REPORT NUMBER: R&D-KAR-20-015

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

HONDA OF AMERICA MFG., INC.
2020 HONDA ACCORD 4-DOOR SEDAN

NHTSA No: R20205386

PREPARED BY:
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SEPTEMBER 07, 2021

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
VEHICLE SAFETY RESEARCH
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FINAL REPORT ACCEPTANCE BY VEHICLE SAFETY RESEARCH,
OFFICE OF STRUCTURAL AND RESTRAINTS RESEARCH DIVISION:

_____

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

Date: _____

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15. Supplementary Notes

16. Abstract

A 40.0 km/h Right Side 30° Frontal Rigid Barrier Impact Test was conducted on a 2020 Honda Accord 4-door sedan in accordance with Contract DTNH22-14-D-00360L, Task Order #693JJ918F000199. The test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The test was conducted at the Applus IDIADA KARCO Engineering, LLC. facility in Adelanto, California on August 13, 2021.

The impact velocity of the vehicle was 39.80 km/h and the ambient temperature at the barrier face at the time of impact was 32.8°C. The vehicle's post-test maximum crush was 379.1 mm measured to the right of the vehicle's centerline. The test vehicle's performance was as follows:

Measurement Description	Units	Driver Hybrid III	Passenger THOR
		Result	Result
Head Injury Criteria (HIC_{15})		33.16	370.1
Brain Injury Criteria (BrIC)			0.82
Nij		0.23	
Peak Neck Tension	N	957.90	553.0
Peak Neck Compression	N	-84.26	-5362.9
Peak Chest Deflection	mm	12.77	37.9
Peak Abdomen Deflection	mm		6.8
Peak Resultant Acetabulum Force	N		2616.4
Peak Femur Force	N	-6490.27	-4664.2
Peak Tibia Index			0.43

17. Key Words	18. Distribution Statement
30° Frontal Rigid Barrier Impact Frontal Research Crash Test THOR Hybrid III	Copies of this report are available from: National Highway Traffic Safety Administration Technical Reference Division 1200 New Jersey Ave., SE Washington, D.C. 20590

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SECTION 1

TEST PURPOSE AND PROCEDURE

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

This 40.0 km/h (24.9 mph) Right Side 30° Frontal Rigid Barrier Impact Test is part of the Frontal Research Crash Test Program outlined in Contract No. DTNH22-14-D-00360L, Task Order #693JJ918F000199. The purpose of this test is to obtain vehicle crashworthiness and occupant restraint system performance data for research purposes.

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

SECTION 2
SUMMARY OF TEST RESULTS

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386
Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

A 40.0 km/h Right Side 30° Frontal Rigid Barrier Impact Test was conducted on a 2020 Honda Accord 4-door sedan. The test was performed at Applus IDIADA KARCO Engineering, LLC. on August 13, 2021.

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

One (1) 50th percentile adult male Hybrid III ATD (Serial No. 168) was seated in the left front seating position (P1 – Driver) and one 50th percentile adult male THOR anthropomorphic test device (ATD) (Serial No. EG2595) was seated in the right front passenger seating position (P2). The driver was positioned according to instructions specified in FMVSS 208 Appendix F, Dummy Positioning Procedures for Driver and Passenger Test Dummy Conforming to Subpart E of Part 572. The passenger was positioned according to instructions specified in the THOR 50th Percentile Male Dummy Seating & Positioning Procedures: Passenger Position.

The driver was restrained with frontal and knee airbags. The passenger was restrained with frontal, knee, torso/pelvis, and curtain airbags. Both ATDs were unbelted for this test.

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386
Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

One hundred and seventy-two (172) channels of data from the two (2) ATD's and the test vehicle were collected using Diversified Technical Systems, Inc. data acquisition systems. Appendix B contains dummy data plots, as well as vehicle response data plots.

There was 100% total windshield retention. There was no intrusion into the protected zone of the windshield during any portion of the impact event. The maximum static crush of the vehicle was 379.1mm measured on the right of the vehicle's centerline.

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

Structural observations include the following:

- The front end including the bumper, grille, and hood were crushed, with the damage concentrated on the right side
- The windshield was broken at the top left corner due to an impact with the driver ATD's head

The driver ATD's visible contact points were:

- Head contacted the front airbag, Sun Visor, and Rear-View Mirror
- Torso contacted the front airbag
- Left leg contacted the knee airbag
- Right leg contacted the knee airbag and steering column

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

- Head contacted the front airbag, curtain airbag, Windshield, A-Pillar
- Torso contacted the front and torso/pelvis airbag
- Left leg contacted the knee airbag
- Right leg contacted the knee airbag

SECTION 2 … (CONTINUED)

SUMMARY OF TEST RESULTS

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

PRIMARY IMPACT DATA

Measured Parameter	Units	Value
Velocity at Impact	km/h	39.80
Vehicle Test Weight	kg	1626.0
Vehicle Maximum Static Crush	mm	379.1
Number of Data Channels		172
Number of Real-Time Cameras		1
Number of High-Speed Cameras		18

DUMMY CONTACTS

Description	Driver	Picture Ref.	Passenger	Picture Ref.
Dummy Type	Hybrid III, S/N: 168		THOR, S/N: EG2595	
Head Contact	Front Airbag, Sun Visor, Rearview Mirror	A-89, A-91a, A-91b	Front Airbag, Curtain Airbag, Windshield, A-Pillar	A-134, A-135, A-136a
Upper Torso Contact	Front Airbag	A-89	Front Airbag torso/pelvis airbag	A-134, A-135
Lower Torso Contact	Front Airbag	A-89	Front Airbag	A-134, A-135
Left Leg Contact	Knee Airbag	A-88, A-91	Knee Airbag	A-136
Right Leg Contact	Knee Airbag, Steering Column	A-88, A-91	Knee Airbag	A-136

SECTION 2 … (CONTINUED)

SUMMARY OF TEST RESULTS

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

DATA ANOMALIES

Channel Description	Explanation
P2TH ACETABULUM RIGHT X FORCE	No data collected, Known channel failure

SECTION 2 … (CONTINUED)

SUMMARY OF TEST RESULTS

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

	Driver, Hybrid III 50th Percentile Male S/N 168				
Injury Reading	**Units**	**Limit**	**Value**	**t^1**	**t^2**
HIC 15		700	33.16	73.1	88.1
Nij		1	0.23	143.6	***NTE***
Upper Neck Force Z (Tension)	N	4170	957.90	101.9	
Upper Neck Force Z (Compression)	N	4000	-84.26	30.1	
Upper Neck Moment Y (Flexion)	Nm	310	52.77	74.9	
Upper Neck Moment Y (Extension)	Nm	135	-24.57	144.4	
Chest Deflection	mm	63	-12.77	113.3	
3 ms Chest Clip	g	60	33.72	100.3	103.3
Femur Force, Left	N	10000	-2878.82	97.9	
Femur Force, Right	N	10000	-6490.27	83.0	

SECTION 2 … (CONTINUED)

SUMMARY OF TEST RESULTS

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

Passenger, THOR S/N EG2595					
LOCATION	**DESCRIPTION**	**UNIT**	**SOURCE**	**MAX**	**MIN**
Head	HIC 15ms		Compute	370.1	
	Brain Injury Criteria (BrIC)		Compute	0.823	
	Head Rotational Velocity X	Deg/s	60	922.1	-659.9
	Head Rotational Velocity Y	Deg/s	60	286.6	-2053.6
	Head Rotational Velocity Z	Deg/s	60	284.6	-1138.3
Neck	Upper Neck Z-axis Force	N	1000	553.0	-5362.9
	Upper Neck Y-axis Moment	Nm	600	23.6	-12.5
Chest	Upper Left Resultant Chest Deflection	mm	Compute	17.2	
	Upper Right Resultant Chest Deflection	mm	Compute	24.6	
	Lower Left Resultant Chest Deflection	mm	Compute	37.9	
	Lower Right Resultant Chest Deflection	mm	Compute	34.7	
Abdomen	Lower Left X-axis Deflection	mm	Compute	6.8	-31.4
	Lower Right X-axis Deflection	mm	Compute	4.1	-40.0
Acetabulum	Left Acetabulum Resultant Force	N	Compute	2616.4	
	Right Acetabulum Resultant Force	N	Compute	1652.4	
Femur	Left Femur Force, FZ	N	600	150.5	-4664.2
	Right Femur Force, FZ	N	600	104.5	-3362.0
Tibia	Left Upper Tibia, FZ	N	600	89.2	-2306.2
	Left Upper Tibia Index		Compute	0.306	
	Right Upper Tibia, FZ	N	600	155.9	-1848.6
	Right Upper Tibia Index		Compute	0.433	
	Left Lower Tibia, FZ	N	600	64.5	-2404.6
	Left Lower Tibia Index		Compute	0.118	
	Right Lower Tibia, FZ	N	600	37.5	-2127.4
	Right Lower Tibia Index		Compute	0.244	
Ankle	Left Ankle Rotation, RX	Deg	180	13.8	-25.5
	Left Ankle Rotation, RY	Deg	180	-5.7	-23.0
	Left Ankle Dorsiflexion Moment, MY	Nm	Compute	66.7	-23.2
	Left Ankle In/Eversion Moment, MX	Nm	Compute	11.0	-15.4
	Right Ankle Rotation, RX	Deg	180	1.0	-30.5
	Right Ankle Rotation, RY	Deg	180	2.4	-19.3
	Right Ankle Dorsiflexion Moment, MY	Nm	Compute	76.0	-25.5
	Right Ankle In/Eversion Moment, MX	Nm	Compute	9.5	-46.2

Anomalies:

Acetabulum Fx not functional

SECTION 3

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

CONVERSION FACTORS

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	miles/hr	km/hr	1.609344
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.574
Pressure	Tire Pressures	lbf/in^2	kPa	6.895
Temperature	General Use	^oF	^oC	=(Tf -32)/1.8
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf-ft	N•m	1.355

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	R20205386
Model Year	2020
Make	Honda
Model	Accord
Body Style	4-Door Sedan
VIN	1HGCV1F19LA147373
Body Color	Obsidian Blue Pearl
Odometer Reading (km / mi)	60 / 37
Engine Displacement (L)	1.5
Type / No. of Cylinders	Inline 4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	CVT
Overdrive	Yes
Final Drive	FWD
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes
Automatic Door Locks (ADLs)	Yes

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

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Honda of America Mfg., Inc.
Date of Manufacture	Sep-20

GVWR (kg)	1950
GAWR Front (kg)	1070
GAWR Rear (kg)	960

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

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

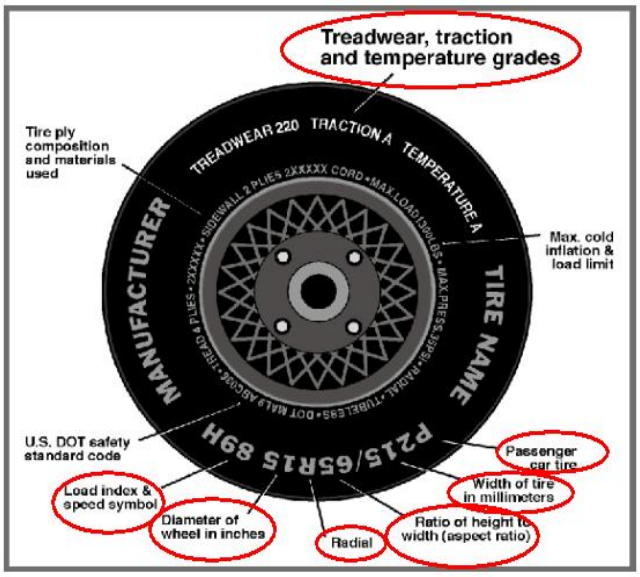
*A maximum RCLW of 136.0 kg is used for a truck, MPV, or bus

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact fTest Date: 08/13/21



Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	350	350
Cold Pressure (kPa)	220	220
Recommended Tire Size	225/50R17	225/50R17
Tire Size on Vehicle	225/50R17	225/50R17
Tire Manufacturer	Hankook	Hankook
Tire Model	Kinergy GT	Kinergy GT
Treadware	500	500
Traction Grade	A	A
Temperature Grade	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	2 Steel, 1 Polyester, 1 Nylon	2 Steel, 1 Polyester, 1 Nylon
Load Index/Speed Symbol	94V	94V
Tire Material	Steel, Polyester, Nylon	Steel, Polyester, Nylon
DOT Safety Code Left	1T7AB 1B 1320	1T7AB 1B 1320
DOT Safety Code Right	1T7AB 1B 1320	1T7AB 1B 1320

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	432.5	287.5		467.5	353.0	
Right	kg	421.5	284.0		454.0	351.5	
Ratio	%	59.9%	40.1%	100.0%	56.7%	43.3%	100.0%
Total	kg	854.0	571.5	1425.5	921.5	704.5	1626.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1425.5	A
Weight of THOR-50M and AM50	kg	192.5	B
Rated Cargo/Luggage Weight (RCLW)	kg	44.8	C
Calculated Vehicle Target Weight (TVTW)	kg	1622.8	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	LF	RF	LR	RR	CG Aft of Front Axle
As Delivered	mm	710	712	721	732	1138
As Tested	mm	693	690	697	699	1230
Post-Test	mm	694	775	674	714	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2838
Total Vehicle Length at Left Side	mm	4761
Total Vehicle Length at Centerline	mm	4883
Total Vehicle Length at Right Side	mm	4767
Weight of Ballast/Equipment in Cargo Area	kg	86.1
Weight of Vehicle Components Removed	kg	54.5
Amount of Stoddard Solvent in Fuel Tank	L	52.10

VEHICLE COMPONENTS REMOVED TO MEET TEST WEIGHT:

Rear Seat Assembly, Spare Tire and Tools, Rear Trunk Trim, Rear Bumper Beam, Trunk Lid

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

TARGET VEHICLE STRUCTURAL MEASUREMENTS

No.	Description	Units	Pre-Test
1	Total Length	mm	4883
2	Total Width	mm	1861
3*	Bumper Top Height	mm	600
4*	Bumper Bottom Height	mm	435
5*	Longitudinal Member Top Height	mm	600
6	Distance Between Longitudinal Members	mm	930
7	Longitudinal Member Width	mm	86
8*	Engine Top Height	mm	930
9*	Engine Bottom Height	mm	220
10	Engine and Gearbox Width	mm	605
11	Front Bumper to Engine Distance	mm	415
12*	Front Shock Absorber Fixing Height	mm	1020
13*	Bonnet Leading Edge Height	mm	900
14	Front Shock Absorber Fixing Width	mm	1181
15	Front Bumper to Front Axle Distance	mm	931
16	Front Axle to A-Pillar Distance	mm	541
17	A-Pillar to B-Pillar Distance	mm	1062
18	B-Pillar to Rear Axle Distance	mm	1219
19	B-Pillar to C-Pillar Distance	mm	880
20*	Roof Sill Bottom Height	mm	1555
21*	Roof Sill Top Height	mm	1665
22*	Floor Sill Bottom Height	mm	330
23*	Floor Sill Top Height	mm	420

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

DATA SHEET NO. 2

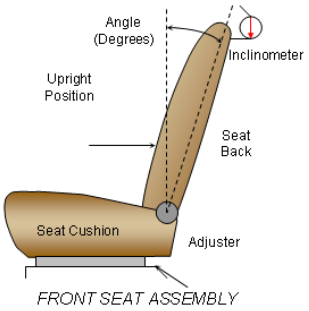
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

NOMINAL DESIGN RIDING POSITION

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

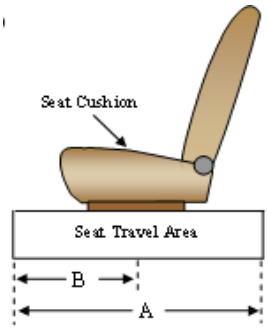


SEAT BACK ANGLE

Seating Position	Unit	FORM 208 Position	After ATD Positioning
Driver Seat Back Angle	Degrees	2.7	3.4
Passenger Seat Back Angle	Degrees	2.7	4.7

SEAT FORE / AFT POSITIONING

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



SEAT FORE/AFT POSITIONS

Seating Position	Total Fore/Aft Travel (mm)	Placed in Position (mm)
Driver Seat	240	120
Passenger Seat	240	120

SEAT BELT UPPER ANCHORAGE

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

SEAT BELT UPPER ANCHORAGES

Seating Position	Total No. of Positions	Placed in Position
Driver Seat	4	H
Passenger Seat	4	H

SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

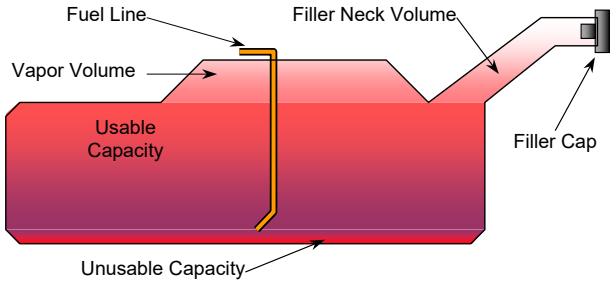
Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

FUEL TANK CAPACITY

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

FUEL PUMP

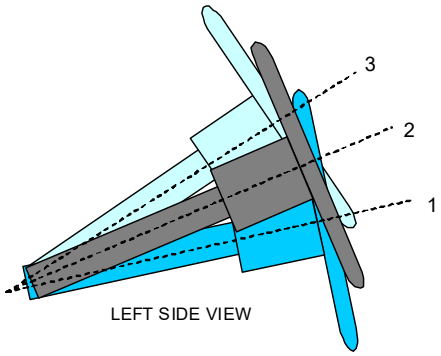
Fuel was evacuated according to the specifications provided by the manufacturer in Form 208. The electric fuel pump operates when the electrical system is activated.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

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



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONING

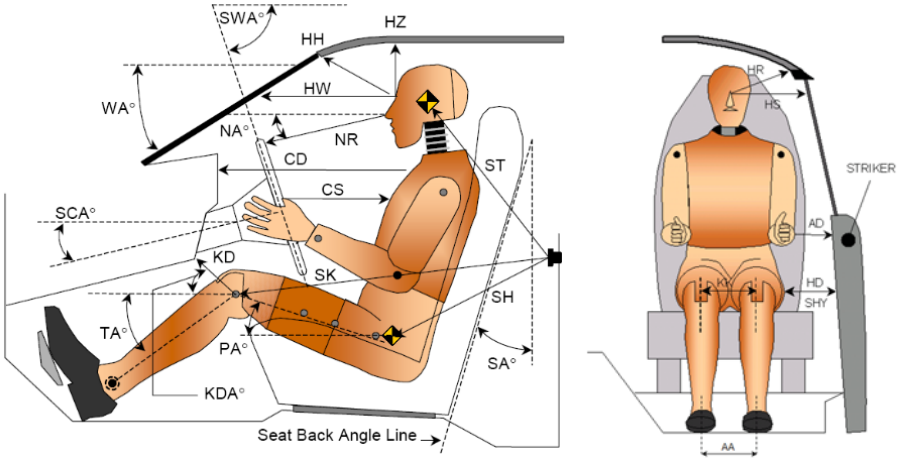
	Degrees	Fore-Aft Position (mm)
Lowermost Position, No. 1	17.7	90
Geometric Center Position, No. 2	20.3	111
Uppermost Position, No. 3	22.9	132
Telescoping Steering Wheel Travel		42
Test Position	20.3	111

DATA SHEET NO. 3

DUMMY CLEARANCE DIMENSIONS

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21



LEFT SIDE VIEW

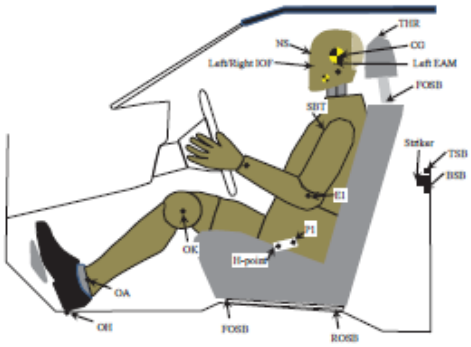
Code	Measurement Description	Driver S/N# 168		Passenger S/N# EG2595	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
HZ	Nasion to Roof (Z Distance)	243		196	
HH	Nasion to Header (3D Distance)	359		408	
HW	Nasion to Windshield Point 1 Inside (X Distance)	692		651	
NR	Tip of Nose to Top of Steering Wheel (3D Distance)	400			
CD	Chest Point 1 to Dash Point 1 (3D Distance)	544		574	
CS	Chest Point 2 to Center of Steering Wheel (X Distance)	318			
CBS	Chest Point 3 to Bottom of Steering Wheel (X Distance)	214			
IKD	Inboard Knee to Dash Point 3 (3D Distance)			125	
OKD	Outboard Knee to Dash Point 2 (3D Distance)	182		119	
HR	Nasion to Side Header (3D Distance)			208	
HS	Nasion to Side Window Distance (Y Distance)	393		348	
AD	Elbow to Door (Y Distance)	153		56	
HD	H-Point to Door (Y Distance)				
HLHL	Inboard Heel to Outboard Heel (Y Distance)			220	
KK	Inboard Knee to Outboard Knee (Y Distance)			224	
SH	Striker to H-Point (3D Distance)	417		442	
HRA	Head Restraint Post Angle	3.4		4.7	
	H-Point Tool Angle		24.3		33.1
	Torso Angle		18.7		19.7
	Windshield Angle		58.7		59.6
	Head Angle (X)		0.3		-0.3
	Head Angle (Y)		0.1		-0.2
	T1 Angle (X)				
	T1 Angle (Y)				
	T6 Angle (X)				-1.4
	T6 Angle (Y)				-20.5
	T12 Angle (X)				
	T12 Angle (Y)				
	Pelvis Angle (X)				-0.3
	Pelvis Angle (Y)				-0.3

DATA SHEET NO. 4

DUMMY CMM MEASUREMENTS RELATIVE TO VCS

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21



Description	Units	Passenger S/N# 168			Driver S/N# EG2595		
		X	Y	Z	X	Y	Z
Center of Upper Striker Bolt	mm	2317	808	-170	2317	808	-170
Center of Lower Striker Bolt	mm	2321	810	-134	2321	810	-134
Center of Striker Bar	mm	2348	-812	-154	2352	811	-155
Front Outboard Seat Bolt	mm	2842	-607	345	2847	604	333
Rear Outboard Seat Bolt	mm	2440	-607	359	2446	606	348
Center of Steering Wheel Hub	mm	2911	-379	-259			
Outer Head Restraint Post	mm						
Right Head CG	mm	2482	-295	-502	2402	453	-550
Left Head CG	mm	2479	-447	-498	2401	299	-549
Right EAM	mm				2411	449	-523
Left EAM	mm				2408	302	-523
Nasion	mm	2570	-366	-491	2496	379	-558
Right IOF	mm				2498	410	-521
Left IOF	mm				2494	348	-522
Tip of Nose	mm	2588	-366	-453	2497	377	-519
Tip of Chin	mm	2562	-366	-380	2495	376	-417
Chest Point 1	mm	2593	-367	-249	2533	377	-290
Chest Point 2	mm	2594	-377	-245			
Chest Point 3	mm	2643	-378	-99			
Shoulder Point 1	mm	2446	-560	-244	2392	574	-320
Shoulder Point 2	mm				2440	572	-286
Elbow	mm	2649	-628	-81	2543	639	-21
Center of H-Point Tool	mm				2563	638	74
H-Point on H-Point Tool	mm	2603	-715	162	2634	593	107
H-Point on ATD Skin	mm	2604	-547	163	2635	561	106
Outboard Knee	mm	2979	-537	15	3028	533	-23
Inboard Knee	mm				3020	310	-18
Outboard Ankle	mm	3327	-576	267	3345	537	228
Inboard Ankle	mm				3330	316	237
Outboard Heel	mm	3342	-566	374	3348	495	379
Inboard Heel	mm				3351	276	374

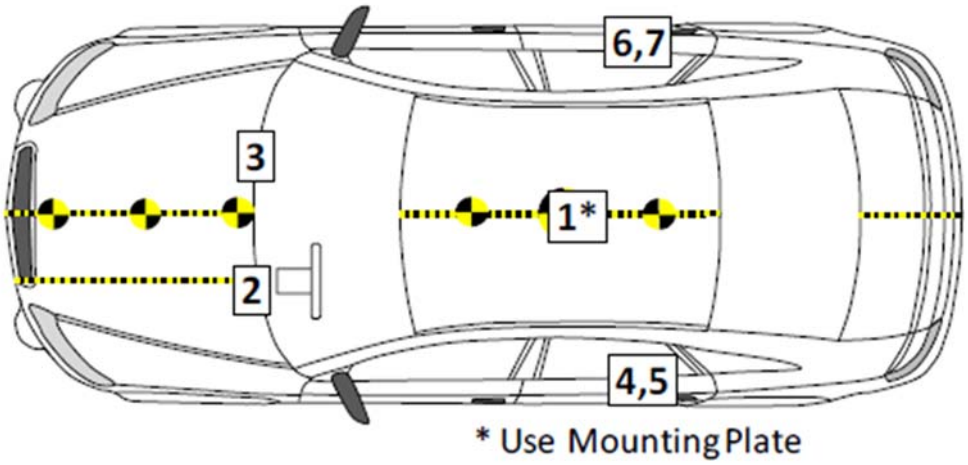
Reference Point:
+X – From the rear of the vehicle to the front of the vehicle
+Y – From the left side of the vehicle to the right side of the vehicle
+Z – From the top of the vehicle to the bottom of the vehicle

DATA SHEET NO. 5

VEHICLE INSTRUMENTATION DATA

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS RELATIVE TO VCS

No.	Instrumentation Location	Axes	Units	Coordinates (mm)		
				X	Y	Z
1	Vehicle CG (Acceleration and Angular Rate)	x, y, z	g, °/s	2106	-1	218
2	Driver Floor Pan	x, y, z	°/s	3670	-343	179
3	Passenger Floor Pan	x, y, z	g	3661	354	208
4	Door Sill LR	x, y	g	1882	-738	267
5	Door Sill LR Redundant	x, y	g	1855	-737	267
6	Door Sill RR	x, y	g	1891	737	265
7	Door Sill RR Redundant	x, y	g	1865	737	265

Reference Point:

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

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

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

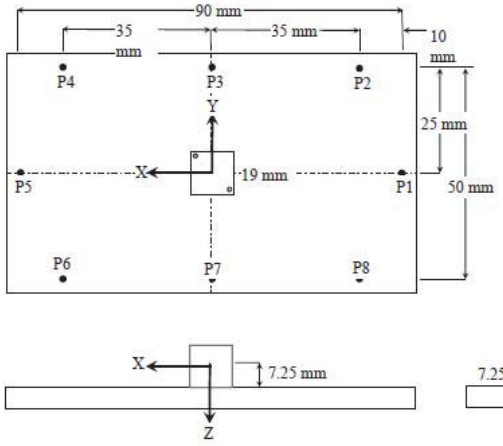
DATA SHEET NO. 5 … (CONTINUED)

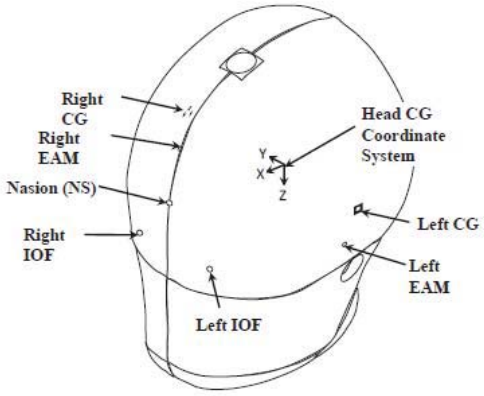
VEHICLE INSTRUMENTATION DATA

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

ANGULAR RATE SENSOR MOUNTING PLATE & THOR HEAD POINT DEFINITIONS





CG ARS MOUNTING PLATE - VEHICLE COORDINATE SYSTEM

No.	Description	Units	X	Y	Z
P1	Plate Point 1	mm	2136	2	234
P2	Plate Point 2	mm	2145	-28	234
P3	Plate Point 3	mm	2185	28	231
P4	Plate Point 4	mm	2218	28	232
P5	Plate Point 5	mm	2228	1	235
P6	Plate Point 6	mm	2218	-23	232
P7	Plate Point 7	mm	2219	-23	233
P8	Plate Point 8	mm	2150	-21	232

DRIVER HEAD POINTS IN RELATION TO HEAD CG COORDINATE SYSTEM

Description	Units	x	y	z
Left CG	mm	63	-42	45
Left EAM	mm	72	-37	73
Left IOF	mm	156	4	74
Right IOF	mm	155	68	72
Nasion	mm	158	36	36
Right EAM	mm	72	107	73
Right CG	mm	67	113	45

DATA SHEET NO. 5 … (CONTINUED)

VEHICLE INSTRUMENTATION DATA

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

Location No.	Description	Axes	Units	Positive Direction		Negative Direction	
				Max	Time (ms)	Min	Time (ms)
1	Vehicle CG	x	g	2.1	106.2	-31.3	106.2
		y	g	3.9	11.4	-13.1	11.4
		z	g	16.1	24.0	-15.9	16.4
	Vehicle CG Rotation	x	°/s	54.4	18.3	-85.6	75.8
		y	°/s	56.1	41.1	-84.3	68.6
		z	°/s	56.5	289.5	-27.3	57.0
2	Driver Floor Pan	x	g	1.9	116.3	-22.6	69.4
		y	g	6.0	19.6	-17.1	38.8
		z	g	30.6	60.6	-0.9	130.7
3	Passenger Floor Pan	x	g	2.4	8.0	-19.9	70.6
		y	g	9.5	64.2	-19.0	36.7
		z	g	29.7	61.1	-5.0	13.1
4	Door Sill LR	x	g	1.2	102.4	-29.2	58.3
		y	g	3.5	64.4	-12.0	57.4
5	Door Sill LR Redundant	x	g	1.1	191.4	-27.4	59.2
		y	g	4.1	64.3	-10.2	57.5
6	Door Sill RR	x	g	1.1	202.2	-31.4	61.9
		y	g	1.2	21.3	-10.8	58.5
7	Door Sill RR Redundant	x	g	0.5	0.3	-11.1	58.4
		y	g	1.5	201.8	-11.1	58.4

Note: See Appendix B for all vehicle data plots

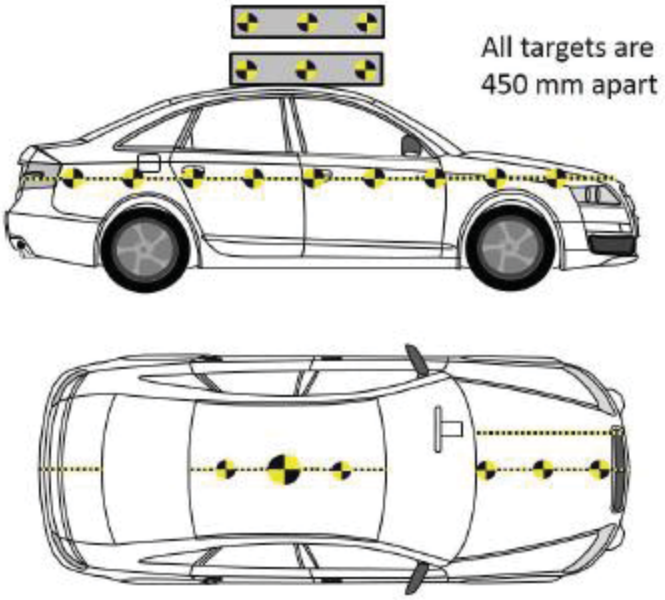
DATA SHEET NO. 6

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

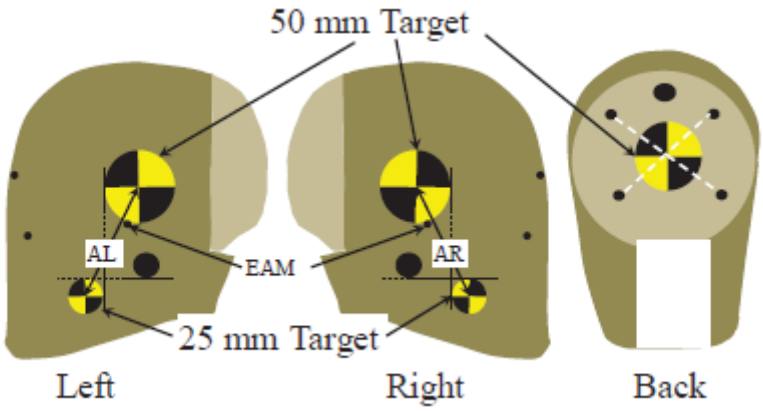
Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

VEHICLE TARGETS



ATD HEAD TARGETS



Driver

Target	Units	Measurement
AL	mm	97
AR	mm	98

DATA SHEET NO. 7

TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

INSTRUMENTATION

Instrumentation	Number of Channels Collected
Driver Dummy Sensors	99
Passenger Dummy Sensors	43
Vehicle Structure Sensors	20
Airbag Timing Sensor	10
Total	172

CAMERA COVERAGE

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

DATA SHEET NO. 8

POST TEST OBSERVATIONS

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

TEST DUMMY INFORMATION AND CONTACT

Description	Driver	Passenger
Dummy Type/Serial No.	AM50 / 168	THOR-50M / EG2595
Lower Leg Type		LX
Head Contact	Front Airbag, Sun Visor, Rear View Mirror	Front Airbag, curtain airbag, Windshield, A-Pillar
Upper Torso Contact	Front Airbag	Front Airbag, Torso/Pelvis Airbag
Lower Torso Contact	Front Airbag	Front Airbag, Torso Pelvis Airbag
Left Knee Contact	Knee Airbag	Knee Airbag
Right Knee Contact	Knee Airbag, Steering Column	Knee Airbag

DOOR OPENING AND SEAT TRACK INFORMATION

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

POST TEST STRUCTURAL OBSERVATIONS

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

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Driver		Passenger	
	Installed	Operated	Installed	Operated
Front Airbag	Yes	Yes	Yes	Yes
Side Airbag 1 (Curtain)	No		Yes	Yes
Side Airbag 2 (Torso/Pelvis)	Yes	No	Yes	Yes
Knee Airbag	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes

DATA SHEET NO. 9

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4883	4670	-212
2	Rear Surface of Vehicle to Front of Engine	4465	4322	-143
3	RSOV to Firewall	3861	3858	-3
4	RSOV to Upper Leading Edge of Right Door	3479	3479	0
5	RSOV to Upper Leading Edge of Left Door	3477	3478	1
6	RSOV to Lower Leading Edge of Right Door	3479	3456	-23
7	RSOV to Lower Leading Edge of Left Door	3456	3455	-1
8	RSOV to Upper Trailing Edge of Right Door	2286	2284	-1
9	RSOV to Upper Trailing Edge of Left Door	2283	2285	2
10	RSOV to Lower Trailing Edge of Right Door	2288	2288	1
11	RSOV to Lower Trailing Edge of Left Door	2285	2284	-1
12	RSOV to Bottom of A-Pillar, Right Side	3406	3406	0
13	RSOV to Bottom of A-Pillar, Left Side	3398	3398	0
14	RSOV to Firewall, Right Side	4030	4014	-16
15	RSOV to Firewall, Left Side	4025	4024	0
16	RSOV to Steering Column	2943	2970	27
17	Center of Steering Column to A-Pillar	454	428	-27
18	Center of Steering Column to Headliner	461	423	-38
19	RSOV to Right Side of Front Bumper	4767	4388	-379
20	RSOV to Left Side of Front Bumper	4761	4791	30
21	Length of Engine Block	565	523	-42
RD	RSOV to Right Side of Dash Panel	3117	3120	3
CD	RSOV to Center of Dash Panel	3075	3084	9
LD	RSOV to Left Side of Dash Panel	3112	3115	3

All measurements in millimeters.

DATA SHEET NO. 10

ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

VEHICLE INFORMATION

VIN: 1HGCV1F19LA147373 Wheelbase (mm): 2838

Vehicle Size Category: Passenger Car Test Weight (kg): 1626.0

ACCELEROMETER DATA

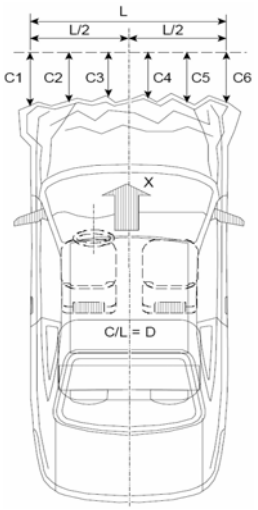
Accelerometer Locations: Vehicle CG_x

Cal. Procedure/Interval: Vibration Test / 6 months

Integration Algorithm: NHTSA Standard

Linearity: Good

Impact Velocity (km/h): 39.80



CRUSH PROFILE

Collision Deformation Classification: 12FREW2

Midpoint of Damage: Vehcle Centerline

Damage Region Length (mm): 1199

Impact Mode: Right Side 30° Frontal

Crush Measurements

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	4734	4764	30
C2	Crush Zone 2 at Left Side	mm	4802	4732	-70
C3	Crush Zone 3 at Left Side	mm	4857	4705	-152
C4	Crush Zone 4 at Right Side	mm	4856	4599	-257
C5	Crush Zone 5 at Right Side	mm	4801	4470	-331
C6	Crush Zone 6 at Right Side	mm	4740	4361	-379
L	C1 to C6	mm	1237		

DATA SHEET NO. 11

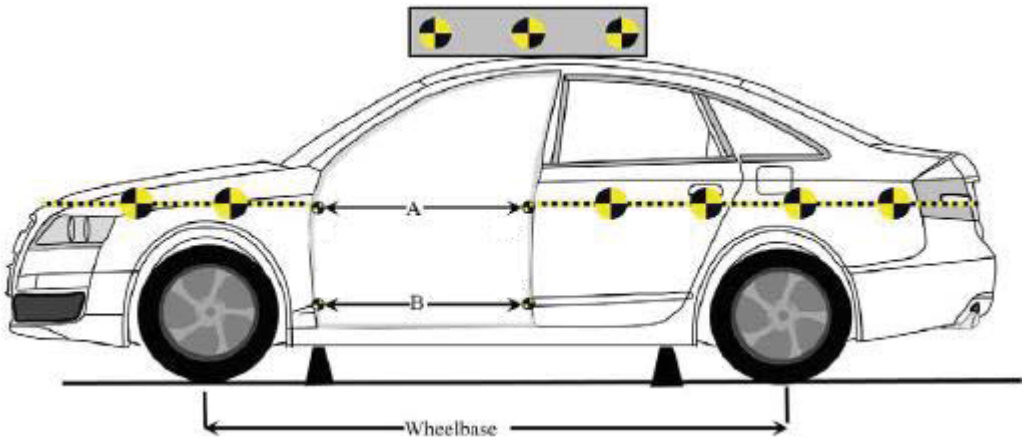
VEHICLE INTRUSION MEASUREMENTS RELATIVE TO VCS

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Driver Side Upper	mm	912	913	-1
B	Driver Side Lower	mm	794	796	-2
D	Passenger Side Upper	mm	911	914	-3
E	Passenger Side Lower	mm	790	791	-1



DATA SHEET NO. 11 … (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS RELATIVE TO VCS

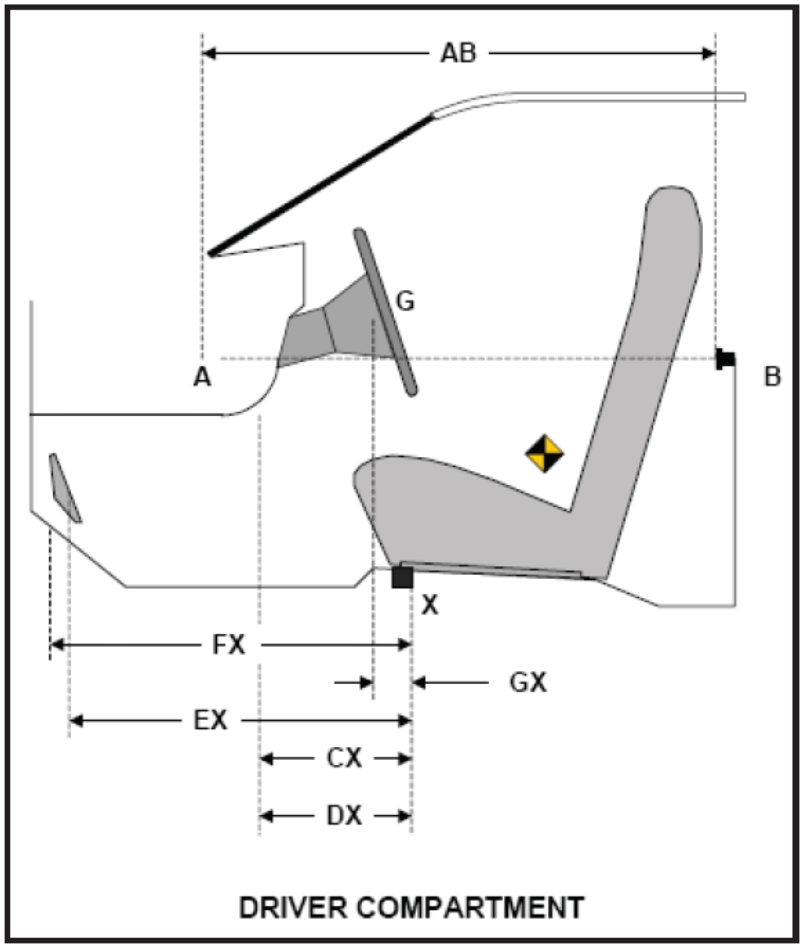
Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	883	885	-1
CX	Left Knee Bolster to X	mm	278	277	2
DX	Right Knee Bolster to X	mm	270	285	-14
EX	Brake Pedal to X	mm	590	584	6
FX	Footrest to X	mm	698	696	2
GX	Center of Steering Column Wheel Hub to X	mm	75	105	-31

X = Front of Seat Track (Stationary)



DRIVER COMPARTMENT

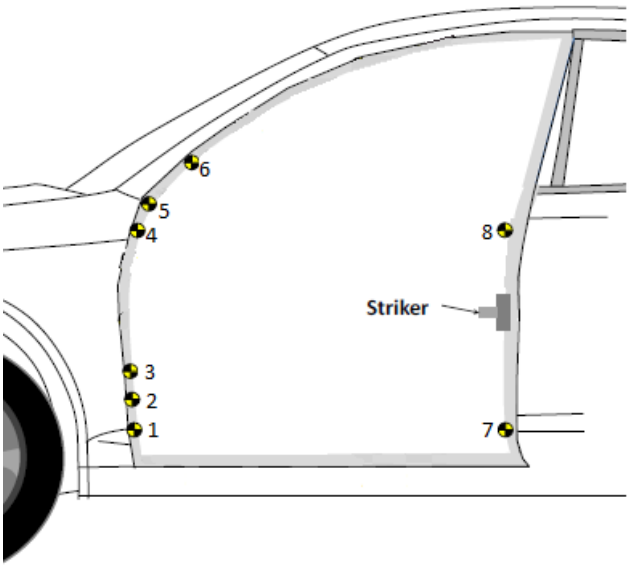
DATA SHEET NO. 11 … (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS RELATIVE TO VCS

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

DRIVER SIDE DOOR SILL INTRUSIONS



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

Point	Pre-Test			Post-Test			Difference		
	x	y	z	x	y	z	x	y	z
1	3310	-776	203	3311	-774	206	1	2	3
2	3335	-772	130	3335	-771	131	-1	1	1
3	3325	-771	53	3326	-770	55	1	1	2
4	3263	-763	-247	3263	-763	-245	0	0	1
5	3234	-749	-323	3236	-749	-322	2	0	1
6	3151	-729	-398	3152	-730	-397	1	-1	1
7	2516	-775	206	2515	-772	207	0	2	1
8	2351	-760	-246	2350	-759	-244	-1	1	2

All measurements in millimeters.

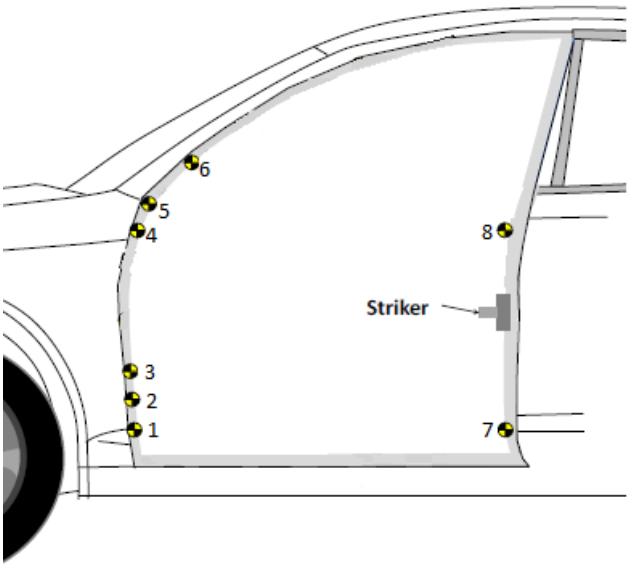
DATA SHEET NO. 11 … (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS RELATIVE TO VCS

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

PASSENGER SIDE DOOR SILL INTRUSIONS



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

Point	Pre-Test			Post-Test			Difference		
	x	y	z	x	y	z	x	y	z
1	3315	769	204	3317	769	203	2	0	-1
2	3339	767	128	3341	766	128	2	0	0
3	3329	765	52	3331	765	52	3	-1	0
4	3268	757	-248	3270	757	-248	2	0	0
5	3240	744	-321	3240	743	-322	0	-1	-1
6	3151	723	-403	3151	722	-404	0	-1	-1
7	2525	772	207	2526	772	207	1	0	0
8	2356	759	-245	2356	758	-245	0	0	-1

All measurements in millimeters.

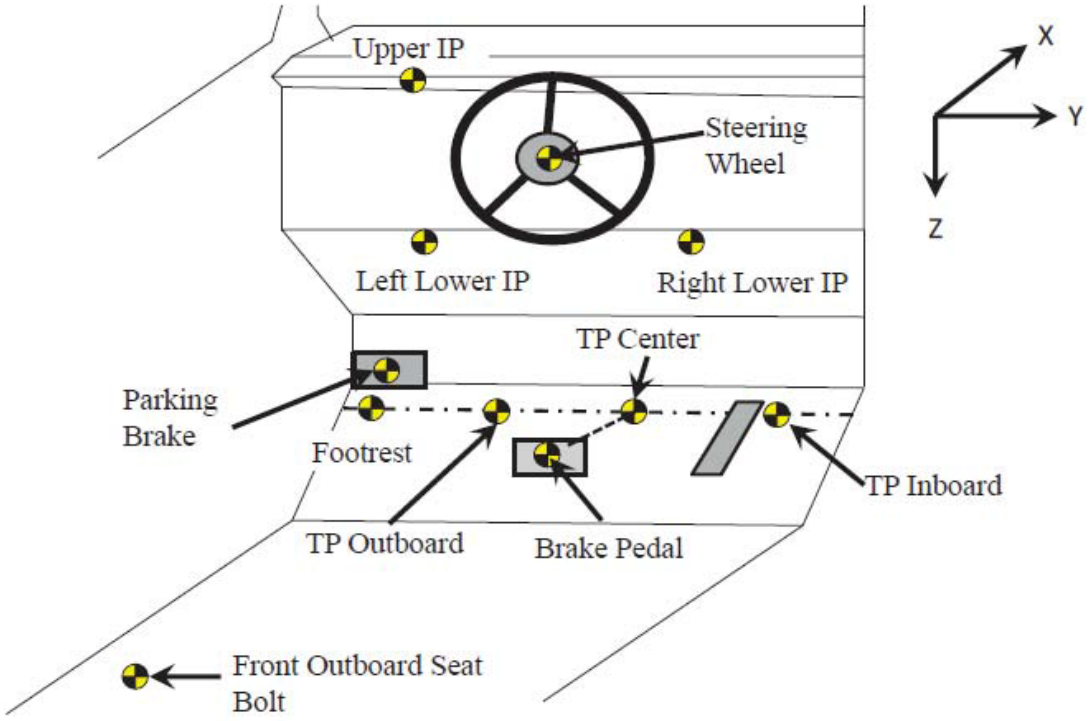
DATA SHEET NO. 11 … (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS RELATIVE TO VCS

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

DRIVER FLOOR PAN MEASUREMENTS



Intrusion Location	Pre-Test (mm)			Post-Test (mm)			Difference (mm)		
	x	y	z	x	y	z	x	y	z
TP Inboard	3649	-205	208	3647	-201	209	-2	4	0
TP Center	3670	-342	204	3668	-338	206	-2	4	1
TP Outboard	3611	-503	202	3607	-505	202	-5	-2	0
TP Footrest	3540	-596	204	3538	-596	203	-1	0	-1
Brake Pedal	3431	-345	204	3426	-344	200	-5	1	-4
Left Lower IP	3120	-529	-98	3119	-525	-99	-1	4	-1
Right Lower IP	3112	-227	-95	3127	-228	-103	15	0	-8
Upper IP	3079	-527	-149	3083	-523	-154	4	4	-5
Steering Wheel	2916	-379	-249	2948	-362	-283	32	17	-34
Front Outboard Bolt	2843	-608	344	2843	-605	344	0	3	1
Emergency Brake									

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

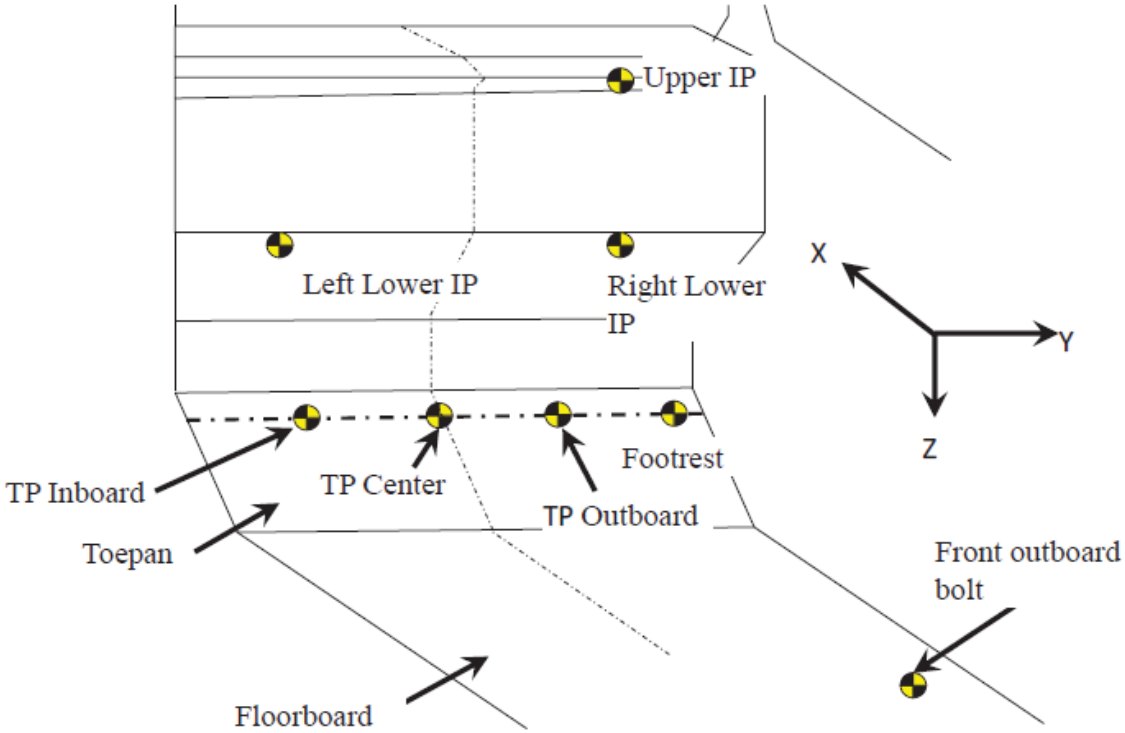
DATA SHEET NO. 11 … (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS RELATIVE TO VCS

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

PASSENGER FLOOR PAN MEASUREMENTS



Intrusion Location	Pre-Test (mm)			Post-Test (mm)			Difference (mm)		
	x	y	z	x	y	z	x	y	z
TP Inboard	3644	219	204	3634	216	204	-9	-2	0
TP Center	3661	371	205	3651	375	202	-10	4	-3
TP Outboard	3583	522	207	3575	523	205	-8	1	-2
TP Footrest	3524	623	202	3520	622	202	-4	0	0
Left Lower IP	3094	219	-96	3103	216	-101	8	-4	-5
Right Lower IP	3123	524	-95	3127	520	-98	4	-3	-3
Upper IP	3068	522	-171	3072	521	-174	4	-2	-3
Front Outboard Seat Bolt	2847	604	333	2846	603	333	-1	-1	0

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

DATA SHEET NO. 12

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

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

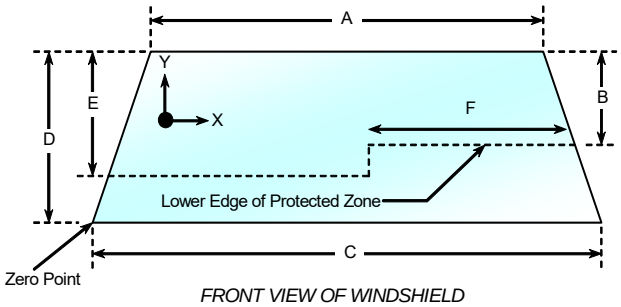
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with plastic molding and rubber cement.

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

Temperature of windshield molding during test: 21.2° C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2218	2218	100.0%
Right Side	2218	2218	100.0%
Total	4436	4436	100.0%



FRONT VIEW OF WINDSHIELD

Item	Units	Value
A	mm	1241
B	mm	340
C	mm	1495
D	mm	850
E	mm	490
F	mm	555

AREAS OF PROTECTED ZONE FAILURES

A. Provide Coordinates of the area that the protected zone was penetrated more than 0.25 inches by a vehicle component other than one that is normally in contact with the windshield.

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.

X	Y

DATA SHEET NO. 12 … (CONTINUED)

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

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 32.8° C Test Time: 10:52 AM

Stoddard Solvent Spillage Measurements

A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable = 1 oz.)

B. For the 5 minute period after motion ceases: 0 oz.
(Maximum allowable = 5 oz.)

C. For the following 25 minutes: 0 oz.
(Maximum allowable = 1 oz./minute)

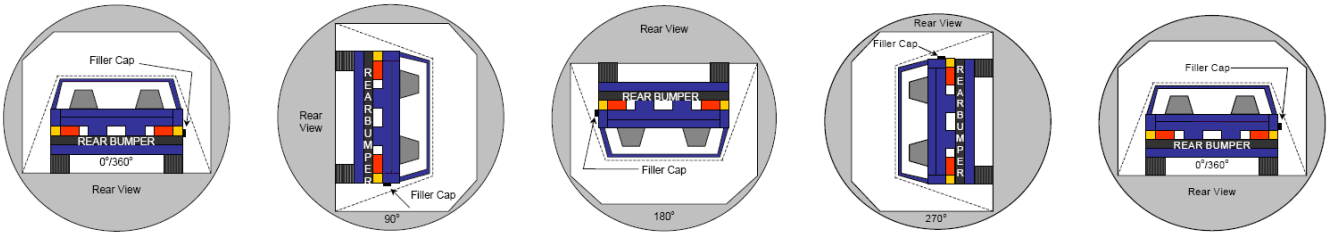
D. Spillage: There was no Stoddard solvent spillage.

DATA SHEET NO. 13

FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2020 Honda Accord 4-Door Sedan NHTSA No. R20205386

Test Program: R&D Right Side 30° Frontal Rigid Barrier Impact Test Date: 08/13/21



0° TO 90° 90° TO 180° 180° TO 270° 270° TO 360°

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

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	88	300	388
90° To 180°	82	300	382
180° To 270°	83	300	383
270° To 360°	85	300	385

FMVSS 301 SPILLAGE TABLE

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

SOLVENT SPILLAGE LOCATION TABLE

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

APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS … (CONTINUED)

TABLE OF PHOTOGRAPHS … (CONTINUED)

TABLE OF PHOTOGRAPHS … (CONTINUED)

TABLE OF PHOTOGRAPHS … (CONTINUED)

