

REPORT NUMBER: NCAP-MGA-2002-004

**NEW CAR ASSESSMENT PROGRAM
FRONTAL BARRIER IMPACT TEST**

**2002 JEEP LIBERTY SUV
NHTSA NUMBER: M20303**

**PREPARED BY:
MGA RESEARCH CORPORATION
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BURLINGTON, WI 53105**



Test Date: February 12, 2002

Report Date: February 19, 2002

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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WASHINGTON, D.C. 20590**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-01-D-12005.

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Date of Acceptance

COTR, NCAP Frontal Impact Program

Date of Acceptance

Technical Report Documentation Page

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16. Abstract A 35 mph (56.3 km/h) frontal barrier impact was conducted on a 2002 Jeep Liberty SUV at MGA Research Corporation on February 12, 2002. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The impact velocity was 56.3 km/h. The ambient temperature at the barrier face at the time of impact was 21 degrees Celsius. The vehicle's maximum post test static crush is 261 mm located to the right of the vehicle centerline. The test vehicle is equipped with a 3-point continuous belt system and an airbag in both front outboard seating positions. With respect to FMVSS 208 "Occupant Crash Protection", the occupant injury criteria summary is as follows: <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="text-align: left;"><u>Measurement Description</u></th> <th style="text-align: left;"><u>Units</u></th> <th style="text-align: left;"><u>Threshold</u></th> <th style="text-align: left;"><u>Driver ATD</u></th> <th style="text-align: left;"><u>Pass. ATD</u></th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC)</td> <td>N/A</td> <td>1000</td> <td>456</td> <td>454</td> </tr> <tr> <td>Max. Thorax Accel. (3msec Clip)</td> <td>G's</td> <td>60</td> <td>43</td> <td>53</td> </tr> <tr> <td>Left Femur force</td> <td>Newtons</td> <td>10009</td> <td>3566</td> <td>5142</td> </tr> <tr> <td>Right Femur force</td> <td>Newtons</td> <td>10009</td> <td>3028</td> <td>4835</td> </tr> </tbody> </table>				<u>Measurement Description</u>	<u>Units</u>	<u>Threshold</u>	<u>Driver ATD</u>	<u>Pass. ATD</u>	Head Injury Criteria (HIC)	N/A	1000	456	454	Max. Thorax Accel. (3msec Clip)	G's	60	43	53	Left Femur force	Newtons	10009	3566	5142	Right Femur force	Newtons	10009	3028	4835
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TABLE OF CONTENTS

<u>Section</u>		<u>Page No</u>
1	Purpose and Summary of the Test	1
2	Occupant and Vehicle Information / Data Sheets	3

<u>Data Sheet No.</u>		<u>Page No.</u>
1	Crash Test Summary	4
2	General Test and Vehicle Parameter Data	5
3	Post Impact Data	7
4	Test Vehicle Information	8
5	Dummy Positioning in Vehicle	10
6	Seat Belt Positioning Data	12
7	Vehicle Accelerometer Location and Data Summary	13
8	Hybrid III ATD Injury Criteria and Sensor Data	14
9	Seat Belt Performance Assessment Test Data	17
10	Summary of FMVSS 212 Data	18
11	Windshield Zone Intrusion FMVSS 212 Data	19
12	FMVSS 301 Fuel System Integrity Post Impact Data	20
13	FMVSS 301 Static Rollover Data	21
14	Vehicle Measurements	22
15	Camera Locations	24
16	Photographic Reference Target Locations	26
17	Vehicle Intrusion Measurements	27
18	Load Cell Locations on Fixed Barrier	32
19	Accident Investigation Division Data	33
20	Dummy/Vehicle Temperature Stabilization Chart	34

<u>Appendix</u>		
A	Photographs	A
B	Dummy and Vehicle Response Data Traces	B
C	Dummy Calibration Data Traces and Tables	C
D	Test Equipment and Instrumentation Calibration	D
E	Vehicle Owner's Manual Occupant Restraint Instructions	E

SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

This 56.3 kph frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under contract number DTNH22-01-D-12005. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact in excess of the current 48.3 kph requirements.

SUMMARY

A load cell barrier consisting of 30 load cells was impacted by a 2002 Jeep Liberty 4WD at a velocity of 56.3 kph. The test was performed at MGA Research Corporation on February 12, 2002. Pre-and post-test photographs of the vehicle and dummies can be found in Appendix A.

One real-time camera and sixteen high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

Two Part 572E, 50th percentile male anthropomorphic test devices (ATDs), were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with nine accelerometer array head, chest and pelvis triaxial accelerometers, chest displacement potentiometer, upper neck transducers, right/left femur load cells, left and right knee sliders, and lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 066) and right-front passenger (position 2) ATD (Serial No. 065) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 113 channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

There was 100 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was no Stoddard Solvent leakage after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 261 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's head, chest, and abdomen contacted the airbag. The driver's knees contacted the knee bolster. The passenger's head, chest, and abdomen contacted the airbag. The passenger head contacted the sunvisor. The passenger's knees contacted the glove box.

The occupant data is summarized below:

ATD position	HIC	Clip(g)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)	Belt Spool (mm)	Belt Stretch (mm/m)
Driver	456	43	25	3566	3028	162	*
Passenger	454	53	23	5142	4835	273	*

* Not recorded

SECTION 2
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

NHTSA No.: M20303
 Test Date: 2/12/02

CONVERSION FACTORS USED IN THIS REPORT*

Quantity	Typical Application	English Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	mile/h	km/h	1.609
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.573
Pressure	Tire Pressure	lbf/in ²	kPa	7.0
Volume	Liquid	gal	liter	3.785
Temperature	General Use	°F	°C	=(tf -32)/1.8
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf/ft	Nm	1.355

*Based on the Recommended Practice in SAE J916, May 85

DATA SHEET NO. 1
CRASH TEST SUMMARY

Test Vehicle: 2002/Jeep/Liberty/SUV
Test Program: NCAP

NHTSA No.: M20303
Test Date: 2/12/02

PRIMARY IMPACT DATA

Measured Parameter	Units	Value
Velocity at Impact	km/hr	56.3
Test Weight	kg	2161.9
Average Rebound	mm	219
Maximum Static Crush	mm	261
Impact Angle	degrees	90.3

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Front Door Opening	Opened without tools	Opened without tools
Rear Door Opening	Opened without tools	Opened without tools
Seat Track Shift (mm)	0	0
Seat Back Failure	None	None

TEST DUMMY INFORMATION

Description	Driver	Passenger
Dummy Type / Serial No.	HIII/066	HIII/065
Head Contact	Airbag	Airbag, sunvisor
Chest Contact	Airbag	Airbag
Abdomen Contact	Airbag	Airbag
Left Knee Contact	Knee bolster	Glovebox
Right Knee Contact	Knee bolster	Glovebox

16mm MOVIE COVERAGE

High Speed	16
Real Time	1
Total	17

Driver ATD Sensors	50
Passenger ATD Sensors	50
Belt Assessment Sensors	4
Vehicle Structure Accelerometers	9
Rigid Barrier Load Cells	6
Total	119

DATA SHEET NO. 2

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

NHTSA No.: M20303
 Test Date: 2/12/02

TEST VEHICLE INFORMATION

Manufacturer	DaimlerChrysler
Model	Liberty
Body Style	SUV
NHTSA No.	M20303
VIN	1J4GL48K42W256252
Color	Silver
Delivery Date	1/3/02
Odometer Reading (mile)	12
Dealer	Ricart
Transmission	Automatic
Final Drive	4WD
Number of Cylinders	6
Engine Displacement (L)	3.7
Engine Placement	Longitudinal

TEST VEHICLE OPTIONS

Driver Airbag	Yes
Passenger Airbag	Yes
Power Windows	Yes
Power Steering	Yes
Power Door Locks	Yes
Tilt Wheel	Yes
Air Conditioning	Yes
Power Brakes	Yes
Disc Brakes, Front	Yes
Disc Brakes, Rear	No
Anti-lock Brakes	No
AM/FM/CD	Yes
Anti-theft System	No
Cruise Control	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	DaimlerChrysler	GVWR (kg)	2541
Date of Manufacture	12/01	GAWR Front (kg)	1248
		GAWR Rear (kg)	1429

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	227	227
Cold Pressure (kPa)	227	227
Recommended Tire Size	P235/70R16	P235/70R16
Tire Size on Vehicle	P235/70R16	P235/70R16
Tire Manufacturer	Goodyear	Goodyear

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Number Of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				522.0
Cargo Wt. (RCLW) (kg)				181.4

DATA SHEET NO. 2...(continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

NHTSA No.: M20303
 Test Date: 2/12/02

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	517.1	436.4		554.3	519.8	
Right	kg	502.1	423.2		571.1	516.7	
Ratio	%	54.2	45.8		52.1	47.9	
Totals	kg	1019.2	859.6	1878.8	1125.4	1036.5	2161.9

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1878.8
Weight of 2 P572E ATDs	kg	156.0
Rated Cargo/Luggage Weight (RCLW)	kg	136.1
Calculated Vehicle Target Weight (TVTW)	kg	2170.9

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG(aft of front axle)
As Delivered	mm	831	832	841	849	1213
As Tested	mm	822	817	822	822	1271
Post Test	mm	891	832	820	821	

Vehicle Wheelbase (mm): 2652

Weight of Ballast secured in cargo area (kg): 78.0

Vehicle Components Removed: Spare tire, rear seat, rear carpet

Ballast weight does not include cameras, instrumentation, and brake abort system.

FUEL SYSTEM DATA

Fuel System Capacity From Owner's Manual (L): 70.0

Usable Capacity Figure Furnished by COTR (L): 70.0

Actual Test Volume (L): 65.3

Test Fluid Type: Stoddard Solvent ; Specific Gravity: 0.77

Is Vehicle Fuel Pump Electric or Mechanical? electric

If electric, does pump operate with ignition switch "ON" & engine "OFF"? yes

DATA SHEET NO. 3
POST IMPACT DATA

Test Vehicle: 2002/Jeep/Liberty/SUV
Test Program: NCAP

NHTSA No.: M20303
Test Date: 2/12/02

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	55.5 – 57.1	56.3
Trap No. 1 Entry Distance	mm	<1524	1300
Trap No. 1 Exit Distance	mm	<1524	300
Trap No. 2 Velocity (Redundant)	km/h	55.5 – 57.1	56.5
Trap No. 2 Entry Distance	mm	<1524	1425
Trap No. 2 Exit Distance	mm	<1524	425

VEHICLE STATIC CRUSH

Measured Parameter	Units	Pre-Test	Post-Test	Difference
Left Side	mm	4017	3898	119
Center	mm	4165	3910	255
Right Side	mm	4019	3890	129

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	212
Center	mm	231
Right Side	mm	213
Average	mm	219

DATA SHEET NO. 4
TEST VEHICLE INFORMATION

Test Vehicle: 2002/Jeep/Liberty/SUV
Test Program: NCAP

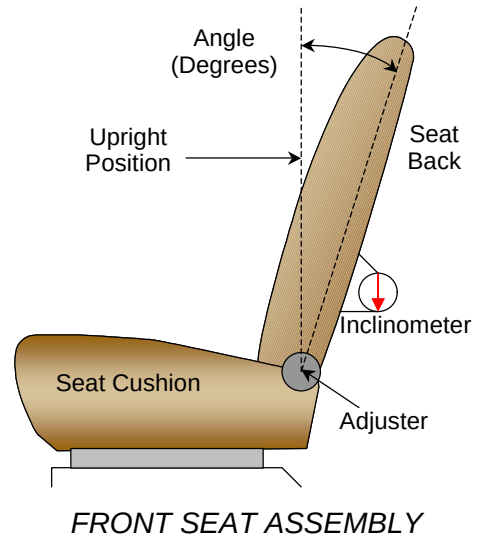
NHTSA No.: M20303
Test Date: 2/12/02

NORMAL DESIGN RIDING POSITION

The driver and passenger seat back is positioned to the manufacturer's designated angle. The procedure is as follows: Ensure the vehicle is level. Cut rear seat cover to expose outboard seat frame. Place inclinometer on exposed frame. Position seat to 23.5 degrees.

Driver seat back angle: 23.3 deg.

Passenger seat back angle: 23.7 deg.



SEAT FORE/AFT POSITIONS

The driver and the passenger seats are manually operated. The total travel on the driver and the passenger seat is 19 seat positions. The fore/aft position is set at the middle position for both driver and passenger the first position is "1".

Driver seat fore/aft total travel: 19 positions

Passenger seat fore/aft total travel: 19 positions

Driver seat fore/aft position: 10th position

Passenger seat fore/aft position: 10th position

SEAT BELT UPPER ANCHORAGE

The adjustable anchorage is placed in the mid position.

DATA SHEET NO. 4...(continued)

TEST VEHICLE INFORMATION

Test Vehicle: 2002/Jeep/Liberty/SUV
Test Program: NCAP

NHTSA No.: M20303
Test Date: 2/12/02

FUEL TANK CAPACITY DATA

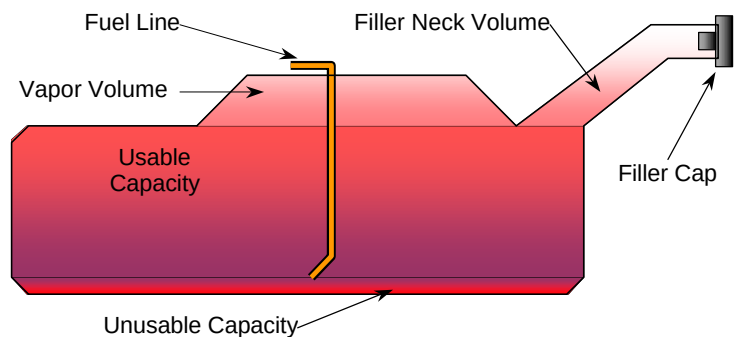
The "Usable Capacity" of the standard equipment fuel tank is: 70.0 liters

The "Usable Capacity" of any optional equipment fuel tank is: n/a liters

The "Usable Capacity" used for certification to FMVSS 301 requirements: 70.0 liters

Actual amount of Stoddard solvent added to vehicle for certification test: 65.3 liters

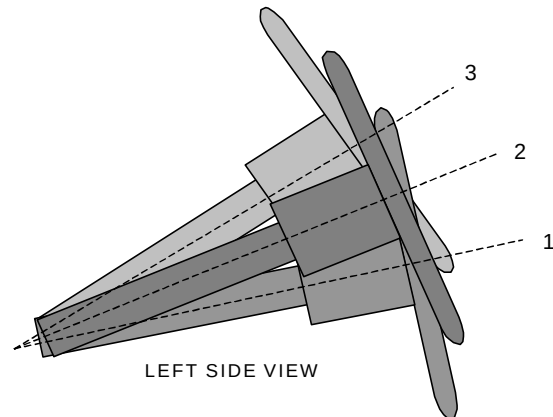
The test vehicle is equipped with an electric fuel pump. The fuel filler door is located on the left rear fender.



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 it is moved through the full range of driving positions. Measure angle at full up and full down positions. Place column at middle angle.



STEERING COLUMN ASSEMBLY

Lowermost, position 1: 21.3 deg

Geometric center, position 2: 24.0 deg

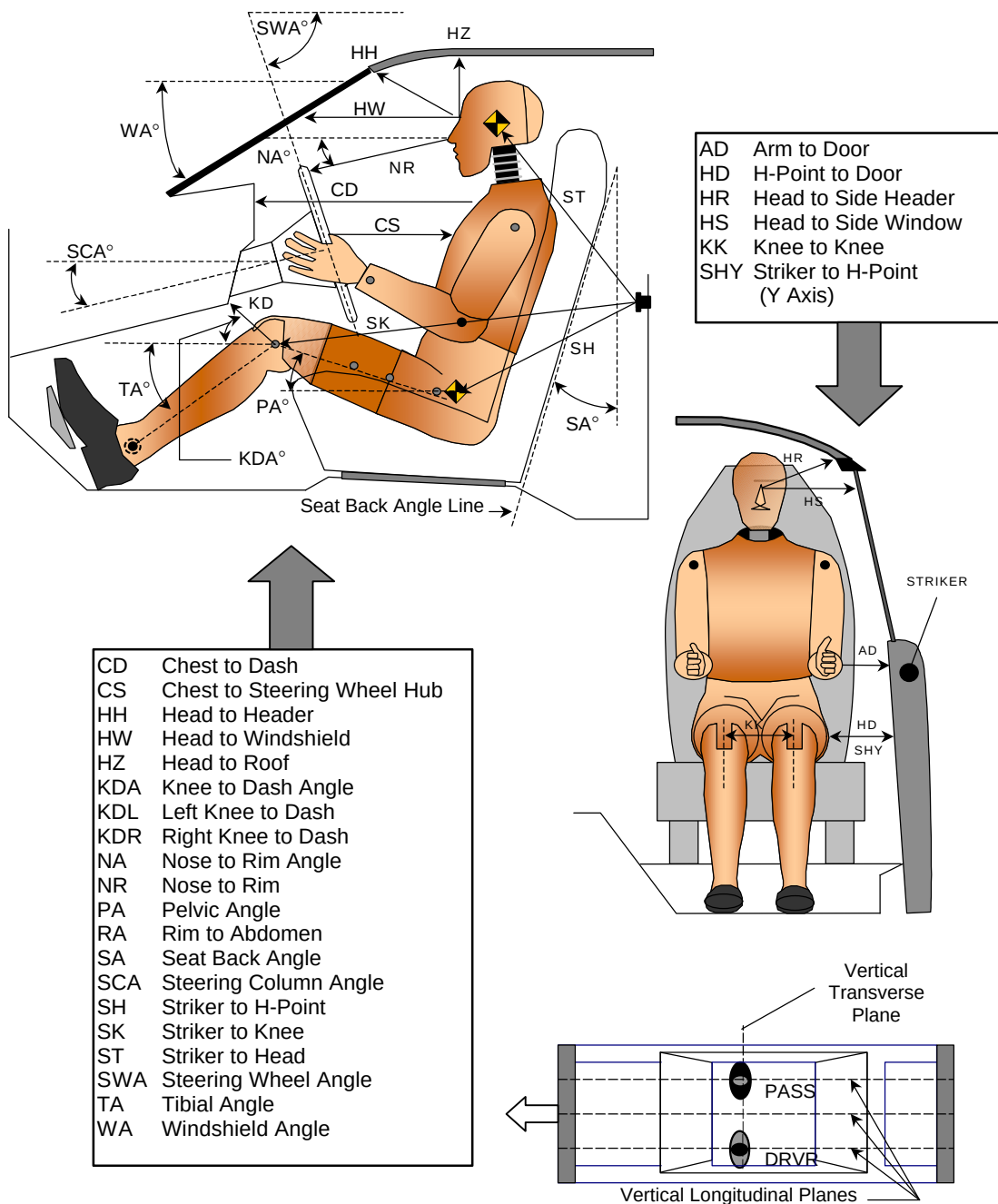
Uppermost, position 3: 26.7 deg

DATA SHEET NO. 5 **DUMMY POSITIONING IN VEHICLE**

Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

NHTSA No.: M20303
 Test Date: 2/12/02

DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS



DATA SHEET NO. 5...(continued)
DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

NHTSA No.: M20303
 Test Date: 2/12/02

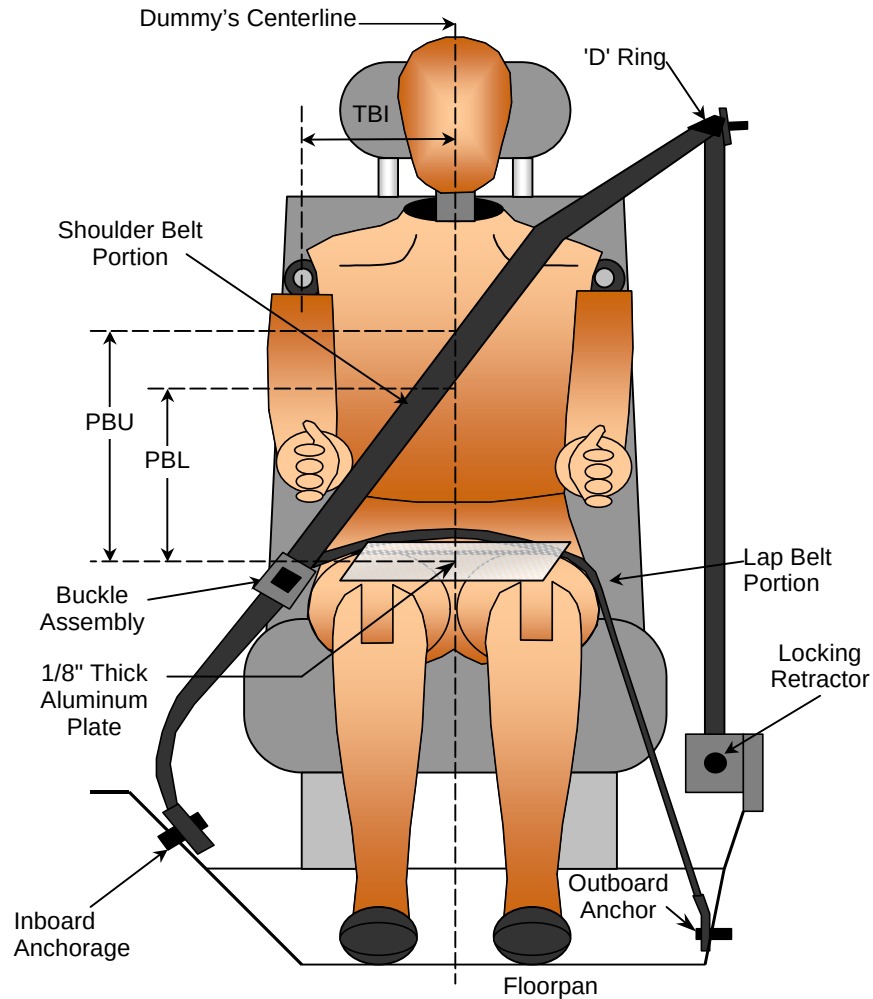
TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA	Windshield Angle		43.2		
SWA	Steering Wheel Angle		66.0		
SCA	Steering Column Angle		24.5		
SA	Seat Back Angle		23.3		23.7
HZ	Head to Roof (Z)	207	90	202	90
HH	Head to Header	407	14	419	15
HW	Head to Windshield	528	0	543	0
HR	Head to Side Header (Y)	178		170	
NR	Nose to Rim	407	17		
CD	Chest to Dash	511		572	
CS	Chest to Steering Hub	341	21		
RA	Rim to Abdomen	189	0		
KDL	Left Knee to Dash	129	0	116	
KDR	Right Knee to Dash	128		114	0
PA	Pelvic Angle		23.7		24.1
TA	Tibia Angle		45.9		53.2
KK	Knee to Knee (Y)	270		265	
SK	Striker to Knee	618	90	610	88
ST	Striker to Head	617	8	612	9
SH	Striker to H-Point	195	95	211	95
SHY	Striker to H-Point (Y)	211		212	
HS	Head to Side Window	298		284	
HD	H-Point to Door (Y)	183		186	
AD	Arm to Door (Y)	76		67	
AA	Ankle to Ankle	260		190	

DATA SHEET NO. 6 **SEAT BELT POSITIONING DATA**

Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

NHTSA No.: M20303
 Test Date: 2/12/02



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
TBI - Dummy centerline to shoulder bolt	mm	170	170
PBU - Top surface of reference to belt upper edge	mm	368	362
PBL - To surface of reference to belt lower edge	mm	297	280

DATA SHEET NO. 7

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

NHTSA No.: M20303
 Test Date: 2/12/02

VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)			Peak Values				
		X	Y	Z	Units	Max	Time	Min	Time
1	Left Rear X-Member X	1482	-550	490	G's	1.7	119	50.4	50
2	Right Rear X-Member X	1482	550	490	G's	3.9	200	49.3	31
3	Engine Top X	3483	-200	910	G's	**	**	**	**
4	Engine Bottom X	3099	78	295	G's	38.1	51	90.7	41
5	Left Brake Caliper X	3299	-629	300	G's	73.5	50	122.2	39
6	Right Brake Caliper X	3299	629	300	G's	87.3	54	155.3	36
7	Instrument Panel X *	2739	0	1230	G's	10.5	25	100.2	19
8	Left Rear X-Member Z	1482	-550	490	G's	8.6	34	15.0	59
9	Right Rear X-Member Z	1482	550	490	G's	8.5	53	8.5	59

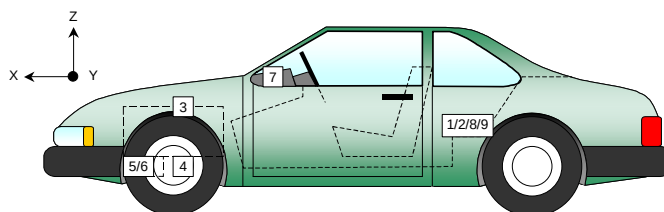
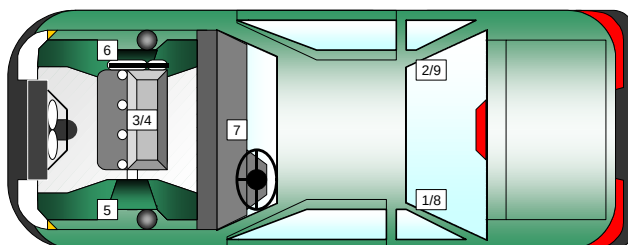
Reference Points: X - Rear Surface of Vehicle (+ forward)

Y - Vehicle Centerline (+ to right)

Z - Ground Plane (+ up)

* Questionable data after 60 msec.

** No valid data collected after 40 msec.



DATA SHEET NO. 8

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

NHTSA No.: M20303
 Test Date: 2/12/02

HEAD PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	1.2	200	55.9	73	0.7	27	33.5	70
Head CG	Y	G's	8.6	82	10.2	49	6.4	38	31.5	81
Head CG	Z	G's	26.6	58	20.5	99	52.1	83	2.3	30
Head CG Resultant	N/A	G's	57.4	71			60.9	83		

CHEST PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	2.9	144	42.7	60	0.5	154	53.4	64
Chest CG	Y	G's	6.8	82	6.0	46	3.5	65	6.7	60
Chest CG	Z	G's	13.4	58	16.1	97	23.3	71	9.4	102
Chest CG Resultant	N/A	G's	44.3	60			54.0	66		

FEMUR PEAK FORCES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Femur	Z	Newtons	260	162	3566	41	444	99	5142	53
Right Femur	Z	Newtons	347	26	3028	61	417	100	4835	43

SEAT BELT SENSOR PEAK VALUES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Lap Belt Force	N/A	Newtons	2525	57			*	*		
Shoulder Belt Force	N/A	Newtons	5286	45			3679	70		

* Passenger Lap Belt – No valid data collected

HEAD INJURY CRITERIA (HIC)

Location	Driver				Passenger			
	HIC	Avg G's	T ¹	T ²	HIC	Avg G's	T ¹	T ²
Head CG Primary	456	43.8	50.4	86.4	454	43.5	65.7	101.7

CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Primary	43	58.1	61.1	53	63.4	66.4

DATA SHEET NO. 8...(continued)

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2002/Jeep/Liberty/SUV
Test Program: NCAP

NHTSA No.: M20303
Test Date: 2/12/02

PELVIC PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Pelvis	X	G's	9.8	87	60.1	56	3.5	92	65.4	50
Pelvis	Y	G's	7.5	89	7.3	57	5.2	49	10.5	61
Pelvis	Z	G's	2.2	150	20.3	81	1.8	82	19.1	63

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Neck Force	X	Newtons	875	75	409	45	501	64	566	129
Neck Force	Y	Newtons	154	131	298	84	417	64	438	118
Neck Force	Z	Newtons	1786	59	839	101	1810	70	258	132
Neck Moment	X	N•m	21.8	123	9.8	103	1.0	200	33.7	125
Neck Moment	Y	N•m	47.4	75	28.5	46	40.6	138	29.9	48
Neck Moment	Z	N•m	10.5	158	23.4	103	36.3	87	20.0	143

FOOT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Foot Aft	X	G's	11.8	139	116.9	34	64.4	63	181.3	40
Left Foot Aft	Z	G's	4.0	119	32.9	36	27.1	40	42.9	70
Left Foot Fore	Z	G's	47.3	40	61.4	52	173.0	40	122.8	70
Right Foot Aft	X	G's	16.8	60	64.9	29	9.8	71	149.9	40
Right Foot Aft	Z	G's	*	*	*	*	10.5	39	44.8	73
Right Foot Fore	Z	G's	39.5	47	134.8	52	140.7	40	148.1	42

* Driver Right Foot Aft Z – No valid data collected

UPPER AND LOWER TIBIA PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Lower Moment	X	N•m	30.6	43	10.8	89	15.4	68	26.6	43
Left Lower Moment	Y	N•m	16.8	86	13.2	35	75.2	49	3.9	22
Left Lower Force	Z	Newtons	119	94	544	63	370	49	3022	65
Left Upper Moment	X	N•m	37.2	46	49.2	89	69.3	67	23.4	43
Left Upper Moment	Y	N•m	106.8	32	11.2	20	136.4	39	28.7	63
Left Upper Force	Z	Newtons	394	101	1157	42	105	107	3113	65
Right Lower Moment	X	N•m	20.0	49	2.4	114	6.1	94	17.3	74
Right Lower Moment	Y	N•m	14.2	79	39.8	49	55.3	72	24.6	43
Right Lower Force	Z	Newtons	263	34	1789	60	275	36	2960	72
Right Upper Moment	X	N•m	55.4	49	18.6	114	19.8	93	53.4	72
Right Upper Moment	Y	N•m	42.4	34	44.1	60	162.2	35	8.0	20
Right Upper Force	Z	Newtons	224	103	1620	62	92	99	2858	72

DATA SHEET NO. 8...(continued)

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

NHTSA No.: M20303
 Test Date: 2/12/02

CHEST PEAK DISPLACEMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	mm			24.8	62			22.5	67

HEAD REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	1.6	200	55.8	73	1.2	25	28.5	68
Head CG	Y	G's	8.2	73	6.2	49	6.6	38	33.2	74
Head CG	Z	G's	28.1	58	21.0	99	51.3	83	3.1	30
Head CG	N/A	G's	57.2	71			61.7	83		

CHEST REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	2.9	145	42.4	56	0.0	9	50.8	65
Chest CG*	Y	G's	15.0	192	4.9	46	3.7	65	6.0	60
Chest CG	Z	G's	14.0	58	16.1	97	23.7	71	9.5	102
Chest CG	N/A	G's	44.4	57			51.8	66		

* Driver Chest Y Redundant – Data affected by spike after 180 msec.

REDUNDANT HEAD INJURY CRITERIA (HIC)

Location	Driver				Passenger			
	HIC	Avg G's	T ¹	T ²	HIC	Avg G's	T ¹	T ²
Head CG Redundant	444	43.3	50.9	86.9	480	44.7	65.6	101.6

REDUNDANT CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Redundant	43	55.7	60.9	50	64.0	67.0

DATA SHEET NO. 9
SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

NHTSA No.: M20303
 Test Date: 2/12/02

SEAT BELT PLACEMENT MEASUREMENTS

Measurement Description	Units	Driver	Passenger
TBI - Dummy centerline to shoulder bolt	mm	170	170
PBU - Top surface of reference to belt upper edge	mm	368	362
PBL - Top surface of reference to belt lower edge	mm	297	280

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Retractor reel to "D" ring	mm	646	655
Shoulder belt length as measured on ATD	mm	794	810
Lap belt length as measured on ATD	mm	727	714
Remainder of belt on reel	mm	891	879
Total belt length for continuous webbing systems	mm	3058	3058

SHOULDER BELT SPOOL-OUT DATA

Measurement Description	Units	Driver	Passenger
As determined by film analysis	mm	162	273

BELT STRETCH DATA

Measurement Description	Units	Driver	Passenger
As determined electronically	mm/m	*	*

* Not recorded

DATA SHEET NO. 10
SUMMARY OF FMVSS 212 DATA

Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

NHTSA No.: M20303
 Test Date: 2/12/02

Windshield Mounting Details:

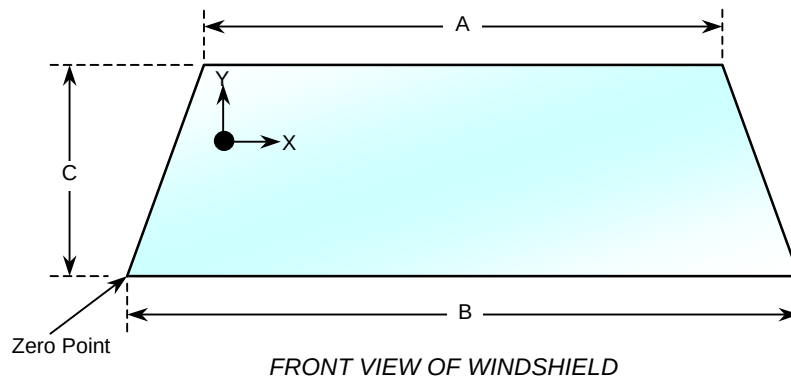
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

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

Temperature of windshield molding during test: 21 °C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% of Retention
Left Side	1948	1948	100
Right Side	1946	1946	100
Total	3894	3894	100



WINDSHIELD DIMENSIONS

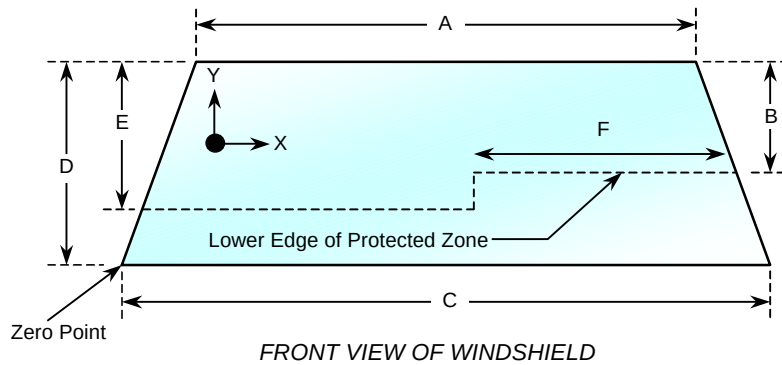
Item	Units	Segment Length	Molding Width
A	mm	1207	14
B	mm	1501	13
C	mm	595	28

DATA SHEET NO. 11

WINDSHIELD ZONE INTRUSION FMVSS 219 (Partial) DATA

Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

NHTSA No.: M20303
 Test Date: 2/12/02



Item	Units	Value
A	mm	1207
B	mm	481
C	mm	1501
D	mm	595
E	mm	457
F	mm	502

AREA OF PROTECTED ZONE FAILURES - NONE

- 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. **None**

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. **None**

X	Y

DATA SHEET NO. 12

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Test Vehicle: 2002/Jeep/Liberty/SUV
Test Program: NCAP

NHTSA No.: M20303
Test Date: 2/12/02

Temperature at Time of Impact: 21° C Test Time: 11:58 AM

Stoddard Solvent Spillage Measurements

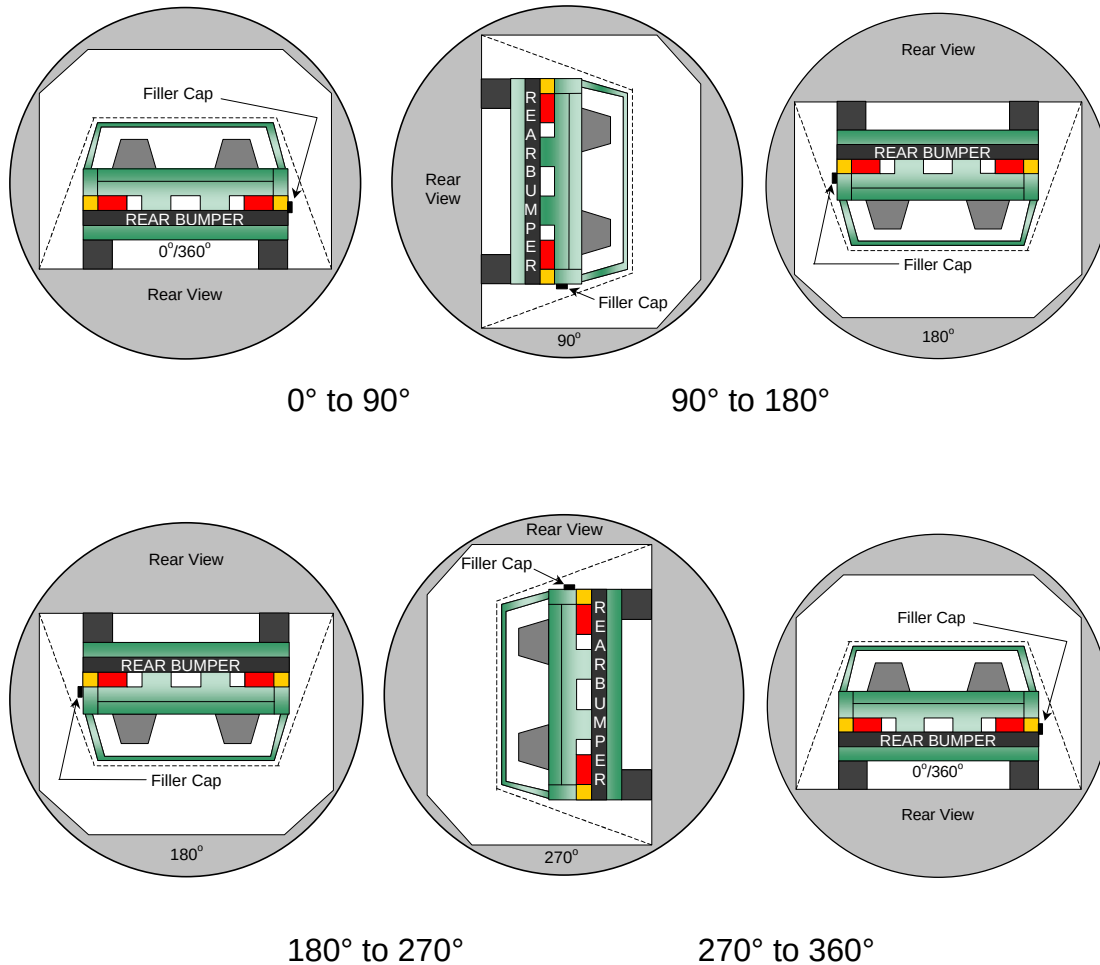
- A. From impact until vehicle motion ceases: 0 oz.
 (Maximum Allowable = 1 ounce)
- B. For the 5 minute period after motion ceases: 0 oz.
 (Maximum Allowable = 5 ounces)
- C. For the following 25 minutes: 0 oz.
 (Maximum Allowable = 1 oz./minute)
- D. Spillage : None

DATA SHEET NO. 13
FMVSS 301 STATIC ROLLOVER DATA

Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

NHTSA No.: M20303
 Test Date: 2/12/02

Test Time: 11:58 AM



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 locations:

Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage (oz.)
0° to 90°	165	300	0
90° to 180°	153	300	0
180° to 270°	149	300	0
270° to 360°	169	300	0

DATA SHEET NO. 14
VEHICLE MEASUREMENTS

Test Vehicle: 2002/Jeep/Liberty/SUV
Test Program: NCAP

NHTSA No.: M20303
Test Date: 2/12/02

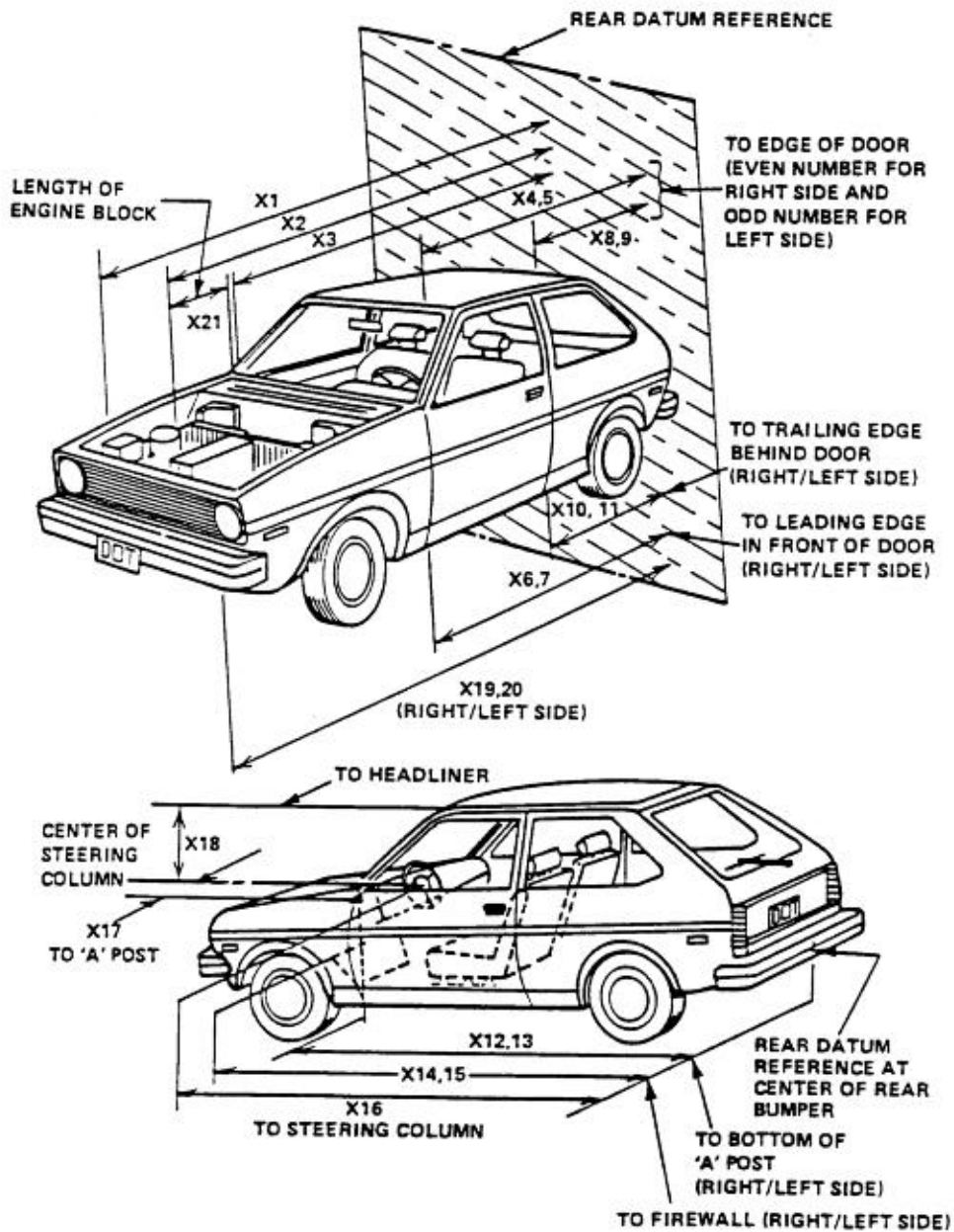
No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total length of vehicle at centerline	mm	4165	3910	255
2	RSOV to front of engine	mm	3543	3448	95
3	RSOV to firewall centerline	mm	3091	3026	65
4	RSOV to leading edge of right door	mm	2821	2813	8
5	RSOV to leading edge of left door	mm	2823	2816	7
6	RSOV to lower leading edge of right door	mm	2787	2771	16
7	RSOV to lower leading edge of left door	mm	2789	2783	6
8	RSOV to upper leading edge of right door	mm	1785	1774	11
9	RSOV to upper leading edge of left door	mm	1782	1778	4
10	RSOV to lower trailing edge of right door	mm	1795	1781	14
11	RSOV to lower trailing edge of left door	mm	1793	1790	3
12	RSOV to bottom of right 'A' pillar	mm	2724	2718	6
13	RSOV to bottom of left 'A' pillar	mm	2721	2720	1
14	RSOV to firewall on right side	mm	3111	3006	105
15	RSOV to firewall on left side	mm	3095	3078	17
16	RSOV to steering column	mm	2318	2326	-8
17	Center of steering column to left 'A' pillar	mm	421	408	13
18	Center of steering column to headlining	mm	532	492	40
19	RSOV to right side of front bumper	mm	4019	3890	129
20	RSOV to left side of front bumper	mm	4017	3898	119
21	Length of engine block	mm	380	380	0
RD	RSOV to right side of dash panel	mm	2566	2554	12
CD	RSOV to center of dash panel	mm	2570	2572	-2
LD	RSOV to left side of dash panel	mm	2577	2550	27

DATA SHEET NO. 14...(continued)

VEHICLE MEASUREMENTS

Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

NHTSA No.: M20303
 Test Date: 2/12/02



DATA SHEET NO. 15
CAMERA LOCATIONS

Test Vehicle: 2002/Jeep/Liberty/SUV
Test Program: NCAP

NHTSA No.: M20303
Test Date: 2/12/02

No.	Camera View	Location (mm) *			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Side View				18	32
2	Left Front View	989	-7275	1445	25	1026
3	Steering Column Top	2038	-7890	1563	25	980
4	Steering Column Bottom	2036	-7890	1029	25	1015
5	Driver Close-up	1582	-8251	1453	50	917
6	Driver Angle	4723	-5080	2038	50	1666
7	Onboard Driver				13	1010
8	Onboard Passenger				13	1093
9	Right Overall	1820	6616	1404	13	1015
10	Right Passenger Half	1007	7643	1392	13	1015
11	Right Close-up	1318	10323	1387	25	1058
12	Right Angle	5100	5760	2108	50	1047
13	Windshield	-700	0	2650	13	1031
14	Top Driver	-90	-430	1745	13	1015
15	Top Passenger	90	460	1745	13	1010
16	Pit Front	1158	0	-5000	13	1010
17	Pit Rear	3021	0	-5000	13	1015

*COORDINATES:

+X = film plane rearward of barrier

+Y = film plane to right of monorail centerline

+Z = film plane above ground level

CAMERA LOCATIONS

NHTSA No.: M20303
Test Date: 2/12/02

The diagram illustrates the layout of the test facility, showing the positions of various cameras and equipment relative to the test vehicle and the concrete barrier.

TOP VIEW: This view shows the test vehicle (VEH.) positioned on the TOW ROAD, adjacent to the CONCRETE BARRIER. The test vehicle is oriented towards the barrier. The CONCRETE PAD is located to the right of the TOW ROAD. The COVERED PHOTO PIT is located to the left of the TOW ROAD. The MONORAIL is located to the right of the TOW ROAD. The diagram includes numbered markers for cameras and equipment: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

LEFT SIDE VIEW: This view shows the test vehicle from the side, positioned on the TOW ROAD. The CONCRETE BARRIER is to the left of the vehicle. The COVERED PHOTO PIT is to the right of the vehicle. The MONORAIL is to the right of the TOW ROAD. The diagram includes numbered markers for cameras and equipment: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

CAMERA FRAME RATES:

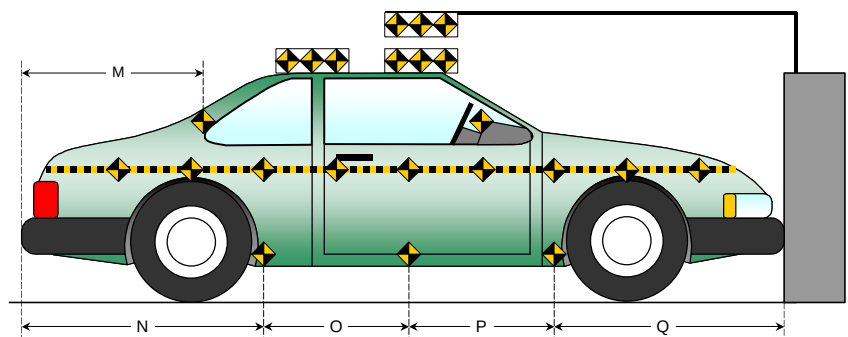
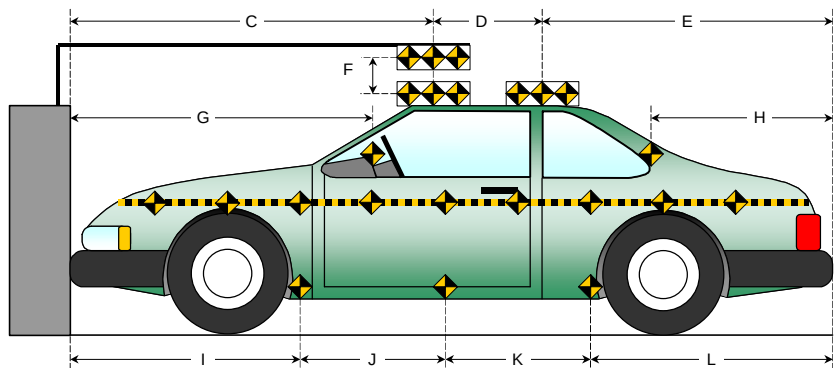
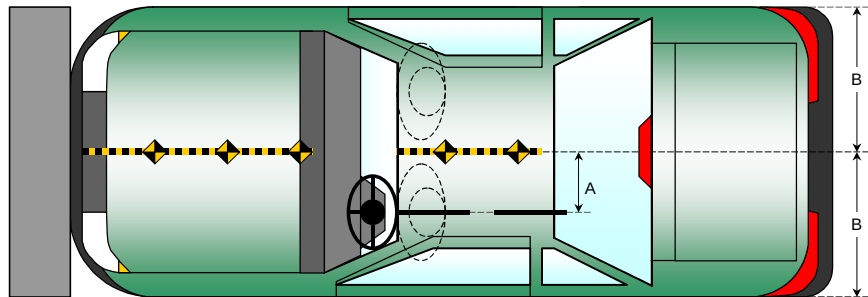
- #1 = 24 fps
- All Others = 1,000 fps

DATA SHEET NO. 16
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

NHTSA No.: M20303
 Test Date: 2/12/02

Item	Value
A	423
B	879
C	2218
D	610
E	1337
F	152
G	1622
H	950
I	1352
J	708
K	708
L	1397
M	952
N	1388
O	709
P	710
Q	1358



DATA SHEET NO. 17
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

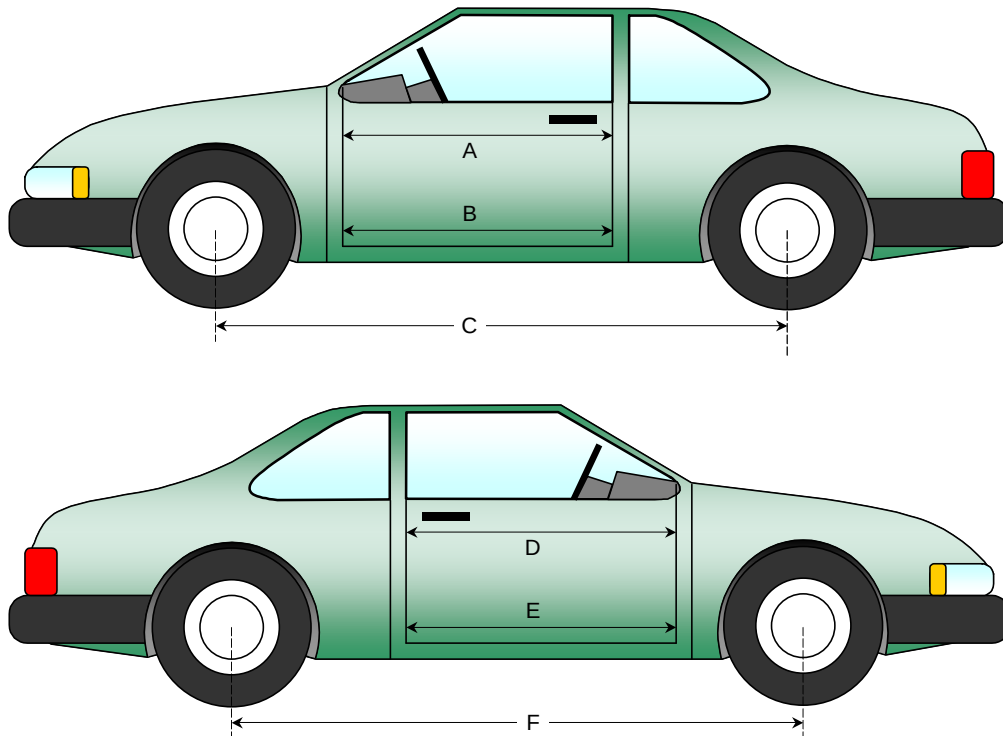
NHTSA No.: M20303
 Test Date: 2/12/02

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	936	936	0
B	Left Side Lower	mm	898	898	0
D	Right Side Upper	mm	934	934	0
E	Right Side Lower	mm	900	900	0

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2652	2574	78
F	Right Side Wheelbase	mm	2654	2577	77



DATA SHEET NO. 17...(continued)
VEHICLE INTRUSION MEASUREMENTS

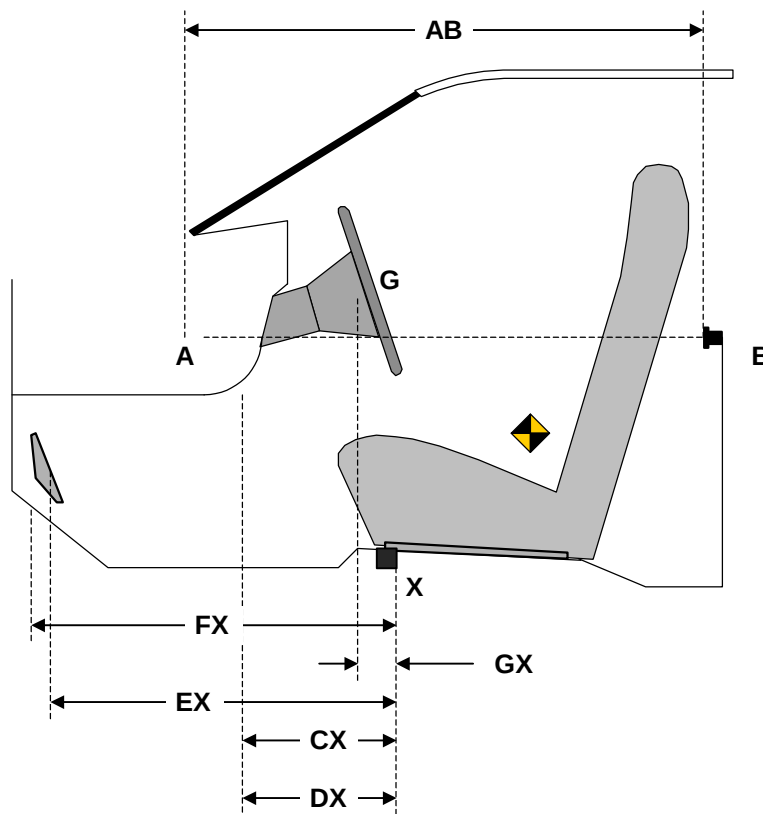
Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

NHTSA No.: M20303
 Test Date: 2/12/02

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside window jam)	mm	936	936	0
CX	Left Knee Bolster to X	mm	270	306	-36
DX	Right Knee Bolster to X	mm	298	311	-13
EX	Brake Pedal to X	mm	513	513	0
FX	Foot Rest to X	mm	583	554	29
GX	Center of Steering Column Wheel Hub to X	mm	44	68	-24

X = Left Front Seat Front Outboard Anchor Bolt Head



DRIVER COMPARTMENT

DATA SHEET NO. 17...(continued)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

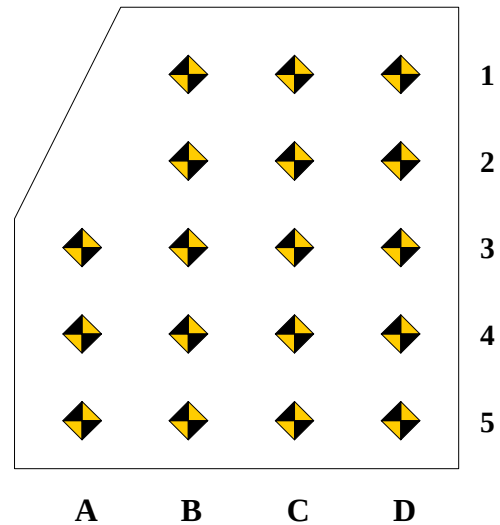
NHTSA No.: M20303
 Test Date: 2/12/02

Measurement reference point for X and Z axis is the forward outboard seat mounting bolt.

Columns A through D are evenly spaced.

Rows 1 and 2 are on the toe kick portion of the floor pan. Rows 3, 4, and 5 are located on the most level portion of the floor pan.

Row 3 will be at the intersection of the toe kick and the level sections of the floor pan.



DRIVER FLOOR PAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1		689	685	685		675	662	662		14	23	23
2		600	596	604		595	590	594		5	6	10
3	507	500	500	497	507	500	500	497	0	0	0	0
4	400	396	394	395	400	396	394	395	0	0	0	0
5	315	308	308	310	315	308	308	310	0	0	0	0

DRIVER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1		-10	-10	-15		0	25	2		-10	-35	-17
2		-68	-60	-70		-59	-43	-56		-9	-17	-14
3	-110	-110	-100	-110	-106	-100	-95	-100	-4	-10	-5	-10
4	-110	-110	-100	-107	-98	-102	-91	-96	-12	-8	-9	-11
5	-107	-107	-97	-102	-90	-100	-88	-92	-17	-7	-9	-10

DATA SHEET NO. 17...(continued)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

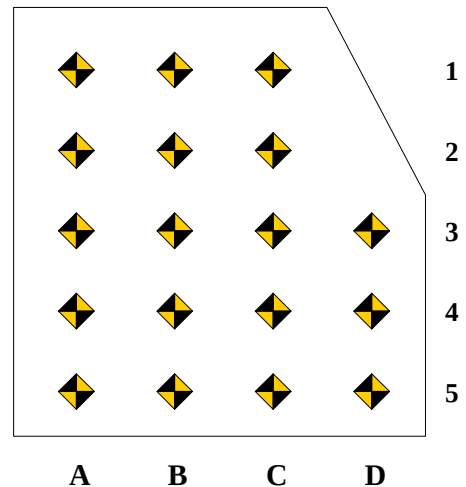
NHTSA No.: M20303
 Test Date: 2/12/02

Measurement reference point for X and Z axis is the forward outboard seat mounting bolt.

Columns A through D are evenly spaced.

Rows 1 and 2 are on the toe kick portion of the floor pan. Rows 3, 4, and 5 are located on the most level portion of the floor pan.

Row 3 will be at the intersection of the toe kick and the level sections of the floor pan.



PASSENGER FLOOR PAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	650	648	650		642	641	650		8	7	0	
2	575	570	580		570	567	580		5	3	0	
3	500	498	502	505	500	498	502	505	0	0	0	0
4	415	410	413	415	415	410	413	415	0	0	0	0
5	322	323	325	325	322	323	325	325	0	0	0	0

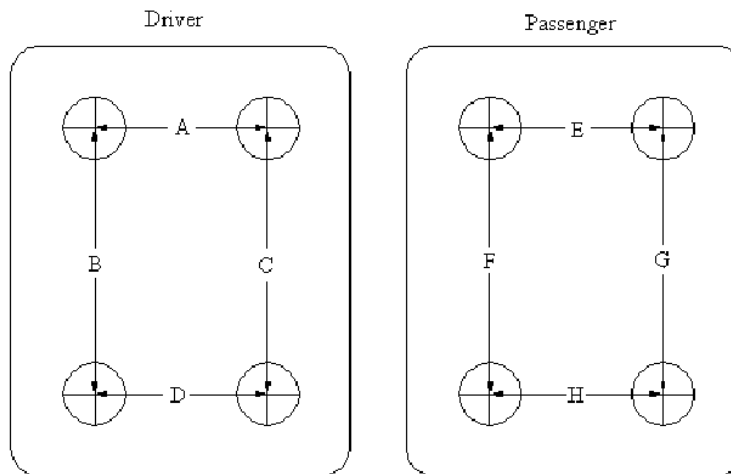
PASSENGER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-46	-42	-40		-37	-27	-35		-9	-15	-5	
2	-74	-74	-74		-87	-81	-81		13	7	7	
3	-105	-108	-112	-106	-113	-105	-114	-112	8	-3	2	6
4	-112	-105	-115	-113	-112	-105	-115	-106	0	0	0	-7
5	-107	-101	-107	-107	-107	-100	-110	-97	0	-1	3	-10

DATA SHEET NO. 17...(continued)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

NHTSA No.: M20303
 Test Date: 2/12/02



UNDERBODY FLOORBOARD DEFORMATION

Measurement	Pre-Test	Post-Test	Difference
A	243	247	-4
B	188	187	1
C	195	196	-1
D	231	227	4
E	232	225	7
F	224	225	-1
G	224	228	-4
H	231	233	-2

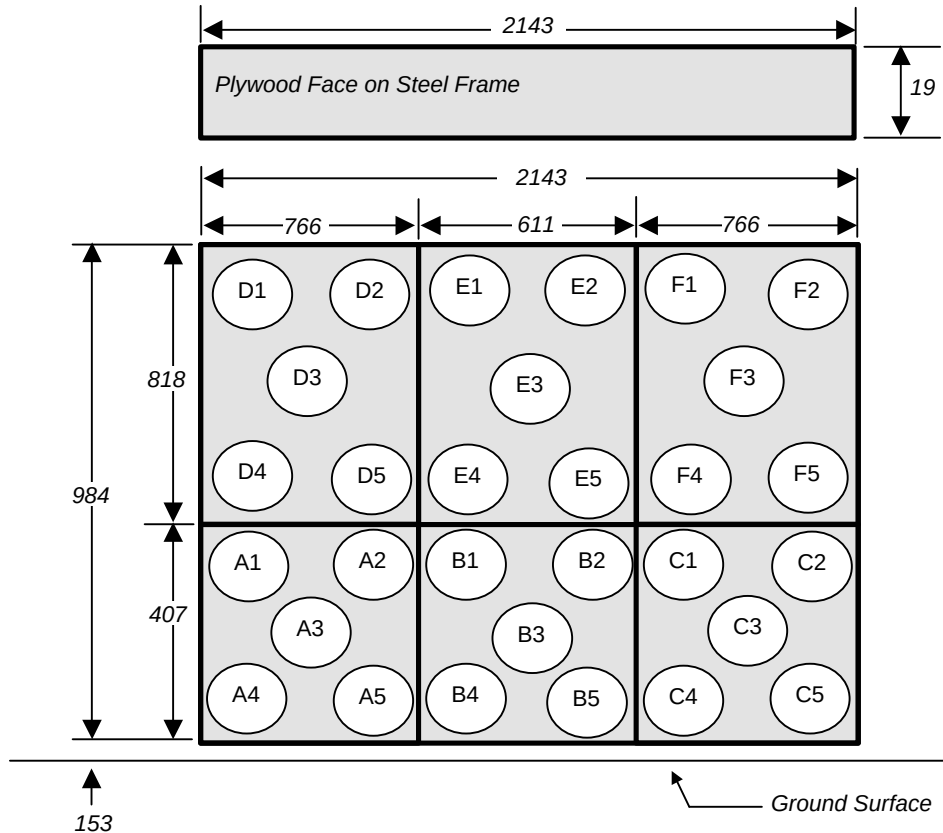
DATA SHEET NO. 18

LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2002/Jeep/Liberty/SUV
 Test Program: NCAP

NHTSA No.: M20303
 Test Date: 2/12/02

30 Load Cell Rigid Barrier Load Cell Locations on Fixed Barrier



Group 4 D1-D5	Group 5 E1-E5	Group 6 F1-F5
Group 1 A1-A5	Group 2 B1-B5	Group 3 C1-C5

6 Groups of 5 Load Cells Each

The Data is presented in Appendix B with the following requirements:

1. Sum data from 6 groupings shown above (5 cells/group)
2. Sum of left 2 groupings, center 2 groupings and right 2 groupings.
3. Total or sum of all 30 individual load cells.
4. Total versus average rear seat crossmember displacement.

DATA SHEET NO. 19**ACCIDENT INVESTIGATION DIVISION DATA**

Test Vehicle: 2002/Jeep/Liberty/SUV
Test Program: NCAP

NHTSA No.: M20303
Test Date: 2/12/02

VEHICLE INFORMATION

VIN: 1J4GL48K42W256252 Wheelbase (mm) : 2652
Vehicle Size Category: SUV Test Weight (kg) : 2161.9

ACCELEROMETER DATA

Accelerometer Locations: As per measurements on Page 13
Cal. Procedure/Interval: MGA procedure / 6 month
Integration Algorithm: Trapezoidal Linearity: > 99%
Impact Velocity (km/h): 56.3
Velocity Change (km/h): 65.1 Time of Separation (msec): 101

CRUSH PROFILE

Collision Deformation Classification: Frontal Midpoint of Damage: C/L
Damage Region Length (mm): 1540 Impact Mode: Frontal

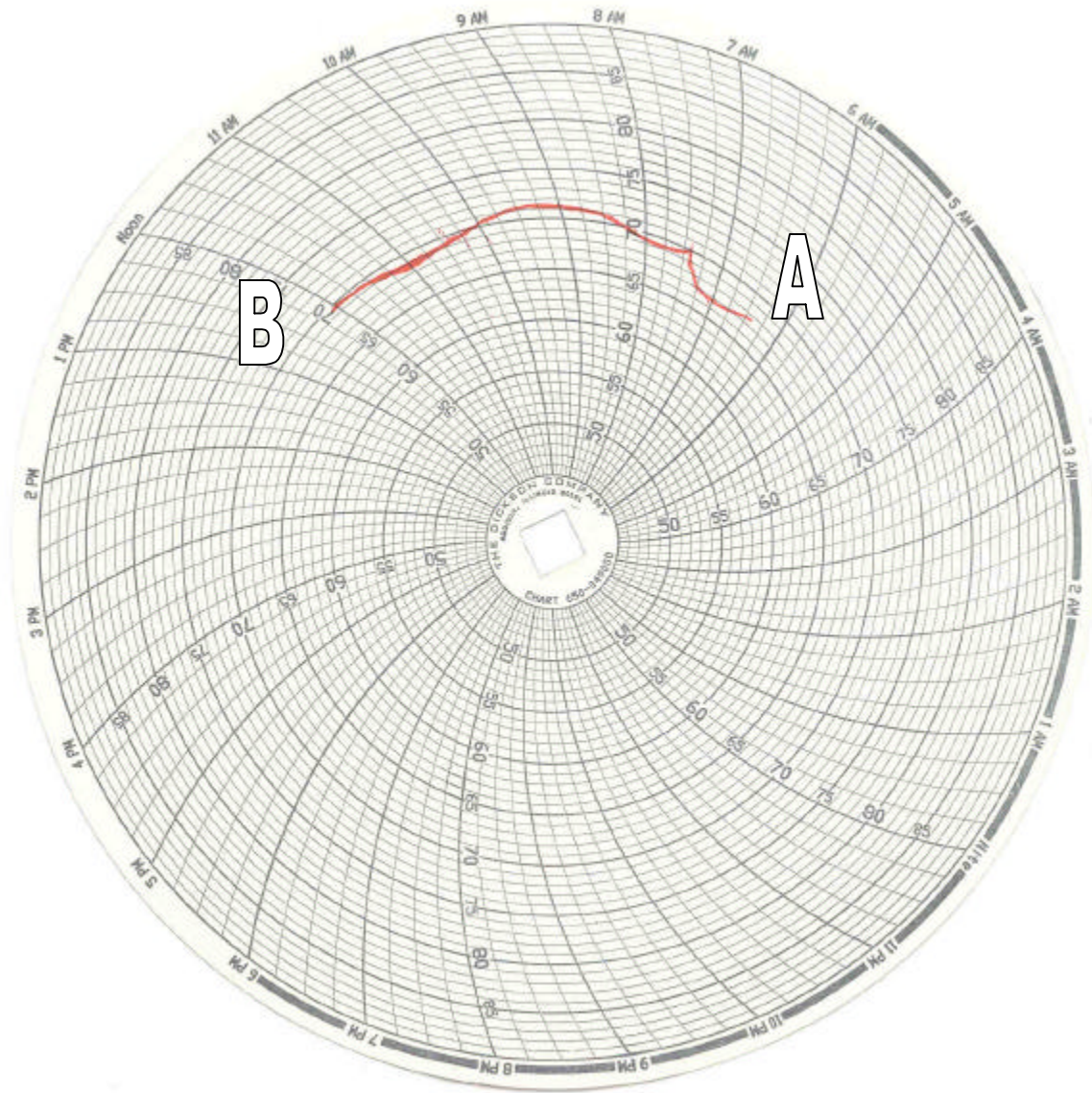
No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4017	3898	119
C2	Crush zone 2 at left side	mm	4148	3907	241
C3	Crush zone 3 at left side	mm	4160	3905	255
C4	Crush zone 4 at right side	mm	4161	3900	261
C5	Crush zone 5 at right side	mm	4150	3901	249
C6	Crush zone 6 at right side	mm	4019	3890	129

DATA SHEET NO. 20

DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2002/Jeep/Liberty/SUV
Test Program: NCAP

NHTSA No.: M20303
Test Date: 2/12/02



A = Dummies installed in vehicle at 7:05 a.m.

B = Test conducted at 11:58 a.m.

APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Photo No. 1	Pre-Test Front View of Test Vehicle	A-1
Photo No. 2	Post-Test Front View of Test Vehicle	A-2
Photo No. 3	Pre-Test Rear View of Test Vehicle	A-3
Photo No. 4	Post-Test Rear View of Test Vehicle	A-4
Photo No. 5	Pre-Test Left Side View of Test Vehicle	A-5
Photo No. 6	Post-Test Left Side View of Test Vehicle	A-6
Photo No. 7	Pre-Test Left Rear Three-Quarter View of Test Vehicle	A-7
Photo No. 8	Post-Test Left Rear Three-Quarter View of Test Vehicle	A-8
Photo No. 9	Pre-Test Right Side View of Test Vehicle	A-9
Photo No. 10	Post-Test Right Side View of Test Vehicle	A-10
Photo No. 11	Pre-Test Right Front Three-Quarter View of Test Vehicle	A-11
Photo No. 12	Post-Test Right Front Three-Quarter View of Test Vehicle	A-12
Photo No. 13	Pre-Test Fuel Filler Cap View	A-13
Photo No. 14	Pre-Test Engine Compartment View	A-14
Photo No. 15	Post-Test Engine Compartment View	A-15
Photo No. 16	Pre-Test Front Underbody View	A-16
Photo No. 17	Post-Test Front Underbody View	A-17
Photo No. 18	Pre-Test Mid Underbody	A-18
Photo No. 19	Post-Test Mid Underbody	A-19
Photo No. 20	Pre-Test Rear Underbody View	A-20
Photo No. 21	Post-Test Rear Underbody View	A-21
Photo No. 22	Pre-Test Windshield View	A-22
Photo No. 23	Post-Test Windshield View	A-23
Photo No. 24	Pre-Test Driver Dummy Position Left Side View	A-24
Photo No. 25	Post-Test Driver Dummy Position Left Side View	A-25
Photo No. 26	Pre-Test Driver Dummy Position Left Side View (Door Open)	A-26
Photo No. 27	Post-Test Driver Dummy Position Left Side View (Door Open)	A-27
Photo No. 28	Pre-Test Driver Seat Position View	A-28
Photo No. 29	Post-Test Driver Seat Position View	A-29
Photo No. 30	Pre-Test Driver Dummy Knee Position	A-30

Photo No. 31	Post-Test Driver Dummy Knee Position	A-31
Photo No. 32	Post-Test Driver Airbag Contact	A-32
Photo No. 33	Post-Test Driver Knee Contact View	A-33
Photo No. 34	Pre-Test Driver Windshield View	A-34
Photo No. 35	Post-Test Driver Windshield View	A-35
Photo No. 36	Pre-Test Passenger Dummy Position Right Side View	A-36
Photo No. 37	Post-Test Passenger Dummy Position Right Side View	A-37
Photo No. 38	Pre-Test Passenger Dummy Position Right Side View (Door Open)	A-38
Photo No. 39	Post-Test Passenger Dummy Position Right Side View (Door Open)	A-39
Photo No. 40	Pre-Test Passenger Seat Position View	A-40
Photo No. 41	Post-Test Passenger Seat Position View	A-41
Photo No. 42	Pre-Test Passenger Dummy Knee Position	A-42
Photo No. 43	Post-Test Passenger Dummy Knee Position	A-43
Photo No. 44	Post-Test Passenger Airbag Contact	A-44
Photo No. 45	Post-Test Passenger Head Contact (Visor)	A-45
Photo No. 46	Post-Test Passenger Knee Contact View	A-46
Photo No. 47	Pre-Test Passenger Windshield View	A-47
Photo No. 48	Post-Test Passenger Windshield View	A-48
Photo No. 49	Vehicle Certification Label	A-49
Photo No. 50	Vehicle Tire Placard	A-50
Photo No. 51	Vehicle Impact	A-51
Photo No. 52	Rollover 90 Degrees	A-52
Photo No. 53	Rollover 180 Degrees	A-53
Photo No. 54	Rollover 270 Degrees	A-54
Photo No. 55	Rollover 360 Degrees	A-55



Pre-Test Front View of Test Vehicle



Post-Test Front View of Test Vehicle



Pre-Test Rear View of Test Vehicle



Post-Test Rear View of Test Vehicle



Pre-Test Left Side View of Test Vehicle



Post-Test Left Side View of Test Vehicle



Pre-Test Left Rear Three-Quarter View of Test Vehicle



Post-Test Left Rear Three-Quarter View of Test Vehicle



Pre-Test Right Side View of Test Vehicle



Post-Test Right Side View of Test Vehicle



Pre-Test Right Front Three-Quarter View of Test Vehicle



Post-Test Right Front Three-Quarter View of Test Vehicle



Pre-Test Fuel Filler Cap View

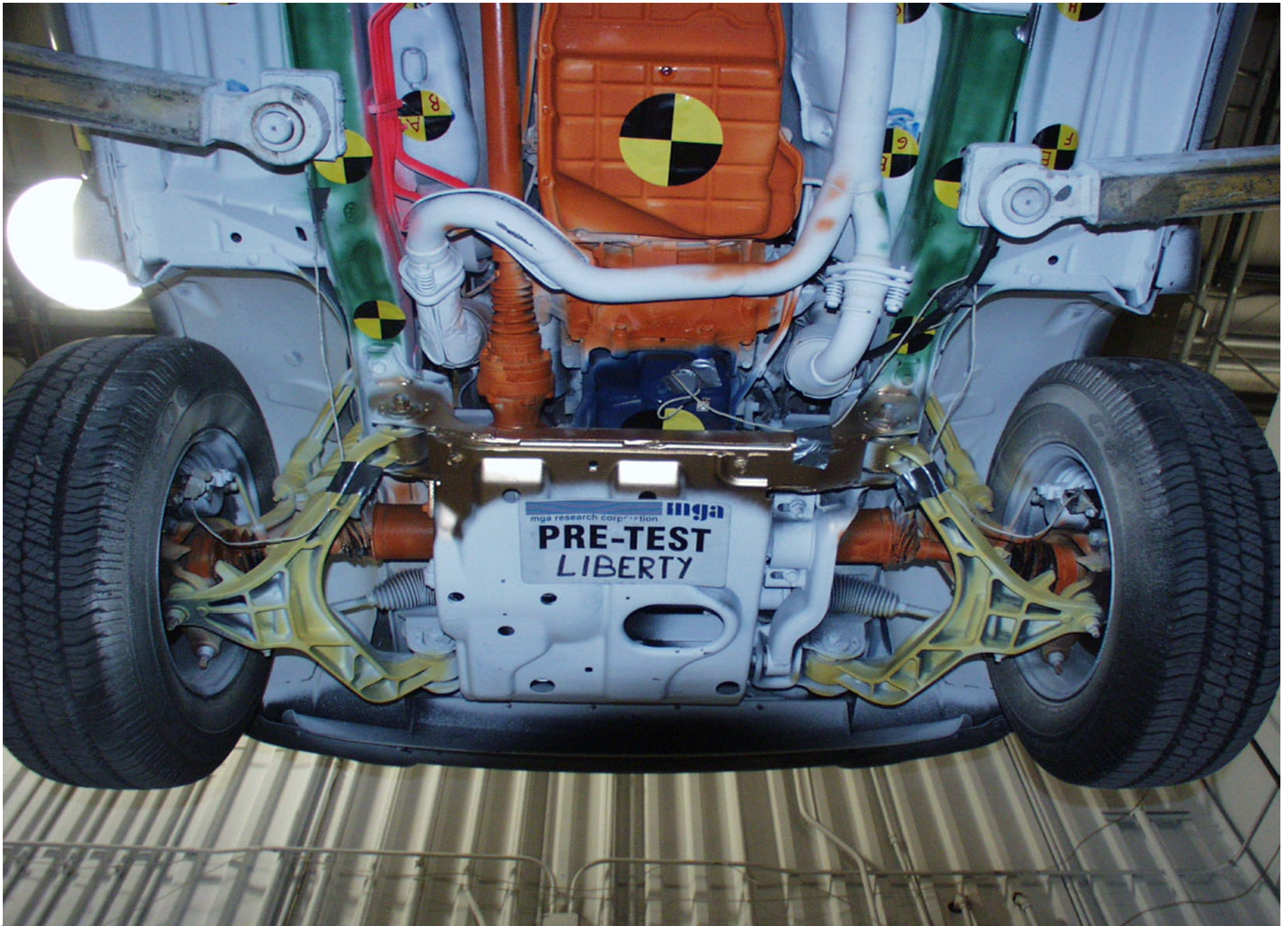
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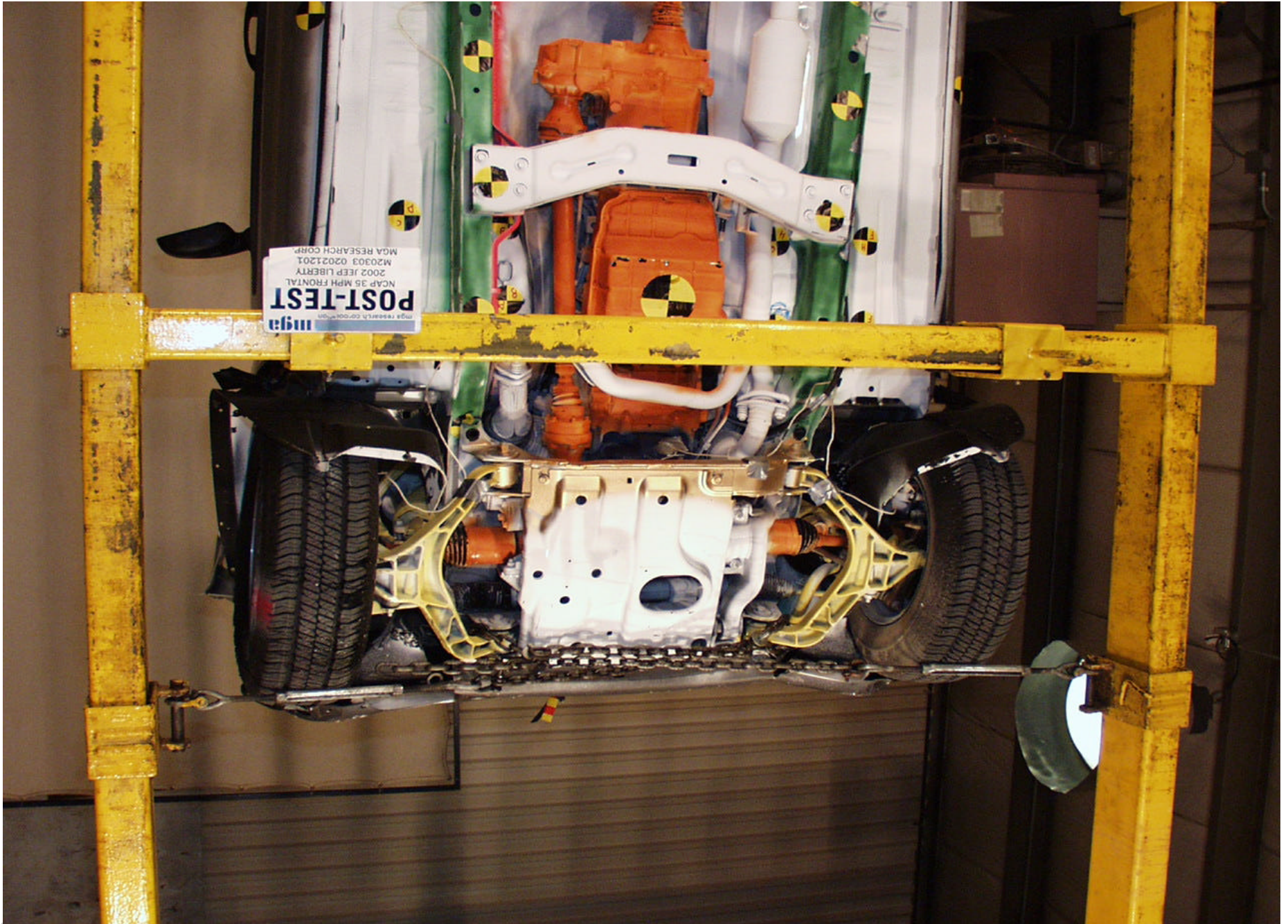
Pre-Test Engine Compartment View



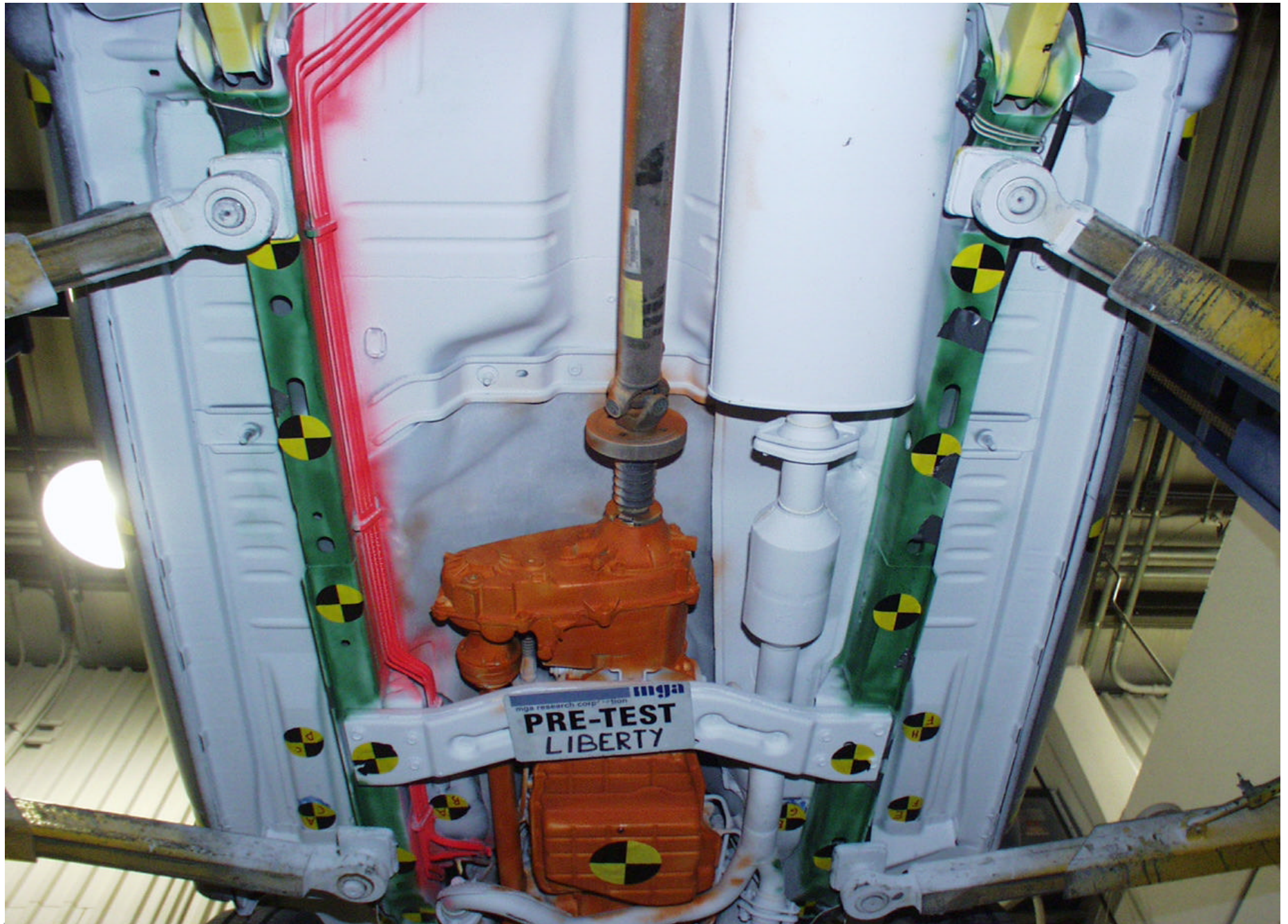
Post-Test Engine Compartment View



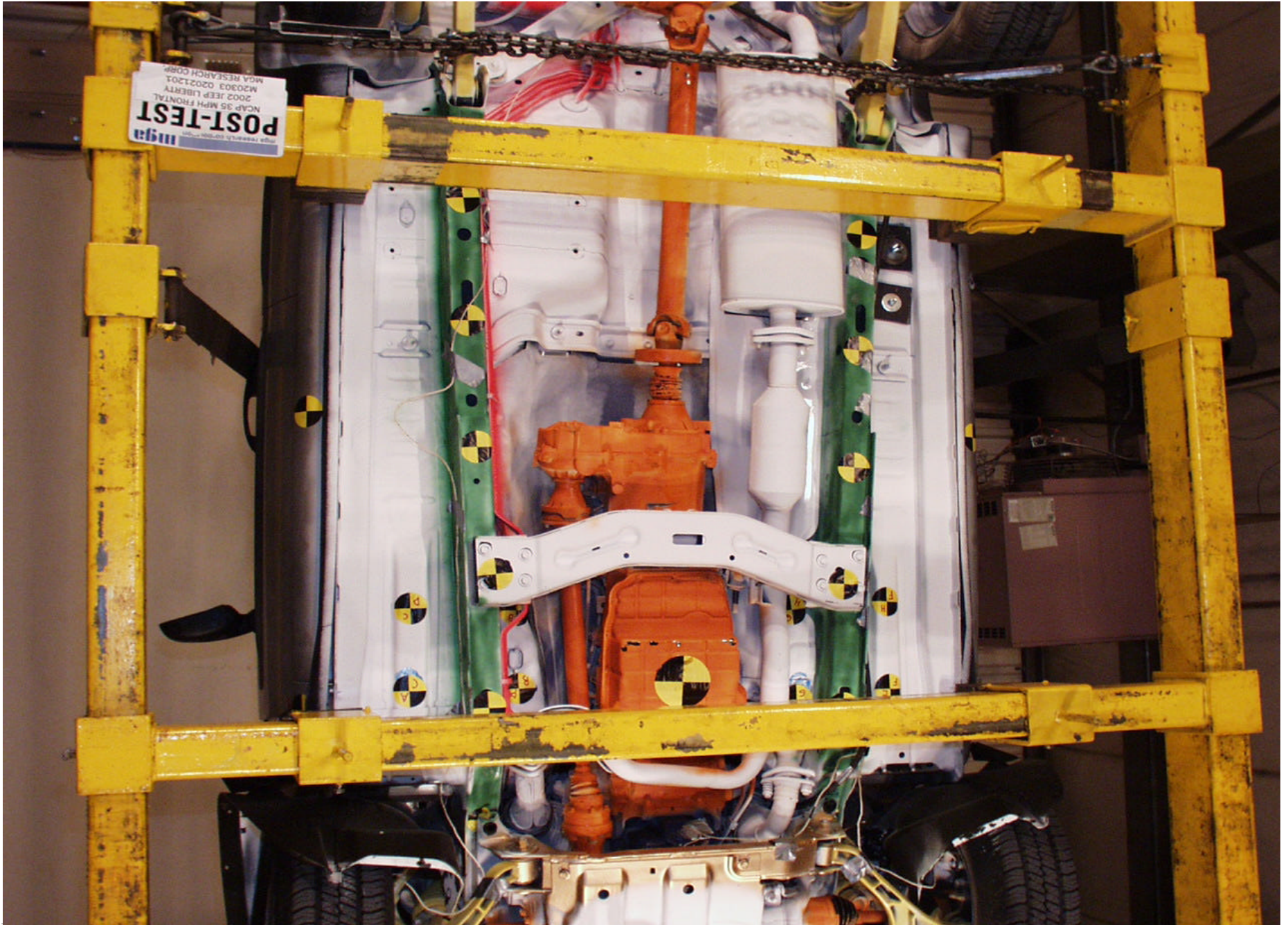
Pre-Test Front Underbody View



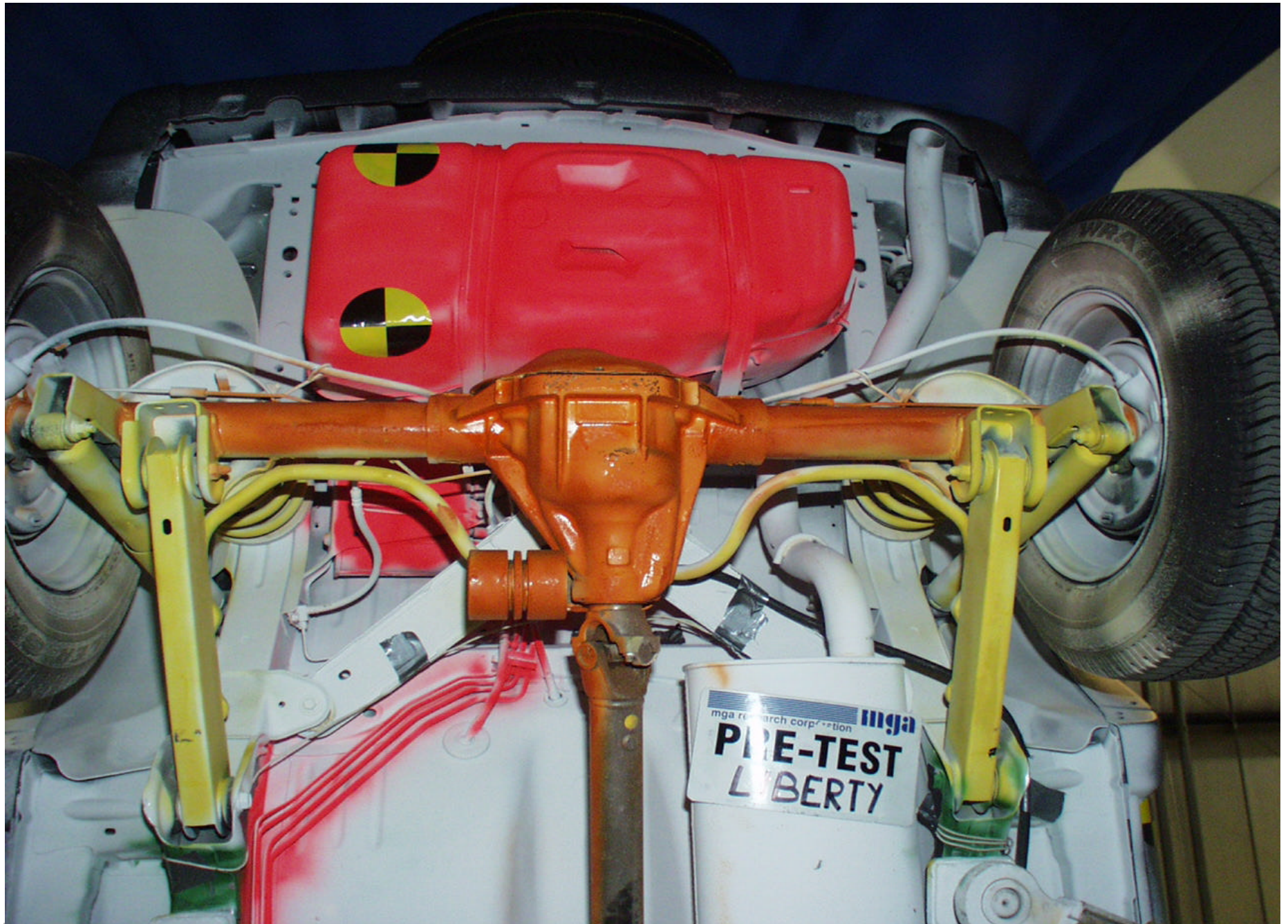
Post-Test Front Underbody View



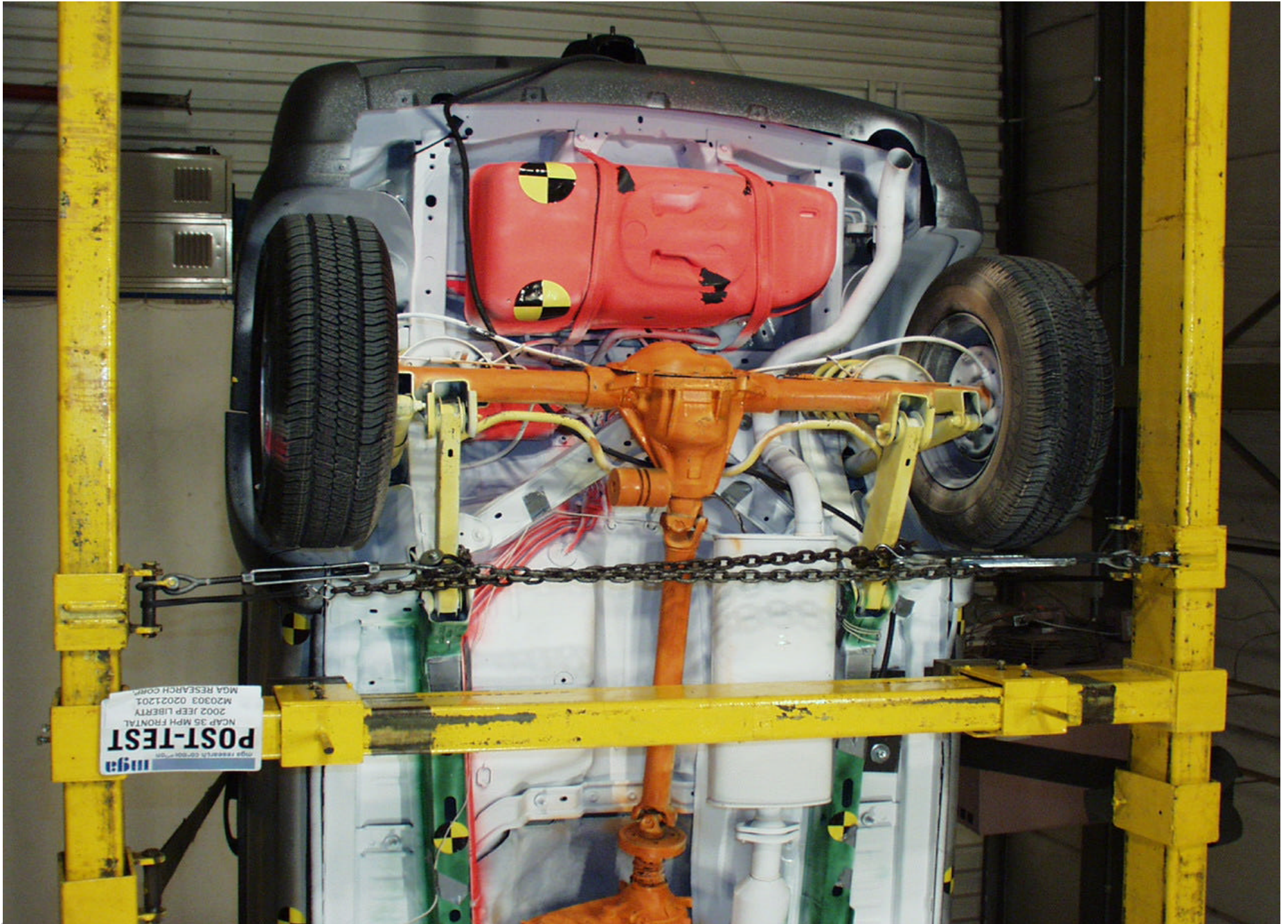
Pre-Test Mid Underbody



Post-Test Mid Underbody



Pre-Test Rear Underbody View



Post-Test Rear Underbody View



Pre-Test Windshield View



Post-Test Windshield View



Pre-Test Driver Dummy Position Left Side View



Post-Test Driver Dummy Position Left Side View



Pre-Test Driver Dummy Position Left Side View (Door Open)



Post-Test Driver Dummy Position Left Side View (Door Open)



Pre-Test Driver Seat Position View



Post-Test Driver Seat Position View



Pre-Test Driver Dummy Knee Position



Post-Test Driver Dummy Knee Position



Post-Test Driver Airbag Contact



Post-Test Driver Knee Contact View



Pre-Test Driver Windshield View



Post-Test Driver Windshield View



Pre-Test Passenger Dummy Position Right Side View



Post-Test Passenger Dummy Position Right Side View



Pre-Test Passenger Dummy Position Right Side View (Door Open)



Post-Test Passenger Dummy Position Right Side View (Door Open)



Pre-Test Passenger Seat Position View



Post-Test Passenger Seat Position View



Pre-Test Passenger Dummy Knee Position



Post-Test Passenger Dummy Knee Position



Post-Test Passenger Airbag Contact



Post-Test Passenger Head Contact (Visor)



Post-Test Passenger Knee Contact View



Pre-Test Passenger Windshield View



Post-Test Passenger Windshield View

MFD BY	DAIMLERCHRYSLER CORPORATION	DATE OF MFR	12-01	GVWR	2541 KG(05600 LB)
GAWR FRONT	WITH TIRES	RIMS AT	COLD		
1248 KG(2750 LB)	P215/75SR16	16X7	227 KPA(33 PSI)		
GAWR REAR	WITH TIRES	RIMS AT	COLD		
1429 KG(3150 LB)	P215/75SR16	16X7	227 KPA(33 PSI)		

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY AND THEFT PREVENTION STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

VIN: 1J4GL48K42W256252 TYPE: MPV SINGLE X DUAL



MDH: 122023 387AA PNT:PS2 VEHICLE MADE IN U.S.A. TRM:M5DU 4648503

Vehicle Certification Label

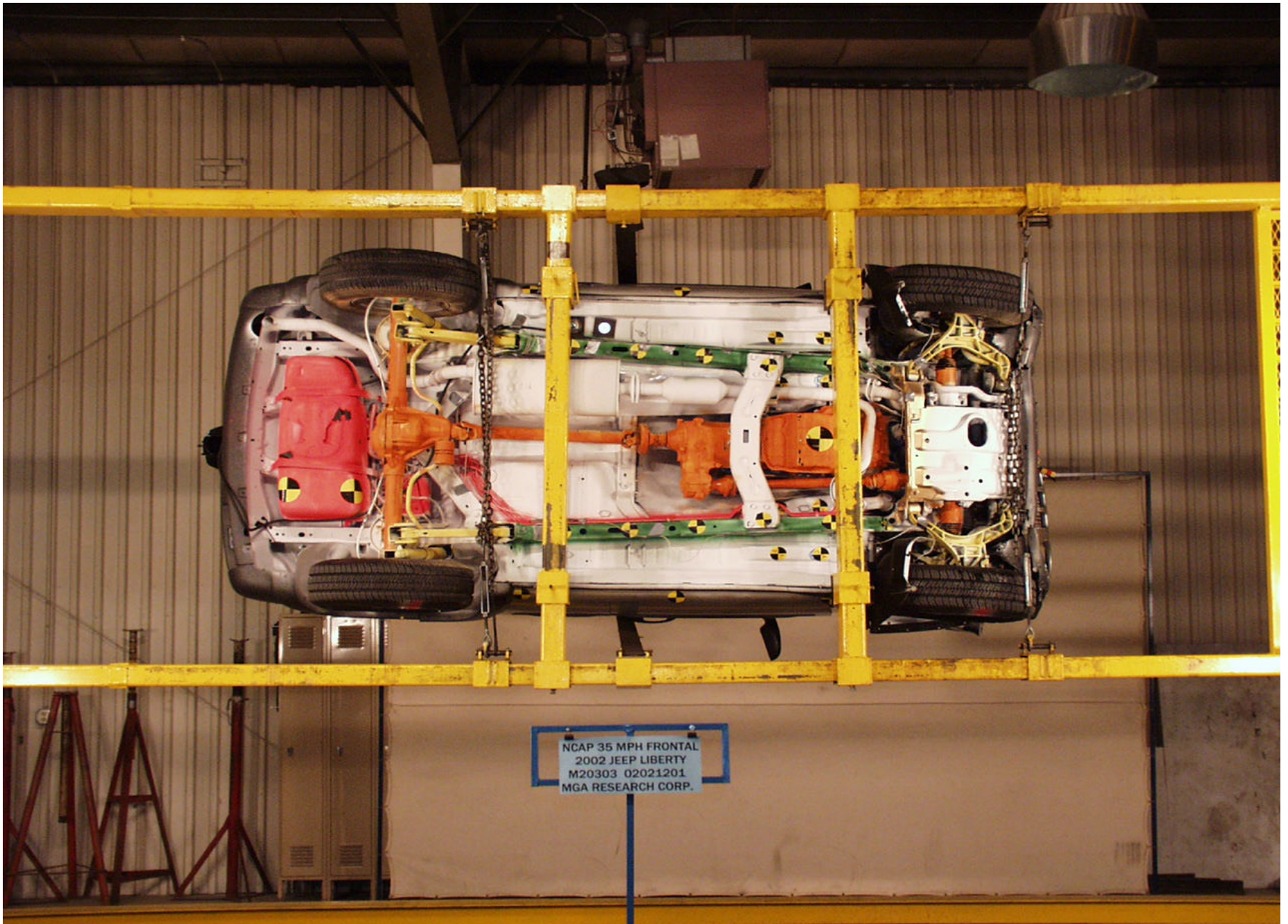
TIRE INFLATION PRESSURE INFLATE TIRES COLD BEFORE RUNNING DO NOT REDUCE PRESSURE IF TIRES ARE WARM	SEE OWNERS MANUAL FOR HIGH SPEED OPERATION AND ADDITIONAL DATA						
RECOMMENDED INFLATION PRESSURE AND TIRE SIZES (INCLUDING POLYSPARE) <table> <tr> <td>P215/75R16</td><td>33psi/227 kPa</td></tr> <tr> <td>P215/75D16</td><td>33psi/227 kPa</td></tr> <tr> <td>P235/70R16</td><td>33psi/227 kPa</td></tr> </table> (AT FULL LOAD)	P215/75R16	33psi/227 kPa	P215/75D16	33psi/227 kPa	P235/70R16	33psi/227 kPa	MINIMUM TIRE SIZE P215/75R16 (W/3.7L or 2.4L)
P215/75R16	33psi/227 kPa						
P215/75D16	33psi/227 kPa						
P235/70R16	33psi/227 kPa						
VEHICLE CAPACITY 1150 lb/522 Kg	SEATING CAPACITY <table> <tr> <td>FRONT</td><td>2</td></tr> <tr> <td>REAR</td><td>3</td></tr> </table>	FRONT	2	REAR	3		
FRONT	2						
REAR	3						

52088962AA

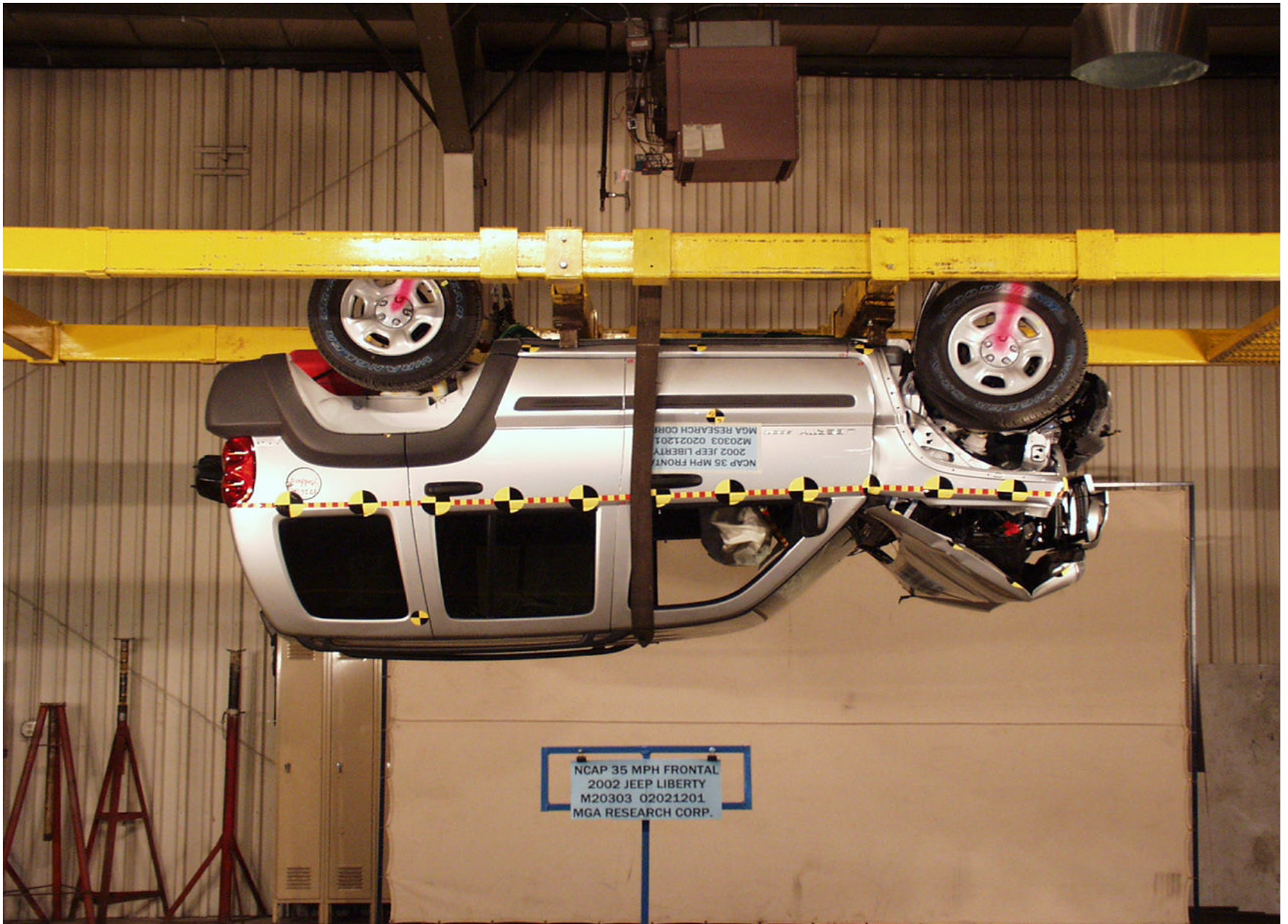
Vehicle Tire Placard



Vehicle Impact



Rollover 90 Degrees



Rollover 180 Degrees



Rollover 270 Degrees



Rollover 360 Degrees

APPENDIX B

DUMMY AND VEHICLE RESPONSE DATA TRACES

TABLE OF DATA PLOTS

Figure No. 1	Driver Head X Acceleration vs. Time	B-1
Figure No. 2	Driver Head Y Acceleration vs. Time	B-1
Figure No. 3	Driver Head Z Acceleration vs. Time	B-1
Figure No. 4	Driver Head Resultant Acceleration vs. Time	B-1
Figure No. 5	Driver Head X Velocity vs. Time	B-2
Figure No. 6	Driver Head Y Velocity vs. Time	B-2
Figure No. 7	Driver Head Z Velocity vs. Time	B-2
Figure No. 8	Driver Head Y – Front Acceleration vs. Time	B-3
Figure No. 9	Driver Head Z – Front Acceleration vs. Time	B-3
Figure No. 10	Driver Head X – Left Acceleration vs. Time	B-4
Figure No. 11	Driver Head Z – Left Acceleration vs. Time	B-4
Figure No. 12	Driver Head X – Upper Acceleration vs. Time	B-5
Figure No. 13	Driver Head Y – Upper Acceleration vs. Time	B-5
Figure No. 14	Driver Head X Redundant Acceleration vs. Time	B-6
Figure No. 15	Driver Head Y Redundant Acceleration vs. Time	B-6
Figure No. 16	Driver Head Z Redundant Acceleration vs. Time	B-6
Figure No. 17	Driver Head Resultant Redundant Acceleration vs. Time	B-6
Figure No. 18	Driver Head X Redundant Velocity vs. Time	B-7
Figure No. 19	Driver Head Y Redundant Velocity vs. Time	B-7
Figure No. 20	Driver Head Z Redundant Velocity vs. Time	B-7
Figure No. 21	Driver Neck Force X vs. Time	B-8
Figure No. 22	Driver Neck Force Y vs. Time	B-8
Figure No. 23	Driver Neck Force Z vs. Time	B-8
Figure No. 24	Driver Neck Force Resultant vs. Time	B-8
Figure No. 25	Driver Neck Moment X vs. Time	B-9
Figure No. 26	Driver Neck Moment Y vs. Time	B-9
Figure No. 27	Driver Neck Moment Z vs. Time	B-9
Figure No. 28	Driver Neck Moment Resultant vs. Time	B-9
Figure No. 29	Driver Chest X Acceleration vs. Time	B-10
Figure No. 30	Driver Chest Y Acceleration vs. Time	B-10

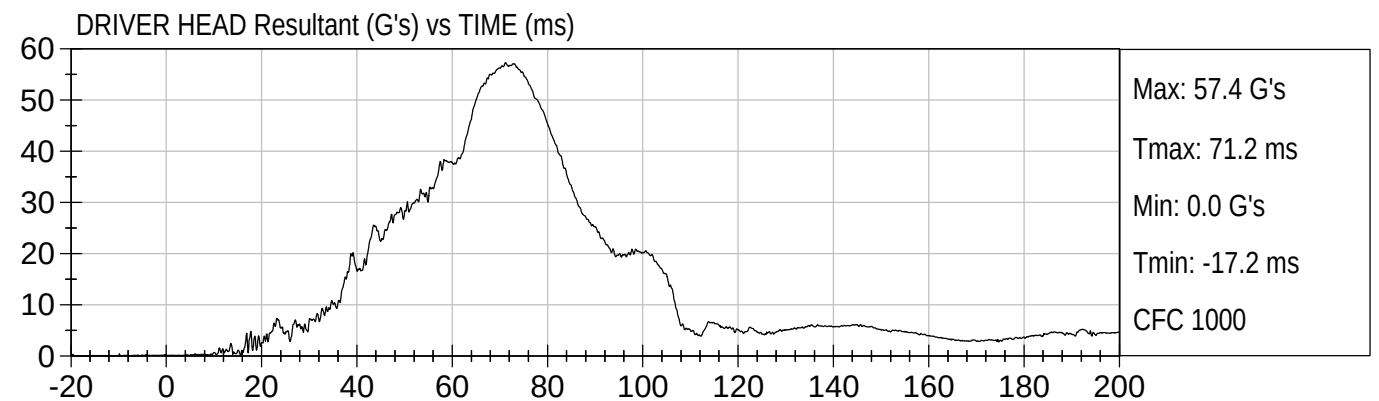
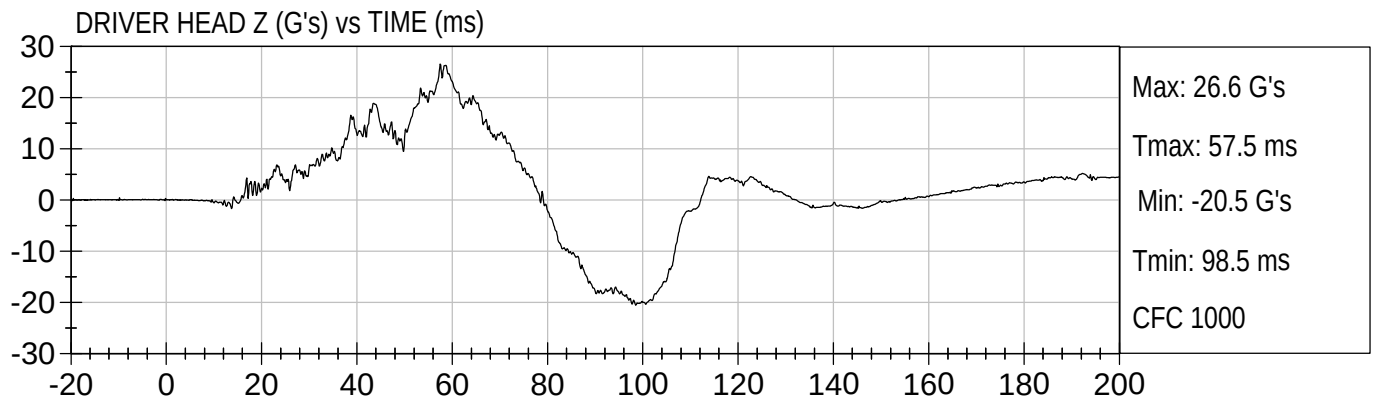
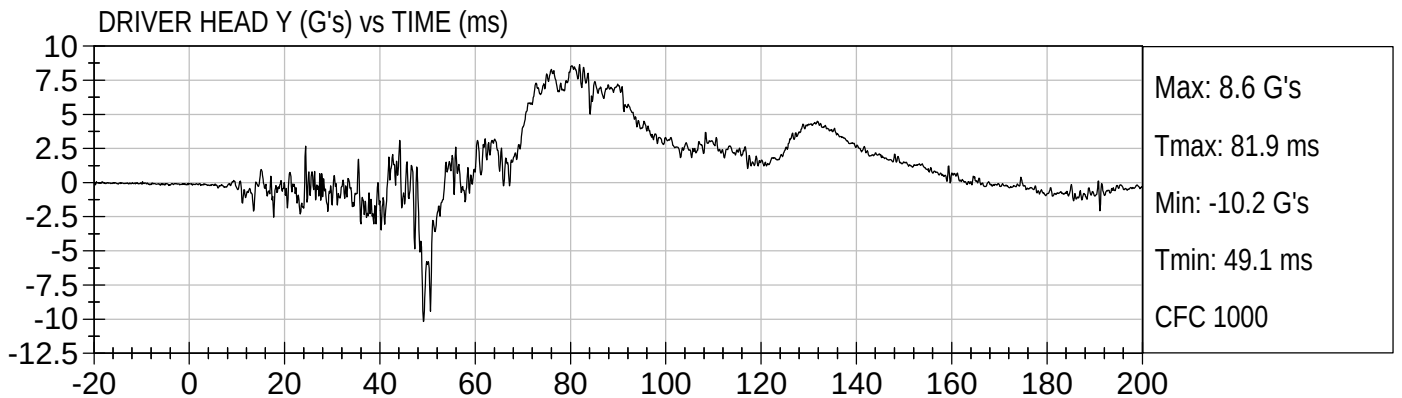
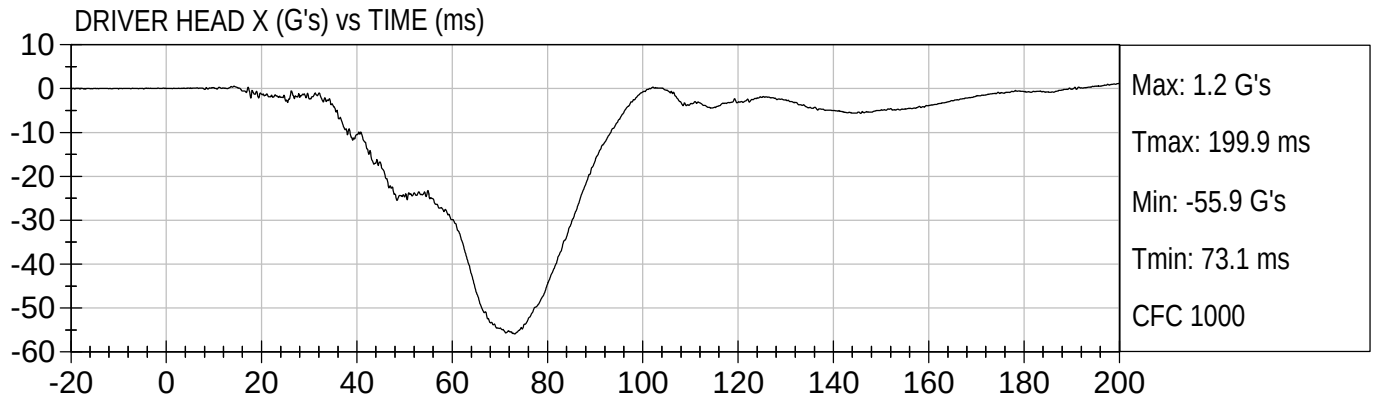
Figure No. 31	Driver Chest Z Acceleration vs. Time	B-10
Figure No. 32	Driver Chest Resultant Acceleration vs. Time	B-10
Figure No. 33	Driver Chest X Velocity vs. Time	B-11
Figure No. 34	Driver Chest Y Velocity vs. Time	B-11
Figure No. 35	Driver Chest Z Velocity vs. Time	B-11
Figure No. 36	Driver Chest Displacement vs. Time	B-11
Figure No. 37	Driver Chest X Redundant Acceleration vs. Time	B-12
Figure No. 38	Driver Chest Y Redundant Acceleration vs. Time	B-12
Figure No. 39	Driver Chest Z Redundant Acceleration vs. Time	B-12
Figure No. 40	Driver Chest Resultant Redundant Acceleration vs. Time	B-12
Figure No. 41	Driver Chest X Redundant Velocity vs. Time	B-13
Figure No. 42	Driver Chest Y Redundant Velocity vs. Time	B-13
Figure No. 43	Driver Chest Z Redundant Velocity vs. Time	B-13
Figure No. 44	Driver Pelvis X Acceleration vs. Time	B-14
Figure No. 45	Driver Pelvis Y Acceleration vs. Time	B-14
Figure No. 46	Driver Pelvis Z Acceleration vs. Time	B-14
Figure No. 47	Driver Pelvis Resultant Acceleration vs. Time	B-14
Figure No. 48	Driver Pelvis X Velocity vs. Time	B-15
Figure No. 49	Driver Pelvis Y Velocity vs. Time	B-15
Figure No. 50	Driver Pelvis Z Velocity vs. Time	B-15
Figure No. 51	Driver Left Femur Force vs. Time	B-16
Figure No. 52	Driver Right Femur Force vs. Time	B-16
Figure No. 53	Driver Left Knee Shear vs. Time	B-16
Figure No. 54	Driver Right Knee Shear vs. Time	B-16
Figure No. 55	Driver Left Upper Tibia Moment X vs. Time	B-17
Figure No. 56	Driver Left Upper Tibia Moment Y vs. Time	B-17
Figure No. 57	Driver Left Upper Tibia Force Z vs. Time	B-17
Figure No. 58	Driver Left Lower Tibia Moment X vs. Time	B-18
Figure No. 59	Driver Left Lower Tibia Moment Y vs. Time	B-18
Figure No. 60	Driver Left Lower Tibia Force Z vs. Time	B-18
Figure No. 61	Driver Right Upper Tibia Moment X vs. Time	B-19
Figure No. 62	Driver Right Upper Tibia Moment Y vs. Time	B-19

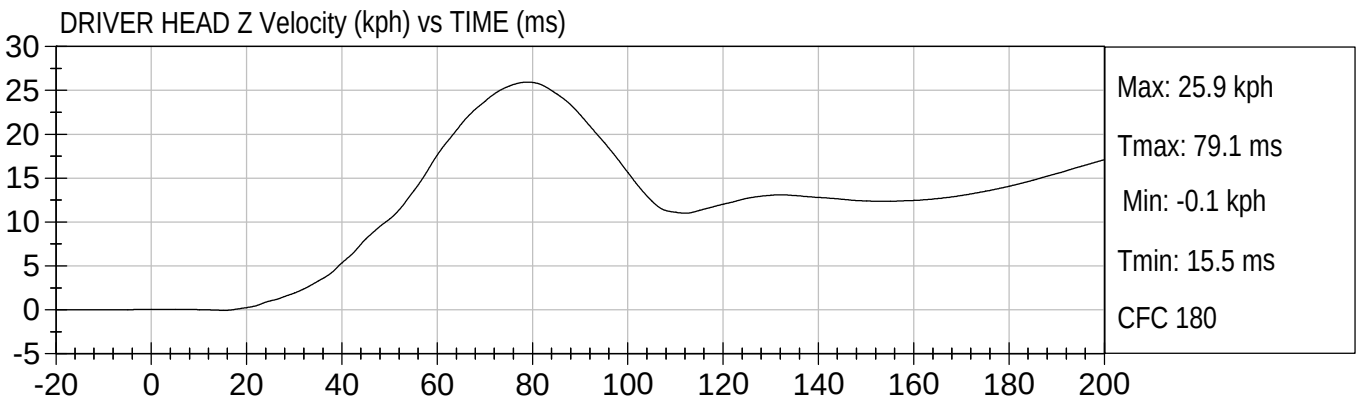
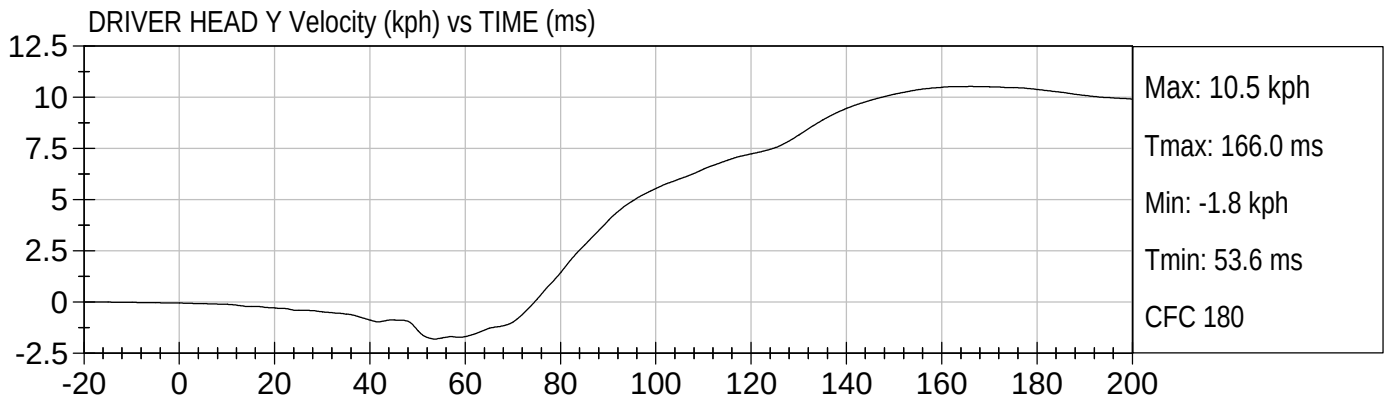
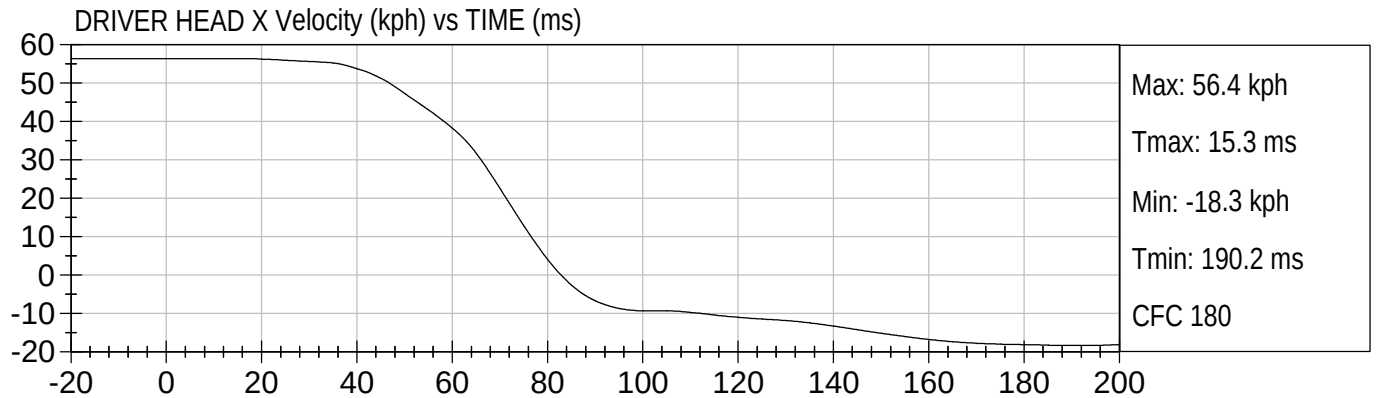
Figure No. 63	Driver Right Upper Tibia Force Z vs. Time	B-19
Figure No. 64	Driver Right Lower Tibia Moment X vs. Time	B-20
Figure No. 65	Driver Right Lower Tibia Moment Y vs. Time	B-20
Figure No. 66	Driver Right Lower Tibia Force Z vs. Time	B-20
Figure No. 67	Driver Left Foot Z – Front Acceleration vs. Time	B-21
Figure No. 68	Driver Left Ankle X Acceleration vs. Time	B-21
Figure No. 69	Driver Left Ankle Z Acceleration vs. Time	B-21
Figure No. 70	Driver Right Foot Z – Front Acceleration vs. Time	B-22
Figure No. 71	Driver Right Ankle X Acceleration vs. Time	B-22
Figure No. 72	Driver Right Ankle Z Acceleration vs. Time	B-22
Figure No. 73	Driver Shoulder Belt Force vs. Time	B-23
Figure No. 74	Driver Lap Belt Force vs. Time	B-23
Figure No. 75	Passenger Head X Acceleration vs. Time	B-24
Figure No. 76	Passenger Head Y Acceleration vs. Time	B-24
Figure No. 77	Passenger Head Z Acceleration vs. Time	B-24
Figure No. 78	Passenger Head Resultant Acceleration vs. Time	B-24
Figure No. 79	Passenger Head X Velocity vs. Time	B-25
Figure No. 80	Passenger Head Y Velocity vs. Time	B-25
Figure No. 81	Passenger Head Z Velocity vs. Time	B-25
Figure No. 82	Passenger Head Y – Front Acceleration vs. Time	B-26
Figure No. 83	Passenger Head Z – Front Acceleration vs. Time	B-26
Figure No. 84	Passenger Head X – Left Acceleration vs. Time	B-27
Figure No. 85	Passenger Head Z – Left Acceleration vs. Time	B-27
Figure No. 86	Passenger Head X – Upper Acceleration vs. Time	B-28
Figure No. 87	Passenger Head Y – Upper Acceleration vs. Time	B-28
Figure No. 88	Passenger Head X Redundant Acceleration vs. Time	B-29
Figure No. 89	Passenger Head Y Redundant Acceleration vs. Time	B-29
Figure No. 90	Passenger Head Z Redundant Acceleration vs. Time	B-29
Figure No. 91	Passenger Head Resultant Redundant Acceleration vs. Time	B-29
Figure No. 92	Passenger Head X Redundant Velocity vs. Time	B-30
Figure No. 93	Passenger Head Y Redundant Velocity vs. Time	B-30
Figure No. 94	Passenger Head Z Redundant Velocity vs. Time	B-30

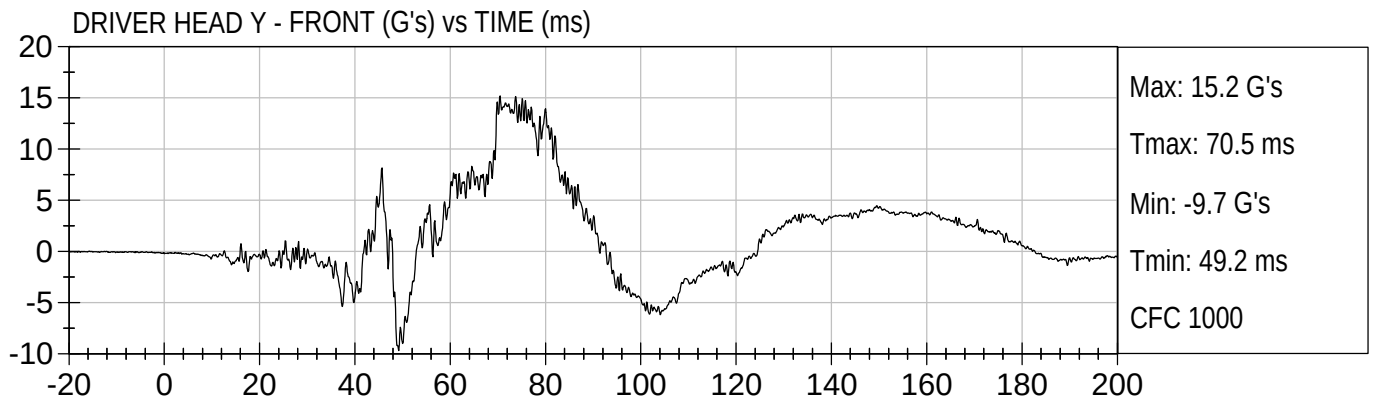
Figure No. 95	Passenger Neck Force X vs. Time	B-31
Figure No. 96	Passenger Neck Force Y vs. Time	B-31
Figure No. 97	Passenger Neck Force Z vs. Time	B-31
Figure No. 98	Passenger Neck Force Resultant vs. Time	B-31
Figure No. 99	Passenger Neck Moment X vs. Time	B-32
Figure No. 100	Passenger Neck Moment Y vs. Time	B-32
Figure No. 101	Passenger Neck Moment Z vs. Time	B-32
Figure No. 102	Passenger Neck Moment Resultant vs. Time	B-32
Figure No. 103	Passenger Chest X Acceleration vs. Time	B-33
Figure No. 104	Passenger Chest Y Acceleration vs. Time	B-33
Figure No. 105	Passenger Chest Z Acceleration vs. Time	B-33
Figure No. 106	Passenger Chest Resultant Acceleration vs. Time	B-33
Figure No. 107	Passenger Chest X Velocity vs. Time	B-34
Figure No. 108	Passenger Chest Y Velocity vs. Time	B-34
Figure No. 109	Passenger Chest Z Velocity vs. Time	B-34
Figure No. 110	Passenger Chest Displacement vs. Time	B-34
Figure No. 111	Passenger Chest X Redundant Acceleration vs. Time	B-35
Figure No. 112	Passenger Chest Y Redundant Acceleration vs. Time	B-35
Figure No. 113	Passenger Chest Z Redundant Acceleration vs. Time	B-35
Figure No. 114	Passenger Chest Resultant Redundant Acceleration vs. Time	B-35
Figure No. 115	Passenger Chest X Redundant Velocity vs. Time	B-36
Figure No. 116	Passenger Chest Y Redundant Velocity vs. Time	B-36
Figure No. 117	Passenger Chest Z Redundant Velocity vs. Time	B-36
Figure No. 118	Passenger Pelvis X Acceleration vs. Time	B-37
Figure No. 119	Passenger Pelvis Y Acceleration vs. Time	B-37
Figure No. 120	Passenger Pelvis Z Acceleration vs. Time	B-37
Figure No. 121	Passenger Pelvis Resultant Acceleration vs. Time	B-37
Figure No. 122	Passenger Pelvis X Velocity vs. Time	B-38
Figure No. 123	Passenger Pelvis Y Velocity vs. Time	B-38
Figure No. 124	Passenger Pelvis Z Velocity vs. Time	B-38
Figure No. 125	Passenger Left Femur Force vs. Time	B-39
Figure No. 126	Passenger Right Femur Force vs. Time	B-39

Figure No. 127	Passenger Left Knee Shear vs. Time	B-39
Figure No. 128	Passenger Right Knee Shear vs. Time	B-39
Figure No. 129	Passenger Left Upper Tibia Moment X vs. Time	B-40
Figure No. 130	Passenger Left Upper Tibia Moment Y vs. Time	B-40
Figure No. 131	Passenger Left Upper Tibia Force Z vs. Time	B-40
Figure No. 132	Passenger Left Lower Tibia Moment X vs. Time	B-41
Figure No. 133	Passenger Left Lower Tibia Moment Y vs. Time	B-41
Figure No. 134	Passenger Left Lower Tibia Force Z vs. Time	B-41
Figure No. 135	Passenger Right Upper Tibia Moment X vs. Time	B-42
Figure No. 136	Passenger Right Upper Tibia Moment Y vs. Time	B-42
Figure No. 137	Passenger Right Upper Tibia Force Z vs. Time	B-42
Figure No. 138	Passenger Right Lower Tibia Moment X vs. Time	B-43
Figure No. 139	Passenger Right Lower Tibia Moment Y vs. Time	B-43
Figure No. 140	Passenger Right Lower Tibia Force Z vs. Time	B-43
Figure No. 141	Passenger Left Foot Z – Front Acceleration vs. Time	B-44
Figure No. 142	Passenger Left Ankle X Acceleration vs. Time	B-44
Figure No. 143	Passenger Left Ankle Z Acceleration vs. Time	B-44
Figure No. 144	Passenger Right Foot Z – Front Acceleration vs. Time	B-45
Figure No. 145	Passenger Right Ankle X Acceleration vs. Time	B-45
Figure No. 146	Passenger Right Ankle Z Acceleration vs. Time	B-45
Figure No. 147	Passenger Shoulder Belt Force vs. Time	B-46
Figure No. 148	Passenger Lap Belt Force vs. Time	B-46
Figure No. 149	Left Rear Seat Crossmember X Acceleration vs. Time	B-47
Figure No. 150	Left Rear Seat Crossmember X Velocity vs. Time	B-47
Figure No. 151	Left Rear Seat Crossmember X Displacement vs. Time	B-47
Figure No. 152	Left Rear Seat Crossmember Z Acceleration vs. Time	B-48
Figure No. 153	Left Rear Seat Crossmember Z Velocity vs. Time	B-48
Figure No. 154	Left Rear Seat Crossmember Z Displacement vs. Time	B-48
Figure No. 155	Right Rear Seat Crossmember X Acceleration vs. Time	B-49
Figure No. 156	Right Rear Seat Crossmember X Velocity vs. Time	B-49
Figure No. 157	Right Rear Seat Crossmember X Displacement vs. Time	B-49
Figure No. 158	Right Rear Seat Crossmember Z Acceleration vs. Time	B-50

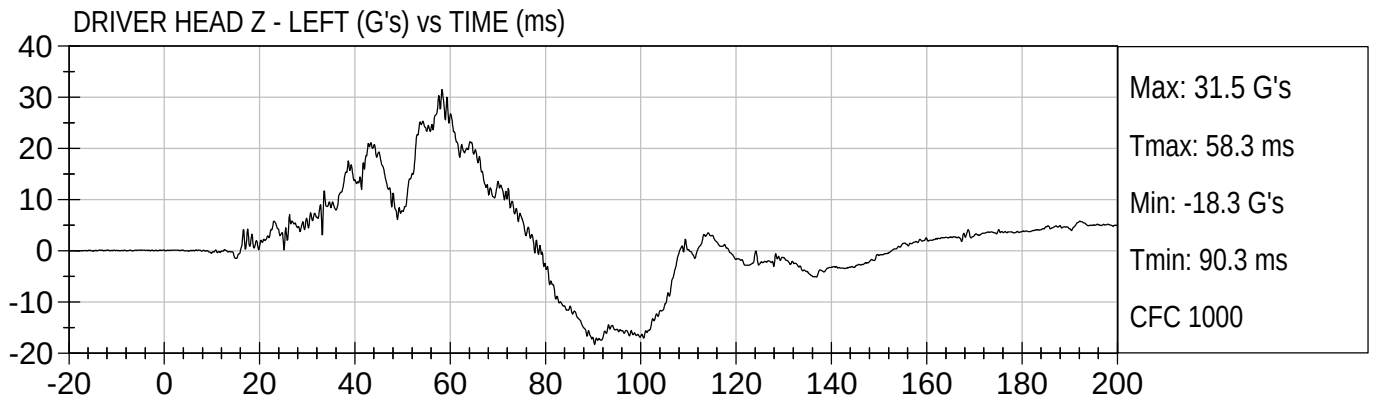
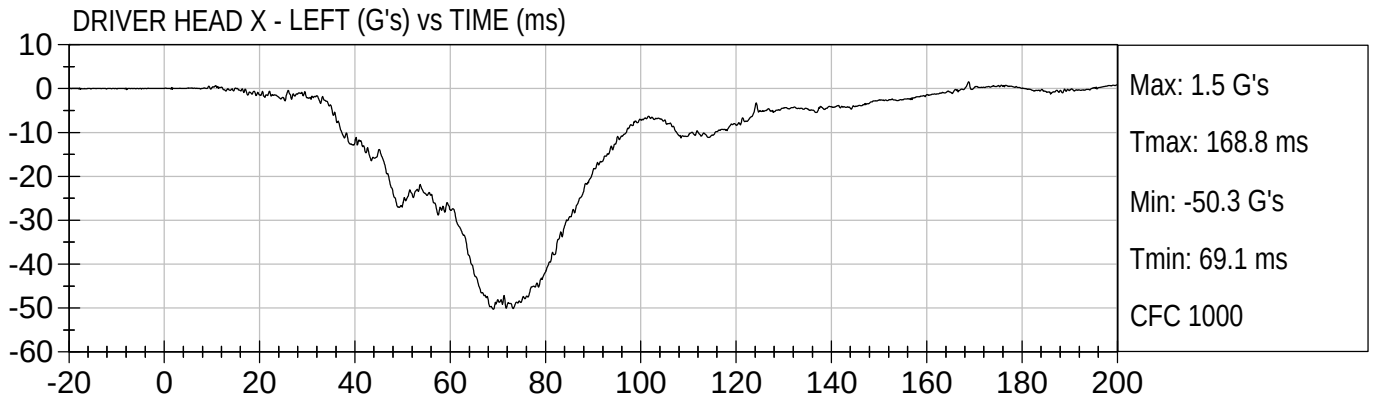
Figure No. 159	Right Rear Seat Crossmember Z Velocity vs. Time	B-50
Figure No. 160	Right Rear Seat Crossmember Z Displacement vs. Time	B-50
Figure No. 161	Top of Engine X Acceleration vs. Time	B-51
Figure No. 162	Top of Engine X Velocity vs. Time	B-51
Figure No. 163	Top of Engine X Displacement vs. Time	B-51
Figure No. 164	Bottom of Engine X Acceleration vs. Time	B-52
Figure No. 165	Bottom of Engine X Velocity vs. Time	B-52
Figure No. 166	Bottom of Engine X Displacement vs. Time	B-52
Figure No. 167	Left Brake Caliper X Acceleration vs. Time	B-53
Figure No. 168	Left Brake Caliper X Velocity vs. Time	B-53
Figure No. 169	Left Brake Caliper X Displacement vs. Time	B-53
Figure No. 170	Right Brake Caliper X Acceleration vs. Time	B-54
Figure No. 171	Right Brake Caliper X Velocity vs. Time	B-54
Figure No. 172	Right Brake Caliper X Displacement vs. Time	B-54
Figure No. 173	Instrument Panel X Acceleration vs. Time	B-55
Figure No. 174	Instrument Panel X Velocity vs. Time	B-55
Figure No. 175	Instrument Panel X Displacement vs. Time	B-55
Figure No. 176	Barrier Force – Upper Left vs. Time	B-56
Figure No. 177	Barrier Force – Upper Center vs. Time	B-56
Figure No. 178	Barrier Force – Upper Right vs. Time	B-56
Figure No. 179	Barrier Force – Lower Left vs. Time	B-57
Figure No. 180	Barrier Force – Lower Center vs. Time	B-57
Figure No. 181	Barrier Force – Lower Right vs. Time	B-57
Figure No. 182	Barrier Force – Sum Left vs. Time	B-58
Figure No. 183	Barrier Force – Sum Center vs. Time	B-58
Figure No. 184	Barrier Force – Sum Right vs. Time	B-58
Figure No. 185	Barrier Force – Sum All vs. Time	B-59
Figure No. 186	Barrier Force – Sum All vs. Avg. Rear Seat X-member Displacement	B-59

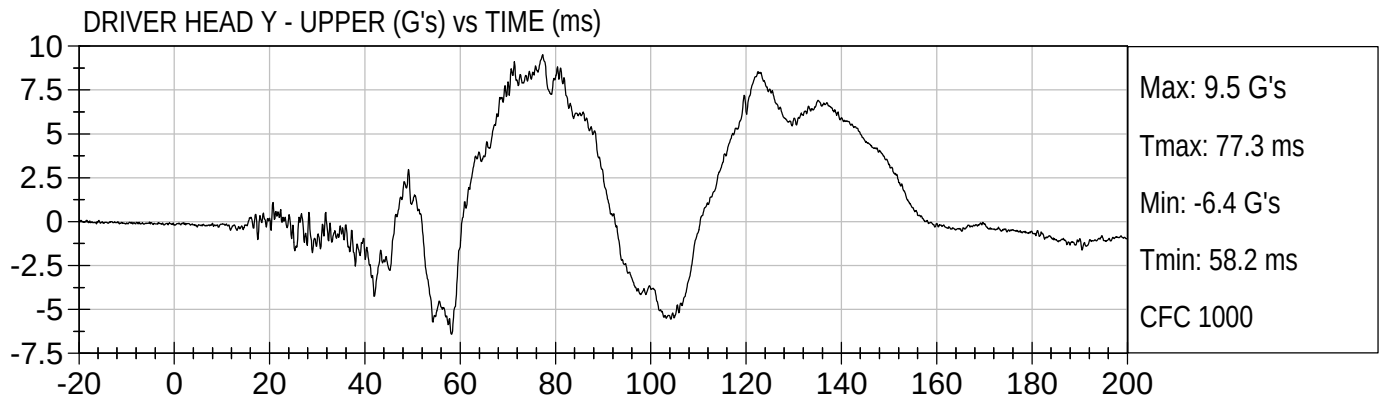
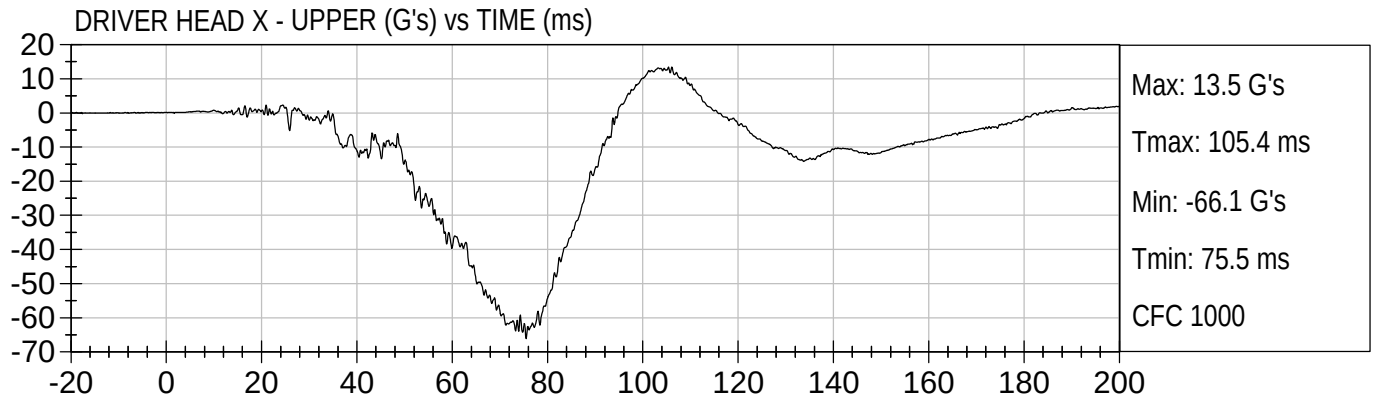


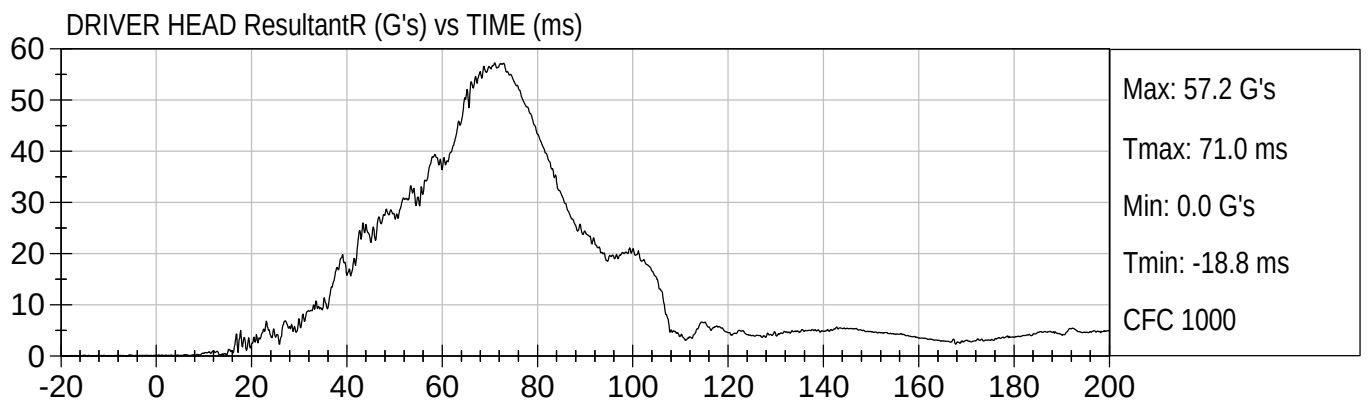
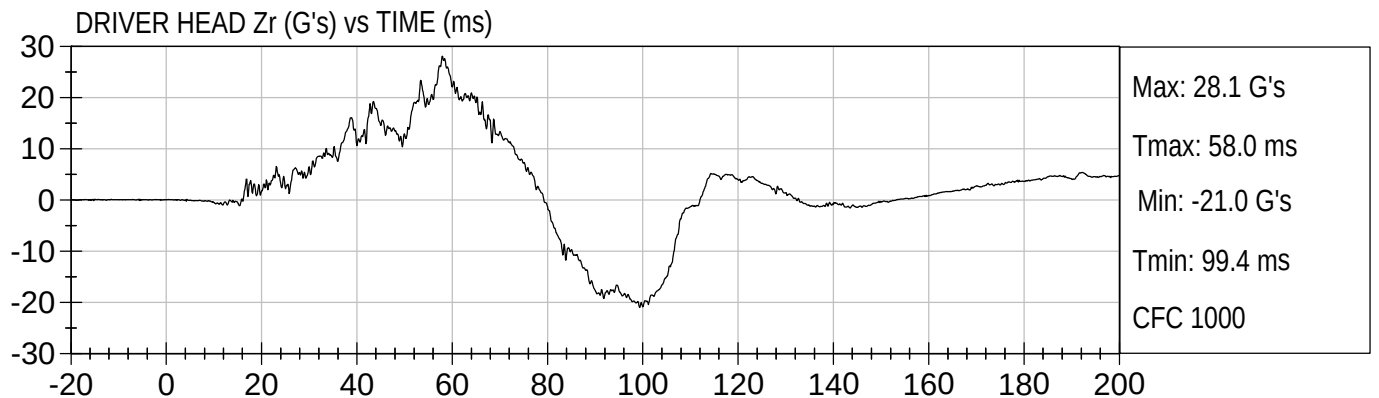
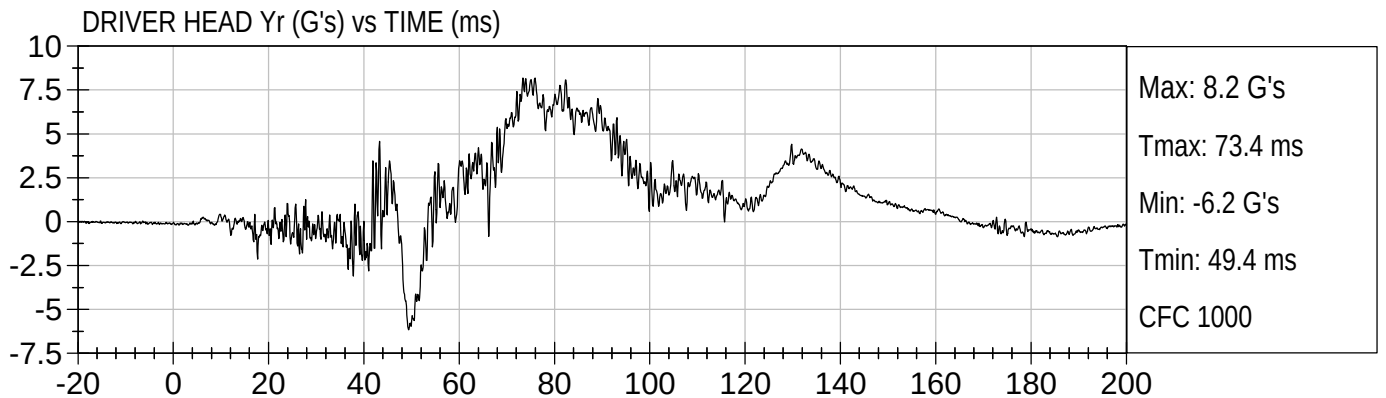
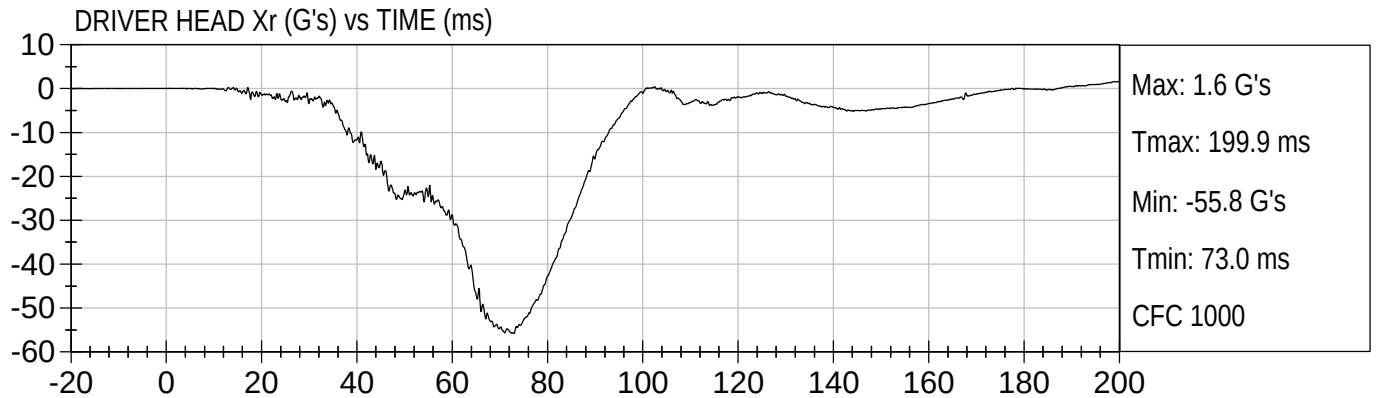


