

REPORT NUMBER: R&D-CAL-15-005

**VEHICLE TO FRONTAL BARRIER CRASH TEST IN SUPPORT OF NHTSA'S
FRONTAL RESEARCH PROGRAM**

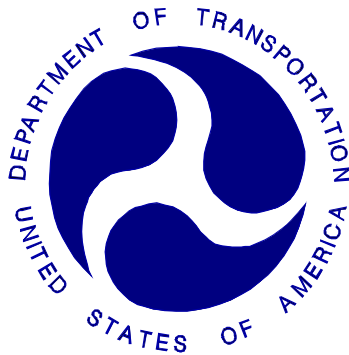
2015 Mazda 3

56.3 KPH RIGID BARRIER FRONTAL

TEST DATE: 8/25/2015

NHTSA No: R20155404

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FINAL REPORT SUBMITTED:

March 30, 2016

PREPARED FOR:

**U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Vehicle safety Research
1200 New Jersey Ave, SE
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Transportation Test Operations

Date: March 30, 2016

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

Date: _____

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

Date: _____

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16. Abstract A test was conducted in accordance with Contract DTNH22-14-D-00359 Task Order 0002. The test consisted of a 2015 Mazda 3 Hatchback traveling at a target speed of 56.3 kph into a stationary flat frontal barrier wall. 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 August 25, 2015. The vehicle's impact velocity was 56.61 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 526 mm. The test vehicle's performance was as follows: <table border="1"> <thead> <tr> <th>Measurement Description</th> <th>Units</th> <th>Driver</th> <th>Front Passenger</th> <th>Rear Passenger</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td>N/A</td> <td>238.26</td> <td>257.76</td> <td>1098.89</td> </tr> <tr> <td>Brain Injury Criterion (BrIC)</td> <td>N/A</td> <td>0.56</td> <td>0.52</td> <td></td> </tr> <tr> <td>Abdomen Deflection</td> <td>mm</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Resultant Acetabulum Force</td> <td>N</td> <td>2636.04</td> <td></td> <td></td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>51.11</td> <td>-21.70</td> <td></td> </tr> <tr> <td>Neck Injury Criteria (Nij)</td> <td>N/A</td> <td>0.22</td> <td>0.45</td> <td>1.29</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>1406.65</td> <td>768.93</td> <td>3387.84</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>-271.70</td> <td>-310.70</td> <td>-2182.40</td> </tr> <tr> <td>Tibia Index</td> <td>N/A</td> <td>0.38</td> <td>0.87</td> <td></td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>-3743.84</td> <td>-166.99</td> <td>-310.28</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>-3890.85</td> <td>-71.56</td> <td>-475.77</td> </tr> </tbody> </table>					Measurement Description	Units	Driver	Front Passenger	Rear Passenger	Head Injury Criteria (HIC ₁₅)	N/A	238.26	257.76	1098.89	Brain Injury Criterion (BrIC)	N/A	0.56	0.52		Abdomen Deflection	mm				Resultant Acetabulum Force	N	2636.04			Maximum Chest Compression	mm	51.11	-21.70		Neck Injury Criteria (Nij)	N/A	0.22	0.45	1.29	Neck Tension	N	1406.65	768.93	3387.84	Neck Compression	N	-271.70	-310.70	-2182.40	Tibia Index	N/A	0.38	0.87		Left Femur Force	N	-3743.84	-166.99	-310.28	Right Femur Force	N	-3890.85	-71.56	-475.77
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DISCLAIMER

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

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Date: March 30, 2016

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SECTION 1
PURPOSE OF TEST

Test Vehicle: 2015 Mazda 3 Hatchback
Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
Test Date: 8/25/2015

This 56.3 kph (35 mph) test vehicle into a rigid barrier is part of the Frontal Rigid Barrier Test a outlined in Contract No. DTNH22-14-D-00359 Task Order 0002. The purpose of this test is to obtain vehicle crashworthiness and occupant restraint system performance data for research purposes.

This test was conducted in accordance with the instructions set forth for a vehicle to rigid barrier impact, outlined in Contract No. DTNH22-14-D-00359 Task Order 0002. Data was obtained indicant of Federal Motor Vehicle Safety Standard FMVSS 208-Occupant Crash Protection, FMVSS 212 – Windshield Mounting, FMVSS 219 (partial) – Windshield Zone Intrusion, and FMVSS 301 – Fuel System Integrity, in addition to the requirements of Contract No. DTNH22-14-D-00359 Task Order 0002.

SECTION 2 SUMMARY OF TEST

Test Vehicle: 2015 Mazda 3 Hatchback
Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
Test Date: 8/25/2015

A rigid fixed barrier was impacted by a 2015 Mazda 3 Hatchback at a velocity of 56.61 km/h. The test was performed at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on August 25th, 2015. Pre- and post-test photographs of the vehicle and dummies to document the test can be found in Appendix A. One real-time camera and 16 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in Data Sheet 6 of this report.

One 50% adult male THOR-M anthropomorphic test device (ATD) (Serial No. DL9207), was placed in the driver seating position according to dummy placement instructions specified in the THOR Seating Test Procedure, and one Part 572O 5th percentile female ATD with RibEye (Serial No. 324), was placed in the right-front passenger seating position at mid-track according to dummy placement instructions specified in the frontal NCAP laboratory test procedure. One Part 572O 5th percentile female ATD with RibEye (Serial No. 019) was also placed in the rear seating position (P3) and positioned according to dummy placement instructions specified in the Side MDB NCAP Laboratory Test Procedure.

Seat belt load cells were also on the driver's and passengers' shoulder and lap belts to measure the dummy's torso and pelvic section loading. In addition to seat belt load cells, belt movement sensors were utilized on both the driver and front passengers' seat belts to measure displacement. The driver (position 1) ATD (Serial No. DL9207), right-front passenger (position 2) ATD (Serial No. 324), and the rear passenger ATD (Serial No. 019) were calibrated previous to this test. Certification details, along with instrumentation calibration data, can be found in Appendix C of this report.

Two hundred and sixty seven (267) channels of data from the ATD's and test vehicle were collected using Kayser – Threde and DTS data acquisition systems. Appendix B contains dummy and vehicle response data plots.

There was 97.2% total windshield retention and 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 526 mm at C4 to the right of the vehicle's centerline. Full vehicle measurements are presented in Section 3 of this report.

SECTION 2 (CONTINUED)
SUMMARY OF TEST

Test Vehicle: 2015 Mazda 3 Hatchback
Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
Test Date: 8/25/2015

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

Structure observations include the following:

- Hood bent inwards exposing part of the engine compartment

The driver ATD's visible contact points were:

- Head contacted the frontal airbag and headrest
- Torso contacted the frontal airbag
- Knees contacted the knee bolster

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

- Head contacted the frontal airbag and headrest
- Torso contacted the frontal airbag

The rear passenger ATD's visible contact points were:

- Head contacted the seatback and headrest
- Knees contacted front passenger's seat back

SECTION 2 (CONTINUED)
CRASH VEHICLE SUMMARY

Test Vehicle: 2015 Mazda 3 Hatchback
Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
Test Date: 8/25/2015

Primary Impact Data

Measured Parameter	Units	Value
Test Vehicle Velocity at Impact	kph	56.61
Vehicle Test Weight	kg	1599
Vehicle Maximum Static Crush	mm	526
Number of Data Channels		267
Number of Real-Time Cameras		1
Number of High-Speed Cameras		16

GENERAL COMMENTS:

1. P1 (Driver) serial number – DL9207
2. P2 (Passenger) serial number – 324
3. P3 (Rear Passenger) serial number – 019

Data Anamolies:

- Driver Front Neck Spring Tower Load Cell, Channel saturated from 117ms to 123ms B-12
- Driver Abdomen Left DGIR X Displacement, Questionable spikes throughout B-19
- Front Passenger Upper Neck X Moment, Questionable data from 14.5ms B-38
- Rear Passenger RibEye Left Rib 01 Displacement X, Questionable data from 80.3ms to 101ms B-57
- Rear Passenger RibEye Left Rib 01 Displacement Y, Questionable data from 80.3ms to 101ms B-57
- Rear Passenger RibEye Right Rib 05 Displacement X, Data anomaly due to chest pot or abdominal insert interference B-62
- Rear Passenger RibEye Right Rib 05 Displacement Y, Data anomaly due to chest pot or abdominal insert interference B-62
- Rear Passenger RibEye Right Rib 06 Displacement X, Data anomaly due to chest pot or abdominal insert interference B-62
- Rear Passenger RibEye Right Rib 06 Displacement Y, Data anomaly due to chest pot or abdominal insert interference B-63

PRELIMINARY INJURY SUMMARY: Driver

Test Vehicle: 2015 Mazda 3 Hatchback - R20155404

NHTSA No.: R20155404

Test Program: NHTSA R&D Frontal Rigid Barrier

Test Date: 8/25/2015

Driver: THOR Serial No. DL9207 Injury Summary

Location	Description	Unit	Source	Max	Min
Head	15 ms HIC		Compute	238.26	
	Brain Injury Criteria		Compute	0.56	
	Head Rotational Velocity X	Deg/s	60	243.49	-266.32
	Head Rotational Velocity Y	Deg/s	60	876.34	-1694.71
	Head Rotational Velocity Z	Deg/s	60	448.38	-288.37
Neck	Upper Neck Z-axis Force	N	1000	1406.65	-271.70
	Upper Neck Y-axis Moment	N-m	Thortest	187.12	-172.03
Chest	Upper Left Resultant Chest Deflection	mm	Thortest	22.31	
	Upper Right Resultant Chest Deflection	mm	Thortest	51.11	
	Lower Left Resultant Chest Deflection	mm	Thortest	10.97	
	Lower Right Resultant Chest Deflection	mm	Thortest	27.83	
Abdomen	Lower Left X-axis Deflection	mm	Thortest	7188.88 ⁽¹⁾	-47.88 ⁽¹⁾
	Lower Right X-axis Deflection	mm	Thortest	0.10	-53.91
Acetabulum	Left Acetabulum Resultant Force	N	Compute	2636.04	2.04
	Right Acetabulum Resultant Force	N	Compute	2517.90	0.70
Femur	Left Femur Force, FZ	N	600	328.53	-3743.84
	Right Femur Force, FZ	N	600	456.70	-3890.85
Tibia	Left Upper Tibia, FZ	N	600	88.44	-2047.95
	Left Upper Tibia Index		Compute	0.29	
	Right Upper Tibia, FZ	N	600	100.90	-1435.33
	Right Upper Tibia Index		Compute	0.25	
	Left Lower Tibia, FZ	N	600	133.24	-3100.88
	Left Lower Tibia Index		Compute	0.33	
	Right Lower Tibia, FZ	N	600	116.56	-1862.36
	Right Lower Tibia Index		Compute	0.38	
Ankle	Left Ankle Rotation, RX	Deg	180	-0.91	-22.23
	Left Ankle Rotation, RY	Deg	180	15.08	-8.00
	Left Ankle Dorsiflexion Moment, MY	Nm	Compute	31.55	-17.10
	Left Ankle In/Eversion Moment, MX	Nm	Compute	18.73	-23.49
	Right Ankle Rotation, RX	Deg	180	13.54	-29.82
	Right Ankle Rotation, RY	Deg	180	14.31	-11.40
	Right Ankle Dorsiflexion Moment, MY	Nm	Compute	23.79	-28.91
	Right Ankle In/Eversion Moment, MX	Nm	Compute	13.59	-49.90

Anomalies:

(1) Questionable Data: Bad Calibration

PRELIMINARY INJURY SUMMARY: Right Front Passenger

Test Vehicle: 2015 Mazda 3 Hatchback - R20155404 NHTSA No.: R20155404
 Test Program: NHTSA R&D Frontal Rigid Barrier Test Date: 8/25/2015

Right Front Passenger: HF Serial No. 324 Injury Summary

Location	Description	Unit	Source	Max	Min
Head	15 ms HIC		Compute	257.76	
	Brain Injury Criteria (BrIC)		Compute	0.52	
Neck	Upper Neck Force Z	N	1000	768.93	-310.70
	Upper Neck Moment Y	Nm	600	22.97	-30.30
	NIJ		Compute	0.45	
Chest	Chest Potentiometer Deflection	mm	600		-17.73
	Left Ribeye 01 X-Axis Deflection	mm	600	0.23	-21.70
	Left Ribeye 02 X-Axis Deflection	mm	600	0.20	-20.36
	Left Ribeye 03 X-Axis Deflection	mm	600	0.30	-19.53
	Left Ribeye 04 X-Axis Deflection	mm	600	0.30	-18.32
	Left Ribeye 05 X-Axis Deflection	mm	600	0.22	-17.24
	Left Ribeye 06 X-Axis Deflection	mm	600	0.24	-16.18
	Right Ribeye 01 X-Axis Deflection	mm	600	0.21	-12.51
	Right Ribeye 02 X-Axis Deflection	mm	600	1.76	-10.58
	Right Ribeye 03 X-Axis Deflection	mm	600	3.37	-9.42
	Right Ribeye 04 X-Axis Deflection	mm	600	0.31	-8.32
	Right Ribeye 05 X-Axis Deflection	mm	600	0.30	-7.54
	Right Ribeye 06 X-Axis Deflection	mm	600	15.91 ⁽²⁾	-5.06 ⁽²⁾
	Overall Ribeye X-Axis Deflection	mm	600	15.91 ⁽²⁾	-21.70
	Chest Resultant Acceleration	g	Compute	41.24	
	Chest Resultant Acceleration, 3 ms clip	g	Compute	39.83	
	Pelvis Resultant Acceleration	g	Compute	49.54	
Femur	Left Femur Force, FZ	N	600	1800.66	-166.99
	Right Femur Force, FZ	N	600	2304.79	-71.56
Tibia	Left Upper Tibia, FZ	N	600	1207.14	-1131.13
	Left Upper Tibia Index		Compute	0.67	
	Right Upper Tibia, FZ	N	600	1309.63	-106.42
	Right Upper Tibia Index		Compute	0.34	
	Left Lower Tibia, FZ	N	600	894.30	-1673.23
	Left Lower Tibia Index		Compute	0.87	
	Right Lower Tibia, FZ	N	600	943.91	-49.92
	Right Lower Tibia Index		Compute	0.57	
Anomalies					
(2) Interference by Chest Pot or Abdominal Insert					

PRELIMINARY INJURY SUMMARY: Right Rear Passenger

Test Vehicle: 2015 Mazda 3 Hatchback - R20155404 NHTSA No.: R20155404
 Test Program: NHTSA R&D Frontal Rigid Barrier Test Date: 8/25/2015

Right Rear Passenger: HF Serial No. 019 Injury Summary

Location	Description	Unit	Source	Max	Min
Head	15 ms HIC		Compute	1098.89	
Neck	Upper Neck Force Z	N	1000	3387.84	-2182.40
	Upper Neck Moment Y	Nm	600	46.84	-67.67
	NIJ		Compute	1.29	
Chest	Chest Potentiometer Deflection	mm	600		-39.13
	Left Ribeye 01 X-Axis Deflection	mm	600	0.30 ⁽³⁾	-86.06 ⁽³⁾
	Left Ribeye 02 X-Axis Deflection	mm	600	0.54	-52.83
	Left Ribeye 03 X-Axis Deflection	mm	600	0.36	-54.06
	Left Ribeye 04 X-Axis Deflection	mm	600	0.36	-52.48
	Left Ribeye 05 X-Axis Deflection	mm	600	0.30	-50.59
	Left Ribeye 06 X-Axis Deflection	mm	600	0.80	-47.88
	Right Ribeye 01 X-Axis Deflection	mm	600	0.23	-22.05
	Right Ribeye 02 X-Axis Deflection	mm	600	1.04	-20.71
	Right Ribeye 03 X-Axis Deflection	mm	600	0.44	-17.75
	Right Ribeye 04 X-Axis Deflection	mm	600	0.91	-14.60
	Right Ribeye 05 X-Axis Deflection	mm	600	31.00 ⁽³⁾	-24.90 ⁽³⁾
	Right Ribeye 06 X-Axis Deflection	mm	600	26.37 ⁽³⁾	-23.59 ⁽³⁾
	Overall Ribeye X-Axis Deflection	mm	600	31.00 ⁽³⁾	-86.06 ⁽³⁾
	Chest Resultant Acceleration	g	Compute	58.64	
	Chest Resultant Acceleration, 3 ms clip	g	Compute	54.63	
	Pelvis Resultant Acceleration	g	Compute	61.86	
Pelvis	Left ASIS Force X	N	600	176.09	-3645.13
	Right ASIS Force X	N	600	210.29	-4100.49
Femur	Left Femur Force Z	N	600	1089.41	-310.28
	Right Femur Force Z	N	600	941.87	-475.77
Anomalies (3) Interference by Chest Pot or Abdominal Insert					

SECTION 3 DATA SHEETS

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
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DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015

VEHICLE INFORMATION

NHTSA No.	R20155404
Model Year	2015
Make	Mazda
Model	Mazda 3
Body Style	5-Door Hatchback
VIN	JM1BM1L73F1268510
Body Color	Charcoal Gray
Odometer Reading (km/mi)	35.4 km / 22 mi
Engine Displacement. (L)	2.0
Type/No. Cylinders	I4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6-Speed
Overdrive	Yes
Final Drive	Front Wheel Drive
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes
All-Wheel Drive (AWD)	No
Traction Control System (TCS)	Yes

VEHICLE OPTIONS

Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
Power Window Auto-Reverse	Yes
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	No
Driver Load Limiter	Yes
Pass. Load Limiter	Yes
Other Safety Restraint	-

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

Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Mazda Motor Corporation
Date of Manufacture	4/15

GWR (kg)	1815
GAWR Front (kg)	975
GAWR Rear (kg)	848

VEHICLE SEATING AND WEIGHT CAPACITY

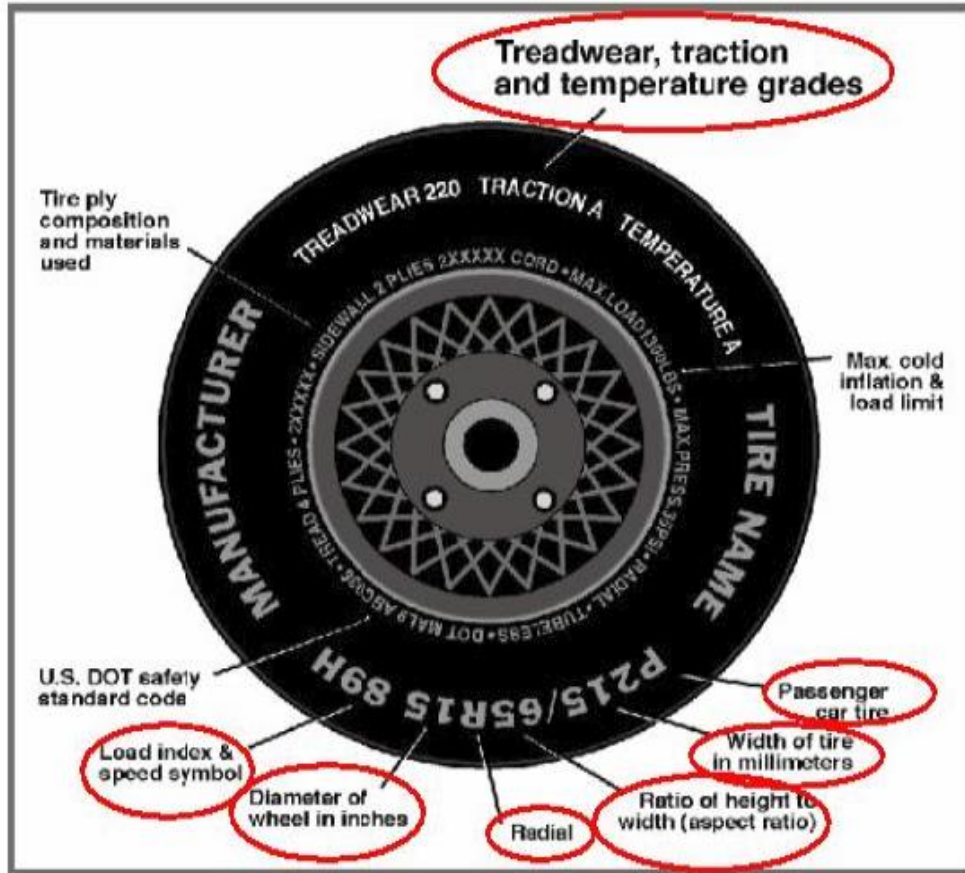
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	-	
Number of Occupants	2	3	-	5
Capacity Wt. (VCW) (kg)				385
Cargo Wt. (RCLW) (kg)				44.8

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

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015

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



Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	250	250
Recommended Tire Size	P205/60R16	P205/60R16
Tire Size on Vehicle	P205/60R16	P205/60R16
Tire Manufacturer	Yokohama	Yokohama
Tire Model	Avid 534FV	Avid 534FV
Treadwear	320	320
Traction	B	B
Temperature Grades	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel	1 Polyester, 2 Steel
Load Index/Speed Symbol	91H	91H
Tire Material	Polyester, Steel	Polyester, Steel
DOT Safety Code Right	FD20 PHY1215	FD20 PHY1215
DOT Safety Code Left	FD20 PHY1215	FD20 PHY1215

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

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	417	254		463	349	
Right	kg	378	265		428	359	
Ratio	%	61%	39%		55.7%	44.3%	
Totals	kg	795	519	1314	891	708	1599

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1314
Weight of 1 THOR & 2 HIII 5 th Females	kg	211
Rated Cargo/Luggage Weight (RCLW)	kg	44.8
Calculated Vehicle Target Weight (TVTW)	kg	1569.8

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	700	701	720	728	1064
As Tested	mm	684	691	669	674	1193
Post Test	mm	737	723	637	687	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2,694
Total Vehicle Length at Left Side	mm	4,339
Total Vehicle Length at Centerline	mm	4,463
Total Vehicle Length at Right Side	mm	4,340
Weight of Ballast in Cargo Area	kg	0
Weight of Vehicle Components Removed	kg	61
Amount of Stoddard Solvent in Fuel Tank	L	16.7

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:

Trunk carpeting, spare tire, jack, tail light, side view mirrors, right rear door window and Trim, rear hatch, rear bumper and cover.

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

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements		Pre-Test
1	Total Length	mm	4463
2	Total Width	mm	1796
3*	Bumper Top Height	mm	566
4*	Bumper Bottom Height	mm	457
5*	Longitudinal Member Top Height	mm	598
6	Distance Between Longitudinal Members	mm	1007
7	Longitudinal Member Width	mm	60
8*	Engine Top Height	mm	861
9*	Engine Bottom Height	mm	217
10	Engine and Gearbox Width	mm	620
11	Front Bumper-Engine Distance	mm	640
12*	Front Shock Absorber Fixing Height	mm	916
13*	Bonnet Leading Edge Height	mm	822
14	Front Shock Absorber Fixing Width	mm	1138
15	Front Bumper – Front Axle Distance	mm	926
16	Front Axle – A Pillar Distance	mm	554
17	A-Pillar – B-Pillar Distance	mm	1105
18	B-Pillar – Rear Axle Distance	mm	1036
19	B-Pillar – C-Pillar Distance	mm	1221
20*	Roof Sill Bottom Height	mm	1356
21*	Roof Sill Top Height	mm	1405
22*	Floor Sill Bottom Height	mm	362
23*	Floor Sill Top Height	mm	409

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

DATA SHEET NO. 2

SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

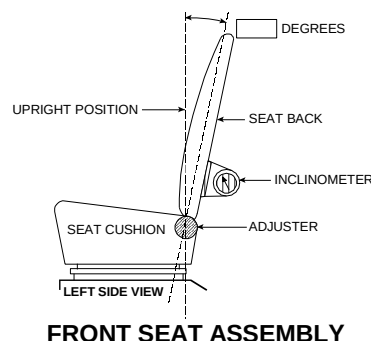
NHTSA No.: R20155404
 Test Date: 8/25/2015

NORMAL DESIGN RIDING POSITION

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

Driver seat: The driver seat back was positioned according to the Nominal Design Riding position listed in FORM 1

Passenger Seat: The passenger seat back was positioned according to the Nominal Design Riding position listed in FORM 1. Rear Passenger seatback is a fixed angle.



	Deg.
Driver Seat Back Angle	4.0
Passenger Seat Back Angle	4.4
Rear Passenger Seat Back Angle	FIXED

SEAT FORE/AFT POSITIONS

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

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

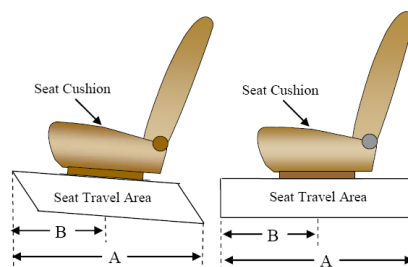
	Total Fore/Aft Travel	Placed in Position #
Driver Seat	27 (0-26)	13
Passenger Seat	27 (0-26)	13
Rear Passenger Seat	FIXED	FIXED

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	3	0
Passenger Seat	3	0
Rear Passenger Seat	FIXED	FIXED



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

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015

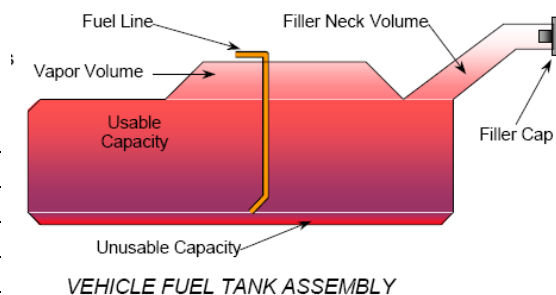
FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	50.0
Usable Capacity of "Optional Tank"	N/A
93% of Usable Capacity	46.5
Actual Amount of Solvent Used	16.7
1/3 of Usable Capacity	16.7

FUEL PUMP

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

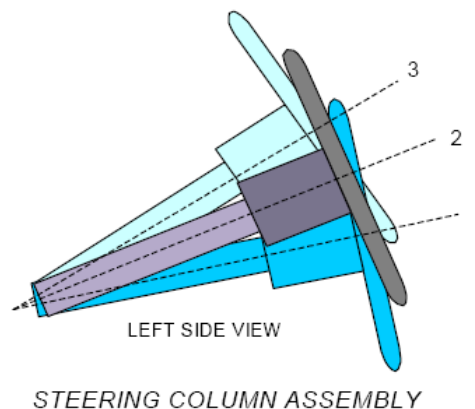
Fuel evacuated according to the specifications provided by the manufacturer in Form 1. Electric fuel pump operates when the ignition is in the 'on' position and the engine is running. The fuel filler neck is located above the left rear wheel.



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)



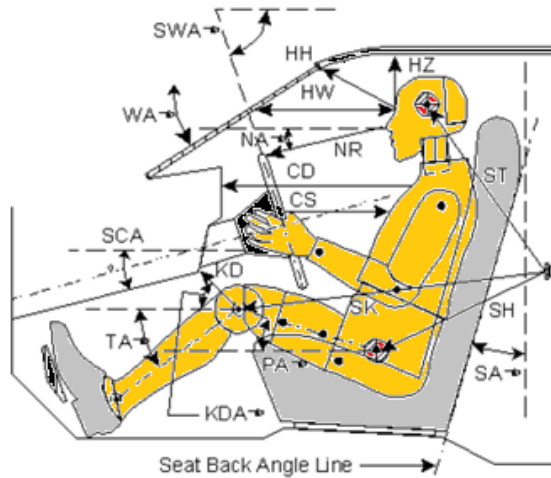
STEERING COLUMN POSITIONS

	Tilt (degrees)	Fore/Aft Position (mm)
Lowermost position No. 1	21	
Geometric center position No. 2	23.3	
Uppermost position No. 3	25.6	
Telescoping Steering Wheel Travel		50
Test Position	23.3	25

DATA SHEET NO. 3 DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Mazda 3 Hatchback
Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
Test Date: 8/25/2015

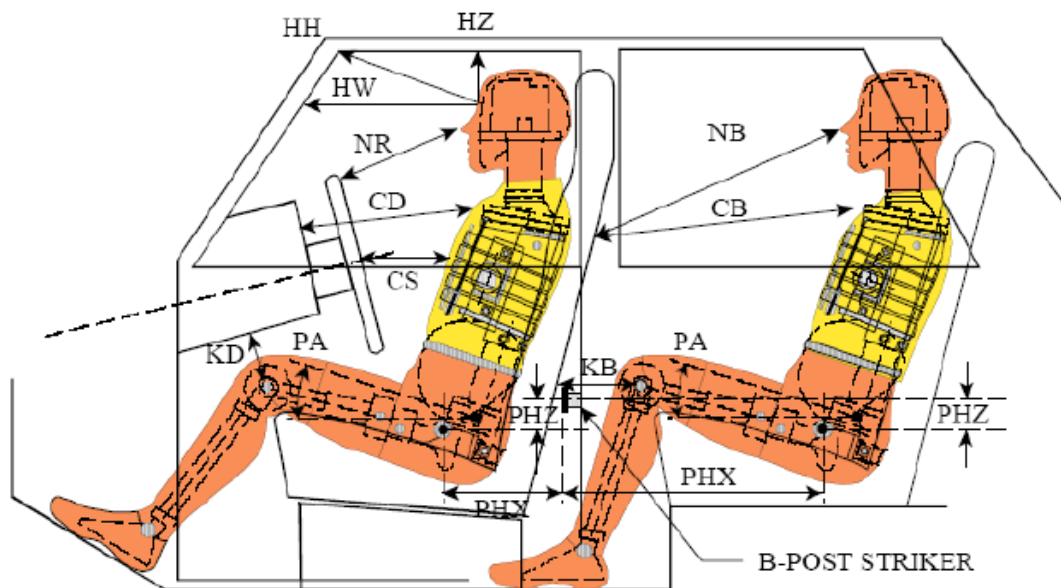


Code	Measurement Description	Driver (Serial # THOR DL9207)		Front Passenger (Serial # 324)	
		Length (mm)	Angle(°)	Length (mm)	Angle (°)
WA°	Windshield Angle		27.3		
SWA°	Steering Wheel Angle		23.1		
SCA°	Steering Column Angle		66.9		
SA°	Seat Back Angle (on headrest post)		5.2		4.3
HZ	Head to Roof (Z)	197	90.0	272	90
HH	Head to Header	377	20.1	373	42.4
HW	Head to Windshield	641	0	745	0
NR	Nose to Rim	495	16.9	540	17.4
CD	Chest to Dash	580		507	
CS	Chest to Steering Hub	362	5.1		
RA	Rim to Abdomen	185	0		
KDL	Left Knee to Dash	112	24.8	205	32.1
KDR	Right Knee to Dash	115	22.3	224	30.1
PA°	Pelvic Angle		35.1		21.4
TA°	Tibia Angle		44.2		33.2
SK	Striker to Knee	593	-1.7	551	-12.6
ST	Striker to Head	480	86.8	373	-81.9
SH	Striker to H-Point	262	-38.8	227	-43.1
HAX°	Head Angle (X)		0.2		
HAY°	Head Angle (Y)		-1.7		
TAX°	T6 Angle (X)		-0.7		
TAY°	T6 Angle (Y)		25.2		
TAX°	T1 (X)		-1.3		
TAY°	T1 (Y)		3.6		
TAX°	T12 (X)		-0.6		
TAY°	T12 (Y)		34.1		
	Pelvis (X)		0.1		
	Pelvis (Y)		35.1		

DATA SHEET NO. 3 (CONTINUED)
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015



LEFT SIDE VIEW

NOTE: 2-DOOR VEHICLE SHOWN.
 REAR DUMMY PHX & PHZ
 MEASUREMENTS FOR A 4-DOOR
 VEHICLE WOULD USE THE C-POST
 STRIKER AS A REFERENCE POINT

Code	Measurement Description	Rear Passenger (Serial # 019)	
		Length (mm)	Angle (°)
SA°	Seat Back Angle (on headrest post)		19.0
HZ	Head to Roof (Z)	290	
NR	Nose to Seatback	479	
CB	Chest to Seatback	495	
KDL	Left Knee to Seatback	230	11.5
KDR	Right Knee to Seatback	230	9.1
PAX°	Pelvic Tilt Angle (X-axis)		0.0
PAY°	Pelvic Tilt Angle (Y-axis)		21.9
PHX	Hip Point to Striker (X-Axis)	239	
PHZ	Hip Point to Striker (Z-Axis)	304	

DATA SHEET NO.3 (CONTINUED) **DUMMY CMM MEASUREMENTS**

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015

MEASUREMENT LOCATIONS

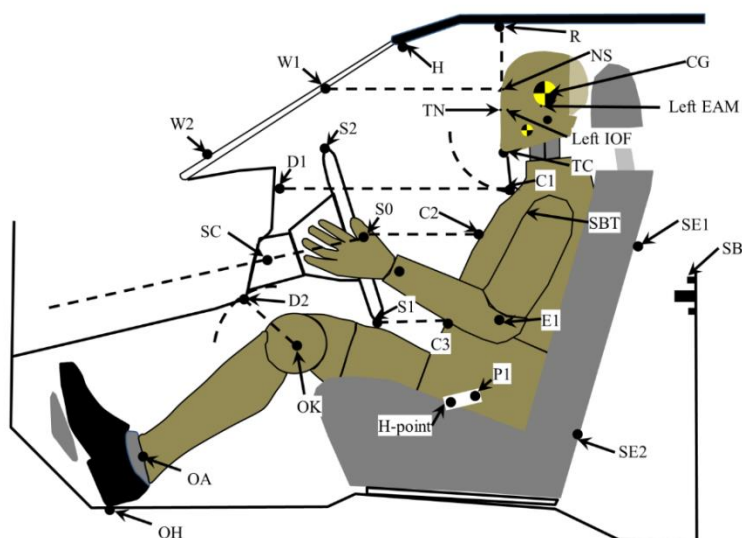


DIAGRAM #1

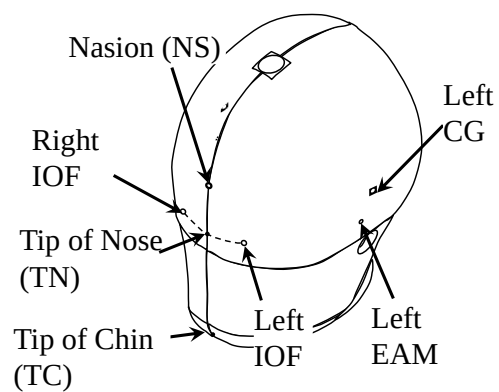


DIAGRAM #2

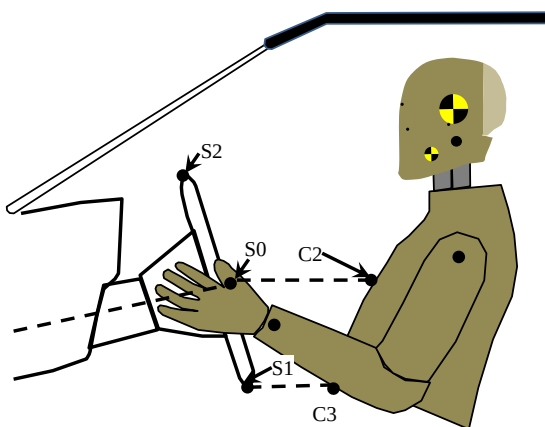


DIAGRAM #3

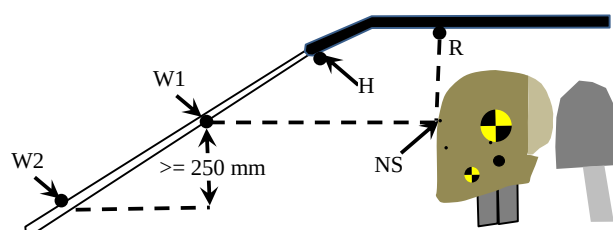


DIAGRAM #4

DATA SHEET NO.3 (CONTINUED)
DUMMY CMM MEASUREMENTS

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015

DRIVER MEASUREMENT PONITS

Description	Units	Driver		
		X	Y	Z
Tip of Striker	mm	1,998	-788	-69
Top of Head Restraint	mm	1,828	-368	-675
Outboard Head Restraint Post	mm	1,773	-452	-409
Head CG	mm	1,971	-444	-548
Nasion	mm	2,067	-368	-553
Tip of Nose	mm	2,067	-368	-518
Tip of Chin	mm	2,060	-368	-416
LEAM	mm	1,978	-439	-519
LIOF	mm	2,062	-400	-516
RIOF	mm	2,064	-337	-515
Outboard Elbow	mm	2,216	-603	-107
H-Point	mm	2,202	-559	95
Center of H-Point Tool	mm	2,124	-606	68
Left Knee	mm	2,591	-568	-51
Right Knee	mm	2,600	-276	-63
Left Ankle	mm	2,893	-580	237
Right Heel	mm	2,917	-561	368
Left Heel	mm	2,868	-195	380
W1 – Upper Windshield	mm	2,751	-367	-552
W2 – Lower Windshield	mm	2,932	-364	-440
Header	mm	2,417	-367	-697
Head to Roof	mm	2,069	-367	-755
C1- Upper Chest	mm	2,108	-367	-276
C2 – Mid Chest	mm	2,114	-368	-259
C3 – Lower Chest	mm	2,221	-367	-102
S2 – Top Steering Wheel Rim	mm	2,544	-367	-424
S1 – Lower Steering Wheel Rim	mm	2,411	-368	-101
SC – Steering Column	mm	2,663	-487	-185
D1 – Dash Point	mm	2,474	-368	-279
D2 – Knee Bolster	mm	2,688	-567	-105
SE1 – Seatback Point	mm	1,762	-368	-261
SE2 – Seatback Point	mm	1,931	-368	164
Left Front Outboard Seat Anchor Bolt	mm	2447	-608	307
Left Rear Outboard Seat Anchor Bolt	mm	2006	-610	353

Reference point:

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

DATA SHEET NO.3 (CONTINUED)
DUMMY CMM MEASUREMENTS

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015

FRONT PASSENGER MEASUREMENT POINTS

Description	Units	Front Passenger		
		X	Y	Z
Tip of Striker	mm	1,995	788	-70
Top of Head Restraint	mm	1,875	366	-615
Outboard Head Restraint Post	mm	1,800	449	-412
Head CG	mm	2,047	433	-439
Bridge of Nose	mm	2,138	366	-446
Tip of Nose	mm	2,159	367	-416
Tip of Chin	mm	2,145	366	-346
Outboard Shoulder Bolt	mm	2,026	520	-206
Outboard Elbow	mm	2,138	580	-18
H-Point	mm	2,197	623	119
Center of H-Point Tool	mm	2,109	634	90
Left Knee	mm	2,537	318	49
Right Knee	mm	2,533	479	50
Left Ankle	mm	2,793	299	287
Right Ankle	mm	2,798	455	280
Left Heel	mm	2,798	285	385
Right Heel	mm	2,796	452	378
W1 – Upper Windshield	mm	2,962	367	-444
W2 – Lower Windshield	mm	3,107	365	-366
Header	mm	2,418	365	-697
Head up to Roof	mm	2,138	367	-728
C1 - Upper Chest	mm	2,148	366	-211
D1 - Dash Point	mm	2,661	366	-210
D2 - Dash Bolster	mm	2,708	318	-65
SE1 - Seat Back Point	mm	1,949	359	175
SE2 - Seat Back Point	mm	1,789	360	-261
Right Front Outboard Seat Anchor Bolt	mm	2445	611	305
Right Rear Outboard Seat Anchor Bolt	mm	2004	609	352

Reference point:

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

DATA SHEET NO.3 (CONTINUED)
DUMMY CMM MEASUREMENTS

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015

Description	Units	Rear Passenger		
		X	Y	Z
Tip of Striker	mm	1,091	757	-208
Top of Head Restraint	mm	909	350	-530
Outboard Head Restraint Post	mm	883	416	-454
Head CG	mm	1,174	420	-457
Bridge of Nose	mm	1,261	350	-465
Tip of Nose	mm	1,282	350	-436
Tip of Chin	mm	1,267	349	-361
Outboard Shoulder Bolt	mm	1,165	503	-222
Outboard Elbow	mm	1,229	587	-18
H-Point	mm	1,330	148	96
Center of H-Point Tool	mm	1,245	96	63
Left Knee	mm	1,667	295	42
Right Knee	mm	1,666	461	40
Left Ankle	mm	1,850	276	338
Right Ankle	mm	1,842	448	339
Left Heel	mm	1,779	247	410
Right Heel	mm	1,778	430	412
Head up to Roof	mm	1,257	350	-752
C1 - Upper Chest	mm	1,276	351	-227
D1 - Dash Point	mm	1,827	350	-229
D2 - Dash Bolster	mm	1,896	297	-3
SE1 - Seat Back Point	mm	866	345	-365
SE2 - Seat Back Point	mm	1029	345	-55

Reference point:

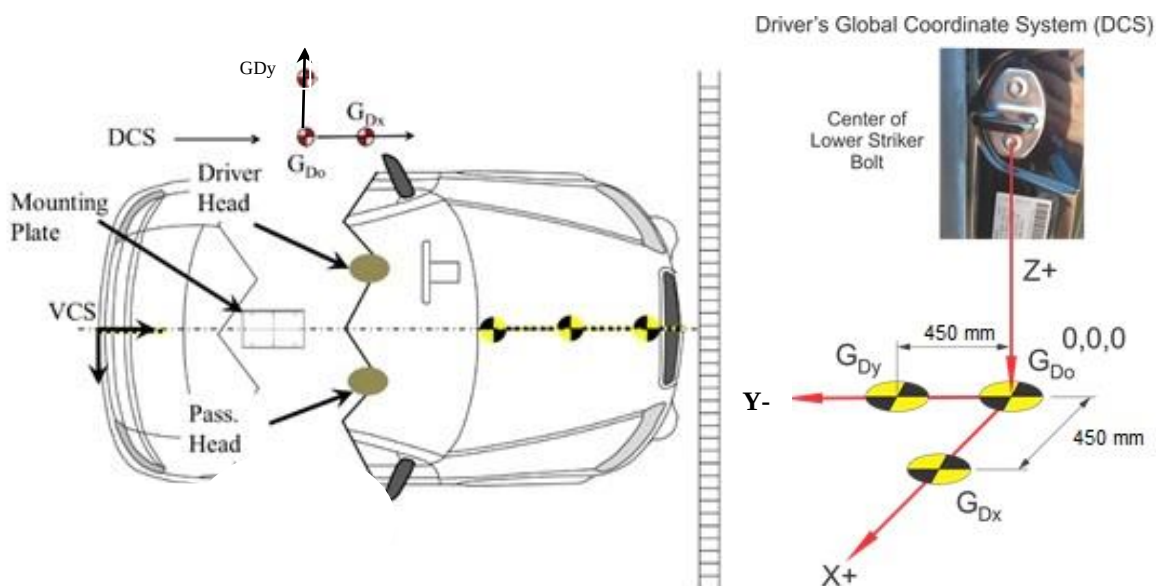
- +X – From the rear of the vehicle to the front of the vehicle
- +Y – From the left side of the vehicle to the right side of the vehicle
- +Z – From the top of the vehicle to the bottom of the vehicle

DATA SHEET NO.3 (CONTINUED) DUMMY CMM MEASUREMENTS

Test Vehicle: 2015 Mazda 3 Hatchback
Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
Test Date: 8/25/2015

DRIVER GLOBAL COORDINATE SYSTEM



Driver ATD Measurement Points

Measurement Points	Units	Measurements (mm)		
		X	Y	Z
Head CG	mm	0	347	-1170
Nasion	mm	97	422	-1175
Tip of Nose	mm	96	422	-1140
Tip of Chin	mm	89	422	-1039
LEAM	mm	7	351	-1141
LIOF	mm	92	390	-1138
RIOF	mm	94	454	-1137

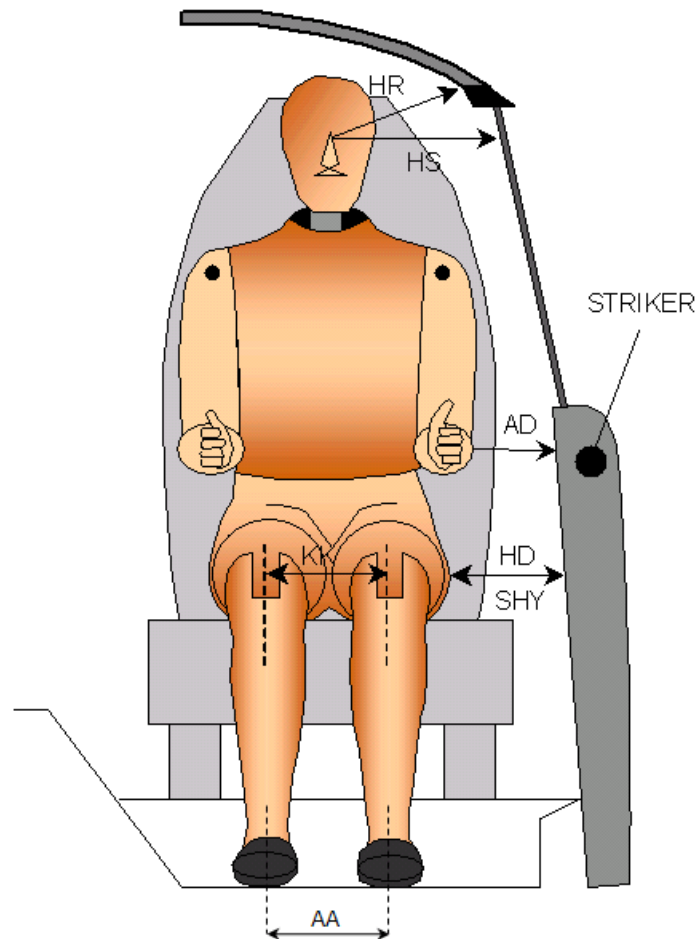
Reference point:

- +X – From GD_0 to the front of the vehicle
- +Y – From GD_0 to the right side of the vehicle
- +Z – From GD_0 into the ground

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015

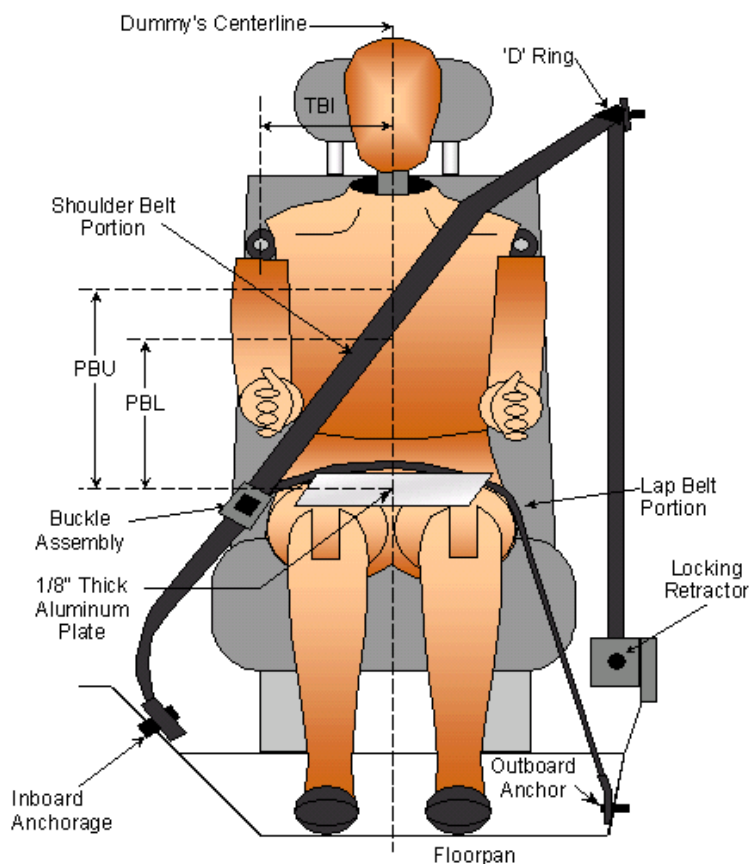


Code	Description	Units	Driver	Front Passenger	Rear Passenger
AD	Arm to Door	mm	124	118	94
HD	H-Point to Door	mm	148	182	188
HR	Head to Side Header	mm	220	284	263
HS	Head to Side Window	mm	340	375	365
KK	Knee to Knee	mm	340	165	167
SHY	Striker to H-Point (Y Direction)	mm	245	280	285
AA	Ankle to Ankle	mm	348	163	165

DATA SHEET NO. 5 SEAT BELT POSITIONING DATA

Test Vehicle: 2015 Mazda 3 Hatchback
Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
Test Date: 8/25/2015



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger	Rear Pass.
PBU — Top surface of reference to belt upper edge	mm	365	300	286
PBL — Top surface of reference to belt lower edge	mm	290	230	205

BELT LENGTH DATA

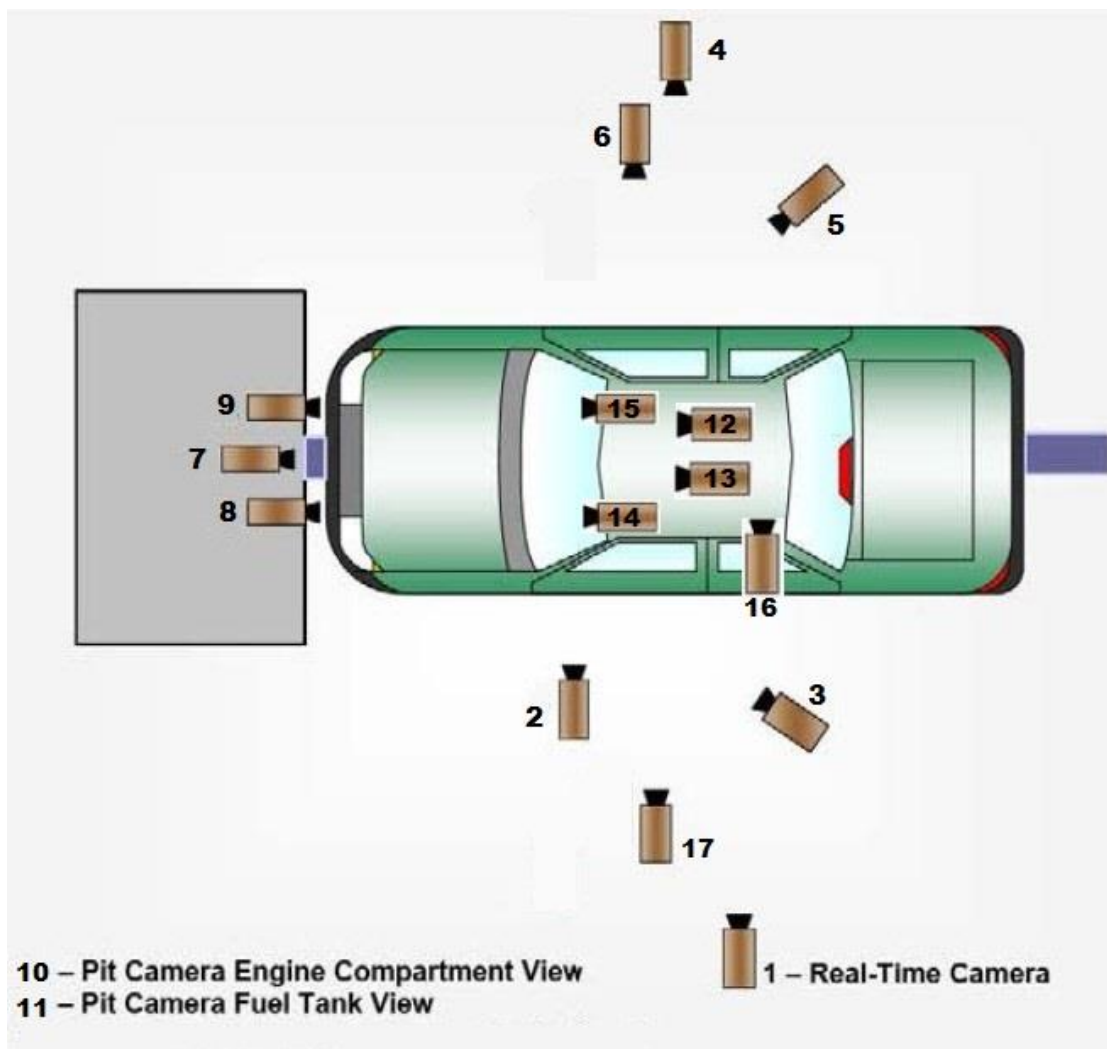
Measurement Description	Units	Driver	Passenger	Rear Pass.
Shoulder belt length as measured on ATD	mm	850	845	905
Lap Belt Length as measured on ATD	mm	745	670	630
Remainder of belt on reel	mm	885	965	1115
Total belt length for continuous webbing systems	mm	2480	2480	2650

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

Test Vehicle: 2015 Mazda 3 Hatchback
Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
Test Date: 8/25/2015

HORIZONTAL LOCATION



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

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015

CAMERA LOCATIONS

No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Side	--	--	--	Zoom	60
2	Left Front Half	-906	-9538	-1600	50	1000
3	Left Angle	-2537	-3018	-2253	28	1000
4	Right Overall	-1910	8592	-1085	24	1000
5	Right Angle	-2664	2702	-2000	28	1000
6	Right Front Half	-1067	6472	-1073	28	1000
7	Windshield	100	0	-3525	20	1000
8	Driver Windshield	-450	-606	-1989	12.5	1000
9	Passenger Windshield	-450	606	-1989	12.5	1000
10	Pit Front	-678	0	1530	13	1000
11	Pit Rear	-2526	0	1521	13	1000
12	Onboard Driver Airbag	-2808	82	-1254	12.5	1000
13	Onboard Passenger Airbag	-2808	-261	-1254	12.5	1000
14	Onboard Driver Toepan	-1698	-356	-295	6.5	1000
15	Onboard Front Passenger Toepan	-1698	356	-295	6.5	1000
16	Onboard Rear Passenger Side View	-3036	-471	-913	12.5	1000
17	Left Overall	-2053	-9100	-1646	24	1000

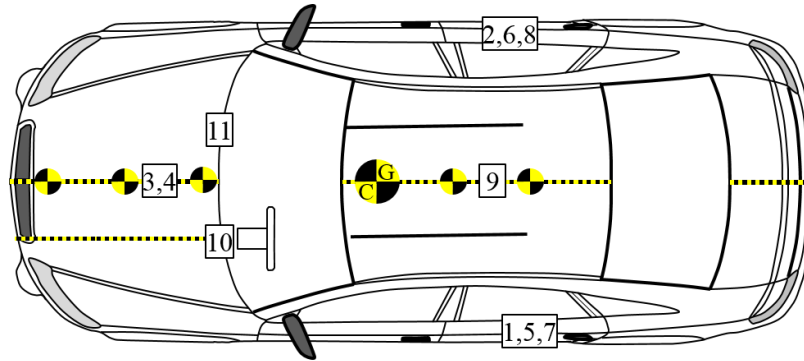
Reference Point:

- +X – forward of impact plane
- +Y – right of monorail center
- +Z – into ground

DATA SHEET NO. 7
VEHICLE INSTRUMENTATION DATA

Test Vehicle: 2015 Mazda 3 Hatchback
Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
Test Date: 8/25/2015



VEHICLE INSTRUMENTATION PRE-TEST LOCATIONS

No.	Instrumentation Location	Axes	Units	Measurements (mm)		
				X	Y	Z
1	Left Rear Seat Cross Member	X,Z	mm	1659	-329	333
2	Right Rear Seat Cross Member	X,Z	mm	1657	334	337
3	Top of Engine	X	mm	3603	123	-191
4	Bottom of Engine*	X	mm			
5	Left Sill	X,Y	mm	1612	-740	296
6	Right Sill	X,Y	mm	1587	737	295
7	Left Rear Seat Cross Member Redundant	X,Z	mm	1587	-740	300
8	Right Rear Seat Cross Member Redundant	X,Z	mm	1613	739	298
9	Linear Acceleration & Angular Rate Sensors	X	mm	1762	1	239
		Y	mm	1750	11	241
		Z	mm	1751	0	235
10	Driver Toe Pan	X,Y,	mm	3148	-322	245
13	Front Passenger Toe Pan	X,Y,	mm	3072	356	248

*Note Bottom of engine accelerometer was removed for this test.

Reference point: Origin at rear centerline of vehicle. Vertical coordinate point for origin determined with contact of vehicle structure by 10 mm deep block moved downward along front edge of a level. The level is positioned perpendicular to ground and in contact with rear centerline of vehicle.

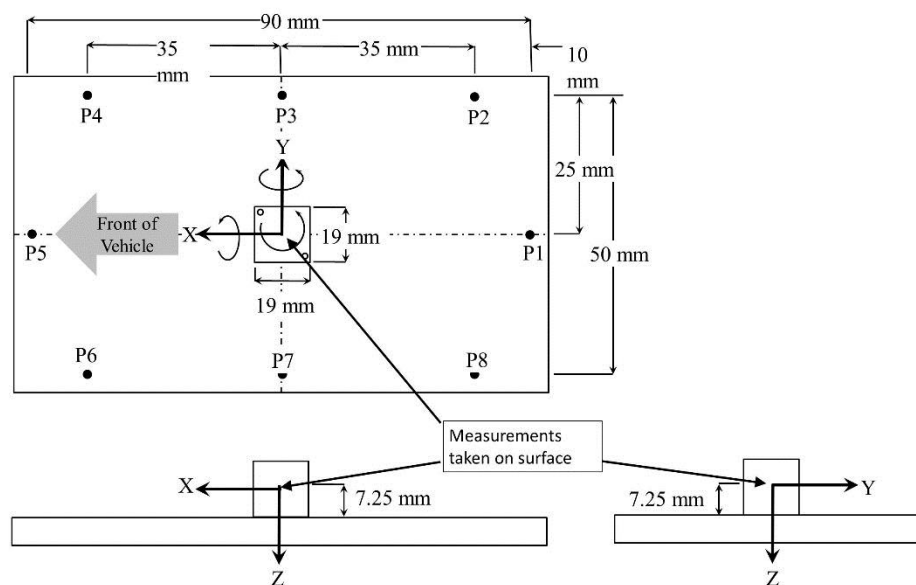
- +X – From the rear of the vehicle to the front of the vehicle
- +Y – From the left side of the vehicle to the right side of the vehicle
- +Z – From the top of the vehicle to the bottom of the vehicle

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

Test Vehicle: 2015 Mazda 3 Hatchback
Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
Test Date: 8/25/2015

ANGULAR RATE SENSOR



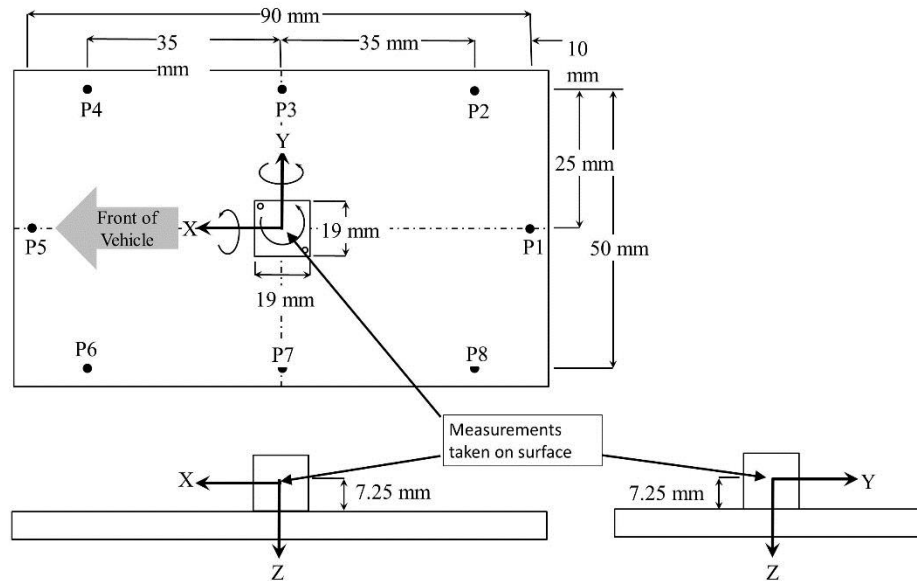
VEHICLE COORDINATE SYSTEM					
No.	Accelerometer Location	Units	Measurements (mm)		
			X	Y	Z
ACC-1	Accelerometer CG – X Direction	mm	1762	1	239
ACC-2	Accelerometer CG – Y Direction	mm	1750	11	241
ACC-3	Accelerometer CG – Z Direction	mm	1751	0	235
M1	Mounting Bolt 1	mm	1743	-8	235
M2	Mounting Bolt 2	mm	1758	8	235
P1	Plate Point 1	mm	1706	-1	250
P2	Plate Point 2	mm	1715	25	250
P3	Plate Point 3	mm	1750	25	250
P4	Plate Point 4	mm	1785	25	250
P5	Plate Point 5	mm	1796	0	250
P6	Plate Point 6	mm	1786	-25	250
P7	Plate Point 7	mm	1751	-25	250
P8	Plate Point 8	mm	1716	-25	250

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

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015

ANGULAR RATE SENSOR



DRIVER GLOBAL COORDINATE SYSTEM					
No.	Accelerometer Location	Units	Measurements (mm)		
			X	Y	Z
ACC-1	Accelerometer CG – X Direction	mm	-208	791	-383
ACC-2	Accelerometer CG – Y Direction	mm	-221	801	-382
ACC-3	Accelerometer CG – Z Direction	mm	-220	790	-387
M1	Mounting Bolt 1	mm	-227	783	-387
M2	Mounting Bolt 2	mm	-212	798	-387
P1	Plate Point 1	mm	-265	790	-372
P2	Plate Point 2	mm	-255	815	-372
P3	Plate Point 3	mm	-220	815	-372
P4	Plate Point 4	mm	-185	816	-372
P5	Plate Point 5	mm	-175	791	-372
P6	Plate Point 6	mm	-184	766	-372
P7	Plate Point 7	mm	-219	765	-372
P8	Plate Point 8	mm	-254	765	-372

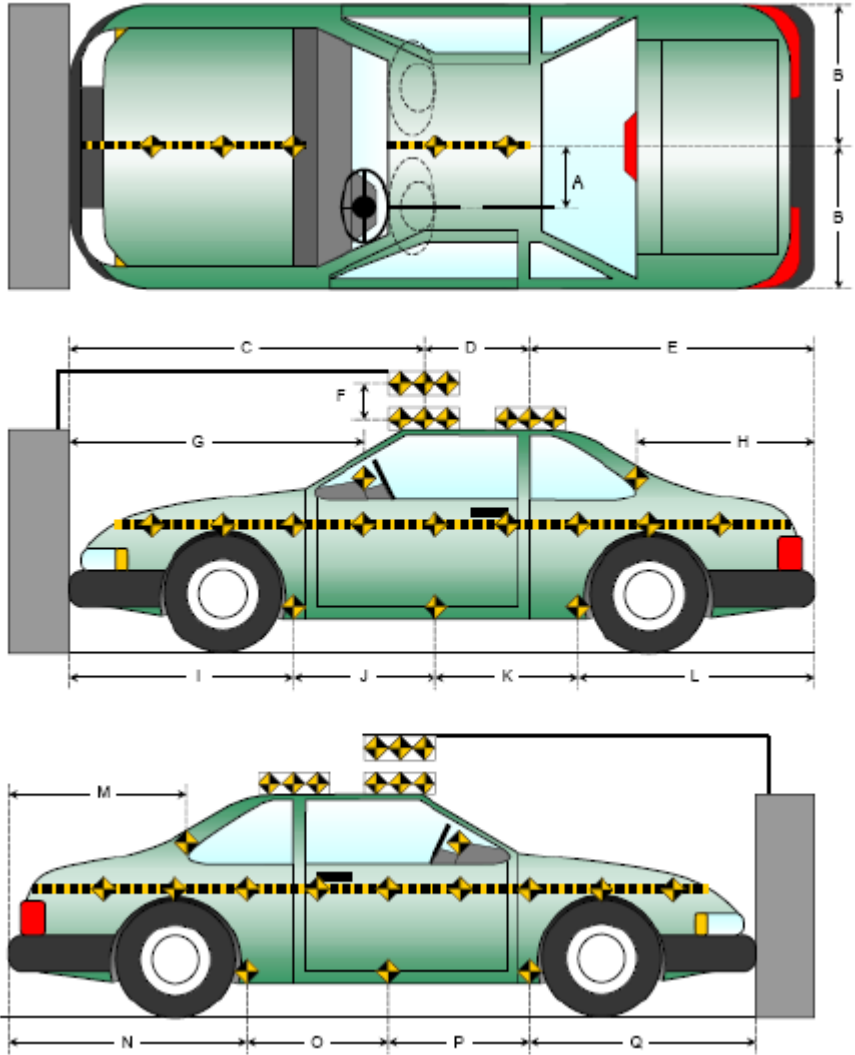
DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2015 Chevrolet Malibu
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015

Item	Value
A	371
B	898
C	2686
D	607
E	1154
F	189
G	1828
H	642
I	1359
J	920
K	915
L	1253
M	643
N	1255
O	909
P	925
Q	1359

All units in millimeters



DATA SHEET NO. 9
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015

INSTRUMENTATION

Instrumentation	Number of Channels Collected
Driver Dummy Accelerometers	108
Passenger Dummy Accelerometers	74
Rear Passenger Dummy Accelerometers	46
Vehicle Structure Accelerometers	39
Total	267

CAMERA COVERAGE

Type of Camera	Number Used in this Test
High-Speed Vehicle Onboard	5
High-Speed Off-board	11
Real-Time Panning	1
Total	17

DATA SHEET NO. 10
POST TEST OBSERVATIONS

Test Vehicle: 2015 Mazda 3 Hatchback
Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
Test Date: 8/25/2015

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Right Front Passenger	Rear Passenger
Dummy Type/Serial No.	THOR/DL9207	5 th Female/324	5 th Female/019
Lower Leg Type	LX		
Lower Leg Serial No.	LX0045/LX0046		
Head Contact	Front Airbag & Headrest	Front Airbag & Headrest	Seatback and Headrest
Upper Torso Contact	Front Airbag	Front Airbag	None
Lower Torso Contact	None	None	None
Left Knee Contact	Knee Bolster	None	Seatback
Right Knee Contact	Knee Bolster	None	Seatback

DOOR OPENING AND SEAT TRACK INFORMATION

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

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Remained in good condition
Windshield Damage	Cracks throughout with minor separation
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	563
Center	mm	522
Right Side	mm	577
Average	mm	554

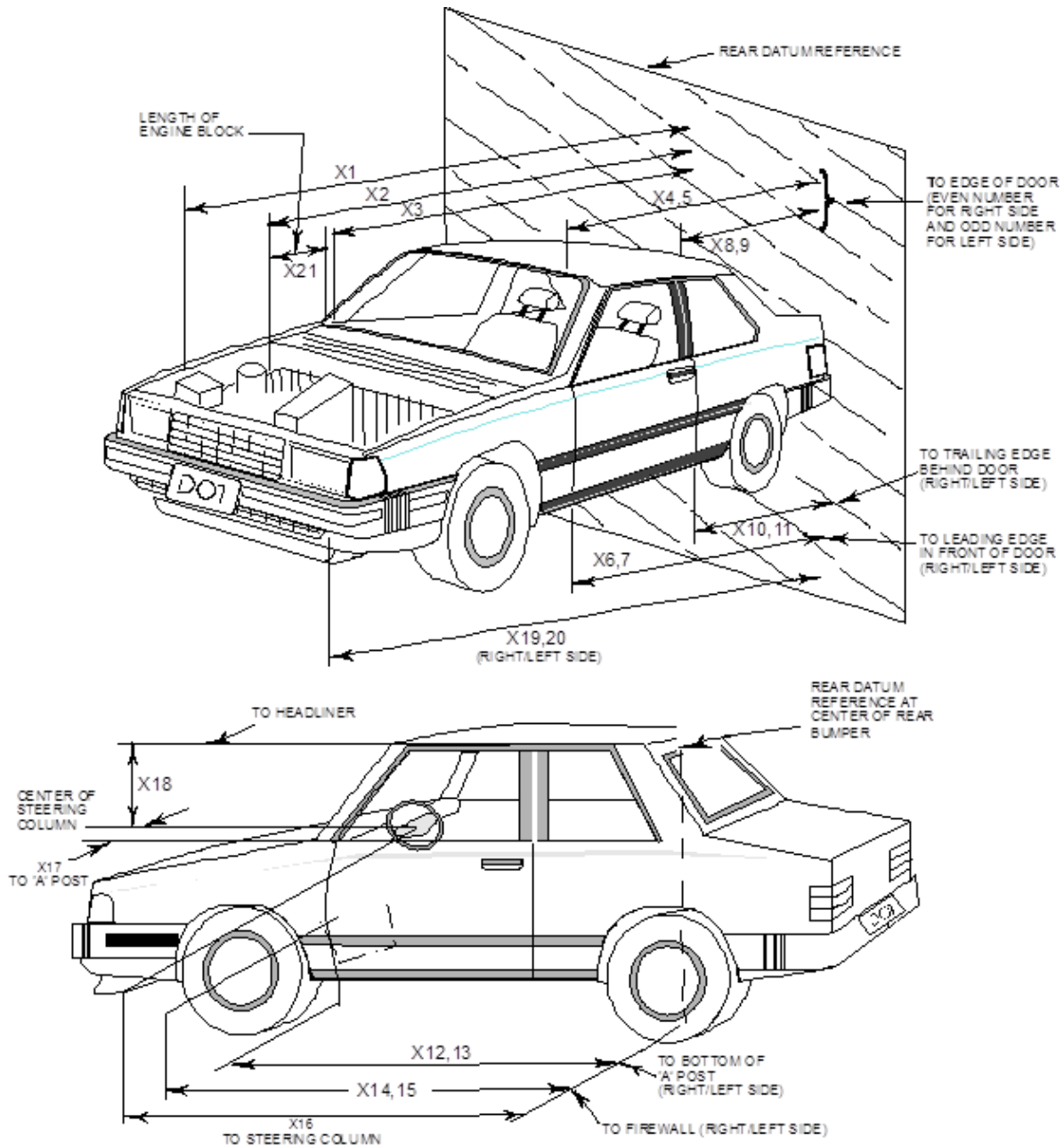
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Driver (Occupant 1)		Right Front Passenger (Occupant 2)		Rear Passenger (Occupant 3)	
	Installed	Deployed	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	Yes	Yes	Yes	No	N/A
Curtain Airbag	Yes	No	Yes	No	Yes	No
Torso Airbag	Yes	No	Yes	No	No	N/A
Knee Airbag	No	N/A	No	N/A	No	N/A
Seat Belt Pretensioner	Yes	Yes	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Yes	Yes	Yes	No	N/A
Other						

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

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015



DATA SHEET NO. 11 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	mm	4463	4087	-376
2	Rear Surface of Vehicle (RSOV) to Front of Engine	mm	3823	3495	-329
3	RSOV to Firewall	mm	3384	3330	-54
4	RSOV to Upper Leading Edge of Right Door	mm	2954	2950	-4
5	RSOV to Upper Leading Edge of Left Door	mm	2957	2951	-6
6	RSOV to Lower Leading Edge of Right Door	mm	2976	2972	-5
7	RSOV to Lower Leading Edge of Left Door	mm	2977	2971	-6
8	RSOV to Upper Trailing Edge of Right Door	mm	1886	1881	-5
9	RSOV to Upper Trailing Edge of Left Door	mm	1888	1883	-5
10	RSOV to Lower Trailing Edge of Right Door	mm	1943	1938	-6
11	RSOV to Lower Trailing Edge of Left Door	mm	1946	1939	-6
12	RSOV to Bottom of "A" Post of Right Side	mm	2996	2950	-46
13	RSOV to Bottom of "A" Post of Left Side	mm	2997	2997	-1
14	RSOV to Firewall, Right Side	mm	3300	3264	-37
15	RSOV to Firewall, Left Side	mm	3300	3275	-25
16	RSOV to Steering Column	mm	2482	2546	64
17	Center of Steering Column to "A" Post	mm	285	283	-2
18	Center of Steering Column to Headliner	mm	414	452	37
19	RSOV to Right Side of Front Bumper	mm	4396	4043	-354
20	RSOV to Left Side of Front Bumper	mm	4398	4040	-357
21	Length of Engine Block	mm	295	295	0
RD	RSOV to Right Side of Dash Panel	mm	2691	2682	-9
CD	RSOV to Center of Dash Panel	mm	2645	2631	-14
LD	RSOV to Left Side of Dash Panel	mm	2692	2687	-5

UR* = Unrecoverable Data Point

DATA SHEET NO. 12
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015

VEHICLE INFORMATION

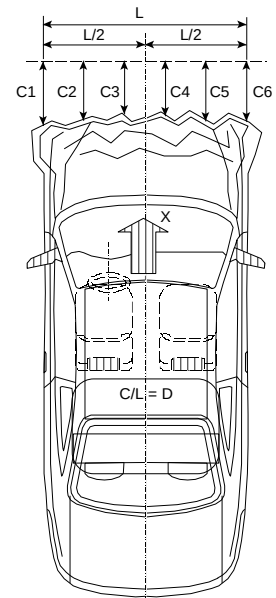
VIN: JM1BM1L73F1268510 Wheelbase (mm): 2694
 Vehicle Size Category: Passenger Test Weight (kg): 1599

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): 56.61
 Velocity Change (kph): 56.61

CRUSH PROFILE

Collision Deformation Classification: 12FDEW3
 Midpoint of Damage: C3
 Damage Region Length (mm): 1427
 Impact Mode: Frontal Research



Crush Measurements: Bumper Cover

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4229	3918	311
C2	Crush zone 2 at left side	mm	4390	3954	436
C3	Crush zone 3 at left side	mm	4401	3886	515
C4	Crush zone 4 at right side	mm	4401	3875	526
C5	Crush zone 5 at right side	mm	4389	3942	447
C6	Crush zone 6 at right side	mm	4231	3903	328
L	C1 to C6	mm	1427	1519	-92
	Logitudinal horizontal distance from the tip of the front bumper to the base of the windshield	mm	1,213	857	355

DATA SHEET NO. 13
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

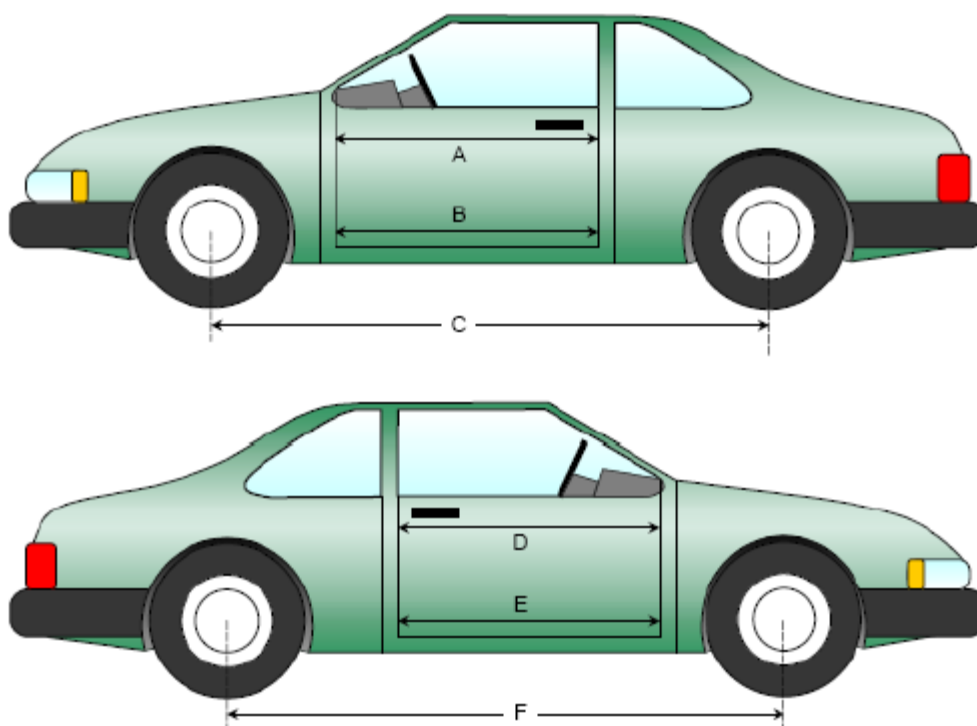
NHTSA No.: R20155404
 Test Date: 8/25/2015

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	980	980	-1
B	Left Side Lower	mm	800	800	0
D	Right Side Upper	mm	981	979	-2
E	Right Side Lower	mm	803	803	0

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2694	2583	-111
F	Right Side Wheelbase	mm	2694	2598	-96



Left & Right Side Views

DATA SHEET NO.13 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

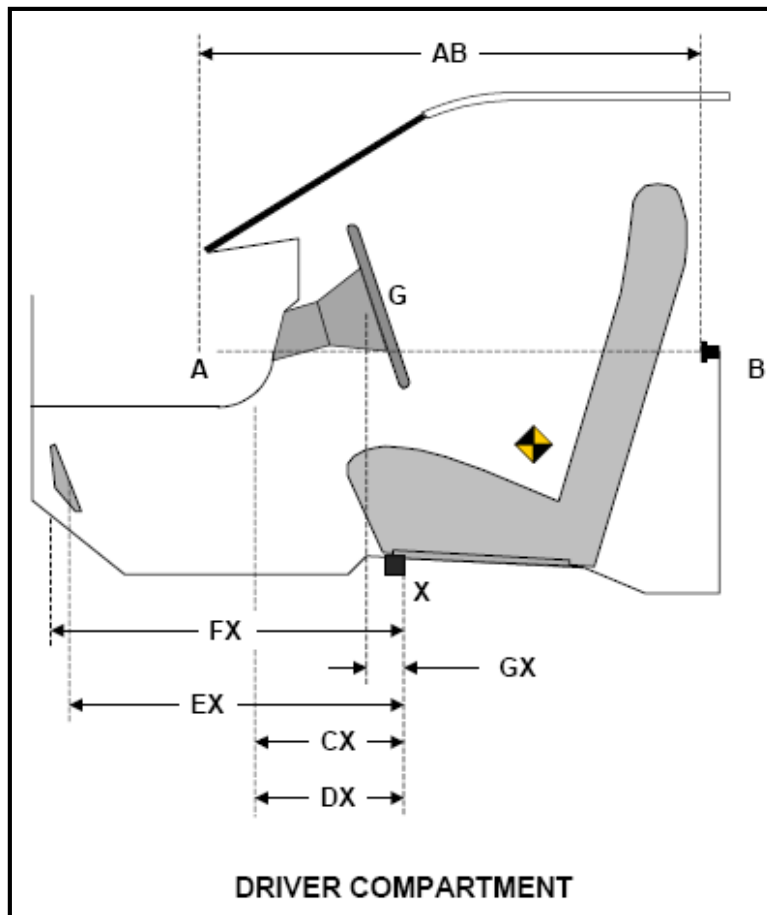
Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	727	727	0
CX	Left Knee Bolster to X	mm	252	253	1
DX	Right Knee Bolster to X	mm	249	251	2
EX	Brake Pedal to X	mm	557	447	-110
FX	Foot Rest to X	mm	611	604	-7
GX	Center of Steering Column Wheel Hub to X	mm	20	90	70

X = Front of Seat Track (Stationary)



DATA SHEET NO. 14
SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015

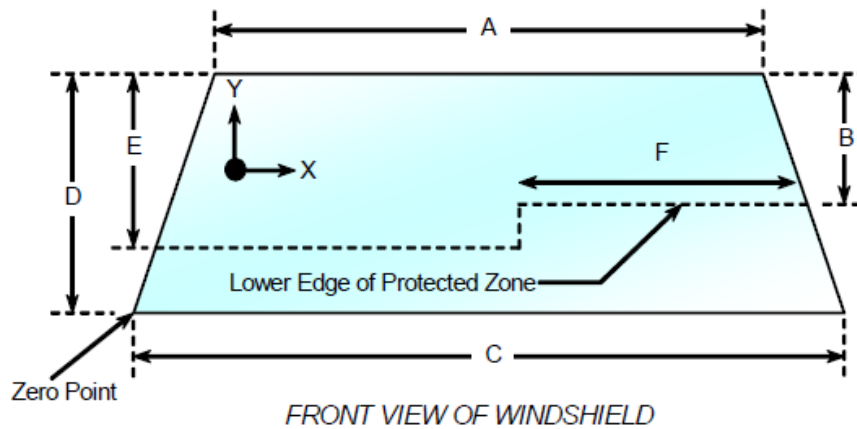
Please provide windshield mounting details. A 0.8 mm trim surrounds the top and side of windshield while a plastic shroud is on the bottom.

The standard requires that the post-test retention measurement be a minimum of 75% of the pre-test total periphery measurement for vehicles not equipped with occupant passive restraints and 50% for each side of the windshield for vehicles which are equipped with occupant passive restraints.

Temperature of windshield molding during test: 21°C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2160	2100	97.2%
Right Side	2160	2160	100.0%
Total	4319	4260	98.6%



Item	Units	Value
A	mm	1235
B	mm	474
C	mm	1458
D	mm	813
E	mm	493
F	mm	526

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

Test Vehicle: 2015 Mazda 3 Hatchback
Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
Test Date: 8/25/2015

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

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

Test Time: 12:30 PM

Stoddard Solvent Spillage Measurements

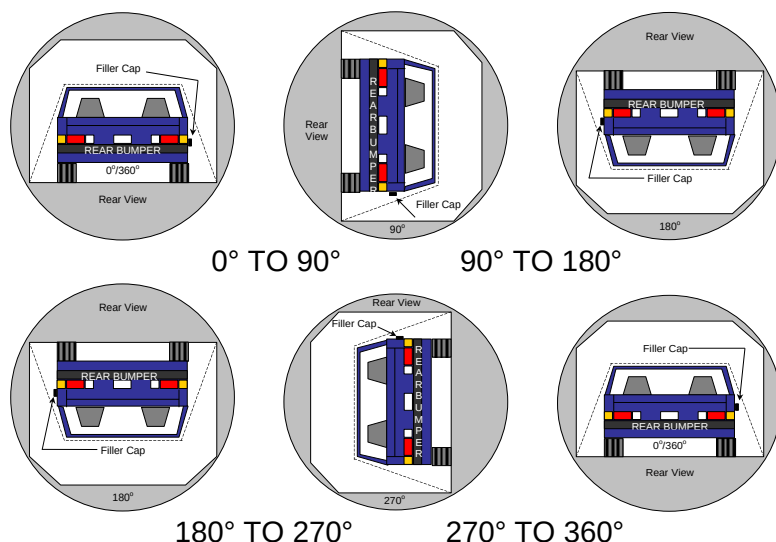
A.	From impact until vehicle motion ceases: (Maximum allowable = 1 oz.)	<u>0</u>	oz
B.	For the 5-minute period after motion ceases: (Maximum allowable = 5 oz.)	<u>0</u>	oz
C.	For the following 25 minutes: (Maximum allowable = 1 oz./minute)	<u>0</u>	oz
D.	Spillage	<u>0</u>	oz

DATA SHEET NO. 15

FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2015 Mazda 3 Hatchback
 Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
 Test Date: 8/25/2015



1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.

2. The position hold time at each position is 300 seconds (minimum).

3. Details of Stoddard Solvent spillage: None

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	75	300	375
90° to 180°	65	300	365
180° to 270°	62	300	362
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	

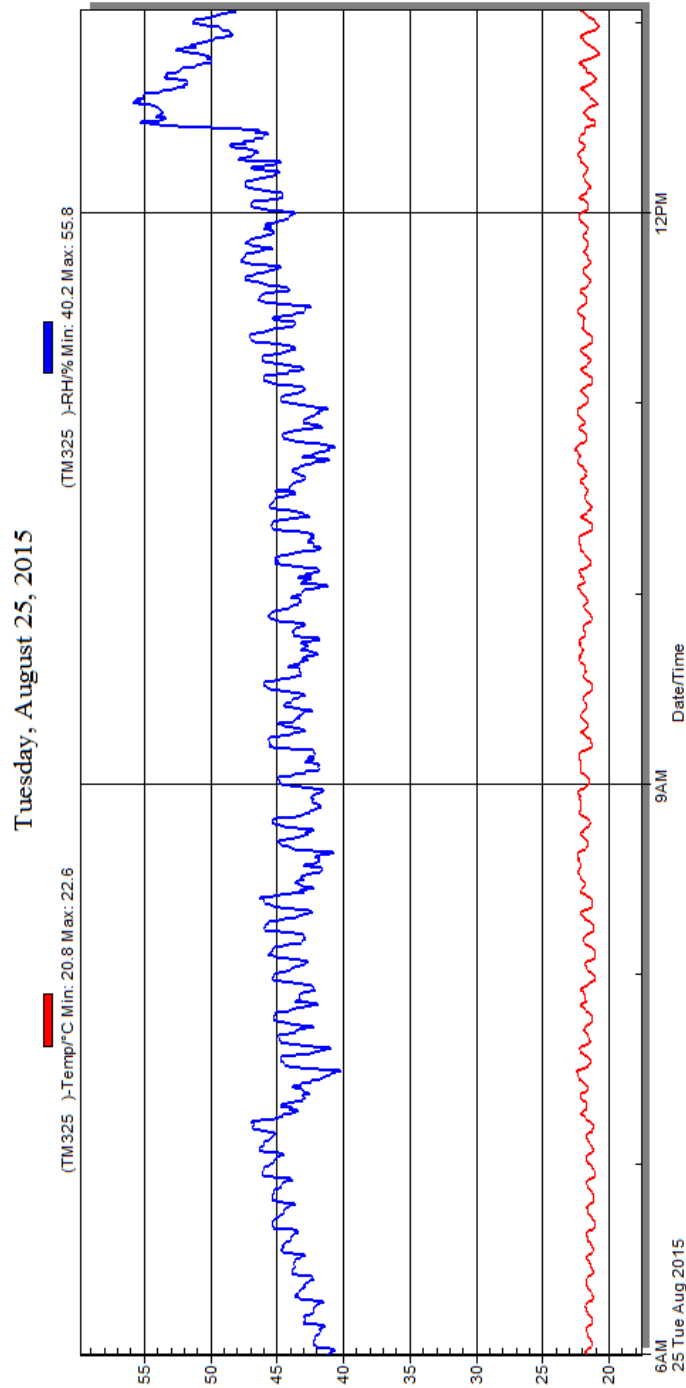
SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 16
DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2015 Mazda 3 Hatchback
Test Program: 56.3 KPH Research Frontal Rigid Barrier Test

NHTSA No.: R20155404
Test Date: 8/25/2015



Temperature Stabilization Chart/Data

APPENDIX A
PHOTOGRAPHS

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95	Post-Test Rear Passenger Dummy Face	A-52
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Photo Not Applicable

Figure A-1: Load Cell Location

Photo Not Applicable

Figure A-2: Load Cell Wall

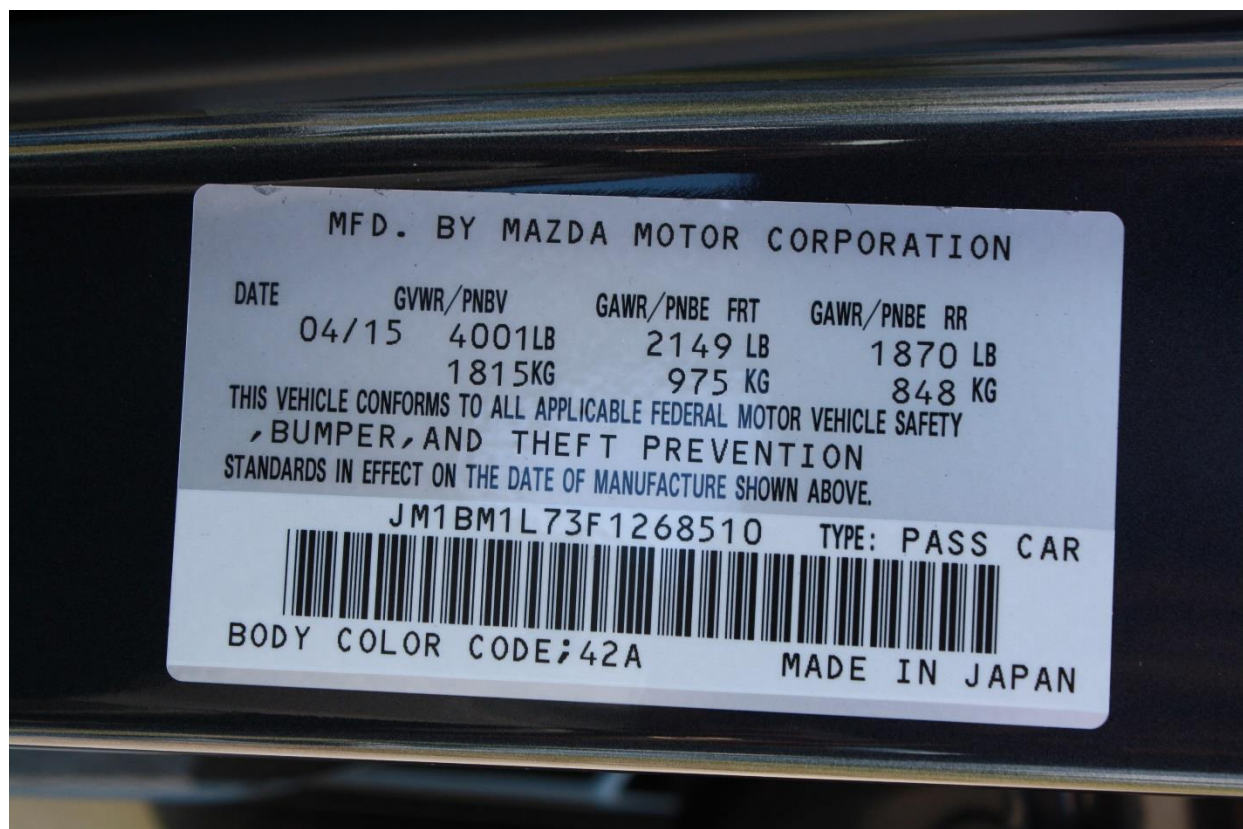


Figure A-3: Manufacturer's Label

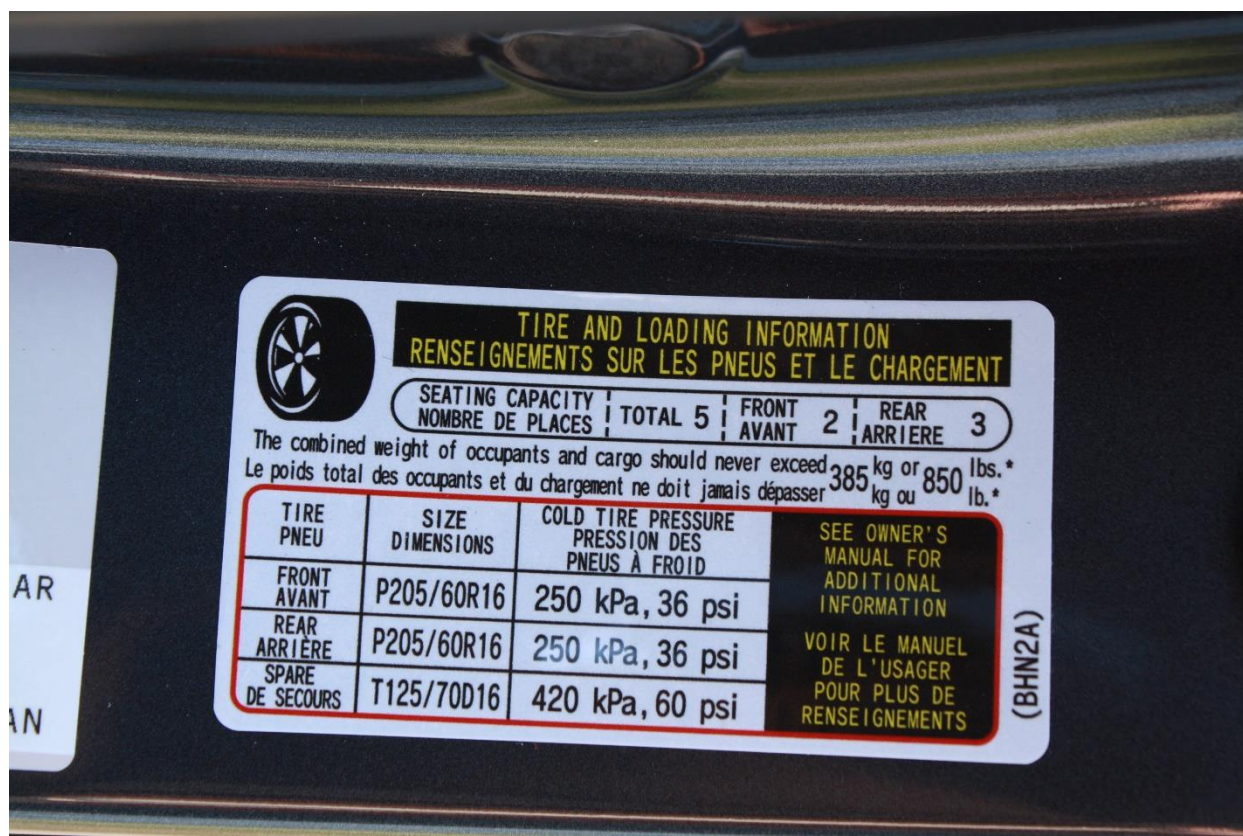


Figure A-4: Tire Placard



Figure A-5: 2015 Mazdam 3 Frontal As Delivered



Figure A-6: Left Rear 3-4 View, As Received



Figure A-7: Pre-Test Front View of Test Vehicle



Figure A-8: Post-Test Front View of Test Vehicle



Figure A-9: Pre-Test Left View of Test Vehicle



Figure A-10: Post-Test Left View of Test Vehicle



Figure A-11: Pre-Test Right View of Test Vehicle



Figure A-12: Post-Test Right View of Test Vehicle



Figure A-13: Pre-Test Right Front 3-4 View



Figure A-14: Post-Test Right Front 3-4 View



Figure A-15: Pre-Test Left Rear 3-4 View



Figure A-16: Post-Test Left Rear 3-4 View



Figure A-17: Pre-Test Windshield View



Figure A-18: Post-Test Windshield View

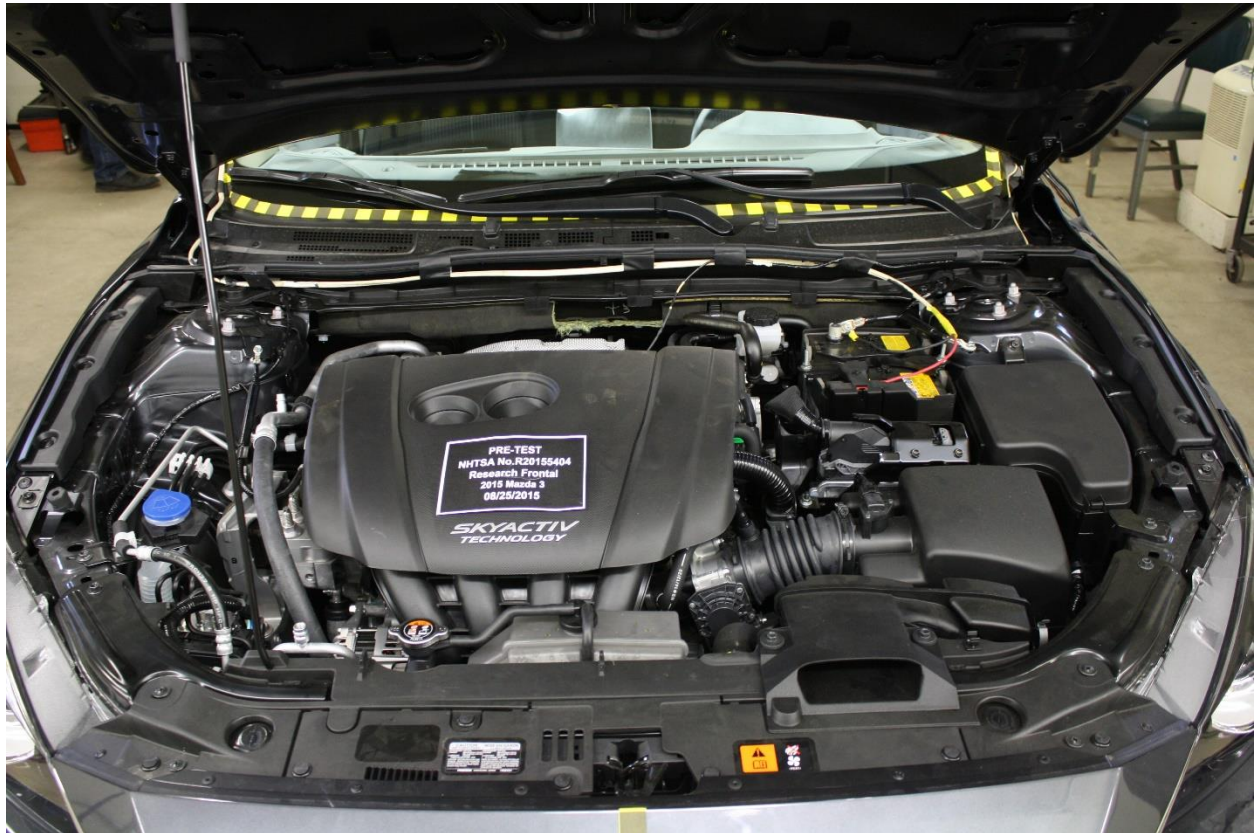


Figure A-19: Pre-Test Engine Compartment View



Figure A-20: Post-Test Engine Compartment View



Figure A-21: Pre-Test Fuel Filler Cap View



Figure A-22: Post-Test Fuel Filler Cap View

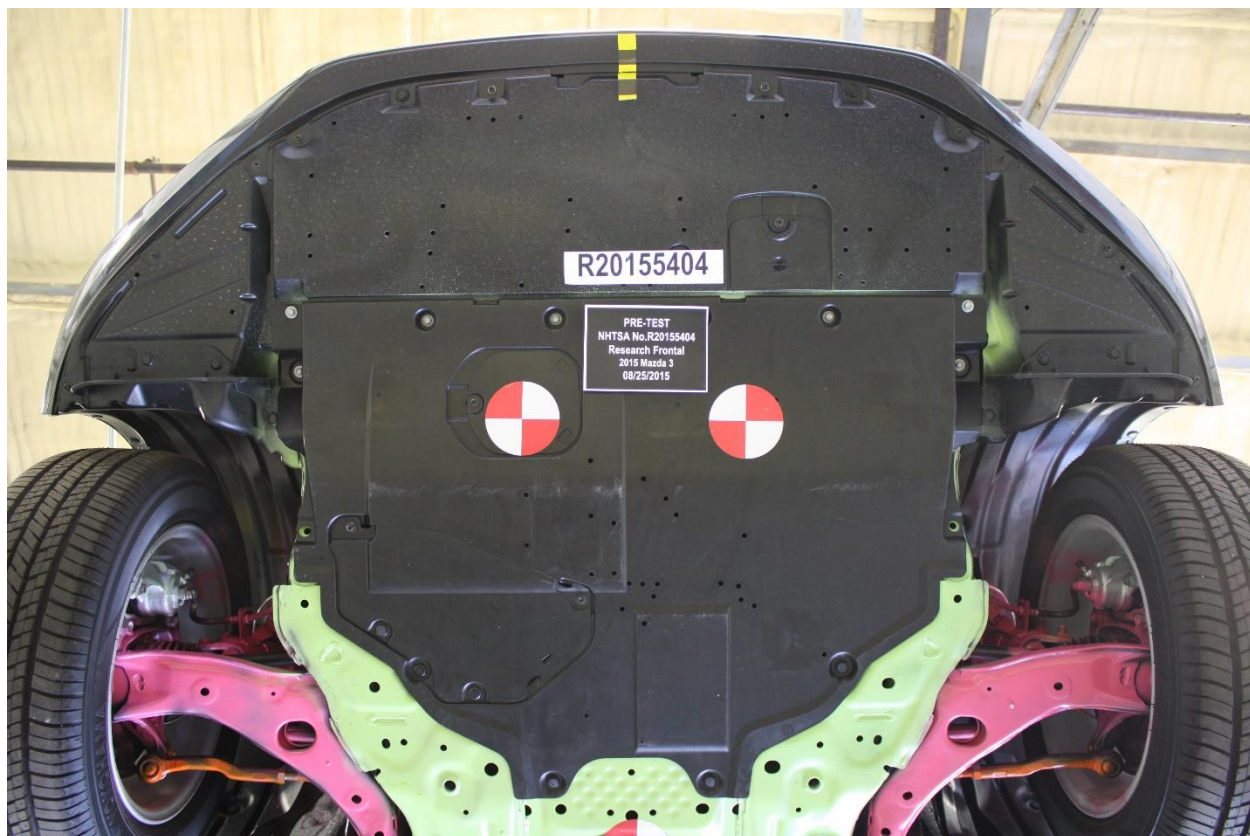


Figure A-23: Pre-Test Front Underbody View



Figure A-24: Post-Test Front Underbody View

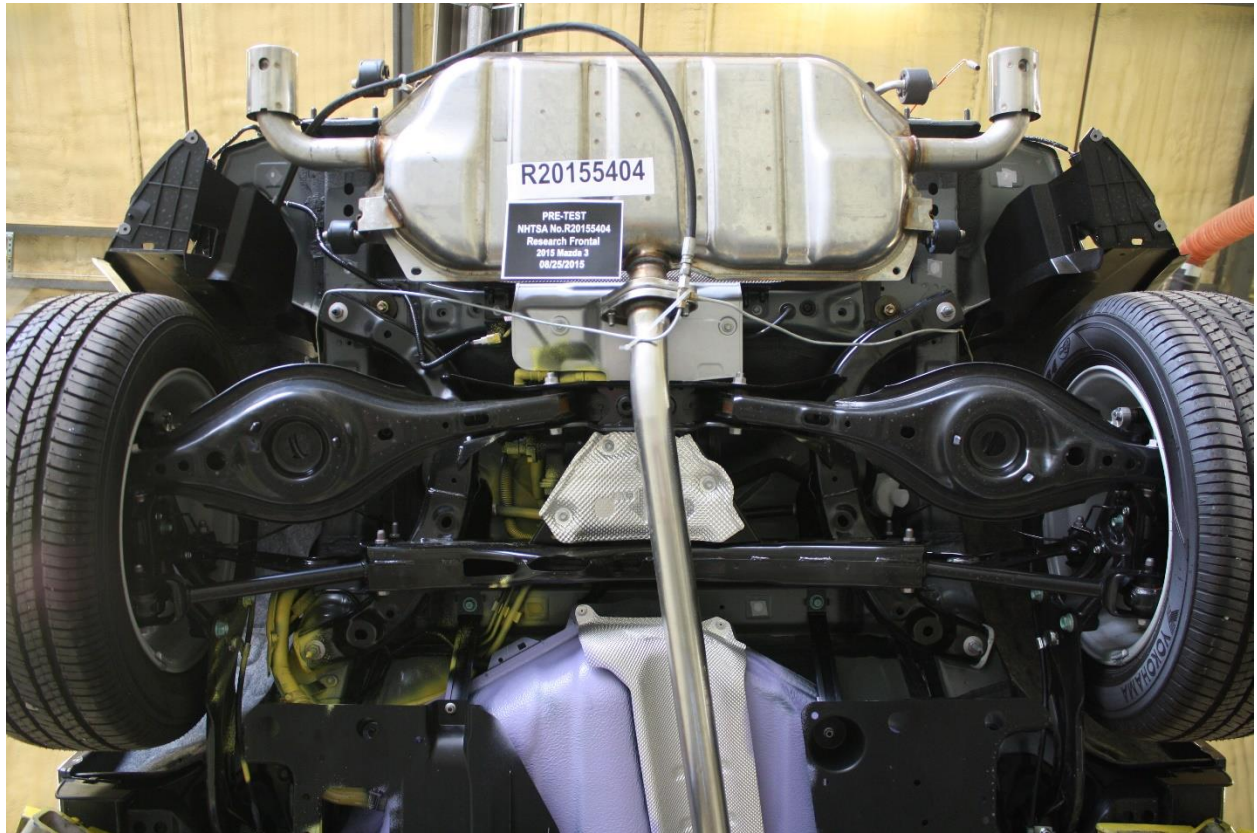


Figure A-25: Pre-Test Rear Underbody View



Figure A-26: Post-Test Rear Underbody View



Figure A-27: Pre-Test Dummy Cable Routing



Figure A-28: Post-Test Dummy Cable Routing



Figure A-29: Pre-Test Driver Dummy Front View



Figure A-30: Post-Test Driver Dummy Front View



Figure A-31: Pre-Test Driver Dummy Window View



Figure A-32: Post-Test Driver Dummy Window View



Figure A-33: Pre-Test Driver Dummy and Vehicle Interior View



Figure A-34: Post-Test Driver Dummy and Vehicle Interior View



Figure A-35: Pre-Test Driver's Seat Fore-Aft Markings

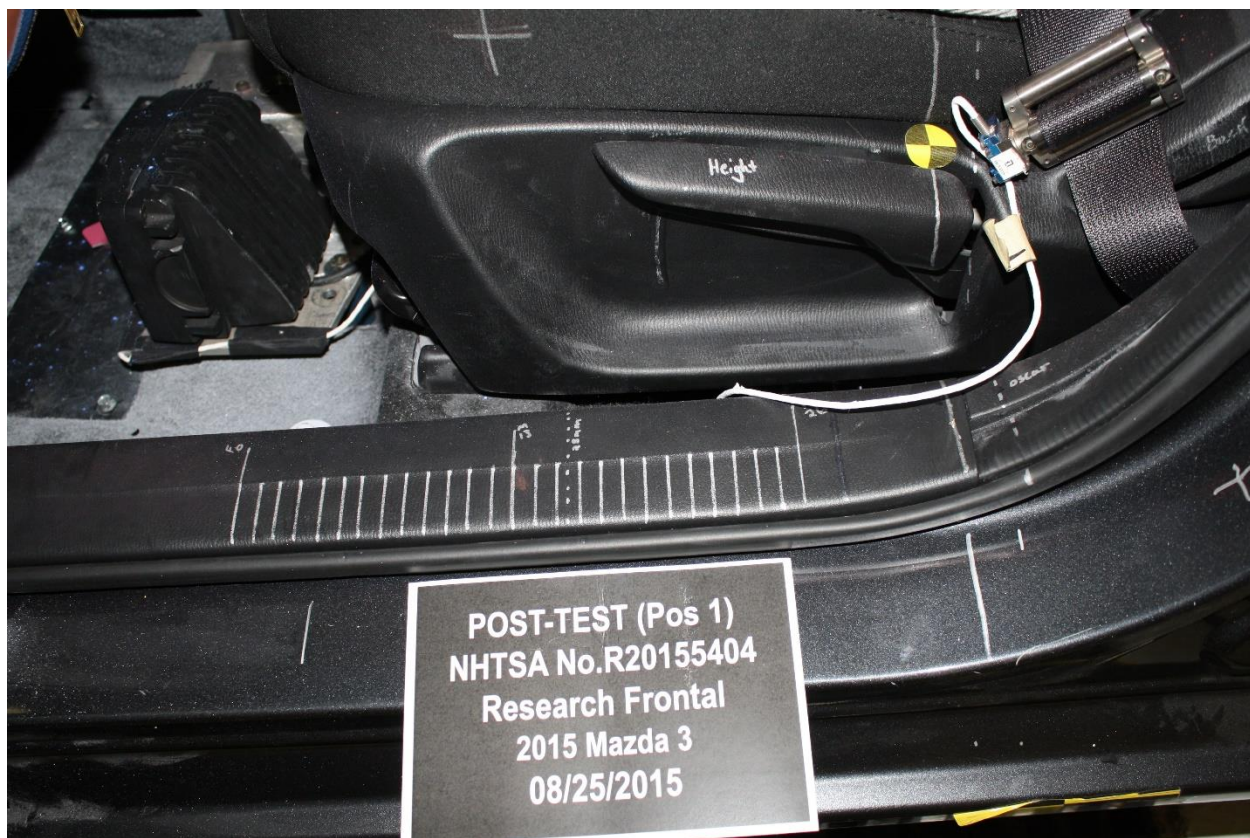


Figure A-36: Post-Test Driver's Seat Fore-Aft Markings



Figure A-37: Pre-Test View of Belt Anchorage for Driver Dummy



Figure A-38: Post-Test View of Belt Anchorage for Driver Dummy



Figure A-39: Pre-Test Driver Dummy Feet



Figure A-40: Post-Test Driver Dummy Feet



Figure A-41: Pre-Test Driver's Side Knee Bolster



Figure A-42: Post-Test Driver's Side Knee Bolster



Figure A-43: Pre-Test Driver's Side Floorpan



Figure A-44: Post-Test Driver's Side Floorpan

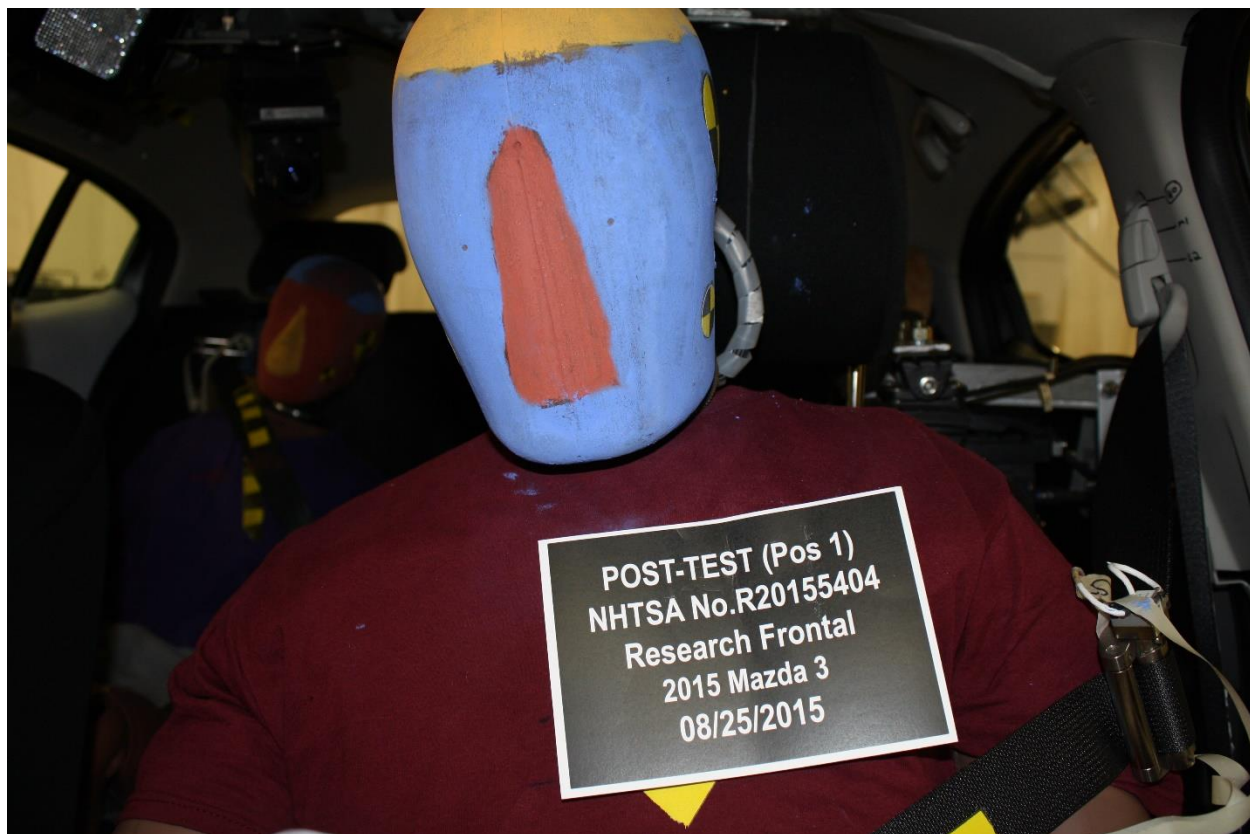


Figure A-45: Post-Test Driver Dummy Face



Figure A-46: Post-Test Driver Dummy Contact With Airbag

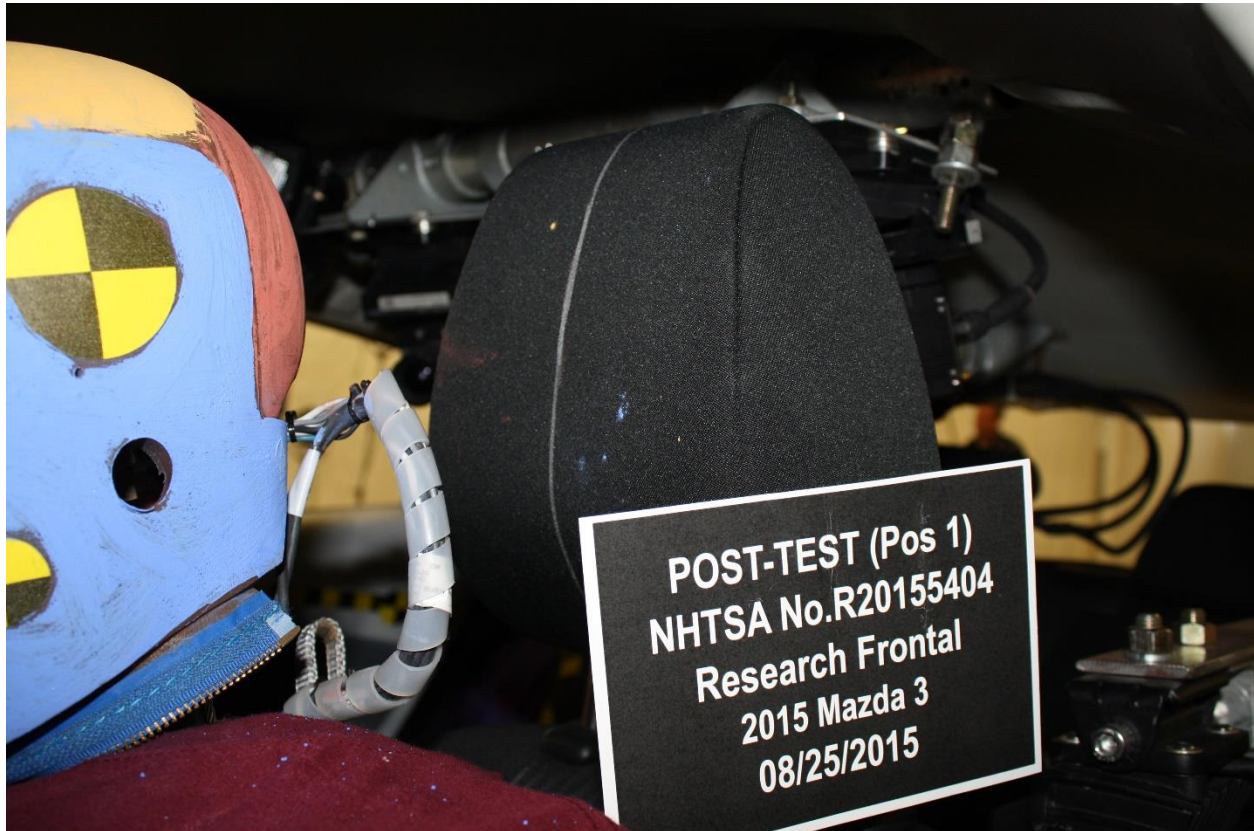


Figure A-47: Post-Test Driver Dummy Contact With Headrest



Figure A-48: Pre-Test View of the Steering Wheel



Figure A-49: Post-Test View of the Steering Wheel



Figure A-50: Pre-Test Passenger Dummy Front View



Figure A-51: Post-Test Passenger Dummy Front View



Figure A-52: Pre-Test Passenger Dummy Window View



Figure A-53: Post-Test Passenger Dummy Window View



Figure A-54: Pre-Test Passenger Dummy and Vehicle Interior View



Figure A-55: Post-Test Passenger Dummy and Vehicle Interior View

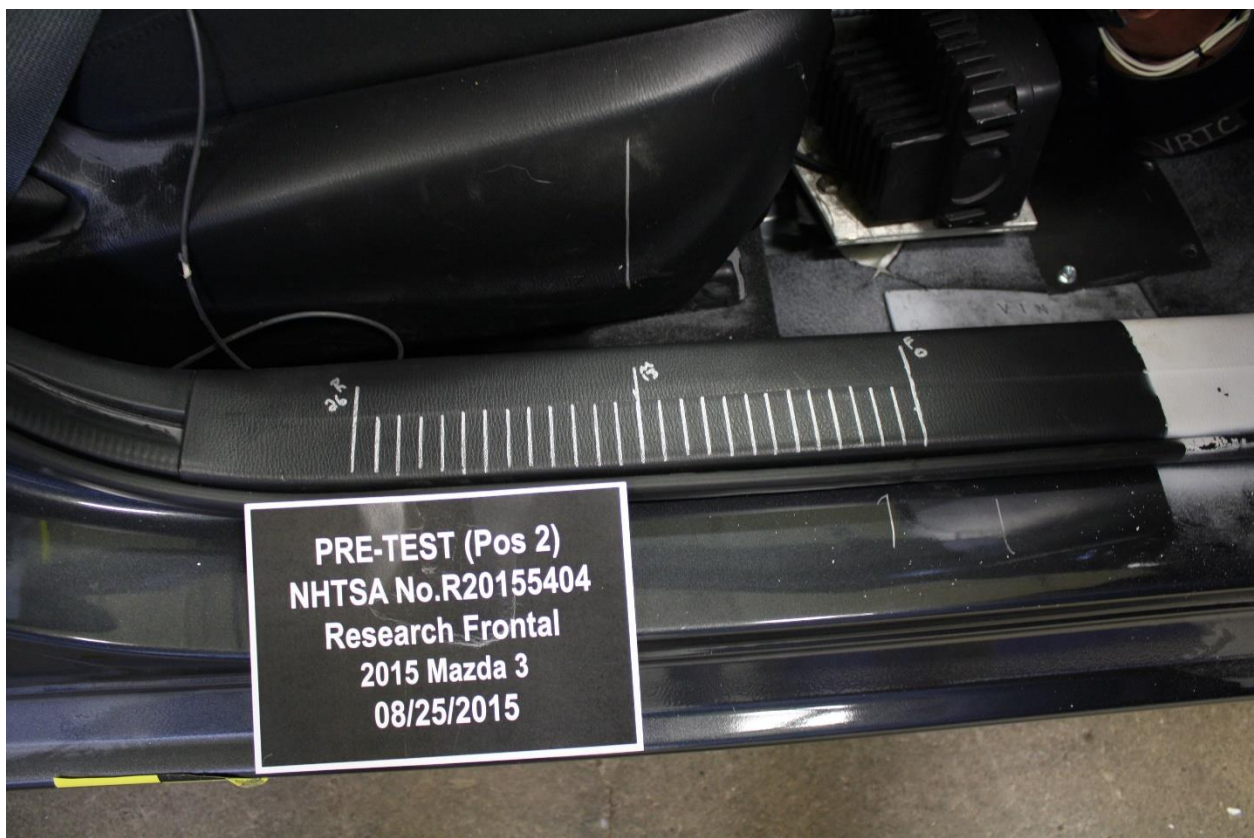


Figure A-56: Pre-Test Passenger's Seat Fore-Aft Markings



Figure A-57: Post-Test Passenger's Seat Fore-Aft Markings

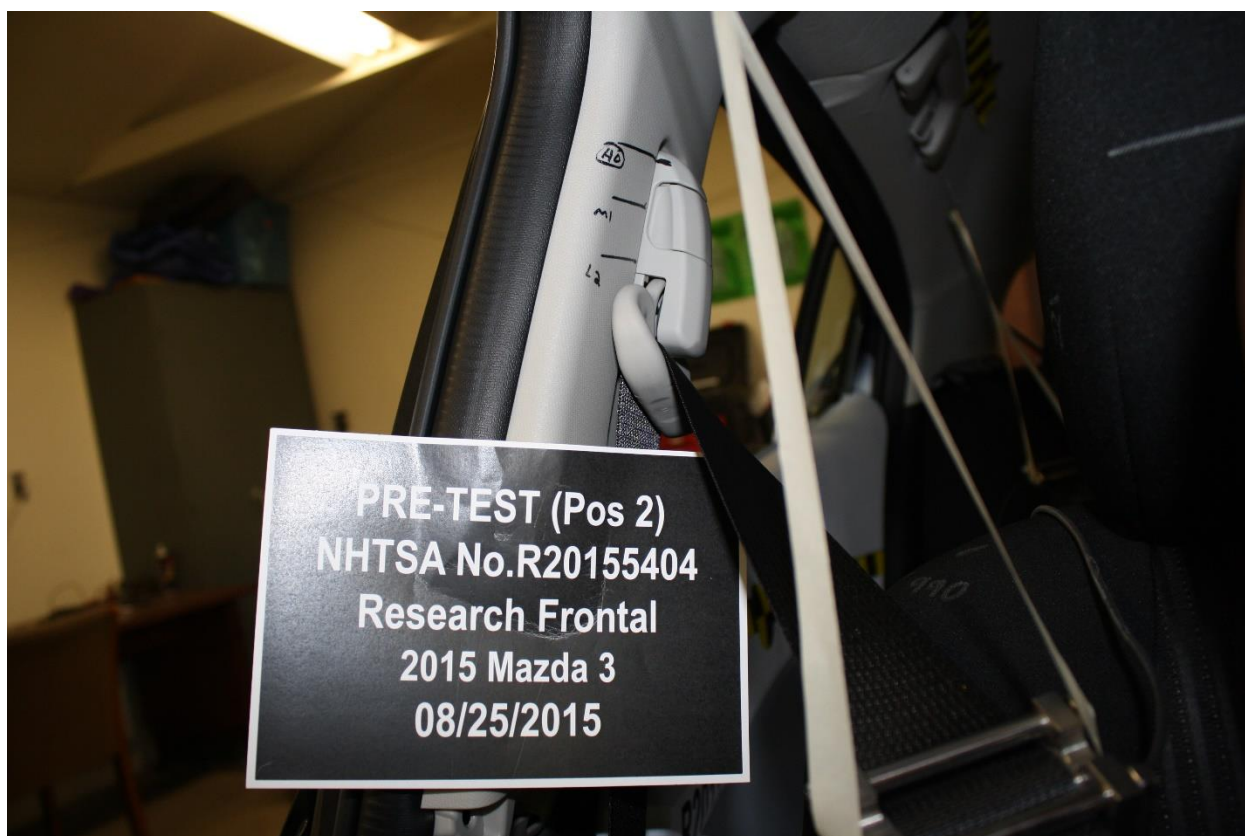


Figure A-58: Pre-Test View of Belt Anchorage for Passenger Dummy



Figure A-59: Post-Test View of Belt Anchorage for Passenger Dummy



Figure A-60: Pre-Test Passenger Dummy Feet



Figure A-61: Post-Test Passenger Dummy Feet



Figure A-62: Pre-Test Passenger's Side Knee Bolster



Figure A-63: Post-Test Passenger's Side Knee Bolster



Figure A-64: Pre-Test Passenger's Side Floorpan



Figure A-65: Post-Test Passenger's Side Floorpan



Figure A-66: Post-Test Passenger Dummy Face



Figure A-67: Post-Test Passenger Dummy Contact With Airbag

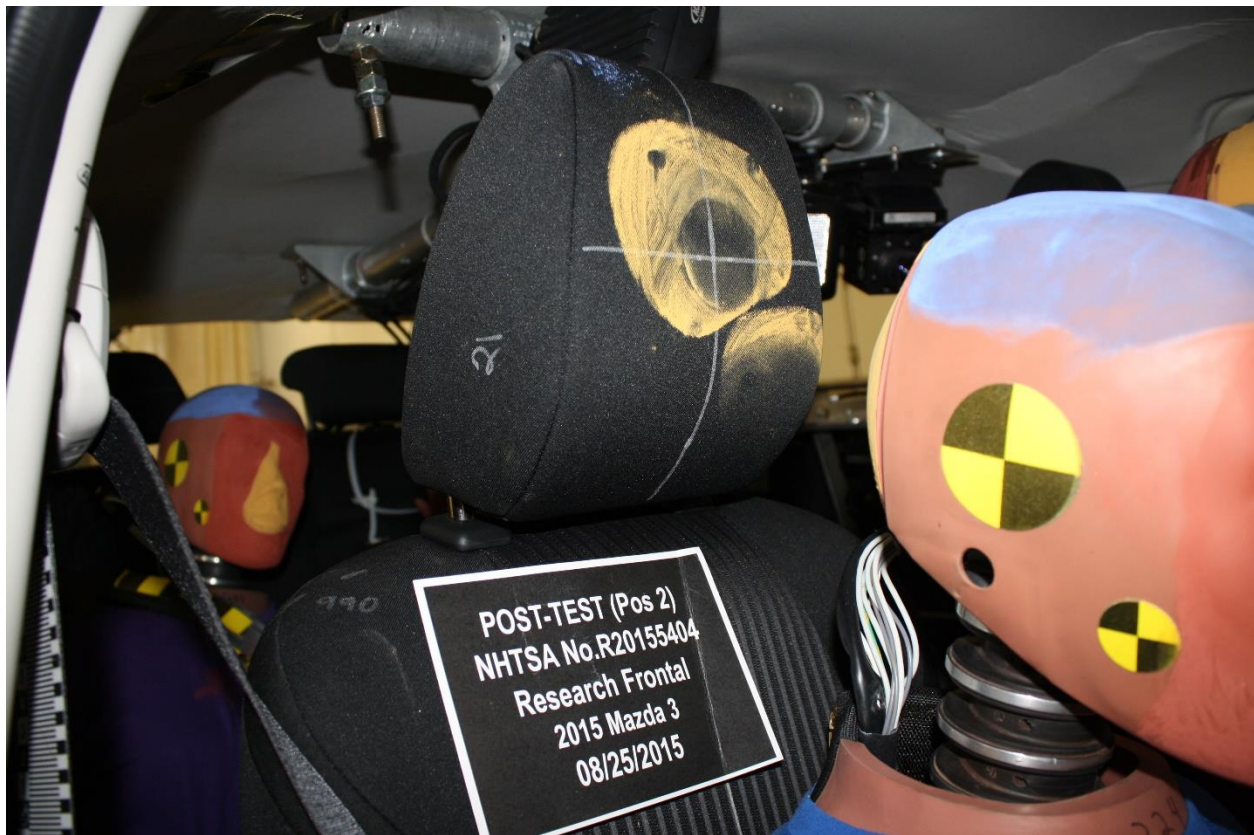


Figure A-68: Post-Test Passenger Dummy Contact With Headrest



Figure A-69: Photograph of Ballast Installed in Vehicle

Photo Not Applicable

Figure A-70: Post-Test Stoddard Solvent Spillage Location View, If Required



Figure A-71: Post-Test Speed Trap Read-Out



Figure A-72: Vehicle at 0° on Static Rollover Device

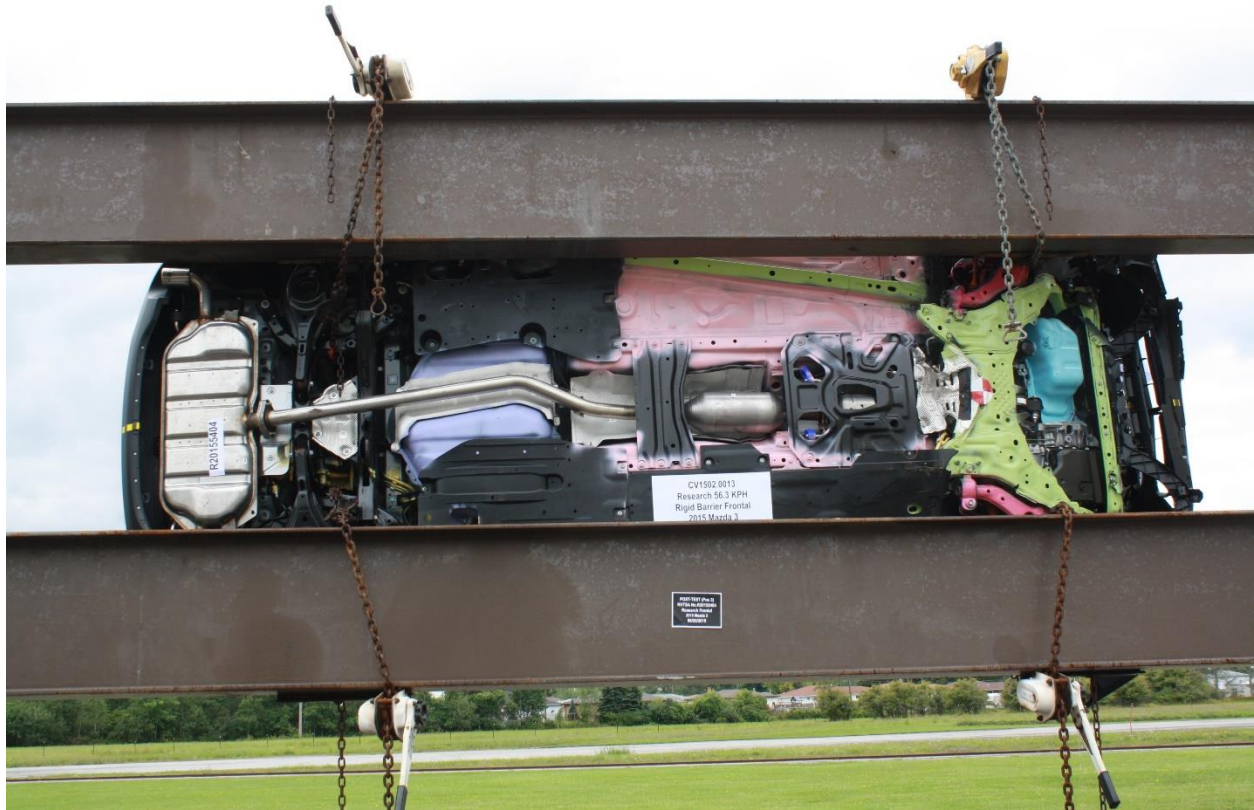


Figure A-73: Vehicle at 90° on Static Rollover Device



Figure A-74: Vehicle at 180° on Static Rollover Device



Figure A-75: Vehicle at 270° on Static Rollover Device



Figure A-76: Vehicle at 360° on Static Rollover Device



Figure A-77: 2015 Mazda 3 Frontal Impact Event

mazda

SKYACTIV TECHNOLOGY

Scan for Vehicle Info and offers

2015 Mazda3
Model: 2015 MAZDA3 I 5-DOOR TOURING
Exterior Color: METEOR GRAY MICA
Interior Color: BLACK

Fuel Economy and Environment

Fuel Economy
33 MPG combined city/hwy
30 city
40 highway
3.0 gallons per 100 miles