FIGURE 1. Test Vehicle Certification Label

FIGURE 2. Test Vehicle Tire Placard

FIGURE 3. Right Front ¾ View, As Received

FIGURE 4. Left Rear ¾ View, As Received

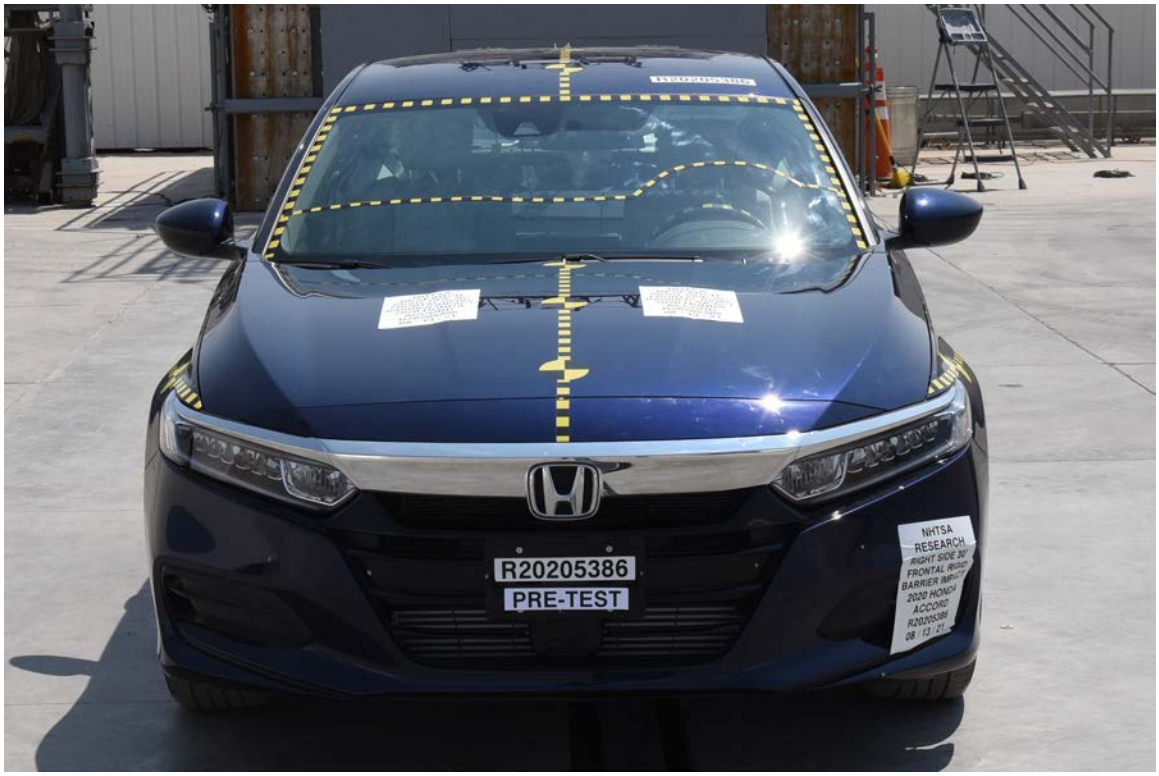


FIGURE 5. Pre-Test Front View of Test Vehicle

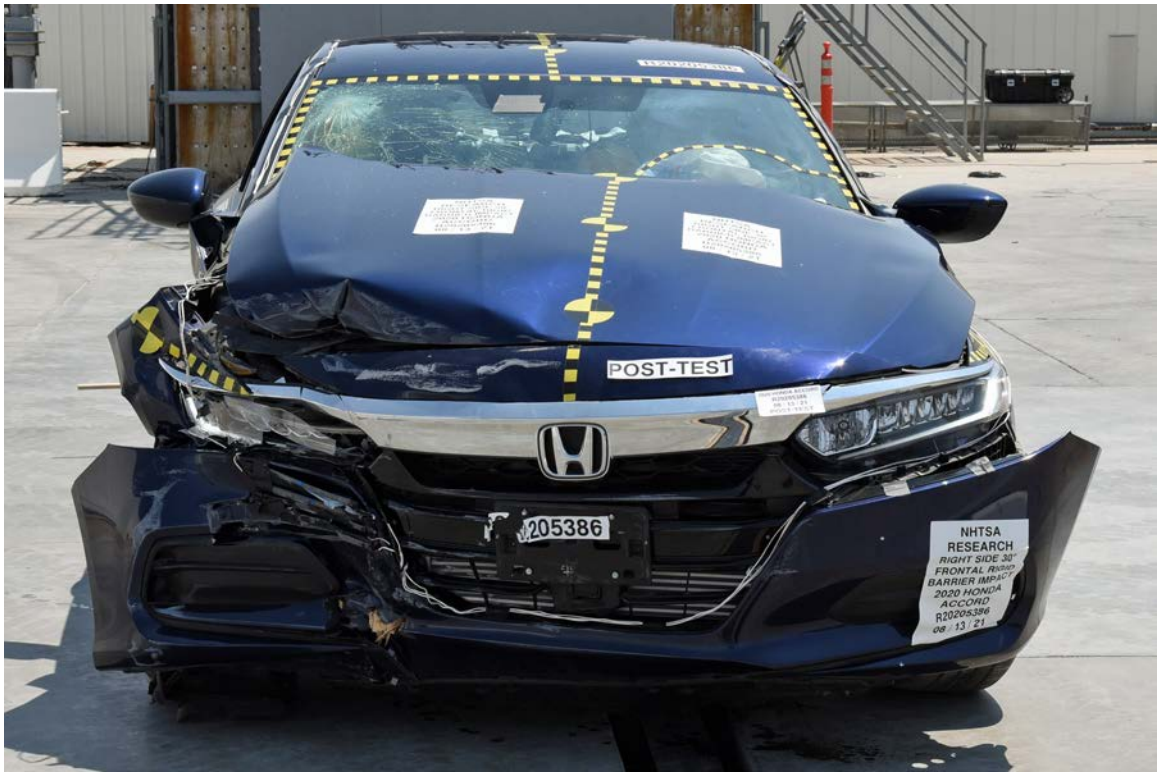


FIGURE 6. Post-Test Front View of Test Vehicle

FIGURE 7. Pre-Test Left View of Test Vehicle

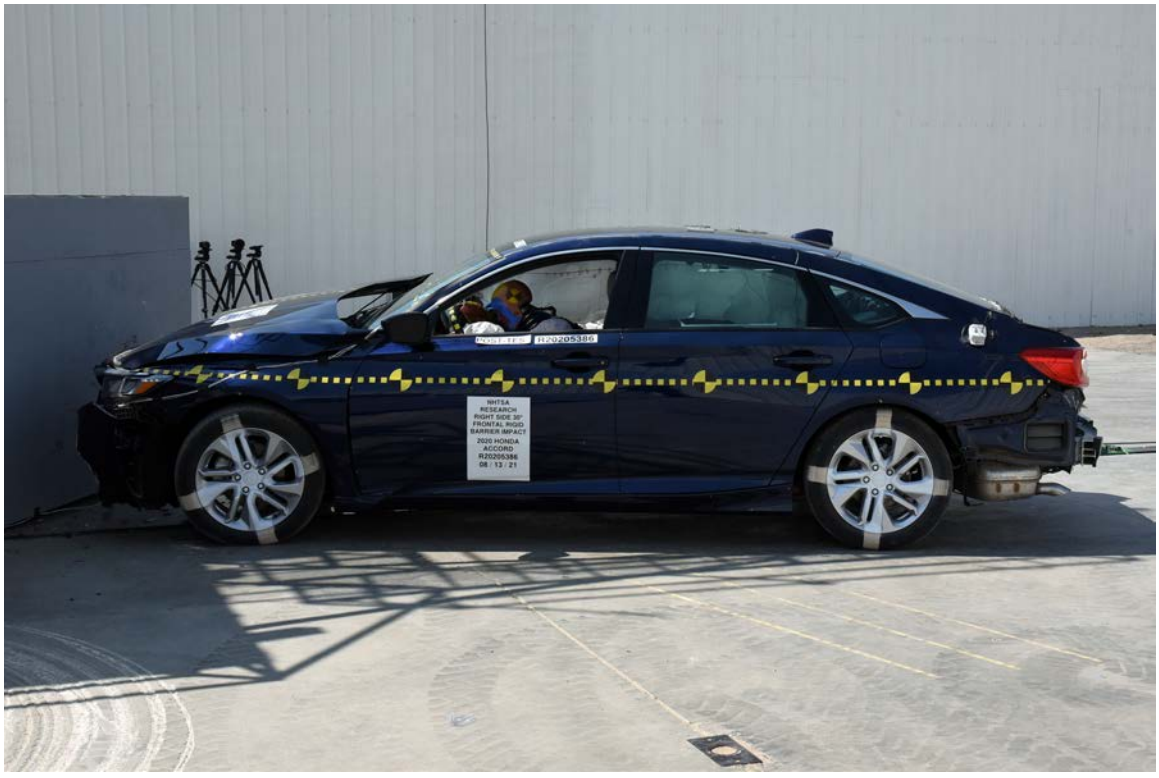


FIGURE 8. Post-Test Left View of Test Vehicle

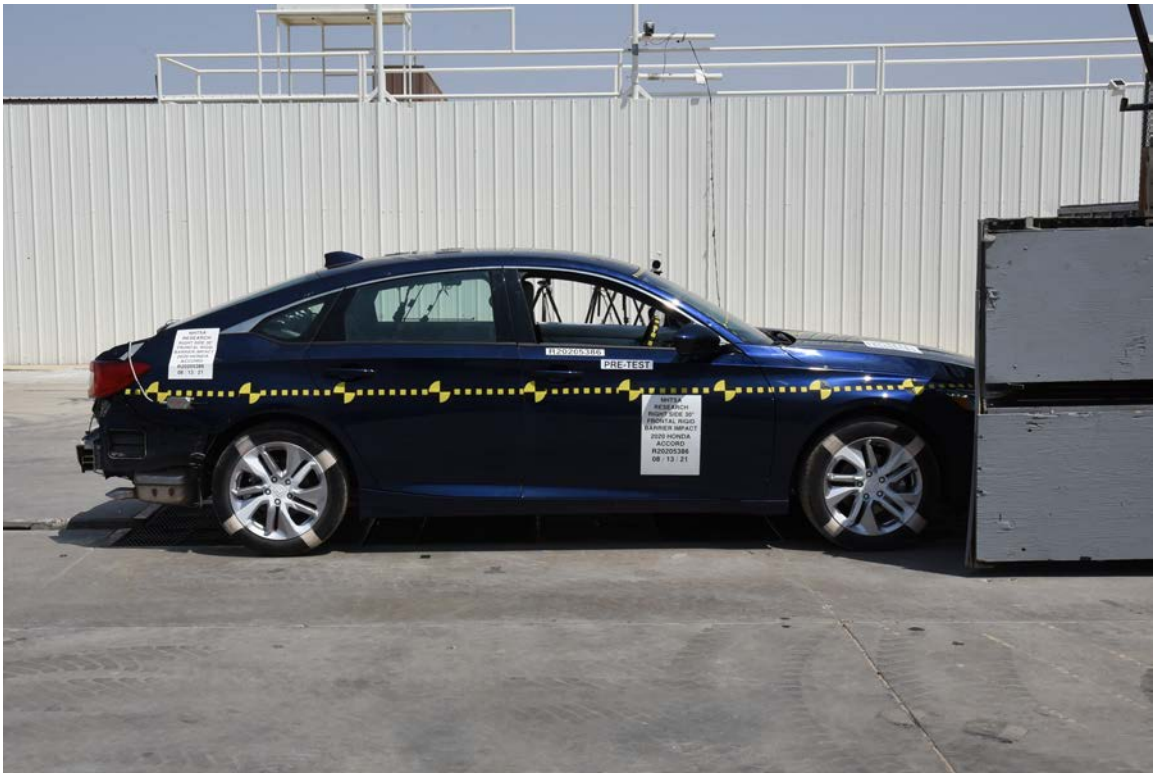


FIGURE 9. Pre-Test Right View of Test Vehicle

FIGURE 10. Post-Test Right View of Test Vehicle

FIGURE 11. Pre-Test Left Front ¾ View of Test Vehicle

FIGURE 12. Post-Test Left Front ¾ View of Test Vehicle

FIGURE 13. Pre-Test Right Front ¾ View of Test Vehicle

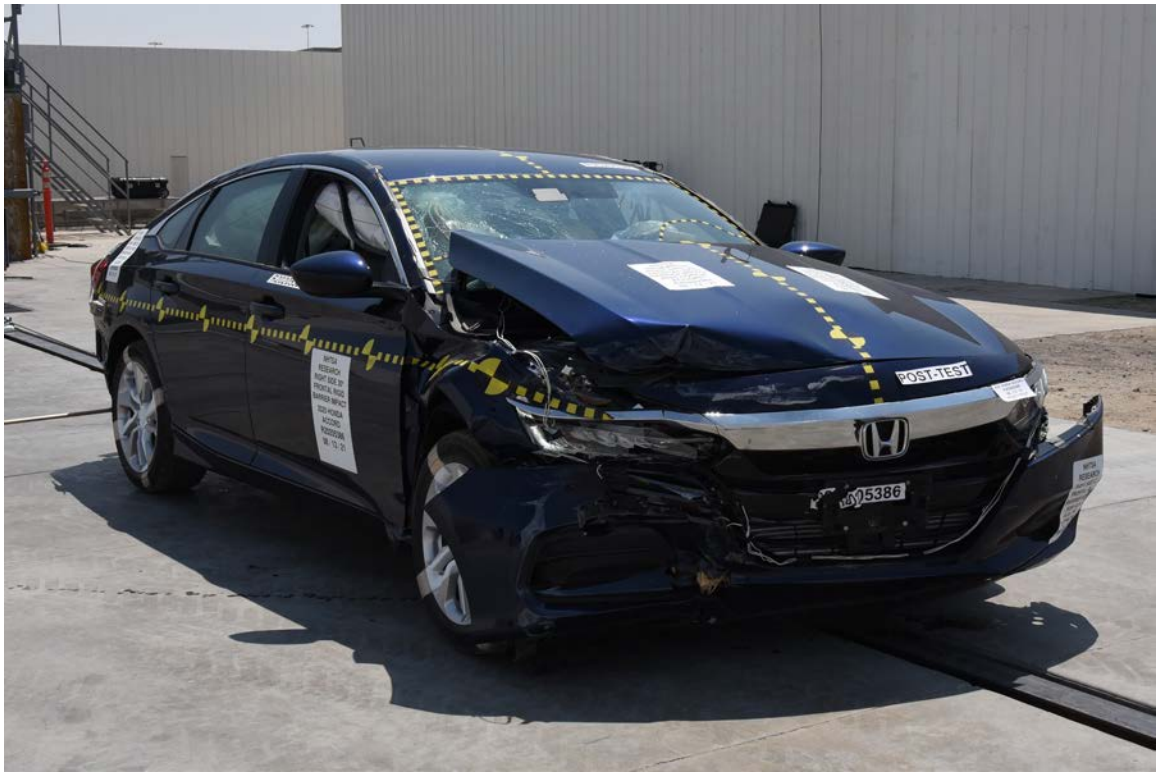


FIGURE 14. Post-Test Right Front ¾ View of Test Vehicle

FIGURE 15. Pre-Test Right Rear ¾ View of Test Vehicle

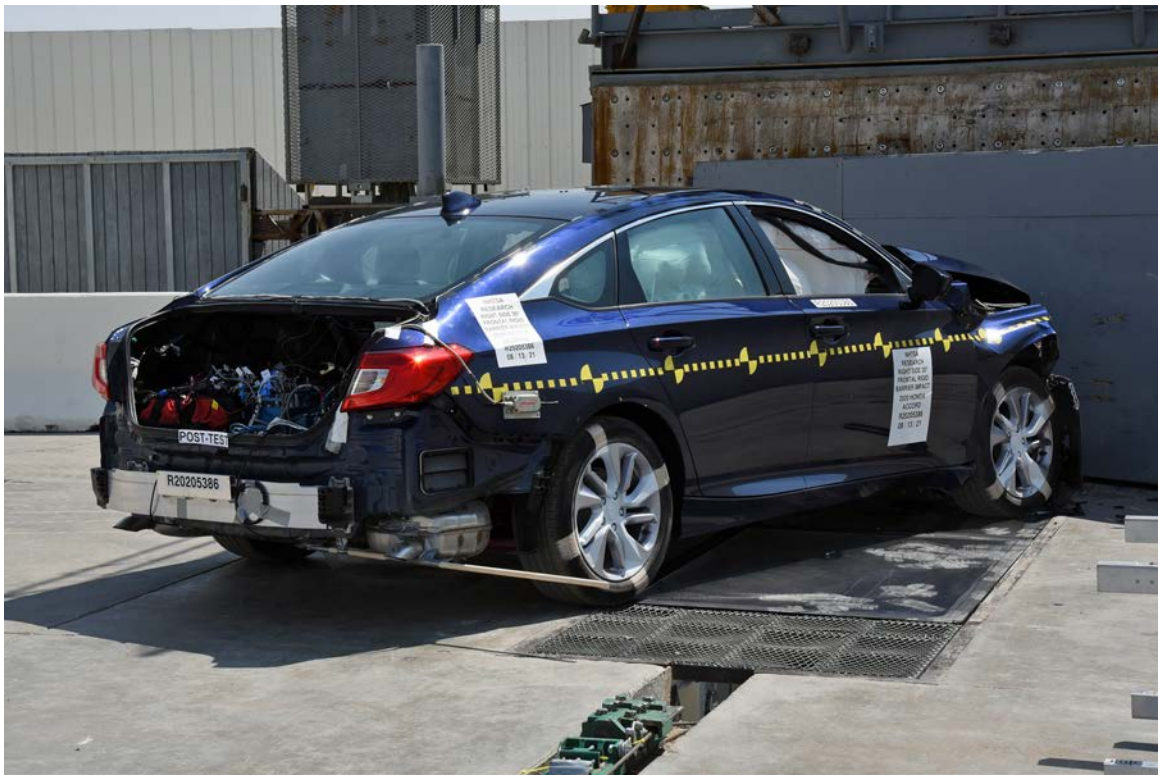


FIGURE 16. Post-Test Right Rear ¾ View of Test Vehicle

FIGURE 17. Pre-Test Rear View of Test Vehicle

FIGURE 18. Post-Test Rear View of Test Vehicle

FIGURE 19. Pre-Test Left Rear ¾ View of Test Vehicle

FIGURE 20. Post-Test Left Rear ¾ View of Test Vehicle

FIGURE 21. Pre-Test Windshield View

FIGURE 22. Post-Test Windshield View

FIGURE 23. Pre-Test Engine Compartment View

FIGURE 24. Post-Test Engine Compartment View

FIGURE 25. Pre-Test Fuel Filler Cap View

FIGURE 26. Post-Test Fuel Filler Cap View

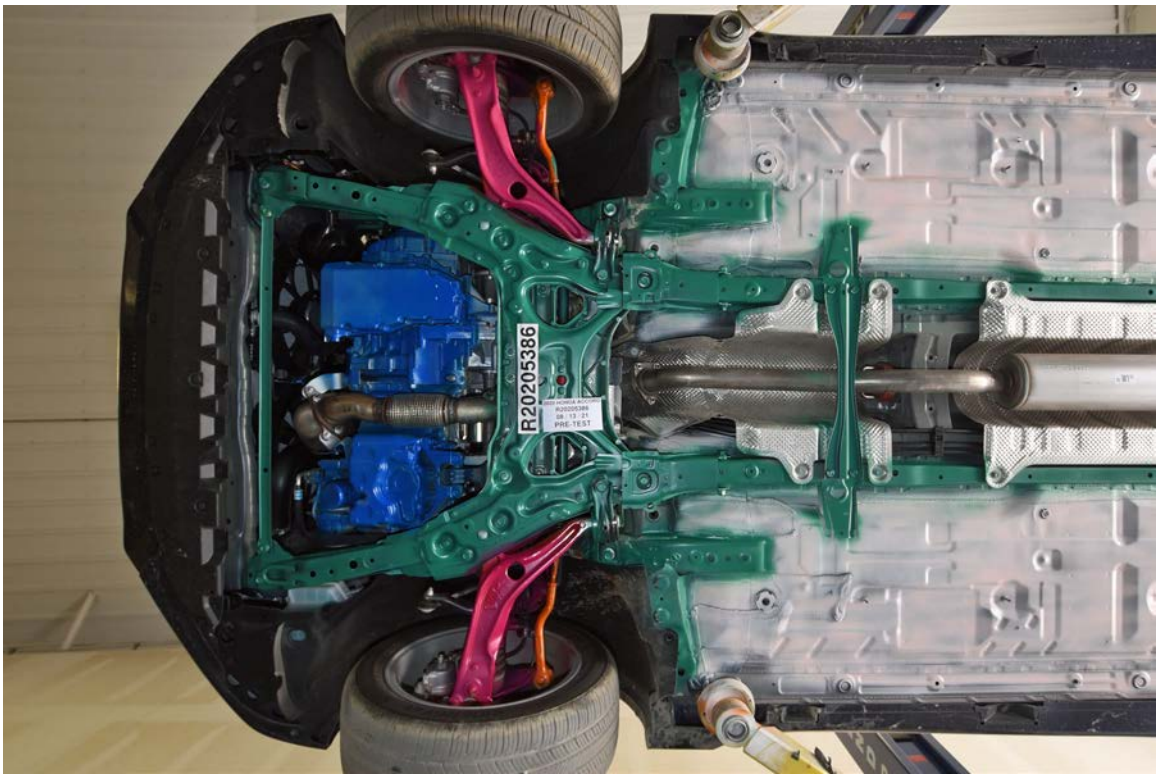


FIGURE 27. Pre-Test Front Underbody View

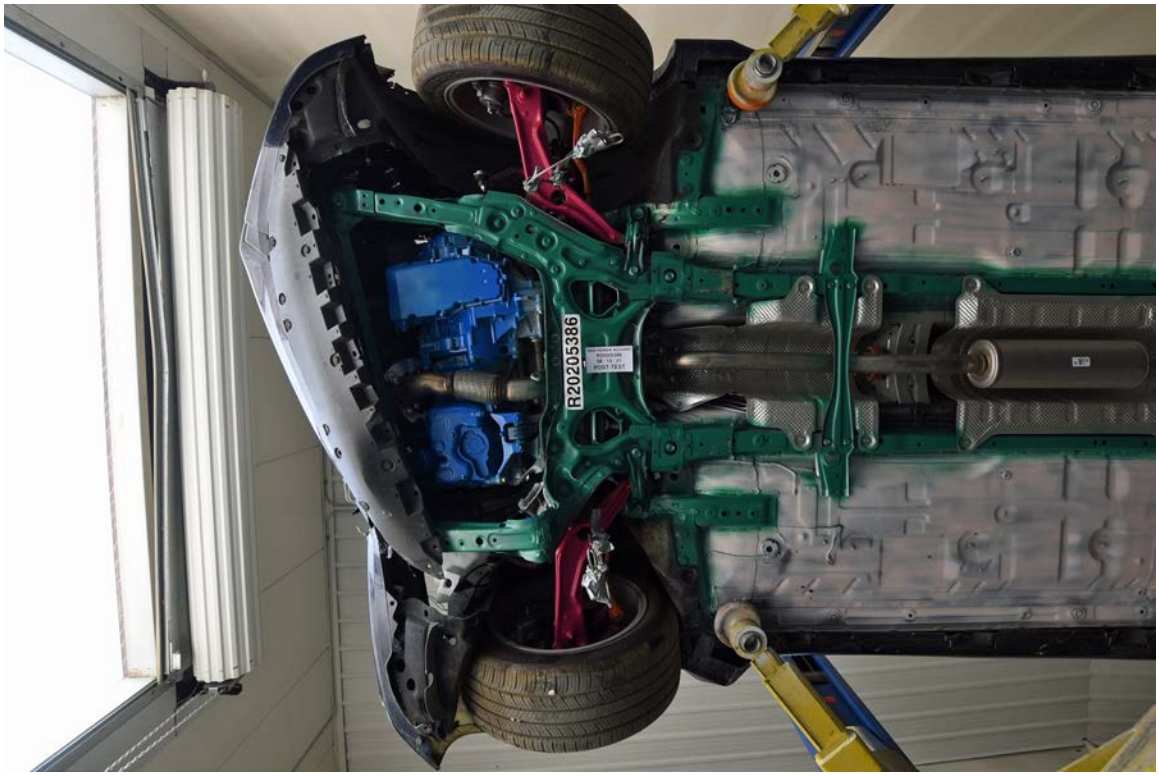


FIGURE 28. Post-Test Front Underbody View

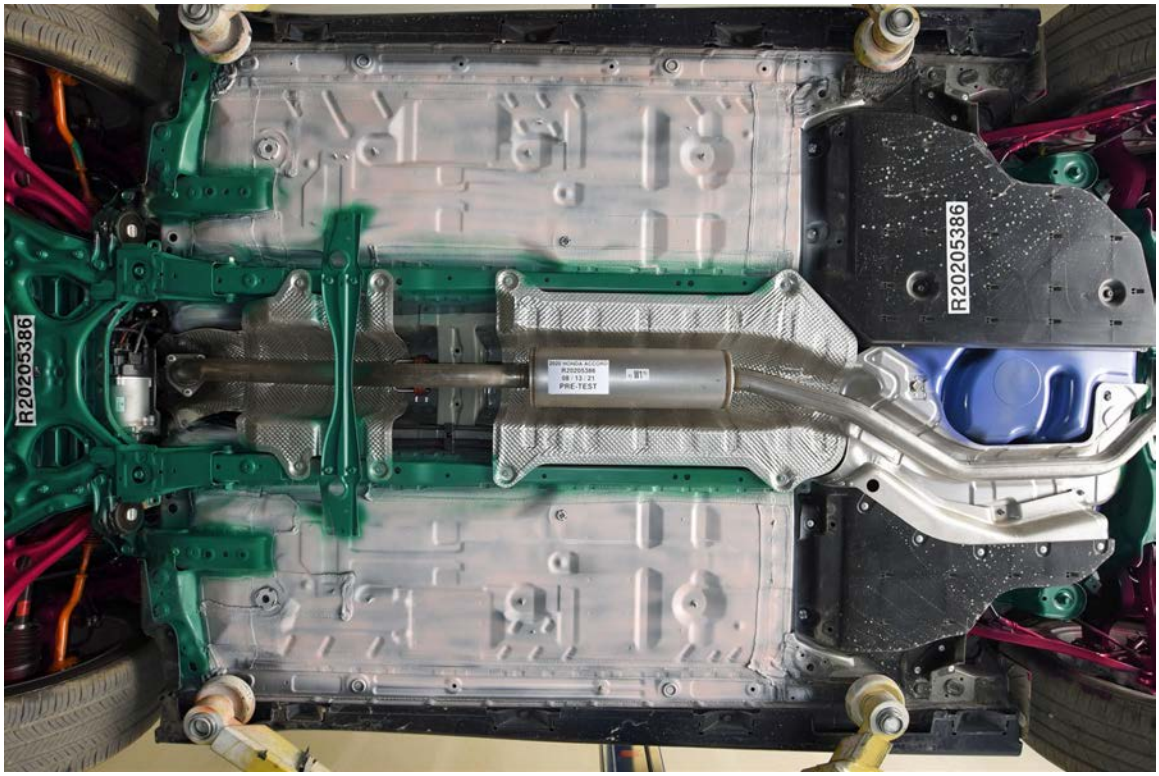


FIGURE 29. Pre-Test Mid Underbody View

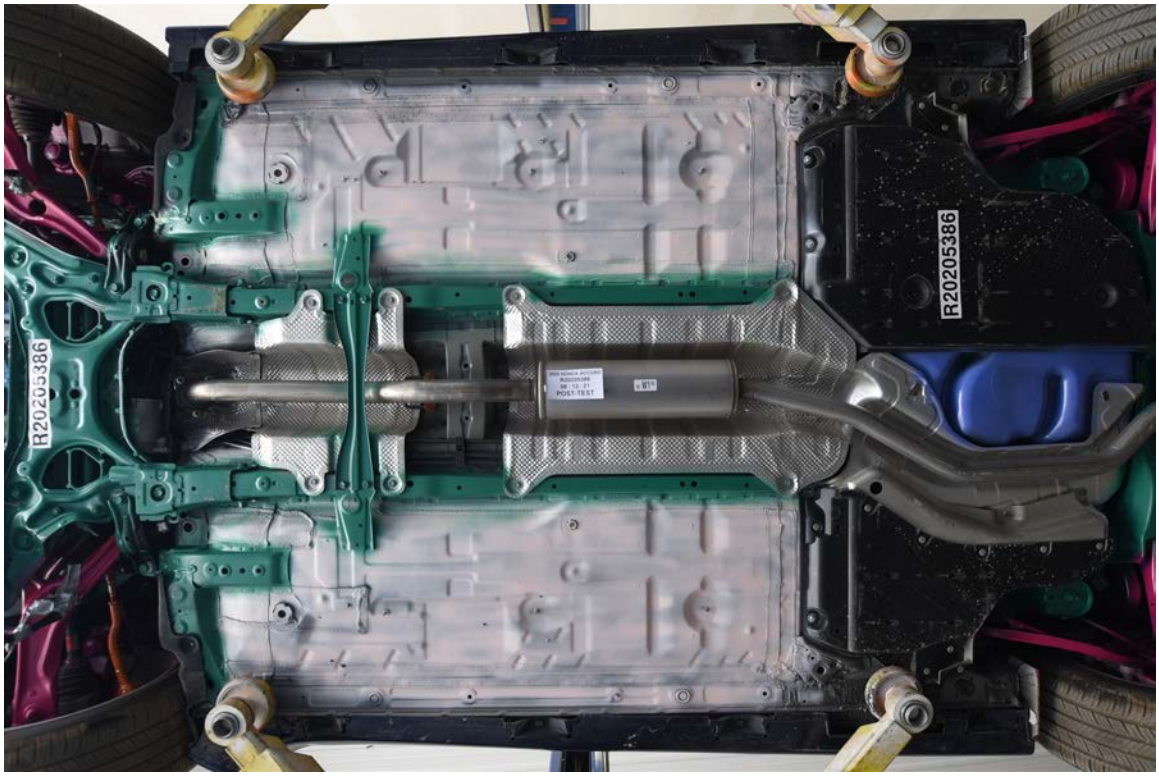


FIGURE 30. Post-Test Mid Underbody View

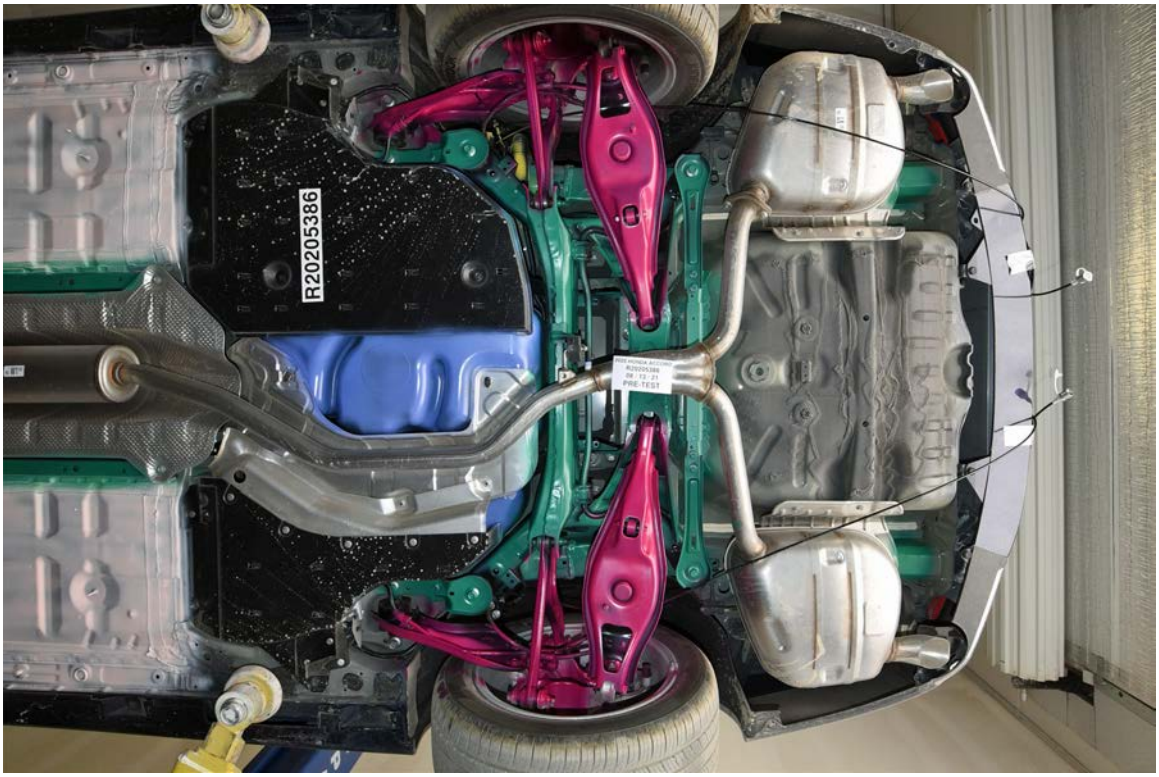


FIGURE 31. Pre-Test Rear Underbody View

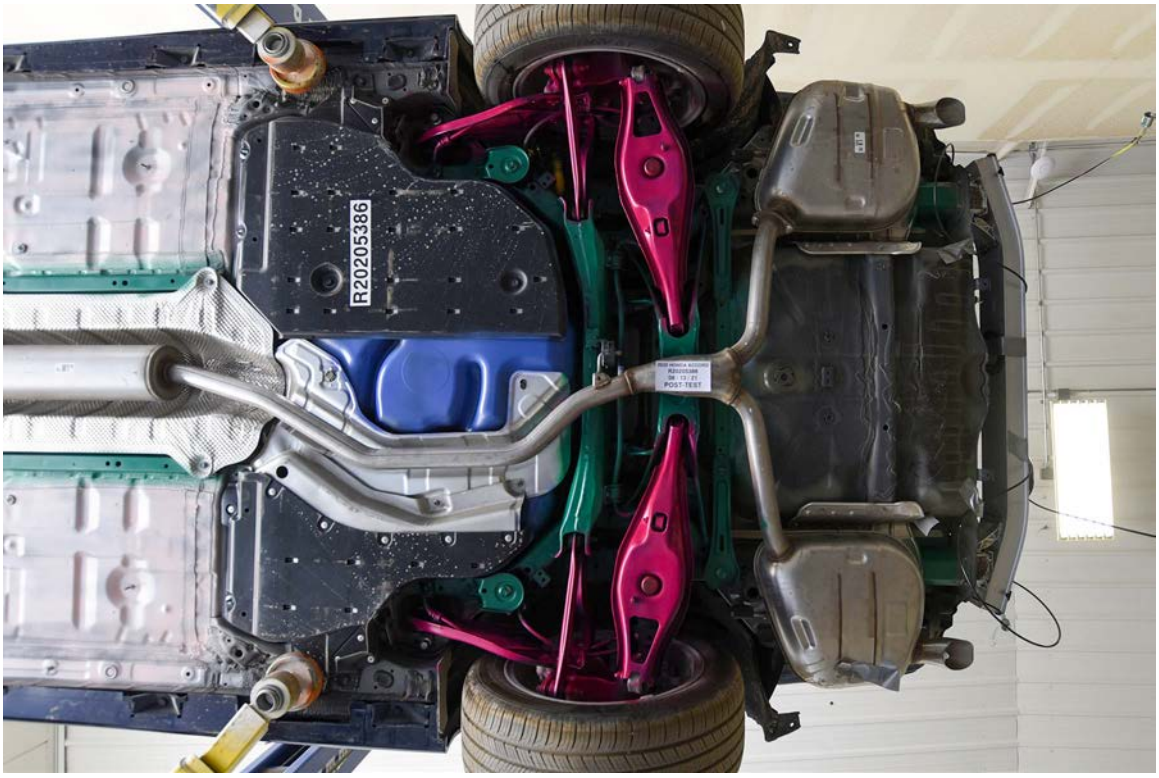


FIGURE 32. Post-Test Rear Underbody View

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

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

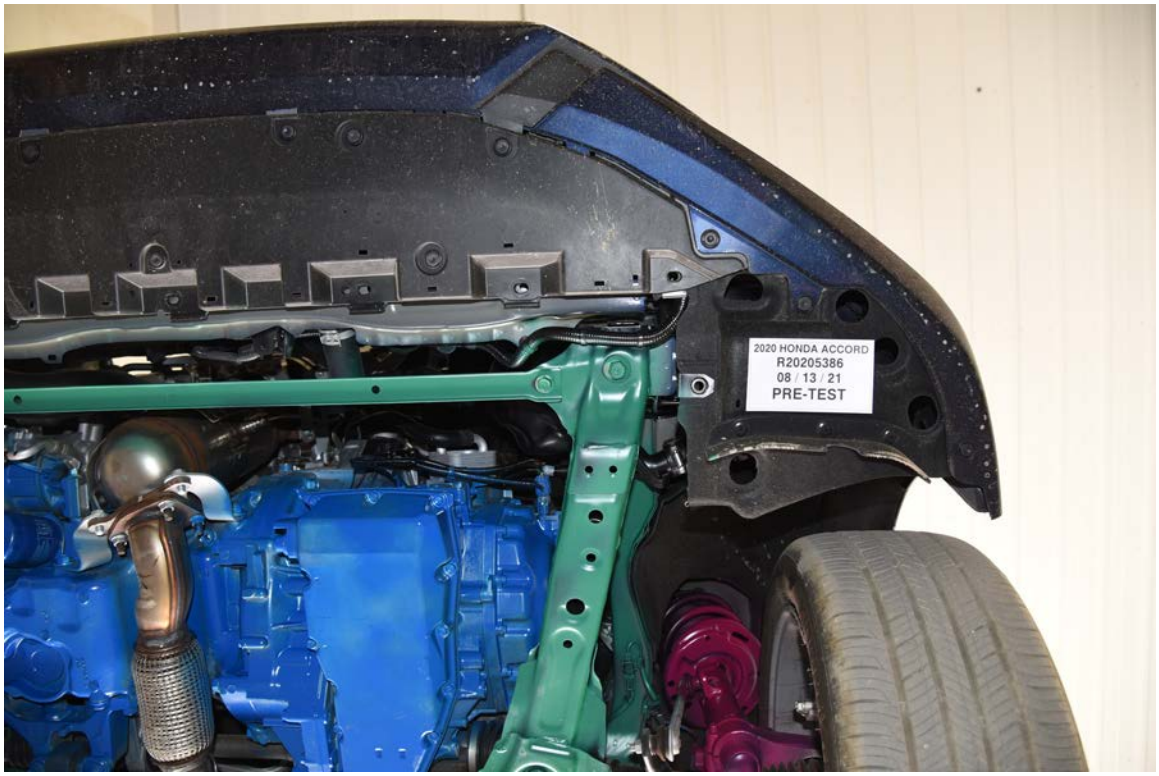


FIGURE 35. Pre-Test Driver Side Bumper to Rail Attachments and Crush Initiators

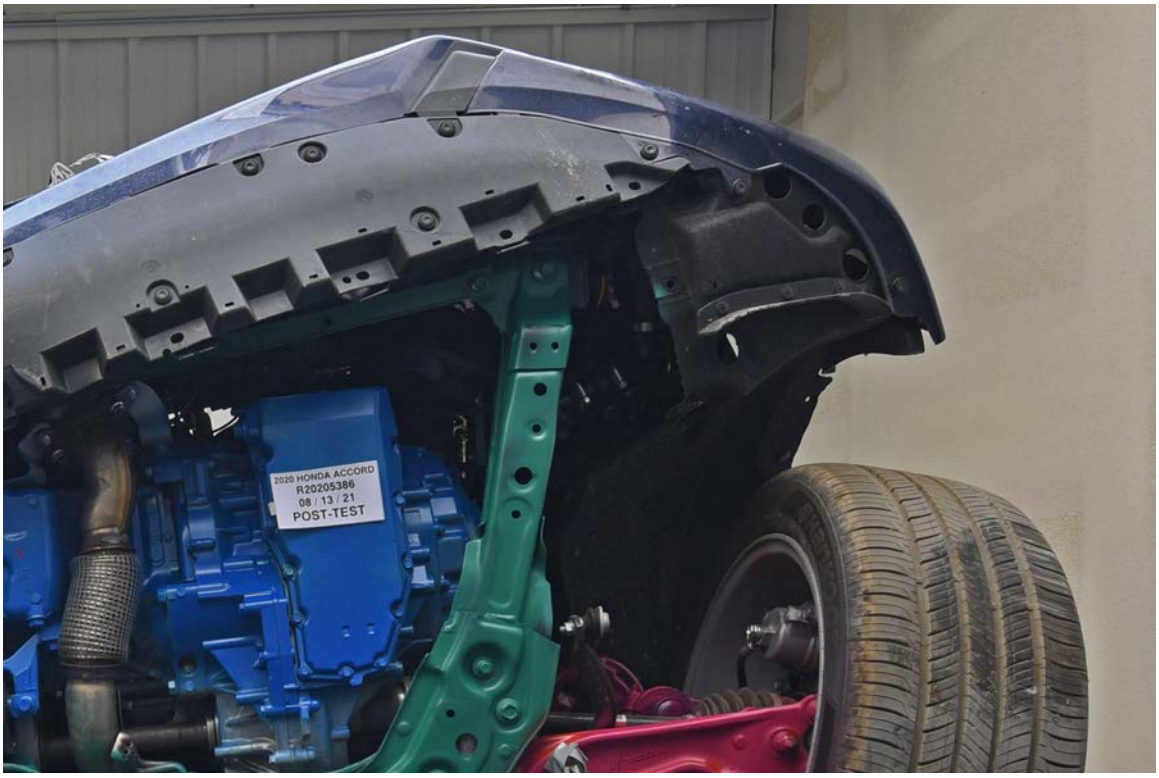


FIGURE 36. Post-Test Driver Side Bumper to Rail Attachments and Crush Initiators

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

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

FIGURE 39. Pre-Test Driver Side Rocker

FIGURE 40. Post-Test Driver Side Rocker

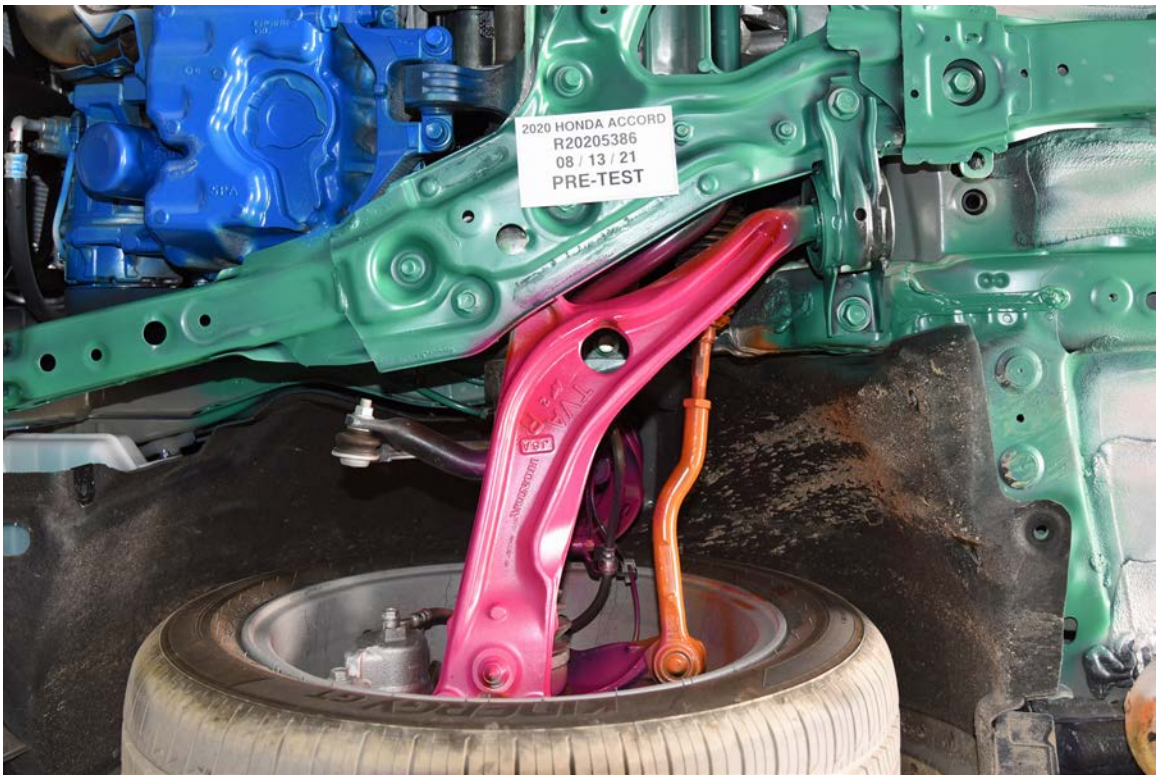


FIGURE 41. Pre-Test Passenger Side Rocker

FIGURE 42. Post-Test Passenger Side Rocker

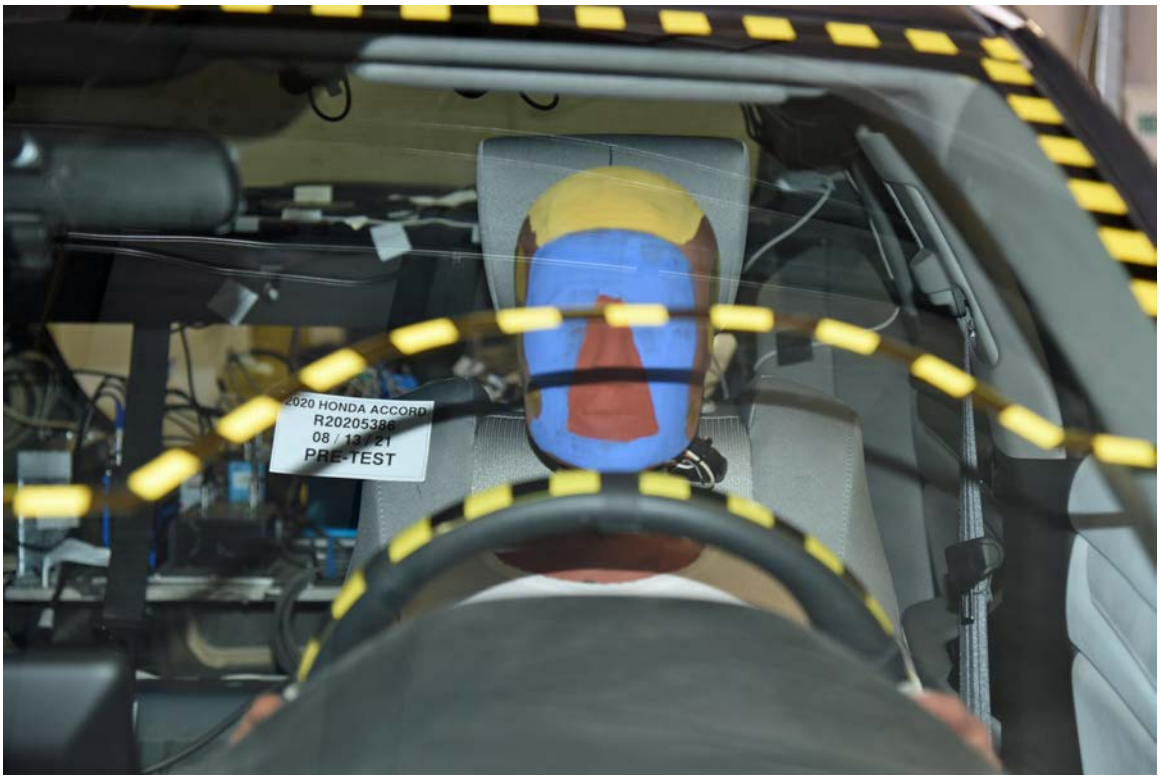


FIGURE 43. Pre-Test Driver Front Windshield View

FIGURE 44. Post-Test Driver Front Windshield View

FIGURE 45. Pre-Test Driver Side Front Window View

FIGURE 46. Post-Test Driver Side Front Window View

FIGURE 47. Pre-Test View of Driver Door Clearance

FIGURE 48. Post-Test View of Driver Door Clearance

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

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

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

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

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

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

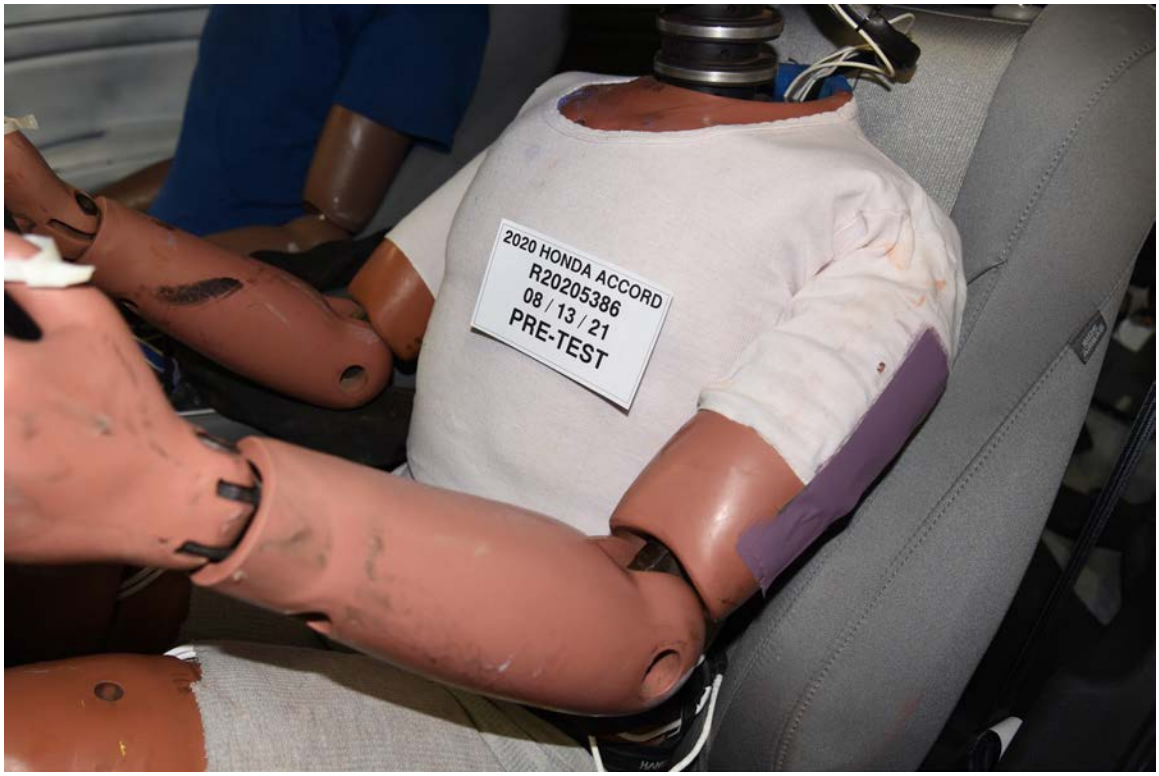


FIGURE 55. Pre-Test View of Driver Abdomen

FIGURE 56. Post-Test View of Driver Abdomen

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

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

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

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

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

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

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

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

FIGURE 65. Pre-Test View of the Driver Feet

FIGURE 66. Post-Test View of the Driver Feet

FIGURE 67. Pre-Test Driver Adjustable D-Ring

FIGURE 68. Post-Test Driver Adjustable D-Ring

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

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

FIGURE 71. Pre-Test Driver Seat Back Markings

FIGURE 72. Post-Test Driver Seat Back Markings

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

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

FIGURE 75. Pre-Test Driver Inner Door Panel

FIGURE 76. Post-Test Driver Inner Door Panel

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

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

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

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

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

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

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

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

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

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

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

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

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

Photograph Not Applicable

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

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

FIGURE 91a. Post-Test Driver Dummy Contact with Sun Visor

FIGURE 91b. Post-Test Driver Dummy Contact with Rear View Mirror

FIGURE 92. Pre-Test Passenger Front Windshield View

FIGURE 93. Post-Test Passenger Front Windshield View

FIGURE 94. Pre-Test Passenger Side Front Window View

FIGURE 95. Post-Test Passenger Side Front Window View

FIGURE 96. Pre-Test View of Passenger Door Clearance

FIGURE 97. Post-Test View of Passenger Door Clearance

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

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

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

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

FIGURE 102. Pre-Test View of Passenger Abdomen

FIGURE 103. Post-Test View of Passenger Abdomen

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

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

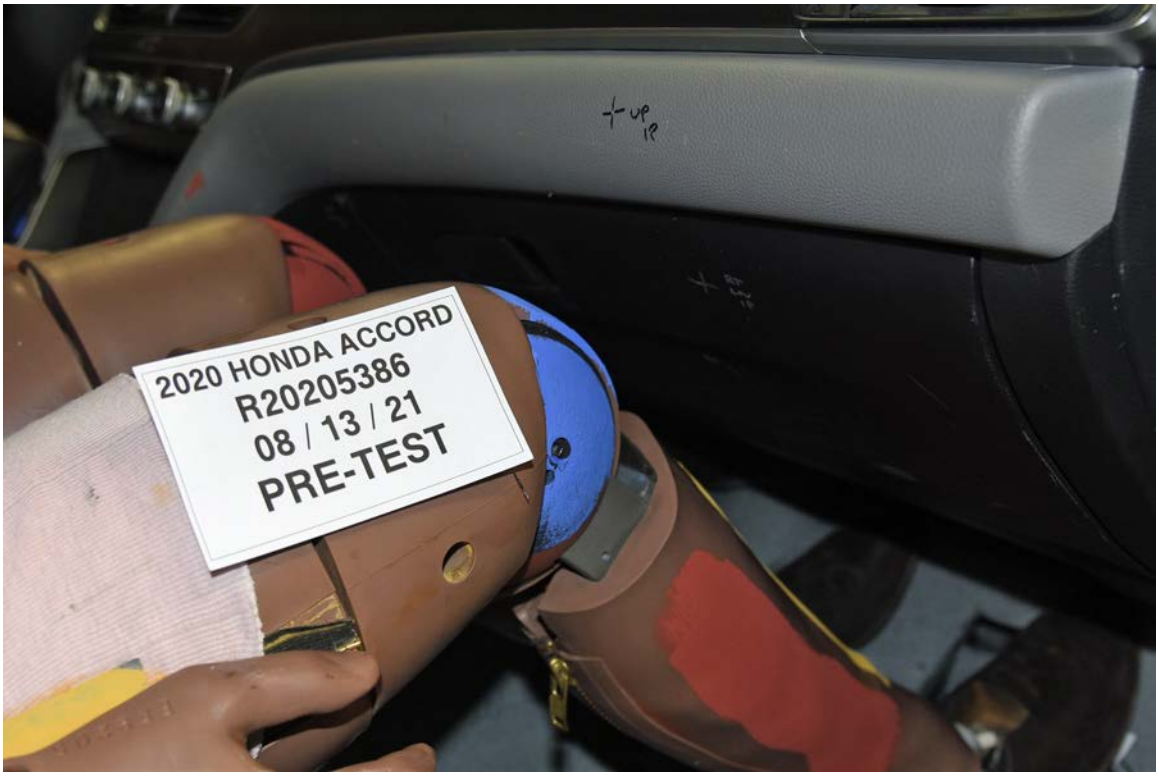


FIGURE 106. Pre-Test View of Passenger Right Knee and Bolster

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

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

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

FIGURE 110. Pre-Test View of the Passenger Feet

FIGURE 111. Post-Test View of the Passenger Feet

FIGURE 112. Pre-Test Passenger Adjustable D-Ring

FIGURE 113. Post-Test Passenger Adjustable D-Ring

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

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

FIGURE 116. Pre-Test Passenger Seat Back Markings

FIGURE 117. Post-Test Passenger Seat Back Markings

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

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

FIGURE 120. Pre-Test Passenger Inner Door Panel

FIGURE 121. Post-Test Passenger Inner Door Panel

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

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

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

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

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

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

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

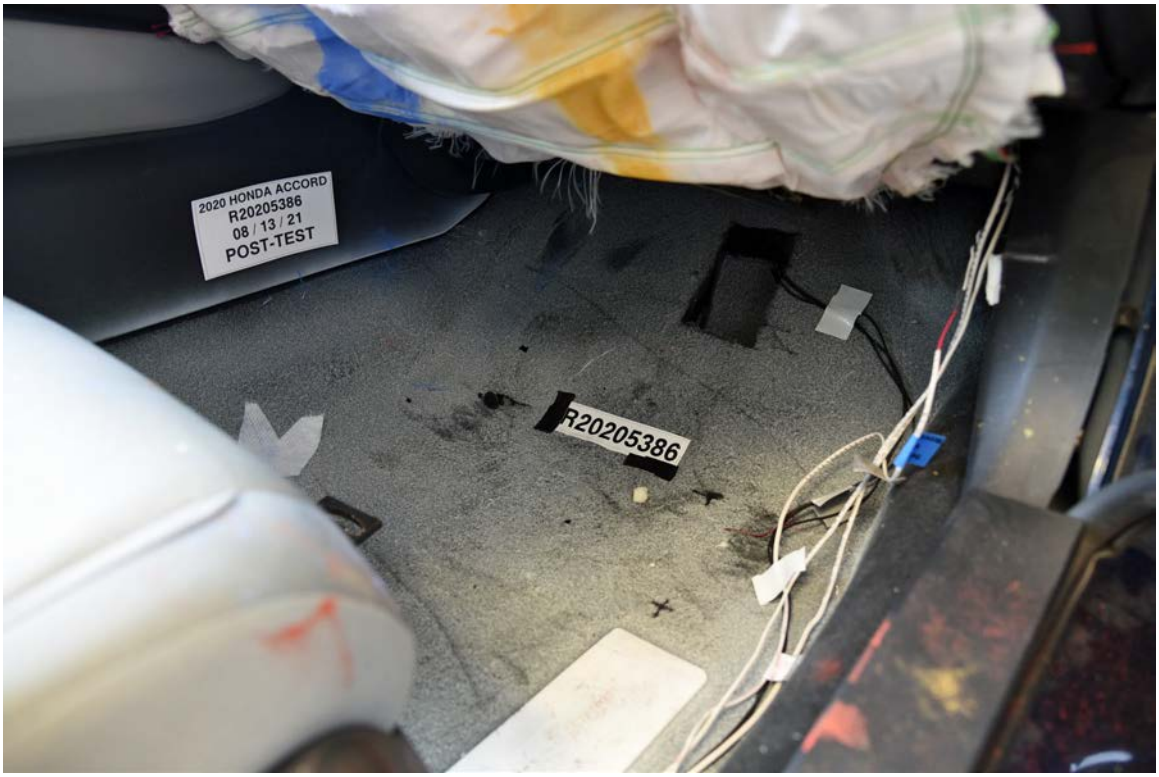


FIGURE 129. Post-Test View of Passenger Floor Pan from Outside of Vehicle

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

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

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

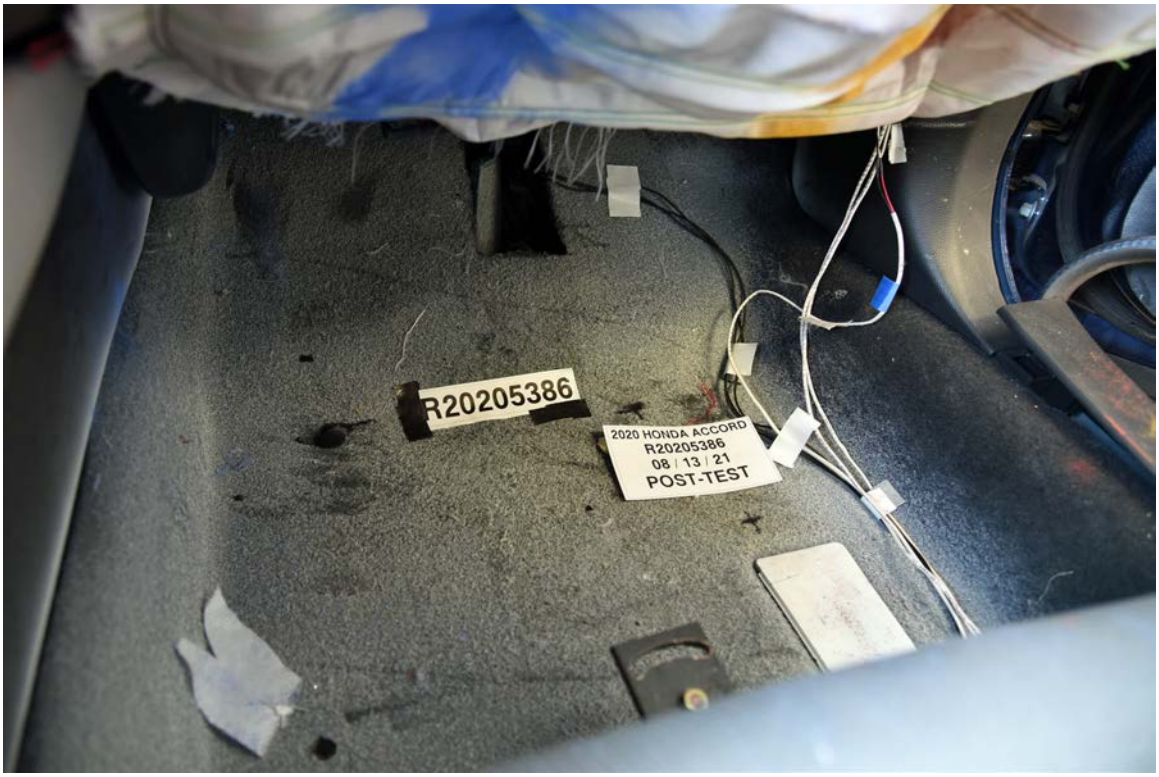


FIGURE 133. Post-Test View of Passenger Floor Pan from Center of Vehicle

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

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

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

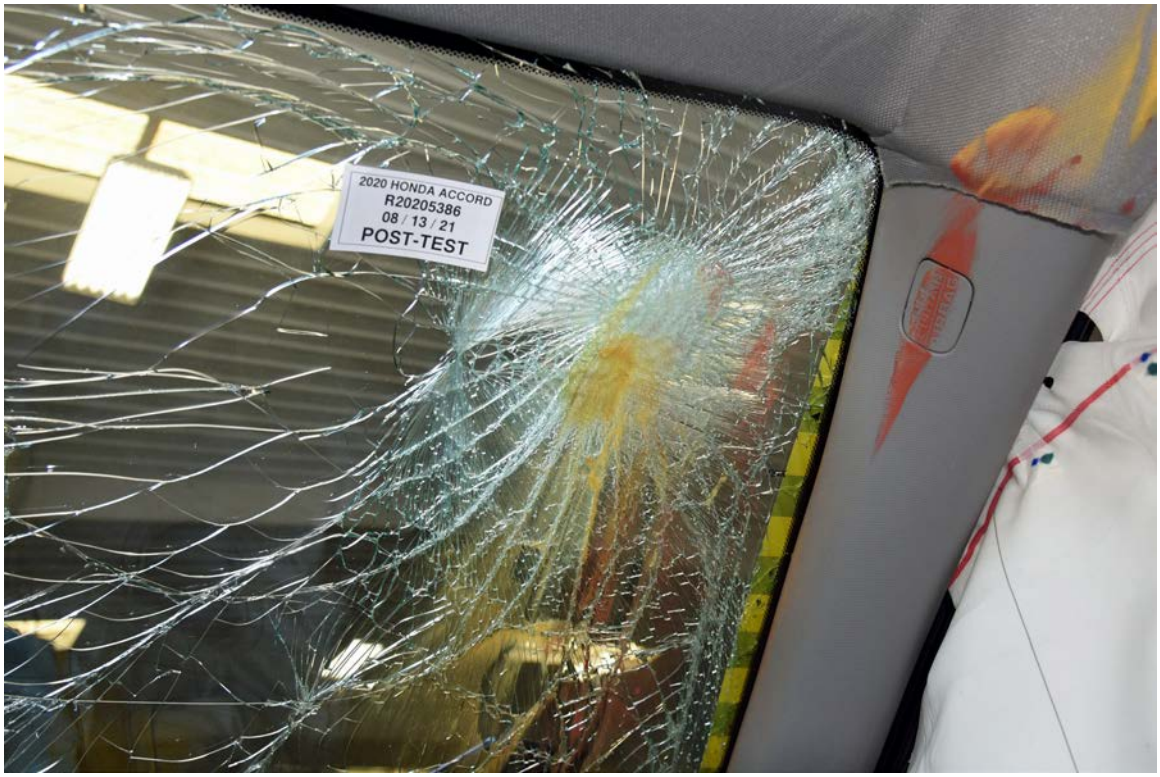


FIGURE 136a. Post-Test Passenger Dummy Contact with Windshield

FIGURE 136b. Post-Test Passenger Dummy Contact with A-Pillar

Photograph Not Applicable

No Stoddard Solvent Spillage

FIGURE 137. Post-Test Stoddard Solvent Spillage Location View

FIGURE 138. Post-Test Speed Trap Read-Out

FIGURE 139. Vehicle at 0° on Static Rollover Device

FIGURE 140. Vehicle at 90° on Static Rollover Device

FIGURE 141. Vehicle at 180° on Static Rollover Device

FIGURE 142. Vehicle at 270° on Static Rollover Device

FIGURE 143. Vehicle at 360° on Static Rollover Device

FIGURE 144. Frontal Impact Event

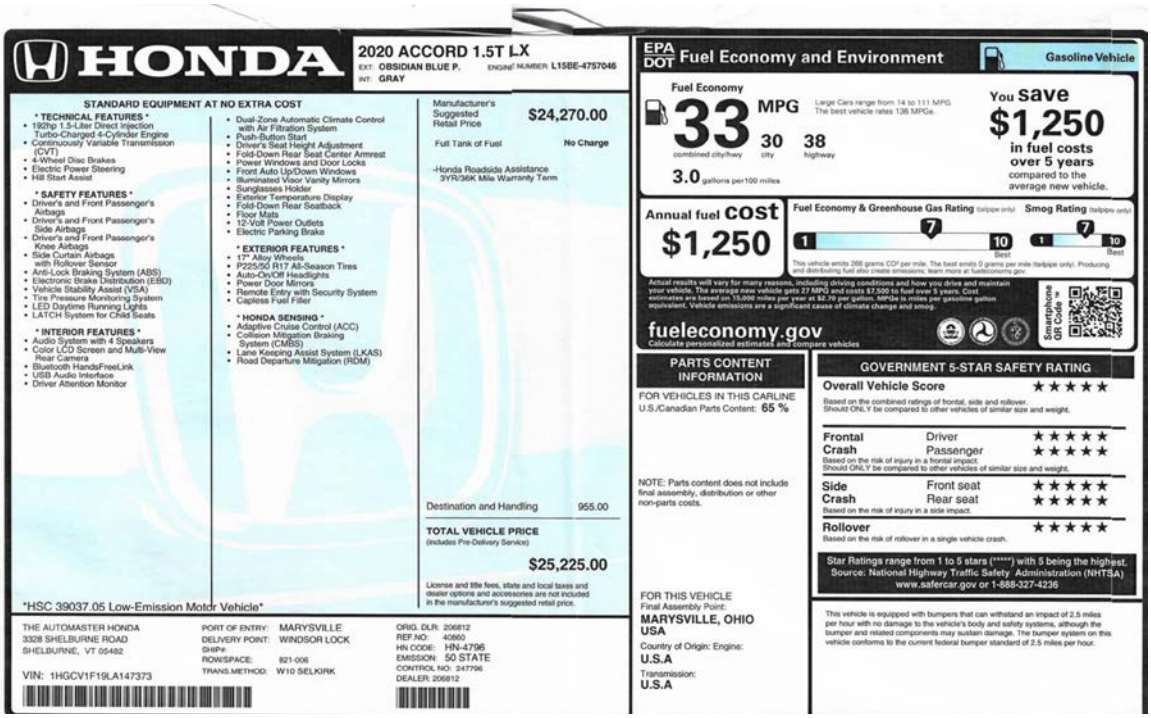


FIGURE 145. Monroney Label Photograph

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA TRACES

TABLE OF DATA PLOTS

TABLE OF DATA PLOTS … (CONTINUED)

TABLE OF DATA PLOTS … (CONTINUED)

TABLE OF DATA PLOTS … (CONTINUED)

TABLE OF DATA PLOTS … (CONTINUED)

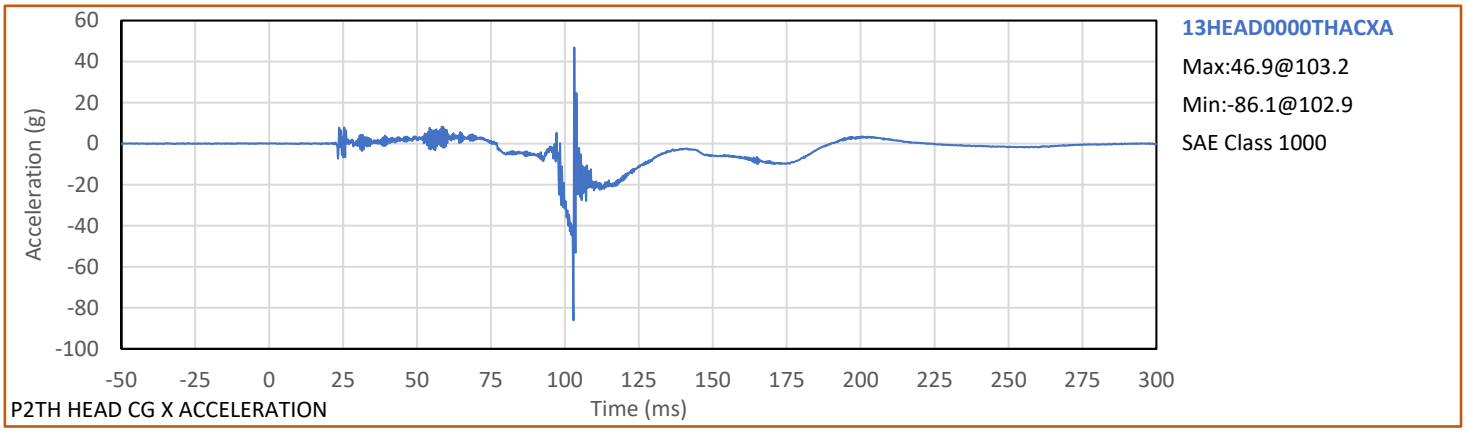
TABLE OF DATA PLOTS … (CONTINUED)

Test Vehicle: 2020 Honda Accord 4-Door Sedan

Test Program: Right Side 30° Frontal Rigid Barrier Impact

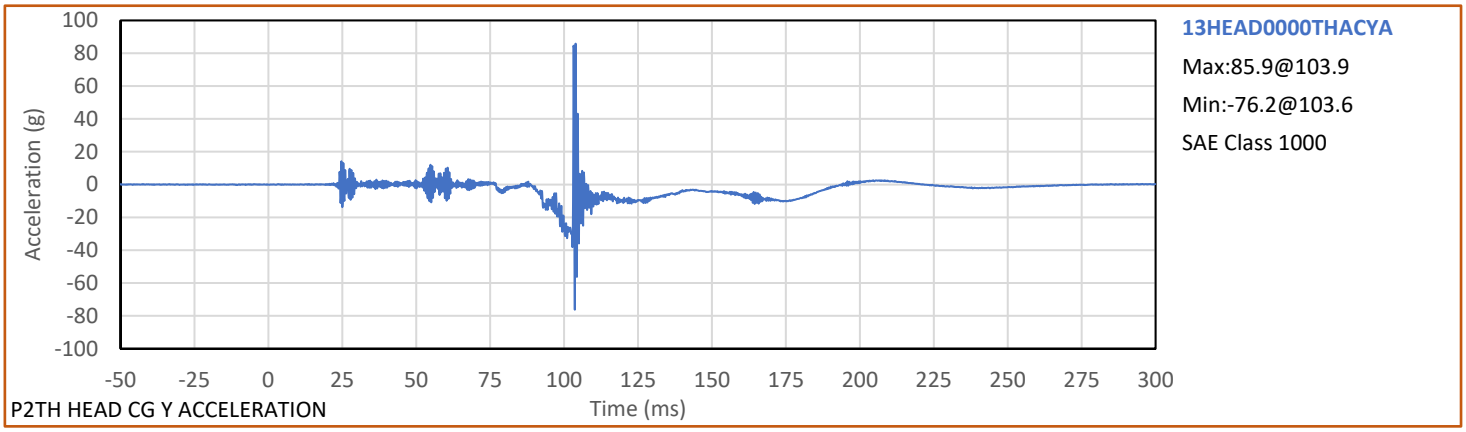
NHTSA No.: R20205386

Test Date: 7/30/2021



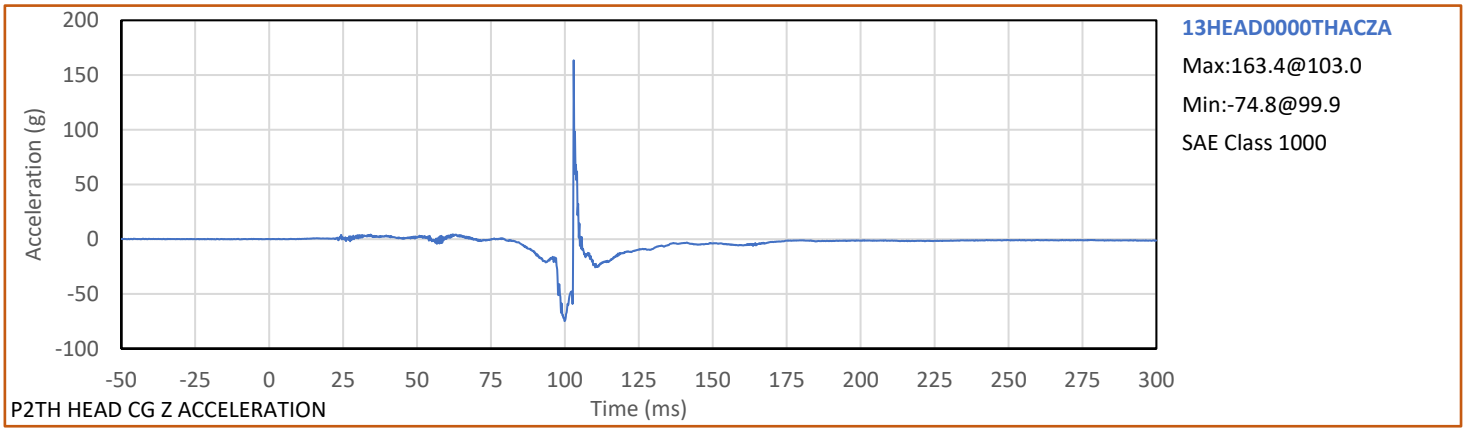
P2TH HEAD CG X ACCELERATION

13HEAD0000THACXA
Max:46.9@103.2
Min:-86.1@102.9
SAE Class 1000



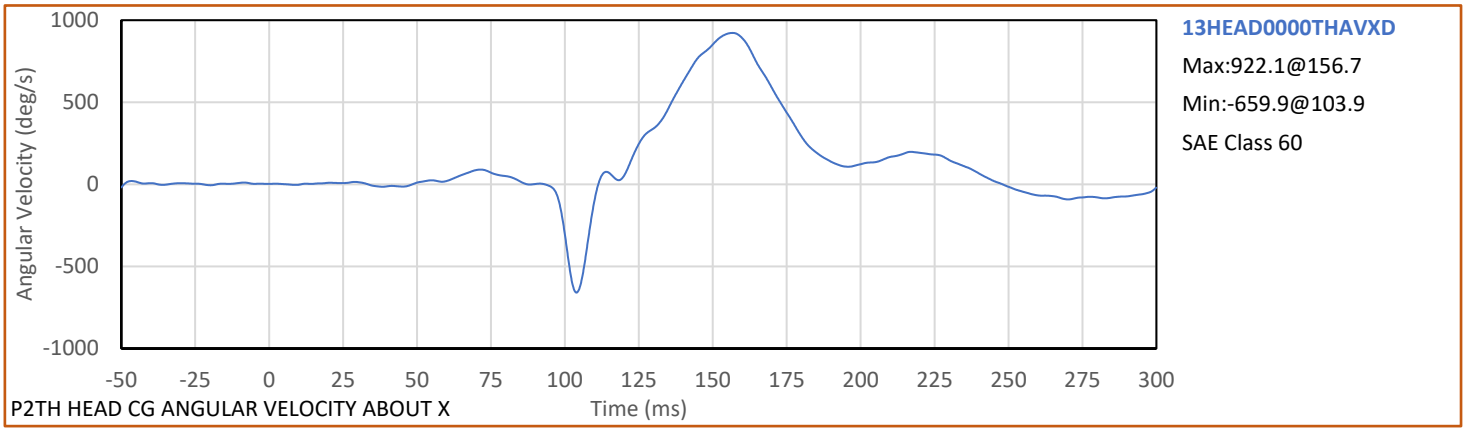
P2TH HEAD CG Y ACCELERATION

13HEAD0000THACYA
Max:85.9@103.9
Min:-76.2@103.6
SAE Class 1000



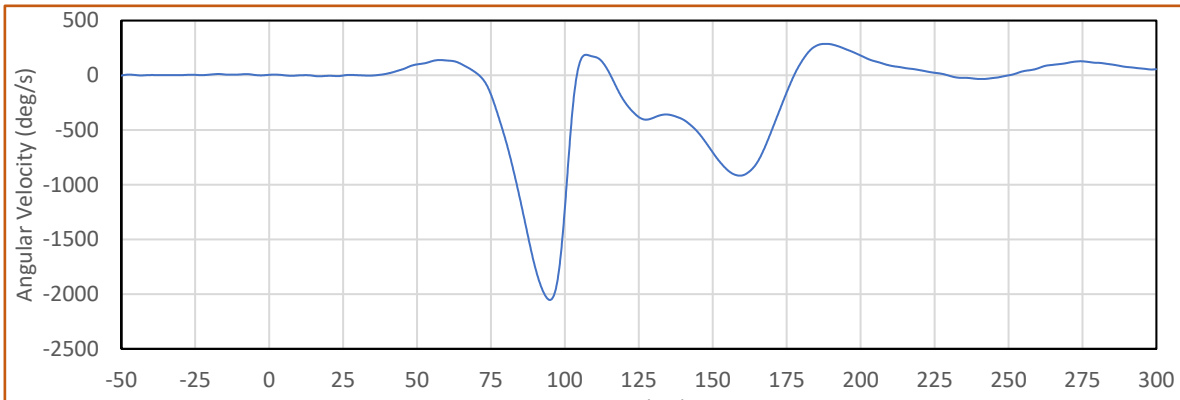
P2TH HEAD CG Z ACCELERATION

13HEAD0000THACZA
Max:163.4@103.0
Min:-74.8@99.9
SAE Class 1000



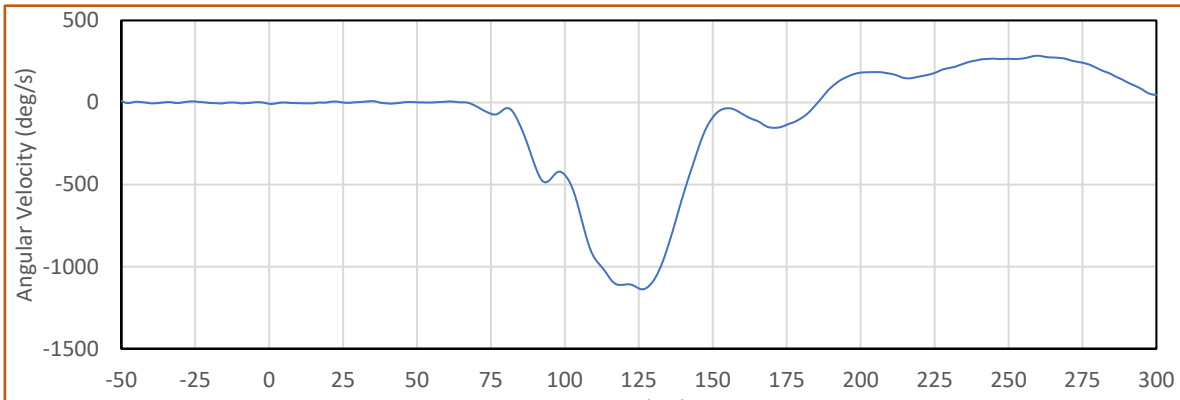
P2TH HEAD CG ANGULAR VELOCITY ABOUT X

13HEAD0000THAVXD
Max:922.1@156.7
Min:-659.9@103.9
SAE Class 60



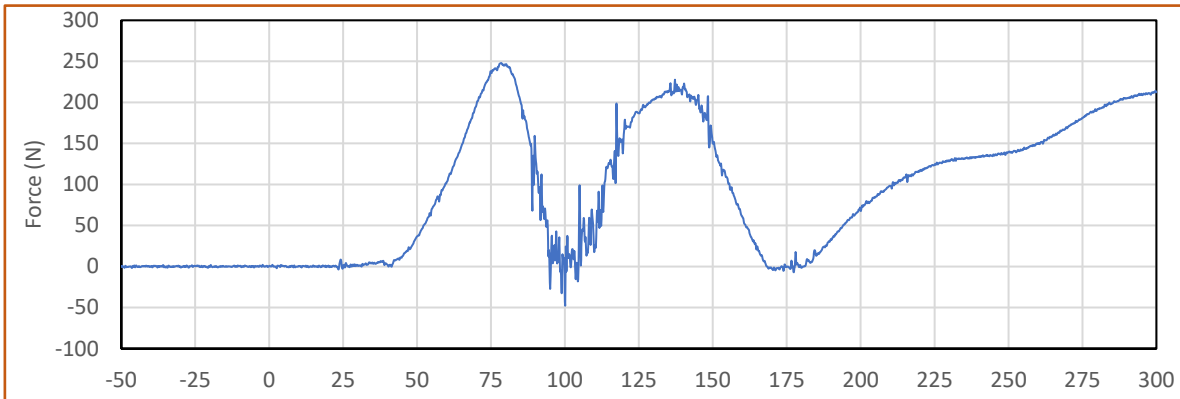
13HEAD0000THAVYD
Max:286.6@188.1
Min:-2053.6@94.9
SAE Class 60

P2TH HEAD CG ANGULAR VELOCITY ABOUT Y



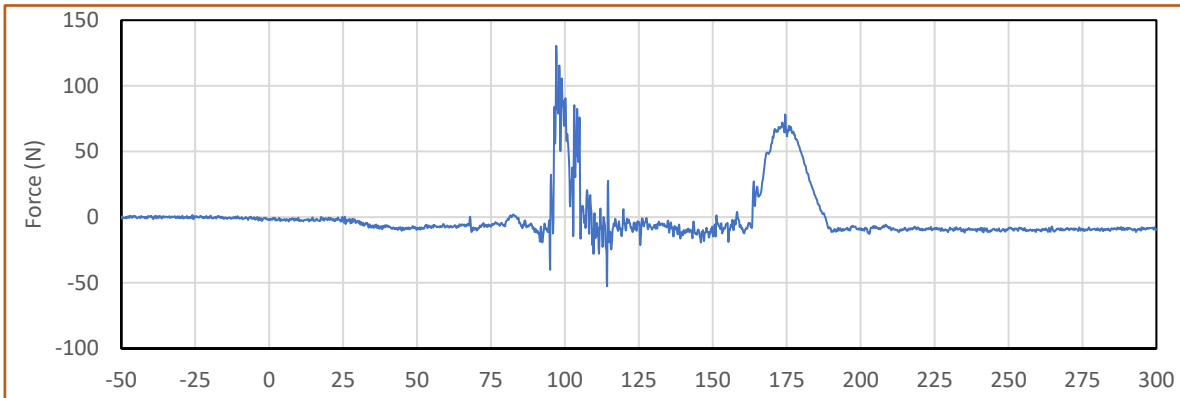
13HEAD0000THAVZD
Max:284.6@259.8
Min:-1138.3@126.2
SAE Class 60

P2TH HEAD CG ANGULAR VELOCITY ABOUT Z



13NECKFR00THFOZA
Max:247.9@78.5
Min:-47.8@100.1
SAE Class 1000

P2TH FRONT NECK SPRING TOWER LOAD CELL



13NECKRE00THFOZA
Max:130.5@97.1
Min:-52.6@114.3
SAE Class 1000

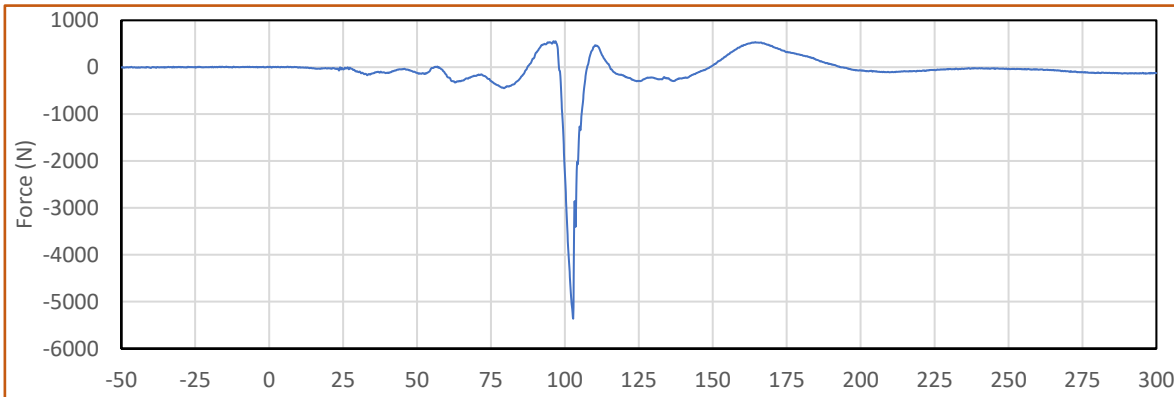
P2TH REAR NECK SPRING TOWER LOAD CELL

P2TH UPPER NECK X FORCE

13NECKUP00THFOXA
Max:1027.9@103.6
Min:-17.9@156.0
SAE Class 1000

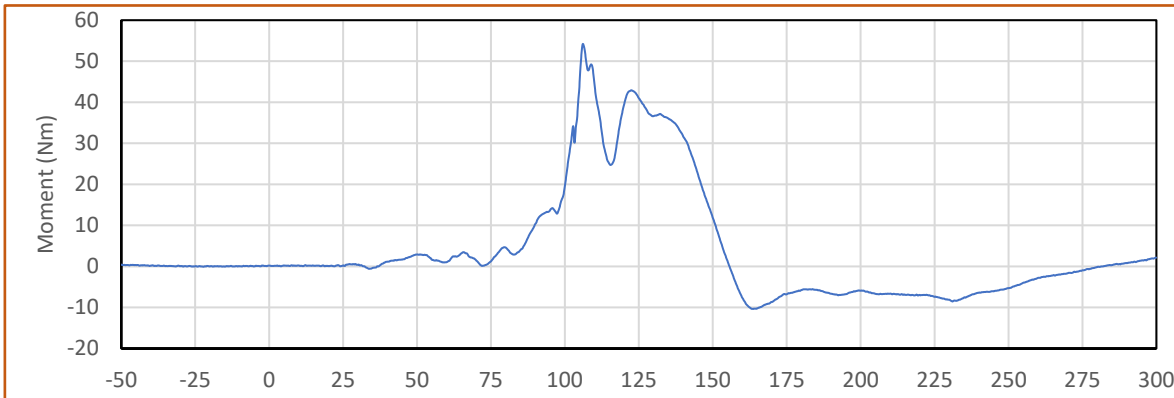
P2TH UPPER NECK Y FORCE

13NECKUP00THFOYA
Max:401.2@103.5
Min:-70.7@240.0
SAE Class 1000



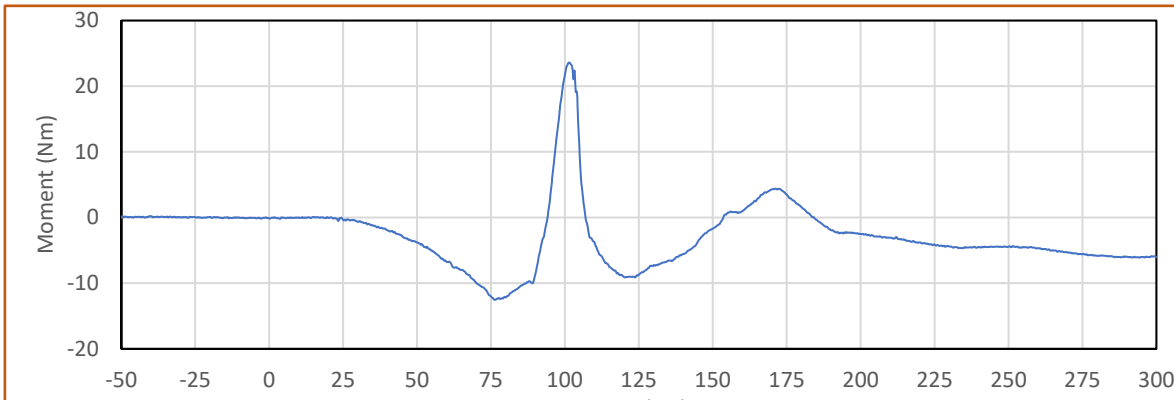
P2TH UPPER NECK Z FORCE

13NECKUP00THFOZA
Max:553.0@96.8
Min:-5362.9@102.8
SAE Class 1000



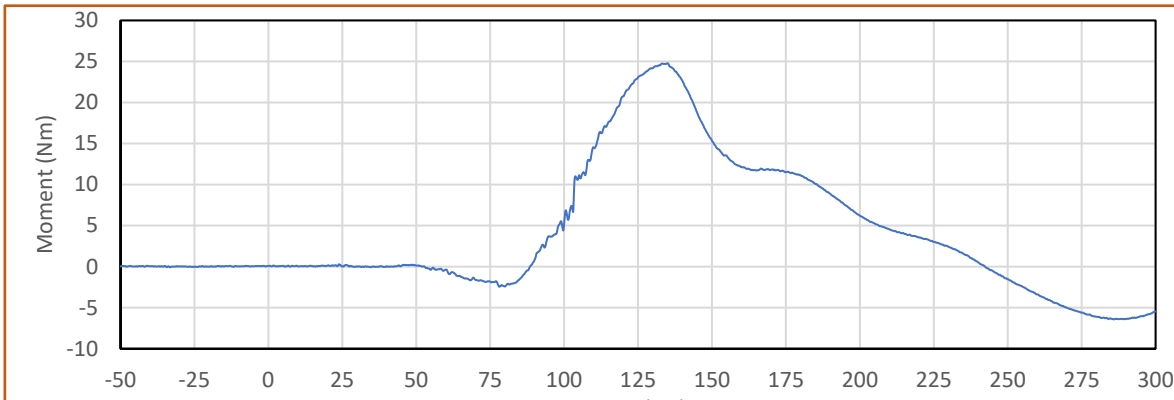
P2TH UPPER NECK X MOMENT

13NECKUP00THMOXB
Max:54.2@106.1
Min:-10.4@163.6
SAE Class 600



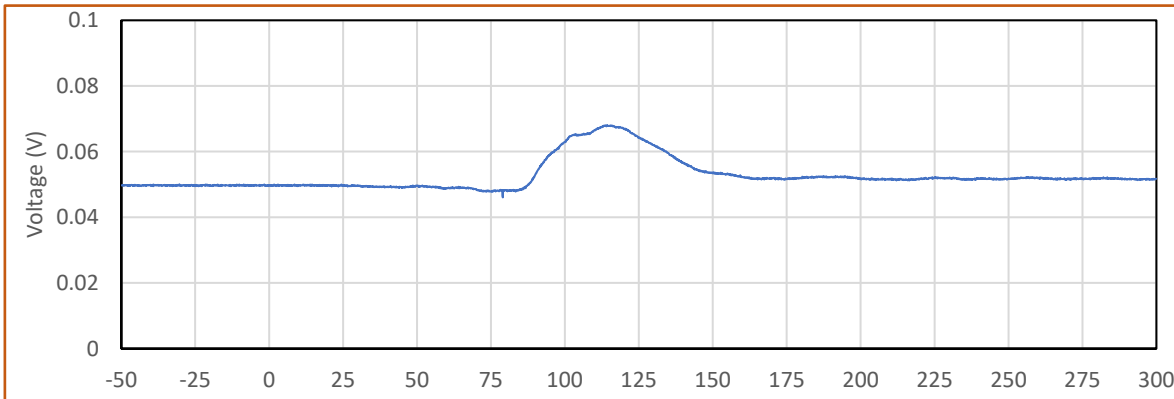
P2TH UPPER NECK Y MOMENT

13NECKUP00THMOYB
Max:23.6@101.5
Min:-12.5@76.3
SAE Class 600



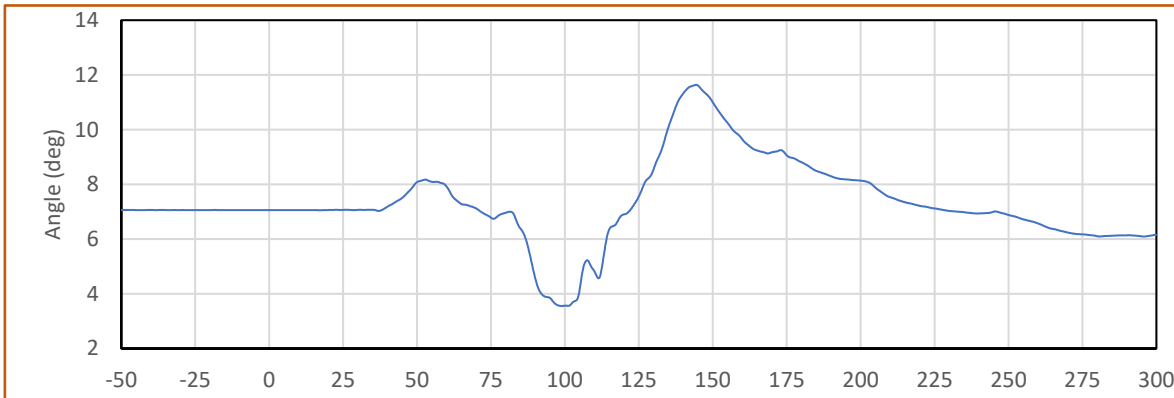
P2TH UPPER NECK Z MOMENT

13NECKUP00THMOZB
Max:24.8@135.0
Min:-6.4@285.9
SAE Class 600



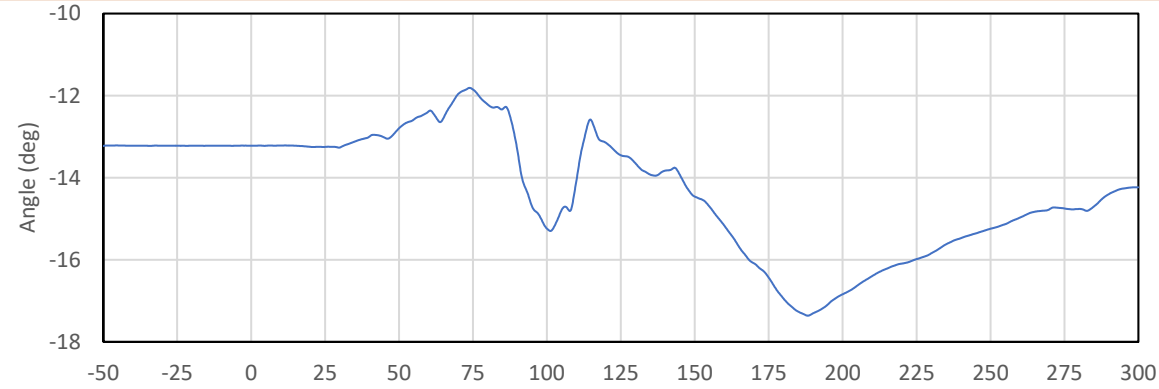
P2TH UPPER LEFT DGIR X DISPLACEMENT

13CHSTLEUPTHVO0P
Max:0.07@114.3
Min:0.05@79.0
No Filter Applied



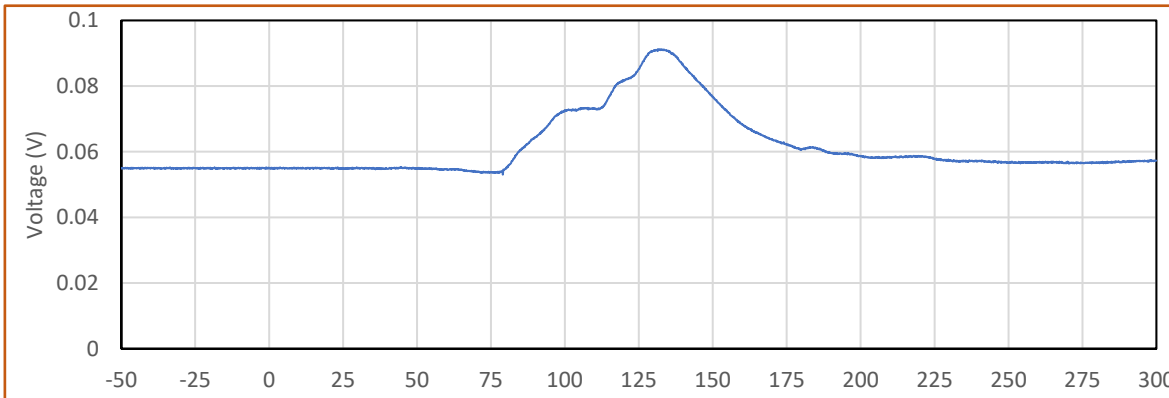
P2TH UPPER LEFT DGIR Y ROTATION

13CHSTLEUPTHANYC
Max:11.6@144.4
Min:3.6@98.9
SAE Class 180



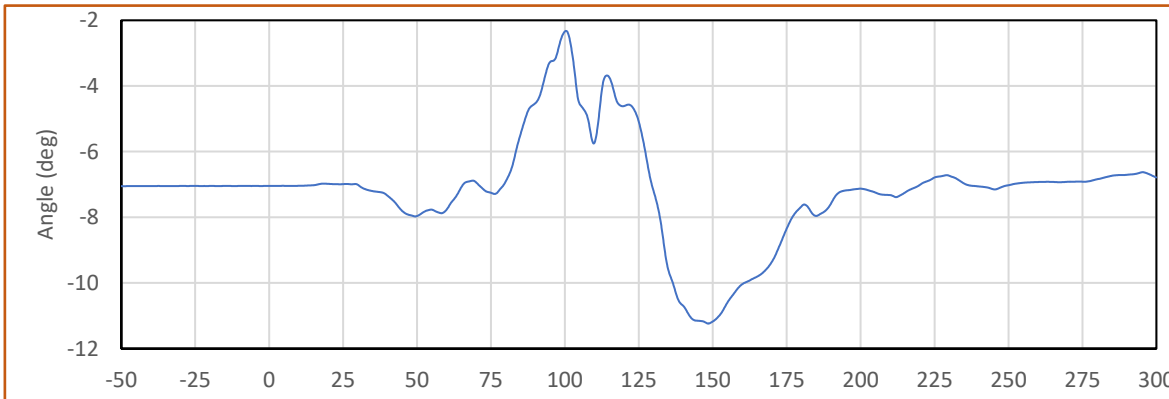
P2TH UPPER LEFT DGIR Z ROTATION

13CHSTLEUPTHANZC
Max:-11.8@73.9
Min:-17.4@188.2
SAE Class 180



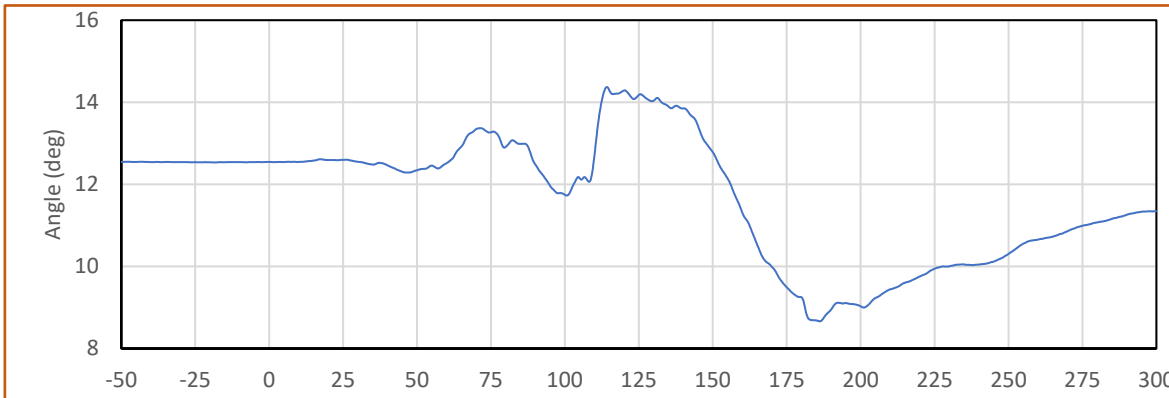
P2TH UPPER RIGHT DGIR X DISPLACEMENT

13CHSTRIUPTHVO0P
Max:0.09@131.5
Min:0.05@79.0
No Filter Applied



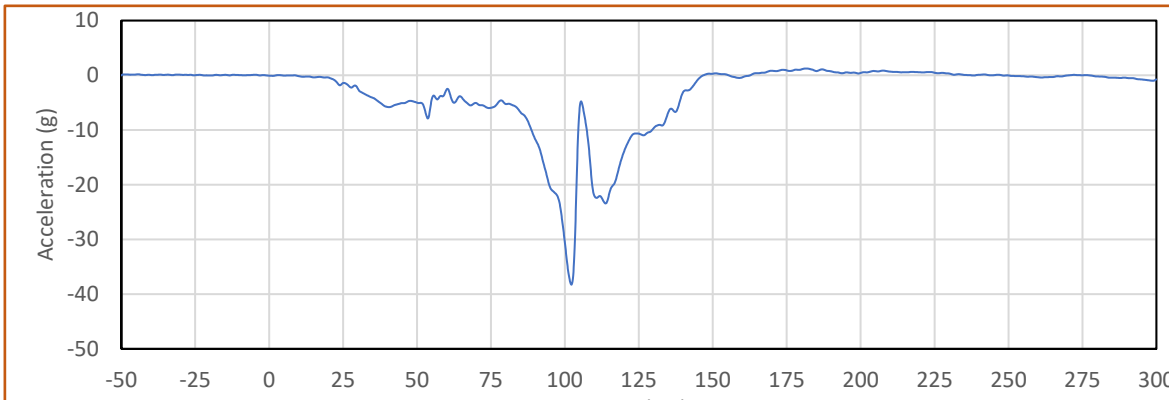
P2TH UPPER RIGHT DGIR Y ROTATION

13CHSTRIUPTHANYC
Max:-2.3@100.4
Min:-11.2@148.5
SAE Class 180



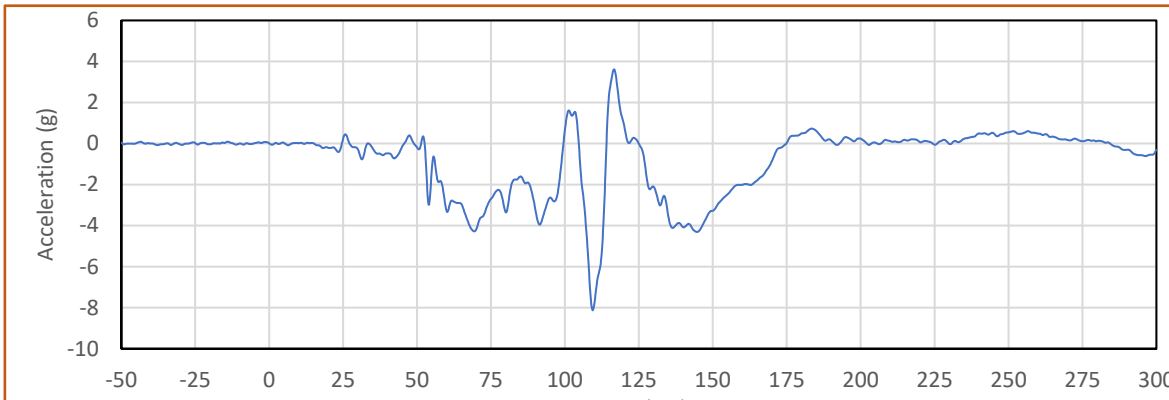
P2TH UPPER RIGHT DGIR Z ROTATION

13CHSTRIUPTHANZC
Max:14.4@114.2
Min:8.7@186.3
SAE Class 180



P2TH T6 X ACCELERATION

13THSP0600THACXC
Max:1.2@181.9
Min:-38.3@102.2
SAE Class 180



P2TH T6 Y ACCELERATION

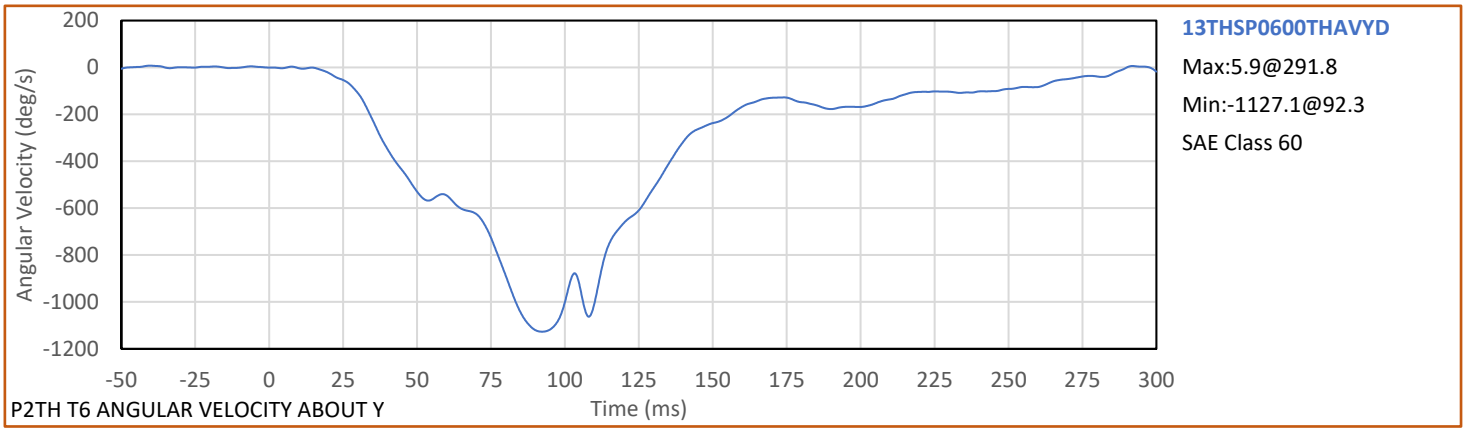
13THSP0600THACYC
Max:3.6@116.6
Min:-8.1@109.4
SAE Class 180

P2TH T6 Z ACCELERATION

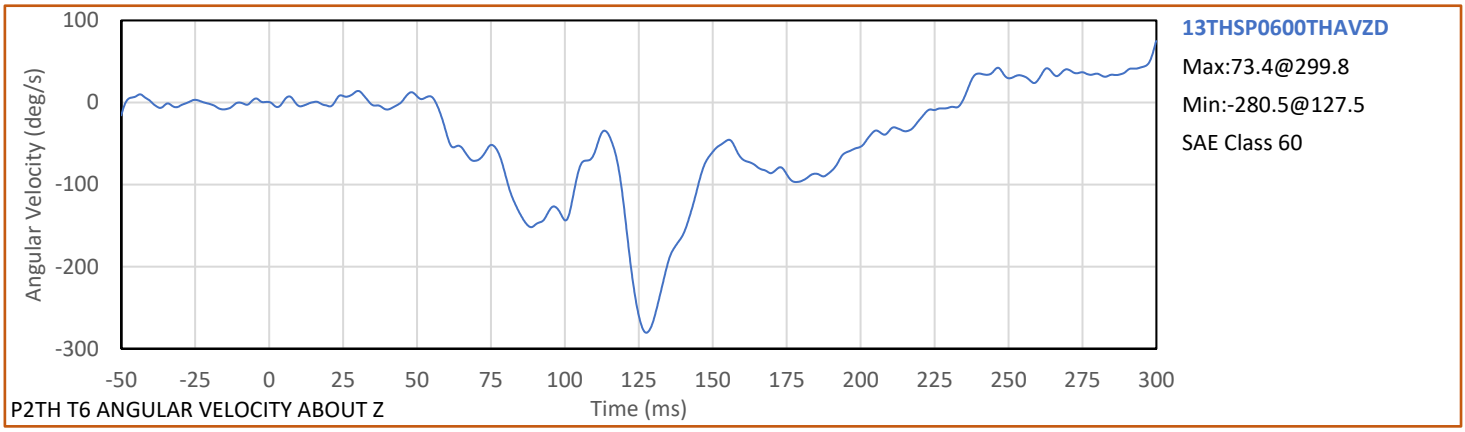
13THSP0600THACZC
Max:33.5@102.5
Min:-6.4@66.6
SAE Class 180

P2TH T6 ANGULAR VELOCITY ABOUT X

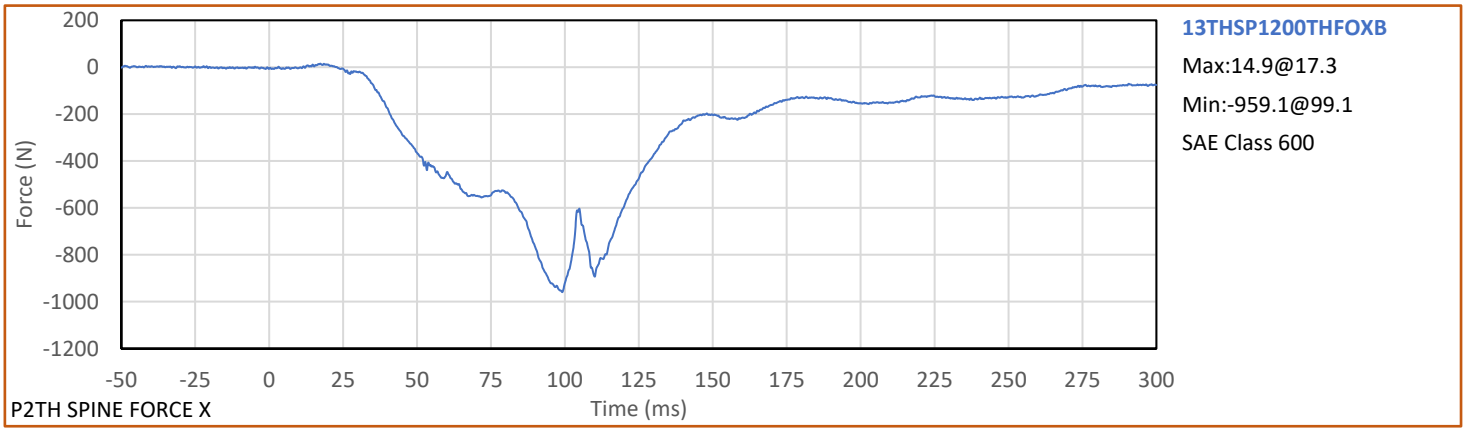
13THSP0600THAVXD
Max:412.1@105.3
Min:-20.5@169.6
SAE Class 60



