

REPORT NUMBER: NCAP-MGA-2005-009

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

**NISSAN MOTOR COMPANY
2005 NISSAN PATHFINDER SE-X4
NHTSA NUMBER: M55205**

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



Test Date: January 11, 2005

Final Report Date: March 14, 2005

FINAL REPORT

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

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Date of Acceptance

COTR, NCAP Frontal Impact Program

Date of Acceptance

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16. Abstract A 35.2 mph (56.6 km/h) frontal barrier impact was conducted on a 2005 Nissan Pathfinder SE-X4 at MGA Research Corporation on January 11, 2005. 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 456 mm located on the right side of the vehicle. The test vehicle is equipped with a 3-point continuous belt system and an airbag in both front outboard seating positions. With respect to FMVSS 208 "Occupant Crash Protection", the occupant injury criteria summary is as follows: <table border="1" style="width: 100%; margin-top: 10px; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Measurement Description</u></th> <th style="text-align: left;"><u>Units</u></th> <th style="text-align: left;"><u>Threshold</u></th> <th style="text-align: left;"><u>Driver ATD</u></th> <th style="text-align: left;"><u>Pass. ATD</u></th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC)</td> <td>N/A</td> <td>1000</td> <td>637</td> <td>660</td> </tr> <tr> <td>Max. Thorax Accel. (3ms Clip)</td> <td>G's</td> <td>60</td> <td>49</td> <td>50</td> </tr> <tr> <td>Left Femur Force</td> <td>Newton</td> <td>10009</td> <td>-7488</td> <td>-4088</td> </tr> <tr> <td>Right Femur Force</td> <td>Newton</td> <td>10009</td> <td>-2693</td> <td>-2687</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	637	660	Max. Thorax Accel. (3ms Clip)	G's	60	49	50	Left Femur Force	Newton	10009	-7488	-4088	Right Femur Force	Newton	10009	-2693	-2687
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SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

This 56.3 km/h 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 Nissan Pathfinder SE-X4 at a velocity of 56.6 kph. The test was performed at MGA Research Corporation on January 11, 2005. Pre-and post-test photographs of the vehicle and dummies can be found in Appendix A.

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

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

Both ATDs were fully instrumented with 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 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 456 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, chest, and abdomen contacted the airbag. The driver's head also contacted the headrest. The driver's knees contacted the bolster. The passenger's head, chest and abdomen contacted the airbag. The passenger's head contacted the headrest and visor. 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	636.6	48.9	-27.4	-7488	-2693
Passenger	659.6	49.9	-28.9	-4088	-2687

TEST NOTES

No valid data was collected for the following:

Driver Left Foot Z – Front after 80ms

Driver Left Ankle Z after 40ms

Left Rear Seat Crossmember Z after 40ms

SECTION 2
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

Test Vehicle: 2005 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

NHTSA No.: M55205
 Test Date: 01/11/05

CONVERSION FACTORS USED IN THIS REPORT*

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

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

**DATA SHEET NO. 1
CRASH TEST SUMMARY**

Test Vehicle: 2005 Nissan Pathfinder SE-X4
Test Program: 35mph Frontal Impact

NHTSA No.: M55205
Test Date: 01/11/05

PRIMARY IMPACT DATA

Measured Parameter	Units	Value
Velocity at Impact	km/hr	56.6
Test Weight	kg	2393.2
Average Rebound	mm	790
Maximum Static Crush	mm	456
Impact Angle	degrees	0.0

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked/Unlocked Doors	Doors were unlocked	Doors were unlocked
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
Glazing Damage	The windshield cracked	

TEST DUMMY INFORMATION

Description	Driver	Passenger
Dummy Type / Serial No.	HIII 50 th / 065	HIII 50 th / 066
Head Contact	Airbag, Headrest	Airbag, Headrest, Visor
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
Total	101

DATA SHEET NO. 2**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2005 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

NHTSA No: M55205
 Test Date: 01/11/05

TEST VEHICLE INFORMATION

Manufacturer	Nissan Motor Company
Model	Pathfinder SE-X4
Body Style	MPV
NHTSA No.	M55205
VIN	5N1AR18W15C704069
Color	Black
Delivery Date	12/29/04
Odometer Reading (mile)	126
Dealer	Gordie Boucher Nissan
Transmission	Automatic
Final Drive	Rear
Number of Cylinders	6
Engine Displacement (L)	4.0
Engine Placement	Longitudinal
Automatic Door Lock (ADL)	No
Owners Manual Details Instructions on Disabling ADLs	NA

TEST VEHICLE OPTIONS

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Nissan Motor Company
Date of Manufacture	10/04

GVWR (kg)	2722
GAWR Front (kg)	1259
GAWR Rear (kg)	1588

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	308	308
Cold Pressure	240	240
Recommended Tire Size	P265/70R16	P265/70R16
Tire size on Vehicle	P265/70R16	P265/70R16
Tire Manufacturer	BF Goodrich	BF Goodrich

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	Bench	
Number of Occupants	2	3	2	7
Capacity Wt. (VCW) (kg)				586
Cargo Wt. (RCLW) (kg)				109.8

DATA SHEET NO. 2... (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2005 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

NHTSA No.: M55205
 Test Date: 01/11/05

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	547.0	528.9		607.4	607.8	
Right	kg	539.8	519.8		577.9	600.1	
Ratio	%	51.5	48.5		49.5	50.5	
Totals	kg	1086.8	1048.7	2135.5	1185.3	1207.9	2393.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	2135.5
Weight of 2 P572E ATDs	kg	156.0
Rated Cargo/Luggage Weight (RCLW)	kg	109.8
Calculated Vehicle Target Weight (TVTW)	kg	2401.3

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG(aft of front axle)
As Delivered	mm	876	883	883	888	1403
As Tested	mm	863	877	864	869	1442
Post Test	mm	865	851	869	874	

Vehicle Wheelbase (mm): 2857

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

Vehicle Components Removed: None

Ballast weight does not include instrumentation and data acquisition system.

FUEL SYSTEM DATA

Fuel System Capacity From Owner's Manual (L): 79.9

Usable Capacity Figure Furnished by COTR (L): 79.9

Actual Test Volume (L): 75.1

Test Fluid Type: Stoddard Solvent; Specific Gravity: 0.77

Is Vehicle Fuel Pump Electric or Mechanical? Electric

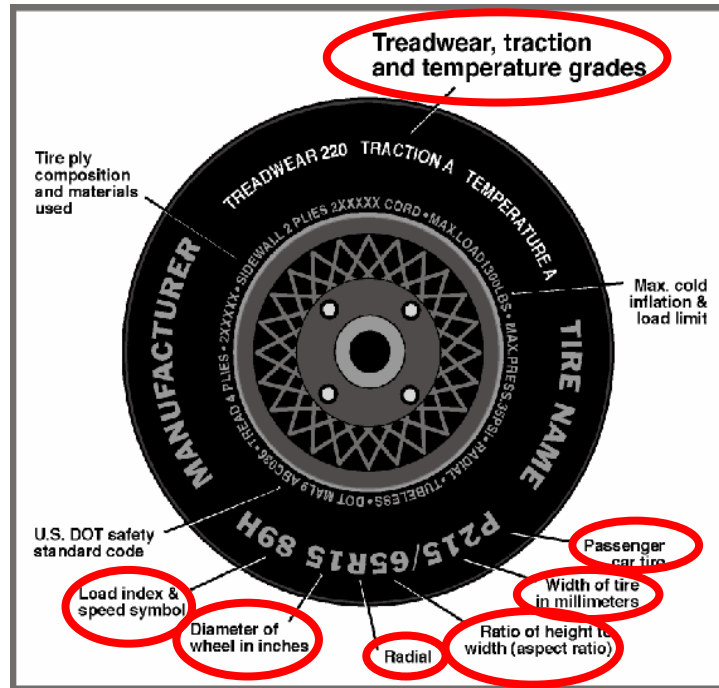
If electric, does pump operate with ignition switch "ON" & engine "OFF"? Yes

DATA SHEET NO. 3
TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2005 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

NHTSA No.: M55205
 Test Date: 01/11/05

Vehicle Year	2005	Vehicle Make	Nissan
VIN	5N1AR18W15C704069	Vehicle Model	Pathfinder



	Front	Rear
Tire Manufacturer	BF Goodrich	BF Goodrich
Tire Name	Radial Long Trail T/A	Radial Long Trail T/A
Tire Type	P	P
Tire Width (mm)	265	265
Ratio of Height to Width (aspect ratio)	70	70
Radial	R	R
Wheel Diameter	16	16
Load Index & Speed Symbol	111T	111T
Treadwear	440	440
Traction Grade	B	B
Temperature Grade	B	B

DATA SHEET NO. 4
POST IMPACT DATA

Test Vehicle: 2005 Nissan Pathfinder SE-X4
Test Program: 35mph Frontal Impact

NHTSA No.: M55205
Test Date: 01/11/05

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	4635	4298	337
Center	mm	4747	4294	453
Right Side	mm	4635	4307	328

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	620
Center	mm	889
Right Side	mm	861
Average	mm	790

DATA SHEET NO. 5
TEST VEHICLE INFORMATION

Test Vehicle: 2005 Nissan Pathfinder SE-X4
Test Program: 35mph Frontal Impact

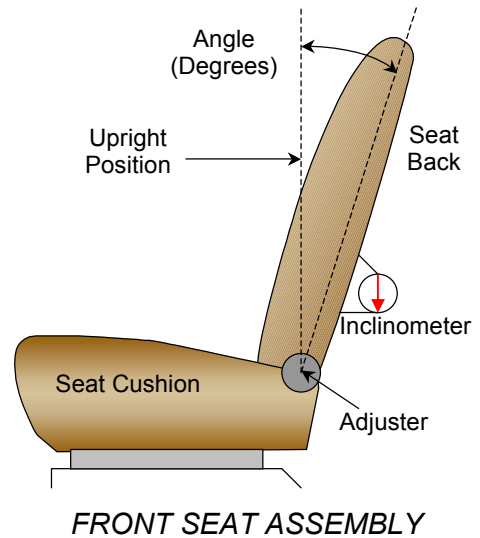
NHTSA No.: M55205
Test Date: 01/11/05

NORMAL DESIGN RIDING POSITION

The driver and passenger seat back is positioned to the manufacturer's designated angle. The procedure is as follows:

Driver seat back angle: 10.9° on headrest post

Passenger seat back angle: 13.0° on headrest post



SEAT FORE/AFT POSITIONS

The driver was power operated and the passenger seat was manually operated.

Driver seat fore/aft total travel: 240 mm

Driver seat fore/aft position: 120 of 240 mm

Passenger seat fore/aft total travel: 21 notches

Passenger seat fore/aft position: 10 of 21 notches (with the forward-most detent defined as 0)

DATA SHEET NO. 5... (continued)

TEST VEHICLE INFORMATION

Test Vehicle: 2005 Nissan Pathfinder SE-X4
Test Program: 35mph Frontal Impact

NHTSA No.: M55205
Test Date: 01/11/05

FUEL TANK CAPACITY DATA

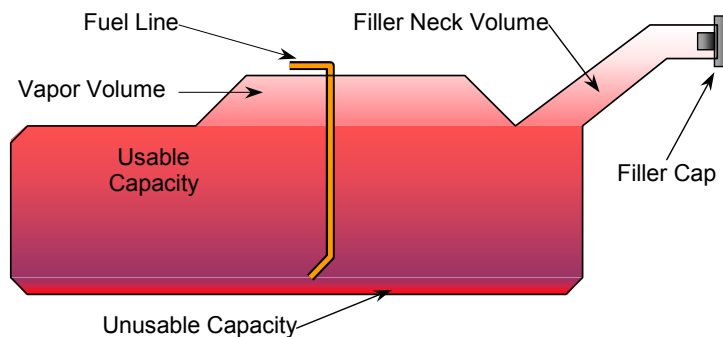
The "Usable Capacity" of the standard equipment fuel tank is: 79.9 liters

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

The "Usable Capacity" used for certification to FMVSS 301 requirements: 79.9 liters

Actual amount of Stoddard solvent added to vehicle for certification test: 75.1 liters

The fuel door is located on the left (driver's) side of the vehicle.



VEHICLE FUEL TANK ASSEMBLY

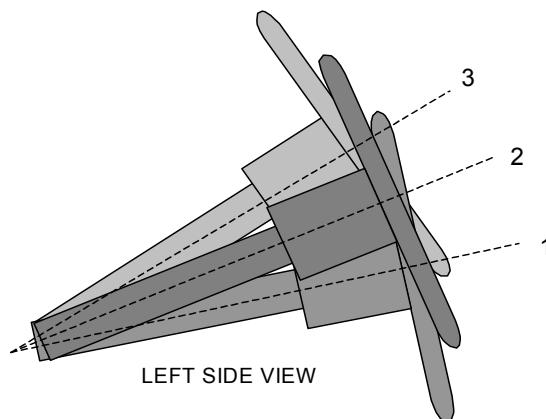
STEERING COLUMN ADJUSTMENT

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

Lowermost, Position 1: 16.3°

Geometric Center, Position 2: 25.2°

Uppermost, Position 3: 34.2°



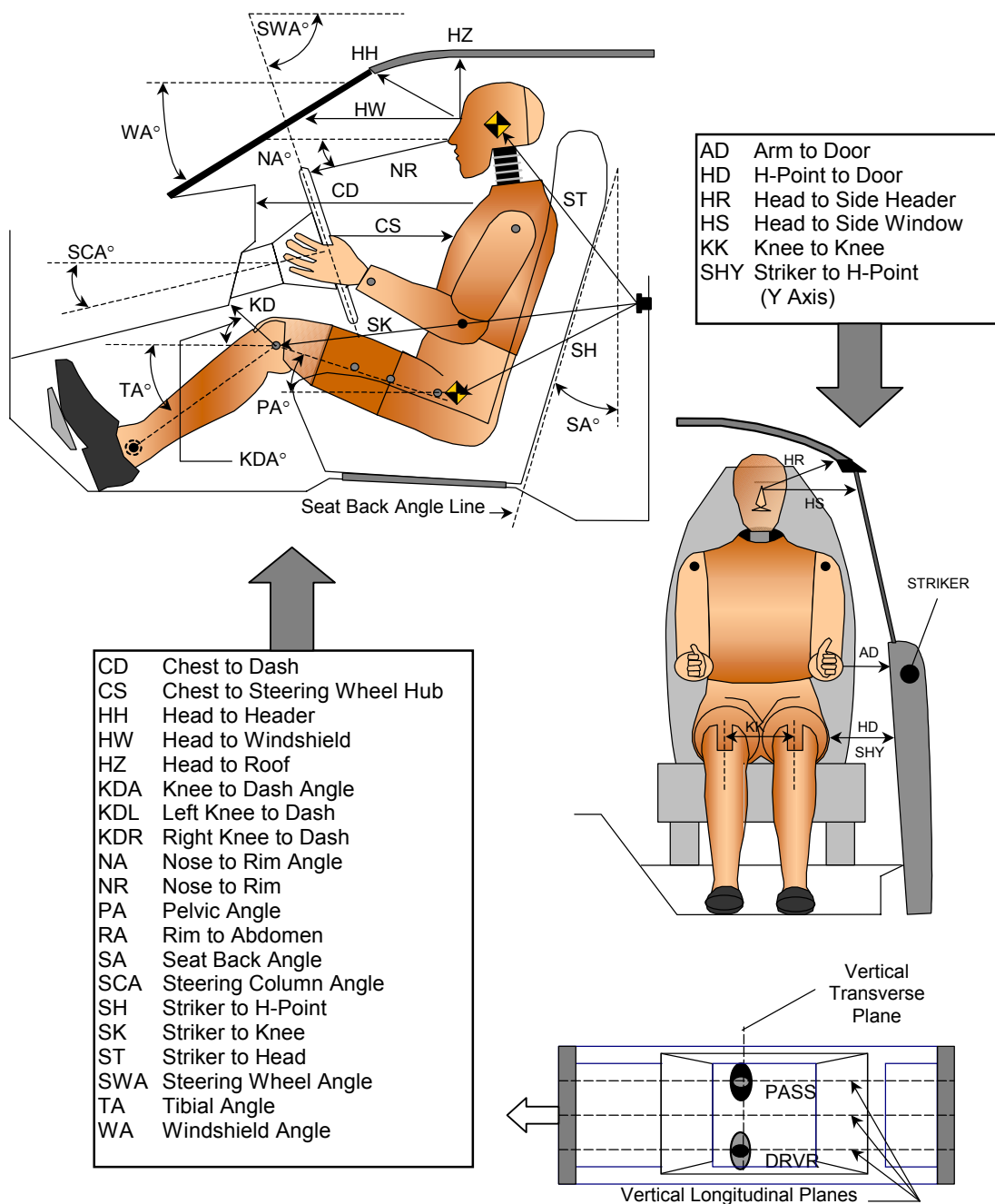
STEERING COLUMN ASSEMBLY

DATA SHEET NO. 6 **DUMMY POSITIONING IN VEHICLE**

Test Vehicle: 2005 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

NHTSA No.: M55205
 Test Date: 01/11/05

DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS



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

Test Vehicle: 2005 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

NHTSA No.: M55205
 Test Date: 01/11/05

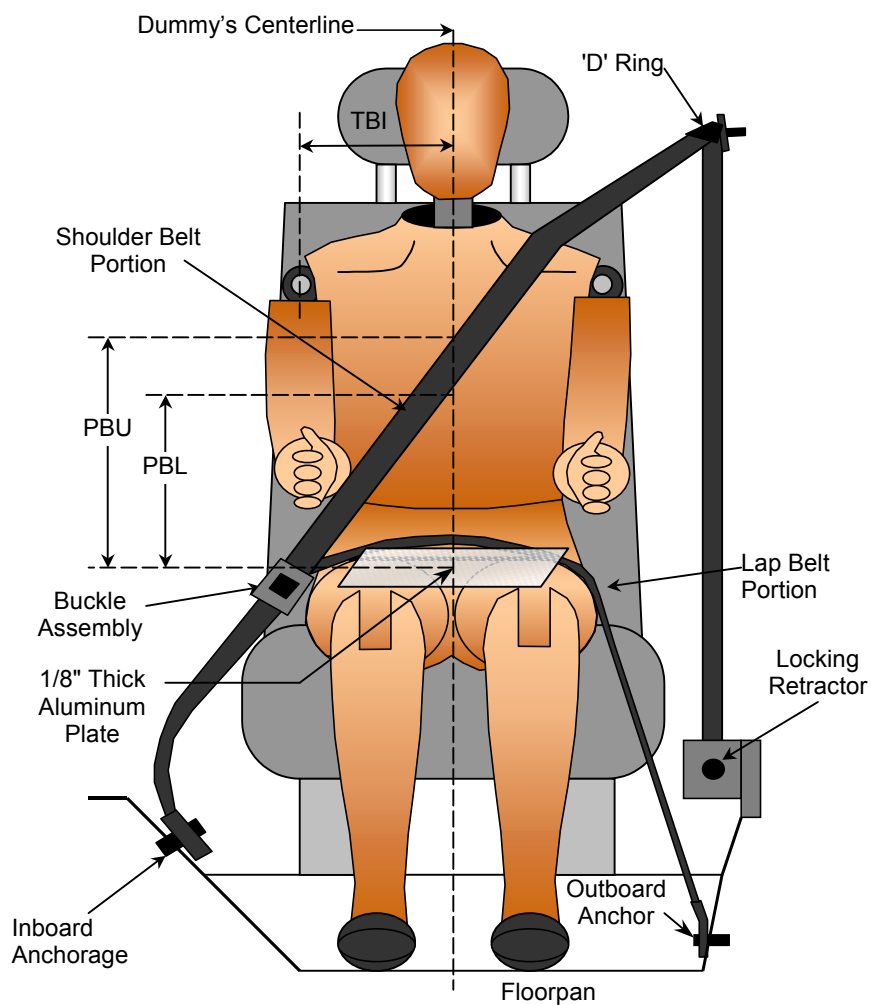
TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA	Windshield Angle		33.5		
SWA	Steering Wheel Angle		64.6		
SCA	Steering Column Angle		23.3		
SA	Seat Back Angle (headrest post)		10.9		13.0
HZ	Head to Roof (Z)	155	90.0	168	90.0
HH	Head to Header	359	18.5	378	25.1
HW	Head to Windshield	584	0.0	594	0.0
HR	Head to Side Header (Y)	199		204	
NR	Nose to Rim	392	13.9		
CD	Chest to Dash	530		527	
CS	Chest to Steering Hub	298	16.1		
RA	Rim to Abdomen	170	0.0		
KDL	Left Knee to Dash	121	14.4	117	
KDR	Right Knee to Dash	116		132	18.0
PA	Pelvic Angle		24.2		23.4
TA	Tibia Angle		47.8		46.5
KK	Knee to Knee (Y)	332		258	
SK	Striker to Knee	642	90.8	630	90.8
ST	Striker to Head	593	10.5	600	10.8
SH	Striker to H-Point	254	103.6	234	103.1
SHY	Striker to H-Point (Y)	229		229	
HS	Head to Side Window	316		301	
HD	H-Point to Door (Y)	167		159	
AD	Arm to Door (Y)	104		102	
AA	Ankle to Ankle	344		235	

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

Test Vehicle: 2005 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

NHTSA No.: M55205
 Test Date: 01/11/05



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	328	347
PBL - To surface of reference to belt lower edge	mm	253	262

DATA SHEET NO. 8

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2005 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

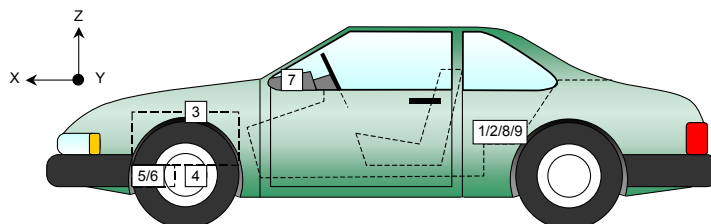
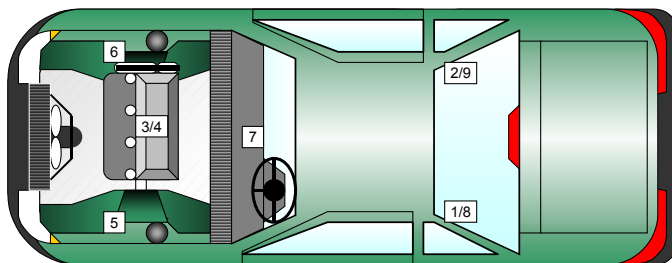
NHTSA No.: M55205
 Test Date: 01/11/05

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	2007	-523	595	G's	2.4	125	-39.4	50
2	Right Rear X-Member X	2012	523	594	G's	2.2	121	-40.3	53
3	Engine Top X	3898	70	1085	G's	20.1	55	-86.5	37
4	Engine Bottom X	3818	-15	240	G's	21.8	52	-86.5	40
5	Left Brake Caliper X	3844	-677	265	G's	91.4	55	-153.1	39
6	Right Brake Caliper X	3844	677	265	G's	70.9	52	-139.0	41
7	Instrument Panel X	3288	0	1321	G's	11.3	83	-76.3	34
8	Left Rear X-Member Z	2007	-523	594	G's	*	*	*	*
9	Right Rear X-Member Z	2012	523	595	G's	23.2	56	-25.7	48

* No valid data collected after 40ms

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 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

NHTSA No.: M55205
 Test Date: 01/11/05

HEAD PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	6.5	243	-58.0	83	42.9	209	-70.3	75
Head CG	Y	G's	3.0	33	-21.8	85	10.4	210	-10.7	74
Head CG	Z	G's	27.3	59	-13.0	93	31.8	58	-14.5	95
Head CG Resultant	N/A	G's	61.6	83			72.8	74		

CHEST PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	3.0	138	-47.9	70	2.5	131	-52.9	70
Chest CG	Y	G's	3.6	96	-11.0	60	4.8	46	-5.6	72
Chest CG	Z	G's	14.8	60	-13.9	95	14.5	76	-12.9	99
Chest CG Resultant	N/A	G's	49.6	70			53.0	70		

FEMUR PEAK FORCES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Femur	Z	Newtons	149	105	-7488	42	322	27	-4088	53
Right Femur	Z	Newtons	356	64	-2693	46	433	30	-2687	50

SEAT BELT SENSOR PEAK VALUES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Lap Belt Force	N/A	Newtons	5779	49			8577	53		
Shoulder Belt Force	N/A	Newtons	6329	76			5867	45		

HEAD INJURY CRITERIA (HIC)

Location	Driver				Passenger			
	HIC	Avg. G's	T ¹	T ²	HIC	Avg. G's	T ¹	T ²
Head CG Primary	636.6	50.5	54.4	89.6	659.6	50.7	56.2	92.2

CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Primary	48.9	69.2	72.2	49.9	68.2	71.2

DATA SHEET NO. 9... (continued)

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2005 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

NHTSA No.: M55205
 Test Date: 01/11/05

PELVIC PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Pelvis	X	G's	4.3	91	-106.6	42	8.4	109	-75.9	53
Pelvis	Y	G's	9.8	42	-13.7	57	9.4	46	-7.4	87
Pelvis	Z	G's	4.2	43	-20.4	75	5.8	33	-30.0	69

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Neck Force	X	Newtons	365	84	-410	117	171	251	-779	75
Neck Force	Y	Newtons	325	73	-239	111	204	258	-112	130
Neck Force	Z	Newtons	2438	59	-409	94	1735	74	-1015	256
Neck Moment	X	N•m	6.3	152	-34.0	73	22.9	75	-26.0	262
Neck Moment	Y	N•m	39.6	131	-19.6	51	30.2	134	-72.4	75
Neck Moment	Z	N•m	19.0	95	-8.5	151	17.8	83	-7.2	143

FOOT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Foot Aft	X	G's	9.0	90	-105.4	41	11.8	56	-84.8	38
Left Foot Aft	Z	G's	*	*	*	*	18.6	64	-79.4	48
Left Foot Fore	Z	G's	**	**	**	**	48.0	64	-87.1	48
Right Foot Aft	X	G's	19.6	54	-156.4	40	10.2	64	-107.4	44
Right Foot Aft	Z	G's	34.2	56	-184.6	42	7.7	130	-50.6	48
Right Foot Fore	Z	G's	114.1	52	-271.7	41	30.3	130	-87.6	43

* No valid data collected after 40ms

** No valid data collected after 80ms

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	10.8	128	-84.3	43	7.1	53	-17.0	80
Left Lower Moment	Y	N•m	357.8	41	-8.9	166	25.1	33	-28.0	80
Left Lower Force	Z	Newtons	230	103	-2499	42	101	128	-4445	51
Left Upper Moment	X	N•m	30.1	43	-31.5	61	16.8	39	-29.5	62
Left Upper Moment	Y	N•m	4.3	26	-112	41	58.8	40	-157.1	51
Left Upper Force	Z	Newtons	187	62	-1932	42	103	257	-4317	51
Right Lower Moment	X	N•m	27.6	44	-87.2	52	18.4	57	-1.8	280
Right Lower Moment	Y	N•m	33.8	39	-177.3	56	12.8	34	-34.4	74
Right Lower Force	Z	Newtons	144	165	-6447	46	59	26	-3105	44
Right Upper Moment	X	N•m	57.5	52	-19.7	91	8.9	147	-63.6	49
Right Upper Moment	Y	N•m	158.9	49	-12.8	67	76.1	42	-39.9	56
Right Upper Force	Z	Newtons	160	138	-5062	45	80	141	-2788	43

DATA SHEET NO. 9... (continued)

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2005 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

NHTSA No.: M55205
 Test Date: 01/11/05

CHEST PEAK DISPLACEMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest	X	mm			-27.4	79			-28.9	72

HEAD REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	6.3	243	-58.2	83	43.0	209	-69.1	75
Head CG	Y	G's	2.8	33	-21.2	85	10.6	34	-10.7	75
Head CG	Z	G's	29.8	58	-13.2	93	31.0	57	-15.3	95
Head CG Resultant	N/A	G's	61.8	83			71.0	75		

CHEST REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	2.7	143	-48.7	76	2.4	143	-52.3	69
Chest CG	Y	G's	4.3	103	-8.2	54	5.5	48	-5.7	68
Chest CG	Z	G's	15.2	61	-13.7	95	14.3	57	-12.9	98
Chest CG Resultant	N/A	G's	49.6	71			52.5	69		

REDUNDANT HEAD INJURY CRITERIA (HIC)

Location	Driver				Passenger			
	HIC	Avg.	T ¹	T ²	HIC	Avg.	T ¹	T ²
Head CG Primary Redundant	665.0	50.9	53.3	89.3	614.8	49.3	56.5	92.5

REDUNDANT CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Primary Redundant	48.3	73.6	76.6	50.0	68.2	72.1

DATA SHEET NO. 10
SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

Test Vehicle: 2005 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

NHTSA No.: M55205
 Test Date: 01/11/05

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	328	347
PBL - Top surface of reference to belt lower edge	mm	253	262

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	867	868
Lap belt length as measured on ATD	mm	808	782
Remainder of belt on reel	mm	1650	1697
Total belt length for continuous webbing systems	mm	3325	3347

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 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

NHTSA No.: M55205
 Test Date: 01/11/05

Windshield Mounting Details:

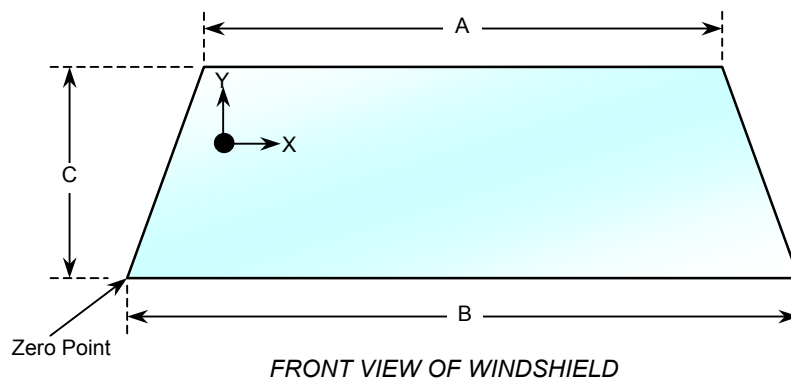
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

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	2120	2120	100
Right Side	2120	2120	100
Total	4240	4240	100



WINDSHIELD DIMENSIONS

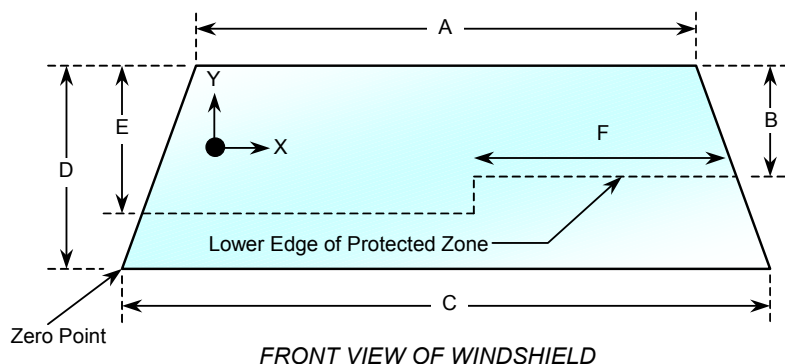
Item	Units	Segment Length	Molding Width
A	mm	1200	17
B	mm	1520	N/A
C	mm	760	14

DATA SHEET NO. 12

WINDSHIELD ZONE INTRUSION FMVSS 219 (Partial) DATA

Test Vehicle: 2005 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

NHTSA No.: M55205
 Test Date: 01/11/05



Item	Units	Value
A	mm	1200
B	mm	510
C	mm	1520
D	mm	760
E	mm	475
F	mm	475

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 Nissan Pathfinder SE-X4
Test Program: 35mph Frontal Impact

NHTSA No.: M55205
Test Date: 01/11/05

Temperature at Time of Impact: 21° C Test Time: 11:50 am

Stoddard Solvent Spillage Measurements

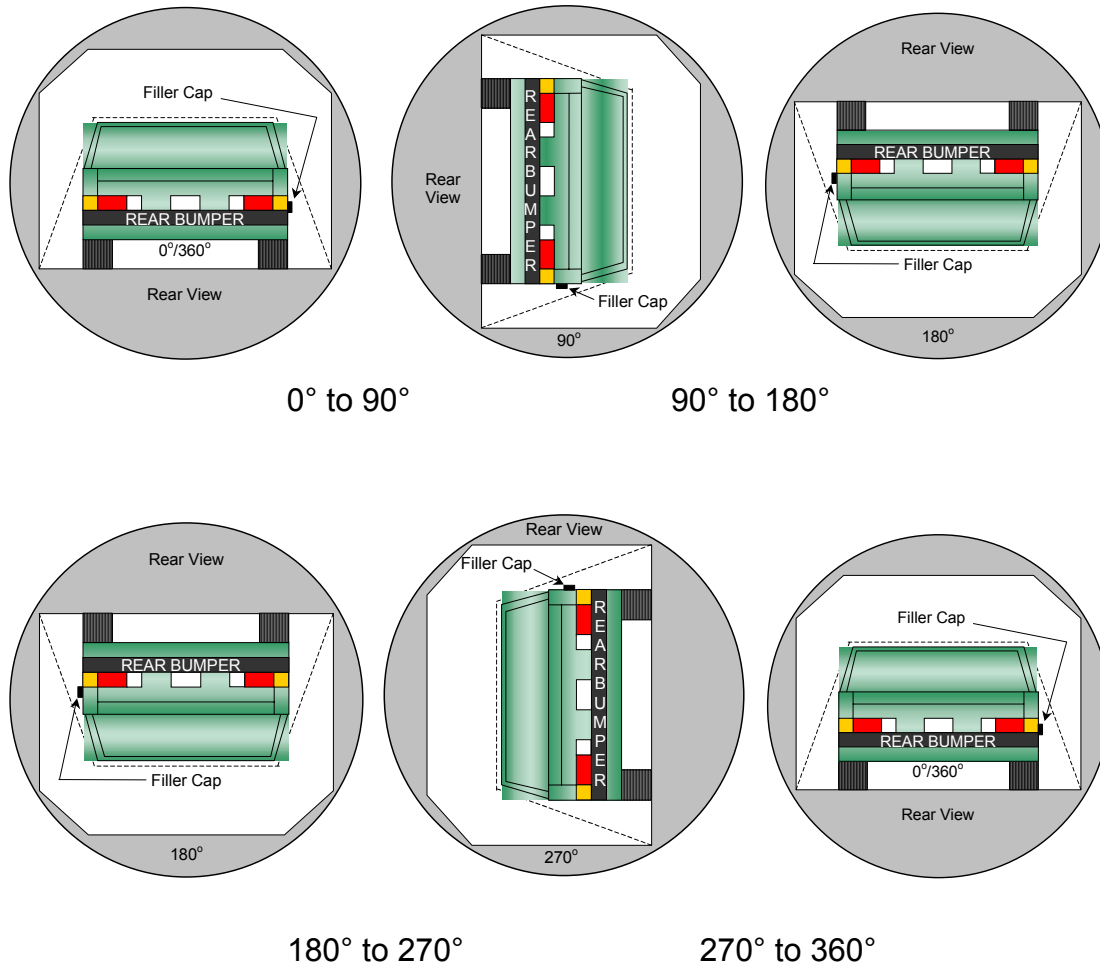
- A. From impact until vehicle motion ceases: 0 oz.
 (Maximum Allowable = 1 ounce)
- B. For the 5 minute period after motion ceases: 0 oz.
 (Maximum Allowable = 5 ounces)
- C. For the following 25 minutes: 0 oz.
 (Maximum Allowable = 1 oz. /minute)
- D. Spillage: None

DATA SHEET NO. 14
FMVSS 301 STATIC ROLLOVER DATA

Test Vehicle: 2005 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

NHTSA No.: M55205
 Test Date: 01/11/05

Test Time: 11:50 am



1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent spillage locations: None

Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage (oz.)
0° to 90°	161	300	0
90° to 180°	141	300	0
180° to 270°	144	300	0
270° to 360°	156	300	0

