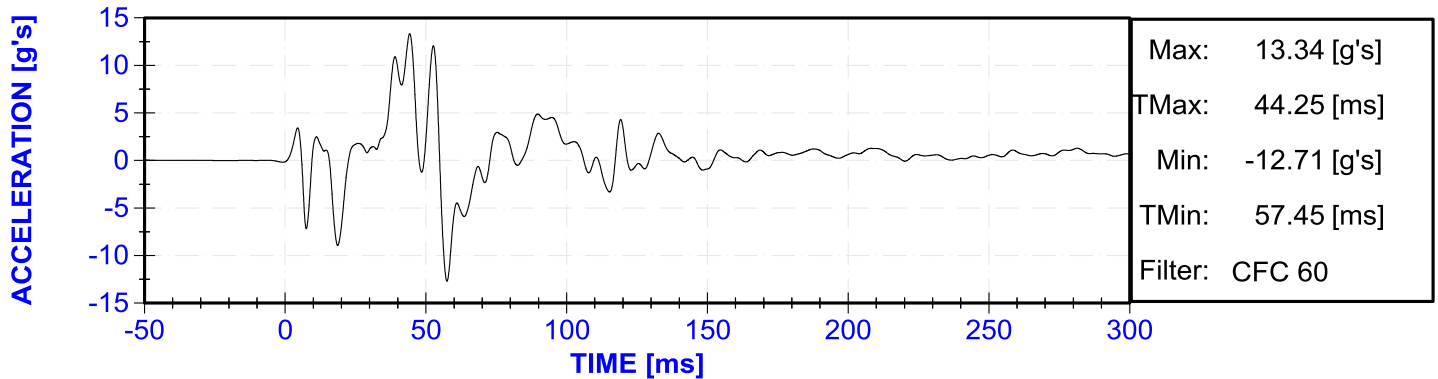




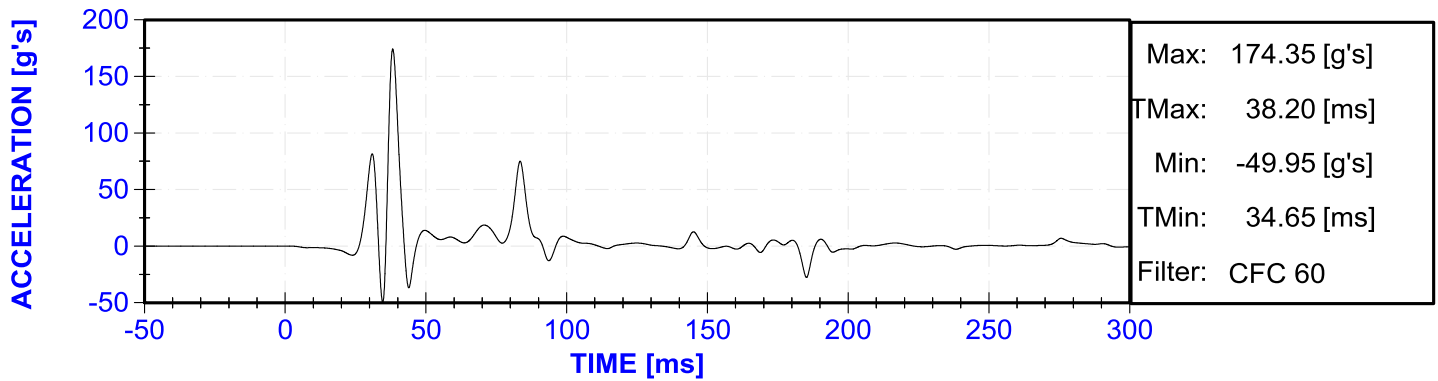




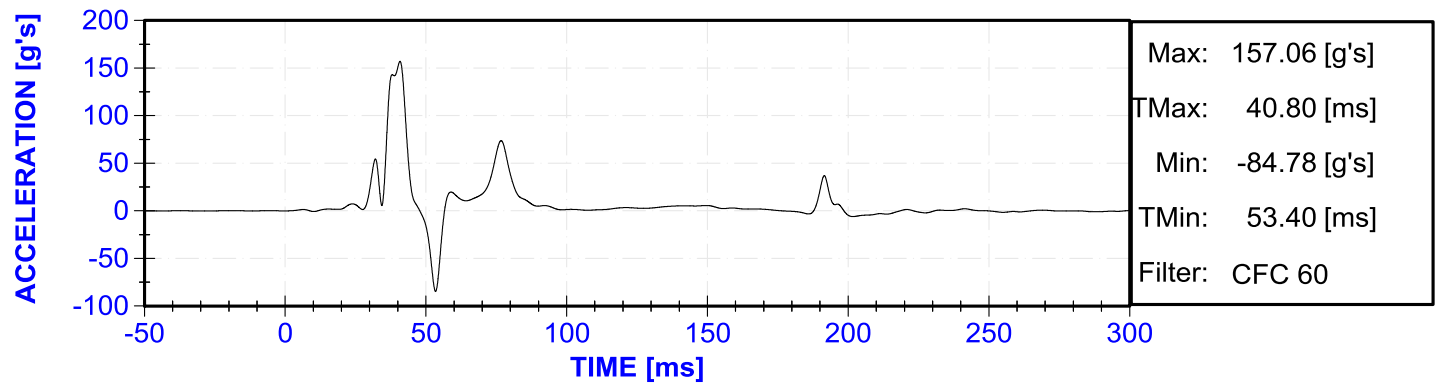
V2 PASSENGER SEAT TRACK Z



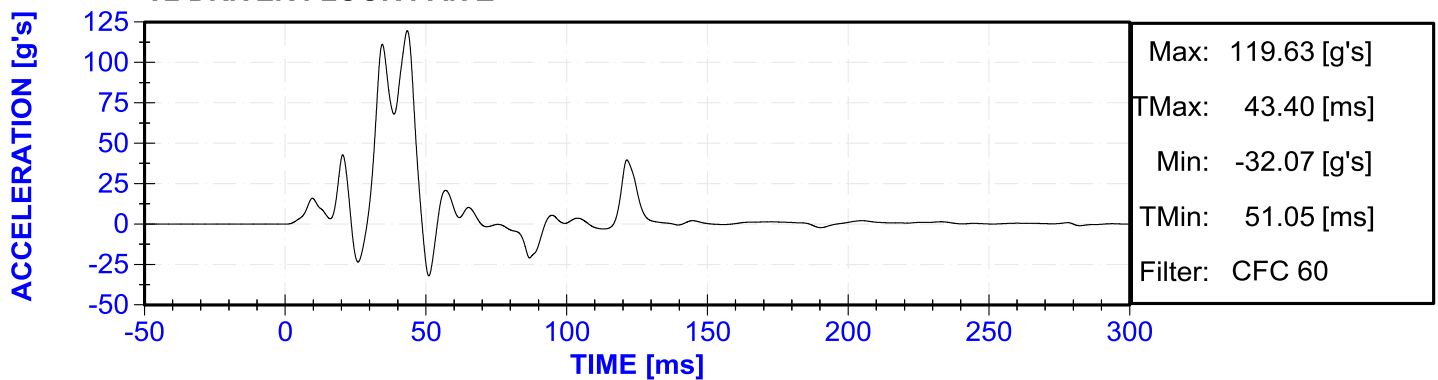
V2 DRIVER FLOOR PAN X

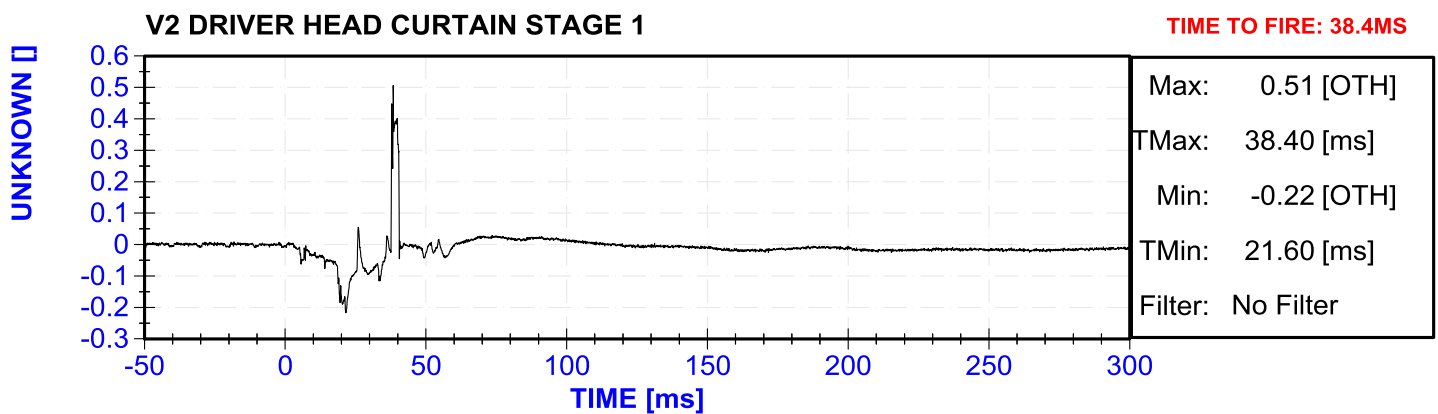
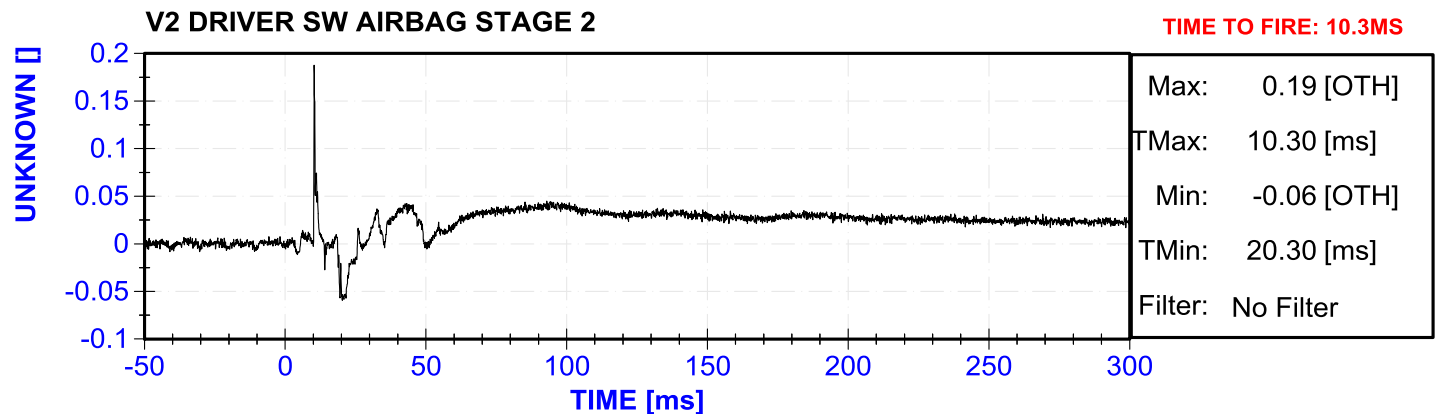
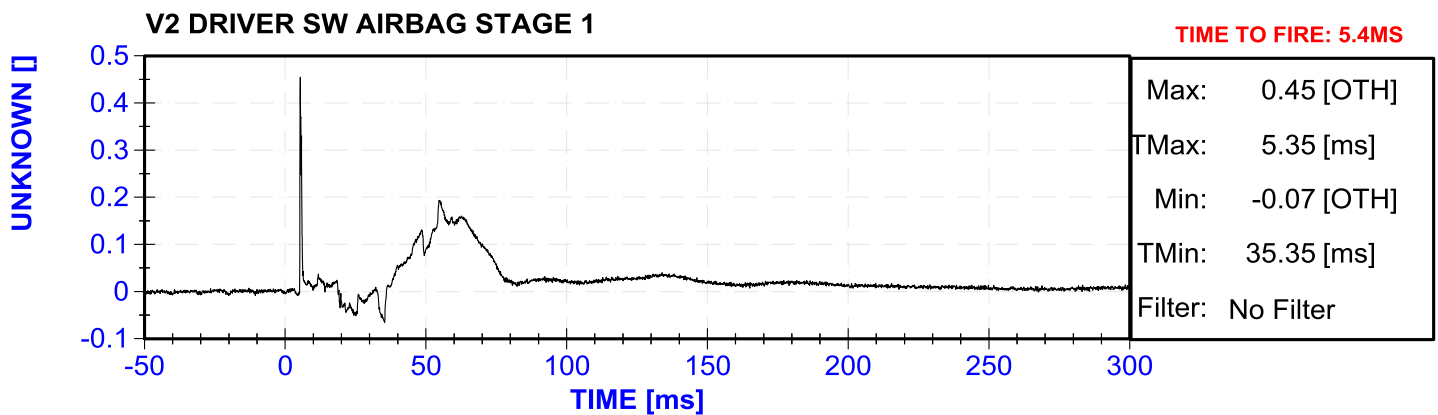
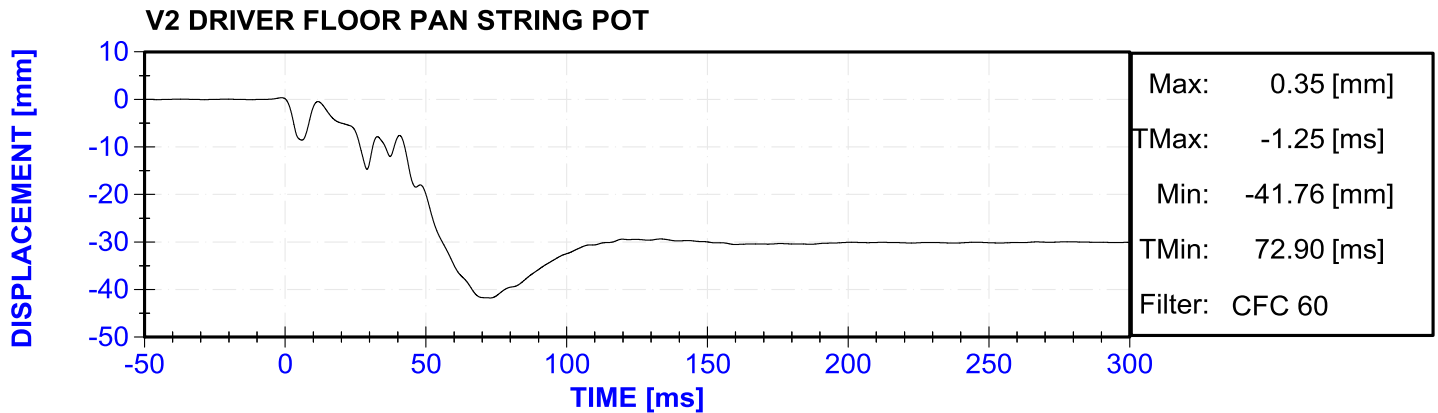


V2 DRIVER FLOOR PAN Y



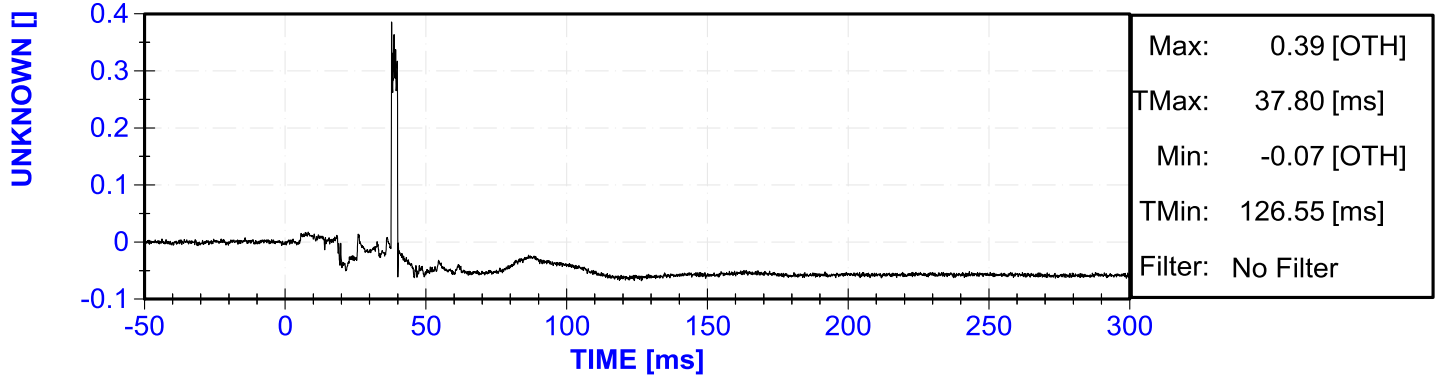
V2 DRIVER FLOOR PAN Z





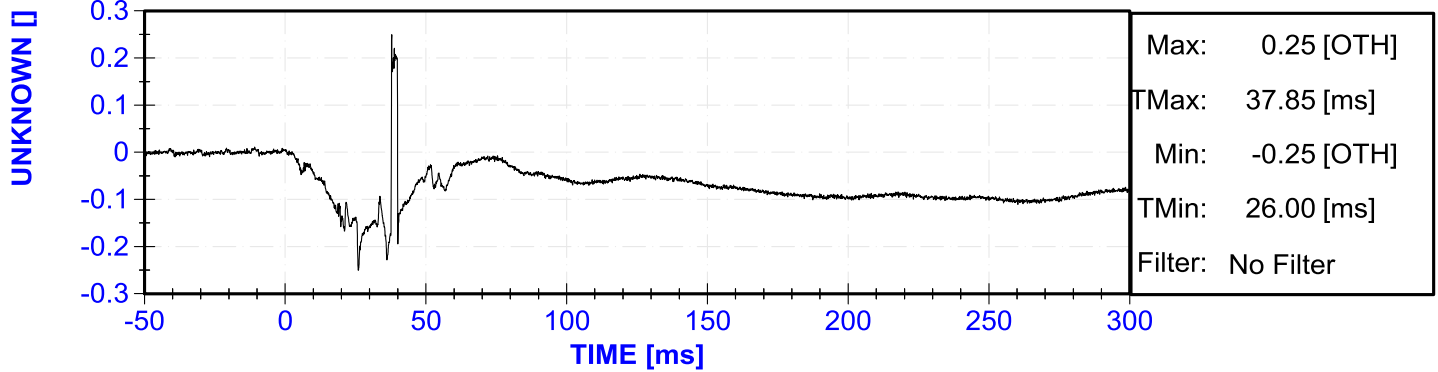
V2 DRIVER HEAD CURTAIN STAGE 2

TIME TO FIRE: 38.4MS



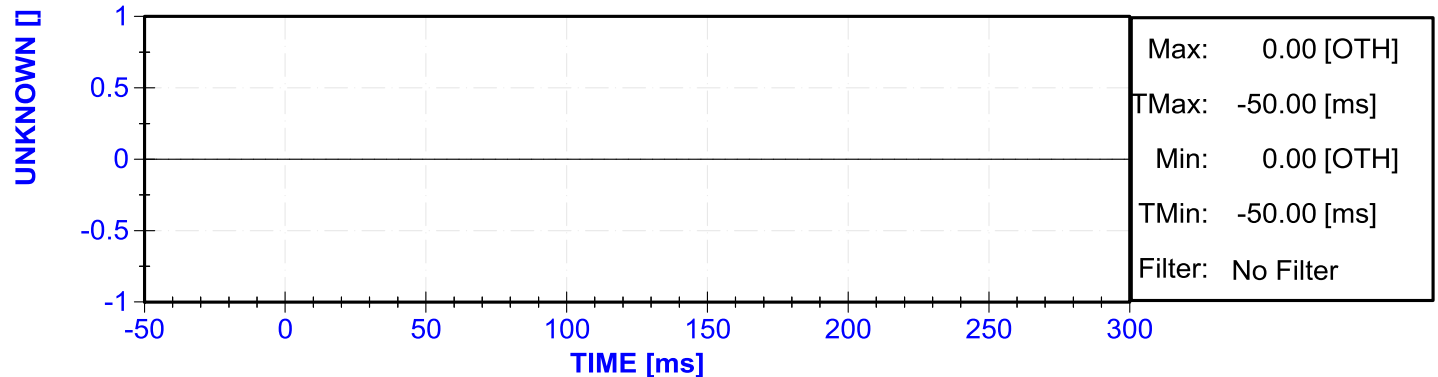
V2 DRIVER SEAT HEAD/TORSO/PELVIS

TIME TO FIRE: 26MS



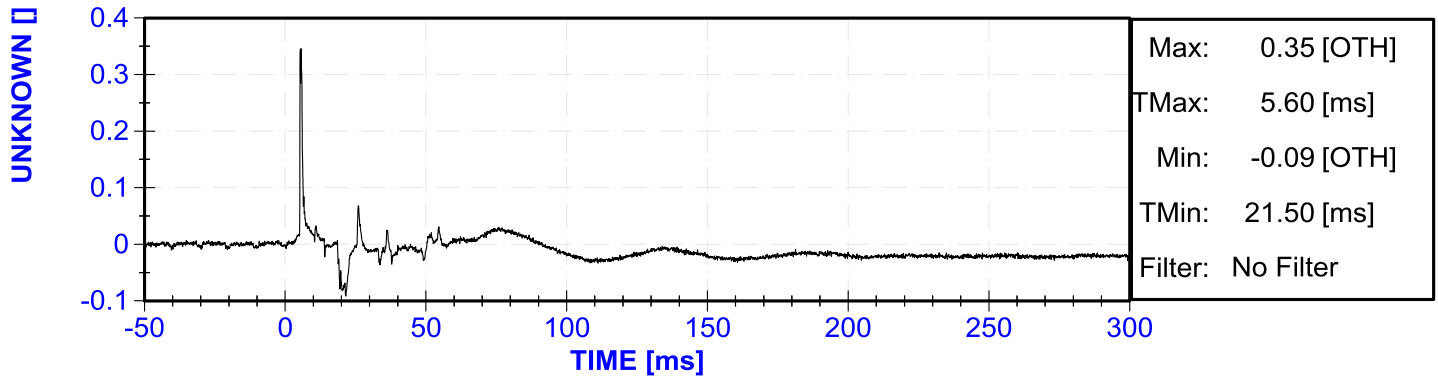
V2 DRIVER KNEE

NOT MONITORED



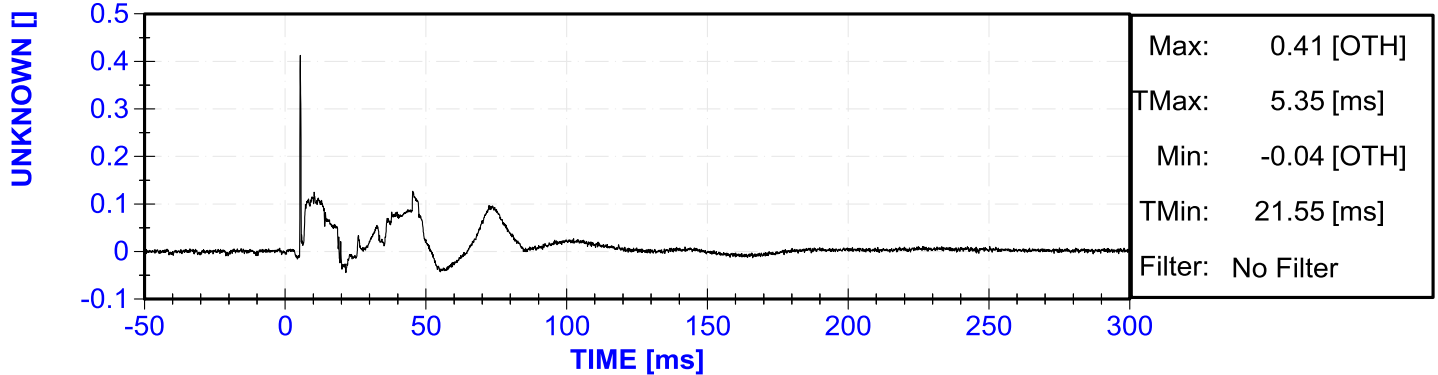
V2 DRIVER TORSO BELT PRETENSIONER

TIME TO FIRE: 5.6MS



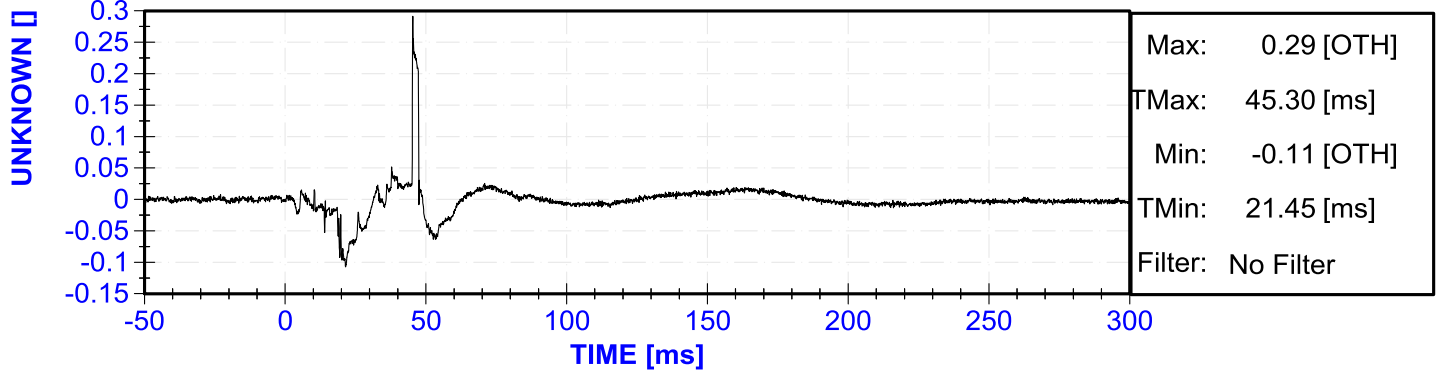
V2 PASSENGER FRT AIRBAG STAGE 1

TIME TO FIRE: 5.4MS



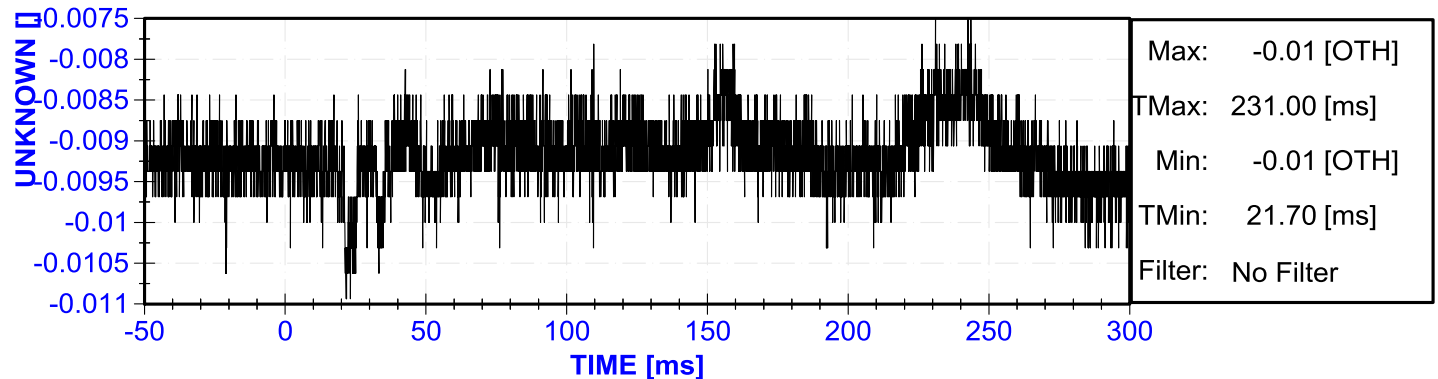
V2 PASSENGER FRT AIRBAG STAGE 2

TIME TO FIRE: 45.3MS



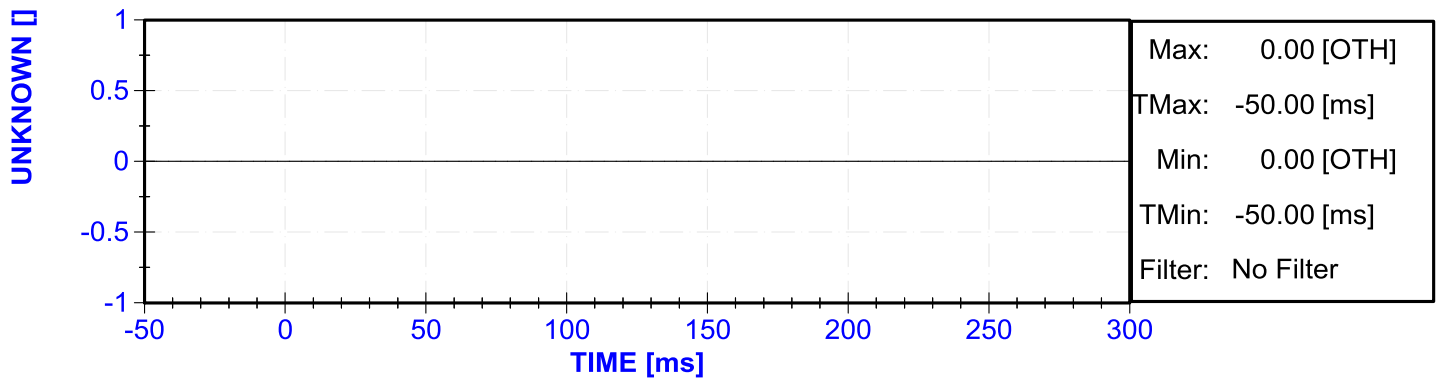
V2 PASSENGER HEAD CURTAIN

DID NOT FIRE



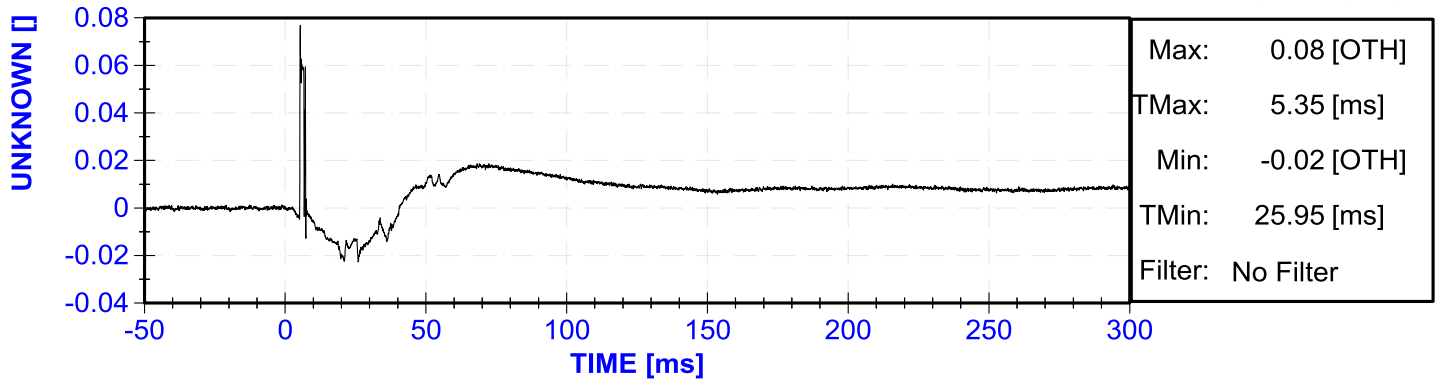
V2 PASSENGER HEAD/TORSO/PELVIS

NOT MONITORED

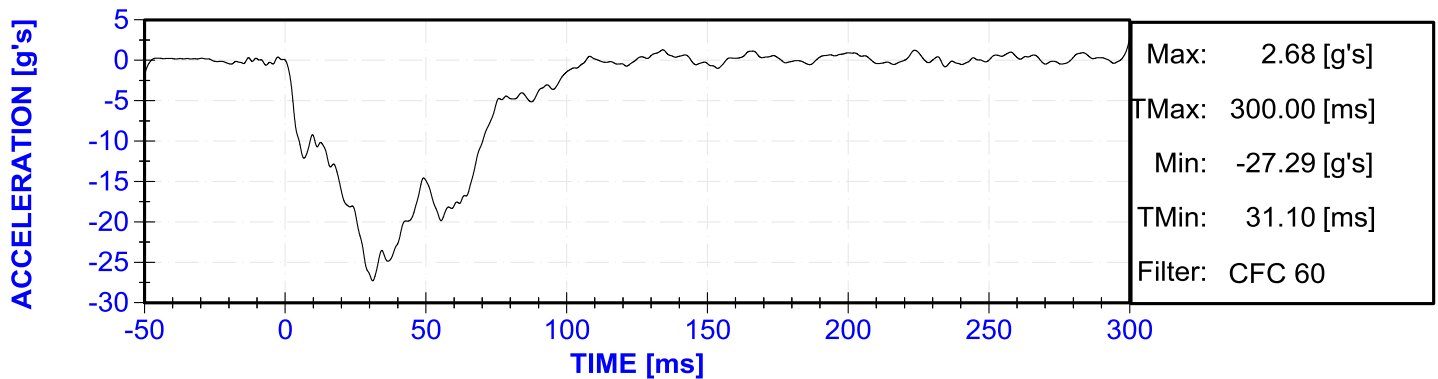


V2 PASSENGER TORSO BELT PRETENTIONER

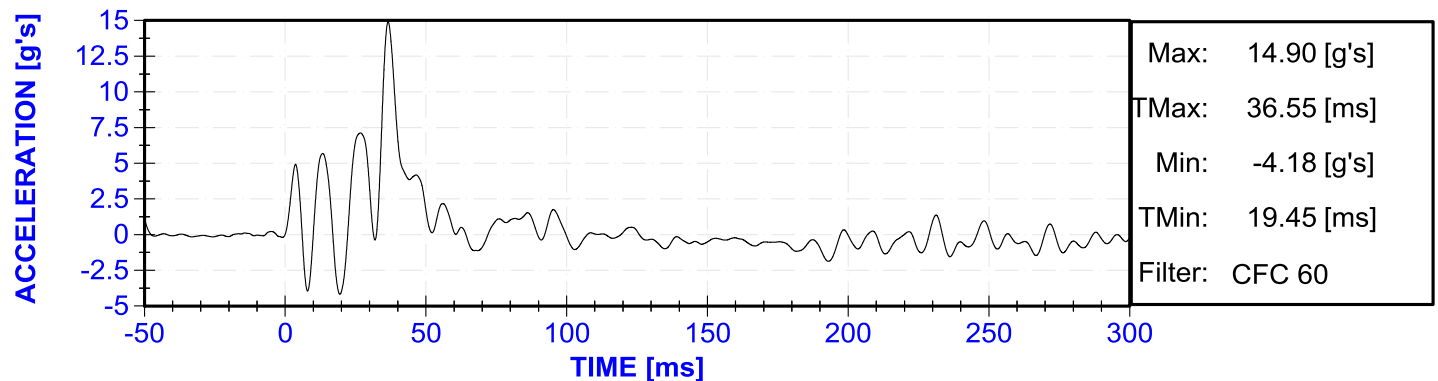
TIME TO FIRE: 5.4MS



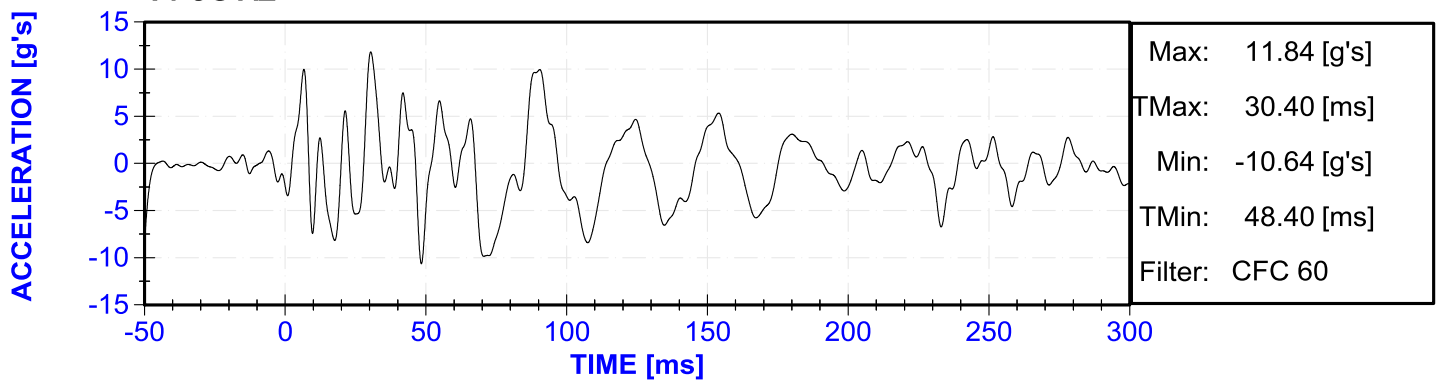
V1 CG AX

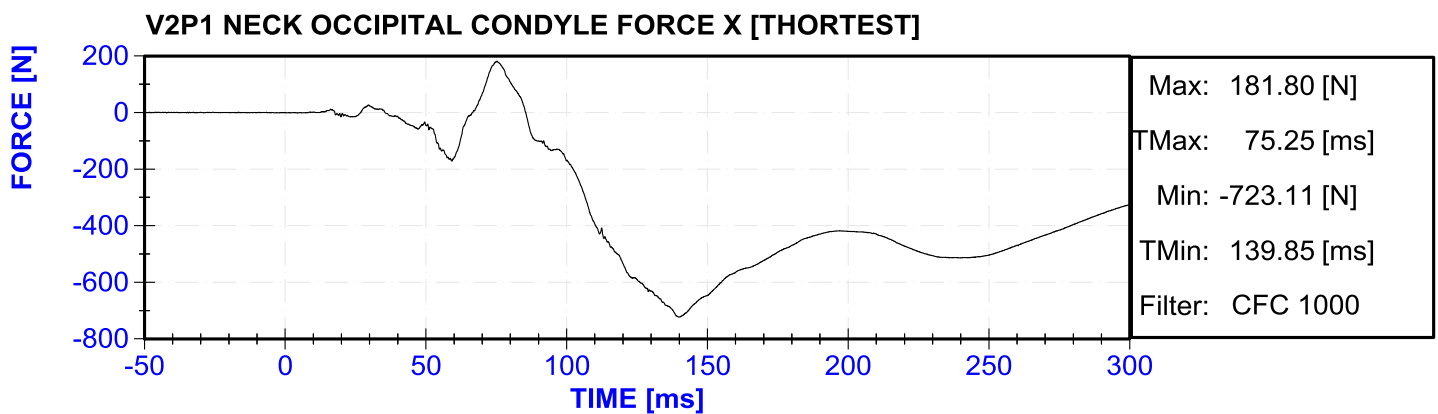
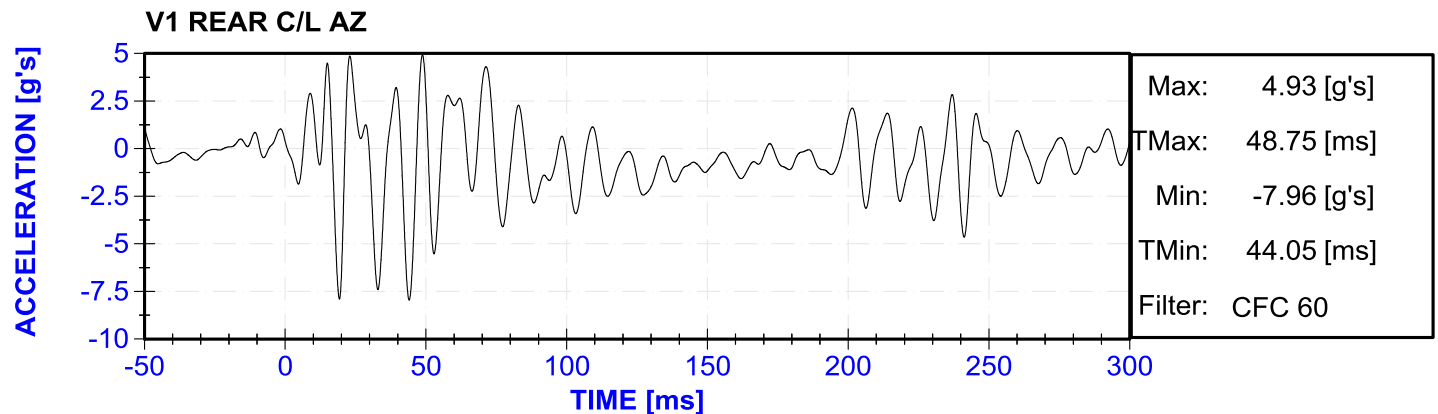
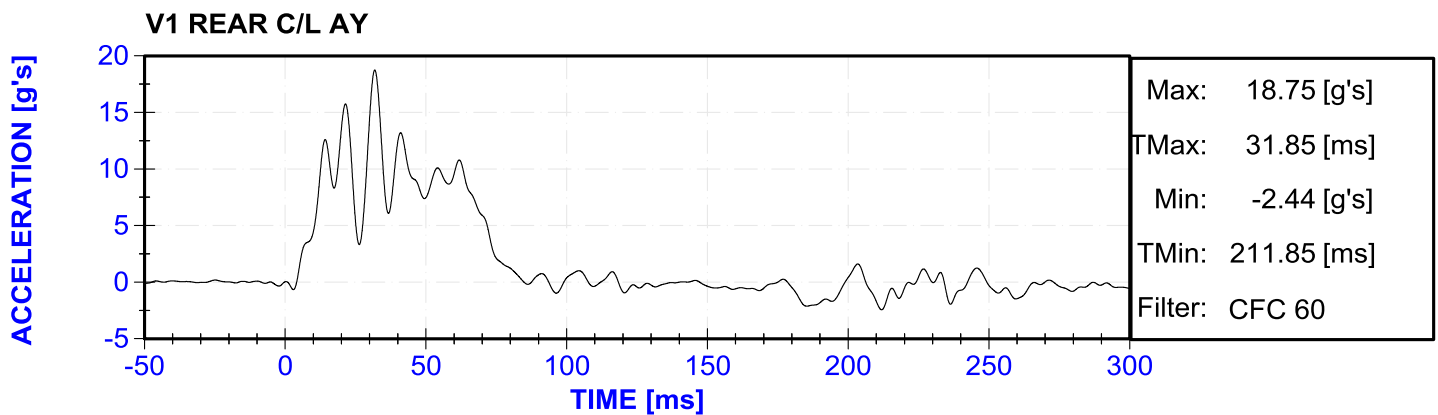
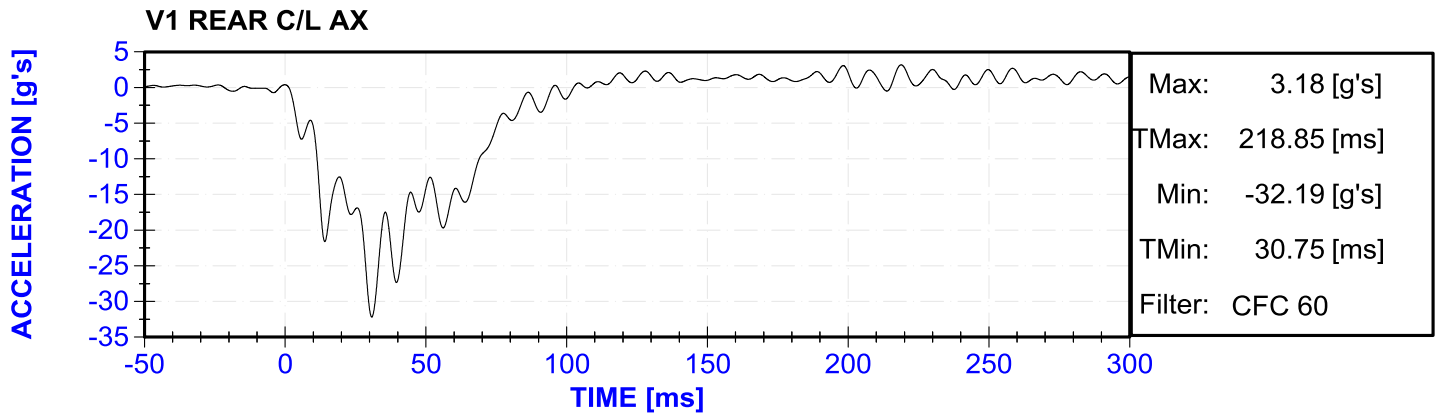


V1 CG AY

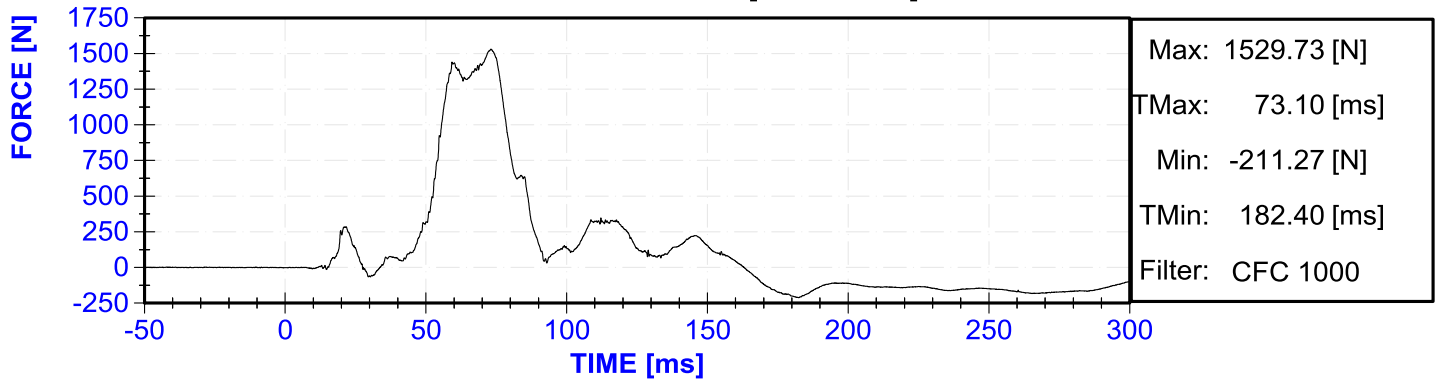


V1 CG AZ

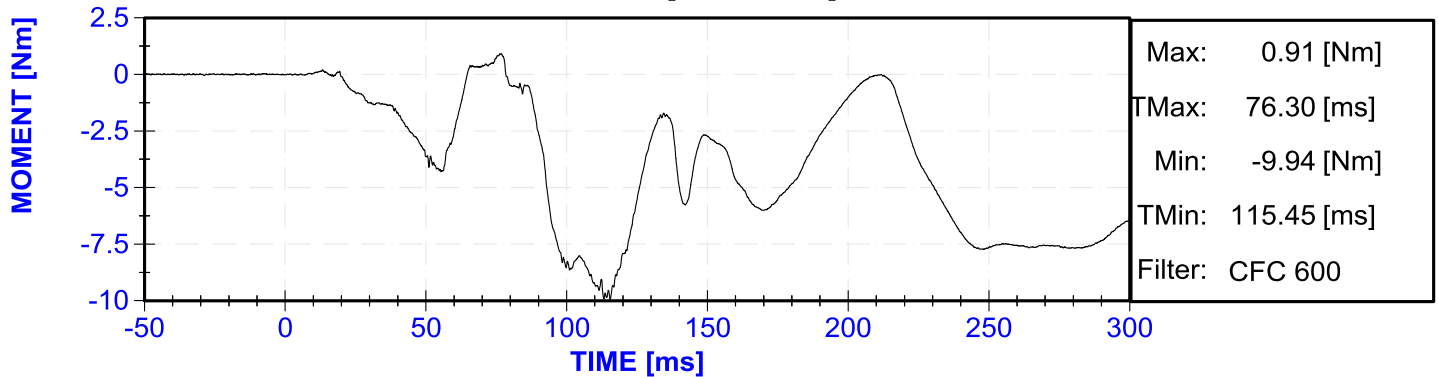




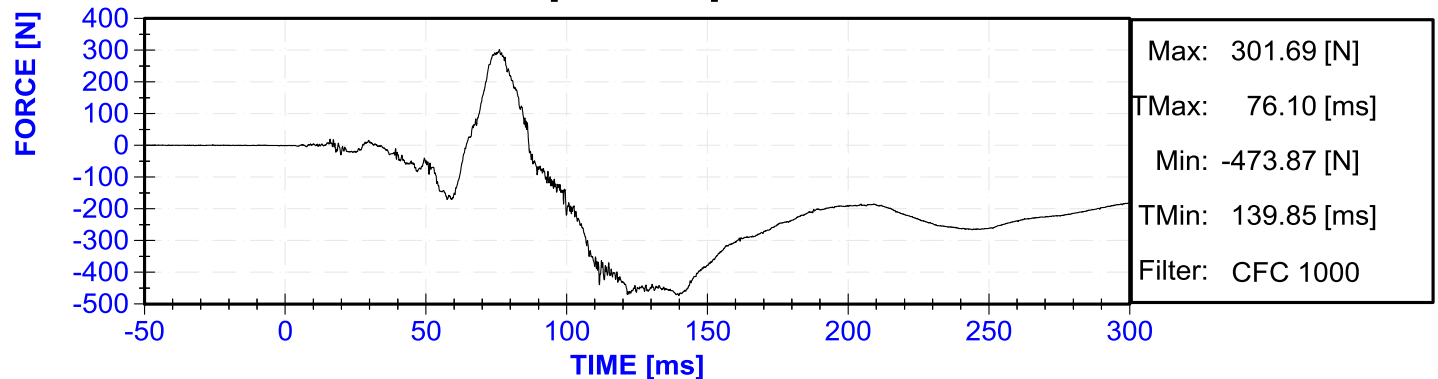
V2P1 NECK OCCIPITAL CONDYLE FORCE Z [THORTEST]



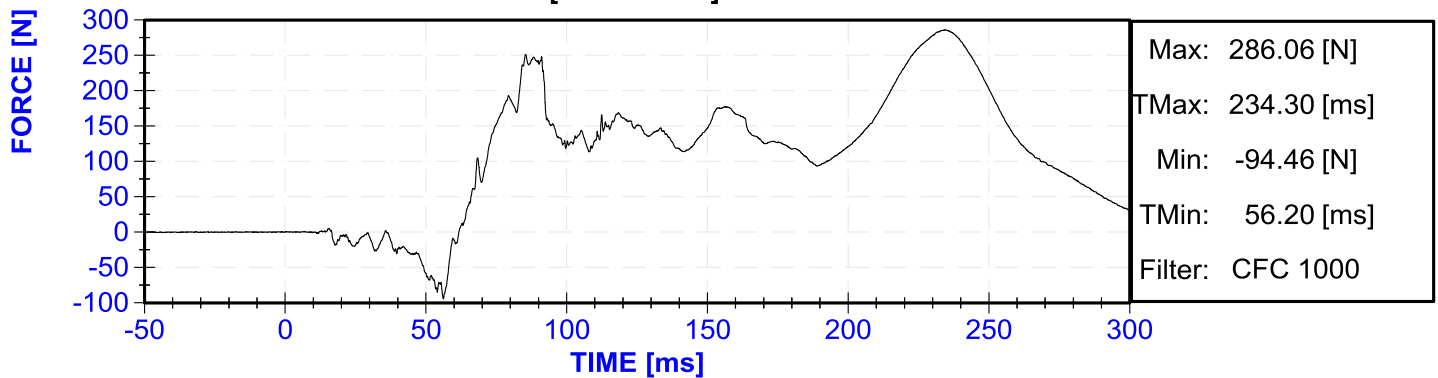
V2P1 NECK OCCIPITAL CONDYLE MY [THORTEST]



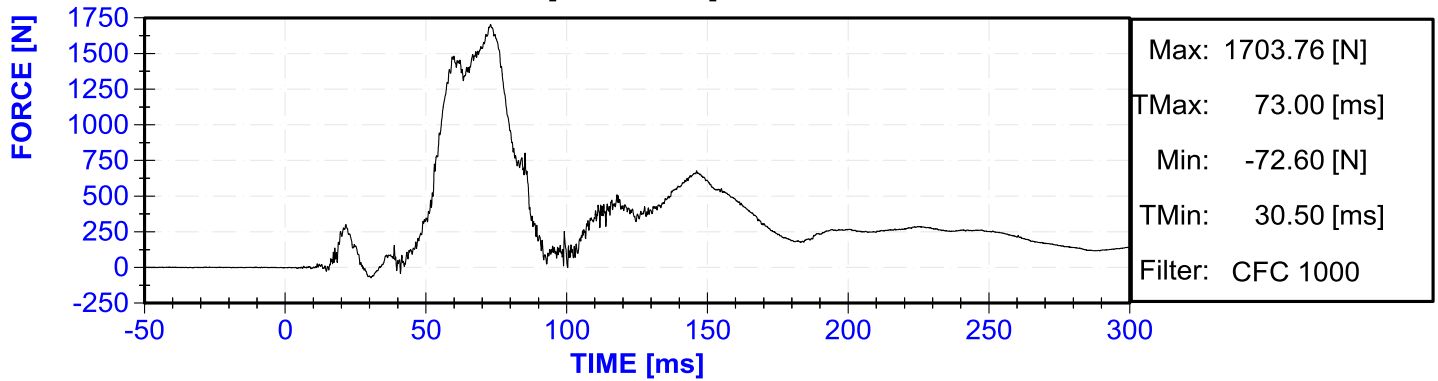
V2P1 NECK UPPER FORCE X [THORTEST]



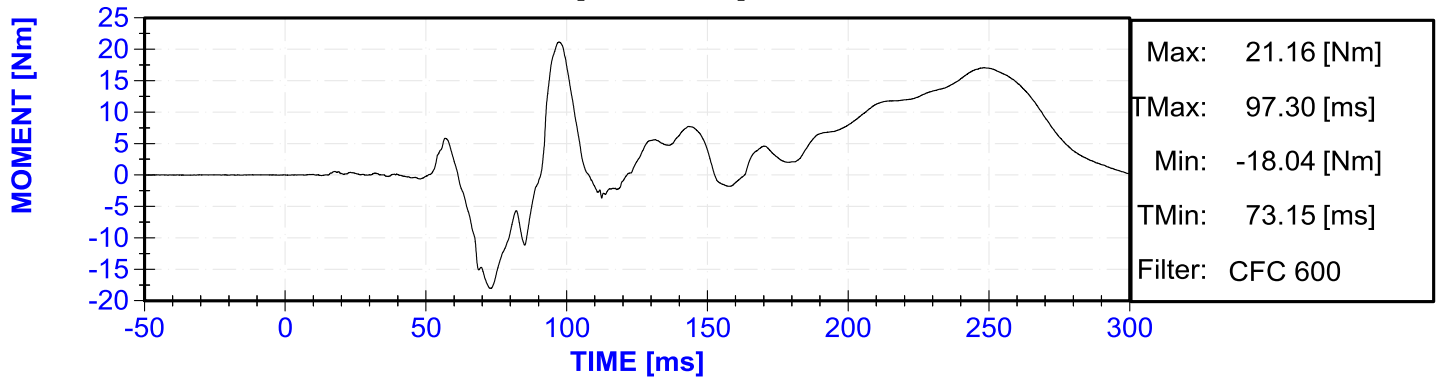
V2P1 NECK UPPER FORCE Y [THORTEST]



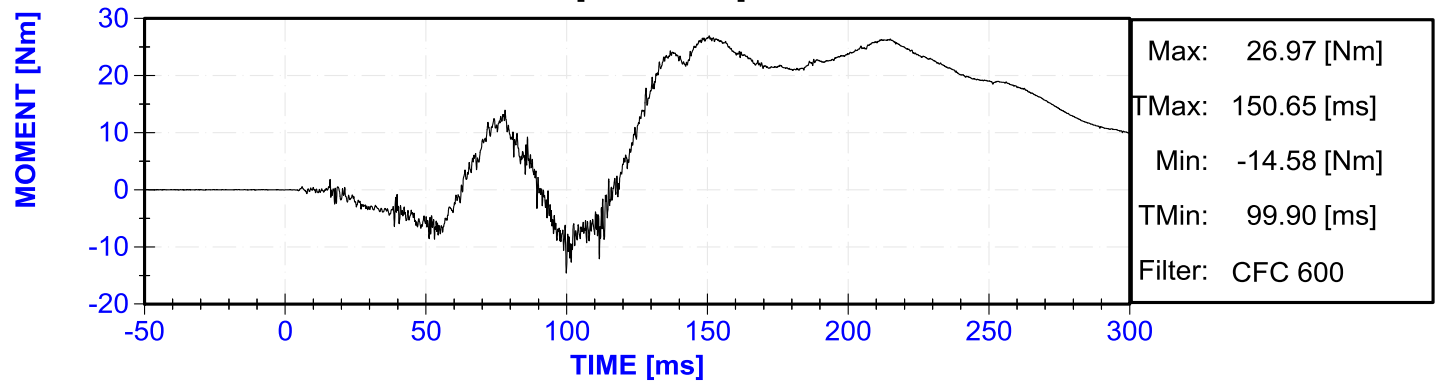
V2P1 NECK UPPER FORCE Z [THORTEST]



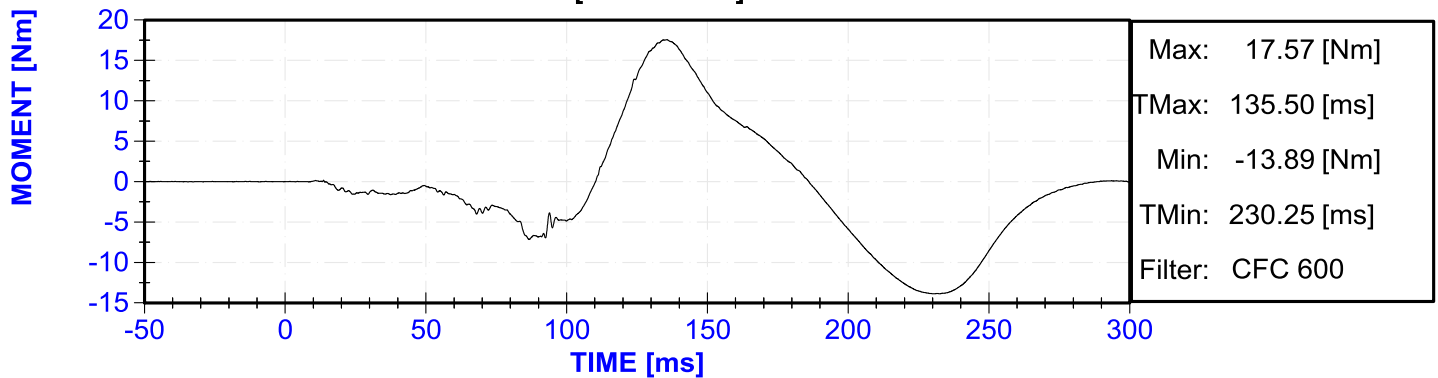
V2P1 NECK UPPER MOMENT X [THORTEST]