You Save \$3,000
in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost \$1,600

Fuel Economy & Greenhouse Gas Rating
8 (Best)

Smog Rating
9 (Best)

GOVERNMENT 5-STAR SAFETY RATINGS
Overall Vehicle Score ★★★★★
Frontal Crash ★★★★★
Side Crash ★★★★★
Rollover ★★★★★

SALES INFORMATION
SOLD TO: 50153 NORTH TOWN MAZDA 3900 SHERIDAN CR AMHERST, NY 14226
SHIP TO: 50153 NORTH TOWN MAZDA 3900 SHERIDAN CR AMHERST, NY 14226

MAZDAUSA.COM

PARTS CONTENT INFORMATION:

FOR VEHICLES IN THIS CARLINE: U.S./CANADIAN PARTS CONTENT: 0%
MAJOR SOURCES OF FOREIGN PARTS CONTENT: JAPAN 85%

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

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

STANDARD EQUIPMENT

ENGINE/MECHANICAL FEATURES

- SKYACTIV 2.5L DOHC 4-CYL ENGINE
- SKYACTIV DRIVE 6SPD AUTO TRANS
- 155 HORSEPOWER, 180 LB-FT TORQUE

EXTERIOR FEATURES

- 16-INCH ALLOY WHEELS
- P225/60 R16 ALL-SEASON TIRES
- VARIABLE INTERMITTENT WIPERS
- HEATED PWR SIDE MIRRORS W/TURN LAMPS & HALOGEN FOG LIGHTS
- DUAL EXHAUST W/BRIGHT OUTLETS

INTERIOR FEATURES

- PREMIUM CLOTH-TRIMMED SPORT SEATS
- 6-WAY MANUAL DRIVER'S SEAT
- AIR CONDITIONING W/POLLEN FILTER
- PWR WINDOW/LOCK/AUTO DOOR LOCKS
- ADVANCED KEYLESS ENTRY SYSTEM
- PUSH BUTTON ENGINE START
- 60/40 SPLIT FOLD-DOWN REAR SEAT
- REAR SEAT ARMREST W/CUPHOLDERS
- LEATHER-WRAPPED STEERING WHEEL, GEARSHIFT KNOB & BRAKE HANDLE
- REARVIEW CAMERA

SAFETY AND SECURITY FEATURES

- 60-MONTH/100,000-MILE POWERTRAIN & 5-YEAR/50,000-MILE Bumper-to-Bumper Warranty
- 24-HOUR ROADSIDE ASSISTANCE
- ANTI-THIEF ENGINE IMMOBILIZER
- BLIND SPOT MONITORING
- REAR CROSS-TRAFFIC ALERT
- TIRE PRESSURE MONITORING SYSTEM

OPTIONAL EQUIPMENT

OPTIONAL EQUIPMENT	MSRP
CGN CARGO NET	\$60
ILK INTERIOR LIGHTING KIT	\$279
WLK WHEEL LOCKS	\$55
CE1 LEV II PZEV EMISSIONS EQUIPMENT	NO CHARGE
Total Vehicle and Options	\$21,535
Delivery, Processing and Handling Fee	\$820
Total MSRP	\$22,355

Figure A-78: Monroney Label Photograph



Figure A-79: Pre-Test Rear Passenger Dummy Front view



Figure A-80: Post-Test Rear Passenger Dummy Front view



Figure A-81: Pre-Test Rear Passenger Dummy Window View



Figure A-82: Post-Test Rear Passenger Dummy Window View



Figure A-83: Pre-Test Rear Passenger Dummy and Vehicle Interior View



Figure A-84: Post-Test Rear Passenger Dummy and Vehicle Interior View



Figure A-85: Pre-Test Rear Passenger Seat Fore-Aft Markings



Figure A-86: Post-Test Rear Passenger Seat Fore-Aft Markings



Figure A-87: Pre-Test View of Belt Anchorage for Rear Passenger Dummy



Figure A-88: Post-Test View of Belt Anchorage for Rear Passenger Dummy



Figure A-89: Pre-Test Rear Passenger Dummy Feet



Figure A-90: Post-Test Rear Passenger Dummy Feet



Figure A-91: Pre-Test Rear Passenger Dummy Knee and Seatback View



Figure A-92: Post-Test Rear Passenger Dummy Knee Contact with Seatback



Figure A-93: Pre-Test Rear Passenger's Side Floorpan



Figure A-94: Post-Test Rear Passenger's Side Floorpan

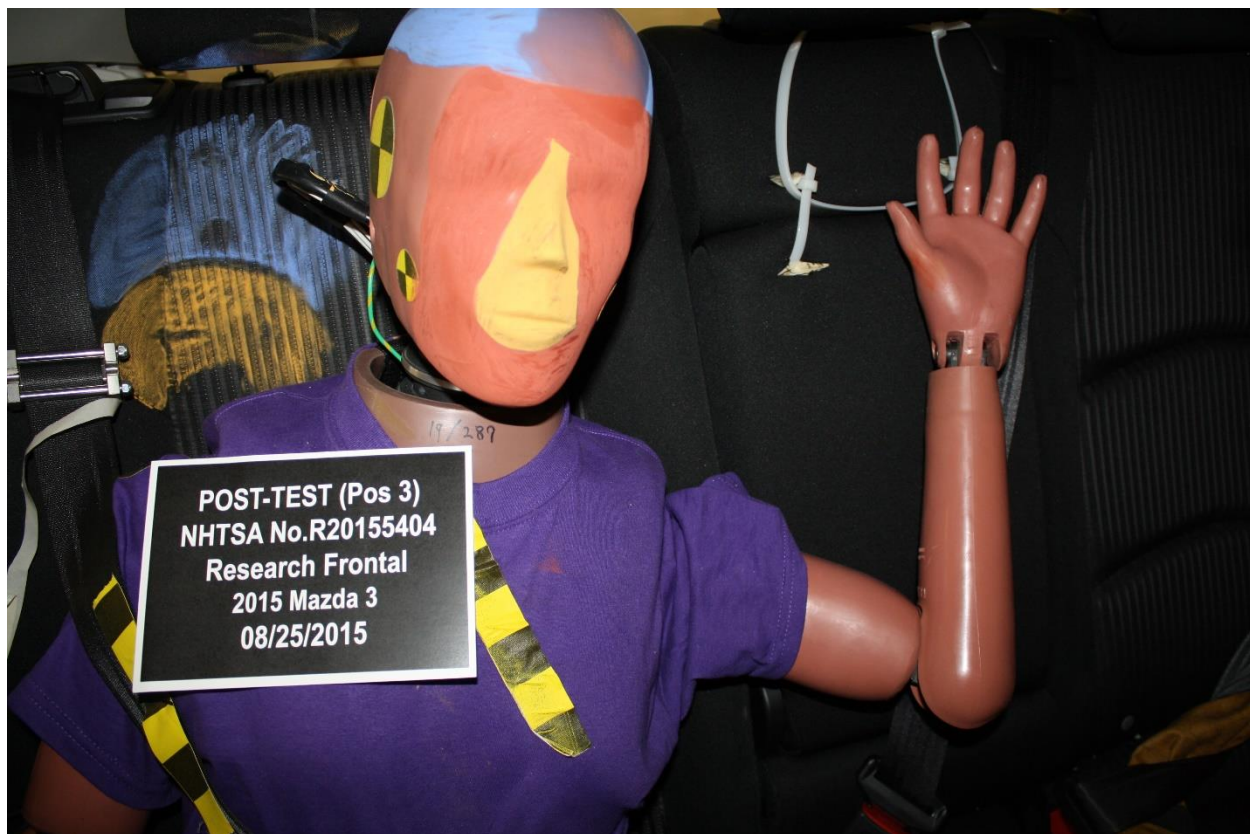


Figure A-95: Post-Test Rear Passenger Dummy Face

Photo Not Applicable

Figure A-96: Post-Test Rear Passenger Dummy Contact with Airbag



Figure A-97: Post-Test Rear Passenger dummy Contact with Headrest

APPENDIX B
VEHICLE & DUMMY RESPONSE DATA TRACES

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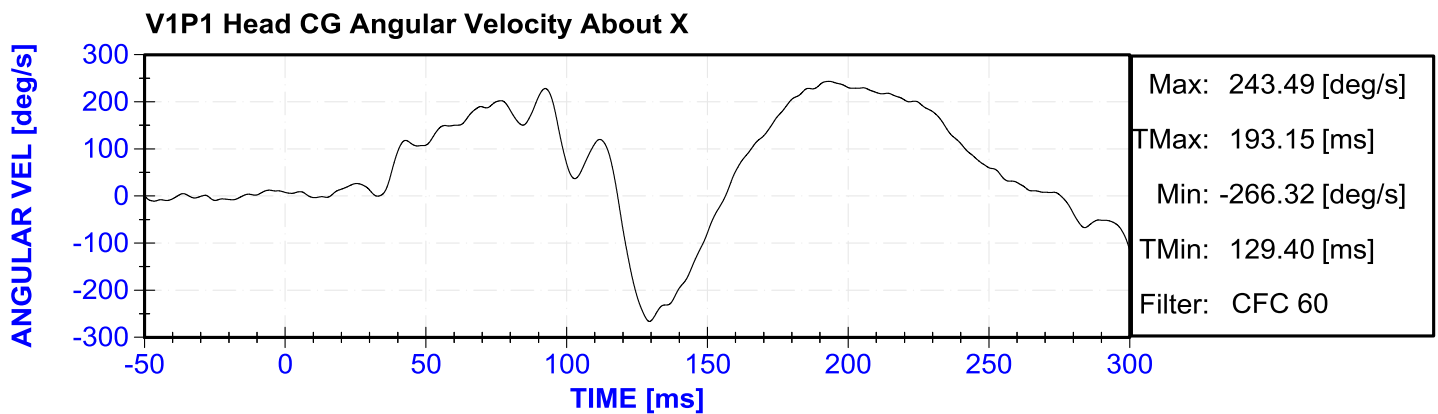
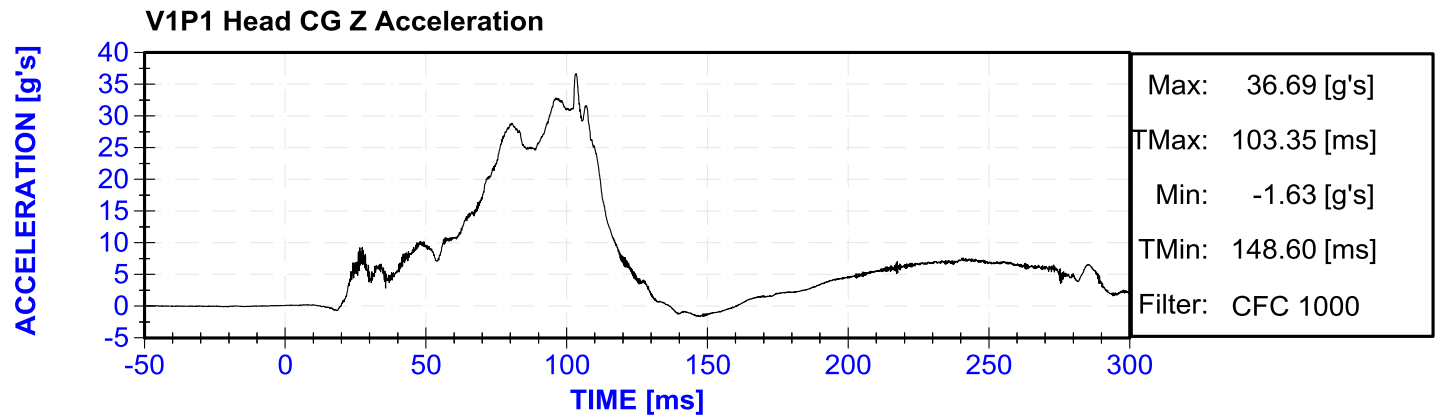
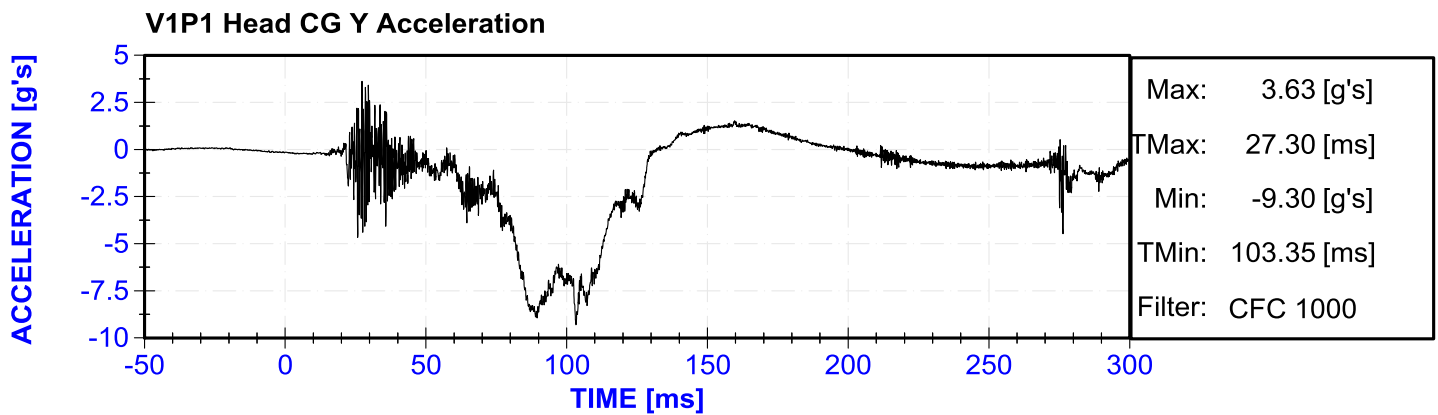
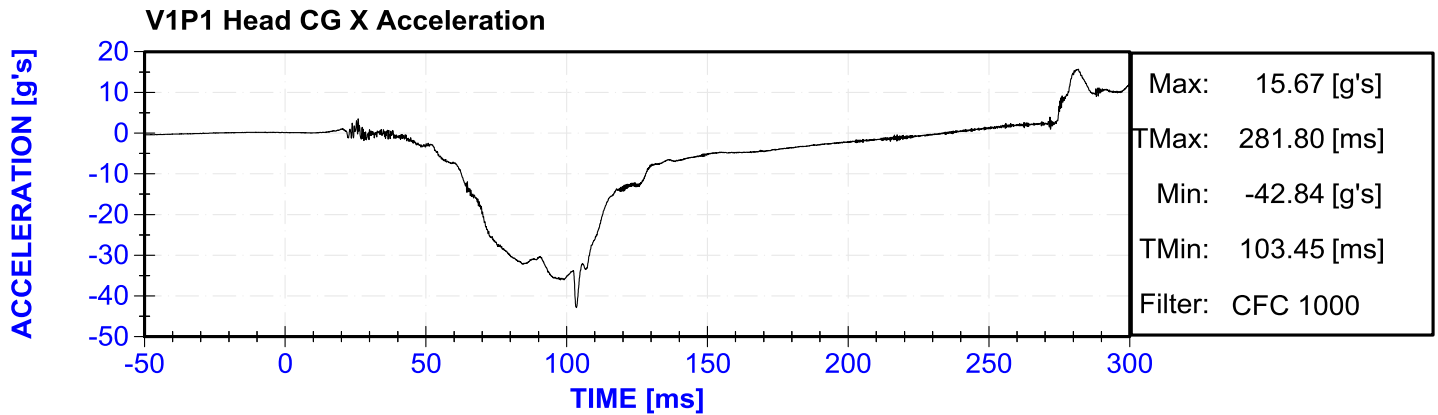
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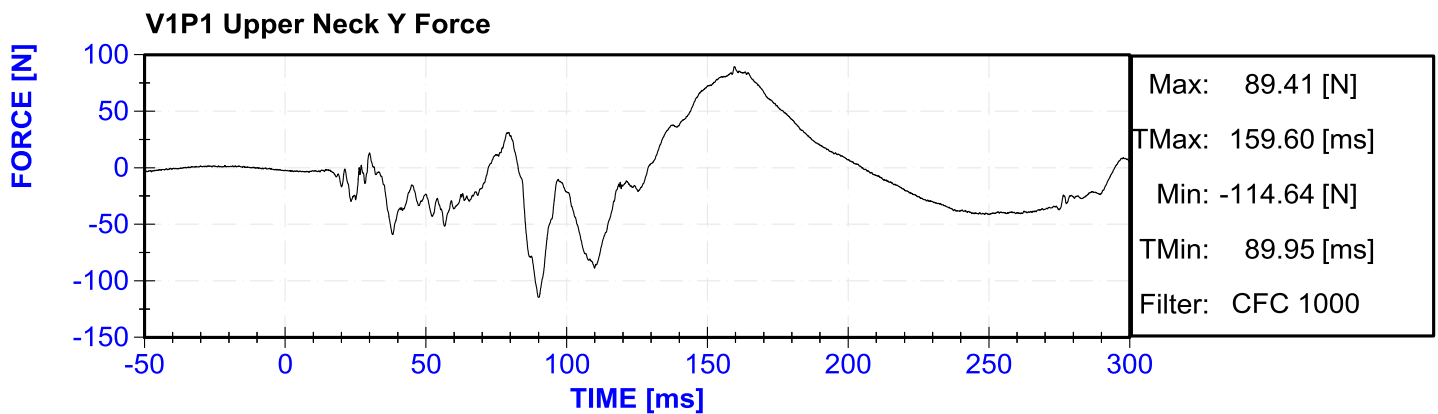
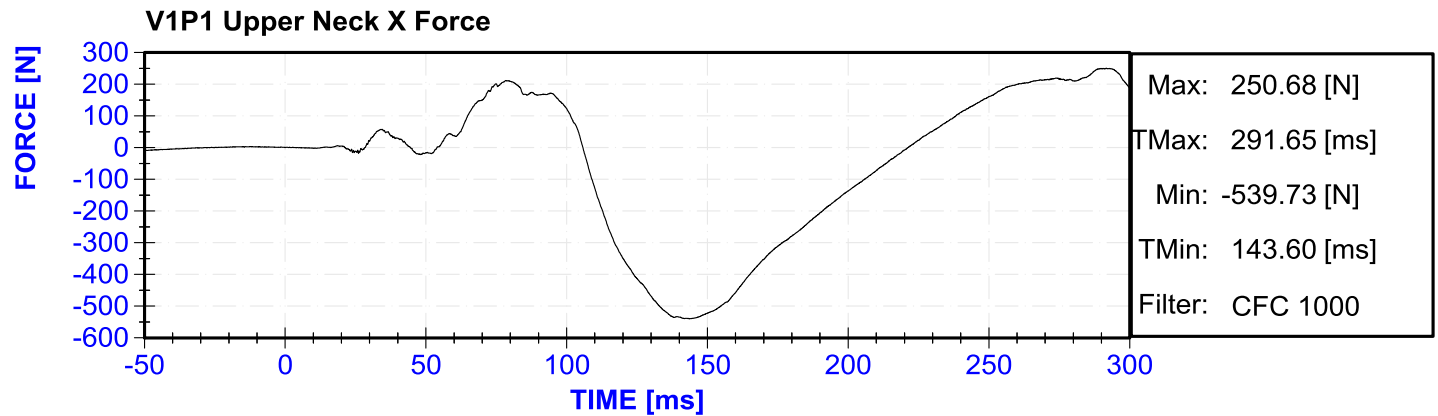
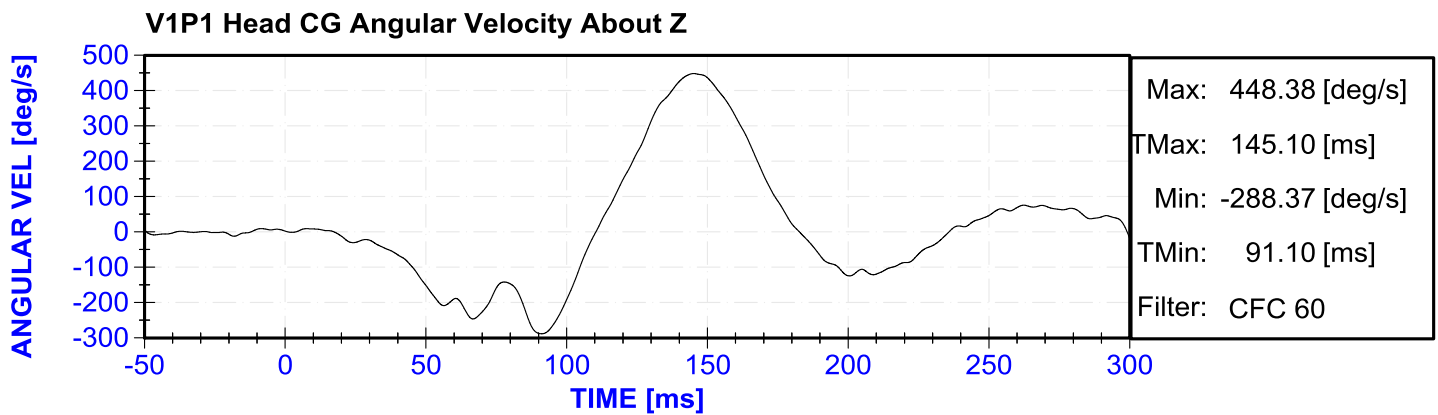
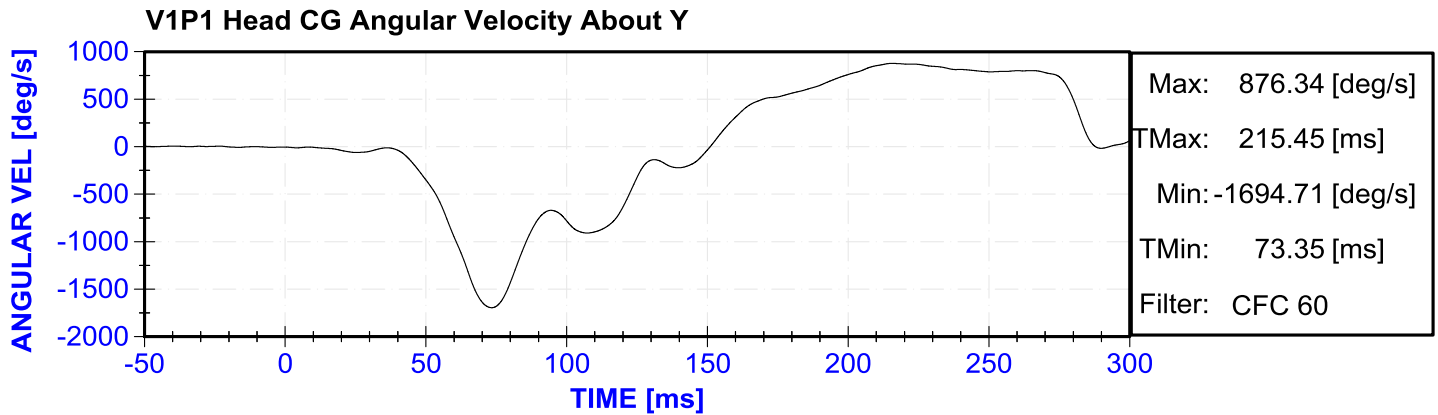
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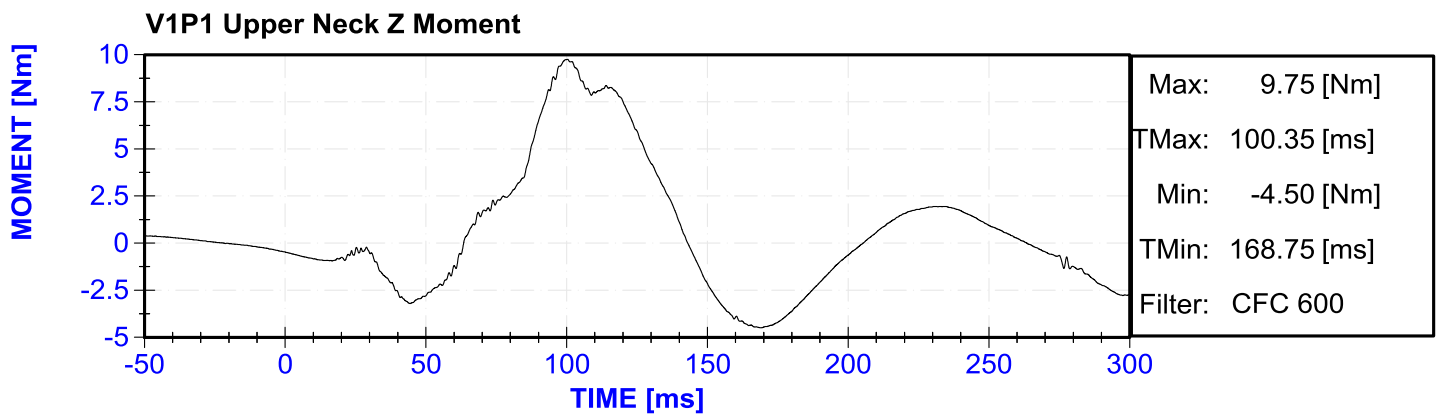
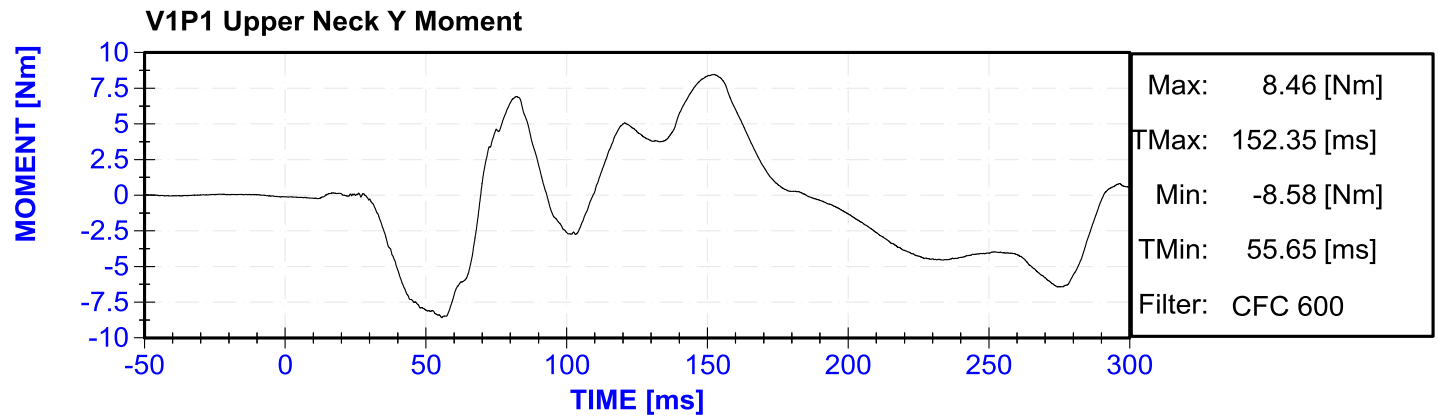
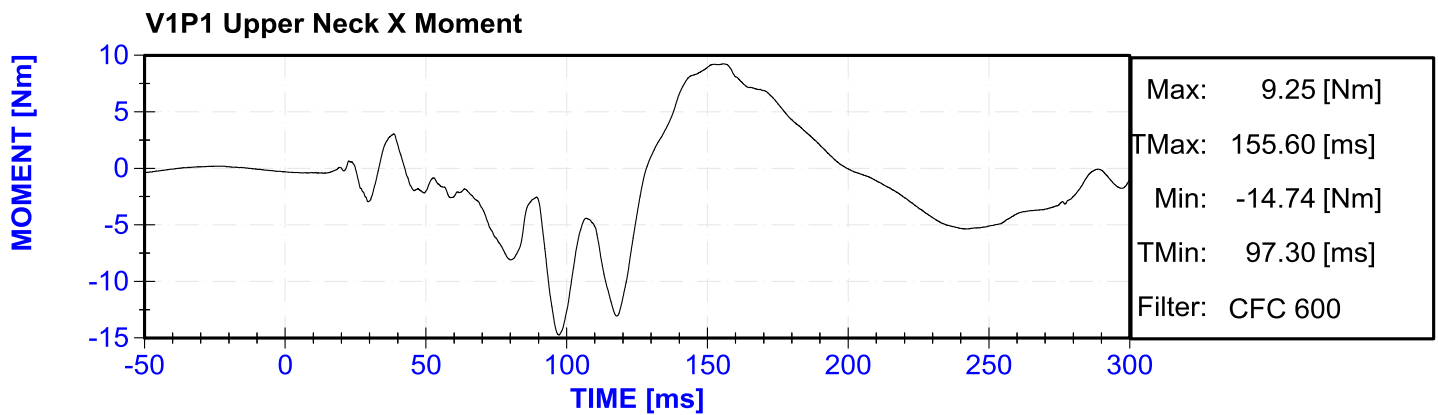
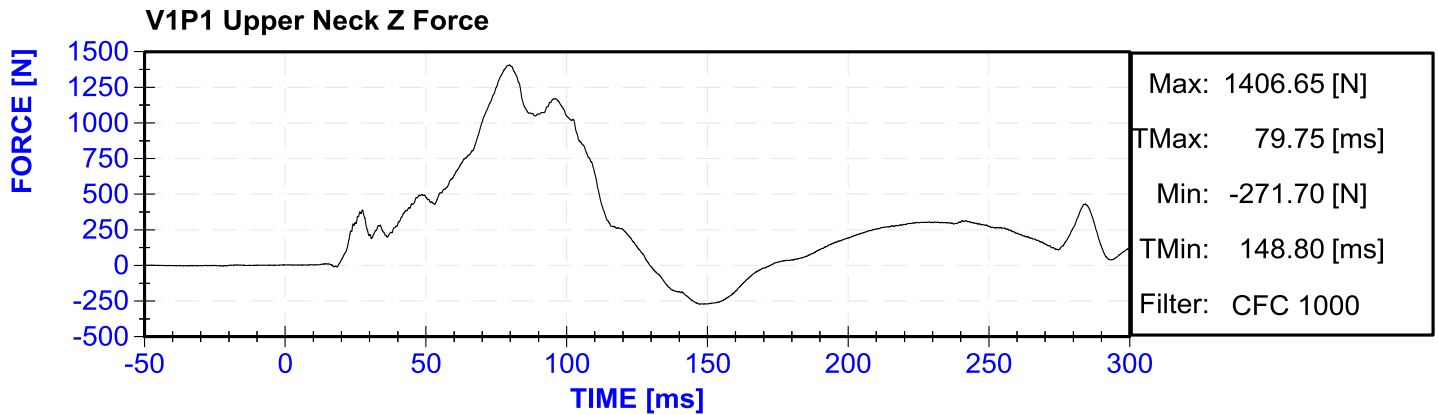
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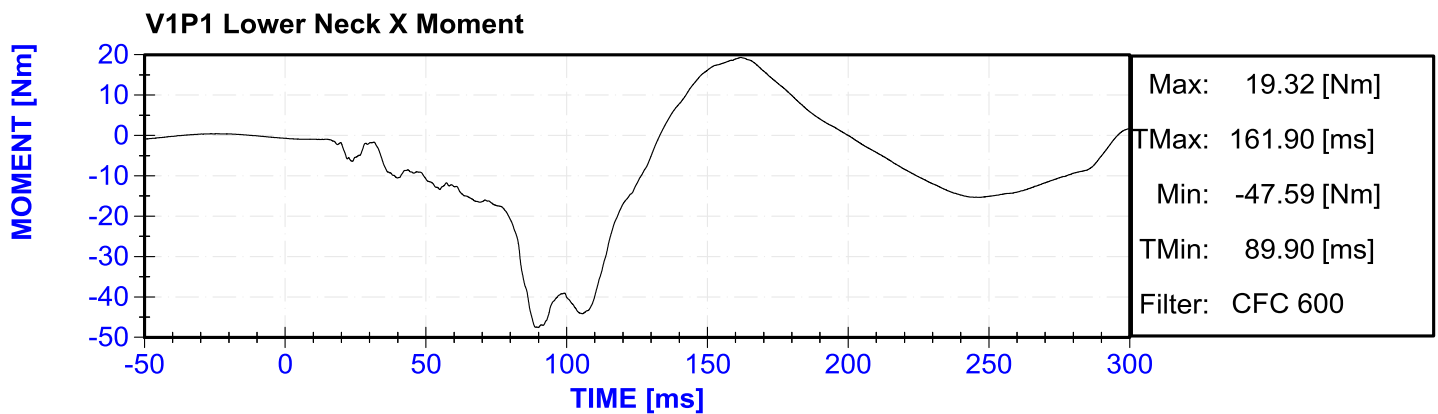
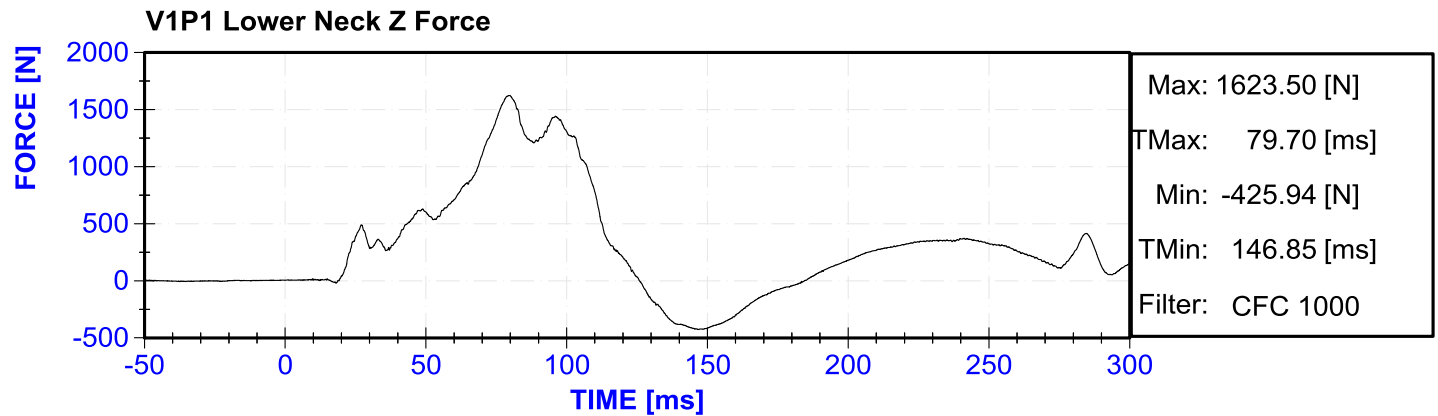
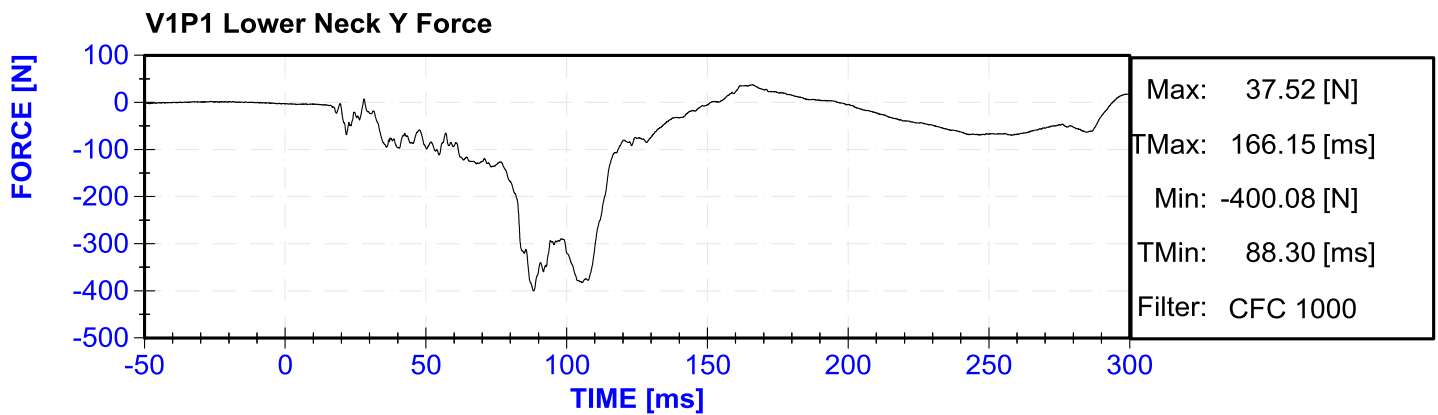
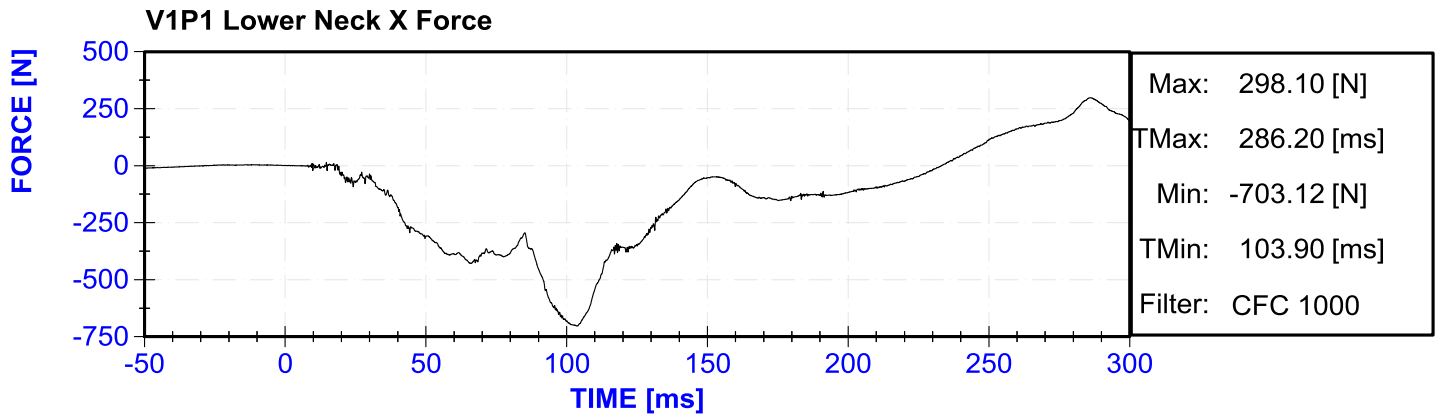
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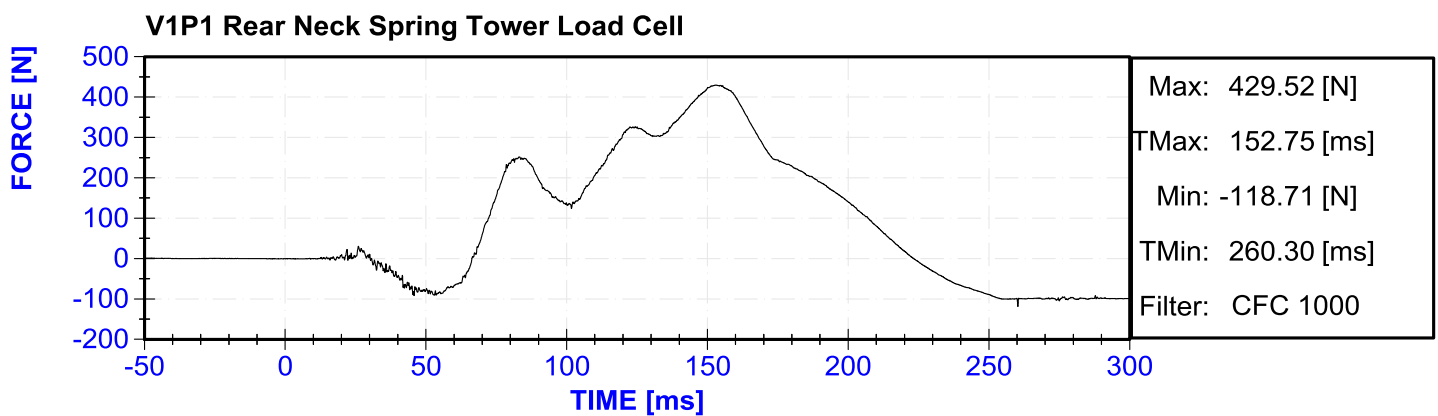
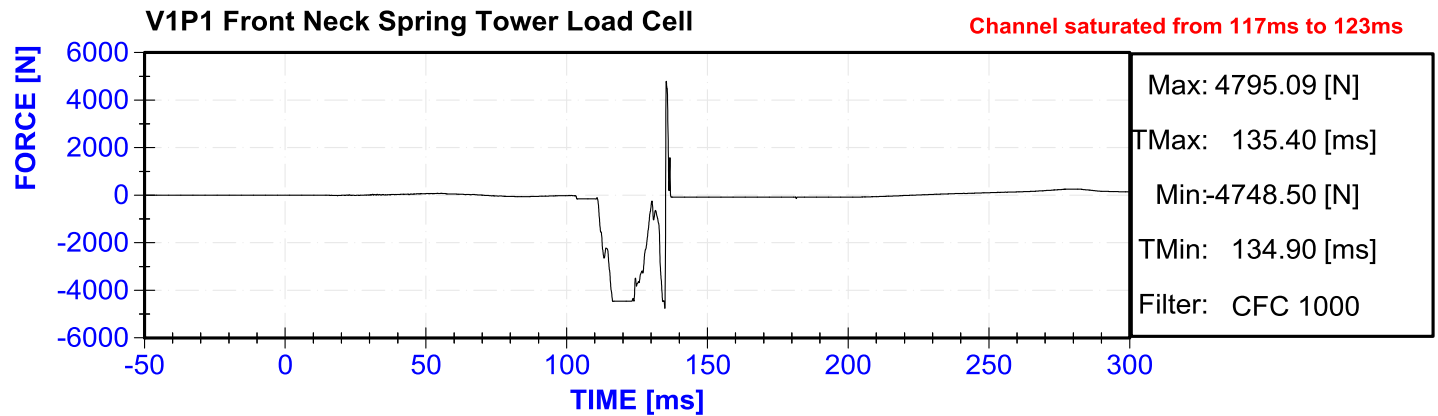
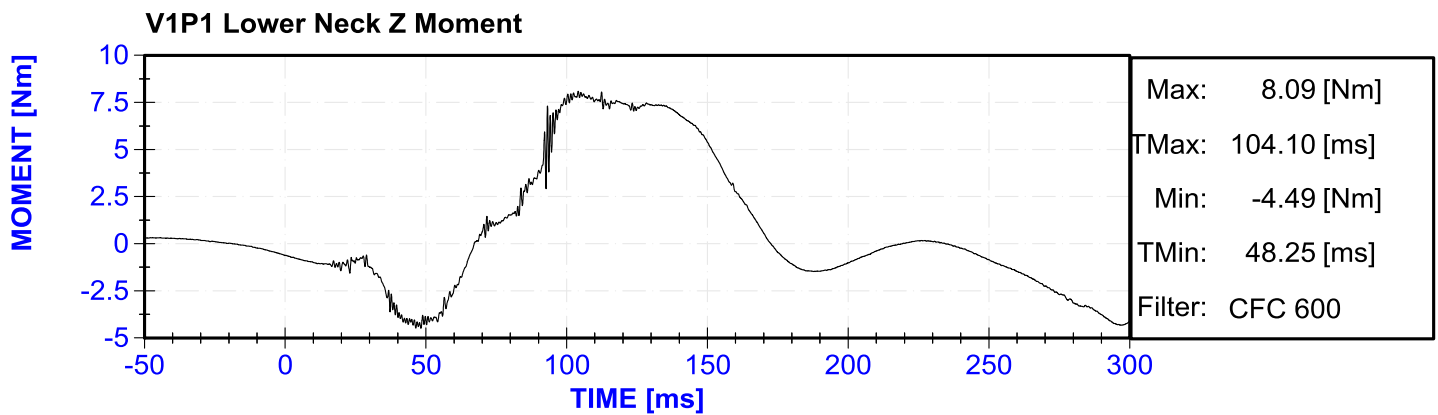
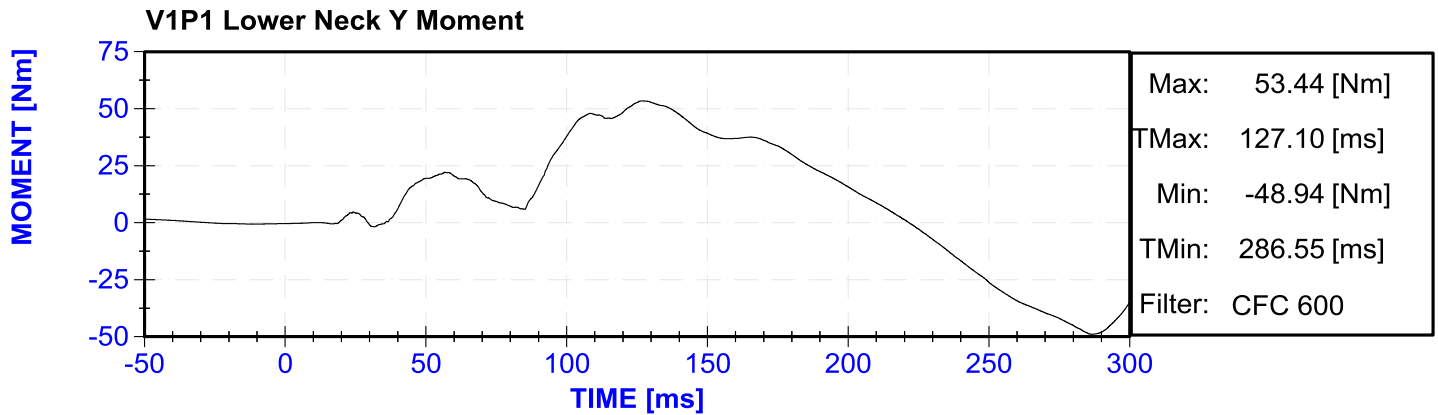
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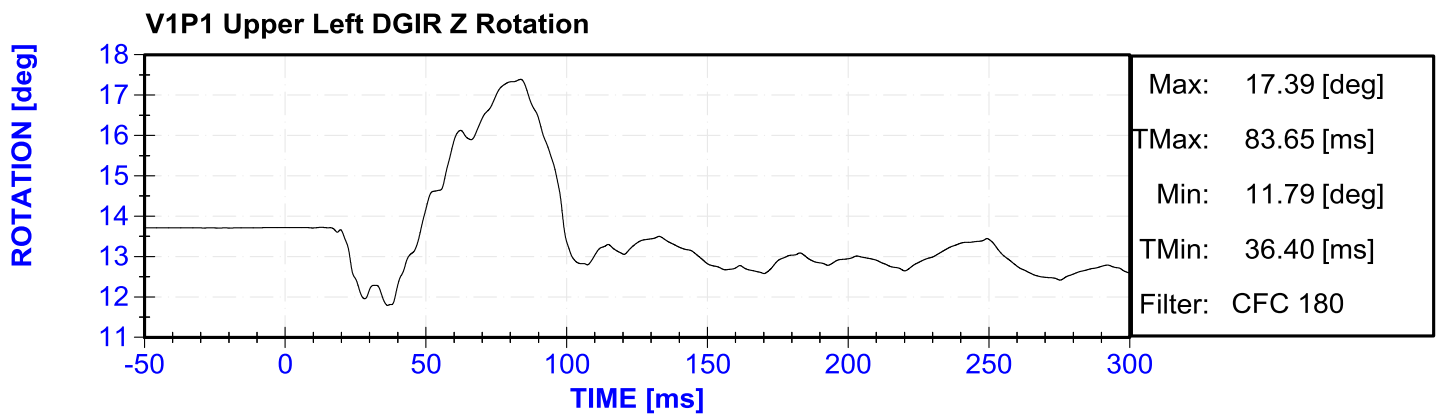
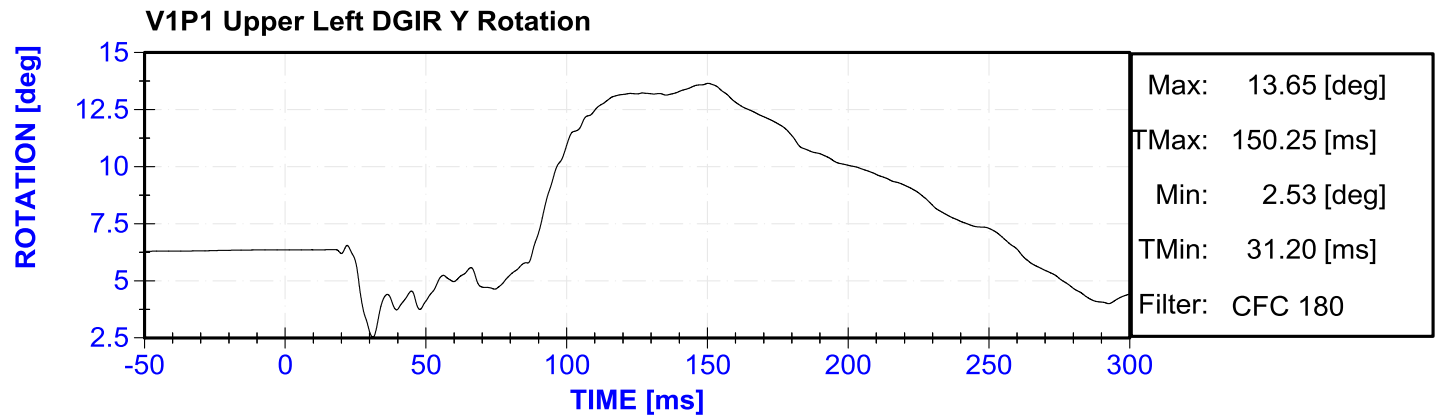
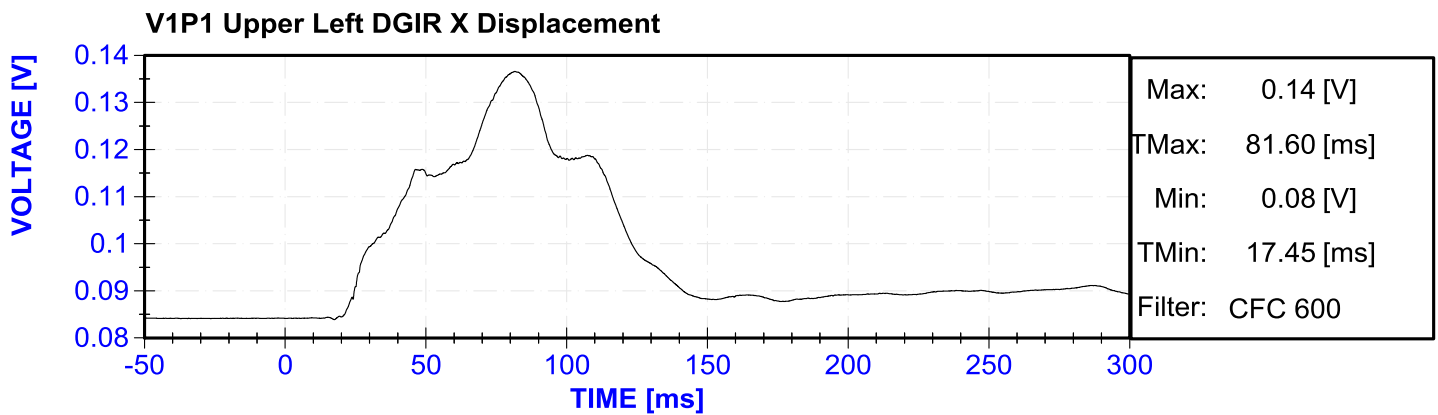
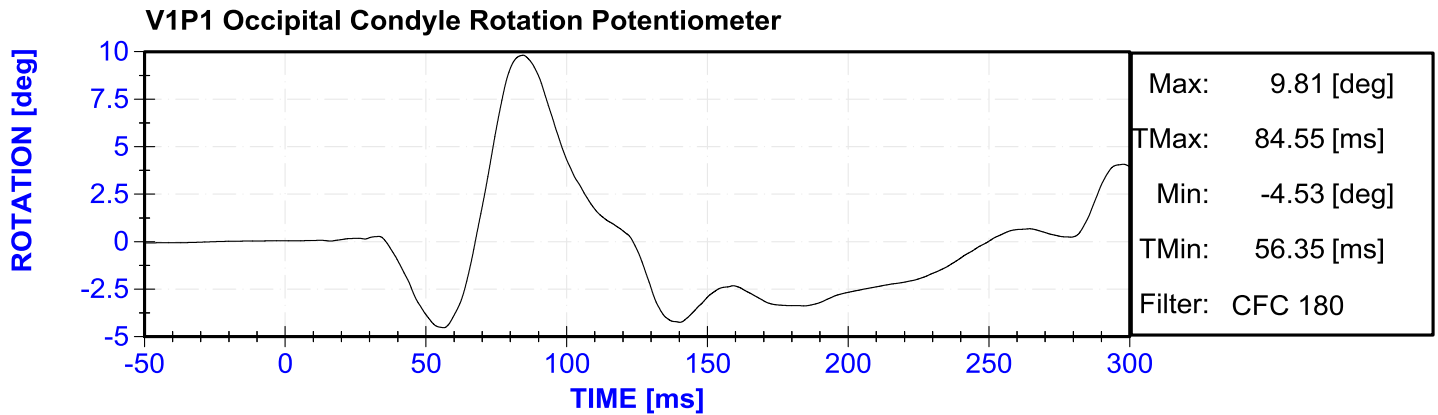




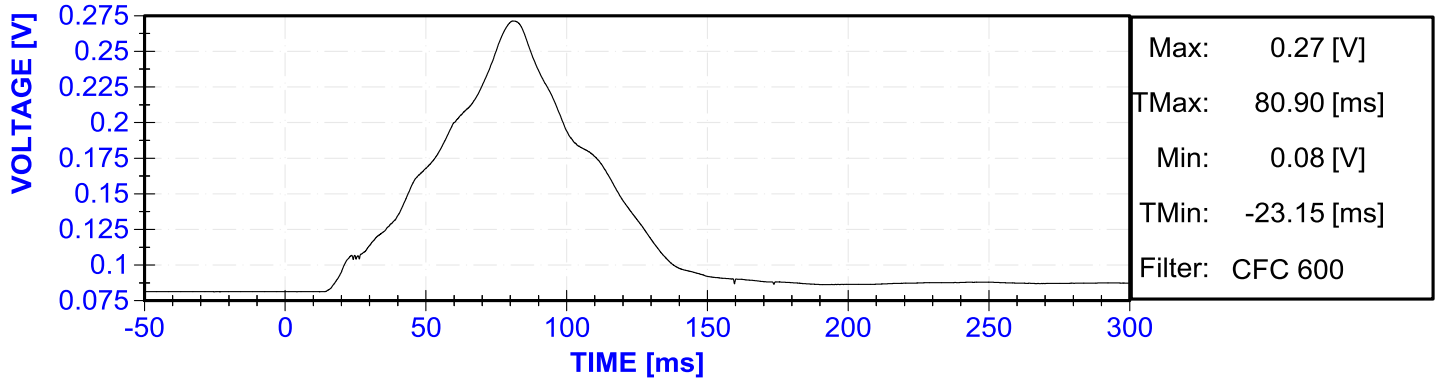




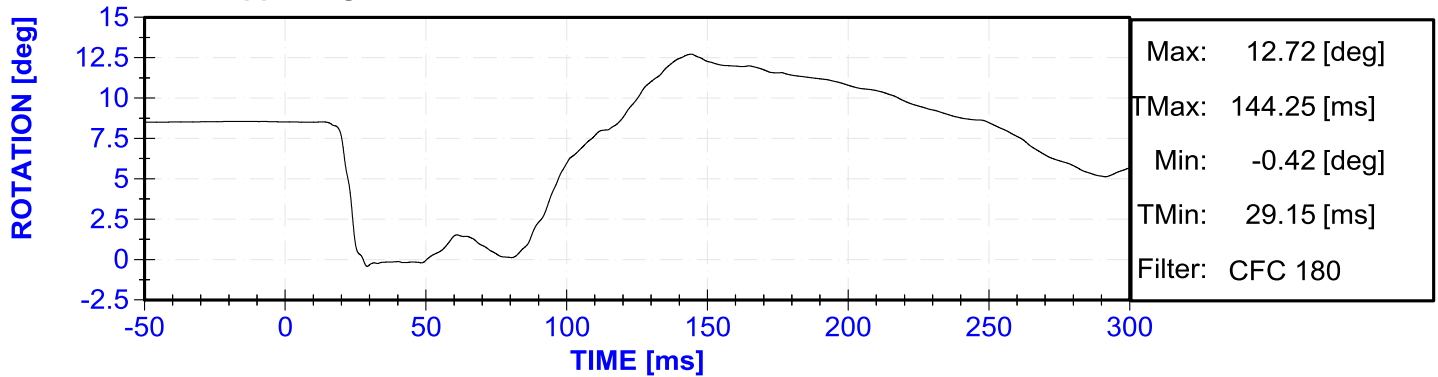




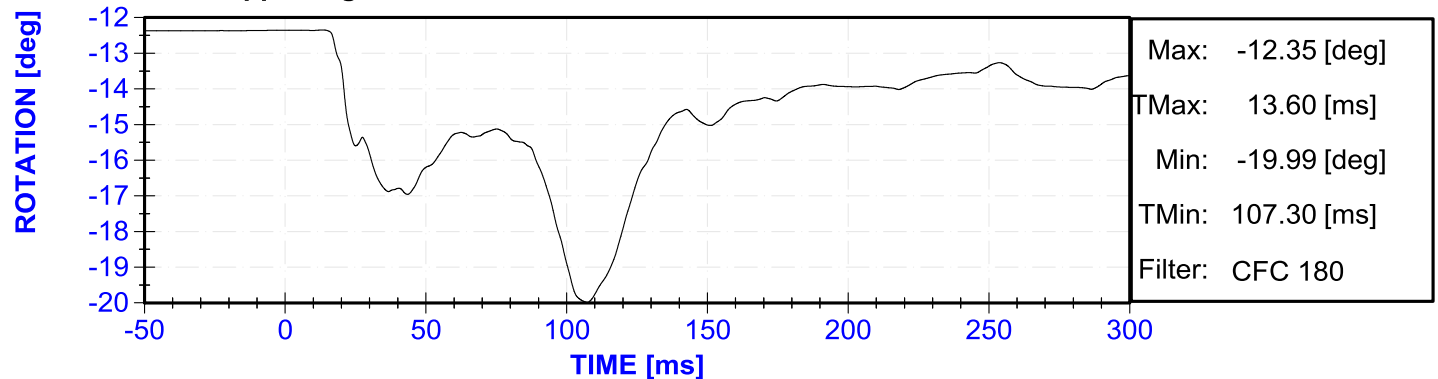
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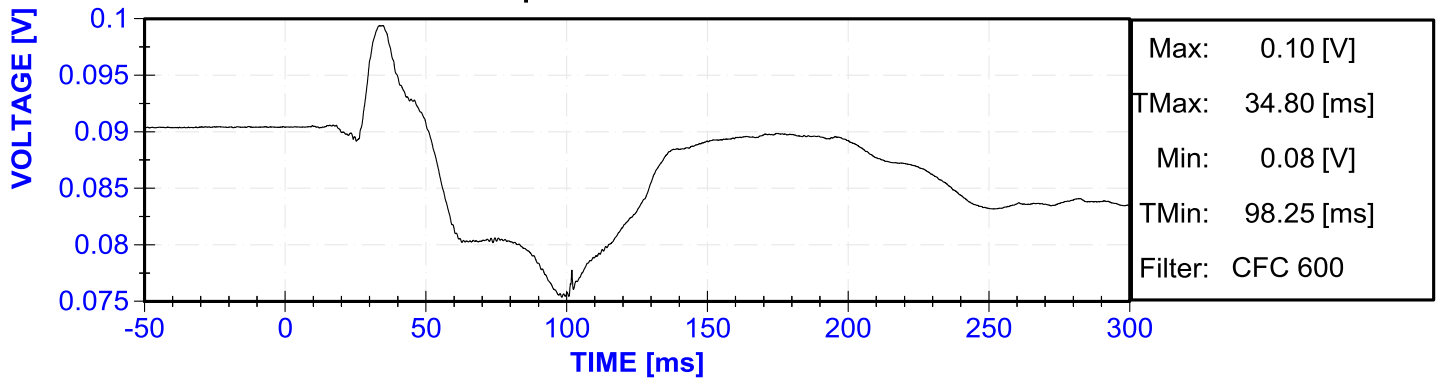
V1P1 Upper Right DGIR Y Rotation

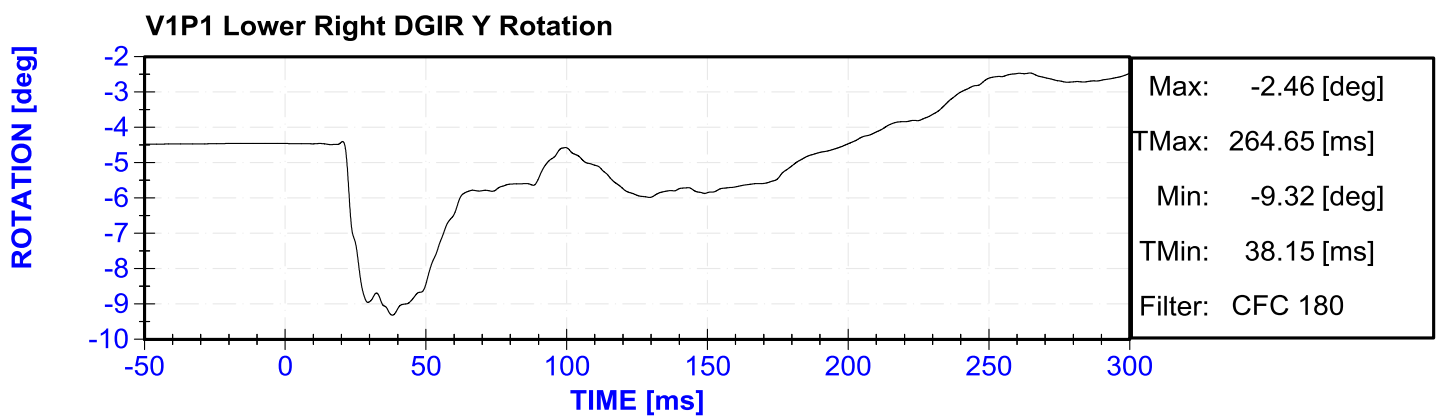
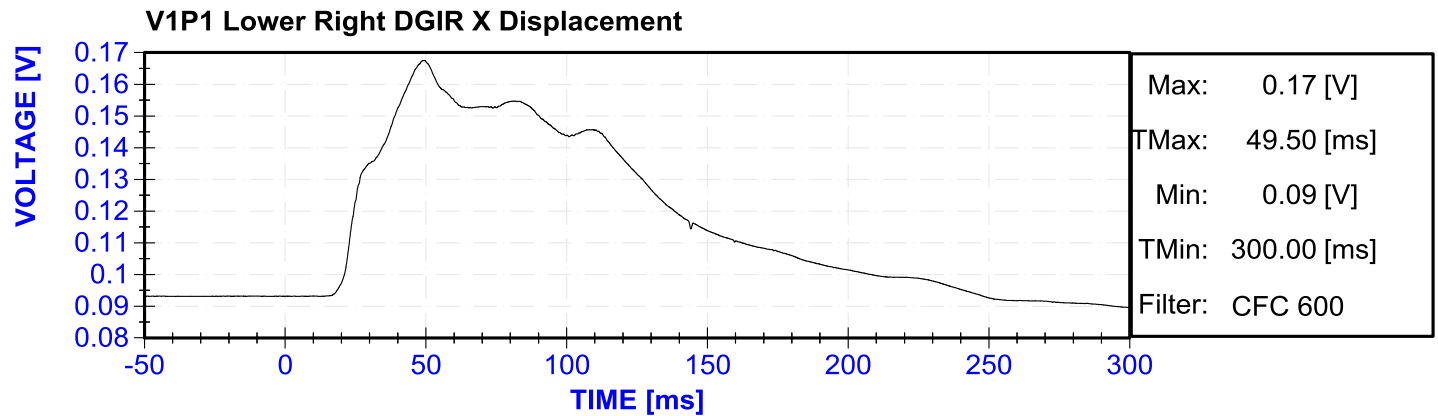
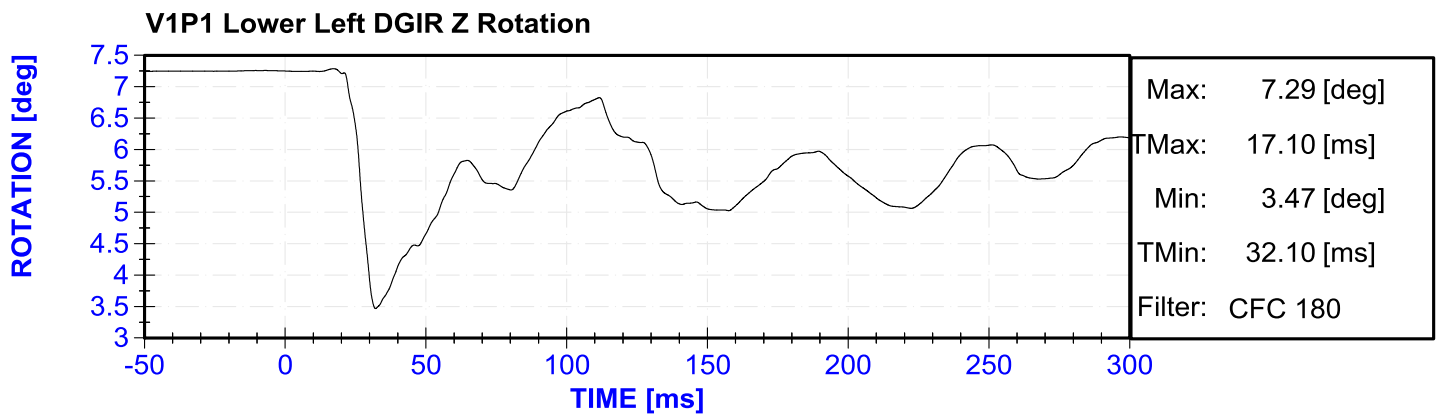
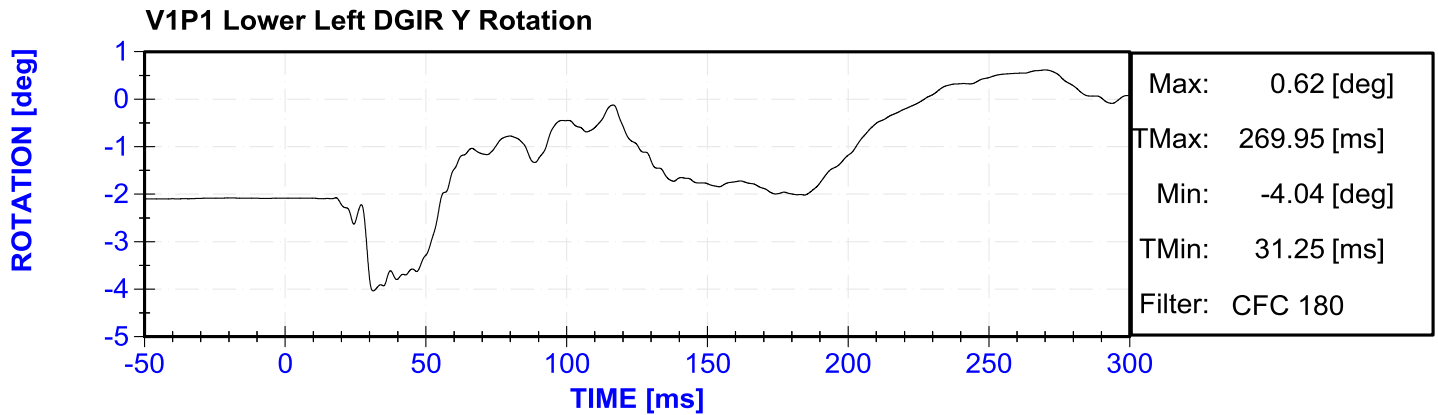


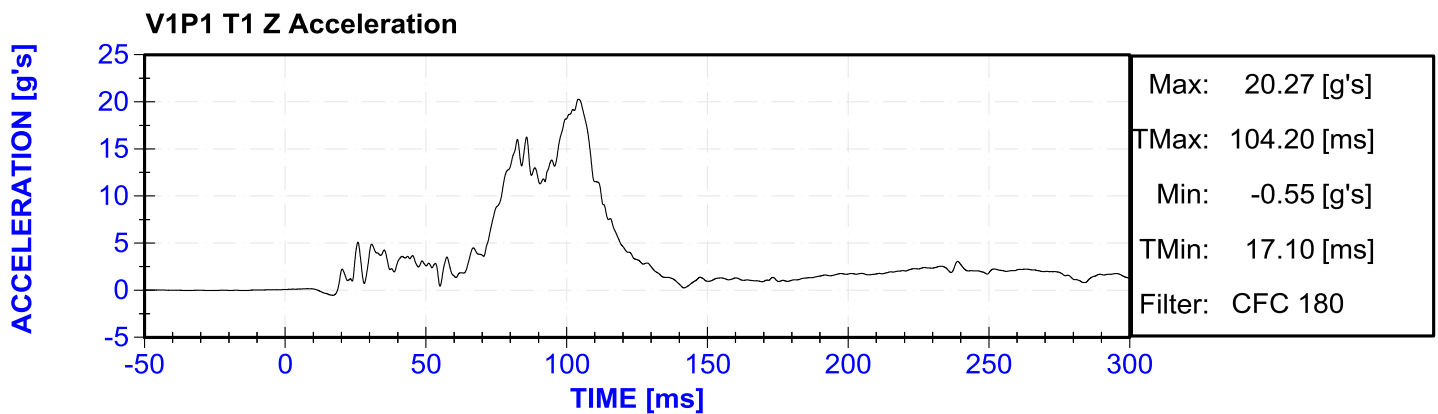
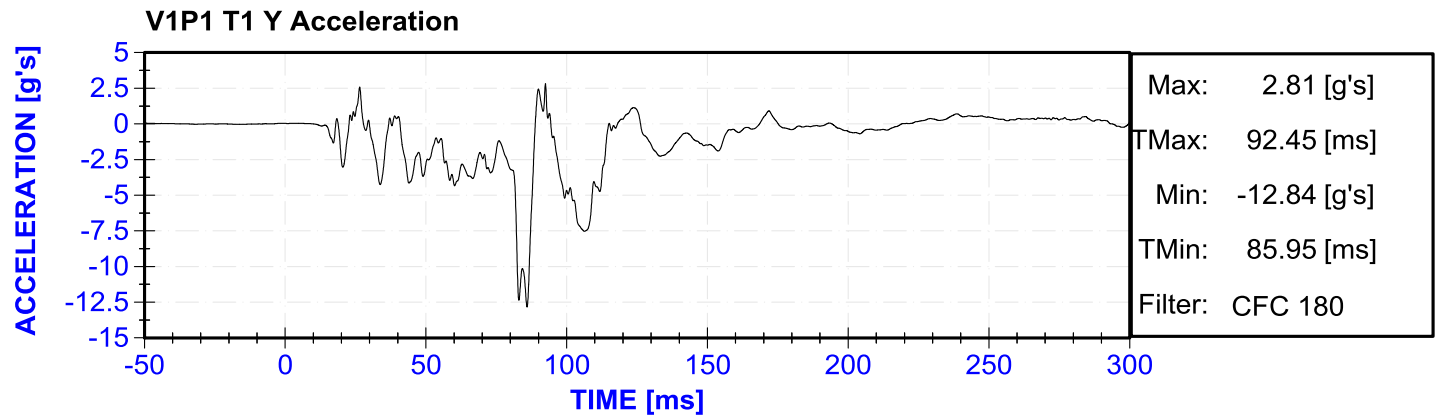
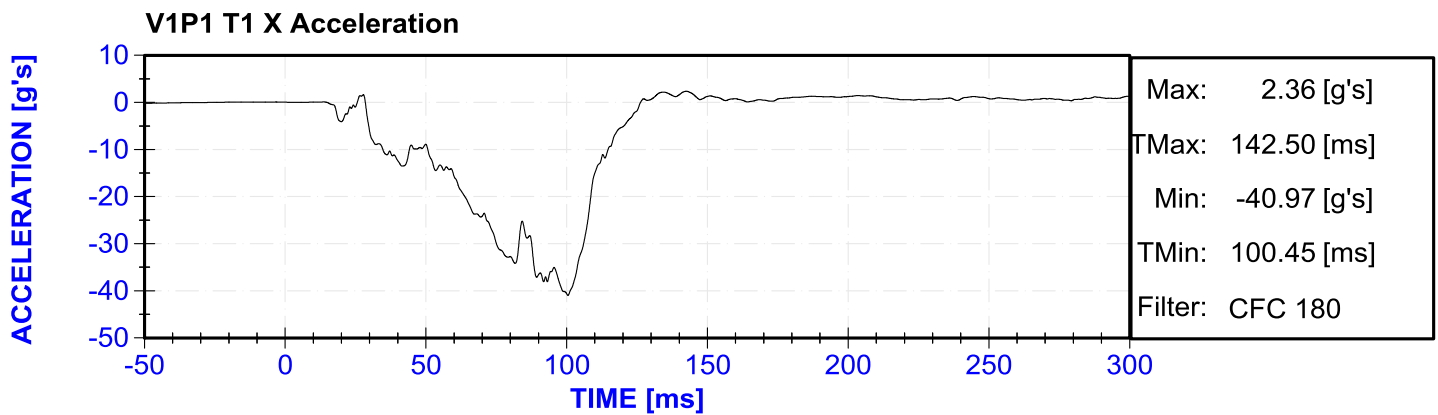
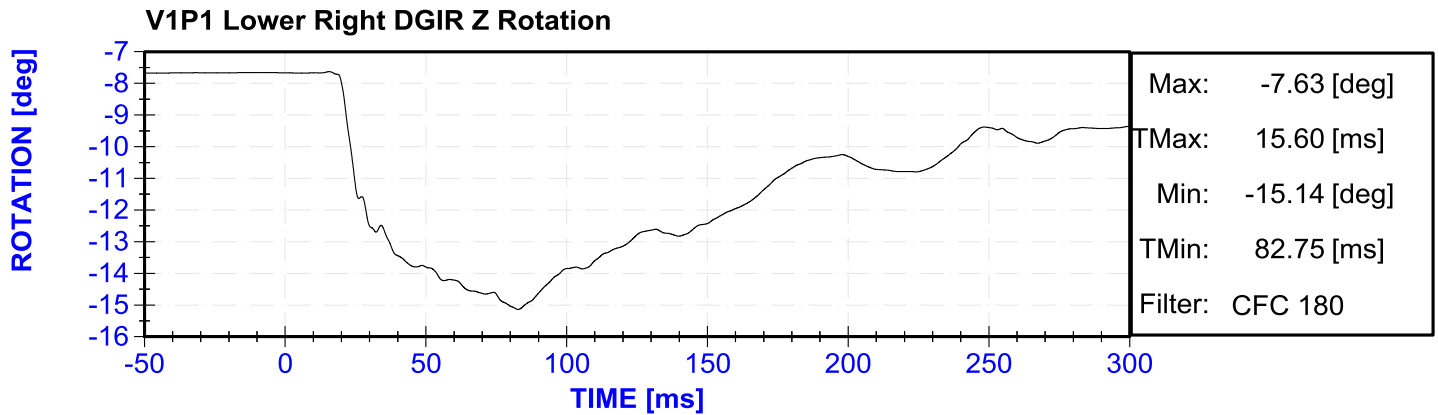
V1P1 Upper Right DGIR Z Rotation

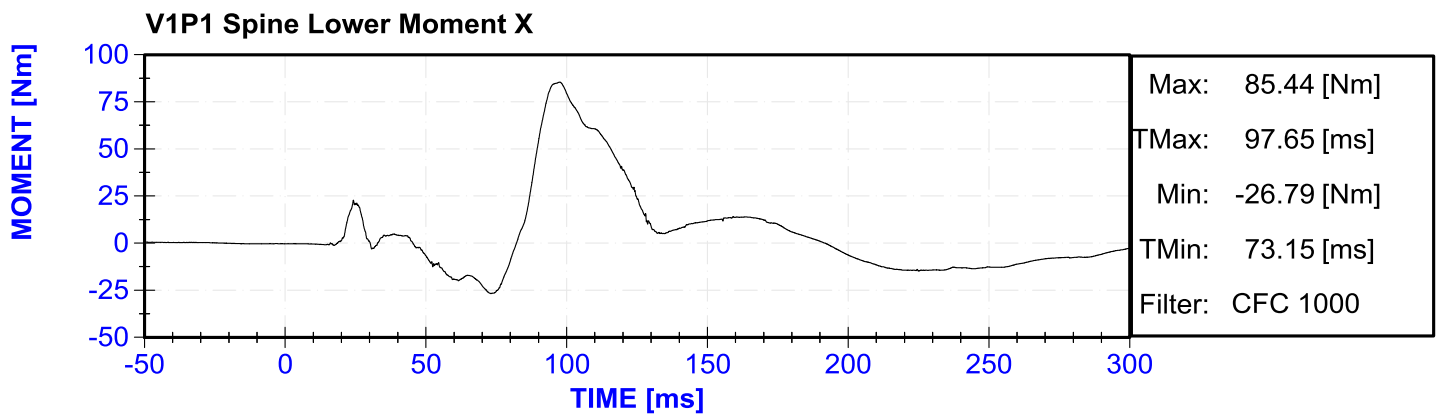
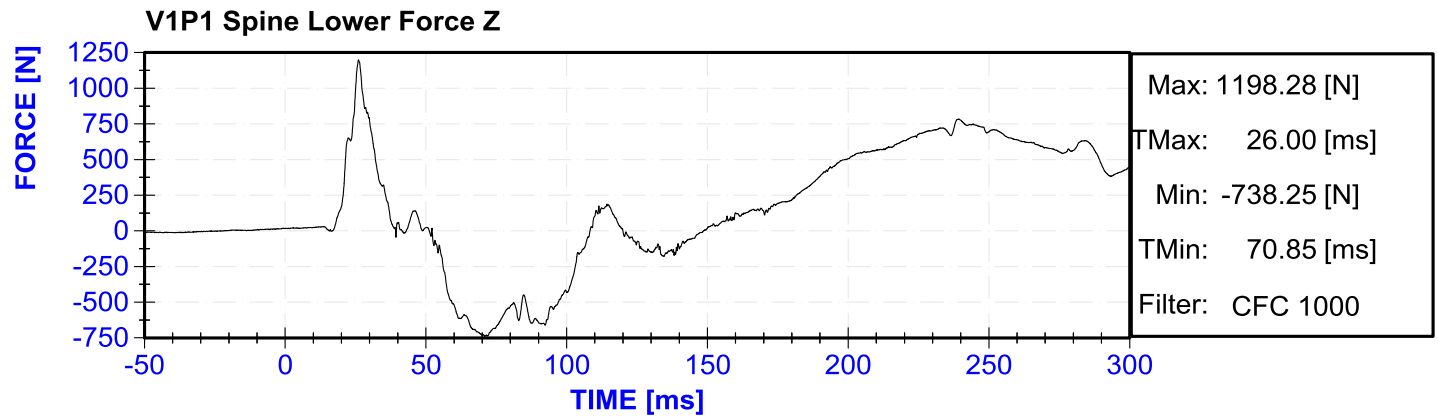
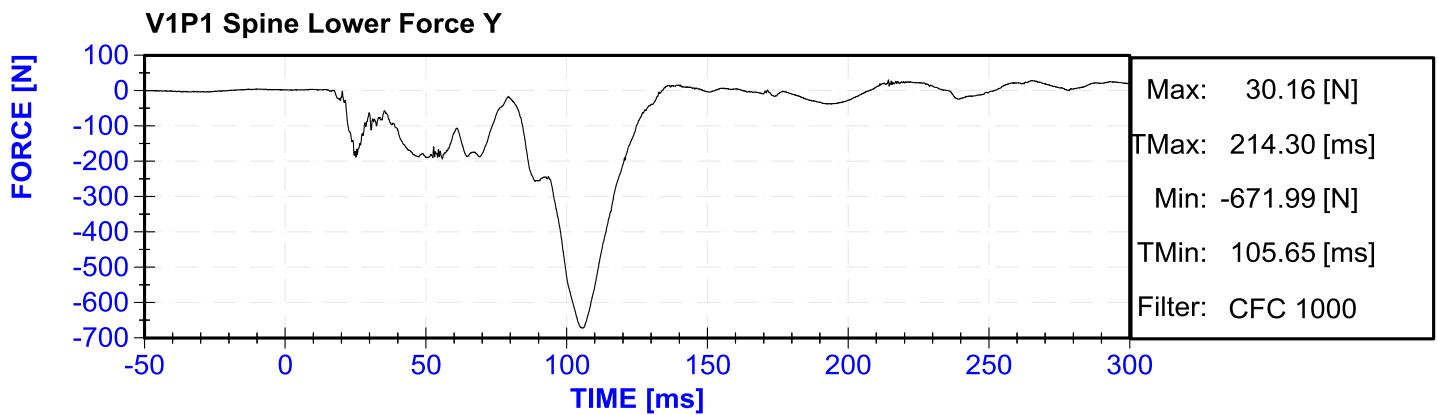
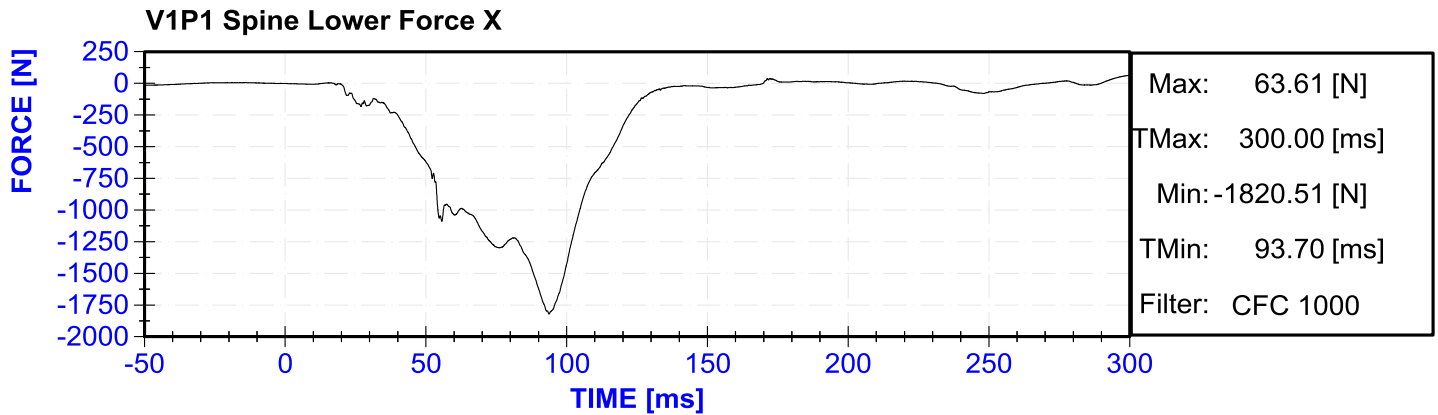


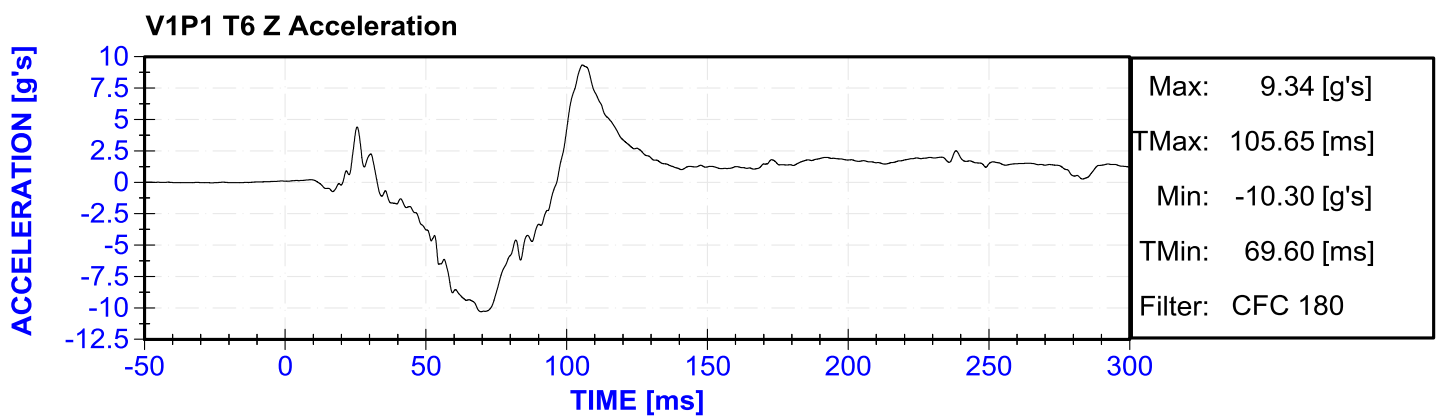
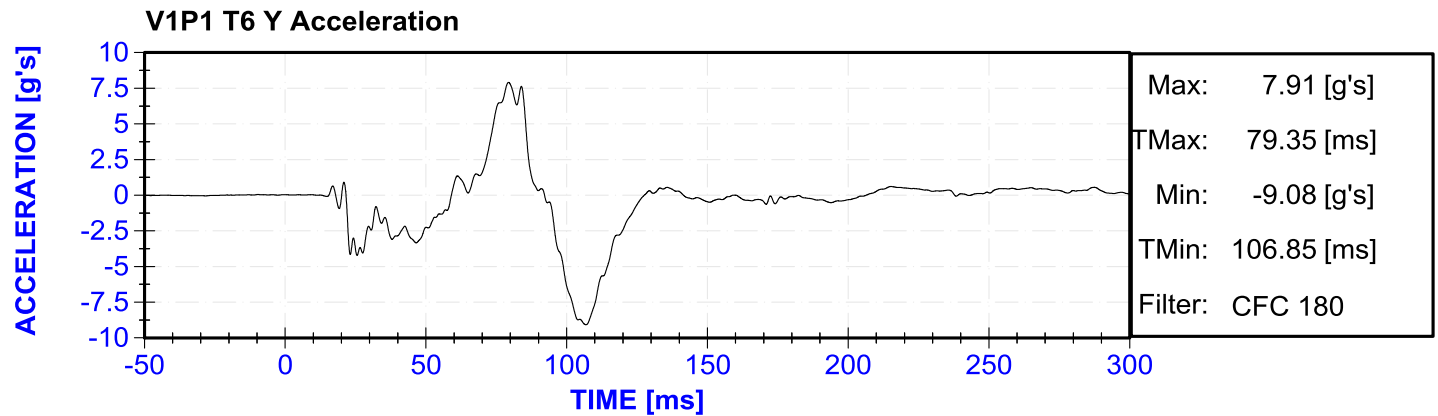
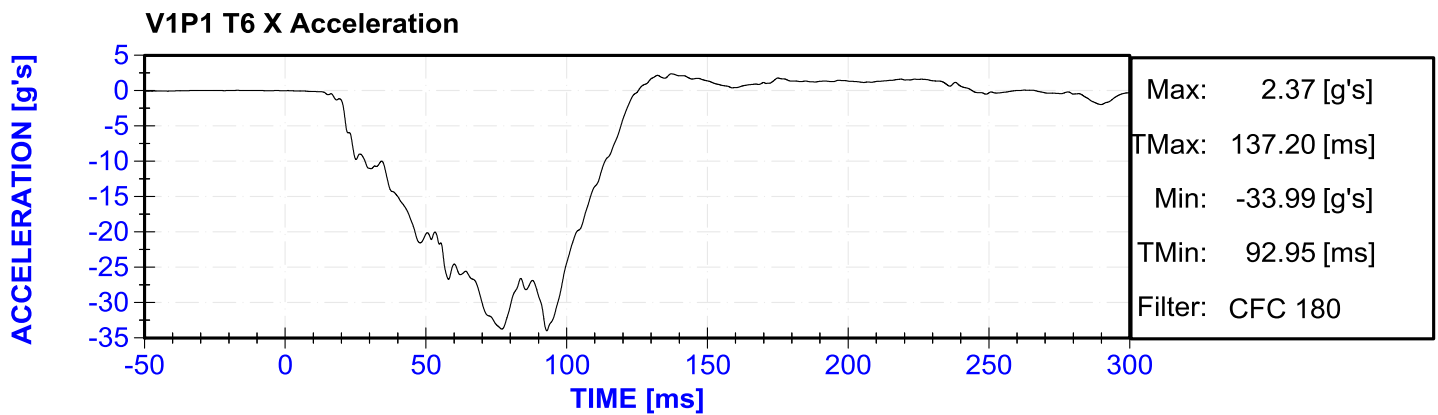
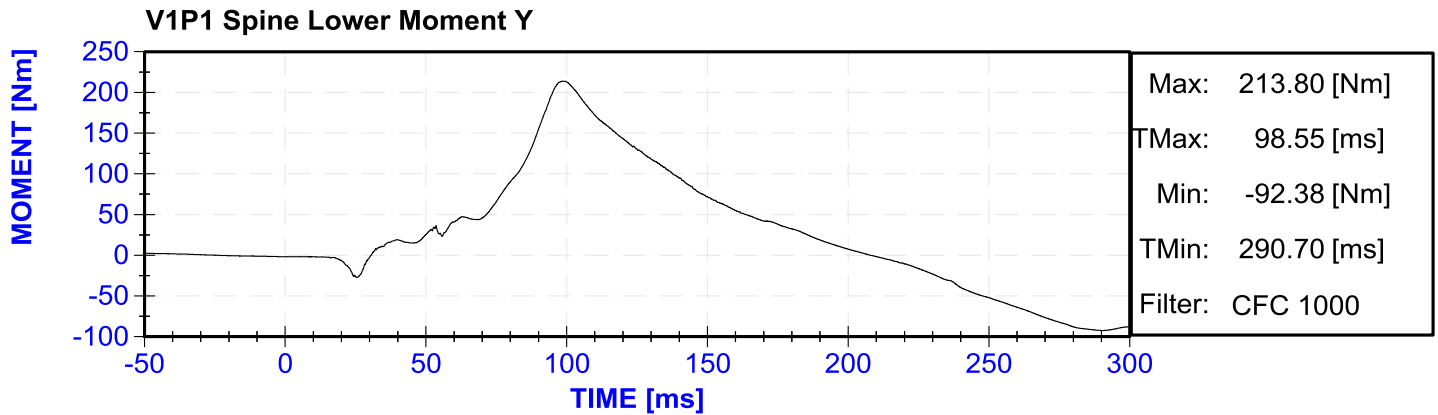
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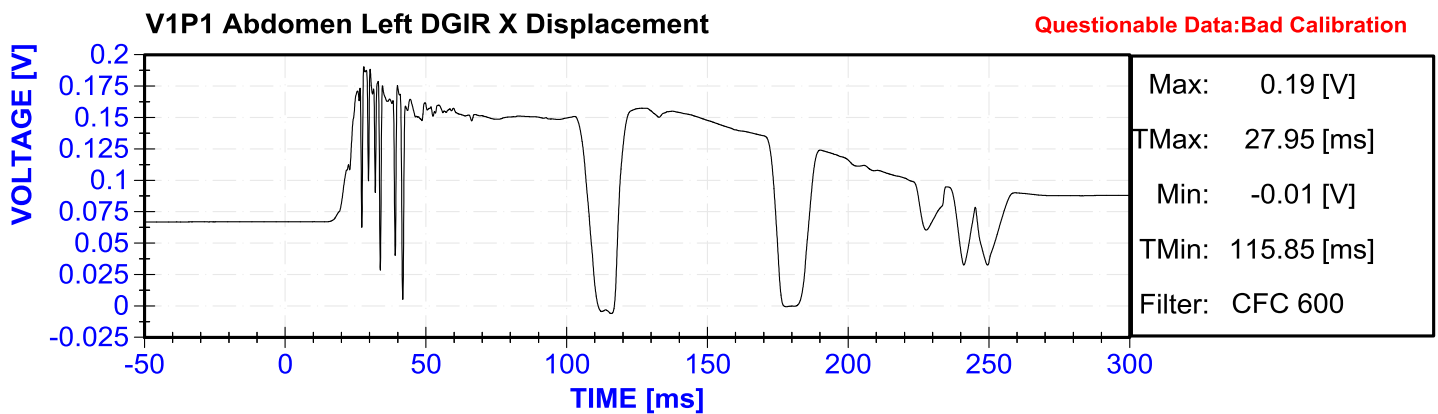
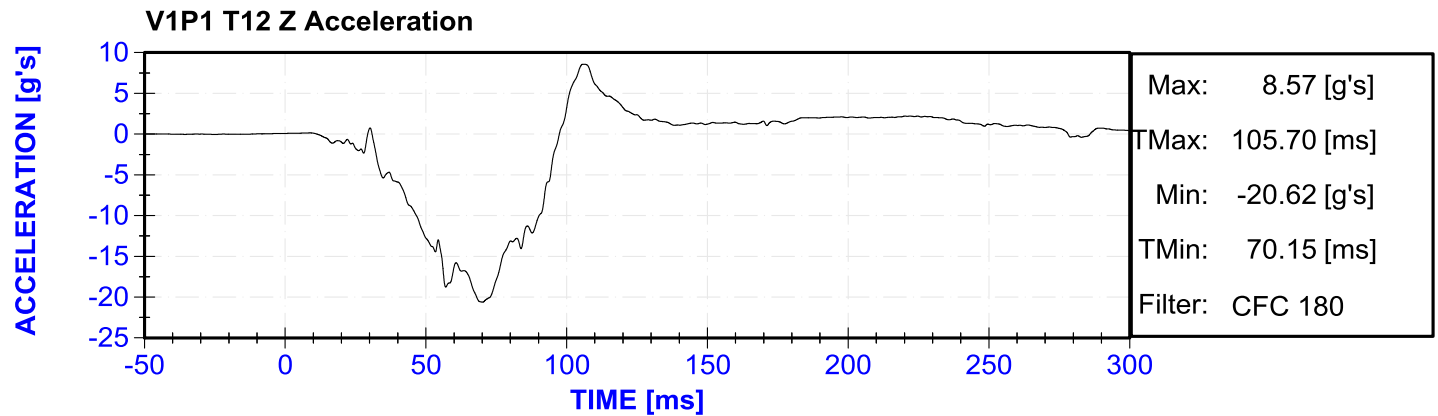
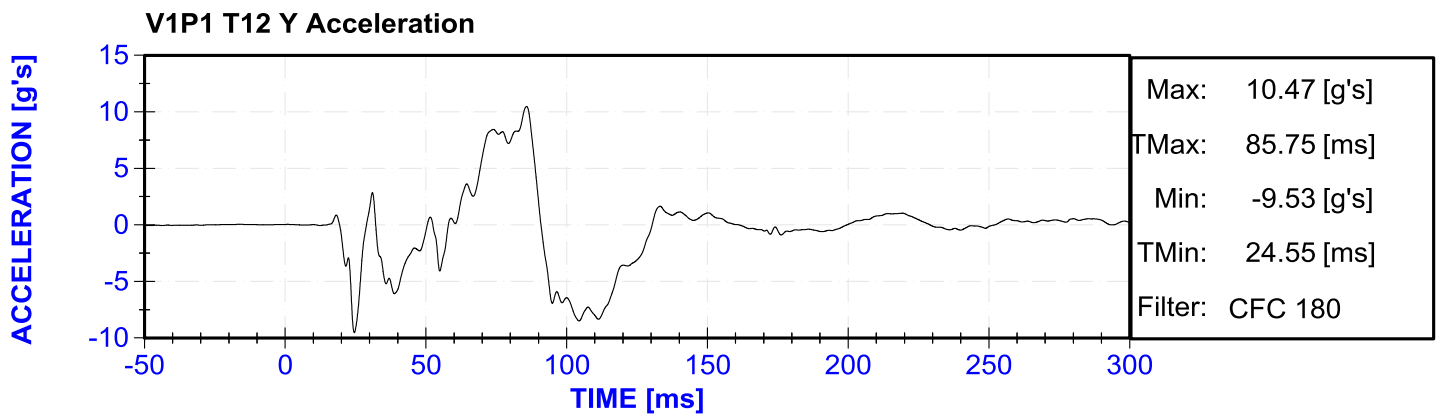
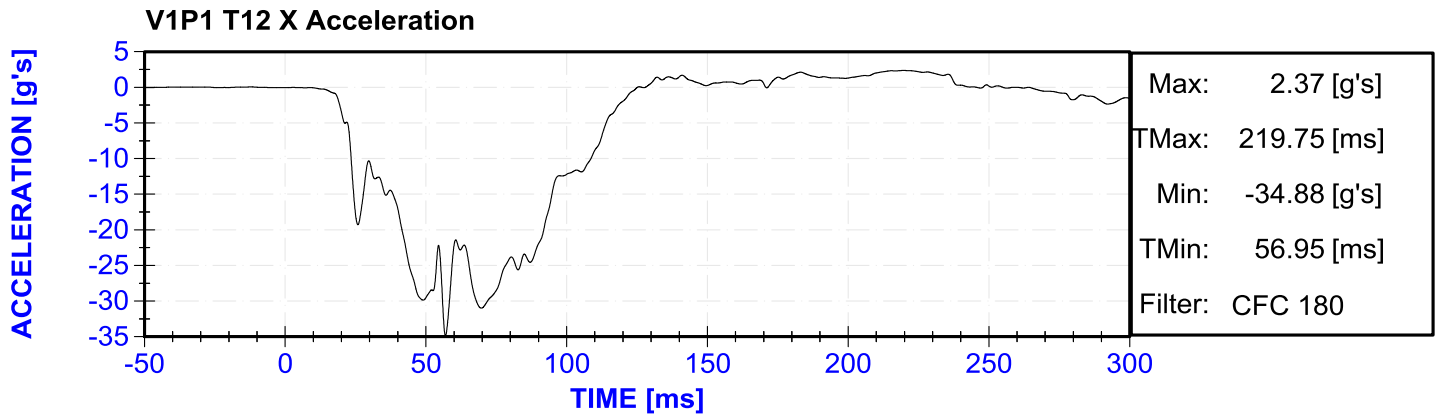


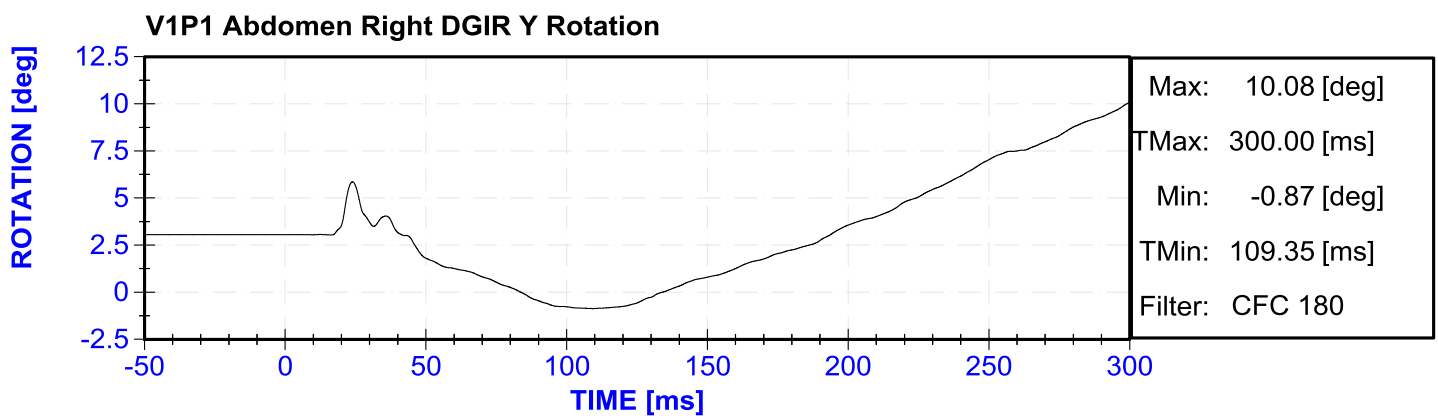
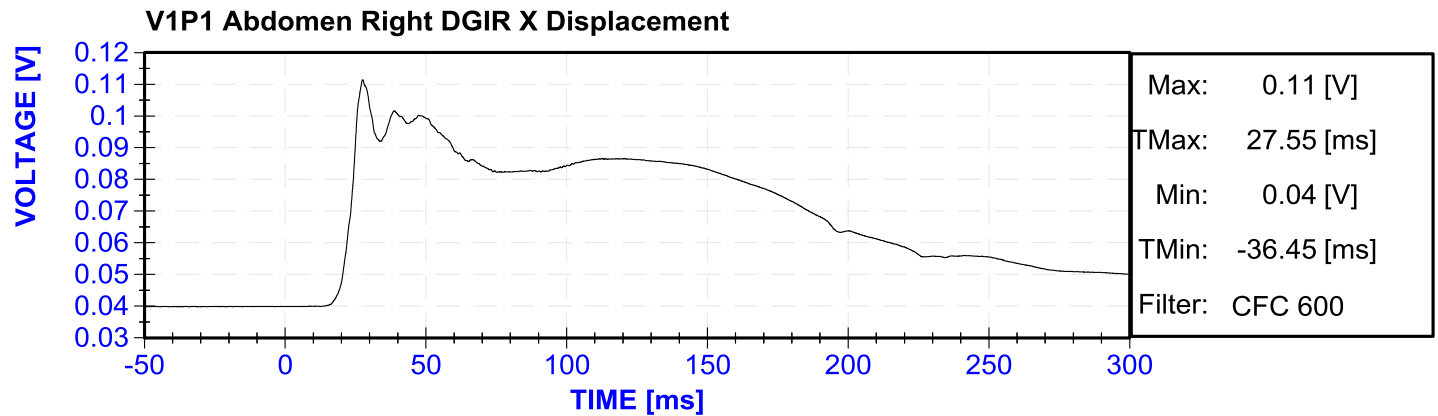
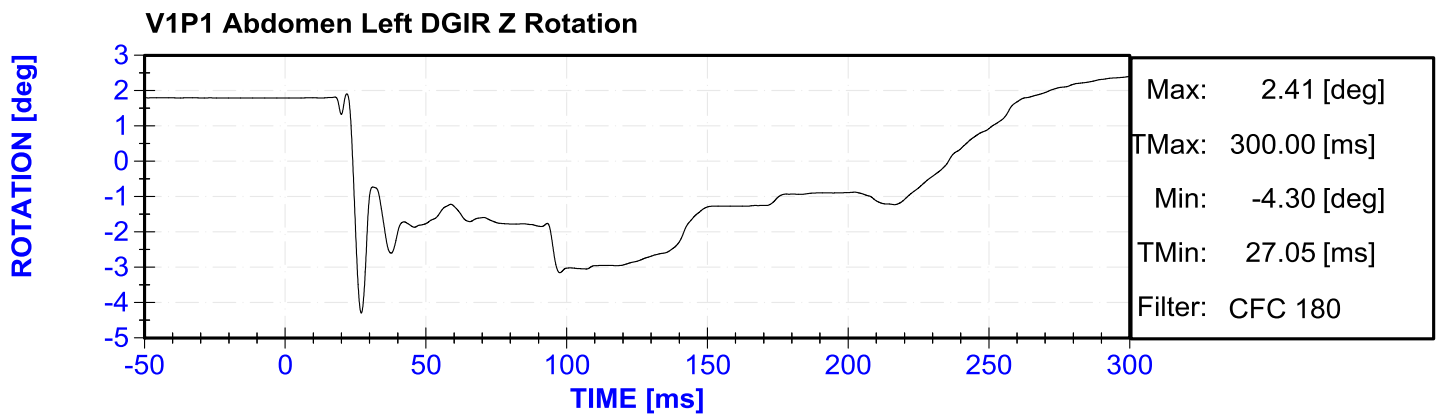
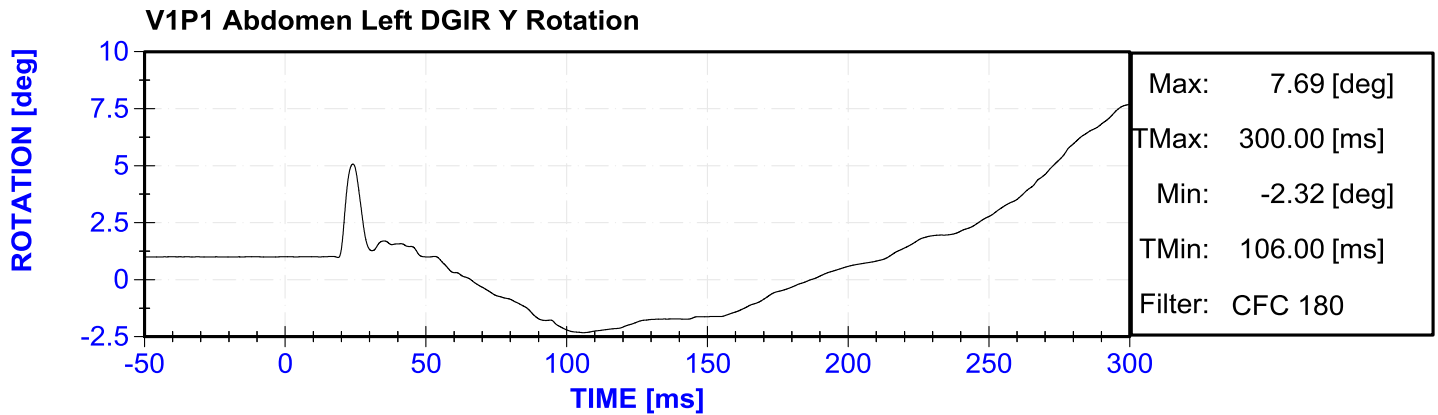


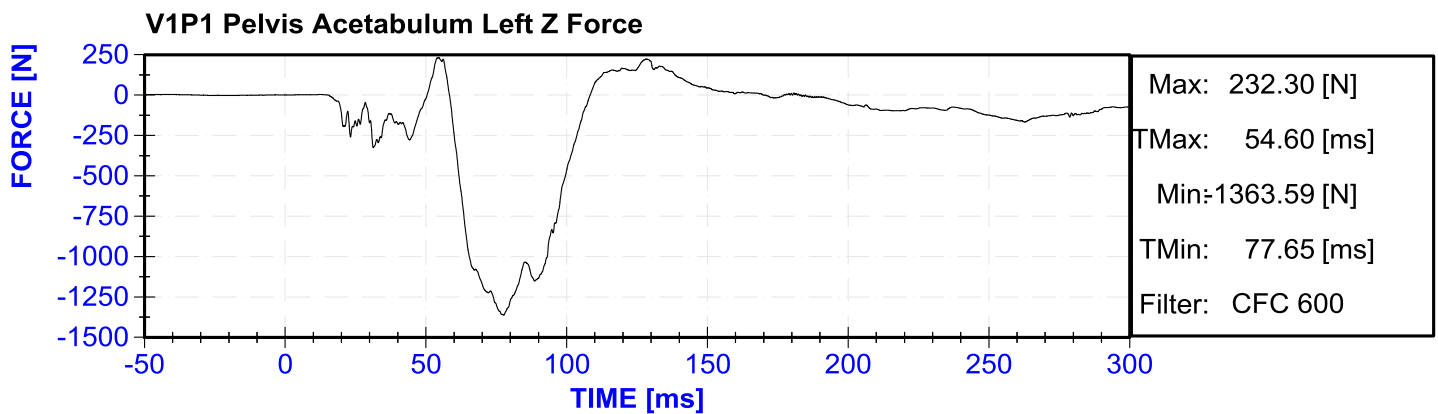
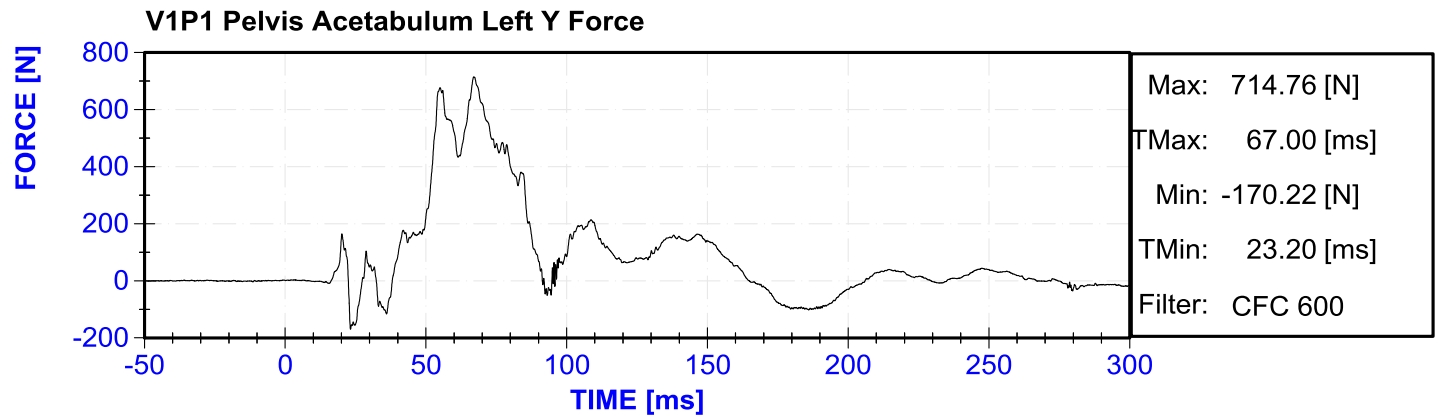
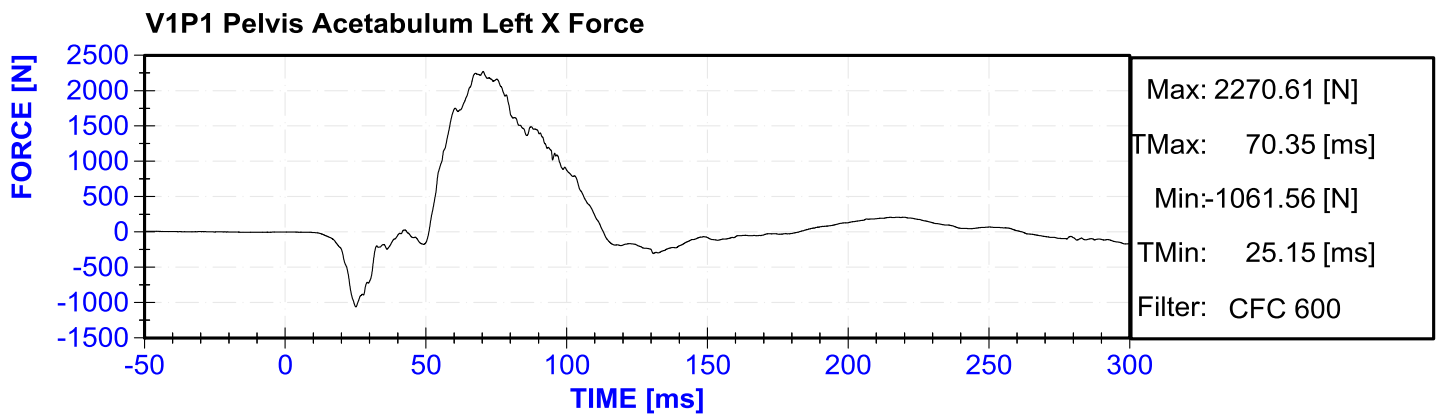
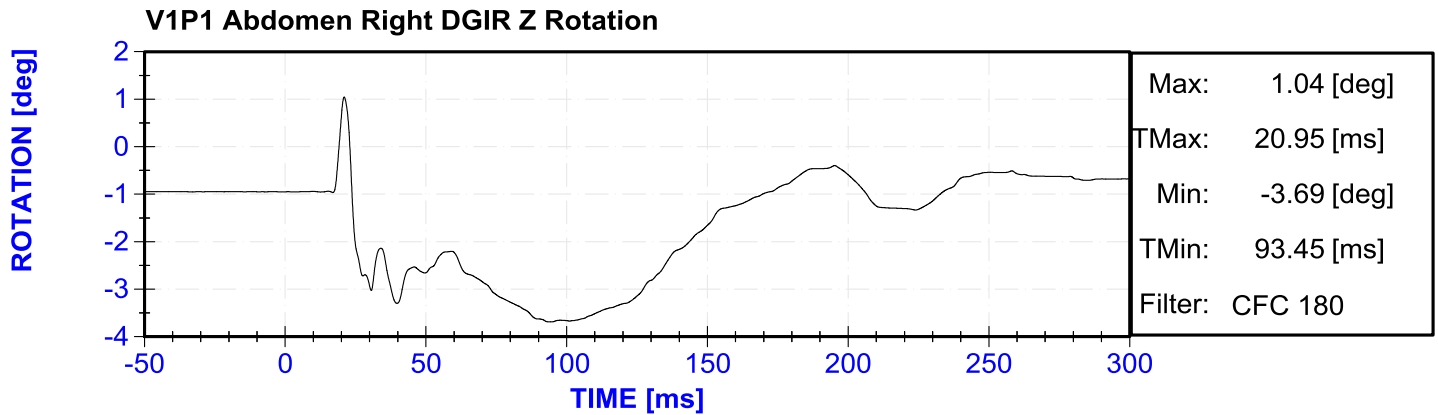


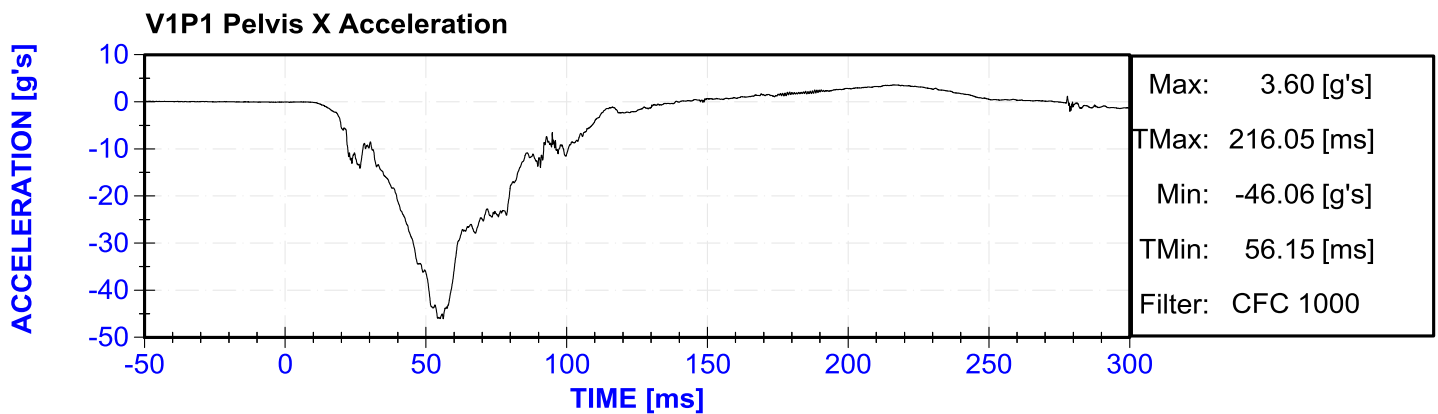
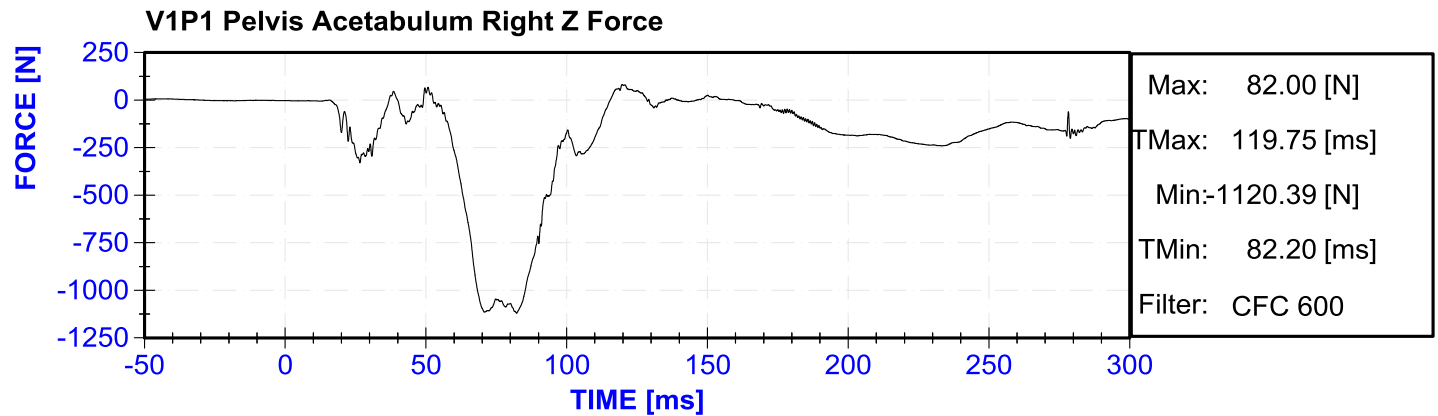
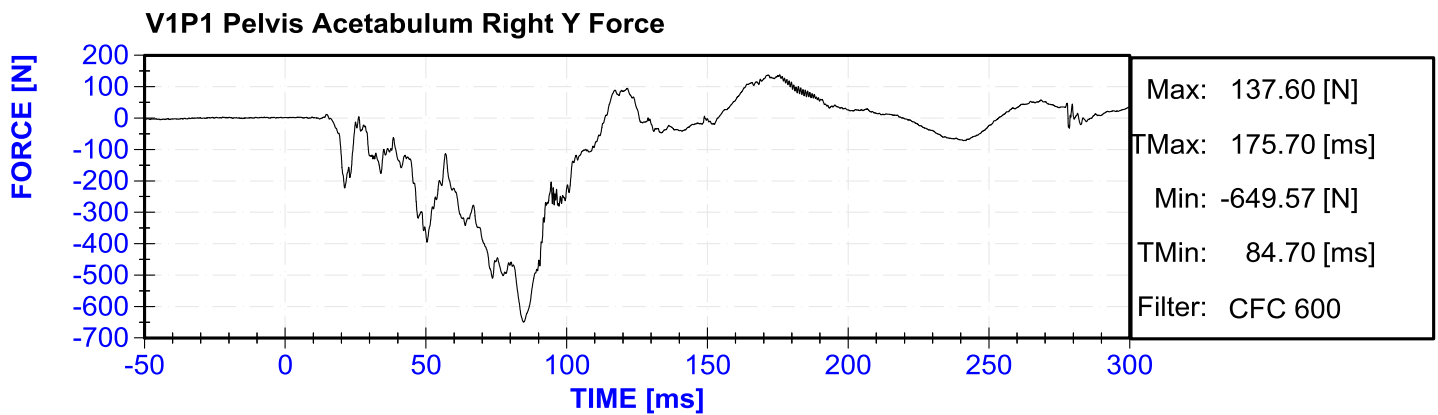
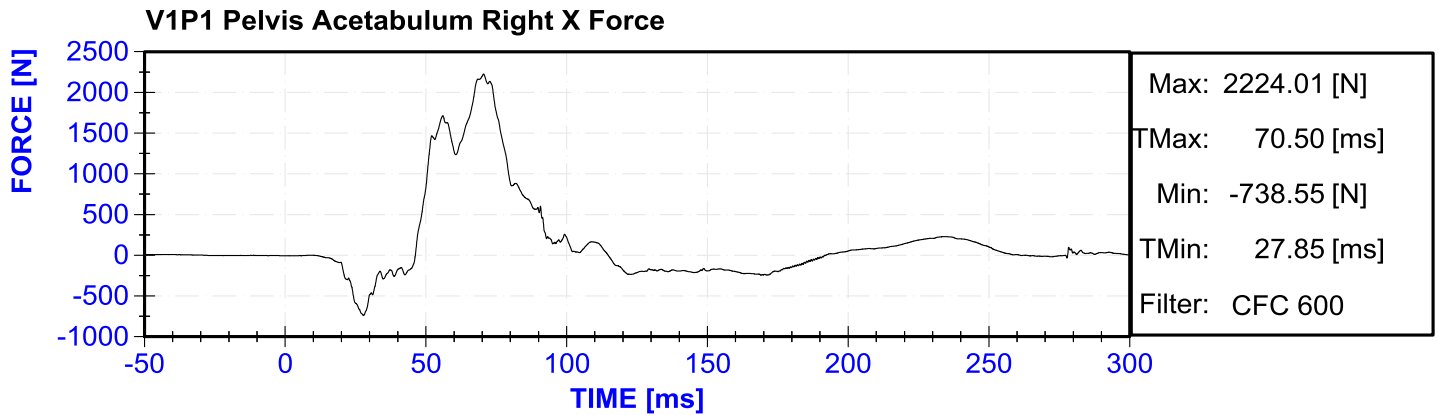


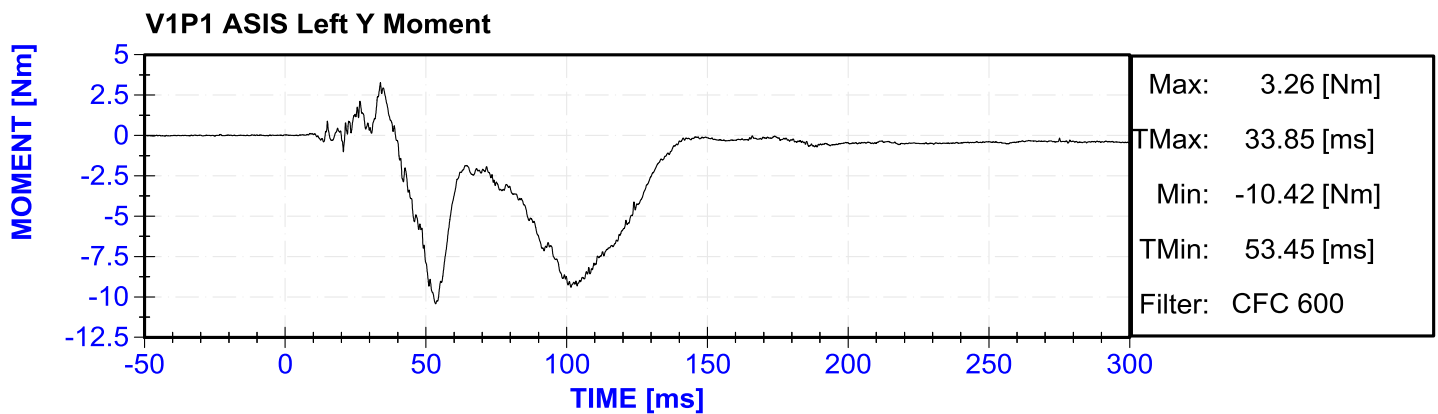
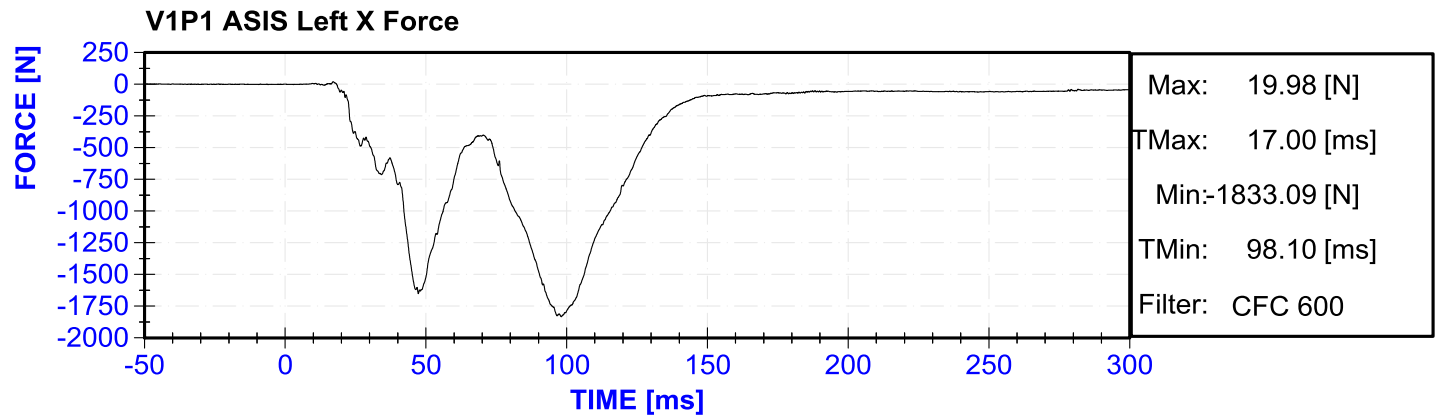
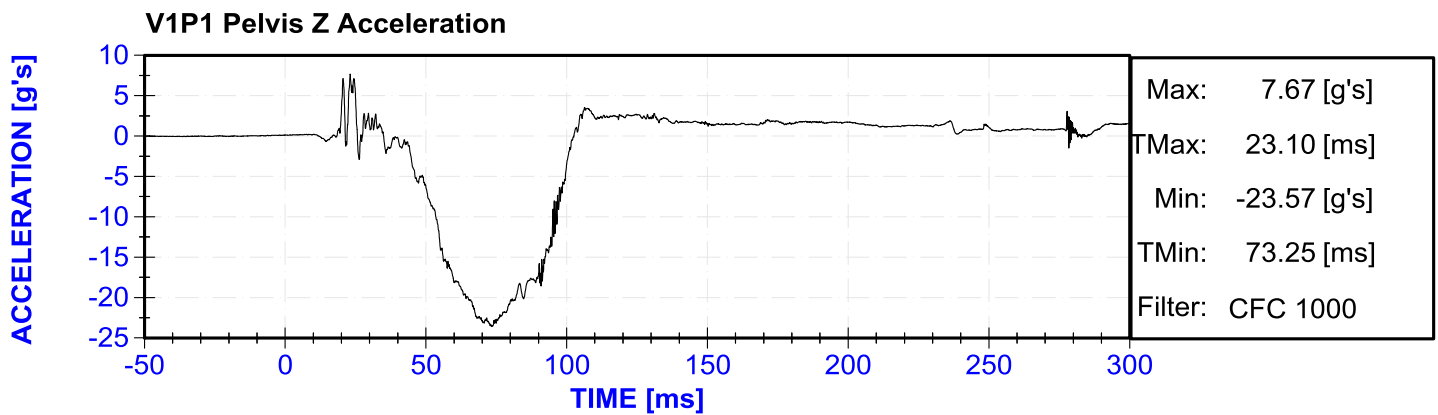
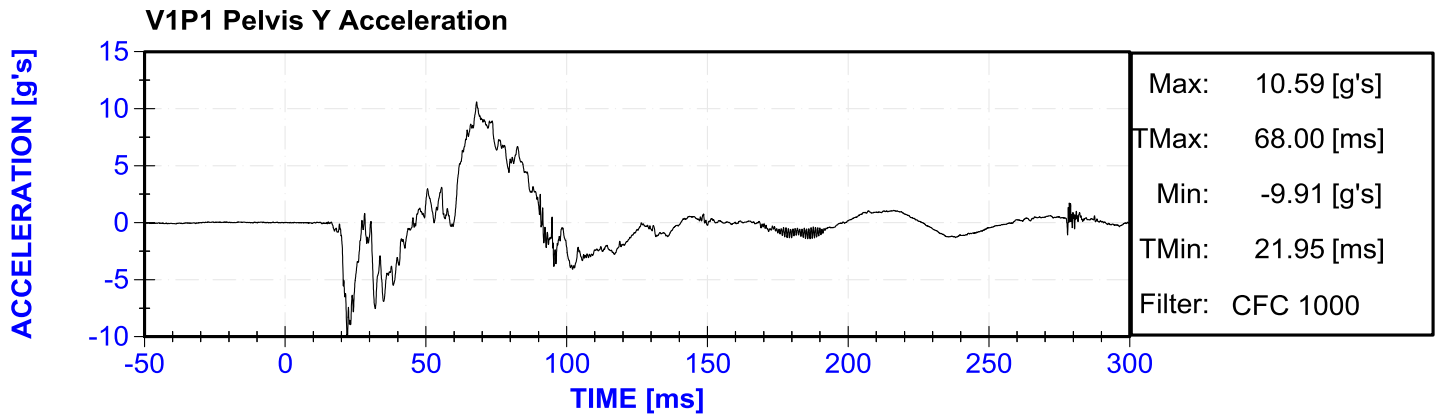


