

**REPORT NUMBER: NCAP-MGA-2005-007**

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

**Daimler Chrysler  
2005 Chrysler Town and Country  
NHTSA NUMBER: D50310**

**PREPARED BY:  
MGA RESEARCH CORPORATION  
5000 WARREN ROAD  
BURLINGTON, WI 53105**



**Test Date: December 8, 2004**

**Report Date: January 19, 2005**

**FINAL REPORT**

**PREPARED FOR:  
U.S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
RULEMAKING  
OFFICE OF CRASHWORTHINESS STANDARDS  
400 SEVENTH STREET, SW, ROOM 5311  
WASHINGTON, D.C. 20590**

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COTR, NCAP Frontal Impact Program

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Date of Acceptance

**Technical Report Documentation Page**

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16. Abstract A 35.2 mph (56.6 km/h) frontal barrier impact was conducted on a 2005 Chrysler Town and Country at MGA Research Corporation on December 8, 2004. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The impact velocity was 56.6 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 692 mm located at 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"> <thead> <tr> <th><u>Measurement Description</u></th> <th><u>Units</u></th> <th><u>Threshold</u></th> <th><u>Driver ATD</u></th> <th><u>Pass. ATD</u></th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC)</td> <td>N/A</td> <td>1000</td> <td>278</td> <td>241</td> </tr> <tr> <td>Max. Thorax Accel. (3ms Clip)</td> <td>G's</td> <td>60</td> <td>37</td> <td>38</td> </tr> <tr> <td>Left Femur Force</td> <td>Newton</td> <td>10009</td> <td>-2533</td> <td>-3787</td> </tr> <tr> <td>Right Femur Force</td> <td>Newton</td> <td>10009</td> <td>-1976</td> <td>-2758</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	278	241	Max. Thorax Accel. (3ms Clip)	G's	60	37	38	Left Femur Force	Newton	10009	-2533	-3787	Right Femur Force	Newton	10009	-1976	-2758
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## 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 2005 Chrysler Town and Country at a velocity of 56.6 kph. The test was performed at MGA Research Corporation on December 8, 2004. 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, 50<sup>th</sup> 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 head, chest and pelvis tri-axial accelerometers, chest displacement potentiometer, upper neck transducers, right/left femur load cells, and lower leg instrumentation. The driver (position 1) ATD (Serial No. 065) and right-front passenger (position 2) ATD (Serial No. 066) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 153 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 692 mm and both the driver and passenger side doors remained closed and latched during the impact event and were operable after the impact.

The driver's head and chest contacted the airbag. The driver's head also contacted the headrest. The driver's knees contacted the bolster. The driver's abdomen contacted the airbag. The passenger's head, chest and abdomen contacted the airbag. The passenger's head contacted the headrest. 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)
Driver	277.5	36.5	-30.5	-2533	-1976
Passenger	240.5	37.9	-31.2	-3787	-2758

#### Test Notes

No valid data was collected for the following:

Passenger Neck FX after 250ms

Driver Left Lower Tibia MX after 30ms

Left Brake Caliper X after 40ms

Due to power failure, the onboard cameras did not work.

**SECTION 2**  
**OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS**

Test Vehicle: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
 Test Date: 12/08/04

**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 <sup>2</sup>	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: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
 Test Date: 12/08/04

**PRIMARY IMPACT DATA**

Measured Parameter	Units	Value
Velocity at Impact	km/hr	56.6
Test Weight	kg	2134.7
Average Rebound	mm	407
Maximum Static Crush	mm	692
Impact Angle	degrees	0

**DOOR OPENING AND SEAT TRACK INFORMATION**

Description	Driver	Passenger
Front Door Opening	Door remained closed and latched; Door opened without tools	Door remained closed and latched; Door opened without tools
Rear Door Opening	Door remained closed and latched; Door opened without tools	Door remained closed and latched; Door opened without tools
Seat Track Shift (mm)	0	0
Seat Back Failure	None	None

**TEST DUMMY INFORMATION**

Description	Driver	Passenger
Dummy Type / Serial No.	H III 50 <sup>th</sup> / 065	H III 50 <sup>th</sup> / 066
Head Contact	Airbag, Headrest	Airbag, Headrest
Chest Contact	Airbag	Airbag
Abdomen Contact	Airbag	Airbag
Left Knee Contact	Knee Bolster	Glove Box
Right Knee Contact	Knee Bolster	Glove Box

**16mm MOVIE COVERAGE**

High Speed	16
Real Time	1
Total	17

Driver ATD Sensors	46
Passenger ATD Sensors	42
Belt Assessment Sensors	4
Vehicle Structure Accelerometers	9
Rigid Barrier Load Cells	6
Total	107

**DATA SHEET NO. 2**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
 Test Date: 12/08/04

**TEST VEHICLE INFORMATION**

**TEST VEHICLE OPTIONS**

Manufacturer	Daimler Chrysler
Model	Town and Country
Body Style	Minivan
NHTSA No.	D50310
VIN	2C4GP44R45R365000
Color	White
Delivery Date	12/03/04
Odometer Reading (mile)	9
Dealer	Miller Motors
Transmission	Automatic
Final Drive	Front
Number of Cylinders	6
Engine Displacement (L)	3.3
Engine Placement	Lateral
Automatic Door Lock (ADL)	Yes
Owner's Manual Details Instructions on Disabling	Yes

Driver Airbag	Yes
Passenger Airbag	Yes
Force Limiter	Yes
Pretensioner	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	Yes
Anti-lock Brakes	Yes
AM/FM/Cassette	Yes
Anti-theft System	Yes
Cruise Control	Yes

**DATA FROM CERTIFICATION LABEL**

Manufactured By	Daimler Chrysler	GVWR (kg)	2586
Date of Manufacture	11/04	GAWR Front (kg)	1293
		GAWR Rear (kg)	1339

**DATA FROM TIRE PLACARD**

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	250	250
Recommended Tire Size	P215/70R15	P215/70R15
Tire Size on Vehicle	P215/70R15	P215/70R15
Tire Manufacturer	Good Year	Good Year

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bucket	Split Bench	
Number Of Occupants	2	2	3	7
Capacity Wt. (VCW) (kg)				521
Cargo Wt. (RCLW) (kg)				45.4

**DATA SHEET NO. 2... (continued)**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
 Test Date: 12/08/04

**TEST VEHICLE WEIGHTS**

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	554.8	432.7		593.8	490.8	
Right	kg	529.8	420.9		575.6	474.5	
Ratio	%	56.0	44.0		54.8	45.2	
Totals	kg	1084.6	853.6	1938.2	1169.4	965.3	2134.7

**TARGET TEST WEIGHT CALCULATION**

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1938.2
Weight of 2 P572E ATDs	kg	156.0
Rated Cargo/Luggage Weight (RCLW)	kg	45.4
Calculated Vehicle Target Weight (TVTW)	kg	2139.6

**TEST VEHICLE ATTITUDES AND CG**

	Units	LF	RF	LR	RR	CG(aft of front axle)
As Delivered	mm	763	768	768	773	1334
As Tested	mm	751	755	750	754	1370
Post Test	mm	812	798	759	733	

Vehicle Wheelbase (mm): 3030

Weight of Ballast secured in cargo area (kg): 0

Vehicle Components Removed: Tools, Third Row Seats

Ballast weight does not include cameras, instrumentation, and data acquisition system.

**FUEL SYSTEM DATA**

Fuel System Capacity From Owner's Manual (L): 75.7

Usable Capacity Figure Furnished by COTR (L): N/A

Actual Test Volume (L): 26.5

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

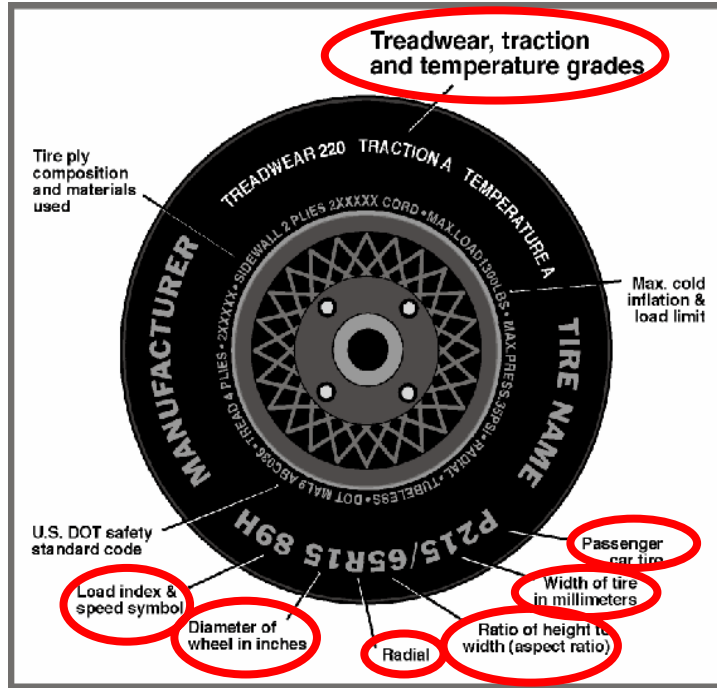
**DATA SHEET NO. 3**

**TEST VEHICLE TIRE INFORMATION**

Test Vehicle: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
 Test Date: 12/08/04

Vehicle Year	2005	Vehicle Make	Daimler Chrysler
VIN	2C4GP44R45R365000	Vehicle Model	Town and Country



	Front	Rear
Tire Manufacturer	Good Year	Good Year
Tire Name	Integrity	Integrity
Tire Type	P	P
Tire Width (mm)	215	215
Ratio of Height to Width (aspect ratio)	70	70
Radial	R	R
Wheel Diameter	15	15
Load Index & Speed Symbol	98S	98S
Treadwear	460	460
Traction Grade	A	A
Temperature Grade	B	B

**DATA SHEET NO. 4**  
**POST IMPACT DATA**

Test Vehicle: 2005 Chrysler Town and Country  
Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
Test Date: 12/08/04

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	55.5 – 57.1	56.6
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	56.6
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	4852	4393	459
Center	mm	5040	4348	692
Right Side	mm	4848	4339	509

**VEHICLE REBOUND FROM BARRIER**

Measured Parameter	Units	Value
Left Side	mm	462
Center	mm	340
Right Side	mm	420
Average	mm	407

**DATA SHEET NO. 5**  
**TEST VEHICLE INFORMATION**

Test Vehicle: 2005 Chrysler Town and Country  
Test Program: 35mph Frontal Impact

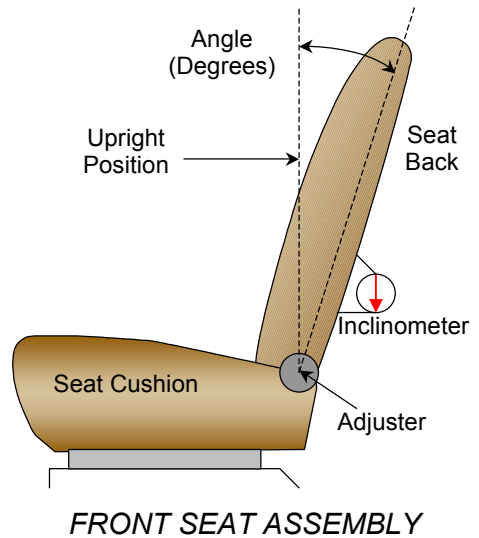
NHTSA No.: D50310  
Test Date: 12/08/04

**NORMAL DESIGN RIDING POSITION**

The driver and passenger seat back is positioned to the manufacturer's designated angle. The procedure is as follows: Driver recline 8 degrees from upright position. Passenger recline 4 degrees from upright position.

Driver seat back angle: 8° back from upright position

Passenger seat back angle: 4° back from upright position



**SEAT FORE/AFT POSITIONS**

The driver and the passenger seats were manual.

Driver seat fore/aft total travel: 23 notches

Passenger seat fore/aft total travel: 23 notches

Driver seat fore/aft position: 12<sup>th</sup> notch

Passenger seat fore/aft position: 12<sup>th</sup> notch

**SEAT BELT UPPER ANCHORAGE**

The front outboard D-rings were adjusted to the third position of 4 with the top as No. 1.

## DATA SHEET NO. 5... (continued)

### TEST VEHICLE INFORMATION

Test Vehicle: 2005 Chrysler Town and Country  
Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
Test Date: 12/08/04

### FUEL TANK CAPACITY DATA

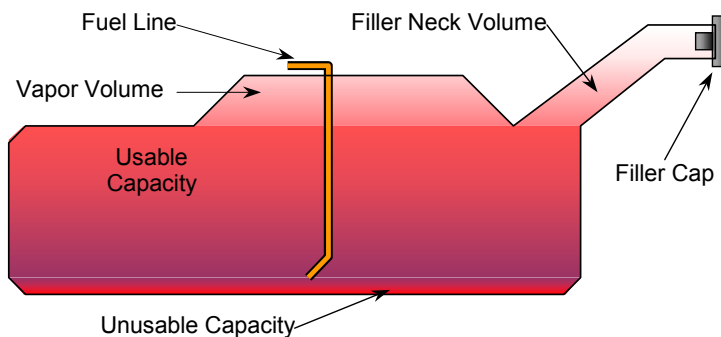
The "Usable Capacity" of the standard equipment fuel tank is: 75.7 liters

The "Usable Capacity" of any optional equipment fuel tank is: N/A liters

The "Usable Capacity" used for certification to FMVSS 301 requirements: 75.7 liters

Actual amount of Stoddard solvent added to vehicle for certification test: 26.5 liters

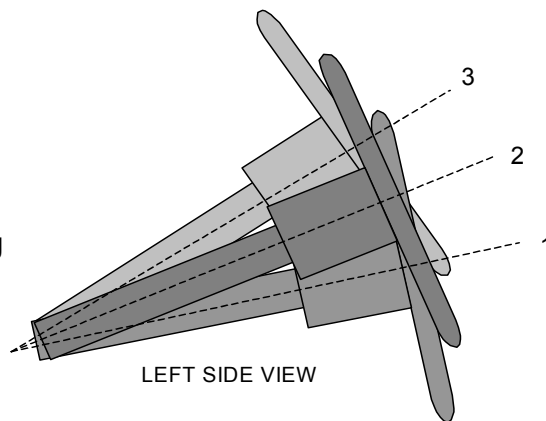
The fuel pump is located on the left side of the vehicle.



VEHICLE FUEL TANK ASSEMBLY

### STEERING COLUMN ADJUSTMENT

Adjustable steering controls are adjusted so that the steering wheel hub is located at the geometric center of the locus it describes when it is moved through its full range of driving positions.



STEERING COLUMN ASSEMBLY

Lowermost, Position 1: 16.0°

Geometric Center, Position 2: 25.0°

Uppermost, Position 3: 34.0°

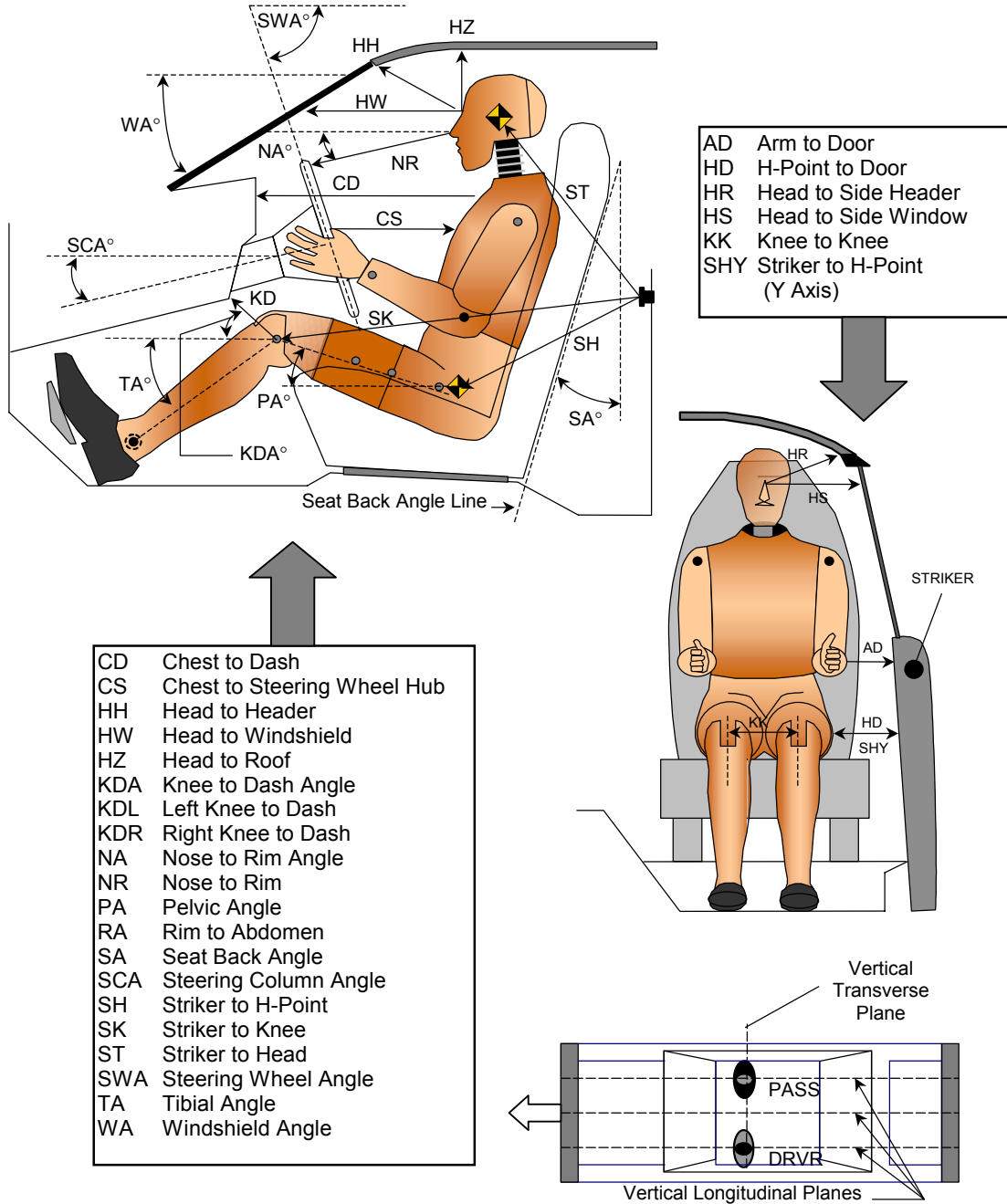
# DATA SHEET NO. 6

## DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
 Test Date: 12/08/04

### DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS



**DATA SHEET NO. 6... (continued)**  
**DUMMY POSITIONING IN VEHICLE**

Test Vehicle: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
 Test Date: 12/08/04

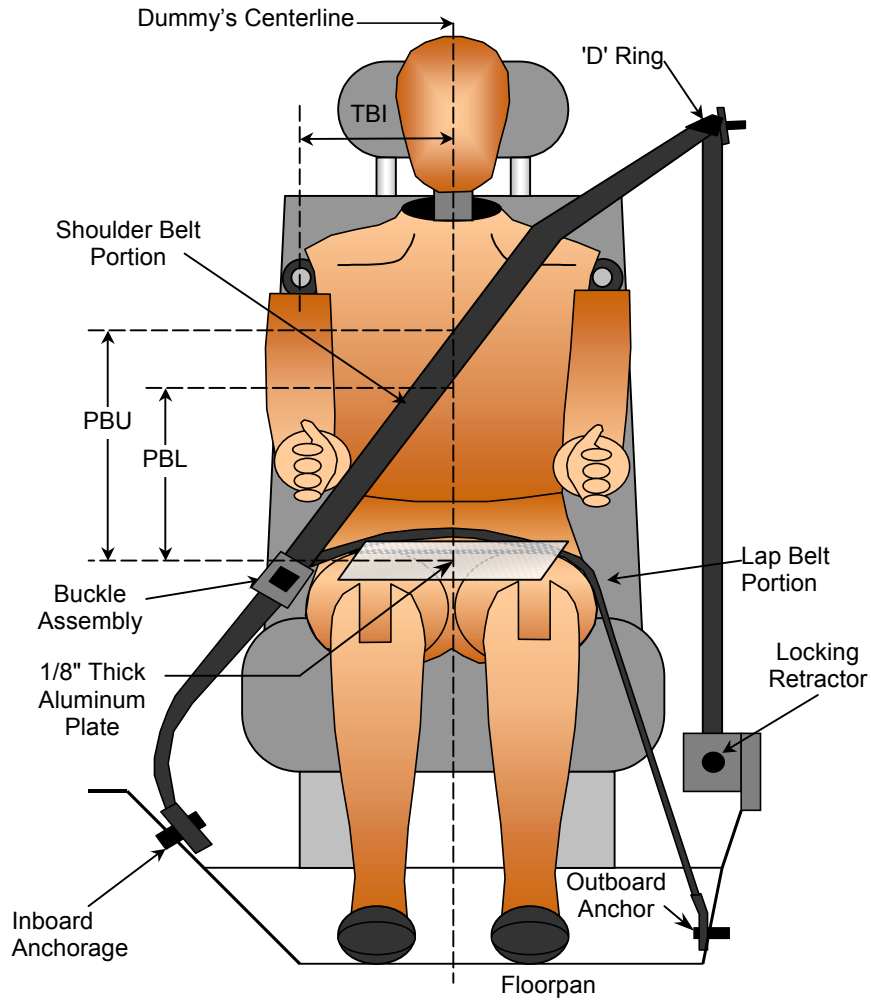
**TEST DUMMY POSITION MEASUREMENTS**

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA	Windshield Angle		28.1		
SWA	Steering Wheel Angle		64.1		
SCA	Steering Column Angle		25.3		
SA	Seat Back Angle (headrest post)		12.5		8.7
HZ	Head to Roof (Z)	190	90.0	167	90.0
HH	Head to Header	371	16.8	341	20.3
HW	Head to Windshield	597	0.0	542	0.0
HR	Head to Side Header (Y)	176		165	
NR	Nose to Rim	430	17.4		
CD	Chest to Dash	602		564	
CS	Chest to Steering Hub	354	22.4		
RA	Rim to Abdomen	182	0.0		
KDL	Left Knee to Dash	167	21.4	202	
KDR	Right Knee to Dash	209		194	25.2
PA	Pelvic Angle		22.4		20.5
TA	Tibia Angle		60.4		53.7
KK	Knee to Knee (Y)	311		227	
SK	Striker to Knee	601	82.3	617	87.0
ST	Striker to Head	676	8.1	700	8.8
SH	Striker to H-Point	194	95.5	213	98.4
SHY	Striker to H-Point (Y)	270		245	
HS	Head to Side Window	309		306	
HD	H-Point to Door (Y)	149		123	
AD	Arm to Door (Y)	149		131	
AA	Ankle to Ankle	304		151	

**DATA SHEET NO. 7**  
**SEAT BELT POSITIONING DATA**

Test Vehicle: 2005 Chrysler Town and Country  
Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
Test Date: 12/08/04



**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	345	383
PBL - To surface of reference to belt lower edge	mm	270	305

**DATA SHEET NO. 8**

**VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY**

Test Vehicle: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

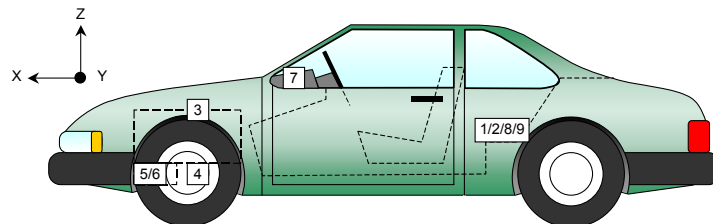
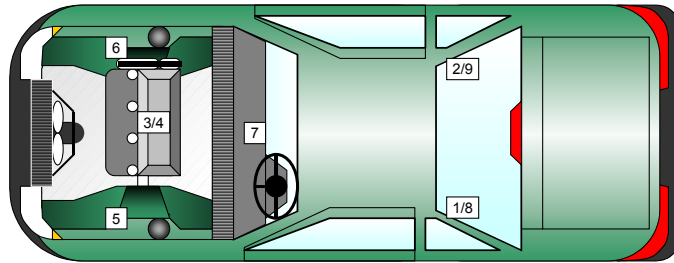
NHTSA No.: D50310  
 Test Date: 12/08/04

**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	2106	-450	420	G's	2.5	136	-41.7	40
2	Right Rear X-Member X	2106	450	420	G's	2.7	137	-36.8	41
3	Engine Top X	4376	-120	940	G's	31.7	41	-141.7	33
4	Engine Bottom X	4307	35	225	G's	15.8	44	-130.1	30
5	Left Brake Caliper X	4188	-720	265	G's	*	*	*	*
6	Right Brake Caliper X	4189	720	265	G's	80.5	69	-82.5	53
7	Instrument Panel X	3614	-50	1260	G's	51.2	32	-81.4	44
8	Left Rear X-Member Z	2106	-450	420	G's	7.5	58	-18.0	50
9	Right Rear X-Member Z	2106	450	420	G's	8.4	56	-14.6	51

\* No valid data after 40 msec.

Reference Points: X - Rear Surface of Vehicle (+ forward)  
 Y - Vehicle Centerline (+ to right)  
 Z - Ground Plane (+ up)



**DATA SHEET NO. 9**

**HYBRID III ATD INJURY CRITERIA AND SENSOR DATA**

Test Vehicle: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
 Test Date: 12/08/04

**HEAD PRIMARY PEAK ACCELERATIONS**

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	2.9	300	-40.1	78	6.9	300	-40.9	69
Head CG	Y	G's	3.8	112	-5.0	37	7.2	44	-9.1	56
Head CG	Z	G's	21.9	97	-1.9	26	14.9	90	-2.2	155
Head CG Resultant	N/A	G's	42.2	78			42.0	69		

**CHEST PRIMARY PEAK ACCELERATIONS**

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	2.3	170	-37.7	69	2.6	165	-38.6	81
Chest CG	Y	G's	2.4	112	-6.4	110	5.0	95	-3.0	66
Chest CG	Z	G's	12.7	99	-2.4	61	8.7	101	-2.0	48
Chest CG Resultant	N/A	G's	37.9	69			38.7	81		

**FEMUR PEAK FORCES**

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Femur	Z	Newtons	569	96	-2533	60	306	116	-3787	65
Right Femur	Z	Newtons	866	89	-1976	29	614	50	-2758	72

**SEAT BELT SENSOR PEAK VALUES**

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Lap Belt Force	N/A	Newtons	3495	89			5114	71		
Shoulder Belt Force	N/A	Newtons	5222	67			6285	61		

**HEAD INJURY CRITERIA (HIC)**

Location	Driver				Passenger			
	HIC	Avg G's	T <sup>1</sup>	T <sup>2</sup>	HIC	Avg G's	T <sup>1</sup>	T <sup>2</sup>
Head CG Primary	277.5	35.9	64.7	100.7	240.5	33.9	59.7	95.7

**CHEST CLIP (3MSEC)**

Location	Driver			Passenger		
	CLIP	T <sup>1</sup>	T <sup>2</sup>	CLIP	T <sup>1</sup>	T <sup>2</sup>
Chest CG Primary	36.5	67.5	70.5	37.9	79.4	82.4

**DATA SHEET NO. 9... (continued)**

**HYBRID III ATD INJURY CRITERIA AND SENSOR DATA**

Test Vehicle: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
 Test Date: 12/08/04

**PELVIC PEAK ACCELERATIONS**

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Pelvis	X	G's	3.6	193	-37.9	30	5.2	145	-58.5	72
Pelvis	Y	G's	8.9	28	-7.3	25	8.8	87	-6.1	54
Pelvis	Z	G's	3.6	31	-17.7	77	10.2	109	-24.8	84

**UPPER NECK PEAK FORCES AND MOMENTS**

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Neck Force	X	Newtons	465	75	-218	127	*	*	*	*
Neck Force	Y	Newtons	192	110	-109	184	194	67	-88	131
Neck Force	Z	Newtons	933	68	-102	166	1392	61	-137	156
Neck Moment	X	N•m	7.4	136	-15.9	84	8.2	89	-8.0	136
Neck Moment	Y	N•m	55.9	75	-14.1	121	38.4	157	-29.4	104
Neck Moment	Z	N•m	5.6	83	-2.7	194	13.1	108	-8.4	154

\* No valid data collected after 250ms

**FOOT PEAK ACCELERATIONS**

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Foot Aft	X	G's	55.1	28	-116.1	26	26.8	52	-155.6	47
Left Foot Aft	Z	G's	23.3	28	-69.8	48	20.1	61	-125.2	48
Left Foot Fore	Z	G's	62.0	28	-168.7	48	138.7	57	-302.5	41
Right Foot Aft	X	G's	25.6	70	-178.2	47	49.5	58	-187.4	48
Right Foot Aft	Z	G's	27.1	57	-208.4	46	18.1	61	-137.6	48
Right Foot Fore	Z	G's	119	57	-535	45	160.8	56	-249.4	47

**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	**	**	**	**	50.2	57	-28.5	49
Left Lower Moment	Y	N•m	194	27	-12.2	45	79.5	43	-219.9	78
Left Lower Force	Z	Newtons	532	27	-2092	28	76	150	-6384	49
Left Upper Moment	X	N•m	25.5	28	-76.4	33	36.1	50	-34.1	58
Left Upper Moment	Y	N•m	104.1	47	-108.3	27	54.2	59	-174.2	50
Left Upper Force	Z	Newtons	357	21	-3141	47	78	21	-4866	49
Right Lower Moment	X	N•m	2.4	90	-4.5	91	33.3	76	-54.6	56
Right Lower Moment	Y	N•m	87.8	47	-165.3	62	104.0	48	-376.9	71
Right Lower Force	Z	Newtons	1373	-120	-3968	47	21	132	-3221	49
Right Upper Moment	X	N•m	26.0	28	-50.6	26	28.5	50	-27.5	70
Right Upper Moment	Y	N•m	141.3	26	-32.6	50	35.9	62	-178.5	49
Right Upper Force	Z	Newtons	593	27	-1599	42	39.0	132	-3465	70

\*\* No valid data collected after 30ms

**DATA SHEET NO. 9... (continued)**

**HYBRID III ATD INJURY CRITERIA AND SENSOR DATA**

Test Vehicle: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
 Test Date: 12/08/04

**CHEST PEAK DISPLACEMENTS**

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	mm			-30.5	70			-31.2	67

**HEAD REDUNDANT PEAK ACCELERATIONS**

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	2.8	299	-42.9	80	6.8	300	-39.9	69
Head CG	Y	G's	5.2	114	-6.1	63	7.1	43	-10.5	44
Head CG	Z	G's	26.6	97	-2.3	26	13.8	111	-2.7	156
Head CG Resultant	N/A	G's	44.8	80			40.7	69		

**CHEST REDUNDANT PEAK ACCELERATIONS**

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	2.4	230	-39.7	69	3.6	135	-38.7	86
Chest CG	Y	G's	3.2	92	-5.0	30	5.0	93	-4.1	70
Chest CG	Z	G's	13.8	101	-1.8	75	8.7	100	-2.2	48
Chest CG Resultant	N/A	G's	39.7	69			39.0	86		

**REDUNDANT HEAD INJURY CRITERIA (HIC)**

Location	Driver				Passenger			
	HIC	Avg G's	T <sup>1</sup>	T <sup>2</sup>	HIC	Avg	T <sup>1</sup>	T <sup>2</sup>
Head CG Primary Redundant	308.4	37.4	64.3	100.3	221.5	32.8	59.7	95.7

**REDUNDANT CHEST CLIP (3MSEC)**

Location	Driver			Passenger		
	CLIP	T <sup>1</sup>	T <sup>2</sup>	CLIP	T <sup>1</sup>	T <sup>2</sup>
Chest CG Primary Redundant	38.8	67.0	70.0	37.5	82.9	86.8

**DATA SHEET NO. 10****SEAT BELT PERFORMANCE ASSESSMENT TEST DATA**

Test Vehicle: 2005 Chrysler Town and Country  
Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
Test Date: 12/08/04

**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	345	383
PBL - Top surface of reference to belt lower edge	mm	270	305

**BELT LENGTH DATA**

Measurement Description	Units	Driver	Passenger
Retractor reel to "D" ring	mm	645	660
Shoulder belt length as measured on ATD	mm	857	839
Lap belt length as measured on ATD	mm	880	857
Remainder of belt on reel	mm	884	845
Total belt length for continuous webbing systems	mm	3266	3201

**SHOULDER BELT SPOOL-OUT DATA**

Measurement Description	Units	Driver	Passenger
As determined mechanically	mm	Not Recorded	
As determined electronically	mm	Not Recorded	

**DATA SHEET NO. 11**  
**SUMMARY OF FMVSS 212 DATA**

Test Vehicle: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
 Test Date: 12/08/04

**Windshield Mounting Details:**

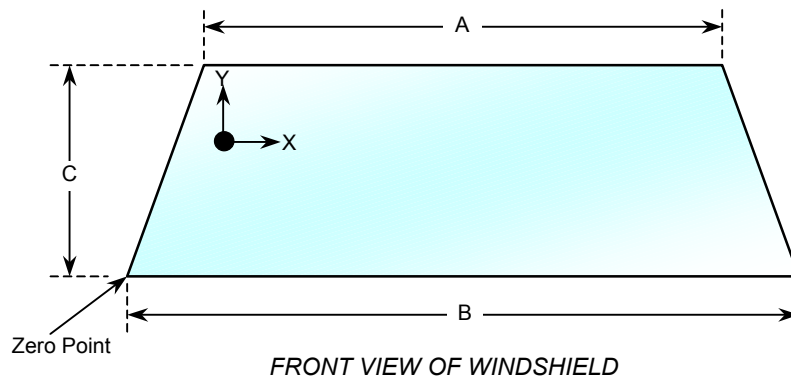
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

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	2310	2310	100
Right Side	2310	2310	100
Total	4620	4620	100



**WINDSHIELD DIMENSIONS**

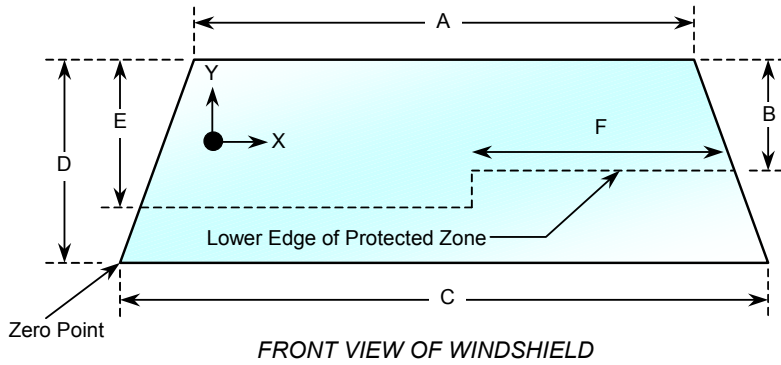
Item	Units	Segment Length	Molding Width
A	mm	1215	12
B	mm	1635	15
C	mm	885	12

**DATA SHEET NO. 12**

**WINDSHIELD ZONE INTRUSION FMVSS 219 (Partial) DATA**

Test Vehicle: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
 Test Date: 12/08/04



Item	Units	Value
A	mm	1215
B	mm	510
C	mm	1635
D	mm	885
E	mm	562
F	mm	750

**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. 13**

**FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA**

Test Vehicle: 2005 Chrysler Town and Country  
Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
Test Date: 12/08/04

Temperature at Time of Impact: 21° C

Test Time: 1:15 pm

**Stoddard Solvent Spillage Measurements**

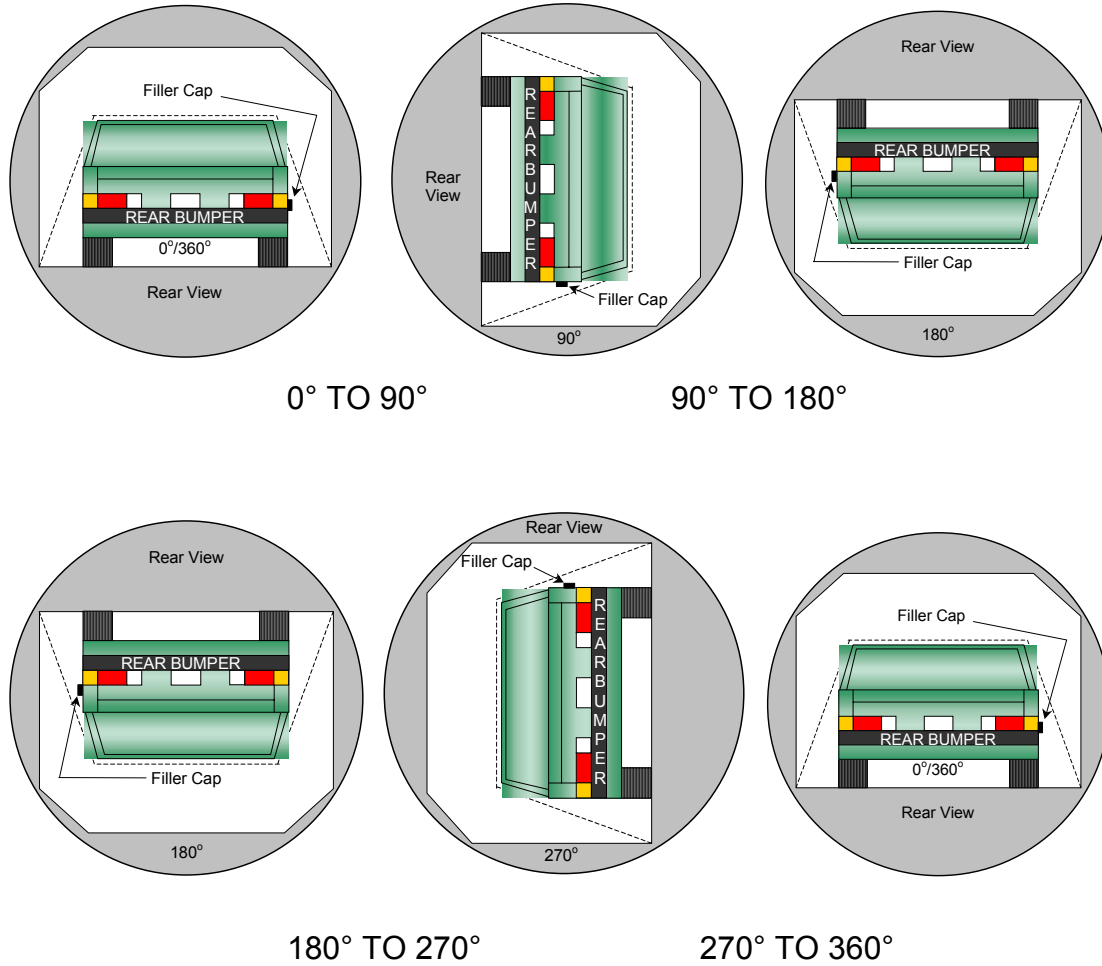
- A. From impact until vehicle motion ceases: 0 oz.  
(Maximum Allowable = 1 ounce)
- B. For the 5 minute period after motion ceases: 0 oz.  
(Maximum Allowable = 5 ounces)
- C. For the following 25 minutes: 0 oz.  
(Maximum Allowable = 1 oz./minute)
- D. Spillage : None

**DATA SHEET NO. 14**  
**FMVSS 301 STATIC ROLLOVER DATA**

Test Vehicle: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
 Test Date: 12/08/04

Test Time: 1:15 pm



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: None

Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage (oz.)
0° TO 90°	154	300	0
90° TO 180°	152	300	0
180° TO 270°	146	300	0
270° TO 360°	161	300	0

**DATA SHEET NO. 15**  
**VEHICLE MEASUREMENTS**

Test Vehicle: 2005 Chrysler Town and Country  
Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
Test Date: 12/08/04

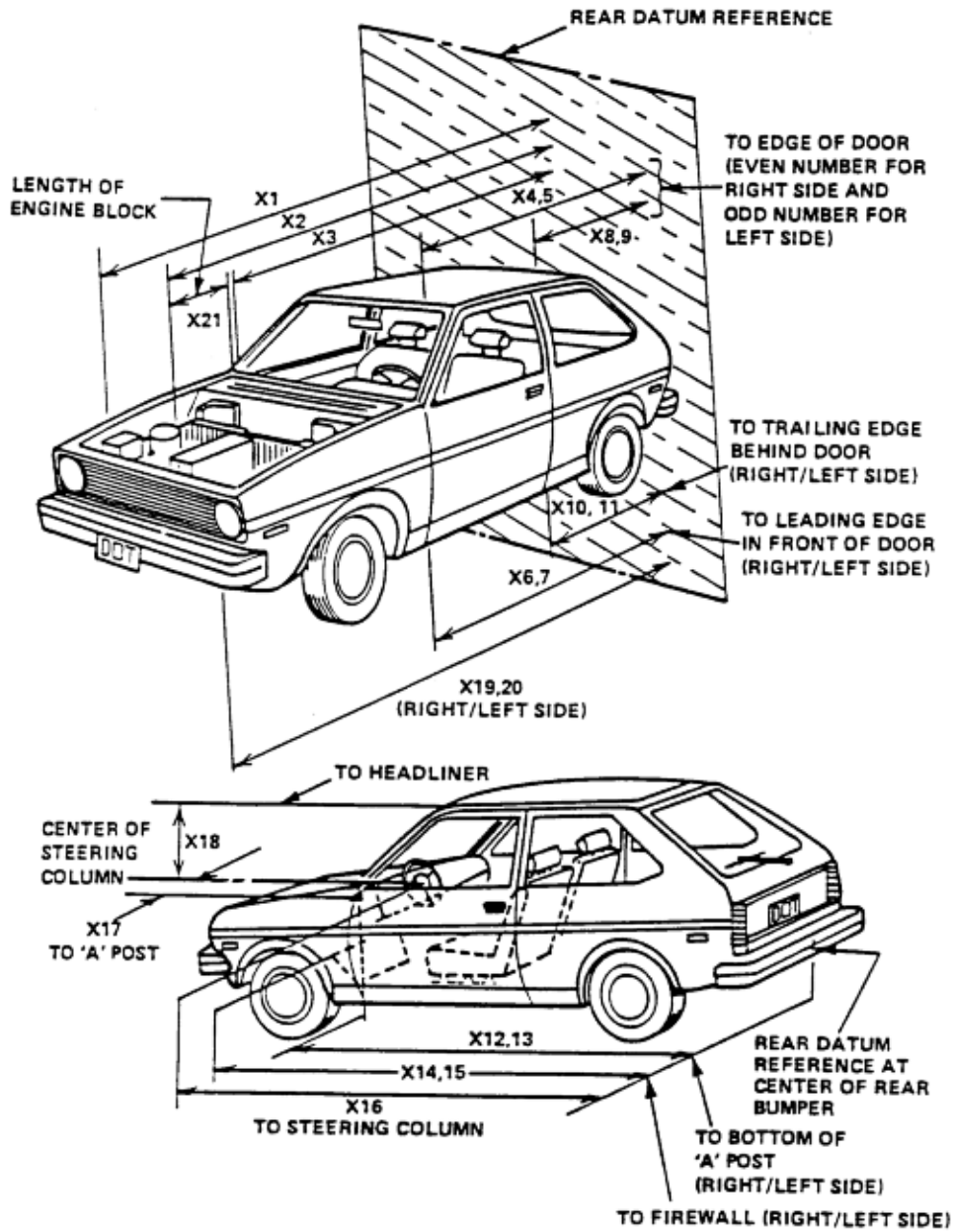
No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total length of vehicle at centerline	mm	5040	4348	692
2	RSOV to front of engine	mm	4468	4210	258
3	RSOV to firewall centerline	mm	4266	4251	15
4	RSOV to leading edge of right door	mm	3610	3660	-50
5	RSOV to leading edge of left door	mm	3620	3625	-5
6	RSOV to lower leading edge of right door	mm	3595	3585	10
7	RSOV to lower leading edge of left door	mm	3595	3585	10
8	RSOV to upper leading edge of right door	mm	2588	2584	4
9	RSOV to upper leading edge of left door	mm	2604	2583	21
10	RSOV to lower trailing edge of right door	mm	2605	2575	30
11	RSOV to lower trailing edge of left door	mm	2599	2584	15
12	RSOV to bottom of right 'A' pillar	mm	3560	3559	1
13	RSOV to bottom of left 'A' pillar	mm	3566	3572	-6
14	RSOV to firewall on right side	mm	4115	4086	29
15	RSOV to firewall on left side	mm	4130	4118	12
16	RSOV to steering column	mm	3170	3143	27
17	Center of steering column to left 'A' pillar	mm	393	390	3
18	Center of steering column to headlining	mm	465	500	-35
19	RSOV to right side of front bumper	mm	4848	4339	509
20	RSOV to left side of front bumper	mm	4852	4393	459
21	Length of engine block	mm	410	410	0
RD	RSOV to right side of dash panel	mm	3464	3434	30
CD	RSOV to center of dash panel	mm	3432	3390	42
LD	RSOV to left side of dash panel	mm	3435	3430	5

DATA SHEET NO. 15...(continued)

VEHICLE MEASUREMENTS

Test Vehicle: 2005 Chrysler Town and Country  
Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
Test Date: 12/08/04



**DATA SHEET NO. 15... (continued)****VEHICLE MEASUREMENTS**Test Vehicle: 2005 Chrysler Town and CountryNHTSA No.: D50310Test Program: 35mph Frontal ImpactTest Date: 12/08/04**Target Vehicle Structural Measurement**

	Elements	Pre-Test (mm)
1	Total Length	5040
2	Total Width	1942
3	Bumper Top Height	590
4	Bumper Bottom Height	435
5	Longitudinal Member Top Height	225
6	Distance between Longitudinal Members	980
7	Longitudinal Member Width	65
8	Engine Top Height	965
9	Engine Bottom Height	230
10	Engine and gearbox width	900
11	Front bumper-engine distance	470
12	Front shock absorber fixing height	990
13	Bonnet leading edge height	845
14	Front shock absorber fixing width	1250
15	Front bumper – front axle distance	875
16	Front axle – a pillar distance	520
17	A-pillar – B-pillar distance	980
18	B-Pillar – rear axle distance	1525
19	B-pillar – C-pillar distance	960
20	Roof sill bottom height	1630
21	Roof sill top height	1680
22	Floor sill bottom height	290
23	Floor sill top height	325

**DATA SHEET NO. 16**  
**CAMERA LOCATIONS**

Test Vehicle: 2005 Chrysler Town and Country  
Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
Test Date: 12/08/04

No.	Camera View	Location (mm) *			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Side View				13	24
2	Left Front View	1085	-9335	1395	24	1000
3	Steering Column Top	2500	-5810	1575	19	1000
4	Steering Column Bottom	2490	-5785	1045	13	1000
5	Driver Close-up	1480	-10110	1485	50	1000
6	Driver Angle	6665	-5425	2000	50	1000
7	Left Rear				10	**
8	Right Rear				13	**
9	Right Overall	2324	7275	1465	19	1000
10	Right Passenger Half	915	9200	1425	25	1000
11	Right Close-up	1345	9665	1525	50	1000
12	Right Angle	6380	5515	2000	50	1000
13	Windshield	290	0	2795	13	1000
14	Top Driver	80	-465	1785	13	1000
15	Top Passenger	105	470	1750	13	1000
16	Pit Front	980	0	-3150	19	1000
17	Pit Rear	3205	0	-3150	19	1000

\*COORDINATES:

- +X = rearward of barrier
- +Y = right of monorail centerline
- +Z = above ground level

\*\* Camera did not run

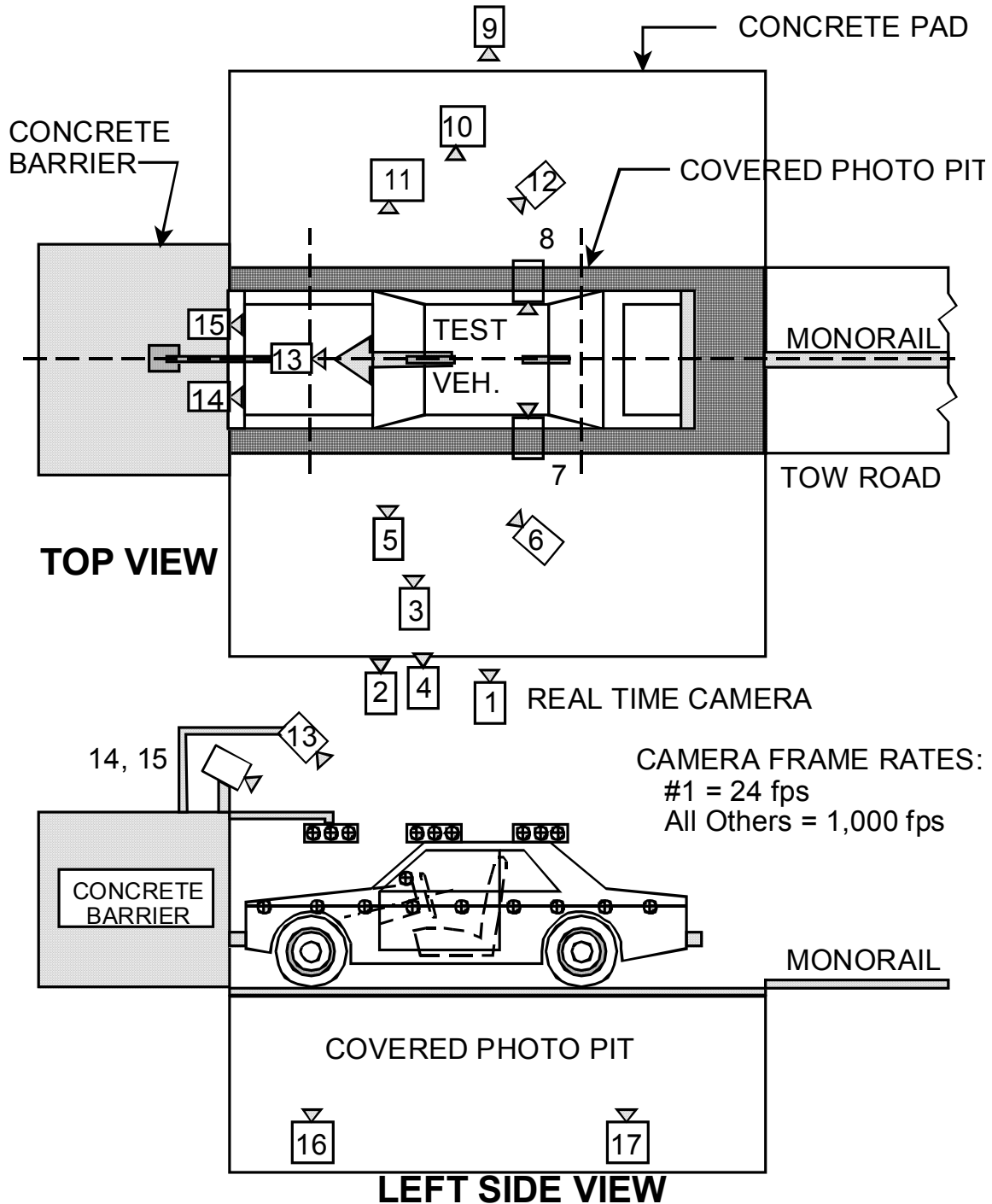
DATA SHEET NO. 16... (continued)

CAMERA LOCATIONS

Test Vehicle: 2005 Chrysler Town and Country  
Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
Test Date: 12/08/04

CAMERA POSITIONS FOR FRONTAL IMPACTS



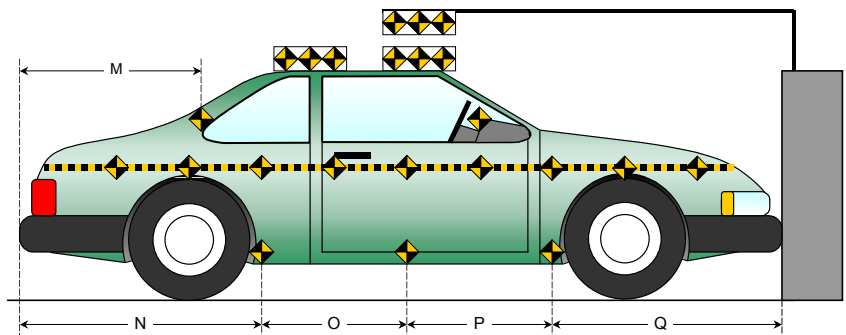
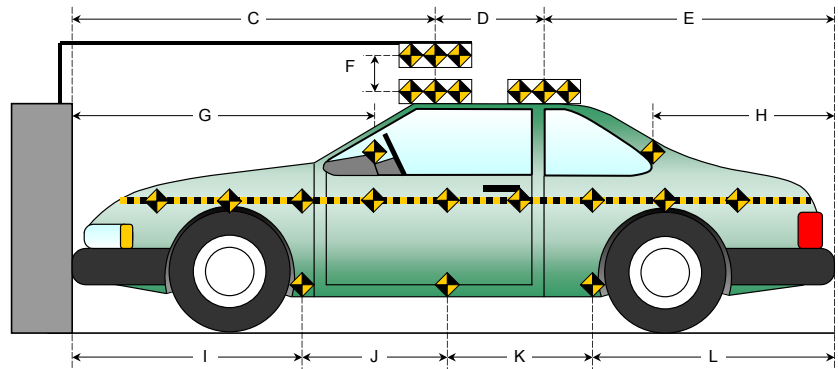
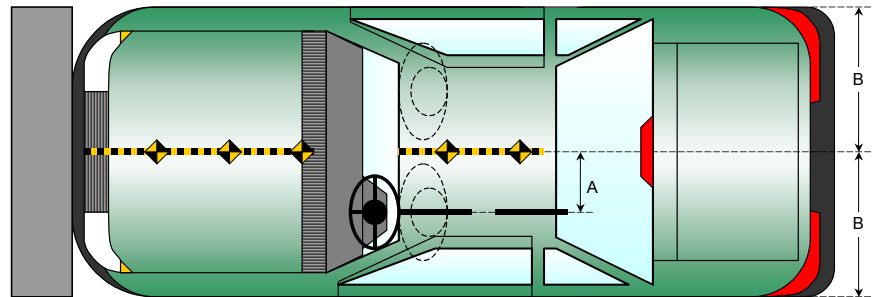
## DATA SHEET NO. 17

### PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
 Test Date: 12/08/04

Item	Value
A	424
B	973
C	2336
D	634
E	2070
F	
G	
H	1518
I	1491
J	1002
K	1002
L	1545
M	1529
N	1553
O	1005
P	1005
Q	1477



**DATA SHEET NO. 18**  
**VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

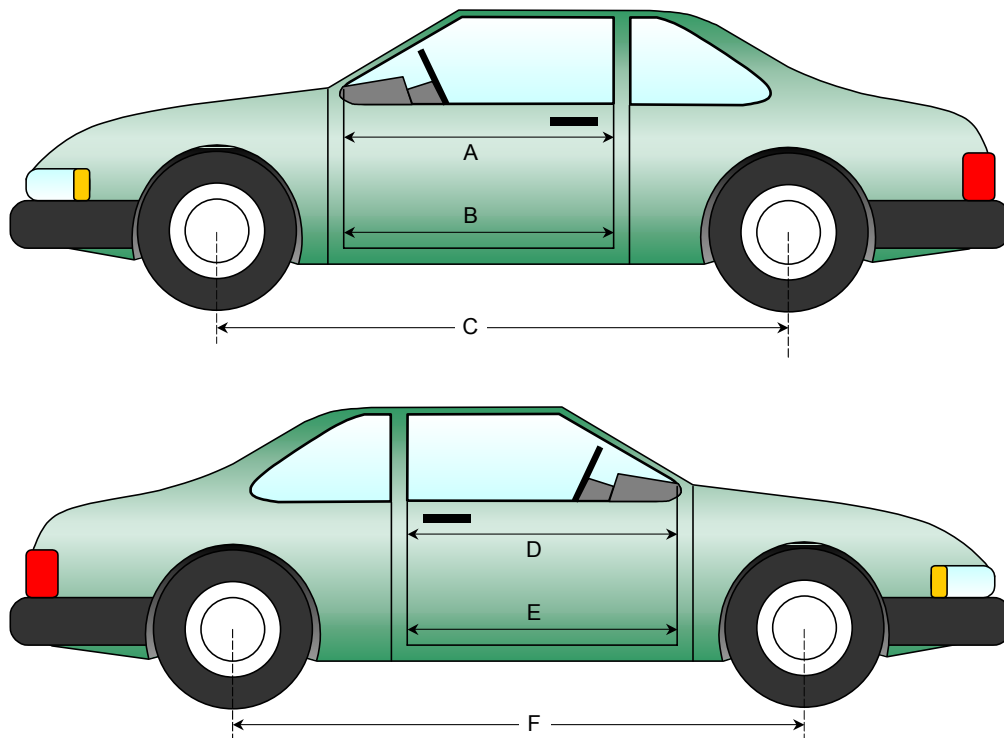
NHTSA No.: D50310  
 Test Date: 12/08/04

**DOOR OPENING WIDTH**

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	927	915	12
B	Left Side Lower	mm	945	942	3
D	Right Side Upper	mm	920	911	9
E	Right Side Lower	mm	940	942	-2

**WHEELBASE MEASUREMENTS**

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	3030	2905	125
F	Right Side Wheelbase	mm	3030	2935	95



**DATA SHEET NO. 18... (continued)**  
**VEHICLE INTRUSION MEASUREMENTS**

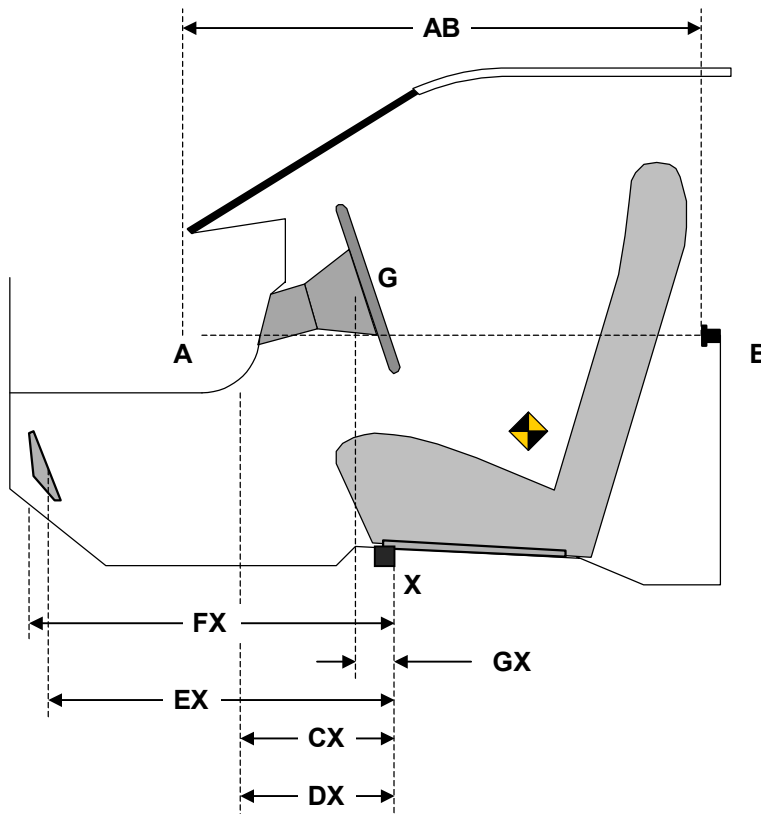
Test Vehicle: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
 Test Date: 12/08/04

**DRIVER COMPARTMENT INTRUSION**

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside window jam)	mm	927	919	8
CX	Left Knee Bolster to X	mm	352	337	15
DX	Right Knee Bolster to X	mm	341	293	48
EX	Brake Pedal to X	mm	506	405	101
FX	Foot Rest to X	mm	563	531	32
GX	Center of Steering Column Wheel Hub to X	mm	38	66	-28

X = Left Front Seat Front Outboard Anchor Bolt Head



**DRIVER COMPARTMENT**

**DATA SHEET NO. 18... (continued)**  
**VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

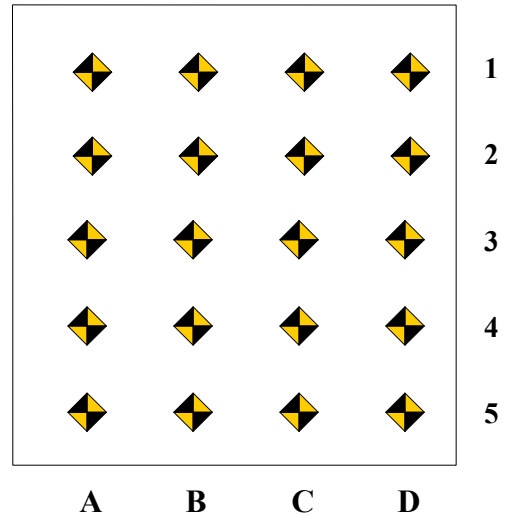
NHTSA No.: D50310  
 Test Date: 12/08/04

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		710	706	704		575	526	499		135	180	205
2		650	648	647		534	495	481		116	153	166
3		583	580	568		510	502	465		73	78	103
4	464	460	448	444	477	465	454	436	-13	-5	-6	8
5	326	328	329	329	334	341	337	330	-8	-13	-8	-1

**DRIVER FLOOR PAN Z-AXIS**

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1		-73	-57	-69		5	34	51		-78	-91	-120
2		-139	-127	-133		-73	-40	-26		-66	-87	-107
3		-198	-184	-167		-160	-130	-111		-38	-54	-56
4	-201	-201	-193	-192	-233	-244	-246	-228	32	43	53	36
5	-195	-191	-191	-190	-223	-220	-229	-226	28	29	38	36

**DATA SHEET NO. 18...(continued)**  
**VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

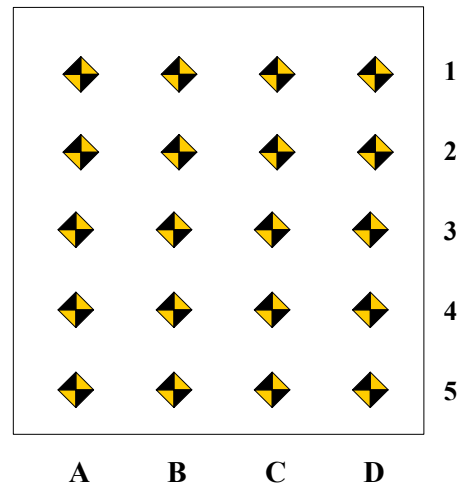
NHTSA No.: D50310  
 Test Date: 12/08/04

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		715	720	651		555	529	576		160	191	75
2		658	659	601		530	519	535		128	140	66
3		591	600	570		497	504	513		94	96	57
4		477	484	480		400	458	479		77	26	1
5	359	365	363	364	337	356	363	365	22	9	0	-1

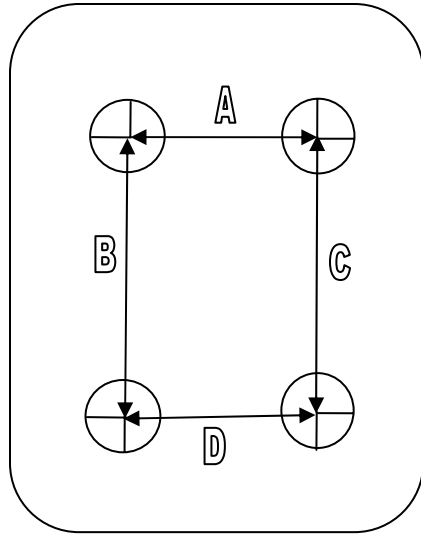
**PASSENGER FLOOR PAN Z-AXIS**

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1		-70	-69	-18		-12	1	8		-58	-70	-26
2		-139	-138	-92		-97	-91	-69		-42	-47	-23
3		-193	-190	-157		-174	-168	-144		-19	-22	-13
4		-207	-203	-206		-225	-241	-253		18	38	47
5	-197	-199	-199	-202	-253	-256	-252	-242	56	57	53	40

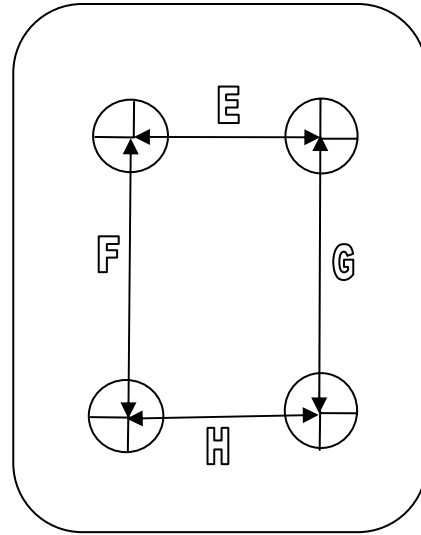
**DATA SHEET NO. 18...(continued)**  
**VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
 Test Date: 12/08/04



Driver



Passenger

**UNDERBODY FLOORBOARD DEFORMATION**

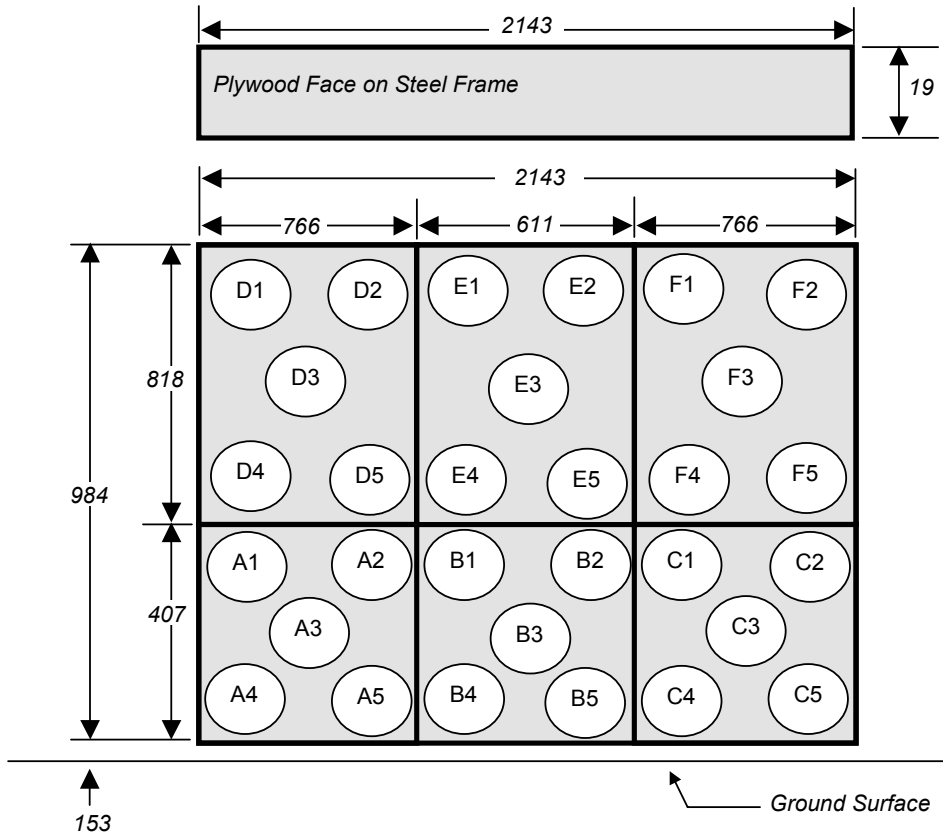
Measurement	Pre-Test	Post-Test	Difference
A	245	261	-16
B	330	335	-5
C	370	332	38
D	275	314	-39
E	300	275	25
F	530	525	5
G	390	375	15
H	300	275	25

**DATA SHEET NO. 19**  
**LOAD CELL LOCATIONS ON FIXED BARRIER**

Test Vehicle: 2005 Chrysler Town and Country  
 Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
 Test Date: 12/08/04

**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 cross member displacement.

## DATA SHEET NO. 20

### ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2005 Chrysler Town and Country NHTSA No.: D50310  
Test Program: 35mph Frontal Impact Test Date: 12/08/04

#### VEHICLE INFORMATION

VIN: 2C4GP44R45R365000 Wheelbase (mm) : 3030  
Vehicle Size Category: Minivan Test Weight (kg) : 2134.7

#### 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): 56.6  
Velocity Change (km/h): 66.1 Time of Separation (msec): 124

#### CRUSH PROFILE

Collision Deformation Classification: Frontal Midpoint of Damage: Centerline  
Damage Region Length (mm): 1527 Impact Mode: Frontal

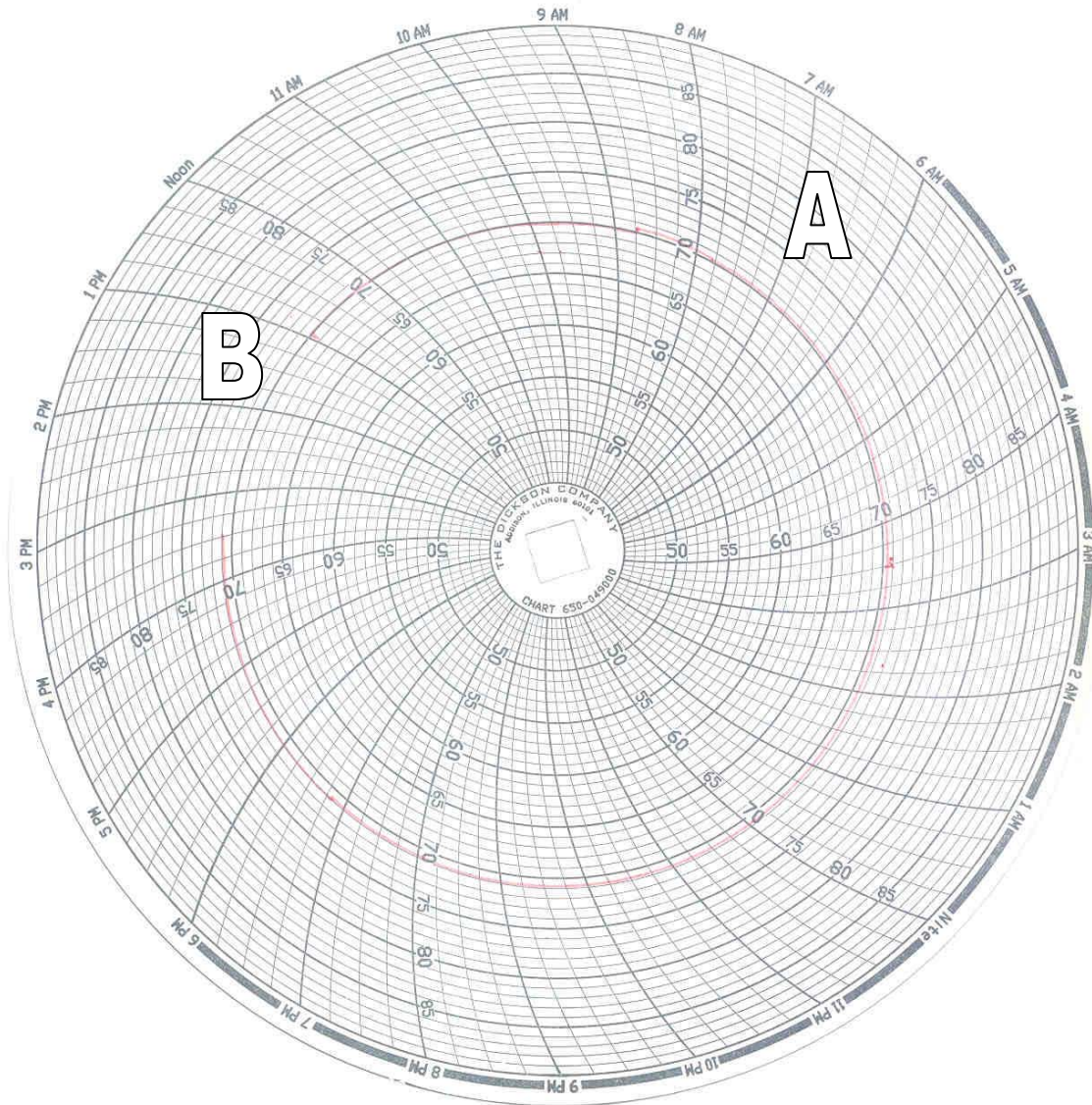
No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4852	4458	394
C2	Crush zone 2 at left side	mm	4969	4455	514
C3	Crush zone 3 at left side	mm	5027	4428	599
C4	Crush zone 4 at right side	mm	5023	4385	638
C5	Crush zone 5 at right side	mm	4965	4385	580
C6	Crush zone 6 at right side	mm	4848	4380	468
L	C1 TO C6	mm	1527	1537	-10

**DATA SHEET NO. 21**

**DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART**

Test Vehicle: 2005 Chrysler Town and Country  
Test Program: 35mph Frontal Impact

NHTSA No.: D50310  
Test Date: 12/08/04



A = Dummies installed in vehicle at 7:00 a.m.