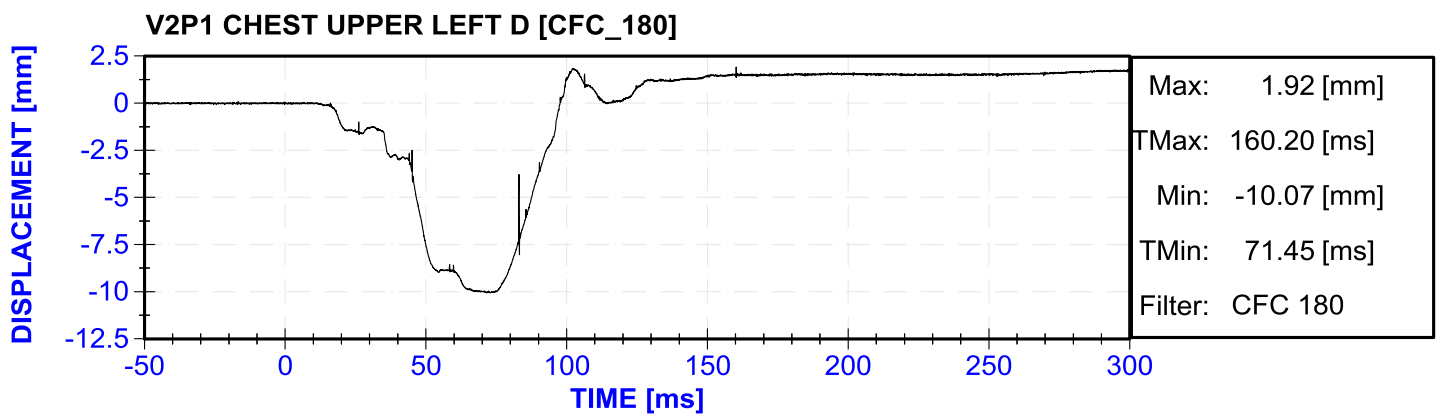
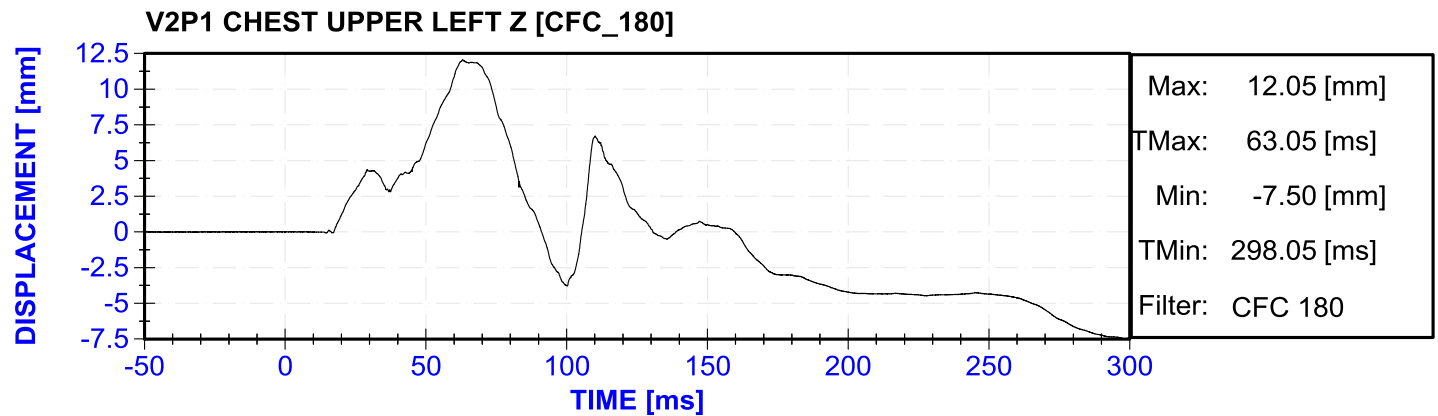
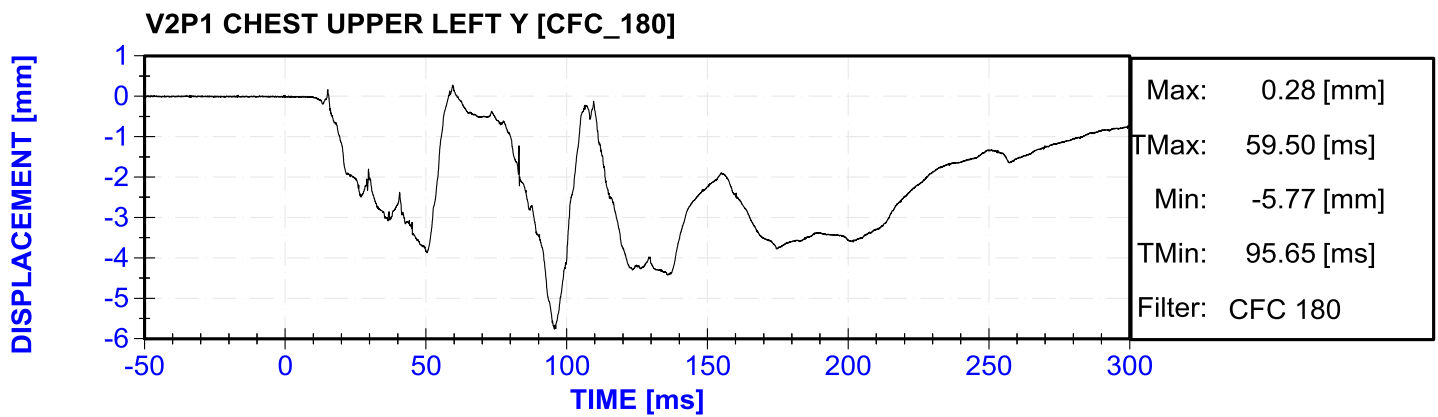
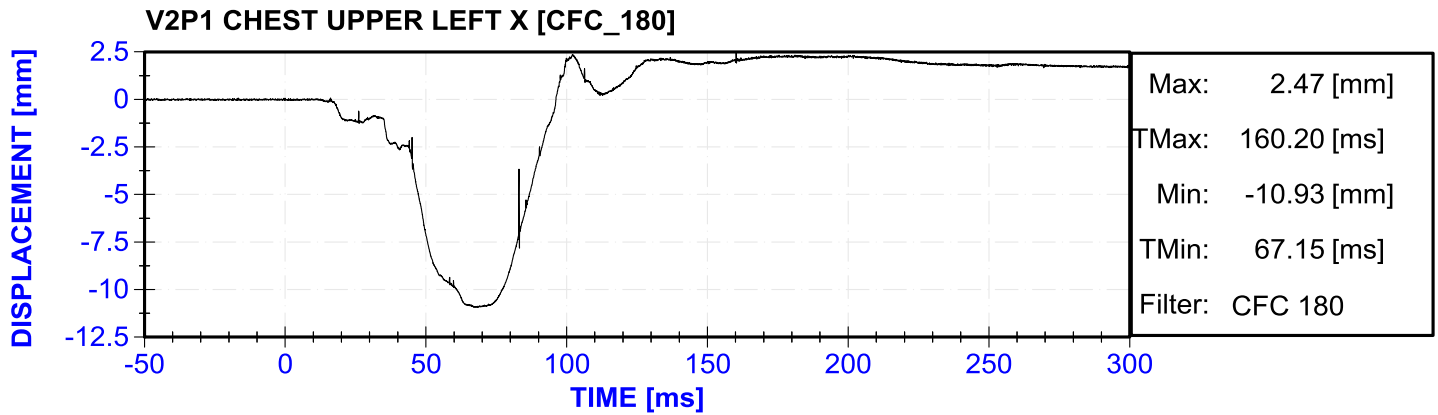


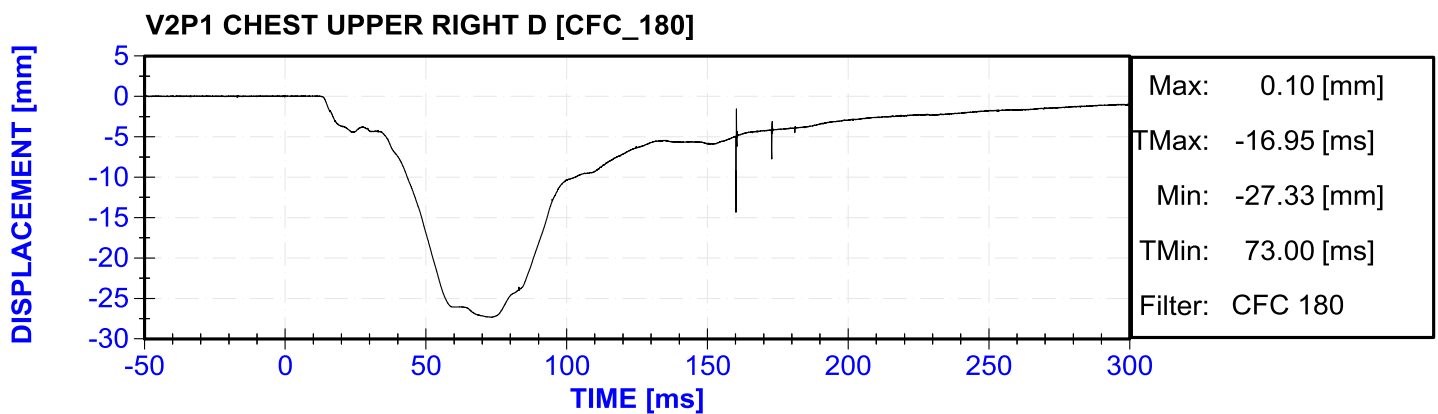
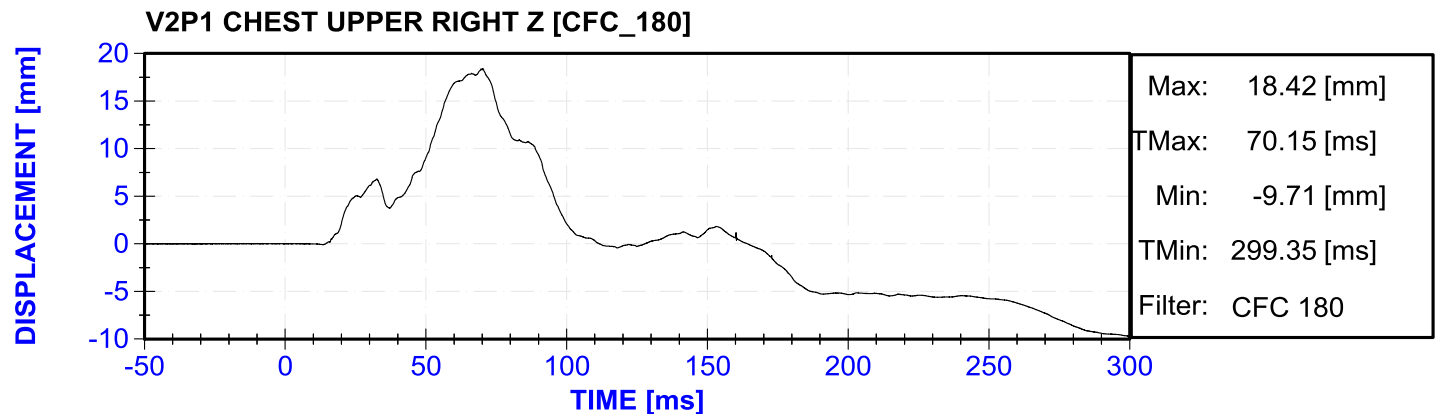
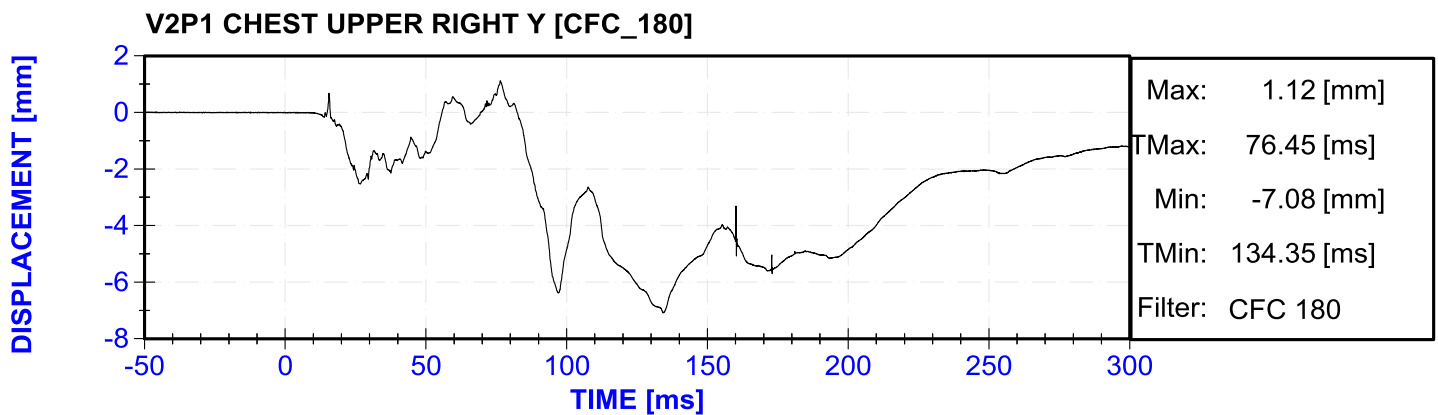
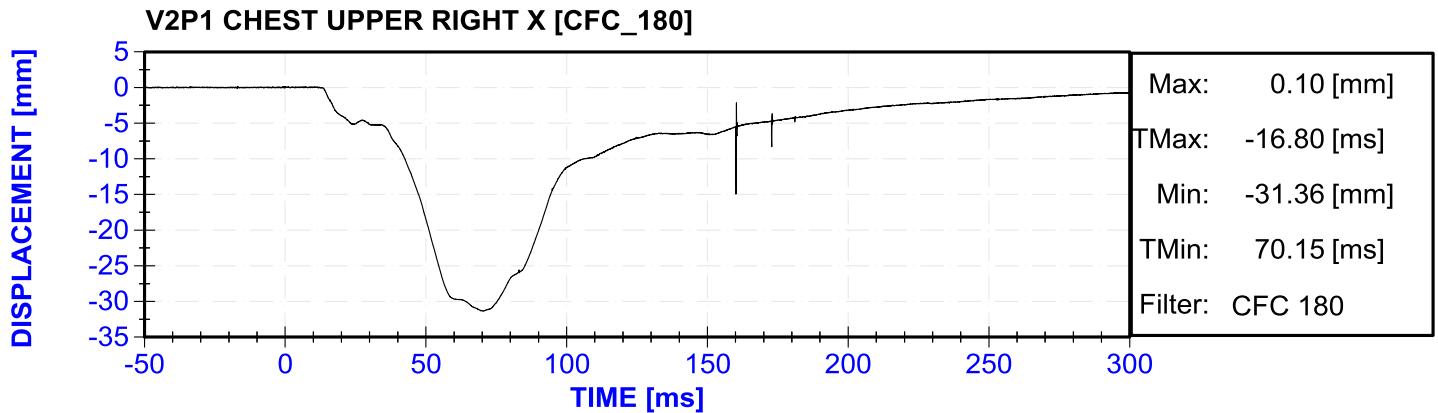
V2P1 NECK UPPER MOMENT Y [THORTEST]

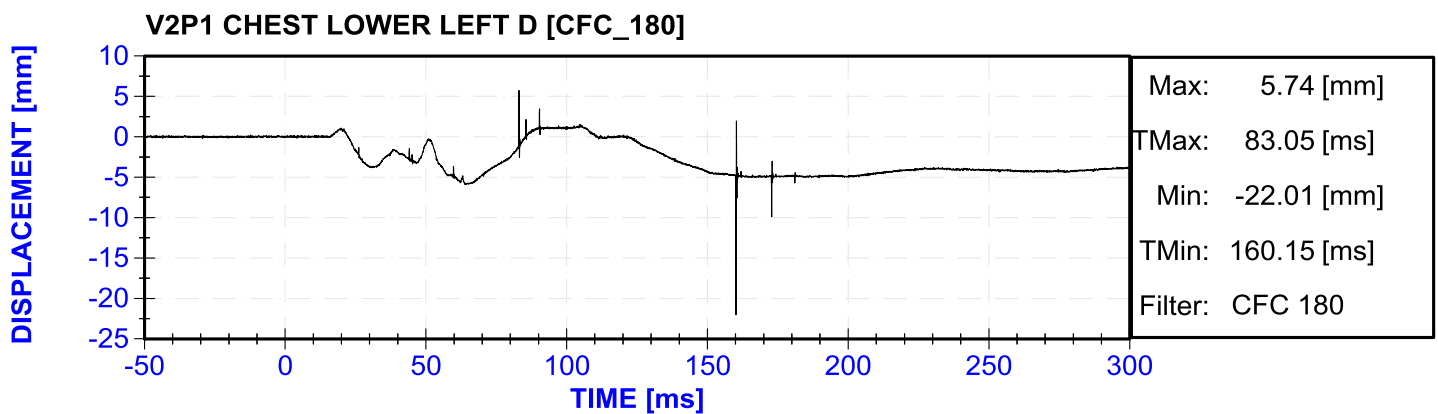
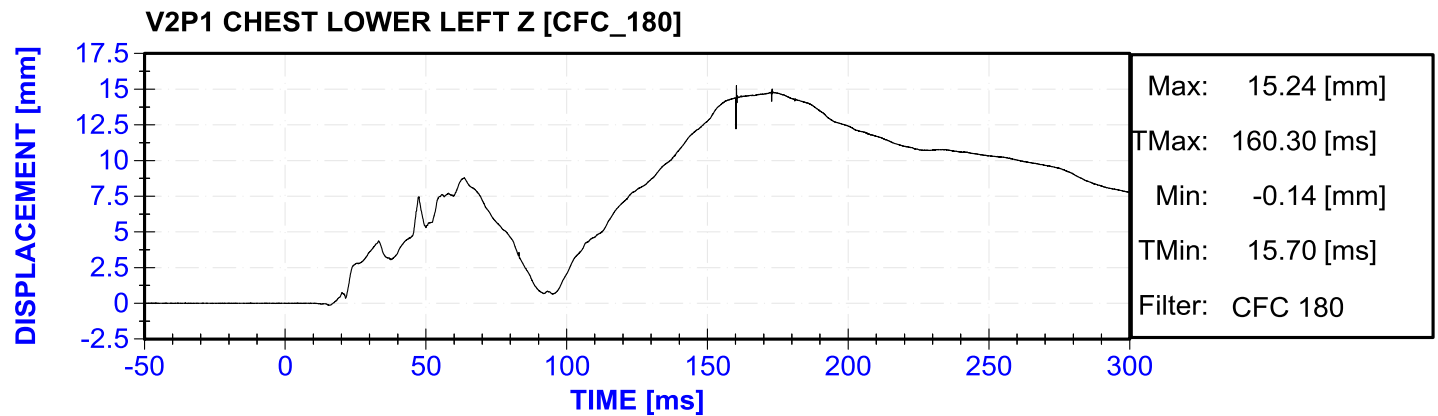
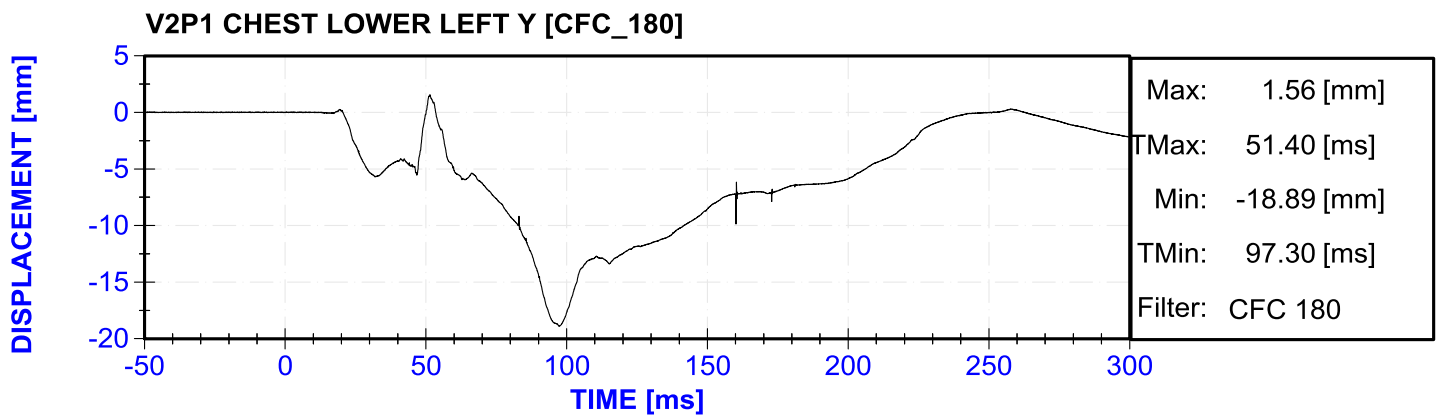
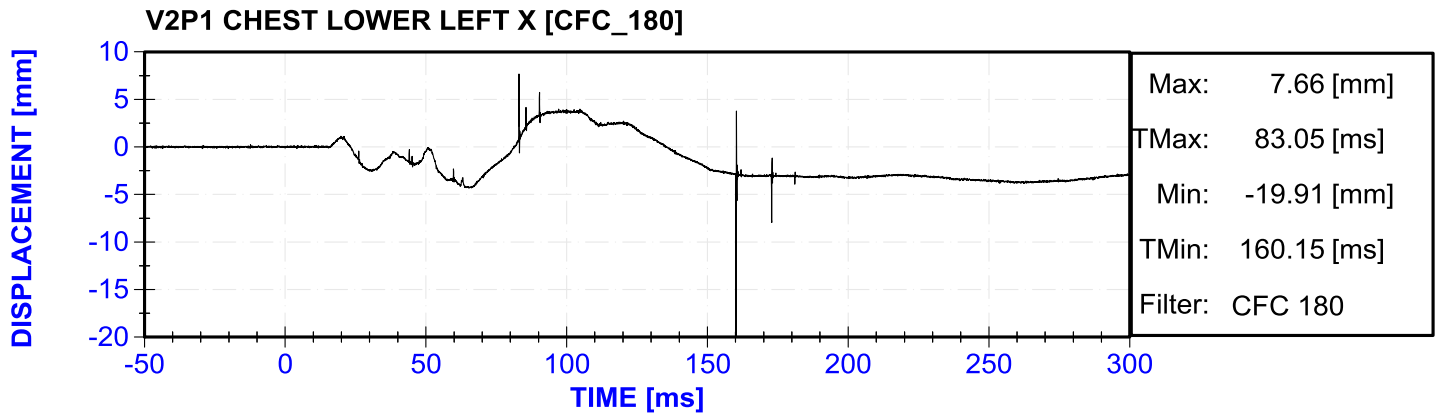


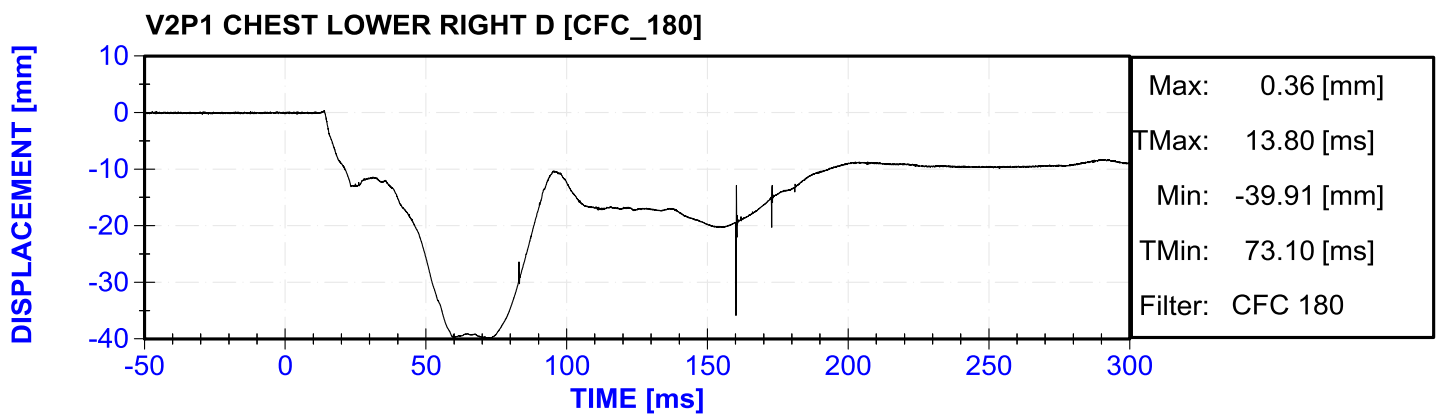
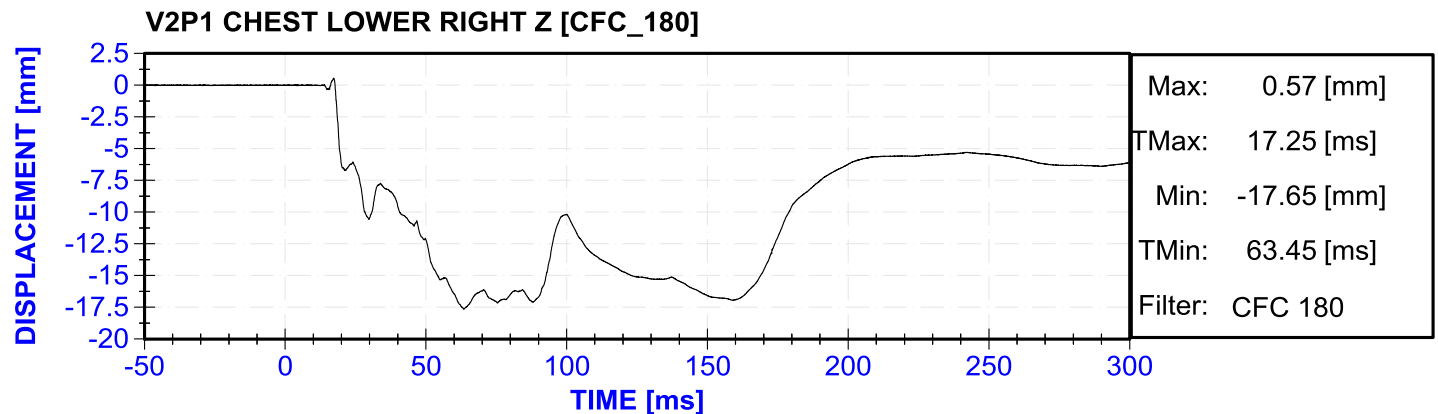
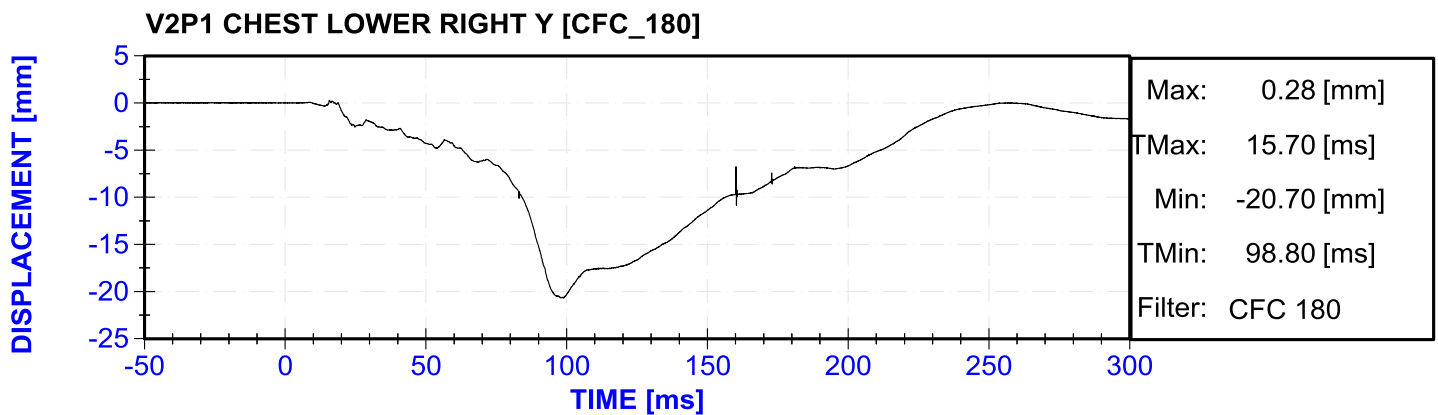
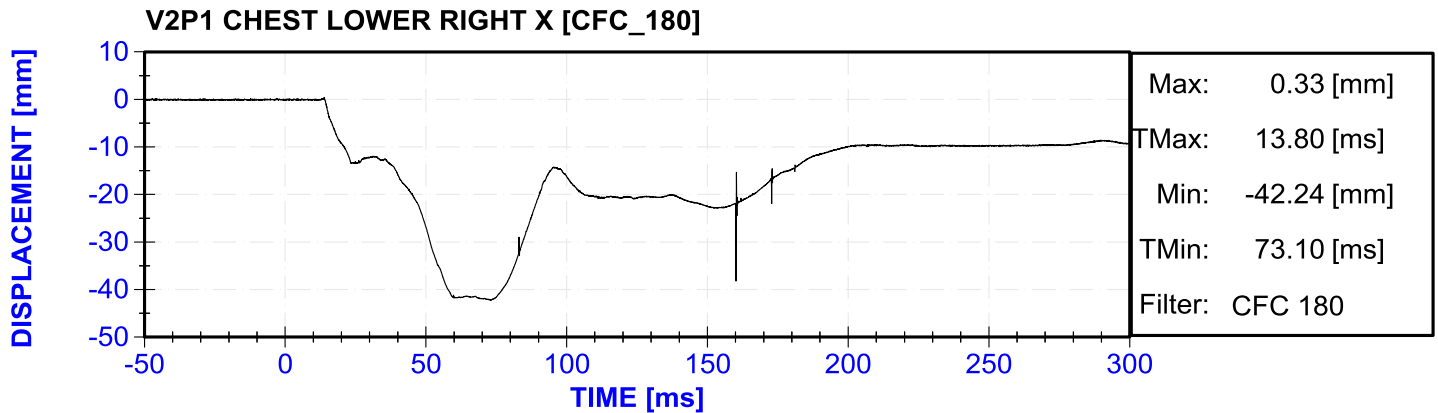
V2P1 NECK UPPER MOMENT Z [THORTEST]

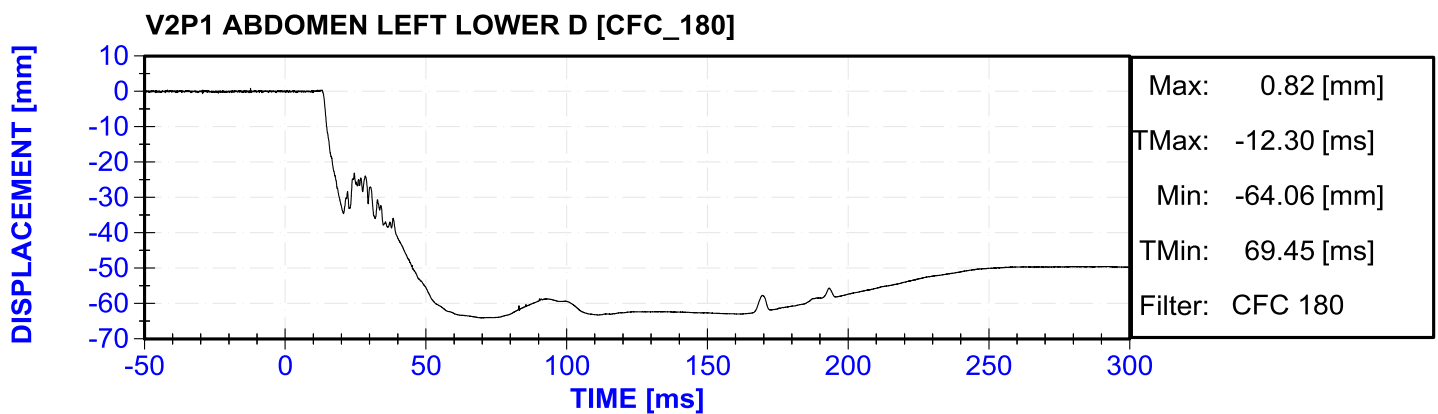
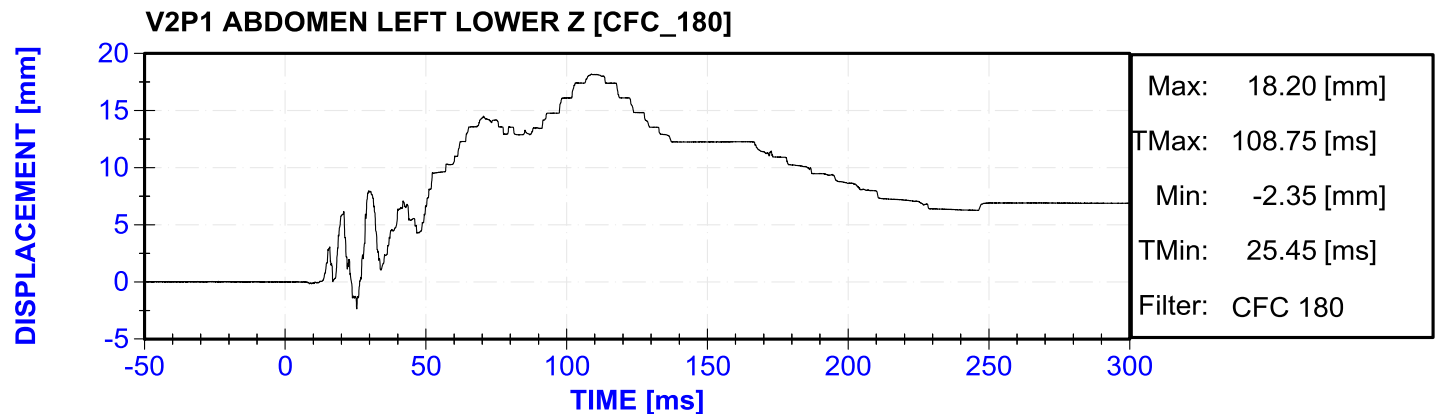
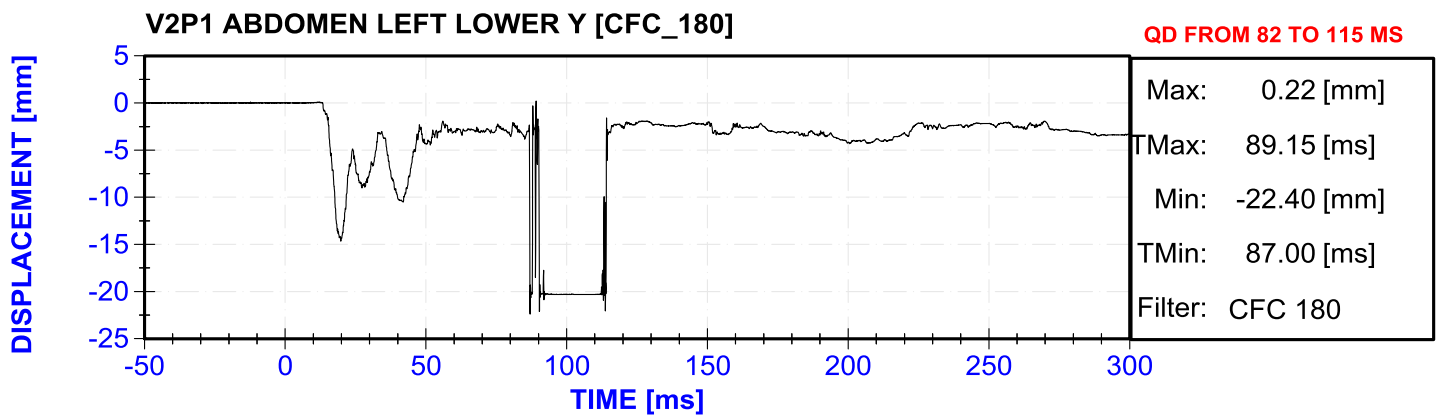
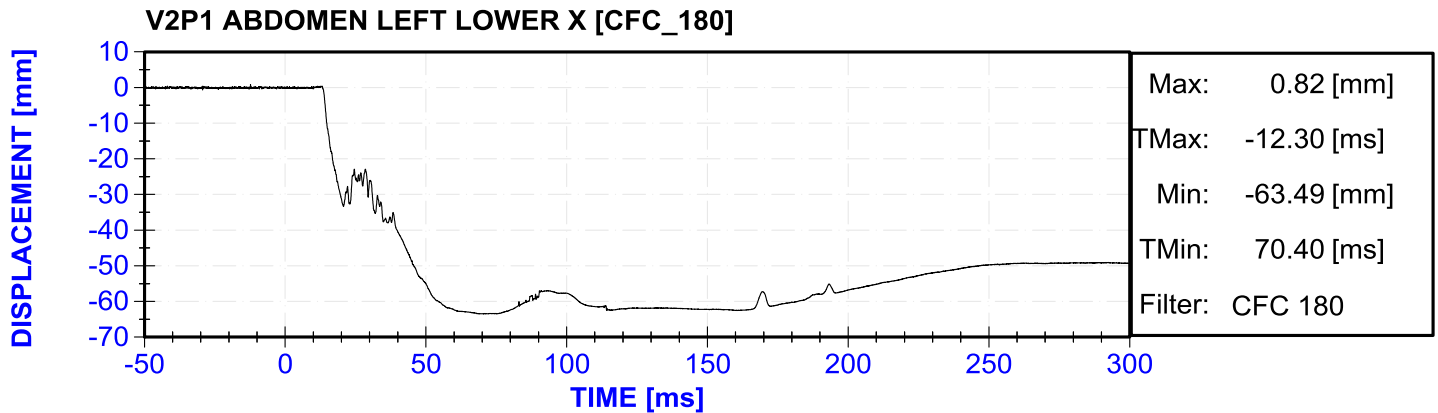


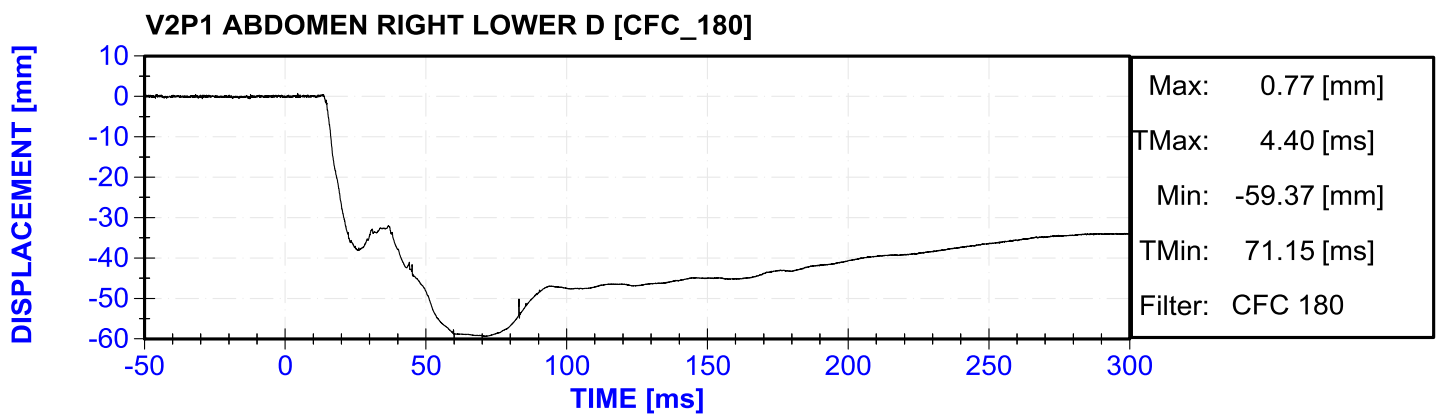
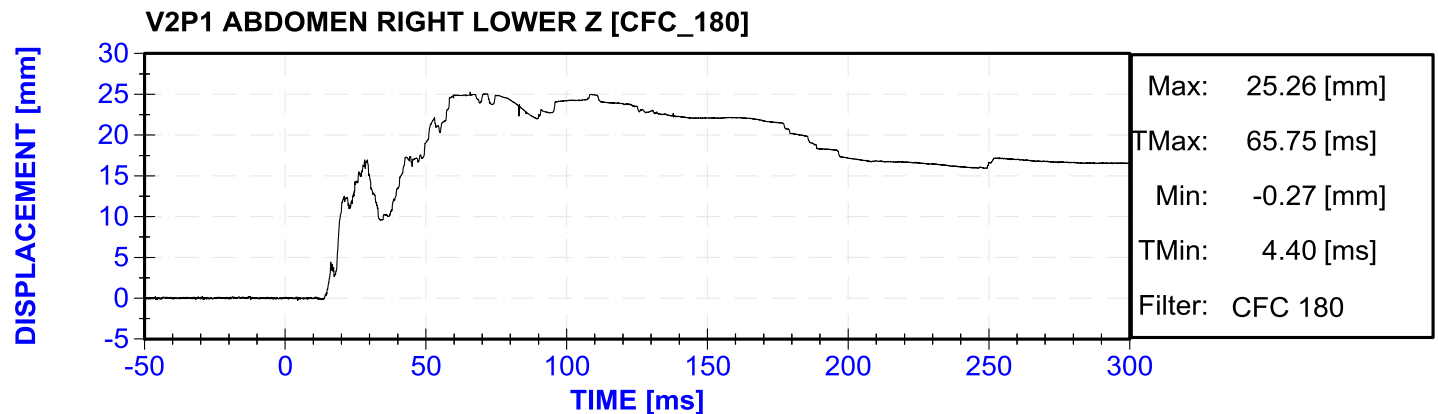
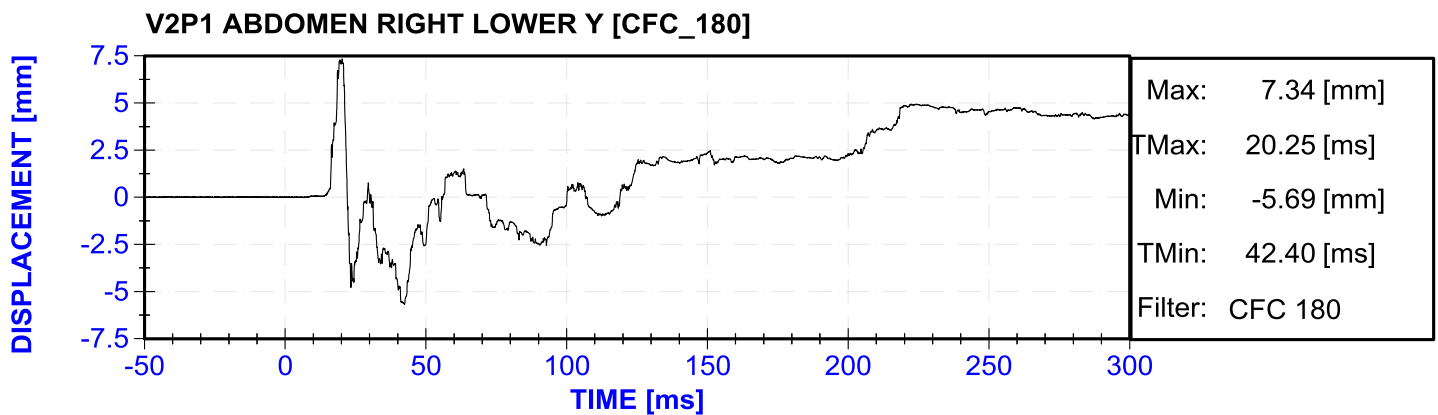
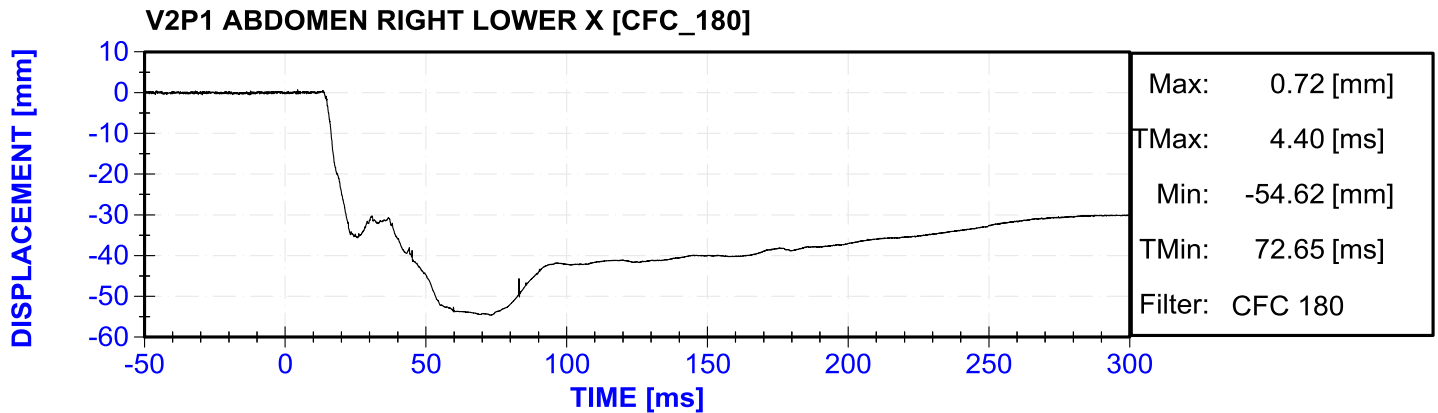


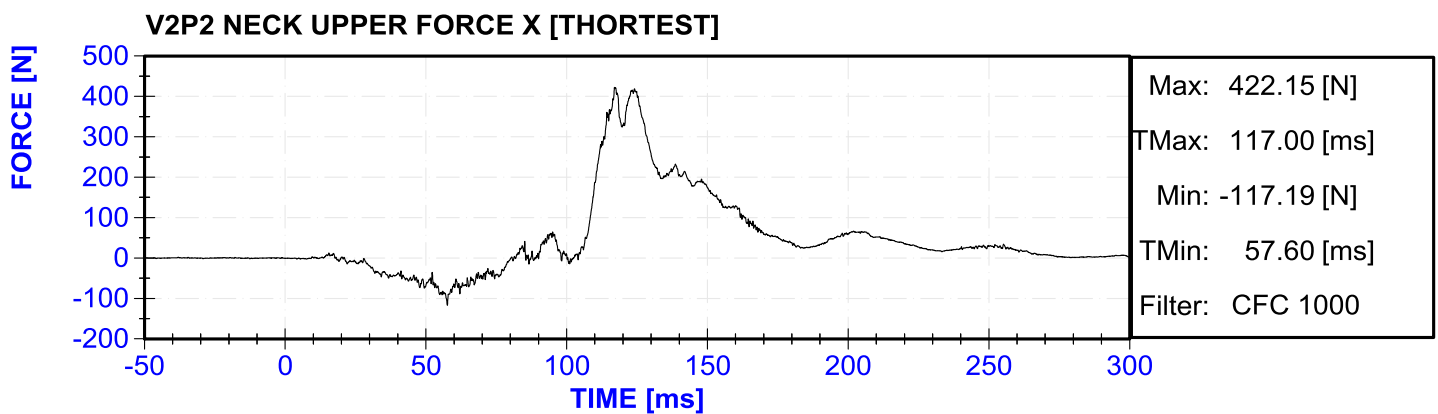
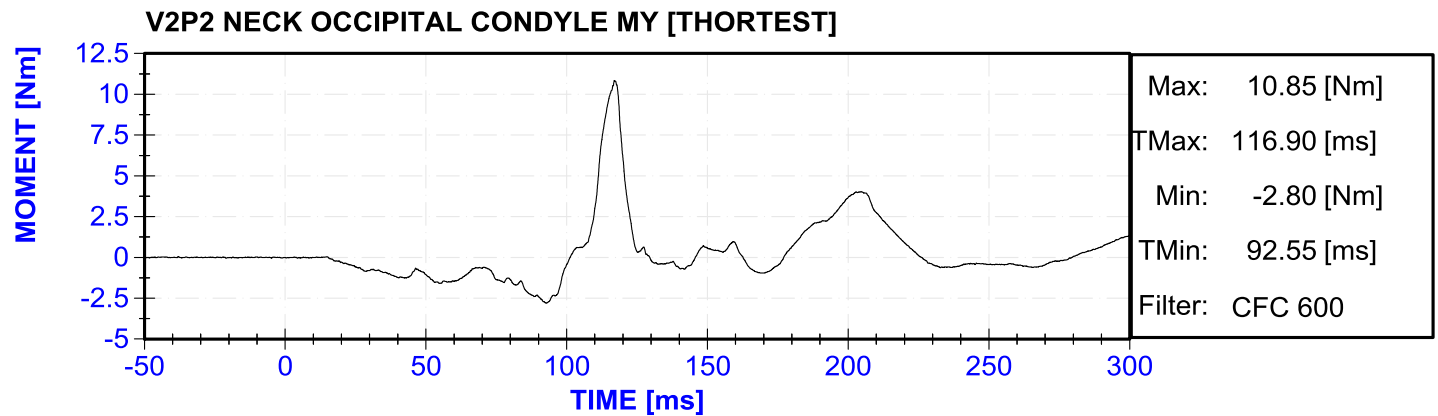
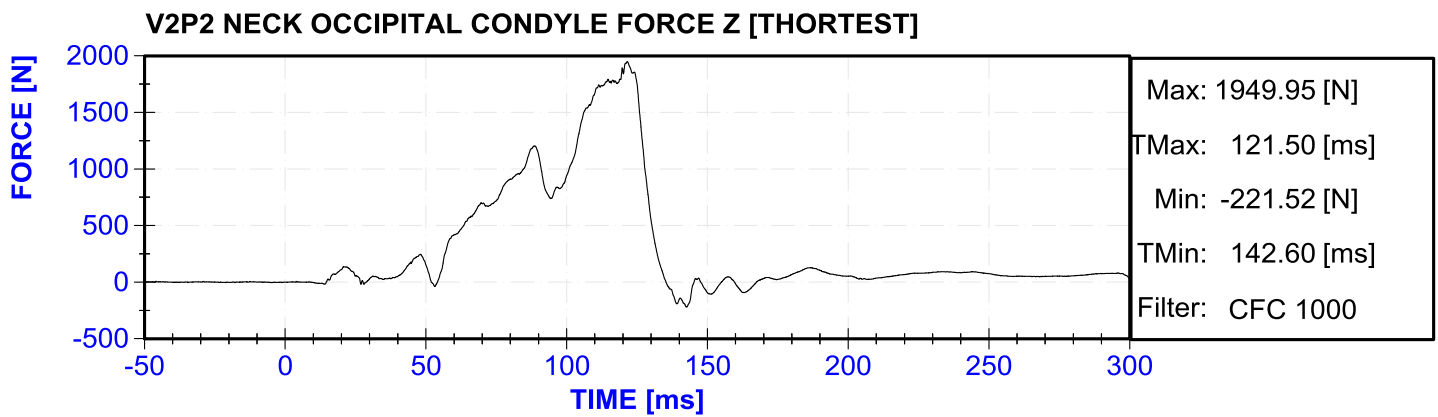
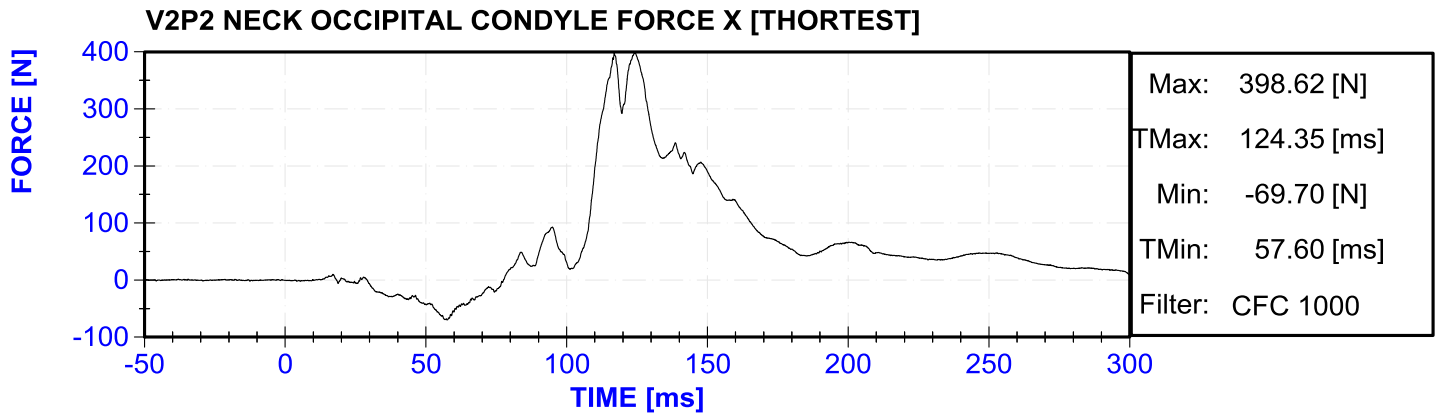


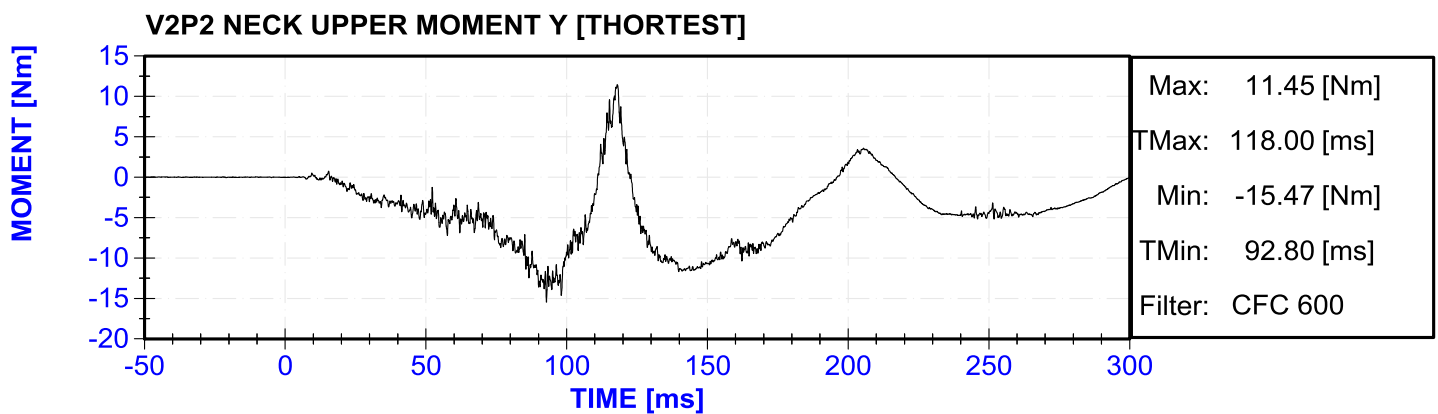
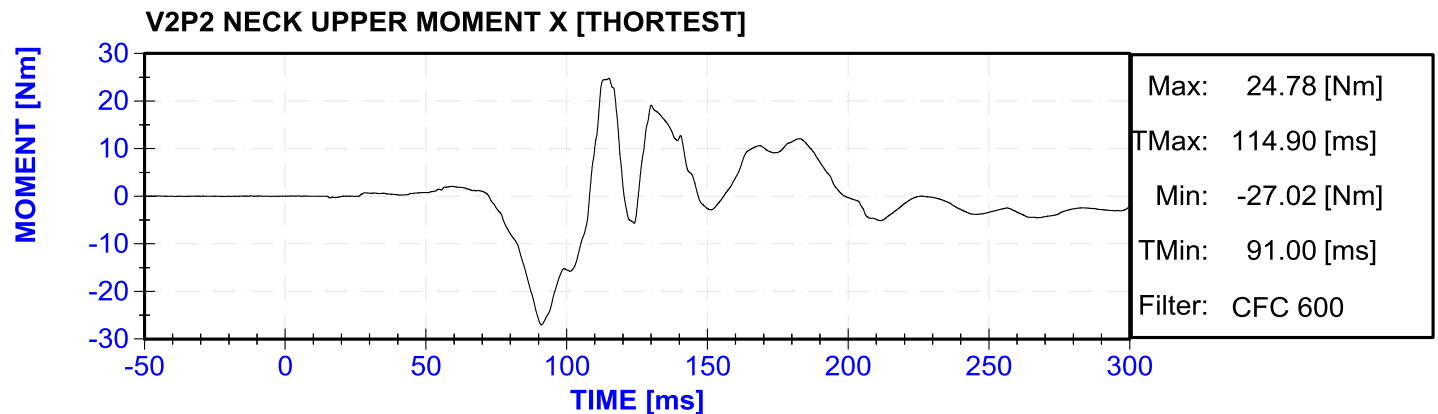
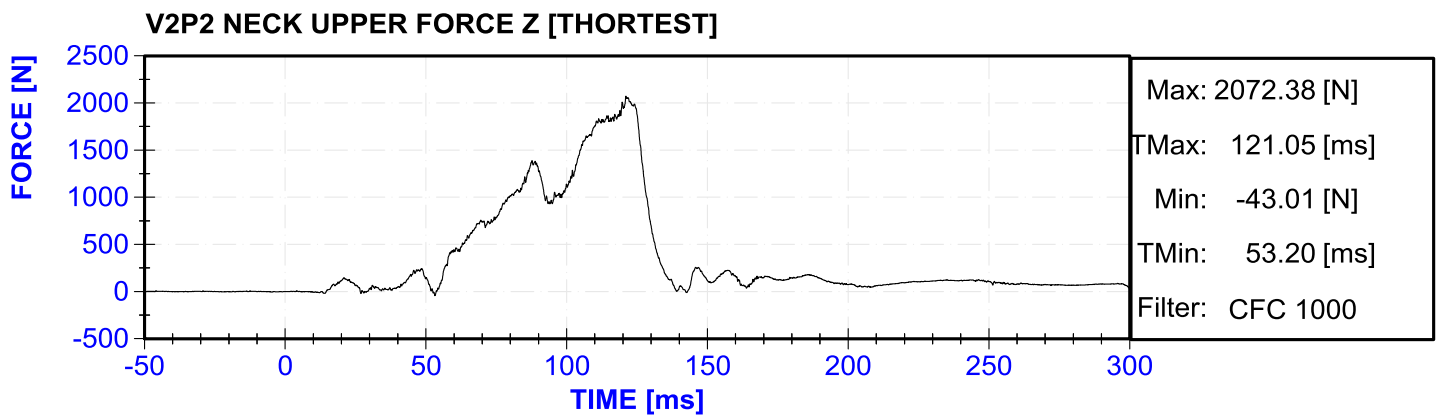
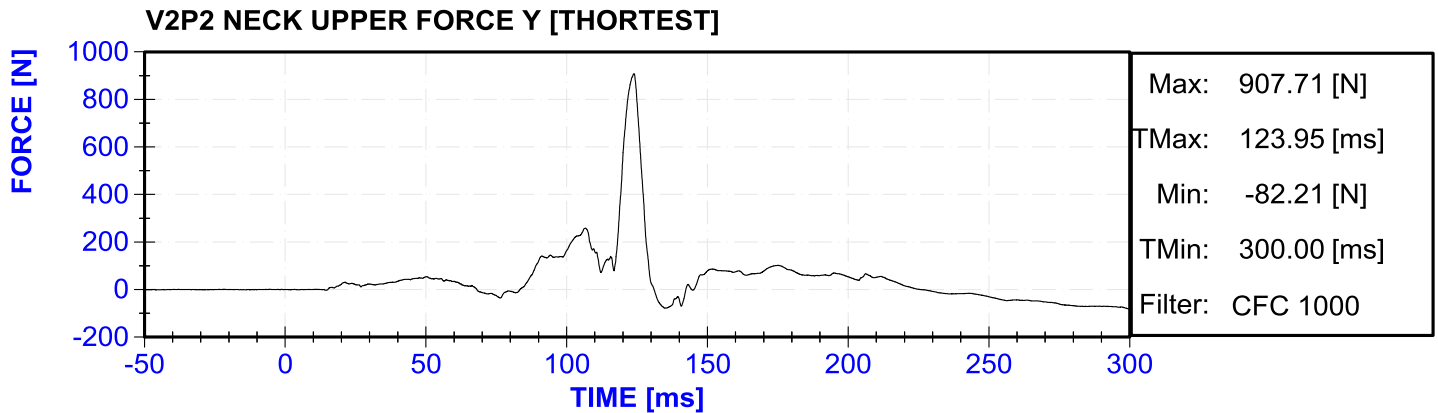