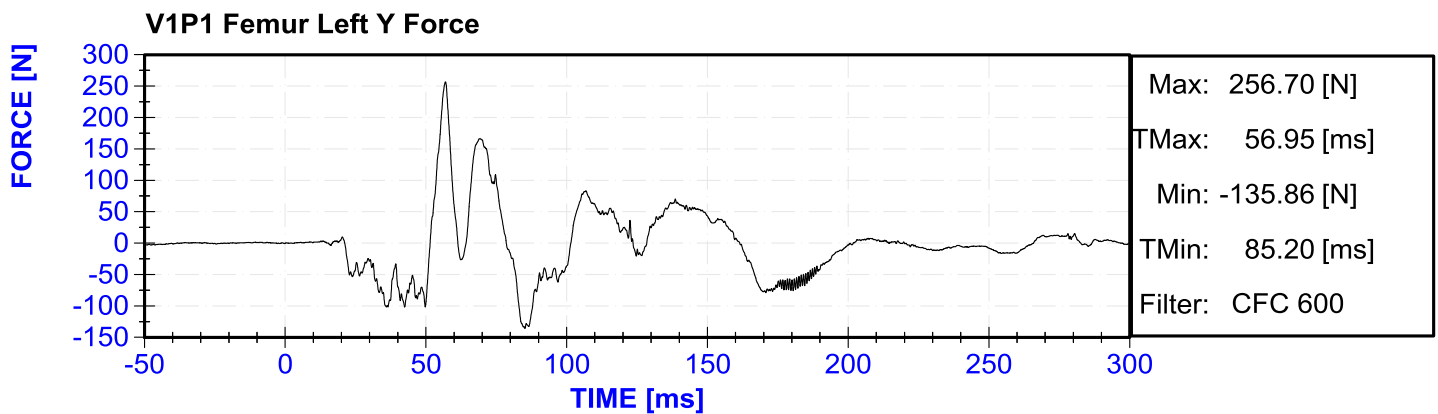
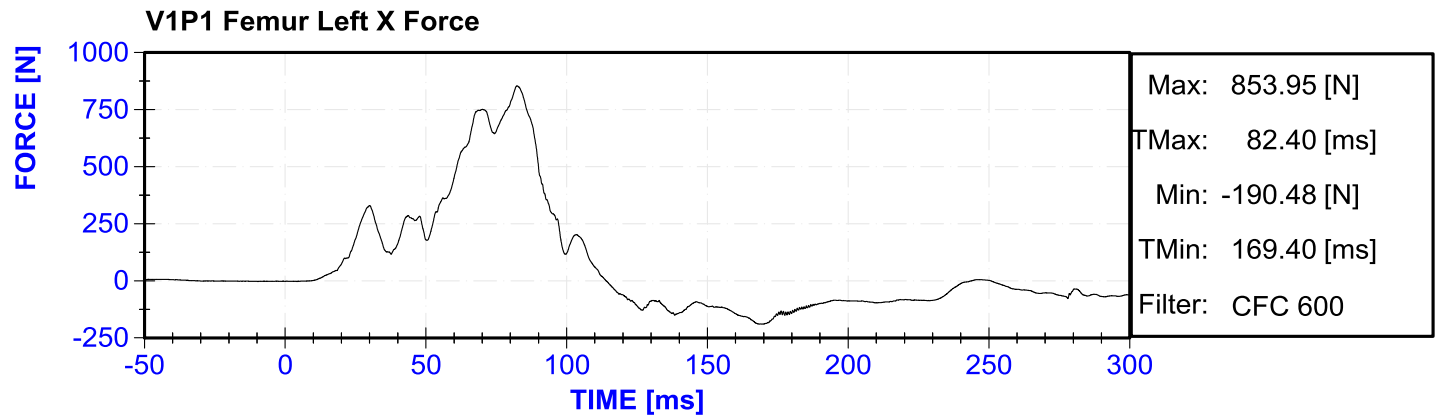
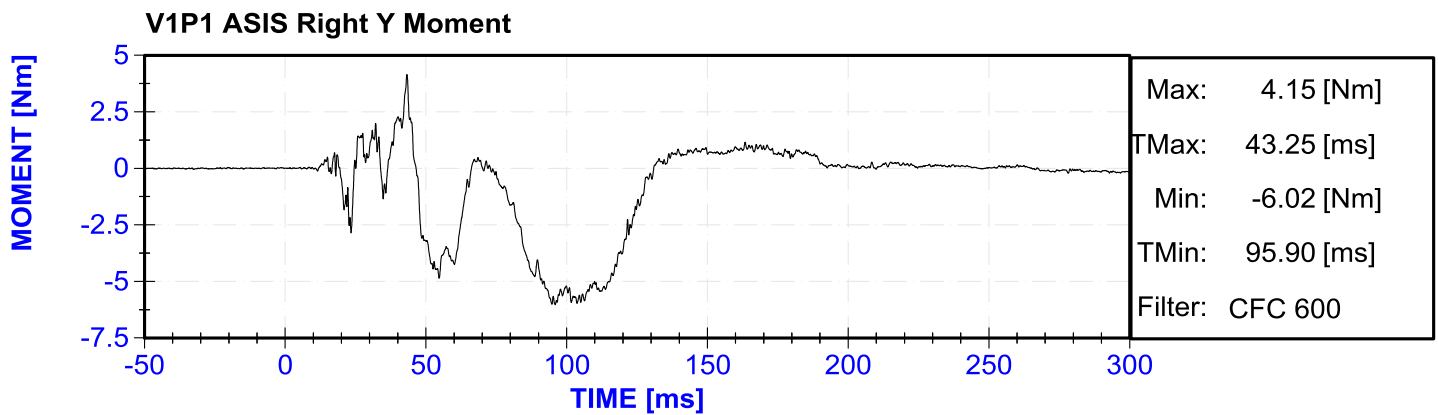
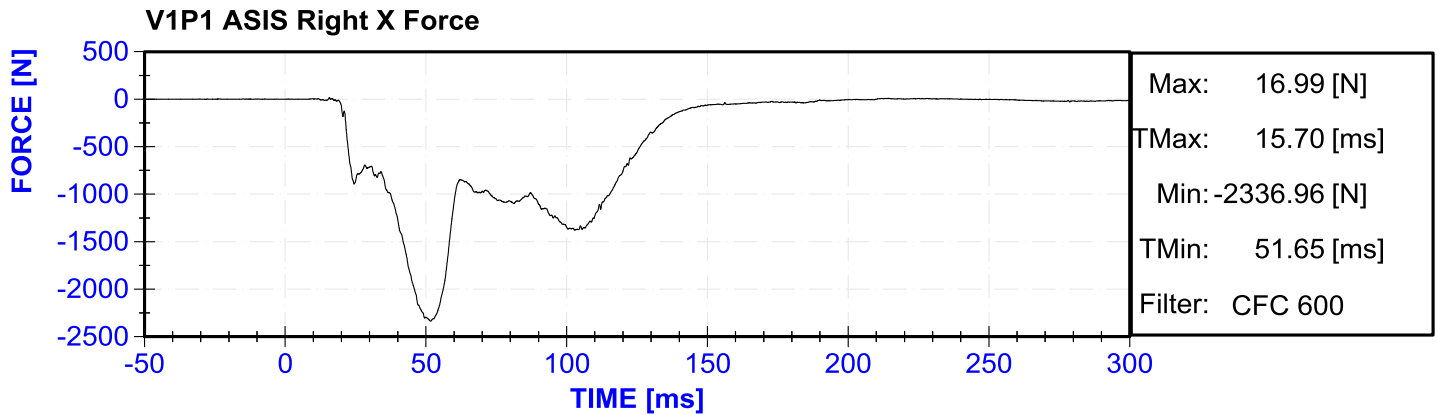


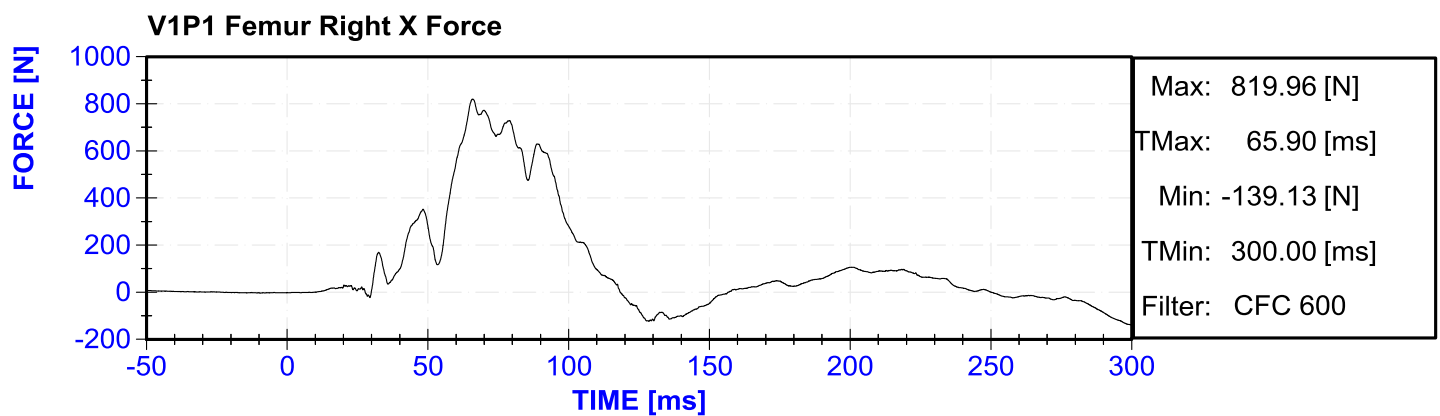
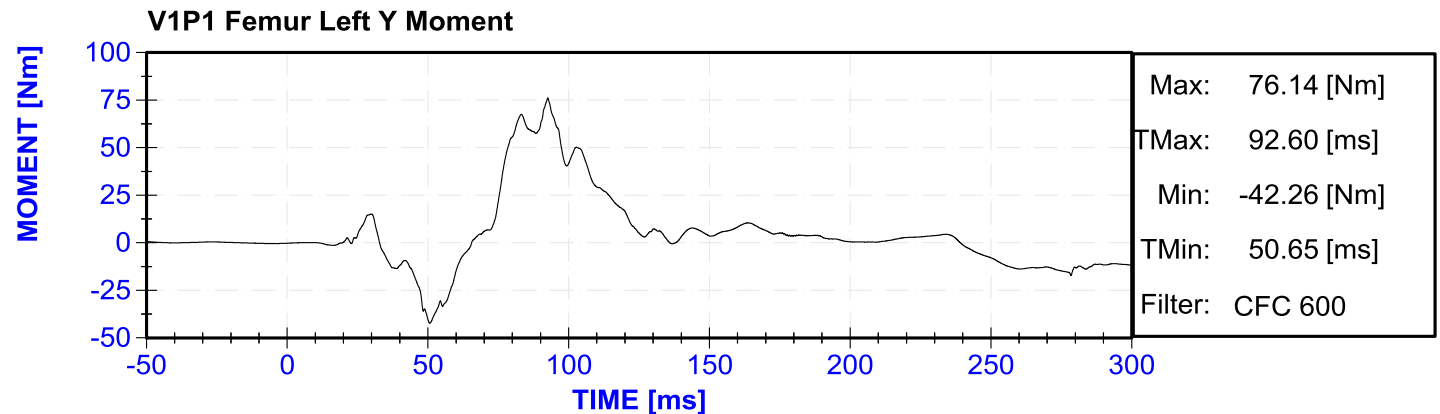
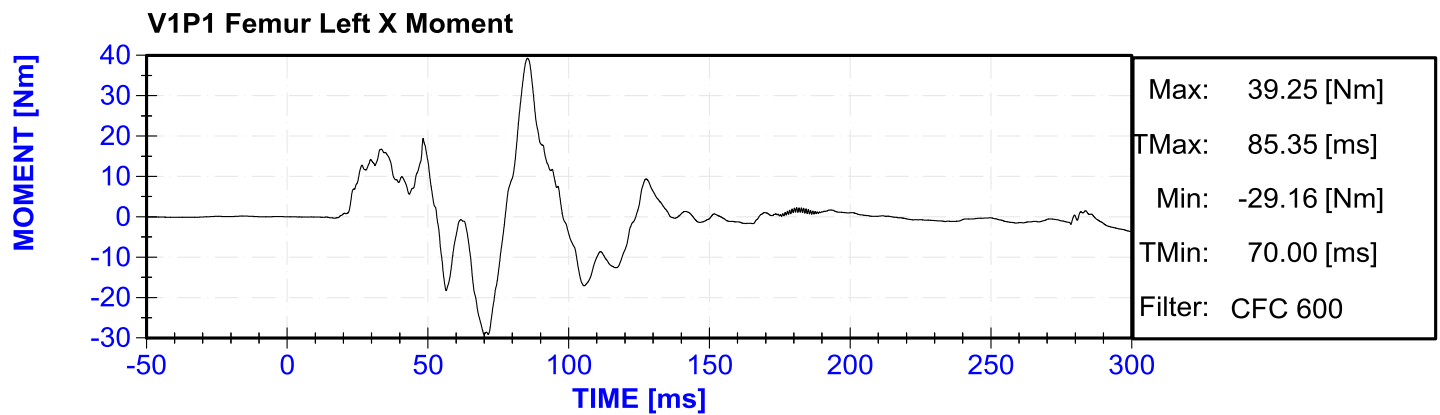
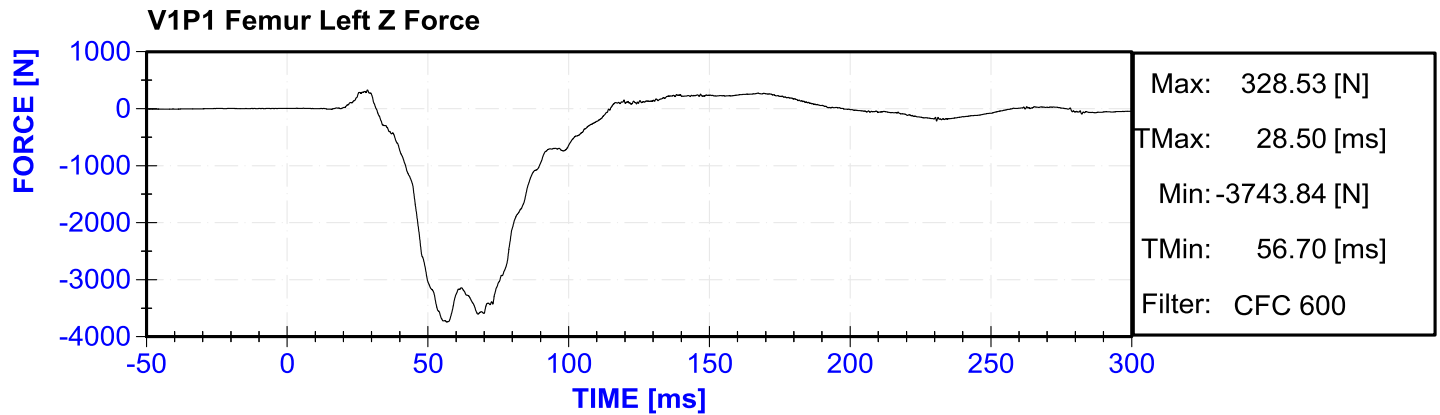


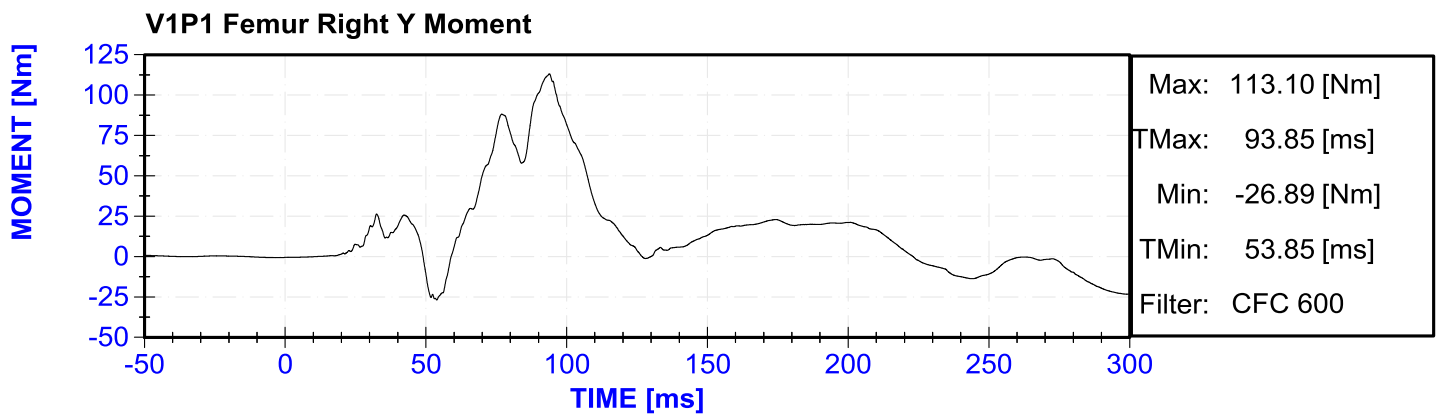
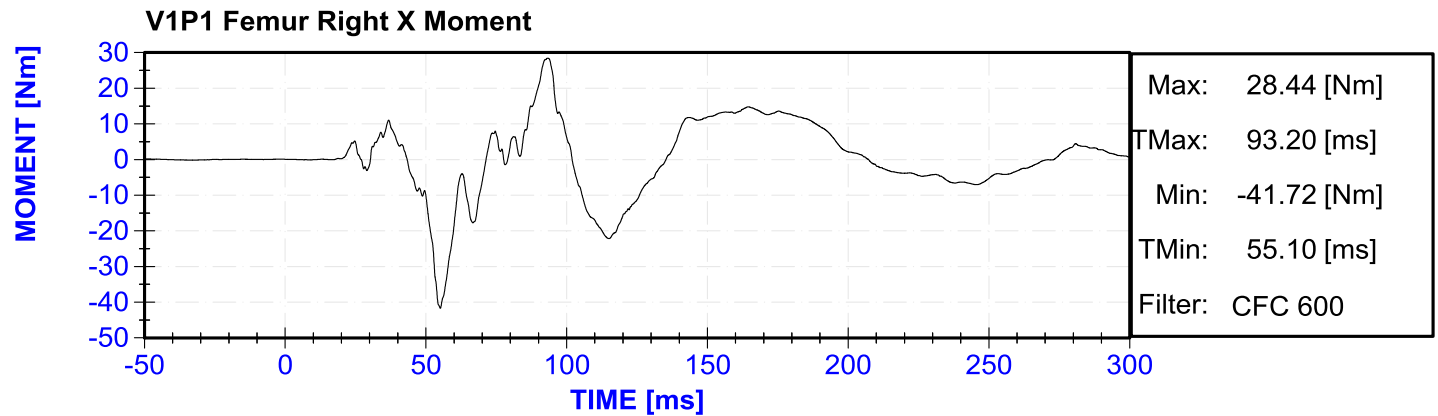
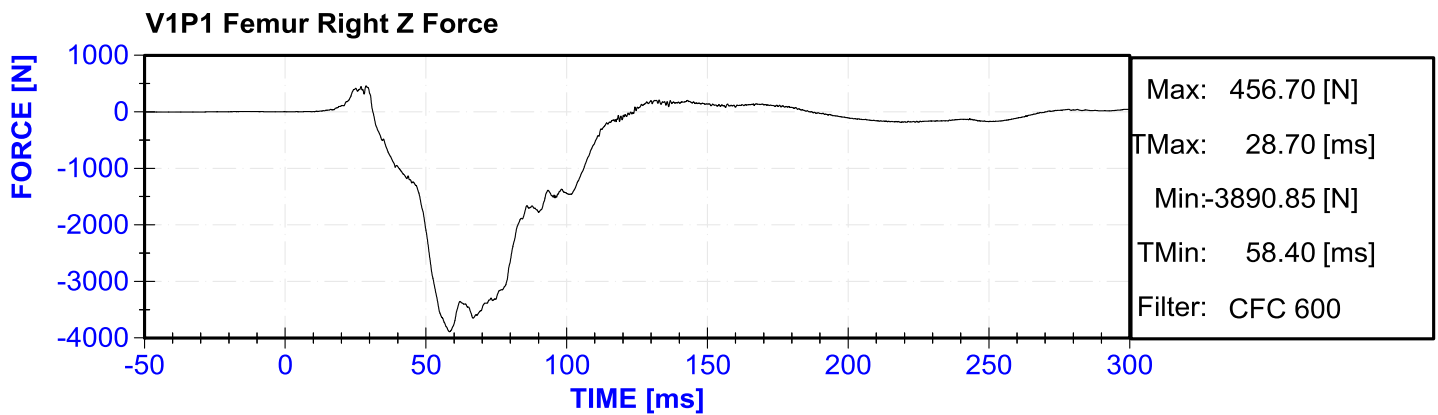
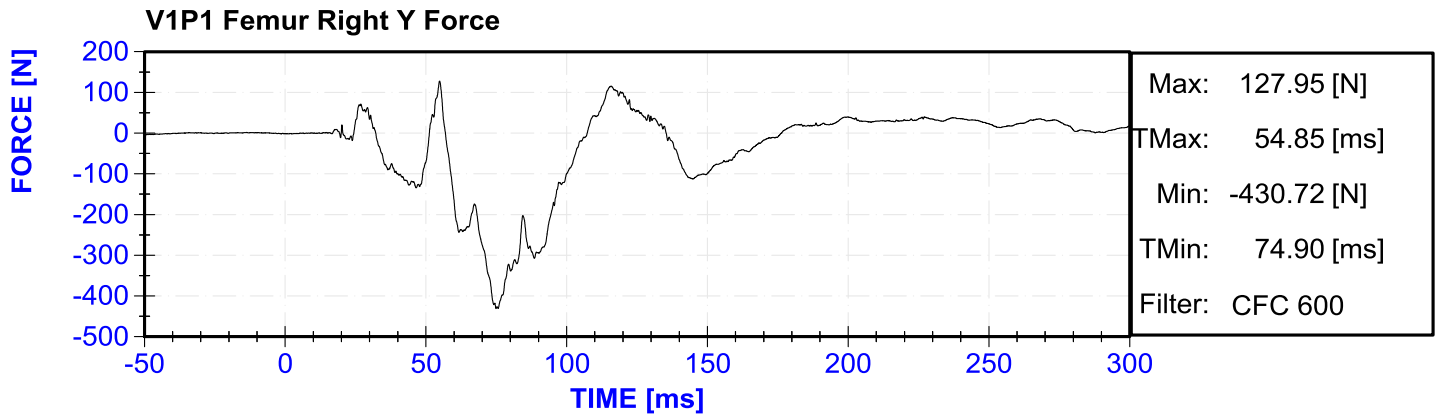


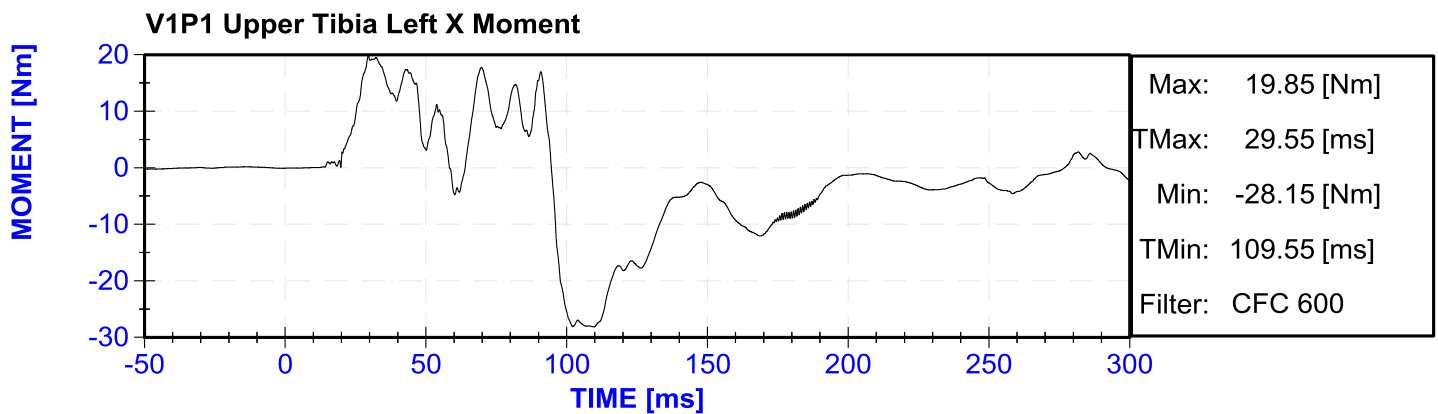
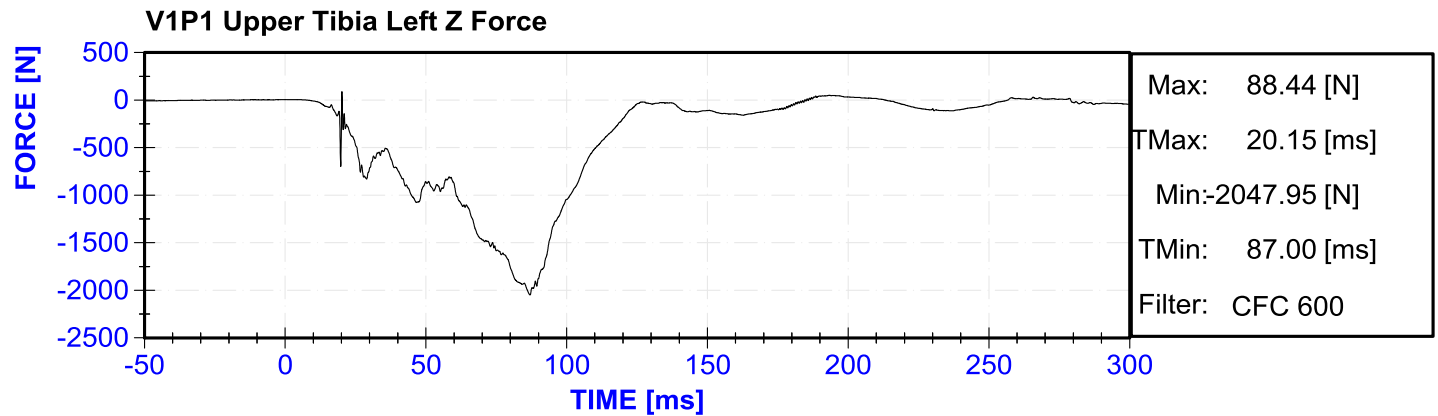
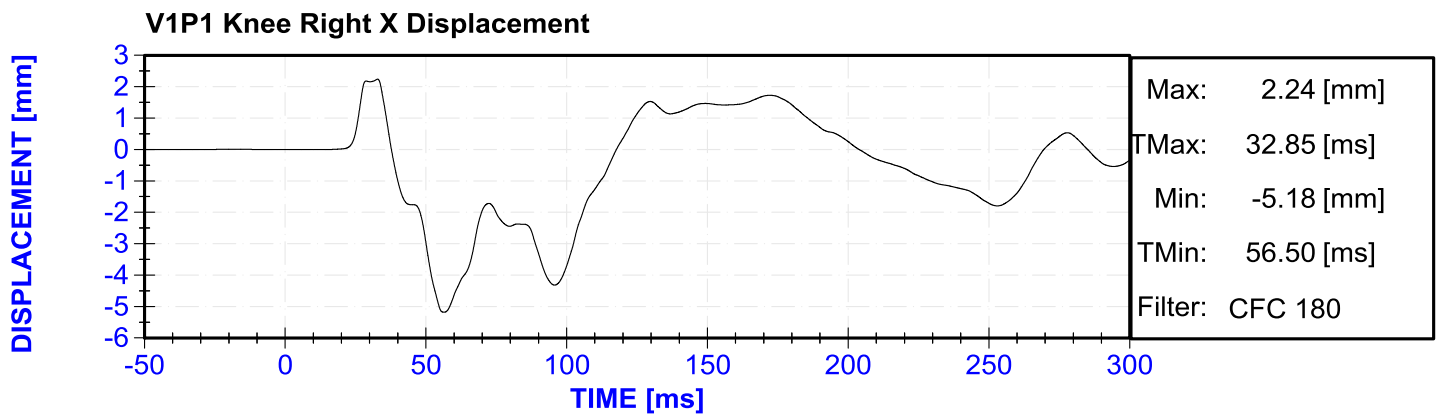
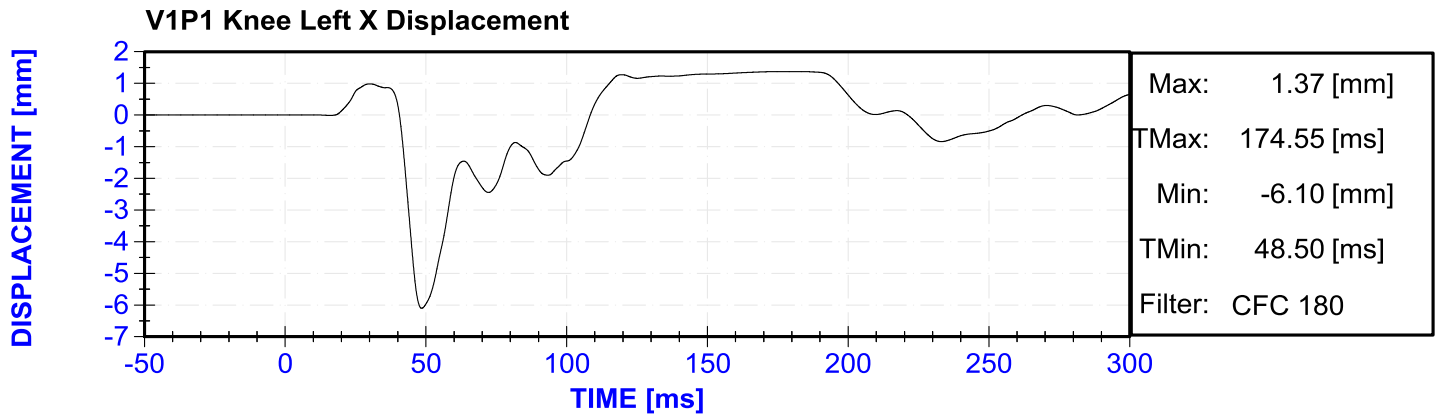


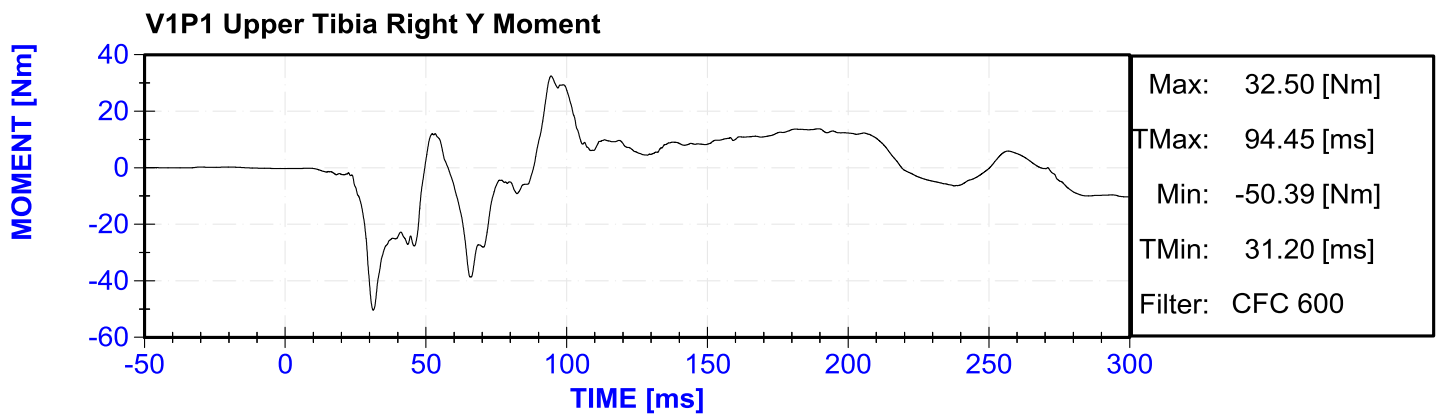
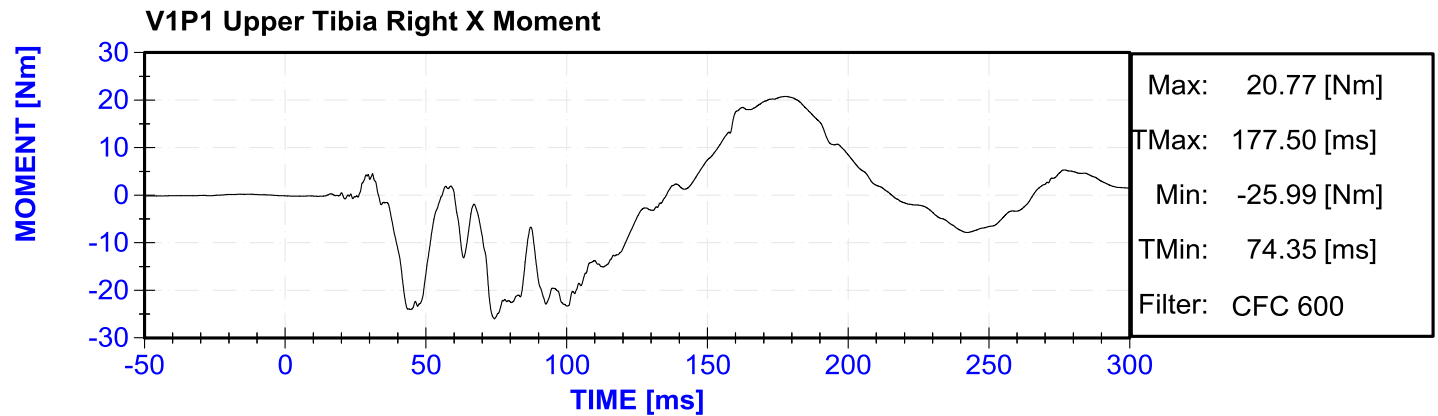
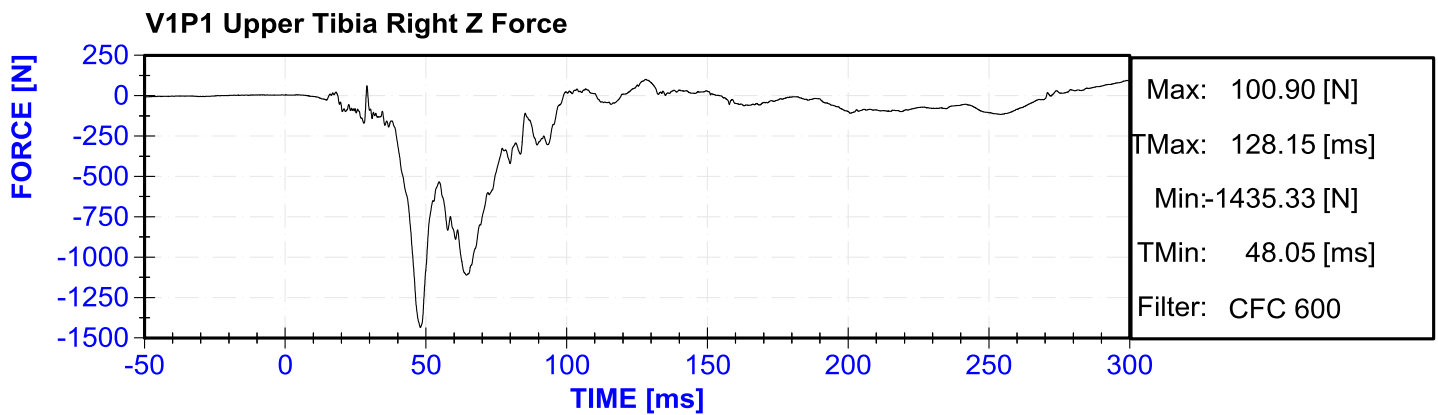
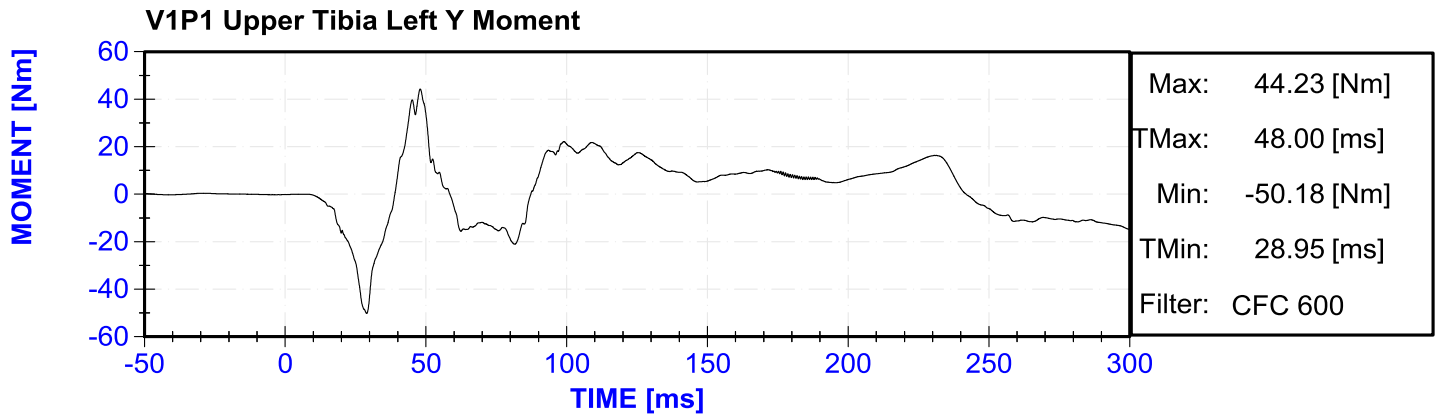


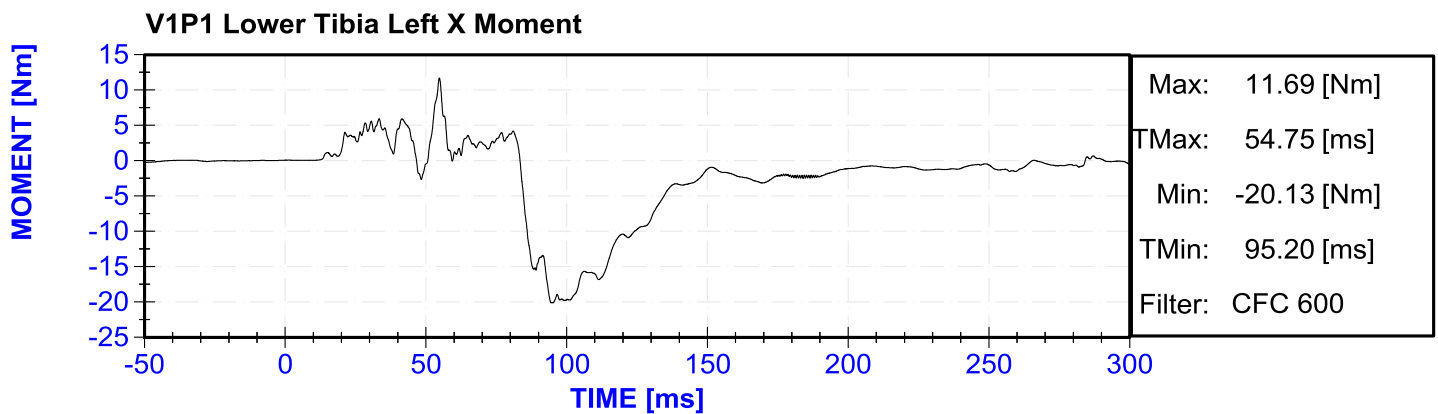
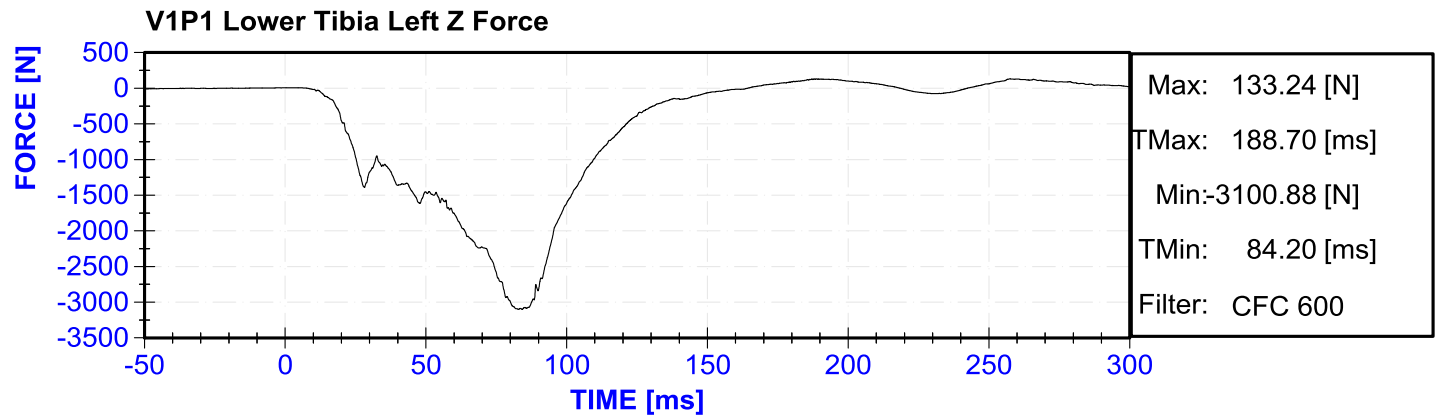
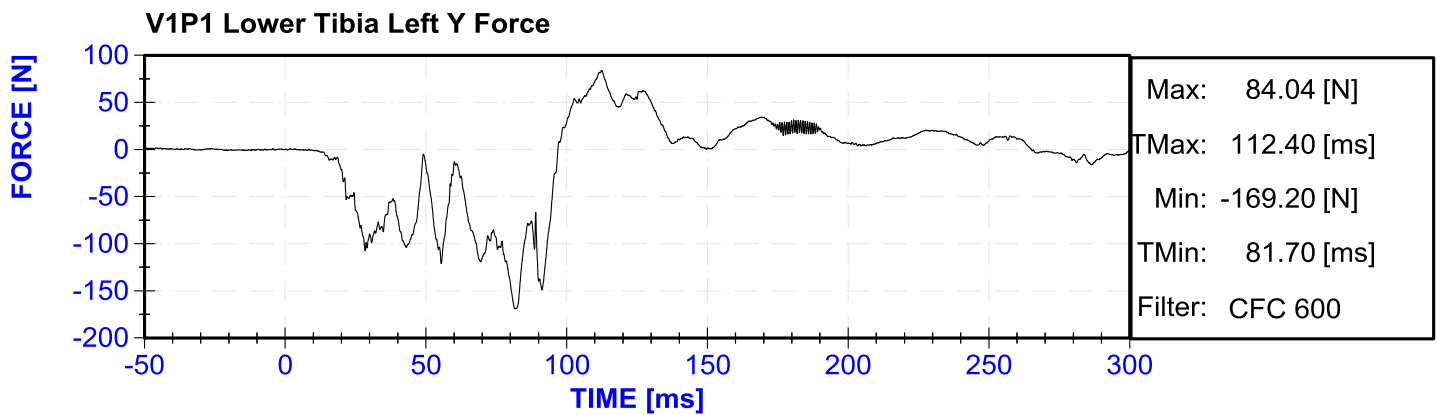
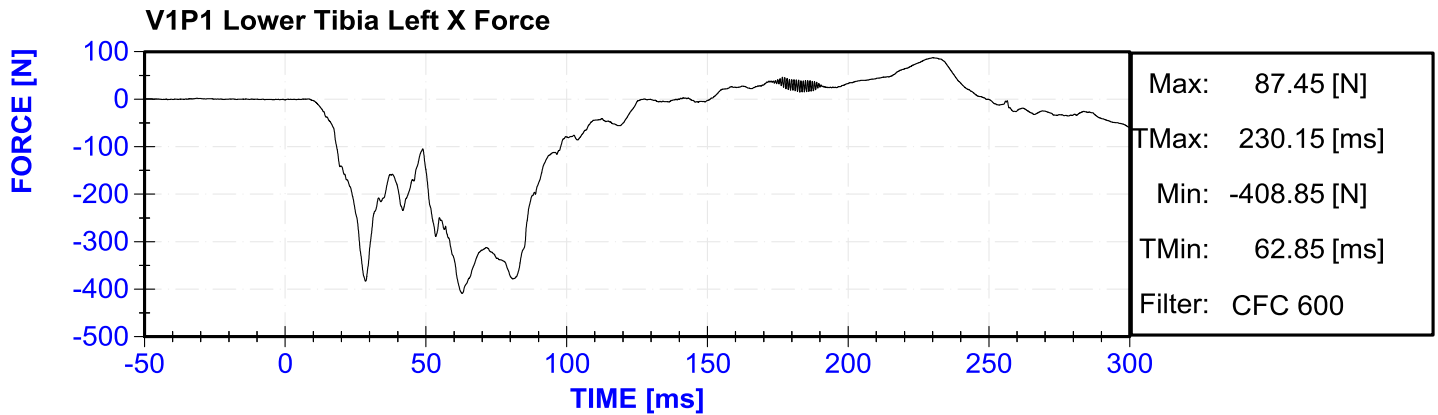


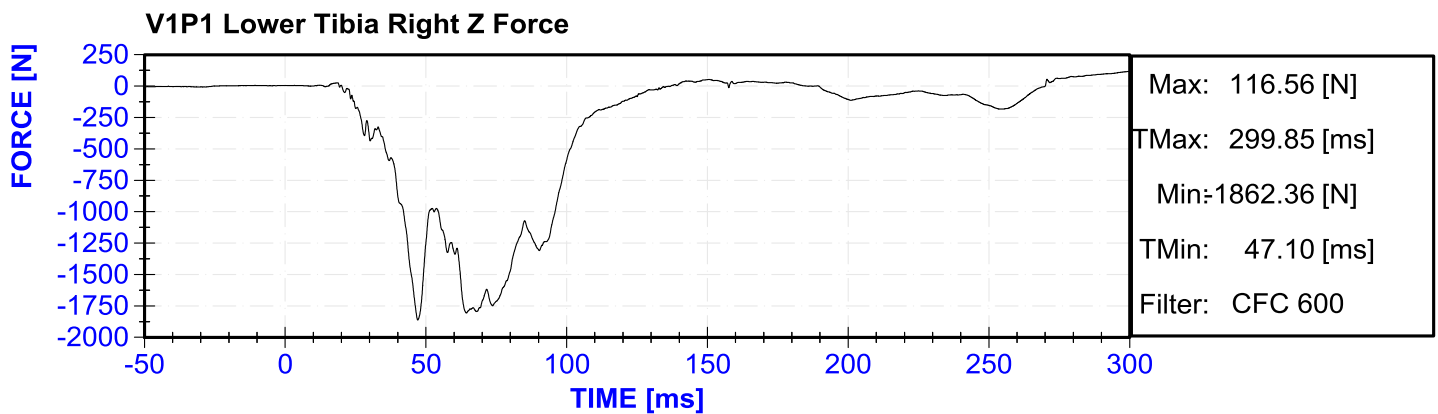
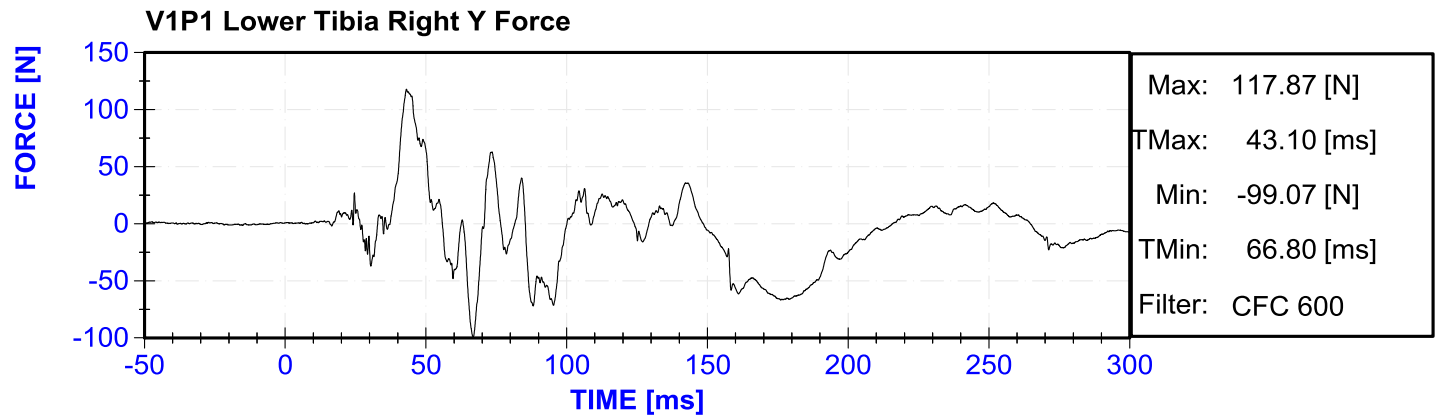
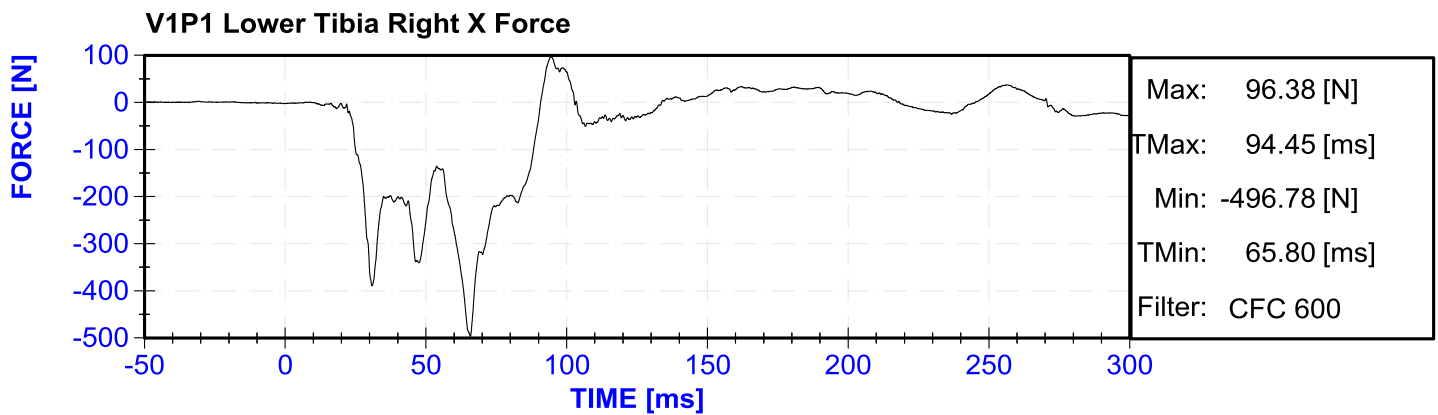
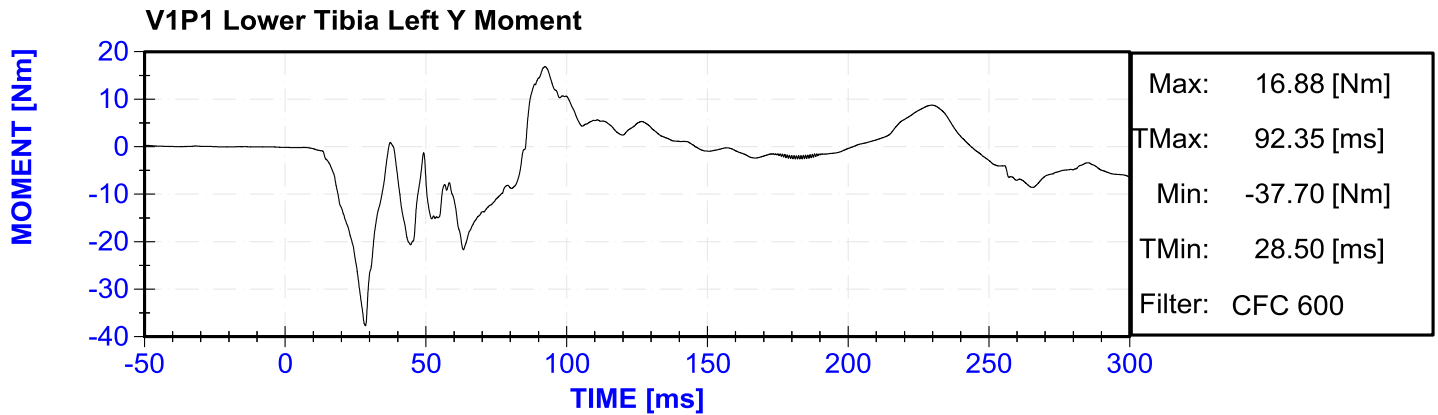


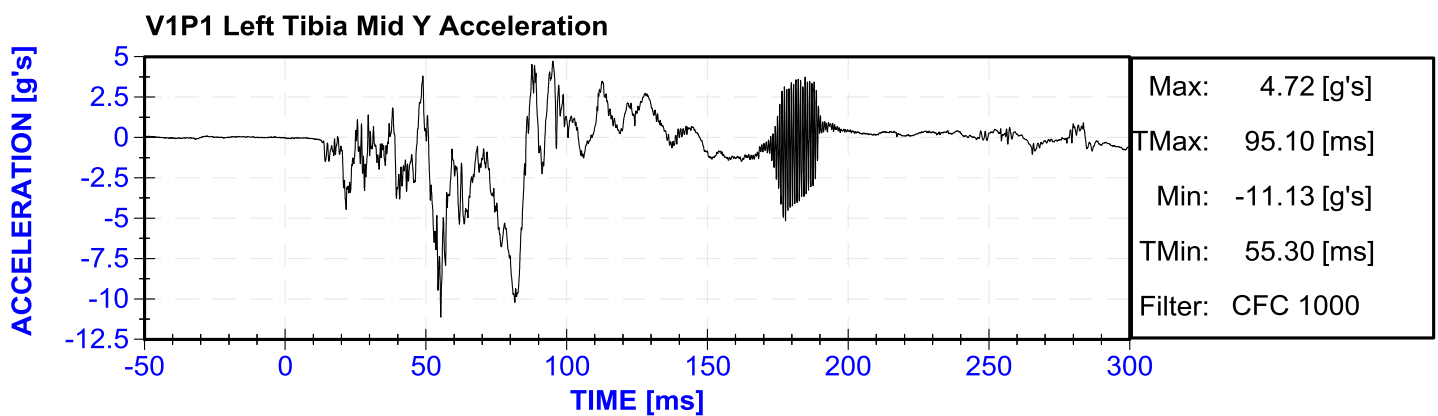
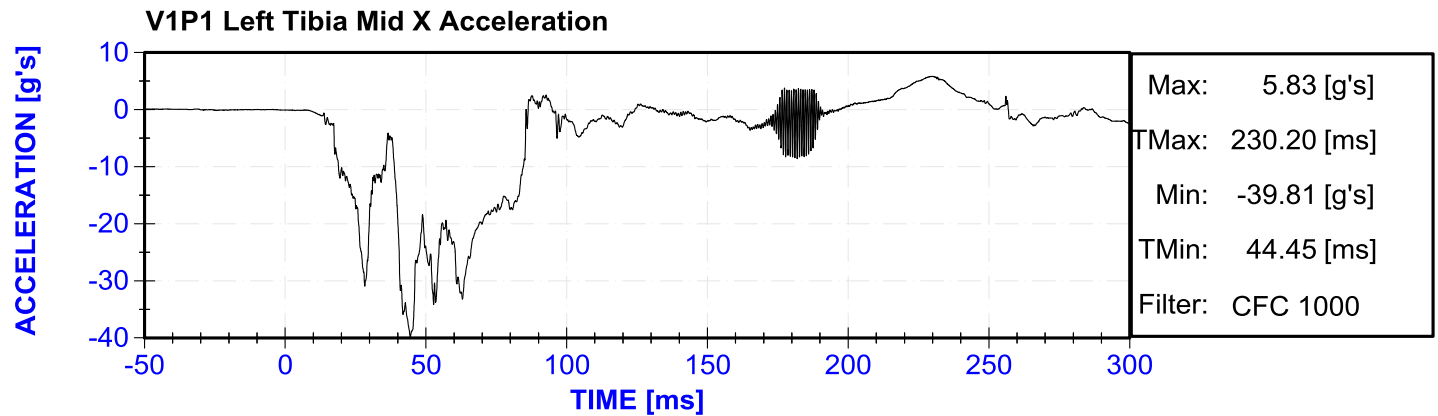
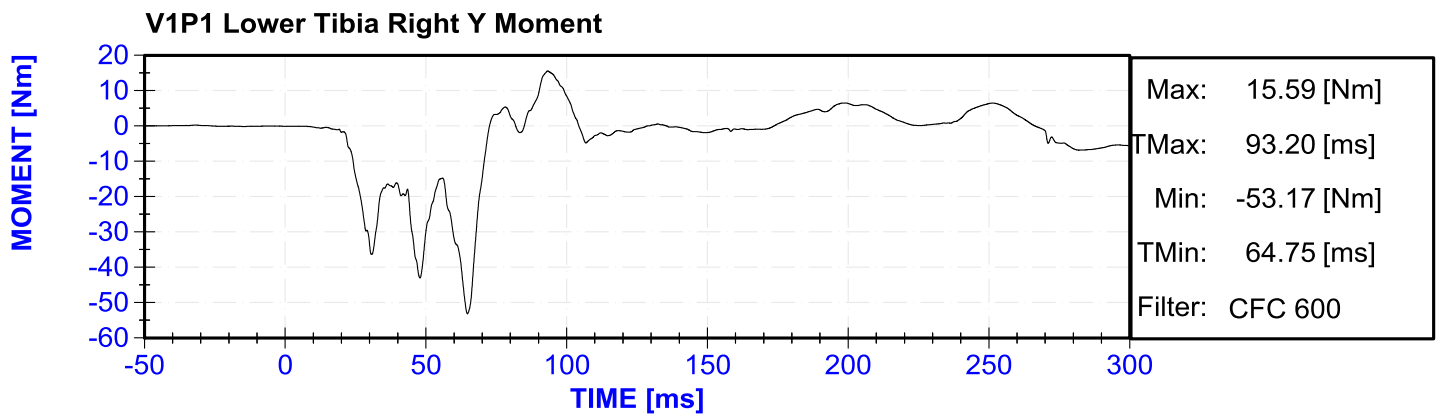
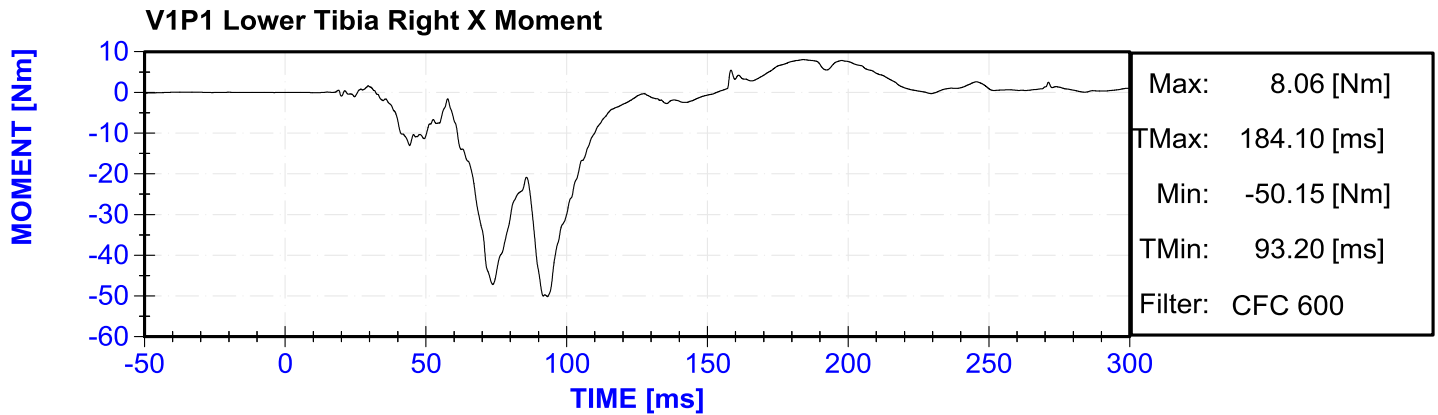


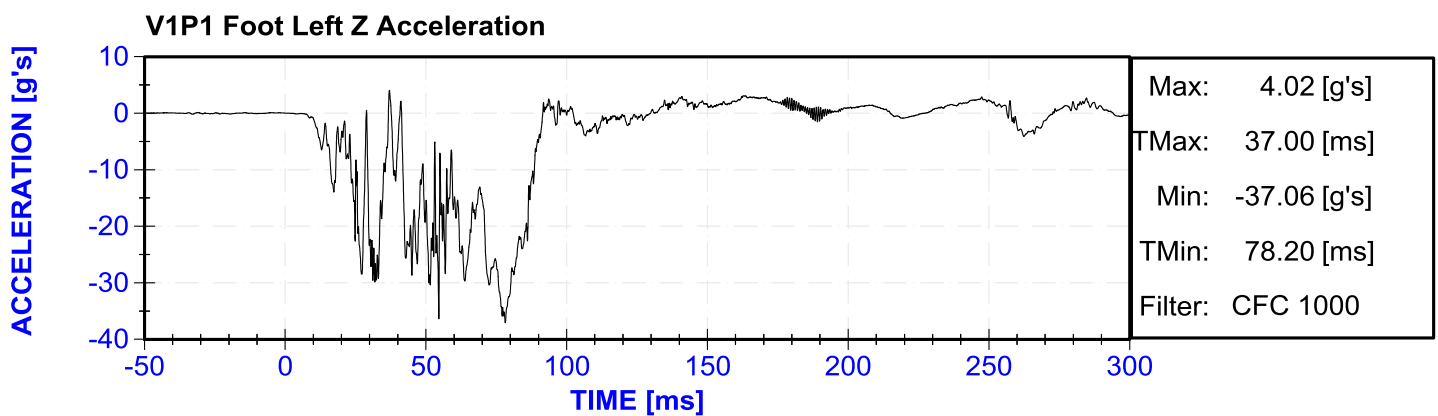
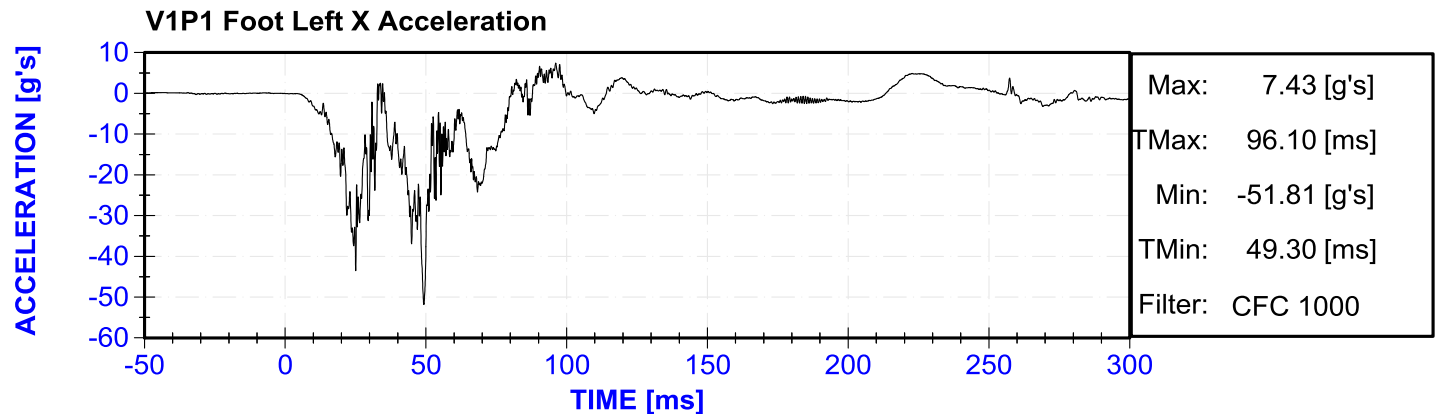
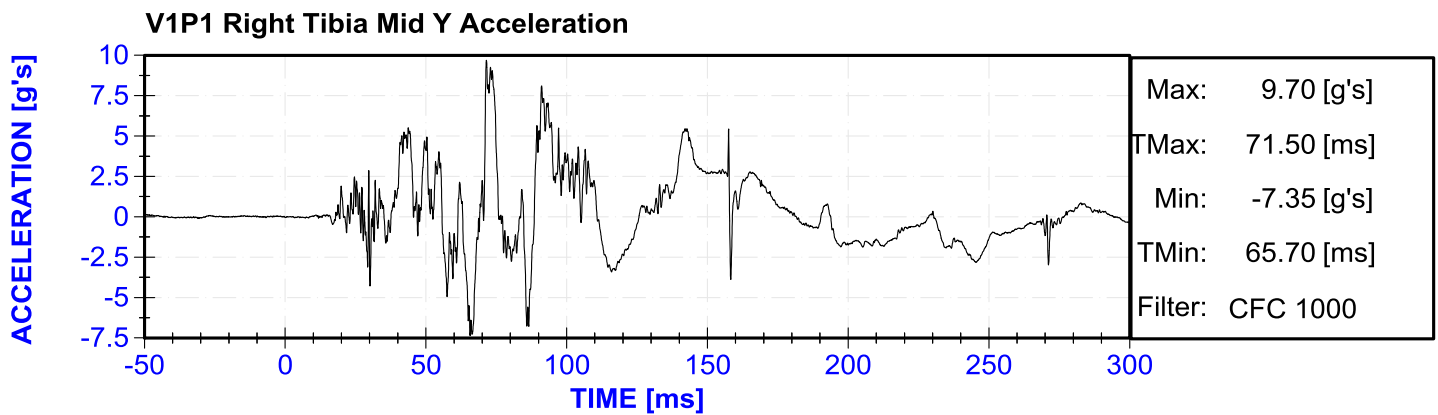
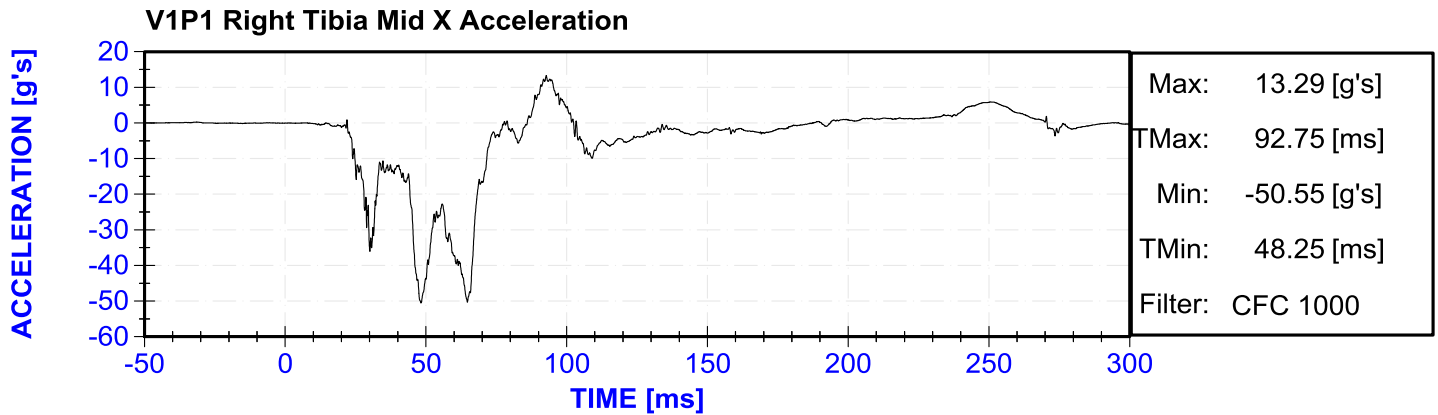


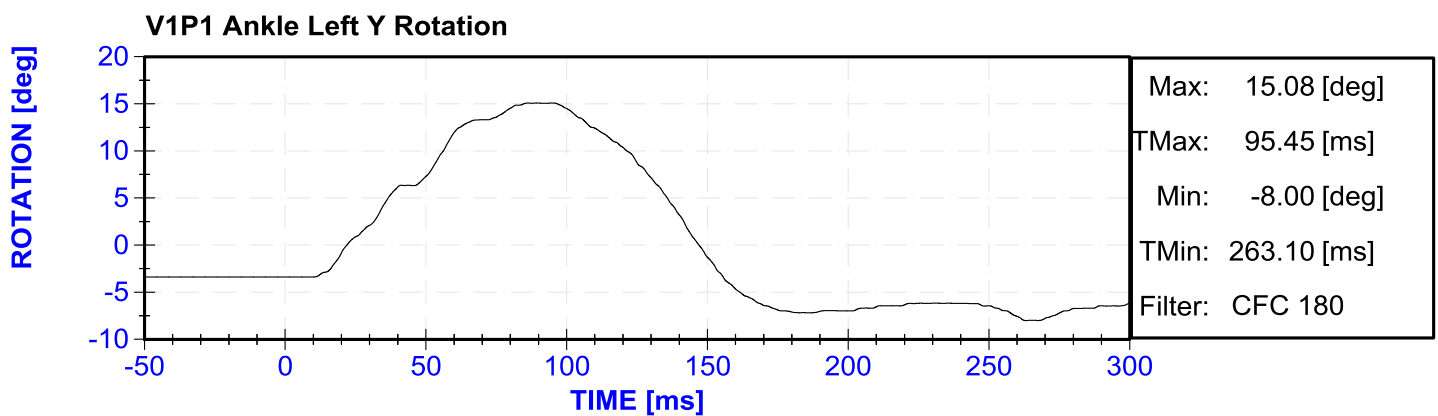
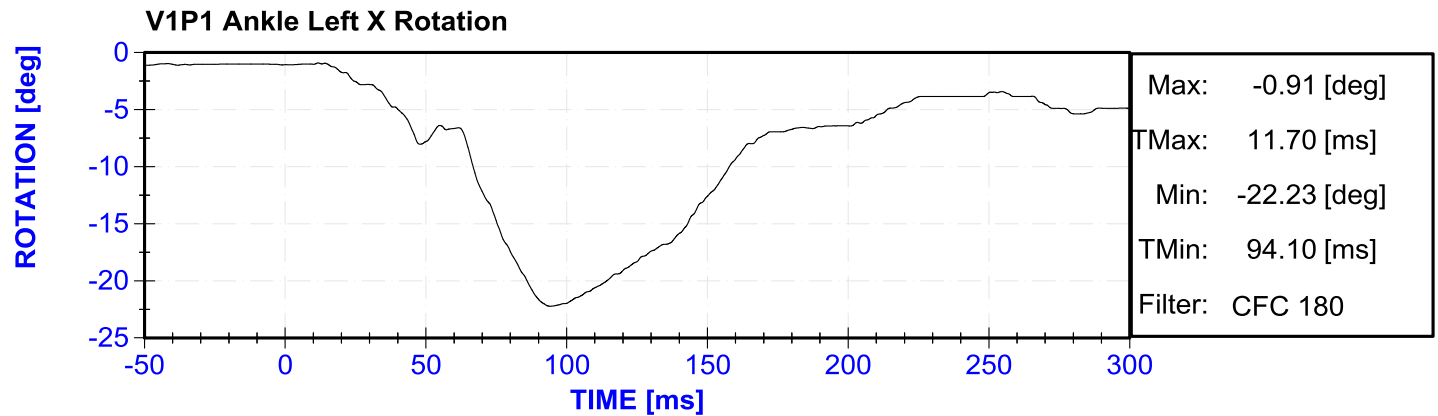
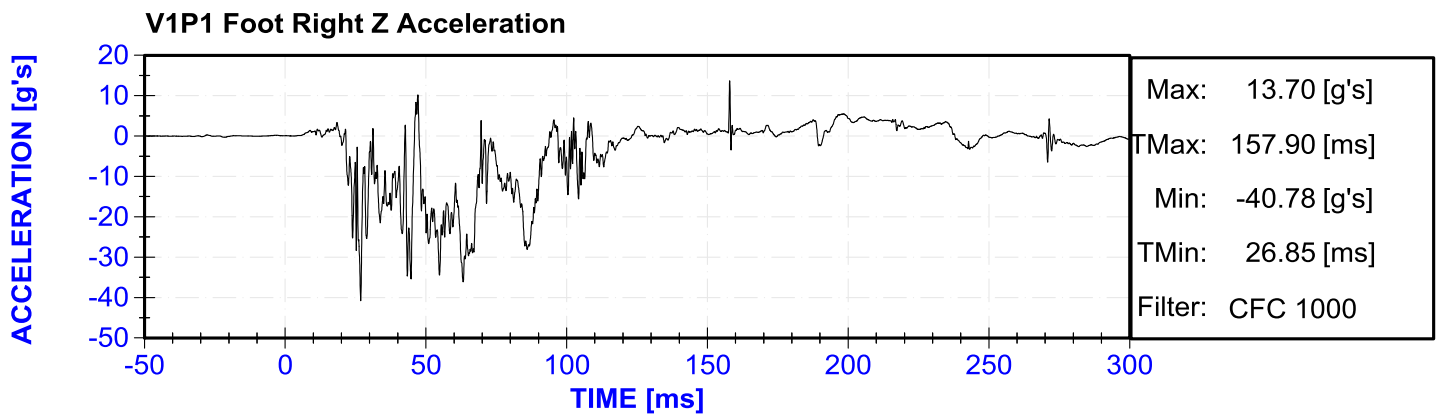
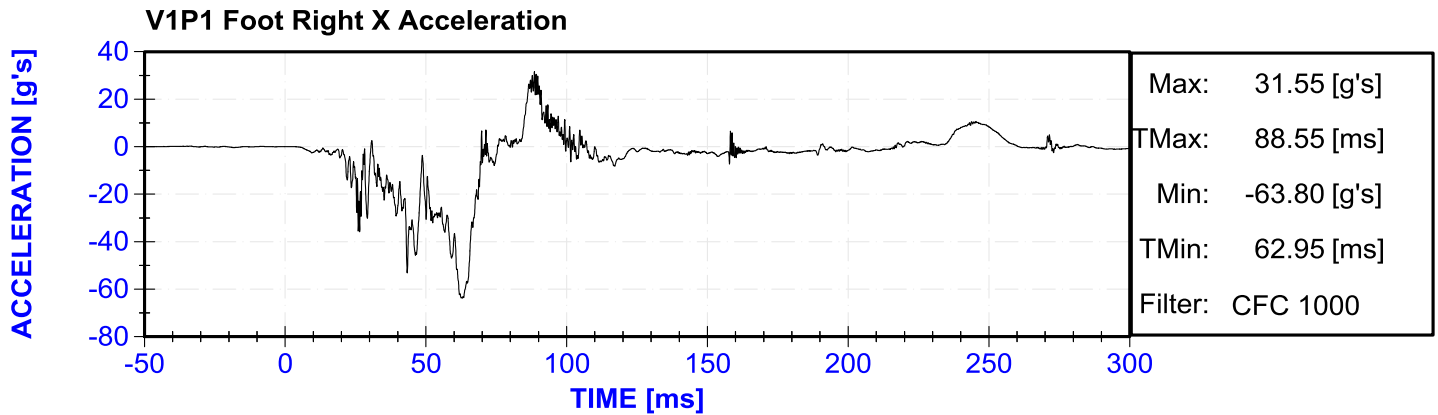


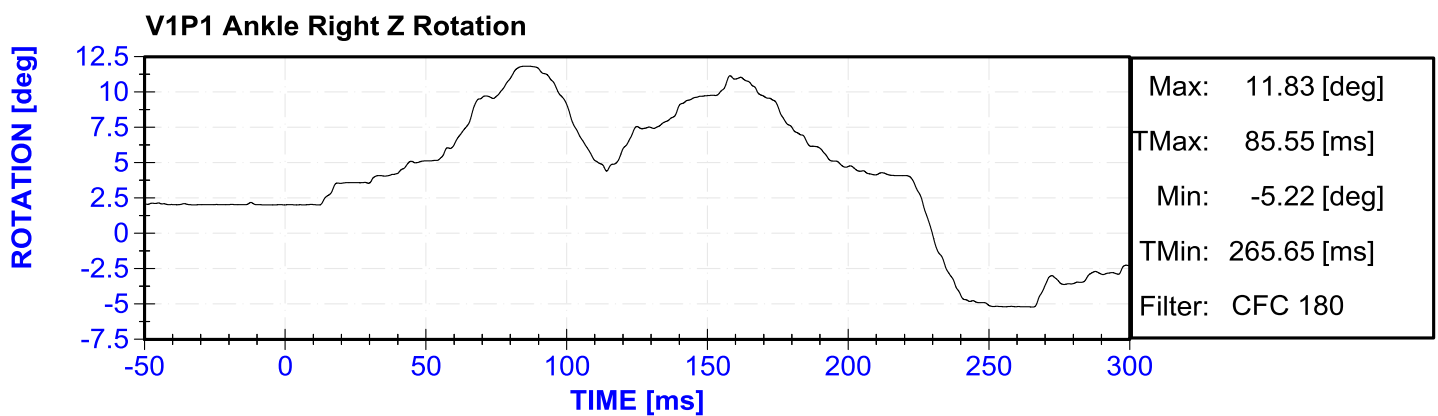
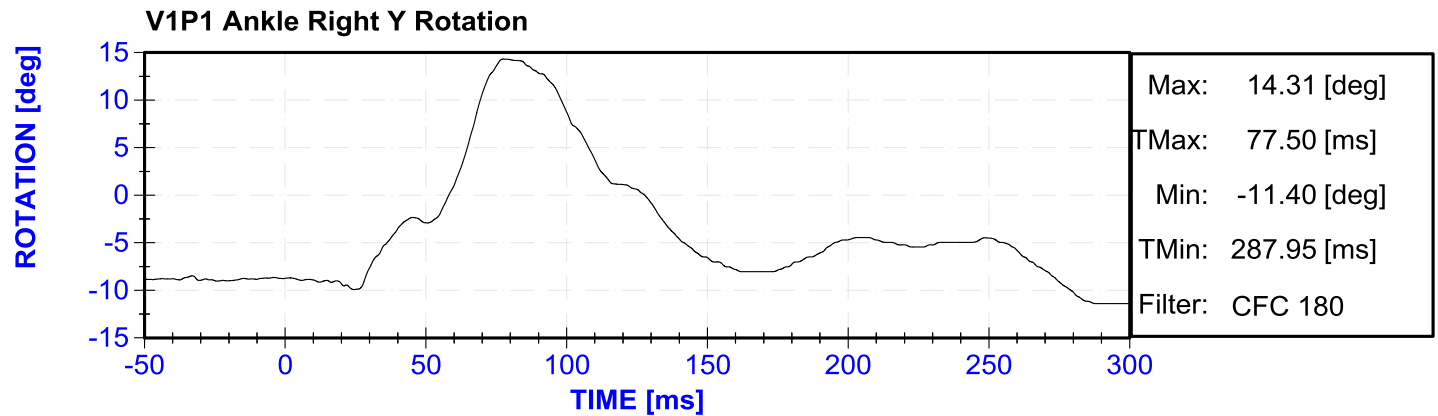
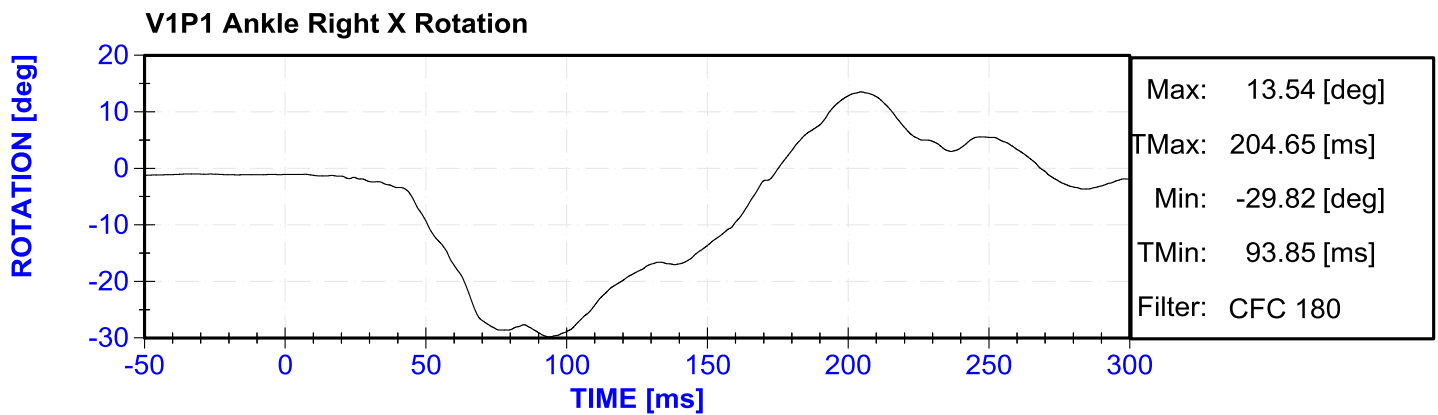
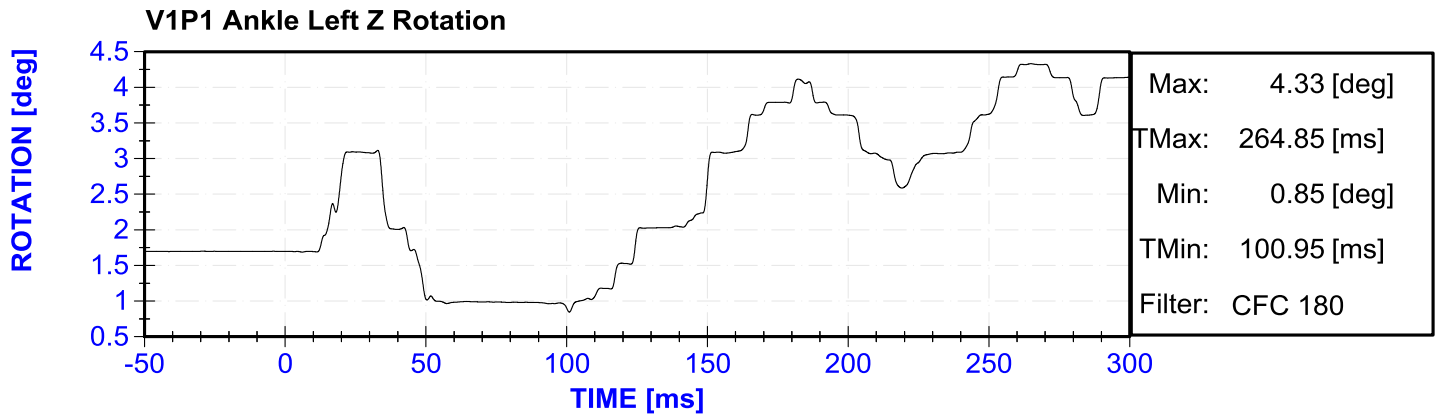


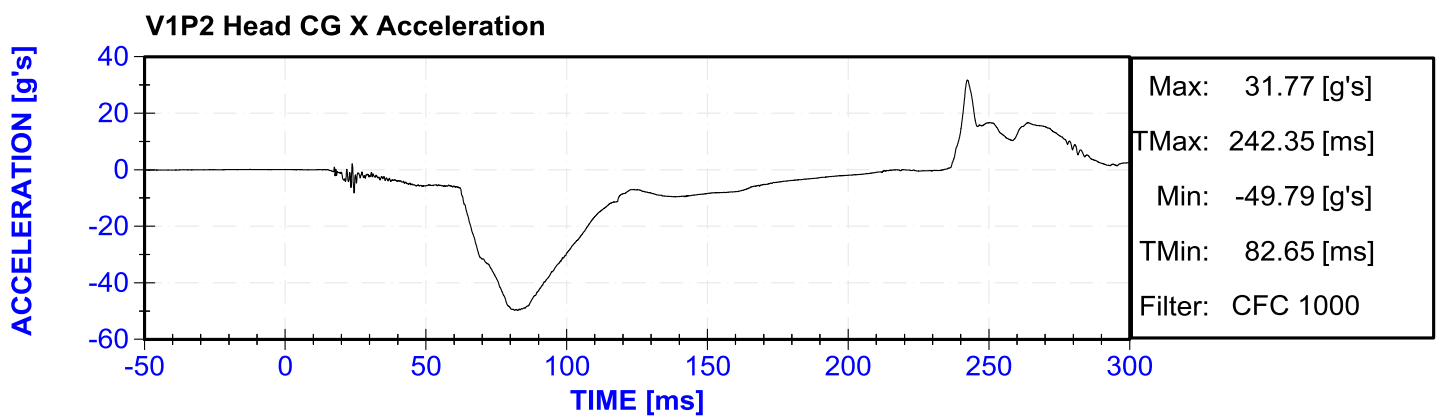
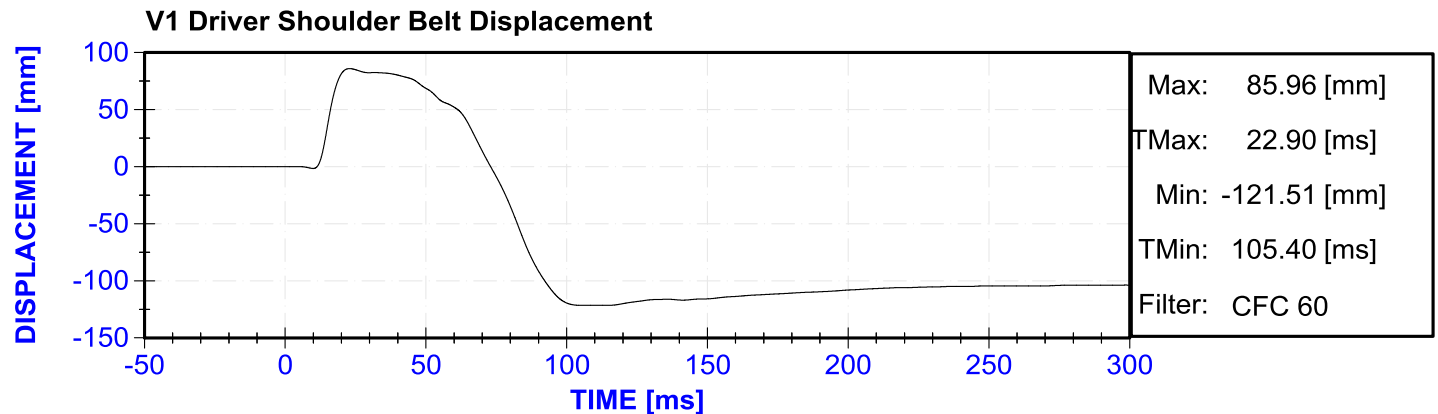
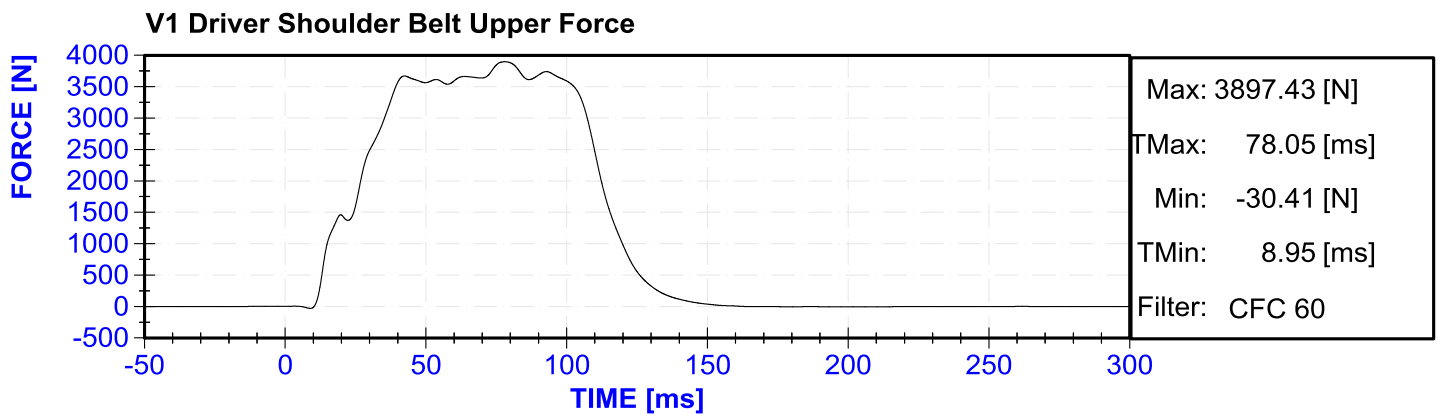
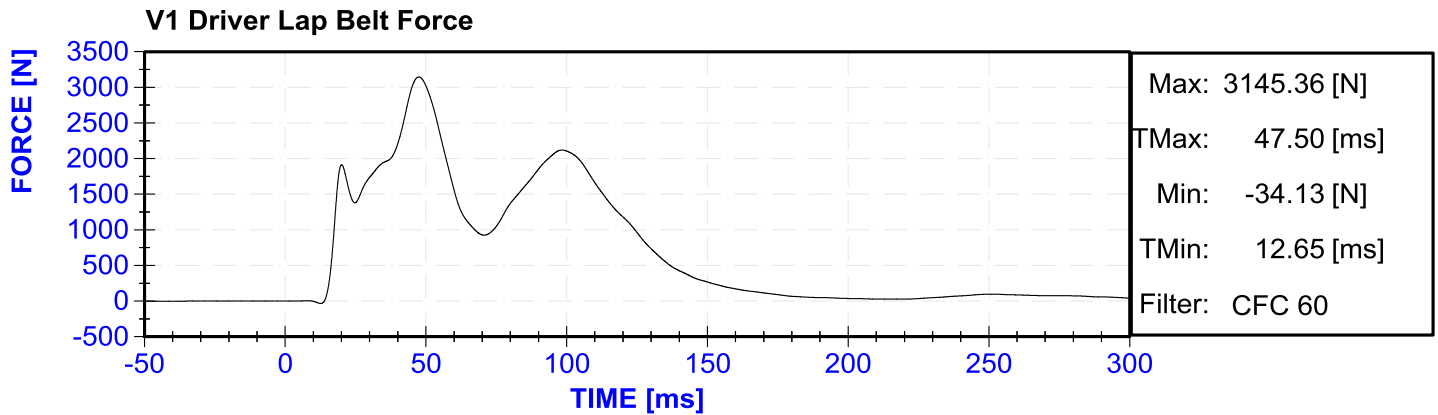


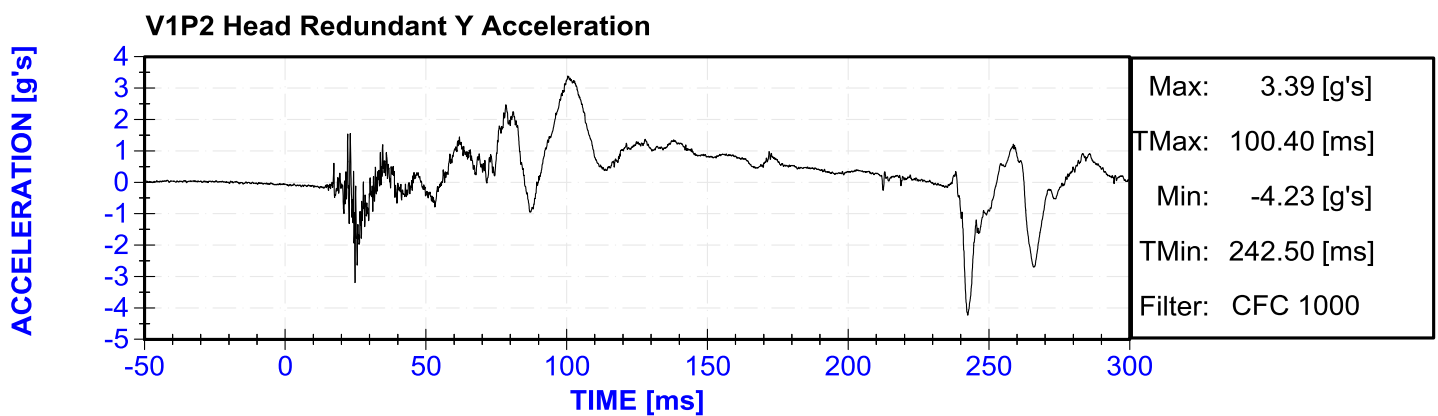
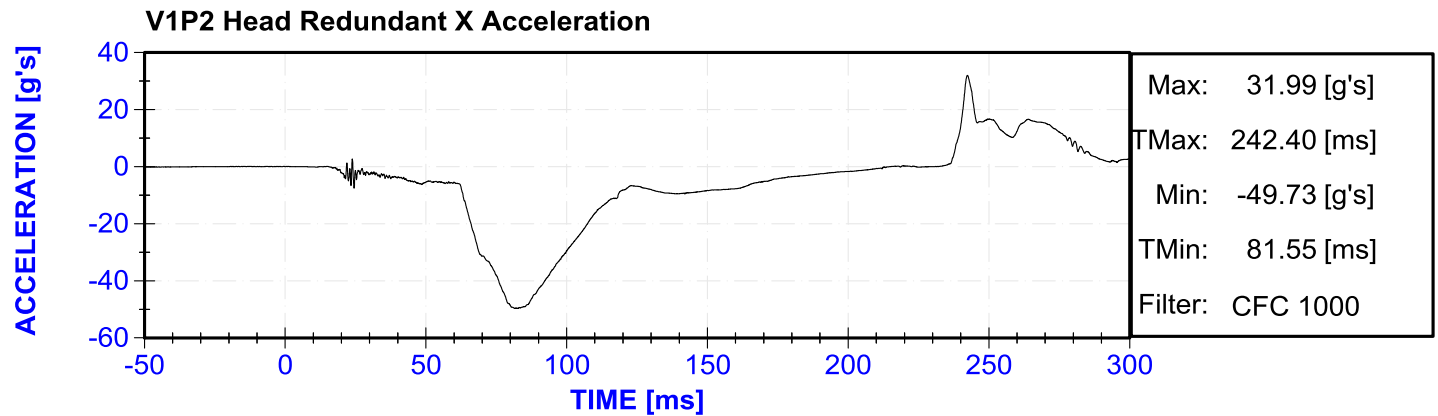
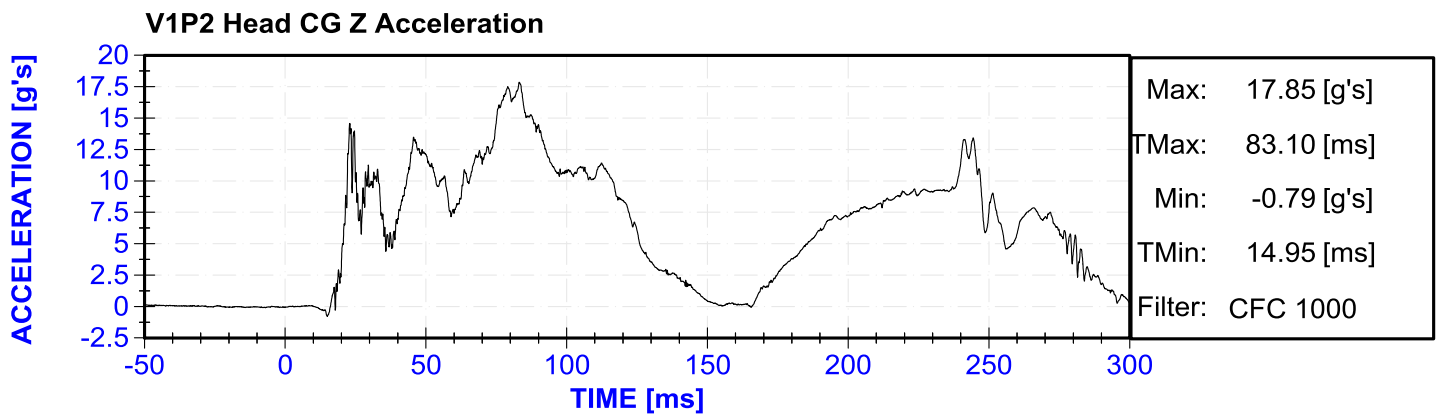
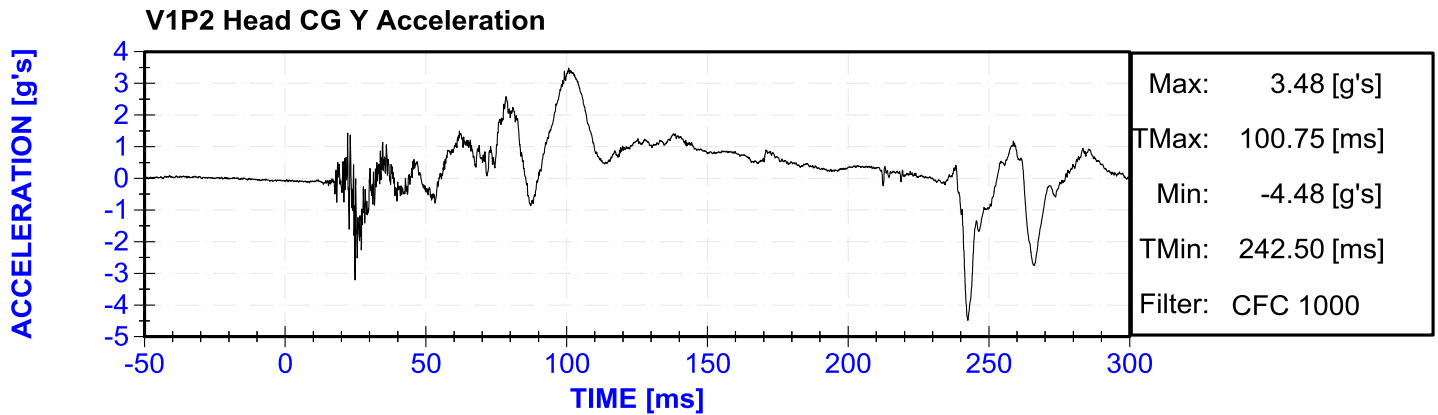


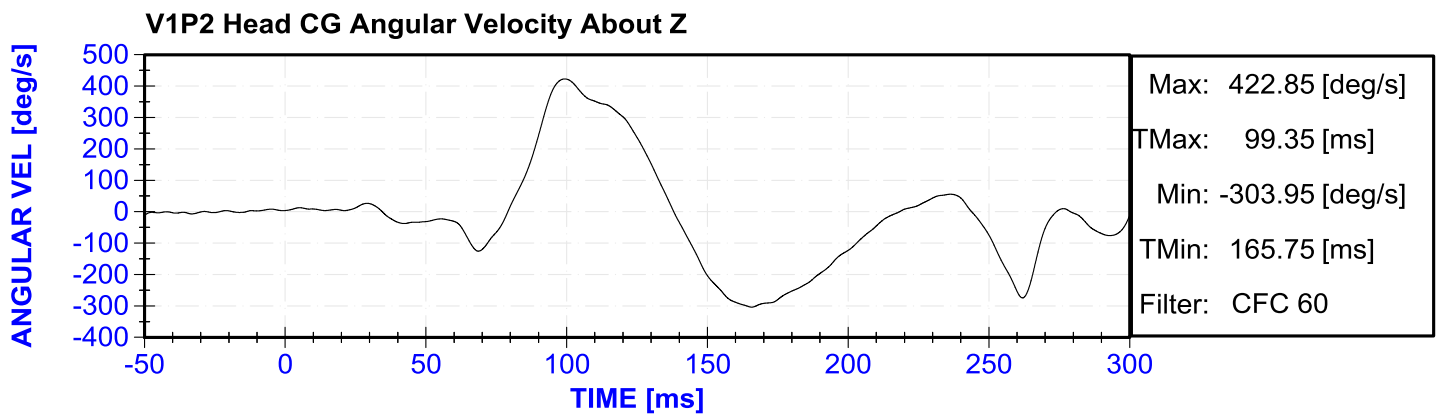
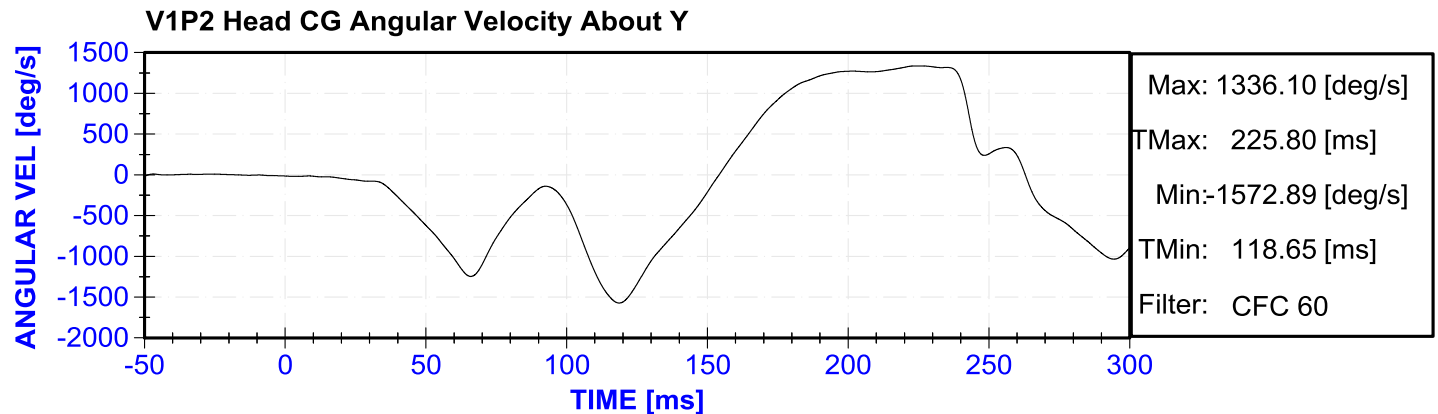
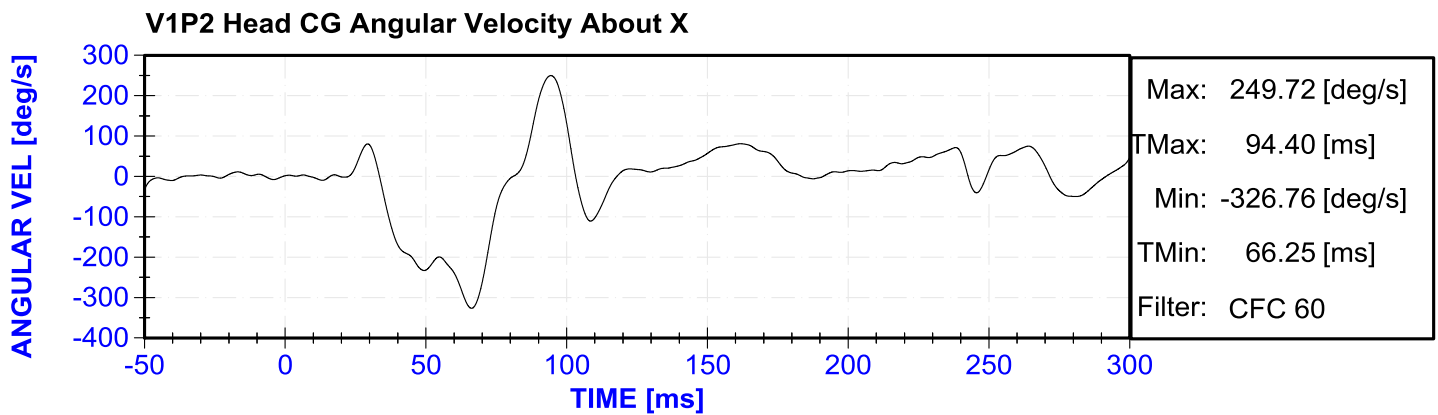
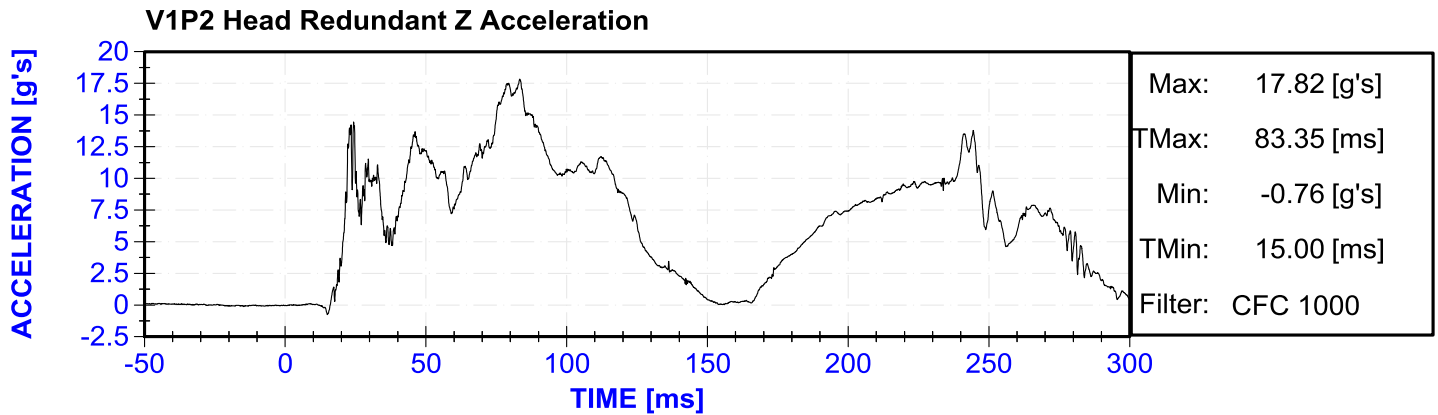


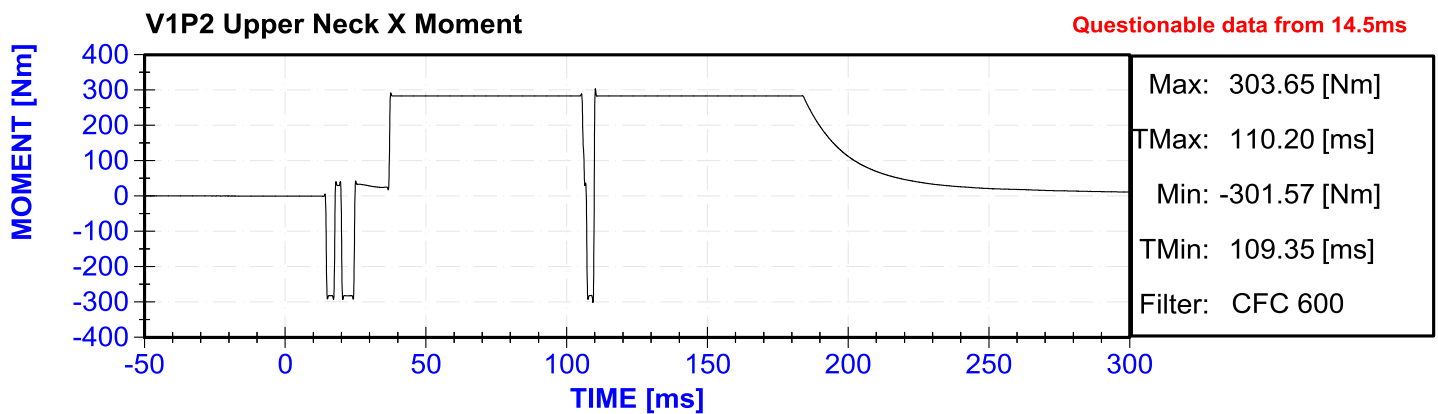
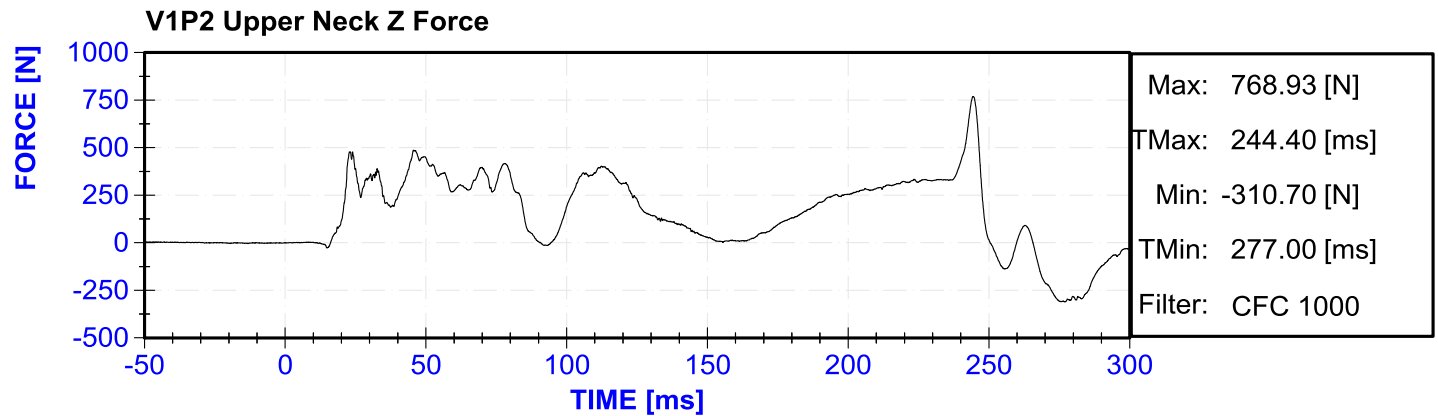
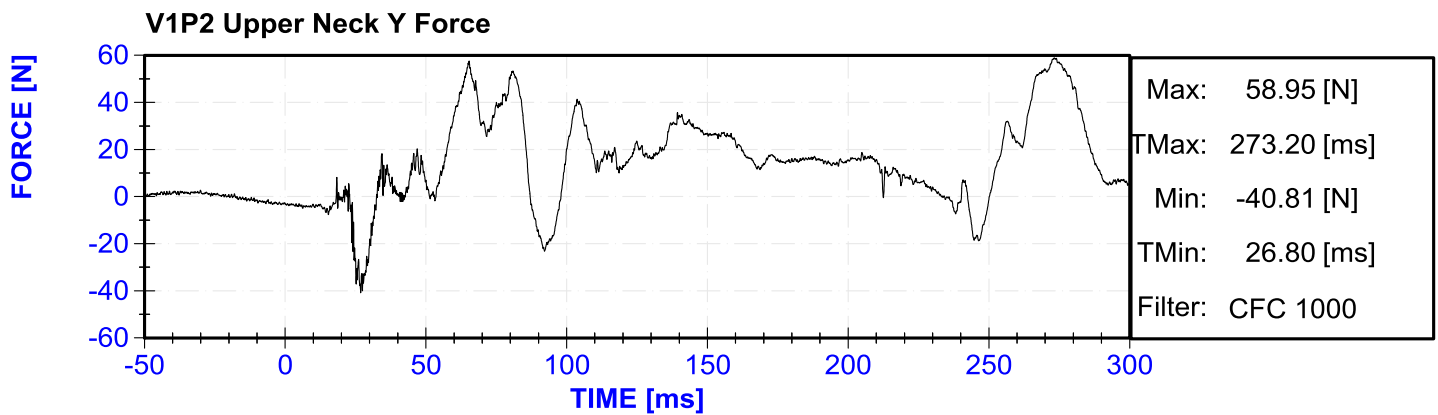
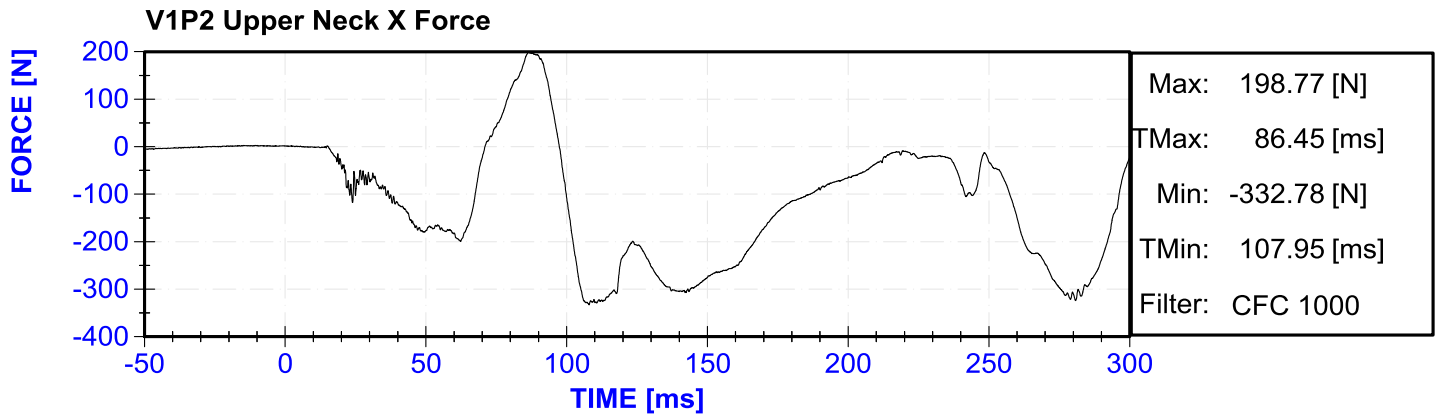


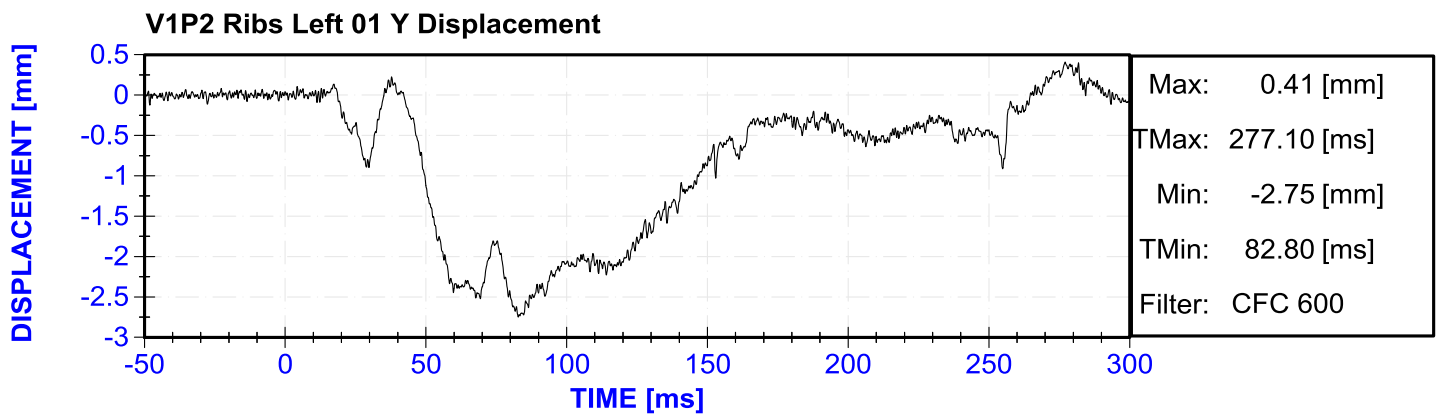
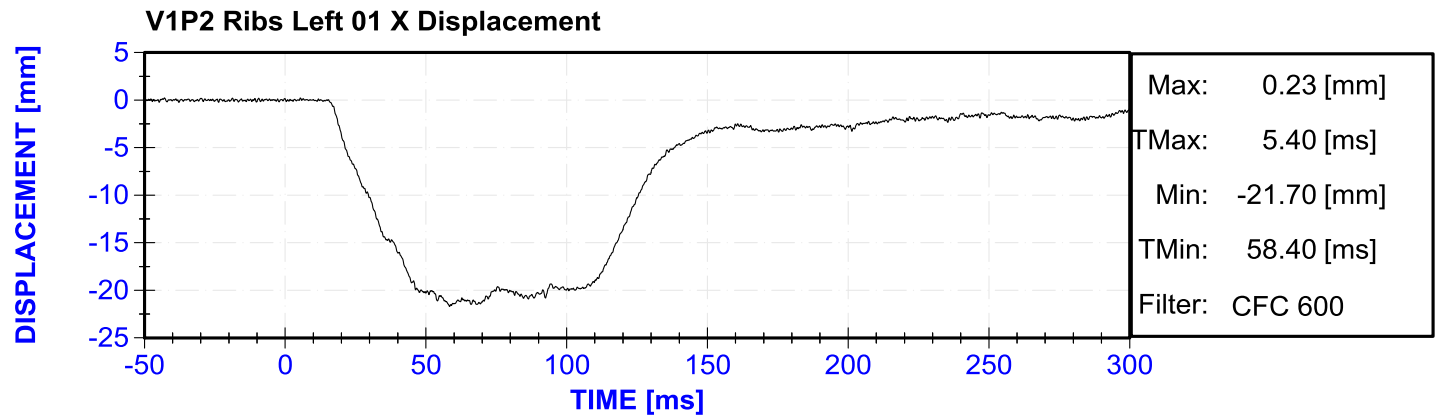
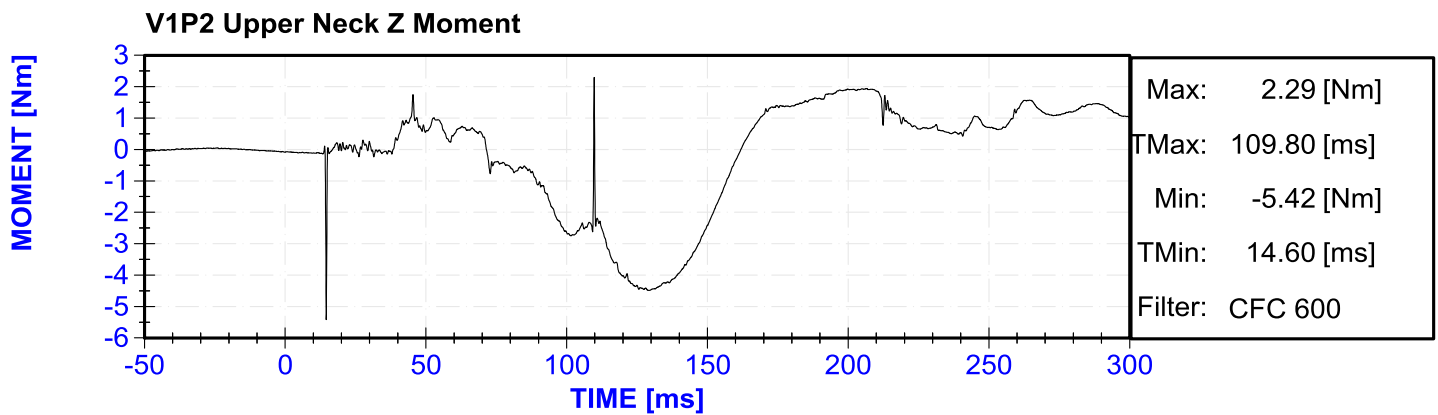
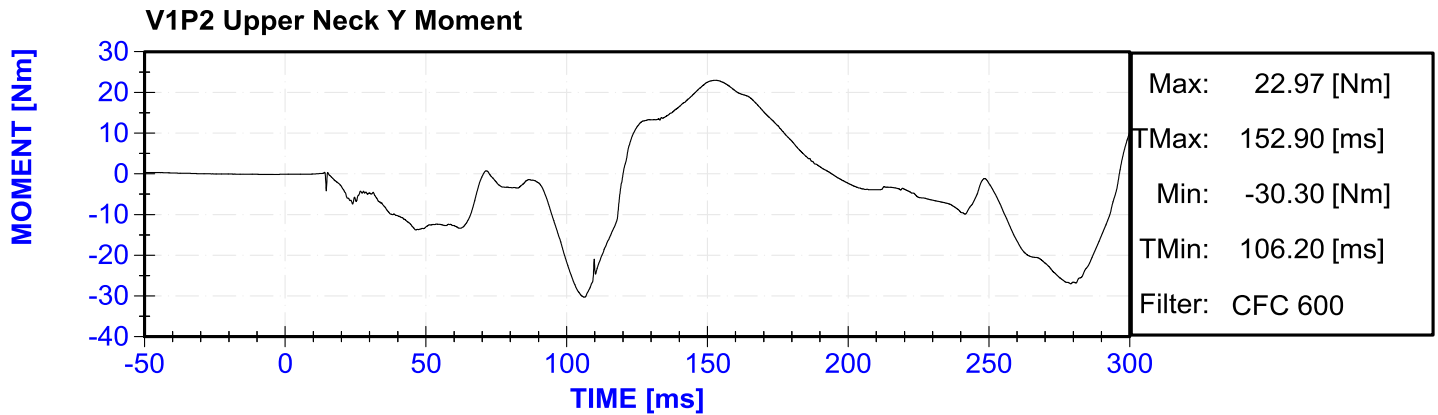


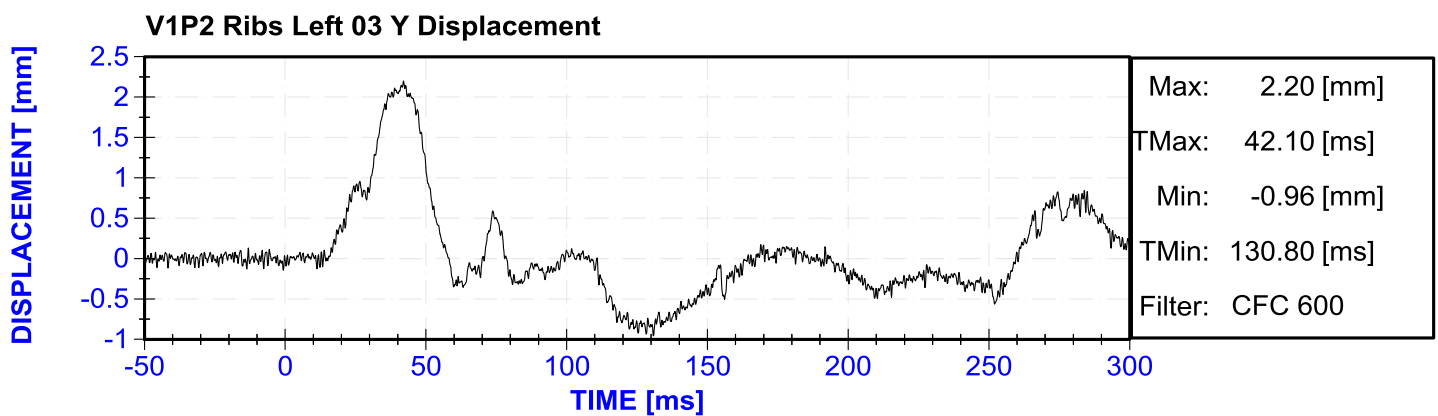
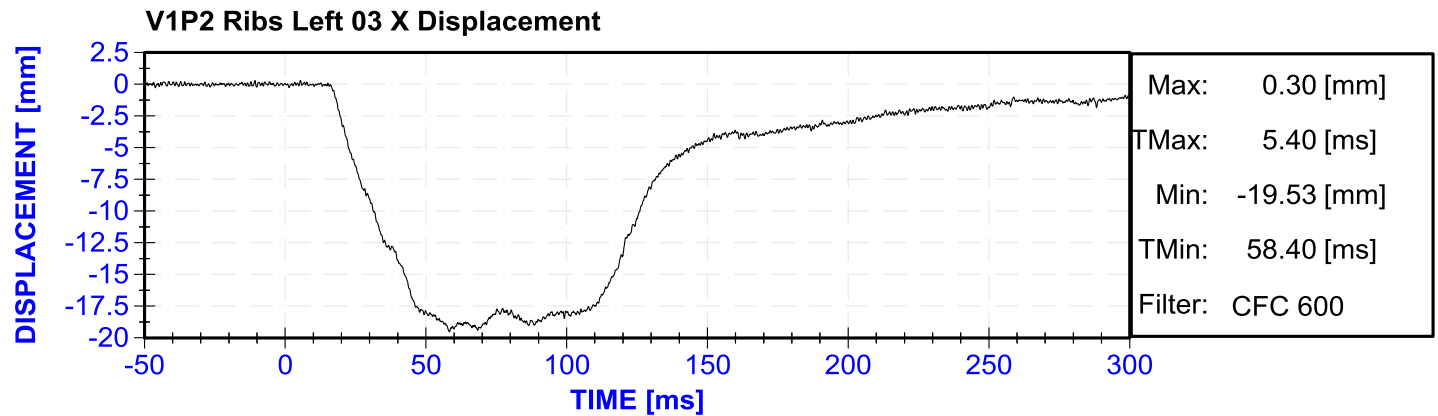
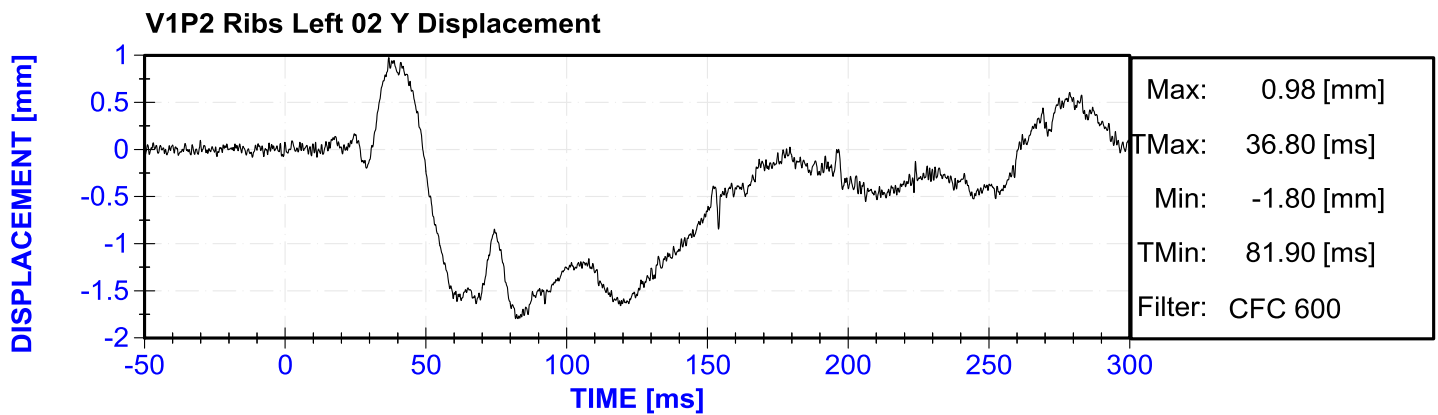
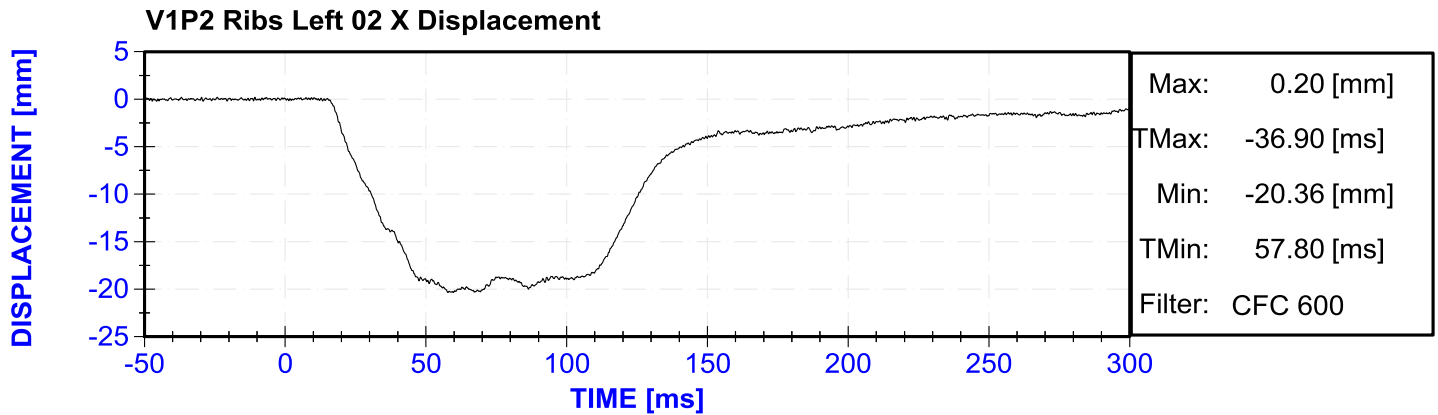