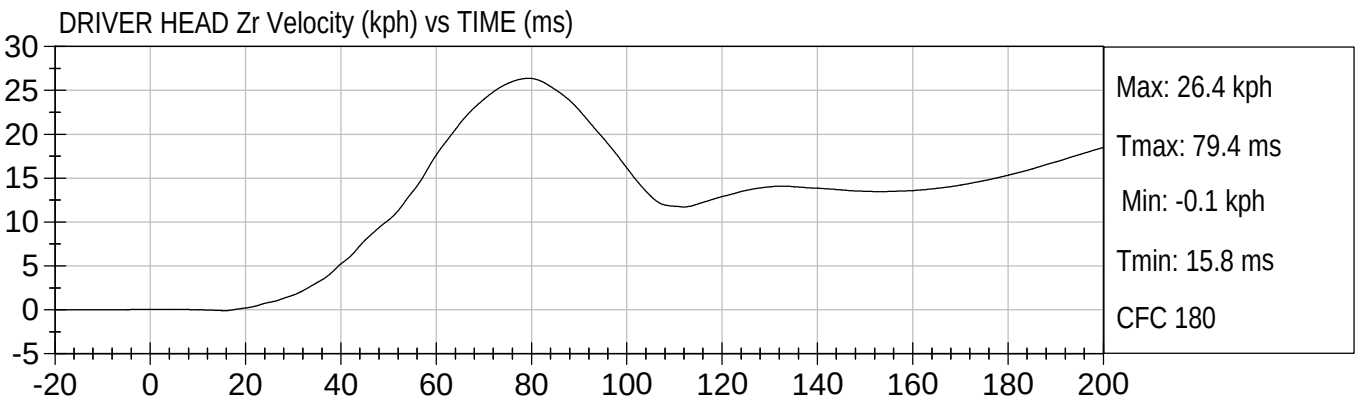
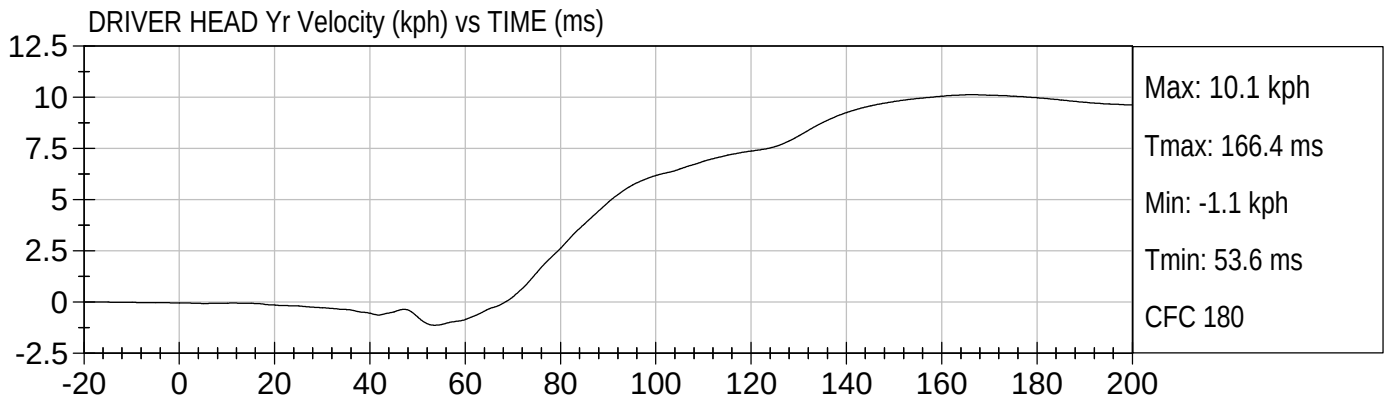
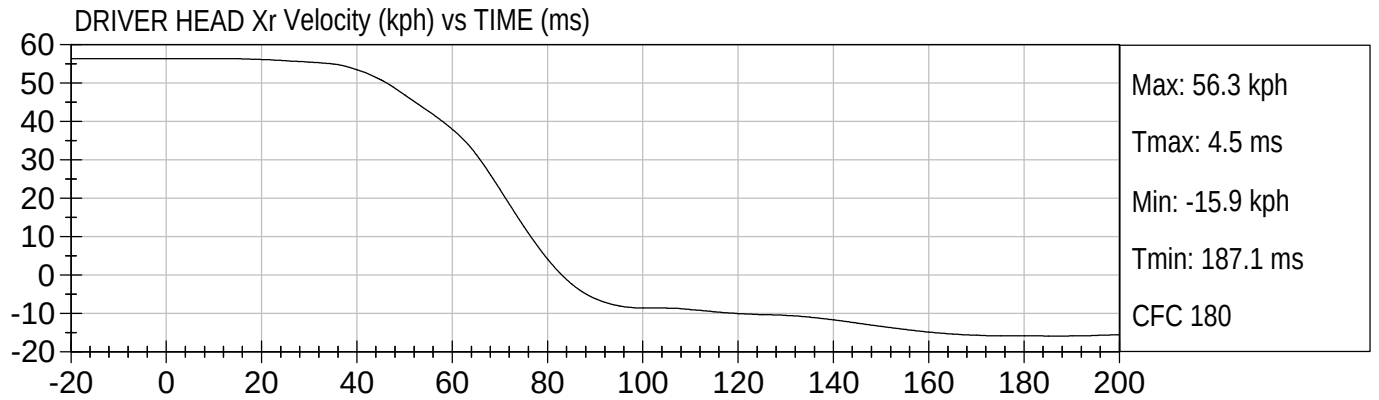


DRIVER HEAD Z - FRONT (G's) vs TIME (ms)
NO VALID DATA COLLECTED



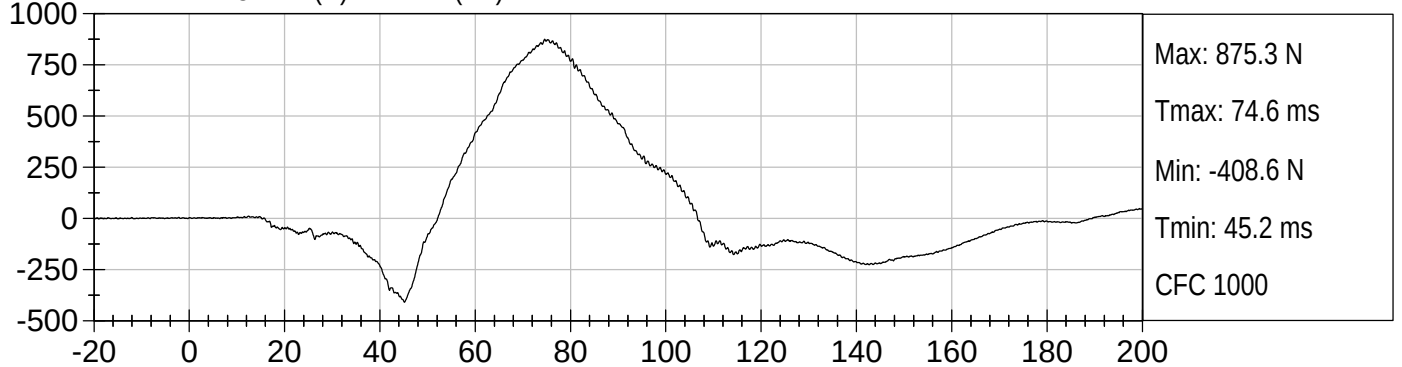




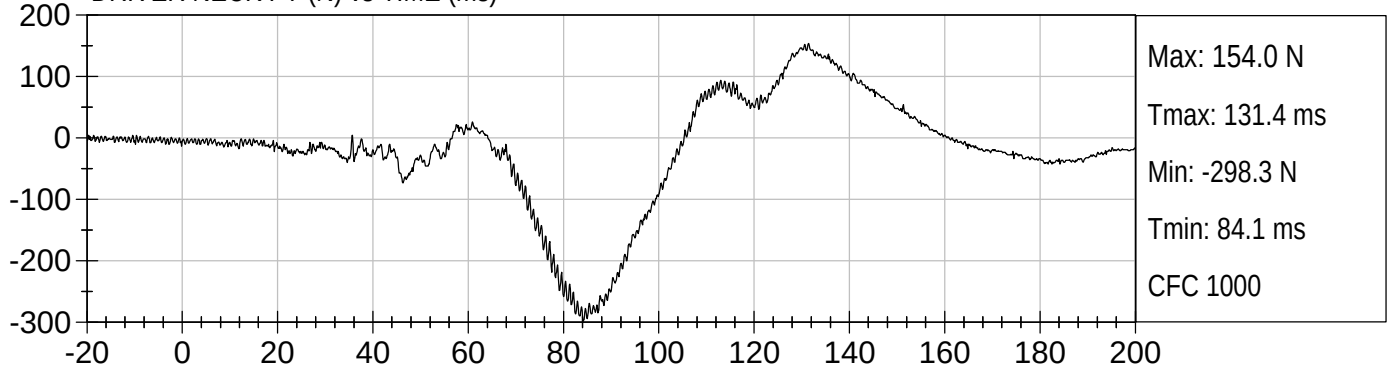




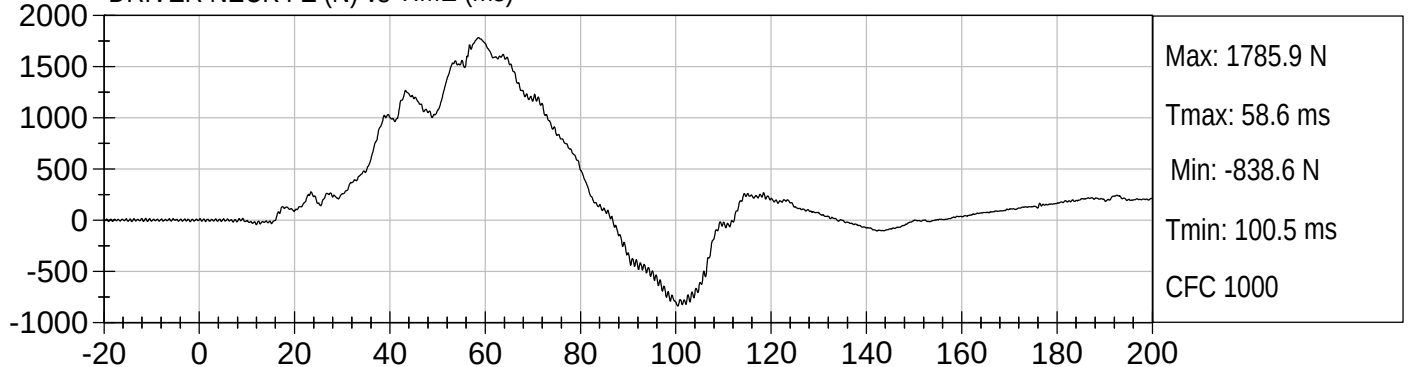
DRIVER NECK FX (N) vs TIME (ms)



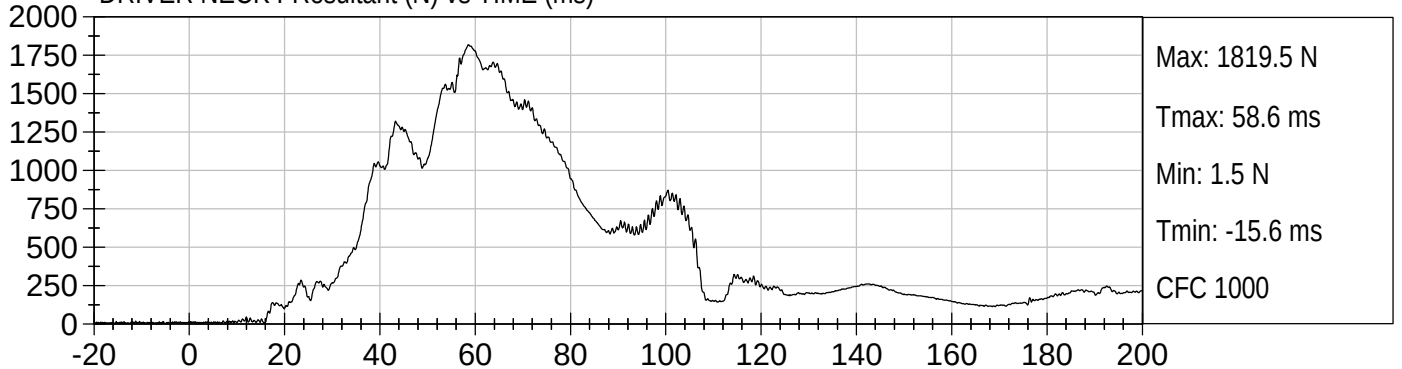
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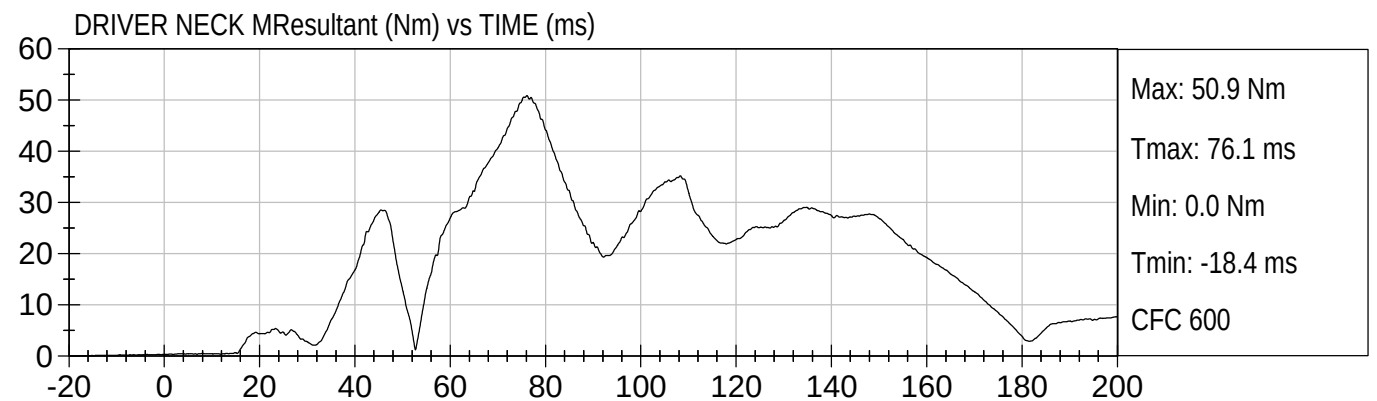
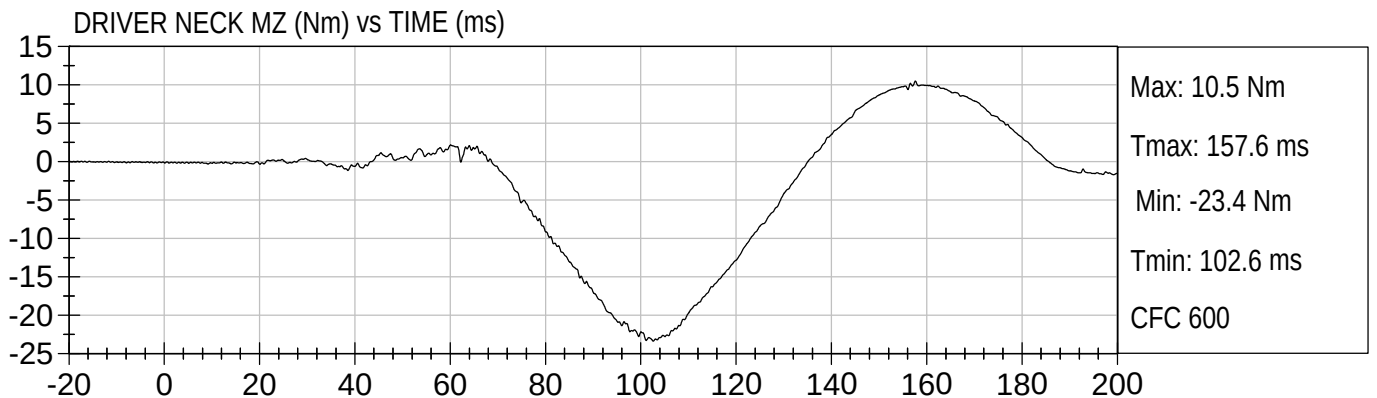
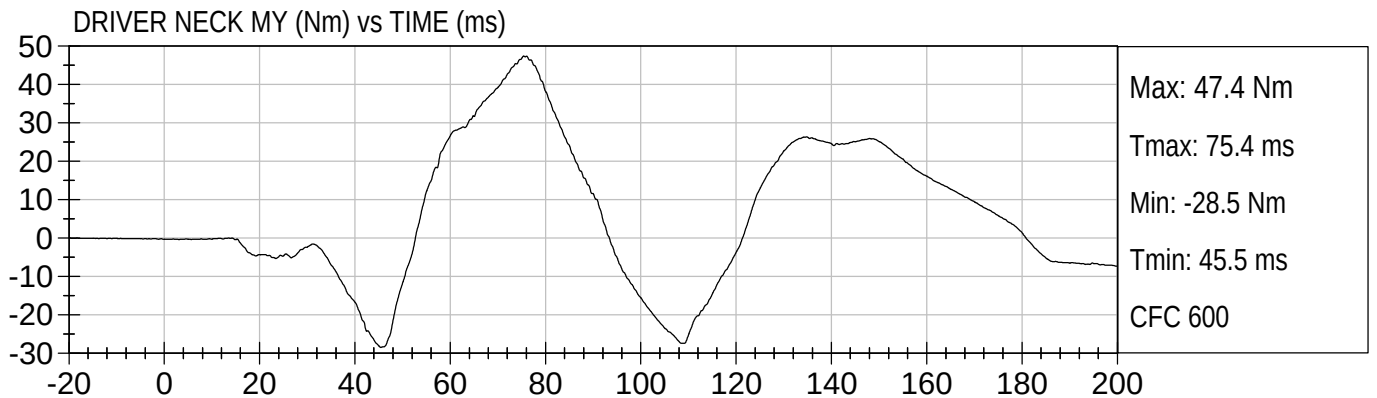
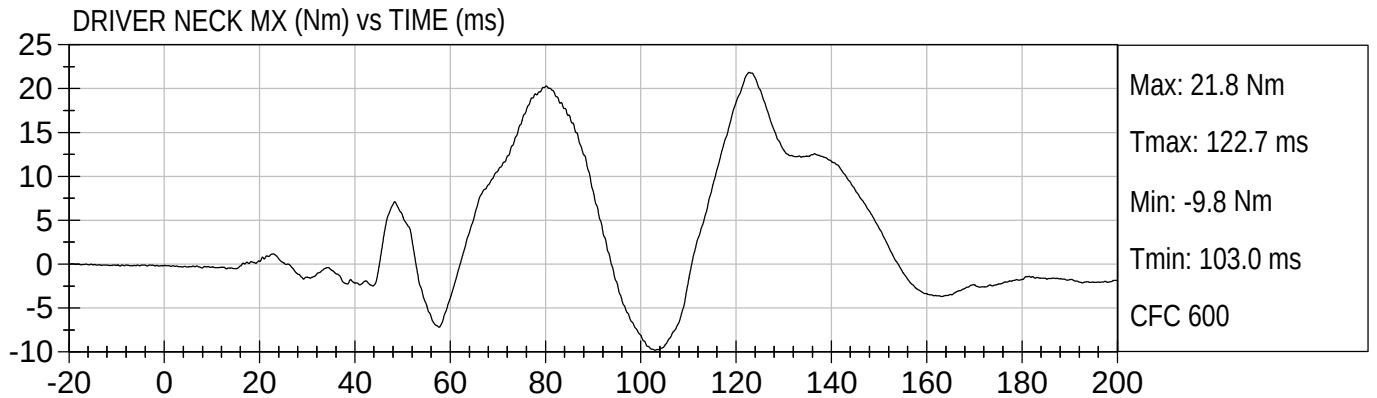


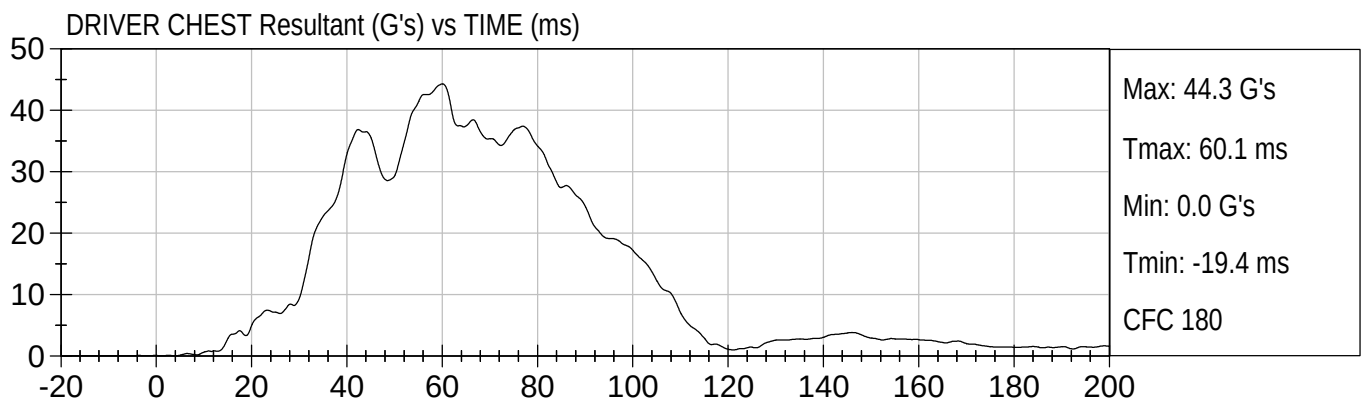
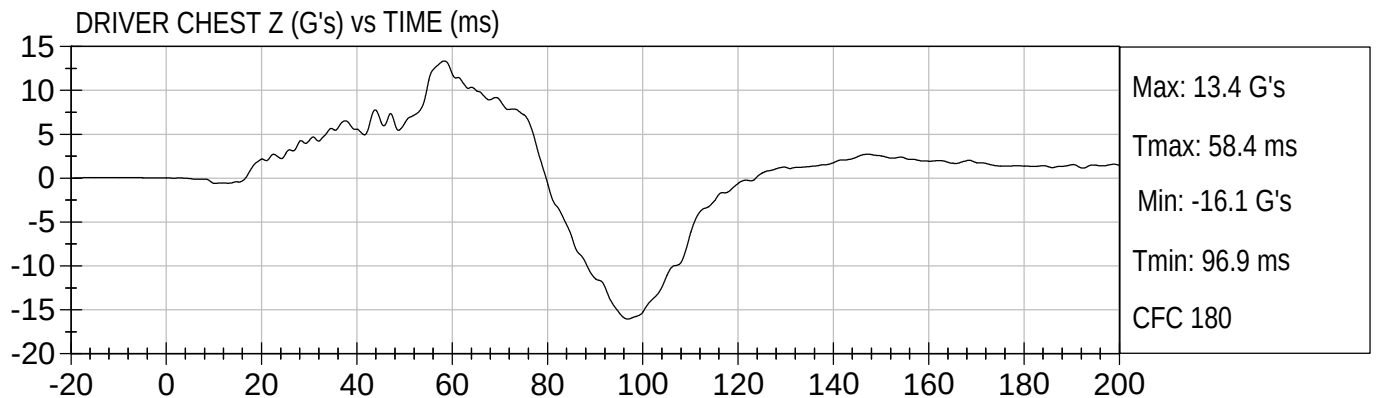
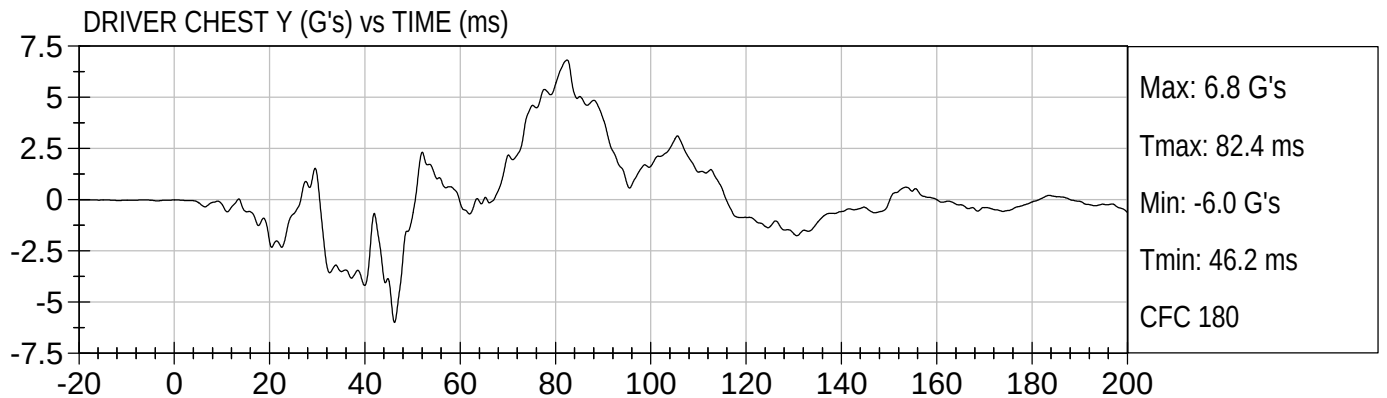
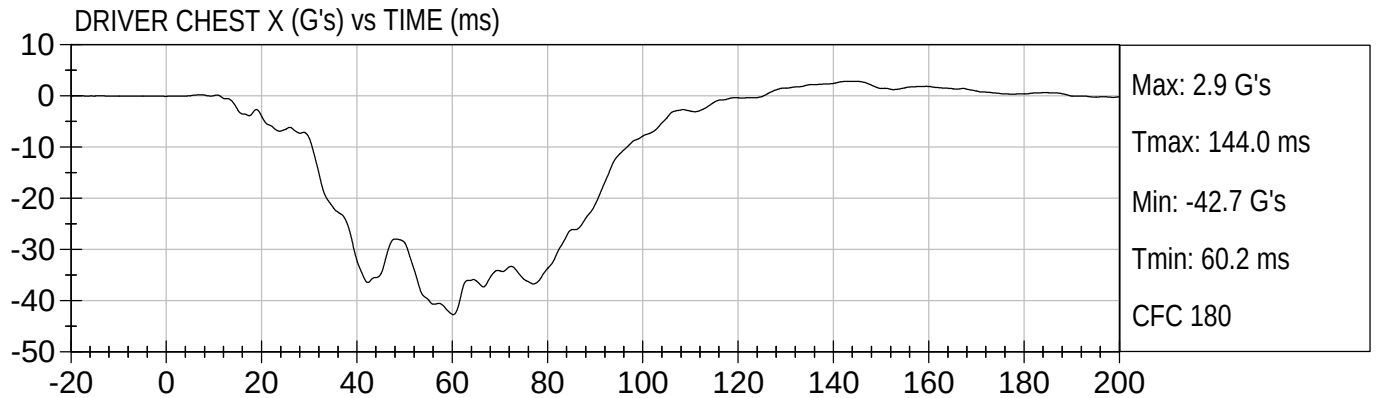
DRIVER NECK FZ (N) vs TIME (ms)

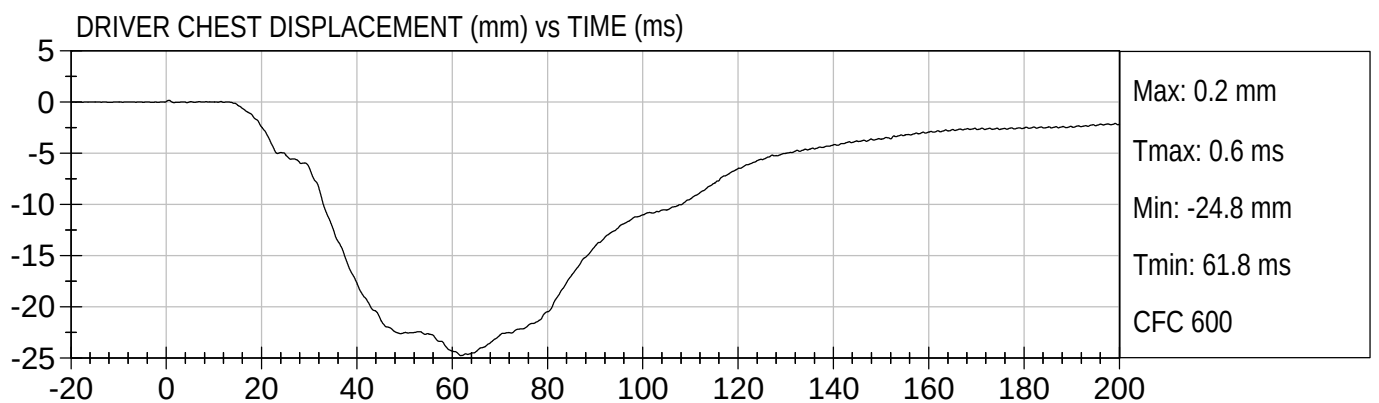
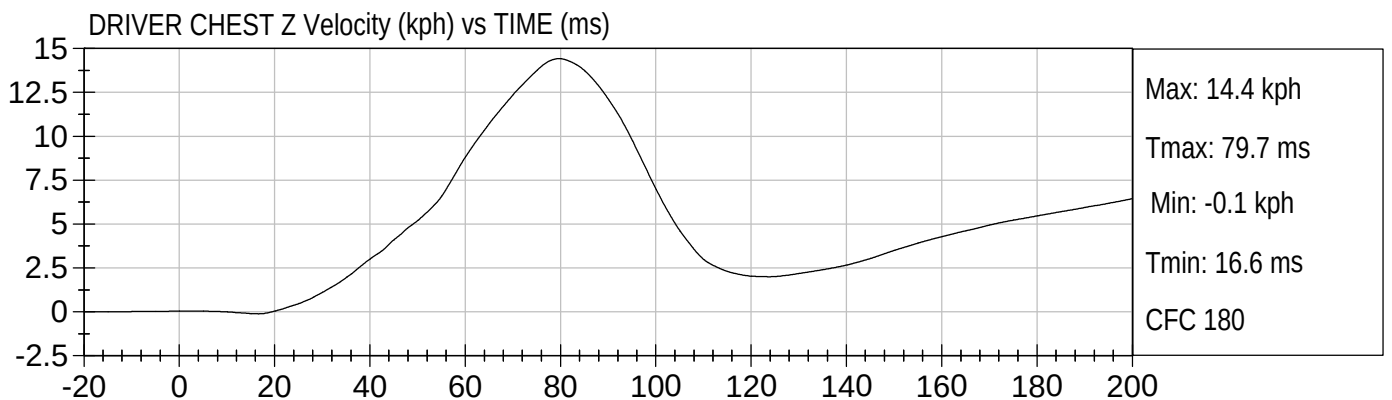
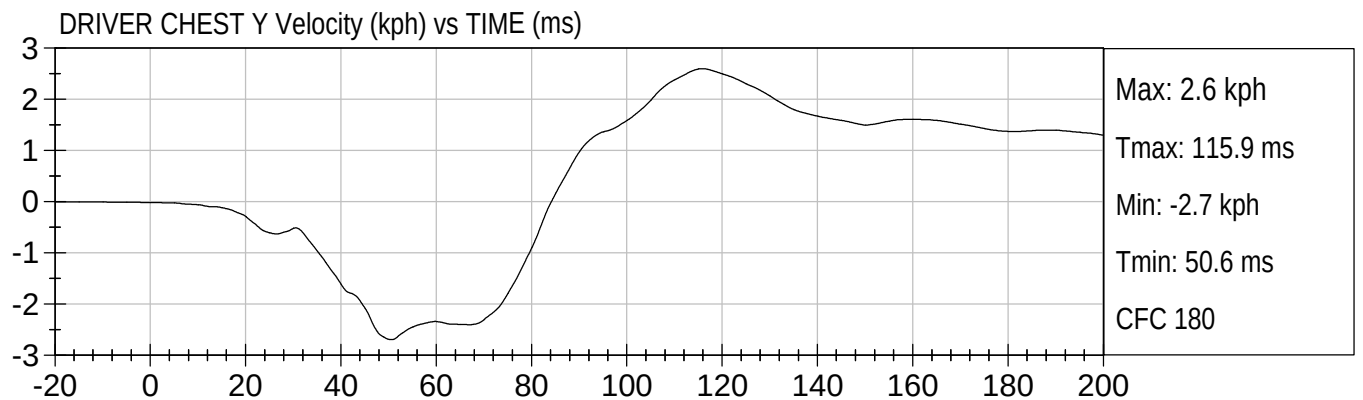
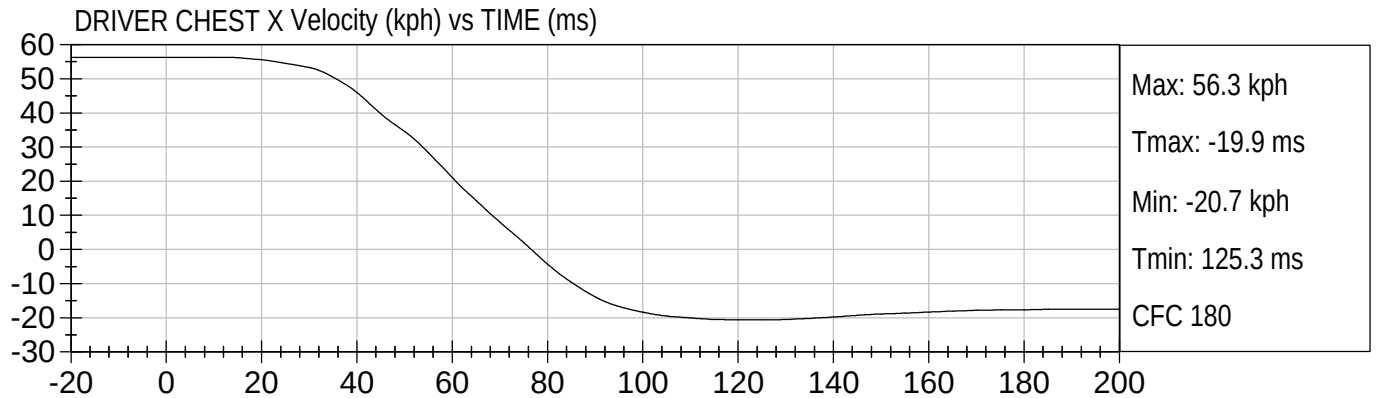


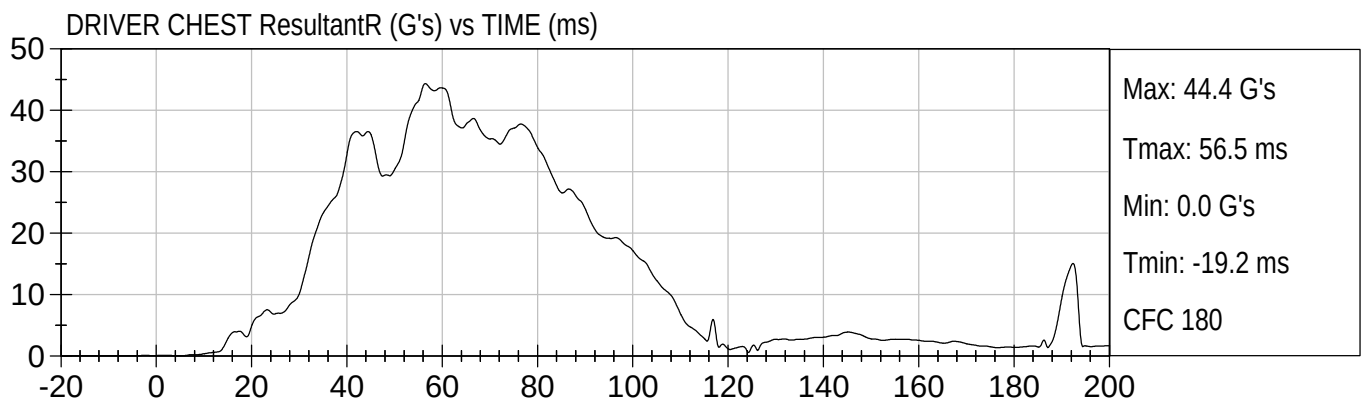
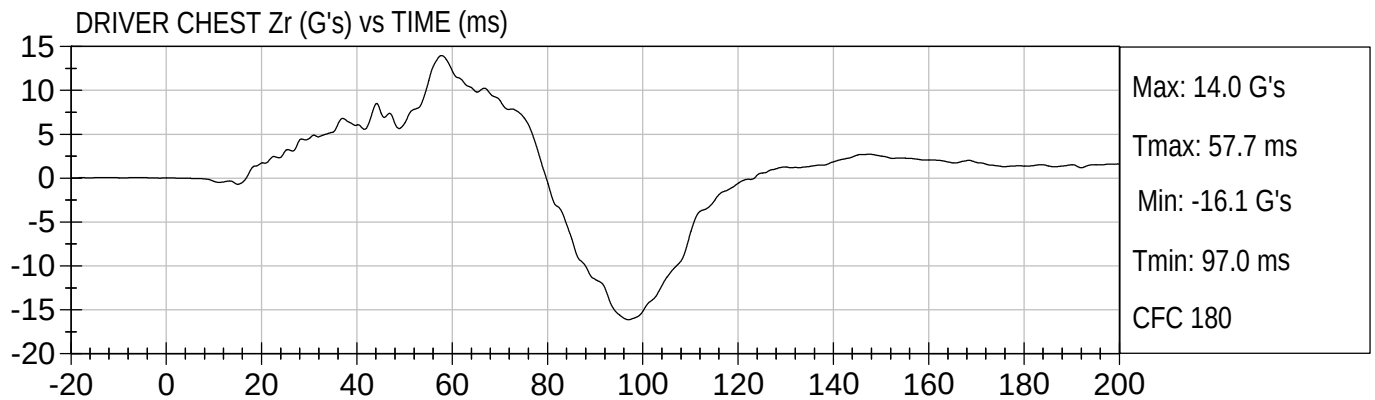
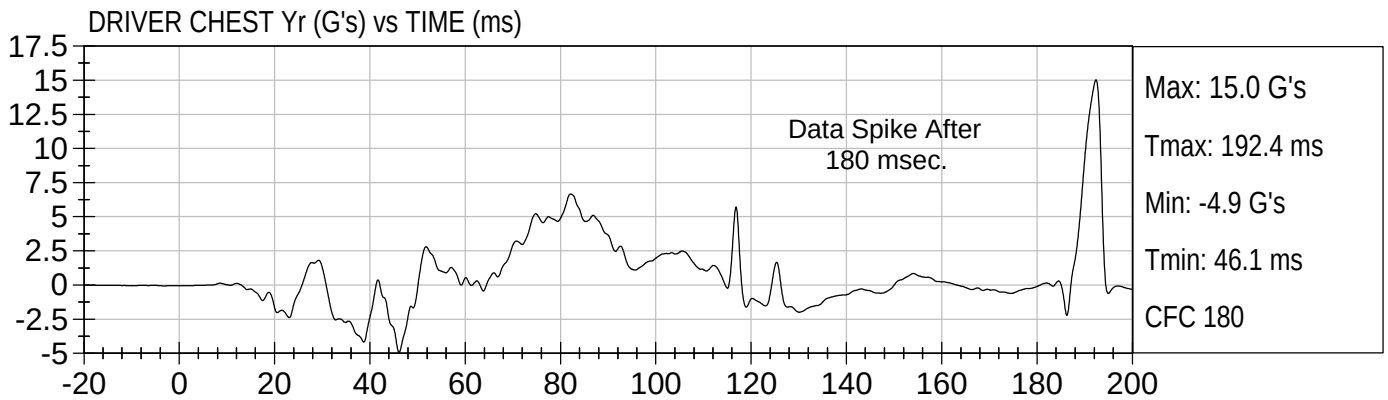
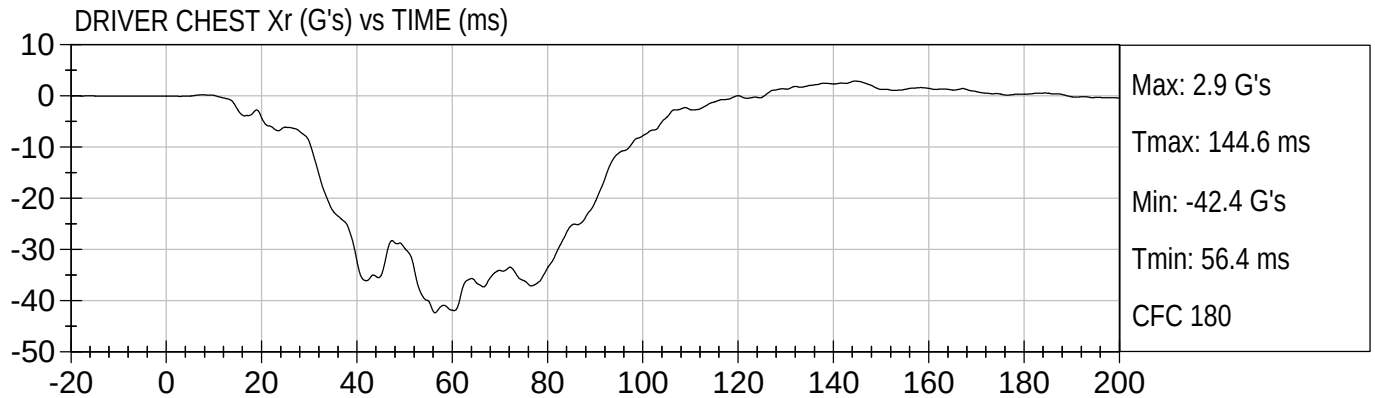
DRIVER NECK FResultant (N) vs TIME (ms)

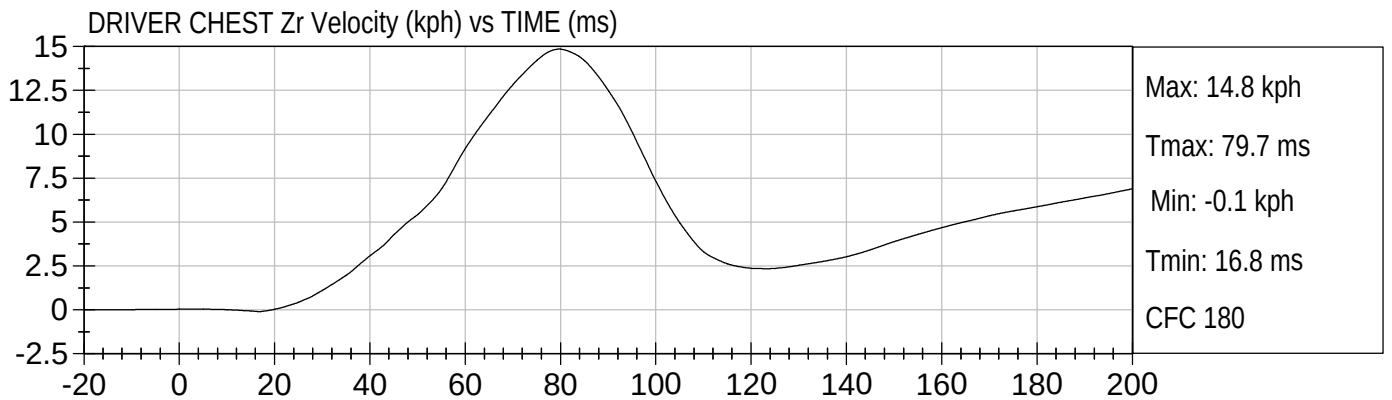
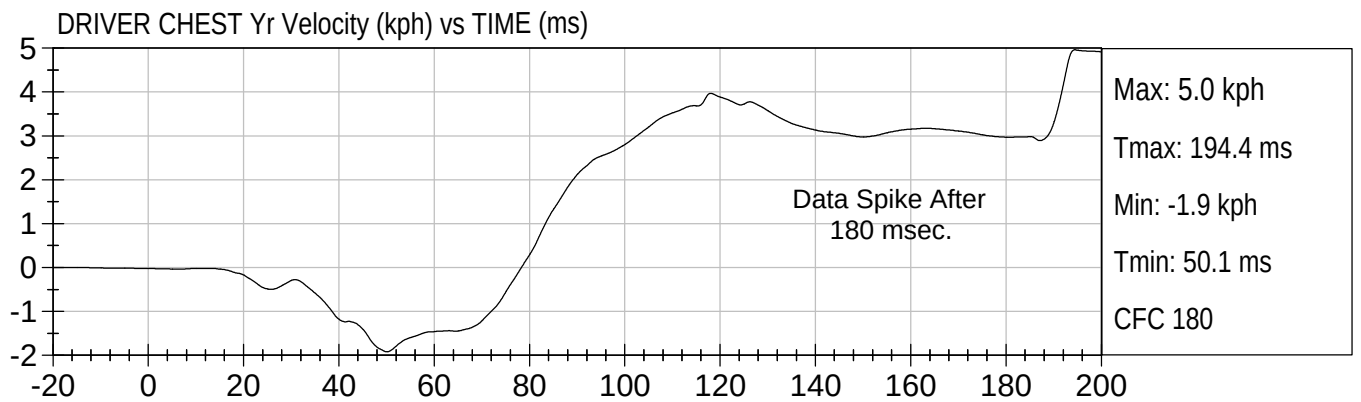
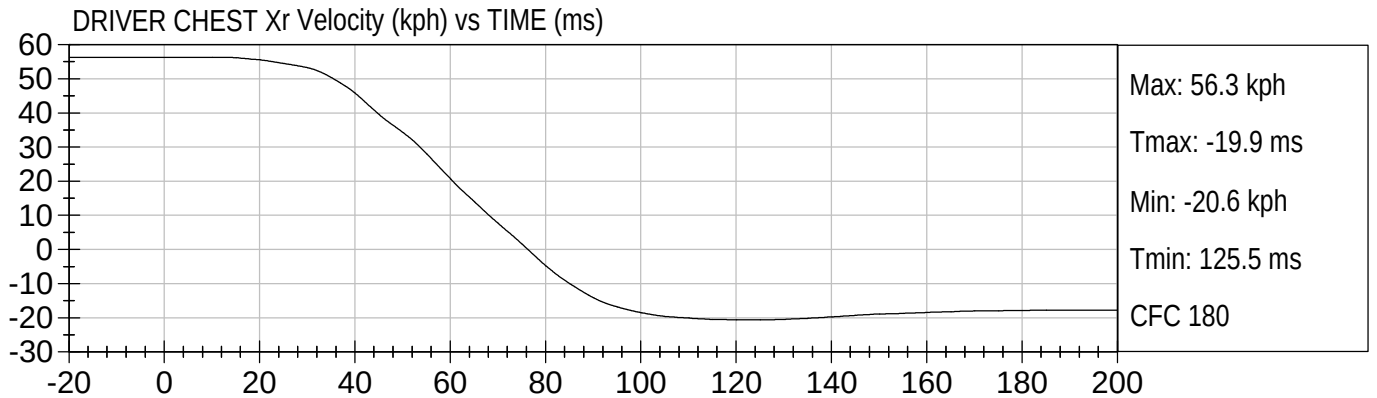


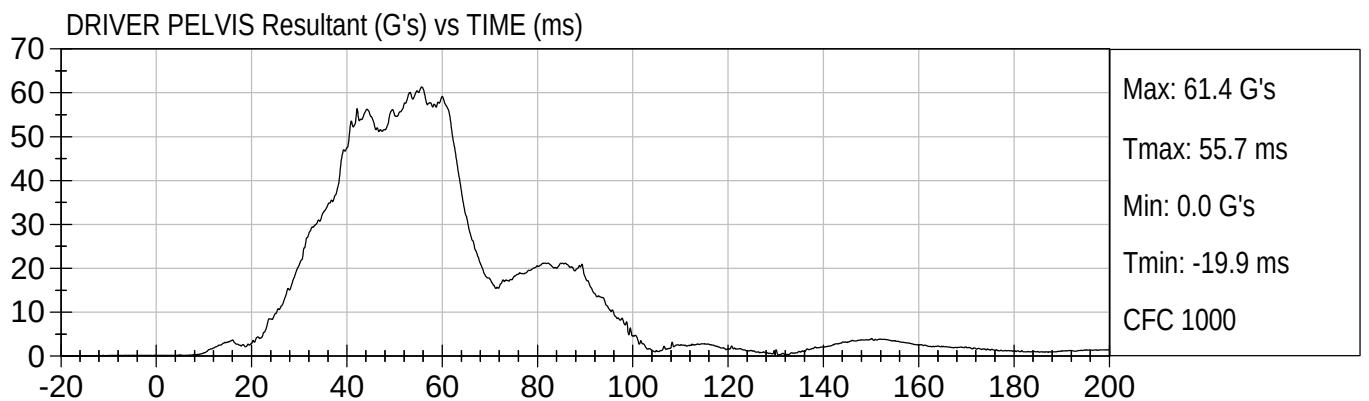
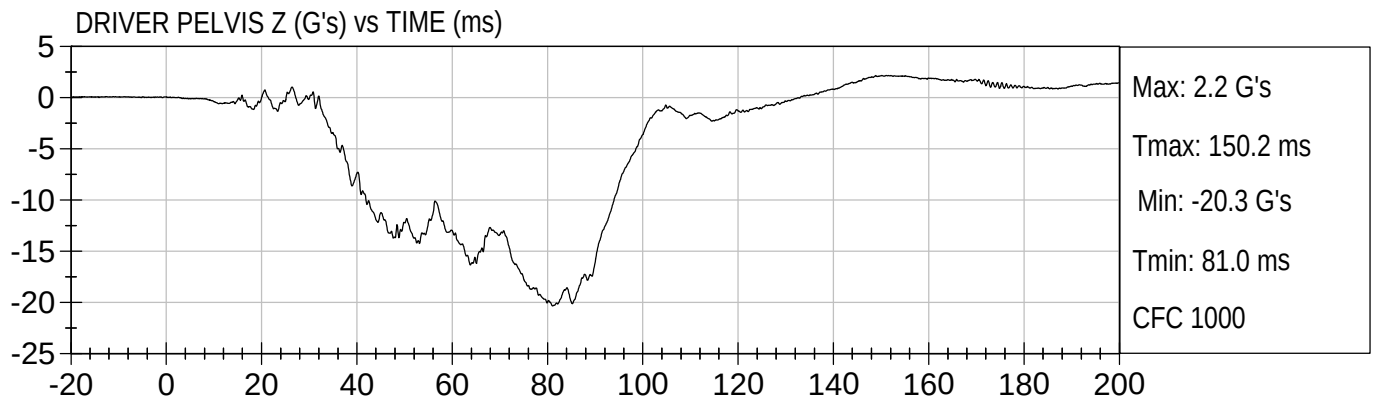
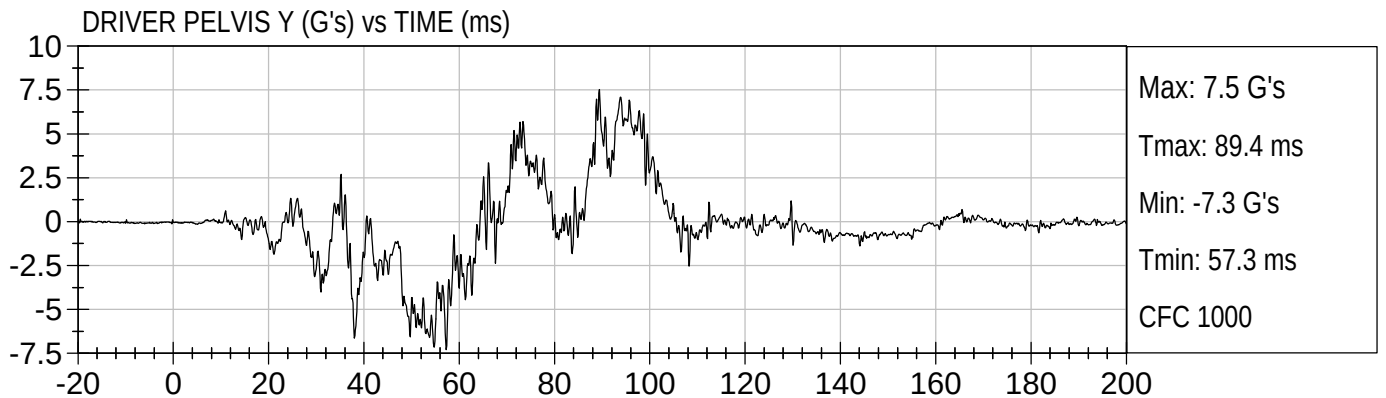
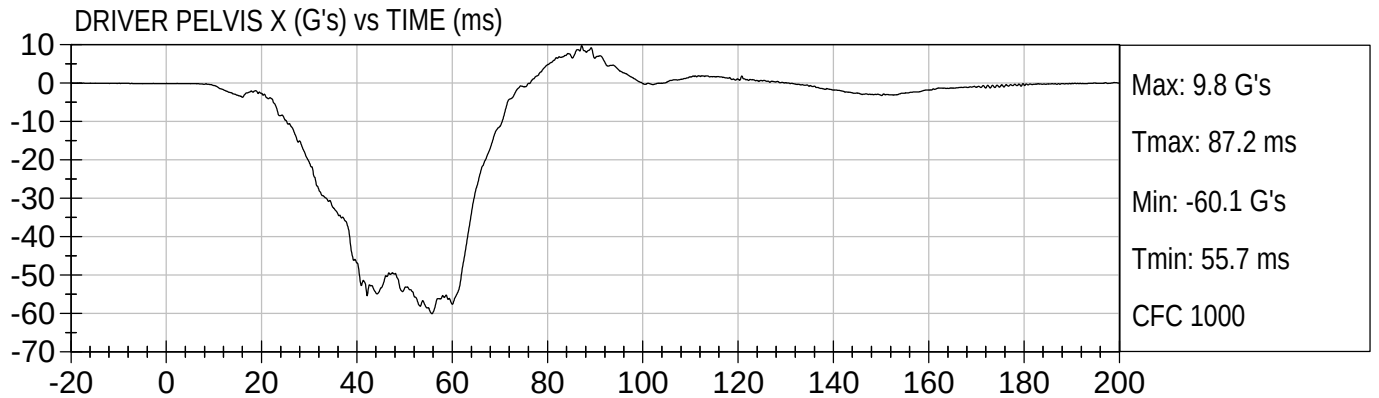


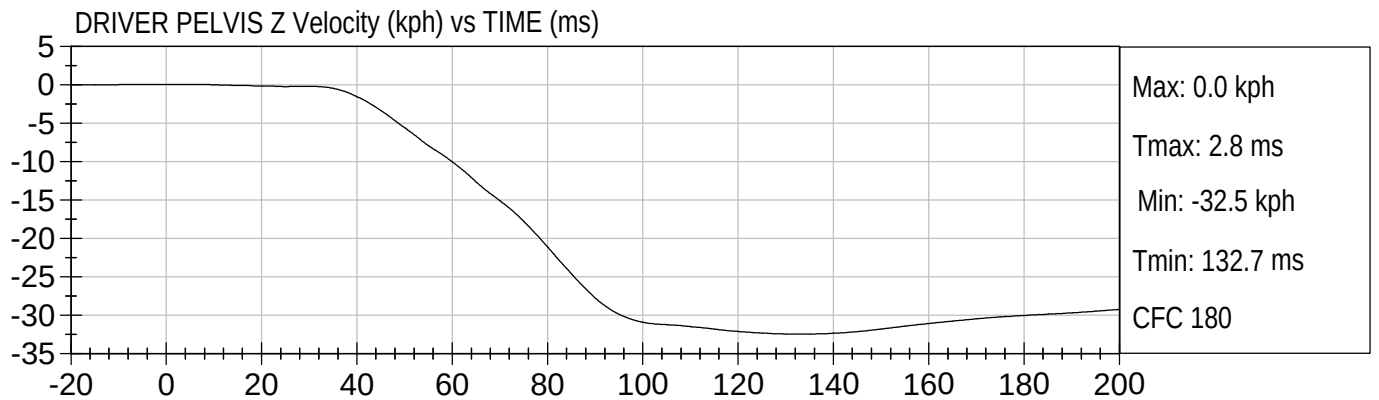
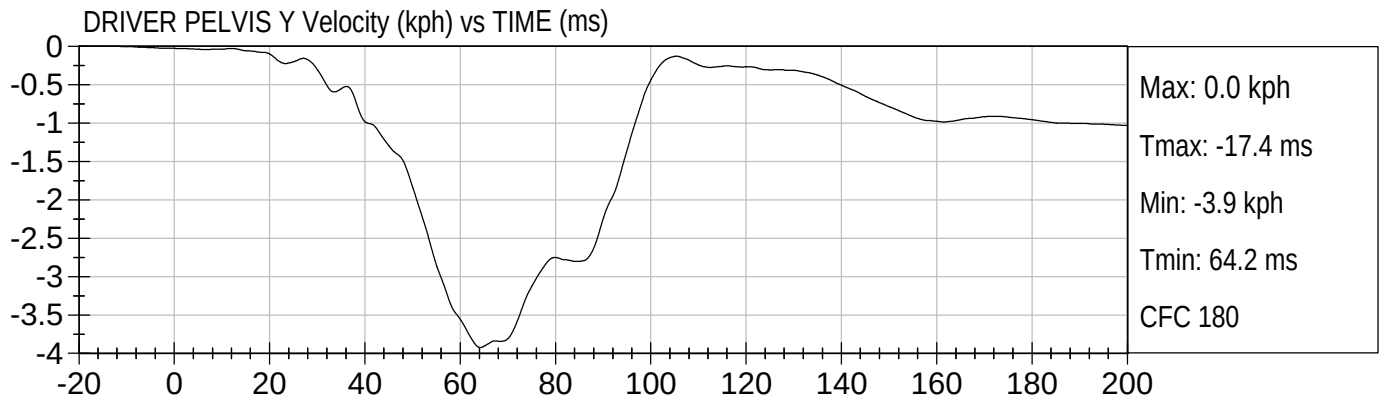
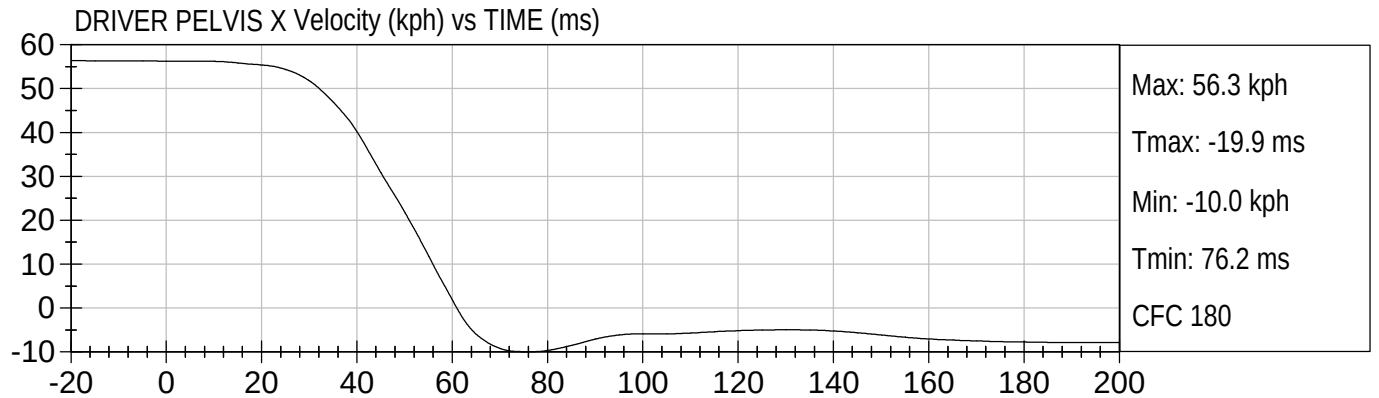


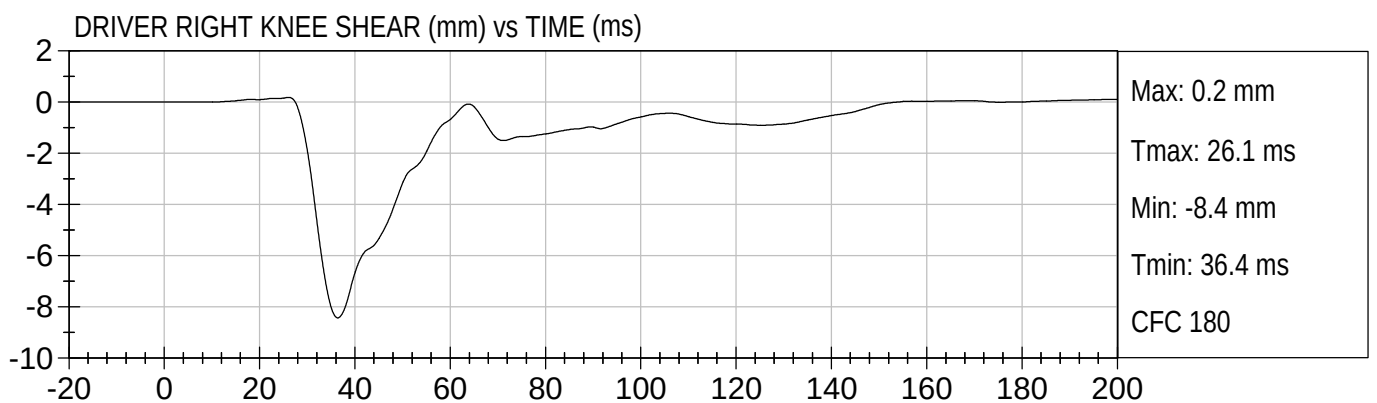
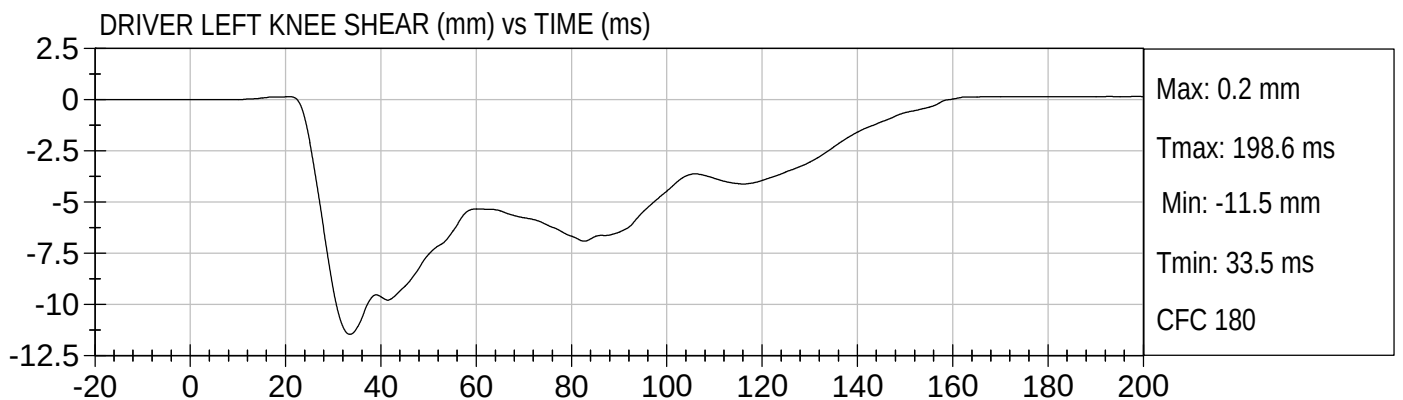
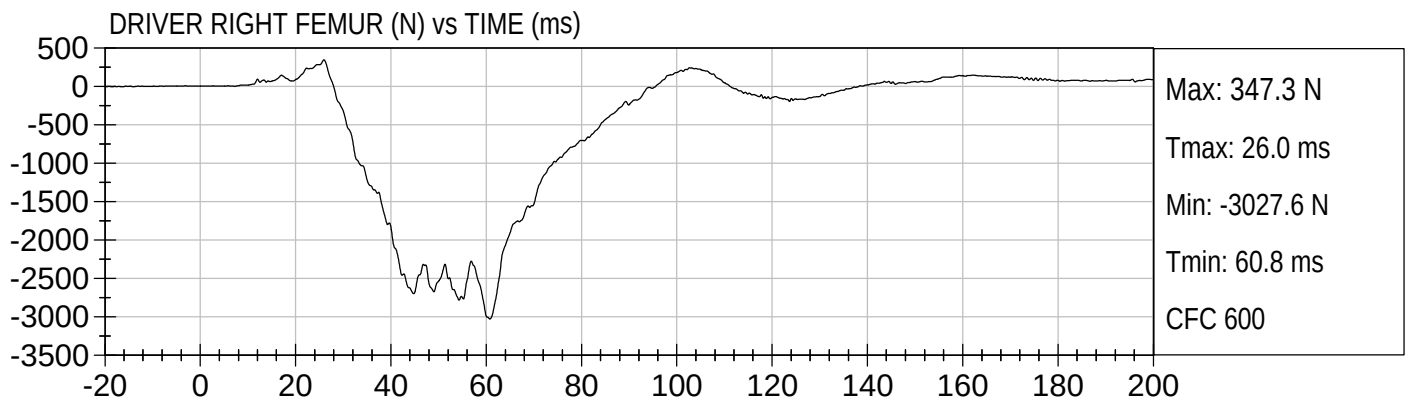
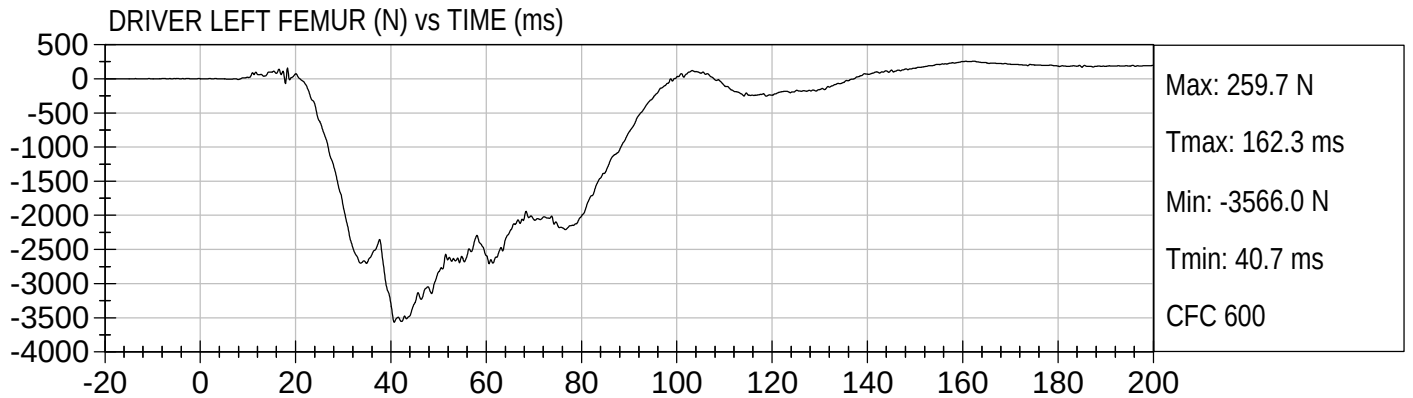






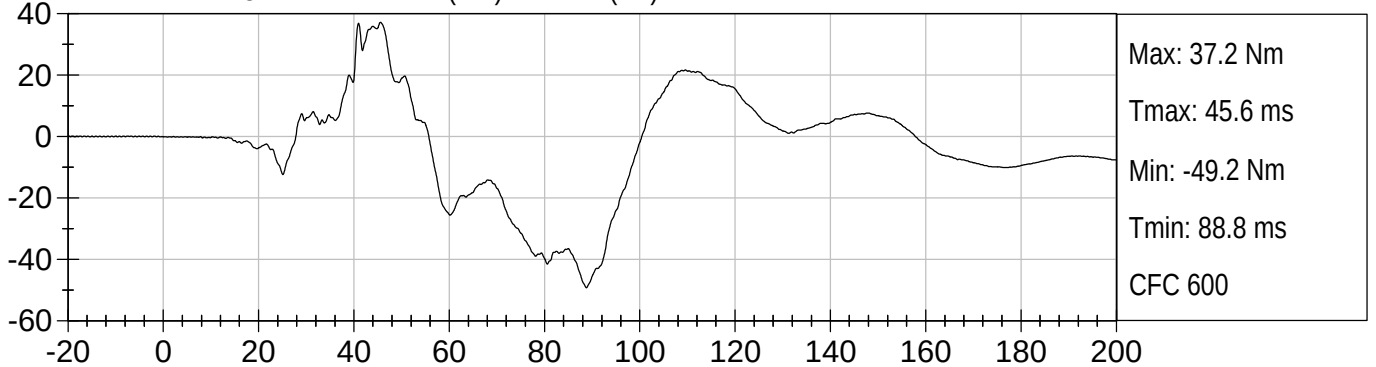




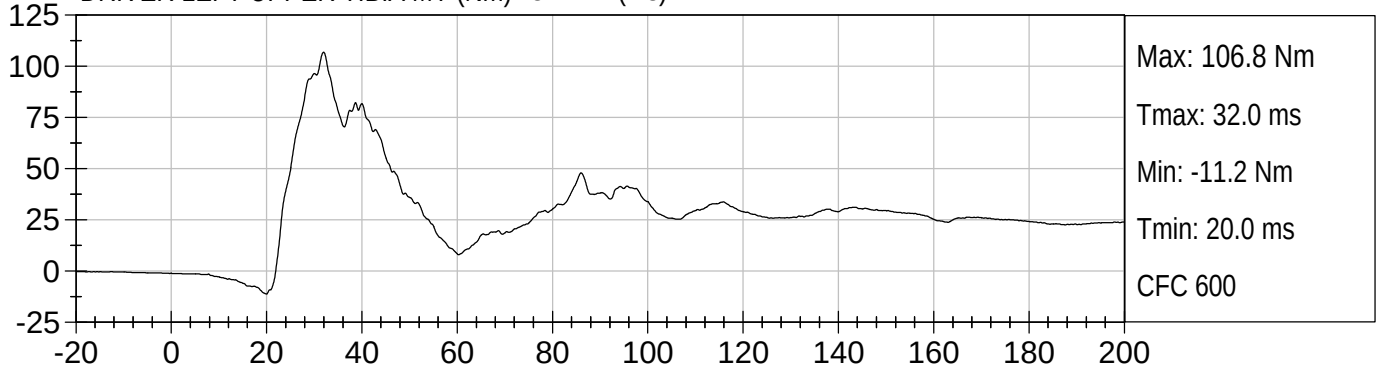




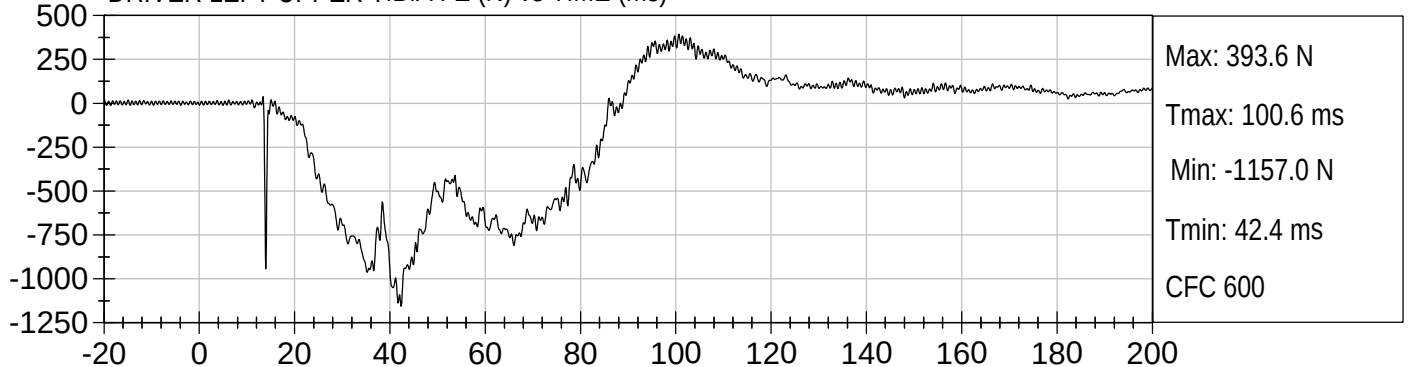
DRIVER LEFT UPPER TIBIA MX (Nm) vs TIME (ms)