B = Test conducted at 1:15 pm

**APPENDIX A**  
**PHOTOGRAPHS**

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Load Cell Location

MFD BY	DAIMLERCHRYSLER CORPORATION	DATE OF MFR	11-04	GVWR	2586 KG(05700 LB)
GAWR FRONT	WITH TIRES	RIMS AT	COLD		
1293 KG(2850 LB)	215/70R15	15X6.5	250 KPA( 36 PSI)		
GAWR REAR	WITH TIRES	RIMS AT	COLD		
1339 KG(2950 LB)	215/70R15	15X6.5	250 KPA( 36 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: 2C4GP44R45R365000    TYPE: MPV    SINGLE X DUAL



MDH: 112221 343AA PNT:PW1    VEHICLE MADE IN CANADA TRM:B7D5 4648505

A-2.

Vehicle Certification Label



### TIRE AND LOADING INFORMATION

SEATING CAPACITY - TOTAL 7 FRONT 2 REAR 5

THE COMBINED WEIGHT OF OCCUPANTS AND CARGO SHOULD NEVER EXCEED  
521 KG OR 1150 LB

TIRE	FRONT	REAR	SPARE
ORIGINAL TIRE SIZE	215/70R15	215/70R15	T145/90D16
GOLD TIRE INFLATION PRESSURE	250 kPa, 36 PSI	250 kPa, 36 PSI	420 kPa, 60 PSI

SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION



5R365000

Tire Placard

A-4.



Right Front View of Test Vehicle, as received

A-5.



Left Rear View of Test Vehicle, as received



Pre-Test Front View of Test Vehicle



Post-Test Front View of Test Vehicle

A-8.



Pre-Test Left Side View of Test Vehicle

A-9.



Post-Test Left Side View of Test Vehicle

A-10.



Pre-Test Right Side View of Test Vehicle

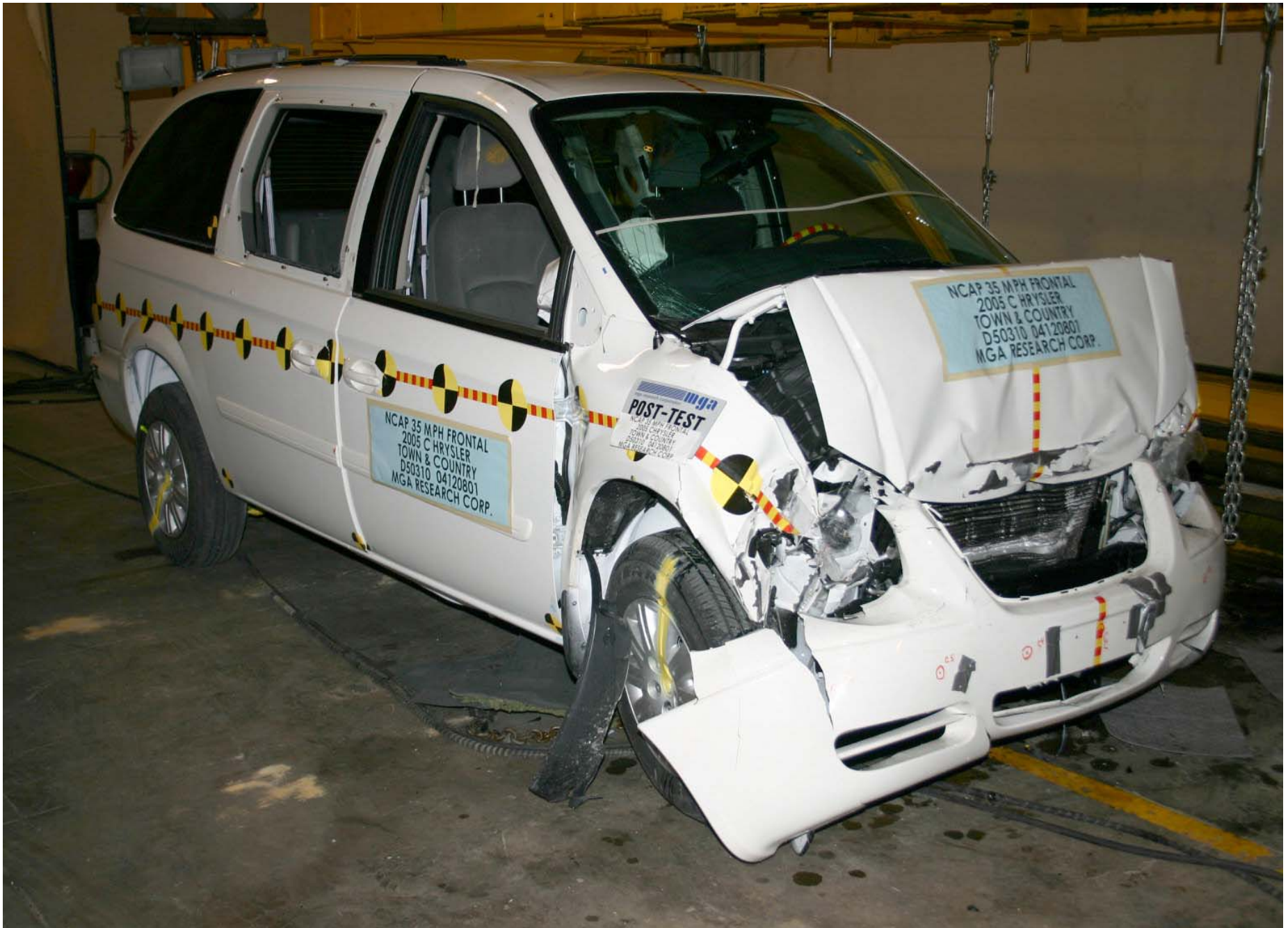
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Post-Test Right Side View of Test Vehicle



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



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

A-14.



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

A-15.



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



Pre-Test Left Rear Three-Quarter View of Door



Post-Test Left Rear Three-Quarter View of Door After Impact



Pre-Test Right Rear Three-Quarter View of Door



Post-Test Right Rear Three-Quarter View of Door After Impact

A-20.



Pre-Test Windshield View

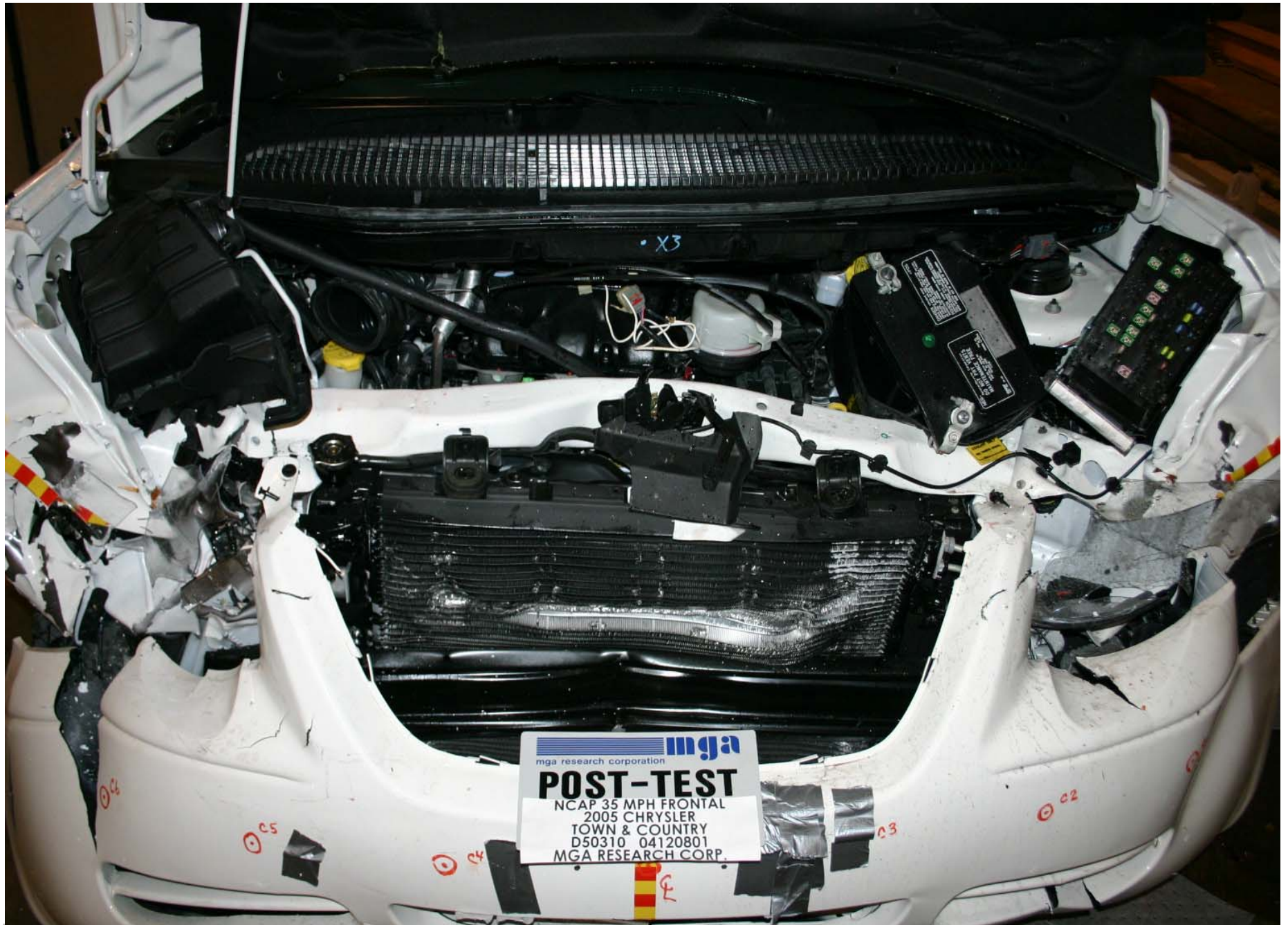
A-21.



Post-Test Windshield View



Pre-Test Engine Compartment View



Post-Test Engine Compartment View

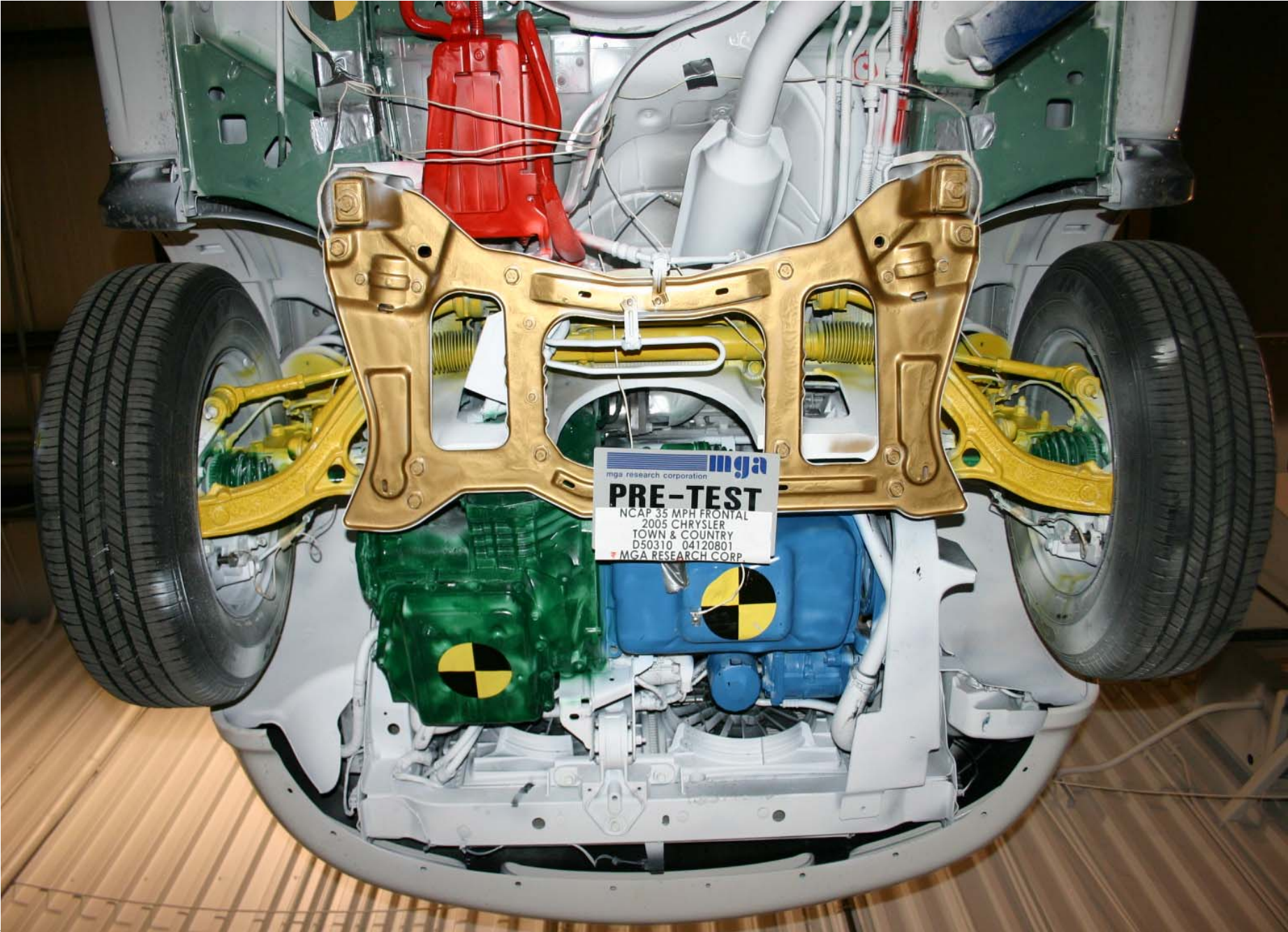
A-24.



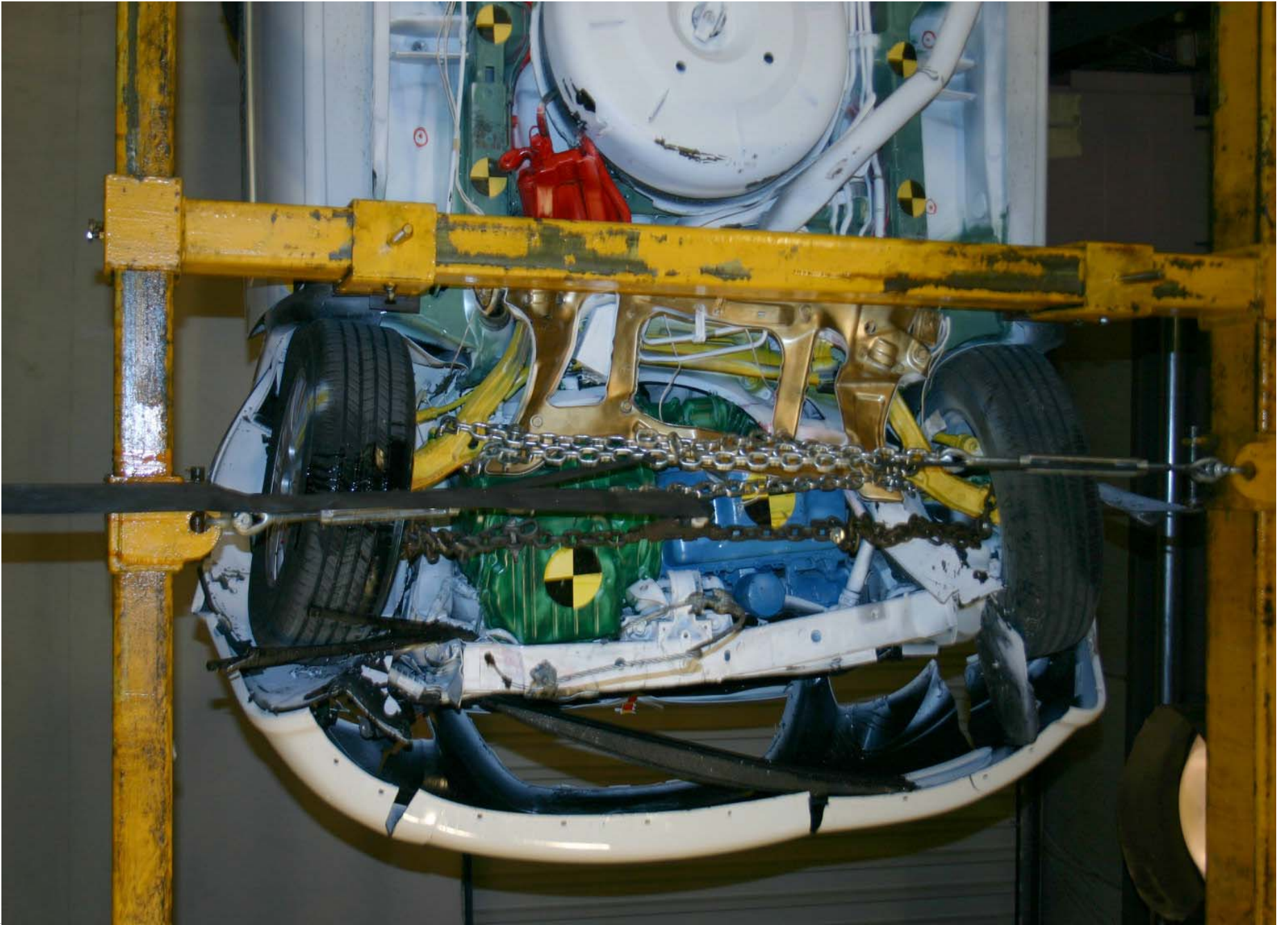
Pre-Test Fuel Filler Cap View



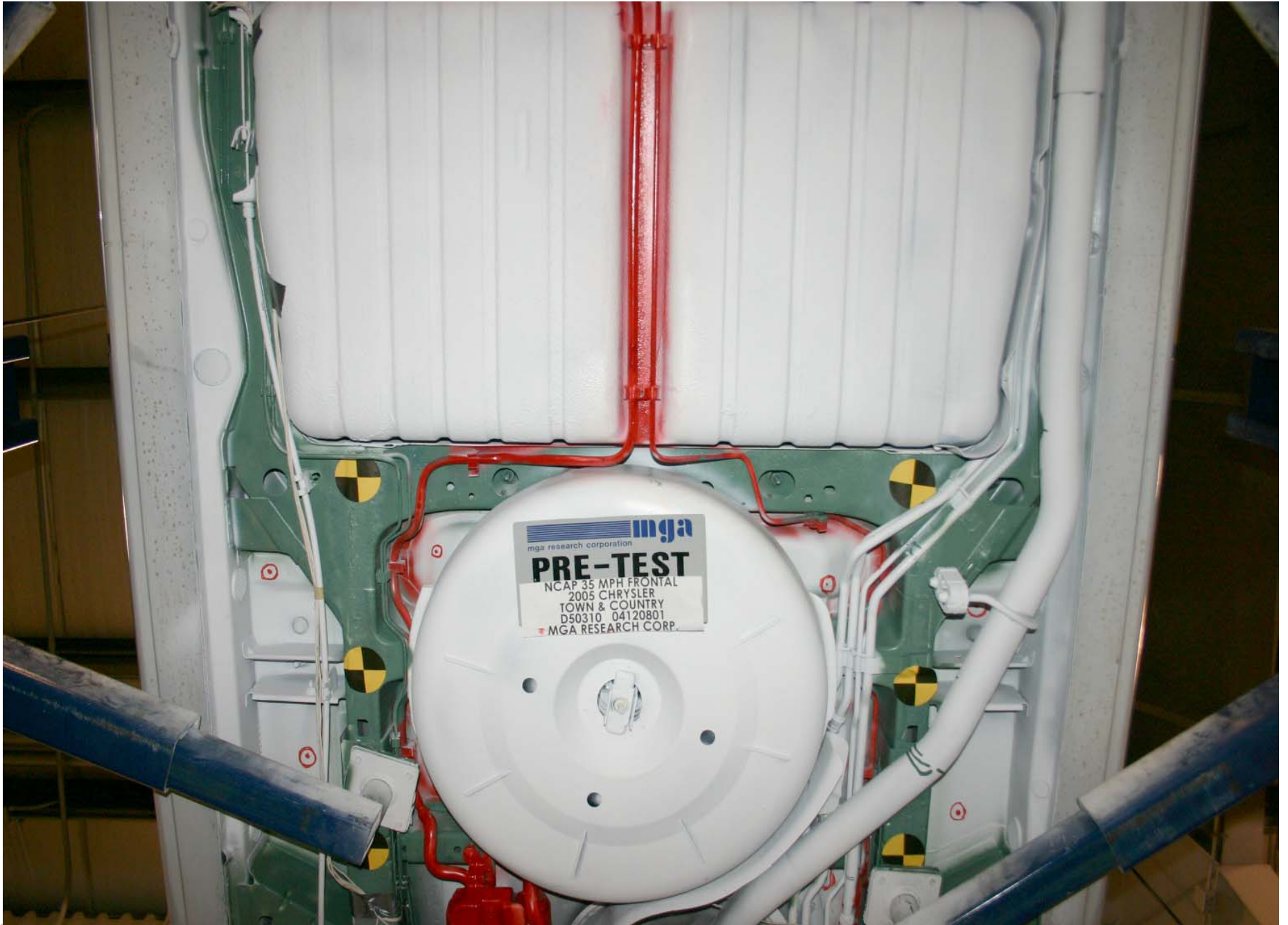
Post-Test Fuel Filler Cap View



Pre-Test Front Underbody View



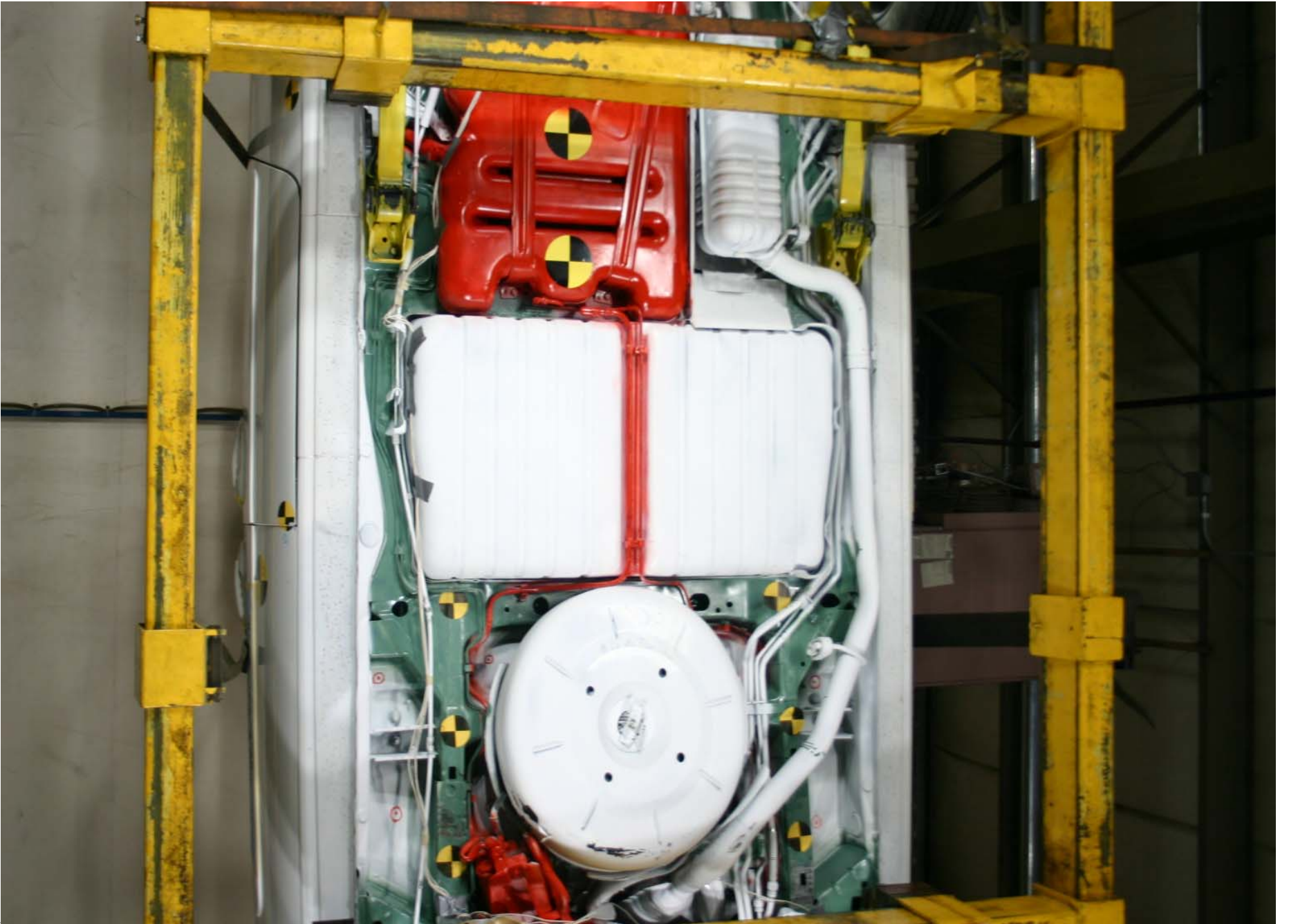
Post-Test Front Underbody View



Pre-Test Front Mid Underbody



Pre-Test Rear Mid Underbody



Post-Test Mid Underbody

A-31.



Pre-Test Rear Underbody View



Post-Test Rear Underbody View

A-33.



Pre-Test Driver Dummy Front View (head position)

A-34.



Post-Test Driver Dummy Front View (head position)



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 Dummy Seat Position



Post-Test Driver Dummy Seat Position



Pre-Test Driver Dummy Feet Position

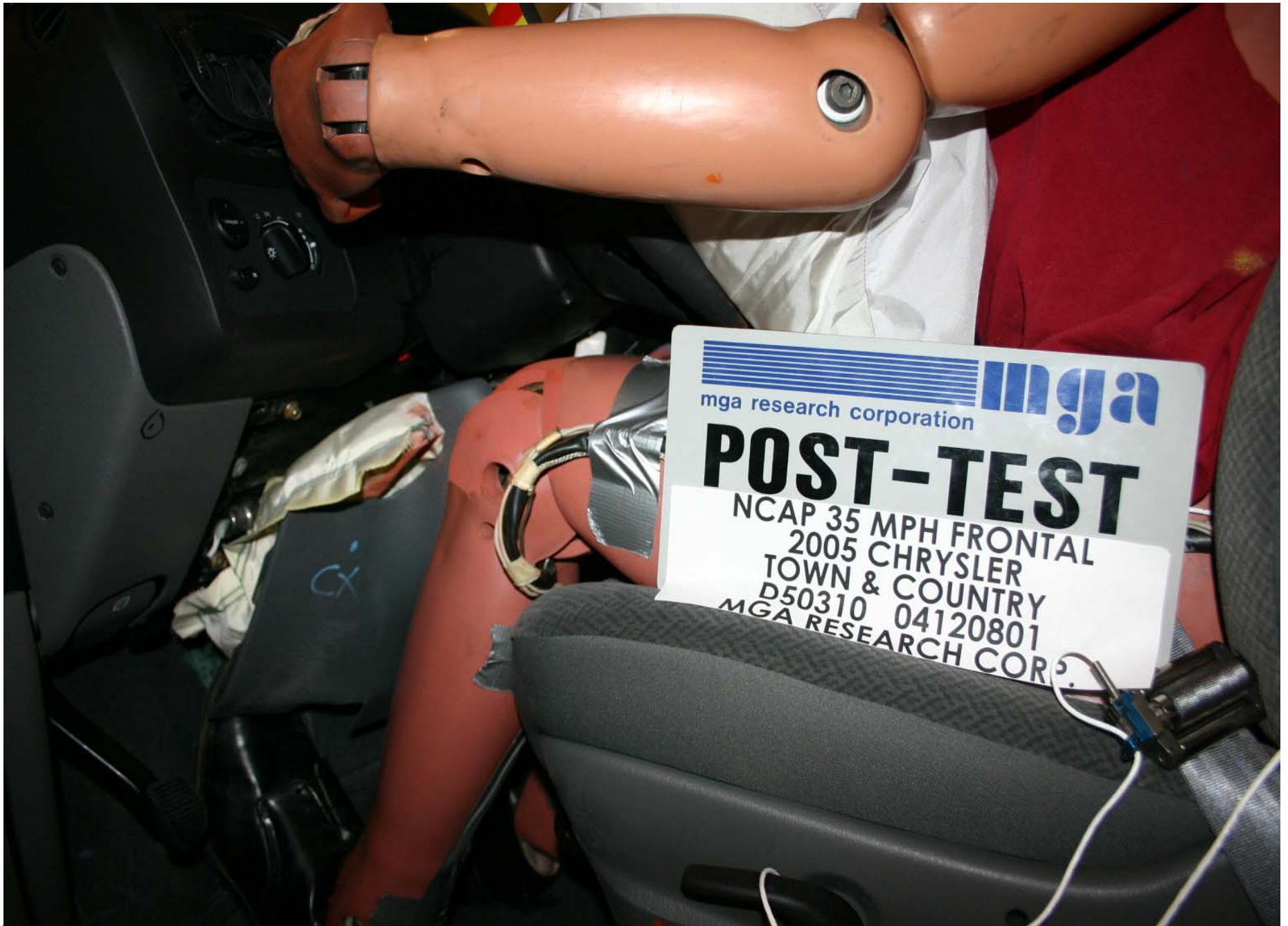


Post-Test Driver Dummy Feet Position



Pre-Test Driver Side Knee Bolster View

A-44.



Post-Test Driver Side Knee Bolster View



Pre-Test Driver Side Floor Pan View



Post-Test Driver Side Floor Pan View

A-47.



Post-Test Driver Dummy Head Contact

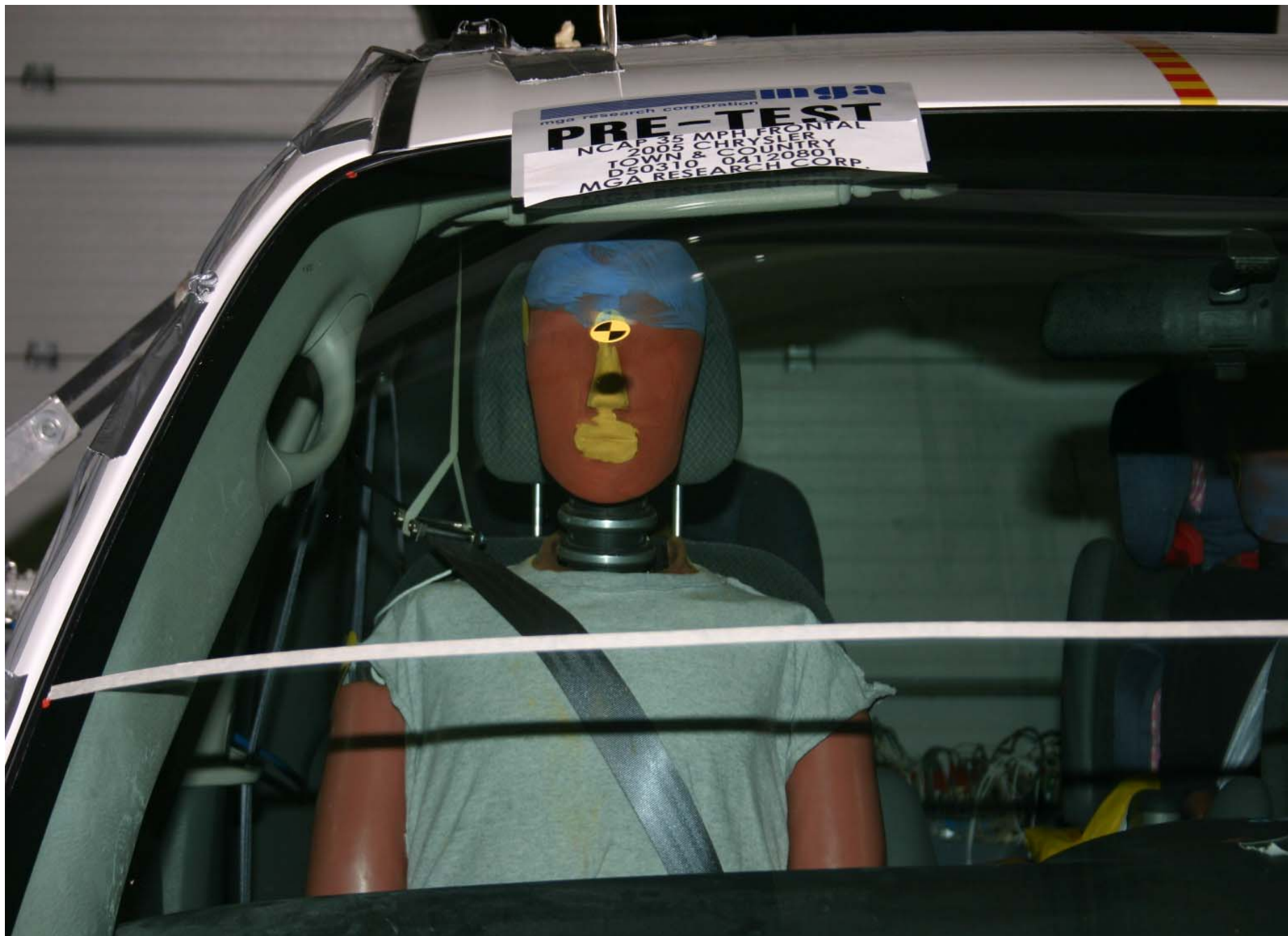


Post-Test Driver Dummy Knee Contact



Post-Test Driver Dummy Airbag Contact

A-50.



Pre-Test Passenger Dummy Front View (head position)

A-51.



Post-Test Passenger Dummy Front View (head position)



Pre-Test Passenger Dummy Position Right Side View



Post-Test Passenger Dummy Position Right Side View



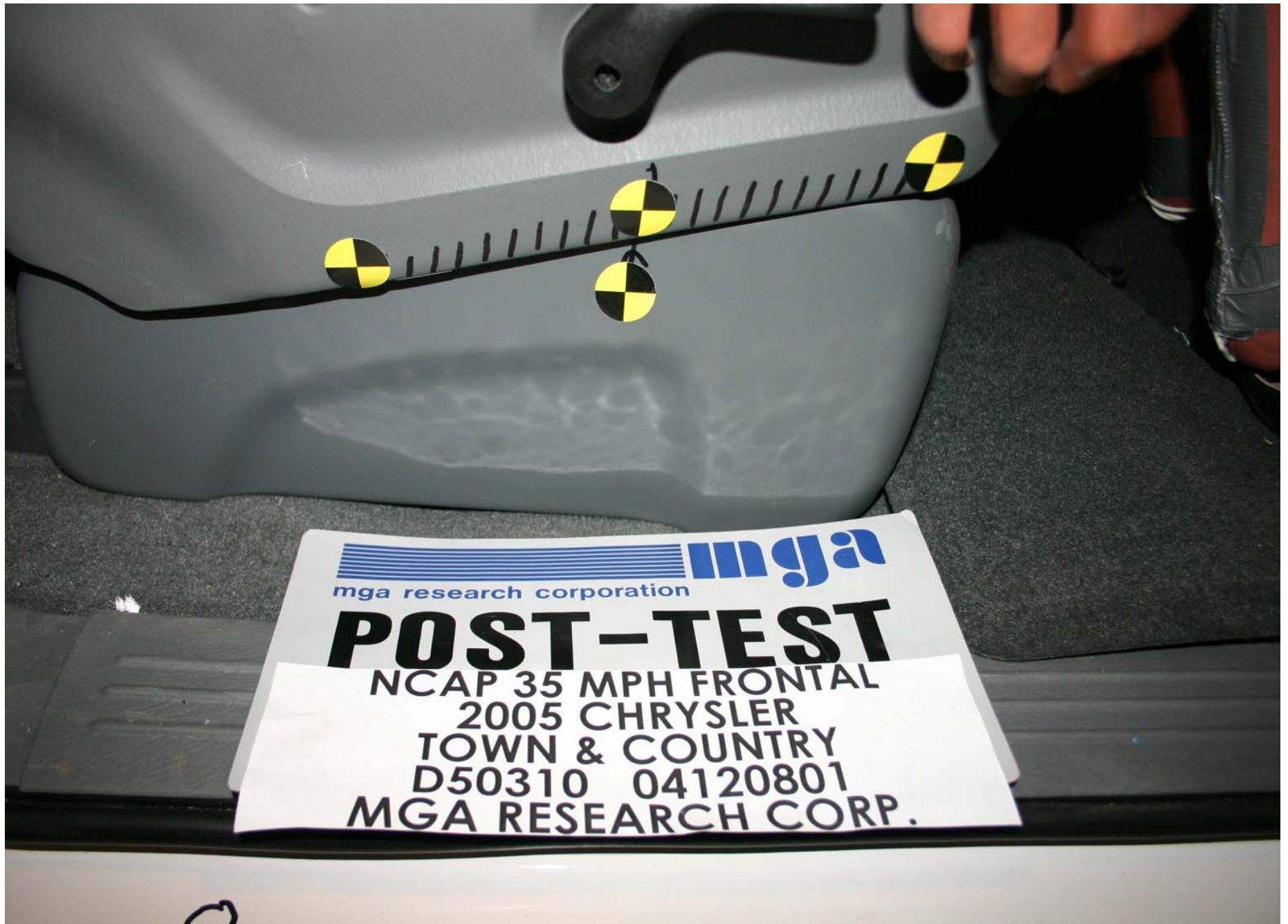
Pre-Test Passenger Dummy Position Right Side View (Door Open)



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



Pre-Test Passenger Dummy Seat Position



Post-Test Passenger Dummy Seat Position



Pre-Test Passenger Dummy Feet Position



Post-Test Passenger Dummy Feet Position



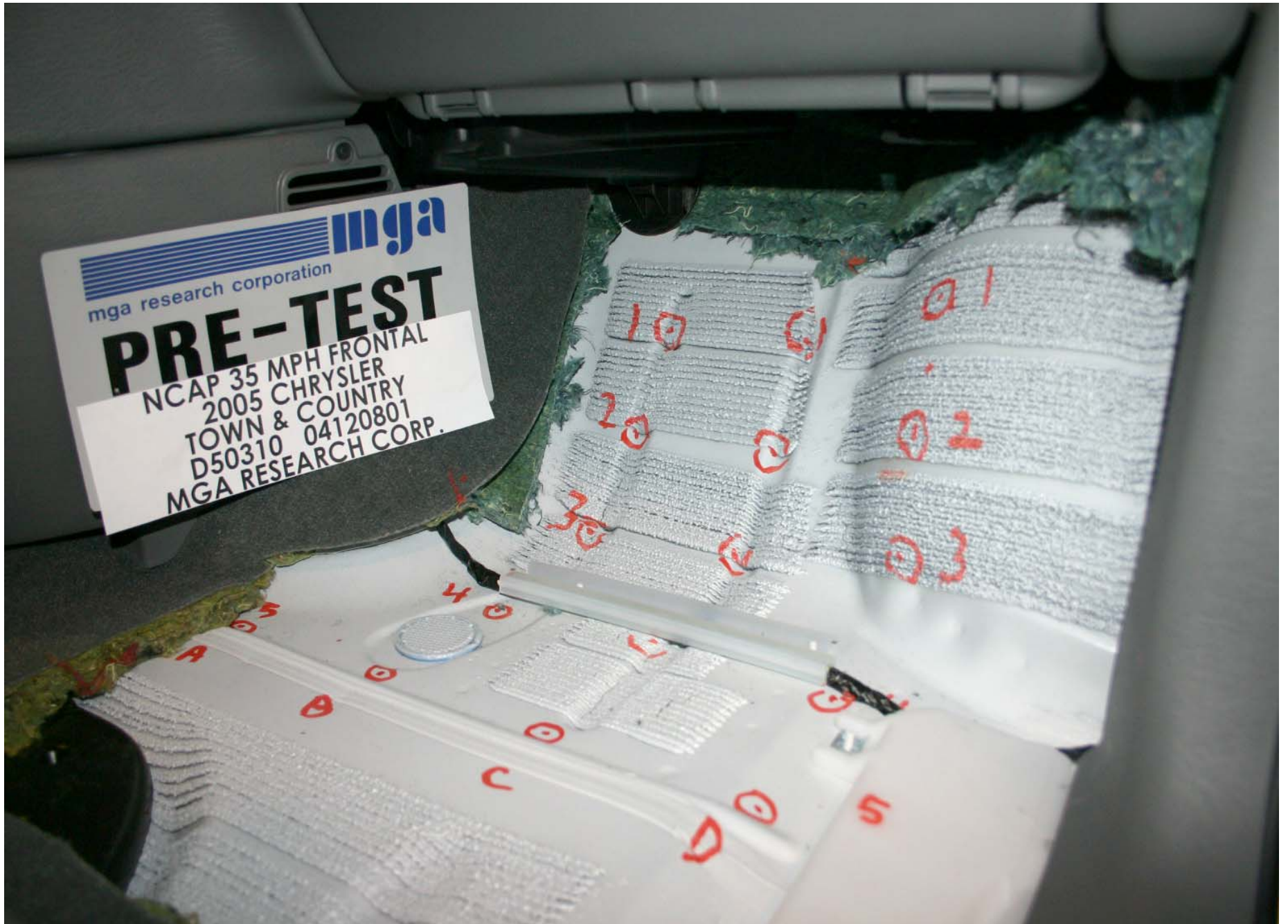
Pre-Test Passenger Side Knee Bolster View



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Post-Test Passenger Side Knee Bolster View

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Pre-Test Passenger Side Floor Pan View



Post-Test Passenger Side Floor Pan View



Post-Test Passenger Dummy Head Contact

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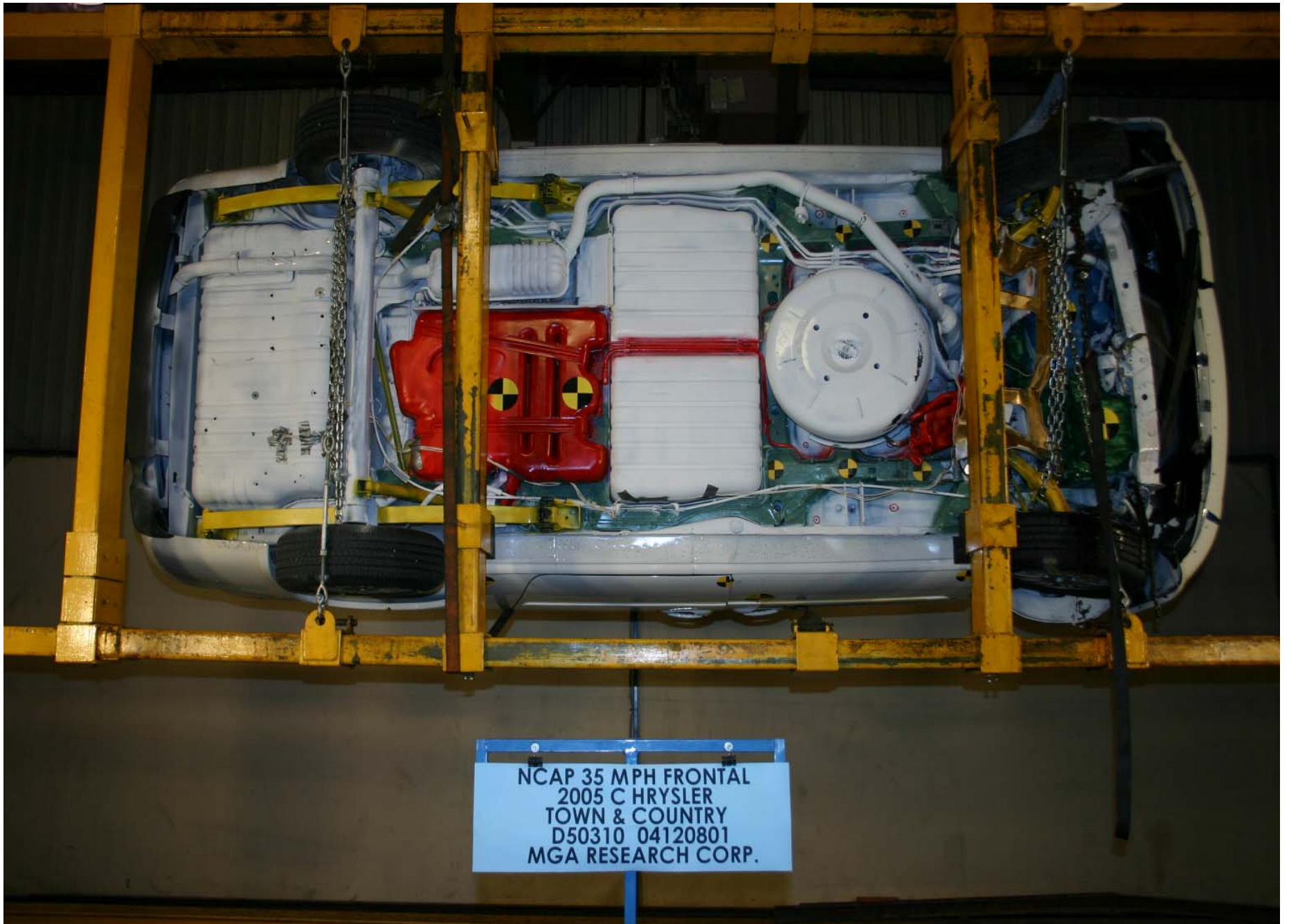
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Post-Test Passenger Dummy Airbag Contact

A-67.



Rollover 90 Degrees

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Rollover 180 Degrees

A-69.



Rollover 270 Degrees

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Rollover 360 Degrees

A-71.