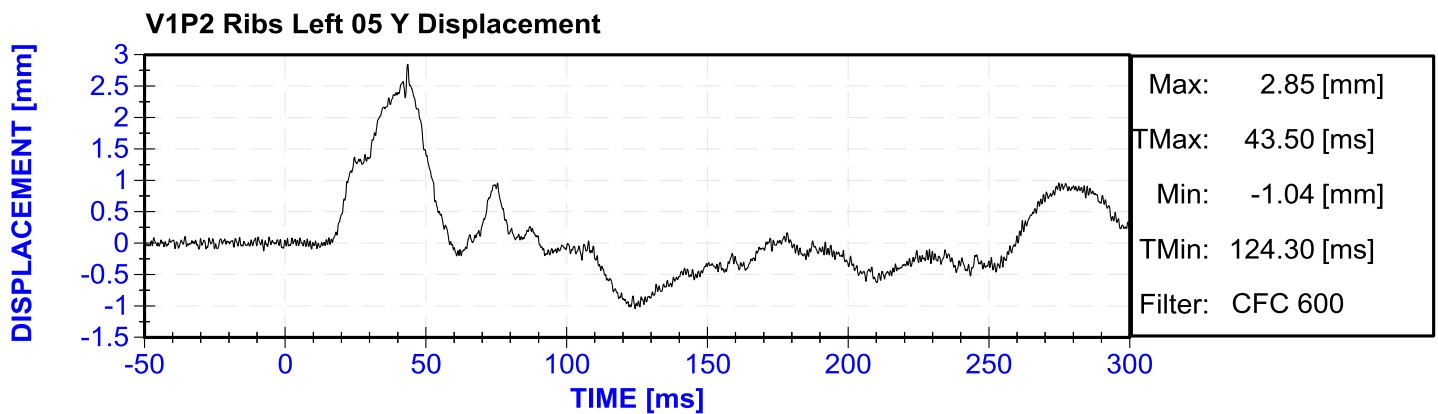
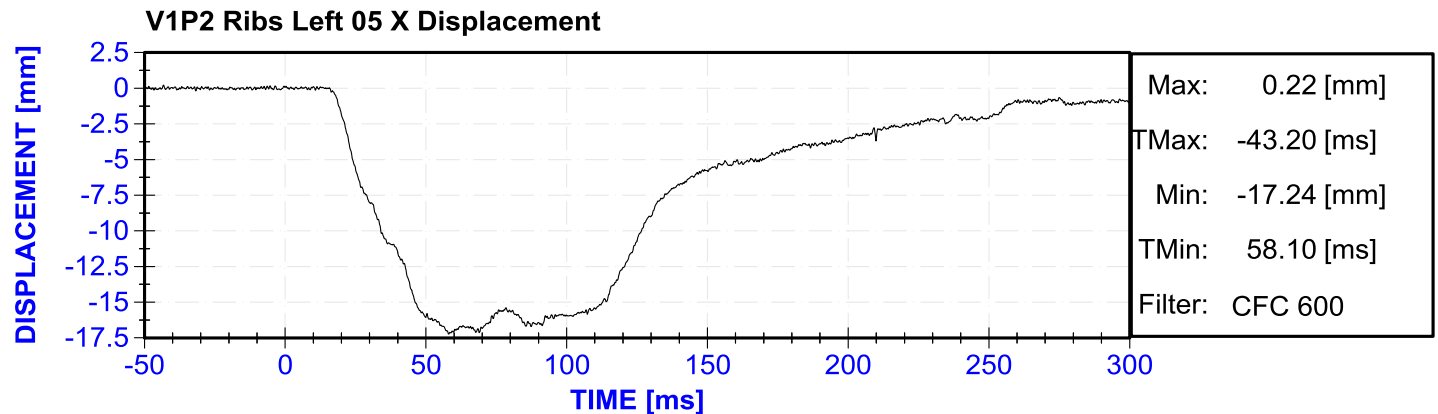
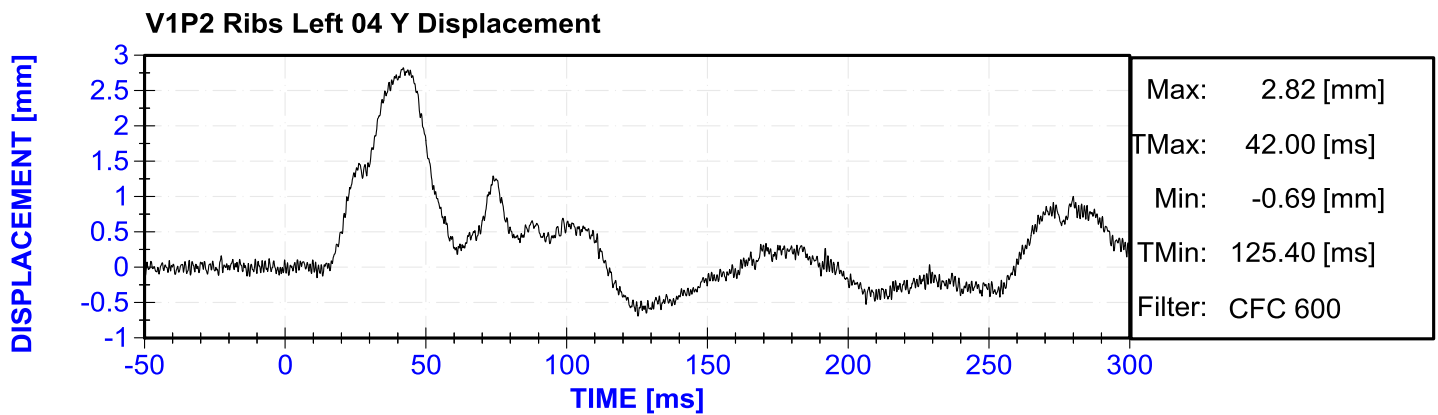
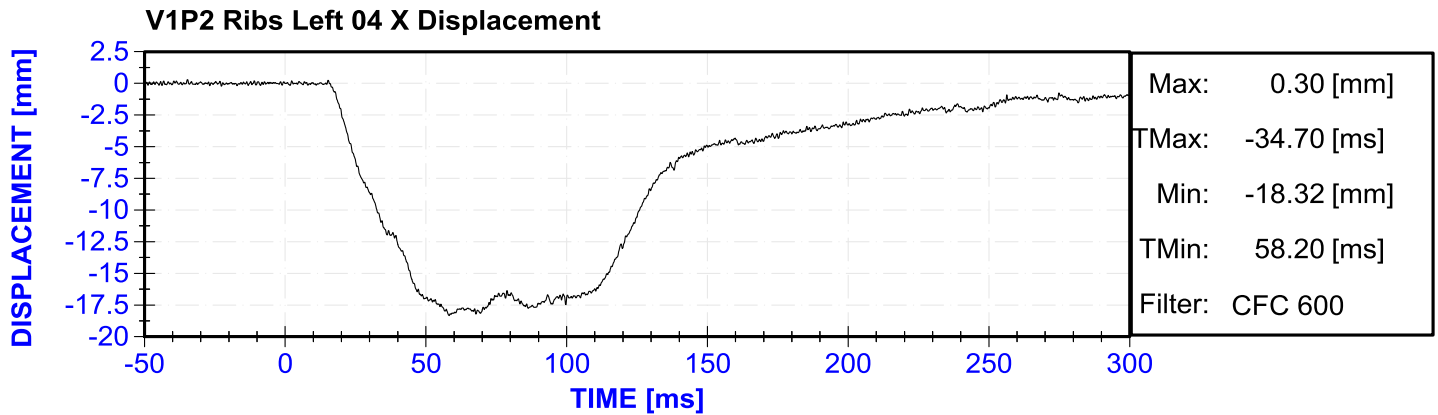


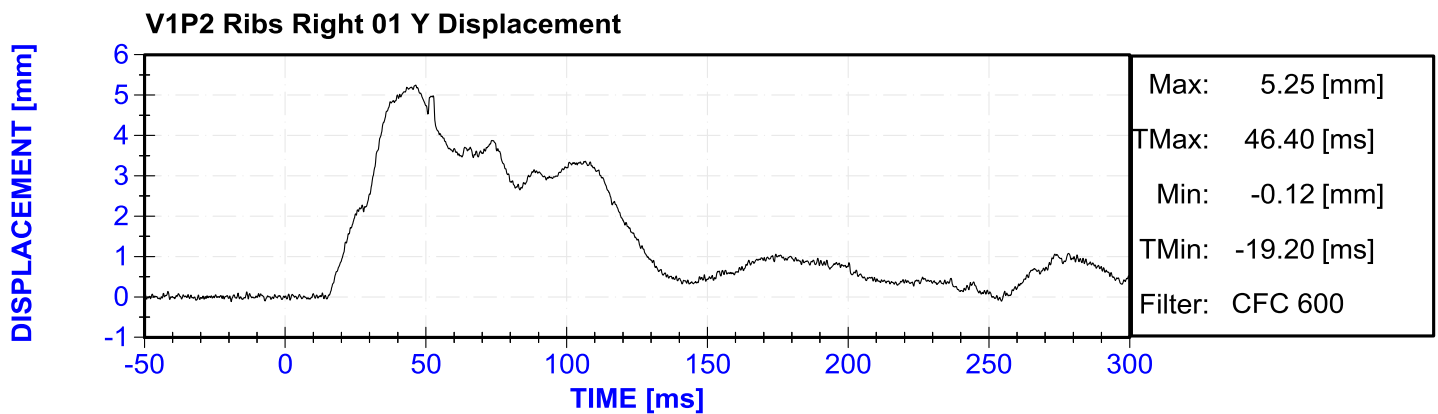
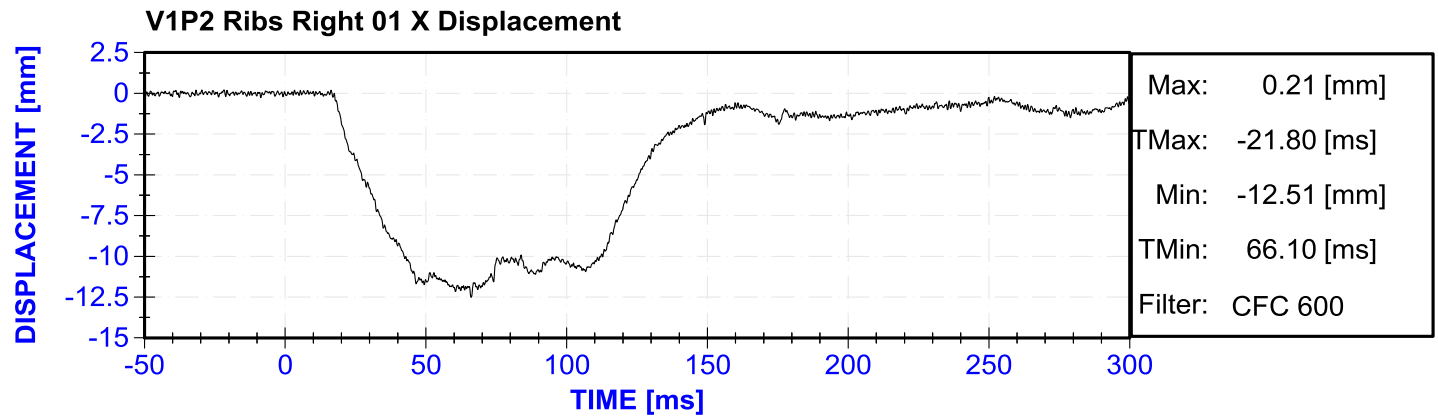
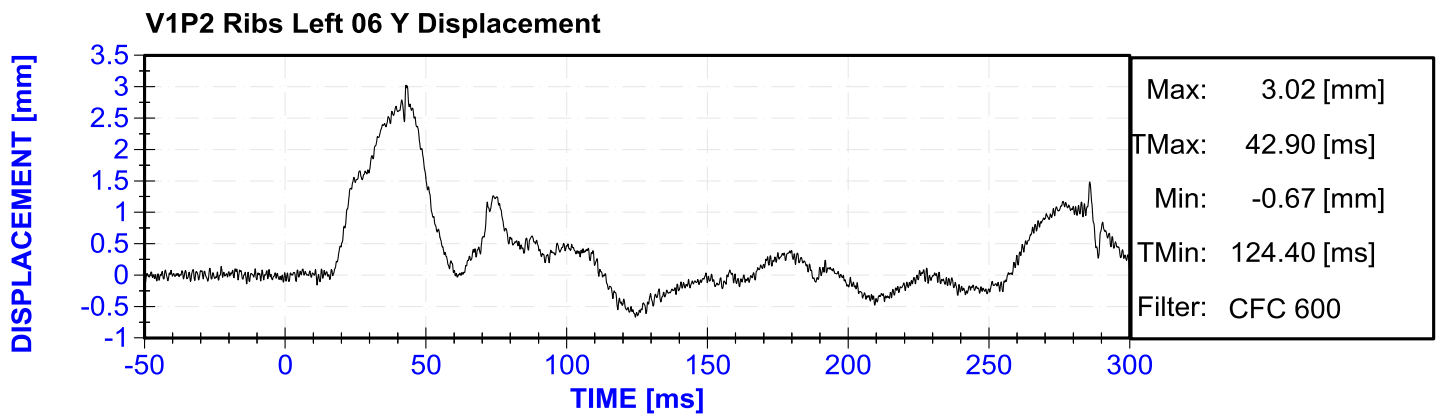
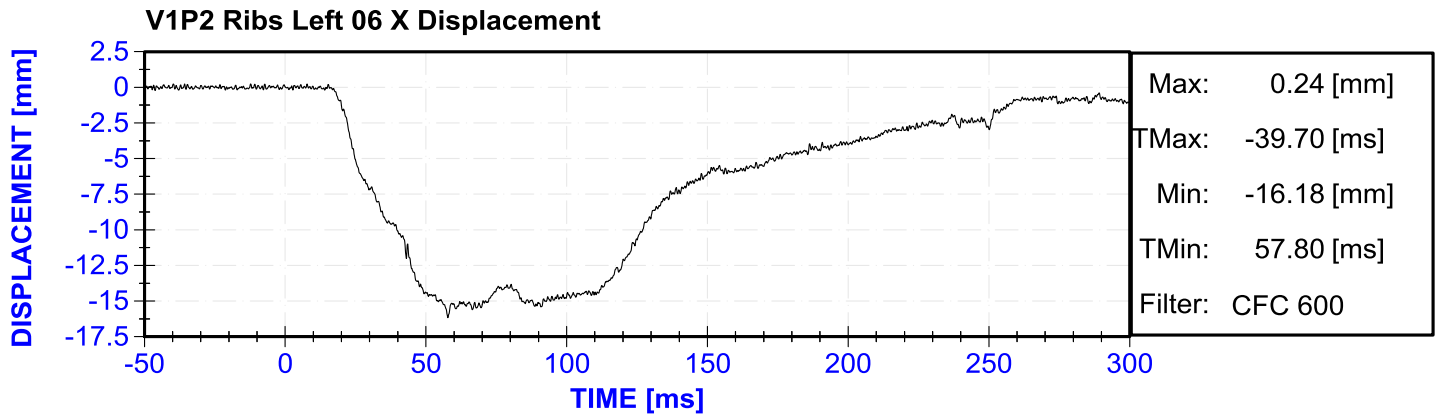


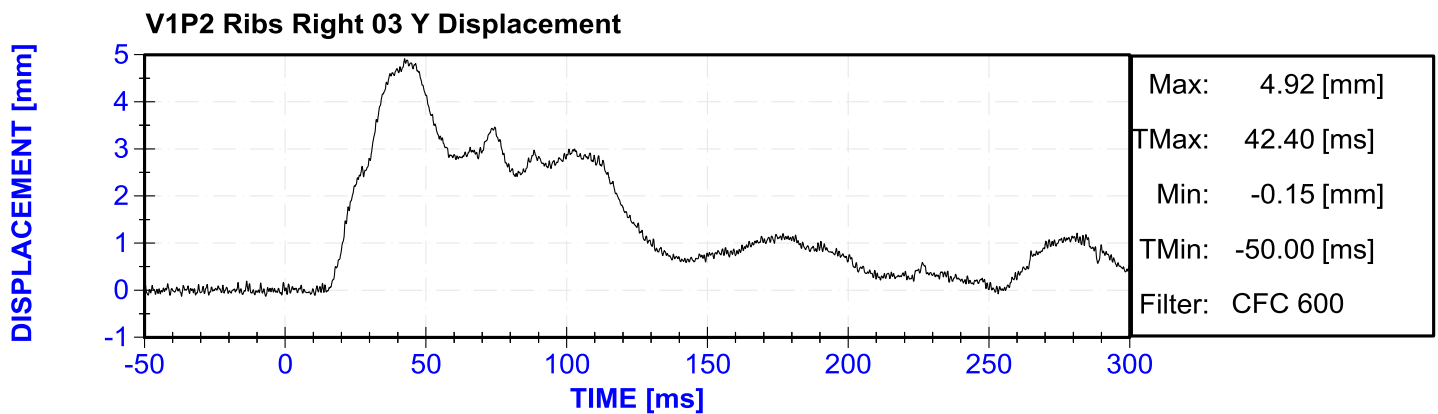
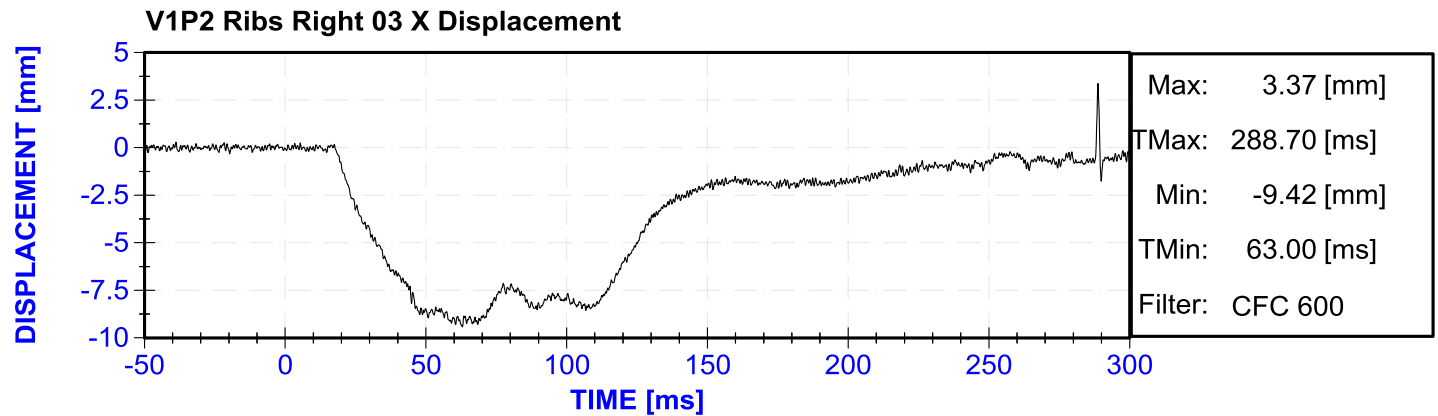
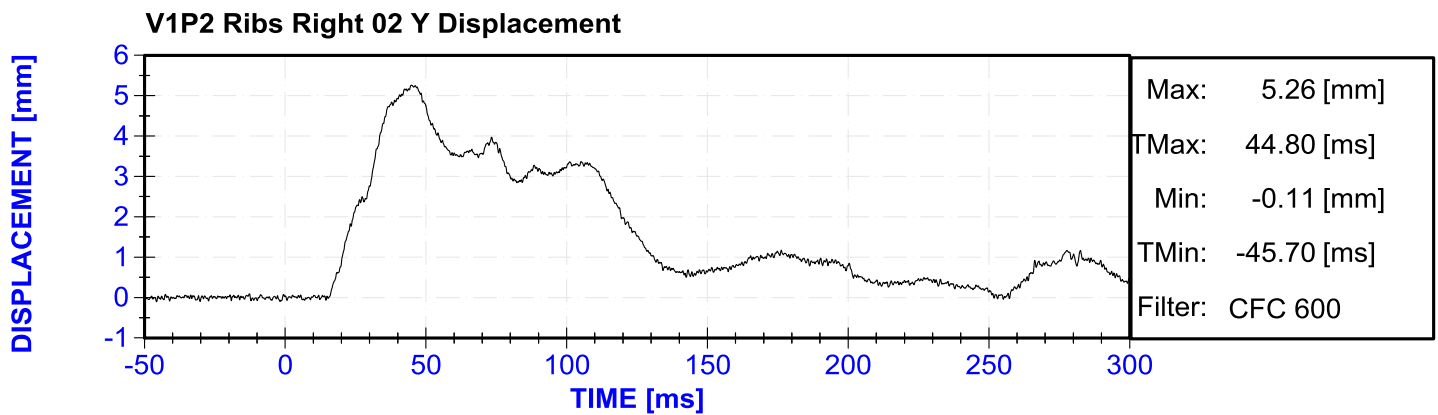
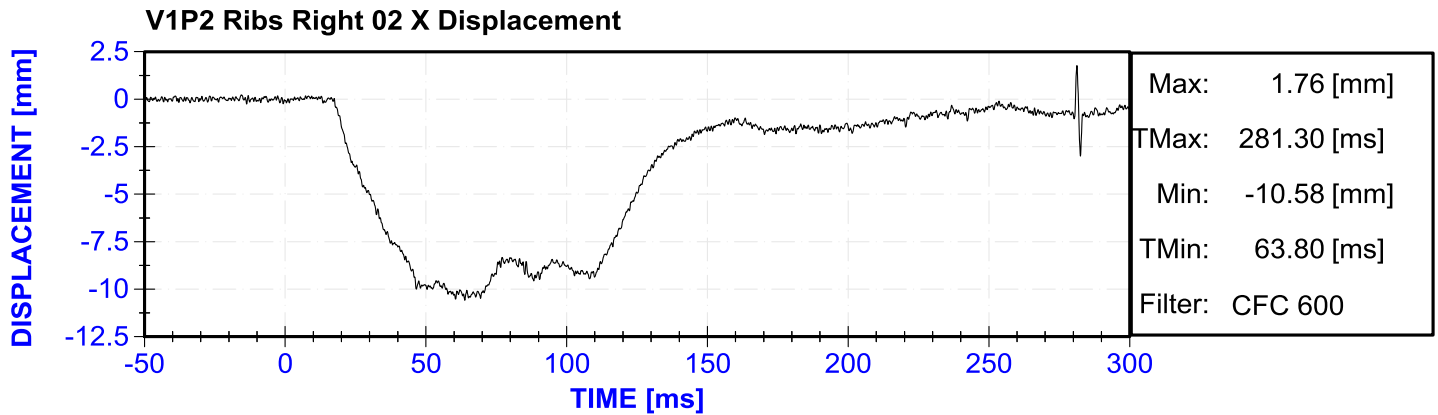


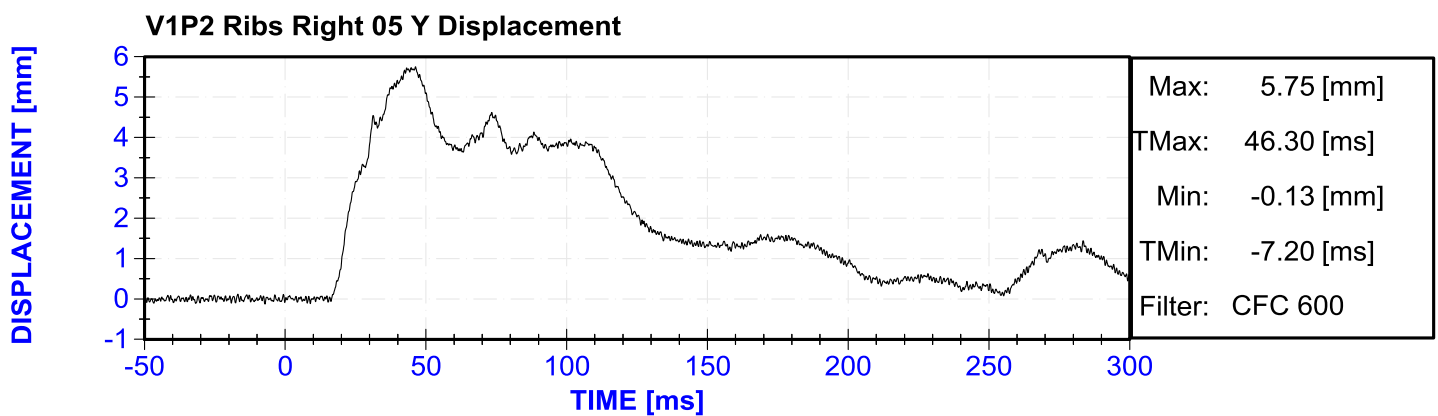
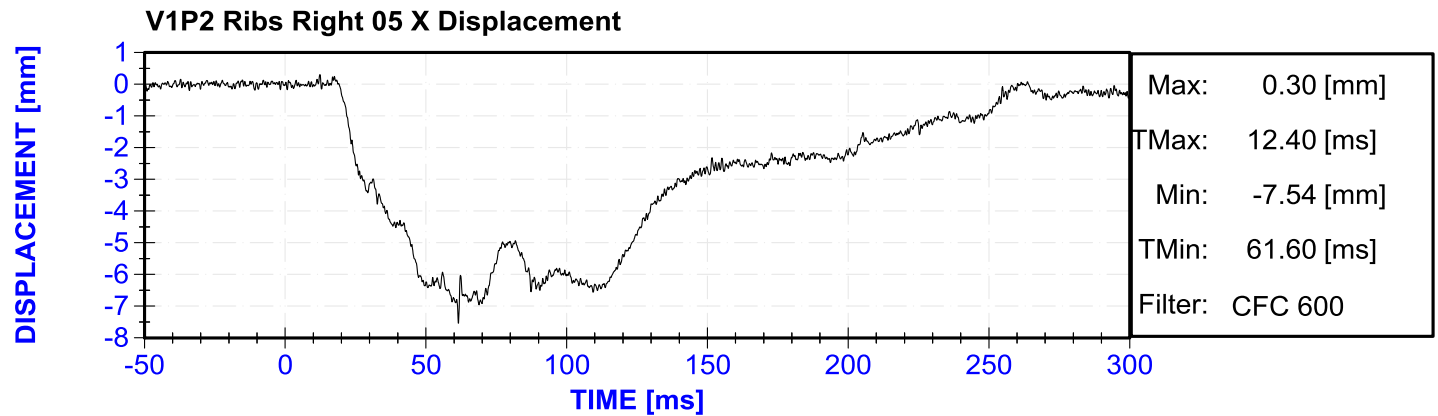
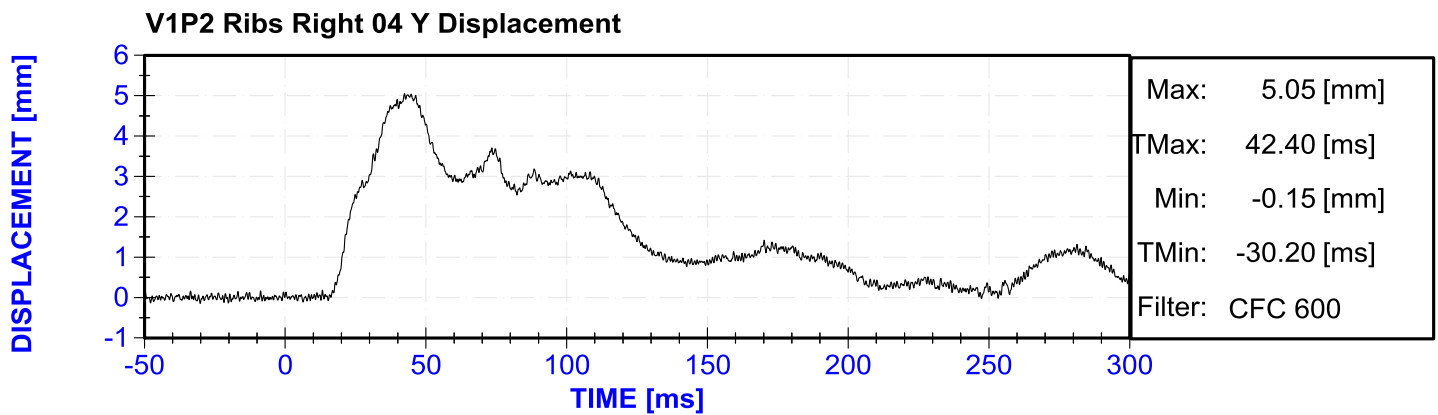
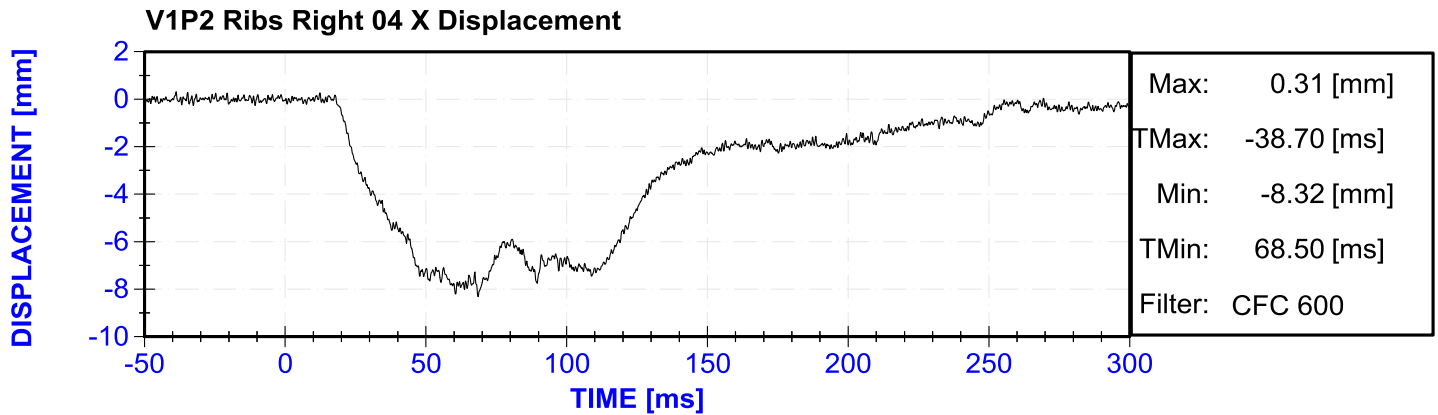


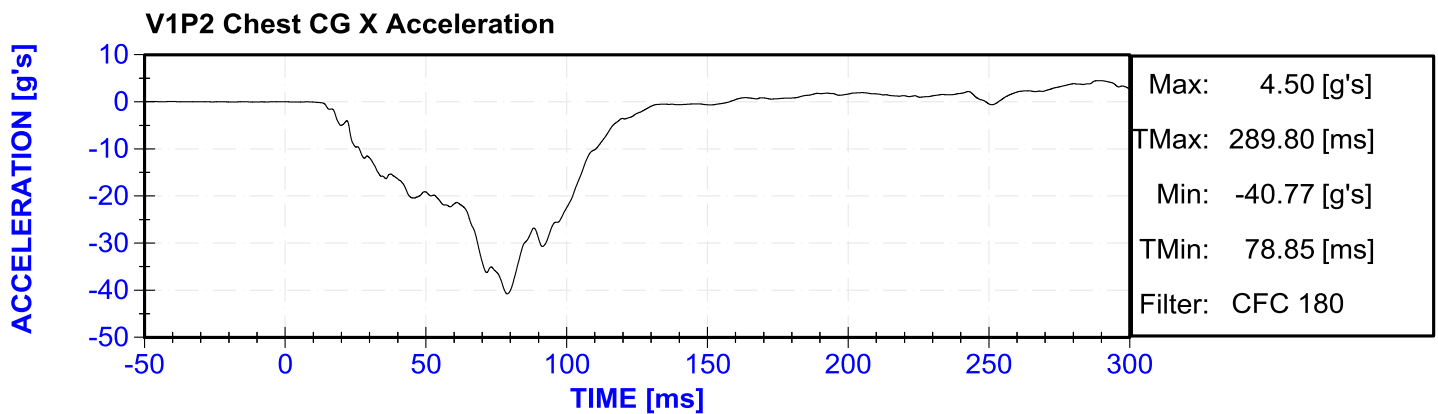
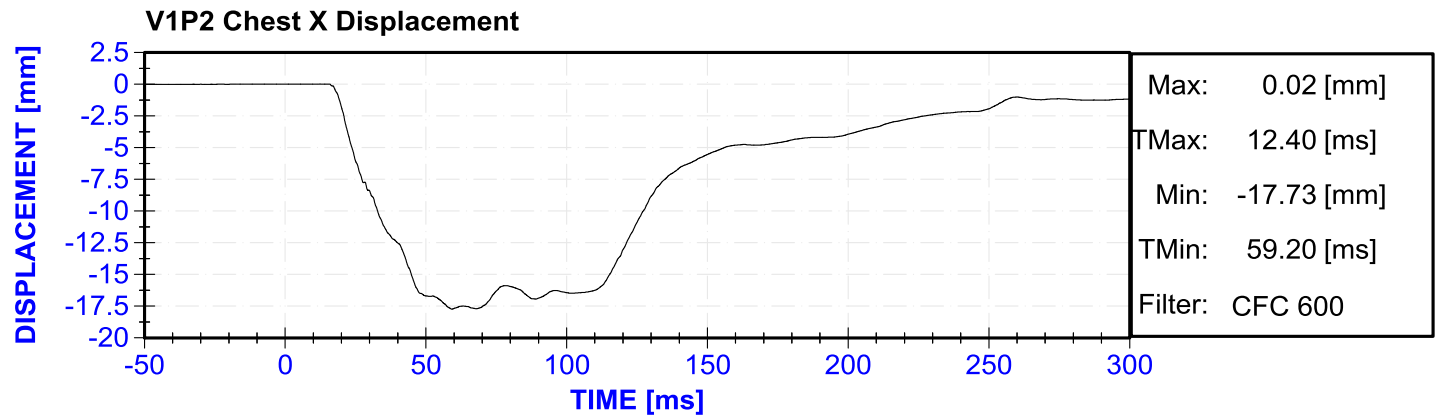
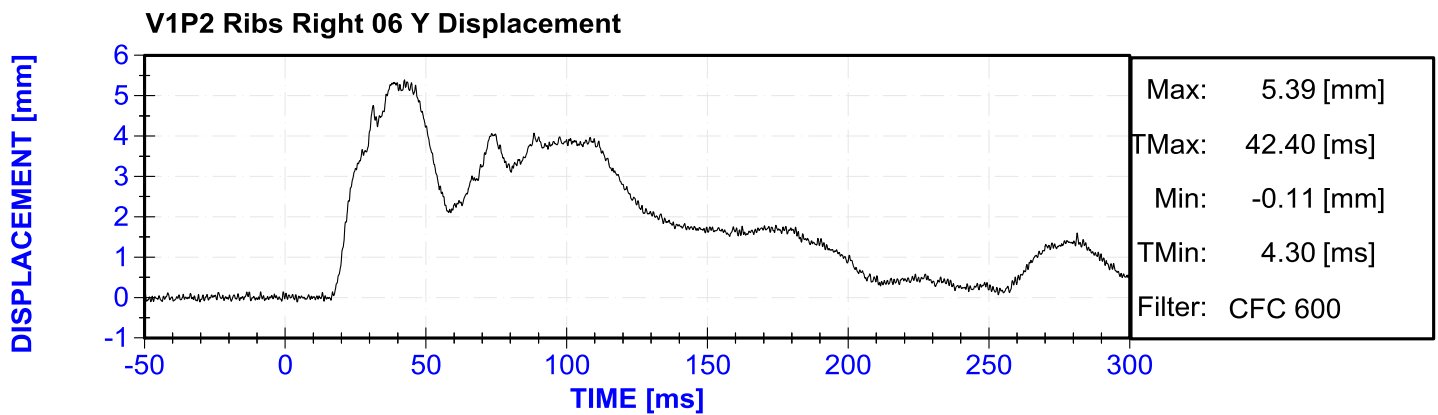
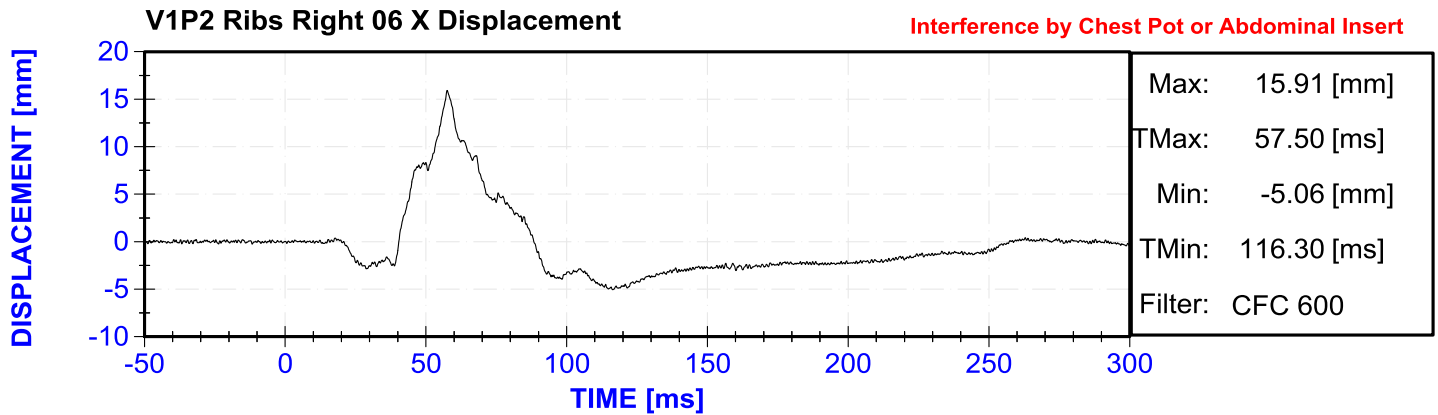


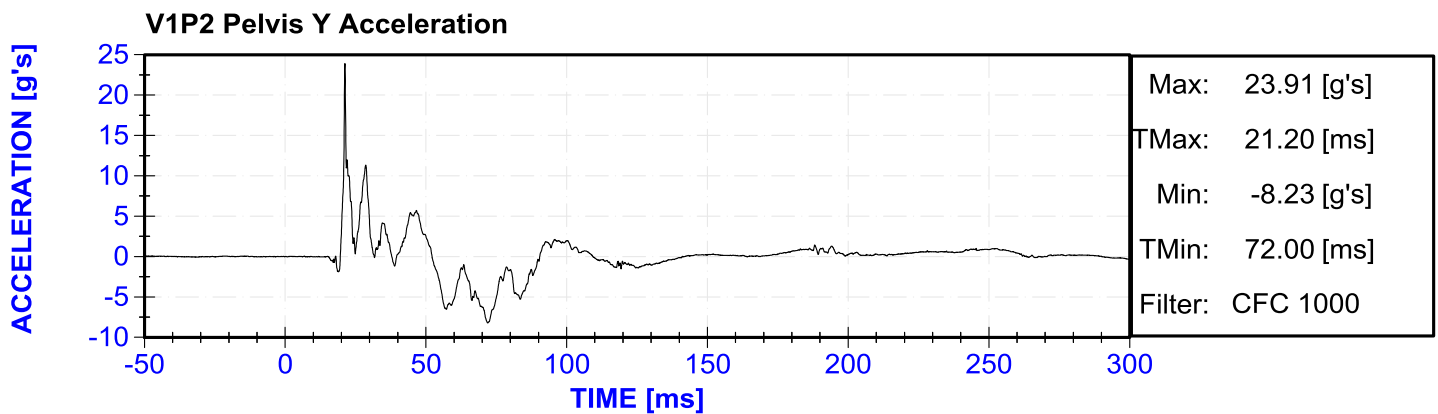
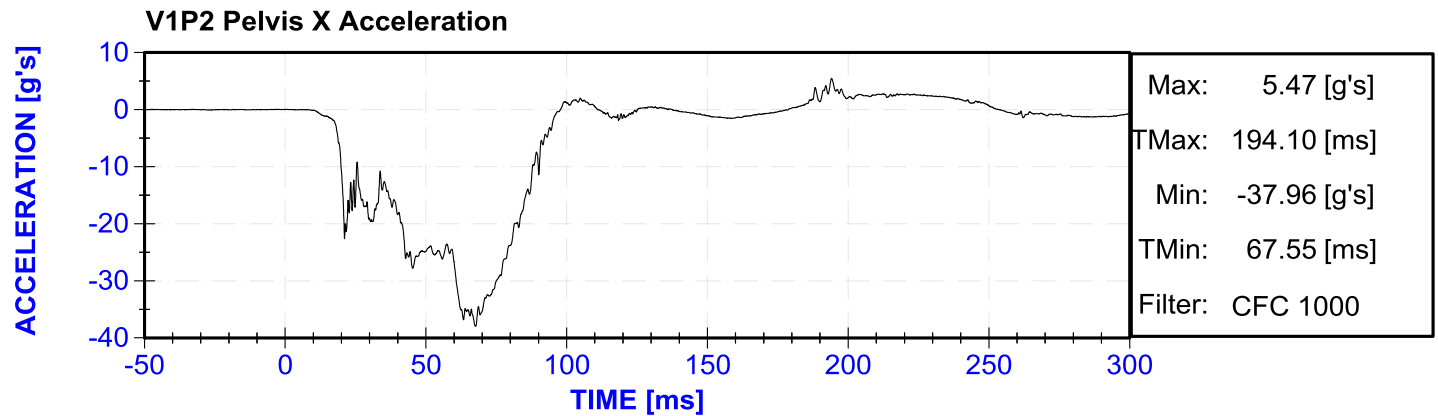
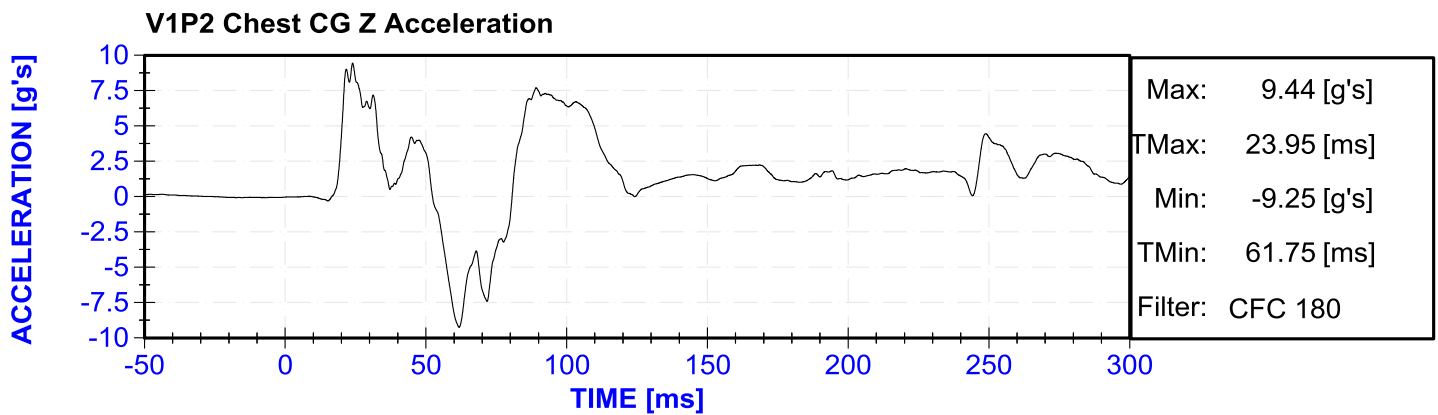
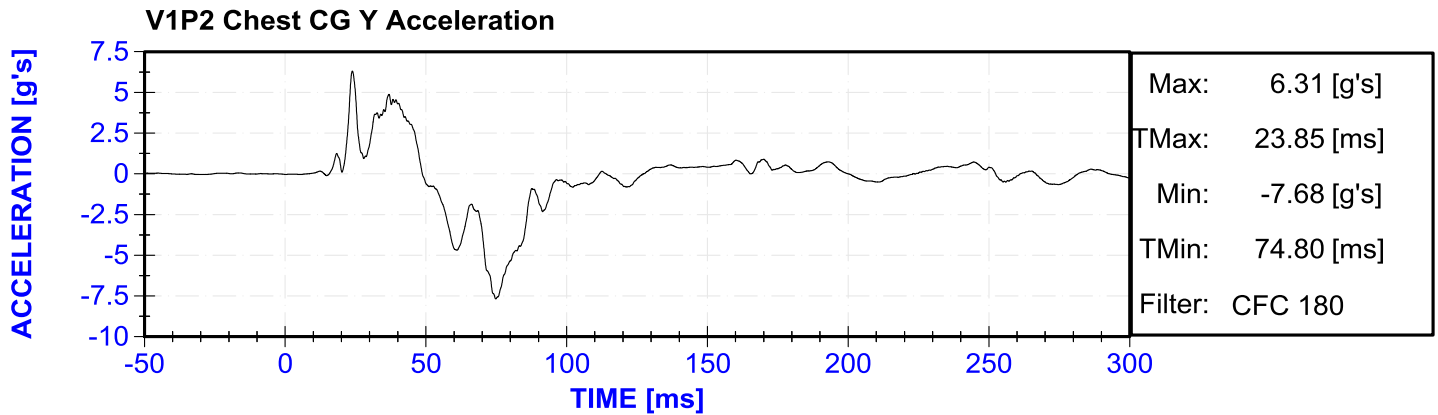


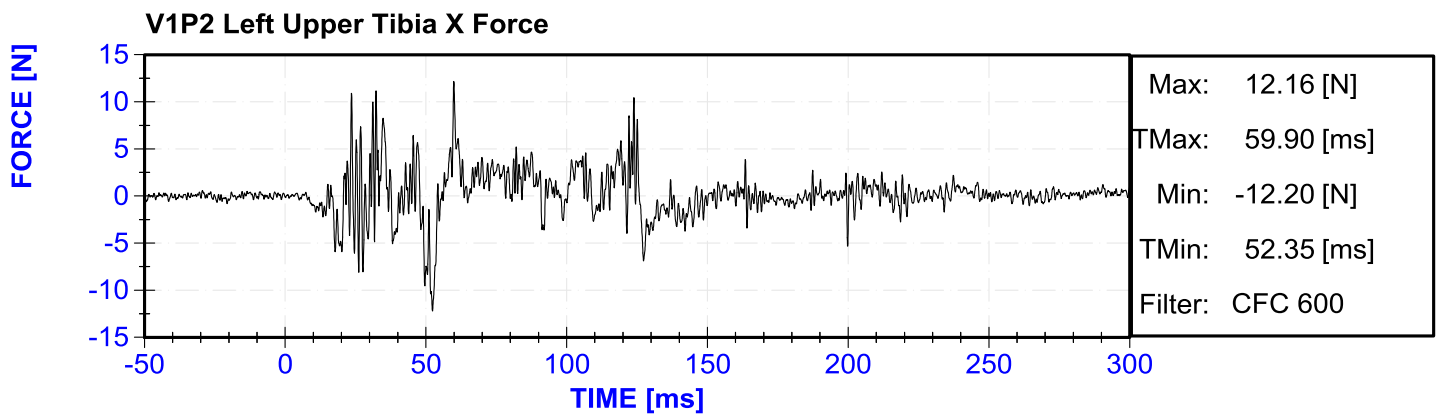
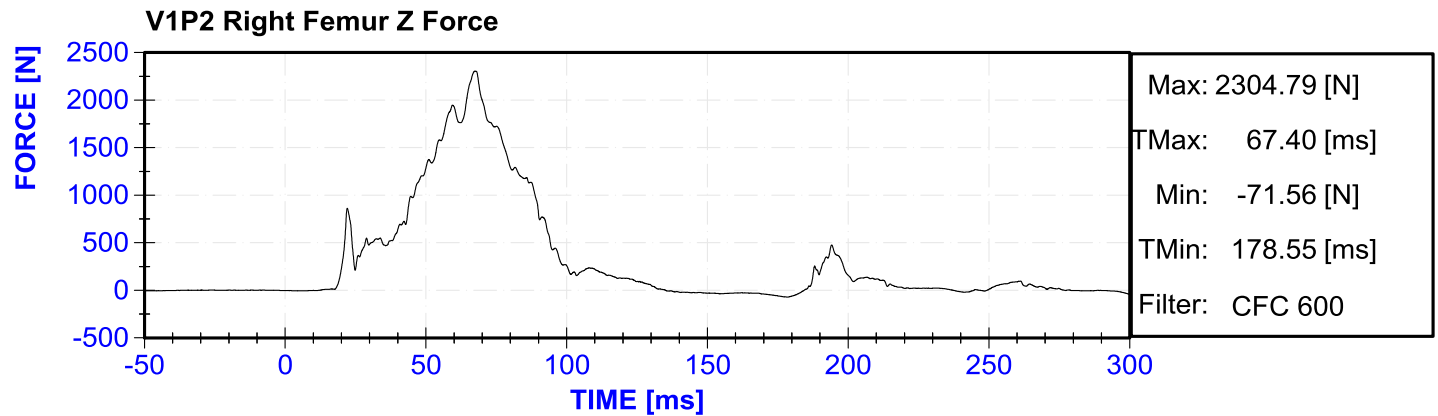
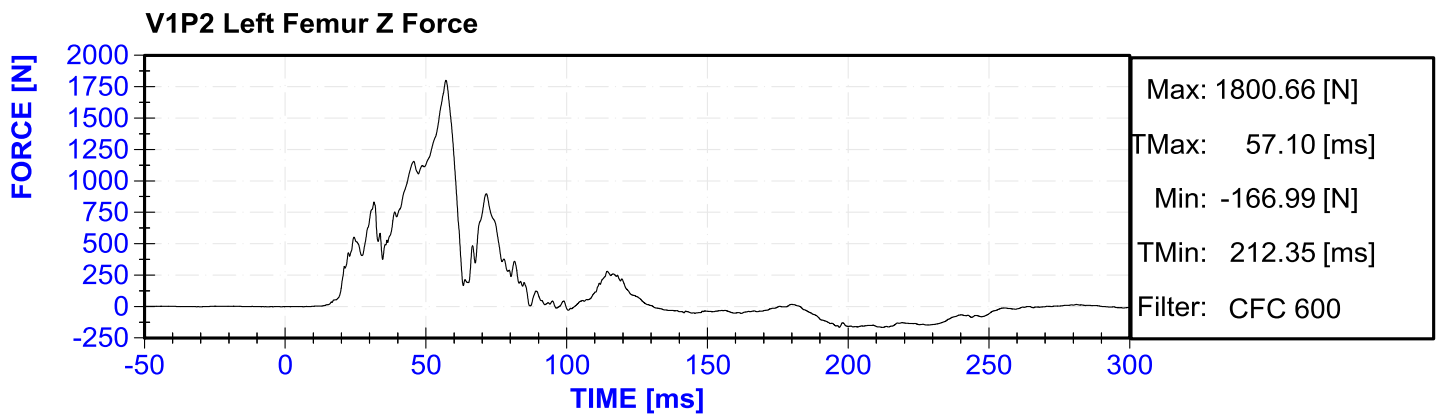
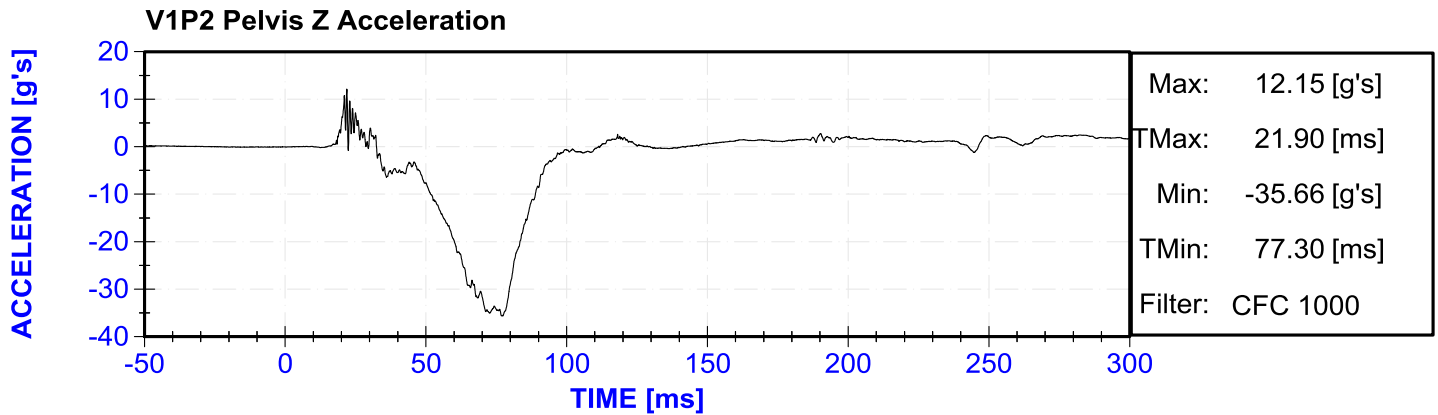


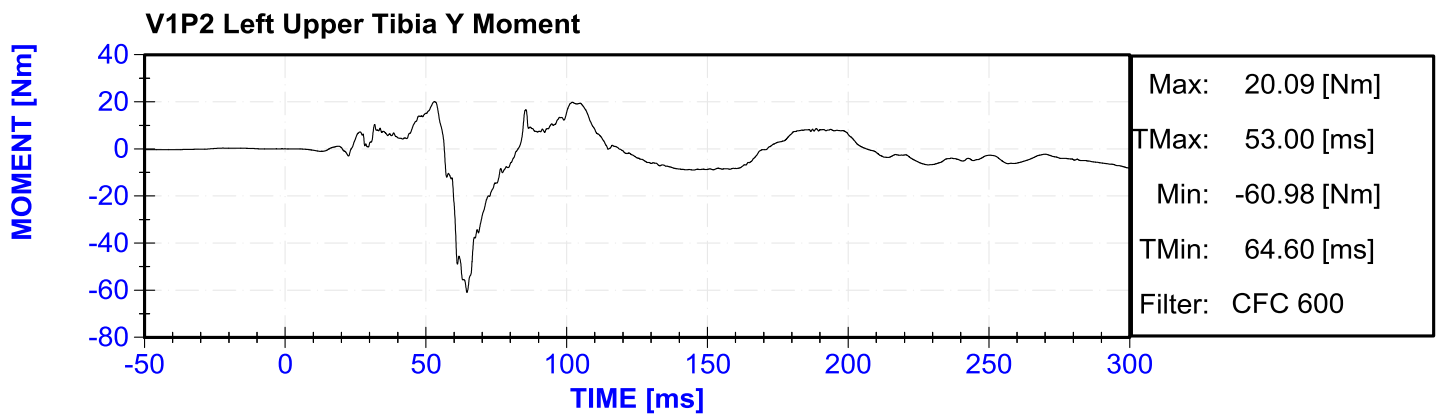
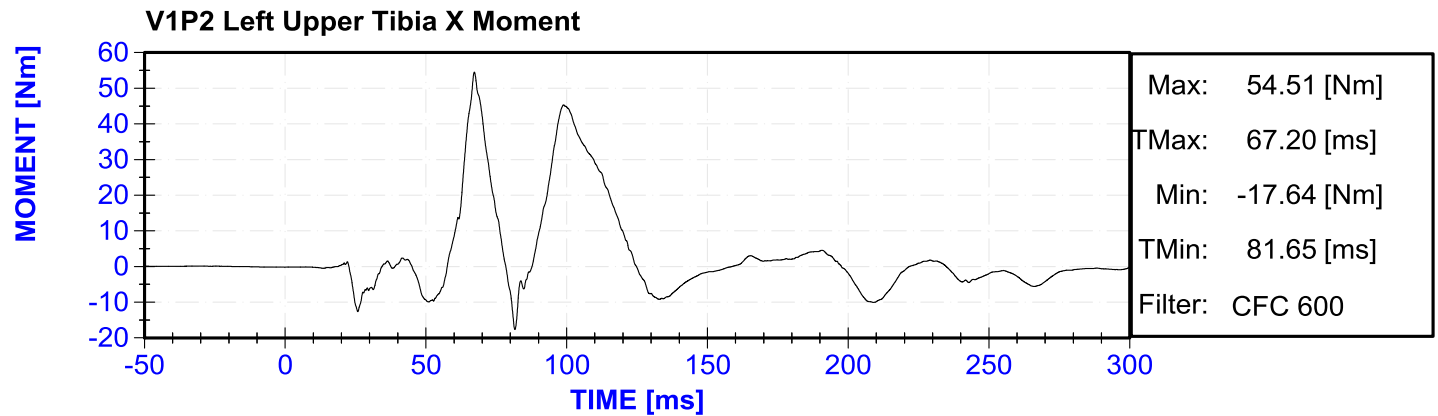
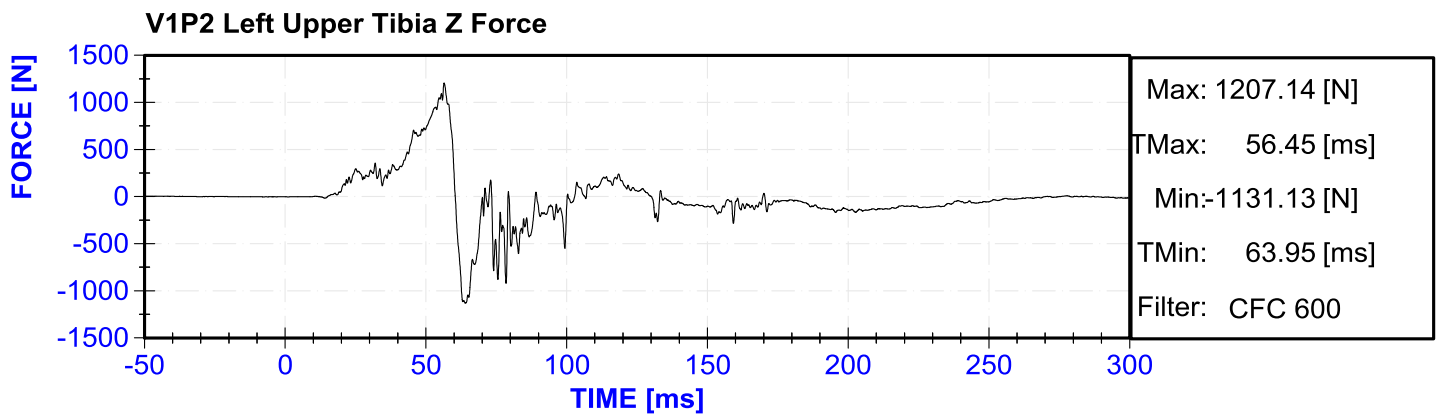
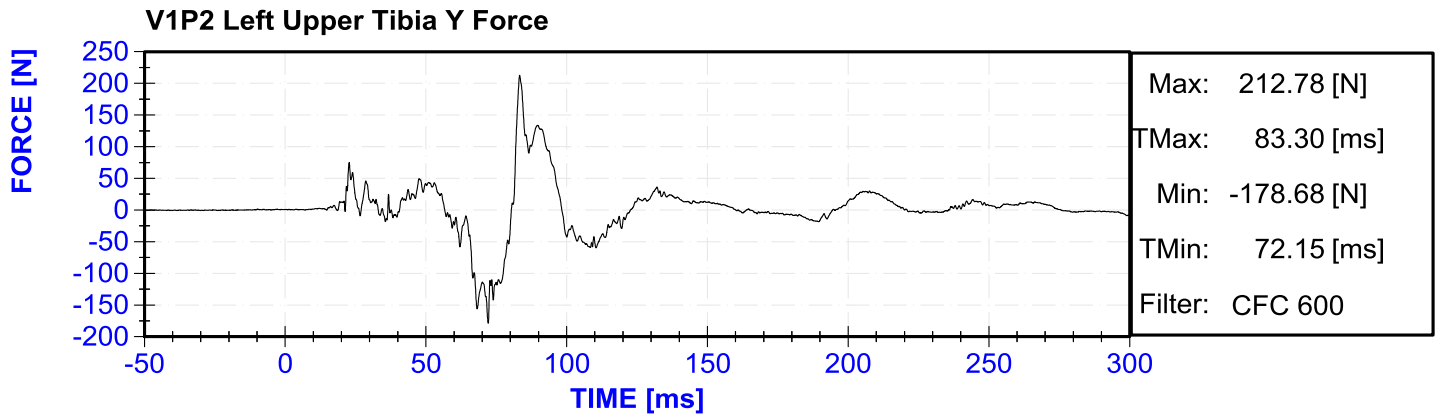


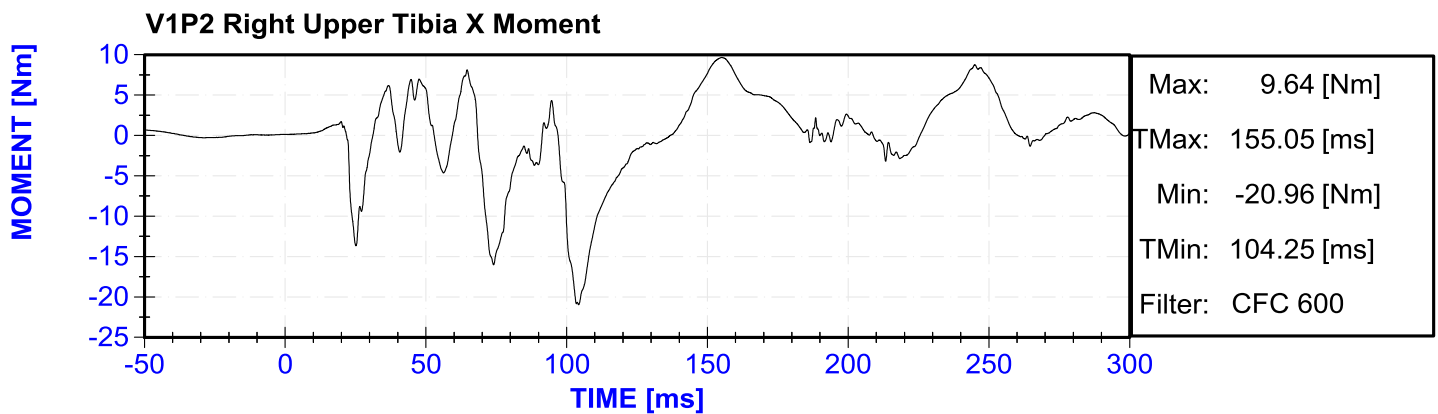
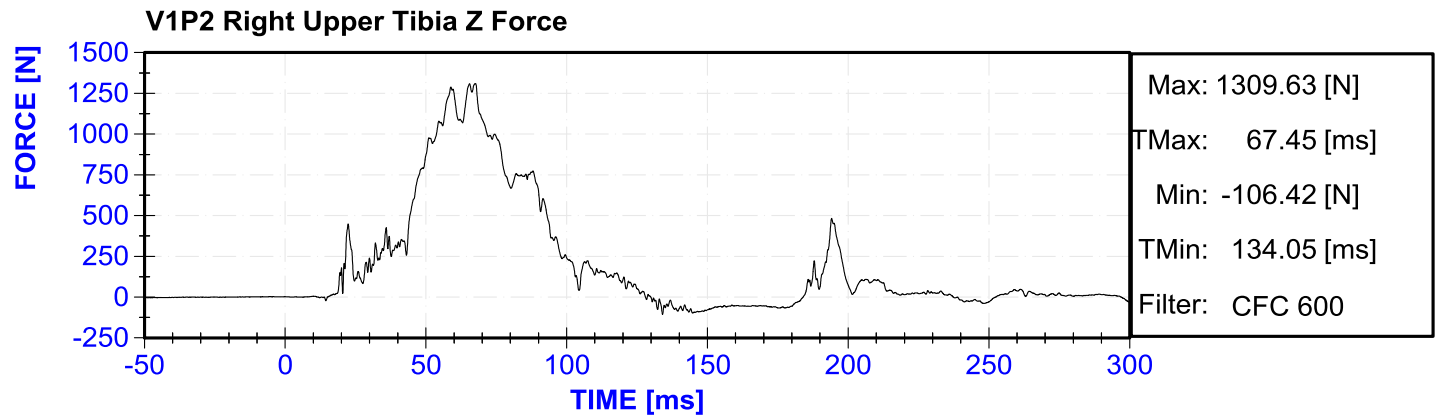
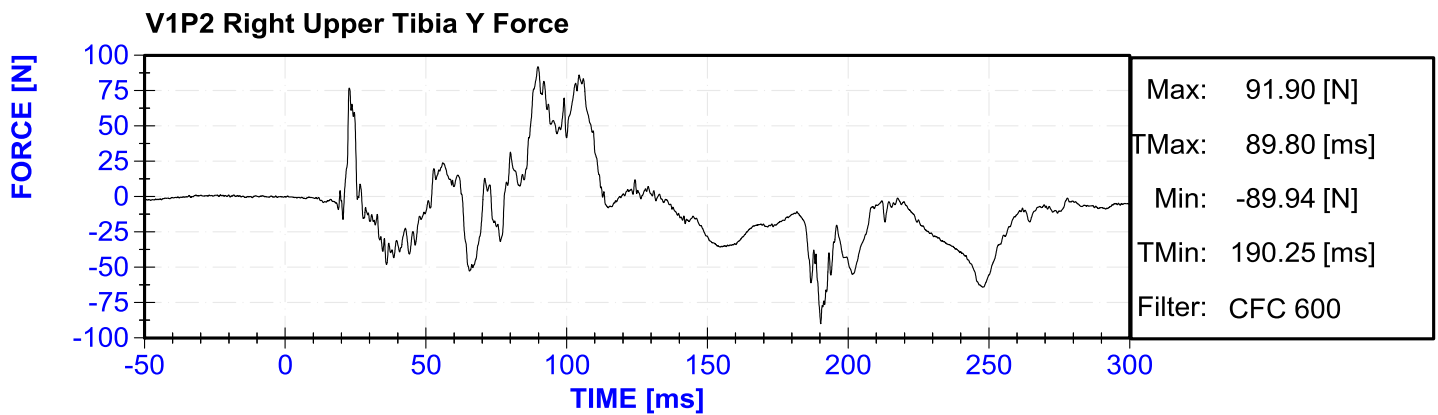
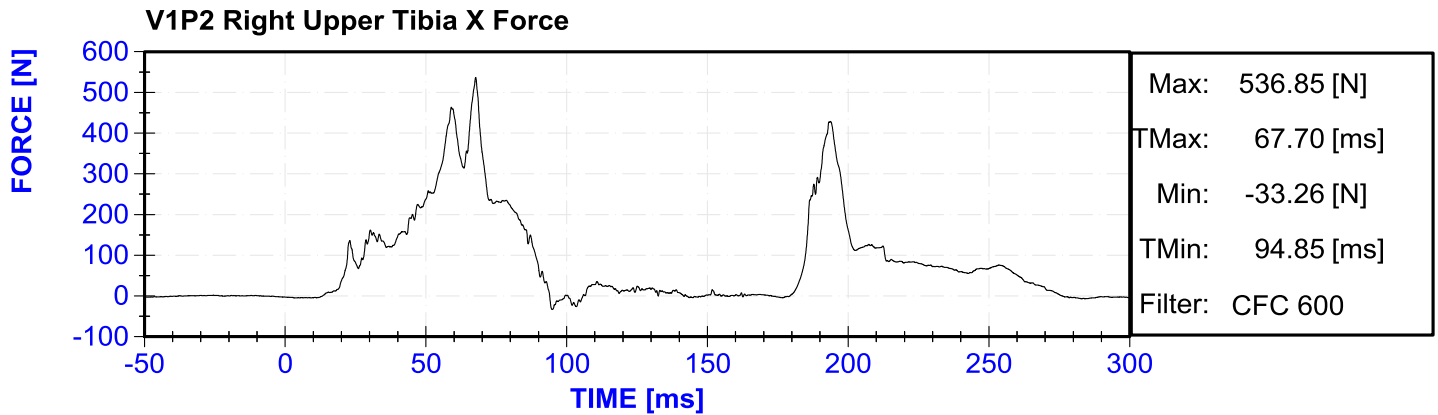


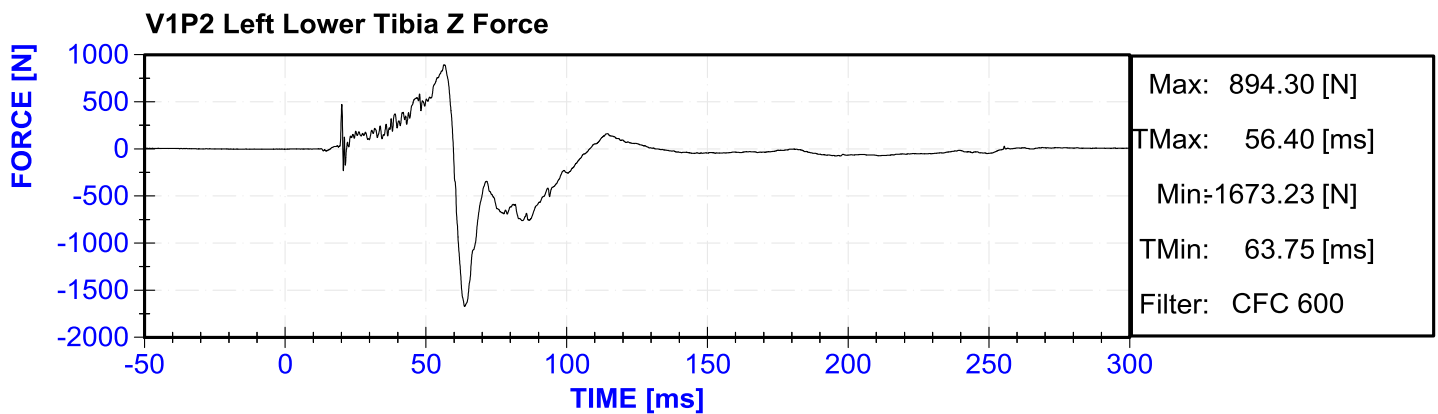
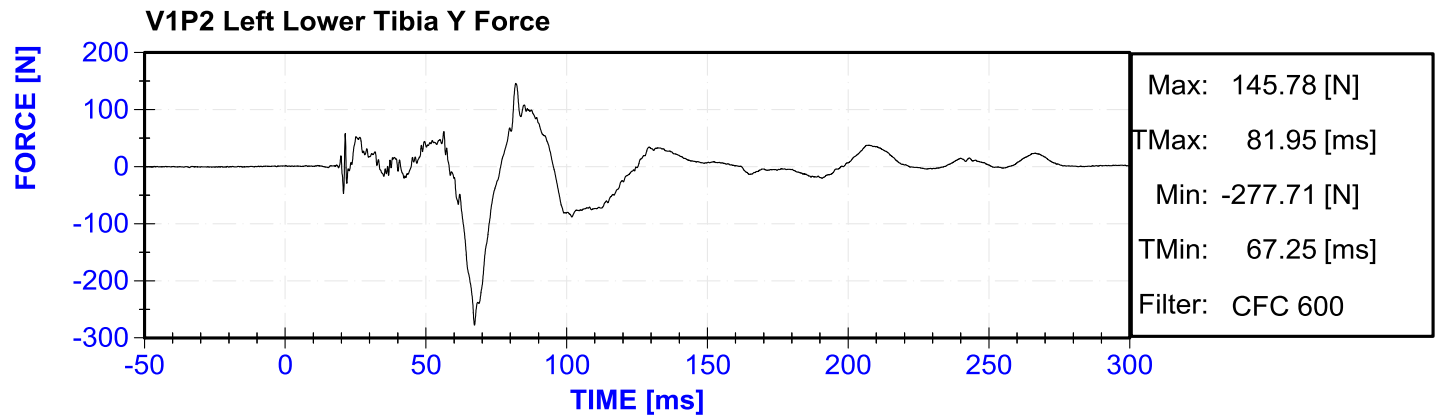
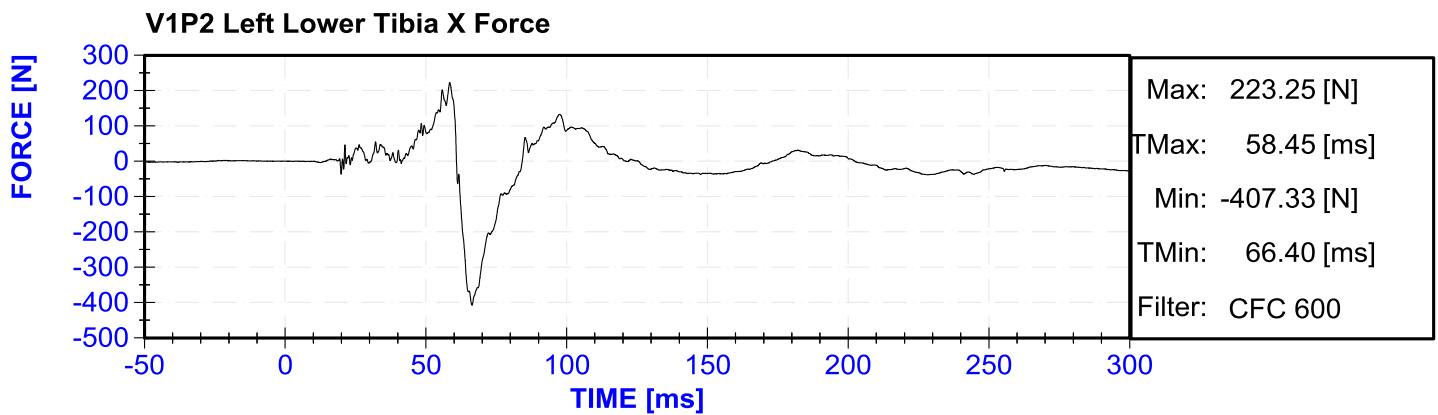
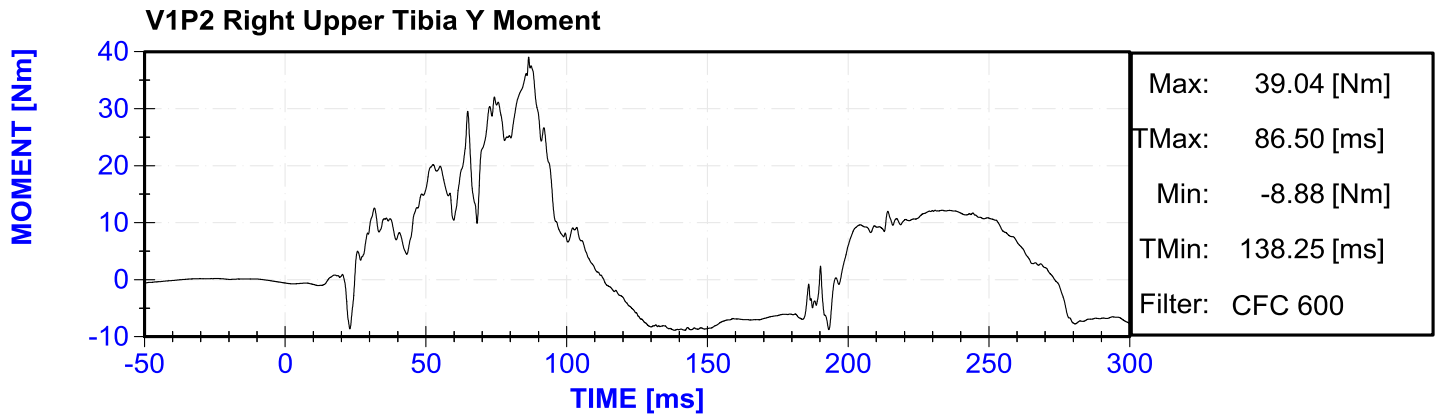


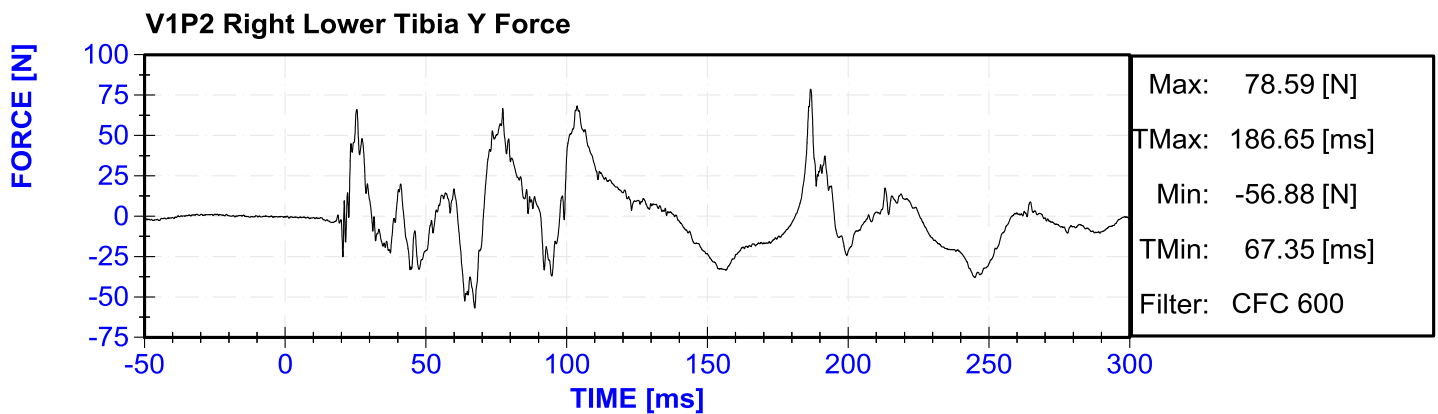
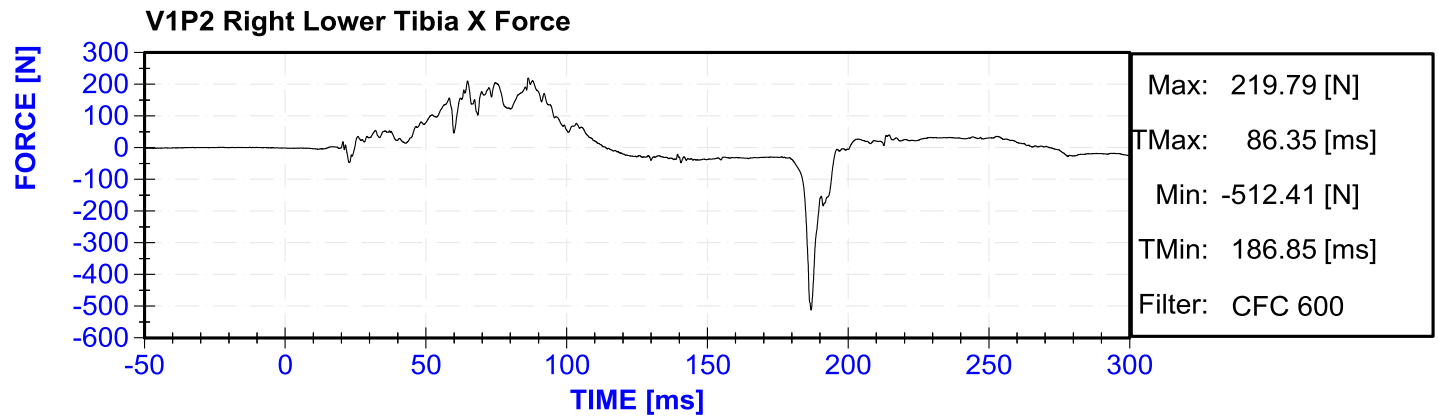
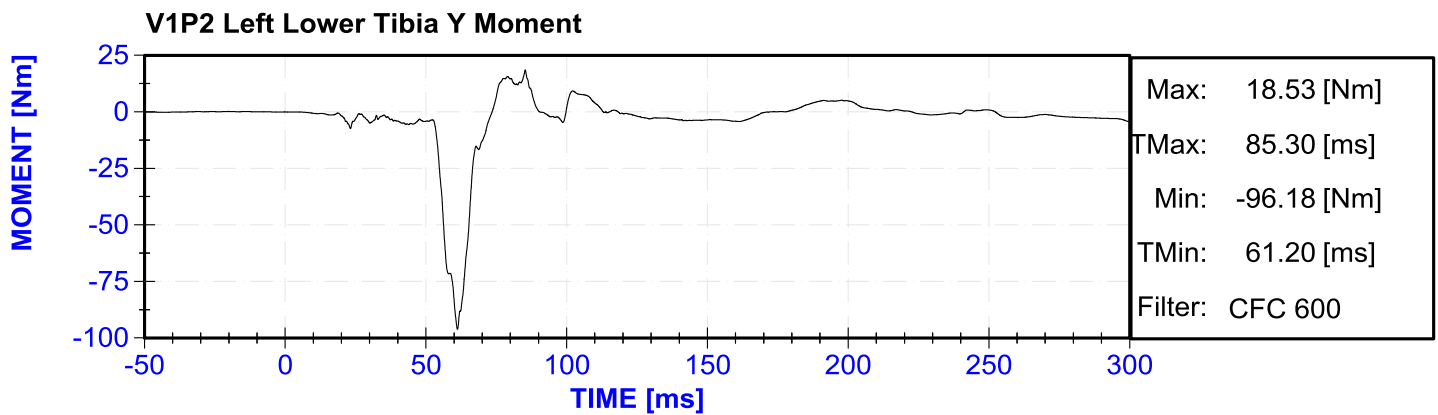
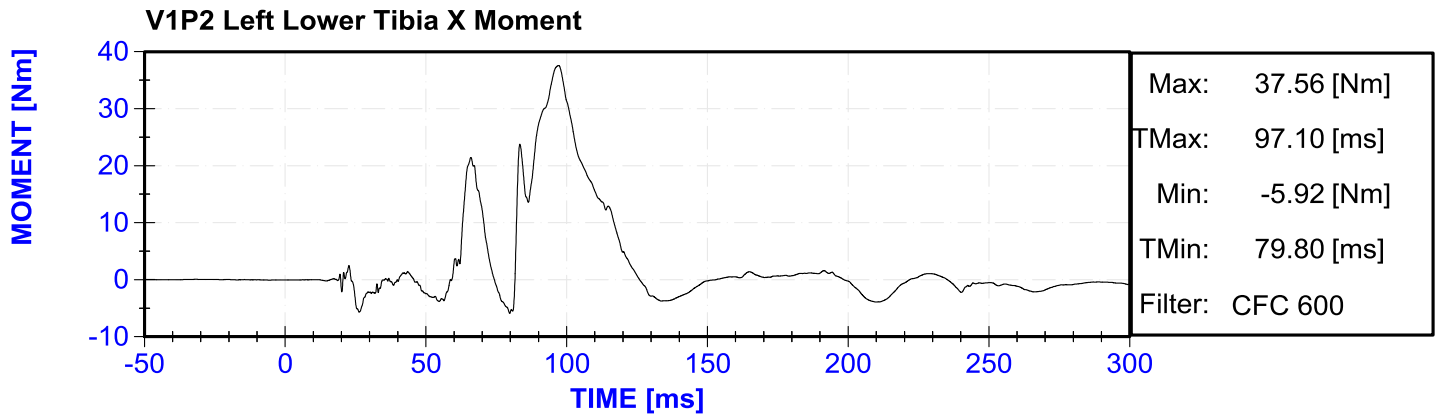


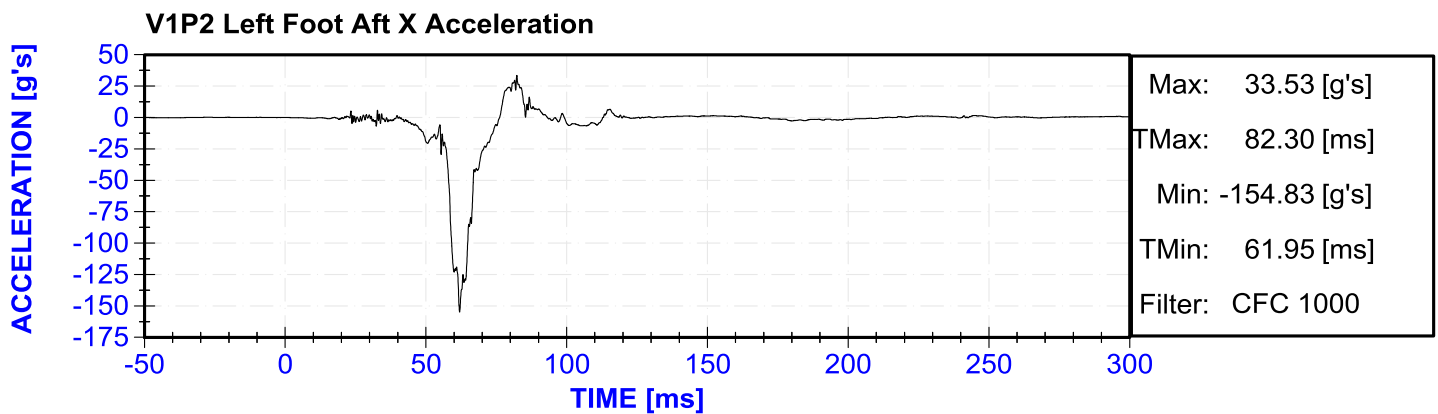
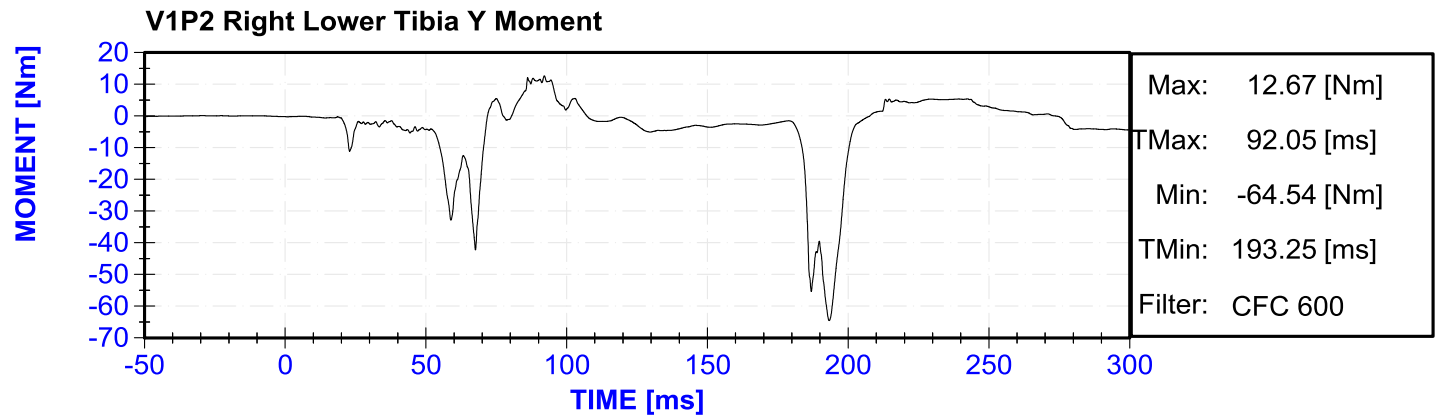
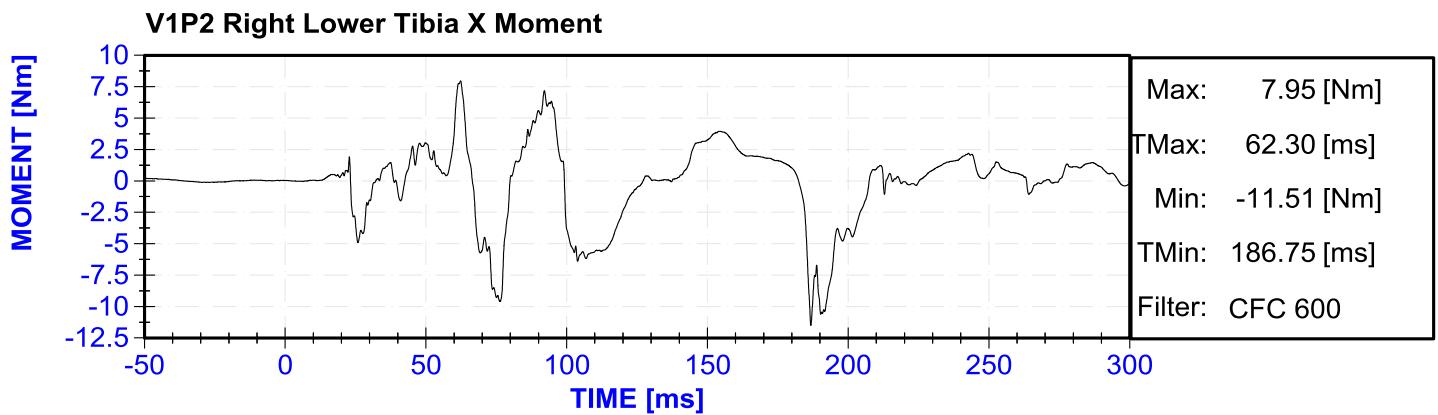
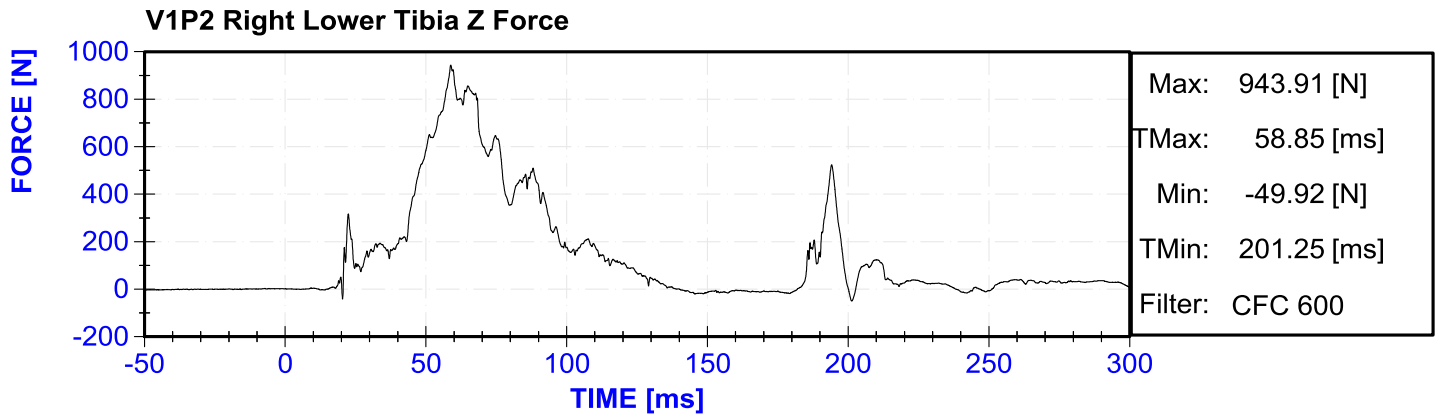


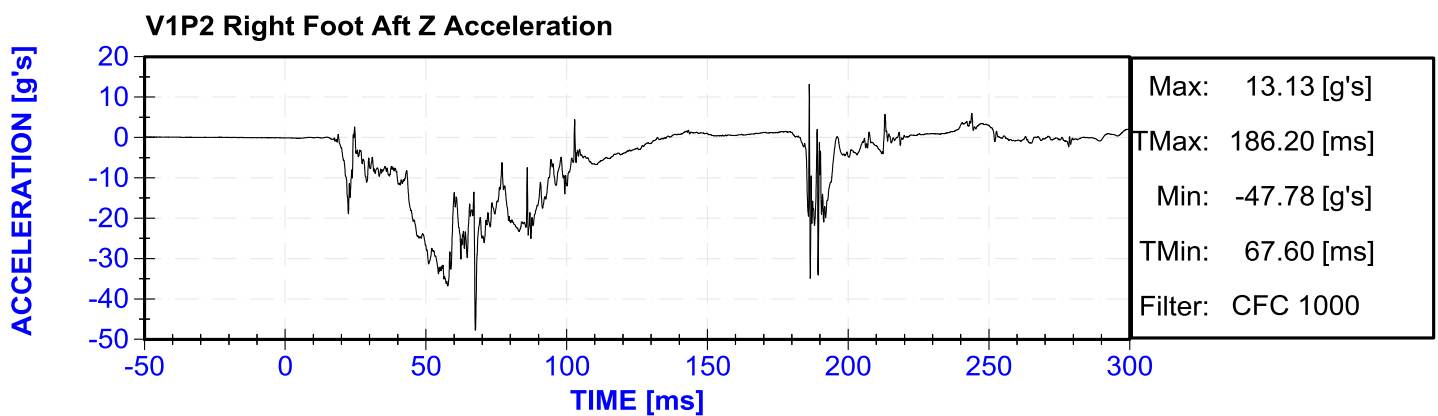
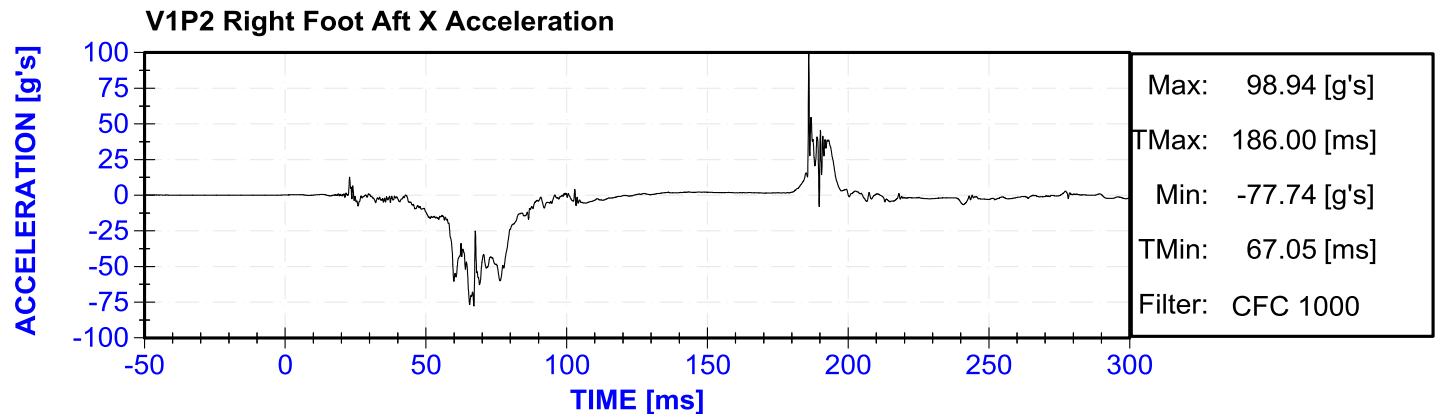
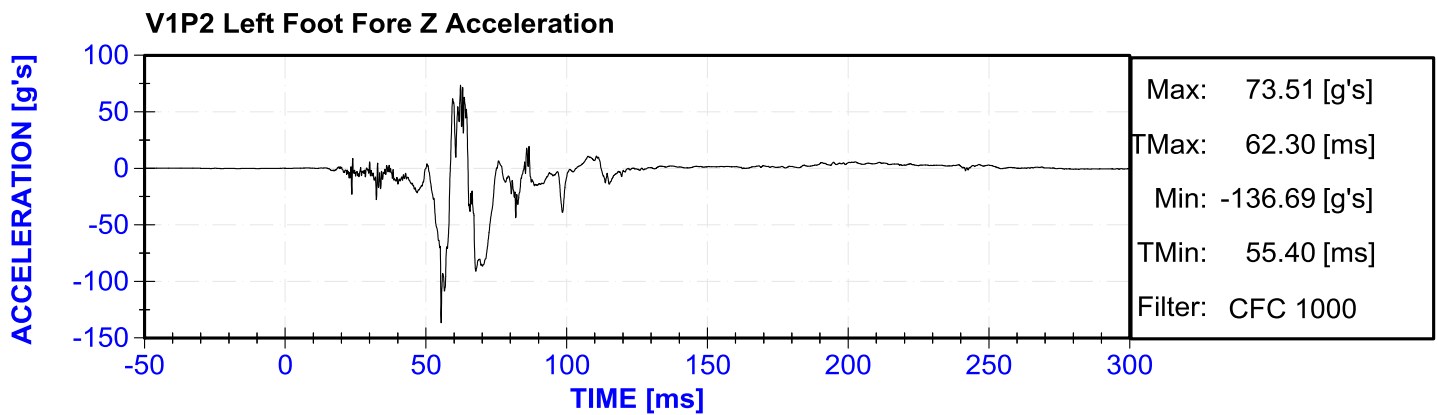
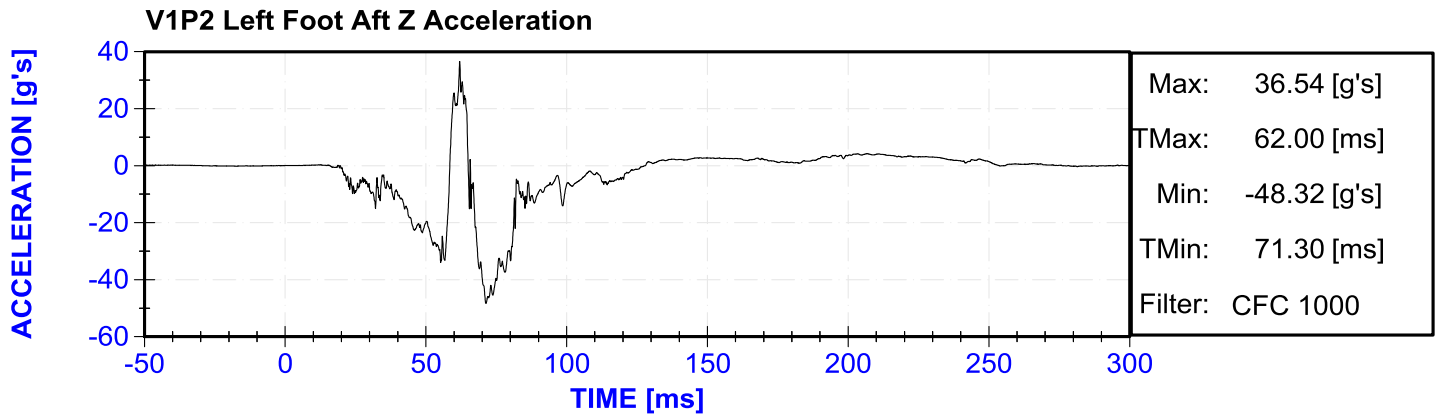


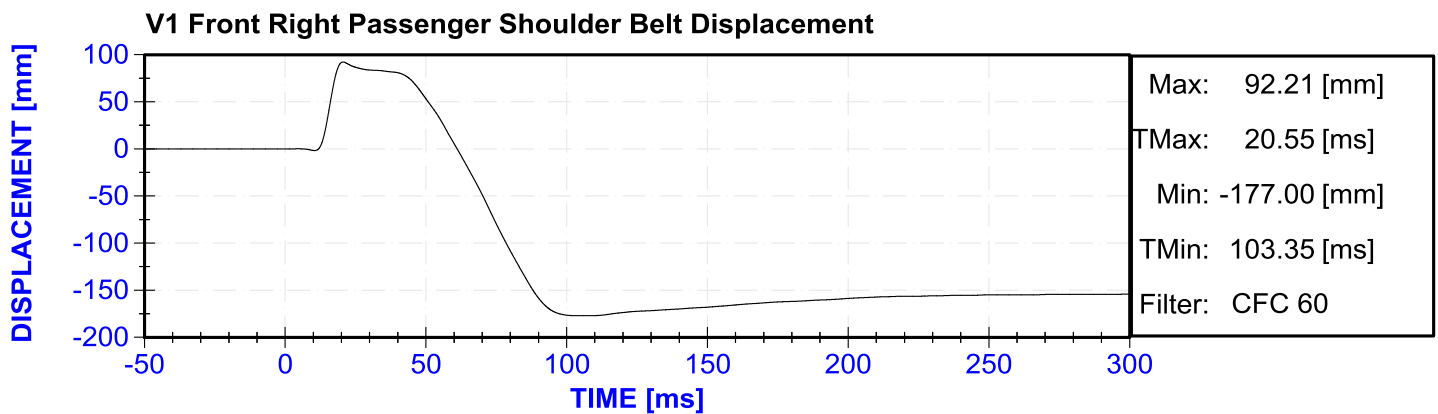
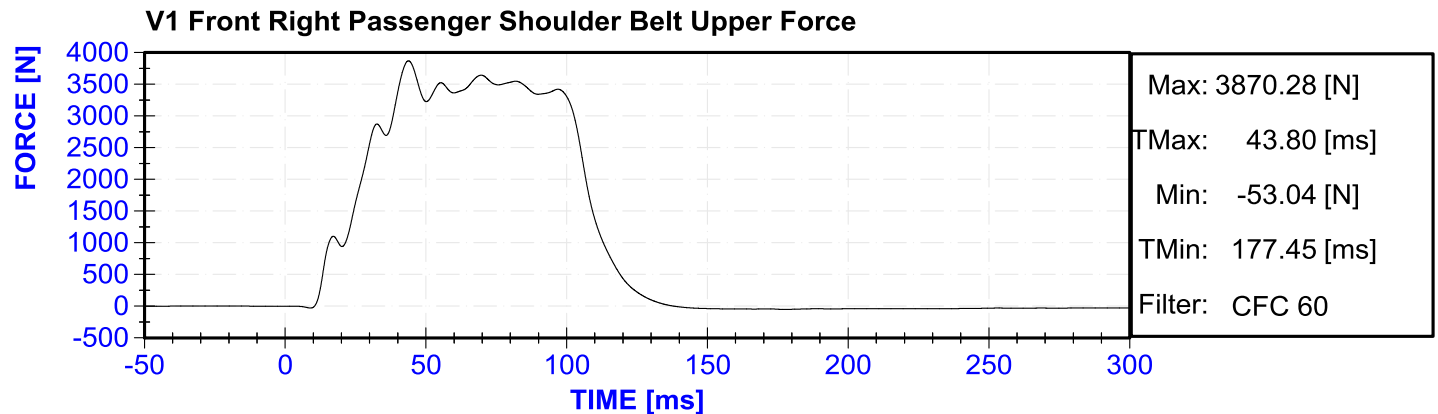
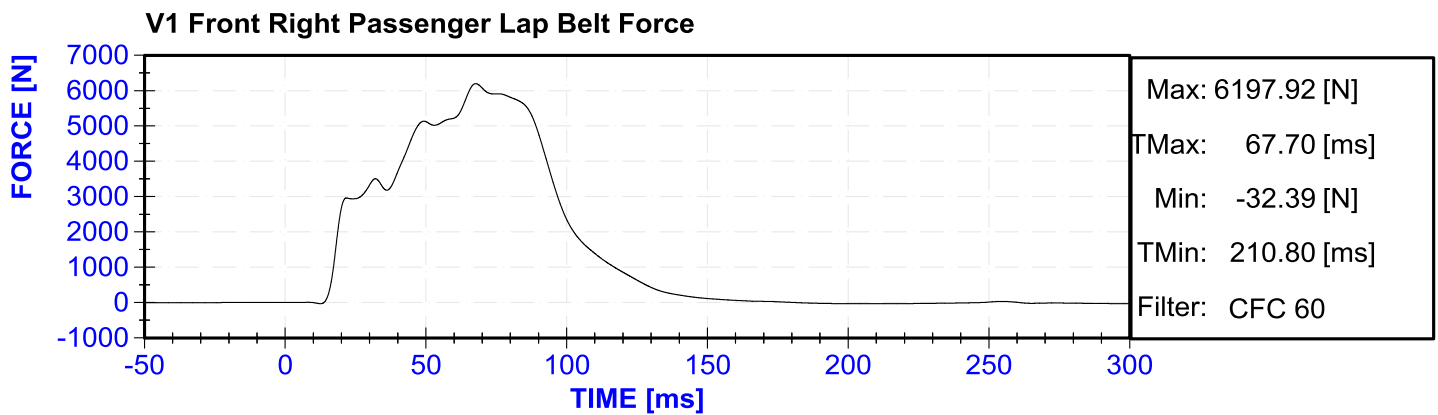
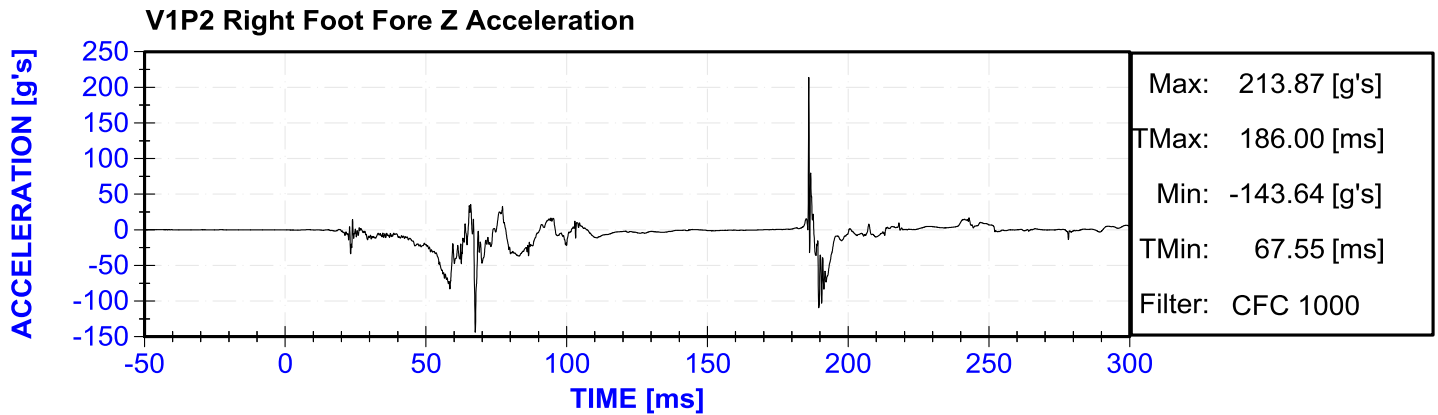


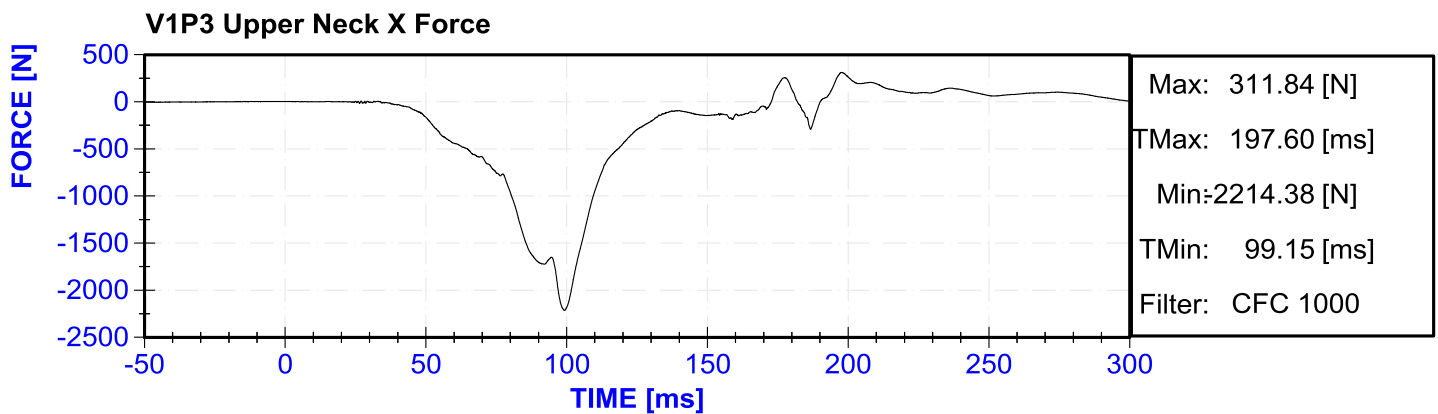
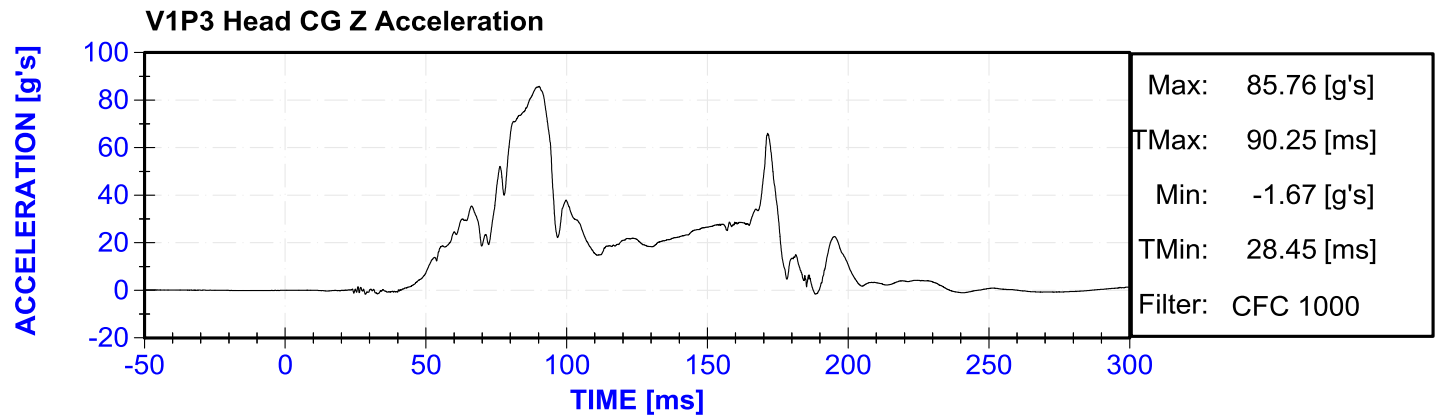
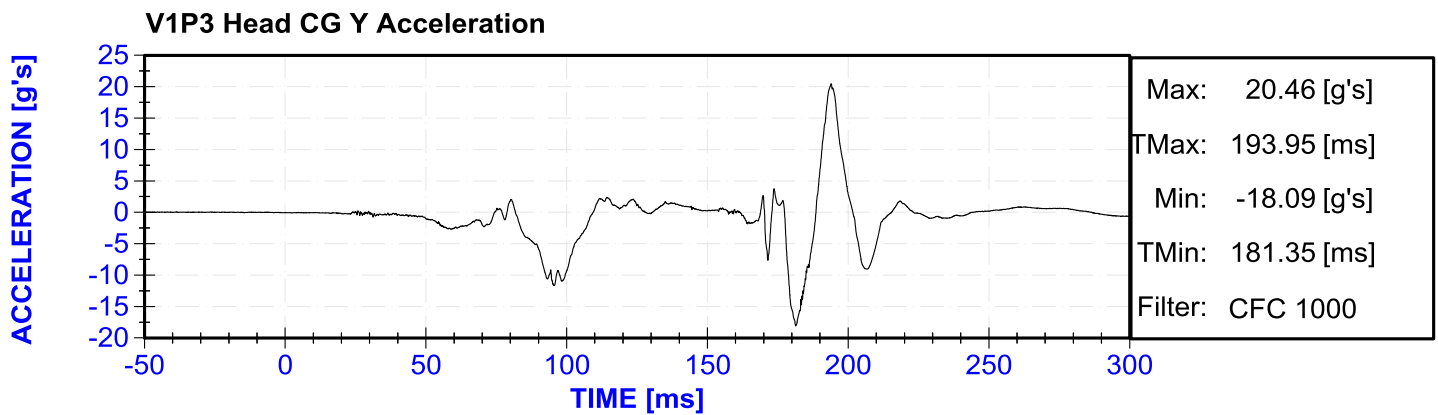
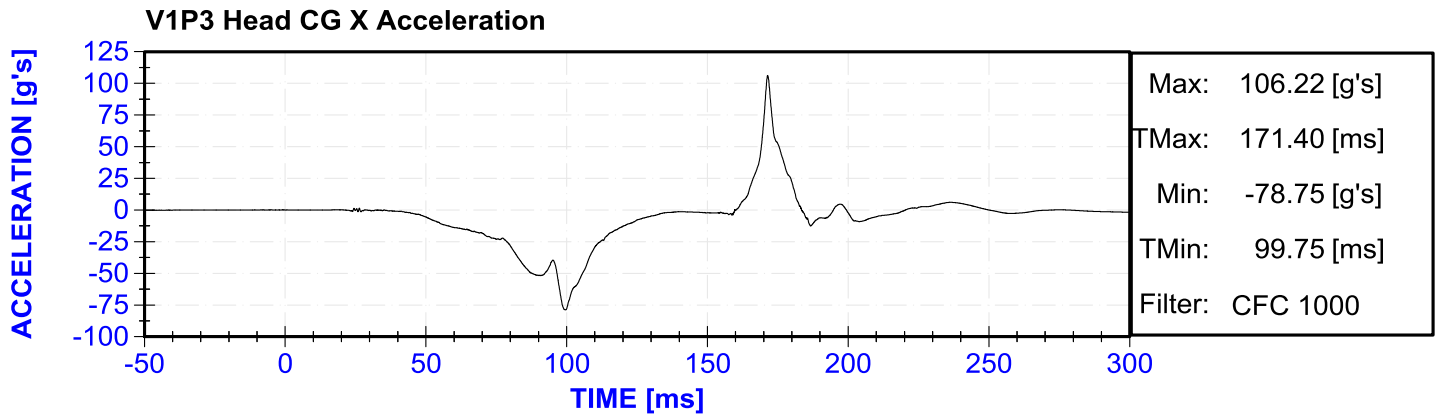


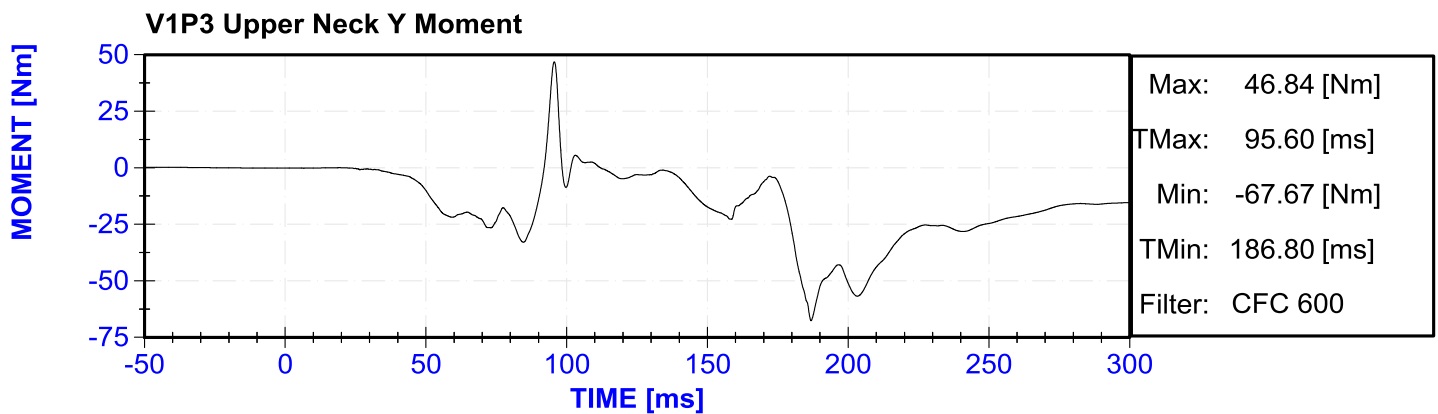
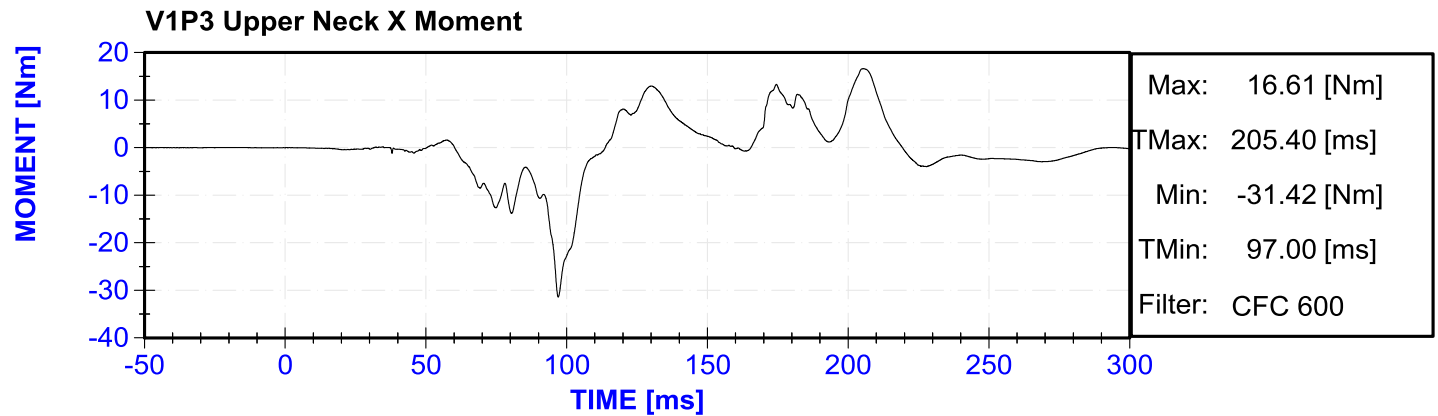
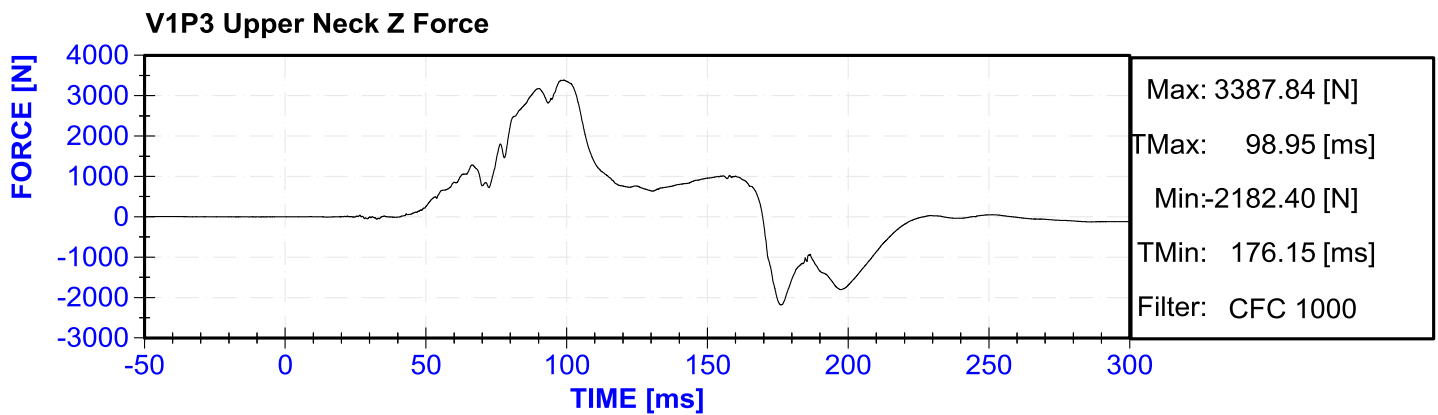
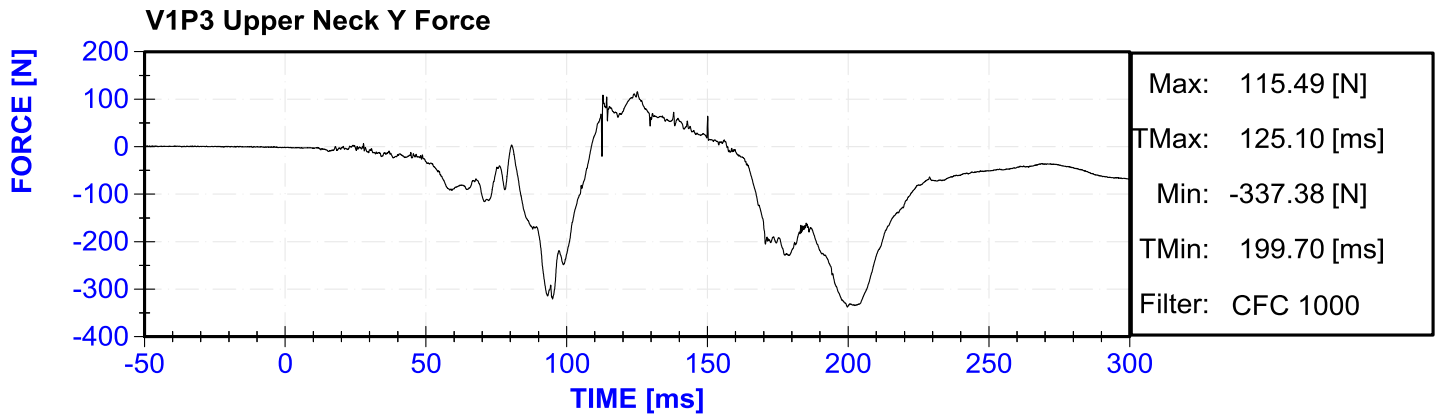


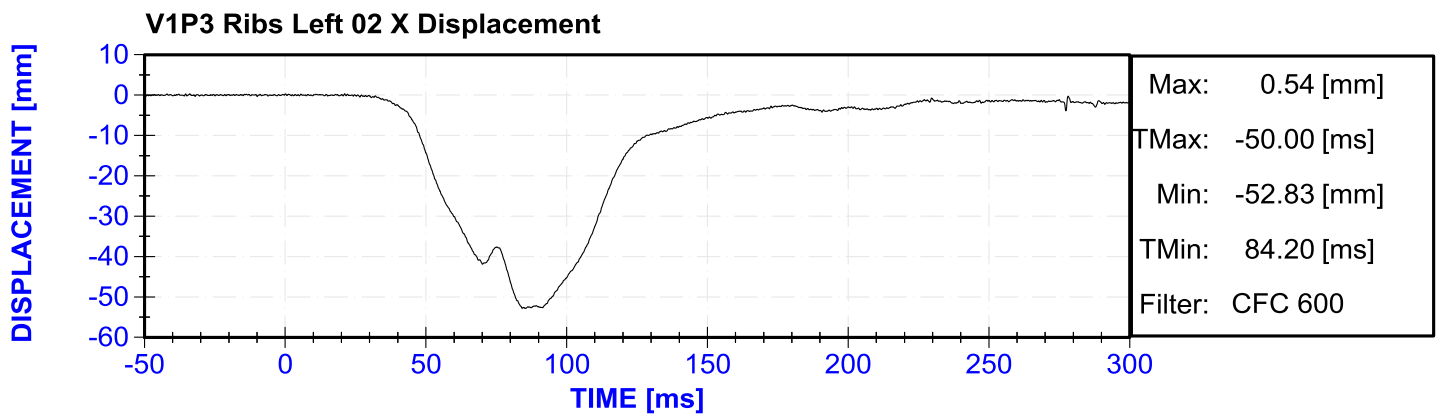
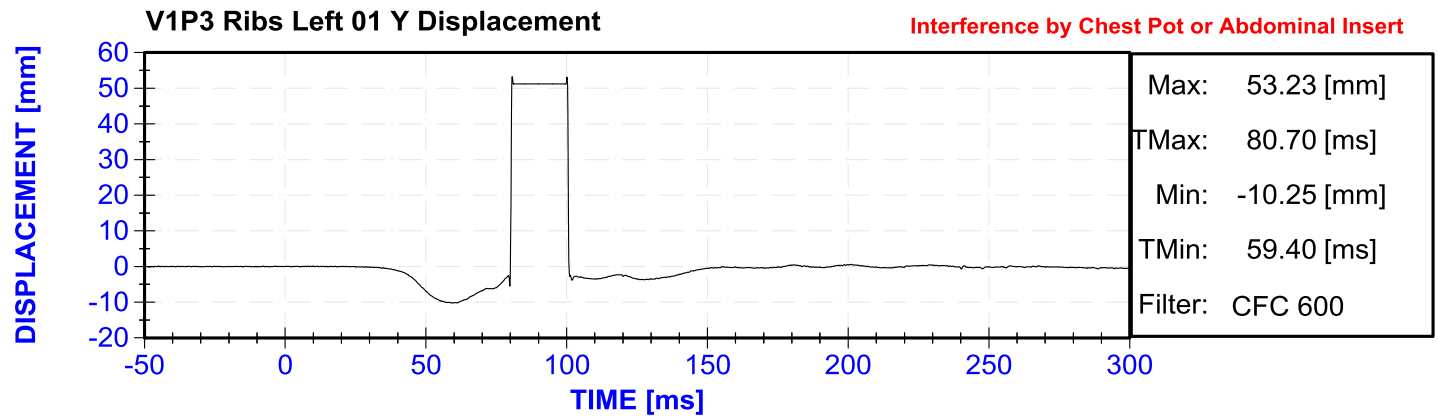
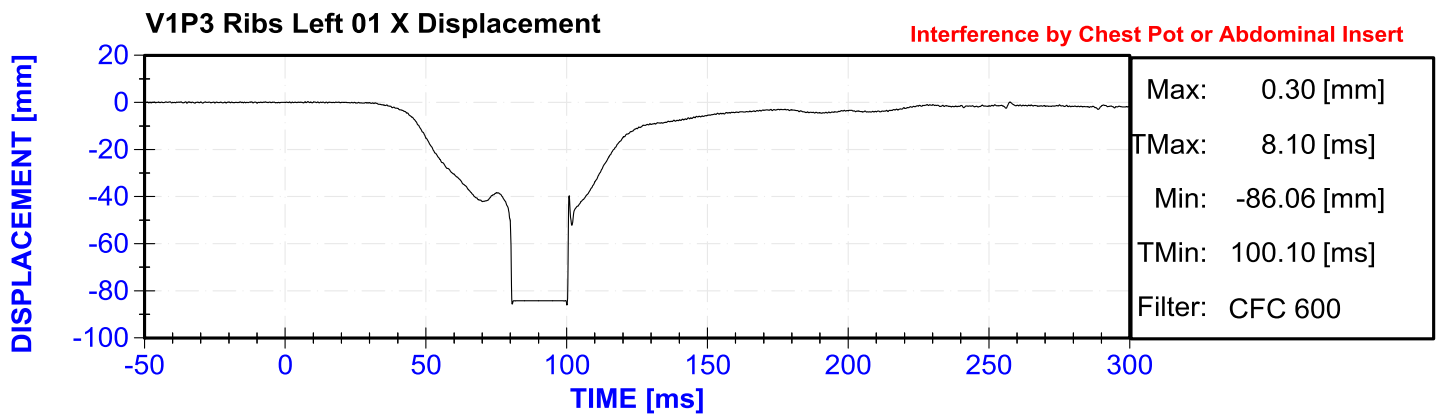
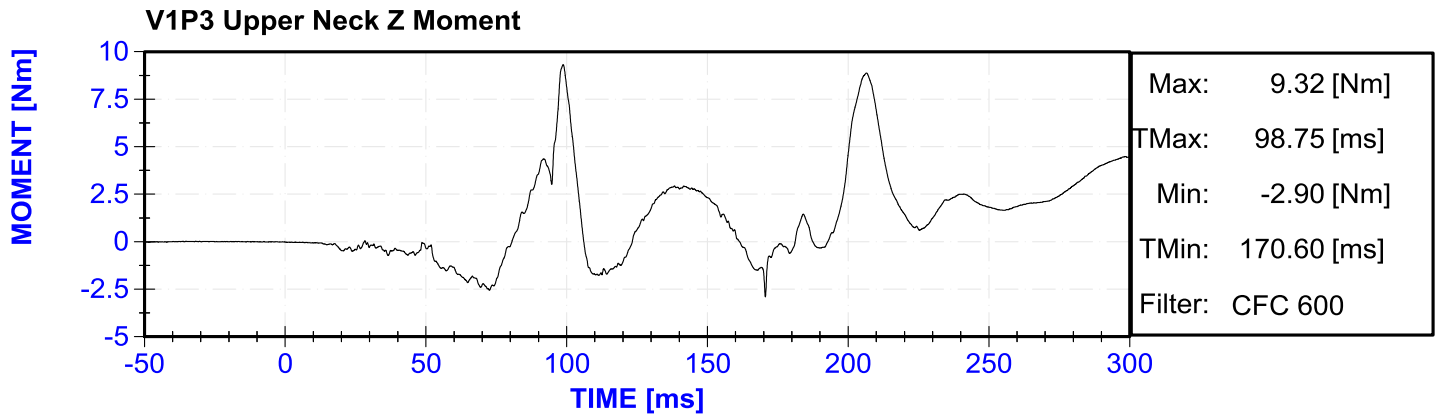