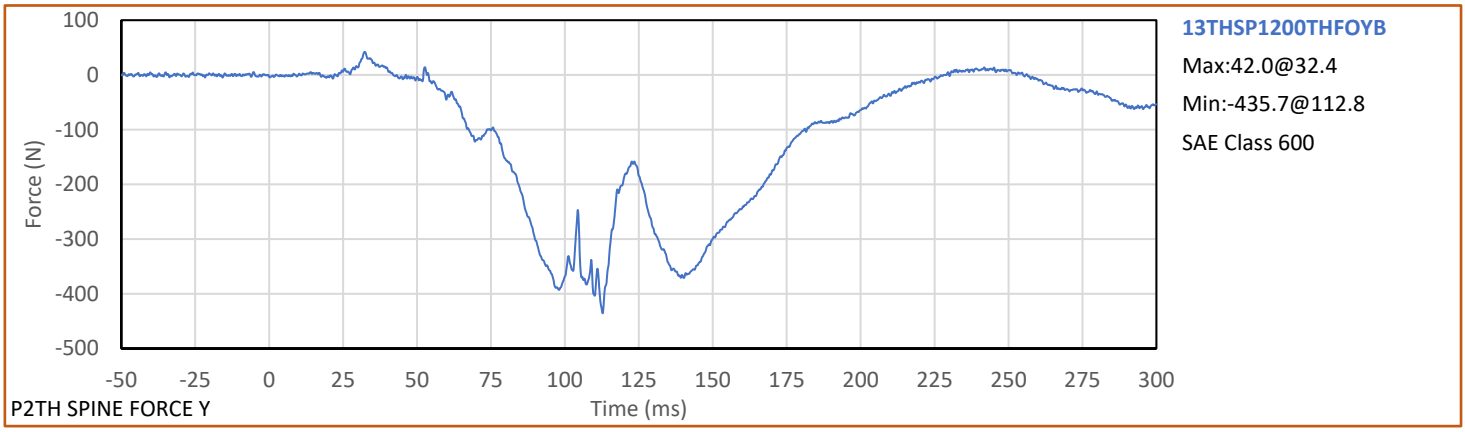
13THSP0600THAVYD
Max:5.9@291.8
Min:-1127.1@92.3
SAE Class 60



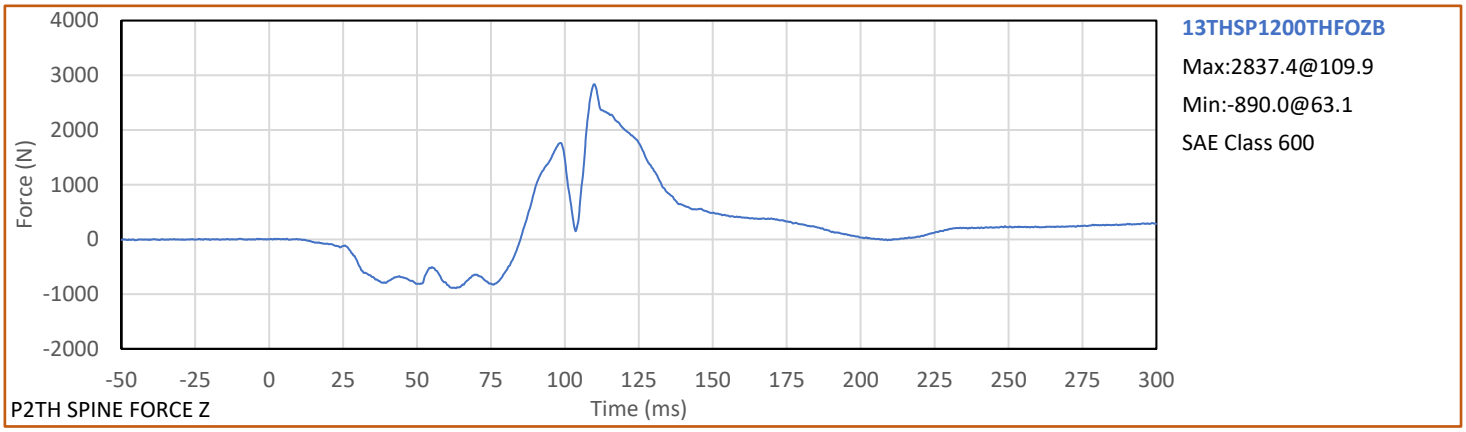
13THSP0600THAVZD
Max:73.4@299.8
Min:-280.5@127.5
SAE Class 60

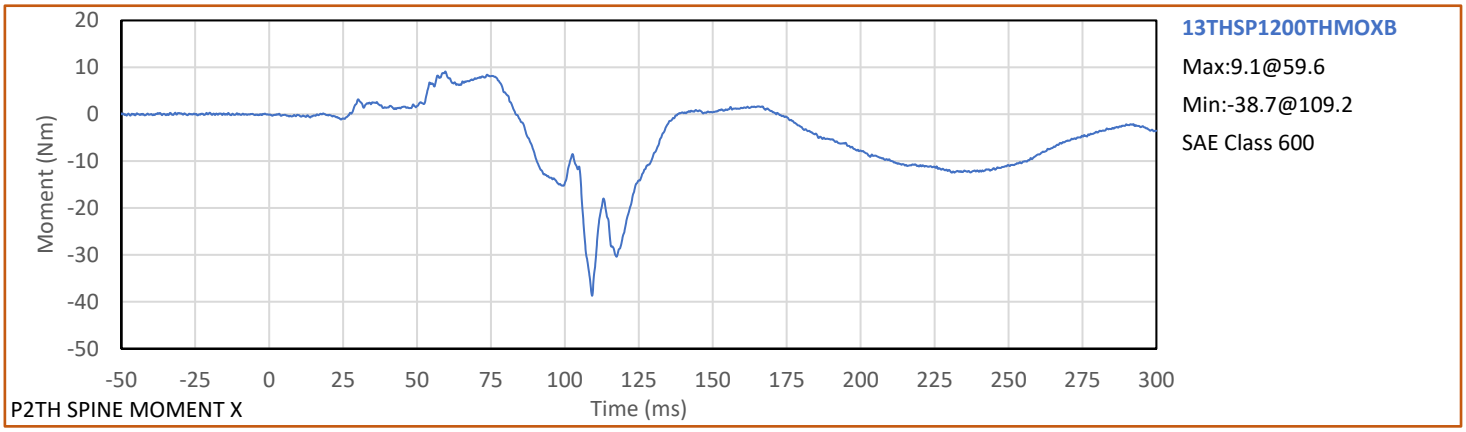


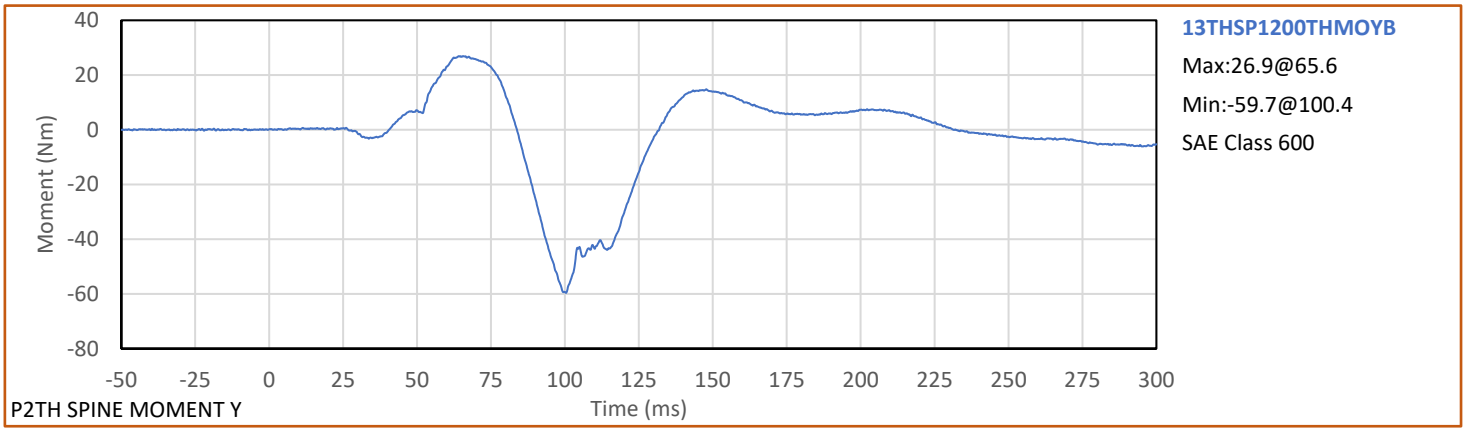
13THSP1200THFOXB
Max:14.9@17.3
Min:-959.1@99.1
SAE Class 600

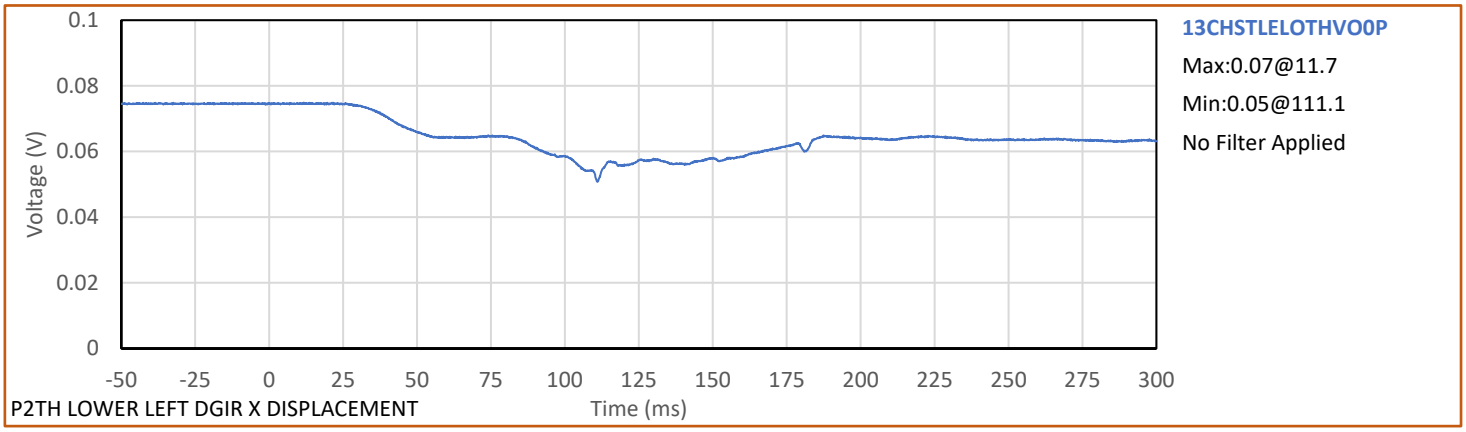


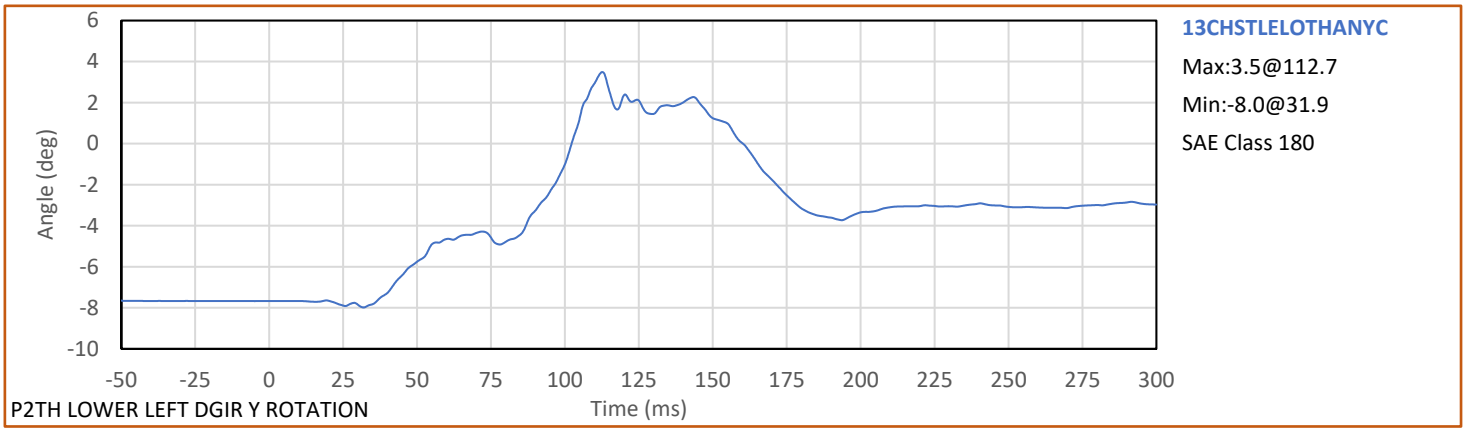
13THSP1200THFOYB
Max:42.0@32.4
Min:-435.7@112.8
SAE Class 600

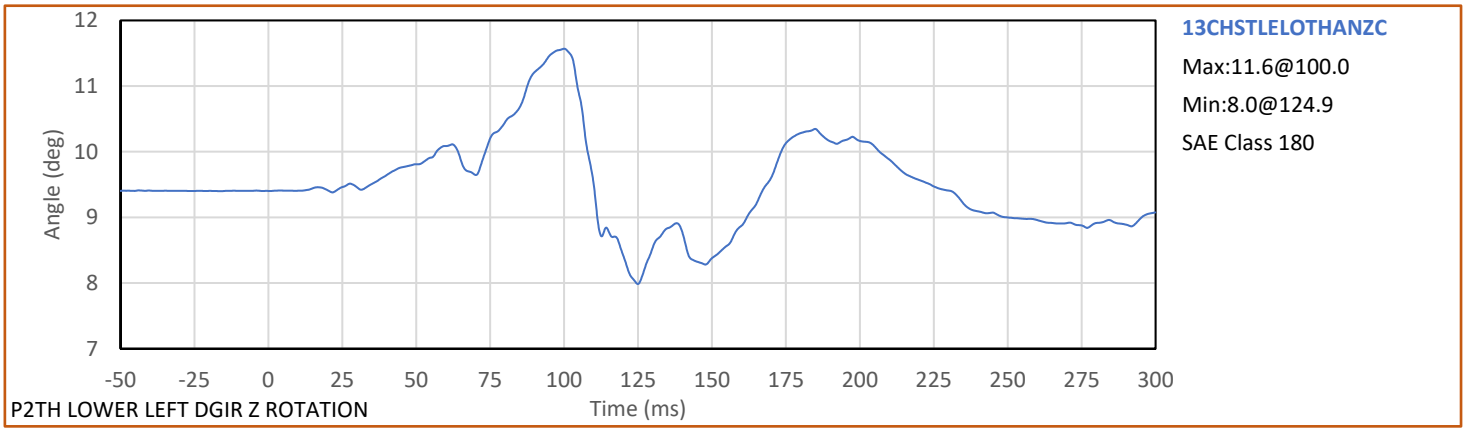

Force (N)
Time (ms)
P2TH SPINE FORCE Z
13THSP1200THFOZB
Max:2837.4@109.9
Min:-890.0@63.1
SAE Class 600

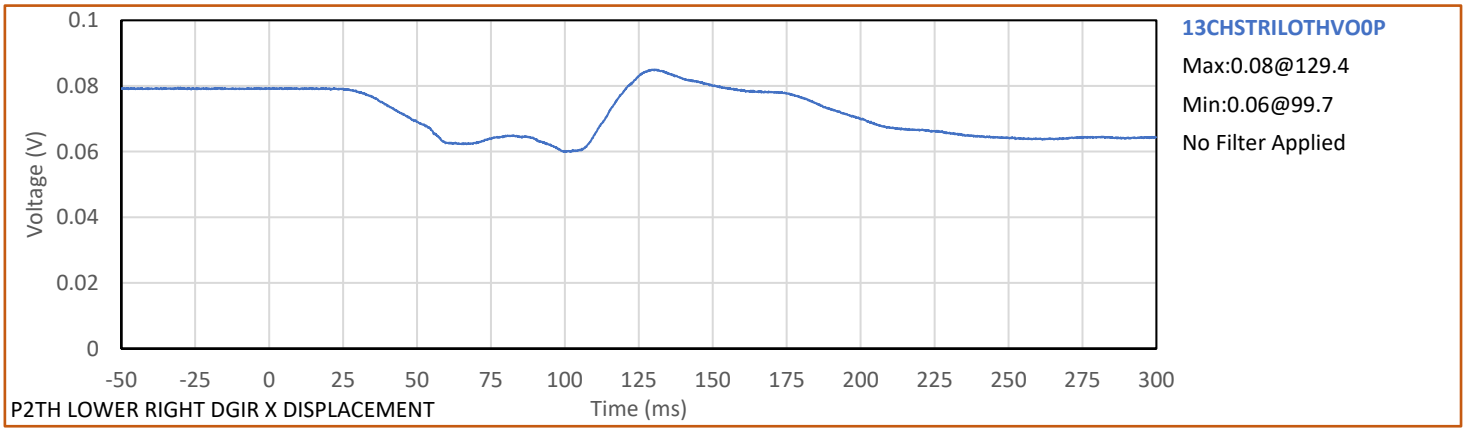

Moment (Nm)
Time (ms)
P2TH SPINE MOMENT X
13THSP1200THMOXB
Max:9.1@59.6
Min:-38.7@109.2
SAE Class 600

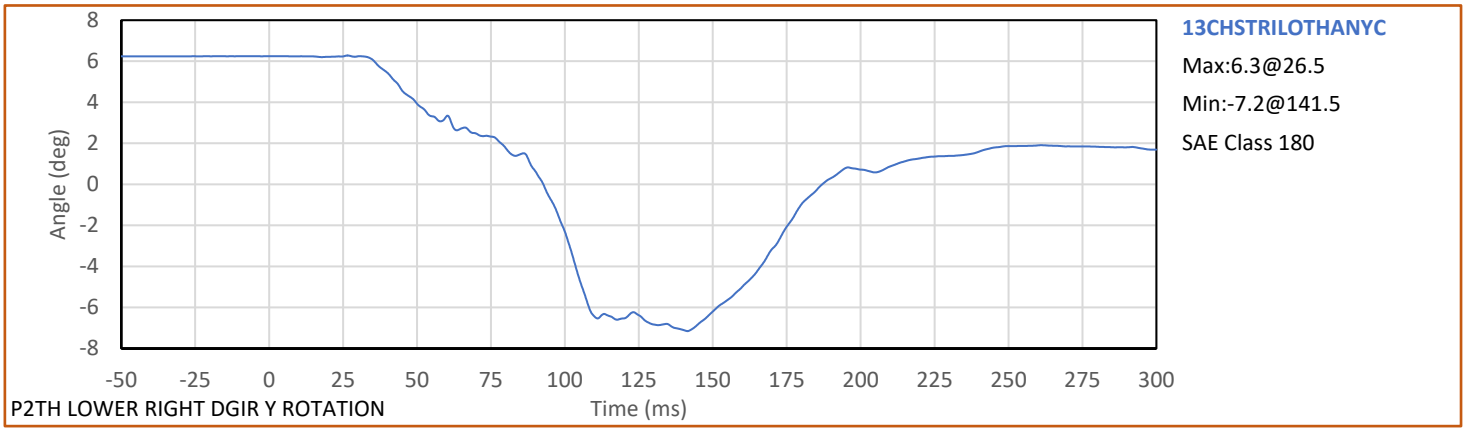

Moment (Nm)
Time (ms)
P2TH SPINE MOMENT Y
13THSP1200THMOYB
Max:26.9@65.6
Min:-59.7@100.4
SAE Class 600

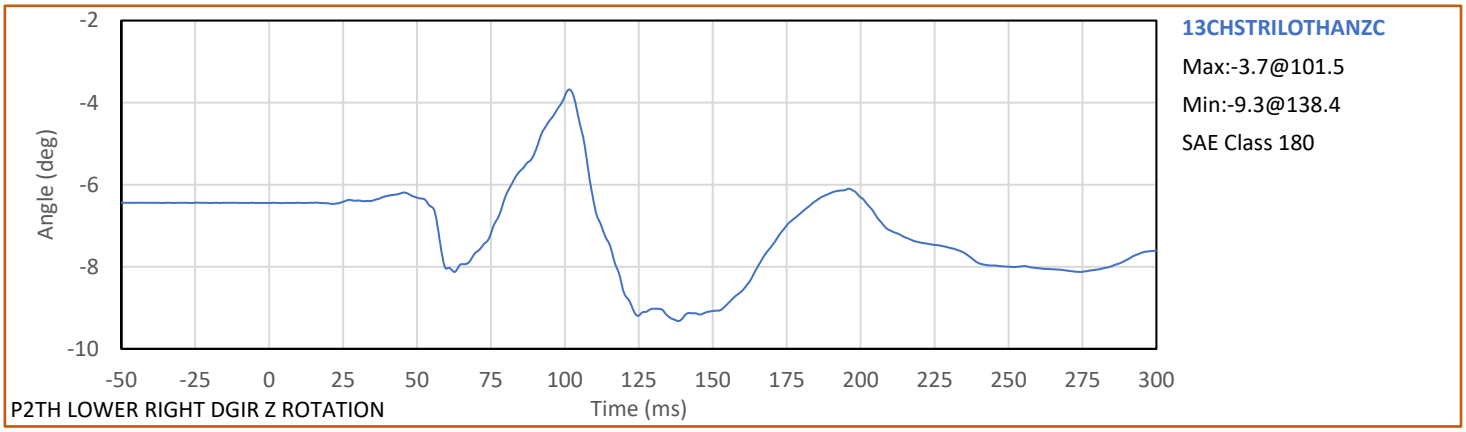

Voltage (V)
Time (ms)
P2TH LOWER LEFT DGIR X DISPLACEMENT
13CHSTLELOTHVO0P
Max:0.07@11.7
Min:0.05@111.1
No Filter Applied

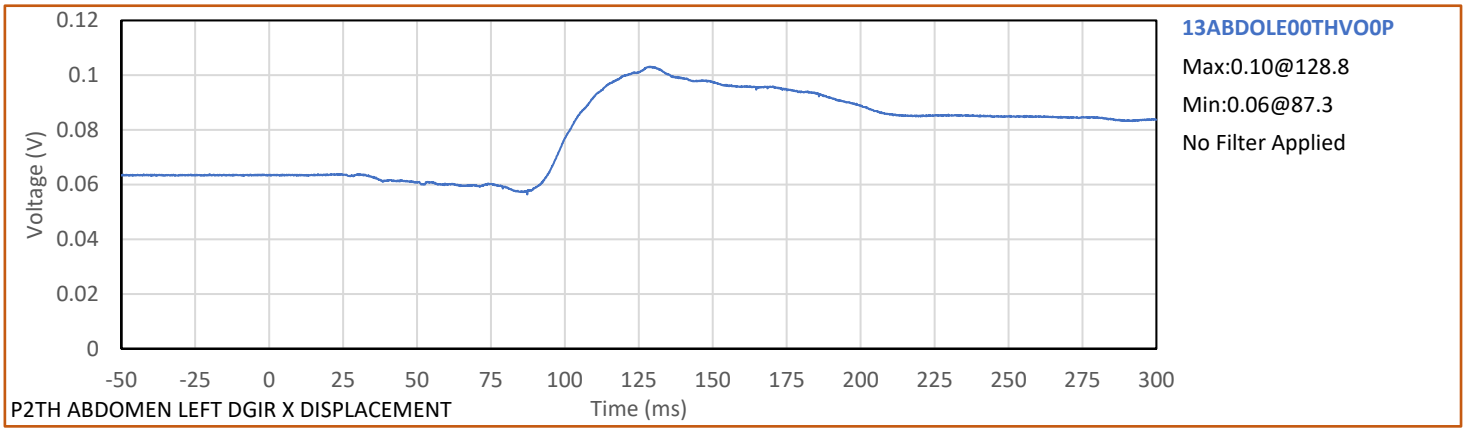

Angle (deg)
Time (ms)
P2TH LOWER LEFT DGIR Y ROTATION
13CHSTLELOTHANYC
Max:3.5@112.7
Min:-8.0@31.9
SAE Class 180

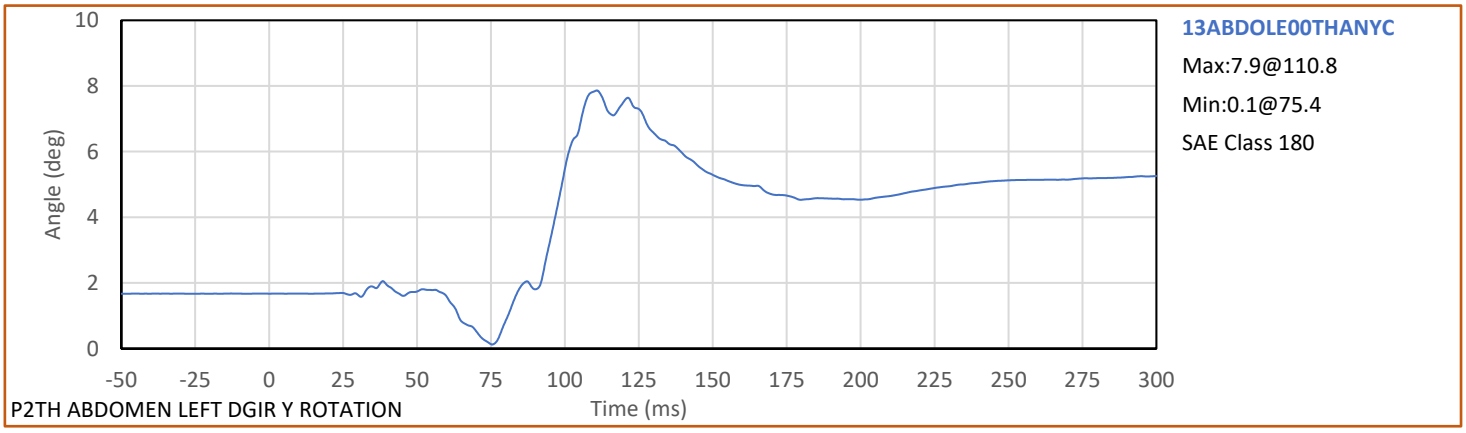

Angle (deg)
Time (ms)
P2TH LOWER LEFT DGIR Z ROTATION
13CHSTLELOTHANZC
Max:11.6@100.0
Min:8.0@124.9
SAE Class 180

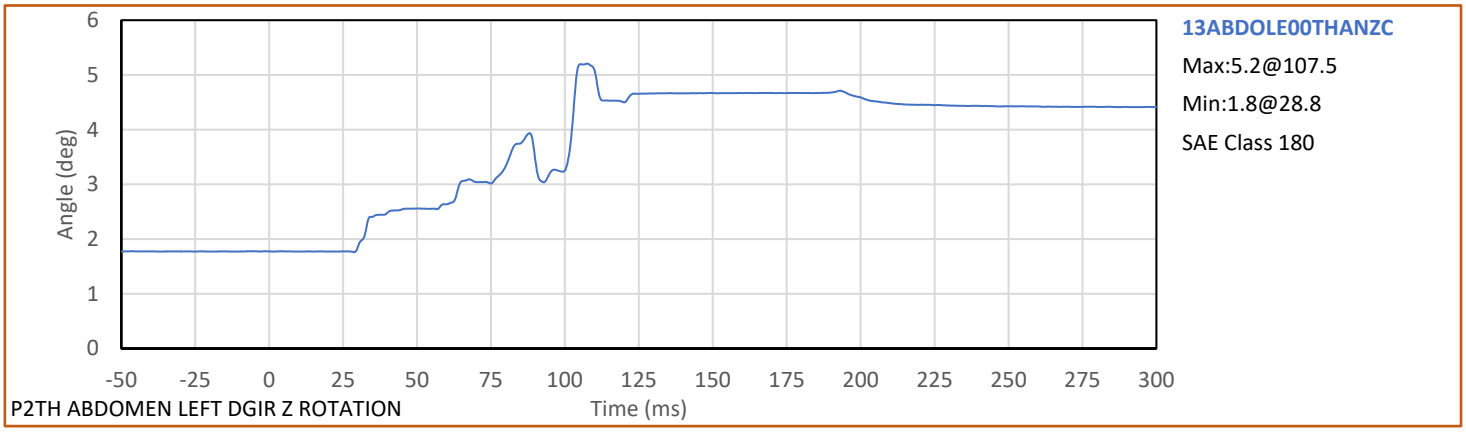

Voltage (V)
Time (ms)
P2TH LOWER RIGHT DGIR X DISPLACEMENT
13CHSTRILOTHVO0P
Max:0.08@129.4
Min:0.06@99.7
No Filter Applied

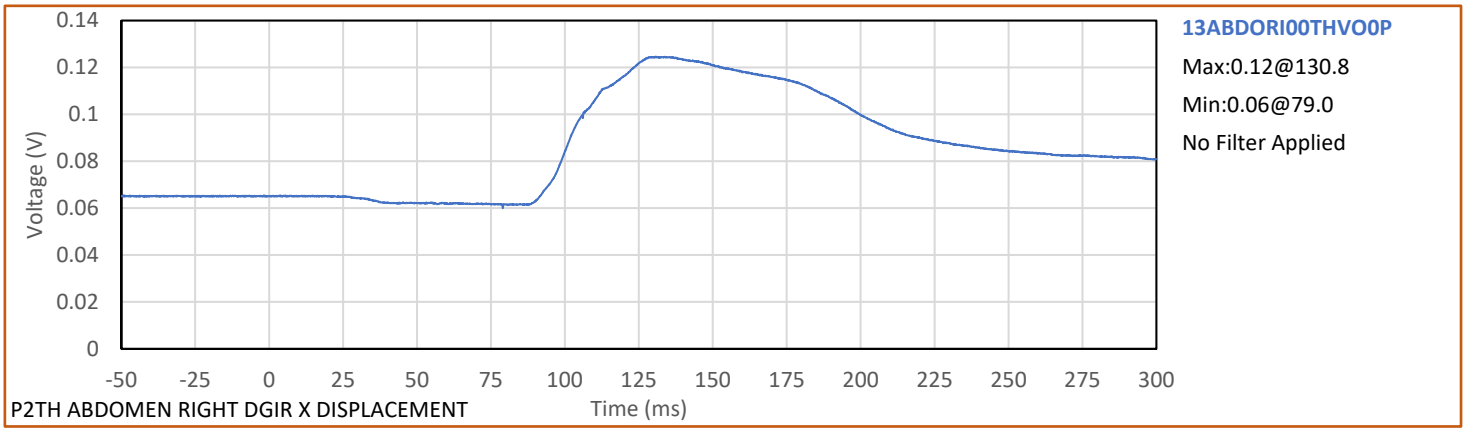

Angle (deg)
Time (ms)
P2TH LOWER RIGHT DGIR Y ROTATION
13CHSTRILOTHANYC
Max:6.3@26.5
Min:-7.2@141.5
SAE Class 180

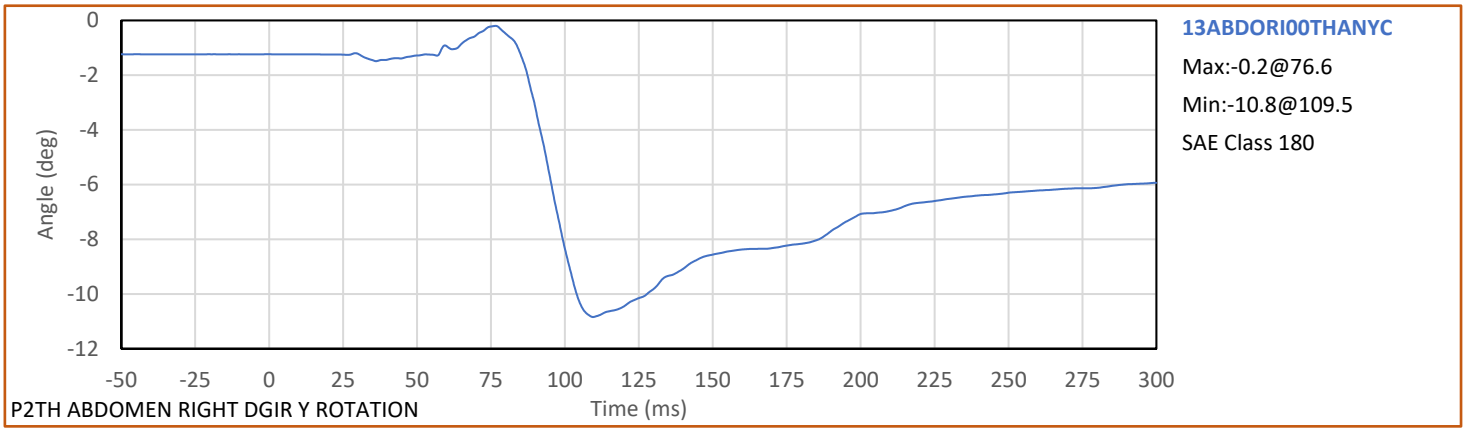

Angle (deg)
Time (ms)
13CHSTRILOTHANZC
Max:-3.7@101.5
Min:-9.3@138.4
SAE Class 180
P2TH LOWER RIGHT DGIR Z ROTATION

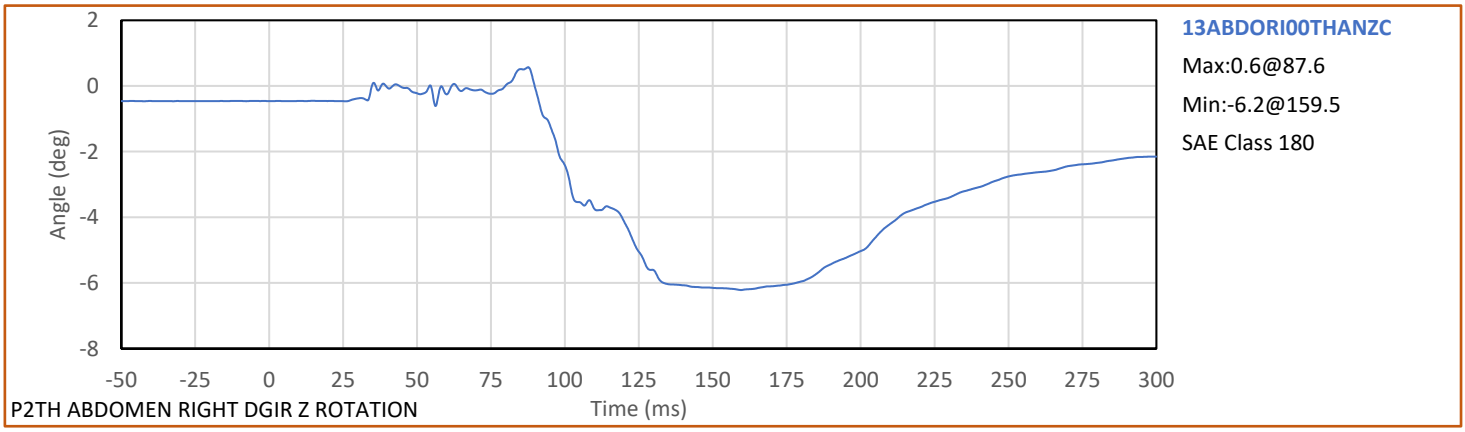

Voltage (V)
Time (ms)
13ABDOLE00THVO0P
Max:0.10@128.8
Min:0.06@87.3
No Filter Applied
P2TH ABDOMEN LEFT DGIR X DISPLACEMENT

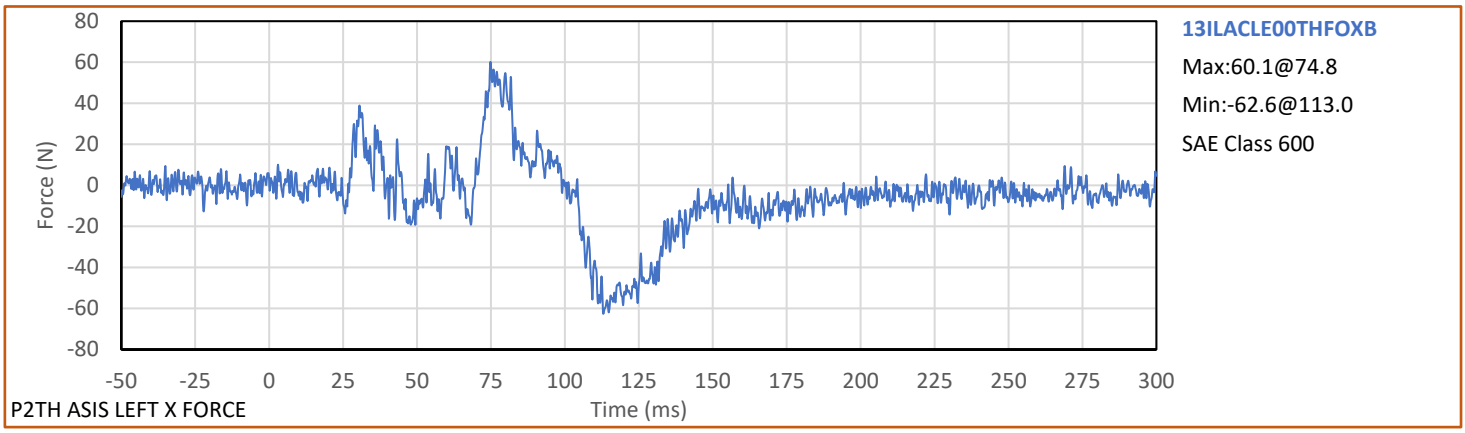

Angle (deg)
Time (ms)
13ABDOLE00THANYC
Max:7.9@110.8
Min:0.1@75.4
SAE Class 180
P2TH ABDOMEN LEFT DGIR Y ROTATION

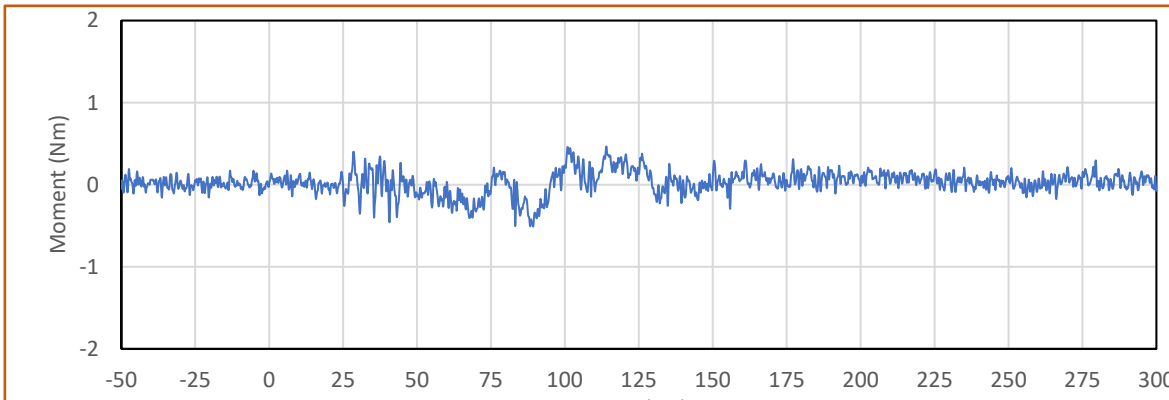

Angle (deg)
Time (ms)
13ABDOLE00THANZC
Max:5.2@107.5
Min:1.8@28.8
SAE Class 180
P2TH ABDOMEN LEFT DGIR Z ROTATION


Voltage (V)
Time (ms)
13ABDORI00THVO0P
Max:0.12@130.8
Min:0.06@79.0
No Filter Applied
P2TH ABDOMEN RIGHT DGIR X DISPLACEMENT

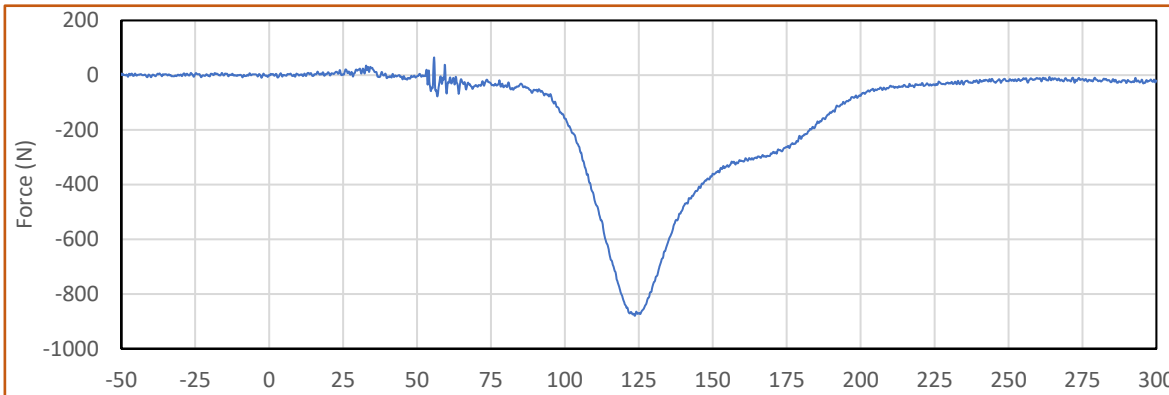

Angle (deg)
Time (ms)
13ABDORI00THANYC
Max:-0.2@76.6
Min:-10.8@109.5
SAE Class 180
P2TH ABDOMEN RIGHT DGIR Y ROTATION


Angle (deg)
Time (ms)
13ABDORI00THANZC
Max:0.6@87.6
Min:-6.2@159.5
SAE Class 180
P2TH ABDOMEN RIGHT DGIR Z ROTATION

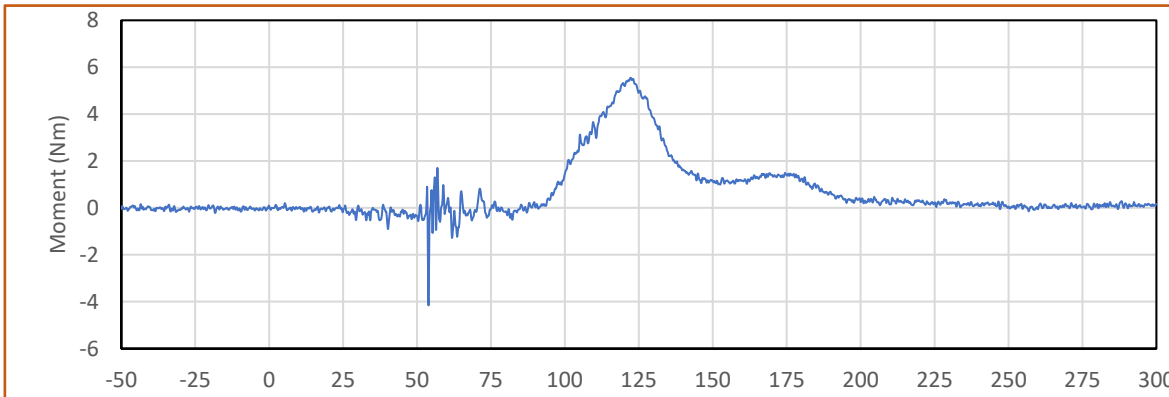

Force (N)
Time (ms)
13ILACLE00THFOXB
Max:60.1@74.8
Min:-62.6@113.0
SAE Class 600
P2TH ASIS LEFT X FORCE



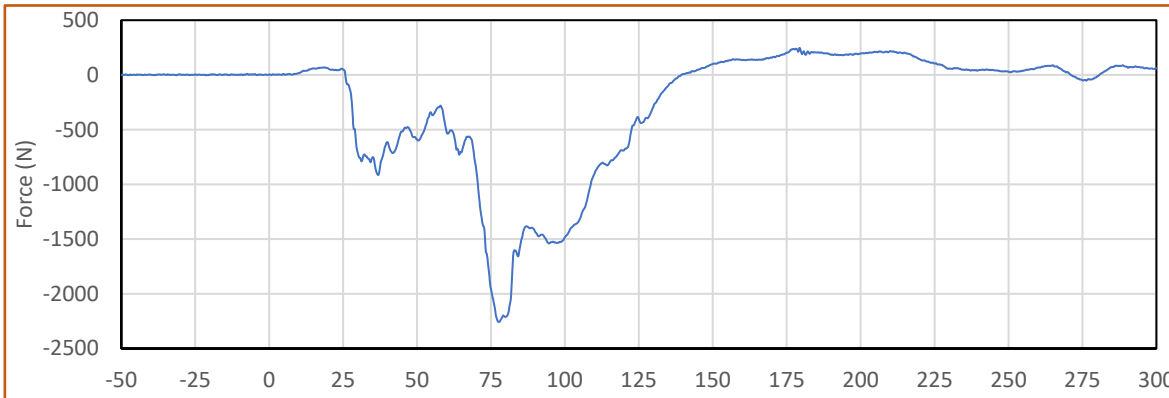
13ILACLE00THMOYB
Max:0.46@114.0
Min:-0.51@89.3
SAE Class 600



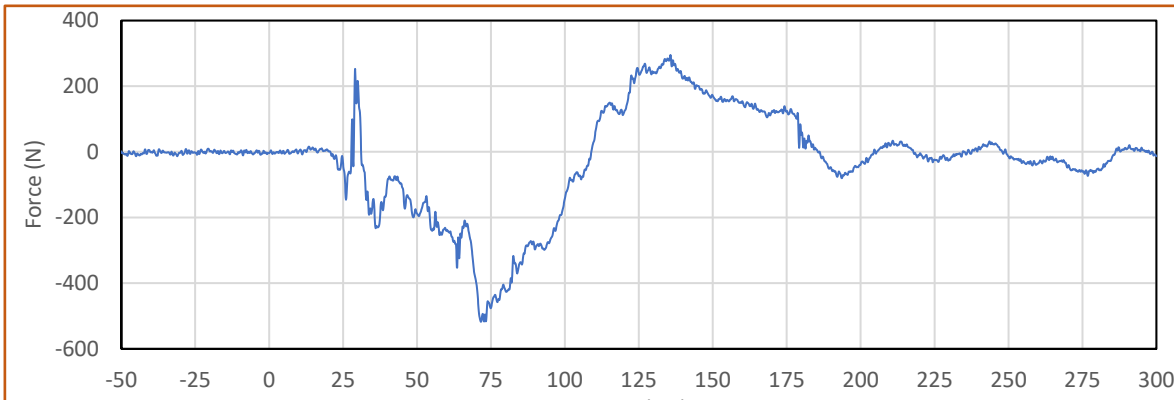
13ILACRI00THFOXB
Max:65.1@55.8
Min:-879.6@123.6
SAE Class 600



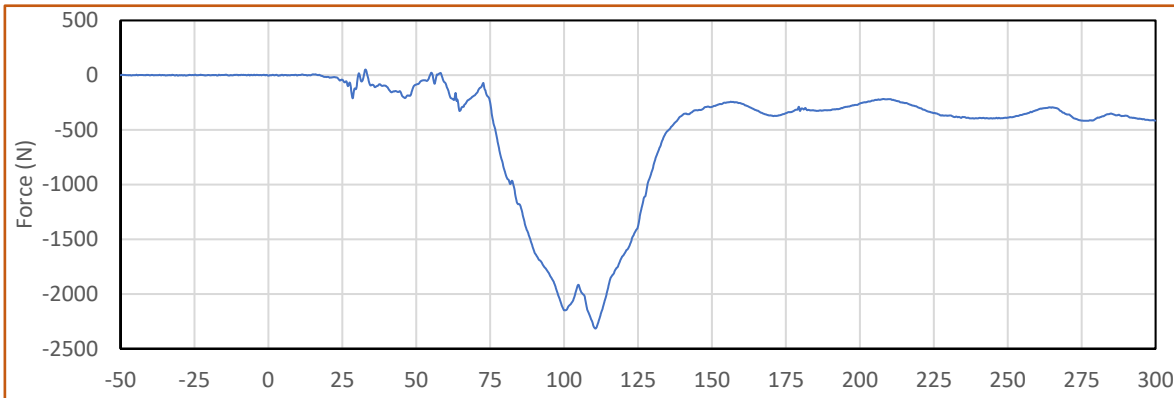
13ILACRI00THMOYB
Max:5.6@122.3
Min:-4.2@53.9
SAE Class 600



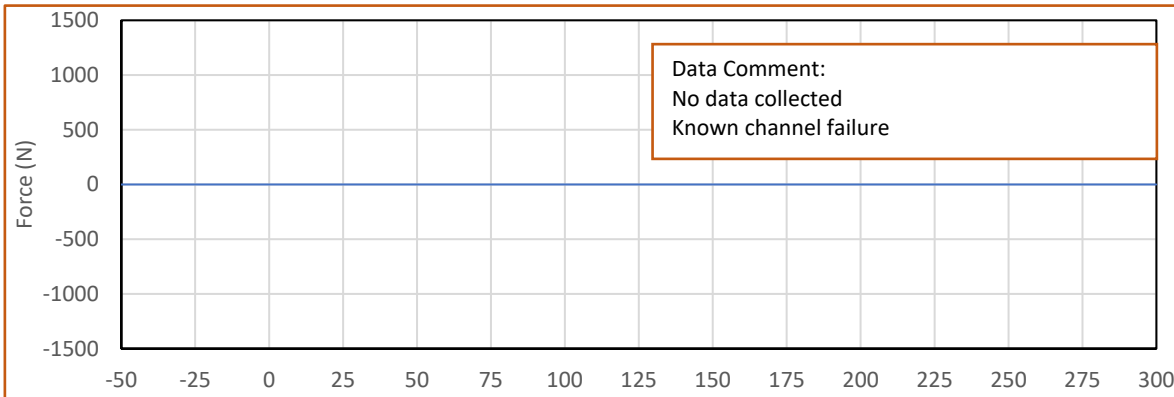
13ACTBLE00THFOXB
Max:245.9@179.4
Min:-2258.0@77.7
SAE Class 600



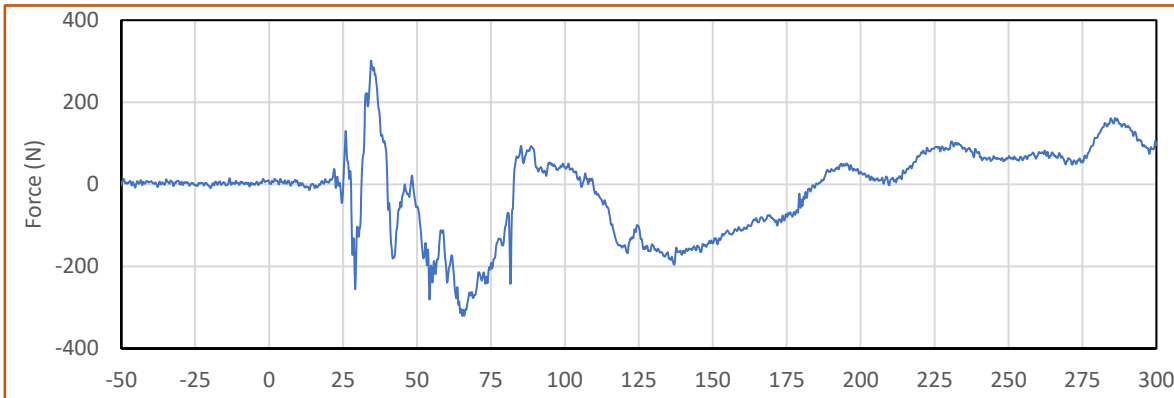
13ACTBLE00THFOYB
Max:295.0@135.7
Min:-517.7@71.6
SAE Class 600



13ACTBLE00THFOZB
Max:51.0@32.8
Min:-2315.2@110.6
SAE Class 600



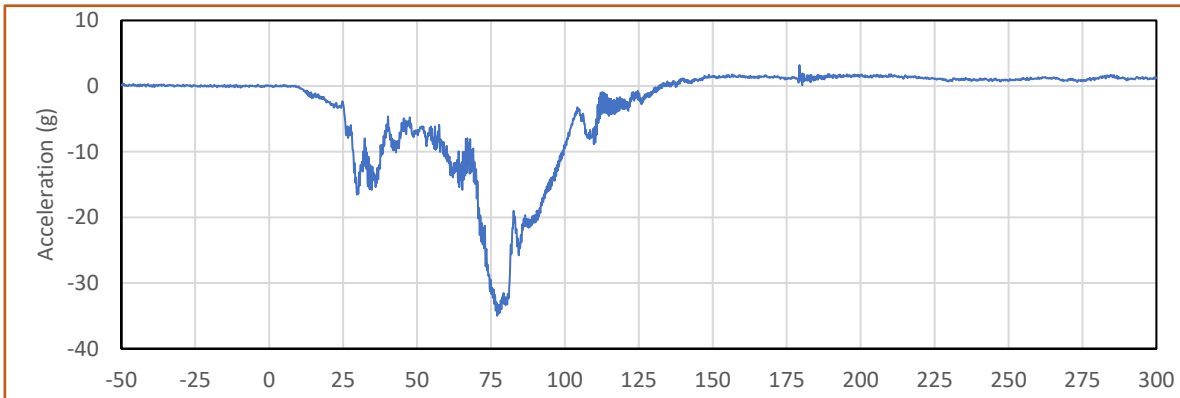
13ACTBRI00THFOXB
Max:0.00@0.1
Min:0.00@0.1
SAE Class 600



13ACTBRI00THFOYB
Max:301.5@34.5
Min:-320.7@65.3
SAE Class 600

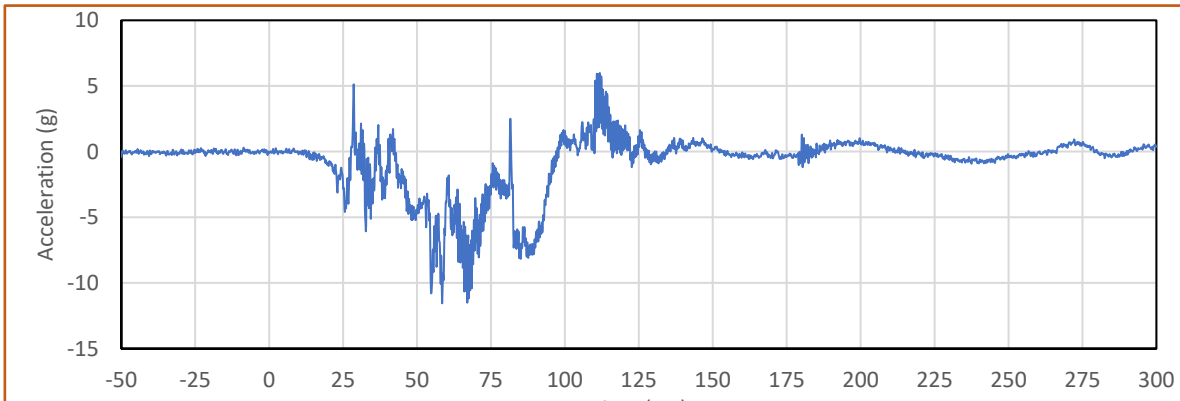
13ACTBRI00THFOZB
Max:1652.3@110.3
Min:-181.9@32.8
SAE Class 600

P2TH ACETABULUM RIGHT Z FORCE



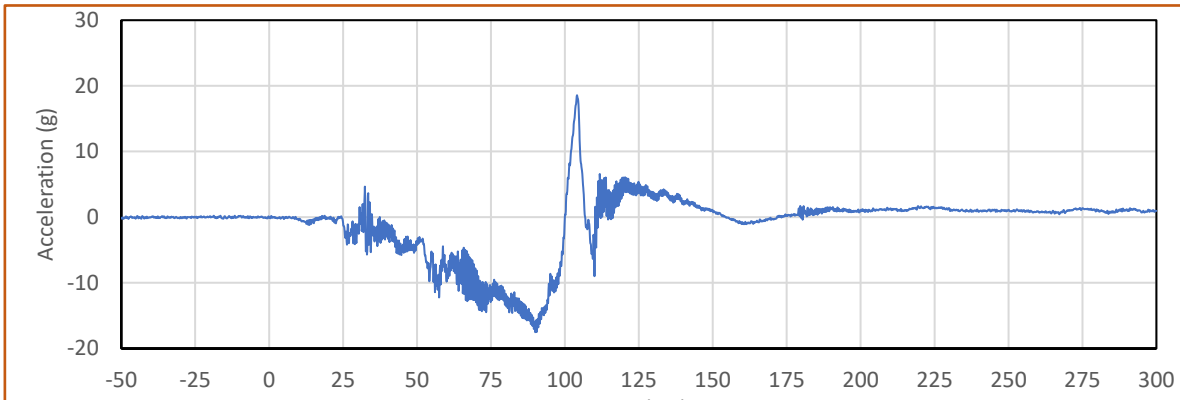
13PELV0000THACXA
Max:3.2@179.3
Min:-35.0@77.1
SAE Class 1000

P2TH PELVIS X ACCELERATION



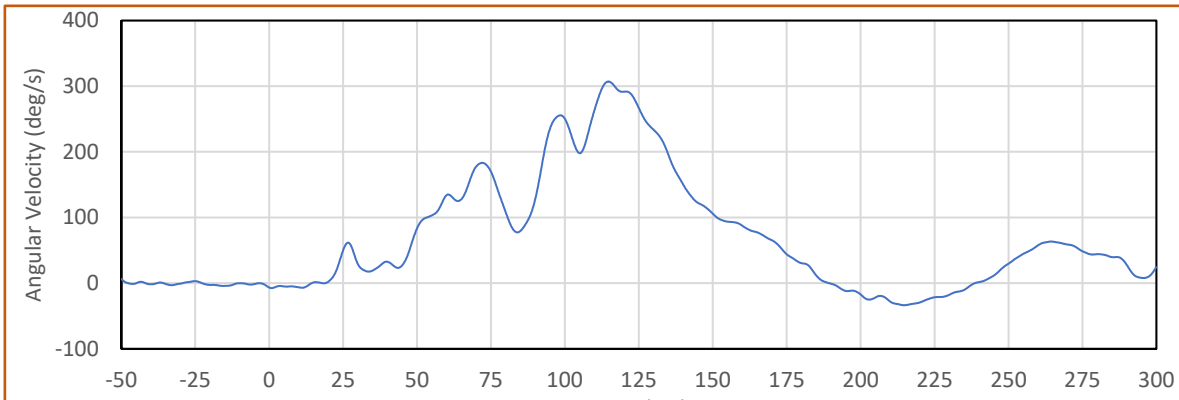
13PELV0000THACYA
Max:6.0@111.8
Min:-11.6@58.5
SAE Class 1000

P2TH PELVIS Y ACCELERATION



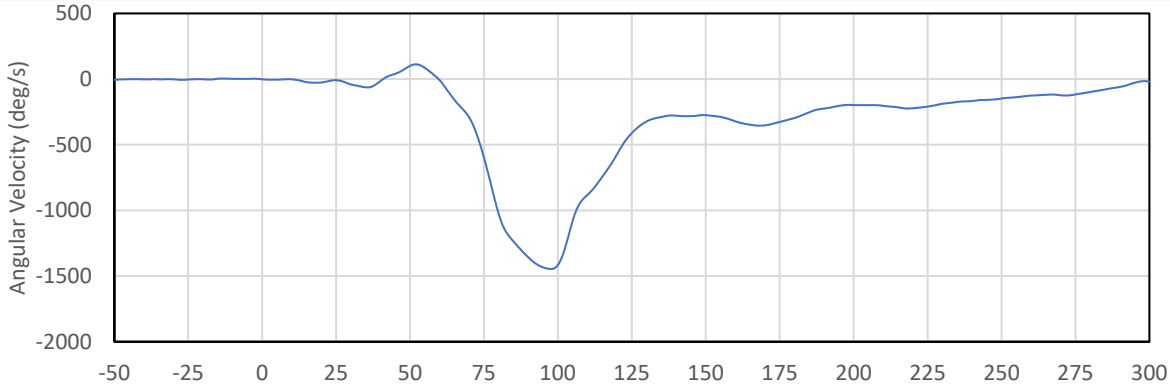
13PELV0000THACZA
Max:18.6@104.1
Min:-17.5@90.0
SAE Class 1000

P2TH PELVIS Z ACCELERATION



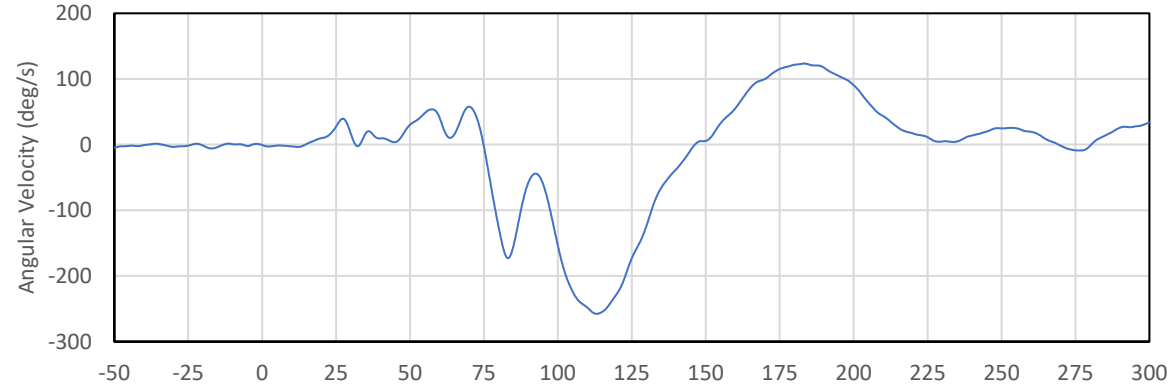
P2TH PELVIS ANGULAR VELOCITY ABOUT X

13PELV0000THAVXD
Max:307.0@114.7
Min:-33.6@214.7
SAE Class 60



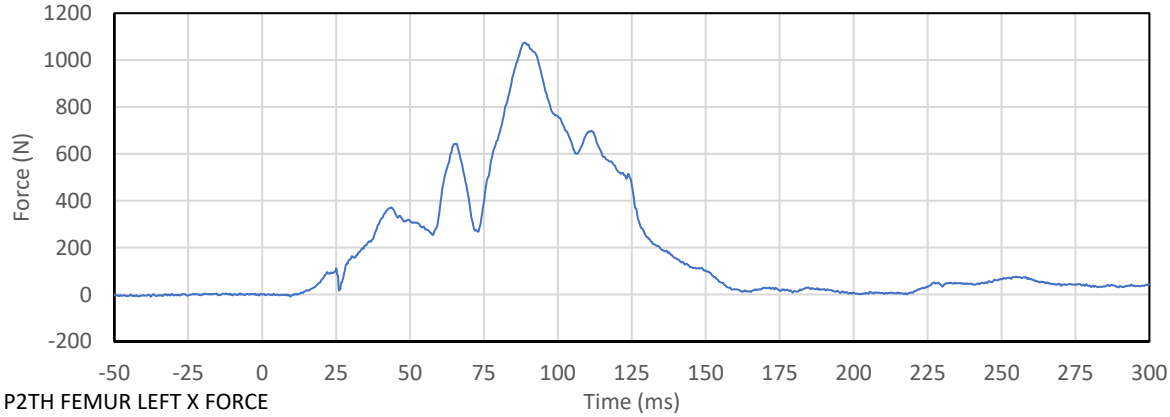
P2TH PELVIS ANGULAR VELOCITY ABOUT Y

13PELV0000THAVYD
Max:111.6@52.0
Min:-1446.7@97.7
SAE Class 60



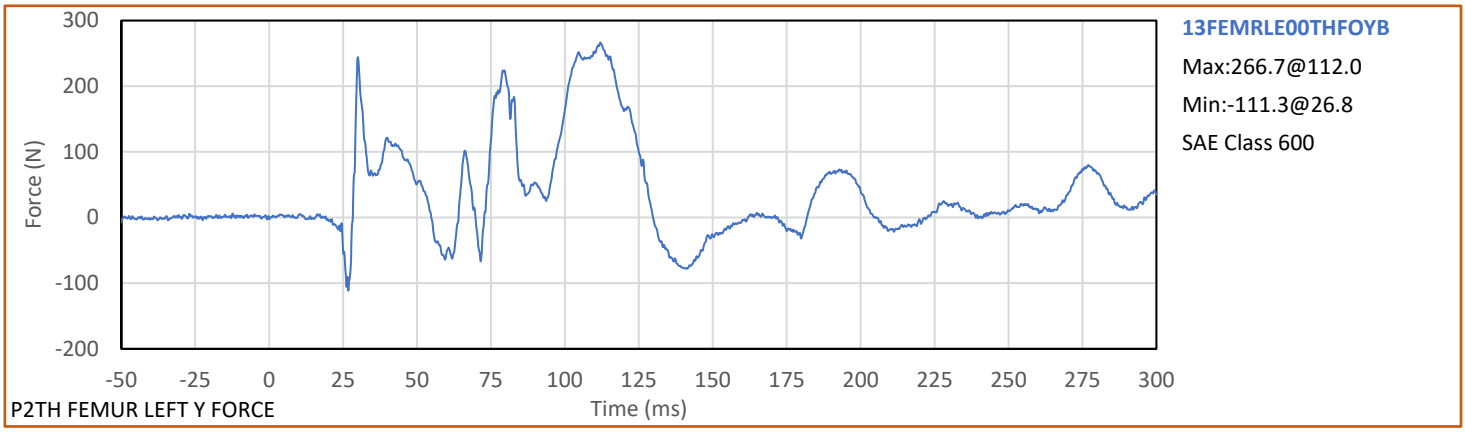
P2TH PELVIS ANGULAR VELOCITY ABOUT Z

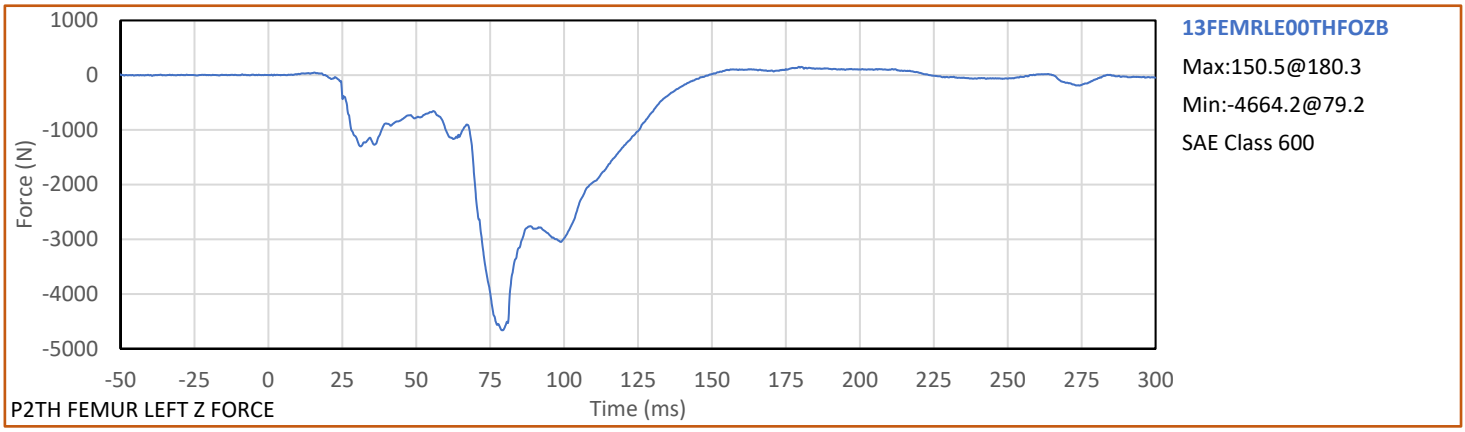
13PELV0000THAVZD
Max:123.3@183.4
Min:-257.7@113.1
SAE Class 60

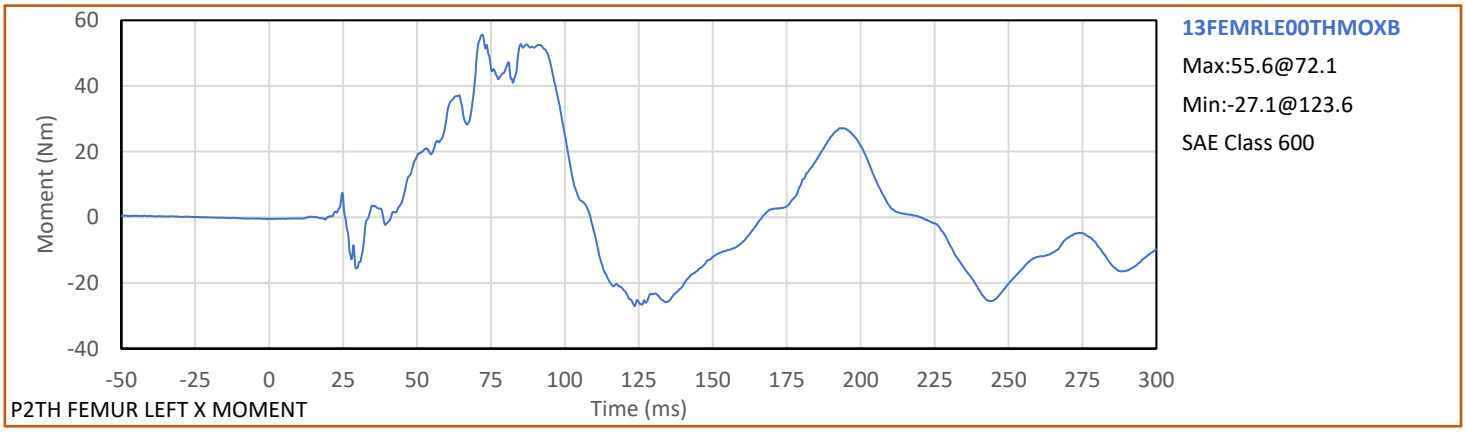


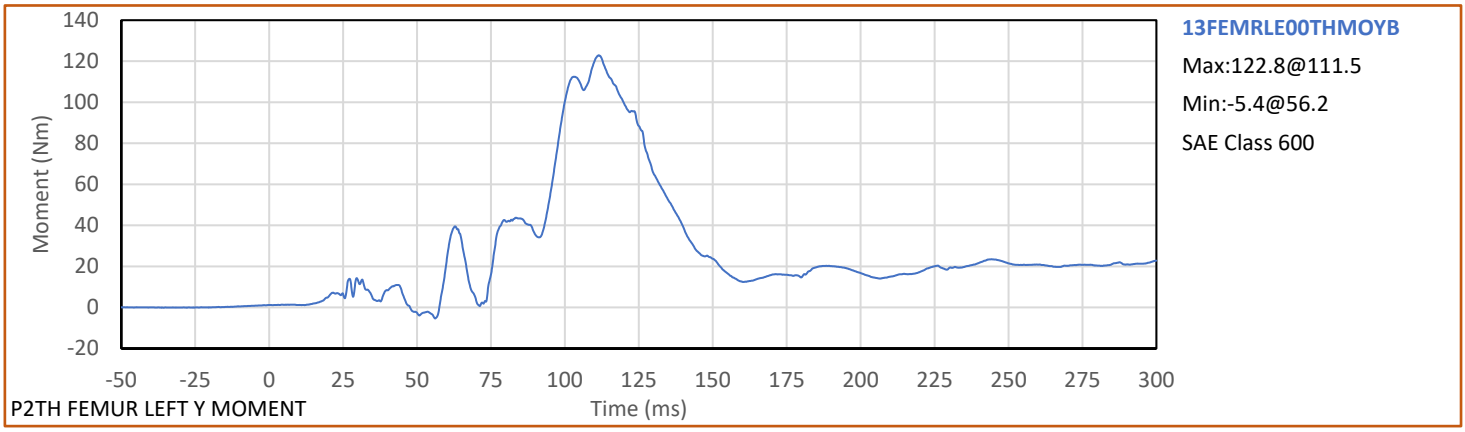
P2TH FEMUR LEFT X FORCE

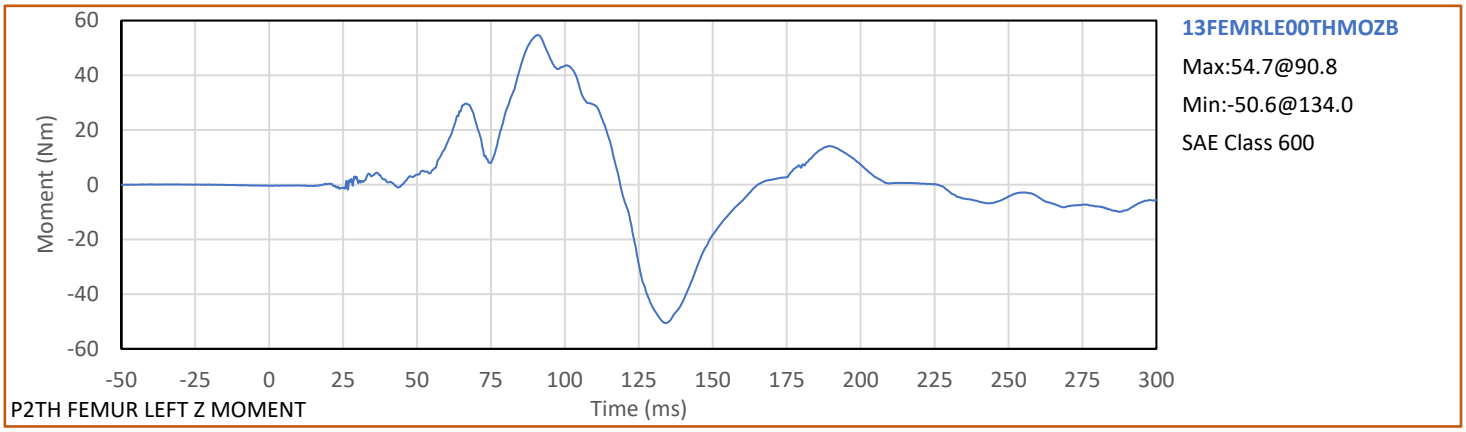
13FEMRLE00THFOXB
Max:1073.9@88.7
Min:-8.4@9.6
SAE Class 600

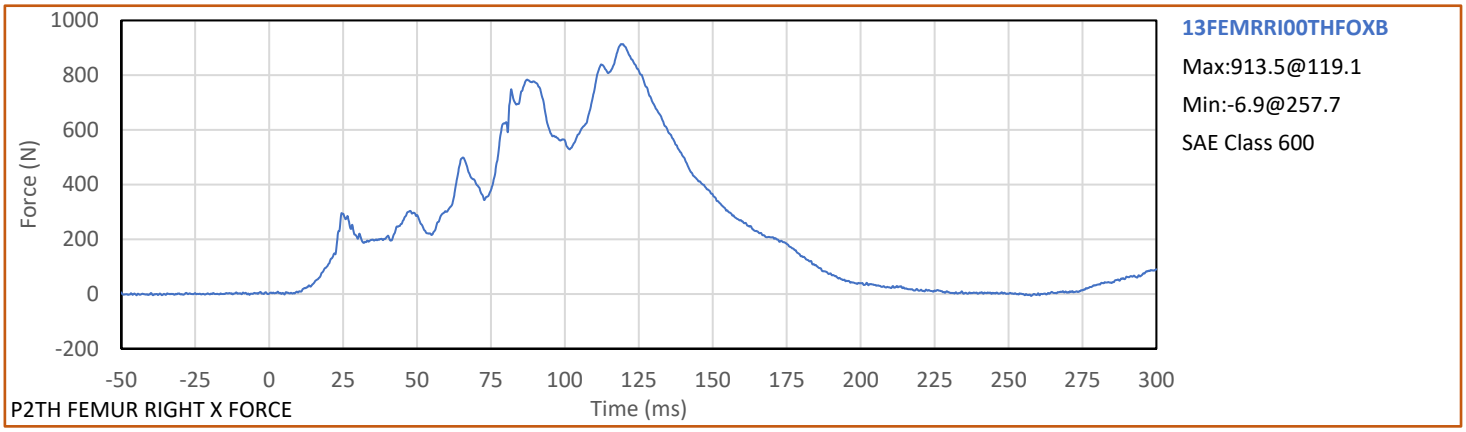

Force (N)
Time (ms)
P2TH FEMUR LEFT Y FORCE
13FEMRLE00THFOYB
Max:266.7@112.0
Min:-111.3@26.8
SAE Class 600

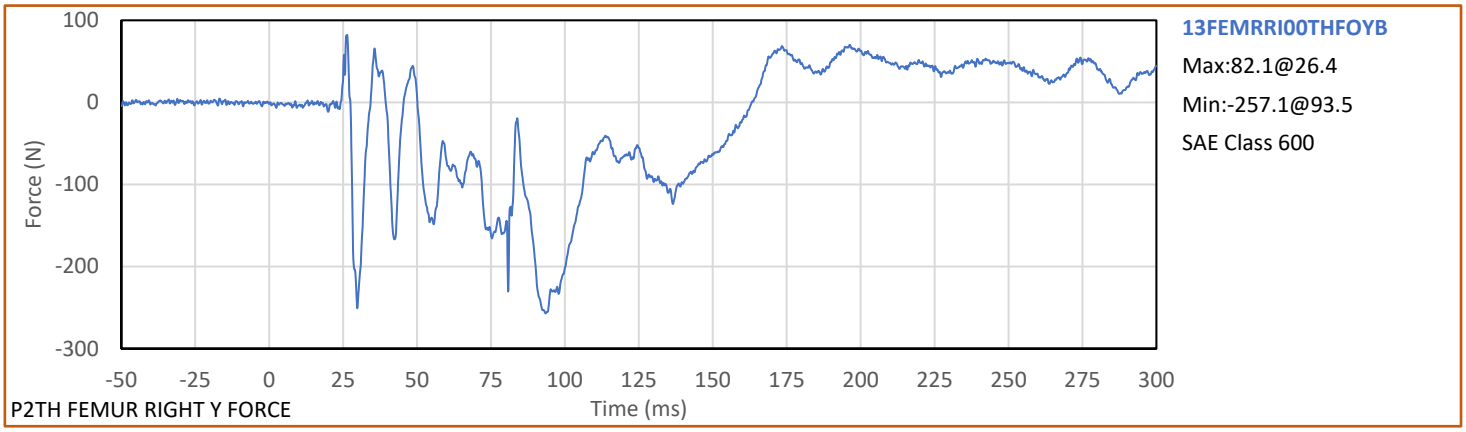

Force (N)
Time (ms)
P2TH FEMUR LEFT Z FORCE
13FEMRLE00THFOZB
Max:150.5@180.3
Min:-4664.2@79.2
SAE Class 600

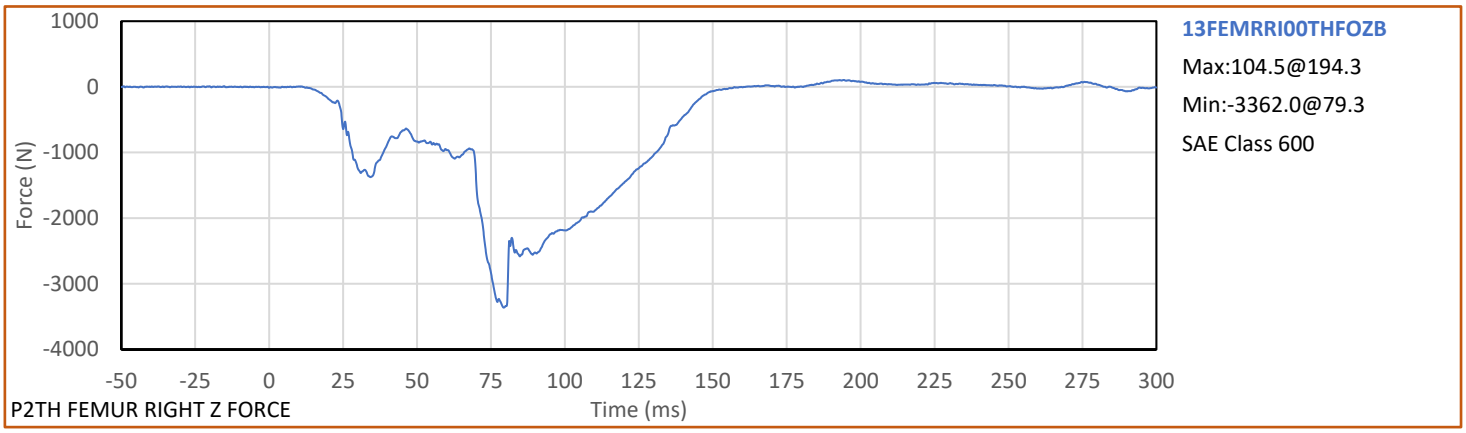

Moment (Nm)
Time (ms)
P2TH FEMUR LEFT X MOMENT
13FEMRLE00THMOXB
Max:55.6@72.1
Min:-27.1@123.6
SAE Class 600

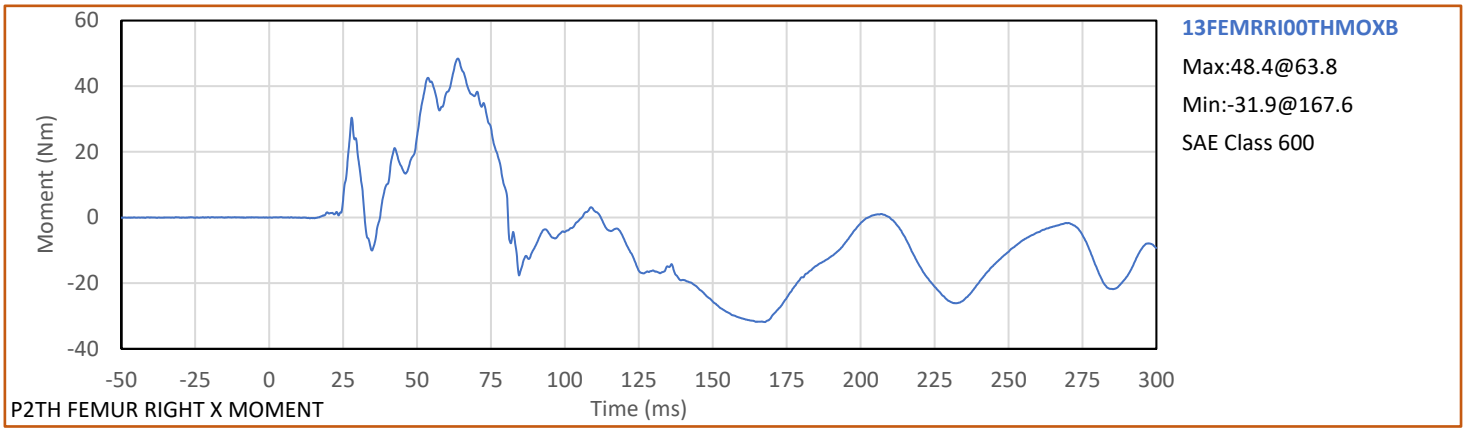

Moment (Nm)
Time (ms)
P2TH FEMUR LEFT Y MOMENT
13FEMRLE00THMOYB
Max:122.8@111.5
Min:-5.4@56.2
SAE Class 600


Moment (Nm)
Time (ms)
P2TH FEMUR LEFT Z MOMENT
13FEMRLE00THMOZB
Max:54.7@90.8
Min:-50.6@134.0
SAE Class 600

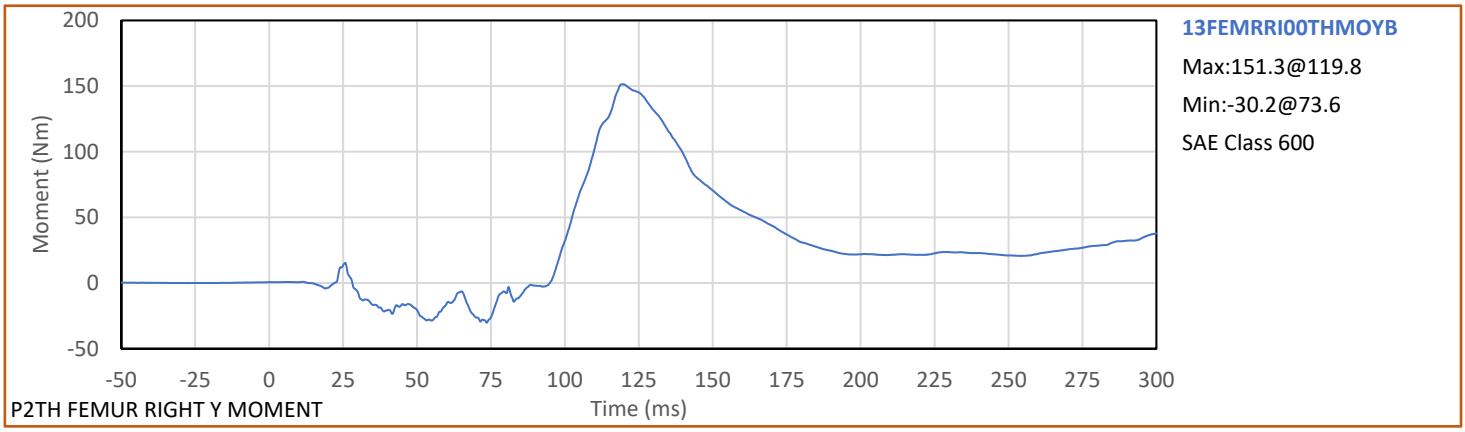

Force (N)
Time (ms)
P2TH FEMUR RIGHT X FORCE
13FEMRRI00THFOXB
Max:913.5@119.1
Min:-6.9@257.7
SAE Class 600