Vehicle Impact

**APPENDIX B**

**DUMMY AND VEHICLE RESPONSE DATA TRACES**

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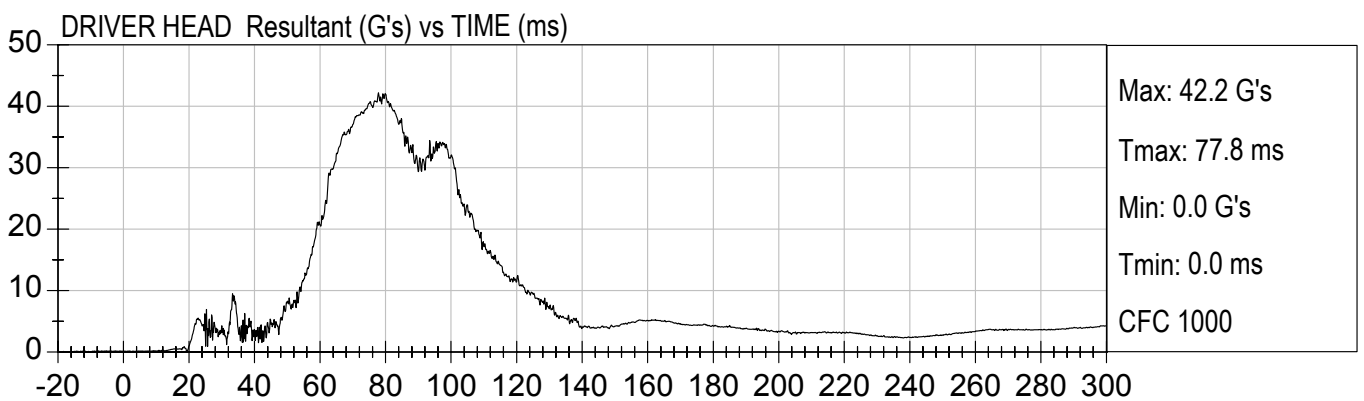
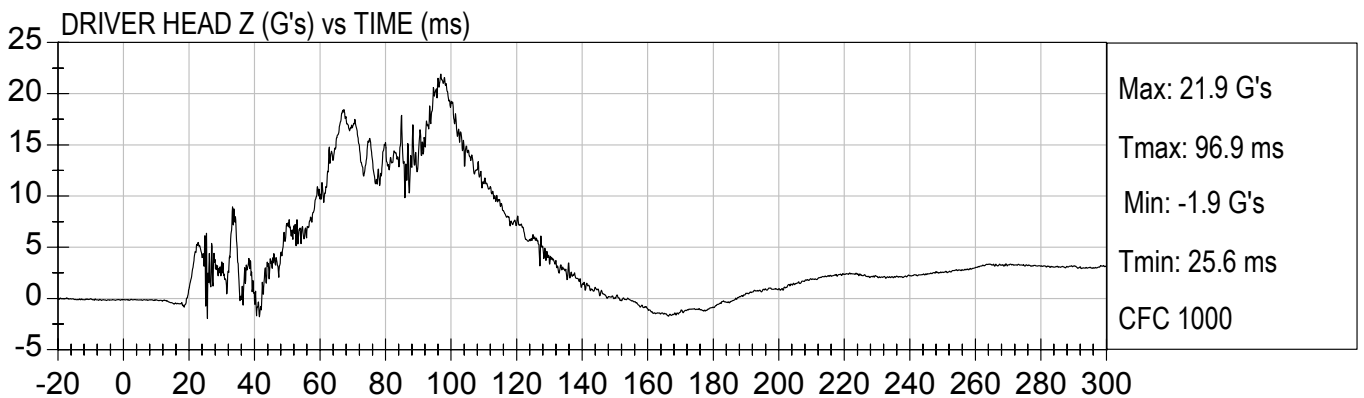
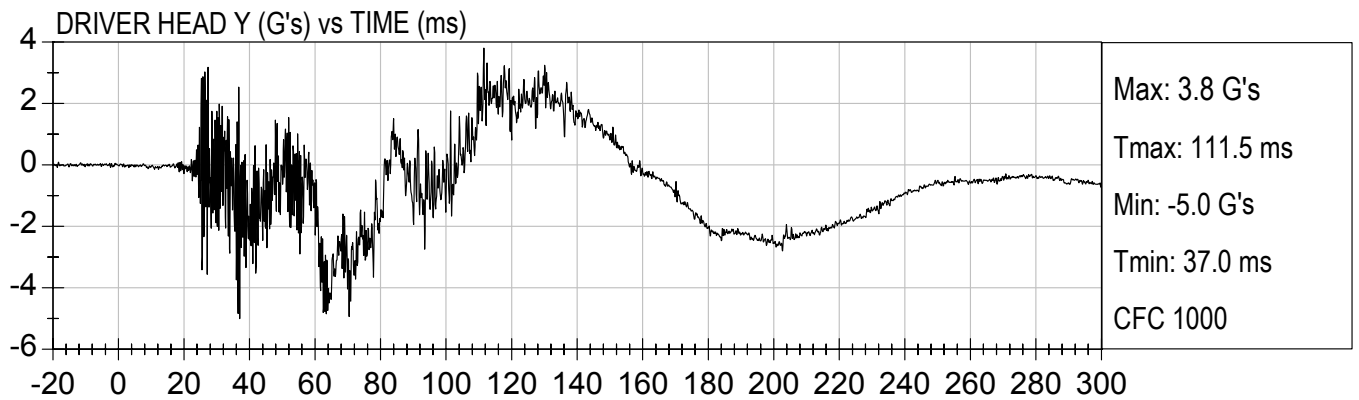
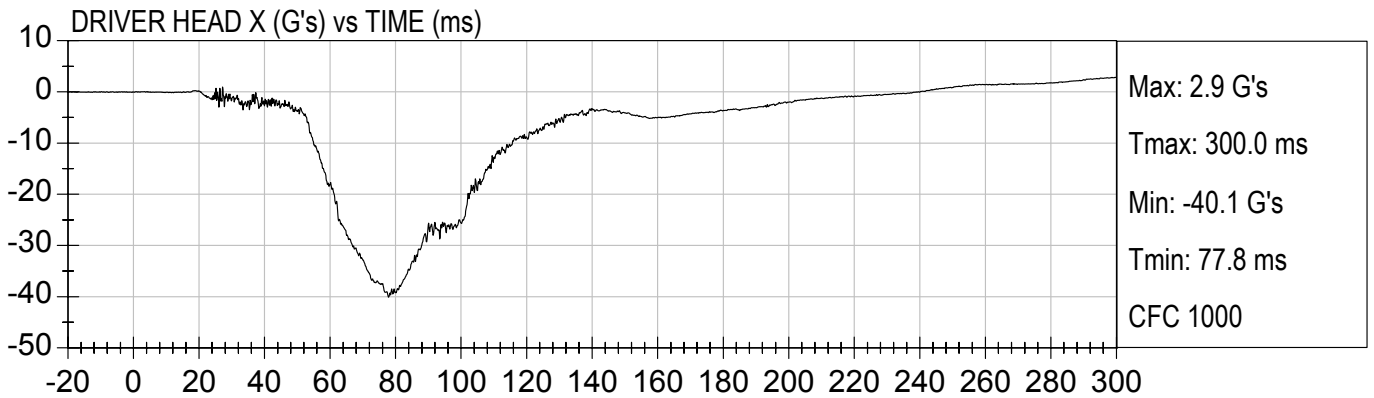
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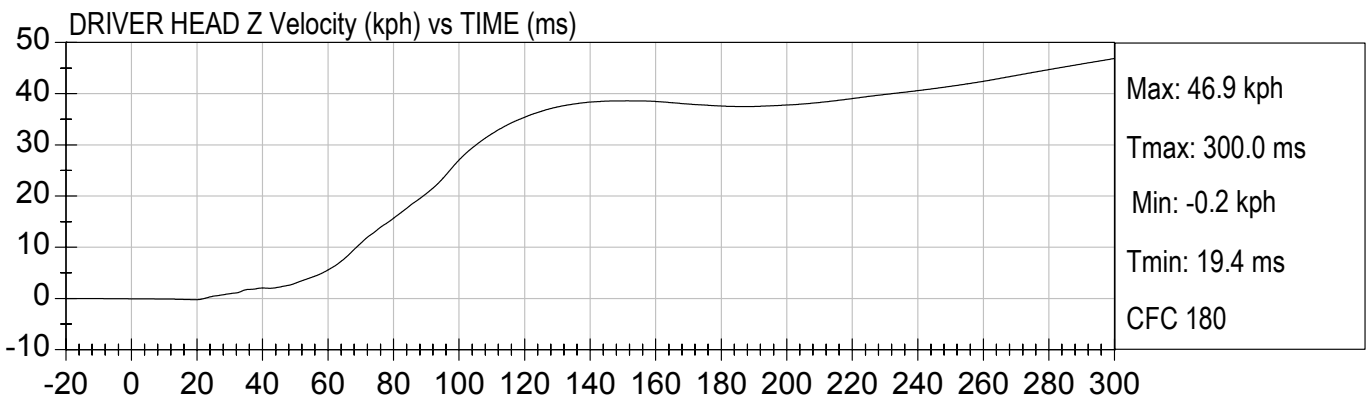
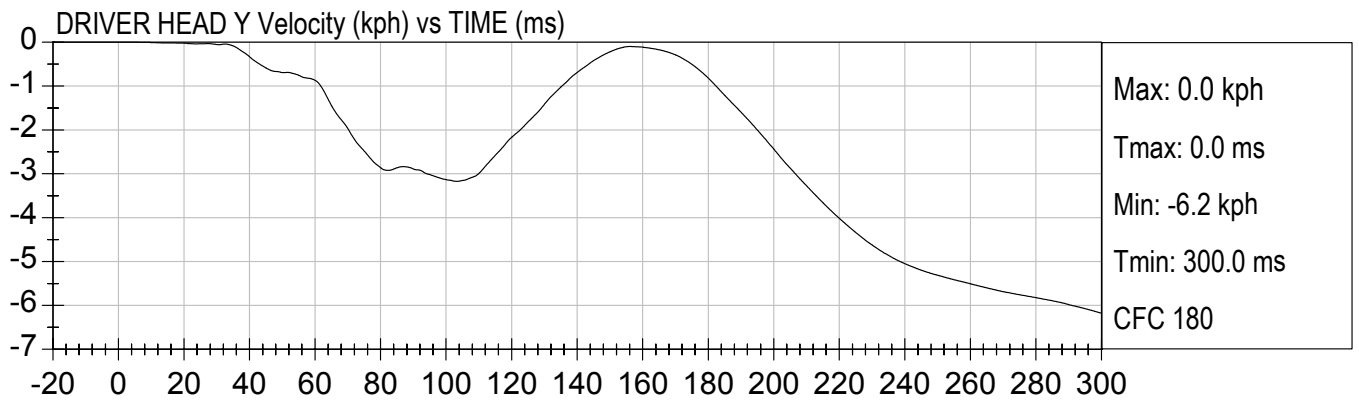
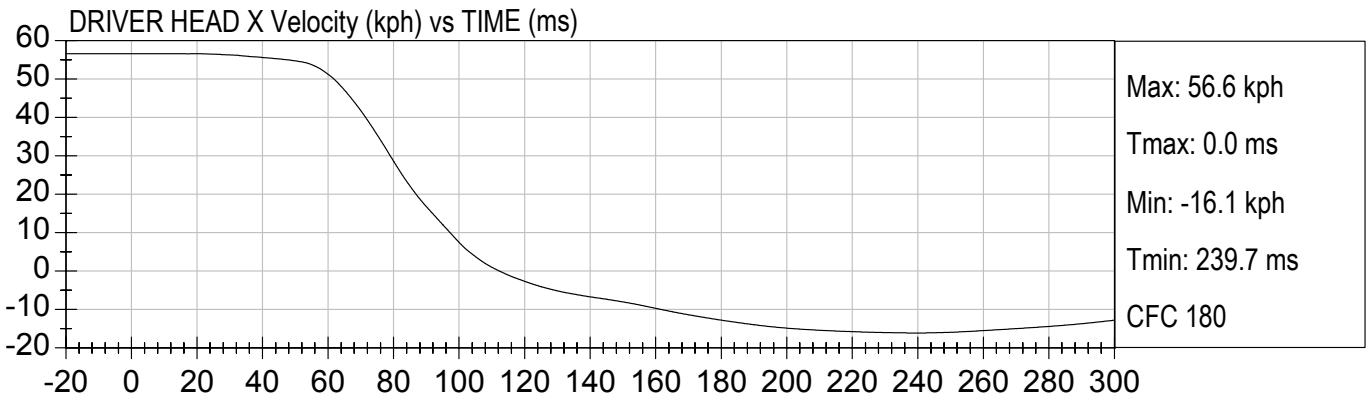
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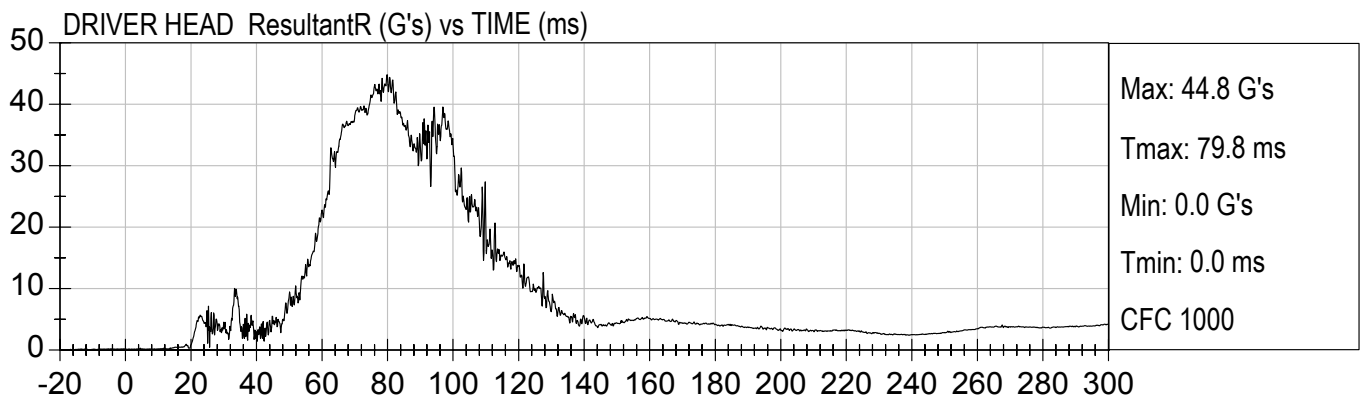
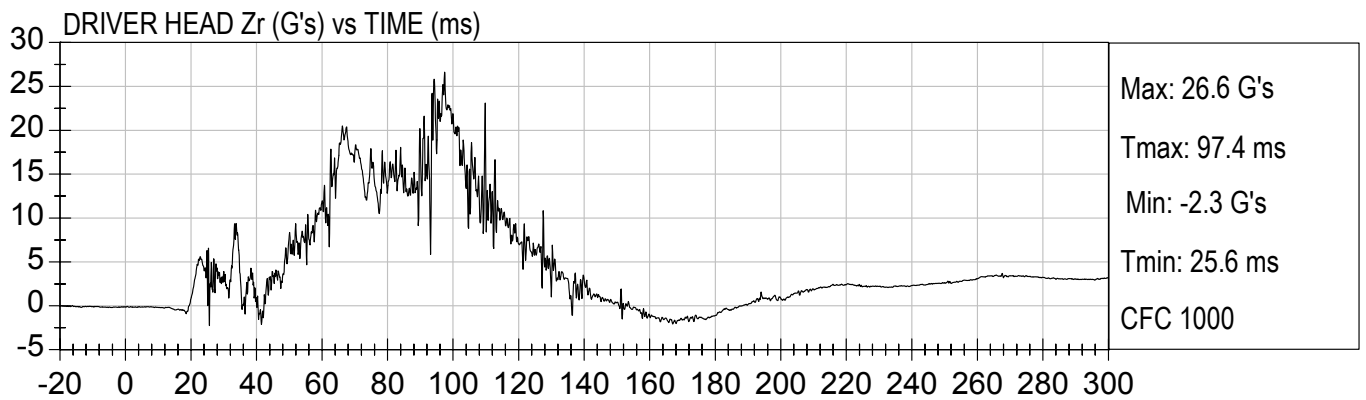
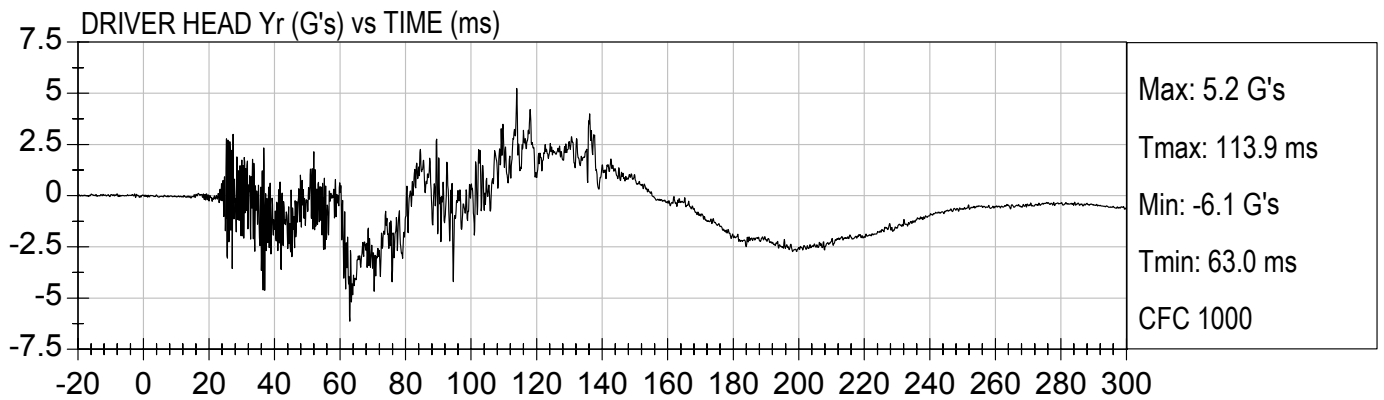
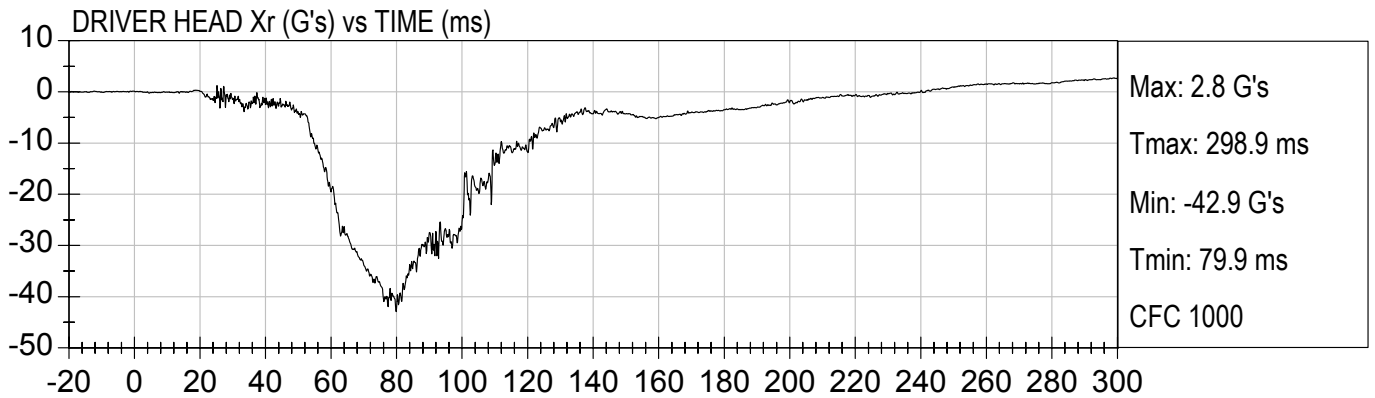
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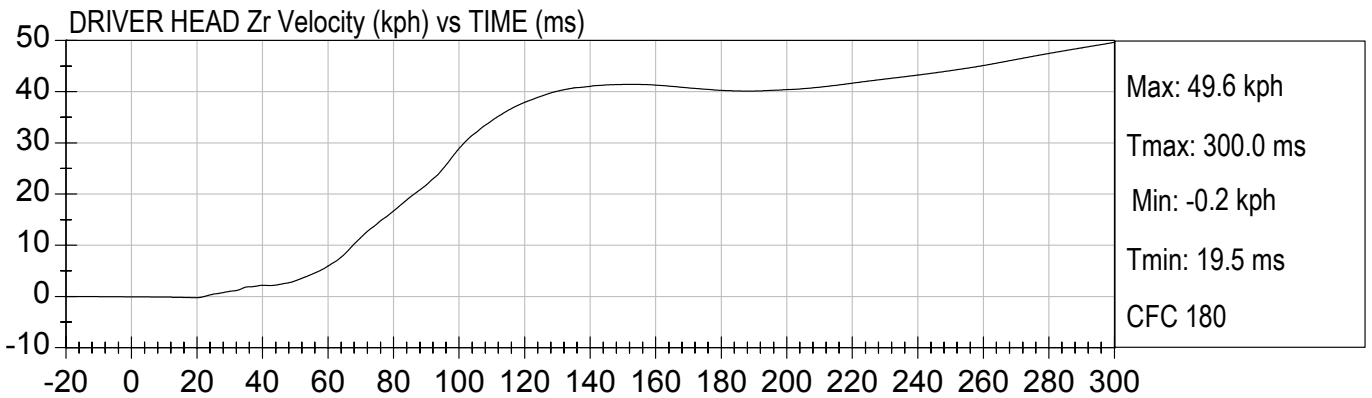
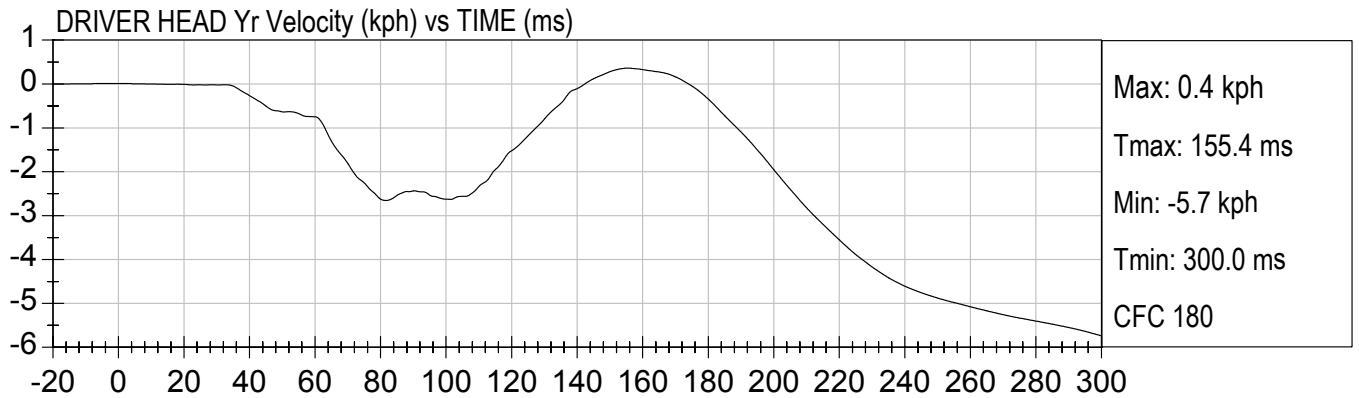
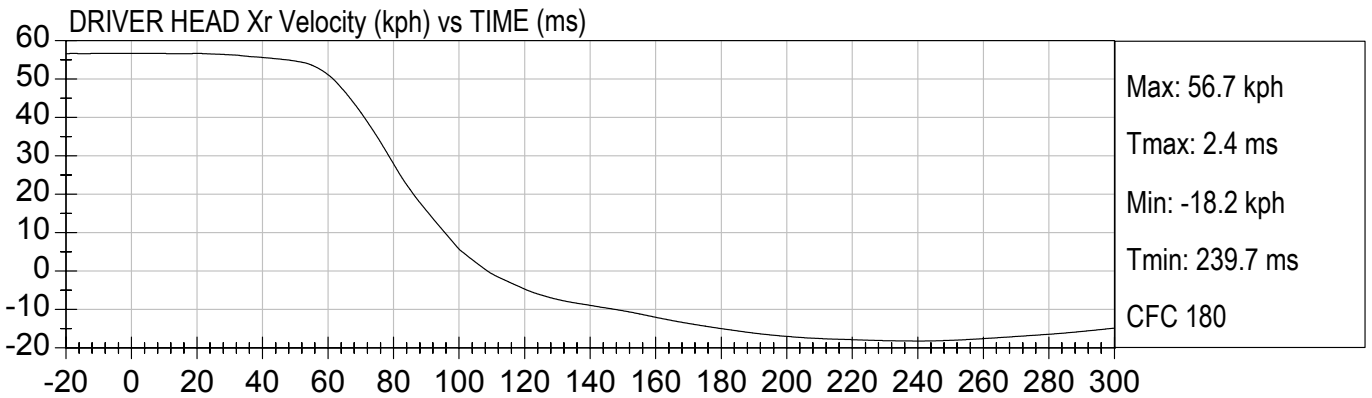
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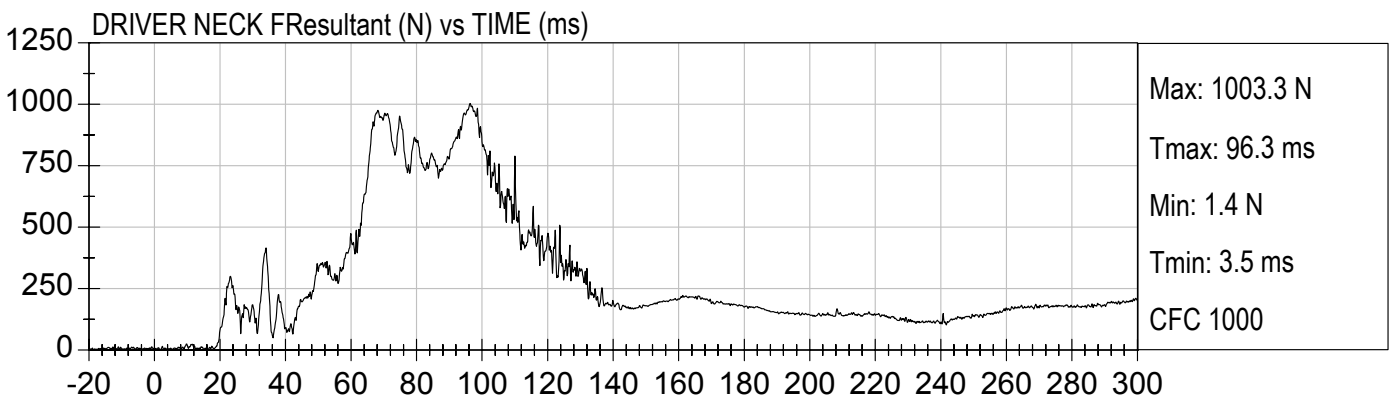
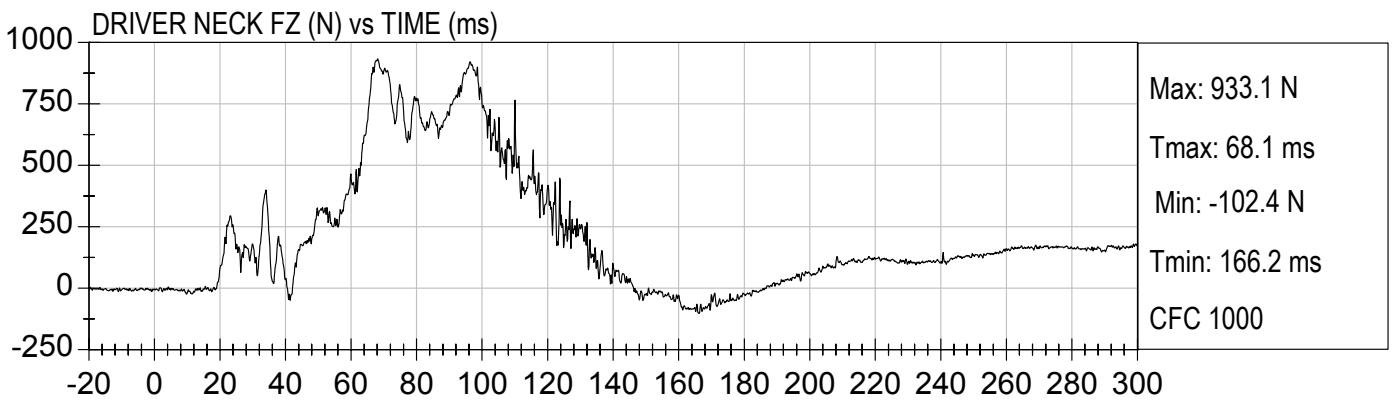
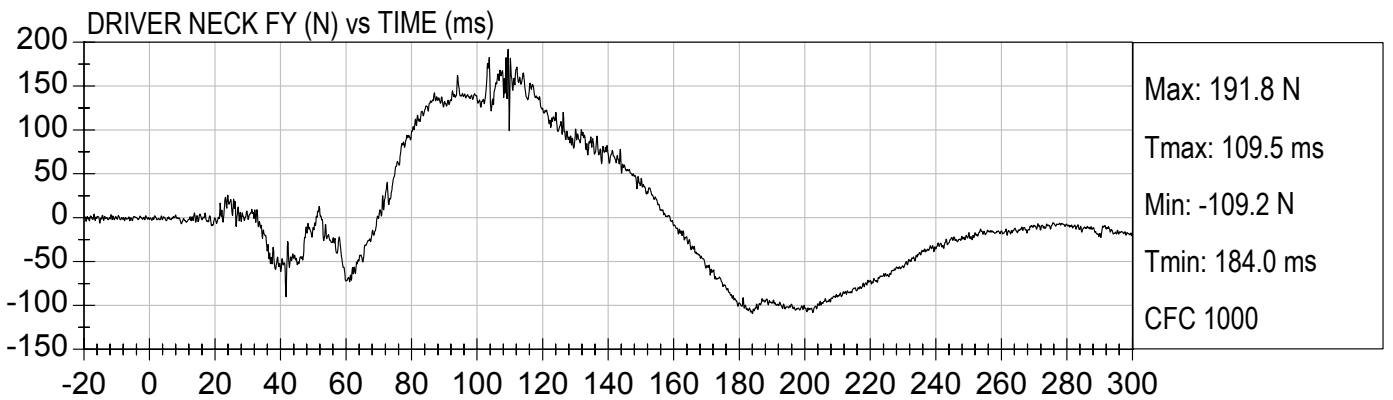
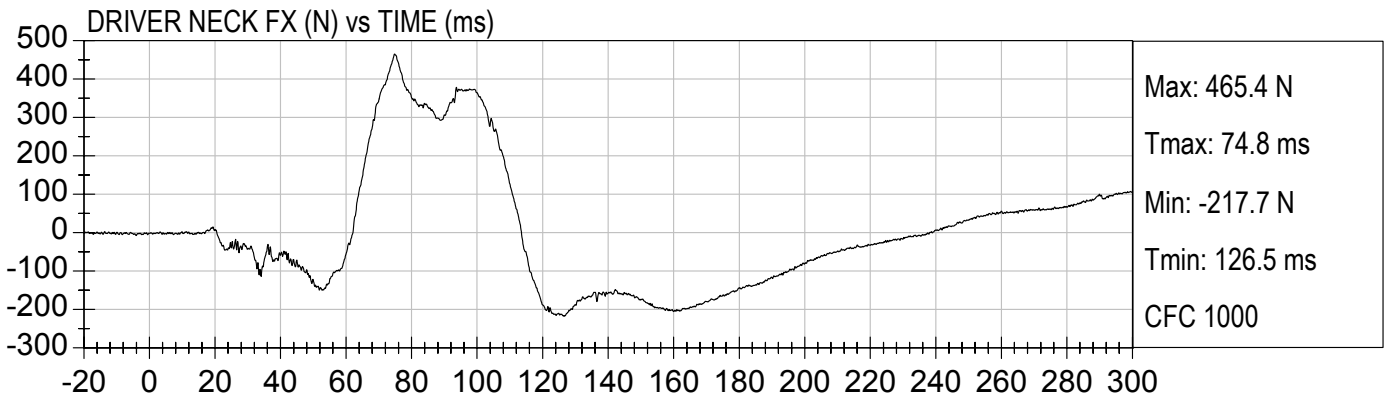
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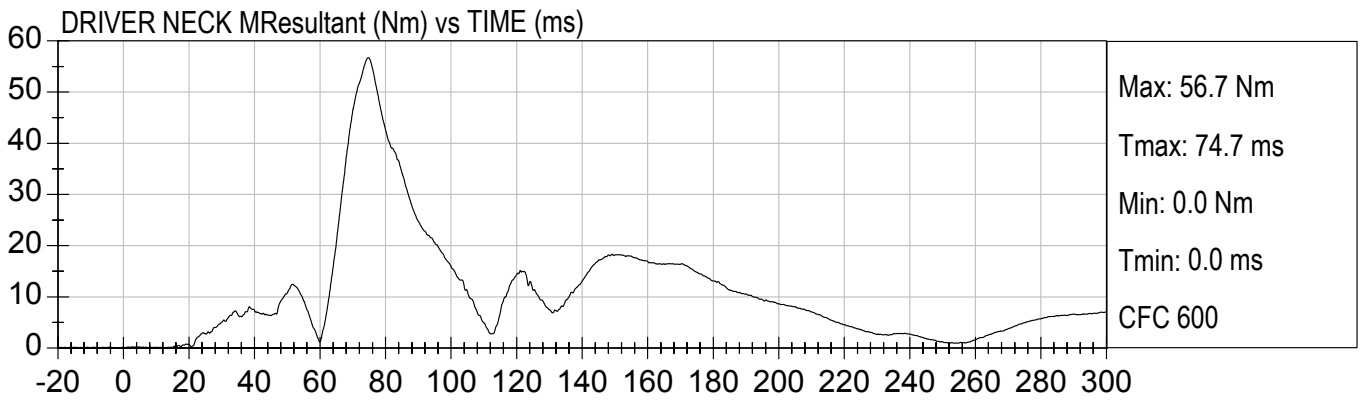
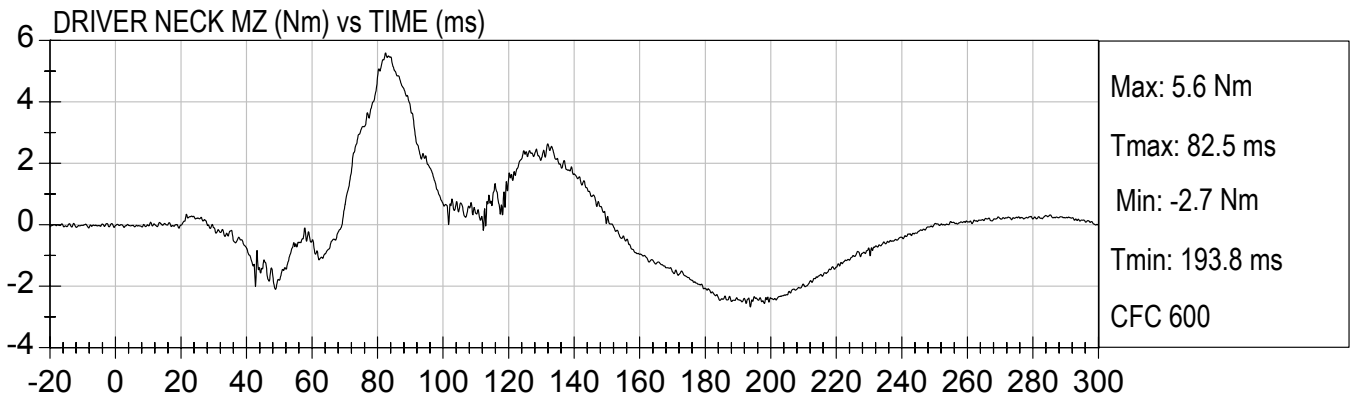
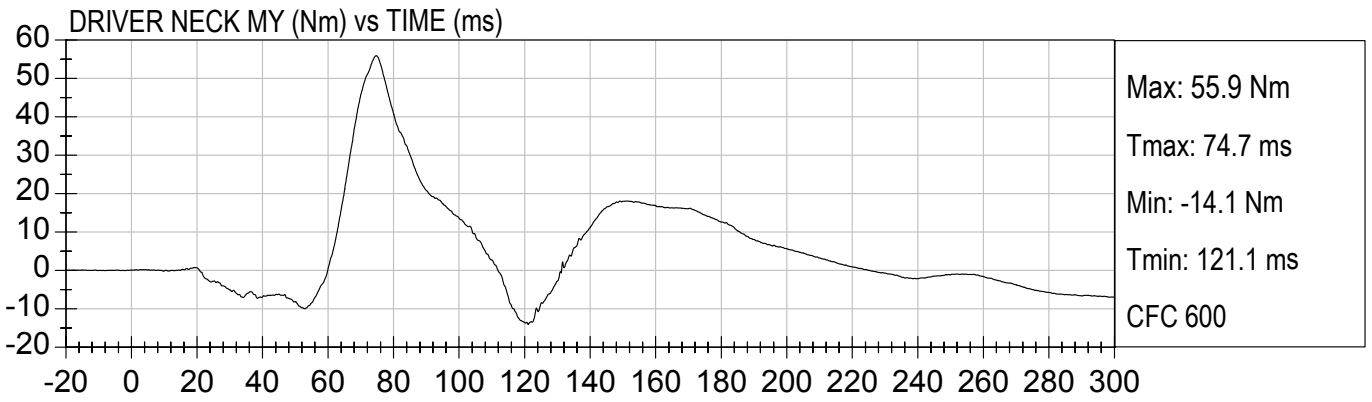
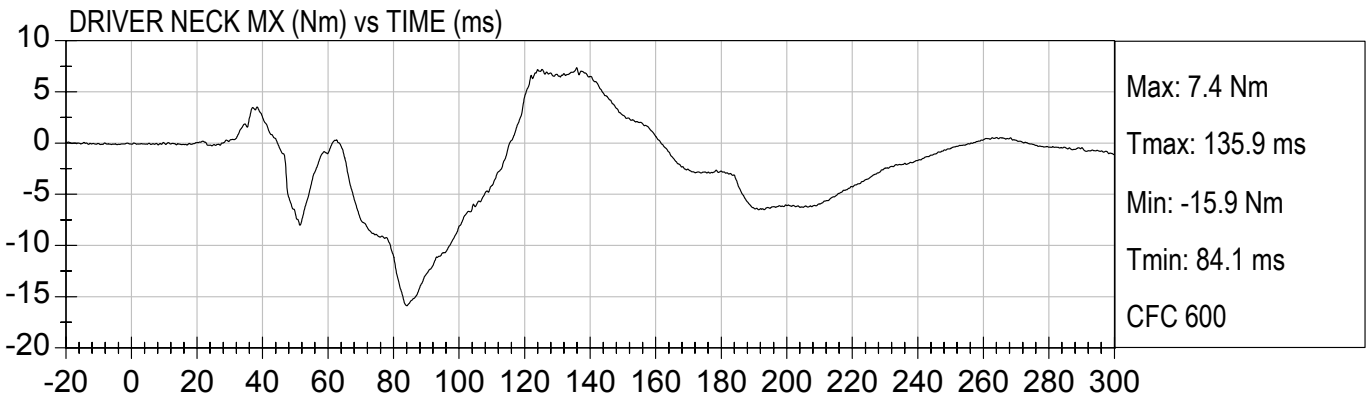


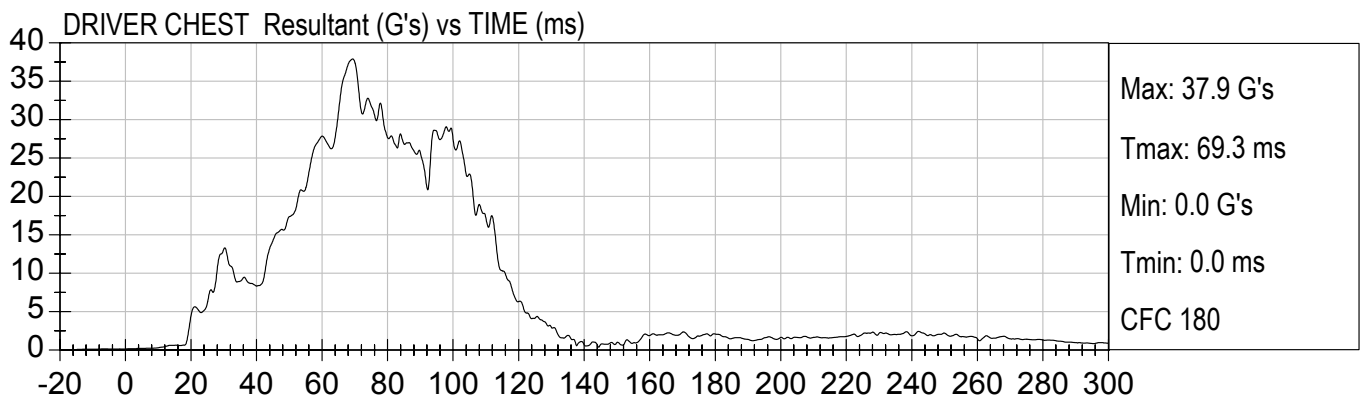
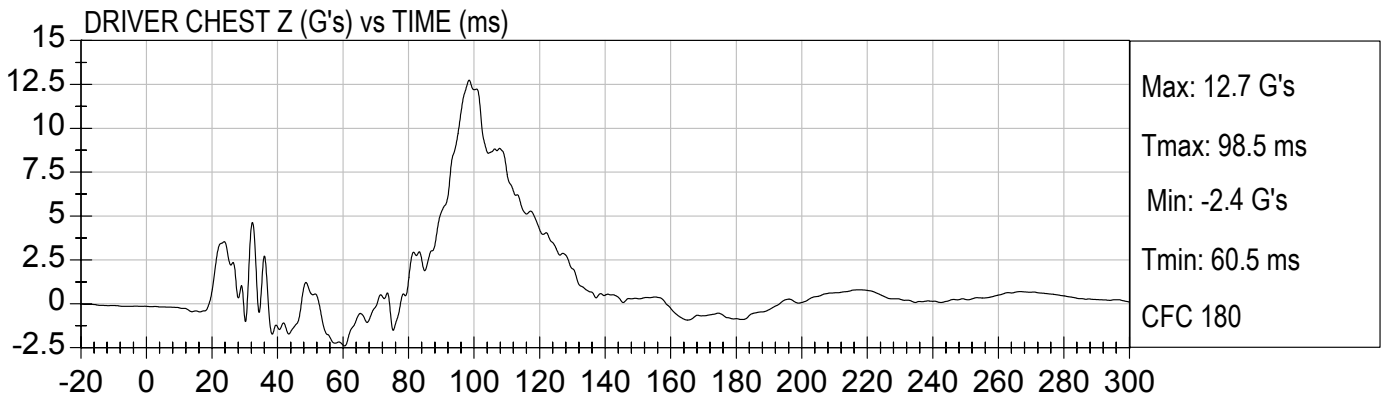
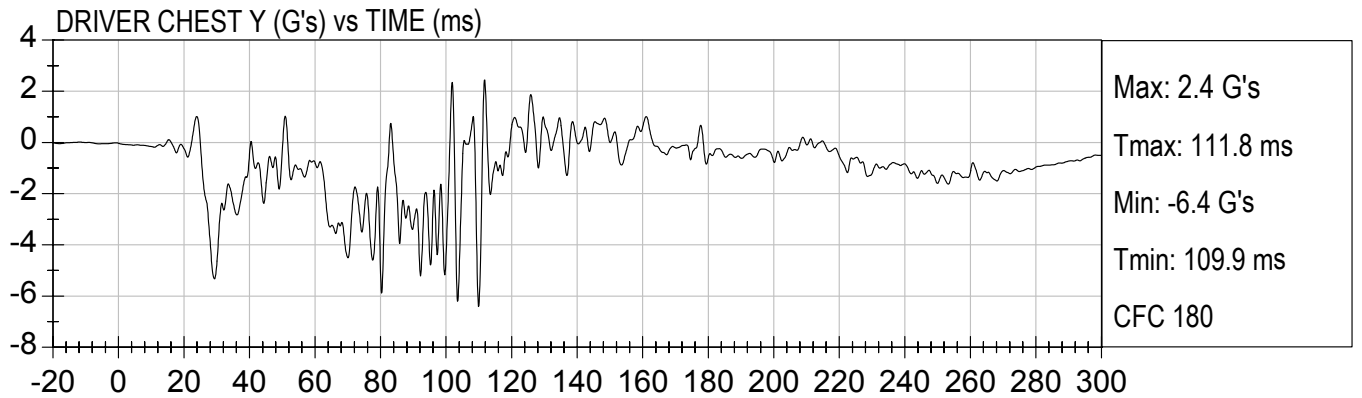
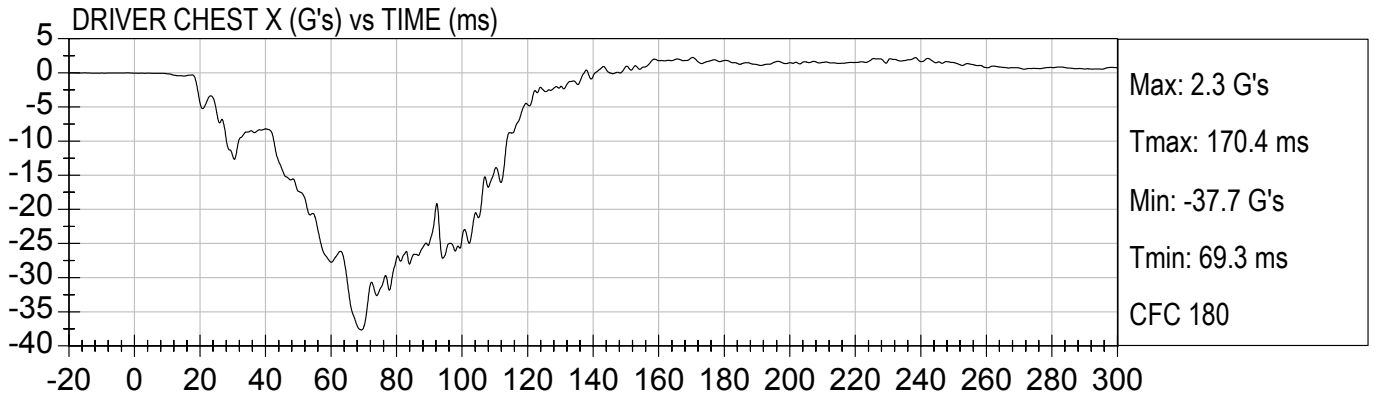


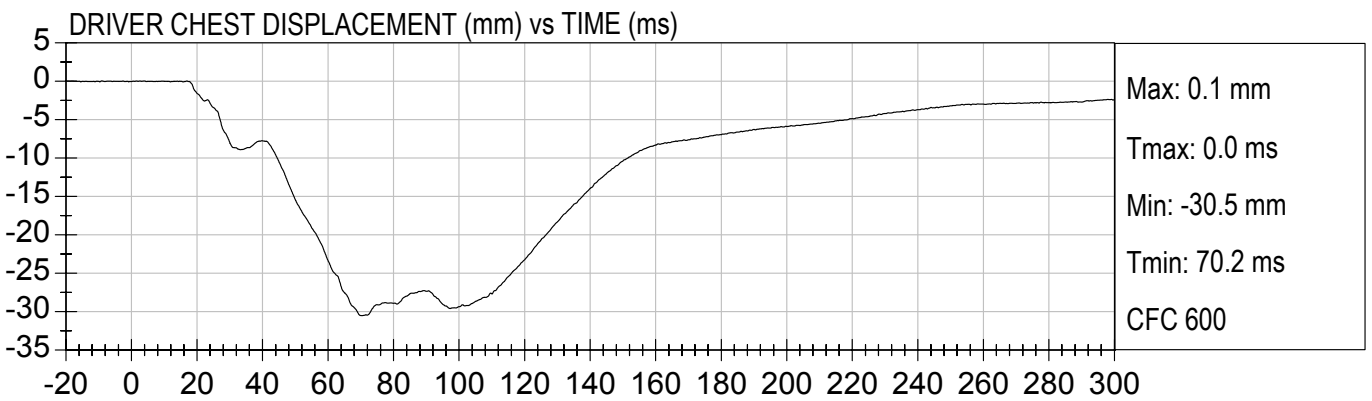
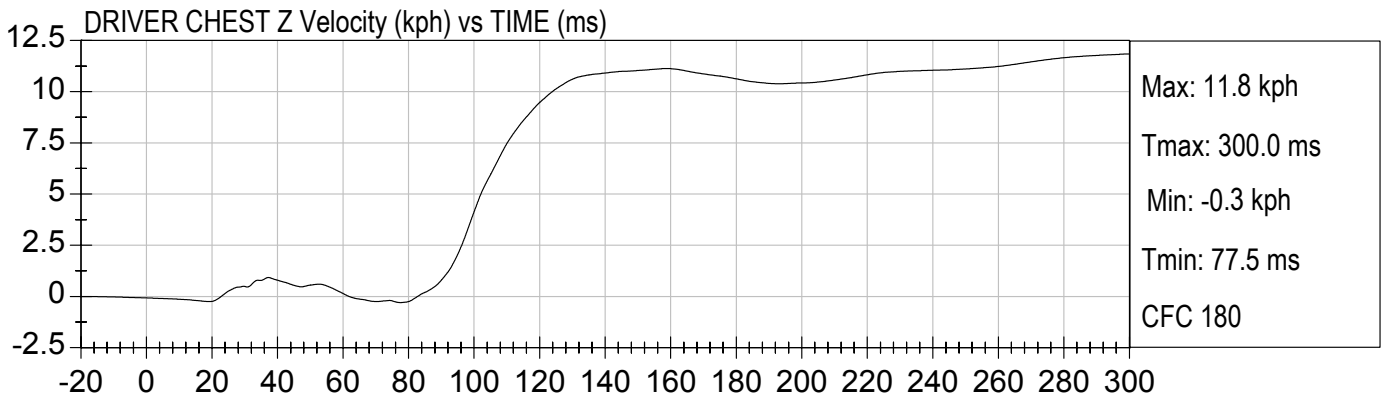
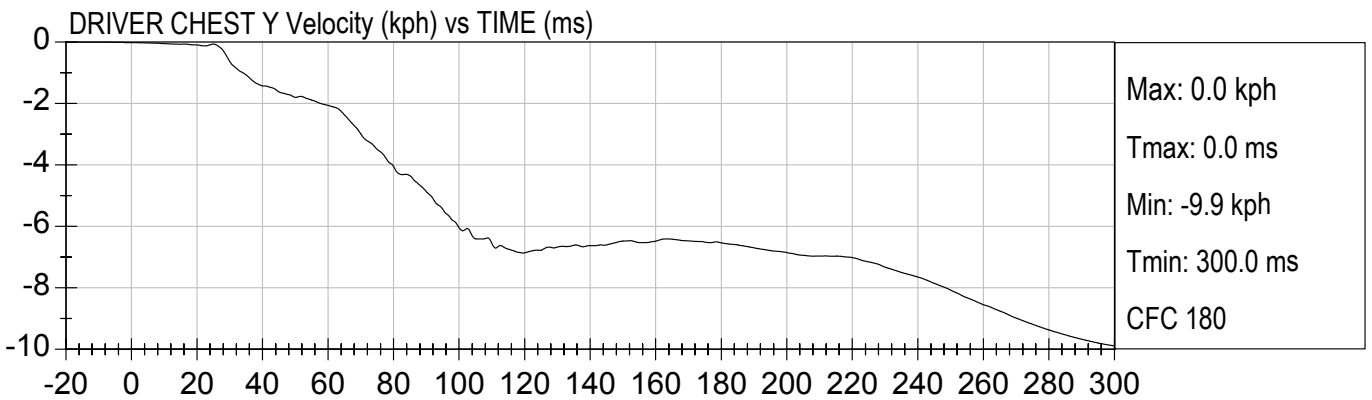
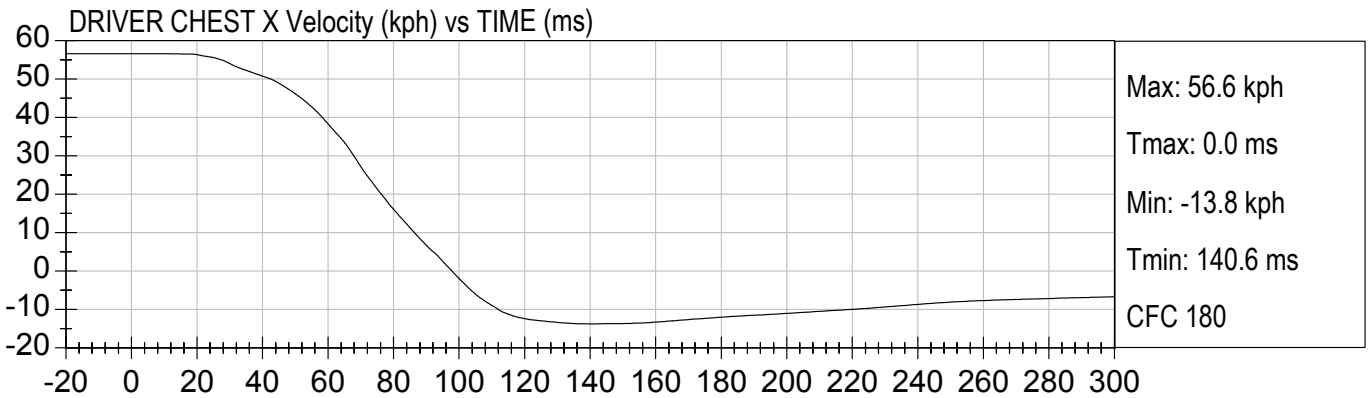


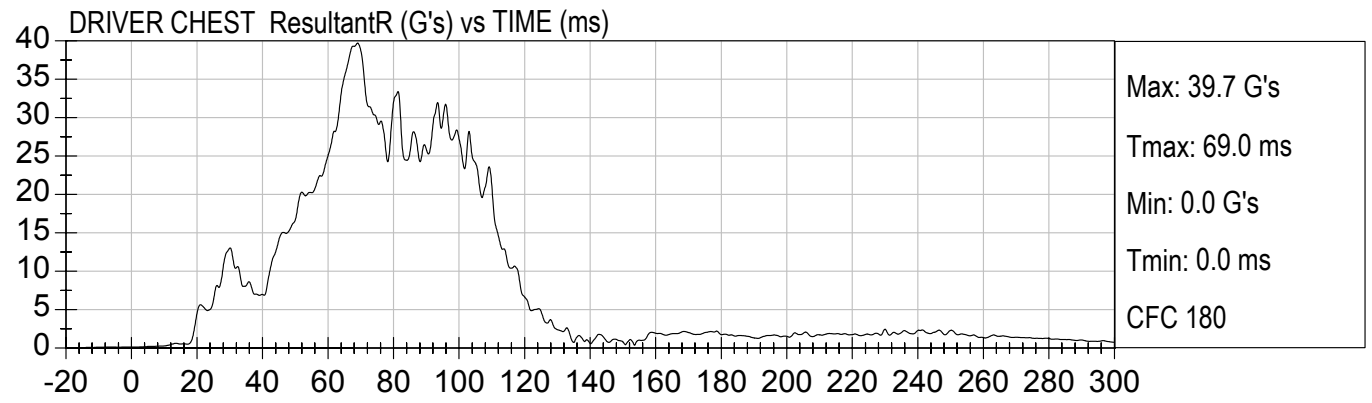
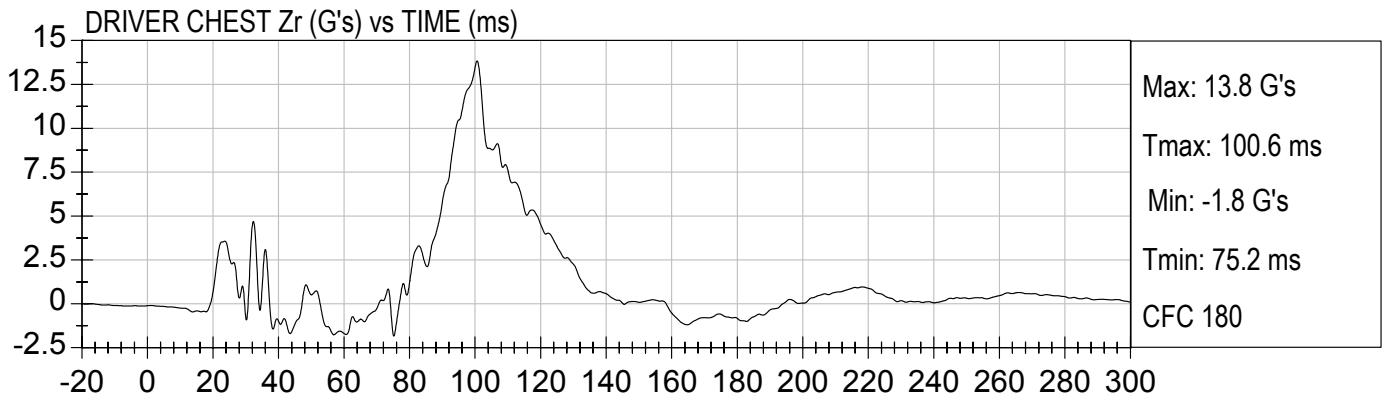
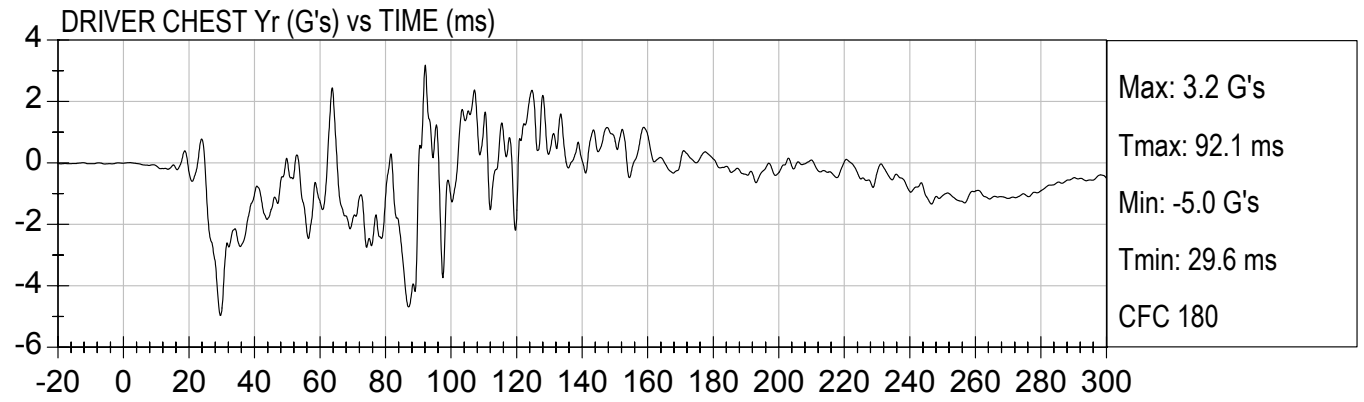
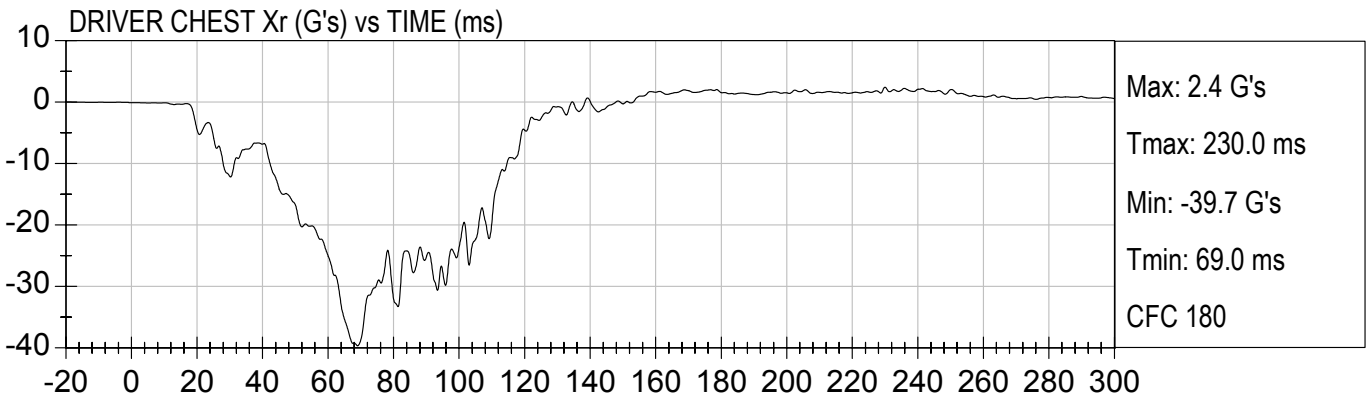


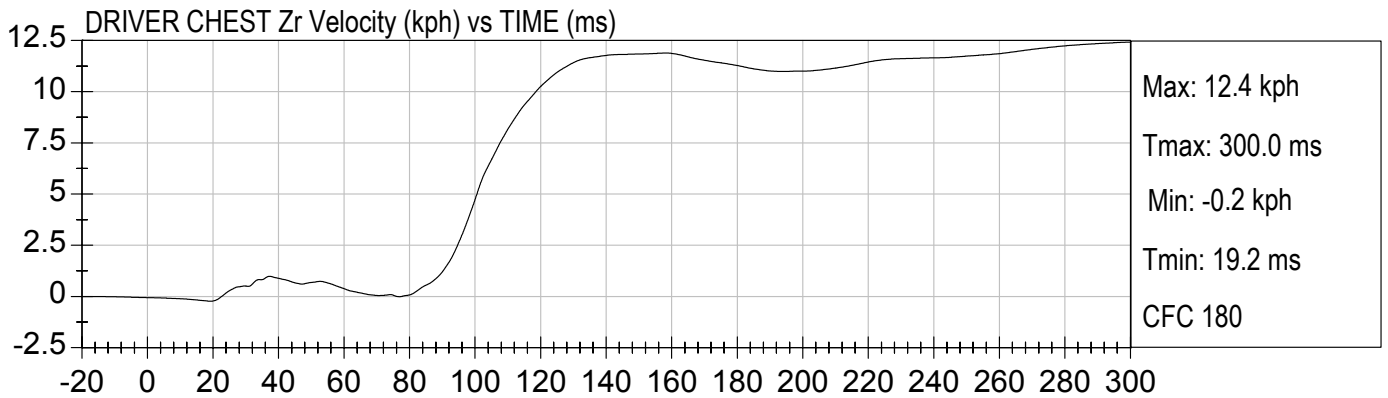
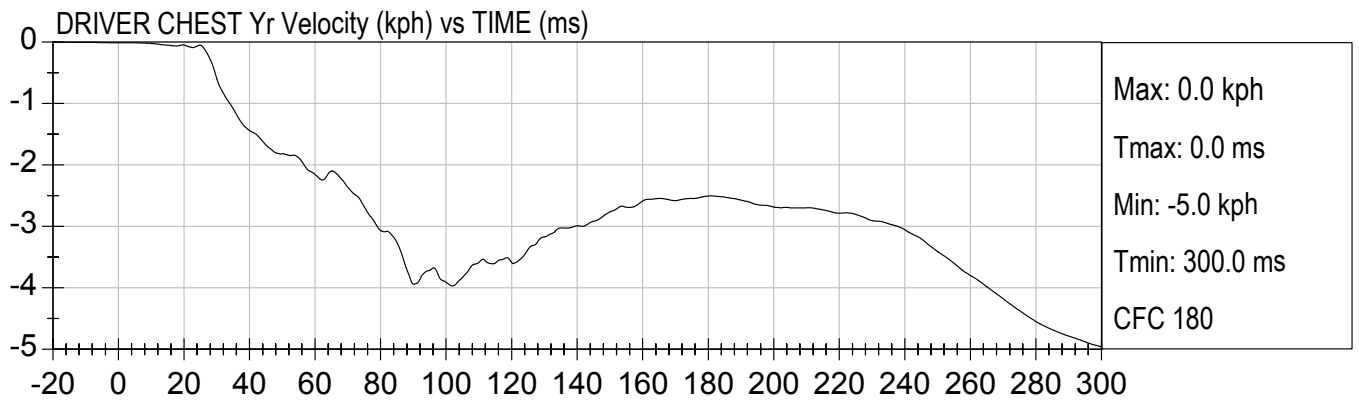
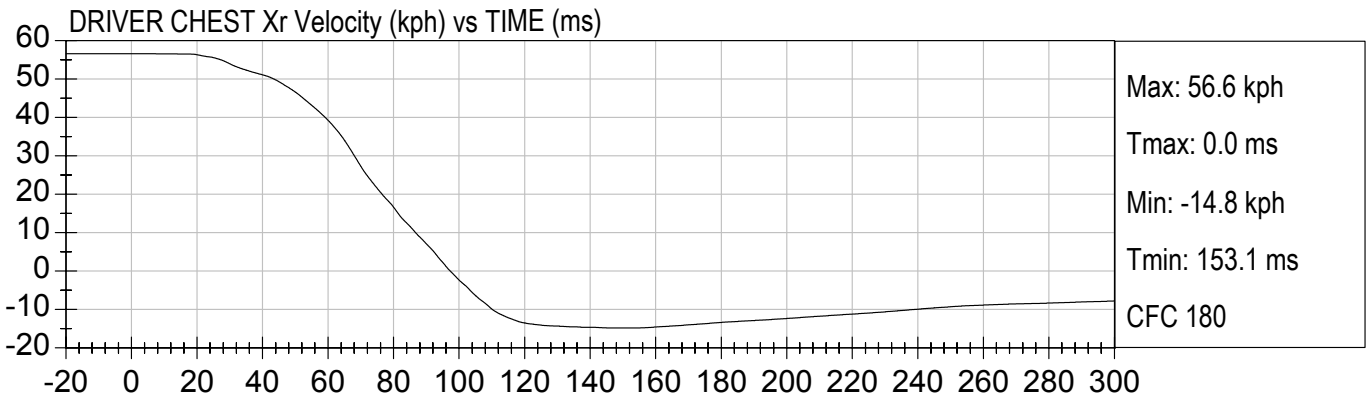


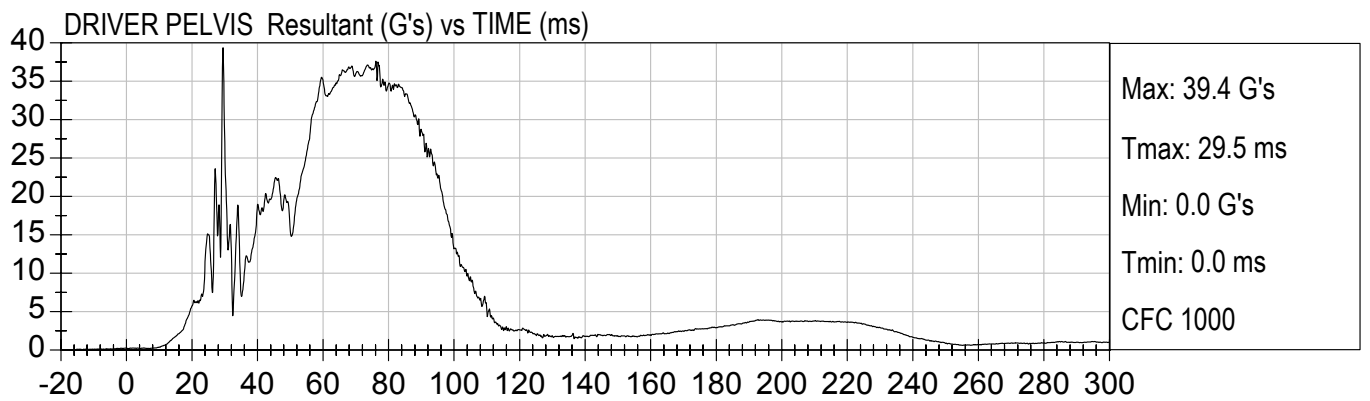
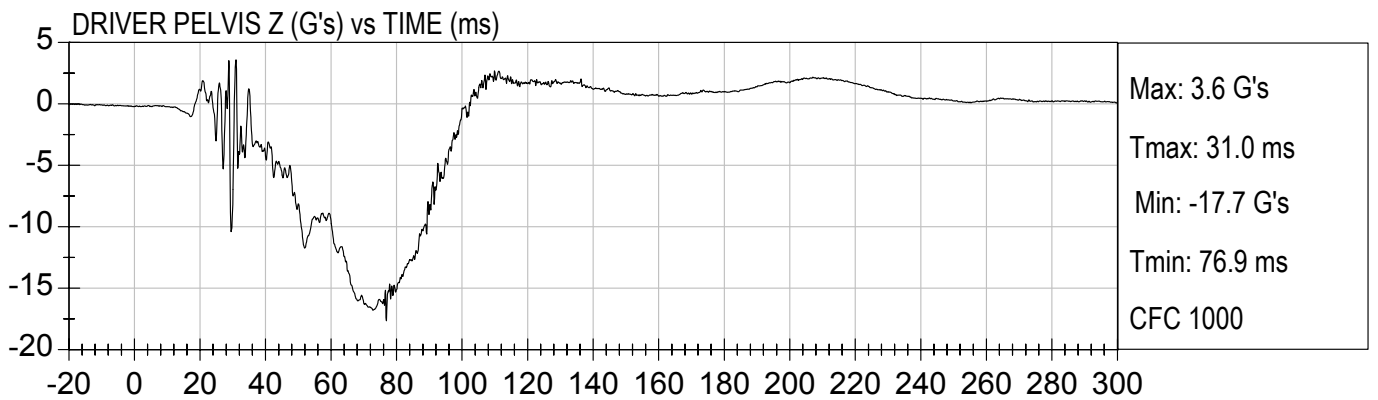
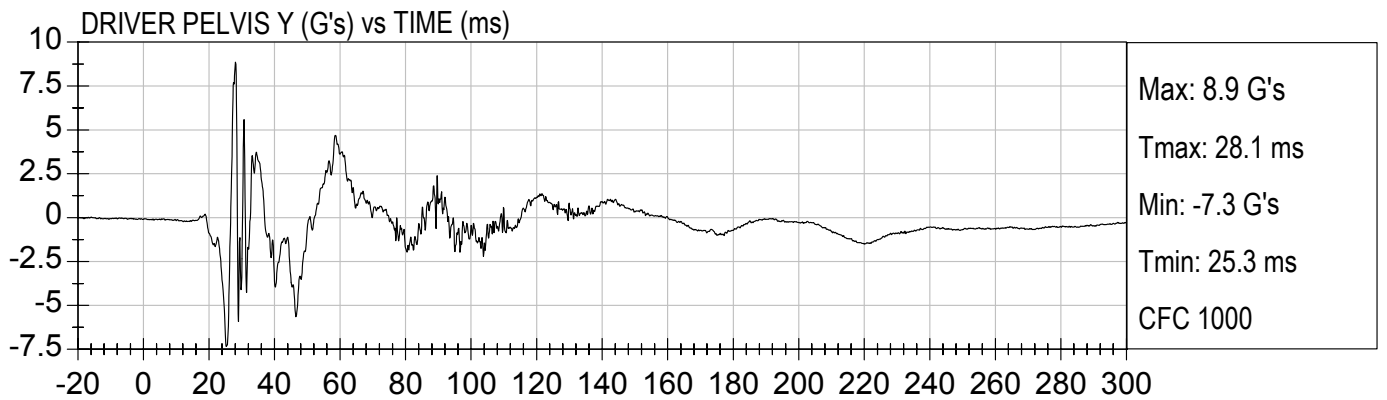
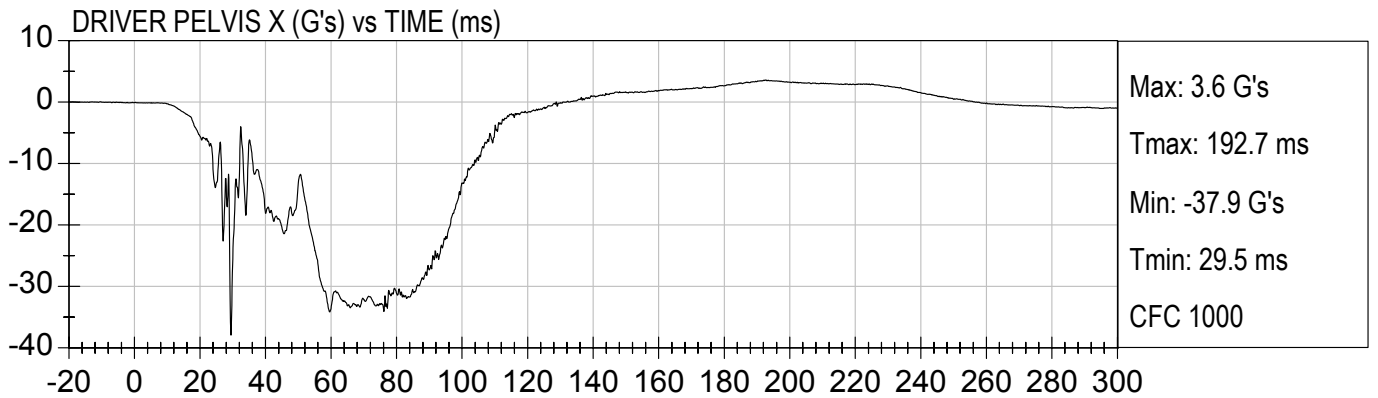


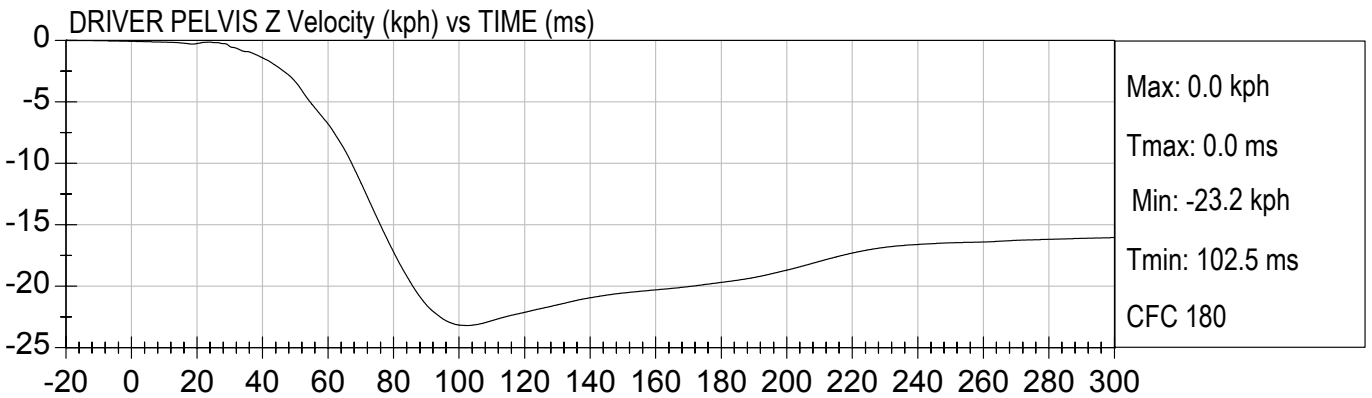
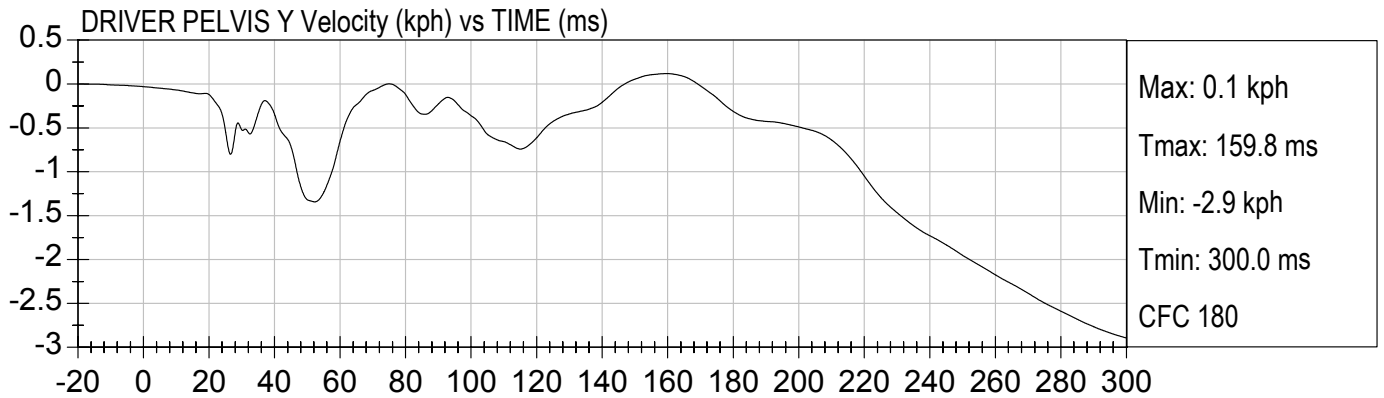
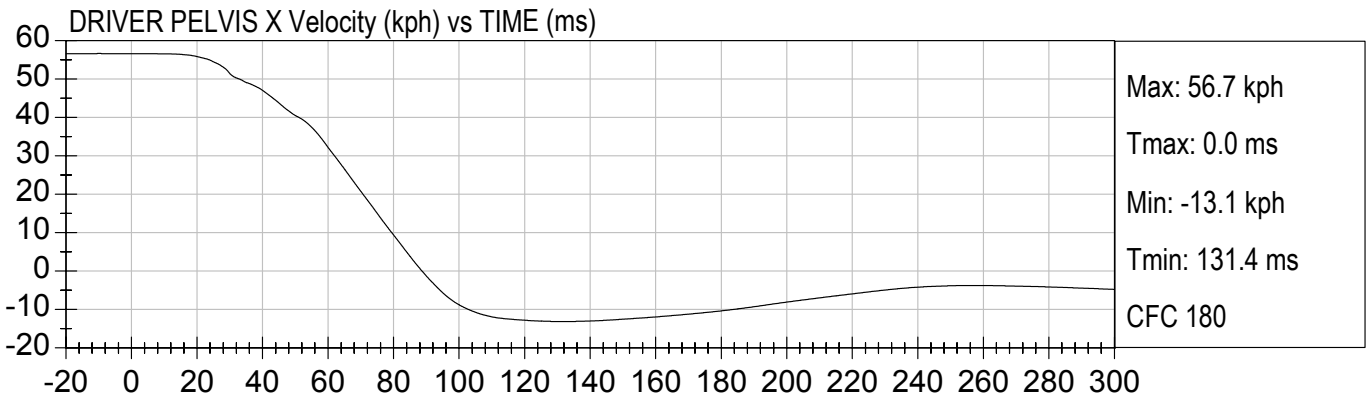