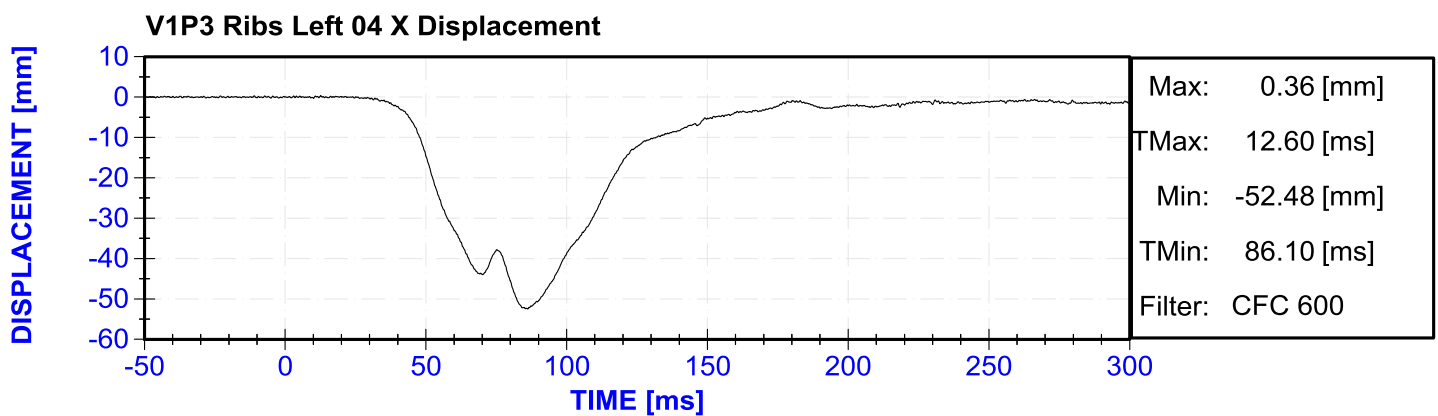
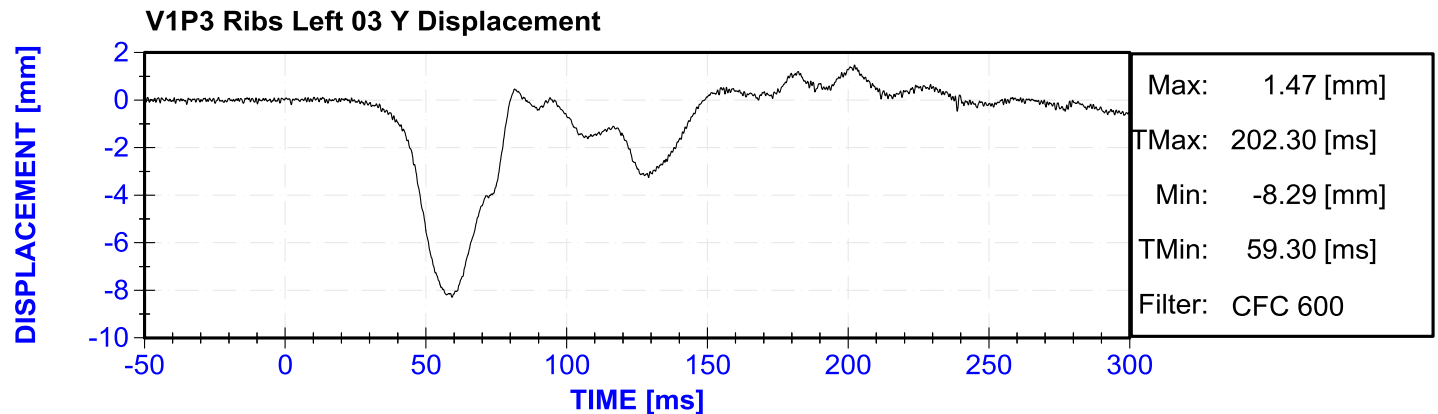
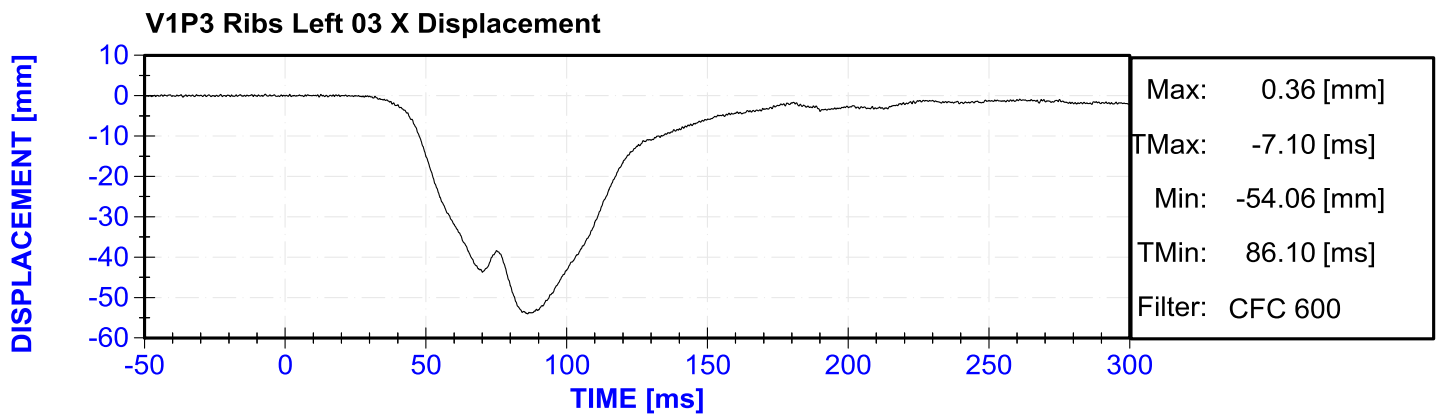
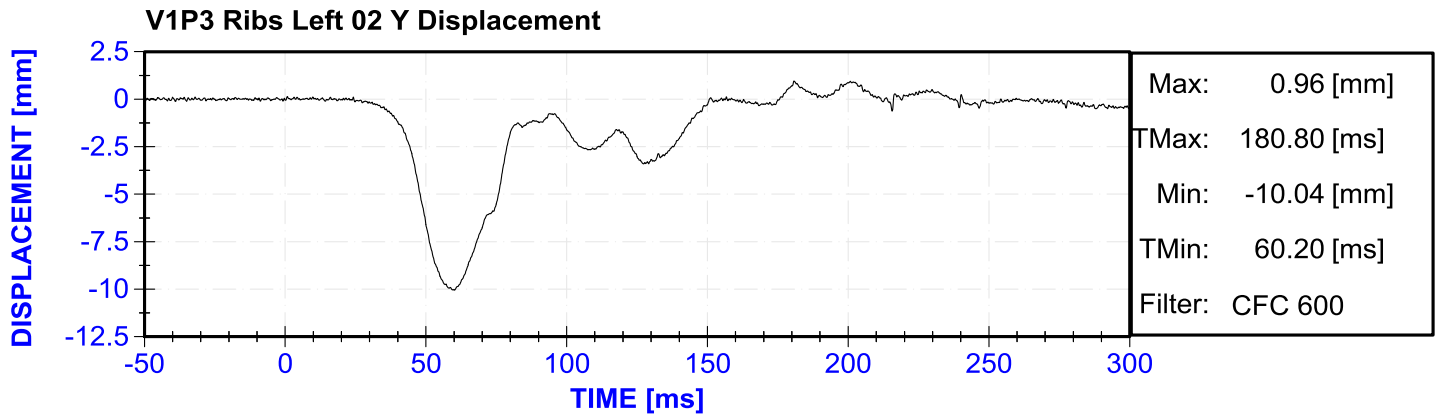


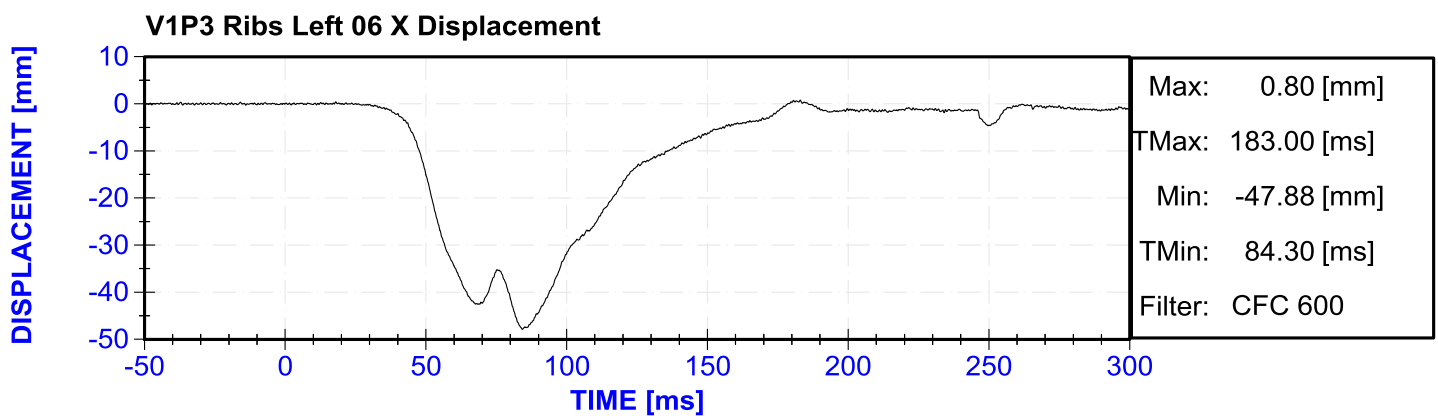
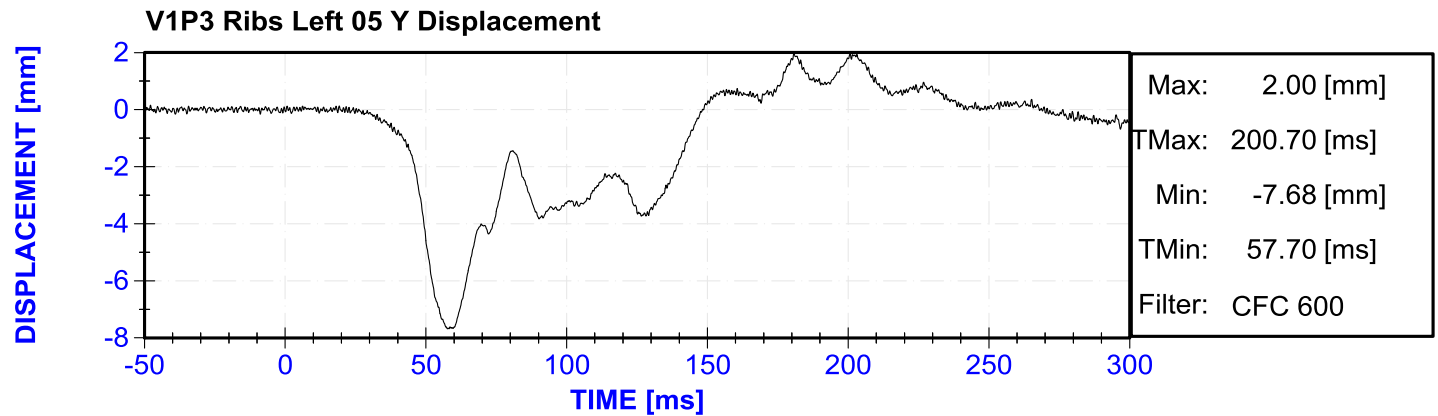
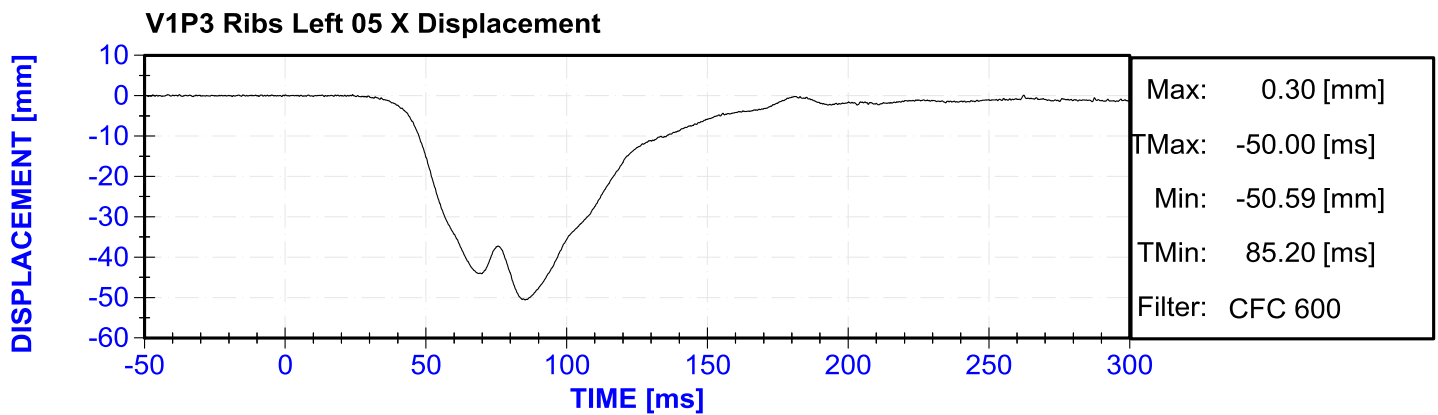
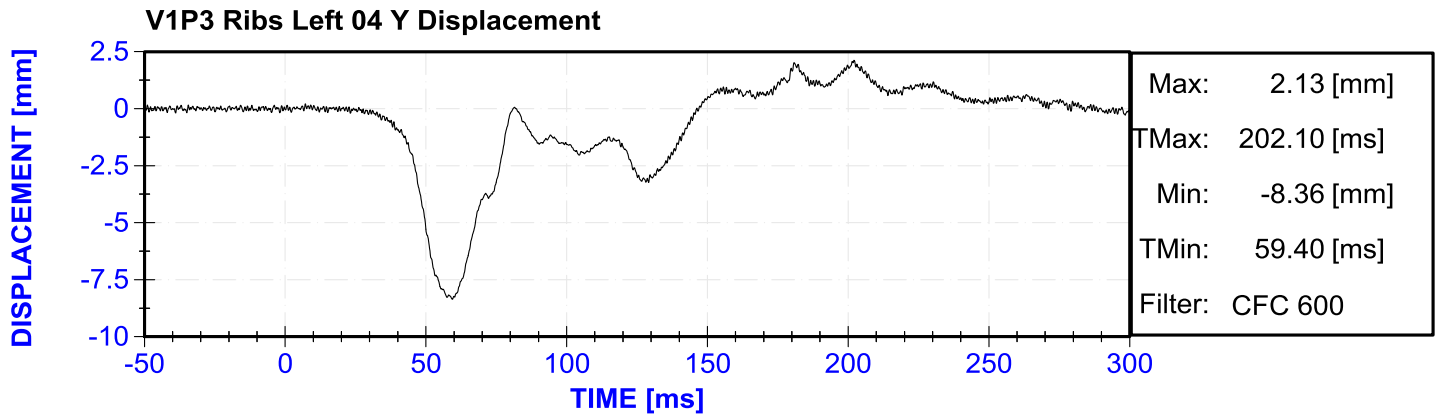


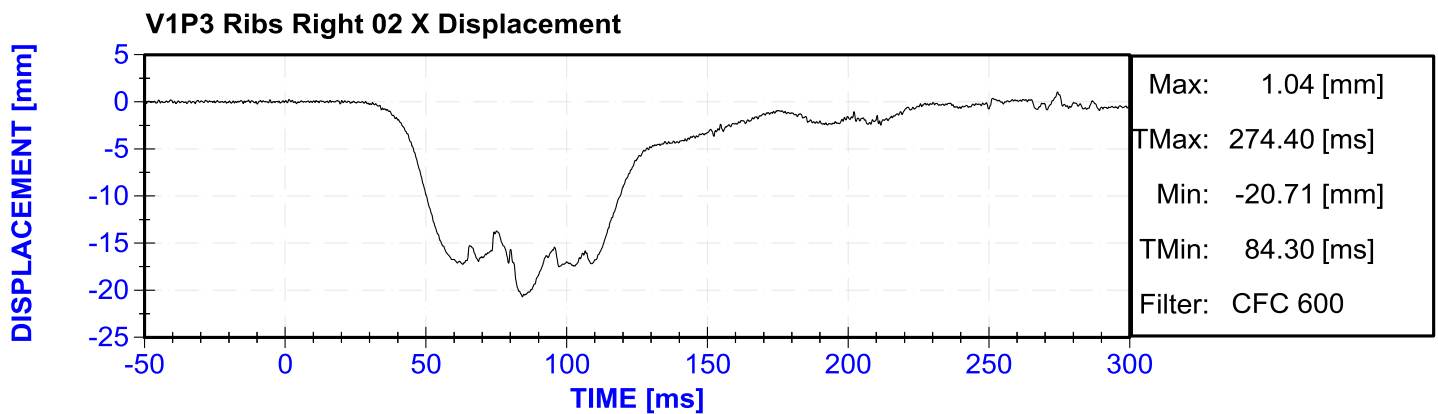
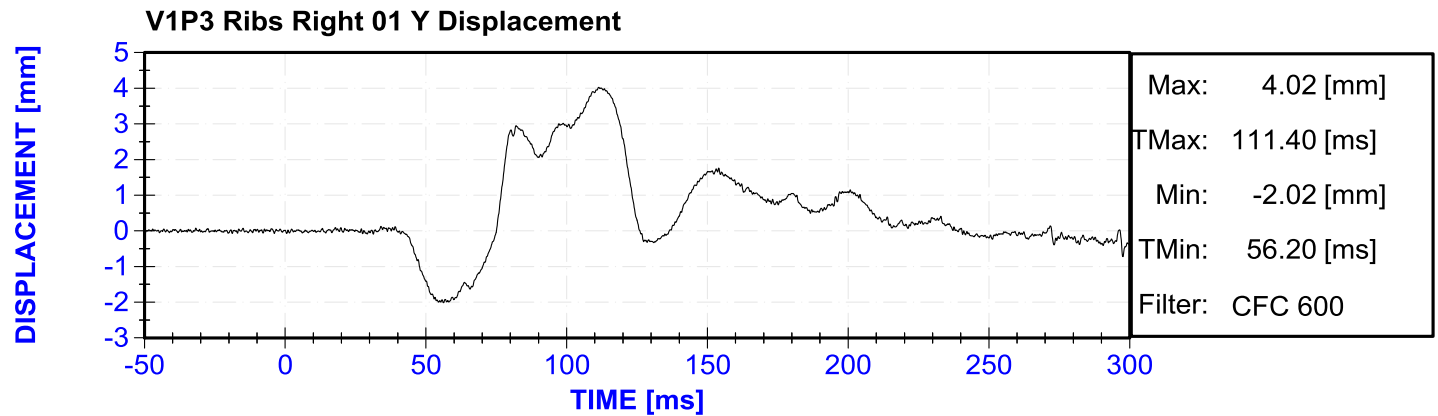
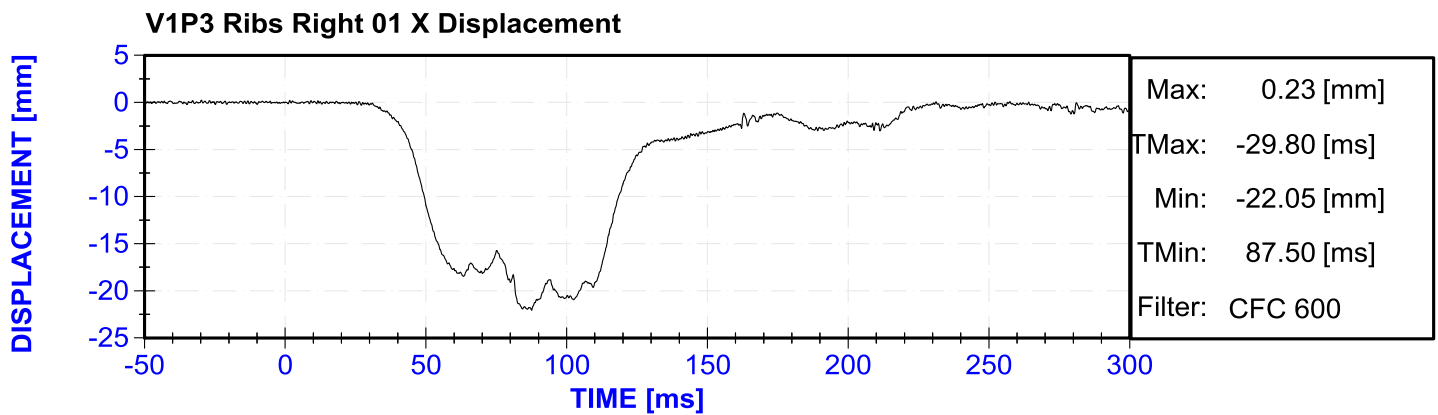
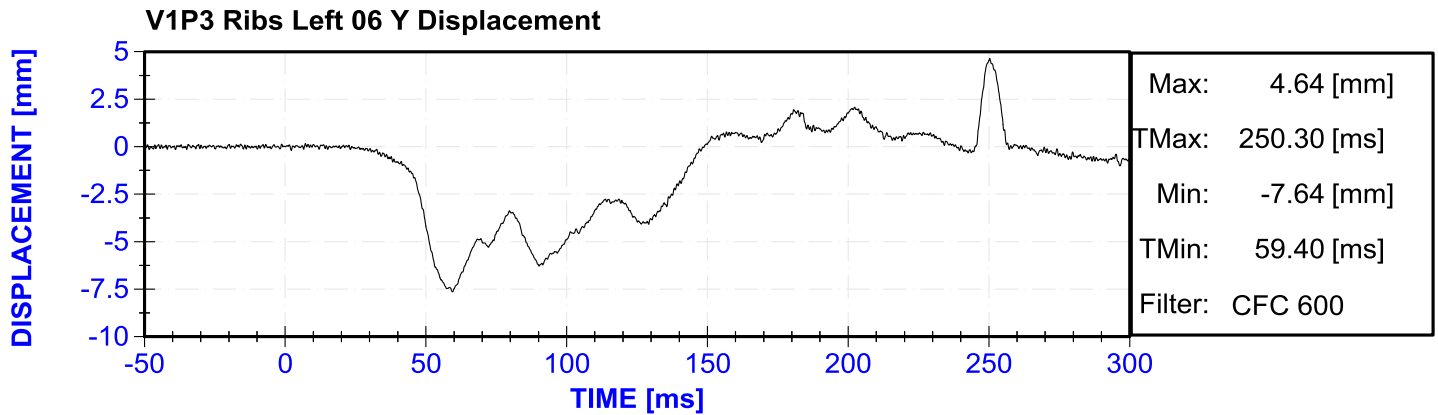


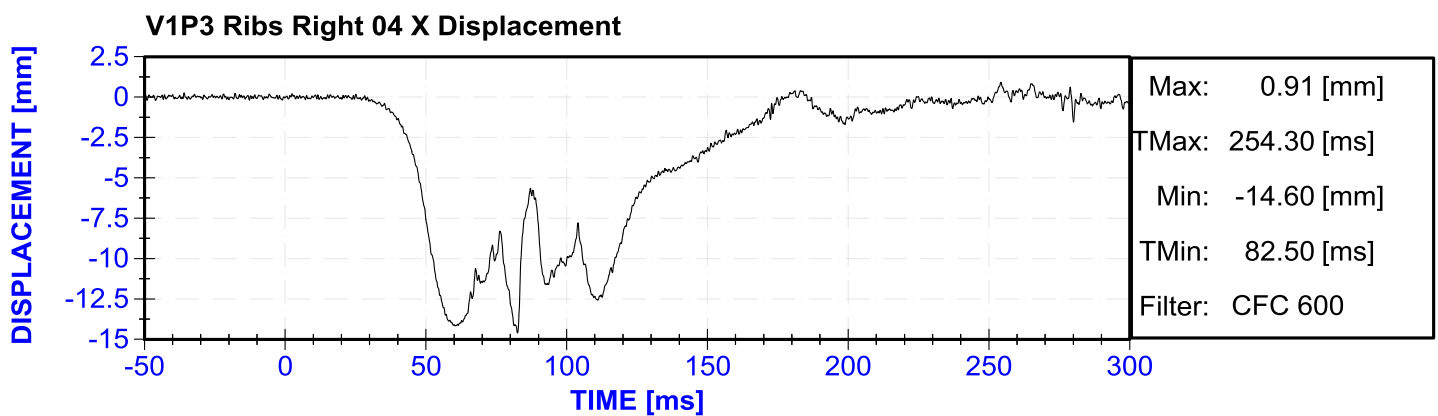
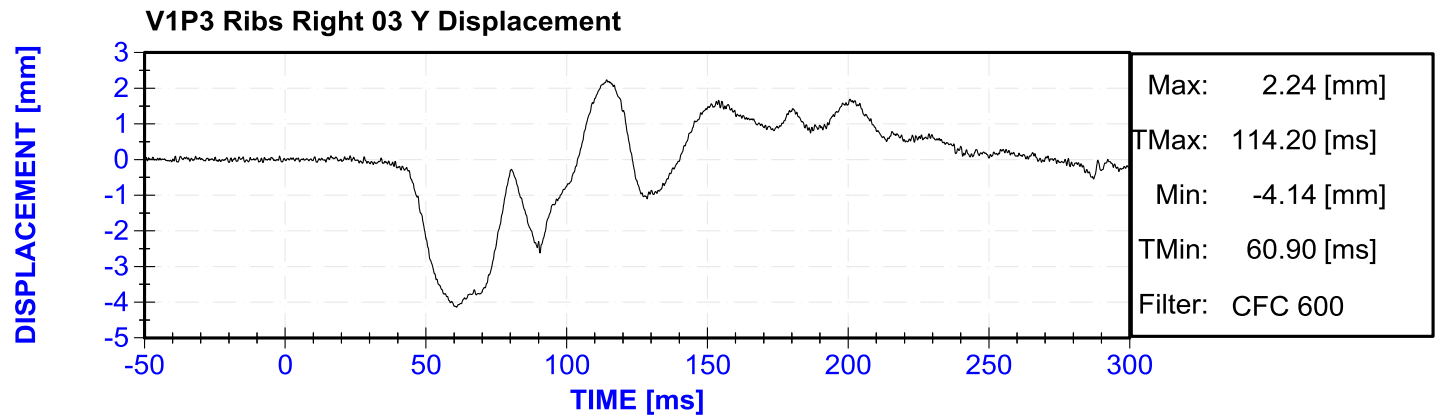
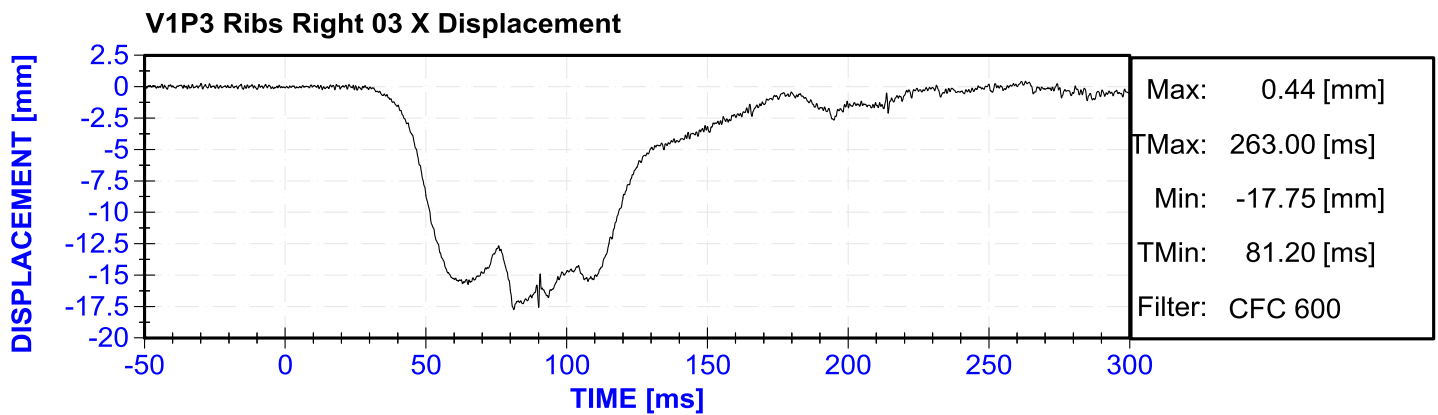
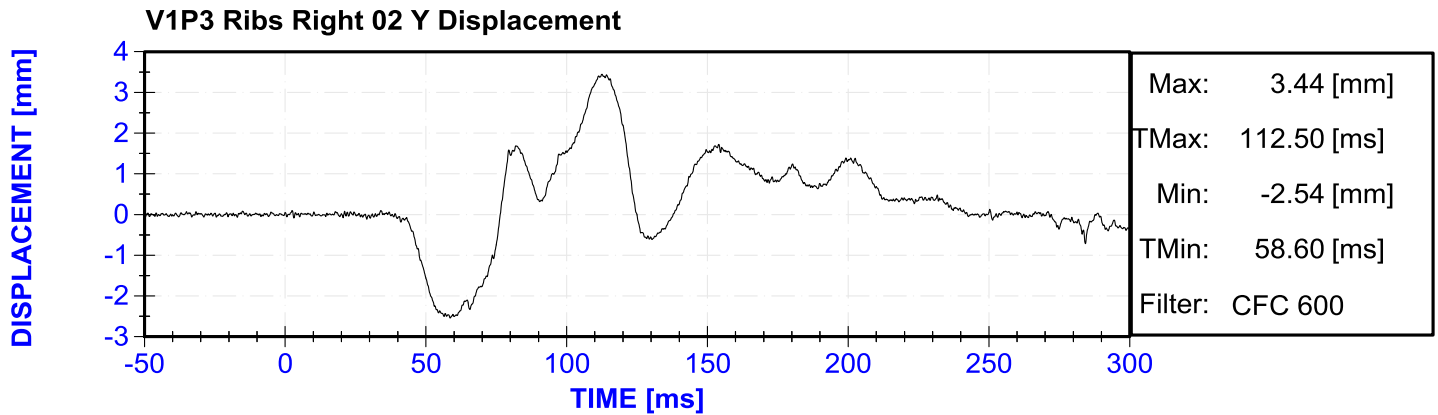


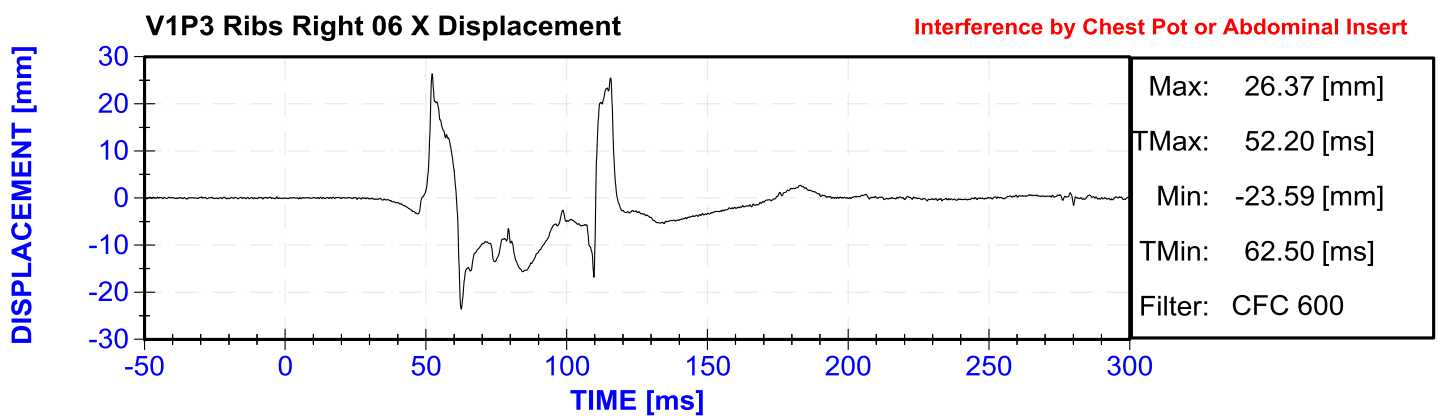
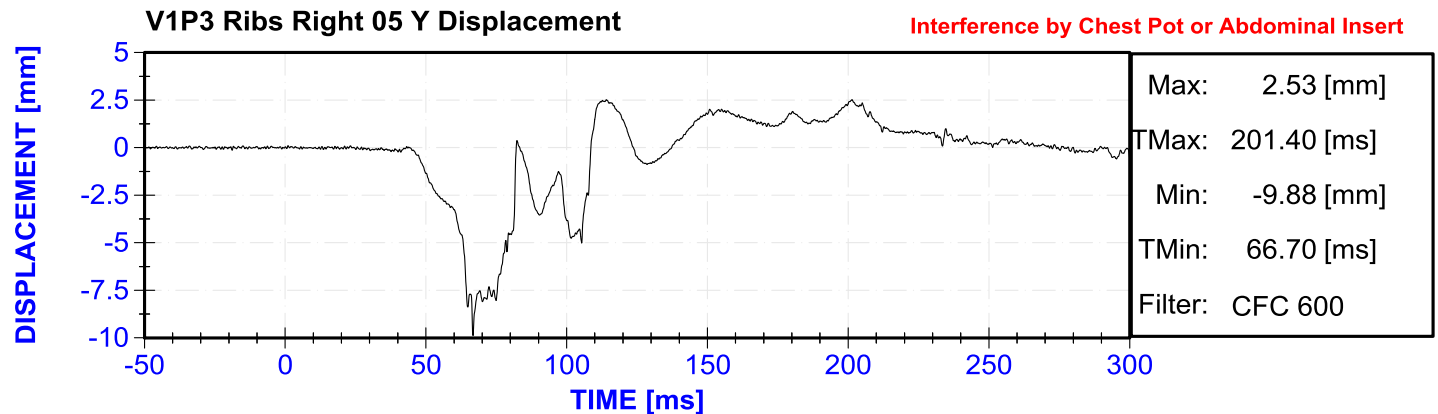
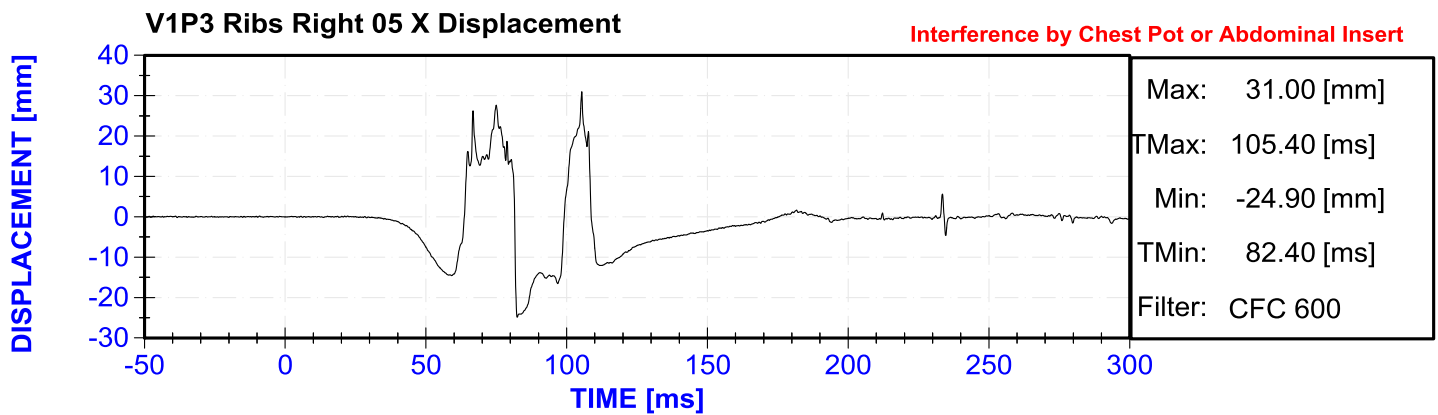
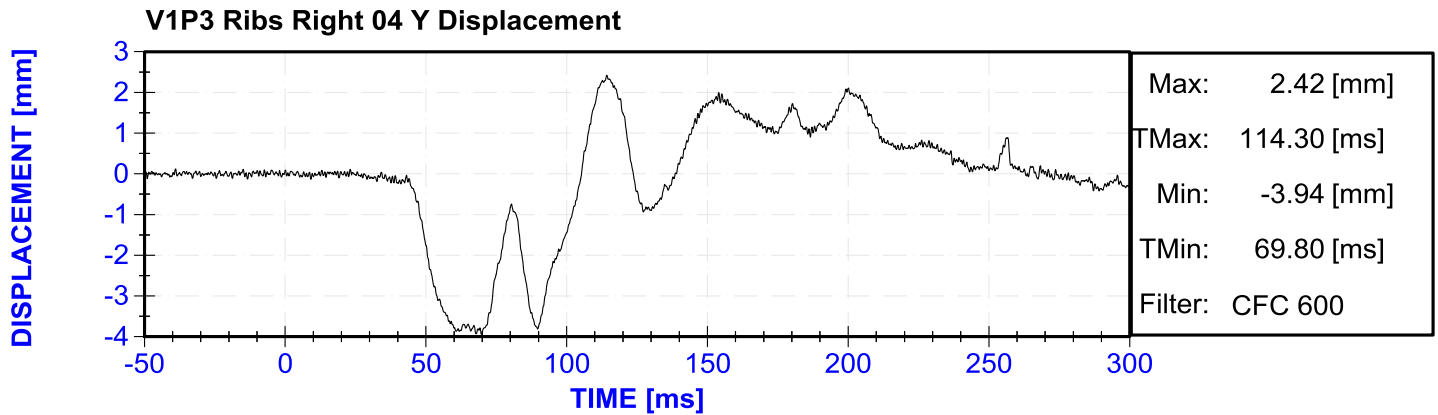


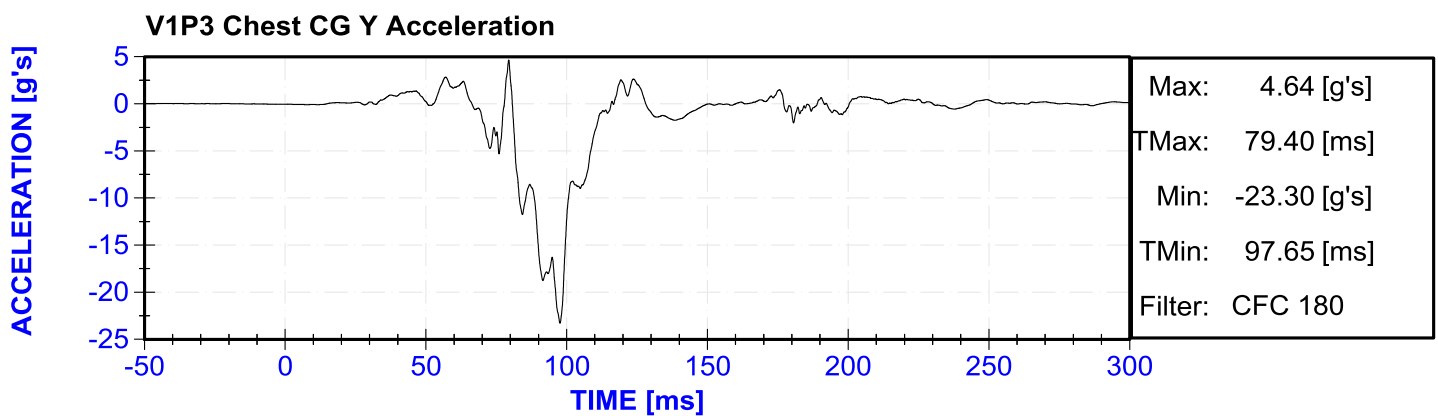
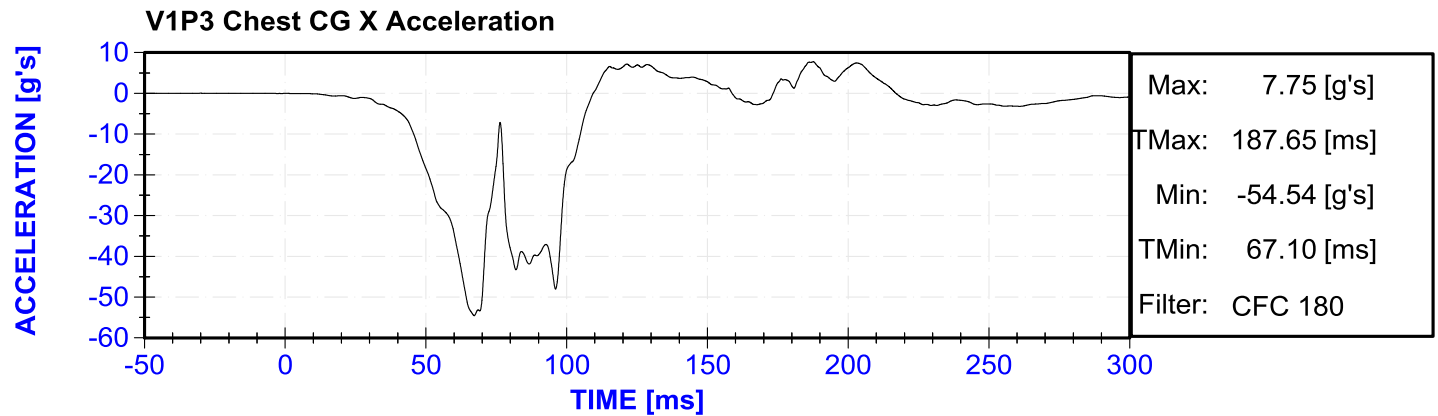
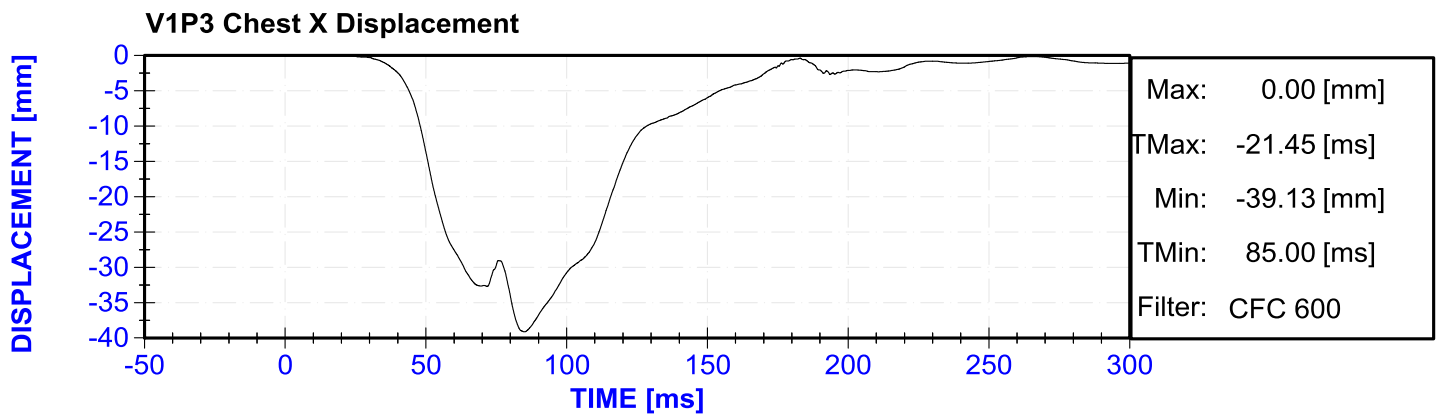
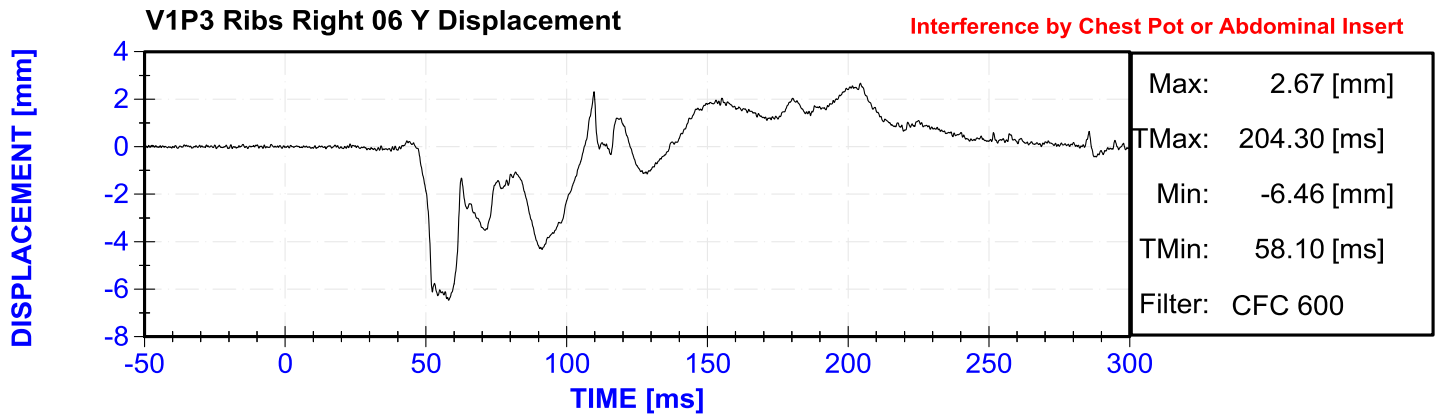


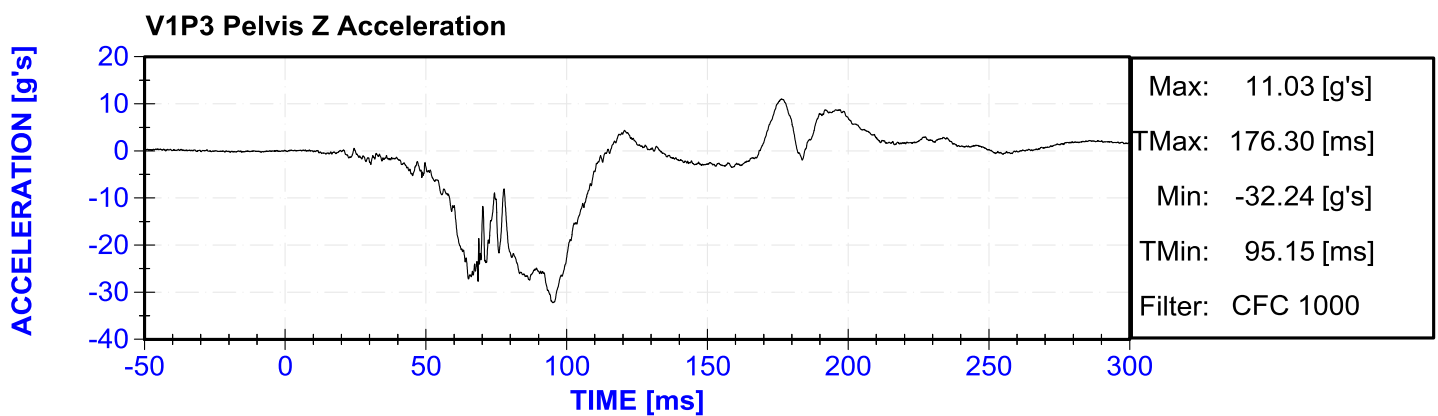
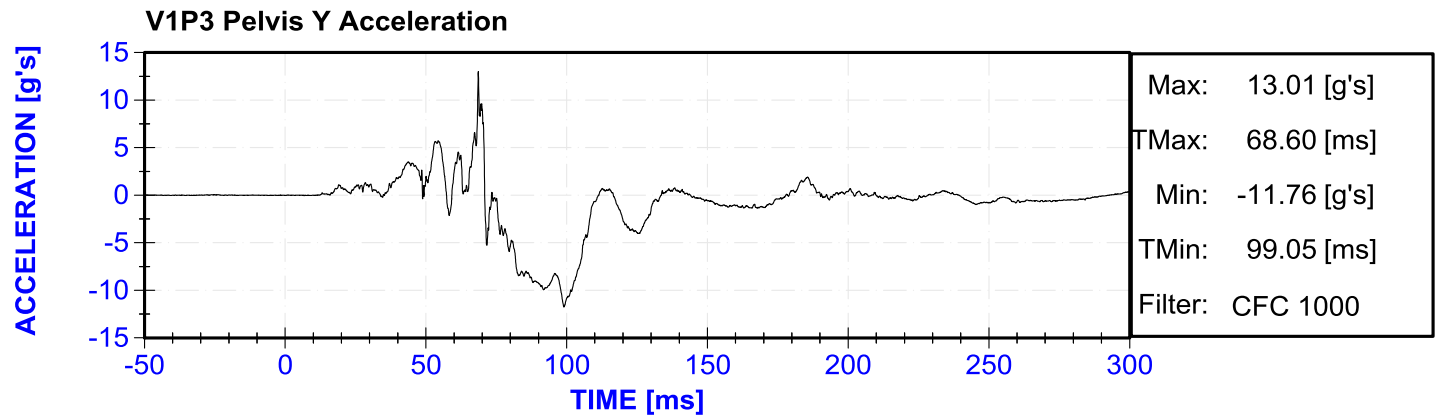
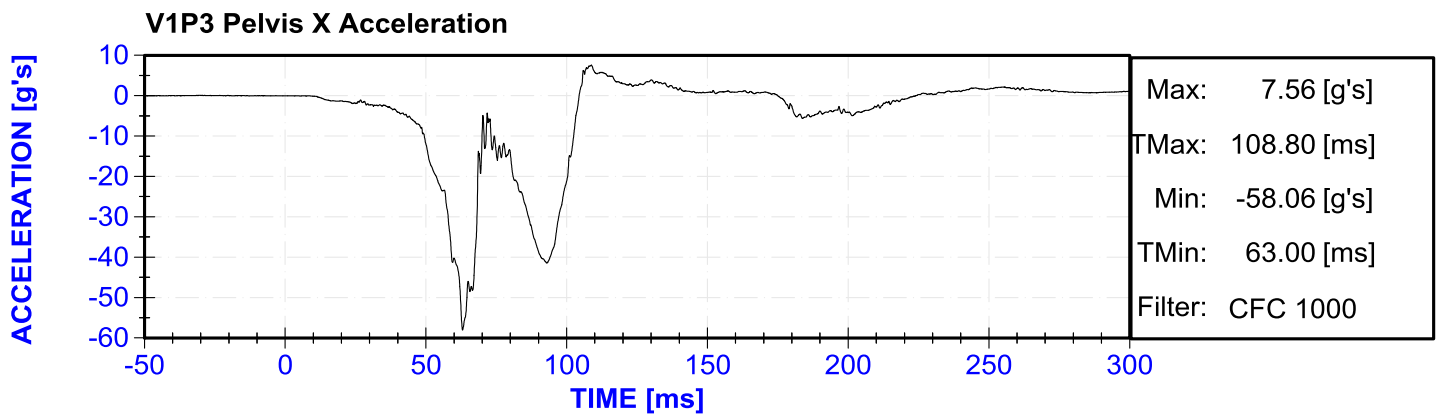
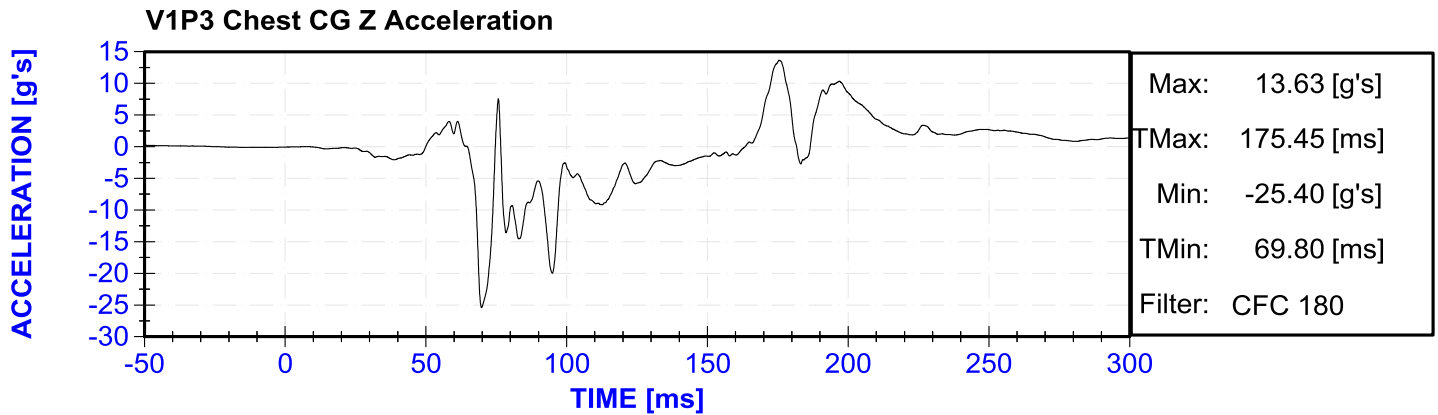


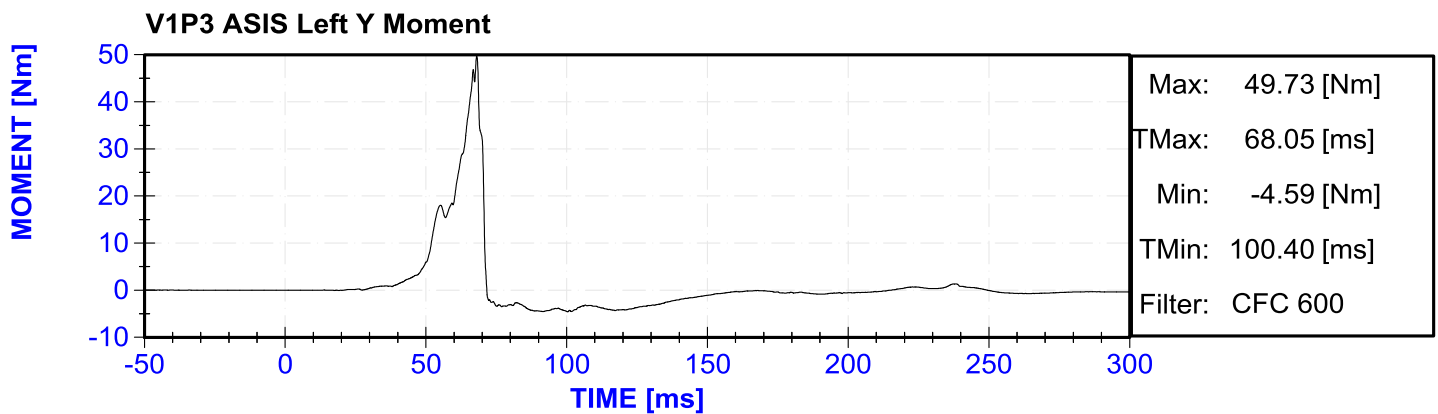
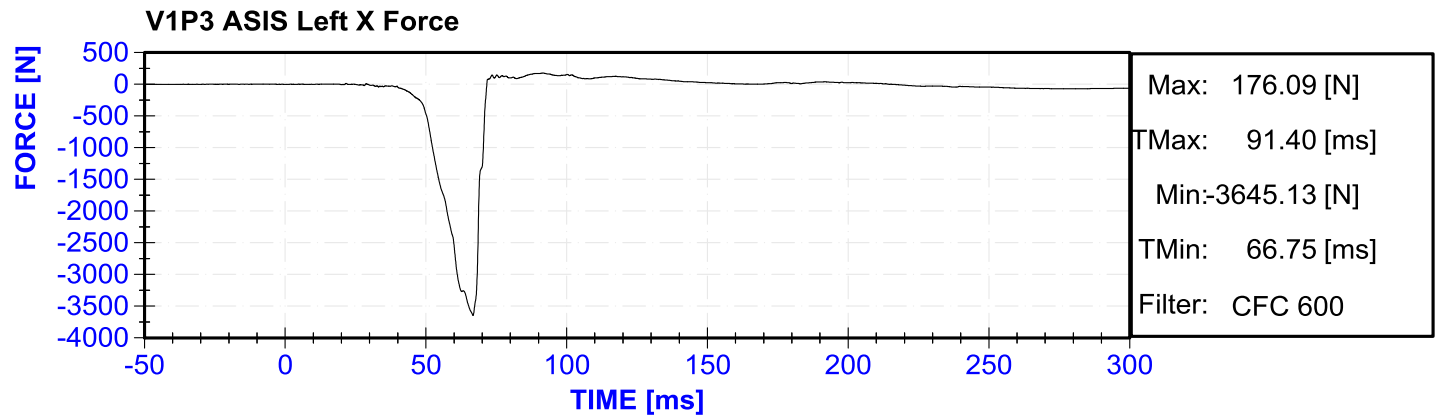
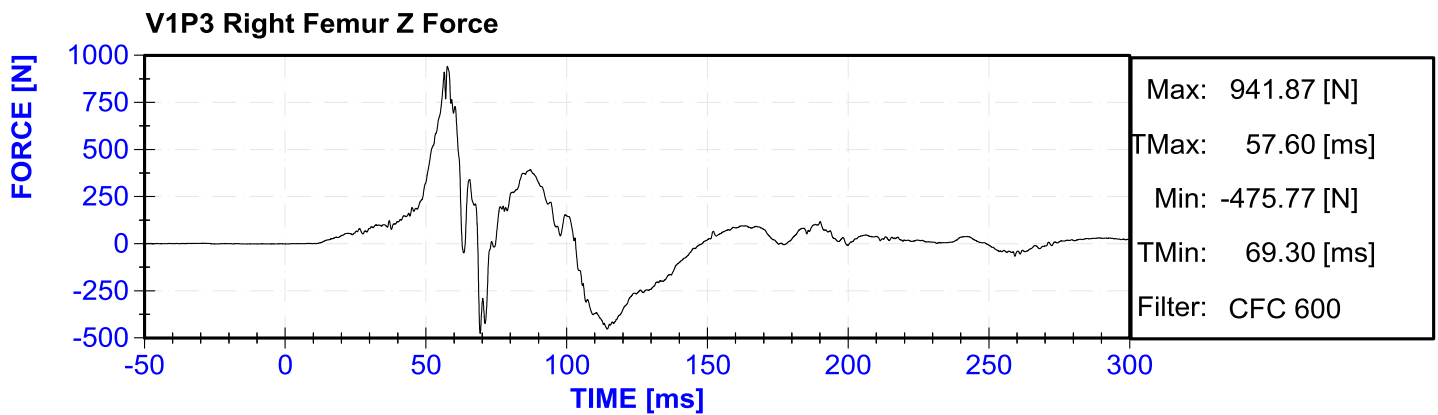
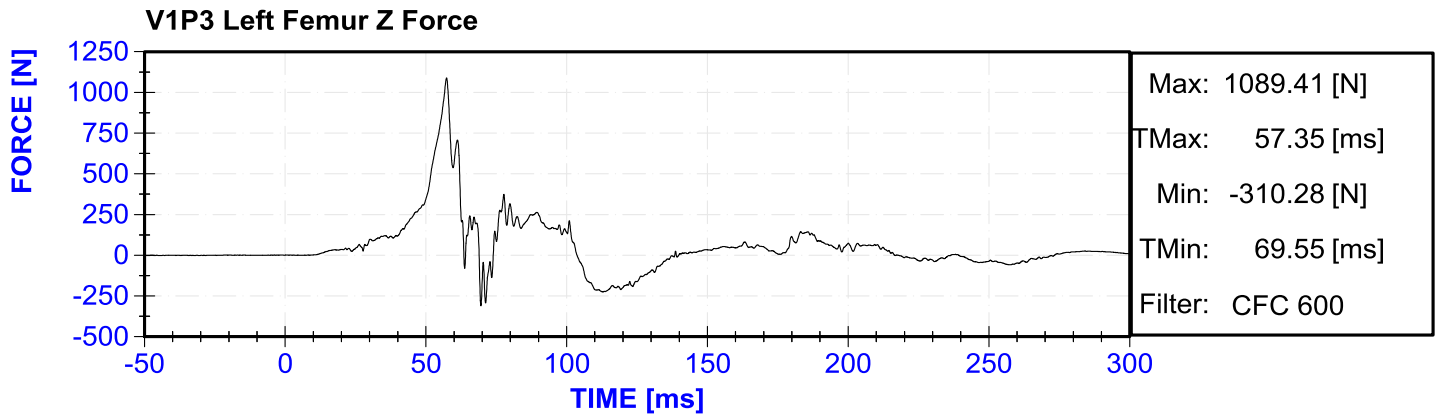


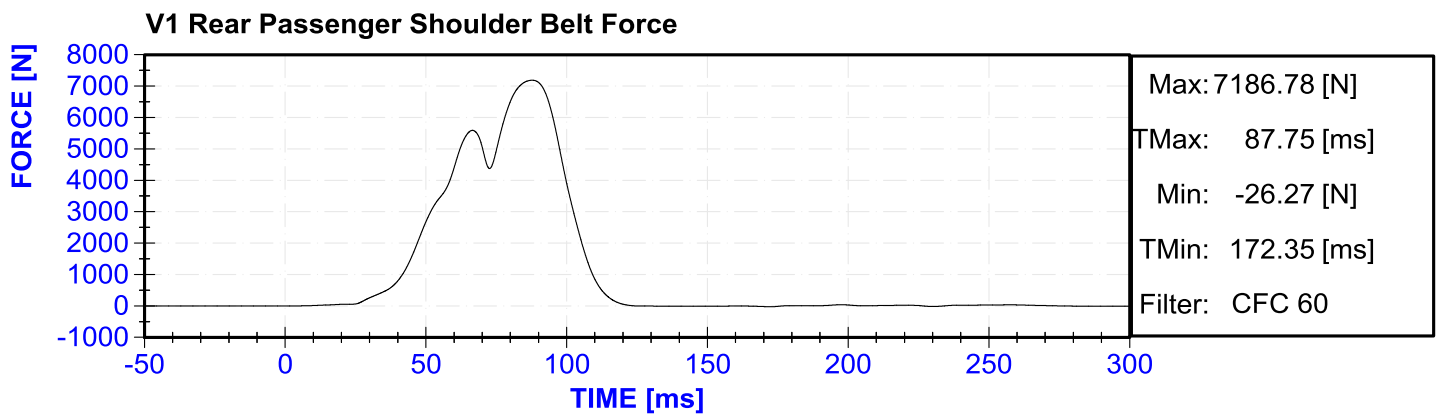
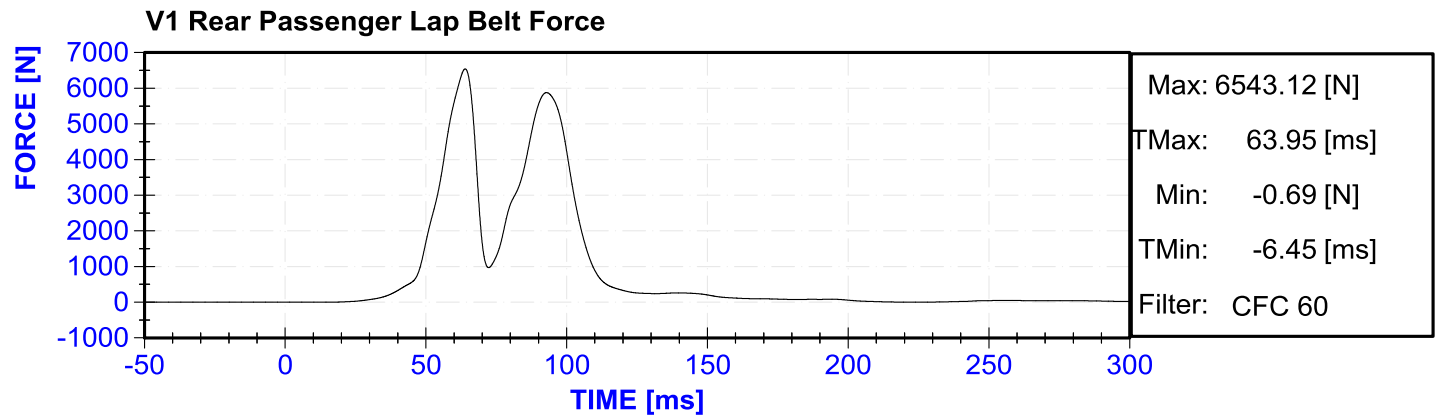
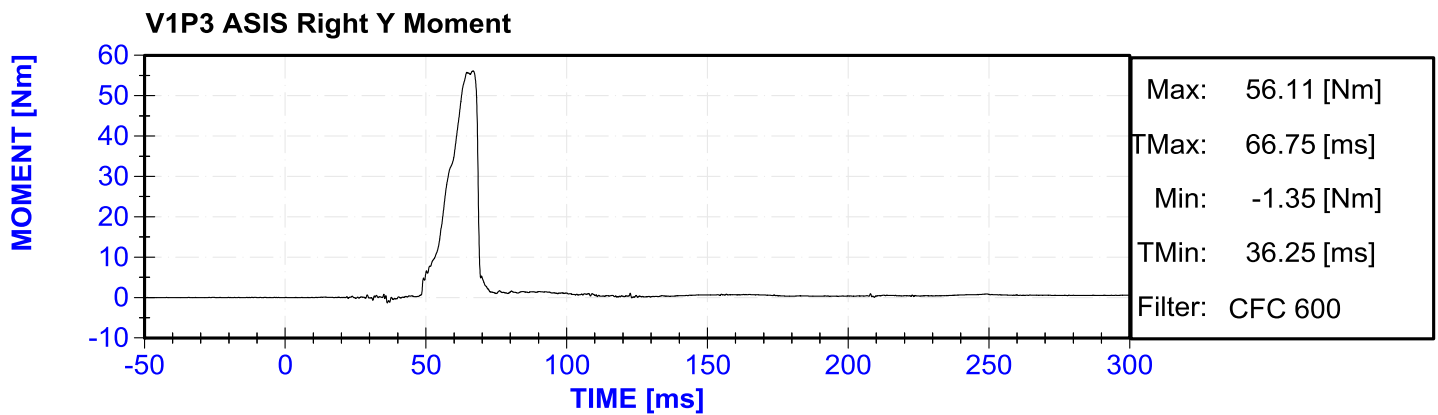
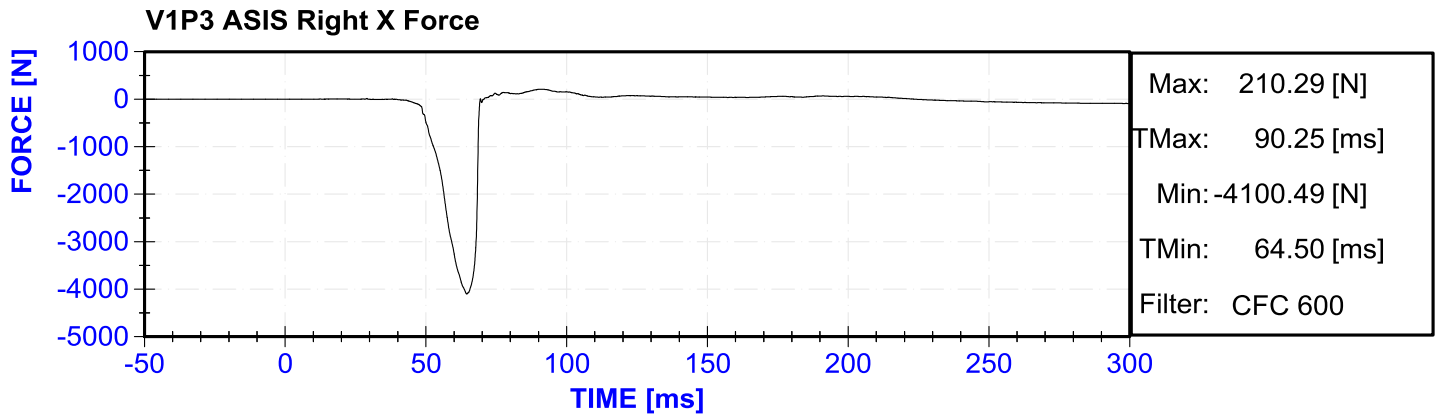


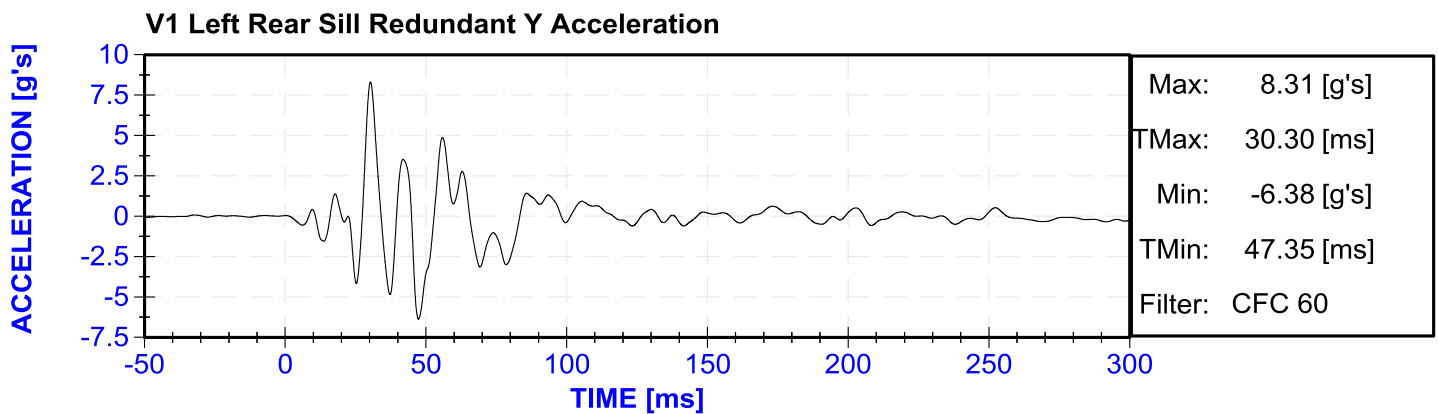
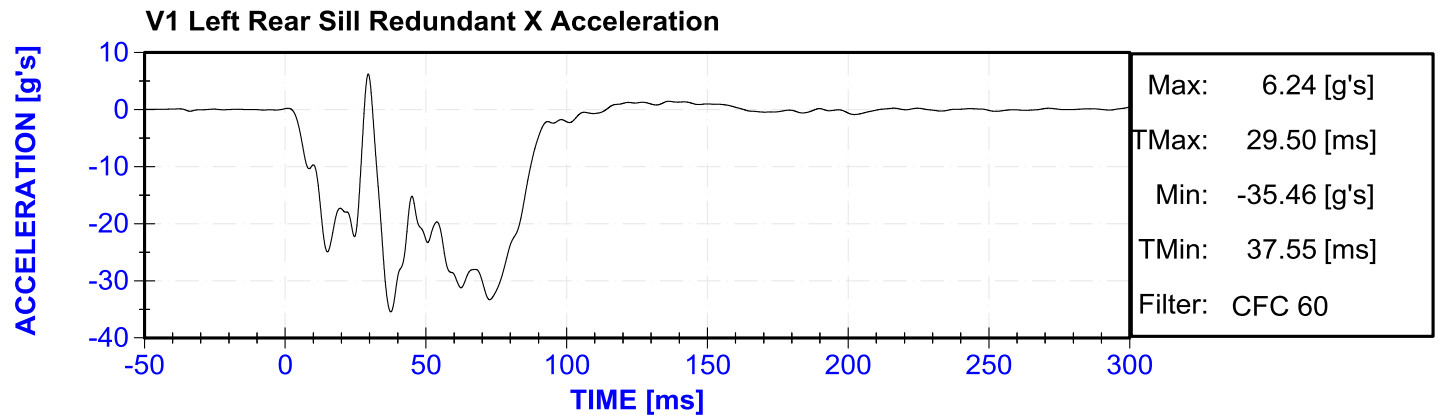
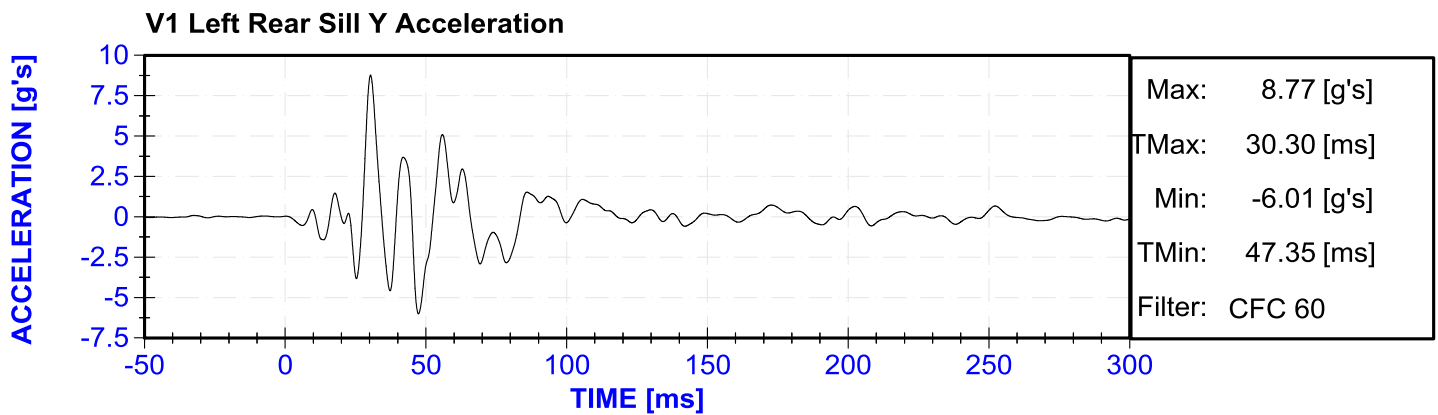
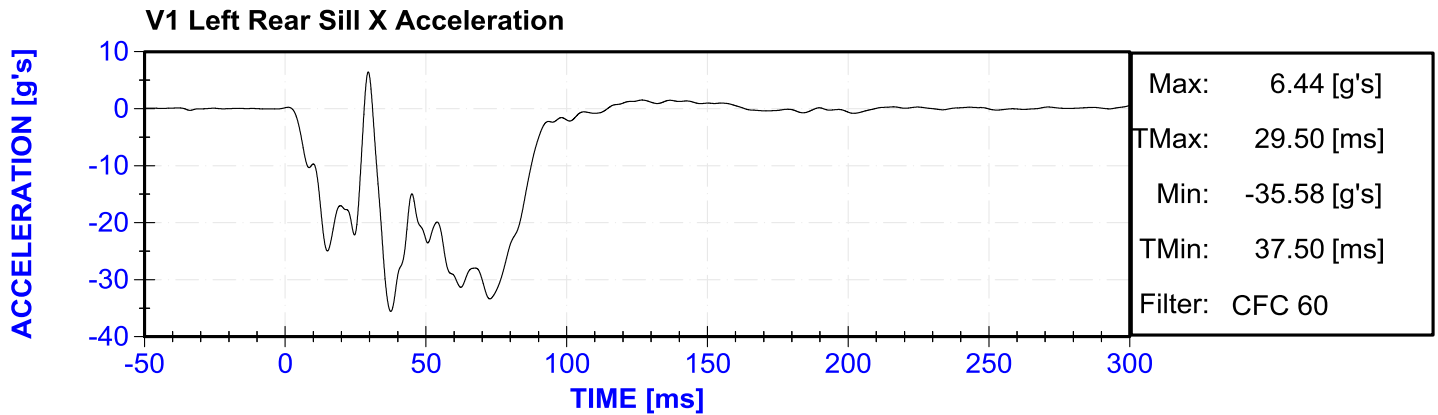


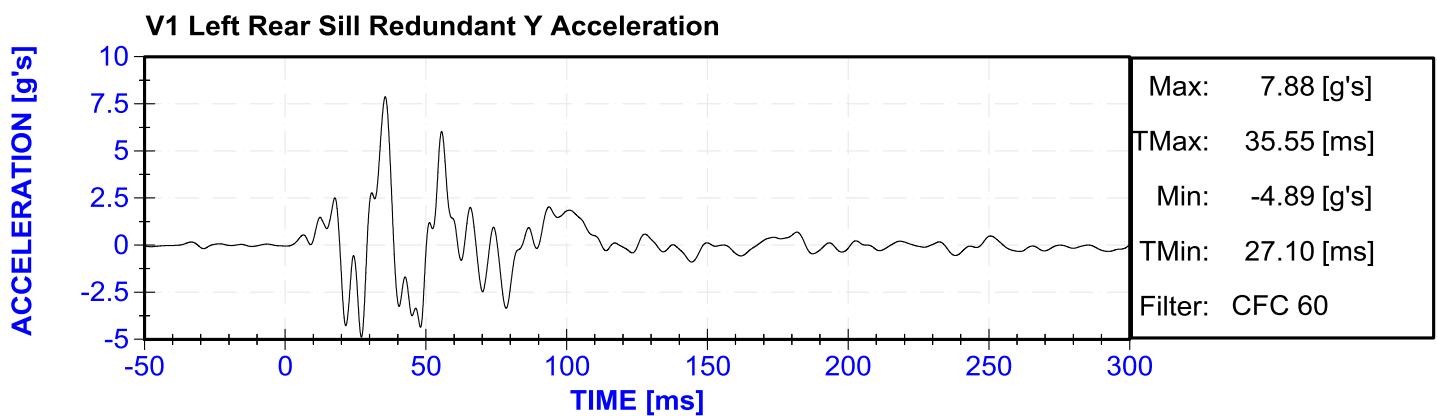
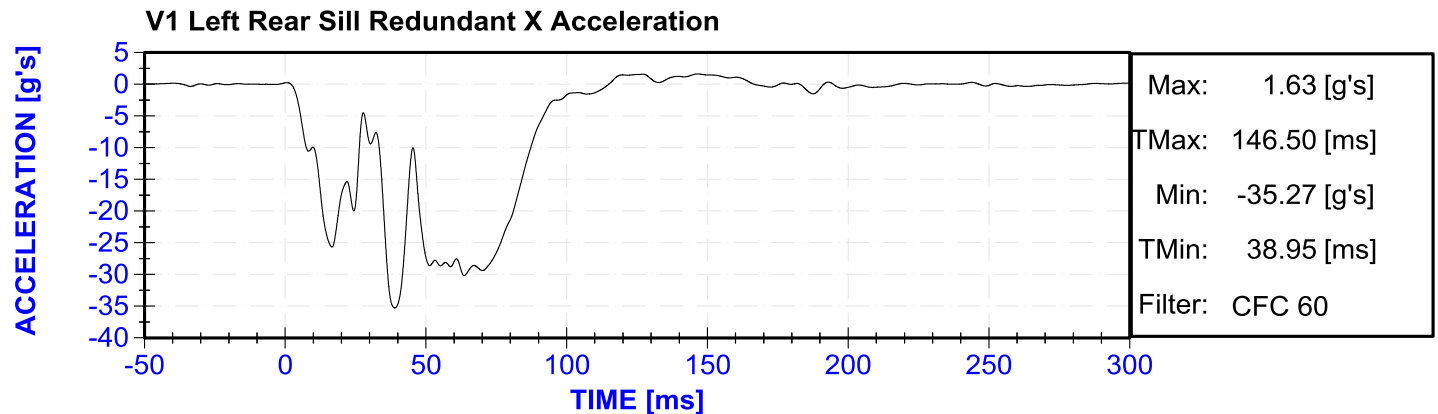
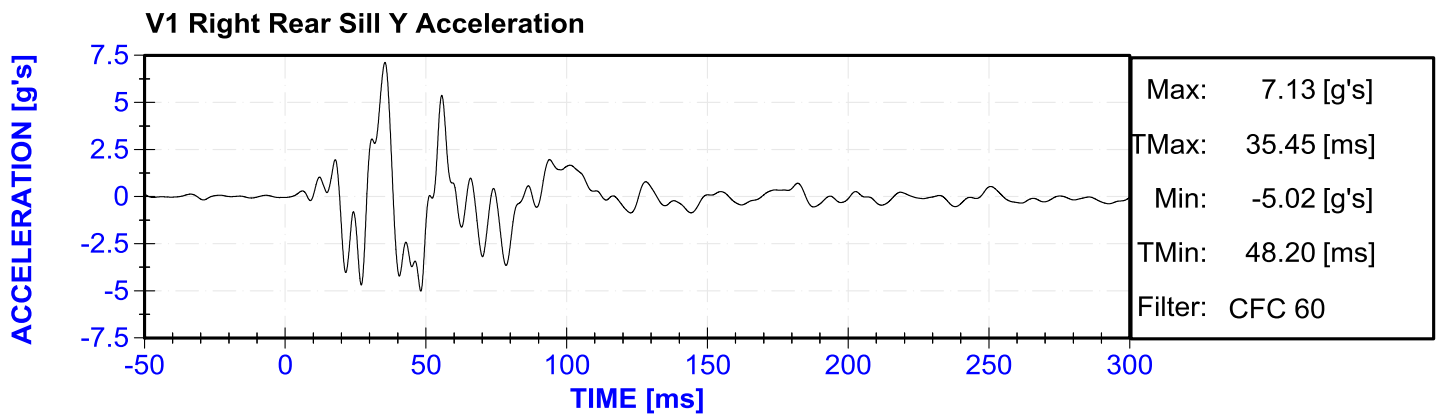
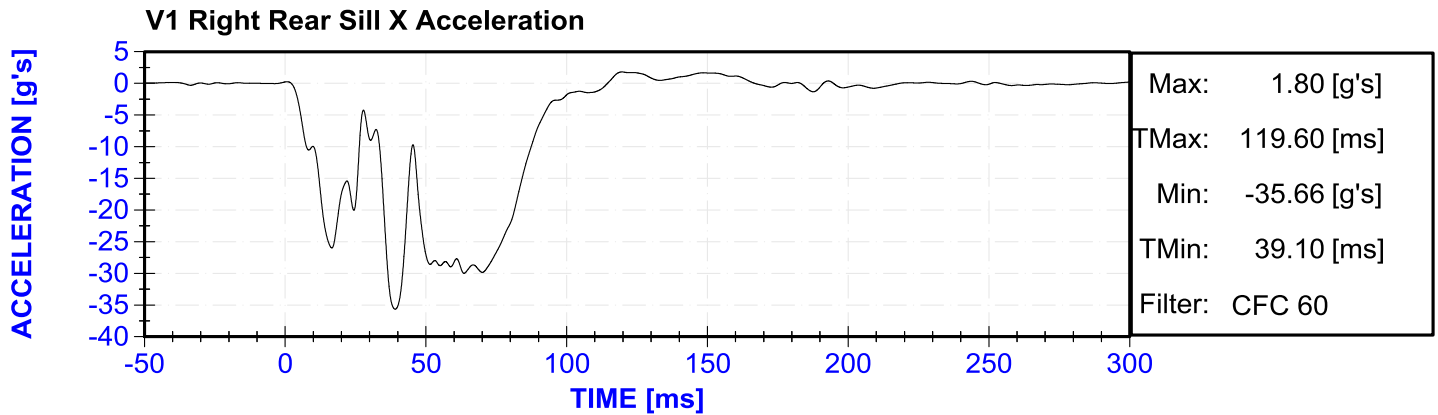


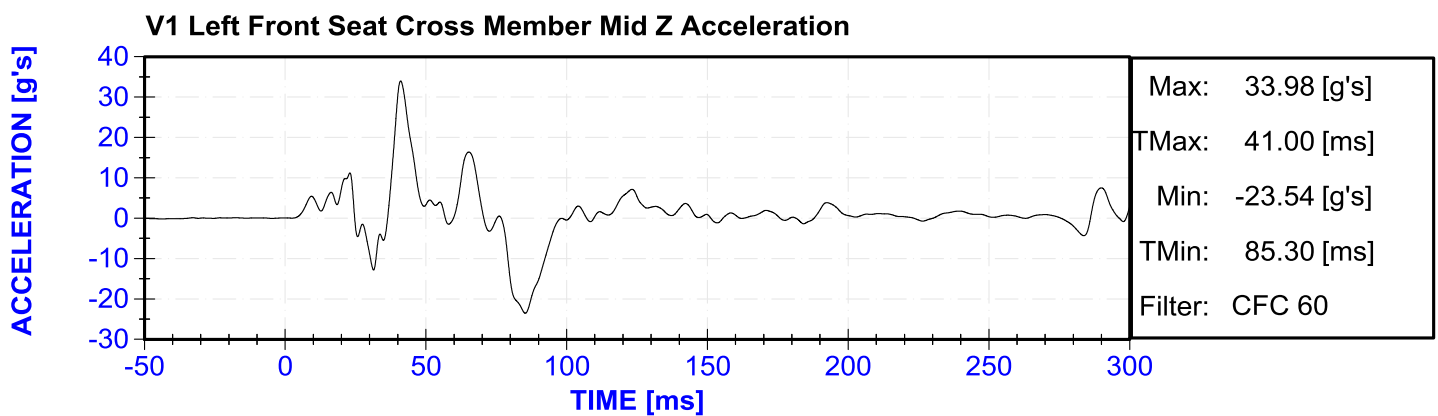
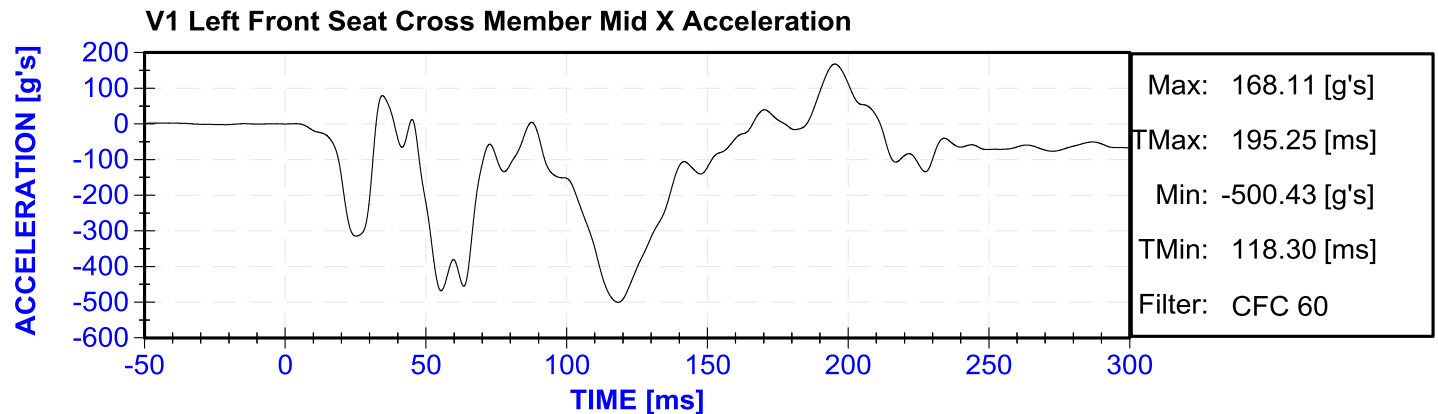
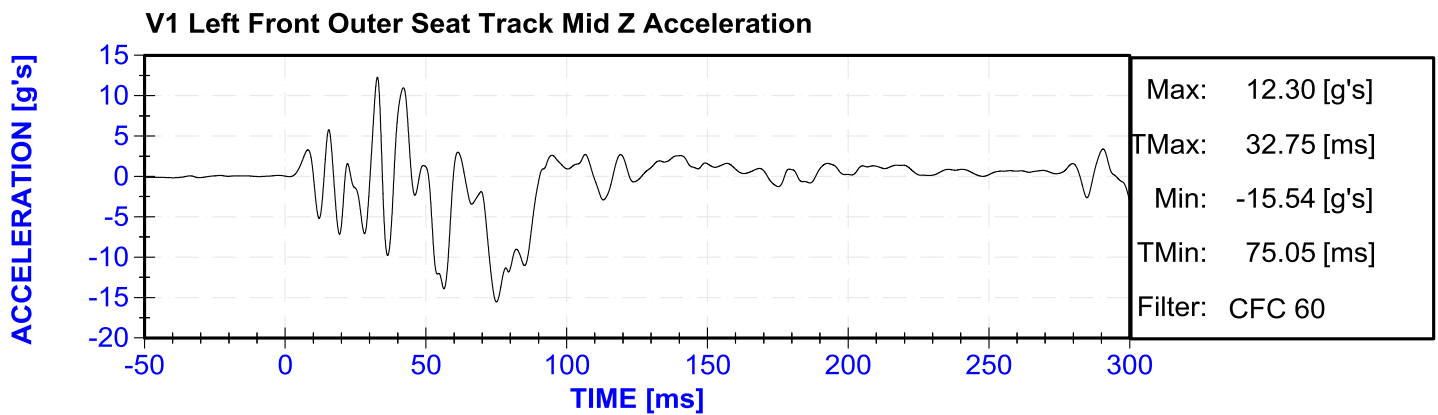
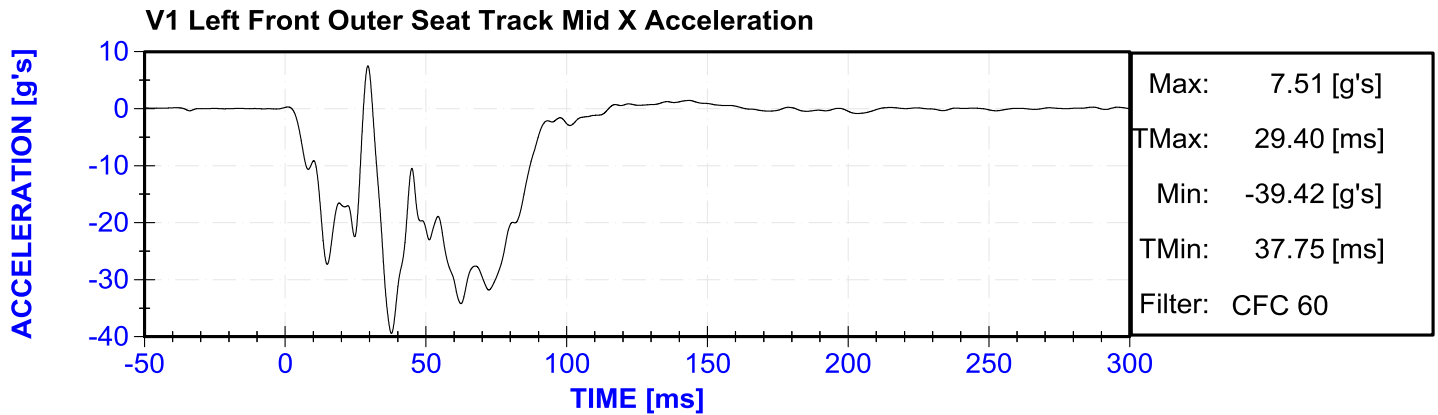


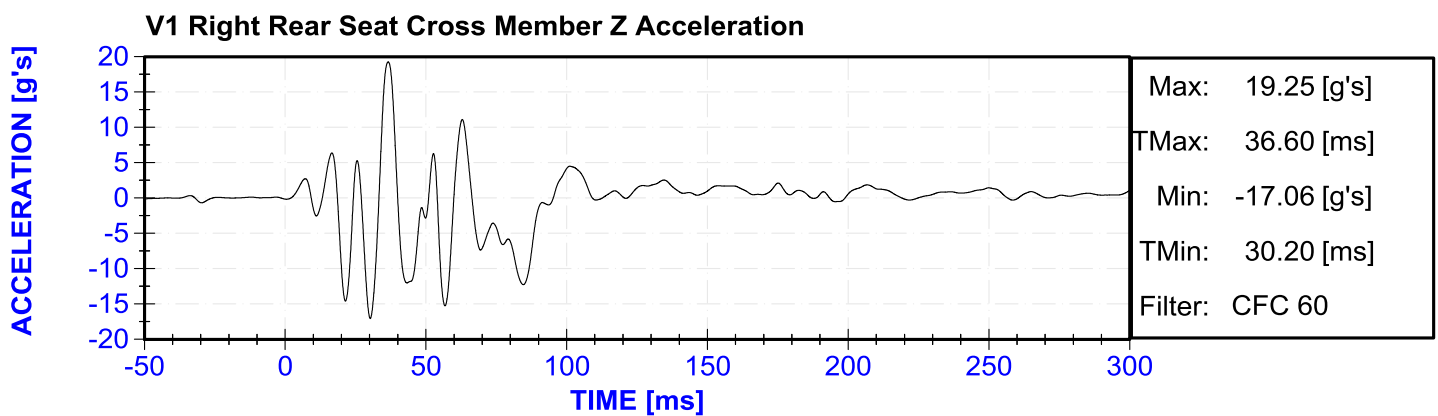
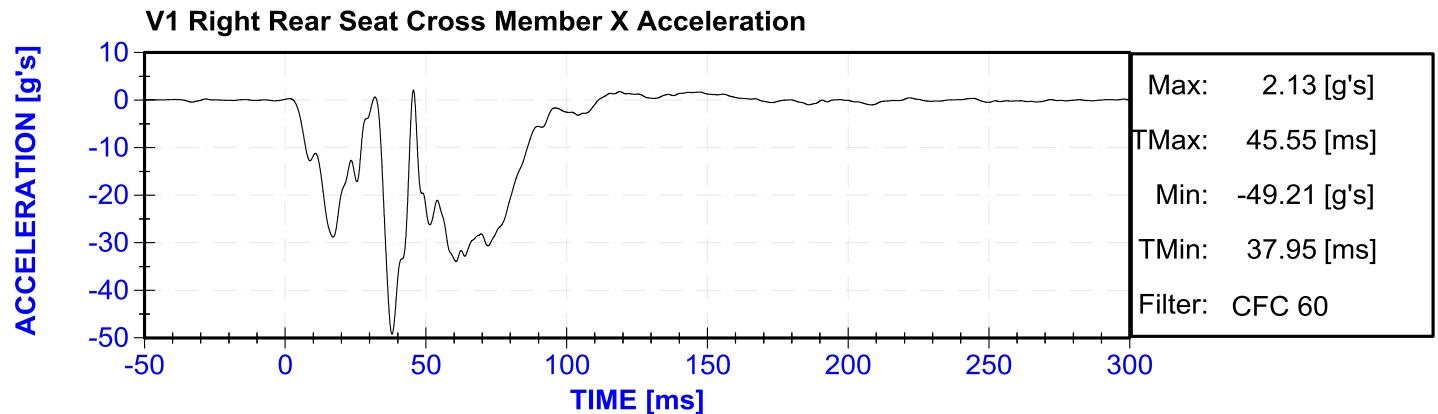
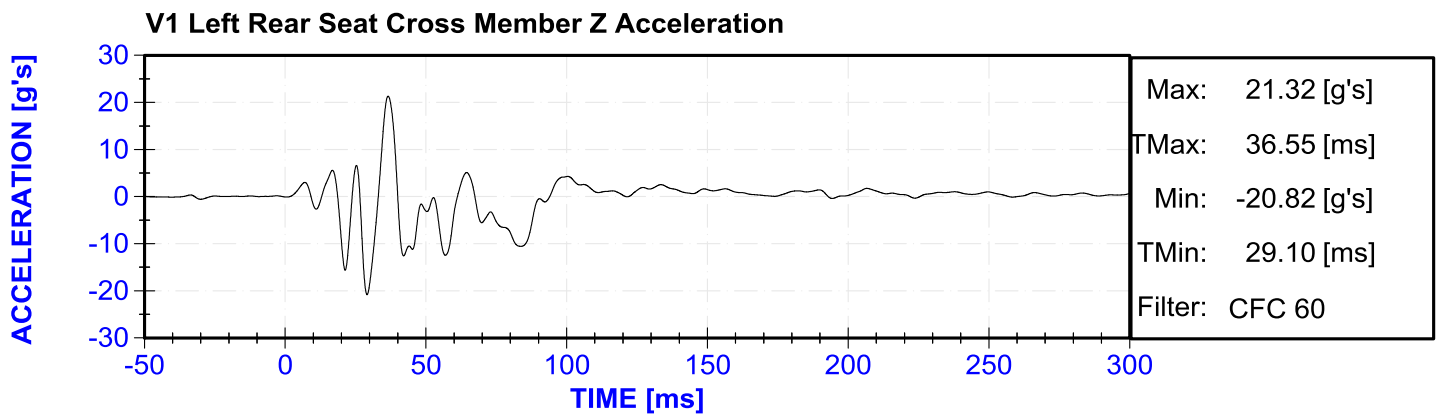
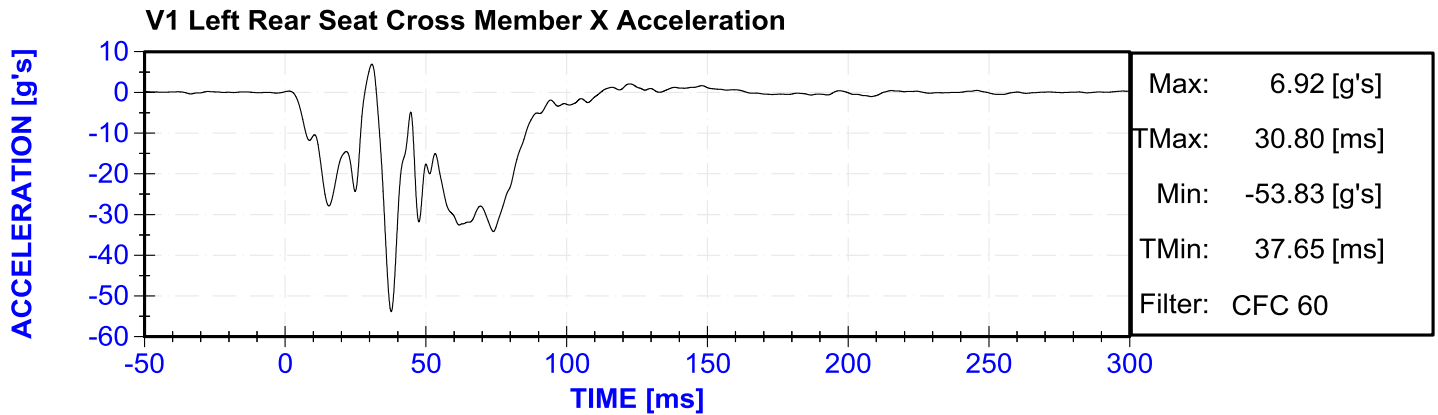


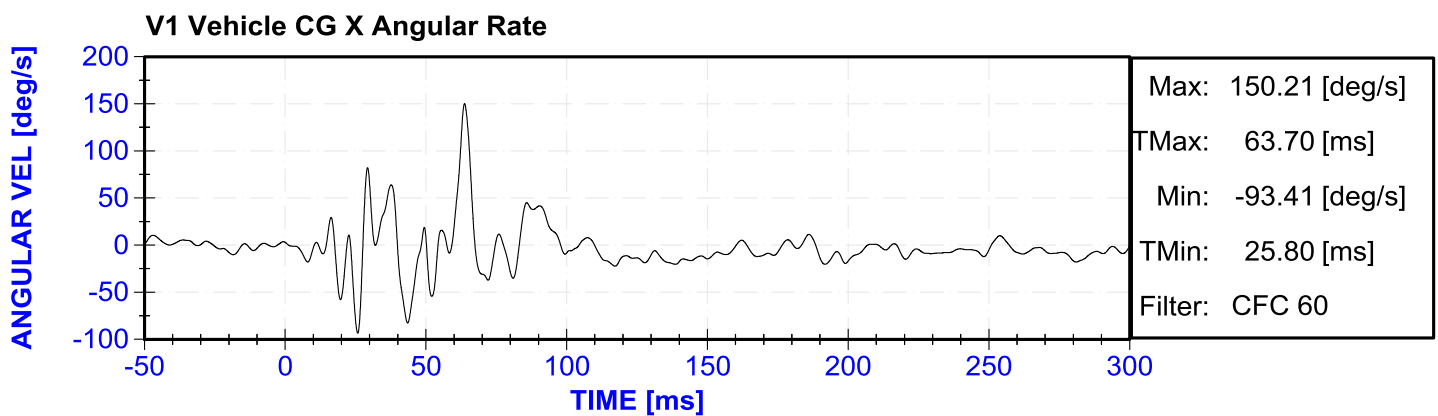
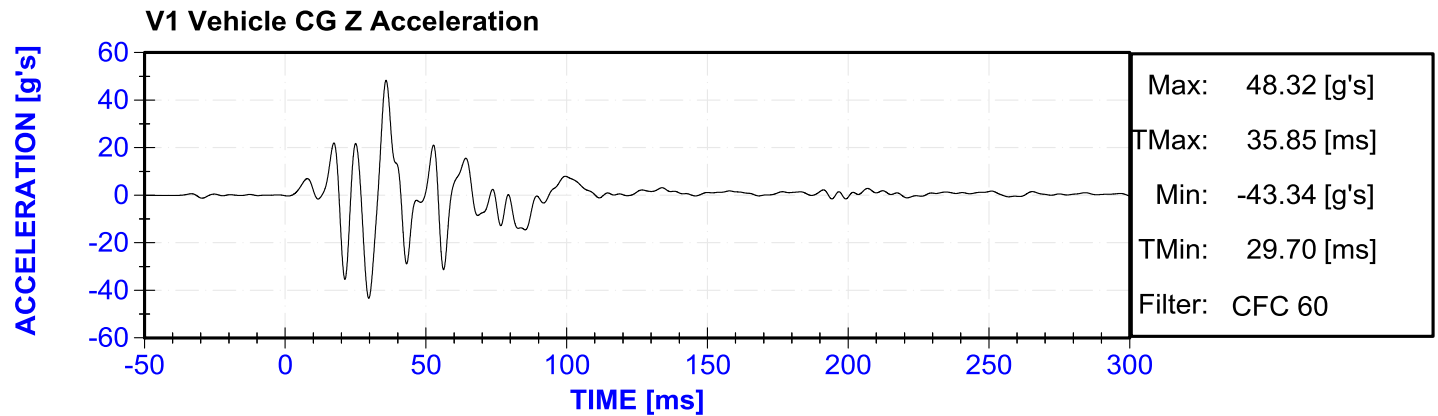
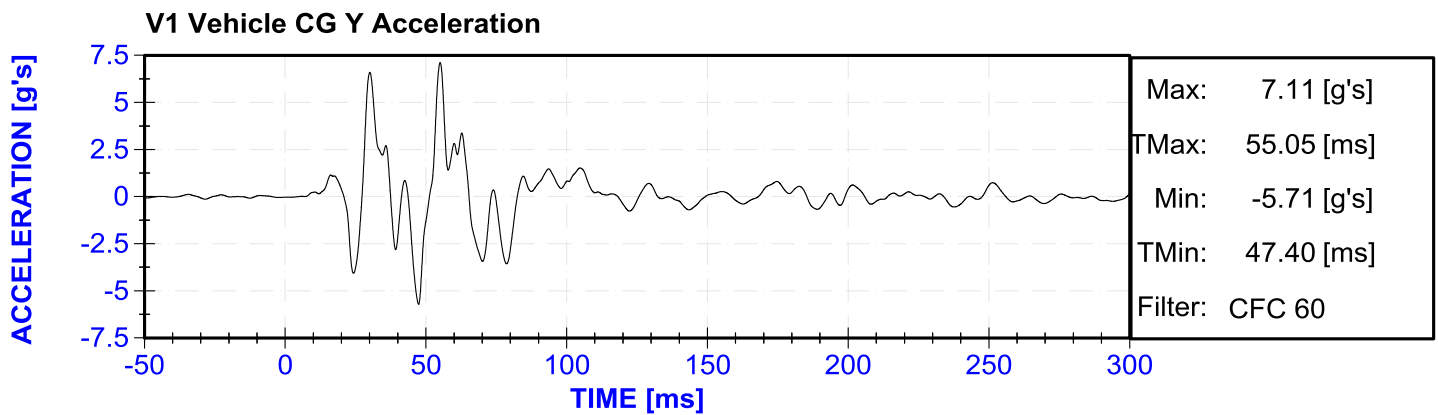
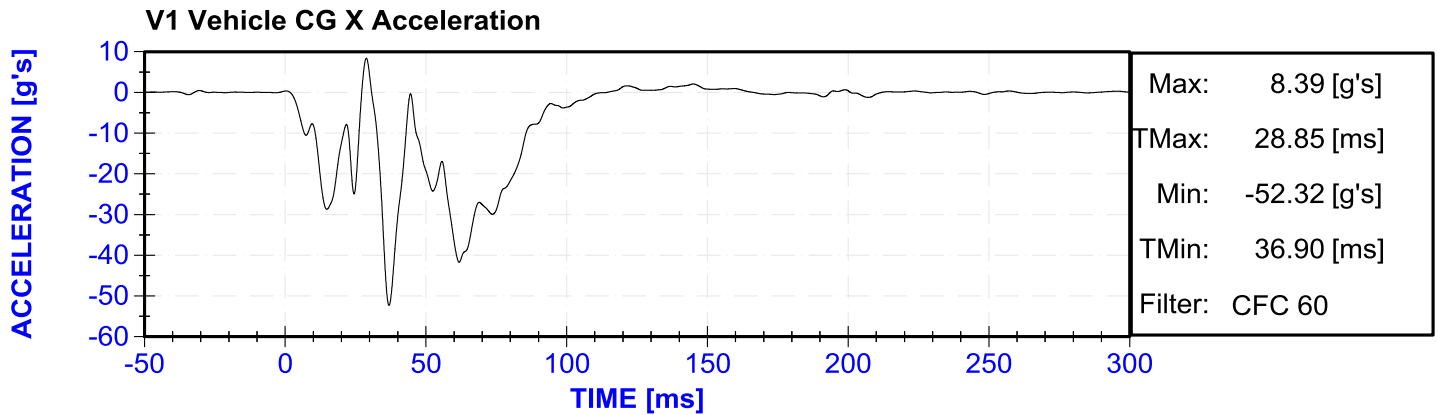


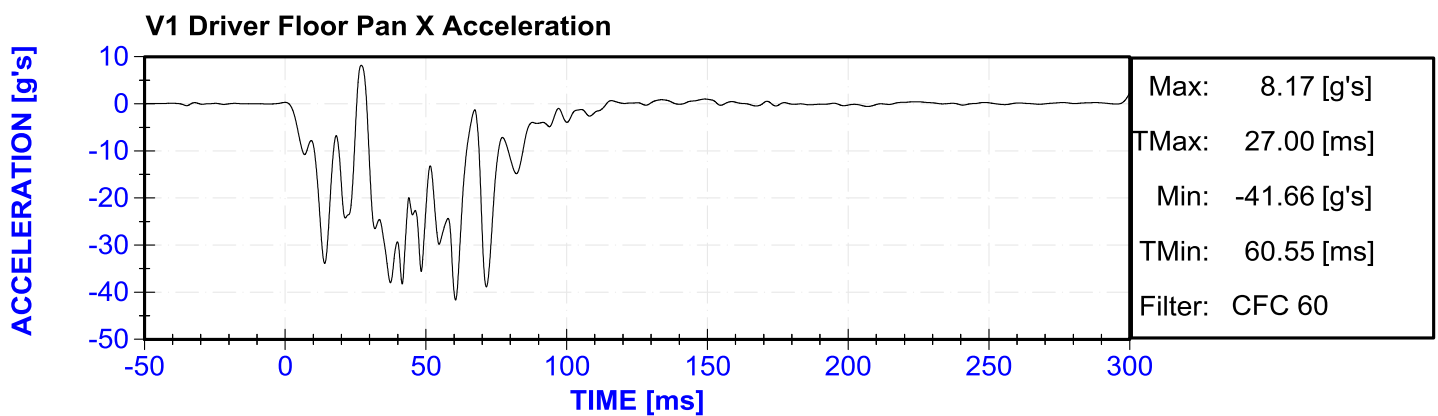
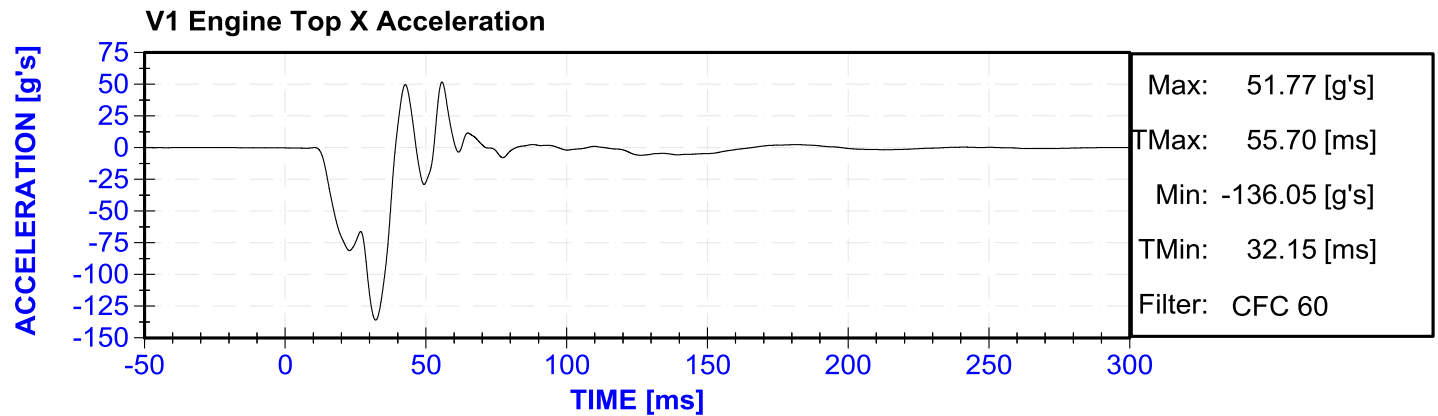
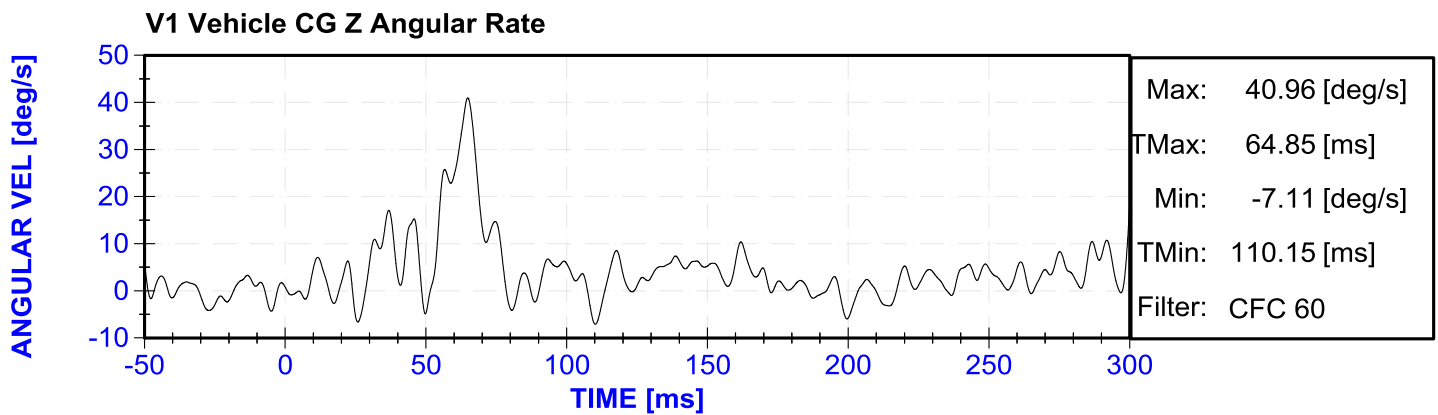
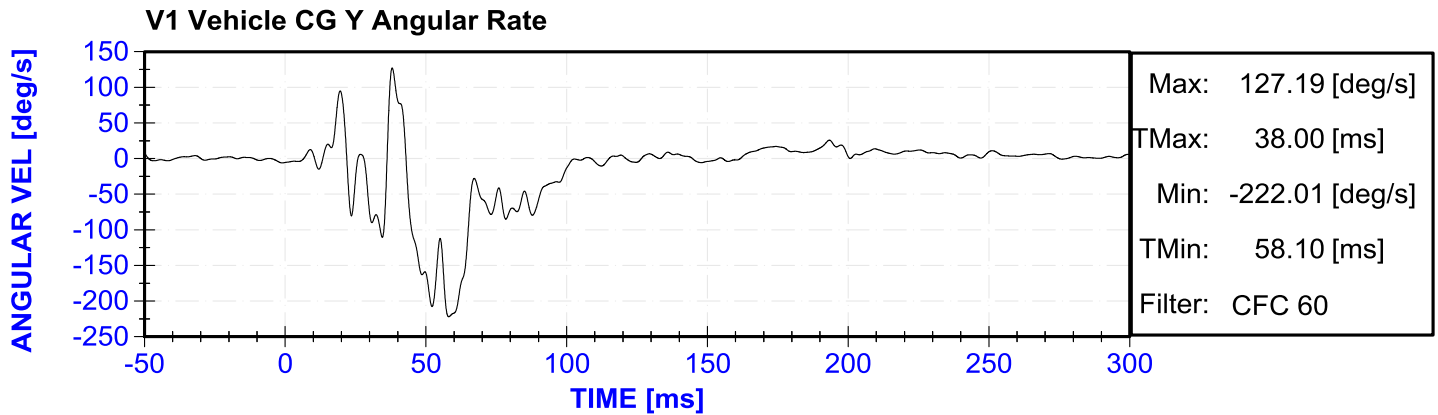




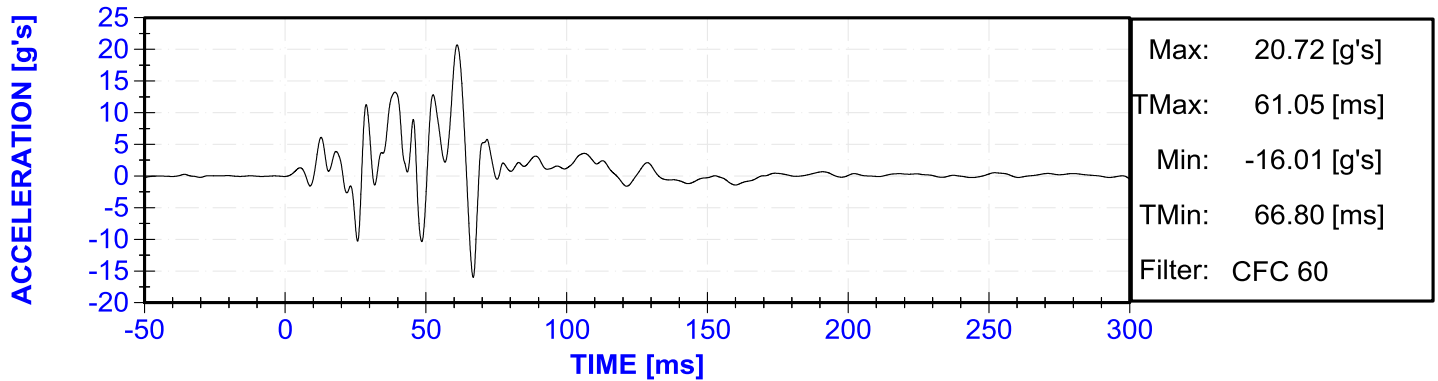




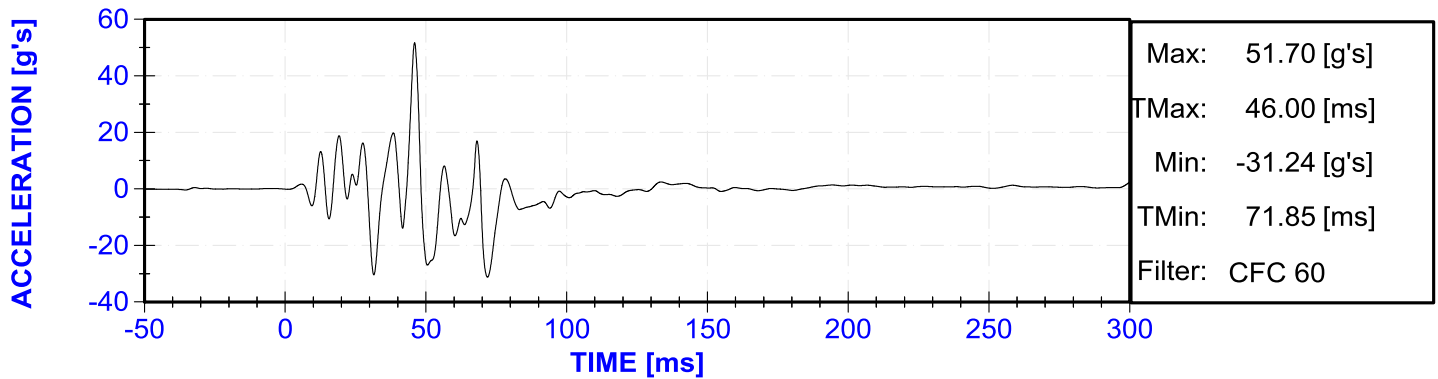




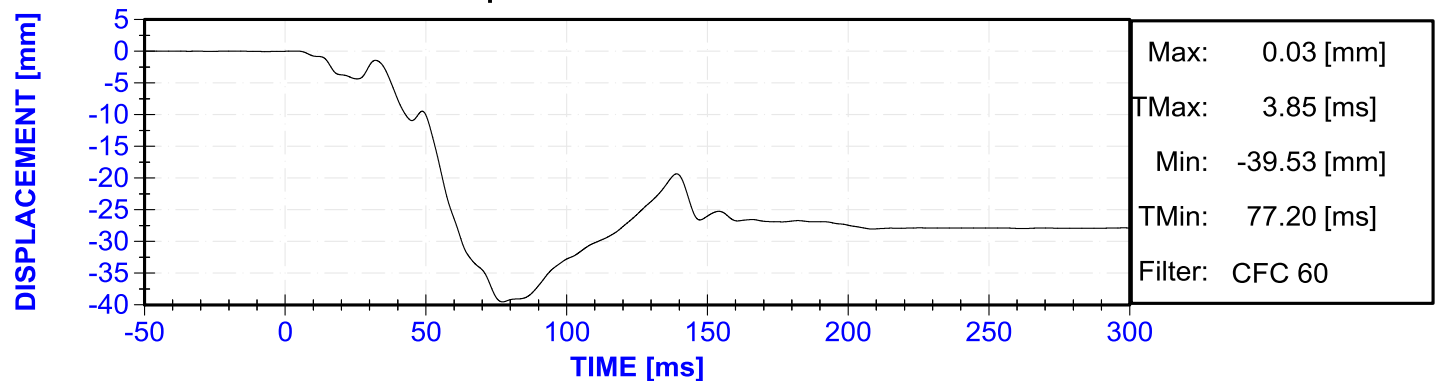
V1 Driver Floor Pan Y Acceleration



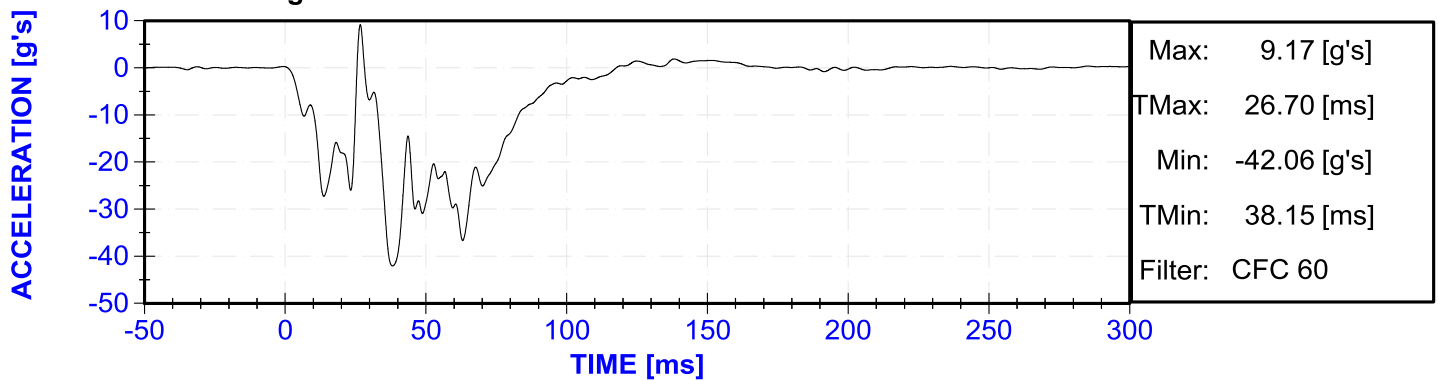
V1 Driver Floor Pan Z Acceleration

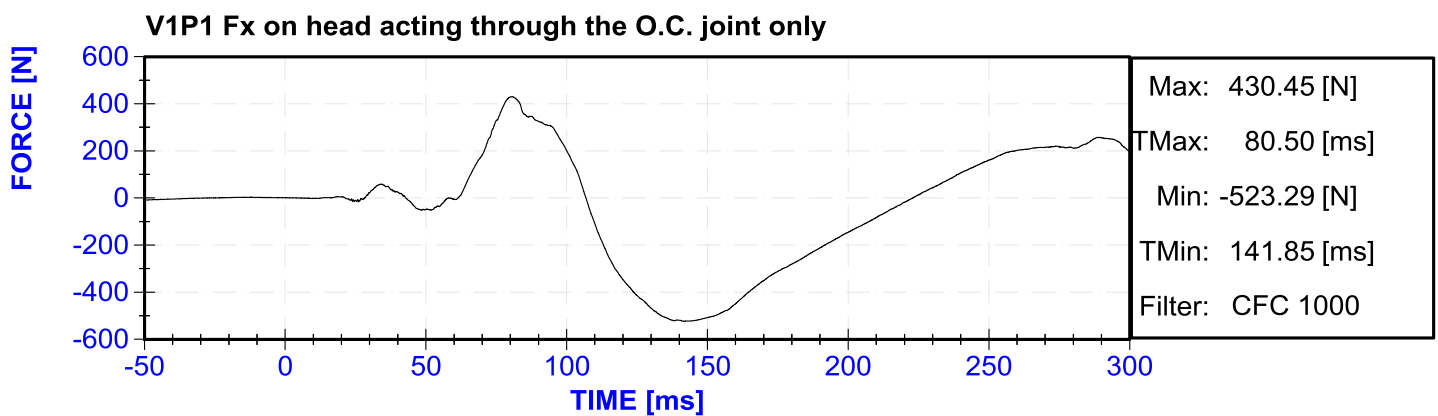
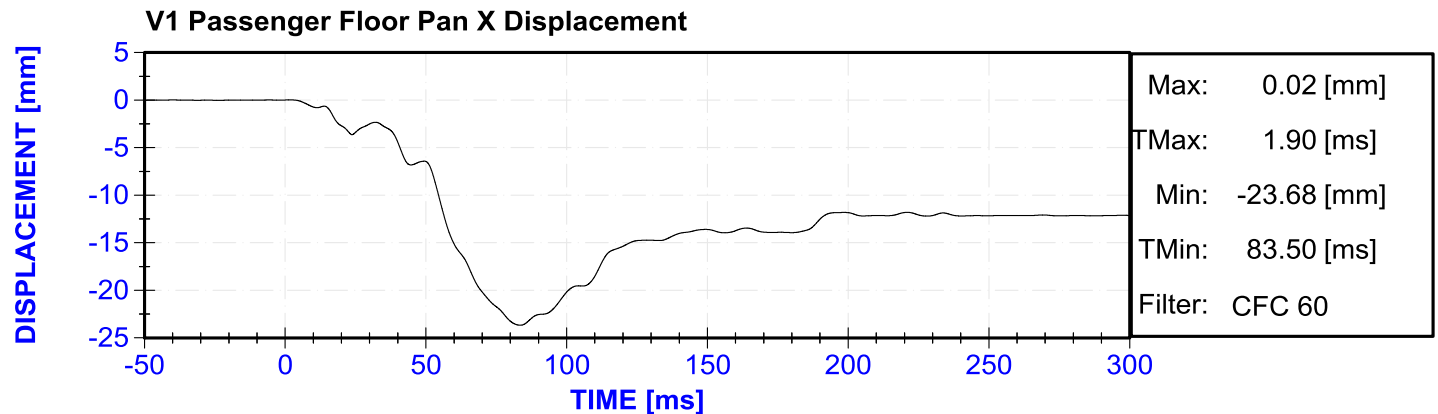
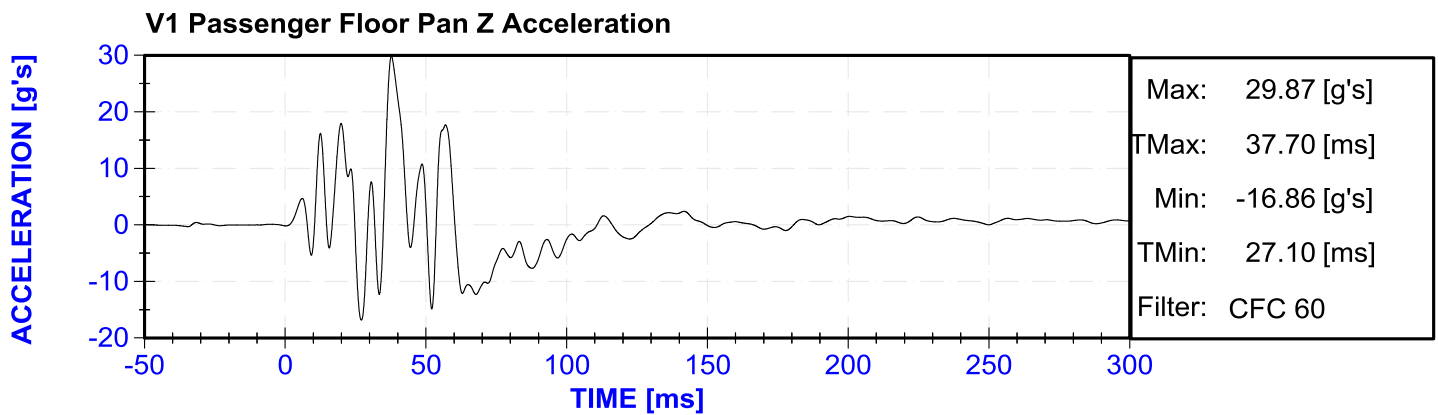
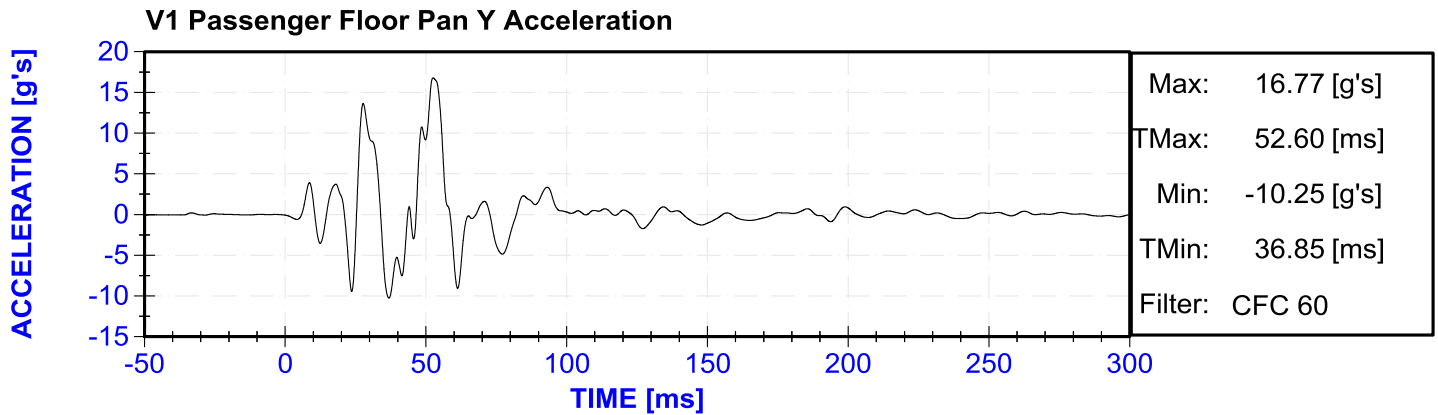