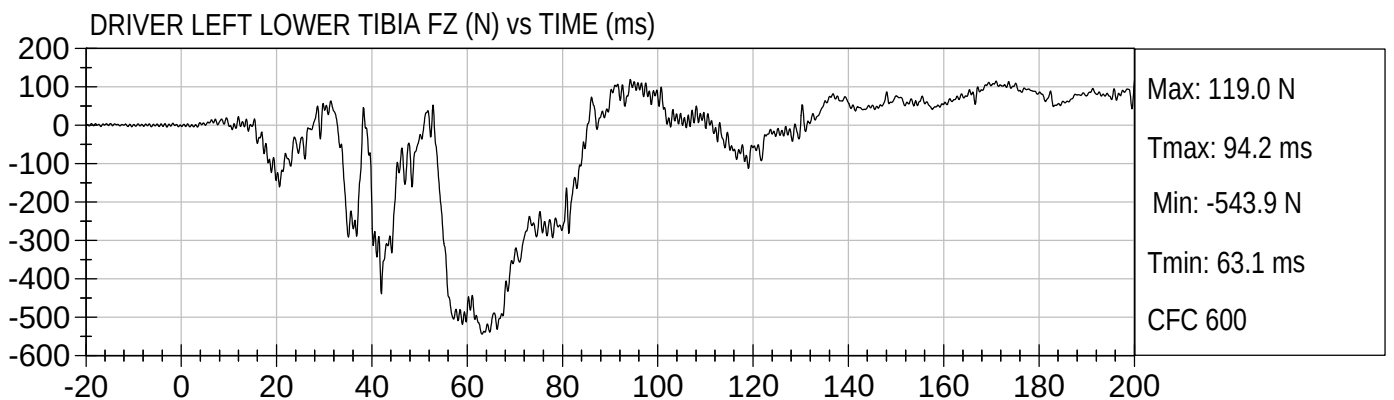
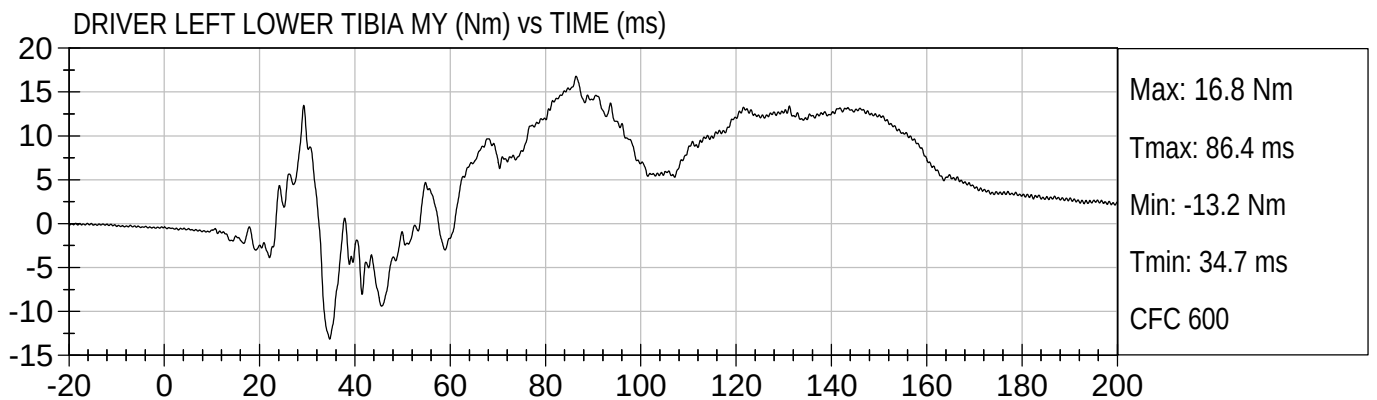
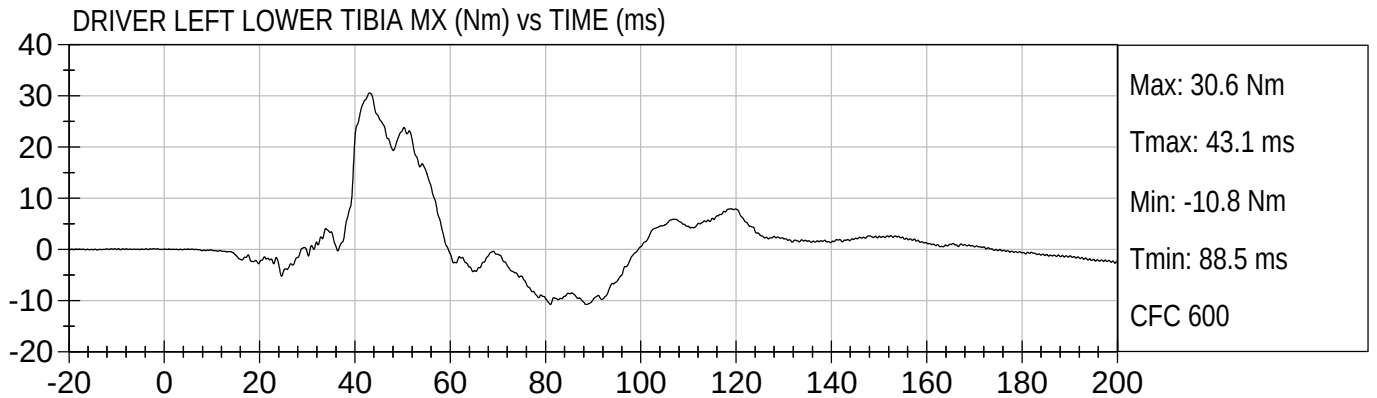


DRIVER LEFT UPPER TIBIA MY (Nm) vs TIME (ms)



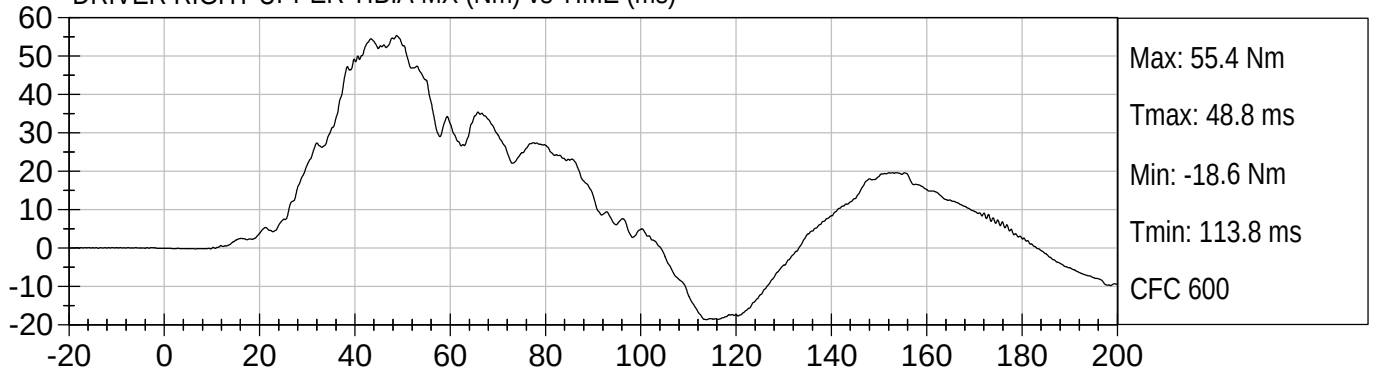
DRIVER LEFT UPPER TIBIA FZ (N) vs TIME (ms)



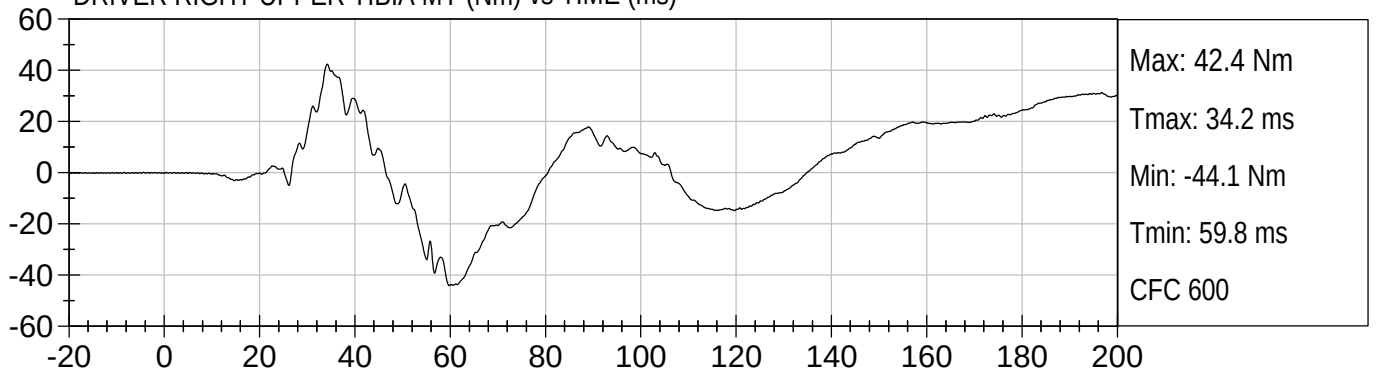




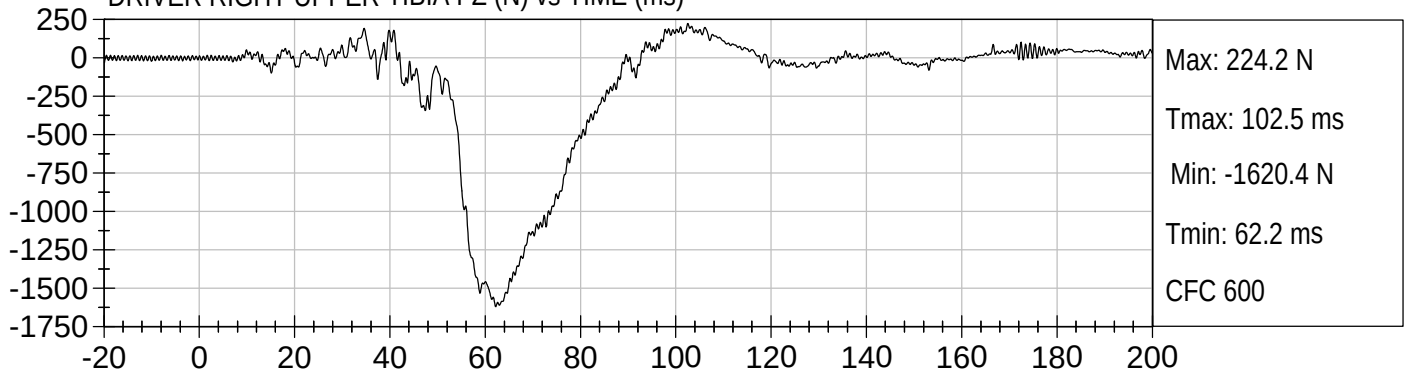
DRIVER RIGHT UPPER TIBIA MX (Nm) vs TIME (ms)



DRIVER RIGHT UPPER TIBIA MY (Nm) vs TIME (ms)

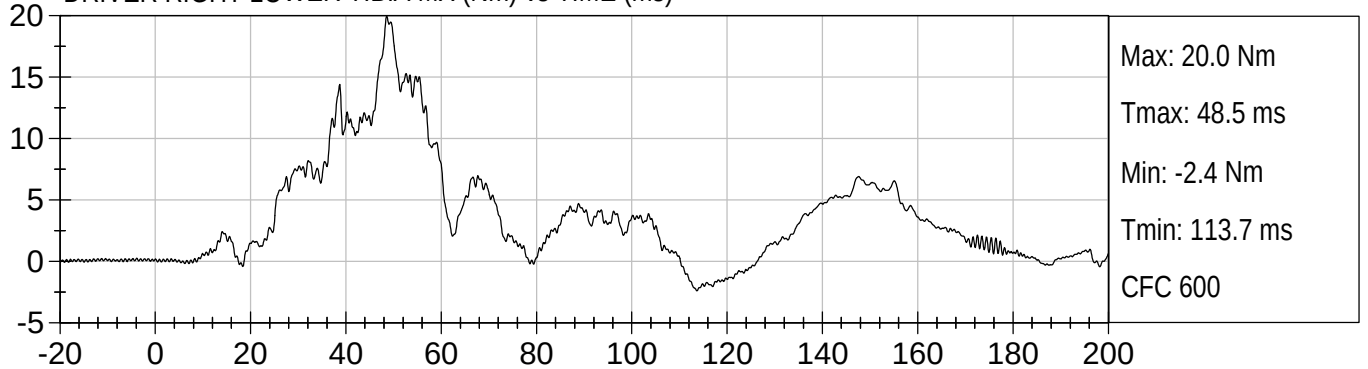


DRIVER RIGHT UPPER TIBIA FZ (N) vs TIME (ms)

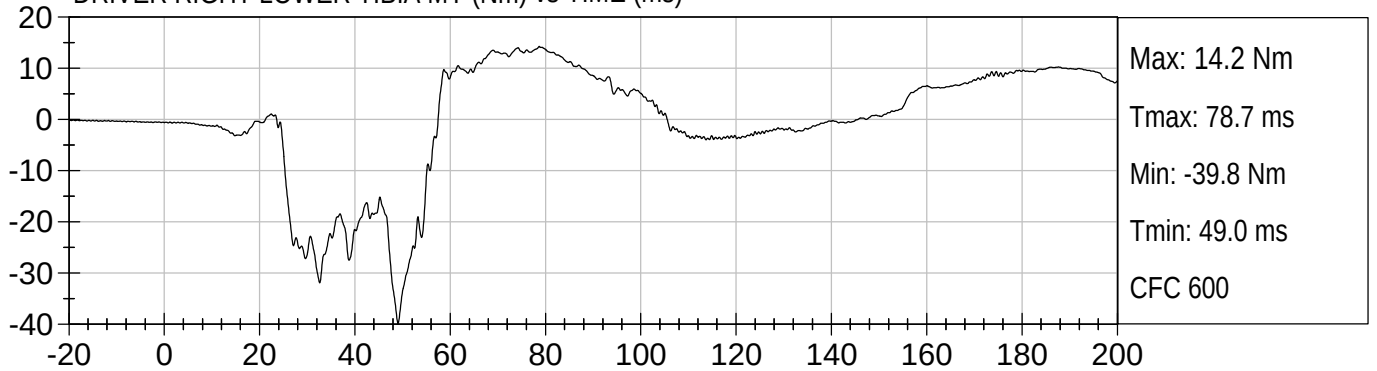




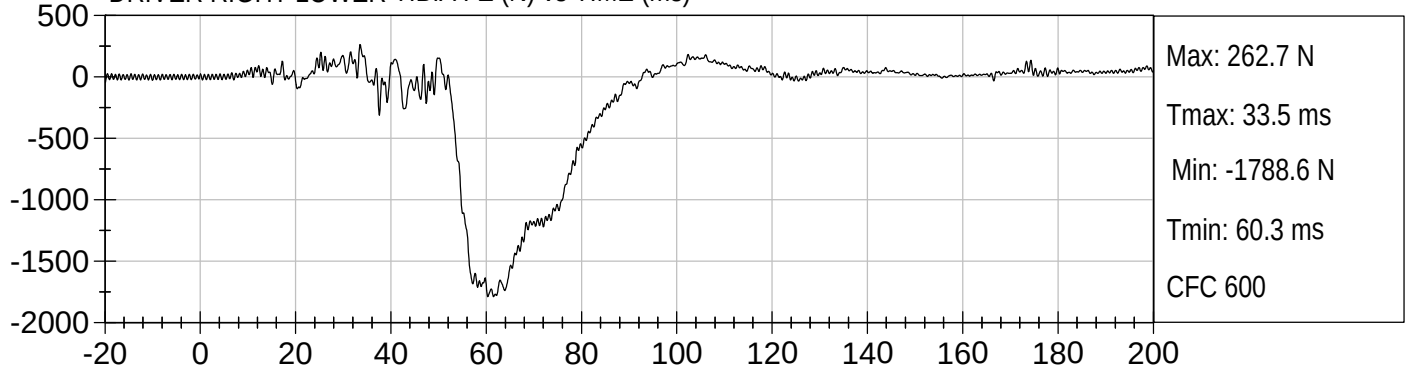
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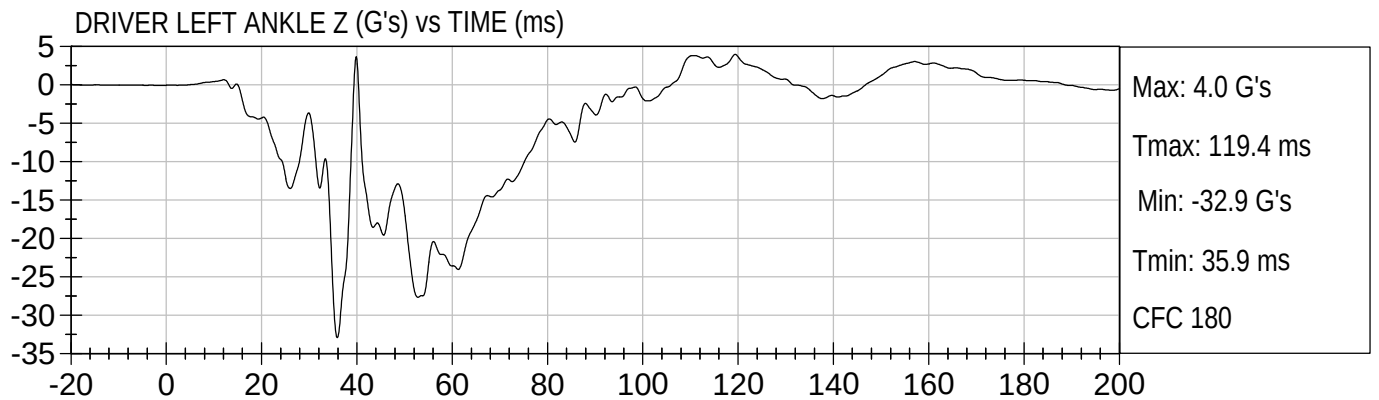
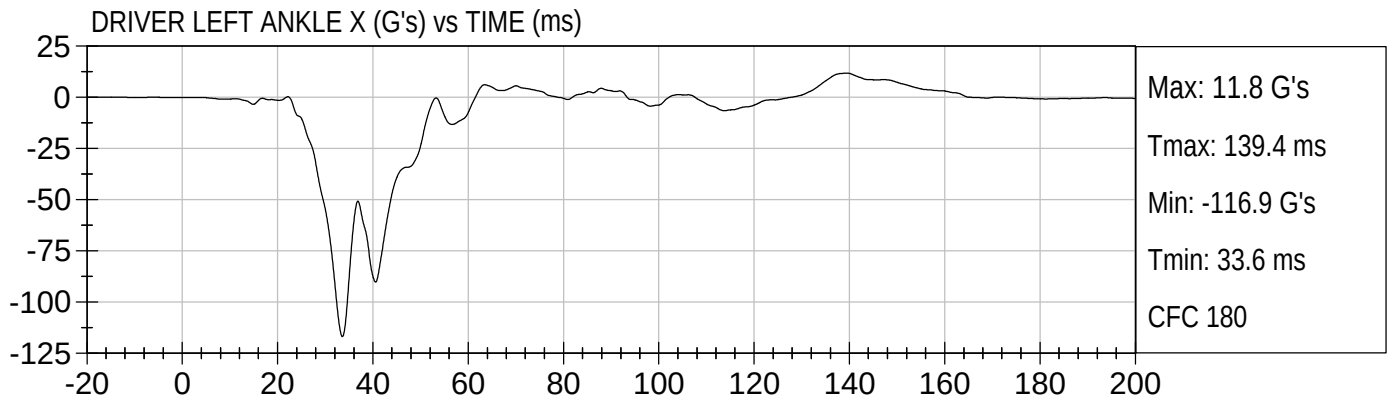
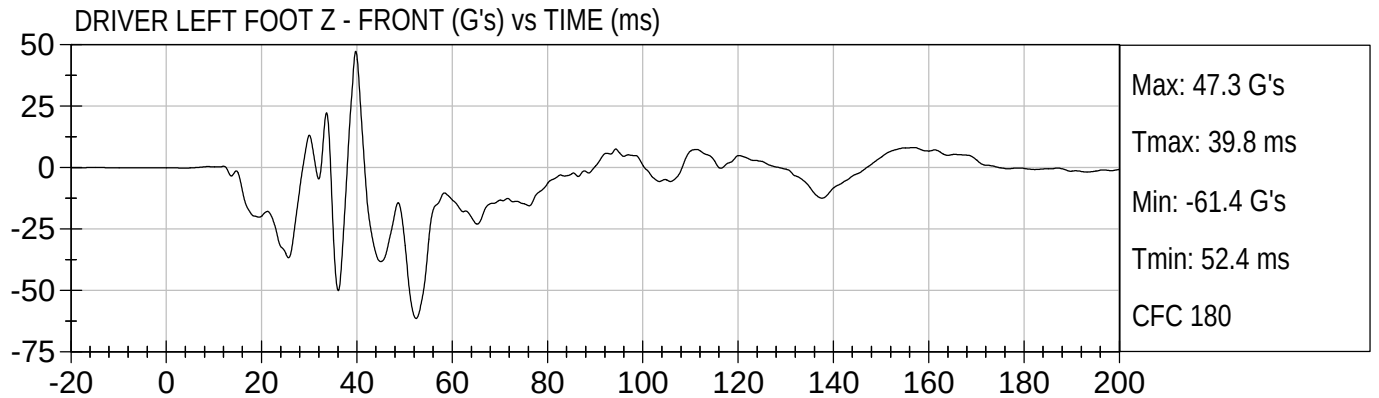


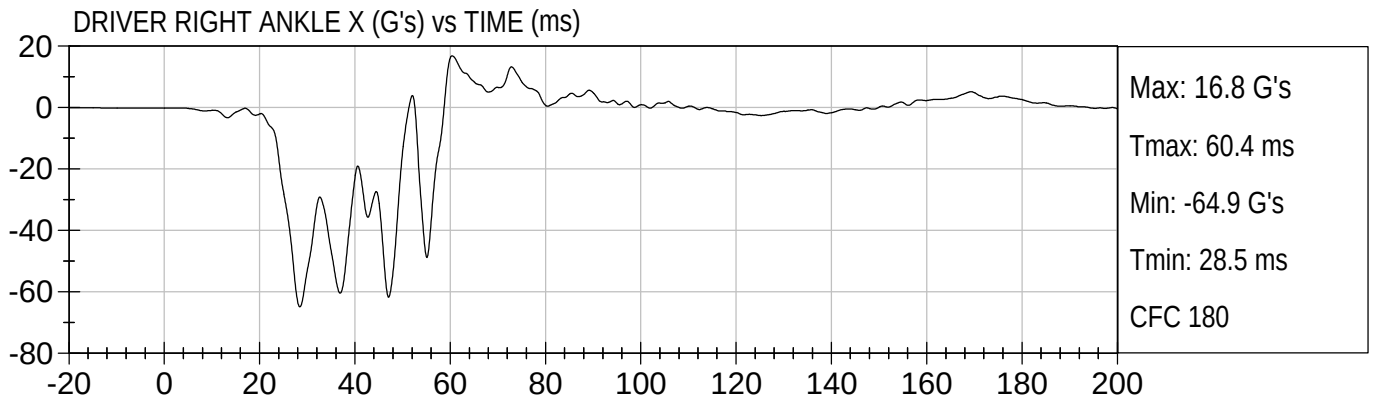
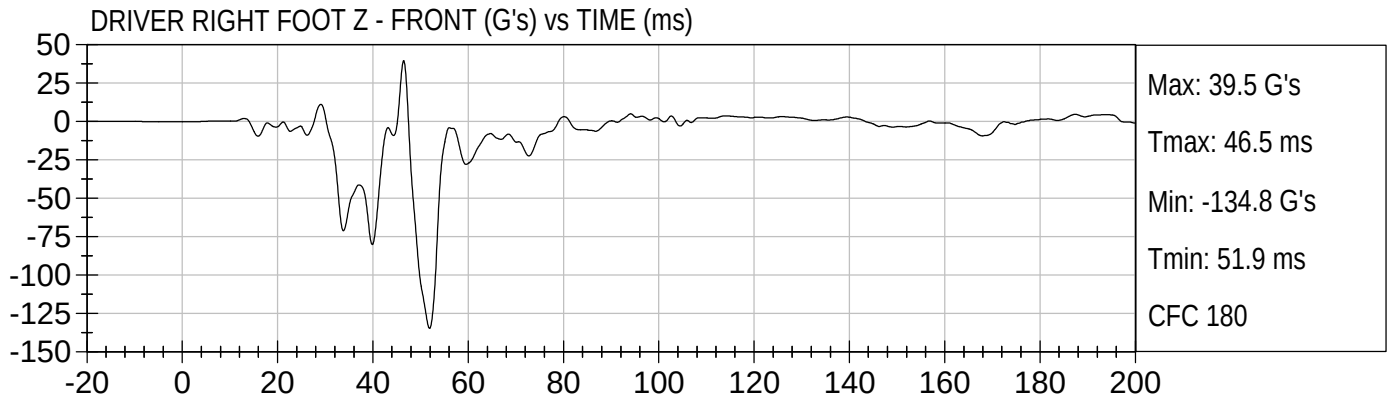
DRIVER RIGHT LOWER TIBIA MY (Nm) vs TIME (ms)



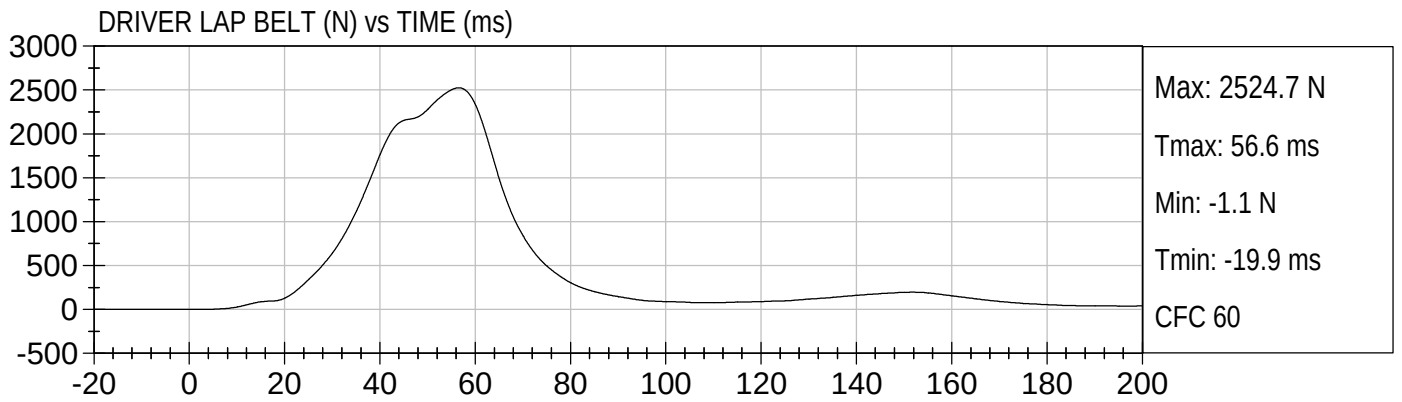
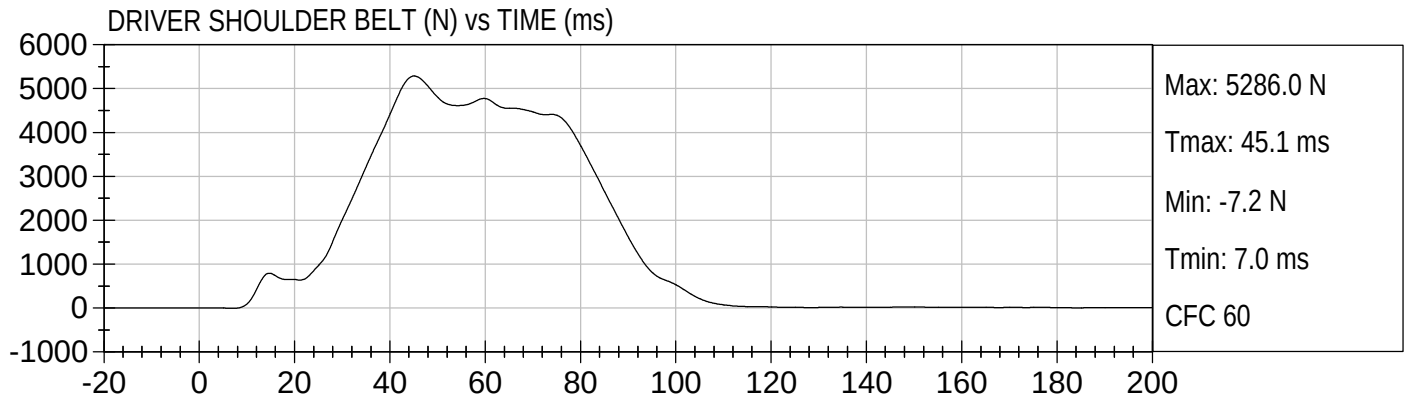
DRIVER RIGHT LOWER TIBIA FZ (N) vs TIME (ms)

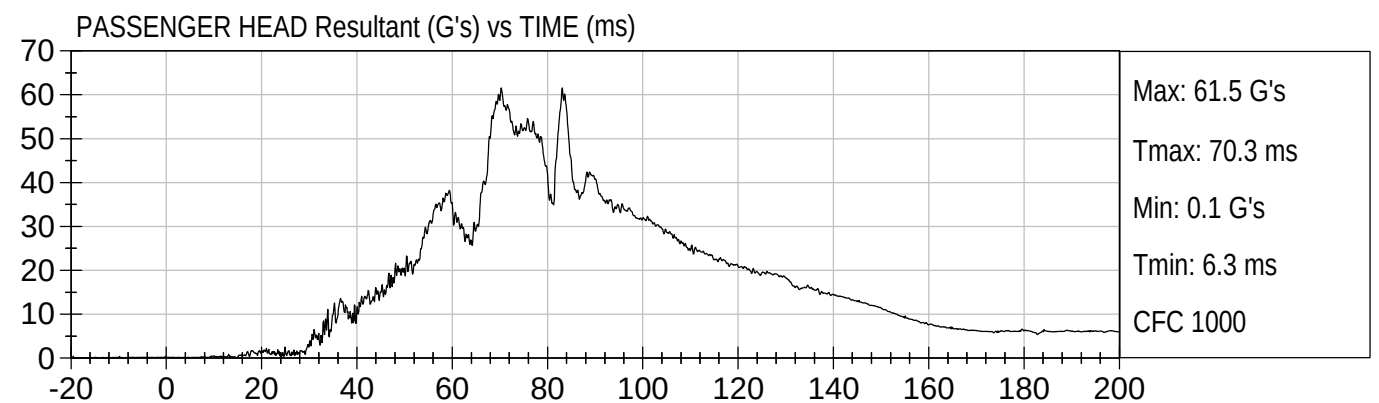
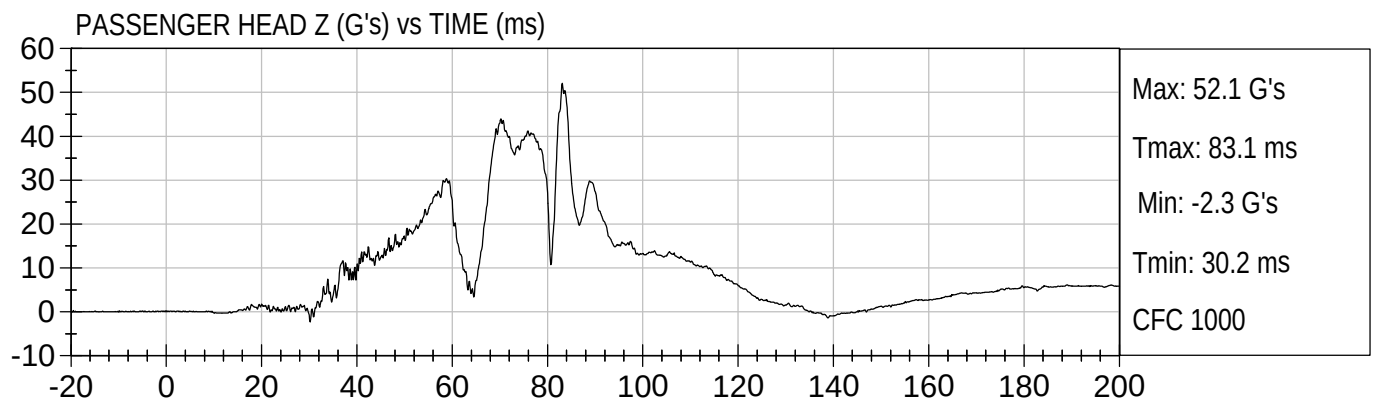
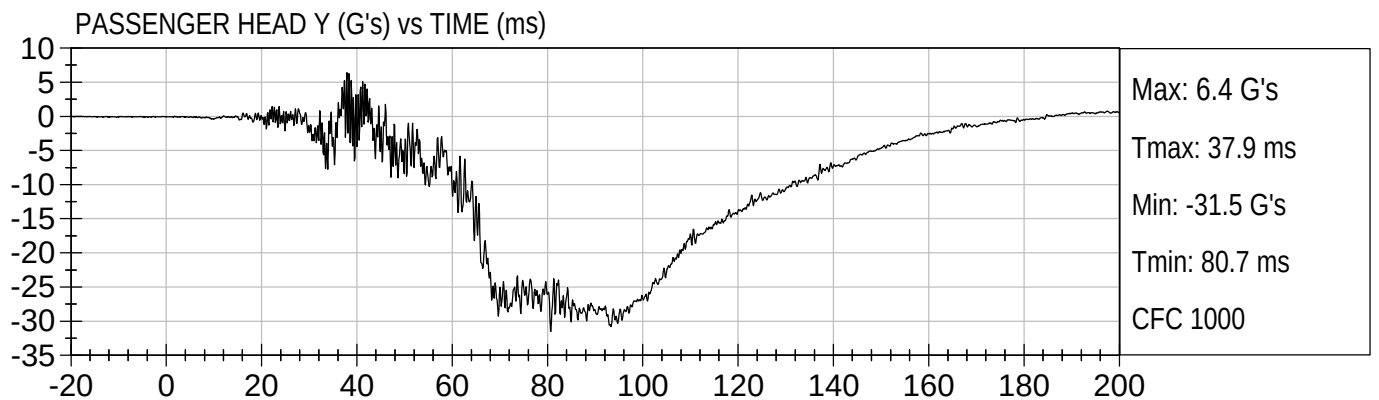
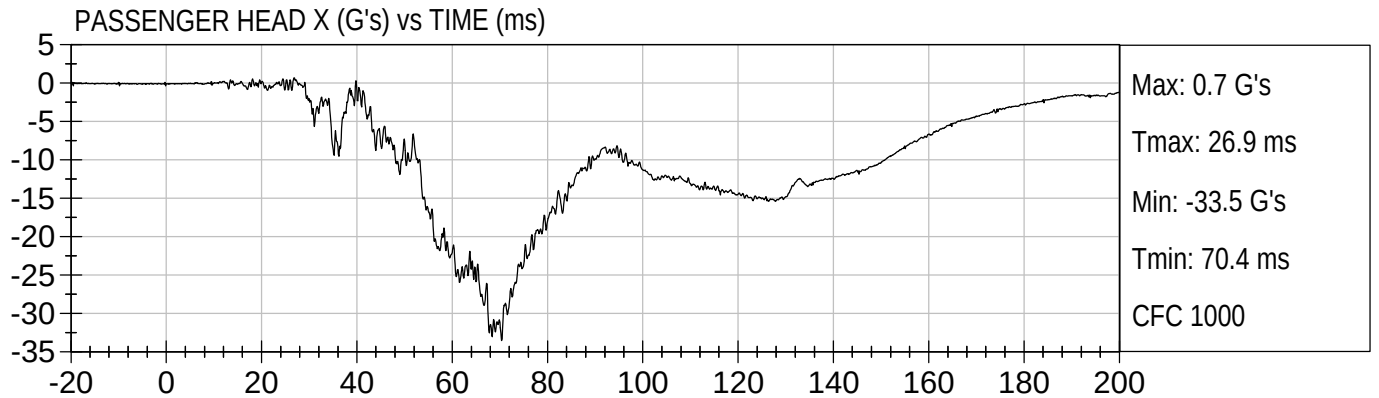


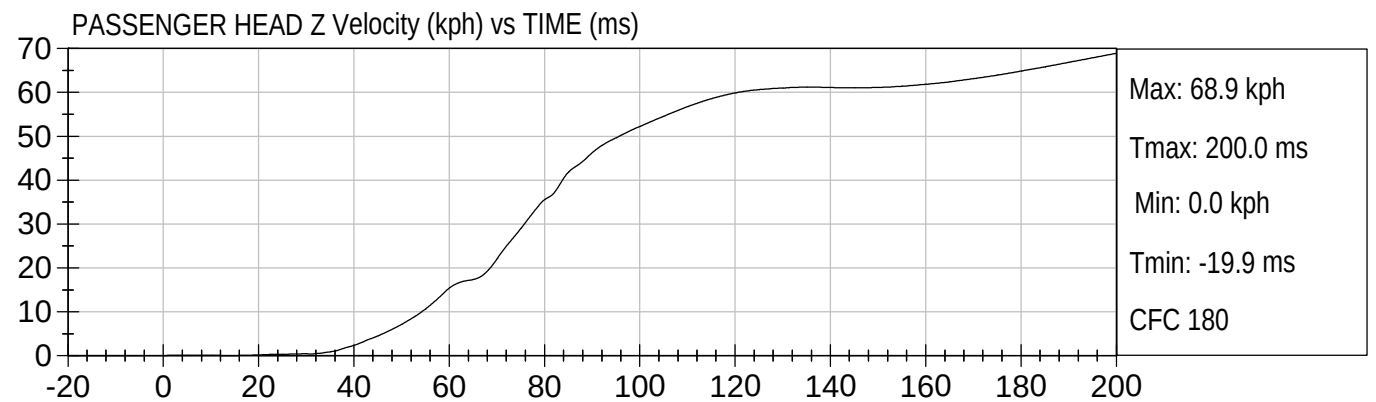
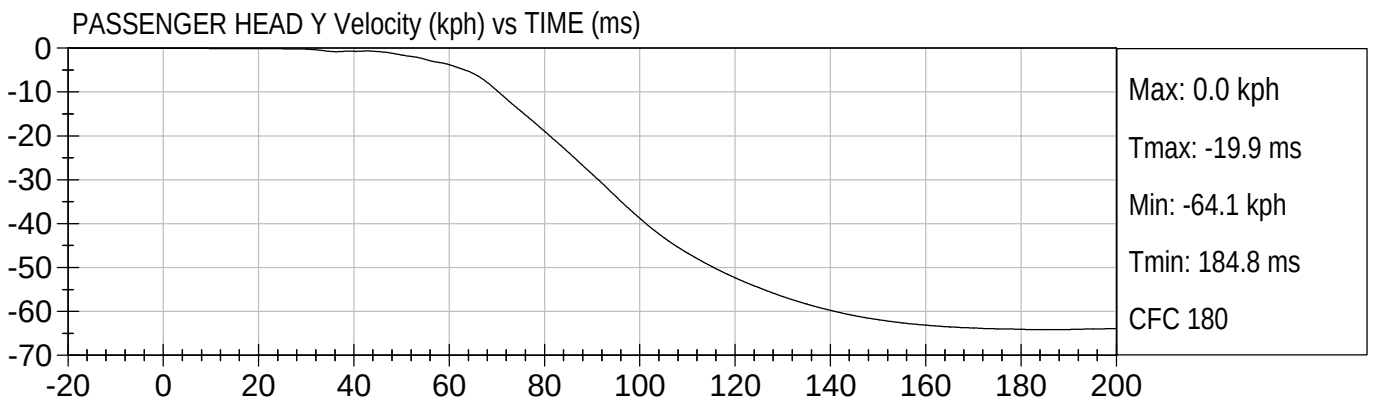
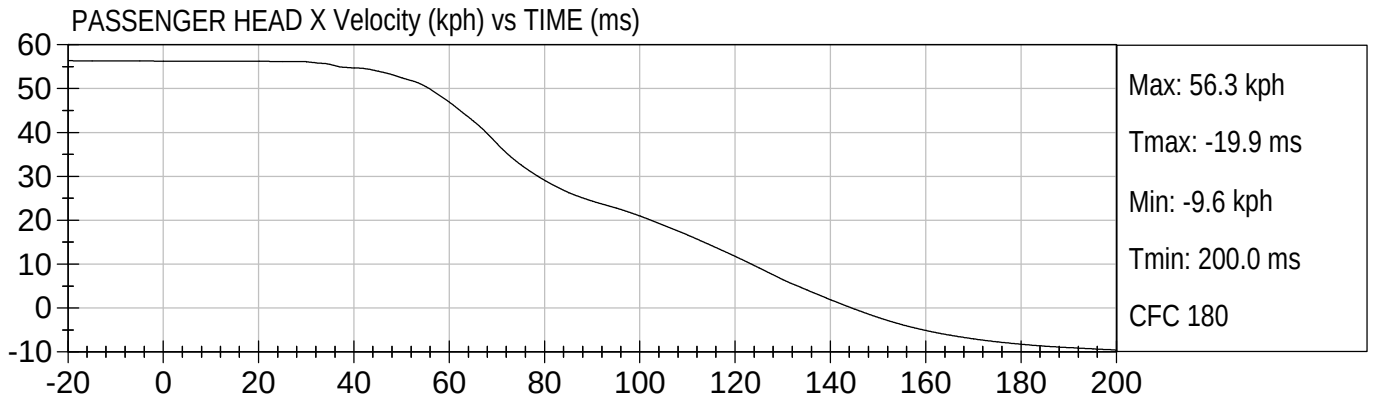


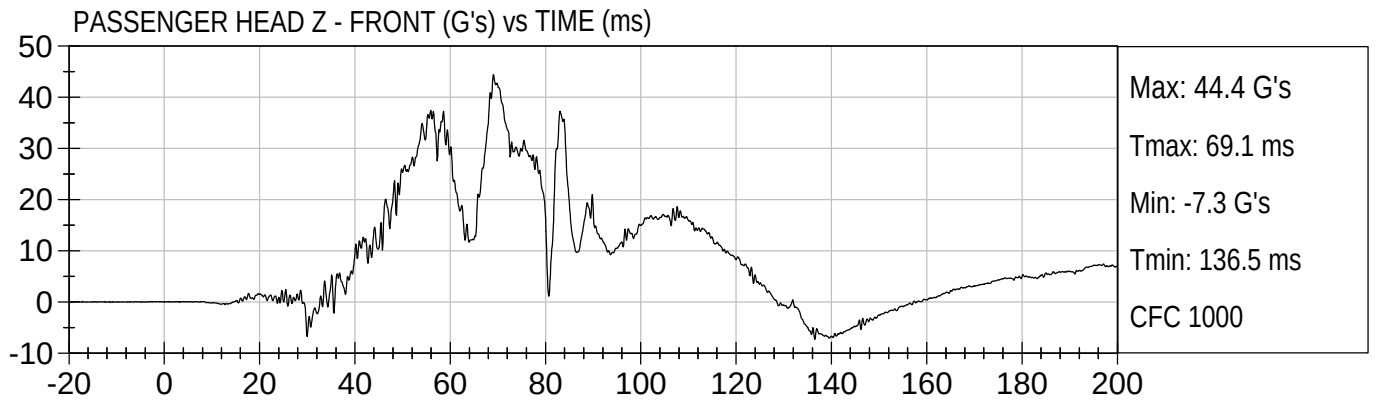
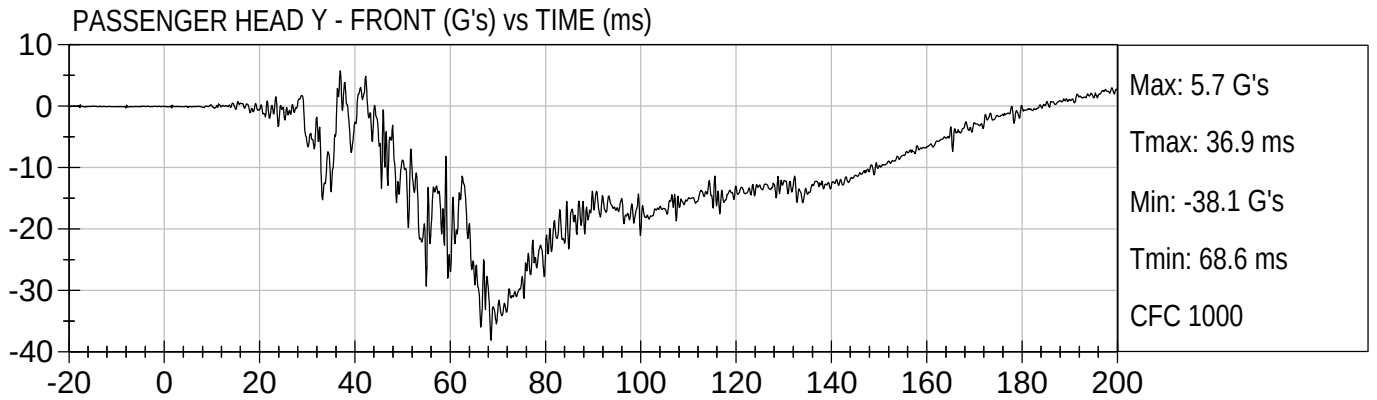


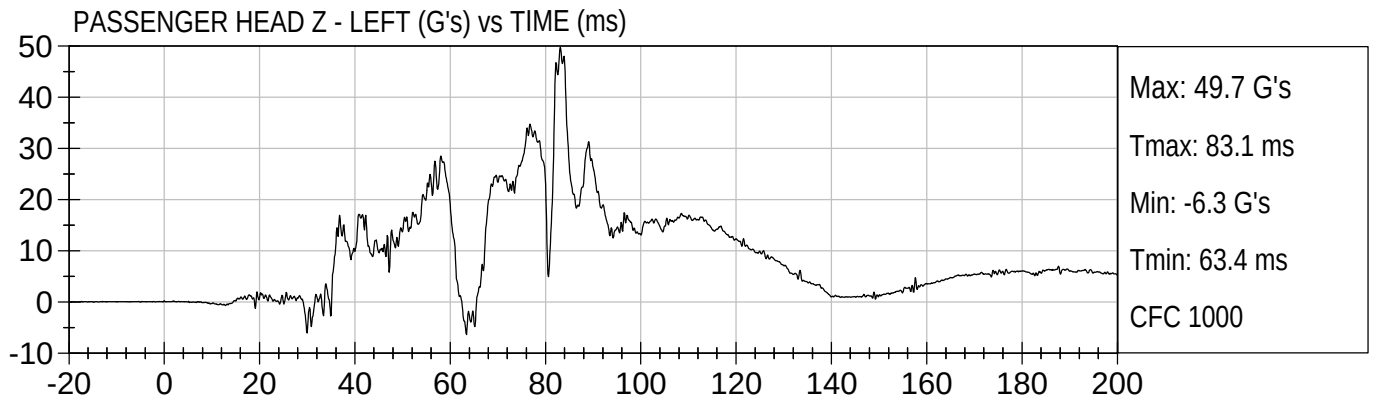
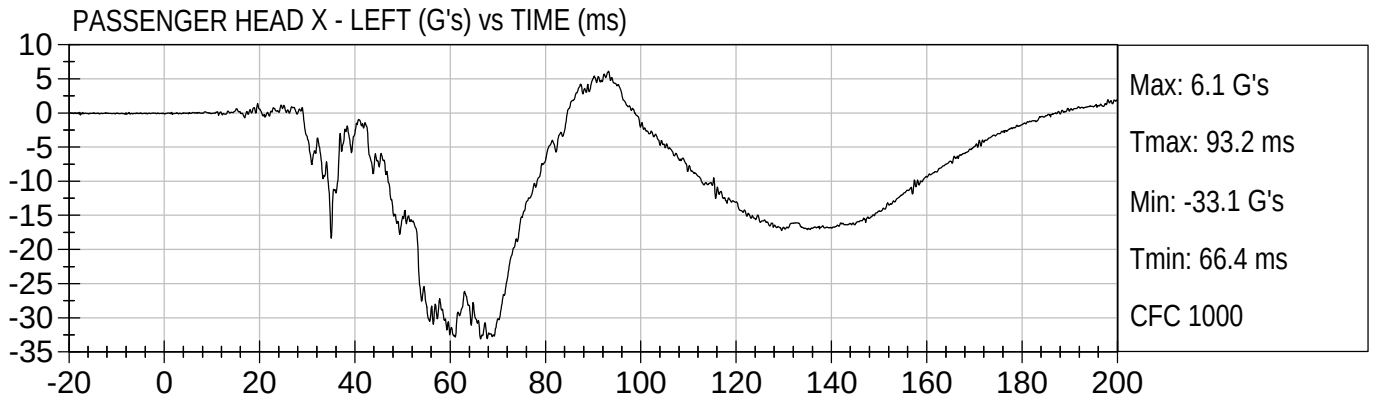
DRIVER RIGHT ANKLE Z (G's) vs TIME (ms)
NO VALID DATA COLLECTED

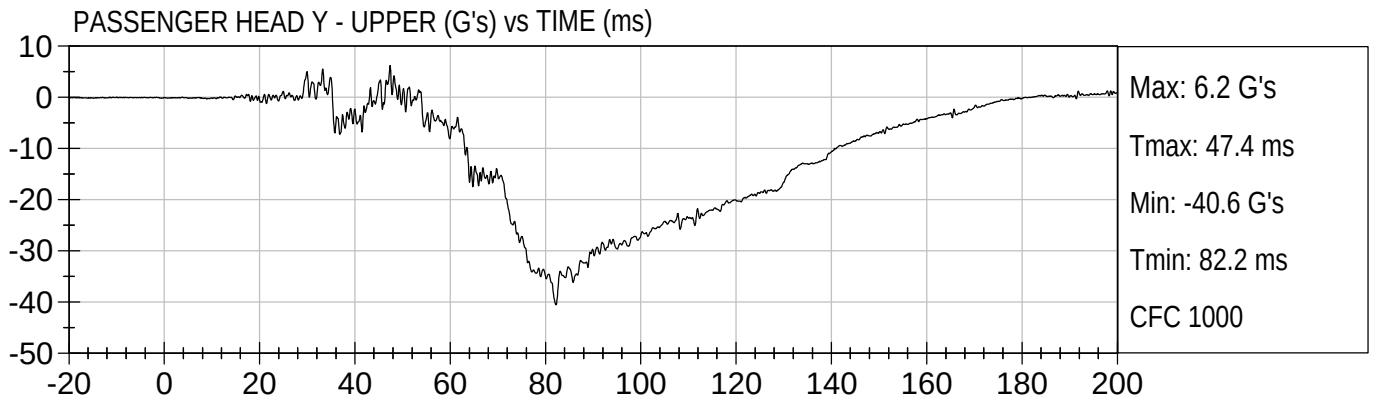
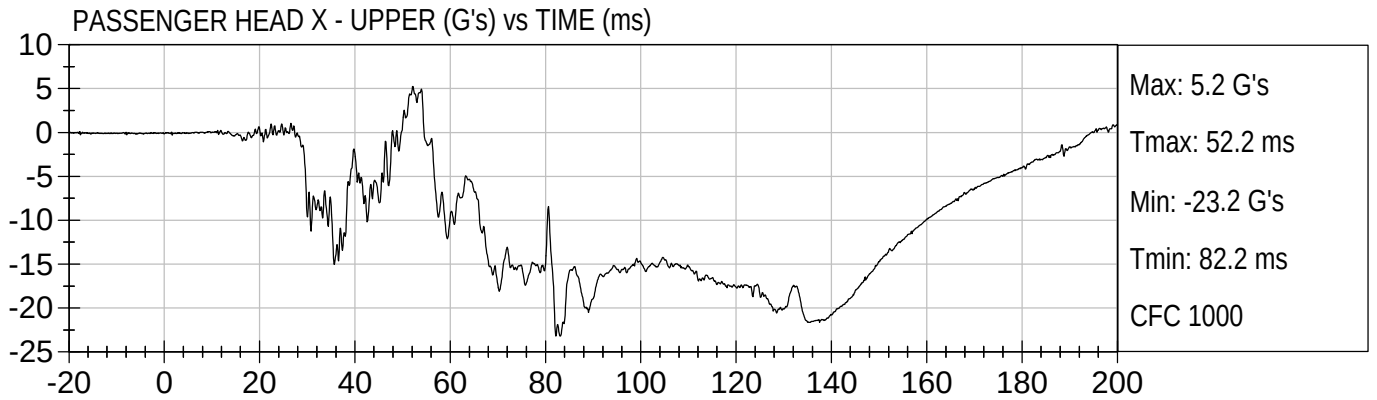


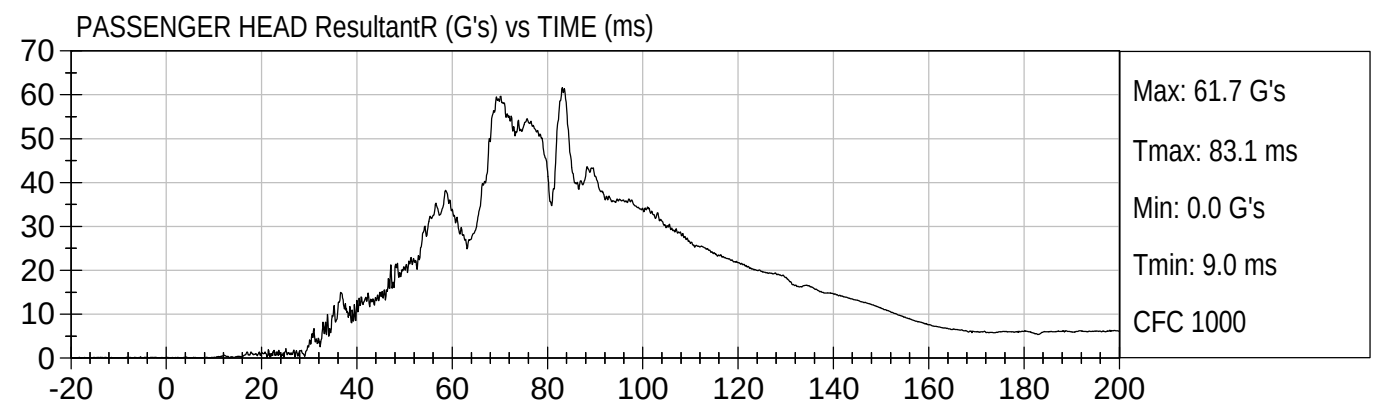
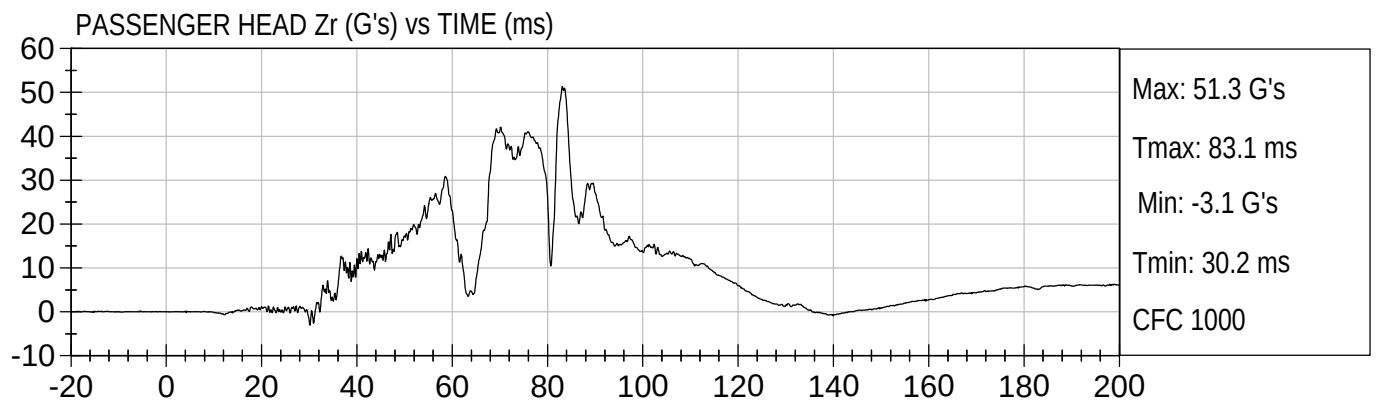
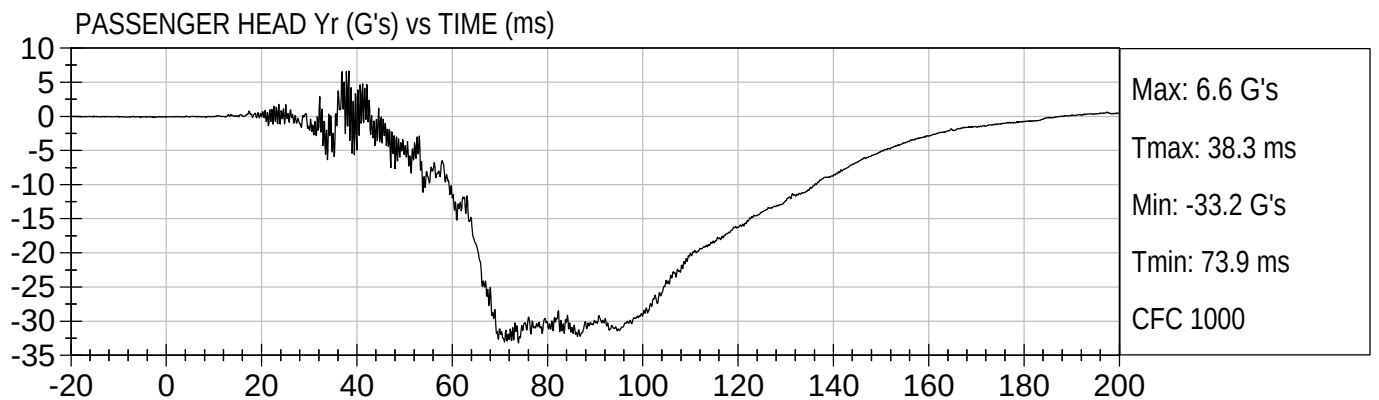
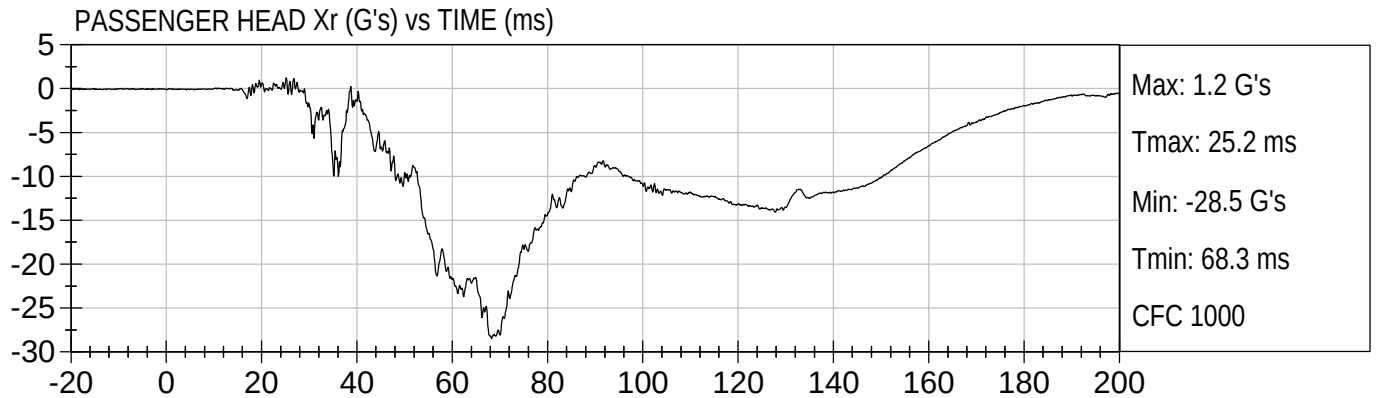


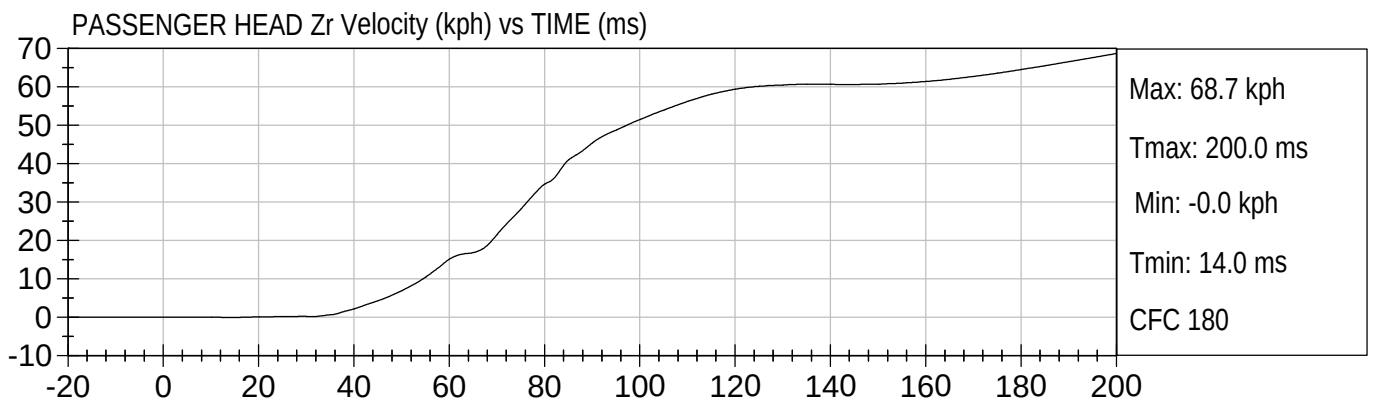
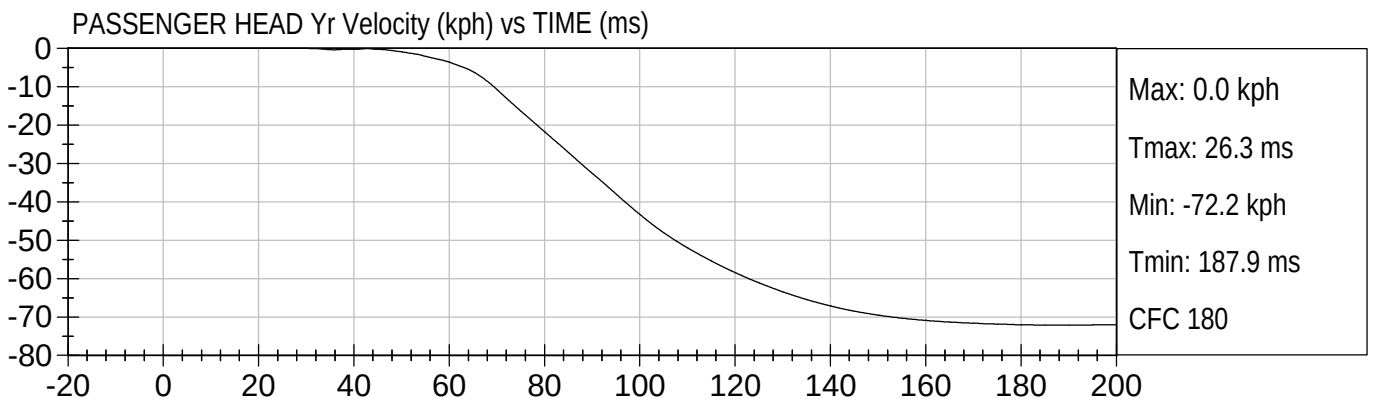
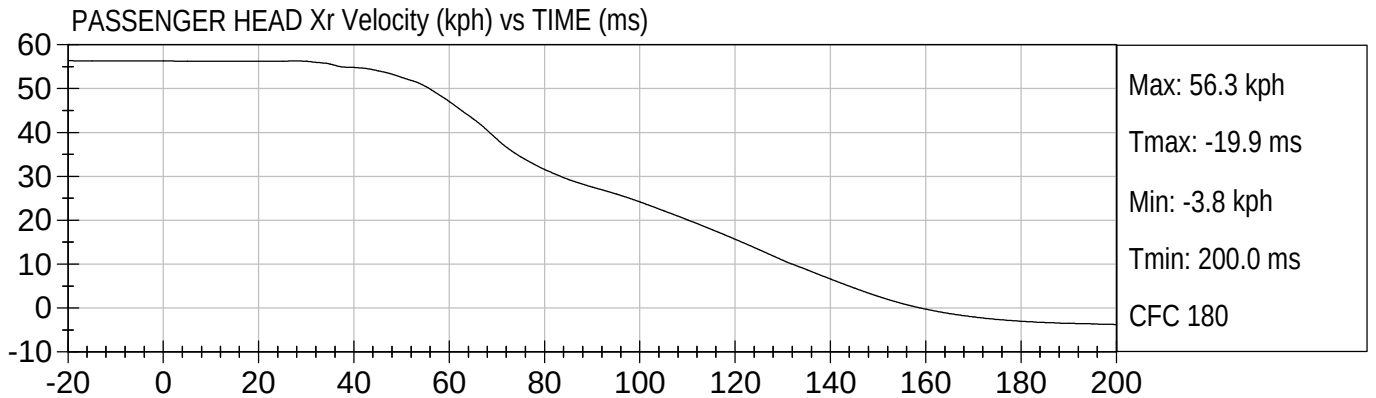


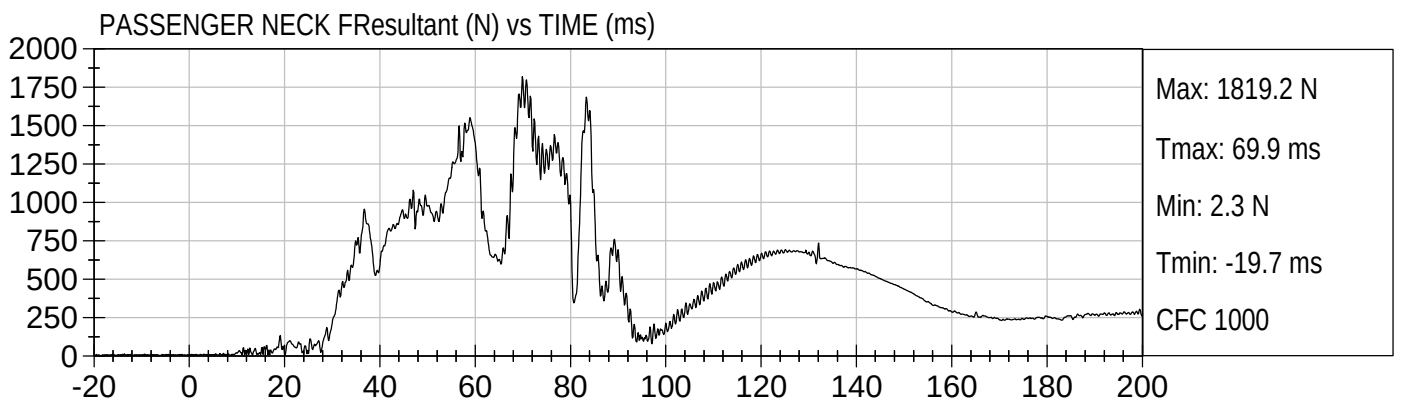
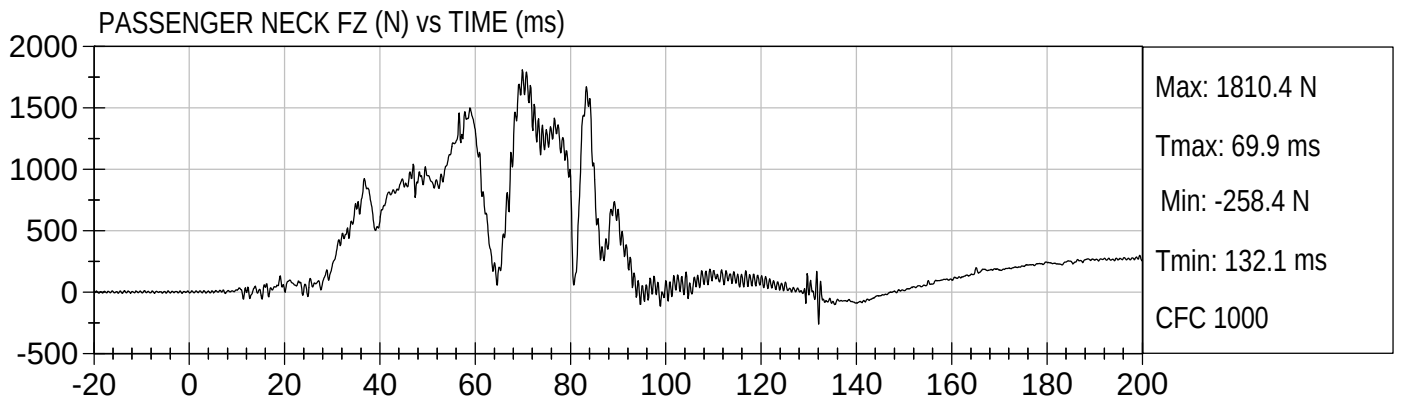
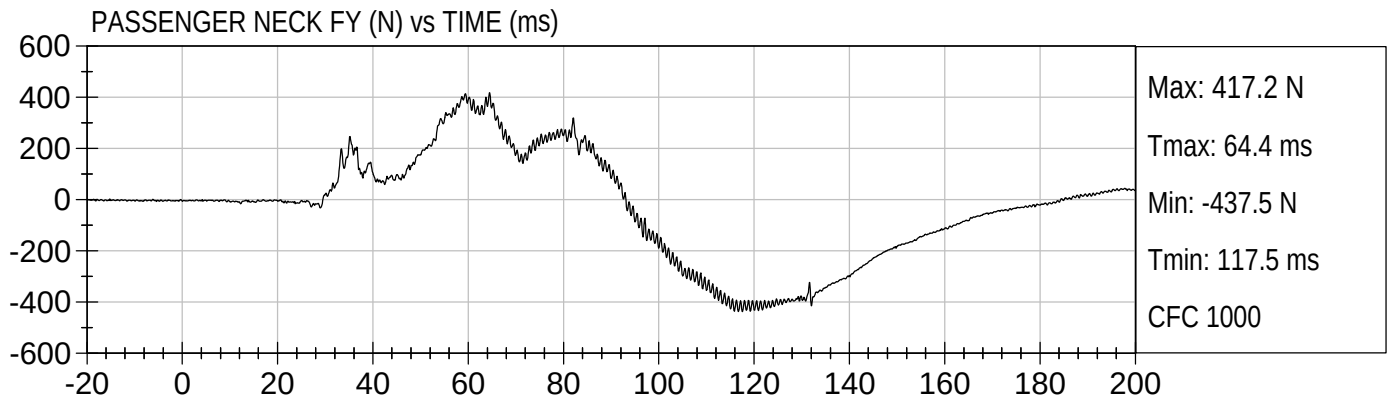
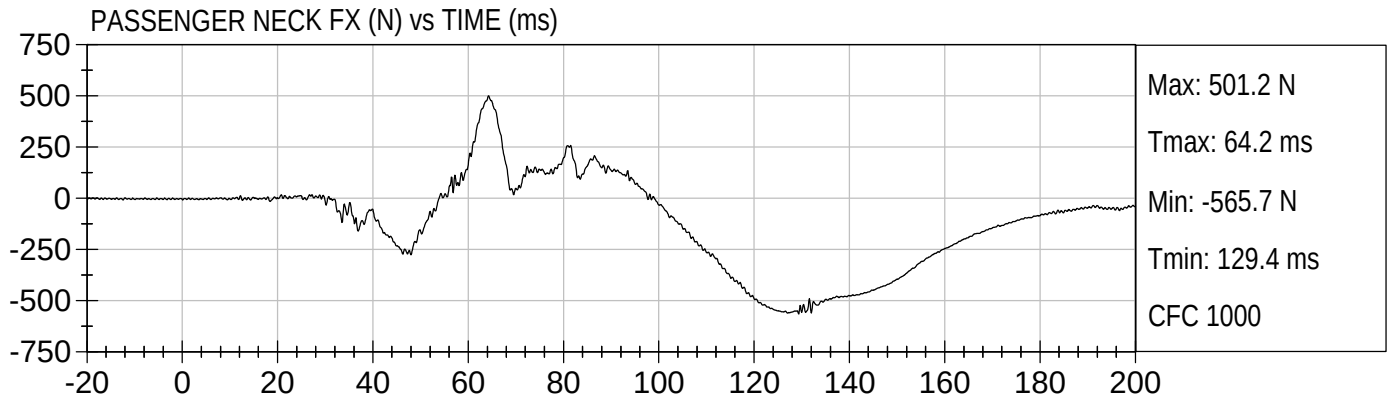