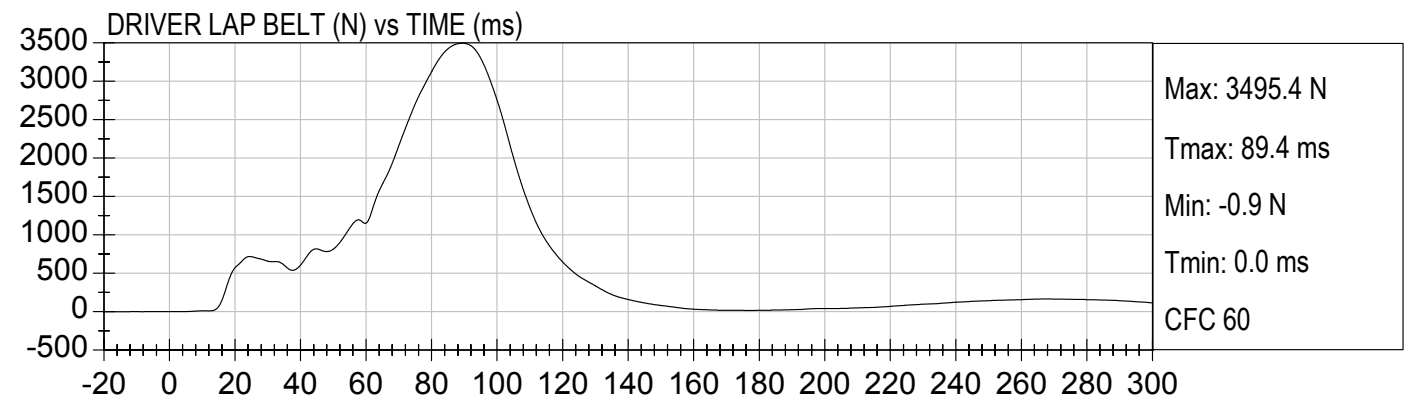
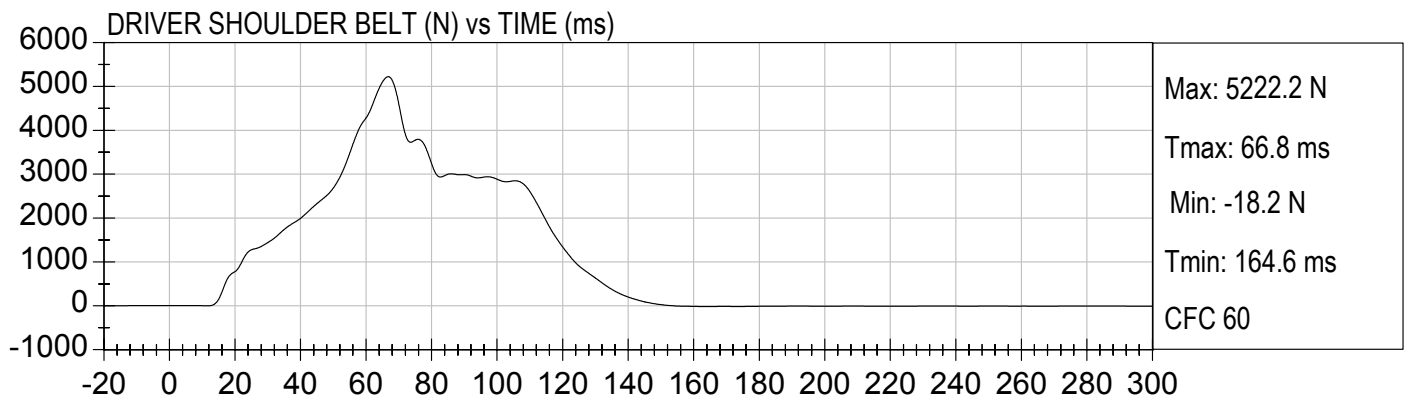
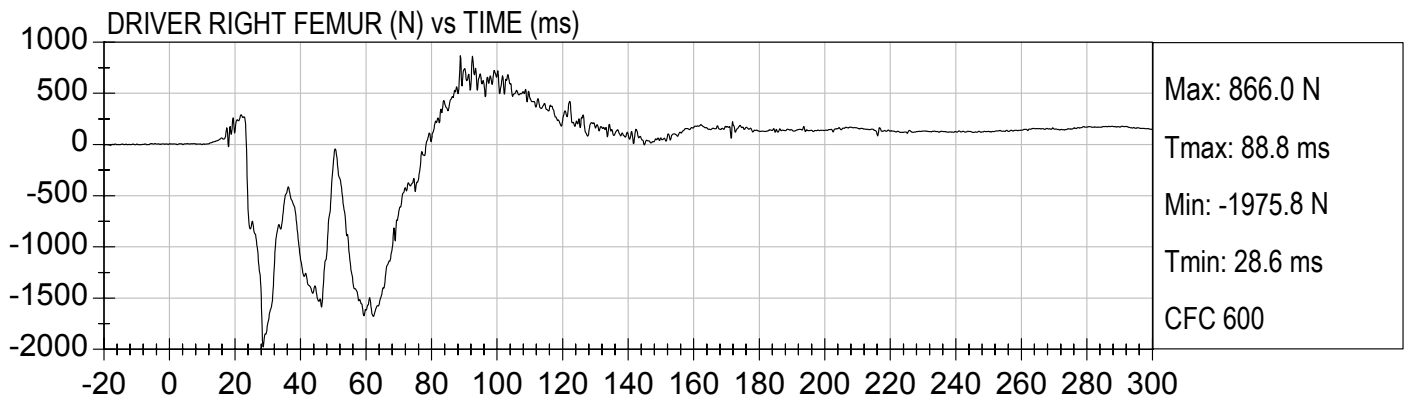
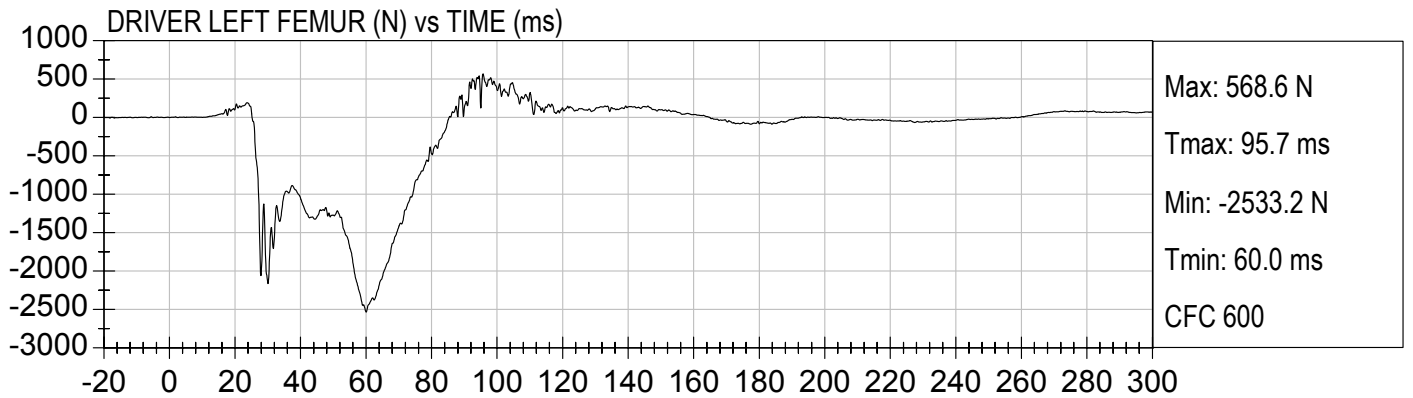


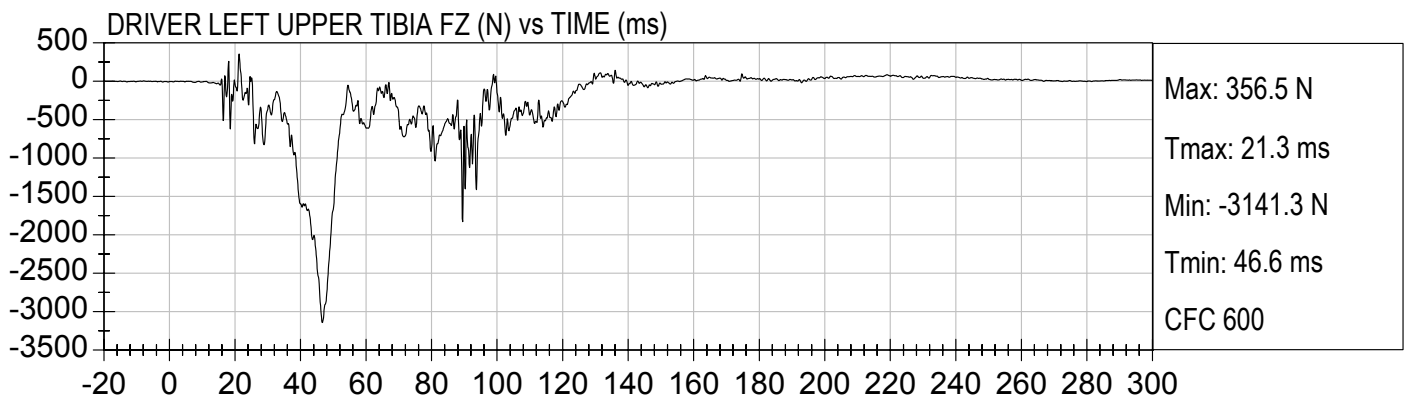
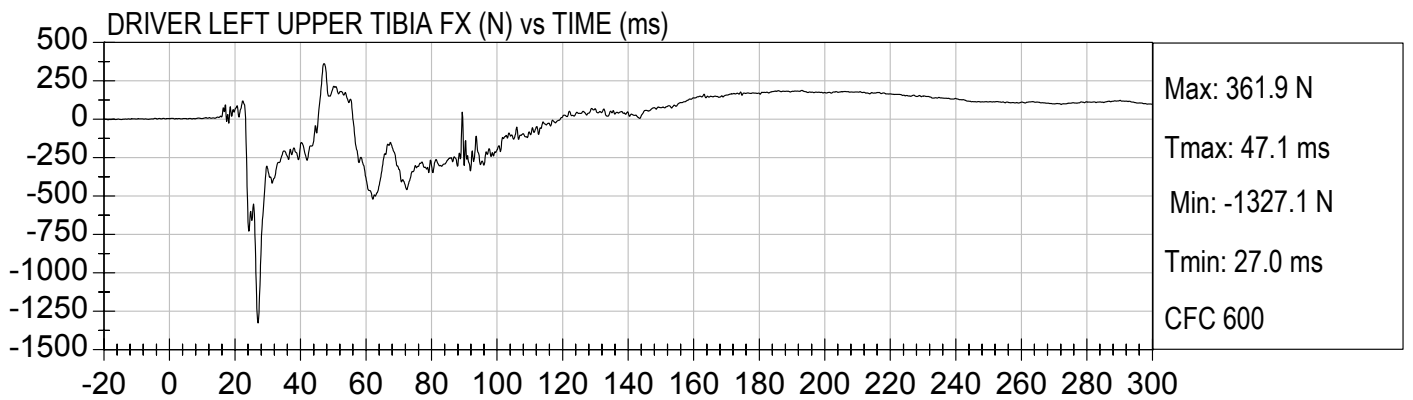
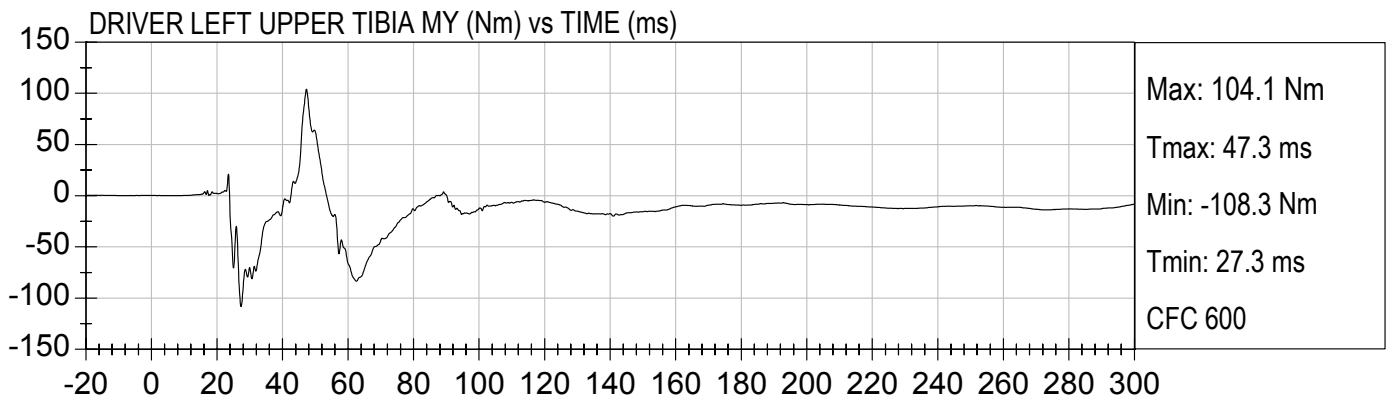
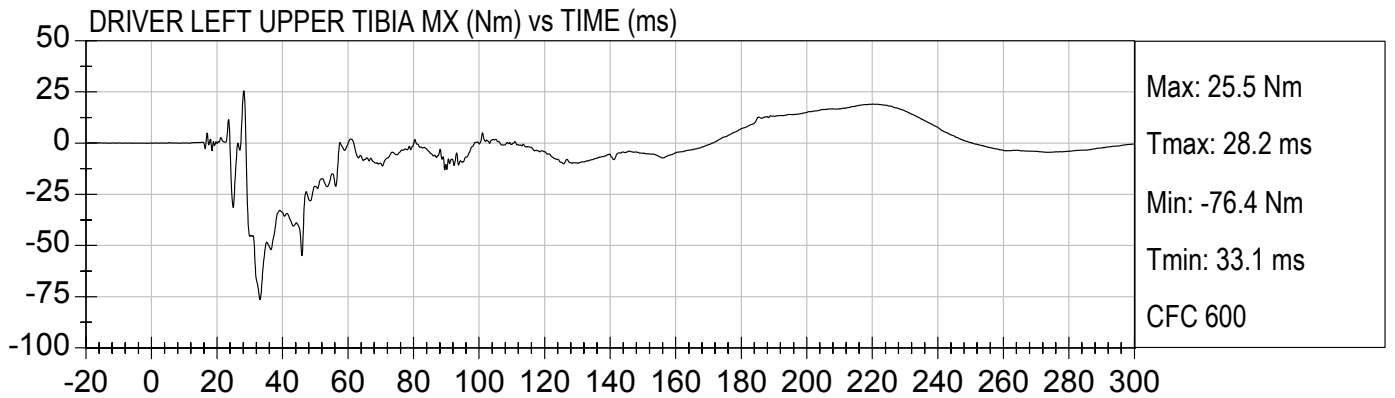


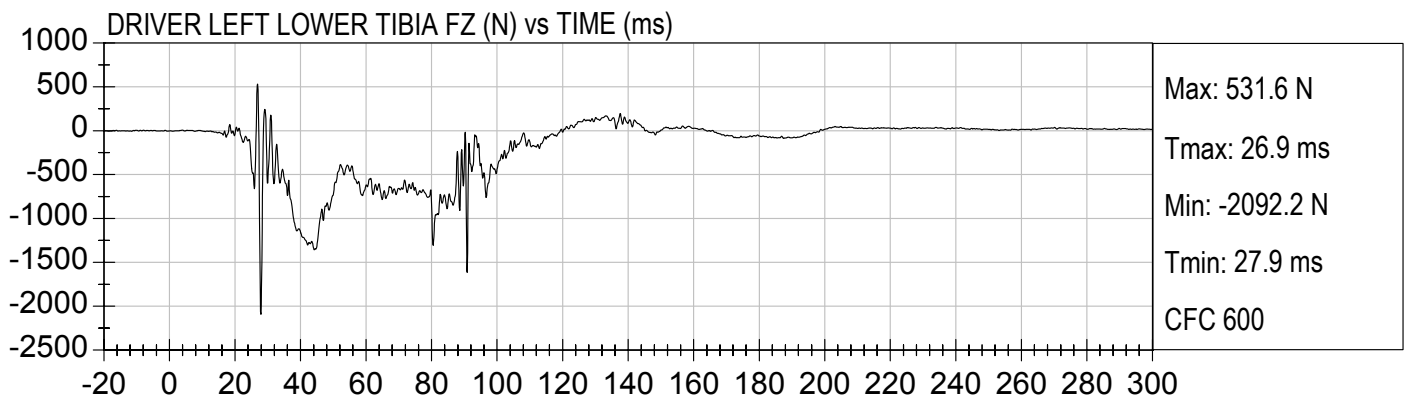
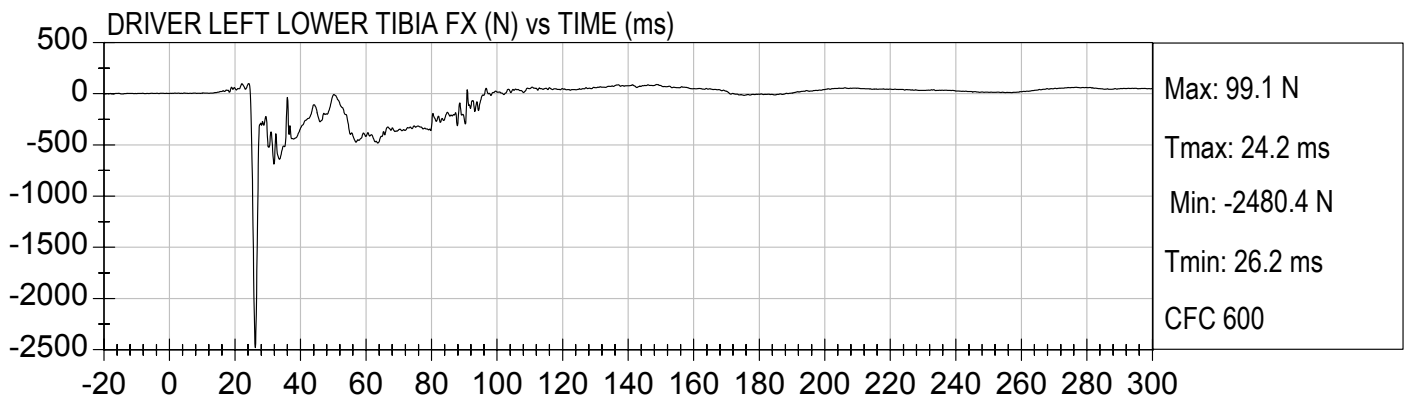
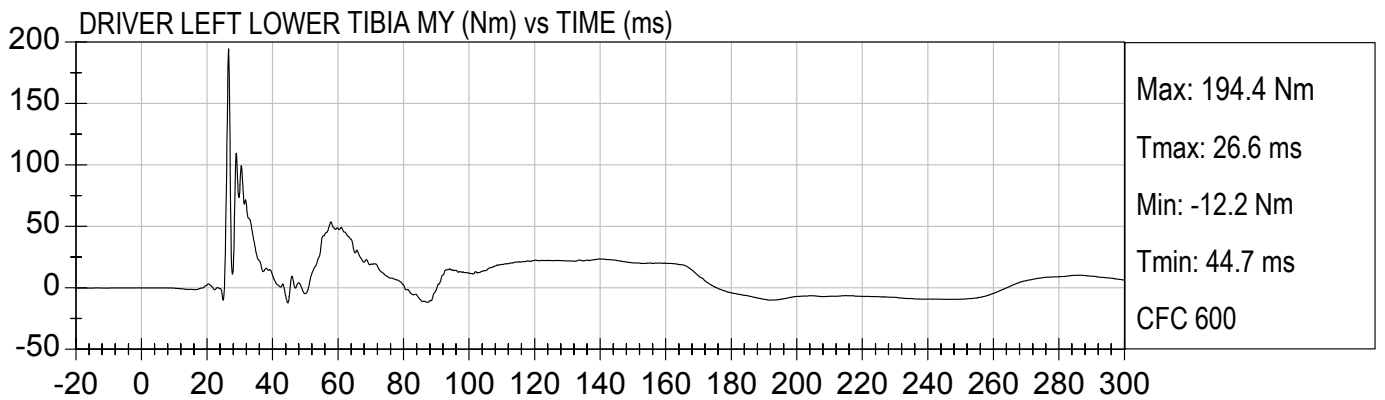
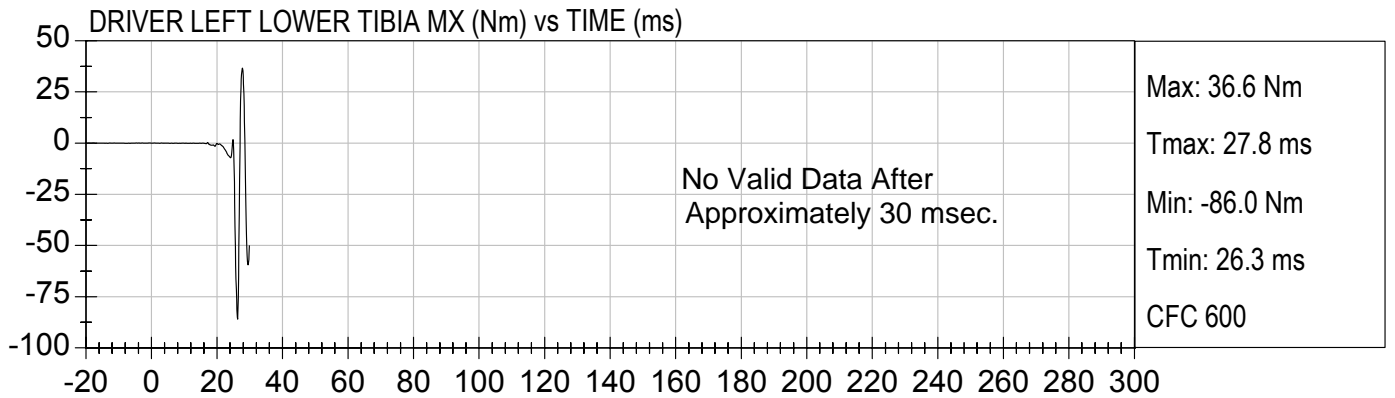






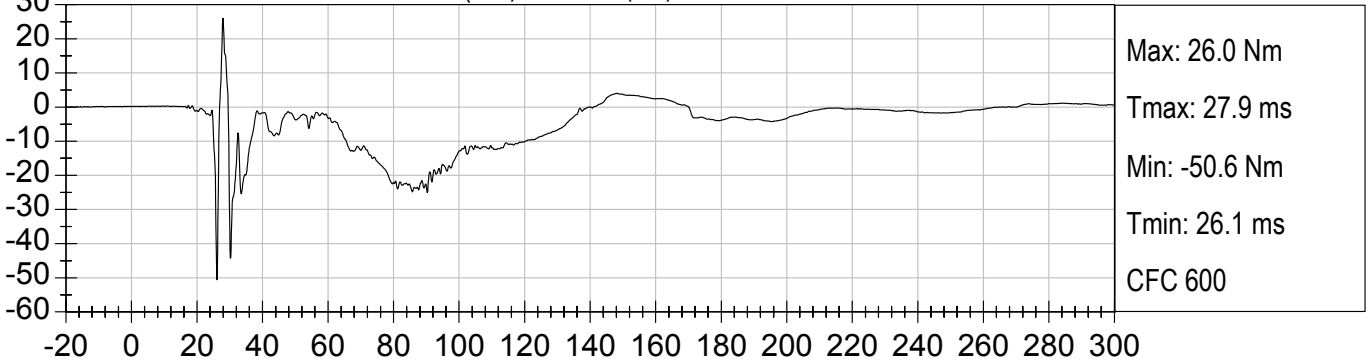




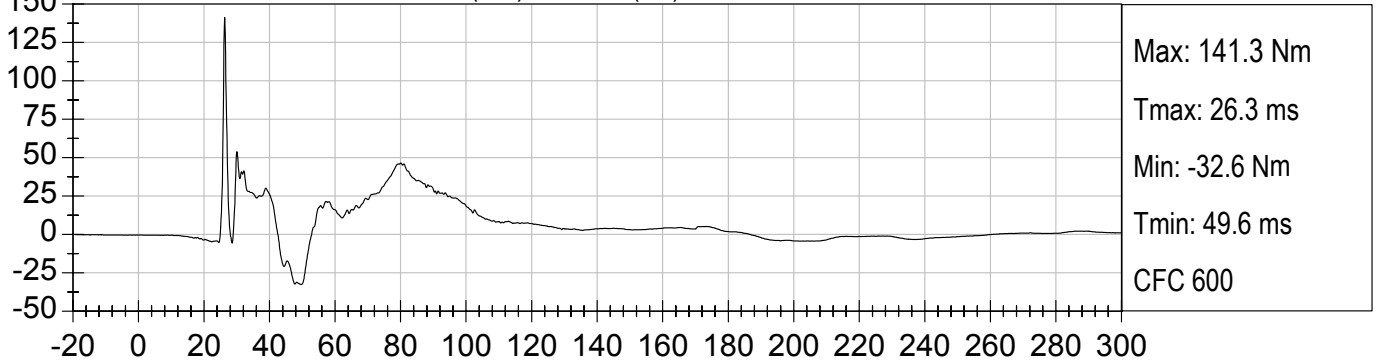




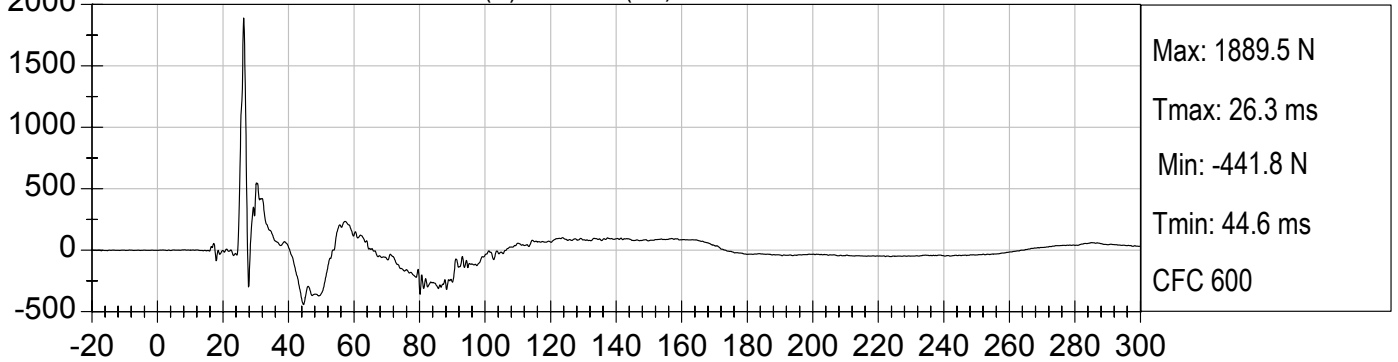
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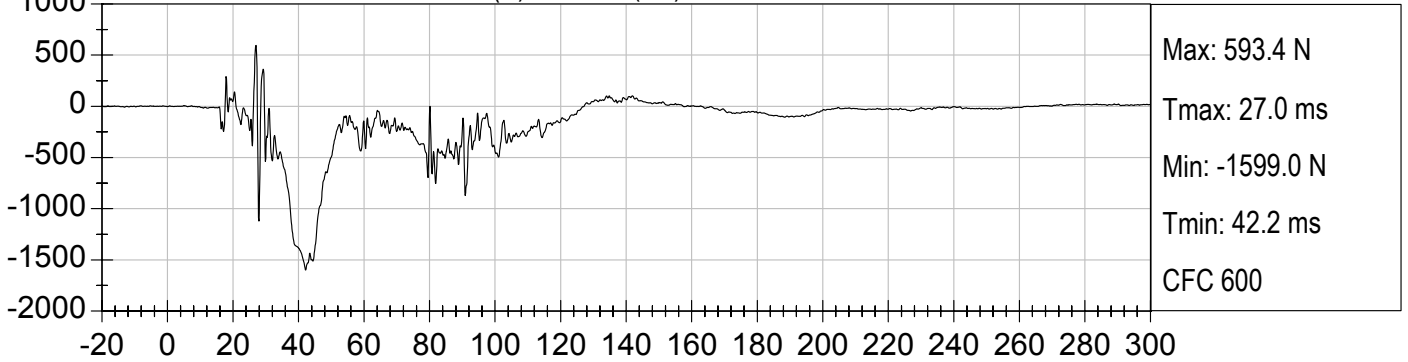
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DRIVER RIGHT UPPER TIBIA FX (N) vs TIME (ms)

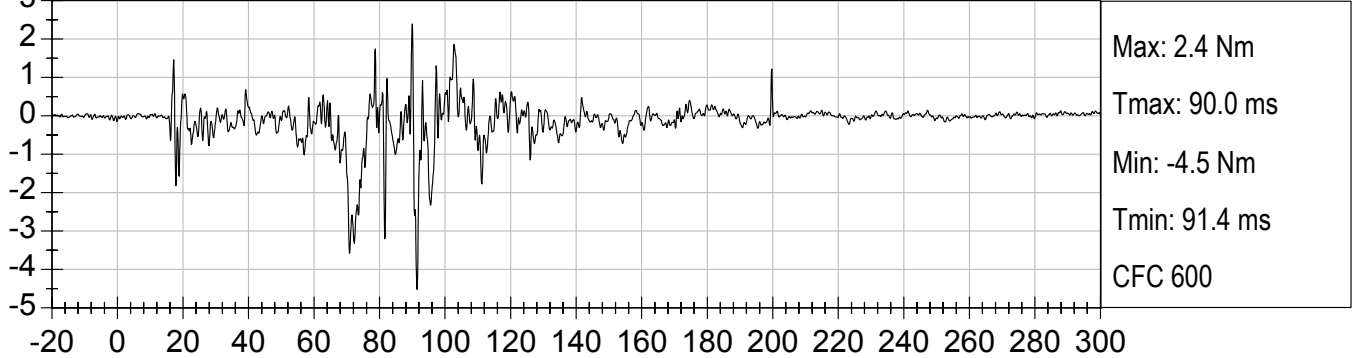


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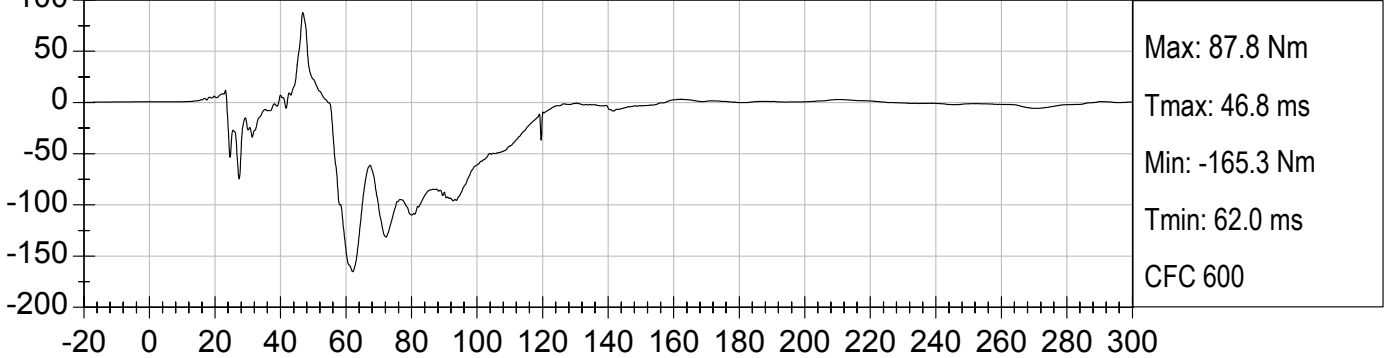




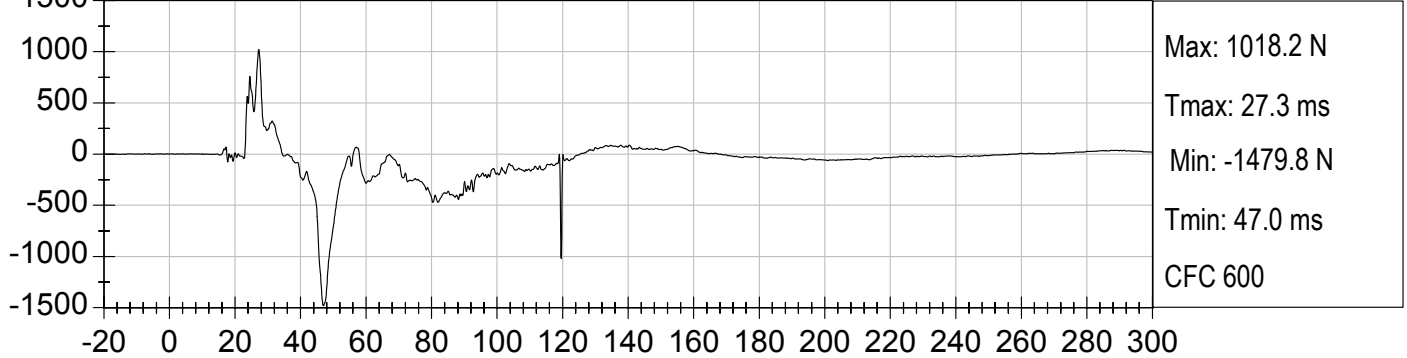
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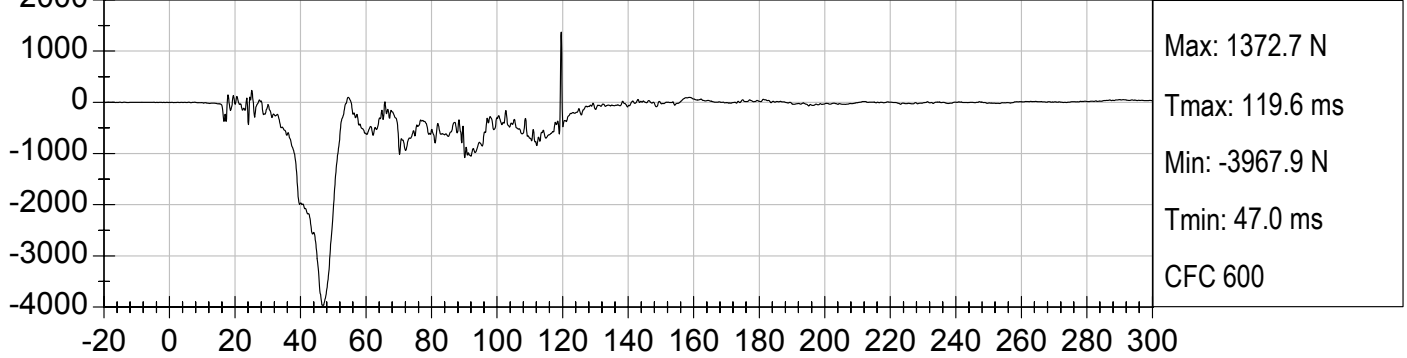
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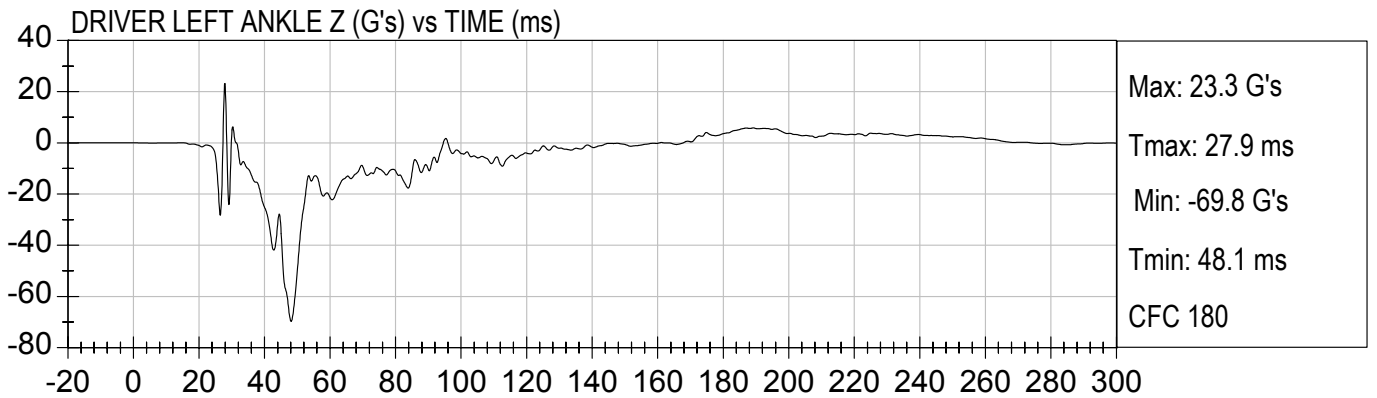
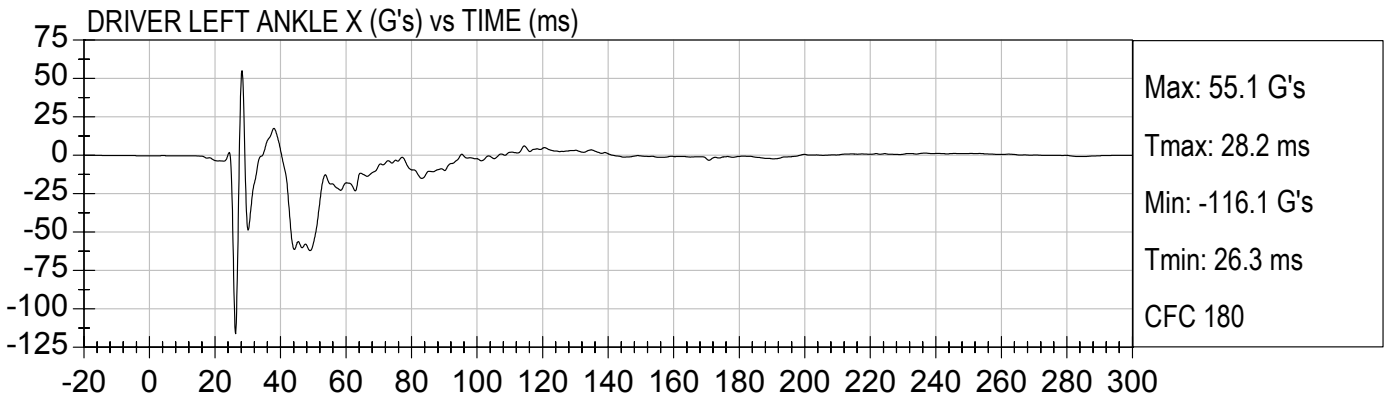
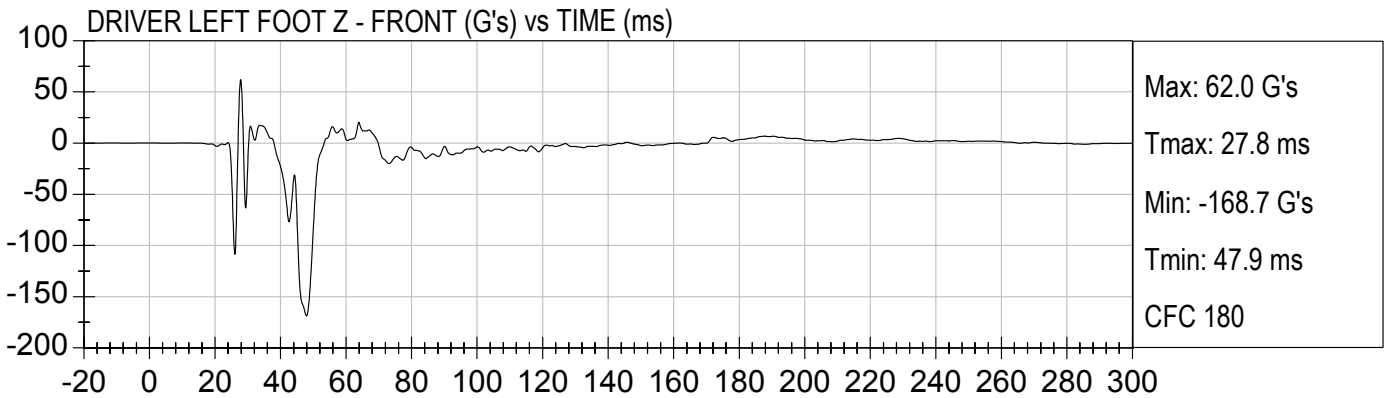


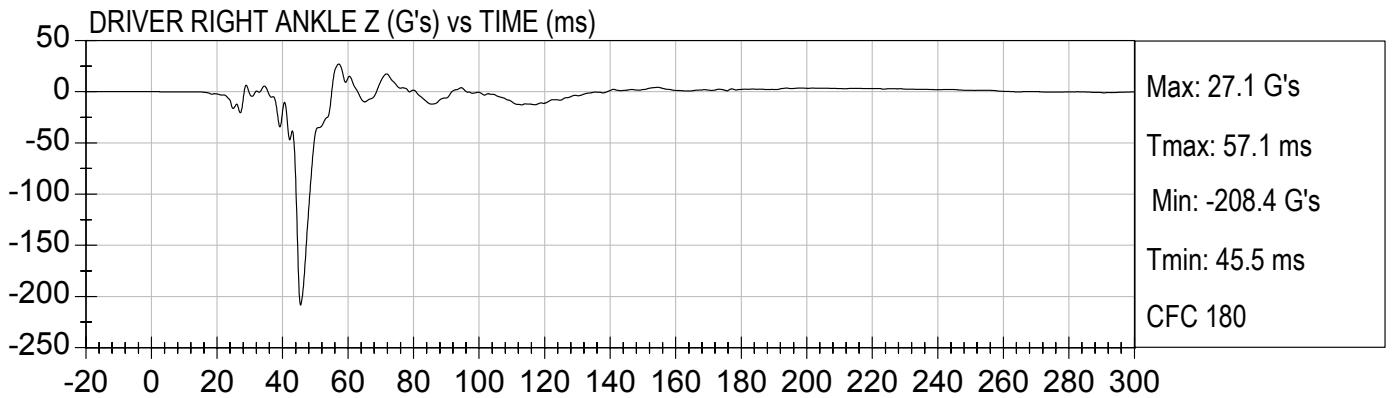
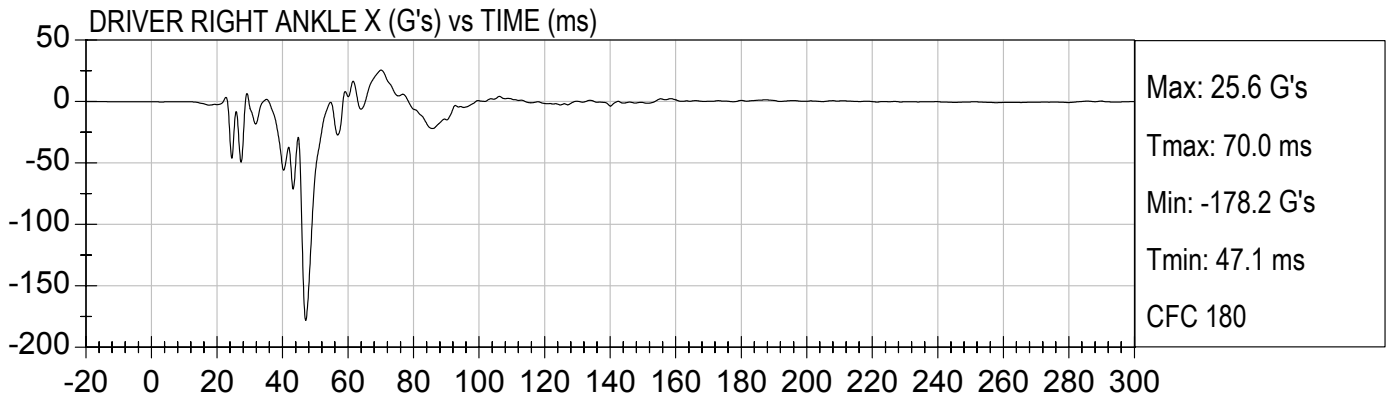
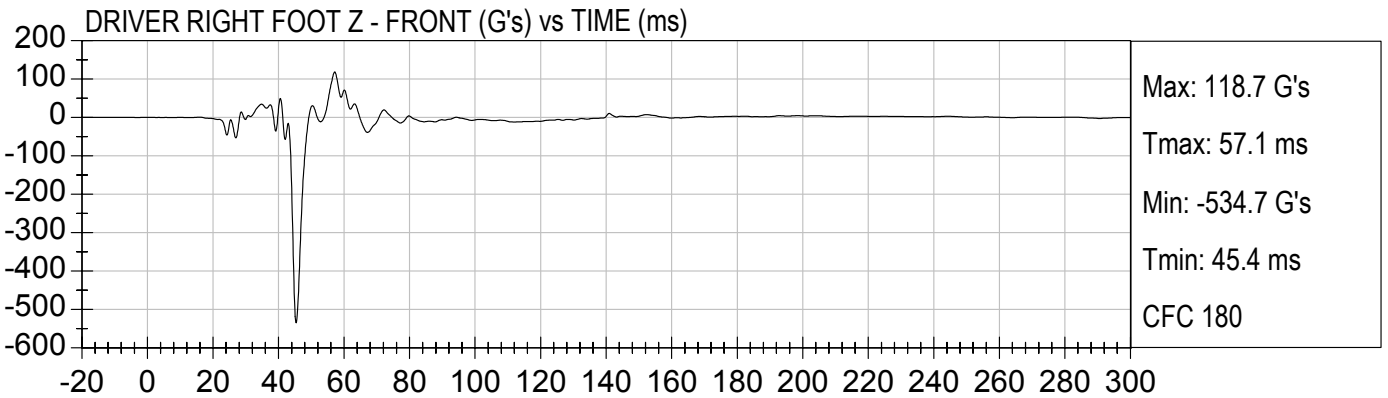
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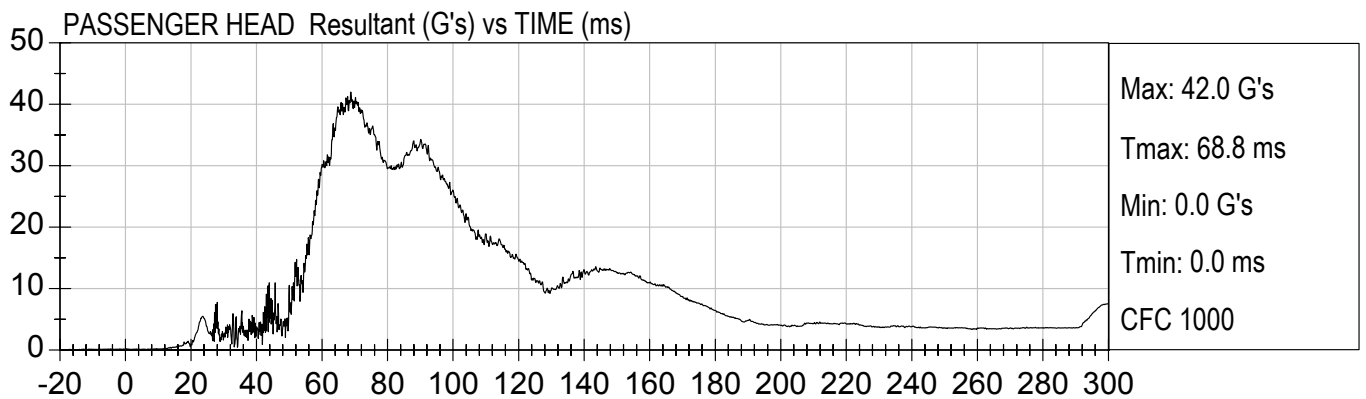
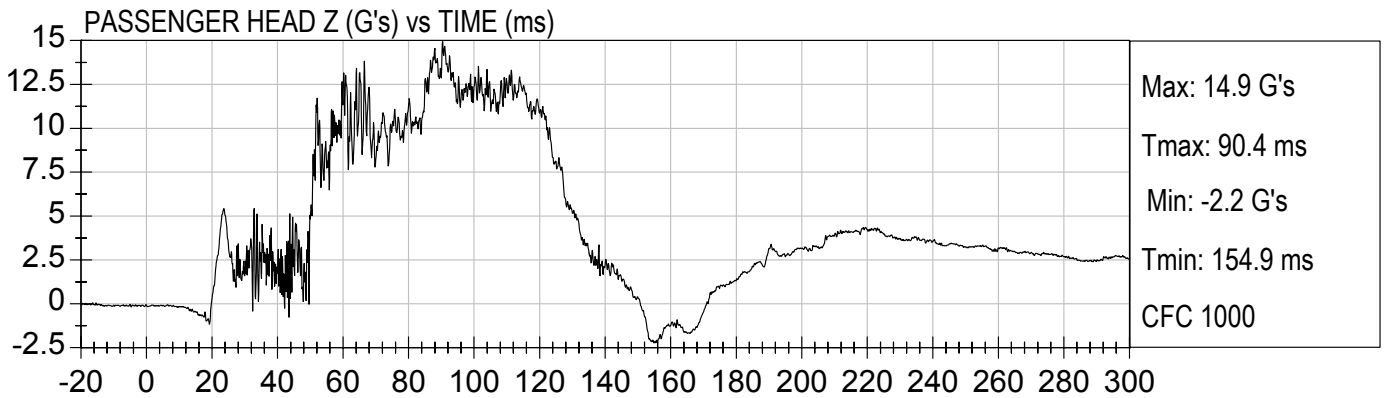
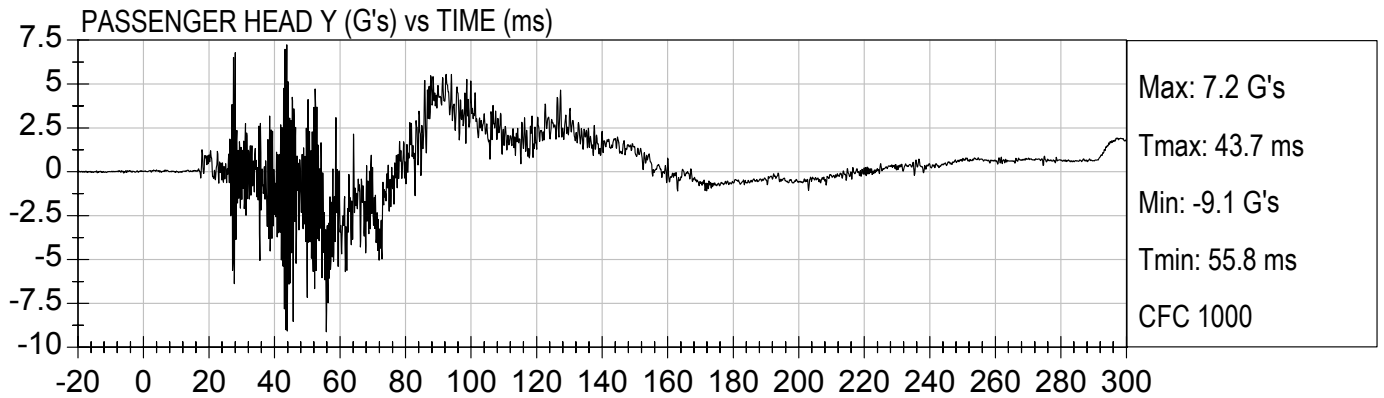
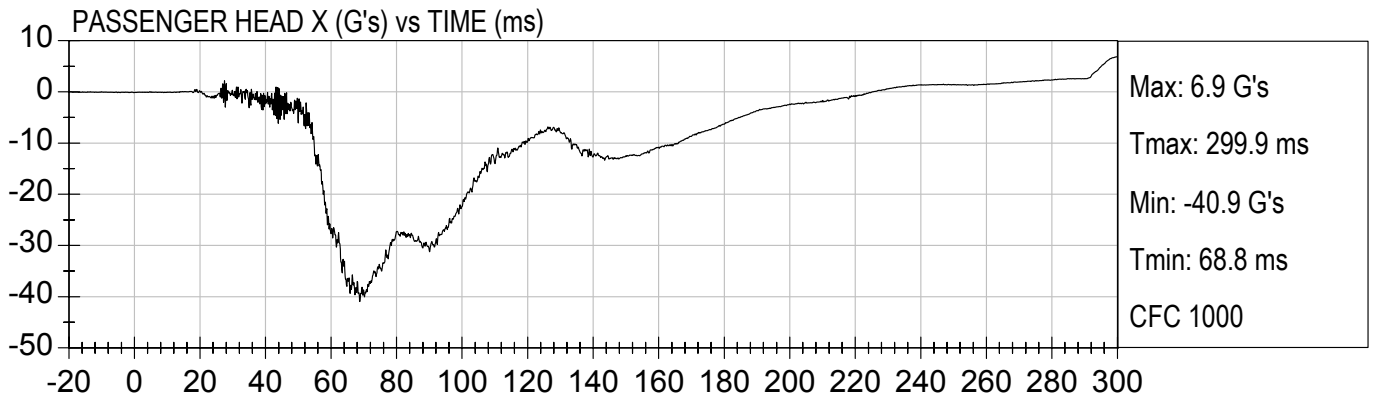


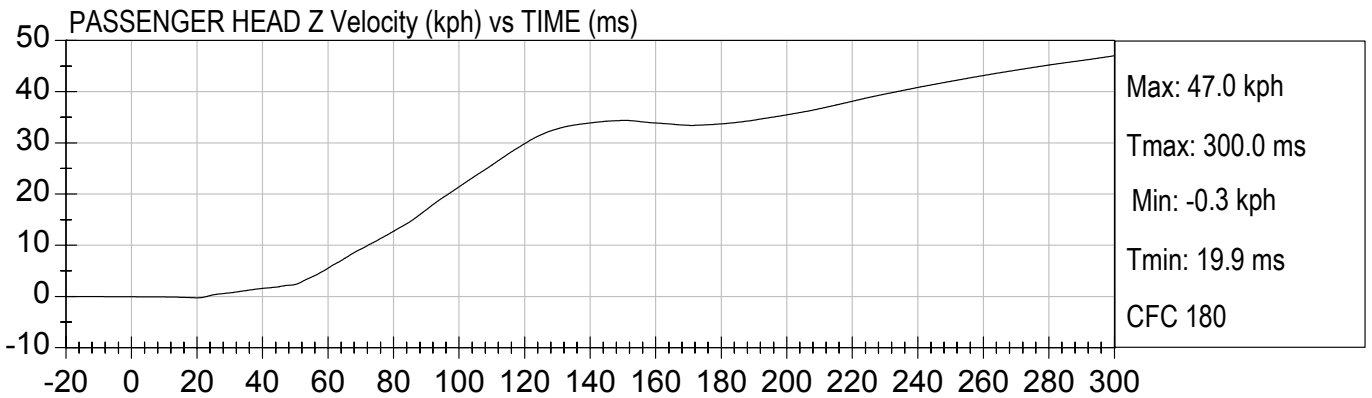
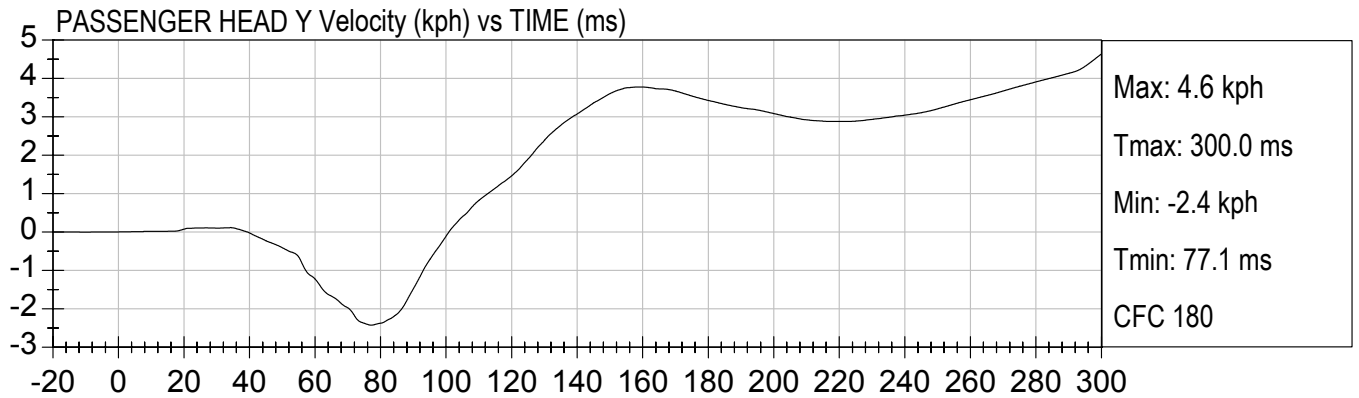
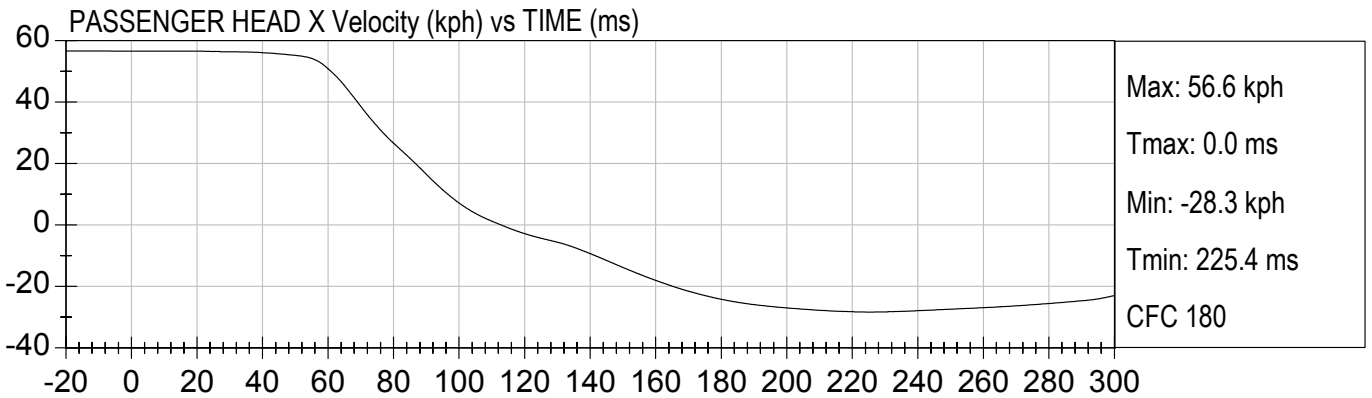
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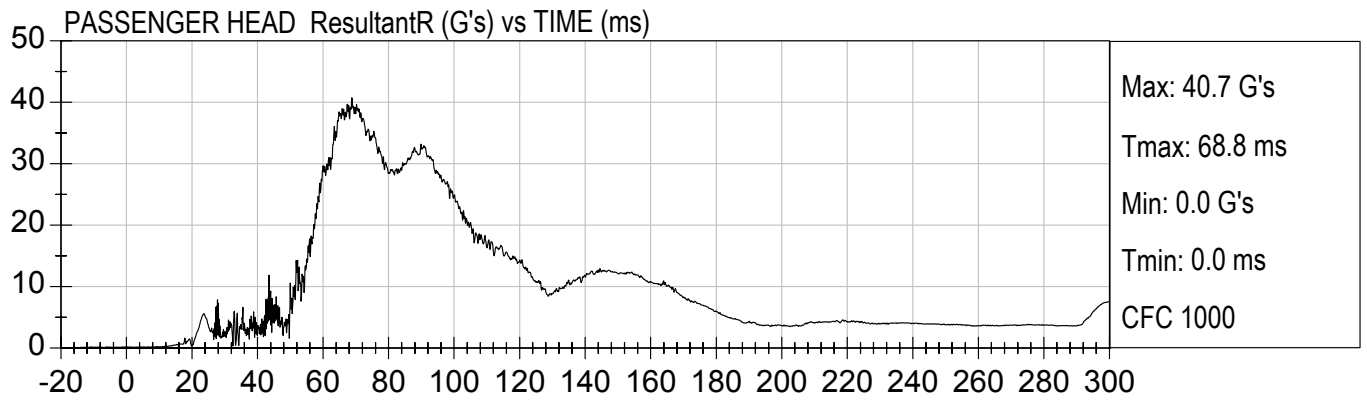
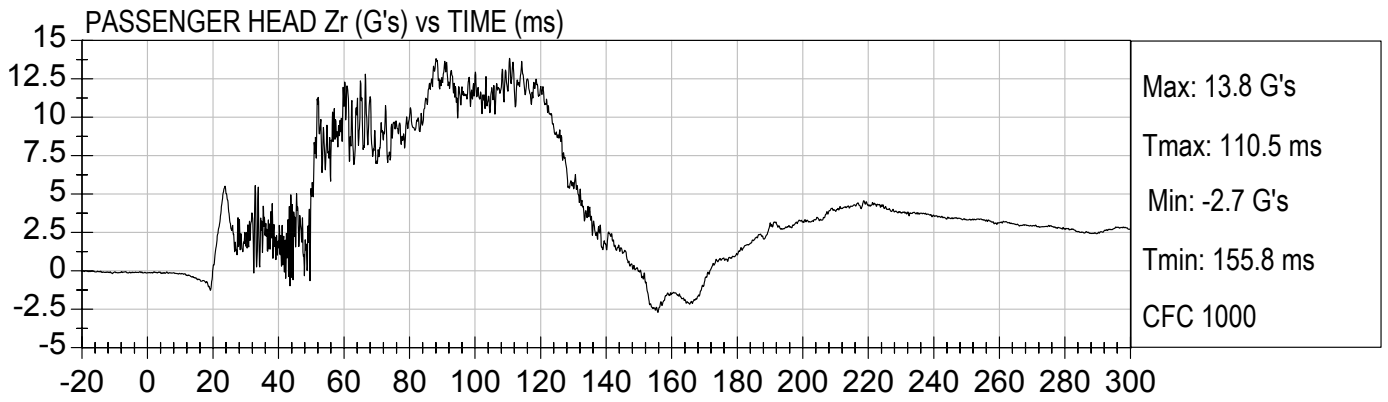
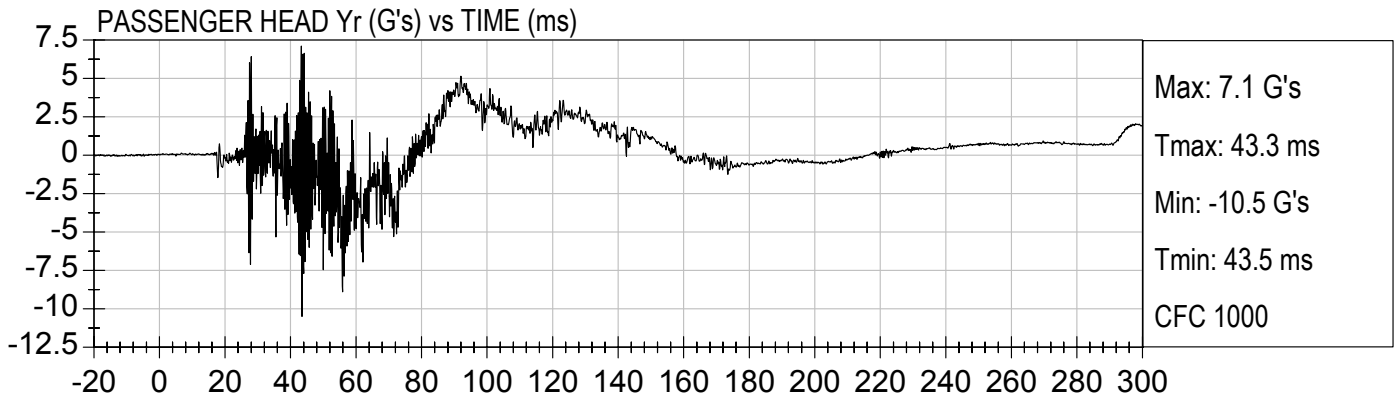
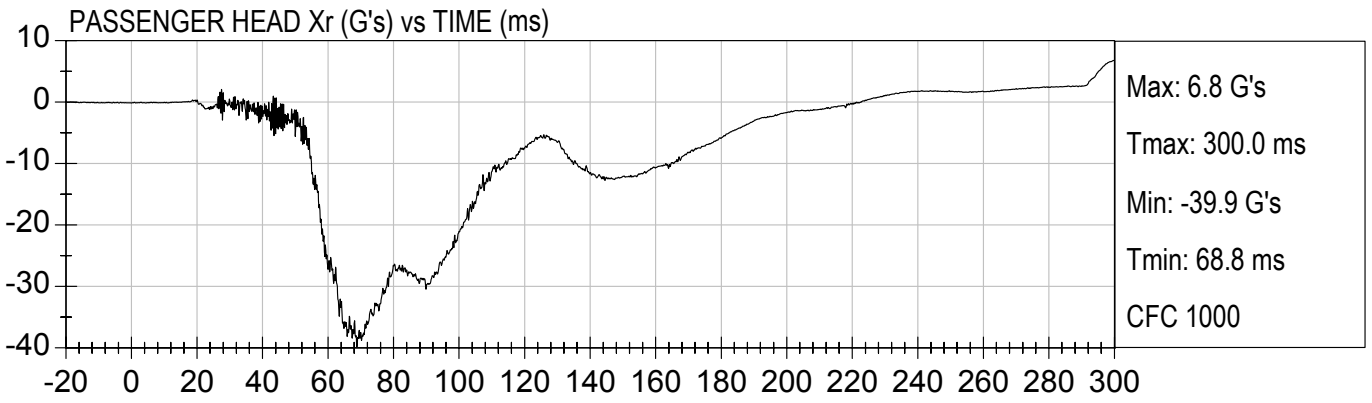


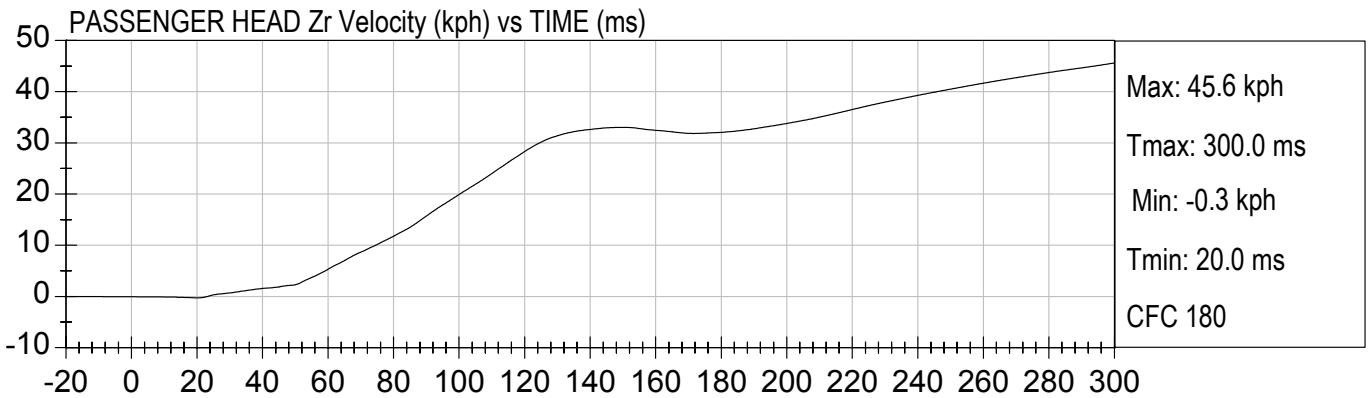
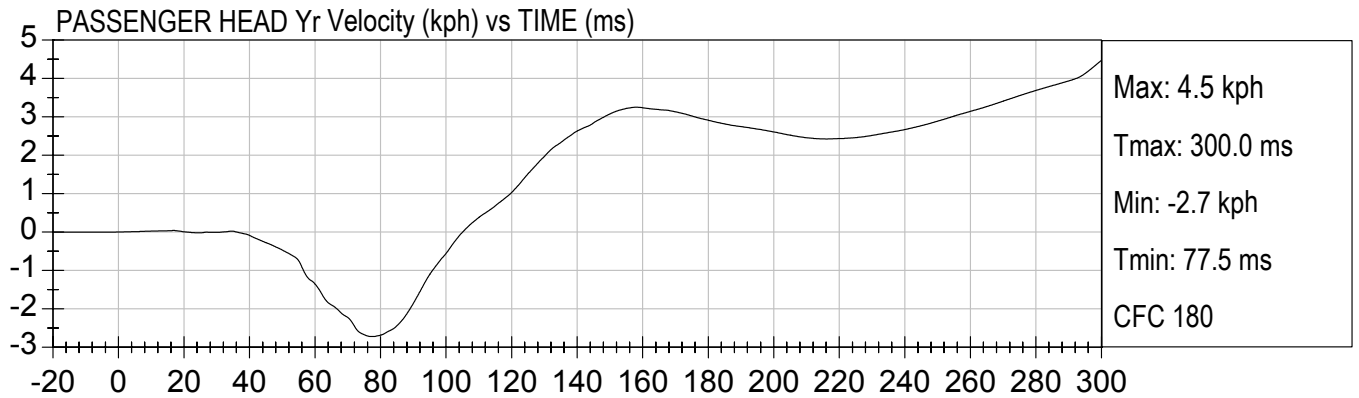
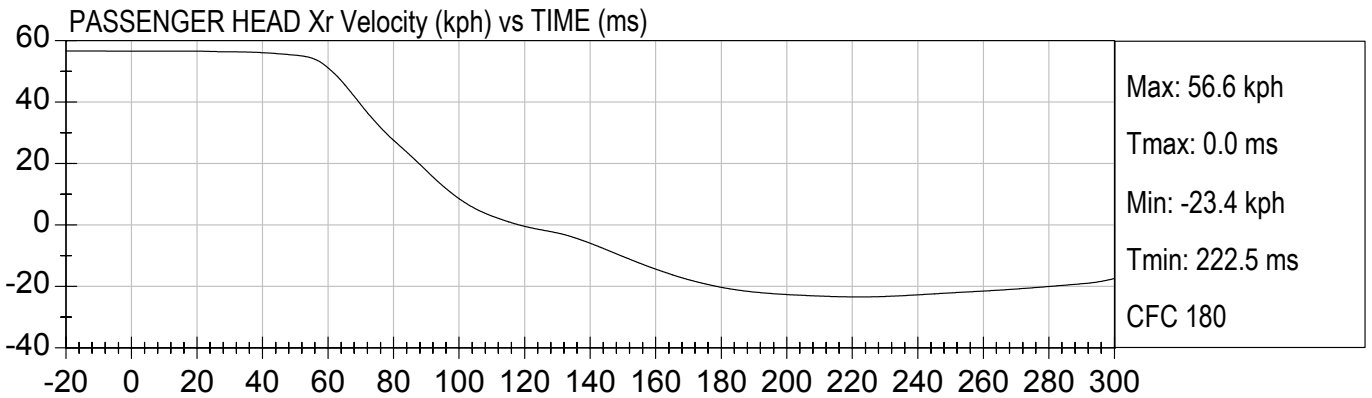