DATA SHEET NO. 15
VEHICLE MEASUREMENTS

Test Vehicle: 2005 Nissan Pathfinder SE-X4
Test Program: 35mph Frontal Impact

NHTSA No.: M55205
Test Date: 01/11/05

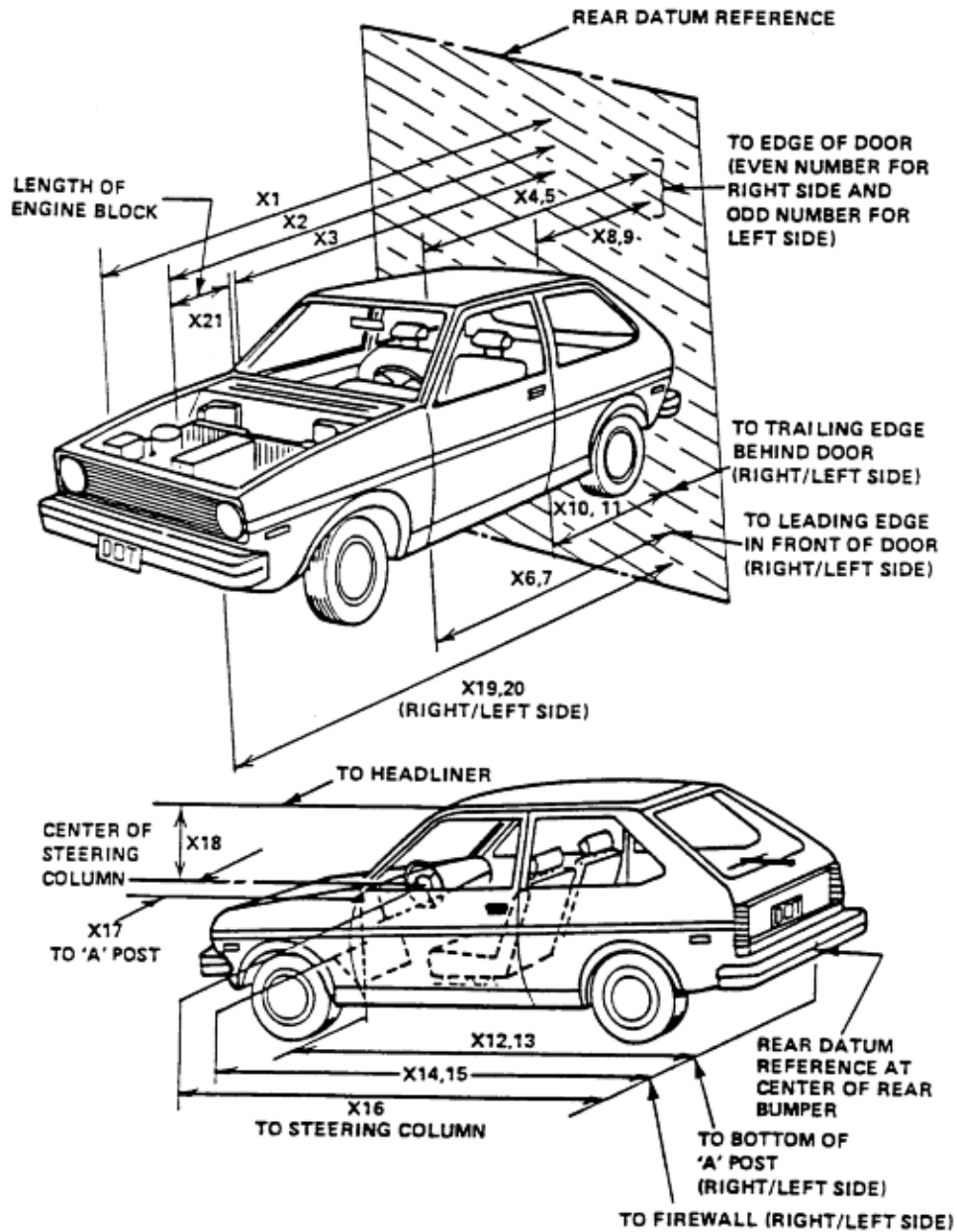
No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total length of vehicle at centerline	mm	4747	4294	453
2	RSOV to front of engine	mm	4080	4022	58
3	RSOV to firewall centerline	mm	3580	3498	82
4	RSOV to leading edge of right door	mm	3332	3317	15
5	RSOV to leading edge of left door	mm	3234	3306	-72
6	RSOV to lower leading edge of right door	mm	3256	3247	9
7	RSOV to lower leading edge of left door	mm	3254	3246	8
8	RSOV to upper leading edge of right door	mm	2236	2225	11
9	RSOV to upper leading edge of left door	mm	2233	2216	17
10	RSOV to lower trailing edge of right door	mm	2218	2207	11
11	RSOV to lower trailing edge of left door	mm	2212	2208	4
12	RSOV to bottom of right 'A' pillar	mm	3244	3232	12
13	RSOV to bottom of left 'A' pillar	mm	3242	3224	18
14	RSOV to firewall on right side	mm	3686	3662	24
15	RSOV to firewall on left side	mm	3882	3646	236
16	RSOV to steering column	mm	2818	2877	-59
17	Center of steering column to left 'A' pillar	mm	400	366	34
18	Center of steering column to headlining	mm	440	404	36
19	RSOV to right side of front bumper	mm	4635	4307	328
20	RSOV to left side of front bumper	mm	4635	4298	337
21	Length of engine block	mm	550	550	0
RD	RSOV to right side of dash panel	mm	3100	3091	9
CD	RSOV to center of dash panel	mm	3130	3086	44
LD	RSOV to left side of dash panel	mm	3100	3089	11

DATA SHEET NO. 15... (continued)

VEHICLE MEASUREMENTS

Test Vehicle: 2005 Nissan Pathfinder SE-X4
Test Program: 35mph Frontal Impact

NHTSA No.: M55205
Test Date: 01/11/05



DATA SHEET NO. 15... (continued)**VEHICLE MEASUREMENTS**

Test Vehicle: 2005 Nissan Pathfinder SE-X4
Test Program: 35mph Frontal Impact

NHTSA No.: M55205
Test Date: 01/11/05

Target Vehicle Structural Measurement

	Elements	Pre-Test (mm)
1	Total Length	4747
2	Total Width	1836
3	Bumper Top Height	536
4	Bumper Bottom Height	464
5	Longitudinal Member Top Height	520
6	Distance between Longitudinal Members	605
7	Longitudinal Member Width	83
8	Engine Top Height	1142
9	Engine Bottom Height	255
10	Engine and gearbox width	585
11	Front bumper-engine distance	666
12	Front shock absorber fixing height	730
13	Bonnet leading edge height	1026
14	Front shock absorber fixing width	920
15	Front bumper – front axle distance	795
16	Front axle – a pillar distance	653
17	A-pillar – B-pillar distance	1107
18	B-Pillar – rear axle distance	1095
19	B-pillar – C-pillar distance	598
20	Roof sill bottom height	1700
21	Roof sill top height	1735
22	Floor sill bottom height	450
23	Floor sill top height	385

DATA SHEET NO. 16
CAMERA LOCATIONS

Test Vehicle: 2005 Nissan Pathfinder SE-X4
Test Program: 35mph Frontal Impact

NHTSA No.: M55205
Test Date: 01/11/05

No.	Camera View	Location (mm) *			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Side View				13	24
2	Left Front View	1280	-9630	1130	25	1000
3	Steering Column Top	2370	-7250	1570	19	1000
4	Steering Column Bottom	2330	-7250	1038	13	1000
5	Driver Close-up	1570	-9220	1290	50	1000
6	Driver Angle	6620	-5110	2080	50	1000
7	On board Driver Side				8	1000
8	On board Passenger Side				8	1000
9	Right Overall	2240	7380	1365	19	1000
10	Right Passenger Half	1165	9480	1465	240	1000
11	Right Close-up	1600	8190	1470	50	1000
12	Right Angle	6560	5000	2220	50	1000
13	Windshield	-290	0	2795	13	1000
14	Top Driver	85	-460	1750	25	1000
15	Top Passenger	84	460	1760	25	1000
16	Pit Front	1110	0	-3150	24	1000
17	Pit Rear	3480	0	-3150	24	1000

***COORDINATES:**

+X = forward of impact plane
+Y = right of monorail centerline
+Z = above ground level

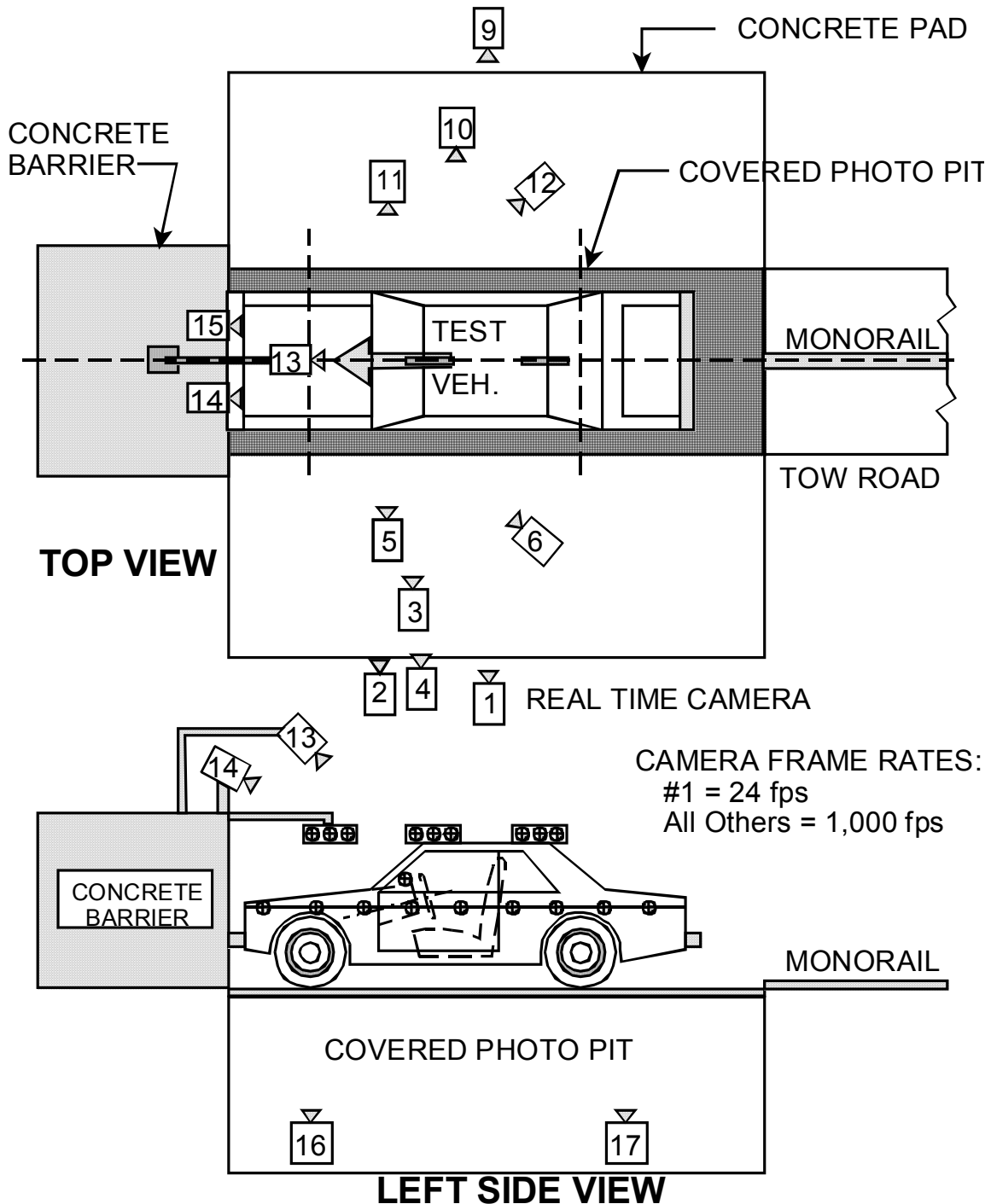
DATA SHEET NO. 16... (continued)

CAMERA LOCATIONS

Test Vehicle: 2005 Nissan Pathfinder SE-X4
Test Program: 35mph Frontal Impact

NHTSA No.: M55205
Test Date: 01/11/05

CAMERA POSITIONS FOR FRONTAL IMPACTS



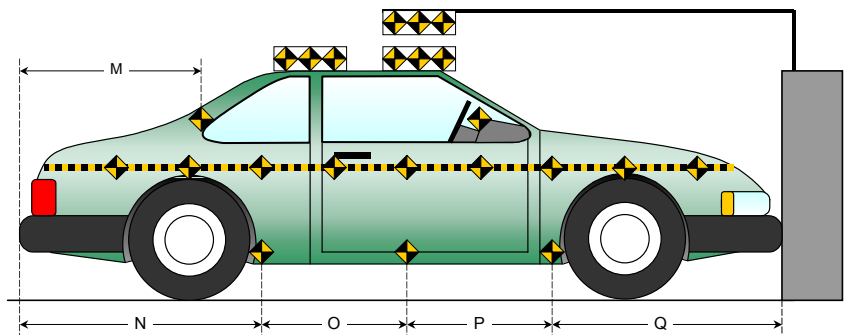
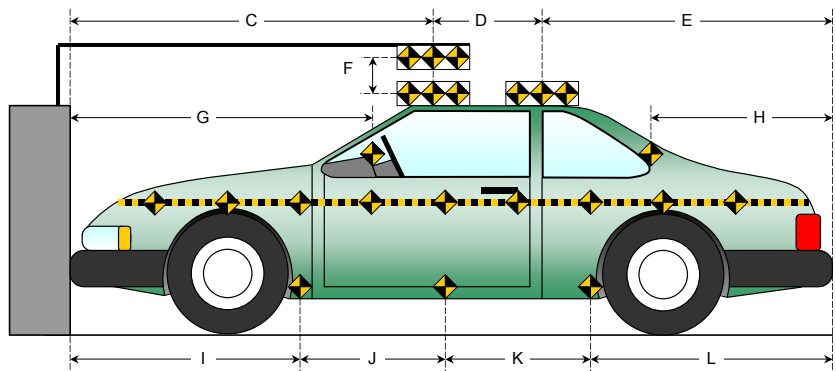
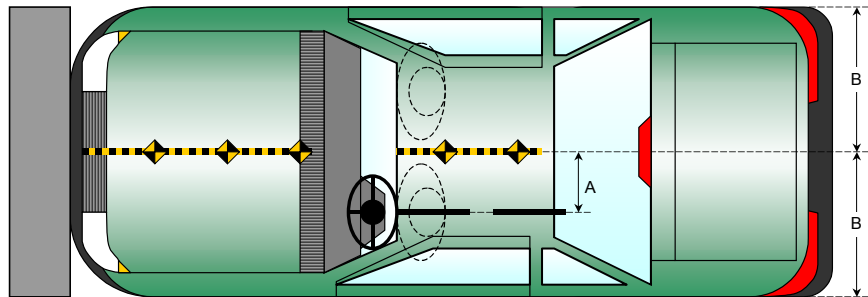
DATA SHEET NO. 17

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2005 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

NHTSA No.: M55205
 Test Date: 01/11/05

Item	Value
A	395
B	918
C	2318
D	549
E	1880
F	
G	
H	1238
I	1443
J	861
K	853
L	1590
M	1246
N	1606
O	860
P	860
Q	1421



DATA SHEET NO. 18
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2005 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

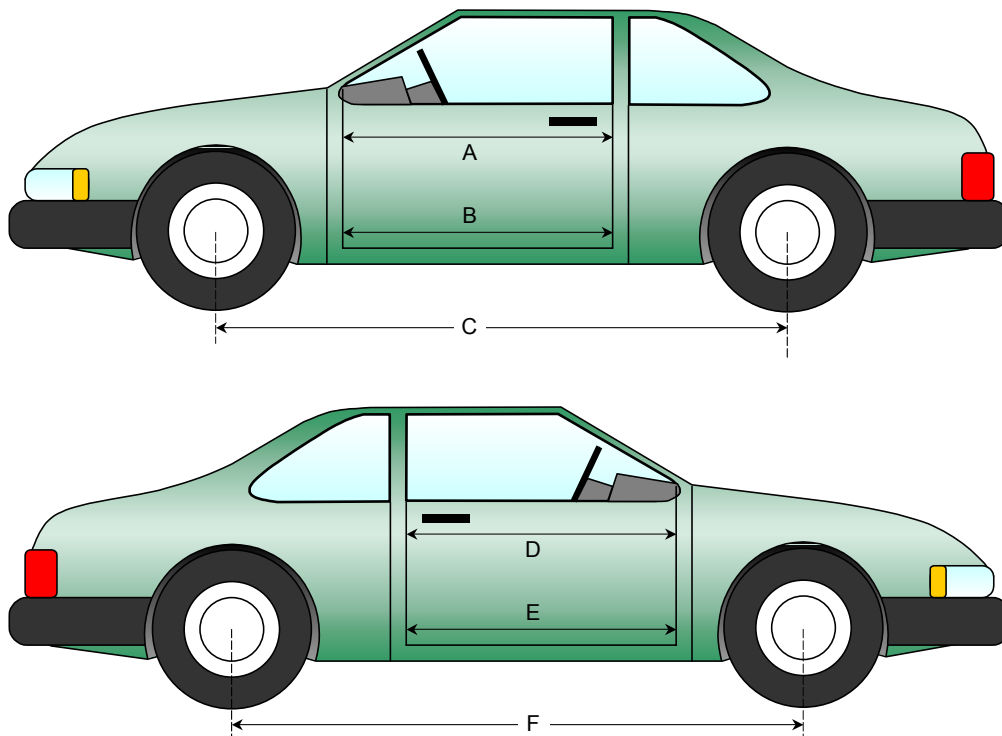
NHTSA No.: M55205
 Test Date: 01/11/05

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1036	1031	5
B	Left Side Lower	mm	985	978	7
D	Right Side Upper	mm	1040	1036	4
E	Right Side Lower	mm	1005	1003	2

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2850	2771	79
F	Right Side Wheelbase	mm	2850	2797	53



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

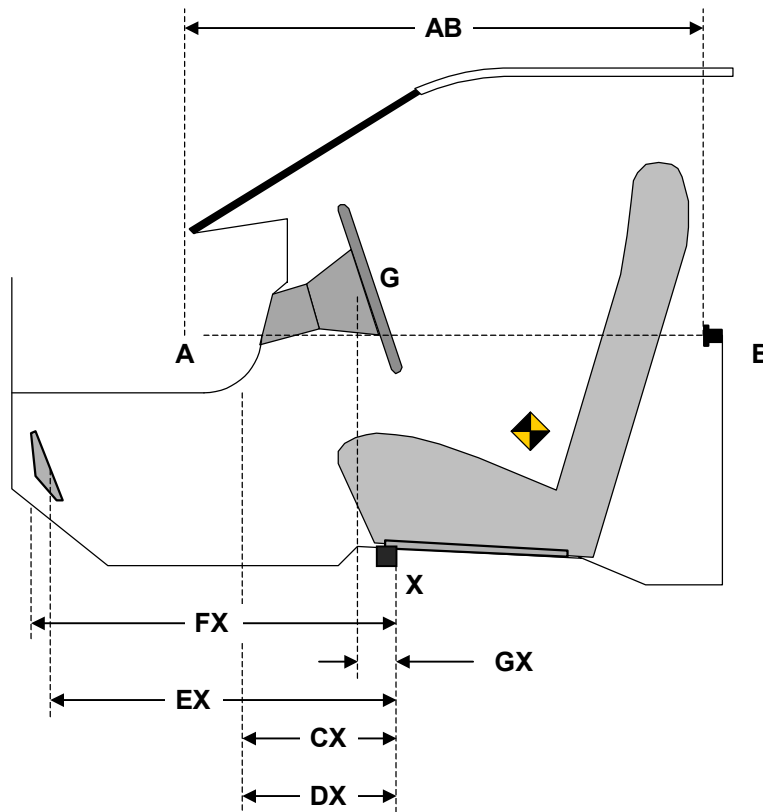
Test Vehicle: 2005 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

NHTSA No.: M55205
 Test Date: 01/11/05

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside window jam)	mm	1036	1031	5
CX	Left Knee Bolster to X	mm	252	333	-81
DX	Right Knee Bolster to X	mm	247	322	-75
EX	Brake Pedal to X	mm	512	639	-127
FX	Foot Rest to X	mm	600	674	-74
GX	Center of Steering Column Wheel Hub to X	mm	19	108	-89

X = Front of Seat Track (stationary)



DRIVER COMPARTMENT

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

Test Vehicle: 2005 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

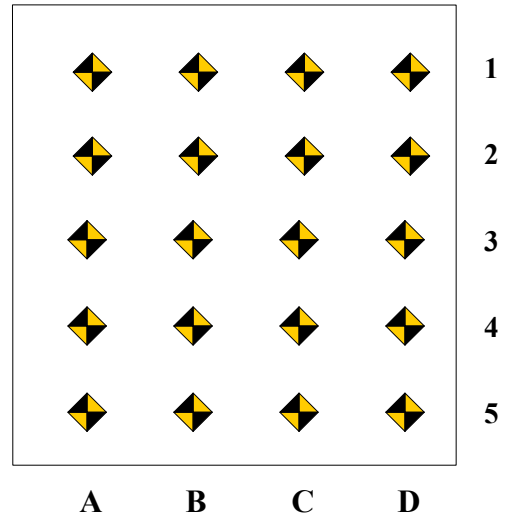
NHTSA No.: M55205
 Test Date: 01/11/05

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	750	751	747	732	732	707	687	675	18	44	60	57
2	688	668	654	645	672	631	607	608	16	37	47	37
3	563	561	553	552	551	538	528	547	12	23	28	30
4	407	409	397	399	408	411	402	404	-1	-2	-5	-5
5	256	255			258	259			-2	-4		

DRIVER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-82	-93	-95	-78	-16	-4	8	22	-66	-89	-103	-100
2	-118	-134	-142	-136	-56	-59	-51	-58	-62	-75	-91	-78
3	-157	-158	-177	-177	-108	-96	-104	-102	-49	-62	-73	-75
4	-150	-155	-165	-168	-122	-114	-120	-114	-28	-41	-45	-54
5	-153	-157			-134	-132			-19	-25		

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

Test Vehicle: 2005 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

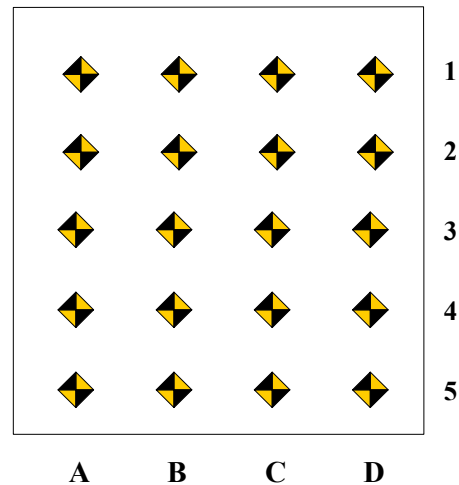
NHTSA No.: M55205
 Test Date: 01/11/05

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

Columns A through D are evenly spaced.

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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	731	734	744	702	686	701	726	688	45	33	18	14
2	643	647	654	656	608	621	638	646	35	26	16	10
3	552	555	556	558	534	535	540	541	18	20	16	17
4	394	402	399	404	386	392	393	396	8	10	6	8
5		249	247	252		242	241	246		7	6	6

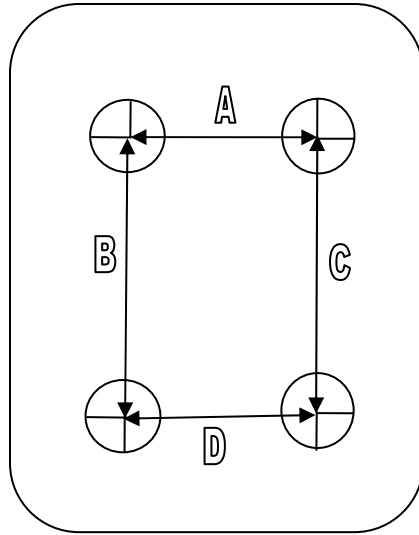
PASSENGER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-73	-71	-69	-41	-14	-23	-31	-12	-59	-48	-38	-29
2	-118	-116	-122	-121	-74	-78	-91	-93	-44	-38	-31	-28
3	-158	-149	-143	-152	-135	-126	-116	-127	-23	-23	-27	-25
4	-150	-147	-139	-147	-126	-126	-123	-143	-24	-21	-16	-4
5		-145	-148	-150		-135	-140	-142		-10	-8	-8

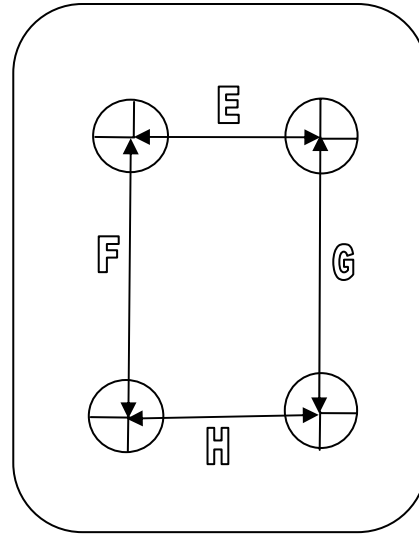
DATA SHEET NO. 18... (continued)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2005 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

NHTSA No.: M55205
 Test Date: 01/11/05



Driver



Passenger

UNDERBODY FLOORBOARD DEFORMATION

Measurement	Pre-Test	Post-Test	Difference
A	141	145	-4
B	125	121	4
C	115	113	2
D	130	130	0
E	151	151	0
F	112	112	0
G	122	117	5
H	145	145	0

DATA SHEET NO. 19

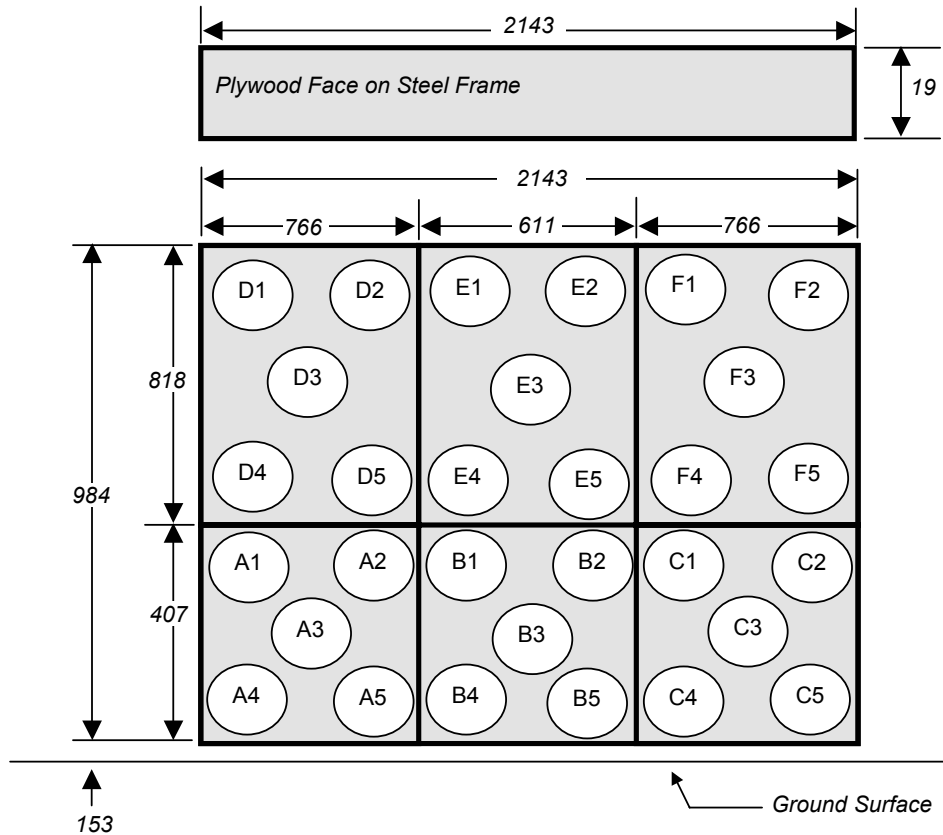
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2005 Nissan Pathfinder SE-X4
 Test Program: 35mph Frontal Impact

NHTSA No.: M55205
 Test Date: 01/11/05

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 Nissan Pathfinder SE-X4
Test Program: 35mph Frontal Impact

NHTSA No.: M55205
Test Date: 01/11/05

VEHICLE INFORMATION

VIN: 5N1AR18W15C704069 Wheelbase (mm) : 2857
Vehicle Size Category: MPV Test Weight (kg) : 2393.2

ACCELEROMETER DATA

Accelerometer Locations: As per measurements on Page 14
Cal. Procedure/Interval: MGA procedure / 6 month
Integration Algorithm: Trapezoidal Linearity: > 99%
Impact Velocity (km/h): 56.6
Velocity Change (km/h): 62.1 Time of Separation (msec): 95

CRUSH PROFILE

Collision Deformation Classification: Frontal Midpoint of Damage: Centerline
Damage Region Length (mm): 1520 Impact Mode: Frontal

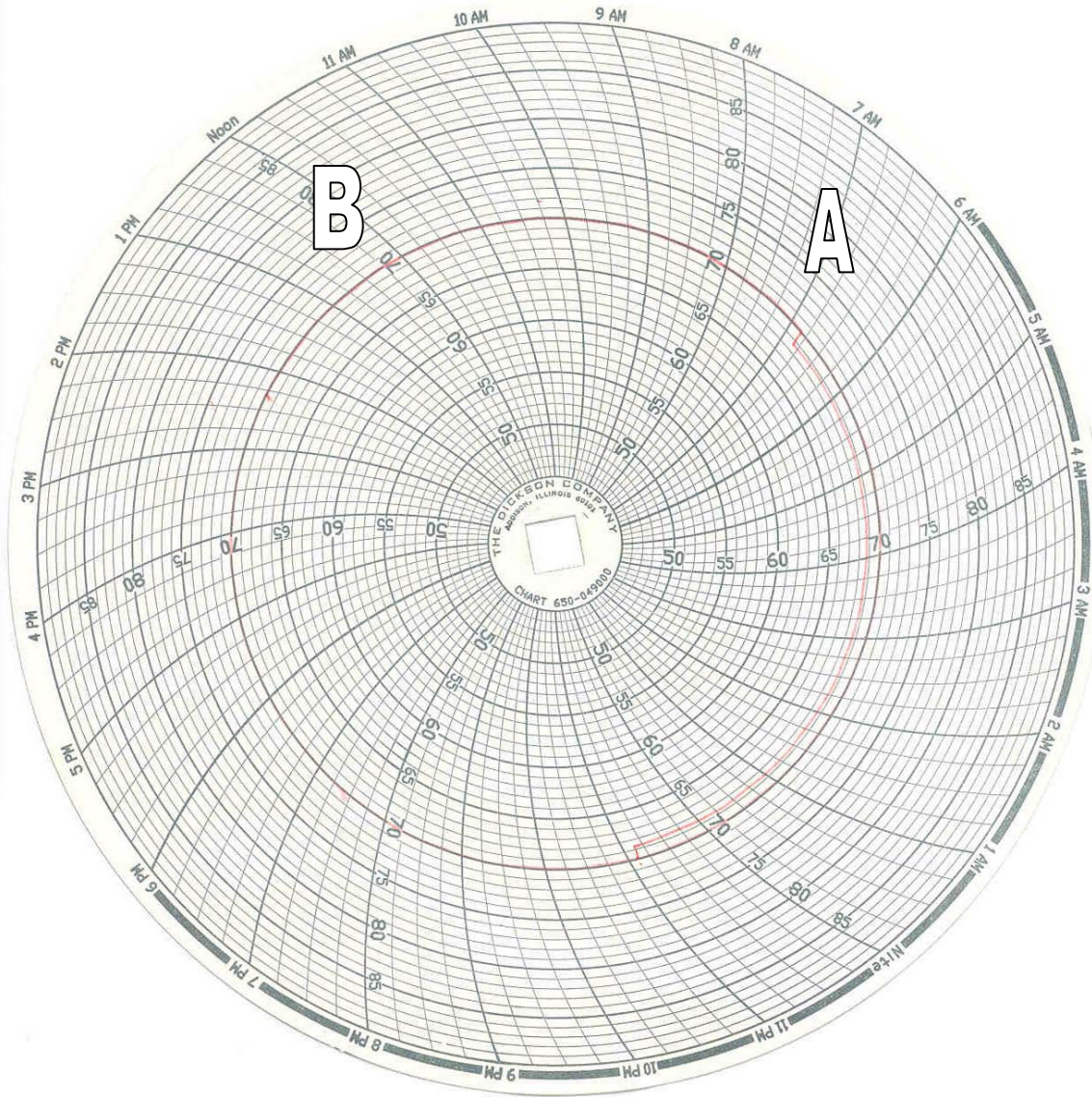
No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4635	4298	337
C2	Crush zone 2 at left side	mm	4706	4298	408
C3	Crush zone 3 at left side	mm	4746	4318	428
C4	Crush zone 4 at right side	mm	4746	4290	456
C5	Crush zone 5 at right side	mm	4707	4251	456
C6	Crush zone 6 at right side	mm	4635	4307	328
L	C1 TO C6	mm	1520	1476	44

DATA SHEET NO. 21

DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2005 Nissan Pathfinder SE-X4
Test Program: 35mph Frontal Impact

NHTSA No.: M55205
Test Date: 01/11/05



A = Dummies installed in vehicle at 7:00 am

B = Test conducted at 11:50 am

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MFD BY NISSAN MOTOR CO., LTD			
DATE	10/04		
GVWR	6000 LB		
GAWR FR.	2775 LB		
WITH P265/70R16 TIRES			
16X7.0	RIMS AT 35 PSI		
COLD SINGLE			
GAWR RR.	3500 LB		
WITH P265/70R16 TIRES			
16X7.0	RIMS AT 35 PSI		
COLD SINGLE			
THIS VEHICLE CONFORMS TO			
ALL APPLICABLE FEDERAL			
MOTOR VEHICLE SAFETY			
AND THEFT PREVENTION			
STANDARDS IN EFFECT			
ON THE DATE OF			
MANUFACTURE SHOWN ABOVE.			
SEE OWNERS MANUAL FOR			
ADDITIONAL INFORMATION.			
5N1AR18W15C704069			
TYPE:MPV	330	7	
MODEL:	JCKZLTN-EUA	02000	
COLOR	TRIM	TRANS	
KH3	K*	RESR05A	
AXLE	ENGINE		
RC33	VQ40DE 3954CC		

Vehicle Certification Label

RECOMMENDED COLD TIRE INFLATION PRESSURE
PRESSION DE GONFLAGE RECOMMANDEE DES PNEUS FROIDS

TIRE SIZE DIMENSIONS		kPa (psi)
P235/75R15	P245/75R16	FRONT: 240 (35)
P265/70R16	P265/75R16	
P265/65R17		REAR: 240 (35)

99090 EA00A



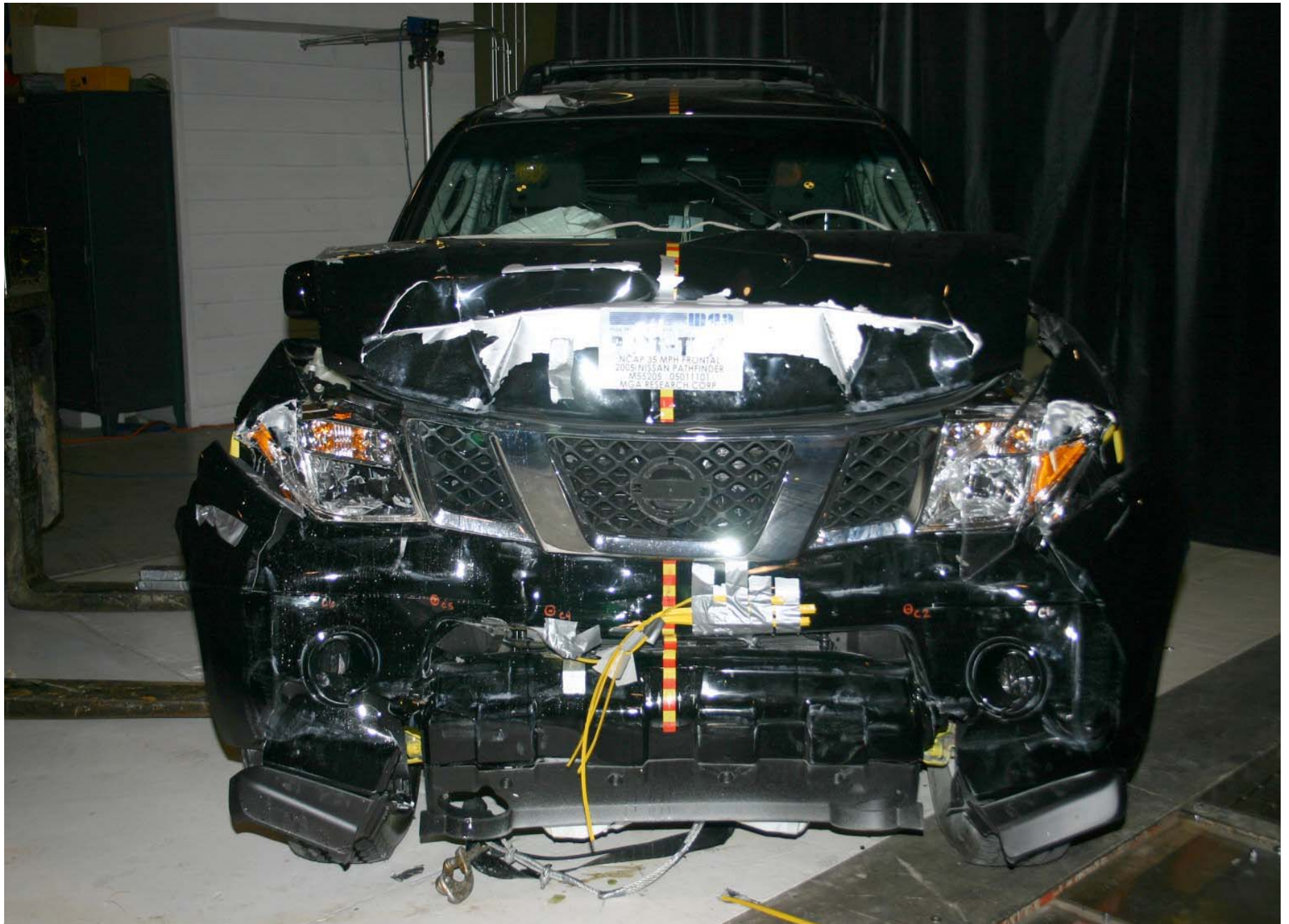
Right Front View of Test Vehicle, as received



Left Rear View of Test Vehicle, as received



Pre-Test Front View of Test Vehicle



Post-Test Front View of Test Vehicle



Pre-Test Left Side View of Test Vehicle

A-8.