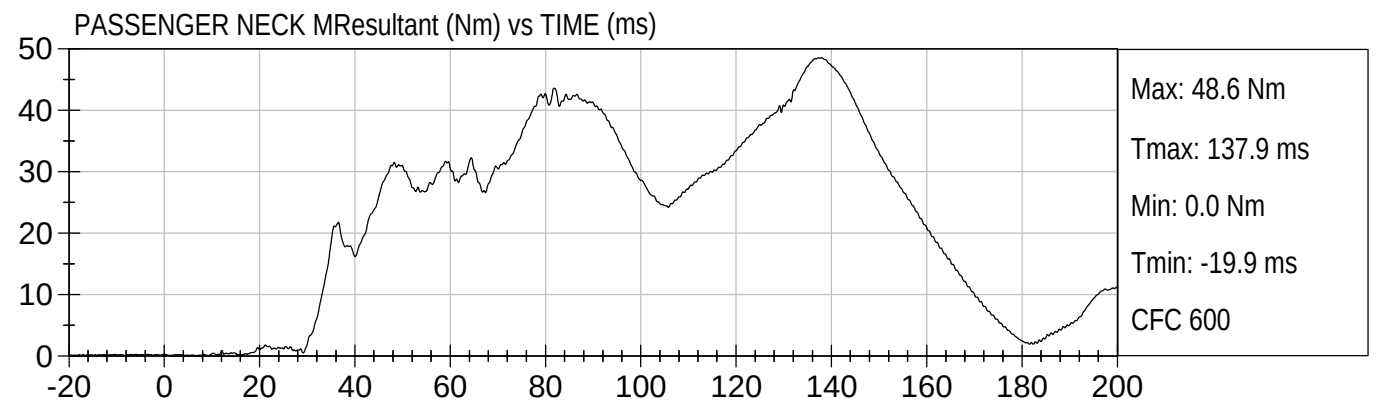
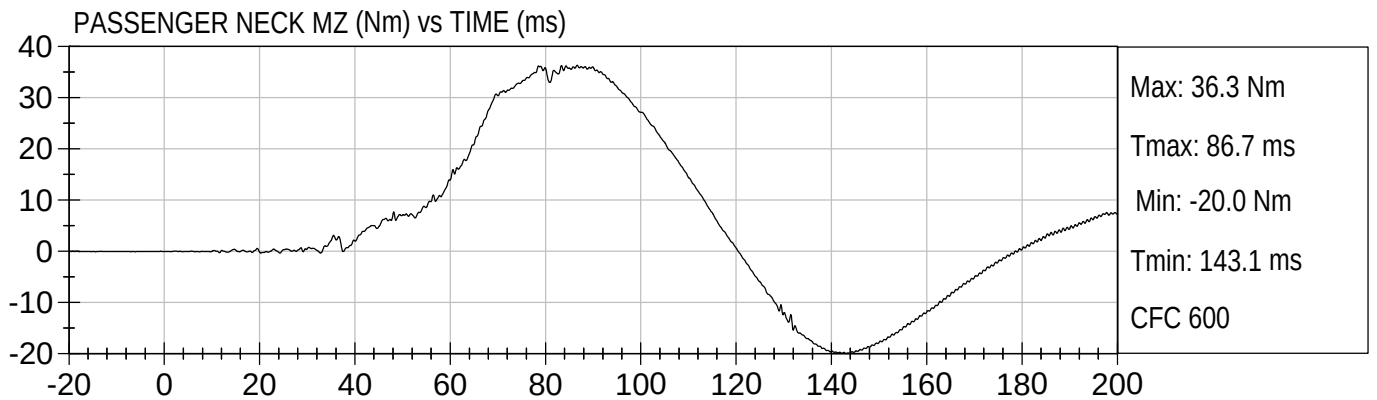
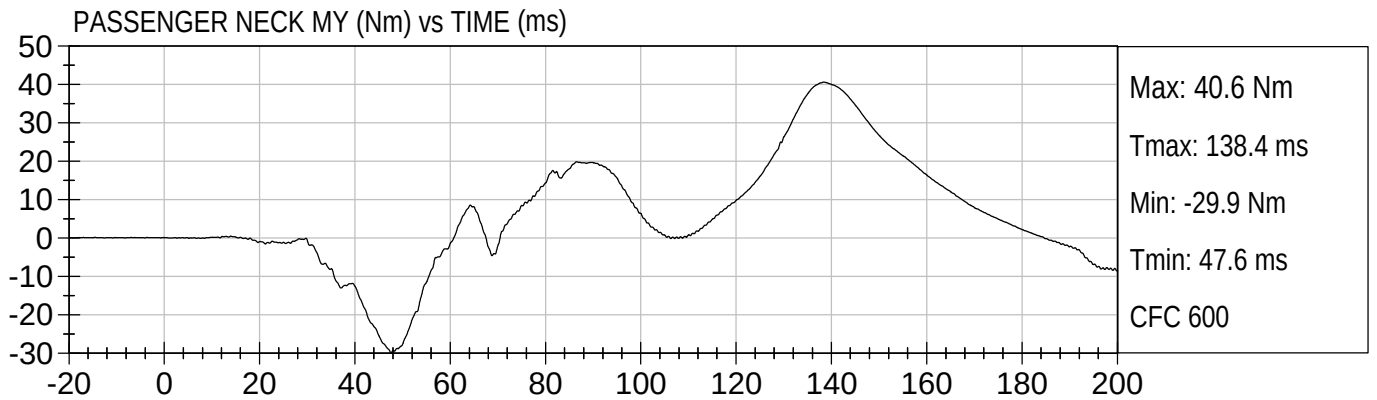
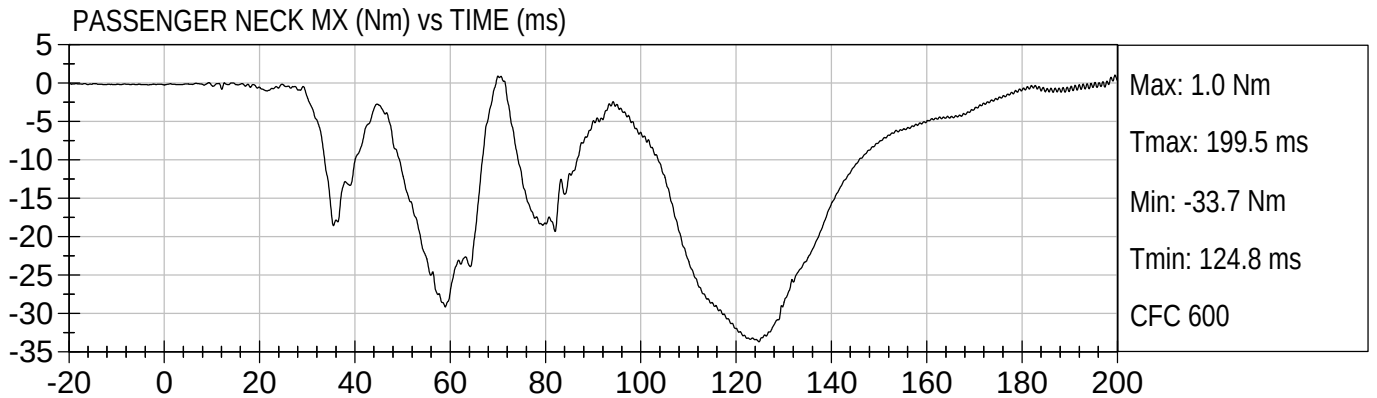


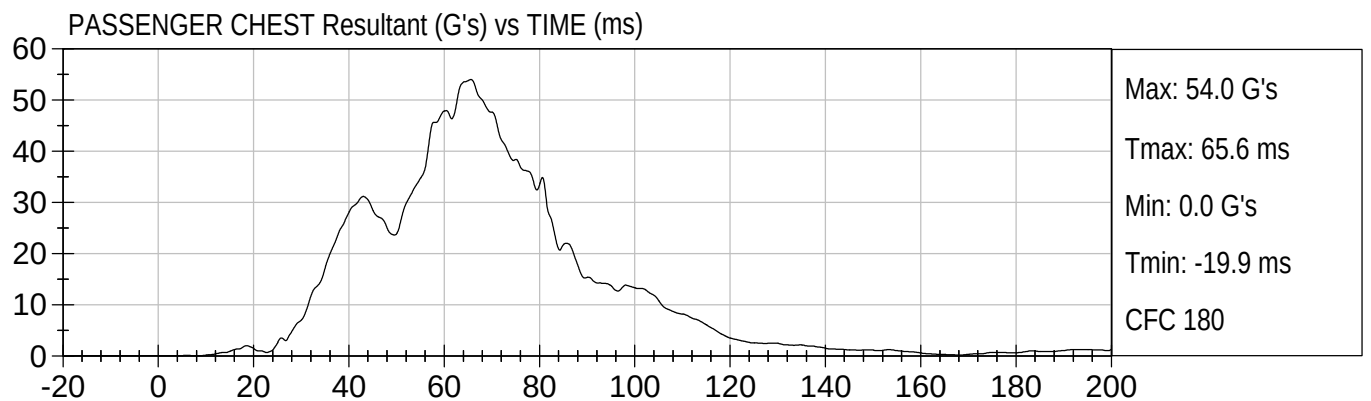
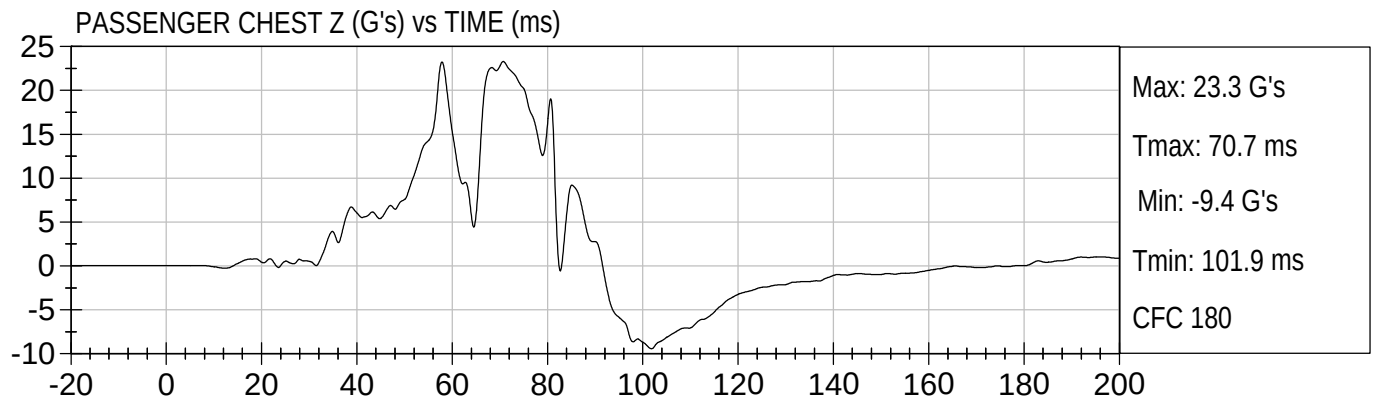
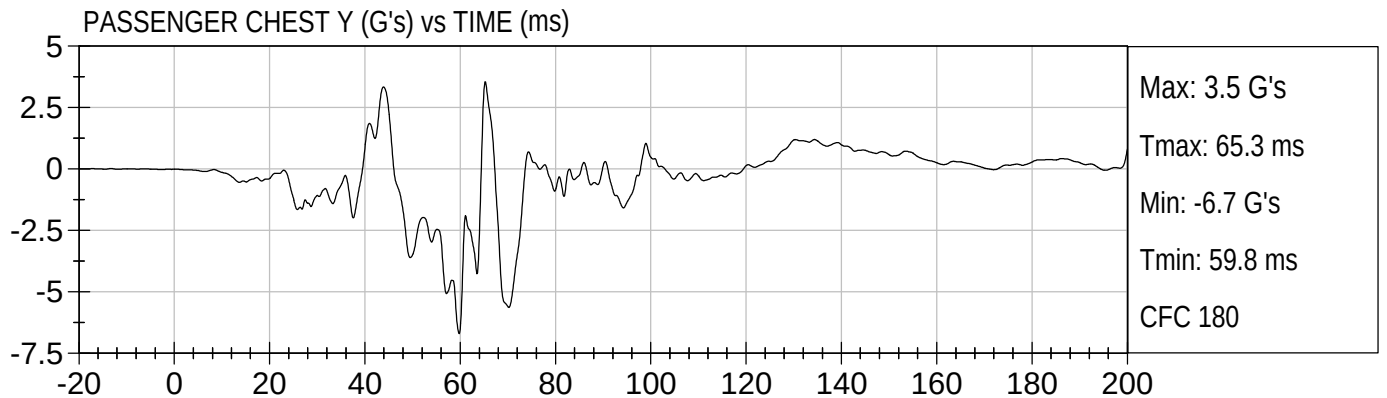
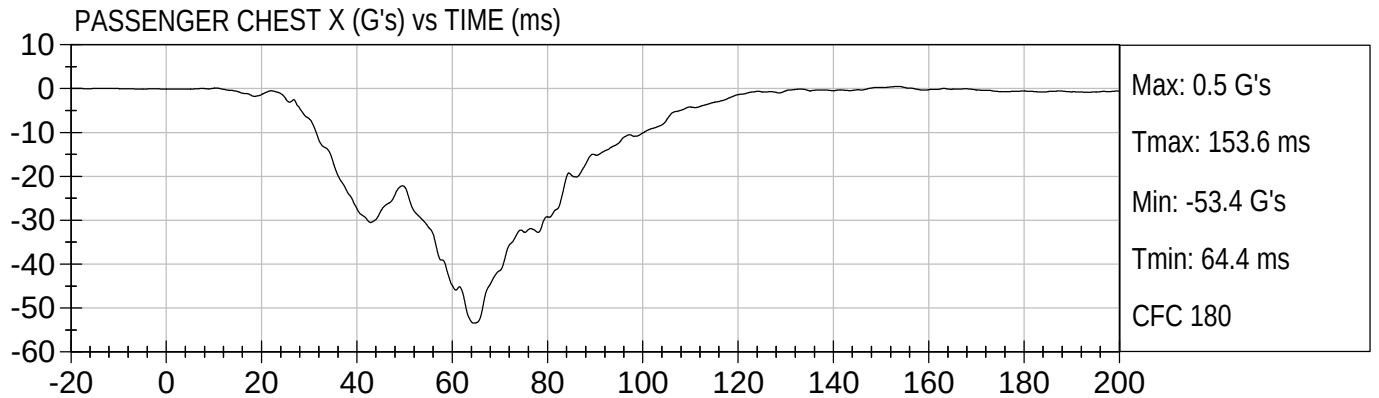


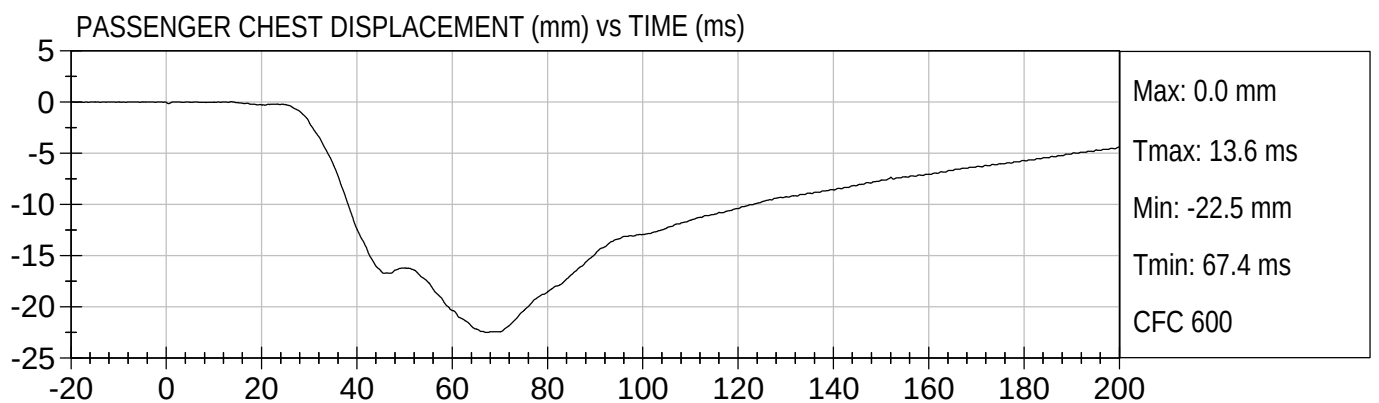
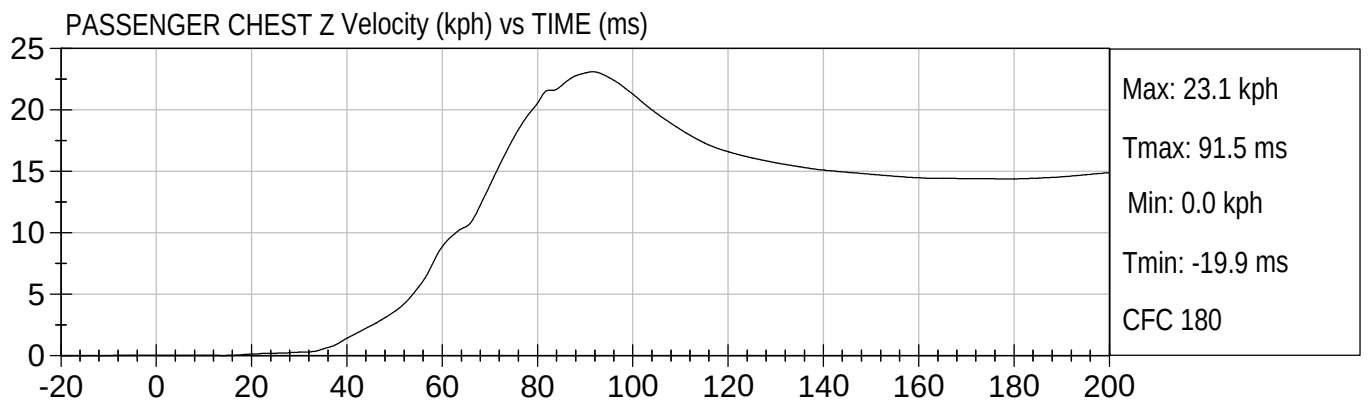
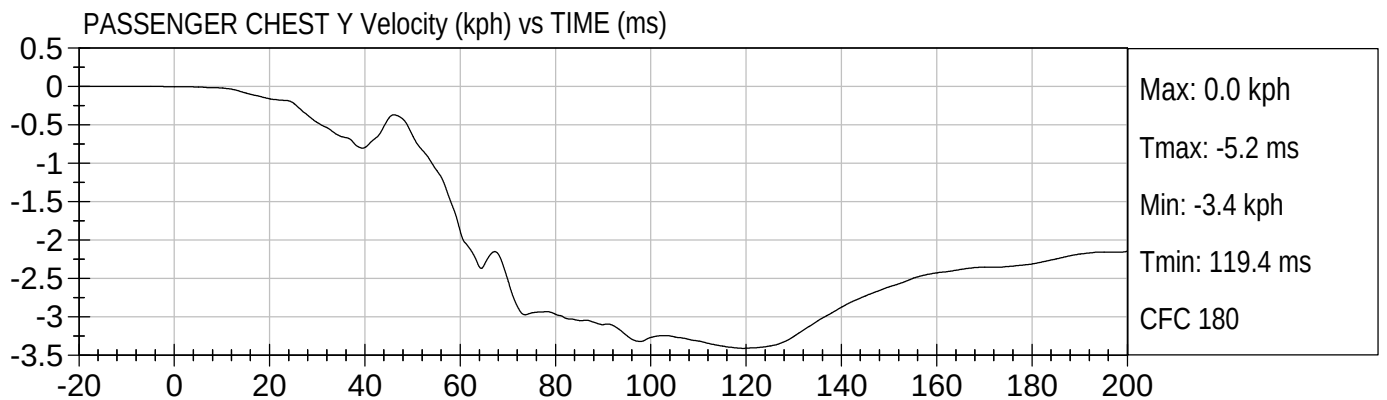
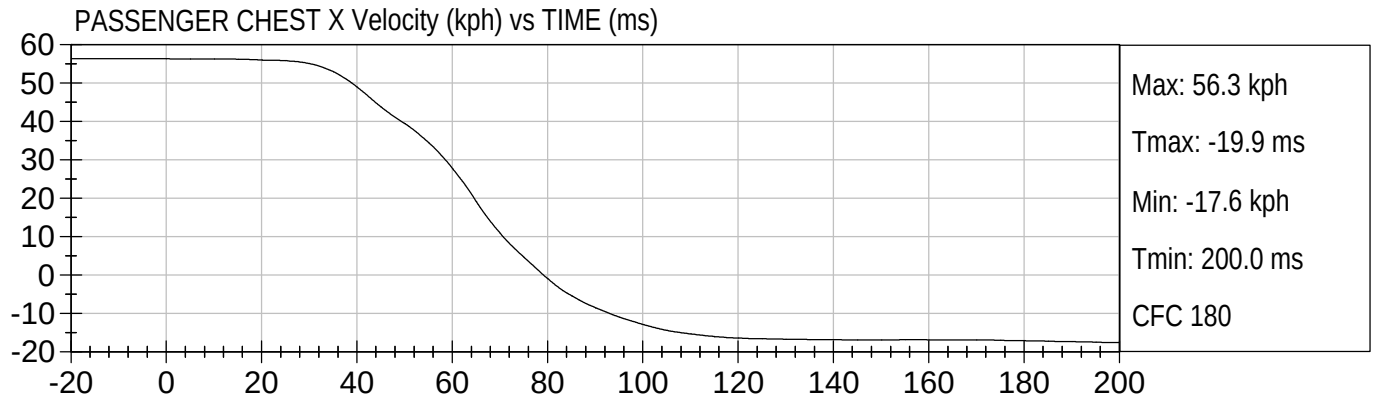


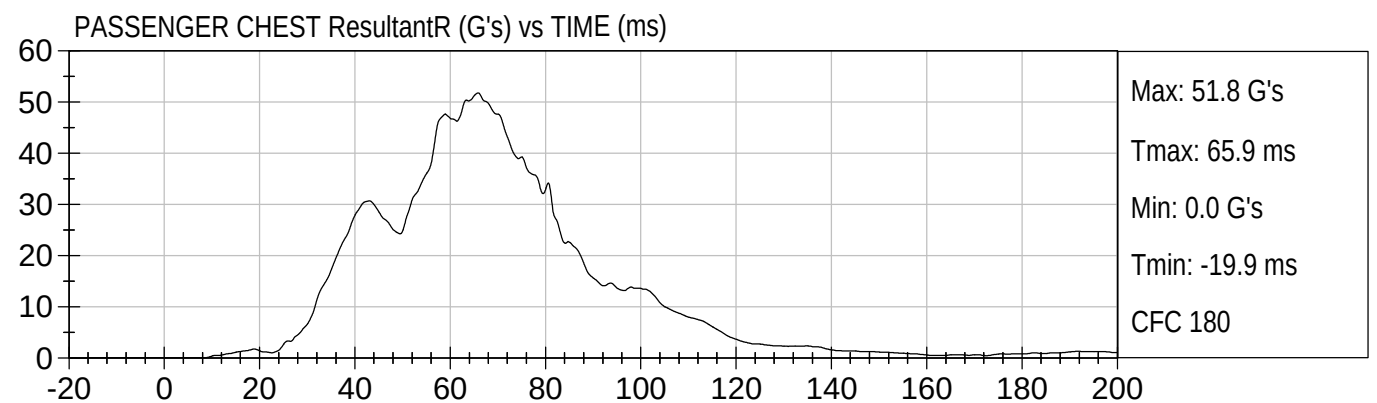
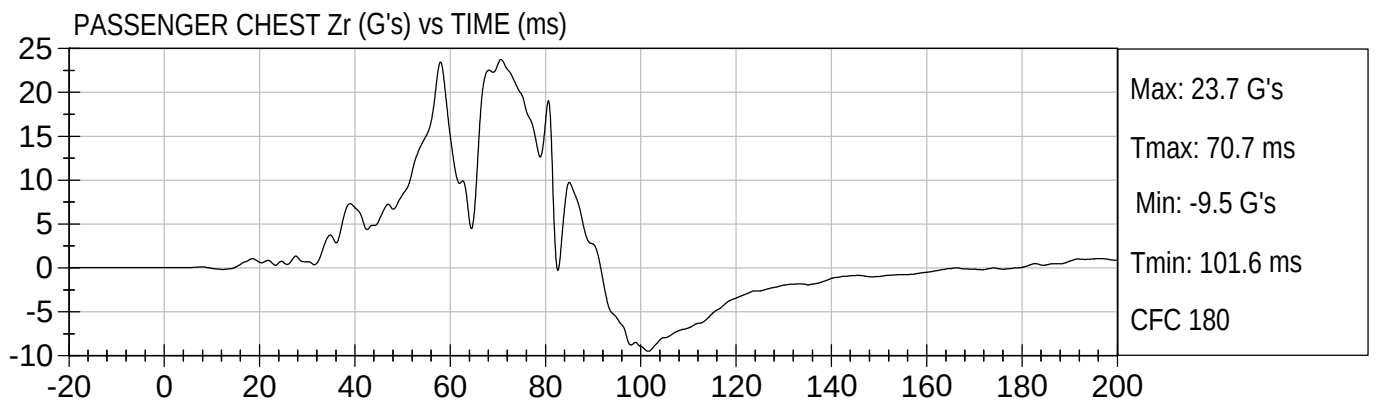
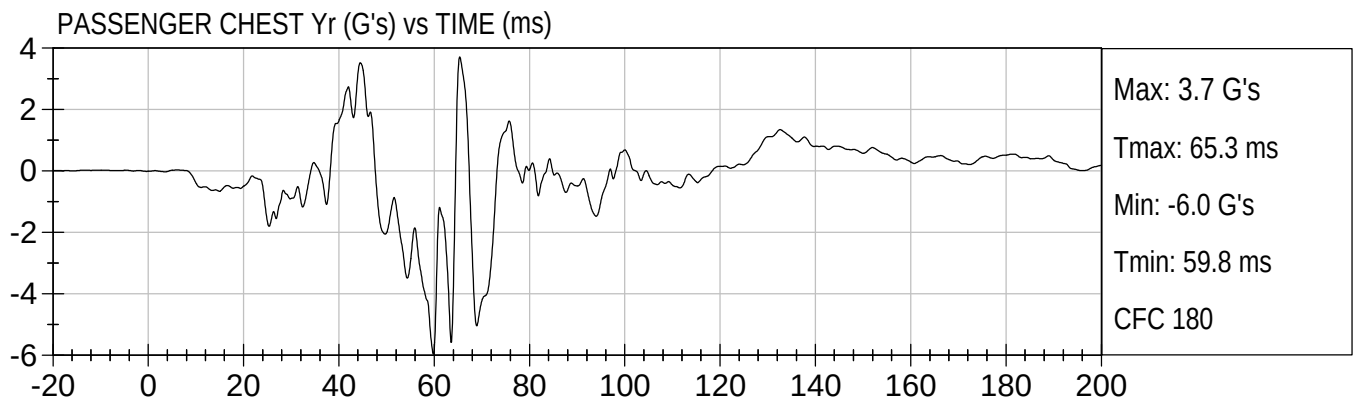
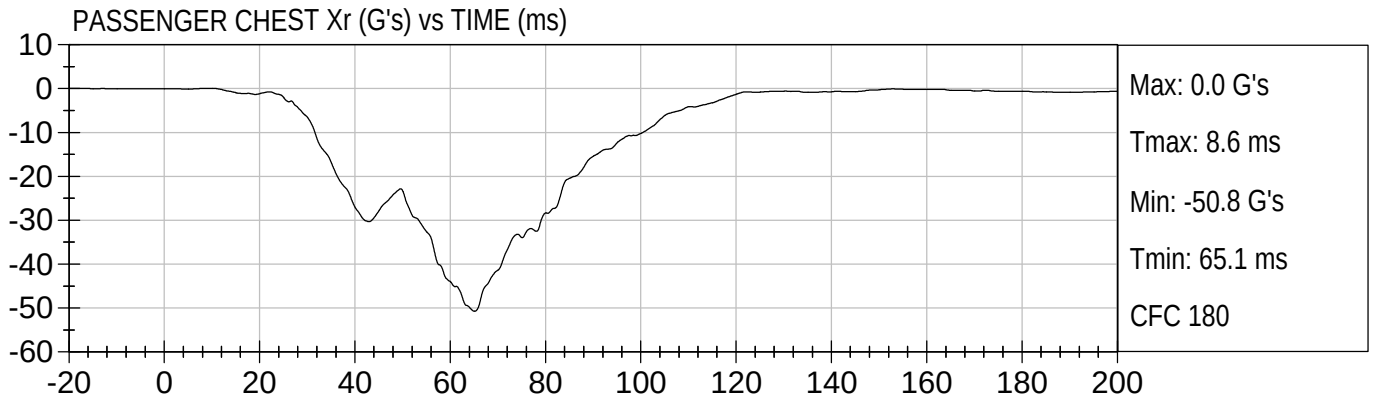


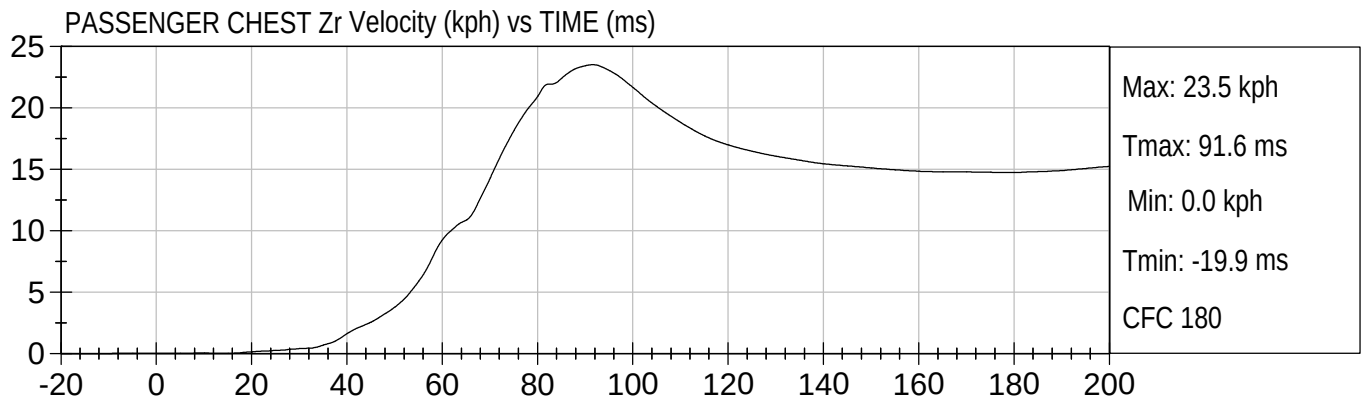
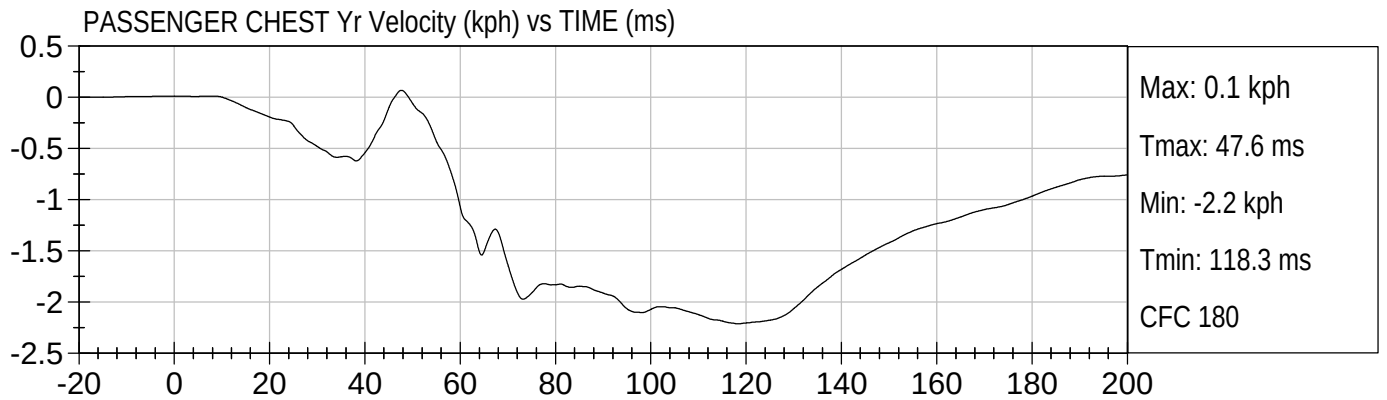
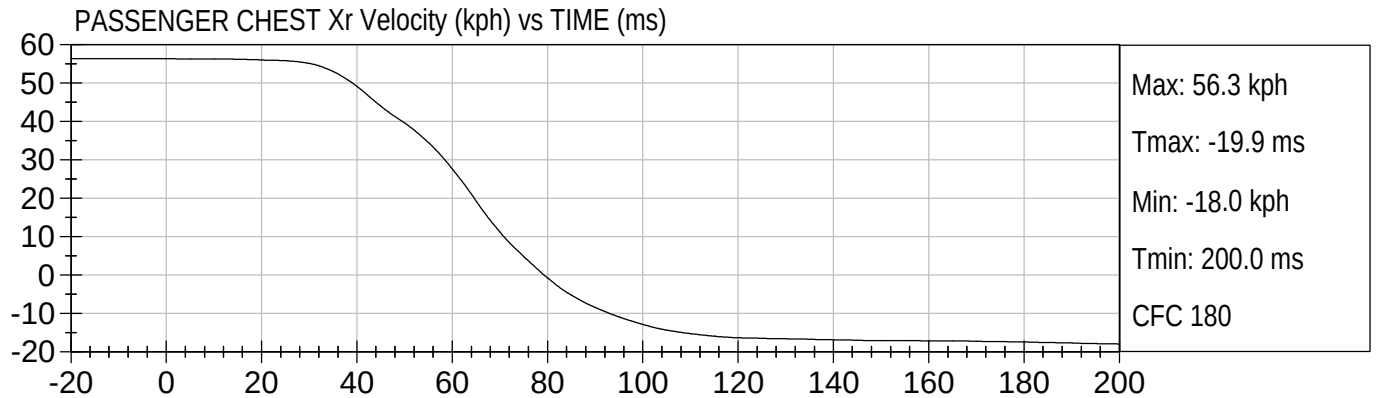






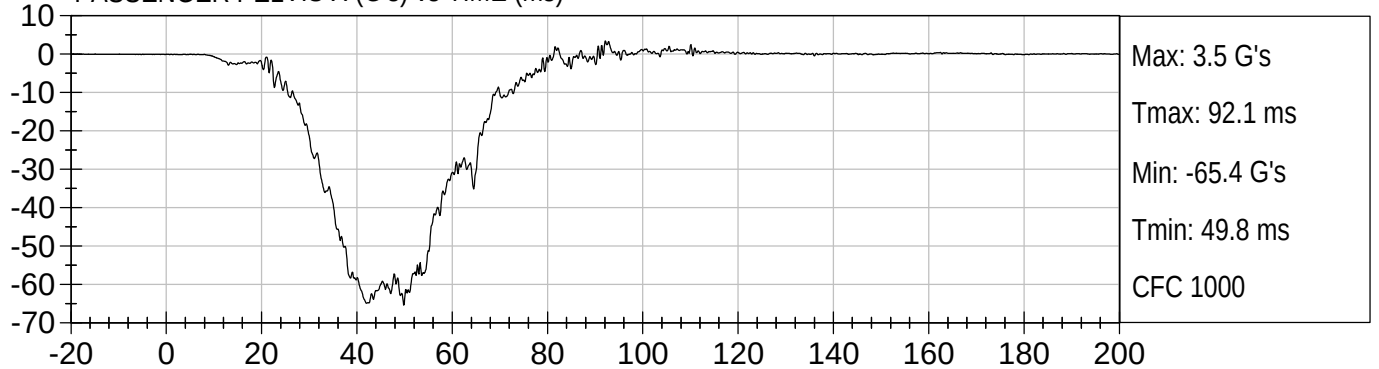




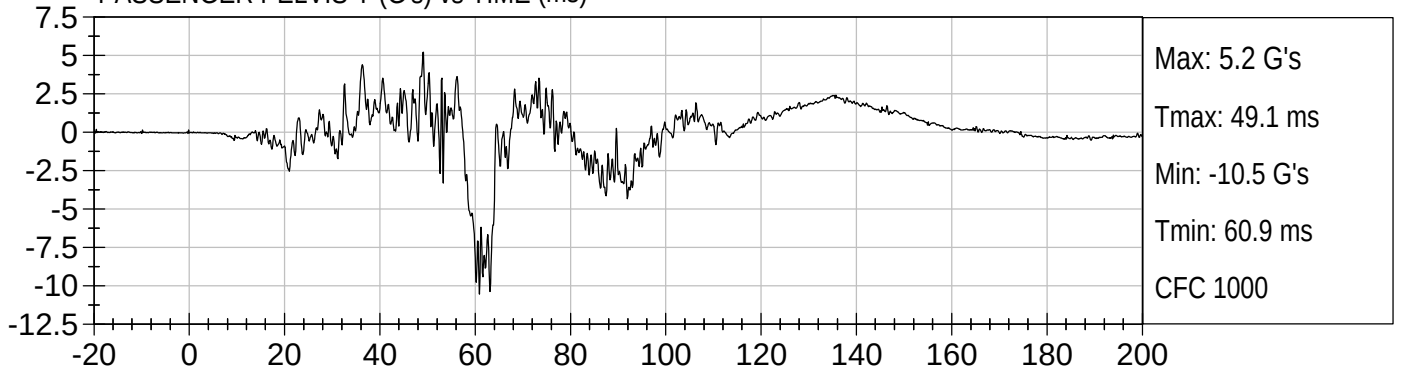




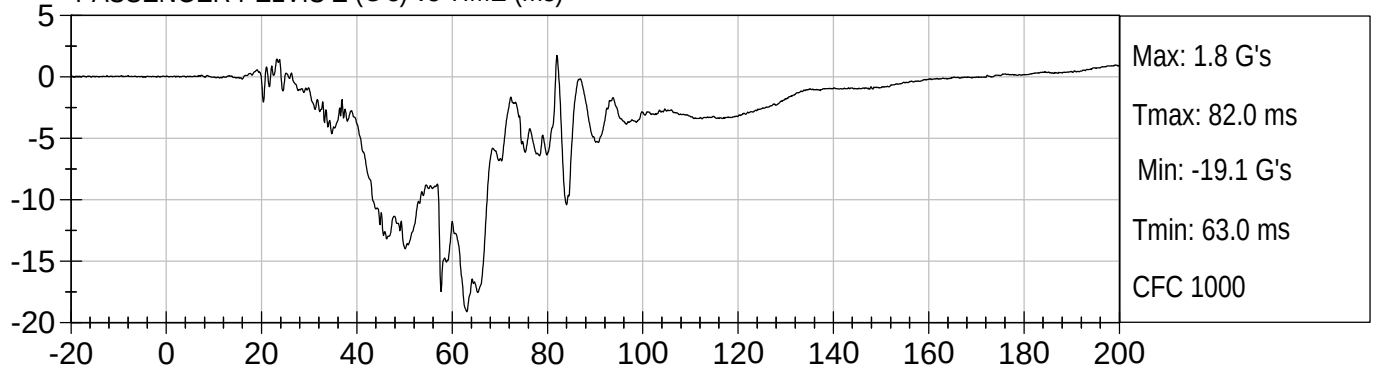
PASSENGER PELVIS X (G's) vs TIME (ms)



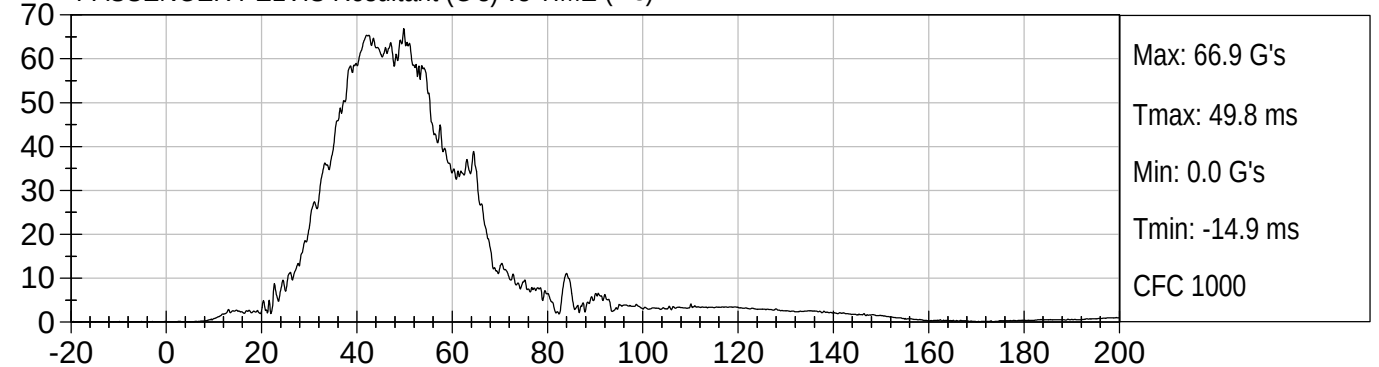
PASSENGER PELVIS Y (G's) vs TIME (ms)

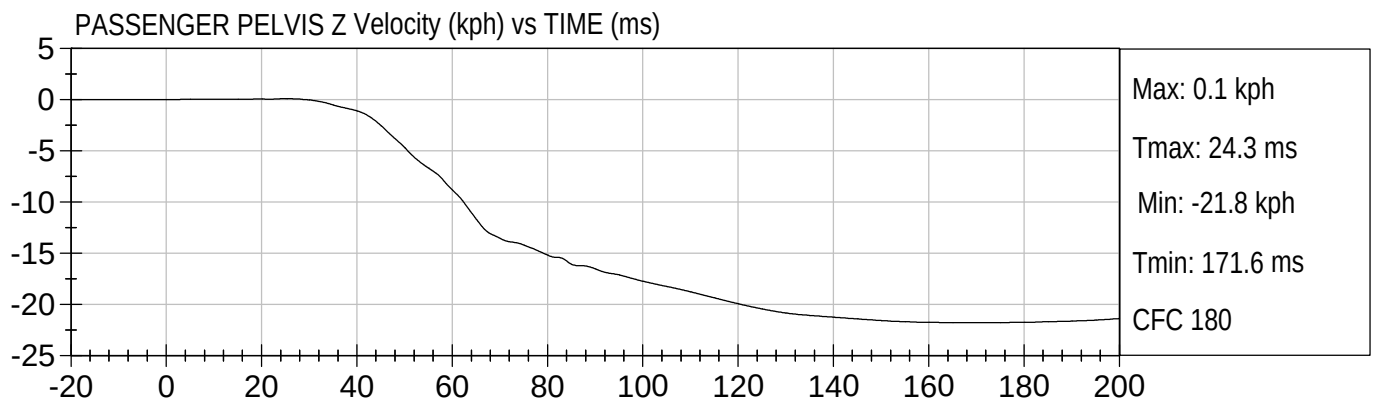
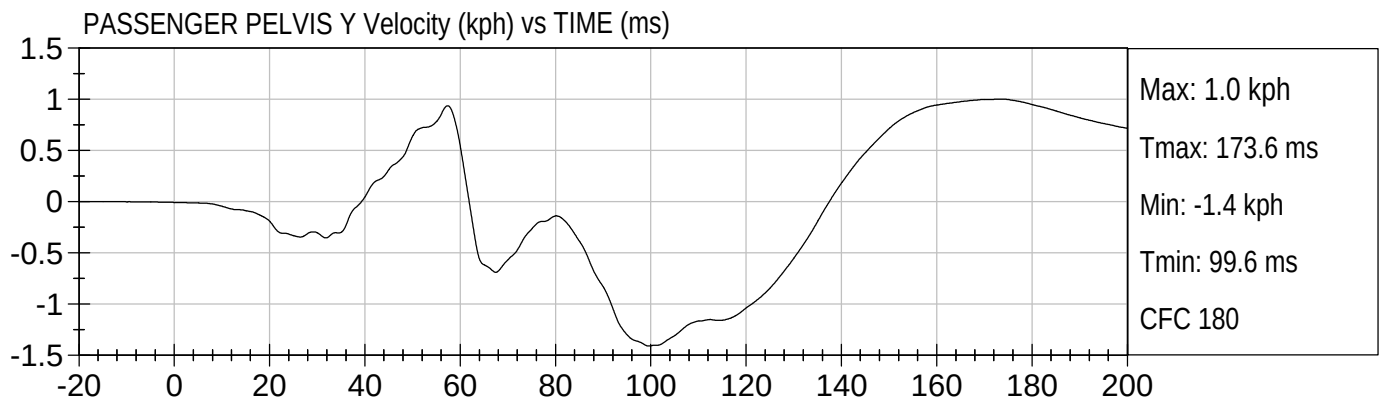
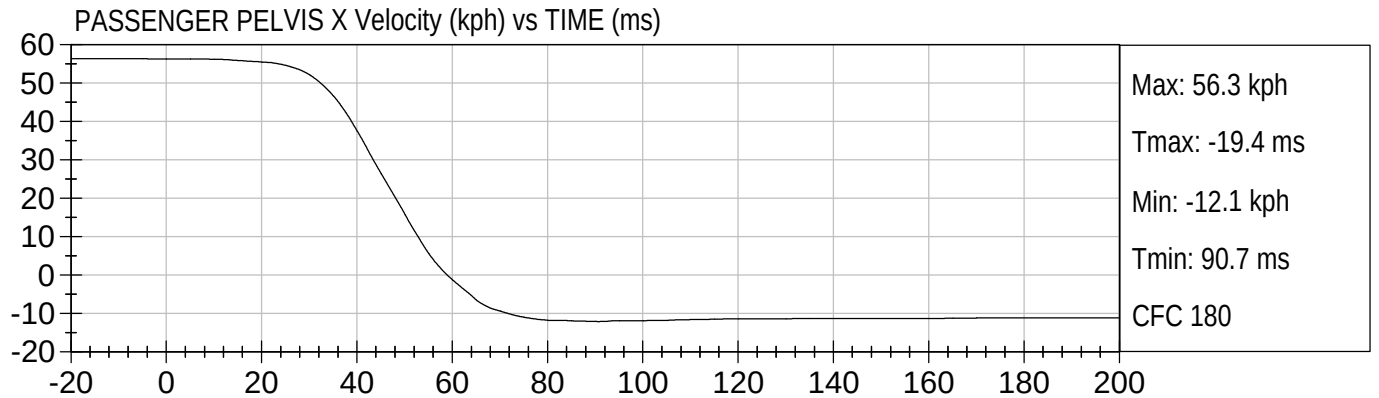


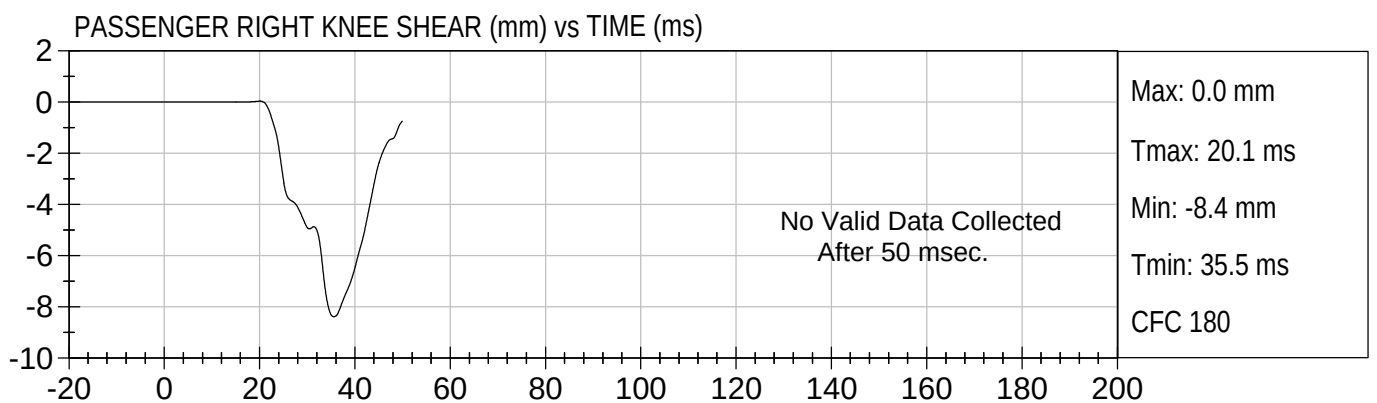
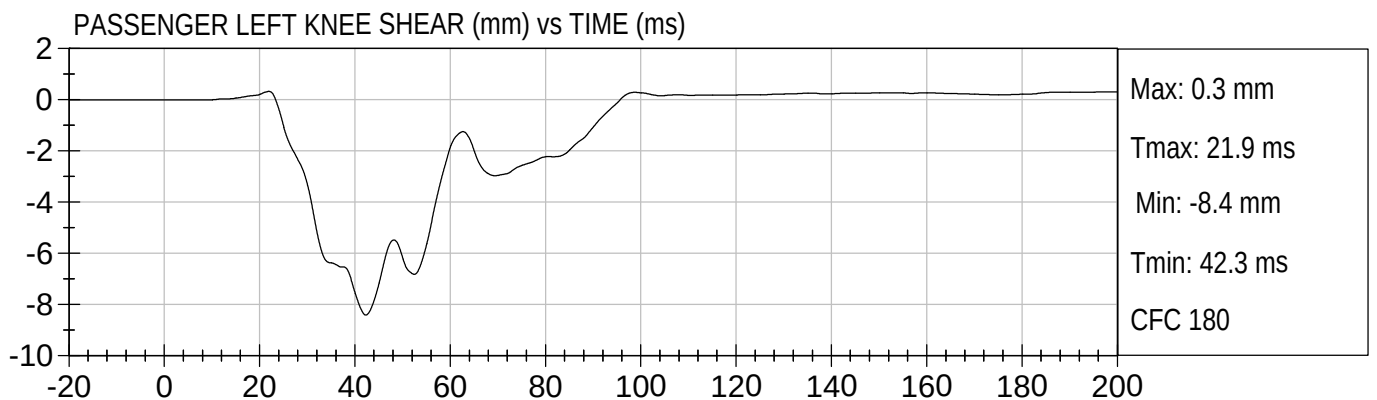
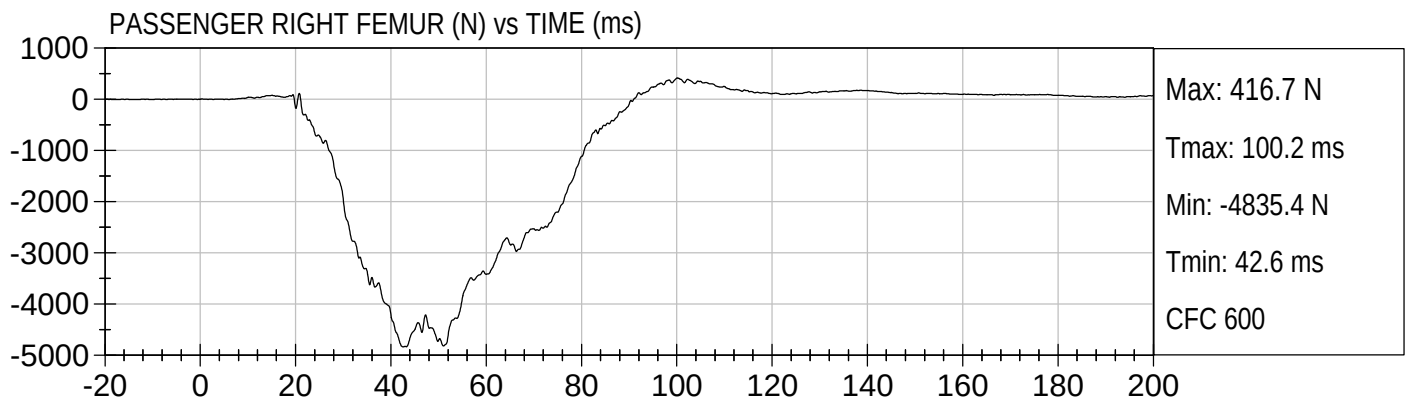
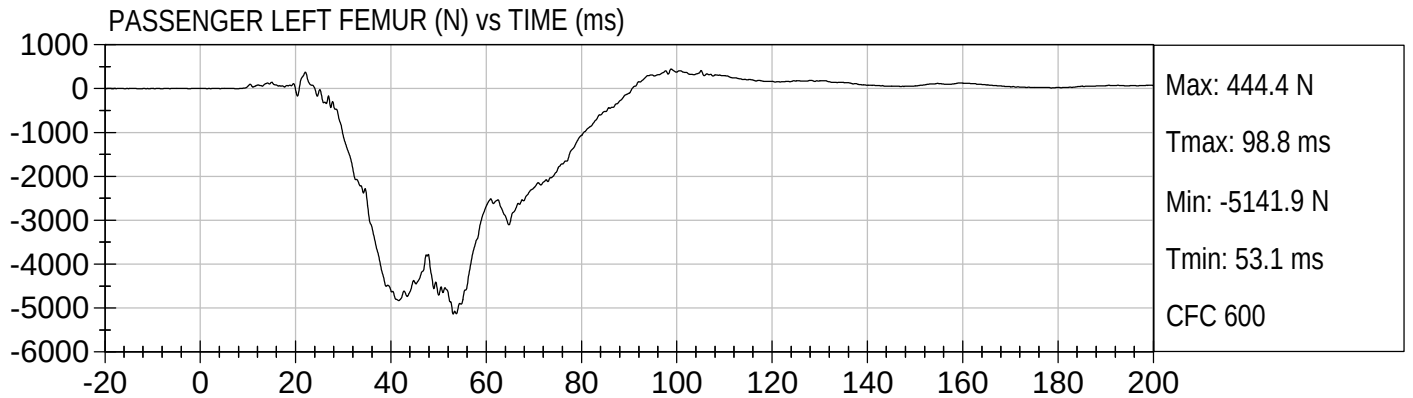
PASSENGER PELVIS Z (G's) vs TIME (ms)



PASSENGER PELVIS Resultant (G's) vs TIME (ms)

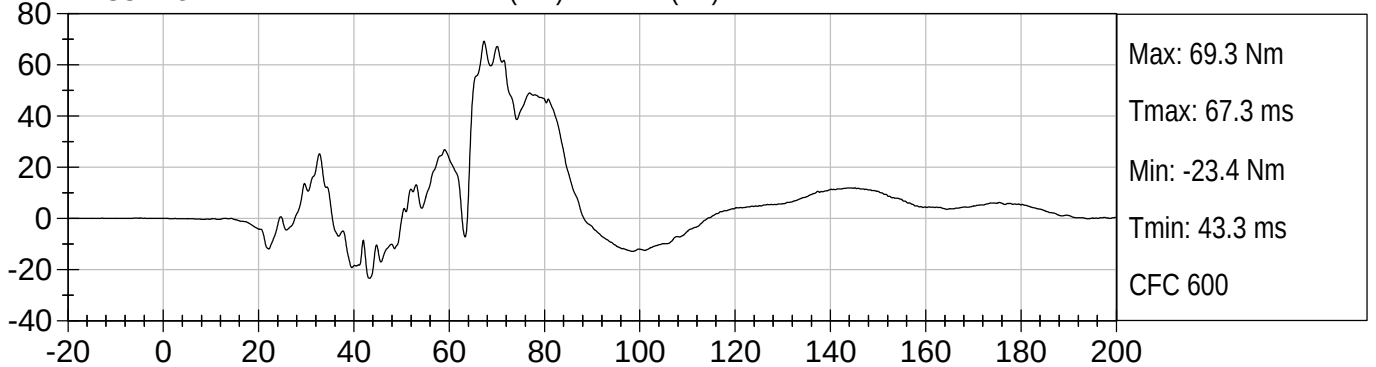




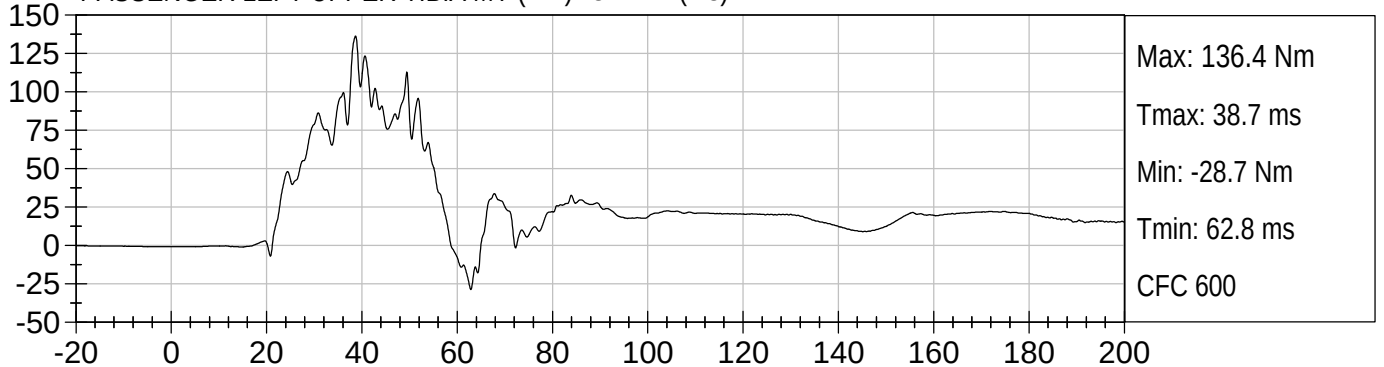




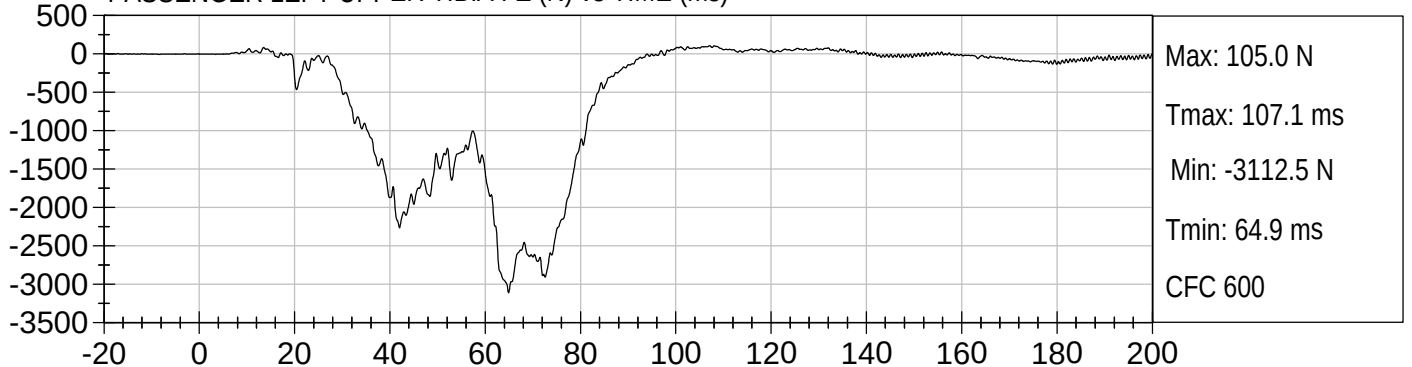
PASSENGER LEFT UPPER TIBIA MX (Nm) vs TIME (ms)



PASSENGER LEFT UPPER TIBIA MY (Nm) vs TIME (ms)

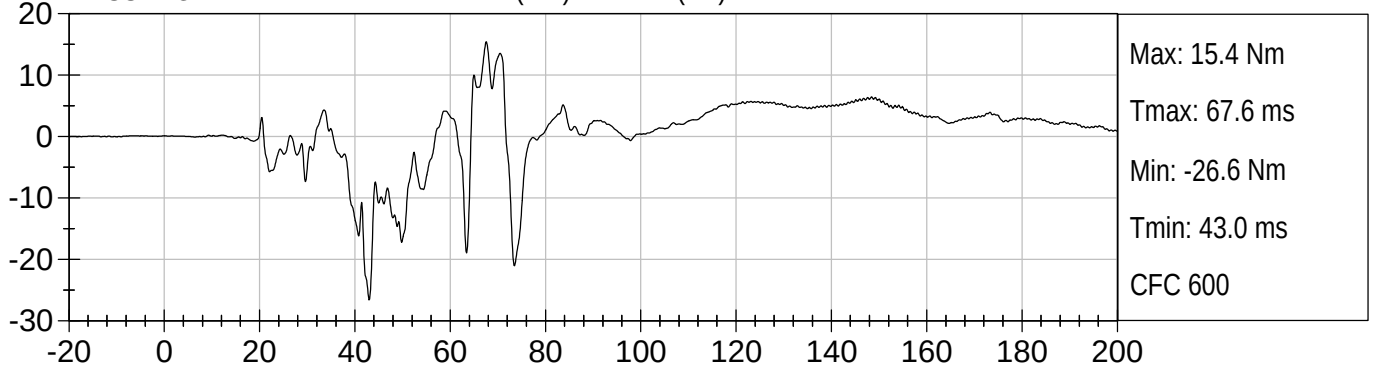


PASSENGER LEFT UPPER TIBIA FZ (N) vs TIME (ms)

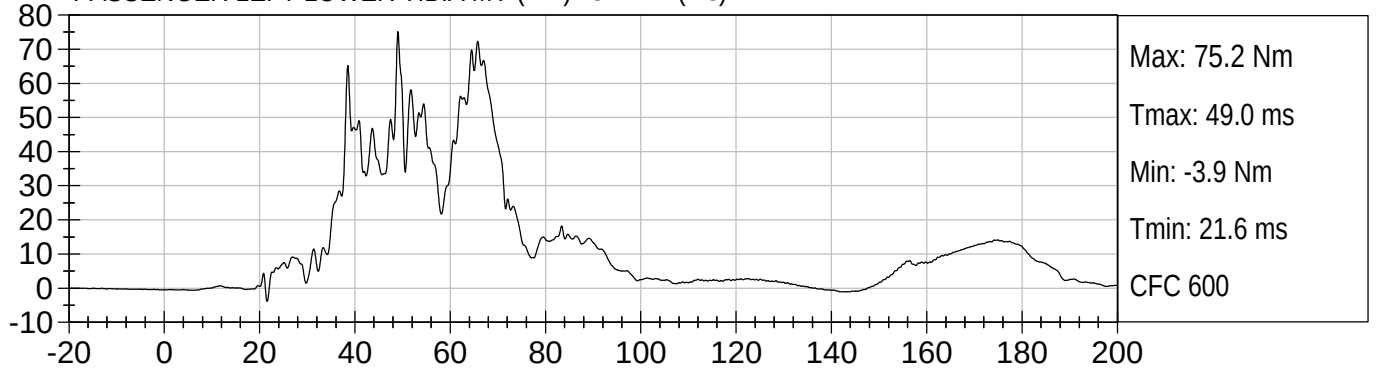




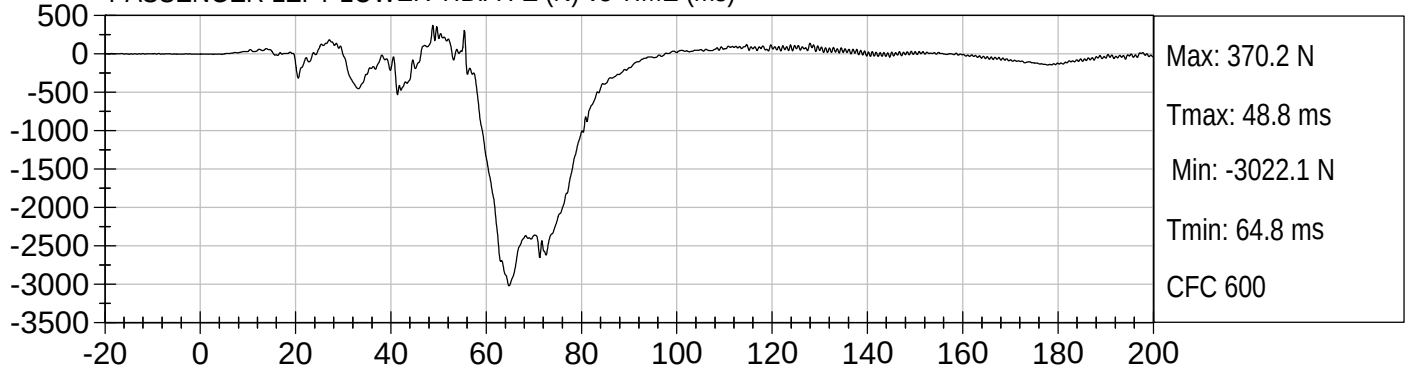
PASSENGER LEFT LOWER TIBIA MX (Nm) vs TIME (ms)



PASSENGER LEFT LOWER TIBIA MY (Nm) vs TIME (ms)

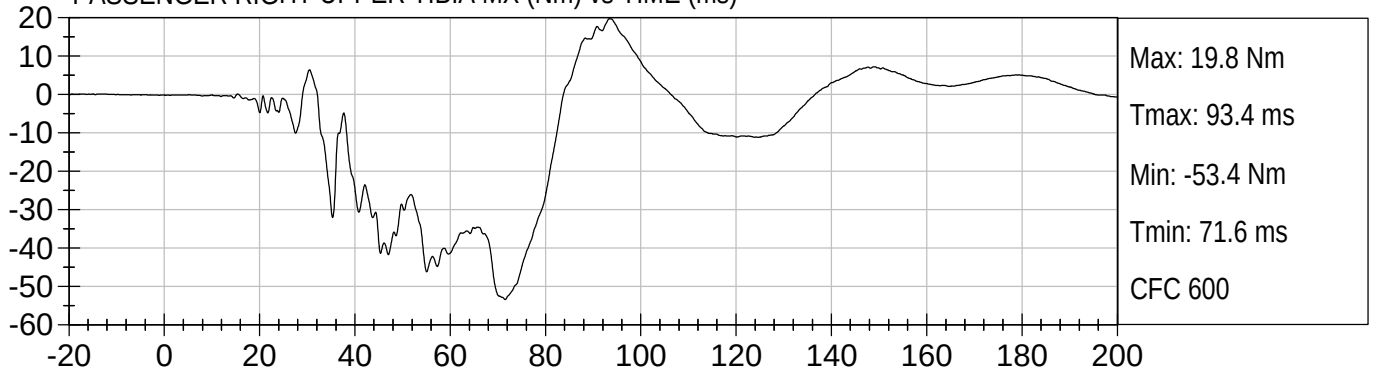


PASSENGER LEFT LOWER TIBIA FZ (N) vs TIME (ms)

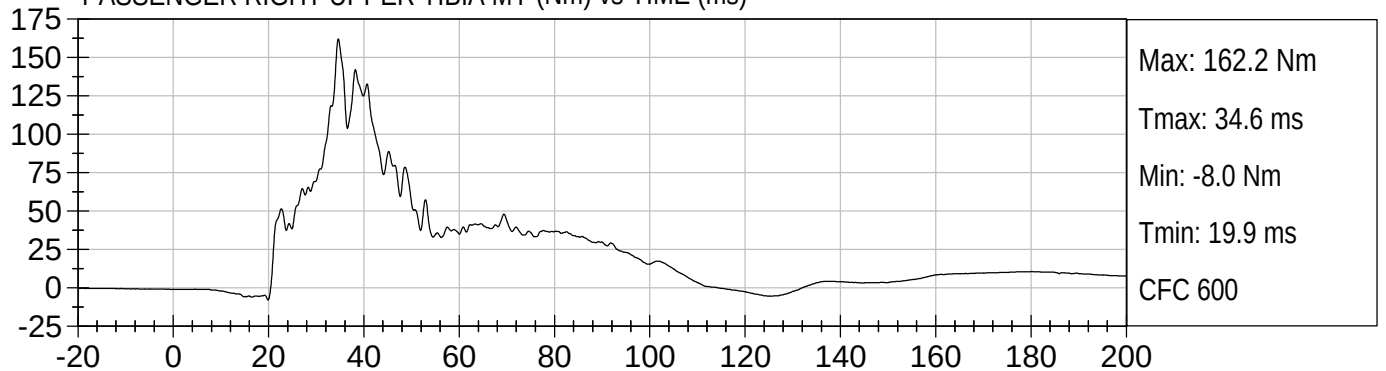




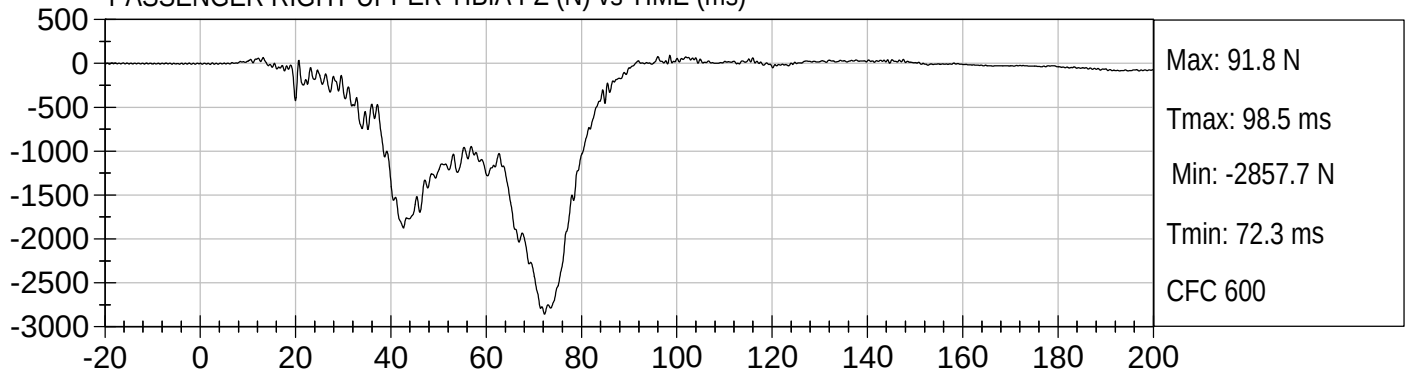
PASSENGER RIGHT UPPER TIBIA MX (Nm) vs TIME (ms)



PASSENGER RIGHT UPPER TIBIA MY (Nm) vs TIME (ms)

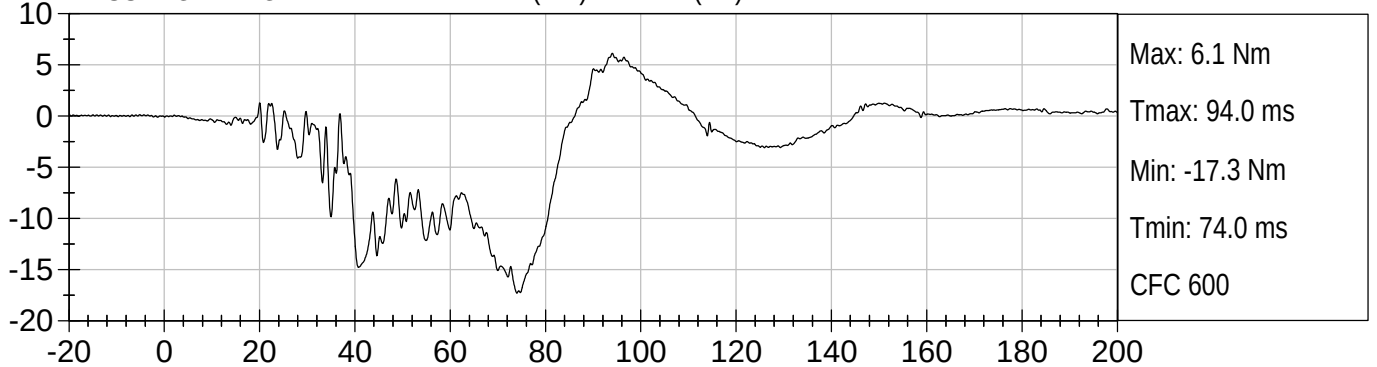


PASSENGER RIGHT UPPER TIBIA FZ (N) vs TIME (ms)

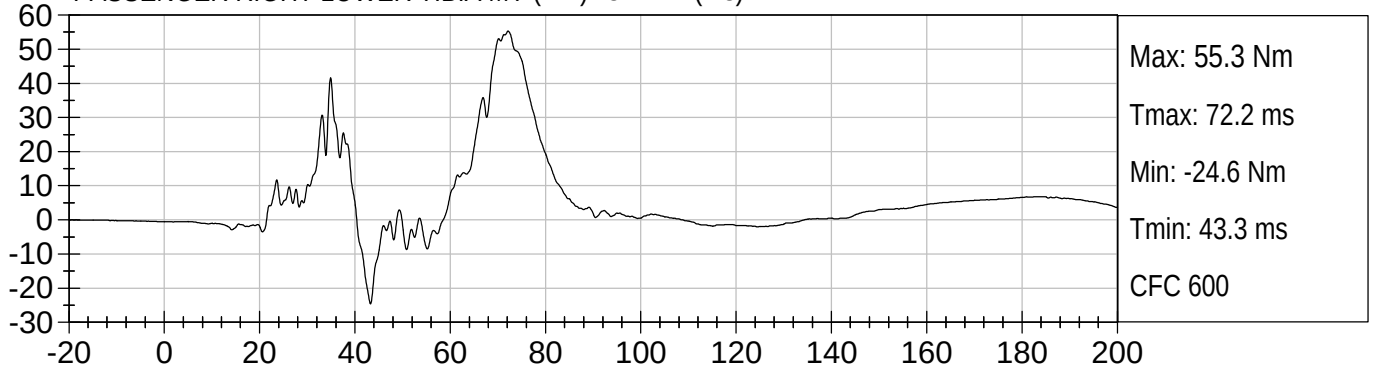




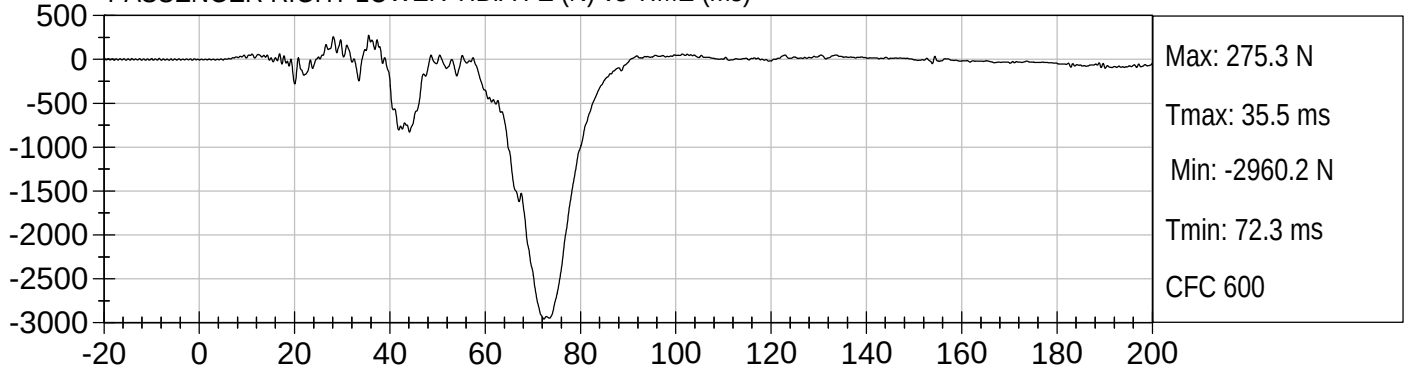
PASSENGER RIGHT LOWER TIBIA MX (Nm) vs TIME (ms)