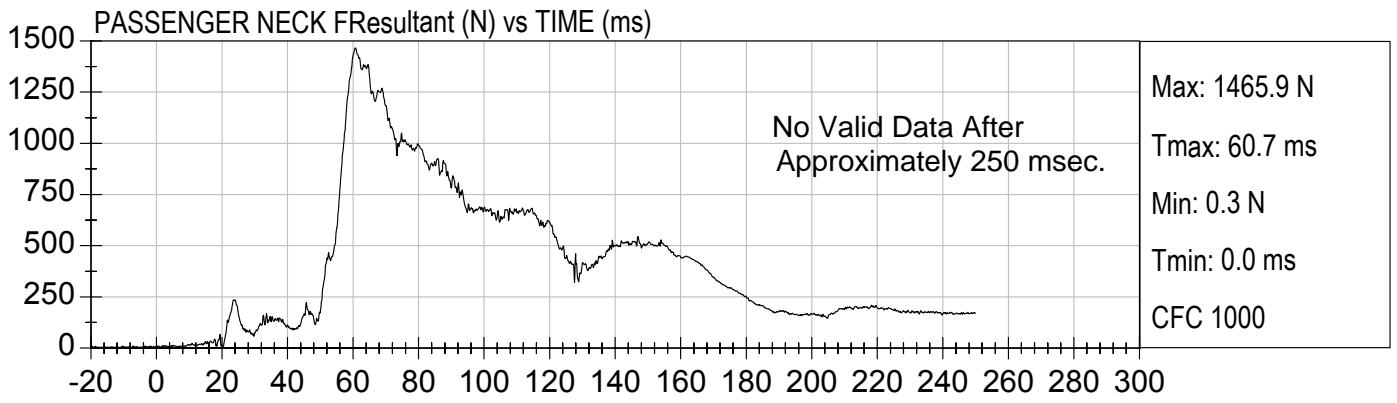
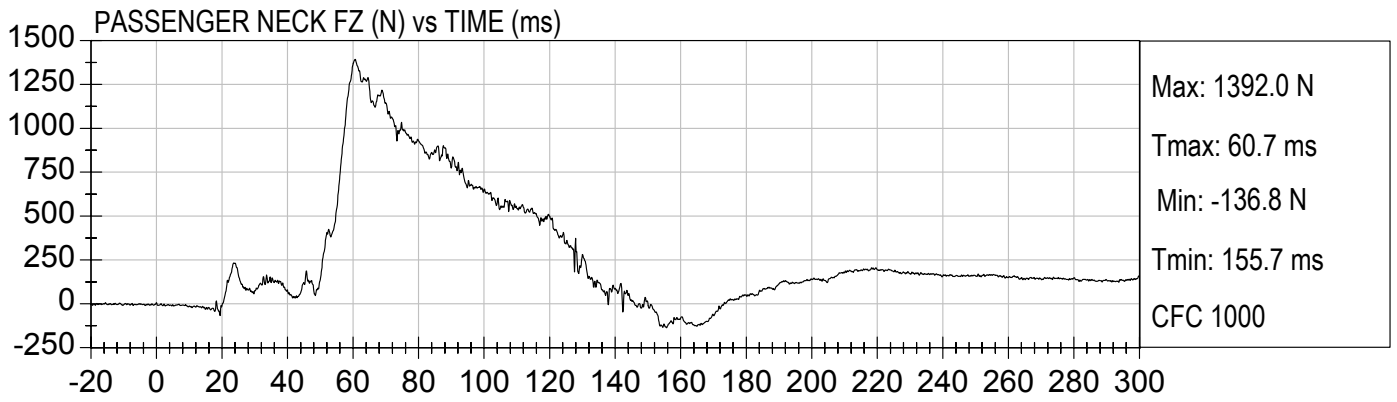
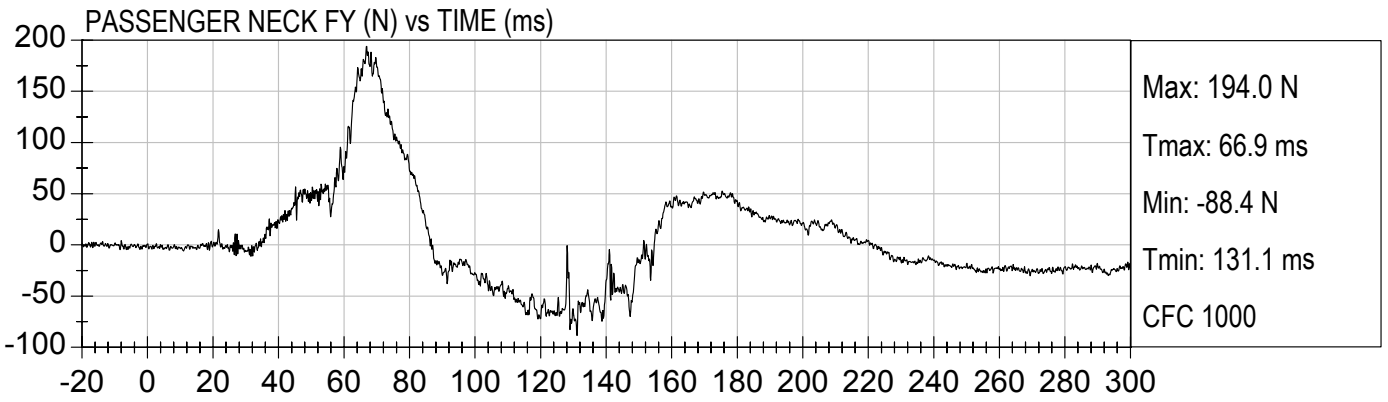
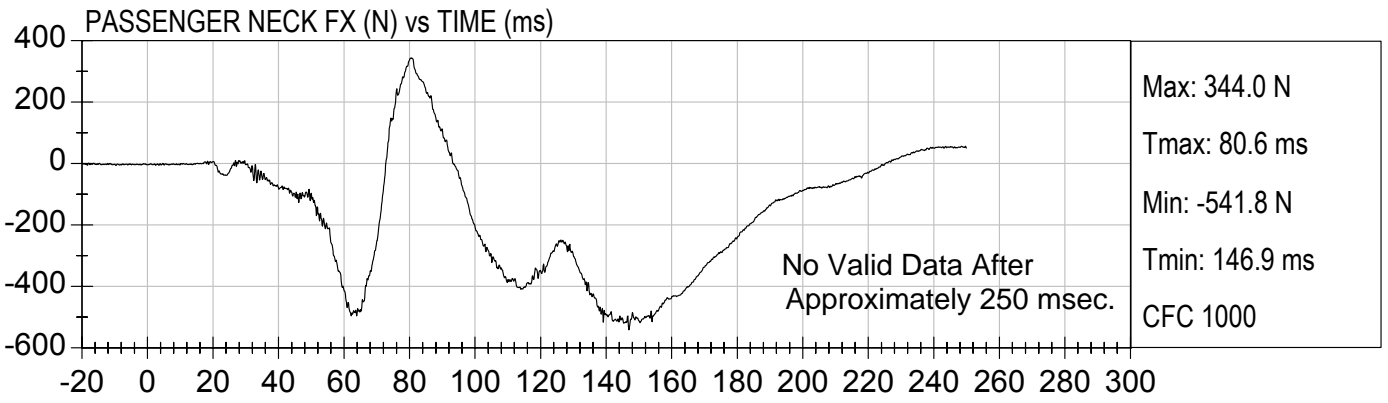


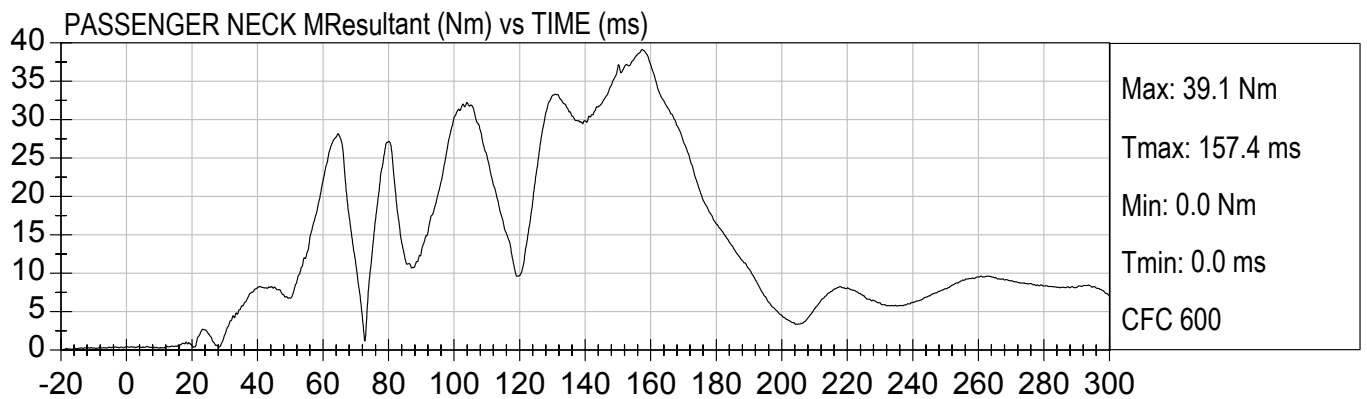
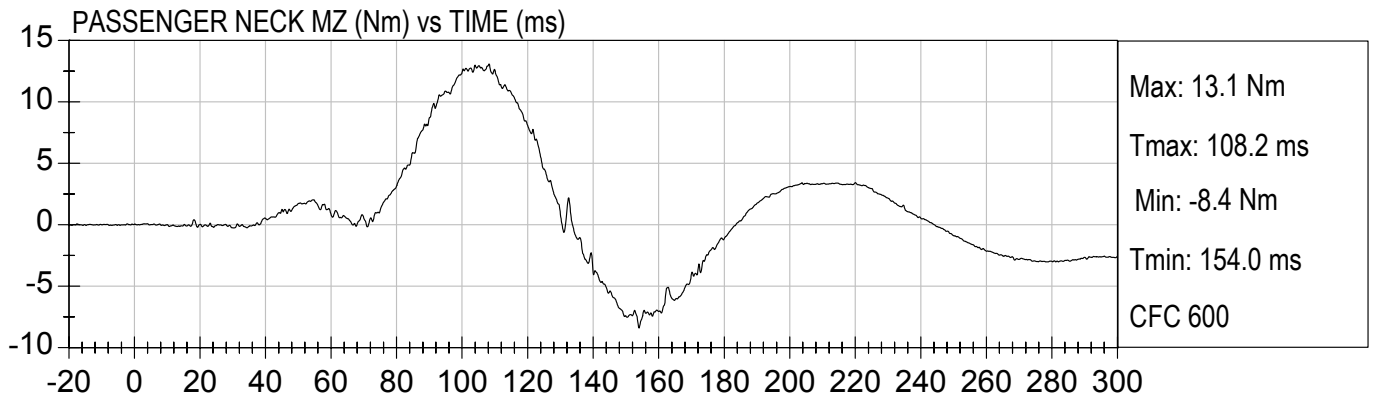
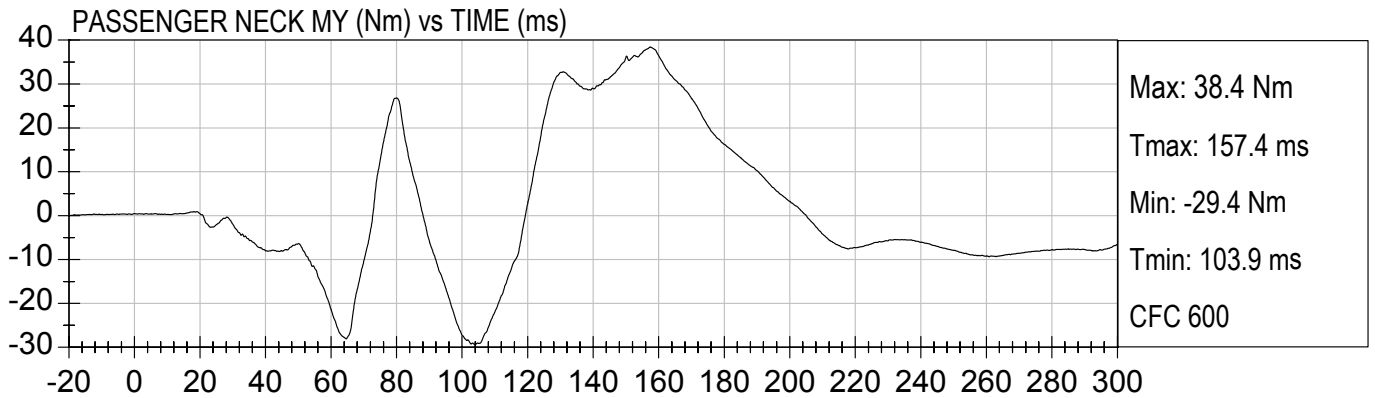
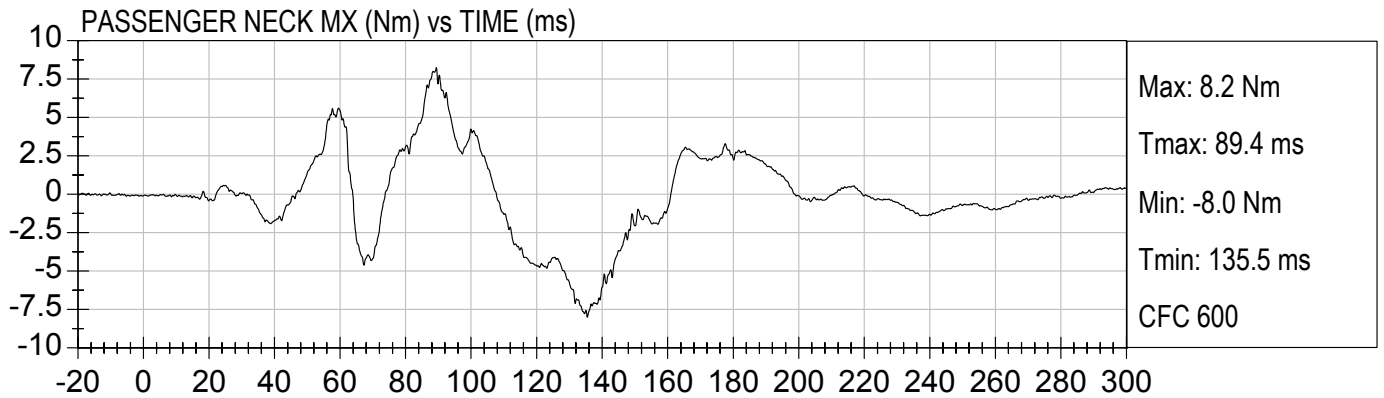


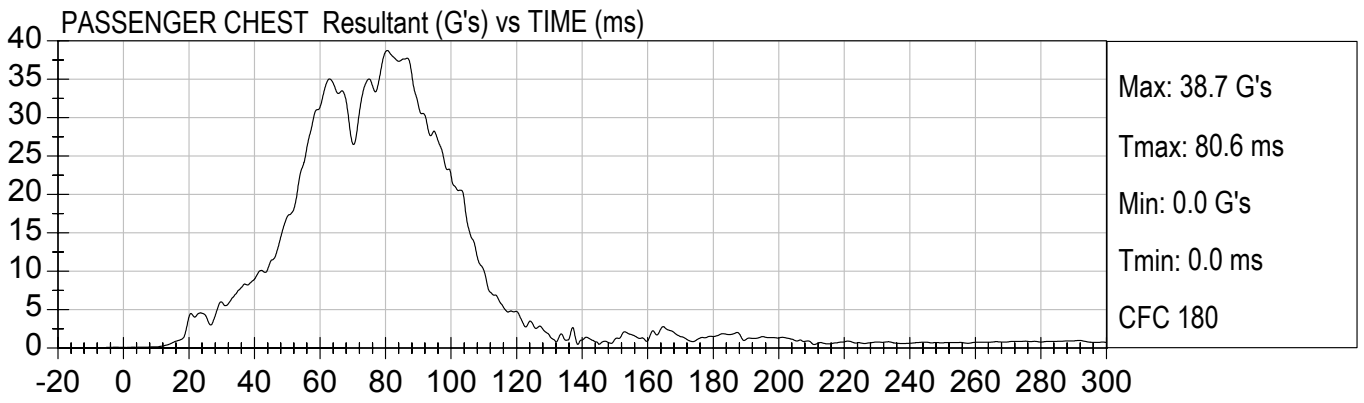
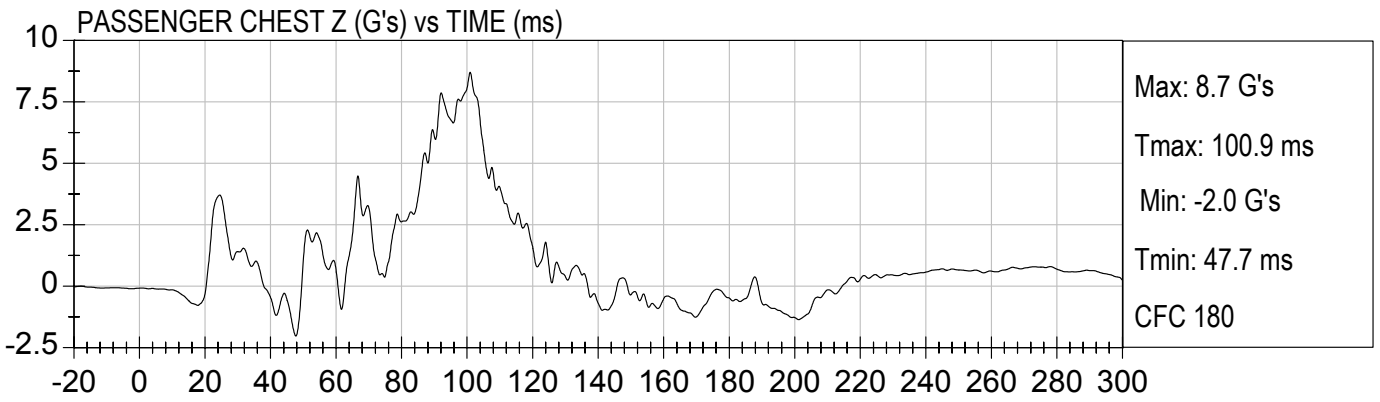
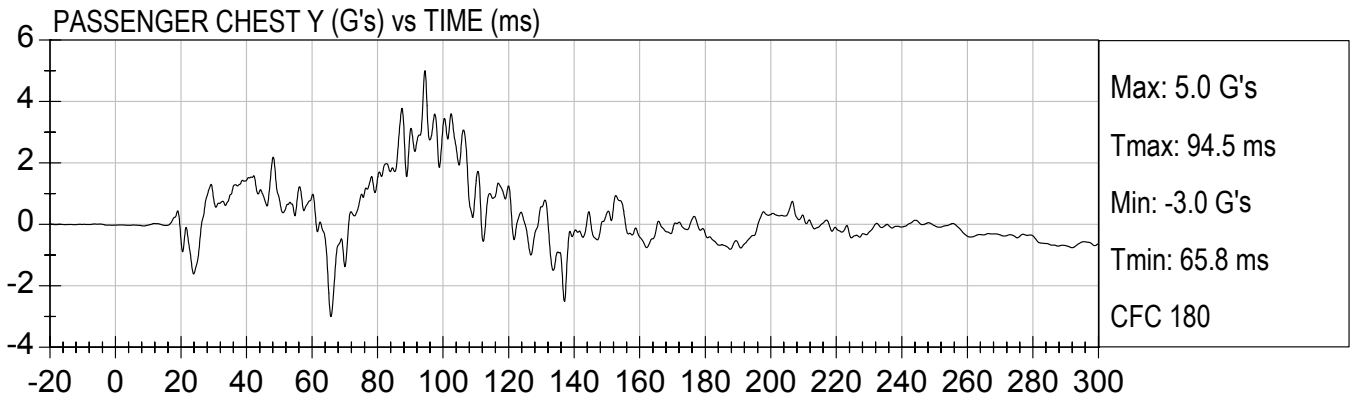
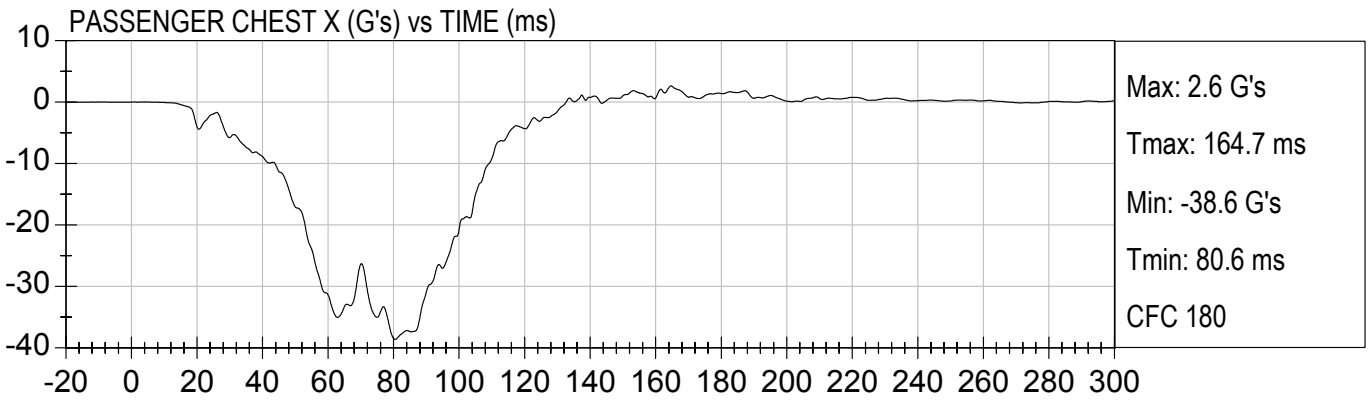


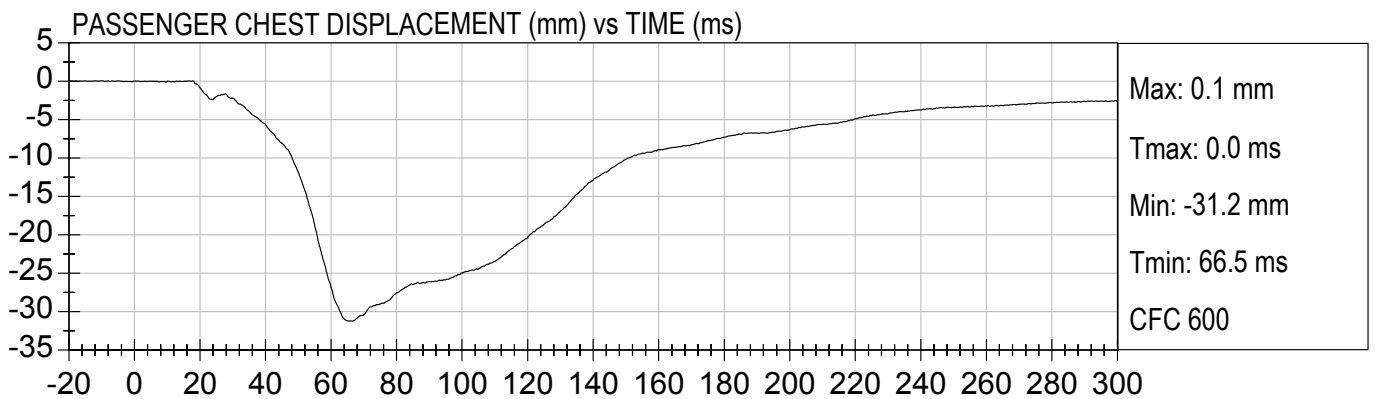
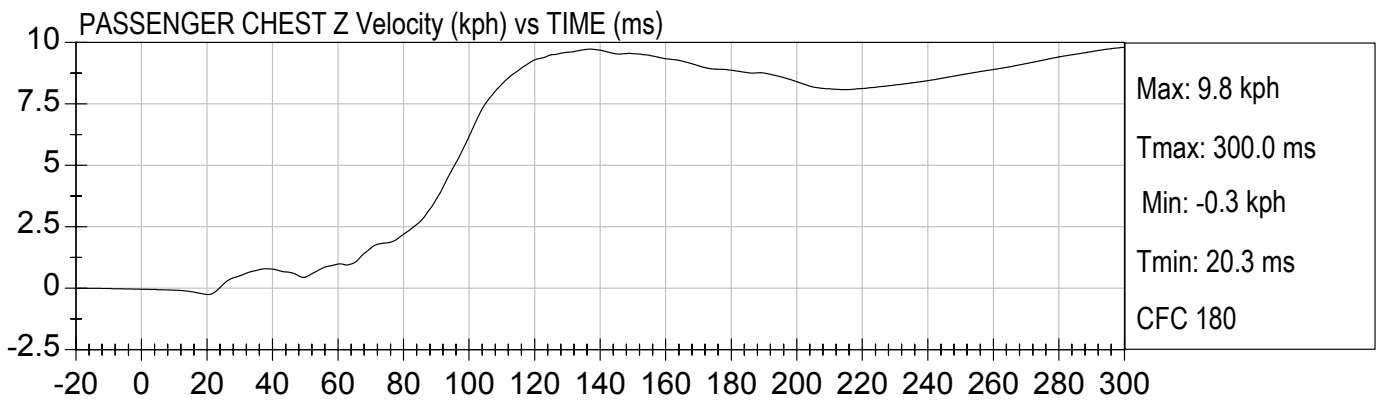
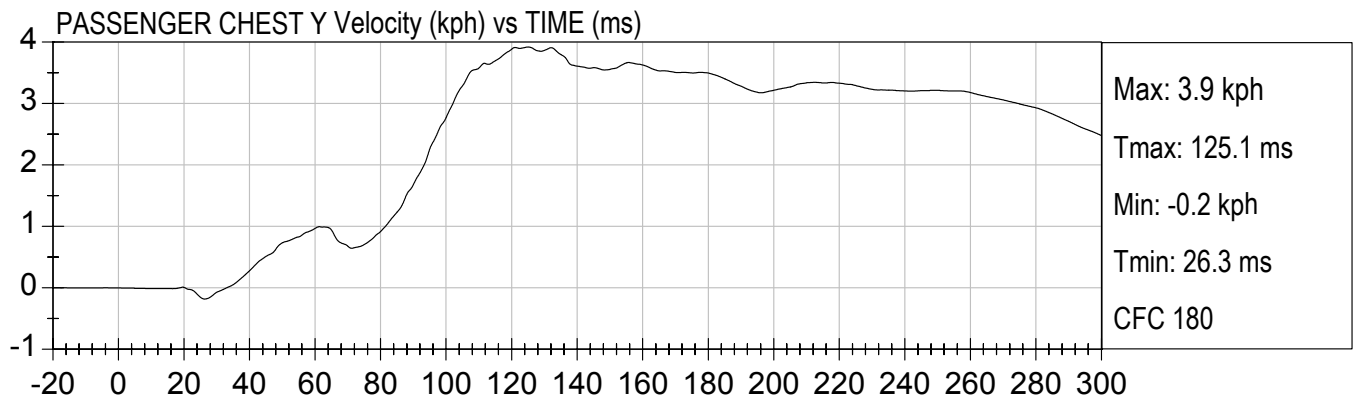
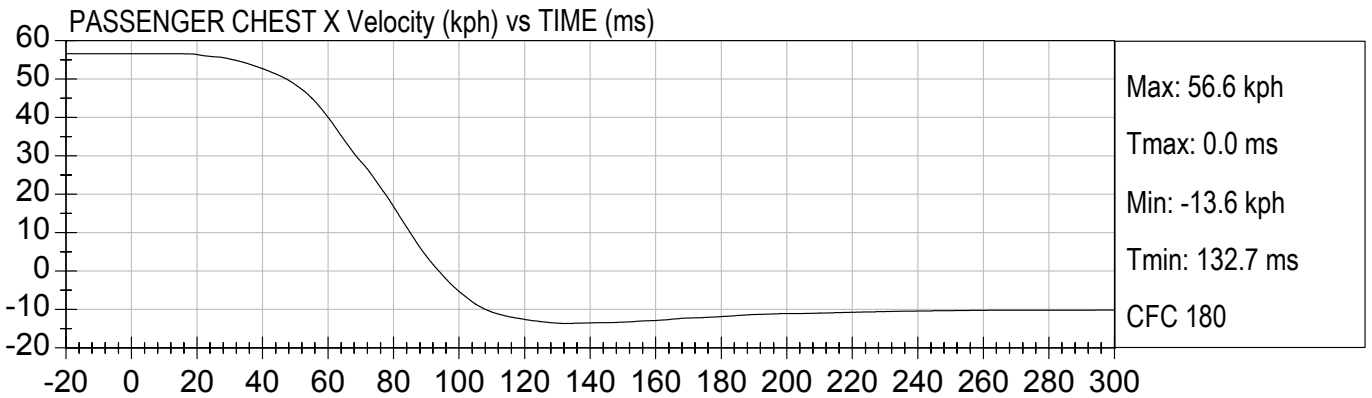


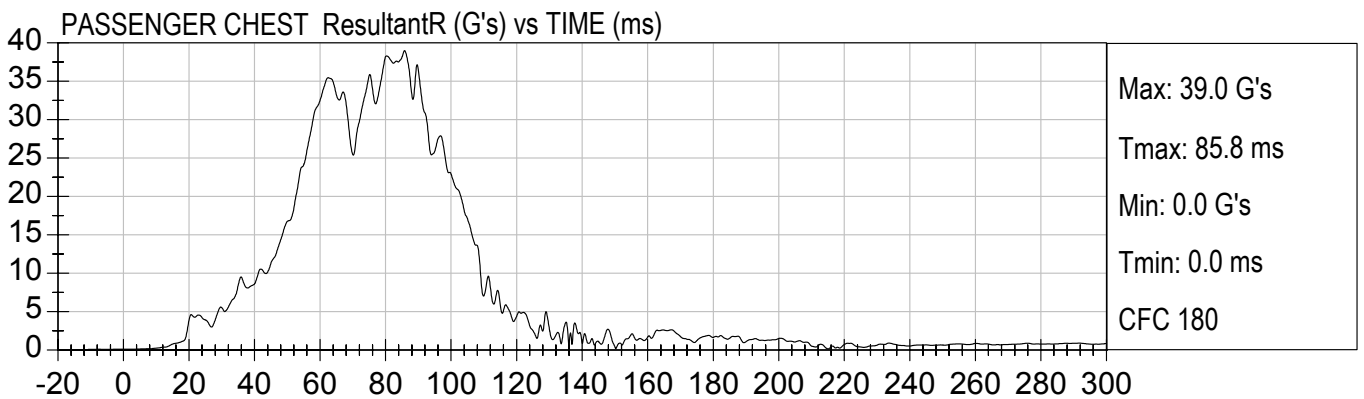
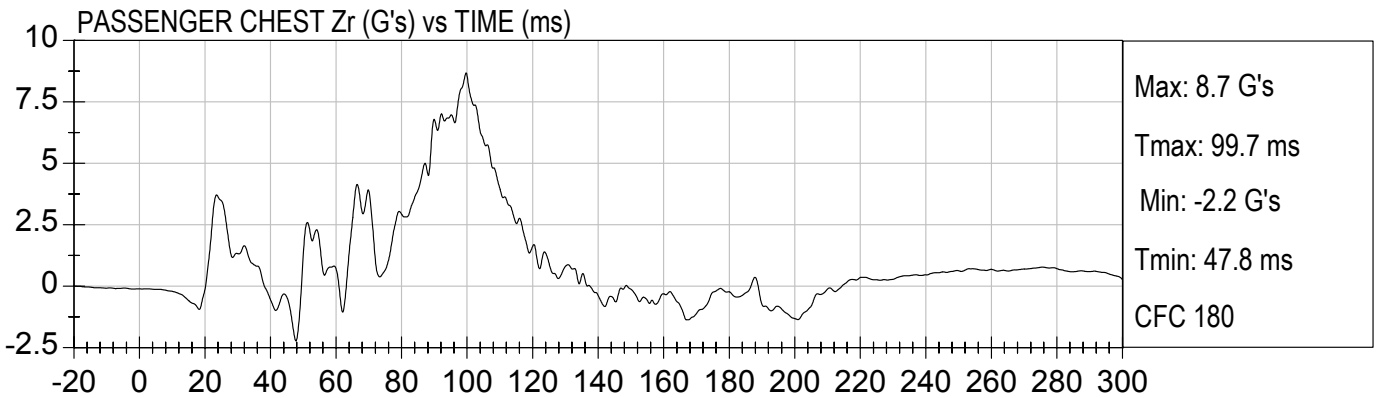
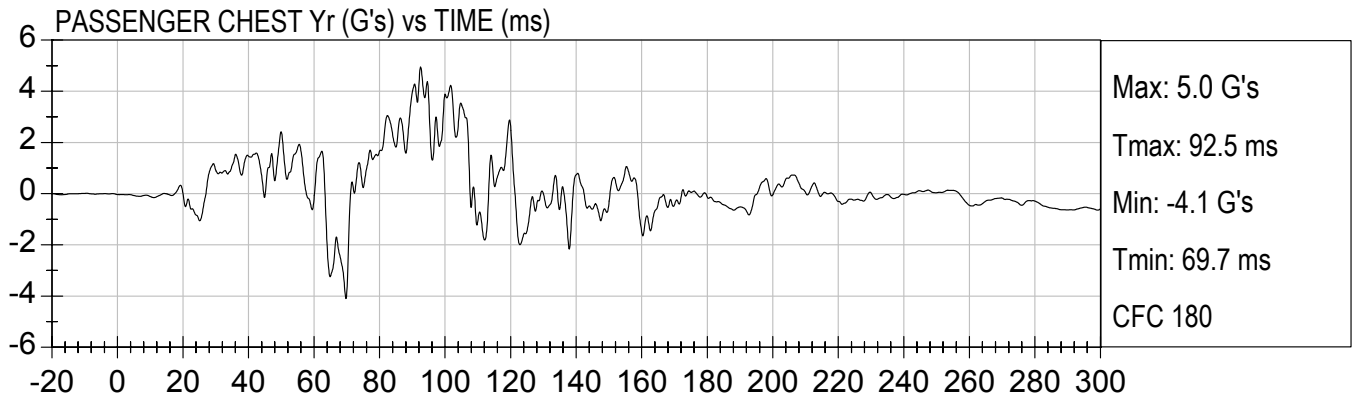
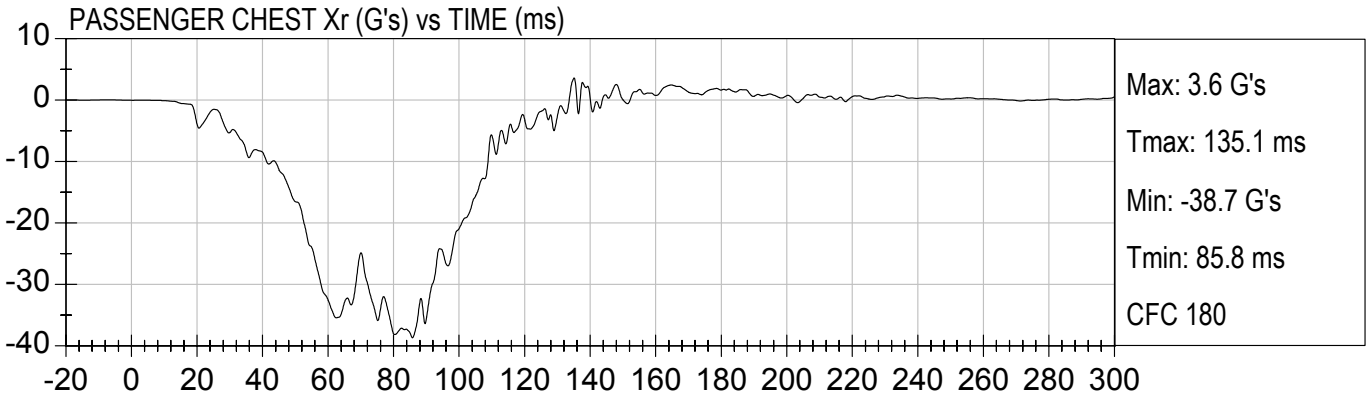


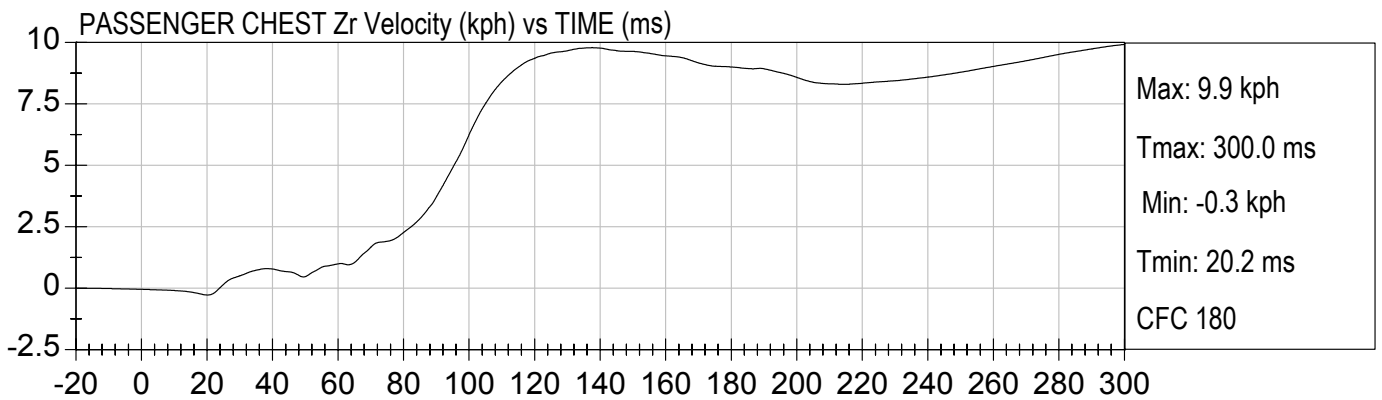
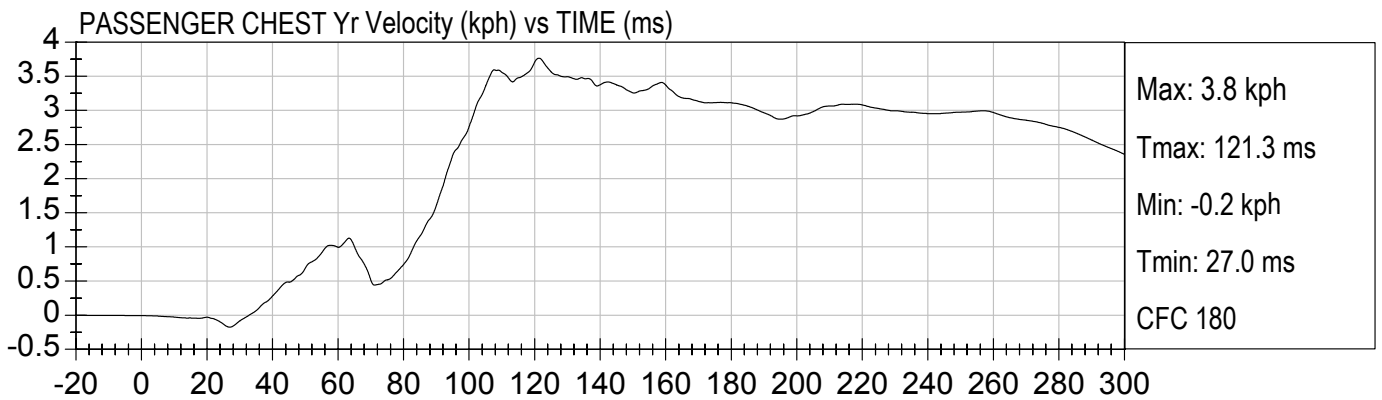
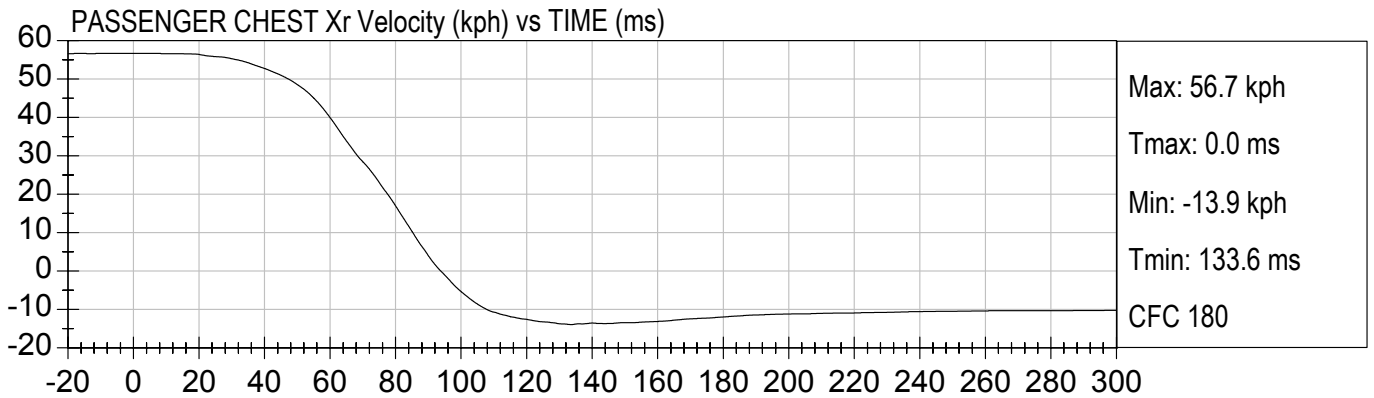


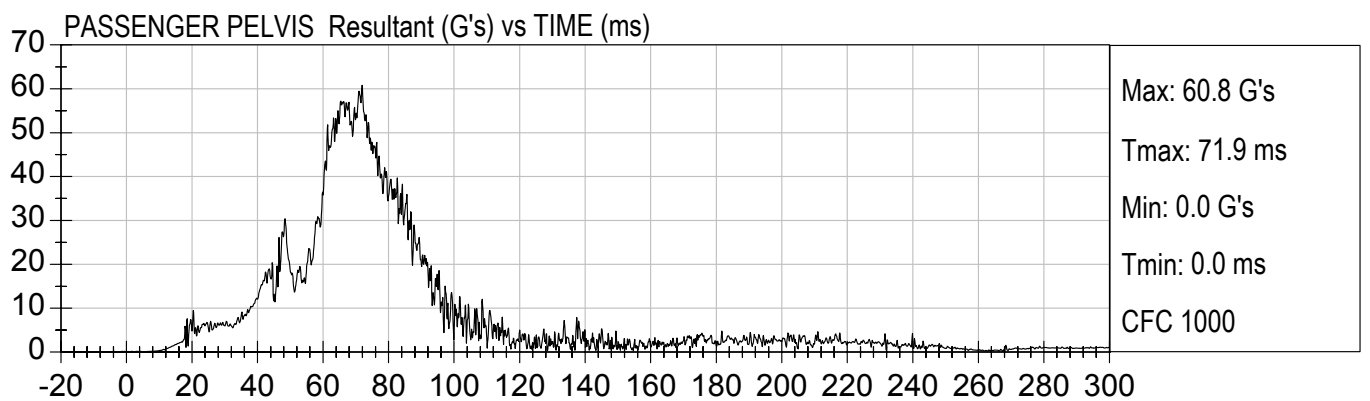
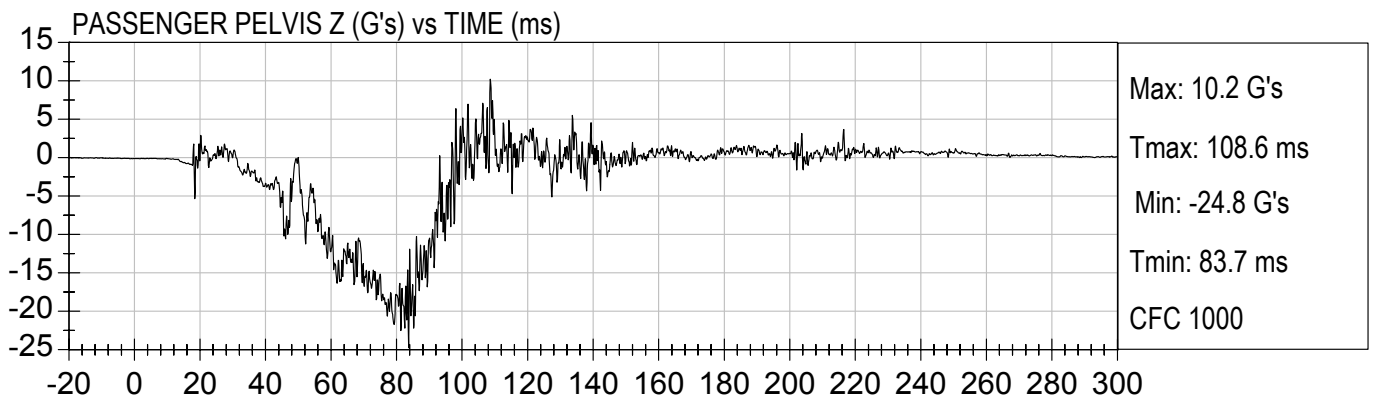
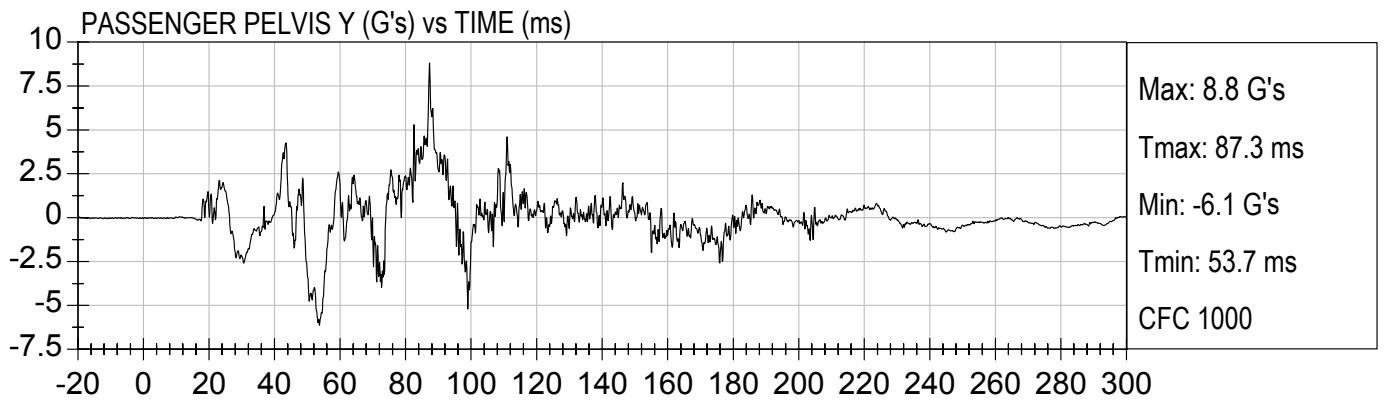
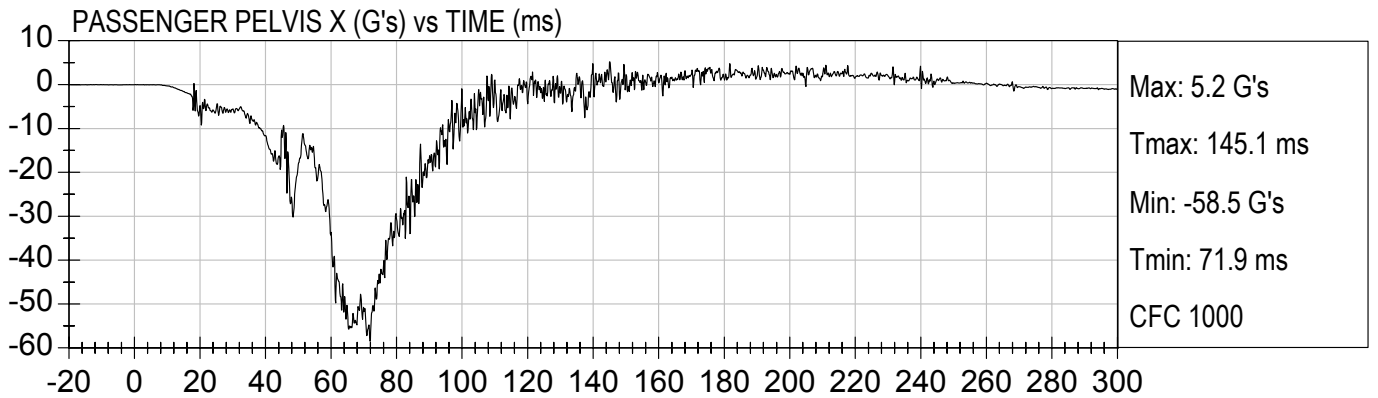


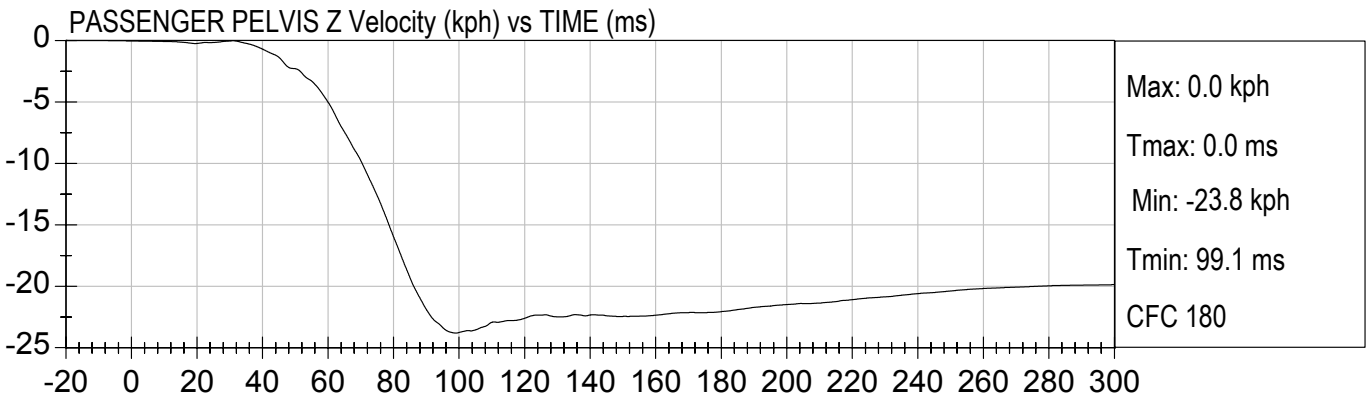
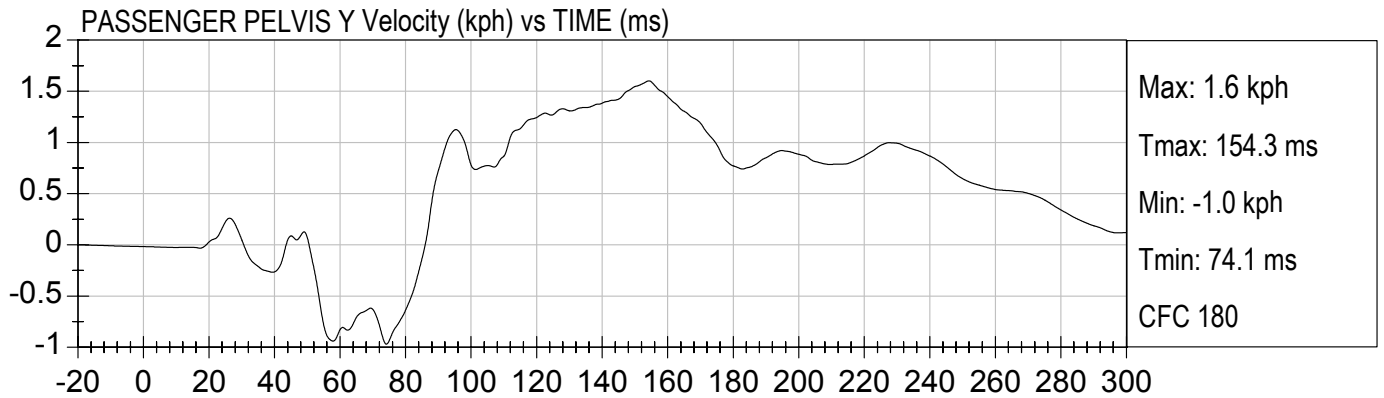
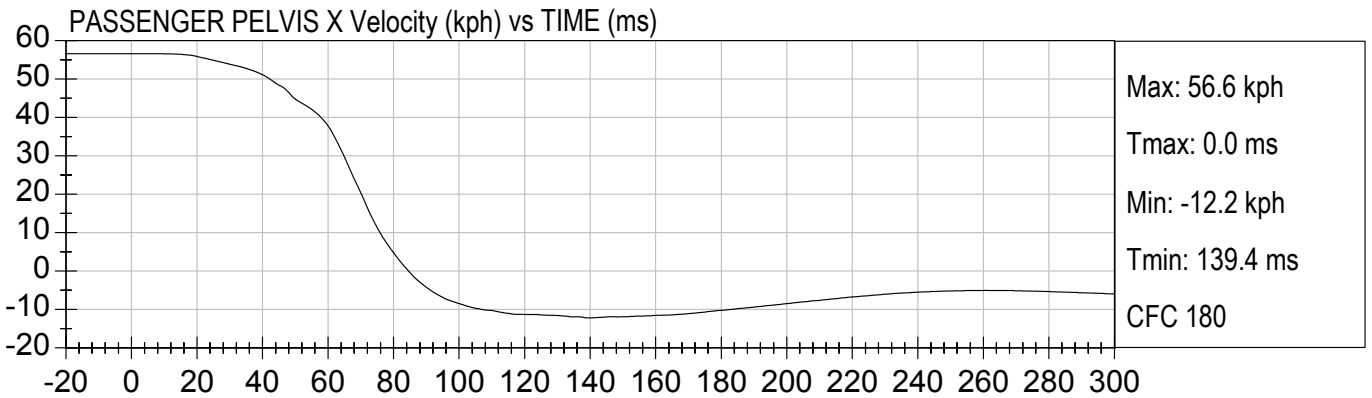


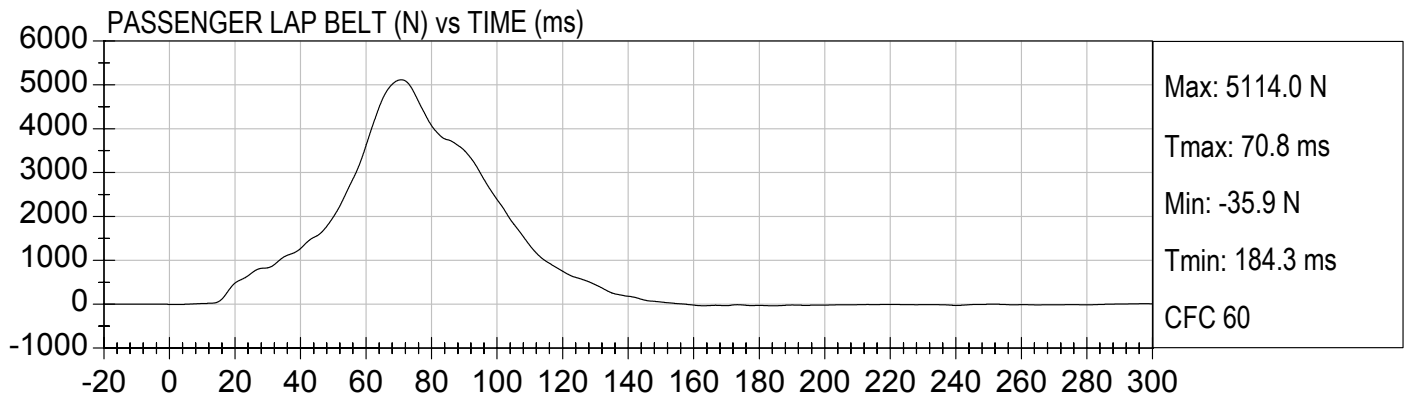
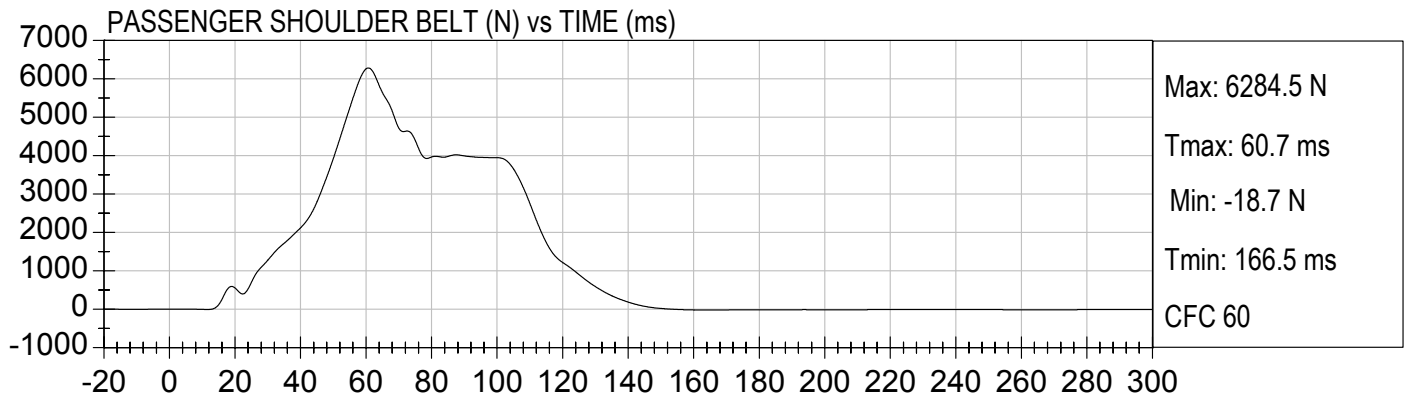
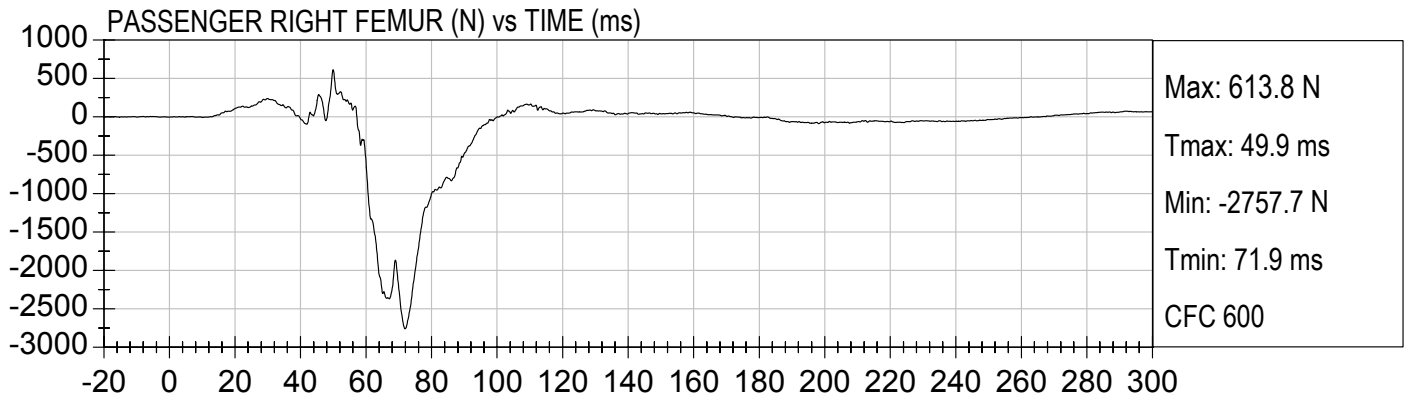
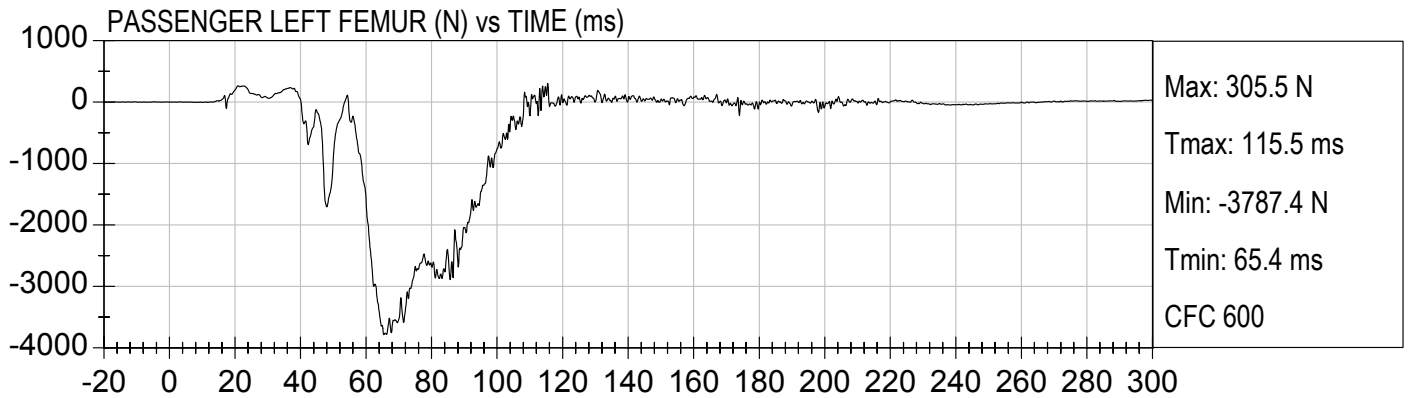






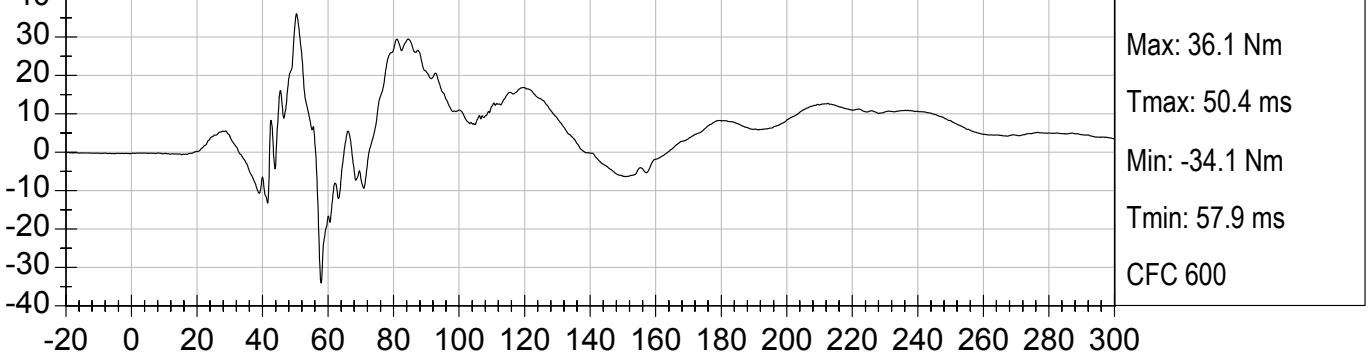




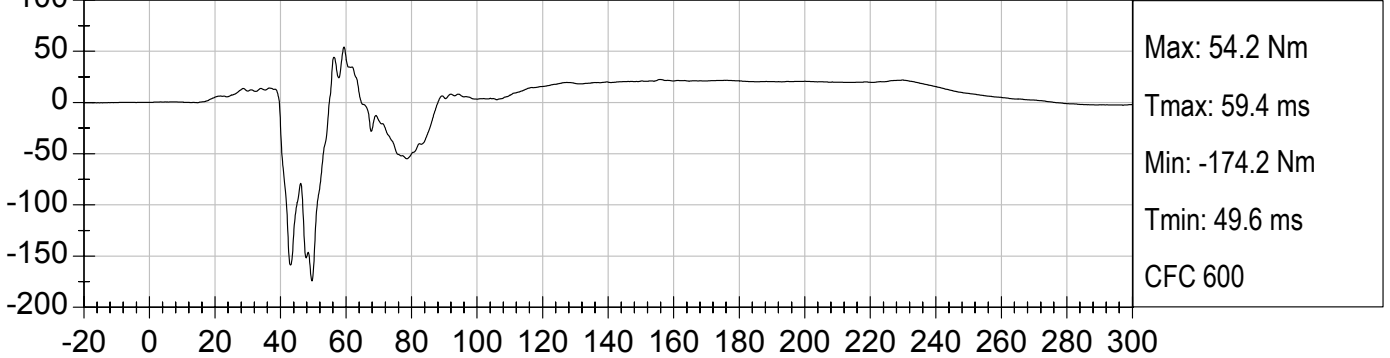




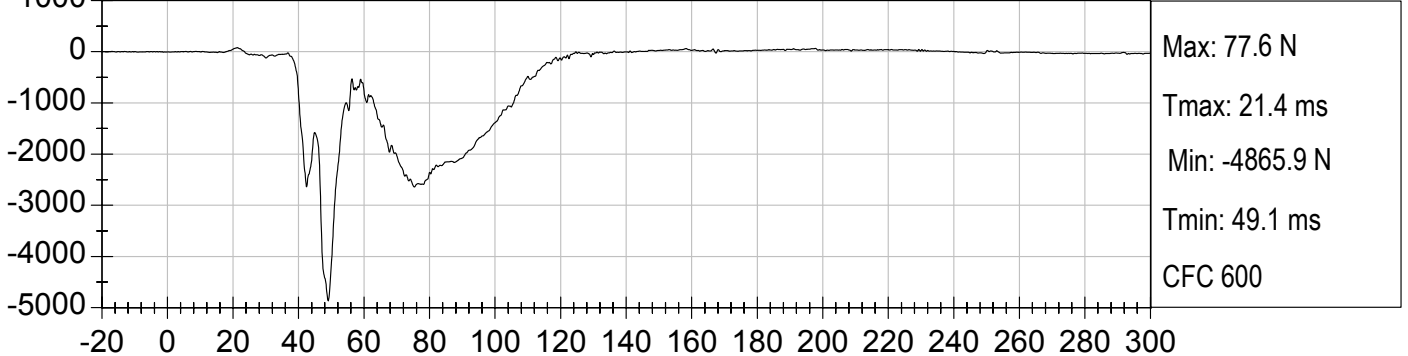
PASSENGER LEFT UPPER TIBIA MX (Nm) vs TIME (ms)