Post-Test Left Side View of Test Vehicle



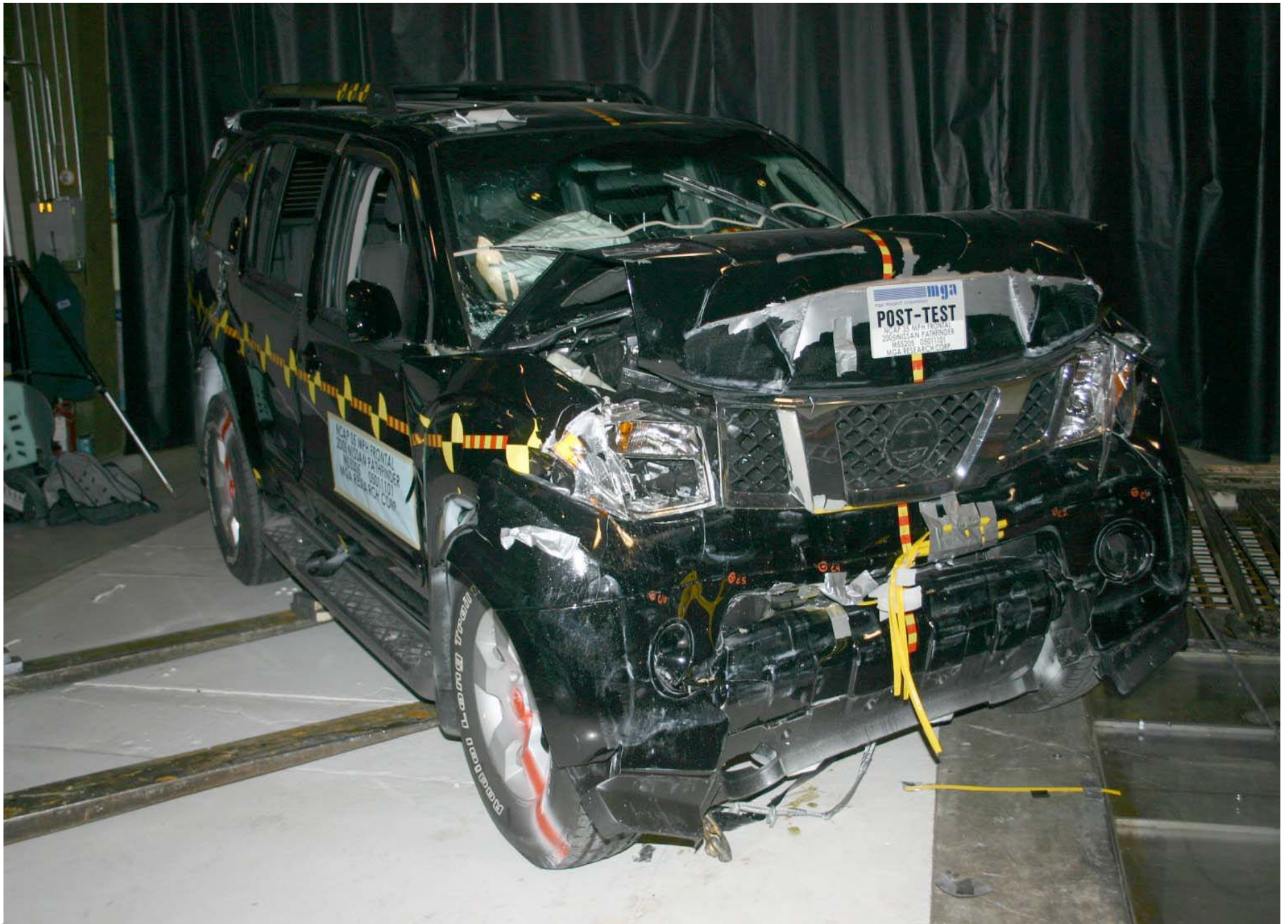
Pre-Test Right Side View of Test Vehicle



Post-Test Right Side View of Test Vehicle



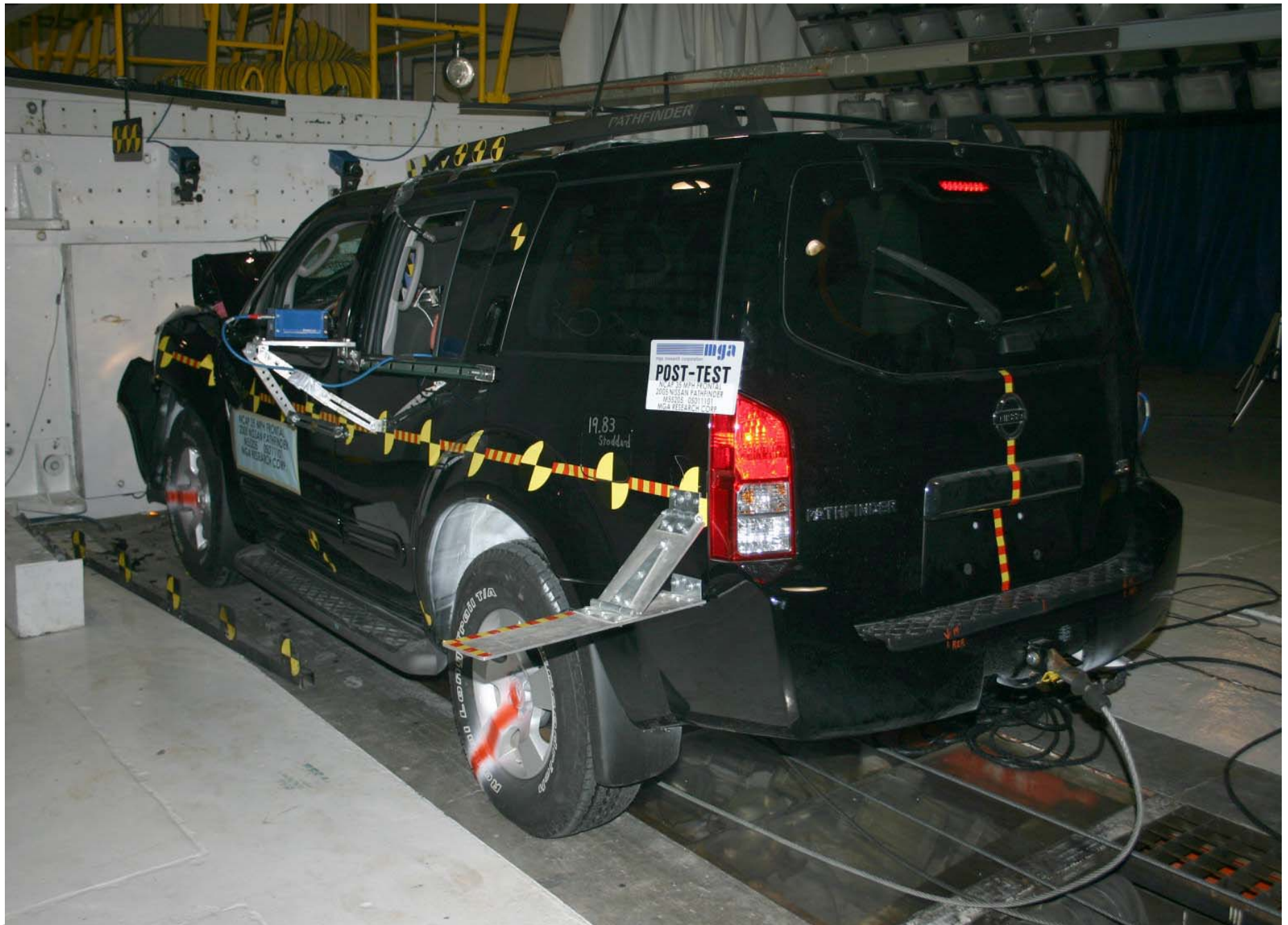
Pre-Test Right Front Three-Quarter View of Test Vehicle



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



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



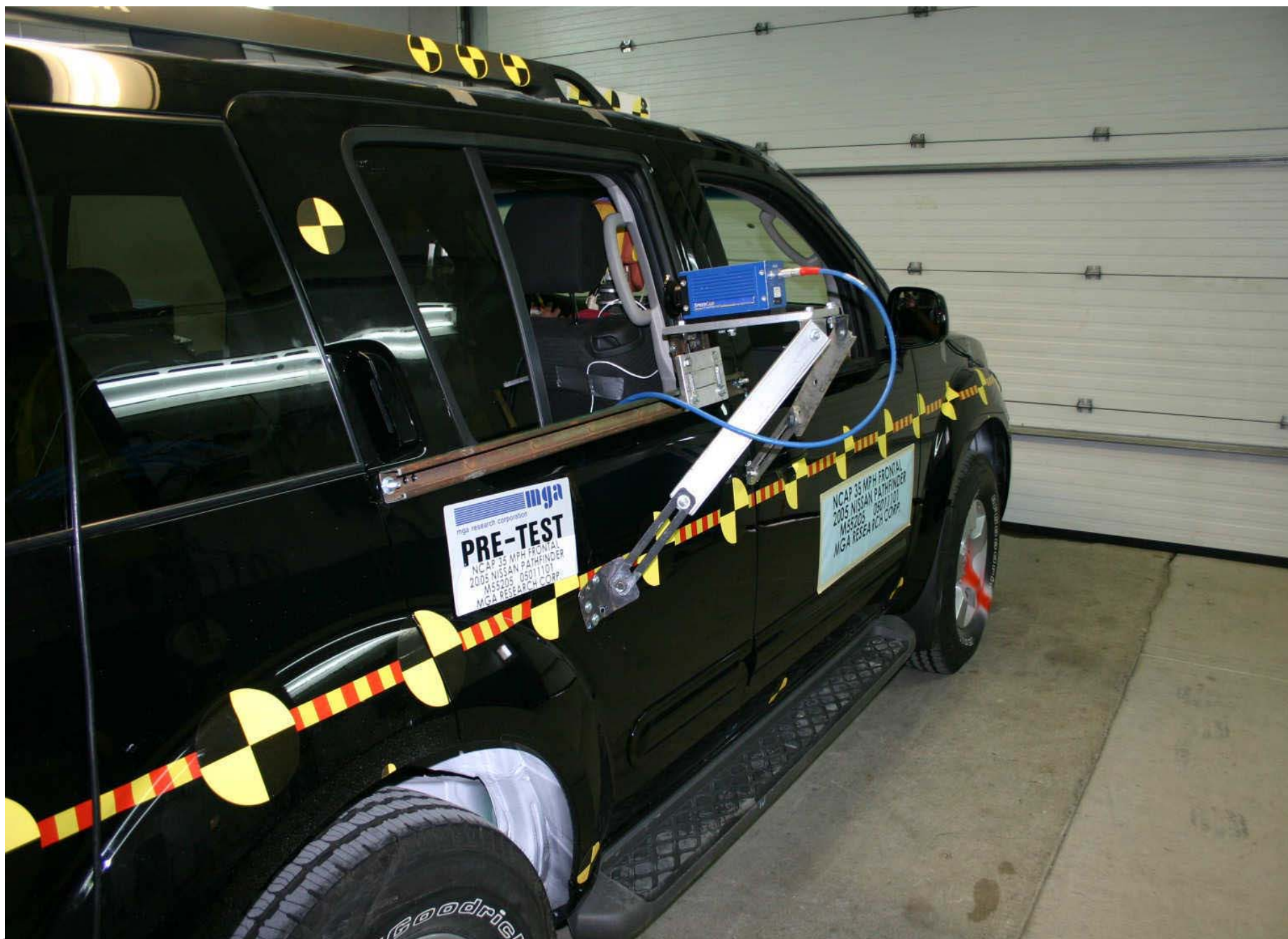
Post-Test Left Rear Three-Quarter View of Test Vehicle



Pre-Test Left Rear Three-Quarter View of Doors



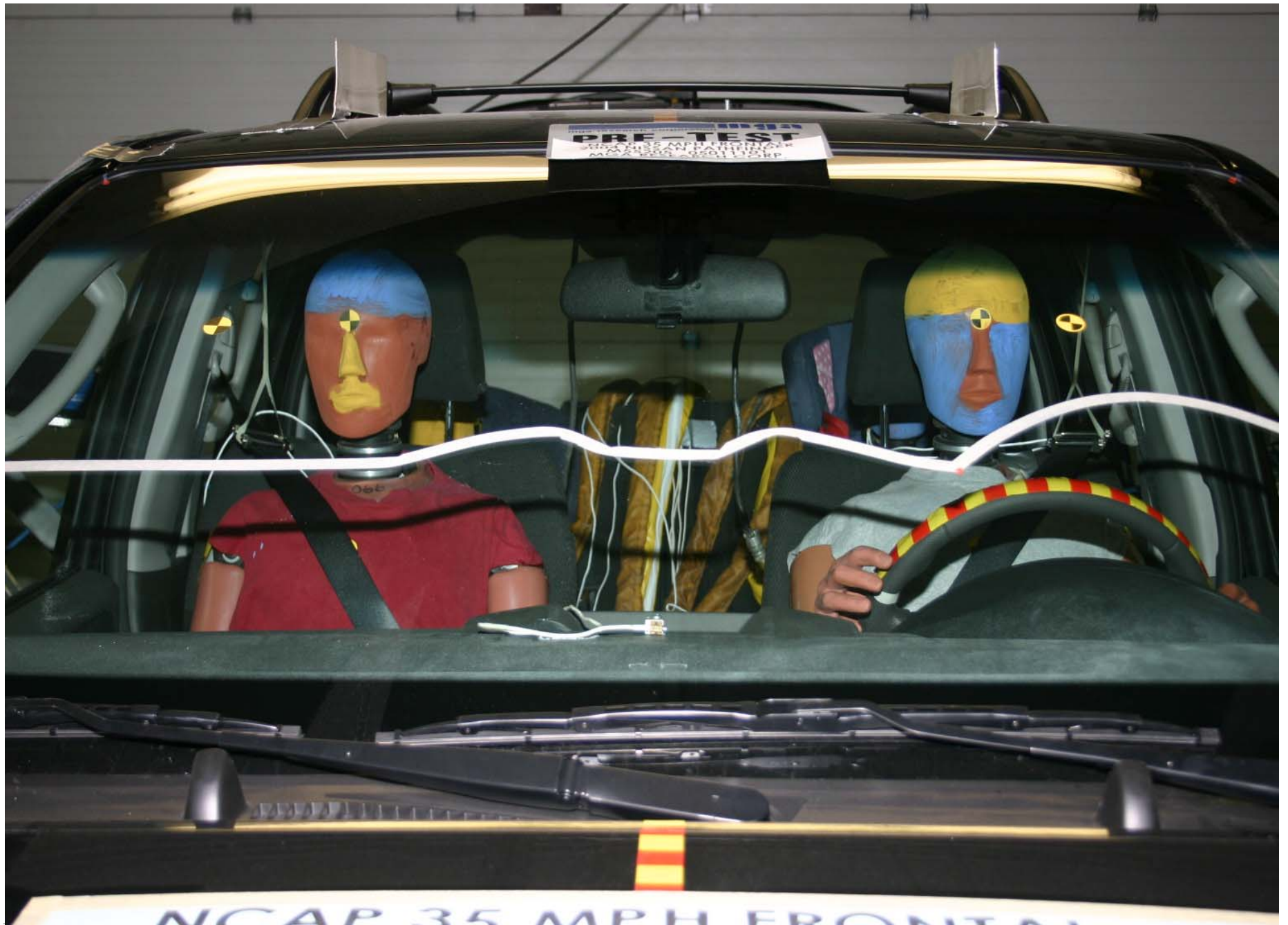
Post-Test Left Rear Three-Quarter View of Doors



Pre-Test Right Rear Three-Quarter View of Doors



Post-Test Right Rear Three-Quarter View of Doors



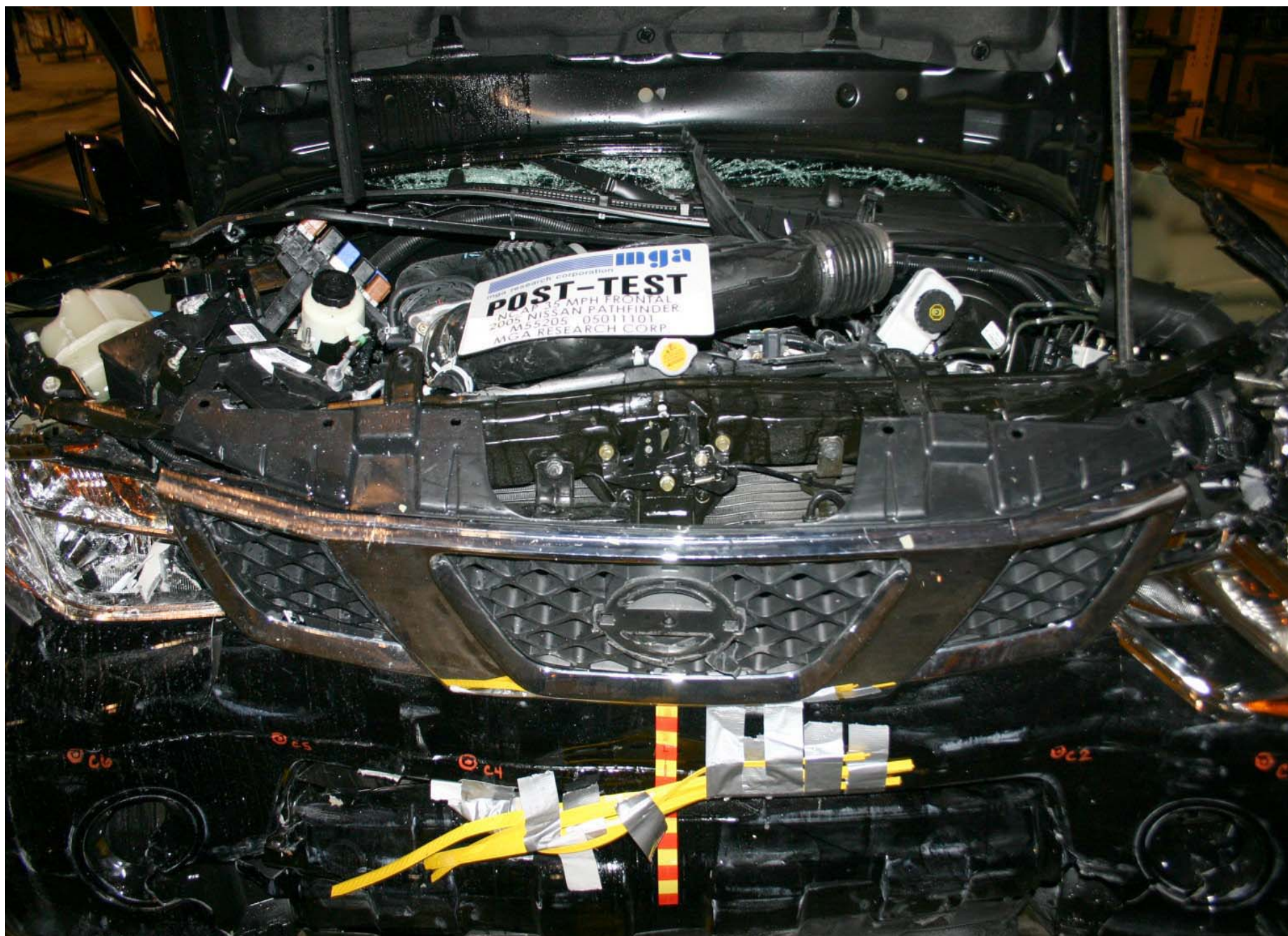
Pre-Test Windshield View



Post-Test Windshield View



Pre-Test Engine Compartment View



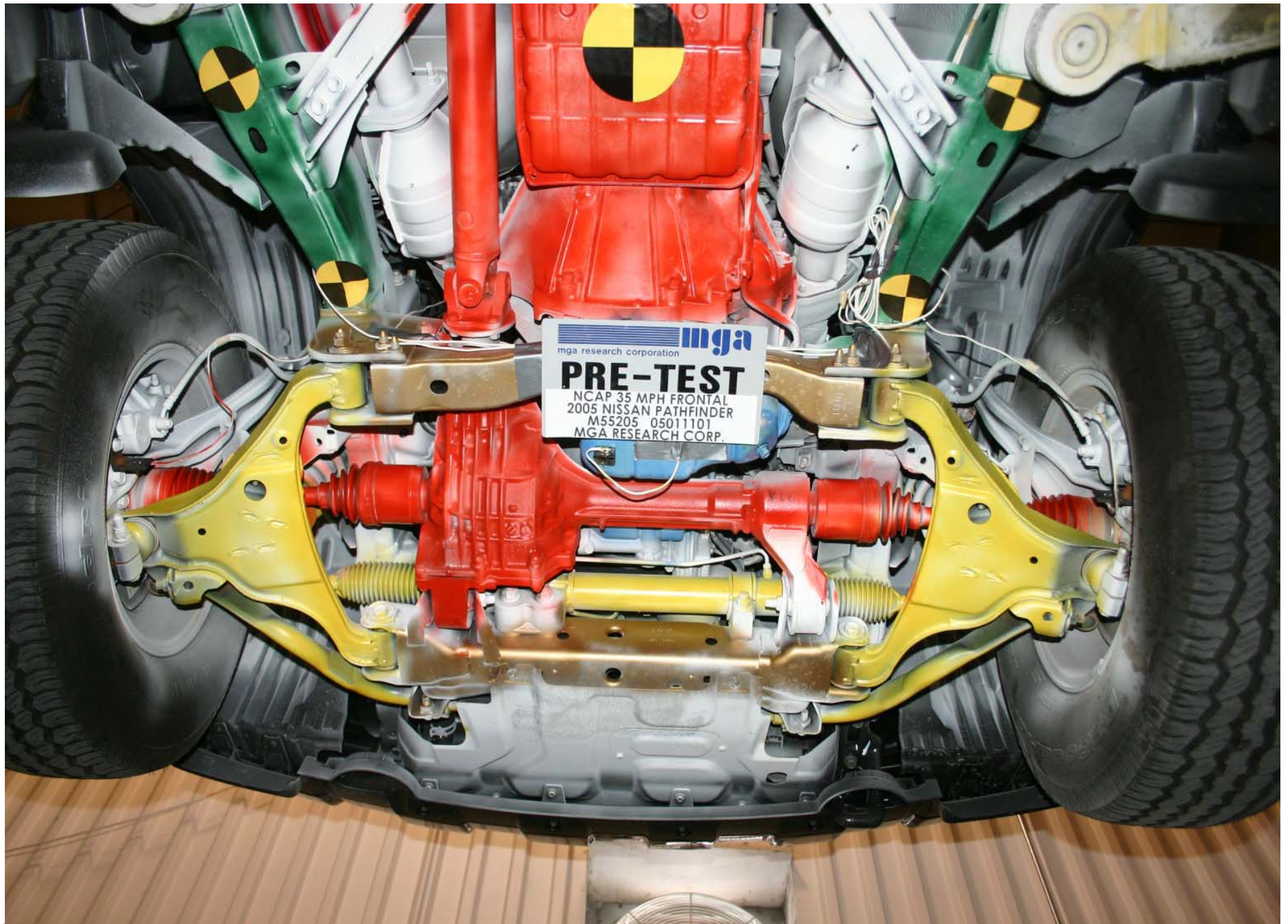
Post-Test Engine Compartment View



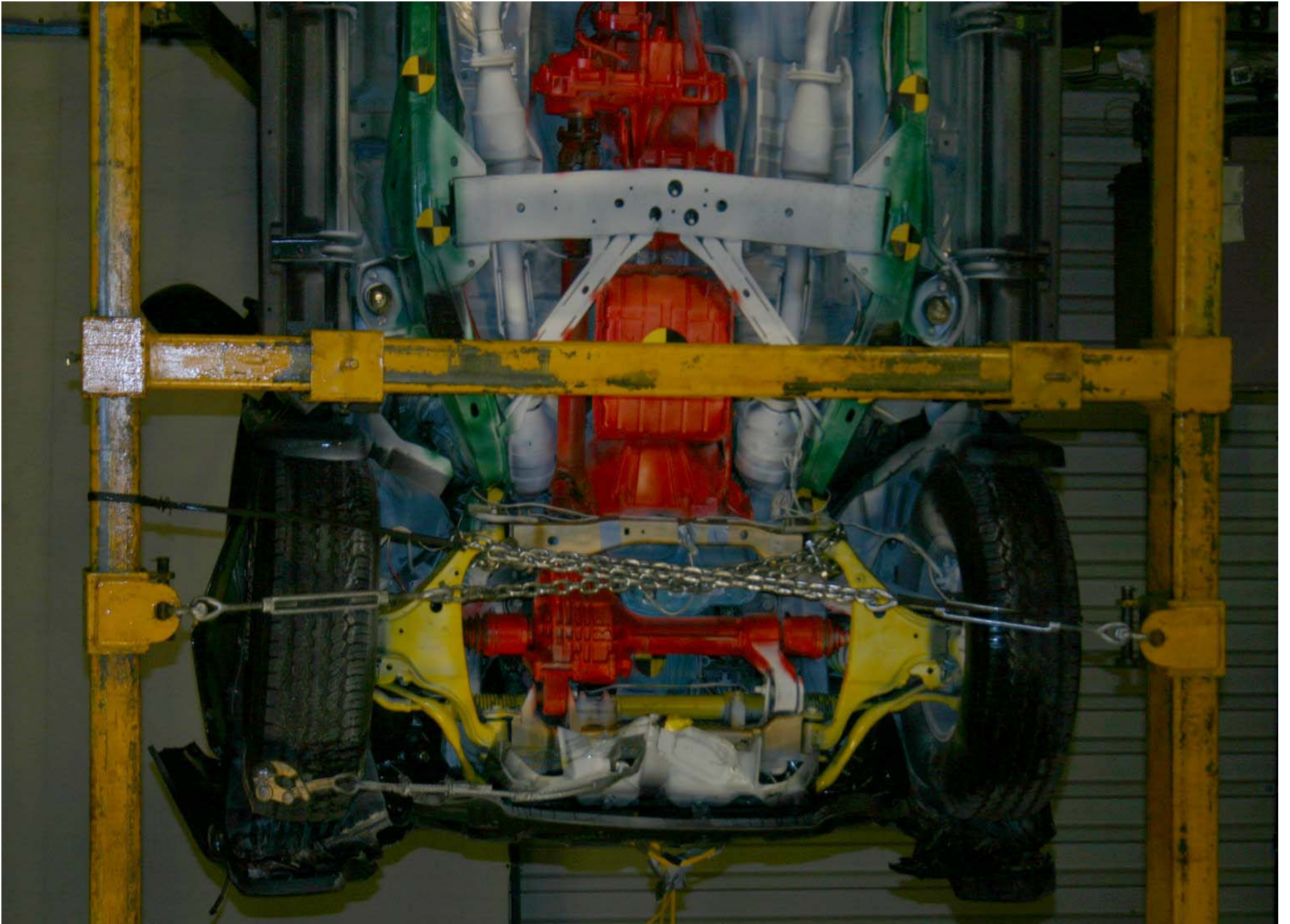
Pre-Test Fuel Filler Cap View



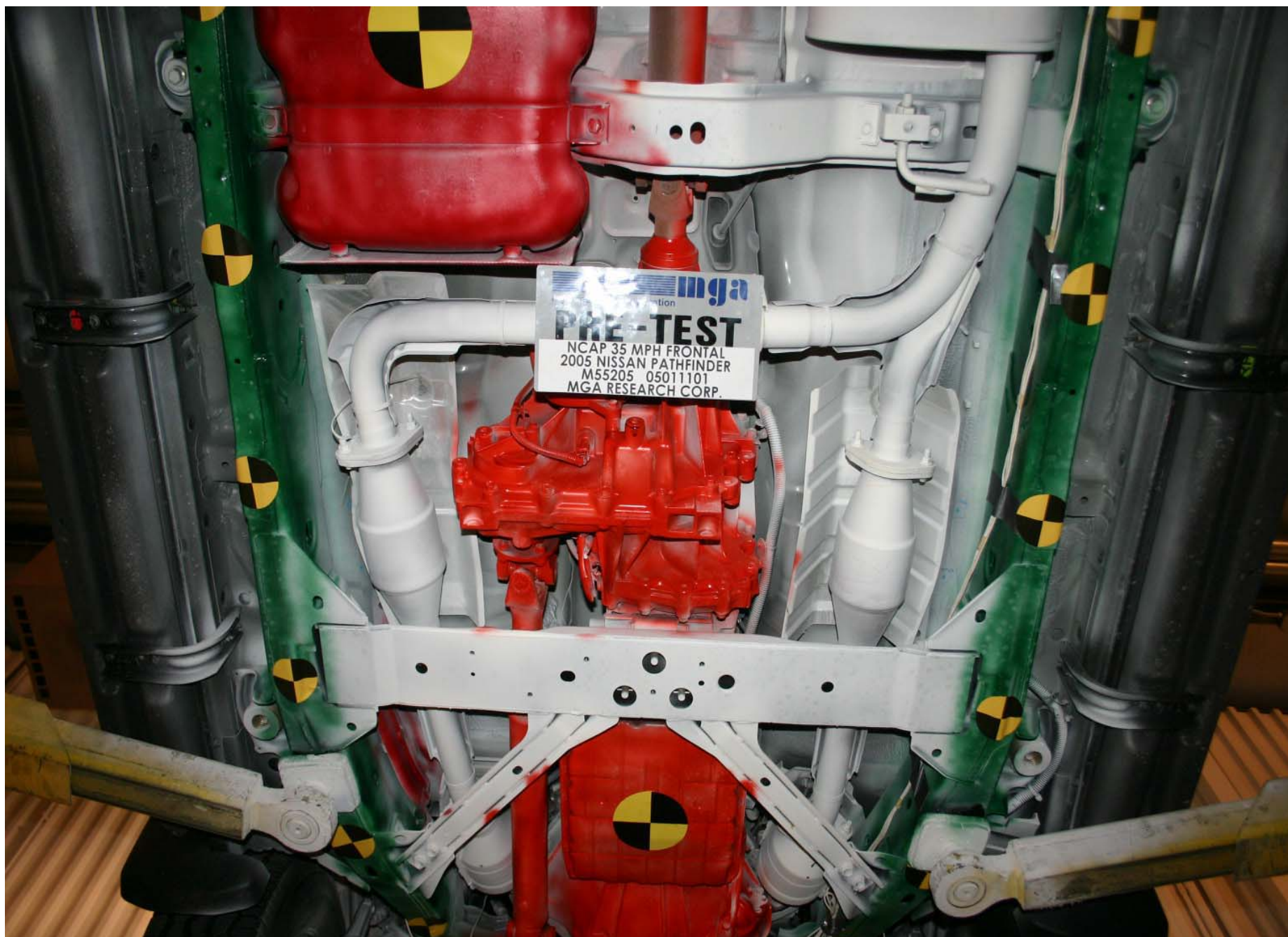
Post-Test Fuel Filler Cap View



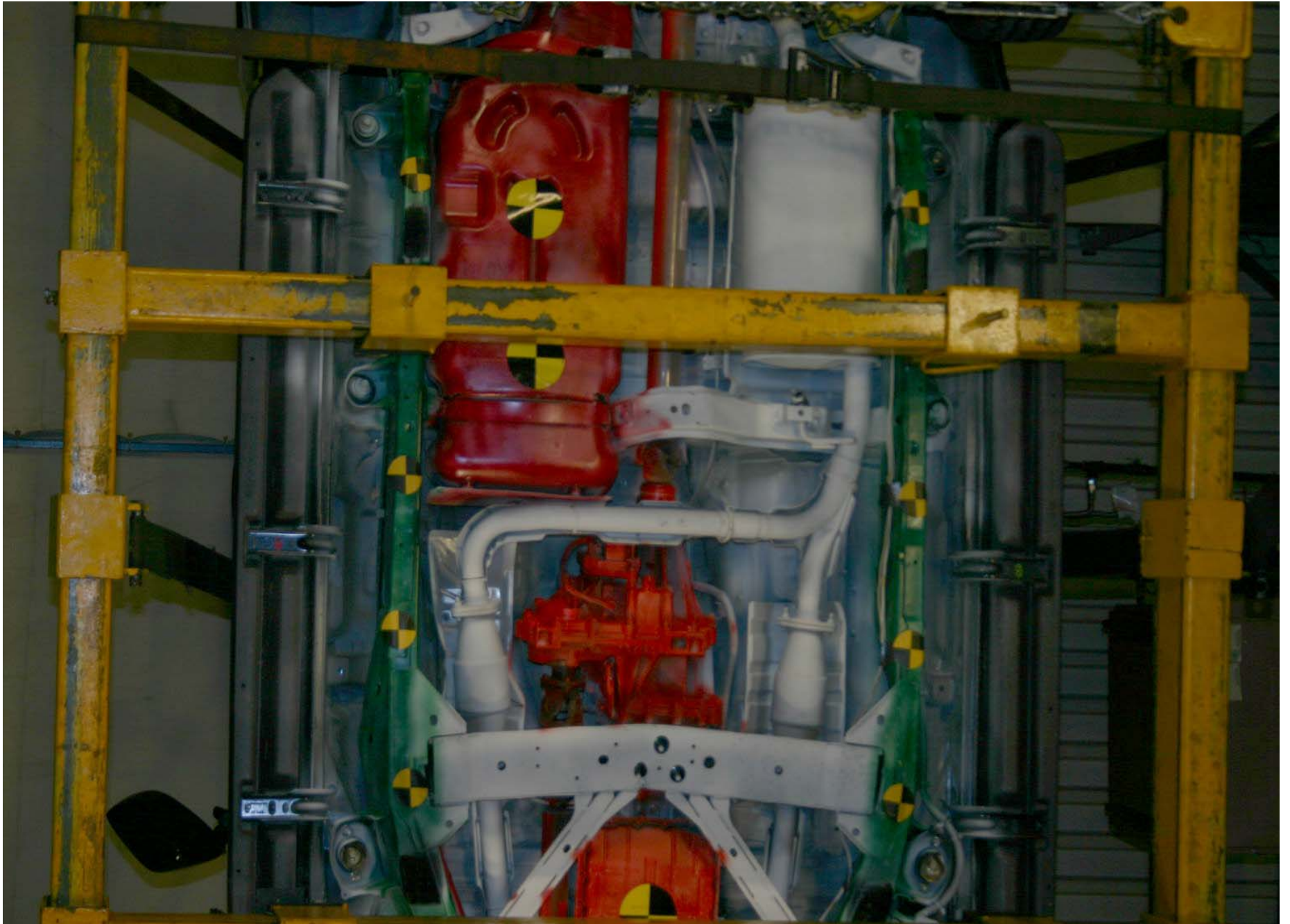
Pre-Test Front Underbody View



Post-Test Front Underbody View



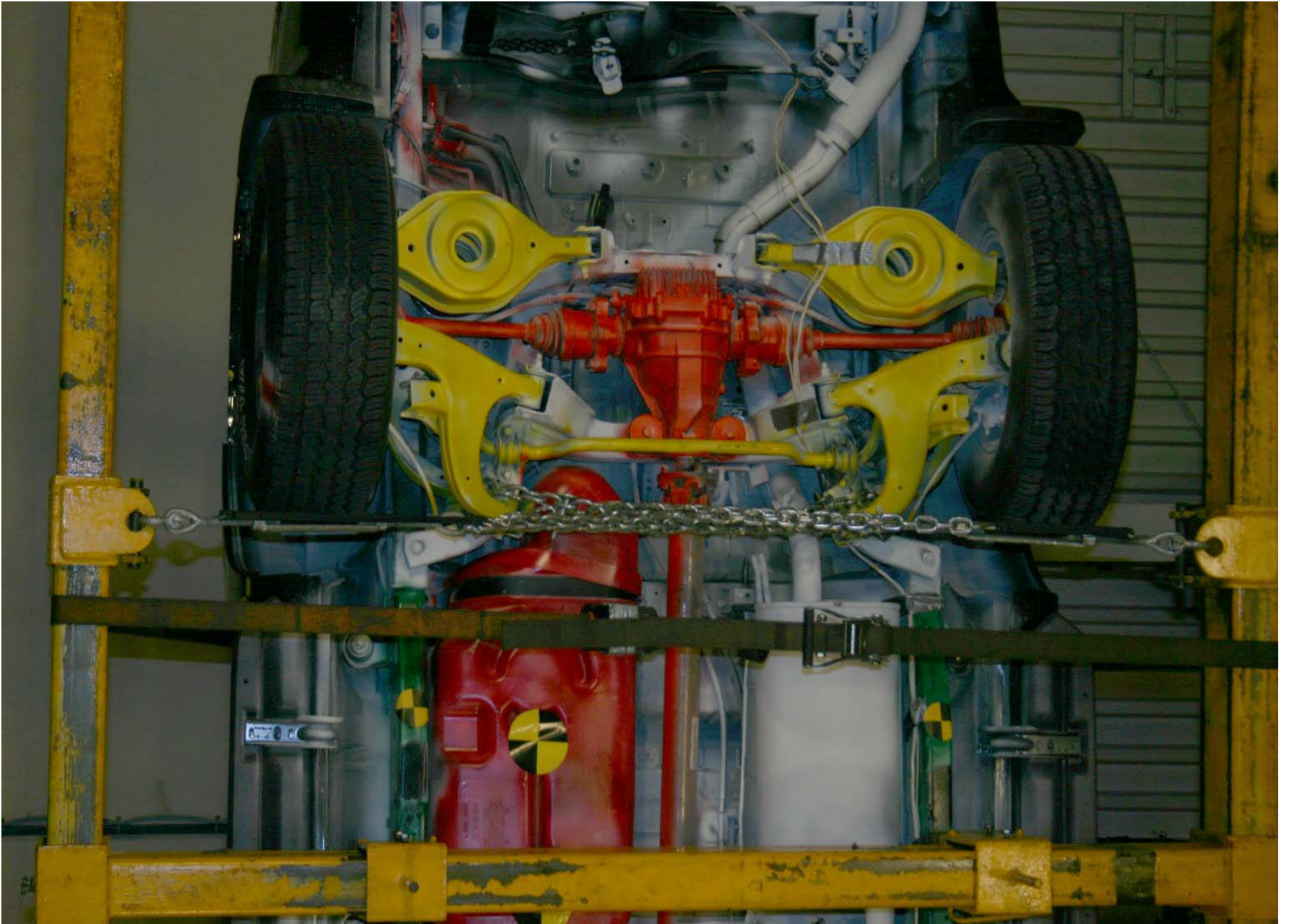
Pre-Test Front Mid Underbody



Post-Test Front Mid Underbody



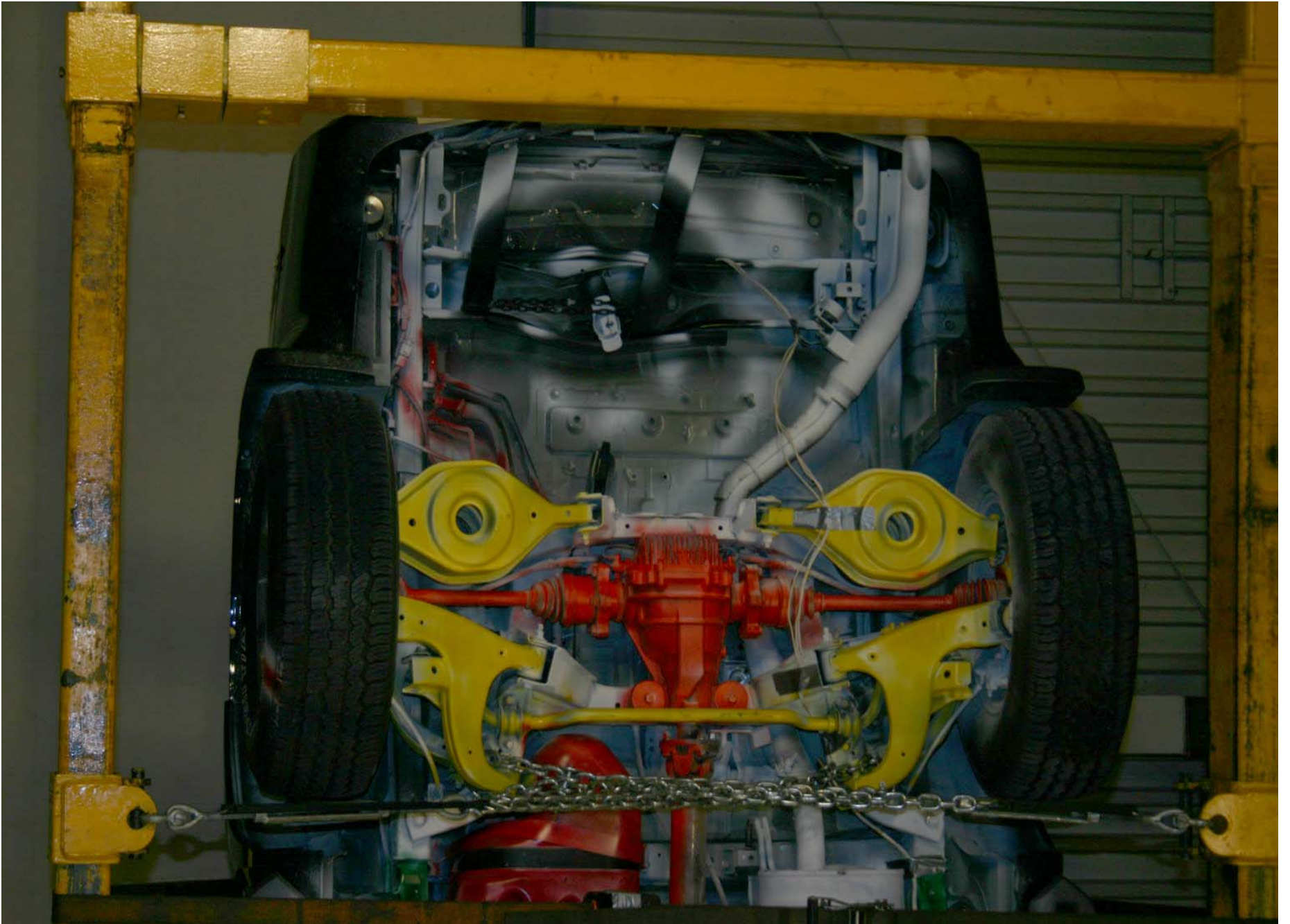
Pre-Test Rear Mid Underbody



Post-Test Rear Mid Underbody



Pre-Test Rear Underbody View



Post-Test Rear Underbody View



Pre-Test Driver Dummy Front View (head position)