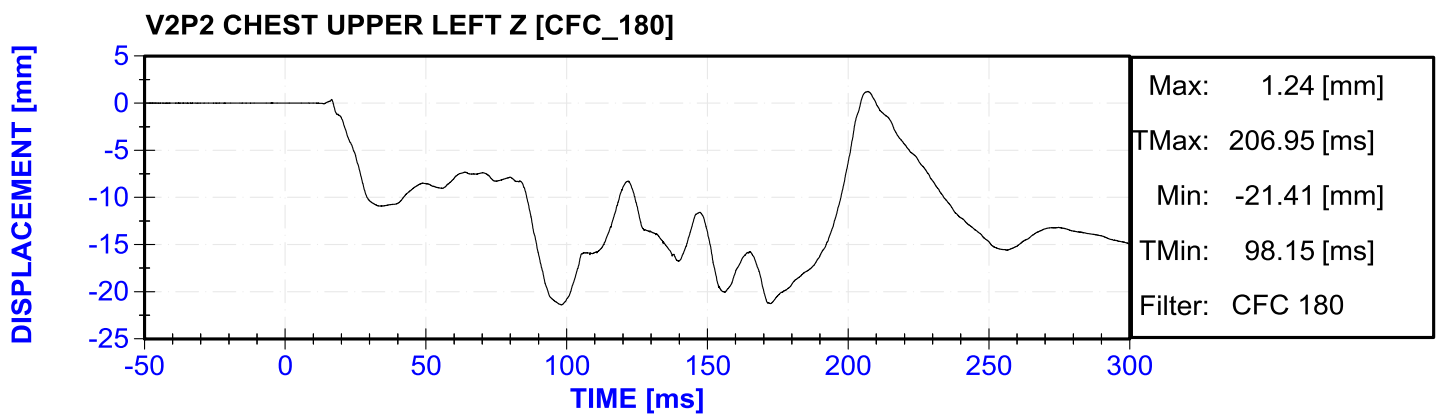
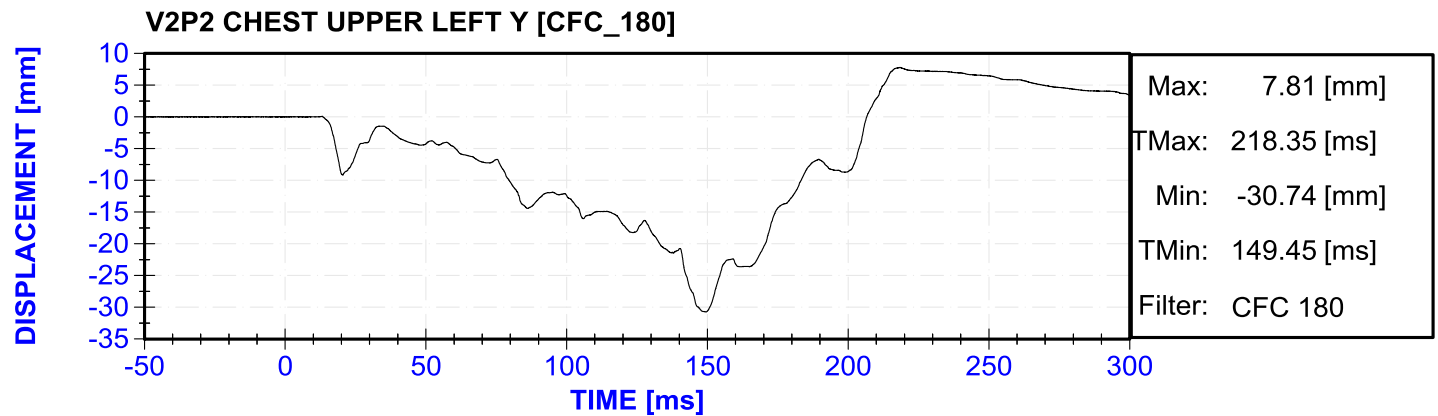
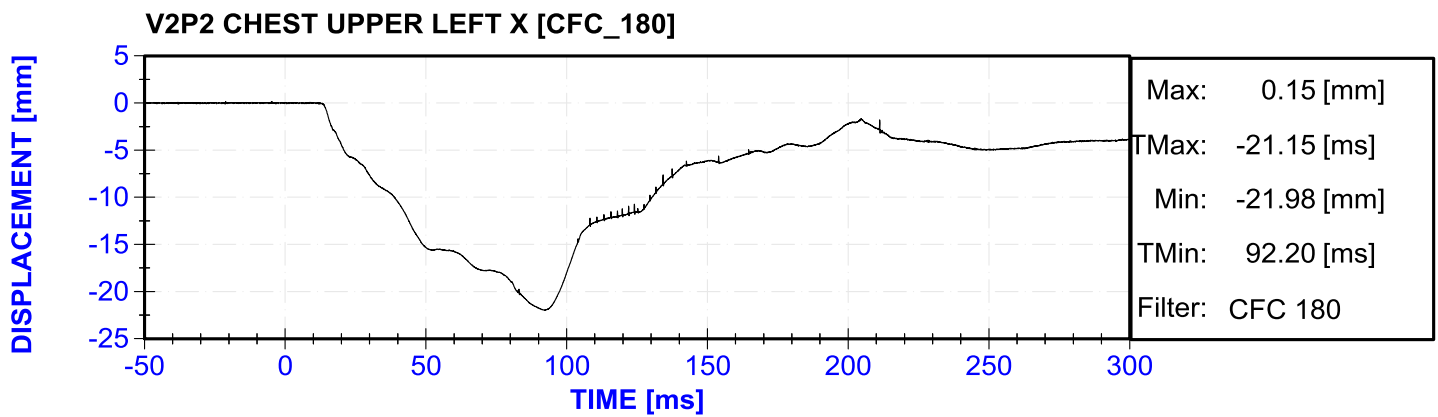
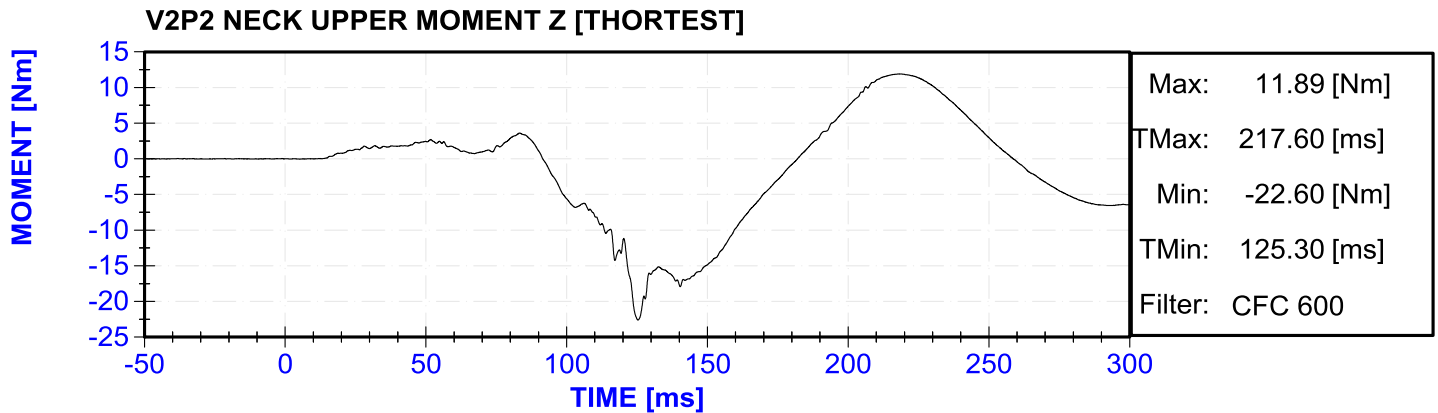


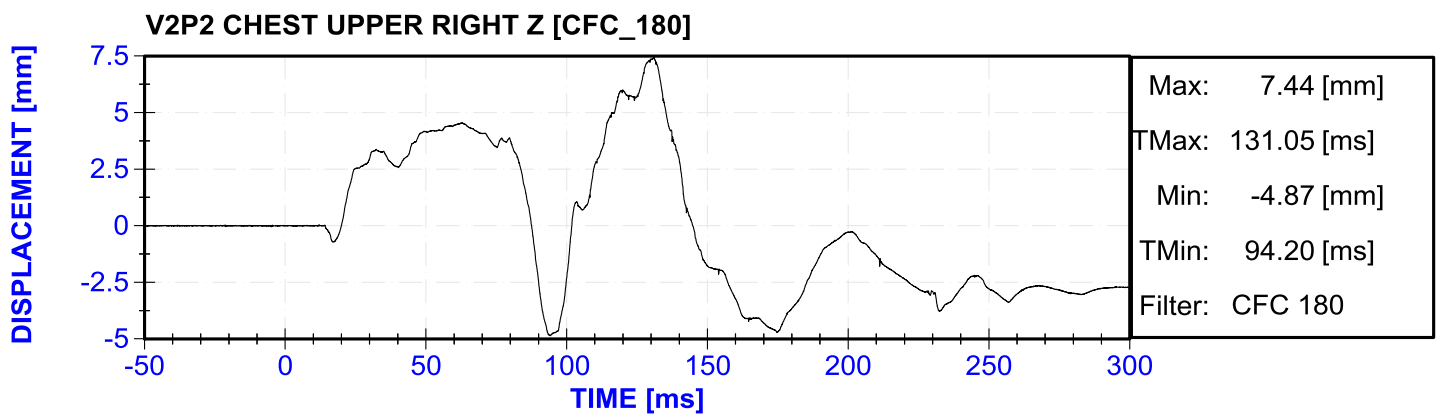
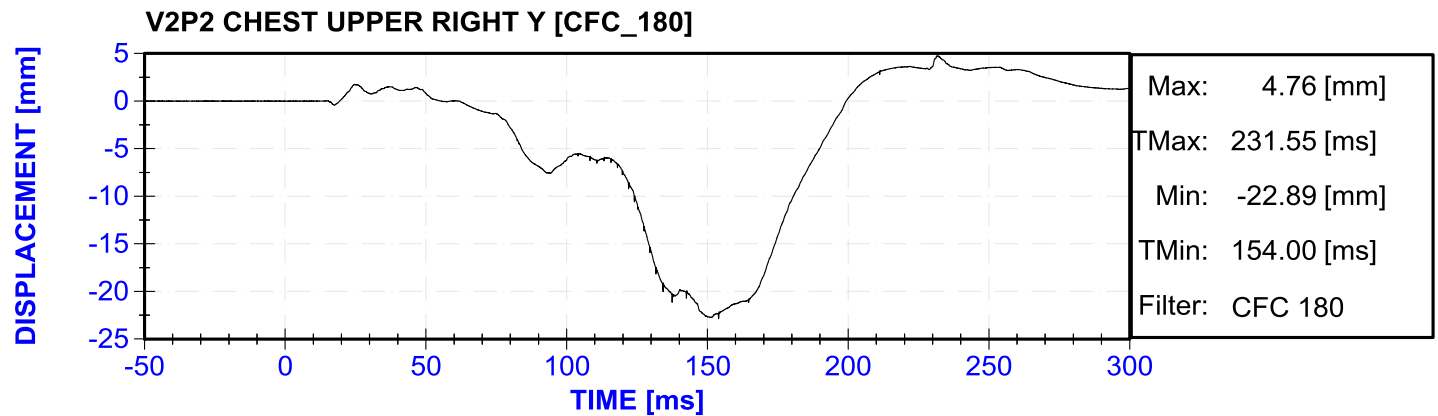
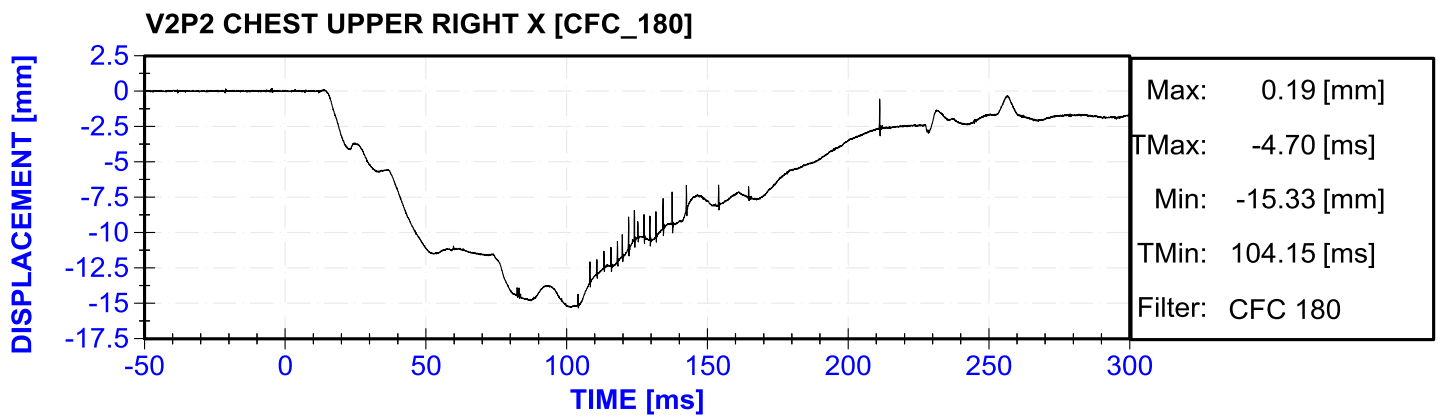
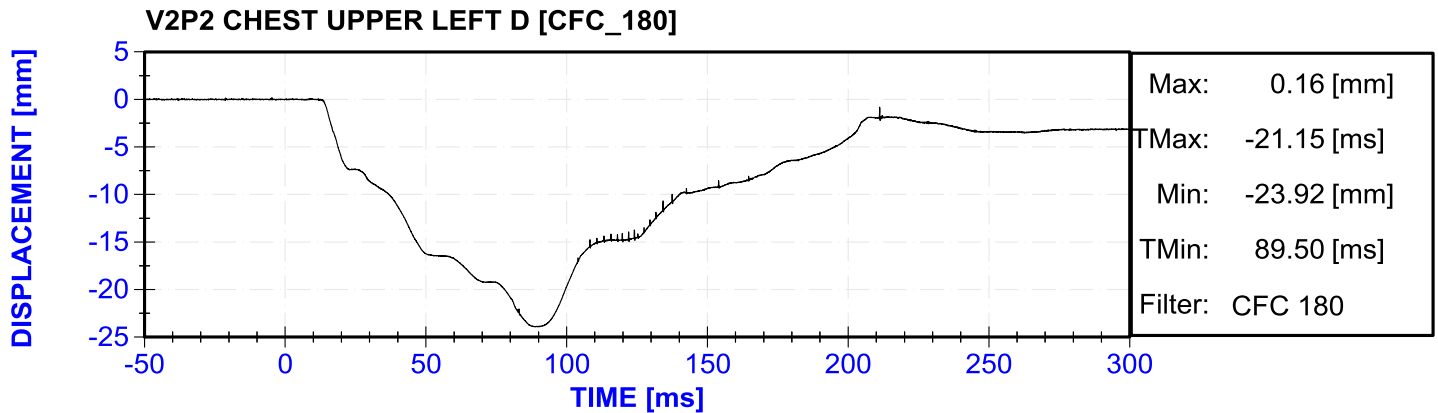


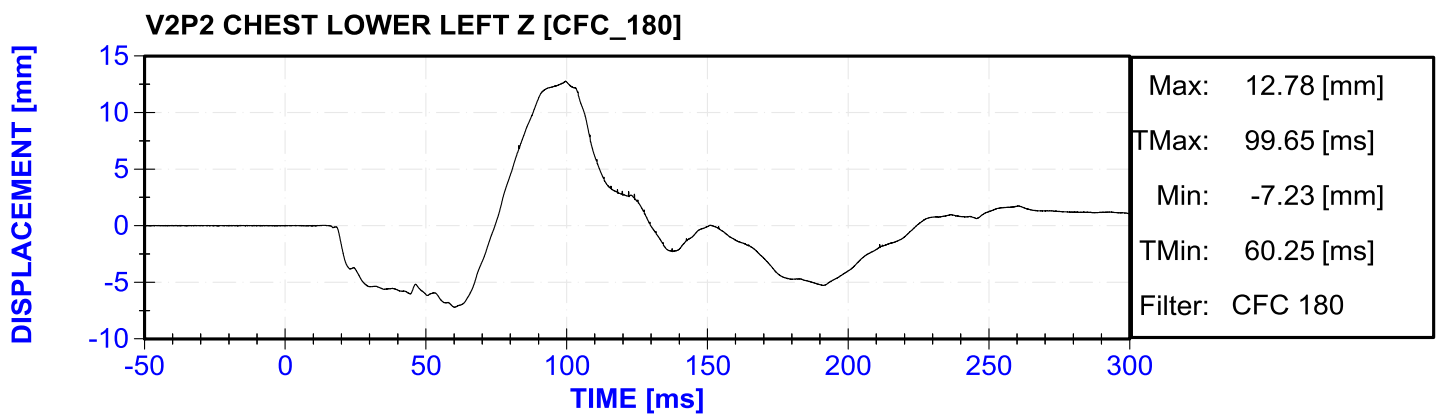
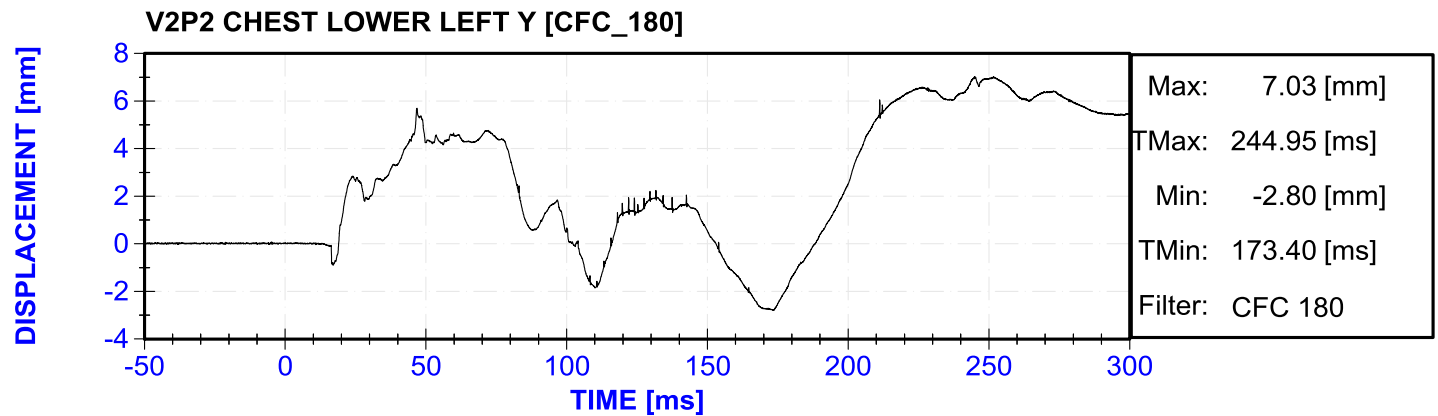
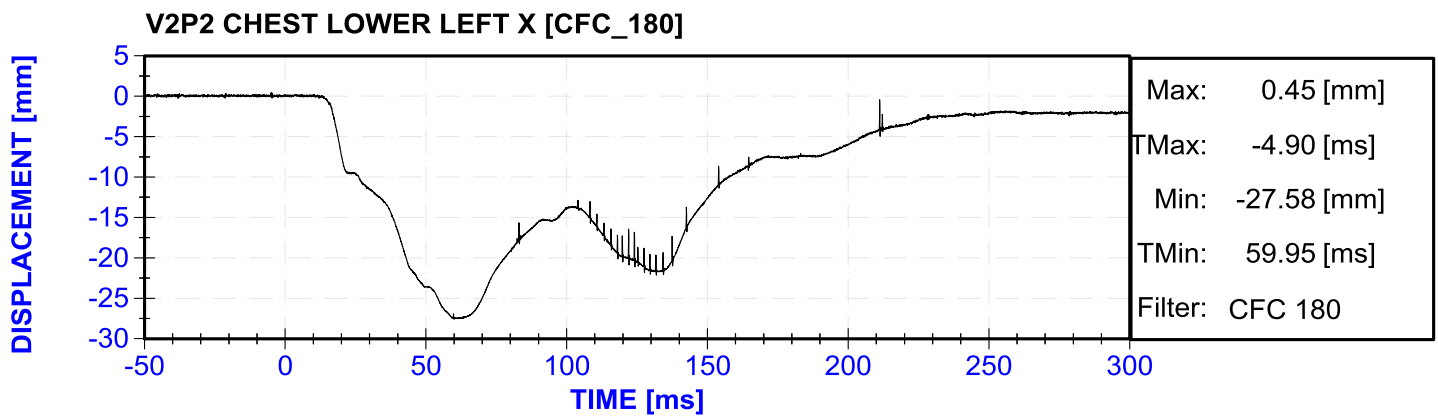
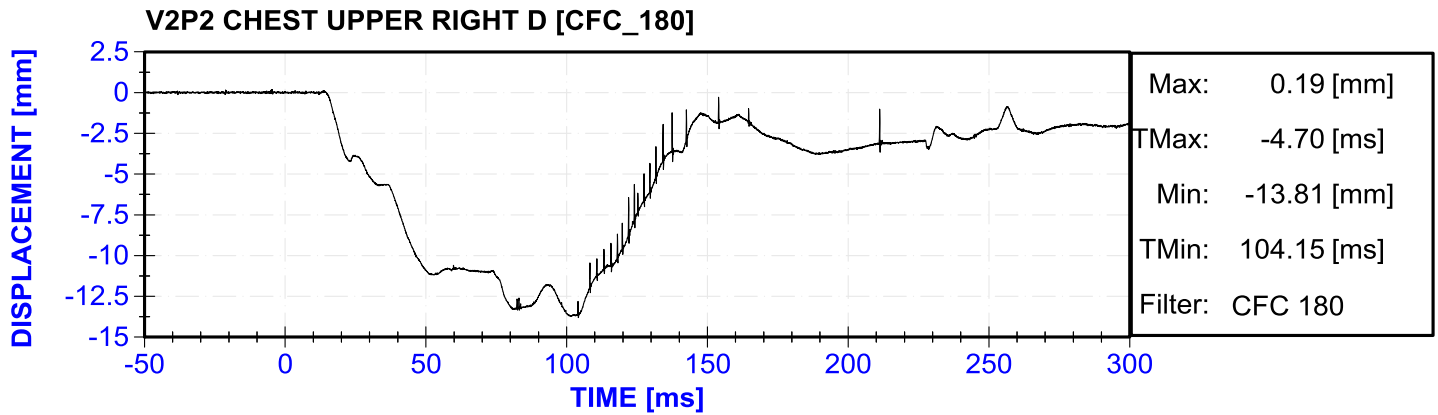


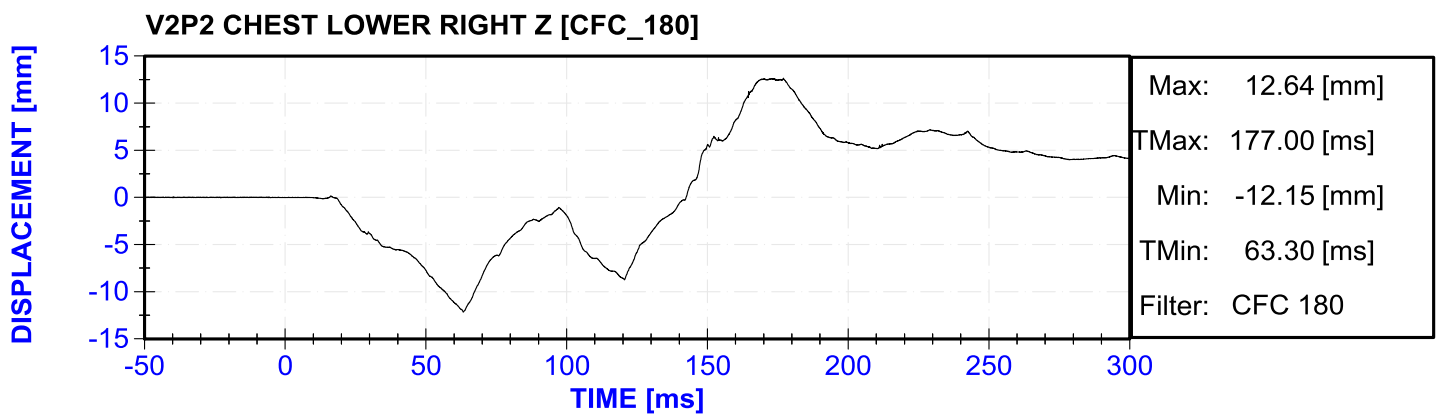
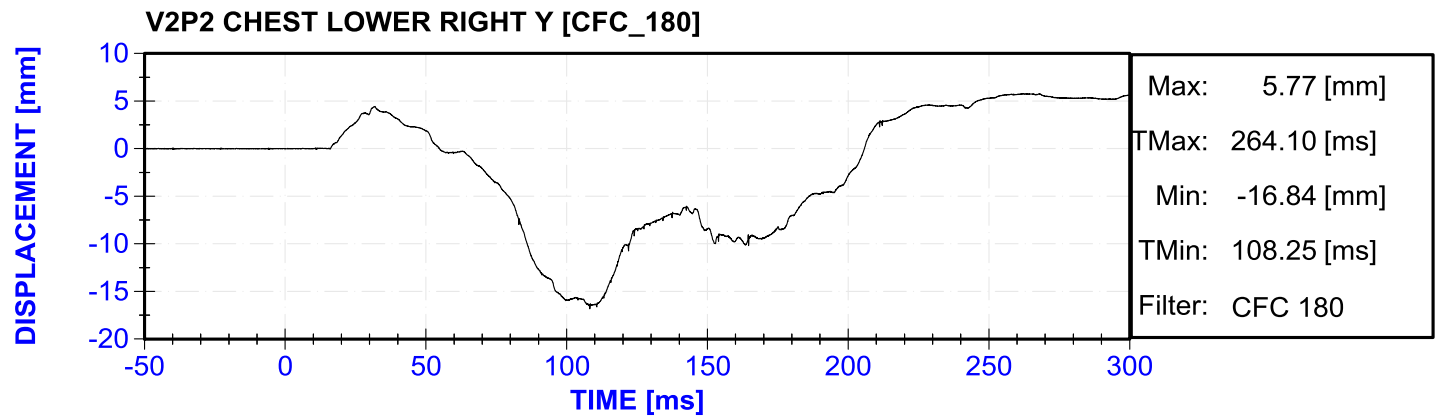
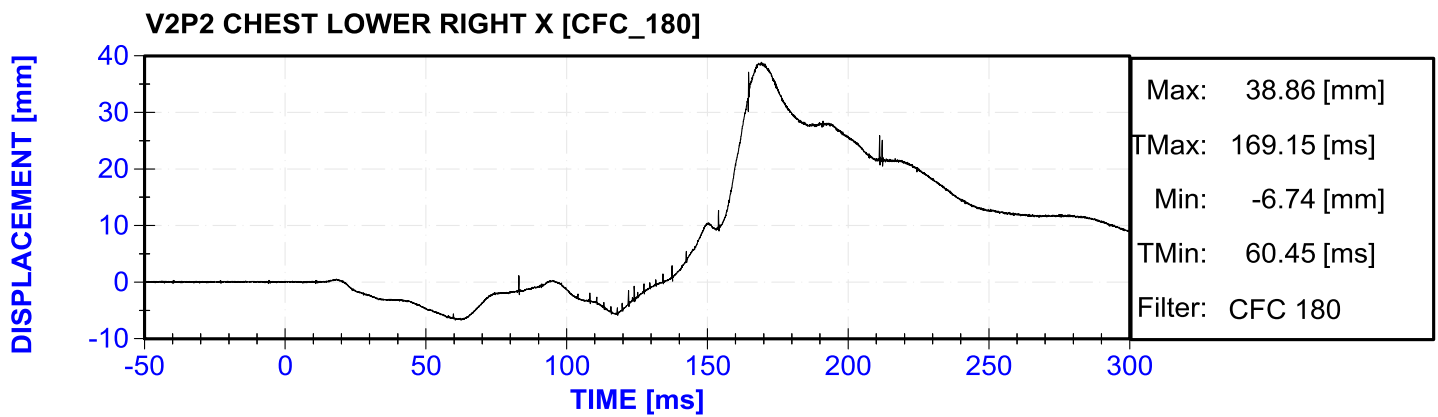
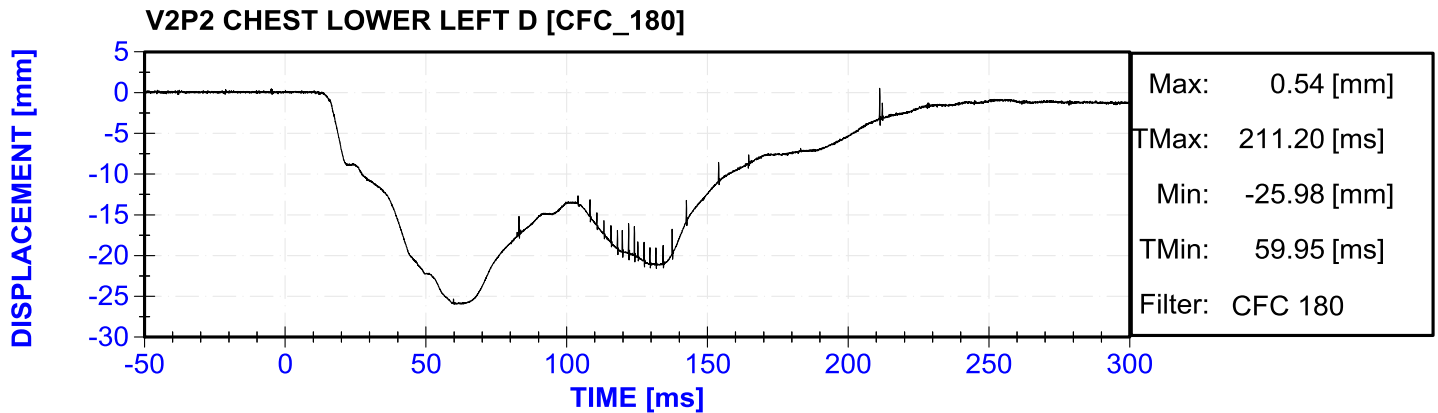


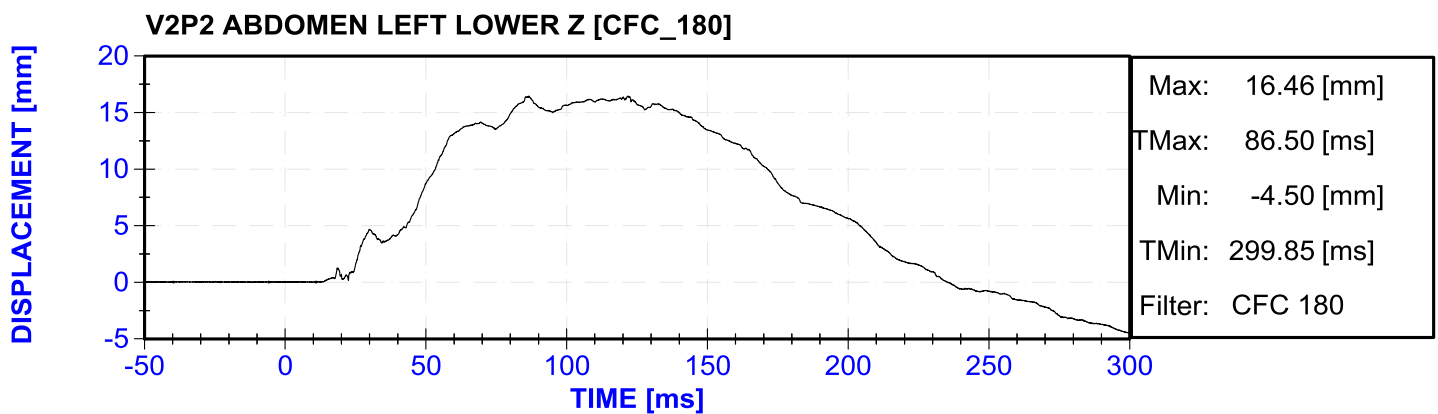
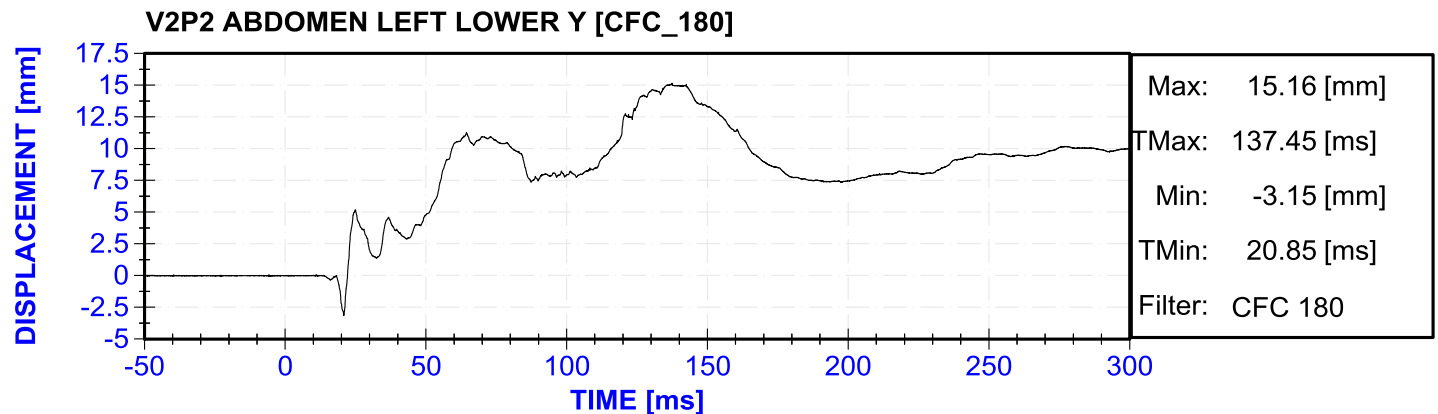
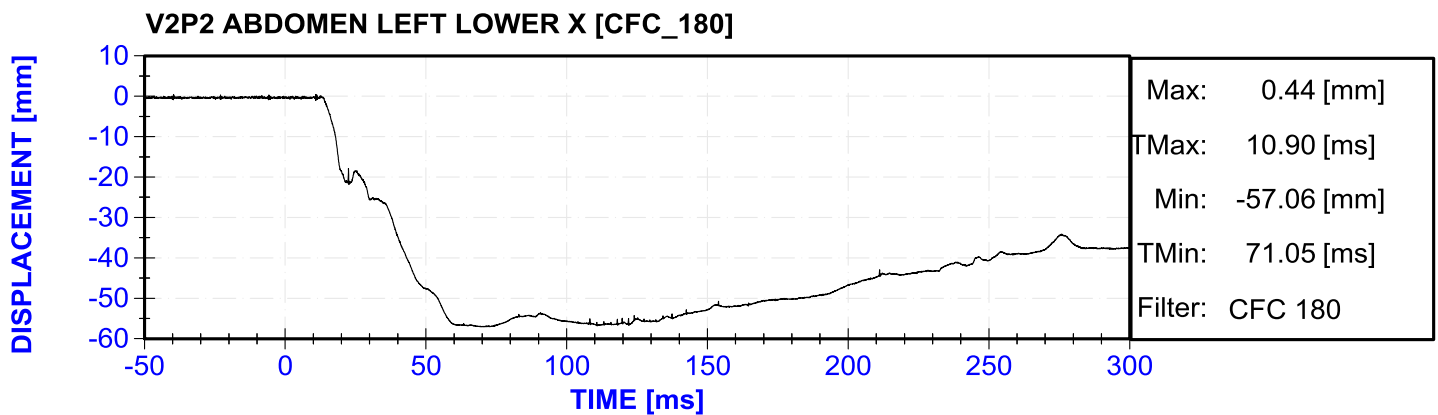
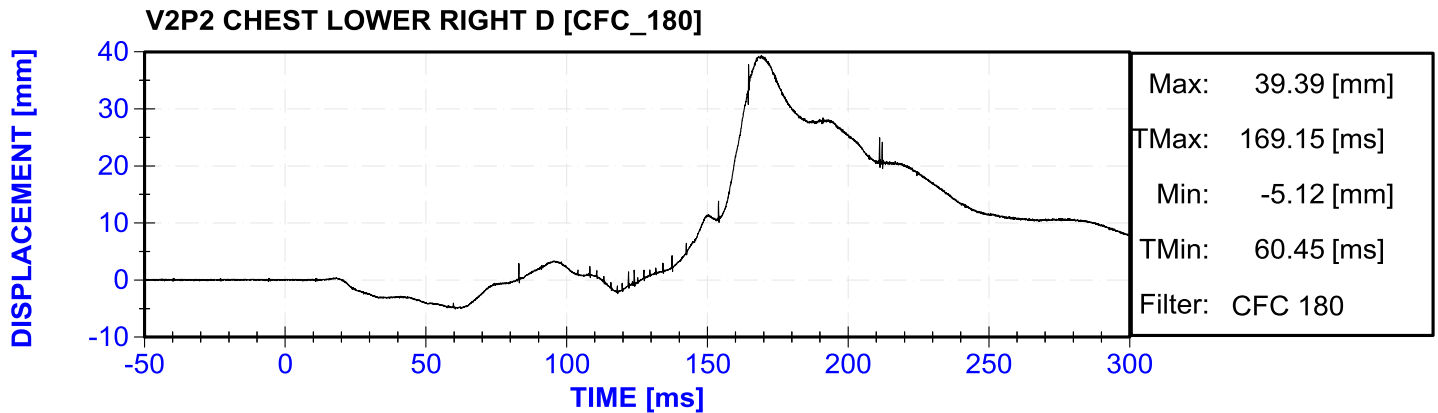


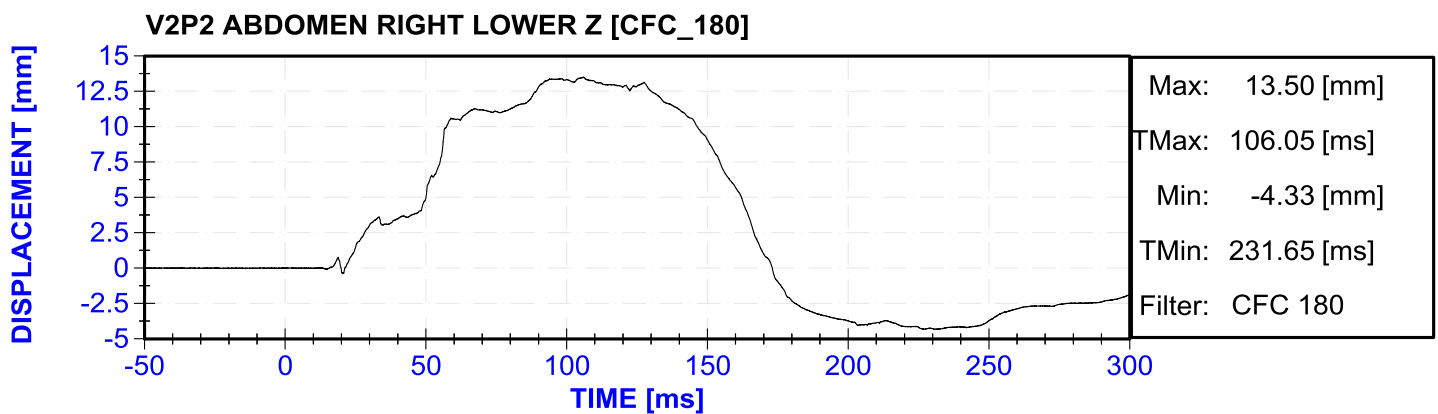
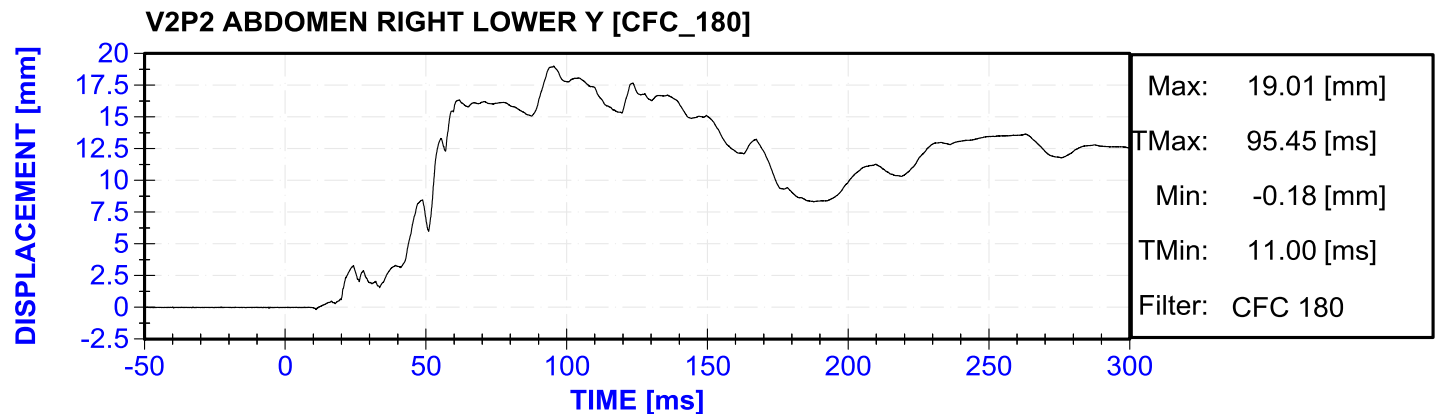
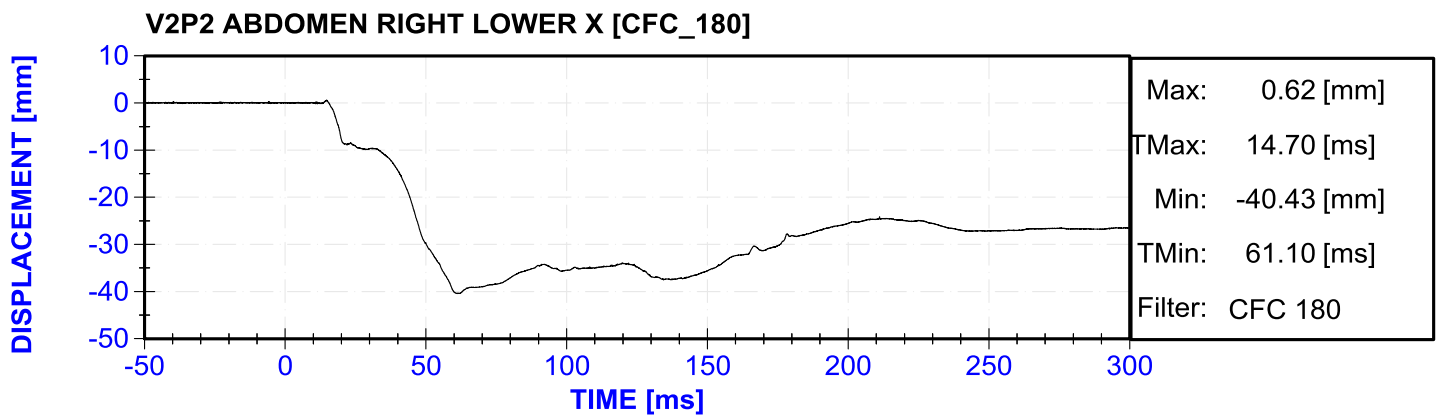
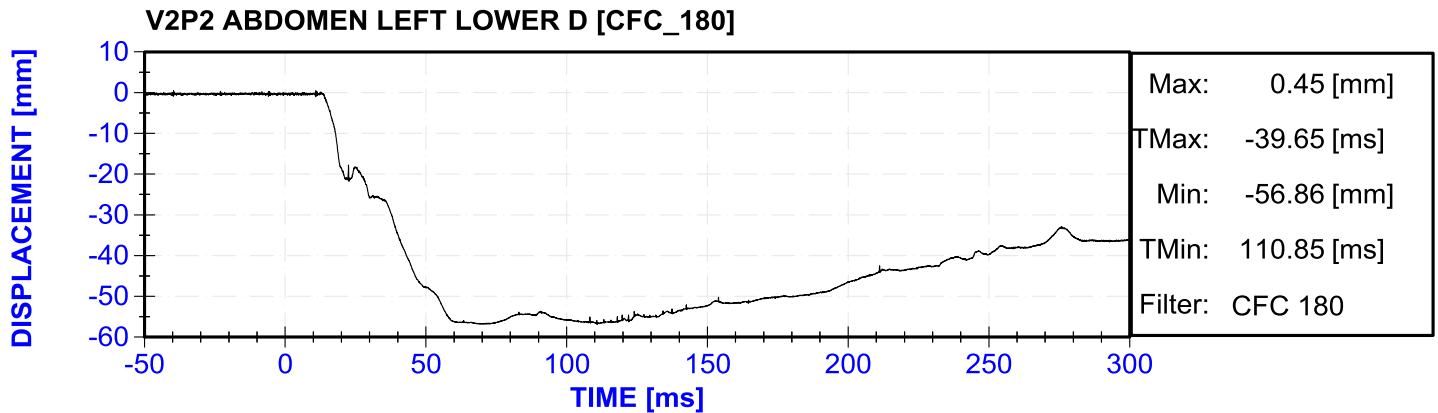


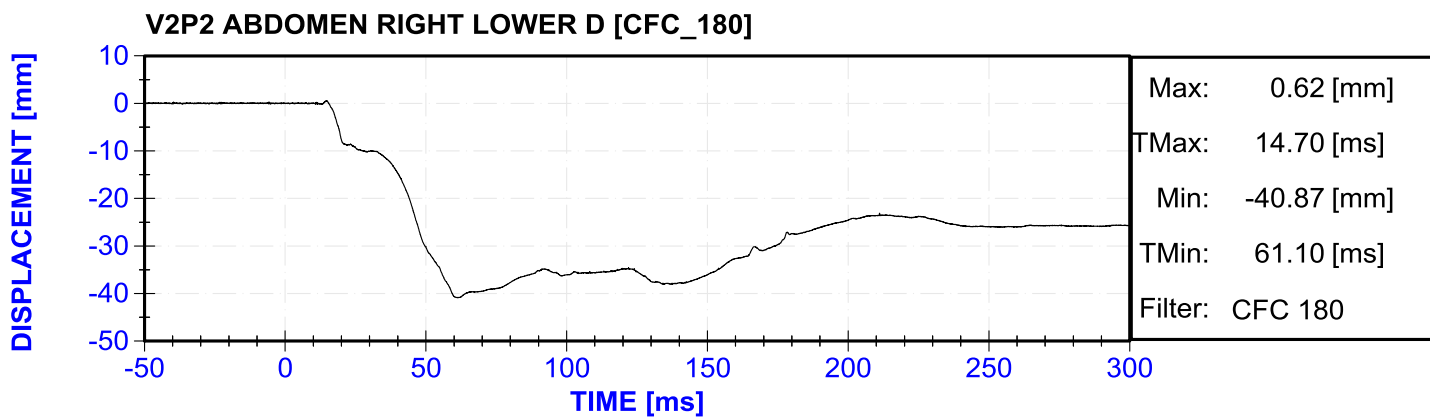












APPENDIX C

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

Table C-1: Dummy Information

TYPE	DESCRIPTION	SERIAL NUMBER
THOR TK	50 TH Male	007
THOR TK	50 TH Male	016

Table C-2: Ankle Offset Files

THOR – TK S/N: 007					
LFTX	LFTY	LFTZ	RFTX	RFTY	RFTZ
Left Ankle X Rotation	Left Ankle Y Rotation	Left Ankle Z Rotation	Right Ankle X Rotation	Right Ankle Y Rotation	Right Ankle Z Rotation
-0.83479	-16.049		0.0405	-11.961	
THOR – TK S/N: 016					
LFTX	LFTY	LFTZ	RFTX	RFTY	RFTZ
Left Ankle X Rotation	Left Ankle Y Rotation	Left Ankle Z Rotation	Right Ankle X Rotation	Right Ankle Y Rotation	Right Ankle Z Rotation
-0.9575	-14.97		-6.842	13.223	

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

THOR – TK S/N: 0007								
Sensor	Manufacturer/ Serial #	Capacity	Units (E)	Units (M)	Range	CFC	Sensitivity (mv/V/EU)	Initial Offset (EU)
HEAD CG X	MFG: ENDEVCO S/N: P74967	2000	g	g	-1000	1000	0.0185	0
HEAD CG Y	MFG: ENDEVCO S/N: P71875	2000	g	g	-1000	1000	0.0176	0
HEAD CG Z	MFG: ENDEVCO S/N: P74784	2000	g	g	-1000	1000	0.01999	0
HDCG Wx	MFG: DTS S/N: ARS4643	36000	deg/s	deg/s	-18000	1000	0.0921	0
HDCG Wy	MFG: DTS S/N: ARS4651	36000	deg/s	deg/s	-18000	1000	0.09301	0
HDCG Wz	MFG: DTS S/N: ARS4650	36000	deg/s	deg/s	-18000	1000	0.09444	0
NEKU Fx	MFG: Denton S/N: 94	18000	lbf	N	-9000	1000	-0.00022811	0
NEKU Fy	MFG: Denton S/N: 94	18000	lbf	N	-9000	1000	0.00022894	0
NEKU Fz	MFG: Denton S/N: 94	26000	lbf	N	-13000	1000	-0.00008764	0
NEKU Mx	MFG: Denton S/N: 94	1200	in-lbf	N-m	-600	600	-0.00591849	0
NEKU My	MFG: Denton S/N: 94	1200	in-lbf	N-m	-600	600	0.00598399	0
NEKU Mz	MFG: Denton S/N: 94	1200	in-lbf	N-m	-600	600	0.00965262	0
NEKL Fx	MFG: DENTON S/N: 88	26000	lbf	N	-13000	1000	0.00017038	0
NEKL Fy	MFG: DENTON S/N: 88	26000	lbf	N	-13000	1000	0.0001704	0
NEKL Fz	MFG: DENTON S/N: 88	26000	lbf	N	-13000	1000	-0.00007065	0
NEKL Mx	MFG: DENTON S/N: 88	1200	in-lbf	N-m	-600	600	-0.0040085	0
NEKL My	MFG: DENTON S/N: 88	1200	in-lbf	N-m	-600	600	0.00400231	0
NEKL Mz	MFG: DENTON S/N: 88	1200	in-lbf	N-m	-600	600	0.0067779	0
NKCF Fz	MFG: DENTON S/N: 93	90000	lbf	N	-45000	1000	0.00086877	0

THOR – TK (Continued) S/N: 0007								
Sensor	Manufacturer/ Serial #	Capacity	Units (E)	Units (M)	Range	CFC	Sensitivity (mv/V/EU)	Initial Offset (EU)
NKCR Fz	MFG: DENTON S/N: 132	90000	lbf	N	-45000	1000	0.00071044	0
HDOT RDy	MFG: Sfernice S/N: 0942	340	deg	deg	-170	180	3.038	0
SPNU Ax	MFG: ENDEVCO S/N: P74970	1000	g	g	-500	180	0.02212	0
SPNU Ay	MFG: ENDEVCO S/N: P74979	1000	g	g	-500	180	0.01907	0
SPNU Az	MFG: ENDEVCO S/N: P75158	1000	g	g	-500	180	0.01723	0
SPNM Ax	MFG: ENDEVCO S/N: P75155	1000	g	g	-500	180	0.01993	0
SPNM Ay	MFG: ENDEVCO S/N: P75150	1000	g	g	-500	180	0.01954	0
SPNM Az	MFG: ENDEVCO S/N: P75153	1000	g	g	-500	180	0.02378	0
CHLU Dx	MFG: FTSS S/N: AC3556	3.3	V	mm	3.3	600	1000	
CHLU Ry	MFG: Sfernice S/N: AC6043	150	deg	deg	-75	180	3.0419	8.364
CHLU Rz	MFG: Sfernice S/N: AC6041	150	deg	deg	-75	180	3.0642	12.383
CHRU Dx	MFG: FTSS S/N: AC2288	3.3	V	mm	3.3	600	1000	
CHRU Ry	MFG: Sfernice S/N: AC6045	150	deg	deg	-75	180	3.0685	4.271
CHRU Rz	MFG: Sfernice S/N: AC6044	150	deg	deg	-75	180	3.0637	-7.104
CHLL Dx	MFG: FTSS S/N: AC3555	3.3	V	mm	3.3	600	1000	
CHLL Ry	MFG: Sfernice S/N: AC6158	150	deg	deg	-75	180	3.0696	-2.058
CHLL Rz	MFG: Sfernice S/N: AC6159	150	deg	deg	-75	180	3.0682	12.064
CHRL Dx	MFG: FTSS S/N: AC2287	3.3	V	mm	3.3	600	1000	
CHRL Ry	MFG: Sfernice S/N: AC6042	150	deg	deg	-75	180	2.6324	4.158
CHRL Rz	MFG: Sfernice S/N: AC6040	150	deg	deg	-75	180	3.0327	-3.550
ABDL Dx	MFG: Denton S/N: 173	3.3	V	mm	3.3	600	12.97679	
ABDL Ry	MFG: Contelec S/N: DS-558	150	deg	deg	-75	180	3.0172	1.067
ABDL Rz	MFG: Contelec S/N: DS-556	150	deg	deg	-75	180	3.0149	4.797
ABDR Dx	MFG: Denton S/N: 172	3.3	V	mm	3.3	600	13.03657	
ABDR Ry	MFG: Contelec S/N: DS-523	150	deg	deg	-75	180	3.0277	16.200
ABDR Rz	MFG: Contelec S/N: DS-557	150	deg	deg	-75	180	3.0114	-4.094
SPNL Fx	MFG: Denton S/N: 122	26000	lbf	N	-13000	1000	-0.0001395	0
SPNL Fy	MFG: Denton S/N: 122	26000	lbf	N	-13000	1000	0.00014053	0
SPNL Fz	MFG: Denton S/N: 122	36000	lbf	N	-18000	1000	-0.0000533	0
SPNL Mx	MFG: Denton S/N: 122	1400	in-lbf	N-m	-700	1000	-0.00209586	0
SPNL My	MFG: Denton S/N: 122	1400	in-lbf	N-m	-700	1000	0.00184981	0
PVCG Ax	MFG: ENDEVCO S/N: P74965	1000	g	g	-500	1000	0.0202	0
PVCG Ay	MFG: ENDEVCO S/N: P74976	1000	g	g	-500	1000	0.01703	0
PVCG Az	MFG: ENDEVCO S/N: P49439	1000	g	g	-500	1000	0.01961	0
PVAL Fx	MFG: DENTON S/N: 75	44000	lbf	N	-22000	600	0.00012174	0
PVAL Fy	MFG: DENTON S/N: 75	27000	lbf	N	-13500	600	-0.00005981	0
PVAL Fz	MFG: DENTON S/N: 75	27000	lbf	N	-13500	600	0.00016528	0
PVAR Fx	MFG: DENTON S/N: 75	44000	lbf	N	-22000	600	0.00012302	0
PVAR Fy	MFG: DENTON S/N: 75	26000	lbf	N	-13000	600	-0.00006078	0
PVAR Fz	MFG: DENTON S/N: 75	26000	lbf	N	-13000	600	-0.0001662	0
PILL Fx	MFG: Denton S/N: 75	26000	lbf	N	-13000	600	-0.00006743	0
PILR Fx	MFG: Denton S/N: 76	26000	lbf	N	-13000	600	-0.00006867	0
FMRL Fx	MFG: Humanetics S/N: DJ1040Fx	30000	N	N	-15000	600	0.0001436	0
FMRL Fy	MFG: Humanetics S/N: DJ1040Fy	30000	N	N	-15000	600	0.0001441	0
FMRL Fz	MFG: Humanetics S/N: DJ1040Fz	40000	N	N	-20000	600	-0.0000728	0
FMRL Mx	MFG: Humanetics S/N: DJ1040Mx	700	N-m	N-m	-350	600	0.0064454	0