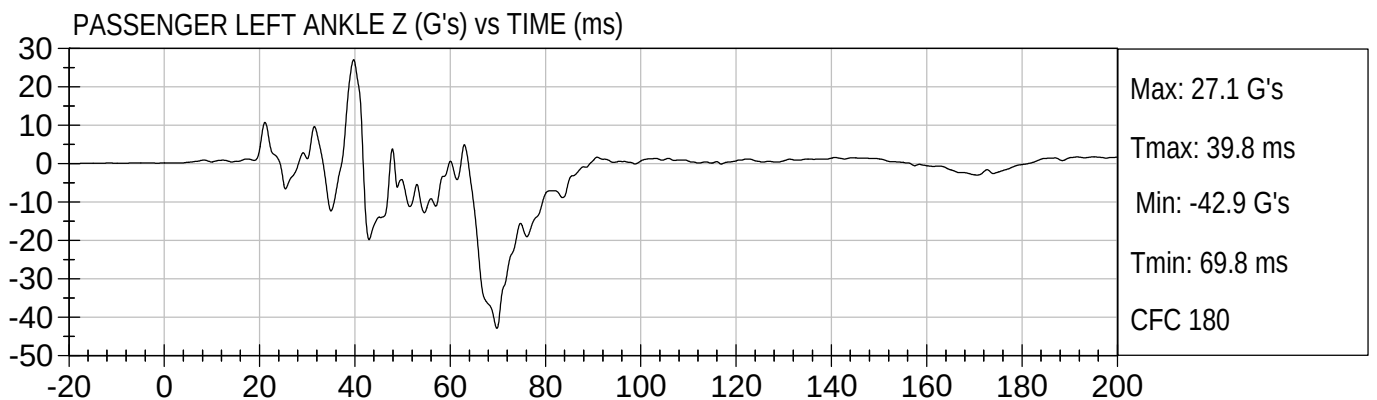
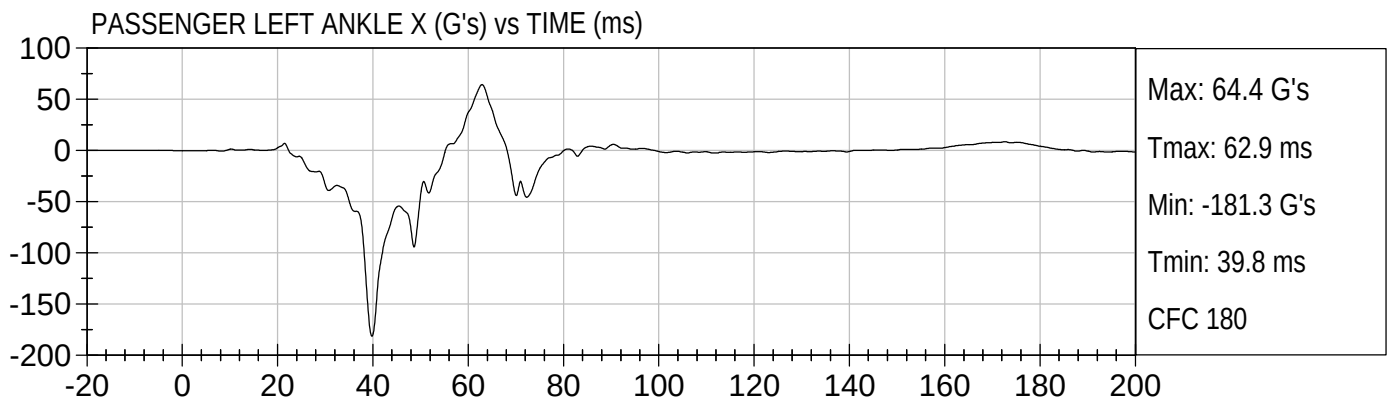
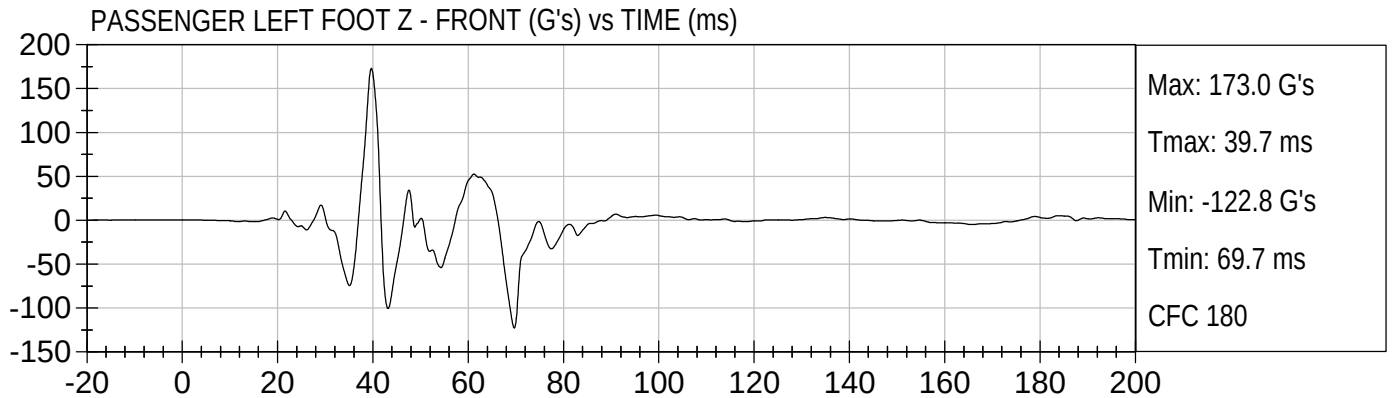


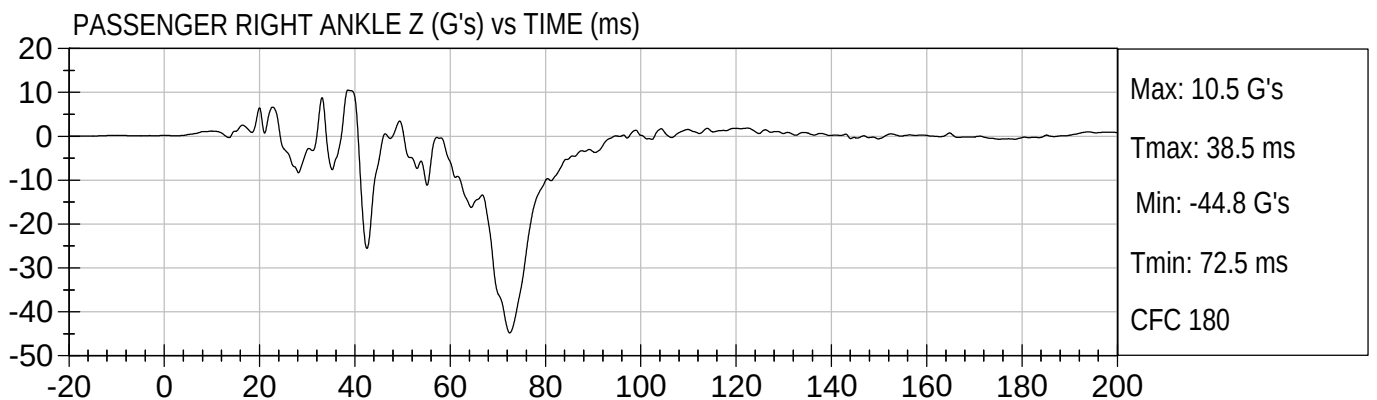
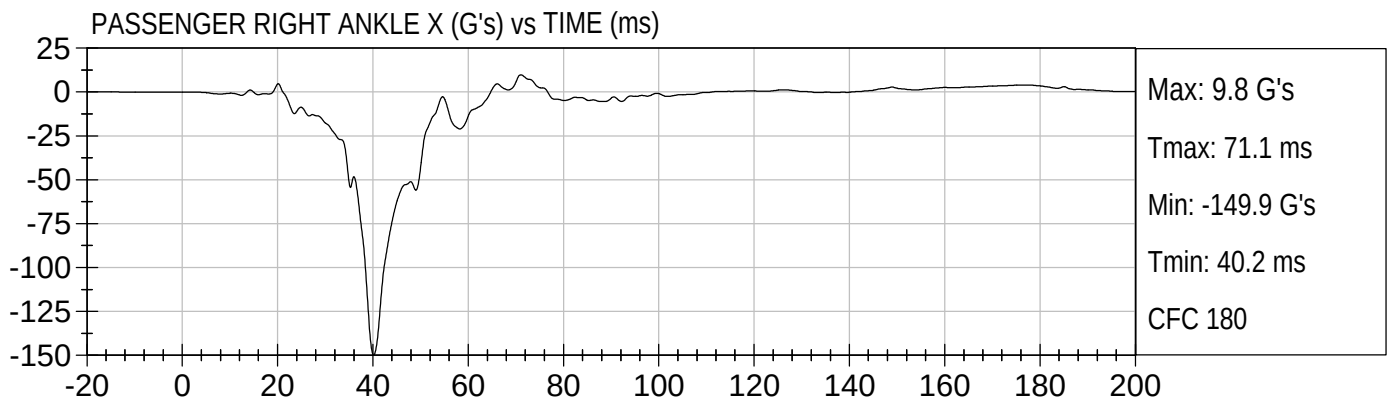
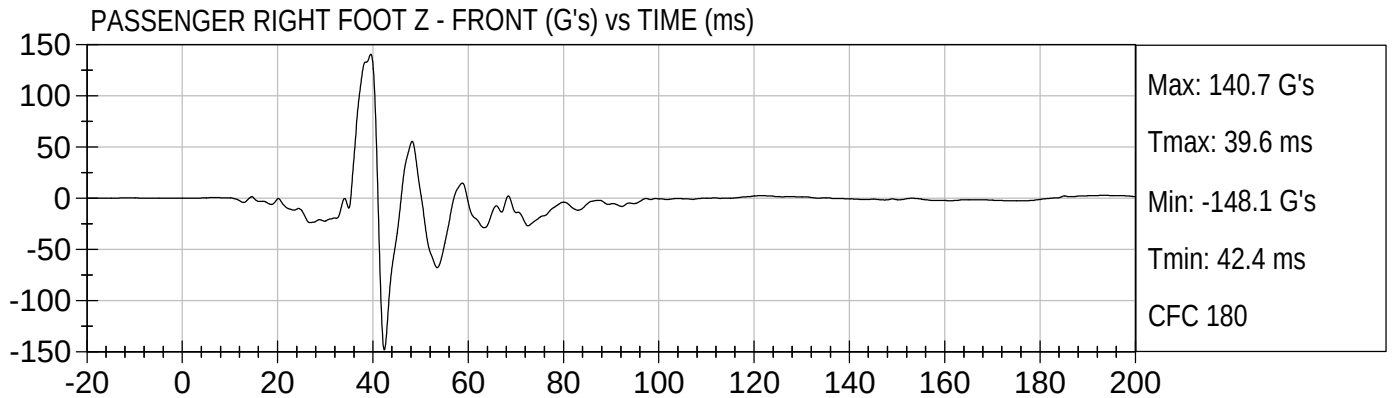
PASSENGER RIGHT LOWER TIBIA MY (Nm) vs TIME (ms)

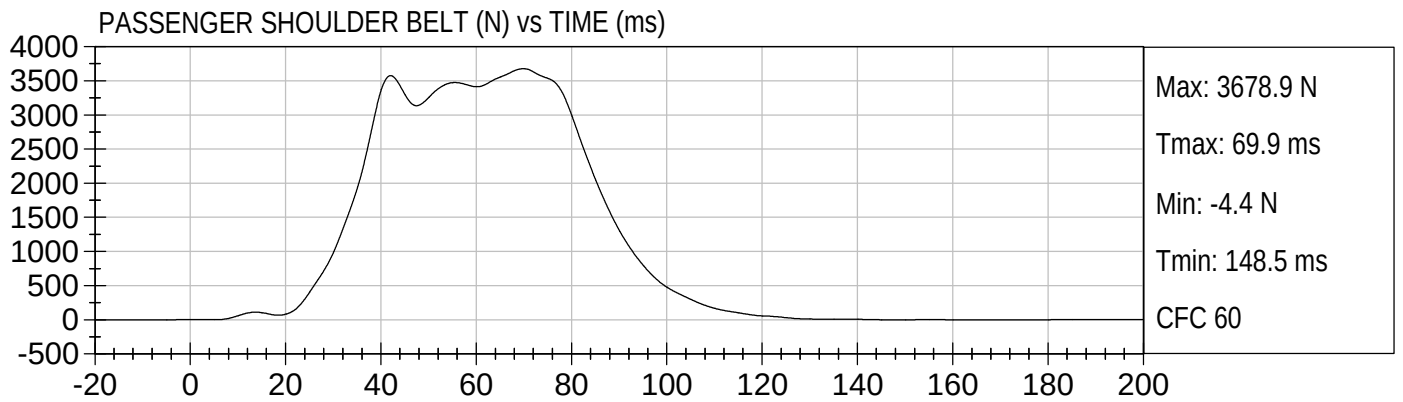


PASSENGER RIGHT LOWER TIBIA FZ (N) vs TIME (ms)

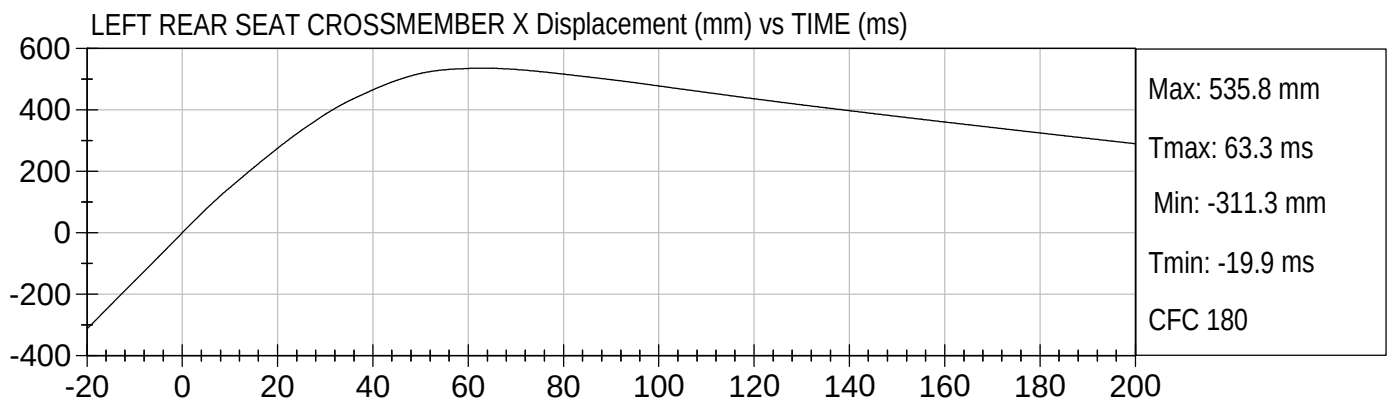
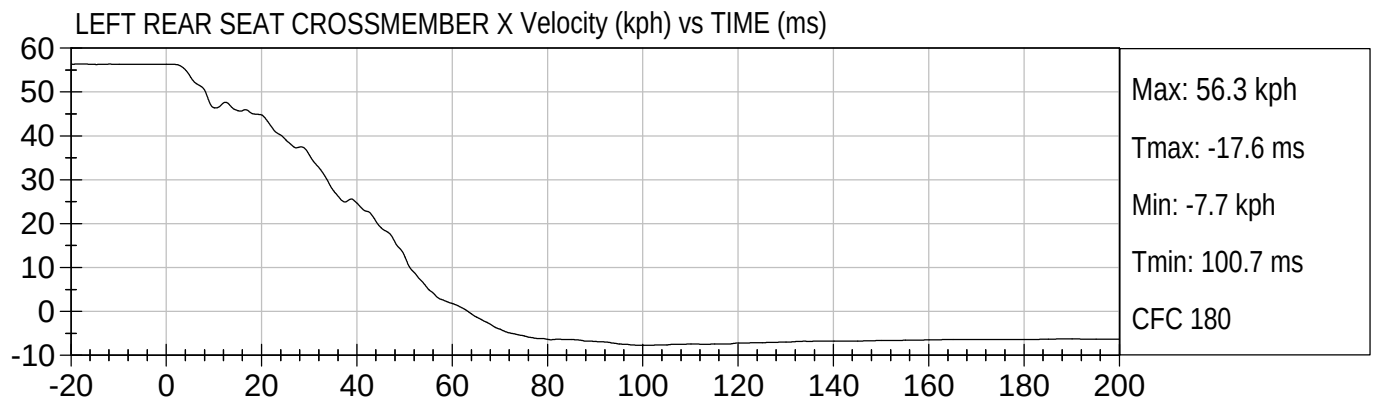
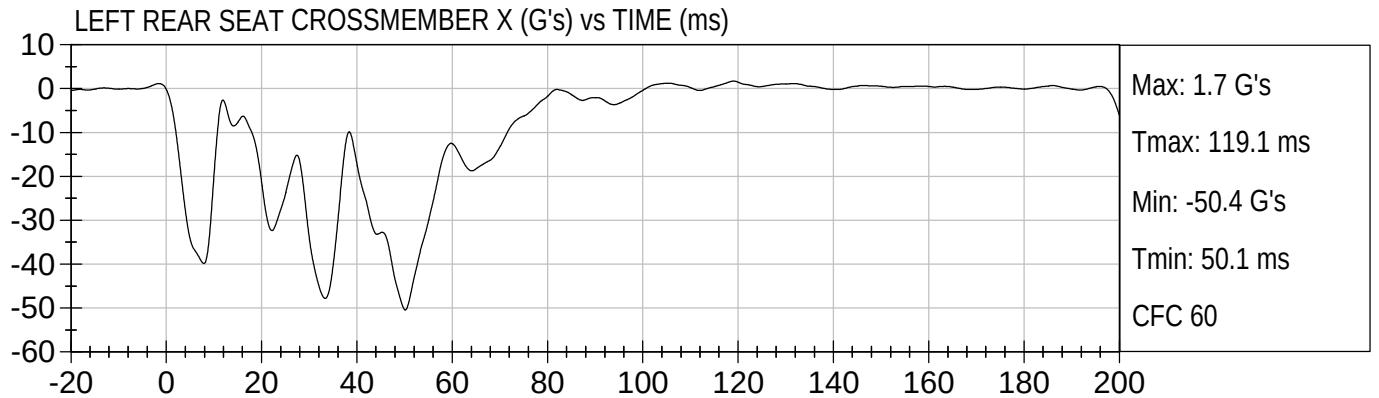


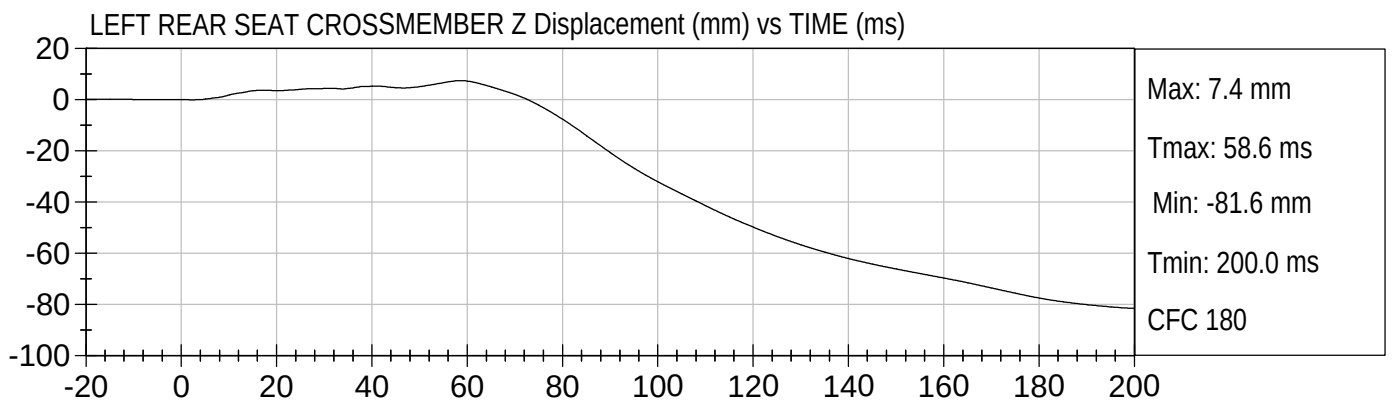
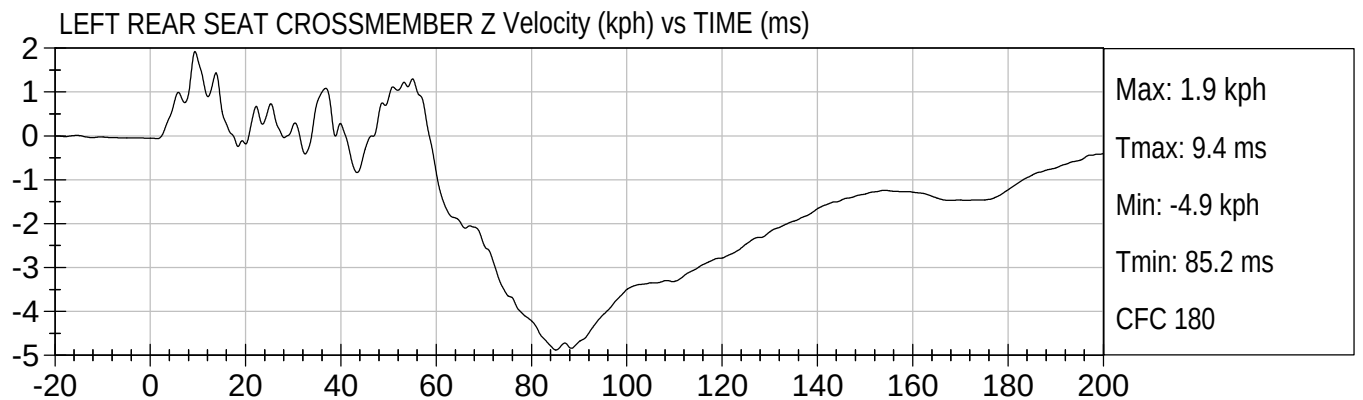
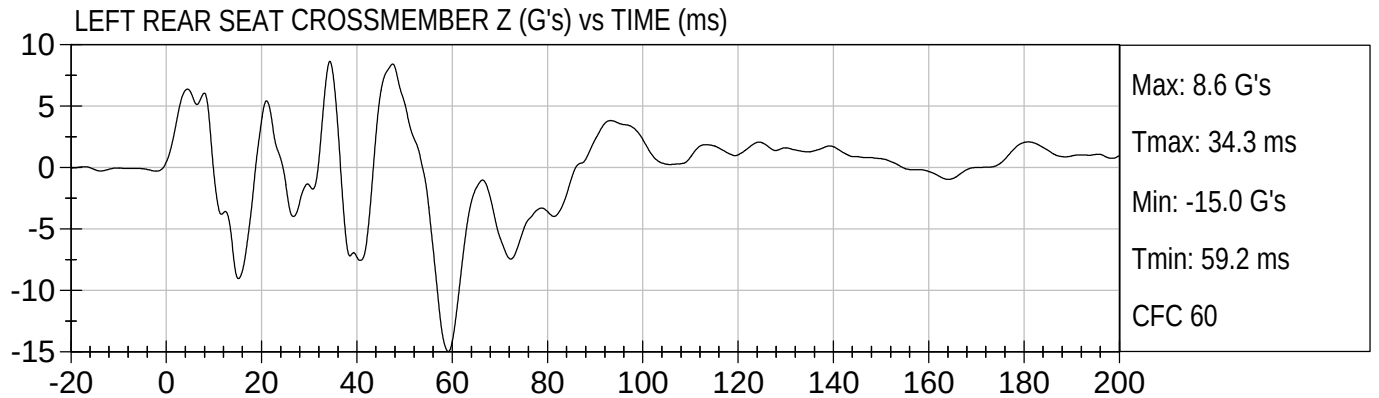


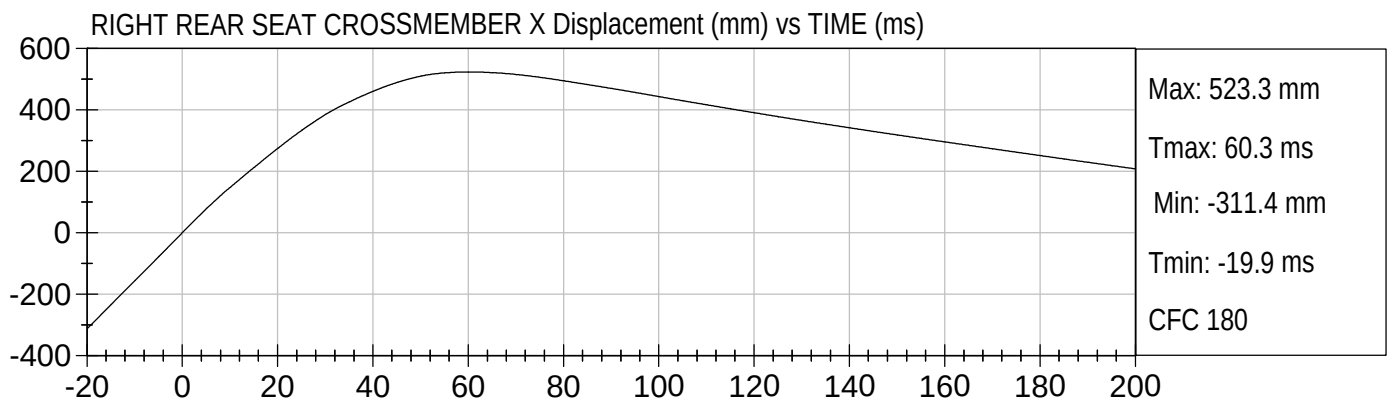
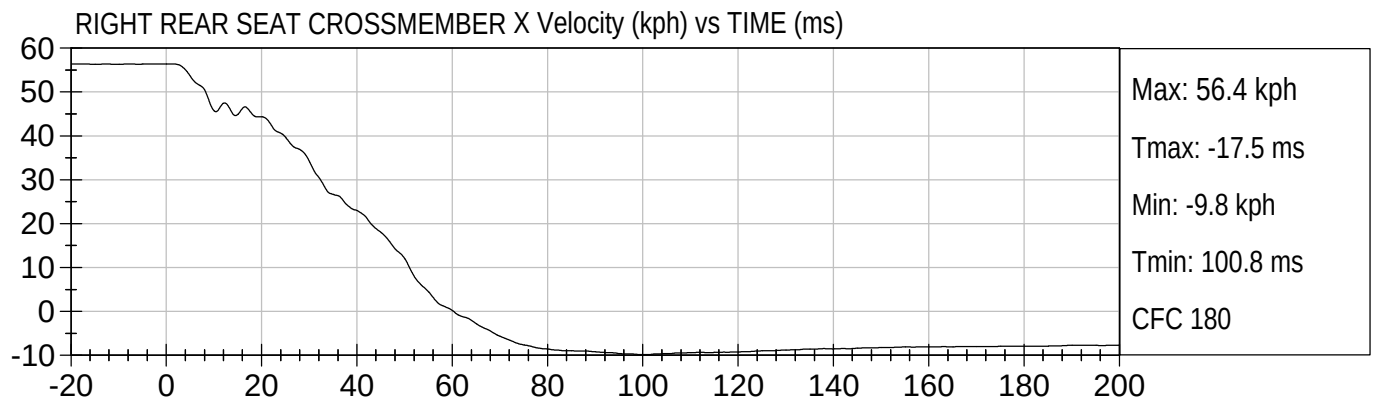
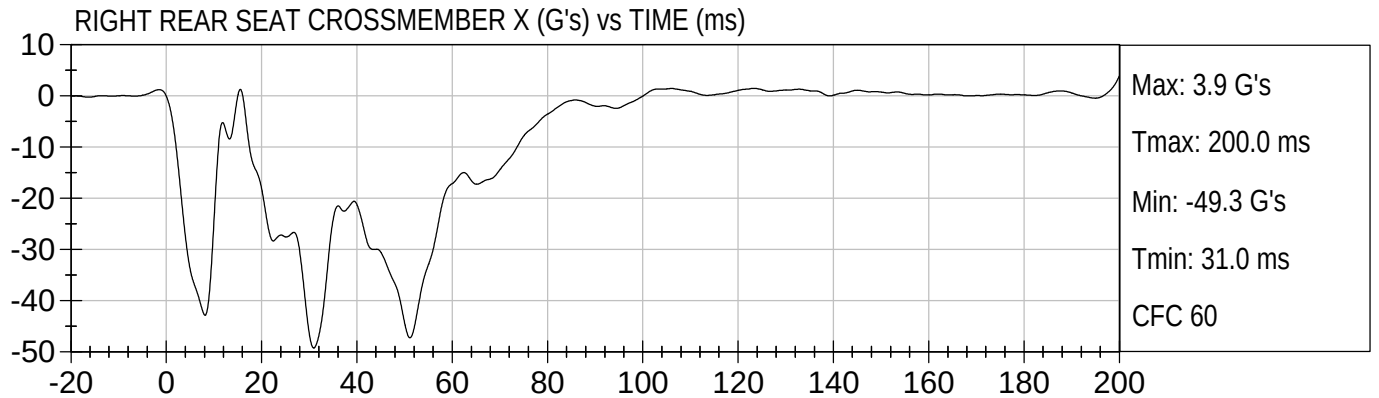




PASSENGER LAP BELT (N) vs TIME (ms)
NO VALID DATA COLLECTED

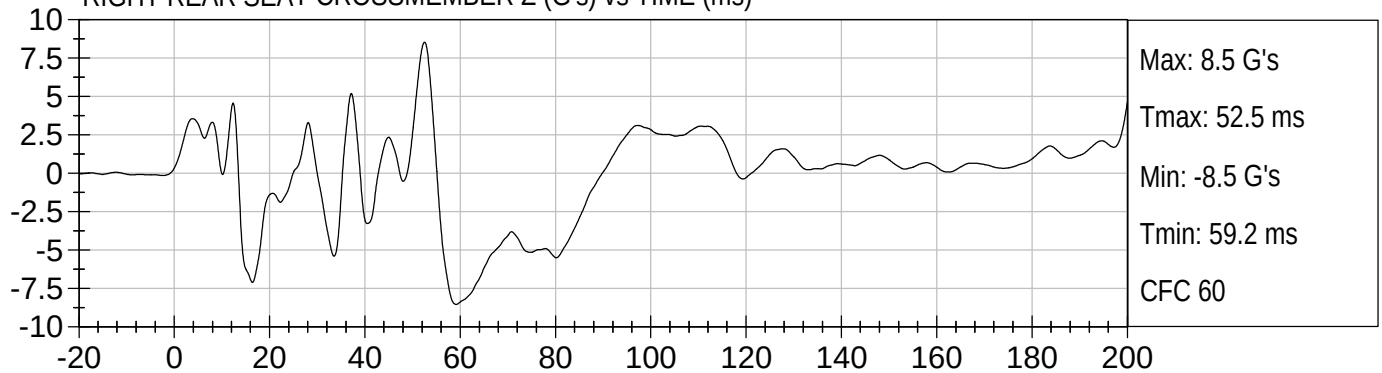




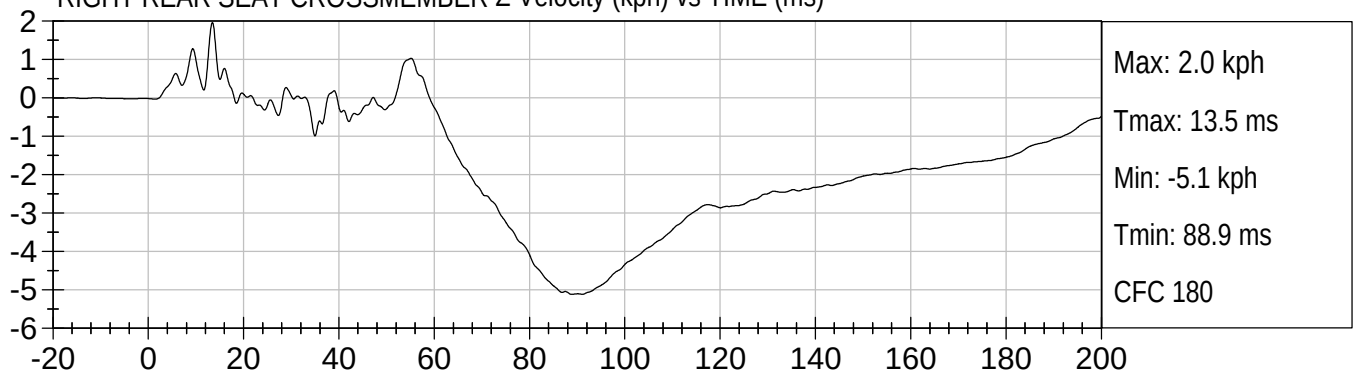




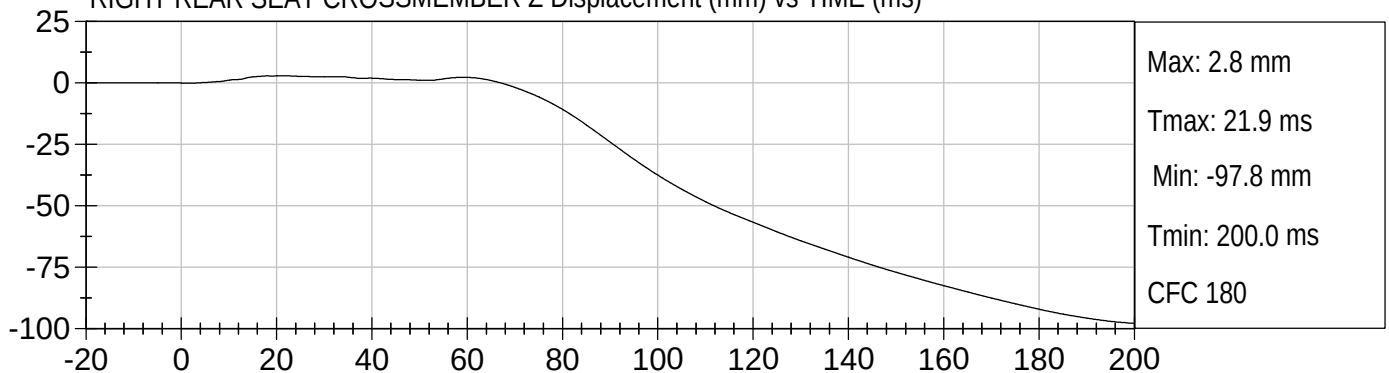
RIGHT REAR SEAT CROSSMEMBER Z (G's) vs TIME (ms)

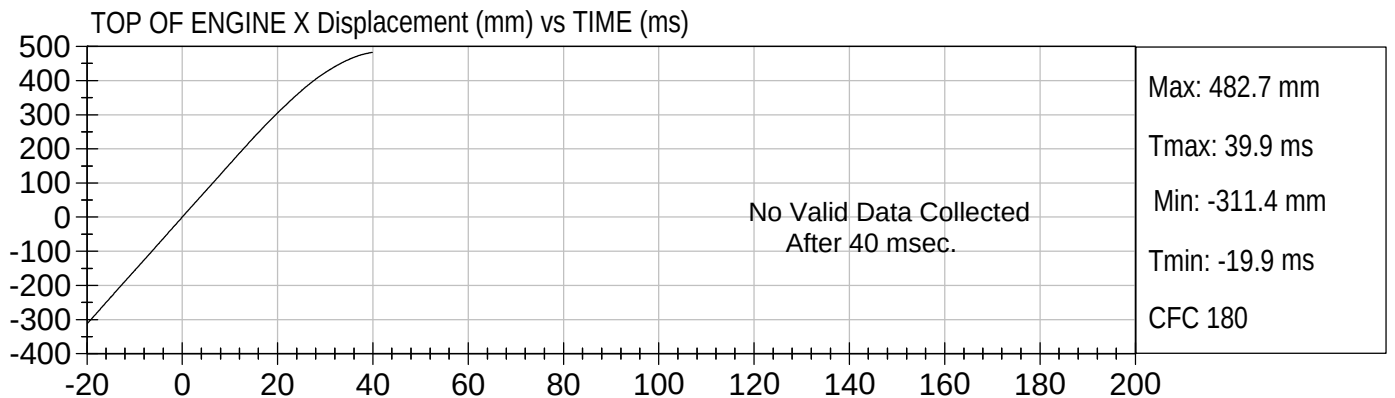
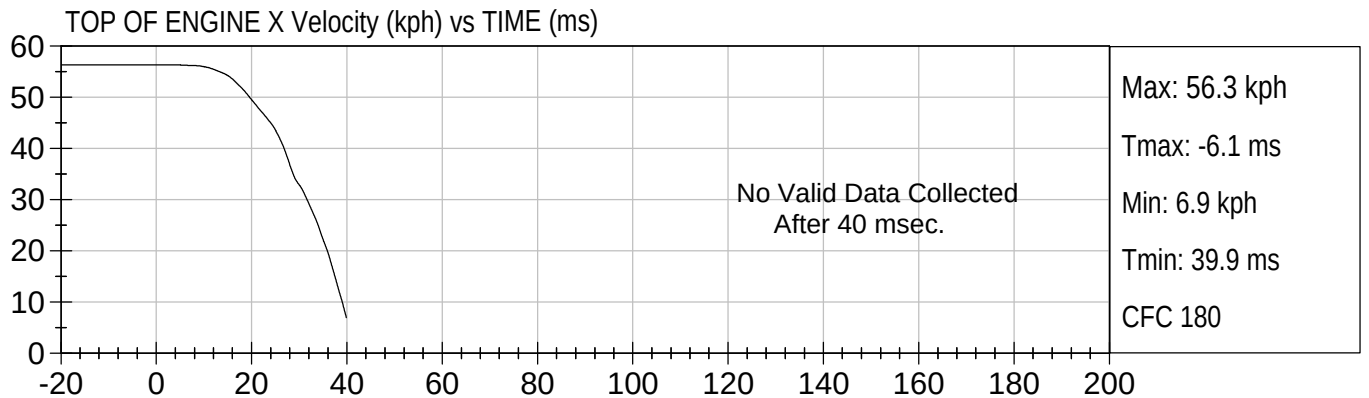
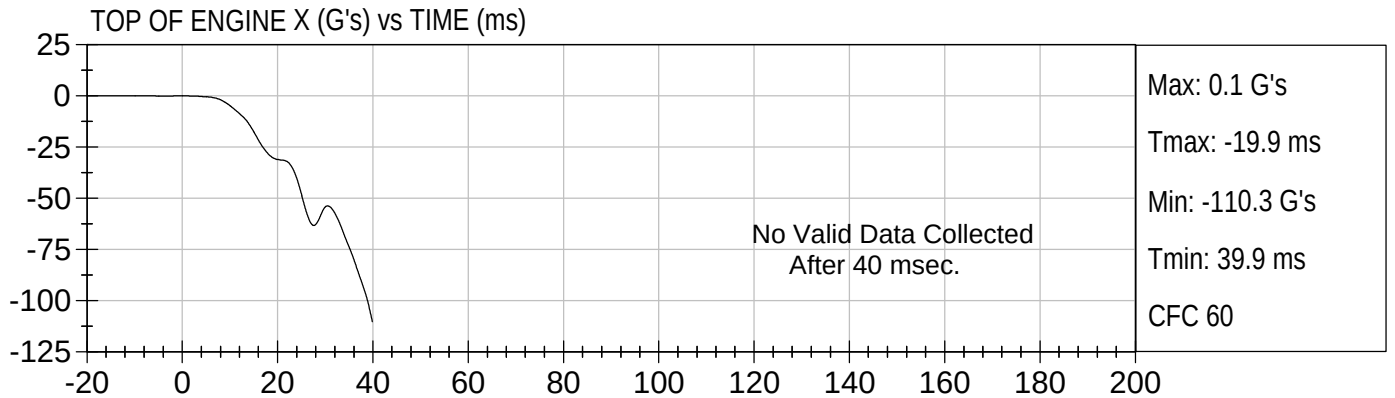


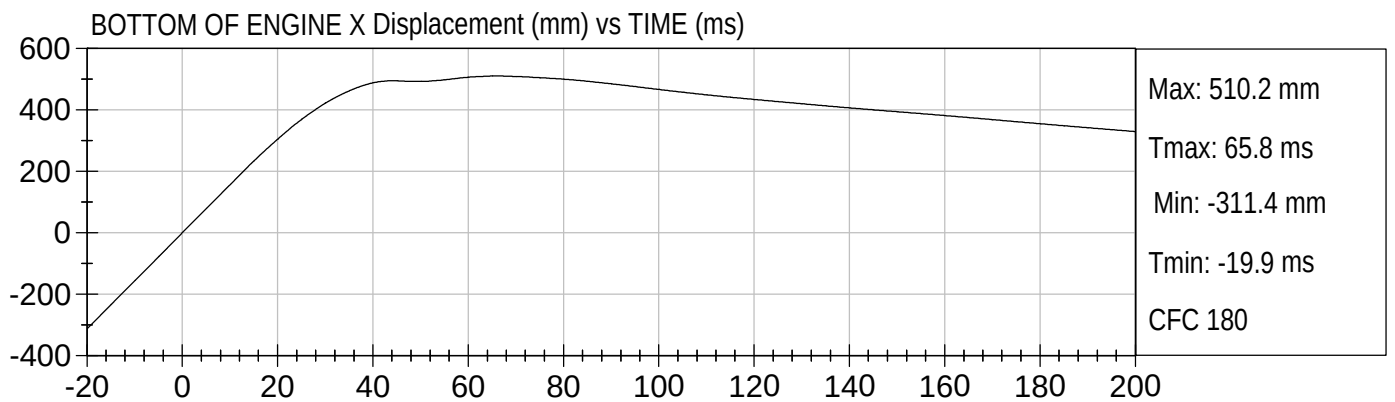
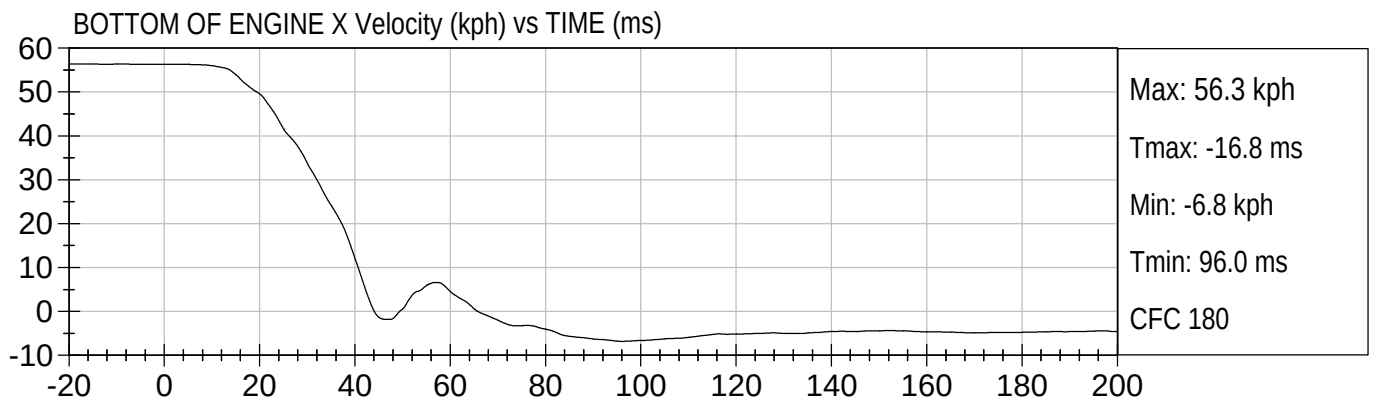
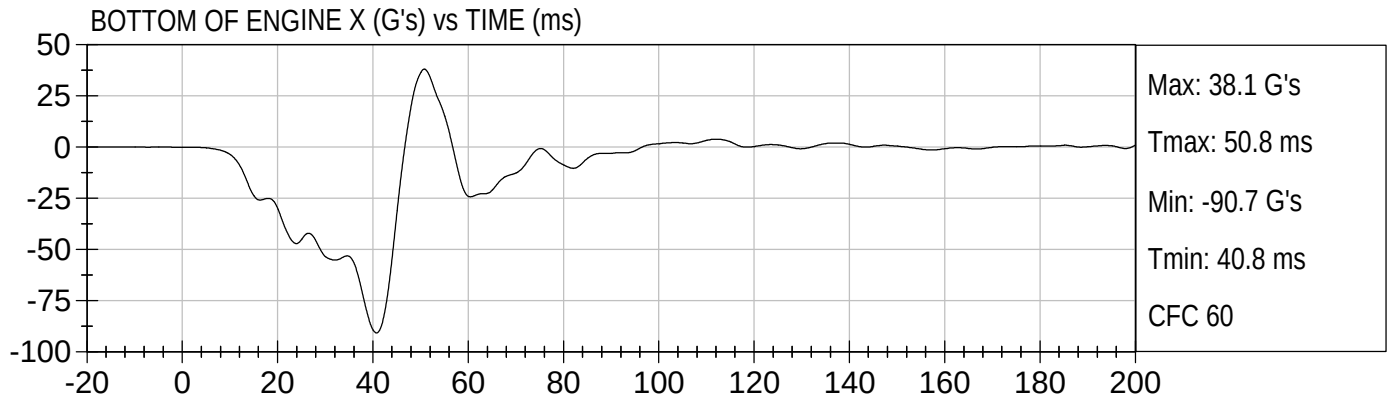
RIGHT REAR SEAT CROSSMEMBER Z Velocity (kph) vs TIME (ms)

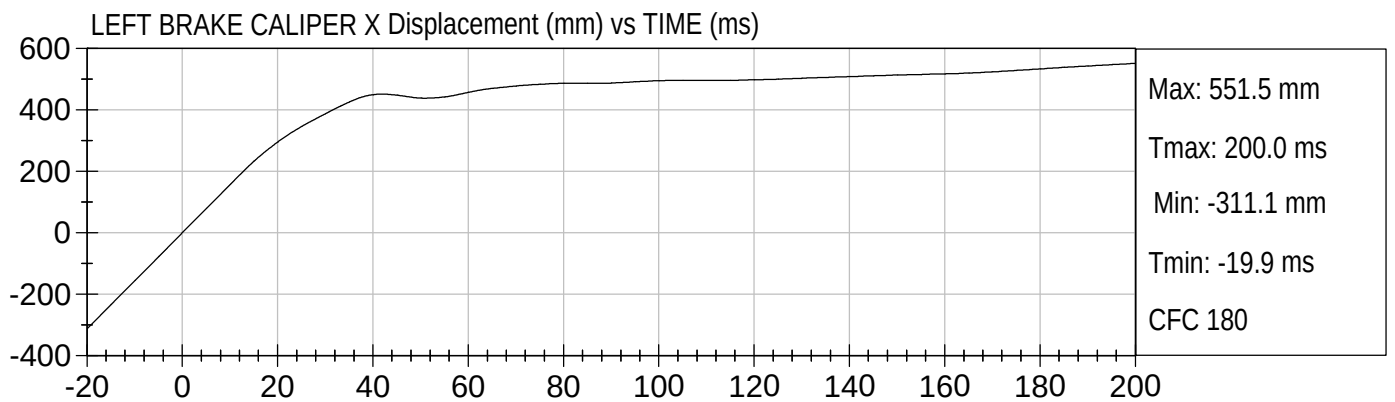
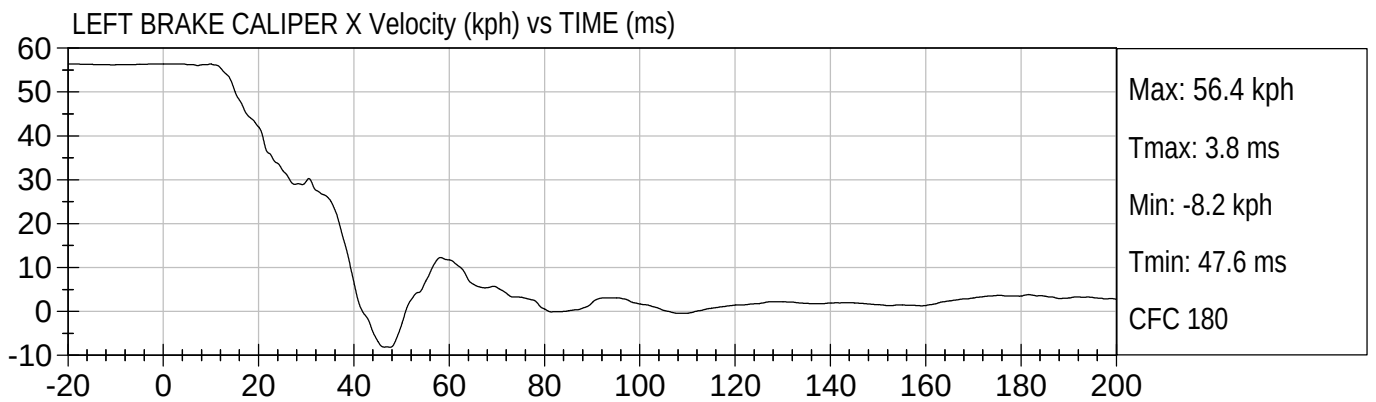
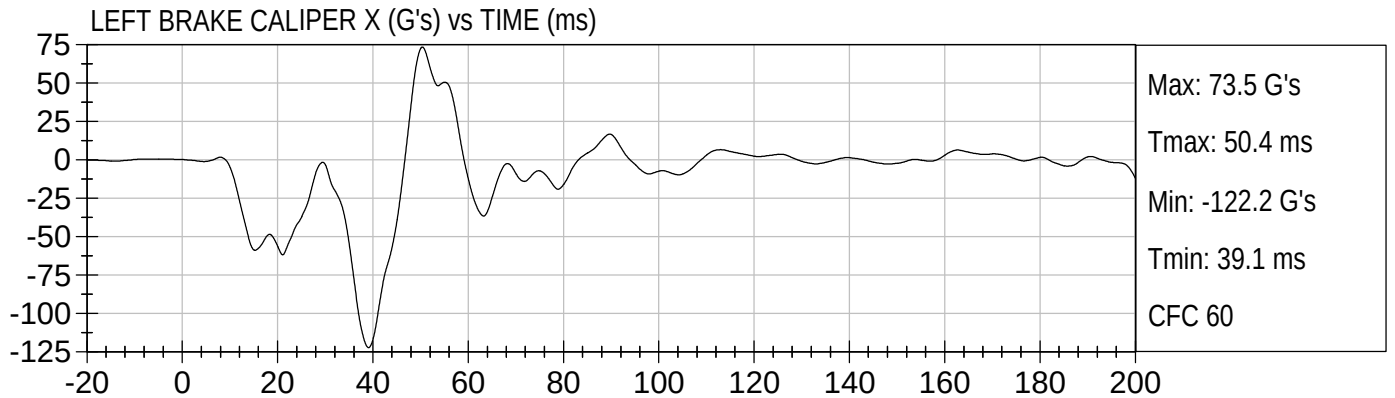


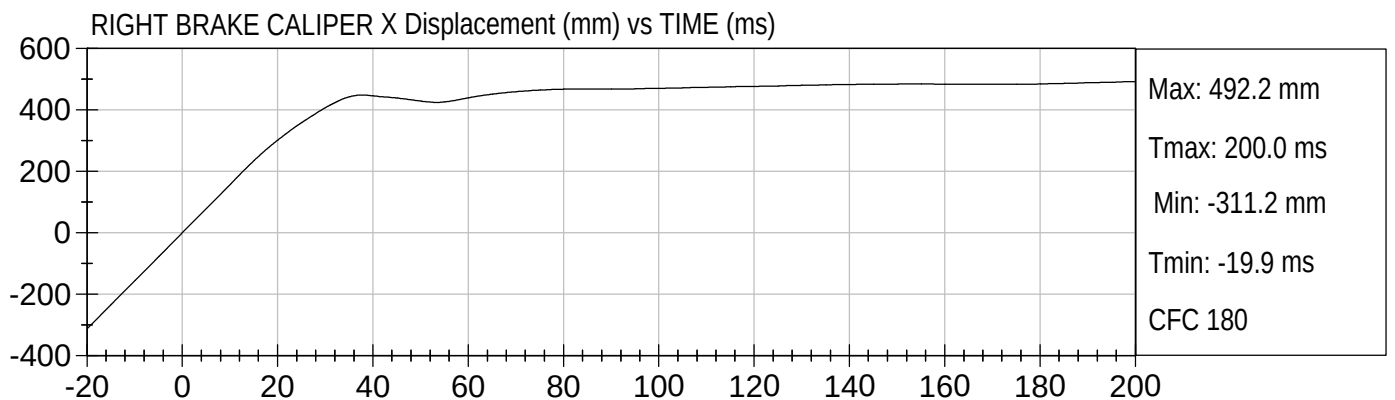
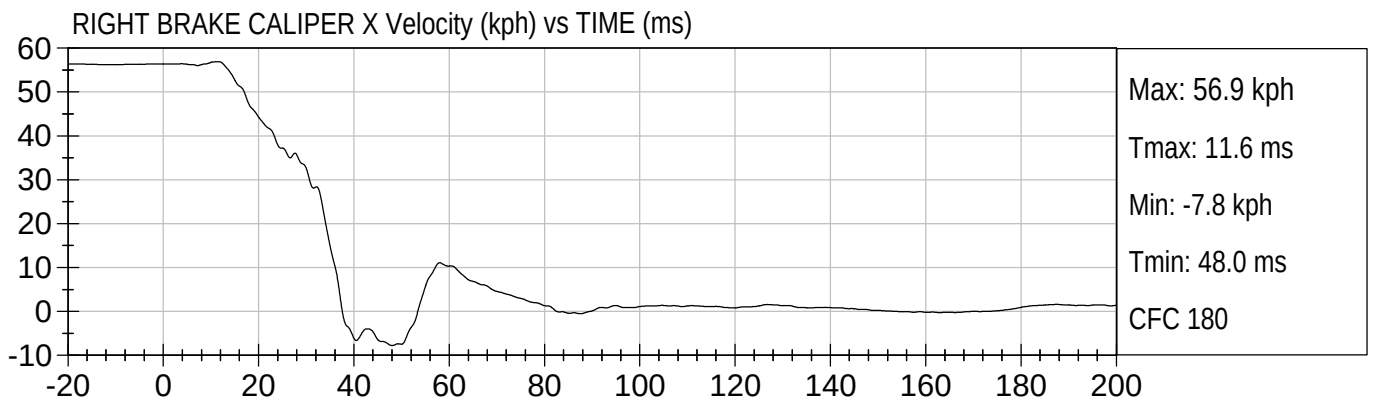
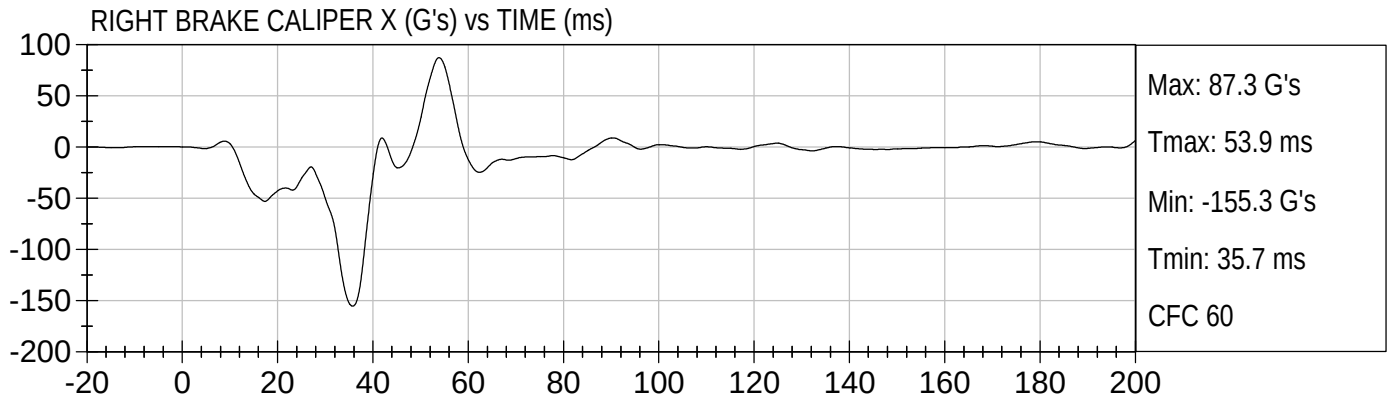
RIGHT REAR SEAT CROSSMEMBER Z Displacement (mm) vs TIME (ms)

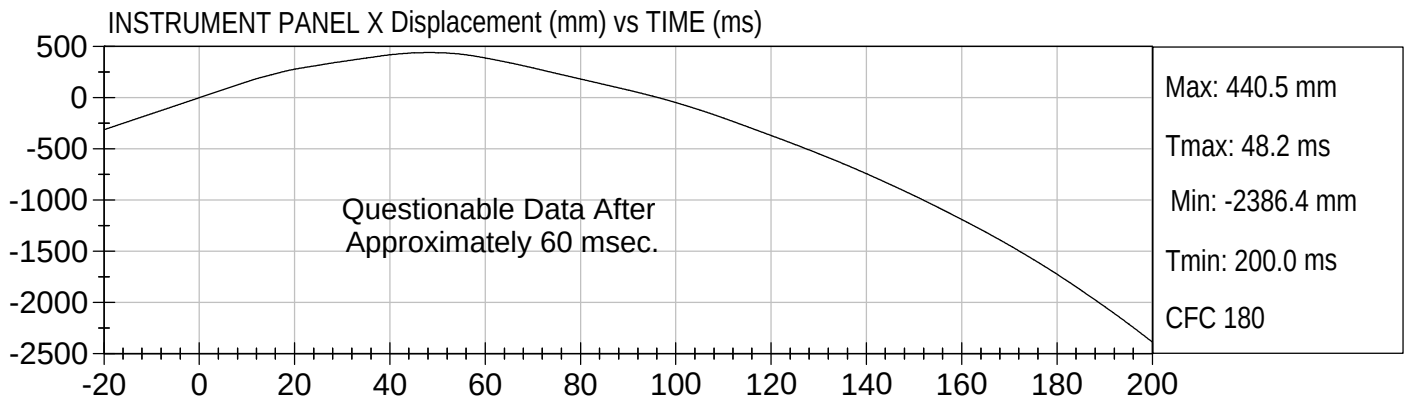
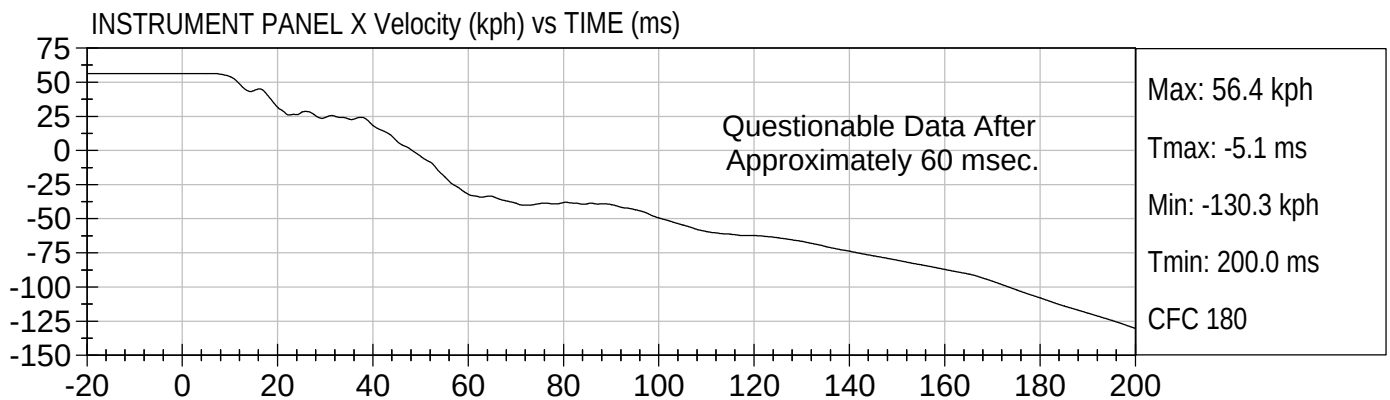
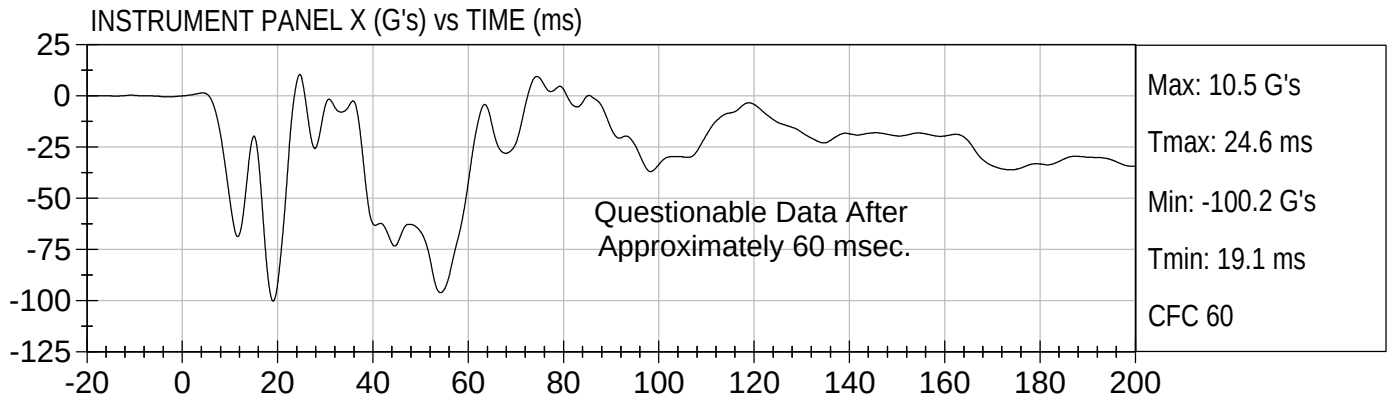


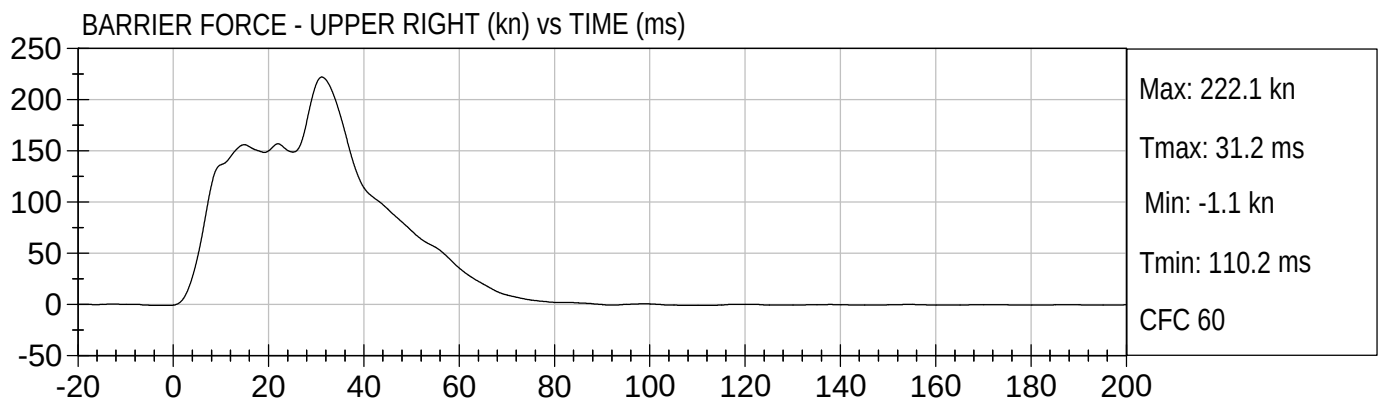
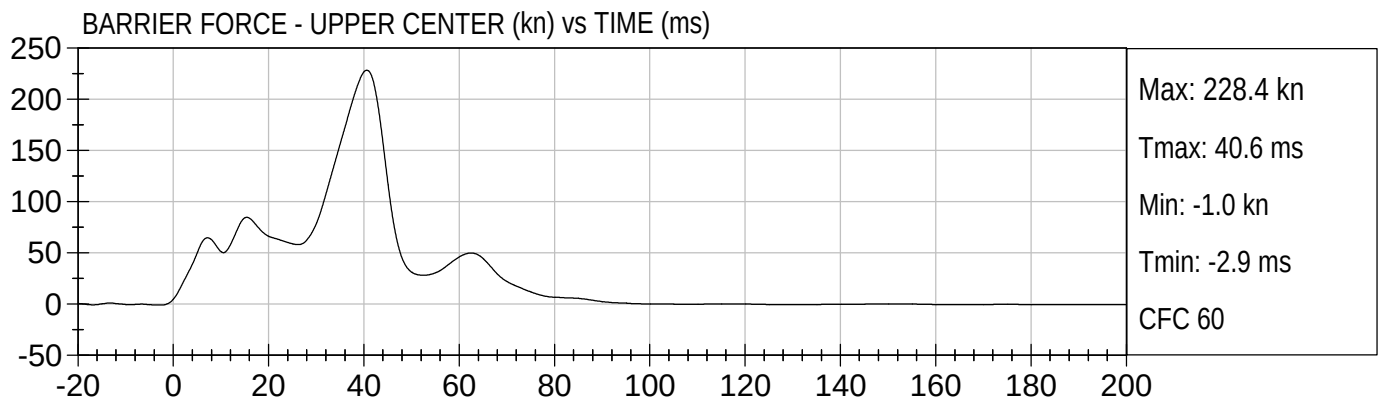
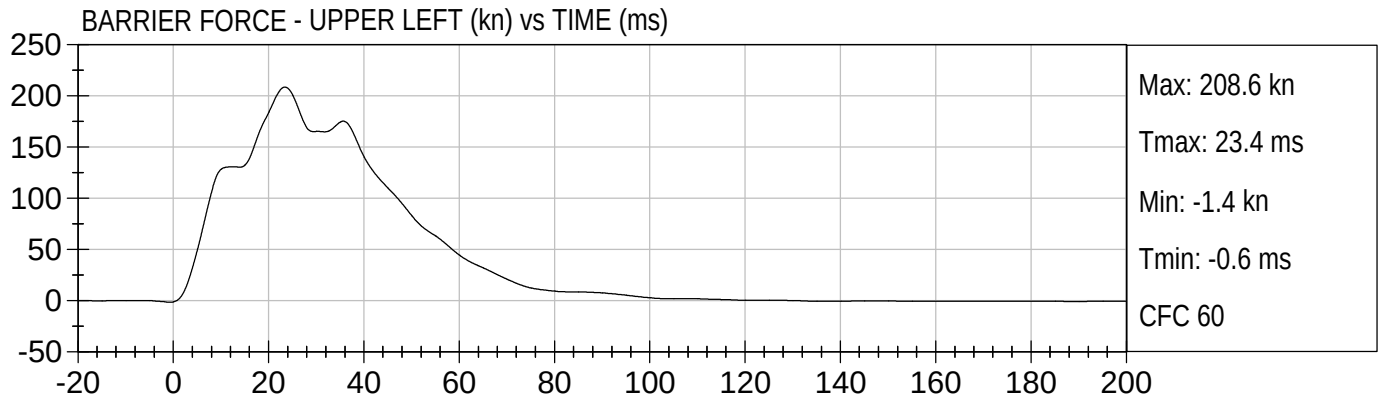


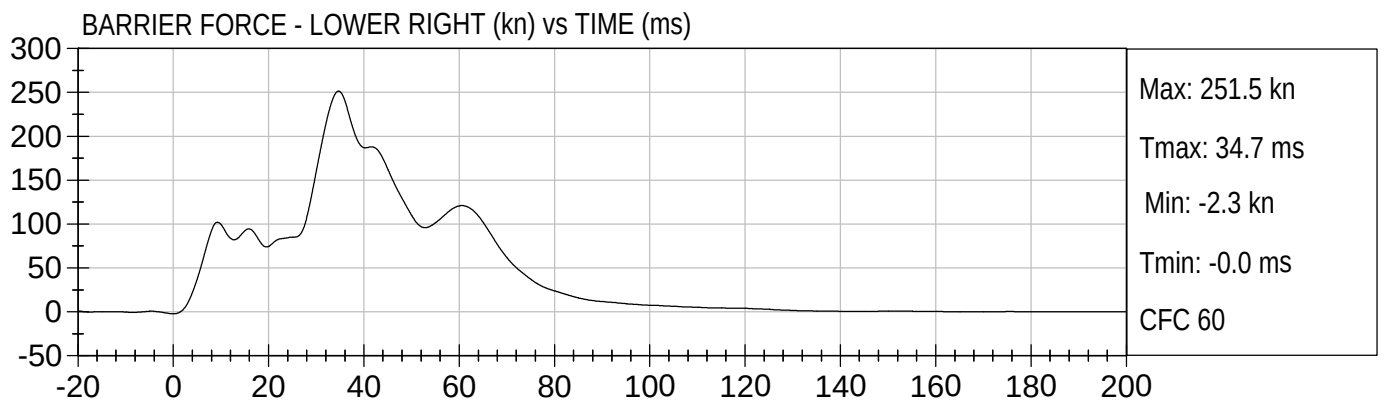
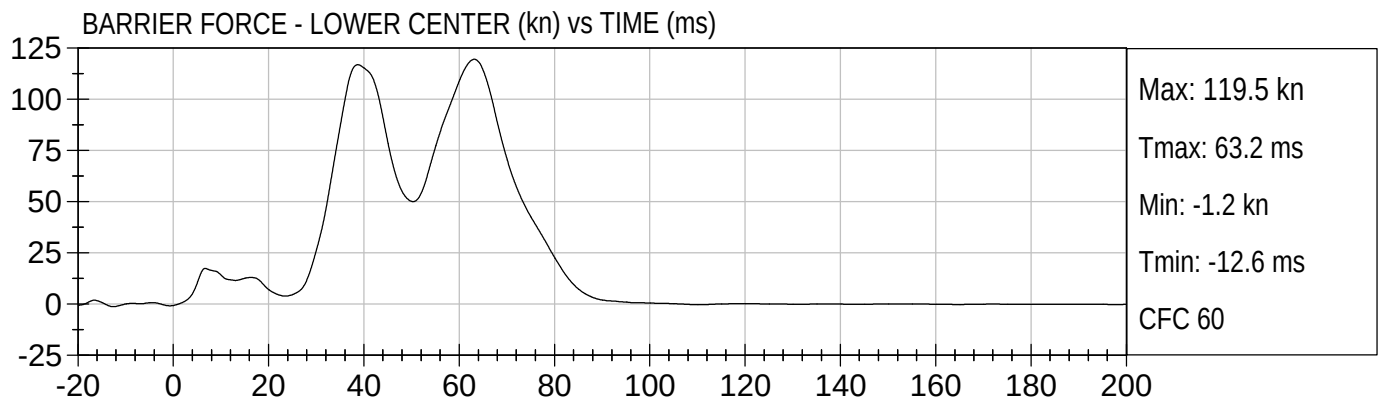
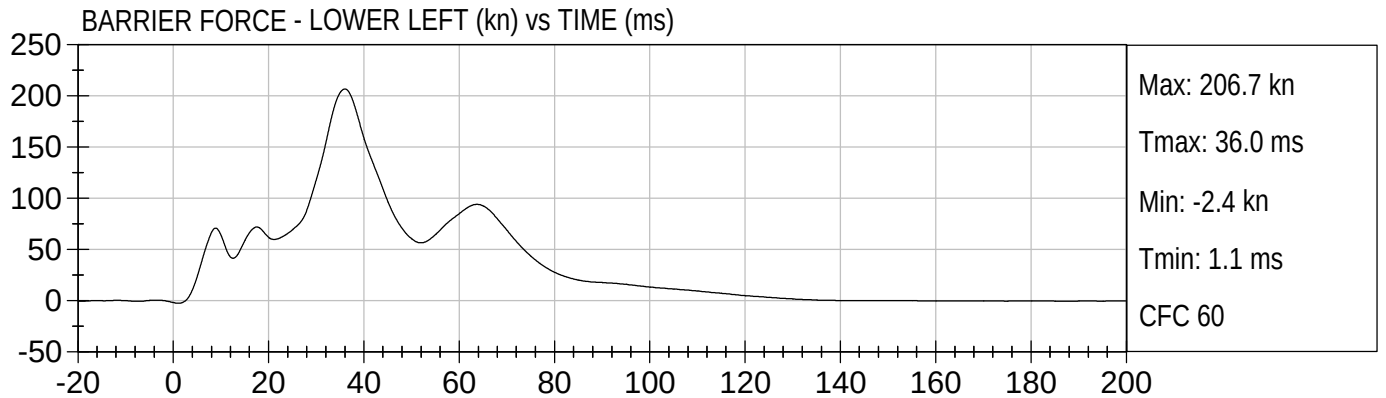


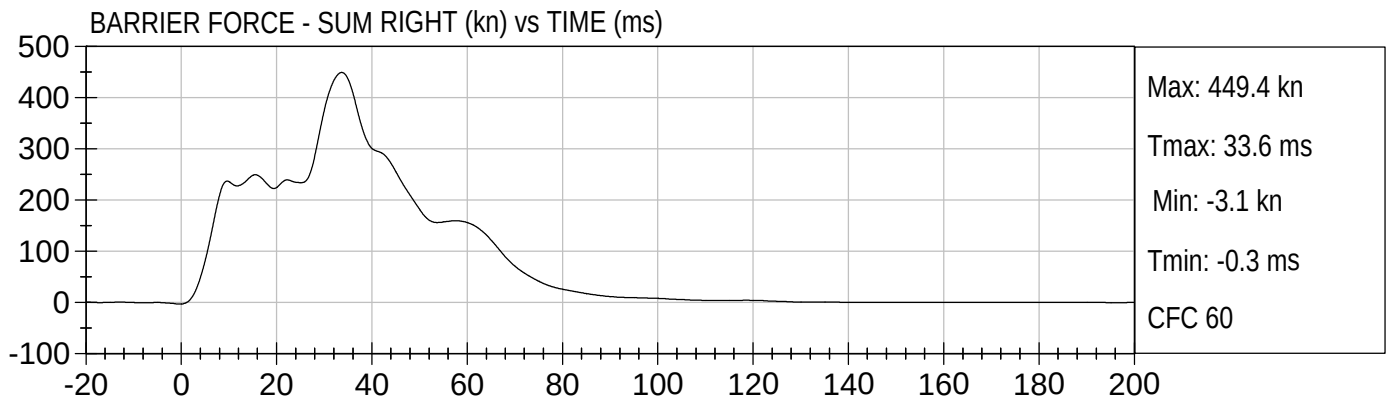
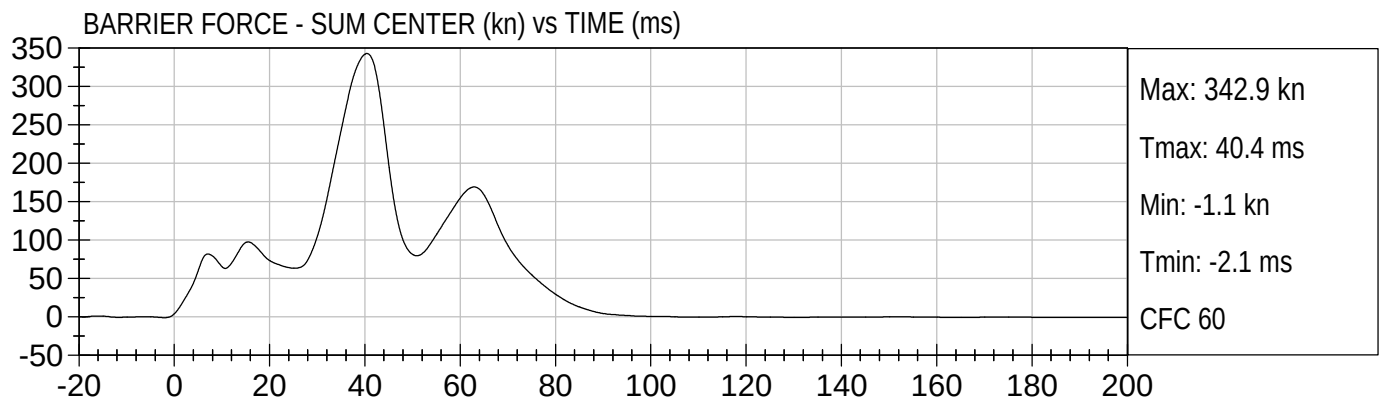
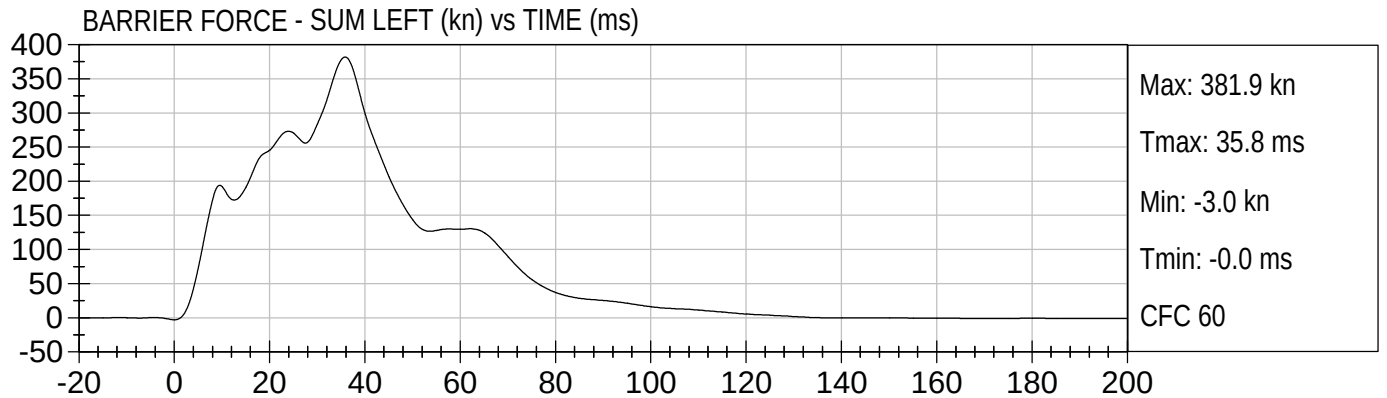