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



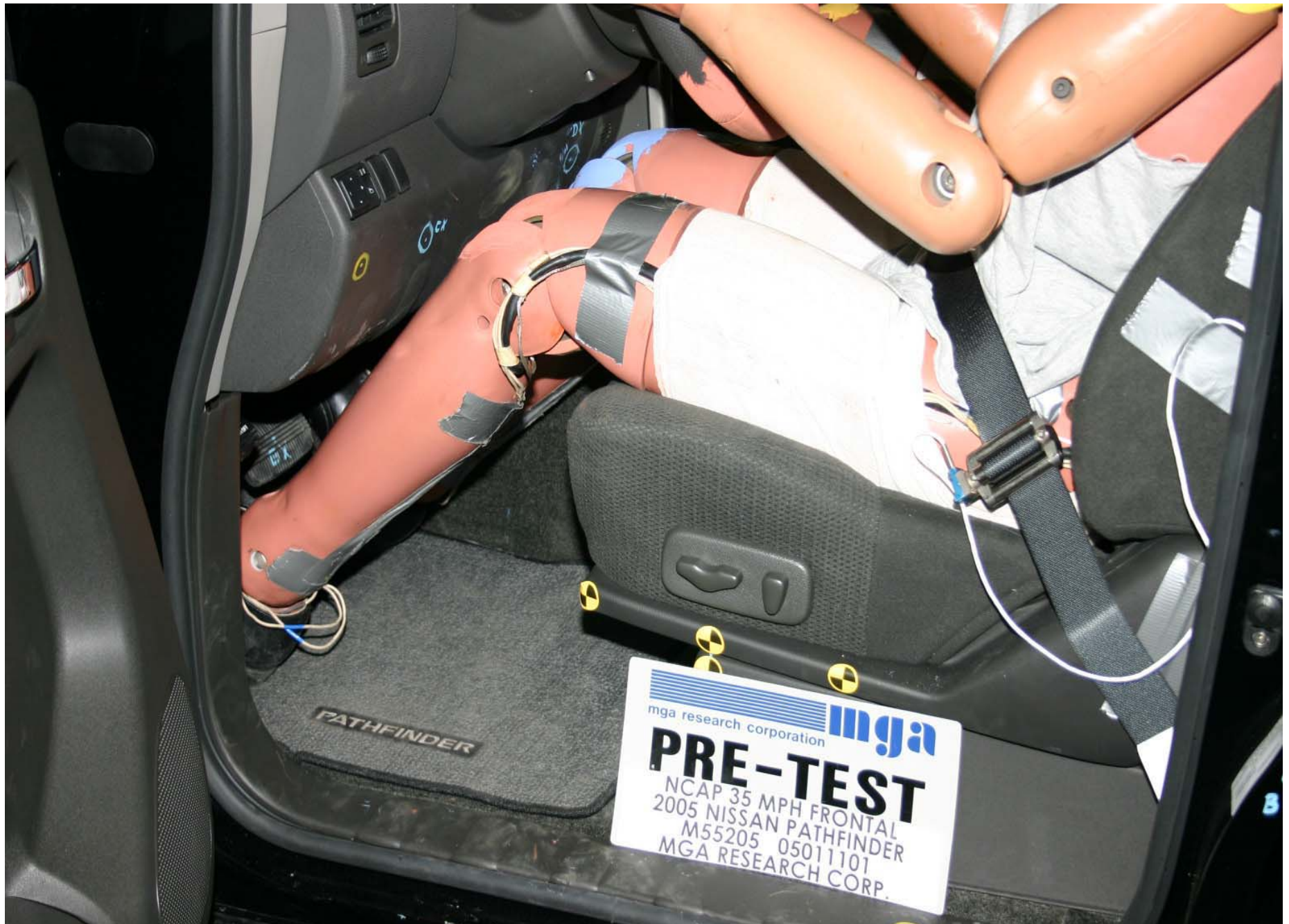
Post-Test Driver Dummy Seat Position



Pre-Test Driver Dummy Feet Position



Post-Test Driver Dummy Feet Position



Pre-Test Driver Side Knee Bolster View



Post-Test Driver Side Knee Bolster View

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Pre-Test Driver Side Floor Pan View



Post-Test Driver Side Floor Pan View



Post-Test Driver Dummy Head Contact



Post-Test Driver Dummy Knee Contact



Post-Test Driver Dummy Airbag Contact

Pre-Test Passenger Dummy Front View (head position)

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Post-Test Passenger Dummy Front View (head position)

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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)

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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



Post-Test Passenger Side Knee Bolster View



Pre-Test Passenger Side Floor Pan View



Post-Test Passenger Side Floor Pan View



Post-Test Passenger Dummy Head Contact



Post-Test Passenger Dummy Head Contact (visor)



Post-Test Passenger Dummy Knee Contact



Post-Test Passenger Dummy Airbag Contact

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Rollover 90 Degrees



Rollover 180 Degrees



Rollover 270 Degrees



Rollover 360 Degrees



Vehicle Impact

APPENDIX B

DUMMY AND VEHICLE RESPONSE DATA TRACES

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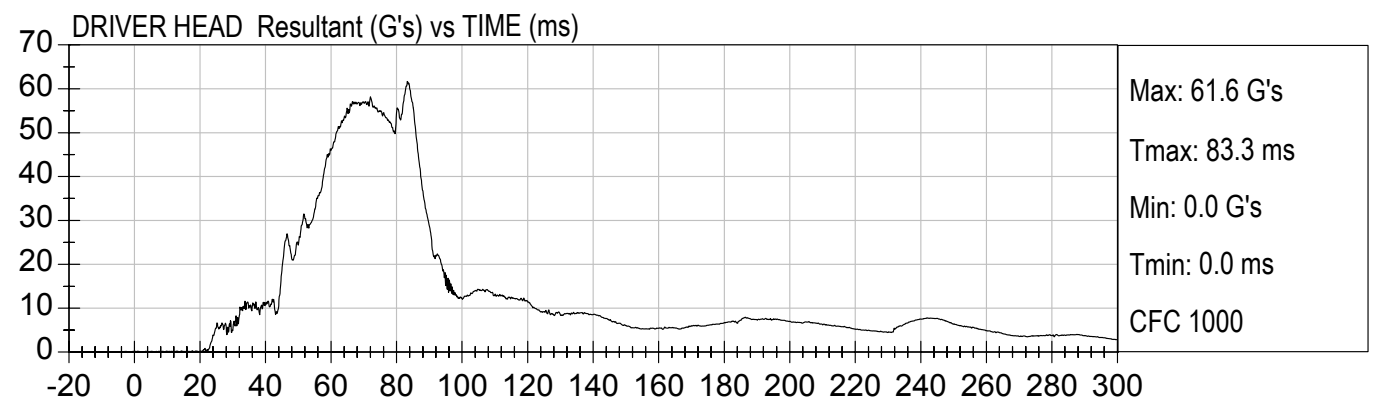
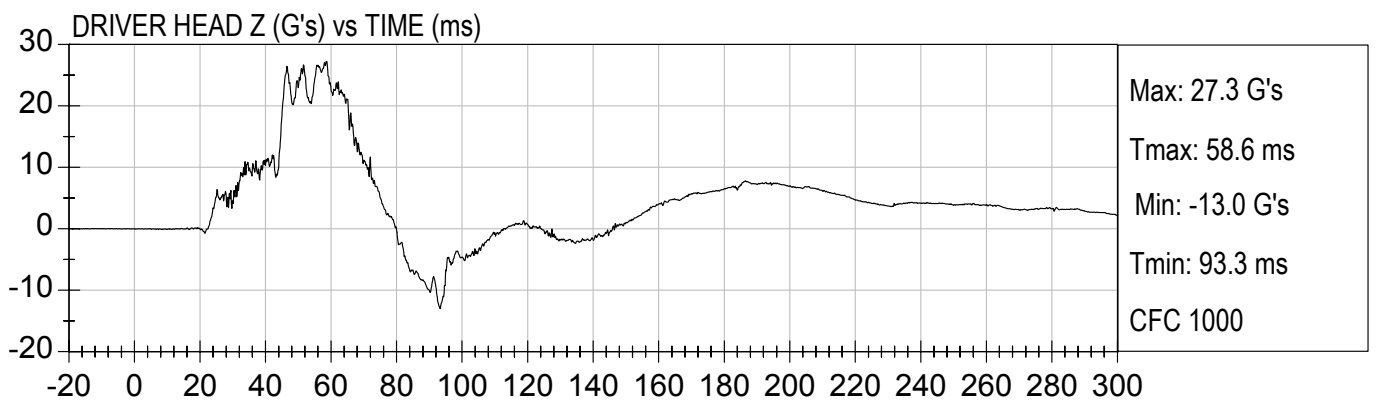
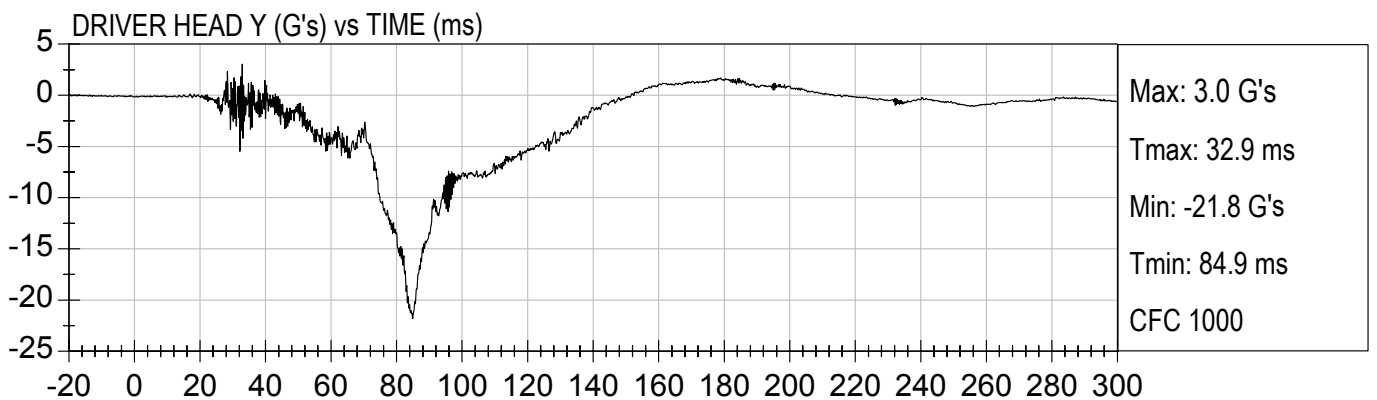
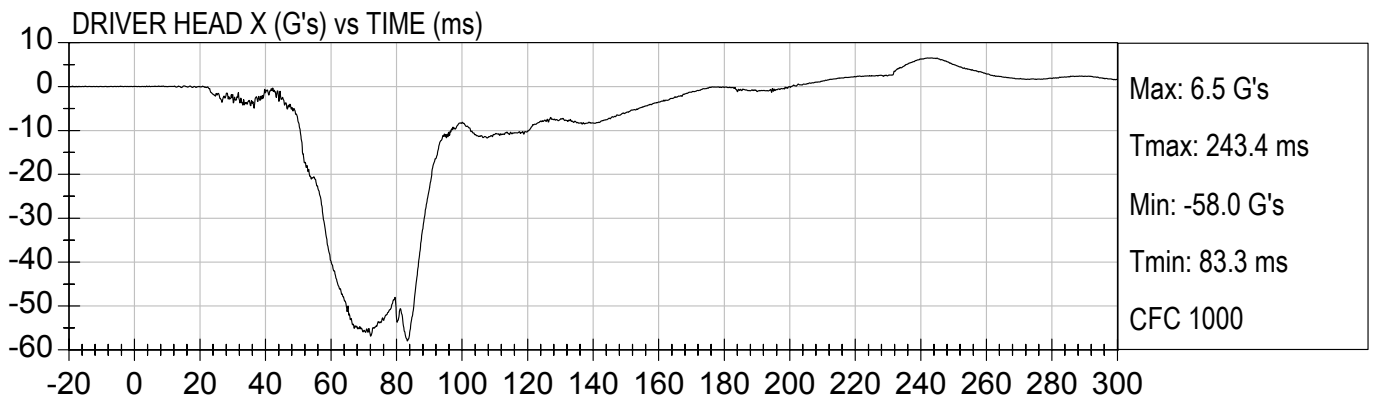
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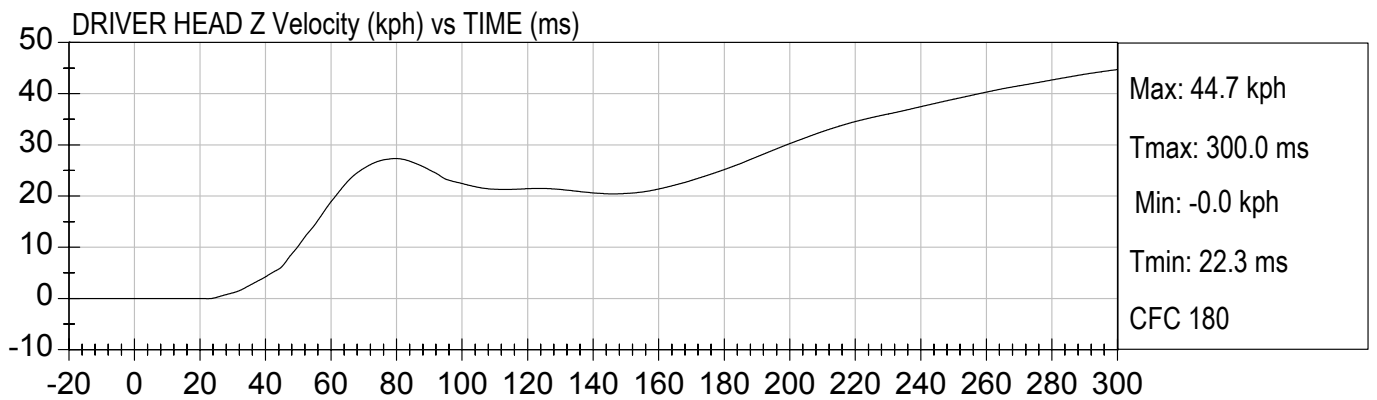
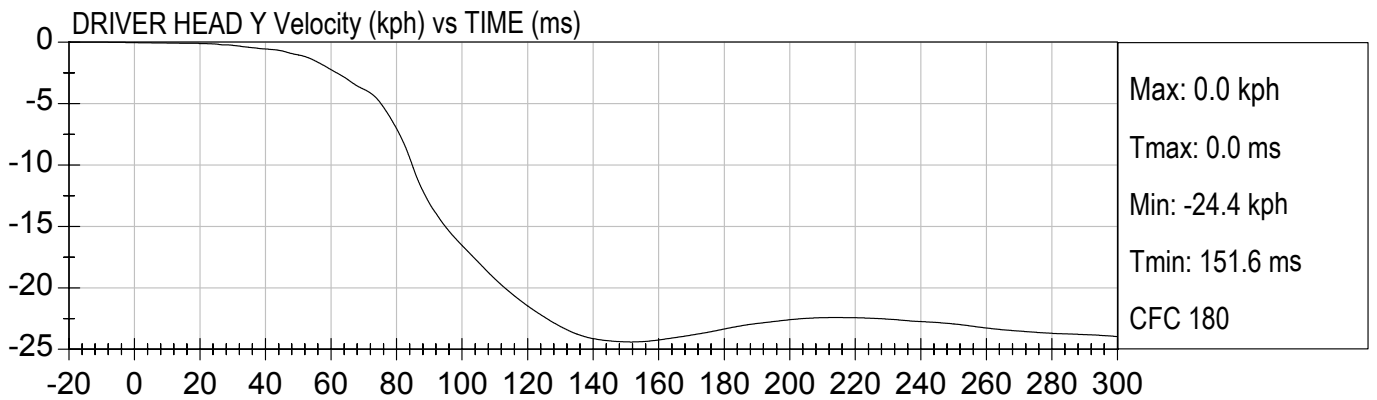
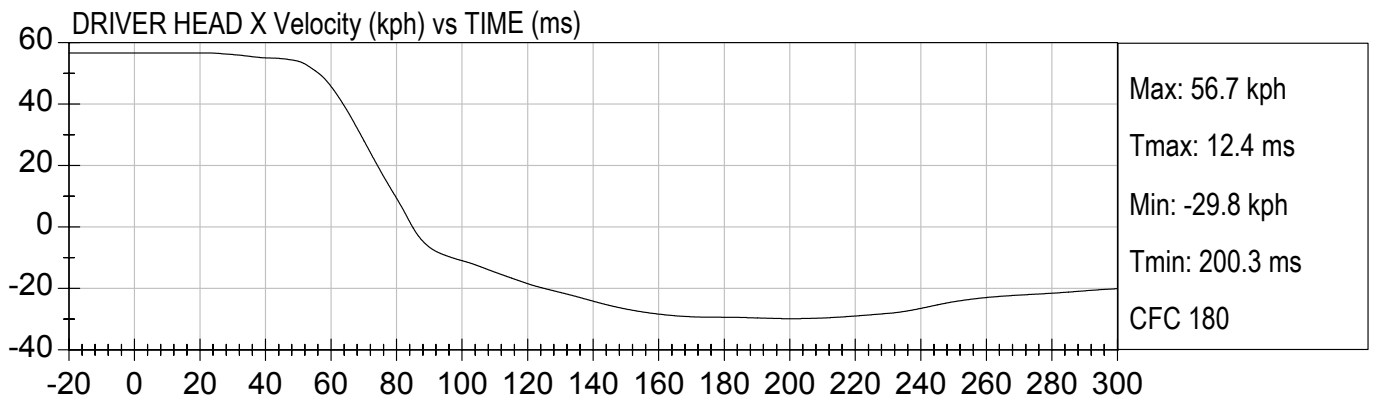
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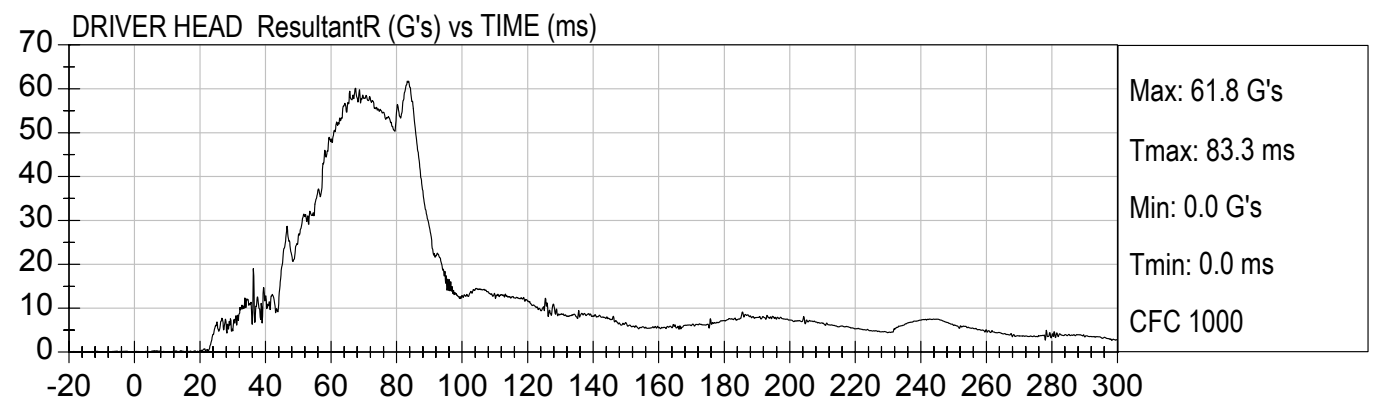
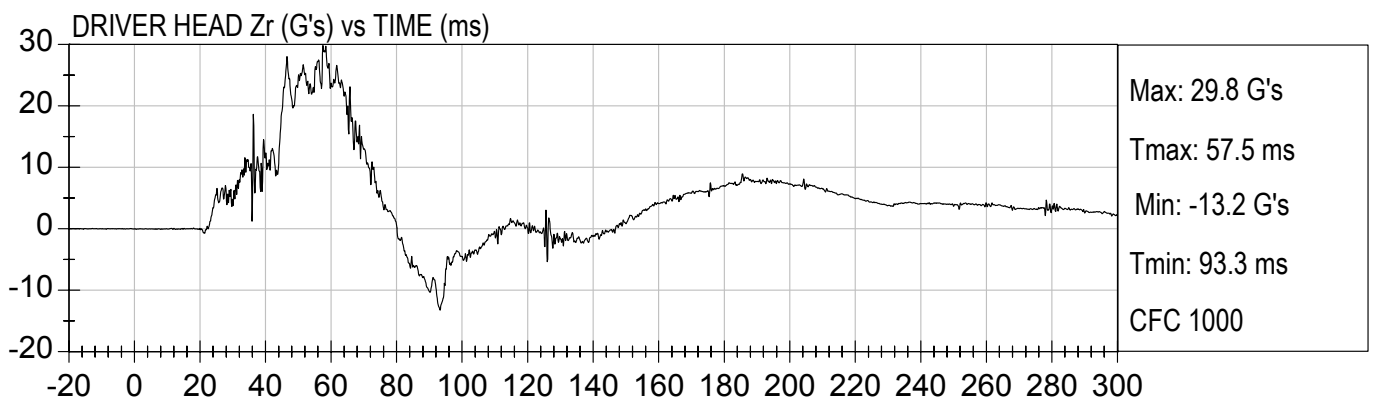
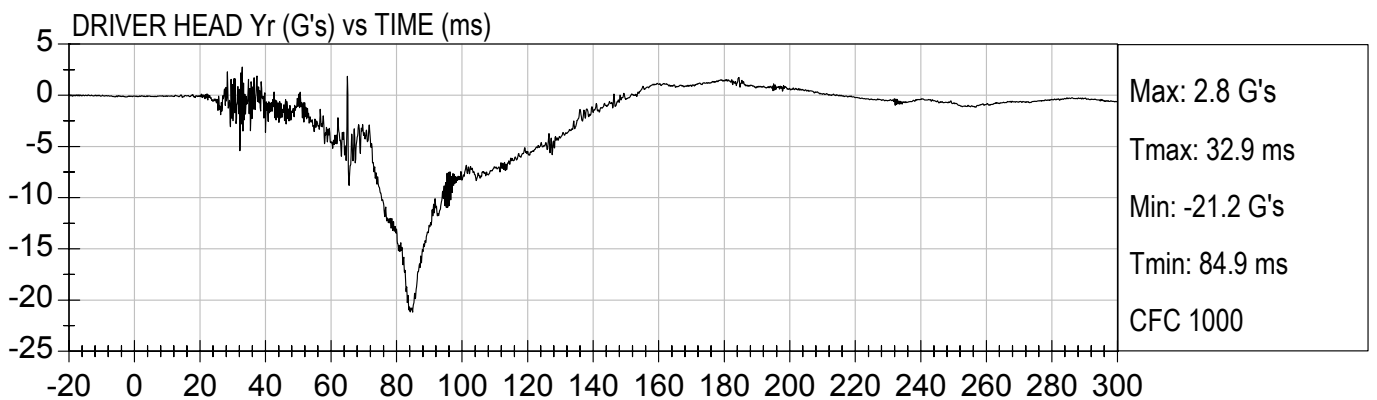
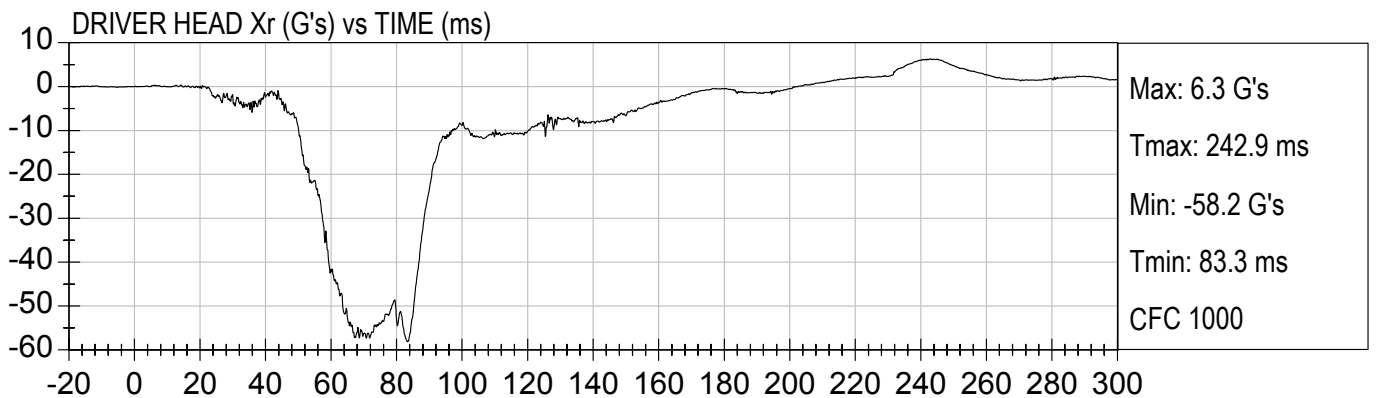
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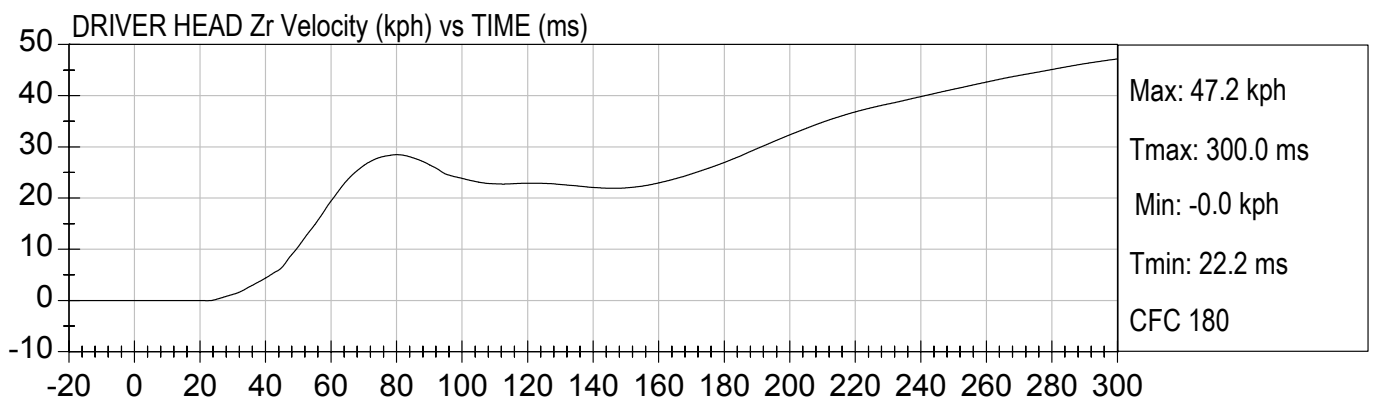
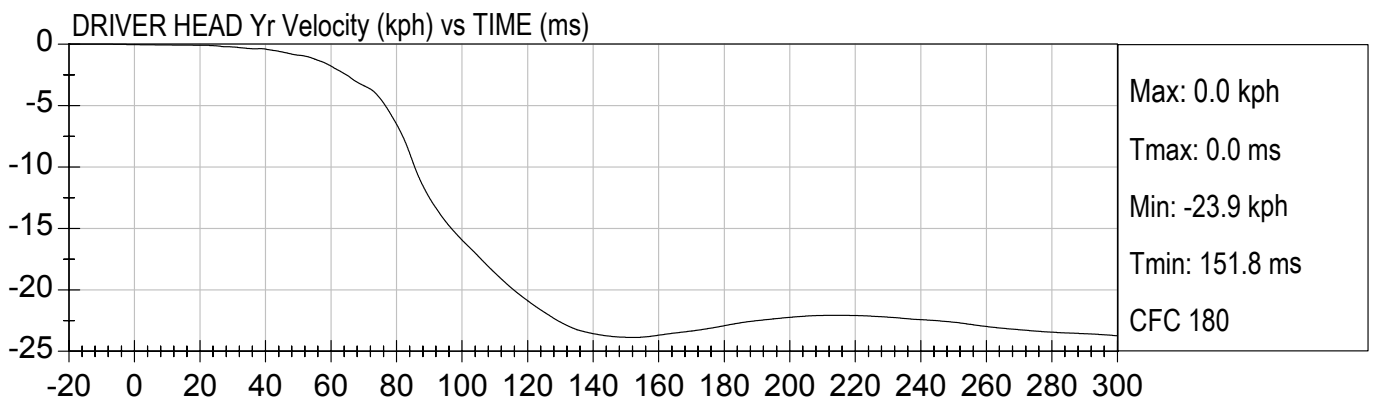
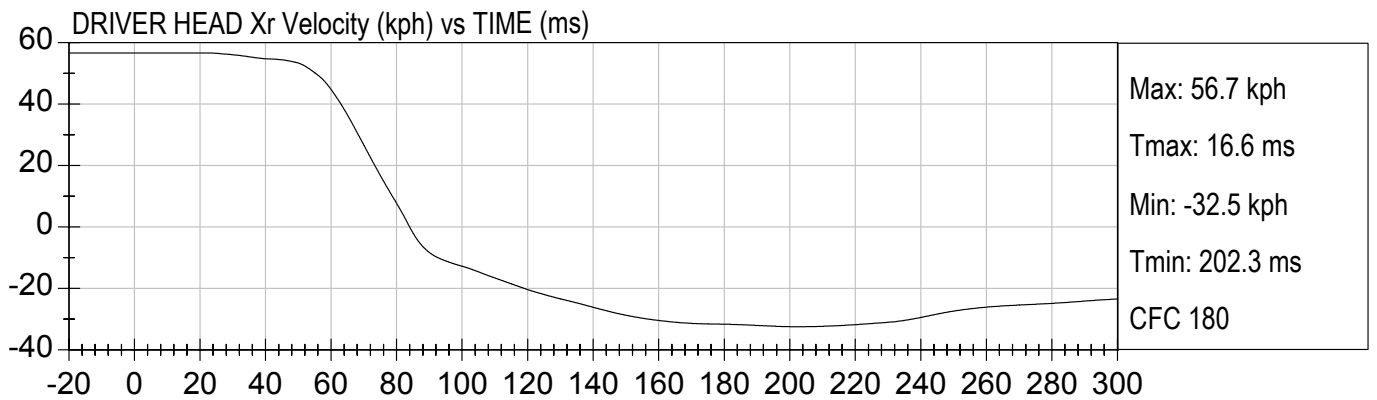
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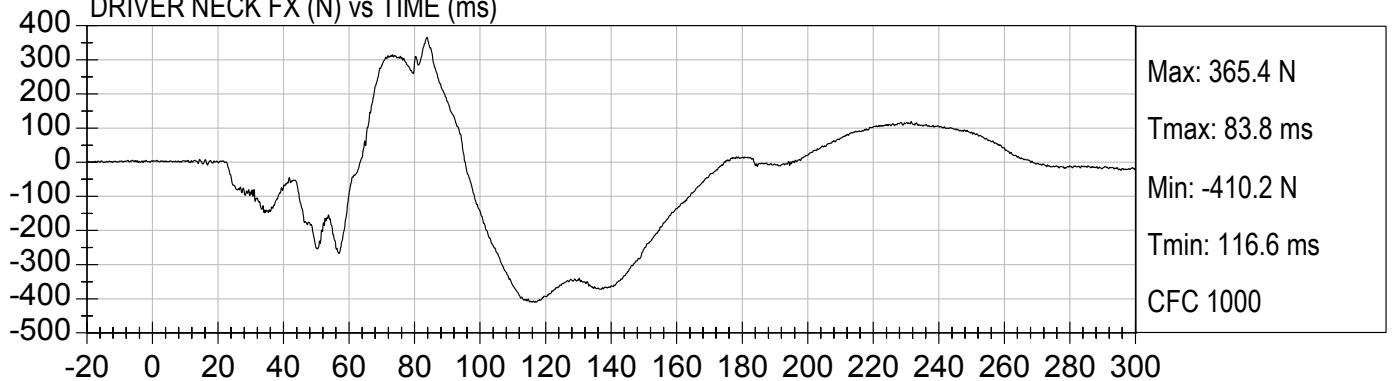




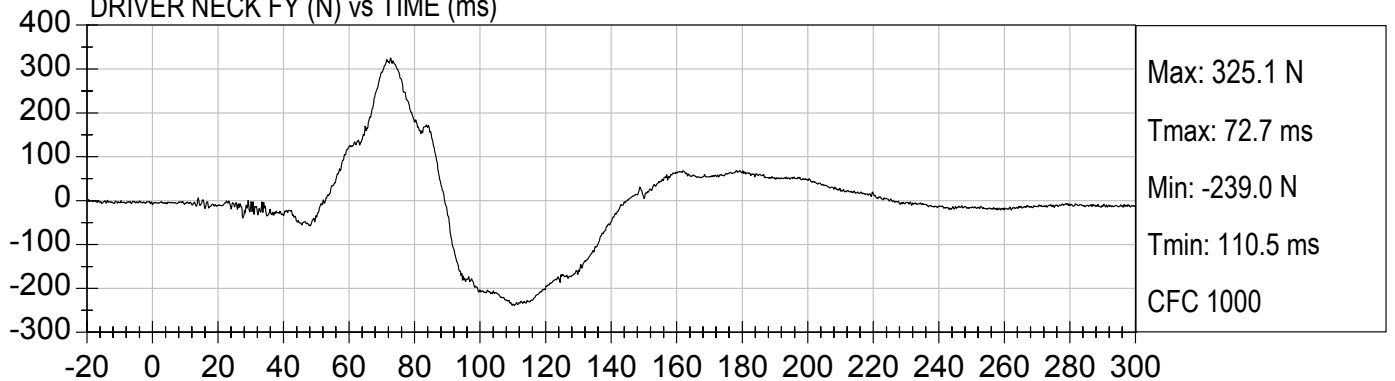




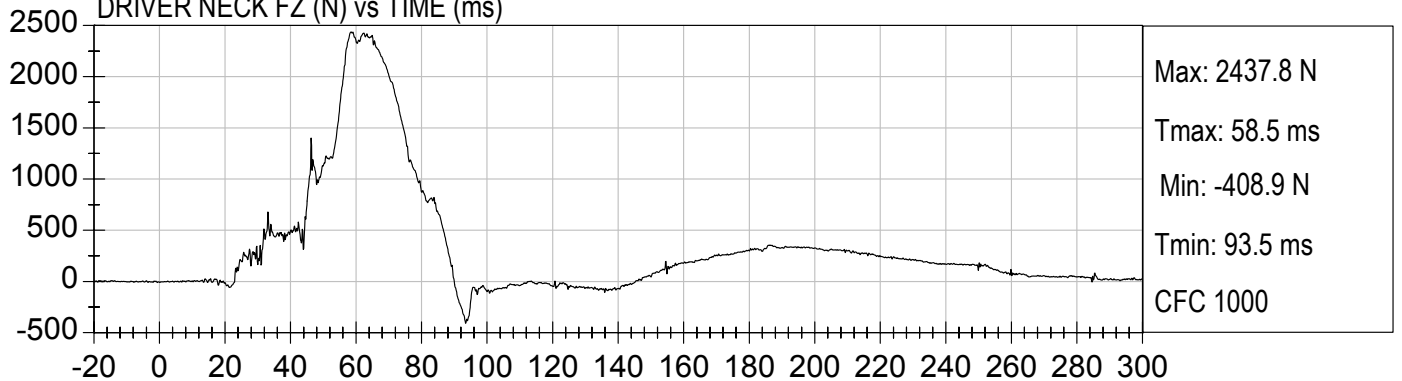
DRIVER NECK FX (N) vs TIME (ms)