THOR – TK (Continued) S/N: 0007								
Sensor	Manufacturer/ Serial #	Capacity	Units (E)	Units (M)	Range	CFC	Sensitivity (mv/V/EU)	Initial Offset (EU)
FMRL My	MFG: Humanetics S/N: DJ1040My	700	N-m	N-m	-350	600	0.0064621	0
FMRL Mz	MFG: Humanetics S/N: DJ1040Mz	600	N-m	N-m	-300	600	0.009063	0
KNEL Dx	MFG: Humanetics S/N: DJ1045Fx	80	mm	mm	-40	180	23.8618	0
TBLU Fz	MFG: Humanetics S/N: DJ1045Fy	50000	N	N	-25000	600	-0.0000908	0
TBLU Mx	MFG: Humanetics S/N: DJ1045Fz	800	N-m	N-m	-400	600	0.0072731	0
TBLU My	MFG: Humanetics S/N: DJ1045Mx	800	N-m	N-m	-400	600	0.0072771	0
TBLL Fz	MFG: Humanetics S/N: DJ1045My	50000	N	N	-25000	600	-0.00009686	0
TBLL Mx	MFG: Humanetics S/N: DJ1045Mz	800	N-m	N-m	-400	600	0.00750986	0
TBLL My	MFG: Space Age Controls S/N: 025670	800	N-m	N-m	-400	600	0.0075842	0
ANKL Rx	MFG: DENTON S/N: 110Fz	200	deg	deg	-100	180	2.995	-0.83479
ANKL Ry	MFG: DENTON S/N: 110Mx	200	deg	deg	-100	180	3.014	-16.049
FOTL Az	MFG: DENTON S/N: 110My	3000	g	g	-1500	1000	0.01972	0
FMRR Fx	MFG: Denton S/N: 120Fz	30000	N	N	-15000	600	0.0001461	0
FMRR Fy	MFG: Denton S/N: 120Mx	30000	N	N	-15000	600	0.0001465	0
FMRR Fz	MFG: Denton S/N: 120My	40000	N	N	-20000	600	-0.0000756	0
FMRR Mx	MFG: Contelec S/N: ANKLX-0371	700	N-m	N-m	-350	600	0.0065482	0
FMRR My	MFG: Contelec S/N: ANKLY-0367	700	N-m	N-m	-350	600	0.006518	0
FMRR Mz	MFG: ENDEVCO S/N: P51711	600	N-m	N-m	-300	600	0.0097325	0
KNER Dx	MFG: Space Age Controls S/N: 019588	80	mm	mm	-40	180	23.9349	0
TBRU Fz	MFG: DENTON S/N: 107Fz	50000	N	N	-25000	600	-0.0000955	0
TBRU Mx	MFG: DENTON S/N: 107Mx	800	N-m	N-m	-400	600	0.0074272	0
TBRU My	MFG: DENTON S/N: 107My	800	N-m	N-m	-400	600	0.007333	0
TBRL Fz	MFG: Denton S/N: 75Fz	50000	N	N	-25000	600	-0.00009964	0
TBRL Mx	MFG: Denton S/N: 75Mx	800	N-m	N-m	-400	600	0.00736028	0
TBRL My	MFG: Denton S/N: 75My	800	N-m	N-m	-400	600	0.00736294	0
ANKR Rx	MFG: Contelec S/N: ANKRX-0368	200	deg	deg	-100	180	3.017	0.0405
ANKR Ry	MFG: Contelec S/N: ANKRY-0369	200	deg	deg	-100	180	3.009	-11.961
FOTR Az	MFG: ENDEVCO S/N: P64128	3000	g	g	-1500	1000	0.02344	0

THOR – TK S/N: 016								
Sensor	Manufacturer/ Serial #	Capacity	Units (E)	Units (M)	Range	CFC	Sensitivity (mv/V/EU)	Initial Offset (EU)
HEAD CG X	MFG: ENDEVCO S/N: P49194	2000	g	g	-1000	1000	0.0177	0
HEAD CG Y	MFG: ENDEVCO S/N: P52086	2000	g	g	-1000	1000	0.02065	0
HEAD CG Z	MFG: ENDEVCO S/N: P52043	2000	g	g	-1000	1000	0.01721	0
HDCG Wx	MFG: DTS S/N: ARS4727	36000	deg/s	deg/s	-18000	1000	0.09262	0
HDCG Wy	MFG: DTS S/N: ARS4712	36000	deg/s	deg/s	-18000	1000	0.09378	0
HDCG Wz	MFG: DTS S/N: ARS4714	36000	deg/s	deg/s	-18000	1000	0.09563	0
NEKU Fx	MFG: DENTON S/N: 77	18000	lbf	N	-9000	1000	0.0002406	0
NEKU Fy	MFG: DENTON S/N: 77	18000	lbf	N	-9000	1000	0.00024081	0
NEKU Fz	MFG: DENTON S/N: 77	26000	lbf	N	-13000	1000	-0.00008546	0
NEKU Mx	MFG: DENTON S/N: 77	1200	in-lbf	N-m	-600	600	0.00584857	0
NEKU My	MFG: DENTON S/N: 77	1200	in-lbf	N-m	-600	600	0.00609285	0

THOR – TK (Continued) S/N: 016								
Sensor	Manufacturer/ Serial #	Capacity	Units (E)	Units (M)	Range	CFC	Sensitivity (mv/V/EU)	Initial Offset (EU)
NEKU Mz	MFG: DENTON S/N: 77	1200	in-lbf	N-m	-600	600	0.00980132	0
NEKL Fx	MFG: DENTON S/N: 80	26000	lbf	N	-13000	1000	-0.00017312	0
NEKL Fy	MFG: DENTON S/N: 80	26000	lbf	N	-13000	1000	0.00017328	0
NEKL Fz	MFG: DENTON S/N: 80	26000	lbf	N	-13000	1000	-0.00006903	0
NEKL Mx	MFG: DENTON S/N: 80	1200	in-lbf	N-m	-600	600	-0.00417667	0
NEKL My	MFG: DENTON S/N: 80	1200	in-lbf	N-m	-600	600	0.00421295	0
NEKL Mz	MFG: DENTON S/N: 80	1200	in-lbf	N-m	-600	600	0.00690093	0
NKCF Fz	MFG: DENTON S/N: 80	90000	lbf	N	-45000	1000	0.00052317	0
NKCR Fz	MFG: DENTON S/N: 75	90000	lbf	N	-45000	1000	0.0004801	0
HDOT RDy	MFG: Sfernice S/N: DI7189	340	deg	deg	-170	180	3.038	0
SPNU Ax	MFG: ENDEVCO S/N: P64099	1000	g	g	-500	180	0.01844	0
SPNU Ay	MFG: ENDEVCO S/N: P58838	1000	g	g	-500	180	0.01739	0
SPNU Az	MFG: ENDEVCO S/N: P58834	1000	g	g	-500	180	0.0188	0
SPNM Ax	MFG: ENDEVCO S/N: P64002	1000	g	g	-500	180	0.01799	0
SPNM Ay	MFG: ENDEVCO S/N: P58735	1000	g	g	-500	180	0.01841	0
SPNM Az	MFG: ENDEVCO S/N: P64111	1000	g	g	-500	180	0.01674	0
CHLU Dx	MFG: FTSS S/N: DI4715	3.3	V	mm	3.3	600	1000	
CHLU Ry	MFG: Denton S/N: DI2382	150	deg	deg	-75	180	3.0087	8.434
CHLU Rz	MFG: Denton S/N: DI2383	150	deg	deg	-75	180	3.0074	11.913
CHRU Dx	MFG: FTSS S/N: DI4716	3.3	V	mm	3.3	600	1000	
CHRU Ry	MFG: Denton S/N: DI2381	150	deg	deg	-75	180	3.0077	7.451
CHRU Rz	MFG: Denton S/N: DI2380	150	deg	deg	-75	180	3.0199	-9.781
CHLL Dx	MFG: FTSS S/N: DI4718	3.3	V	mm	3.3	600	1000	
CHLL Ry	MFG: Denton S/N: DI2386	150	deg	deg	-75	180	3.0211	3.758
CHLL Rz	MFG: Denton S/N: DI6129	150	deg	deg	-75	180	3.01218	7.021
CHRL Dx	MFG: FTSS S/N: DI4717	3.3	V	mm	3.3	600	1000	
CHRL Ry	MFG: Denton S/N: DI2385	150	deg	deg	-75	180	3.016	.5991
CHRL Rz	MFG: Denton S/N: DI2384	150	deg	deg	-75	180	3.0217	-8.613
ABDL Dx	MFG: Denton S/N: 183T	3.3	V	mm	3.3	600	1000	
ABDL Ry	MFG: Denton S/N: 219	150	deg	deg	-75	180	3.218	4.171
ABDL Rz	MFG: Denton S/N: 218	150	deg	deg	-75	180	3.165	1.789
ABDR Dx	MFG: Denton S/N: 184	3.3	V	mm	3.3	600	1000	
ABDR Ry	MFG: Denton S/N: 220	150	deg	deg	-75	180	3.182	5.652
ABDR Rz	MFG: Denton S/N: 221	150	deg	deg	-75	180	3.168	-1.162
SPNL Fx	MFG: Denton S/N: 123	26000	lbf	N	-13000	1000	0.00139138	0
SPNL Fy	MFG: Denton S/N: 123	26000	lbf	N	-13000	1000	0.00013943	0
SPNL Fz	MFG: Denton S/N: 123	36000	lbf	N	-18000	1000	-0.00005291	0
SPNL Mx	MFG: Denton S/N: 123	1400	in-lbf	N-m	-700	1000	-0.00209586	0
SPNL My	MFG: Denton S/N: 123	1400	in-lbf	N-m	-700	1000	0.00182945	0
PVCG Ax	MFG: ENDEVCO S/N: P64087	1000	g	g	-500	1000	0.01834	0
PVCG Ay	MFG: ENDEVCO S/N: P50065	1000	g	g	-500	1000	0.01785	0
PVCG Az	MFG: ENDEVCO S/N: P64123	1000	g	g	-500	1000	0.01914	0
PVAL Fx	MFG: DENTON S/N: 77	44000	lbf	N	-22000	600	-0.00011976	0
PVAL Fy	MFG: DENTON S/N: 77	27000	lbf	N	-13500	600	-0.00005959	0
PVAL Fz	MFG: DENTON S/N: 77	27000	lbf	N	-13500	600	-0.00016344	0

THOR – TK (Continued) S/N: 016								
Sensor	Manufacturer/ Serial #	Capacity	Units (E)	Units (M)	Range	CFC	Sensitivity (mv/V/EU)	Initial Offset (EU)
PVAR Fx	MFG: DENTON S/N: 84	44000	lbf	N	-22000	600	0.00012055	0
PVAR Fy	MFG: DENTON S/N: 84	26000	lbf	N	-13000	600	-0.00006006	0
PVAR Fz	MFG: DENTON S/N: 84	26000	lbf	N	-13000	600	0.00016272	0
PILL Fx	MFG: Denton S/N: DI4774	26000	lbf	N	-13000	1000	-0.00012118	0
PILR Fx	MFG: Denton S/N: DI4775	26000	lbf	N	-13000	1000	-0.00012068	0
FMRL Fx	MFG: Denton S/N: DH9717	30000	N	N	-15000	600	0.0001446	0
FMRL Fy	MFG: Denton S/N: DH9717	30000	N	N	-15000	600	0.0001458	0
FMRL Fz	MFG: Denton S/N: DH9717	40000	N	N	-20000	600	-0.0000724	0
FMRL Mx	MFG: Denton S/N: DH9717	700	N-m	N-m	-350	600	0.0065482	0
FMRL My	MFG: Denton S/N: DH9717	700	N-m	N-m	-350	600	0.0065257	0
FMRL Mz	MFG: Denton S/N: DH9717	600	N-m	N-m	-300	600	0.0091723	0
KNEL Dx	MFG: Denton S/N: DH9722	80	mm	mm	-40	180	22.147	0
TBLU Fz	MFG: Denton S/N: DH9722	50000	N	N	-25000	600	-0.0000921	0
TBLU Mx	MFG: Denton S/N: DH9722	800	N-m	N-m	-400	600	0.0073598	0
TBLU My	MFG: Denton S/N: DH9722	800	N-m	N-m	-400	600	0.0073288	0
TBLL Fz	MFG: Denton S/N: DH9722	50000	N	N	-25000	600	-0.0000948	0
TBLL Mx	MFG: Denton S/N: DH9722	800	N-m	N-m	-400	600	0.0073026	0
TBLL My	MFG: Space Age Controls S/N: D2103665B	800	N-m	N-m	-400	600	0.0073735	0
ANKL Rx	MFG: Denton S/N: 89	200	deg	deg	-100	180	3.04982	-0.9575
ANKL Ry	MFG: Denton S/N: 89	200	deg	deg	-100	180	2.96419	-14.97
FOTL Az	MFG: Denton S/N: 89	3000	g	g	-1500	1000	0.0191	0
FMRR Fx	MFG: Denton S/N: 142	30000	N	N	-15000	600	0.0001474	0
FMRR Fy	MFG: Denton S/N: 142	30000	N	N	-15000	600	0.0001474	0
FMRR Fz	MFG: Denton S/N: 142	40000	N	N	-20000	600	-0.0000737	0
FMRR Mx	MFG: Contelec S/N: LX0019	700	N-m	N-m	-350	600	0.0065614	0
FMRR My	MFG: Contelec S/N: LX0019	700	N-m	N-m	-350	600	0.0065759	0
FMRR Mz	MFG: ENDEVCO S/N: P52001	600	N-m	N-m	-300	600	0.0089348	0
KNER Dx	MFG: Space Age Controls S/N: D2103657B	80	mm	mm	-40	180	23.135	0
TBRU Fz	MFG: Denton S/N: 95	50000	N	N	-25000	600	-0.0000918	0
TBRU Mx	MFG: Denton S/N: 95	800	N-m	N-m	-400	600	0.0073681	0
TBRU My	MFG: Denton S/N: 95	800	N-m	N-m	-400	600	0.0072947	0
TBRL Fz	MFG: Denton S/N: 164	50000	N	N	-25000	600	-0.0000956	0
TBRL Mx	MFG: Denton S/N: 164	800	N-m	N-m	-400	600	0.0075105	0
TBRL My	MFG: Denton S/N: 164	800	N-m	N-m	-400	600	0.0073588	0
ANKR Rx	MFG: Contelec S/N: LX0018	200	deg	deg	-100	180	3.13066	-6.842
ANKR Ry	MFG: Contelec S/N: LX0018	200	deg	deg	-100	180	2.95682	13.223
FOTR Az	MFG: ENDEVCO S/N: P64102	3000	g	g	-1500	1000	0.01986	0

Table C-4: THOR Dummy Initial Set-Up Information (IR-TRACC)

THOR – TK S/N: 007			
Sensor	IR-TRACC Exponent	IR-TRACC Slope	IR-TRACC Intercept
CHLU Dx	-0.4675	-34.009493	120.7103
CHRU Dx	-0.4675	-34.871682	125.2528
CHLL Dx	-0.4675	-34.916600	123.9557
CHRL Dx	-0.4675	-34.121632	121.9603
ABDL Dx	-0.43568	31.6159	3.688
ABDR Dx	-0.40940	31.7099	3.774
THOR – TK S/N: 016			
Sensor	IR-TRACC Exponent	IR-TRACC Slope	IR-TRACC Intercept
CHLU Dx	-0.48024	33.0284	3.680
CHRU Dx	-0.4675	-34.919035	121.2325
CHLL Dx	-0.4672	33.6317	3.612
CHRL Dx	-0.48206	32.0908	3.791
ABDL Dx	-0.47743	38.9774	3.894
ABDR Dx	-0.48020	53.1720	2.874

Table 5 - 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 007

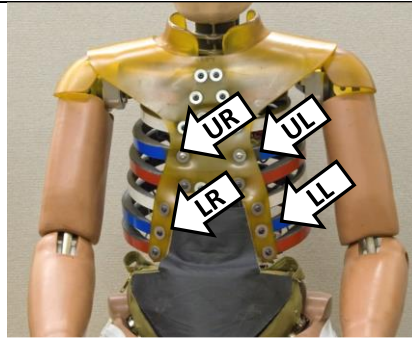
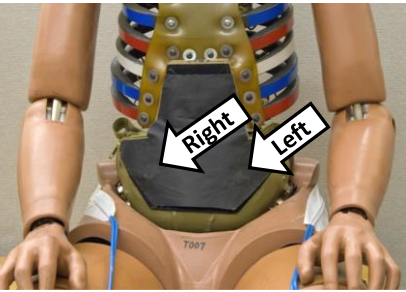


Figure 1. Manipulation to determine thoracic IR-TRACC polarity.

UR				UL			
Channel	Initial	Final	Measured	Channel	Initial	Final	Measured
			Expected				Expected
DX (V)	.1501	.1760	Increase	DX (V)	.1759	.2025	Increase
			Increase				Increase
RY (Deg)	4.271	-.331	Increase	RY (Deg)	8.364	5.141	Decrease
			Decrease				Decrease
RZ (Deg)	-7.104	-5.851	Decrease	RZ (Deg)	12.383	13.858	Decrease
			Increase				Increase
LR				LL			
Channel	Initial	Final	Measured	Channel	Initial	Final	Measured
			Expected				Expected
DX (V)	.0781	.1042	Increase	DX (V)	.0921	.1323	Increase
			Increase				Increase
RY (Deg)	4.158	.9250	Increase	RY (Deg)	-2.058	-4.612	Decrease
			Decrease				Decrease
RZ (Deg)	-3.550	-1.357	Decrease	RZ (Deg)	12.064	17.925	Increase
			Increase				Increase
							
Abdomen Left				Abdomen Right			
Channel	Initial	Final	Measured	Channel	Initial	Final	Measured
			Expected				Expected
DX (V)	.0431	.1373	Increase	DX (V)	.0329	.9302	Increase
			Increase				Increase
RY (Deg)	1.067	-3.028	Decrease	RY (Deg)	16.200	8.392	Increase
			Decrease				Decrease
RZ (Deg)	4.797	10.073	Increase	RZ (Deg)	-4.094	.4204	Decrease
			Increase				Increase

THOR 0016

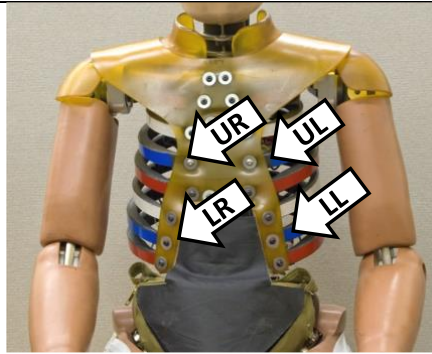
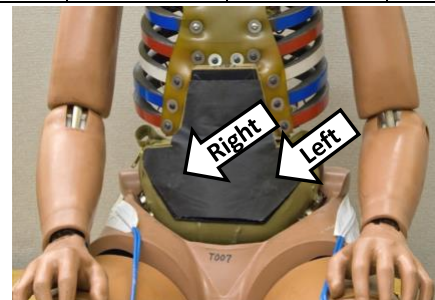


Figure 2. Manipulation to determine thoracic IR-TRACC polarity.

UR				UL			
Channel	Initial	Final	Measured	Channel	Initial	Final	Measured
			Expected				Expected
DX (V)	.1312	.2071	Increase	DX (V)	.1357	.2316	Increase
			Increase				Increase
RY (Deg)	7.451	2.791	Increase	RY (Deg)	8.434	1.591	Decrease
			Decrease				Decrease
RZ (Deg)	-9.781	-6.440	Decrease	RZ (Deg)	11.913	16.909	Decrease
			Increase				Increase
LR				LL			
Channel	Initial	Final	Measured	Channel	Initial	Final	Measured
			Expected				Expected
DX (V)	.0856	.1421	Increase	DX (V)	.0753	.1350	Increase
			Increase				Increase
RY (Deg)	.5991	-3.319	Increase	RY (Deg)	3.758	-1.598	Decrease
			Decrease				Decrease
RZ (Deg)	-8.613	-1.556	Decrease	RZ (Deg)	7.021	15.472	Increase
			Increase				Increase
							
Abdomen Left				Abdomen Right			
Channel	Initial	Final	Measured	Channel	Initial	Final	Measured
			Expected				Expected
DX (V)	.0512	.1152	Increase	DX (V)	.1361	.2685	Increase
			Increase				Increase
RY (Deg)	4.171	-2.343	Decrease	RY (Deg)	5.652	-.500	Increase
			Decrease				Decrease
RZ (Deg)	1.789	10.213	Increase	RZ (Deg)	-1.162	2.668	Decrease
			Increase				Increase

THOR Inspection Checklist

Date: 12/21/2012
NHTSA Representative: James Saunders
Witness(es):
Inspection type (check one): ☒ PRE ☐ POST
Dummy S/N: 007
Dummy Description: Thor NT 50th Male
Date of last Certification or Inspection: 12/13/2012
<u>Tests conducted since last full certification or inspection:</u> <u>Since last inspection:</u> RC5369 Left side CR-V <u>Since last certification:</u> RD5227 Right side Versa RC5142 Right side Camry RD5226 Left side Versa RD4200 Left side Elantra RC5141 Left side Camry RC5369 Left side CR-V
<u>Known errors in data channels (no data, clipping, unexpected drops):</u> HDCG AX had a spike at 52ms – loose connector wiring NKCF FZ had noise throughout the data – mechanical noise NKCR FZ was noisy between 50 & 95ms – mechanical noise PVCG AY had a spike at 58ms – loose connector wiring FOTL Az Spikes at 43 & 47ms FOTR AZ Spikes at 37, 41 & 101ms
<u>Physical evidence of damage:</u>
<u>Anecdotal evidence of damage:</u>
<u>Equipment delivered to Borrower:</u>

HEAD	
Y / N	Rear head cap mounts securely to head
Y / N	Head skin fits securely over skull -slightly small, does not fit 100% in rear
Y / N	Head skin shows no sign of tears or damage -nicks/cuts 
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 debonding between neck pucks and plates If N – indicate which interface (where plate/puck 1 attach to upper neck load cell): -debonding above pucks 4, 5 
Y / N	No evidence of debonding 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	

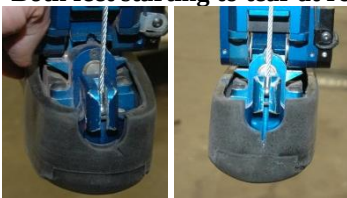
SPINE	
Y / N	No evidence of debonding between thoracic spine flex joint and metal plates -tears in left/right sides? 
Y / N	No evidence of debonding between lumbar spine flex joint and metal plates
Y / N	Lumbar spine pitch change joint mechanism mating teeth are engaged
OTHER	

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 debonding, tearing, or permanent compression of posterior soft stops -left stop slightly debonded 
OTHER	

THORAX	
Y / N	No evidence of contact at top, bottom, or interior faces of rib damping material -top interior left ribs 2, 5 -top interior right rib 4 
Y / N	No evidence of debonding between rib damping material and ribs
Y / N	CRUX anterior arms securely attached to anterior ribs
Y / N	CRUX posterior arms 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	-Right arm has a gouge near elbow 
ABDOMEN	
Y / N	No evidence of tearing, cuts, or broken stitches in upper abdomen bag and zipper -holes in left, right sides near zipper 
Y / N	Upper abdomen insert securely attached to spine
Y / N	Upper abdomen insert shows no evidence of permanent set
Y / N	No evidence of tearing, cuts, or broken stitches in lower abdomen bag and zipper
Y / N	Lower abdomen insert securely attached to spine
Y / N	Lower abdomen insert shows no evidence of permanent set
OTHER	
PELVIS	
Y / N	Pelvis flesh fits securely over pelvis bones
Y / N	H-point tool fits securely into hole on both sides of pelvis
OTHER	-holes in pelvis flesh near ASIS anterior surfaces 

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 -cuts/tears/hole in both knee flesh covers 
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 debonding, tearing, or permanent compression of ankle soft stops
OTHER	-Both feet starting to tear at rear 

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: 01/05/2013
NHTSA Representative: James Saunders
Witness(es):
Inspection type (check one): ☐ PRE ☒ POST
Dummy S/N: 007
Dummy Description: Thor NT 50th Male
Date of last Certification or Inspection: 12/21/2012
<u>Tests conducted since last full certification or inspection:</u> <u>Since last inspection:</u> RC5370 Left Side Odyssey <u>Since last certification:</u> RD5227 Right side Versa RC5142 Right side Camry RD5226 Left side Versa RD4200 Left side Elantra RC5141 Left side Camry RC5369 Left side CR-V RC5370 Left Side Odyssey
<u>Known errors in data channels (no data, clipping, unexpected drops):</u> CHLL DX had a spike at 160 ms SPNL MX had a spike at 111ms FOTL AZ had a spike at 59 ms TBRL FZ had spikes at 15 & 64ms
<u>Physical evidence of damage:</u>
<u>Anecdotal evidence of damage:</u>
<u>Equipment delivered to Borrower:</u>

HEAD	
Y / N	Rear head cap mounts securely to head
Y / N	Head skin fits securely over skull -slightly small, does not fit 100% in rear
Y / N	Head skin shows no sign of tears or damage -nicks/cuts 
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 debonding between neck pucks and plates If N – indicate which interface (where plate/puck 1 attach to upper neck load cell): -debonding above pucks 4, 5 
Y / N	No evidence of debonding 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	

SPINE	
Y / N	No evidence of debonding between thoracic spine flex joint and metal plates -tears in left/right sides? 
Y / N	No evidence of debonding between lumbar spine flex joint and metal plates
Y / N	Lumbar spine 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 debonding, tearing, or permanent compression of posterior soft stops -left stop slightly debonded 
OTHER	

THORAX	
Y / N	No evidence of contact at top, bottom, or interior faces of rib damping material -top interior left ribs 2, 5 -top interior right rib 4 
Y / N	No evidence of debonding between rib damping material and ribs
Y / N	CRUX anterior arms securely attached to anterior ribs
Y / N	CRUX posterior arms 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	-Right arm has a gouge near elbow 
ABDOMEN	
Y / N	No evidence of tearing, cuts, or broken stitches in upper abdomen bag and zipper -holes in left, right sides near zipper 
Y / N	Upper abdomen insert securely attached to spine
Y / N	Upper abdomen insert shows no evidence of permanent set
Y / N	No evidence of tearing, cuts, or broken stitches in lower abdomen bag and zipper
Y / N	Lower abdomen insert securely attached to spine
Y / N	Lower abdomen insert shows no evidence of permanent set
OTHER	
PELVIS	
Y / N	Pelvis flesh fits securely over pelvis bones
Y / N	H-point tool fits securely into hole on both sides of pelvis
OTHER	-holes in pelvis flesh near ASIS anterior surfaces 

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 -cuts/tears/hole in both knee flesh covers 
OTHER	

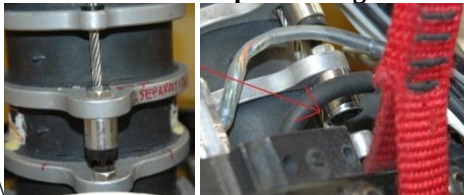
LOWER EXTREMITY (LX)	
Y / N	Rotational potentiometers in ankle securely attached
Y / N	Achilles tendon provides resistance to dorsiflexion
Y / N	No evidence of debonding, tearing, or permanent compression of ankle soft stops
OTHER	-Both feet starting to tear at rear 

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	

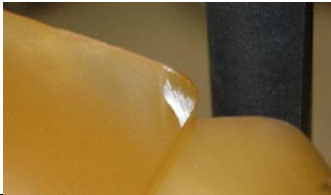
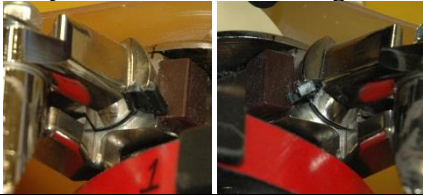
THOR Inspection Checklist

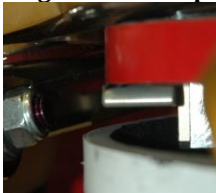
Date: 12/21/2012
NHTSA Representative: James Saunders
Witness(es):
Inspection type (check one): ☒ PRE ☐ POST
Dummy S/N: 0016
Dummy Description: Thor NT 50th Male
Date of last Certification or Inspection: 12/13/2012
<u>Tests conducted since last full certification or inspection:</u> <u>Since last inspection:</u> RC5369 Left side CR-V <u>Since last certification:</u> RD5227 Right side Versa RC5142 Right side Camry RD5226 Left side Versa RD4200 Left side Elantra RC5141 Left side Camry RC5369 Left side CR-V
<u>Known errors in data channels (no data, clipping, unexpected drops):</u> HDCG AY Spike at 110ms HDCG AZ Spike at 110ms NKCR FZ Noisy between 43 & 95ms FOTL AZ Channel Failed ANKL RX Questionable Data ANKL RY Questionable Data ANKR RX Questionable Data ANKR RY Questionable Data
<u>Physical evidence of damage:</u>
<u>Anecdotal evidence of damage:</u>
<u>Equipment delivered to Borrower:</u> Thor 16 ATD

HEAD	
Y / N	Rear head cap mounts securely to head
Y / N	Head skin fits securely over skull
Y / N	Head skin shows no sign of tears or damage -Small scrapes on right side of head 
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 debonding between neck pucks and plates If N – indicate which interface (where plate/puck 1 attach to upper neck load cell): -cracks in neck rubber, 2-3, 3-4 -Lower rear neck stop is missing 
Y / N	No evidence of debonding 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	

SPINE	
Y / N	No evidence of debonding between thoracic spine flex joint and metal plates
Y / N	No evidence of debonding between lumbar spine flex joint and metal plates
Y / N	Lumbar spine pitch change joint mechanism mating teeth are engaged
OTHER	

SHOULDER	
Y / N	Urethane shoulder pads show no evidence of contact -small white mark on left shoulder 
Y / N	Clavicles securely attached to sternum and shoulder
Y / N	No evidence of debonding, tearing, or permanent compression of posterior soft stops
OTHER	-Stops on shoulder interacting with mechanism that rotates on the y-axis are breaking. 

THORAX	
Y / N	No evidence of contact at top, bottom, or interior faces of rib damping material -slight contact top right of rib #2 under arm 
Y / N	No evidence of debonding between rib damping material and ribs -right front of rib #5 
Y / N	CRUX anterior arms securely attached to anterior ribs
Y / N	CRUX posterior arms securely attached to double gimbals, spine

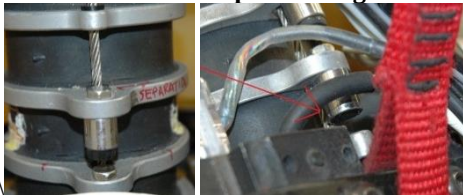
Y / N	Urethane bib is securely attached to ribs with no sign of tearing or washer penetration
Y / N	Ribs securely attached to posterior spine
Y / N	Rib stiffeners show no evidence of bending (no gaps between ribs and stiffeners)
OTHER	- Left lower IR-Tracc sticks during compression
ABDOMEN	
Y / N	No 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 -torn stitches on left/right side at leg zipper
	
Y / N	Lower abdomen insert securely attached to spine
Y / N	Lower abdomen insert shows no evidence of permanent set
OTHER	
PELVIS	
Y / N	Pelvis flesh fits securely over pelvis bones
Y / N	H-point tool fits securely into hole on both sides of pelvis
OTHER	

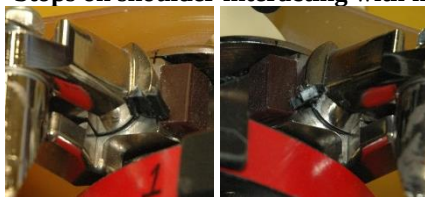
FEMUR	
Y / N	Acetabular load cells firmly attached
Y / N	Femur load cells firmly attached
Y / N	No evidence of deformation of knee slider bump stop
Y / N	No cuts, tears, or scuffing of knee flesh
OTHER	
LOWER EXTREMITY (LX)	
Y / N	Rotational potentiometers in ankle securely attached
Y / N	Achilles tendon provides resistance to dorsiflexion
Y / N	No evidence of debonding, tearing, or permanent compression of ankle soft stops -ankle roll stops cracked 
OTHER	-Right leg skin is tearing -Right leg has a chip out of structural ring 
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: 01/05/2013
NHTSA Representative: James Saunders
Witness(es):
Inspection type (check one): ☐ PRE ☒ POST
Dummy S/N: 0016
Dummy Description: Thor NT 50th Male
Date of last Certification or Inspection: 12/21/2012
<u>Tests conducted since last full certification or inspection:</u> <u>Since last inspection:</u> RC5370 Left Side Odyssey <u>Since last certification:</u> RD5227 Right side Versa RC5142 Right side Camry RD5226 Left side Versa RD4200 Left side Elantra RC5141 Left side Camry RC5369 Left side CR-V RC5370 Left Side Odyssey
<u>Known errors in data channels (no data, clipping, unexpected drops):</u> HDCG AX had a spike at 116 ms NEKL MZ had a spike at 164 ms ANKL RX had questionable data ANKL RY had questionable data FOTL AZ failed ANKR RX had questionable data ANKR RY had questionable data
<u>Physical evidence of damage:</u>
<u>Anecdotal evidence of damage:</u>
<u>Equipment delivered to Borrower:</u> Thor 16 ATD

HEAD	
Y / N	Rear head cap mounts securely to head
Y / N	Head skin fits securely over skull
Y / N	Head skin shows no sign of tears or damage -Small scrapes on right side of head 
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 debonding between neck pucks and plates If N – indicate which interface (where plate/puck 1 attach to upper neck load cell): -cracks in neck rubber, 2-3, 3-4 -Lower rear neck stop is missing 
Y / N	No evidence of debonding 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	

SPINE	
Y / N	No evidence of debonding between thoracic spine flex joint and metal plates
Y / N	No evidence of debonding between lumbar spine flex joint and metal plates
Y / N	Lumbar spine pitch change joint mechanism mating teeth are engaged
OTHER	
SHOULDER	
Y / N	Urethane shoulder pads show no evidence of contact -small white mark on left shoulder 
Y / N	Clavicles securely attached to sternum and shoulder
Y / N	No evidence of debonding, tearing, or permanent compression of posterior soft stops
OTHER	-Stops on shoulder interacting with mechanism that rotates on the y-axis are breaking. 
THORAX	
Y / N	No evidence of contact at top, bottom, or interior faces of rib damping material -slight contact top right of rib #2 under arm 
Y / N	No evidence of debonding between rib damping material and ribs -right front of rib #5 
Y / N	CRUX anterior arms securely attached to anterior ribs
Y / N	CRUX posterior arms securely attached to double gimbals, spine

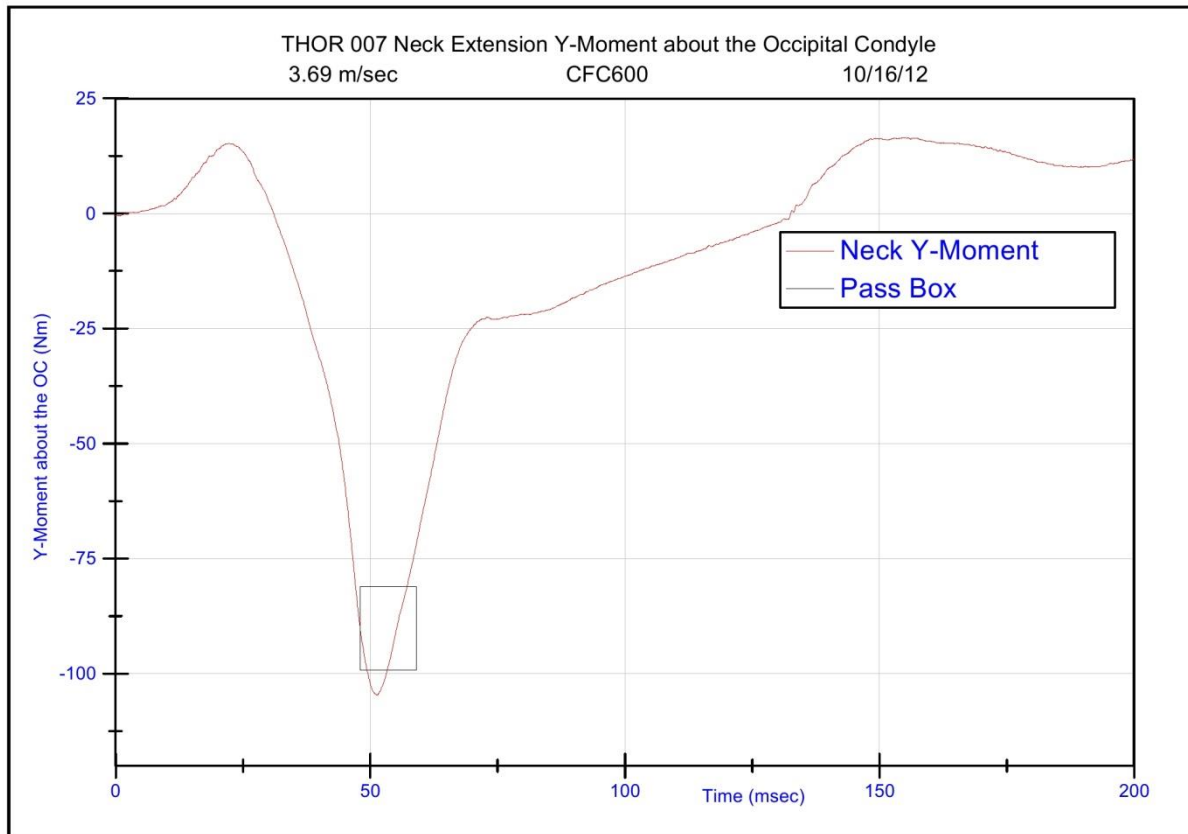
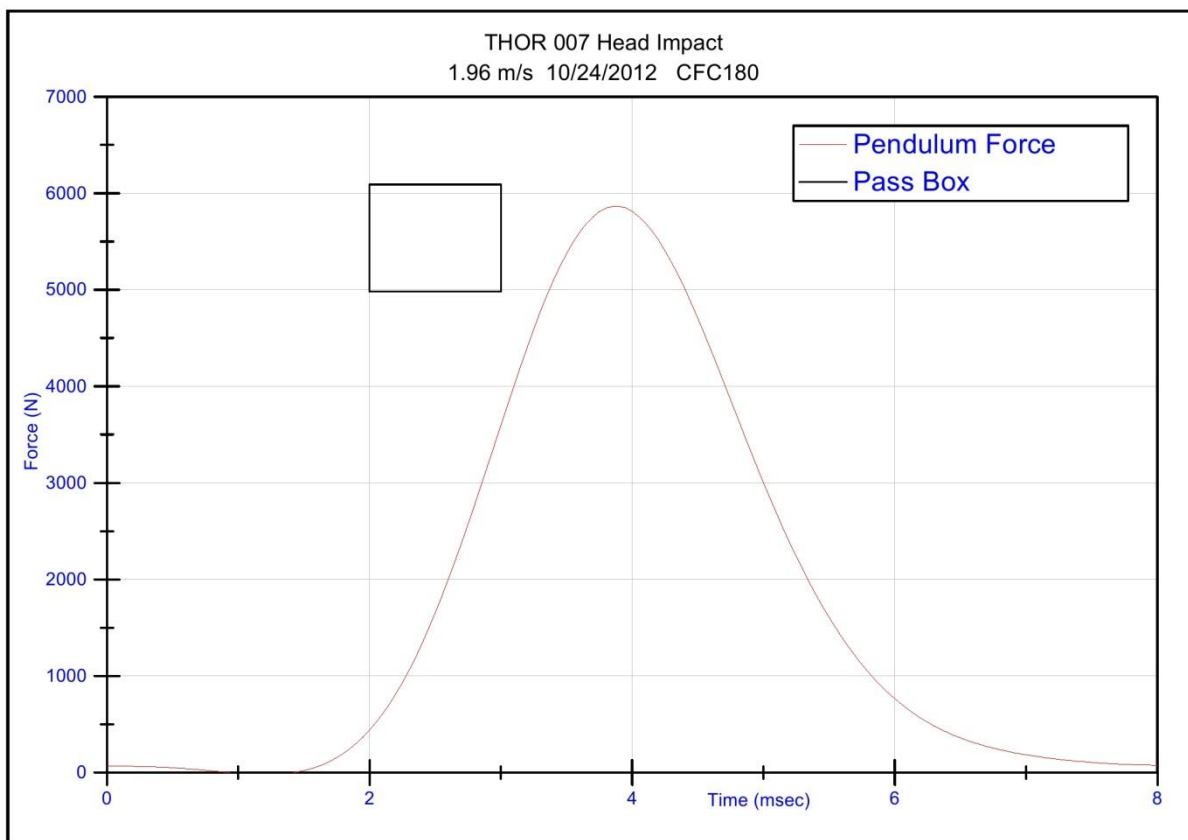
Y / N	Urethane bib is securely attached to ribs with no sign of tearing or washer penetration
Y / N	Ribs securely attached to posterior spine
Y / N	Rib stiffeners show no evidence of bending (no gaps between ribs and stiffeners)
OTHER	- Left lower IR-Tracc sticks during compression
ABDOMEN	
Y / N	No 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 -torn stitches on left/right side at leg zipper
	
Y / N	Lower abdomen insert securely attached to spine
Y / N	Lower abdomen insert shows no evidence of permanent set
OTHER	
PELVIS	
Y / N	Pelvis flesh fits securely over pelvis bones
Y / N	H-point tool fits securely into hole on both sides of pelvis
OTHER	

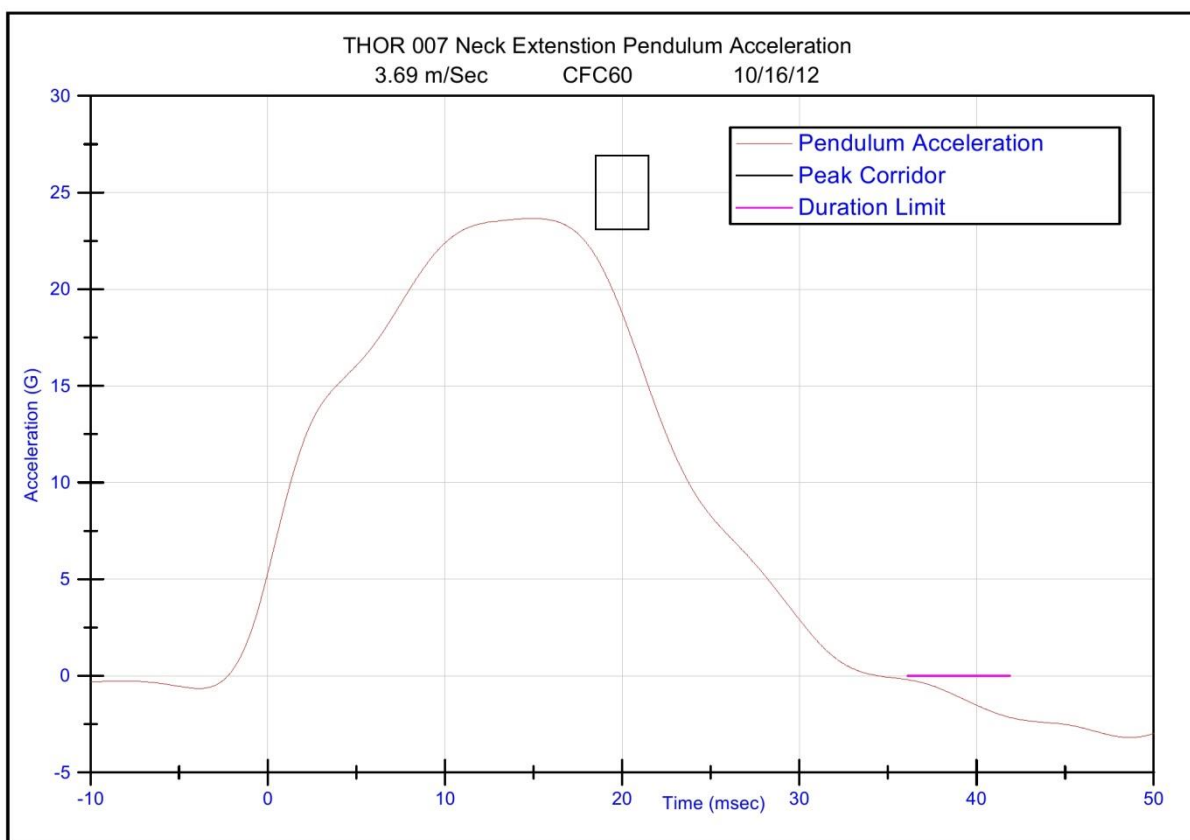
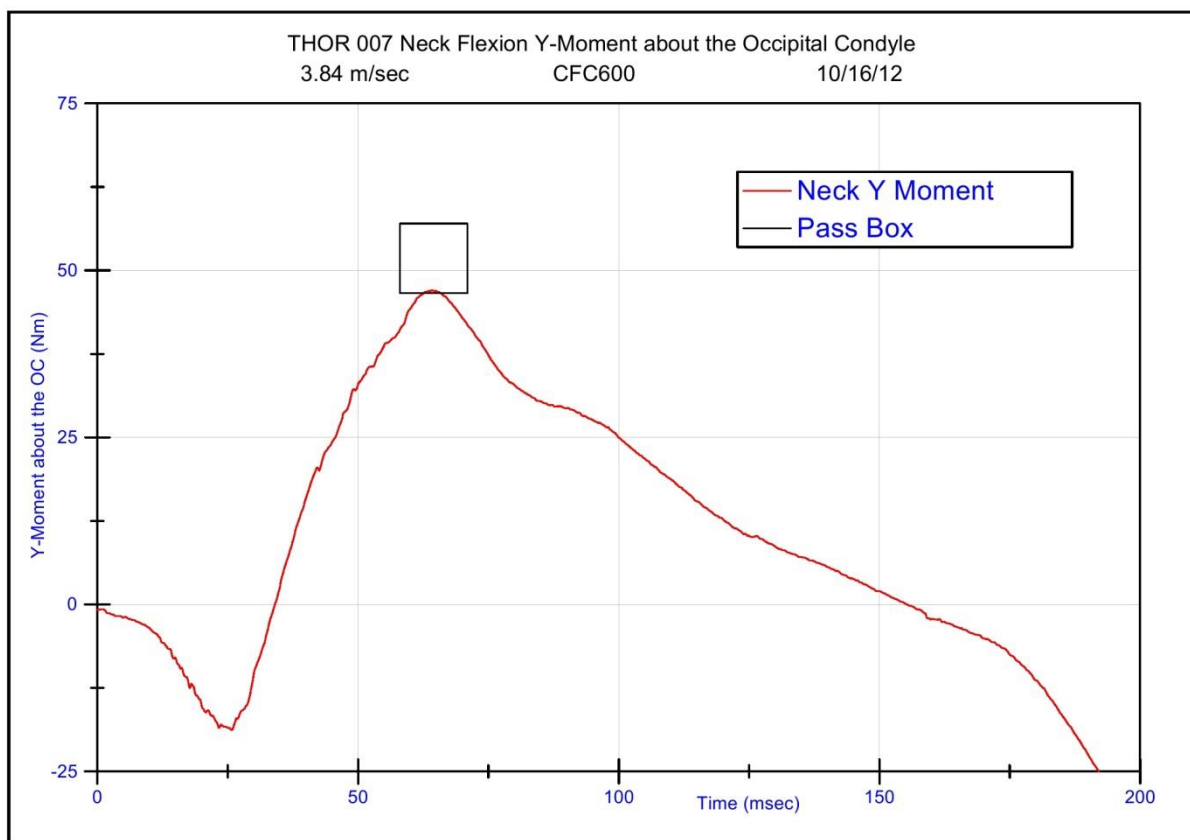
FEMUR	
Y / N	Acetabular load cells firmly attached
Y / N	Femur load cells firmly attached
Y / N	No evidence of deformation of knee slider bump stop
Y / N	No cuts, tears, or scuffing of knee flesh
OTHER	
LOWER EXTREMITY (LX)	
Y / N	Rotational potentiometers in ankle securely attached
Y / N	Achilles tendon provides resistance to dorsiflexion
Y / N	No evidence of debonding, tearing, or permanent compression of ankle soft stops -ankle roll stops cracked 
OTHER	-Right leg skin is tearing -Right leg has a chip out of structural ring 
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	

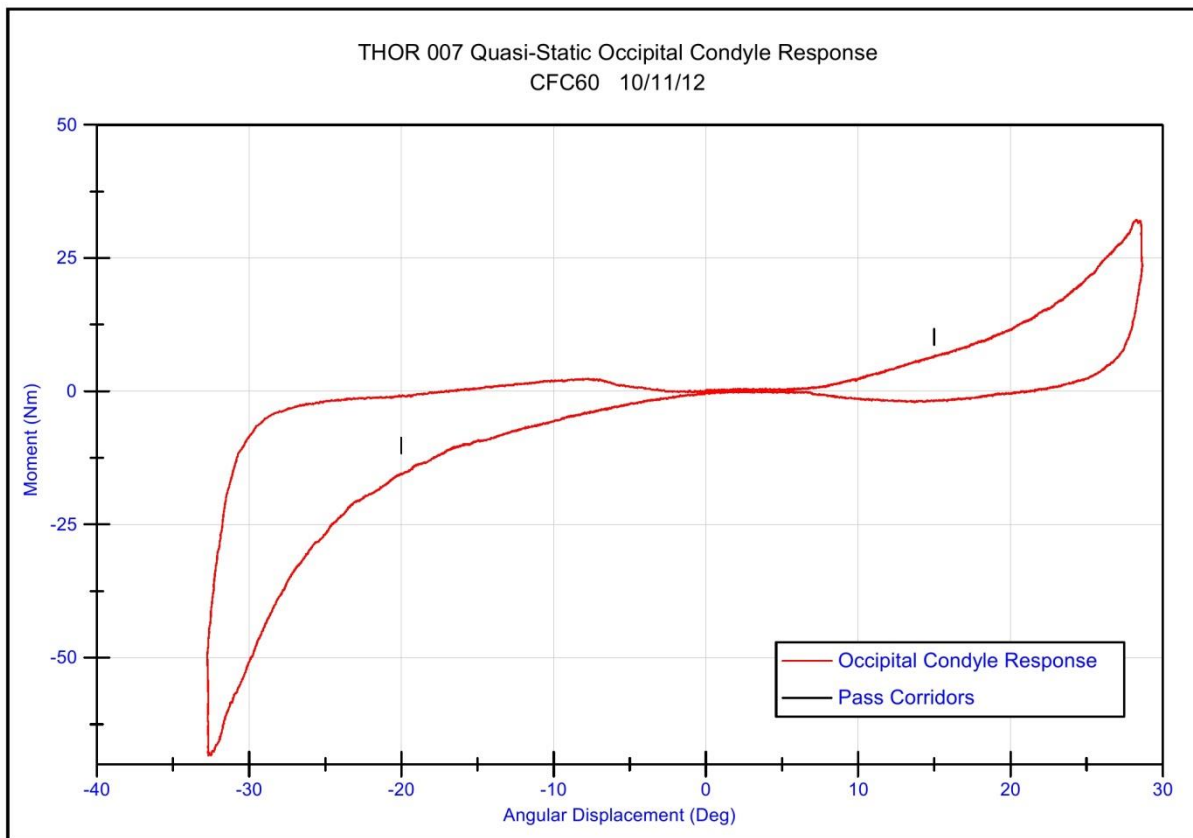
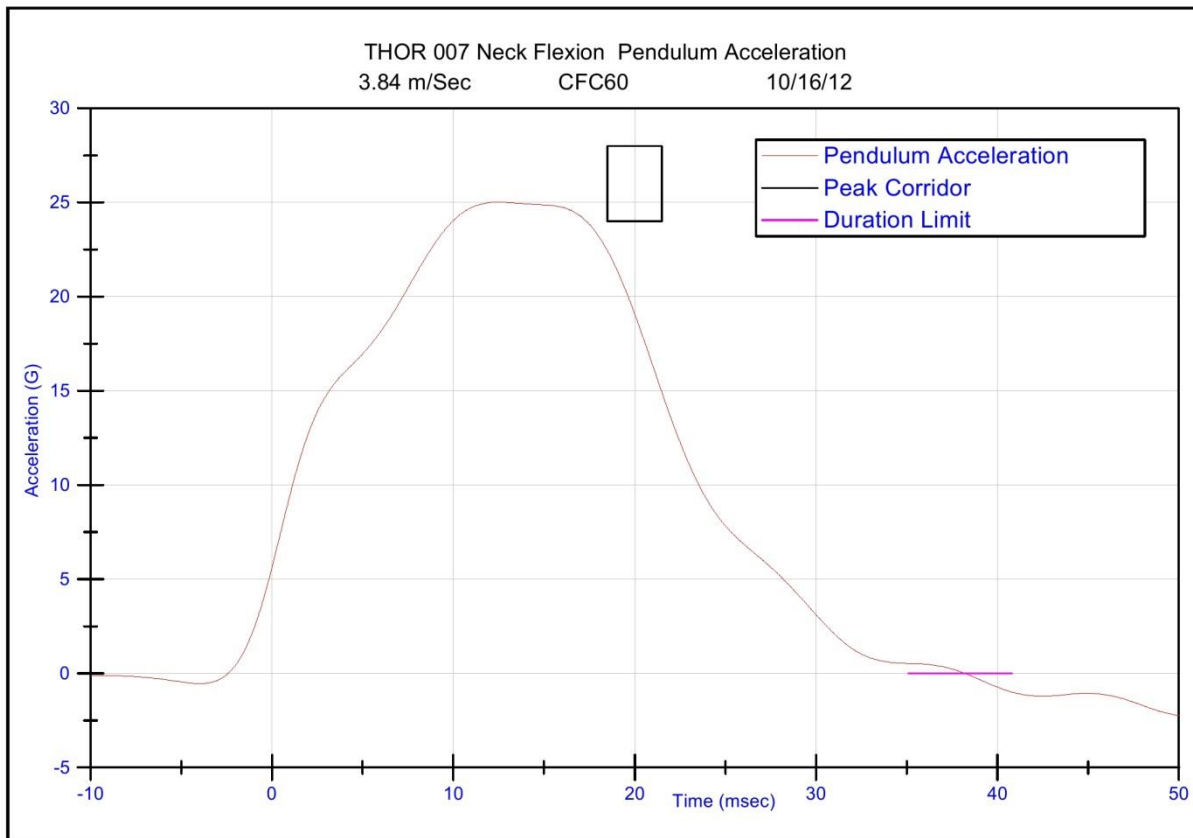
Test Data/Sensor Repair Notes

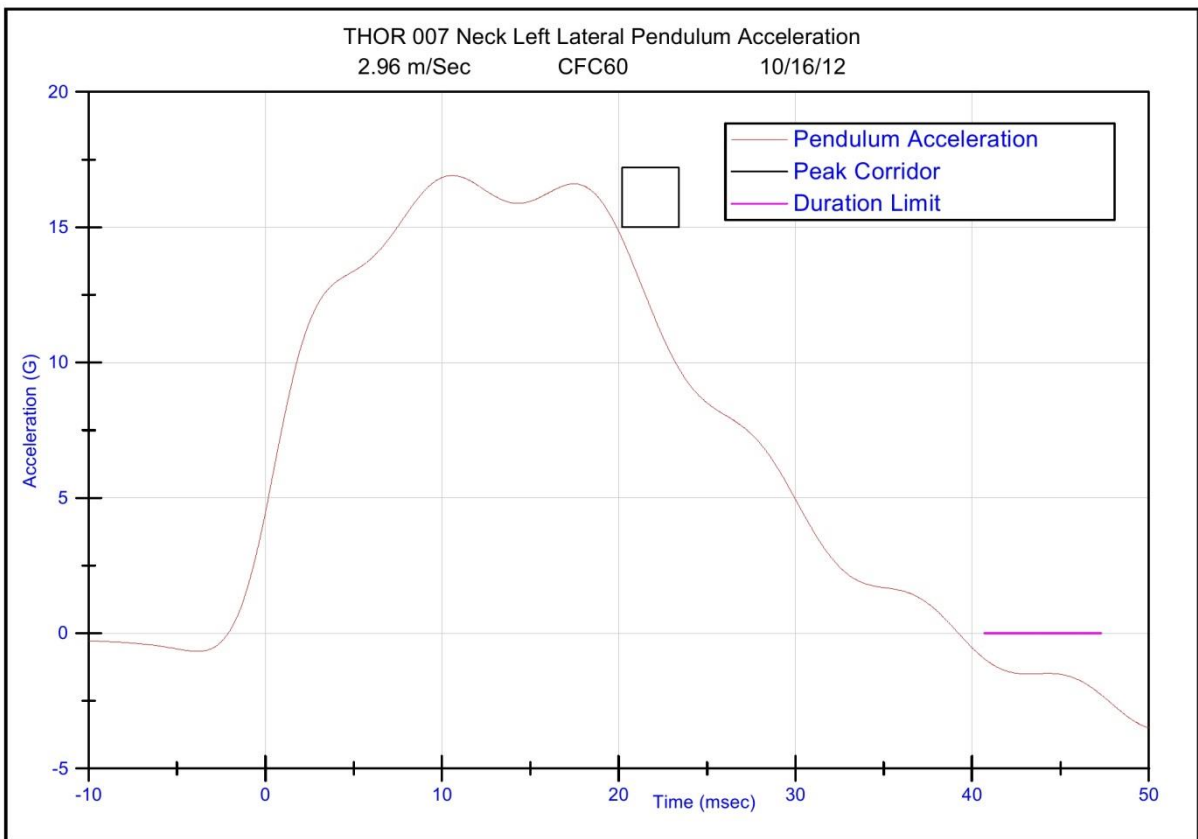
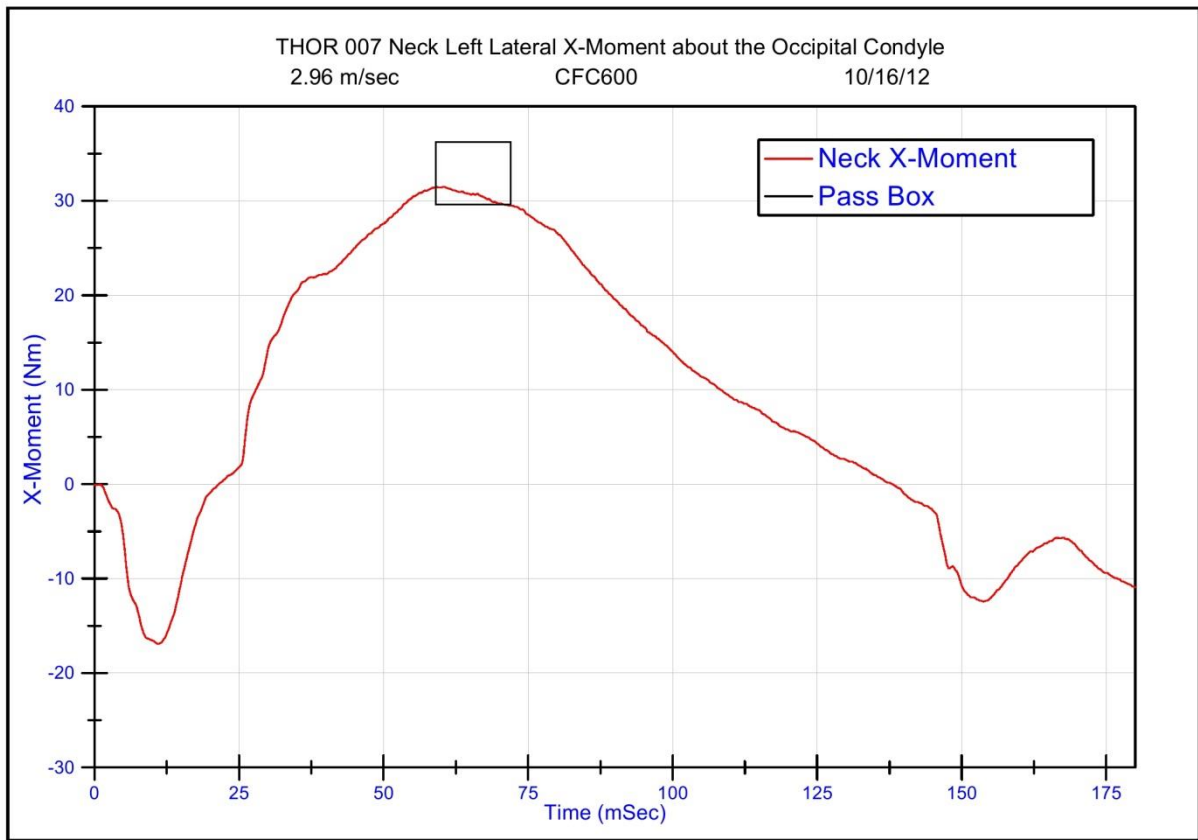
DUMMY CALIBRATIONS