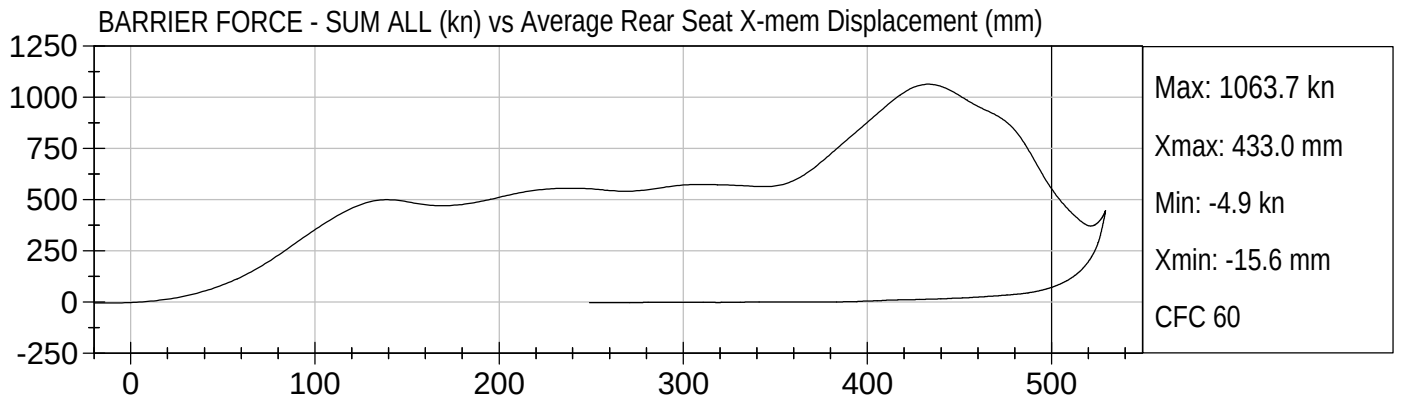
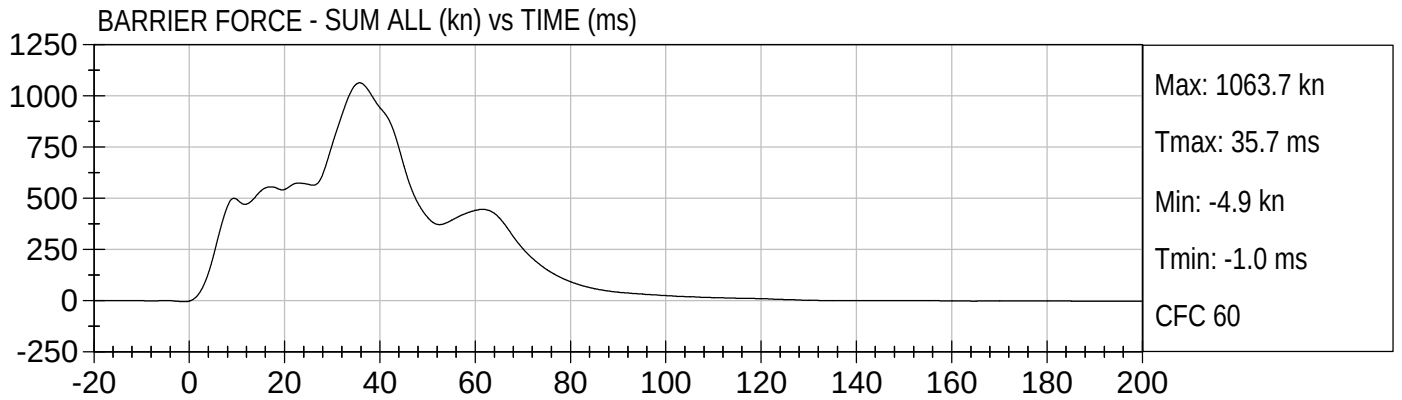












APPENDIX C

DUMMY CALIBRATION DATA TRACES AND TABLES

Hybrid III Calibration Data Sheet
50th Percentile Male
Head Drop Calibration

ATD Serial No: 066

Test I.D: D02191

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	262.1	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	12.7	Pass
Is Acceleration Unimodal?	Yes/No	< 10% Peak	Yes	Pass
			Overall Test Results	Pass

Laboratory Technician

2/7/02
Test Date

Approved By



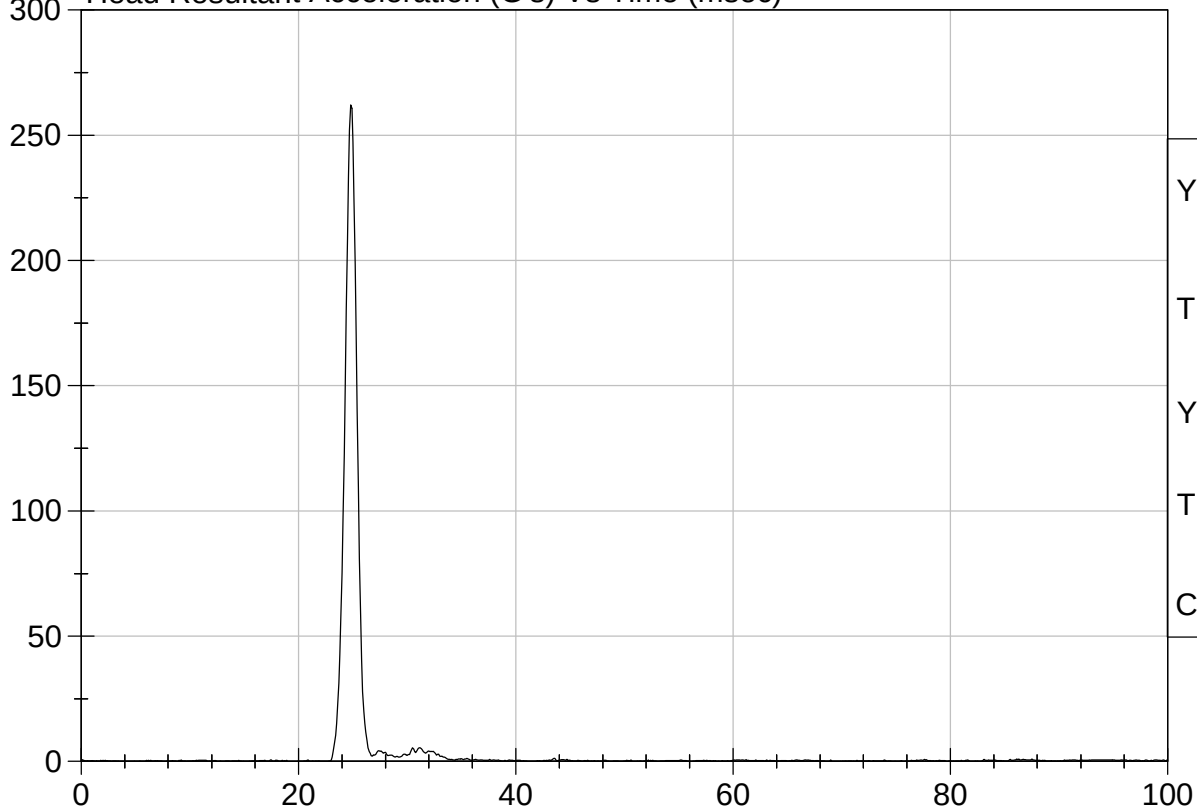
Test Description: Head Drop

Test Date: 2/7/02

Component: D02191

Speed: 0 ft/s, 0.00 m/s

Head Resultant Acceleration (G's) Vs Time (msec)



YMax: 262.1 G

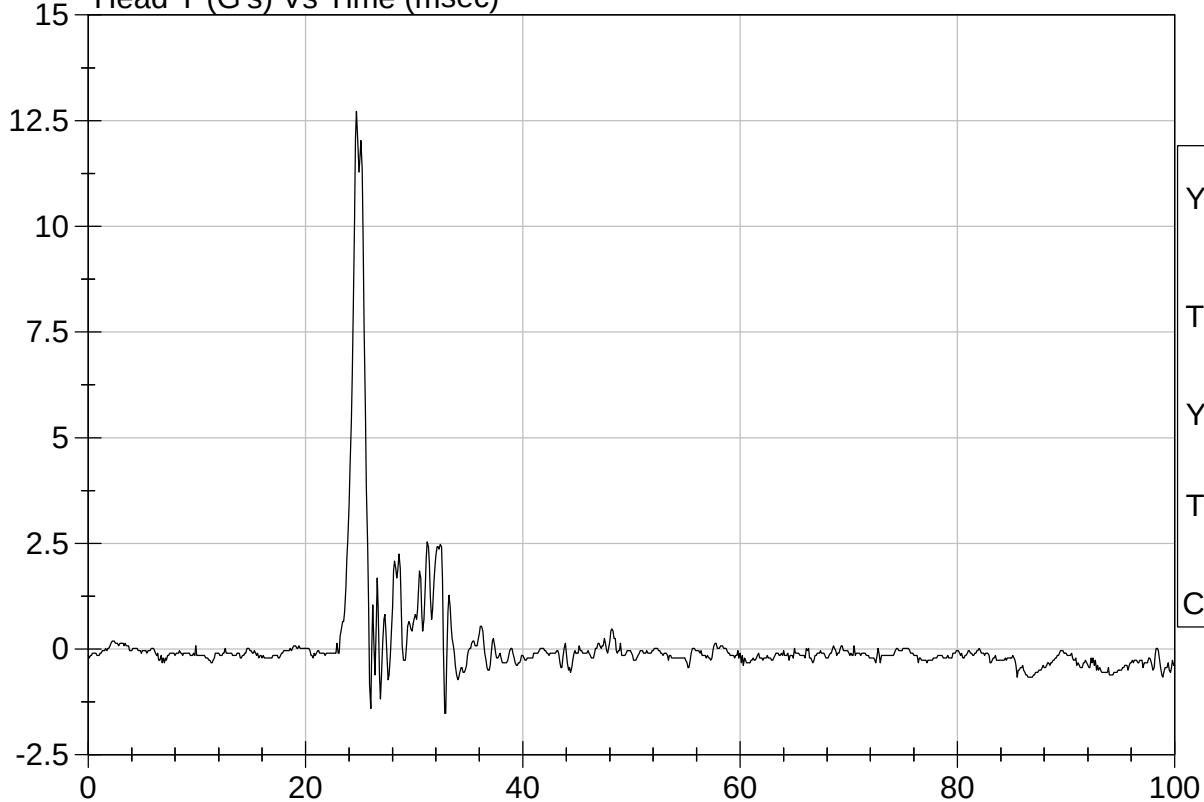
Tmax: 24.8 ms

YMin: 0.1 G

Tmin: 4.1 ms

CFC 1000

Head Y (G's) Vs Time (msec)



YMax: 12.7 G

Tmax: 24.7 ms

YMin: -1.5 G

Tmin: 32.8 ms

CFC 1000

Hybrid III Calibration Data Sheet
50th Percentile Male
Neck Flexion Test

ATD Serial No: 066

Test I.D: D02192

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	22	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.95	Pass
Pendulum Deceleration	10 msec	G's	22.50 to 27.50	23.90	Pass
	20 msec	G's	17.60 to 22.60	18.78	Pass
	30 msec	G's	12.50 to 18.50	14.67	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 29.0	14.7	Pass
Deceleration Decay Time to Cross 5 G's		msec	34.0 to 42.0	37.2	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	73.1	Pass
	Time	msec	57.0 to 64.0	57.3	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	113.0 to 128.0	114.9	Pass
Moment About Occipital Condyle	Maximum	N m	84.1 to 108.5	95.0	Pass
	Time	msec	47.0 to 58.0	50.5	Pass
Positive Moment Decay Time To Zero Crossing		msec	97.0 to 107.0	97.8	Pass
Overall Test Results					Pass

Laboratory Technician

2/7/02

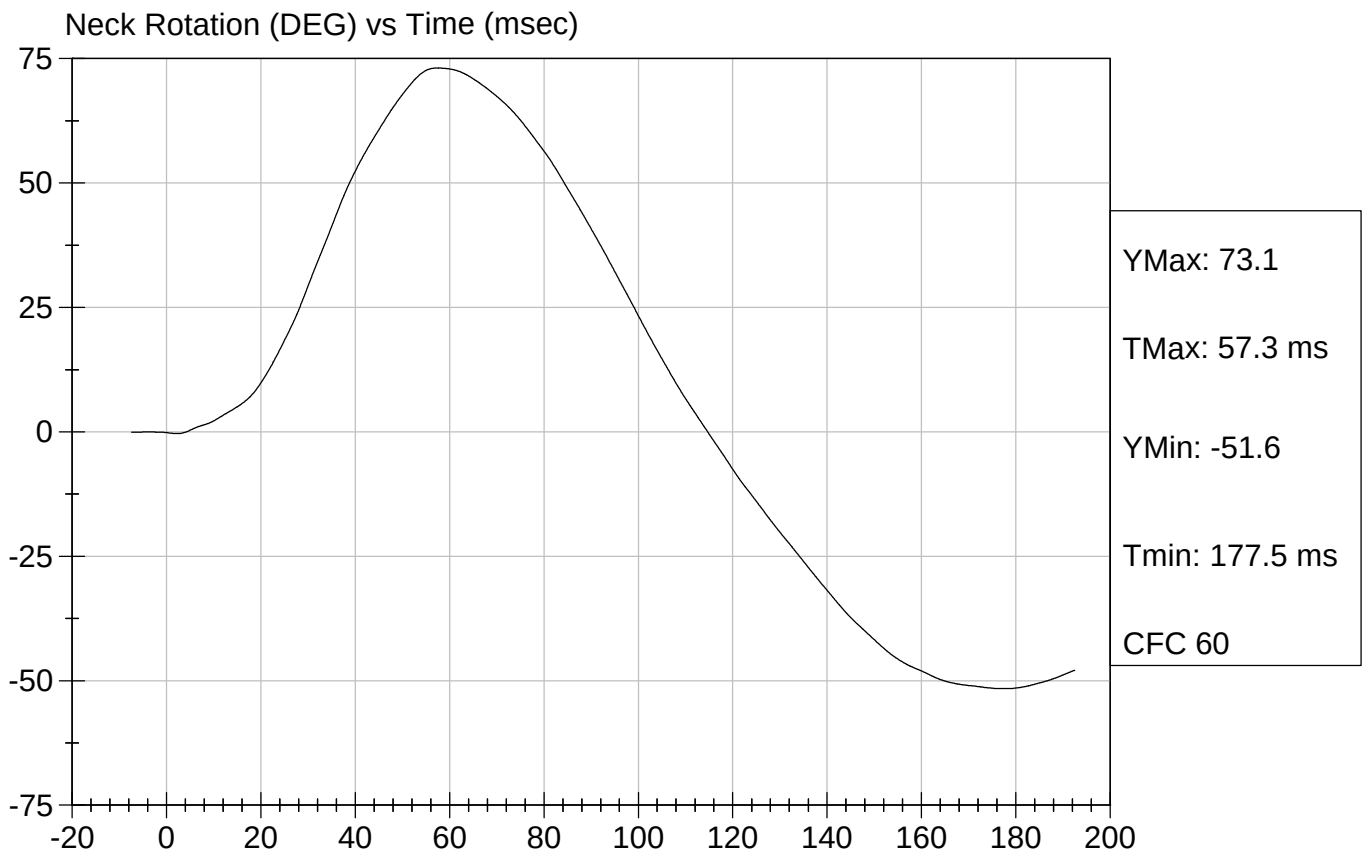
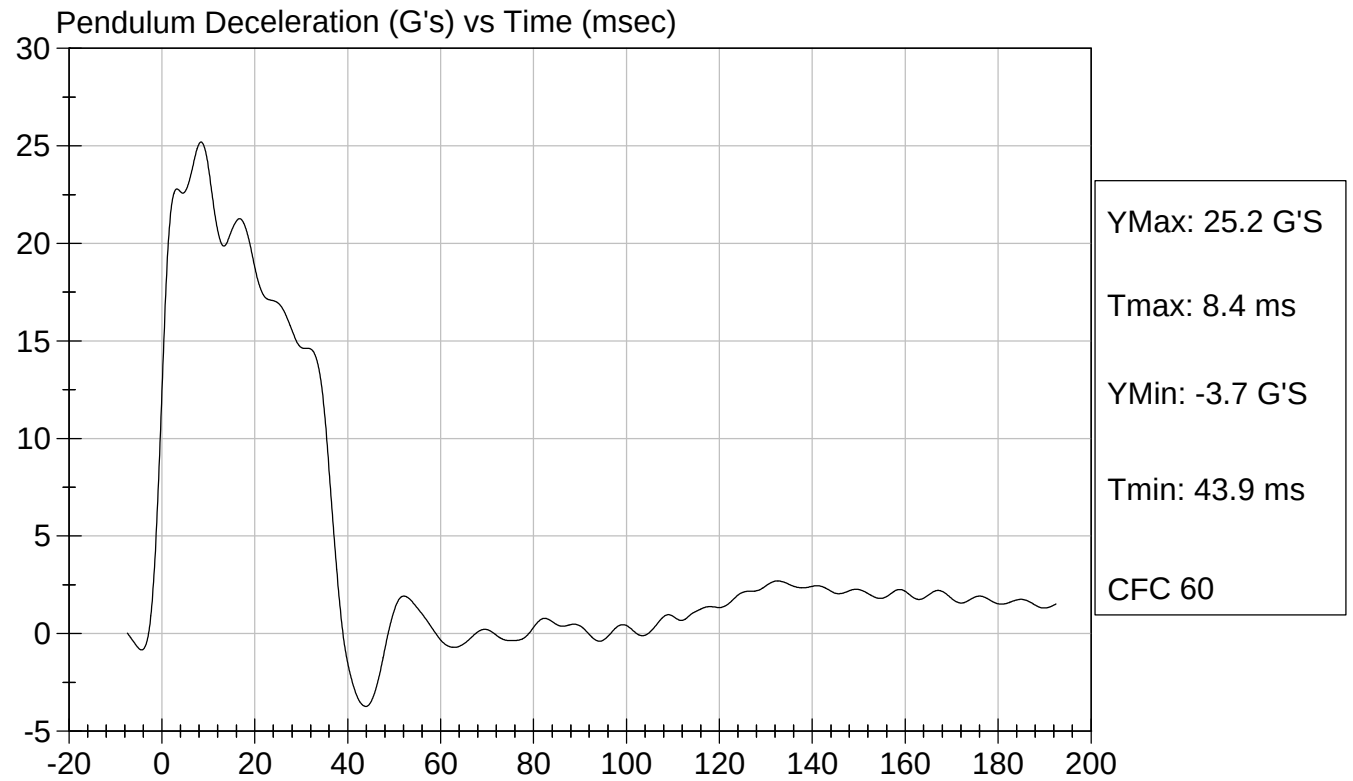
Test Date

Approved By



Test Desc: Neck Flexion
Component ID: D02192

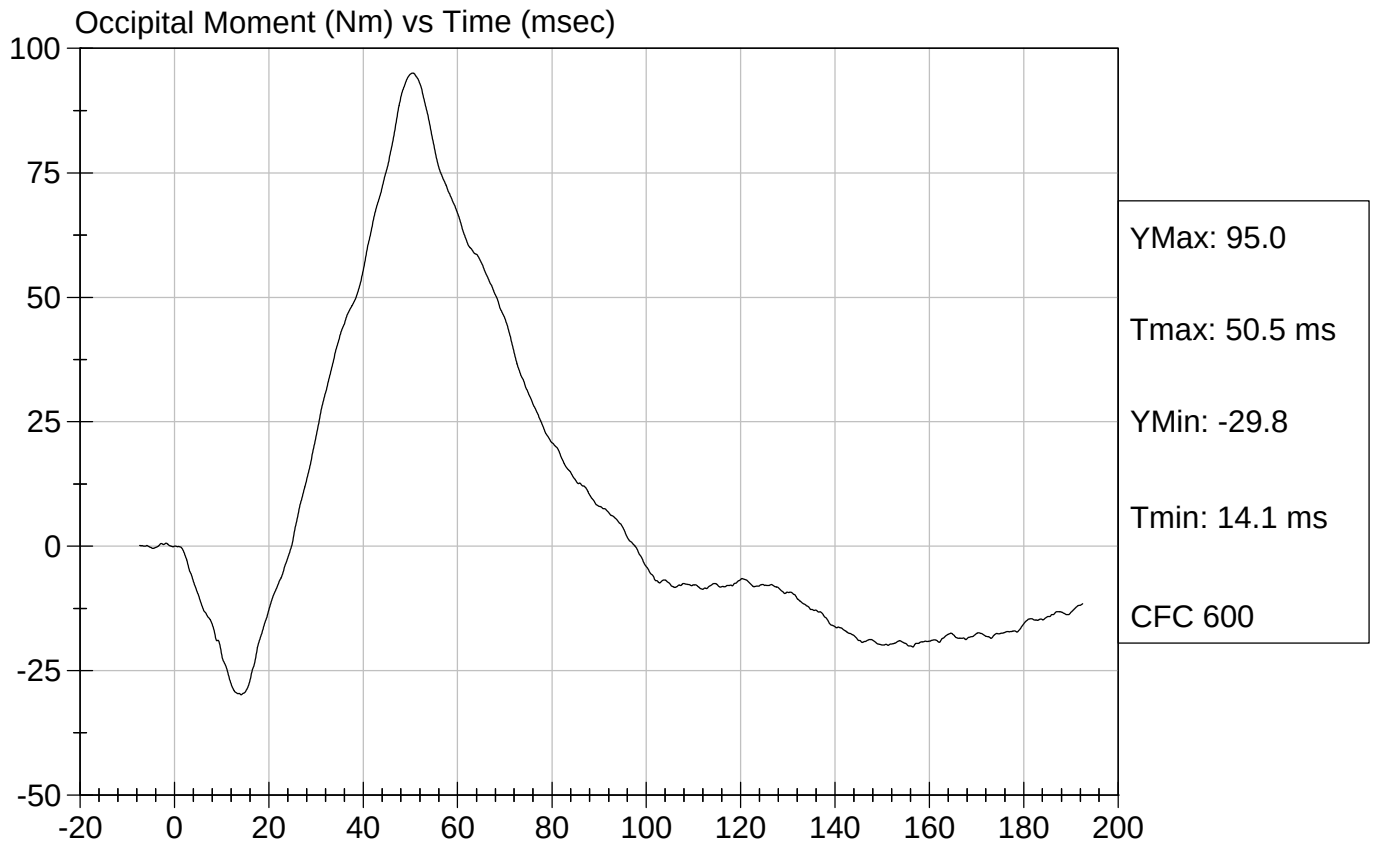
Test Date: 2/7/02
Speed: 22.80 ft/sec, 6.95 m/sec





Test Desc: Neck Flexion
Component ID: D02192

Test Date: 2/7/02
Speed: 22.80 ft/sec, 6.95 m/sec



Hybrid III Calibration Data Sheet
50th Percentile Male
Neck Extension Test

ATD Serial No: 066

Test I.D: D02193

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	22	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.06	Pass
Pendulum Deceleration	10 msec	G's	17.20 to 21.20	18.17	Pass
	20 msec	G's	14.00 to 19.00	16.17	Pass
	30 msec	G's	11.00 to 16.00	13.82	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 22.0	13.8	Pass
Deceleration Decay Time to Cross 5 G's		msec	38.0 to 46.0	39.6	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	98.6	Pass
	Time	msec	72.0 to 82.0	75.3	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	147.0 to 174.0	153.5	Pass
Moment About Occipital Condyle	Minimum	N m	-52.9 to -79.9	-62.5	Pass
	Time	msec	65.0 to 79.0	69.7	Pass
Negative Moment Decay Time To Zero Crossing		msec	120.0 to 148.0	138.8	Pass
Overall Test Results					Pass

Laboratory Technician

2/7/02

Test Date

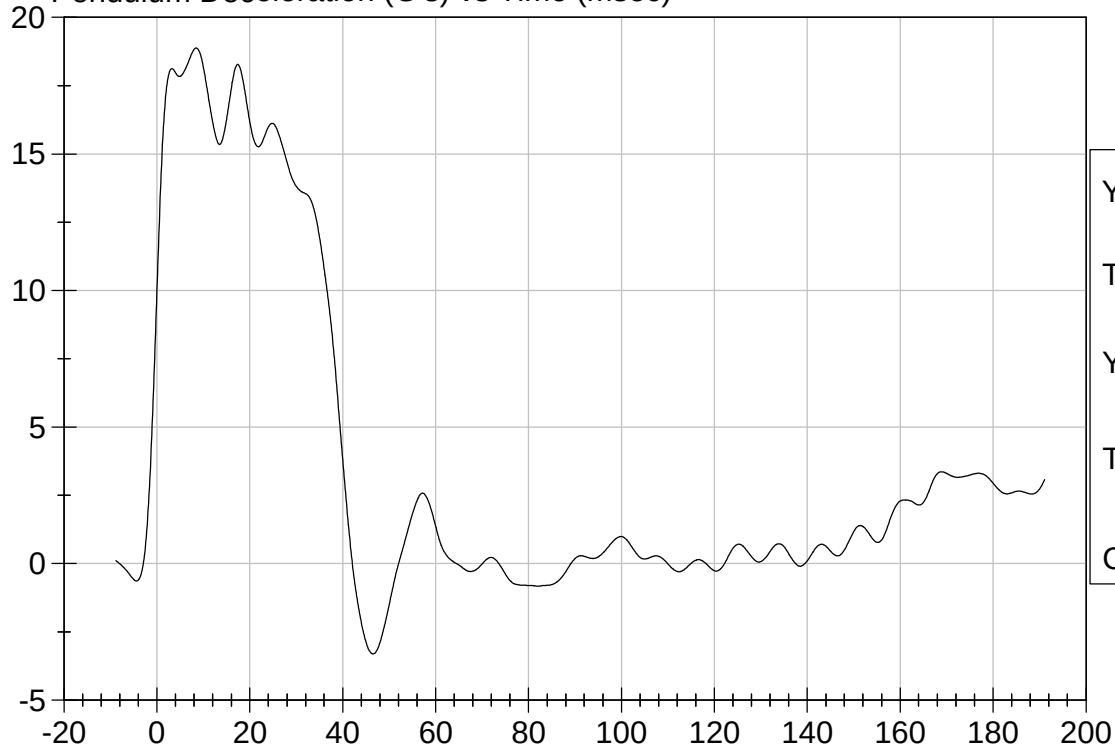
Approved By



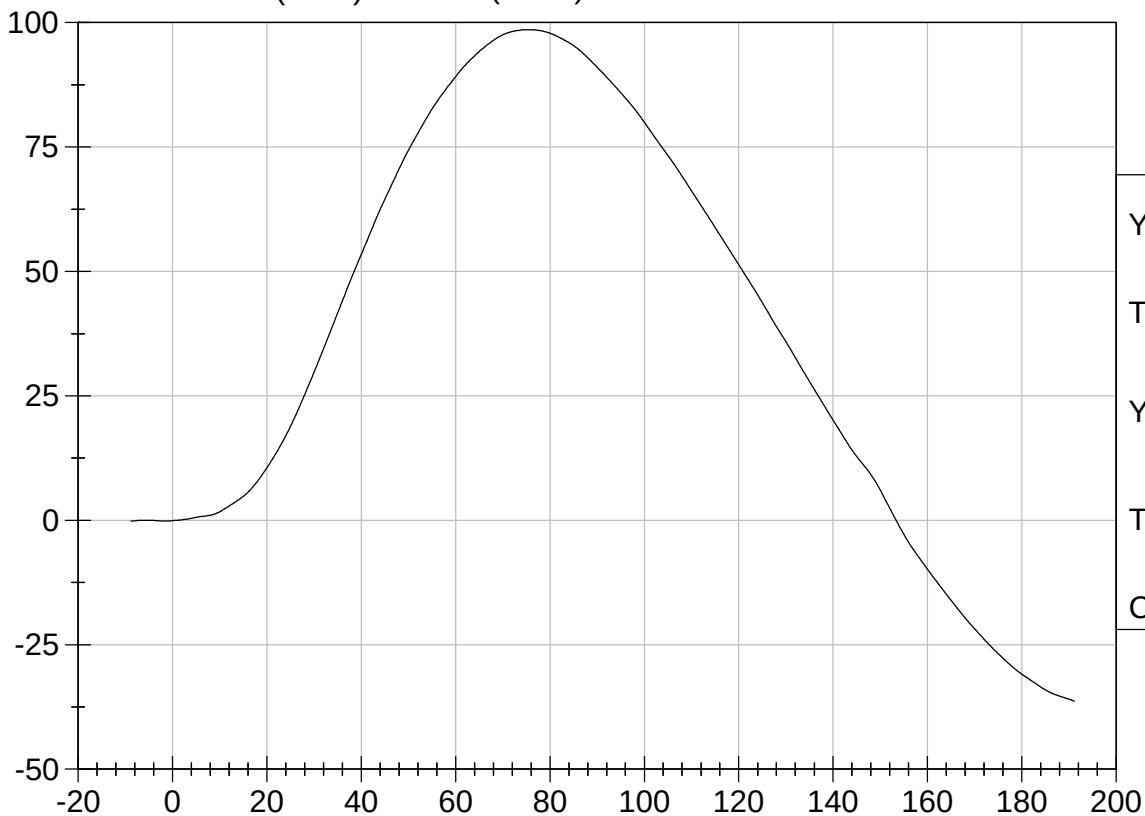
Test Desc: Neck Extension
Component ID: D02193

Test Date: 2/7/02
Speed: 19.88 ft/sec, 6.06 m/sec

Pendulum Deceleration (G's) vs Time (msec)



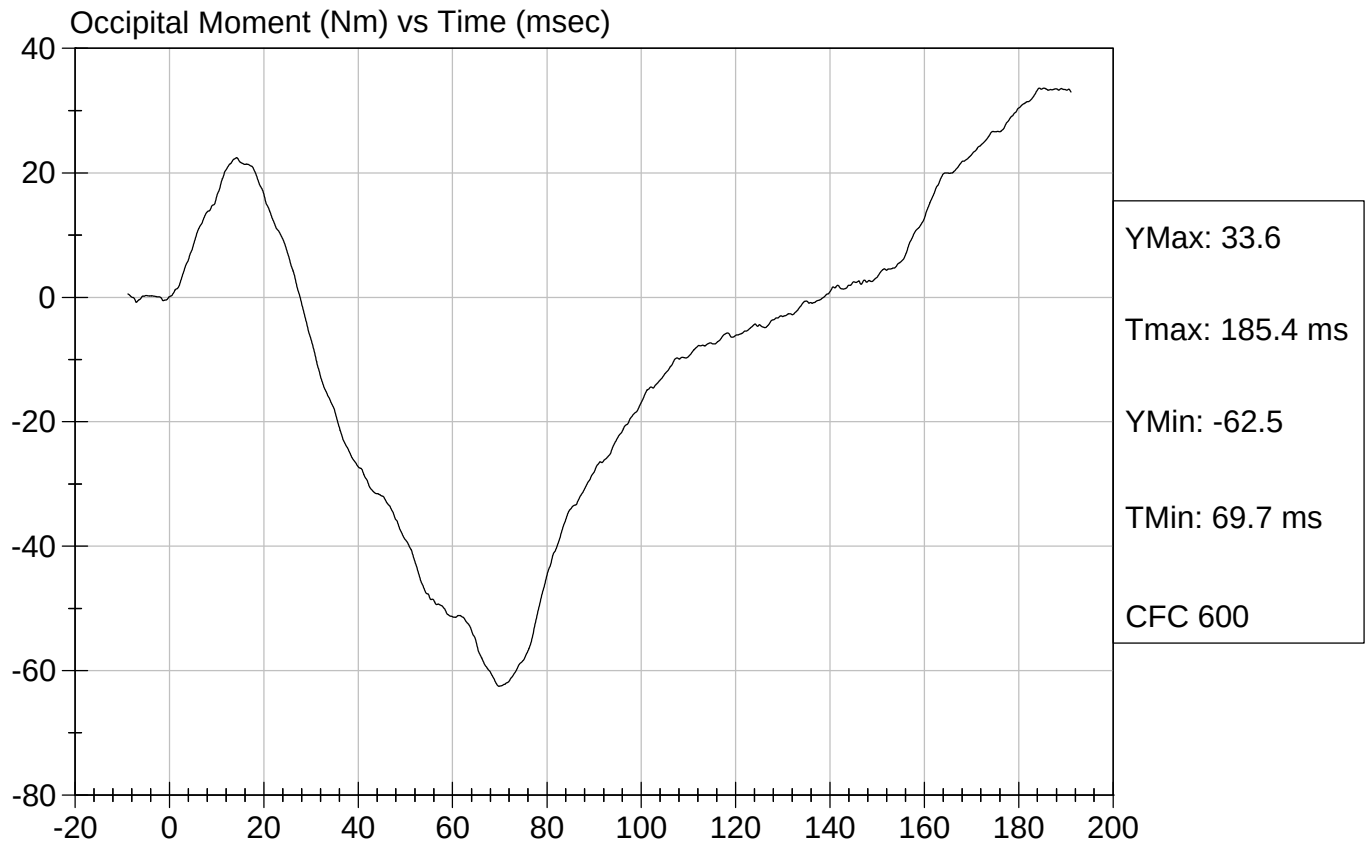
Neck Rotation (DEG) vs Time (msec)





Test Desc: Neck Extension
Component ID: D02193

Test Date: 2/7/02
Speed: 19.88 ft/sec, 6.06 m/sec



Hybrid III Calibration Data Sheet
50th Percentile Male
Thorax Impact Test

ATD Serial No: 066

Test I.D: D02194

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Probe Velocity	m/s	6.58 to 6.82	6.69	Pass
Peak Probe Force	Newtons	5159 to 5893	5,787	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.68	Pass
Internal Hysteresis	%	69 to 85	71	Pass
			Overall Test Results	Pass

Laboratory Technician

2/11/02
Test Date

Approved By

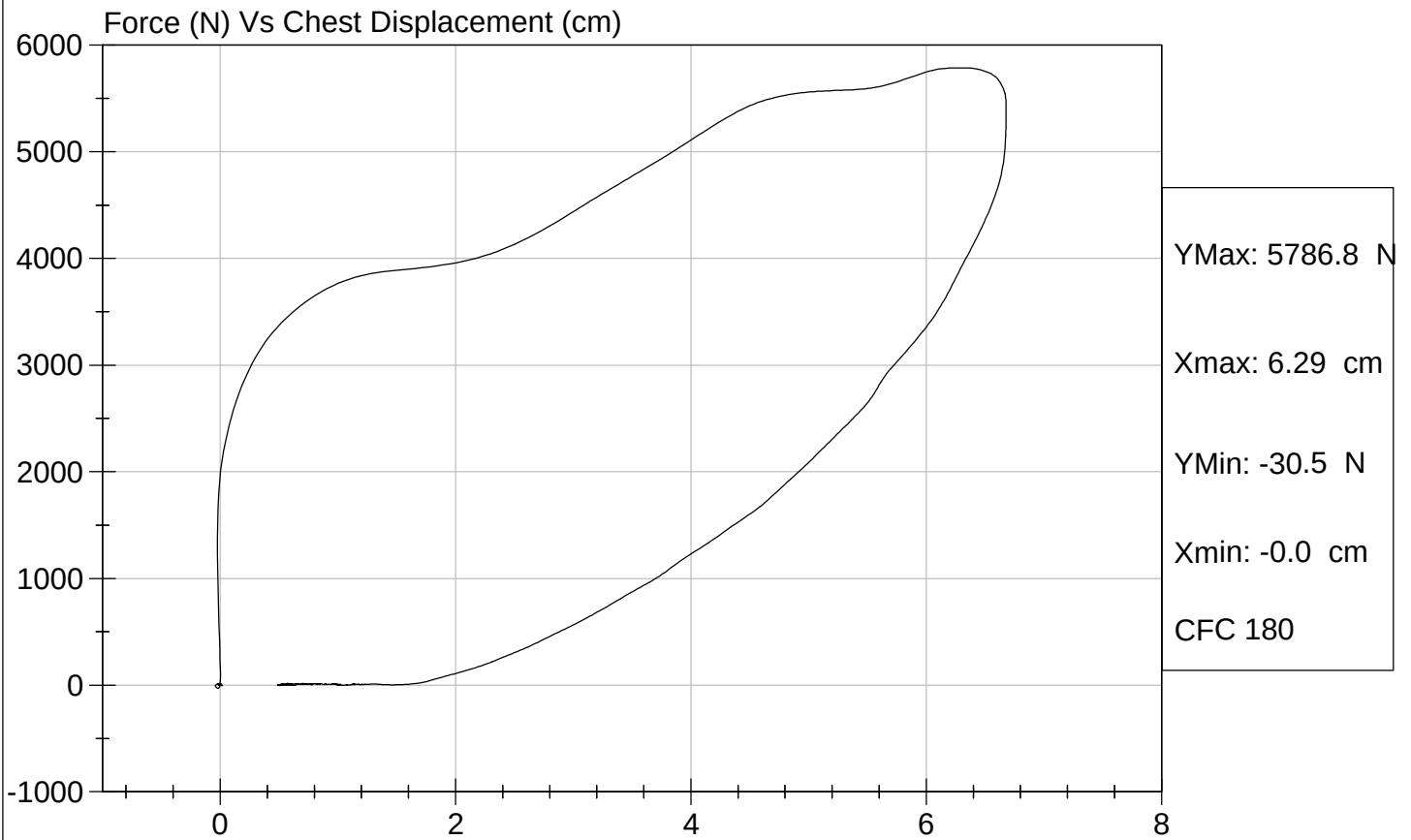


Test Description: Thorax Impact

Test Date: 2/11/02

Component: D02194

Speed: 21.95 ft/sec, 6.69 m/sec



Hybrid III Calibration Data Sheet
50th Percentile Male
Right Knee Impact Test

ATD Serial No: 066

Test I.D: D02195

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Probe Velocity	m/s	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	4715 to 5782	4,966	Pass
Overall Test Results				Pass

Laboratory Technician

2/7/02
Test Date

Approved By

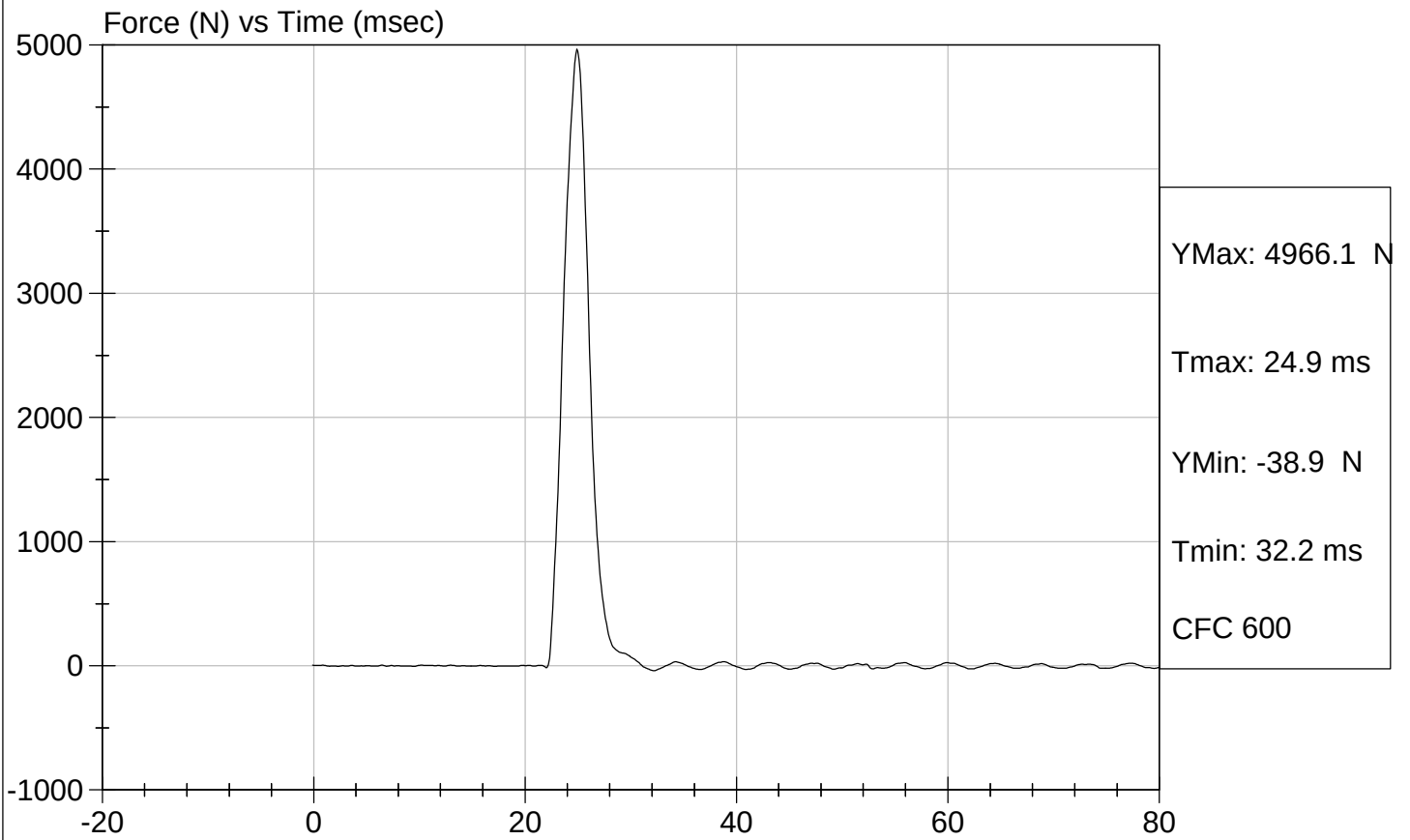


Test Description: Right Knee

Test Date: 2/7/02

Component: D02195

Speed: 6.92 ft/sec, 2.11 m/sec



Hybrid III Calibration Data Sheet
50th Percentile Male
Left Knee Impact Test

ATD Serial No: 066

Test I.D: D02196

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Probe Velocity	m/s	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	4715 to 5782	5,146	Pass
Overall Test Results				Pass

Laboratory Technician

2/7/02
Test Date

Approved By

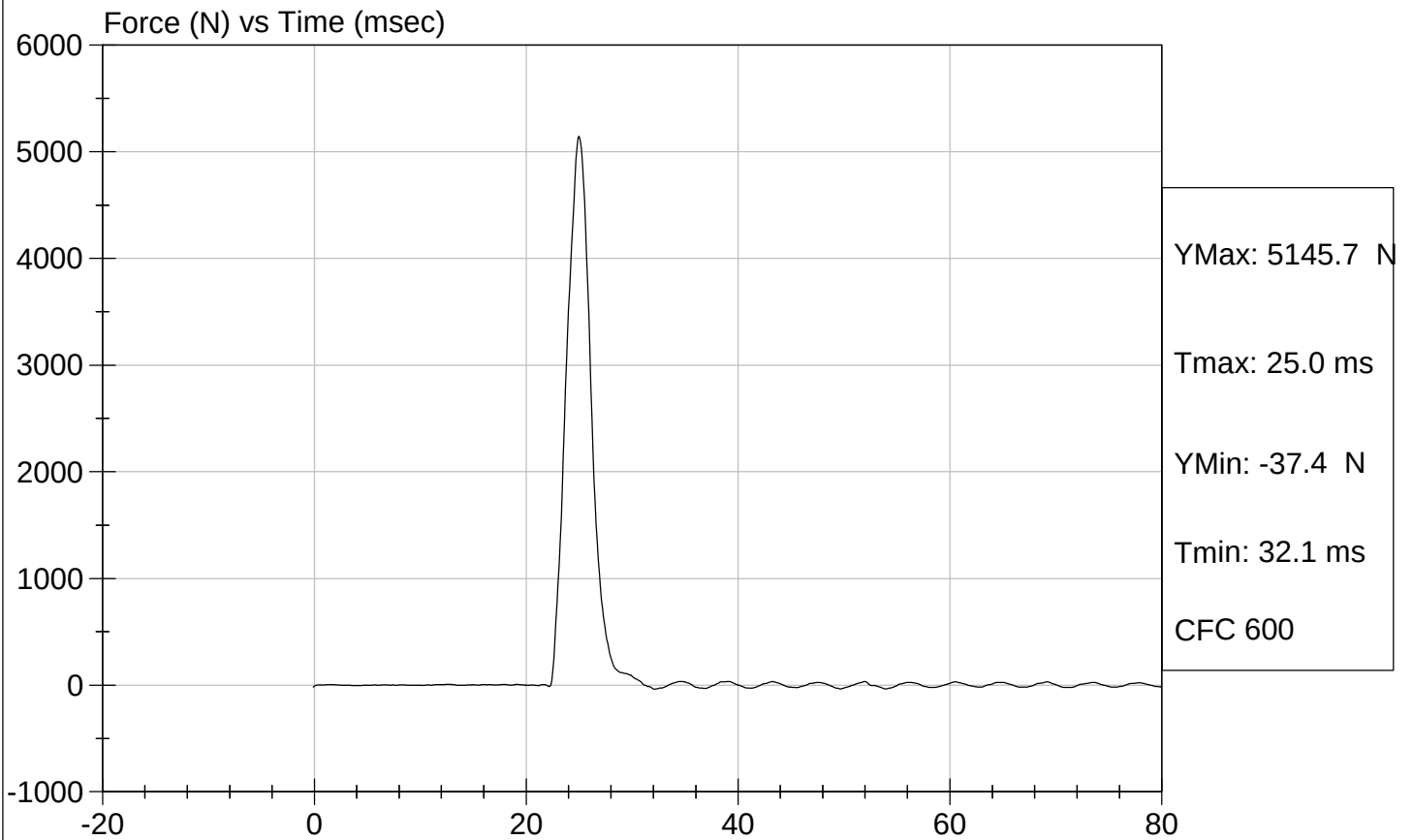


Test Description: Left Knee

Test Date: 2/7/02

Component: D02196

Speed: 6.92 ft/sec, 2.11 m/sec



Hybrid III Calibration Data Sheet
50th Percentile Male
Right Knee Slider

ATD Serial No: 066

Test I.D: D02197

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Velocity	m/s	2.7 to 2.8	2.74	Pass
Impact Force At 10 mm	kN	-1.72 to -1.26	-1.39	Pass
Impact Force At 18 mm	kN	-3.10 to -2.27	-2.40	Pass
Overall Test Results				Pass

Laboratory Technician

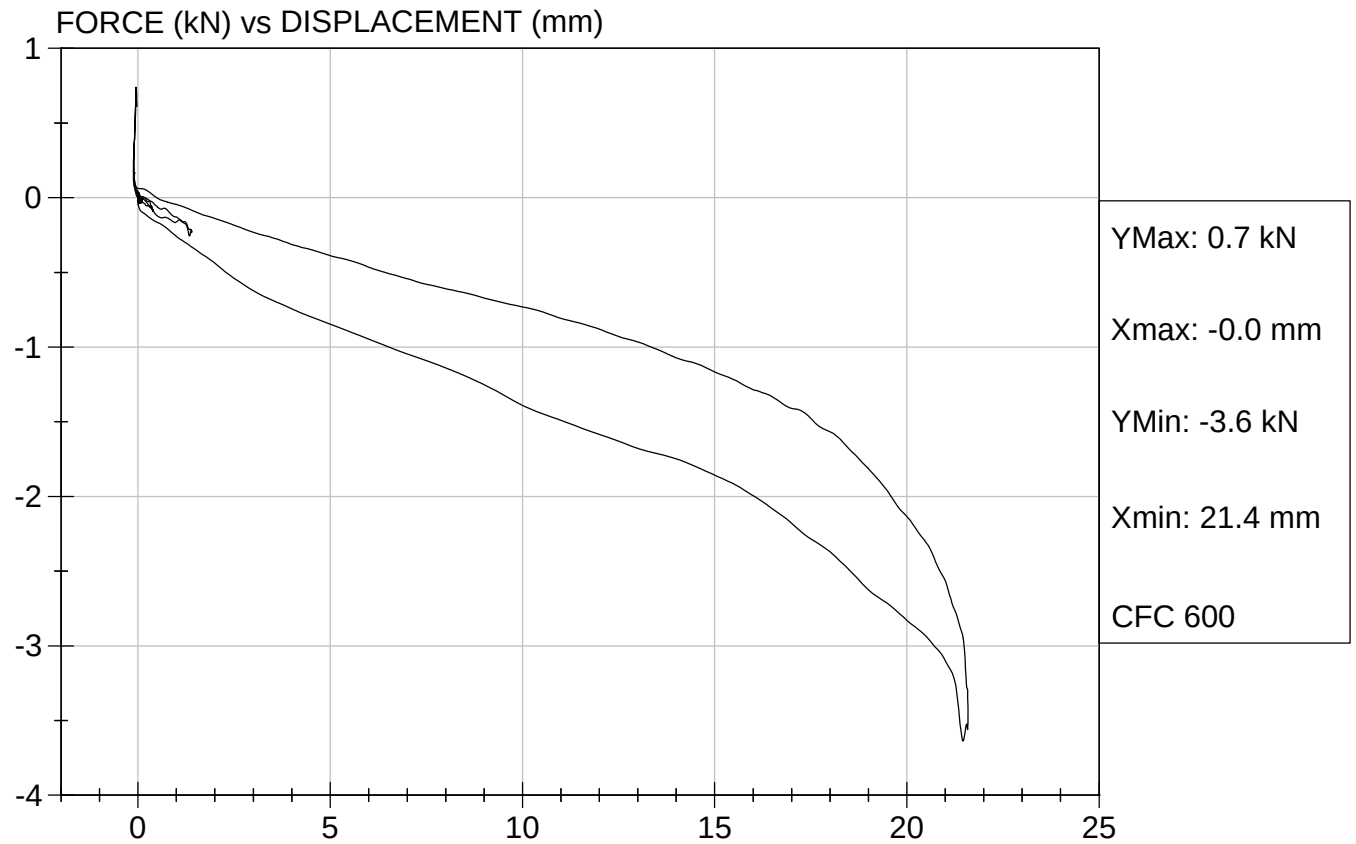
2/8/02
Test Date

Approved By



Test Desc: Right Knee Slider
Component ID: D02197

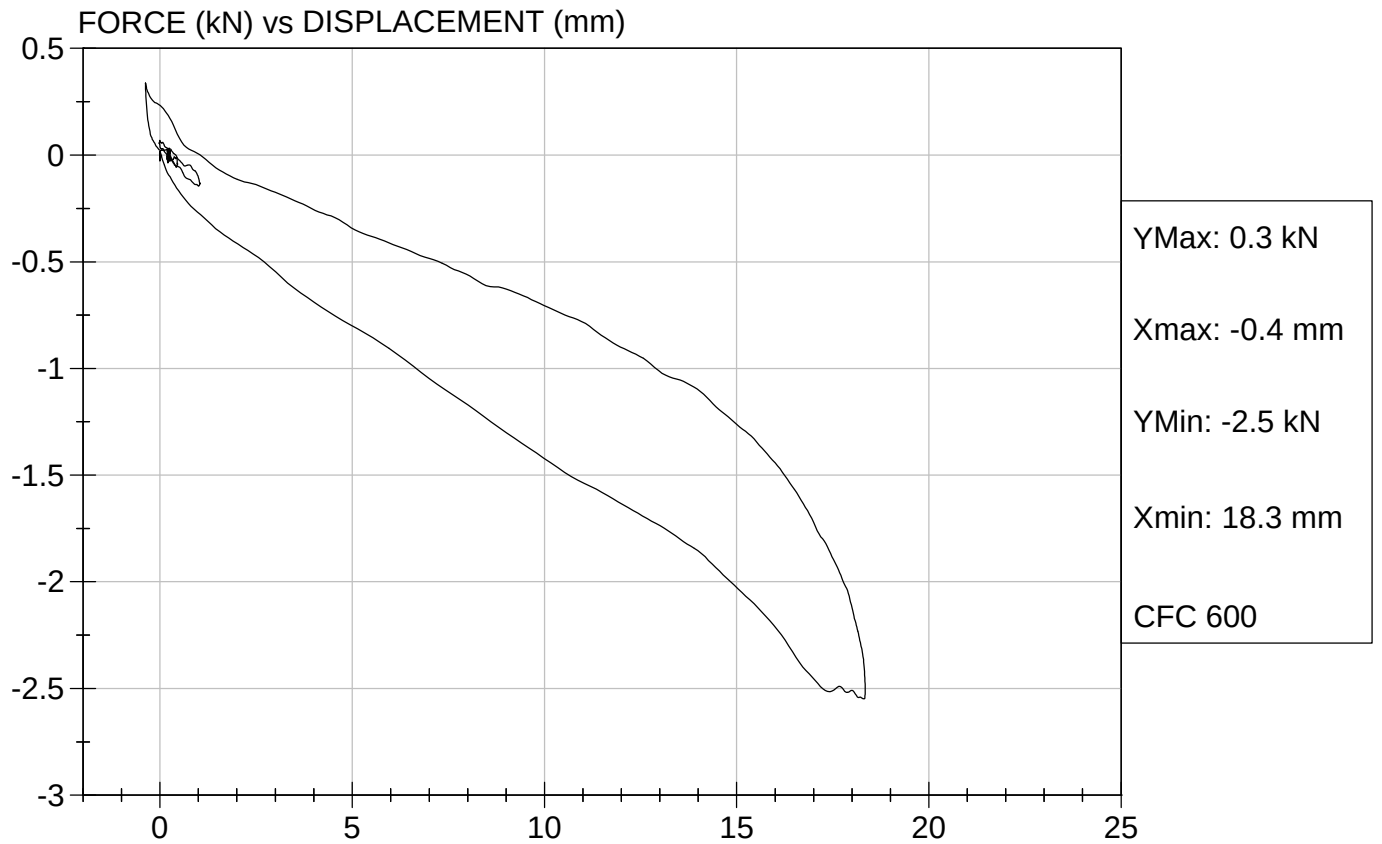
Test Date: 2/8/02
Speed: 8.99 ft/sec, 2.74 m/sec





Test Desc: Right Knee Slider
Component ID: D02198

Test Date: 2/8/02
Speed: 8.99 ft/sec, 2.74 m/sec



Hybrid III Calibration Data Sheet
50th Percentile Male
Hip-Femur Flexion Test

ATD Serial No: 066

Test I.D: D02199/0

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	20.4	20.4	Pass
Laboratory Relative Humidity	%	10 to 70	22	22	Pass
Rotation Rate	deg/sec	5 -10	8	8	Pass
30 Degrees	Nm	94.9 Nm Max	72.2	69.7	Pass
150 ft-lbf / 203.4 Nm	Deg	40- 50 Degree Max Rotation	45	44	Pass
Overall Test Results					Pass

Laboratory Technician

2/8/02
Test Date

Approved By

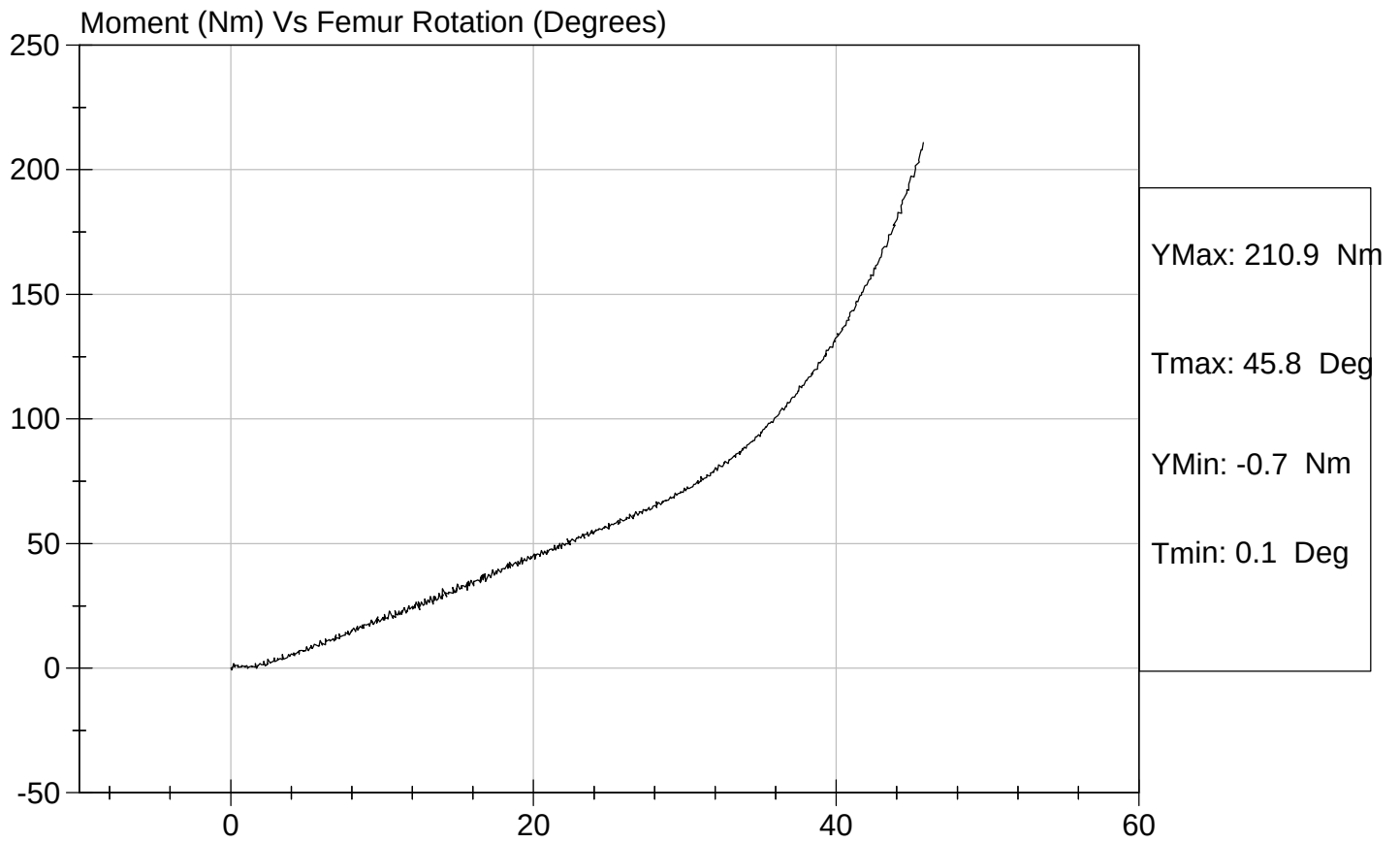


Test Description: Hip Femur Flexion

Test Date: 2/8/02

Component: D02199

Speed: 0 ft/sec, 0.00 m/sec



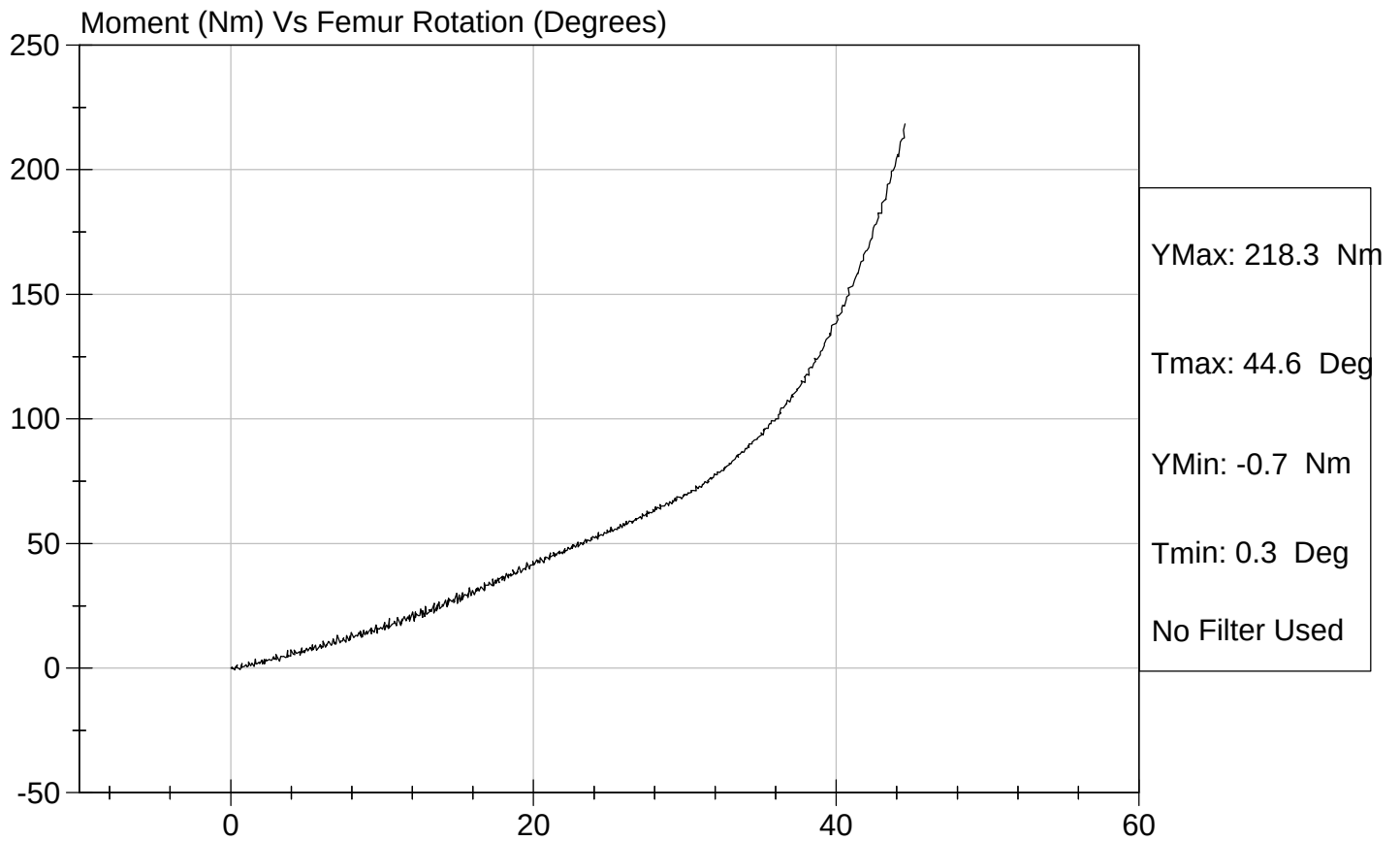


Test Description: Hip Femur Flexion

Test Date: 2/8/02

Component: D02190

Speed: 0 ft/sec, 0.00 m/sec



Hybrid III Calibration Data Sheet
50th Percentile Male
Head Drop Calibration

ATD Serial No: 065

Test I.D: D02181

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	21	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	243.3	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	8.2	Pass
Is Acceleration Unimodal?	Yes/No	< 10% Peak	Yes	Pass
			Overall Test Results	Pass

Laboratory Technician

2/7/02
Test Date

Approved By



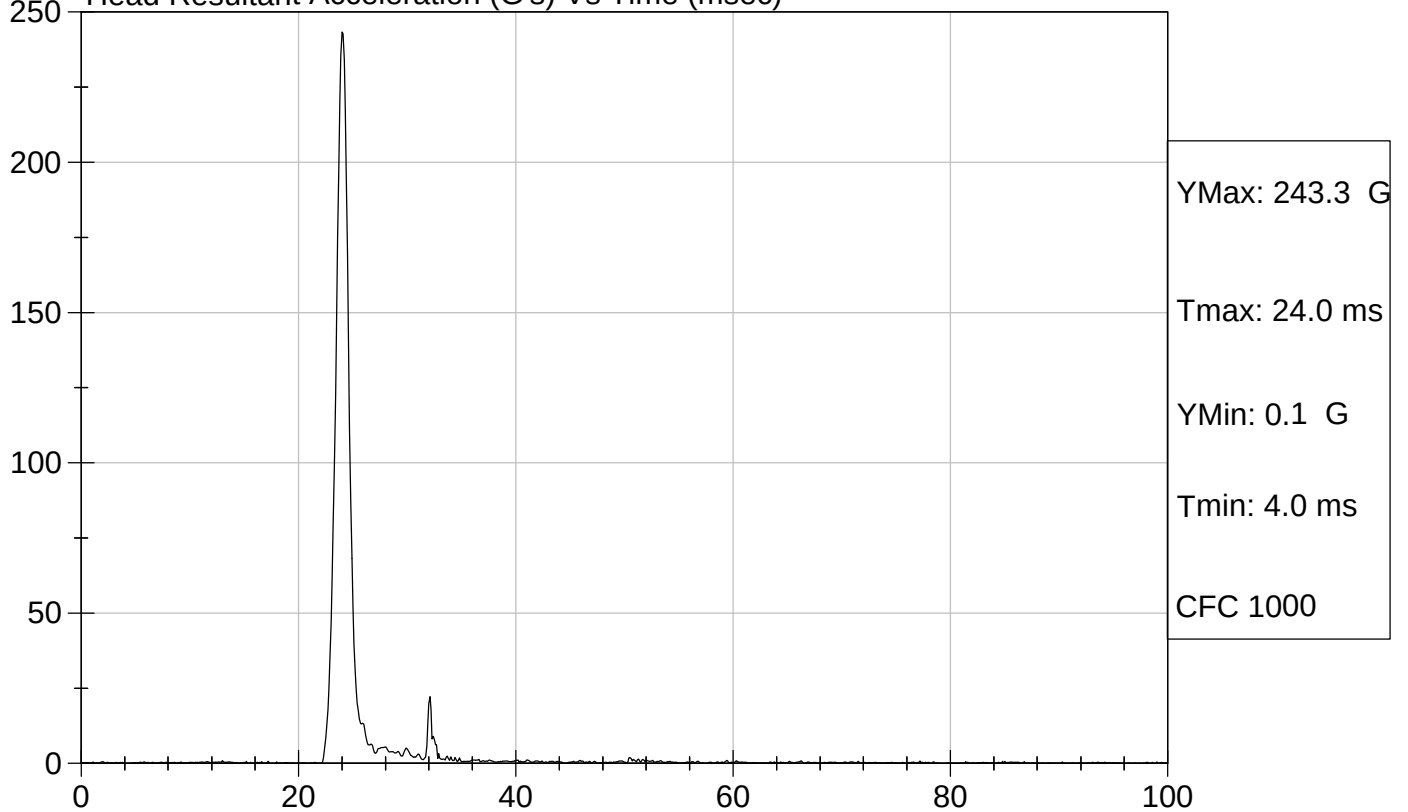
Test Description: Head Drop

Test Date: 2/7/02

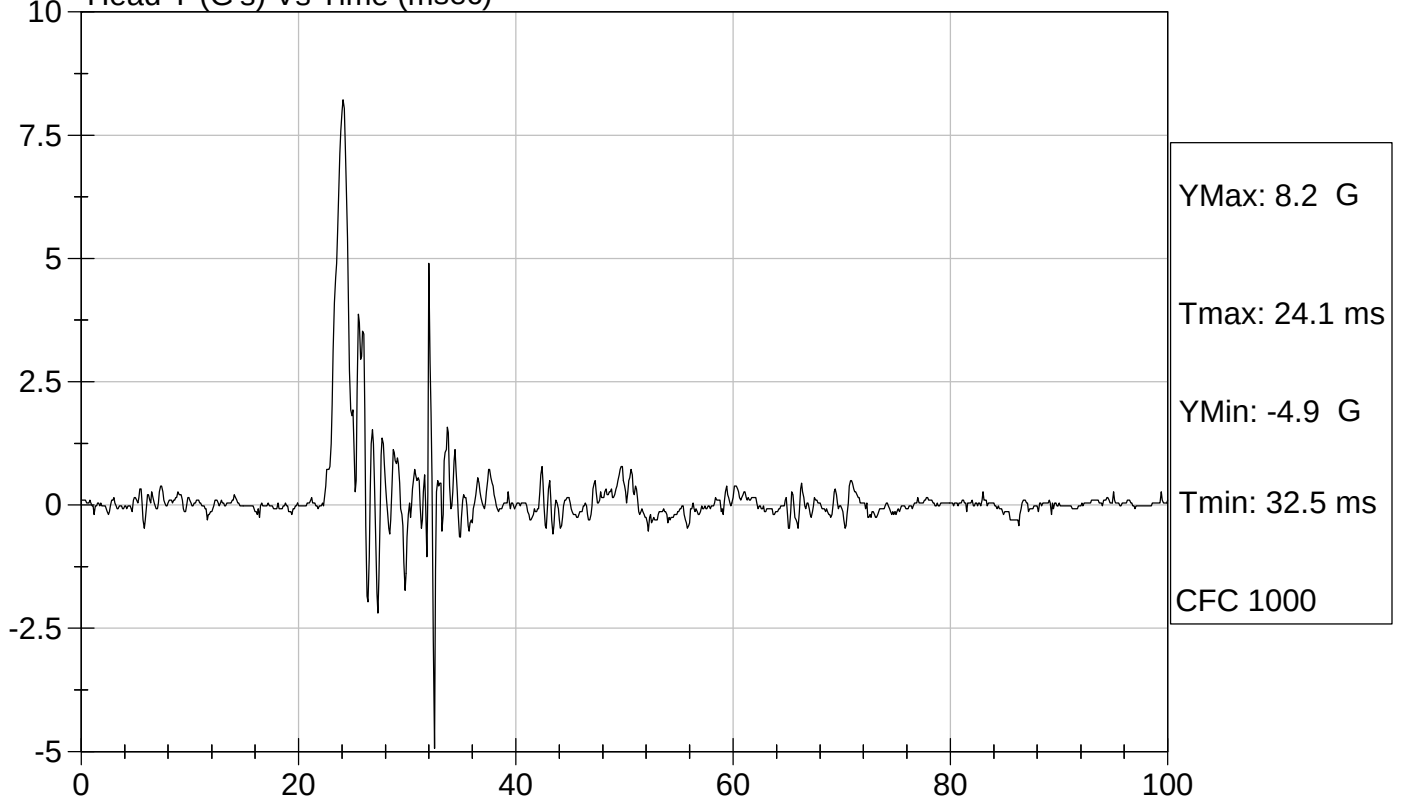
Component: D02181

Speed: 0 ft/s, 0.00 m/s

Head Resultant Acceleration (G's) Vs Time (msec)



Head Y (G's) Vs Time (msec)



Hybrid III Calibration Data Sheet
50th Percentile Male
Neck Flexion Test

ATD Serial No: 065

Test I.D: D02182

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity		%	10 to 70	22	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.98	Pass
Pendulum Deceleration	10 msec	G's	22.50 to 27.50	23.43	Pass
	20 msec	G's	17.60 to 22.60	19.29	Pass
	30 msec	G's	12.50 to 18.50	15.18	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 29.0	15.2	Pass
Deceleration Decay Time to Cross 5 G's		msec	34.0 to 42.0	38.7	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	74.6	Pass
	Time	msec	57.0 to 64.0	57.6	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	113.0 to 128.0	113.7	Pass
Moment About Occipital Condyle	Maximum	N m	84.1 to 108.5	92.3	Pass
	Time	msec	47.0 to 58.0	51.9	Pass
Positive Moment Decay Time To Zero Crossing		msec	97.0 to 107.0	102.1	Pass
Overall Test Results					Pass