Force (N)
Time (ms)
P2TH FEMUR RIGHT Y FORCE
13FEMRRI00THFOYB
Max:82.1@26.4
Min:-257.1@93.5
SAE Class 600

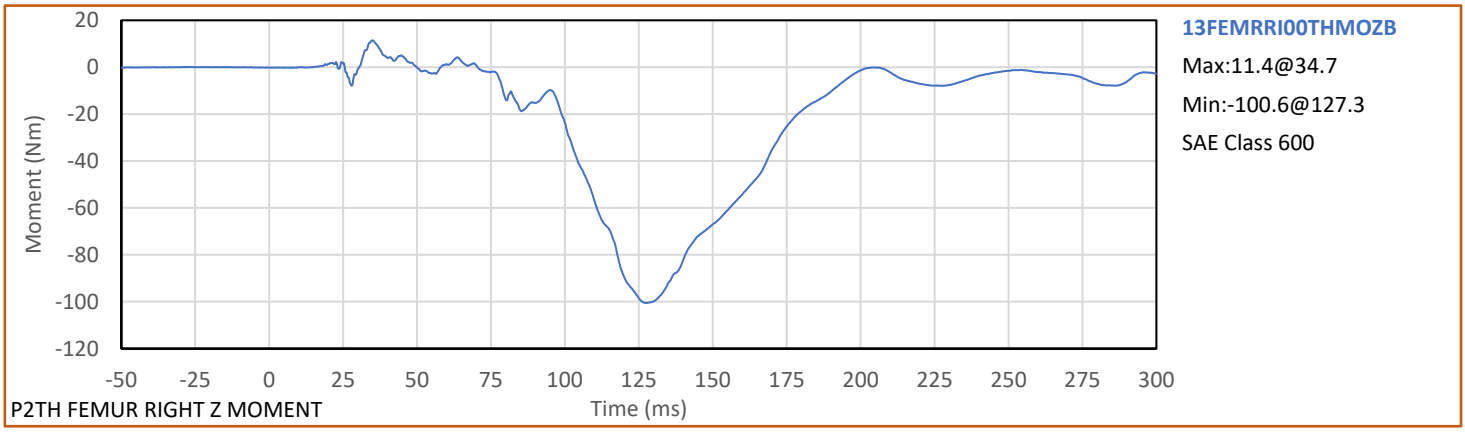

Force (N)
Time (ms)
P2TH FEMUR RIGHT Z FORCE
13FEMRRI00THFOZB
Max:104.5@194.3
Min:-3362.0@79.3
SAE Class 600



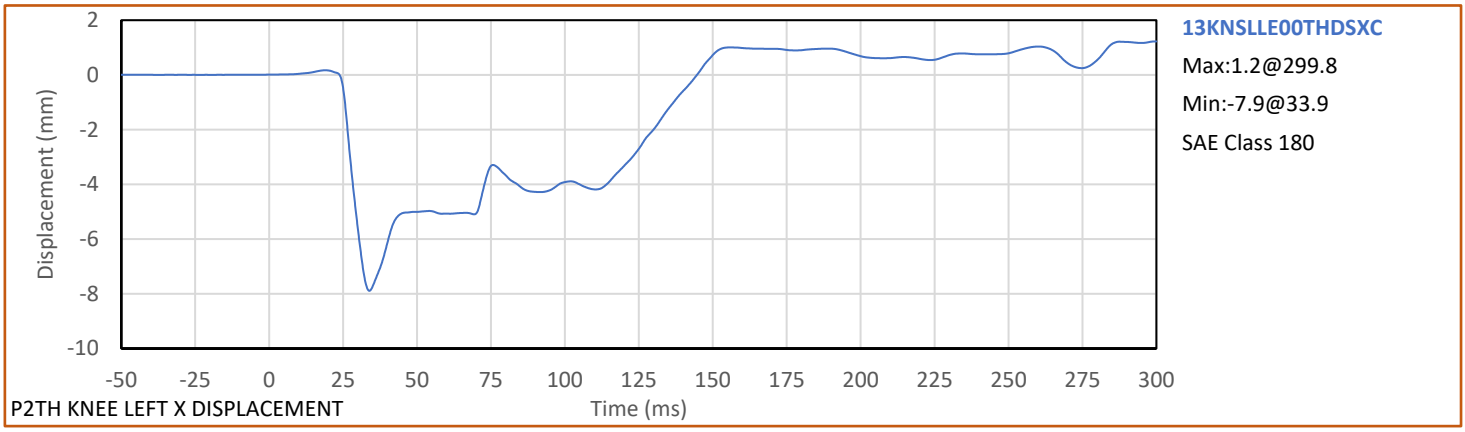
13FEMRRI00THMOXB
Max:48.4@63.8
Min:-31.9@167.6
SAE Class 600



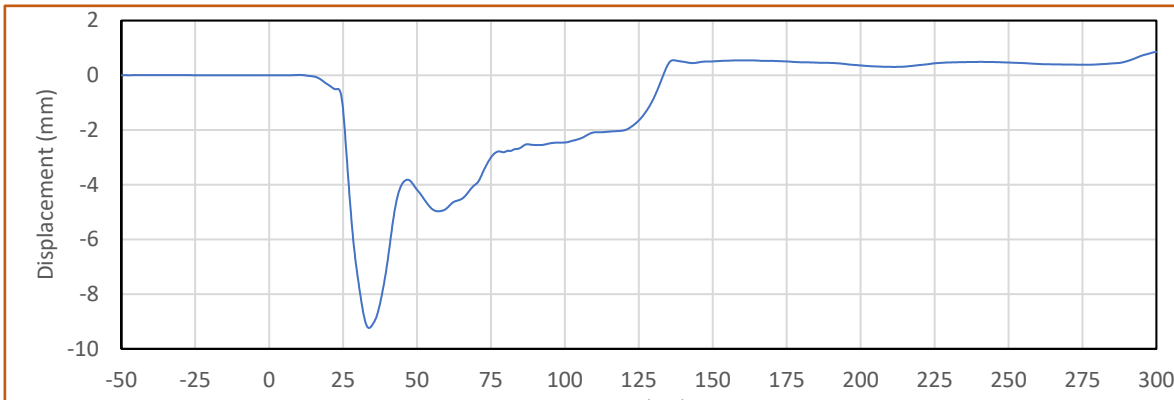
13FEMRRI00THMOYB
Max:151.3@119.8
Min:-30.2@73.6
SAE Class 600



13FEMRRI00THMOZB
Max:11.4@34.7
Min:-100.6@127.3
SAE Class 600



13KNSLLE00THDSXC
Max:1.2@299.8
Min:-7.9@33.9
SAE Class 180

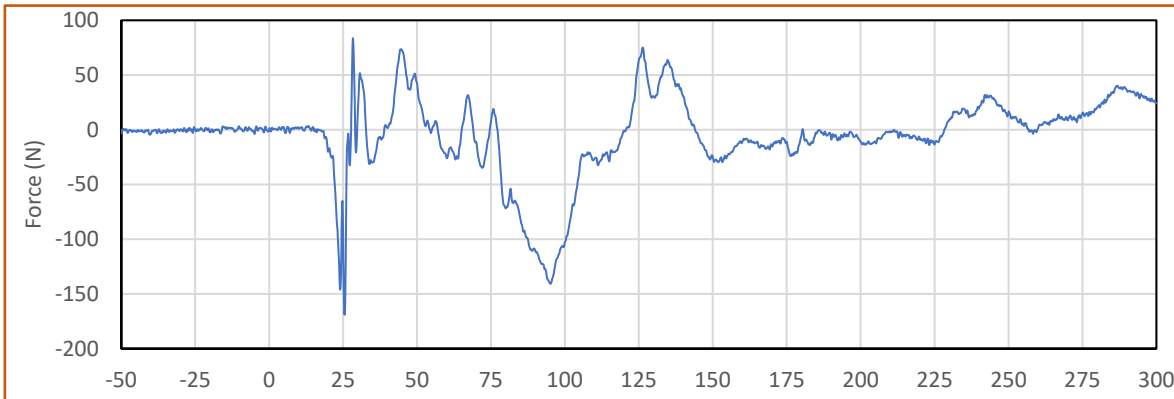


P2TH KNEE RIGHT X DISPLACEMENT

13KNSLRI00THDSXC
Max:0.9@299.8
Min:-9.2@33.8
SAE Class 180

P2TH UPPER TIBIA LEFT X FORCE

13TIBILEUPTHFOXB
Max:98.3@299.7
Min:-398.3@32.2
SAE Class 600

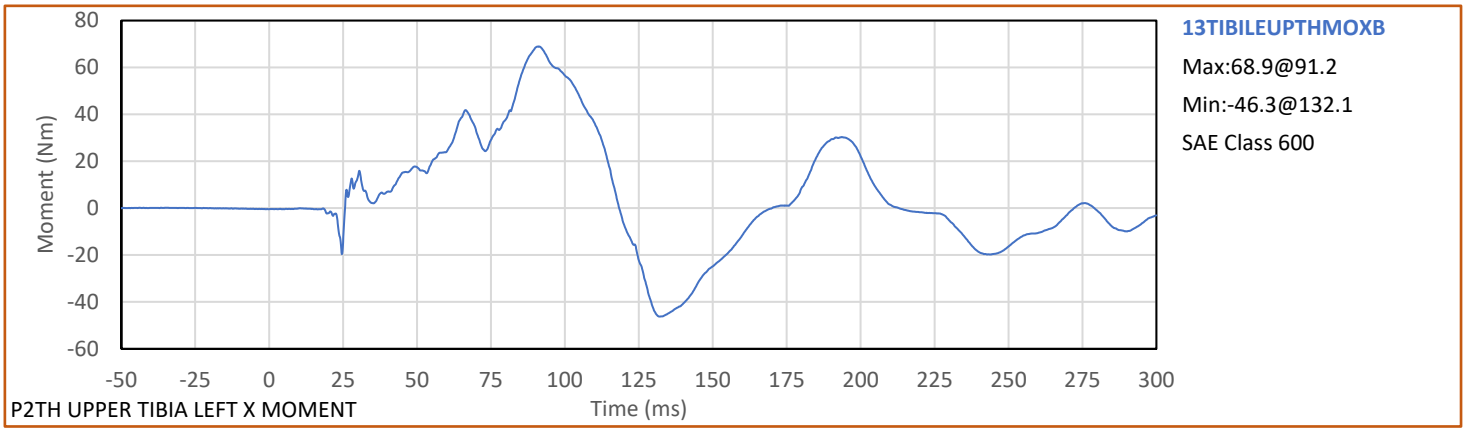


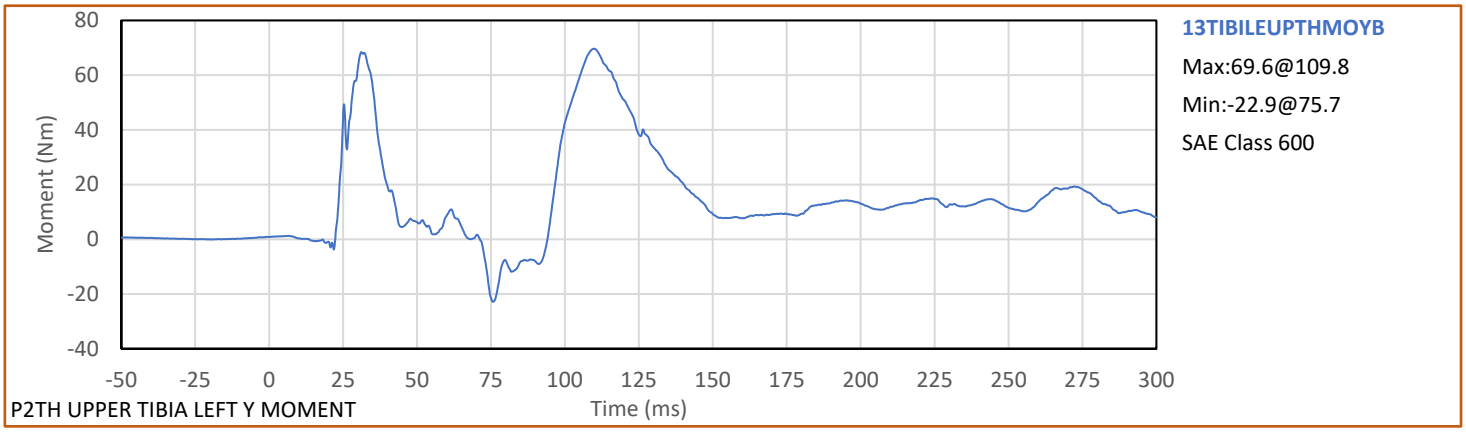
P2TH UPPER TIBIA LEFT Y FORCE

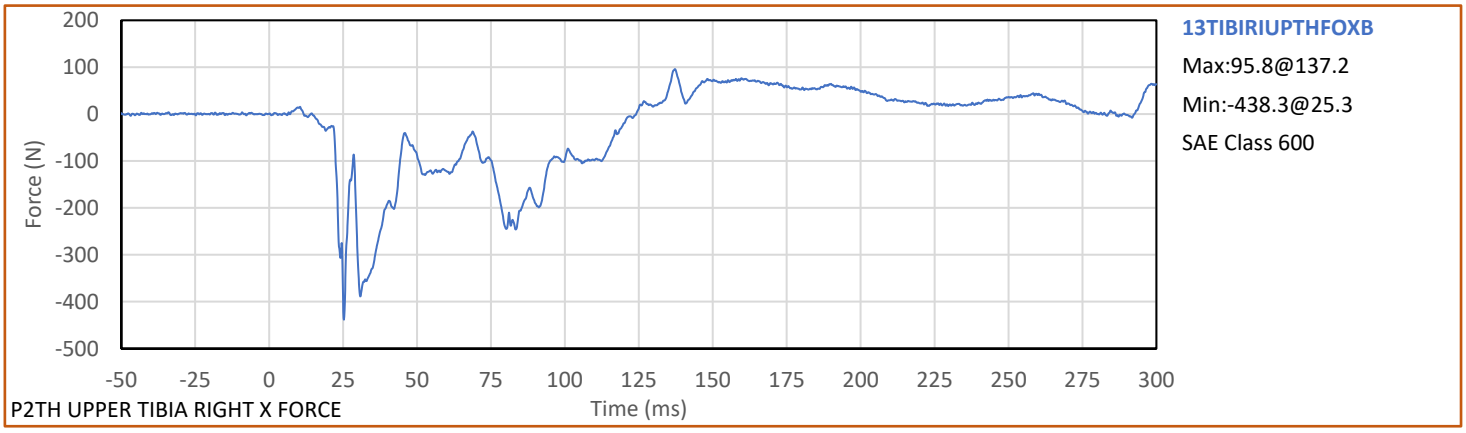
13TIBILEUPTHFOYB
Max:83.7@28.3
Min:-169.0@25.5
SAE Class 600

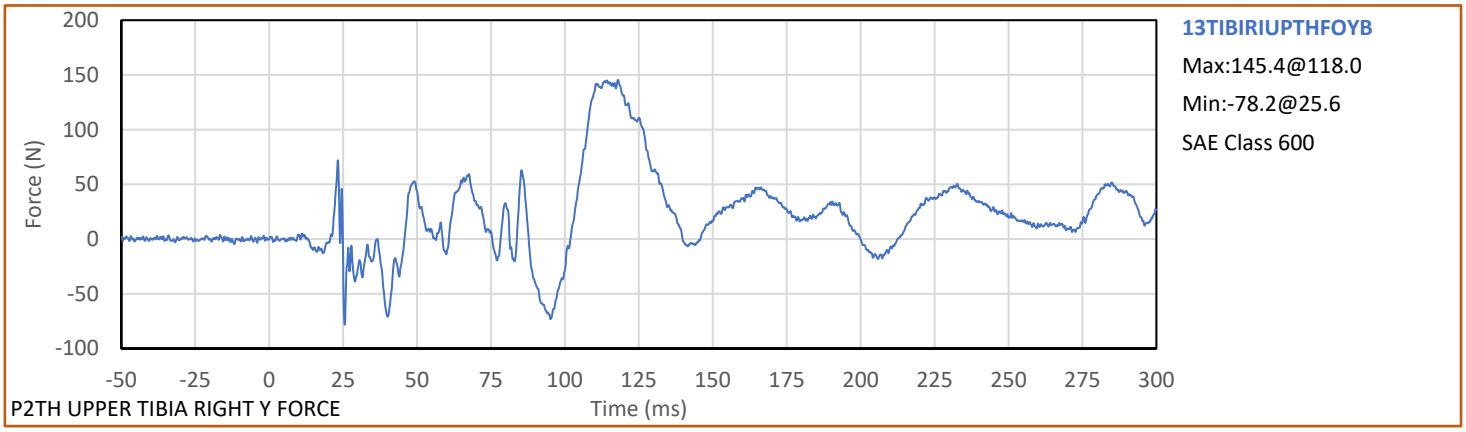
P2TH UPPER TIBIA LEFT Z FORCE

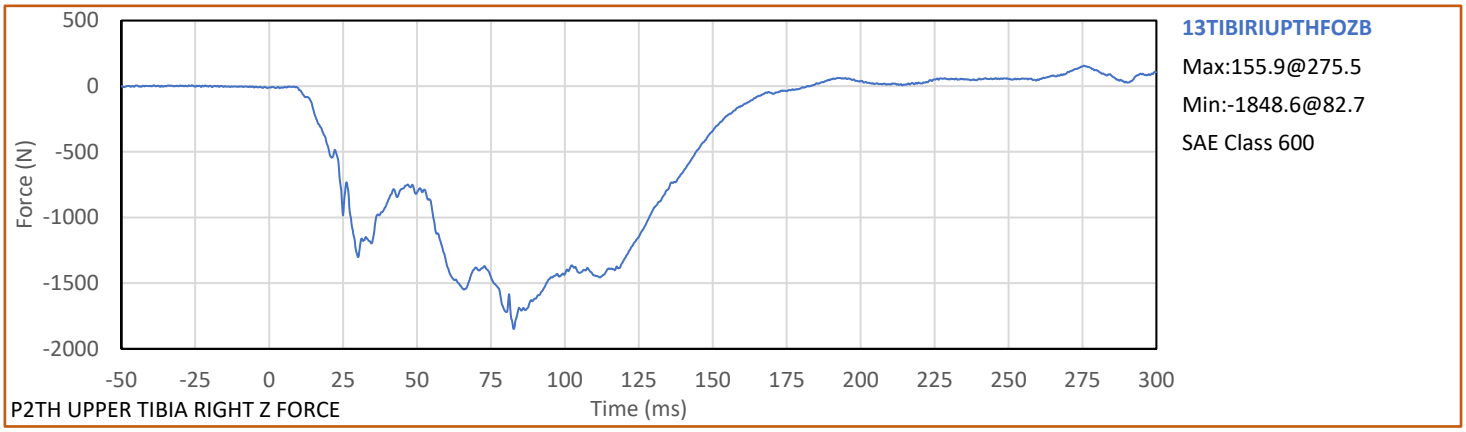
13TIBILEUPTHFOZB
Max:89.2@179.9
Min:-2306.2@81.2
SAE Class 600

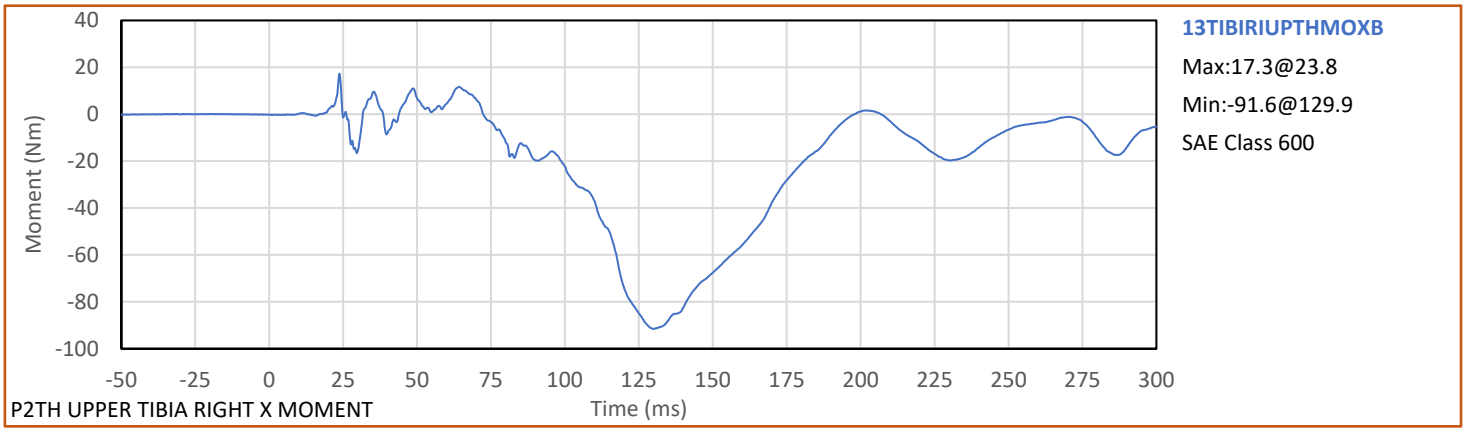

Moment (Nm)
Time (ms)
P2TH UPPER TIBIA LEFT X MOMENT
13TIBILEUPTHMOXB
Max:68.9@91.2
Min:-46.3@132.1
SAE Class 600

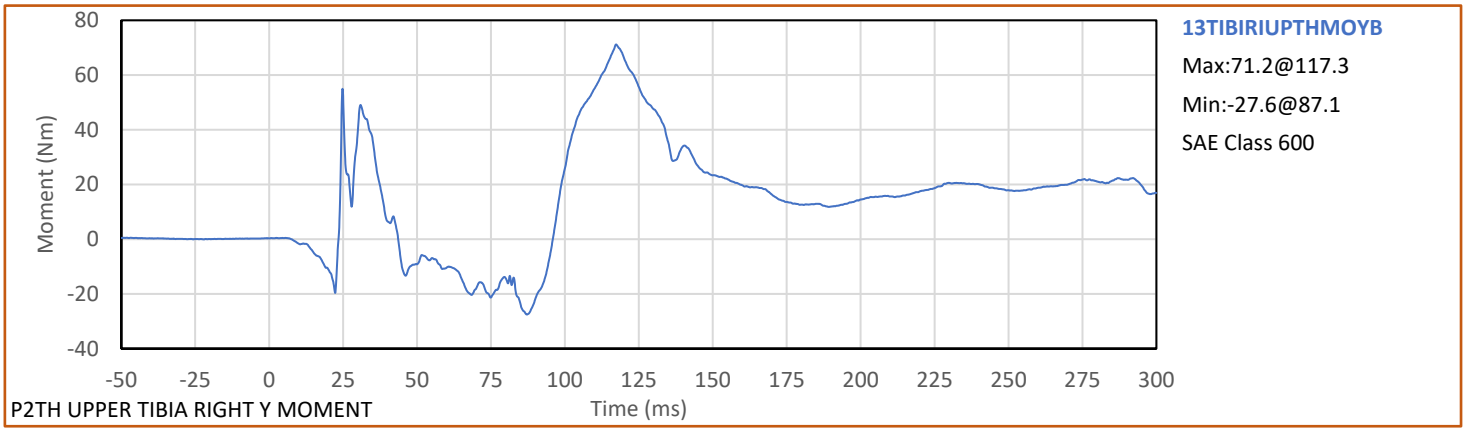

Moment (Nm)
Time (ms)
P2TH UPPER TIBIA LEFT Y MOMENT
13TIBILEUPTHMOYB
Max:69.6@109.8
Min:-22.9@75.7
SAE Class 600

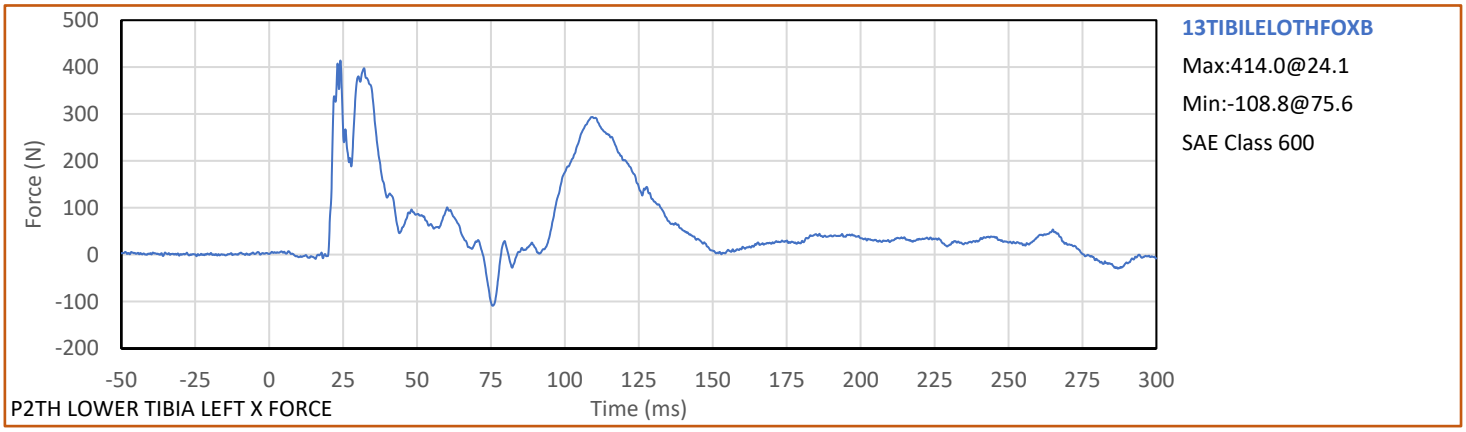

Force (N)
Time (ms)
P2TH UPPER TIBIA RIGHT X FORCE
13TIBIRIUPTHFOXB
Max:95.8@137.2
Min:-438.3@25.3
SAE Class 600

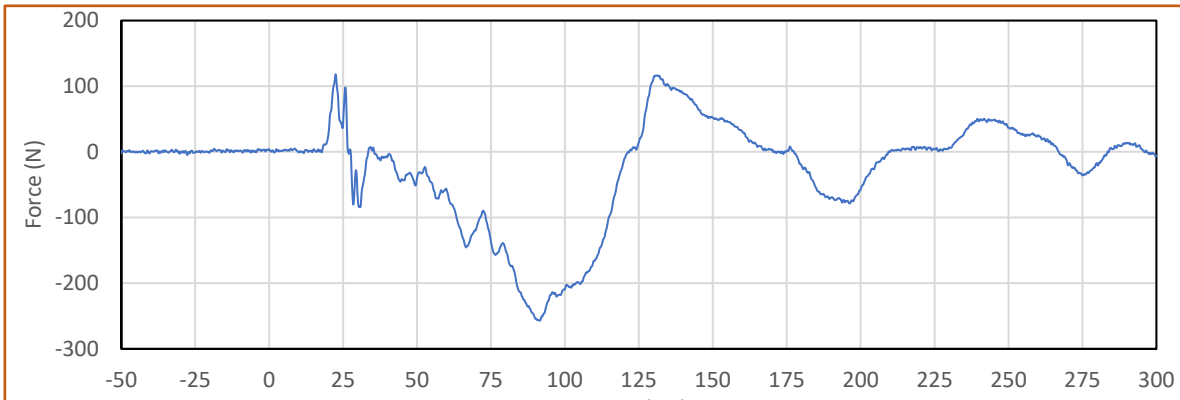

Force (N)
Time (ms)
P2TH UPPER TIBIA RIGHT Y FORCE
13TIBIRIUPTHFOYB
Max:145.4@118.0
Min:-78.2@25.6
SAE Class 600


Force (N)
Time (ms)
P2TH UPPER TIBIA RIGHT Z FORCE
13TIBIRIUPTHFOZB
Max:155.9@275.5
Min:-1848.6@82.7
SAE Class 600

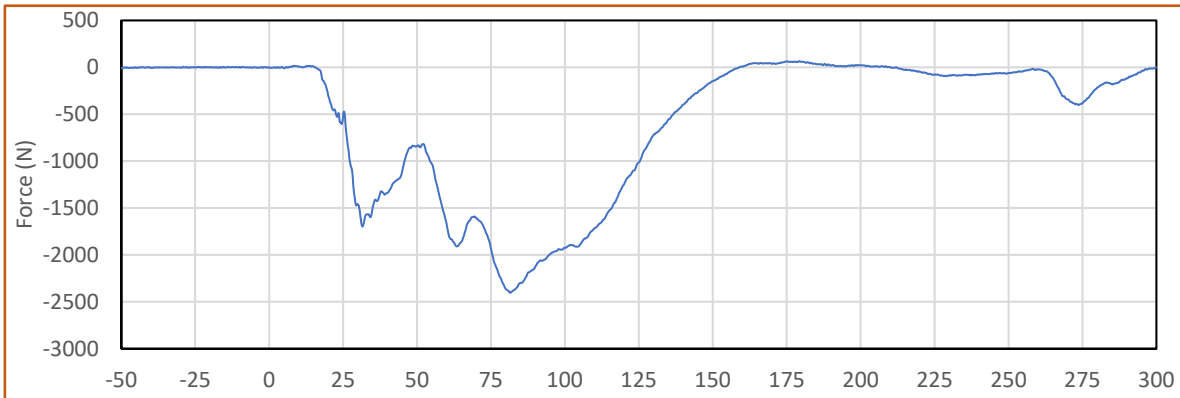

Moment (Nm)
Time (ms)
P2TH UPPER TIBIA RIGHT X MOMENT
13TIBIRIUPTHMOXB
Max:17.3@23.8
Min:-91.6@129.9
SAE Class 600


Moment (Nm)
Time (ms)
P2TH UPPER TIBIA RIGHT Y MOMENT
13TIBIRIUPTHMOYB
Max:71.2@117.3
Min:-27.6@87.1
SAE Class 600

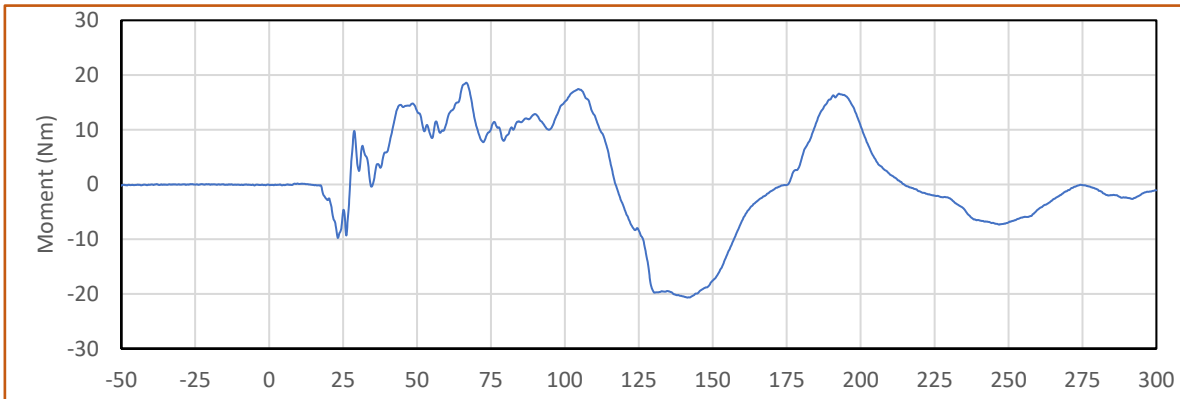

Force (N)
Time (ms)
P2TH LOWER TIBIA LEFT X FORCE
13TIBILELOTHFOXB
Max:414.0@24.1
Min:-108.8@75.6
SAE Class 600



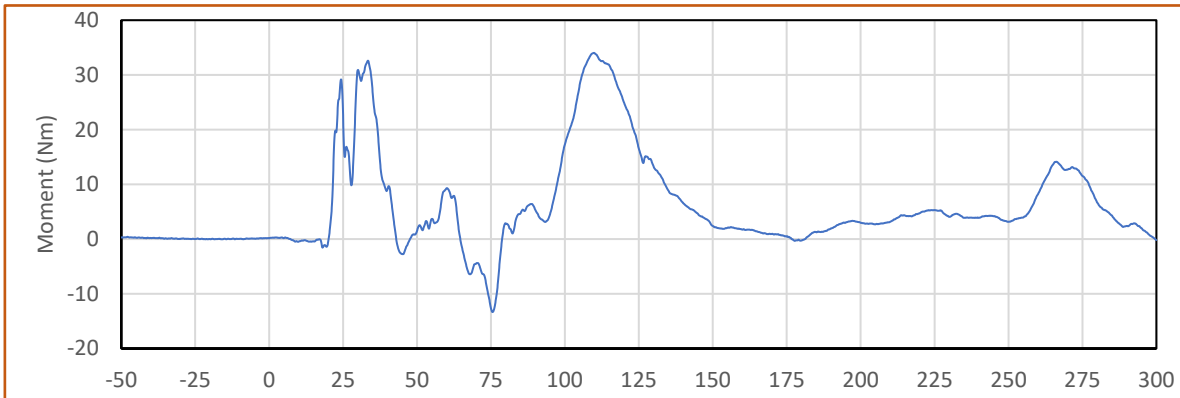
13TIBILELOTHFOYB
Max:118.0@22.5
Min:-257.0@91.5
SAE Class 600



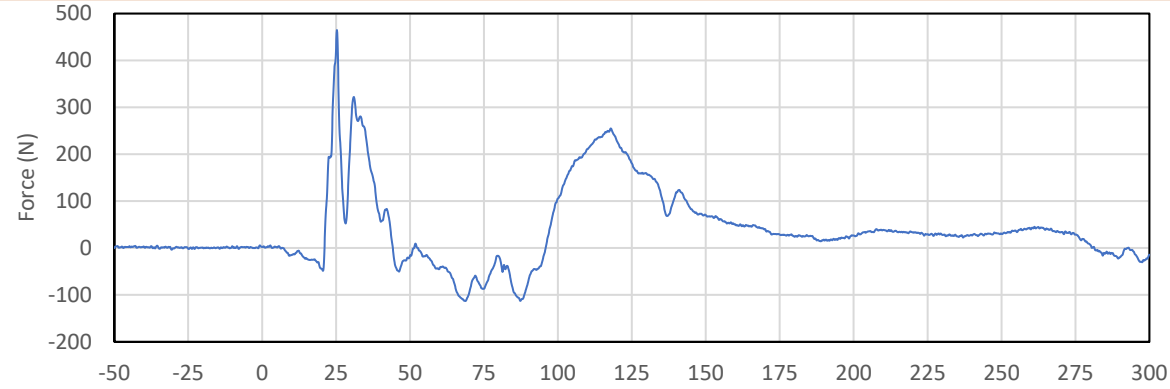
13TIBILELOTHFOZB
Max:64.5@179.2
Min:-2404.6@81.5
SAE Class 600



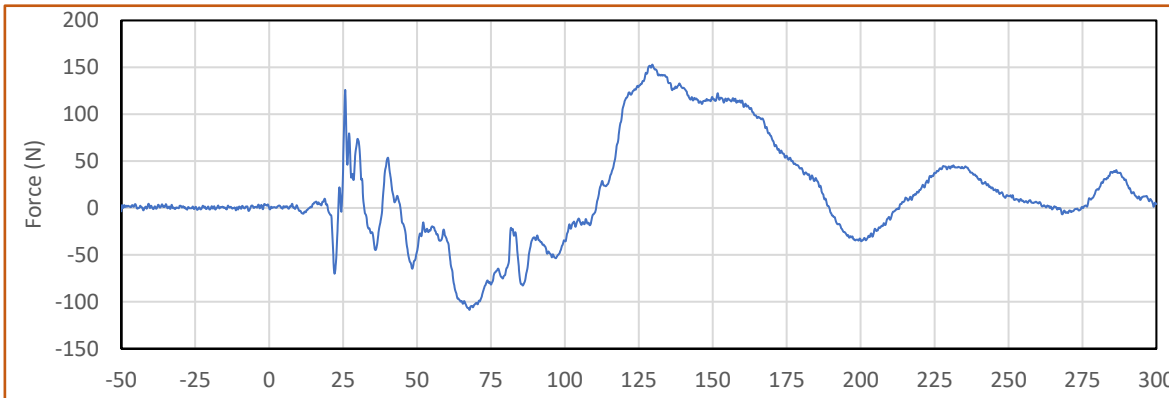
13TIBILELOTHMOXB
Max:18.6@66.7
Min:-20.7@141.5
SAE Class 600



13TIBILELOTHMOYB
Max:34.0@109.8
Min:-13.3@75.6
SAE Class 600

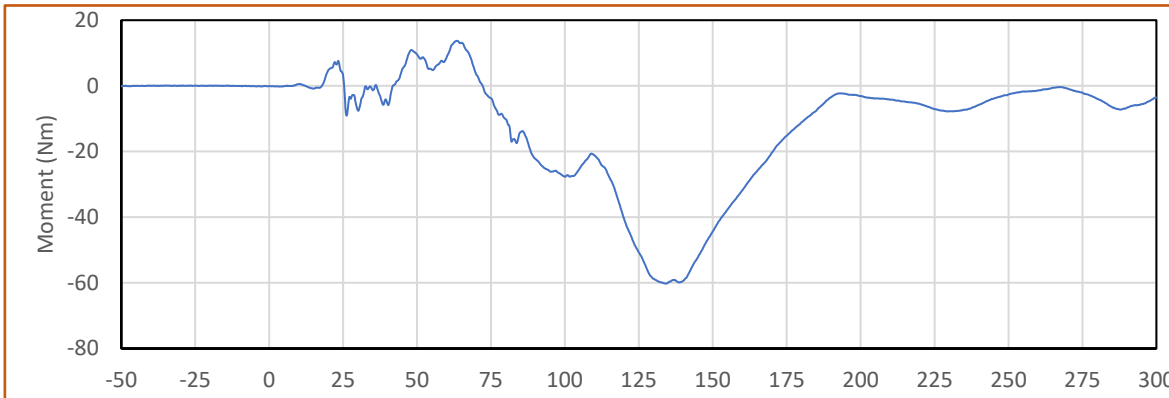


13TIBIRILOTHFOXB
Max:464.8@25.3
Min:-112.9@68.8
SAE Class 600

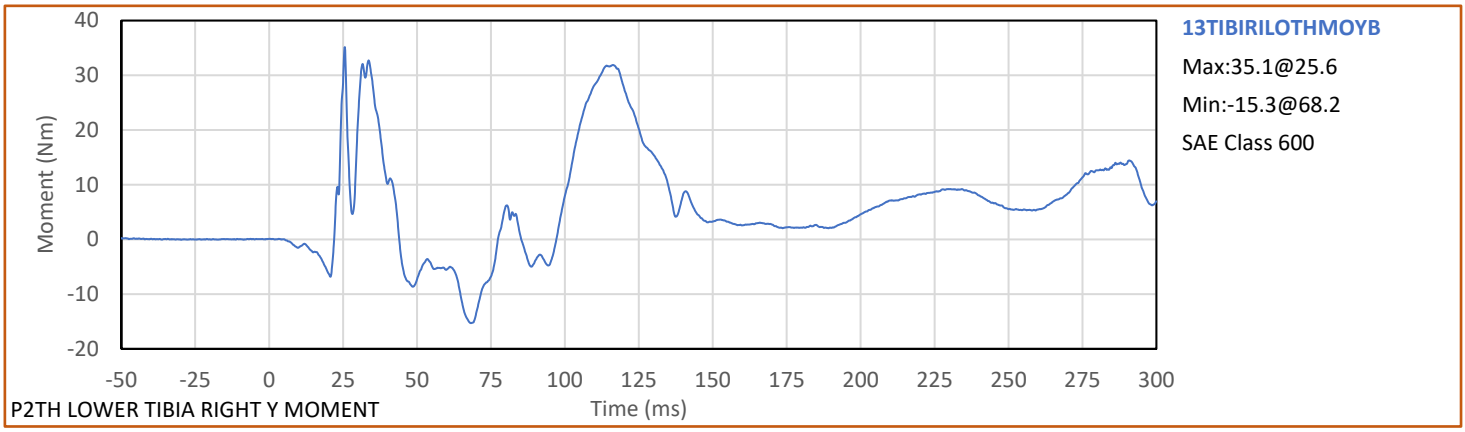


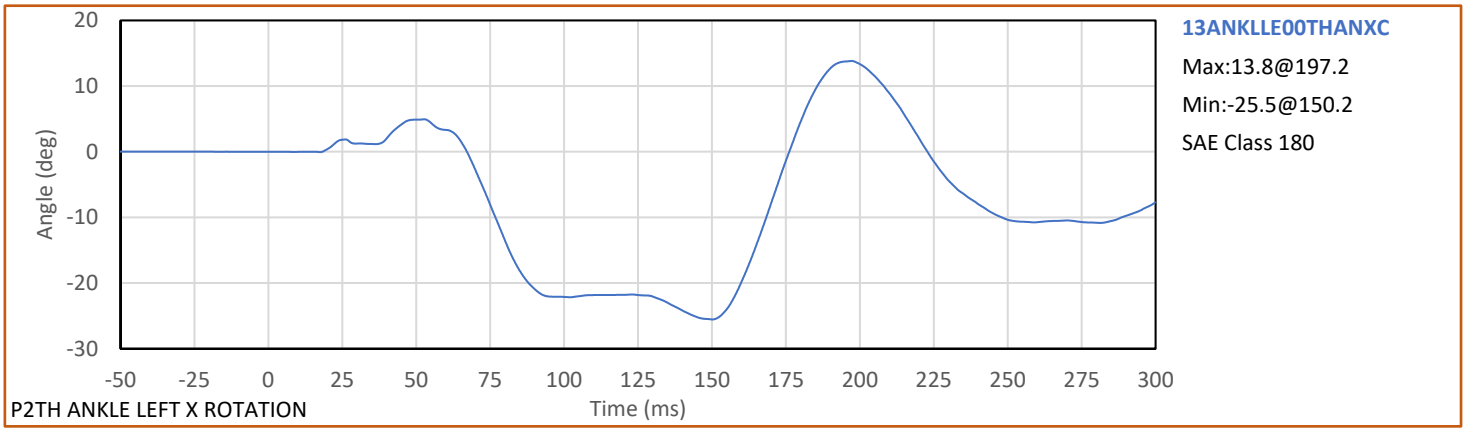
13TIBIRILOTHFOYB
Max:152.9@129.6
Min:-108.6@67.7
SAE Class 600

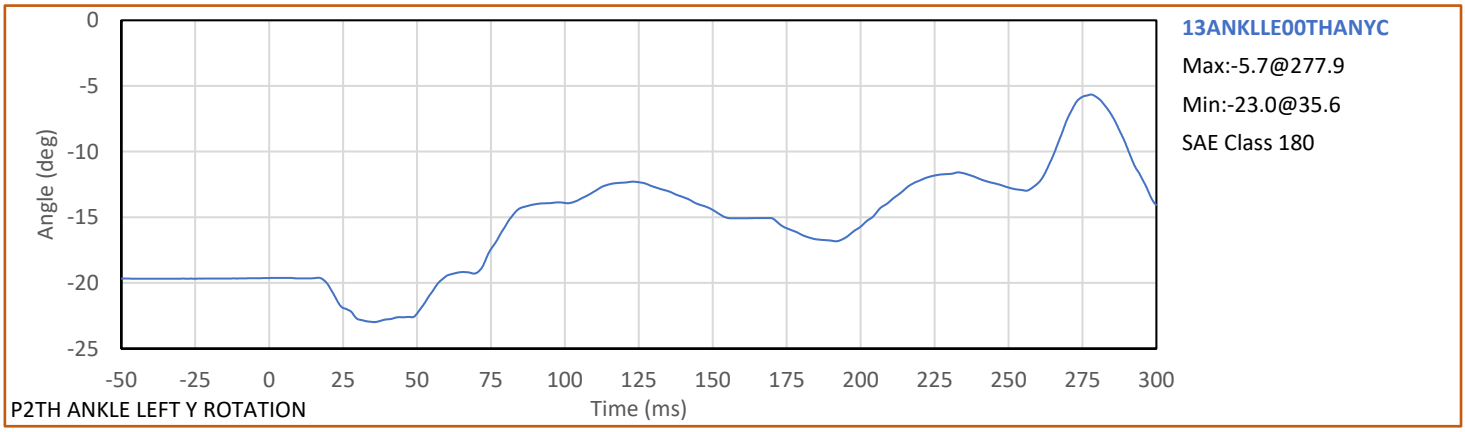
13TIBIRILOTHFOZB
Max:37.5@192.5
Min:-2127.4@65.5
SAE Class 600

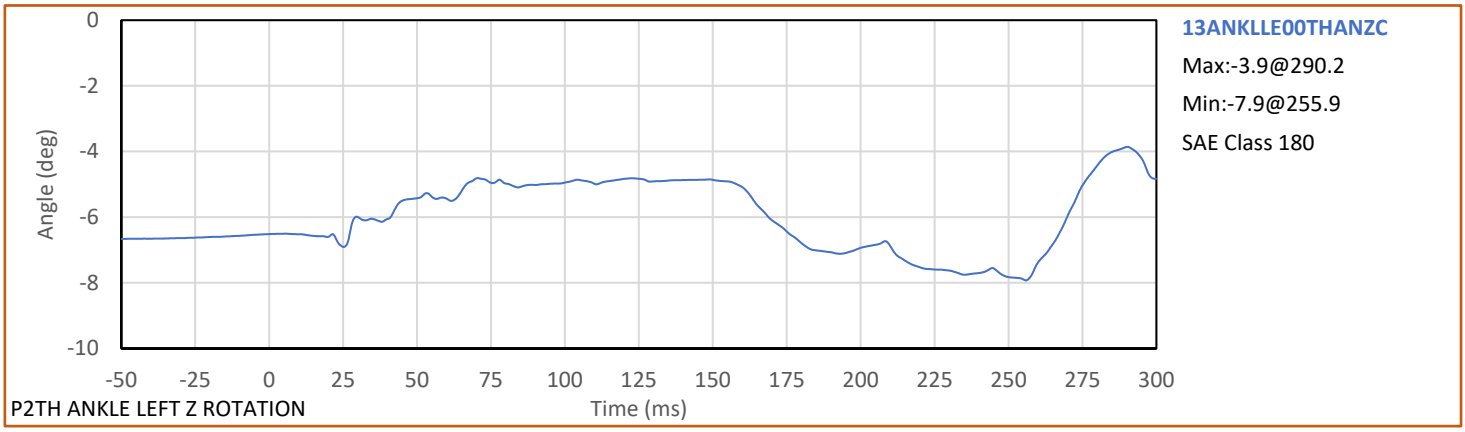


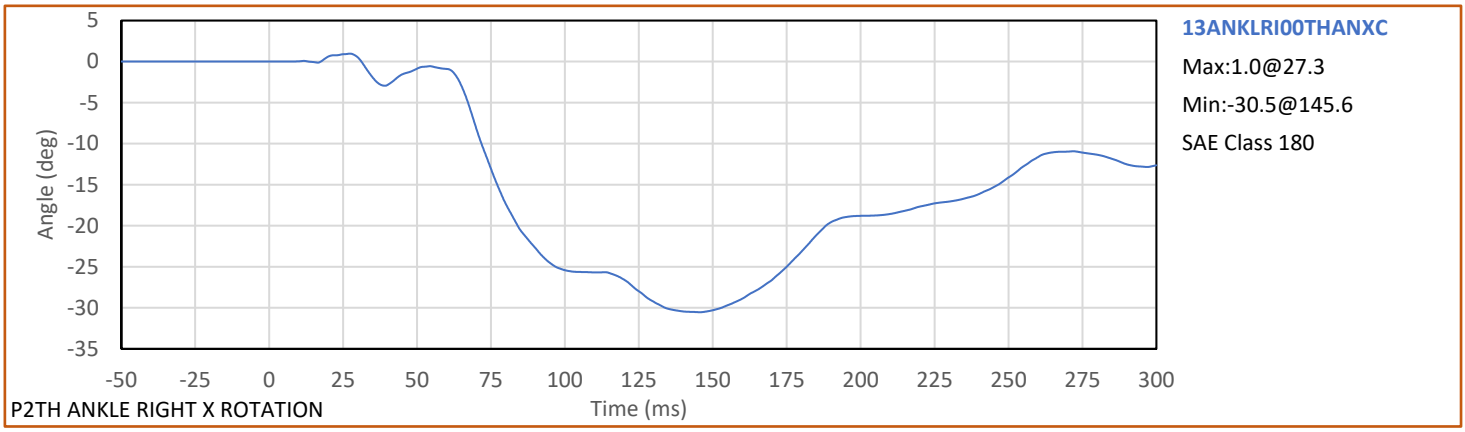
13TIBIRILOTHMOXB
Max:13.7@63.6
Min:-60.2@134.0
SAE Class 600

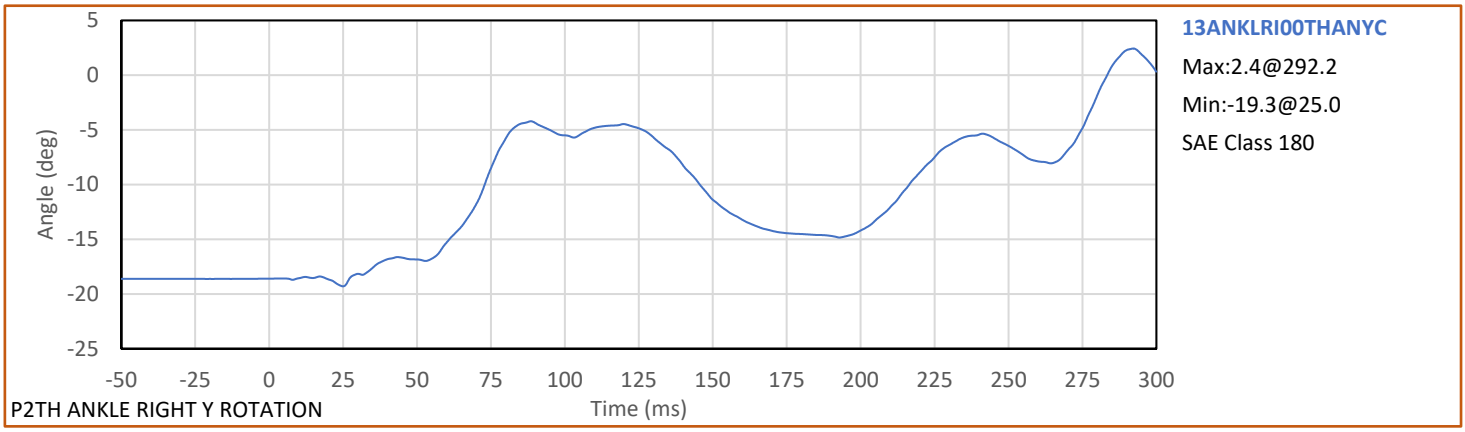

Moment (Nm)
Time (ms)
P2TH LOWER TIBIA RIGHT Y MOMENT
13TIBIRILOTHMOYB
Max:35.1@25.6
Min:-15.3@68.2
SAE Class 600

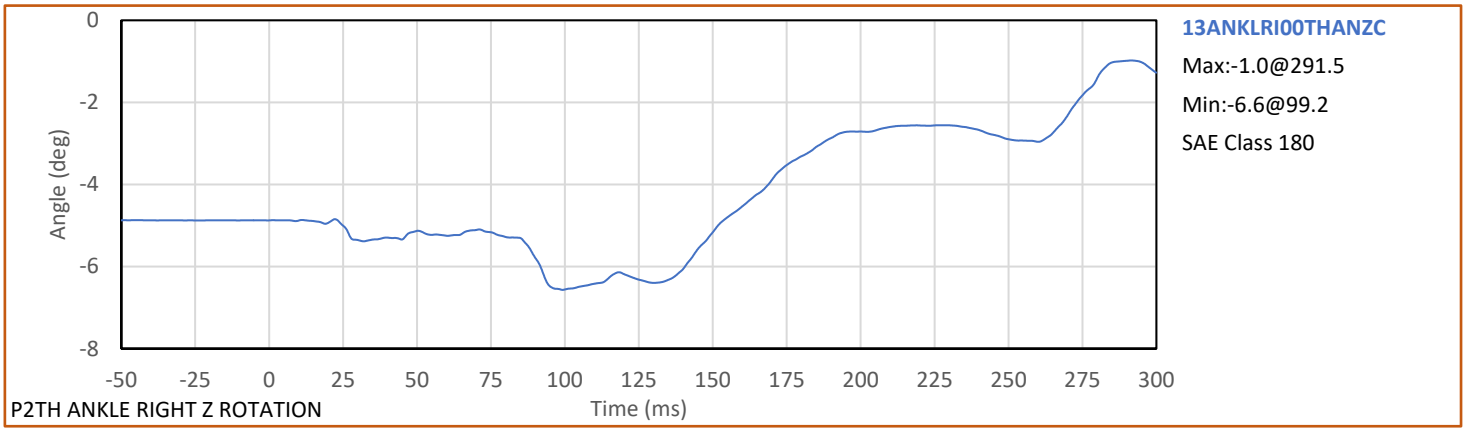

Angle (deg)
Time (ms)
P2TH ANKLE LEFT X ROTATION
13ANKLLE00THANXC
Max:13.8@197.2
Min:-25.5@150.2
SAE Class 180


Angle (deg)
Time (ms)
P2TH ANKLE LEFT Y ROTATION
13ANKLLE00THANYC
Max:-5.7@277.9
Min:-23.0@35.6
SAE Class 180


Angle (deg)
Time (ms)
P2TH ANKLE LEFT Z ROTATION
13ANKLLE00THANZC
Max:-3.9@290.2
Min:-7.9@255.9
SAE Class 180


13ANKLRI00THANXC
Max:1.0@27.3
Min:-30.5@145.6
SAE Class 180
Angle (deg)
Time (ms)
P2TH ANKLE RIGHT X ROTATION


13ANKLRI00THANYC
Max:2.4@292.2
Min:-19.3@25.0
SAE Class 180
Angle (deg)
Time (ms)
P2TH ANKLE RIGHT Y ROTATION

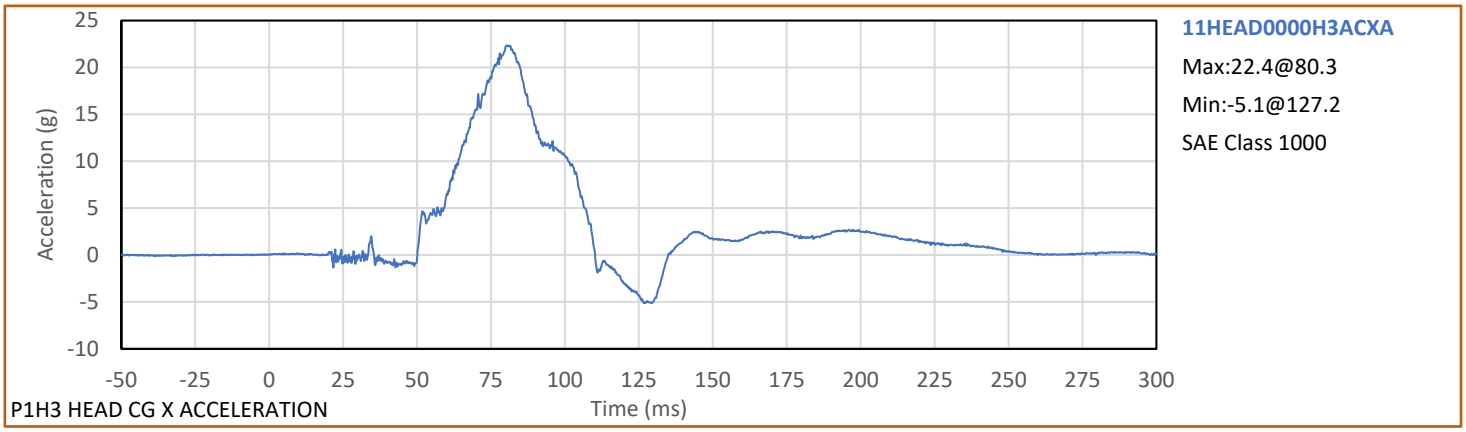

13ANKLRI00THANZC
Max:-1.0@291.5
Min:-6.6@99.2
SAE Class 180
Angle (deg)
Time (ms)
P2TH ANKLE RIGHT Z ROTATION

Test Vehicle: 2020 Honda Accord 4-Door Sedan

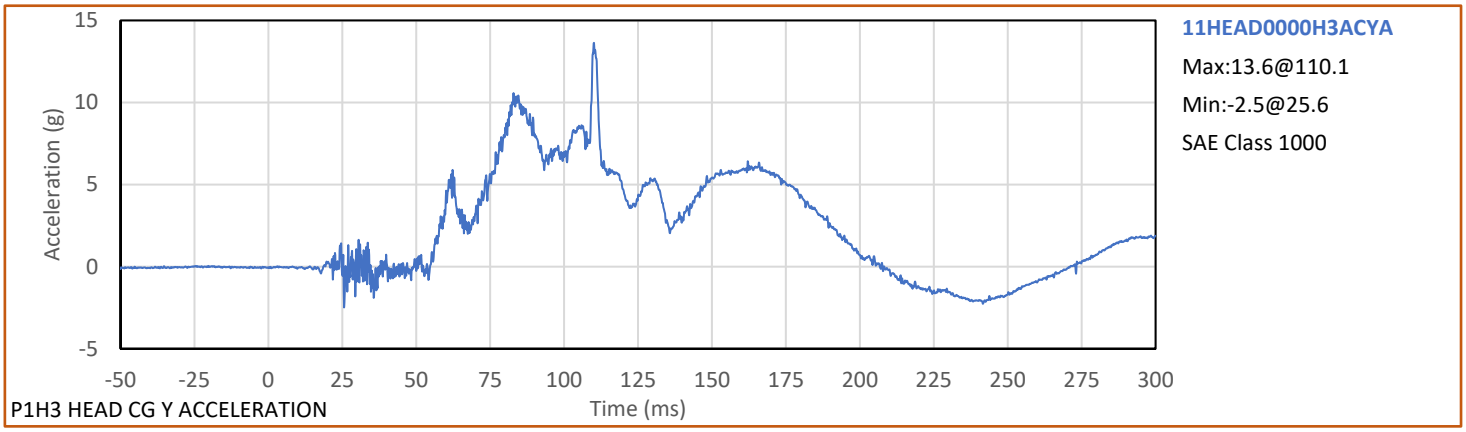
Test Program: Right Side 30° Frontal Rigid Barrier Impact

NHTSA No.: R20205386

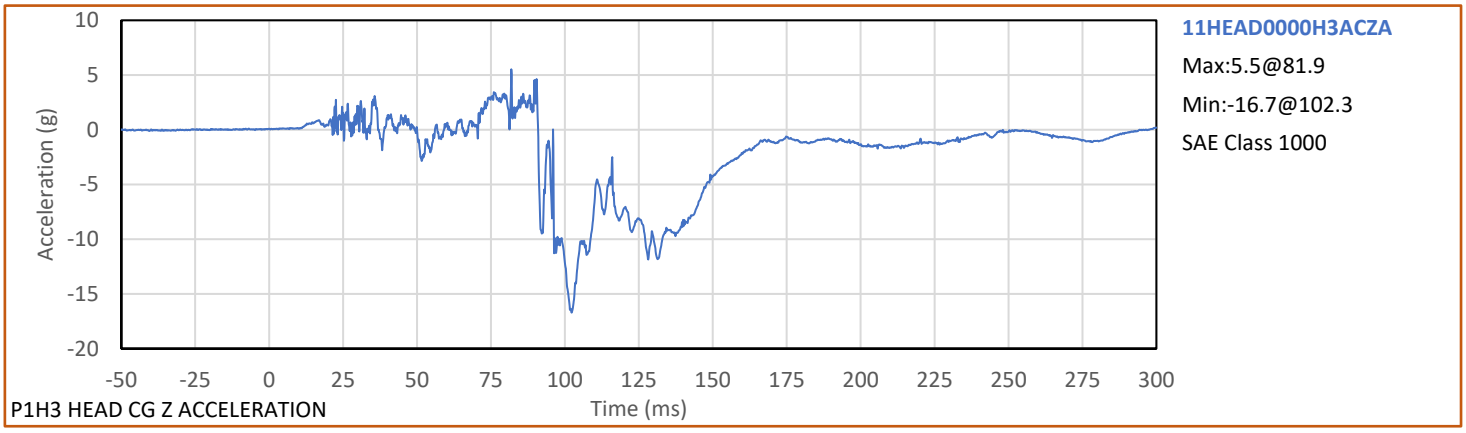
Test Date: 7/30/2021



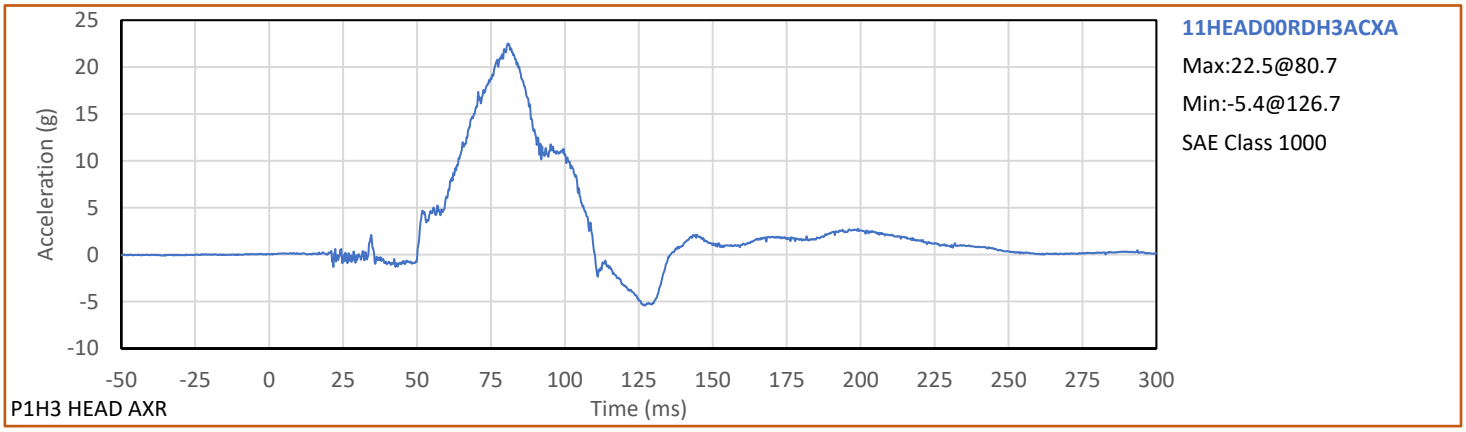
P1H3 HEAD CG X ACCELERATION



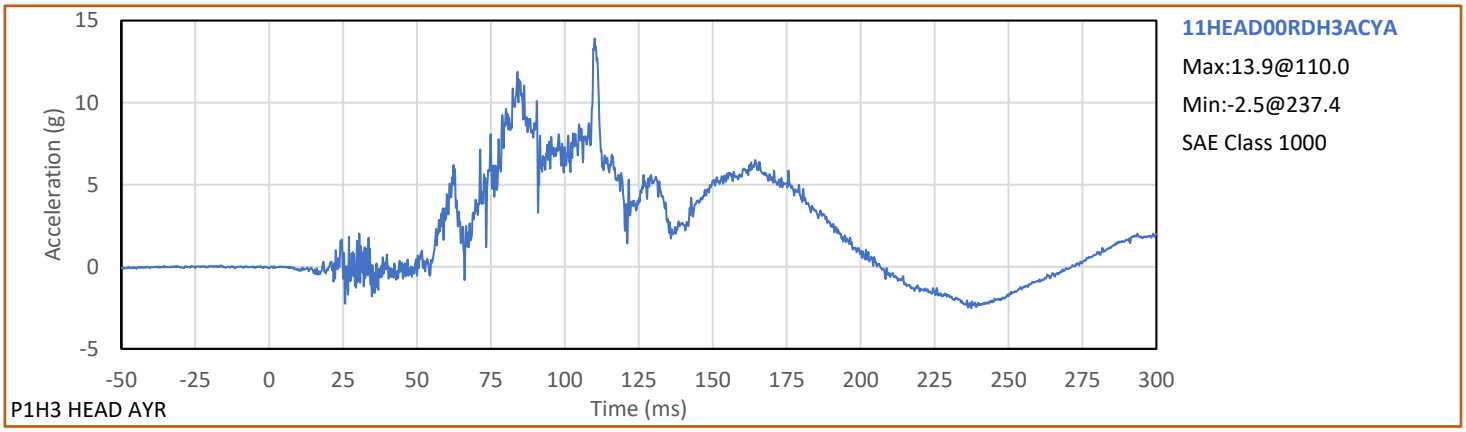
P1H3 HEAD CG Y ACCELERATION

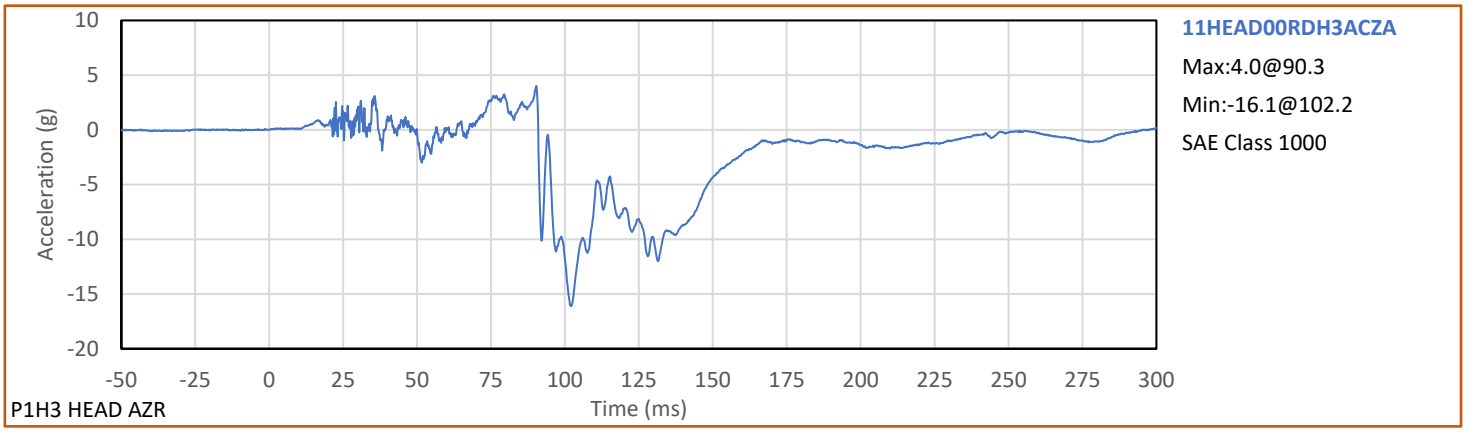


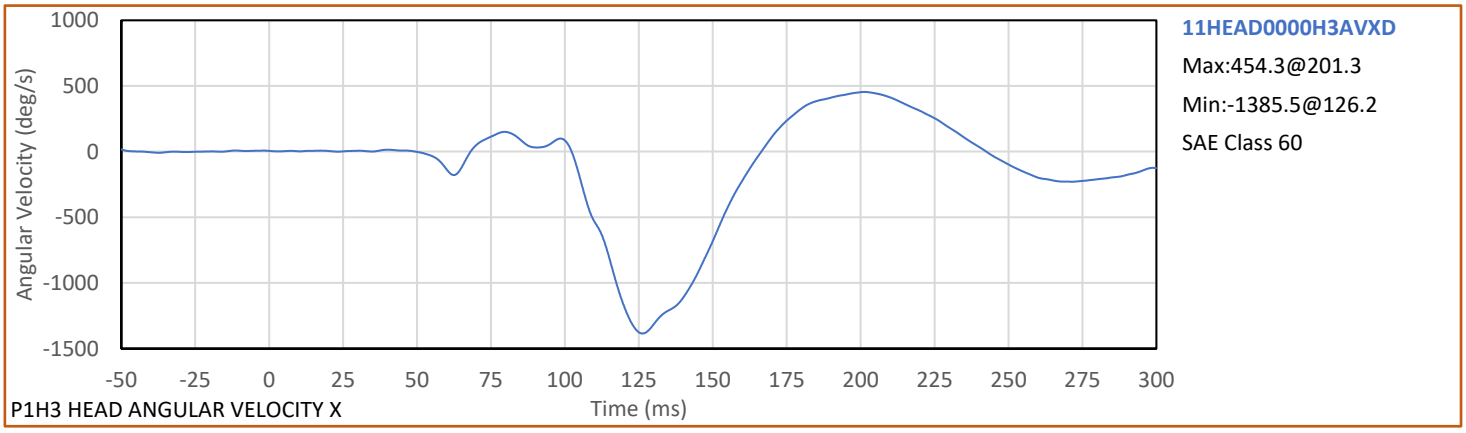
P1H3 HEAD CG Z ACCELERATION

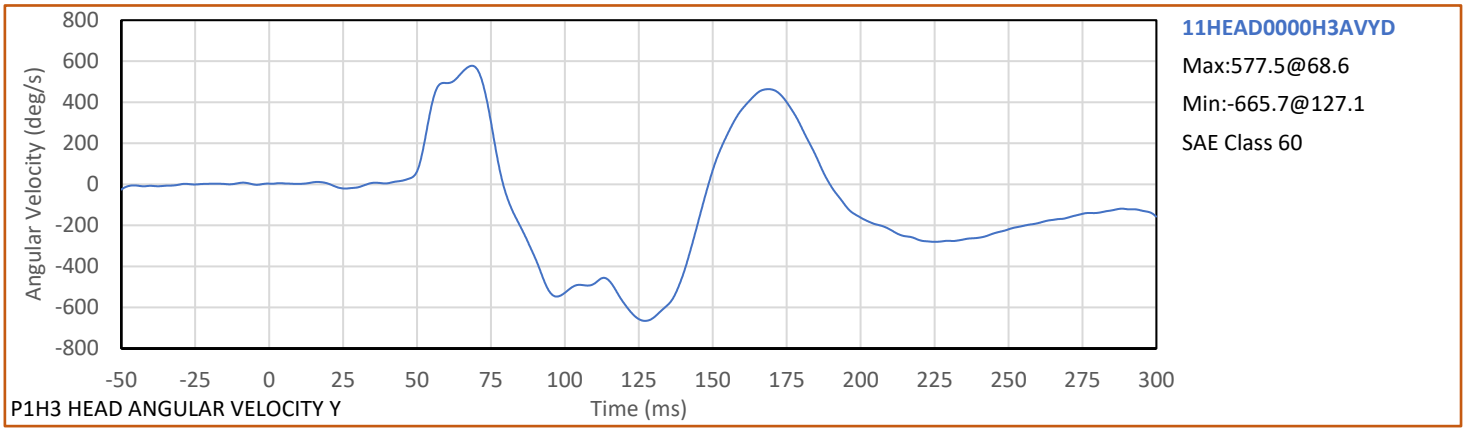


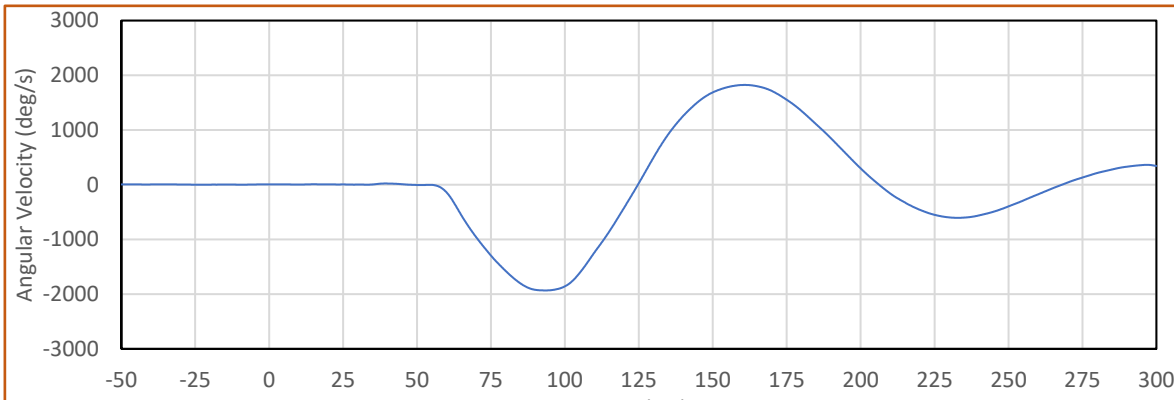
P1H3 HEAD AXR


Acceleration (g)
Time (ms)
P1H3 HEAD AYR
11HEAD00RDH3ACYA
Max:13.9@110.0
Min:-2.5@237.4
SAE Class 1000


Acceleration (g)
Time (ms)
P1H3 HEAD AZR
11HEAD00RDH3ACZA
Max:4.0@90.3
Min:-16.1@102.2
SAE Class 1000

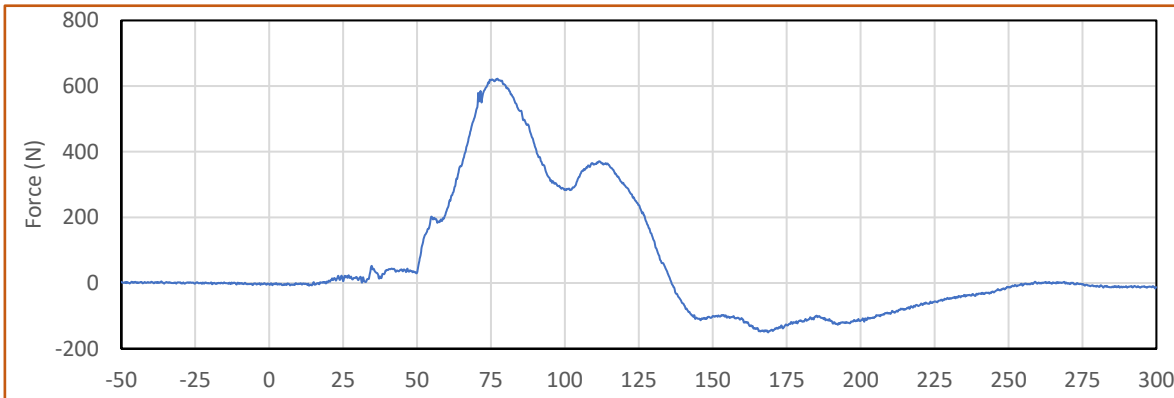

Angular Velocity (deg/s)
Time (ms)
P1H3 HEAD ANGULAR VELOCITY X
11HEAD0000H3AVXD
Max:454.3@201.3
Min:-1385.5@126.2
SAE Class 60


Angular Velocity (deg/s)
Time (ms)
P1H3 HEAD ANGULAR VELOCITY Y
11HEAD0000H3AVYD
Max:577.5@68.6
Min:-665.7@127.1
SAE Class 60



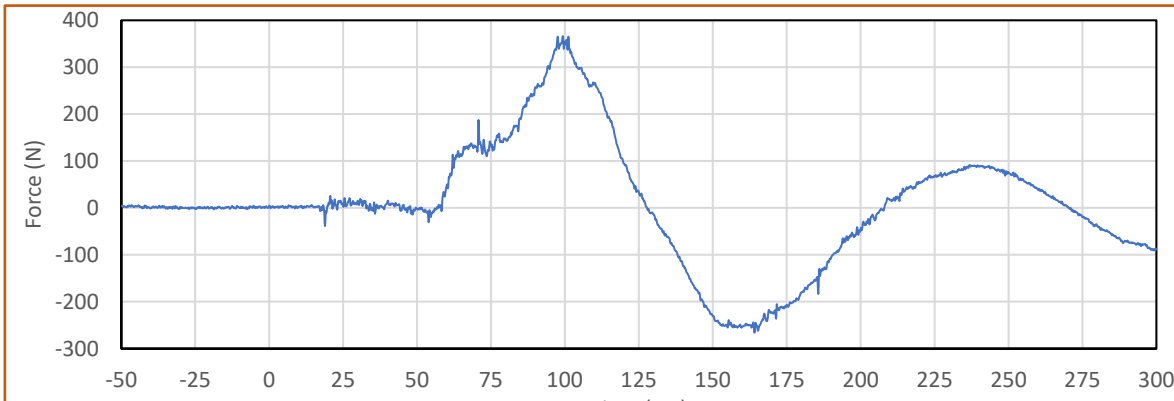
11HEAD0000H3AVZD
Max:1822.0@160.8
Min:-1933.1@93.5
SAE Class 60

P1H3 HEAD ANGULAR VELOCITY Z



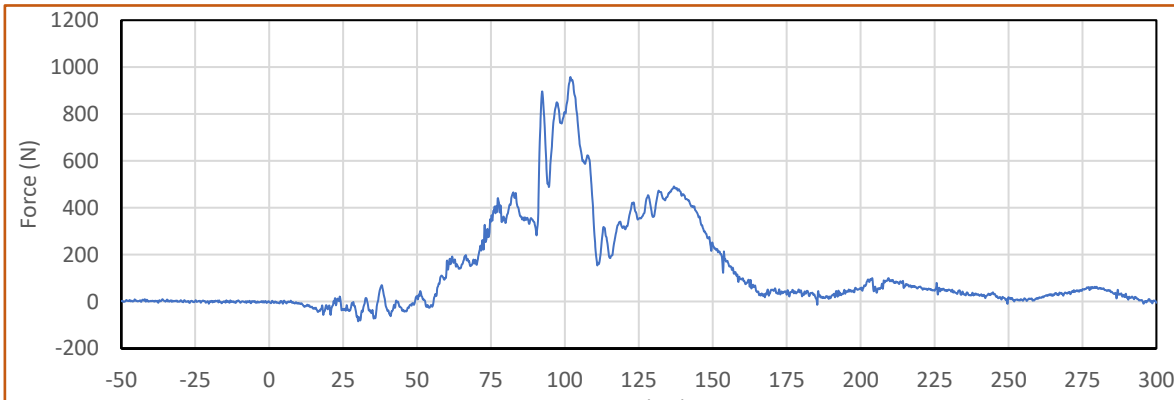
11NECKUP00H3FOXA
Max:622.7@77.2
Min:-150.3@168.7
SAE Class 1000

P1H3 UPPER NECK FX



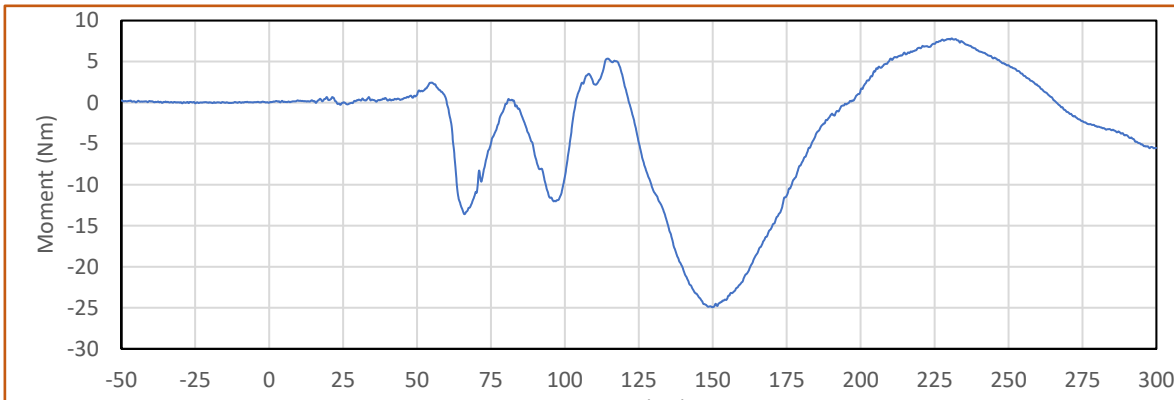
11NECKUP00H3FOYA
Max:366.1@99.3
Min:-266.1@164.1
SAE Class 1000

P1H3 UPPER NECK FY



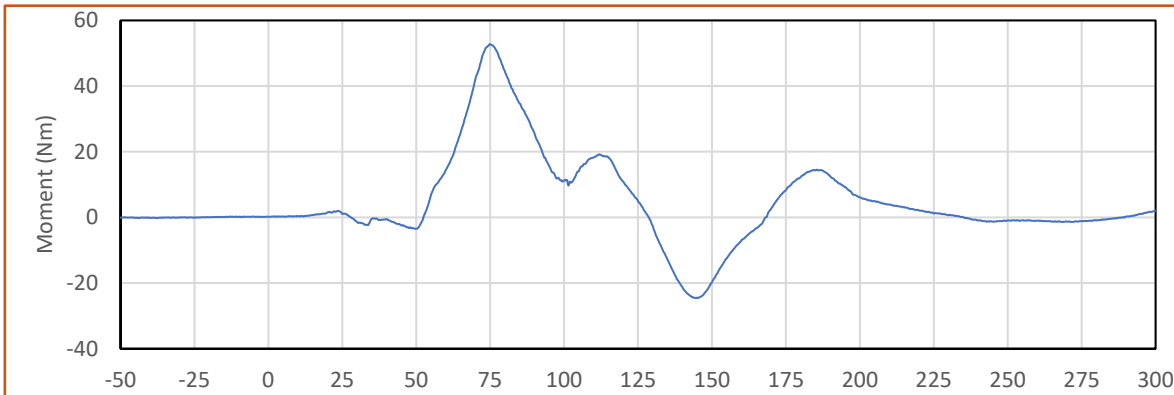
11NECKUP00H3FOZA
Max:957.9@101.9
Min:-84.3@30.1
SAE Class 1000