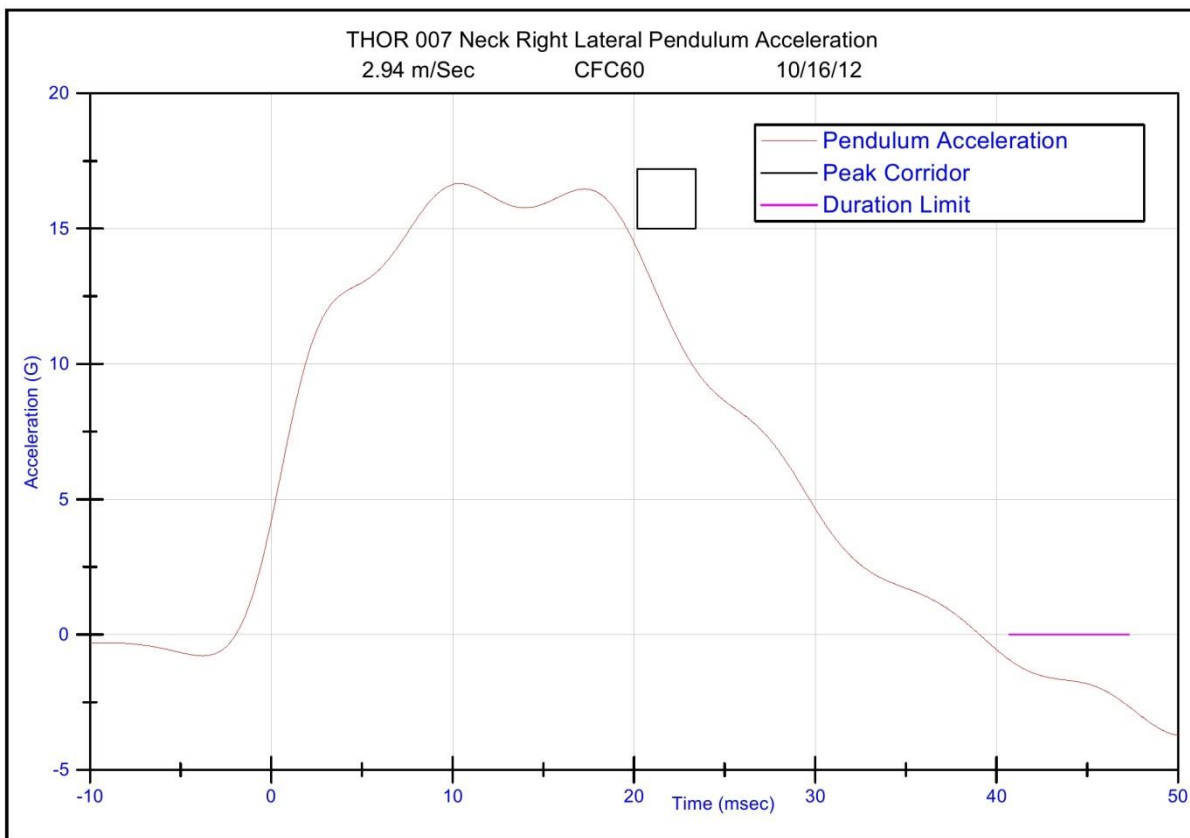
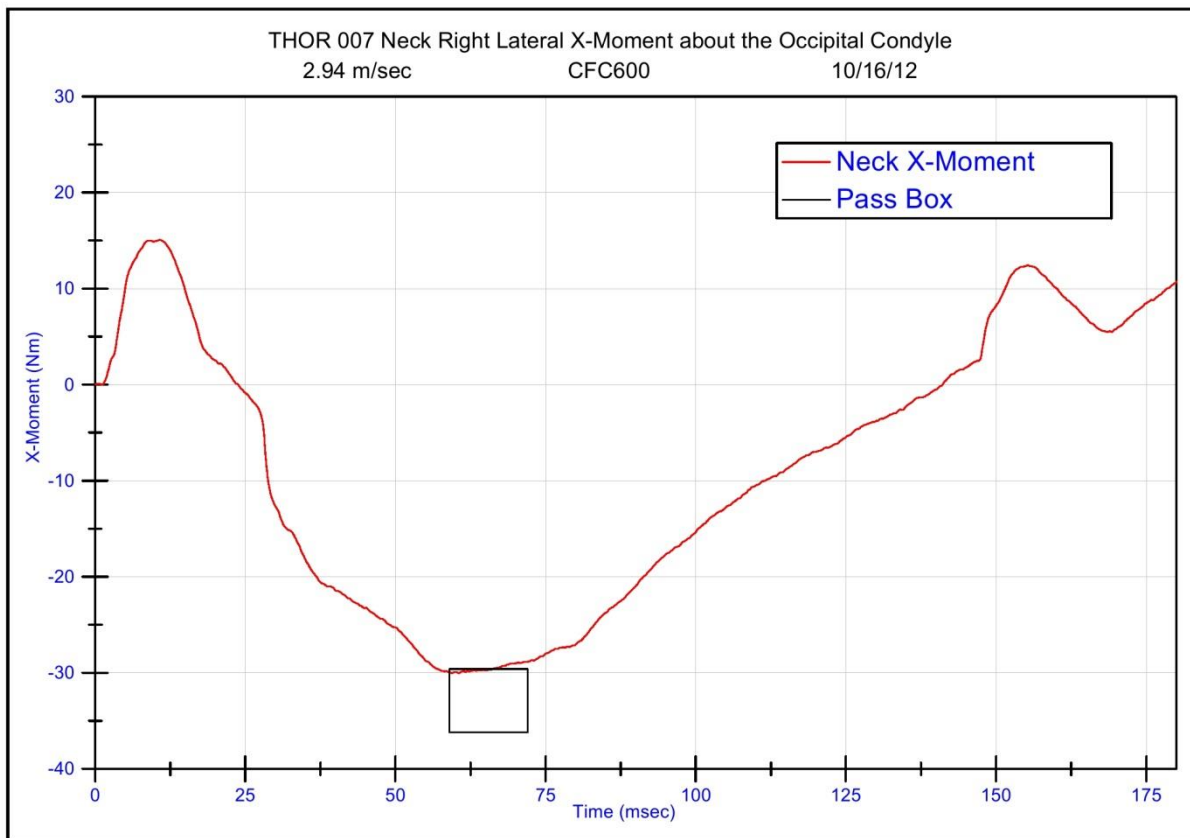
50% ADULT MALE THOR007 DUMMY CALIBRATIONS

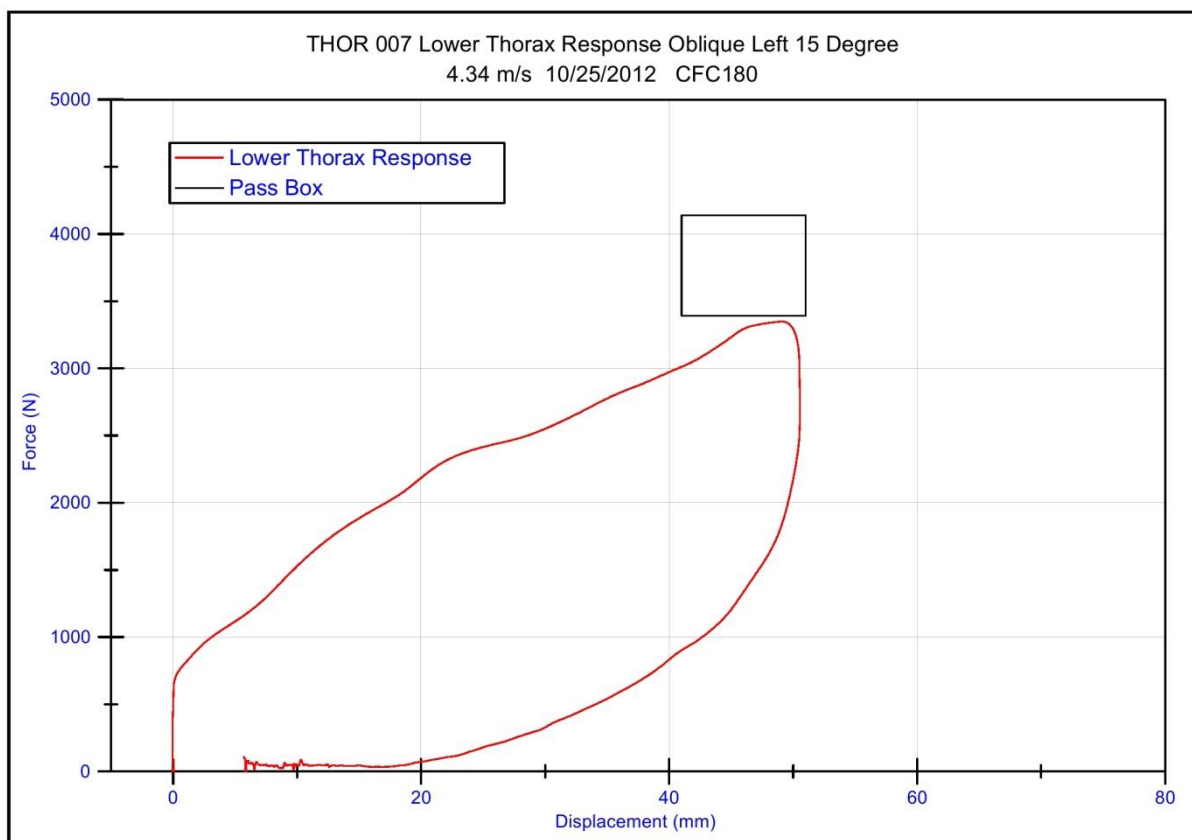
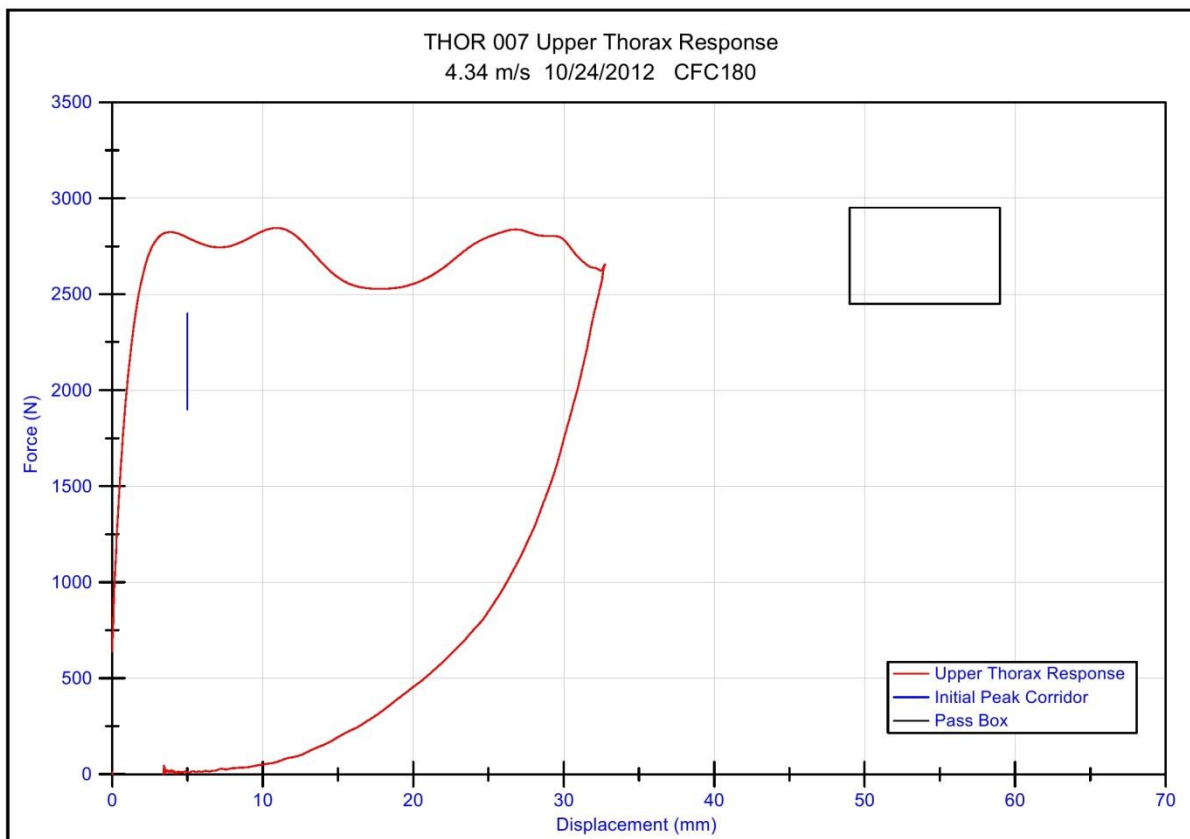


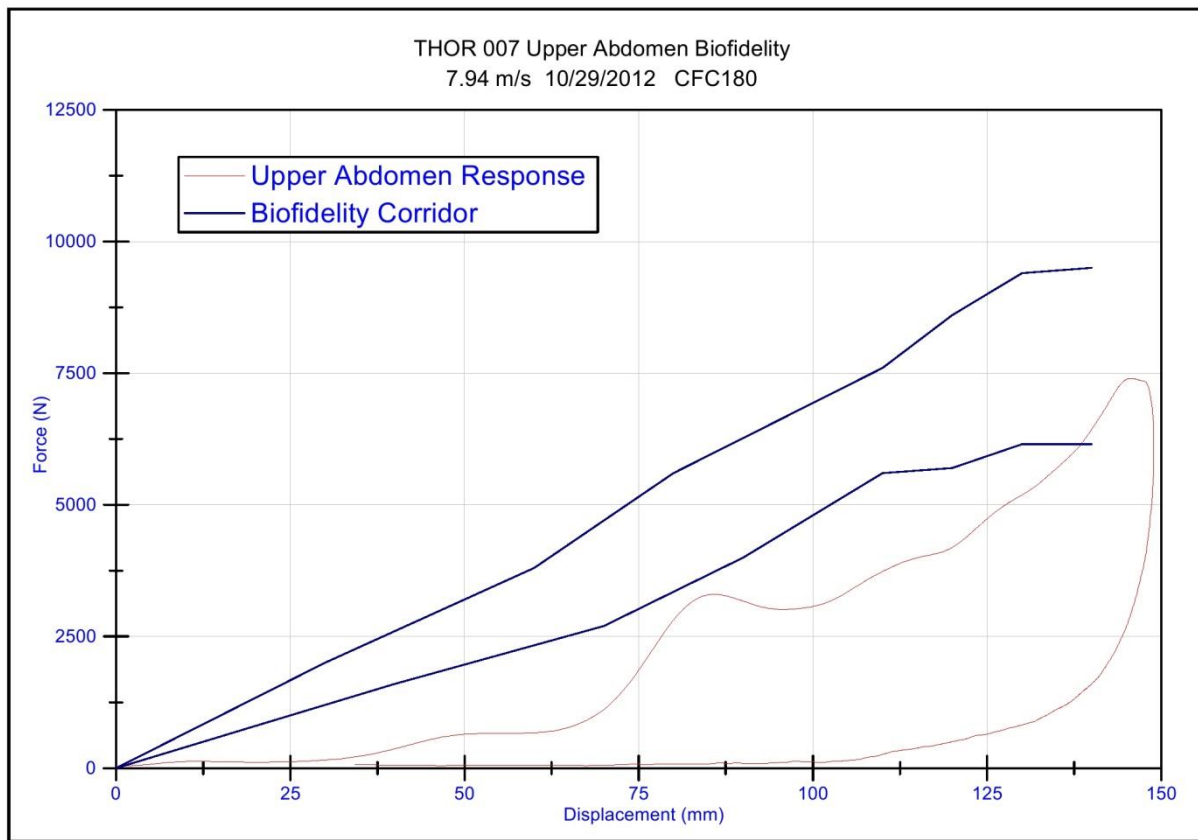
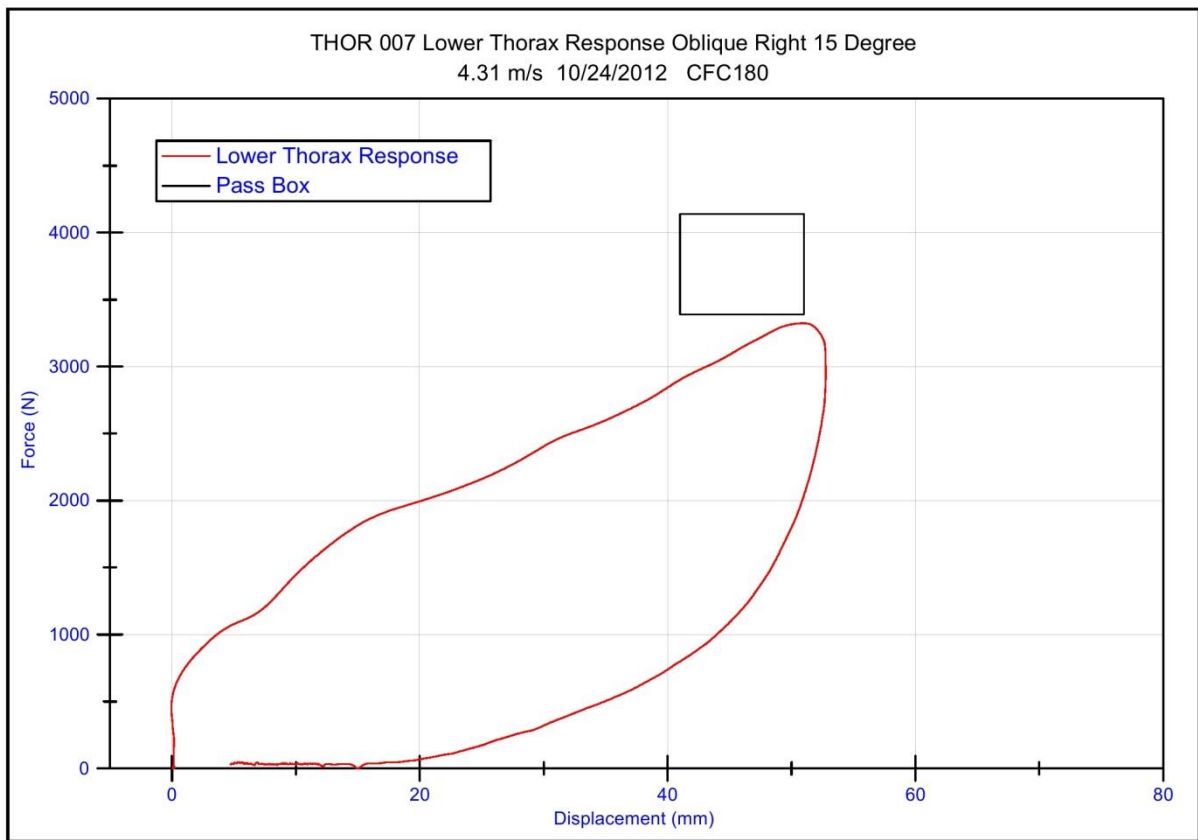


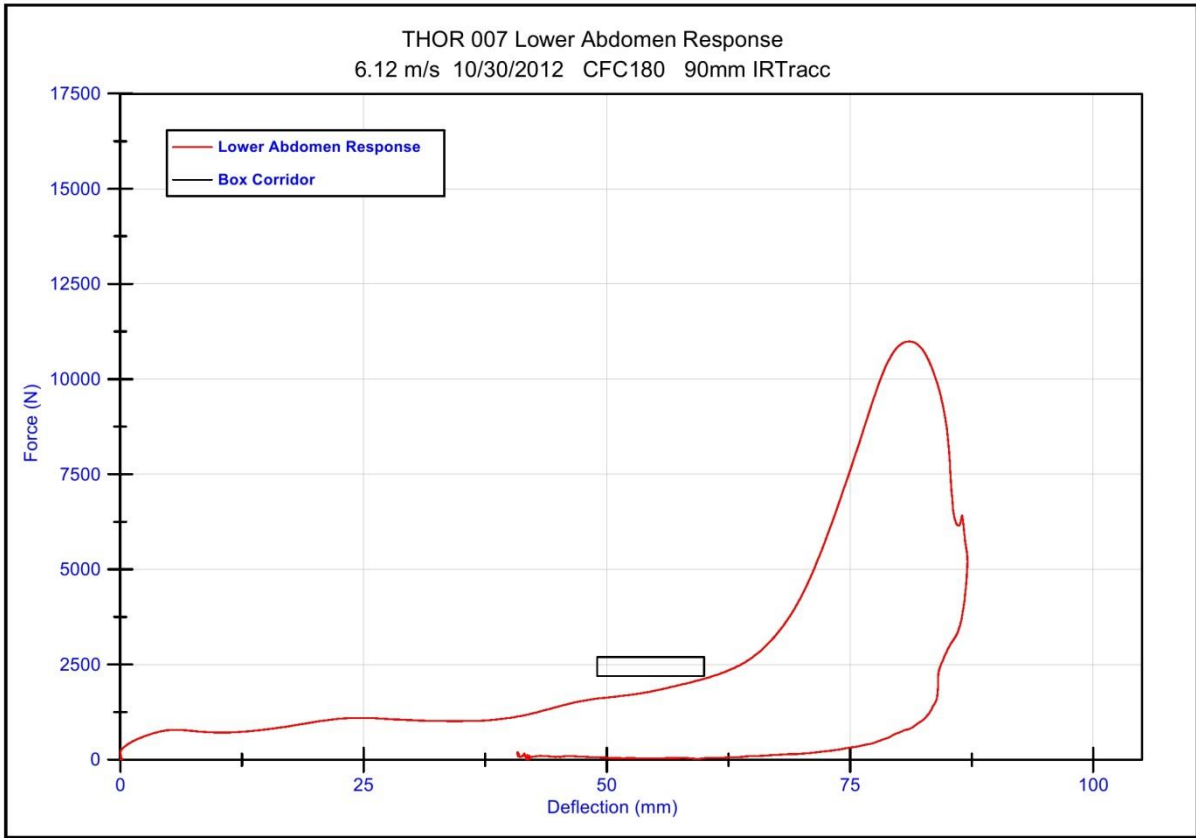






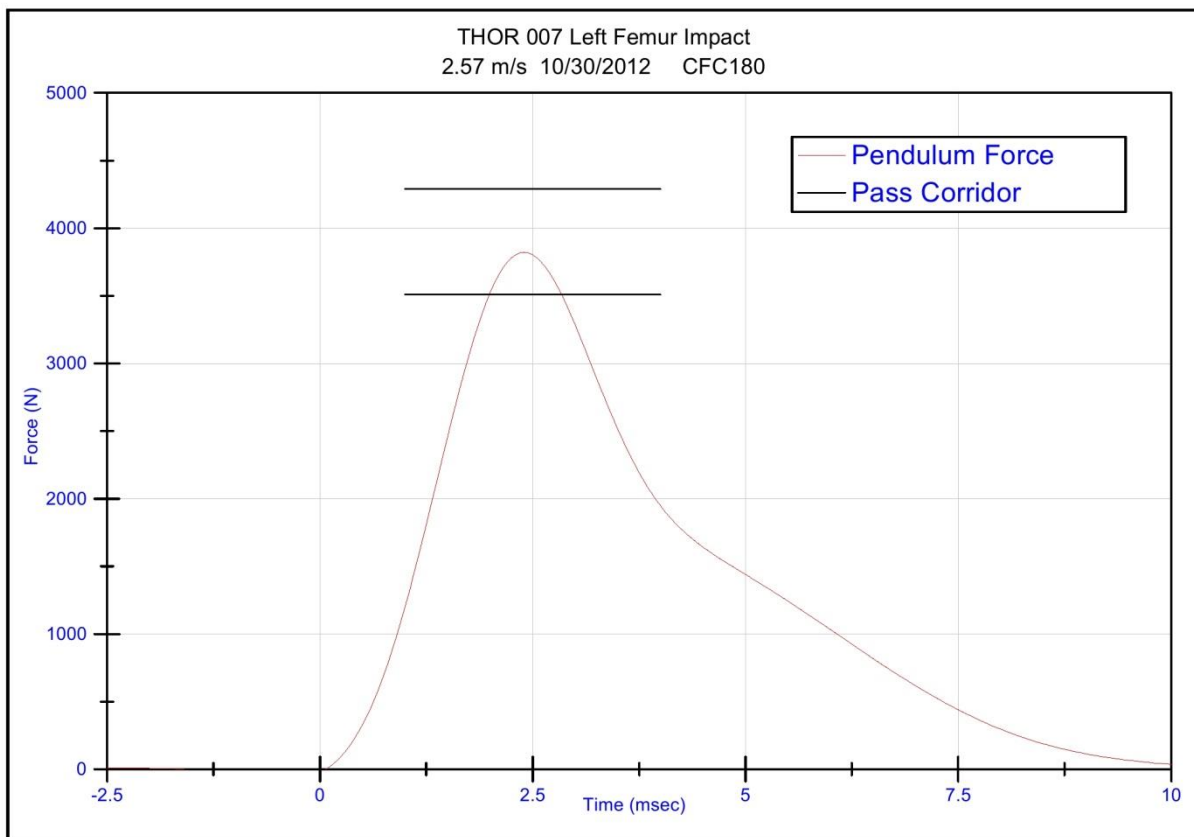
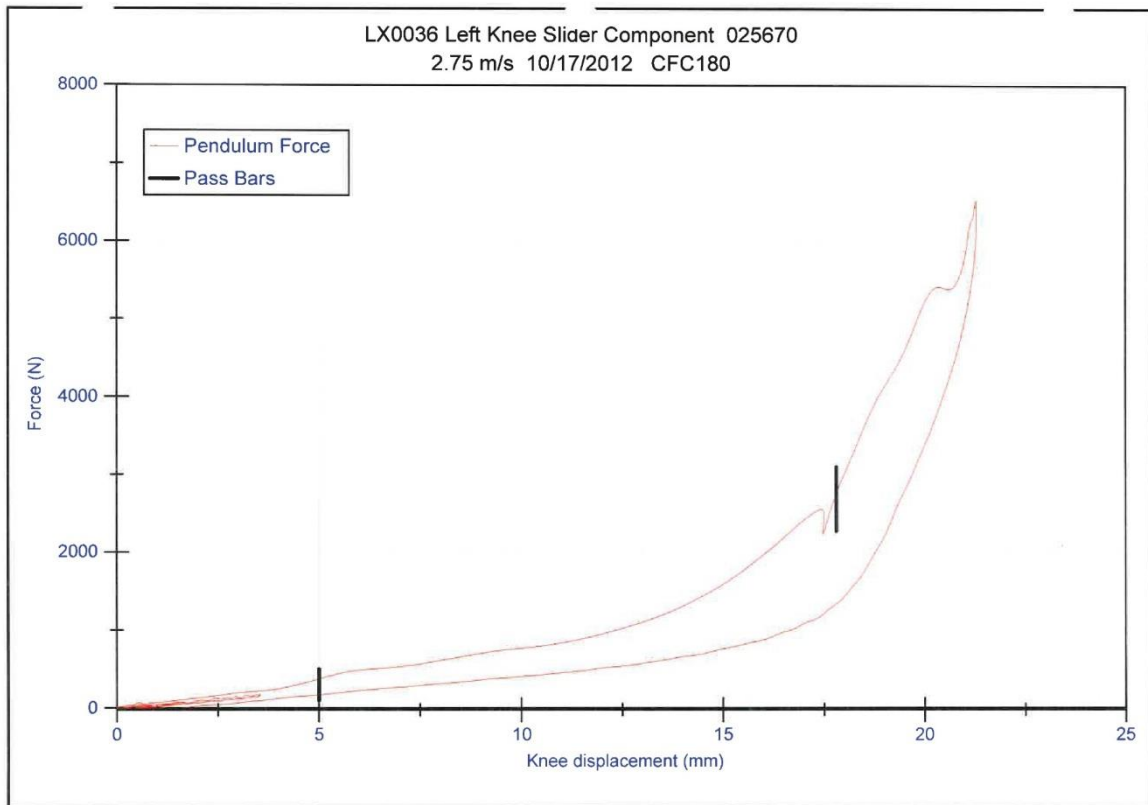


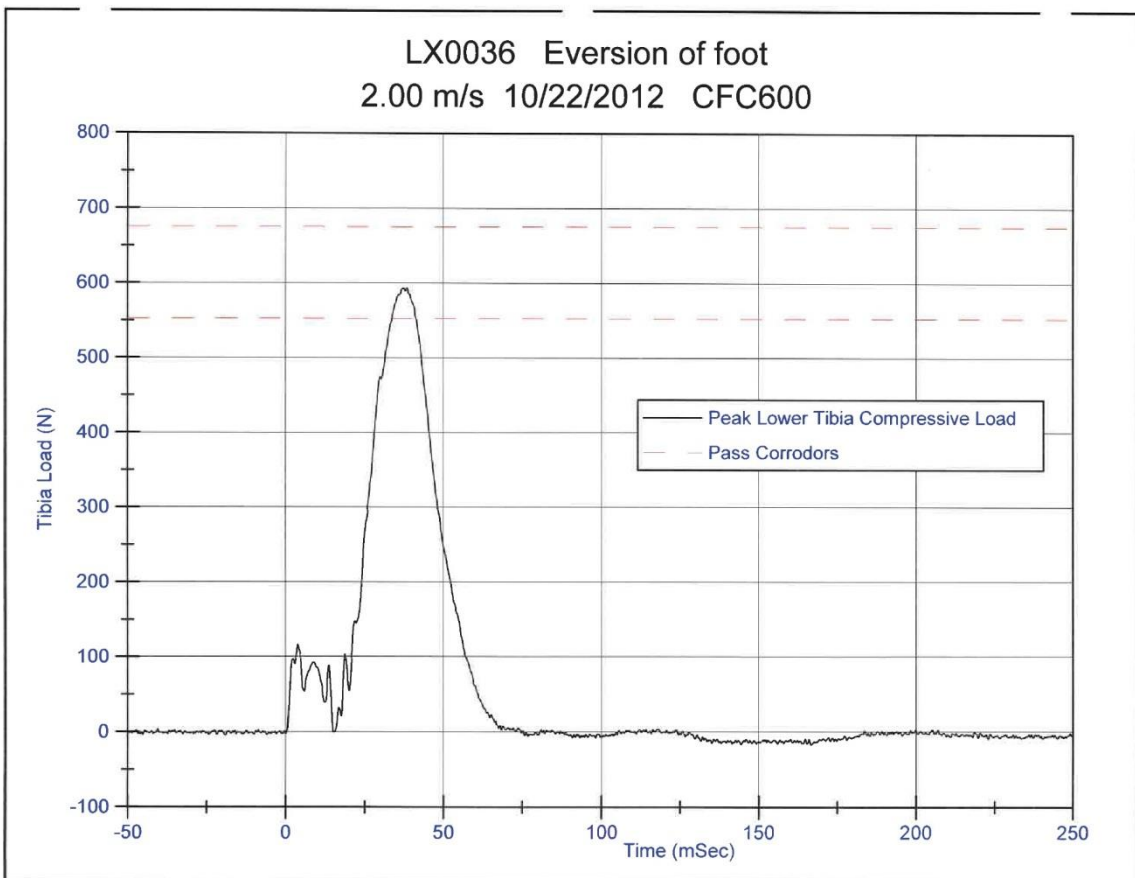
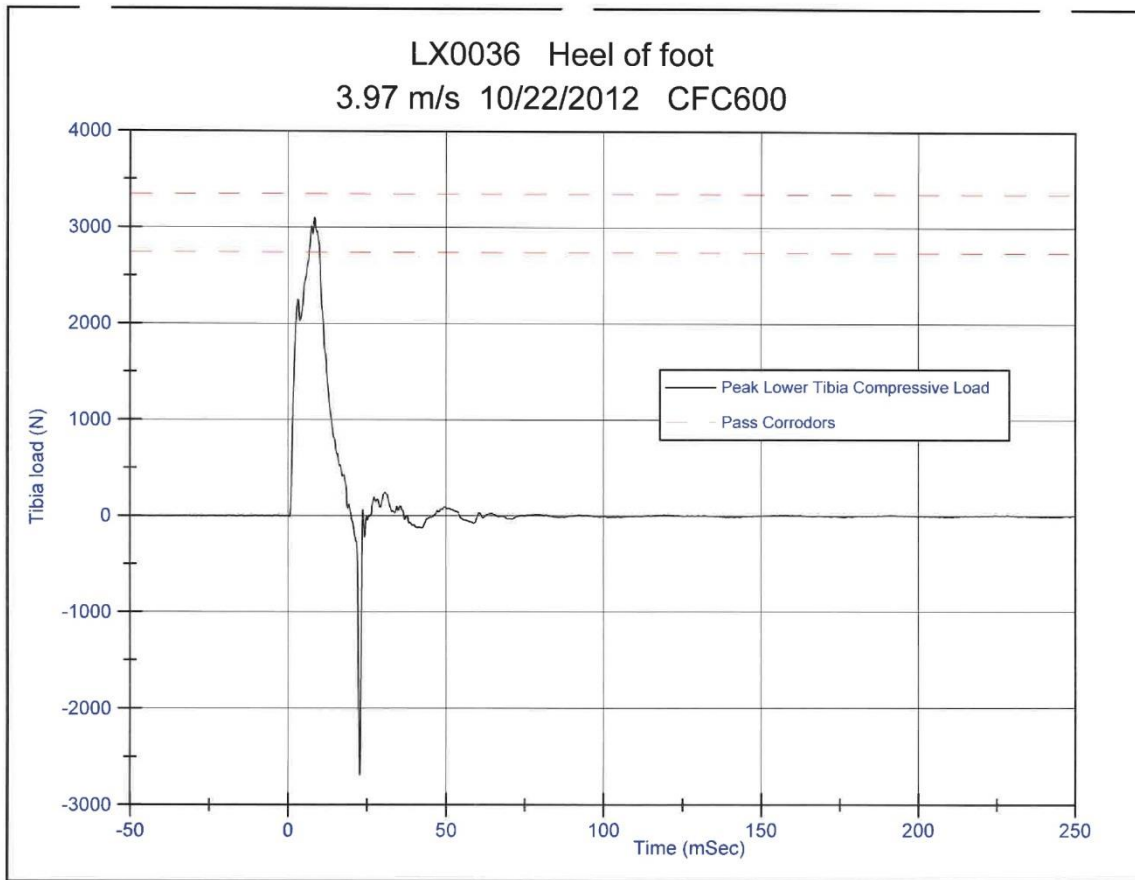


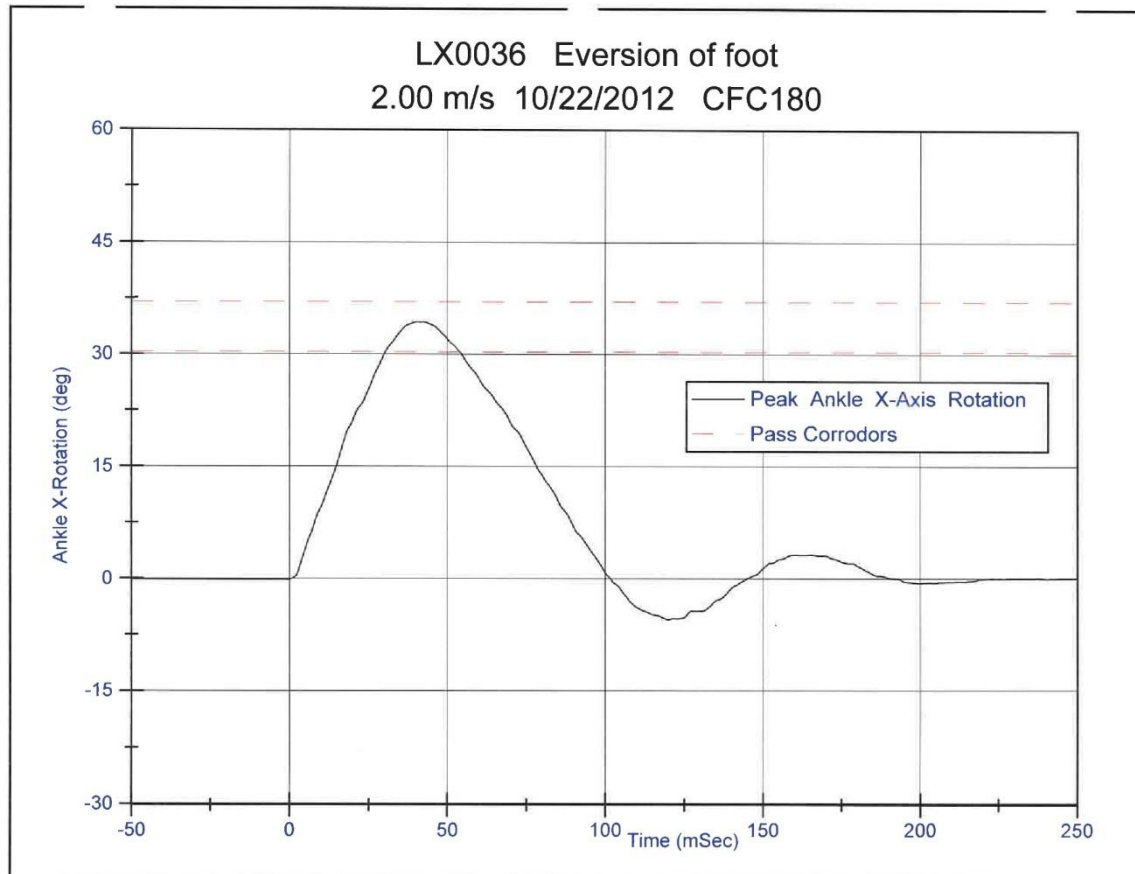
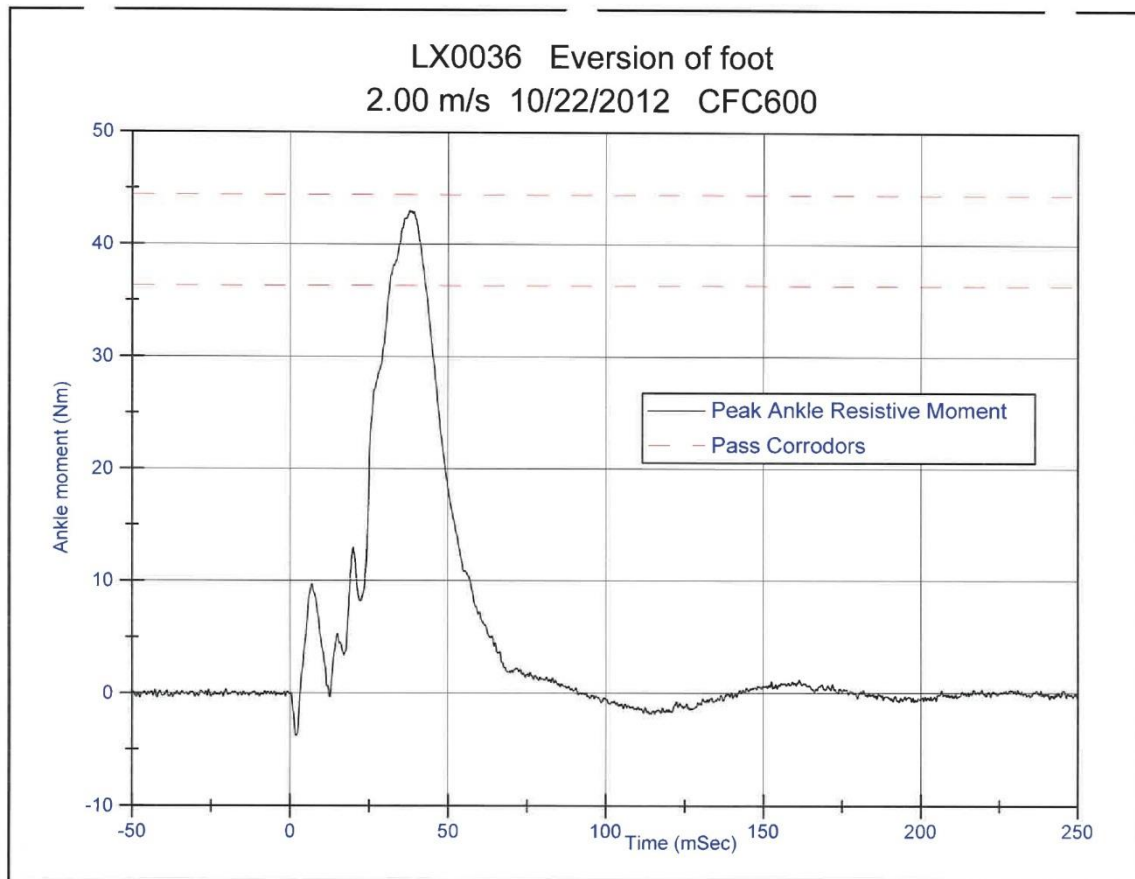


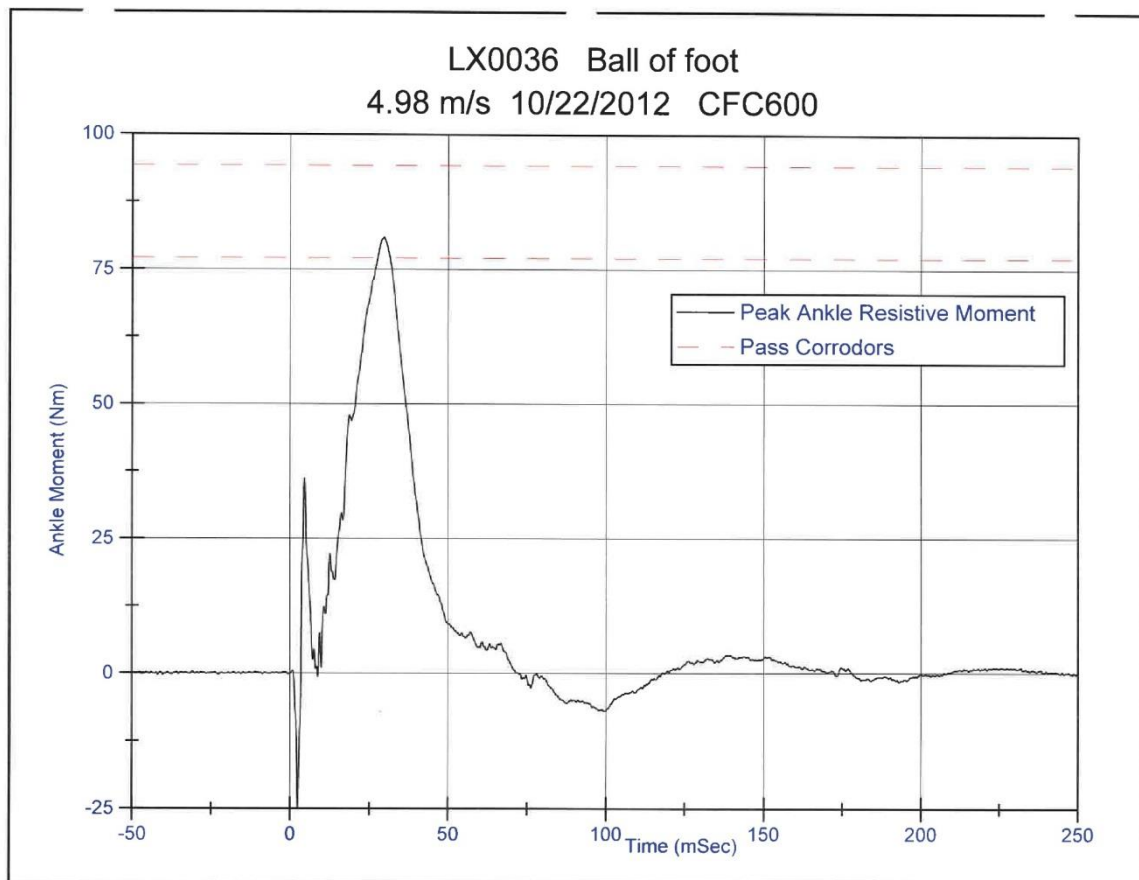
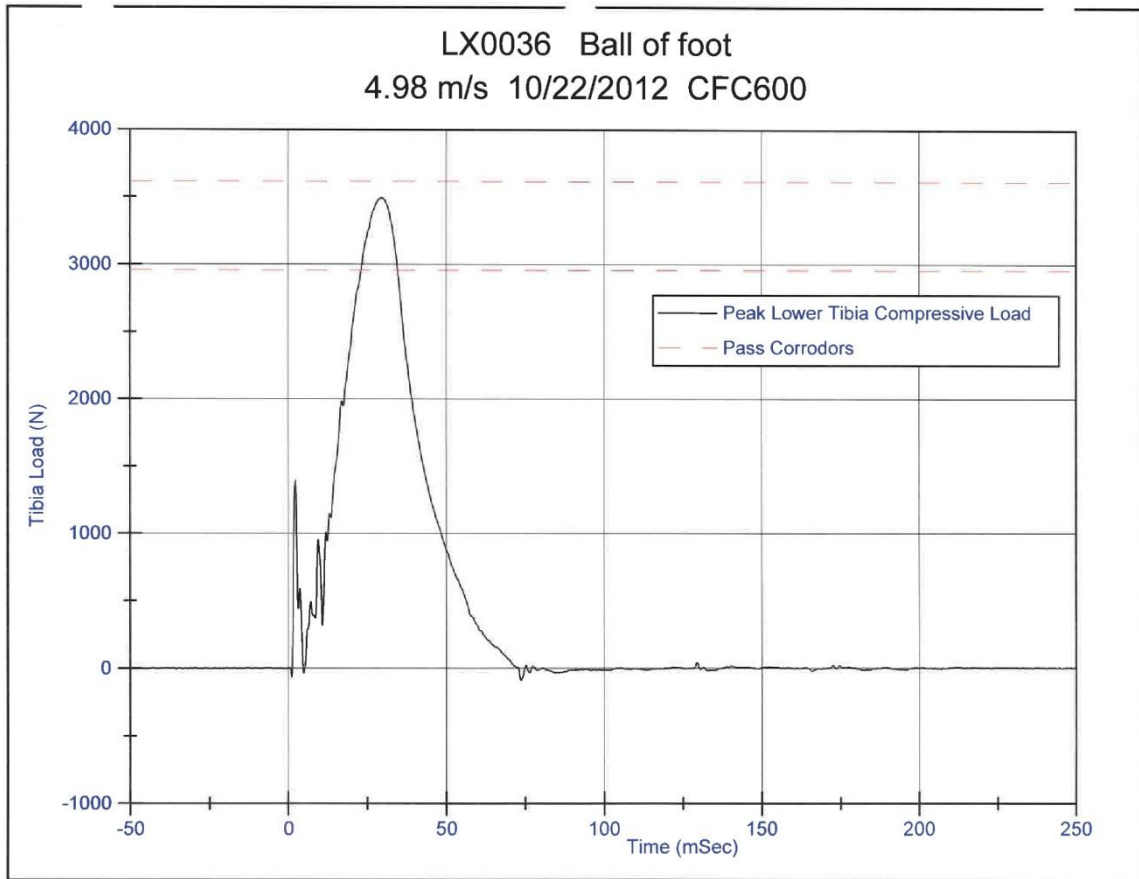
THOR 007 LEG CALIBRATIONS
LX0036 / LX0037

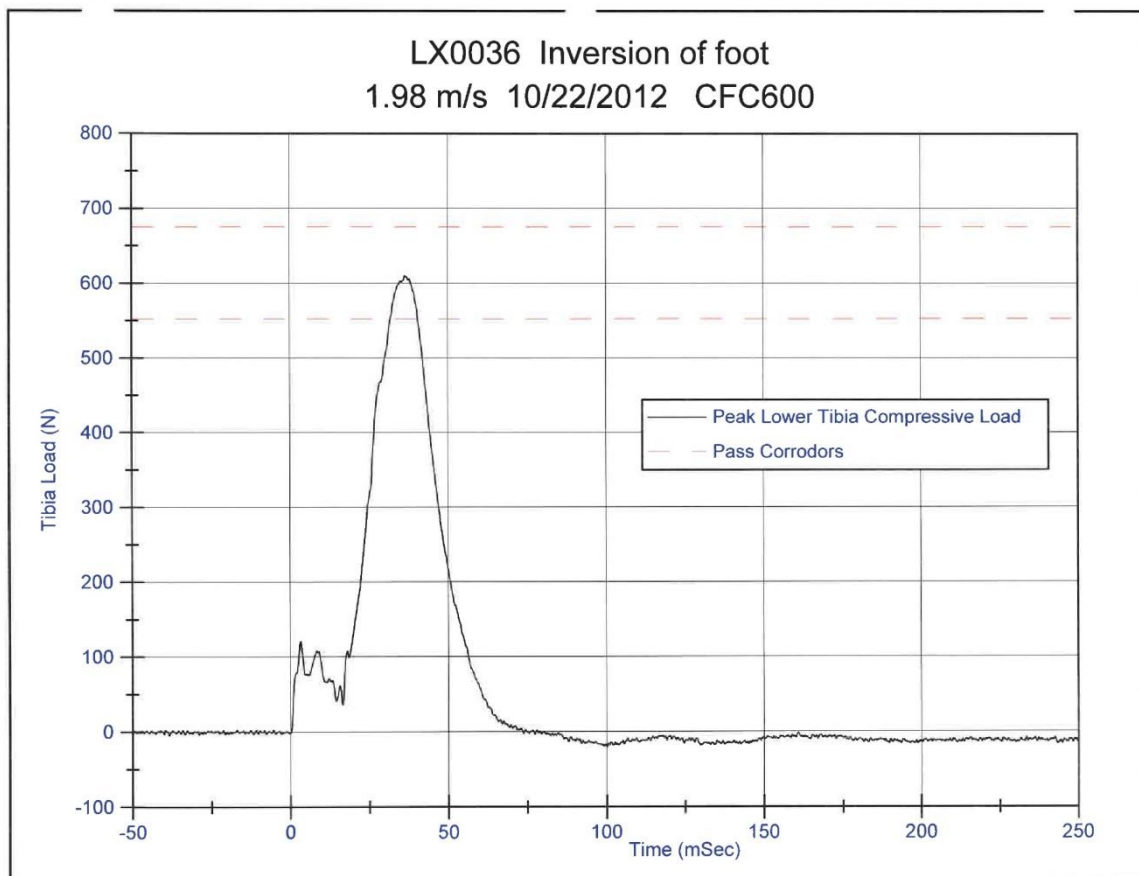
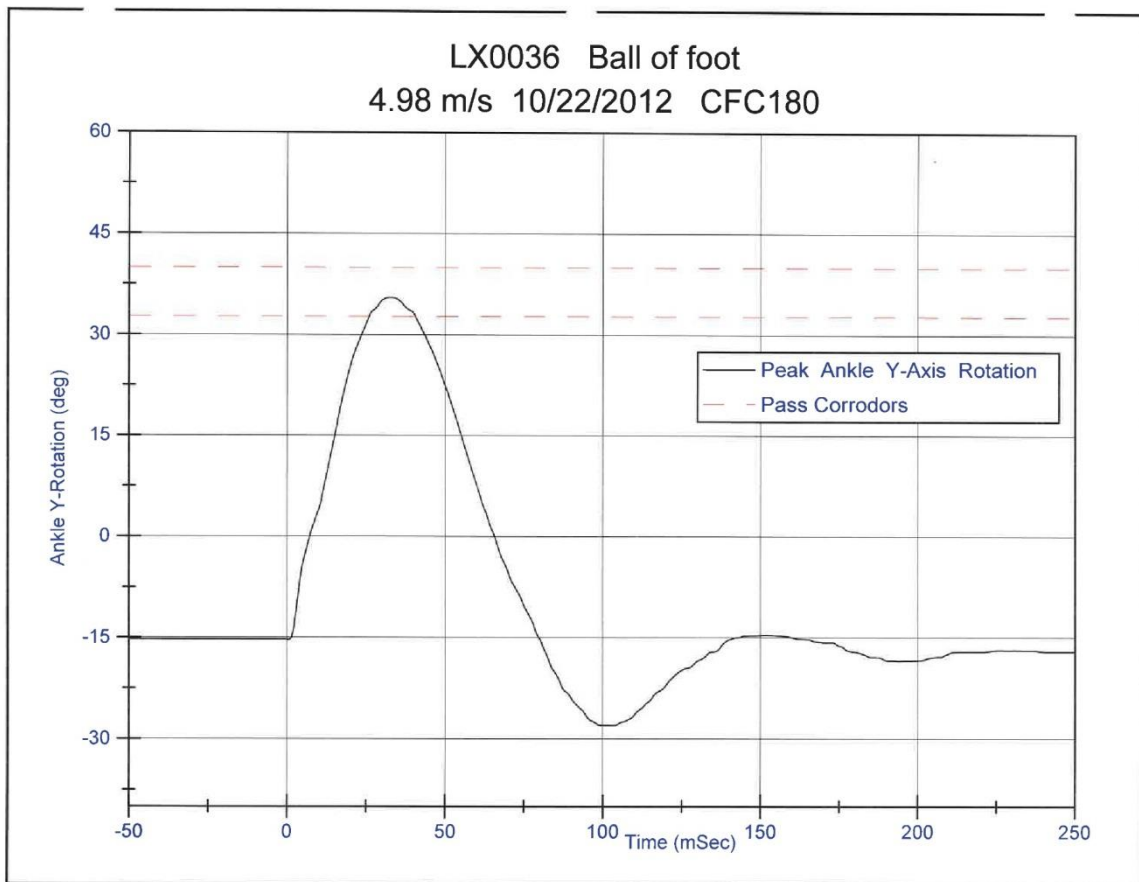
LX0036

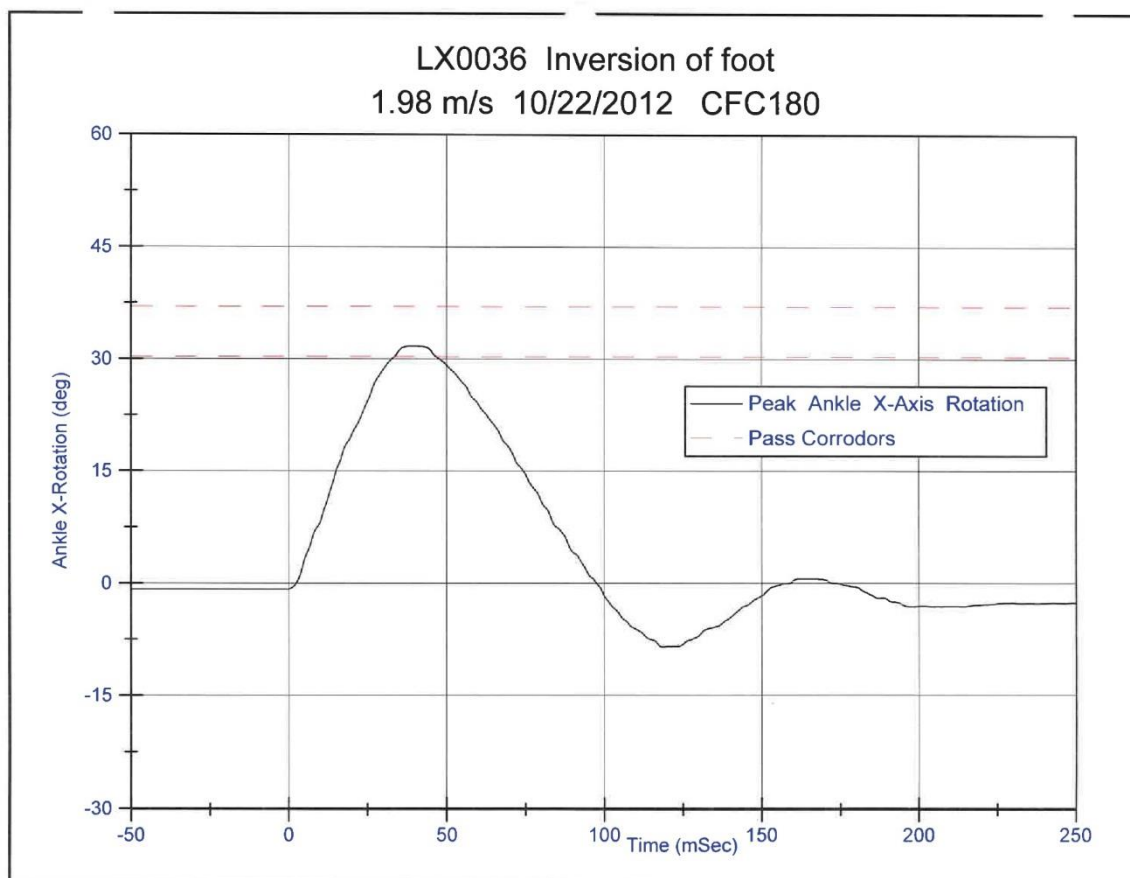
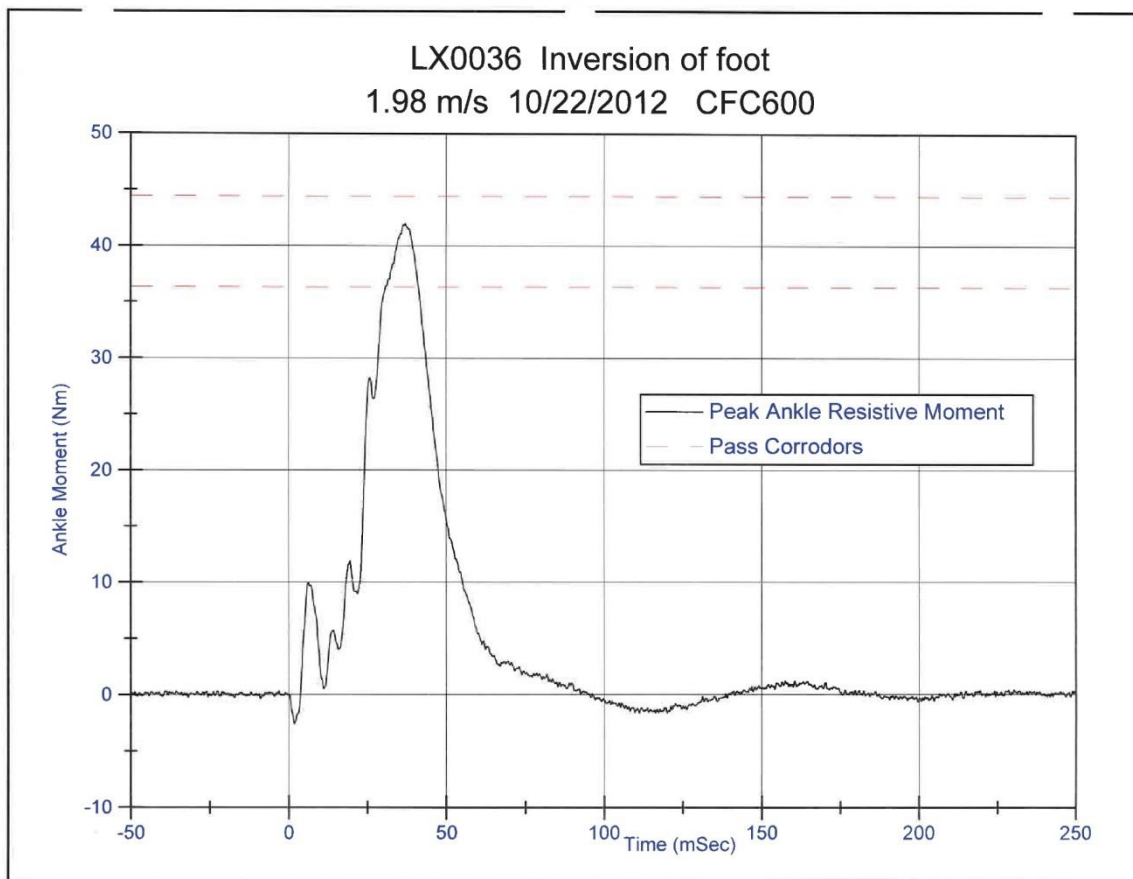