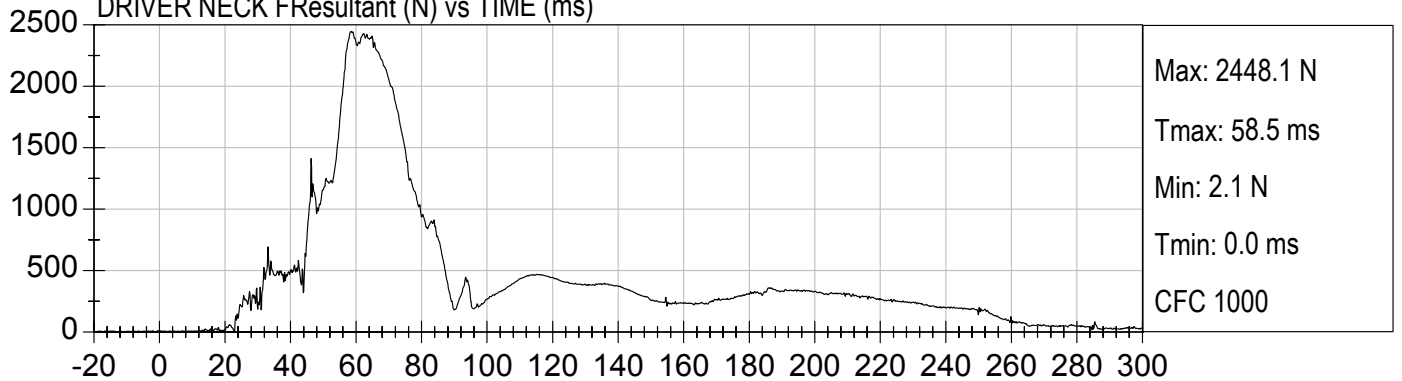
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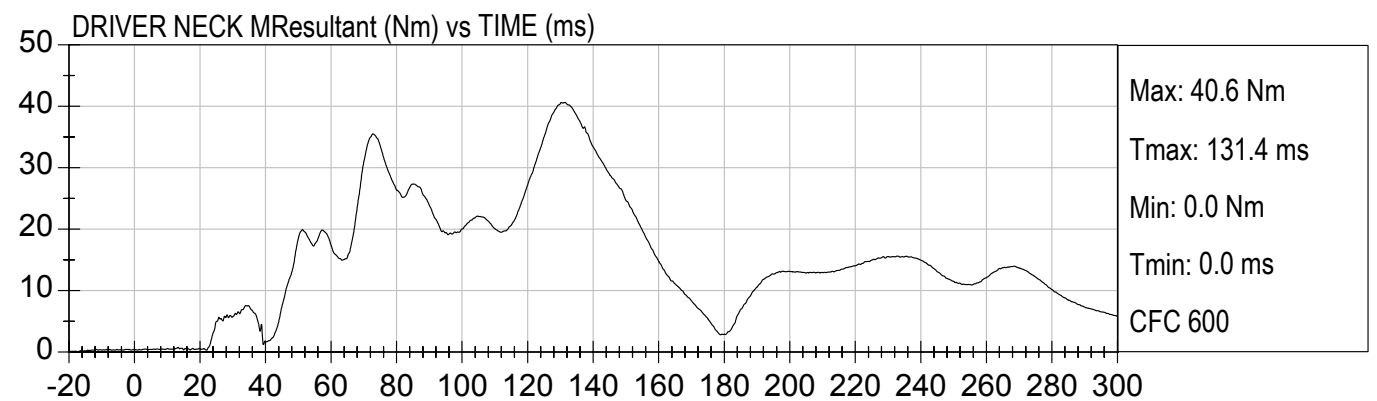
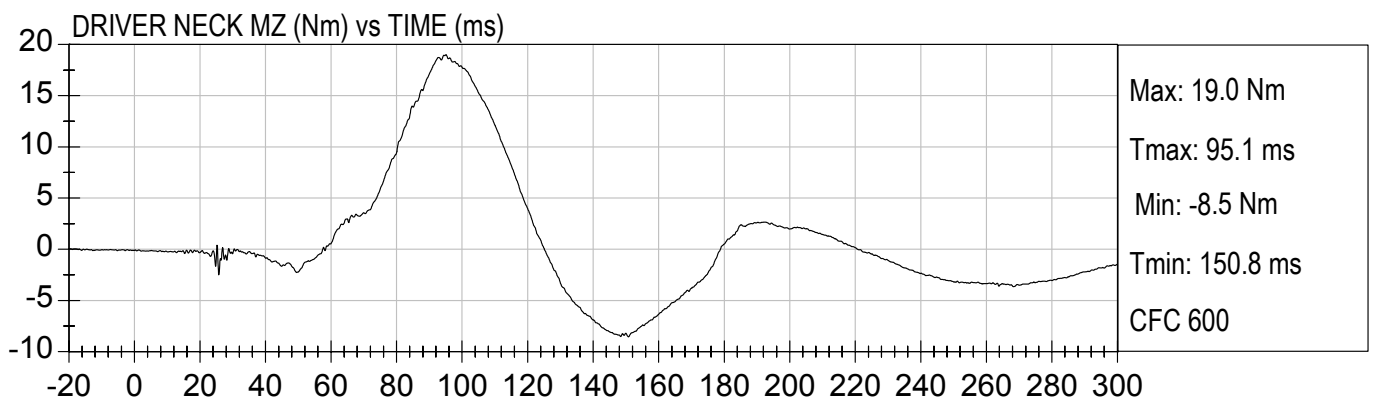
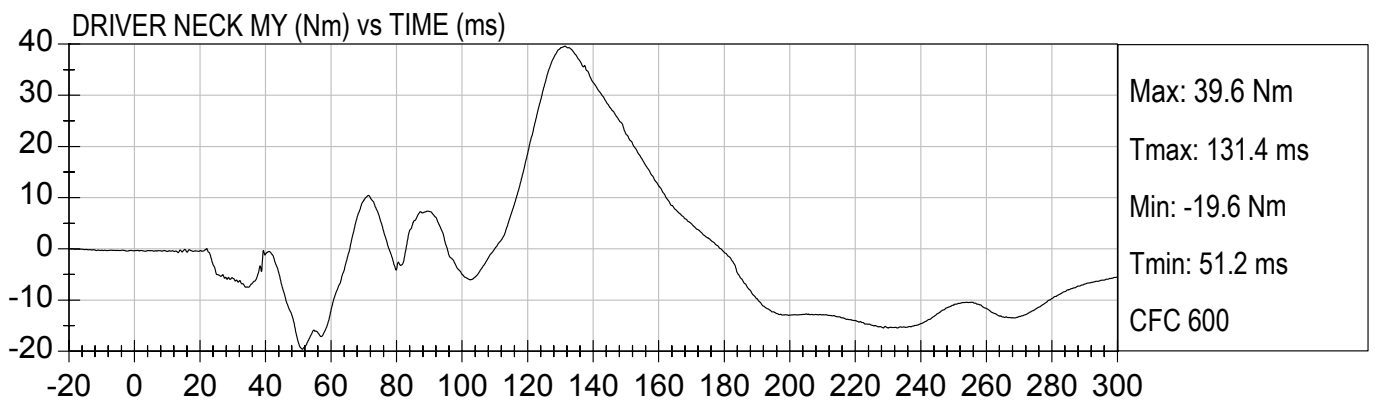
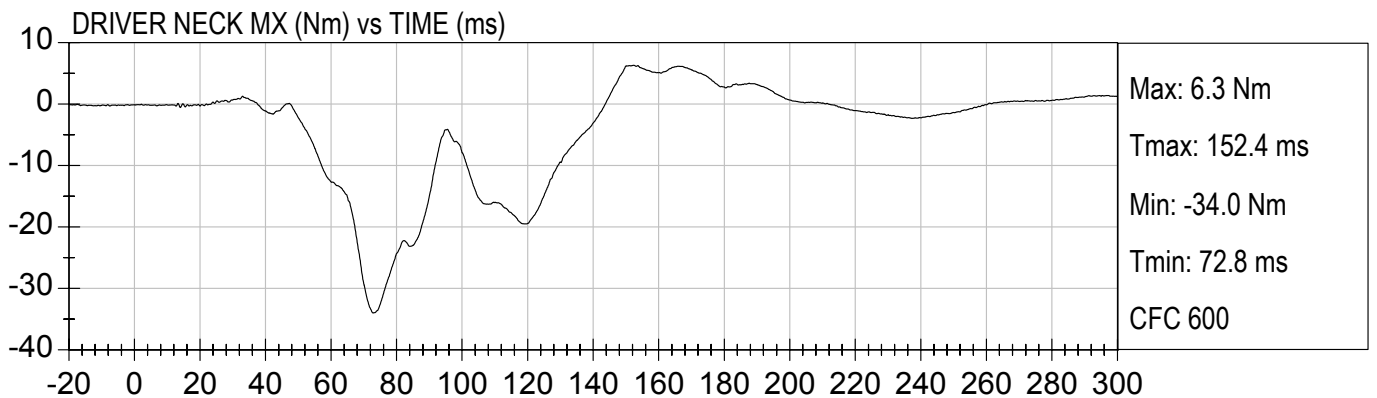


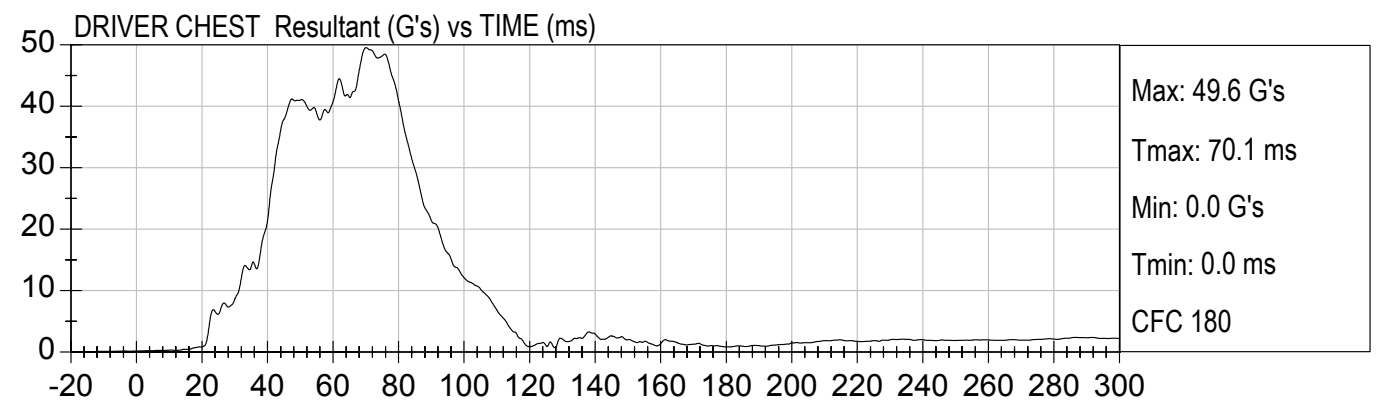
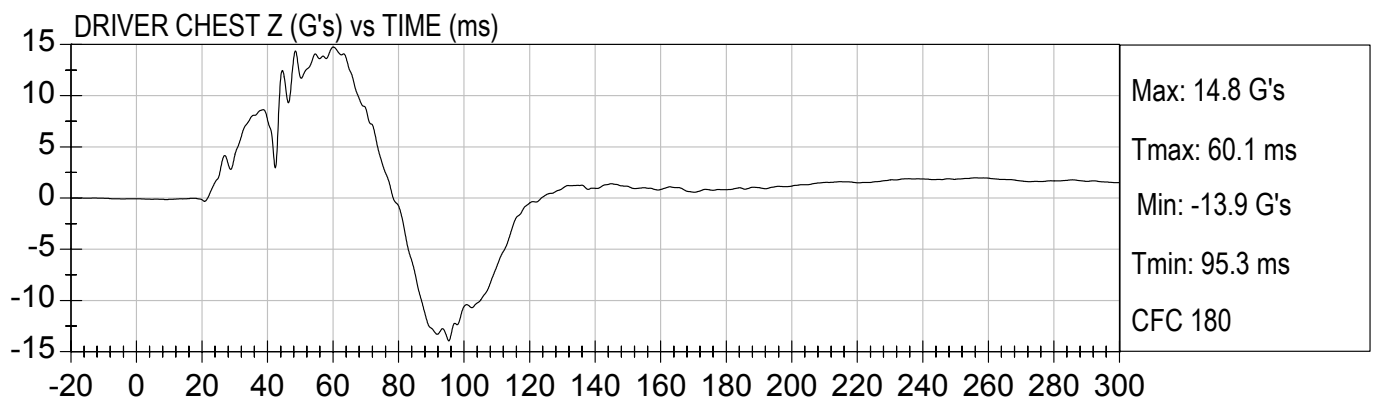
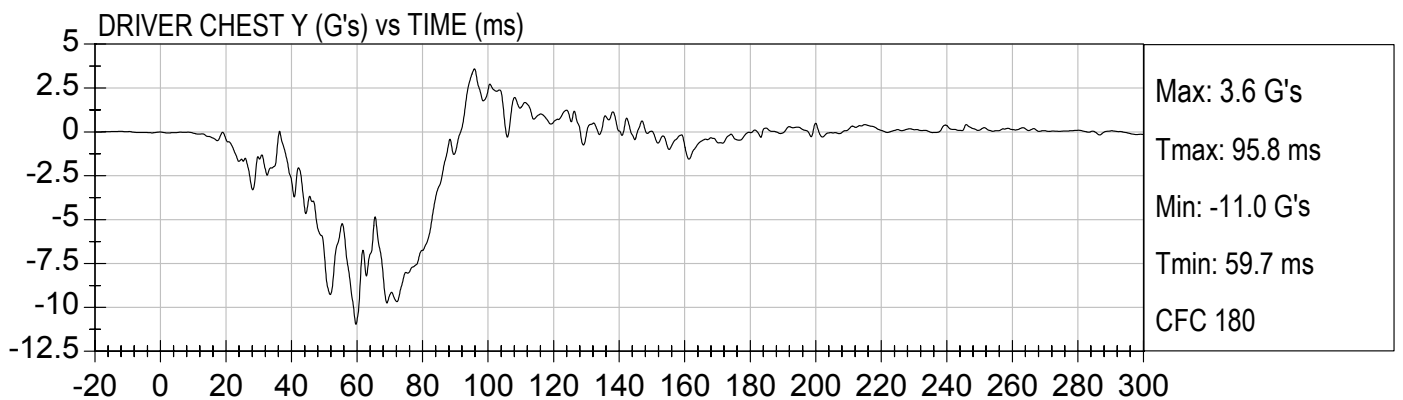
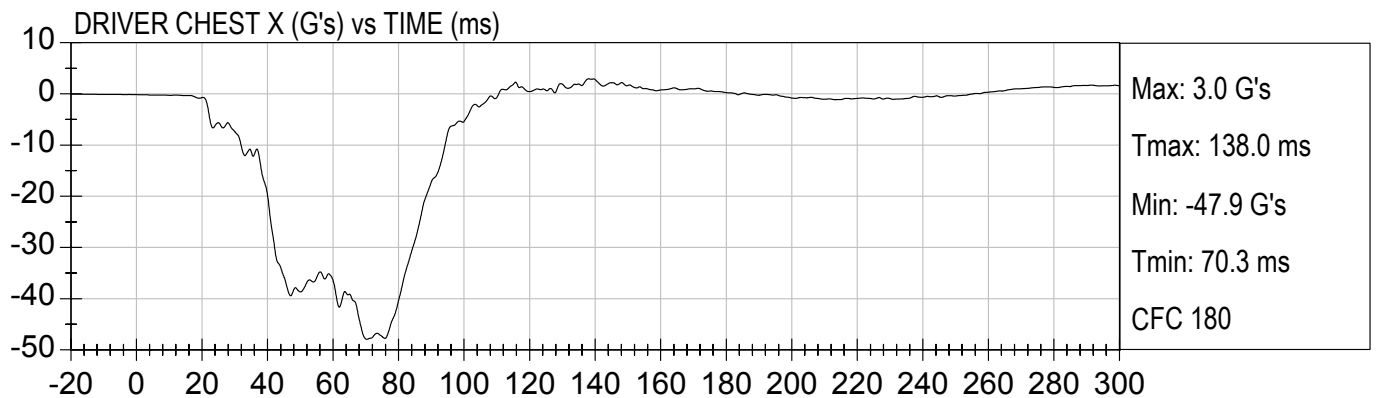
DRIVER NECK FZ (N) vs TIME (ms)



DRIVER NECK FResultant (N) vs TIME (ms)

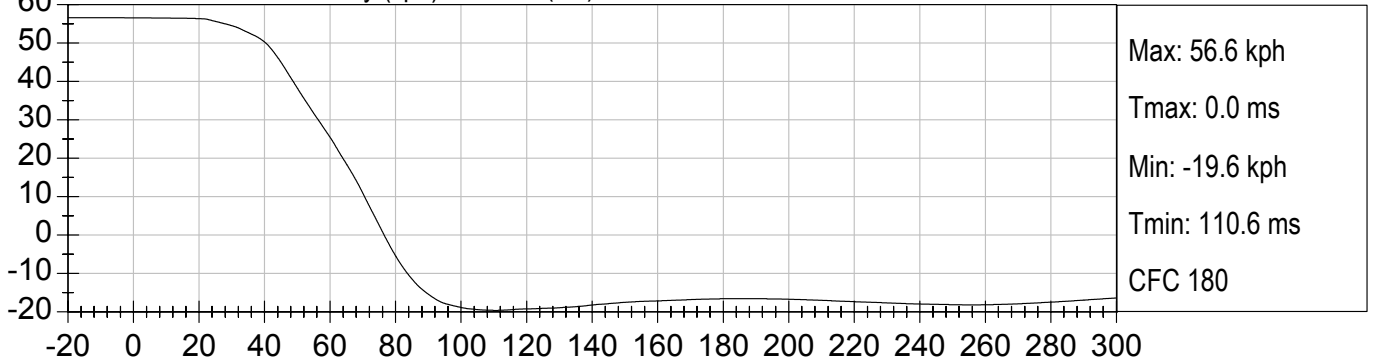




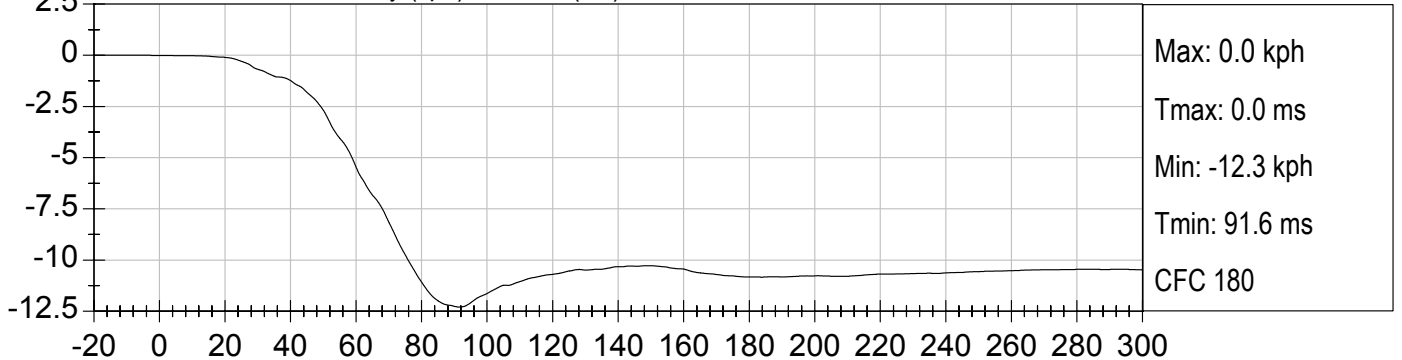




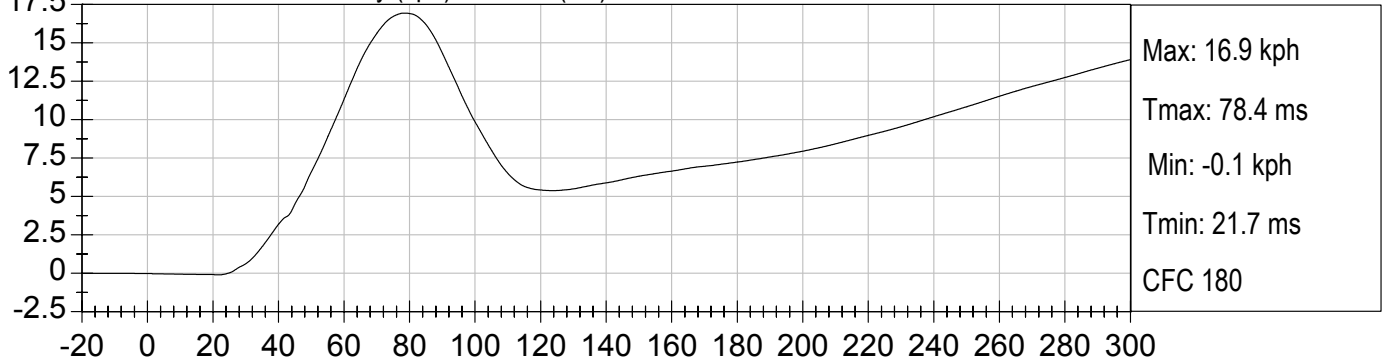
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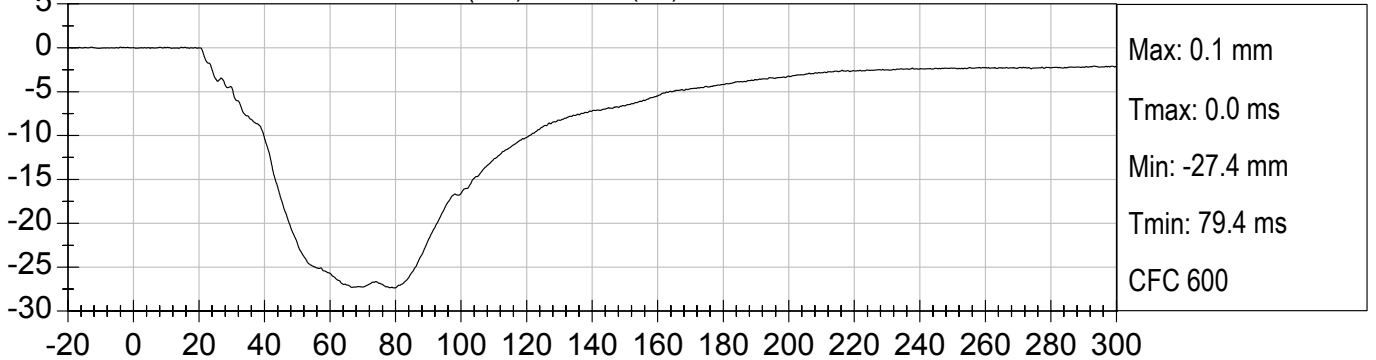
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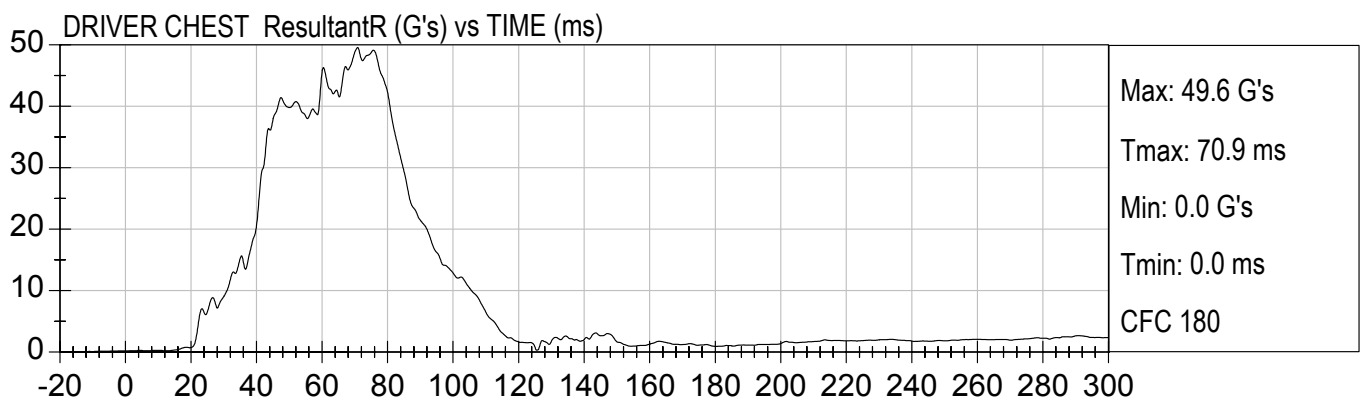
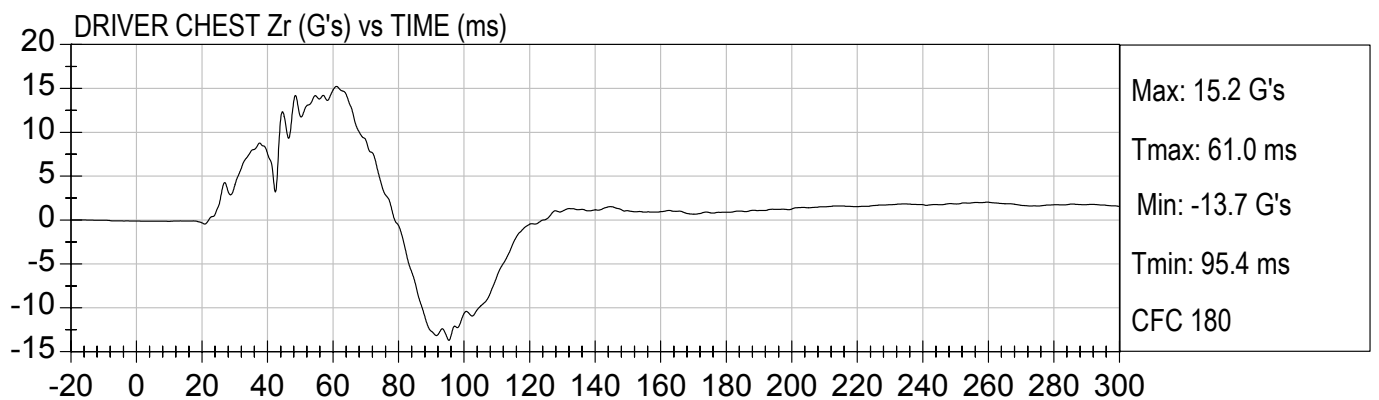
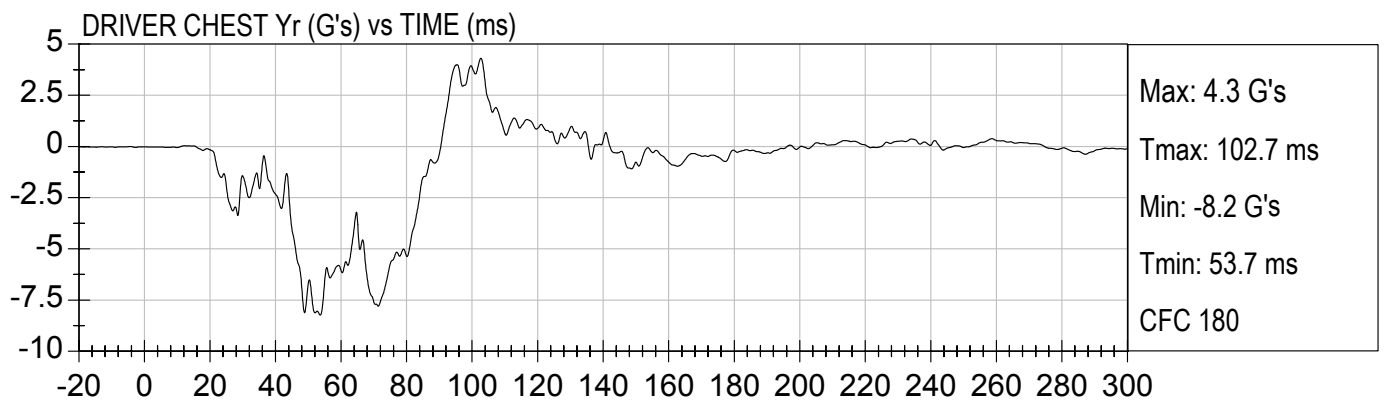
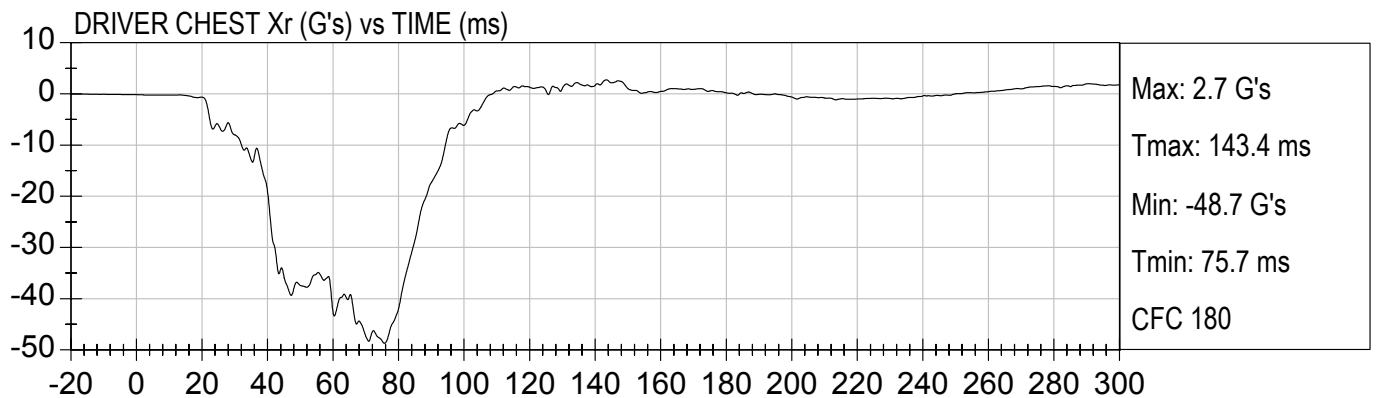


DRIVER CHEST Z Velocity (kph) vs TIME (ms)



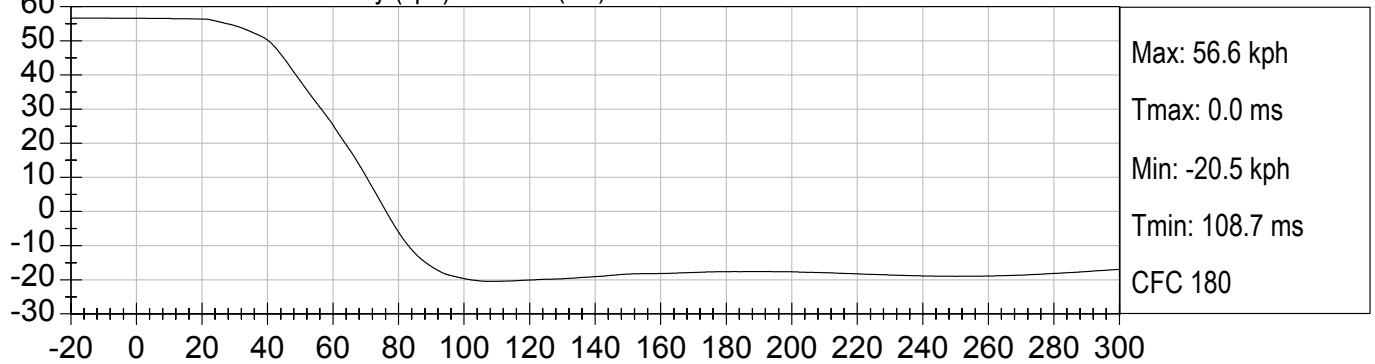
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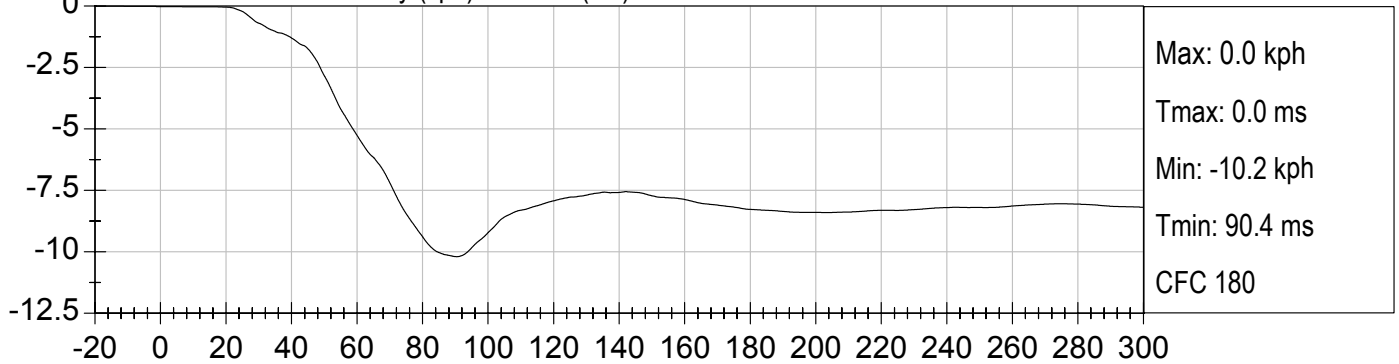




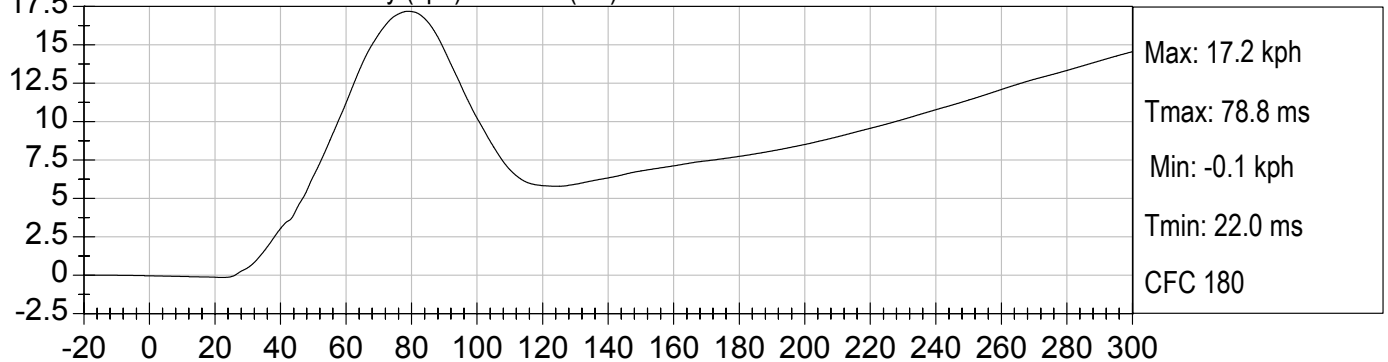
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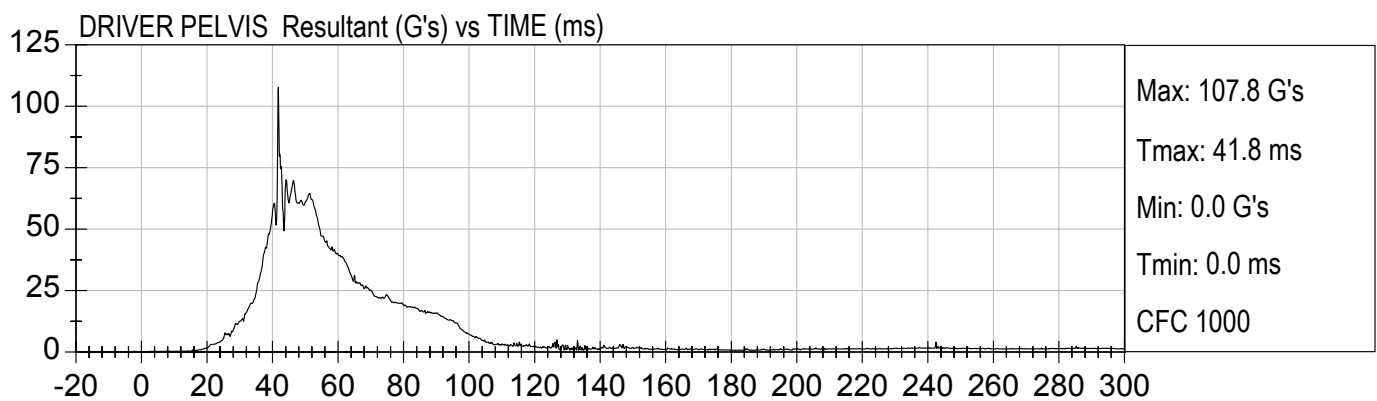
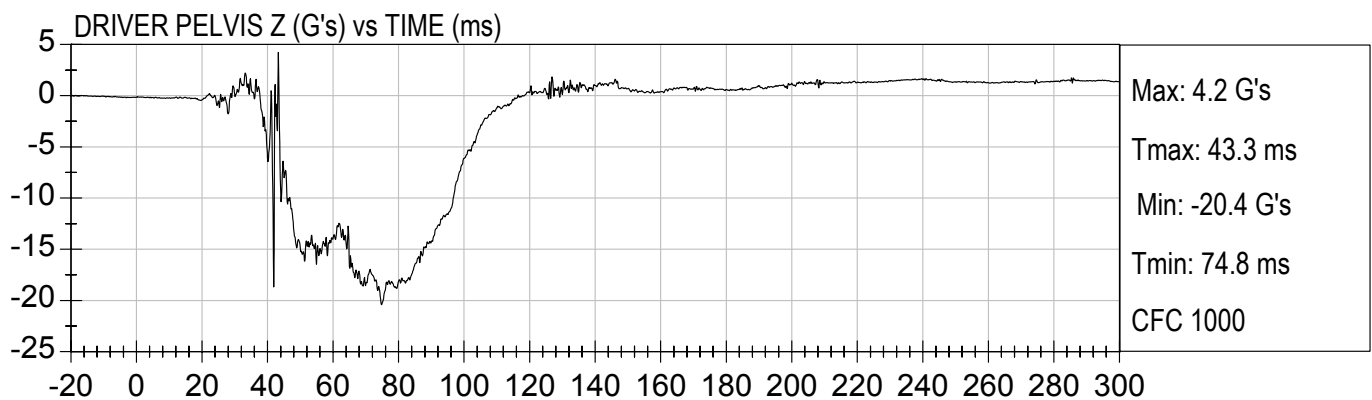
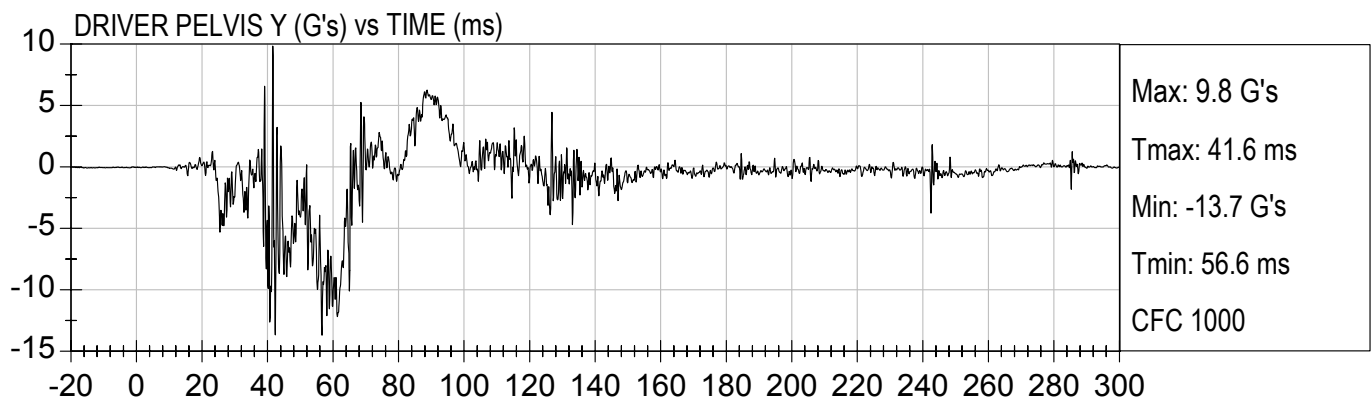
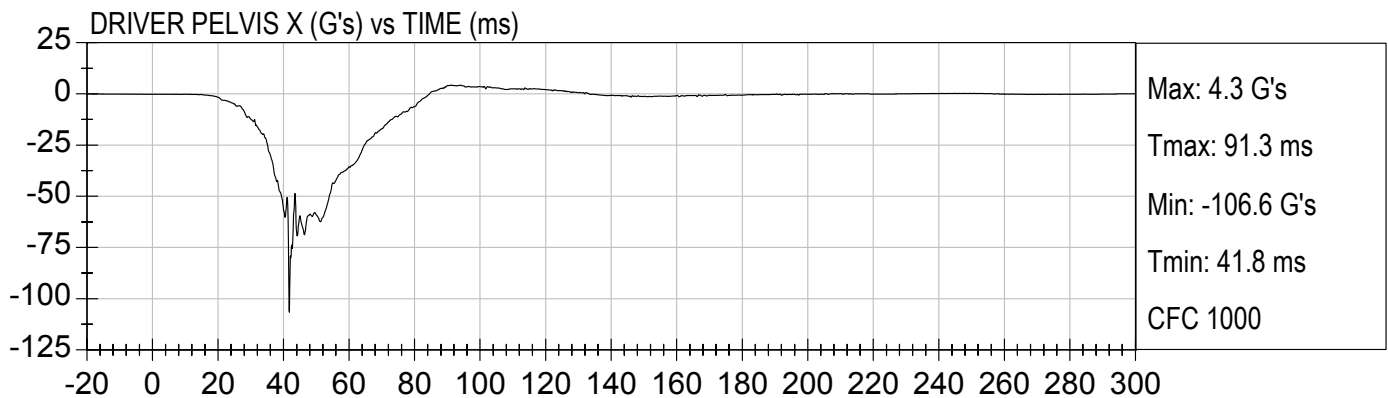