P1H3 UPPER NECK FZ



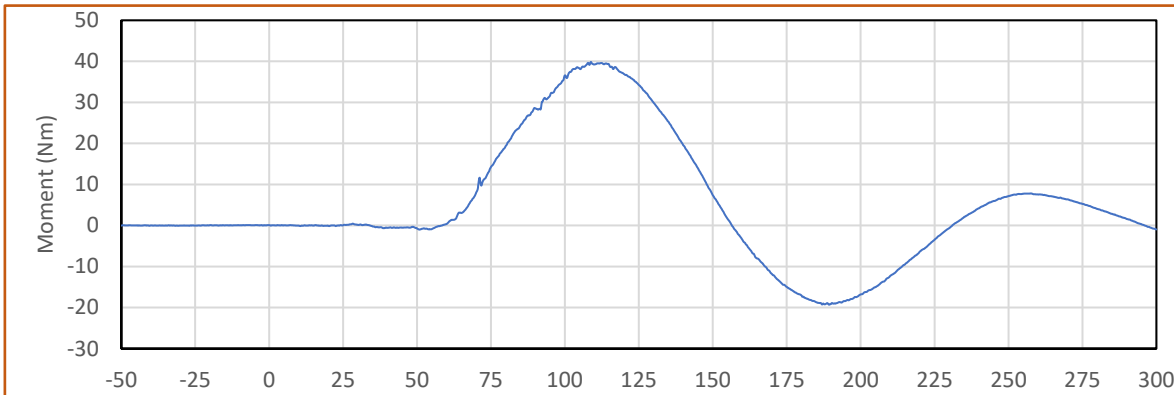
P1H3 UPPER NECK MX

11NECKUP00H3MOXB
Max:7.8@230.8
Min:-24.9@149.9
SAE Class 600



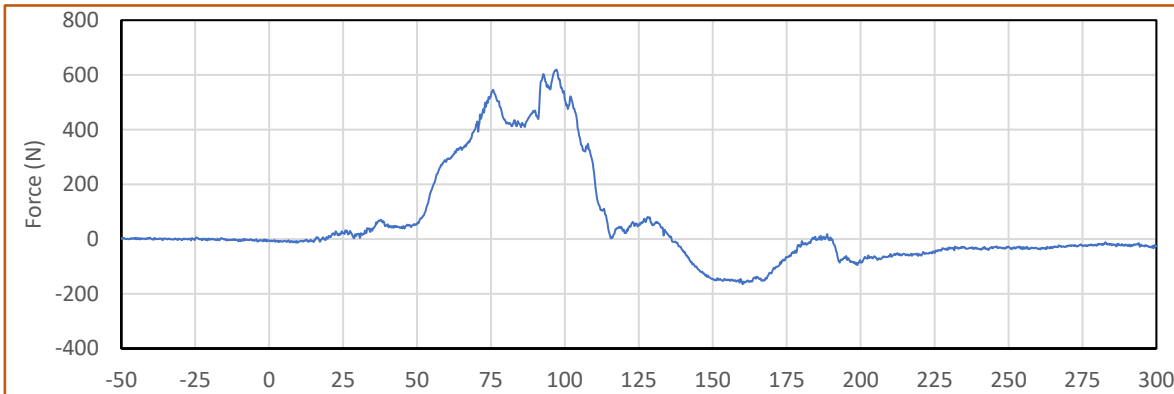
P1H3 UPPER NECK MY

11NECKUP00H3MOYB
Max:52.8@74.9
Min:-24.6@144.4
SAE Class 600



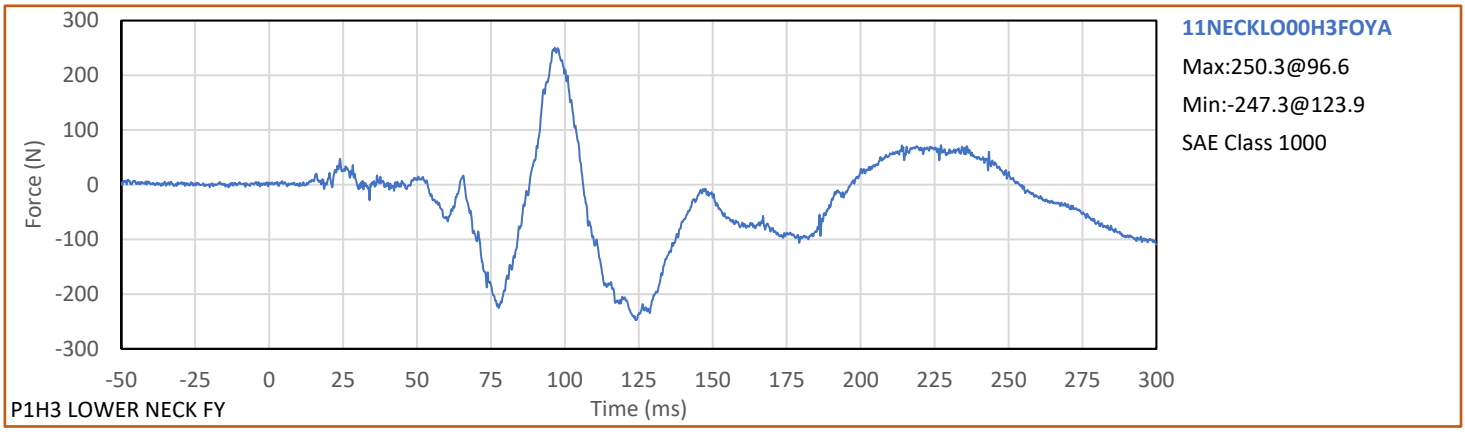
P1H3 UPPER NECK MZ

11NECKUP00H3MOZB
Max:39.8@108.8
Min:-19.3@189.3
SAE Class 600

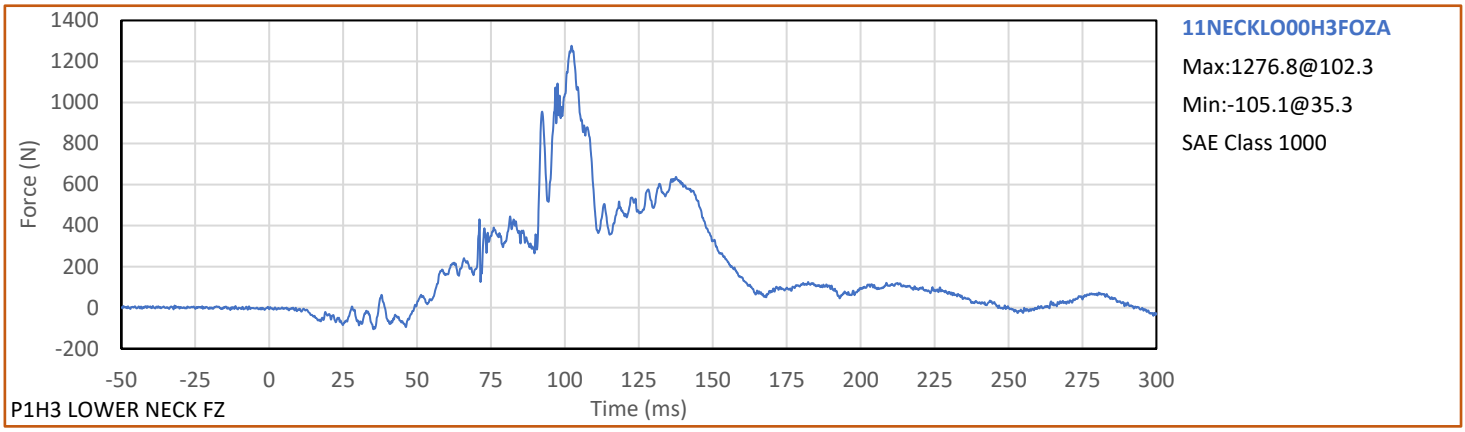


P1H3 LOWER NECK FX

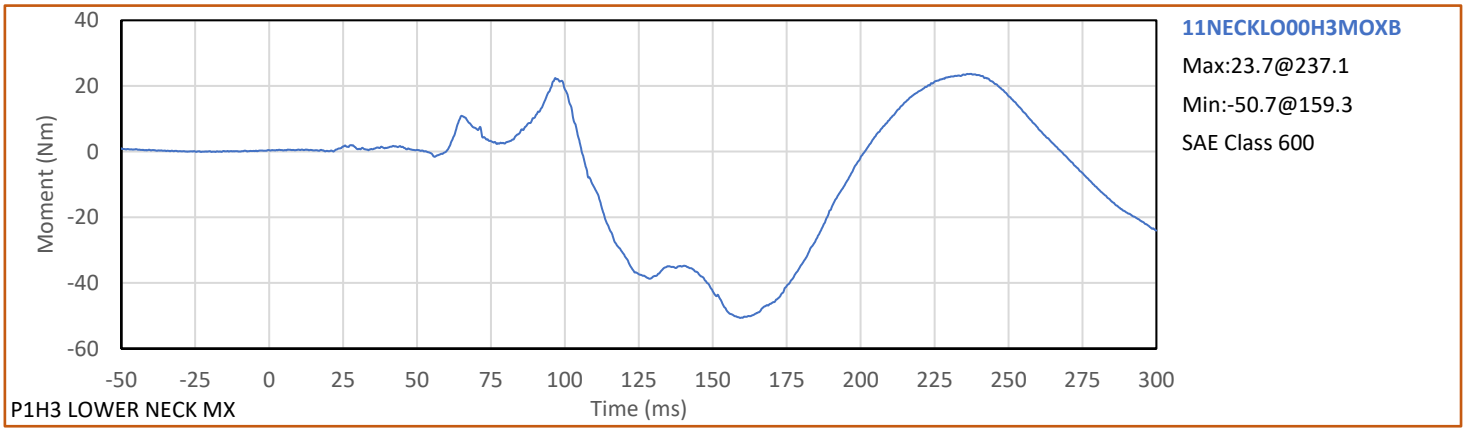
11NECKLO00H3FOXA
Max:619.1@97.1
Min:-164.8@160.1
SAE Class 1000



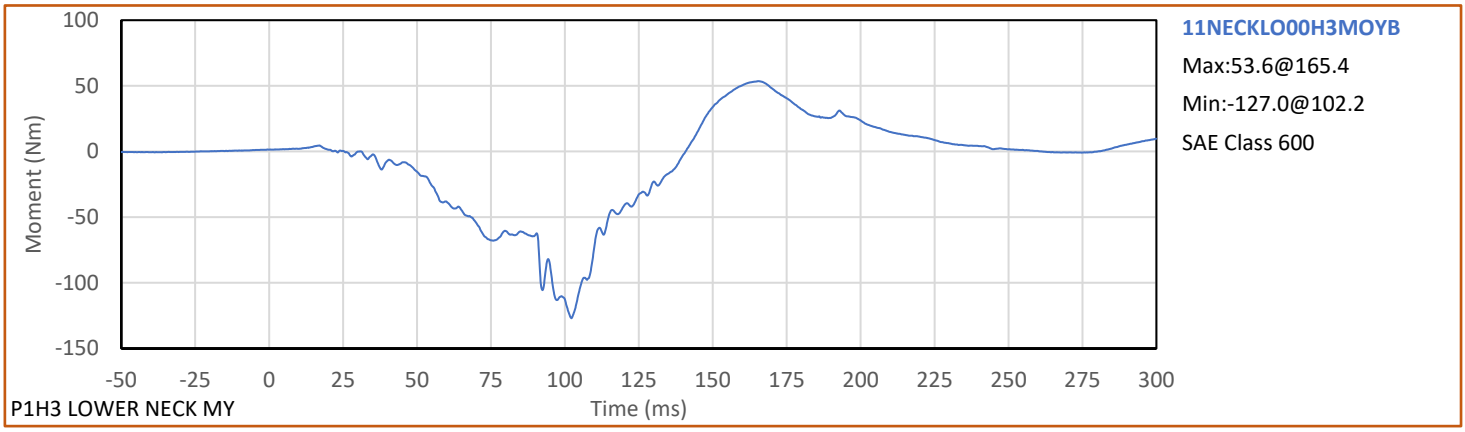
11NECKLO00H3FOYA
Max:250.3@96.6
Min:-247.3@123.9
SAE Class 1000



11NECKLO00H3FOZA
Max:1276.8@102.3
Min:-105.1@35.3
SAE Class 1000



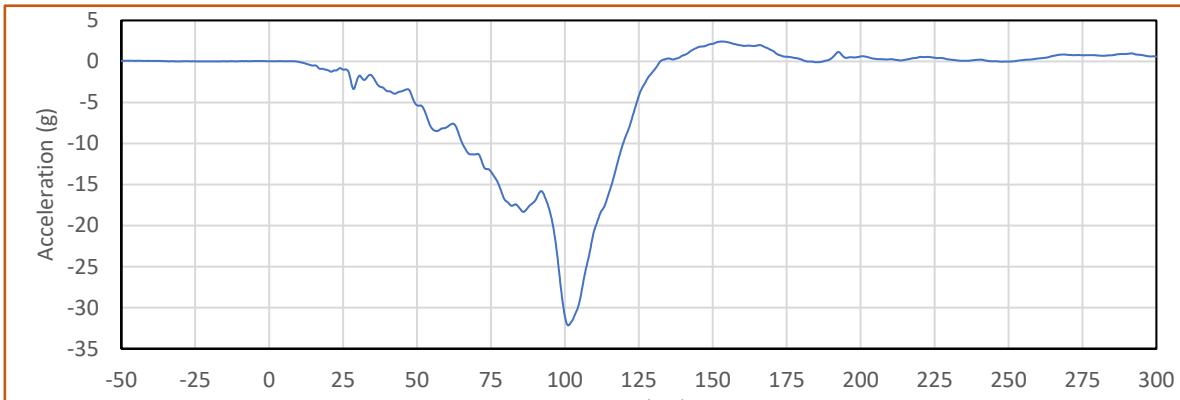
11NECKLO00H3MOXB
Max:23.7@237.1
Min:-50.7@159.3
SAE Class 600



11NECKLO00H3MOYB
Max:53.6@165.4
Min:-127.0@102.2
SAE Class 600

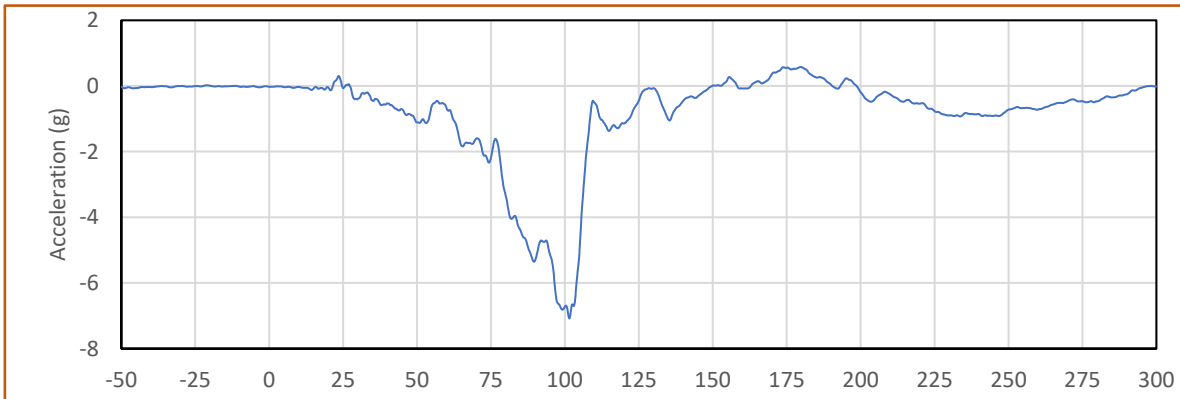
P1H3 LOWER NECK MZ

11NECKLO00H3MOZB
Max:55.5@99.7
Min:-17.4@184.7
SAE Class 600



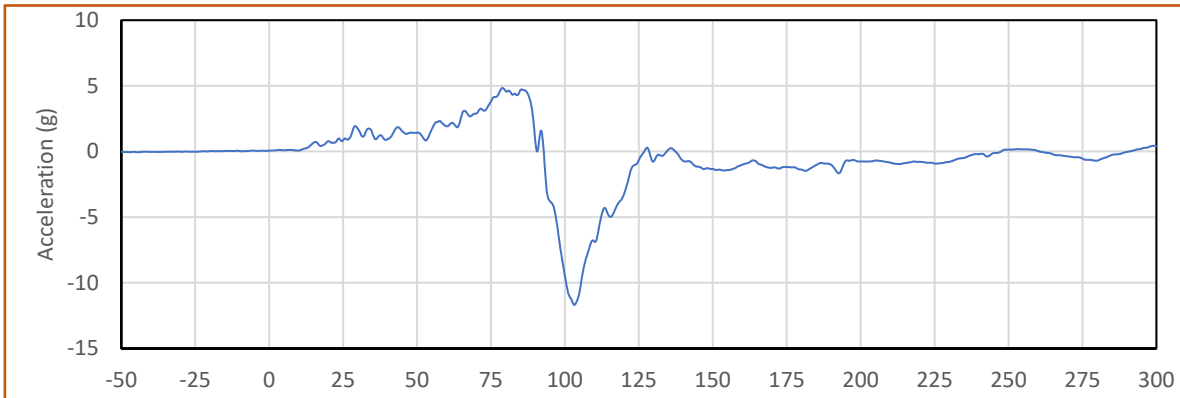
P1H3 CHEST AX

11CHST0000H3ACXC
Max:2.4@152.9
Min:-32.2@101.2
SAE Class 180



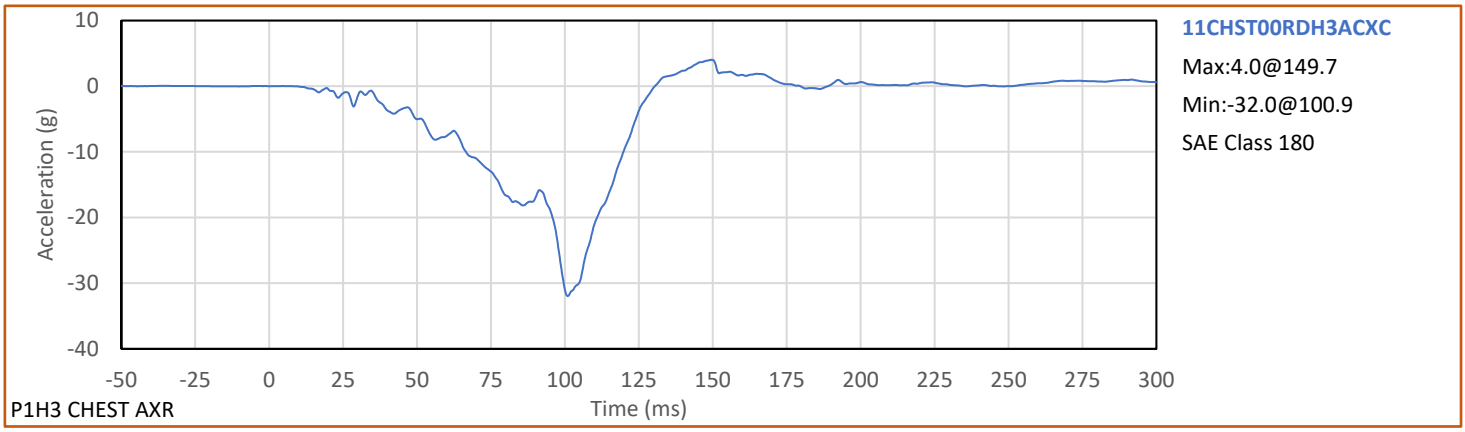
P1H3 CHEST AY

11CHST0000H3ACYC
Max:0.6@179.7
Min:-7.1@101.5
SAE Class 180

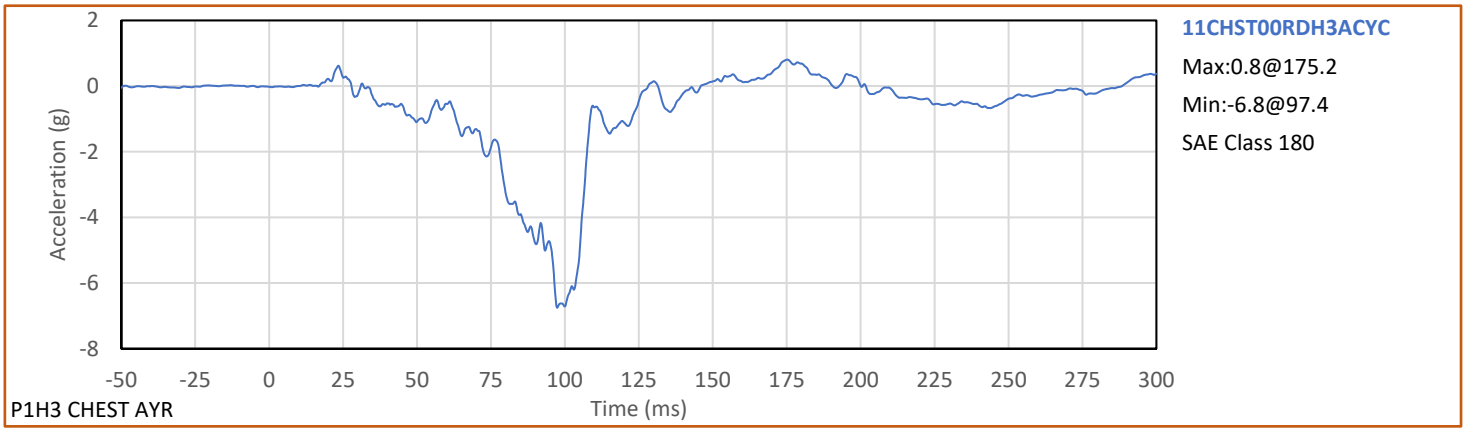


P1H3 CHEST AZ

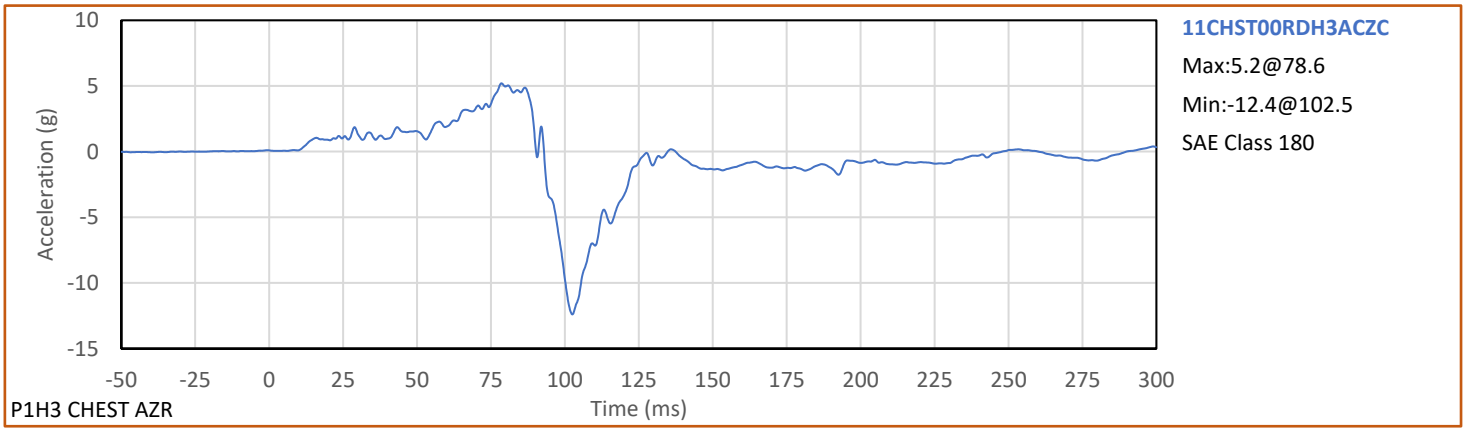
11CHST0000H3ACZC
Max:4.8@78.9
Min:-11.7@103.2
SAE Class 180



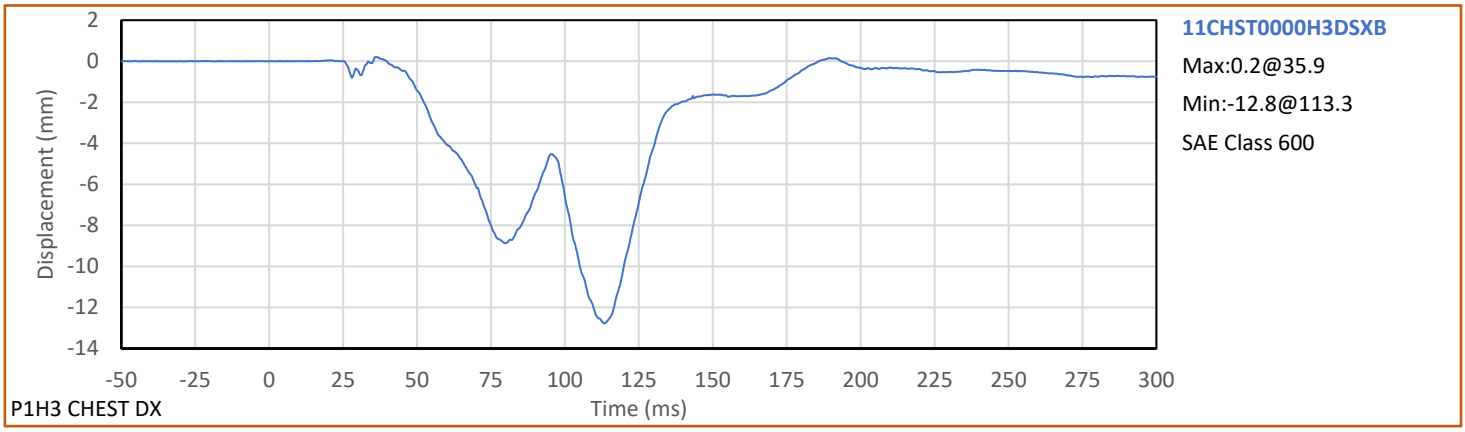
11CHST00RDH3ACXC
Max:4.0@149.7
Min:-32.0@100.9
SAE Class 180



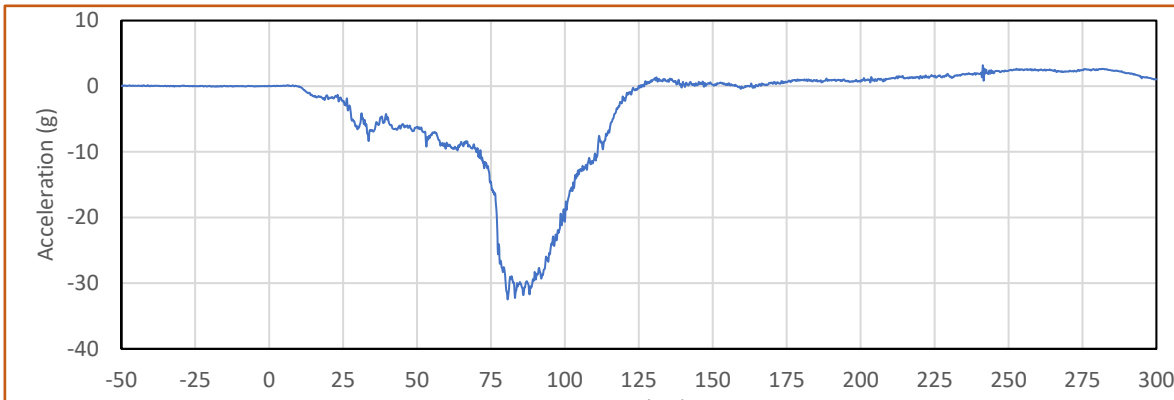
11CHST00RDH3ACYC
Max:0.8@175.2
Min:-6.8@97.4
SAE Class 180



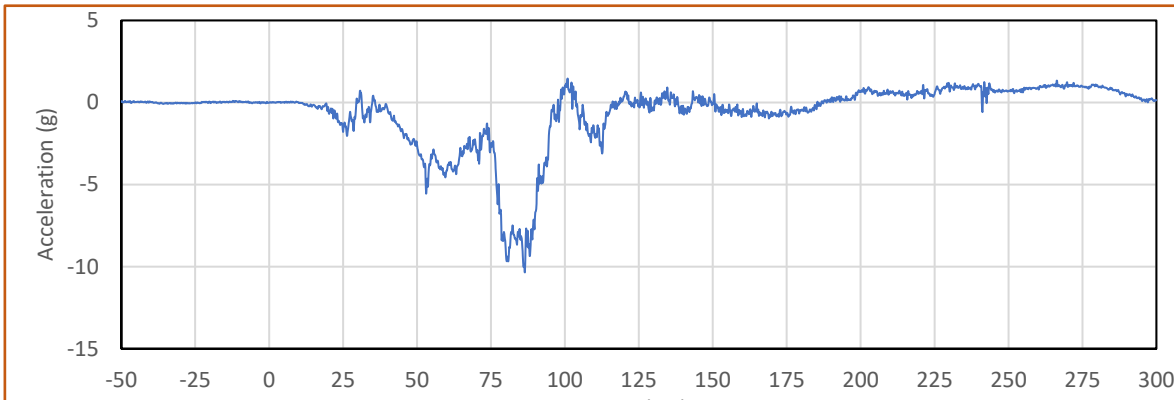
11CHST00RDH3ACZC
Max:5.2@78.6
Min:-12.4@102.5
SAE Class 180



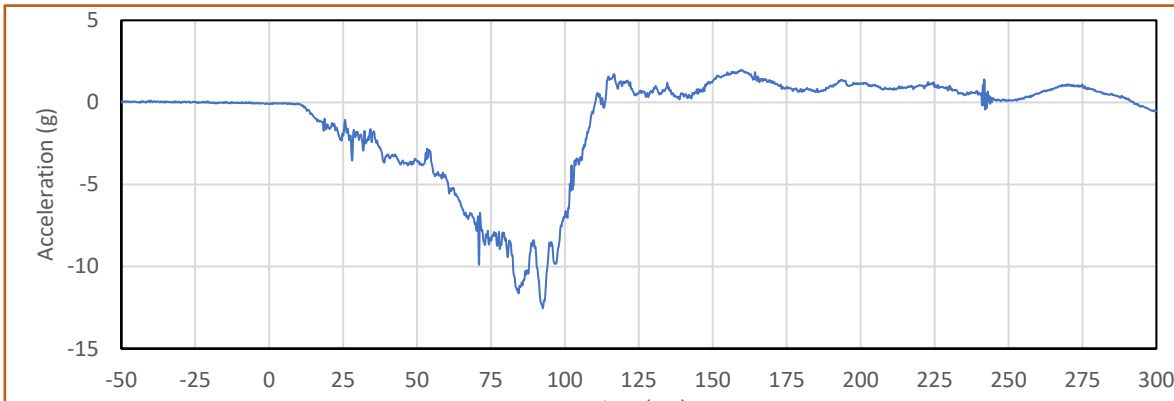
11CHST0000H3DSXB
Max:0.2@35.9
Min:-12.8@113.3
SAE Class 600



11PELV0000H3ACXA
Max:3.2@241.3
Min:-32.5@80.7
SAE Class 1000

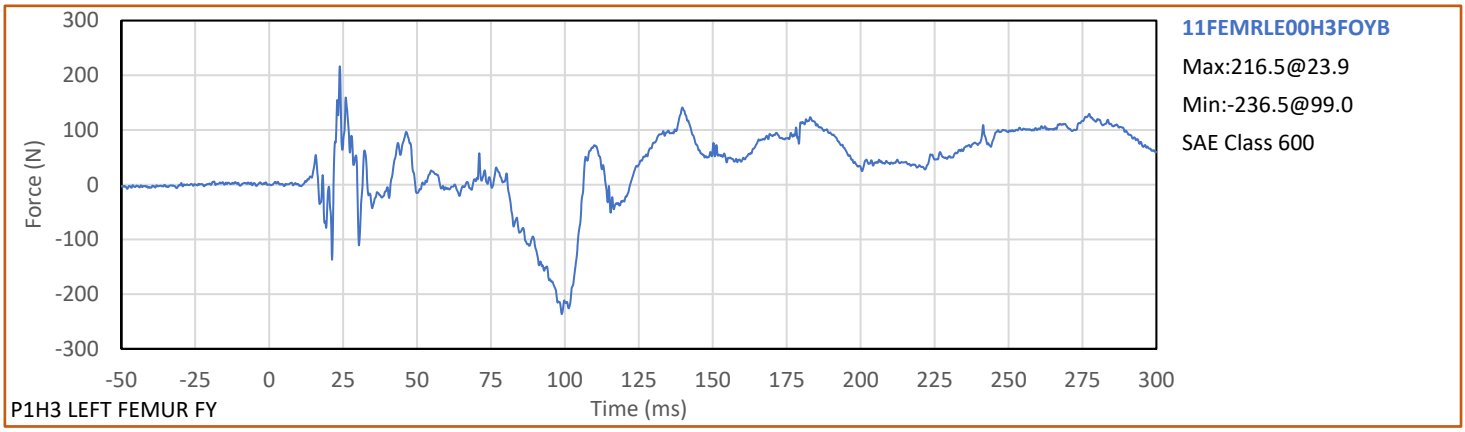


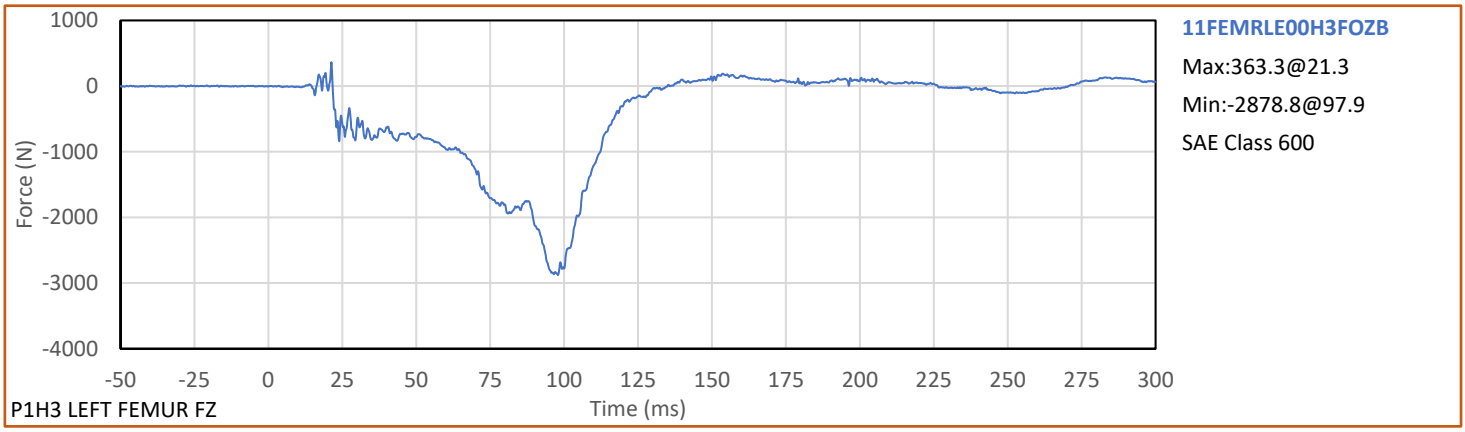
11PELV0000H3ACYA
Max:1.5@100.9
Min:-10.4@86.5
SAE Class 1000

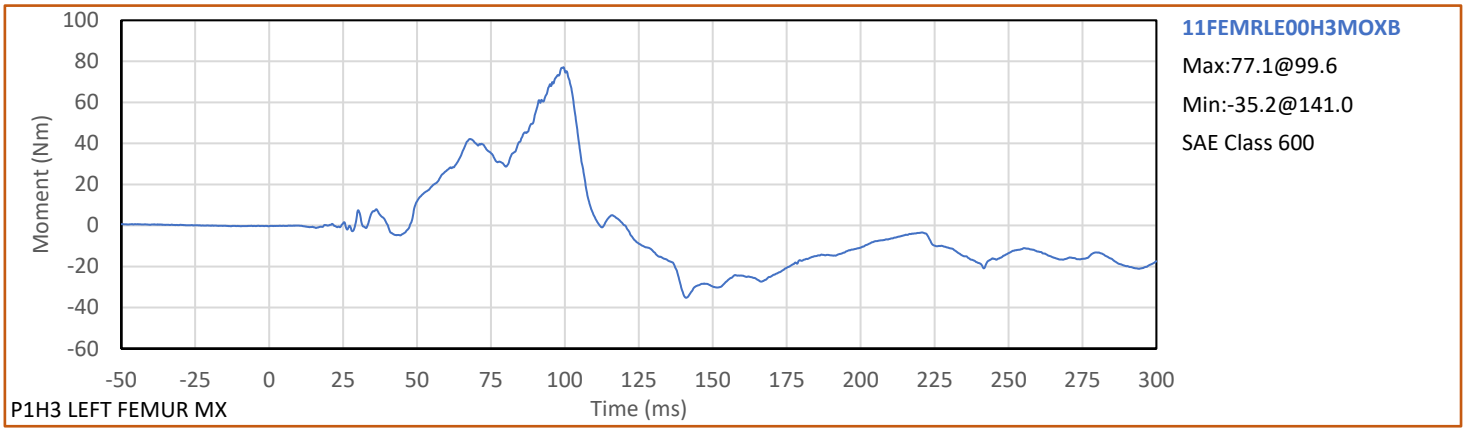


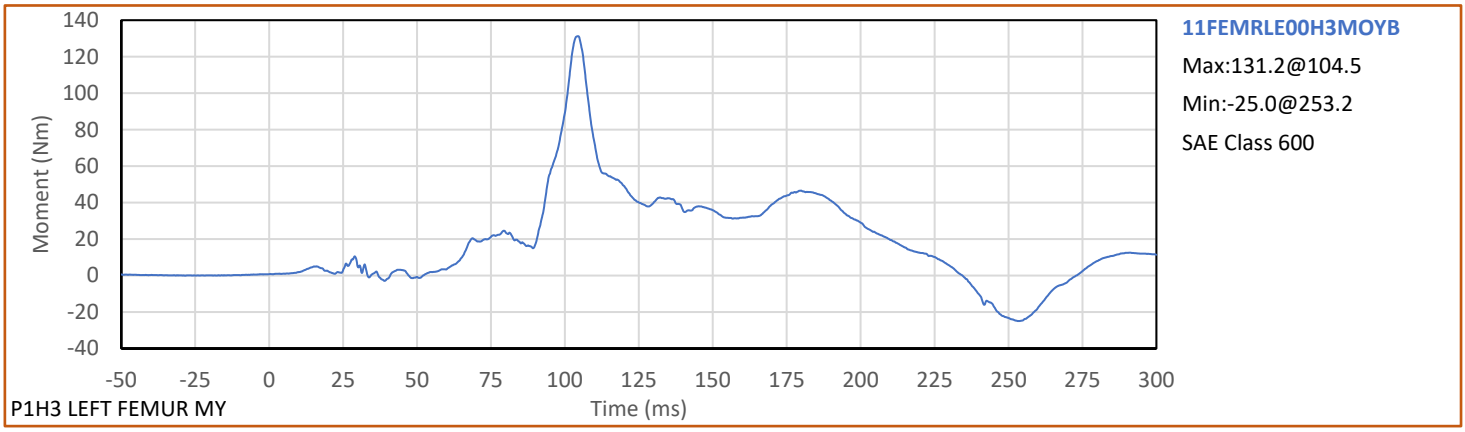
11PELV0000H3ACZA
Max:2.0@159.7
Min:-12.5@92.6
SAE Class 1000

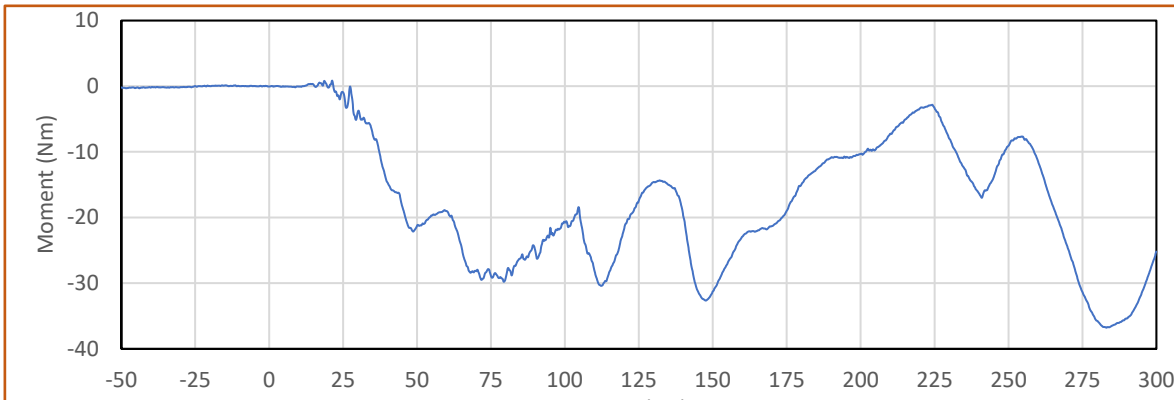
11FEMRLE00H3FOXB
Max:1039.8@98.5
Min:-109.9@156.8
SAE Class 600


Force (N)
Time (ms)
P1H3 LEFT FEMUR FY
11FEMRLE00H3FOYB
Max:216.5@23.9
Min:-236.5@99.0
SAE Class 600


Force (N)
Time (ms)
P1H3 LEFT FEMUR FZ
11FEMRLE00H3FOZB
Max:363.3@21.3
Min:-2878.8@97.9
SAE Class 600


Moment (Nm)
Time (ms)
P1H3 LEFT FEMUR MX
11FEMRLE00H3MOXB
Max:77.1@99.6
Min:-35.2@141.0
SAE Class 600


Moment (Nm)
Time (ms)
P1H3 LEFT FEMUR MY
11FEMRLE00H3MOYB
Max:131.2@104.5
Min:-25.0@253.2
SAE Class 600

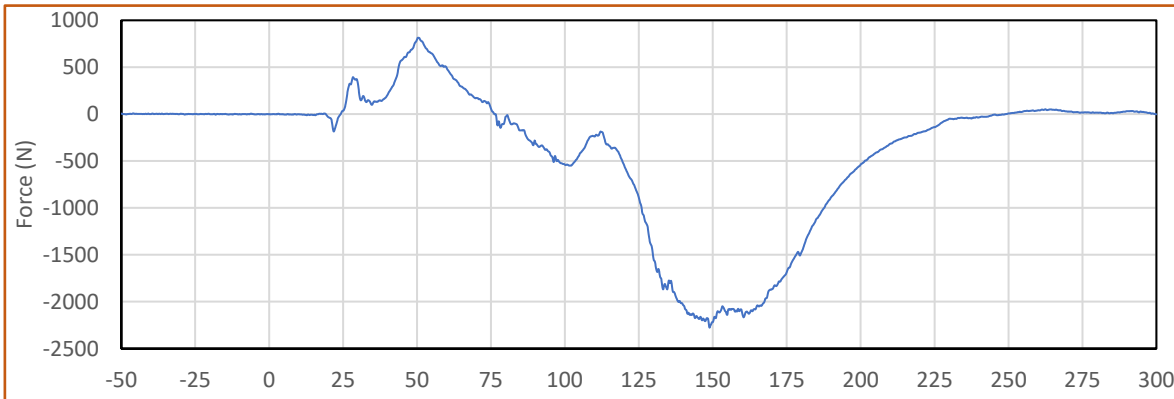


P1H3 LEFT FEMUR MZ

11FEMRLE00H3MOZB
Max:0.9@21.3
Min:-36.8@283.1
SAE Class 600

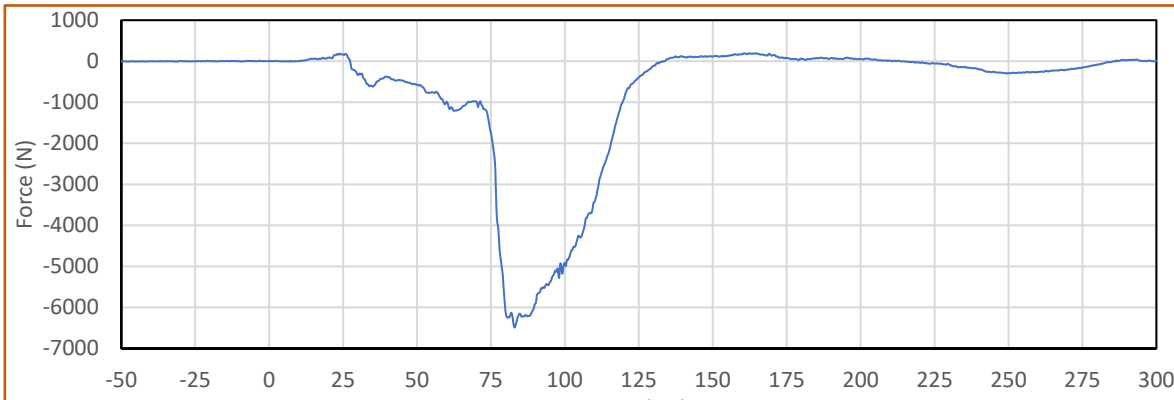
P1H3 RIGHT FEMUR FX

11FEMRRI00H3FOXB
Max:1582.9@99.7
Min:-161.4@27.7
SAE Class 600



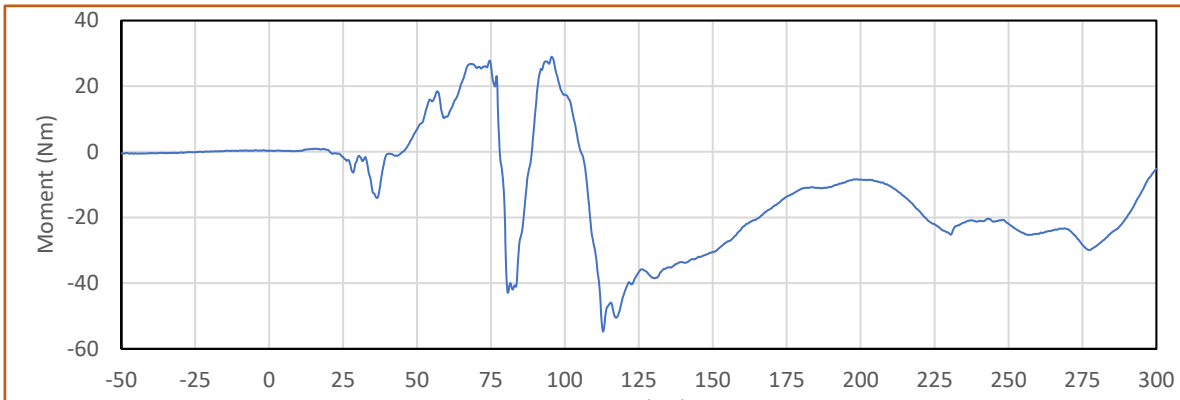
P1H3 RIGHT FEMUR FY

11FEMRRI00H3FOYB
Max:814.7@50.4
Min:-2277.2@148.9
SAE Class 600

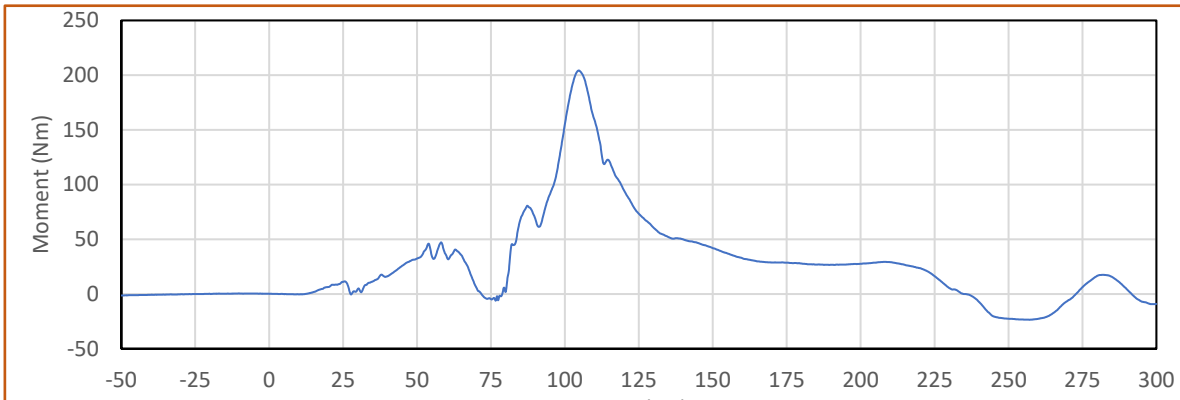


P1H3 RIGHT FEMUR FZ

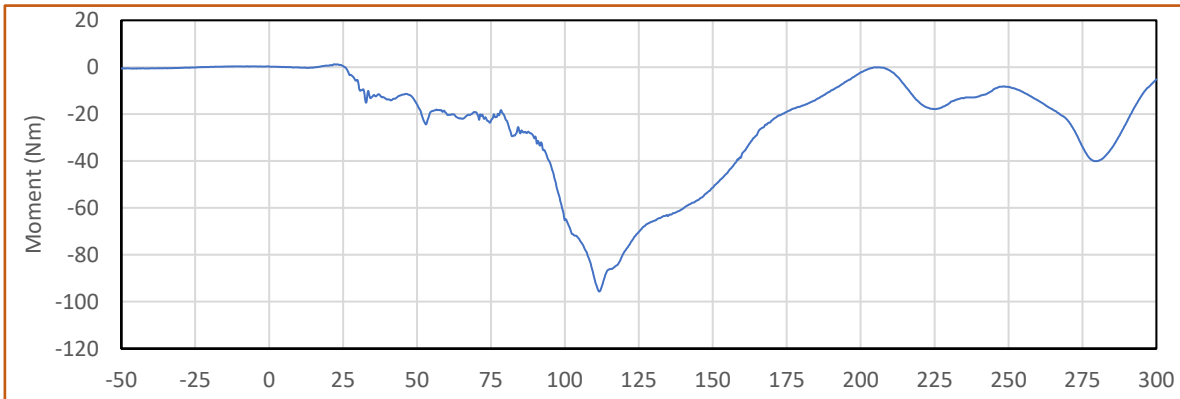
11FEMRRI00H3FOZB
Max:195.0@164.7
Min:-6490.3@83.0
SAE Class 600



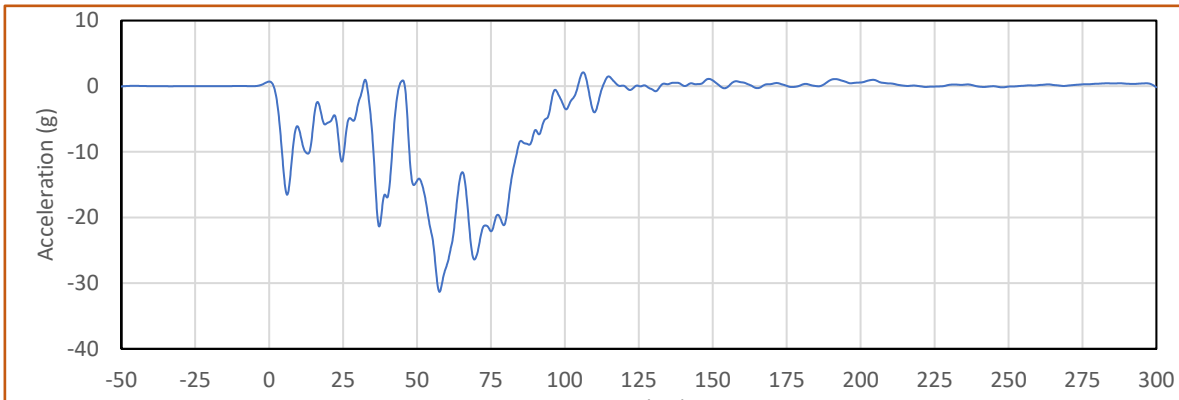
11FEMRRI00H3MOXB
Max:29.0@95.6
Min:-54.8@112.9
SAE Class 600



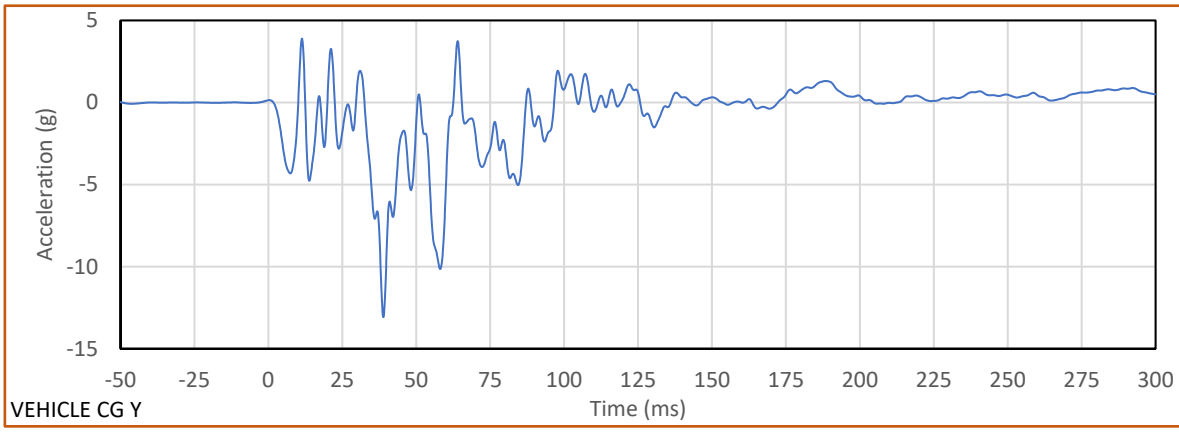
11FEMRRI00H3MOYB
Max:204.1@104.7
Min:-23.6@257.1
SAE Class 600



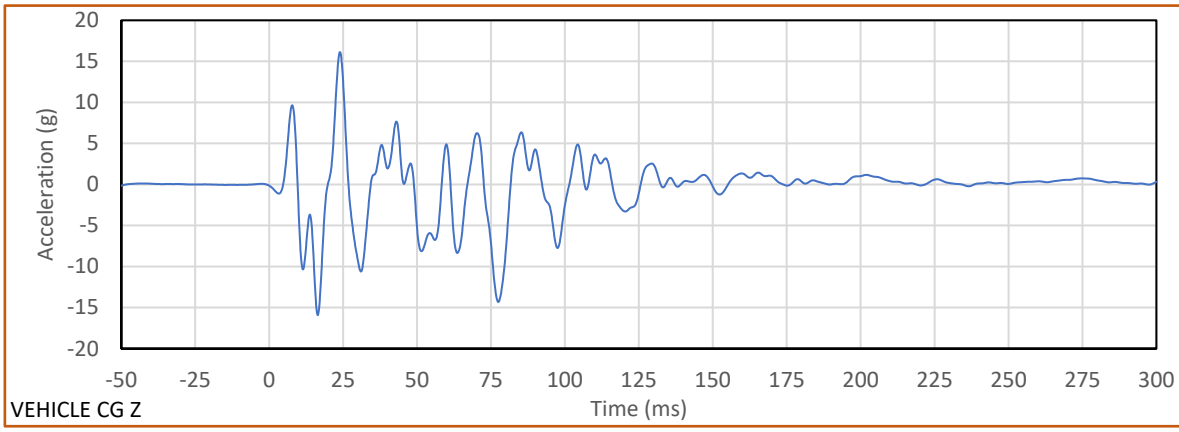
11FEMRRI00H3MOZB
Max:1.2@22.0
Min:-95.7@111.6
SAE Class 600



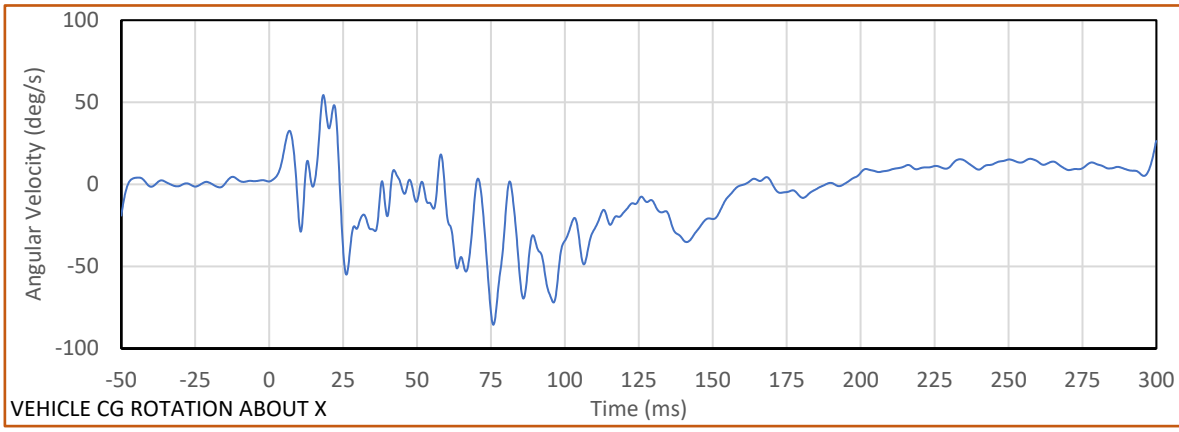
15TUNNCGLO00ACXD
Max:2.1@106.2
Min:-31.3@57.6
SAE Class 60



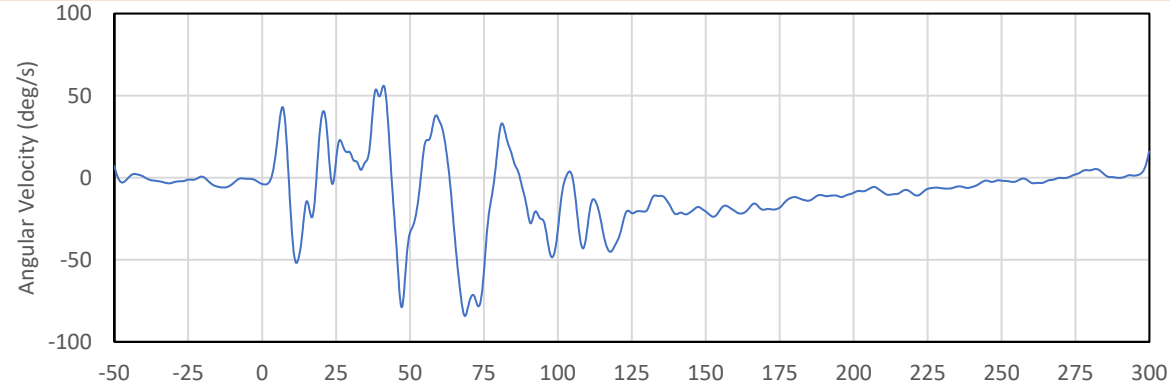
15TUNNCGLO00ACYD
Max:3.9@11.4
Min:-13.1@38.9
SAE Class 60



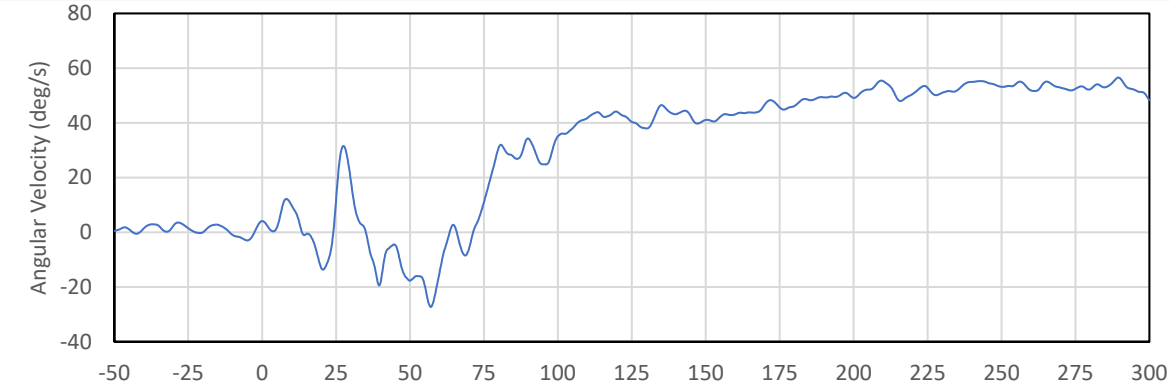
15TUNNCGLO00ACZD
Max:16.1@24.0
Min:-15.9@16.4
SAE Class 60



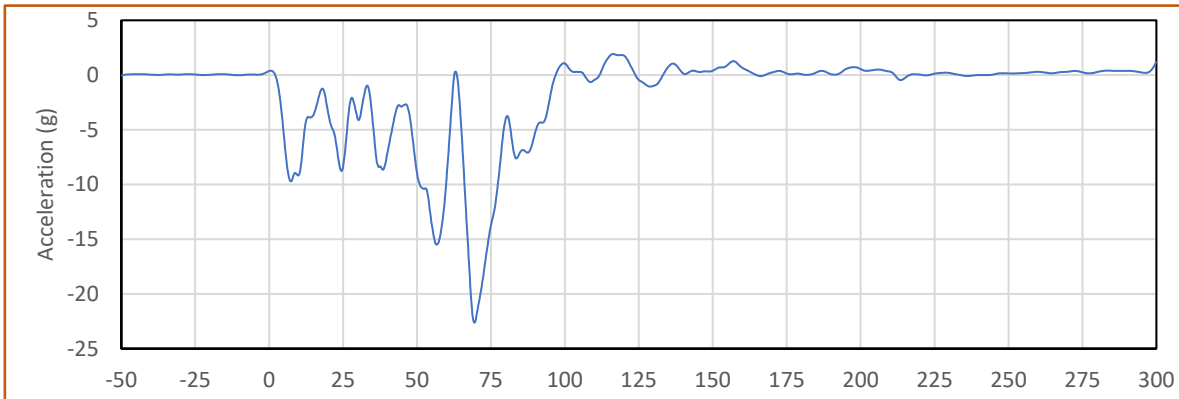
15TUNNCGLO00AVXD
Max:54.4@18.3
Min:-85.6@75.8
SAE Class 60



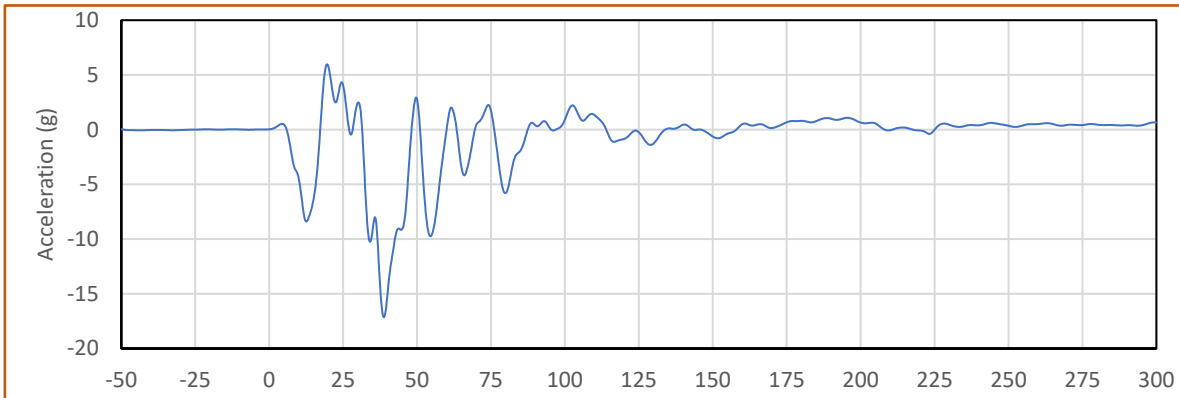
15TUNNCGLO00AVYD
Max:56.1@41.1
Min:-84.3@68.6
SAE Class 60



15TUNNCGLO00AVZD
Max:56.5@289.5
Min:-27.3@57.0
SAE Class 60



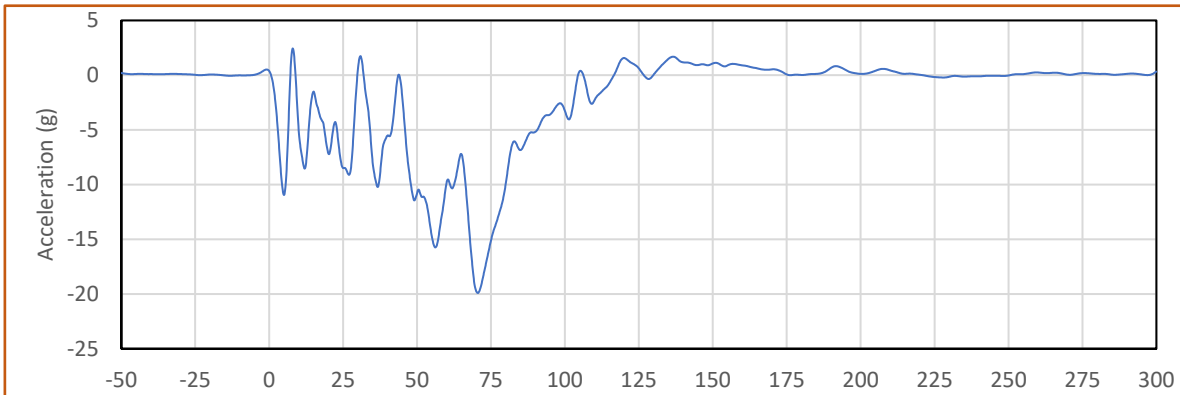
11FOWE000000ACXD
Max:1.9@116.3
Min:-22.6@69.4
SAE Class 60



11FOWE000000ACYD
Max:6.0@19.6
Min:-17.1@38.8
SAE Class 60

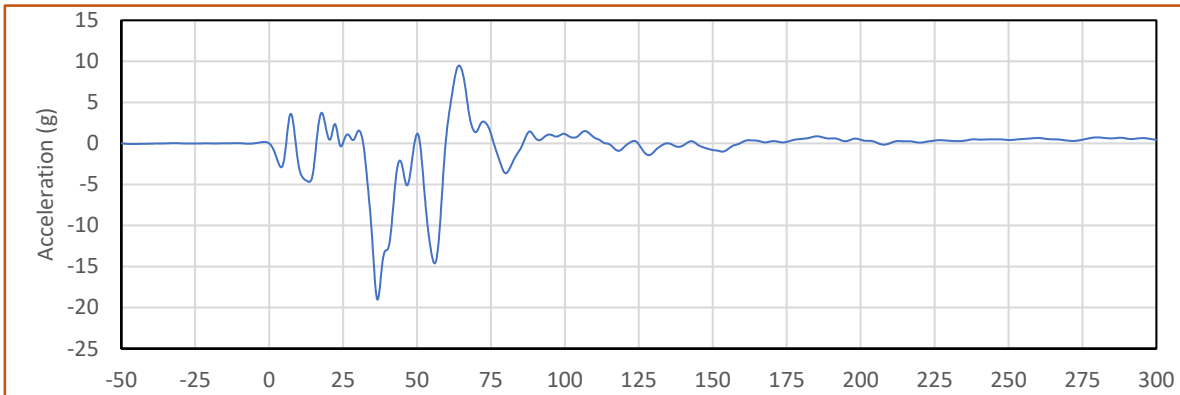
DRIVER FLOOR PAN Z

11FOWE000000ACZD
Max:30.6@60.6
Min:-0.9@130.7
SAE Class 60



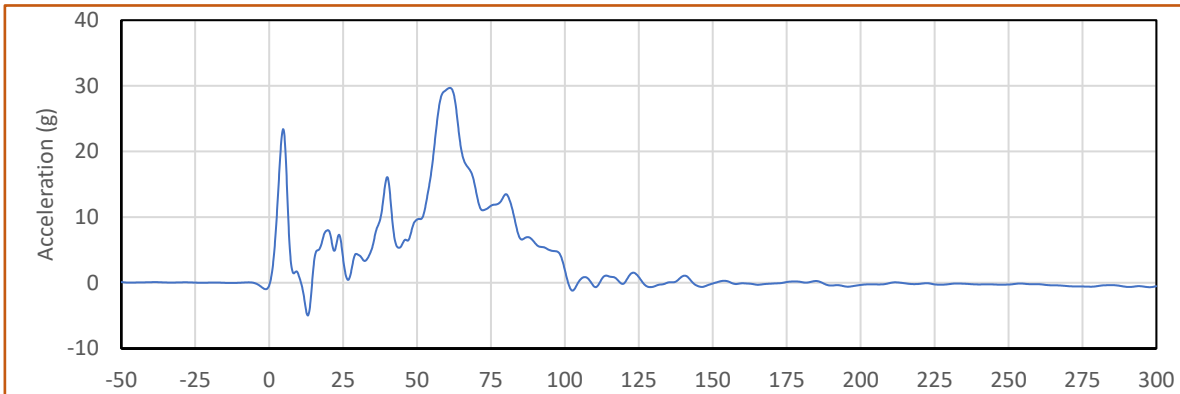
PASSENGER FLOOR PAN X

13FOWE000000ACXD
Max:2.4@8.0
Min:-19.9@70.6
SAE Class 60



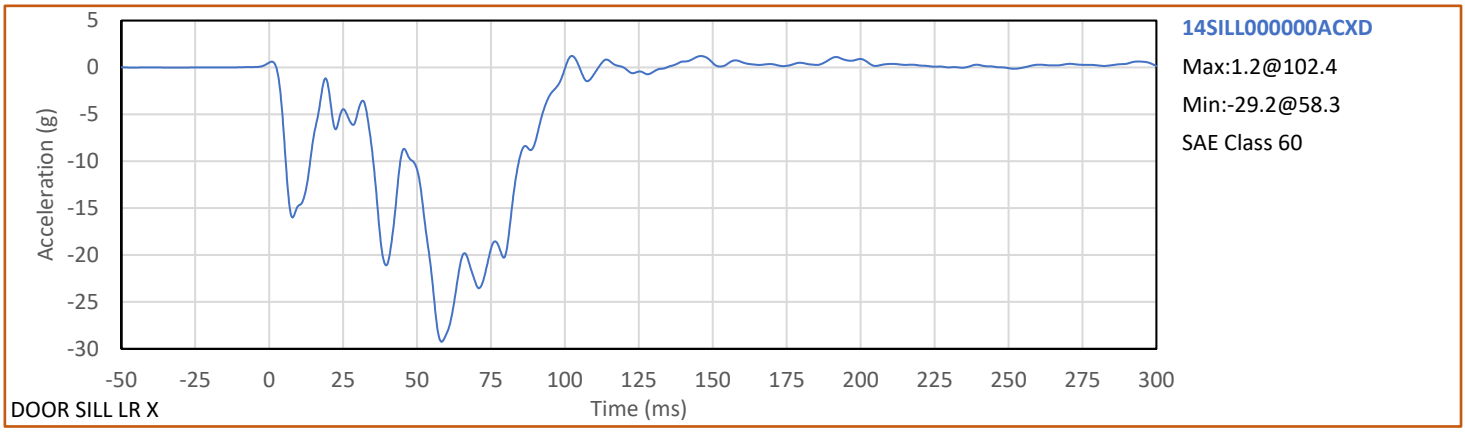
PASSENGER FLOOR PAN Y

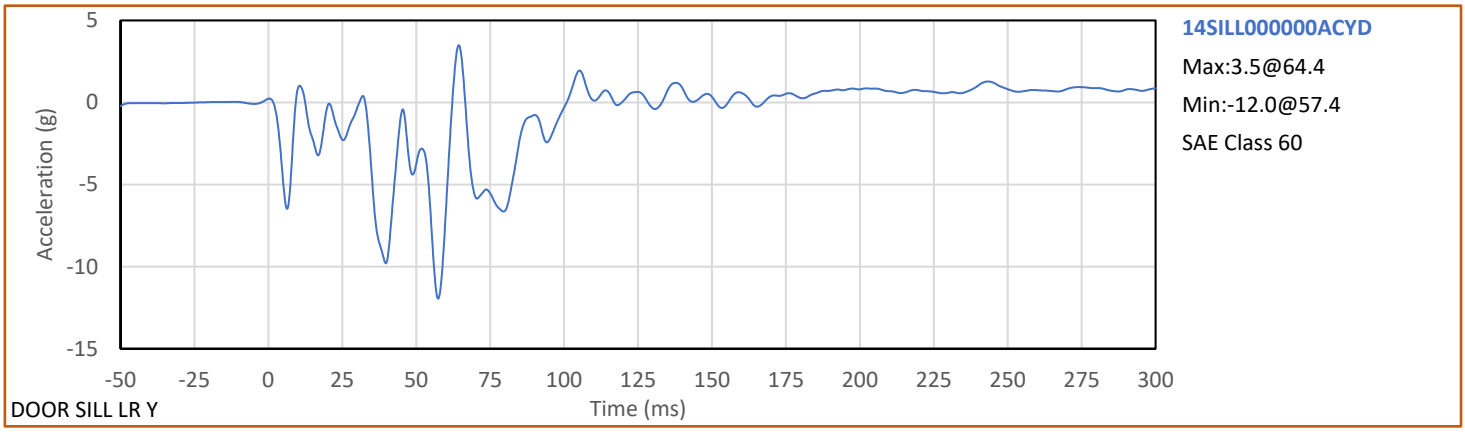
13FOWE000000ACYD
Max:9.5@64.2
Min:-19.0@36.7
SAE Class 60

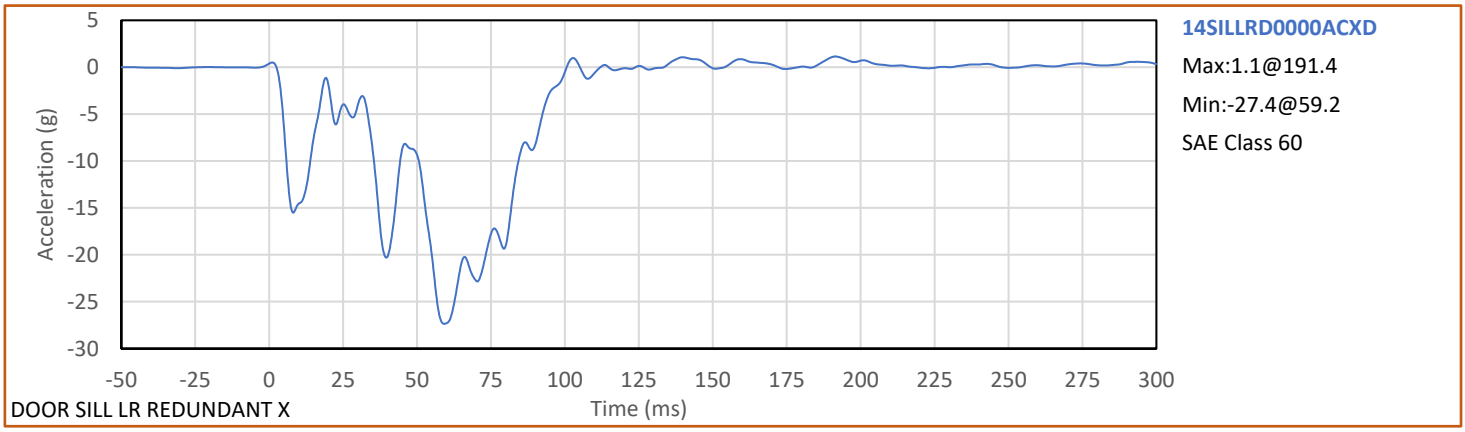


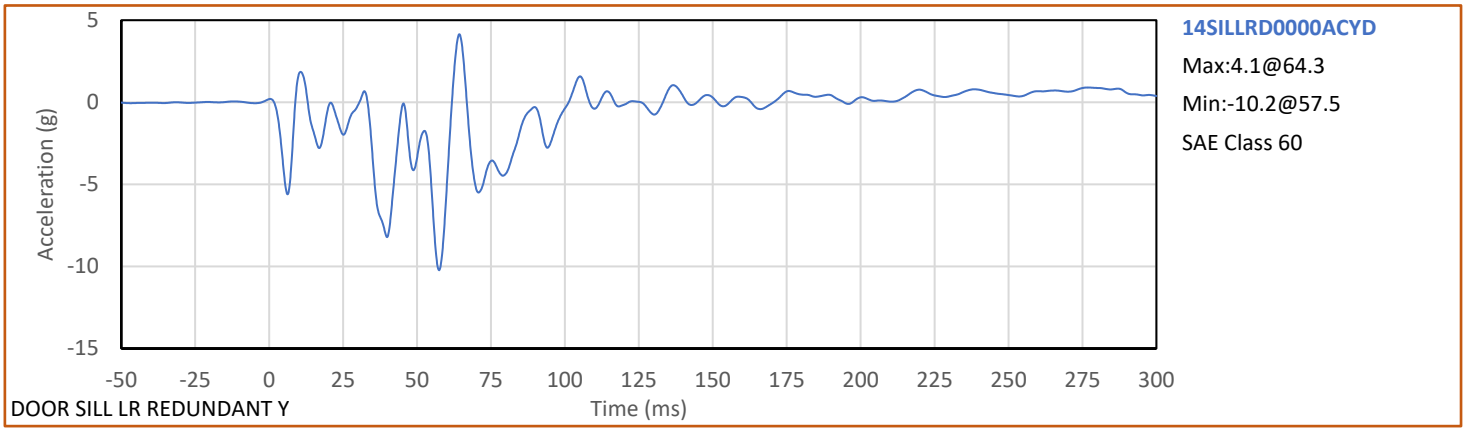
PASSENGER FLOOR PAN Z

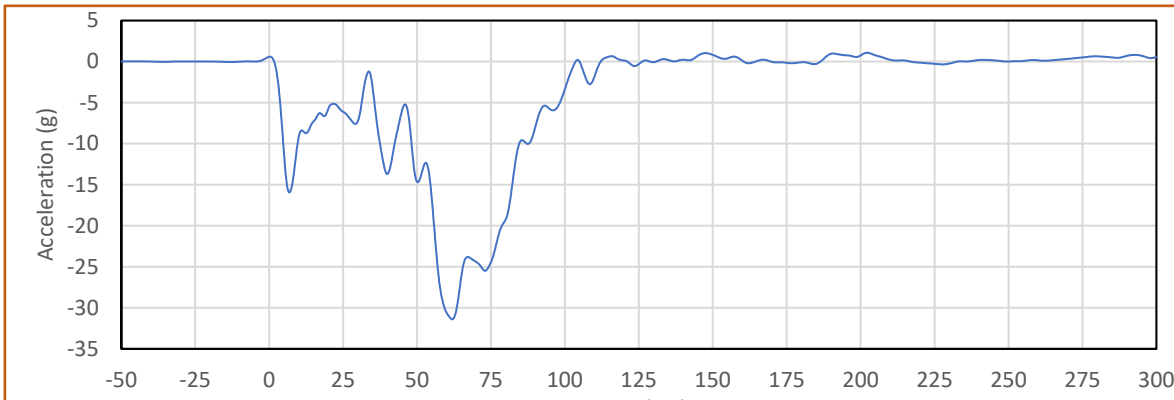
13FOWE000000ACZD
Max:29.7@61.1
Min:-5.0@13.1
SAE Class 60


14SILL000000ACXD
Max:1.2@102.4
Min:-29.2@58.3
SAE Class 60
Acceleration (g)
Time (ms)
DOOR SILL LR X

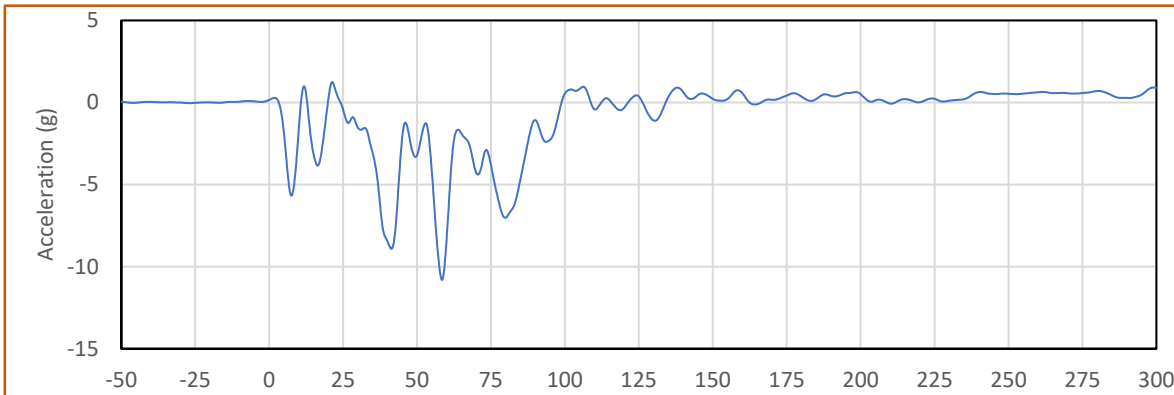

14SILL000000ACYD
Max:3.5@64.4
Min:-12.0@57.4
SAE Class 60
Acceleration (g)
Time (ms)
DOOR SILL LR Y


14SILLRD0000ACXD
Max:1.1@191.4
Min:-27.4@59.2
SAE Class 60
Acceleration (g)
Time (ms)
DOOR SILL LR REDUNDANT X

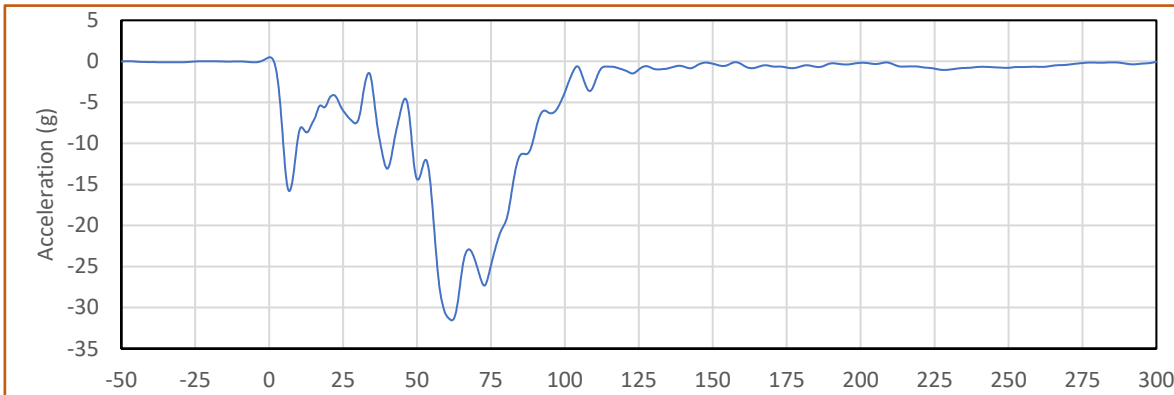

14SILLRD0000ACYD
Max:4.1@64.3
Min:-10.2@57.5
SAE Class 60
Acceleration (g)
Time (ms)
DOOR SILL LR REDUNDANT Y



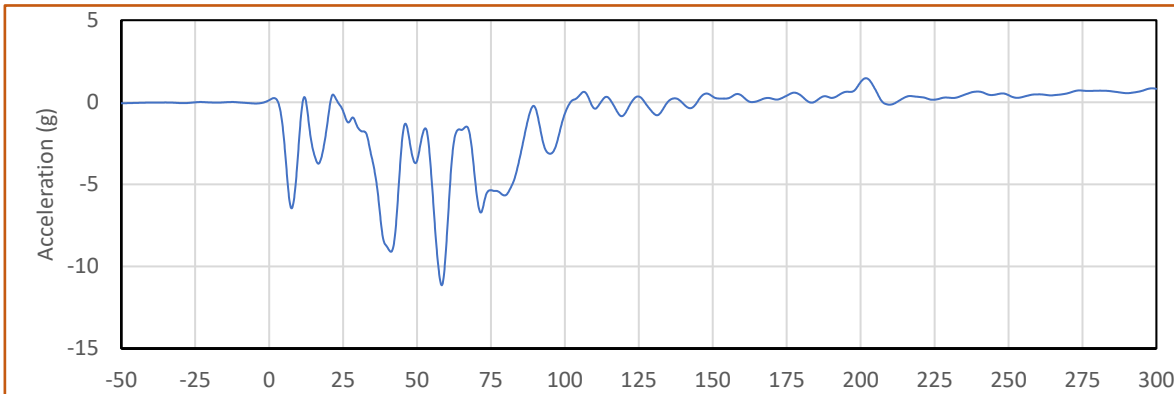
DOOR SILL RR X



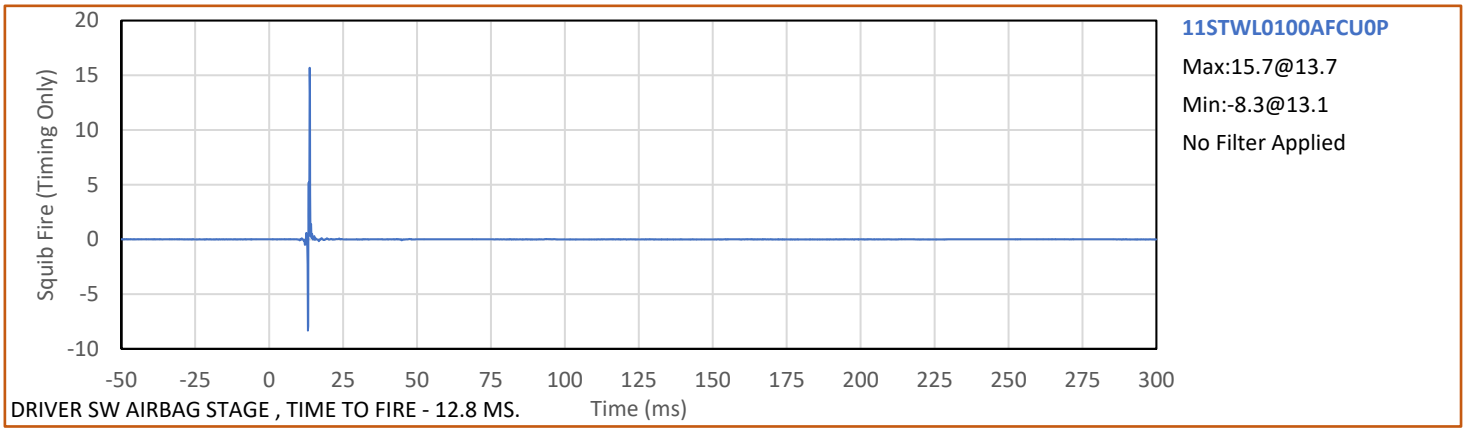
DOOR SILL RR Y



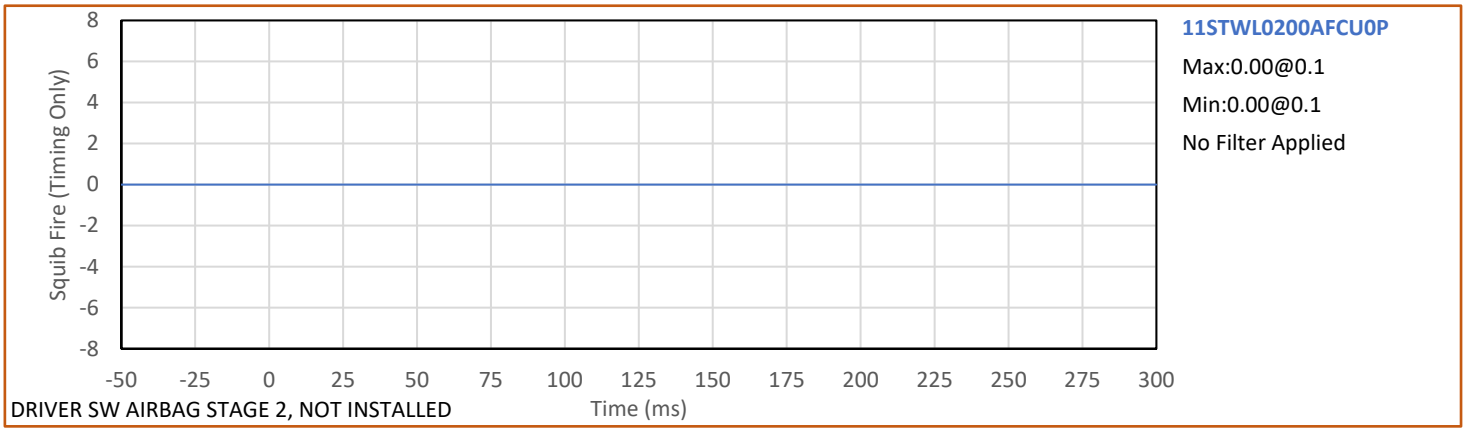
DOOR SILL RR REDUNDANT X



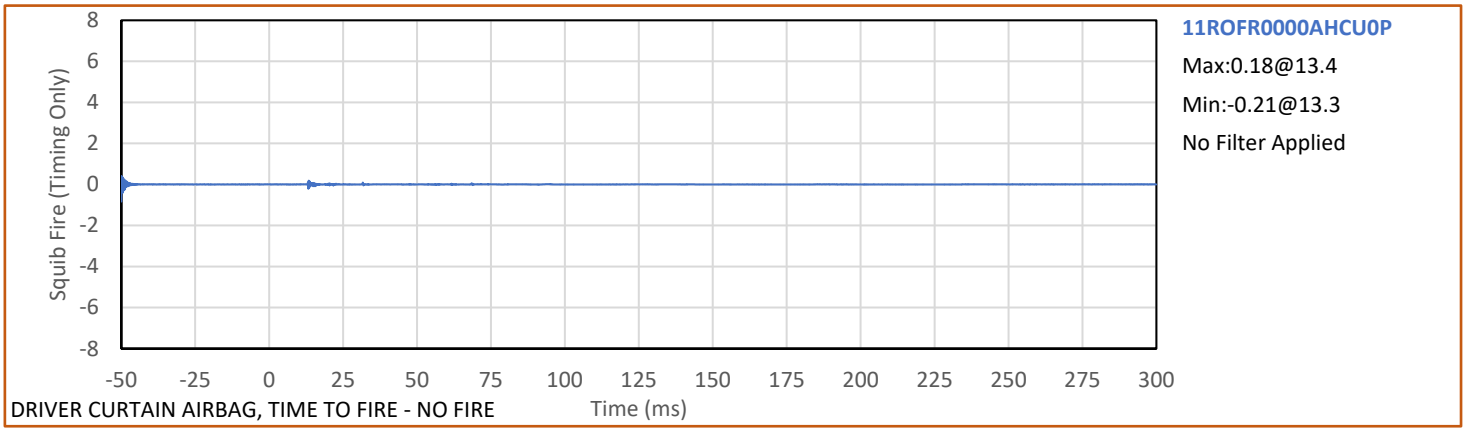
DOOR SILL RR REDUNDANT Y



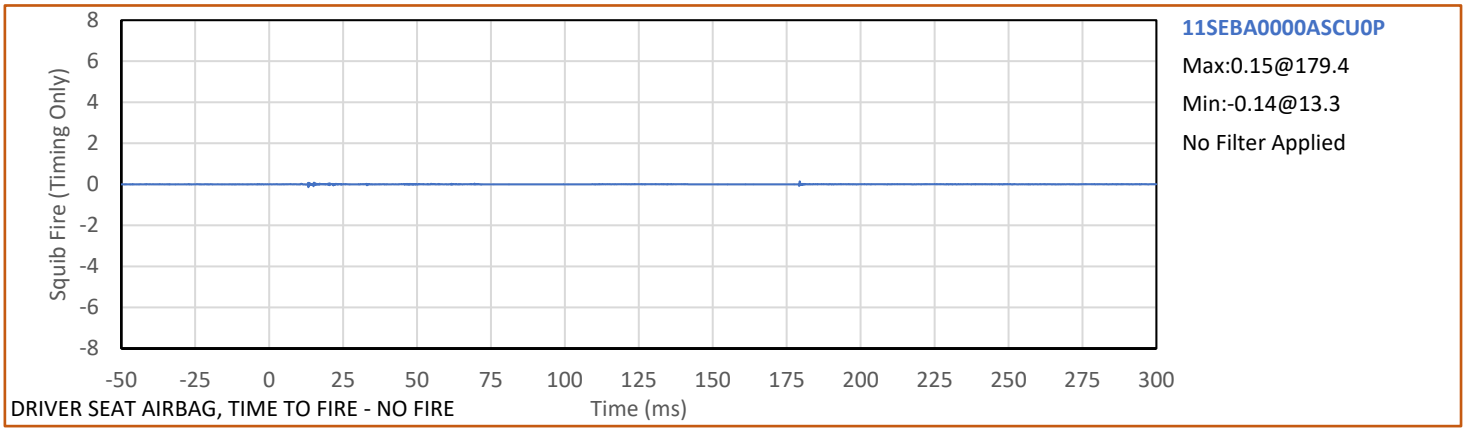
DRIVER SW AIRBAG STAGE , TIME TO FIRE - 12.8 MS.