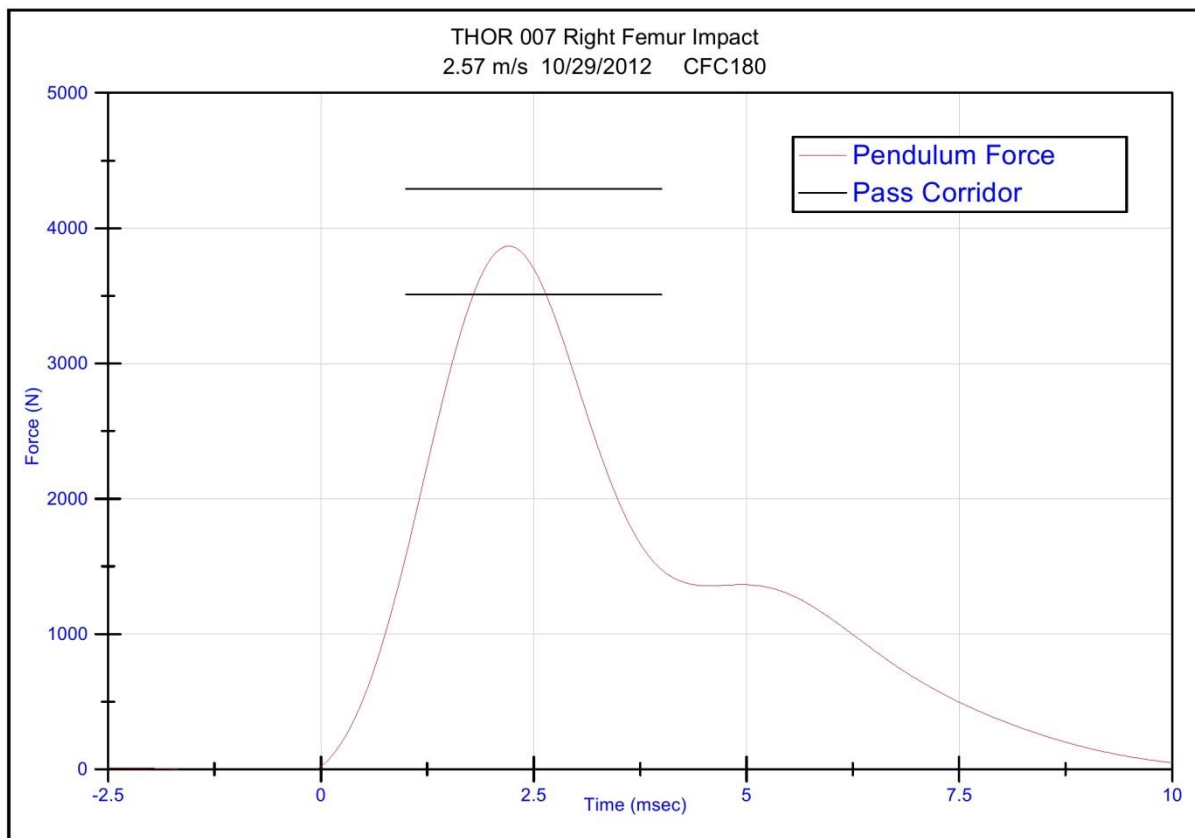
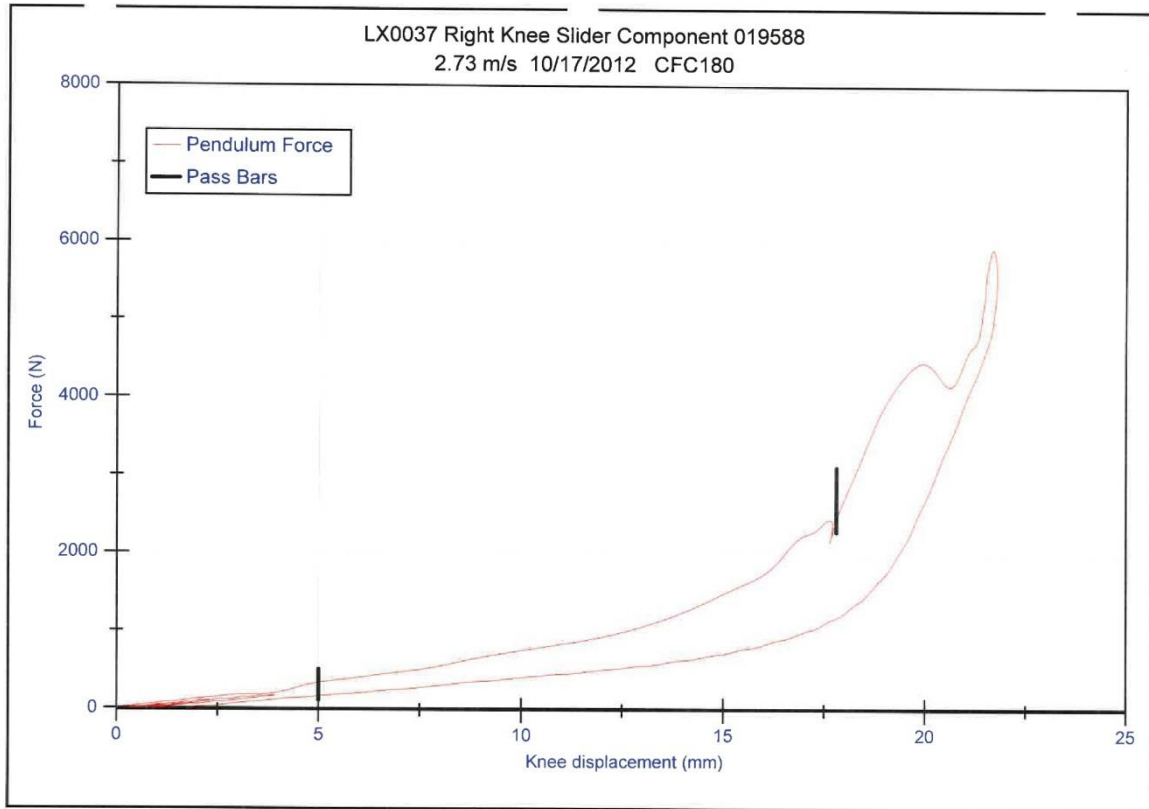


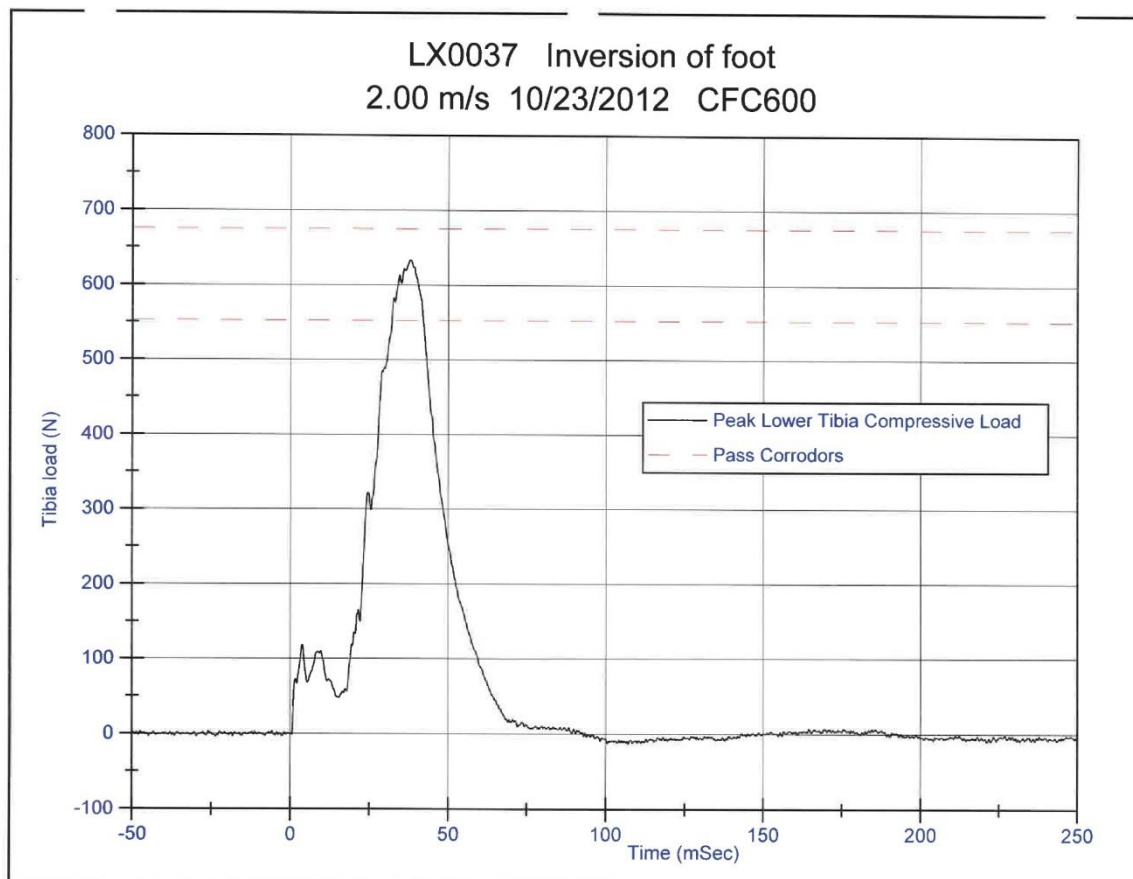
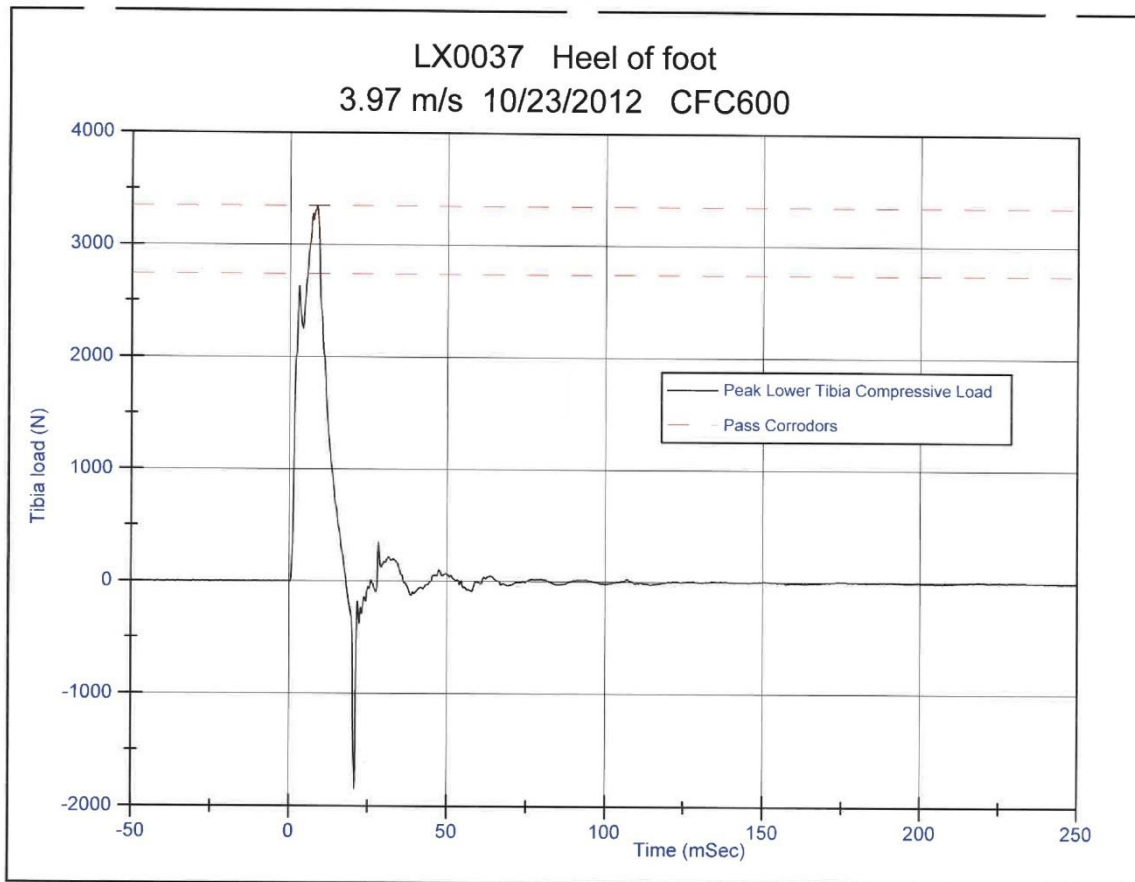


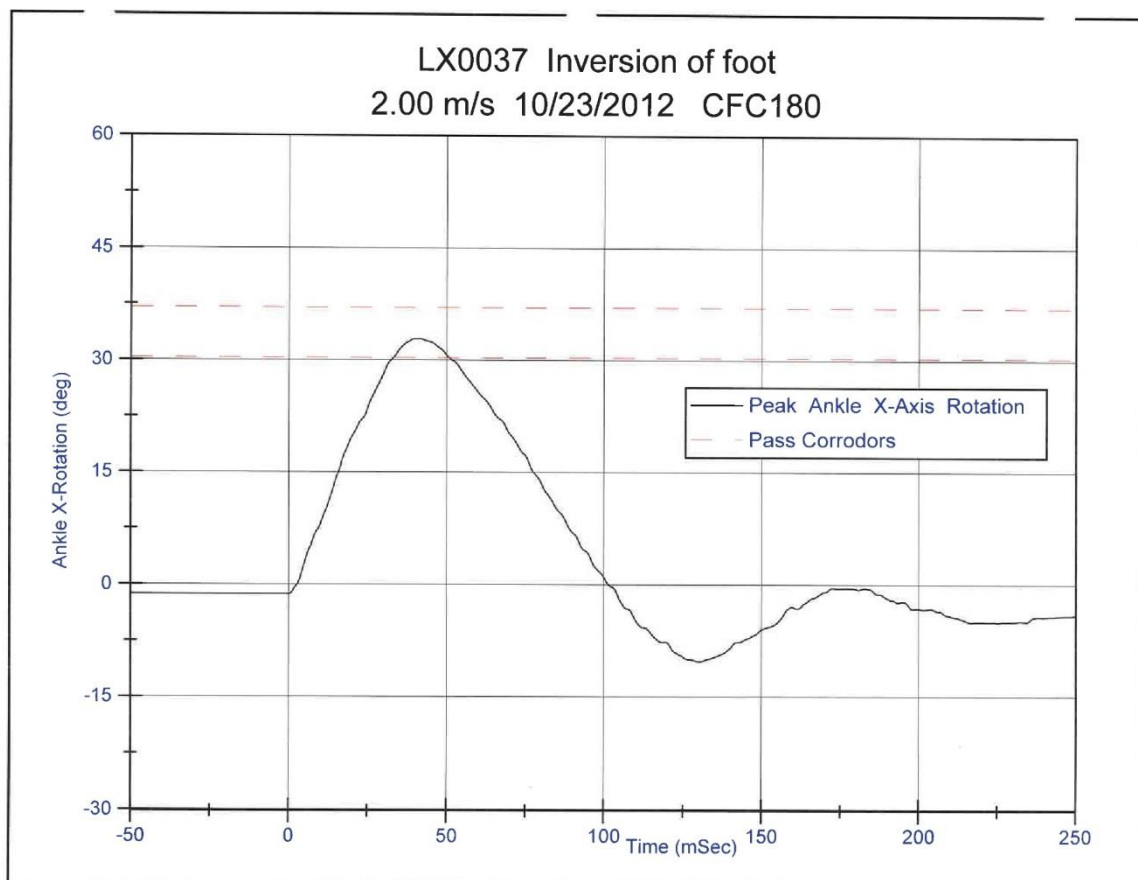
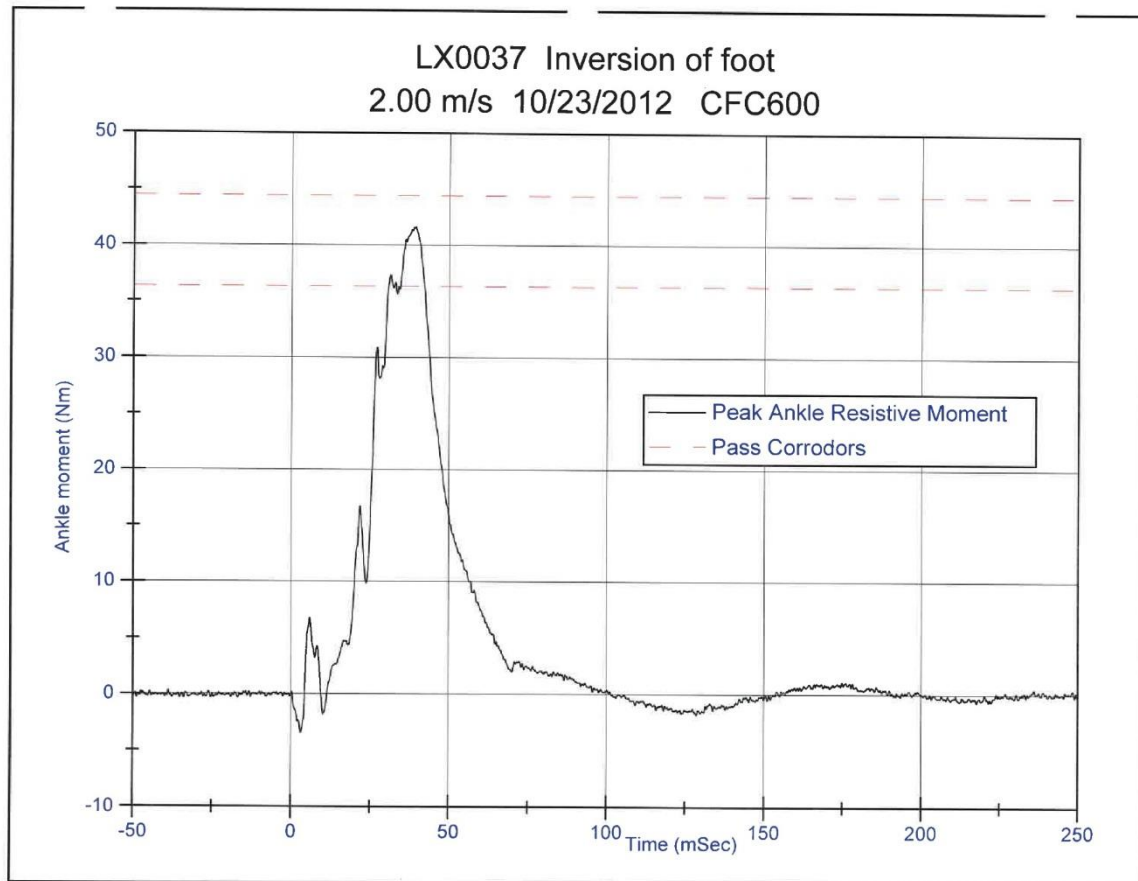


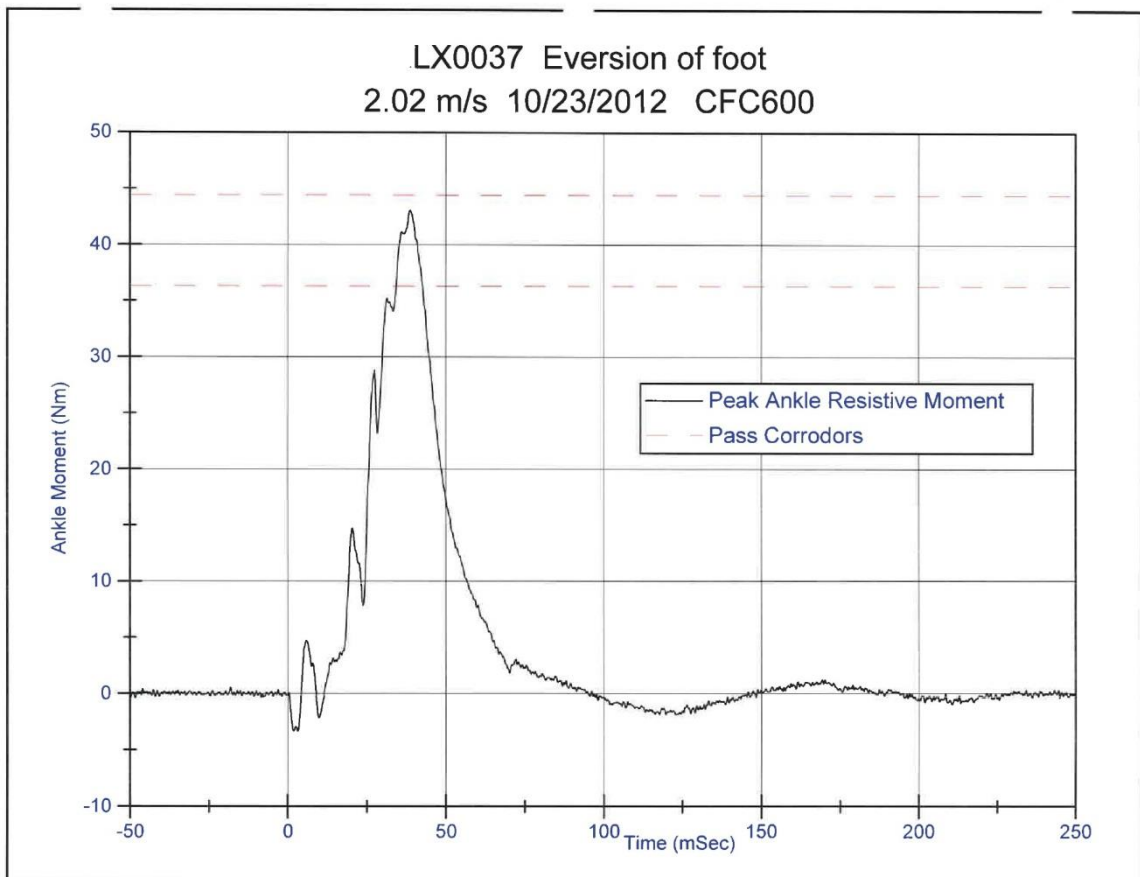
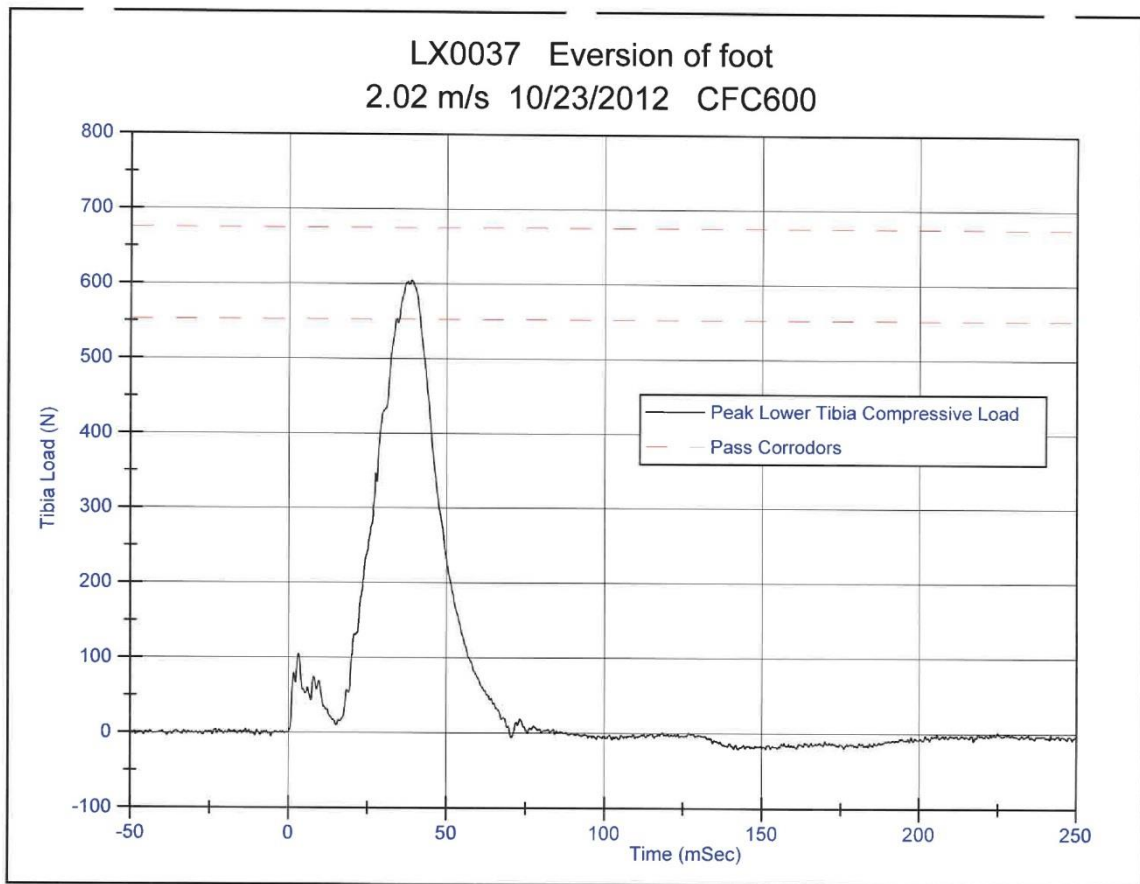


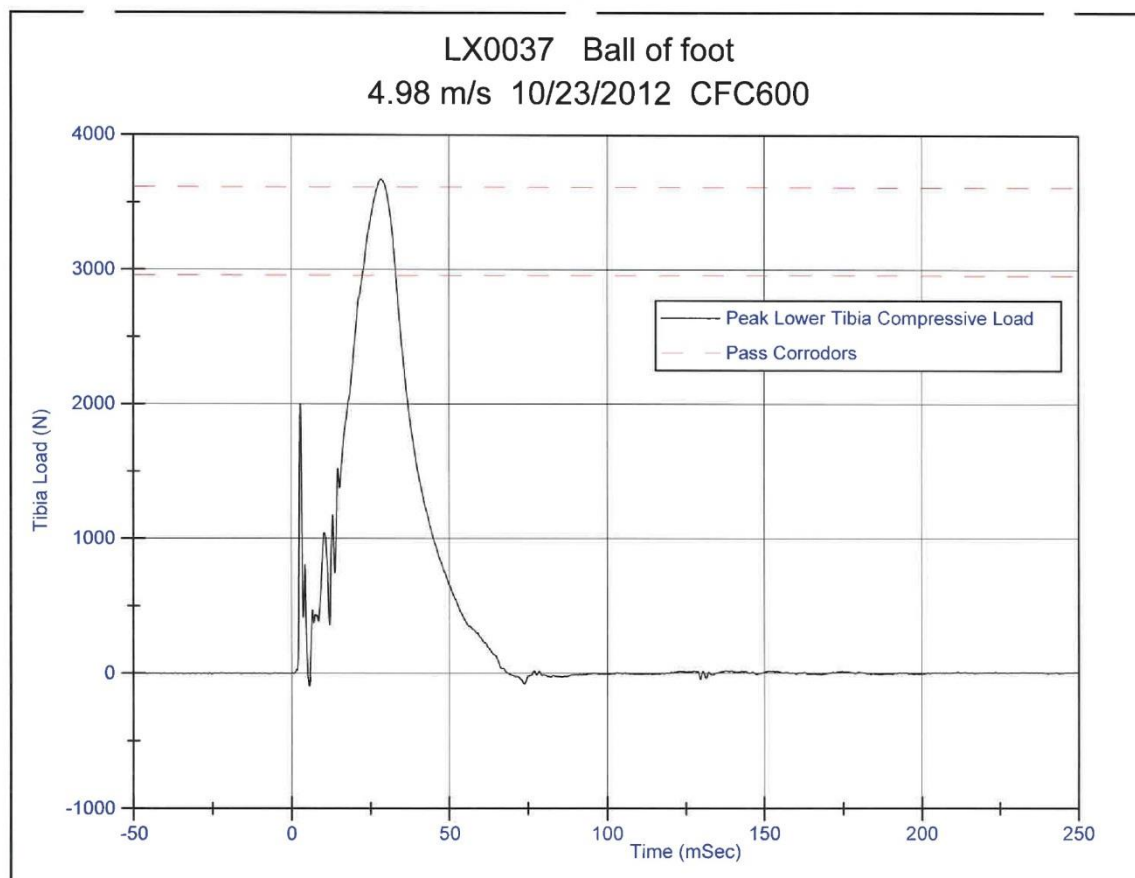
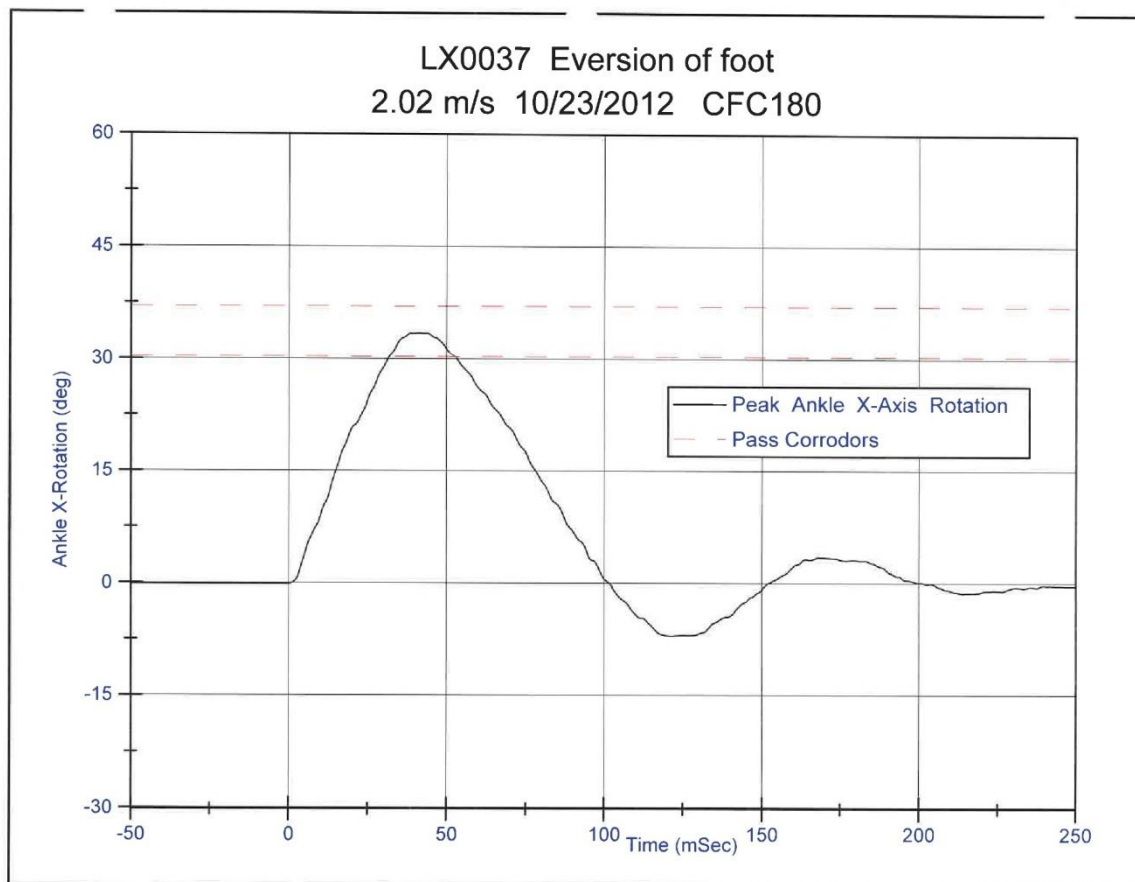
LX0037

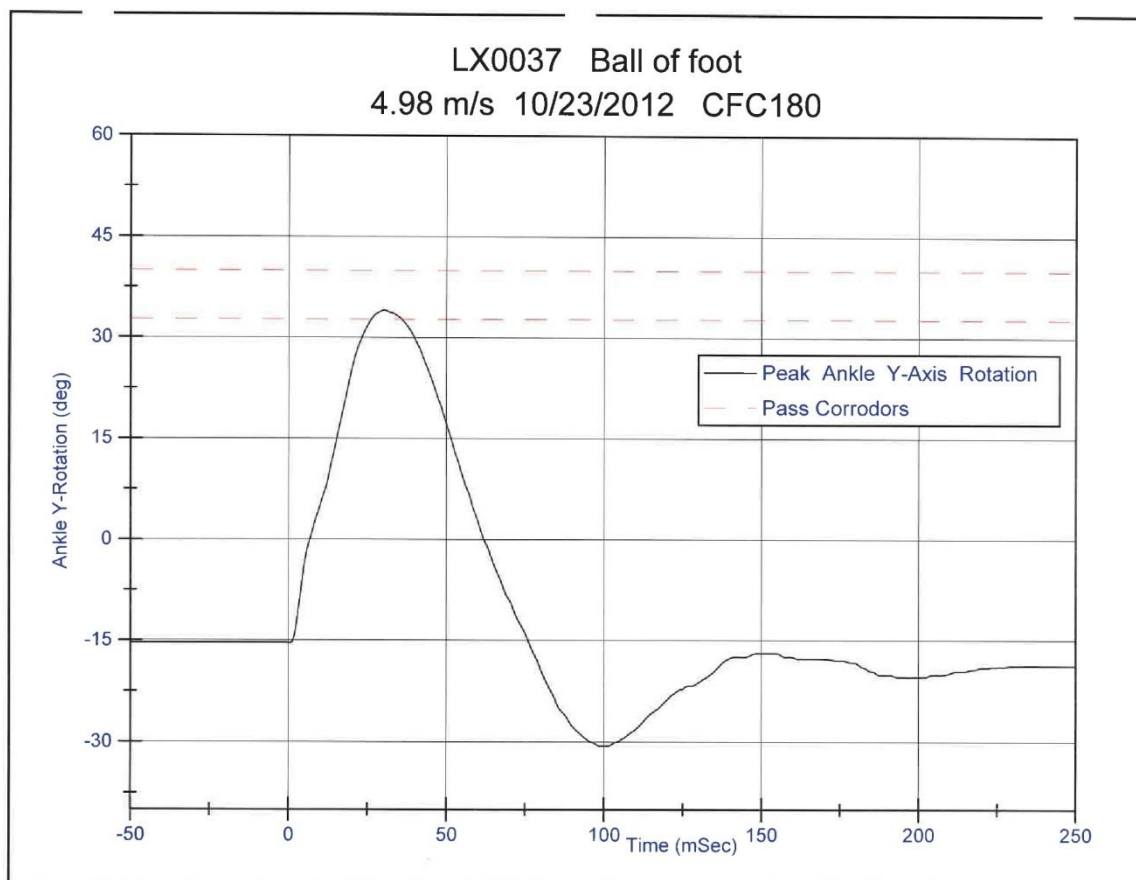
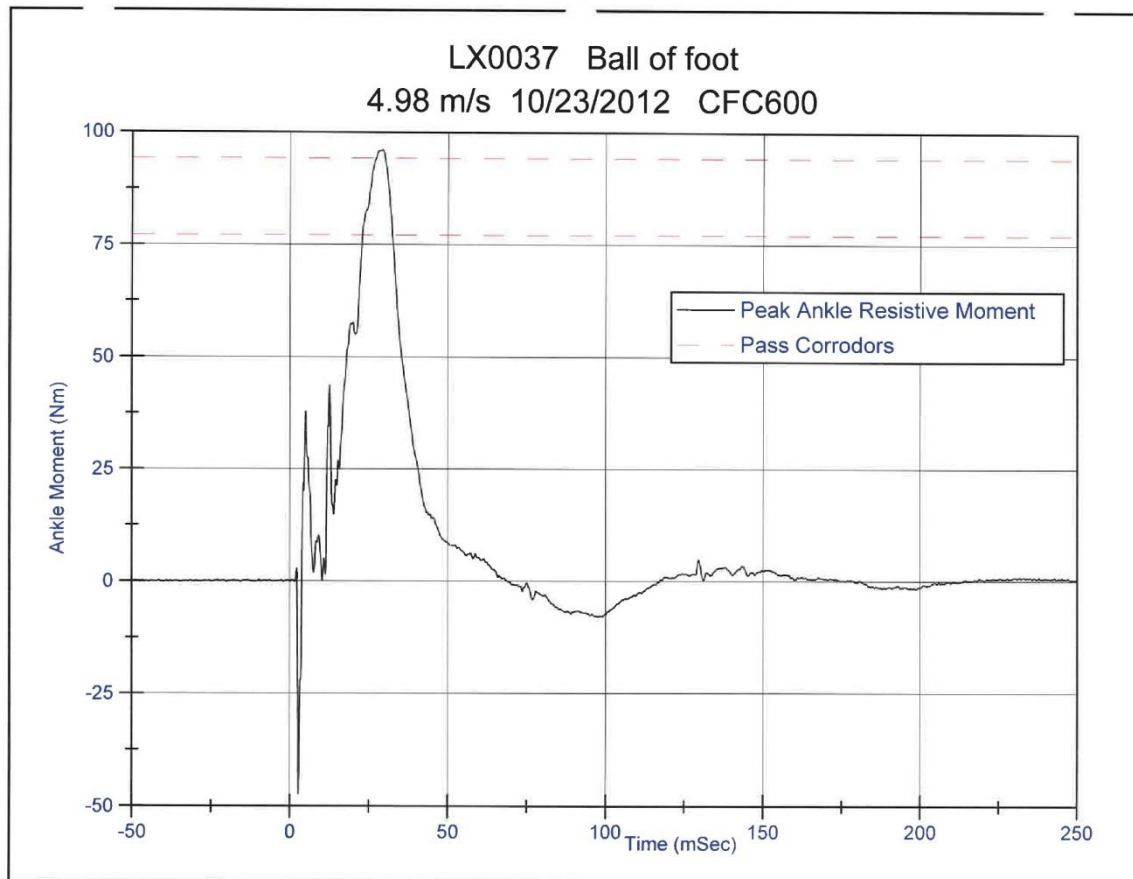




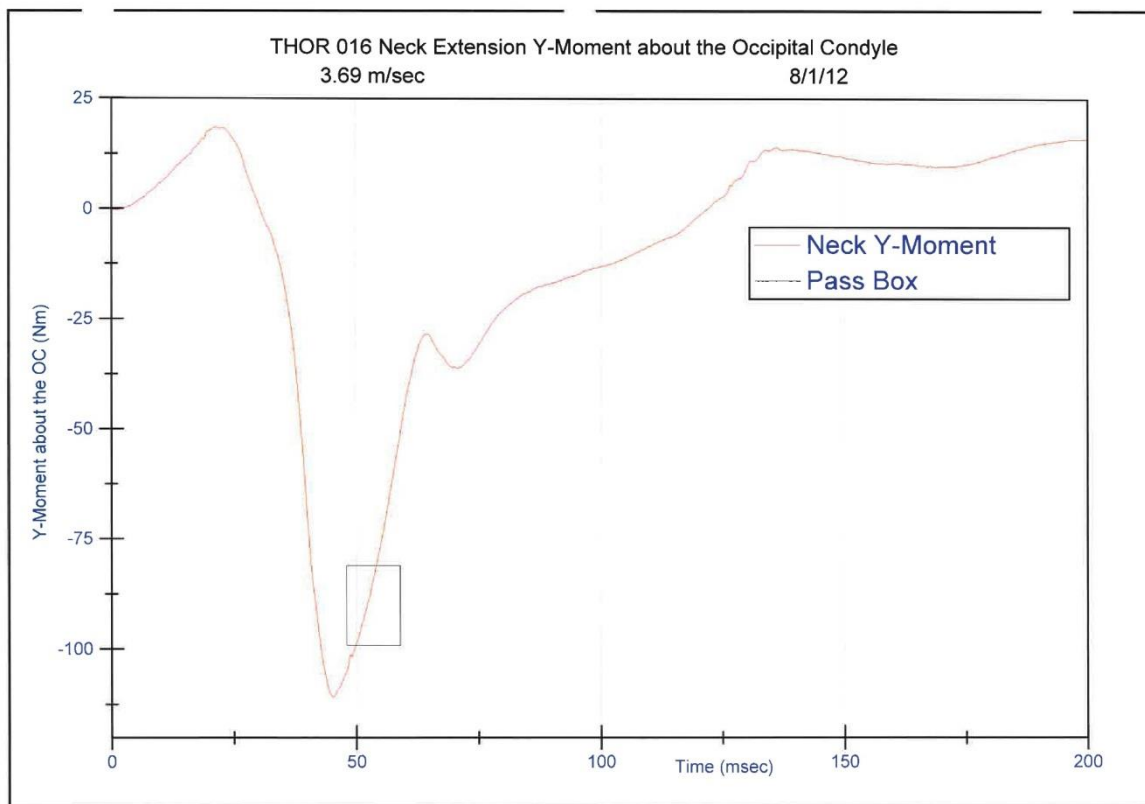
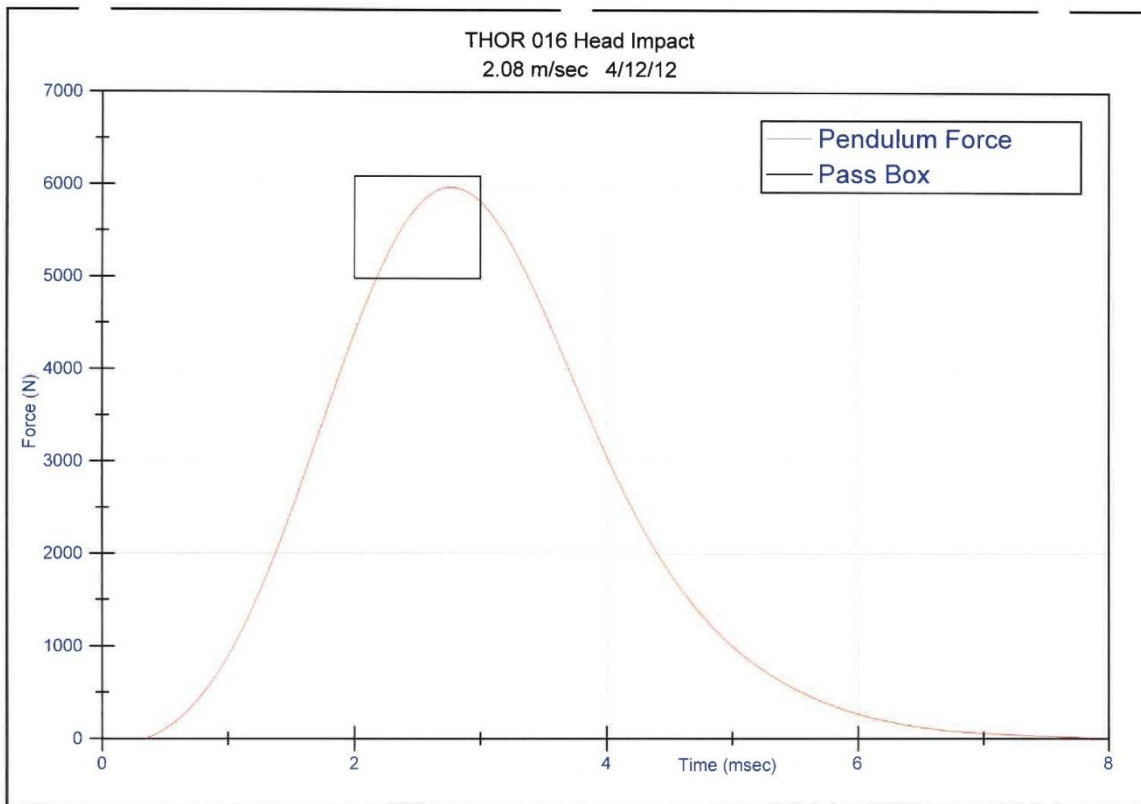


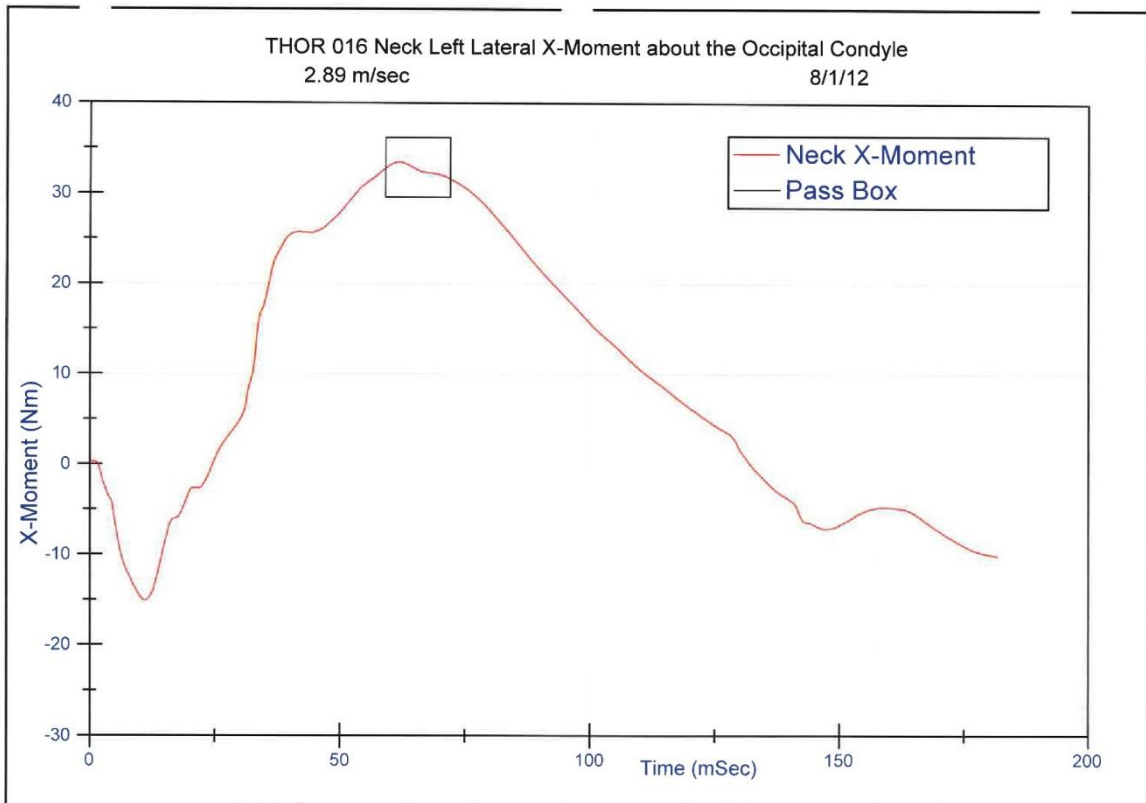
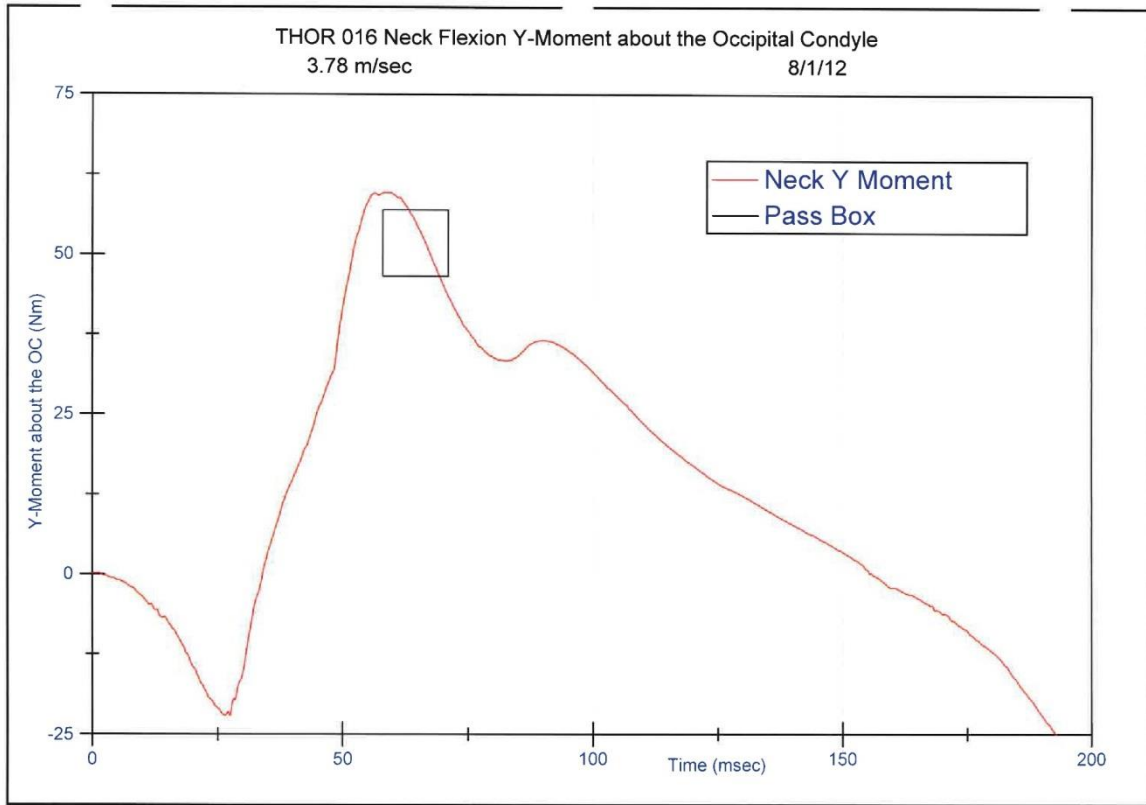


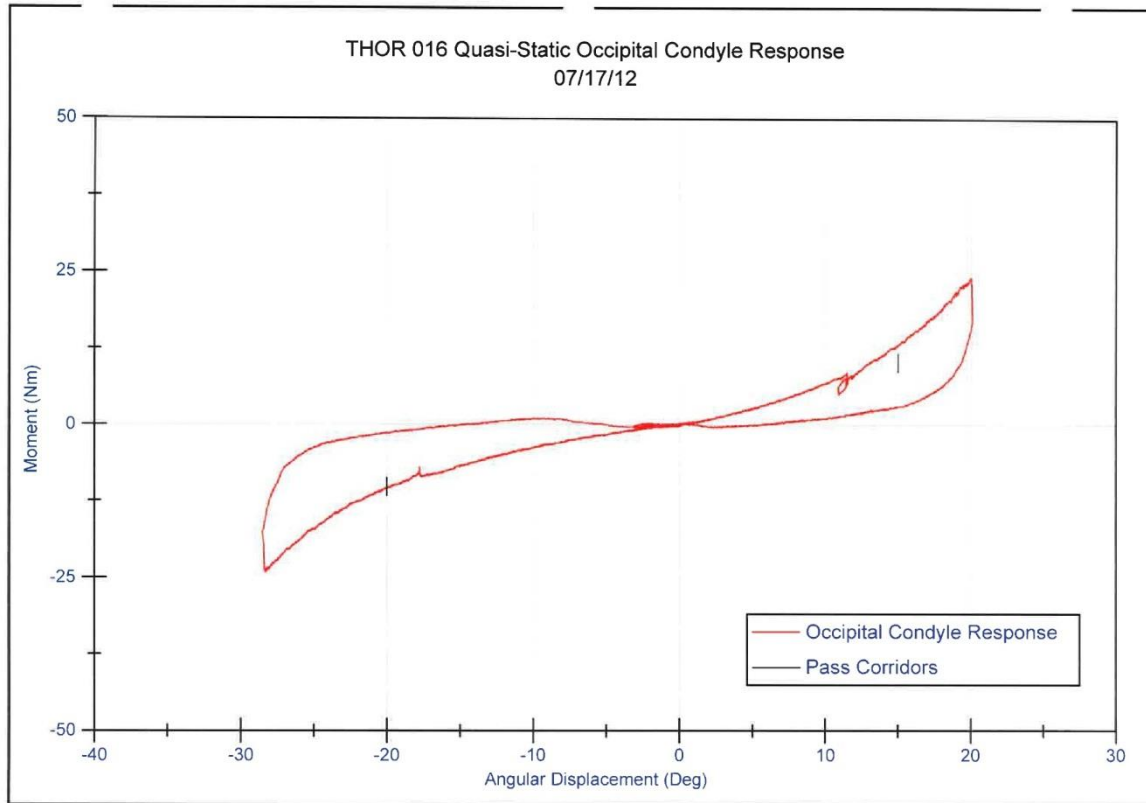
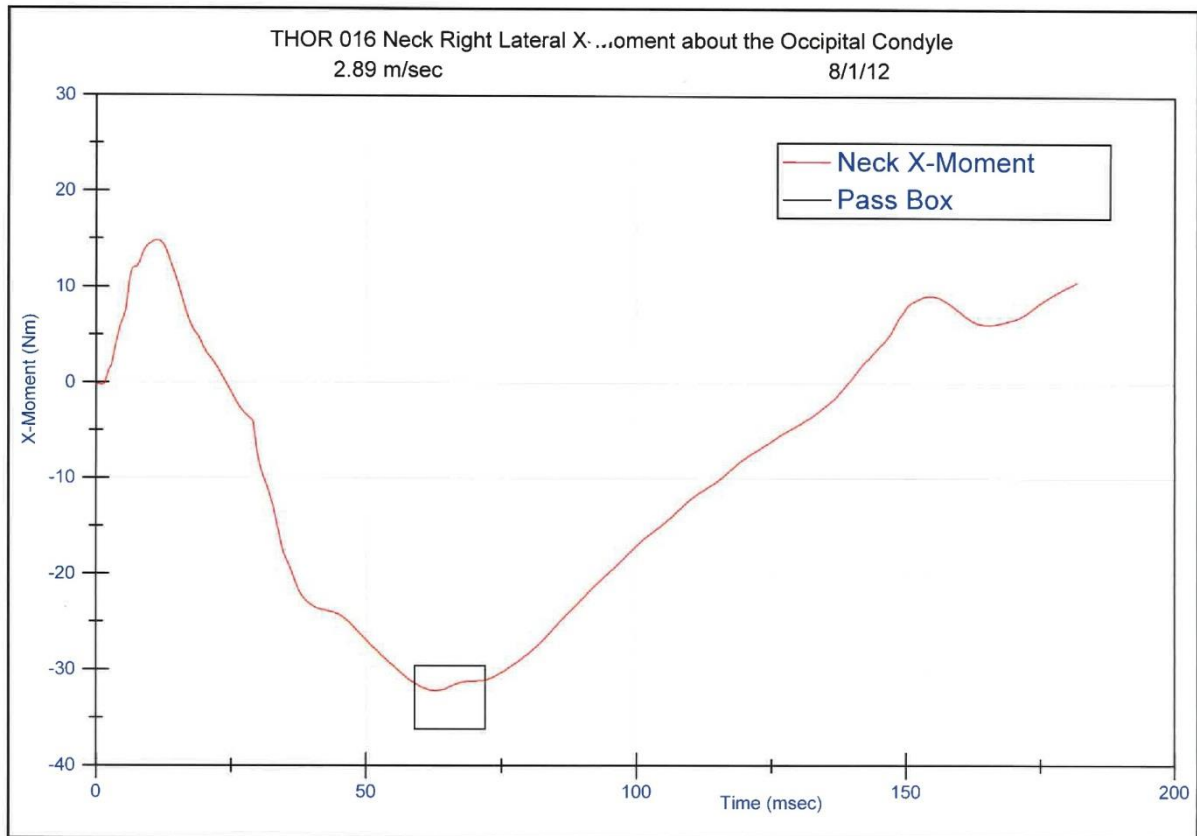