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

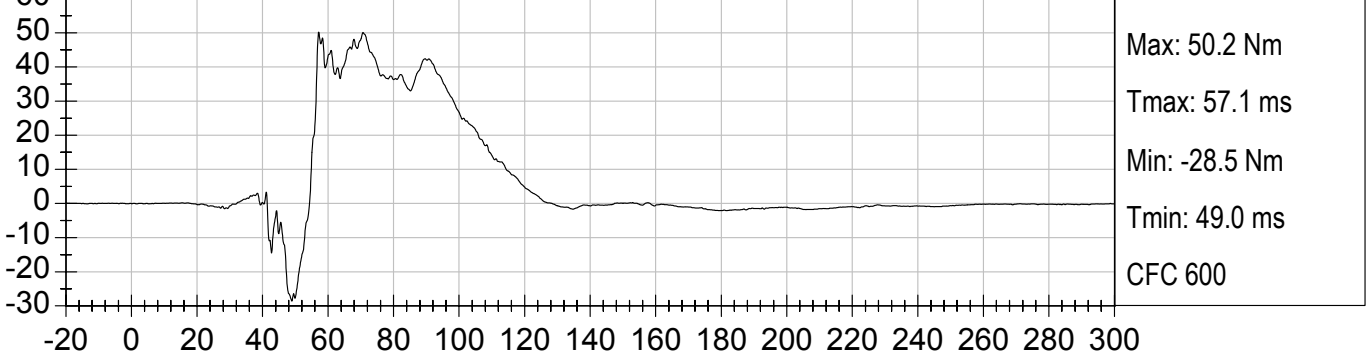


PASSENGER LEFT UPPER TIBIA FZ (N) vs TIME (ms)

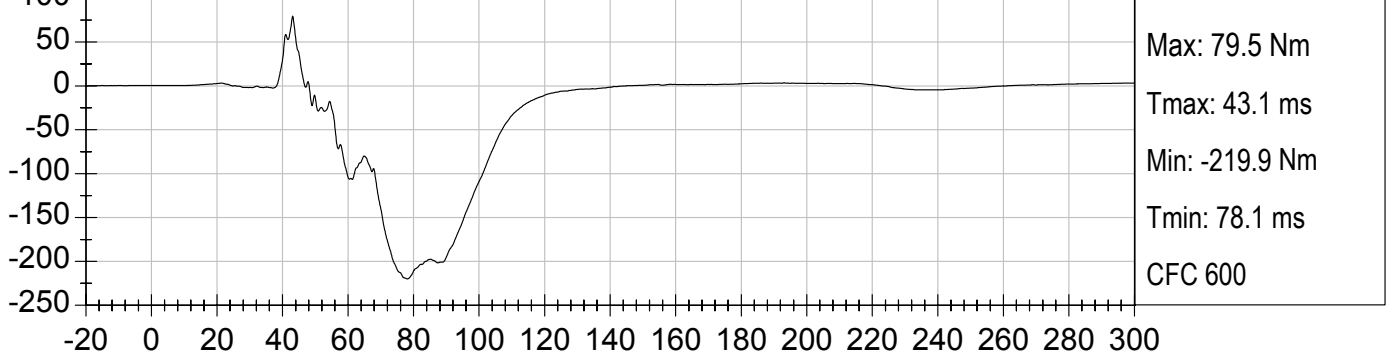




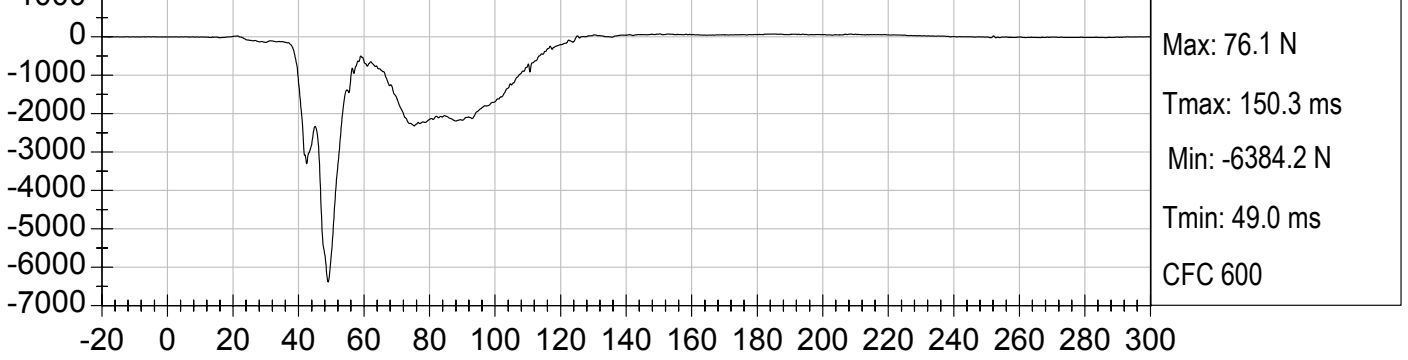
PASSENGER LEFT LOWER TIBIA MX (Nm) vs TIME (ms)



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

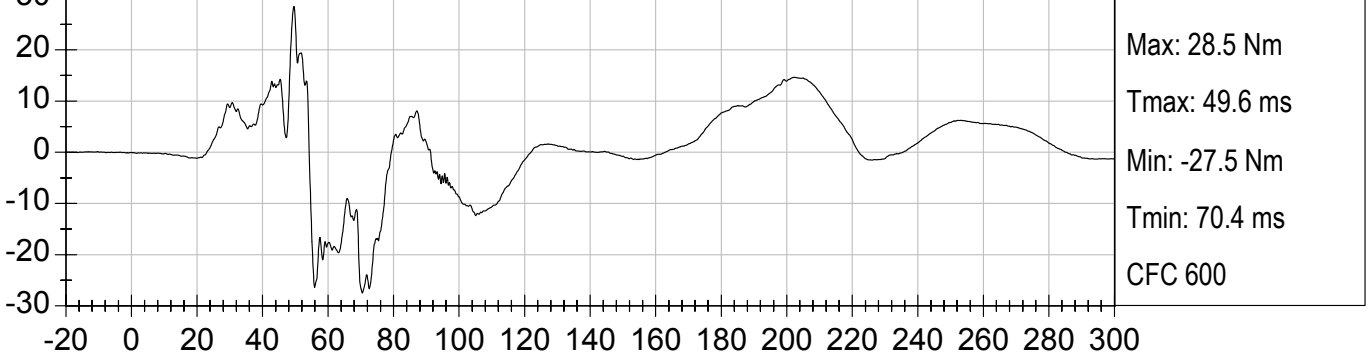


PASSENGER LEFT LOWER TIBIA FZ (N) vs TIME (ms)

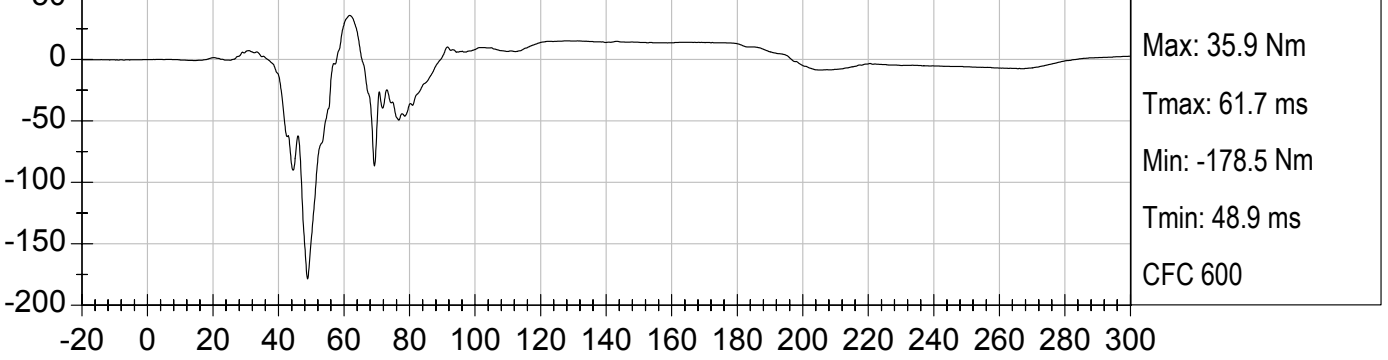




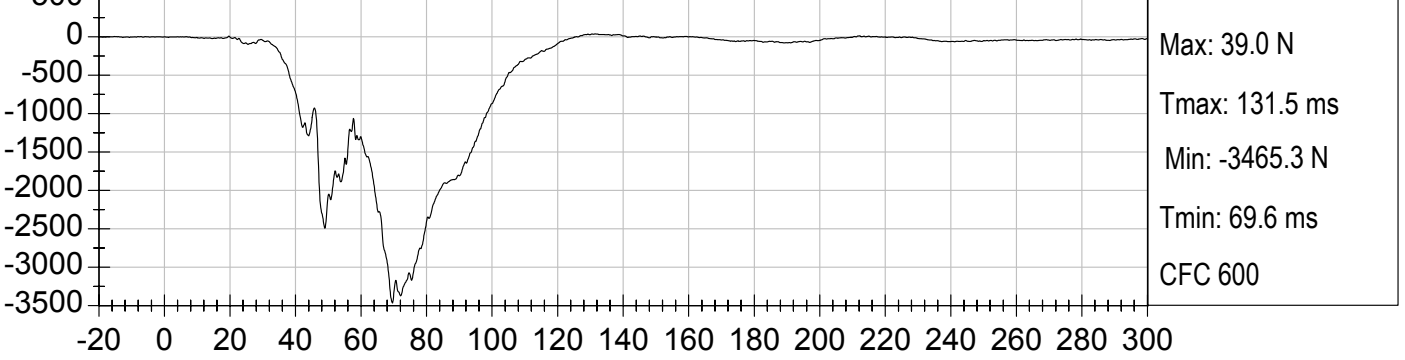
PASSENGER RIGHT UPPER TIBIA MX (Nm) vs TIME (ms)



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

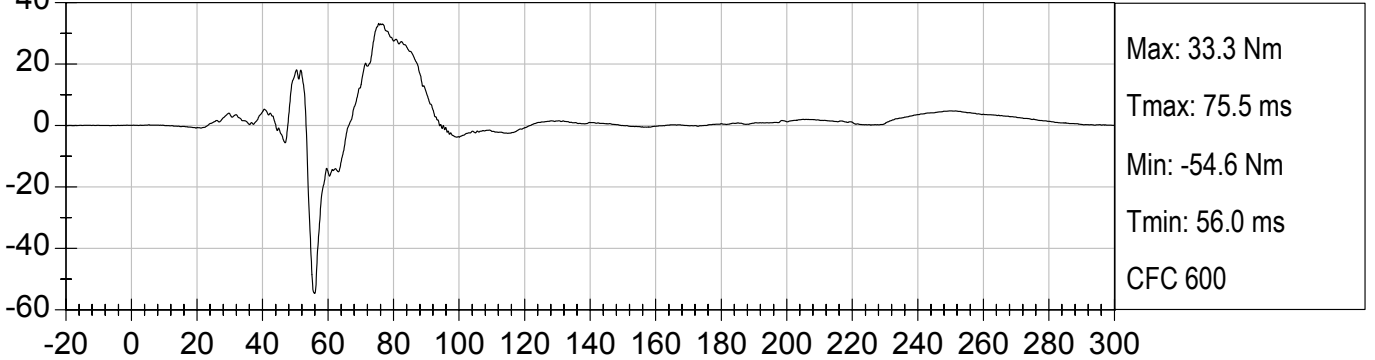


PASSENGER RIGHT UPPER TIBIA FZ (N) vs TIME (ms)

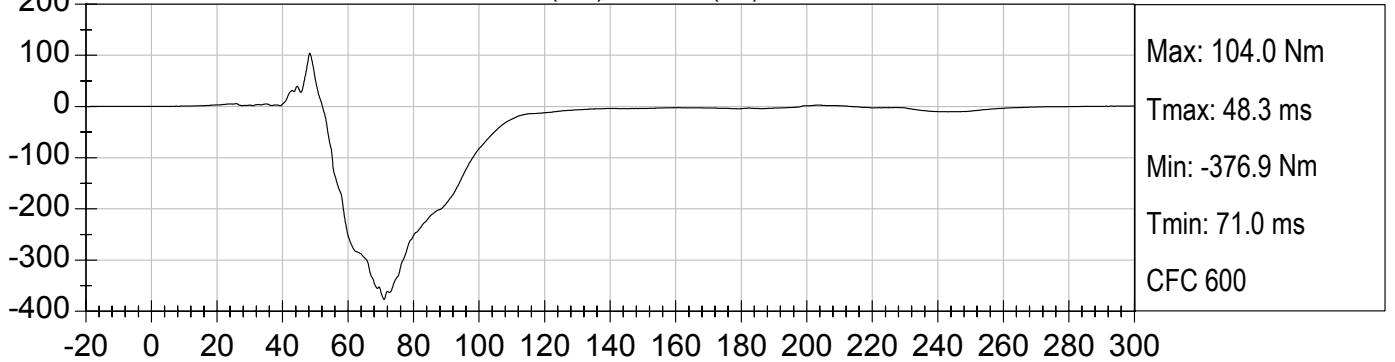




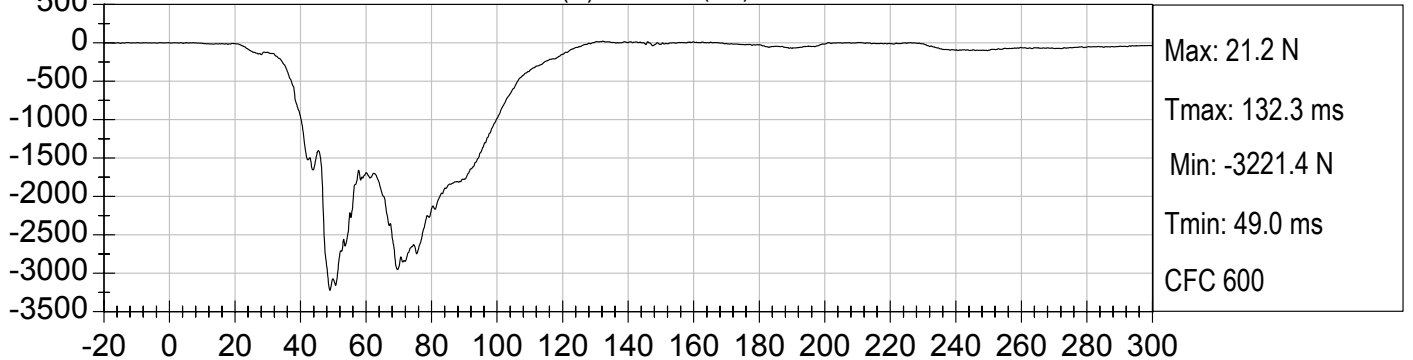
PASSENGER RIGHT LOWER TIBIA MX (Nm) vs TIME (ms)

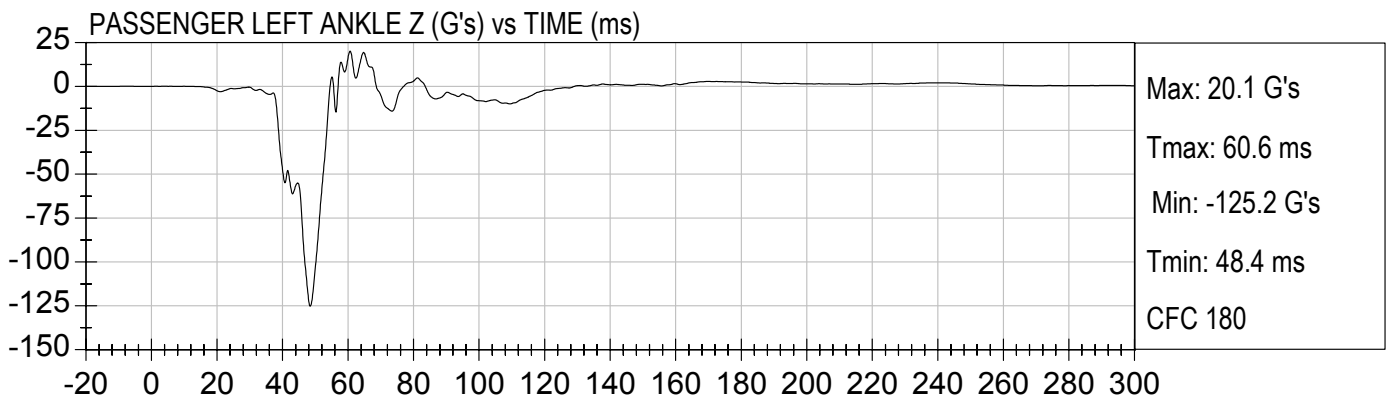
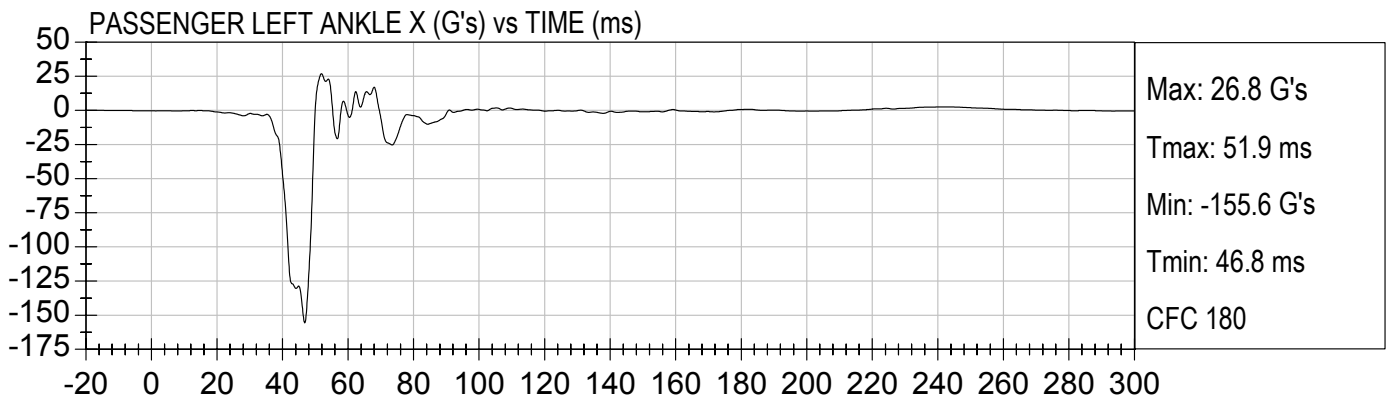
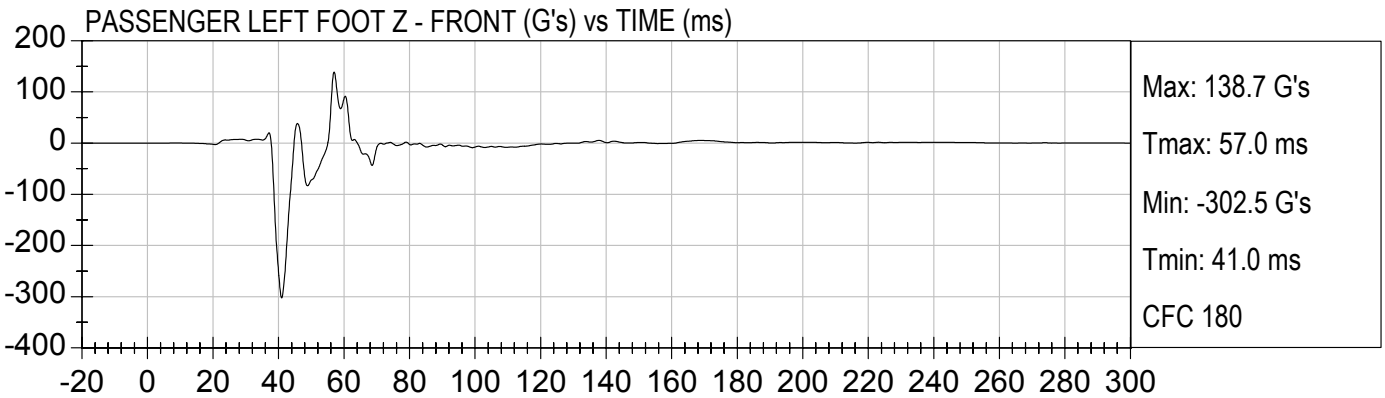


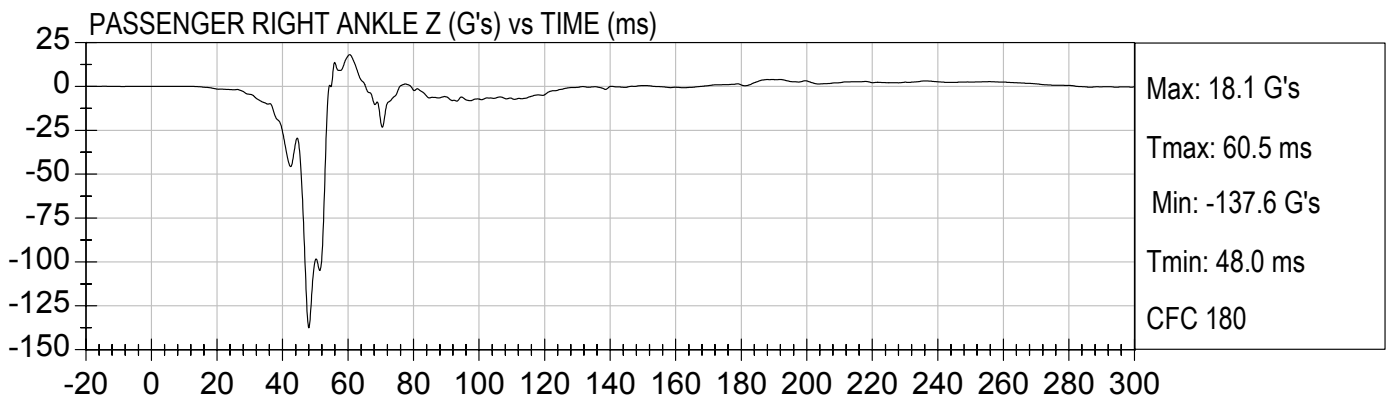
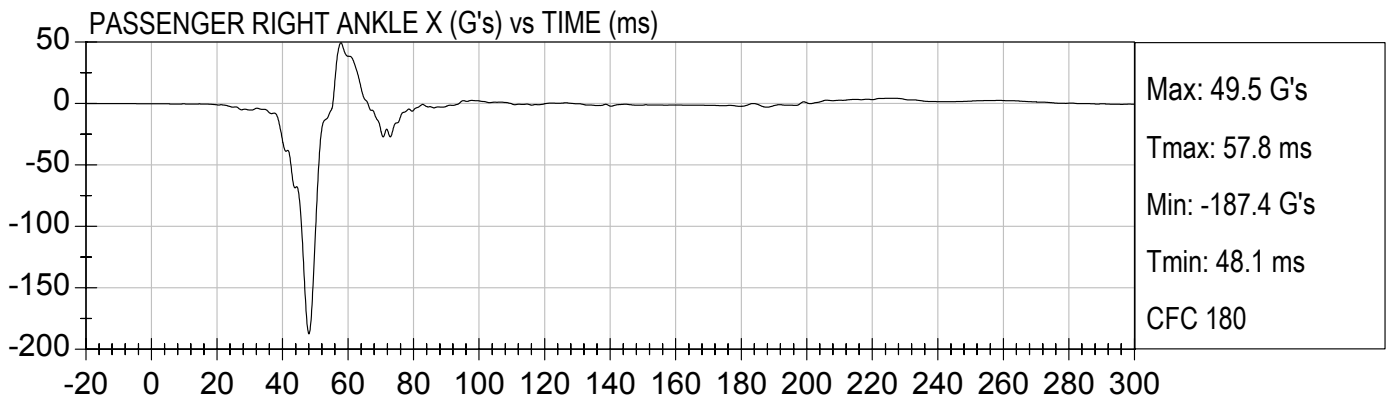
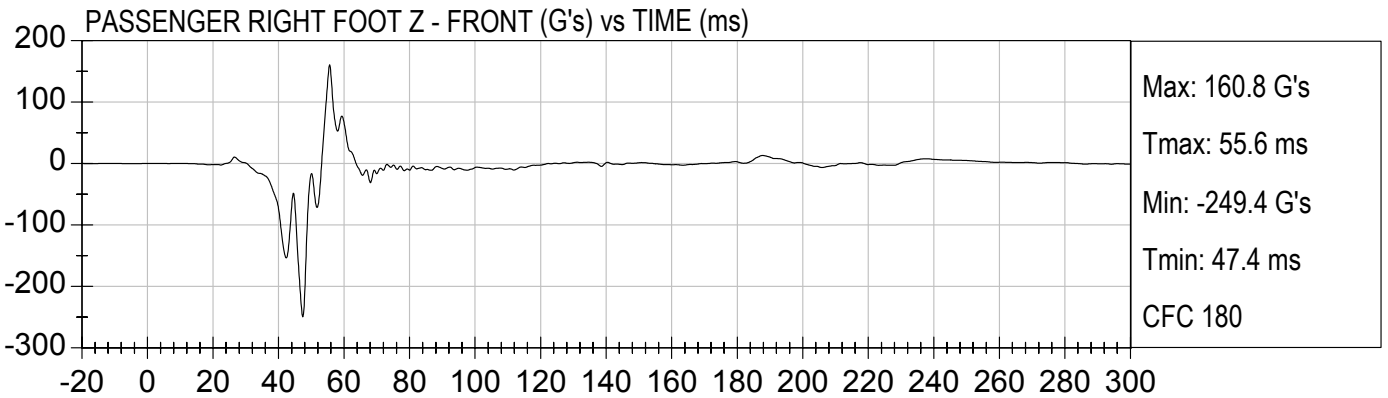
PASSENGER RIGHT LOWER TIBIA MY (Nm) vs TIME (ms)

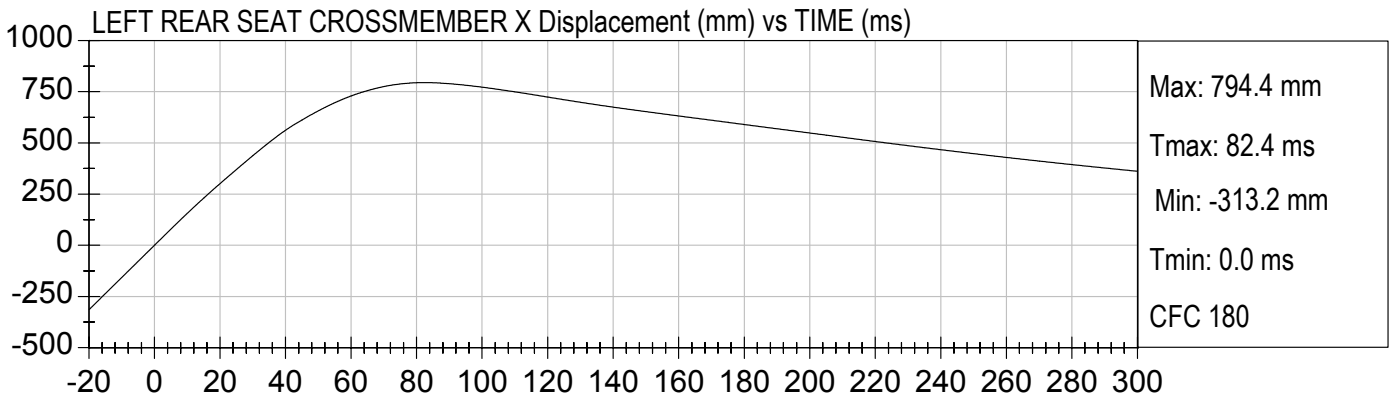
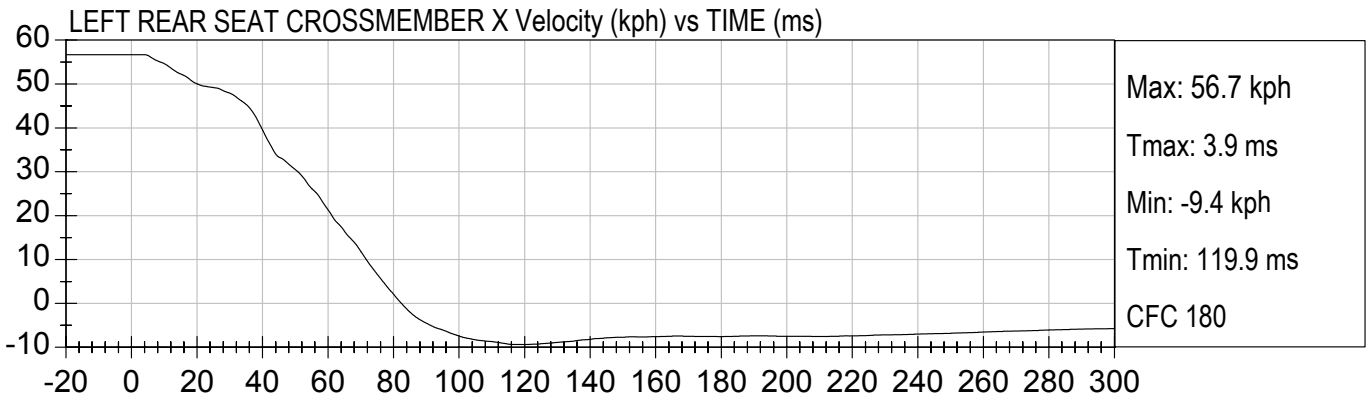
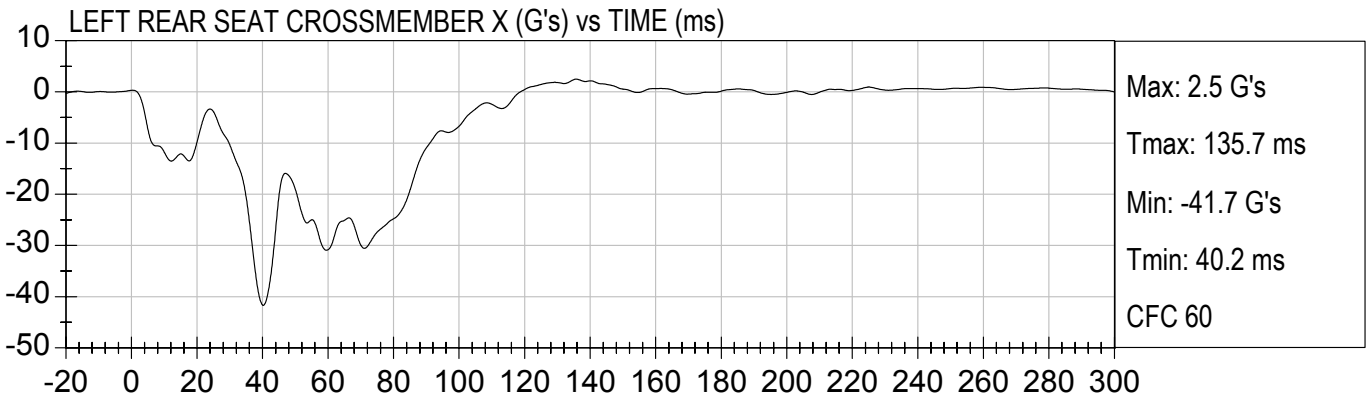


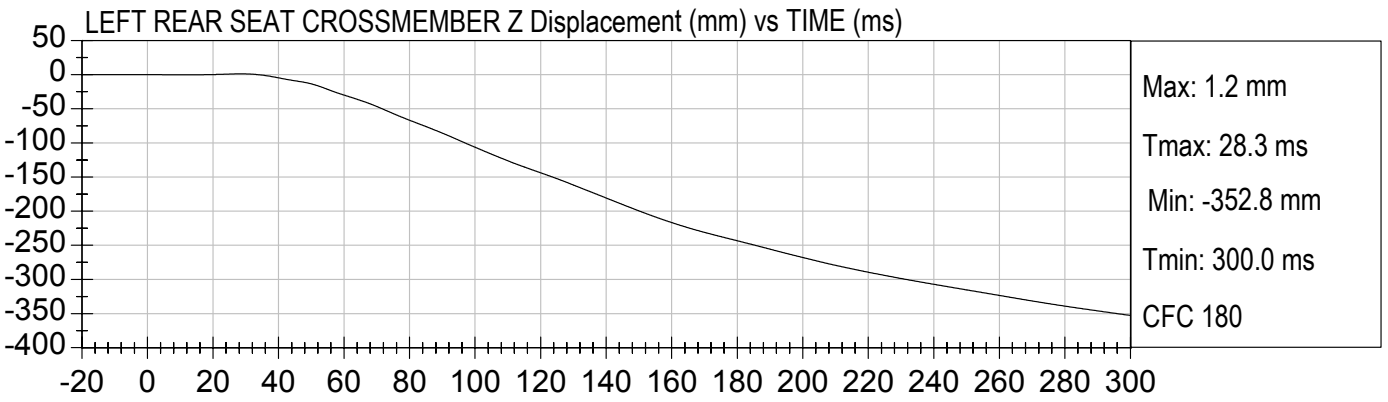
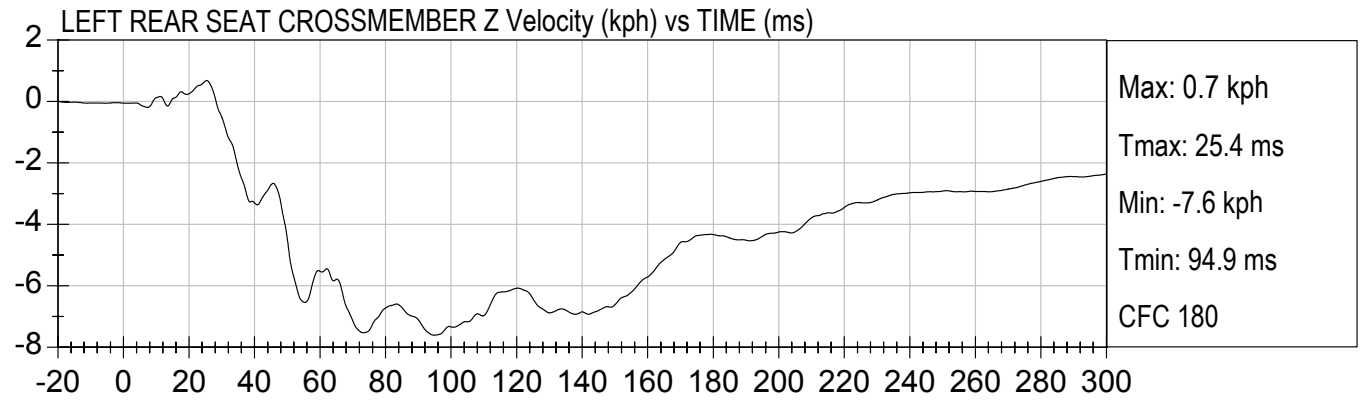
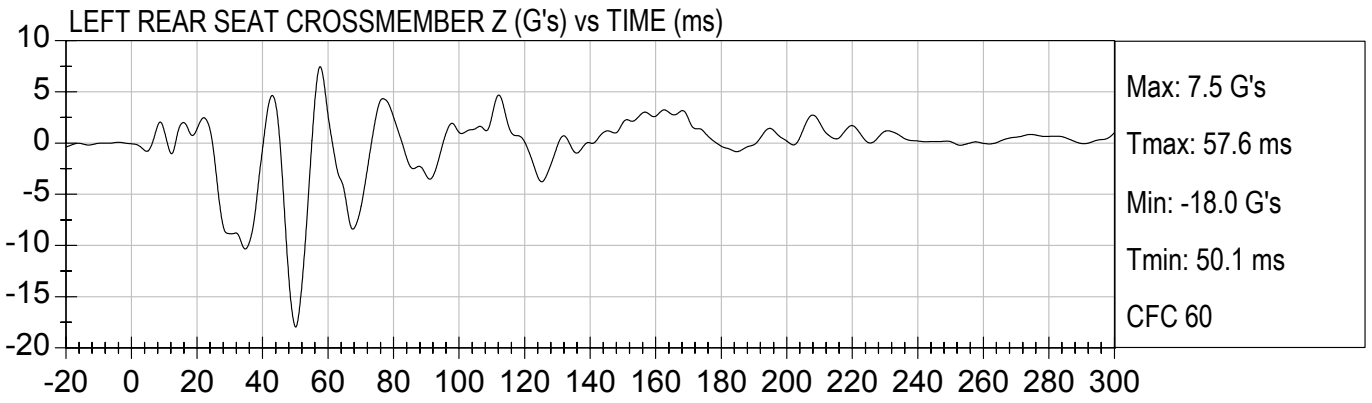
PASSENGER RIGHT LOWER TIBIA FZ (N) vs TIME (ms)

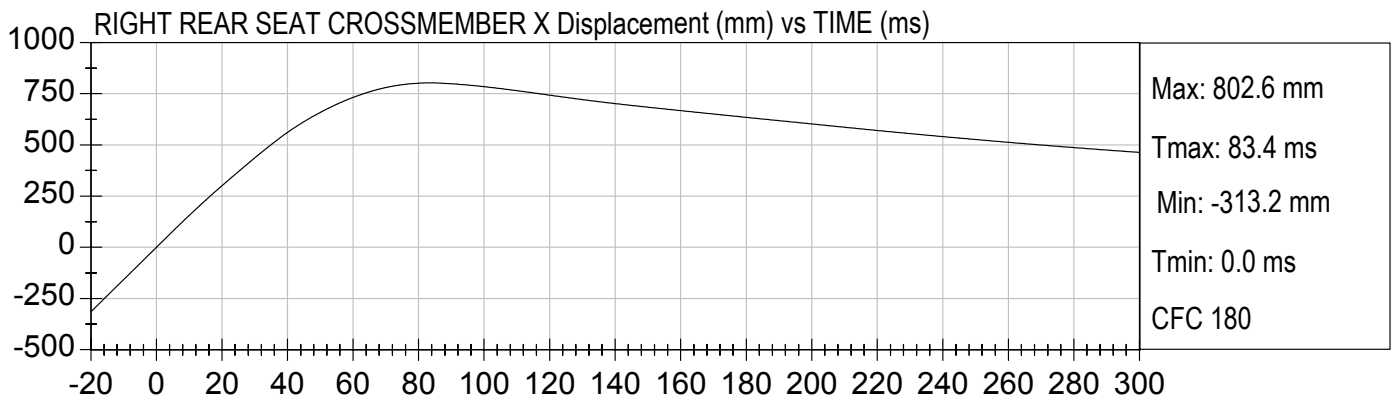
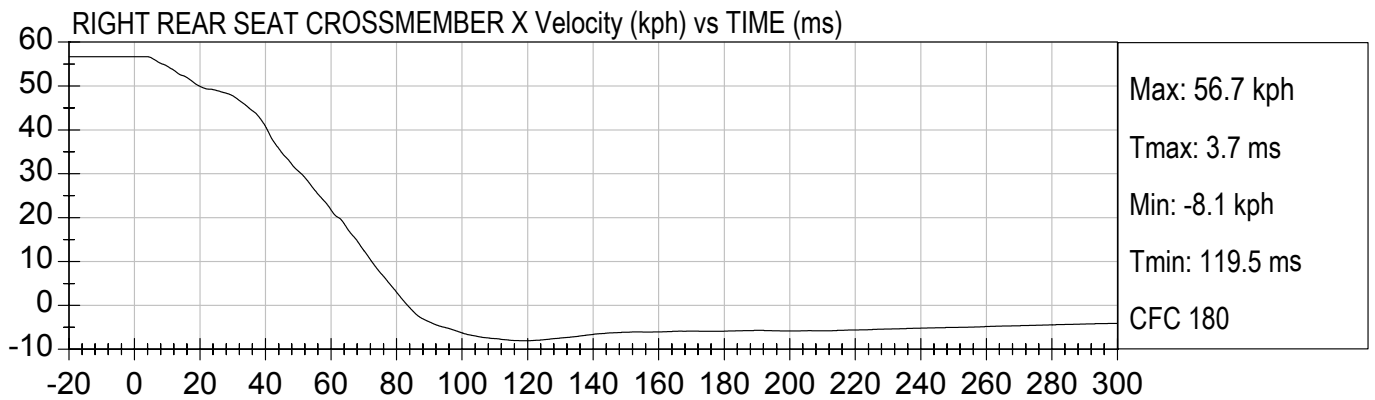
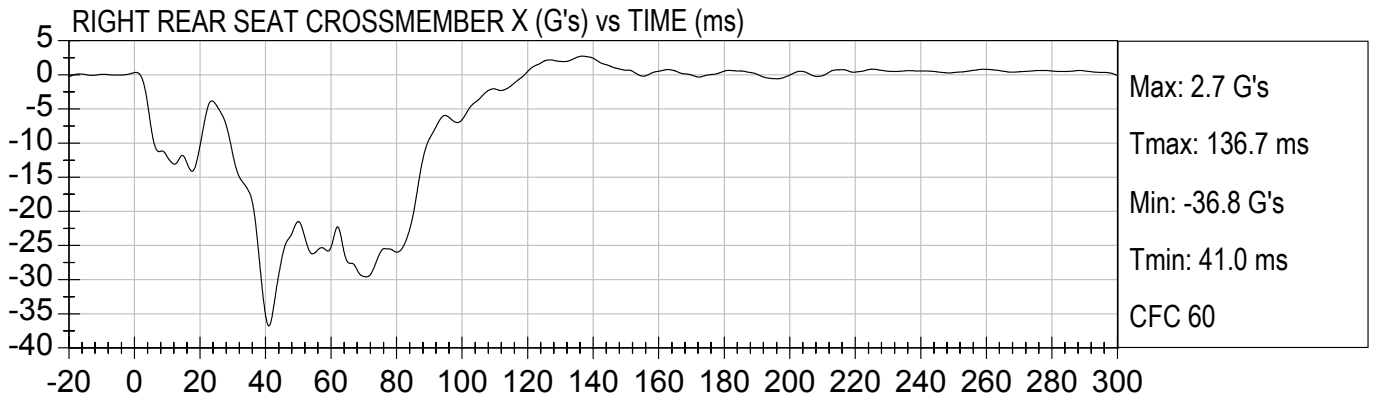


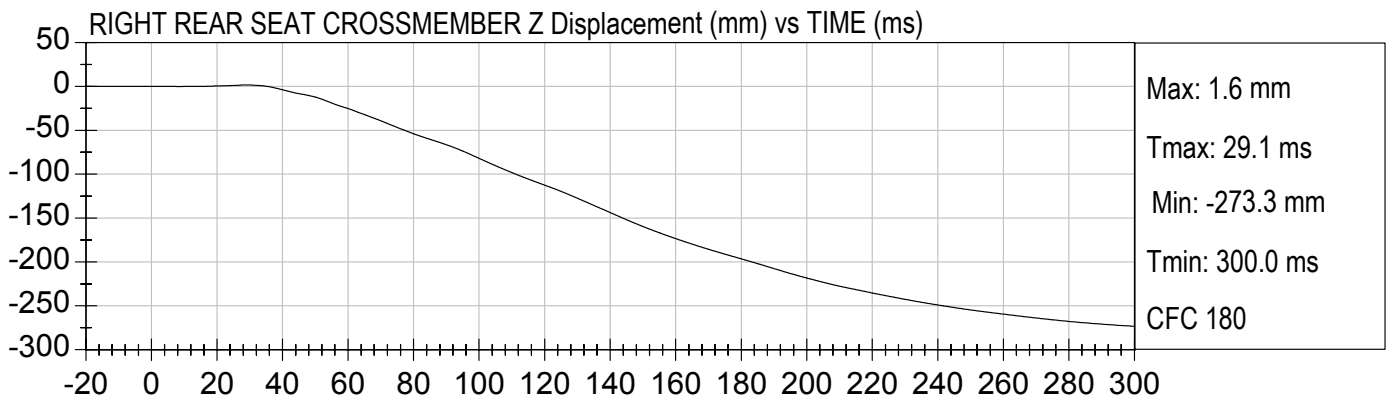
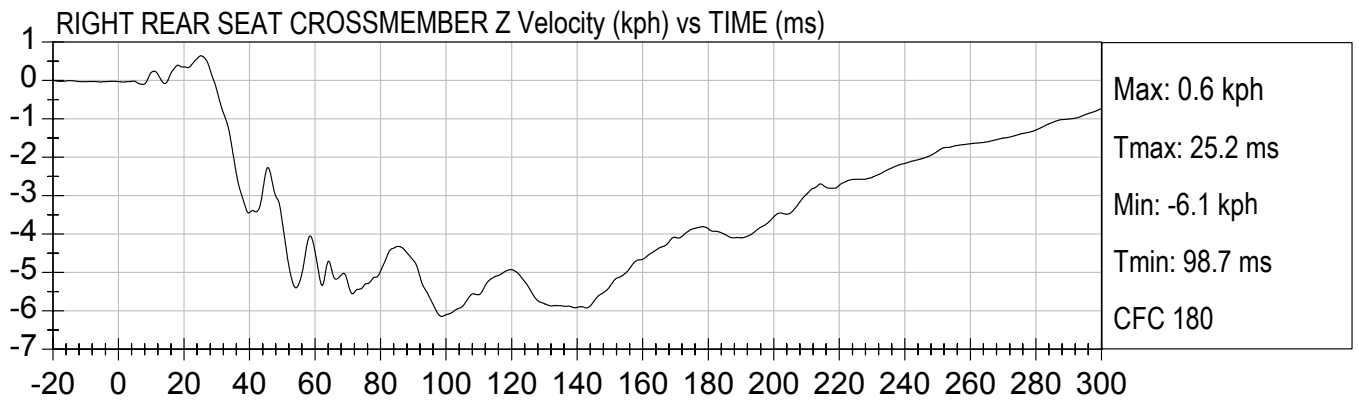
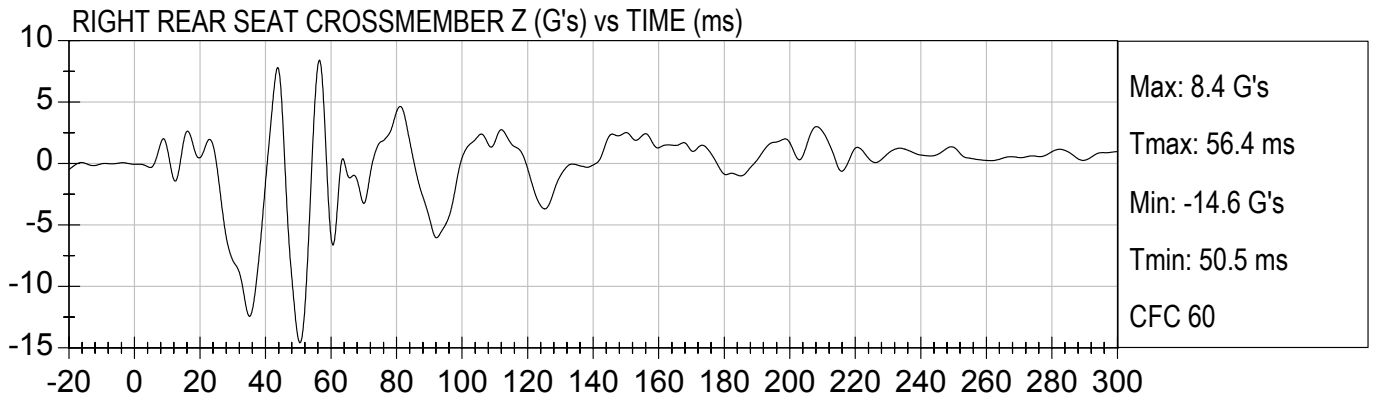


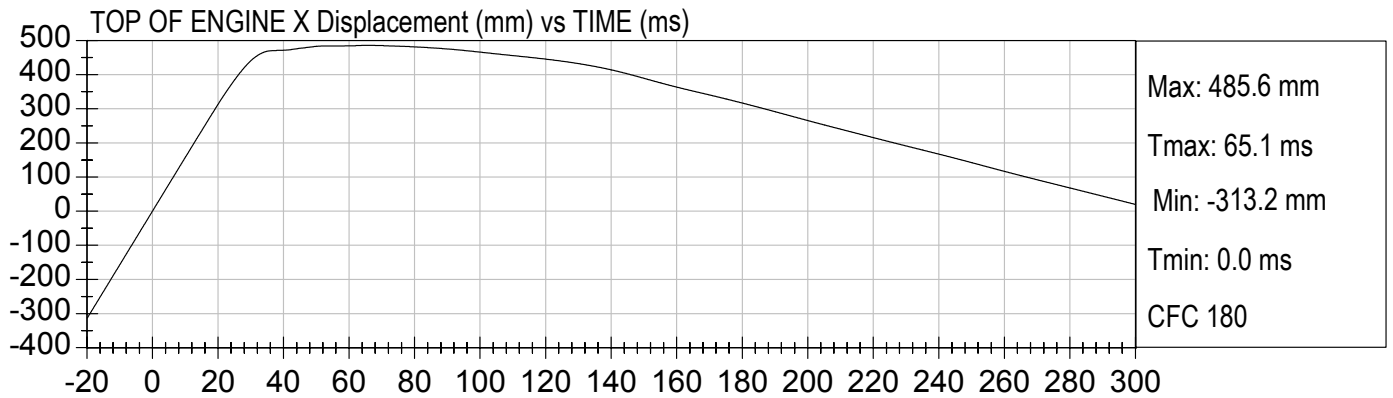
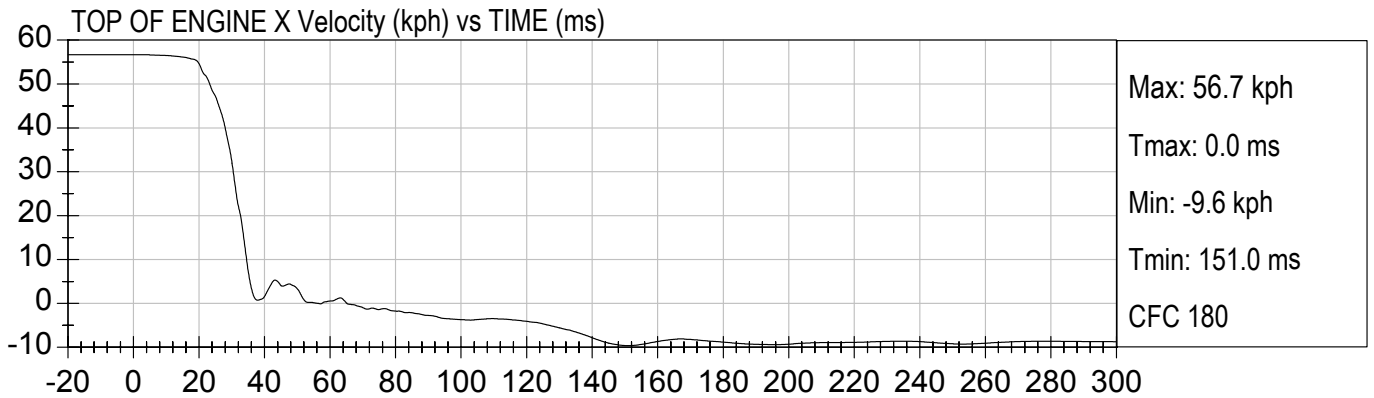
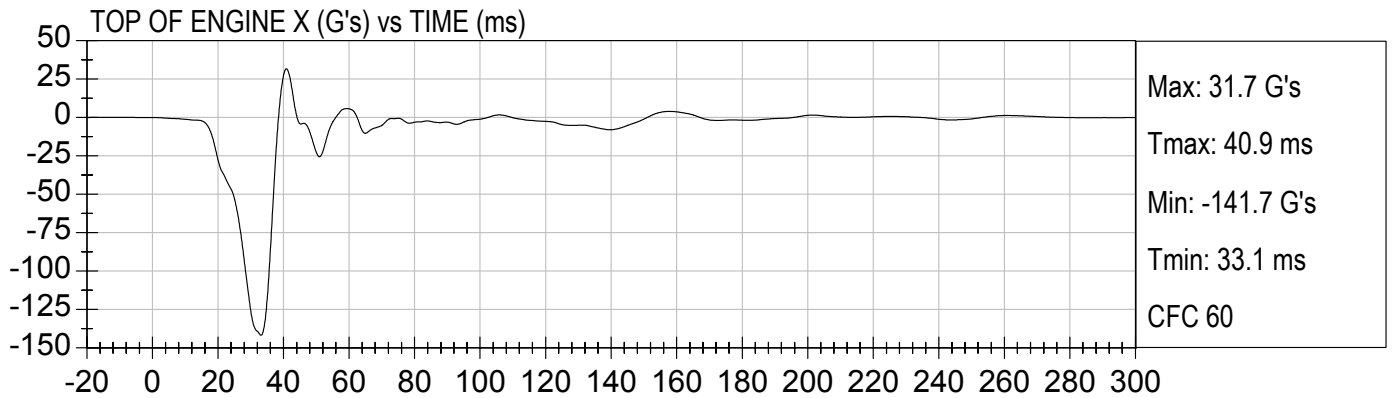


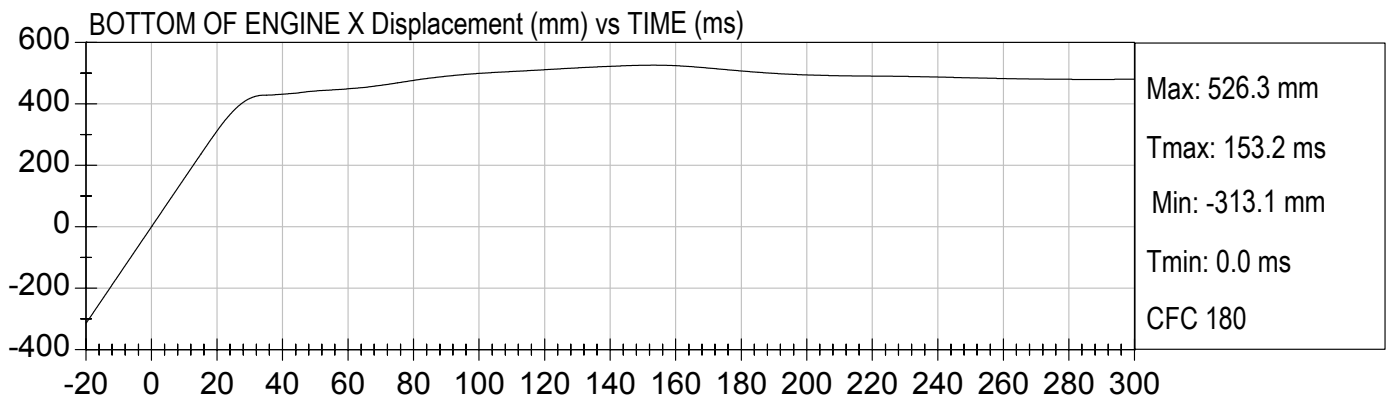
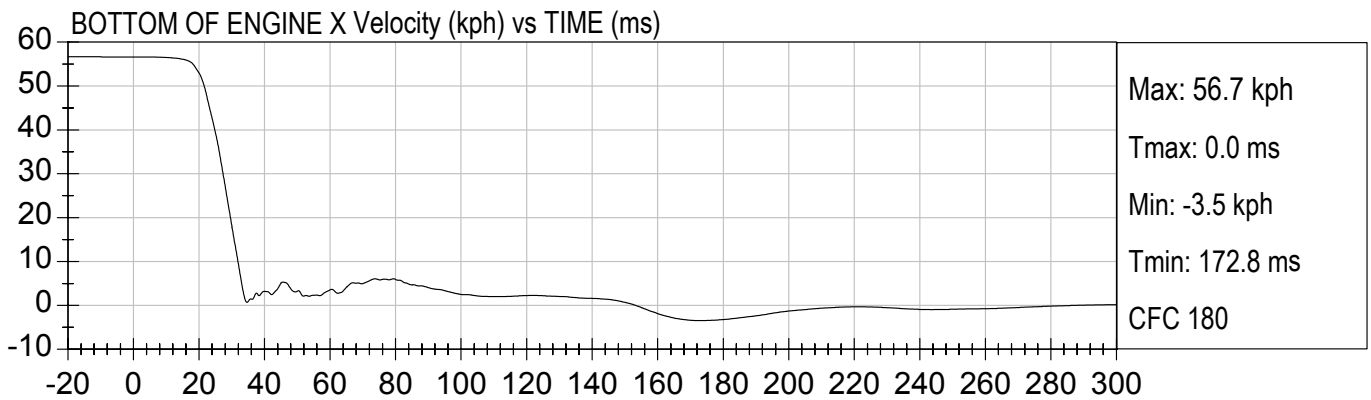
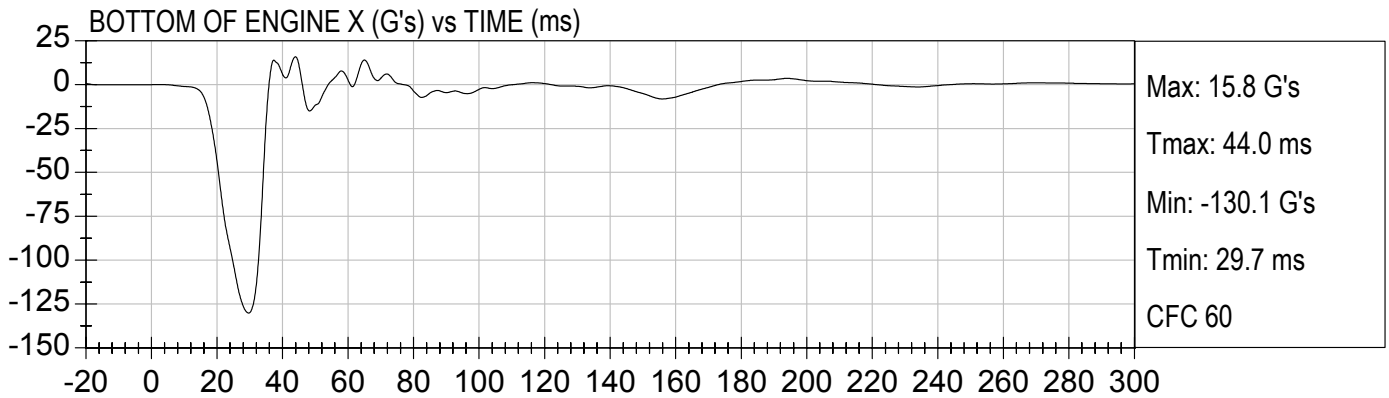


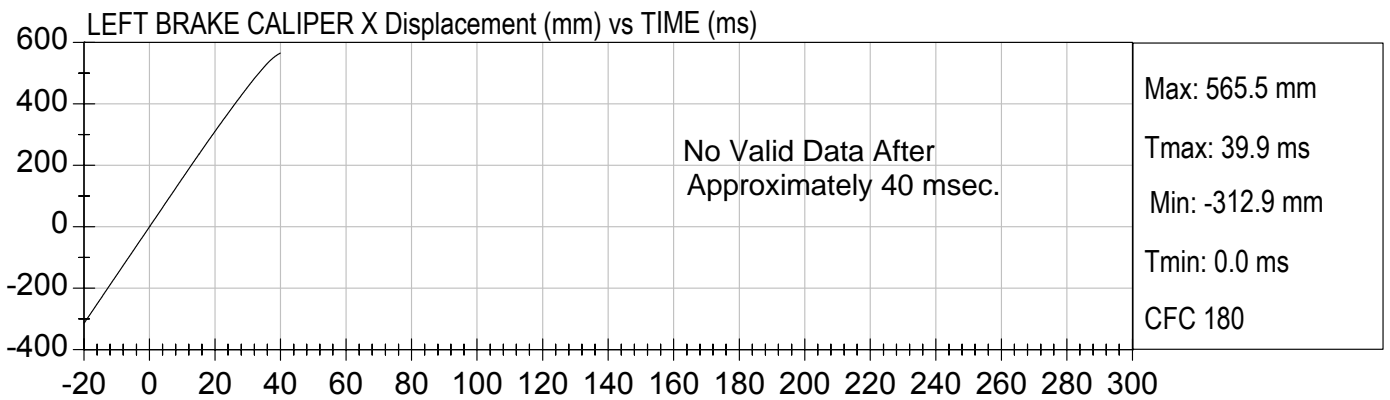
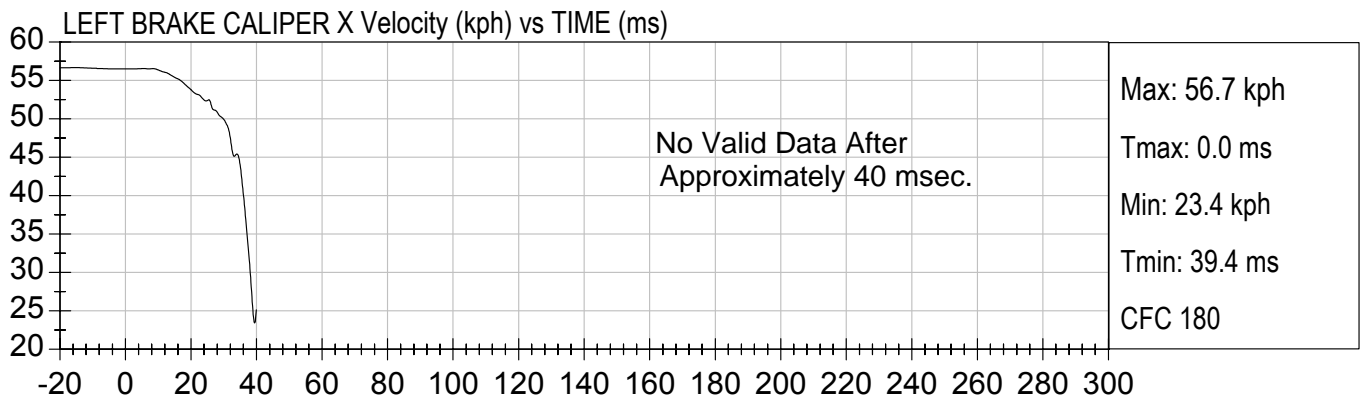
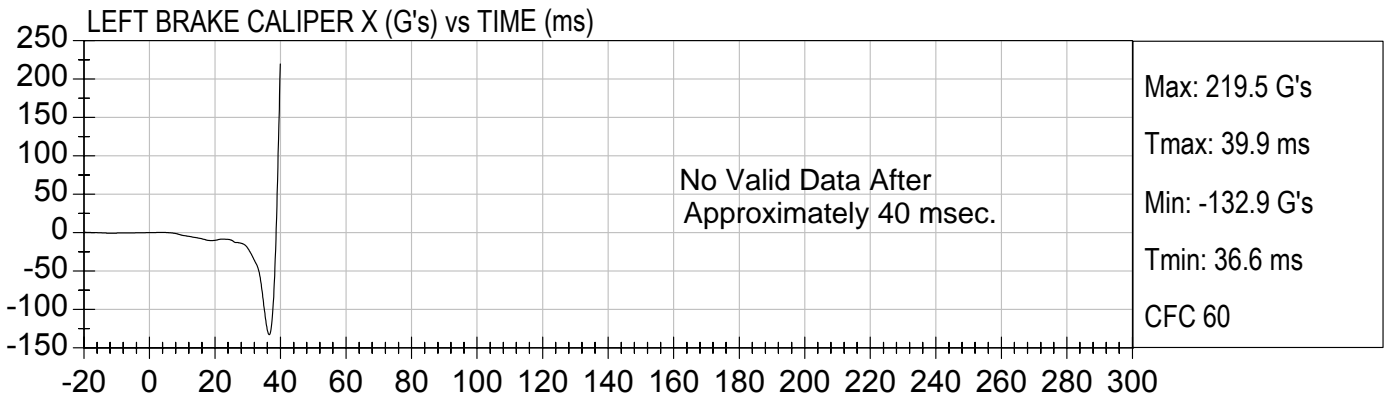