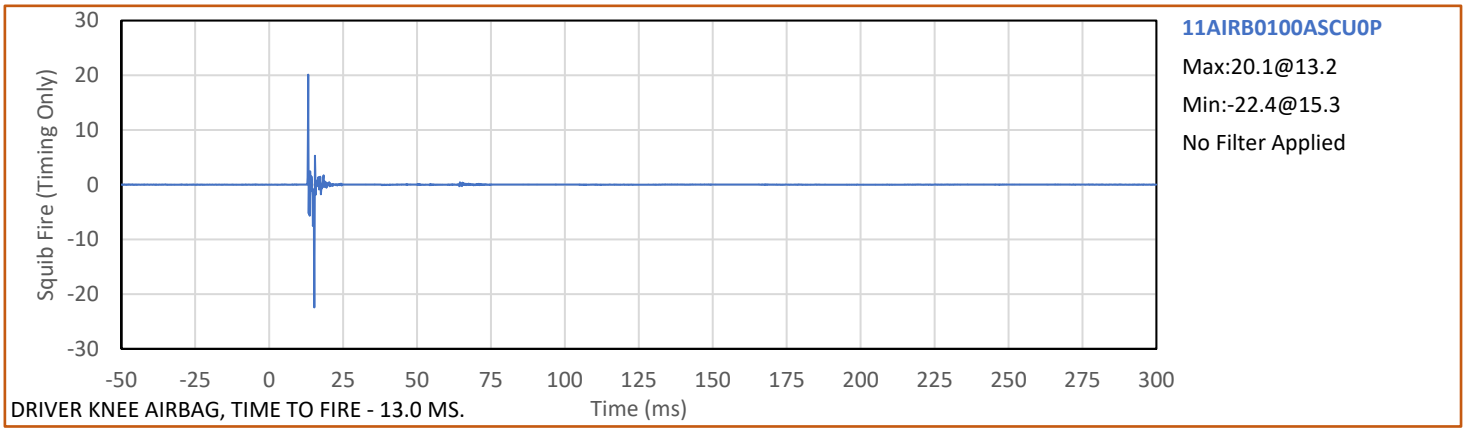
DRIVER SW AIRBAG STAGE 2, NOT INSTALLED



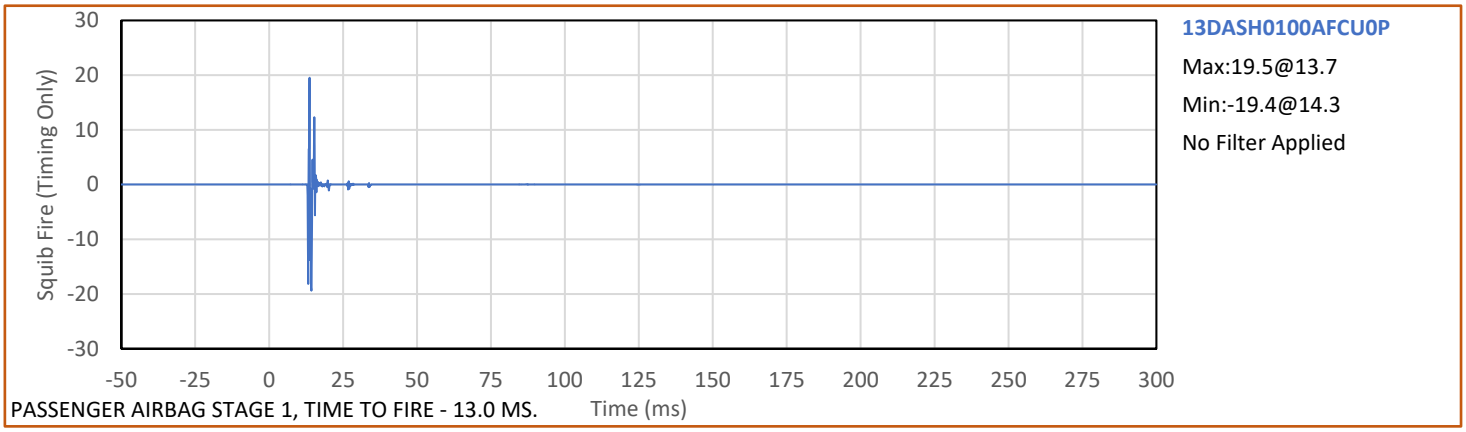
DRIVER CURTAIN AIRBAG, TIME TO FIRE - NO FIRE



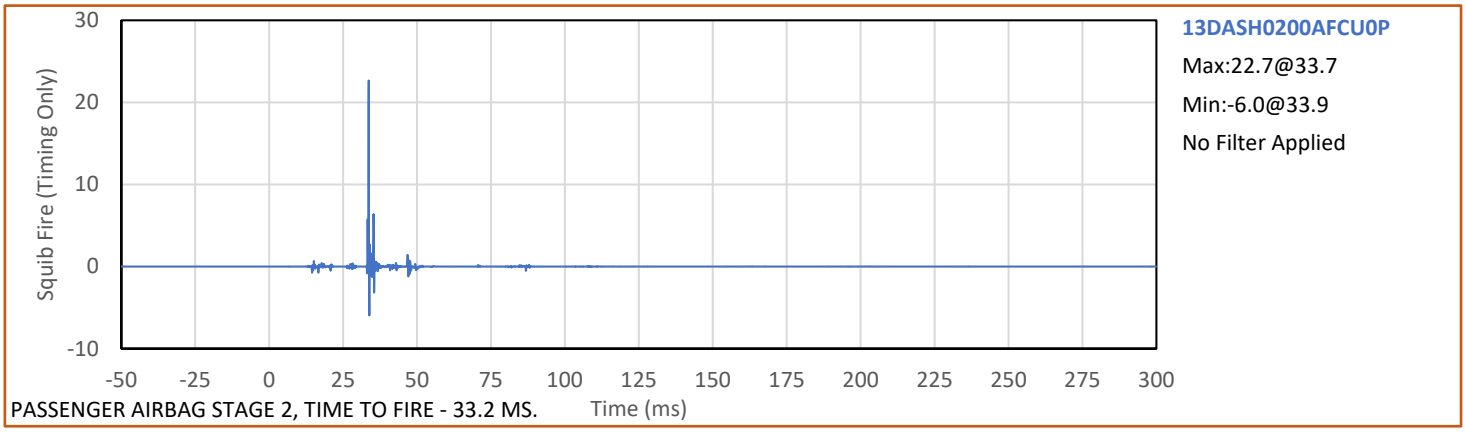
DRIVER SEAT AIRBAG, TIME TO FIRE - NO FIRE



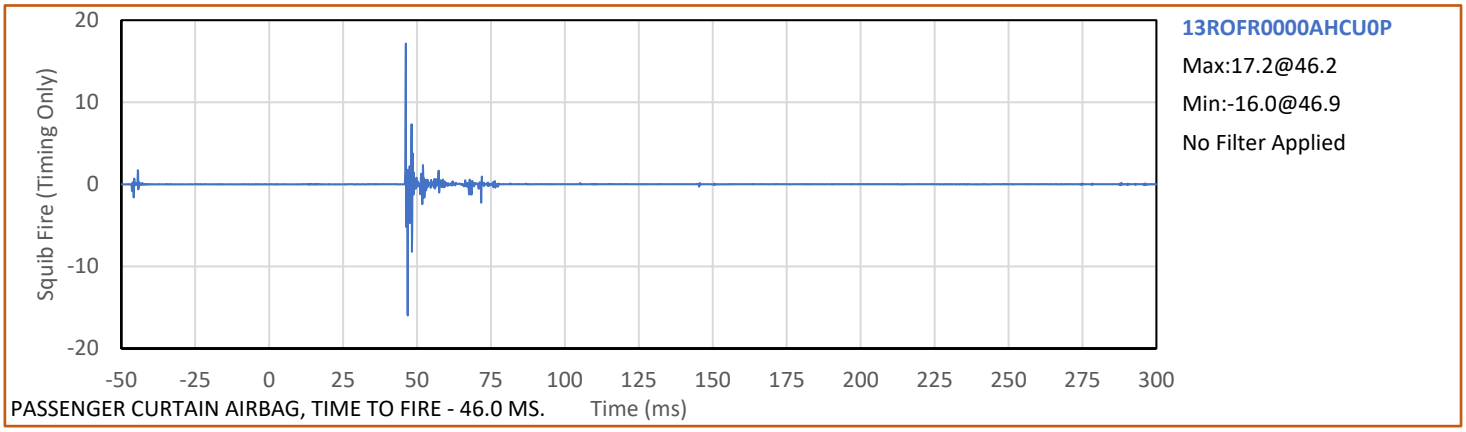
DRIVER KNEE AIRBAG, TIME TO FIRE - 13.0 MS.



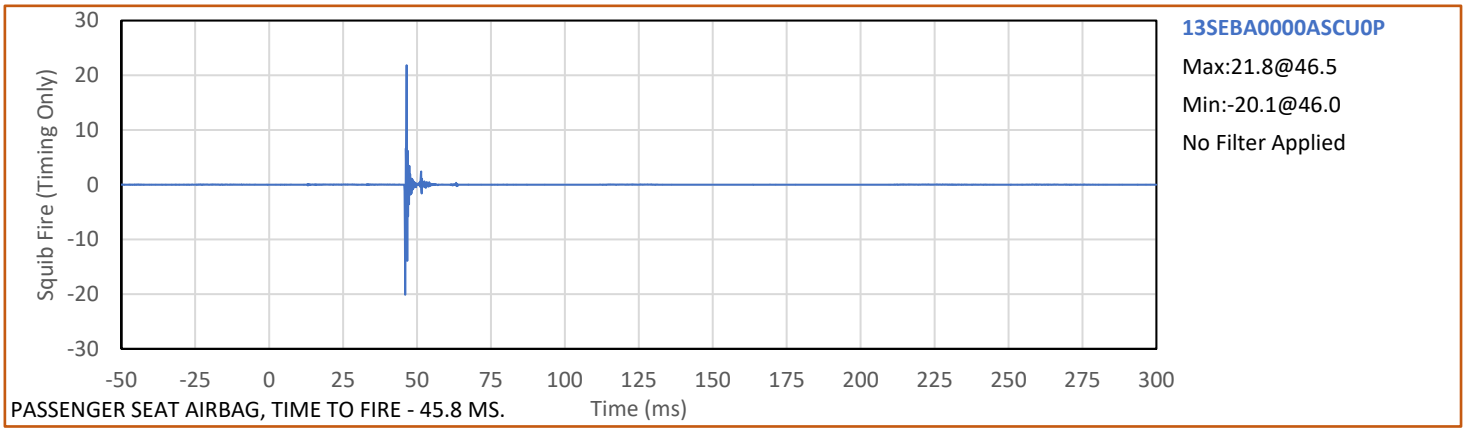
PASSENGER AIRBAG STAGE 1, TIME TO FIRE - 13.0 MS.



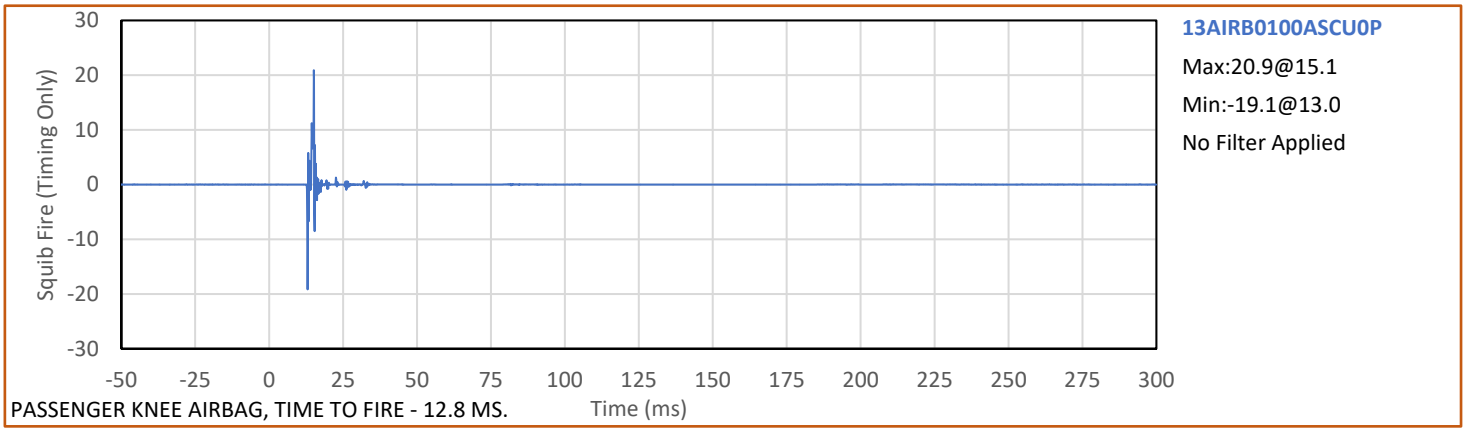
PASSENGER AIRBAG STAGE 2, TIME TO FIRE - 33.2 MS.



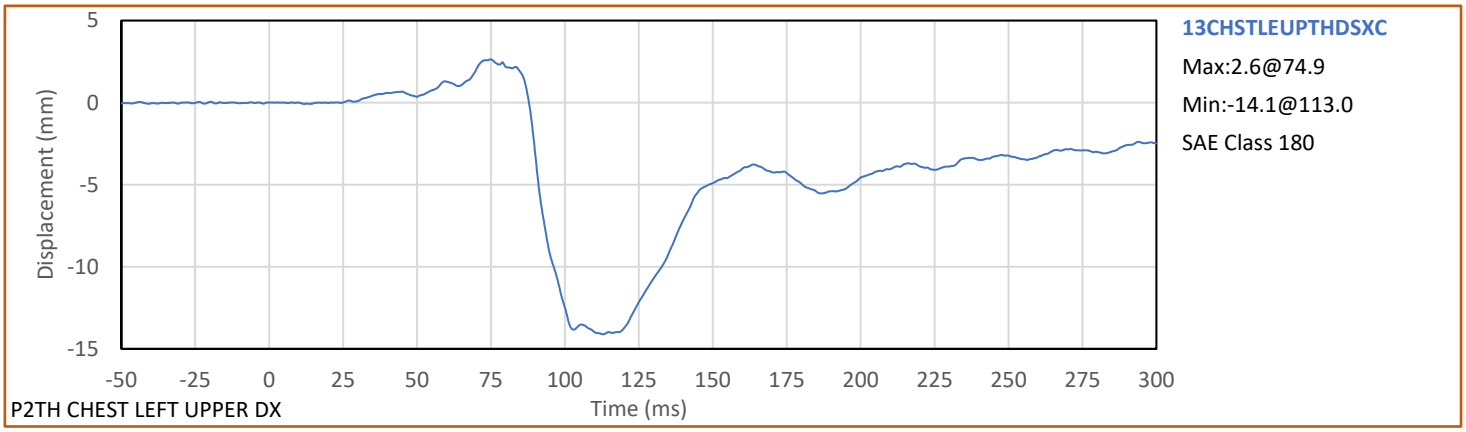
PASSENGER CURTAIN AIRBAG, TIME TO FIRE - 46.0 MS.

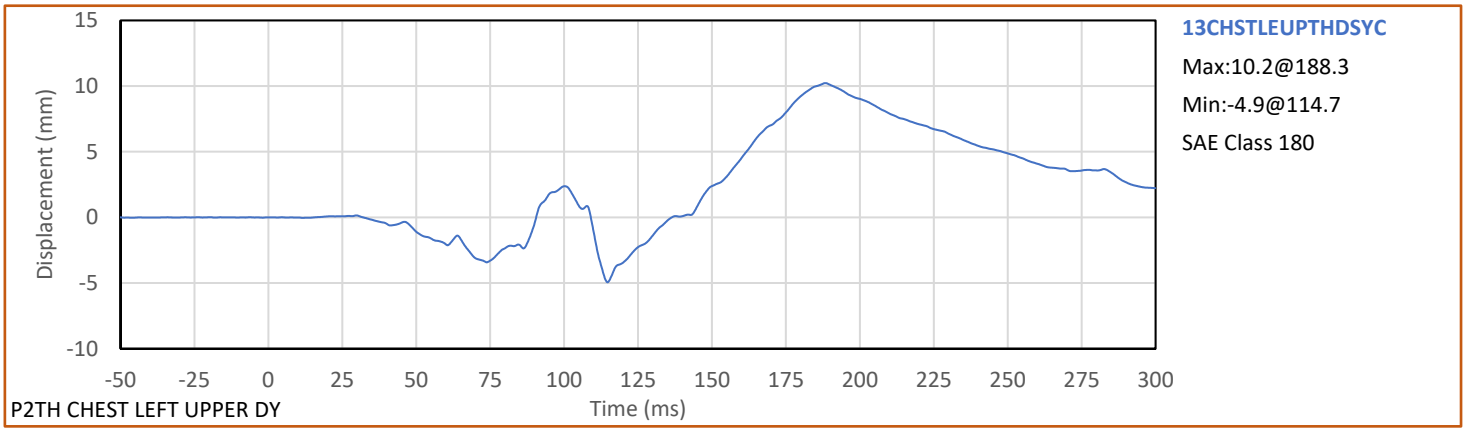


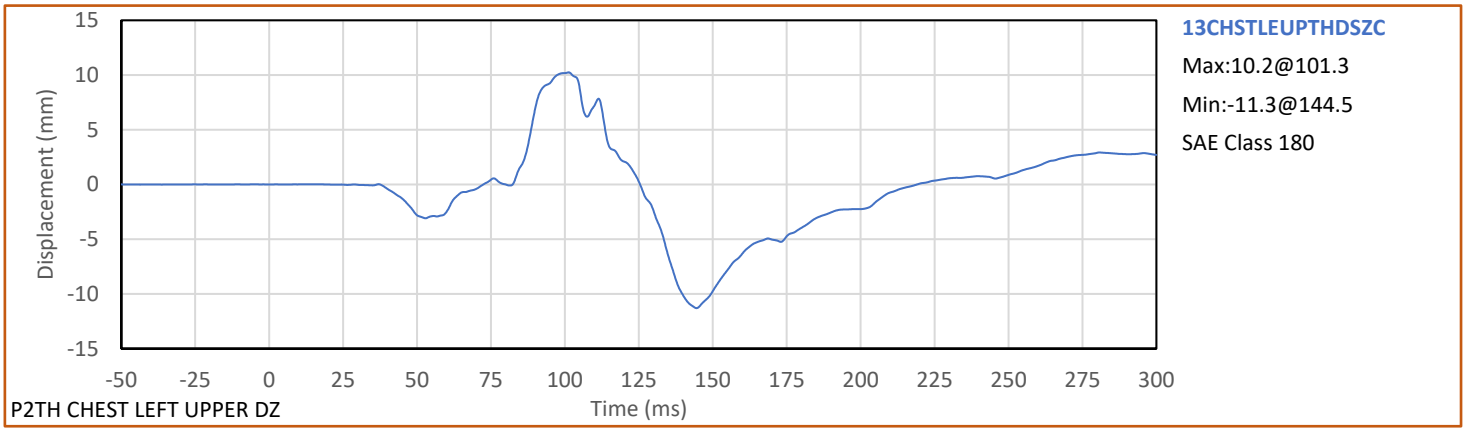
PASSENGER SEAT AIRBAG, TIME TO FIRE - 45.8 MS.

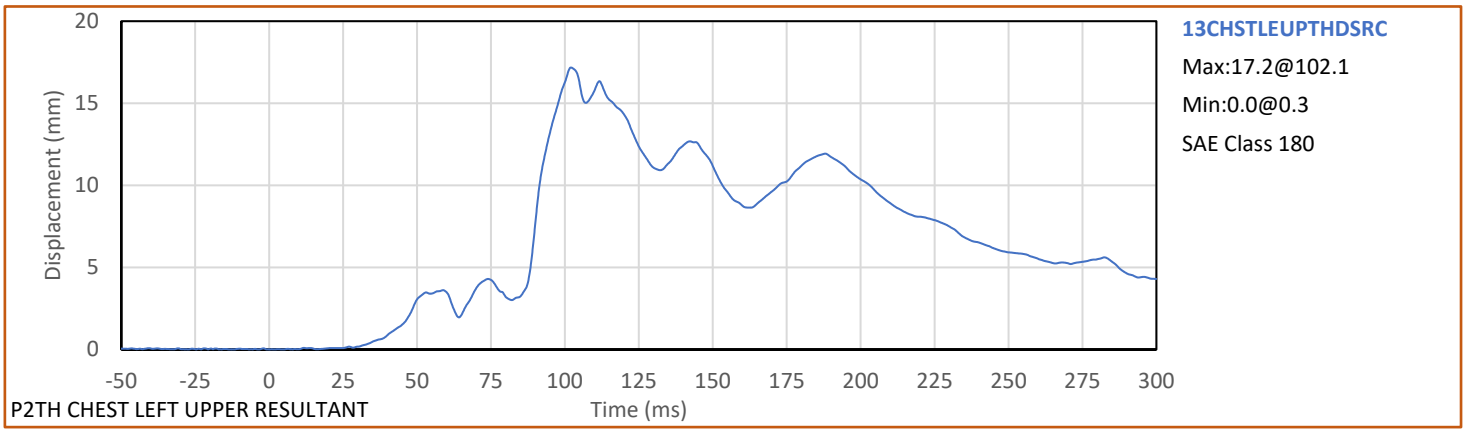


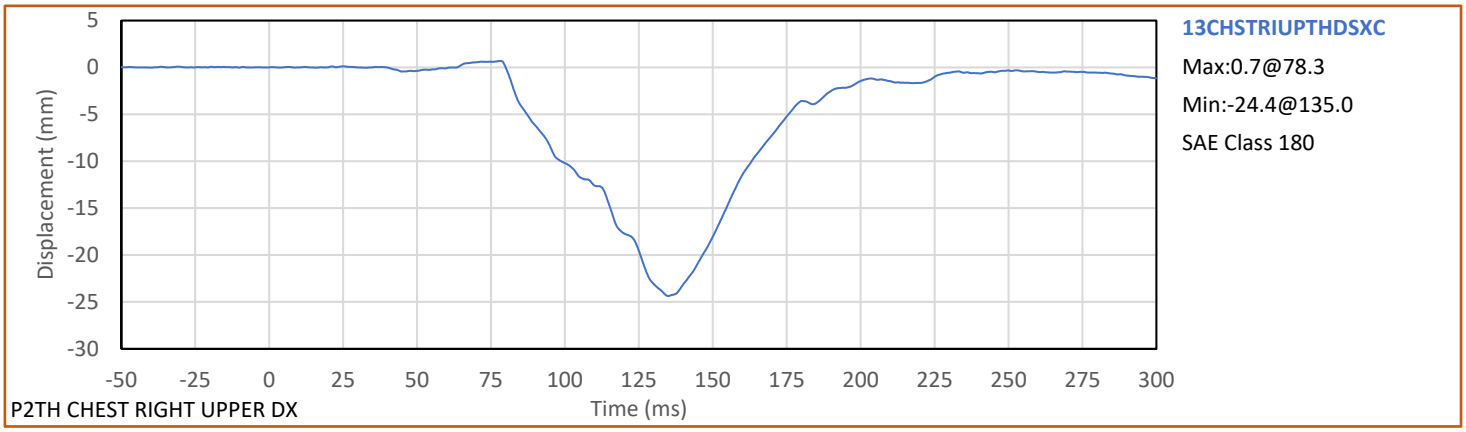
PASSENGER KNEE AIRBAG, TIME TO FIRE - 12.8 MS.

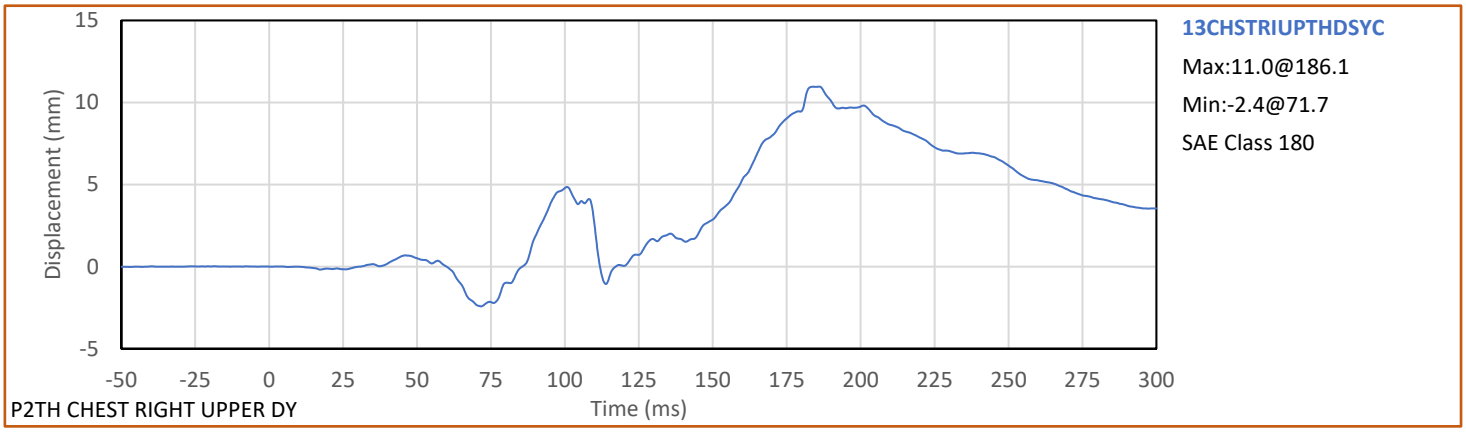

Displacement (mm)
Time (ms)
P2TH CHEST LEFT UPPER DX
13CHSTLEUPTHDSXC
Max:2.6@74.9
Min:-14.1@113.0
SAE Class 180

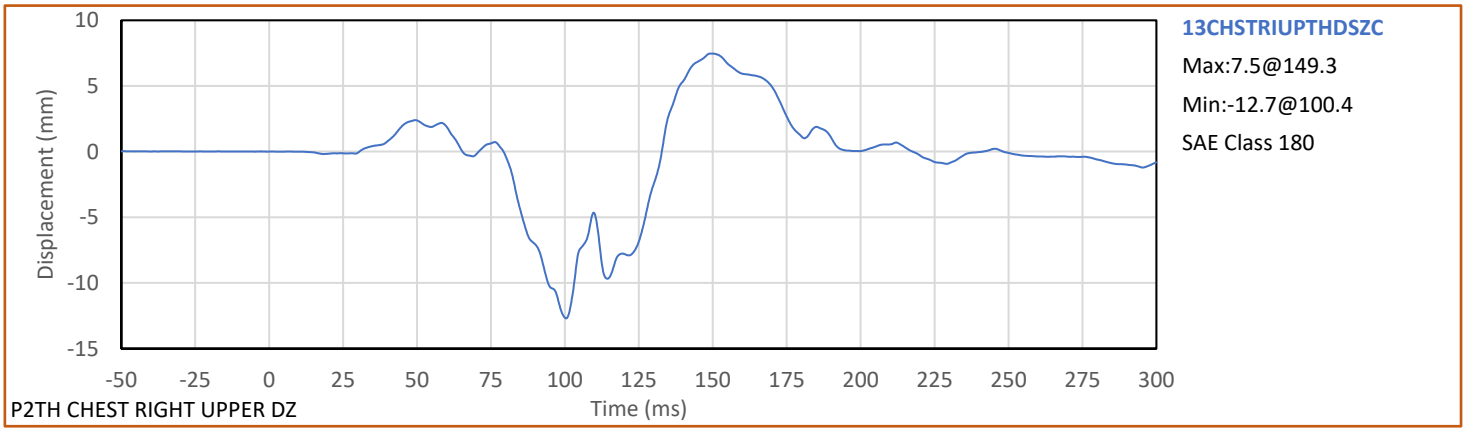

Displacement (mm)
Time (ms)
P2TH CHEST LEFT UPPER DY
13CHSTLEUPTHDSYC
Max:10.2@188.3
Min:-4.9@114.7
SAE Class 180

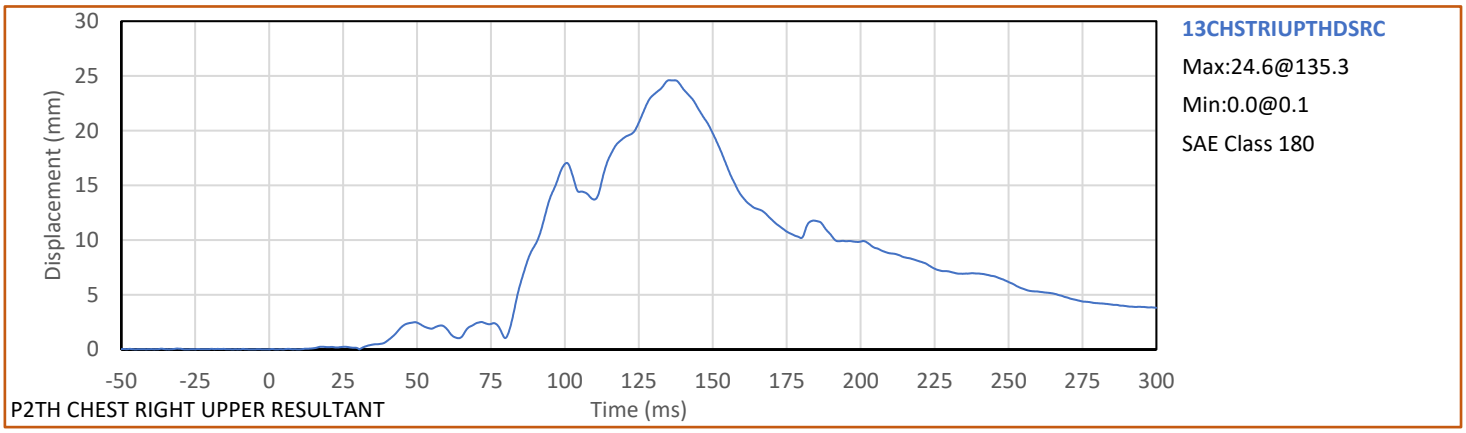

Displacement (mm)
Time (ms)
P2TH CHEST LEFT UPPER DZ
13CHSTLEUPTHDSZC
Max:10.2@101.3
Min:-11.3@144.5
SAE Class 180

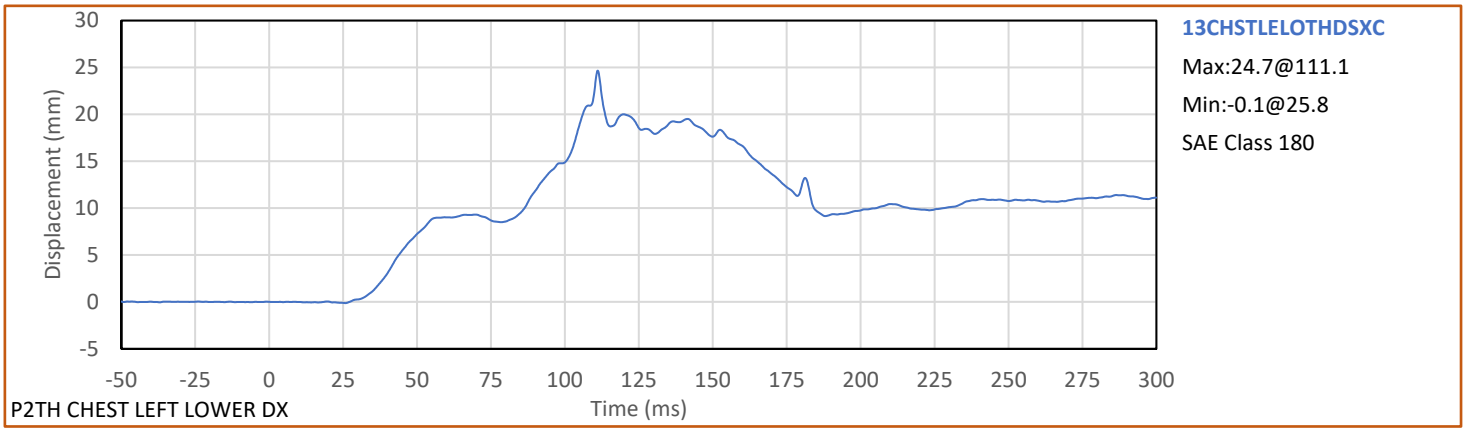

Displacement (mm)
Time (ms)
P2TH CHEST LEFT UPPER RESULTANT
13CHSTLEUPTHDSRC
Max:17.2@102.1
Min:0.0@0.3
SAE Class 180

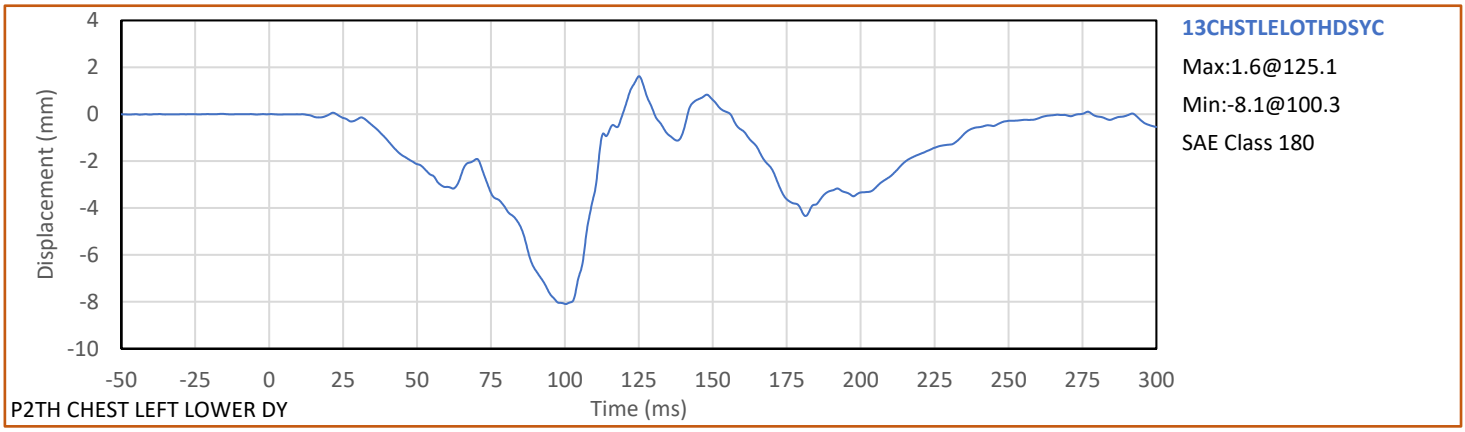

Displacement (mm)
Time (ms)
P2TH CHEST RIGHT UPPER DX
13CHSTRIUPTHDSXC
Max:0.7@78.3
Min:-24.4@135.0
SAE Class 180

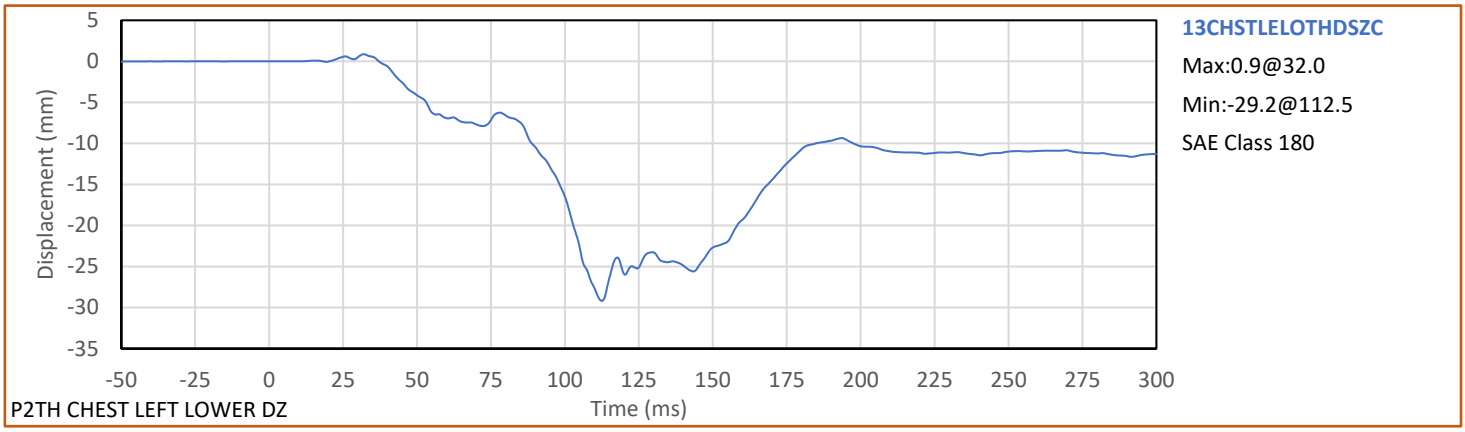

Displacement (mm)
Time (ms)
P2TH CHEST RIGHT UPPER DY
13CHSTRIUPTHDSYC
Max:11.0@186.1
Min:-2.4@71.7
SAE Class 180

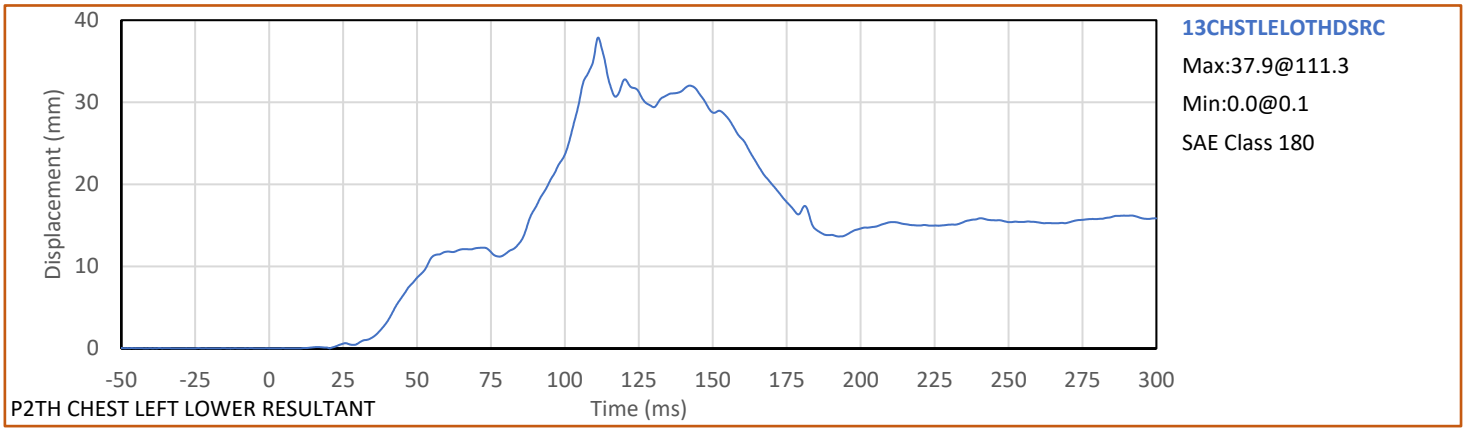

Displacement (mm)
Time (ms)
P2TH CHEST RIGHT UPPER DZ
13CHSTRIUPTHDSZC
Max:7.5@149.3
Min:-12.7@100.4
SAE Class 180

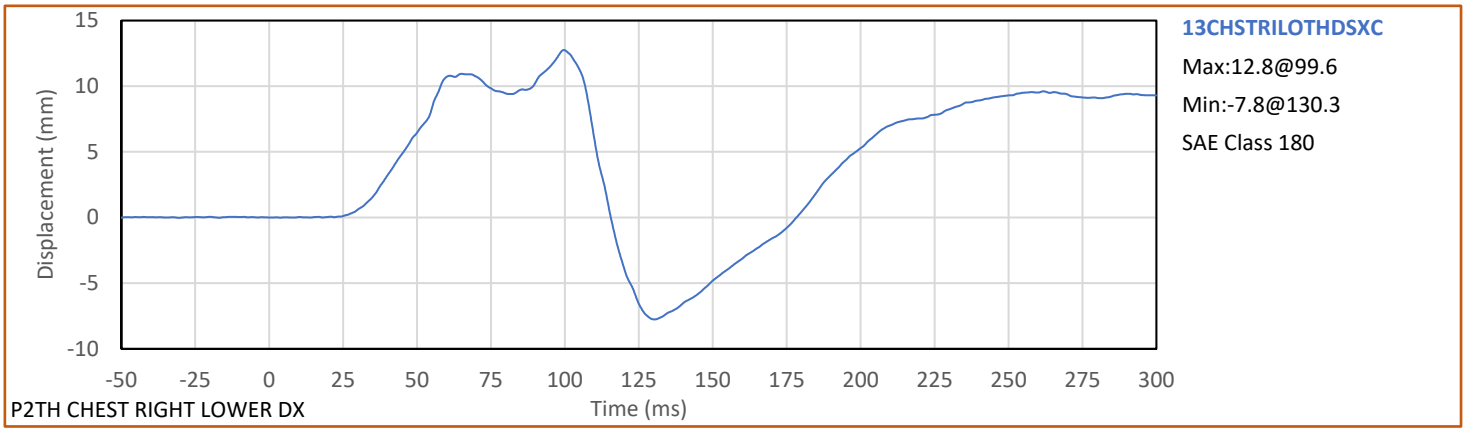

Displacement (mm)
Time (ms)
P2TH CHEST RIGHT UPPER RESULTANT
13CHSTRIUPTHDSRC
Max:24.6@135.3
Min:0.0@0.1
SAE Class 180

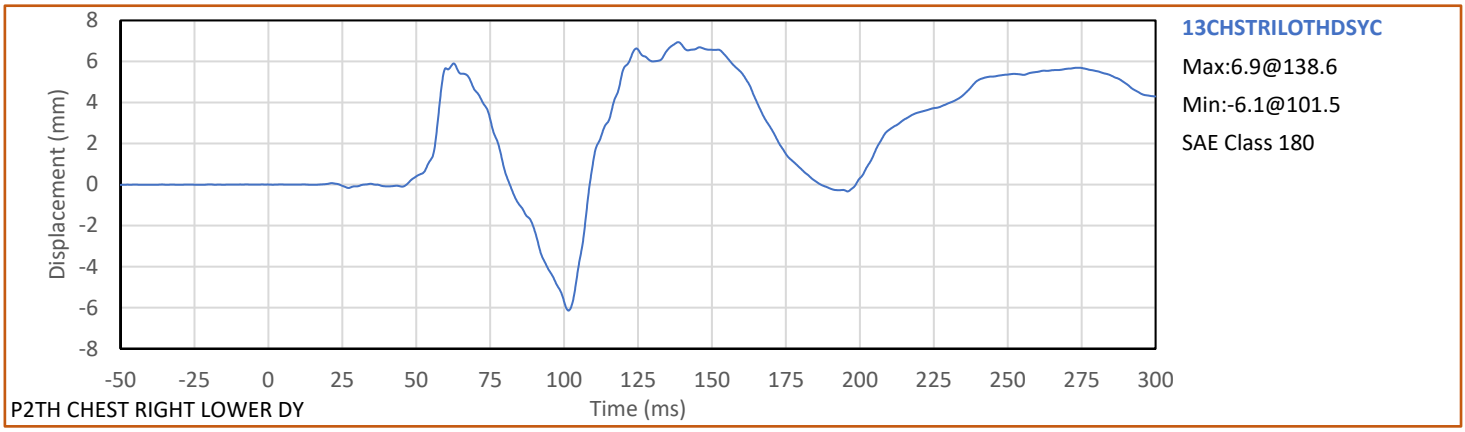

Displacement (mm)
Time (ms)
P2TH CHEST LEFT LOWER DX
13CHSTLELOTHDSXC
Max:24.7@111.1
Min:-0.1@25.8
SAE Class 180

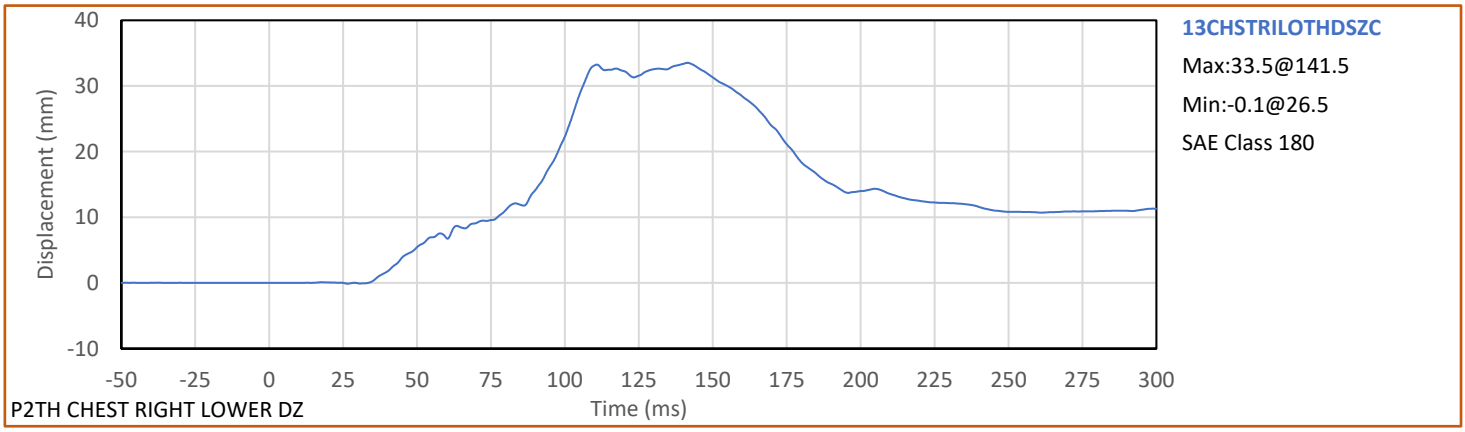

Displacement (mm)
Time (ms)
P2TH CHEST LEFT LOWER DY
13CHSTLELOTHDSYC
Max:1.6@125.1
Min:-8.1@100.3
SAE Class 180

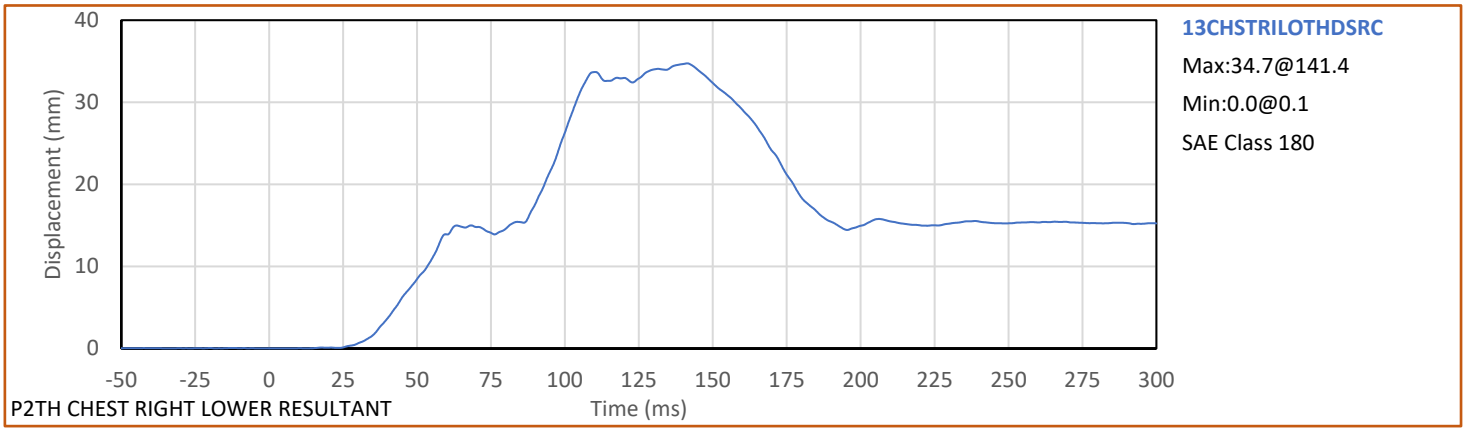

Displacement (mm)
Time (ms)
P2TH CHEST LEFT LOWER DZ
13CHSTLELOTHDSZC
Max:0.9@32.0
Min:-29.2@112.5
SAE Class 180

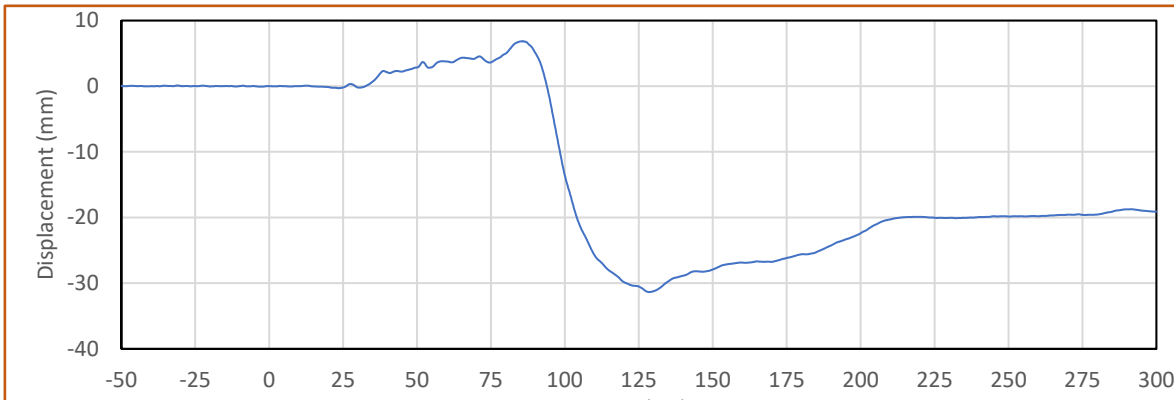

Displacement (mm)
Time (ms)
P2TH CHEST LEFT LOWER RESULTANT
13CHSTLELOTHDSRC
Max:37.9@111.3
Min:0.0@0.1
SAE Class 180


Displacement (mm)
Time (ms)
P2TH CHEST RIGHT LOWER DX
13CHSTRILOTHDSXC
Max:12.8@99.6
Min:-7.8@130.3
SAE Class 180


Displacement (mm)
Time (ms)
P2TH CHEST RIGHT LOWER DY
13CHSTRILOTHDSYC
Max:6.9@138.6
Min:-6.1@101.5
SAE Class 180

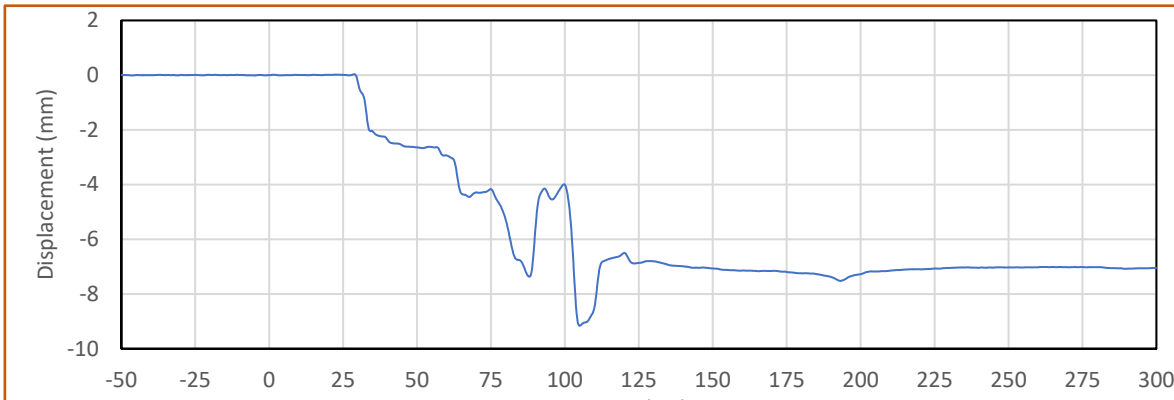

Displacement (mm)
Time (ms)
P2TH CHEST RIGHT LOWER DZ
13CHSTRILOTHDSZC
Max:33.5@141.5
Min:-0.1@26.5
SAE Class 180


Displacement (mm)
Time (ms)
P2TH CHEST RIGHT LOWER RESULTANT
13CHSTRILOTHDSRC
Max:34.7@141.4
Min:0.0@0.1
SAE Class 180



P2TH ABDOMEN LEFT LOWER DX

13ABDOLE00THDSXC
Max:6.8@85.7
Min:-31.4@128.5
SAE Class 180

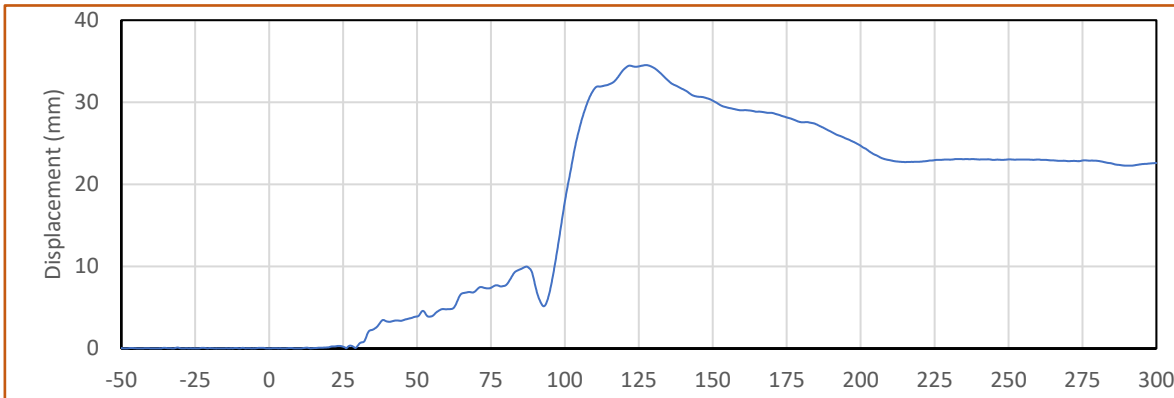


P2TH ABDOMEN LEFT LOWER DY

13ABDOLE00THDSYC
Max:0.0@28.8
Min:-9.2@105.0
SAE Class 180

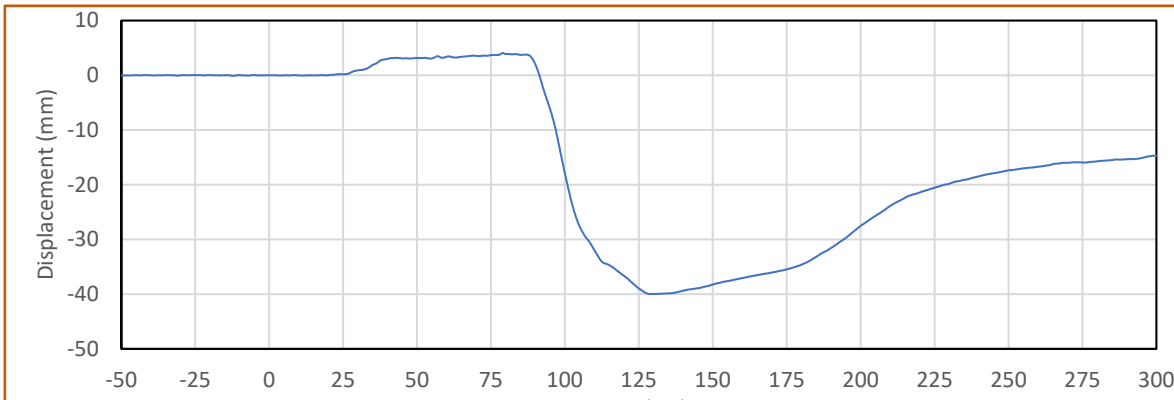
P2TH ABDOMEN LEFT LOWER DZ

13ABDOLE00THDSZC
Max:4.9@75.4
Min:-16.4@108.9
SAE Class 180



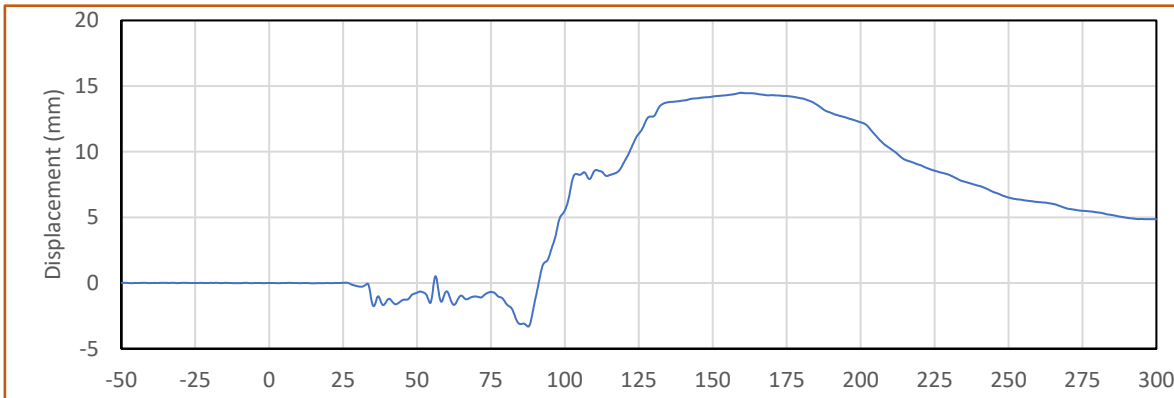
P2TH ABDOMEN LEFT LOWER RESULTANT

13ABDOLE00THDSRC
Max:34.5@127.4
Min:0.0@0.1
SAE Class 180



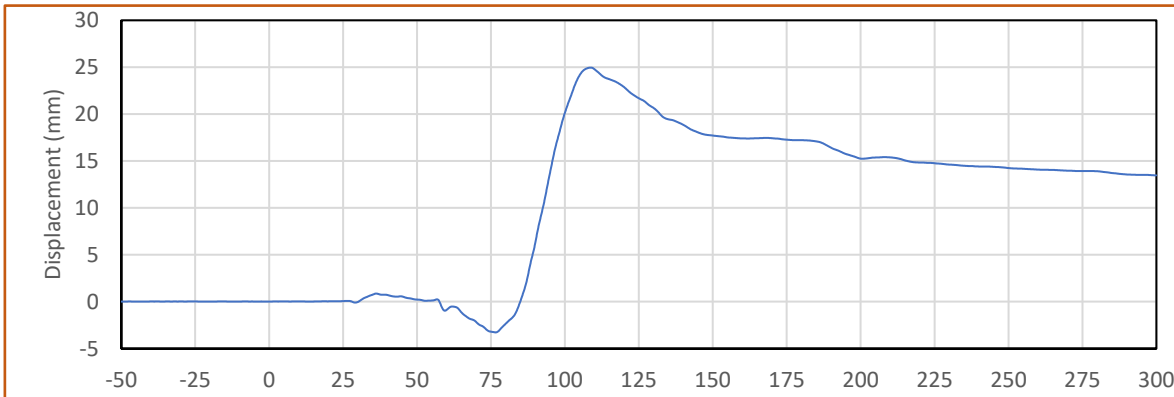
P2TH ABDOMEN RIGHT LOWER DX

13ABDORI00THDSXC
Max:4.1@79.0
Min:-40.0@129.1
SAE Class 180



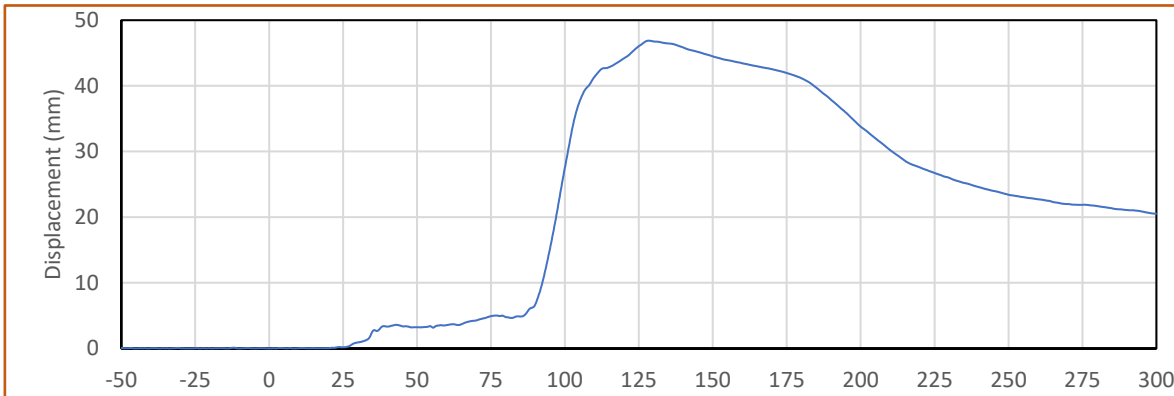
P2TH ABDOMEN RIGHT LOWER DY

13ABDORI00THDSYC
Max:14.5@159.7
Min:-3.3@87.6
SAE Class 180



P2TH ABDOMEN RIGHT LOWER DZ

13ABDORI00THDSZC
Max:25.0@108.7
Min:-3.3@76.6
SAE Class 180



P2TH ABDOMEN RIGHT LOWER RESULTANT

13ABDORI00THDSRC
Max:46.9@128.4
Min:0.0@0.1
SAE Class 180

APPENDIX C

ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

THOR-50M 50TH PERCENTILE MALE ATD

PRE-TEST QUALIFICATION (PARTIAL)

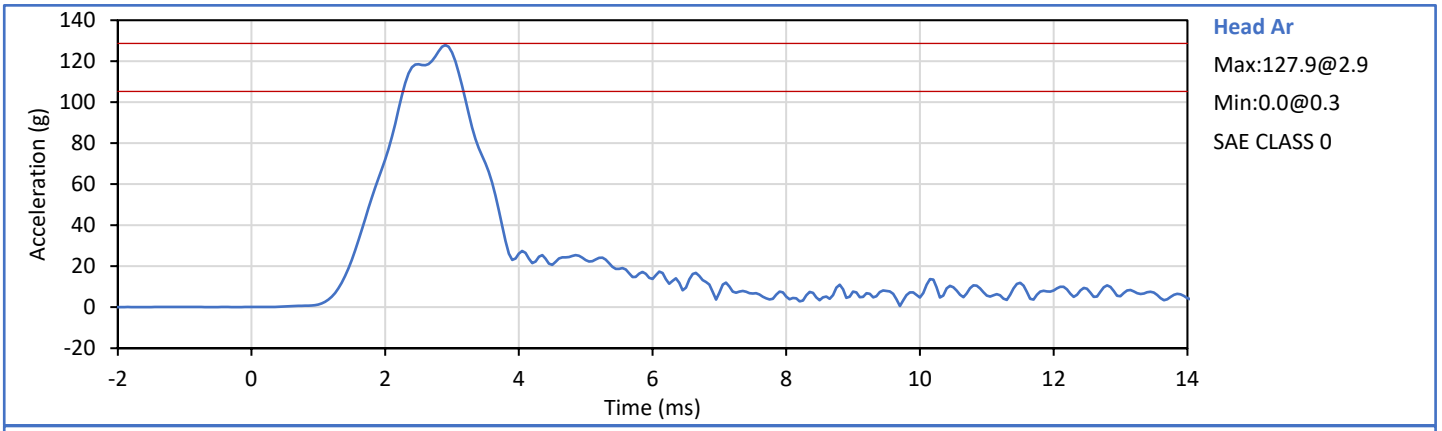
APPENDIX D
ATD Configuration and Performance Verification Data
THOR-50M 50th Percentile Male ATD
Post-Test Qualification (Partial) S/N: EG2595

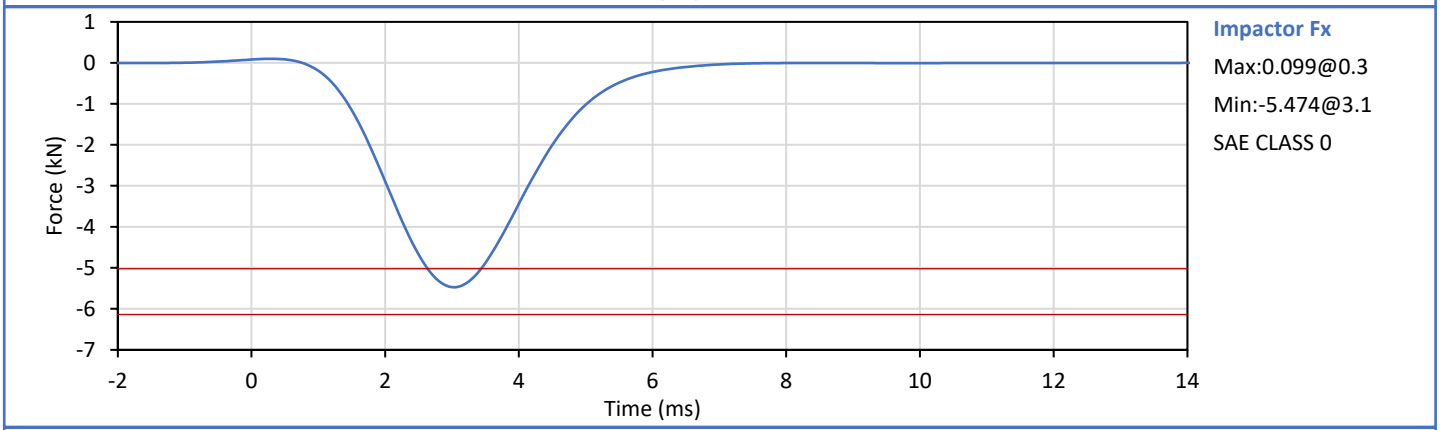
Applus IDIADA KARCO

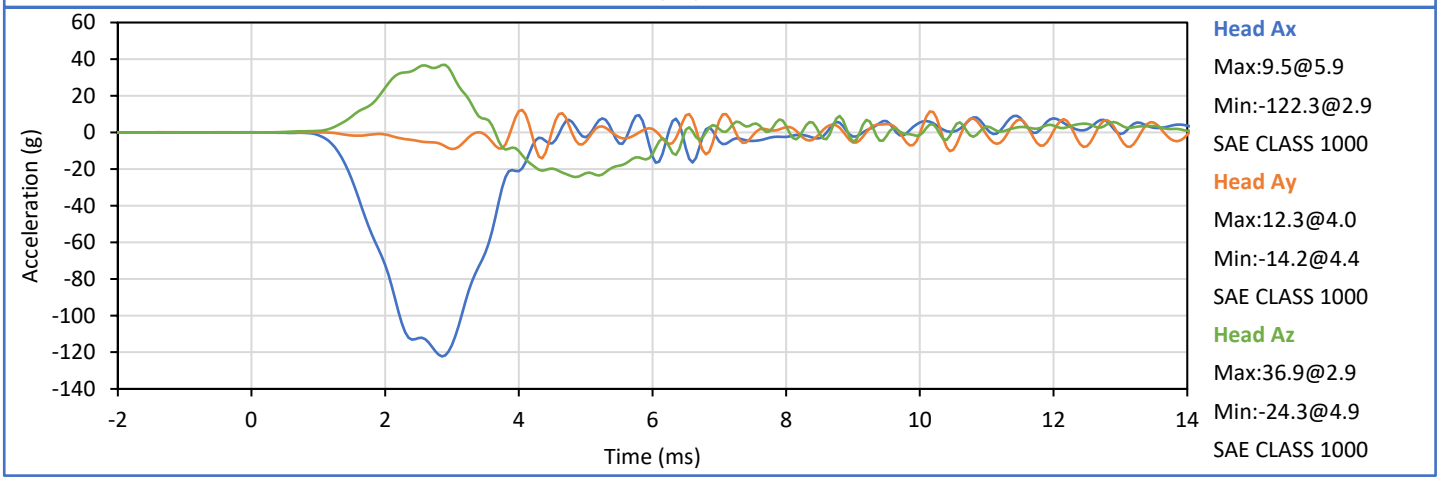
Pre-Test Qualification (Partial) **THOR-50M 50th Percentile Male ATD Head Qualification**

ATD Serial No.: EG2595 Test Date: 2021-08-12

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.0	Pass
Laboratory Relative Humidity	%	10	70	45	Pass
Velocity	m/s	1.95	2.05	1.98	Pass
Peak Impactor Force	kN	-6.138	-5.022	-5.474	Pass
Peak Head Resultant Acceleration	g	105.3	128.7	127.9	Pass
NHTSA Corridor 2019-05			Overall Test Results		Pass







Technician: J. Hernandez

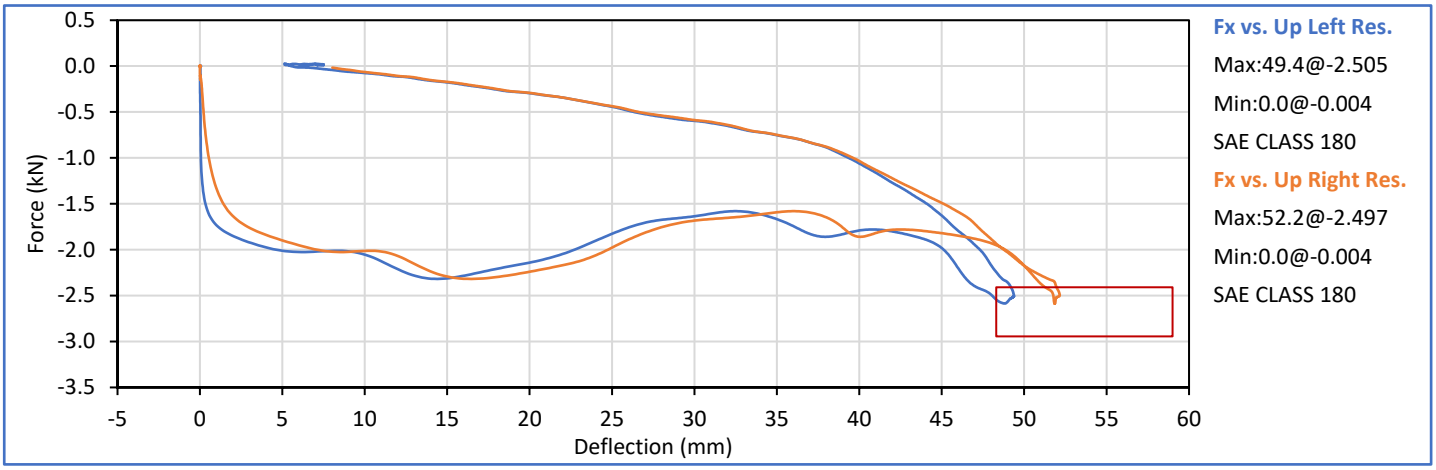
Approved By: P .Puzzuto

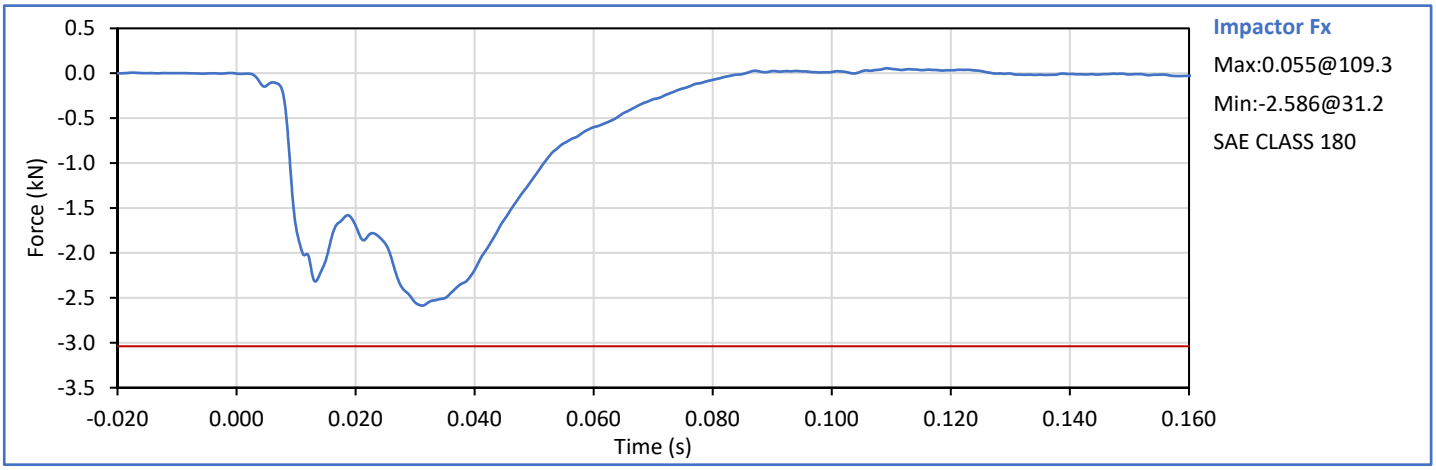
Applus IDIADA KARCO

Pre-Test Qualification (Partial) **THOR-50M 50th Percentile Male ATD**
Thorax Impact (Upper)

ATD Serial No.: EG2595 Test Date: 2021-08-12

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.4	Pass
Laboratory Relative Humidity	%	10	70	46	Pass
Probe Velocity	m/s	4.25	4.35	4.33	Pass
Peak Probe Force	kN	-3.039		-2.586	Pass
Peak Upper Left Deflection Res.	mm	48.3	59.0	49.4	Pass
Peak Upper Right Deflection Res.	mm			52.2	Pass
Absolute Difference L/R Defl. Res.	mm	0.0	5.0	2.8	Pass
Force at Peak Upper Left Res.	mm	-2.944	-2.409	-2.505	Pass
Force at Peak Upper Right Res.	mm			-2.497	Pass
NHTSA Corridor 2019-05			Overall Test Results		Pass

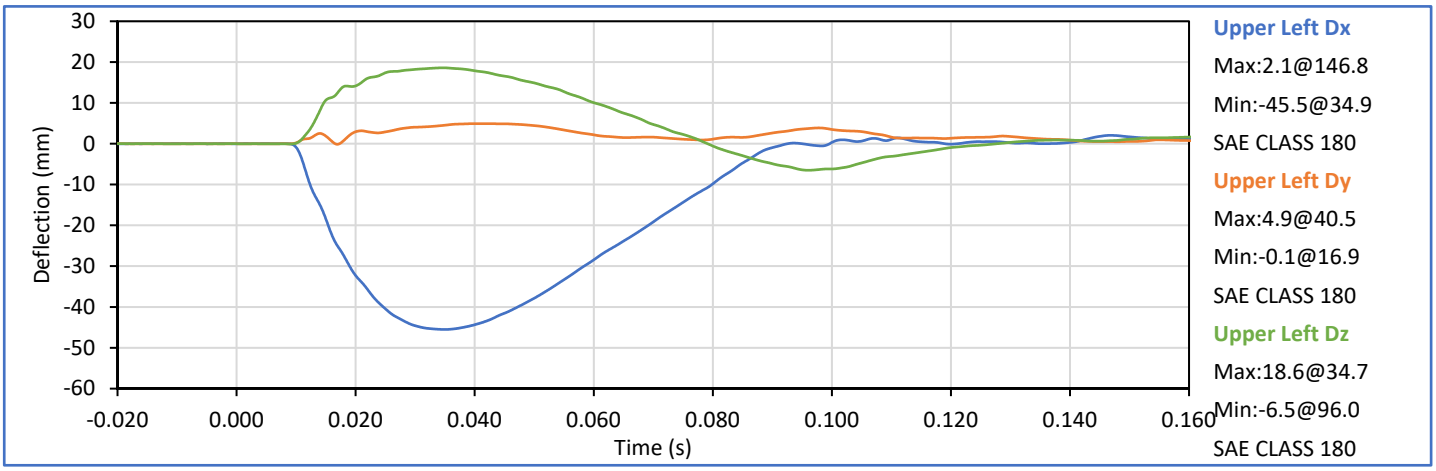


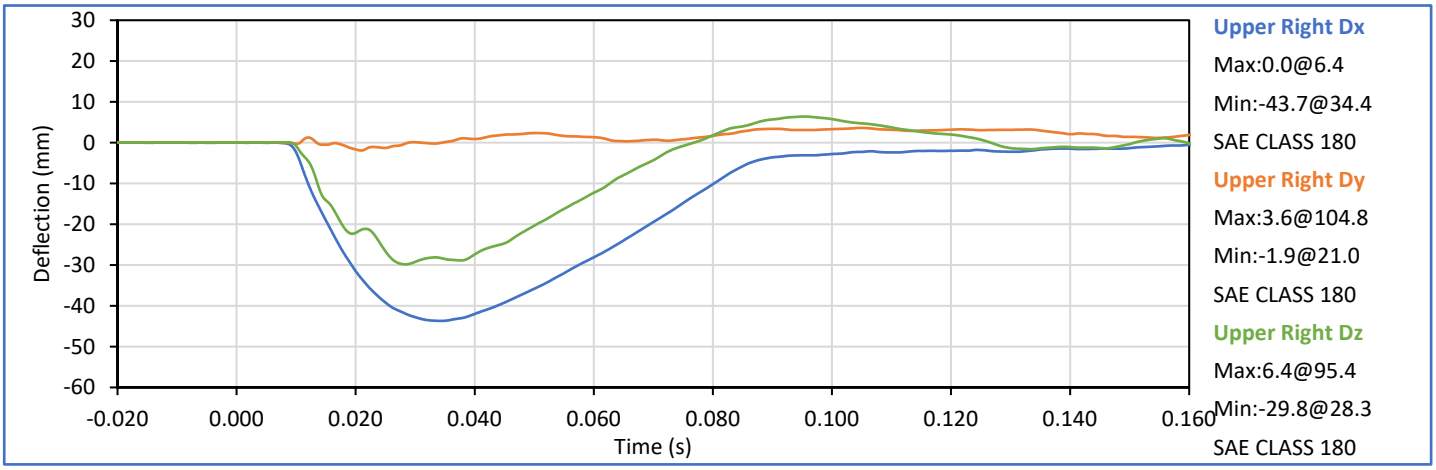


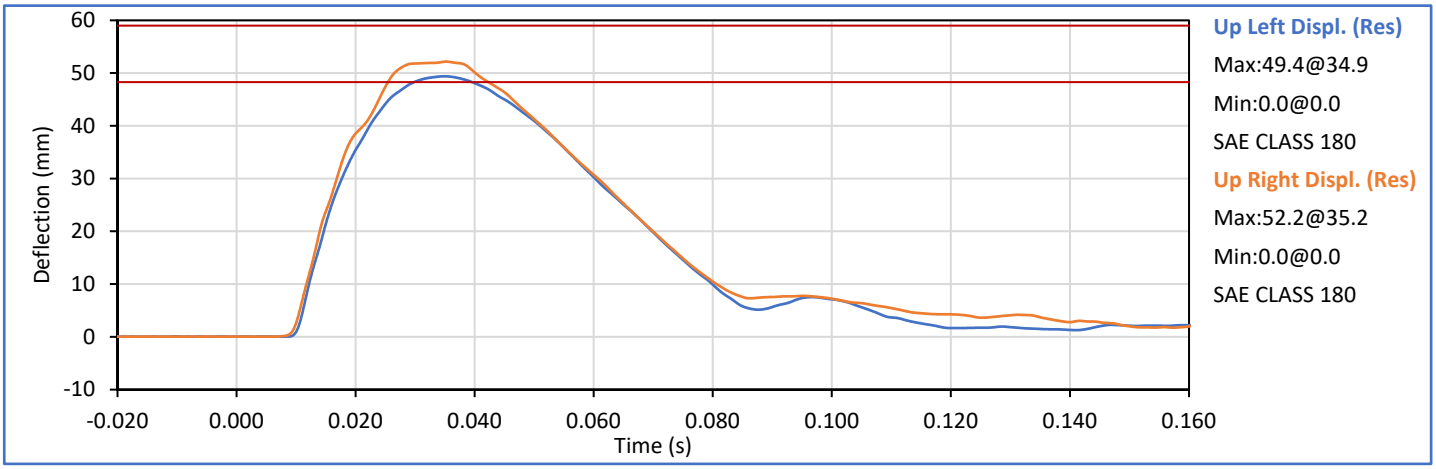
Technician: J. Hernandez

Approved By: P. Puzzuto

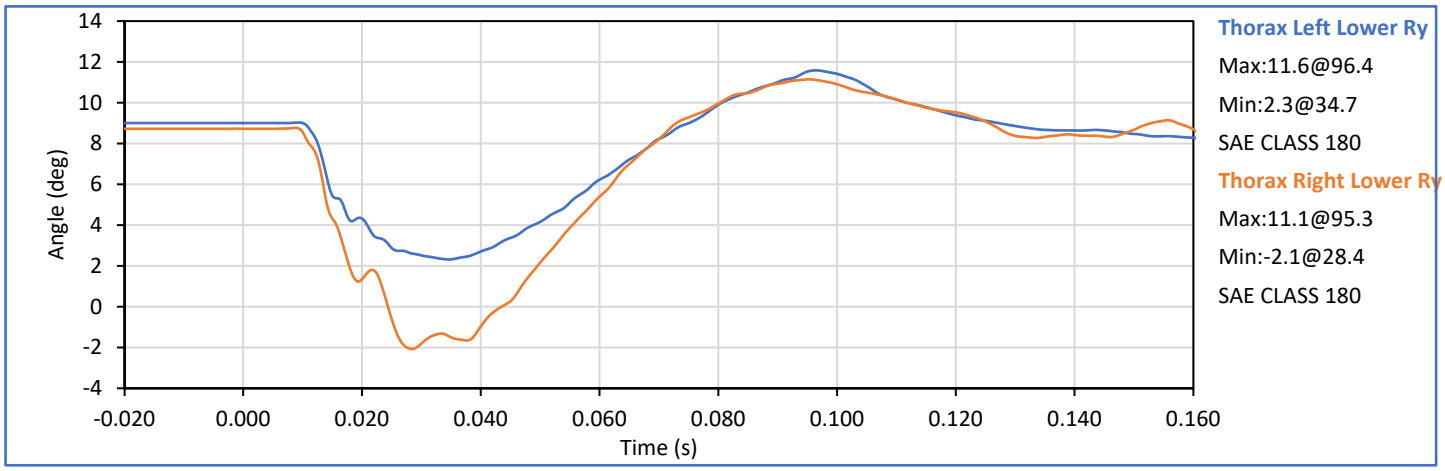
ATD Serial No.: EG2595 Test Date: 2021-08-12