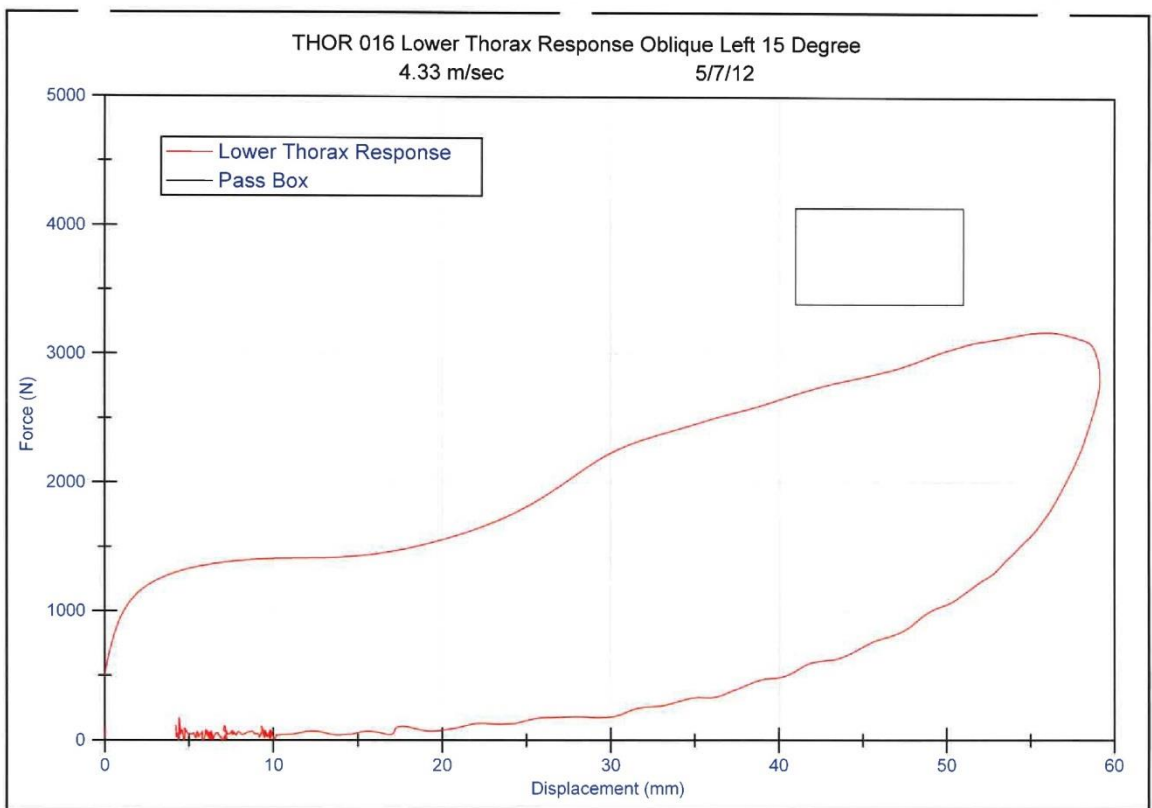
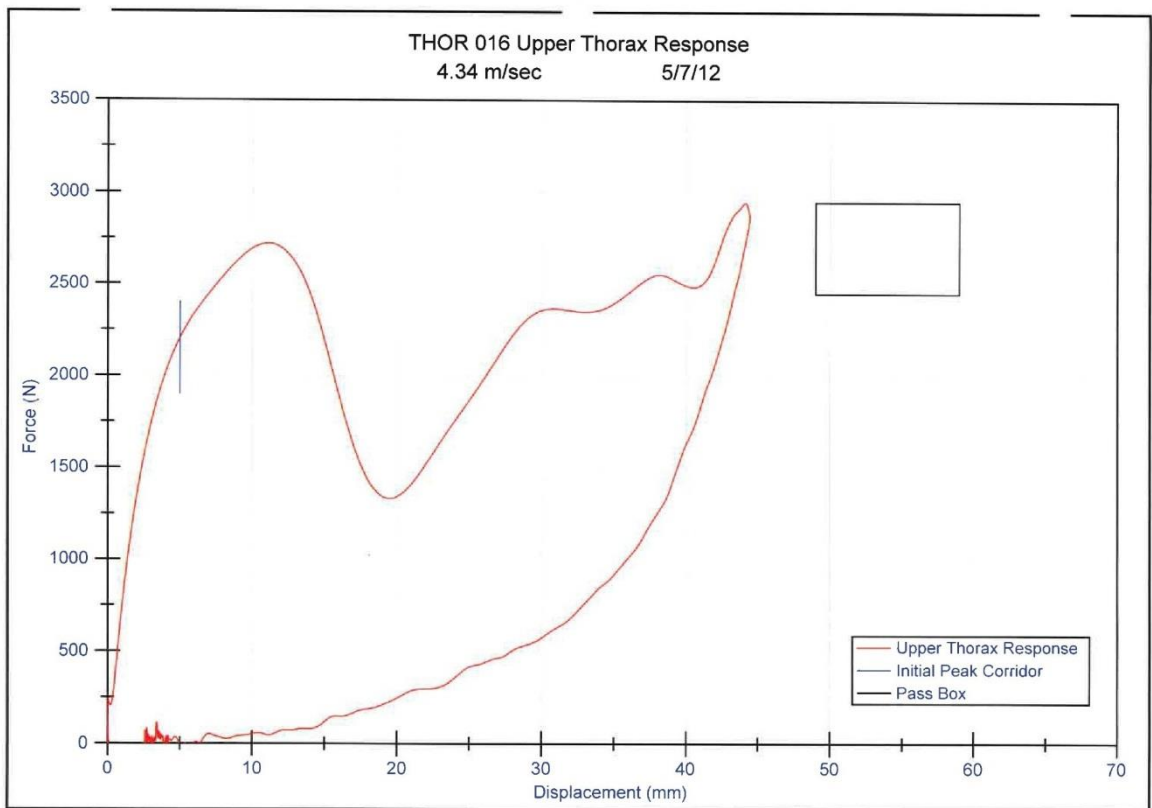


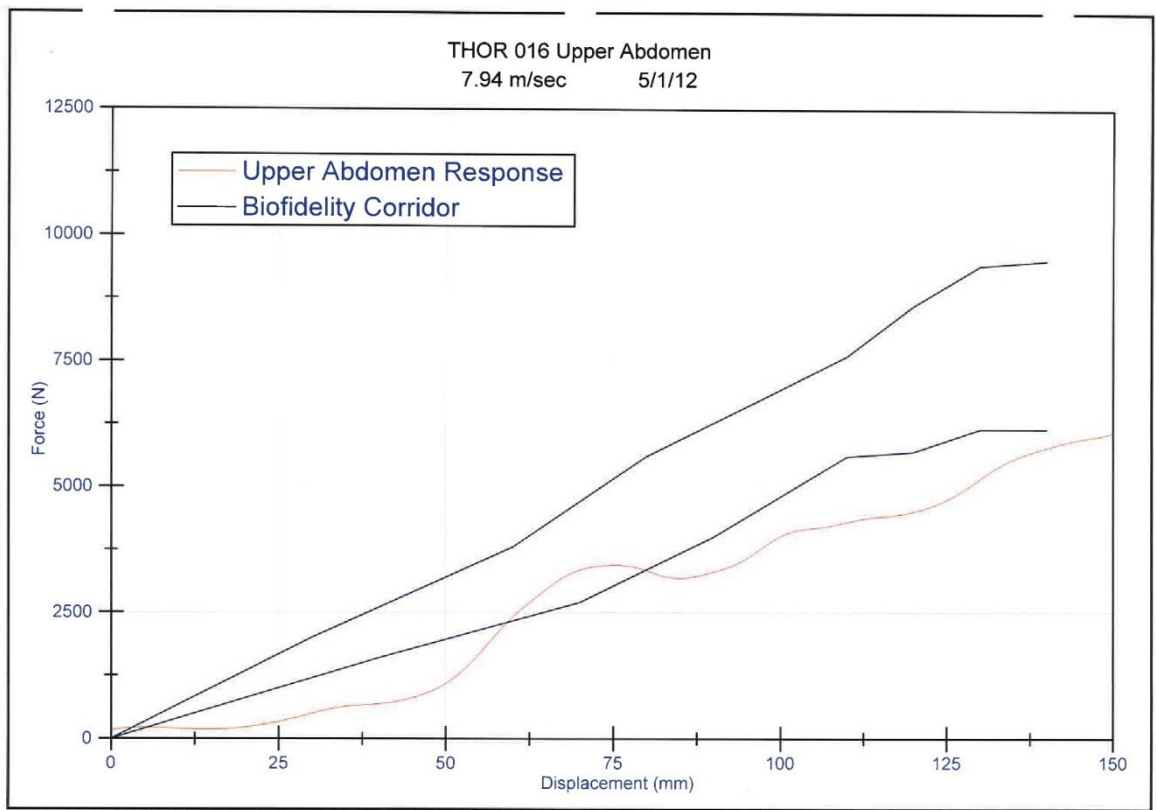
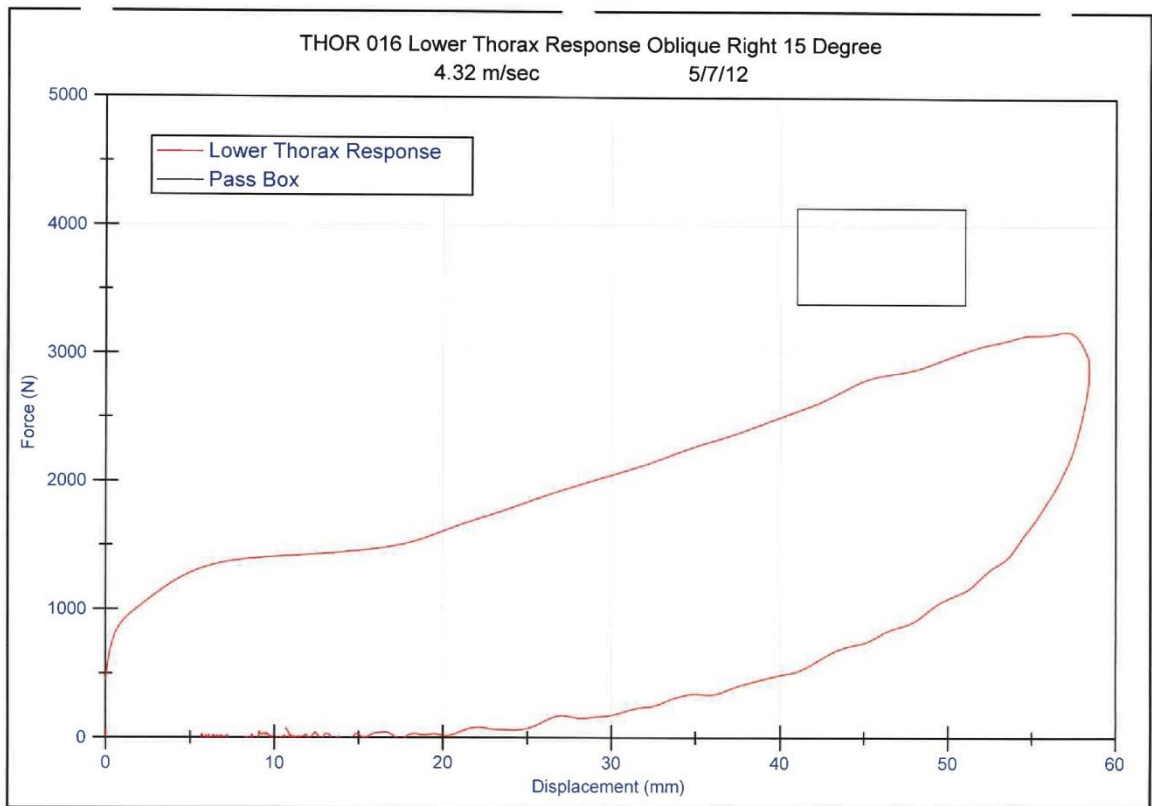
50% ADULT MALE THOR016 DUMMY CALIBRATIONS

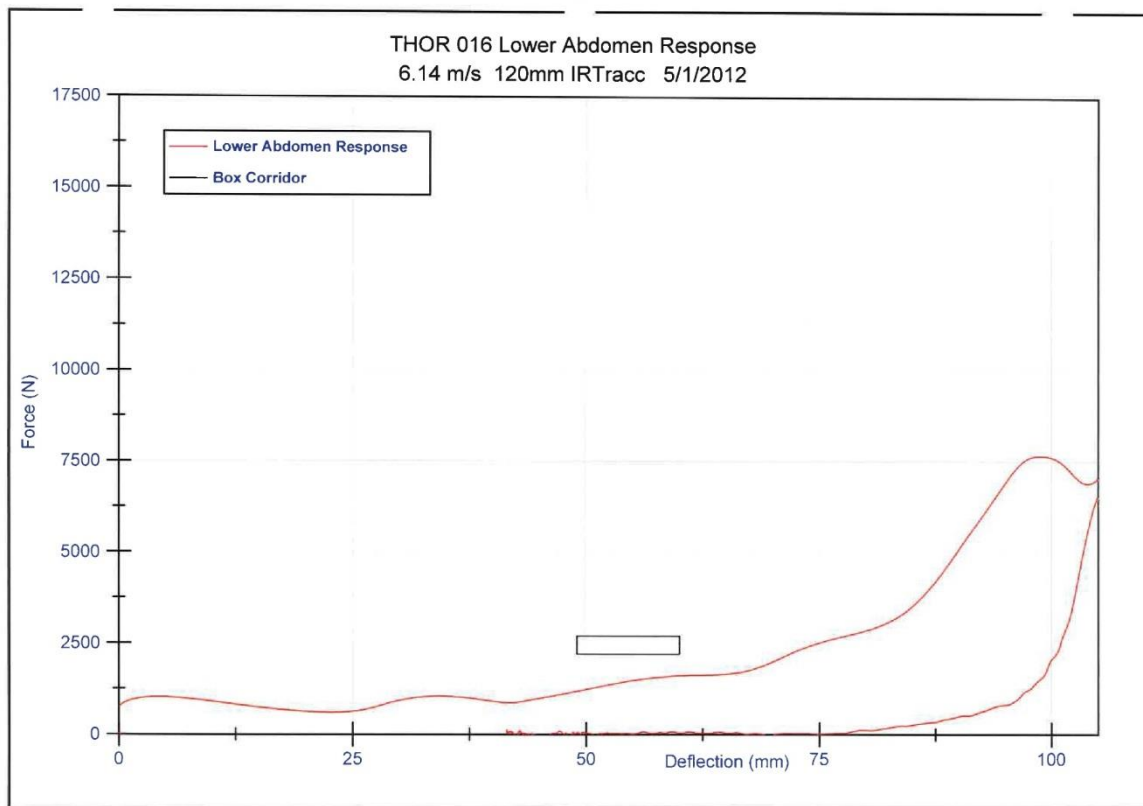






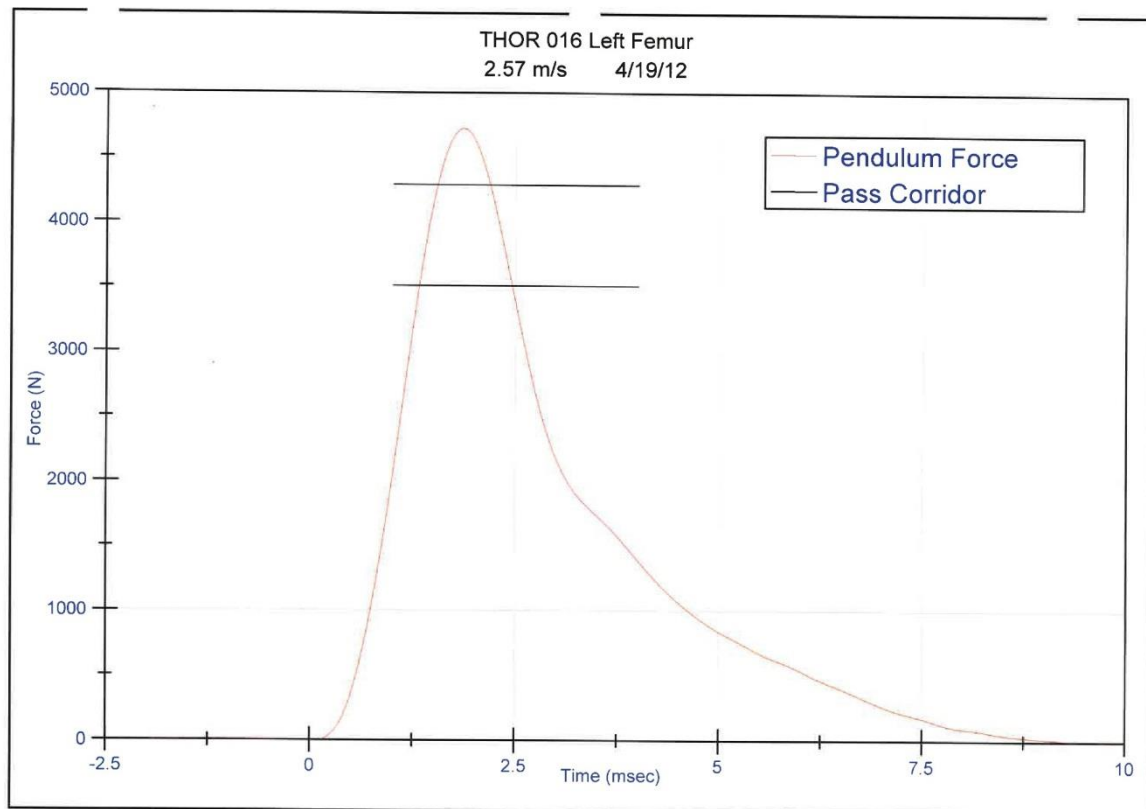
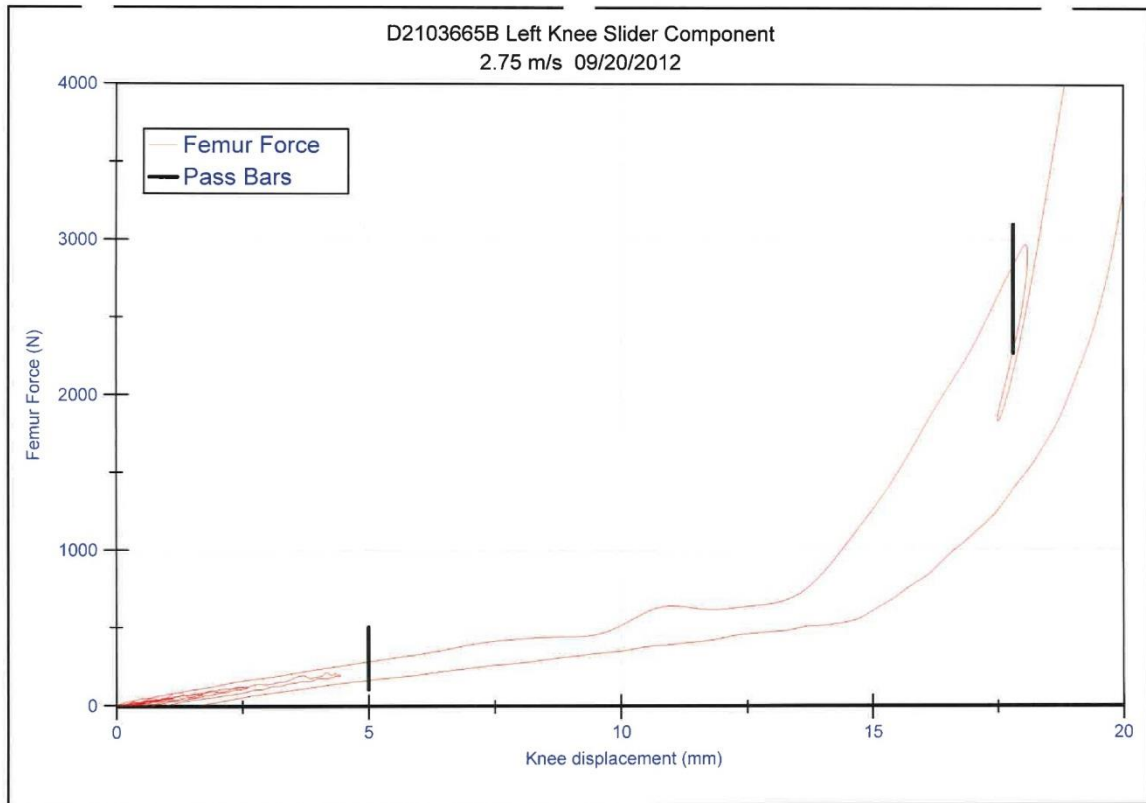


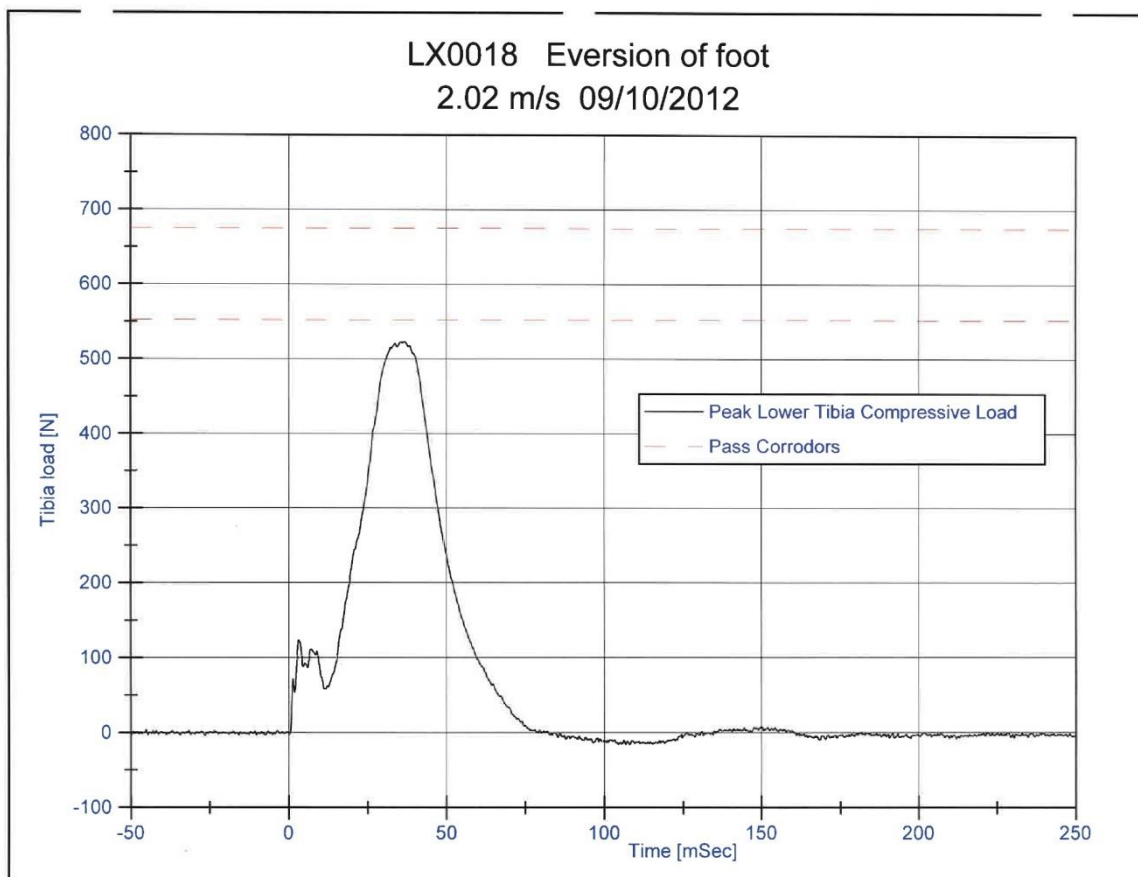
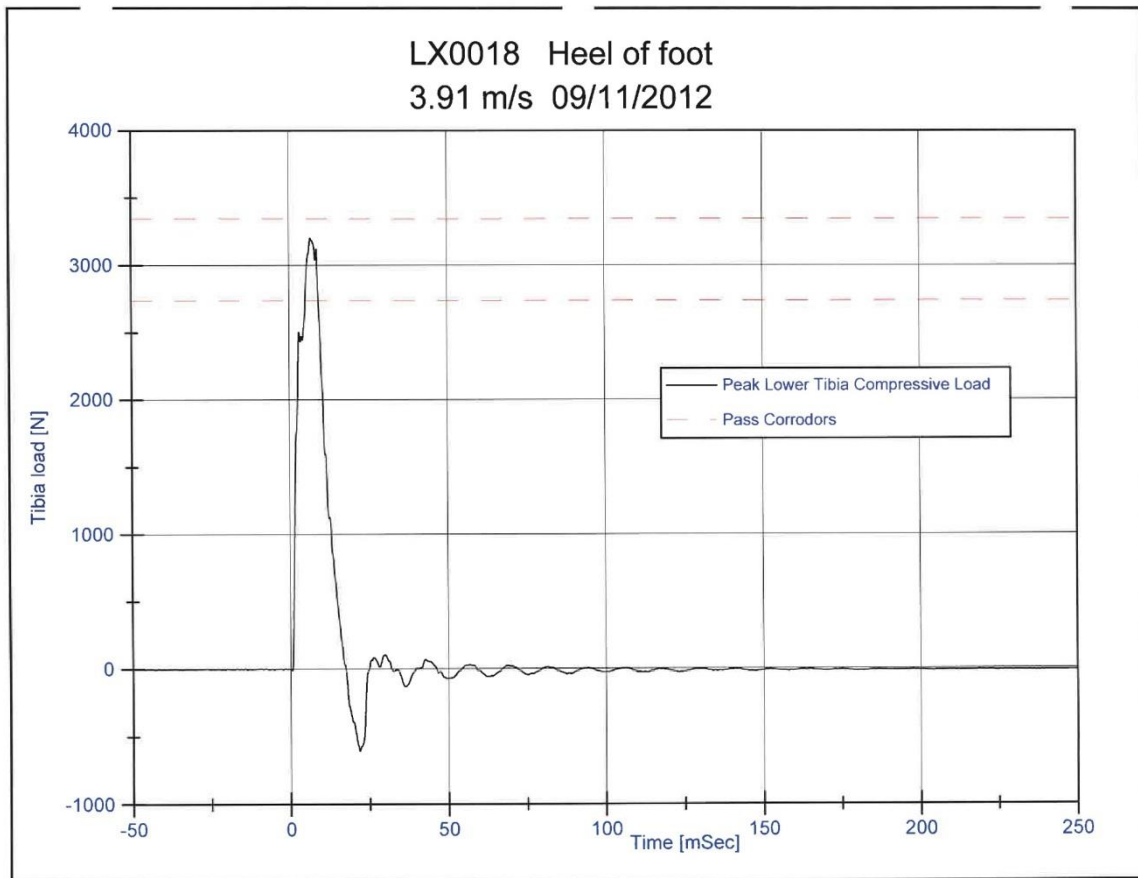


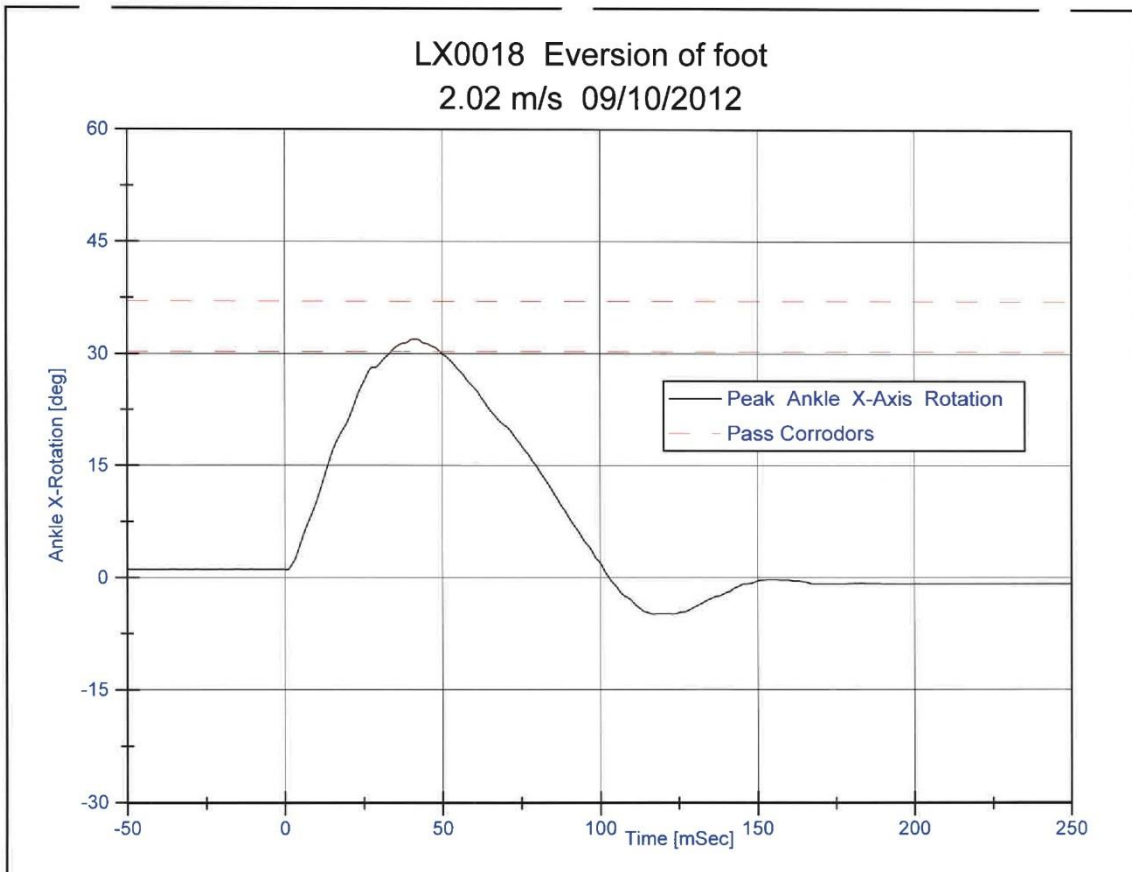
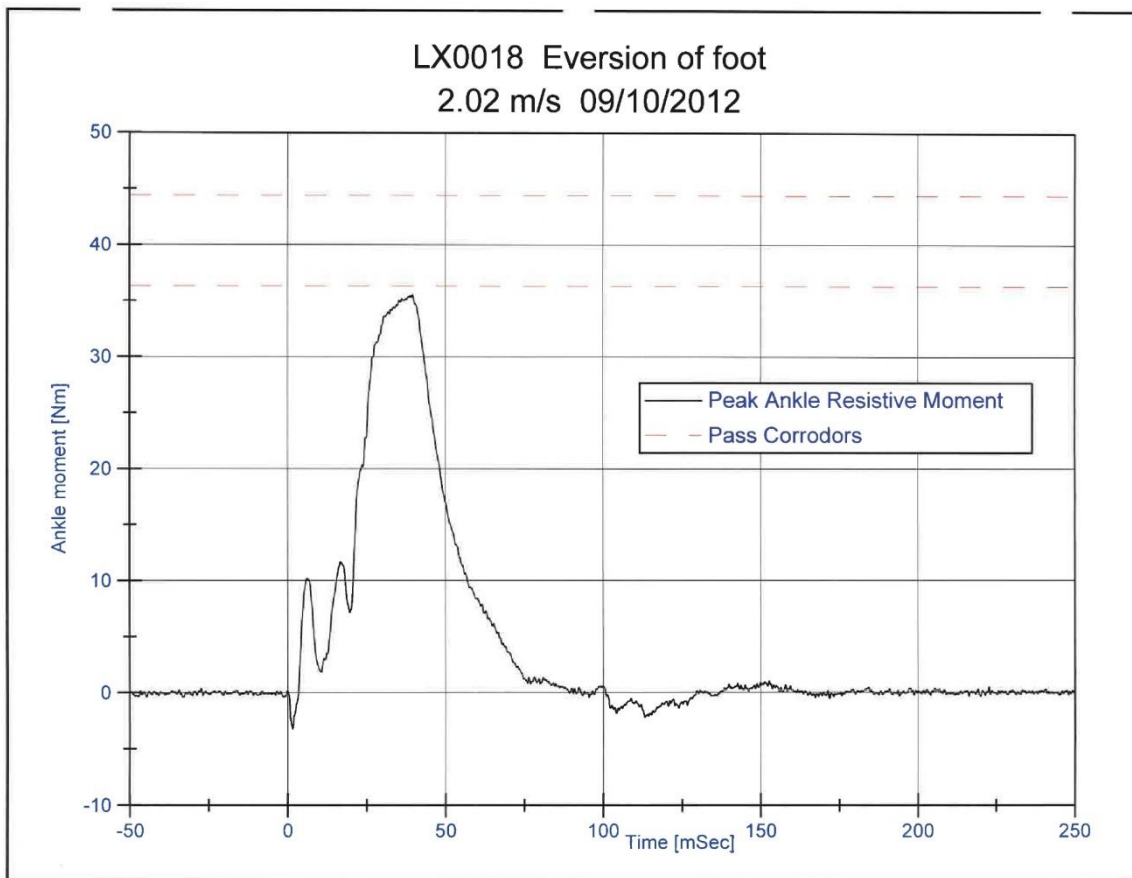


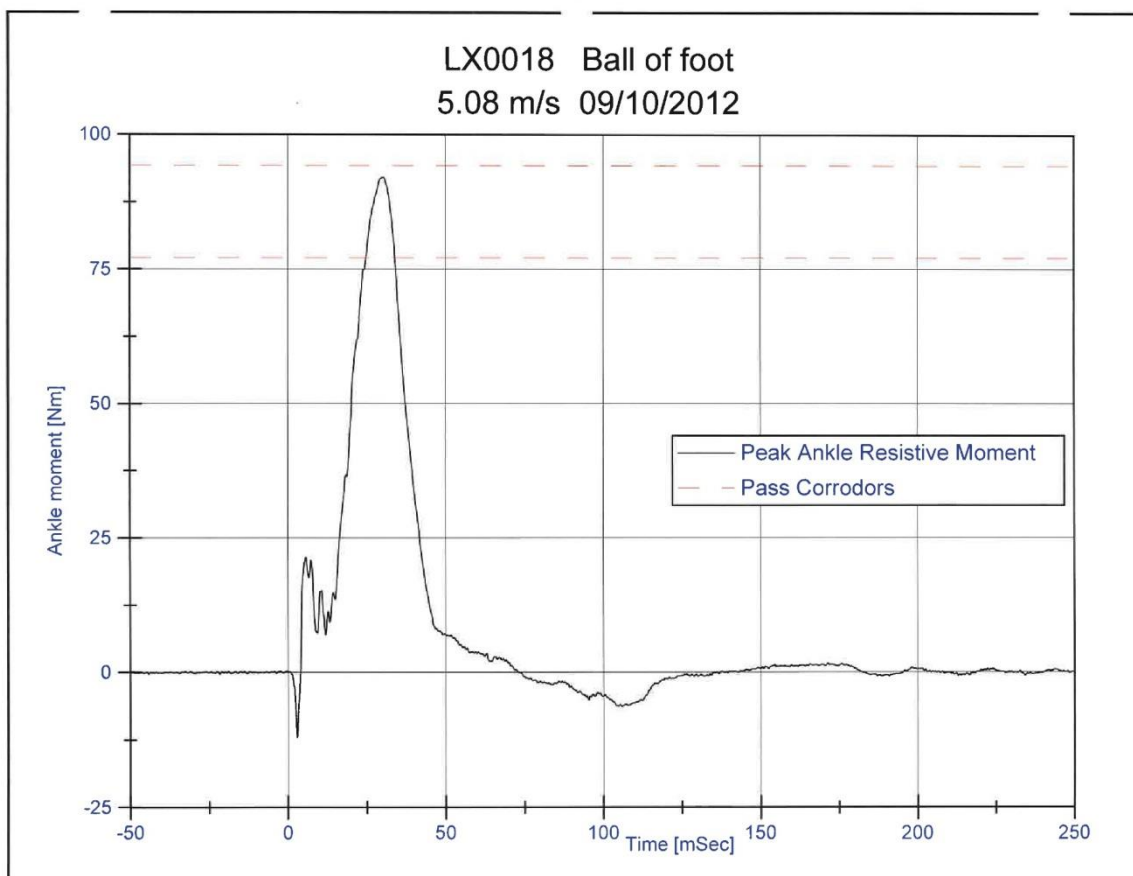
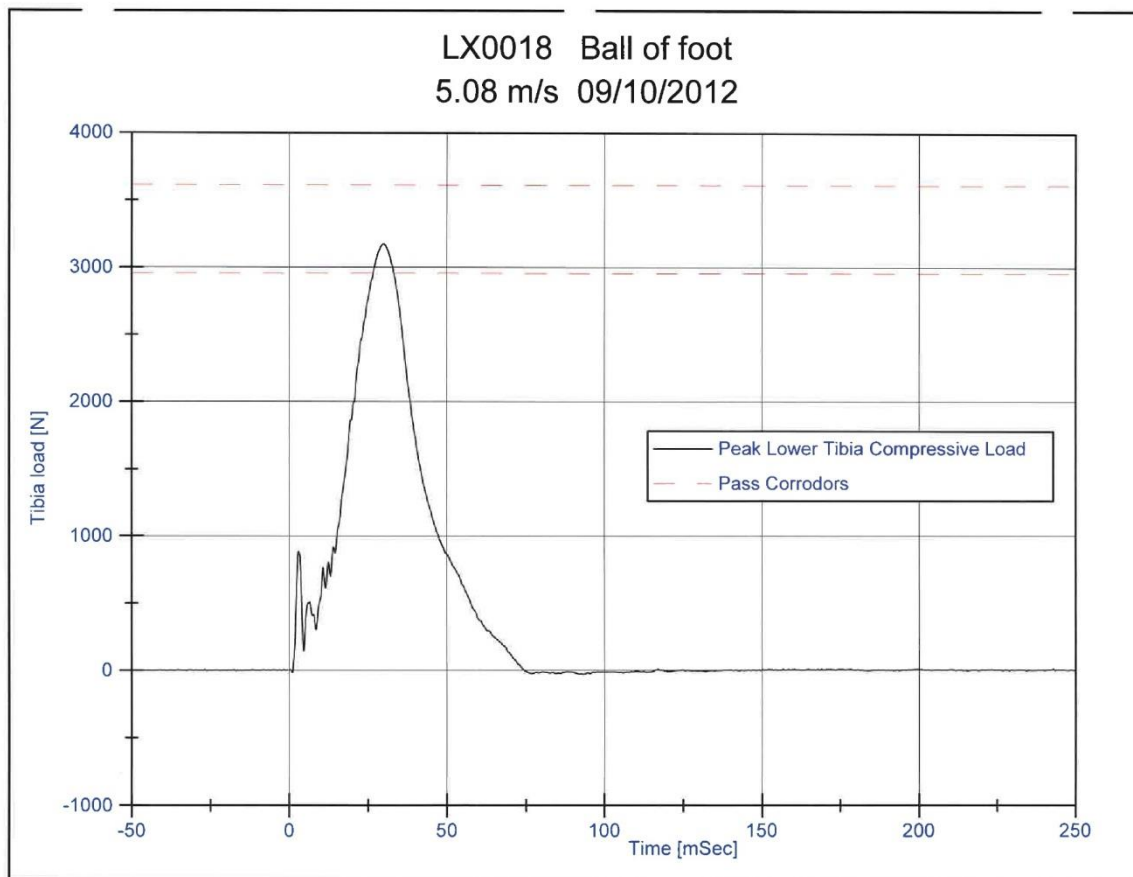
THOR 016 LEG CALIBRATIONS
LX0018 / LX0019

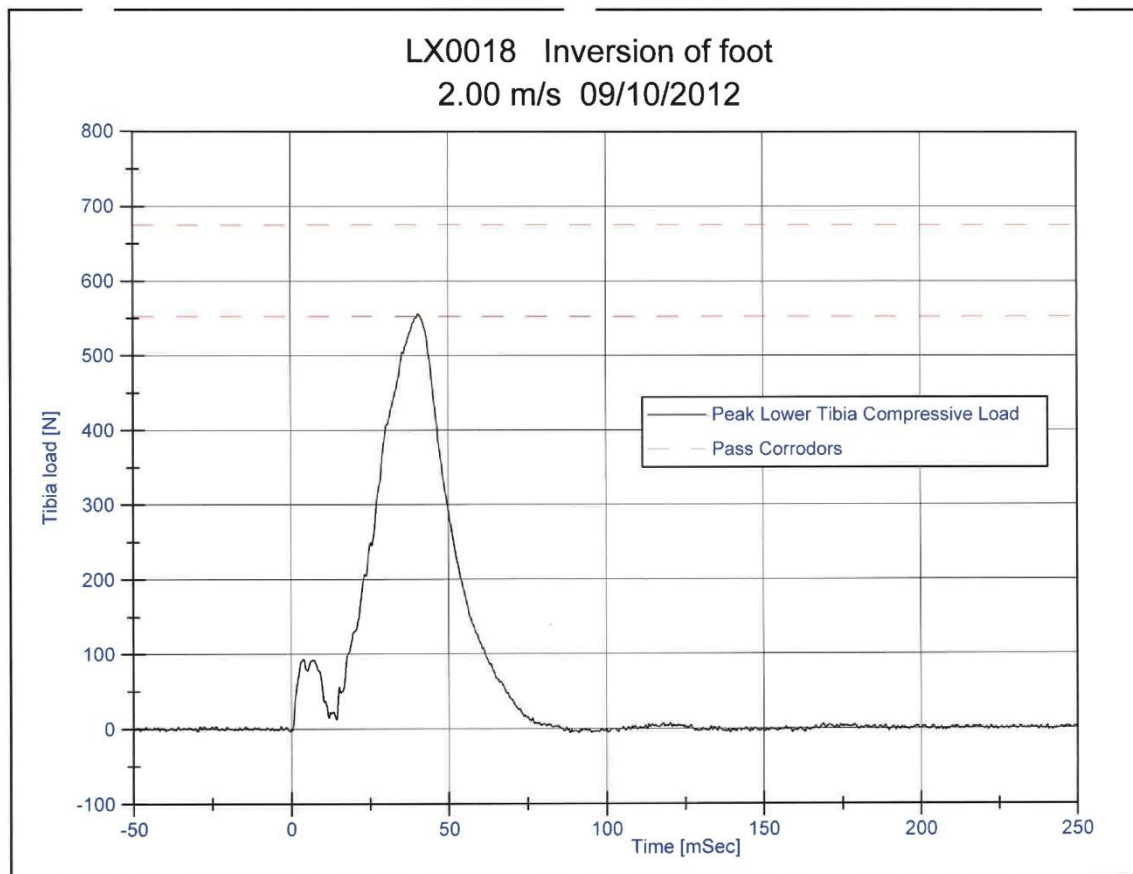
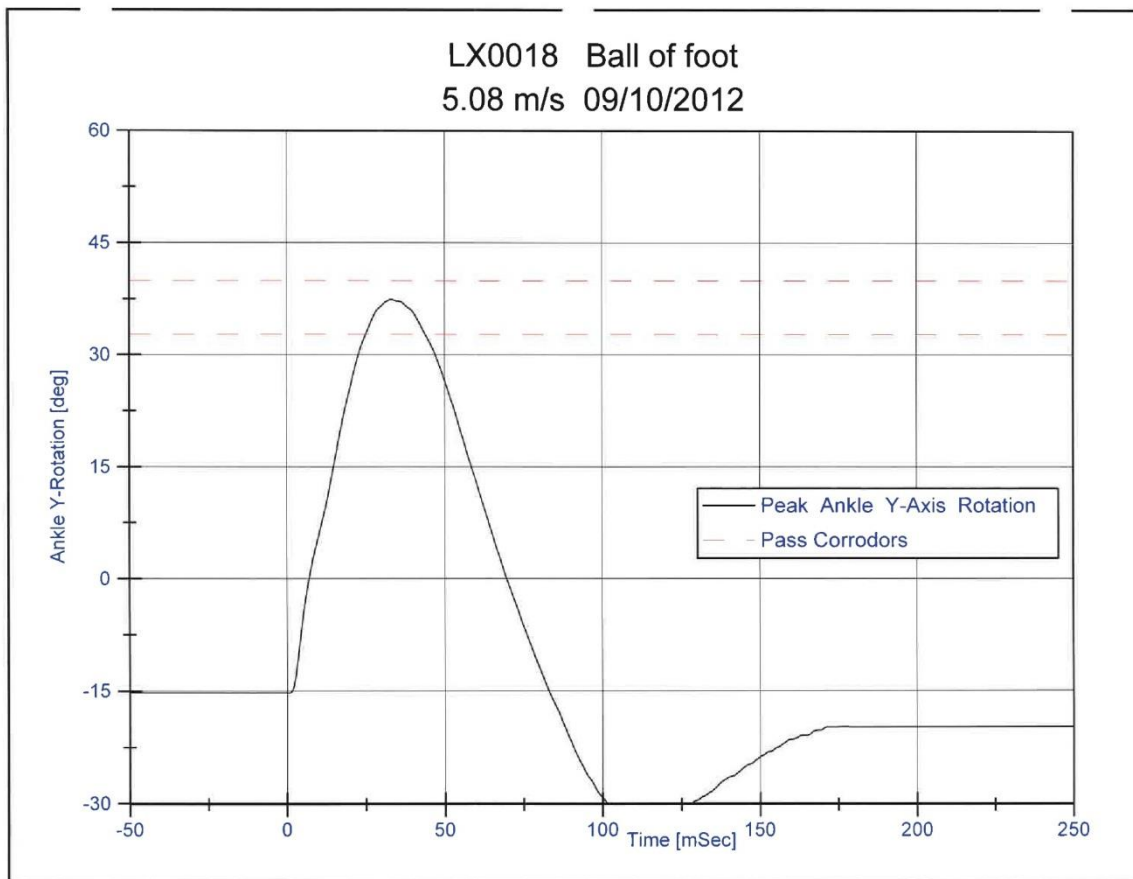
LX0018

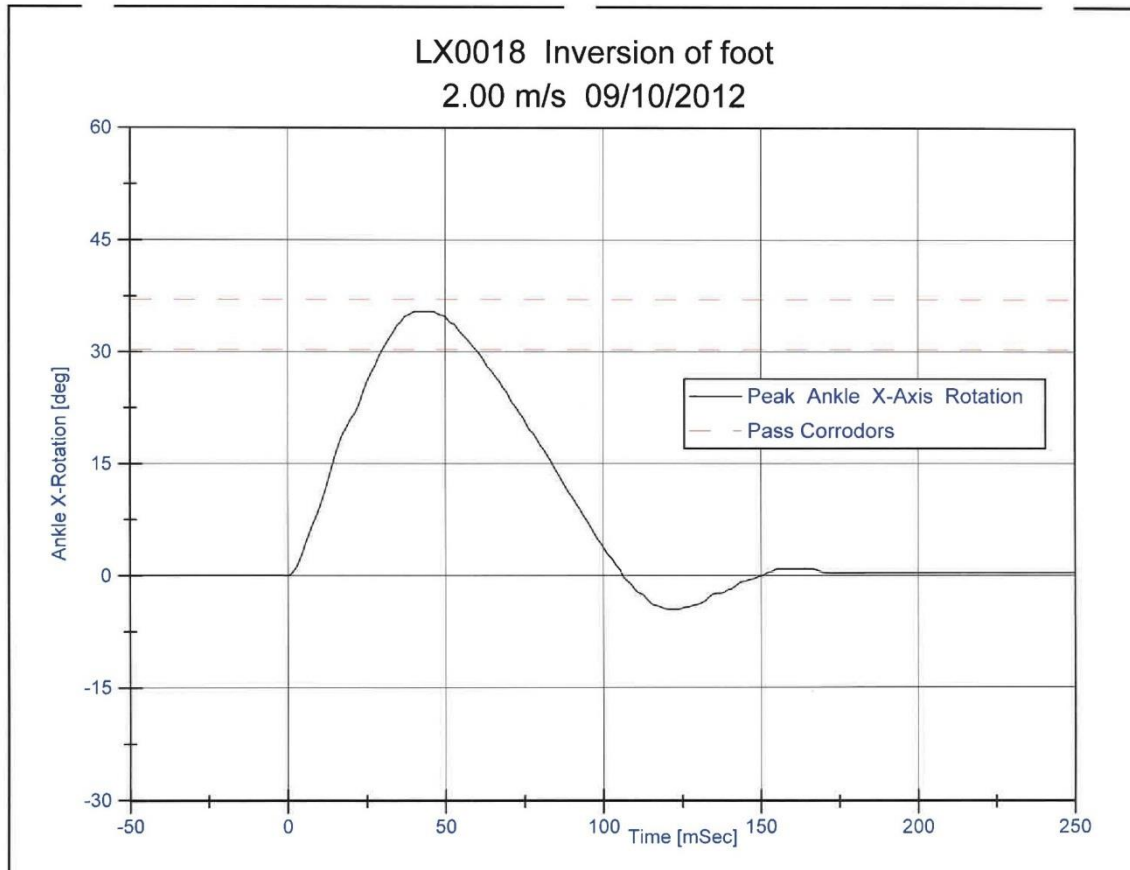
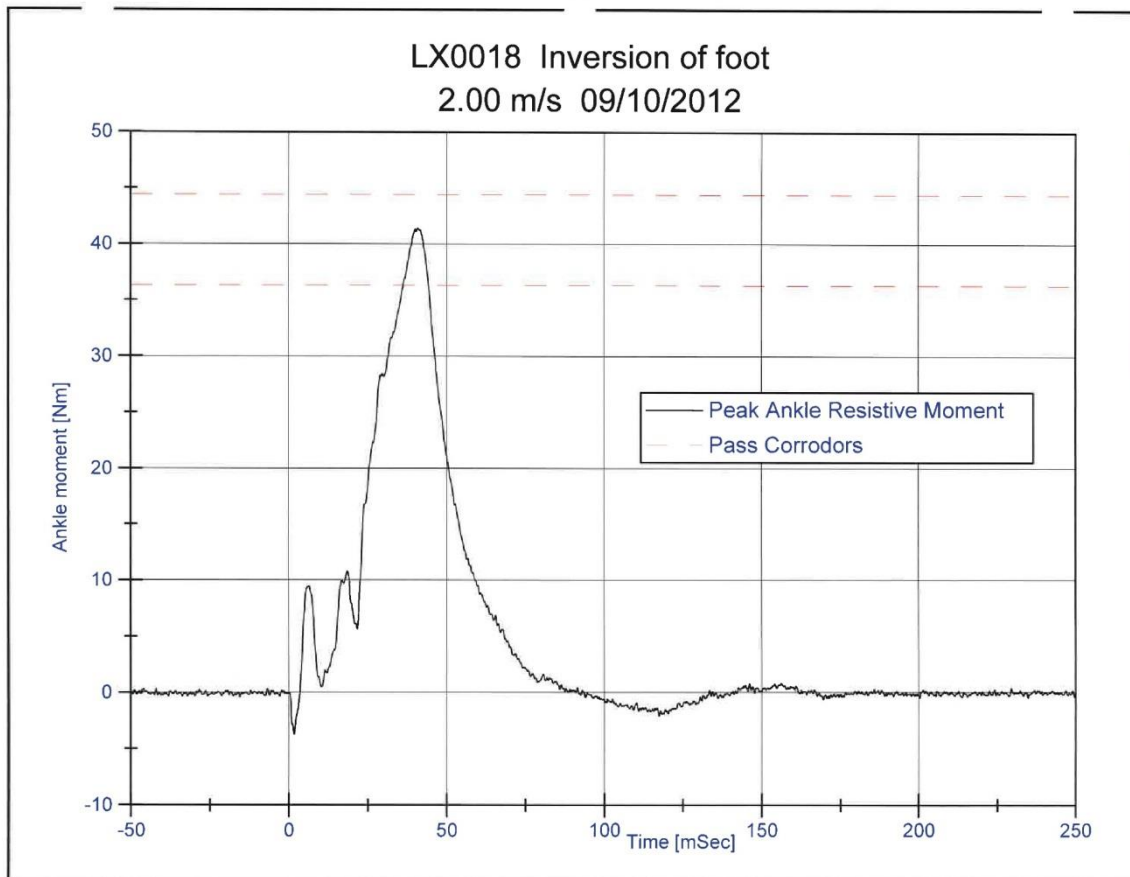




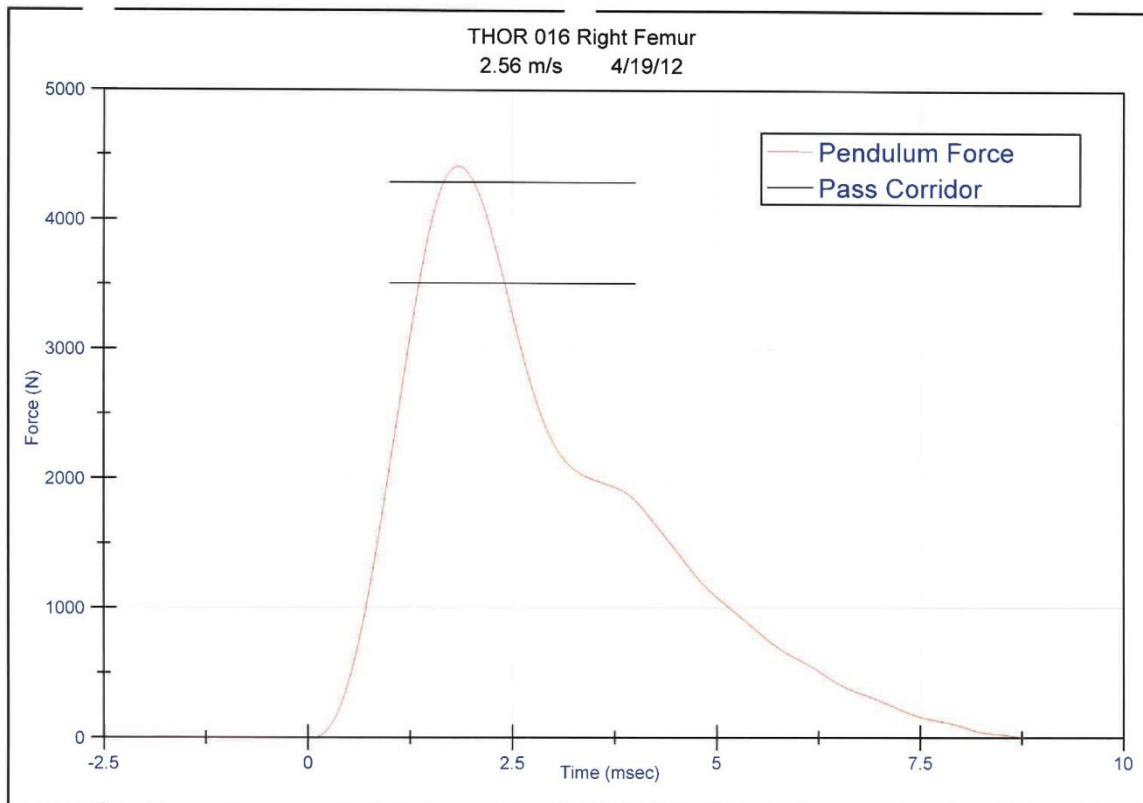
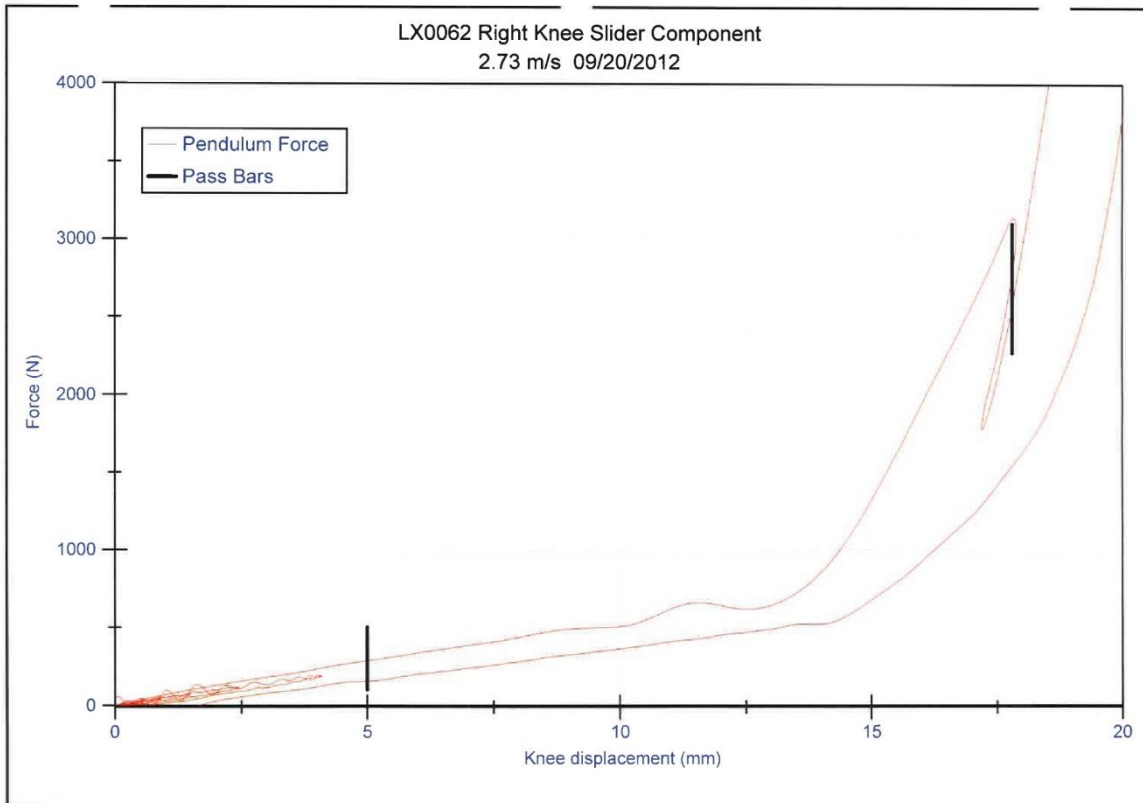