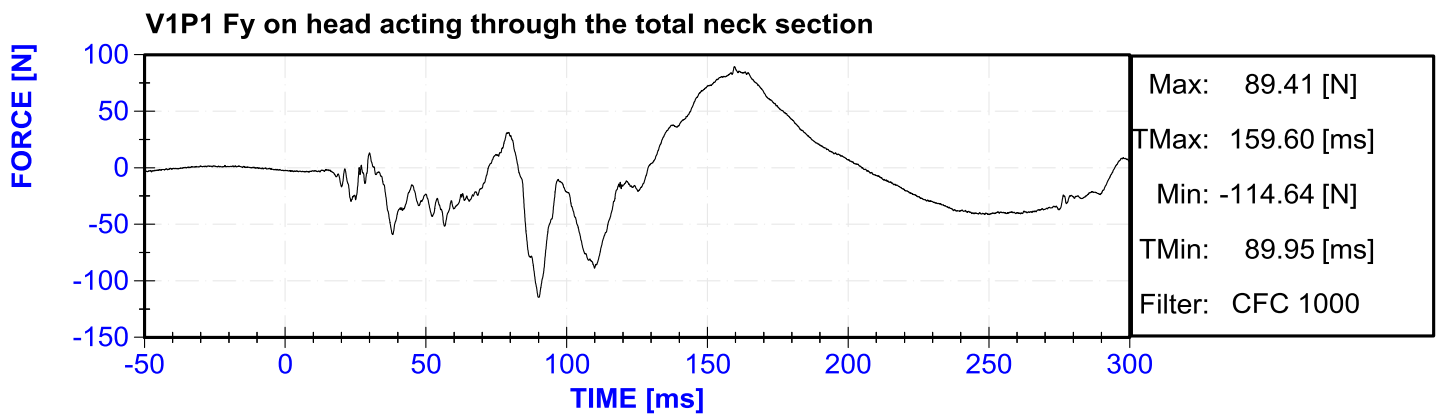
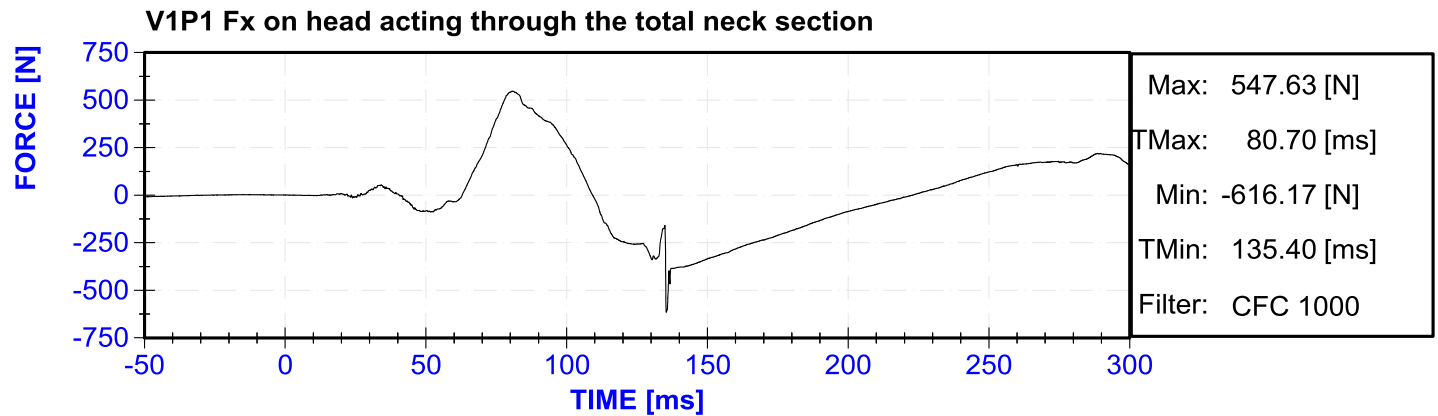
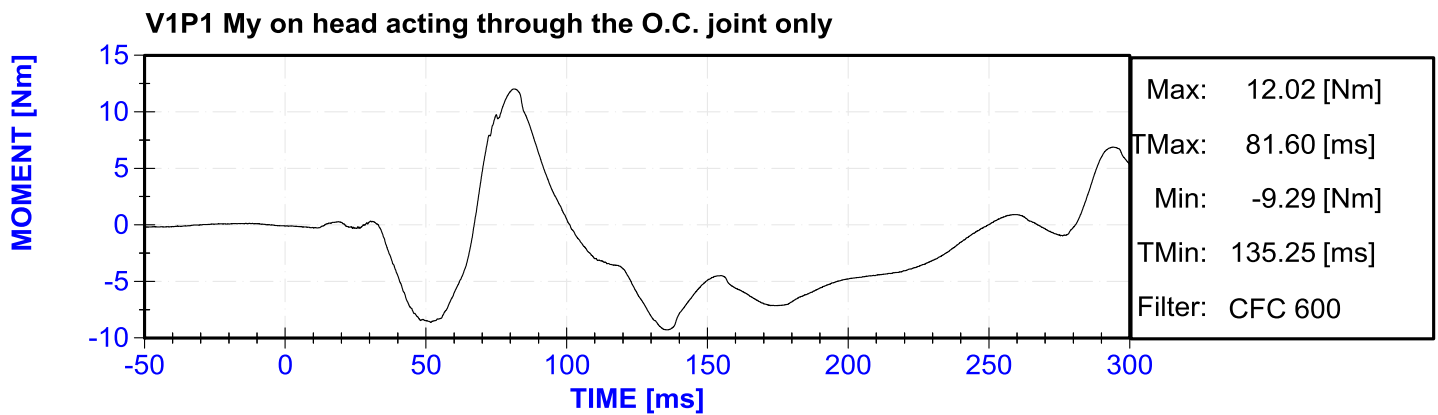
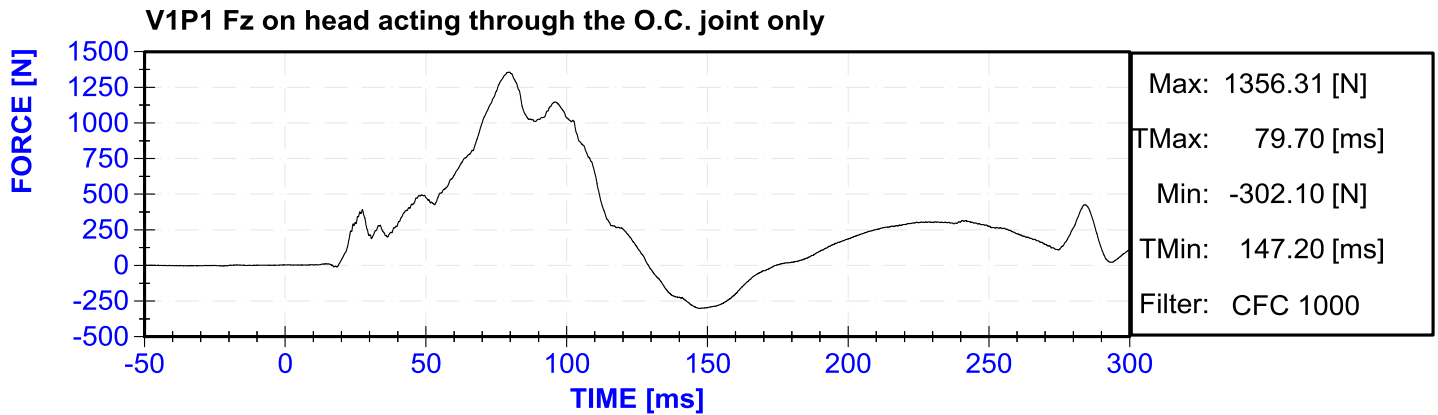
V1 Driver Floor Pan X Displacement

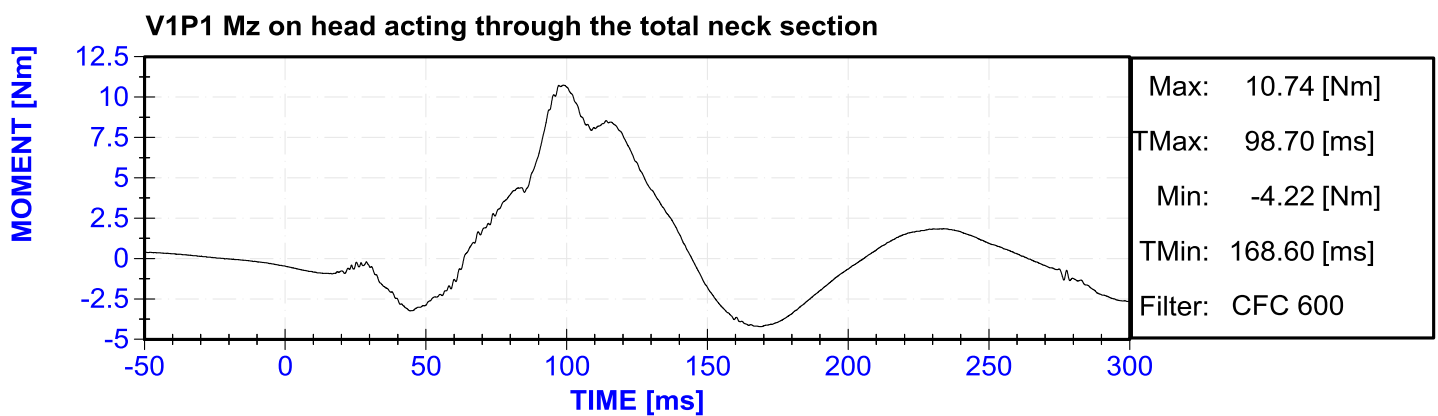
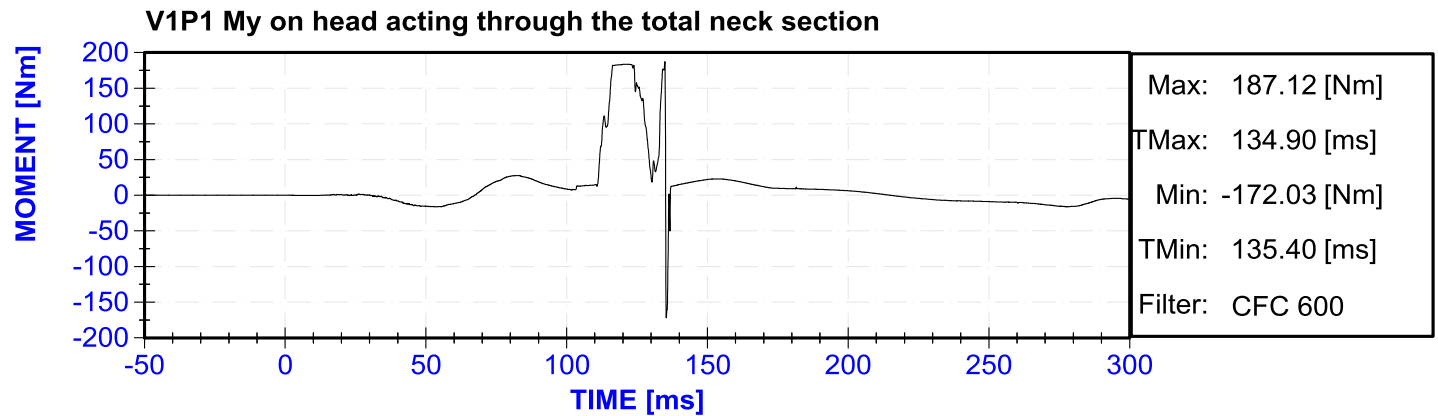
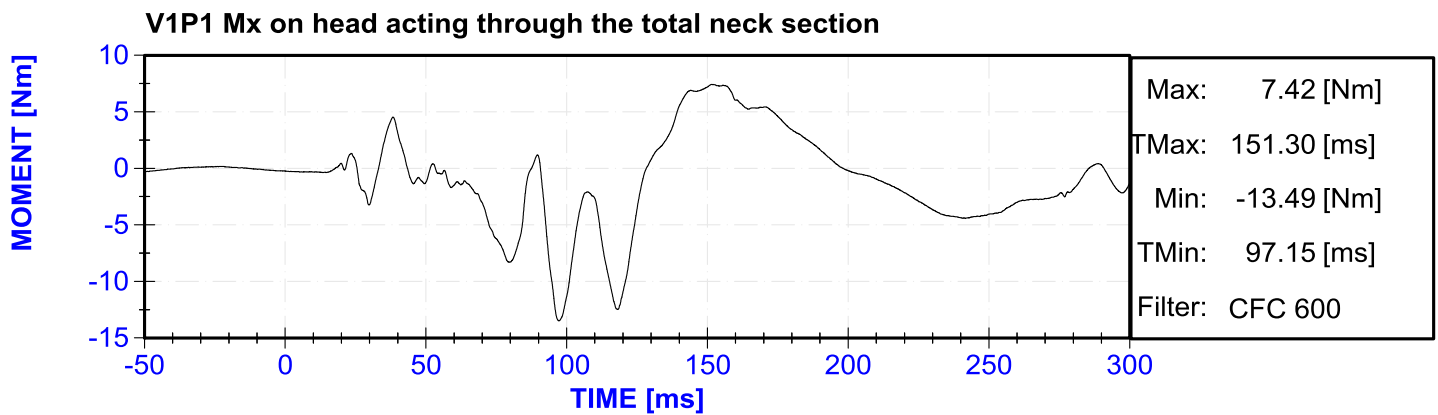
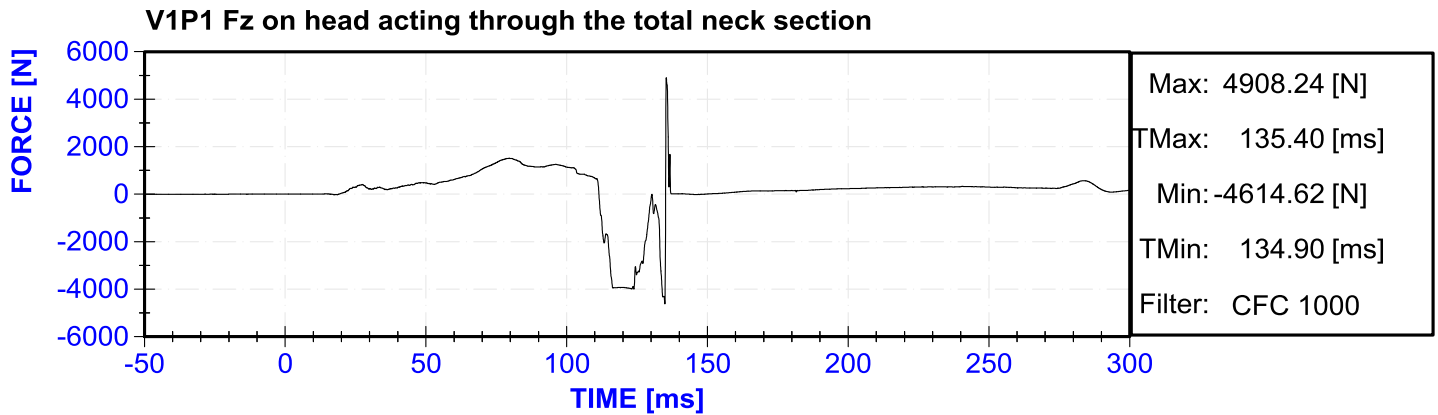


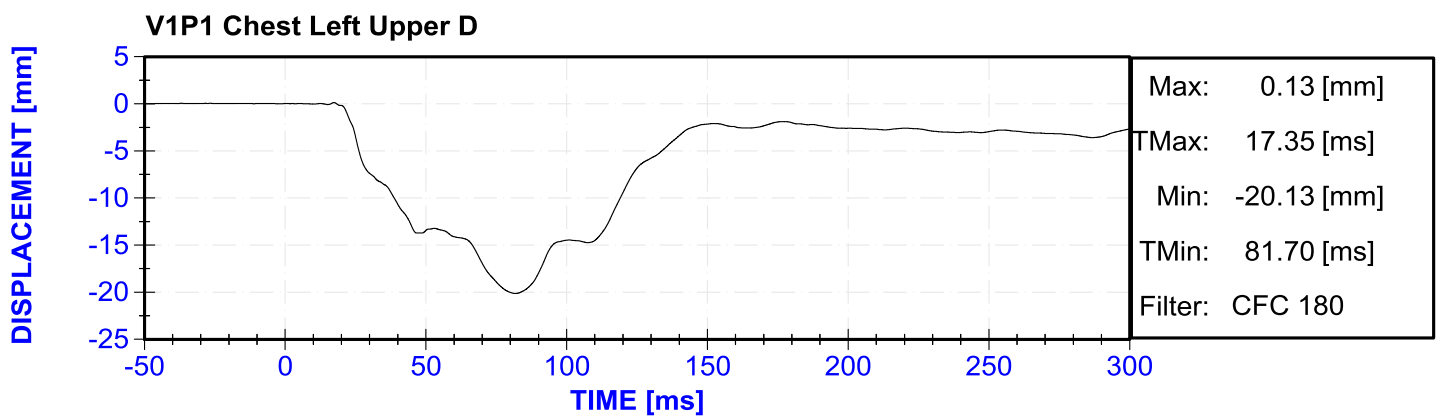
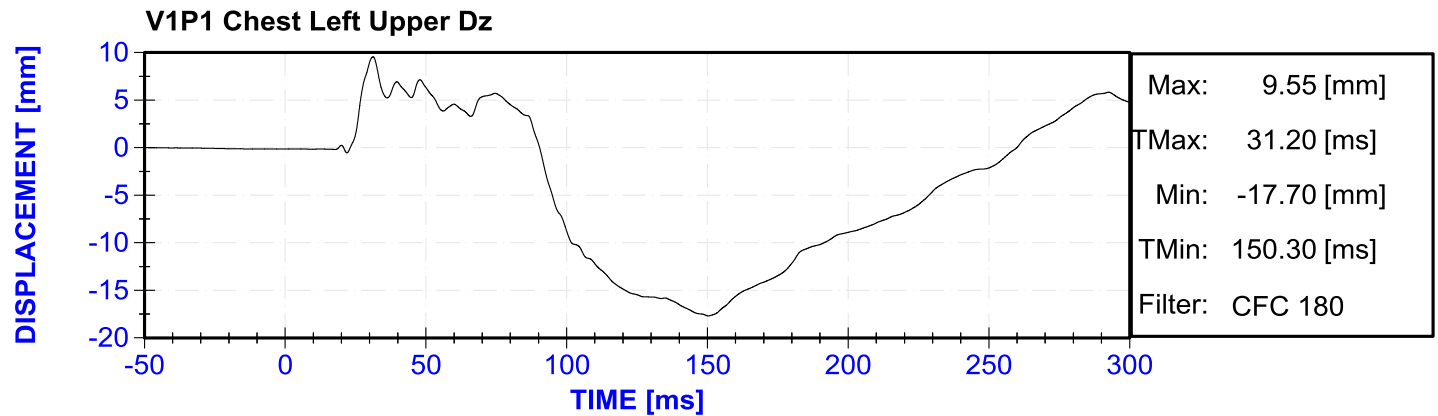
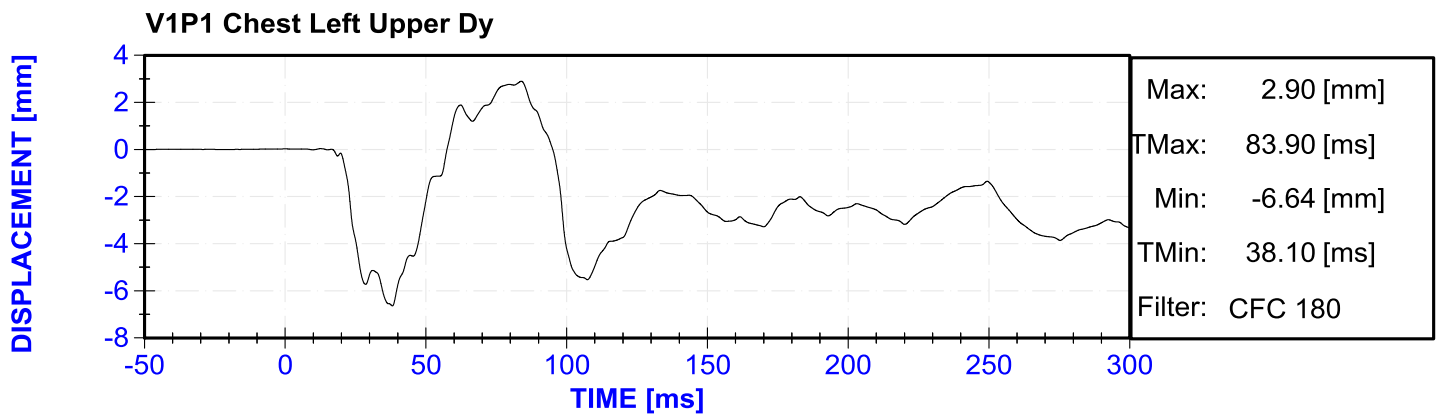
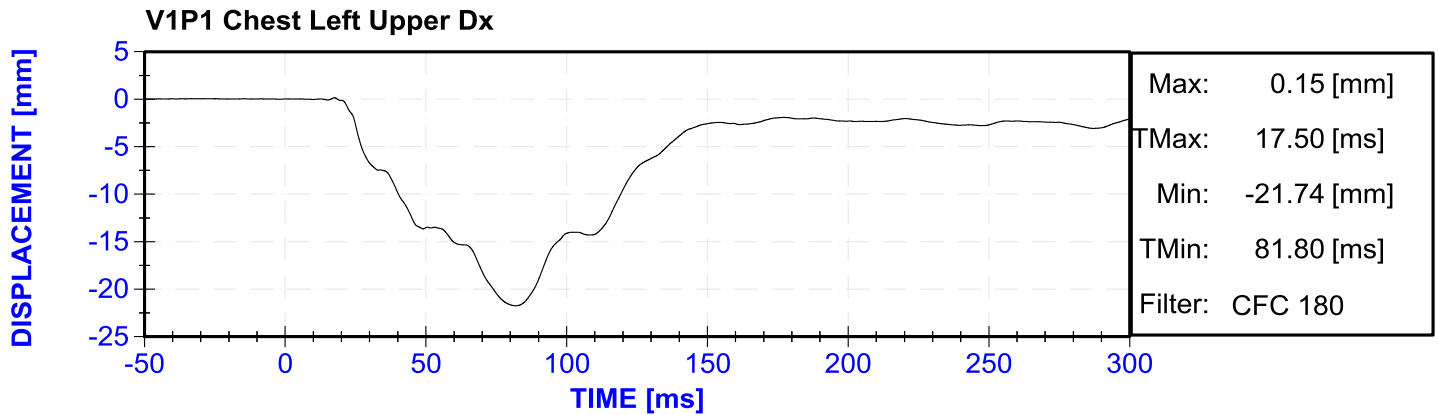
V1 Passenger Floor Pan X Acceleration

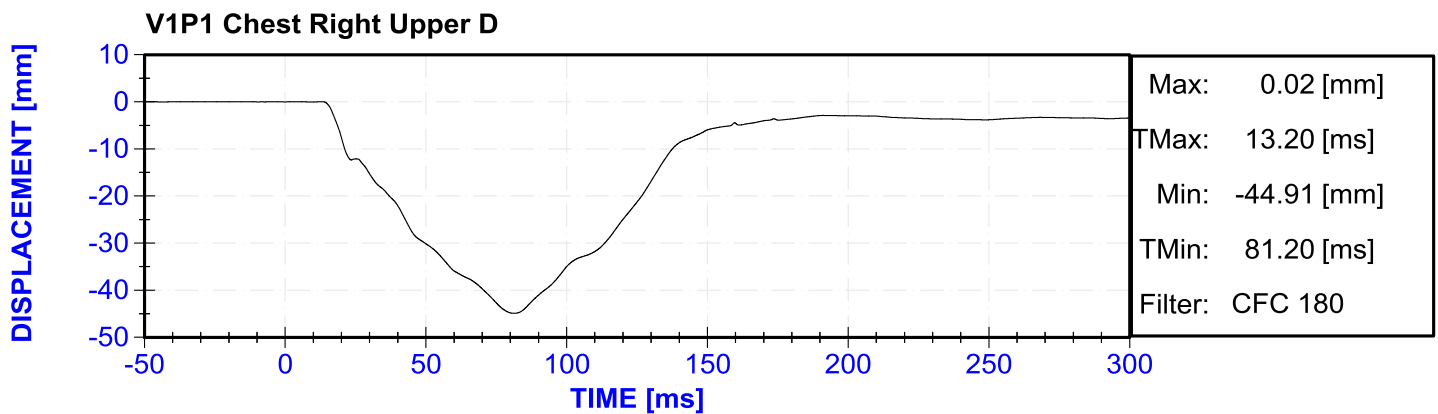
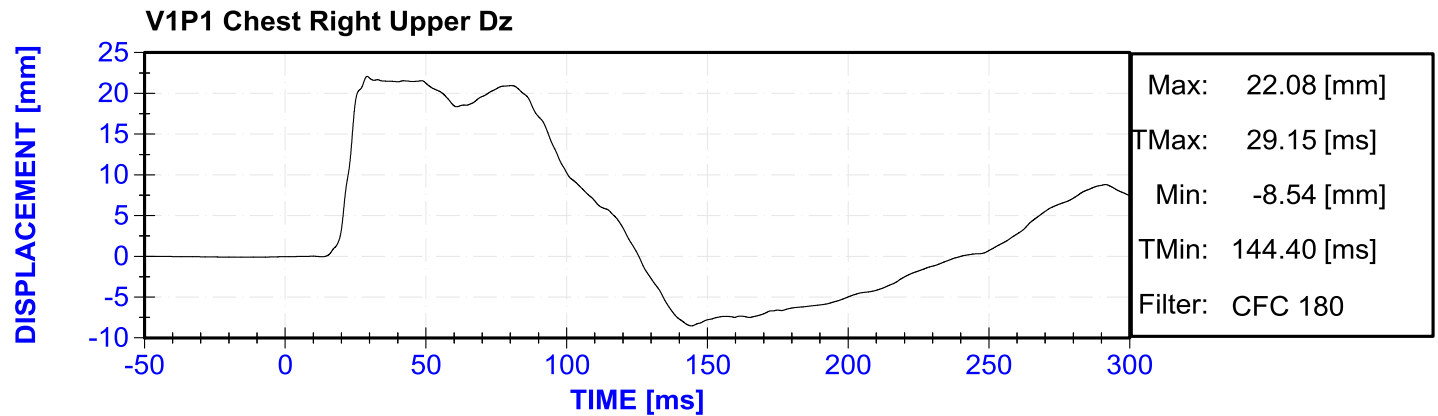
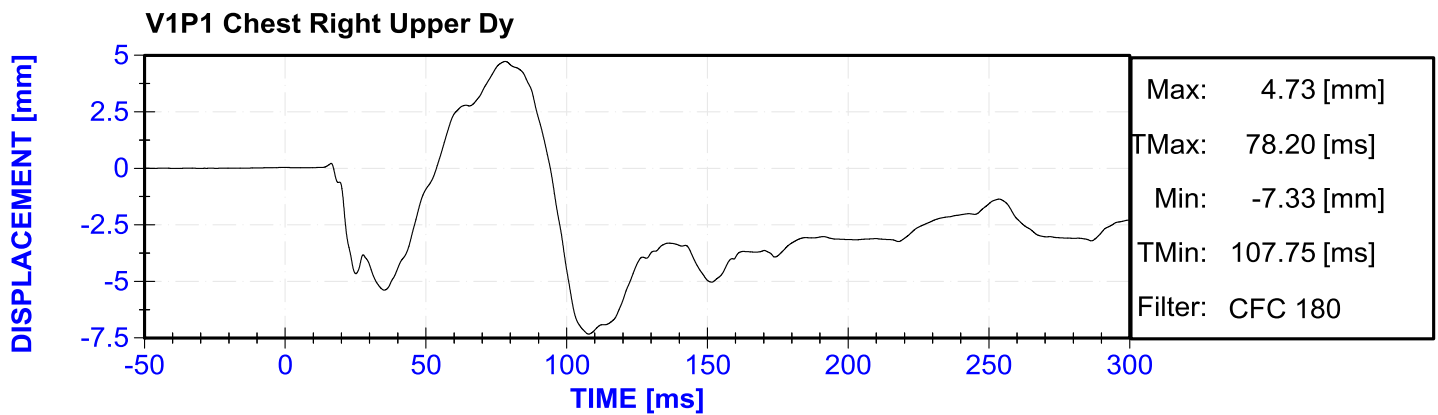
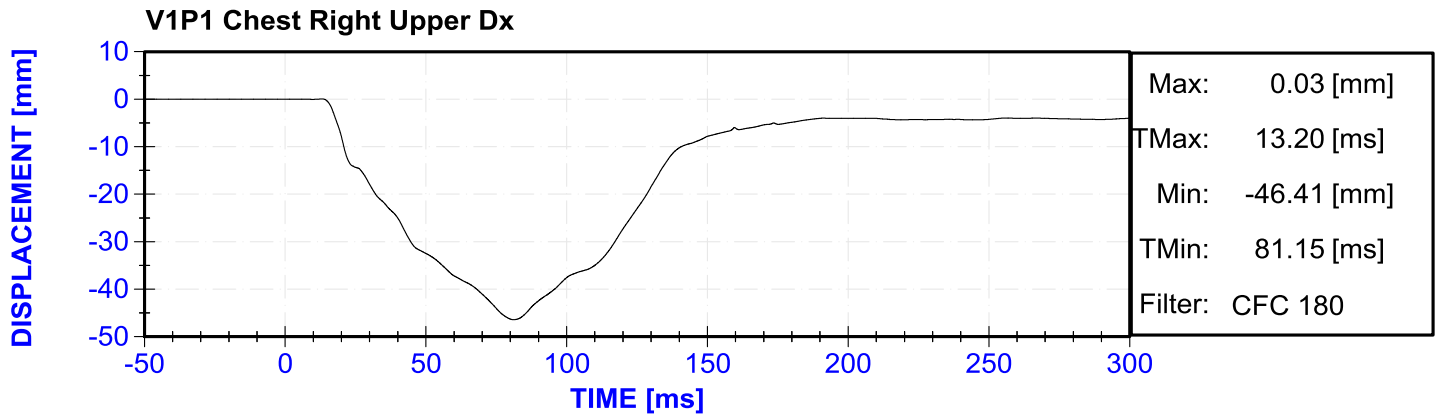


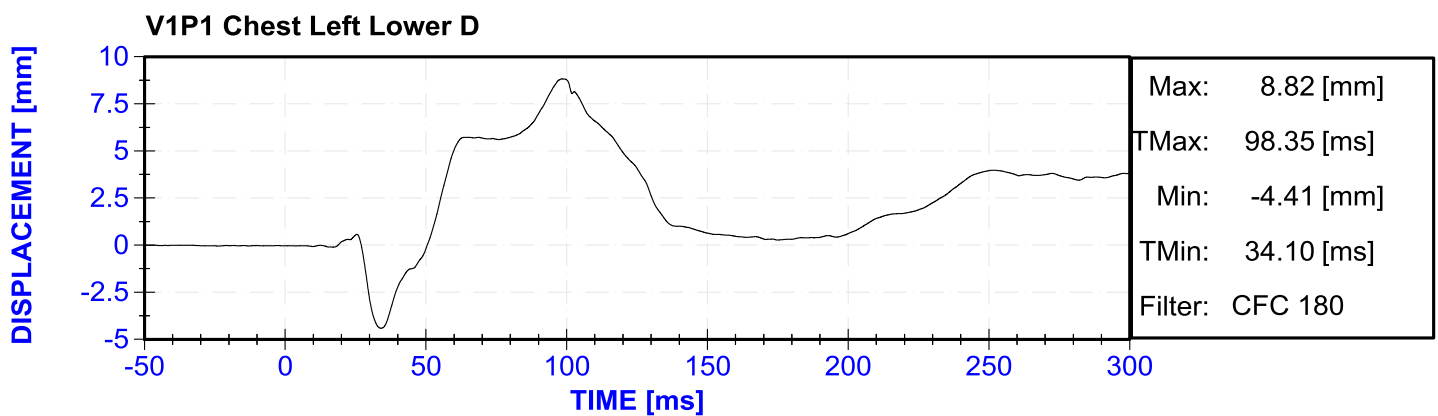
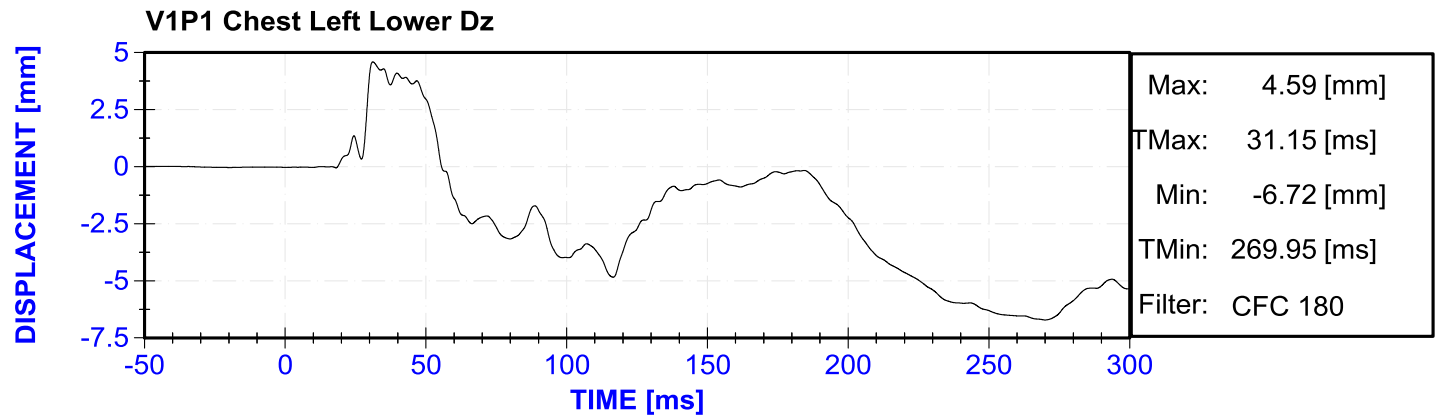
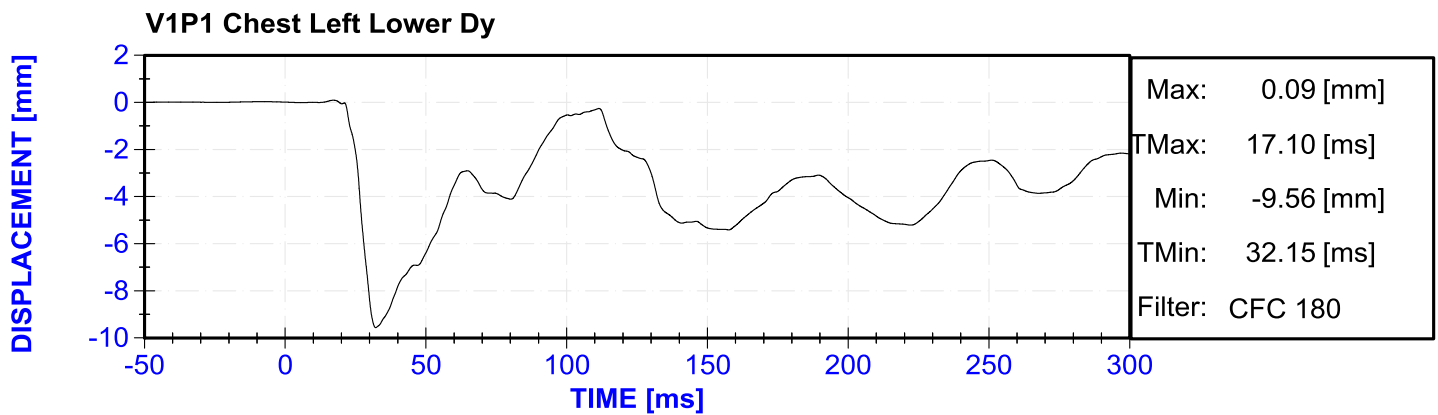
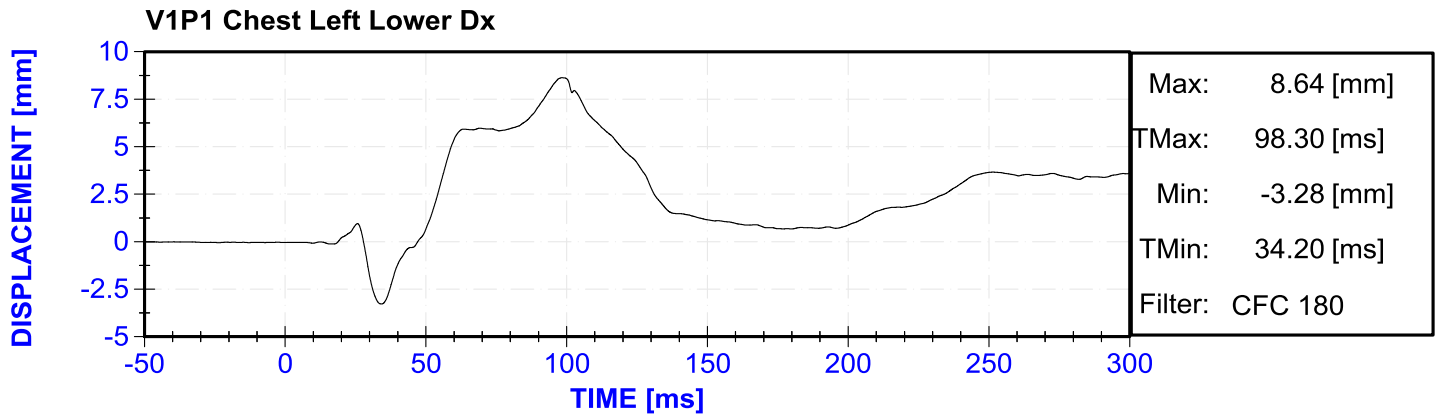


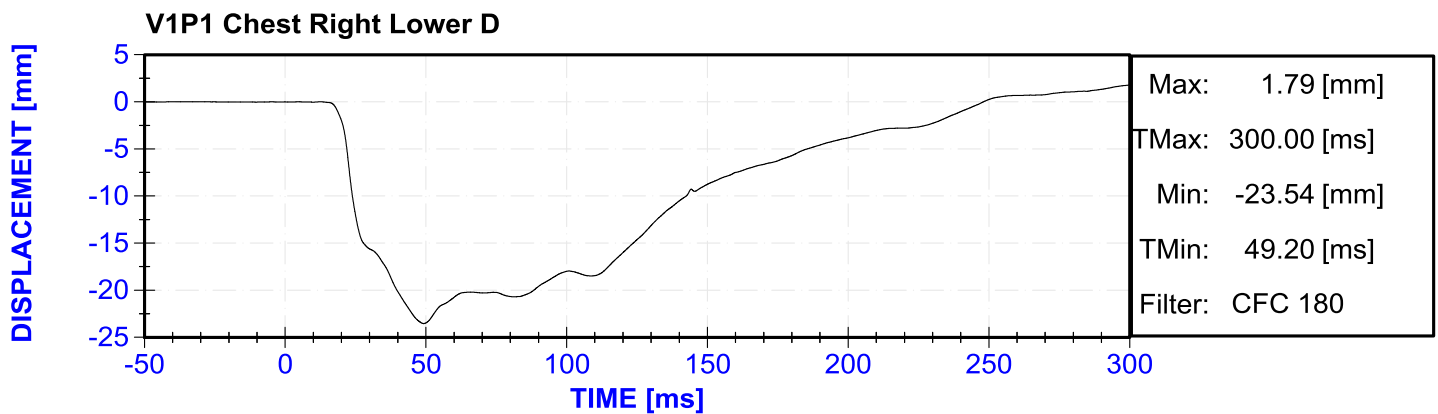
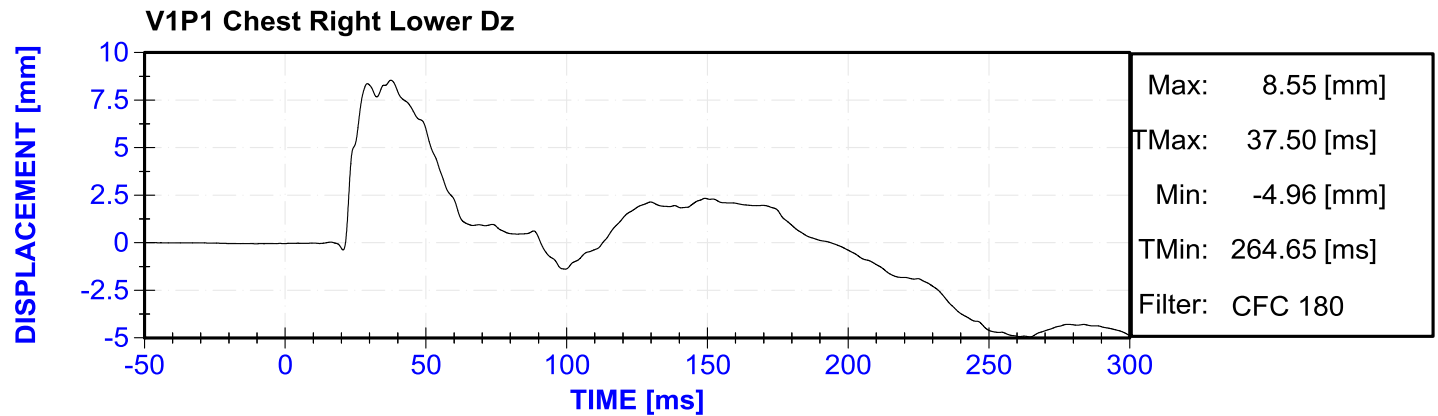
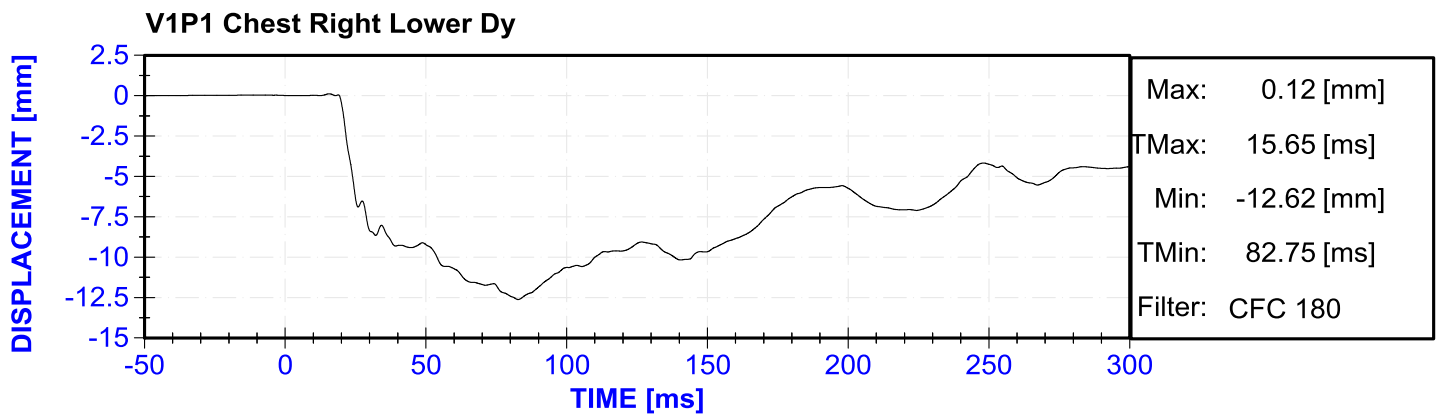
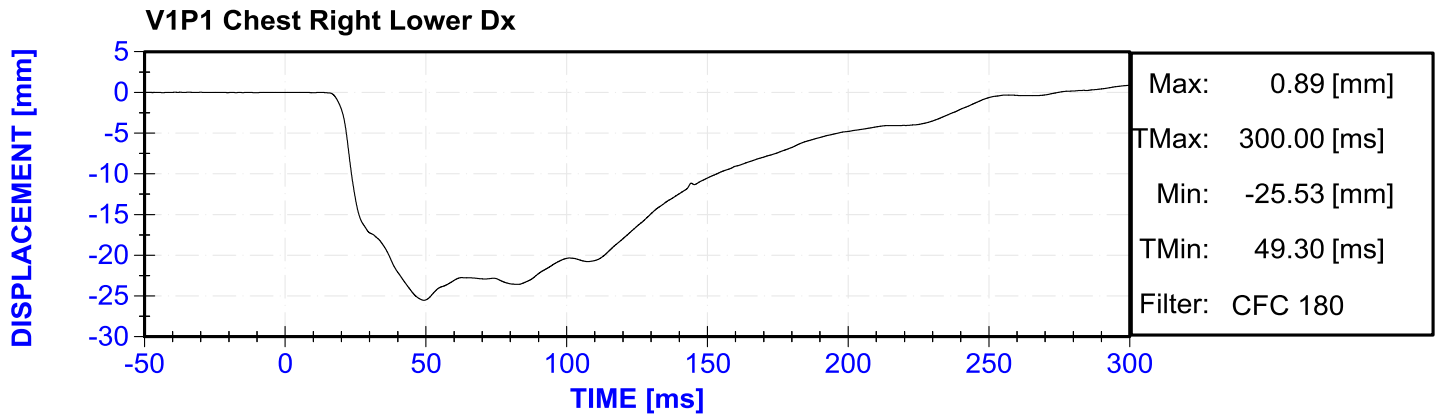


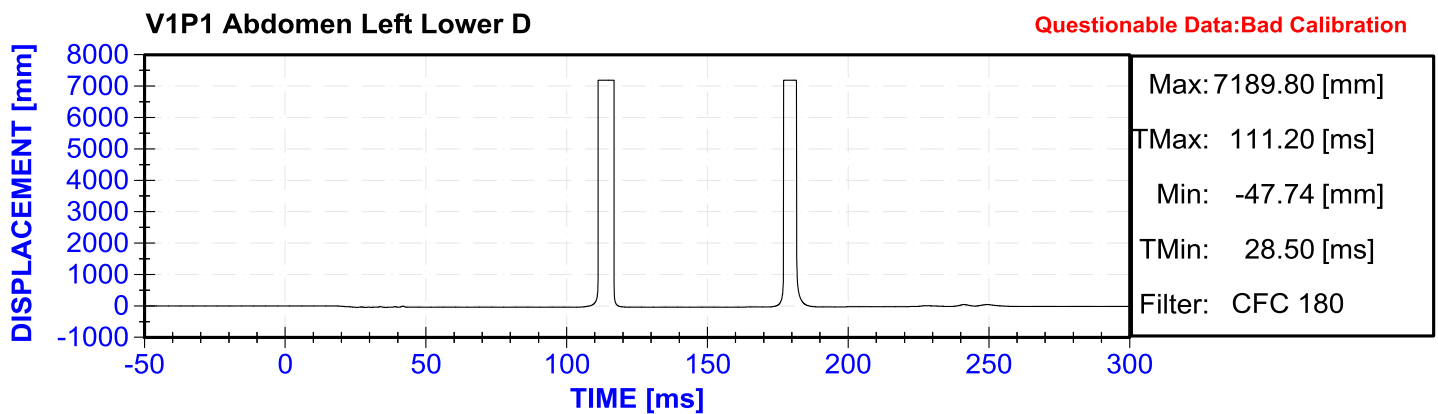
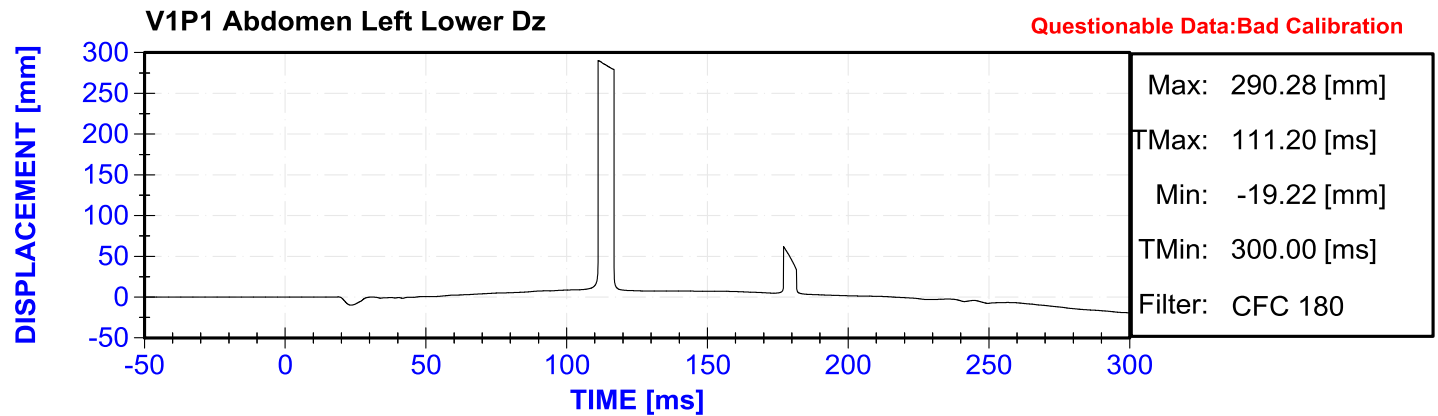
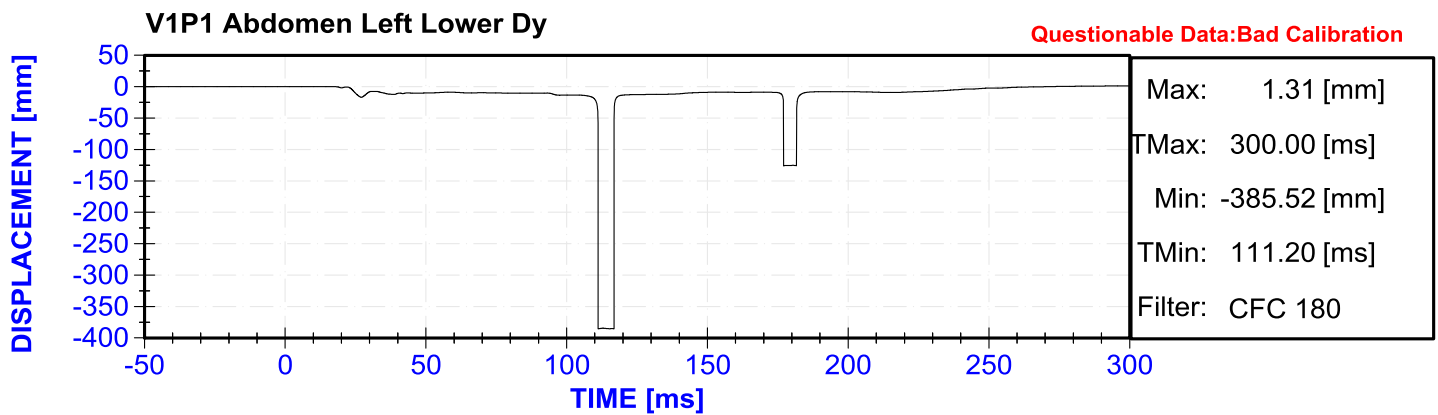
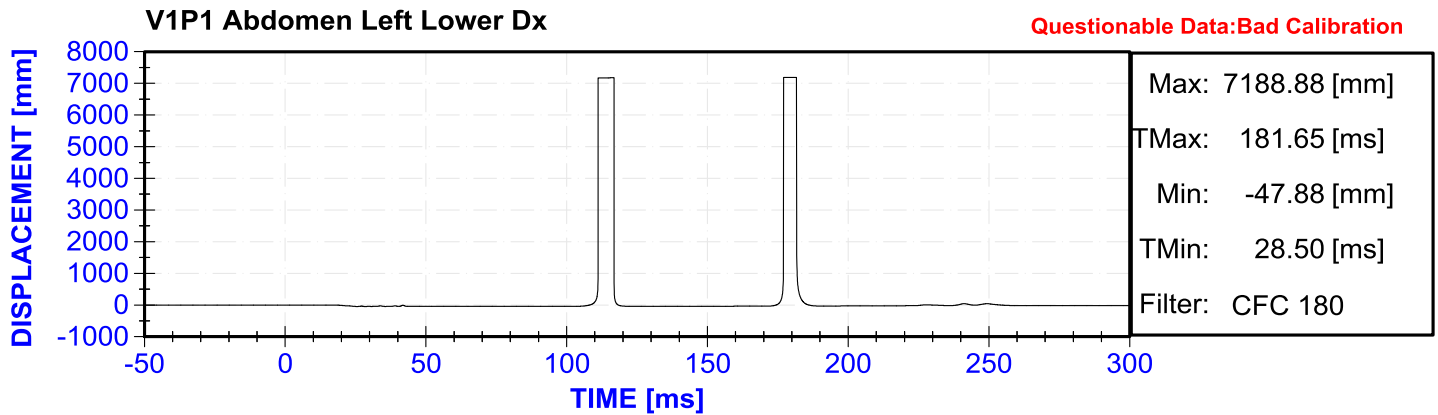


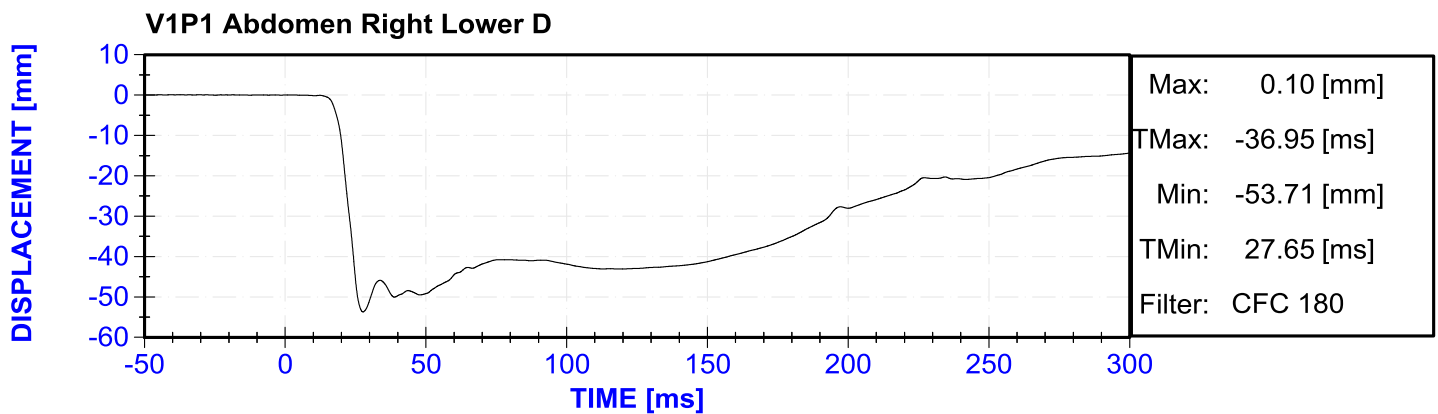
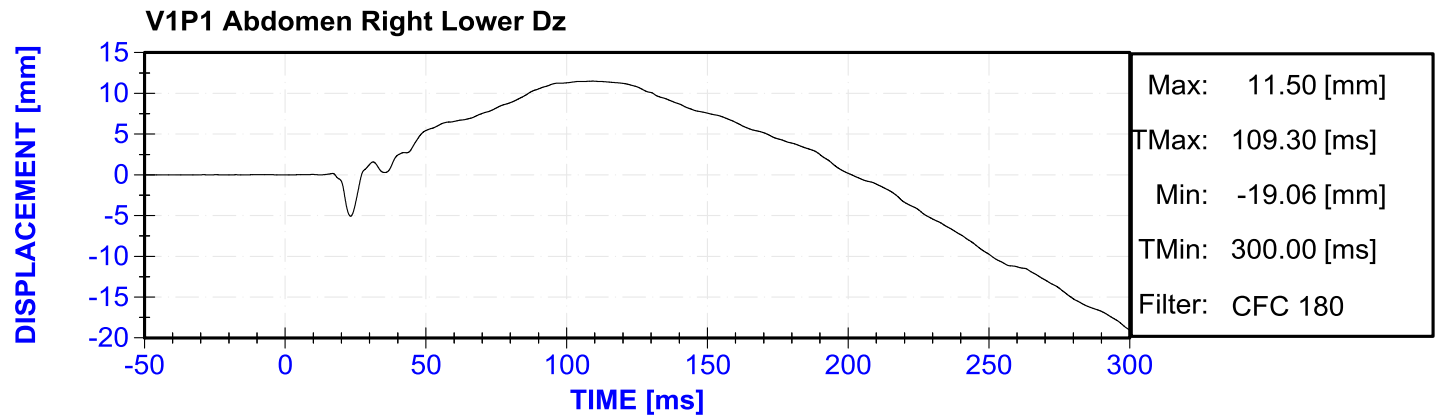
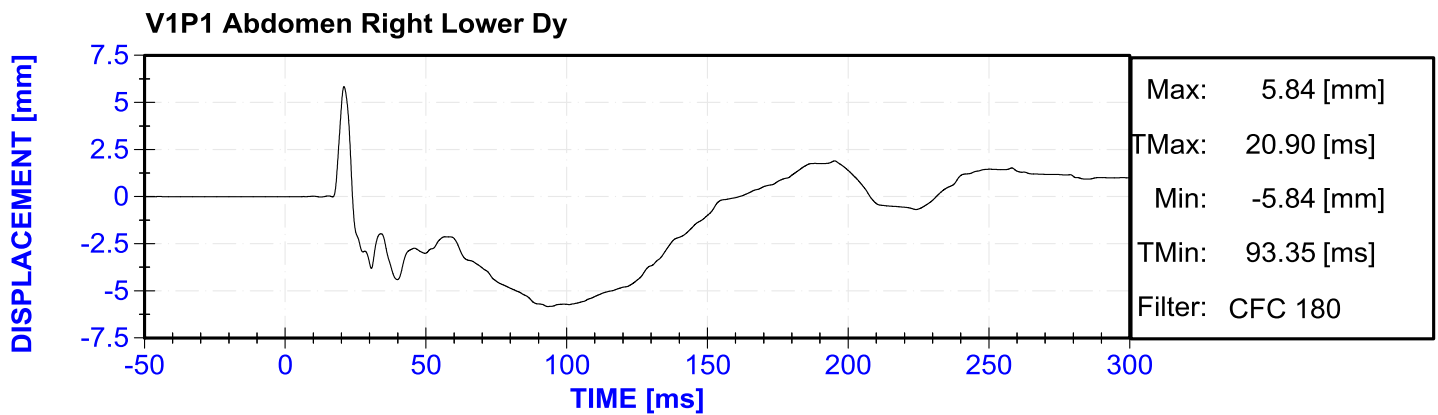
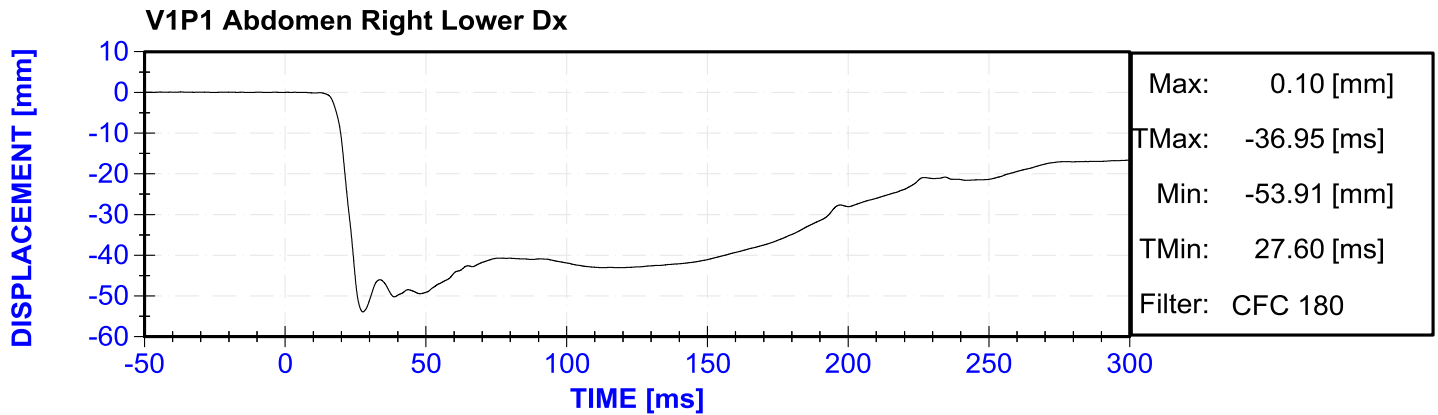












APPENDIX C

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

Table C-1: Dummy Information

TYPE	SERIAL NUMBER
THOR-M 50 TH Male	DL9207
5 th Female	324
5 th Female	019

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

THOR – M S/N: DL9207		
IR-TRACC Location	IR-TRACC Exponent	IR-TRACC Slope
Upper Left Thorax Dx	-0.43199	36.9703
Upper Right Thorax Dx	-0.48860	29.8982
Lower Left Thorax Dx	-0.45268	35.3389
Lower Right Thorax Dx	-0.43502	37.4827
Left Abdomen Dx	-0.34061	66.5336
Right Abdomen Dx	-0.50000	26.8025

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

THOR – M S/N:					
Sensor	Manufacturer	Serial Number	Range	Sensitivity	Sensitivity Units
Head CG Ax	Endevco	P82183	2000	0.017690000	mV/V/g
Head CG Ay	Endevco	P81384	2000	0.017600000	mV/V/g
Head CG Az	Endevco	P81797	2000	0.019350000	mV/V/g
Head Wx	DTS	ARS4740	18000	0.091430000	mV/deg/sec
Head Wy	DTS	ARS4737	18000	0.095640000	mV/deg/sec
Head Wz	DTS	ARS4073	18000	0.093760000	mV/deg/sec
Skull Spring Front Fz	Humanetics	DO9740	4448.2	0.000512814	mV/V/N
Skull Spring Rear Fz	Humanetics	DO9741	4448.2	0.000508183	mV/V/N
Condyle Pot Ry	Humanetics	DK5911	180	3.021000000	mV/V/deg
Upper Neck Fx	Humanetics	DP3956	8896.4	0.000224158	mV/V/N
Upper Neck Fy	Humanetics	DP3956	8896.4	0.000227755	mV/V/N
Upper Neck Fz	Humanetics	DP3956	13344.7	0.000085255	mV/V/N
Upper Neck Mx	Humanetics	DP3956	282.5	0.005819469	mV/V/Nm
Upper Neck My	Humanetics	DP3956	282.5	0.005983009	mV/V/Nm
Upper Neck Mz	Humanetics	DP3956	282.5	0.009425133	mV/V/Nm
Lower Neck Fx	Humanetics	DP4780	13344.7	0.000173709	mV/V/N
Lower Neck Fy	Humanetics	DP4780	13344.7	0.000174489	mV/V/N

Lower Neck Fz	Humanetics	DP4780	13344.7	0.000070575	mV/V/N
Lower Neck Mx	Humanetics	DP4780	451.9	0.004108210	mV/V/Nm
Lower Neck My	Humanetics	DP4780	451.9	0.004146714	mV/V/Nm
Lower Neck Mz	Humanetics	DP4780	226	0.006740265	mV/V/Nm
T1 Ax	Endevco	P79630	2000	0.020870000	mV/V/g
T1 Ay	Endevco	P78880	2000	0.019820000	mV/V/g
T1 Az	Endevco	P82758	2000	0.018610000	mV/V/g
Upper Left Thorax Dx	Humanetics	DS6355			
Upper Left Thorax Ry	Humanetics	DI2382	180	2.978800000	mV/V/deg
Upper Left Thorax Rz	Humanetics	DI2383	180	3.007300000	mV/V/deg
Upper Right Thorax Dx	Humanetics	DJ2613			
Upper Right Thorax Ry	Humanetics	DI7753	180	3.035900000	mV/V/deg
Upper Right Thorax Rz	Humanetics	DI7752	180	3.052400000	mV/V/deg
Lower Left Thorax Dx	Humanetics	DS6353			
Lower Left Thorax Ry	Humanetics	DM4781	180	3.001400000	mV/V/deg
Lower Left Thorax Rz	Humanetics	DS4092	180	3.072500000	mV/V/deg
Lower Right Thorax Dx	Humanetics	DS6354			
Lower Right Thorax Ry	Humanetics	DM4776	180	3.004900000	mV/V/deg
Lower Right Thorax Rz	Humanetics	DM4777	180	2.994700000	mV/V/deg
T6 Ax	Endevco	P49229	2000	0.018010000	mV/V/g
T6 Ay	Endevco	P49215	2000	0.016950000	mV/V/g
T6 Az	Endevco	P52122	2000	0.017050000	mV/V/g
Thoracic Spine Fx	Humanetics	DP2984	13344.7	0.000146365	mV/V/N
Thoracic Spine Fy	Humanetics	DP2984	13344.7	0.000147107	mV/V/N
Thoracic Spine Fz	Humanetics	DP2984	17792.9	0.000060193	mV/V/N
Thoracic Spine Mx	Humanetics	DP2984	677.9	0.002146039	mV/V/Nm
Thoracic Spine My	Humanetics	DP2984	903.9	0.001914371	mV/V/Nm
T12 Ax	Endevco	P74936	2000	0.017350000	mV/V/g
T12 Ay	Endevco	P74937	2000	0.017230000	mV/V/g
T12 Az	Endevco	P52005	2000	0.019870000	mV/V/g
Abdomen Left Dx	Humanetics	DQ2303			
Abdomen Left Ry	Humanetics	DS8363	150	3.024100000	mV/V/deg
Abdomen Left Rz	Humanetics	DS8361	150	3.047400000	mV/V/deg
Abdomen Right Dx	Humanetics	DM2641			
Abdomen Right Ry	Humanetics	DS4094	150	3.012300000	mV/V/deg
Abdomen Right Rz	Humanetics	DS4121	150	3.021800000	mV/V/deg
Acetabulum Right Fx	Humanetics	DP3835	22241.1	0.000118506	mV/V/N
Acetabulum Right Fy	Humanetics	DP3835	13344.7	0.000059342	mV/V/N
Acetabulum Right Fz	Humanetics	DP3835	13344.7	0.000161173	mV/V/N
Acetabulum Left Fx	Humanetics	DP4639	22241.1	0.000121280	mV/V/N
Acetabulum Left Fy	Humanetics	DP4639	13344.7	0.000059432	mV/V/N
Acetabulum Left Fz	Humanetics	DP4639	13344.7	0.000165871	mV/V/N
Pelvis Ax	Endevco	P83434	2000	0.017540000	mV/V/g
Pelvis Ay	Endevco	P82752	2000	0.018310000	mV/V/g
Pelvis Az	Endevco	P80296	2000	0.019410000	mV/V/g
ASIS Right Fx	Humanetics	DP5091	13000	0.000065215	mV/V/N
ASIS Right My	Humanetics	DP5091	325	0.003697538	mV/V/Nm

ASIS Left Fx	Humanetics	DP5092	13000	0.000067323	mV/V/N
ASIS Left My	Humanetics	DP5092	325	0.003688923	mV/V/Nm
Femur Left Fx	Denton	DM4975	15000	0.000143700	mV/V/N
Femur Left Fy	Denton	DM4975	15000	0.000143600	mV/V/N
Femur Left Fz	Denton	DM4975	15000	0.000072700	mV/V/N
Femur Left Mx	Denton	DM4975	350	0.006601400	mV/V/Nm
Femur Left My	Denton	DM4975	350	0.006642000	mV/V/Nm
Femur Left Mz	Denton	DM4975	300	0.008961300	mV/V/Nm
Femur Right Fx	Denton	DM4976	15000	0.000142600	mV/V/N
Femur Right Fy	Denton	DM4976	15000	0.000142900	mV/V/N
Femur Right Fz	Denton	DM4976	15000	0.000072200	mV/V/N
Femur Right Mx	Denton	DM4976	350	0.006505700	mV/V/Nm
Femur Right My	Denton	DM4976	350	0.006488900	mV/V/Nm
Femur Right Mz	Denton	DM4976	300	0.008811600	mV/V/Nm
Upper Tibia Fx	Denton	97	11120	0.00017270	mv/v/N
Upper Tibia Fz	Denton	97	11120	0.00009330	mv/v/N
Upper Tibia Mx	Denton	97	395	0.00733320	mv/v/Nm
Upper Tibia My	Denton	97	395	0.00739800	mv/v/Nm
Lower Tibia Fx	Denton	121	11100	0.00017510	mv/v/N
Lower Tibia Fy	Denton	121	11100	0.00017180	mv/v/N
Lower Tibia Fz	Denton	121	11100	0.00009580	mv/v/N
Lower Tibia Mx	Denton	121	395	0.00739650	mv/v/Nm
Lower Tibia My	Denton	121	395	0.00744720	mv/v/Nm
Ankle Rx	Contelec	0523	180	3.17860	mv/v/deg
Ankle Ry	Contelec	0524	180	3.19060	mv/v/deg
Ankle Rz	Contelec	0525	180	3.18790	mv/v/deg
Knee Dx	Space Age	C2102639B	33	24.09410	mv/v/mm
Leg Ax	Endevco	P77996	2000	0.01803	mv/v/g
Leg Ay	Endevco	P64094	2000	0.02214	mv/v/g
Foot Ax	Endevco	P80271	2000	0.02100	mv/v/g
Foot Ay	Endevco	P74950	2000	0.01782	mv/v/g
Foot Az	Endevco	P51684	2000	0.01953	mv/v/g
Achilles Fz	Denton	136	4448	0.000257800	mv/V/N
Upper Tibia Fx	Denton	75	11120	0.00017350	mv/v/N
Upper Tibia Fz	Denton	75	11120	0.00009520	mv/v/N
Upper Tibia Mx	Denton	75	395	0.00749000	mv/v/Nm
Upper Tibia My	Denton	75	395	0.00747580	mv/v/Nm
Lower Tibia Fx	Denton	166	11100	0.00017560	mv/v/N
Lower Tibia Fy	Denton	166	11100	0.00017130	mv/v/N
Lower Tibia Fz	Denton	166	11100	0.00009950	mv/v/N
Lower Tibia Mx	Denton	166	395	0.00742480	mv/v/Nm
Lower Tibia My	Denton	166	395	0.00737260	mv/v/Nm
Ankle Rx	Contelec	0528	180	3.20220	mv/v/deg
Ankle Ry	Contelec	0526	180	3.15530	mv/v/deg

Ankle Rz	Contelec	0527-1	180	3.16060	mv/v/deg
Knee Dx	Space Age	021033	30	23.25080	mv/v/mm
Leg Ax	Endevco	P82744	2000	0.01827	mv/v/g
Leg Ay	Endevco	P82322	2000	0.01726	mv/v/g
Foot Ax	Endevco	P74976	2000	0.01784	mv/v/g
Foot Ay	Endevco	P83340	2000	0.02038	mv/v/g
Foot Az	Endevco	P83339	2000	0.01990	mv/v/g
Achilles Fz	Denton	129	4448	0.000278100	mv/V/N

Table C- 4: 5th Female Dummy Initial Set-Up Information

5 th Female S/N: 324					
Sensor	Manufacturer	Serial Number	Range	Sensitivity	Sensitivity Units
Head CG Ax	Endevco	P58729	2000	0.018150000	mV/V/g
Head CG Ax	Endevco	P74955	2000	0.018560000	mV/V/g
Head CG Ax	Endevco	P74778	2000	0.017380000	mV/V/g
Head CG RAx	Endevco	P74972	2000	0.017520000	mV/V/g
Head CG RAY	Endevco	P82756	2000	0.017520000	mV/V/g
Head CG RAz	Endevco	P74773	2000	0.018130000	mV/V/g
Head Wx	DTS	ARS5931	18000	0.093230000	mV/V/sec
Head Wy	DTS	ARS4714	18000	0.094490000	mV/V/sec
Head Wz	DTS	ARS6635	18000	0.098430000	mV/V/sec
Upper Neck Fx	Denton	2193	8896.4	0.000189700	mV/V/N
Upper Neck Fy	Denton	2193	8896.4	0.000184400	mV/V/N
Upper Neck Fz	Denton	2193	13344.6	0.000098300	mV/V/N
Upper Neck Mx	Denton	2193	282.5	0.005692000	mV/V/Nm
Upper Neck My	Denton	2193	282.5	0.005724200	mV/V/Nm
Upper Neck Mz	Denton	2193	282.5	0.008138800	mV/V/Nm
Chest Ax	Endevco	P52012	2000	0.017510000	mV/V/g
Chest Ay	Endevco	P80910	2000	0.018350000	mV/V/g
Chest Az	Endevco	P74774	2000	0.017030000	mV/V/g
Chest Dx	Servo	CST324	54	1.752400000	mV/V/deg
Pelvis Ax	Endevco	P80335	2000	0.016810000	mV/V/g
Pelvis Ay	Endevco	P78730	2000	0.017530000	mV/V/g
Pelvis Az	Endevco	P52128	2000	0.016890000	mV/V/g
Femur Right Fz	Denton	1714	13340	0.000108200	mV/V/N
Femur Left Fz	Denton	1702	13340	0.000109400	mV/V/N
Upper Tibia Right Fx	Denton	372	11120.55	0.000171412	mV/V/N
Upper Tibia Right Fy	Denton	372	11120.55	0.000170342	mV/V/N

Upper Tibia Right Fz	Denton	372	11120.55	0.000092630	mV/V/N
Upper Tibia Right Mx	Denton	372	395.4467	0.007423756	mV/V/Nm
Upper Tibia Right My	Denton	372	395.4467	0.007387342	mV/V/Nm
Lower Tibia Right Fx	Denton	405	11120.55	0.000174398	mV/V/N
Lower Tibia Right Fy	Denton	405	11120.55	0.000178211	mV/V/N
Lower Tibia Right Fz	Denton	405	11120.55	0.000093925	mV/V/N
Lower Tibia Right Mx	Denton	405	395.4467	0.007600771	mV/V/Nm
Lower Tibia Right My	Denton	405	395.4467	0.007638450	mV/V/Nm
Upper Tibia Left Fx	Denton	484	11120.55	0.000172159	mV/V/N
Upper Tibia Left Fy	Denton	484	11120.55	0.000170585	mV/V/N
Upper Tibia Left Fz	Denton	484	11120.55	0.000098853	mV/V/N
Upper Tibia Left Mx	Denton	484	395.4467	0.007399480	mV/V/Nm
Upper Tibia Left My	Denton	484	395.4467	0.007426791	mV/V/Nm
Lower Tibia Left Fx	Denton	397	11120.55	0.000174299	mV/V/N
Lower Tibia Left Fy	Denton	397	11120.55	0.000178453	mV/V/N
Lower Tibia Left Fz	Denton	397	11120.55	0.000095040	mV/V/N
Lower Tibia Left Mx	Denton	397	395.4467	0.007559047	mV/V/Nm
Lower Tibia Left My	Denton	397	395.4467	0.007546908	mV/V/Nm
Right Toe Az	Endevco	P82746	2000	0.017850000	mV/V/g
Right Foot Ax	Endevco	P64098	2000	0.023010000	mV/V/g
Right Foot Az	Endevco	P52046	2000	0.019130000	mV/V/g
Left Toe Az	Endevco	P52045	2000	0.020320000	mV/V/g
Left Foot Ax	Endevco	P52055	2000	0.018800000	mV/V/g
Left Foot Az	Endevco	P79408	2000	0.017150000	mV/V/g
RibEye Rib Deflection System	Boxboro	108	N/A	N/A	N/A

Table C- 5: 5th Female Dummy Initial Set-Up Information

5 th Female S/N: 019					
Sensor	Manufacturer	Serial Number	Range	Sensitivity	Sensitivity Units
Head CG Ax	Endevco	P78168	2000	0.017840000	mV/V/g
Head CG Ay	Endevco	P82323	2000	0.018100000	mV/V/g
Head CG Az	Endevco	P58727	2000	0.017660000	mV/V/g
Upper Neck Fx	Denton	2184	8896.4	0.000186800	mV/V/N
Upper Neck Fy	Denton	2184	8896.4	0.000182300	mV/V/N
Upper Neck Fz	Denton	2184	13344.6	0.000098100	mV/V/N
Upper Neck Mx	Denton	2184	282.5	0.005686400	mV/V/Nm
Upper Neck My	Denton	2184	282.5	0.005715100	mV/V/Nm
Upper Neck Mz	Denton	2184	282.5	0.008202000	mV/V/Nm
Chest Ax	Endevco	P83431	2000	0.017910000	mV/V/g
Chest Ay	Endevco	P84365	2000	0.019440000	mV/V/g
Chest Az	Endevco	P84472	2000	0.019240000	mV/V/g

Chest Ds	Servo	FEM019	54	1.831500000	mV/V/deg
Pelvis Ax	Endevco	P84579	2000	0.017590000	mV/V/g
Pelvis Ay	Endevco	P51698	2000	0.022320000	mV/V/g
Pelvis Az	Endevco	P64084	2000	0.023570000	mV/V/g
ASIS Left Fx	Denton	79	8896.4	0.000185400	mV/V/N
ASIS Left My	Denton	79	225.9	0.005273300	mV/V/Nm
ASIS Right Fx	Denton	76	8896.4	0.000185200	mV/V/N
ASIS Right My	Denton	76	225.9	0.005243000	mV/V/Nm
Left Femur Fz	Denton	1394	13340	0.000108800	mV/V/N
Right Femur Fz	Denton	1395	13340	0.000108300	mV/V/N
RibEye Rib Deflection System	Boxboro	107	N/A	N/A	N/A

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 DL9207

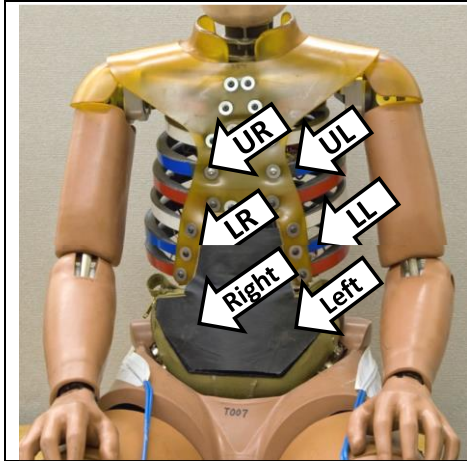


Figure 1. Manipulation to determine thoracic and abdominal IR-TRACC polarity.

Channel	Motion
DX	Push inward
RY	Push upward
RZ	Push rightward

Upper Right Thorax				Upper Left Thorax			
Channel	Initial Value	Expected Polarity	Recorded Polarity	Channel	Initial Value	Expected Polarity	Recorded Polarity
DX (V)	0.12625	+	+	DX (V)	0.14208	+	+
RY (Deg)	8.1864	+	+	RY (Deg)	3.5479	+	+
RZ (Deg)	-8.7763	+	+	RZ (Deg)	11.9783	+	+
Lower Right Thorax				Lower Left Thorax			
Channel	Initial Value	Expected Polarity	Recorded Polarity	Channel	Initial Value	Expected Polarity	Recorded Polarity
DX (V)	0.07354	+	+	DX (V)	0.08948	+	+
RY (Deg)	0.77097	+	+	RY (Deg)	3.7068	+	+
RZ (Deg)	-6.8798	+	+	RZ (Deg)	7.1676	+	+
Abdomen Right				Abdomen Left			
Channel	Initial Value	Expected Polarity	Recorded Polarity	Channel	Initial Value	Expected Polarity	Recorded Polarity
DX (V)	N/A	+	+	DX (V)	N/A	+	+
RY (Deg)	N/A	+	+	RY (Deg)	N/A	+	+
RZ (Deg)	N/A	+	+	RZ (Deg)	N/A	+	+

THOR Inspection Checklist

Date: 8/25/2015		
NHTSA Representative: Timothy Keon		
Inspection Reporter: Matt Goehle		
Inspection type (check one): ☒ Pre-Test ☐ Post-Test		
Dummy S/N: DL9207	Legs S/N: LX0045/LX0046	
Dummy Description: THOR-M 50th Male		
Date of last Certification: Certification performed from 7/2014 through 4/2015		
<u>Tests conducted:</u> <u>Since last inspection:</u> R20155404 - 2015 F-150 <u>Since last certification:</u> S0309 (at UVA)	S0310 (at UVA) S0311 (at UVA) S0312 (at UVA) LX Leg certification performed R20150186 - 2015 Malibu	R20150187 - 2015 Malibu R20155144 – 2015 Highlander LX Leg certification performed R20155404 - 2015 F-150
<u>Known errors in data channels (no data, clipping, unexpected drops):</u> - 11HEADCG00THACYP,Head CG Y Acceleration, Questionable spikes throughout, SN:AC-P81384 - Spikes occur while shaking the amphenol connection. Pins are spread on the female connection. -We retightened the pins, retested, and it no longer shows spikes. - 11TIBIRILXTHACYP,Right Tibia Y Acceleration, Questionable data throughout, SN:AC-P82322 - Input and output circuits are open. Cable break found where the cable is run near the Iliac load cell. - We spliced the cable together, retested, and secured to the outside of pelvis flesh with more gaffers tape to reduce the chance of the wire snagging on something again.		
<u>Physical evidence of damage:</u> None New		
<u>Anecdotal evidence of damage:</u> None		
<u>Equipment delivered to Borrower:</u> THOR DL9207 ATD 26 Accelerometers 3 Angular Rate Sensors 2 Skull Spring LC 1 Condyle Pot 1 Upper Neck LC 6 IRTraccs 12 Rotational Pots 1 Spine LC 2 Acetabulum LC 2 ASIS LC 2 Femur LC	<i>Continued</i> 2 LX Leg Assemblies 2 Upper Tibia LC 2 Lower Tibia LC 6 Ank1e Potentiometers 2 Knee Sliders 1 Neck Skin 1 Neck Foam 1 Tiltview Interface Cable 4 Tilt Sensors 1 H-Point Tool 1 Tool Box 1 Laptop	

Note: New Damage is Noted in Red

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

ABDOMEN	
Y / N	No evidence of tearing, cuts, or broken stitches in upper abdomen bag and zipper
Y / N	Upper abdomen insert securely attached to spine
Y / N	Upper abdomen insert shows no evidence of permanent set
Y / N	No evidence of tearing, cuts, or broken stitches in lower abdomen bag and zipper Multiple tears and broken stitches in lower abdomen bag. The upper and lower abdomen bags appear to be from THOR SN007
	
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	Left femur flesh is separating from zipper. We placed gaffer's tape across zipper to prevent further damage. 

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

THOR Inspection Checklist

Date: 8/26/2015		
NHTSA Representative: Timothy Keon		
Inspection Reporter: Matt Goehle		
Inspection type (check one): ☐ Pre-Test ☒ Post-Test		
Dummy S/N: DL9207	Legs S/N: LX0045/LX0046	
Dummy Description: THOR-M 50th Male		
Date of last Certification: Certification performed from 7/2014 through 4/2015		
<u>Tests conducted:</u> <u>Since last inspection:</u> R20155404 - 2015 Mazda <u>Since last certification:</u> S0309 (at UVA)	S0310 (at UVA) S0311 (at UVA) S0312 (at UVA) LX Leg certification performed R20150186 - 2015 Malibu	R20150187 - 2015 Malibu R20155144 - 2015 Highlander LX Leg certification performed R20150228 - 2015 F-150 R20155404 - 2015 Mazda
<u>Known errors in data channels (no data, clipping, unexpected drops):</u> - 11NECKFR00THFO0P, Front Neck Spring Tower Load Cell, Channel saturated from 117ms to 123ms, SN:LC-DO9740 - We found an omnetics cable junction in the neck cable bundle that had disconnected. - We reconnected the connectors and retested okay. To reduce these little omnetics connectors from separating, we install a ziptie underneath the release mechanism and add heatshrink around the entire connection. We did this for both neck spring load cell cables - 11ABDOLL00THVO0P, Abdomen Left DGIR X Displacement, Questionable spikes throughout, SN:DS-DQ2303 - We are unable to repeat these spikes by shaking wires and connectors, and there do not seem to be any electrical issues. We disassembled the IRTRACC to discover that a snap ring from the smallest diameter telescoping sections had fallen out, and was likely interfering with the LED-to-sensor path. - We reinstalled the snap ring, ensured it was seated properly, reassembled the dummy, and retested.		
<u>Physical evidence of damage:</u> See Report – Knee Flesh		
<u>Anecdotal evidence of damage:</u> None		
<u>Equipment delivered to Borrower:</u> THOR DL9207 ATD 26 Accelerometers 3 Angular Rate Sensors 2 Skull Spring LC 1 Condyle Pot 1 Upper Neck LC 6 IRTraccs 12 Rotational Pots 1 Spine LC 2 Acetabulum LC 2 ASIS LC 2 Femur LC	<i>Continued</i> 2 LX Leg Assemblies 2 Upper Tibia LC 2 Lower Tibia LC 6 Ank1e Potentiometers 2 Knee Sliders 1 Neck Skin 1 Neck Foam 1 Tiltview Interface Cable 4 Tilt Sensors 1 H-Point Tool 1 Tool Box 1 Laptop	

Note: New Damage is Noted in Red

HEAD	
Y / N	Rear head cap mounts securely to head
Y / N	Head skin fits securely over skull
Y / N	Head skin shows no sign of tears or damage
Y / N	Interior components of skull cavity (ballast, accelerometer mount, accelerometers) securely attached
Y / N	Head securely mounted to OC joint
OTHER	
NECK	
Y / N	Neck cables slide freely through holes in neck plates
Y / N	Neck cables show no sign of fraying, broken strands, or kinking
Y / N	No evidence of de-bonding between neck pucks and plates
Y / N	No evidence of de-bonding or permanent compression in neck soft stop assemblies
Y / N	Neck securely attached to upper neck load cell
Y / N	Neck securely attached to lower neck load cell
Y / N	Neck pitch change joint mechanism mating teeth are engaged
OTHER	
SHOULDER	
Y / N	Urethane shoulder pads show no evidence of contact
Y / N	Clavicles securely attached to sternum and shoulder
Y / N	No evidence of de-bonding, tearing, or permanent compression of posterior soft stops
OTHER	
SPINE	
Y / N	No evidence of de-bonding between thoracic spine flex joint and metal plates
Y / N	No evidence of de-bonding between lumbar spine flex joint and metal plates
Y / N	Lumbar spine pitch change joint mechanism mating teeth are engaged
OTHER	
THORAX	
Y / N	No evidence of contact at top, bottom, or interior faces of rib damping material
Y / N	No evidence of de-bonding between rib damping material and ribs
Y / N	IRTRACCs securely attached to anterior ribs
Y / N	IRTRACCs securely attached to double gimbals, spine
Y / N	Urethane bib is securely attached to ribs with no sign of tearing or washer penetration
Y / N	Ribs securely attached to posterior spine
Y / N	Rib stiffeners show no evidence of bending (no gaps between ribs and stiffeners)
OTHER	
ABDOMEN	
Y / N	No evidence of tearing, cuts, or broken stitches in upper abdomen bag and zipper
Y / N	Upper abdomen insert securely attached to spine
Y / N	Upper abdomen insert shows no evidence of permanent set
Y / N	No evidence of tearing, cuts, or broken stitches in lower abdomen bag and zipper Multiple tears and broken stitches in lower abdomen bag. The upper and lower abdomen bags appear to be from THOR SN007
	

	
Y / N	Lower abdomen insert securely attached to spine
Y / N	Lower abdomen insert shows no evidence of permanent set
OTHER	Left ITRACC snap ring was loose upon disassembly of the telescoping section. 
PELVIS	
Y / N	Pelvis flesh fits securely over pelvis bones
Y / N	H-point tool fits securely into hole on both sides of pelvis
OTHER	
FEMUR	
Y / N	Acetabular load cells firmly attached
Y / N	Femur load cells firmly attached
Y / N	No evidence of deformation of knee slider bump stop
Y / N	No cuts, tears, or scuffing of knee flesh Right knee flesh torn 
OTHER	Left femur flesh is separating from zipper. We placed gaffer's tape across zipper to prevent further damage. 

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

ATD 324: Pre-Test Inspection



FM-ATD-DC5F-031-R00

Damage Checklist Hybrid III – 5th Female

Dummy Serial Number 324

Technician M. Hartung

Test Date 8/18/15

☒ Pre-test calibration
☐ Post-test calibration

- 1) Clean dummy and disassemble as necessary to check for damage.
- 2) Complete the following table and throughout the certification process, note any physical or anecdotal damage on this form.

Dummy Item	Inspect for	Comments	Damaged	OK
Outer skin	Gashes, rips, cracks			☒
Head	Ballast secure			☒
	General appearance <i>See tear repair (K) Abrasion on nose</i>			☒
Neck	Broken or cracked rubber			☒
	Upper neck bracket firmly attached to the lower neck bracket			☒
	Looseness at the condyle joint			☒
	Nodding blocks cracked or out of position			☒
Spine	Broken or cracks in rubber.			☒
Ribs	Broken or bent ribs			☒
	Broken or bent rib supports			☒
	Damping material separated or cracked			☒
	Rubber bumpers in place			☒
Chest	Bent shaft			☒
Potentiometer	Slider arm riding in track			☒
Transducer leads	Torn cables			☒
Accelerometer Mountings	Head mounting secure			☒
	Chest mounting secure			☒
Knees	Skin condition			☒
	Insert (do not remove)			☒
	Casting			☒
Limbs	Normal movement and adjustment			☒
Knee Sliders	Wires intact			☒
	Rubber returned to "at rest" position			<i>Not</i>
Pelvis	Broken			☒
Other				☒

(Discuss any damage with the lab supervisor and if replacement parts are required, complete the "Parts Requested from NHTSA" Section of the Certification Workbook, and forward this form to Calspan's Contracts Department.)

Signature M. Hartung

Date 8/18/15

ATD 324: Post-Test Inspection

FM-ATD-DC5F-031-R01
Damage Inspection – Hybrid III 5th Female



Damage Inspection Hybrid III – 5th Female

Dummy Serial Number 324

Technician M. Hartung

Test Date 8/25/15

- ☒ 1) Clean dummy and disassemble as necessary to check for damage.
- ☒ 2) Complete the following table and throughout the certification process, note any physical or anecdotal damage on this form.
- ☒ 3) Take 4 surround photos and photos of any damage and save on server.

Dummy Item	Inspect for	Comments	Damaged	OK
Outer skin	Gashes, rips, cracks			☒
Head	Ballast secure			☒
	General appearance <i>sin tear @ rear / abrasion/burn on nose</i>			☒
Neck	Broken or cracked rubber			☒
	Upper neck bracket firmly attached to the lower neck bracket			☒
	Looseness at the condyle joint			☒
	Nodding blocks cracked or out of position			☒
Spine	Broken or cracks in rubber.			☒
Ribs	Broken or bent ribs			☒
	Broken or bent rib supports			☒
	Damping material separated or cracked			☒
	Rubber bumpers in place			☒
Chest	Bent shaft			☒
Potentiometer	Slider arm riding in track			☒
Transducers	Torn cables			☒
Accelerometer Mountings	Head mounting secure			☒
	Chest mounting secure			☒
Knees	Skin condition			☒
	Insert (do not remove)			☒
	Casting			☒
Limbs	Normal movement and adjustment			☒
Knee Sliders	Wires intact			☒
	Rubber returned to "at rest" position			☒
Pelvis	Broken			☒
Other	<i>Ribeye</i>			☒

(Discuss any damage with the lab supervisor and if replacement parts are required, complete the "Parts Requested from NHTSA" Section of the Certification Workbook, and forward this form to Calspan's Contracts Department.)

M. Hartung
Signature

8/25/15
Date

ATD 019: Pre-Test Inspection



FM-ATD-DC5F-031-R00

Damage Checklist Hybrid III – 5th Female

Dummy Serial Number 019

Technician M. Harding

Test Date 8/18/15

- ☒ Pre-test calibration
☒ Post-test calibration

- 1) Clean dummy and disassemble as necessary to check for damage.
2) Complete the following table and throughout the certification process, note any physical or anecdotal damage on this form.

Dummy Item	Inspect for	Comments	Damaged	OK
Outer skin	Gashes, rips, cracks			☒
Head	Ballast secure			☒
	General appearance			☒
Neck	Broken or cracked rubber			☒
	Upper neck bracket firmly attached to the lower neck bracket			☒
	Looseness at the condyle joint			☒
	Nodding blocks cracked or out of position			☒
Spine	Broken or cracks in rubber.			☒
Ribs	Broken or bent ribs			☒
	Broken or bent rib supports			☒
	Damping material separated or cracked			☒
	Rubber bumpers in place			☒
Chest	Bent shaft			☒
Potentiometer	Slider arm riding in track			☒
Transducer leads	Torn cables	<u>Two HARD X & Insulation - 2</u>	☒	☒
Accelerometer Mountings	Head mounting secure			☒
	Chest mounting secure			☒
Knees	Skin condition			☒
	Insert (do not remove)			☒
	Casting			☒
Limbs	Normal movement and adjustment			☒
Knee Sliders	Wires intact			☒
	Rubber returned to "at rest" position			☒
Pelvis	Broken			☒
Other	<u>Rib Eye</u>	<u>Not Functioning</u>		☒

(Discuss any damage with the lab supervisor and if replacement parts are required, complete the "Parts Requested from NHTSA" Section of the Certification Workbook, and forward this form to Calspan's Contracts Department.)

Signature M. Harding

Date 8/18/15

ATD 019: Post-Test Inspection

FM-ATD-DC5F-031-R01
Damage Inspection – Hybrid III 5th Female



Damage Inspection Hybrid III – 5th Female

Dummy Serial Number 019

Technician M. Hartung

Test Date 8/25/15

- 1) Clean dummy and disassemble as necessary to check for damage.
- 2) Complete the following table and throughout the certification process, note any physical or anecdotal damage on this form.
- 3) Take 4 surround photos and photos of any damage and save on server.

Dummy Item	Inspect for	Comments	Damaged	OK
Outer skin	Gashes, rips, cracks	Seatbelt mark (R) collar		✓
Head	Ballast secure			✓
	General appearance	black mark from (L) eyebrow to skull cap		✓
Neck	Broken or cracked rubber			✓
	Upper neck bracket firmly attached to the lower neck bracket			✓
	Looseness at the condyle joint			✓
	Nodding blocks cracked or out of position			✓
Spine	Broken or cracks in rubber.			✓
Ribs	Broken or bent ribs			✓
	Broken or bent rib supports			✓
	Damping material separated or cracked			✓
	Rubber bumpers in place			✓
Chest	Bent shaft			✓
Potentiometer	Slider arm riding in track			✓
Transducers	Torn cables			✓
Accelerometer Mountings	Head mounting secure			✓
	Chest mounting secure			✓
Knees	Skin condition			✓
	Insert (do not remove)			✓
	Casting			✓
Limbs	Normal movement and adjustment			✓
Knee Sliders	Wires intact			✓
	Rubber returned to "at rest" position			✓
Pelvis	Broken			✓
Other	Rib eye			✓

(Discuss any damage with the lab supervisor and if replacement parts are required, complete the "Parts Requested from NHTSA" Section of the Certification Workbook, and forward this form to Calspan's Contracts Department.)

Signature M. Hartung

Date 8/25/15

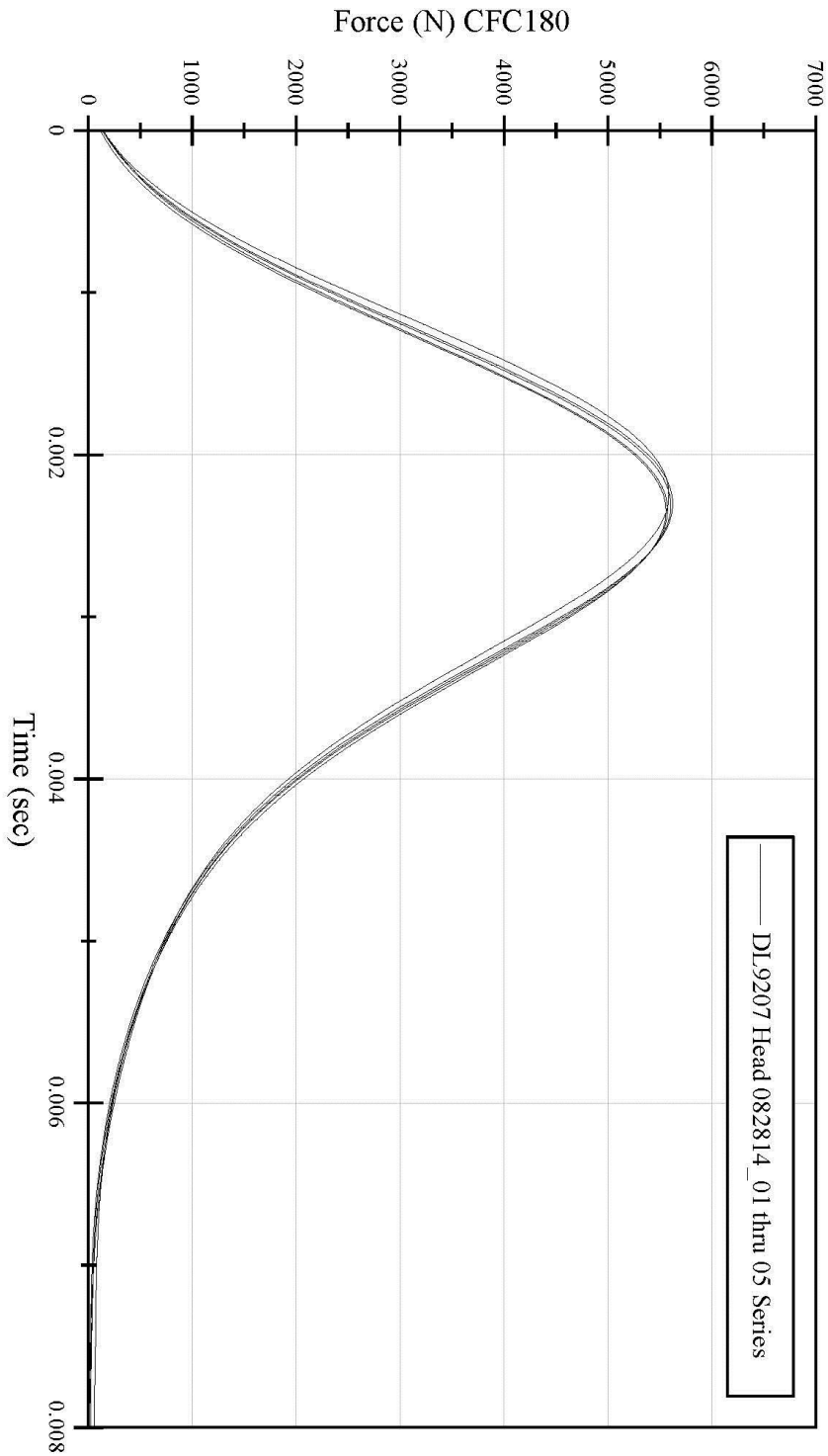
Test Data/Sensor Repair Notes

DUMMY CALIBRATIONS

50% ADULT MALE THOR DL9207 DUMMY CALIBRATIONS

Test Temperature: 71 degrees
Relative Humidity: 50%
Test Velocity: 2 m/s

THOR Head Impact Qualification
Probe Force
Serial Number: DL9207

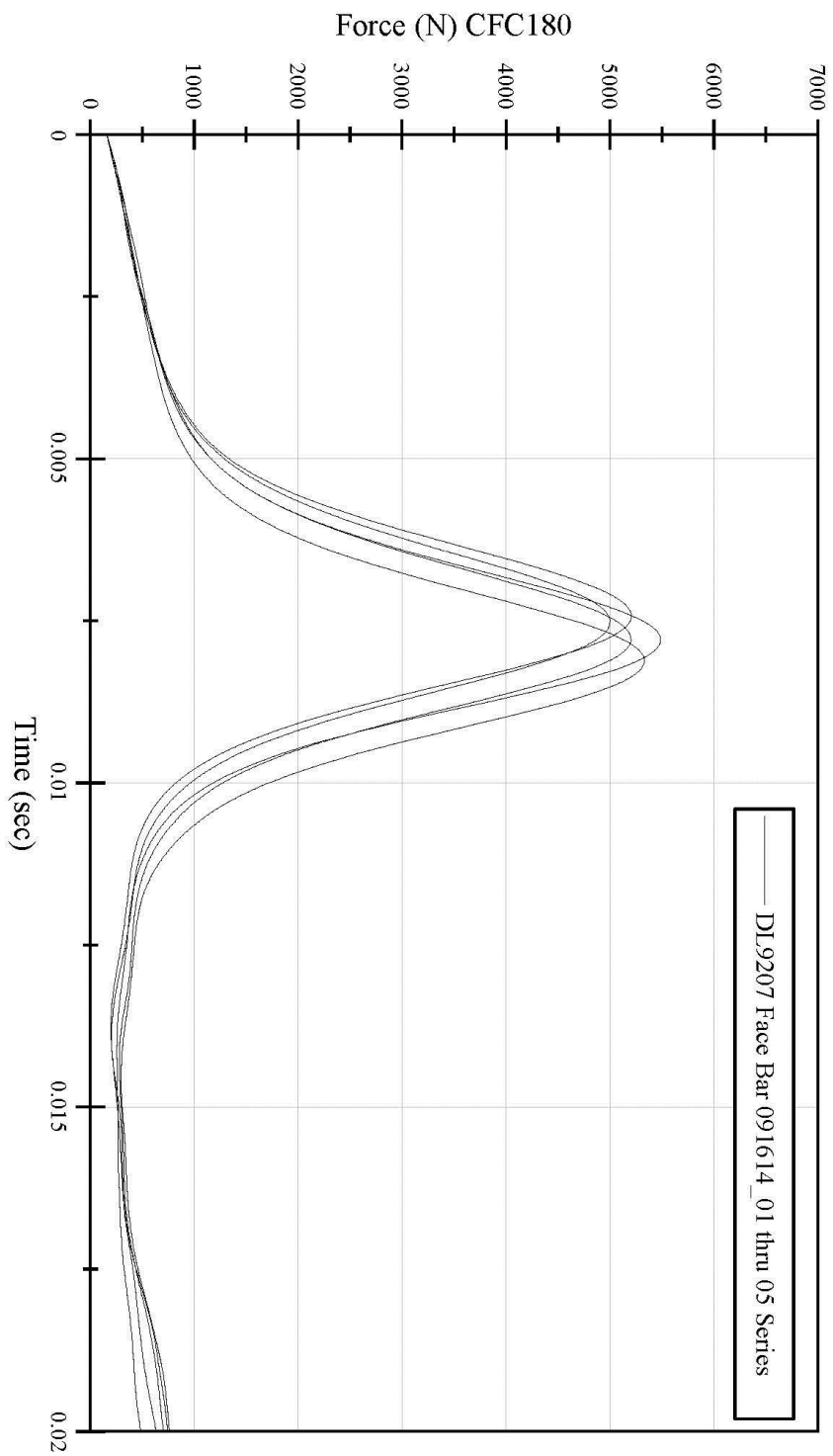


Software Version:

File Name: DL9207Head082814_01 thru 05 Series patrick
08/28/2014 14:08:19.0000

Test Temperature: 71 degrees
Relative Humidity: 44%
Test Velocity: 3.60 m/s

THOR Face-Bar Qualification
Probe Force
Serial Number: DL9207

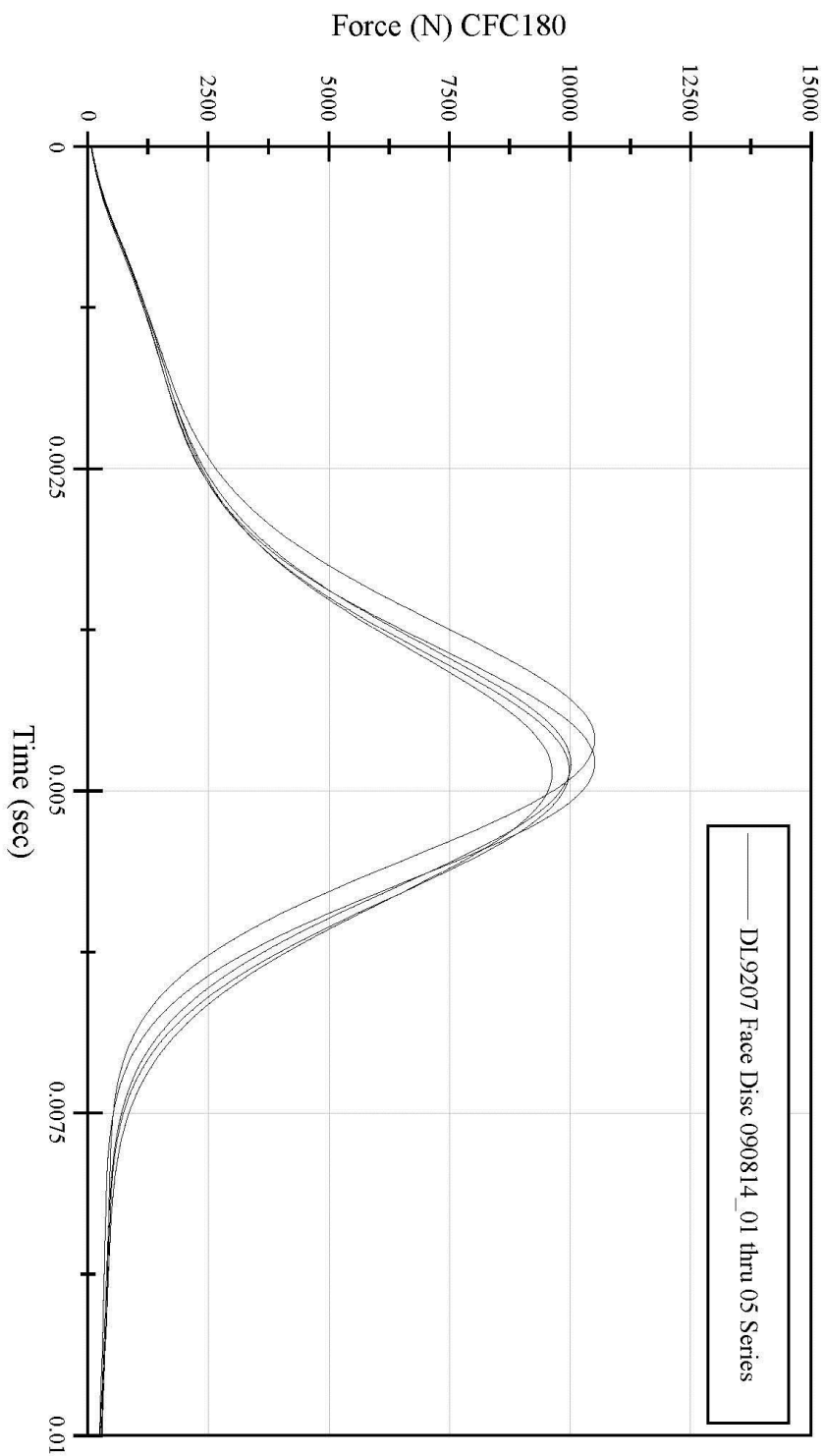


Software Version:

File Name: DL9207FaceBar091614_01 thru 05 Series patrick
09/16/2014 13:05:36.0000

Test Temperature: 71 degrees
Relative Humidity: 50%
Test Velocity: 6.68 m/s

THOR Face-Disk Qualification
Probe Force
Serial Number: DL9207

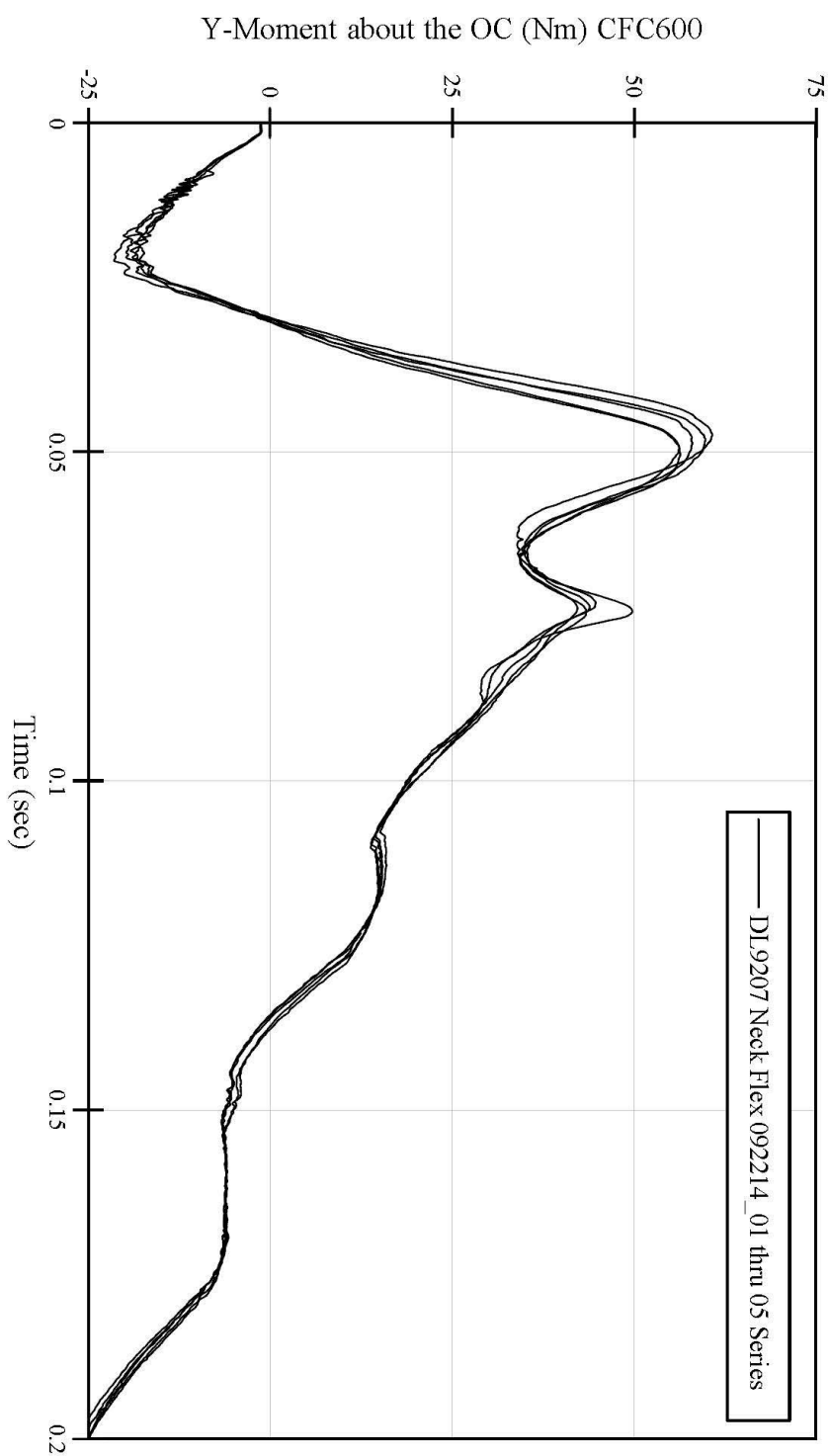


Software Version:

File Name: DL9207FaceDisc090814_01 thru 05 Series patrick
09/08/2014 14:44:59.0000

Test Temperature: 71 degrees
Relative Humidity: 50%
Test Velocity: 5.00 m/s

THOR Neck Flexion Qualification
Y-Moment
Serial Number: DL9207

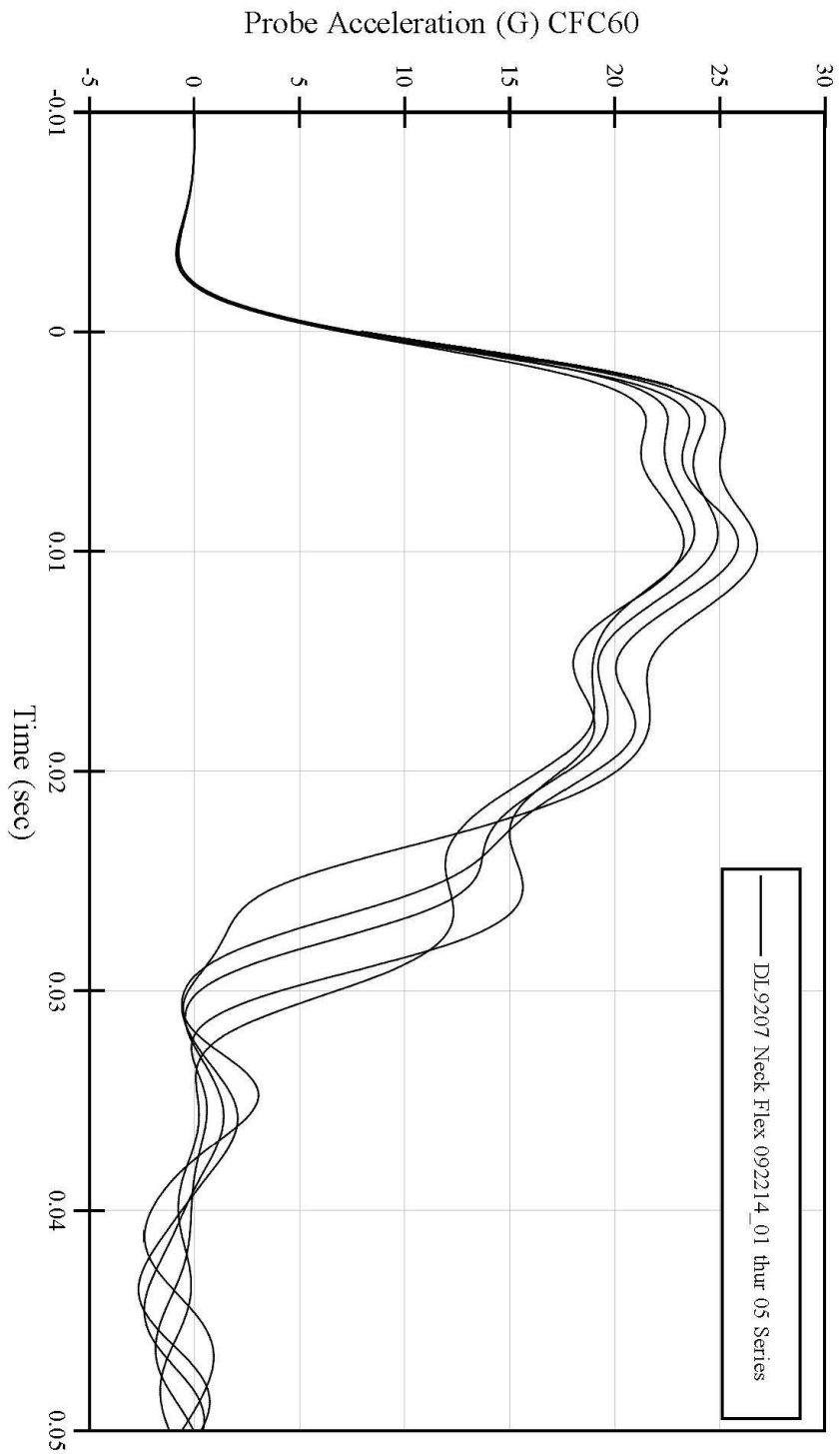


Software Version:

File Name: DL9207NeckFlex092214_01 thru 05 series patrick
09/22/2014 15:12:10.0000

Test Temperature: 71 degrees
Relative Humidity: 50%
Test Velocity: 5.00 m/s

THOR Neck Flexion Qualification
Probe Acceleration
Serial Number: DL9207

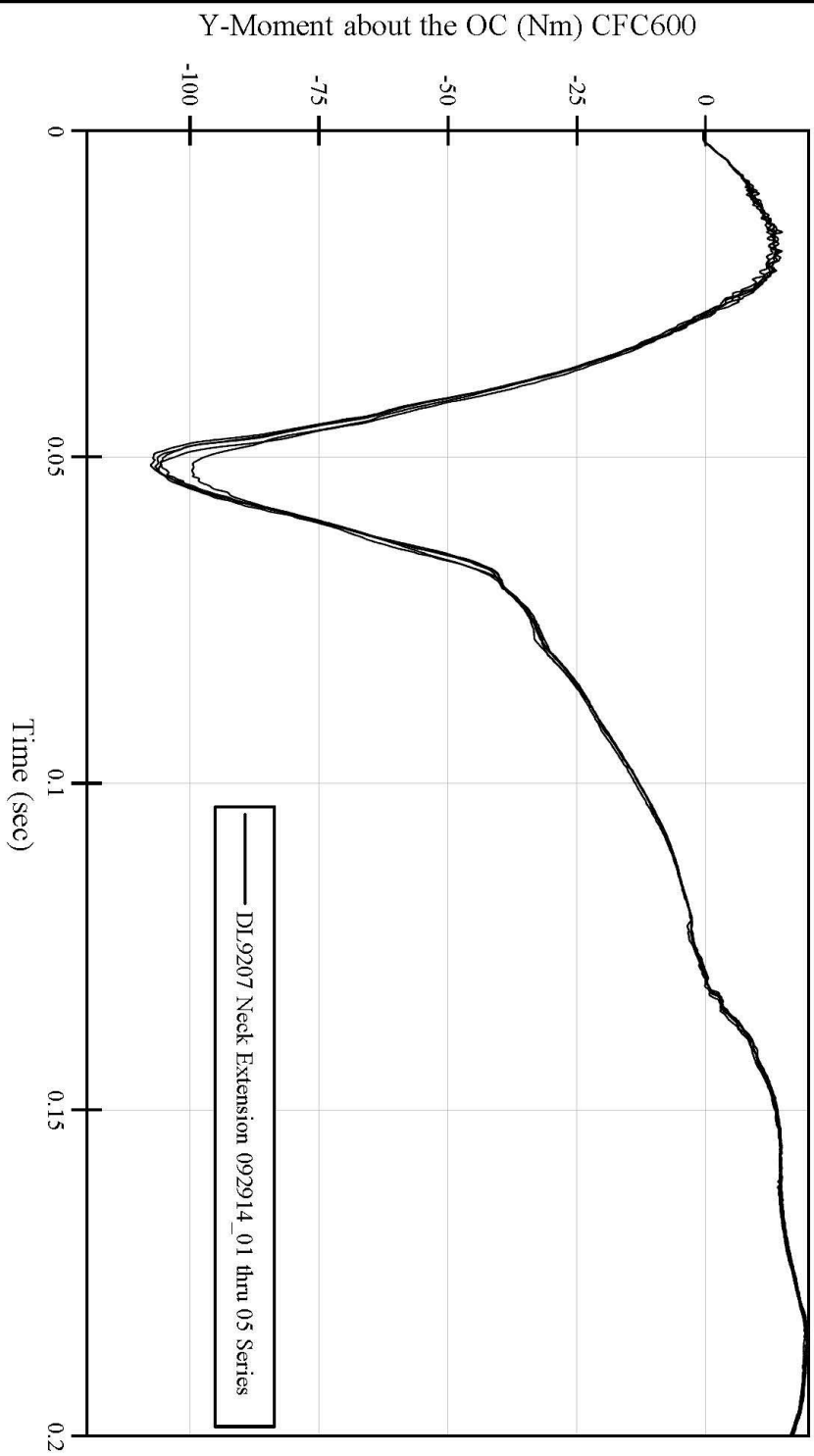


Software Version:

File Name: DL9207NeckFlex092214_01 thru 05 series patrick
09/22/2014 15:12:10.0000

Test Temperature: 71 degrees
Relative Humidity: 50%
Test Velocity: 5.04 m/s

THOR Neck Extension Qualification
Y-Moment
Serial Number: DL9207

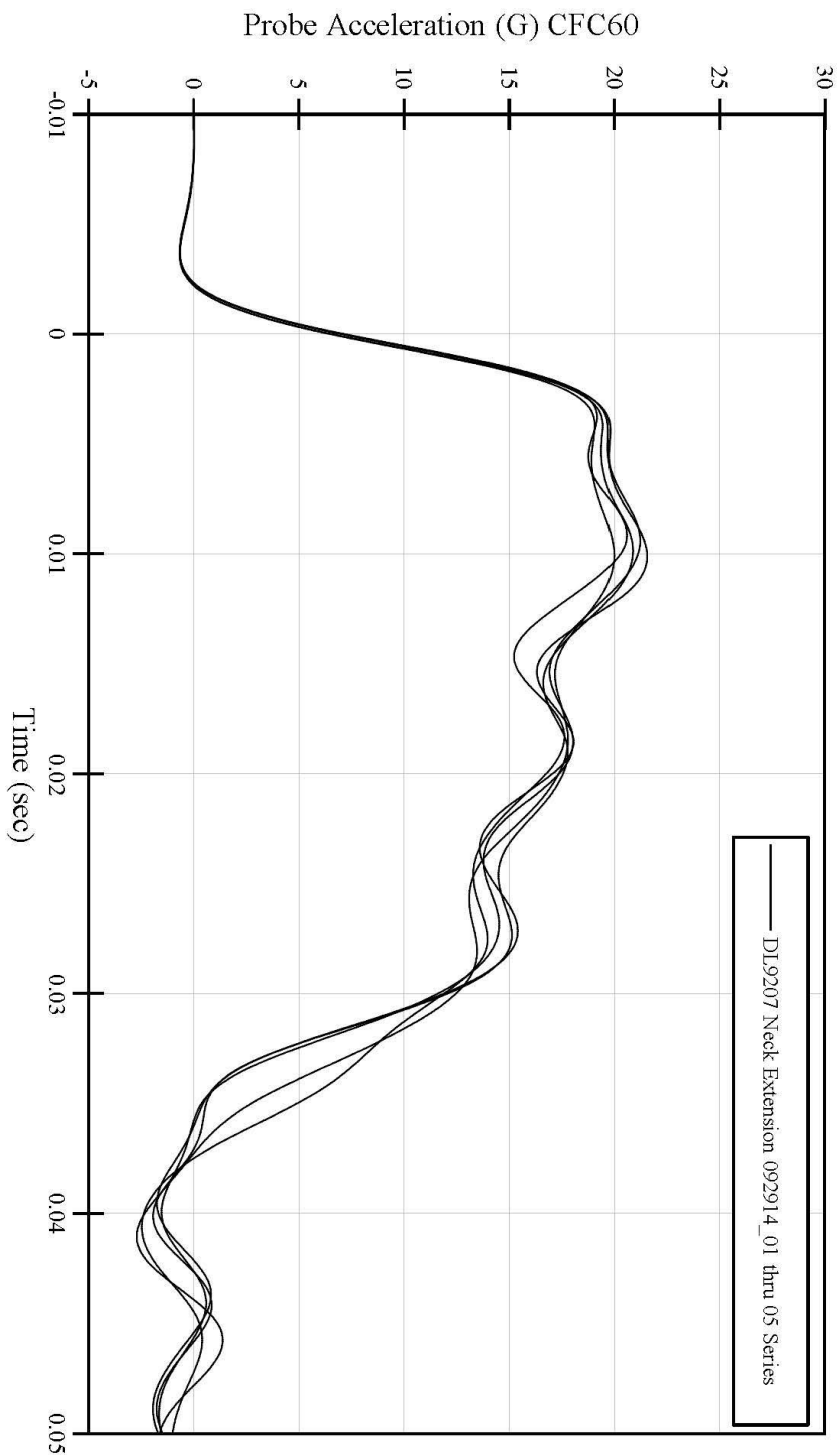


Software Version:

File Name: DL9207NeckExtension092914_01 thru 05 Series patrick
09/30/2014 09:17:19.0000

Test Temperature: 71 degrees
Relative Humidity: 50%
Test Velocity: 5.04 m/s

THOR Neck Extension Qualification
Probe Acceleration
Serial Number: DL9207



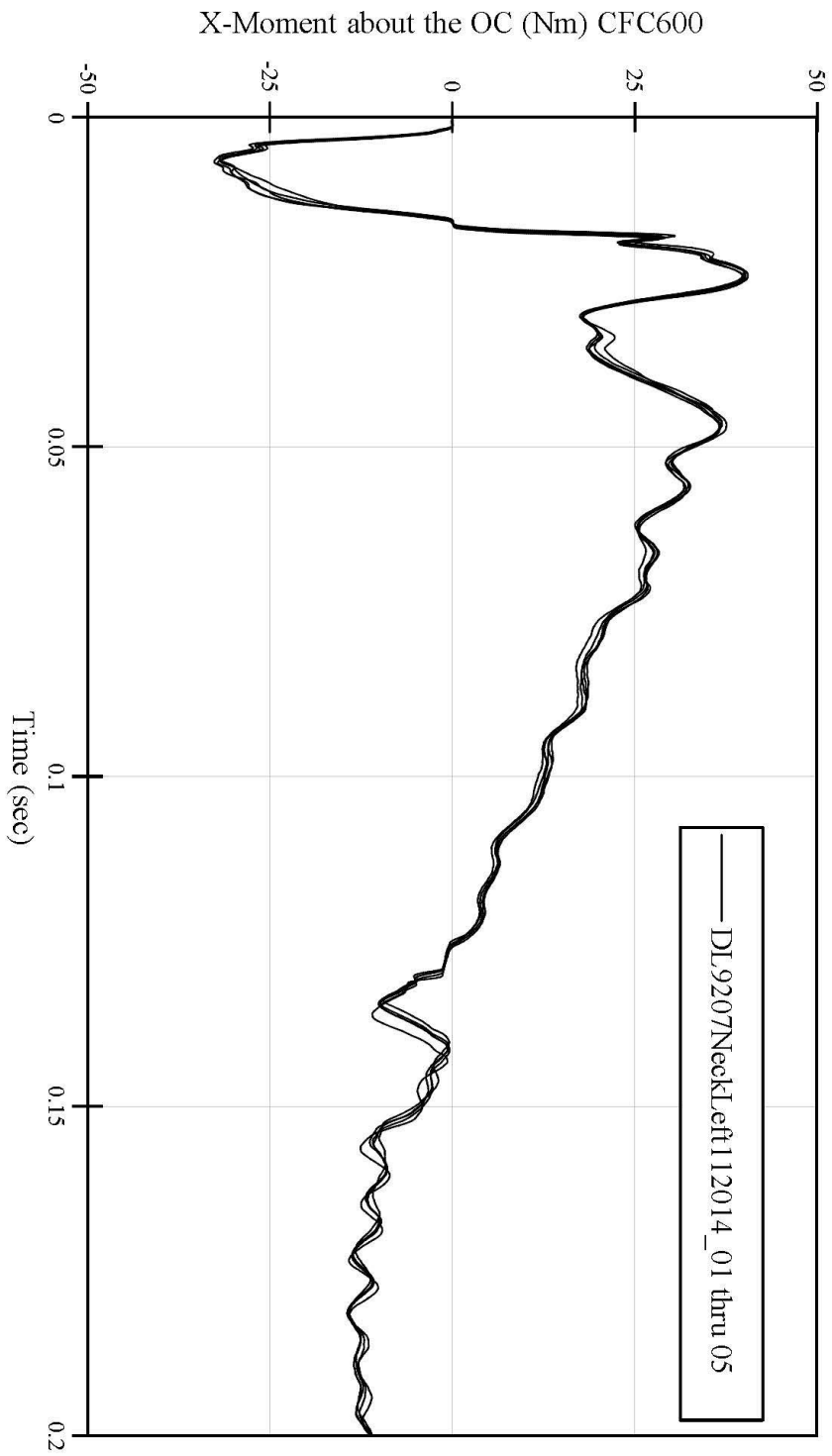
Software Version:

File Name: DL9207NeckExtension092914_01 thru 05 Series patrick
09/30/2014 09:17:19.0000

Test Temperature: 71 degrees
Relative Humidity: 30%
Test Velocity: 3.43 m/s

THOR Neck Left Lateral Flexion Qualification

X-Moment
Serial Number: DL9207



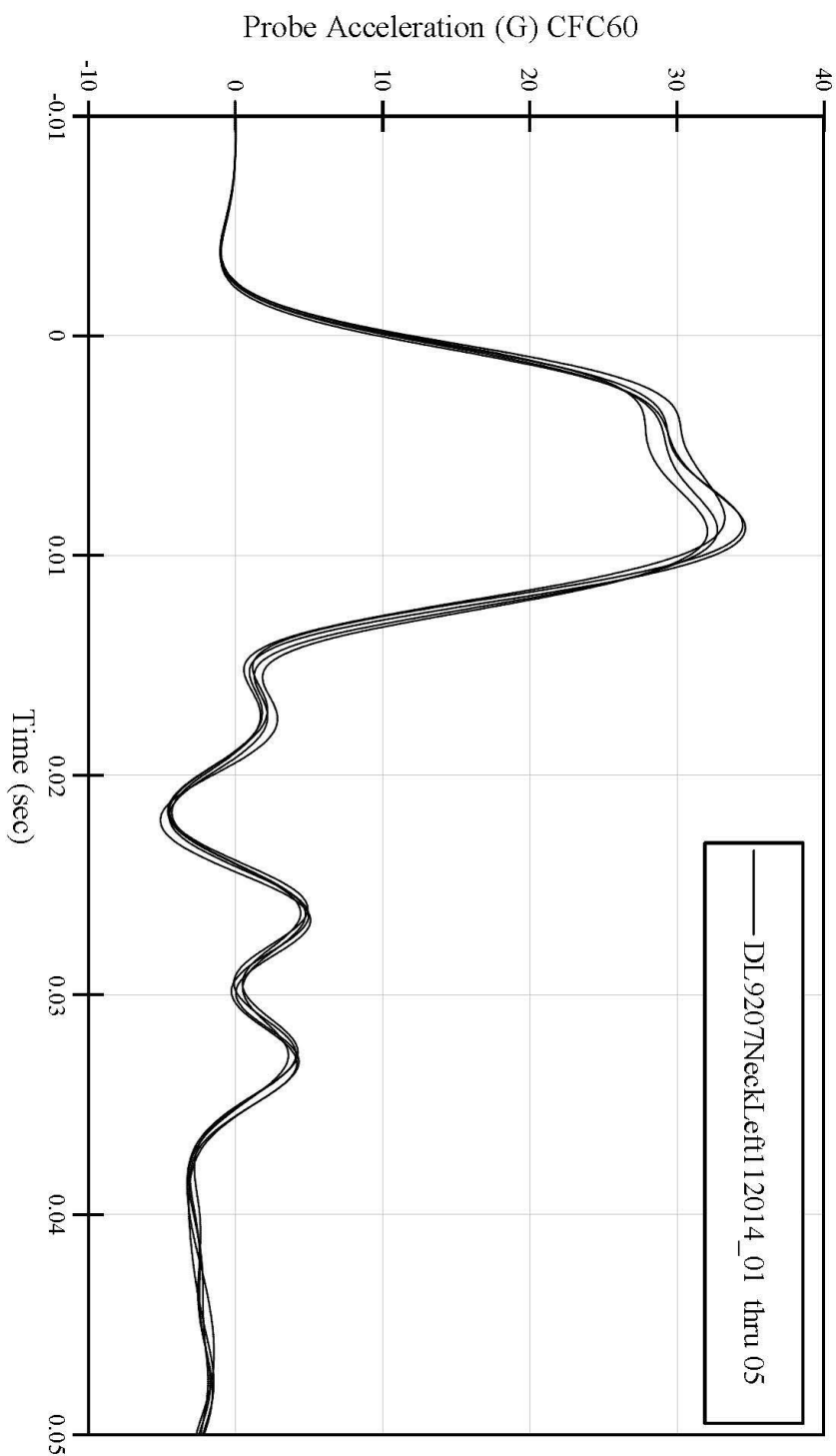
Software Version:

File Name: DL9207NeckLeft112014_01 thru 05 patrick
11/20/2014 12:31:49.0000

Test Temperature: 71 degrees
Relative Humidity: 30%
Test Velocity: 3.43 m/s

THOR Neck Left Lateral Flexion Qualification

Probe Acceleration
Serial Number: DL9207



Software Version:

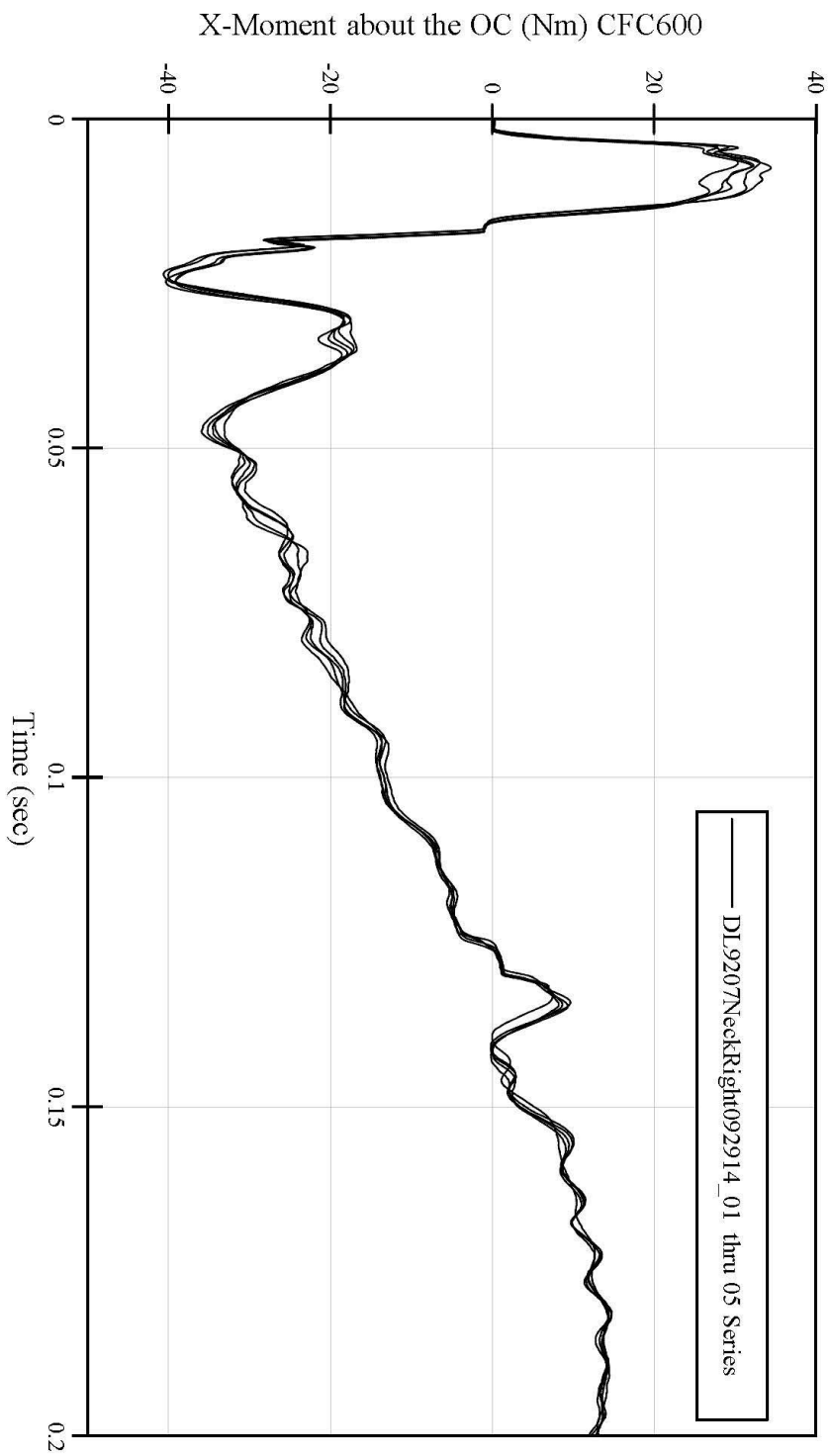
File Name: DL9207NeckLeft112014_01 thru 05 patrick
11/20/2014 12:31:49.0000

Test Temperature: 71 degrees
Relative Humidity: 50%
Test Velocity: 3.39 m/s

THOR Neck Right Lateral Flexion Qualification

X-Moment

Serial Number: DL9207



Software Version:

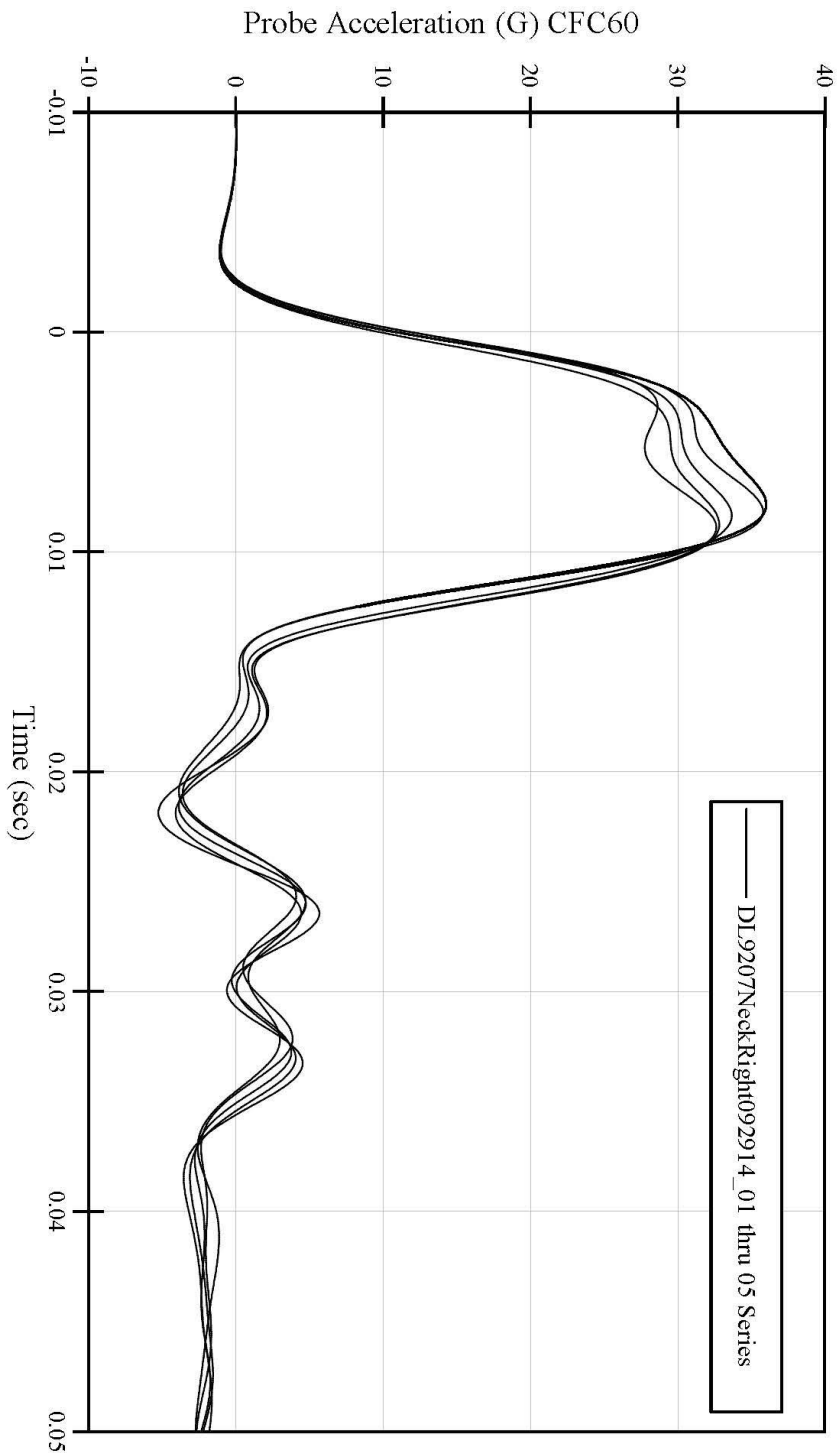
File Name: DL9207NeckRight092914_01 thru 05 Series patrick
09/30/2014 09:09:35.0000

Test Temperature: 71 degrees
Relative Humidity: 50%
Test Velocity: 3.39 m/s

THOR Neck Right Lateral Flexion Qualification

Probe Acceleration

Serial Number: DL9207

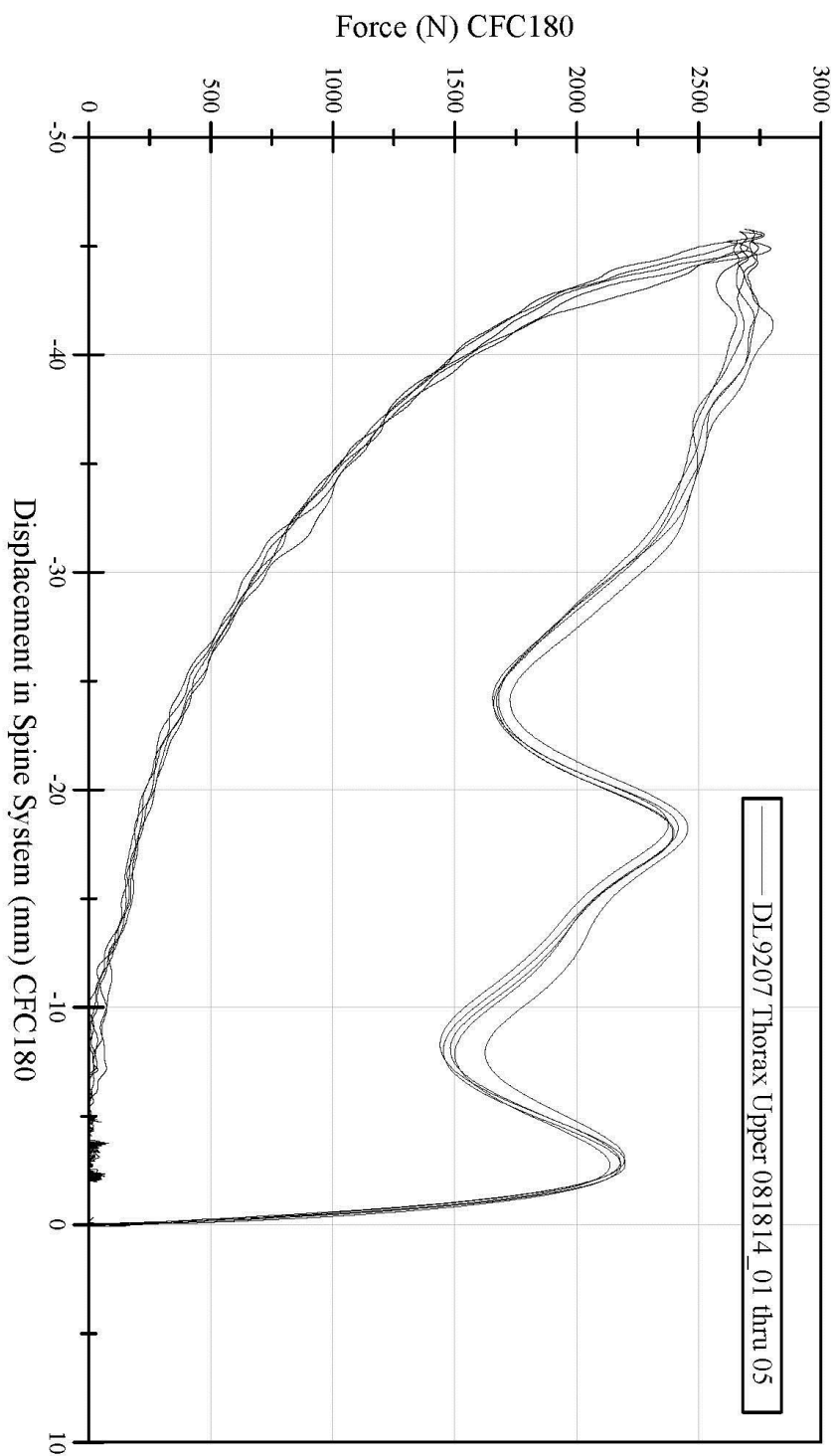


Software Version:

File Name: DL9207NeckRight092914_01 thru 05 Series patrick
09/30/2014 09:09:35.0000

Test Temperature: 71 degrees
Relative Humidity: 50%
Test Velocity: 4.34 m/s

THOR Upper Thorax Qualification
Serial Number: DL9207

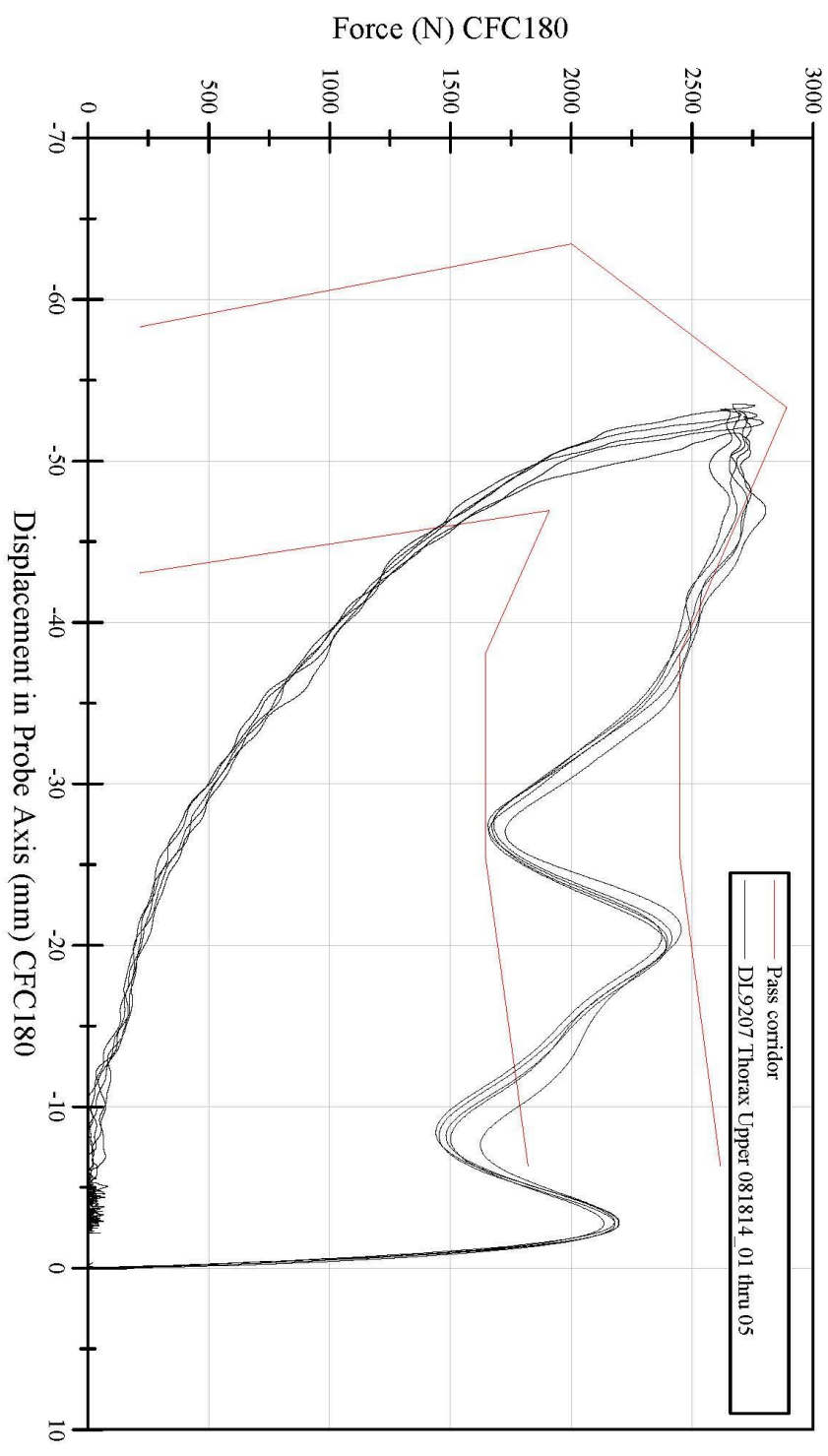


Software Version: 2.5

File Name: DL9207ThoraxUpper081814_01_DIADEMHeader_BINARY.patrick.tdms
08/21/2014 10:13:55.0000

Test Temperature: 71 degrees
Relative Humidity: 50%
Test Velocity: 4.34 m/s

THOR Upper Thorax Qualification
Thorax Response With Kroell Corridor
Serial Number: DL9207

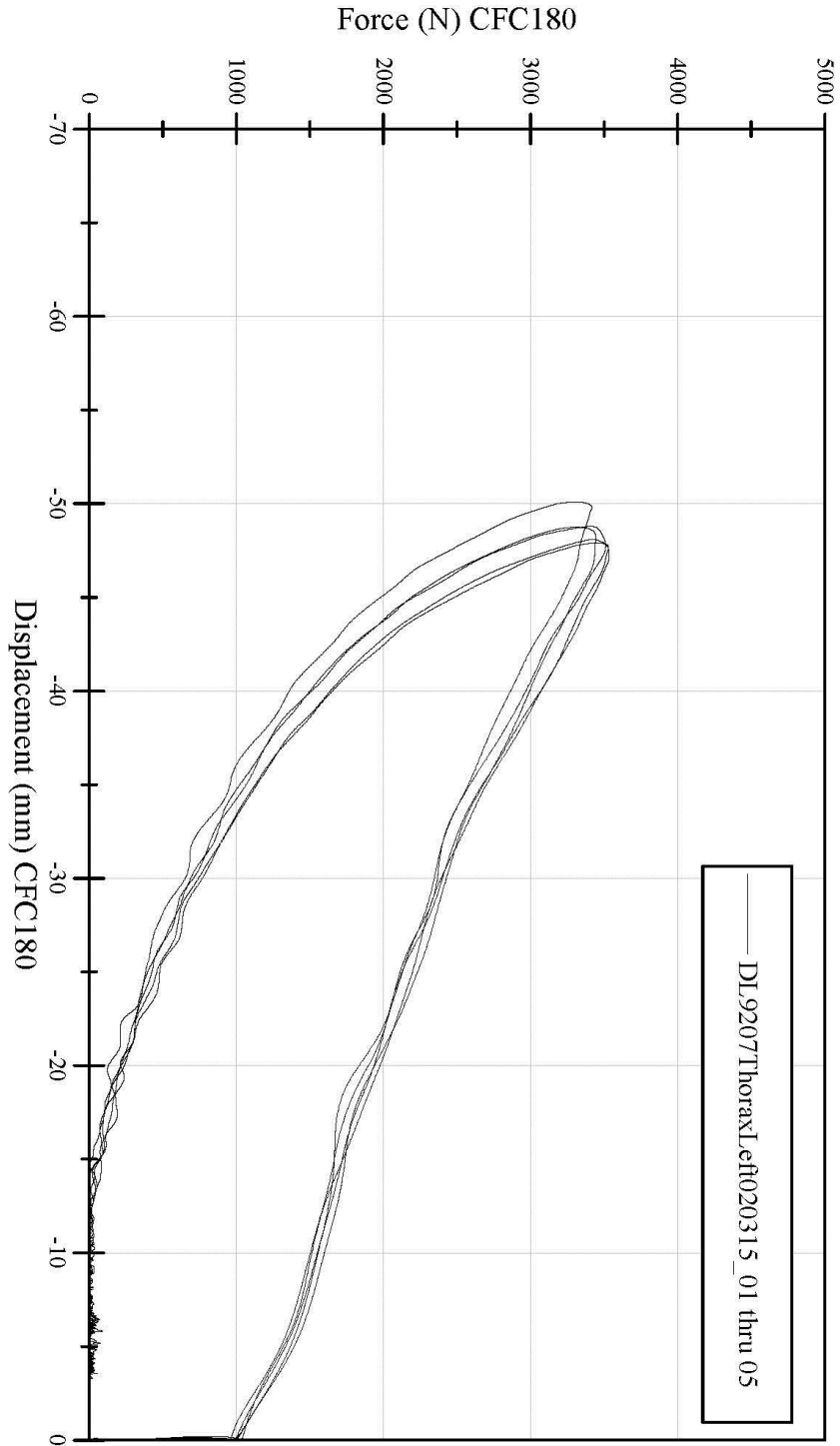


Software Version: 2.5

File Name: DL9207ThoraxUpper081814_01_DIADEMHeader_BINARYPatrick.tdms
08/21/2014 10:13:55.0000

Test Temperature: 71 degrees
Relative Humidity: 30%
Test Velocity: 4.27 m/s

THOR Lower Left Thorax Qualification
Thorax Displacement vs. Probe Force
Serial Number: DL9207

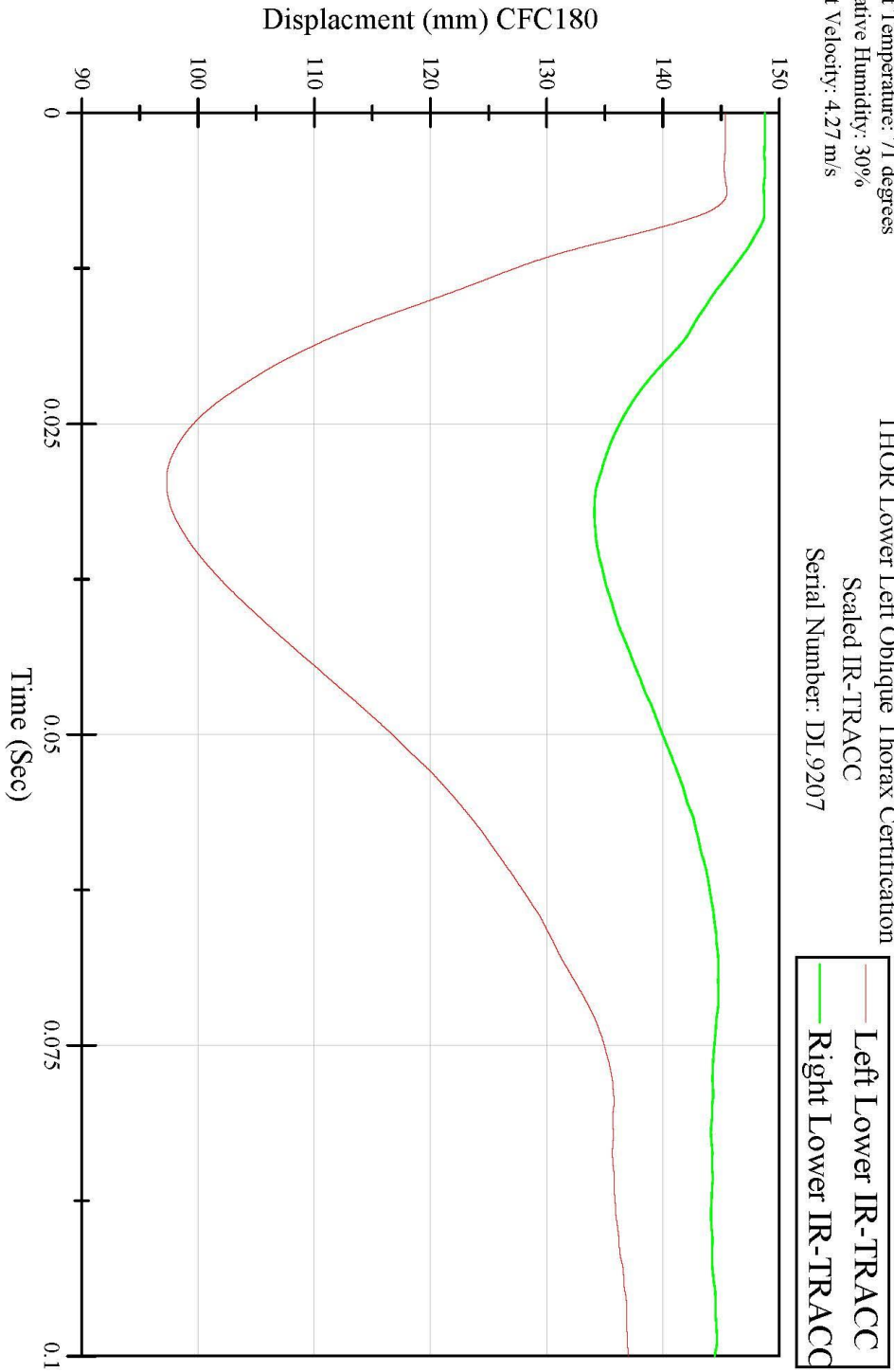


Software Version: 2.5

File Name: DL9207ThoraxLeft020315_01 thru 05 patrick
02/03/2015 13:26:42.0000

Test Temperature: 71 degrees
Relative Humidity: 30%
Test Velocity: 4.27 m/s

THOR Lower Left Oblique Thorax Certification
Scaled IR-TRACC
Serial Number: DL9207

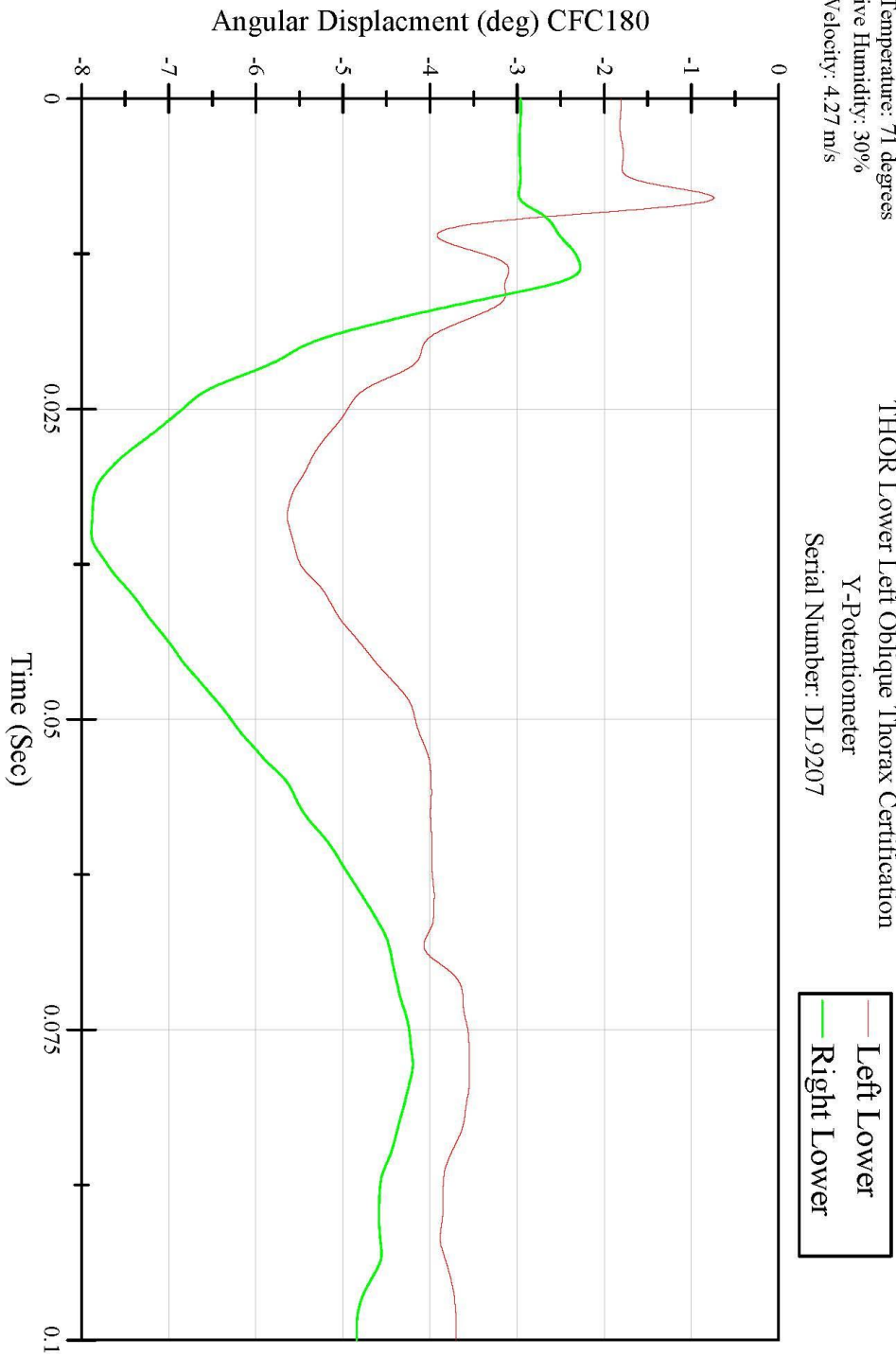


Software Version: 2.5

File Name: DL9207ThoraxLeft020315_01 thru 05 patrick
02/03/2015 13:26:42.0000

Test Temperature: 71 degrees
Relative Humidity: 30%
Test Velocity: 4.27 m/s

THOR Lower Left Oblique Thorax Certification
Y-Potentiometer
Serial Number: DL9207

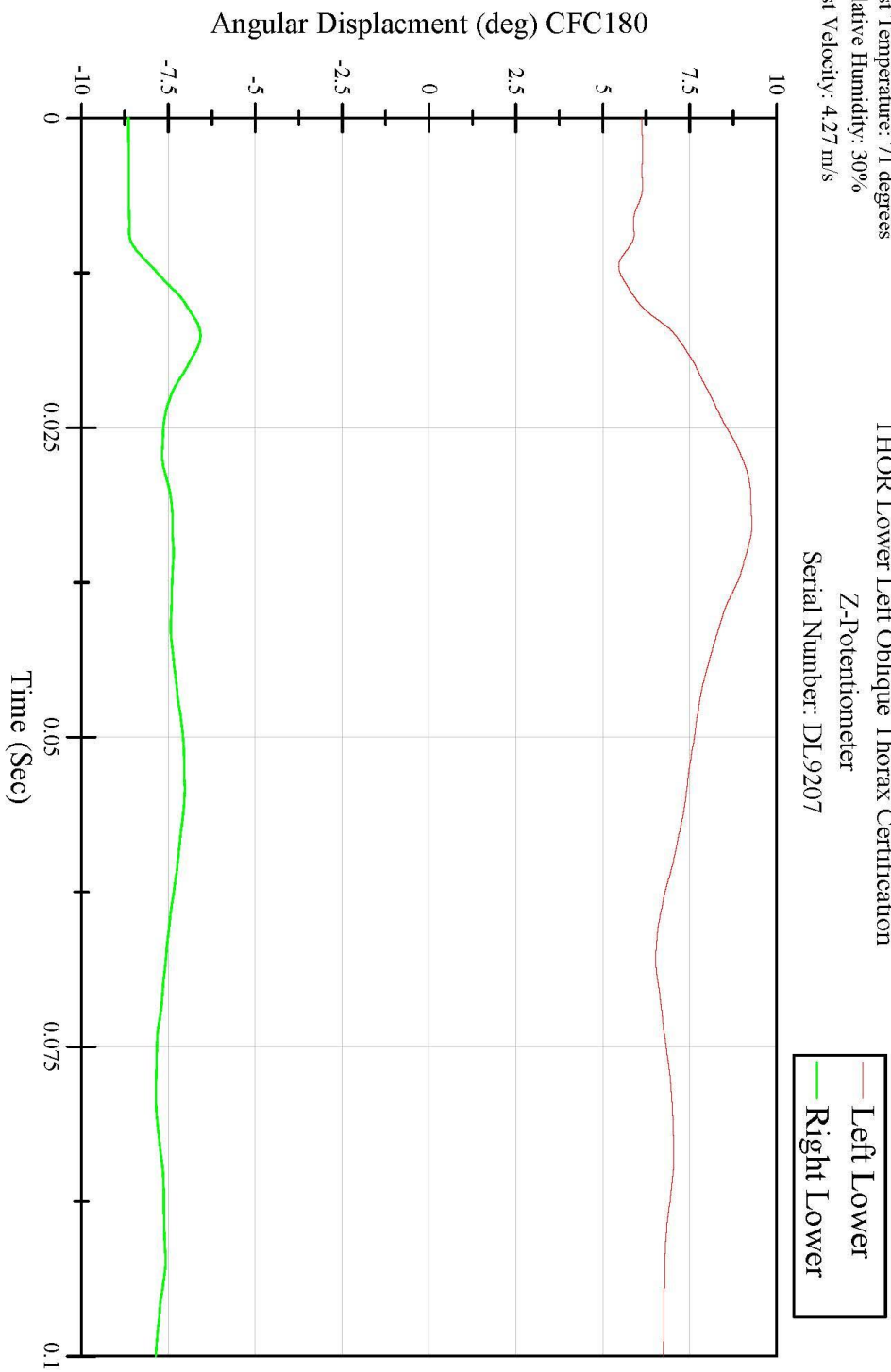


Software Version: 2.5

File Name: DL9207ThoraxLeft020315_01 thru 05 patrick
02/03/2015 13:26:42.0000

Test Temperature: 71 degrees
Relative Humidity: 30%
Test Velocity: 4.27 m/s

THOR Lower Left Oblique Thorax Certification
Z-Potentiometer
Serial Number: DL9207

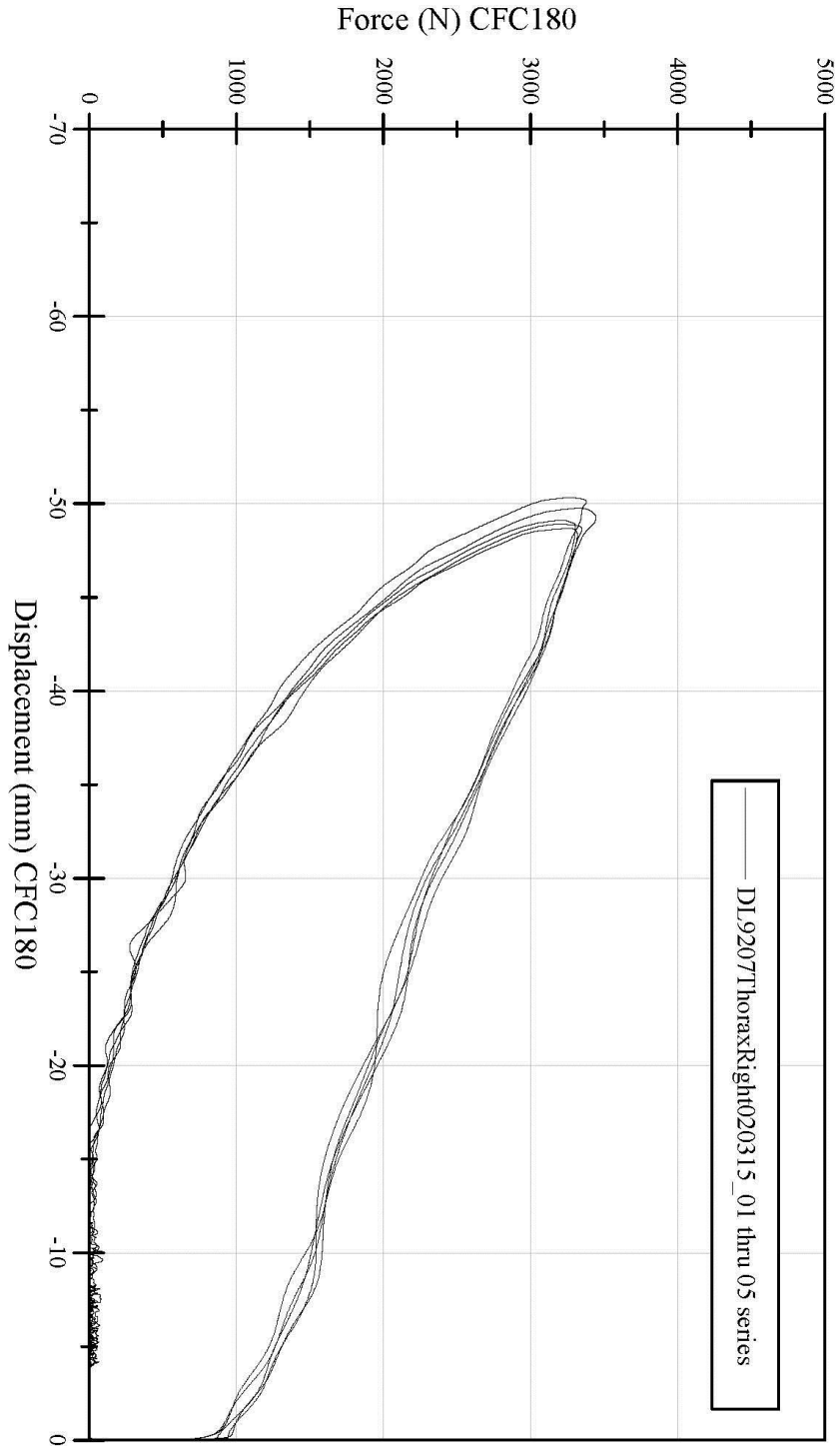


Software Version: 2.5

File Name: DL9207ThoraxLeft020315_01 thru 05 patrick
02/03/2015 13:26:42.0000

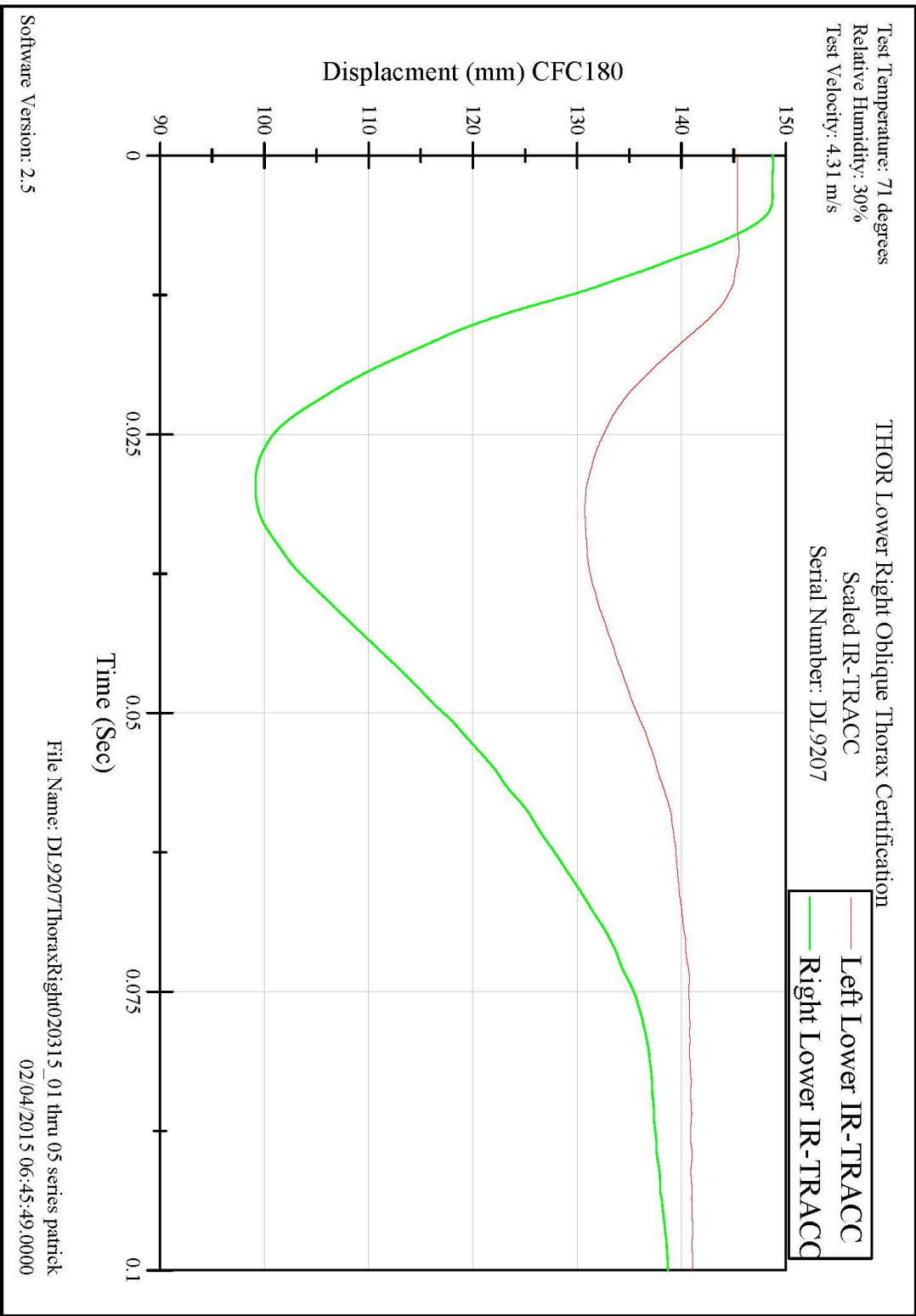
Test Temperature: 71 degrees
Relative Humidity: 30%
Test Velocity: 4.31 m/s

THOR Lower Right Thorax Qualification
Thorax Displacement vs. Probe Force
Serial Number: DL9207



Software Version: 2.5

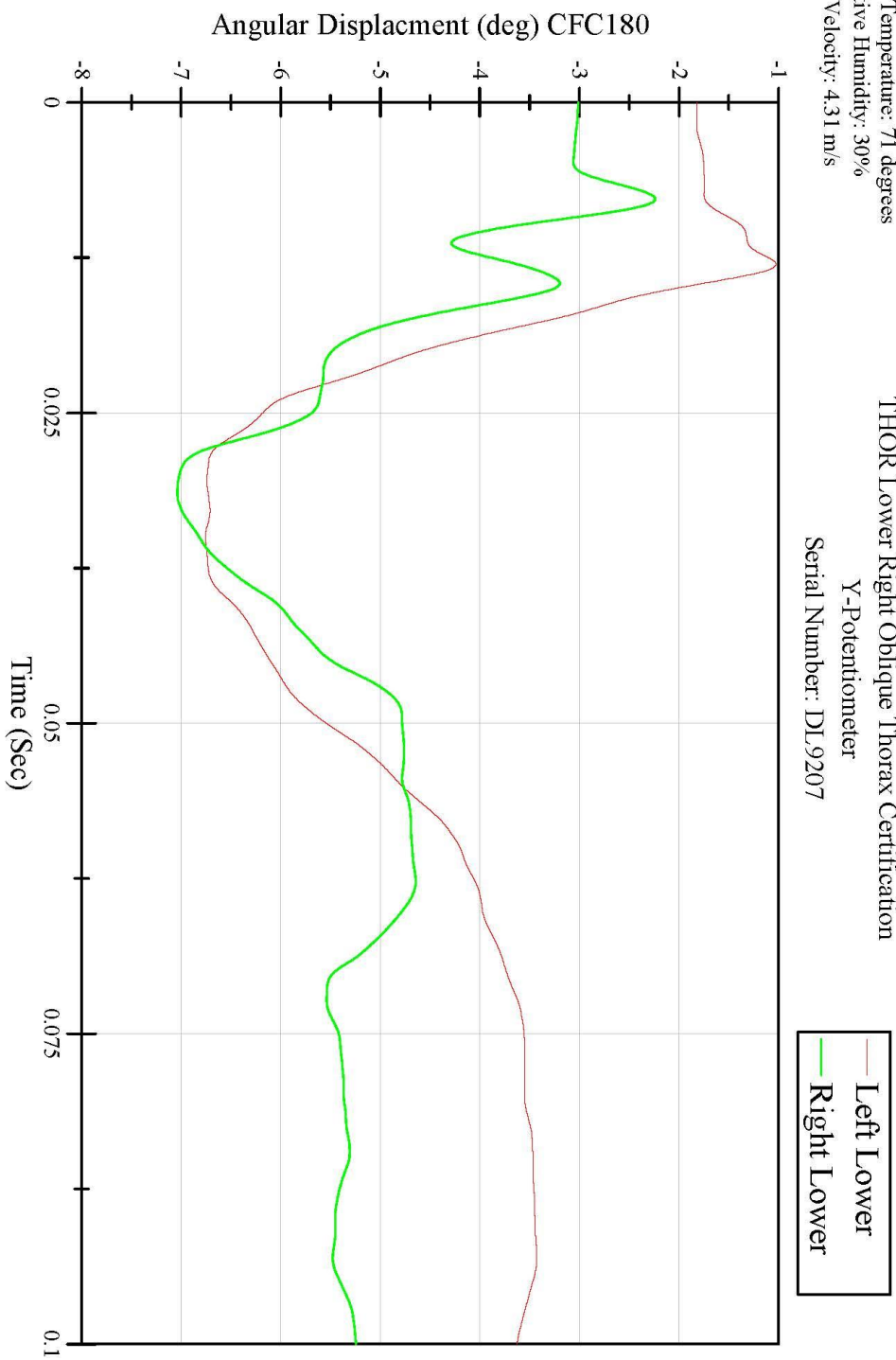
File Name: DL9207ThoraxRight020315_01 thru 05 series patrick
02/04/2015 06:45:49.0000



Test Temperature: 71 degrees
Relative Humidity: 30%
Test Velocity: 4.31 m/s

THOR Lower Right Oblique Thorax Certification

Y-Potentiometer
Serial Number: DL9207



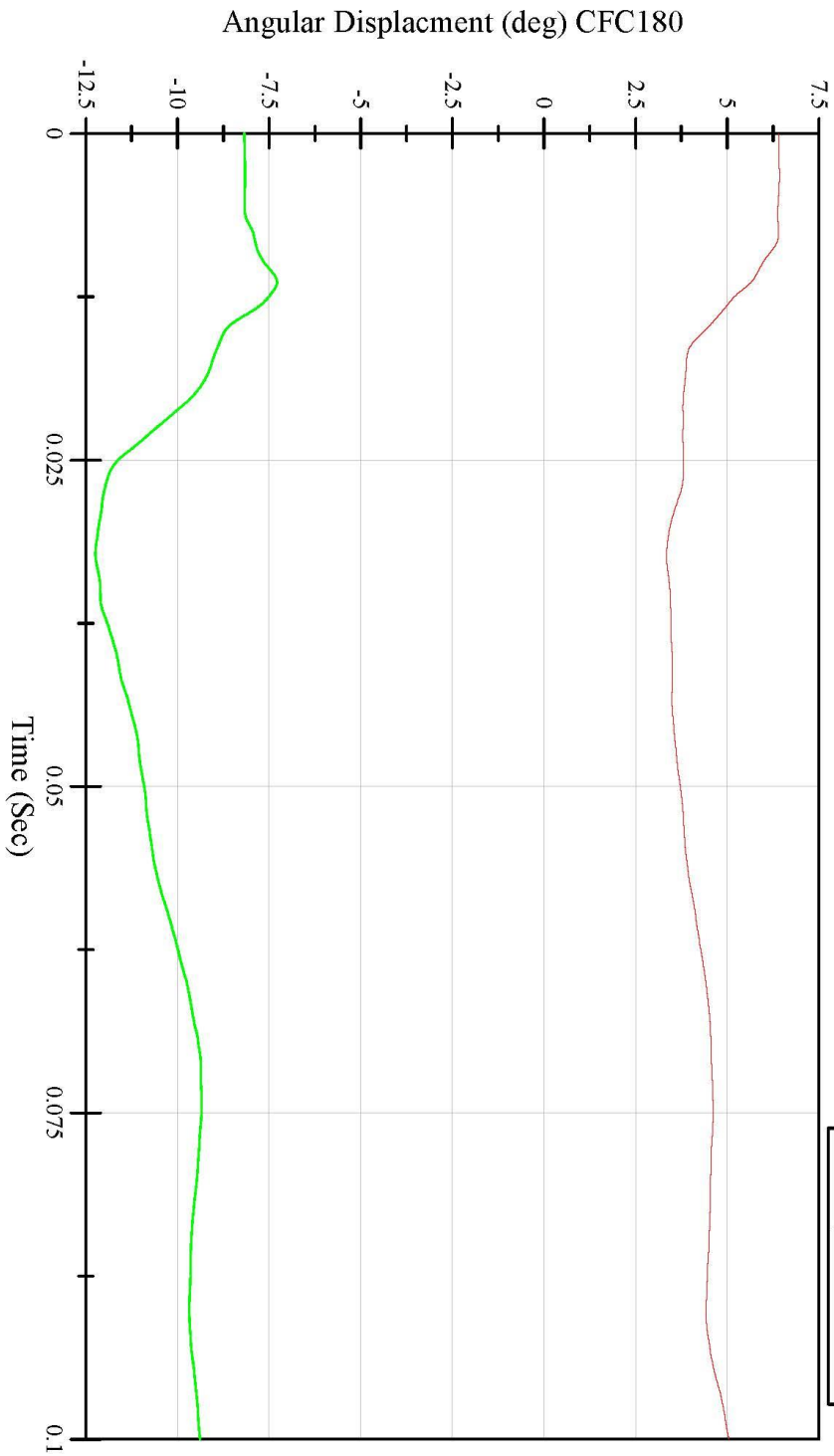
Software Version: 2.5

File Name: DL9207ThoraxRight020315_01 thru 05 series patrick
02/04/2015 06:45:49.0000

Test Temperature: 71 degrees
Relative Humidity: 30%
Test Velocity: 4.31 m/s

THOR Lower Right Oblique Thorax Certification

Z-Potentiometer
Serial Number: DL9207

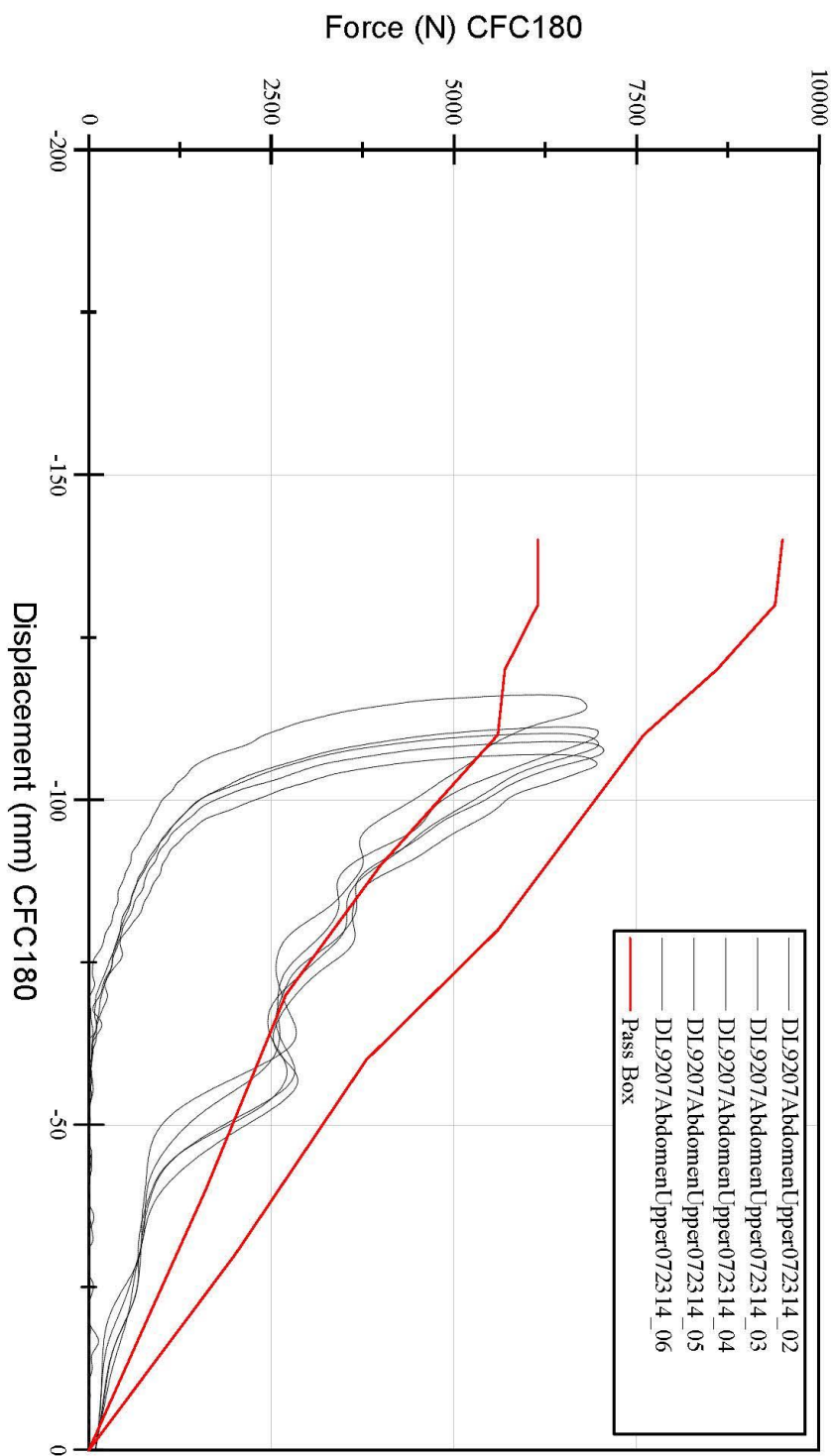


Software Version: 2.5

File Name: DL9207ThoraxRight020315_01 thru 05 series patrick
02/04/2015 06:45:49.0000

Test Temperature: 71 degrees
Relative Humidity: 50%
Test Velocity: 6.68 m/s

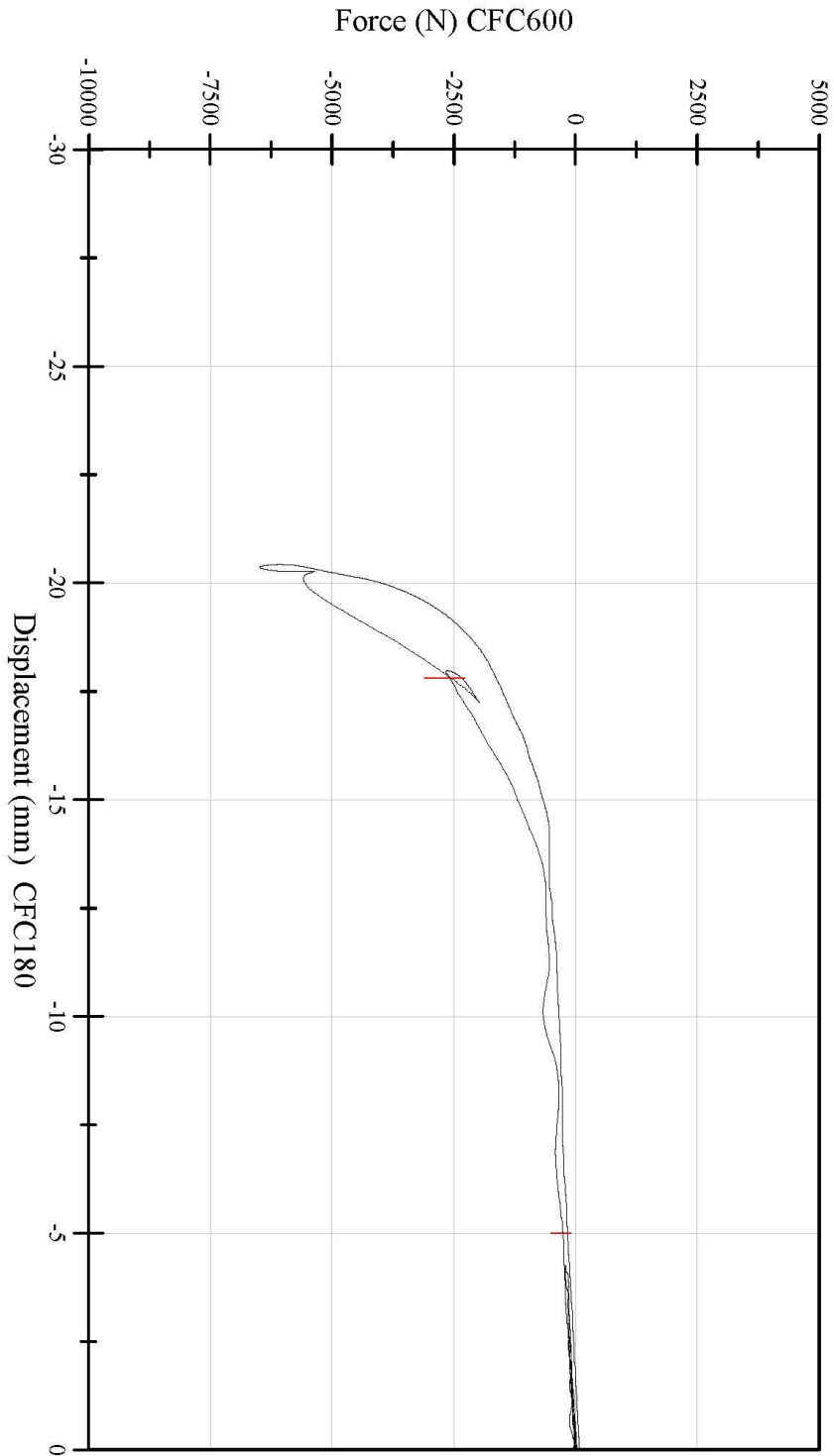
THOR Upper Abdomen Qualification
Abdomen Displacement vs. Probe Force
Serial Number: DL9207



Software Version: File Name: DL9207AbdomenUppert072314_all_DLAdemHeader_BINARYpatrick 07/23/2014 11:21:18.0000

Test Temperature: 70.7 degrees
Relative Humidity: 45%
Test Velocity: 2.78 m/s

THOR Right Knee Certification
Femur Force vs. Knee Displacement
Serial Number: 021033

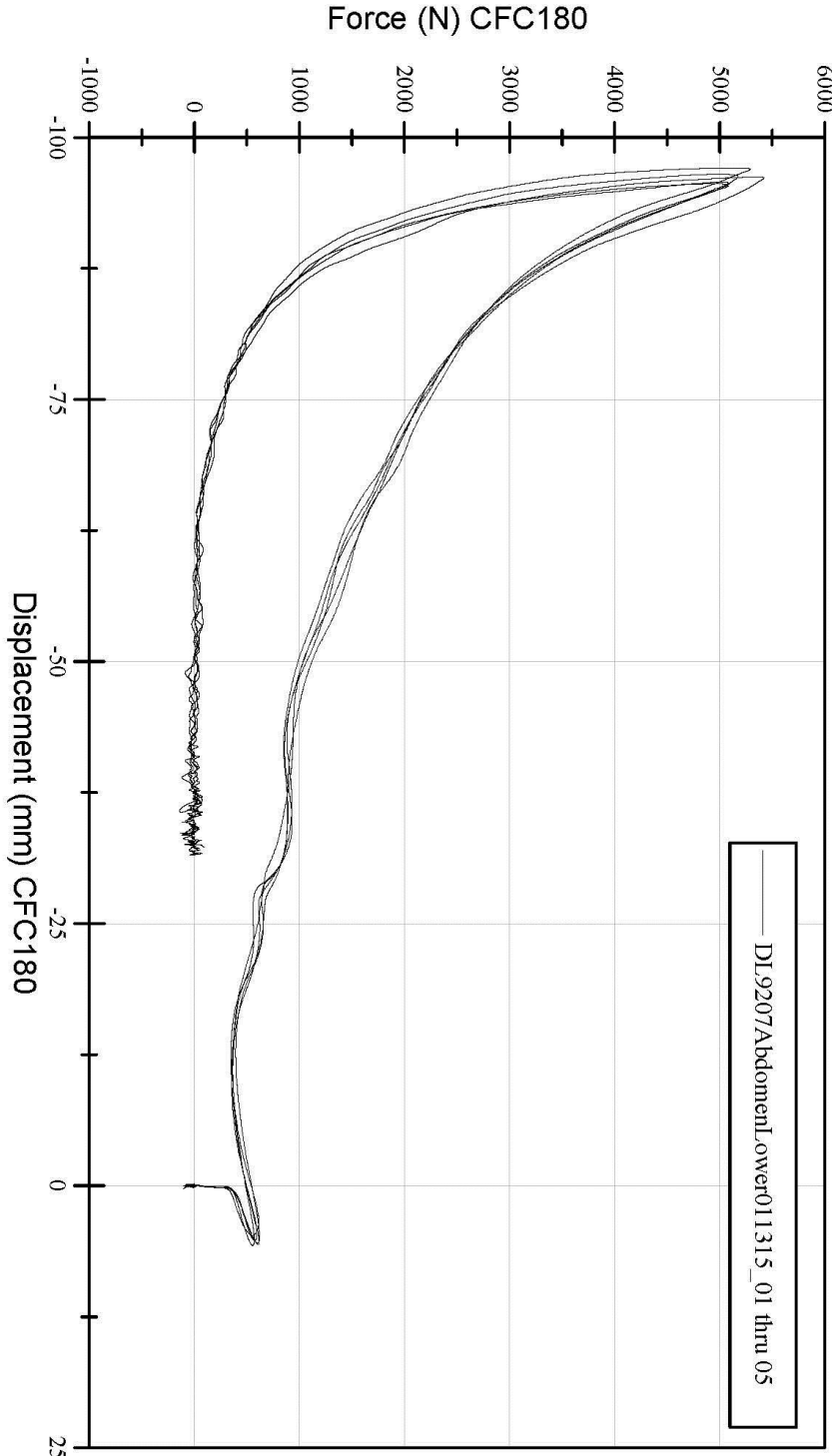


Software Version: 2.4

File Name: 012033 Knee1150407-03processed.dat
04/07/2015 09:51:56.0000

Test Temperature: 71 degrees
Relative Humidity: 25%
Test Velocity: 4.27 m/s

THOR Lower Abdomen Qualification
Abdomen Displacement vs. Probe Force
Serial Number: DL9207

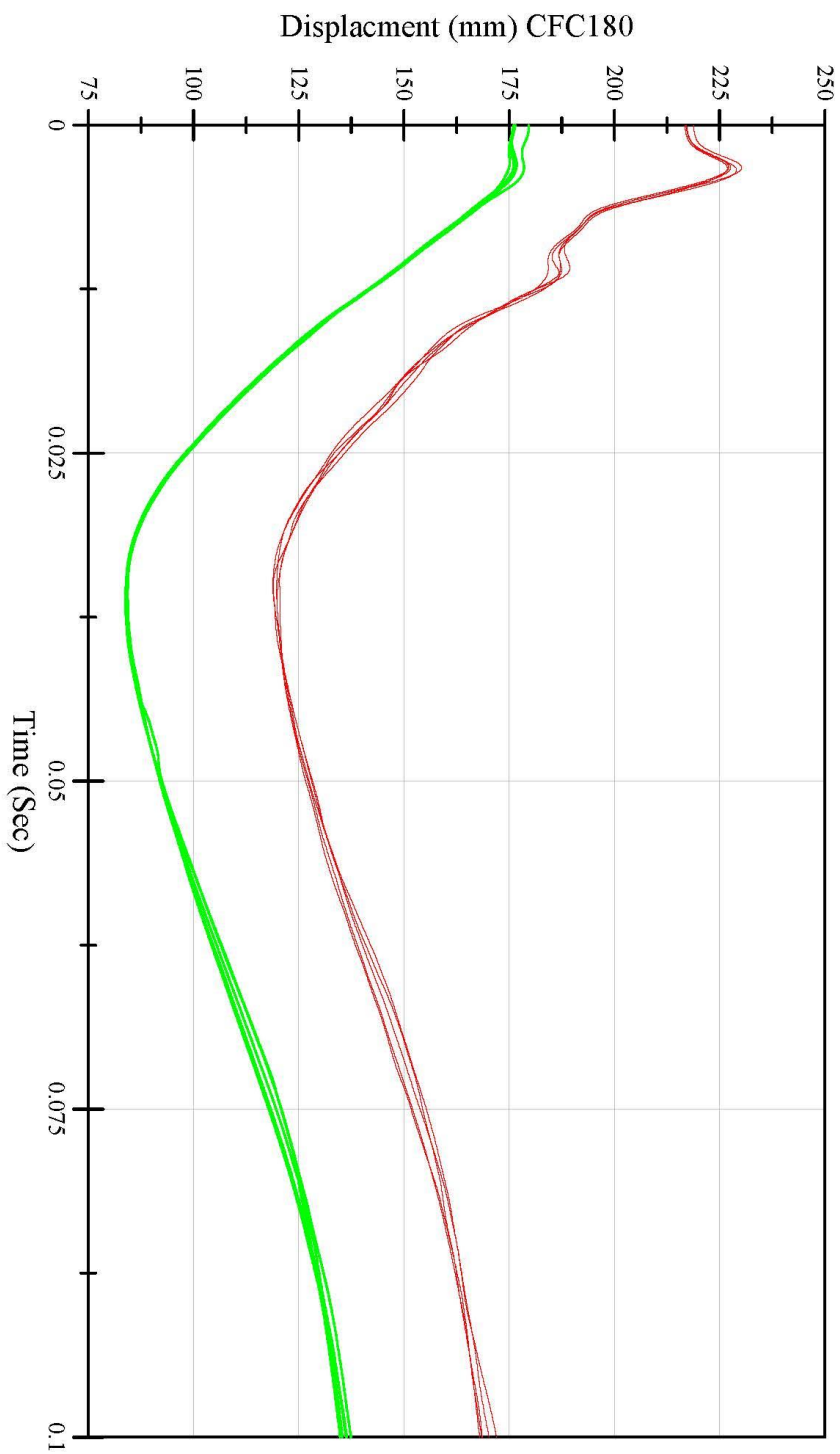


Software Version:

File Name: DL9207AbdomenLower011315_01 thru 05 Series patrick
01/13/2015 12:19:51.0000

Test Temperature: 71 degrees
Relative Humidity: 25%
Test Velocity: 4.27 m/s

THOR Lower Abdomen Qualification
IRTRACC Displacement
Serial Number: DL9207

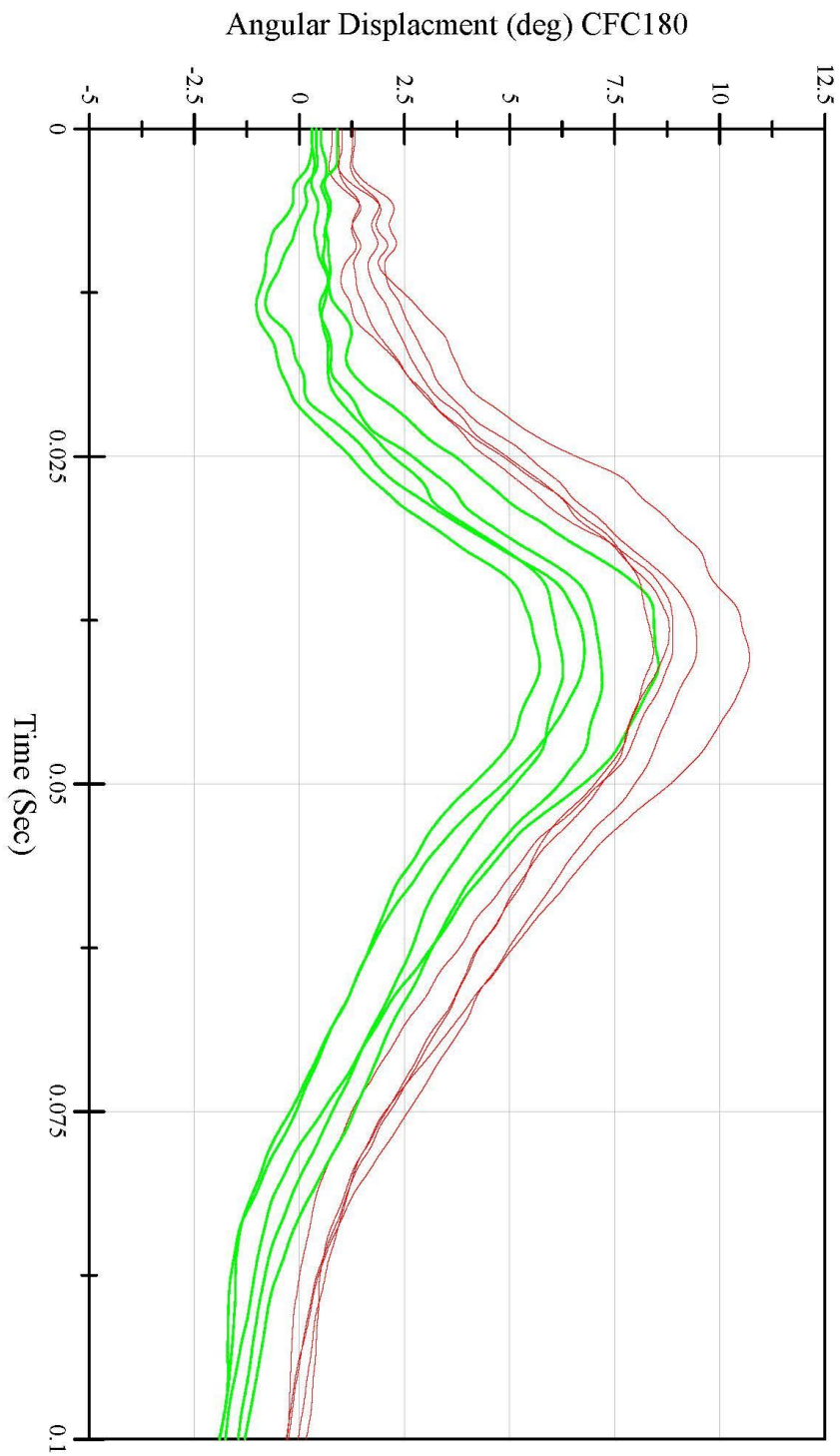


Software Version:

File Name: DL9207AbdomenLower011315_01 thru 05 Series patrick
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Test Temperature: 71 degrees
Relative Humidity: 25%
Test Velocity: 4.27 m/s

THOR Lower Abdomen Qualification
Y-Pot Displacement
Serial Number: DL9207

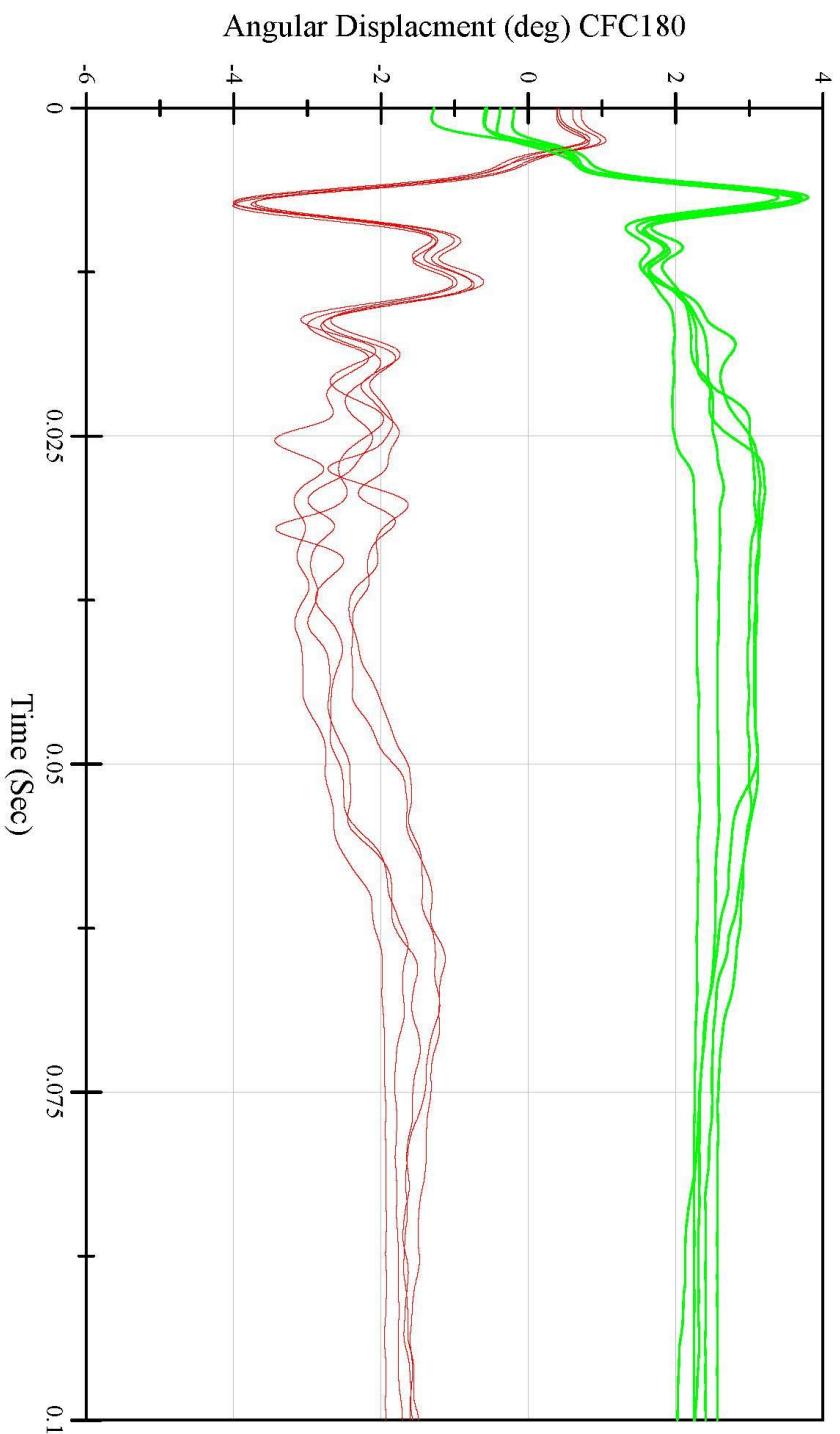


Software Version:

File Name: DL9207AbdomenLower011315_01 thru 05 Series patrick
01/13/2015 12:19:51.0000

Test Temperature: 71 degrees
Relative Humidity: 25%
Test Velocity: 4.27 m/s

THOR Lower Abdomen Qualification
Z-Potentiometer
Serial Number: DL9207

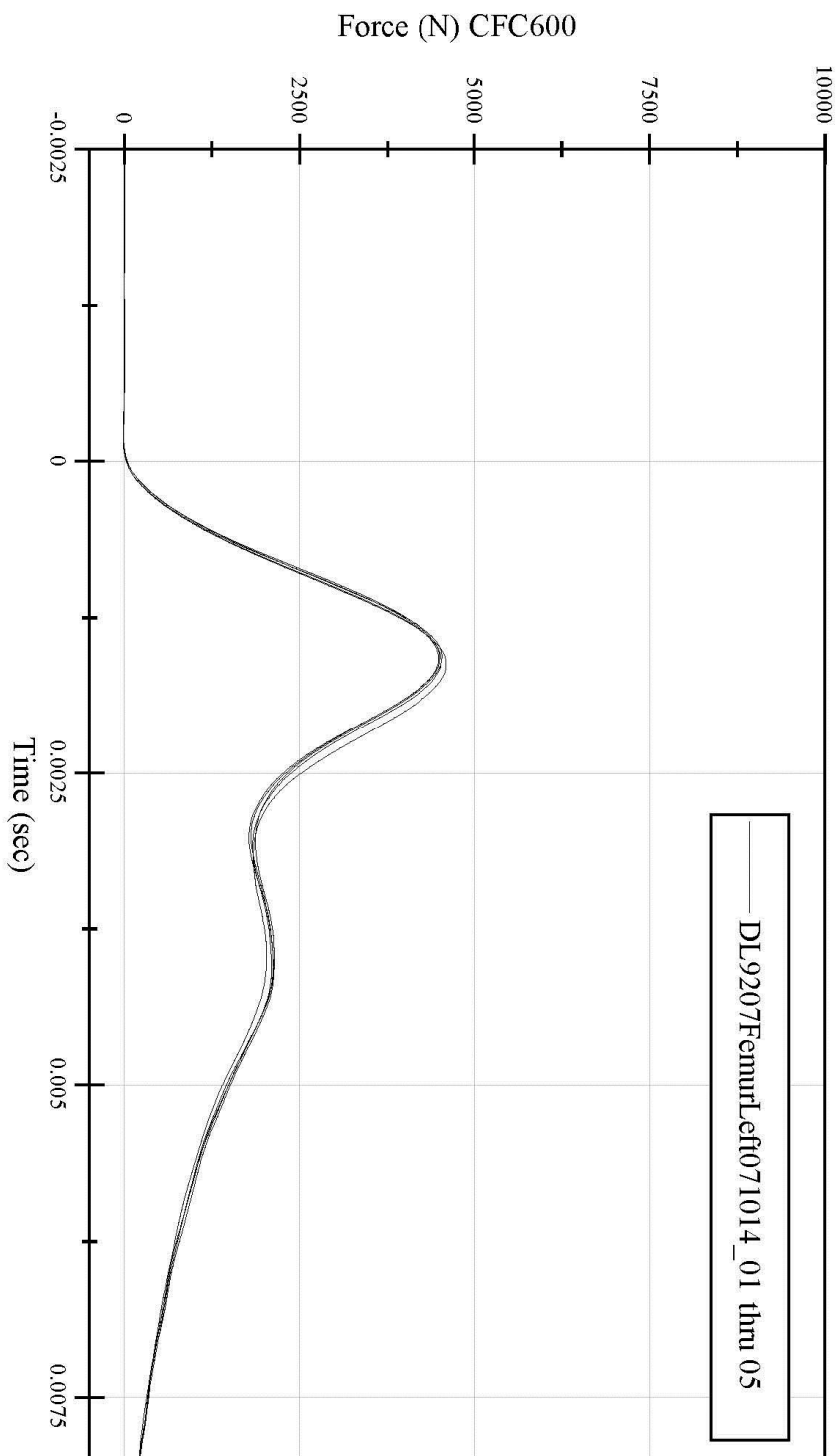


Software Version:

File Name: DL9207AbdomenLower011315_01 thru 05 Series patrick
01/13/2015 12:19:51.0000

Test Temperature: 71 degrees
Relative Humidity: 49%
Test Velocity: 2.58 m/s

THOR Left Femur Qualification
Probe Force
Serial Number: DL9207

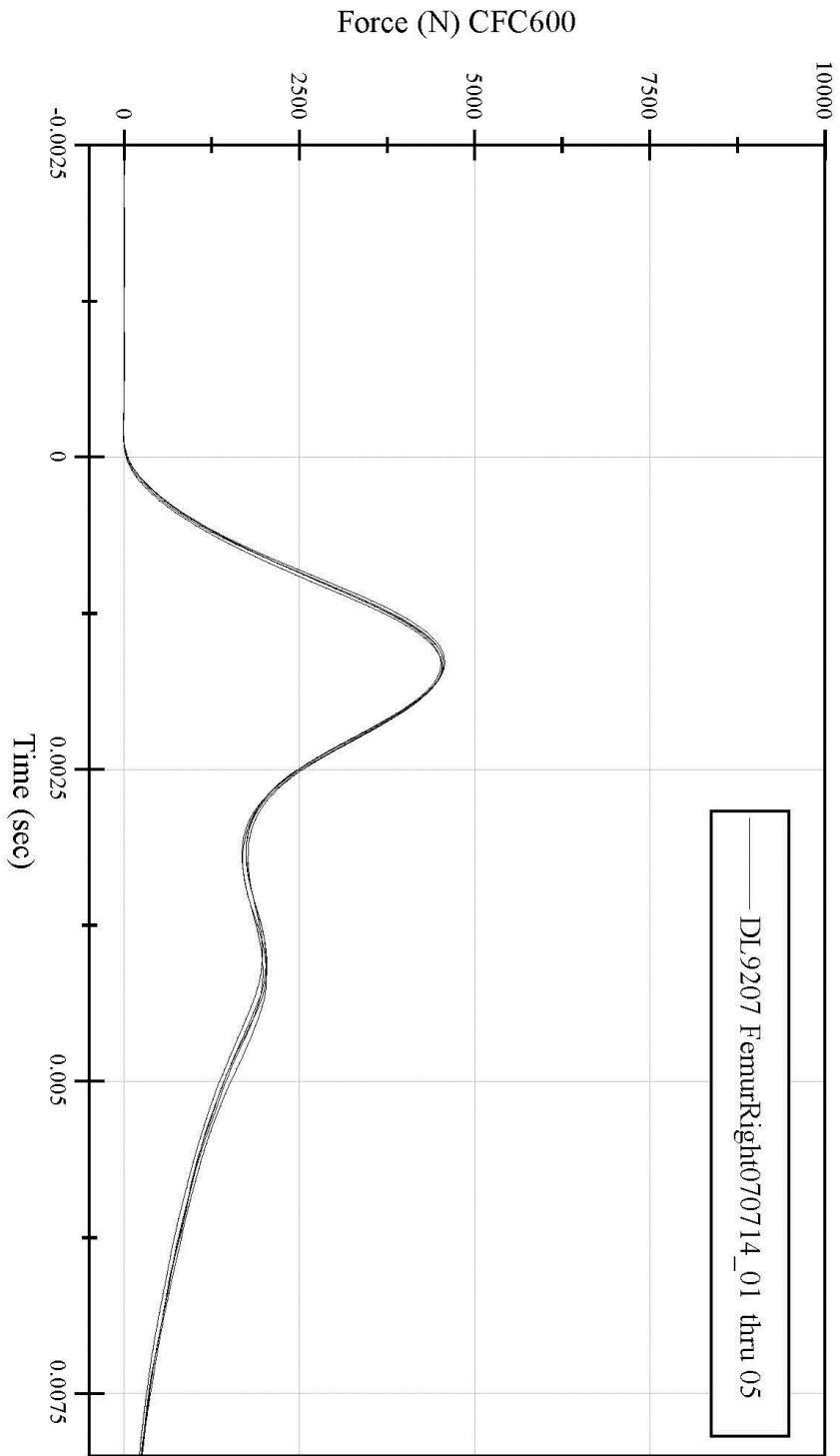


Software Version:

File Name: DL9207 Femur Left 070814_01 thru 05 Series
07/09/2014 09:10:57.0000

Test Temperature: 71 degrees
Relative Humidity: 49%
Test Velocity: 2.58 m/s

THOR Right Femur Qualification
Probe Force
Serial Number: DL9207

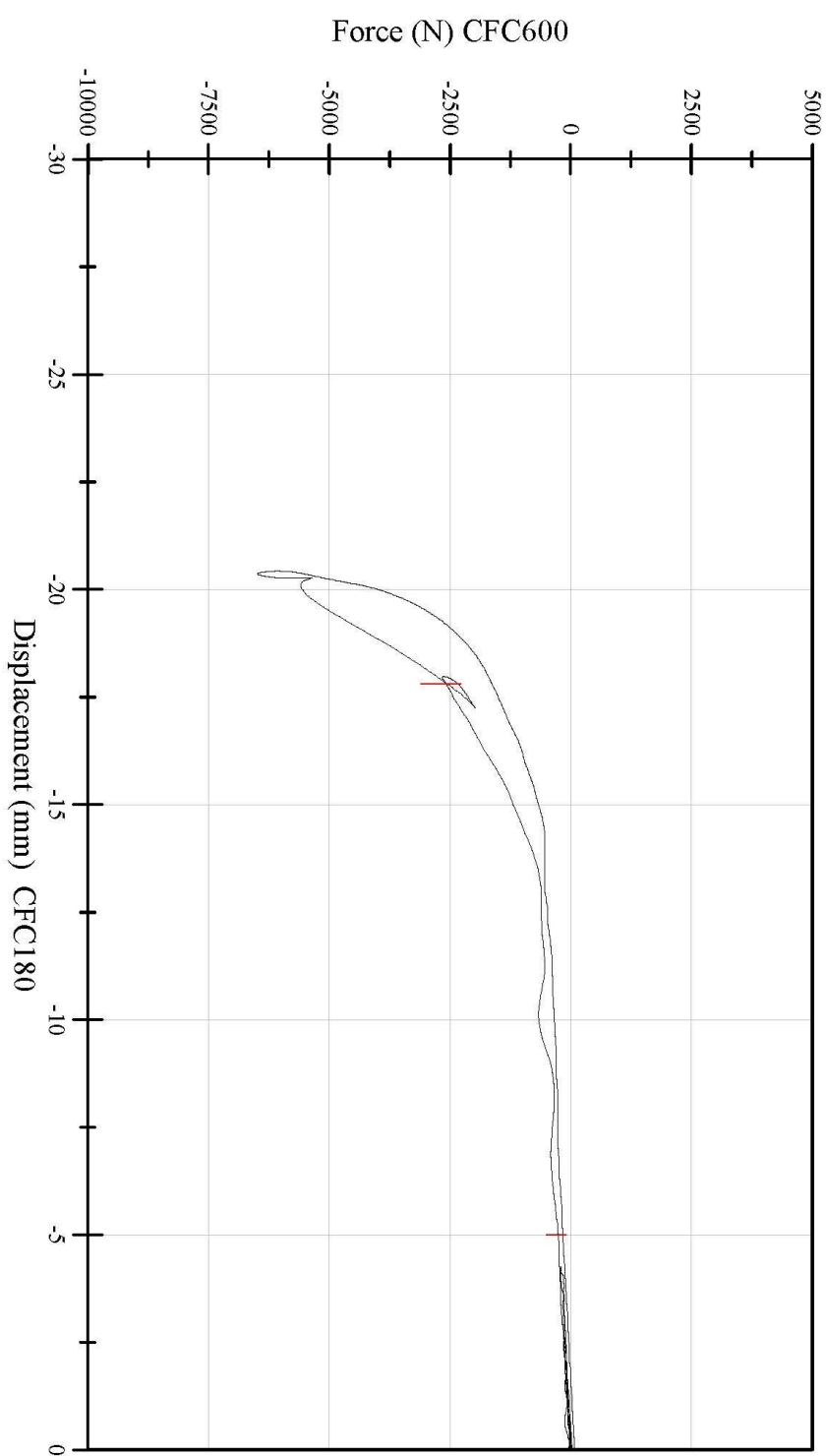


Software Version:

File Name: DL9207 Femur Right 070714_01 thru 05 Series
07/09/2014 09:12:34.0000

Test Temperature: 70.7 degrees
Relative Humidity: 45%
Test Velocity: 2.78 m/s

THOR Right Knee Certification
Femur Force vs. Knee Displacement
Serial Number: 021033



Software Version: 2.4

File Name: 012033 Knee1150407-03processed.dat
04/07/2015 09:51:56.0000

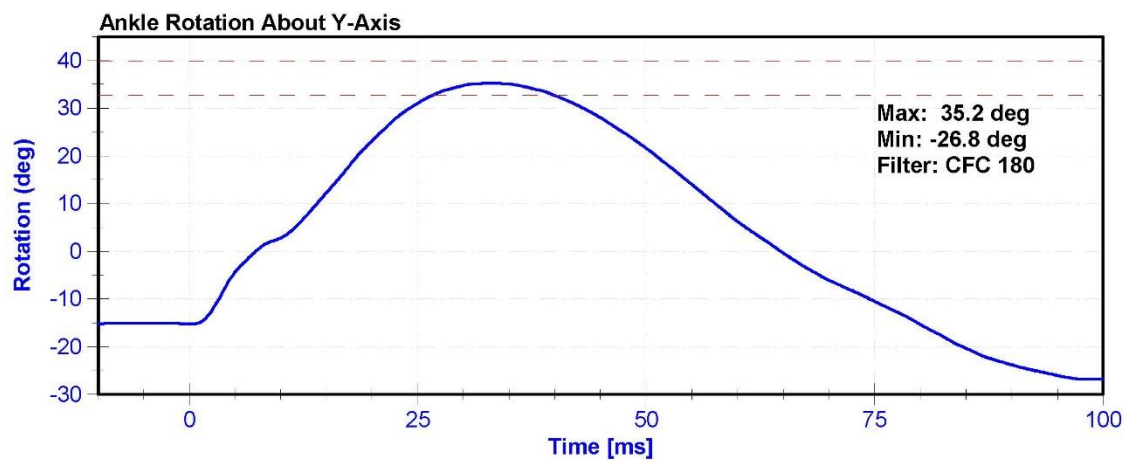
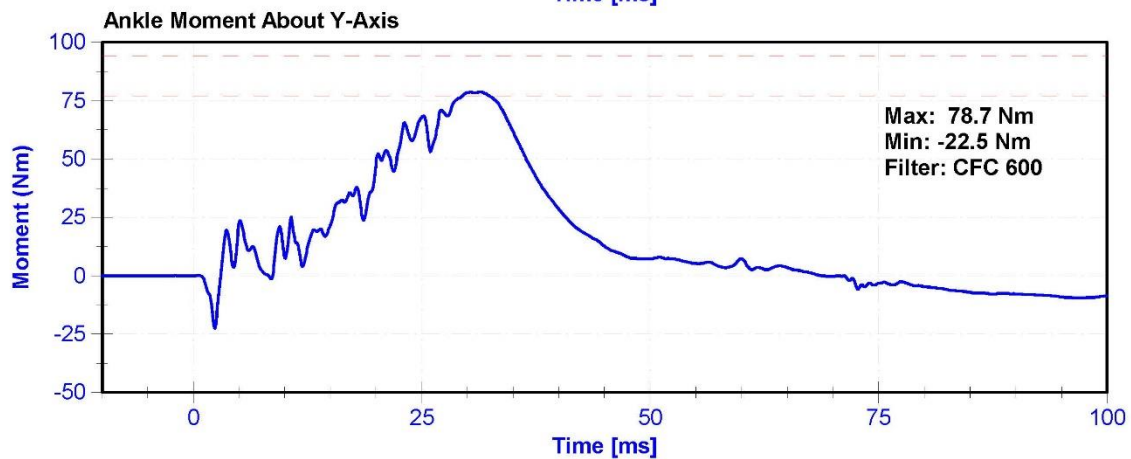
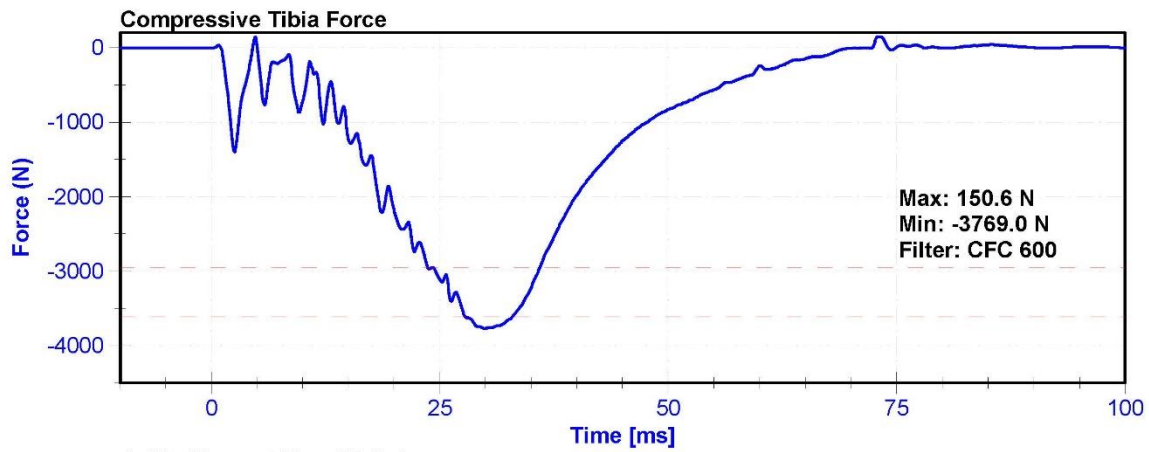
ATD Manufacturer	Humanetics	Test Technician	M. Goehle
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	64.4	Pass
Velocity	4.9	5.1	m/s	4.916	Pass
Lower Tibia Compressive Force	-3,613	-2,956	N	-3769.0	Fail
Peak Moment about Y-Axis	77.1	94.2	Nm	78.73	Pass
Peak Rotation about Y-Axis	32.7	39.9	deg	35.23	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C15018	7/15/2015	7/14/2016
Lower Tibia Load Cell	Denton 4929J	LC-121 Fz	2/10/2015	2/10/2016
Ankle Y Potentiometer	Contelec PD210-4B	DS-0524	2/18/2015	2/18/2016





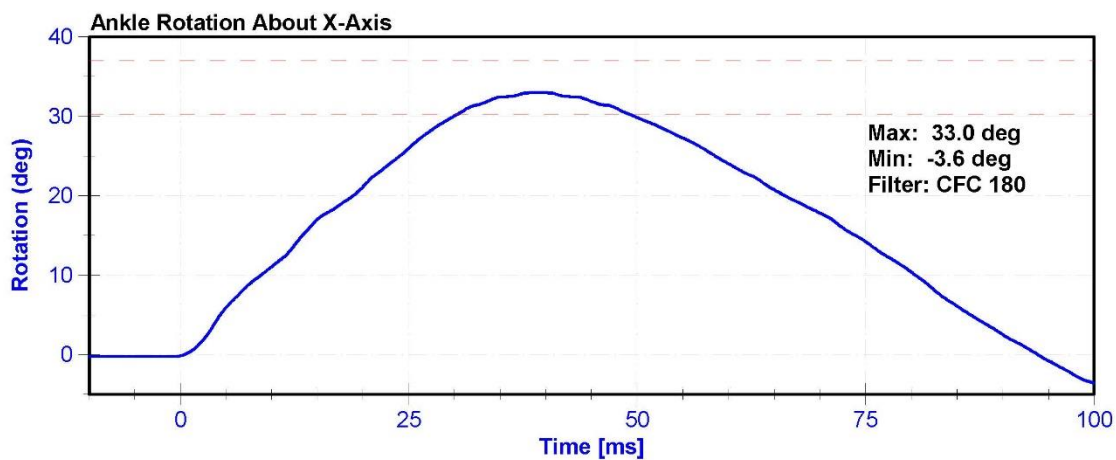
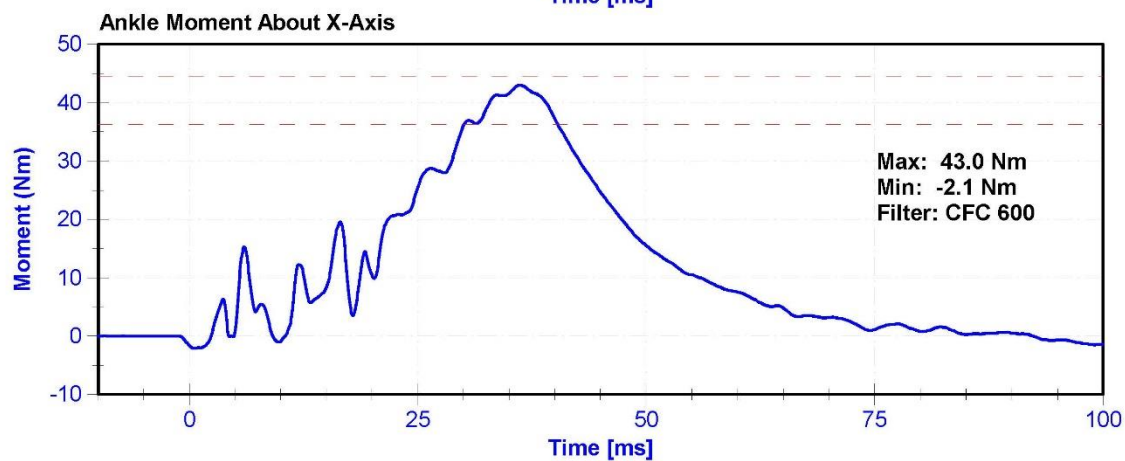
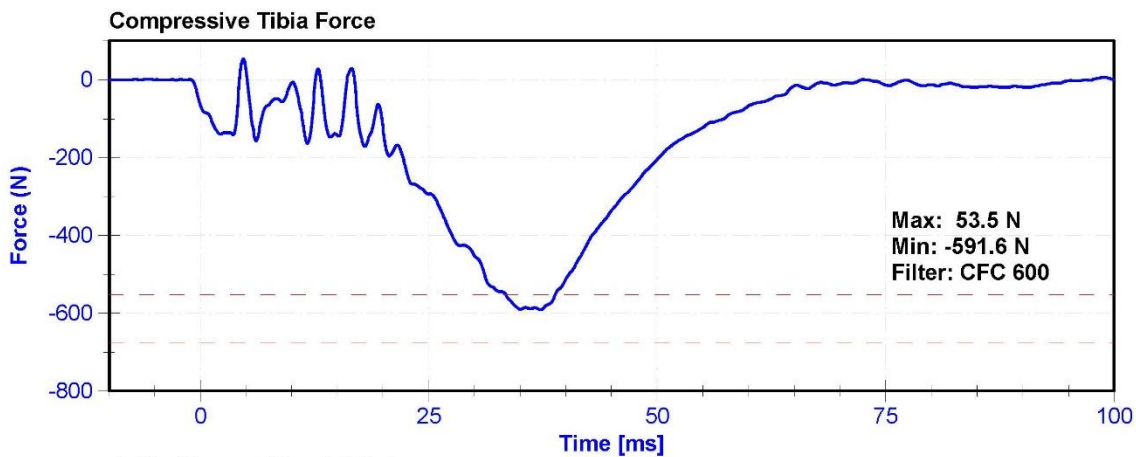
ATD Manufacturer	Humanetics	Test Technician	M. Goehle
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	58.4	Pass
Velocity	1.9	2.1	m/s	2.016	Pass
Lower Tibia Compressive Force	-675	-552	N	-591.6	Pass
Peak Moment about X-Axis	36.3	44.4	Nm	42.99	Pass
Peak Rotation about X-Axis	30.3	37.0	deg	32.97	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C15018	7/15/2015	7/14/2016
Lower Tibia Load Cell	Denton 4929J	LC-121 Fz	2/10/2015	2/10/2016
Ankle Y Potentiometer	Contelec PD210-4B	DS-0525	2/18/2015	2/18/2016



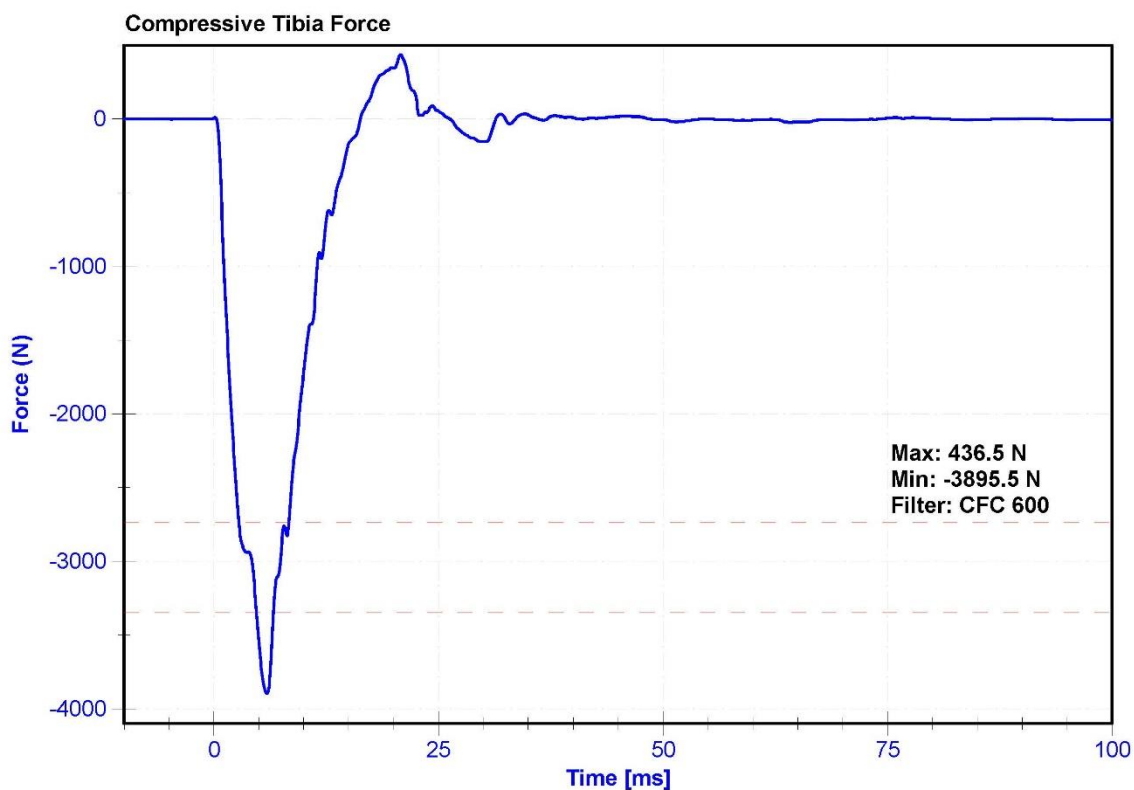
ATD Manufacturer	Humanetics	Test Technician	M. Goehle
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	65.3	Pass
Velocity	3.9	4.1	m/s	3.908	Pass
Lower Tibia Compressive Force	2,738	3,346	N	-3895.5	Fail

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C15018	7/15/2015	7/14/2016
Lower Tibia Load Cell	Denton 4929J	LC-121 Fz	2/10/2015	2/10/2016





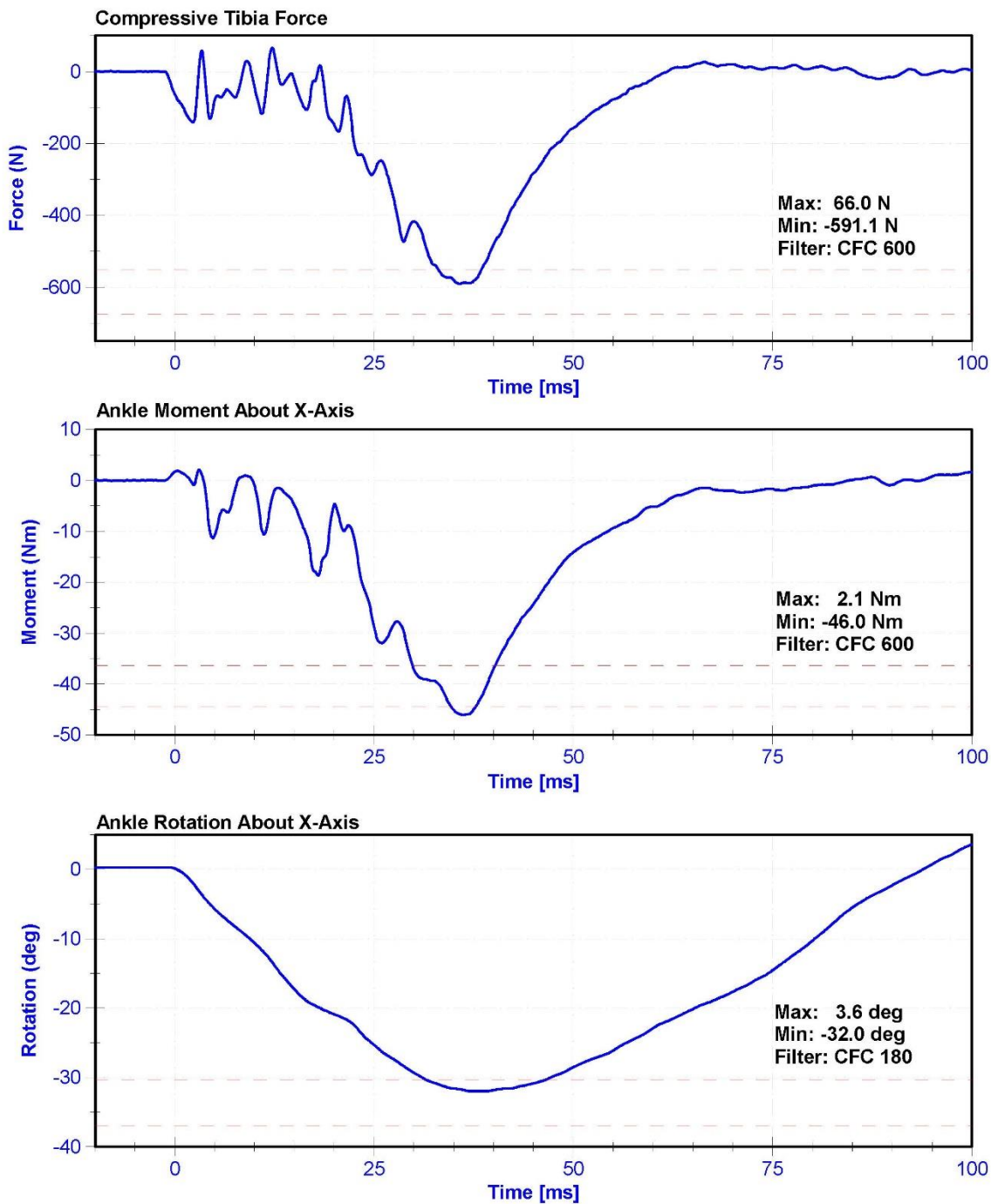
ATD Manufacturer	Humanetics	Test Technician	M. Goehle
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	58.3	Pass
Velocity	1.9	2.1	m/s	1.939	Pass
Lower Tibia Compressive Force	-675	-552	N	-591.1	Pass
Peak Moment about X-Axis	-44.4	-36.3	Nm	-46.02	Fail
Peak Rotation about X-Axis	-37.0	-30.3	deg	-32.01	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C15018	7/15/2015	7/14/2016
Lower Tibia Load Cell	Denton 4929J	LC-121 Fz	2/10/2015	2/10/2016
Ankle Y Potentiometer	Contelec PD210-4B	DS-0525	2/18/2015	2/18/2016





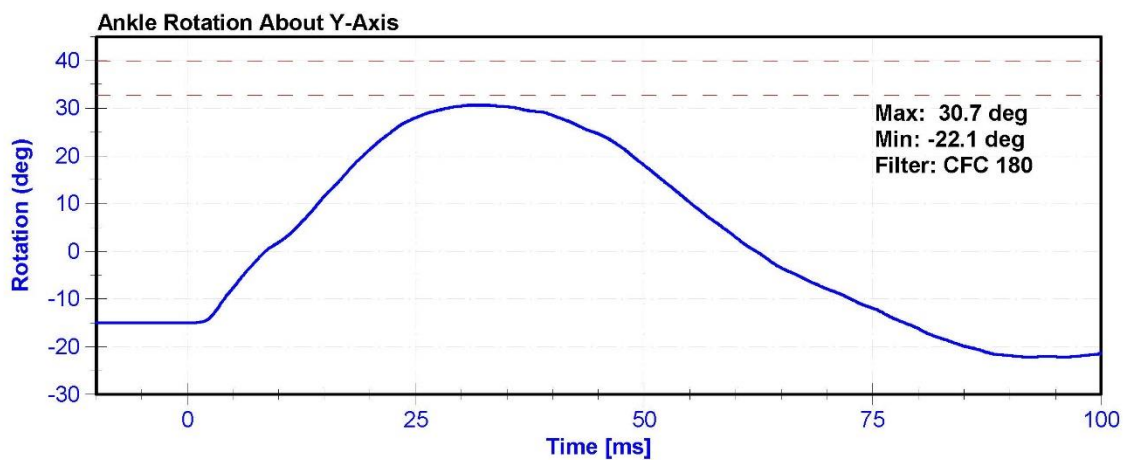
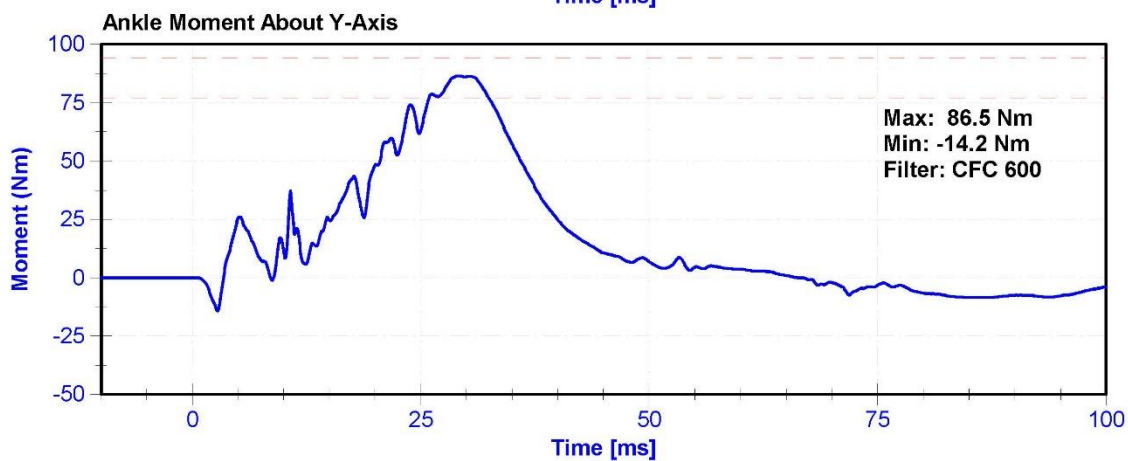
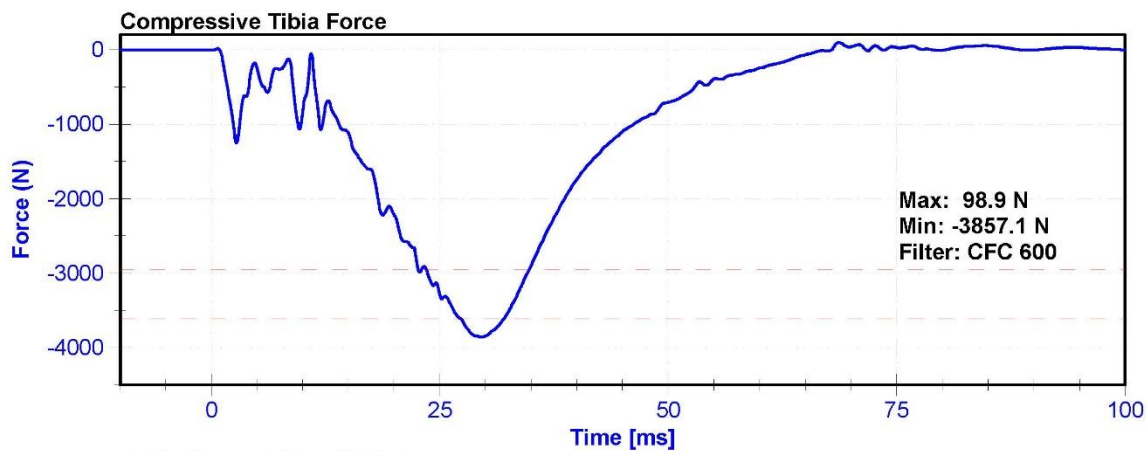
ATD Manufacturer	Humanetics	Test Technician	M. Goehle
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	53.9	Pass
Velocity	4.9	5.1	m/s	4.916	Pass
Lower Tibia Compressive Force	-3,613	-2,956	N	-3857.1	Fail
Peak Moment about Y-Axis	77.1	94.2	Nm	86.48	Pass
Peak Rotation about Y-Axis	32.7	39.9	deg	30.69	Fail

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C15018	7/15/2015	7/14/2016
Lower Tibia Load Cell	Denton 4929J	LC-166 Fz	2/9/2015	2/9/2016
Ankle Y Potentiometer	Contelec PD210-4B	DS-0526	2/19/2015	2/19/2016



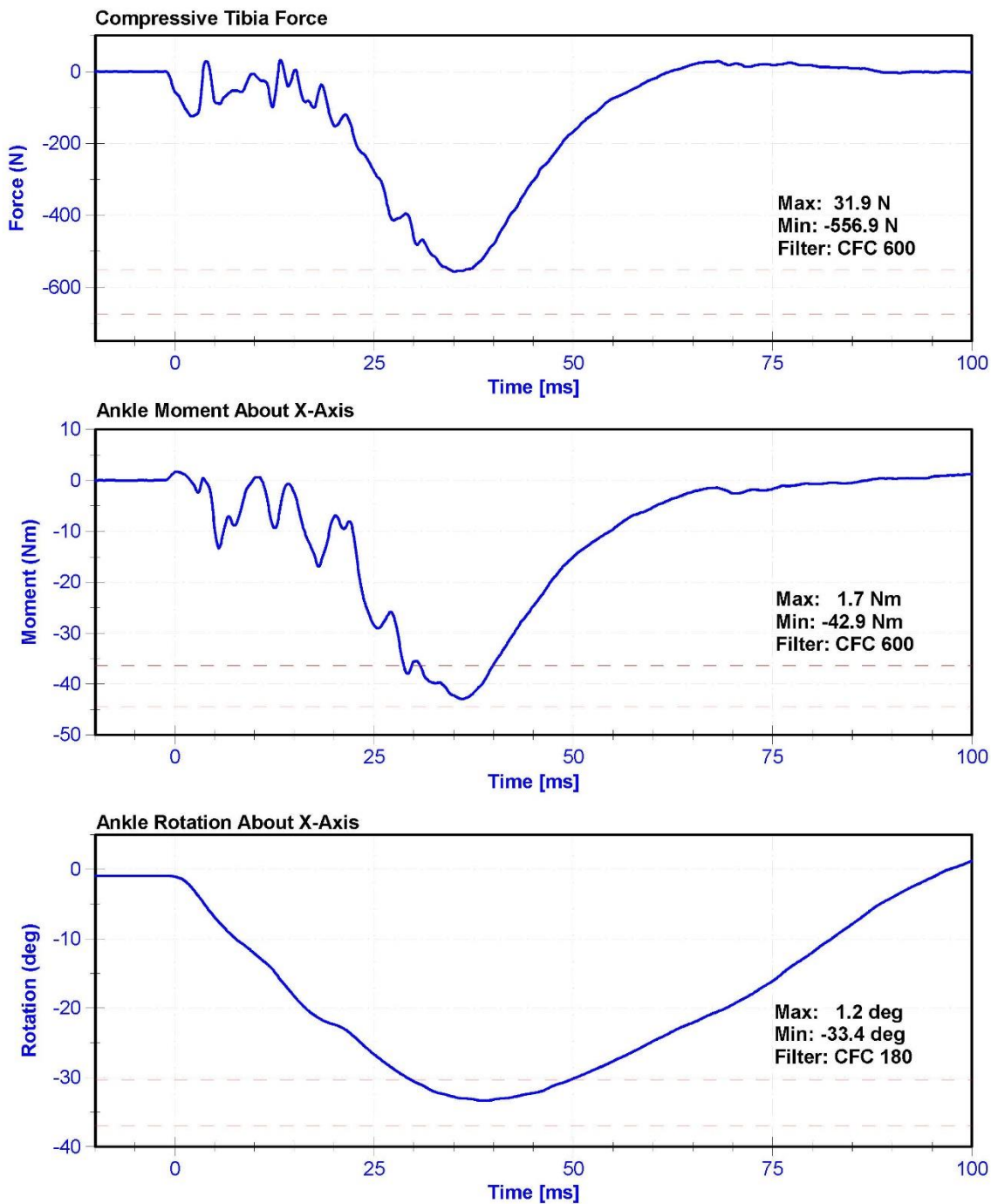
ATD Manufacturer	Humanetics	Test Technician	M. Goehle
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	60.4	Pass
Velocity	1.9	2.1	m/s	1.934	Pass
Lower Tibia Compressive Force	-675	-552	N	-556.9	Pass
Peak Moment about X-Axis	-44.4	-36.3	Nm	-42.92	Pass
Peak Rotation about X-Axis	-37.0	-30.3	deg	-33.36	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C15018	7/15/2015	7/14/2016
Lower Tibia Load Cell	Denton 4929J	LC-166 Fz	2/9/2015	2/9/2016
Ankle Y Potentiometer	Contelec PD210-4B	DS-0528	2/19/2015	2/19/2016



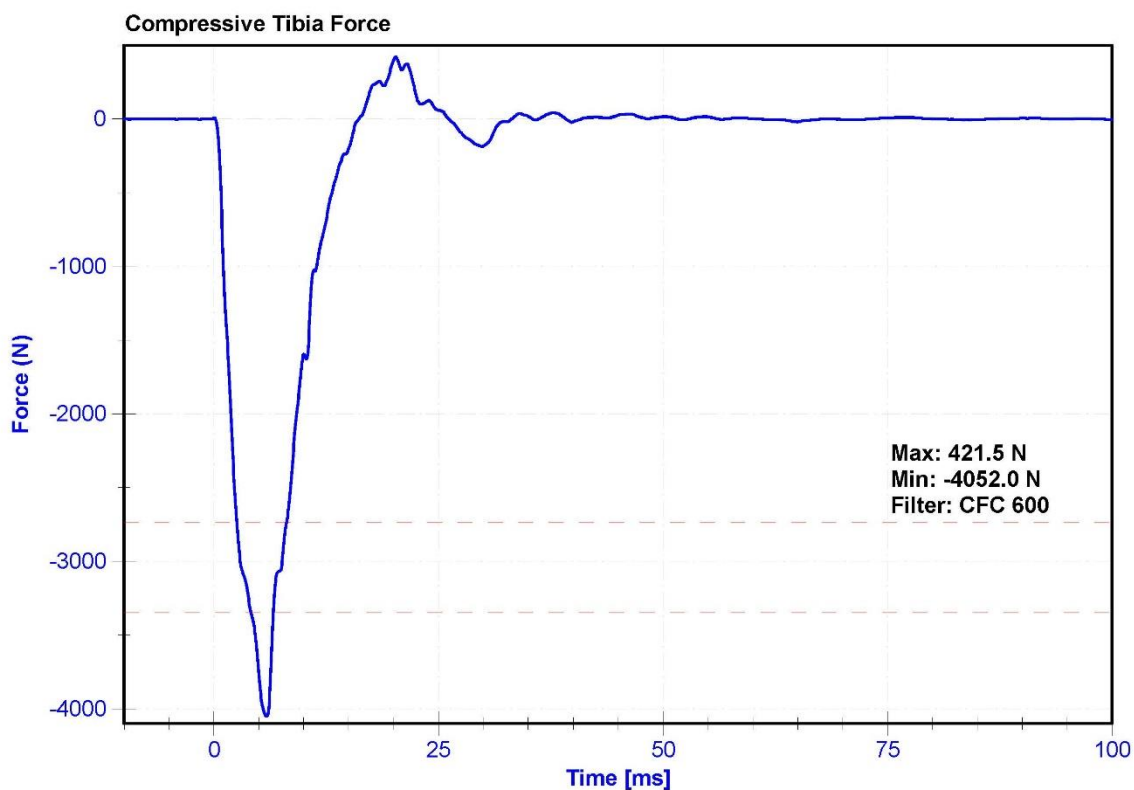
ATD Manufacturer	Humanetics	Test Technician	M. Goehle
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	55.2	Pass
Velocity	3.9	4.1	m/s	3.948	Pass
Lower Tibia Compressive Force	2,738	3,346	N	-4052.0	Fail

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C15018	7/15/2015	7/14/2016
Lower Tibia Load Cell	Denton 4929J	LC-166 Fz	2/9/2015	2/9/2016





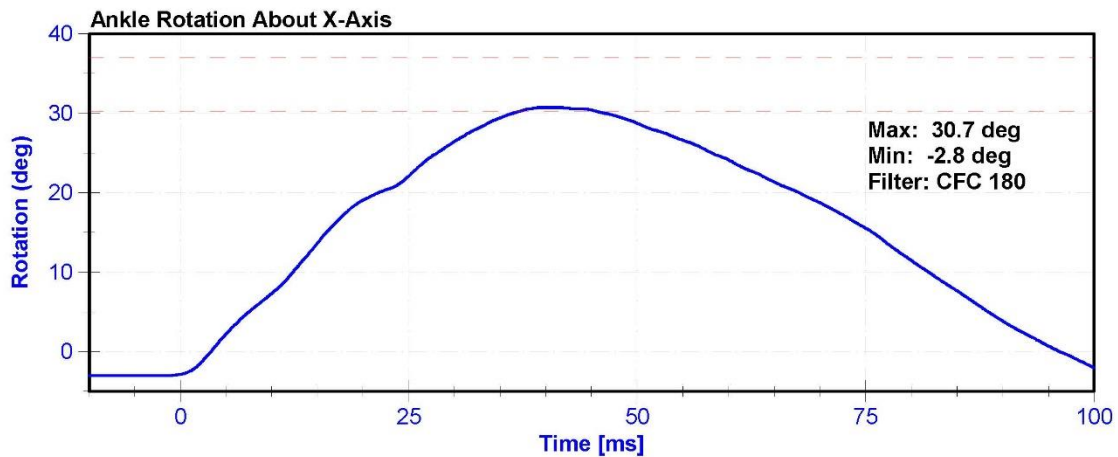
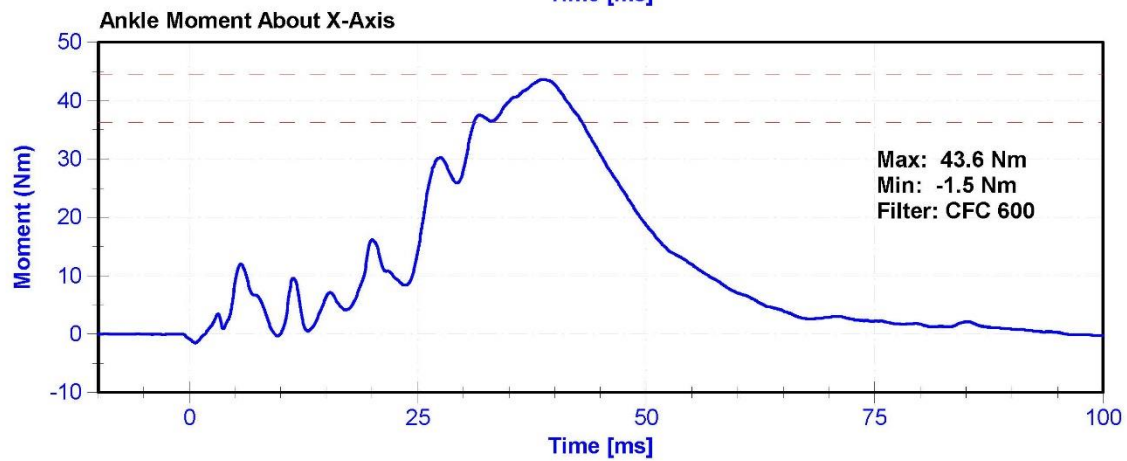
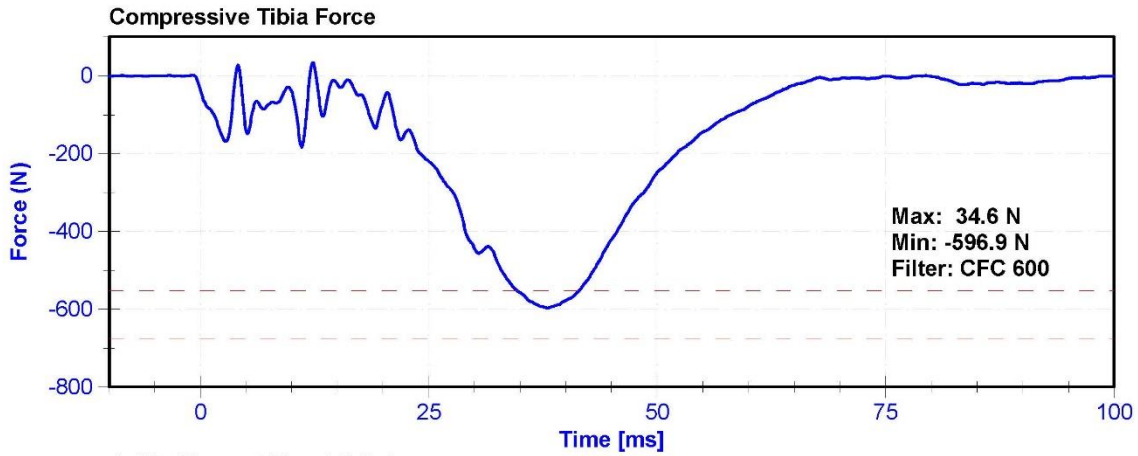
ATD Manufacturer	Humanetics	Test Technician	M. Goehle
ATD Serial Number	DL9207	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	58.2	Pass
Velocity	1.9	2.1	m/s	1.934	Pass
Lower Tibia Compressive Force	-675	-552	N	-596.9	Pass
Peak Moment about X-Axis	36.3	44.4	Nm	43.63	Pass
Peak Rotation about X-Axis	30.3	37.0	deg	30.72	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C15018	7/15/2015	7/14/2016
Lower Tibia Load Cell	Denton 4929J	LC-166 Fz	2/9/2015	2/9/2016
Ankle Y Potentiometer	Contelec PD210-4B	DS-0528	2/19/2015	2/19/2016