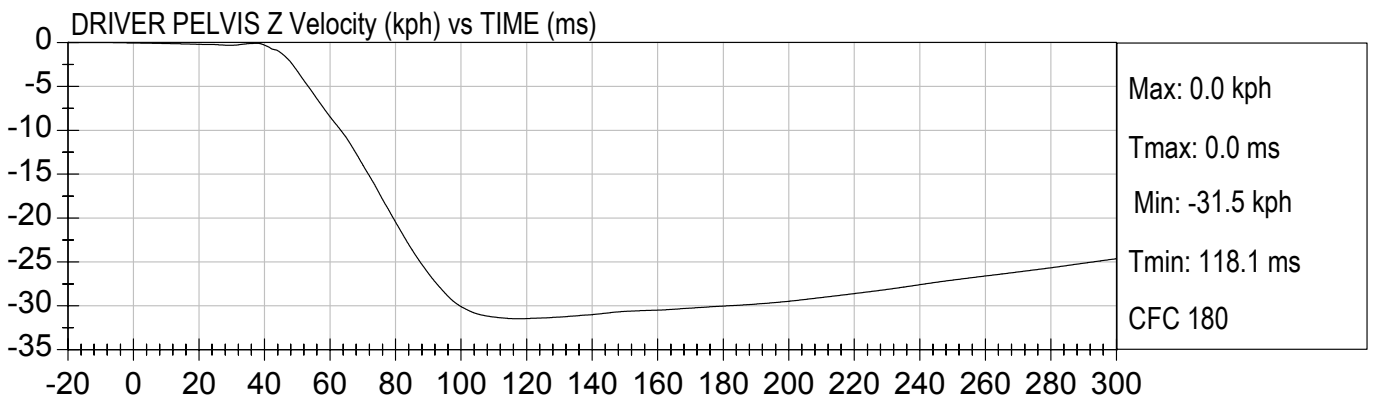
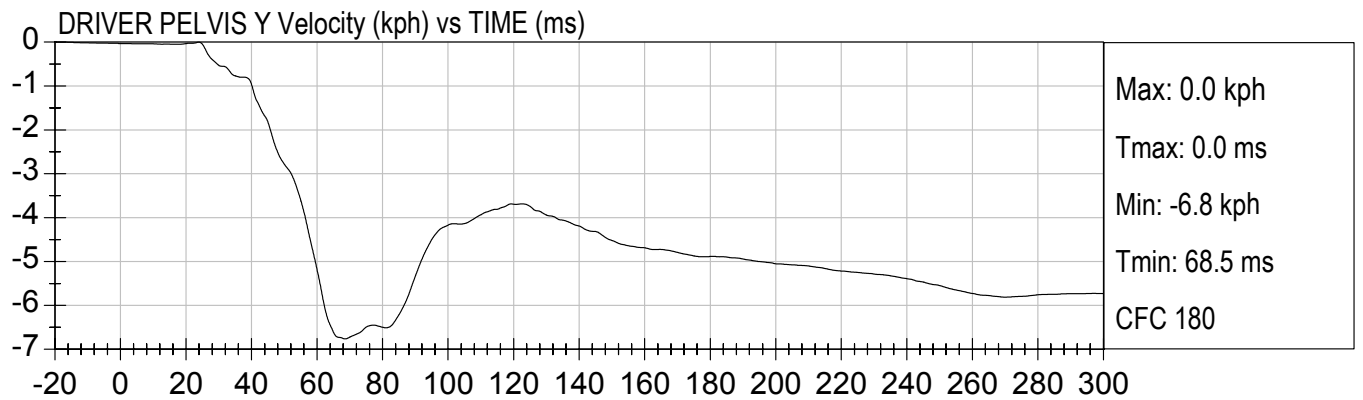
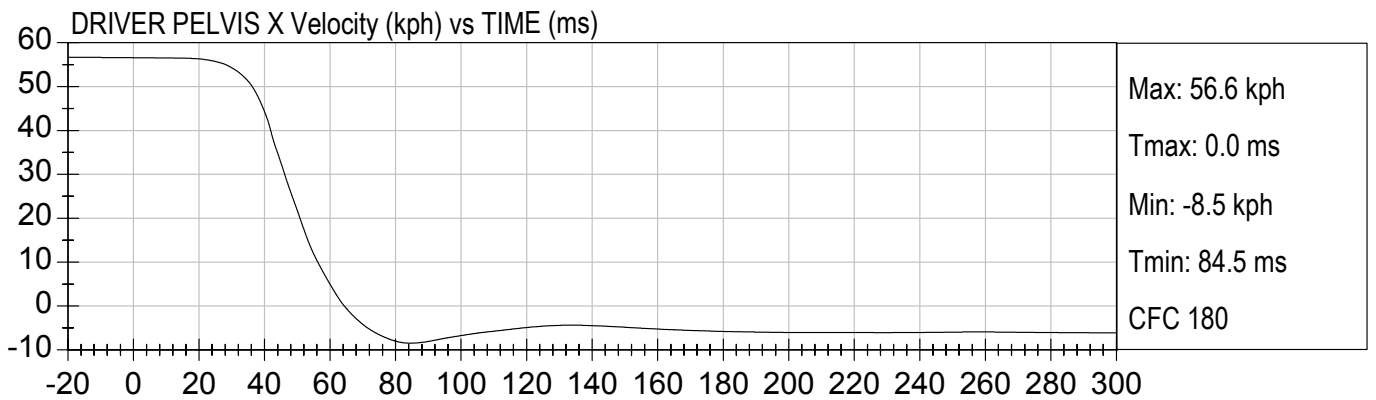
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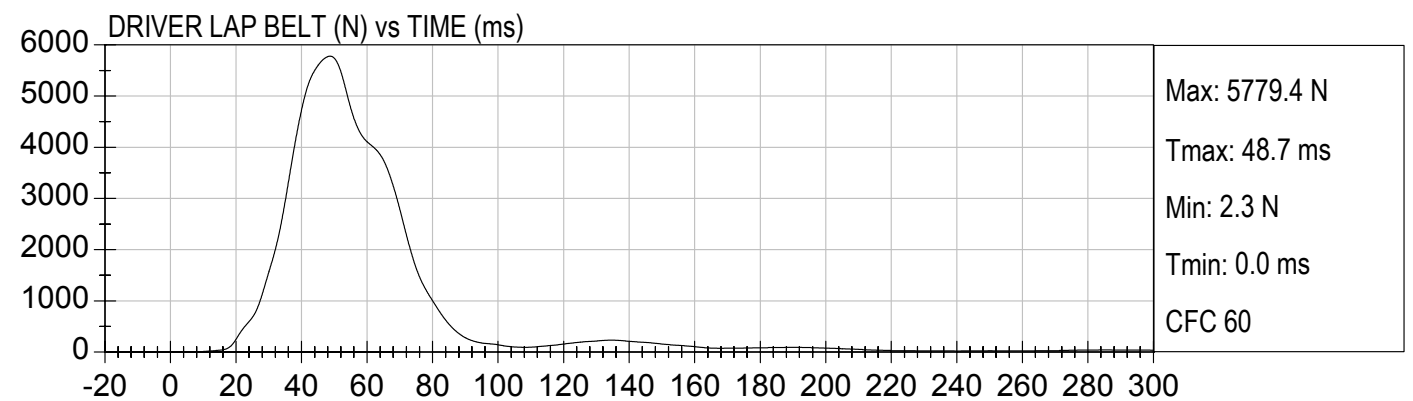
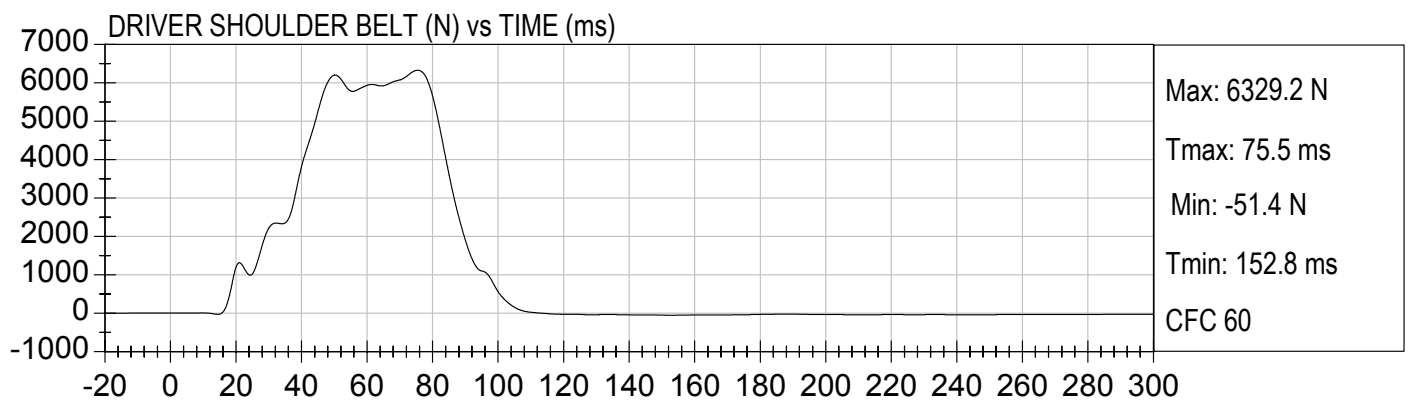
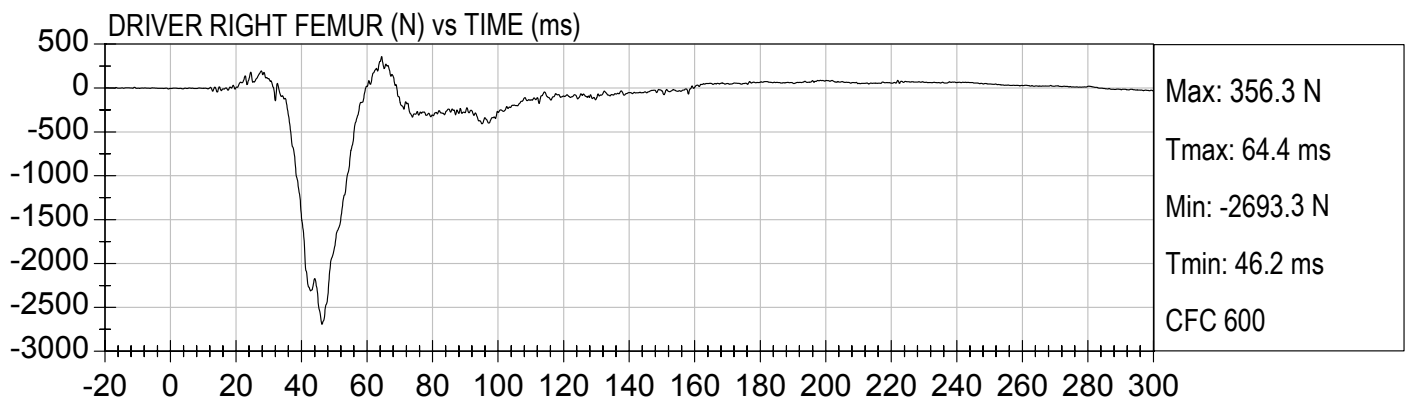
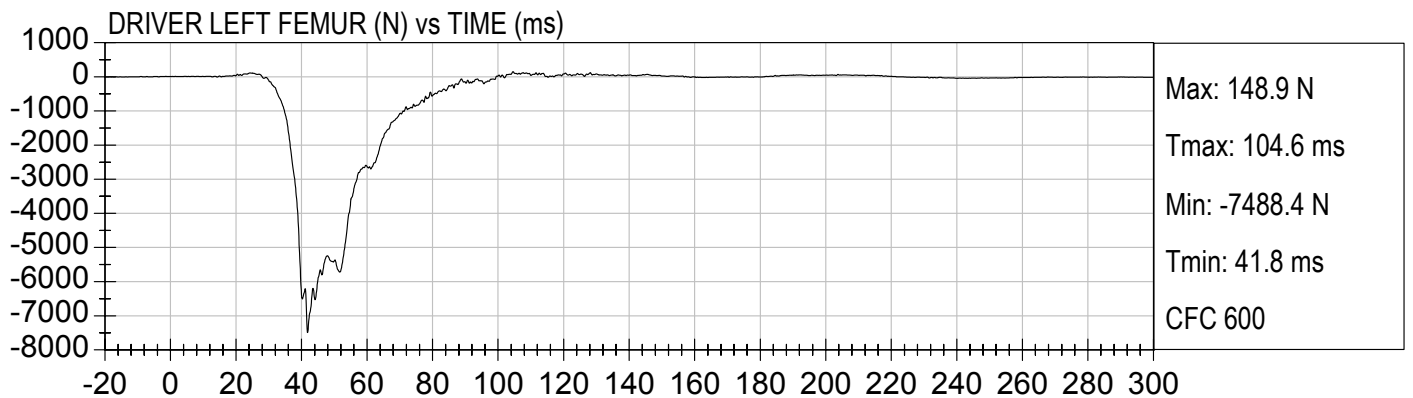


DRIVER CHEST Zr Velocity (kph) vs TIME (ms)



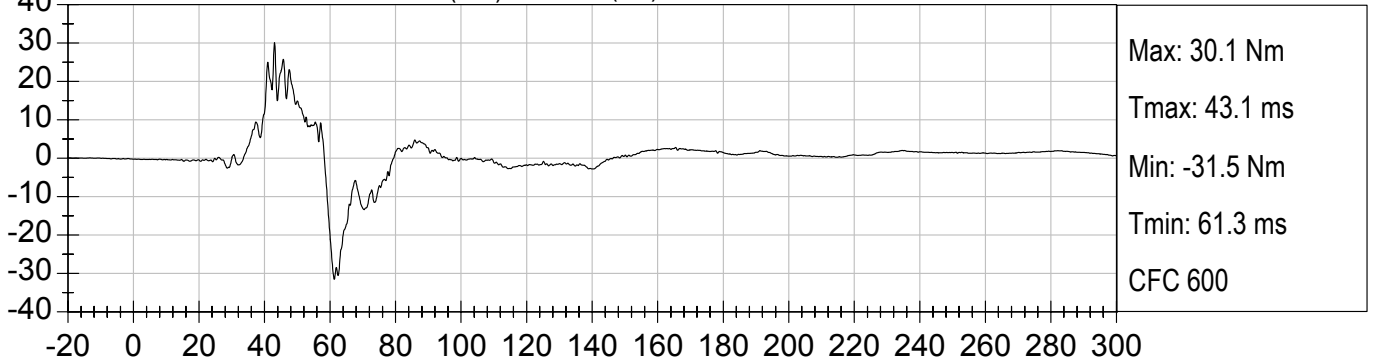




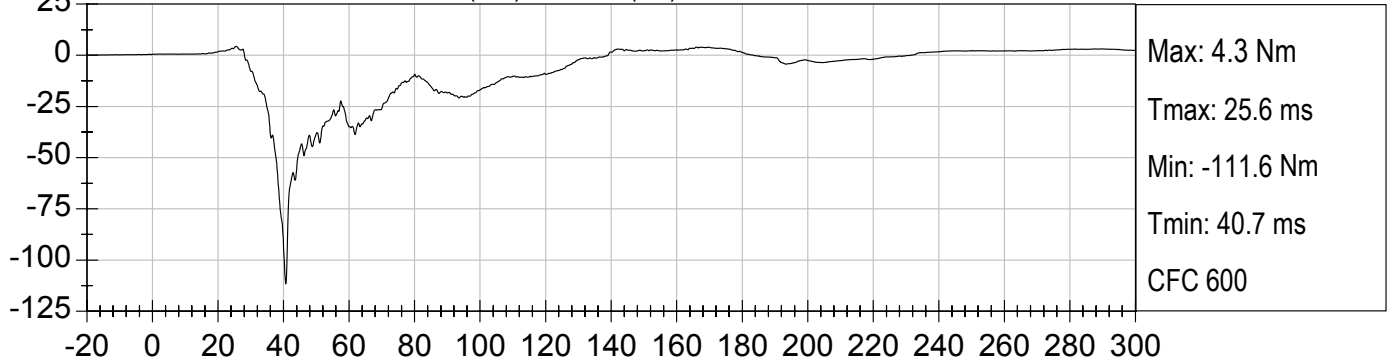




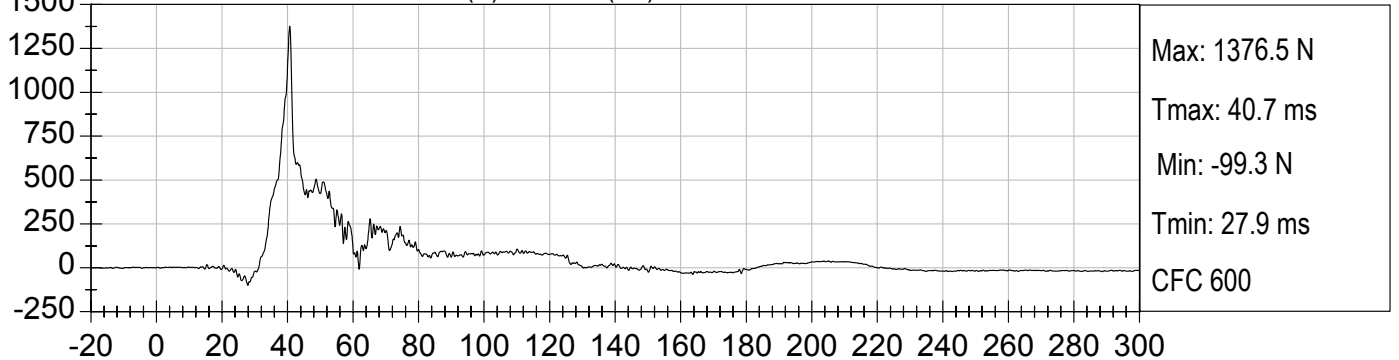
DRIVER LEFT UPPER TIBIA MX (Nm) vs TIME (ms)



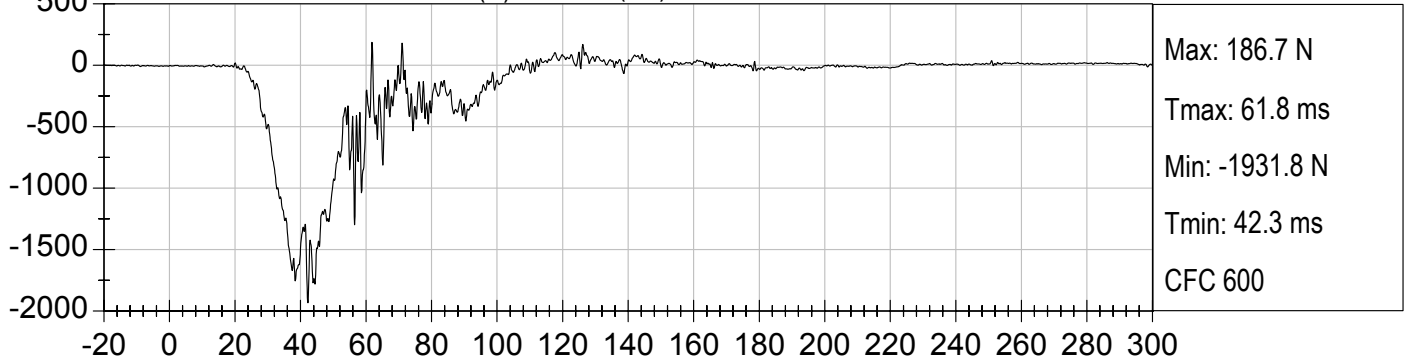
DRIVER LEFT UPPER TIBIA MY (Nm) vs TIME (ms)

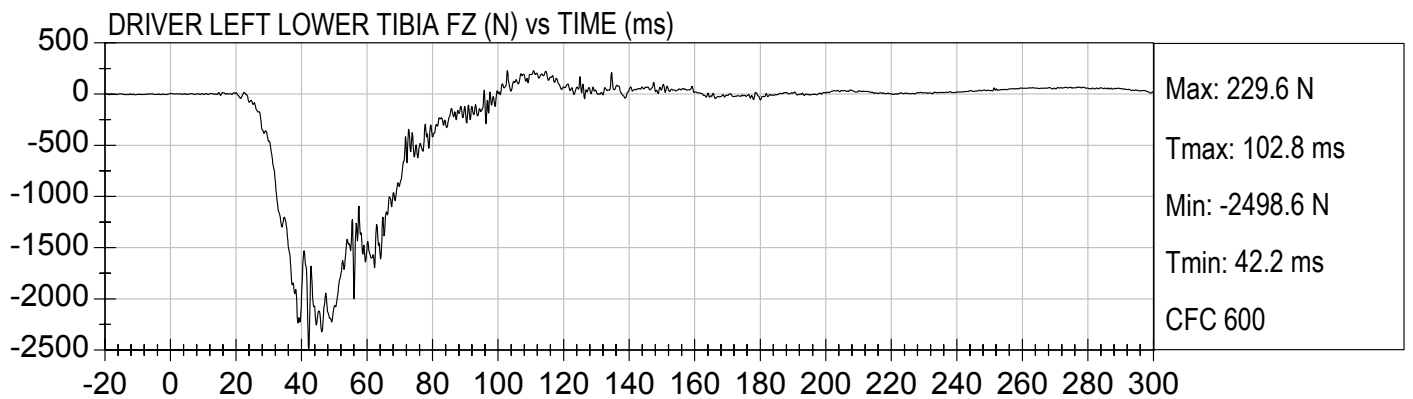
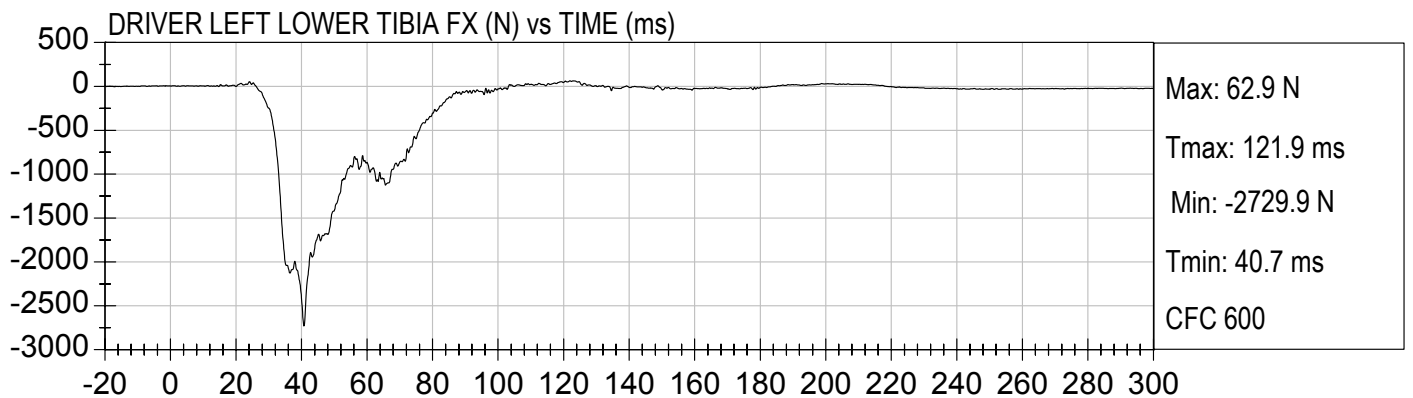
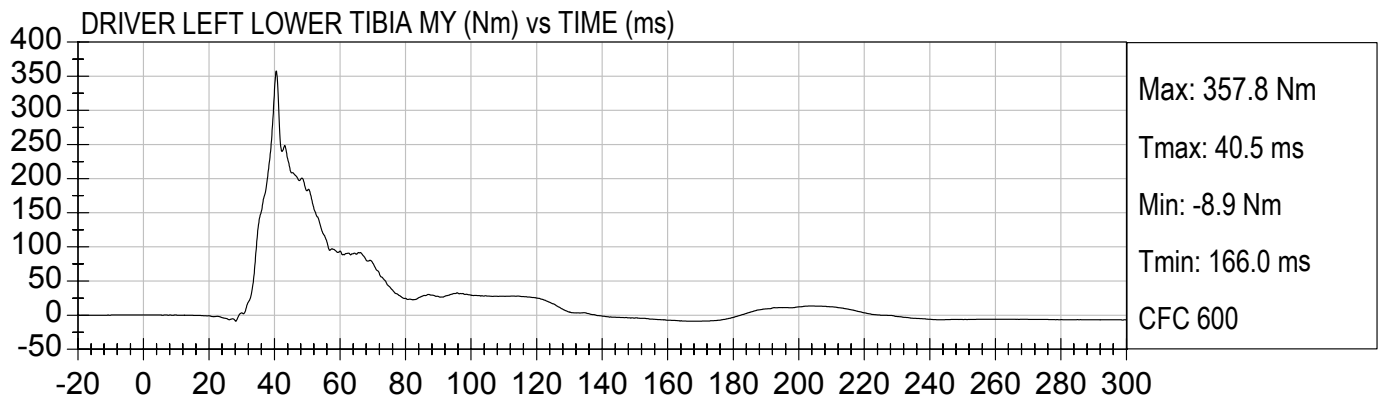
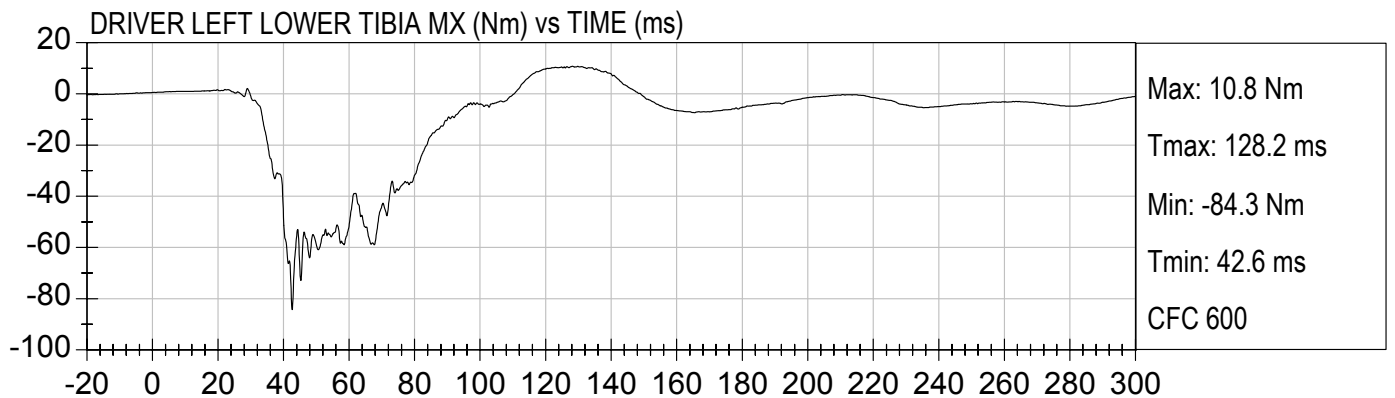


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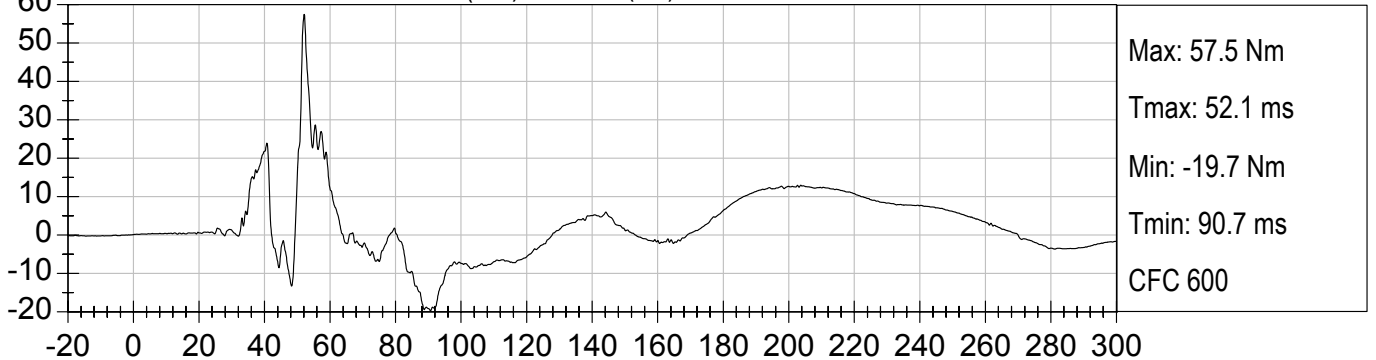
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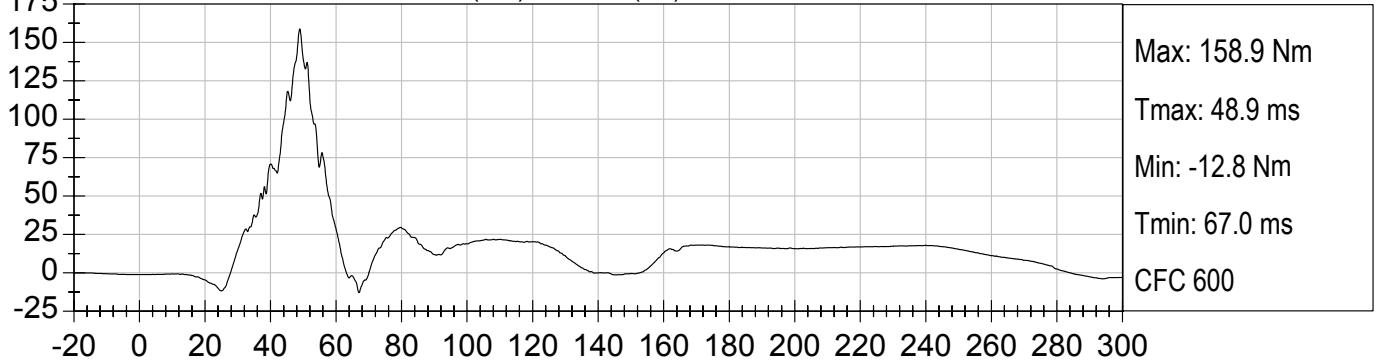




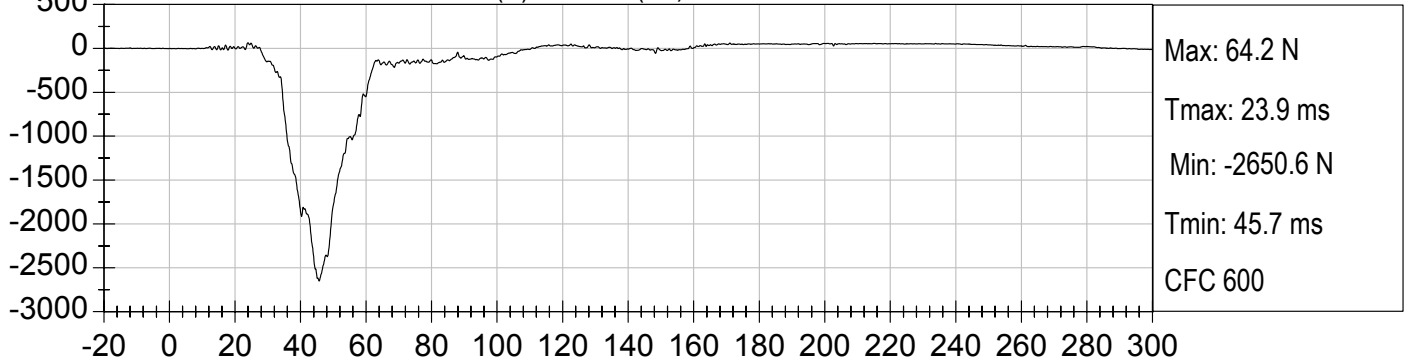
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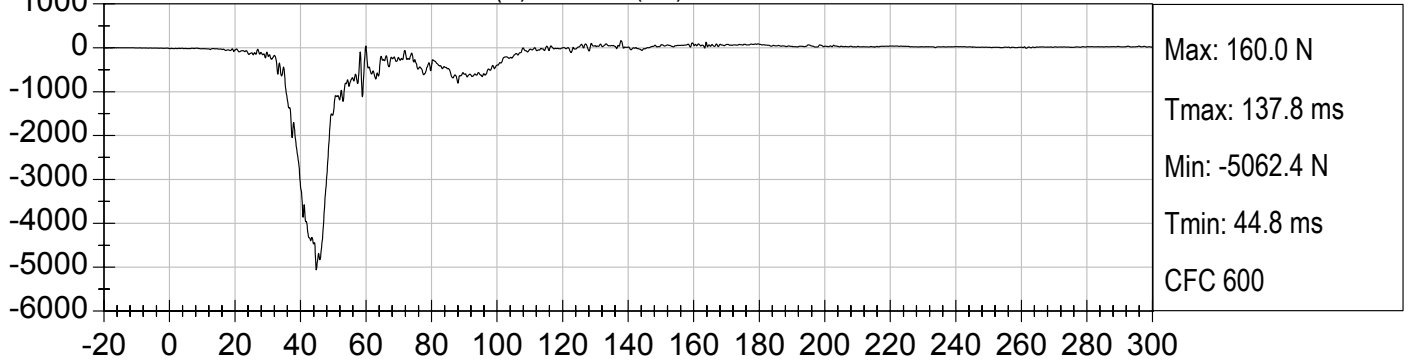
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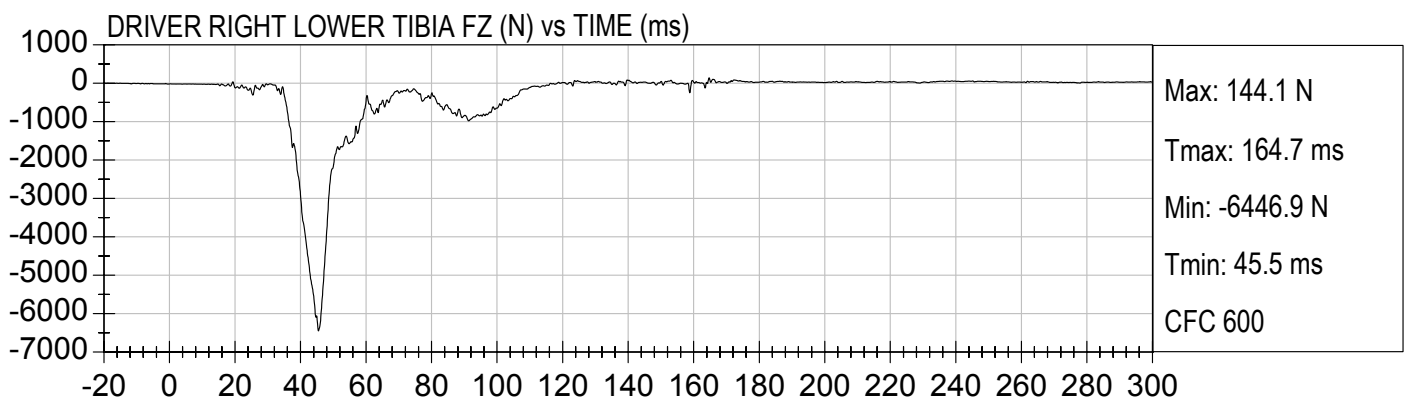
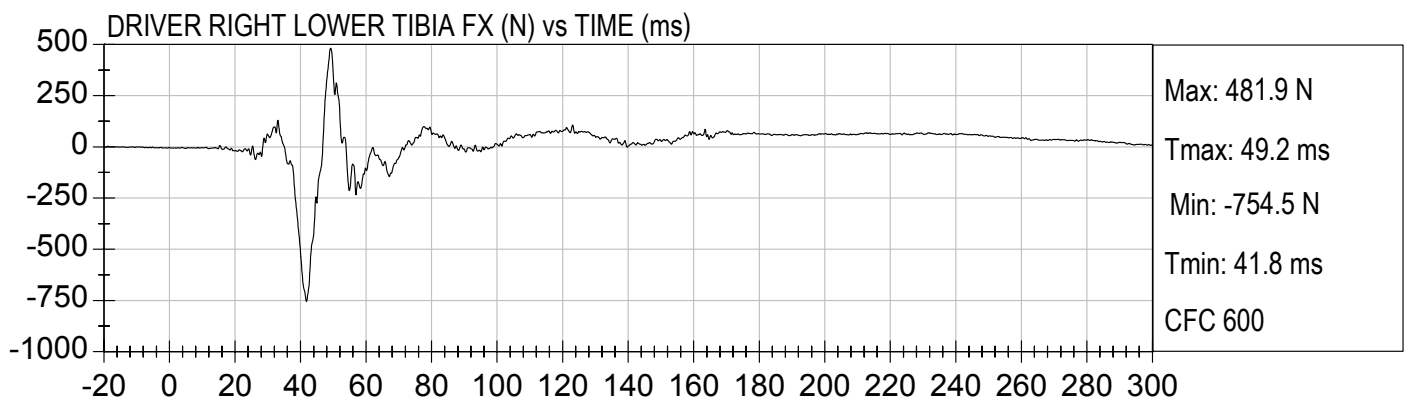
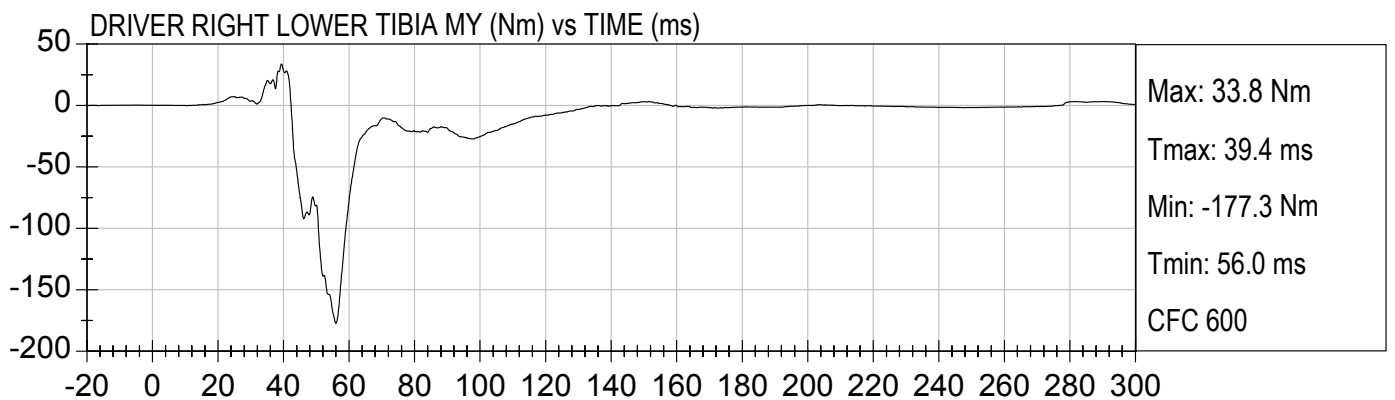
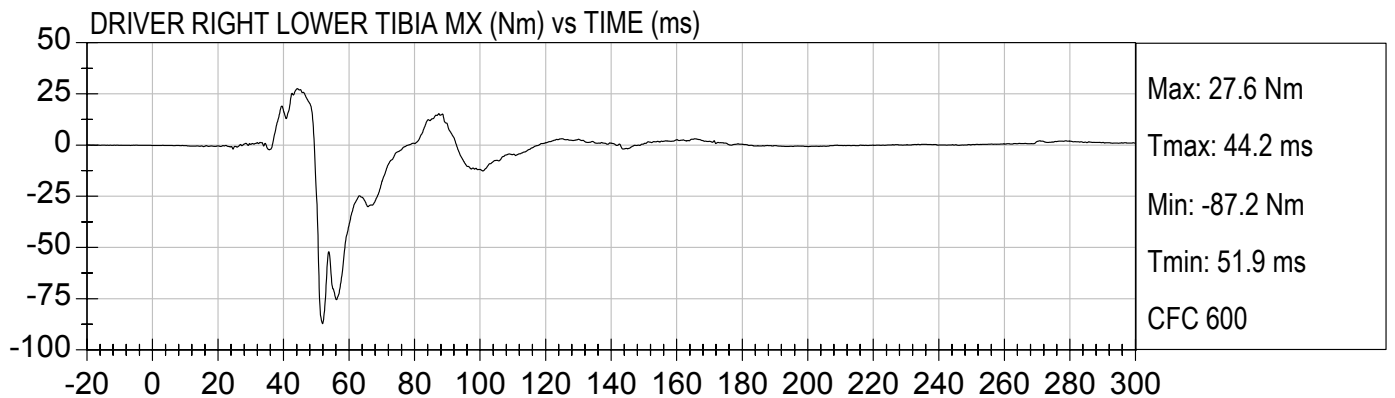