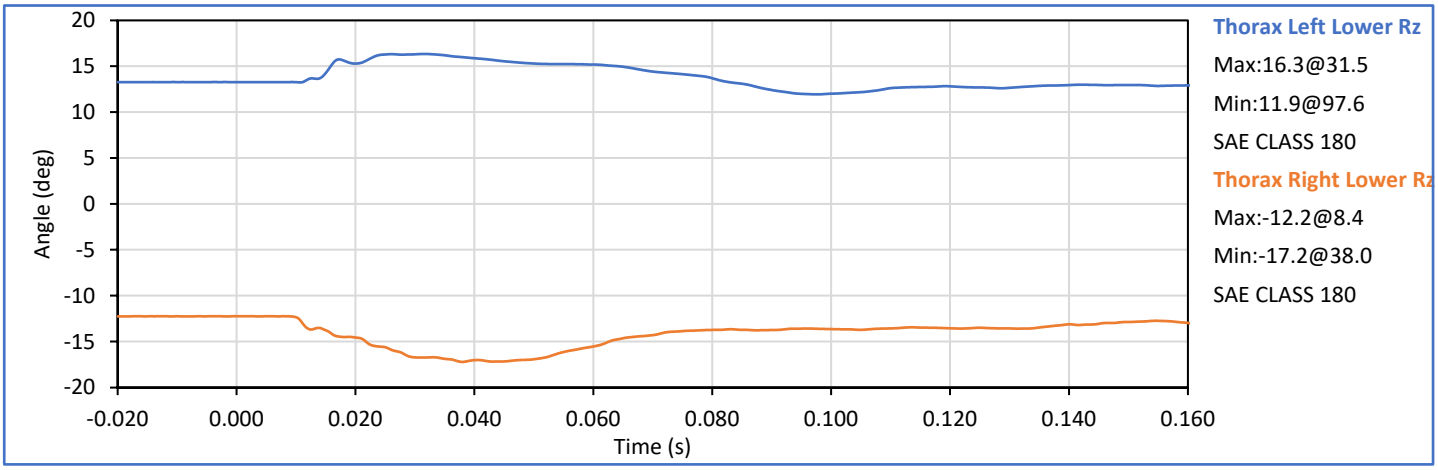






ATD Serial No.: EG2595 Test Date: 2021-08-12



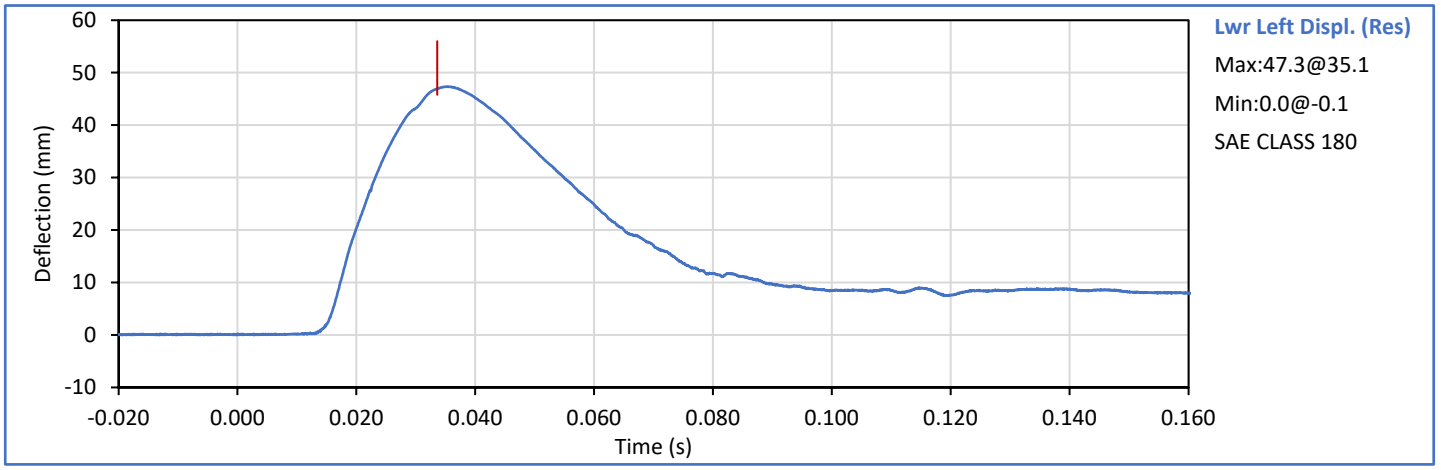


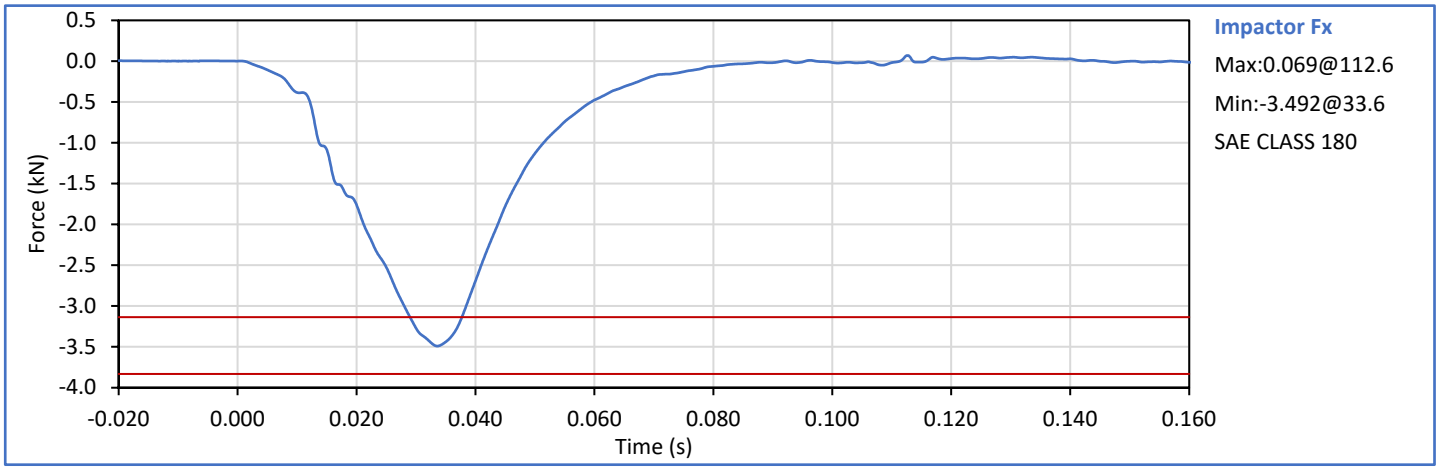
Applus IDIADA KARCO

Pre-Test Qualification (Partial) **THOR-50M 50th Percentile Male ATD**
Thorax Impact (Lower Left)

ATD Serial No.: EG2595 Test Date: 2021-08-12

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	45	Pass
Probe Velocity	m/s	4.25	4.35	4.34	Pass
Peak Probe Force	kN	-3.832	-3.136	-3.492	Pass
Lower Left Defl. Res. at Peak Fx	mm	45.8	56.0	46.9	Pass
NHTSA Corridor 2019-05			Overall Test Results		Pass





Technician: J. Hernandez

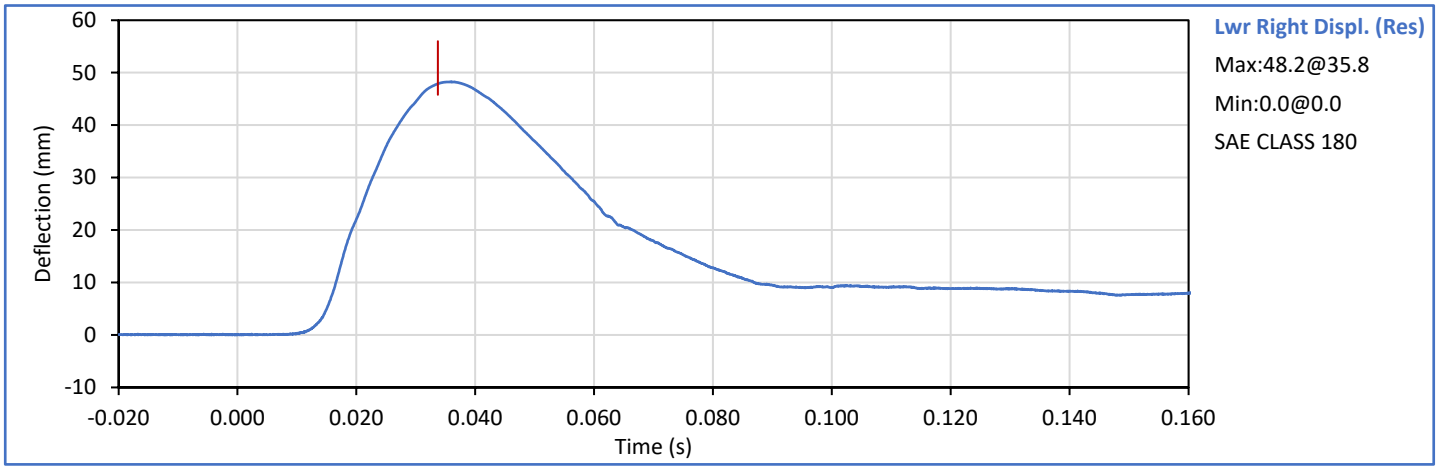
Approved By: P. Puzzuto

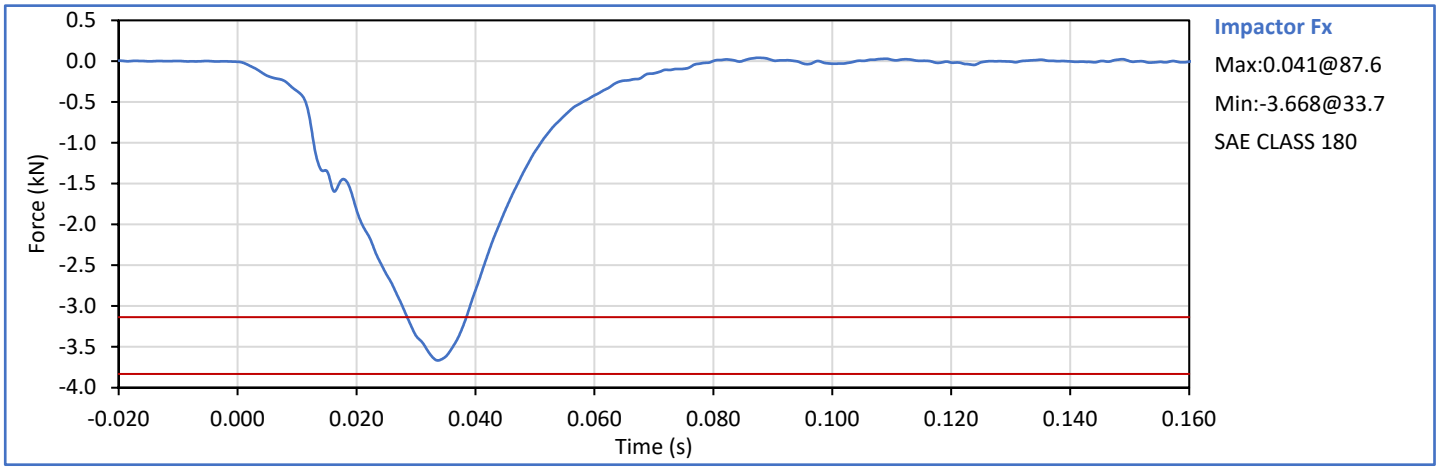
Applus IDIADA KARCO

Pre-Test Qualification (Partial) **THOR-50M 50th Percentile Male ATD**
Thorax Impact (Lower Right)

ATD Serial No.: EG2595 Test Date: 2021-08-12

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	22.2	Pass
Laboratory Relative Humidity	%	10	70	42	Pass
Probe Velocity	m/s	4.25	4.35	4.33	Pass
Peak Probe Force	kN	-3.832	-3.136	-3.668	Pass
Lower Left Defl. Res. at Peak Fx	mm	45.8	56.0	47.9	Pass
NHTSA Corridor 2019-05			Overall Test Results		Pass





Technician: J. Hernandez

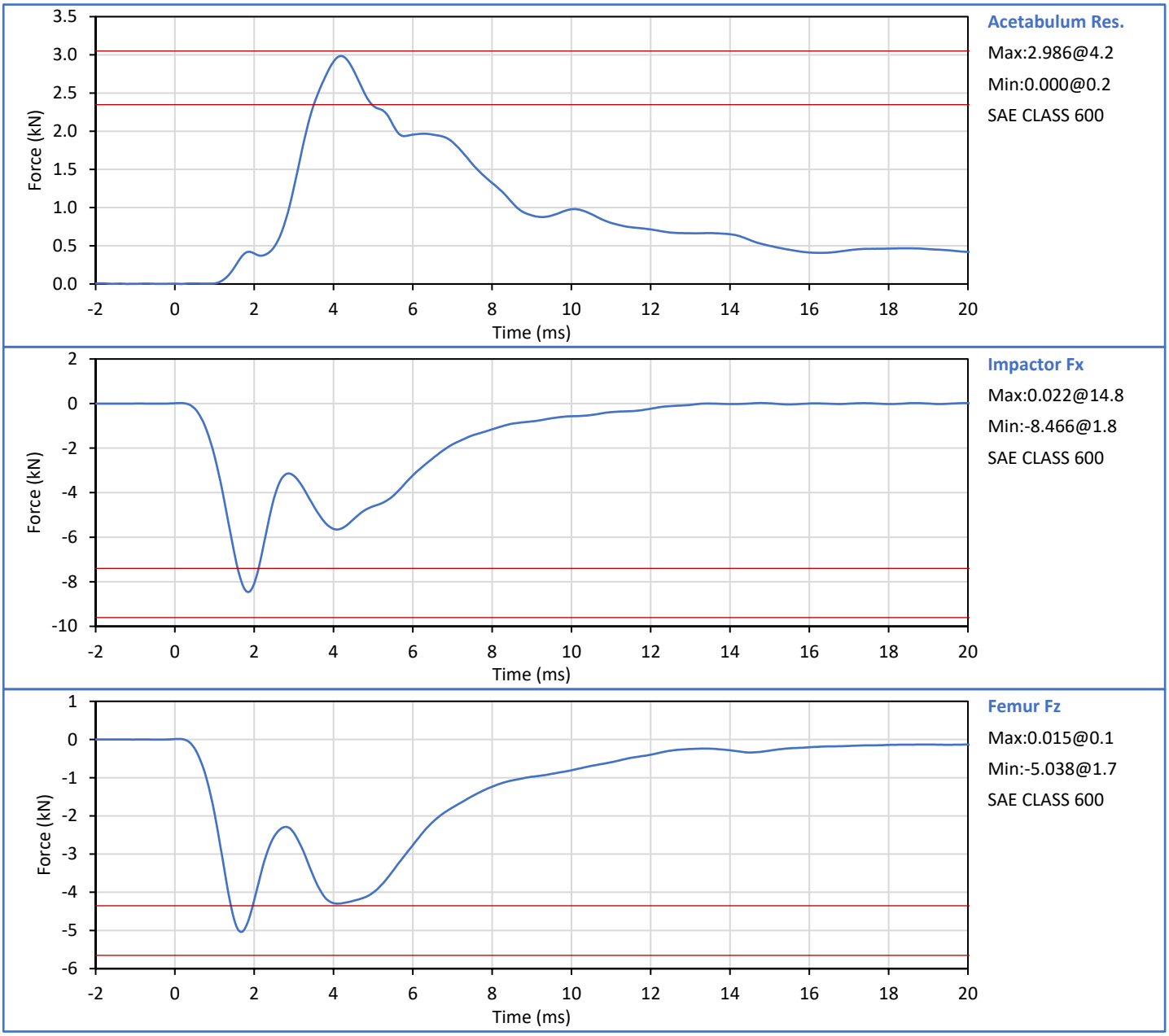
Approved By: P. Puzzuto

Applus IDIADA KARCO

Pre-Test Qualification (Partial) **THOR-50M 50th Percentile Male ATD**
Upper Leg (Left) Qualification

ATD Serial No.: EG2595 Test Date: 2021-08-12

Tested Parameter	Units	Spec. Low[1]	Spec. High[1]	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	22.2	Pass
Laboratory Humidity	%	10	70	42	Pass
Pendulum Velocity	m/s	3.25	3.35	3.33	Pass
Peak Impactor Force	kN	-9.605	-7.395	-8.466	Pass
Peak Femur Fz	kN	-5.650	-4.350	-5.038	Pass
Acetabulum Force Resultant	kN	2.349	3.051	2.986	Pass
NHTSA Corridor 2020-03 (Preliminary Corridor)			Overall Test Results		Pass



Technician: J. Hernandez

Approved By: P. Puzzuto

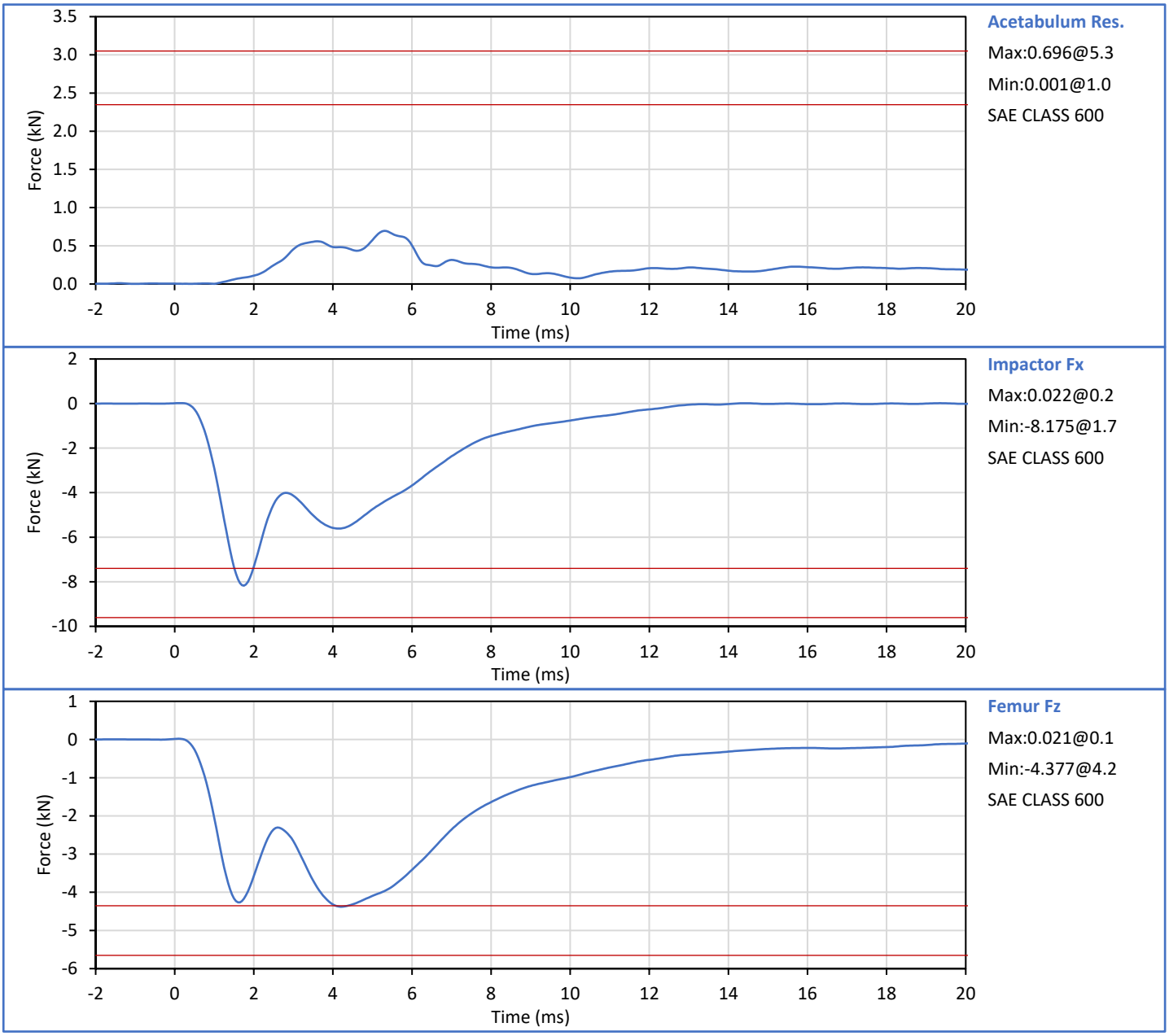
Applus IDIADA KARCO

Pre-Test Qualification (Partial) **THOR-50M 50th Percentile Male ATD**
Upper Leg (Right) Qualification

ATD Serial No.: EG2595 Test Date: 2021-08-12

Tested Parameter	Units	Spec. Low[1]	Spec. High[1]	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	22.1	Pass
Laboratory Humidity	%	10	70	32	Pass
Pendulum Velocity	m/s	3.25	3.35	3.35	Pass
Peak Impactor Force	kN	-9.605	-7.395	-8.175	Pass
Peak Femur Fz	kN	-5.650	-4.350	-4.377	Pass
Acetabulum Force Resultant	kN	2.349	3.051	0.696	**Fail** *
NHTSA Corridor 2020-03 (Preliminary Corridor)			Overall Test Results		**Fail**

* Acetablum Load Cell Fx is not functioning



Technician: J. Hernandez

Approved By: P. Puzzuto

APPENDIX D
ATD Qualification and Performance Verification
Hybrid III 50th Percentile Male ATD
Post-Test Qualification (Partial) S/N: 168

Applus IDIADA KARCO

Pre-Test Qualification (Partial)

Hybrid III 50th Percentile Male ATD
ATD Damage Checklist

ATD Serial No.: 168

Test Date: 2021-08-09

Dummy Item	Inspect for	Comments	Damage	OK
Entire ATD	Perform general cleaning			✓
Outer Skin	Gashes, rips, cracks			✓
Head	Ballast secure			✓
	General appearance			✓
Neck bracket	Upper neck firmly attached to lower bracket			✓
Neck	Broken or cracked rubber			✓
	Looseness at the condyle joint			✓
Nodding block	Cracked or out of position			✓
Lumbar Spine	Broken or cracked rubber			✓
Ribs	Broken or bent ribs			✓
	Broken or bent rib supports			✓
	Damping material separated or cracked			✓
	Rubber bumpers in place			✓
Chest Displ.	Bent shaft			✓
Assembly	Slider arm riding in track			✓
Sensors	Check cables for cuts, tears			✓
	Check for damaged insulation			✓
Accelerometer	Head mounting secure			✓
Mounting	Chest mounting secure			✓
Knees	Skin condition			✓
	Insert (do not remove)			✓
	Casting			✓
Limbs	Normal movement and adjustment			✓
Knee Sliders	Wires intact			✓
	Rubber returned to "resting" position			✓
Pelvis	Broken			✓
Other	Describe below as needed		✗	

Describe any repairs or replacement of parts or other findings:

No Problems Found
Head Redundant Ay not functioning. Replaced accelerometer. Cause of failure is not known

Technician: J. Hernandez

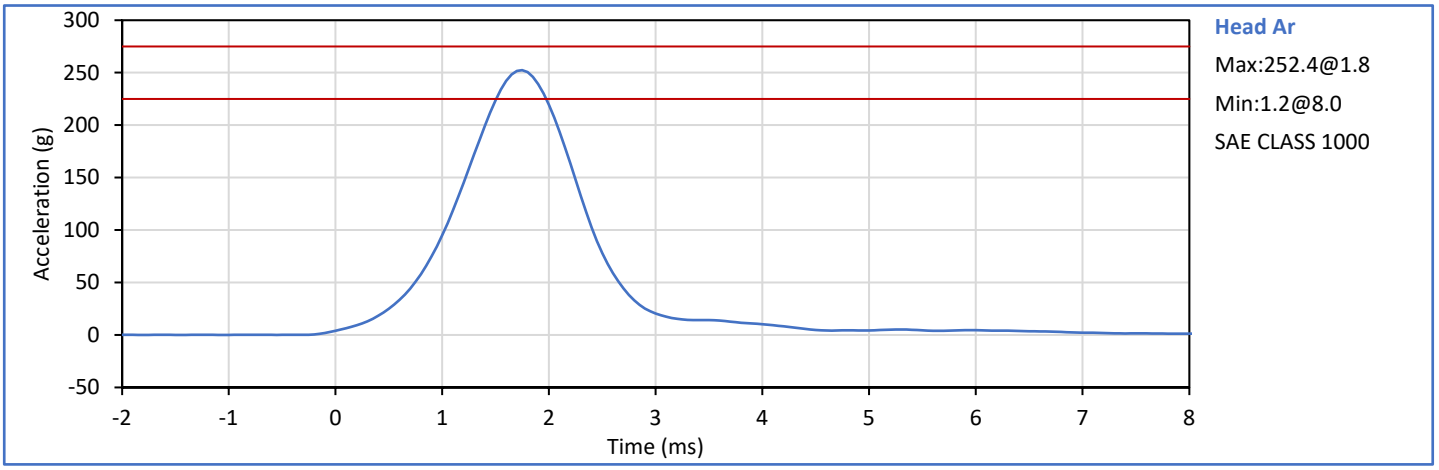
Approved By: P. Puzzuto

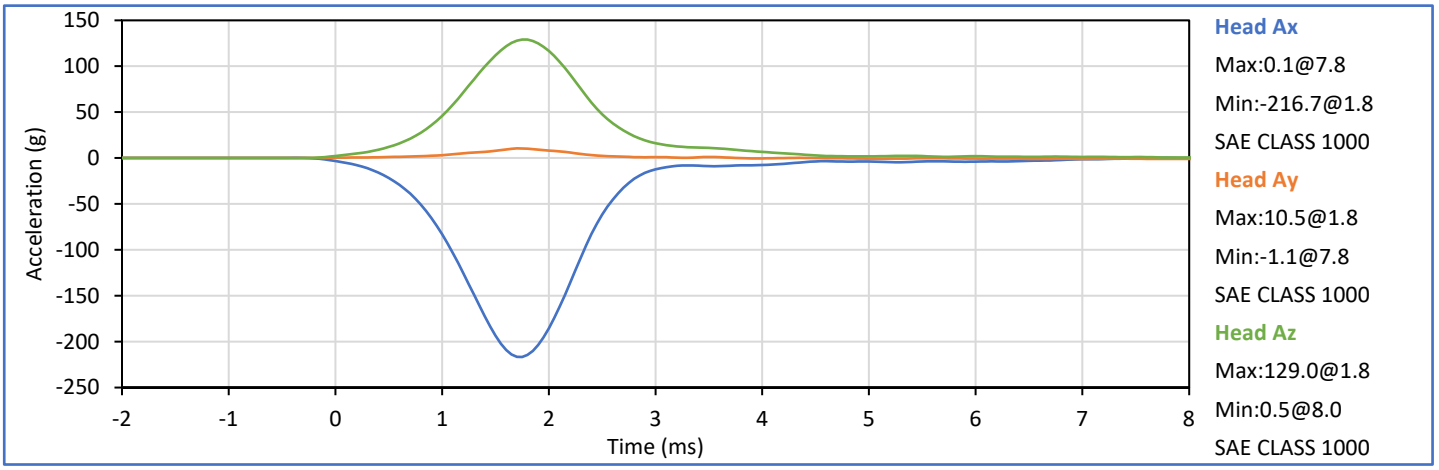
Applus IDIADA KARCO

Pre-Test Qualification (Partial) **Hybrid III 50th Percentile Male ATD Head Drop**

ATD Serial No.: 168 Test Date: 2021-08-11

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	22.2	Pass
Laboratory Relative Humidity	%	10	70	48	Pass
Peak Resultant Acceleration	g	225.0	275.0	252.4	Pass
Peak Lateral Acceleration	g	-15.0	15.0	10.5	Pass
Oscillations After Main Pulse	%	0.0	10.0	1.8	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

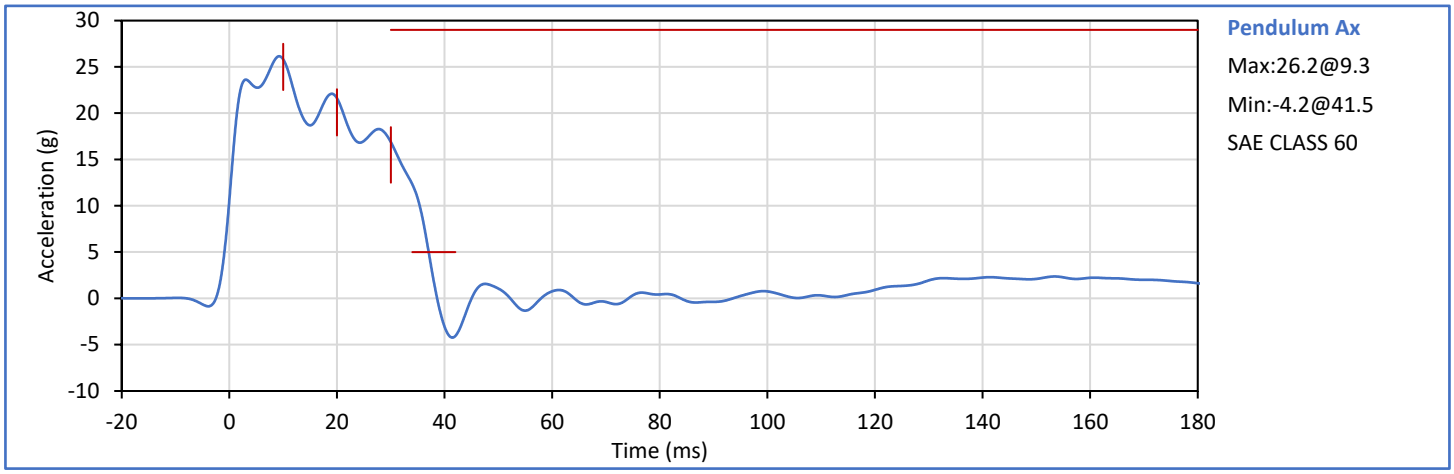
Approved By: P. Puzzuto

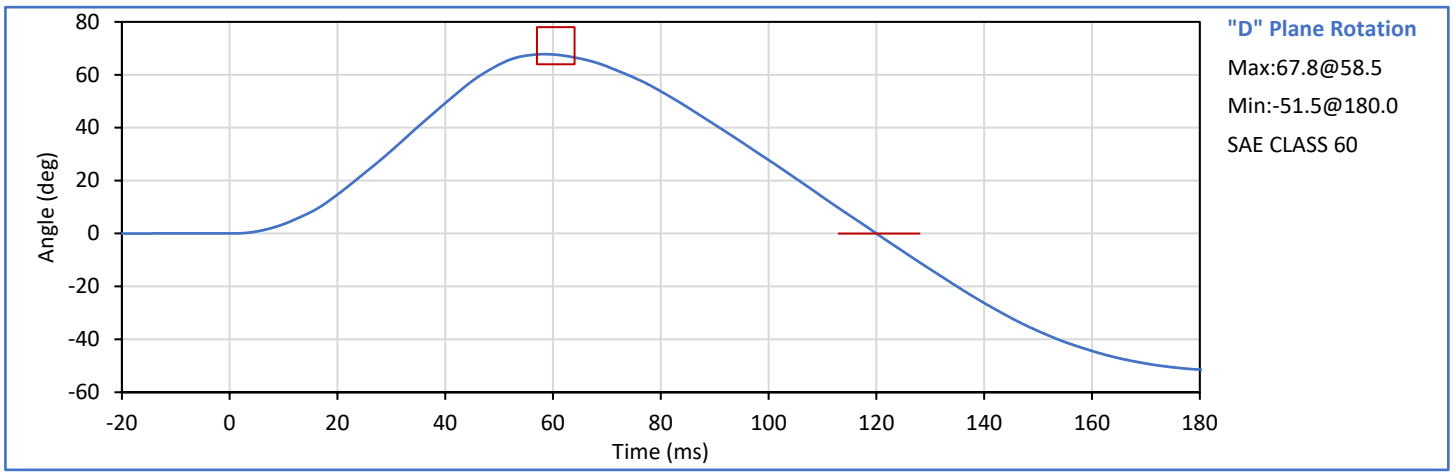
Applus IDIADA KARCO

Pre-Test Qualification (Partial) **Hybrid III 50th Percentile Male ATD**
Neck Flexion Test

ATD Serial No.: EL0140 Test Date: 2021-08-11

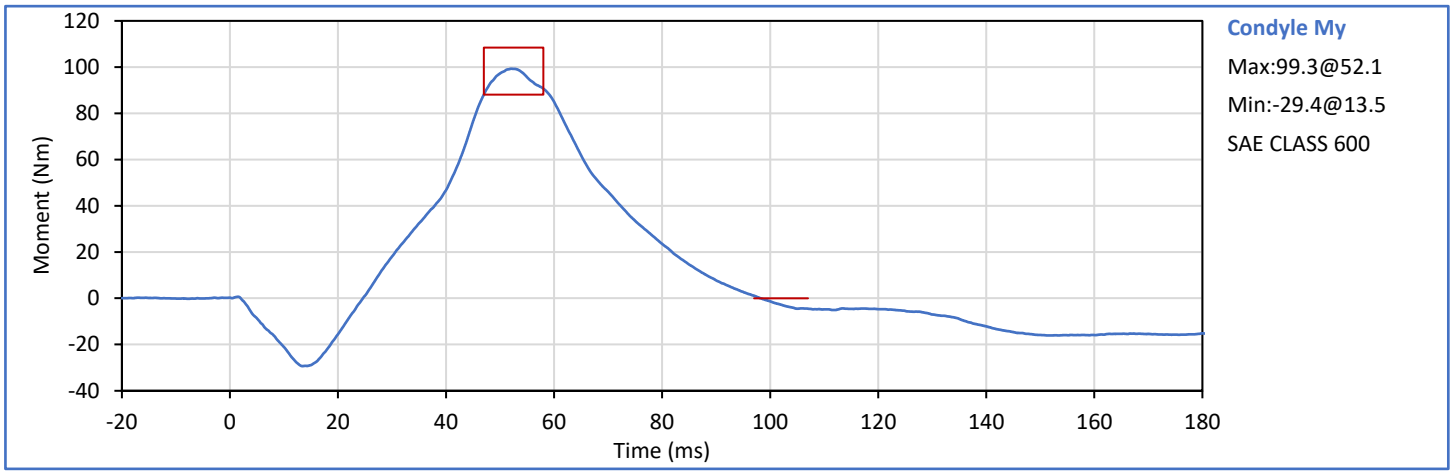
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.8	Pass
Laboratory Relative Humidity	%	10	70	46	Pass
Pendulum Velocity	m/s	6.89	7.13	6.99	Pass
Pendulum Deceleration at 10 ms	g	22.5	27.5	25.8	Pass
Pendulum Deceleration at 20 ms	g	17.6	22.6	21.6	Pass
Pendulum Deceleration at 30 ms	g	12.5	18.5	16.9	Pass
Peak Pendulum Decel After 30 ms	g	0.0	29.0	16.9	Pass
Deceleration Decay to Cross 5g	ms	34.0	42.0	37.0	Pass
"D" Plane Rotation peak	deg	64.0	78.0	67.8	Pass
	ms	57.0	64.0	58.5	Pass
"D" Plane Rotation Decay to Zero	ms	113.0	128.0	120.1	Pass
Moment About Occipital Condyle	Nm	88.1	108.5	99.3	Pass
	ms	47.0	58.0	52.1	Pass
Moment Decay, Peak to Zero	ms	97.0	107.0	98.2	Pass
			Overall Test Results		Pass

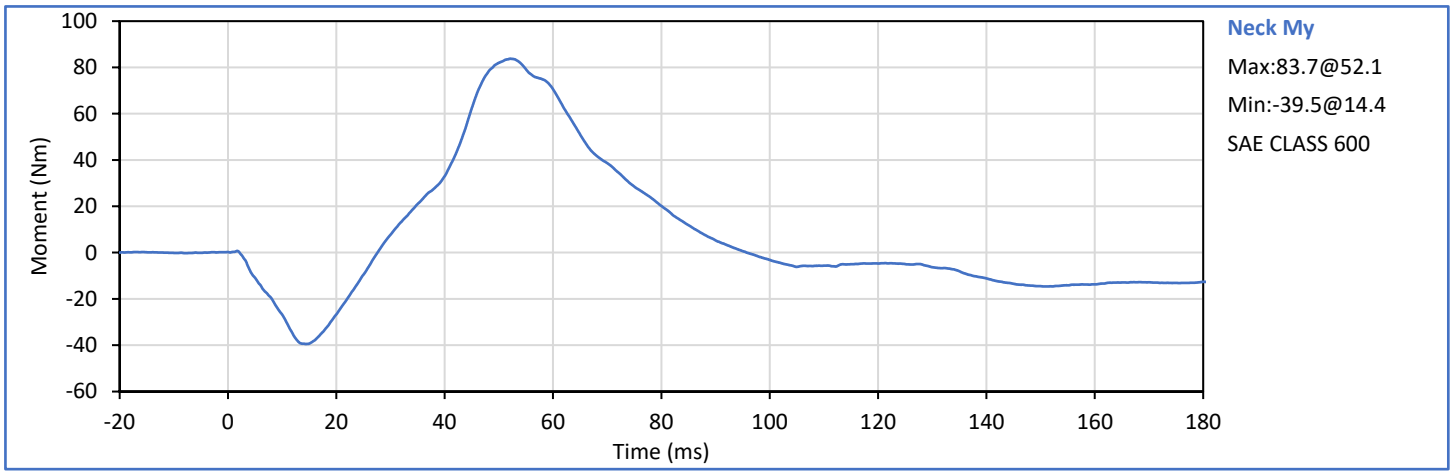


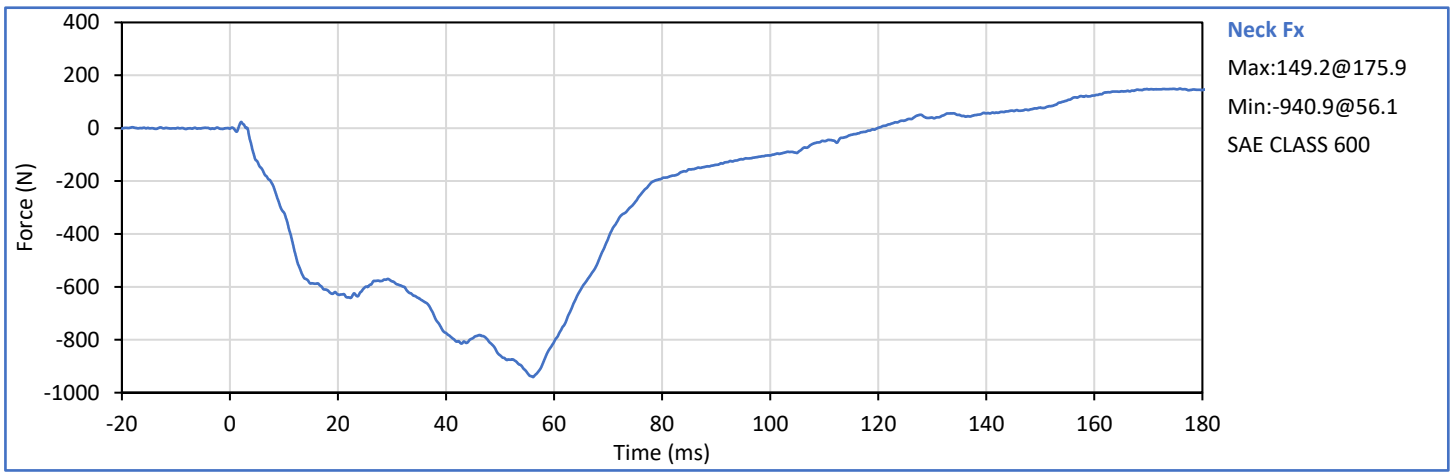


Technician: J. Hernandez

Approved By: P. Puzzuto


Moment (Nm)
Time (ms)
Condyle My
Max:99.3@52.1
Min:-29.4@13.5
SAE CLASS 600


Moment (Nm)
Time (ms)
Neck My
Max:83.7@52.1
Min:-39.5@14.4
SAE CLASS 600

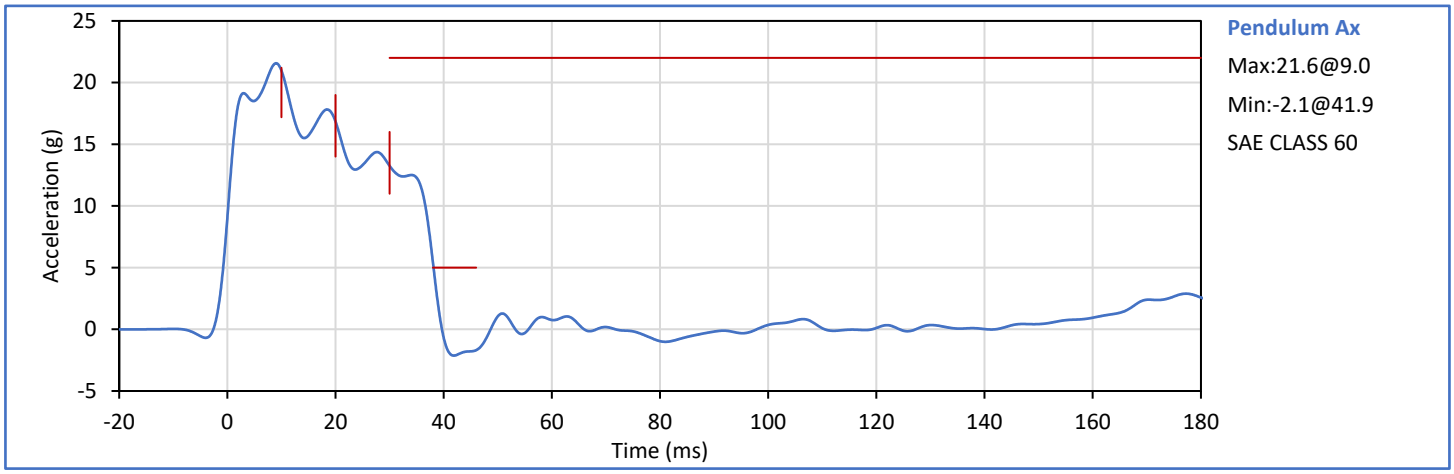

Force (N)
Time (ms)
Neck Fx
Max:149.2@175.9
Min:-940.9@56.1
SAE CLASS 600

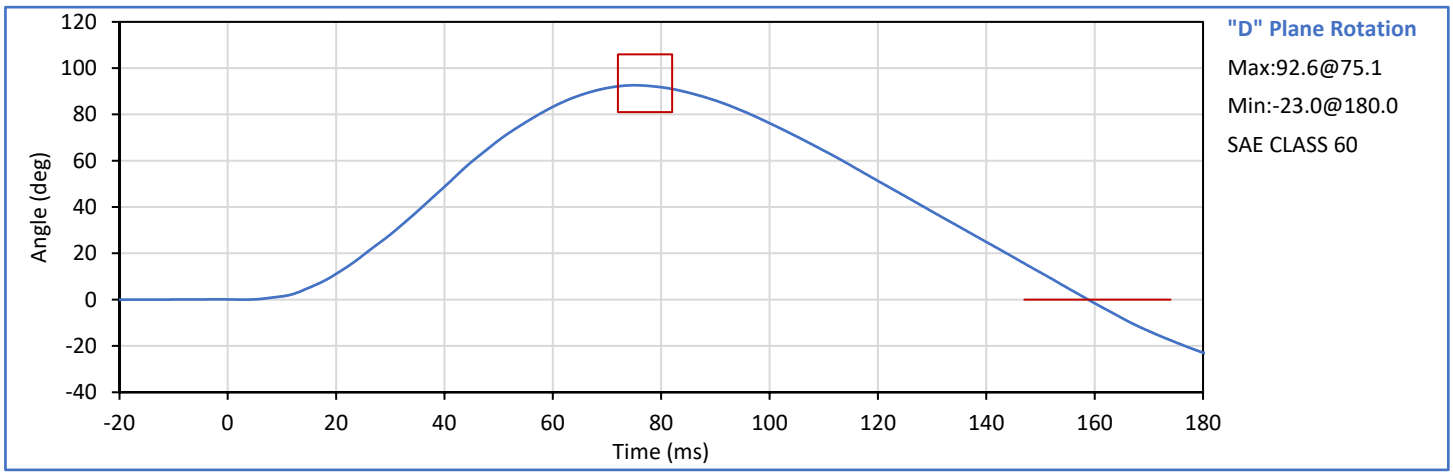
Applus IDIADA KARCO

Pre-Test Qualification (Partial) **Hybrid III 50th Percentile Male ATD**
Neck Extension Test

ATD Serial No.: EL0140 Test Date: 2021-08-11

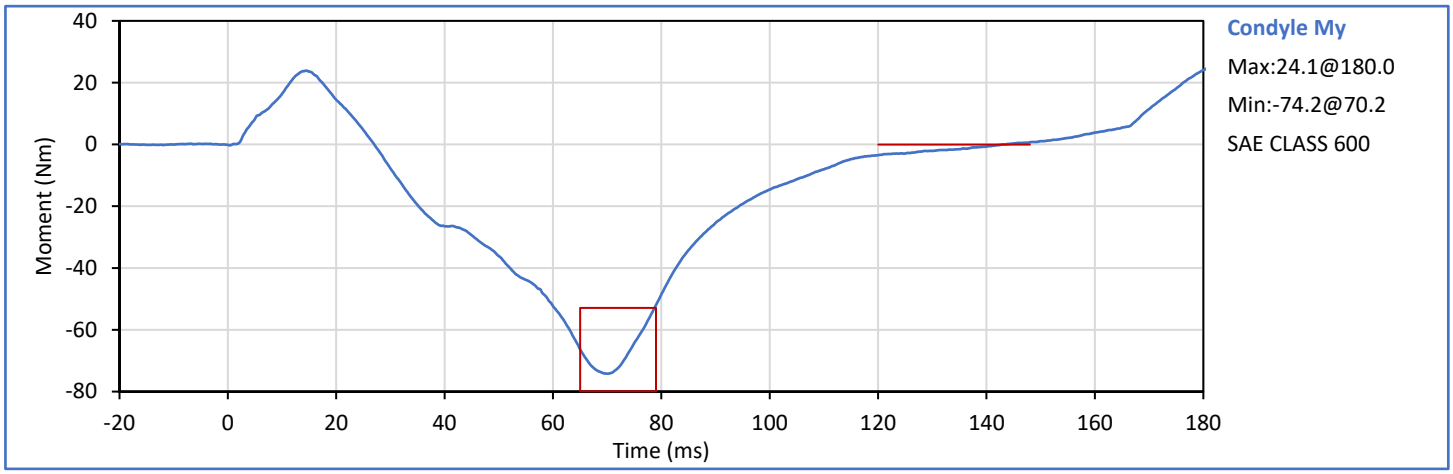
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.8	Pass
Laboratory Relative Humidity	%	10	70	43	Pass
Pendulum Velocity	m/s	5.94	6.19	6.17	Pass
Pendulum Deceleration at 10 ms	g	17.2	21.2	21.0	Pass
Pendulum Deceleration at 20 ms	g	14.0	19.0	16.9	Pass
Pendulum Deceleration at 30 ms	g	11.0	16.0	13.3	Pass
Peak Pendulum Decel After 30 ms	g	0.0	22.0	13.3	Pass
Deceleration Decay to Cross 5g	ms	38.0	46.0	38.1	Pass
"D" Plane Rotation peak	deg	81.0	106.0	92.6	Pass
	ms	72.0	82.0	75.1	Pass
"D" Plane Rotation Decay to Zero	ms	147.0	174.0	158.9	Pass
Moment About Occipital Condyle	Nm	-79.9	-52.9	-74.2	Pass
	ms	65.0	79.0	70.2	Pass
Moment Decay, Peak to Zero	ms	120.0	148.0	143.4	Pass
			Overall Test Results		Pass

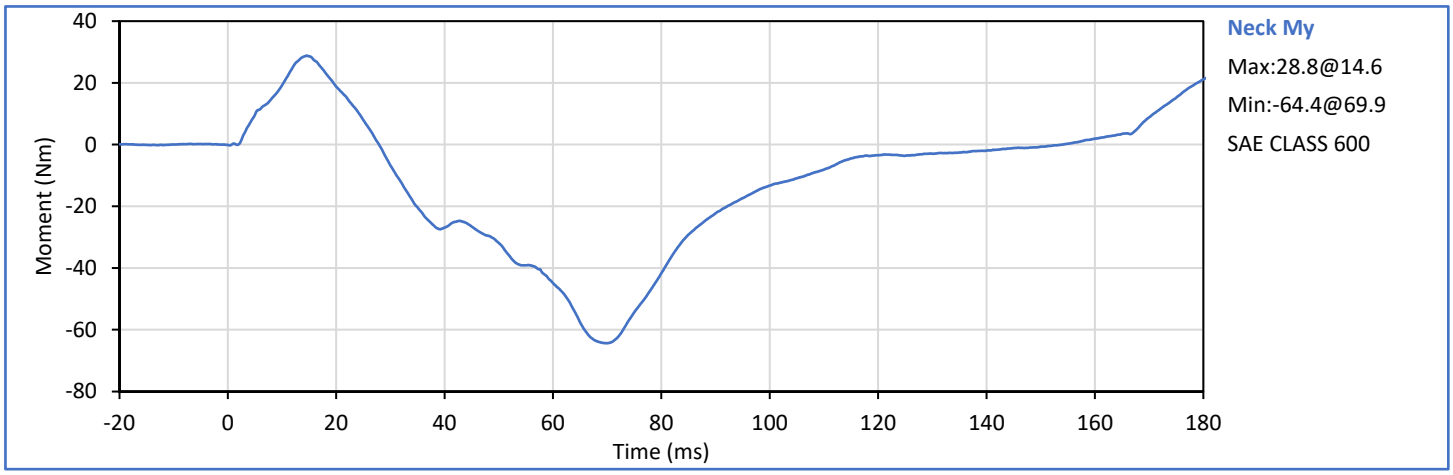


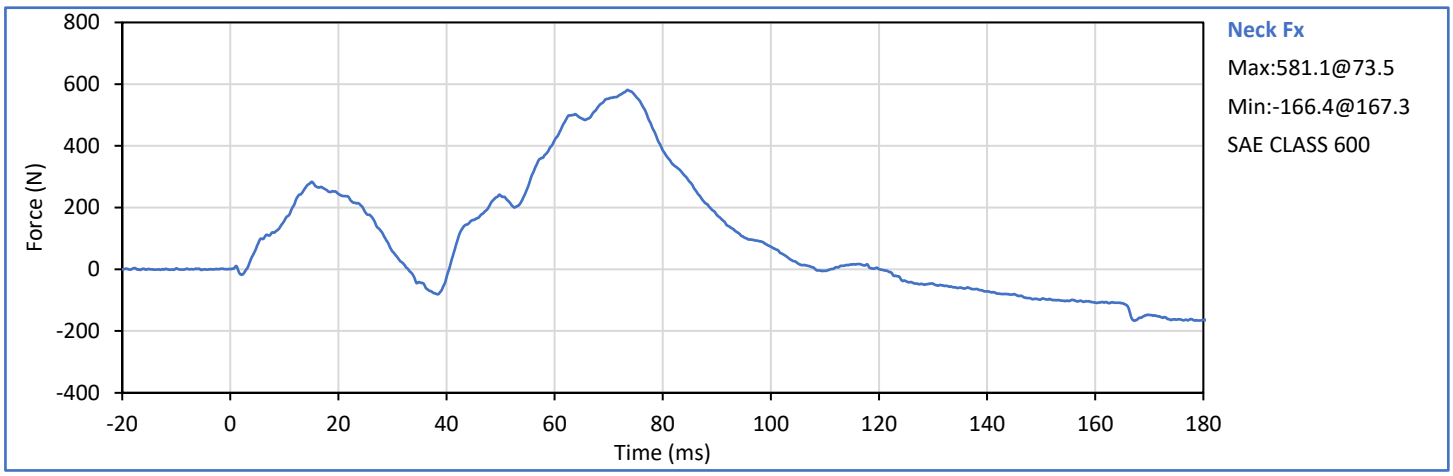


Technician: J. Hernandez

Approved By: P. Puzzuto


Moment (Nm)
Time (ms)
Condyle My
Max:24.1@180.0
Min:-74.2@70.2
SAE CLASS 600


Moment (Nm)
Time (ms)
Neck My
Max:28.8@14.6
Min:-64.4@69.9
SAE CLASS 600

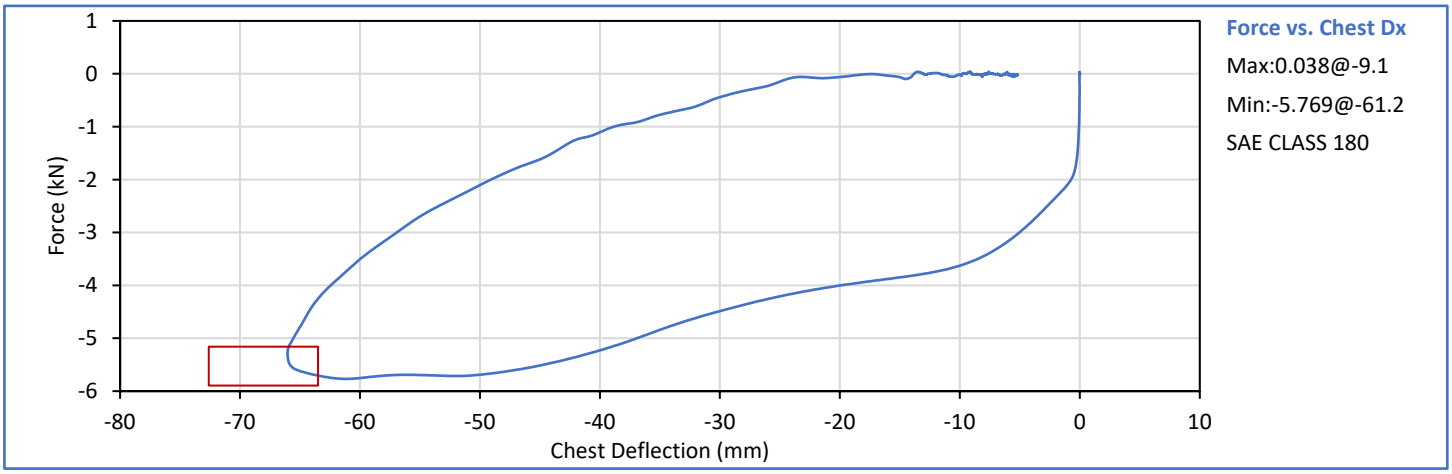

Force (N)
Time (ms)
Neck Fx
Max:581.1@73.5
Min:-166.4@167.3
SAE CLASS 600

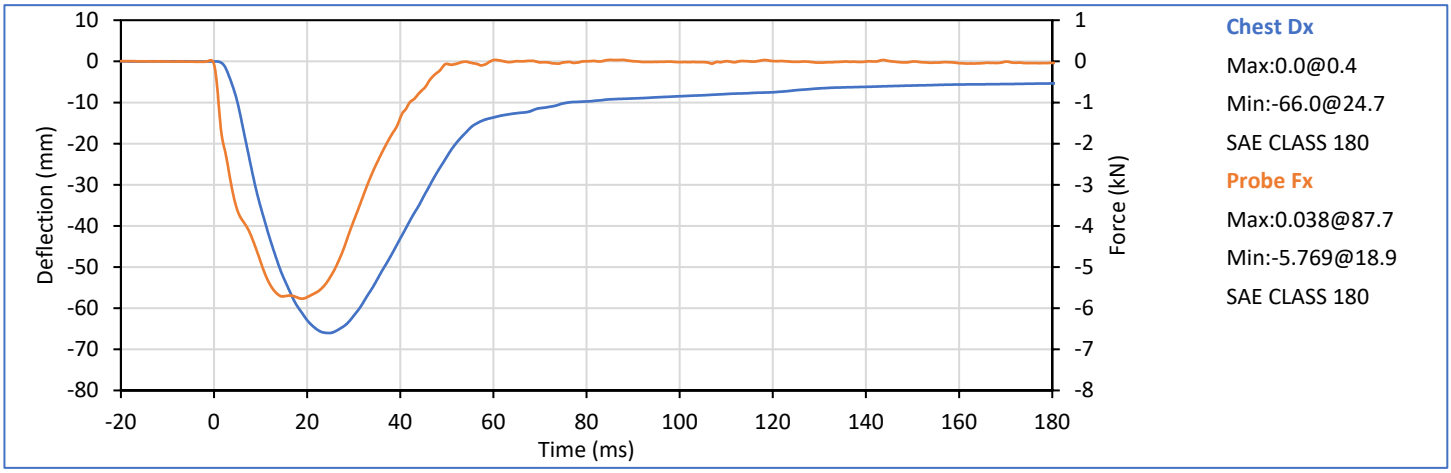
Applus IDIADA KARCO

Pre-Test Qualification (Partial) **Hybrid III 50th Percentile Male ATD Thorax Impact**

ATD Serial No.: EL0140 Test Date: 2021-08-09

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	31	Pass
Probe Velocity	m/s	6.58	6.82	6.78	Pass
Peak Chest Deflection	mm	-72.6	-63.5	-66.0	Pass
Peak Probe Force	kN	-5.893	-5.159	-5.769	Pass
Internal Hysterisis	%	69.0	85.0	74.1	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

Approved By: P. Puzzuto

APPENDIX D

ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

THOR-50M 50TH PERCENTILE MALE ATD

POST-TEST QUALIFICATION (FULL)

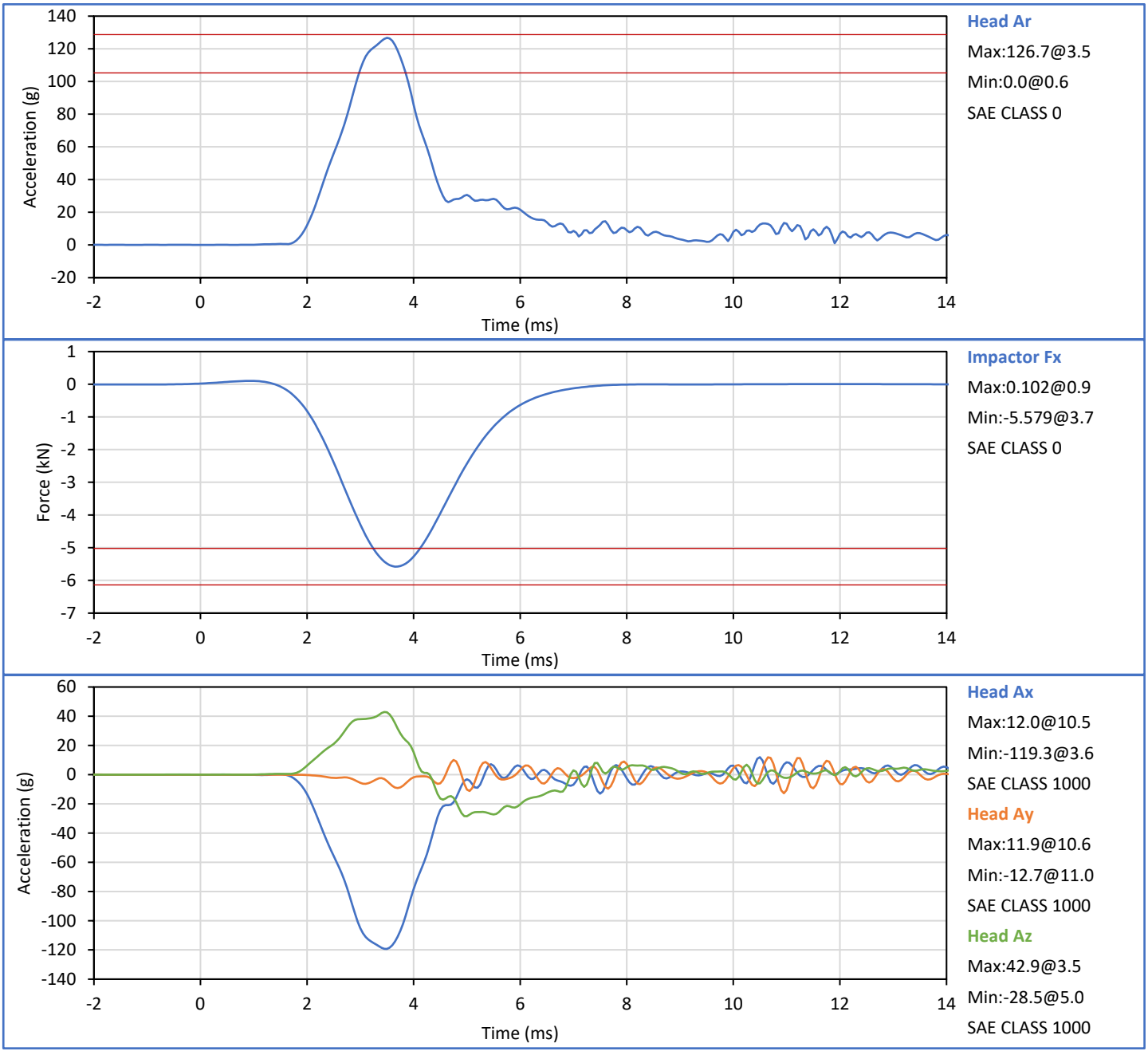
APPENDIX D
ATD Configuration and Performance Verification Data
THOR-50M 50th Percentile Male ATD
Post-Test Qualification (Partial) S/N: EG2595

Applus IDIADA KARCO

Post-Test Qualification (Partial) THOR-50M 50th Percentile Male ATD
Head Qualification

ATD Serial No.: EG2595 Test Date: 2021-08-23

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



Technician: J. Hernandez

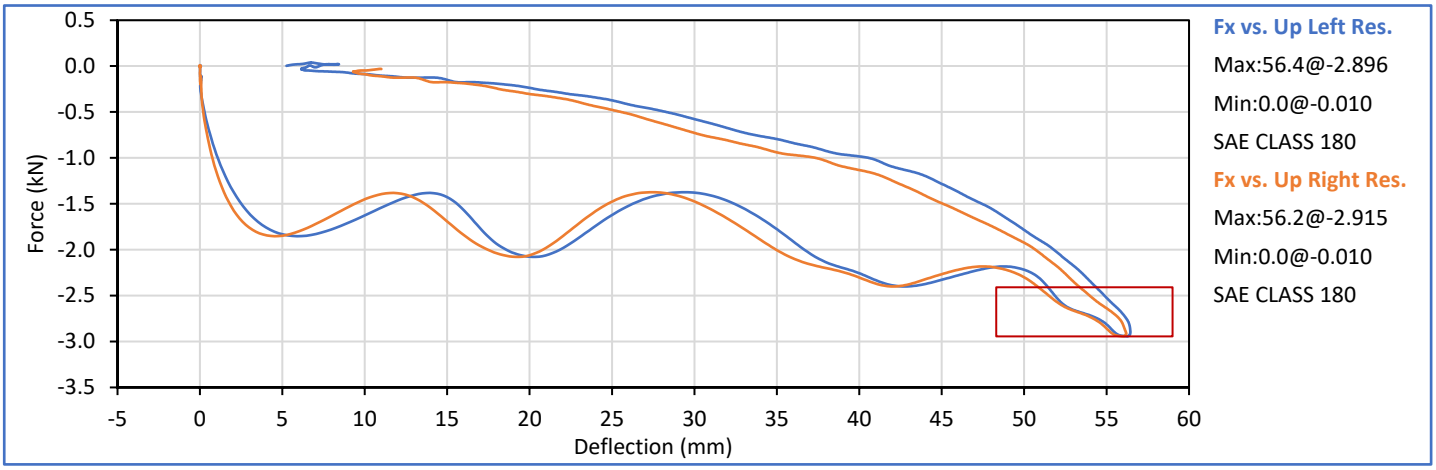
Approved By: P .Puzzuto

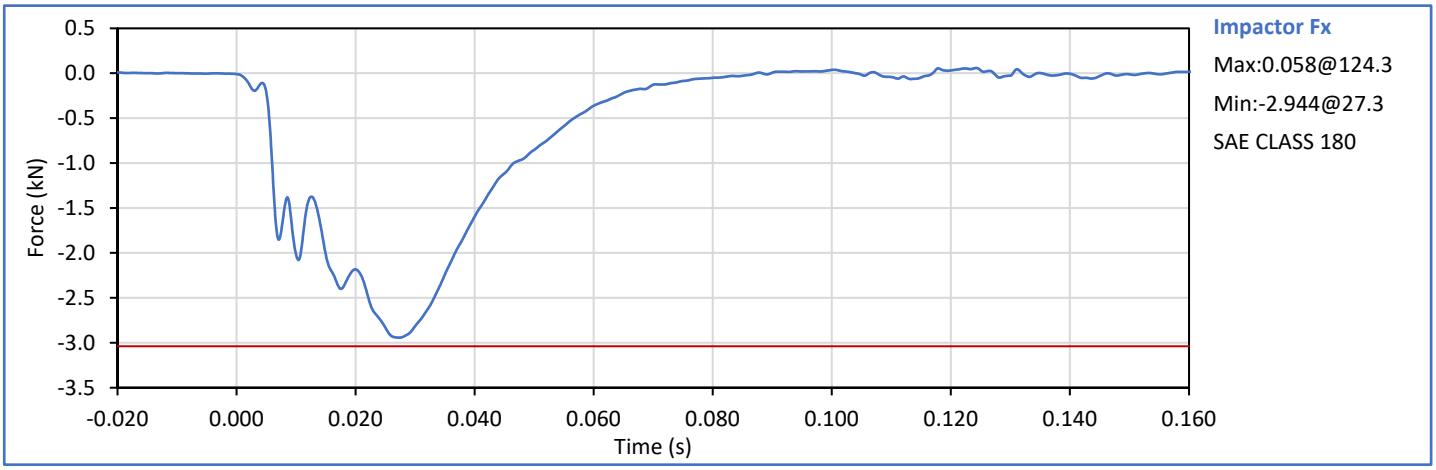
Applus IDIADA KARCO

Post-Test Qualification (Partial) **THOR-50M 50th Percentile Male ATD**
Thorax Impact (Upper)

ATD Serial No.: EG2595 Test Date: 2021-08-20

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

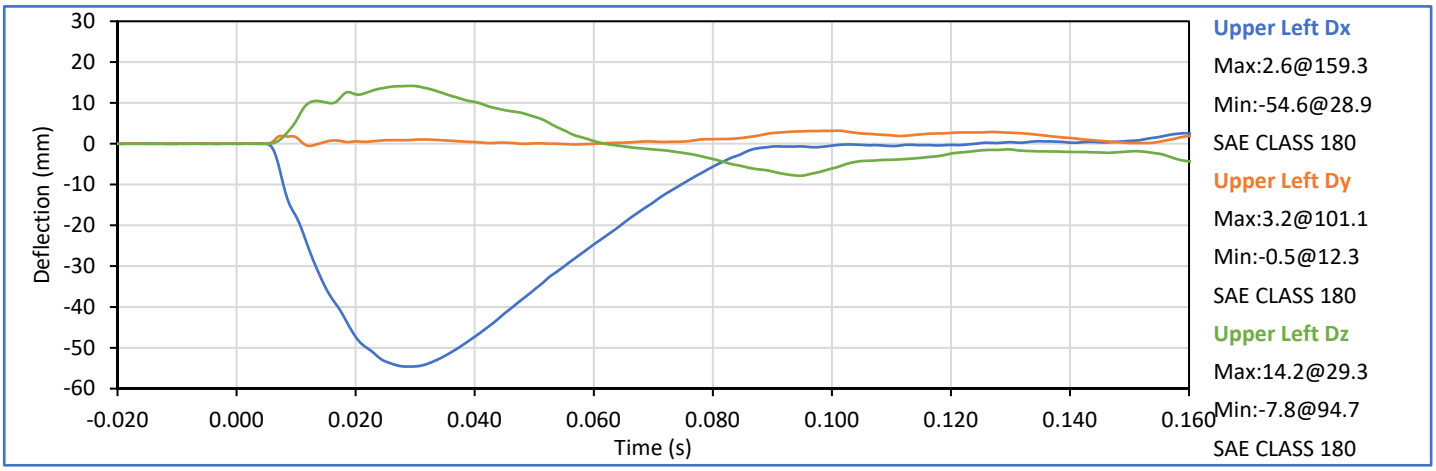


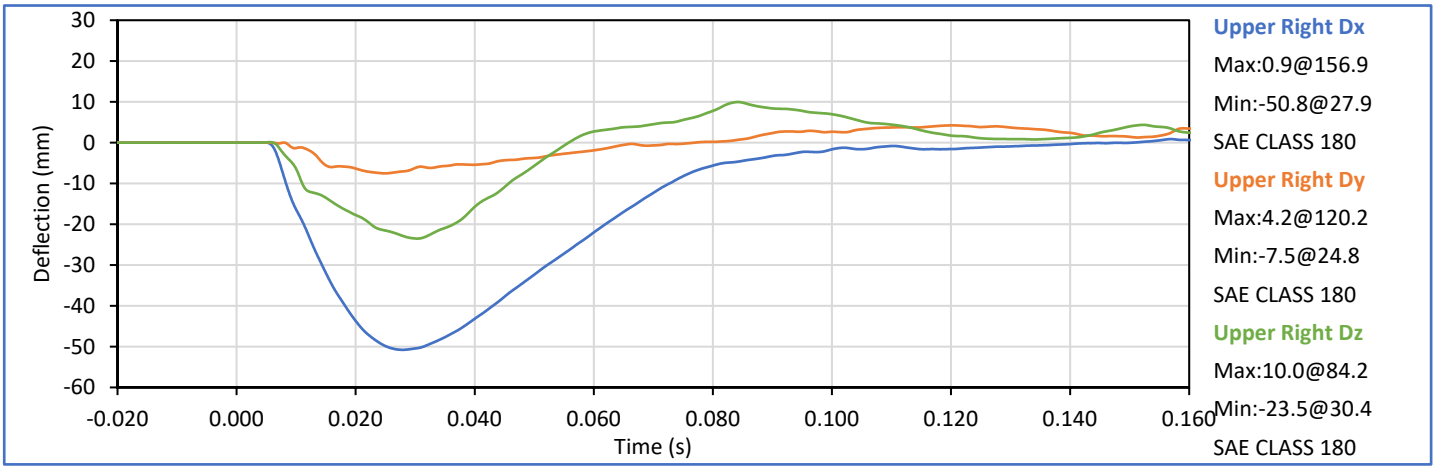


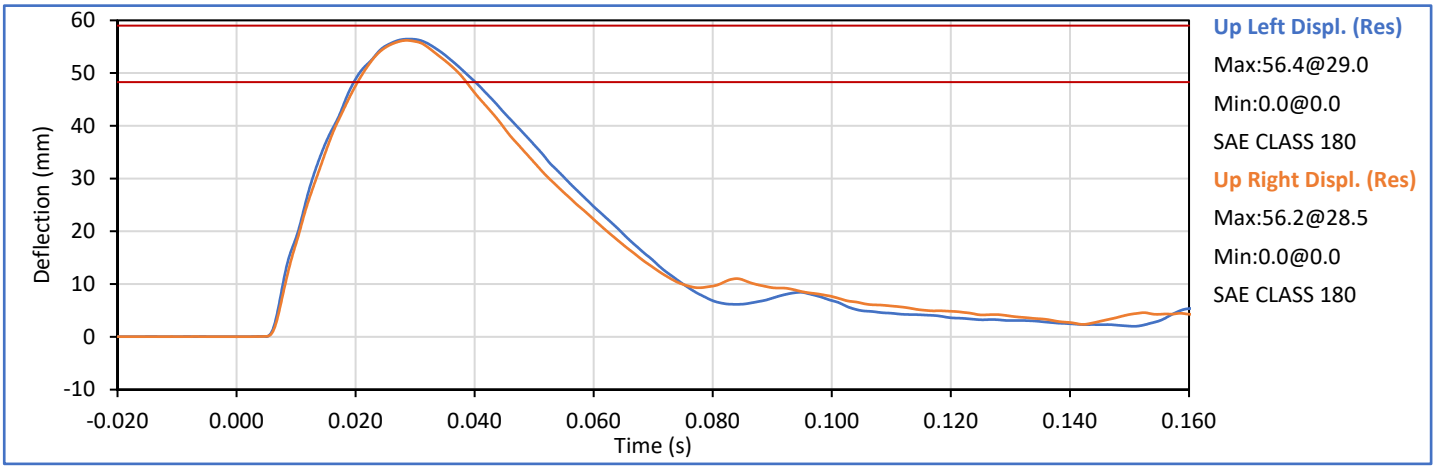
Technician: J. Hernandez

Approved By: P. Puzzuto

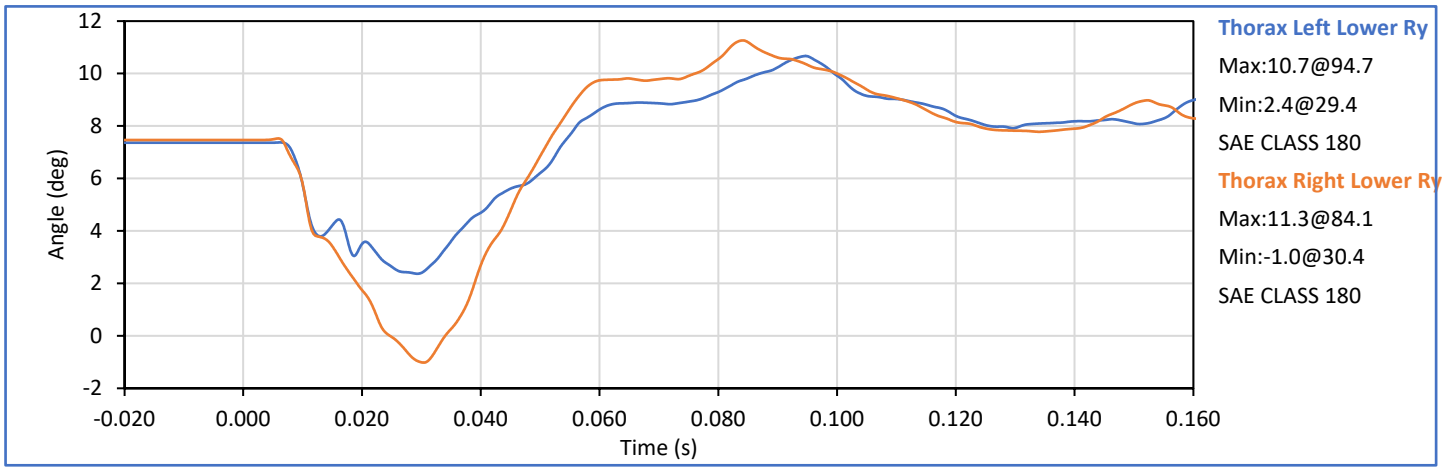
ATD Serial No.: EG2595 Test Date: 2021-08-20

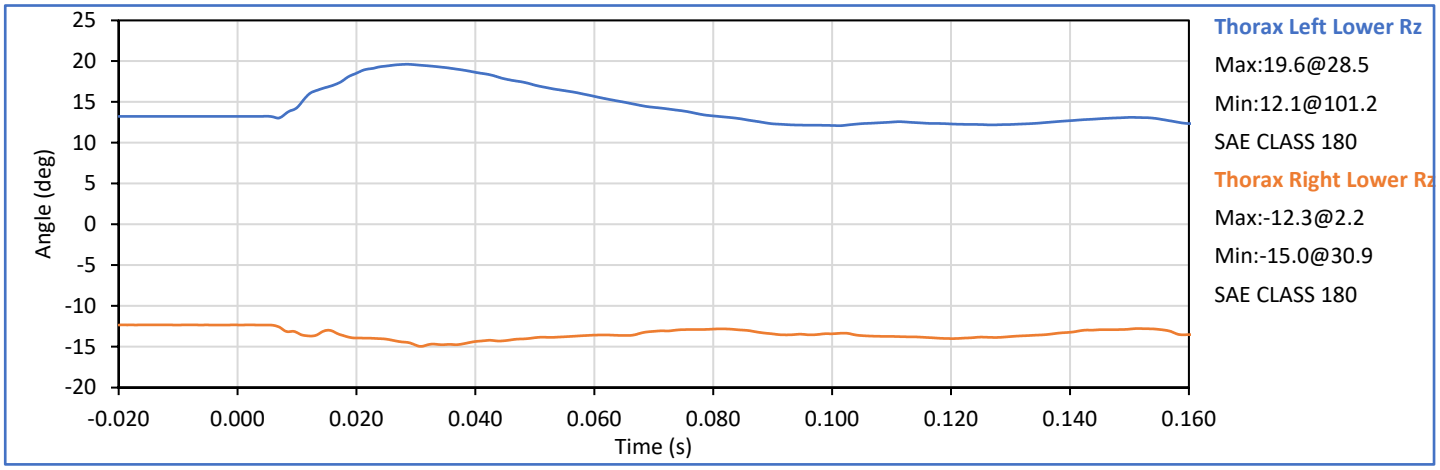






ATD Serial No.: EG2595 Test Date: 2021-08-20



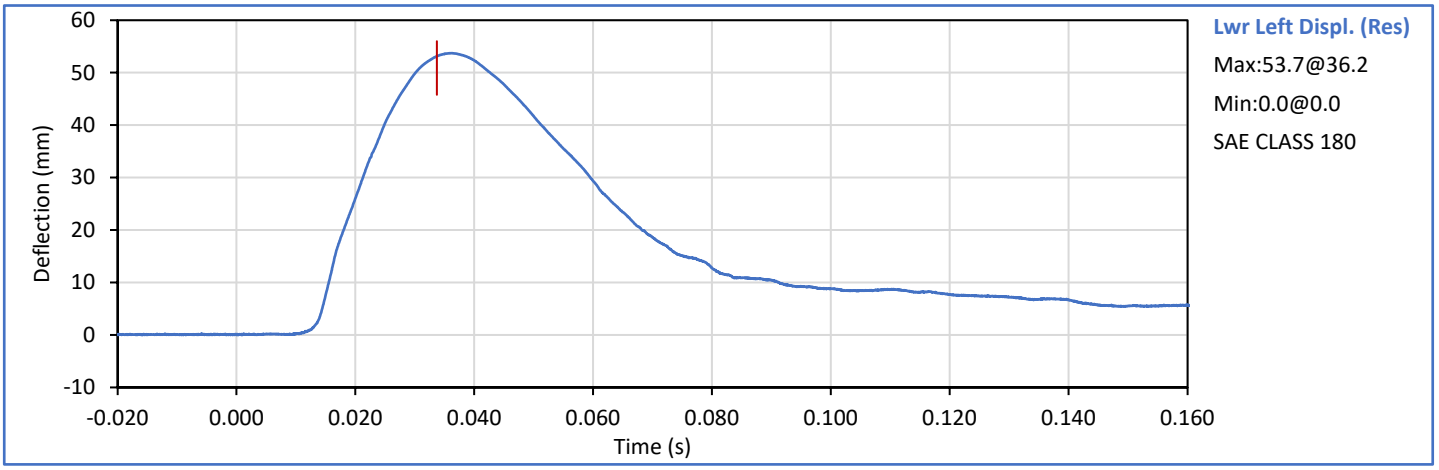


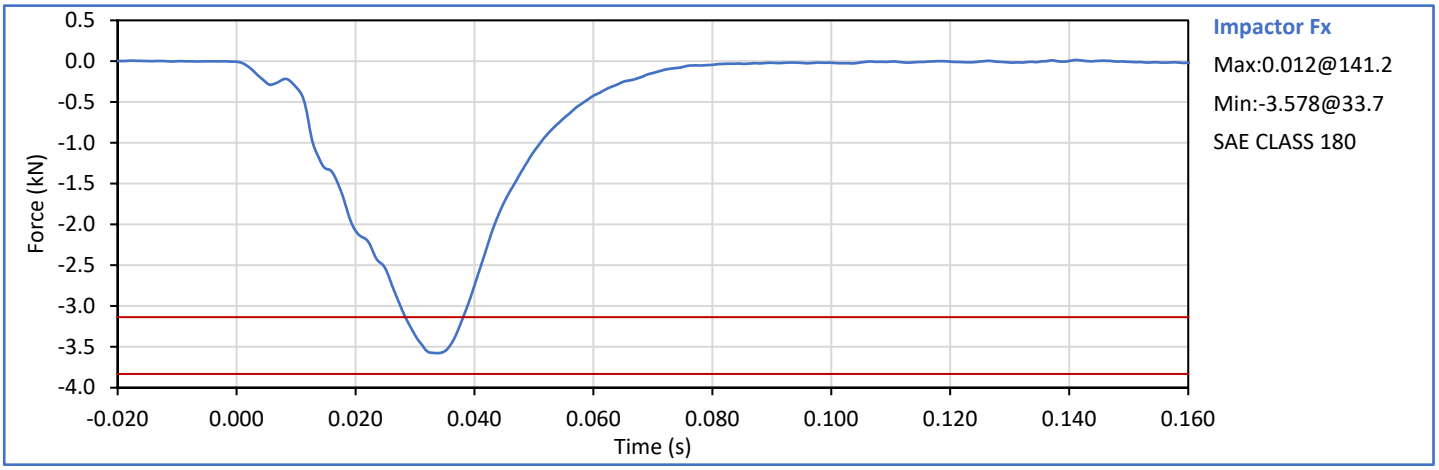
Applus IDIADA KARCO

Post-Test Qualification (Partial) **THOR-50M 50th Percentile Male ATD**
Thorax Impact (Lower Left)