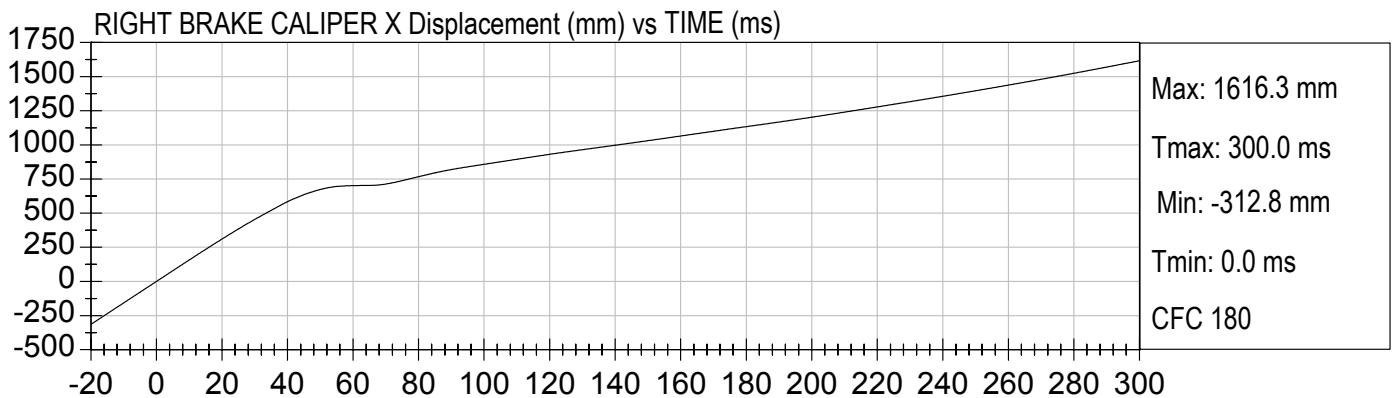
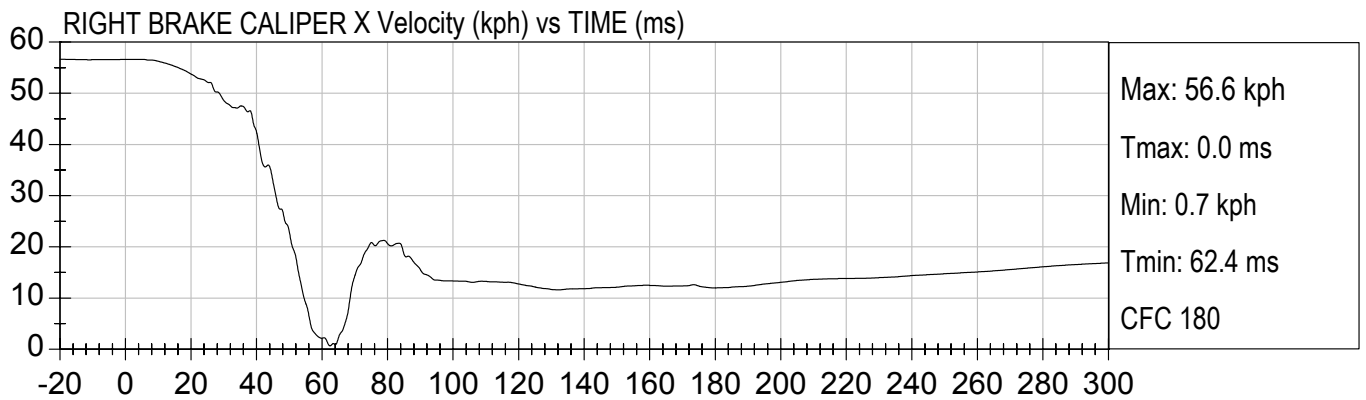
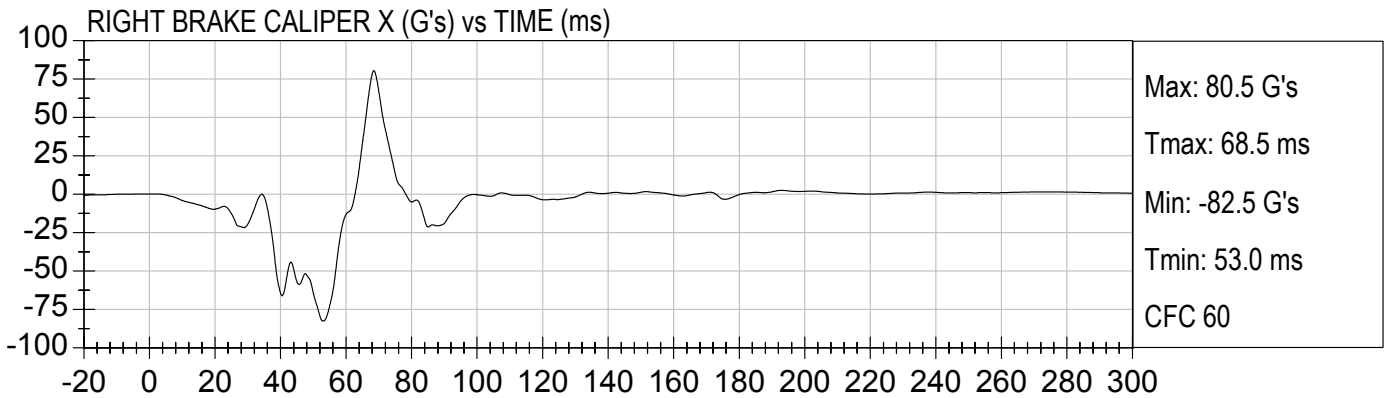


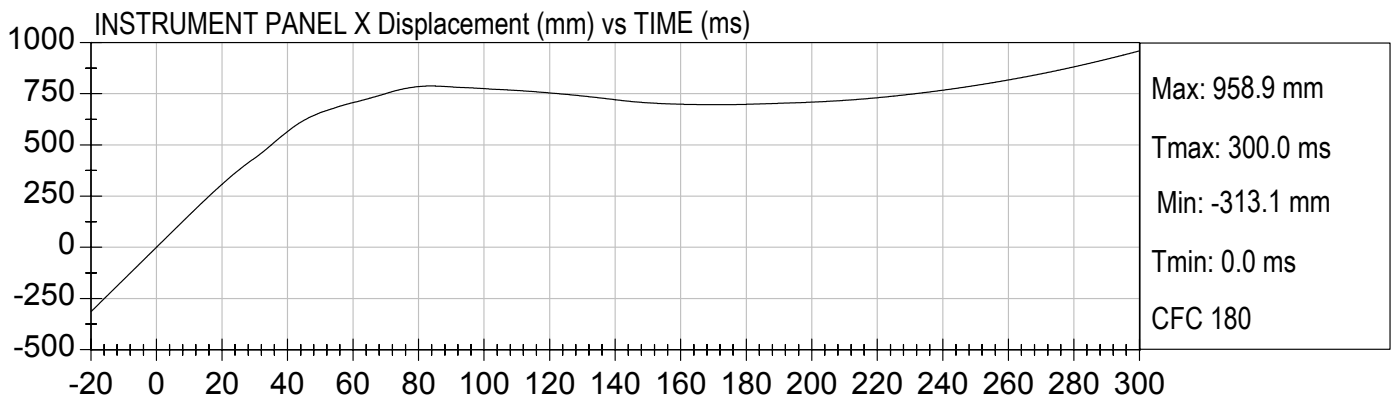
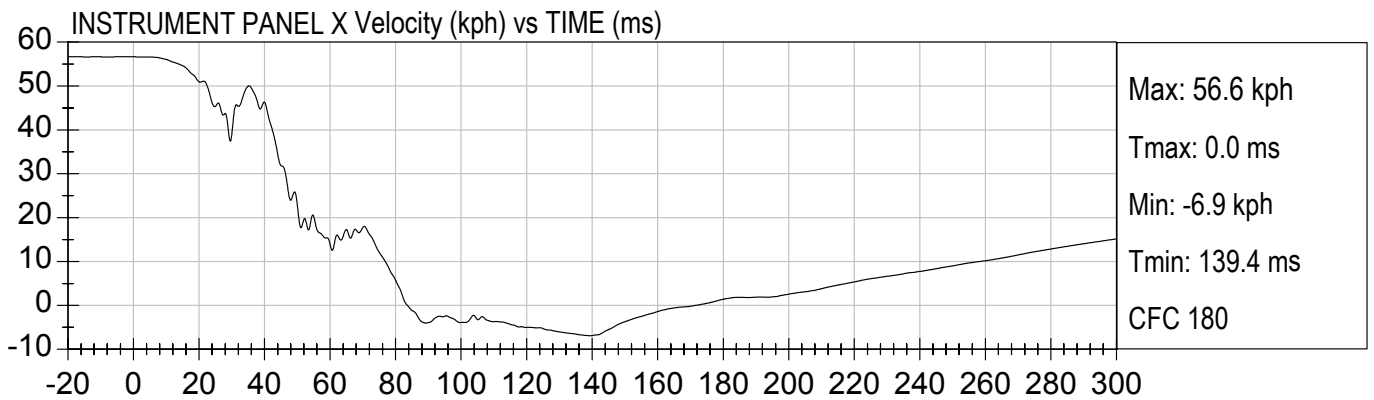
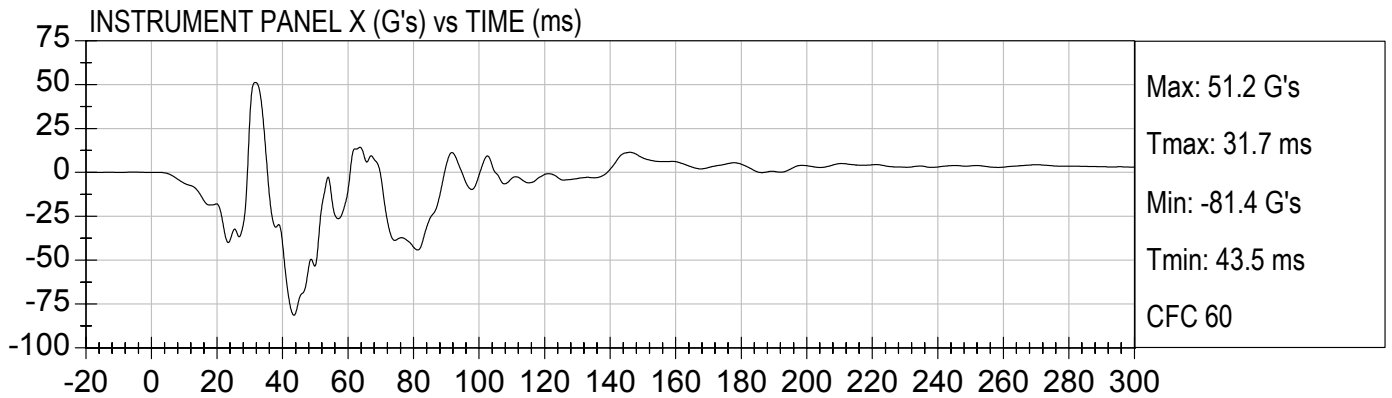


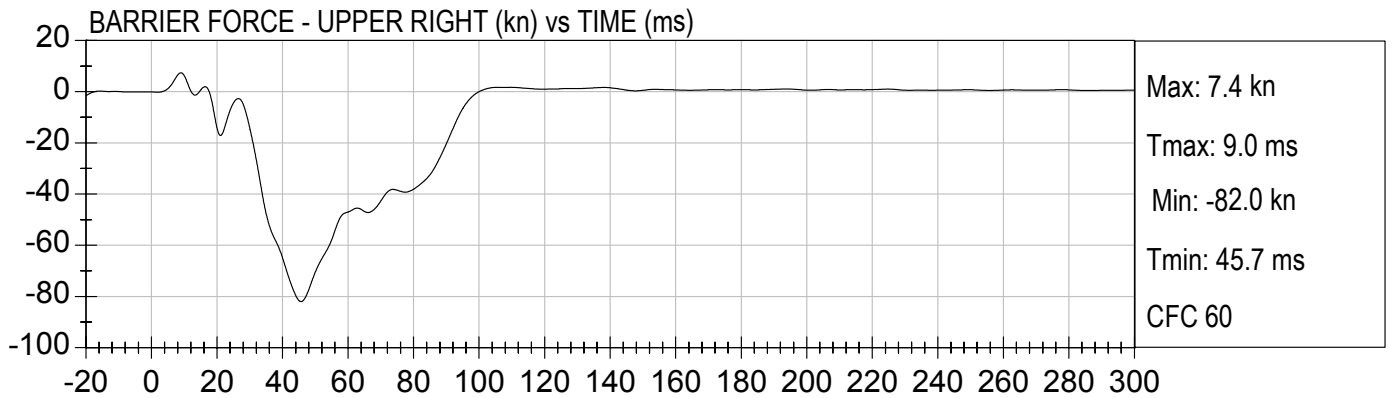
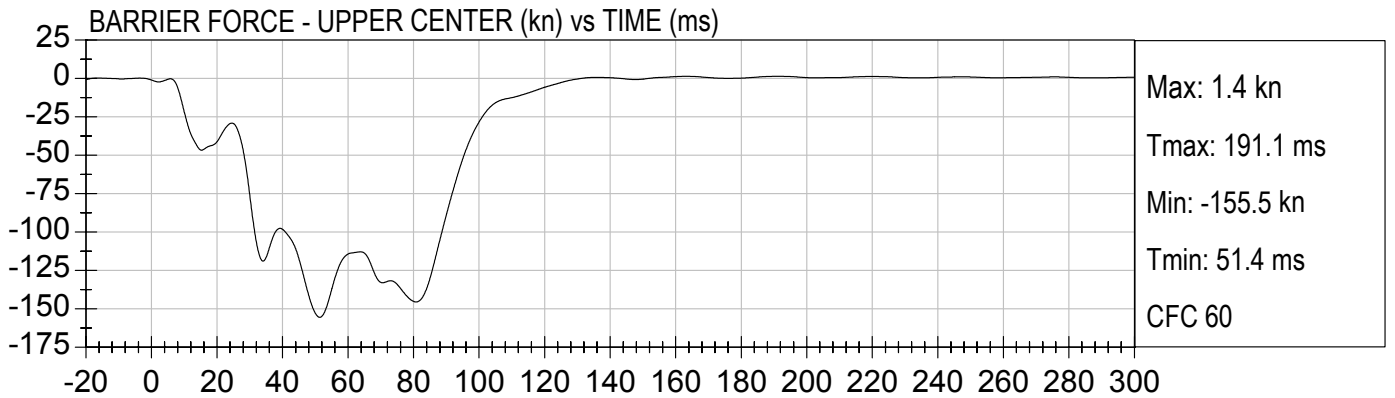
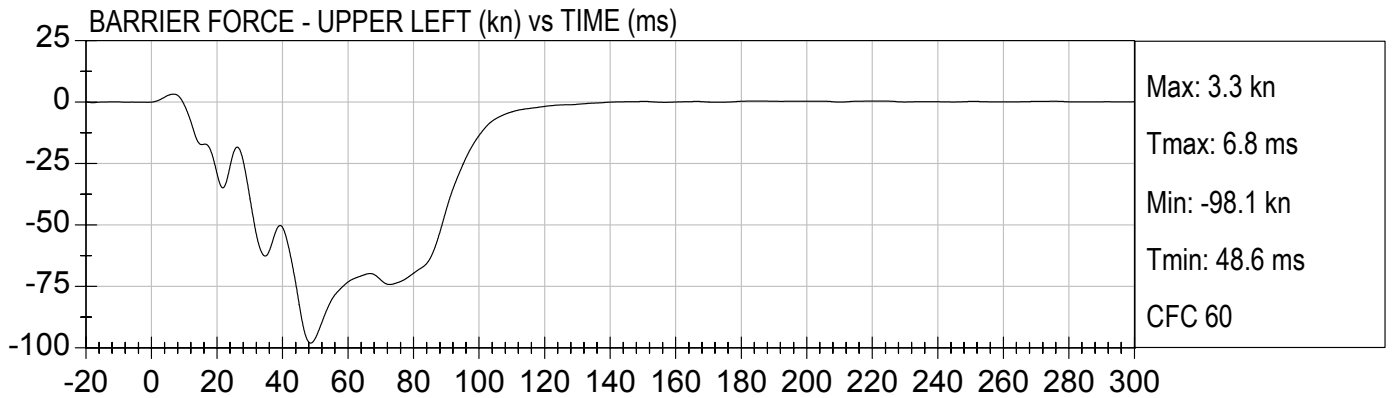


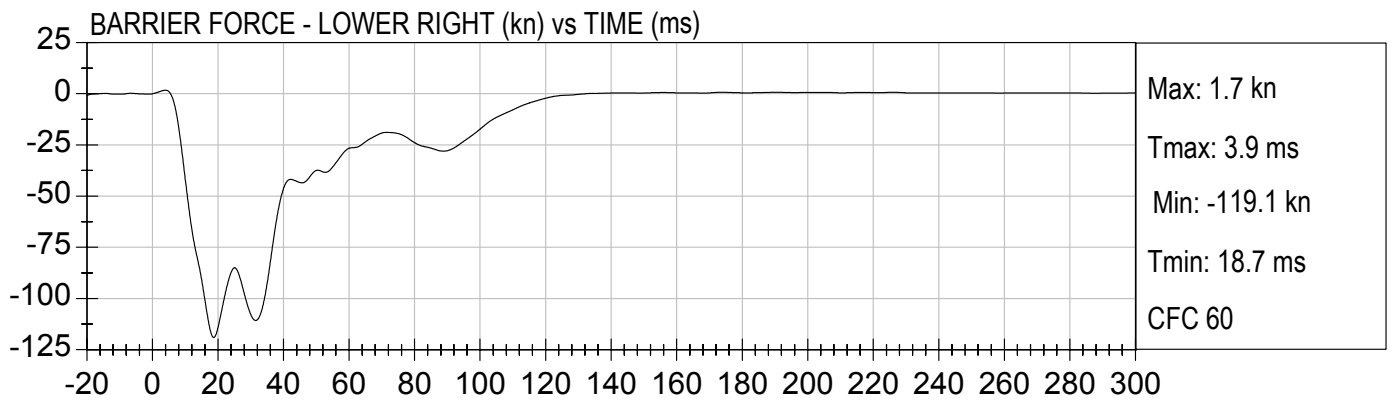
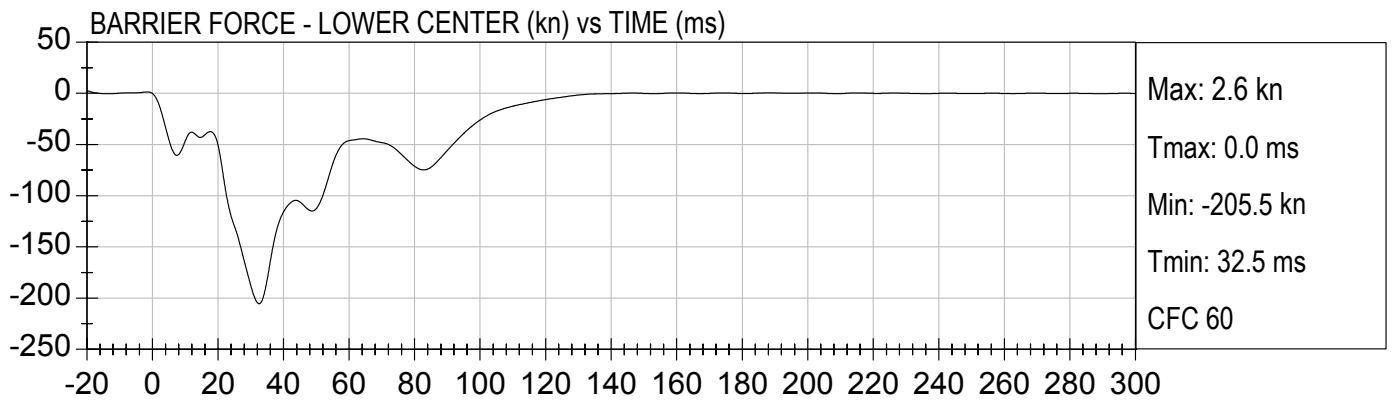
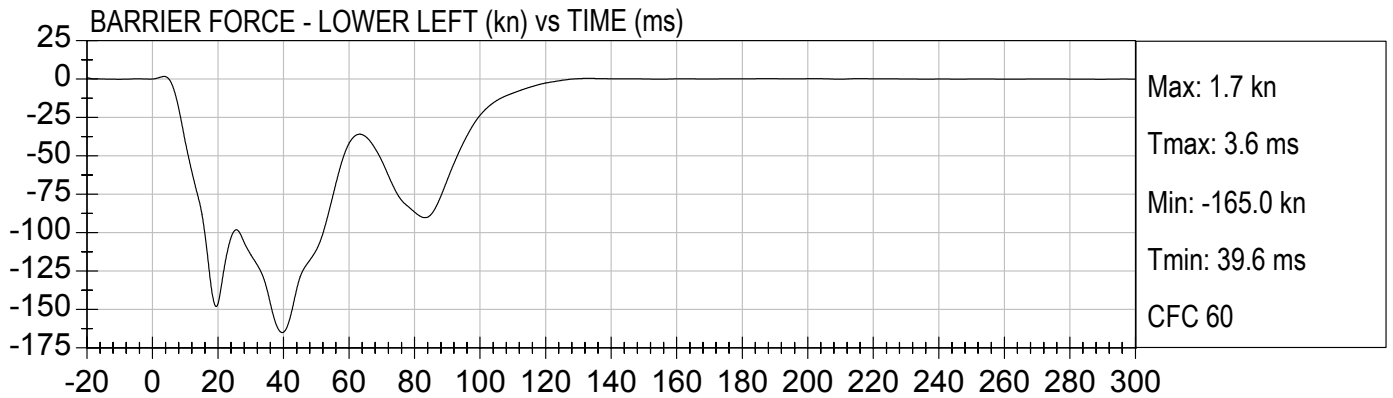


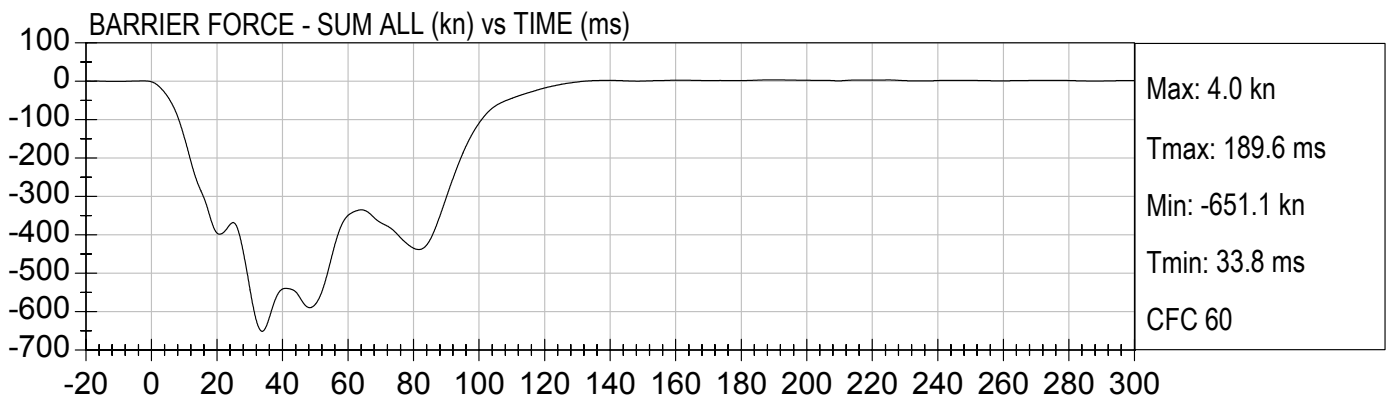
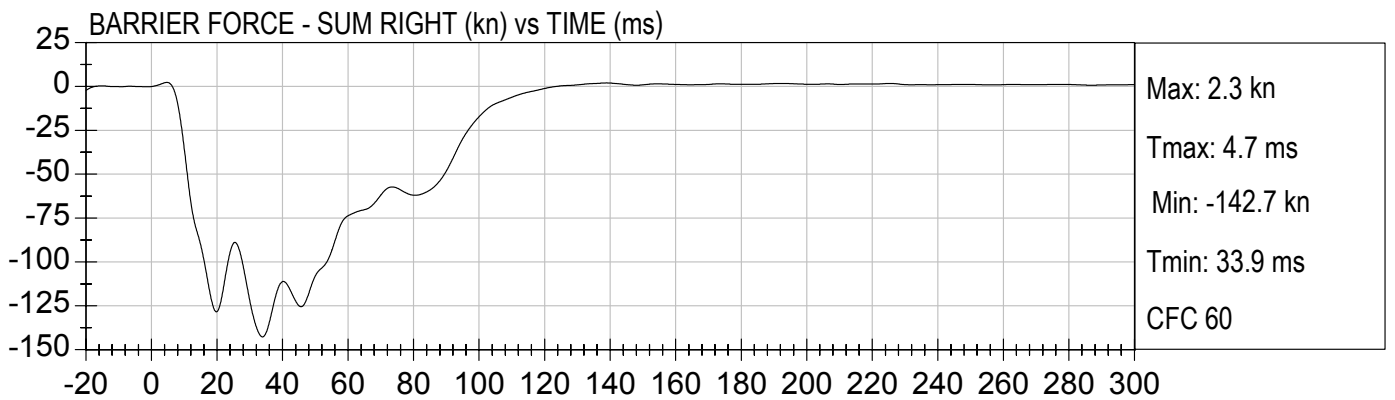
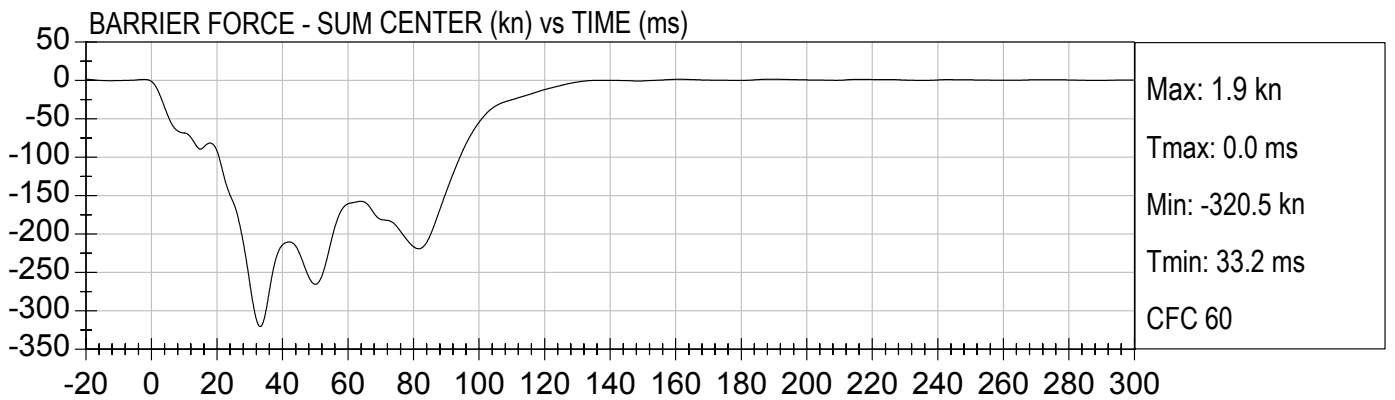
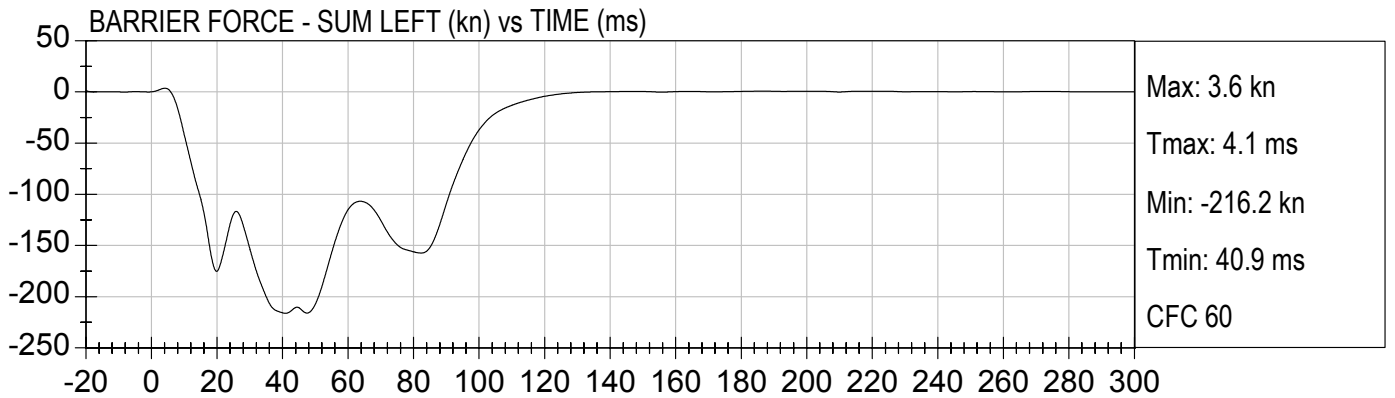


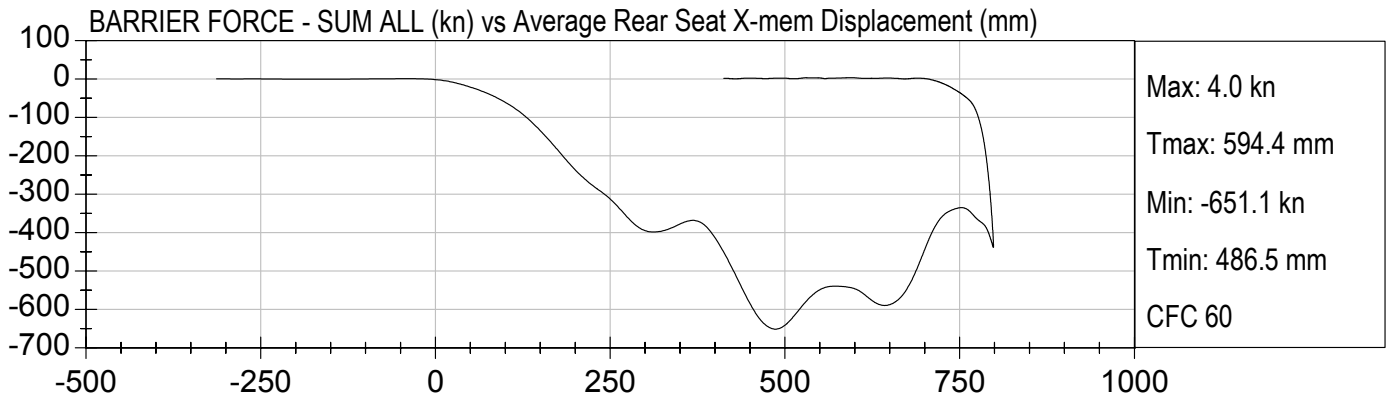












## **APPENDIX C**

### **DUMMY CALIBRATION DATA TRACES AND TABLES**

**MGA RESEARCH CORPORATION  
HEAD DROP TEST  
HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 065

Test ID: D042711

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Peak Resultant Acceleration	G's	225 - 275	272	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-11.9	Pass
Unimodal	Yes/No	NA	Yes	Pass
Oscillations	Yes/No	within 10% of peak	Yes	Pass
Overall Test Results				Pass



\_\_\_\_\_  
Laboratory Technician

12/01/2004

\_\_\_\_\_  
Test Date



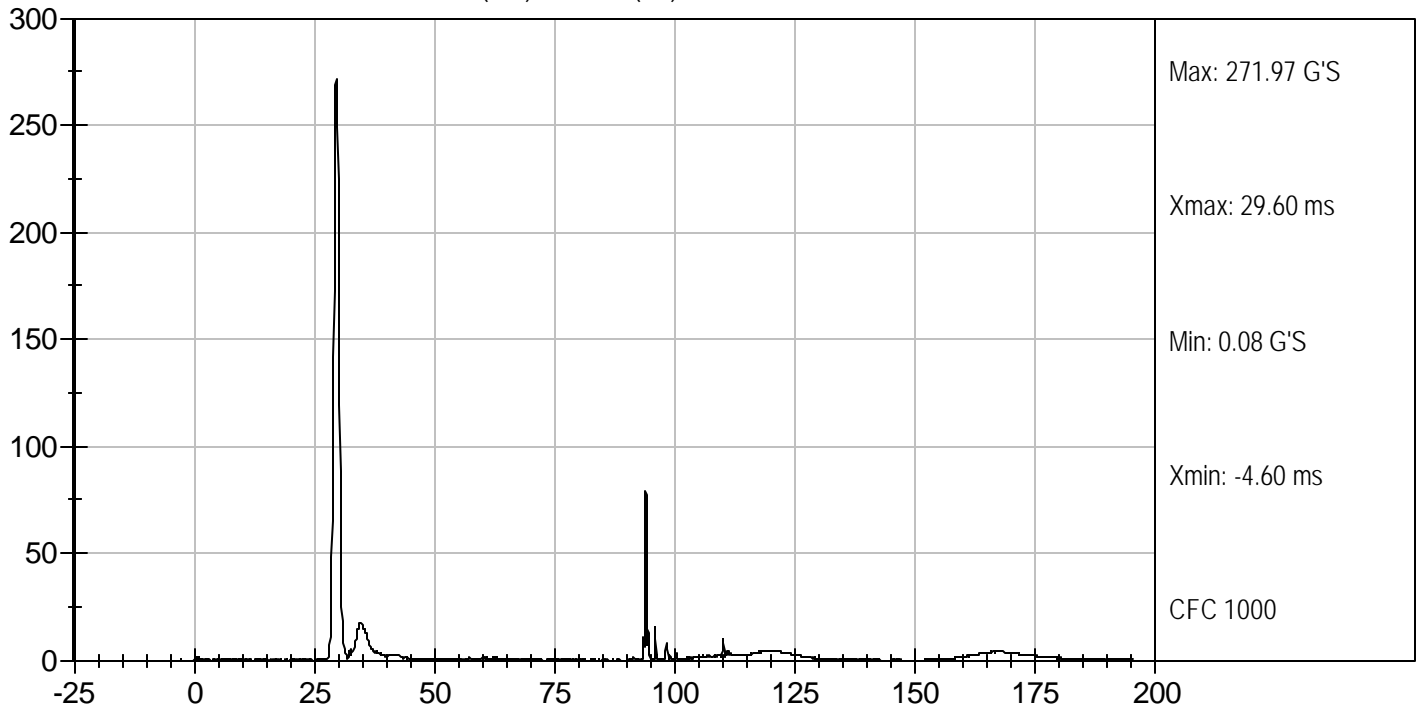
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Approved By



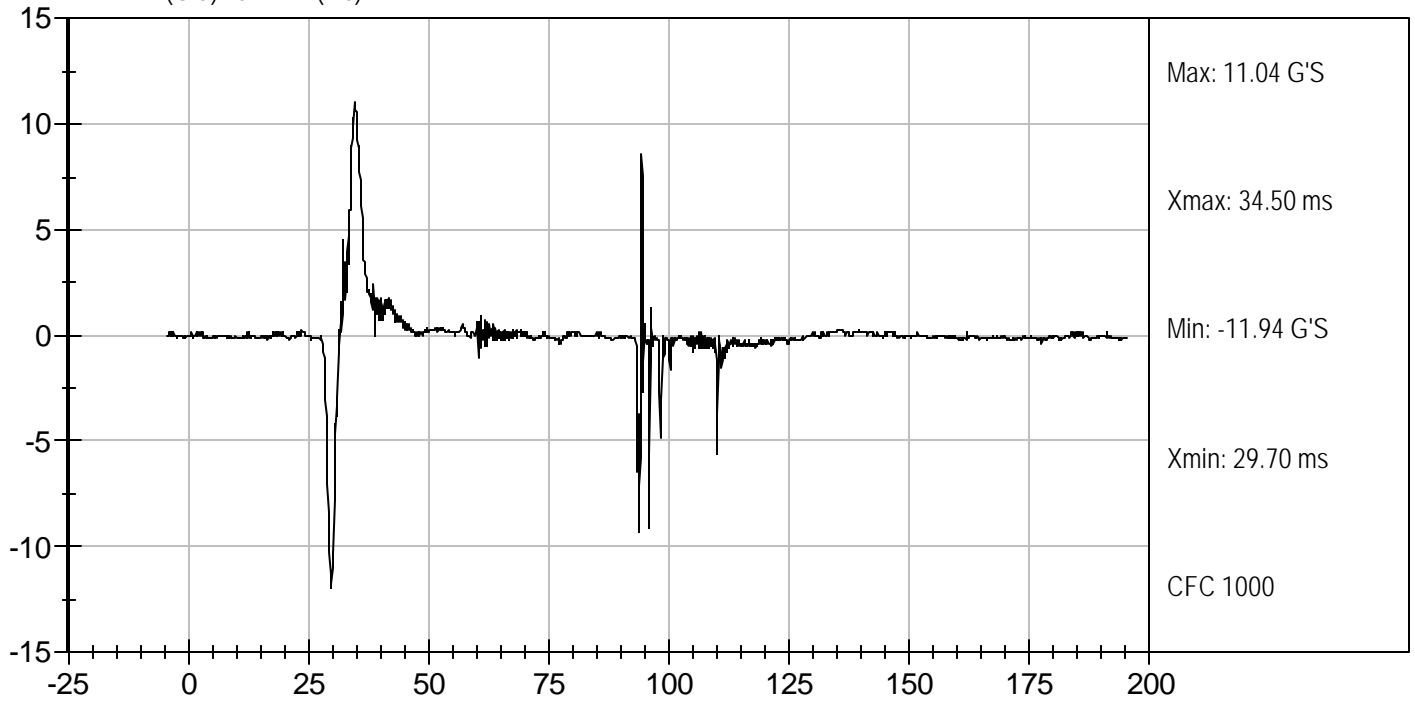
Test Desc: Head Drop  
Componet ID: D042711

Test Date: 12/01/2004  
Velocity: 0 ft/s, 0.00 m/s

HEAD RESULTANT ACCELERATION (G'S) vs TIME (ms)



HEAD Y (G'S) vs TIME (ms)



**MGA RESEARCH CORPORATION  
NECK FLEXION TEST  
HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 065

Test I.D.: D042712

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.8	Pass
Laboratory Relative Humidity		%	10 to 70	27	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.91	Pass
Pendulum Deceleration	10 msec	G's	22.50 to 27.50	24.27	Pass
	20 msec	G's	17.60 to 22.60	20.57	Pass
	30 msec	G's	12.50 to 18.50	16.32	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 29.0	16.27	Pass
Deceleration Decay Time to Cross 5 G's		msec	34.0 to 42.0	37.4	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	75.4	Pass
	Time	msec	57.0 to 64.0	58.7	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	113.0 to 128.0	114.2	Pass
Moment About Occipital Condyle	Maximum	N m	88.1 to 108.5	99.8	Pass
	Time	msec	47.0 to 58.0	49.9	Pass
Positive Moment Decay Time To Zero Crossing		msec	97.0 to 107.0	104.2	Pass
Overall Test Results					Pass

*Joe Fleck*

\_\_\_\_\_  
Laboratory Technician

12/01/2004

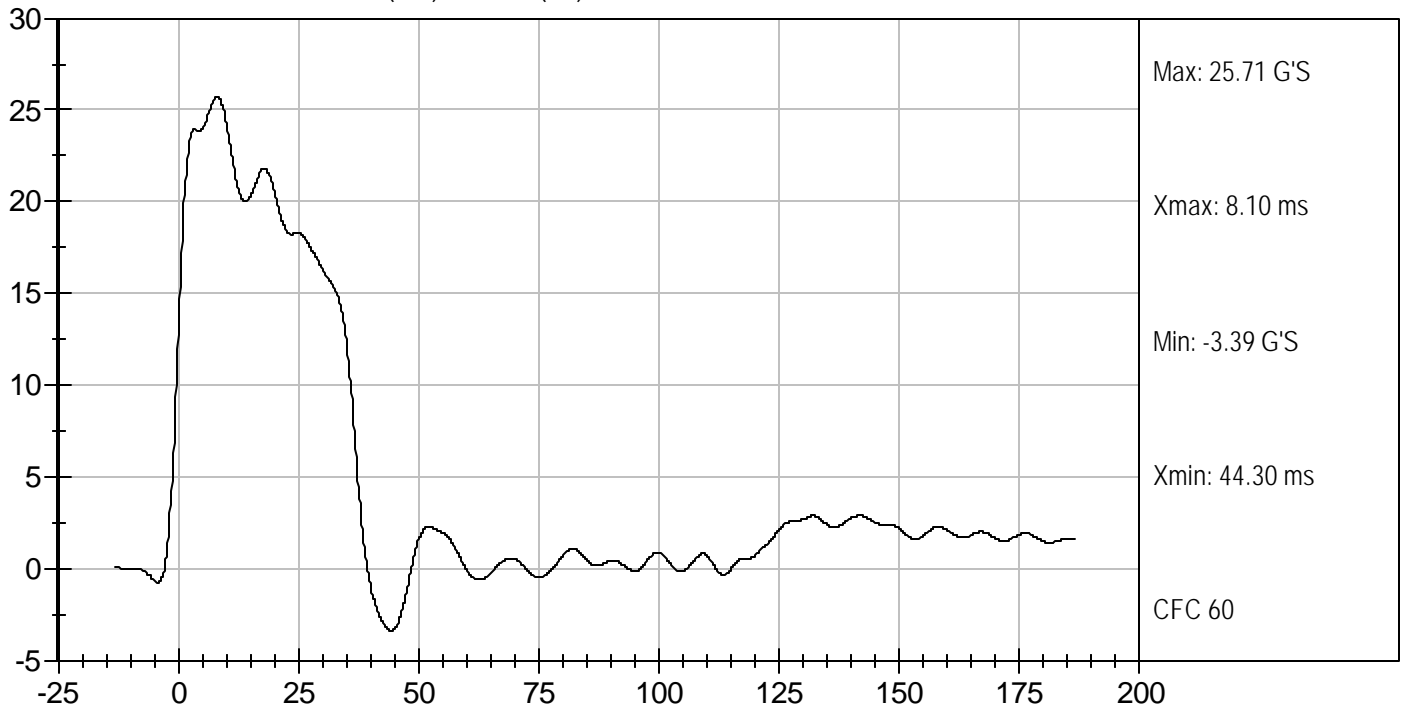
\_\_\_\_\_  
Test Date

*David Winkelbauer*

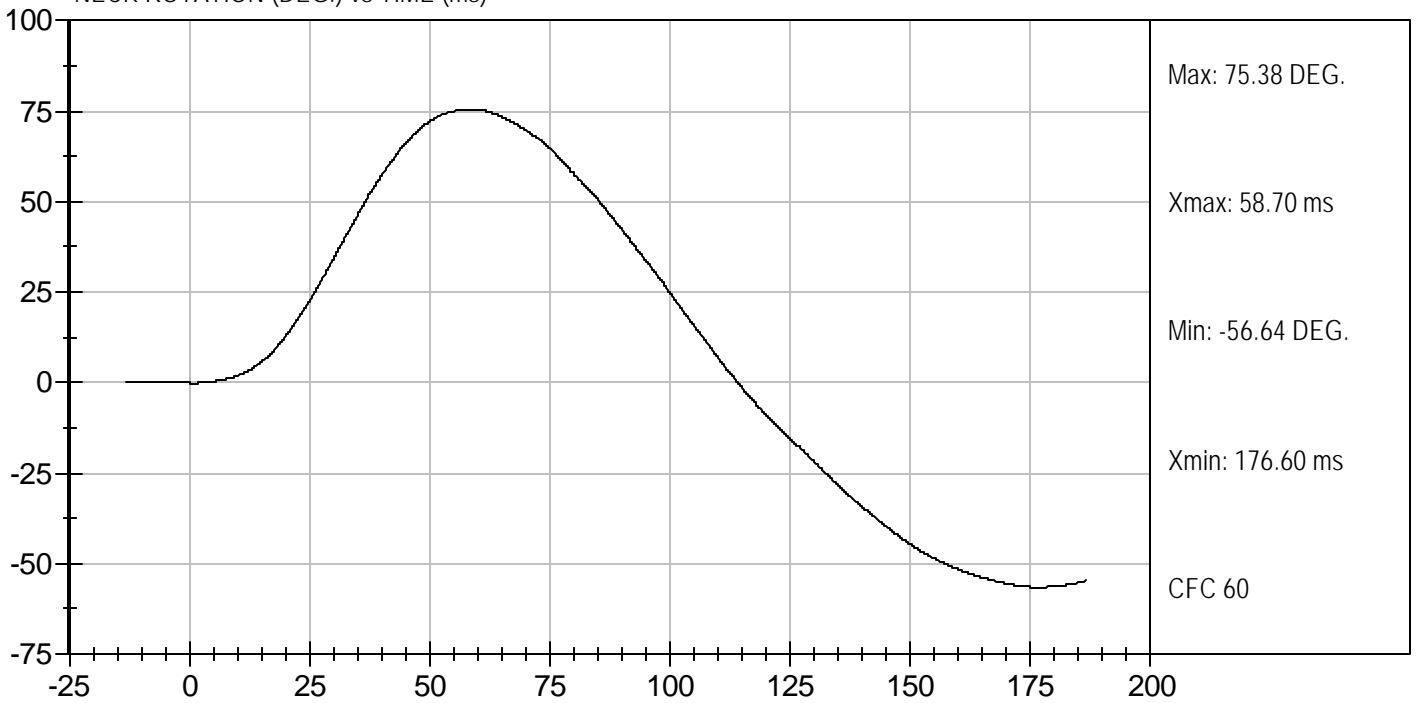
\_\_\_\_\_  
Approved By



PENDULUM DECELERATION (G'S) vs TIME (ms)



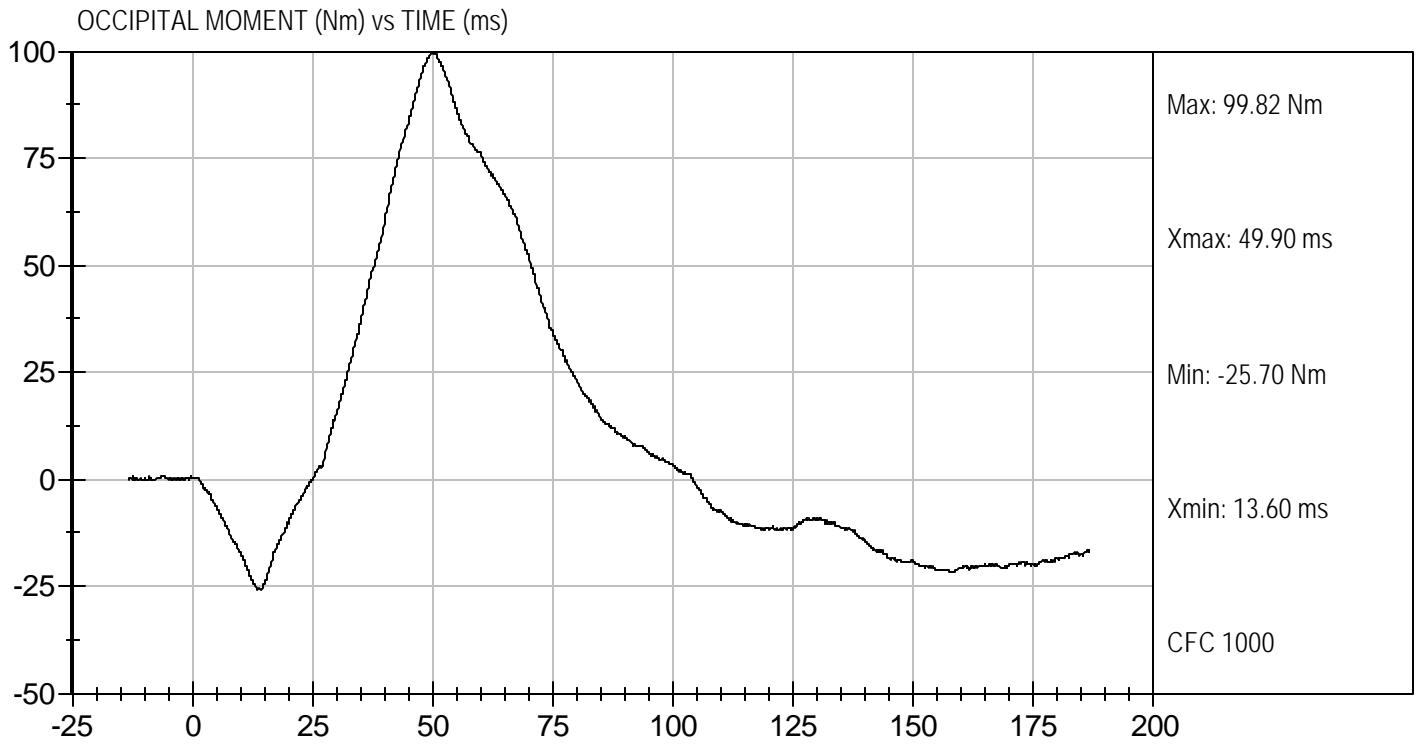
NECK ROTATION (DEG.) vs TIME (ms)





Test Desc: Neck Flexion  
Componet ID: D042712

Test Date: 12/01/2004  
Velocity: 22.67 ft/s, 6.91 m/s



**MGA RESEARCH CORPORATION  
NECK EXTENSION TEST  
HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 065

Test I.D: D042713

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.8	Pass
Laboratory Relative Humidity		%	10 to 70	27	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.07	Pass
Pendulum Deceleration	10 msec	G's	17.20 to 21.20	19.58	Pass
	20 msec	G's	14.00 to 19.00	17.00	Pass
	30 msec	G's	11.00 to 16.00	12.43	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 22.0	12.38	Pass
Deceleration Decay Time to Cross 5 G's		msec	38.0 to 46.0	42.1	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	100.1	Pass
	Time	msec	72.0 to 82.0	78.2	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	147.0 to 174.0	158.2	Pass
Moment About Occipital Condyle	Maximum	N m	-52.9 to -79.9	-66.6	Pass
	Time	msec	65.0 to 79.0	73.7	Pass
Negative Moment Decay Time To Zero Crossing		msec	120.0 to 148.0	144.4	Pass
Overall Test Results					Pass

*Joe Fleck*

\_\_\_\_\_  
Laboratory Technician

12/01/2004

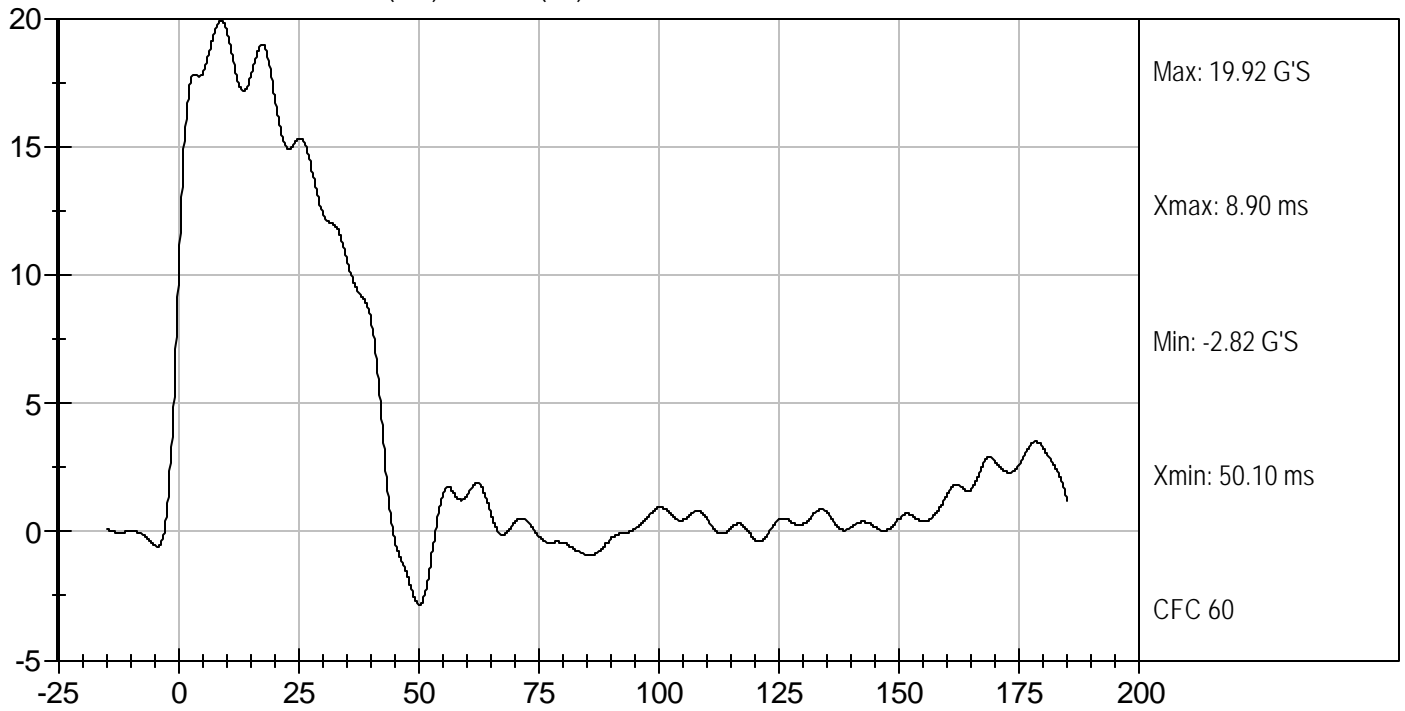
\_\_\_\_\_  
Test Date

*David Winkelbauer*

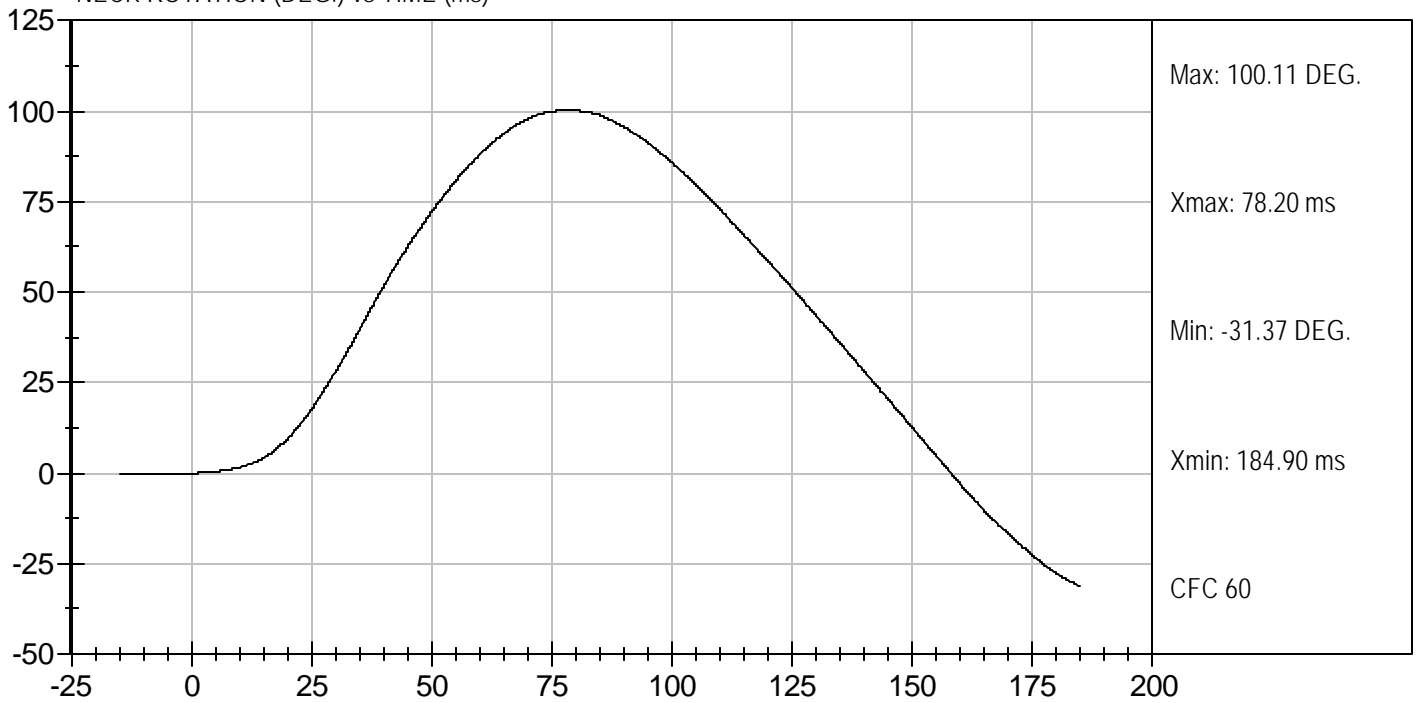
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Approved By

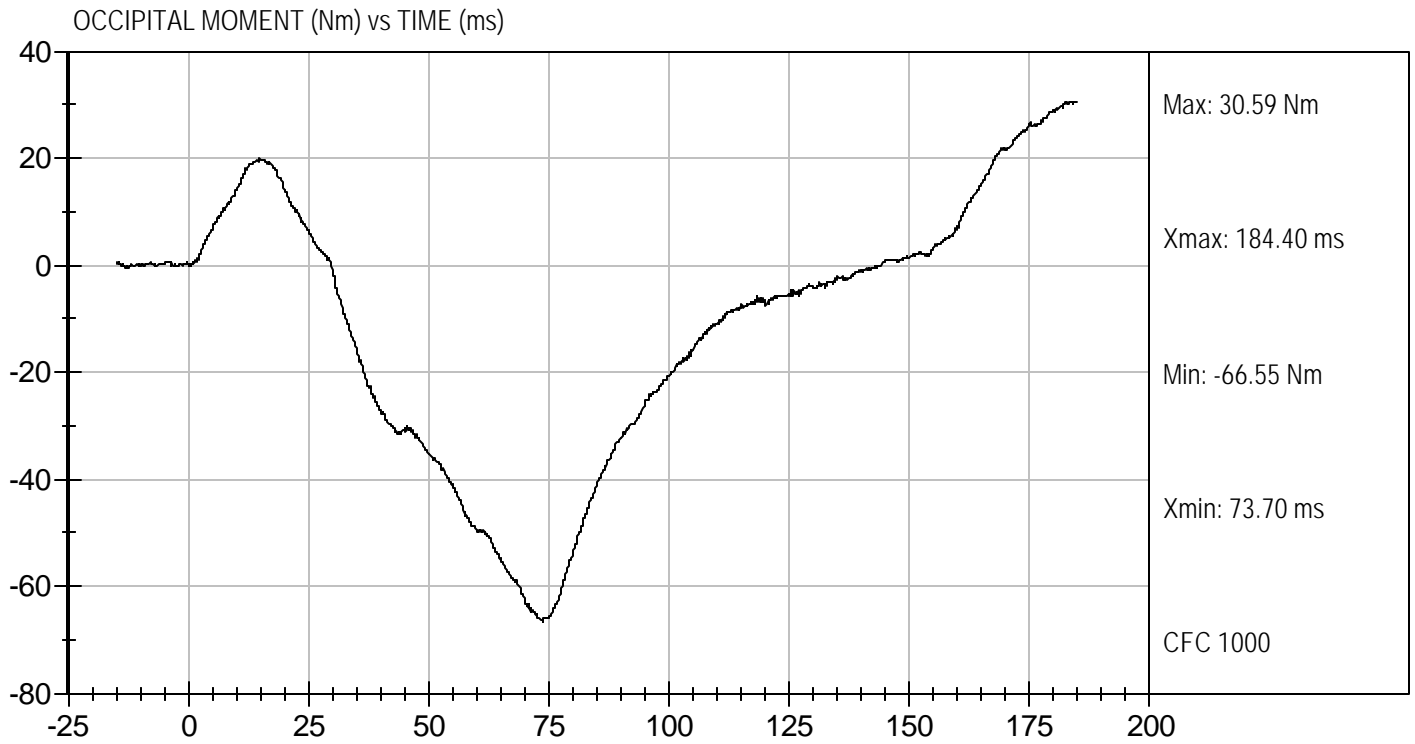


PENDULUM DECELERATION (G'S) vs TIME (ms)



NECK ROTATION (DEG.) vs TIME (ms)





**MGA RESEARCH CORPORATION  
THORAX IMPACT  
HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 065

Test I.D: D042714

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Probe Velocity	m/s	6.58 to 6.82	6.69	Pass
Peak Probe Force	N	5159 to 5893	5,747	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.62	Pass
Internal Hysteresis	%	69 to 85	74	Pass
Overall Test Results				Pass

  
Laboratory Technician

12/01/2004  
Test Date

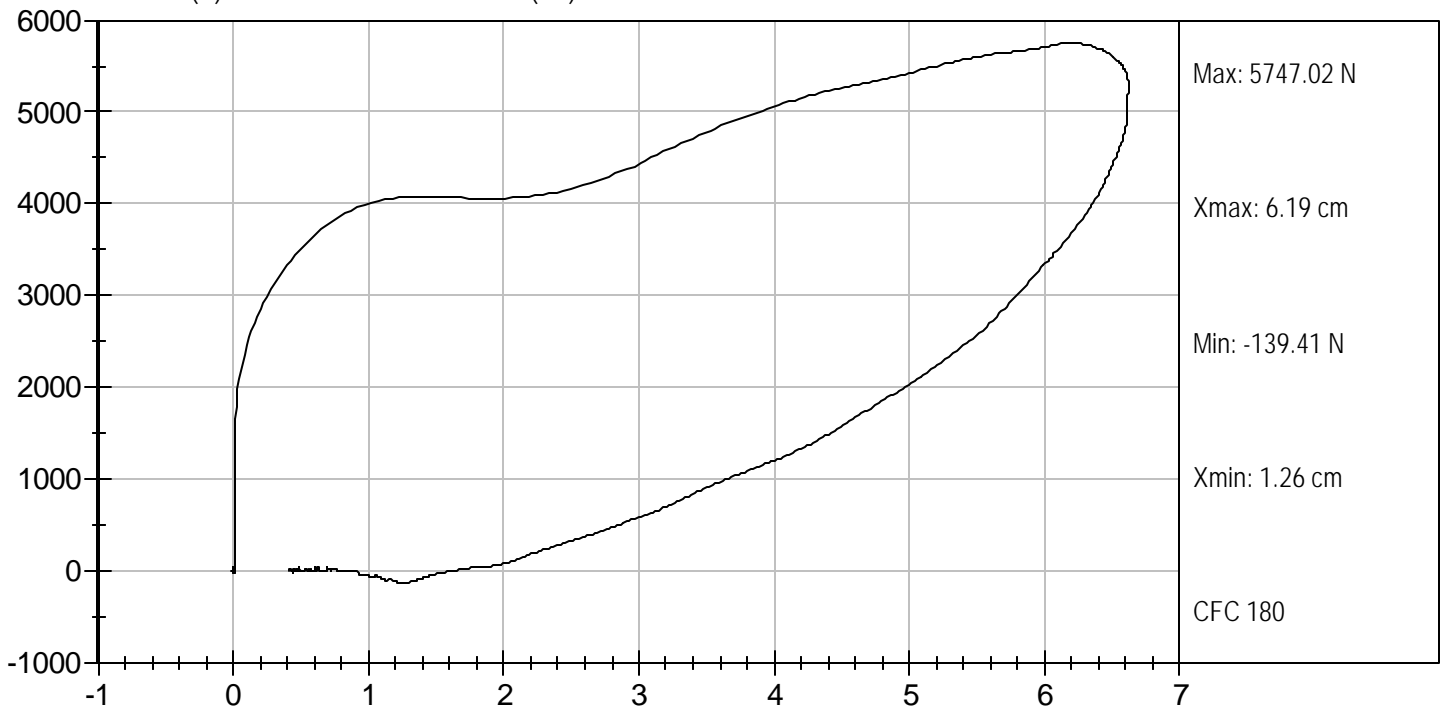
  
Approved By



Test Desc: Thorax Impact  
Componet ID: D042714

Test Date: 12/01/2004  
Velocity: 21.94 ft/s, 6.69 m/s

FORCE (N) vs CHEST DISPLACEMENT (cm)



**MGA RESEARCH CORPORATION  
RIGHT KNEE IMPACT TEST  
HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 065

Test I.D: D042715

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	27	Pass
Probe Velocity	m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force	Newtons	4715 to 5782	5,165	Pass
Overall Test Results				Pass

*Jessica Gall*  
 \_\_\_\_\_  
 Laboratory Technician

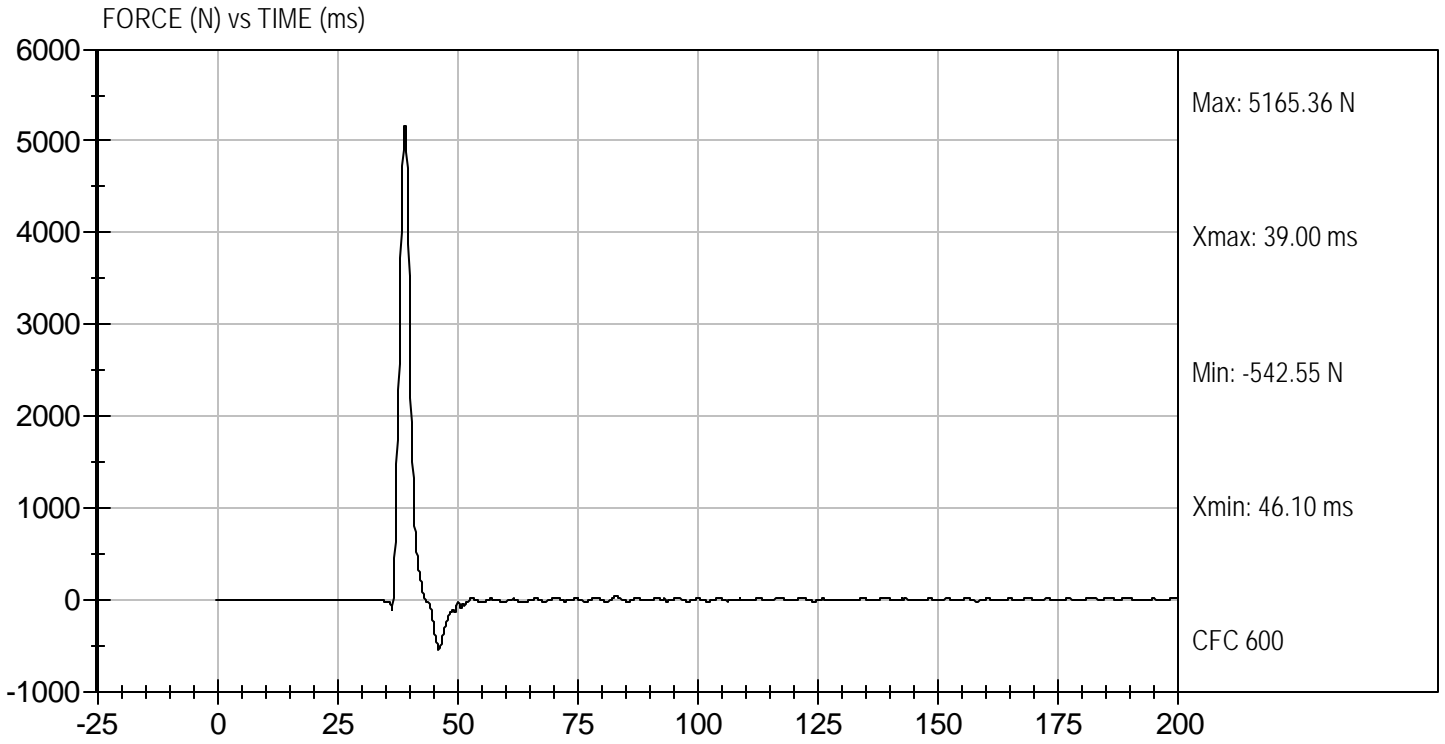
*David Winkelbauer*  
 \_\_\_\_\_  
 Approved By