Laboratory Technician

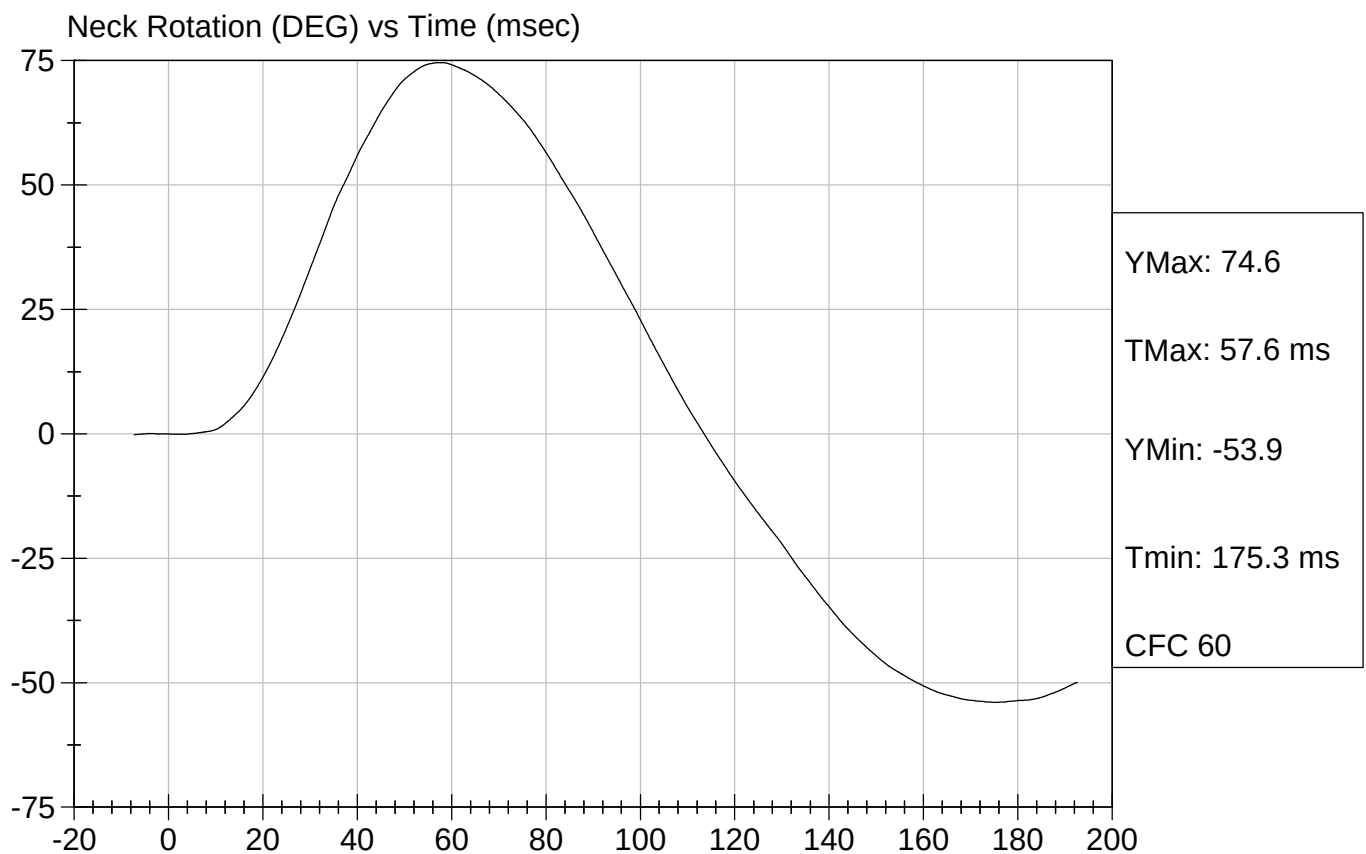
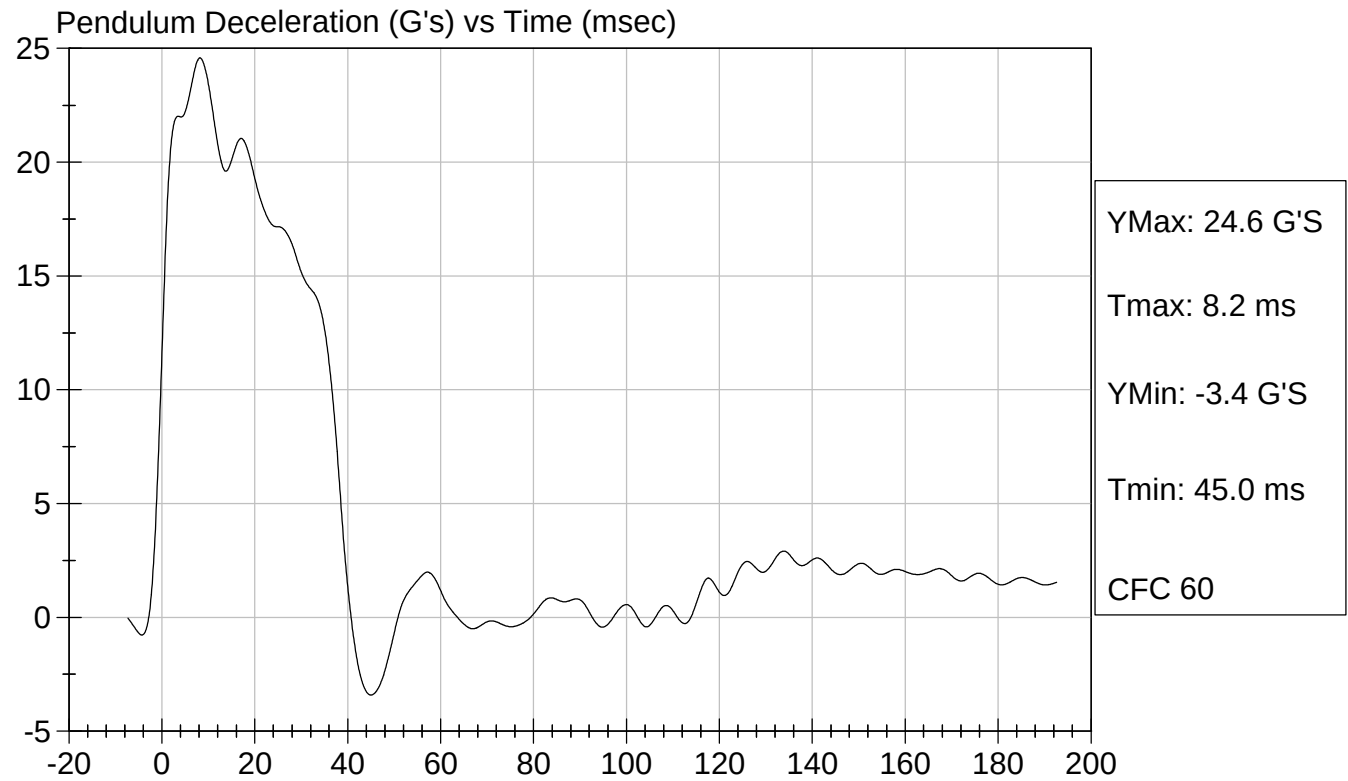
2/8/02
Test Date

Approved By



Test Desc: Neck Flexion
Component ID: D02182

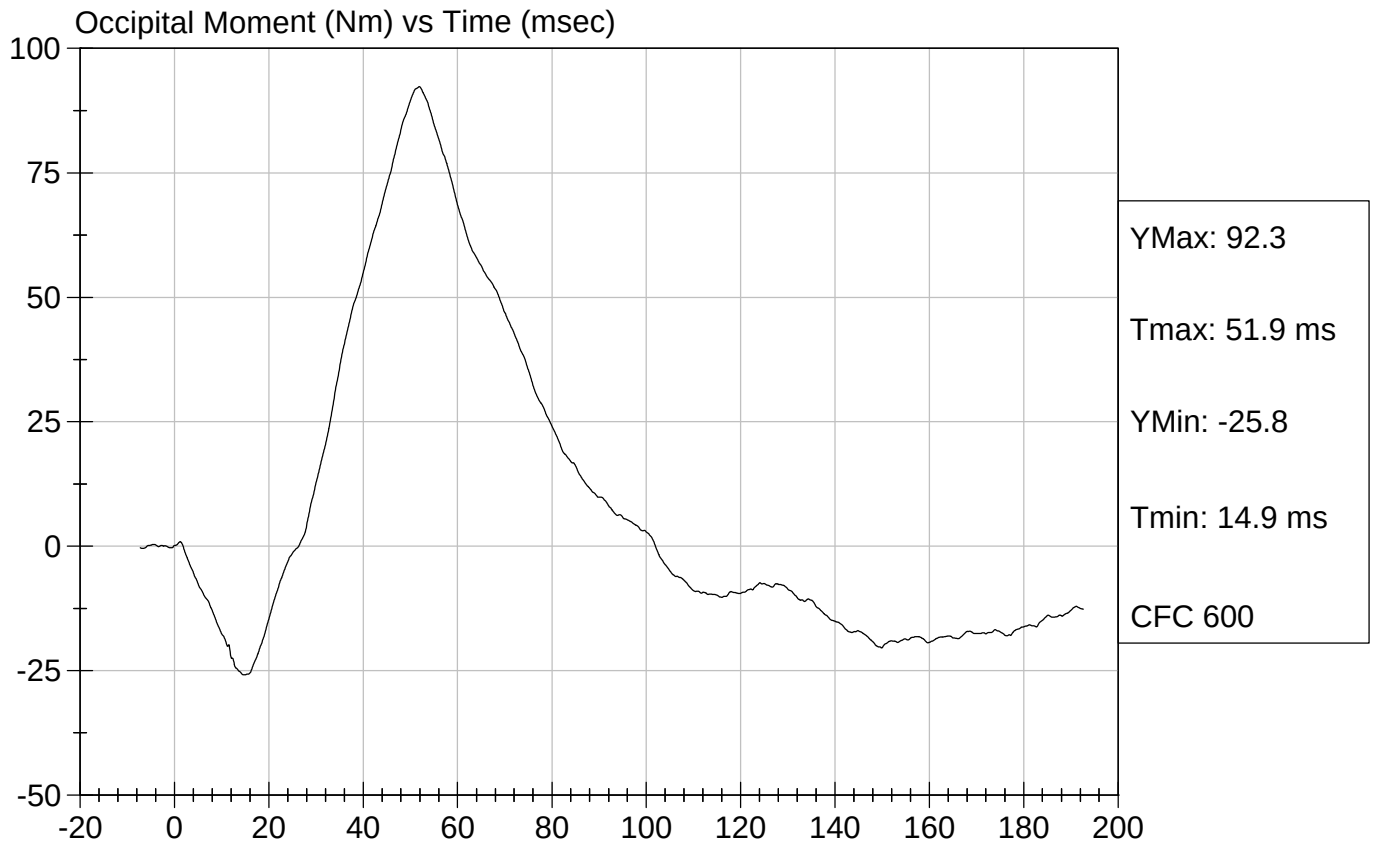
Test Date: 2/8/02
Speed: 22.90 ft/sec, 6.98 m/sec





Test Desc: Neck Flexion
Component ID: D02182

Test Date: 2/8/02
Speed: 22.90 ft/sec, 6.98 m/sec



Hybrid III Calibration Data Sheet
50th Percentile Male
Neck Extension Test

ATD Serial No: 065

Test I.D: D02183

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity		%	10 to 70	21	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.09	Pass
Pendulum Deceleration	10 msec	G's	17.20 to 21.20	19.02	Pass
	20 msec	G's	14.00 to 19.00	16.92	Pass
	30 msec	G's	11.00 to 16.00	13.36	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 22.0	13.9	Pass
Deceleration Decay Time to Cross 5 G's		msec	38.0 to 46.0	38.5	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	100.7	Pass
	Time	msec	72.0 to 82.0	75.9	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	147.0 to 174.0	155.2	Pass
Moment About Occipital Condyle	Minimum	N m	-52.9 to -79.9	-62.6	Pass
	Time	msec	65.0 to 79.0	72.4	Pass
Negative Moment Decay Time To Zero Crossing		msec	120.0 to 148.0	143.2	Pass
Overall Test Results					Pass

Laboratory Technician

2/7/02

Test Date

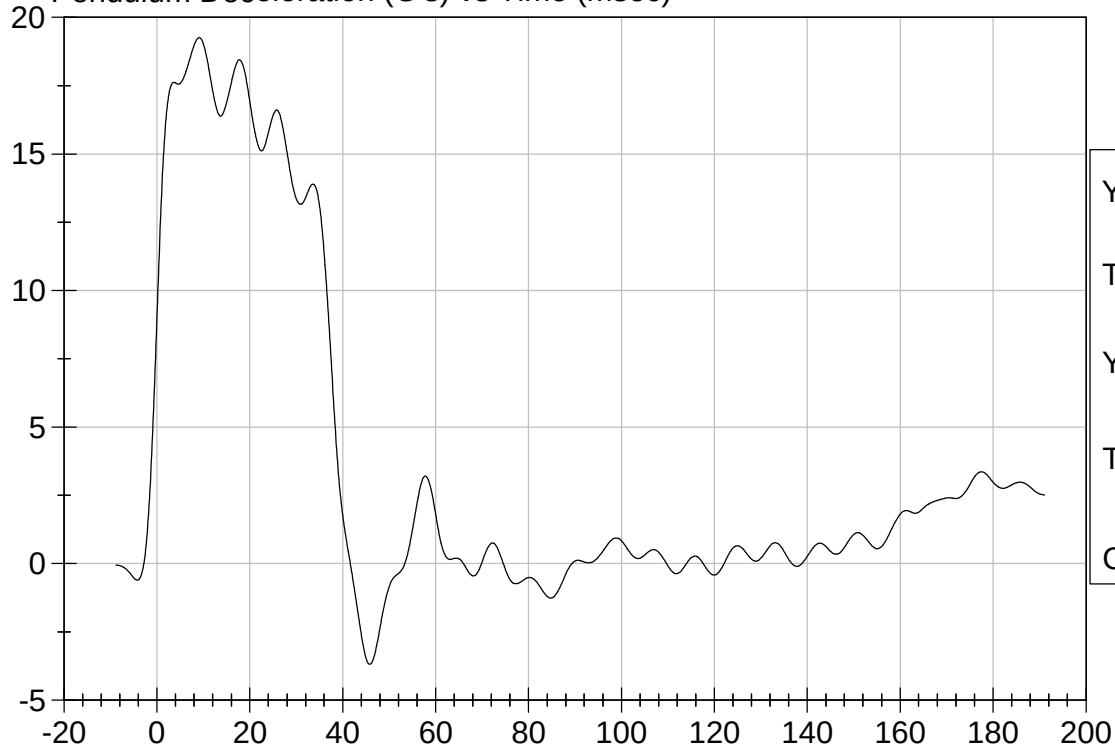
Approved By



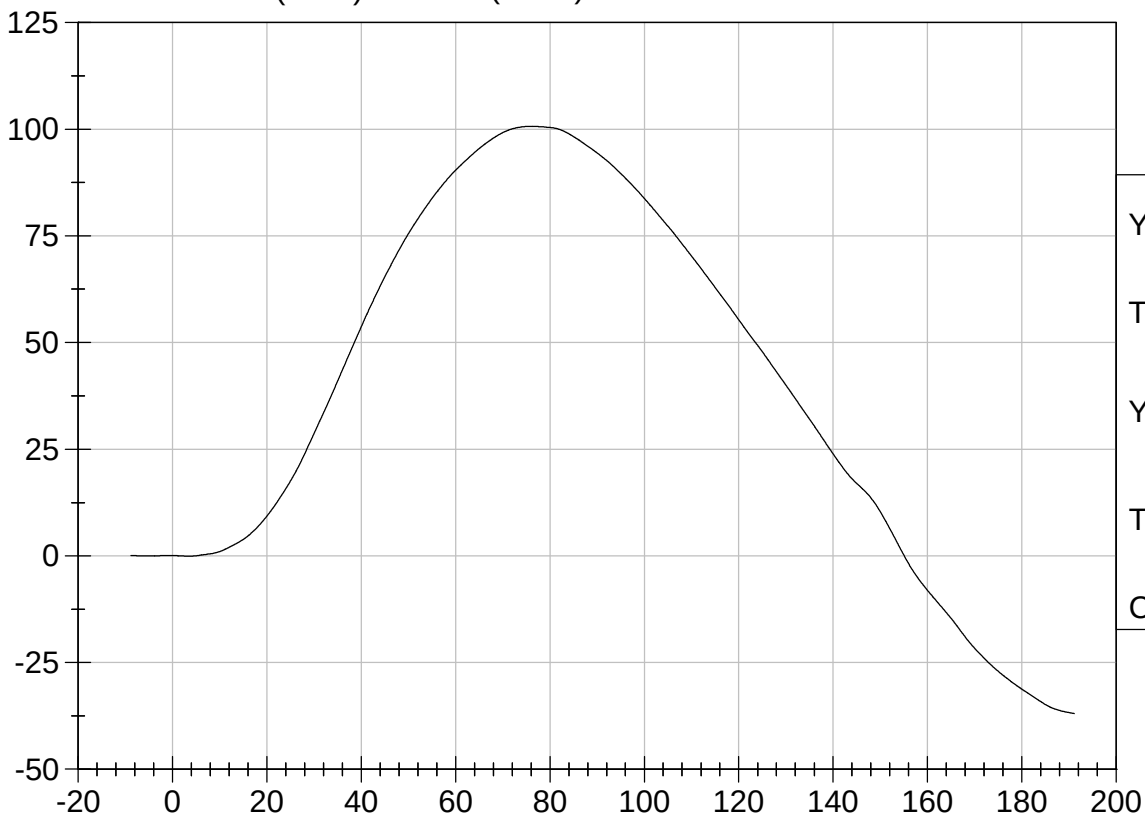
Test Desc: Neck Extension
Component ID: D02183

Test Date: 2/7/02
Speed: 19.98 ft/sec, 6.09 m/sec

Pendulum Deceleration (G's) vs Time (msec)



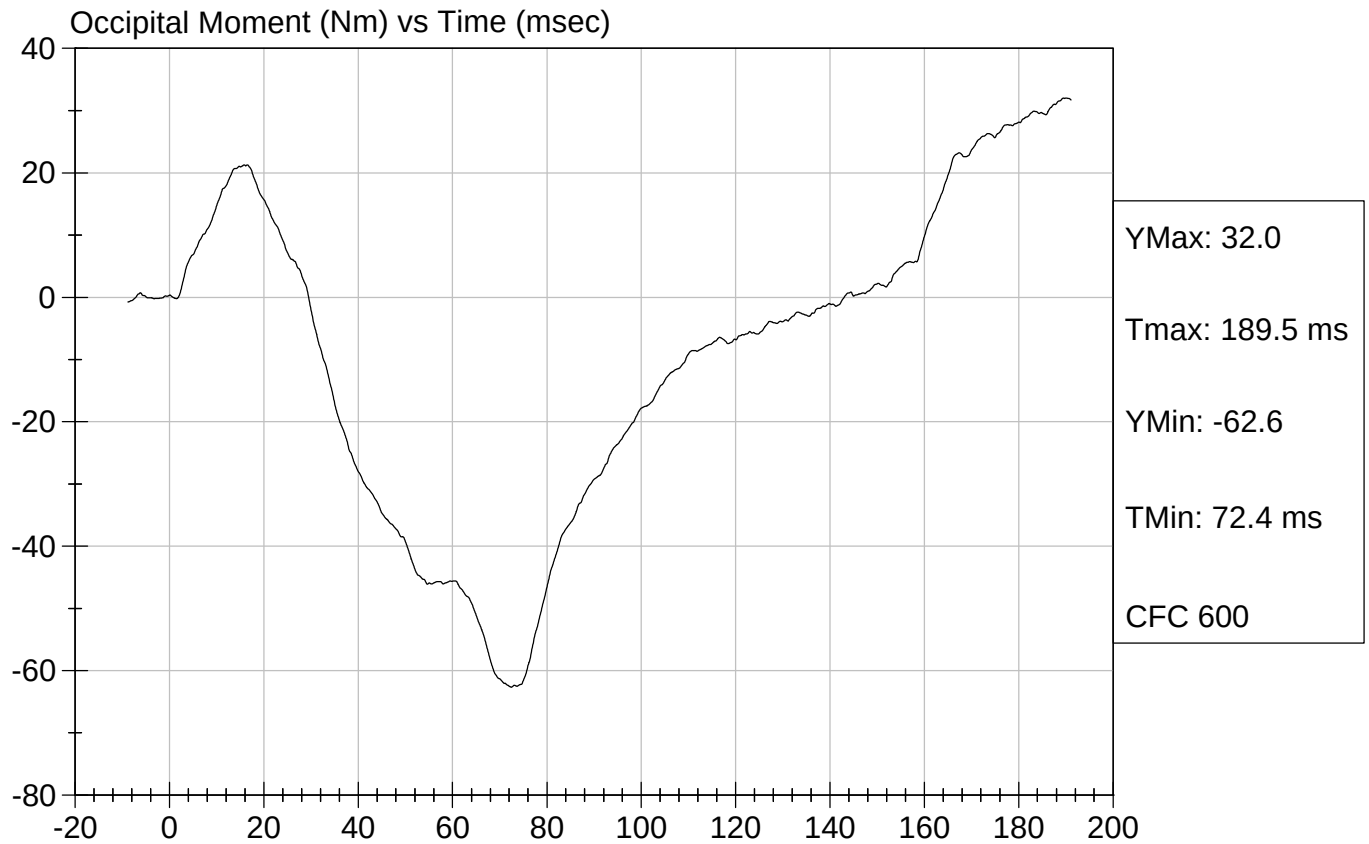
Neck Rotation (DEG) vs Time (msec)





Test Desc: Neck Extension
Component ID: D02183

Test Date: 2/7/02
Speed: 19.98 ft/sec, 6.09 m/sec



Hybrid III Calibration Data Sheet
50th Percentile Male
Thorax Impact Test

ATD Serial No: 065

Test I.D: D02184

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Probe Velocity	m/s	6.58 to 6.82	6.72	Pass
Peak Probe Force	Newtons	5159 to 5893	5,808	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.82	Pass
Internal Hysteresis	%	69 to 85	69	Pass
Overall Test Results			Pass	

Laboratory Technician

2/11/02
Test Date

Approved By

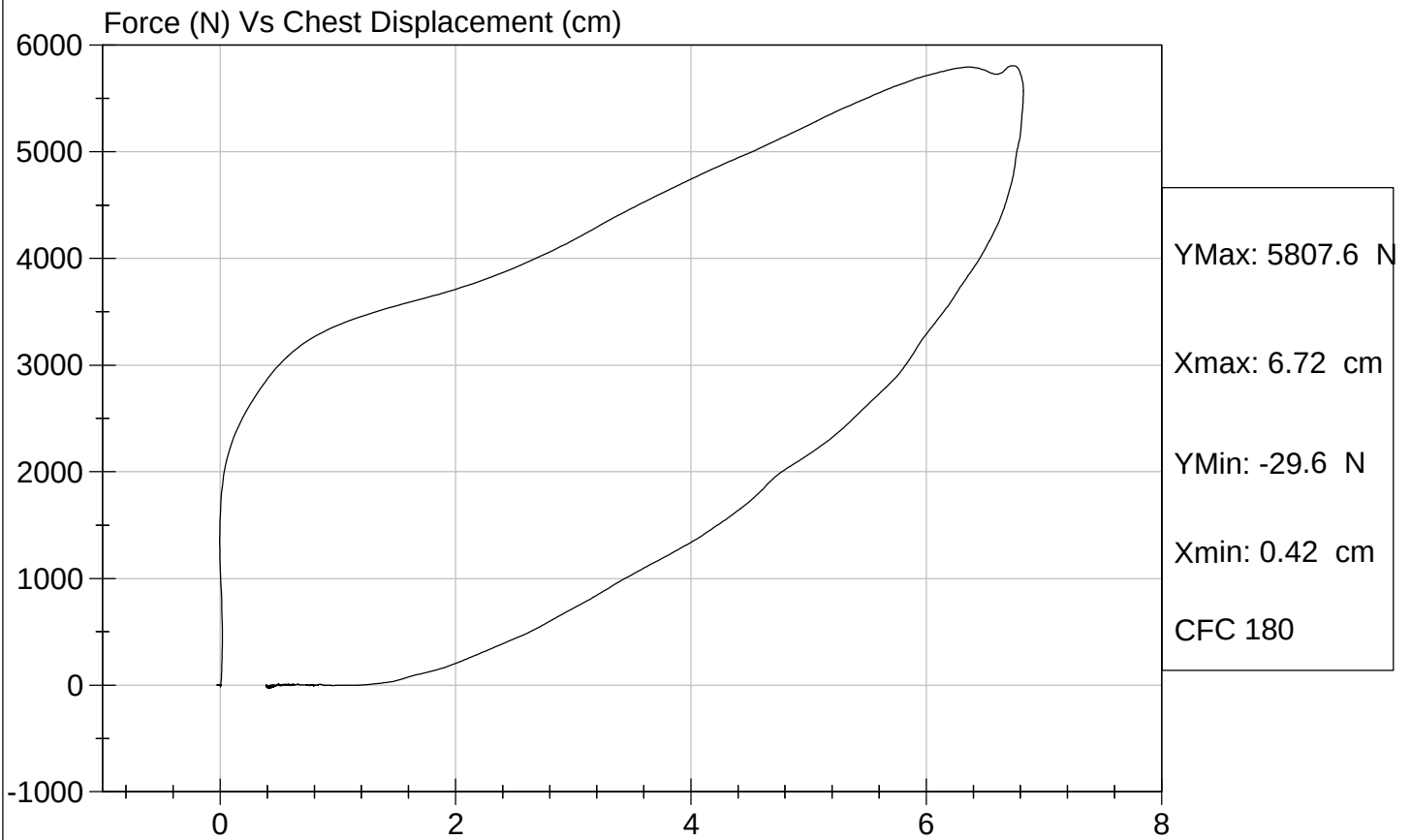


Test Description: Thorax Impact

Test Date: 2/11/02

Component: D02184

Speed: 22.05 ft/sec, 6.72 m/sec



Hybrid III Calibration Data Sheet
50th Percentile Male
Right Knee Impact Test

ATD Serial No: 065

Test I.D: D02185

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Probe Velocity	m/s	2.07 to 2.13	2.10	Pass
Peak Probe Force	Newtons	4715 to 5782	5,663	Pass
Overall Test Results				Pass

Laboratory Technician

2/7/02
Test Date

Approved By

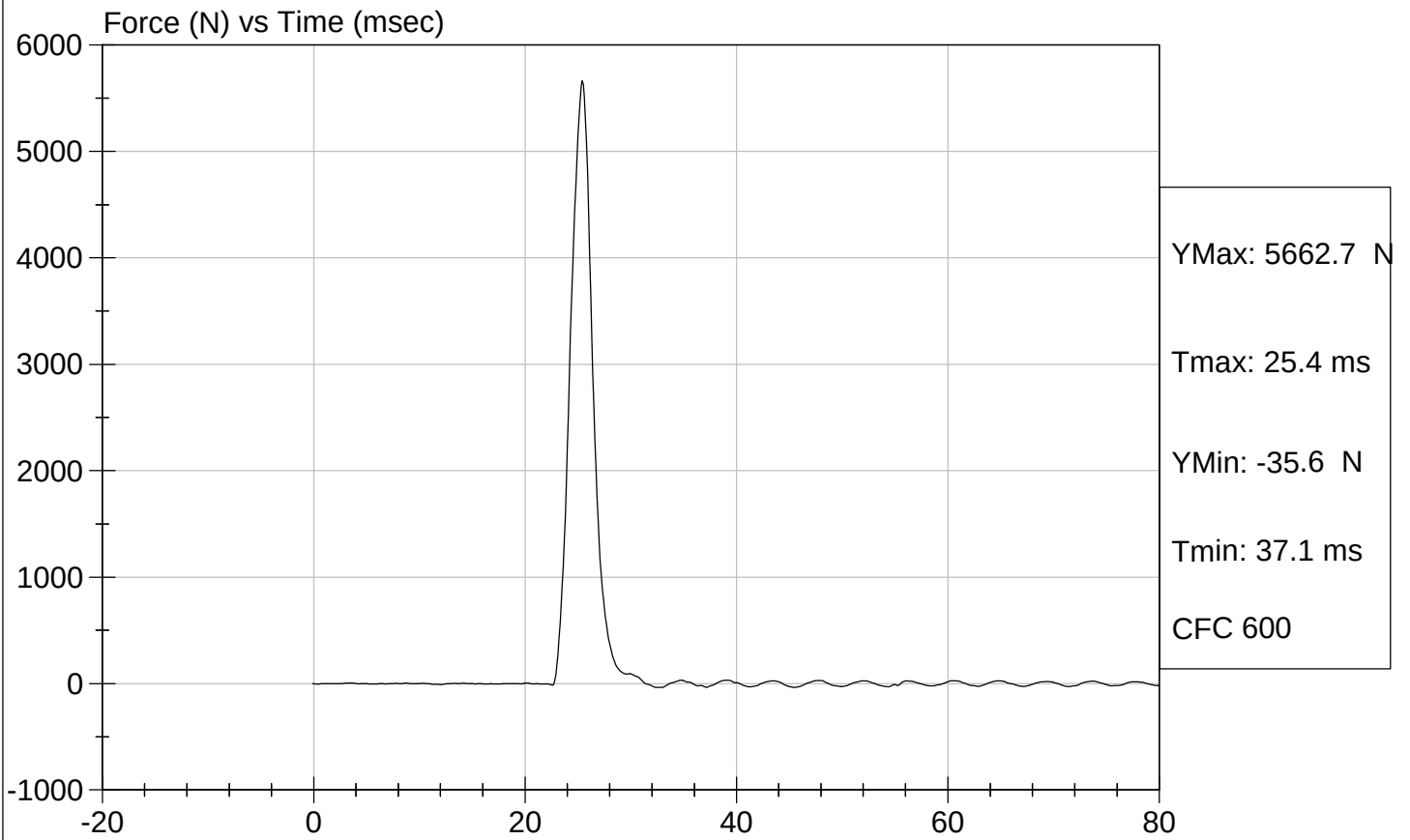


Test Description: Right Knee Impact

Test Date: 2/7/02

Component: D02185

Speed: 6.89 ft/sec, 2.10 m/sec



Hybrid III Calibration Data Sheet
50th Percentile Male
Left Knee Impact Test

ATD Serial No: 065

Test I.D: D02186

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Probe Velocity	m/s	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	4715 to 5782	5,500	Pass
Overall Test Results				Pass

Laboratory Technician

2/7/02
Test Date

Approved By

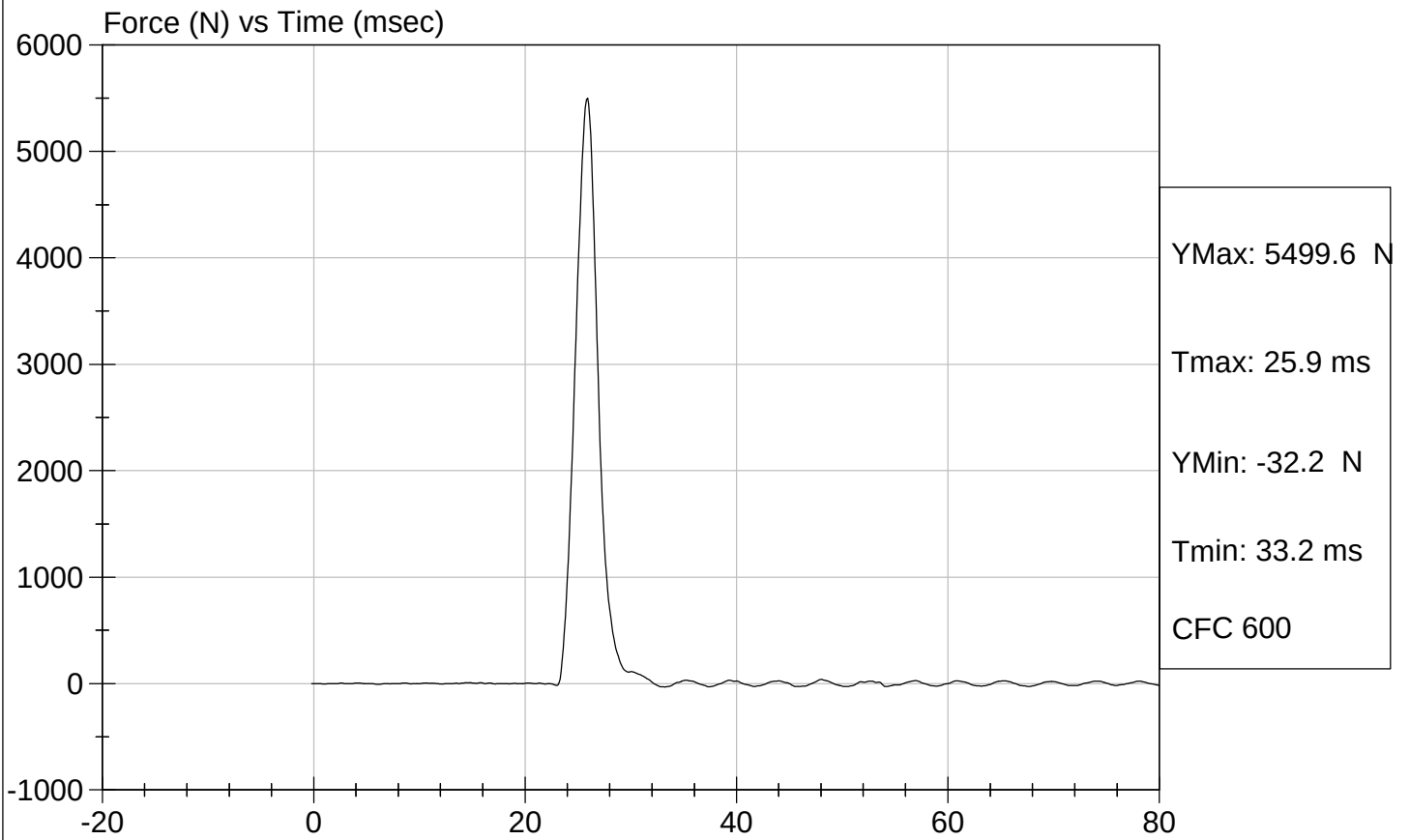


Test Description: Left Knee Impact

Test Date: 2/7/02

Component: D02186

Speed: 6.92 ft/sec, 2.11 m/sec



Hybrid III Calibration Data Sheet
50th Percentile Male
Right Knee Slider

ATD Serial No: 065

Test I.D: D02187

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	23	Pass
Velocity	m/s	2.7 to 2.8	2.74	Pass
Impact Force At 10 mm	kN	-1.72 to -1.26	-1.41	Pass
Impact Force At 18 mm	kN	-3.10 to -2.27	-2.54	Pass
Overall Test Results				Pass

Laboratory Technician

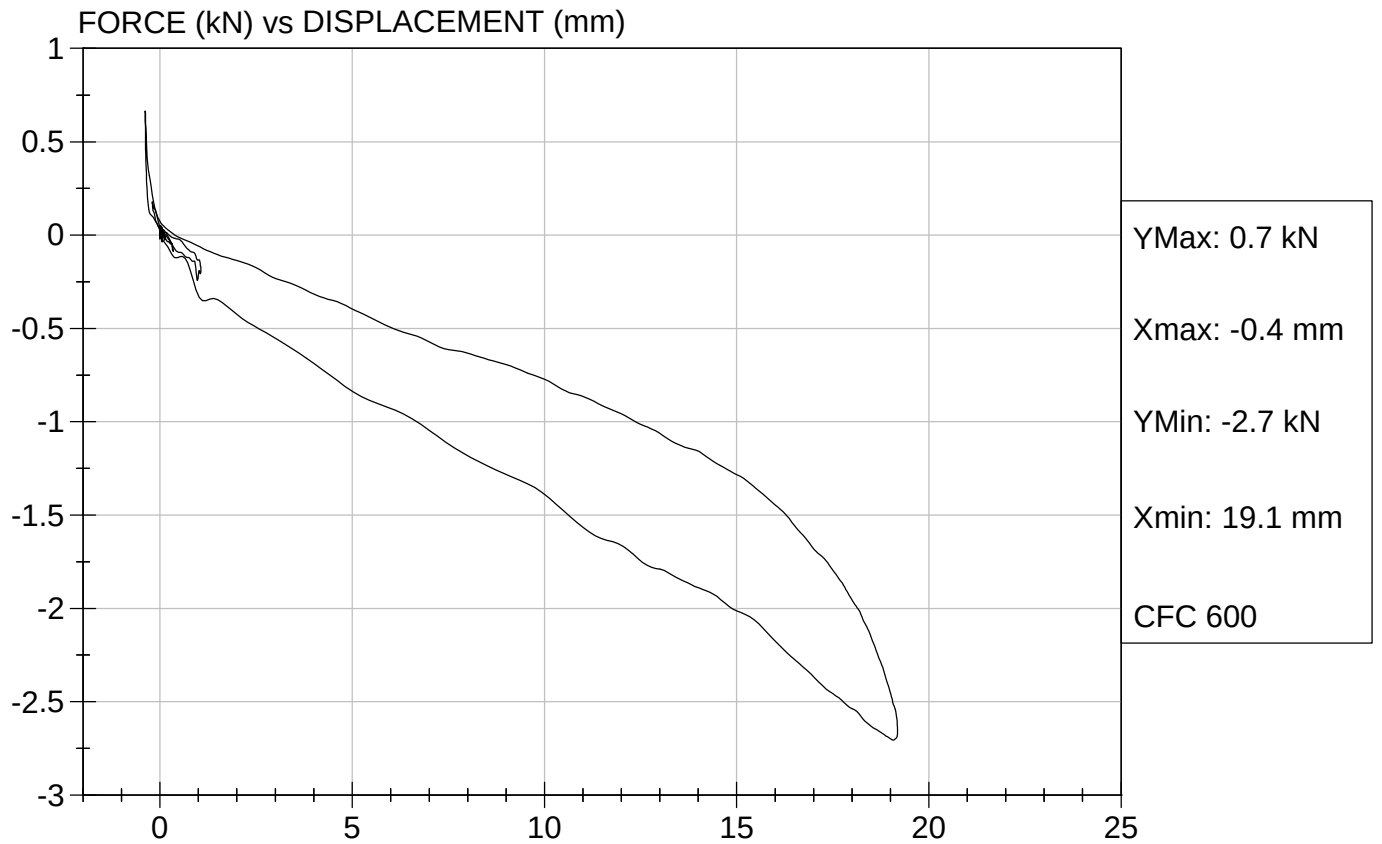
2/8/02
Test Date

Approved By



Test Desc: Right Knee Slider
Component ID: D02187

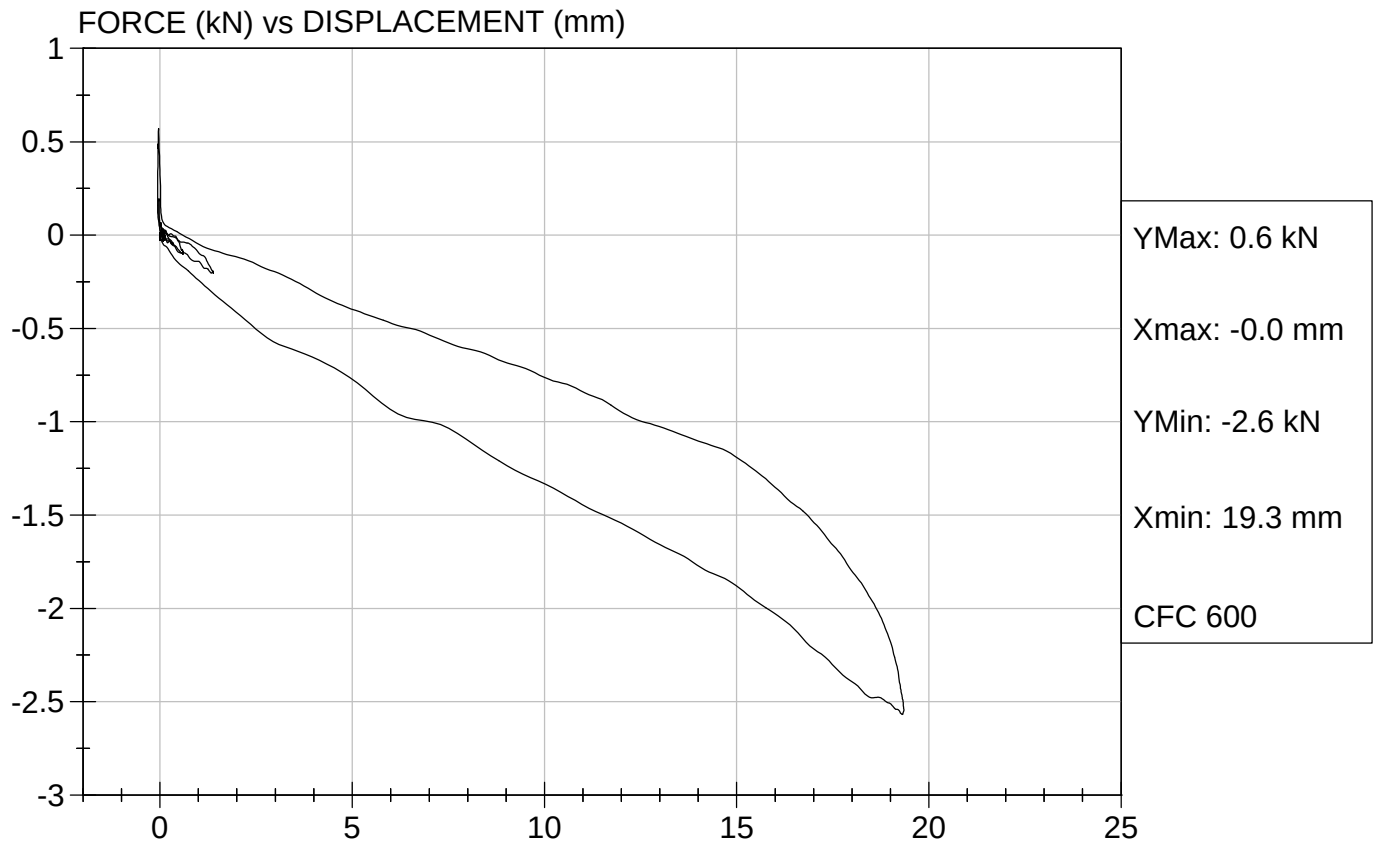
Test Date: 2/8/02
Speed: 8.99 ft/sec, 2.74 m/sec





Test Desc: Left Knee Slider
Component ID: D02188

Test Date: 2/8/02
Speed: 8.99 ft/sec, 2.74 m/sec



Hybrid III Calibration Data Sheet
50th Percentile Male
Hip-Femur Flexion Test

ATD Serial No: 065

Test I.D: D02189/0

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	20.4	20.4	Pass
Laboratory Relative Humidity	%	10 to 70	22	22	Pass
Rotation Rate	deg/sec	5 -10	8	8	Pass
30 Degrees	Nm	94.9 Nm Max	58.6	66.8	Pass
150 ft-lbf / 203.4 Nm	Deg	40- 50 Degree Max Rotation	47	45	Pass
Overall Test Results					Pass

Laboratory Technician

2/8/02
Test Date

Approved By

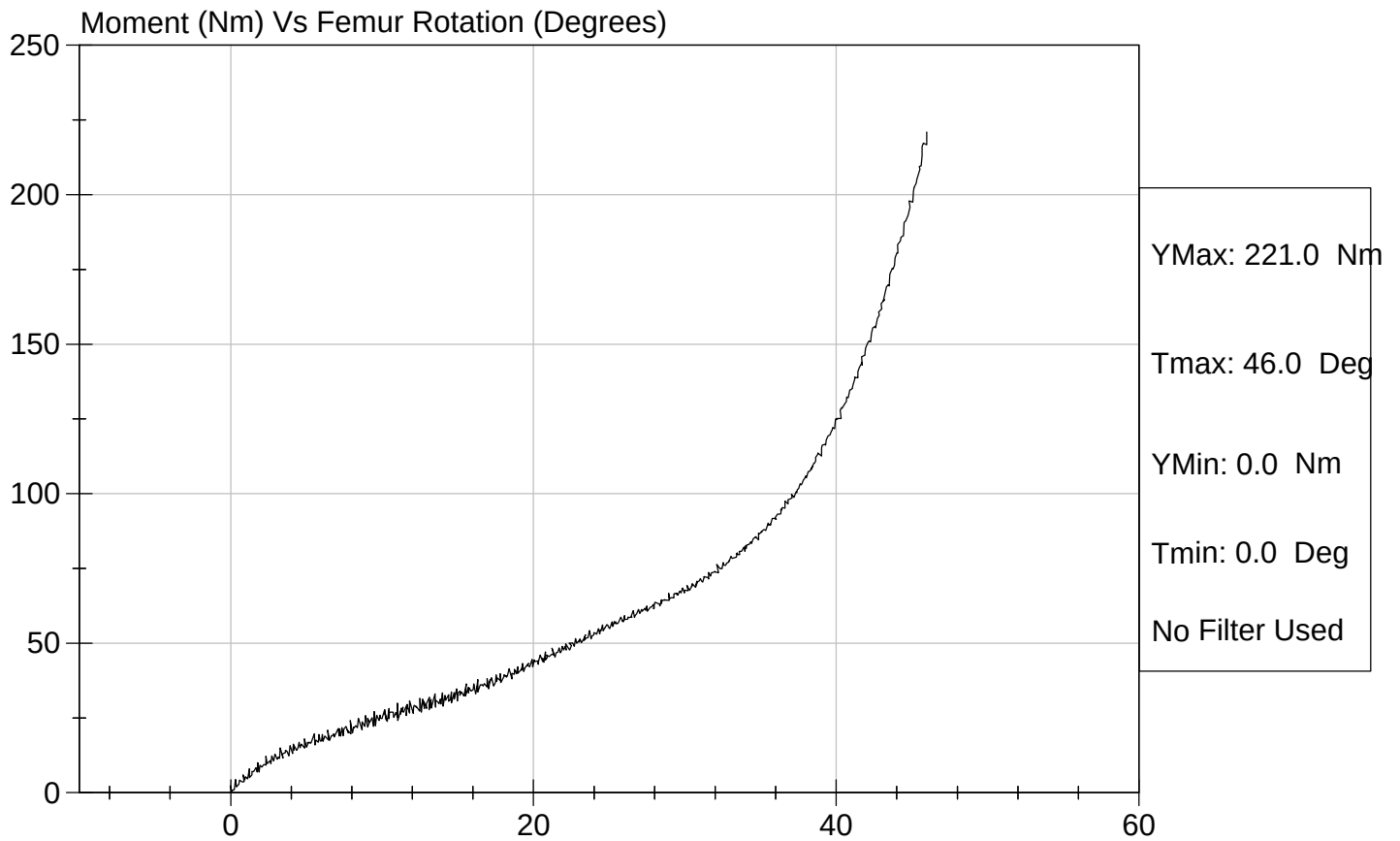


Test Description: Left Femur

Test Date: 2/8/02

Component: D02180

Speed: 0 ft/sec, 0.00 m/sec



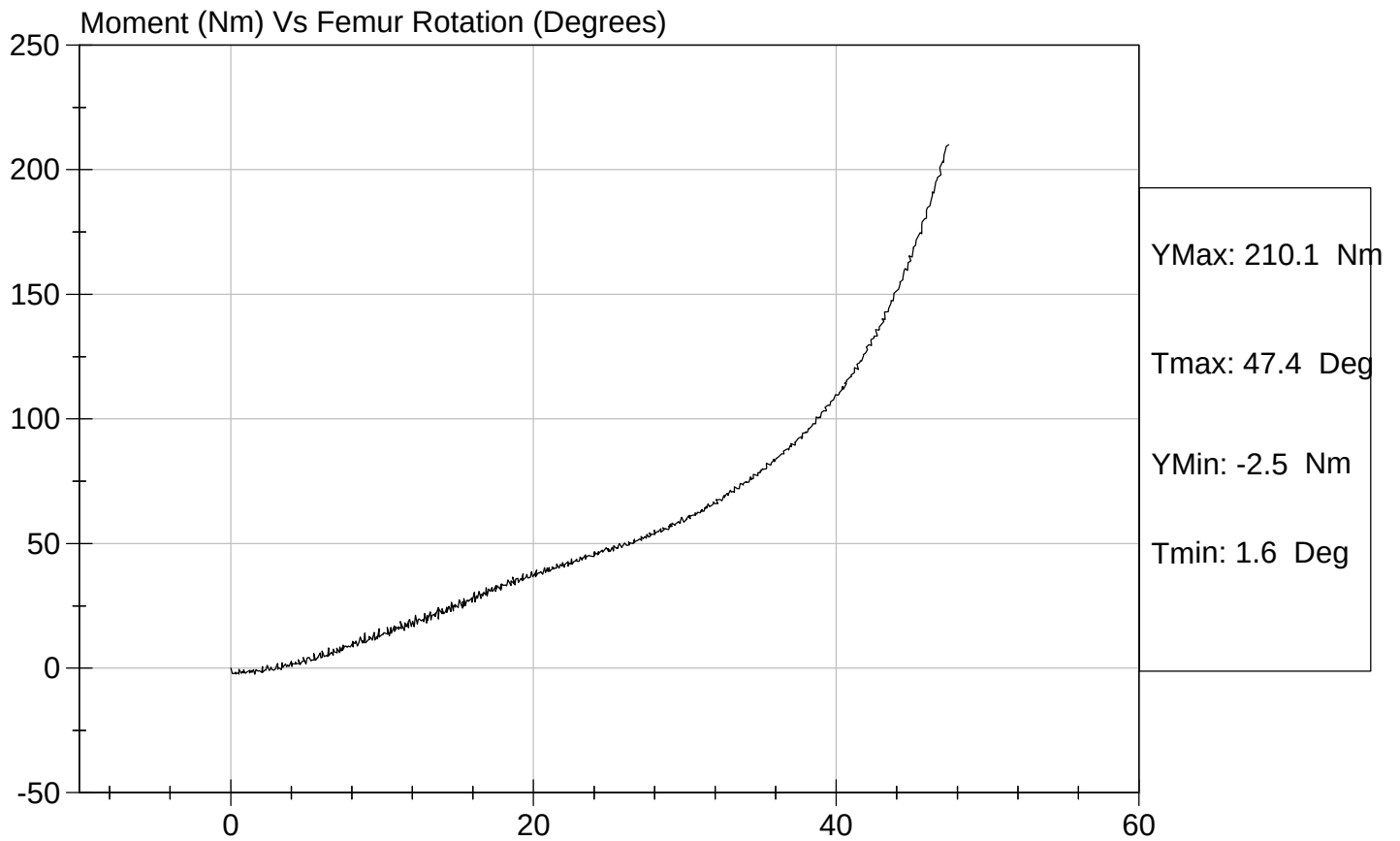


Test Description: Left Femur

Test Date: 2/8/02

Component: D02180

Speed: 0 ft/sec, 0.00 m/sec



APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION

INSTRUMENTS FOR DRIVER DUMMY NO. 065

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	ACCY6	Endevco	11/14/01
Head Y	J13941	Endevco	10/2/01
Head Z	AAMW5	Endevco	11/14/01
Head Y – Front	J20165	Endevco	11/15/01
Head Z – Front	J28708	Endevco	11/15/01
Head X – Left	J27513	Endevco	11/15/01
Head Z – Left	J23946	Endevco	11/15/01
Head X – Upper	J20580	Endevco	11/15/01
Head Y - Upper	J23914	Endevco	11/15/01
Head X Redundant	J18724	Endevco	11/15/01
Head Y Redundant	J14235	Endevco	11/15/01
Head Z Redundant	AJ5R0	Endevco	11/15/01
Neck Load Cell	442	Denton	9/7/01
Chest X	ACC78	Endevco	11/14/01
Chest Y	ACCE6	Endevco	11/14/01
Chest Z	ACCY3	Endevco	11/14/01
Chest Deflection Gauge	065	Servo	11/28/01
Chest X Redundant	J19927	Endevco	11/15/01
Chest Y Redundant	J14674	Endevco	11/15/01
Chest Z Redundant	J18736	Endevco	11/15/01
Pelvis X	AJ9N4	Endevco	11/16/01
Pelvis Y	ALFL9	Endevco	11/16/01
Pelvis Z	AJ808	Endevco	11/16/01
Left Femur Load Cell	260	Denton	11/30/01
Right Femur Load Cell	259	Denton	11/30/01
Left Knee Shear	14690	Denton	12/1/01
Right Knee Shear	14682	Denton	12/1/01
Left Upper Tibia Load Cell	105	Denton	11/19/01

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Lower Tibia Load Cell	133	Denton	11/16/01
Right Upper Tibia Load Cell	103	Denton	11/19/01
Right Lower Tibia Load Cell	134	Denton	11/16/01
Left Foot Z – Front	AJ9F3	Endevco	9/10/01
Left Ankle X	AJ9D9	Endevco	9/10/01
Left Ankle Z	AJ9D4	Endevco	9/10/01
Right Foot Z – Front	AJ9J7	Endevco	11/16/01
Right Ankle X	AJ819	Endevco	11/16/01
Right Ankle Z	AJ7A2	Endevco	11/16/01
Shoulder Belt Load Cell	195	Denton	11/7/01
Lap Belt Load Cell	199	Denton	11/7/01
Belt Stretch Potentiometer	01	Servo	12/4/01

INSTRUMENTS FOR PASSENGER DUMMY NO. 066

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	AAMN8	Endevco	11/14/01
Head Y	ACC61	Endevco	11/14/01
Head Z	ACCW9	Endevco	11/14/01
Head Y – Front	APYY3	Endevco	10/2/01
Head Z – Front	J23774	Endevco	11/15/01
Head X – Left	J20382	Endevco	11/15/01
Head Z – Left	J28988	Endevco	11/15/01
Head X – Upper	J22036	Endevco	11/15/01
Head Y - Upper	J20569	Endevco	11/15/01
Head X Redundant	J19884	Endevco	11/15/01
Head Y Redundant	J21988	Endevco	11/15/01
Head Z Redundant	J28986	Endevco	11/15/01
Neck Load Cell	606	Denton	9/7/01
Chest X	ACCY1	Endevco	11/14/01
Chest Y	ACCC8	Endevco	11/14/01
Chest Z	ACCT7	Endevco	11/14/01
Chest Deflection Gauge	066	Servo	11/28/01
Chest X Redundant	J13541	Endevco	10/2/01
Chest Y Redundant	J20093	Endevco	11/15/01
Chest Z Redundant	J19440	Endevco	11/15/01
Pelvis X	AJ820	Endevco	8/29/01
Pelvis Y	AGTG8	Endevco	8/29/01
Pelvis Z	AJ8Y6	Endevco	8/29/01
Left Femur Load Cell	262	Denton	11/30/01
Right Femur Load Cell	261	Denton	11/30/01
Left Knee Shear	13462	Denton	12/1/01
Right Knee Shear	18921	Denton	12/1/01
Left Upper Tibia Load Cell	109	Denton	11/19/01

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Lower Tibia Load Cell	138	Denton	11/16/01
Right Upper Tibia Load Cell	106	Denton	11/19/01
Right Lower Tibia Load Cell	135	Denton	11/16/01
Left Foot Z – Front	AHWK8	Endevco	11/16/01
Left Ankle X	AH0D1	Endevco	11/16/01
Left Ankle Z	AH0M0	Endevco	11/16/01
Right Foot Z – Front	J21612	Endevco	11/16/01
Right Ankle X	J22034	Endevco	11/16/01
Right Ankle Z	J21724	Endevco	11/16/01
Shoulder Belt Load Cell	197	Denton	11/7/01
Lap Belt Load Cell	190	Denton	11/6/01
Belt Stretch Potentiometer	02	Servo	12/4/01

INSTRUMENTS FOR VEHICLE AND LABORATORY

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	E03-H06	Entran	1/16/02
Left Rear Seat Crossmember Z	D11-F14	Entran	1/16/02
Right Rear Seat Crossmember X	I12-F16	Entran	10/29/01
Right Rear Seat Crossmember Z	A08-A10	Entran	10/29/01
Top of Engine X	H14-N12	Entran	9/12/01
Bottom of Engine X	F18-G13	Entran	1/16/02
Left Brake Caliper X	I25-F09	Entran	1/16/02
Right Brake Caliper X	I12-F05	Entran	10/10/01
Instrument Panel X	I25-J06	Entran	8/8/01

Note: All Endevco accelerometers are Model No. 7264-2000
All Entran accelerometers are Model No. EGE-72

APPENDIX E

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT INSTRUCTIONS

WARNING!

Driving with the flip-up window open can allow poisonous exhaust gases into your vehicle. You and your passengers could be injured by these fumes. Keep the flip-up window closed when you are operating the vehicle.

NOTE: The rear swing gate will lock while the rear wiper is operating. The gate will stay locked until the wiper is turned off and the gate is unlocked (by key, lock switch, or key fob).

ILLUMINATED ENTRY (IF EQUIPPED)

The interior lights will come on when you open any door. They will remain on for about 30 seconds after all doors are closed then fade to off.

Also, the lights will fade to off if you turn on the ignition after you close all the doors.

OCCUPANT RESTRAINTS

Some of the most important safety features in your vehicle are the restraint systems. These include the front and rear seat belts for the driver and all passengers, front airbags for both the driver and front passenger and, if so equipped, window bags for the driver and passengers seated next to a window. If you will be carrying children too small for adult-size belts, your seat belts also can be used to hold infant and child restraint systems.

NOTE: The front airbags have a multi stage inflator design. This allows the airbag to have different rates of inflation that are based on collision severity.

Please pay close attention to the information in this section. It tells you how to use your restraint system properly to keep you and your passengers as safe as possible.

WARNING!

In a collision, you and your passengers can suffer much greater injuries if you are not properly buckled up. You can strike the interior of your vehicle or other passengers, or you can be thrown out of the vehicle. Always be sure you and others in your vehicle are buckled up properly.

Buckle up even though you are an excellent driver, even on short trips. Someone on the road may be a poor driver and cause a collision which includes you. This can happen far away from home or on your own street.

Research has shown that seat belts save lives, and they can reduce the seriousness of injuries in a collision. Some of the worst injuries happen when people are thrown from the vehicle. Seat belts reduce the possibility of

ejection and the risk of injury caused by striking the inside of the vehicle. **Everyone** in a motor vehicle should be belted at all times.

Lap/Shoulder Belts

All the seats in your vehicle are equipped with lap/shoulder belts.

The belt webbing retractor is designed to lock during very sudden stops or collisions. This feature allows the shoulder part of the belt to move freely with you under normal conditions. But in a collision, the belt will lock and reduce the risk of you striking the inside of the vehicle or being thrown out.

WARNING!

- Wearing a seat belt incorrectly is dangerous. Seat belts are designed to go around the large bones of your body. These are the strongest parts of your body and can take the forces of a collision the best. Wearing your belt in the wrong place could make your injuries in a collision much worse. You might suffer internal injuries, or you could even slide out of part of the belt. Follow these instructions to wear your seat belt safely and to keep your passengers safe, too.
- Two people should never be belted into a single seat belt. People belted together can crash into one another in an accident, hurting one another badly. Never use a lap/shoulder belt or a lap belt for more than one person, no matter what their size.

Lap/Shoulder Belt Operating Instructions

1. Enter the vehicle and close the door. Sit back and adjust the seat.
2. The seat belt latch plate is above the back of your seat. Grasp the latch plate and pull out the belt. Slide the latch plate up the webbing as far as necessary to make the belt go around your lap.



3. When the belt is long enough to fit, insert the latch plate into the buckle until you hear a "click."



WARNING!

A belt that is buckled into the wrong buckle will not protect you properly. The lap portion could ride too high on your body, possibly causing internal injuries. Always buckle your belt into the buckle nearest you.

A belt that is too loose will not protect you as well. In a sudden stop you could move too far forward, increasing the possibility of injury. Wear your seat belt snugly.

A belt that is worn under your arm is very dangerous. Your body could strike the inside surfaces of the vehicle in a collision, increasing head and neck injury. A belt worn under the arm can cause internal injuries. Ribs aren't as strong as shoulder bones. Wear the belt over your shoulder so that your strongest bones will take the force in a collision.

A shoulder belt placed behind will not protect you from injury during a collision. You are more likely to hit your head in a collision if you do not wear your shoulder belt. The lap and shoulder belt are meant to be used together.

4. Position the lap belt across your thighs, below your abdomen. To remove slack in the lap portion, pull up a bit on the shoulder belt. To loosen the lap belt if it is too tight, tilt the latch plate and pull on the lap belt. A snug belt reduces the risk of sliding under the belt in a collision.

NOTE: The "Seat Belt Indicator Light" will remain on until the driver's seat belt is buckled.

**WARNING!**

A lap belt worn too high can increase the risk of injury in a collision. The belt forces won't be at the strong hip and pelvic bones, but across your abdomen. Always wear the lap part of your seat belt as low as possible and keep it snug.

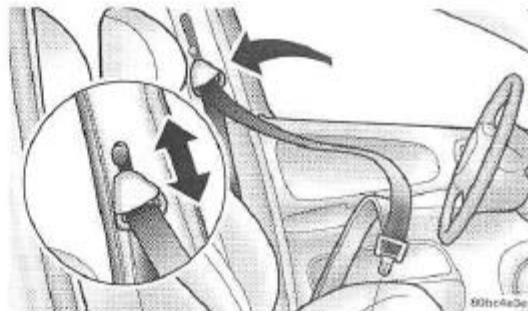
A twisted belt cannot do its job as well. In a collision it could even cut into you. Be sure the belt is straight. If you cannot straighten a belt in your vehicle, take it to your authorized dealer and have it fixed.

5. Position the shoulder belt on your chest so that it is comfortable and not resting on your neck. The retractor will withdraw any slack in the belt.

6. To release the belt, push the red button marked **PRESS** on the buckle. The belt will automatically retract to its stowed position. If necessary, slide the latch plate down the webbing to allow it to retract fully.

WARNING!

A frayed or torn belt could rip apart in a collision and leave you with no protection. Inspect the belt system periodically, checking for cuts, frays, or loose parts. Damaged parts must be replaced immediately. Do not disassemble or modify the system. Seat belt assemblies must be replaced after an accident if they have been damaged (bent retractor, torn webbing, pretensioner, etc.).

**Adjustable Upper Shoulder Belt Anchorage**

In the front seat positions, the shoulder belt can be adjusted upward or downward to position the belt away from your neck. To lower the shoulder belt height, push the button and slide the height adjuster down. To raise the height of the shoulder belt, slide the height adjuster up. Pull down on the height adjuster to make sure it is locked in place.

WARNING!

Position the shoulder belt height adjusters so that the belt rests across the middle of your shoulder. Failure to adjust the safety belt properly could reduce the effectiveness of the seat belt and increase the risk of injury in a collision.

As a guide, if you are shorter than average, you will prefer a lower position, and if you are taller than average, you'll prefer a higher position. When you release the anchorage, try to move it up or down to make sure that it is locked in position.

Automatic Locking Mode (If Equipped)

In this mode, the shoulder belt is automatically pre-locked. The belt will still retract to remove any slack in the shoulder belt.

The automatic locking mode is only available on the front passenger belt.

When To Use The Automatic Locking Mode

Anytime a child safety seat is installed in a passenger front or outboard rear seating position (if equipped). Children 12 years old and under should be properly restrained in the rear seat whenever possible.

2**How To Use The Automatic Locking Mode**

1. Buckle the combination lap and shoulder belt.
2. Grasp the shoulder portion and pull downward until the entire belt is extracted.
3. Allow the belt to retract. As the belt retracts, you will hear a clicking sound. This indicates the safety belt is now in the automatic locking mode.

How to Disengage The Automatic Locking Mode

Disconnect the combination lap/shoulder belt and allow it to retract completely to disengage the automatic locking mode and activate the vehicle sensitive (emergency) locking mode.

Energy Management Feature

This vehicle has a safety belt system with an energy management feature at the front passenger seating position to help further reduce the risk of injury in the event of a head-on collision.

This safety belt system has a retractor assembly that is designed to pay out webbing in a controlled manner. This feature is designed to help reduce the belt force acting on the occupant's chest.

WARNING!

- After a vehicle collision, the front passenger out-board seat belt system must be checked by a qualified technician to verify that the "automatic locking retractor" feature for child seats is still functioning properly. In addition, all seat belts should be checked for proper function.
- The belt and retractor assembly must be replaced if the seat belt assembly "automatic locking retractor" feature or any other seat belt function is not working properly when checked according to the procedures in the Service Manual.
- Failure to replace the belt and retractor assembly could increase the risk of injury in collisions.

Seat Belt Pretensioner

The driver's seat belt is equipped with a pretensioning device that is designed to remove any slack from the seat belt systems in the event of a collision. This device improves the performance of the seat belt by assuring that the belt is tight around the occupant early in a collision. Pretensioners work for all size occupants, including those in child restraints.

NOTE: These devices are not a substitute for proper seat belt placement by the occupant. The seat belt must still be worn snugly and positioned properly.

The pretensioner is triggered by the front Airbag Control Module. Like the front airbags, the pretensioner is a single use item. After a collision that is severe enough to deploy the airbags and pretensioner, both must be replaced.

Seat Belts and Pregnant Women

We recommend that pregnant women use the seat belts throughout their pregnancy. Keeping the mother safe is the best way to keep the baby safe.

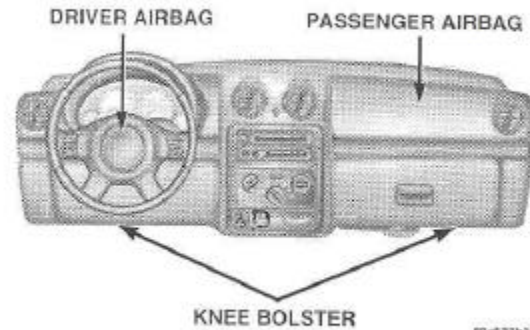
Pregnant women should wear the lap part of the belt across the thighs and as snug across the hips as possible. Keep the belt low so that it does not come across the abdomen. That way the strong bones of the hips will take the force if there is a collision.

Seat Belt Extender

If a seat belt is too short, even when fully extended and when the adjustable upper shoulder belt anchorage (if so equipped) is in its lowest position, your authorized dealer can provide you with a seat belt extender. This extender should be used only if the existing belt is not long enough. When it is not required, remove the extender and store it.

WARNING!

Using a seat belt extender when not needed can increase the risk of injury in a collision. Only use when the lap belt is not long enough when it is worn low and snug, and in the recommended seating positions. Remove and store the extender when not needed.

Driver And Front Passenger Supplemental Restraint Systems (SRS) — Airbags

This vehicle has airbags for both the driver and right front passenger as a supplement to the seat belt restraint systems. The driver's front airbag is mounted in the steering wheel. The passenger side airbag is mounted in the instrument panel, above the glove compartment. The words SRS/AIRBAG are embossed on the airbag covers.

NOTE: The front airbags are certified to the Federal regulations that allow less forceful deployment.

The front airbags have a multi stage inflator design. This allows the airbag to have different rates of inflation that are based on collision severity.

This vehicle may also be equipped with window bags to protect the driver, front, and rear passengers sitting next to a window. If the vehicle is equipped with window bags, they are located above the side windows.

NOTE: Airbag covers may not be obvious in the interior trim; but they will open to allow airbag deployment.

WARNING!

- Do not put anything on or around the front airbag covers or attempt to manually open them. You may damage the airbags and you could be injured because the airbags are not there to protect you. These protective covers for the airbag cushions are designed to open only when the airbags are inflating.
- If your vehicle is equipped with window bags, do not stack luggage or other cargo up high enough to block the location of the window bag. The area where the window bag is located should remain free from any obstructions.
- If your vehicle is equipped with window bags, do not have any accessory items installed which will alter the roof, including adding a sunroof to your vehicle. Do not add roof racks that require permanent attachments (bolts or screws) for installation on the vehicle roof. Do not drill into the roof of the vehicle for any reason.

The front airbags have a multi stage inflator design. This allows the airbag to have different rates of inflation that are based on collision severity. Along with the seat belts, front airbags work with the instrument panel knee bolsters to provide improved protection for the driver and front passenger. Window bags also work with seat belts to improve occupant protection.

The seat belts are designed to protect you in many types of collisions. The front airbags deploy in moderate to severe frontal collisions. If your vehicle is so equipped, the window bag on the crash side of the vehicle is triggered in moderate to severe side collisions. But even in collisions where the airbags work, you need the seat belts to keep you in the right position for the airbags to protect you properly.

Here are some simple steps you can take to minimize the risk of harm from a deploying airbag.

1. Children 12 years and under should always ride buckled up in a rear seat.

Infants in rear-facing child restraints should **NEVER** ride in the front seat of a vehicle with a passenger front airbag. An airbag deployment can cause severe injury or death to infants in that position.

If a child from 1 to 12 years old must ride in the front passenger seat because the vehicle is crowded, move the seat as far back as possible, and use the proper child restraint. See "Child Restraint" in this section.

You should read the instructions provided with your child restraint belt-positioning booster seat to make sure that you are using it properly.

2. All occupants should use their lap and shoulder belts properly.
3. The driver and front passenger seats should be moved back as far as practical to allow the airbag room to inflate.
4. If your vehicle has window bags, do not lean against the door or window, airbags will inflate forcefully into the space between you and the door.

WARNING!

- Relying on the airbags alone could lead to more severe injuries in a collision. The airbags work with your seat belt to restrain you properly. In some collisions the airbags won't deploy at all. Always wear your seat belts even though you have airbags.
- Being too close to the steering wheel or instrument panel during airbag deployment could cause serious injury. Airbags need room to inflate. Sit back, comfortably extending your arms to reach the steering wheel or instrument panel.
- If the vehicle has window bags, they also need room to inflate. Do not lean against the door or window. Sit upright in the center of the seat.

Airbag System Components

The airbag system consists of the following:

- Front Airbag Control Module (with integrated crash sensors)
- Side Impact Airbag Control Module (SLACM)
- Airbag Warning Light
- Driver Airbag
- Passenger Airbag
- Window Bags above Side Windows (If Equipped)
- Steering Wheel and Column
- Instrument Panel
- Seat Belt Sensors
- Interconnecting Wiring
- Knee Impact Bolsters

- Front Acceleration Sensors
- Driver Seat Belt (Pretensioner)

How The Airbag System Works

- The **Airbag Control Module (ACM)** determines if a frontal collision is severe enough to require the airbags to inflate. Based on the level of collision severity, the front control module determines the proper rate of inflation. The front airbag inflators are designed to provide different rates of airbag inflation.
- The ACM will not detect side, roll over, or rear impacts.
- The ACM monitors the readiness of the electronic parts of the system whenever the ignition switch is in the START or RUN positions. These include all of the items listed above except the steering wheel and column, seat belt sensors, and knee bolsters. If the key is in the OFF position, in the ACC position, or not in the ignition, the airbags are not on and will not inflate.

Also, the ACM turns on the AIRBAG warning light in the instrument panel for 6 to 8 seconds when the ignition is first turned on, then turns the light off. If it detects a malfunction in any part of the system, it turns on the light either momentarily or continuously. A single chime will sound if the light comes on again after initial start up.

WARNING!

Ignoring the AIRBAG warning light in your instrument panel could mean you won't have the airbags to protect you in a collision. If the light does not come on, stays on after you start the vehicle, or if it comes on as you drive, have the airbag system checked right away.

- The **Driver and Passenger Airbag/Inflator Units** are located in the center of the steering wheel and the right side of the instrument panel. When the ACM detects a collision requiring the airbags, it signals the inflator units. A large quantity of nontoxic gas is generated to inflate the front airbags. Different airbag inflation rates are possible based on collision severity. These rates are determined by the front airbag control module based on collision severity. The steering wheel hub trim cover and the upper right side of the instrument panel separate and fold out of the way as the bags inflate to their full size. The bags fully inflate in about 50–70 milliseconds. This is about half of the time it takes to blink your eyes. The bags then quickly deflate while helping to restrain the driver and front passenger.

The driver's front airbag gas is vented through vent holes in the back side of the airbag towards the instrument panel. The passenger's front airbag gas is

vented through vent holes in the sides of the airbag. In this way the airbags do not interfere with your control of the vehicle.

- The **Knee Impact Bolsters** help protect the knees of the driver and the front passenger, and position everyone for the best interaction with the front airbag.

If A Deployment Occurs

The airbag system is designed to deploy the airbags when the impact sensors detect a moderate-to-severe frontal collision, to help restrain the driver and front passenger, and then immediately deflate.

NOTE: A frontal collision that is not severe enough to need airbag protection will not activate the system. This does not mean something is wrong with the airbag system.

If you do have a collision which deploys the airbags, any or all of the following may occur:

- The nylon airbag material may sometimes cause abrasions and/or skin reddening to the driver and front passenger as the airbags deploy and unfold. The abrasions are similar to friction rope burns or those you might get sliding along a carpet or gymnasium floor. They are not caused by contact with chemicals. They are not permanent and normally heal quickly. However, if you haven't healed significantly within a few days, or if you have any blistering, see your doctor immediately.
- As the airbags deflate you may see some smoke-like particles. The particles are a normal by-product of the process that generates the nontoxic gas used for airbag inflation. These airborne particles may irritate the skin, eyes, nose, or throat. If you have skin or eye irritation, rinse the area with cool water. For nose or throat irritation, move to fresh air. If the irritation continues, see your doctor. If these particles settle on your clothing, follow the garment manufacturer's instructions for cleaning.

- It is not advisable to drive your vehicle after the airbags have deployed. If you are involved in another collision, the airbags will not be in place to protect you.

WARNING!

Deployed airbags and seat belt pretensioners cannot protect you in another collision. Have the airbags and seat belt pretensioners replaced by an authorized dealer as soon as possible.

The side impact SRS airbags are designed to activate only in certain side collisions. When the side airbag control module (SIACM) detects a collision requiring the window bags to inflate, it signals the inflators on the crash side of the vehicle. A quantity of nontoxic gas is generated to inflate the window bag. The inflating window bag pushes the outside edge of the headliner out of the way and covers the window. The airbag inflates in about 30 milliseconds (about one quarter of the time it takes to blink your eyes) with enough force to injure you if you are not belted and seated properly, or if items are positioned in the area where the window bag inflates. This especially applies to children. The window bag is only about 9 cm (3½ inches) thick when it is inflated.

Maintaining Your Airbag System

WARNING!

- Modifications to any part of the airbag system could cause it to fail when you need it. You could be injured if the airbag system is not there to protect you. Do not modify the components or wiring, including adding any kind of badges or stickers to the steering wheel hub trim cover or the upper right side of the instrument panel. Do not modify the front bumper, vehicle body structure, or add aftermarket side steps or running boards.
- You need proper knee impact protection in a collision. Do not mount or locate any aftermarket equipment on or behind the knee bolsters.
- It is dangerous to try to repair any part of the airbag system yourself. Be sure to tell anyone who works on your vehicle that it has an airbag system.

Airbag Warning Light

You will want to have the airbag system ready to inflate for your protection in an impact. The airbag system is designed to be maintenance free. If any of the following occurs, have an authorized dealer service the system promptly:

- Does not come on during the 6 to 8 seconds after the ignition switch is first turned on.
- Remains on after the 6 to 8 second interval.
- Comes on for any period of time while driving.

Child Restraint

Everyone in your vehicle needs to be buckled up all the time — babies and children, too. Every state in the United States and all Canadian provinces require that small children ride in proper restraint systems. This is the law, and you can be prosecuted for ignoring it.