ATD Serial No.: EG2595 Test Date: 2021-08-20

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





Technician: J. Hernandez

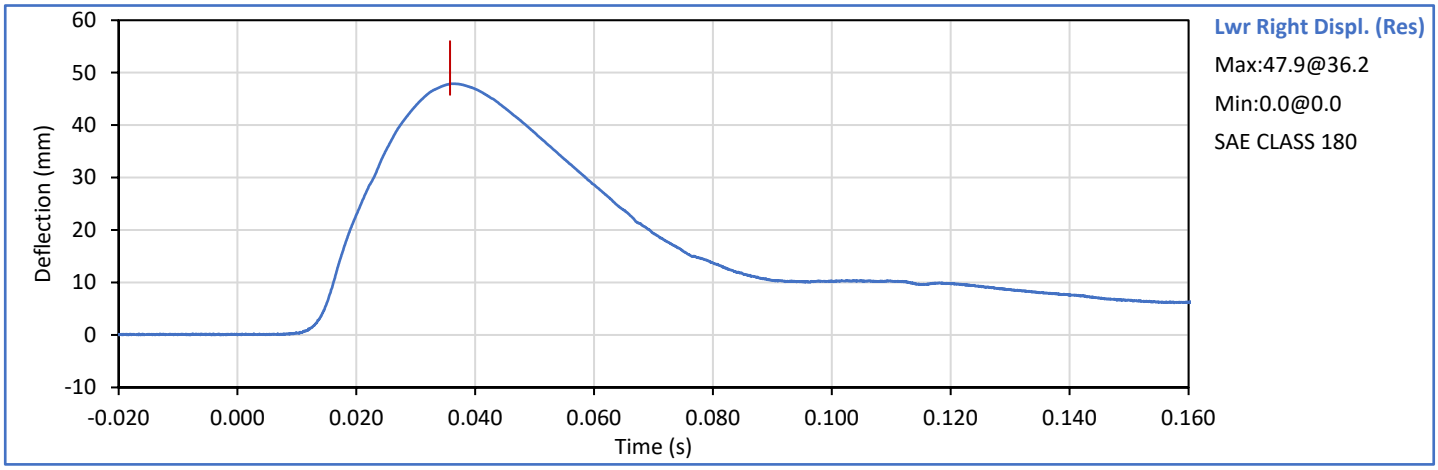
Approved By: P. Puzzuto

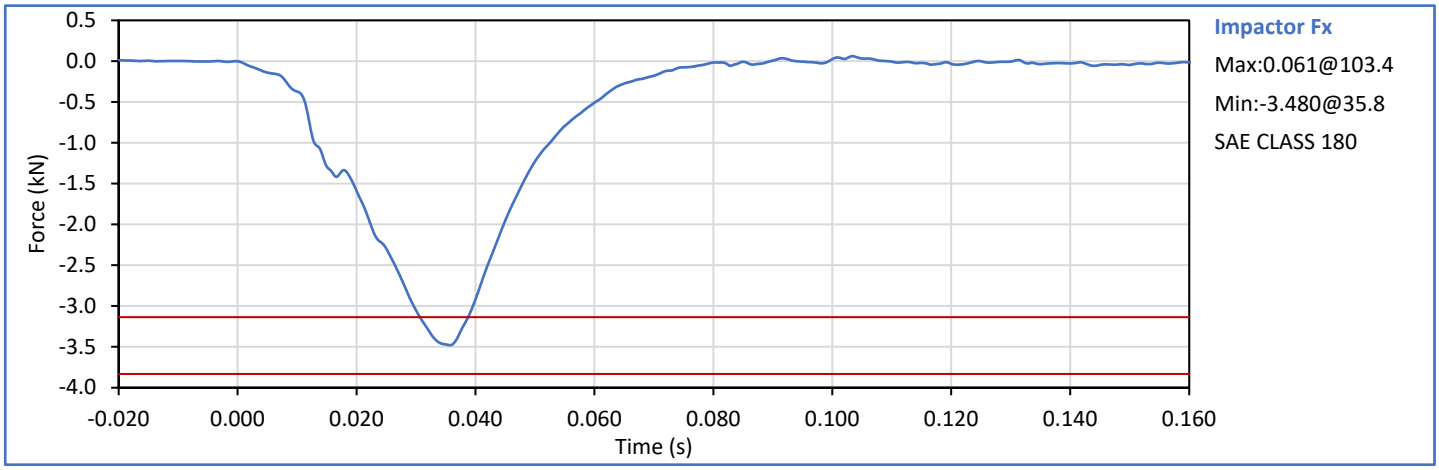
Applus IDIADA KARCO

Post-Test Qualification (Partial) **THOR-50M 50th Percentile Male ATD**
Thorax Impact (Lower Right)

ATD Serial No.: EG2595 Test Date: 2021-08-20

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





Technician: J. Hernandez

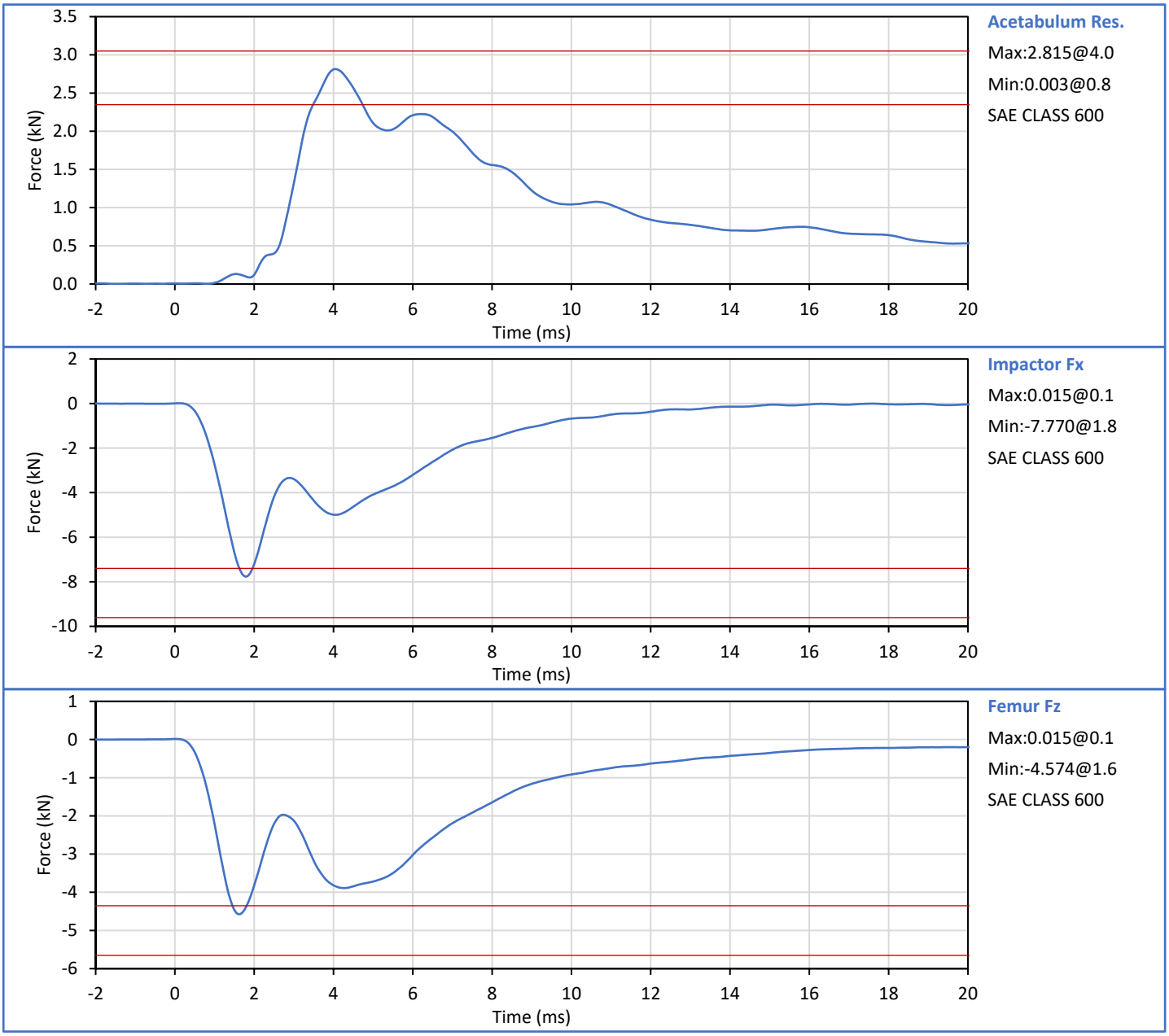
Approved By: P. Puzzuto

Applus IDIADA KARCO

Post-Test Qualification (Partial) **THOR-50M 50th Percentile Male ATD**
Upper Leg (Left) Qualification

ATD Serial No.: EG2595 Test Date: 2021-08-26

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



Technician: J. Hernandez

Approved By: P. Puzzuto

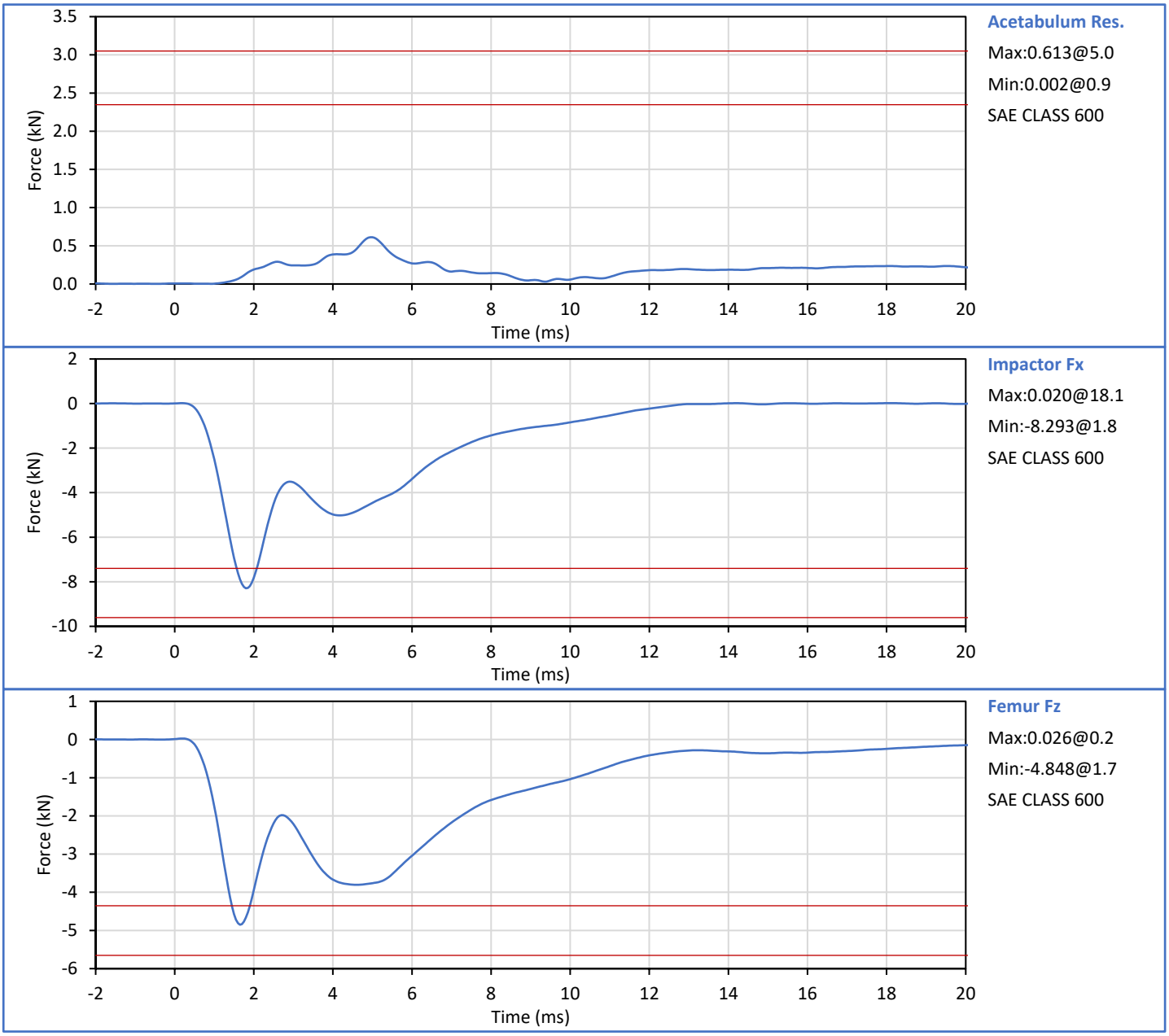
Applus IDIADA KARCO

Post-Test Qualification (Partial) THOR-50M 50th Percentile Male ATD
Upper Leg (Right) Qualification

ATD Serial No.: EG2595 Test Date: 2021-08-26

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

* Acetablum Load Cell Fx is not functioning



Technician: J. Hernandez

Approved By: P. Puzzuto

APPENDIX D
ATD Qualification and Performance Verification
Hybrid III 50th Percentile Male ATD
Post-Test Qualification (Full) S/N: 168

Applus IDIADA KARCO

Post-Test Qualification (Full)

Hybrid III 50th Percentile Male ATD
ATD Damage Checklist

ATD Serial No.: 168

Test Date: 2021-08-19

Dummy Item	Inspect for	Comments	Damage	OK
Entire ATD	Perform general cleaning			✓
Outer Skin	Gashes, rips, cracks			✓
Head	Ballast secure			✓
	General appearance			✓
Neck bracket	Upper neck firmly attached to lower bracket			✓
Neck	Broken or cracked rubber			✓
	Looseness at the condyle joint			✓
Nodding block	Cracked or out of position			✓
Lumbar Spine	Broken or cracked rubber			✓
Ribs	Broken or bent ribs			✓
	Broken or bent rib supports			✓
	Damping material separated or cracked			✓
	Rubber bumpers in place			✓
Chest Displ.	Bent shaft			✓
Assembly	Slider arm riding in track			✓
Sensors	Check cables for cuts, tears			✓
	Check for damaged insulation			✓
Accelerometer	Head mounting secure			✓
Mounting	Chest mounting secure			✓
Knees	Skin condition			✓
	Insert (do not remove)			✓
	Casting			✓
Limbs	Normal movement and adjustment			✓
Knee Sliders	Wires intact			✓
	Rubber returned to "resting" position			✓
Pelvis	Broken			✓
Other	Describe below as needed			✓

Describe any repairs or replacement of parts or other findings:

No Problems Found

Technician: J. Hernandez

Approved By: P. Puzzuto

Applus IDIADA KARCO

Post-Test Qualification (Full) **Hybrid III 50th Percentile Male ATD External Measurements**

ATD Serial No.: 168 Test Date: 2021-08-19

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	36	Pass
A - Total sitting height	mm	879	889	885	Pass
B - Shoulder pivot height	mm	505	521	514	Pass
C - 'H' point height	mm	84	89	85	Pass
D - 'H' point location from backline	mm	135	140	139	Pass
E - Shoulder pivot from backline	mm	84	94	90	Pass
F - Thigh clearance	mm	140	155	148	Pass
G - Back of elbow to wrist pivot	mm	290	305	299	Pass
H - Head back to backline	mm	41	46	46	Pass
I - Shoulder to elbow length	mm	330	345	341	Pass
J - Elbow rest height	mm	190	211	207	Pass
K - Buttock to knee length	mm	579	604	593	Pass
L - Popliteal length	mm	429	455	445	Pass
M - Knee pivot height	mm	485	500	491	Pass
N - Buttock popliteal length	mm	452	477	471	Pass
O - Chest depth without jacket	mm	213	229	222	Pass
P - Foot length	mm	251	267	260	Pass
V - Shoulder breadth	mm	422	437	428	Pass
W - Foot breadth	mm	91	107	101	Pass
Y - Chest circum. (w/chest jacket)	mm	970	1001	992	Pass
Z - Waist circum.	mm	836	866	856	Pass
AA - Location for chest circum.	mm	429	434	430	Pass
BB - Location for waist circum.	mm	226	231	230	Pass
			Overall Test Results		Pass

Technician: J. Hernandez

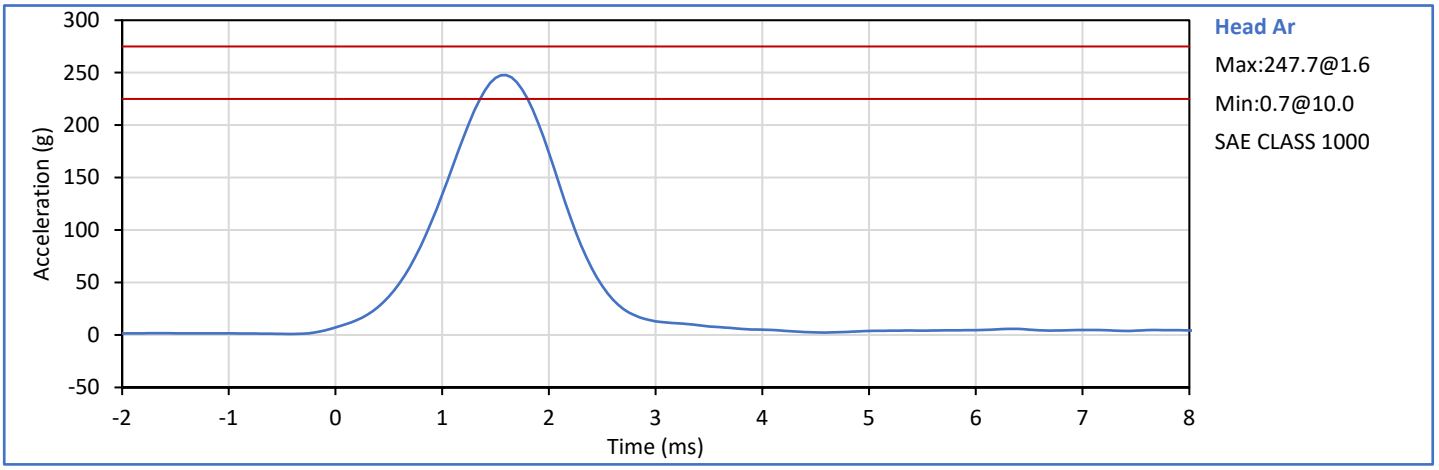
Approved By: P. Puzzuto

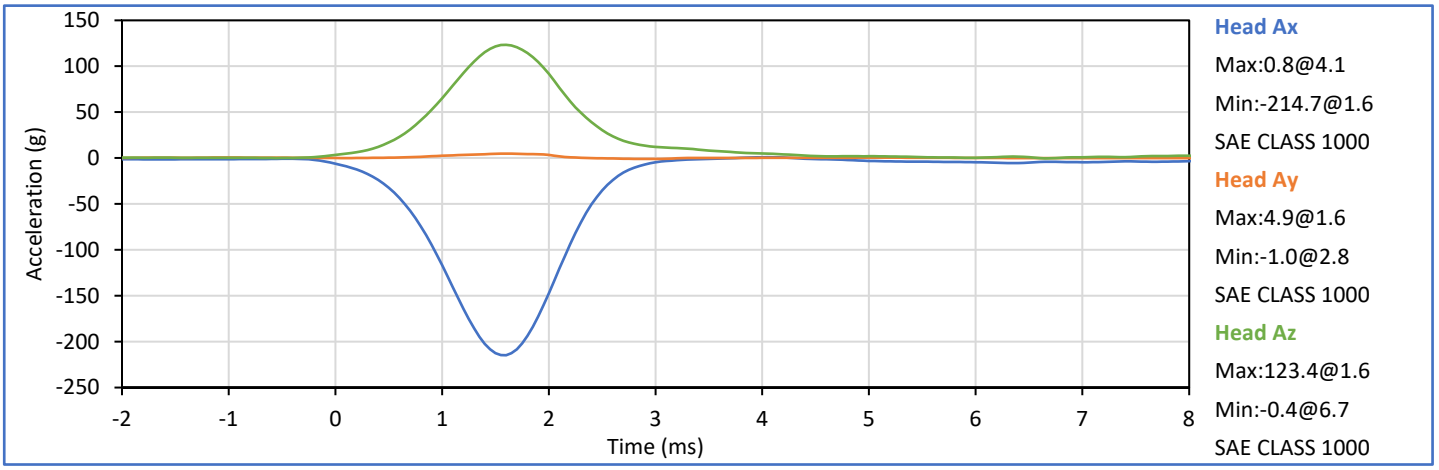
Applus IDIADA KARCO

Post-Test Qualification (Full) **Hybrid III 50th Percentile Male ATD Head Drop**

ATD Serial No.: 168 Test Date: 2021-08-26

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	20.8	Pass
Laboratory Relative Humidity	%	10	70	33	Pass
Peak Resultant Acceleration	g	225.0	275.0	247.7	Pass
Peak Lateral Acceleration	g	-15.0	15.0	4.9	Pass
Oscillations After Main Pulse	%	0.0	10.0	0.0	Pass
Is Acceleration Unimodal?	Yes/No	Yes		Yes	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

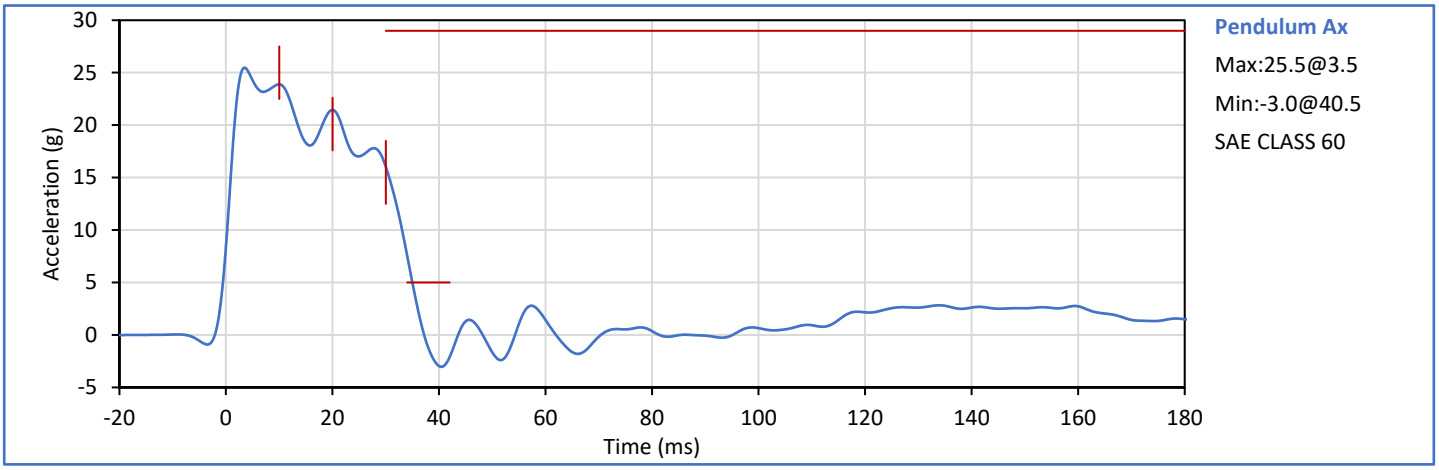
Approved By: P. Puzzuto

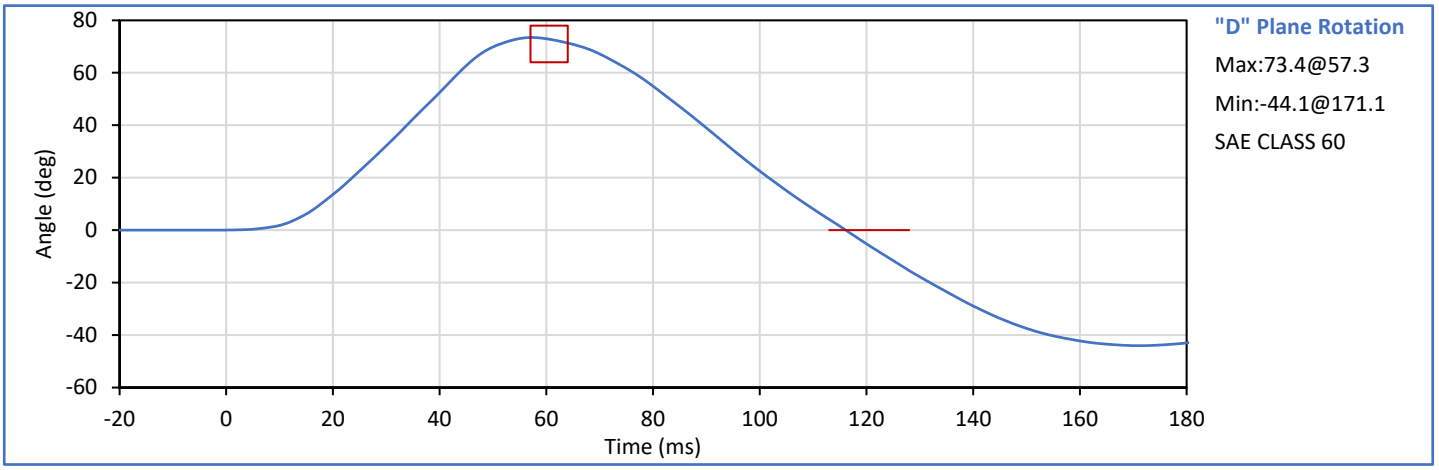
Applus IDIADA KARCO

Post-Test Qualification (Full) **Hybrid III 50th Percentile Male ATD**
Neck Flexion Test

ATD Serial No.: 168 Test Date: 2021-08-26

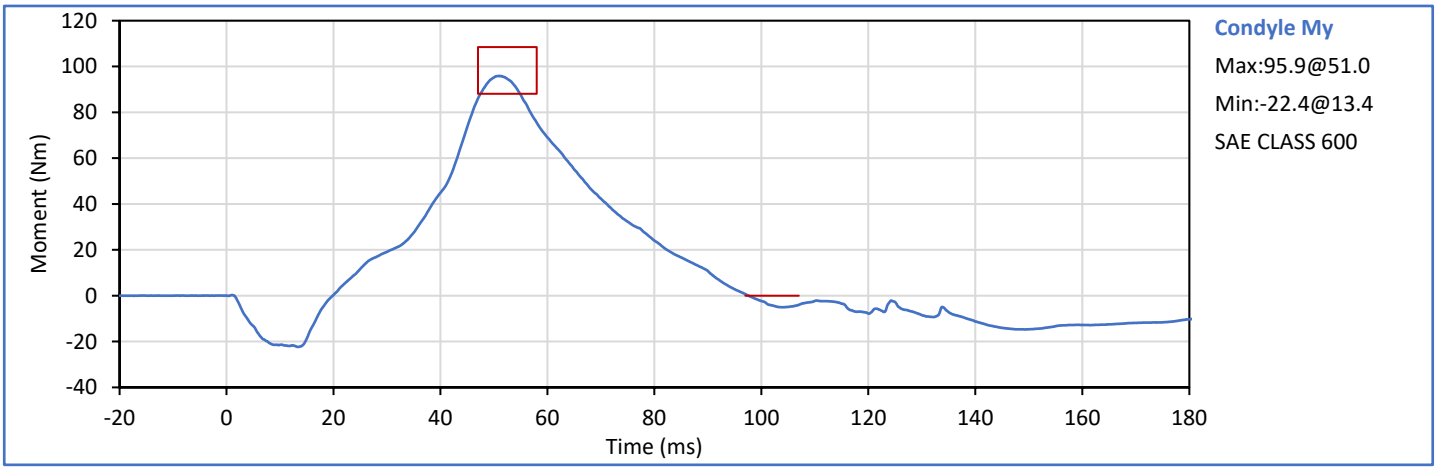
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.3	Pass
Laboratory Relative Humidity	%	10	70	38	Pass
Pendulum Velocity	m/s	6.89	7.13	7.00	Pass
Pendulum Deceleration at 10 ms	g	22.5	27.5	23.9	Pass
Pendulum Deceleration at 20 ms	g	17.6	22.6	21.4	Pass
Pendulum Deceleration at 30 ms	g	12.5	18.5	16.1	Pass
Peak Pendulum Decel After 30 ms	g	0.0	29.0	16.1	Pass
Deceleration Decay to Cross 5g	ms	34.0	42.0	35.0	Pass
"D" Plane Rotation peak	deg	64.0	78.0	73.4	Pass
	ms	57.0	64.0	57.3	Pass
"D" Plane Rotation Decay to Zero	ms	113.0	128.0	116.2	Pass
Moment About Occipital Condyle	Nm	88.1	108.5	95.9	Pass
	ms	47.0	58.0	51.0	Pass
Moment Decay, Peak to Zero	ms	97.0	107.0	97.6	Pass
			Overall Test Results		Pass

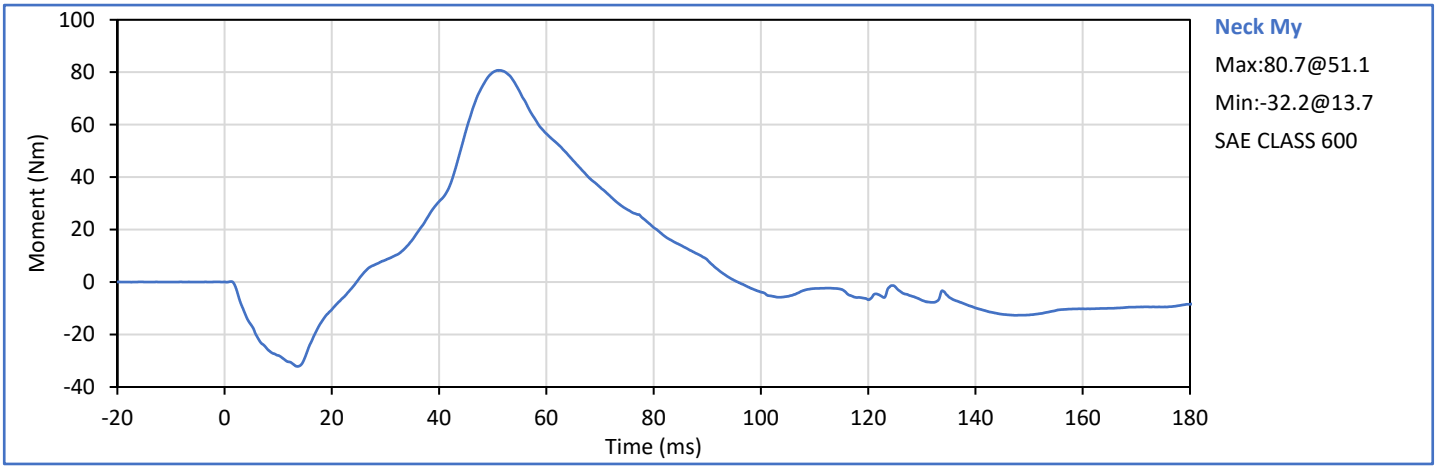


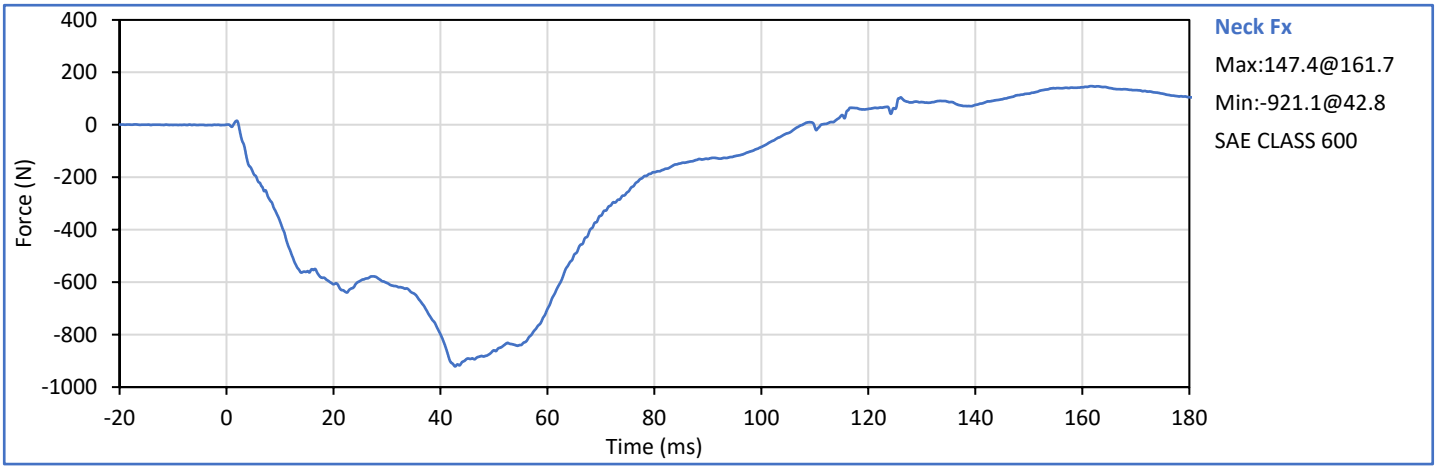


Technician: J. Hernandez Approved By: P. Puzzuto

ATD Serial No.: 168 Test Date: 2021-08-26





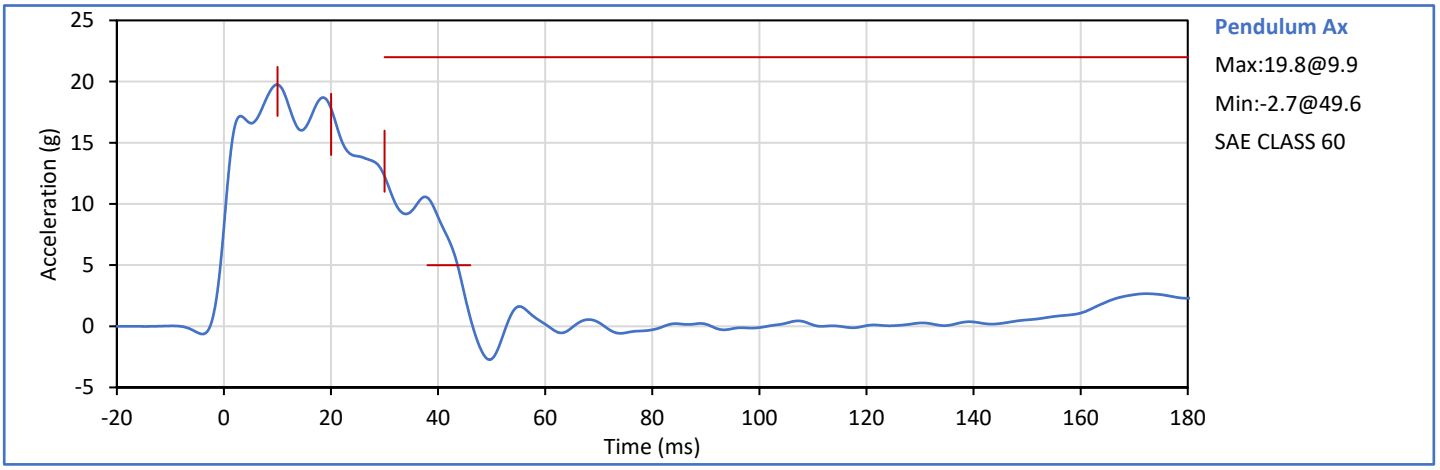


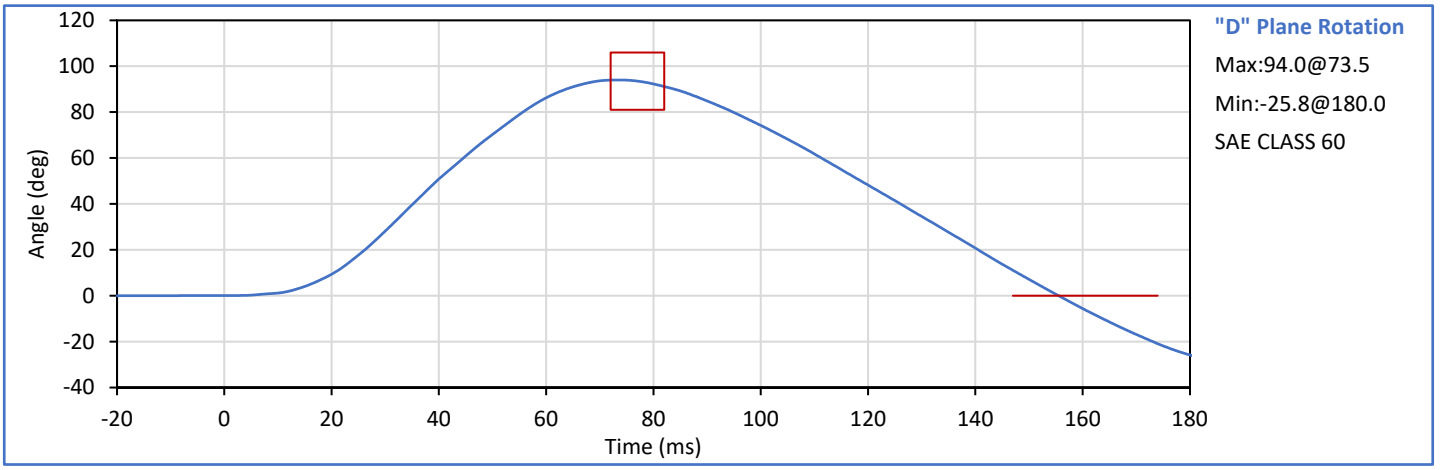
Applus IDIADA KARCO

Post-Test Qualification (Full) **Hybrid III 50th Percentile Male ATD**
Neck Extension Test

ATD Serial No.: 168 Test Date: 2021-08-26

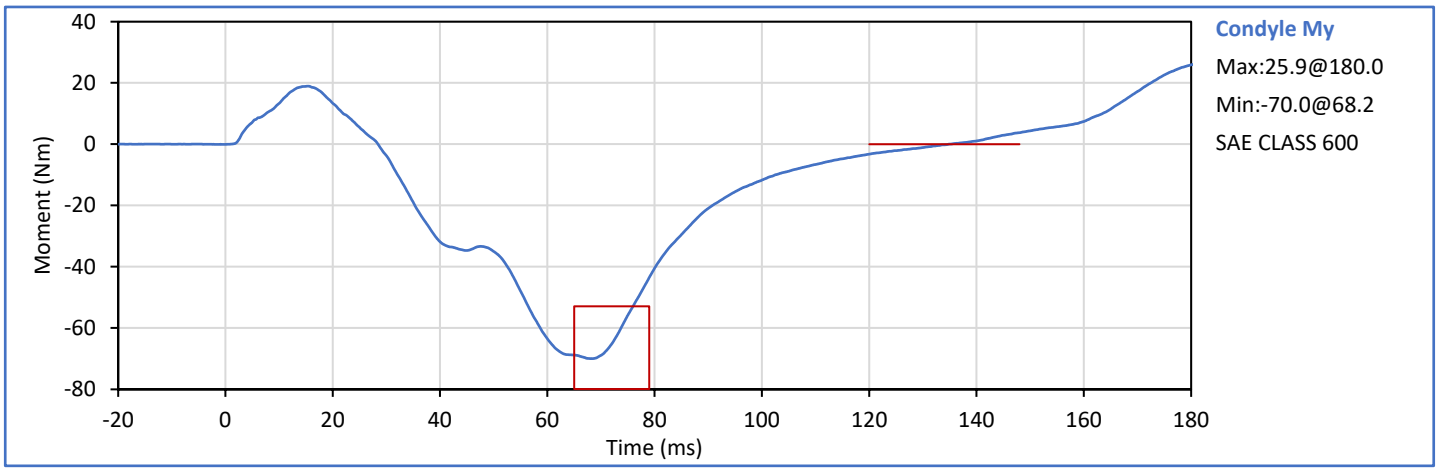
Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	20.8	Pass
Laboratory Relative Humidity	%	10	70	39	Pass
Pendulum Velocity	m/s	5.94	6.19	6.10	Pass
Pendulum Deceleration at 10 ms	g	17.2	21.2	19.8	Pass
Pendulum Deceleration at 20 ms	g	14.0	19.0	17.8	Pass
Pendulum Deceleration at 30 ms	g	11.0	16.0	12.3	Pass
Peak Pendulum Decel After 30 ms	g	0.0	22.0	12.3	Pass
Deceleration Decay to Cross 5g	ms	38.0	46.0	43.6	Pass
"D" Plane Rotation peak	deg	81.0	106.0	94.0	Pass
	ms	72.0	82.0	73.5	Pass
"D" Plane Rotation Decay to Zero	ms	147.0	174.0	155.6	Pass
Moment About Occipital Condyle	Nm	-79.9	-52.9	-70.0	Pass
	ms	65.0	79.0	68.2	Pass
Moment Decay, Peak to Zero	ms	120.0	148.0	134.9	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

Approved By: P. Puzzuto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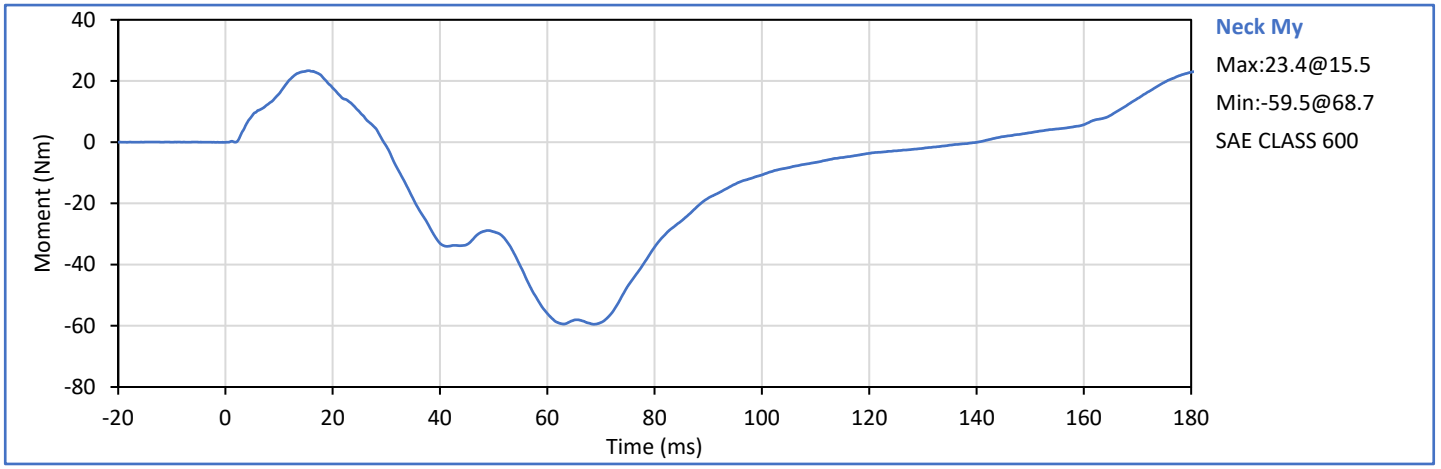
Condyle My
Max:25.9@180.0
Min:-70.0@68.2
SAE CLASS 600


Moment (Nm)
Time (ms)
Neck My
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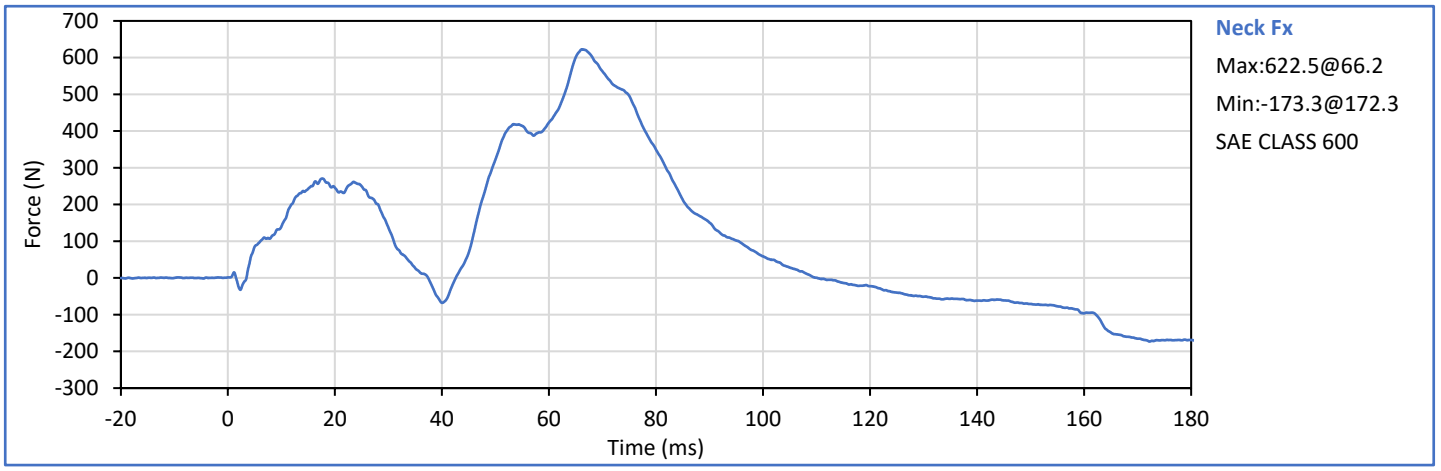
SAE CLASS 600

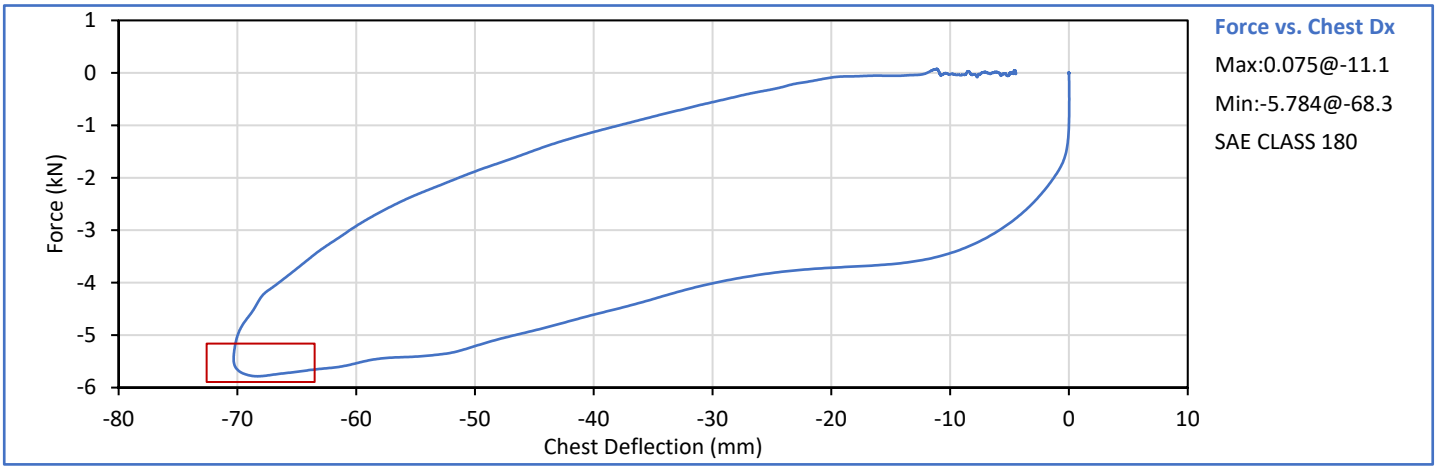

Force (N)
Time (ms)
Neck Fx
Max:622.5@66.2
Min:-173.3@172.3
SAE CLASS 600

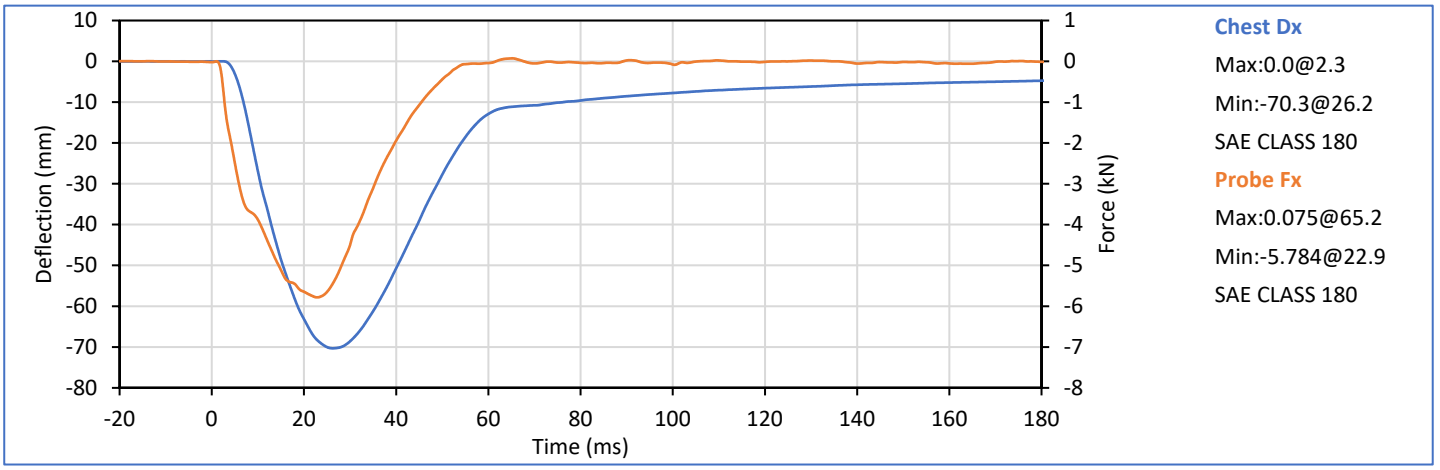
Applus IDIADA KARCO

Post-Test Qualification (Full) **Hybrid III 50th Percentile Male ATD**
Thorax Impact

ATD Serial No.: 168 Test Date: 2021-08-19

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	20.6	22.2	21.1	Pass
Laboratory Relative Humidity	%	10	70	47	Pass
Probe Velocity	m/s	6.58	6.82	6.71	Pass
Peak Chest Deflection	mm	-72.6	-63.5	-70.3	Pass
Peak Probe Force	kN	-5.893	-5.159	-5.784	Pass
Internal Hysterisis	%	69.0	85.0	70.7	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

Approved By: P. Puzzuto

Applus IDIADA KARCO

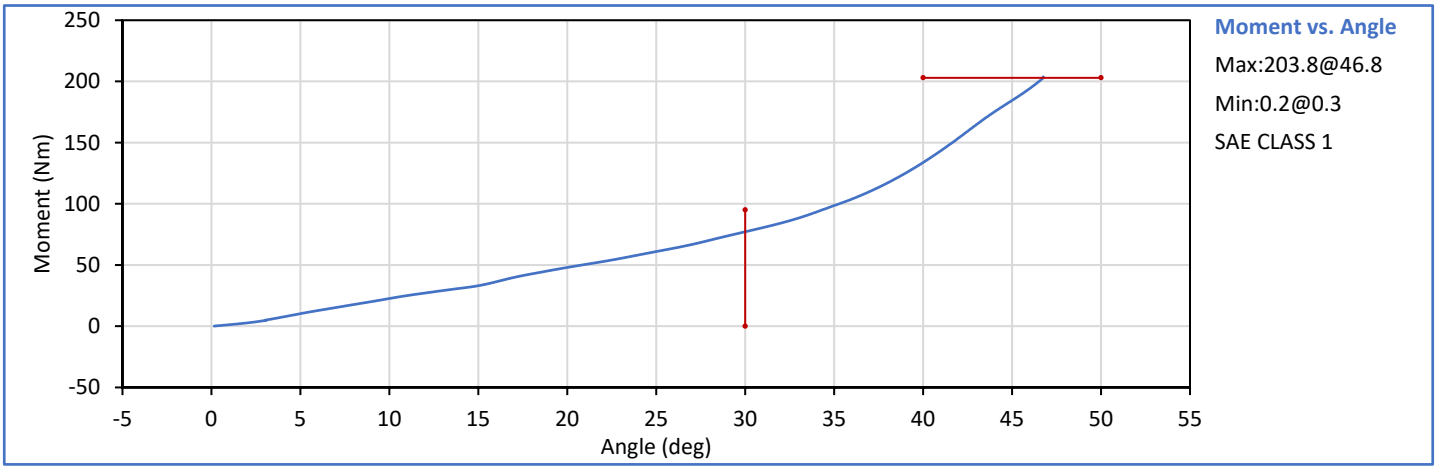
Post-Test Qualification (Full)

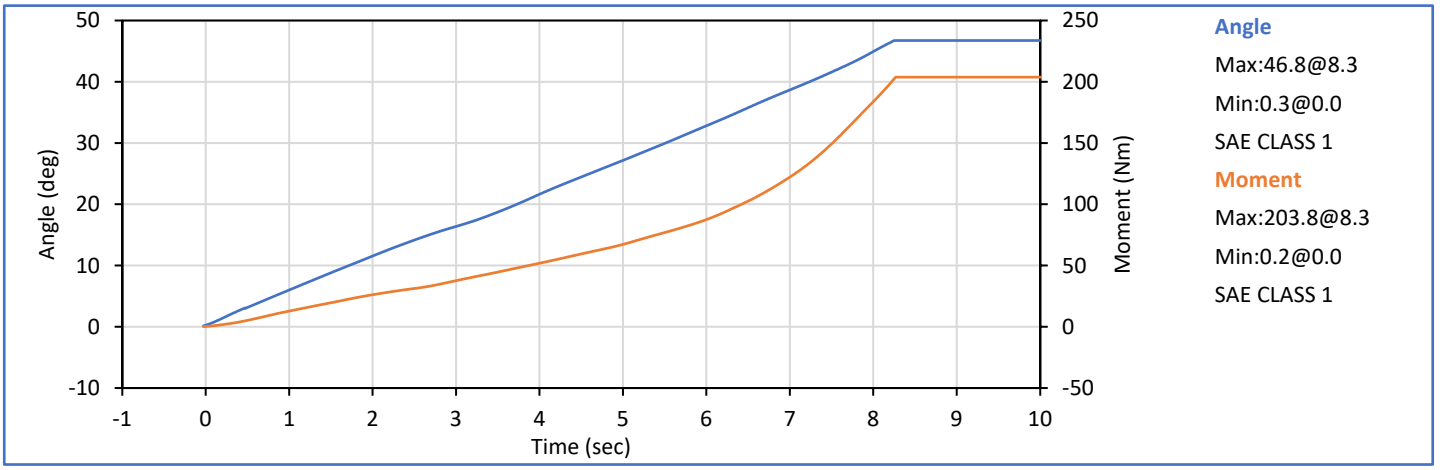
Hybrid III 50th Percentile Male ATD
Hip Range of Motion (Left)

ATD Serial No.: 168

Test Date: 2021-08-26

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Relative Humidity	%	10	70	36	Pass
Left Hip Rotation Rate	deg/s	5.0	10.0	5.5	Pass
Left Femur Torque at 30°	Nm	0.0	95.0	77.0	Pass
Left Hip Rotation at 203 Nm	deg	40.0	50.0	46.8	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

Approved By: P. Puzzuto

Applus IDIADA KARCO

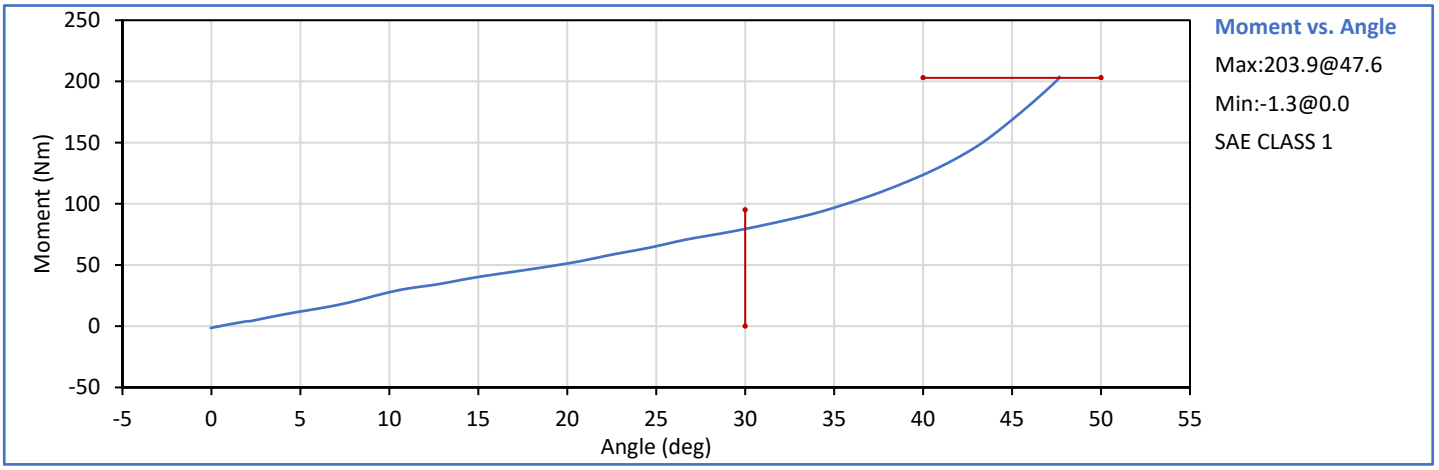
Post-Test Qualification (Full)

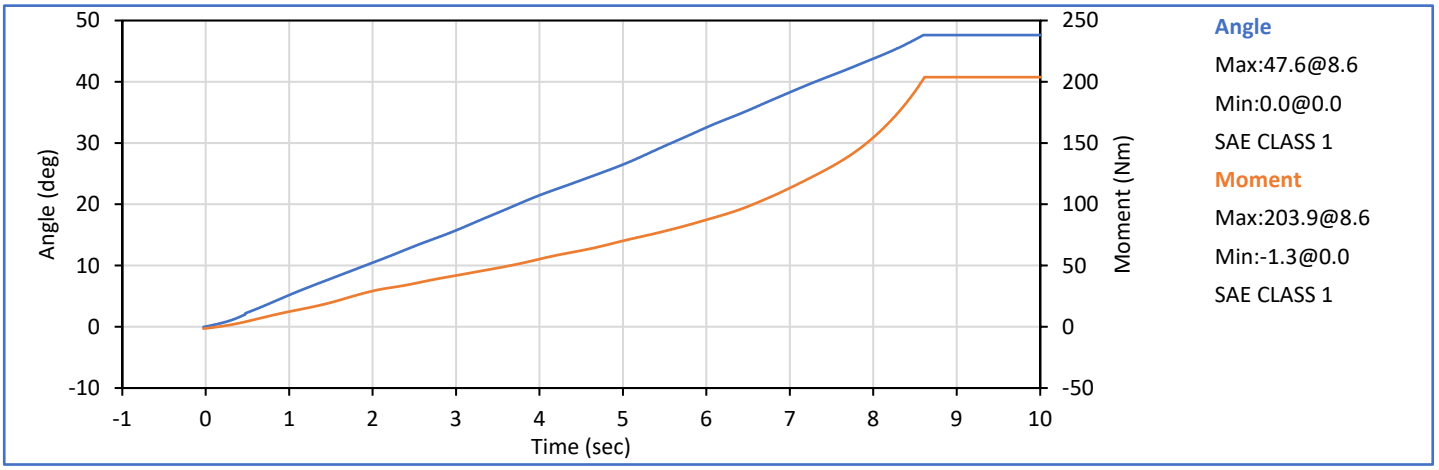
Hybrid III 50th Percentile Male ATD
Hip Range of Motion (Right)

ATD Serial No.: 168

Test Date: 2021-08-26

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Relative Humidity	%	10	70	36	Pass
Right Hip Rotation Rate	deg/s	5.0	10.0	5.6	Pass
Right Femur Torque at 30°	Nm	0.0	95.0	79.4	Pass
Right Hip Rotation at 203 Nm	deg	40.0	50.0	47.6	Pass
			Overall Test Results		Pass





Technician: J. Hernandez

Approved By: P. Puzzuto

Applus IDIADA KARCO

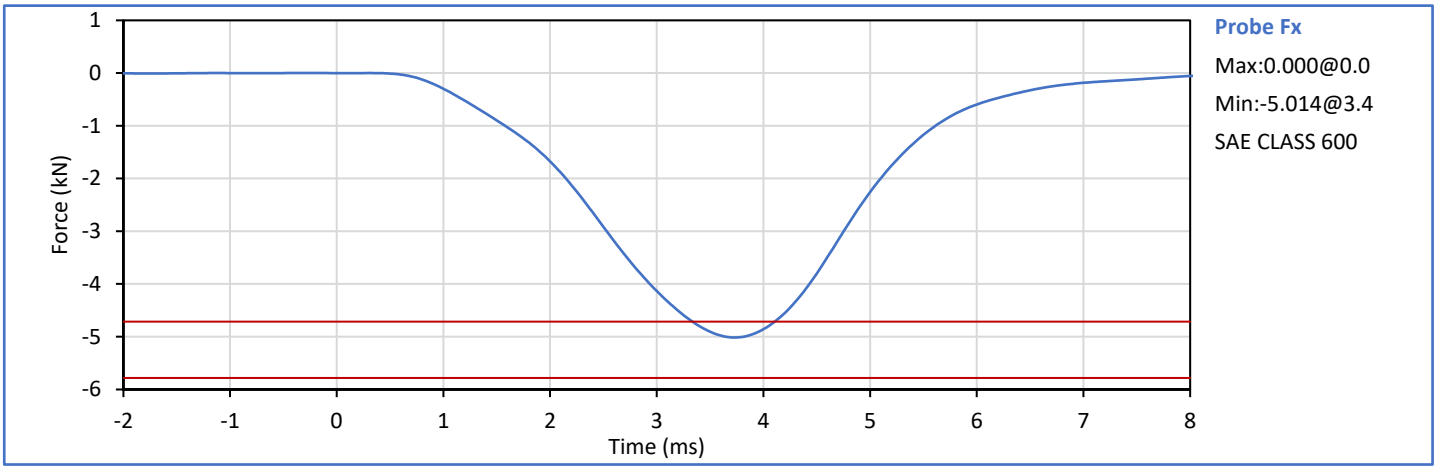
Post-Test Qualification (Full)

Hybrid III 50th Percentile Male ATD
Knee Impact (Left)

ATD Serial No.: 168

Test Date: 2021-08-26

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Relative Humidity	%	10	70	33	Pass
Probe Velocity	m/s	2.070	2.130	2.096	Pass
Peak Resistive Force	kN	-5.782	-4.715	-5.014	Pass
			Overall Test Results		Pass



Technician: J. Hernandez

Approved By: P. Puzzuto

Applus IDIADA KARCO

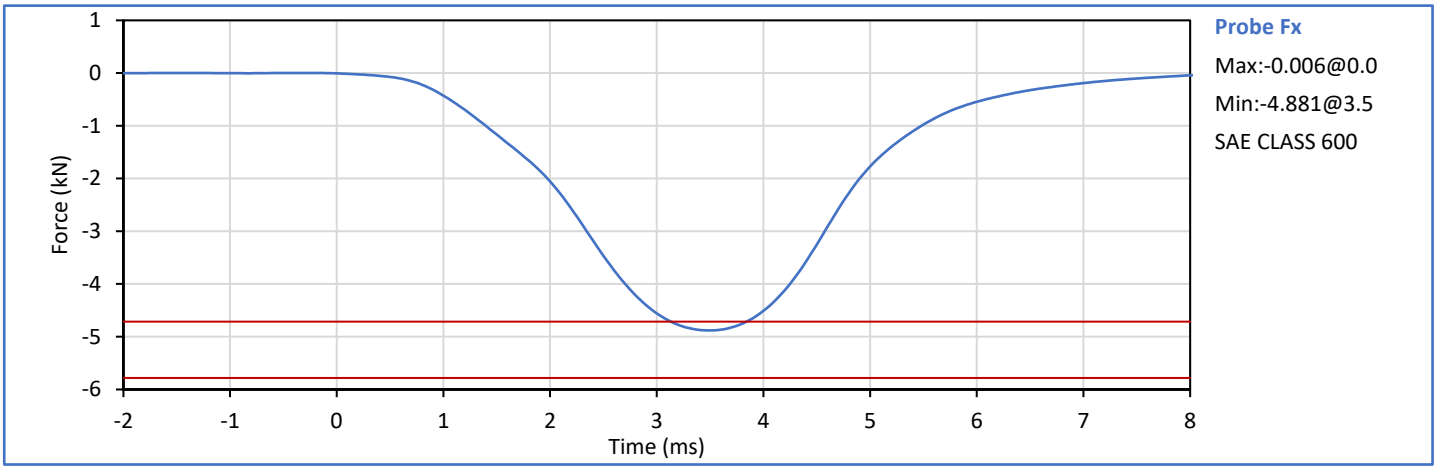
Post-Test Qualification (Full)

Hybrid III 50th Percentile Male ATD
Knee Impact (Right)

ATD Serial No.: 168

Test Date: 2021-08-26

Tested Parameter	Units	Spec. Low	Spec. High	Result	Pass/Fail
Laboratory Temperature	°C	18.9	25.6	21.1	Pass
Laboratory Relative Humidity	%	10	70	33	Pass
Probe Velocity	m/s	2.070	2.130	2.102	Pass
Peak Resistive Force	kN	-5.782	-4.715	-4.881	Pass
			Overall Test Results		Pass



Technician: J. Hernandez

Approved By: P. Puzzuto

APPENDIX E

THOR-50M 50TH PERCENTILE MALE ATD

PHYSICAL INSPECTION, PRE-TEST

Applus IDIADA KARCO

THOR-50M 50th Percentile Male ATD
Physical Inspection, Pre-Test

ATD Serial No.: EG2595 Inspection Date: 2021-08-11

Overall Conditon/Functionality	Note
Known errors in data channels (no data, clipping, unexpected drops): Serial Number: DL9552-FX Right Acetabulum Force X bad channel. Serial Number: DW9502 Occipital Condyle Potentiometer not wired. Serial Number: DL9552-FX Right Acetabulum Force X bad channel, no data recorded during the test* Serial Number: DW9502 Occipital Condyle Potentiometer, no data recorded during the test**	
Physical evidence of damage: *Right acetabulum force X was received with bad channel. It was investigated why it was not working and was determined it was not fixable without replacing the loadcell. NHTSA approved running the test without recording this channel. **Occipital Condyle Potentiometer was not wired when received and was required to be recorded. NHTSA approved running the test without recording this channel. Left Upper Thorax IRTRACC - SCREW SHCS M2.5 X 0.45X 10 was loose.	
Anecdotal evidence of damage:	
Equipment delivered to Borrower: THOR-50M S/N EG2595 with DTS SLICE6 Internal DAS Laptop DTS MiniDistributor with cables and PSU	

Technician: J. Hernandez

Approved By: P .Puzzuto

Applus IDIADA KARCO

THOR-50M 50th Percentile Male ATD
Physical Inspection, Pre-Test

ATD Serial No.: EG2595 Inspection Date: 2021-08-11

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

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

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

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

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

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

Technician: J. Hernandez

Approved By: P .Puzzuto

Applus IDIADA KARCO

THOR-50M 50th Percentile Male ATD
Physical Inspection, Pre-Test

ATD Serial No.: EG2595 Inspection Date: 2021-08-11

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

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

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

Technician: J. Hernandez

Approved By: P .Puzzuto

Applus IDIADA KARCO

THOR-50M 50th Percentile Male ATD
Physical Inspection, Pre-Test

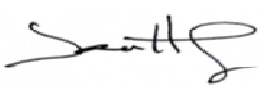
ATD Serial No.: EG2595 Inspection Date: 2021-08-11

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

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

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

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

Technician:  Approved By: 

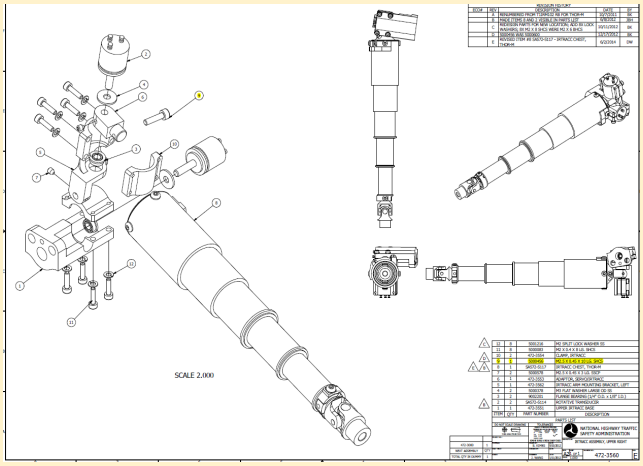
J. Hernandez P .Puzzuto

ATD Serial No.: EG2595 Inspection Date: 2021-08-11

Damage and Discrepancy Details

Cuts in Face Foam

Cut on top of face.



Left Upper Thorax IRTRACC - SHCS M2.5 X 0.45X 10 loose

Additional Notes:

Thorax Left Upper gimbal Rz set screw was found to be loose after the test. This was checked due to some less than typical potentiometer data. During the inspection, the set screw was clearly loose. After securing, performed a cursory zero check to <+/- 1.0 deg. and the starting angle of the pot aafter installation is +/- 1.0 degree of the previous cert and test starting angles. The cert test data is accurate

APPENDIX F

THOR-50M 50TH PERCENTILE MALE ATD

PHYSICAL INSPECTION, POST-TEST

Applus IDIADA
KARCO

THOR-50M 50th Percentile Male ATD
Physical Inspection, Post-Test

ATD Serial No.: EG2595 Inspection Date: 2021-08-20

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

Technician: J. Hernandez

Approved By: P .Puzzuto

Applus IDIADA KARCO

THOR-50M 50th Percentile Male ATD
Physical Inspection, Post-Test

ATD Serial No.: EG2595 Inspection Date: 2021-08-20

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

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

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

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

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

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

Technician: J. Hernandez

Approved By: P .Puzzuto

Applus IDIADA KARCO

THOR-50M 50th Percentile Male ATD
Physical Inspection, Post-Test

ATD Serial No.: EG2595 Inspection Date: 2021-08-20

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

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

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

Technician: J. Hernandez

Approved By: P .Puzzuto

Applus IDIADA KARCO

THOR-50M 50th Percentile Male ATD
Physical Inspection, Post-Test

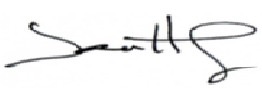
ATD Serial No.: EG2595 Inspection Date: 2021-08-20

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

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

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

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

Technician:  Approved By: 

J. Hernandez P .Puzzuto

Applus IDIADA KARCO

THOR-50M 50th Percentile Male ATD
Physical Inspection, Post-Test

ATD Serial No.: EG2595

Inspection Date: 2021-08-20

Damage and Discrepancy Details

Cuts in Face Foam

Cut on top of face.

Additional Notes:

Technician: J. Hernandez

Approved By: P .Puzzuto

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

Applus IDIADA KARCO

THOR-50M 50th Percentile Male ATD
Sensor Polarities

ATD S/N: EG2595 Date: 5/10/2021

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

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

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

Applus IDIADA KARCO

THOR-50M 50th Percentile Male ATD

Sensor Polarities

ATD S/N: EG2595 Date: 5/10/2021

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

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

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

Applus IDIADA KARCO

THOR-50M 50th Percentile Male ATD
Sensor Polarities

ATD S/N: EG2595 Date: 5/10/2021

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

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

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THOR-50M 50th Percentile Male ATD
Sensor Polarities

ATD S/N: EG2595 Date: 5/10/2021

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Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Lower Extremity Left	Knee Shear Displacement	Dx	KNSLLE00THDSXP	Hold femur, move tibia forward	+	+	No
	Upper Tibia Load	Fx	TIBILEUPTHFOXP	Move tibia forward, knee rearward	+	+	No
		Fy	TIBILEUPTHFOYP	Move ankle right, knee left	+	+	No
		Fz	TIBILEUPTHFOZP	Move ankle down, knee up	+	+	No
		Mx	TIBILEUPTHMOXP	Impact left of Tibia	+	+	No
		My	TIBILEUPTHMOYP	Impact front of Tibia	+	+	No
	Lower Tibia Load	Fx	TIBILELOTHFOXP	Move ankle forward, knee rearward	+	+	No
		Fy	TIBILELOTHFOYP	Move ankle right, knee left	+	+	No
		Fz	TIBILELOTHFOZP	Move ankle down, knee up	+	+	No
		Mx	TIBILELOTHMOXP	Impact left of Tibia	+	+	No
		My	TIBILELOTHMOYP	Impact front of Tibia	+	+	No
	Tibia Accelerometer	Ax	TIBILE00THACXP	Impact back of Tibia	+	NA	NA
		Ay	TIBILE00THACYP	Impact left of Tibia	+	NA	NA
	Achilles Load	Fz	ANKLLE00THFO0P	Rotate foot forward	+	NA	NA
	Ankle Rotation	Rx	ANKLLE00THANXP	Hold tibia, rotate foot leftward	+	+	No
		Ry	ANKLLE00THANYP	Hold tibia, push toe upward	+	-	Yes
		Rz	ANKLLE00THANZP	From top, hold tibia, rotate foot CCW	+	-	Yes
	Foot Acceleration	Ax	FOOTLE00THACXP	Impact back of Foot	+	NA	NA
		Ay	FOOTLE00THACYP	Impact left of Foot	+	NA	NA
		Az	FOOTLE00THACZP	Impact top of Foot	+	NA	NA

Applus IDIADA KARCO

THOR-50M 50th Percentile Male ATD
Sensor Polarities

ATD S/N: EG2595 Date: 5/10/2021

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Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Lower Extremity Right	Knee Shear Displacement	Dx	KNSLRI00THDSXP	Hold femur, move tibia forward	+	+	No
	Upper Tibia Load	Fx	TIBIRIUPTHFOXP	Move tibia forward, knee rearward	+	+	No
		Fy	TIBIRIUPTHFOYP	Move ankle right, knee left	+	+	No
		Fz	TIBIRIUPTHFOZP	Move ankle down, knee up	+	+	No
		Mx	TIBIRIUPTHMOXP	Impact left of Tibia	+	+	No
		My	TIBIRIUPTHMOYP	Impact front of Tibia	+	+	No
	Lower Tibia Load	Fx	TIBIRILOTHFOXP	Move ankle forward, knee rearward	+	+	No
		Fy	TIBIRILOTHFOYP	Move ankle right, knee left	+	+	No
		Fz	TIBIRILOTHFOZP	Move ankle down, knee up	+	+	No
		Mx	TIBIRILOTHMOXP	Impact left of Tibia	+	+	No
		My	TIBIRILOTHMOYP	Impact front of Tibia	+	+	No
	Tibia Accelerometer	Ax	TIBIRI00THACXP	Impact back of Tibia	+	NA	NA
		Ay	TIBIRI00THACYP	Impact left of Tibia	+	NA	NA
	Achilles Load	Fz	ANKLRI00THFO0P	Rotate foot forward	+	NA	NA
	Ankle Rotation	Rx	ANKLRI00THANXP	Hold tibia, rotate foot leftward	+	+	No
		Ry	ANKLRI00THANYP	Hold tibia, push toe upward	+	-	Yes
		Rz	ANKLRI00THANZP	From top, hold tibia, rotate foot CCW	+	-	Yes
	Foot Acceleration	Ax	FOOTRI00THACXP	Impact back of Foot	+	NA	NA
		Ay	FOOTRI00THACYP	Impact left of Foot	+	NA	NA
		Az	FOOTRI00THACZP	Impact top of Foot	+	NA	NA

THOR-50M 50th Percentile Male ATD
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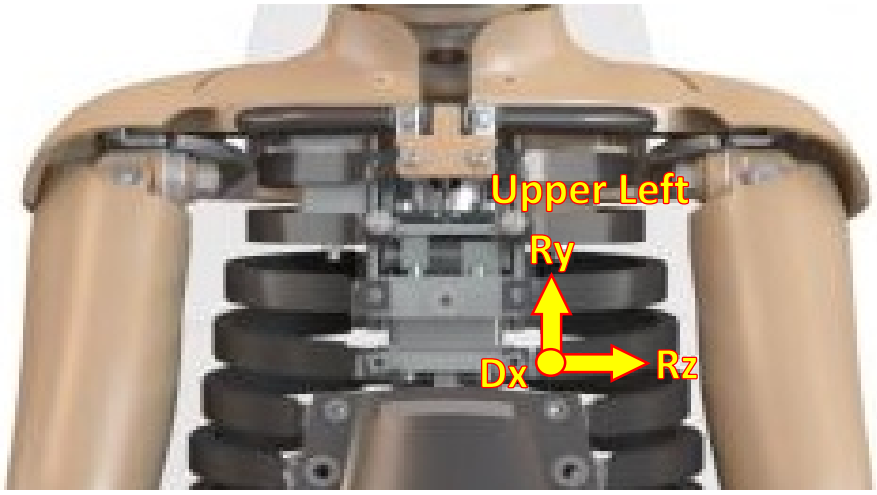
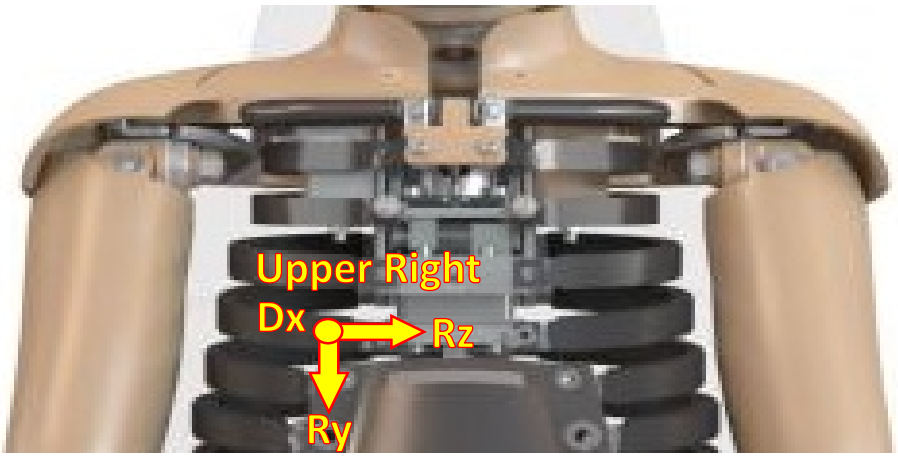
Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Thorax Upper Left	IRTRACC Raw Voltage	Dx (V)	CHSTLEUPTHVO0P	Push Inward	+	+	No
	Rotation Pitch	Ry	CHSTLEUPTHANYP	Push upward	+	+	No
	Rotation Yaw	Rz	CHSTLEUPTHANZP	Push leftward	+	+	No
Thorax Upper Right	IRTRACC Raw Voltage	Dx (V)	CHSTRIUPTHVO0P	Push Inward	+	+	No
	Rotation Pitch	Ry	CHSTRIUPTHANYP	Push downward	+	+	No
	Rotation Yaw	Rz	CHSTRIUPTHANZP	Push leftward	+	+	No





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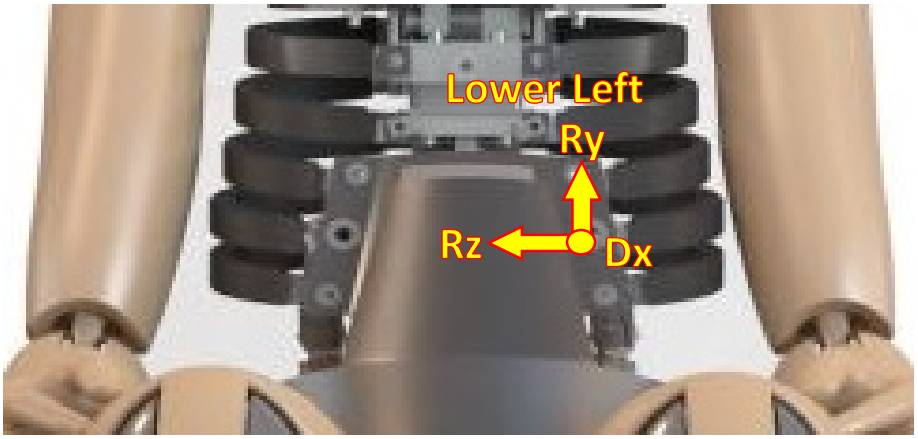
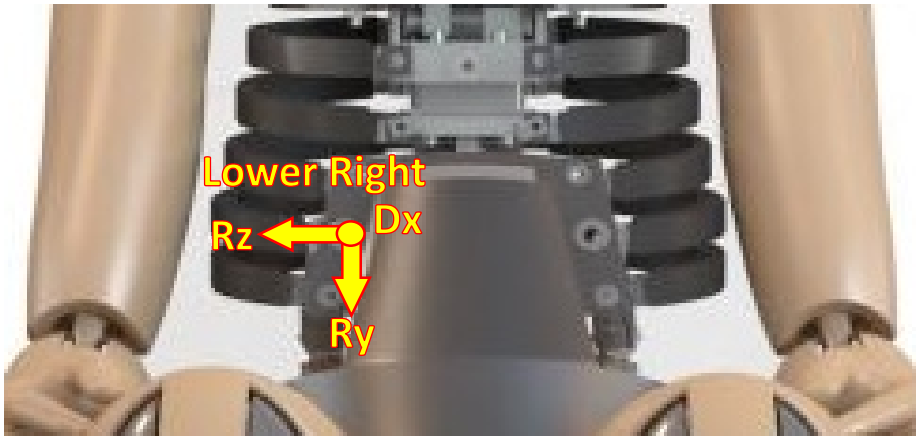
Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Thorax Lower Left	IRTRACC Raw Voltage	Dx (V)	CHSTLELOTHVO0P	Push Inward	+	+	No
	Rotation Pitch	Ry	CHSTLELOTHANYP	Push upward	+	+	No
	Rotation Yaw	Rz	CHSTLELOTHANZP	Push rightward	+	+	No
Thorax Lower Right	IRTRACC Raw Voltage	Dx (V)	CHSTRILOTHVO0P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





THOR-50M 50th Percentile Male ATD
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Segment	Instrument	Axis	ISO Code	Motion	J211	Actual	Invert
Abdomen Left	IRTRACC Raw Voltage	Dx (V)	ABDOLE00THVO0P	Push Inward	+	+	No
	Rotation Pitch	Ry	ABDOLE00THANYP	Push upward	+	+	No
	Rotation Yaw	Rz	ABDOLE00THANZP	Push rightward	+	+	No
Abdomen Right	IRTRACC Raw Voltage	Dx (V)	ABDORI00THVO0P	Push Inward	+	+	No
	Rotation Pitch	Ry	ABDORI00THANYP	Push downward	+	+	No
	Rotation Yaw	Rz	ABDORI00THANZP	Push rightward	+	+	No