12/01/2004  
 \_\_\_\_\_  
 Test Date



Test Desc: Right Knee  
Componet ID: D042715

Test Date: 12/01/2004  
Velocity: 6.9 ft/s, 2.10 m/s



**MGA RESEARCH CORPORATION**  
**LEFT KNEE IMPACT TEST**  
**HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 065

Test I.D: D042716

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Velocity	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	5,579	Pass
Overall Test Results				Pass

*Jessica Gall*  
 \_\_\_\_\_  
 Laboratory Technician

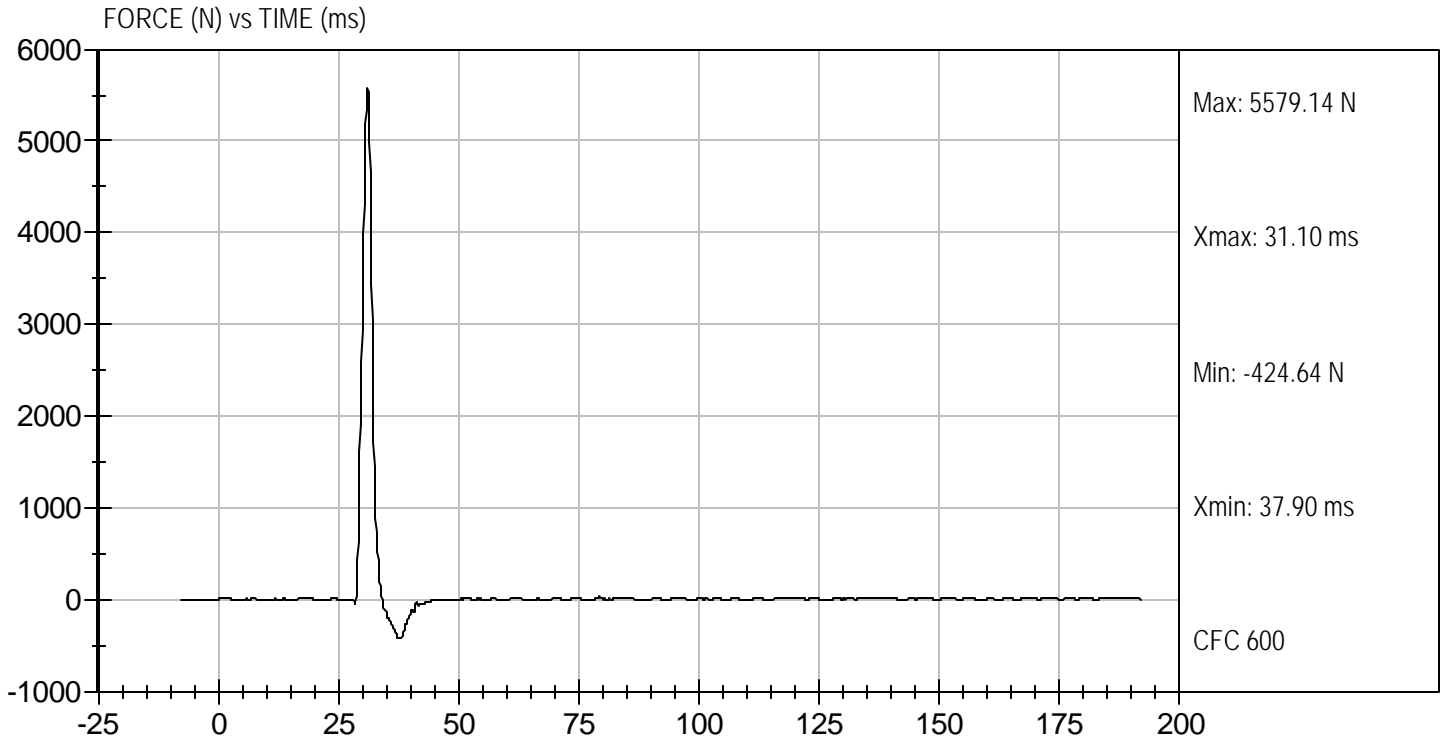
12/01/2004  
 \_\_\_\_\_  
 Test Date

*David Winkelbauer*  
 \_\_\_\_\_  
 Approved By



Test Desc: Left Knee  
Componet ID: D042716

Test Date: 12/01/2004  
Velocity: 6.87 ft/s, 2.09 m/s



**MGA RESEARCH CORPORATION**  
**HIP-FEMUR FLEXION TEST**  
**HYBRID III 50TH PERCENTILE MALE**


ATD Serial No: 065

Test I.D: D042710

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.0	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	27	27	Pass
Rotation Rate	deg/sec	5 -10	8	8	Pass
30 Degrees	Nm	94.9 Nm Max	70.4	69.7	Pass
150 ft-lbf / 203.4 Nm	Deg	40- 50 Degree Max Rotation	44	44	Pass
Overall Test Results					Pass

  
 \_\_\_\_\_  
 Laboratory Technician

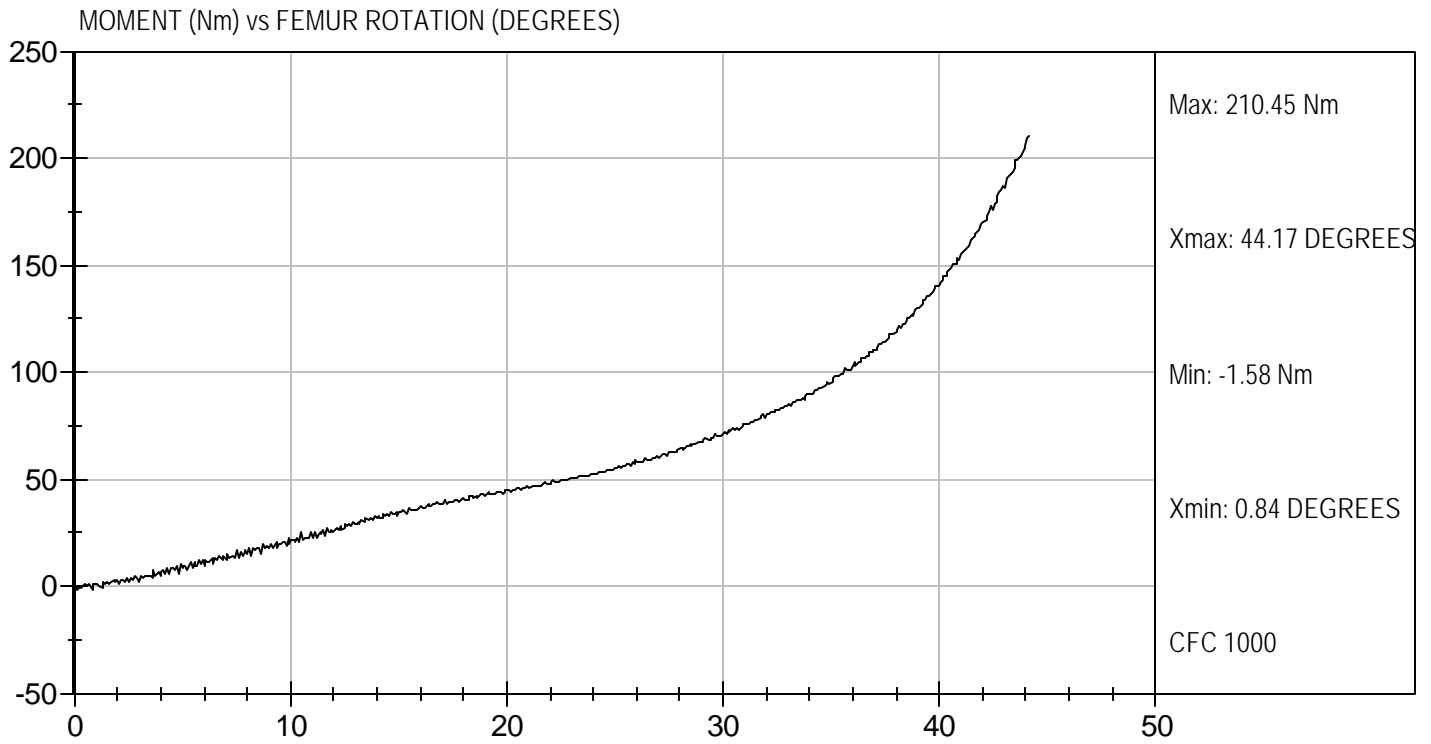
12/01/2004  
 \_\_\_\_\_  
 Test Date

  
 \_\_\_\_\_  
 Approved By



Test Desc: Hip Femur Flexion  
Componet ID: D042719

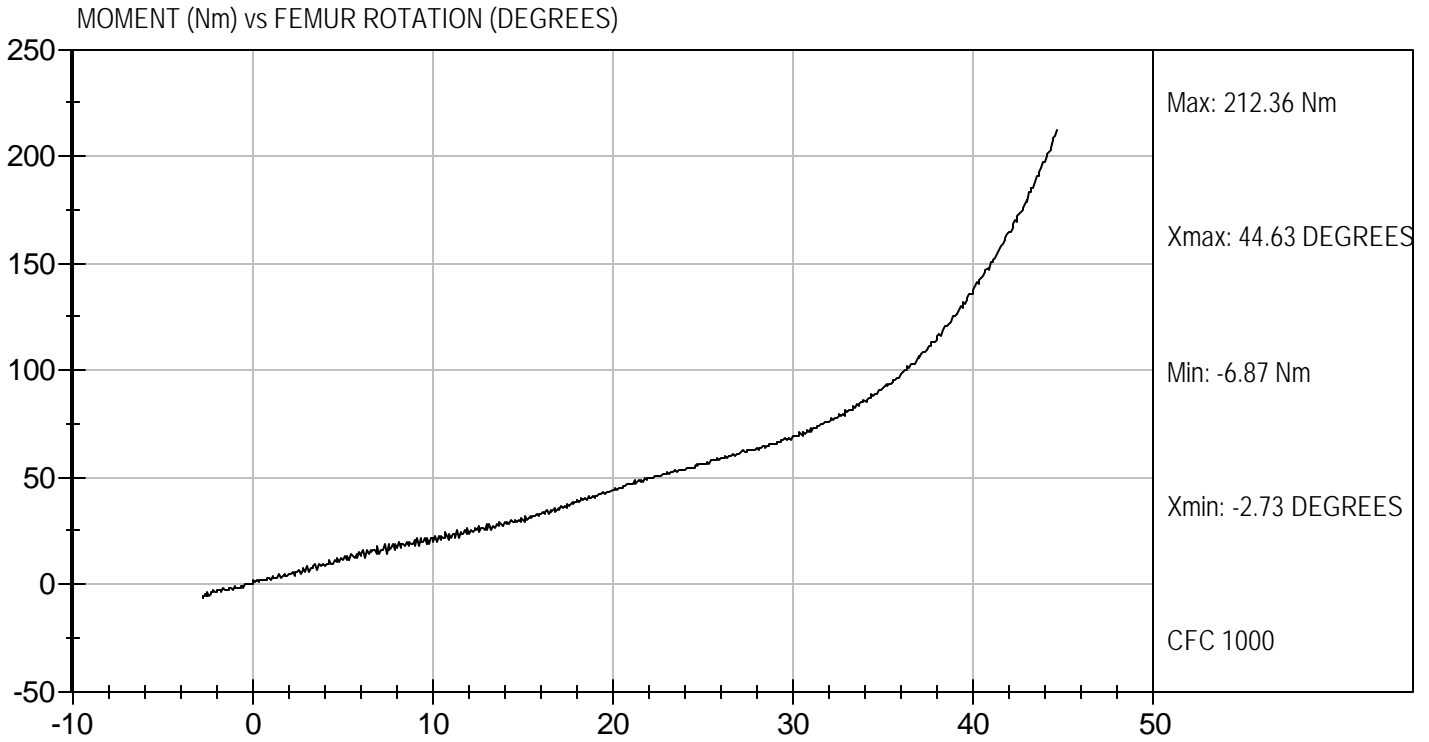
Test Date: 12/01/2004  
Velocity: 0 ft/s, 0.00 m/s





Test Desc: Hip Femur Flexion  
Componet ID: D042710

Test Date: 12/01/2004  
Velocity: 0 ft/s, 0.00 m/s



**MGA RESEARCH CORPORATION  
HEAD DROP TEST  
HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 066

Test ID: D042721

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.6	20.5	Pass
Laboratory Relative Humidity	%	10 to 70	27	Pass
Peak Resultant Acceleration	G's	225 - 275	251	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-12.2	Pass
Unimodal	Yes/No	NA	Yes	Pass
Oscillations	Yes/No	within 10% of peak	Yes	Pass
Overall Test Results				Pass



\_\_\_\_\_  
Laboratory Technician

12/01/2004

\_\_\_\_\_  
Test Date



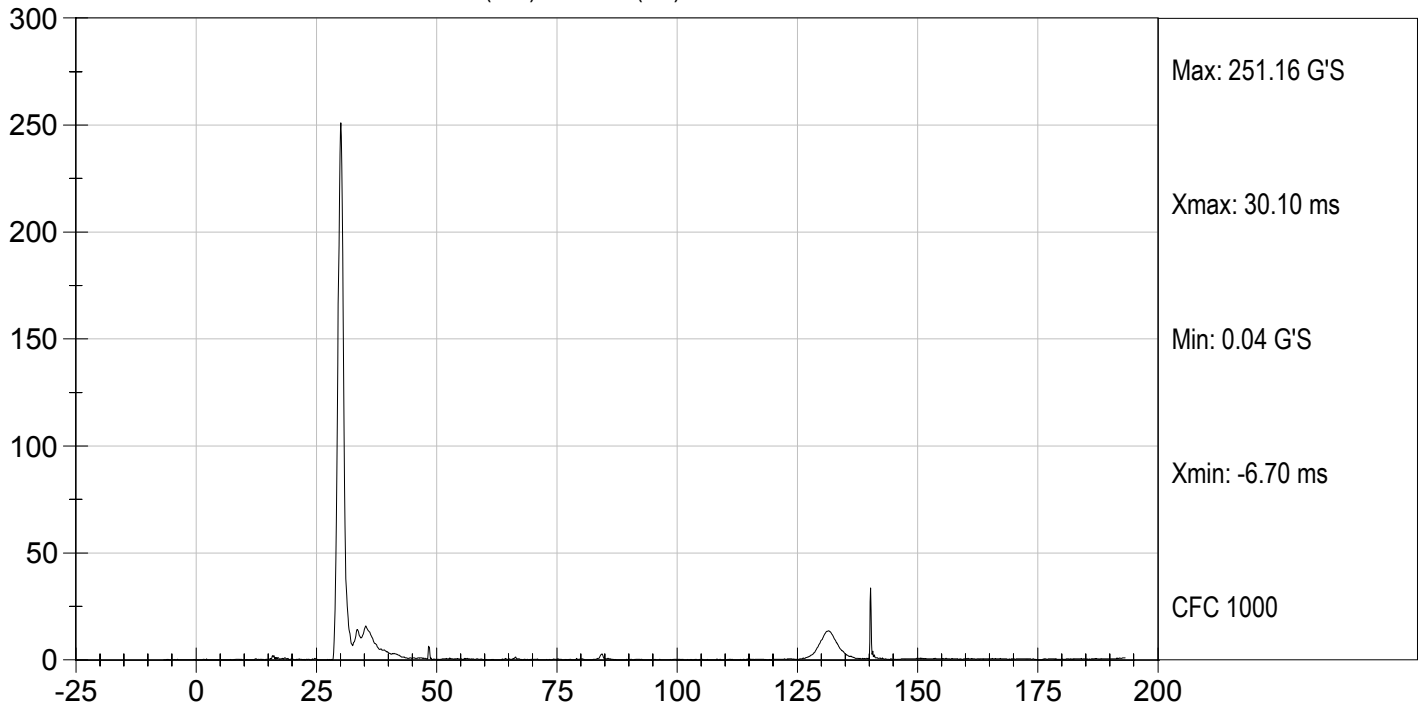
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Approved By



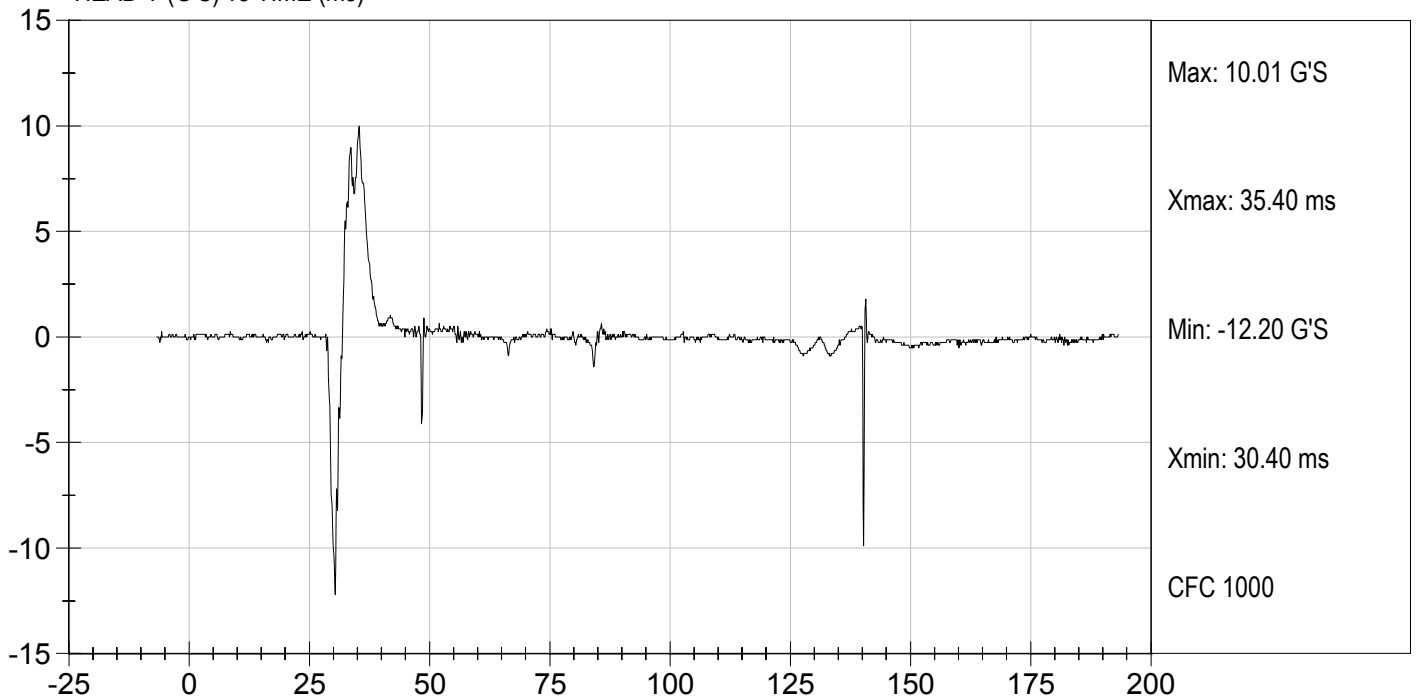
Test Desc: Head Drop  
Componet ID: D042721

Test Date: 12/01/2004  
Velocity: 0 ft/s, 0.00 m/s

HEAD RESULTANT ACCELERATION (G'S) vs TIME (ms)



HEAD Y (G'S) vs TIME (ms)



**MGA RESEARCH CORPORATION  
NECK FLEXION TEST  
HYBRID III 50TH PERCENTILE MALE**


ATD Serial No: 066

Test I.D.: D042722

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.8	Pass
Laboratory Relative Humidity		%	10 to 70	27	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.00	Pass
Pendulum Deceleration	10 msec	G's	22.50 to 27.50	24.12	Pass
	20 msec	G's	17.60 to 22.60	20.41	Pass
	30 msec	G's	12.50 to 18.50	14.59	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 29.0	14.50	Pass
Deceleration Decay Time to Cross 5 G's		msec	34.0 to 42.0	39.6	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	71.3	Pass
	Time	msec	57.0 to 64.0	58.0	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	113.0 to 128.0	113.6	Pass
Moment About Occipital Condyle	Maximum	N m	88.1 to 108.5	95.3	Pass
	Time	msec	47.0 to 58.0	52.3	Pass
Positive Moment Decay Time To Zero Crossing		msec	97.0 to 107.0	101.4	Pass
Overall Test Results					Pass

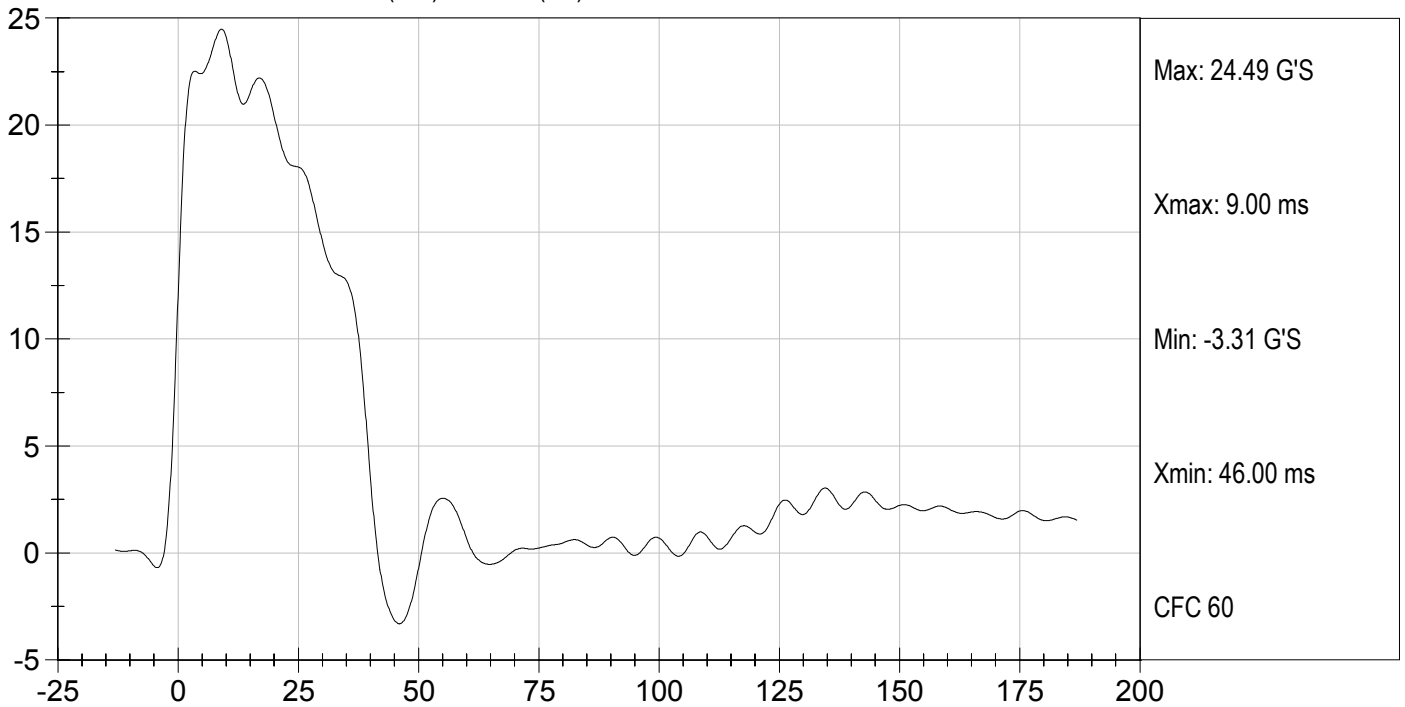
  
\_\_\_\_\_  
Laboratory Technician

12/01/2004  
\_\_\_\_\_  
Test Date

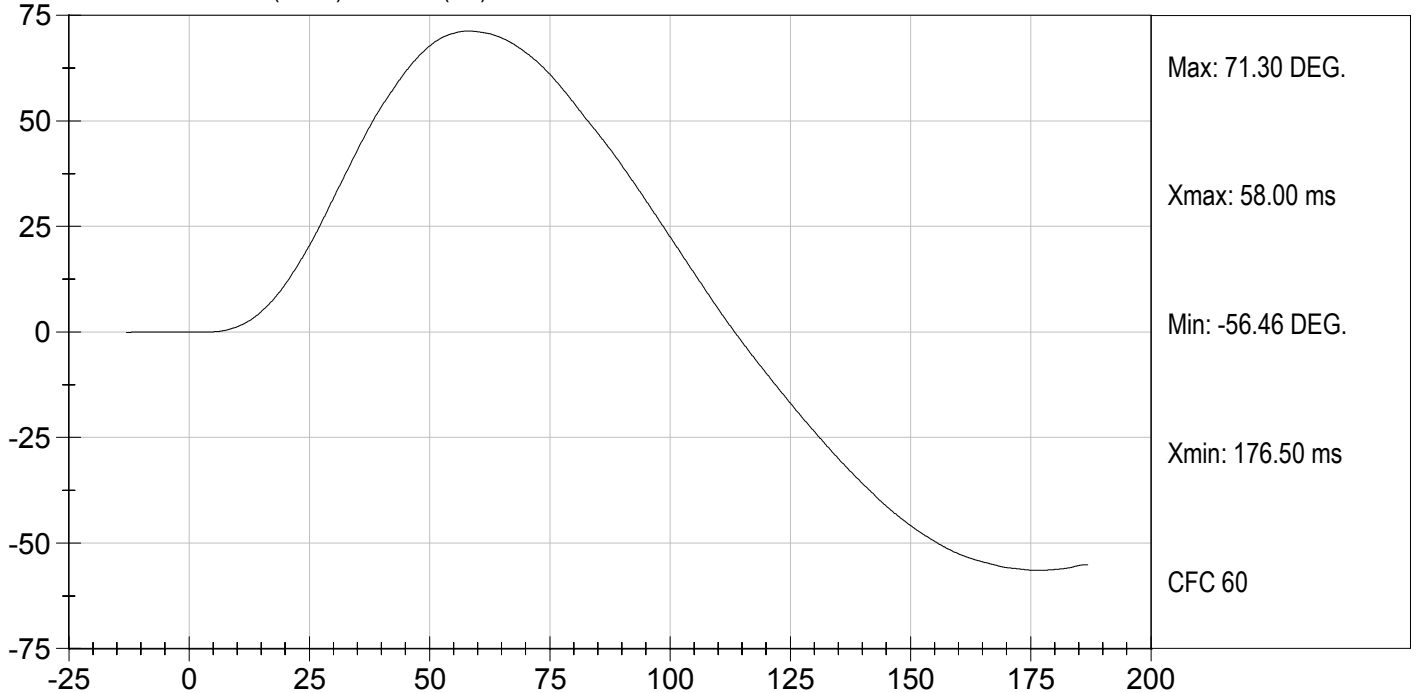
  
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Approved By



PENDULUM DECELERATION (G'S) vs TIME (ms)



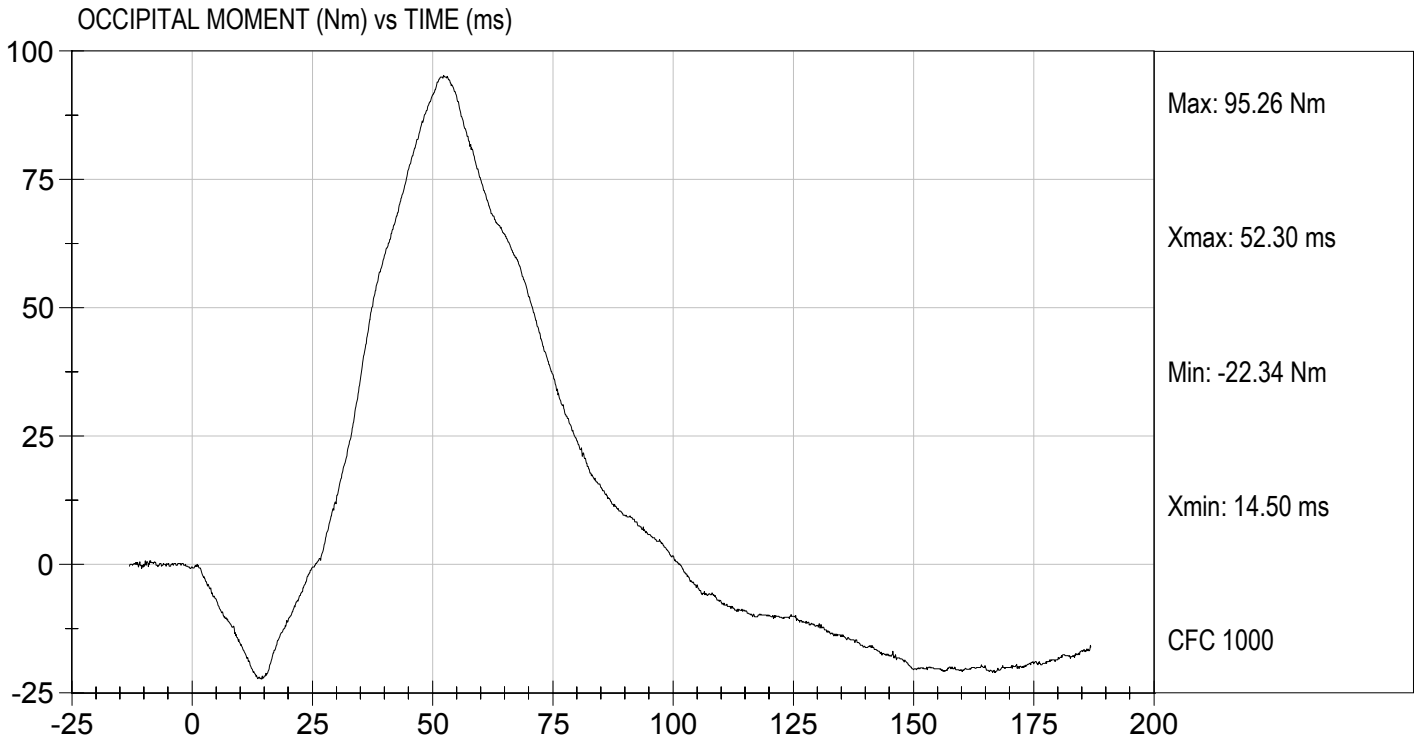
NECK ROTATION (DEG.) vs TIME (ms)





Test Desc: Neck Flexion  
Componet ID: D042722

Test Date: 12/01/2004  
Velocity: 22.97 ft/s, 7.00 m/s



**MGA RESEARCH CORPORATION  
NECK EXTENSION TEST  
HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 066

Test I.D.: D042723

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity		%	10 to 70	26	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.07	Pass
Pendulum Deceleration	10 msec	G's	17.20 to 21.20	20.12	Pass
	20 msec	G's	14.00 to 19.00	15.95	Pass
	30 msec	G's	11.00 to 16.00	12.55	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 22.0	12.48	Pass
Deceleration Decay Time to Cross 5 G's		msec	38.0 to 46.0	42.2	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	100.9	Pass
	Time	msec	72.0 to 82.0	79.0	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	147.0 to 174.0	157.4	Pass
Moment About Occipital Condyle	Maximum	N m	-52.9 to -79.9	-67.7	Pass
	Time	msec	65.0 to 79.0	73.9	Pass
Negative Moment Decay Time To Zero Crossing		msec	120.0 to 148.0	145.6	Pass
Overall Test Results					Pass

*Joe Fleck*

\_\_\_\_\_  
Laboratory Technician

12/01/2004

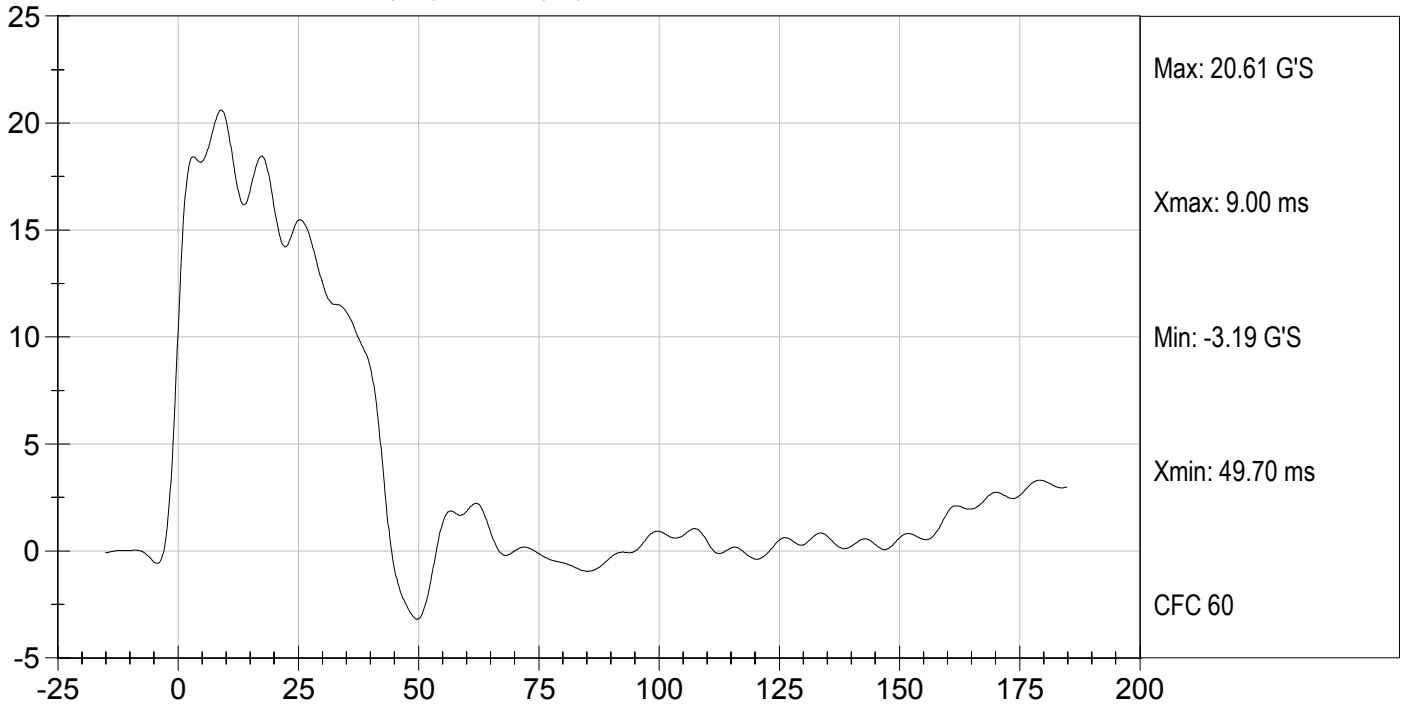
\_\_\_\_\_  
Test Date

*David Winkelbauer*

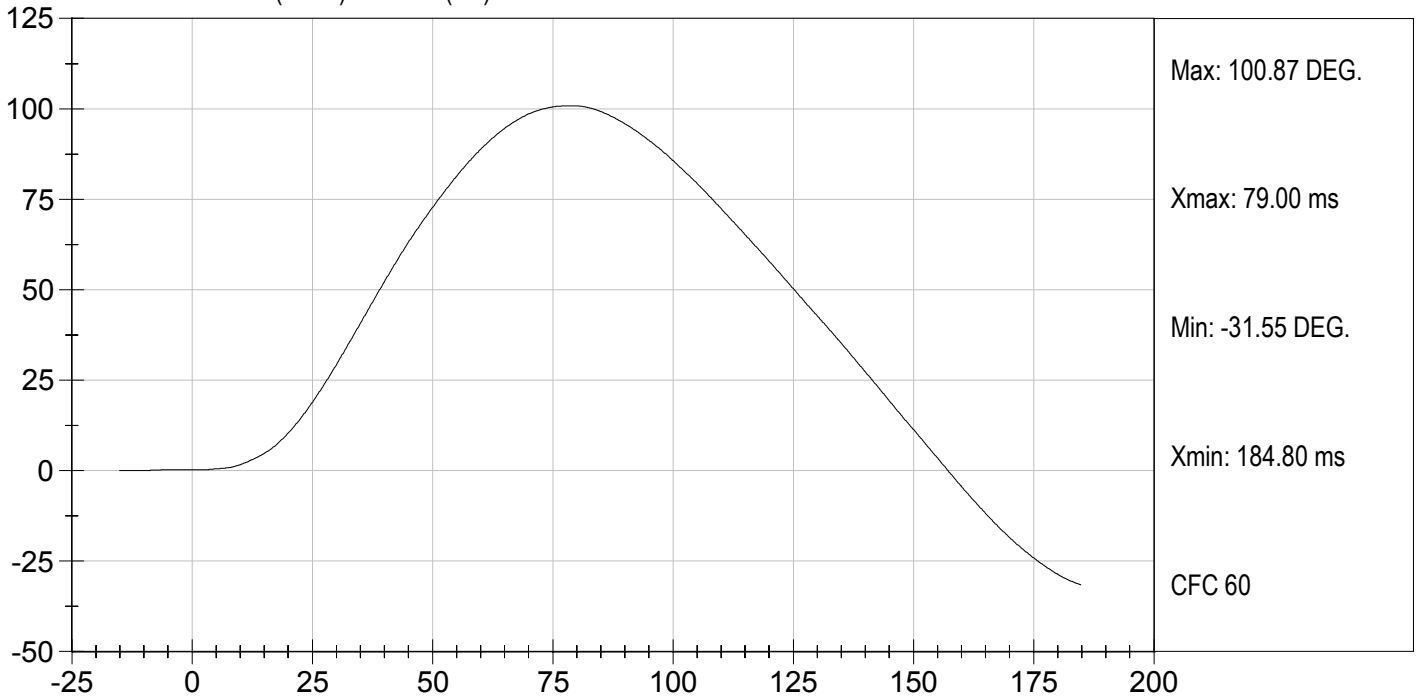
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Approved By



PENDULUM DECELERATION (G'S) vs TIME (ms)



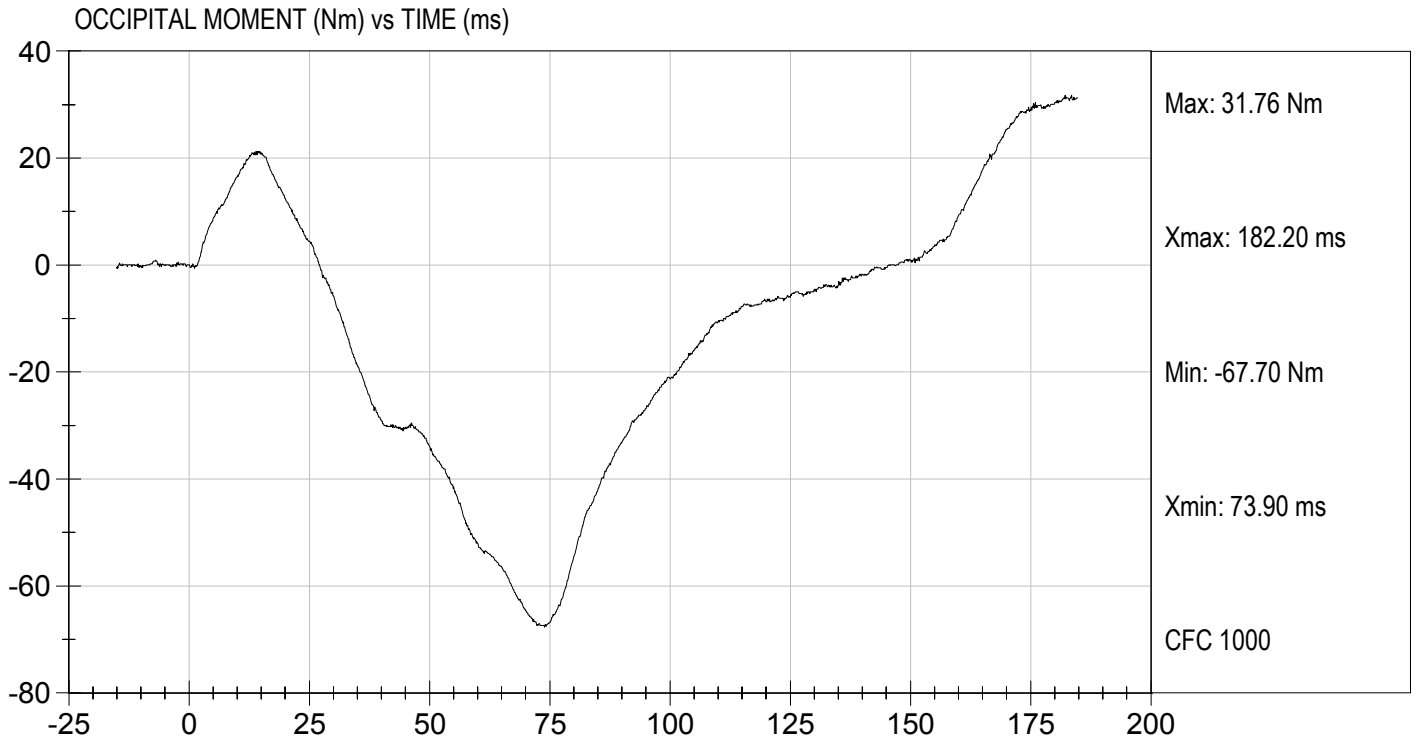
NECK ROTATION (DEG.) vs TIME (ms)





Test Desc: Neck Extension  
Componet ID: D042723

Test Date: 12/01/2004  
Velocity: 19.91 ft/s, 6.07 m/s



**MGA RESEARCH CORPORATION  
THORAX IMPACT  
HYBRID III 50TH PERCENTILE MALE**

**ATD Serial No:** 066

**Test I.D.:** D042724

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Probe Velocity	m/s	6.58 to 6.82	6.72	Pass
Peak Probe Force	N	5159 to 5893	5,873	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.67	Pass
Internal Hysteresis	%	69 to 85	71	Pass
Overall Test Results				Pass

  
 Laboratory Technician

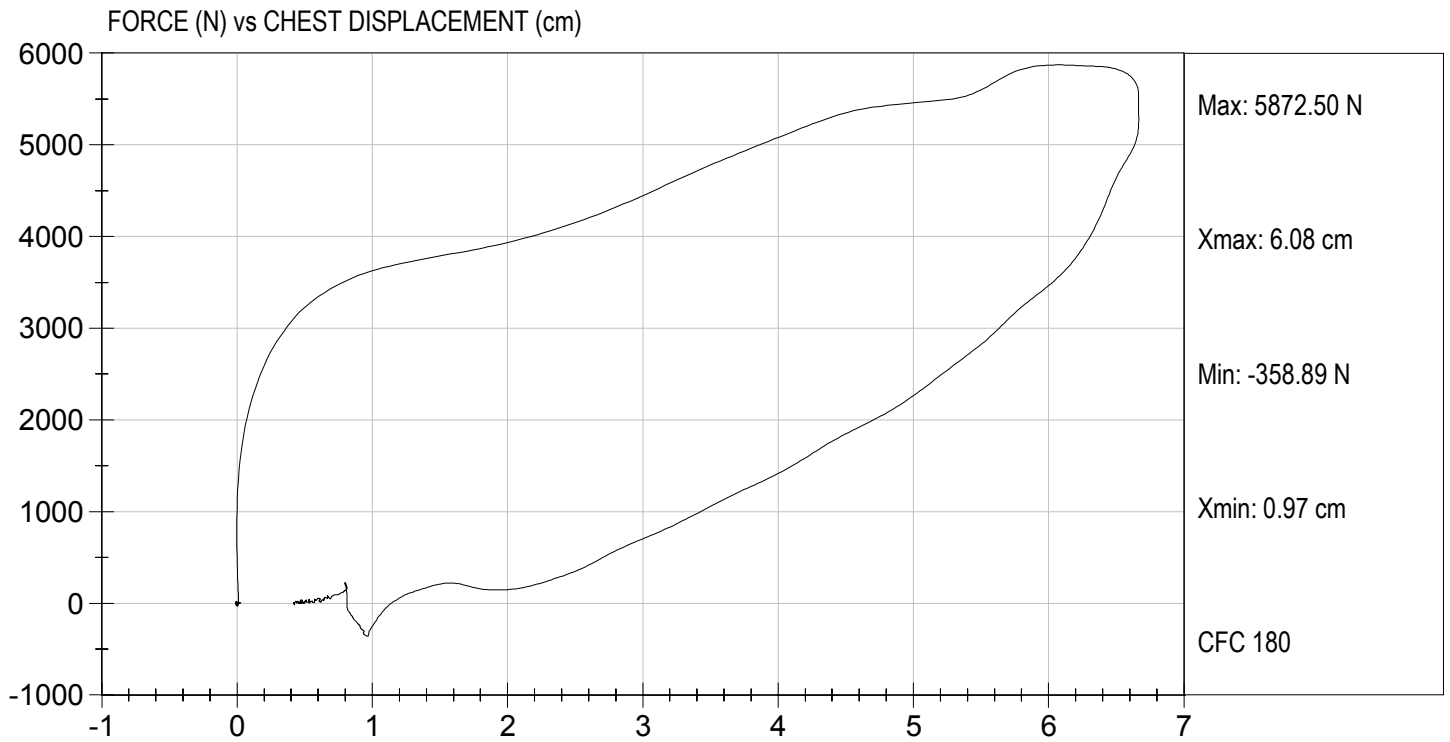
12/01/2004  
 Test Date

  
 Approved By



Test Desc: Thorax Impact  
Componet ID: D042724

Test Date: 12/01/2004  
Velocity: 22.04 ft/s, 6.72 m/s



**MGA RESEARCH CORPORATION  
RIGHT KNEE IMPACT TEST  
HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 66,

Test I.D.: D042725

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Velocity	m/sec	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	4715 to 5782	4,879	Pass
Overall Test Results				Pass

*Jessica Gall*  
 \_\_\_\_\_  
 Laboratory Technician

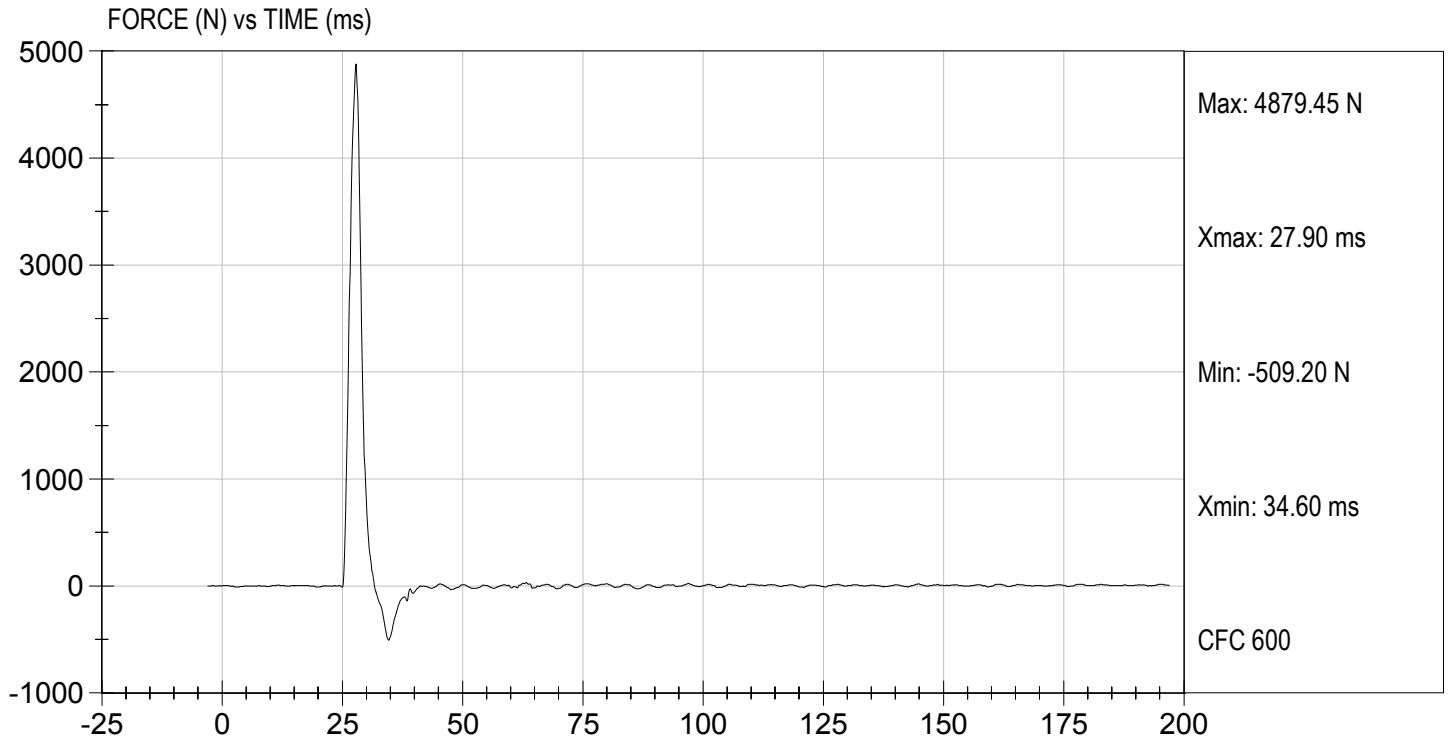
12/01/2004  
 \_\_\_\_\_  
 Test Date

*David Winkelbauer*  
 \_\_\_\_\_  
 Approved By



Test Desc: Right Knee  
Componet ID: D042725

Test Date: 12/01/2004  
Velocity: 6.93 ft/s, 2.11 m/s



**MGA RESEARCH CORPORATION**  
**LEFT KNEE IMPACT TEST**  
**HYBRID III 50TH PERCENTILE MALE**

ATD Serial No: 66,

Test I.D.: D042726

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Velocity	m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force	Newtons	4715 to 5782	5,150	Pass
Overall Test Results				Pass

*Jessica Gall*  
 \_\_\_\_\_  
 Laboratory Technician

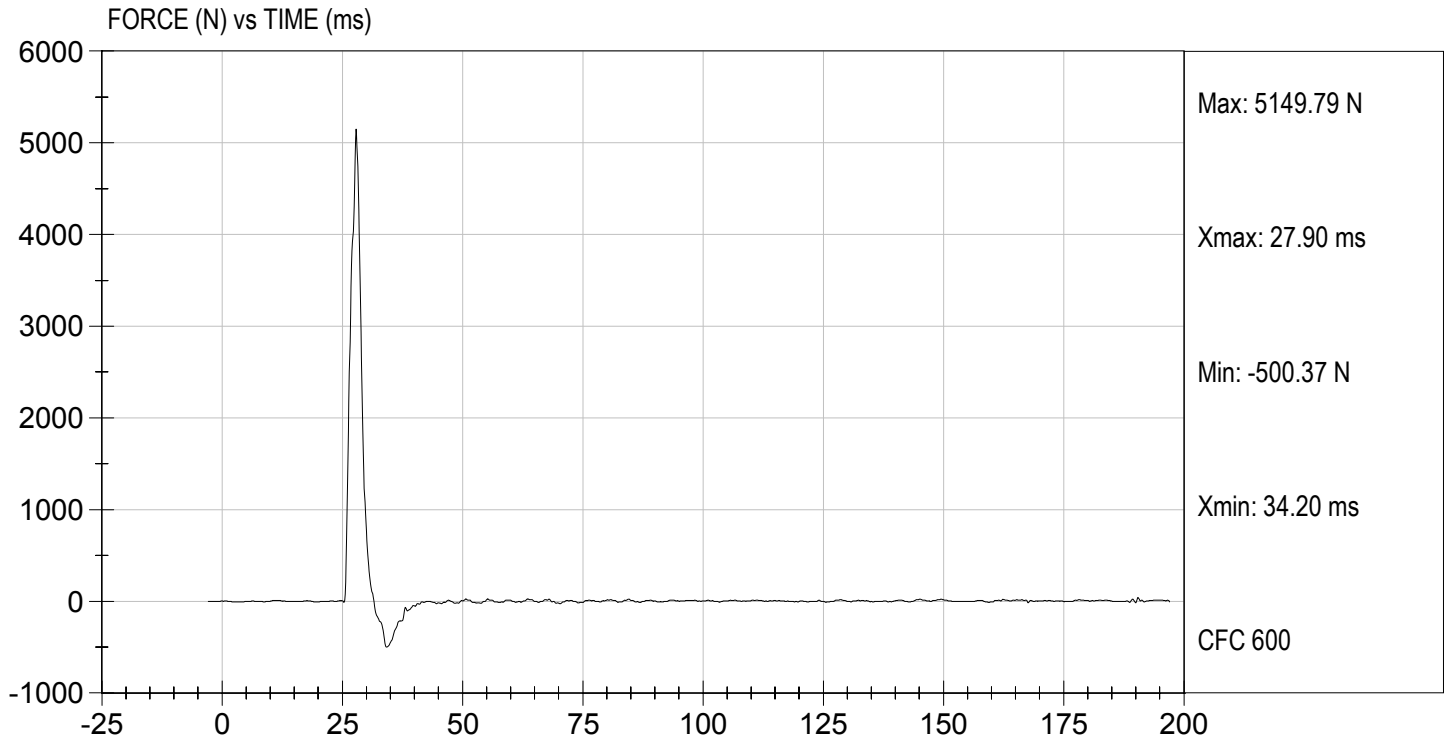
12/01/2004  
 \_\_\_\_\_  
 Test Date

*David Winkelbauer*  
 \_\_\_\_\_  
 Approved By



Test Desc: Left Knee  
Componet ID: D042726

Test Date: 12/01/2004  
Velocity: 6.9 ft/s, 2.10 m/s



**MGA RESEARCH CORPORATION  
HIP-FEMUR FLEXION TEST  
HYBRID III 50TH PERCENTILE MALE**


**ATD Serial No:** 066

**Test I.D:** D042720

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	27	27	Pass
Rotation Rate	deg/sec	5 -10	8	8	Pass
30 Degrees	Nm	94.9 Nm Max	83.3	79.2	Pass
150 ft-lbf / 203.4 Nm	Deg	40- 50 Degree Max Rotation	42	40	Pass
Overall Test Results					Pass

  
Laboratory Technician

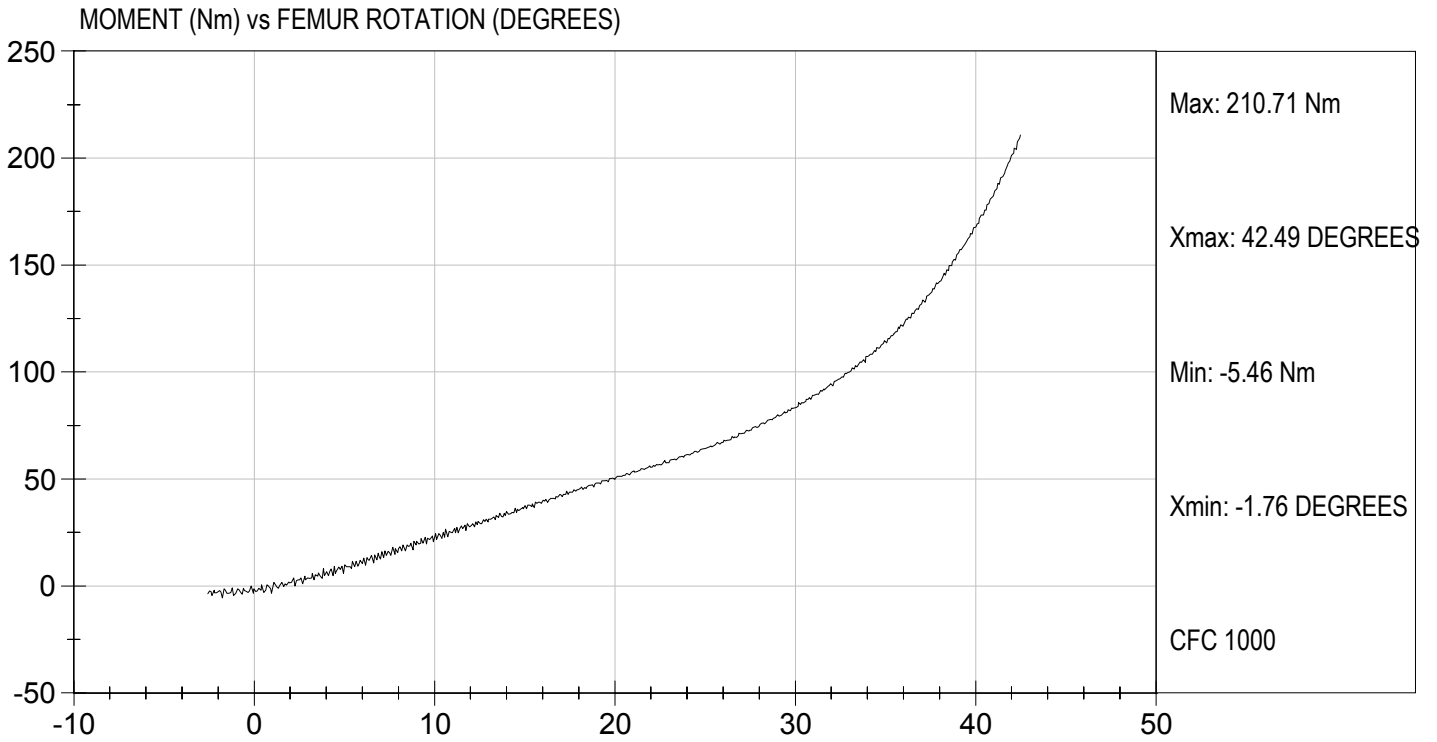
12/01/2004  
Test Date

  
Approved By



Test Desc: Hip Femur Flexion  
Componet ID: D042729

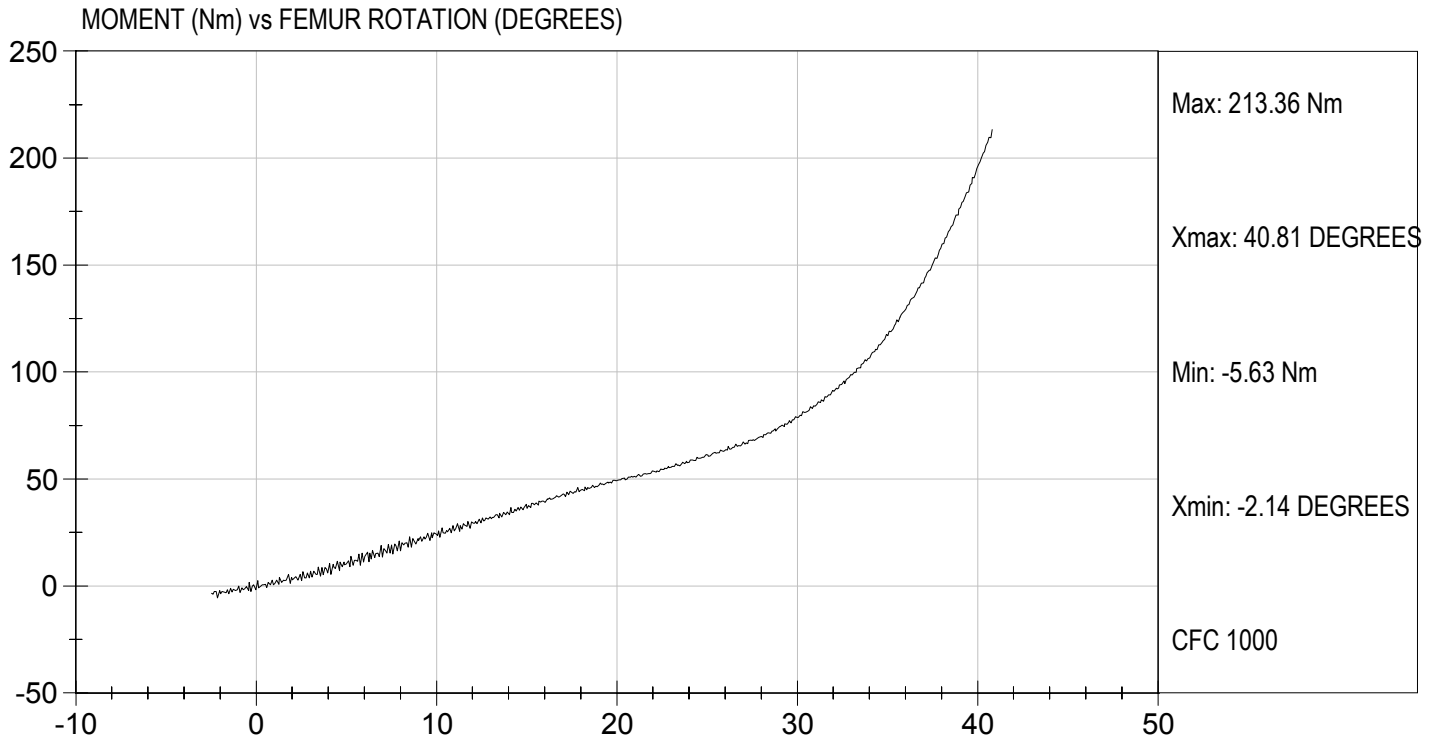
Test Date: 12/01/2004  
Velocity: 0 ft/s, 0.00 m/s





Test Desc: Hip Femur Flexion  
Componet ID: D042720

Test Date: 12/01/2004  
Velocity: 0 ft/s, 0.00 m/s



## **APPENDIX D**

### **TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION**

### INSTRUMENTS FOR DRIVER DUMMY NO. 065

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	P27020	Endevco	8/04/04
Head Y	P27025	Endevco	8/04/04
Head Z	P22692	Endevco	8/04/04
Head X Redundant	J10431	Endevco	8/04/04
Head Y Redundant	P26986	Endevco	8/04/04
Head Z Redundant	AN9E3	Endevco	8/04/04
Neck Load Cell	443	Denton	7/20/04
Chest X	AMT78	Endevco	8/04/04
Chest Y	AP1Y8	Endevco	8/04/04
Chest Z	J11361	Endevco	8/04/04
Chest Deflection Gauge	065	Servo	8/03/04
Chest X Redundant	ALFP5	Endevco	8/04/04
Chest Y Redundant	AP138	Endevco	8/04/04
Chest Z Redundant	AJ9Y3	Endevco	8/04/04
Pelvis X	C29-N11	Entran	7/01/04
Pelvis Y	C23-M12	Entran	7/01/04
Pelvis Z	C12-R01	Entran	7/01/04
Left Femur Load Cell	262	Denton	7/20/04
Right Femur Load Cell	261	Denton	7/20/04
Left Upper Tibia Load Cell	266	Denton	7/22/04
Left Lower Tibia Load Cell	179	Denton	7/22/04
Right Upper Tibia Load Cell	263	Denton	7/22/04
Right Lower Tibia Load Cell	174	Denton	7/22/04
Left Foot Z – Front	AMTL6	Endevco	9/17/04
Left Ankle X	AMTG3	Endevco	9/17/04
Left Ankle Z	ALC37	Endevco	9/17/04
Right Foot Z – Front	J21970	Endevco	9/17/04
Right Ankle X	J22033	Endevco	9/17/04
Right Ankle Z	J21691	Endevco	9/17/04
Shoulder Belt Load Cell	158	Denton	12/07/04
Lap Belt Load Cell	166	Denton	12/07/04

**INSTRUMENTS FOR PASSENGER DUMMY NO. 066**

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	A28-H01	Entran	9/17/04
Head Y	J13535	Endevco	10/25/04
Head Z	A28-H02	Entran	9/17/04
Head X Redundant	A27-Z12	Entran	9/17/04
Head Y Redundant	AH097	Endevco	10/25/04
Head Z Redundant	L17-Z14	Entran	9/17/04
Neck Load Cell	442	Denton	7/20/04
Chest X	P22086	Endevco	8/04/04
Chest Y	AJ9D2	Endevco	8/04/04
Chest Z	P24265	Endevco	8/04/04
Chest Deflection Gauge	066	Servo	8/03/04
Chest X Redundant	P22652	Endevco	8/04/04
Chest Y Redundant	AJ417	Endevco	8/04/04
Chest Z Redundant	P22150	Endevco	8/04/04
Pelvis X	J13851	Endevco	8/02/04
Pelvis Y	AJ808	Endevco	8/02/04
Pelvis Z	AH0F0	Endevco	8/02/04
Left Femur Load Cell	259	Denton	7/20/04
Right Femur Load Cell	256	Denton	7/20/04
Left Upper Tibia Load Cell	107	Denton	7/22/04
Left Lower Tibia Load Cell	136	Denton	7/22/04
Right Upper Tibia Load Cell	103	Denton	7/22/04
Right Lower Tibia Load Cell	133	Denton	7/22/04
Left Foot Z – Front	A05-A20	Entran	8/04/04
Left Ankle X	A05-A21	Entran	8/04/04
Left Ankle Z	A07-J01	Entran	8/04/04
Right Foot Z – Front	ANBP7	Endevco	7/23/04
Right Ankle X	L30-Z18	Entran	8/04/04
Right Ankle Z	A12-A11	Entran	8/04/04
Shoulder Belt Load Cell	157	Denton	8/18/04
Lap Belt Load Cell	194	Denton	12/07/04

### INSTRUMENTS FOR VEHICLE

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	L17-D10	Entran	9/24/04
Left Rear Seat Crossmember Z	E01-F13	Entran	10/27/04
Right Rear Seat Crossmember X	I16-B19	Entran	11/02/04
Right Rear Seat Crossmember Z	H21-N16	Entran	10/27/04
Top of Engine X	H20-R10	Entran	9/24/04
Bottom of Engine X	L18-N12	Entran	10/22/04
Left Brake Caliper X	A29-B06	Entran	9/13/04
Right Brake Caliper X	L17-D25	Entran	9/24/04
Instrument Panel X	A29-F06	Entran	11/02/04