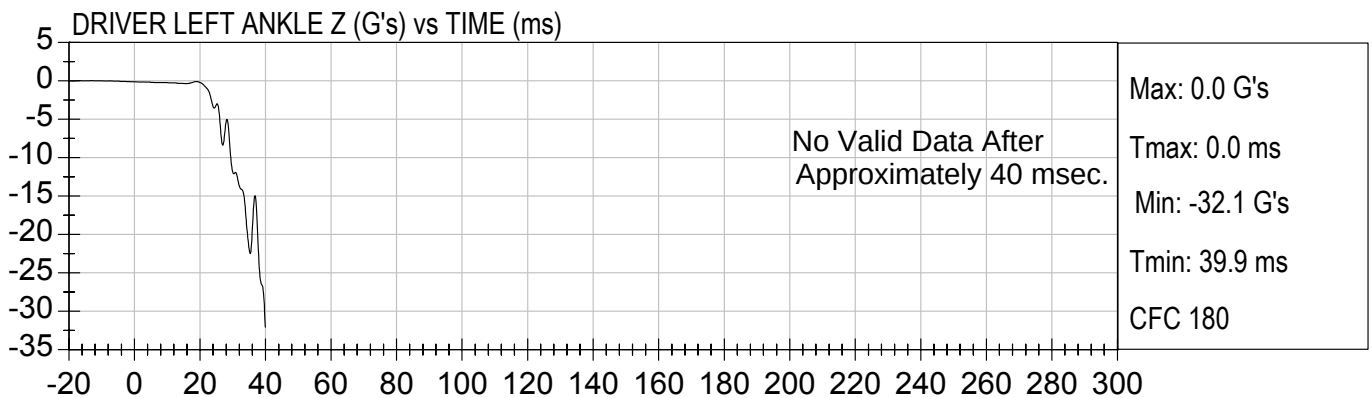
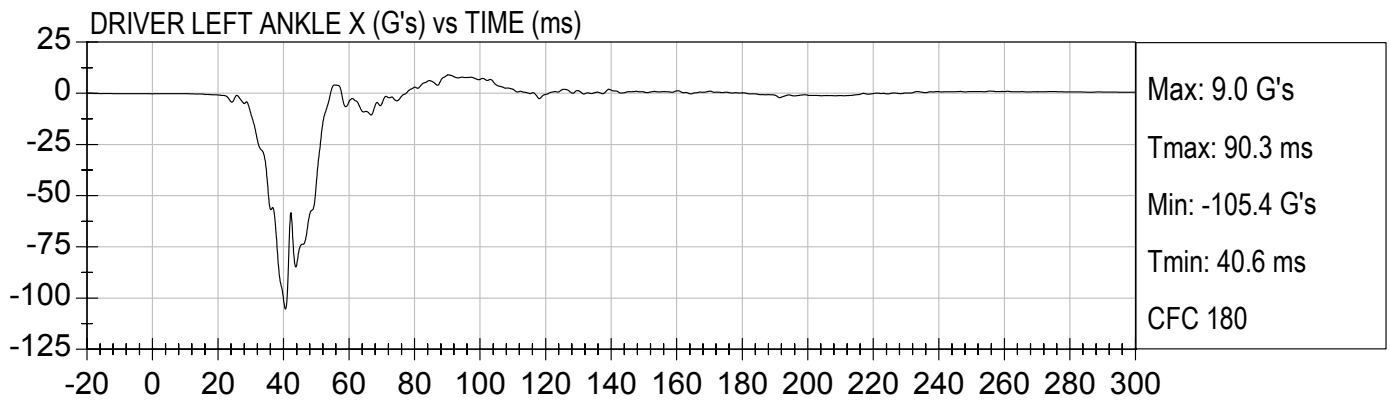
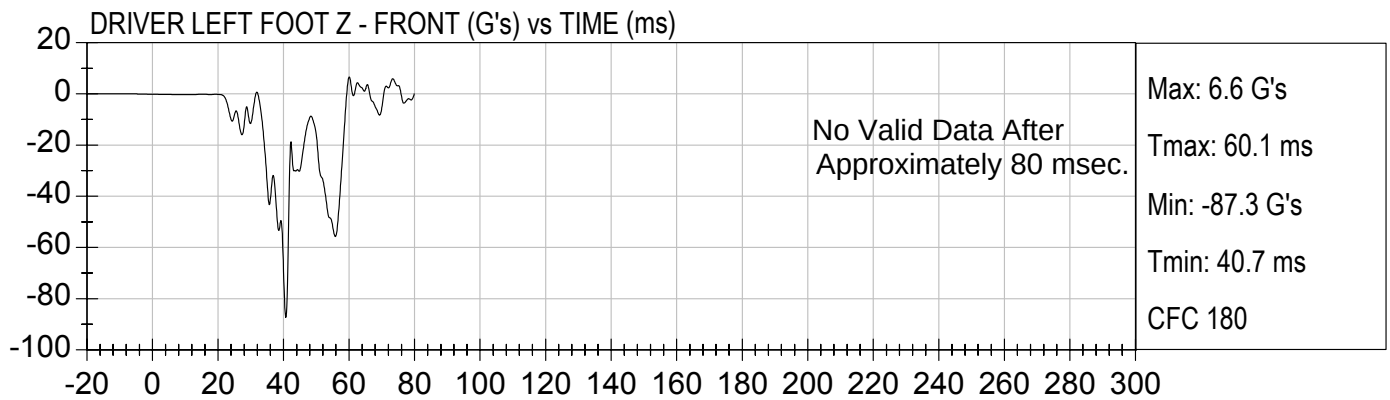
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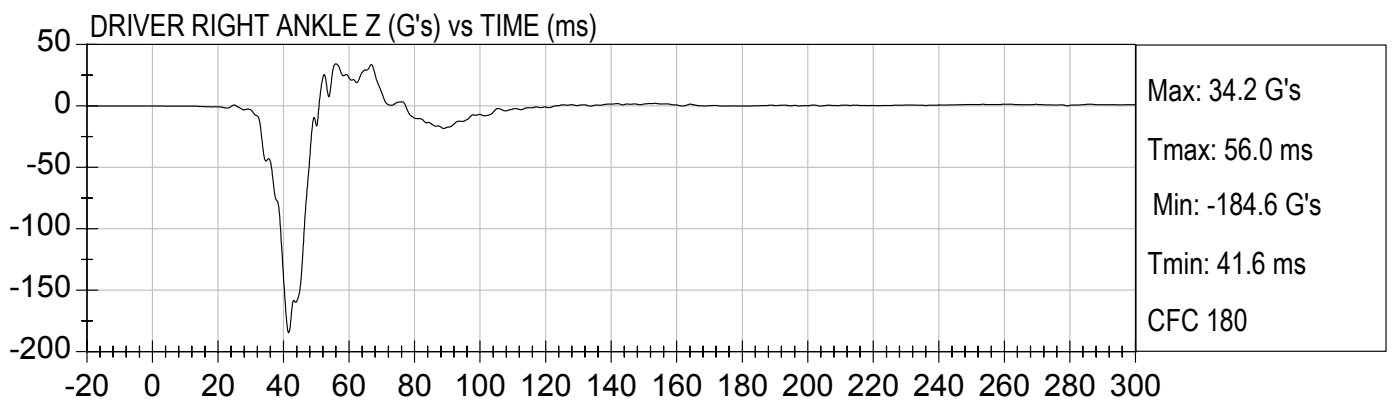
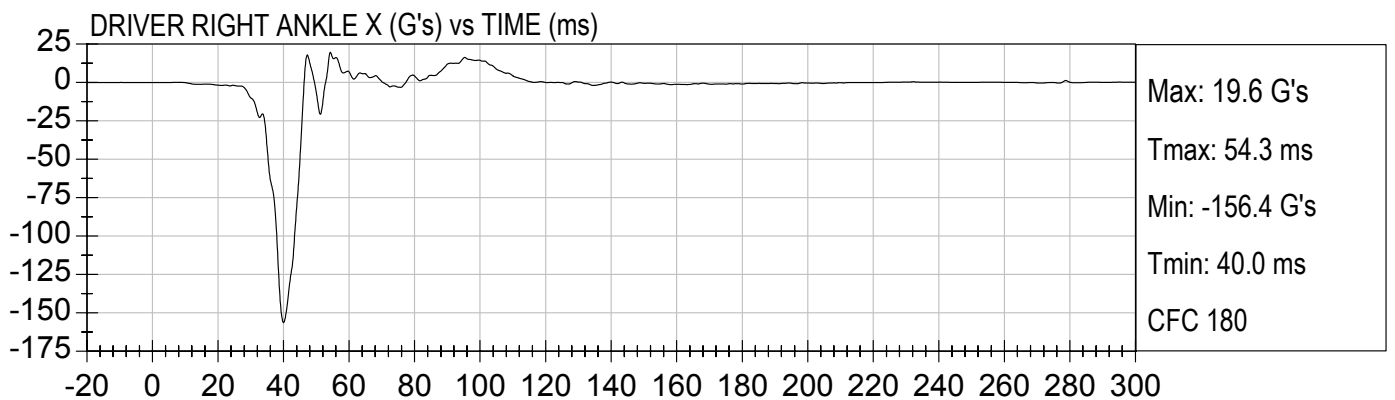
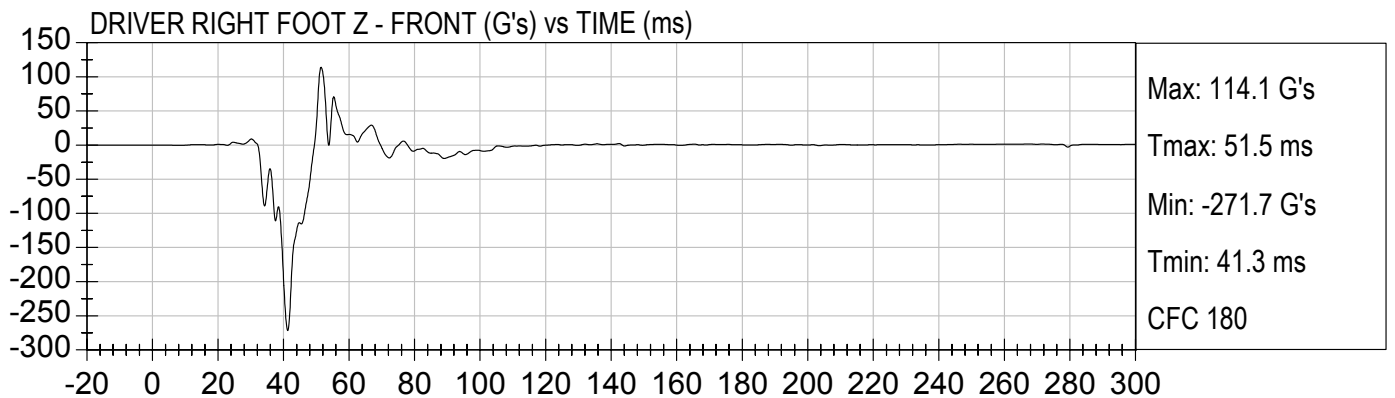


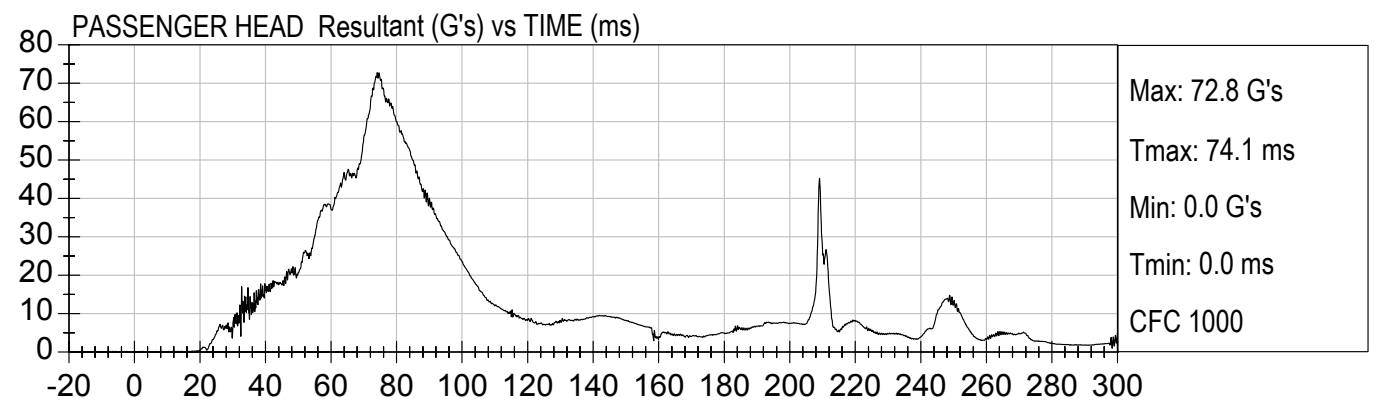
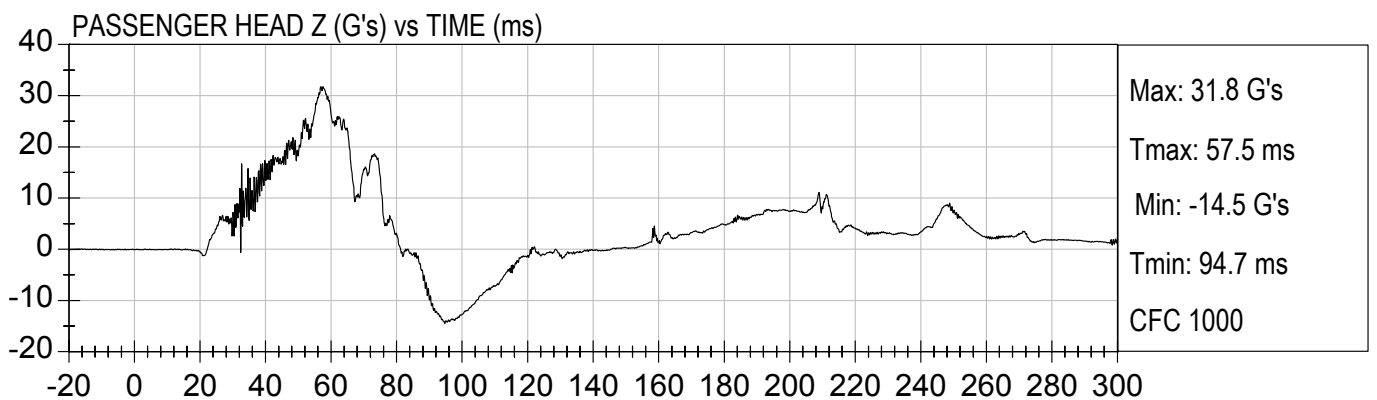
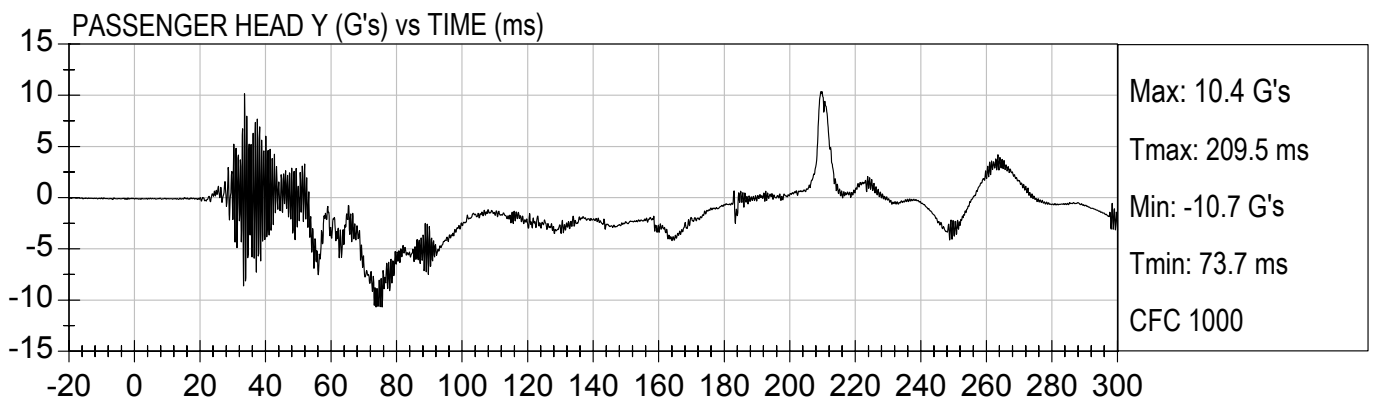
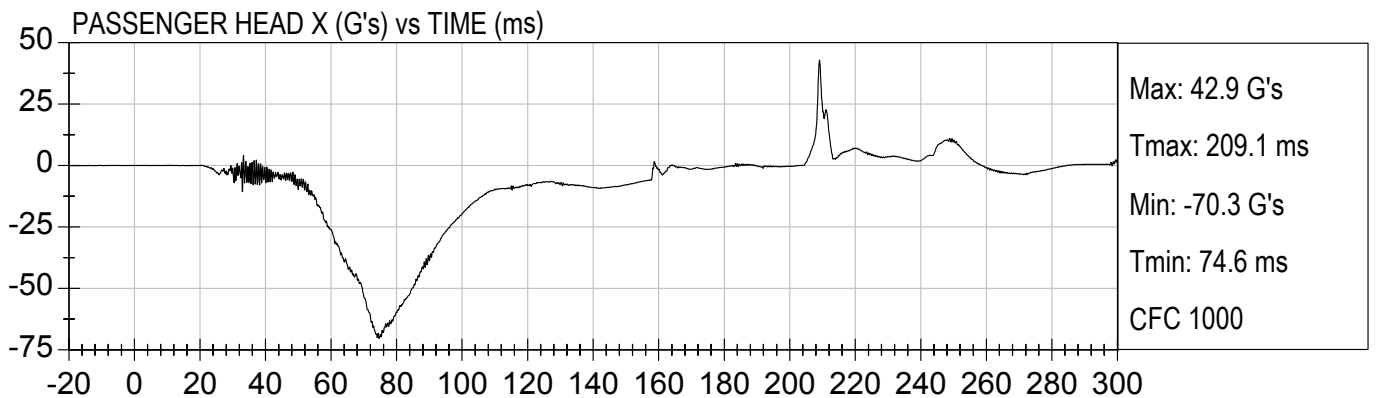
DRIVER RIGHT UPPER TIBIA FZ (N) vs TIME (ms)





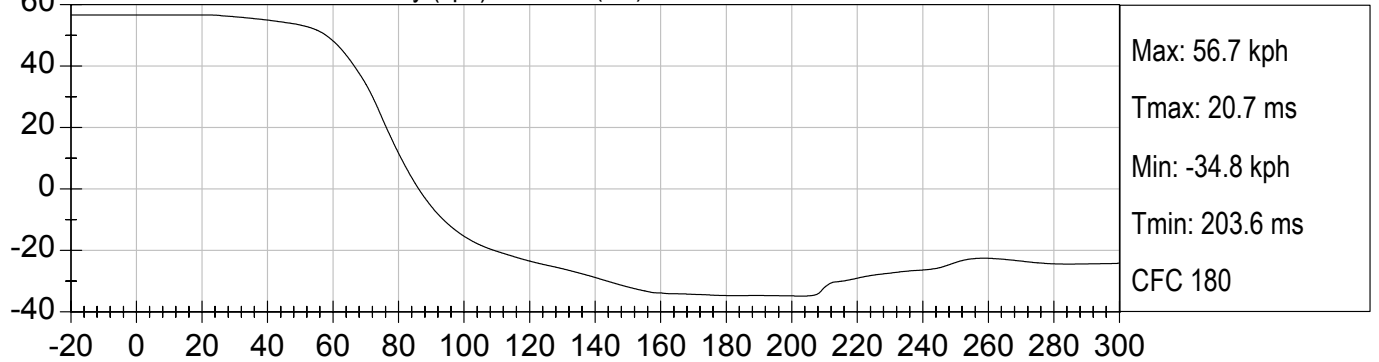




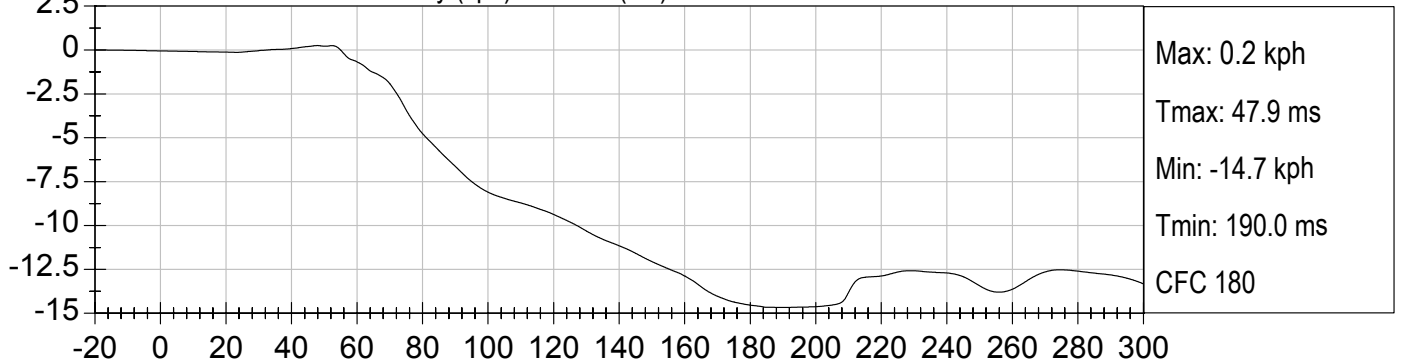




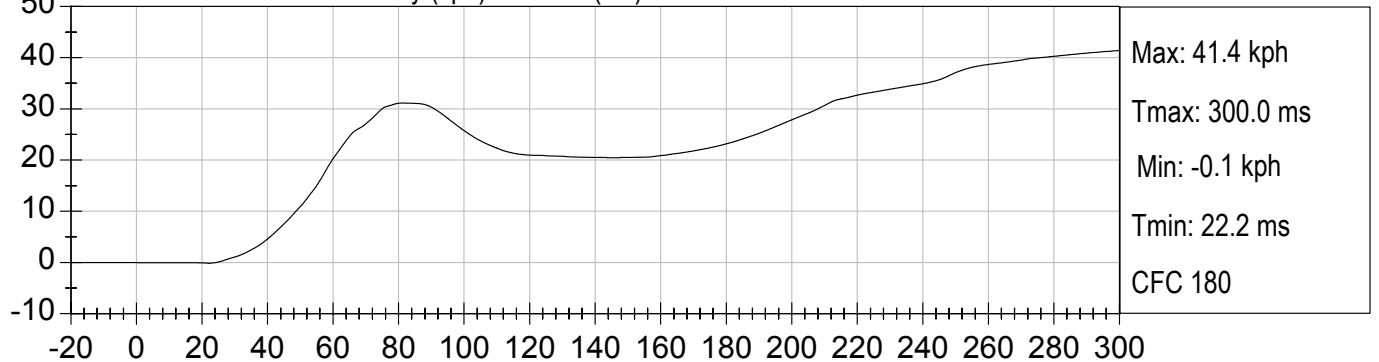
PASSENGER HEAD X Velocity (kph) vs TIME (ms)

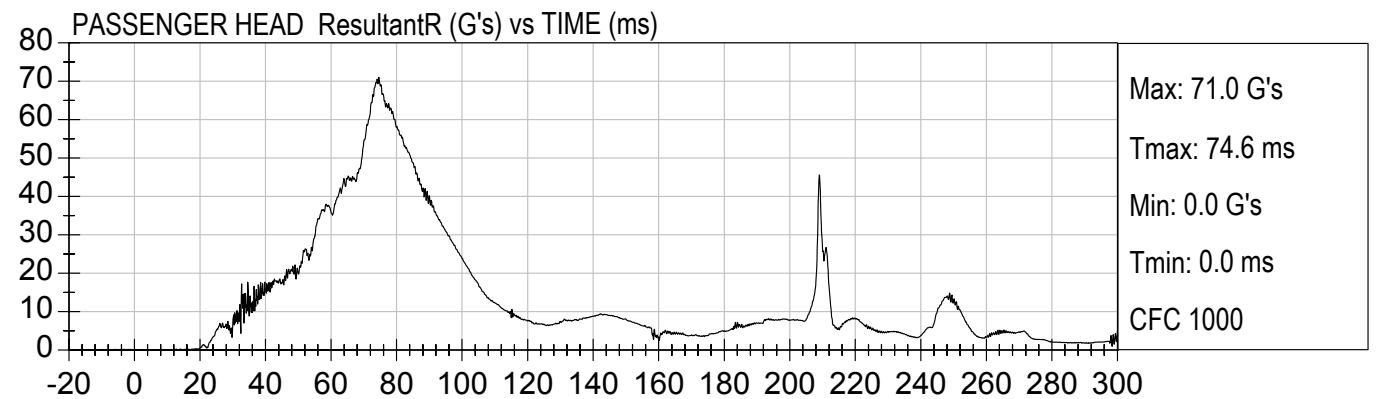
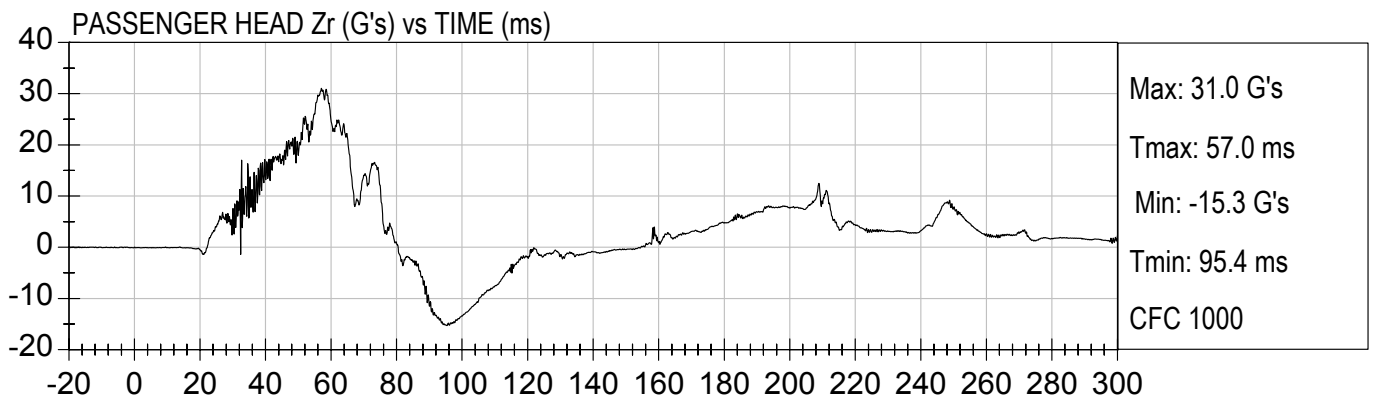
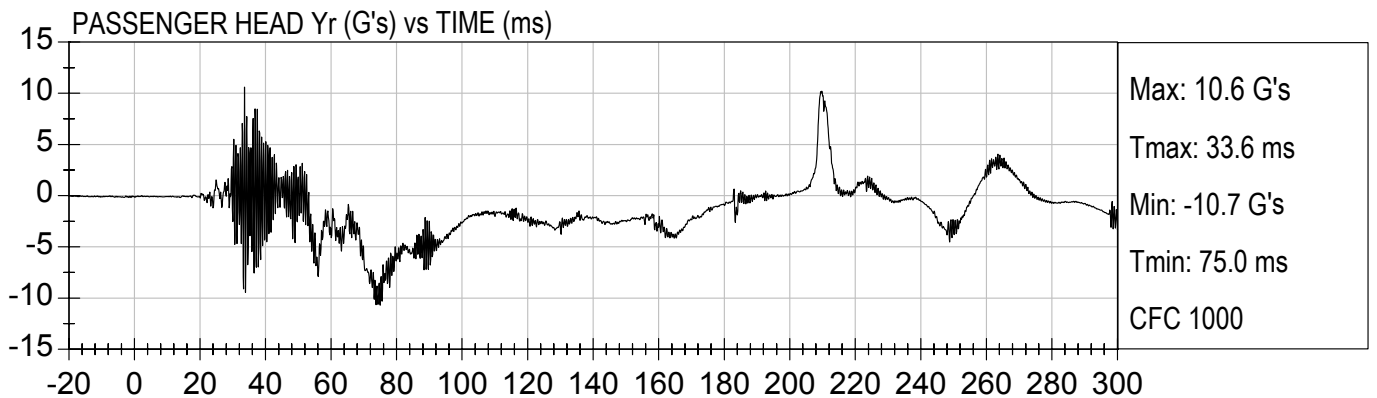
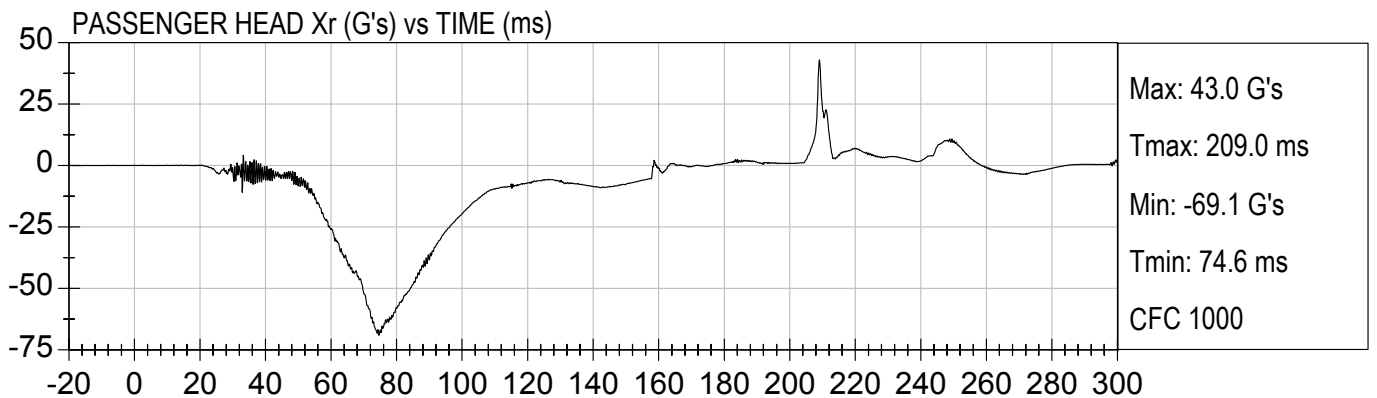


PASSENGER HEAD Y Velocity (kph) vs TIME (ms)



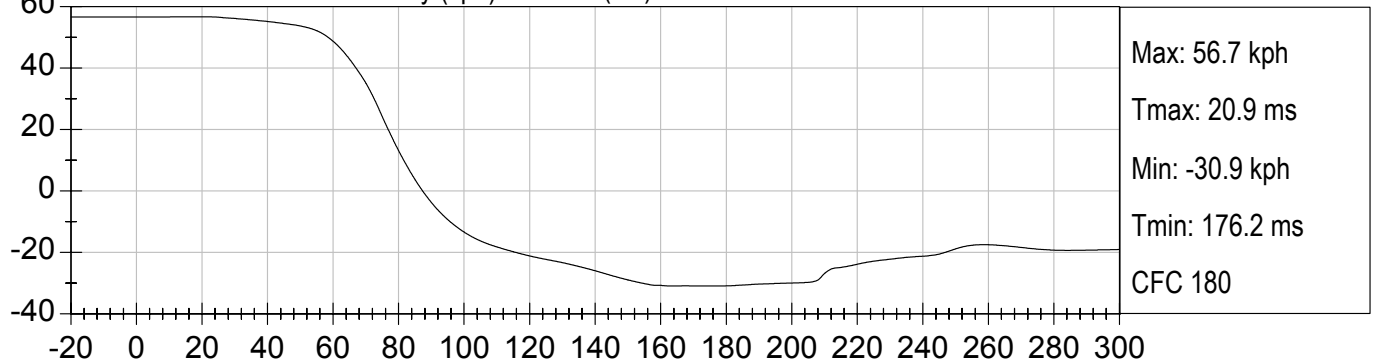
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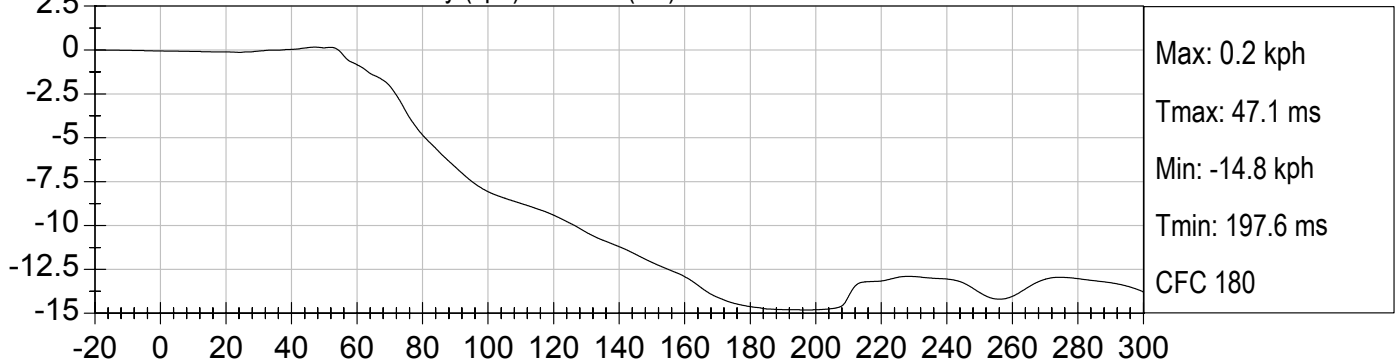




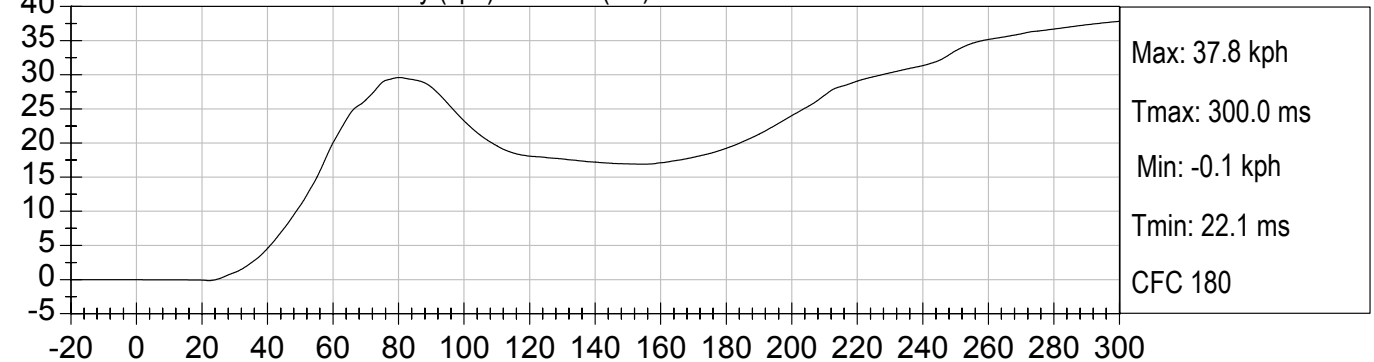
PASSENGER HEAD Xr Velocity (kph) vs TIME (ms)