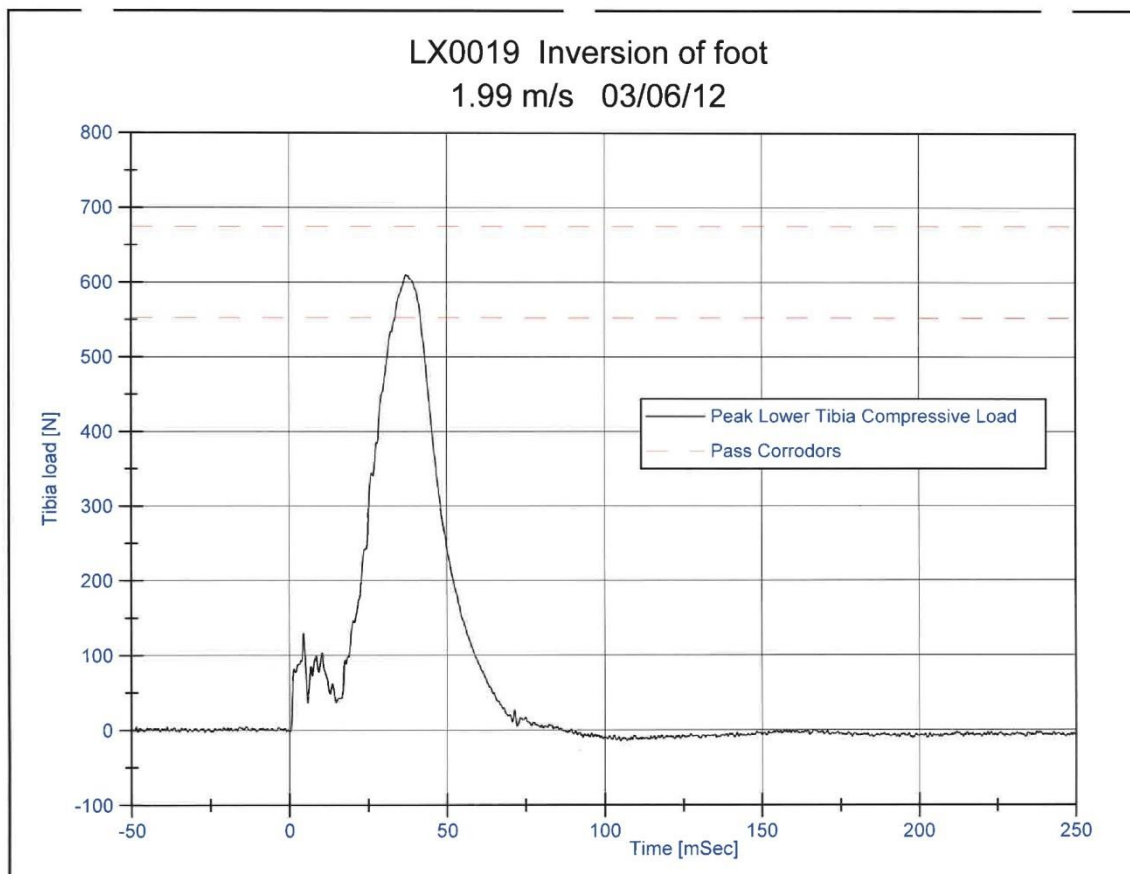
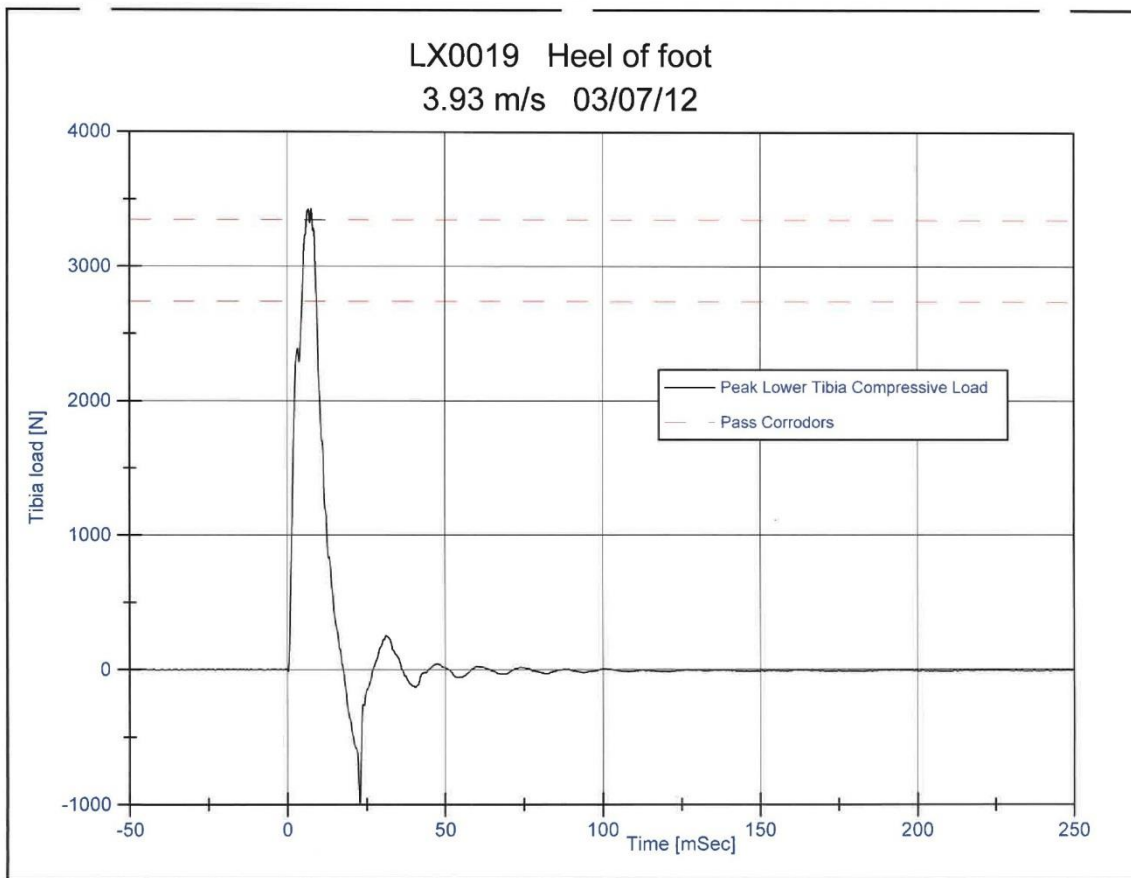


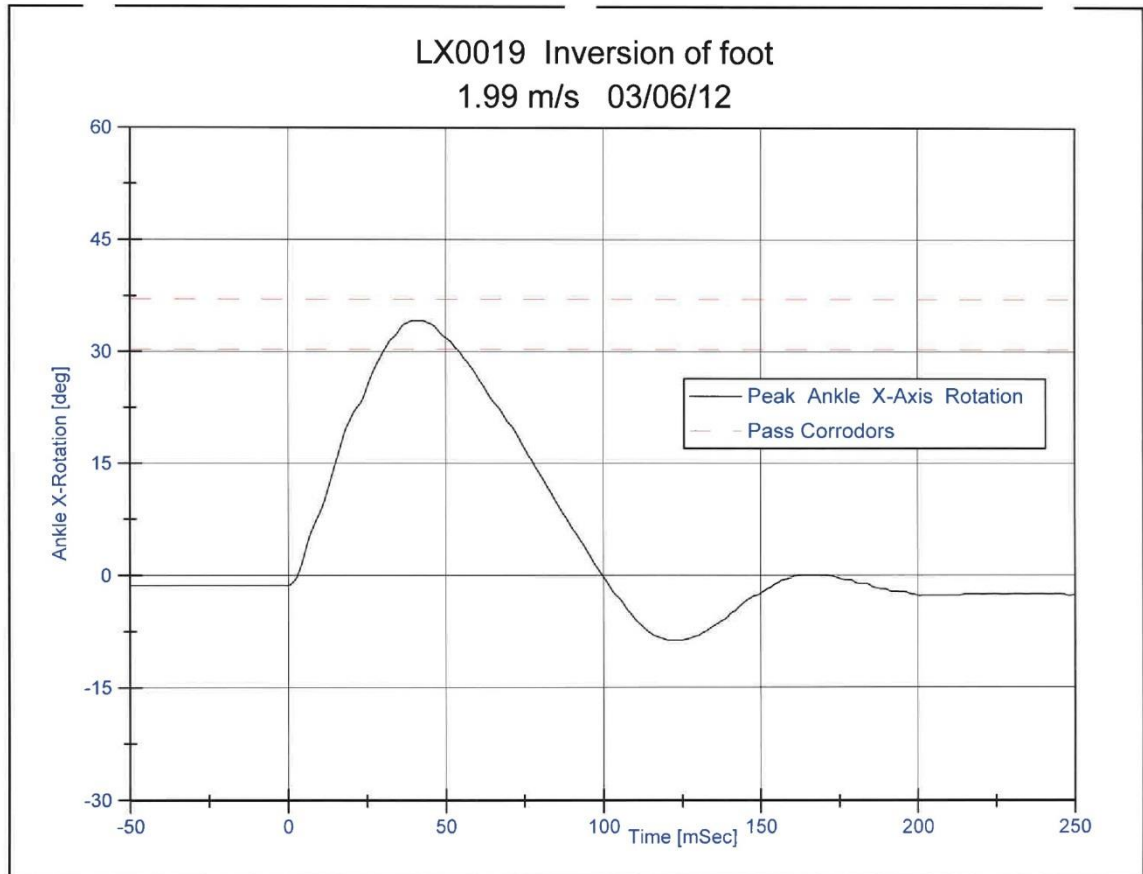
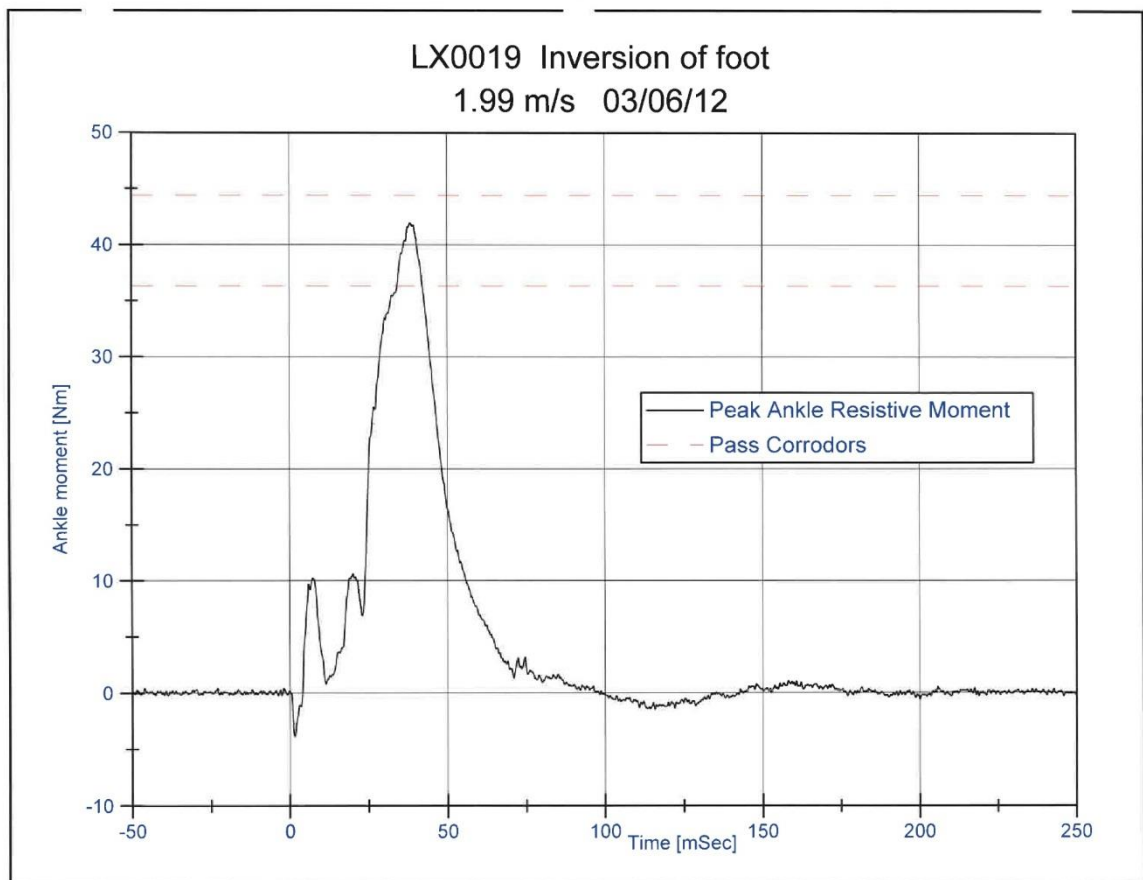




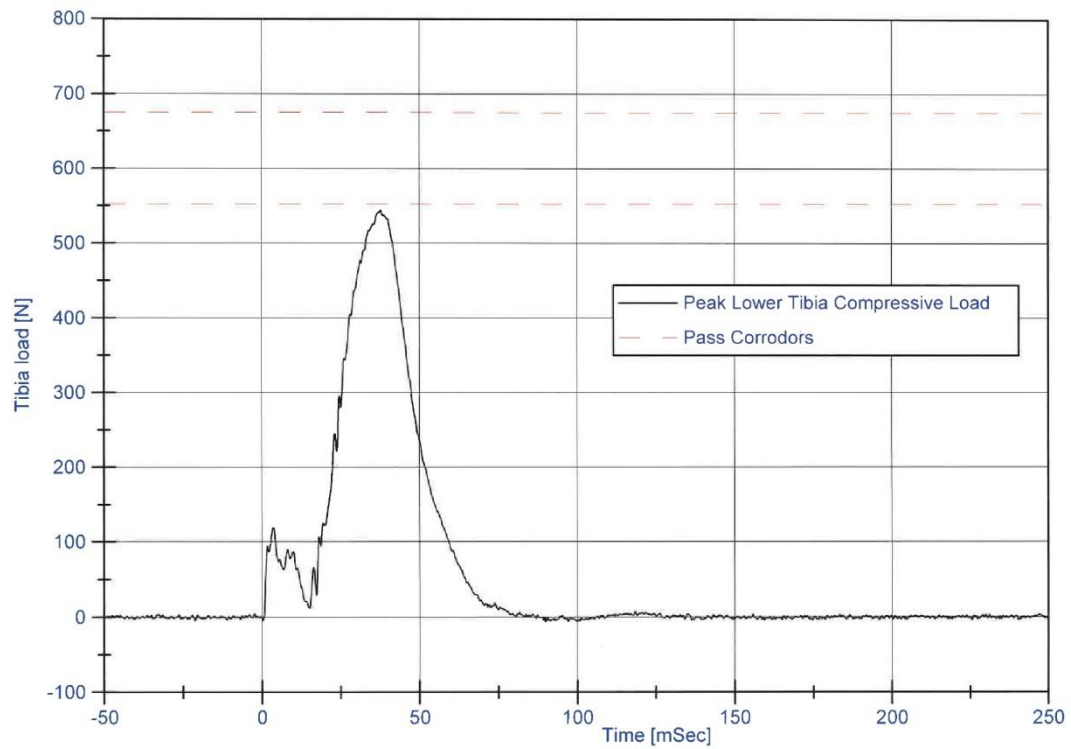
LX0019



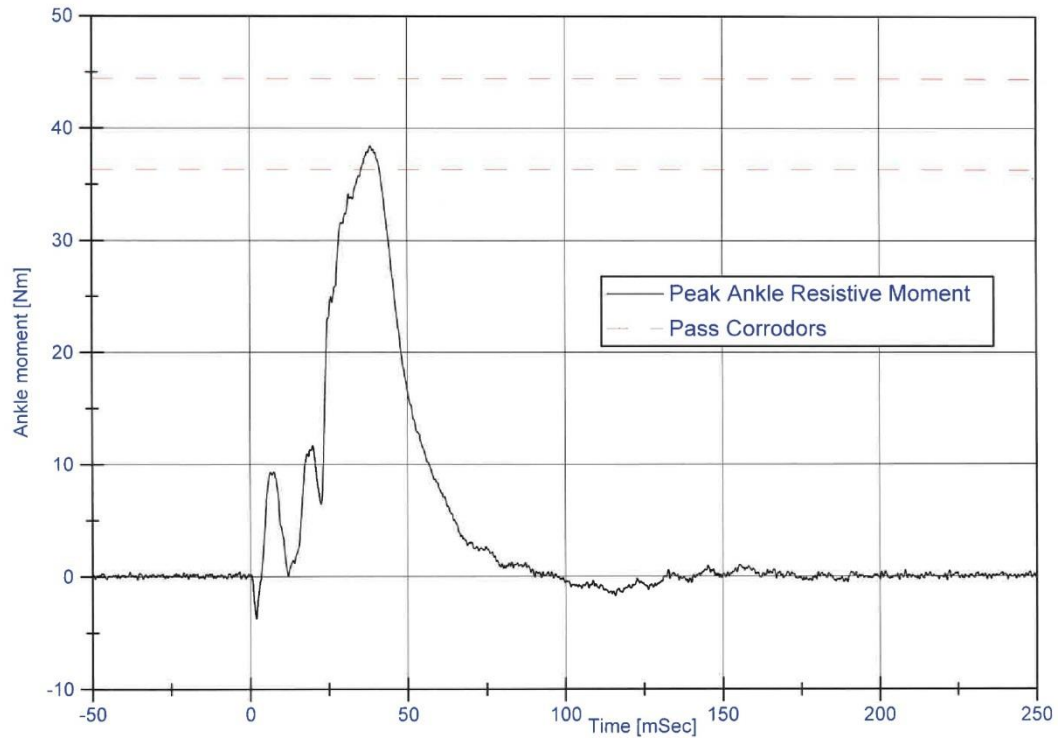


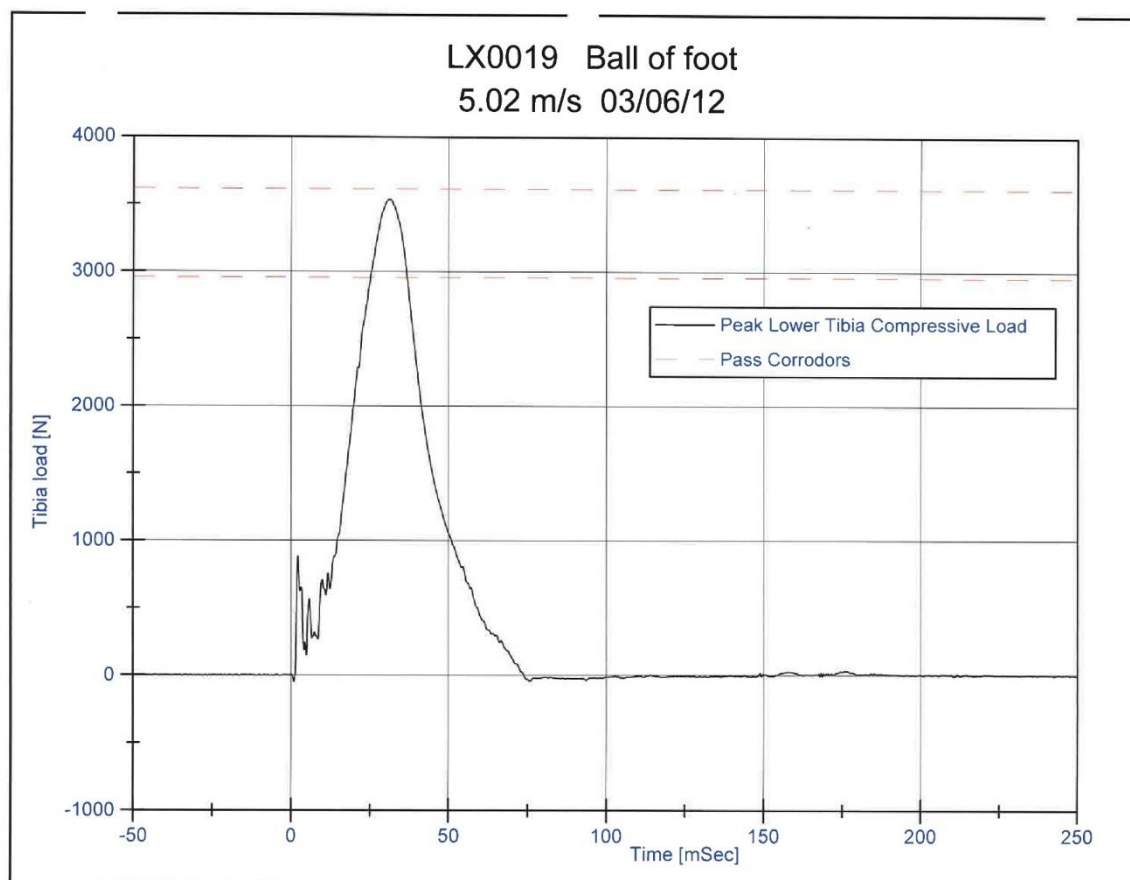
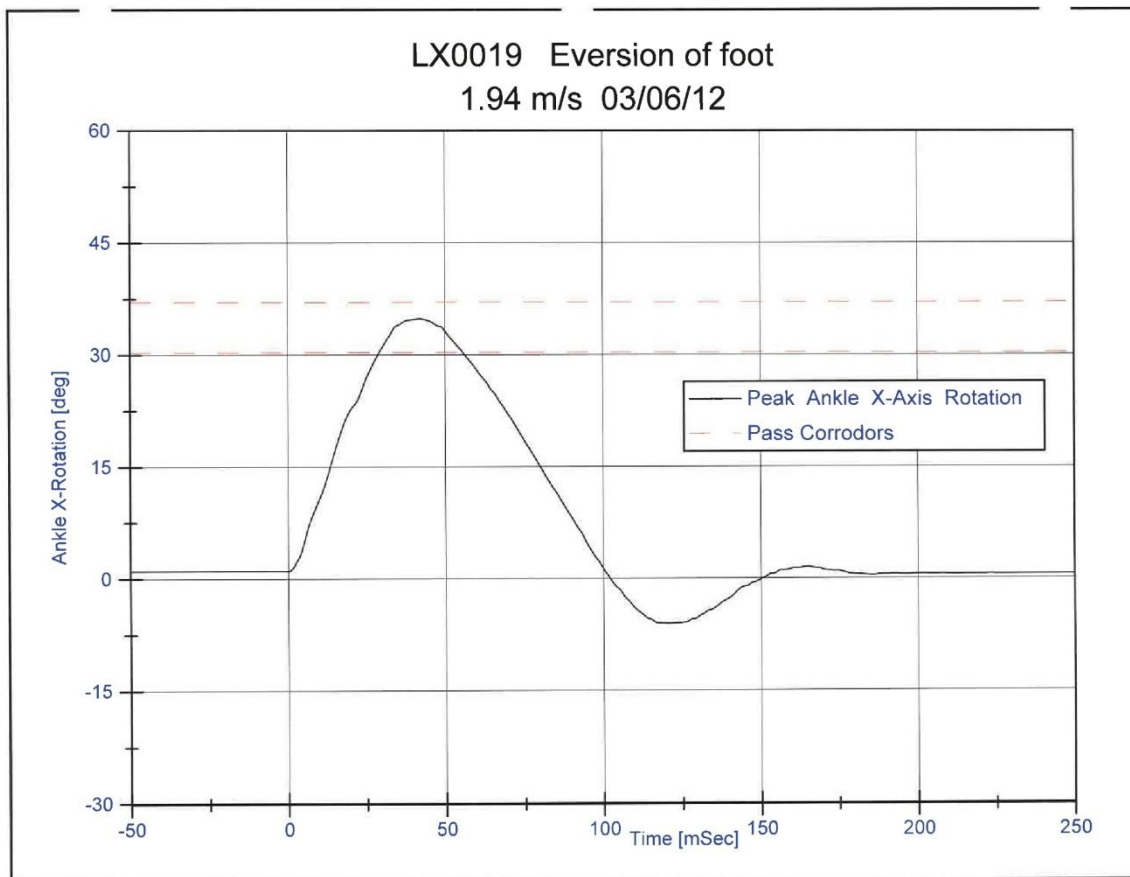


LX0019 Eversion of foot
1.94 m/s 03/06/12

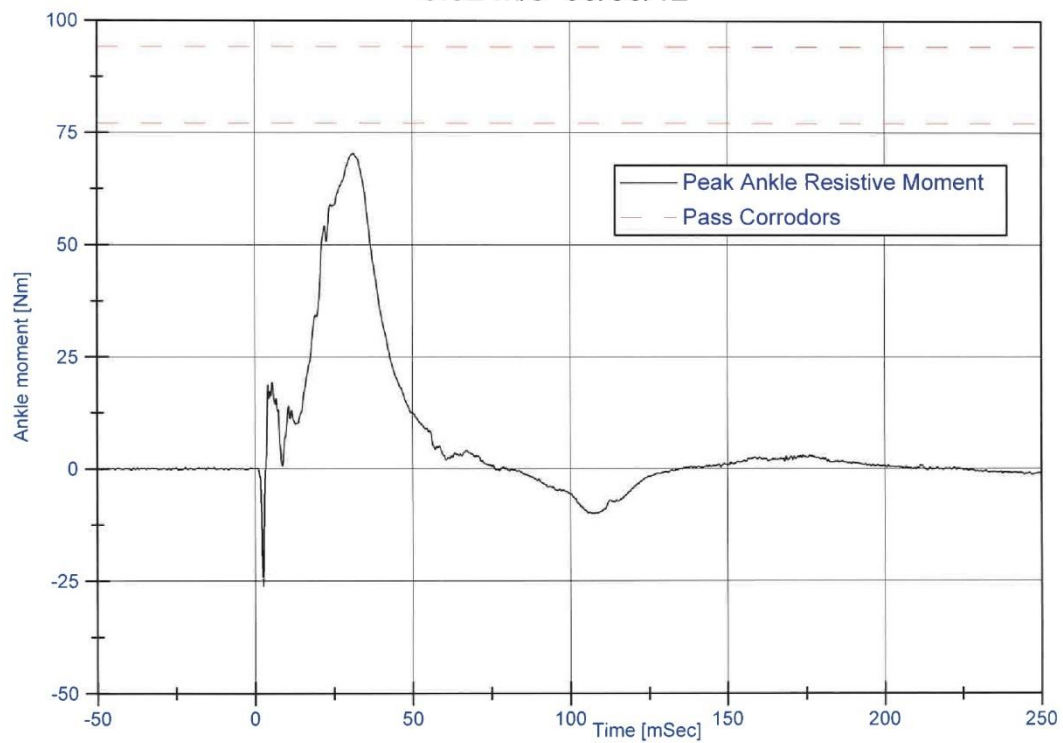


LX0019 Eversion of foot
1.94 m/s 03/06/12

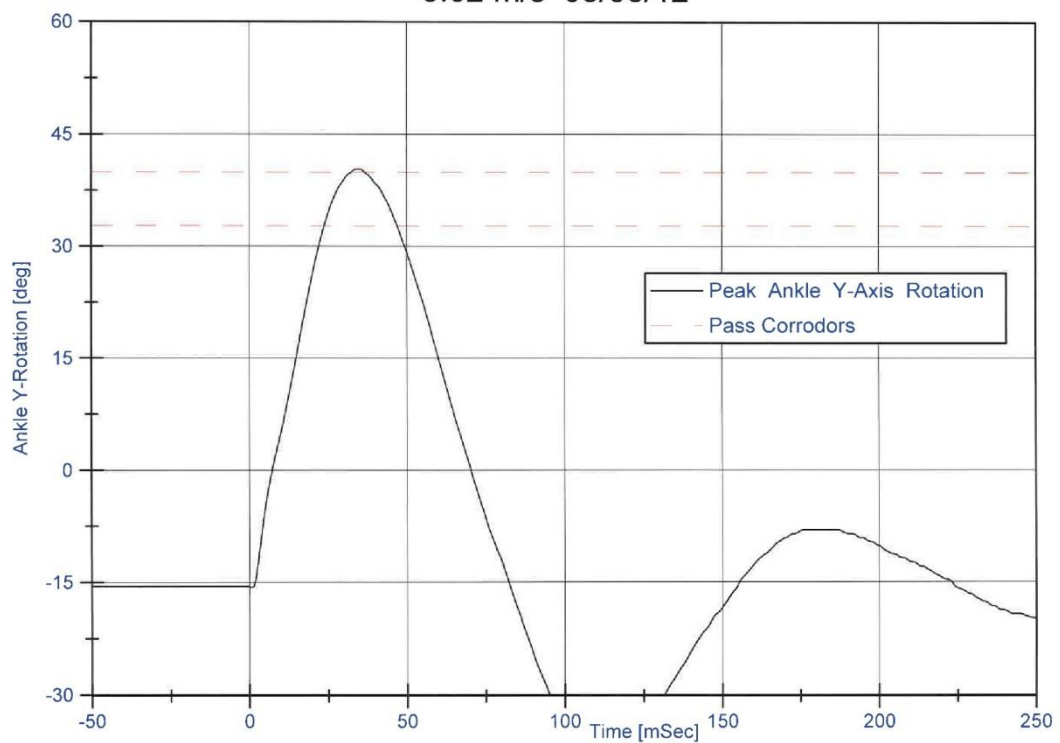




LX0019 Ball of foot
5.02 m/s 03/06/12



LX0019 Ball of foot
5.02 m/s 03/06/12



APPENDIX D:
CMM MEASUREMENT PROCEDURES

Vehicle Coordinate System

The origin point of the VCS is a point 50 mm forward of the rear window glass or hatchback door onto the roof of the vehicle along the vehicle's lateral centerline. The ground is not used as a reference.

The following procedure was used to create the Vehicle Coordinate System (VCS):

- 1) Place the As Delivered vehicle on a flat surface.
- 2) Measure the width of the vehicle at the rear of the vehicle to establish a first center point.
- 3) Measure the width of the vehicle at the front of the vehicle to establish a second center point.
- 4) Using a vertical laser beam, connect the two points to establish the lateral centerline of the vehicle.
- 5) Establish a point 50 mm from the edge of the rear window glass or rear hatchback door frame at the intersection of the roof onto the roof to establish the VCS origin point.
- 6) Construct a line perpendicular to the lateral centerline of the vehicle from VCS origin point towards the C-pillar. Mark a point along this line that is on the C-pillar at the body crease line between the roof and pillar geometry. This will be reference point #2.
- 7) Construct another perpendicular line in the opposite direction from the lateral centerline of the vehicle that is the same distance from the centerline as reference point #2. This will be reference point #3.
- 8) The VCS origin point is defined as the following:
 - Positive X is from the VCS origin point to the front of the vehicle
 - Positive Y is from the driver side of the vehicle to the passenger side of the vehicle
 - Positive Z is from the VCS origin point of the vehicle to the bottom of the vehicle

Steering Column Reference Point

The Steering Column Reference point is the x, y, and z location of the geometric center of the steering wheel in the VCS.

Brake Pedal Reference Point

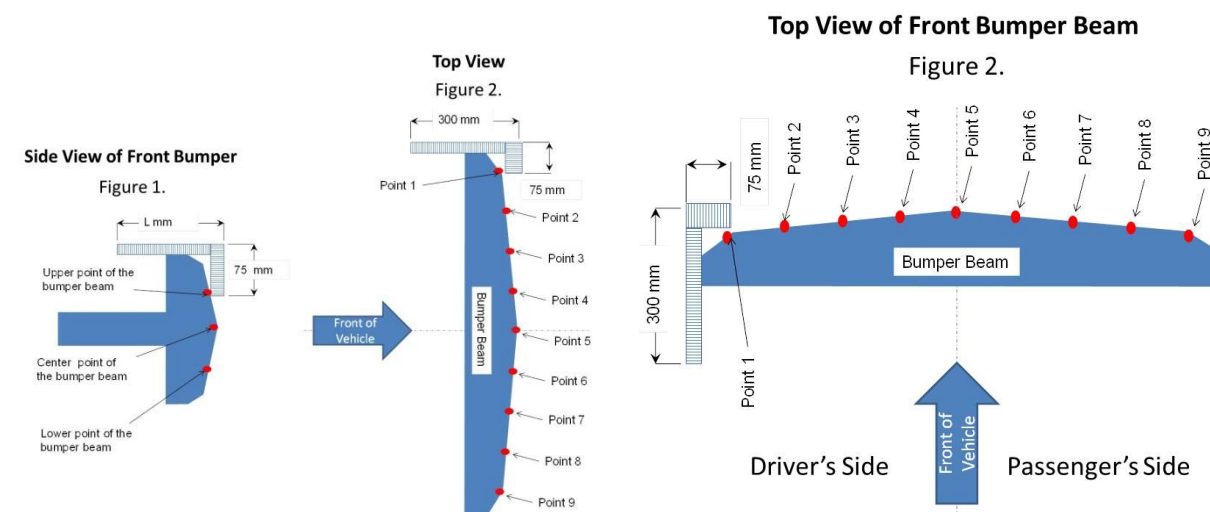
The Brake Pedal Reference Point is the x, y, and z location of the geometric center of the brake pedal pad (top surface) in the VCS.

Floor Reference Point

The Floor Reference Point is the x, y, and z location of the floor in the VCS. Use the following procedure to determine the Floor Reference Point:

1. If the vehicle has an accelerator pedal with fore-aft adjustment, adjust the pedal to its forward most position
2. Locate the centerline of the top surface of the bottom of the accelerator pedal (CLAP)
3. Remove floor mats
4. Project a vertical line down from the CLAP point until contact is made to the floor. This point is the Floor Reference Point

Pre and Post Bumper Beam and Radiator Support Measurement



Find the vertical center of the bumper beam using the following procedure (Reference Figure 1).

- 1) Position a square above the bumper beam at the centerline of the vehicle such that the plan of the square is aligned with the longitudinal axis of the vehicle and the "L mm" part of the square is parallel to the ground.
- 2) Move the square toward the ground until it contacts the bumper beam.
- 3) Move the square toward the rear of the vehicle until it contacts the bumper beam. The point where the 75 mm part of the square contacts the bumper beam is the Upper point of the bumper beam.
- 4) Perform the same procedure for the lower part of the bumper beam. The point where the 75 mm part of the square contacts the bumper beam is the Lower point of the bumper beam.
- 5) The center point of the bumper beam is half the distance between the Upper and Lower points of the bumper beam.
- 6) Transpose the lateral center of the bumper beam up onto the top of the upper radiator support.
- 7) Mark the center of the upper radiator support along its forward leading edge. If the radiator support is not flat this mark is made along the top edge.
- 8) Mark enough points along this edge to define its profile.

Pre and Post Driver Left Lower Instrument Panel

The left lower instrument panel (knee bolster) lateral coordinates are defined by adding 15 cm from the steering column reference lateral coordinate, respectively. The vertical coordinate is defined as 45 cm above the height of the floor reference point. If the panel or knee bolster loosens or breaks away in the crash, the post-crash measurements are taken by pressing and holding the panel against the underlying structure. Create a floor vehicle coordinate system on the floor at the location of this measurement.

Pre and Post Driver Right Lower Instrument Panel

The left lower instrument panel (knee bolster) lateral coordinates are defined by subtracting 15 cm from the steering column reference lateral coordinate, respectively. The vertical coordinate is defined as 45 cm above the height of the floor reference point. If the panel or knee bolster loosens or breaks away in the crash, the post-crash measurements are taken by pressing and holding the panel against the underlying structure.

Pre and Post Brake Pedal (Figure 22)

If the brake pedal is constructed so that it dangles loosely after the crash, the brake pedal is pushed straight forward against the toepan/floor pan and held there to take the post-crash measurement. If the pedal drops away entirely, no post-crash measurement is taken.

Pre and Post Driver Toe pan and Floor Board (Figure 22)

DRIVER POINT A1

The vertical coordinate for the A1 measurement location is the vertical of the brake pedal reference. The lateral coordinate of the A1 is obtained by subtracting 25 cm from the brake pedal reference lateral coordinate.

DRIVER POINT B1

The vertical coordinate for the B1 location is the vertical coordinate of the brake pedal reference. The lateral coordinate of the B1 is obtained by subtracting 15 cm from the brake pedal reference lateral coordinate.

DRIVER POINT C1

The vertical coordinate for the C1 location is the vertical coordinate of the brake pedal reference. The lateral coordinate of the C1 is obtained by subtracting 0 cm from the brake pedal reference lateral coordinate.

DRIVER POINT D1

The vertical coordinate for the D1 location is the vertical coordinate of the brake pedal reference. The lateral coordinate of the D1 is obtained by adding 15 cm from the brake pedal reference lateral coordinate.

DRIVER POINT A2

The vertical coordinate of the A2 measurement location is obtained by adding half the distance between the vertical coordinate of the brake pedal reference and the vertical coordinate of the floor reference. The lateral coordinate of the A2 is obtained by subtracting 25 cm from the brake pedal reference lateral coordinate.

DRIVER POINT B2

The vertical coordinate of the B2 measurement location is obtained by adding half the distance between the vertical coordinate of the brake pedal reference the vertical coordinate of the floor reference. The lateral coordinate of the B2 is obtained by subtracting 15 cm from the brake pedal reference lateral coordinate.

DRIVER POINT C2

The vertical coordinate of the C2 measurement location is obtained by adding half the distance between the vertical coordinate of the brake pedal reference and the vertical coordinate of the floor reference. The lateral coordinate of the C2 is obtained by subtracting 0 cm from the brake pedal reference lateral coordinate.

DRIVER POINT D2

The vertical coordinate of the D2 measurement location is obtained by adding half the distance between the vertical coordinate of the brake pedal reference and the vertical coordinate of the floor reference. The lateral coordinate of the 22 is obtained by adding 15 cm from the brake pedal reference lateral coordinate.

DRIVER POINT A3

The vertical coordinate of the A3 measurement location is obtained by subtracting 1 cm from the floor reference. The lateral coordinate of the A3 is obtained by subtracting 25 cm from the brake pedal reference lateral coordinate.

DRIVER POINT B3

The vertical coordinate of the B3 measurement location is obtained by subtracting 1 cm from the floor reference. The lateral coordinate of the B3 is obtained by subtracting 15 cm from the brake pedal reference lateral coordinate.

DRIVER POINT C3

The vertical coordinate of the C3 measurement location is obtained by subtracting 1 cm from the floor reference. The lateral coordinate of the C3 is obtained by subtracting 0 cm from the brake pedal reference lateral coordinate.

DRIVER POINT D3

The vertical coordinate of the D3 measurement location is obtained by subtracting 1 cm from the floor reference. The lateral coordinate of the D3 is obtained by adding 15 cm from the brake pedal reference lateral coordinate.

DRIVER POINT A4

The longitudinal coordinate of the A4 measurement location is obtained by subtracting 5 cm from the A3 reference. The lateral coordinate of the A4 is obtained by subtracting 25 cm from the brake pedal reference lateral coordinate.

DRIVER POINT B4

The longitudinal coordinate of the B4 measurement location is obtained by subtracting 5 cm from the B3 reference. The lateral coordinate of the B4 is obtained by subtracting 15 cm from the brake pedal reference lateral coordinate.

DRIVER POINT C4

The longitudinal coordinate of the C4 measurement location is obtained by subtracting 5 cm from the C3 reference. The lateral coordinate of the C4 is obtained by subtracting 0 cm from the brake pedal reference lateral coordinate.

DRIVER POINT D4

The longitudinal coordinate of the D4 measurement location is obtained by subtracting 5 cm from the D3 reference. The lateral coordinate of the D4 is obtained by adding 15 cm from the brake pedal reference lateral coordinate.

DRIVER POINT A5

The longitudinal coordinate of the A5 measurement location is obtained by subtracting 5 cm from the A4 reference. The lateral coordinate of the A5 is obtained by subtracting 25 cm from the brake pedal reference lateral coordinate.

DRIVER POINT B5

The longitudinal coordinate of the B5 measurement location is obtained by subtracting 5 cm from the B4 reference. The lateral coordinate of the B5 is obtained by subtracting 15 cm from the brake pedal reference lateral coordinate.

DRIVER POINT C5

The longitudinal coordinate of the C5 measurement location is obtained by subtracting 5 cm from the C4 reference. The lateral coordinate of the C5 is obtained by subtracting 0 cm from the brake pedal reference lateral coordinate.

DRIVER POINT D5

The longitudinal coordinate of the D5 measurement location is obtained by subtracting 5 cm

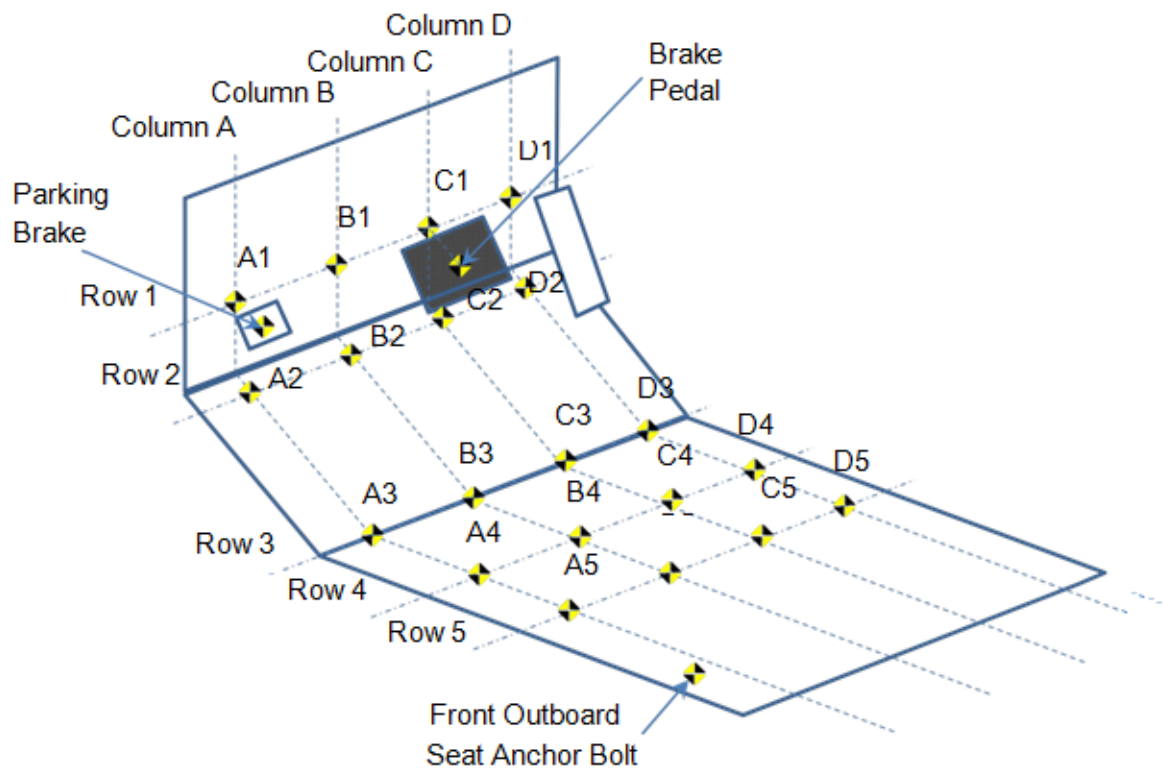
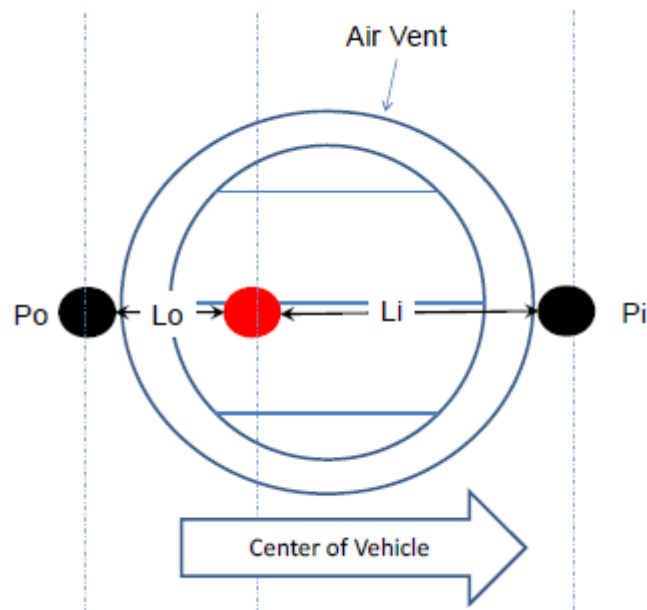


Figure 22: Lower interior intrusion measurements

Driver Upper Dash

The upper dash point is obtained by subtracting 25 cm from the lateral coordinate of the steering column reference lateral coordinate. This defines a line of points on the edge of the upper dash. The upper dash point is located on the rearward most (toward the rear of the vehicle) point on this line. This point must be located at least 30 cm above the brake pedal reference point to ensure a vertical location high enough to represent a location that could be contacted by the driver's upper body or head. If the rearward most point is less than 30 cm above the brake pedal reference point, the upper dash point is located at this 30 cm reference location.

There may be instances when the upper dash point is located on a “soft component” such as an air vent or control knob (Figure 23). To measure a more robust structure, the upper dash point is replaced with two additional points, and the weighted average of their coordinates is used to represent the deformation of a point at the original location (Equation 1). Each new point is determined by moving inboard/outboard to a location that is just off of the soft component.



$$dp = \frac{L_i}{L_o + L_i} [X_o, Y_o, Z_o] + \frac{L_o}{L_o + L_i} [X_i, Y_i, Z_i]$$

Figure 23: Equation for Measuring Soft Component Driver Upper Dash Point

Passenger Left Lower Instrument Panel

The left lower instrument panel (knee bolster) lateral coordinates are defined by adding 15 cm from the center passenger seat reference lateral coordinate, respectively. The vertical coordinate is defined as 45 cm above the height of the floor (without floor mats). If the panel or knee bolster loosens or breaks away in the crash, the post-crash measurements are taken by pressing and holding the panel against the underlying structure.

Create a floor vehicle coordinate system on the floor at the location of this measurement.

Passenger Right Lower Instrument Panel

The left lower instrument panel (knee bolster) lateral coordinates are defined by subtracting 15 cm from the center passenger seat reference lateral coordinate, respectively. The vertical coordinate is defined as 45 cm above the height of the floor (without floor mats). If the panel or knee bolster loosens or breaks away in the crash, the post-crash measurements are taken by pressing and holding the panel against the underlying structure.

Passenger Toe pan and Floor Board (Figure 24)

PASSENGER POINT A1

The vertical coordinate for the A1 measurement location is the vertical coordinate of the brake pedal reference. The lateral coordinate of the A1 is obtained by subtracting 25 cm from the center passenger seat reference lateral coordinate.

PASSENGER POINT B1

The vertical coordinate for the B1 location is the vertical coordinate of the brake pedal reference. The lateral coordinate of the B1 is obtained by subtracting 15 cm from the center passenger seat reference lateral coordinate.

PASSENGER POINT C1

The vertical coordinate for the C1 location is the vertical coordinate of the brake pedal reference. The lateral coordinate of the C1 is obtained by subtracting 0 cm from the center passenger seat reference lateral coordinate..

PASSENGER POINT A2

The vertical coordinate of the A2 measurement location is obtained by adding half the distance between the vertical coordinate of the brake pedal reference and the vertical coordinate of the floor reference. The lateral coordinate of the A2 is obtained by subtracting 25 cm from the center passenger seat reference lateral coordinate.

PASSENGER POINT B2

The vertical coordinate of the B2 measurement location is obtained by adding half the distance between the vertical coordinate of the brake pedal reference the vertical coordinate of the floor reference. The lateral coordinate of the B2 is obtained by subtracting 15 cm from the center passenger seat reference lateral coordinate.

PASSENGER POINT C2

The vertical coordinate of the C2 measurement location is obtained by adding half the distance between the vertical coordinate of the brake pedal reference and the vertical coordinate of the floor reference. The lateral coordinate of the C2 is obtained by subtracting 0 cm from the center passenger seat reference lateral coordinate.

PASSENGER POINT A3

The vertical coordinate of the A3 measurement location is obtained by subtracting 1 cm from the floor reference. The lateral coordinate of the A3 is obtained by subtracting 25 cm from the center passenger seat reference lateral coordinate.

PASSENGER POINT B3

The vertical coordinate of the B3 measurement location is obtained by subtracting 1 cm from the floor reference. The lateral coordinate of the B3 is obtained by subtracting 15 cm from the center passenger seat reference lateral coordinate.

PASSENGER POINT C3

The vertical coordinate of the C3 measurement location is obtained by subtracting 1 cm from the floor reference. The lateral coordinate of the C3 is obtained by subtracting 0 cm from the center passenger seat reference lateral coordinate.

PASSENGER POINT A4

The longitudinal coordinate of the A4 measurement location is obtained by subtracting 5 cm from the A3 reference. The lateral coordinate of the A4 is obtained by subtracting 25 cm from the center passenger seat reference lateral coordinate.

PASSENGER POINT B4

The longitudinal coordinate of the B4 measurement location is obtained by subtracting 5 cm from the B3 reference. The lateral coordinate of the B4 is obtained by subtracting 15 cm from the center passenger seat reference lateral coordinate.

PASSENGER POINT C4

The longitudinal coordinate of the C4 measurement location is obtained by subtracting 5 cm from the C3 reference. The lateral coordinate of the C4 is obtained by subtracting 0 cm from the center passenger seat reference lateral coordinate.

PASSENGER POINT A5

The longitudinal coordinate of the A5 measurement location is obtained by subtracting 5 cm from the A4 reference. The lateral coordinate of the A5 is obtained by subtracting 25 cm from the center passenger seat reference lateral coordinate.

PASSENGER POINT B5

The longitudinal coordinate of the B5 measurement location is obtained by subtracting 5 cm from the B4 reference. The lateral coordinate of the B5 is obtained by subtracting 15 cm from the center passenger seat reference lateral coordinate.

PASSENGER POINT C5

The longitudinal coordinate of the C5 measurement location is obtained by subtracting 5 cm from the C4 reference. The lateral coordinate of the C5 is obtained by adding 15 cm from the center passenger seat reference lateral coordinate.

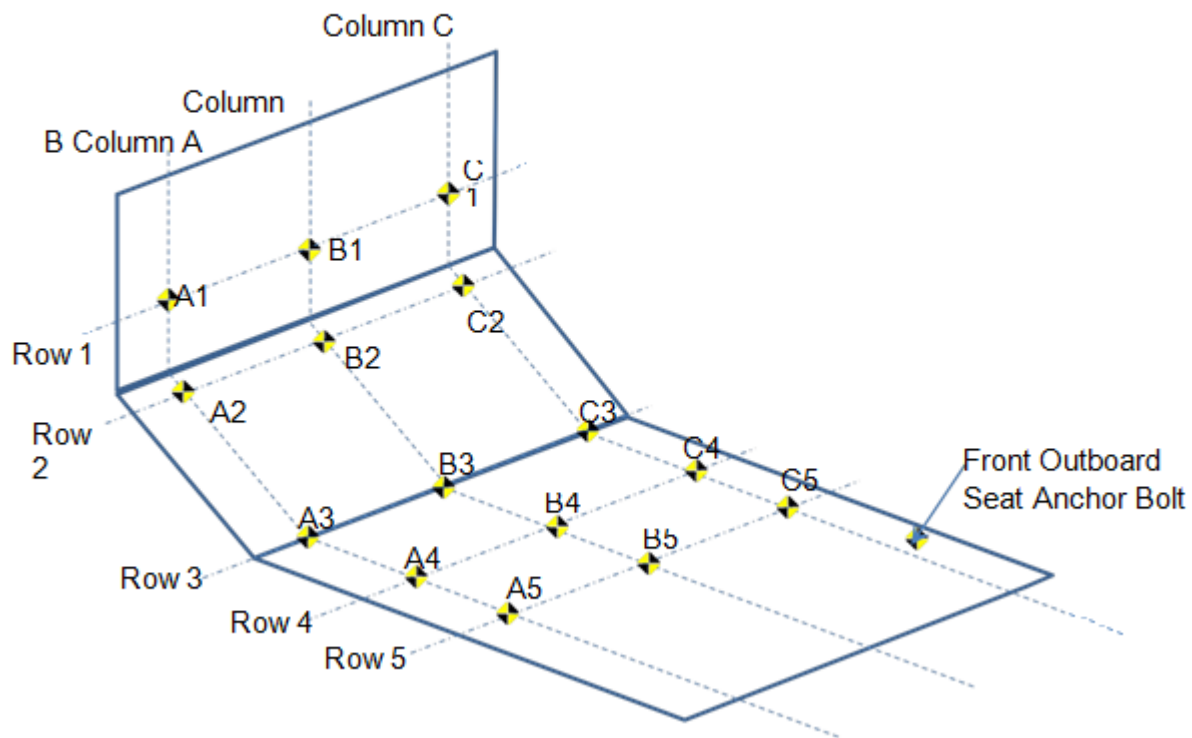


Figure 24: Passenger side lower interior measurements

Passenger Upper Dash

The upper dash point is obtained by adding 25 cm from the lateral coordinate of the center passenger seat reference lateral coordinate. This defines a line of points on the edge of the upper dash. The upper dash point is located on the rearward most (toward the rear of the vehicle) point on this line. This point must be located at least 30 cm above the brake pedal reference point to ensure a vertical location high enough to represent a location that could be contacted by the driver's upper body or head. If the rearward most point is less than 30 cm above the brake pedal reference point, the upper dash point is located at this 30 cm reference location.

There may be instances when the upper dash point is located on a "soft component" such as an air vent or control knob (Figure 23). To measure a more robust structure, the upper dash point is replaced with two additional points, and the weighted average of their coordinates is used to represent the deformation of a point at the original location (Equation 1). Each new point is determined by moving inboard/outboard to a location that is just off of the soft component.

Driver Door Measurements (Figure 25)

Mark the following points on the inner most surface of the door opening, typically on the pinch weld.

- 1) **Point 1:** The vertical coordinates of this point is obtained by subtracting 0 cm from the brake pedal reference point.
- 2) **Point 2:** The vertical coordinates of this point is obtained by subtracting 7.5 cm from the

brake pedal reference point.

- 3) **Point 3:** The vertical coordinates of this point is obtained by subtracting 15 cm from the brake pedal reference point
- 4) **Point 4:** The vertical coordinates of this point is obtained by subtracting 45 cm from the brake pedal reference point.
- 5) **Point 5:** The vertical coordinates of this point is obtained by subtracting 52.5 cm from the brake pedal reference point).
- 6) **Point 6:** The vertical coordinates of this point is obtained by subtracting 60 cm from the brake pedal reference point
- 7) **Point 7:** The longitudinal coordinates of this point is obtained by subtracting 20 cm from the brake pedal reference point. If the 20 cm point is forward of the actual door frame, this point is located 5 cm rearward of lower hinge pillar point.
- 8) **Point 8:** The longitudinal coordinates of this point is obtained by subtracting 35 cm from the brake pedal reference point.
- 9) **Point 9:** The longitudinal coordinates of this point is obtained by subtracting 50 cm from the brake pedal reference point.
- 10) **Point 10 and 11:** Mark 2 evenly spaced points between points 1 and 7
- 11) **Point 12 and 13:** Mark 2 evenly spaced points between points 3 and 4
- 12) **Point 26:** Mark a point at the intersection of the roof rail and the start of the B-pillar
- 13) **Points 14-25:** Mark 12 evenly spaced points between points 6 and 26
- 14) **Point 32:** Mark a point at the intersection of the lower sill and the start of the B-pillar
- 15) **Points 27-31:** Mark 5 evenly spaced points between points 9 and 32



Figure 25: Driver Door Measurements

Passenger Door Measurements

Perform the same procedure as the driver door on the passenger side.

Pre-Test Exterior Profile

- 1) Expose the front bumper beam.
- 2) At the lateral center of the bumper beam, measure and mark the center of the front bumper beam (along front face of beam).
- 3) Using this Z coordinate, mark and measure enough points around the complete circumference of the vehicle to establish cross section A-A.
- 4) Transpose the lateral center of the bumper beam up onto the top of the upper radiator support.
- 5) Mark the center of the upper radiator support along its forward leading edge.
- 6) Using this Z coordinate, mark and measure enough points around the complete circumference of the vehicle to establish cross section B-B.

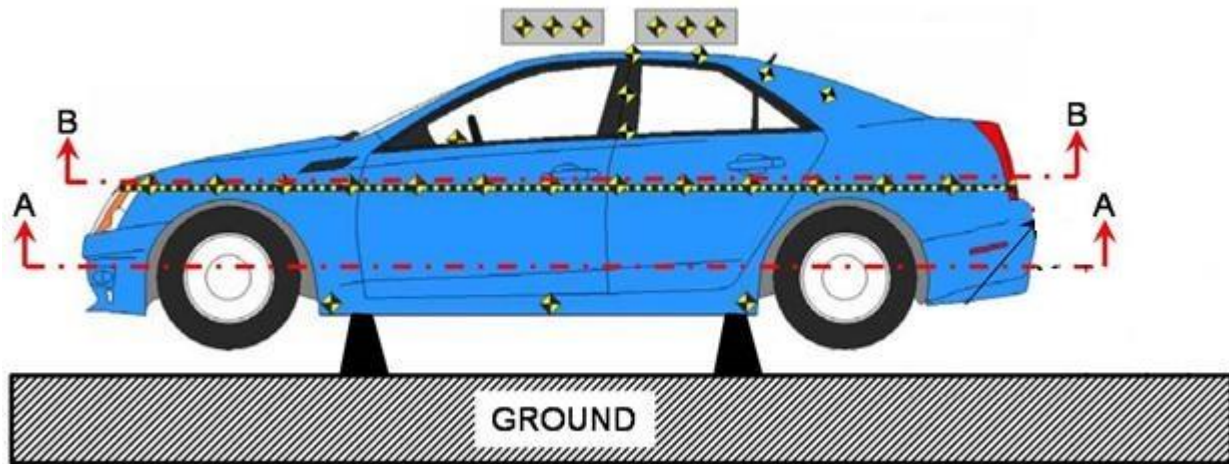


Figure 26: Pre-Test Vehicle Profile

Post-Test Exterior Profile

- 1) Remove bumper cover
- 2) Using the vehicle's origin reference point leap into vehicle's coordinate system.
- 3) Using the pre-test z-value at section A-A which was recorded from VCS origin, take measurements at this z-distance around the circumference of the vehicle.
- 4) Using the pre-test z-value at section B-B that was recorded from VCS origin, take measurements at this z-distance around the circumference of the vehicle.

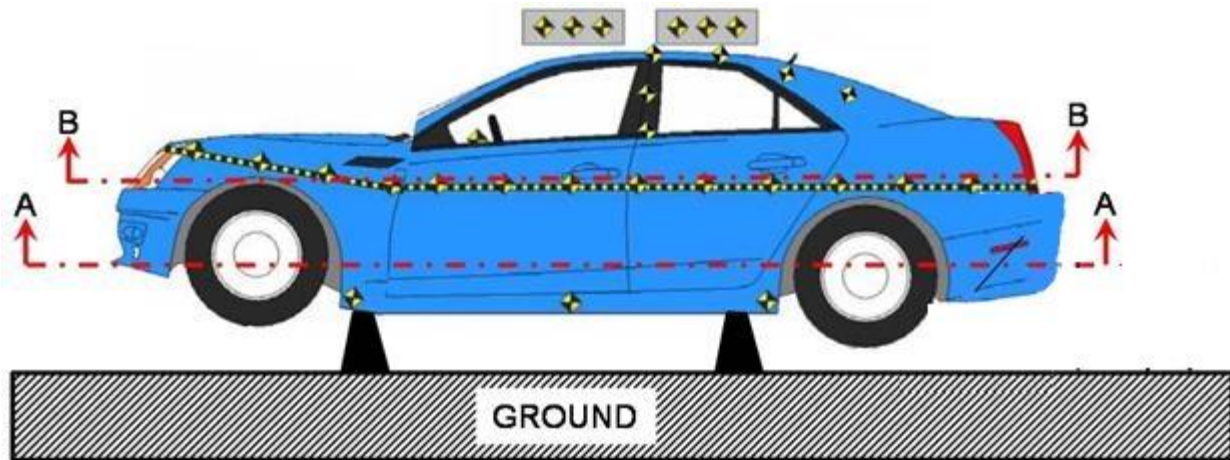


Figure 27: Post-Test Vehicle Profile

Pre and Post Honeycomb Requirements

The contractor shall take pre-and post-crush measurements of the honeycomb while attached to the barrier. These measurements shall be documented in the appropriate datasheet. Also, the contractor shall take pre-and post-test pictures of the left and right side, top, and front view of the honeycomb while attached to the barrier.