Hybrid III 5th Female 019 DUMMY CALIBRATIONS

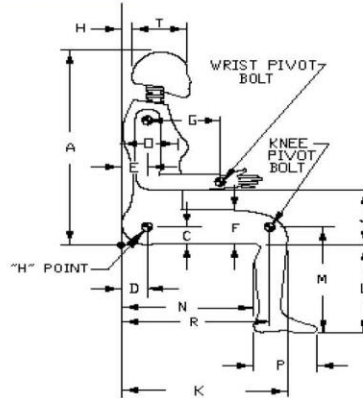
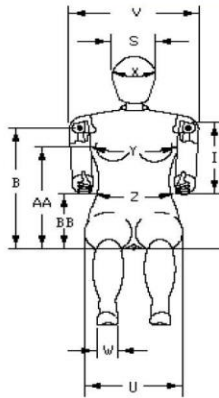


External Measurements - Hybrid 3 - 5th Female

Technician: M. Geesey

Date: 8/14/2015

Dummy Serial Number: 19



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	775	800	776	Pass
B	Shoulder Pivot Height	432	457	445	Pass
C	H-Point Height	81	86	83	Pass
D	H-Point from Backline	145	150	146	Pass
E	Shoulder Pivot from Backline	69	84	76	Pass
F	Thigh Clearance	119	135	130	Pass
G	Back of Elbow to Wrist Pivot	244	259	248	Pass
H	Head Back to Backline	43	48	45	Pass
I	Shoulder to Elbow Length	277	297	281	Pass
J	Elbow Rest Height	183	203	186	Pass
K	Buttock to Knee Length	521	546	535	Pass
L	Popliteal Height	356	376	360	Pass
M	Knee Pivot Height	394	419	401	Pass
N	Buttock Popliteal Length	414	439	429	Pass
O	Chest Depth without Jacket	175	191	182	Pass
P	Foot Length (right)	219	234	225	Pass
R	Buttock To Knee Pivot Length	457	483	478	Pass
S	Head Breadth	137	147	141	Pass
T	Head Depth	178	188	182	Pass
U	Hip Breadth	300	315	308	Pass
V	Shoulder Breadth	351	366	358	Pass
W	Foot Breadth	79	94	85	Pass
X	Head Circumference	528	549	533	Pass
Y	Chest Circumference with Jacket	851	881	869	Pass
Z	Waist Circumference	460	790	771	Pass
AA	Reference Location (Chest Circumference)	333	358	340	Pass
BB	Reference Location (Waist Circumference)	160	170	165	Pass

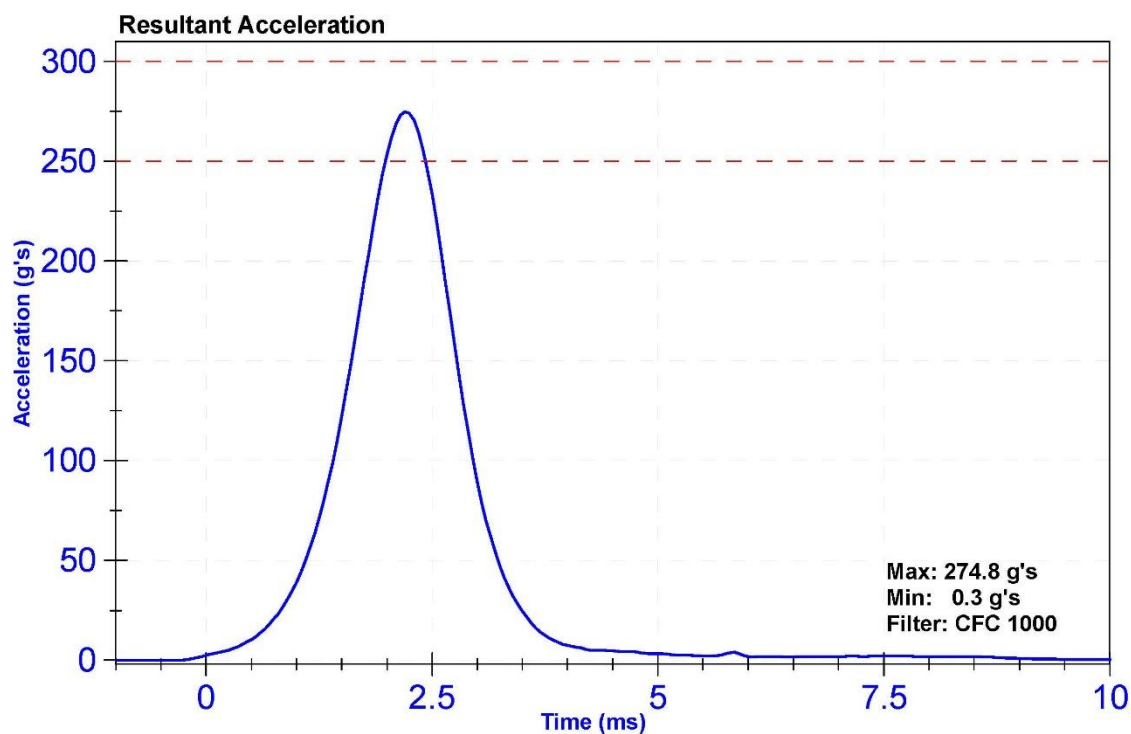
ATD Manufacturer	ASTC	Test Technician	M.Hartung
ATD Serial Number	019	Laboratory Supervisor	M.Goehle

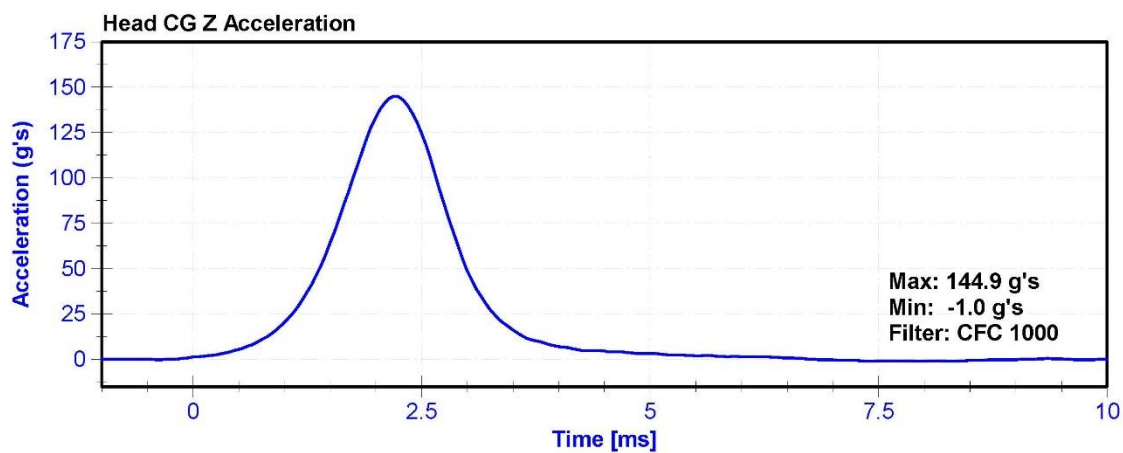
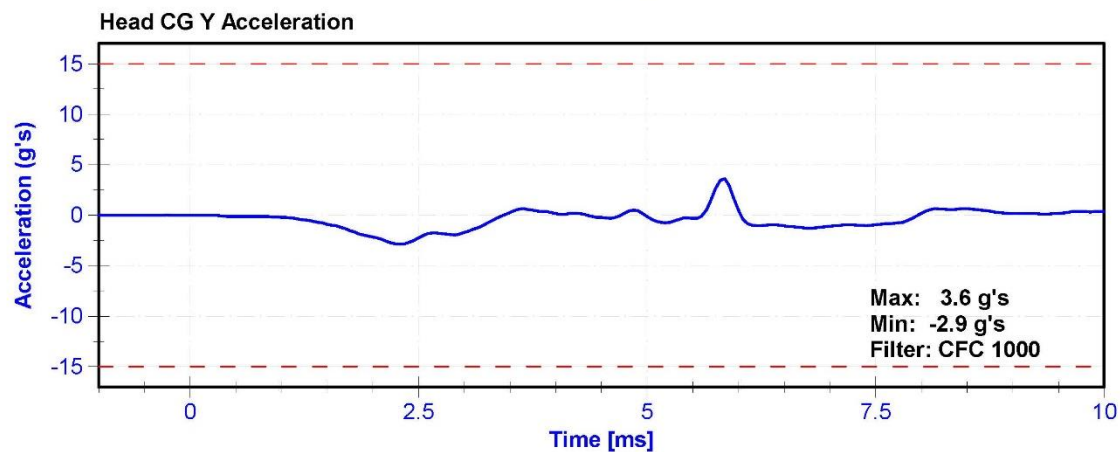
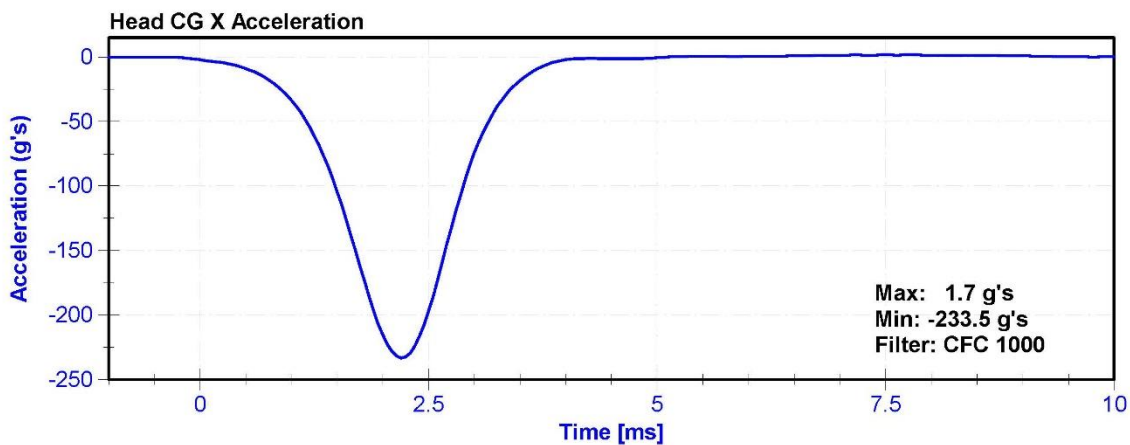
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	66.5	Pass
Resultant Acceleration	250	300	g's	274.8	Pass
Oscillation	0	10	%	1.8	Pass
Lateral Acceleration	-15	15	g's	3.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco 7264	AC-P78168	6/26/2015	6/25/2016
Y Accelerometer	Endevco 7264	AC-P82323	6/26/2015	6/25/2016
Z Accelerometer	Endevco 7264	AC-P58727	6/26/2015	6/25/2016





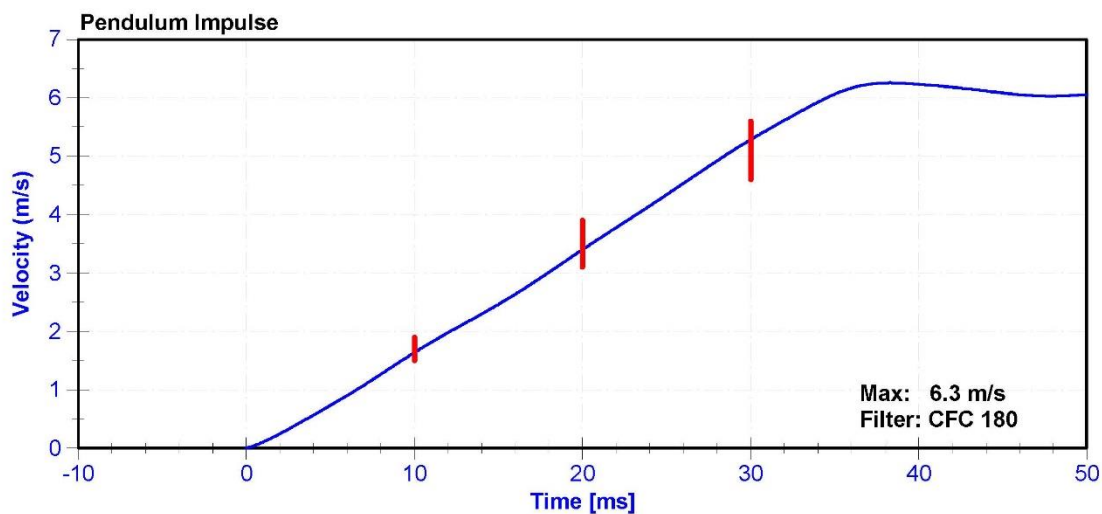
ATD Manufacturer	ASTC	Test Technician	M.Hartung
ATD Serial Number	019	Laboratory Supervisor	M.Goehle

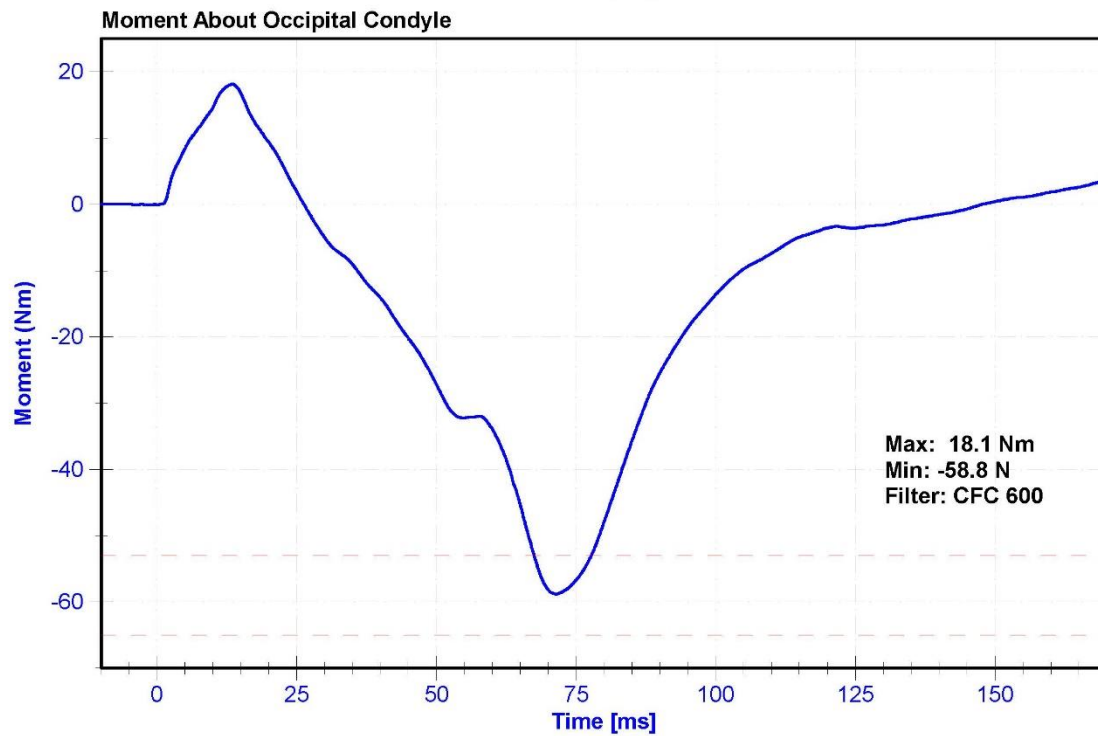
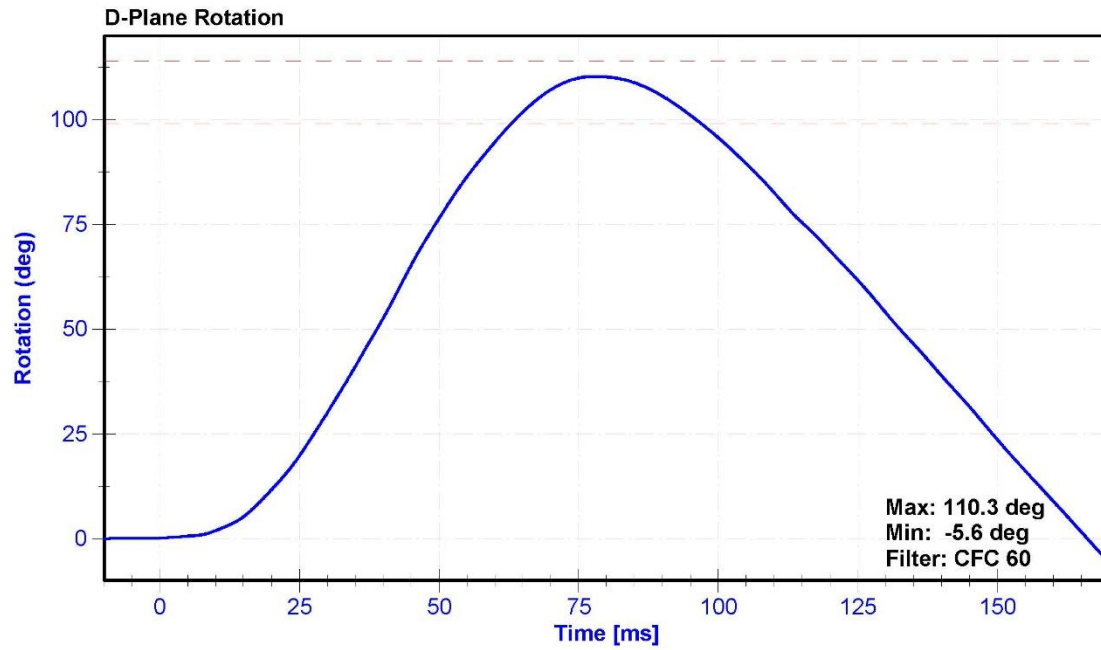
Results

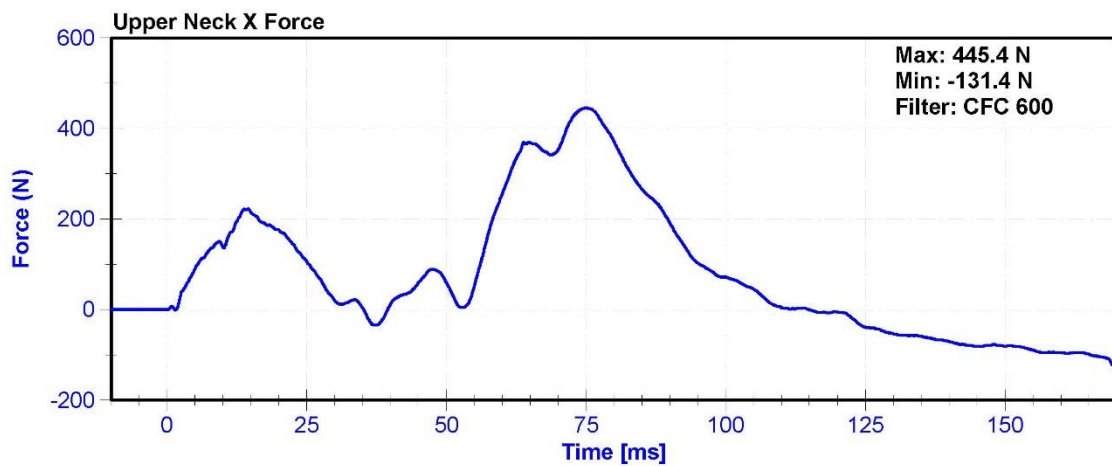
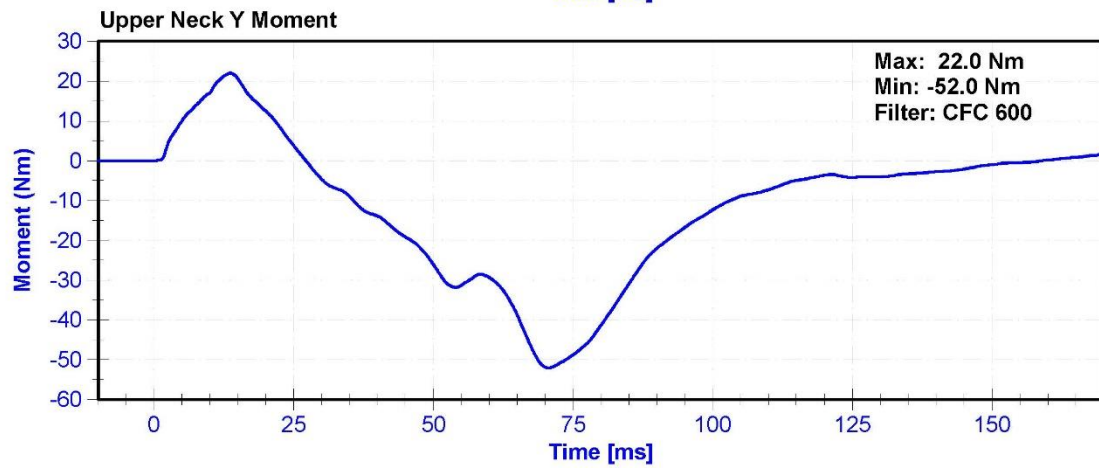
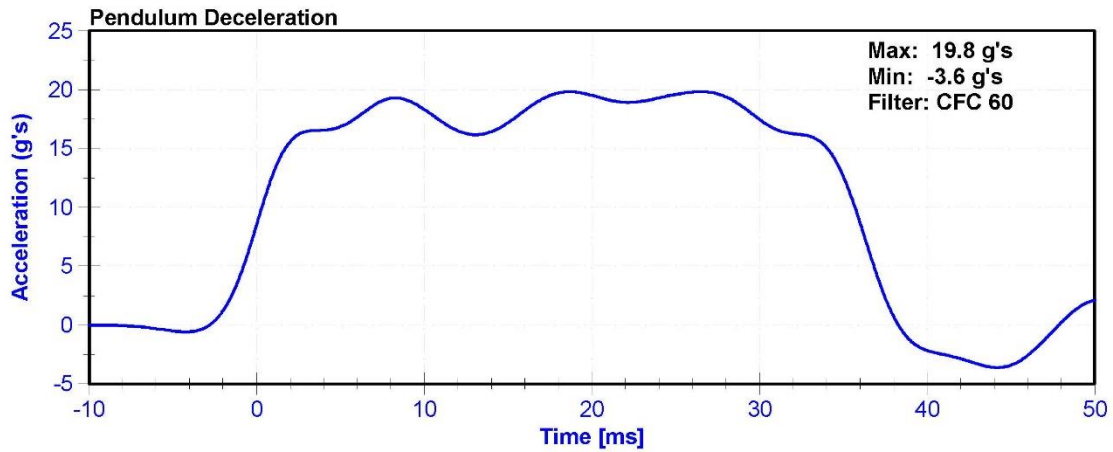
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	61.2	Pass
Velocity	5.95	6.19	m/s	6.025	Pass
Pendulum Impulse at 10ms	1.5	1.9	m/s	1.64	Pass
Pendulum Impulse at 20ms	3.1	3.9	m/s	3.40	Pass
Pendulum Impulse at 30ms	4.6	5.6	m/s	5.28	Pass
D Plane Rotation	99	114	deg	110.3	Pass
Moment During Rotation Interval	-65	-53	Nm	-58.8	Pass
Moment Decay to -10Nm	94	114	ms	104.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/7/2015	11/7/2015
Pendulum Potentiometer	SP22G	DS-PendPot	3/3/2015	3/2/2016
Condyle Potentiometer	SP22G	DS-CondPot	3/3/2015	3/2/2016
Upper Neck Load Cell	Denton 1716ATF	LC-2184 Fx	6/29/2015	6/28/2016







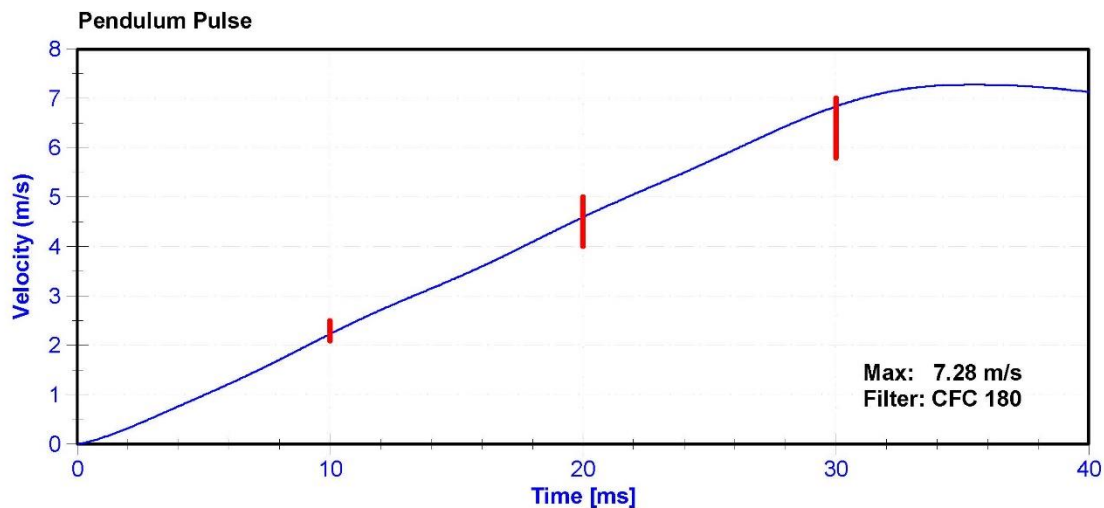
ATD Manufacturer	ASTC	Test Technician	M.Hartung
ATD Serial Number	019	Laboratory Supervisor	M.Goehle

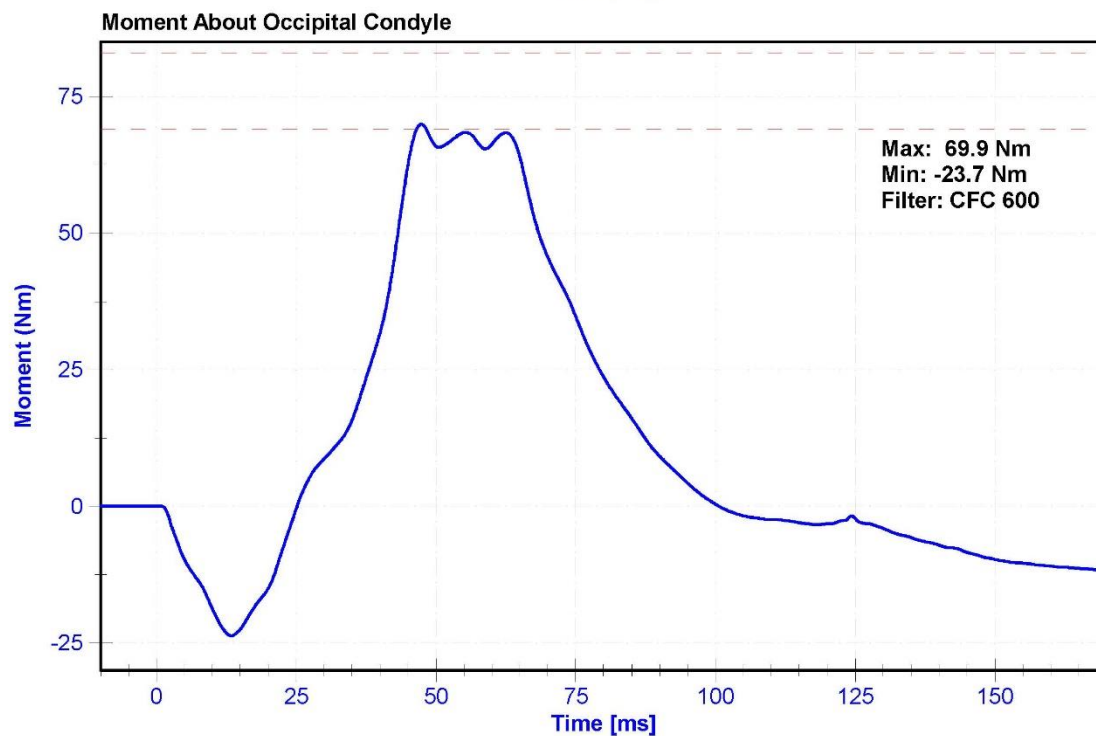
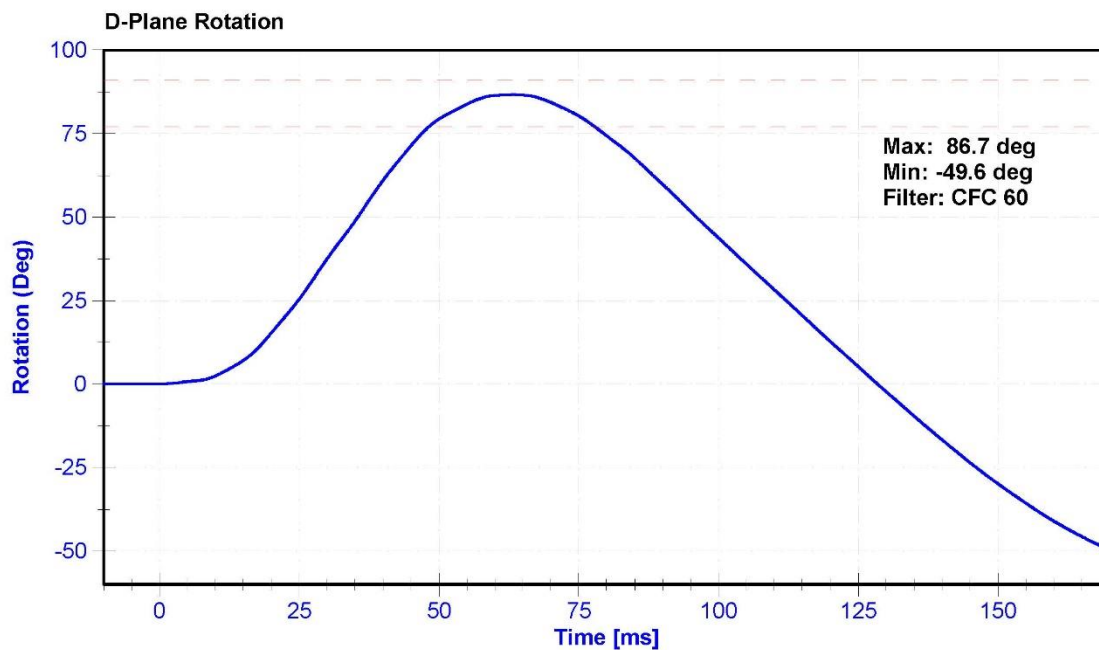
Results

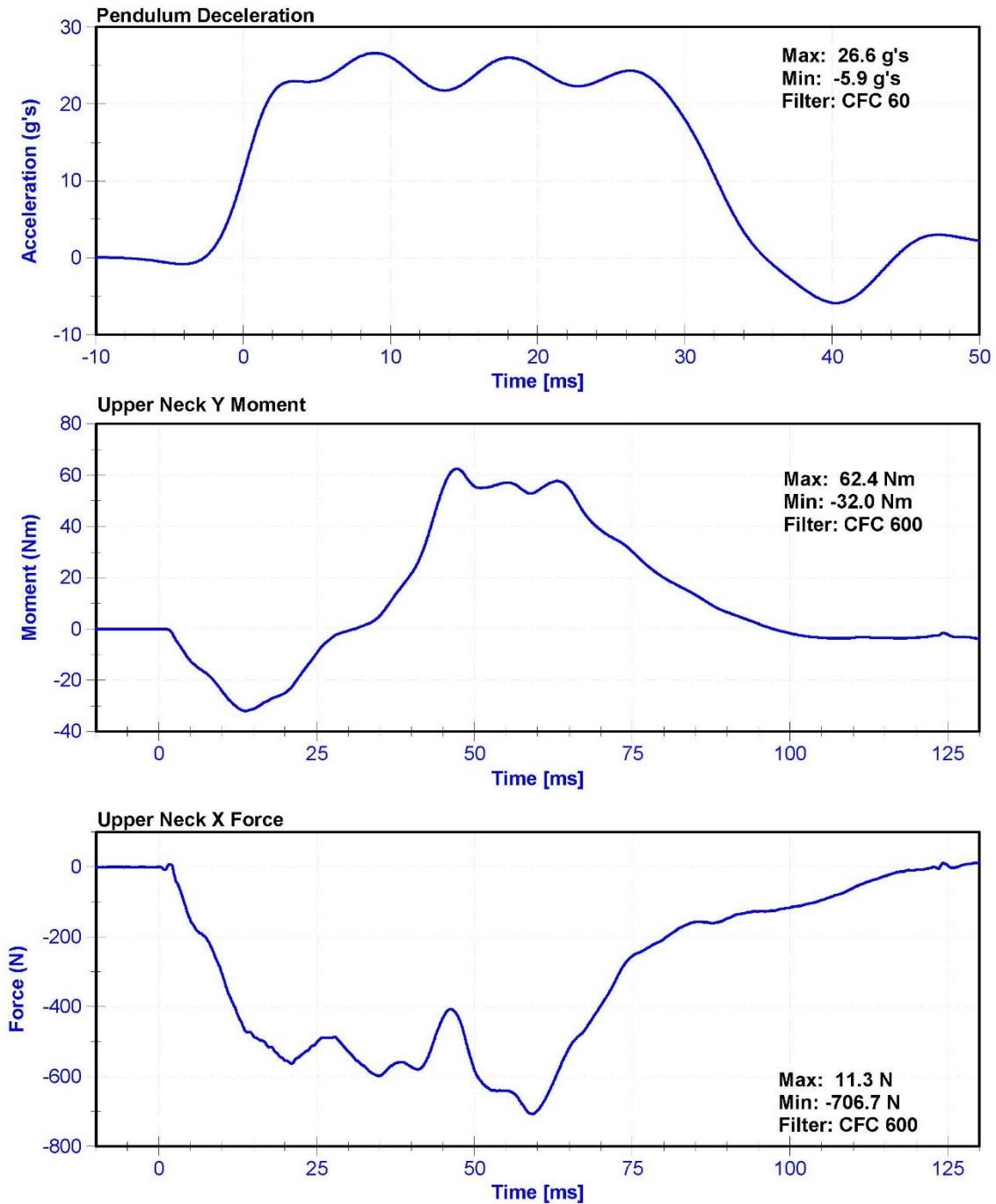
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	61.1	Pass
Velocity	6.89	7.13	m/s	7.037	Pass
Pendulum Impulse at 10ms	2.1	2.5	m/s	2.23	Pass
Pendulum Impulse at 20ms	4.0	5.0	m/s	4.60	Pass
Pendulum Impulse at 30ms	5.8	7.0	m/s	6.84	Pass
Max D Plane Rotation	77	91	deg	86.7	Pass
Max Moment During Rotation Interval	69	83	Nm	69.9	Pass
Moment Decay to 10.0 Nm	80	100	ms	89.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/7/2015	11/7/2015
Pendulum Potentiometer	SP22G	DS-PendPot	3/3/2015	3/2/2016
Condyle Potentiometer	SP22G	DS-CondPot	3/3/2015	3/2/2016
Upper Neck Load Cell	Denton 1716ATF	LC-2184 Fx	6/29/2015	6/28/2016







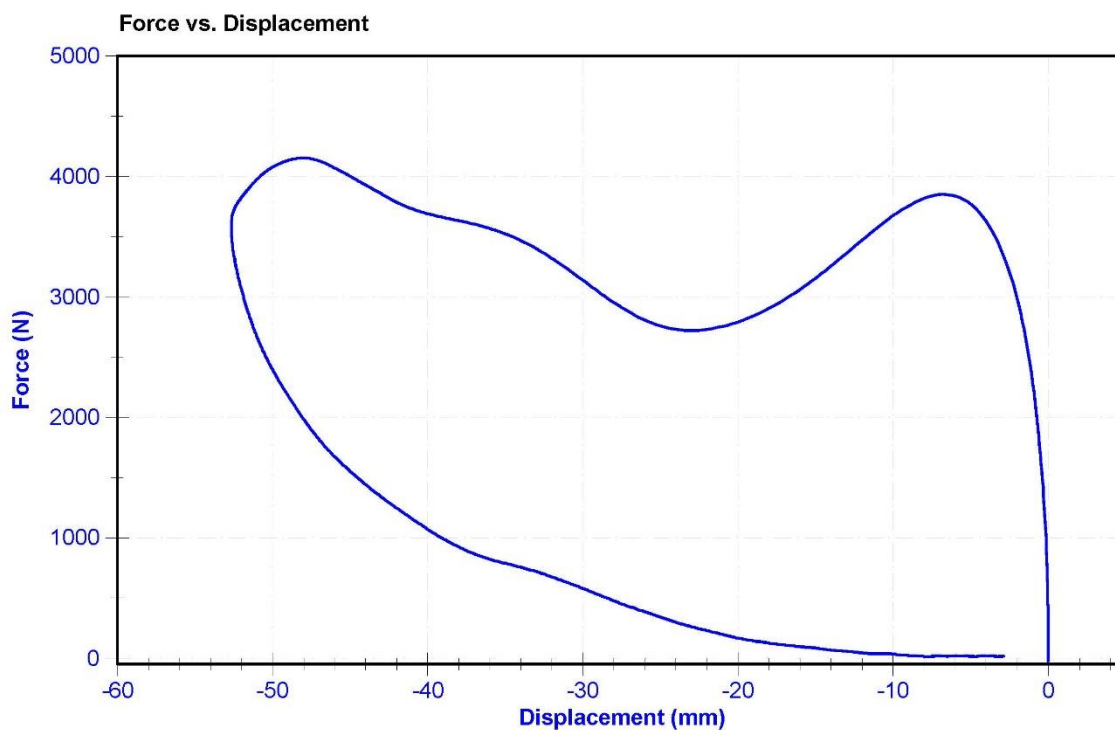
ATD Manufacturer	ASTC	Test Technician	M.Hartung
ATD Serial Number	019	Laboratory Supervisor	M.Goehle

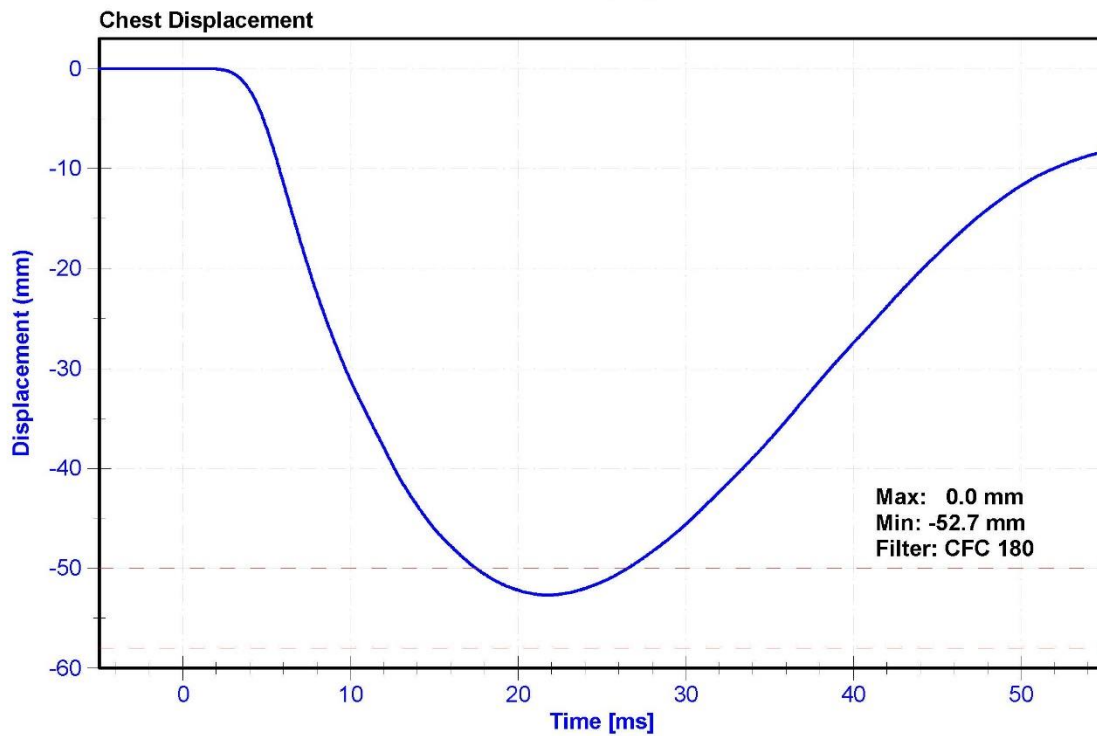
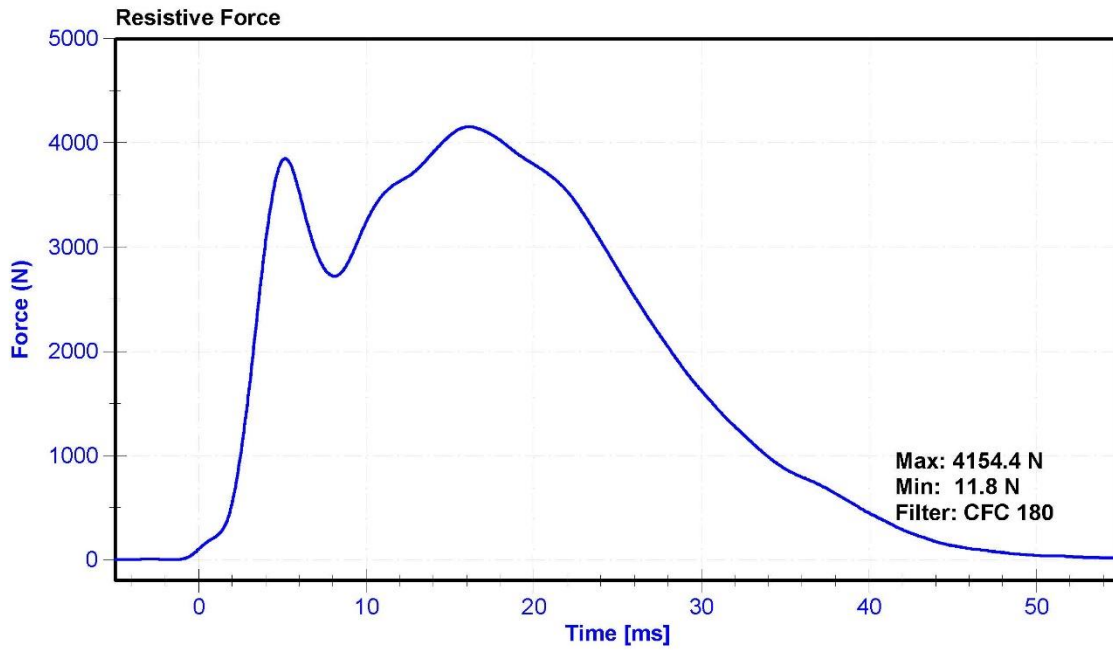
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	65.9	Pass
Velocity	6.59	6.83	m/s	6.684	Pass
Chest Deflection	-58	-50	mm	-52.7	Pass
Maximum Resistive Force (50 to 58mm)	3,900	4,400	N	4081.9	Pass
Maximum Resistive Force (18 to 50mm)	0	4,600	N	4154.4	Pass
Hysteresis	69	85	%	79.8	Pass

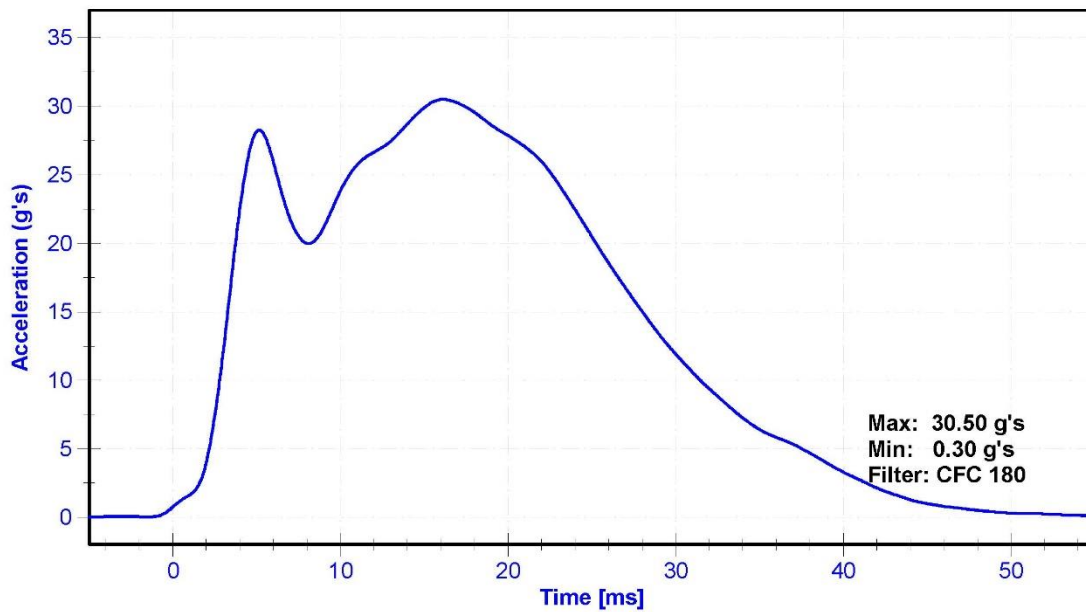
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Chest Potentiometer	Servo 14CB1	DS-FEM019	7/1/2015	6/30/2016

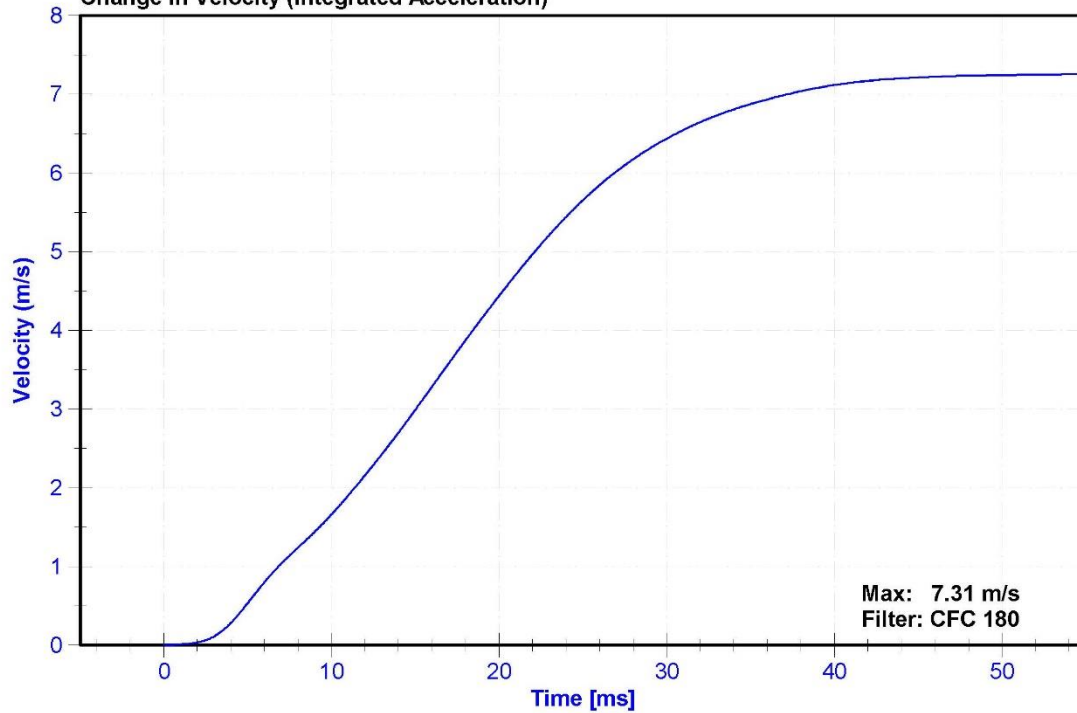




Probe Acceleration



Change in Velocity (Integrated Acceleration)



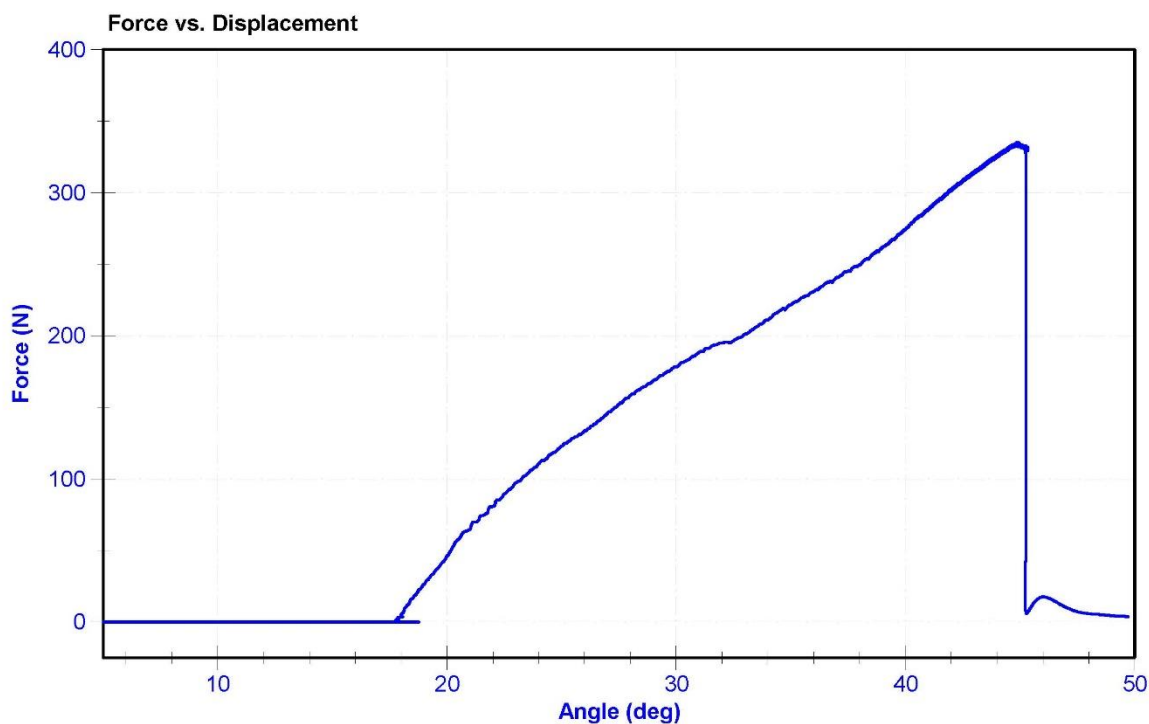
ATD Manufacturer	ASTC	Test Technician	M.Hartung
ATD Serial Number	019	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.6	25.6	°C	21.5	Pass
Humidity	10	70	%	68.6	Pass
Initial Angle	0	20	deg	17.3	Pass
Force at 45 Degrees	320	390	N	332.6	Pass
Return Angle Relative to Initial	0	8	deg	3.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	Rieker N4C-1	DS-13051548	8/14/2015	8/13/2016
Load Cell	Interface SML-200	LC-493319	8/13/2015	8/12/2016



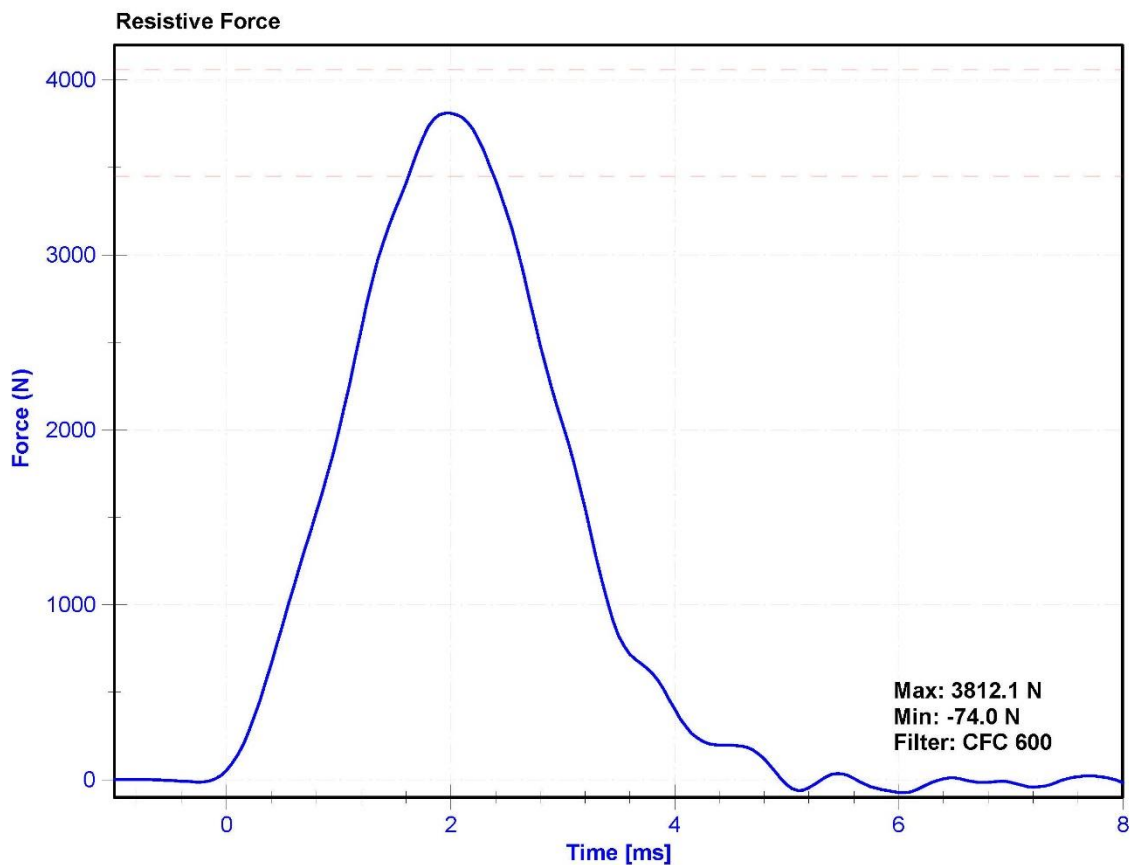
ATD Manufacturer	ASTC	Test Technician	M.Hartung
ATD Serial Number	019	Laboratory Supervisor	M.Goehle

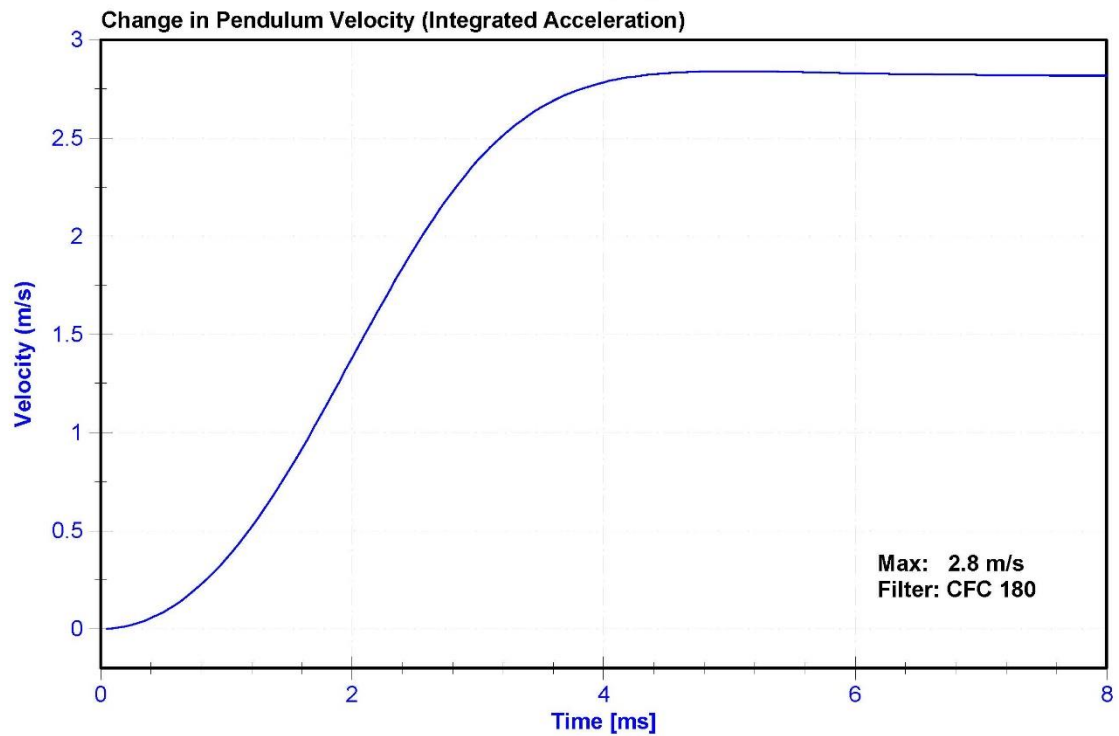
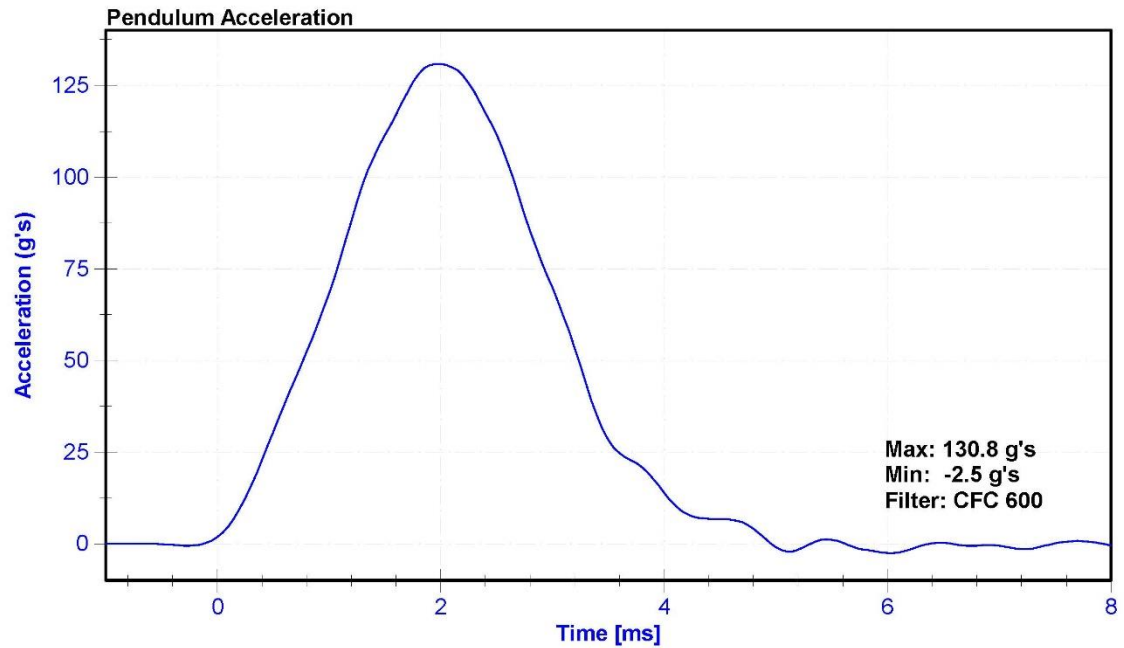
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21	Pass
Humidity	10	70	%	69	Pass
Velocity	2.07	2.13	m/s	2.083	Pass
Resistive Force	3,450	4,060	N	3812.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016





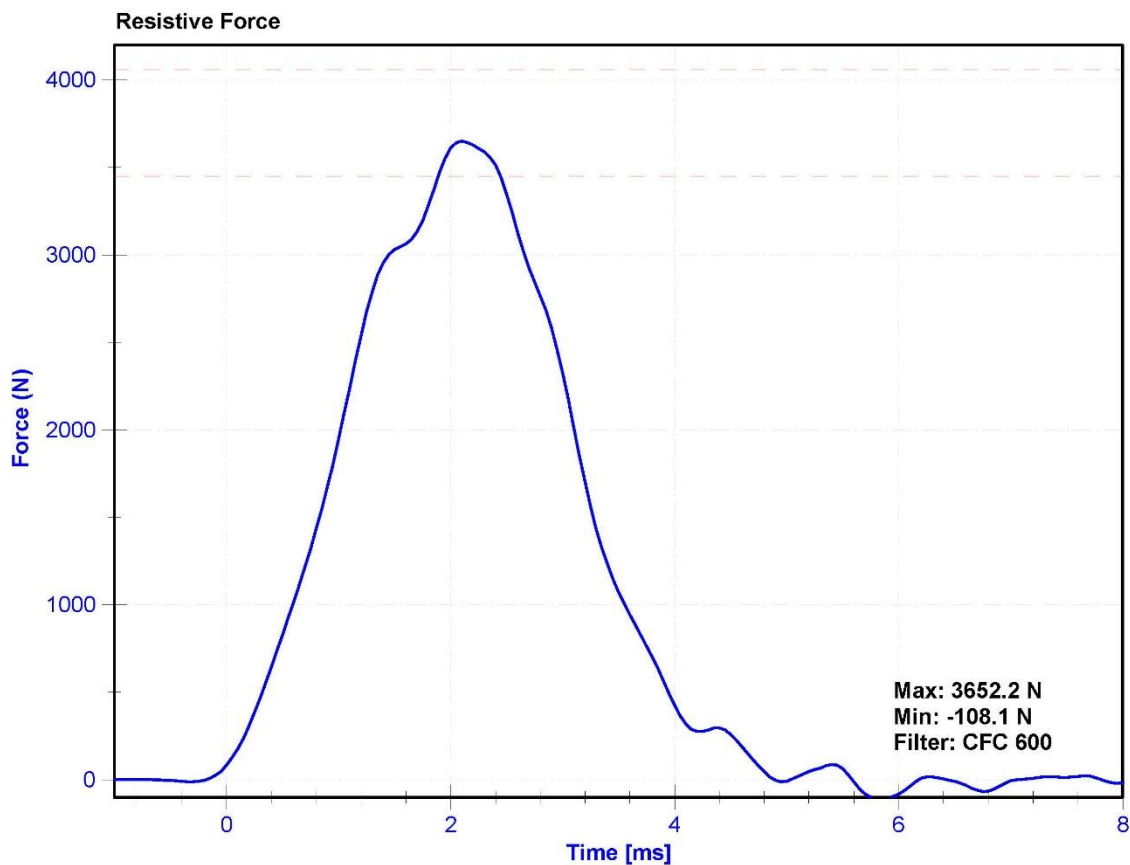
ATD Manufacturer	ASTC	Test Technician	M.Hartung
ATD Serial Number	019	Laboratory Supervisor	M.Goehle

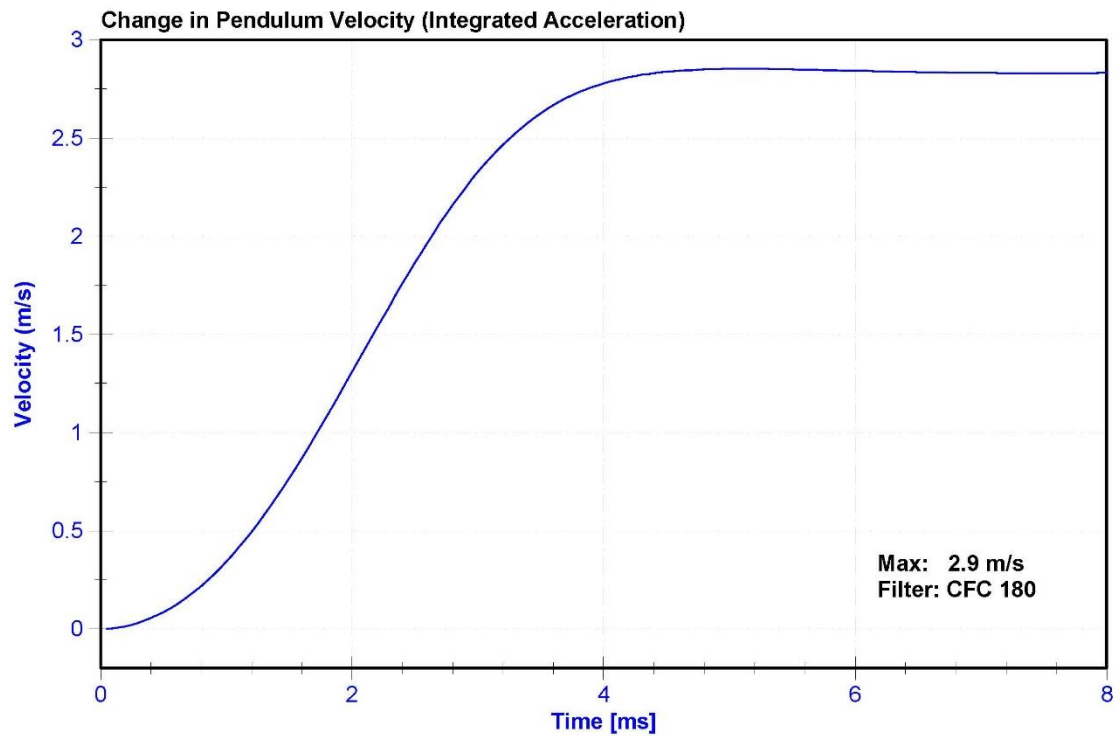
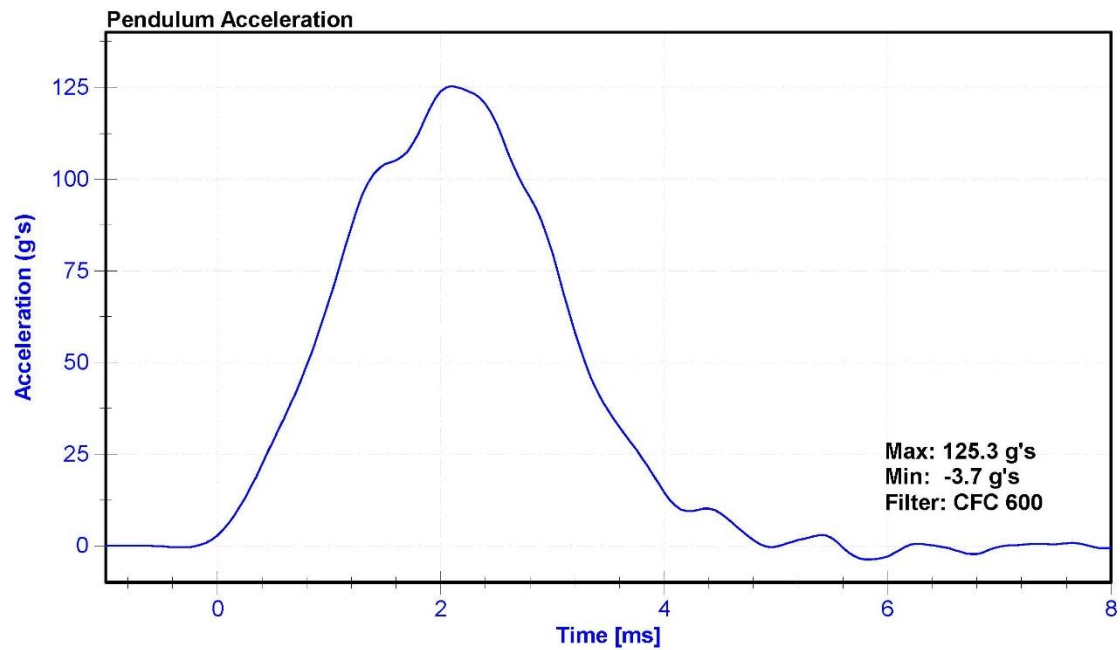
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.5	Pass
Humidity	10	70	%	63.4	Pass
Velocity	2.07	2.13	m/s	2.081	Pass
Resistive Force	3,450	4,060	N	3652.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016





Hybrid III 5th Female 324 DUMMY CALIBRATIONS

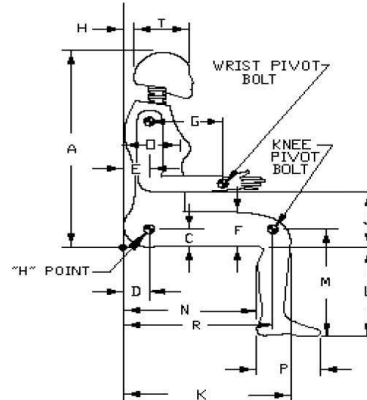
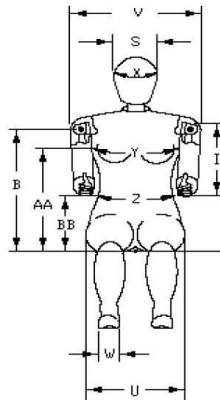


External Measurements - Hybrid 3 - 5th Female

Technician: M.Hartung

Date: 8/17/2015

Dummy Serial Number: 324



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	775	800	780	Pass
B	Shoulder Pivot Height	432	457	442	Pass
C	H-Point Height	81	86	85	Pass
D	H-Point from Backline	145	150	146	Pass
E	Shoulder Pivot from Backline	69	84	79	Pass
F	Thigh Clearance	119	135	128	Pass
G	Back of Elbow to Wrist Pivot	244	259	250	Pass
H	Head Back to Backline	43	48	46	Pass
I	Shoulder to Elbow Length	277	297	282	Pass
J	Elbow Rest Height	183	203	195	Pass
K	Buttock to Knee Length	521	546	535	Pass
L	Popliteal Height	356	376	368	Pass
M	Knee Pivot Height	394	419	409	Pass
N	Buttock Popliteal Length	414	439	433	Pass
O	Chest Depth without Jacket	175	191	183	Pass
P	Foot Length (right)	219	234	223	Pass
R	Buttock To Knee Pivot Length	457	483	471	Pass
S	Head Breadth	137	147	140	Pass
T	Head Depth	178	188	181	Pass
U	Hip Breadth	300	315	306	Pass
V	Shoulder Breadth	351	366	356	Pass
W	Foot Breadth	79	94	84	Pass
X	Head Circumference	528	549	539	Pass
Y	Chest Circumference with Jacket	851	881	865	Pass
Z	Waist Circumference	460	790	772	Pass
AA	Reference Location (Chest Circumference)	333	358	346	Pass
BB	Reference Location (Waist Circumference)	160	170	165	Pass

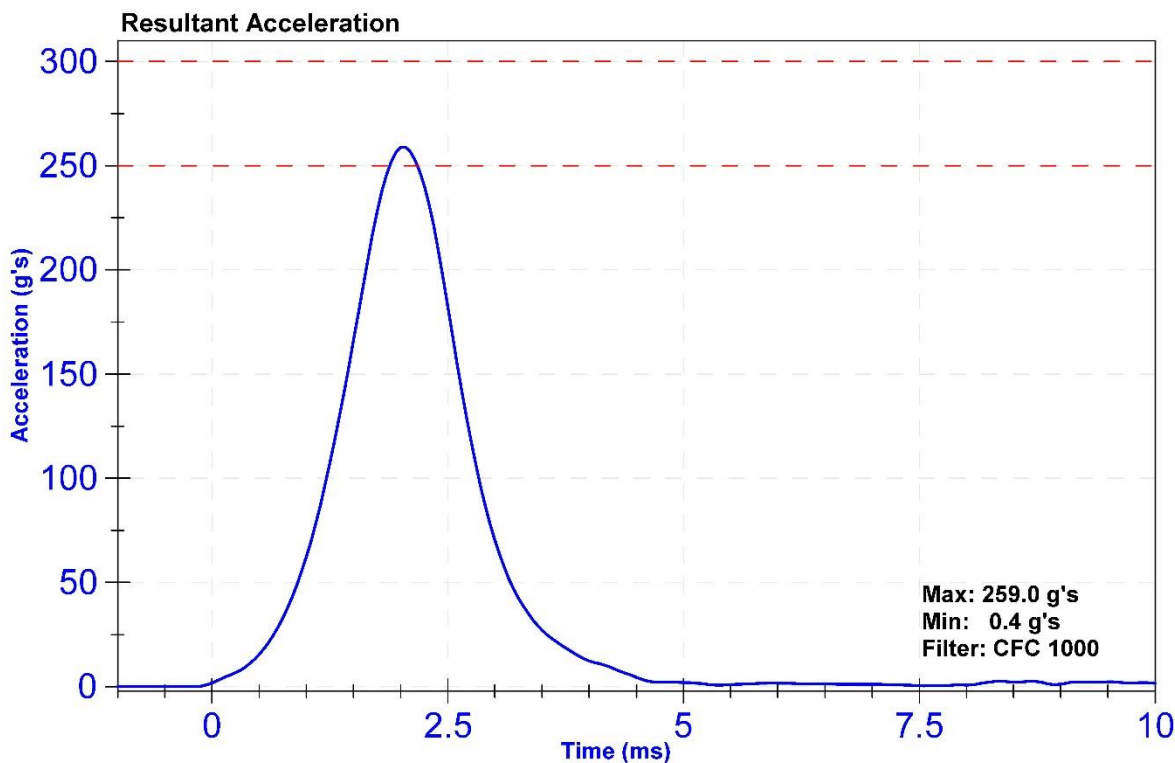
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	324	Laboratory Supervisor	M.Goehle

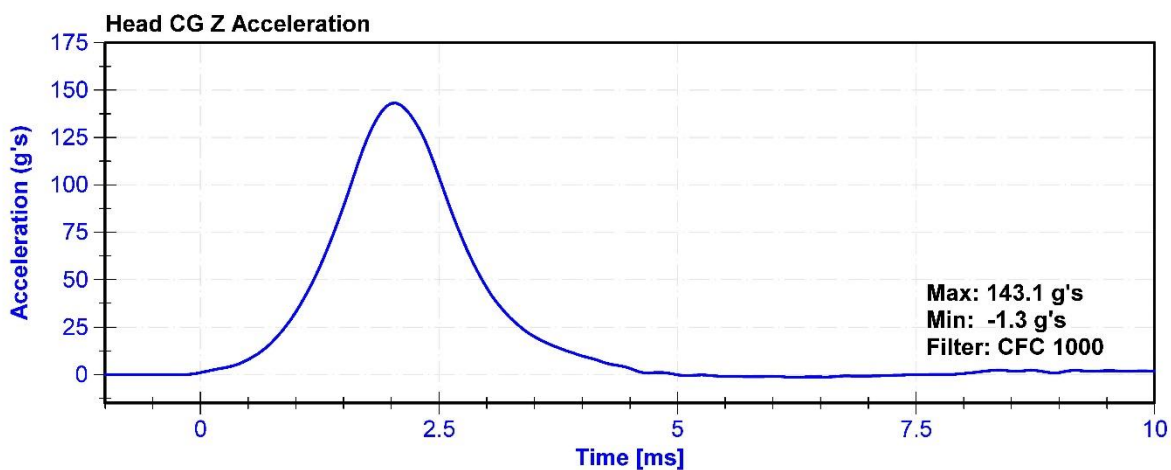
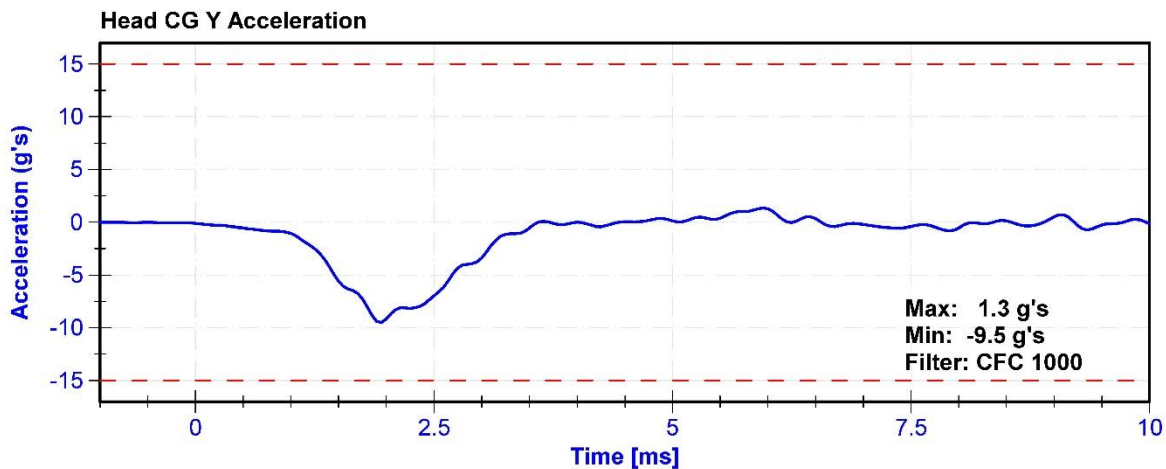
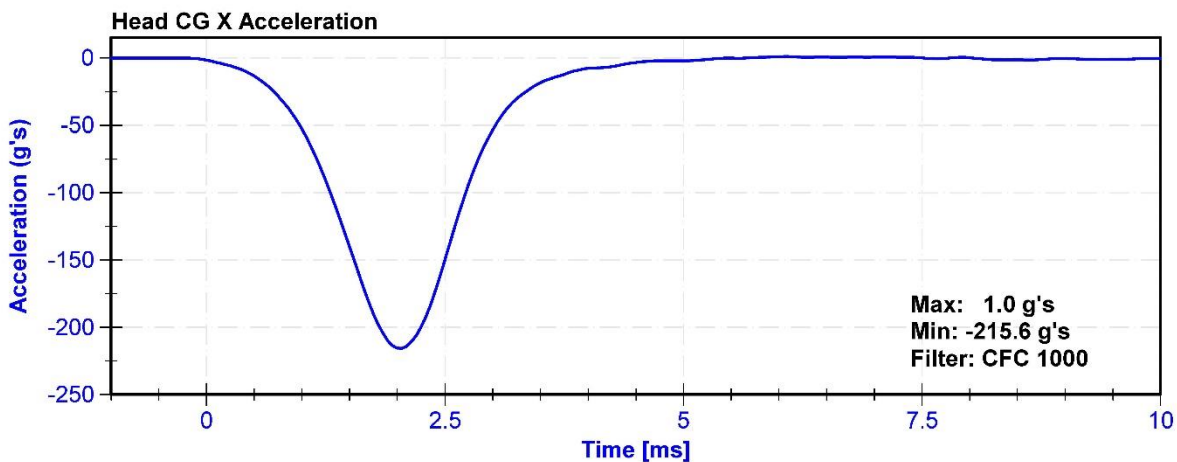
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	61.8	Pass
Resultant Acceleration	250	300	g's	259.0	Pass
Oscillation	0	10	%	1.0	Pass
Lateral Acceleration	-15	15	g's	-9.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	Endevco 7264	AC-P58729	6/26/2015	6/25/2016
Y Accelerometer	Endevco 7264	AC-P74955	6/26/2015	6/25/2016
Z Accelerometer	Endevco 7264	AC-P74778	6/26/2015	6/25/2016





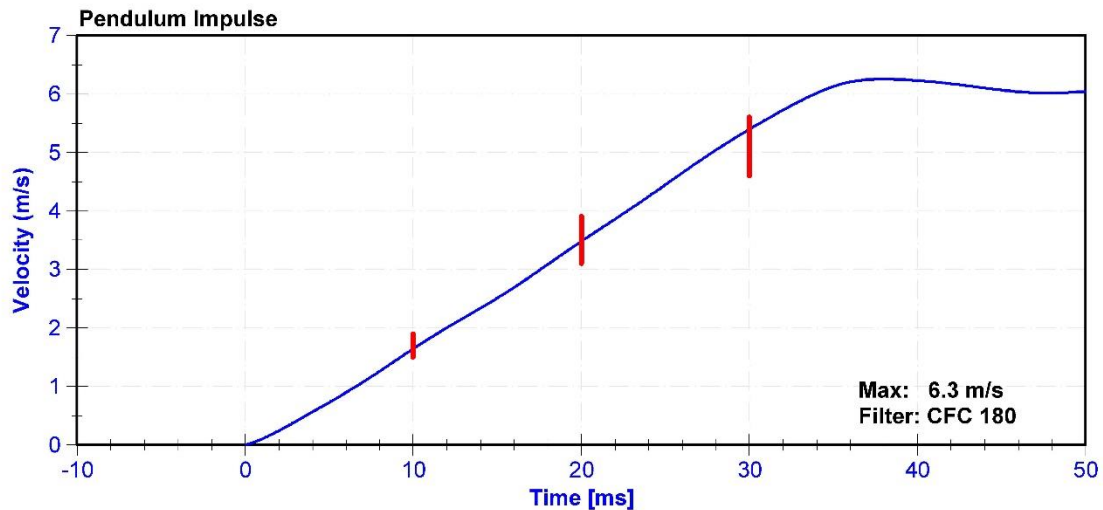
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	324	Laboratory Supervisor	M.Goehle

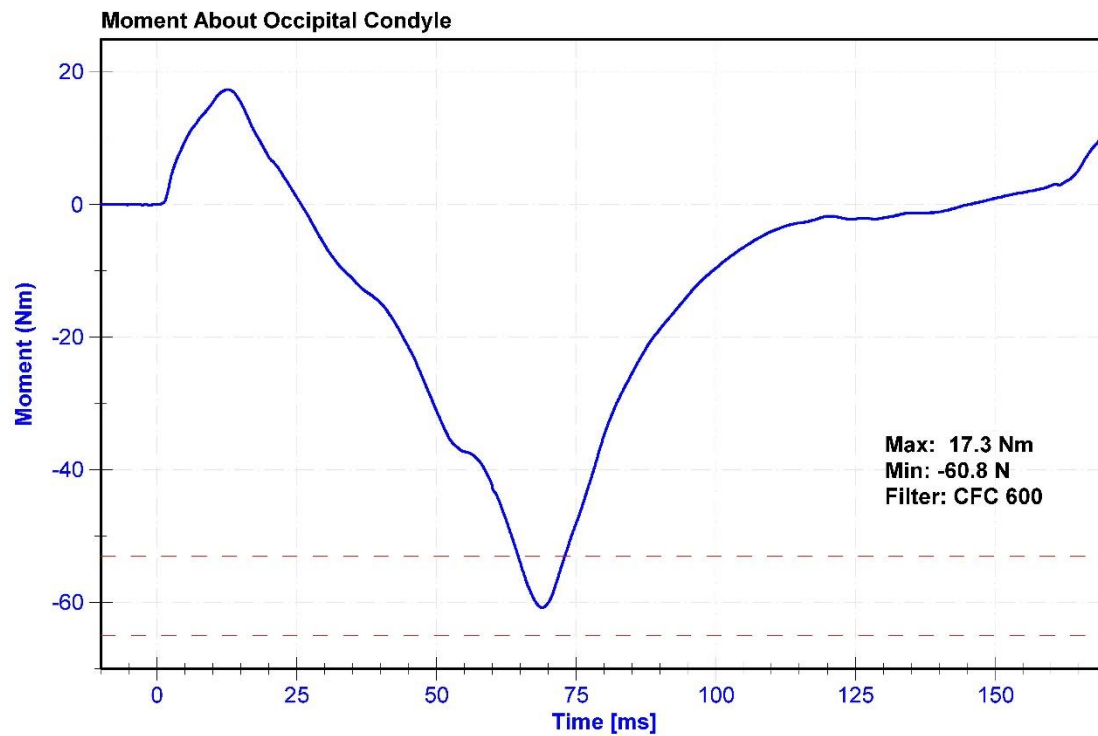
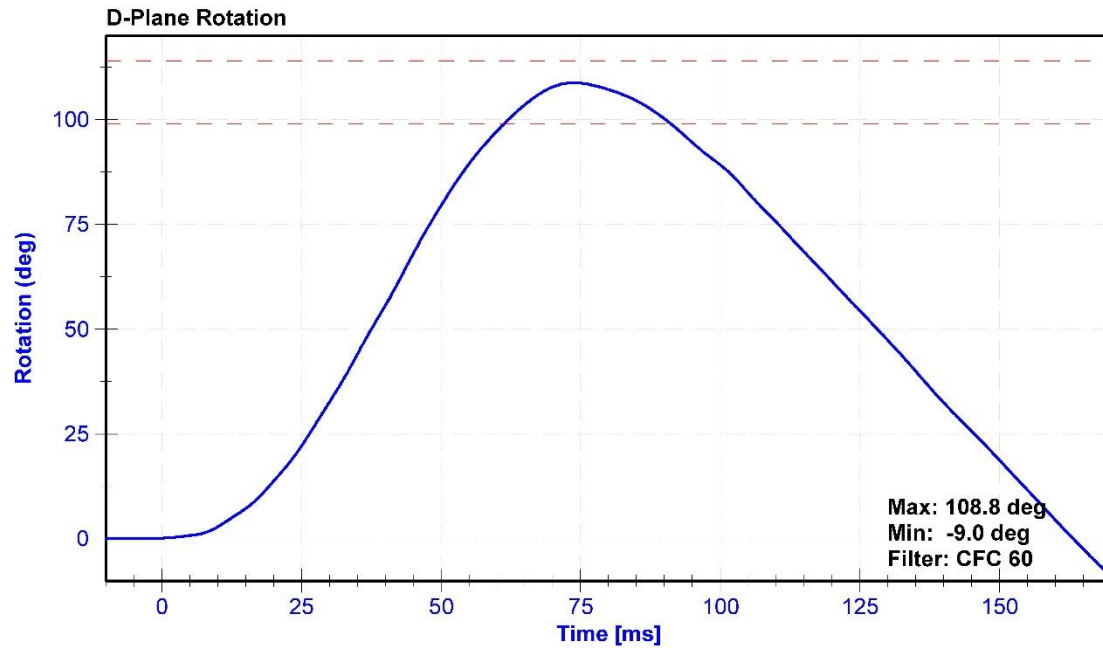
Results

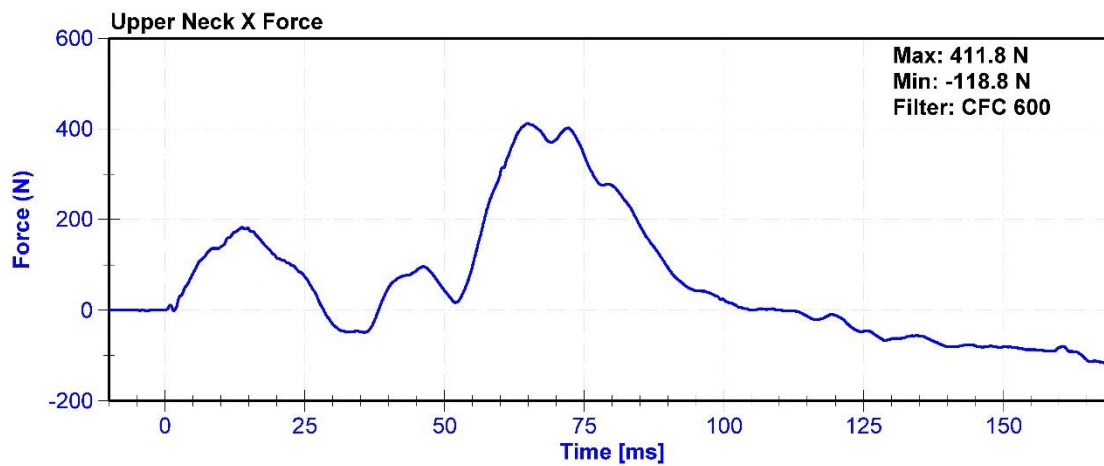
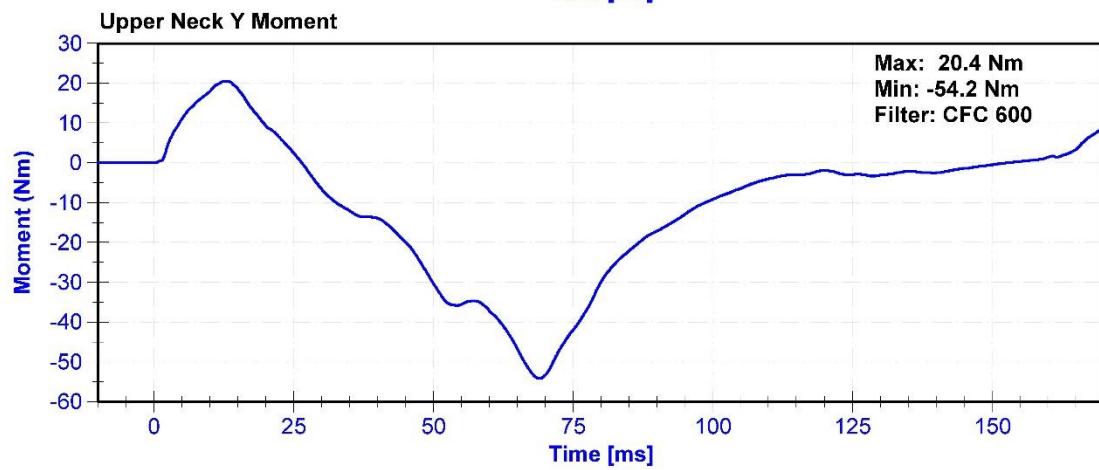
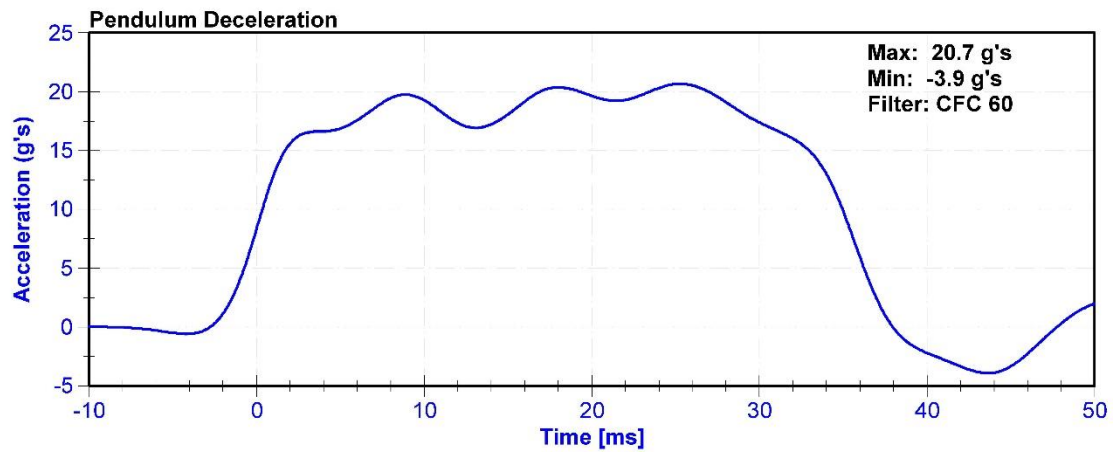
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	62.0	Pass
Velocity	5.95	6.19	m/s	6.025	Pass
Pendulum Impulse at 10ms	1.5	1.9	m/s	1.64	Pass
Pendulum Impulse at 20ms	3.1	3.9	m/s	3.48	Pass
Pendulum Impulse at 30ms	4.6	5.6	m/s	5.40	Pass
D Plane Rotation	99	114	deg	108.8	Pass
Moment During Rotation Interval	-65	-53	Nm	-60.8	Pass
Moment Decay to -10Nm	94	114	ms	99.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/7/2015	11/7/2015
Pendulum Potentiometer	SP22G	DS-PendPot	3/3/2015	3/2/2016
Condyle Potentiometer	SP22G	DS-CondPot	3/3/2015	3/2/2016
Upper Neck Load Cell	Denton 1716	LC-2193 Fx	11/25/2014	11/25/2015







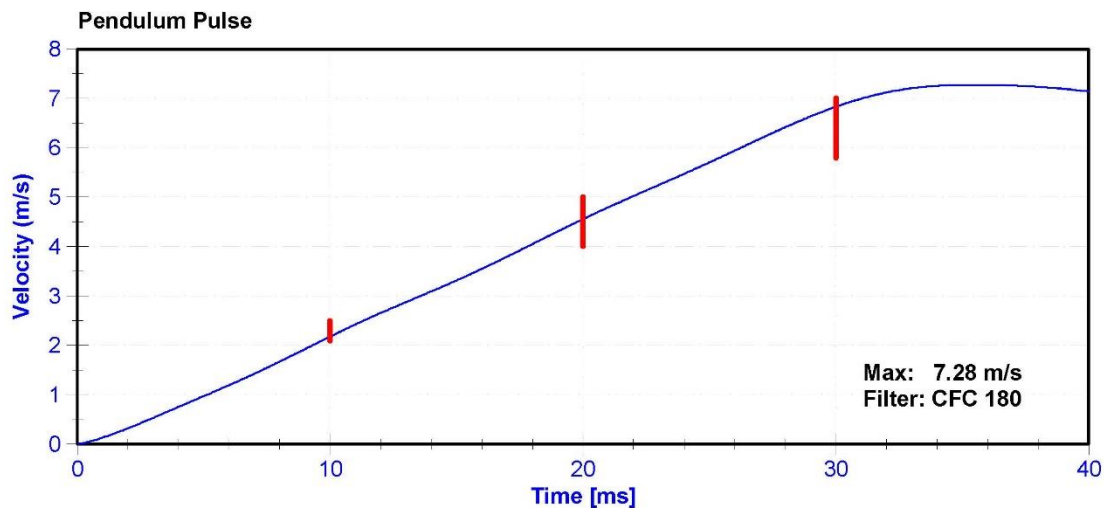
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	324	Laboratory Supervisor	M.Goehle

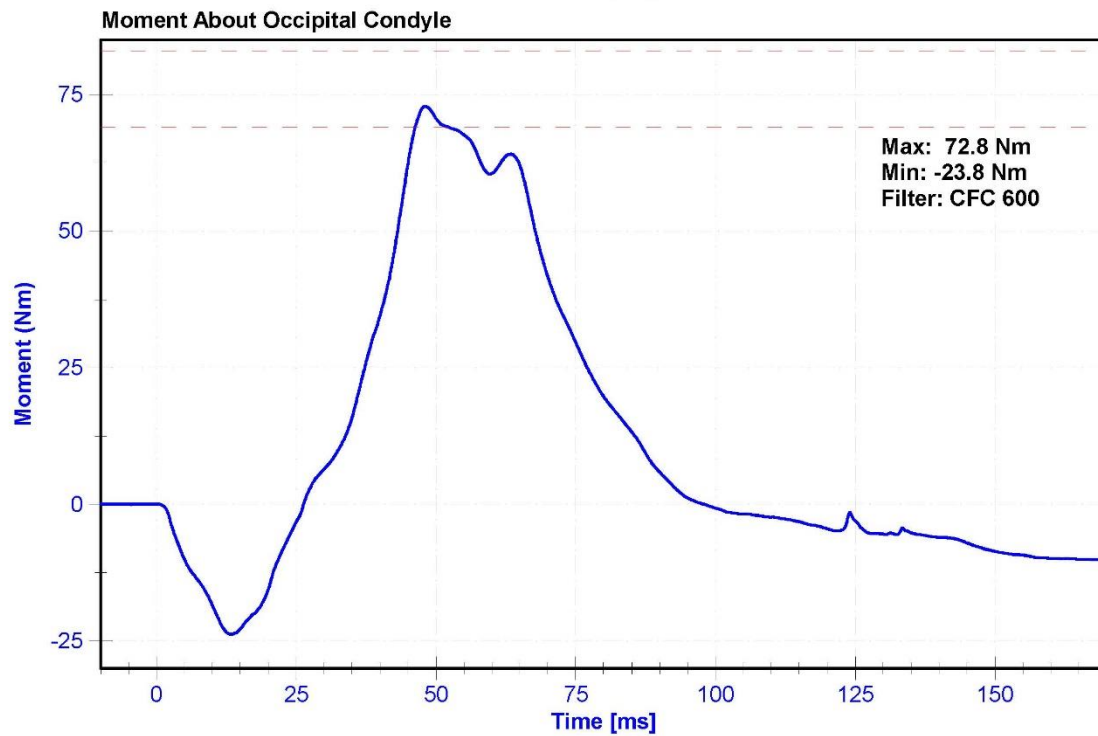
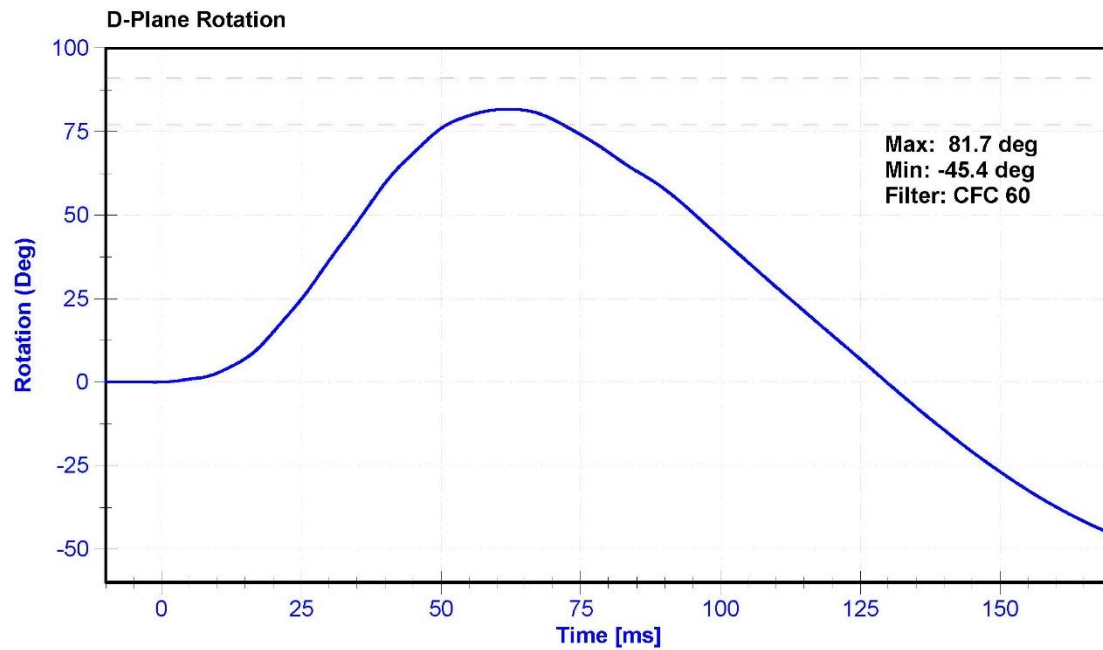
Results

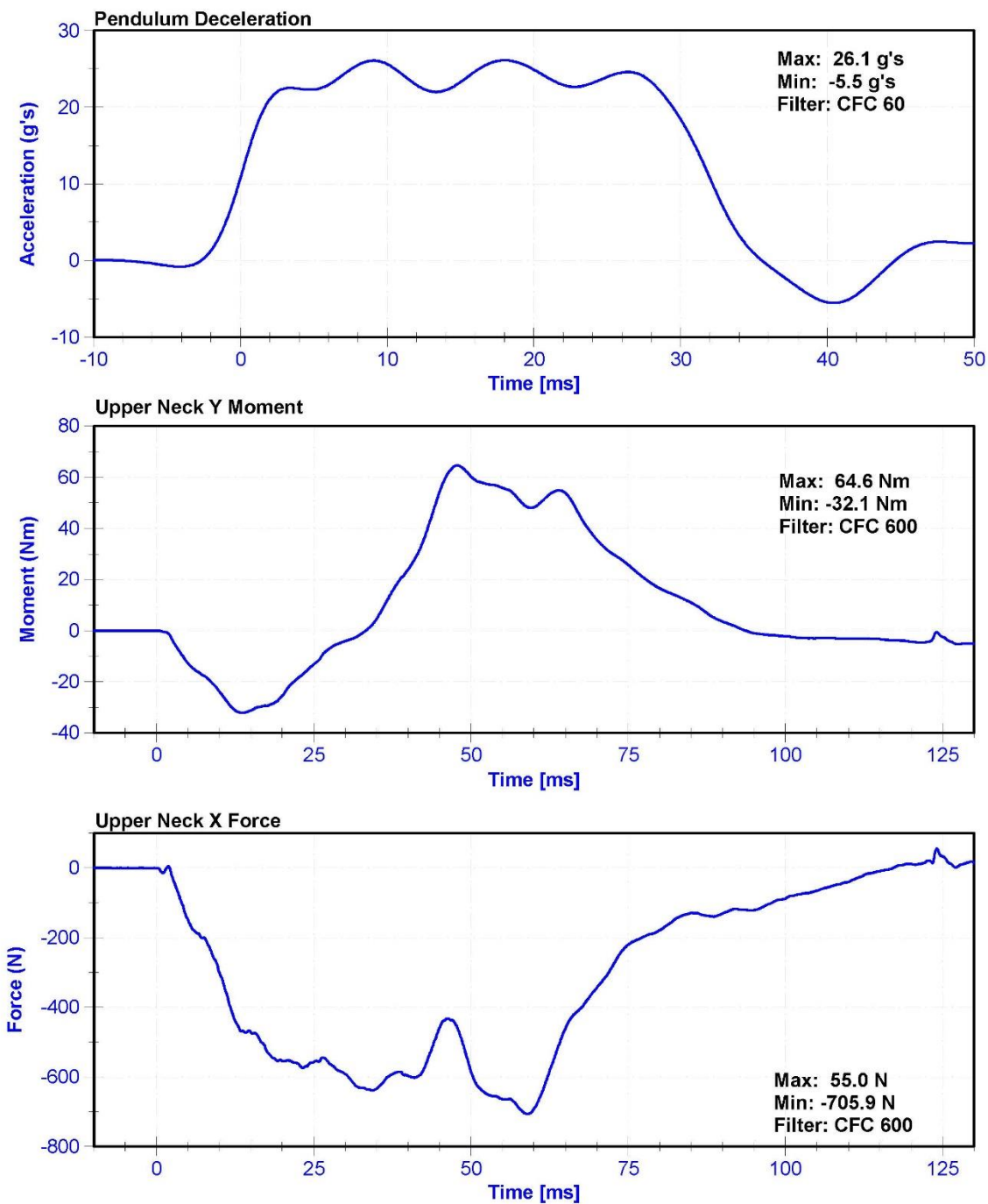
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	49.2	Pass
Velocity	6.89	7.13	m/s	6.979	Pass
Pendulum Impulse at 10ms	2.1	2.5	m/s	2.18	Pass
Pendulum Impulse at 20ms	4.0	5.0	m/s	4.56	Pass
Pendulum Impulse at 30ms	5.8	7.0	m/s	6.83	Pass
Max D Plane Rotation	77	91	deg	81.7	Pass
Max Moment During Rotation Interval	69	83	Nm	72.8	Pass
Moment Decay to 10.0 Nm	80	100	ms	87.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/7/2015	11/7/2015
Pendulum Potentiometer	SP22G	DS-PendPot	3/3/2015	3/2/2016
Condyle Potentiometer	SP22G	DS-CondPot	3/3/2015	3/2/2016
Upper Neck Load Cell	Denton 1716	LC-2193 Fx	11/25/2014	11/25/2015







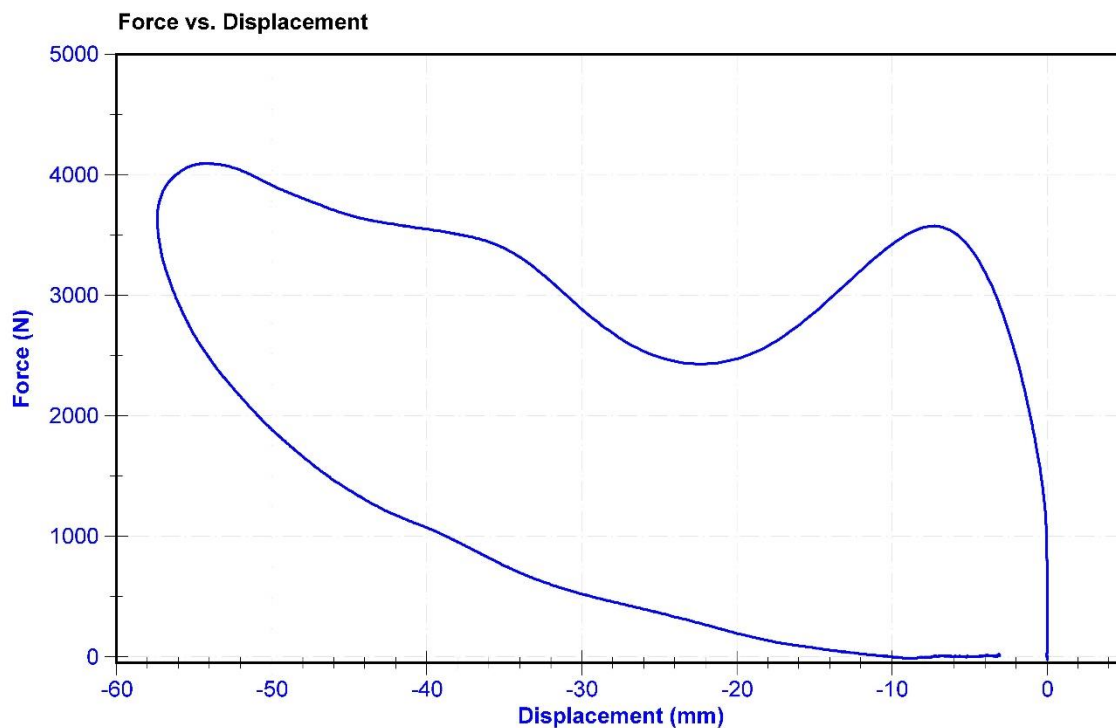
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	324	Laboratory Supervisor	M.Goehle

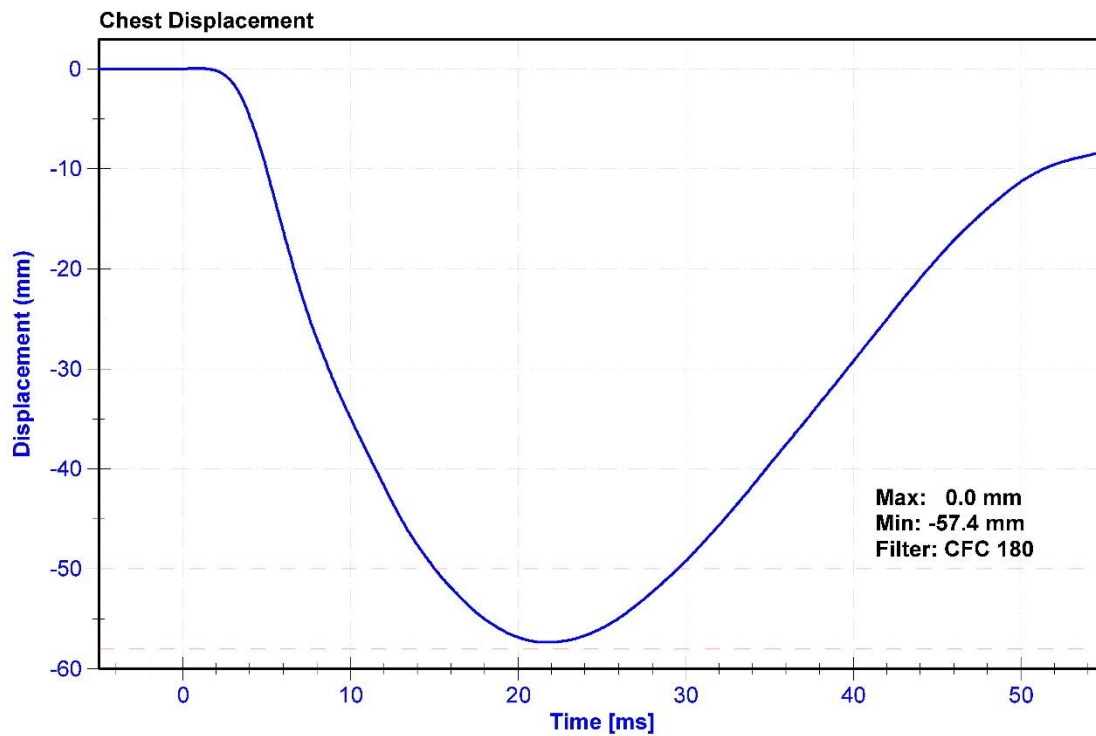
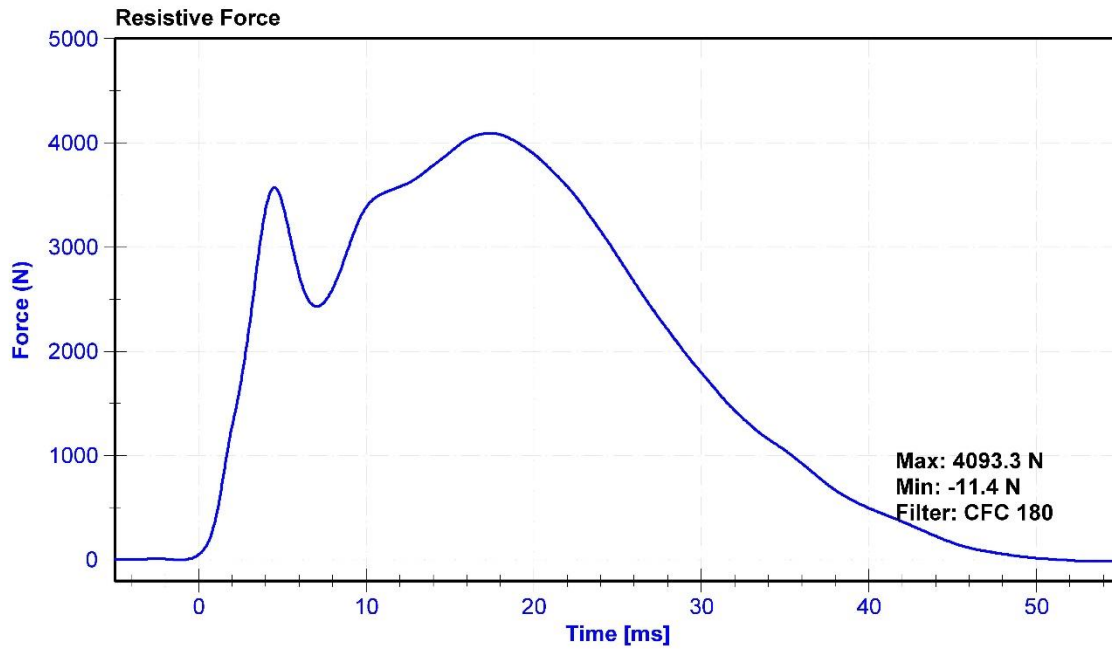
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	57.5	Pass
Velocity	6.59	6.83	m/s	6.612	Pass
Chest Deflection	-58	-50	mm	-57.4	Pass
Maximum Resistive Force (50 to 58mm)	3,900	4,400	N	4093.3	Pass
Maximum Resistive Force (18 to 50mm)	0	4,600	N	3909.2	Pass
Hysteresis	69	85	%	75.8	Pass

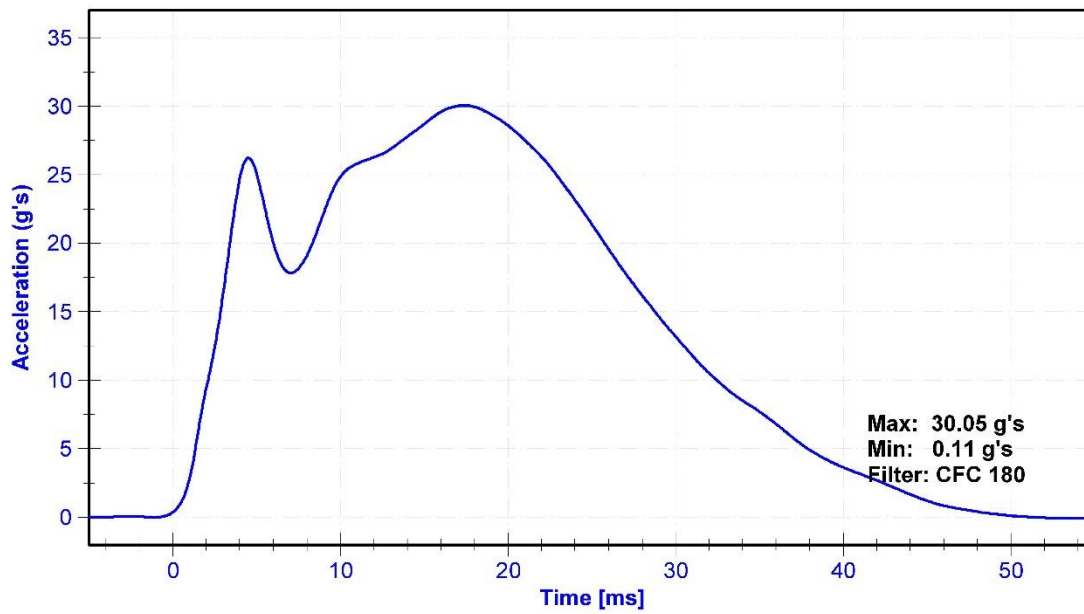
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Chest Potentiometer	Servo 14CB1	DS-CST324	6/30/2015	6/29/2016

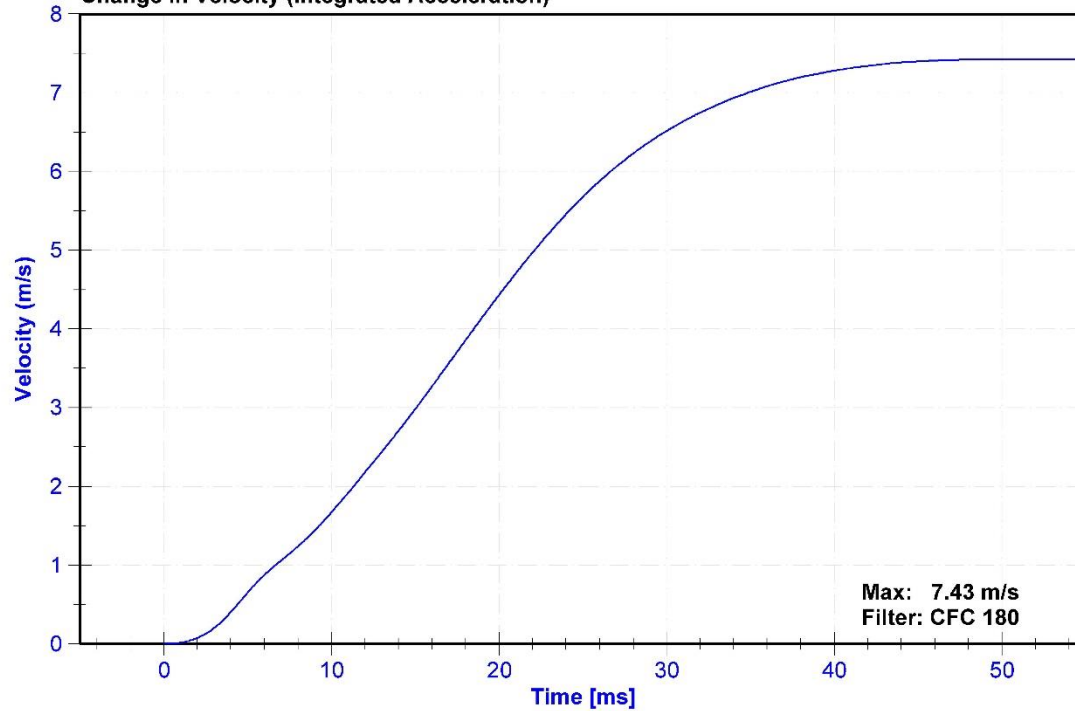




Probe Acceleration



Change in Velocity (Integrated Acceleration)



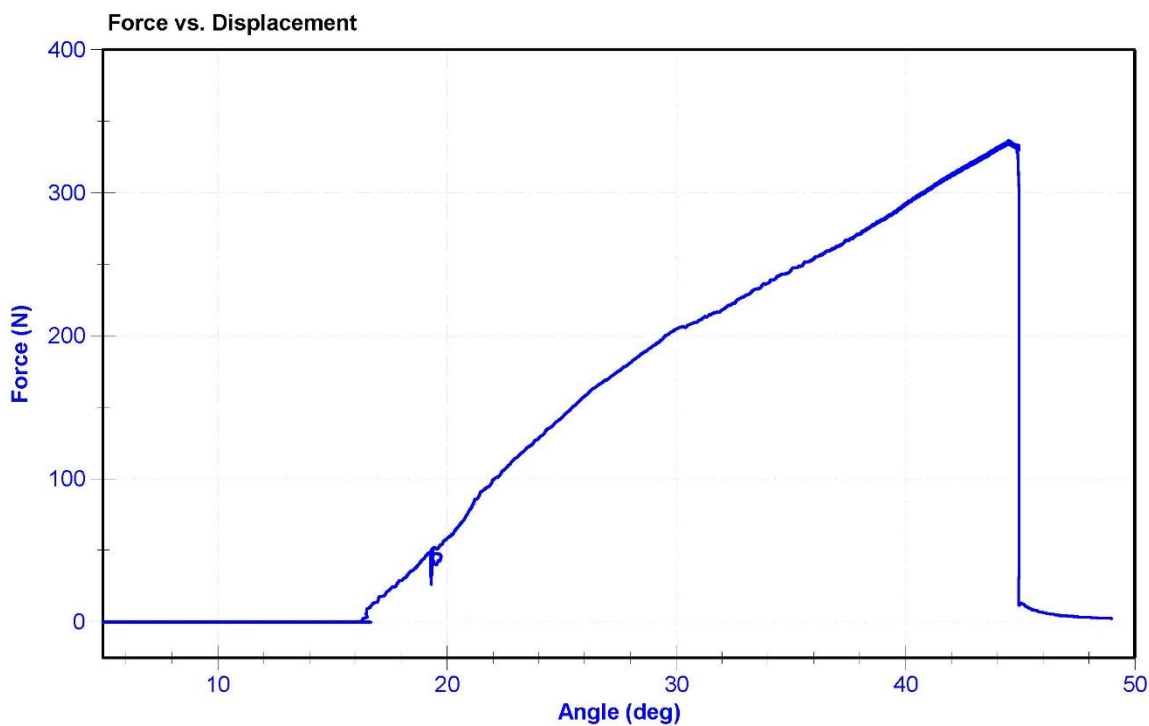
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	324	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.6	25.6	°C	21.3	Pass
Humidity	10	70	%	69.2	Pass
Initial Angle	0	20	deg	15.6	Pass
Force at 45 Degrees	320	390	N	336.4	Pass
Return Angle Relative to Initial	0	8	deg	4.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	Rieker N4C-1	DS-13051548	8/14/2015	8/13/2016
Load Cell	Interface SML-200	LC-493319	8/13/2015	8/12/2016



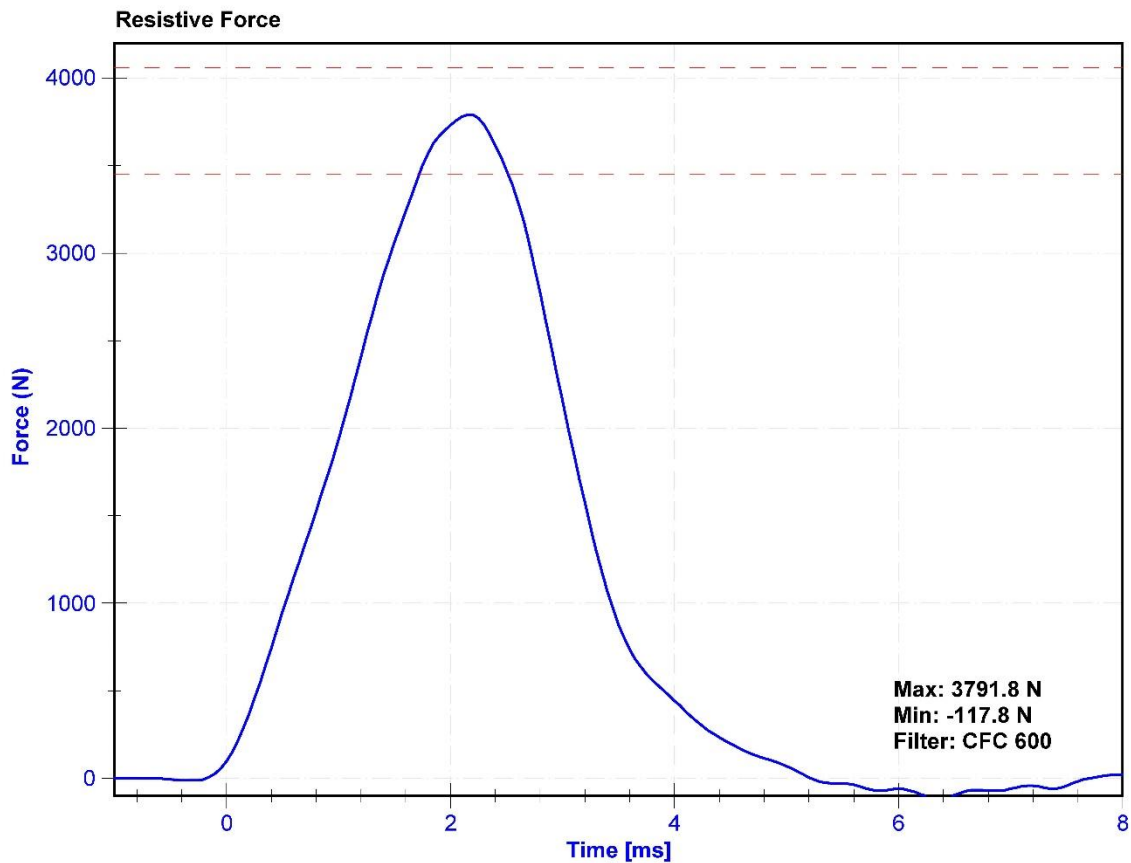
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	324	Laboratory Supervisor	M.Goehle

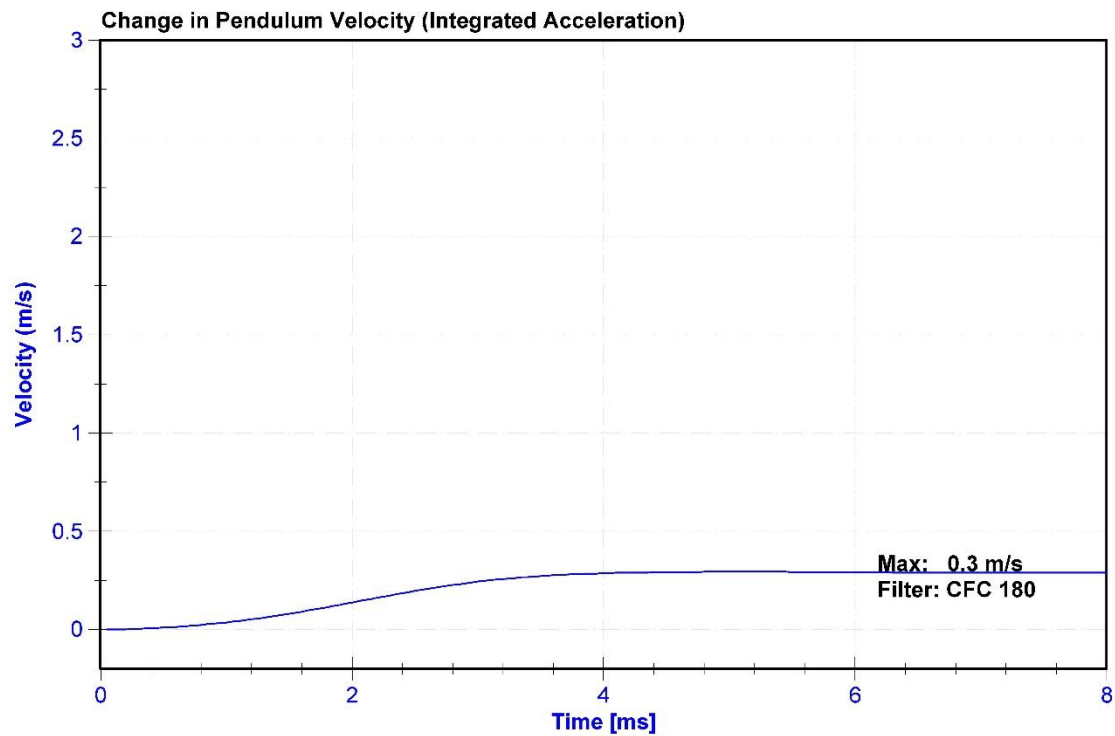
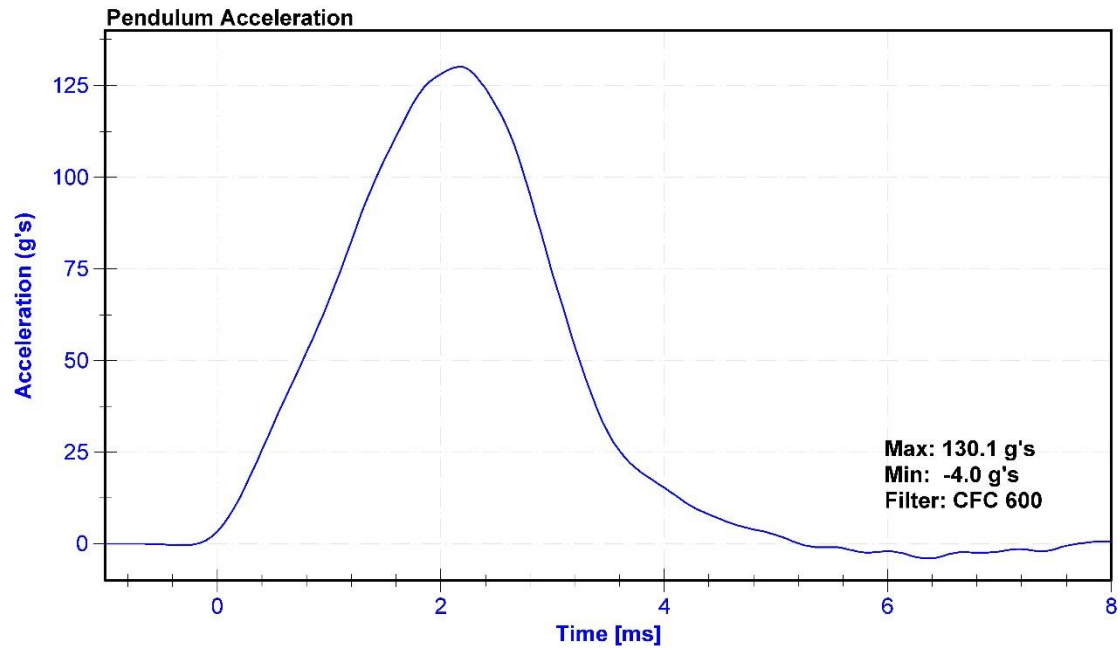
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.6	Pass
Humidity	10	70	%	68.3	Pass
Velocity	2.07	2.13	m/s	2.128	Pass
Resistive Force	3,450	4,060	N	3791.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016





ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	324	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.7	Pass
Humidity	10	70	%	62.7	Pass
Velocity	2.07	2.13	m/s	2.082	Pass
Resistive Force	3,450	4,060	N	3527.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016