PASSENGER HEAD Yr Velocity (kph) vs TIME (ms)

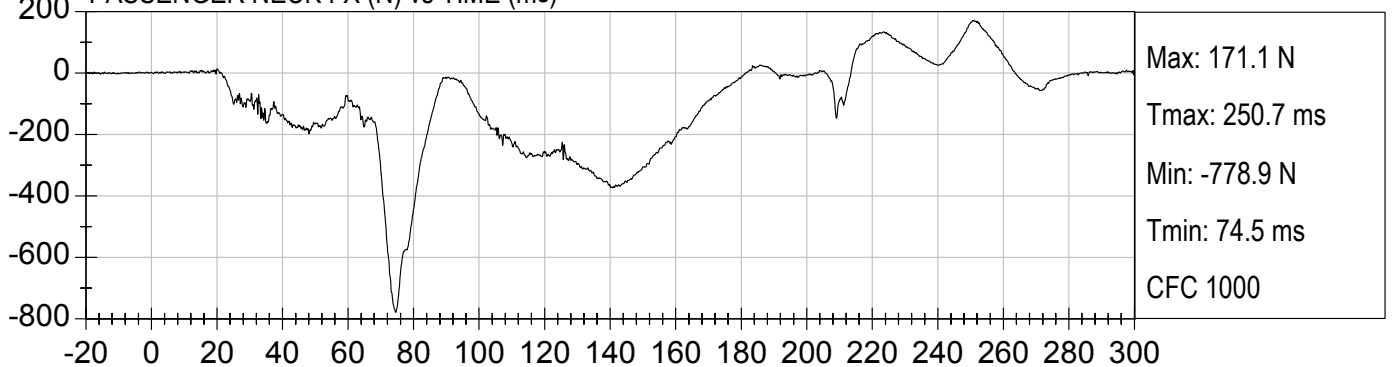


PASSENGER HEAD Zr Velocity (kph) vs TIME (ms)

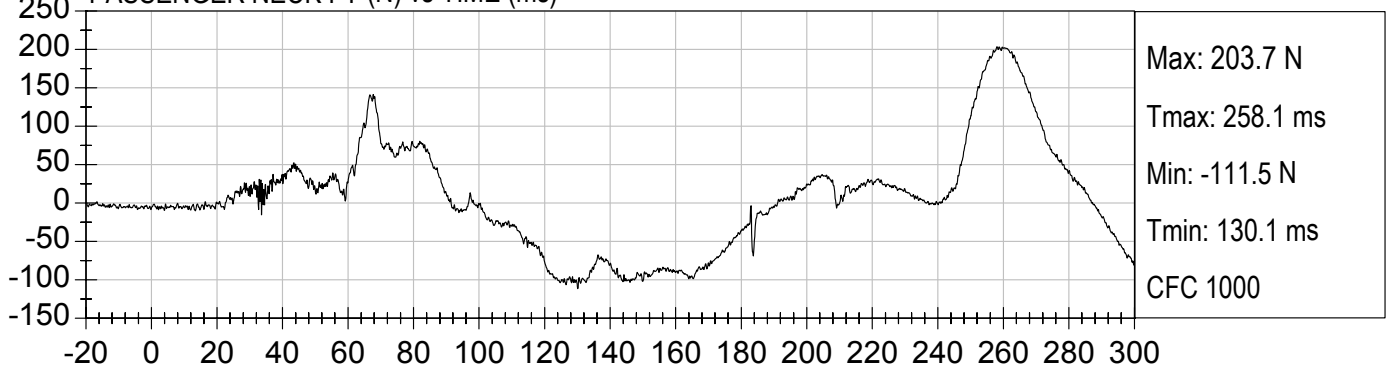




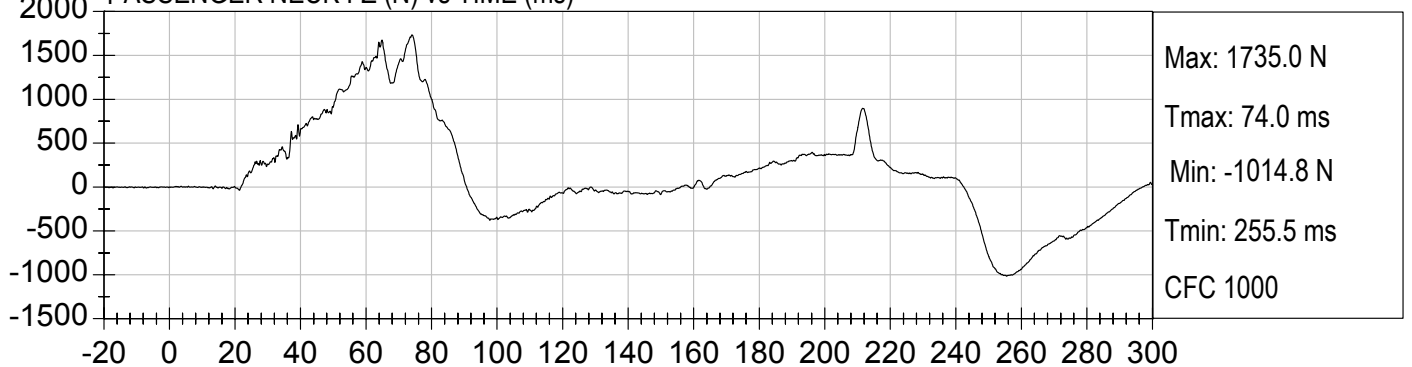
PASSENGER NECK FX (N) vs TIME (ms)



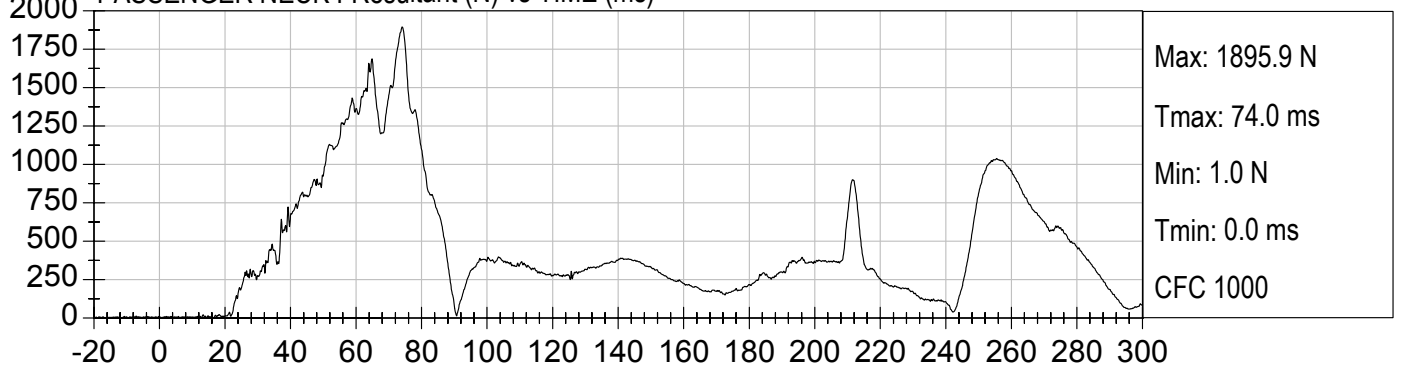
PASSENGER NECK FY (N) vs TIME (ms)

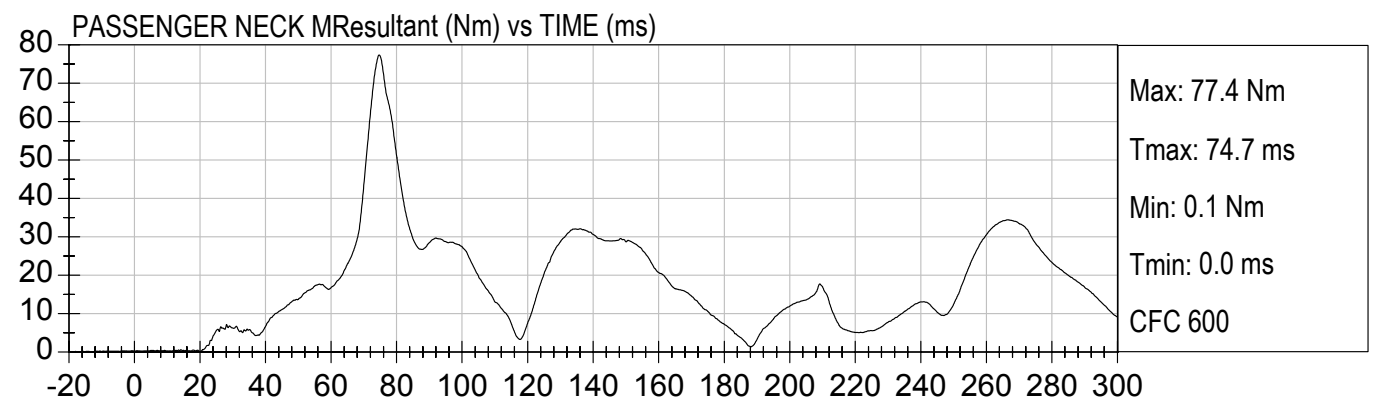
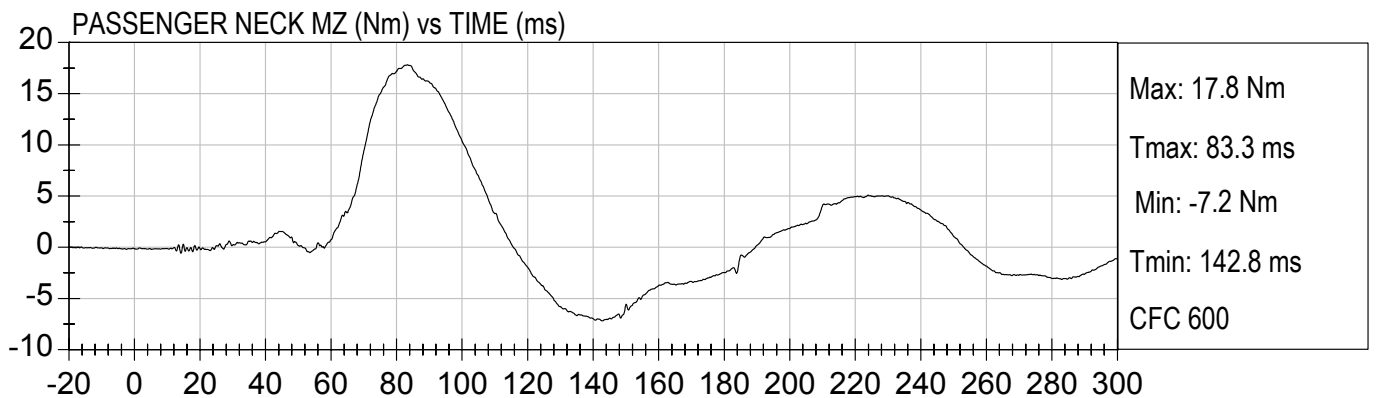
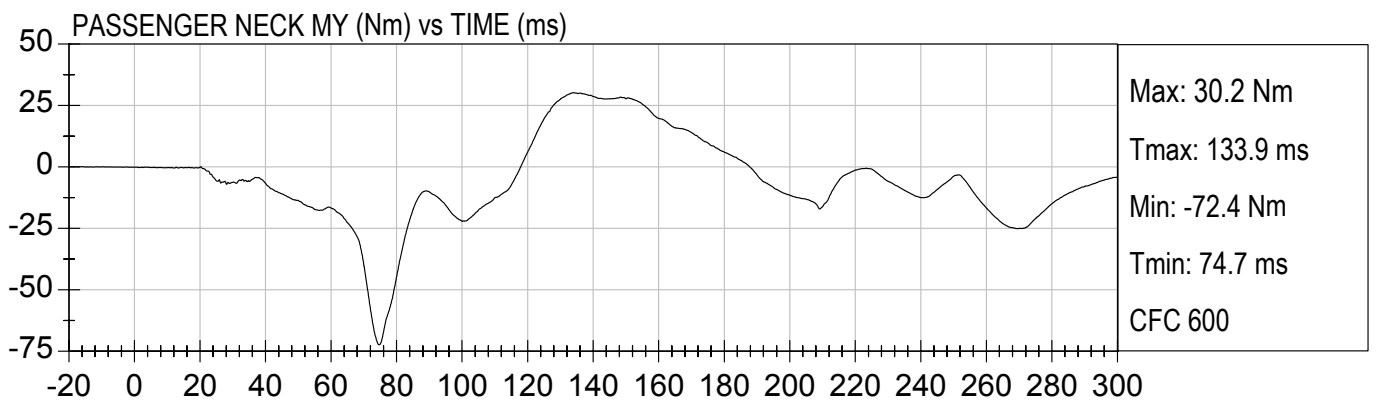
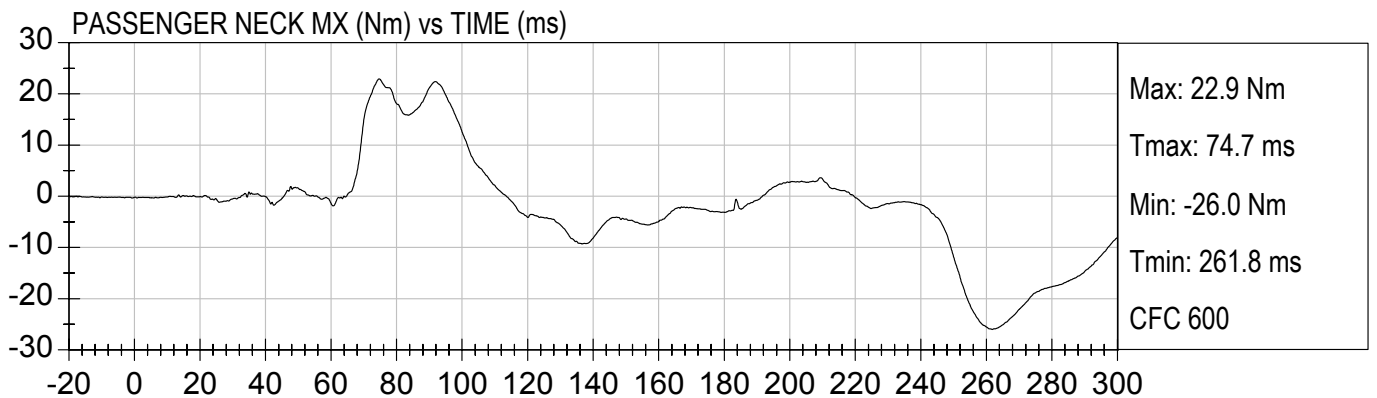


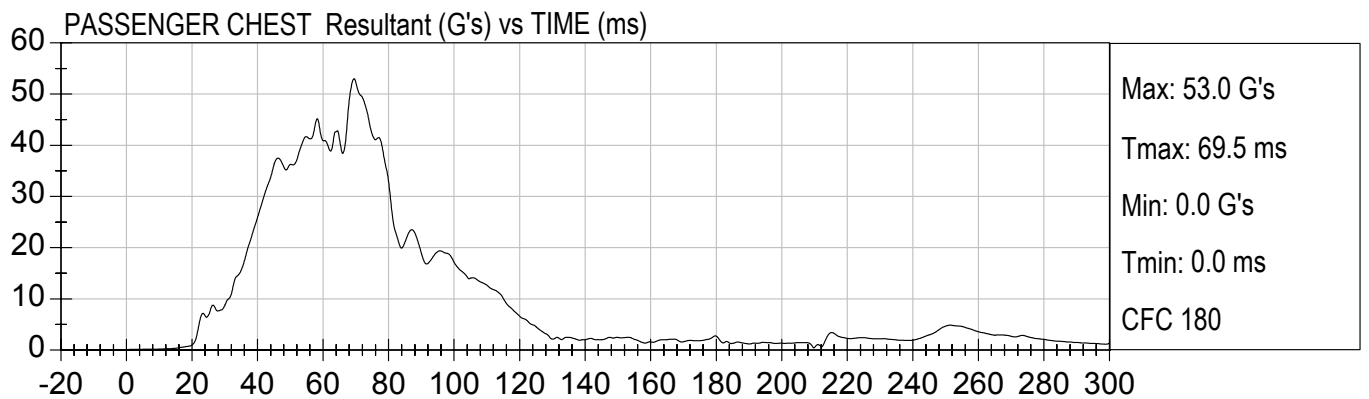
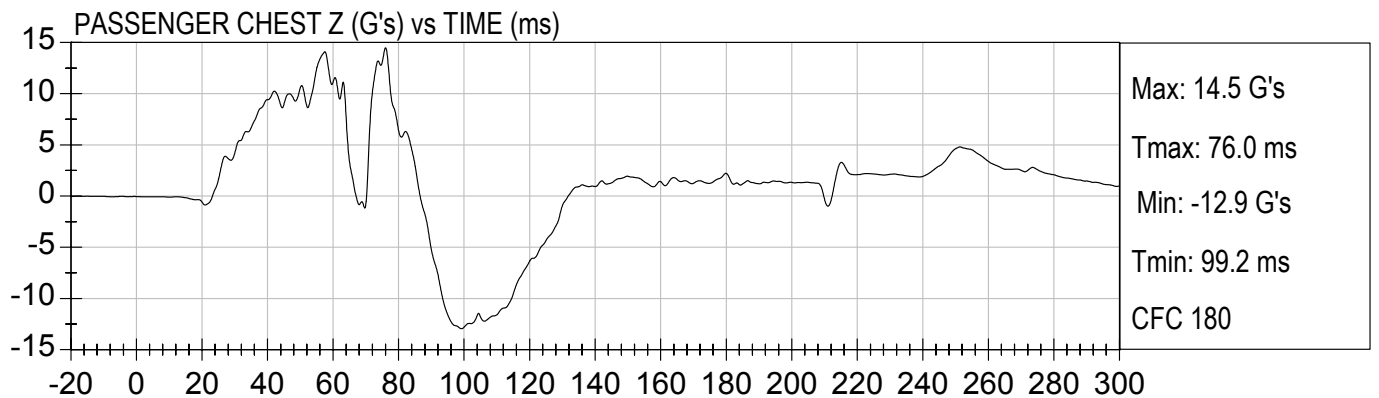
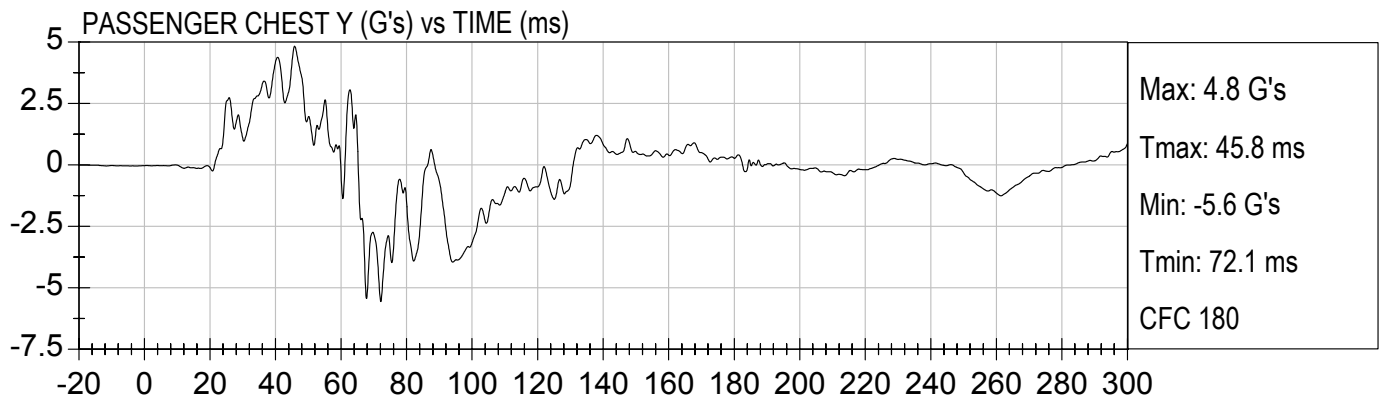
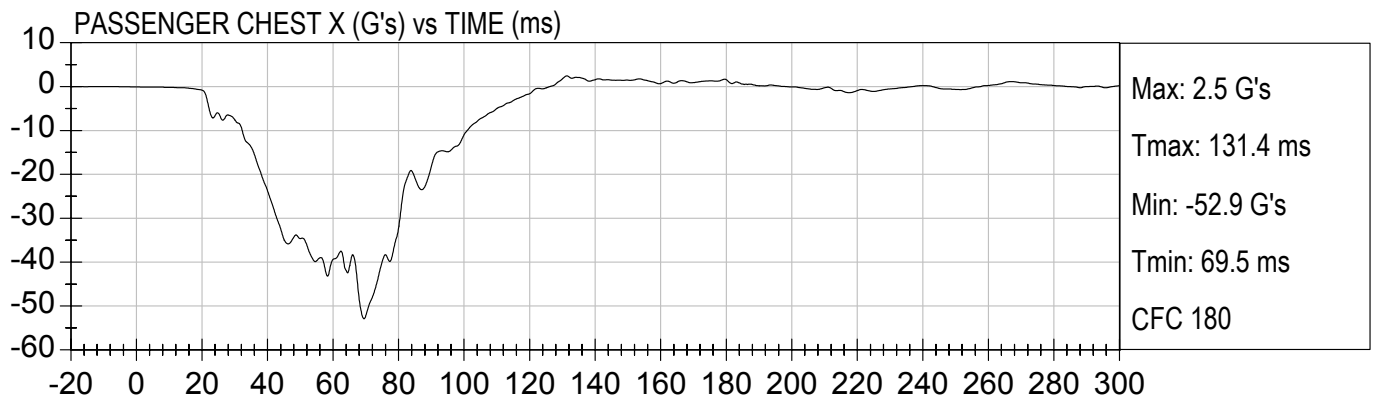
PASSENGER NECK FZ (N) vs TIME (ms)

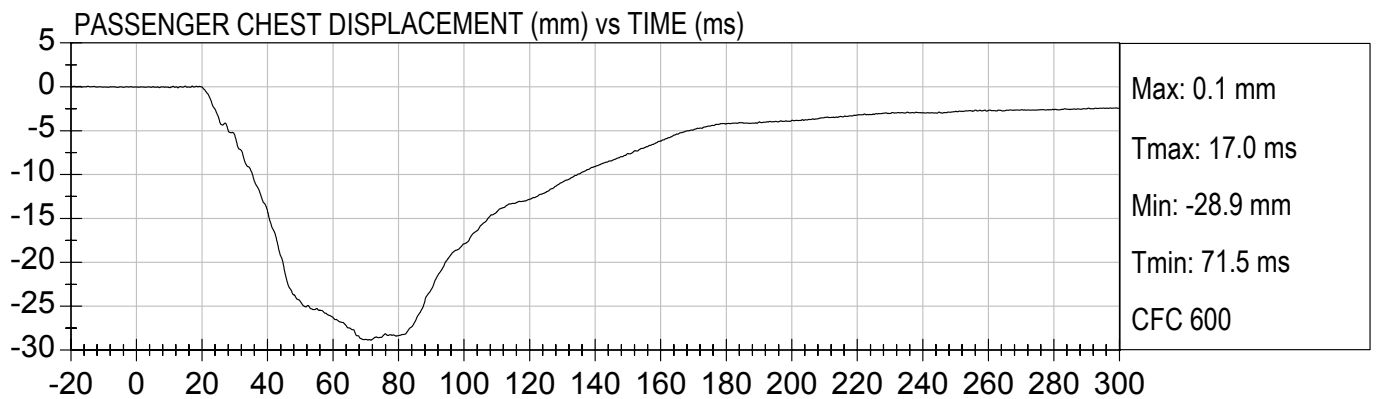
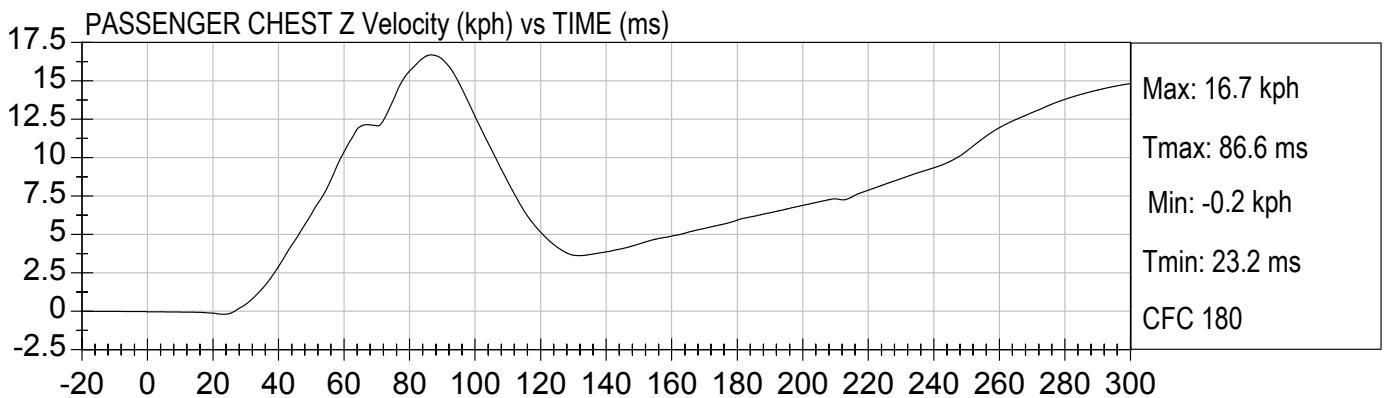
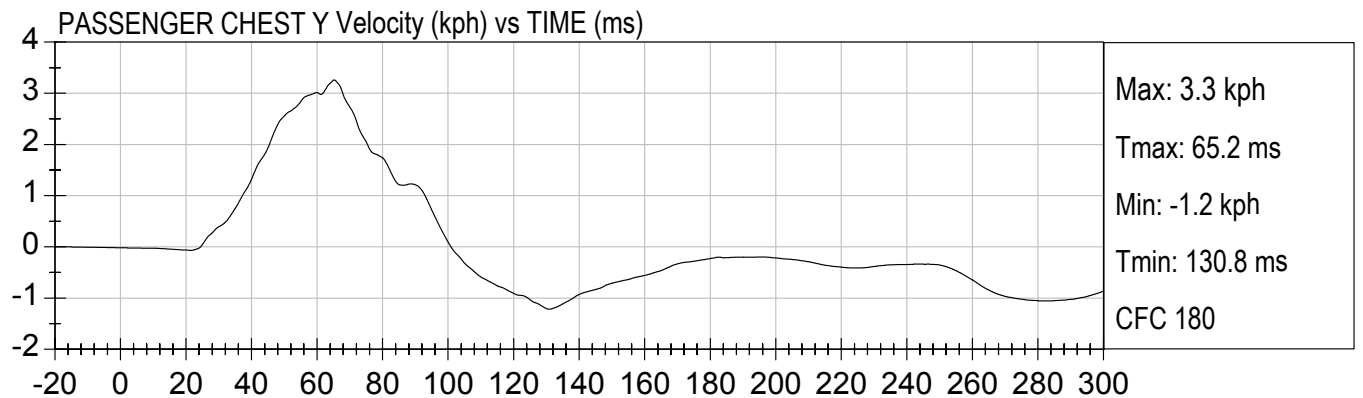
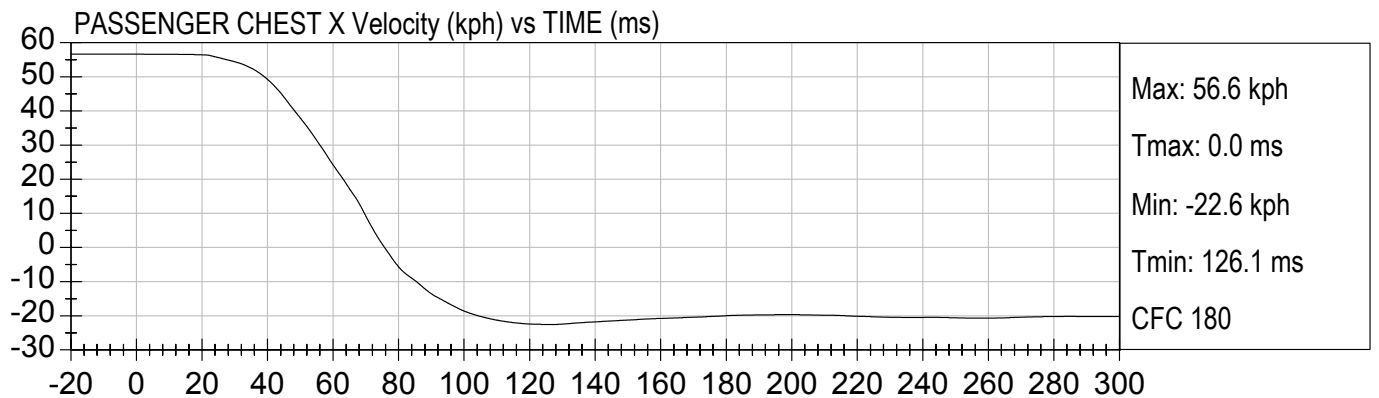


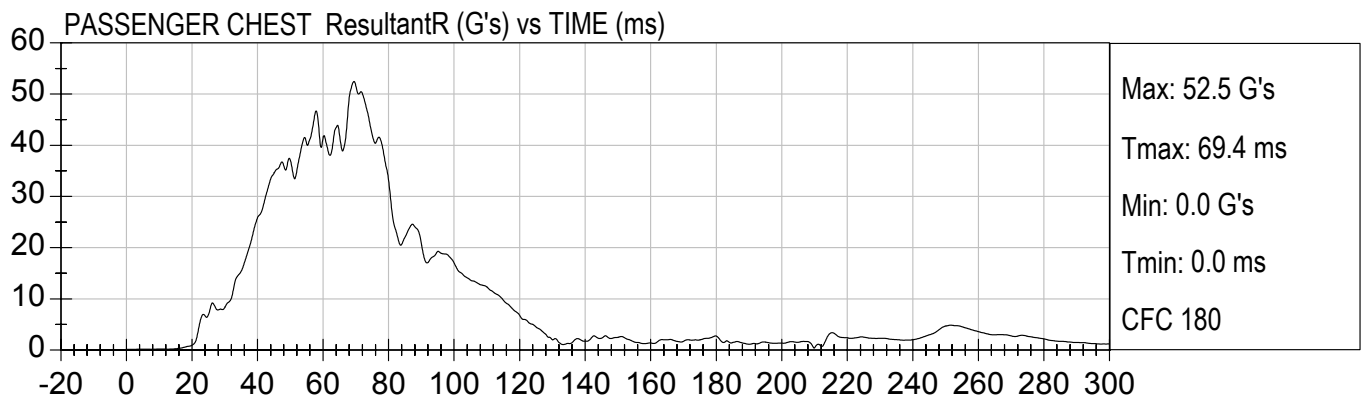
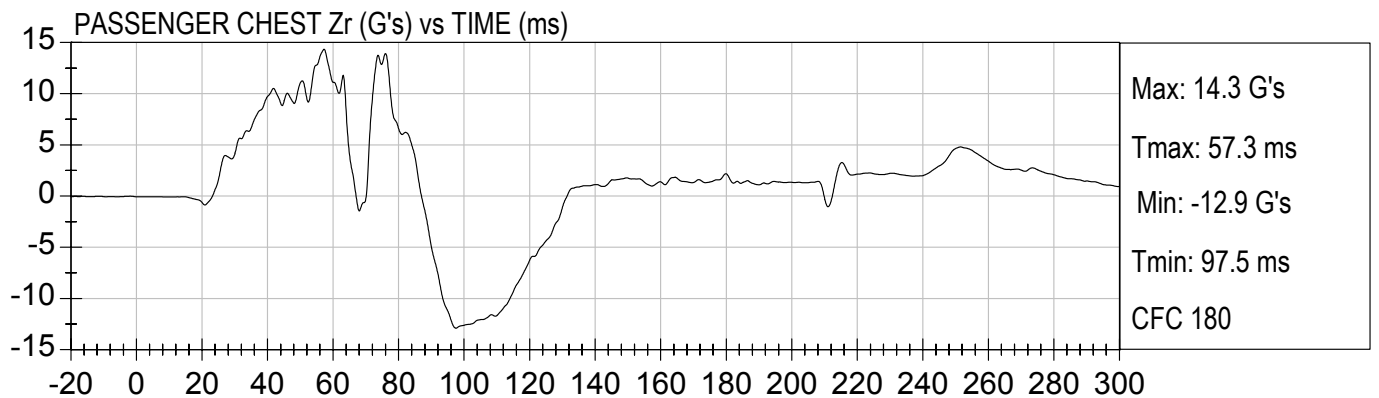
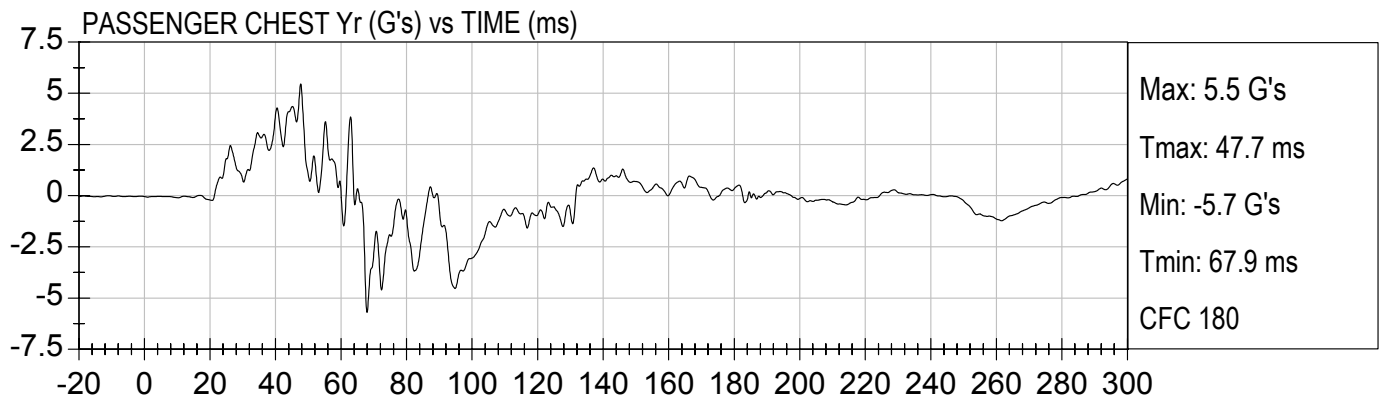
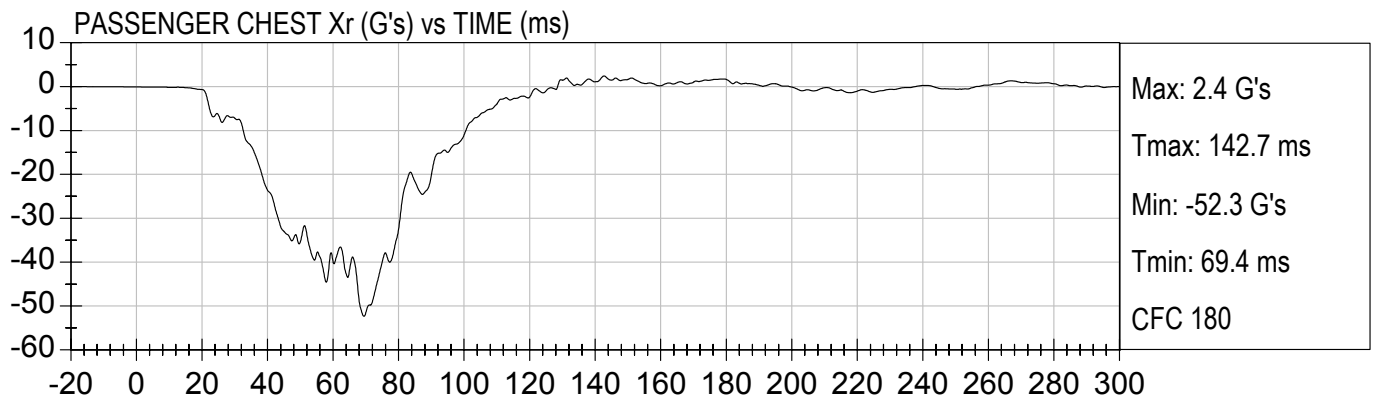
PASSENGER NECK FResultant (N) vs TIME (ms)

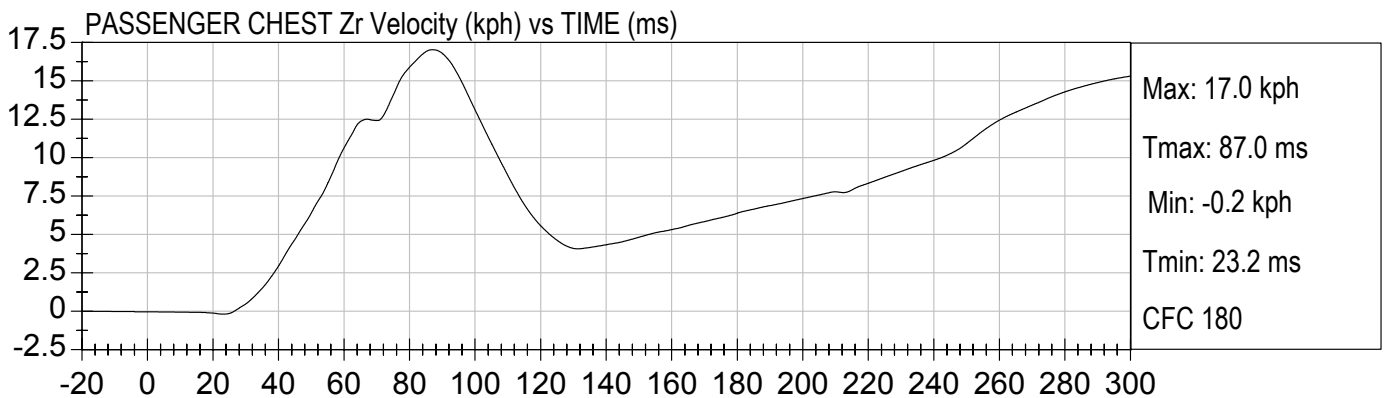
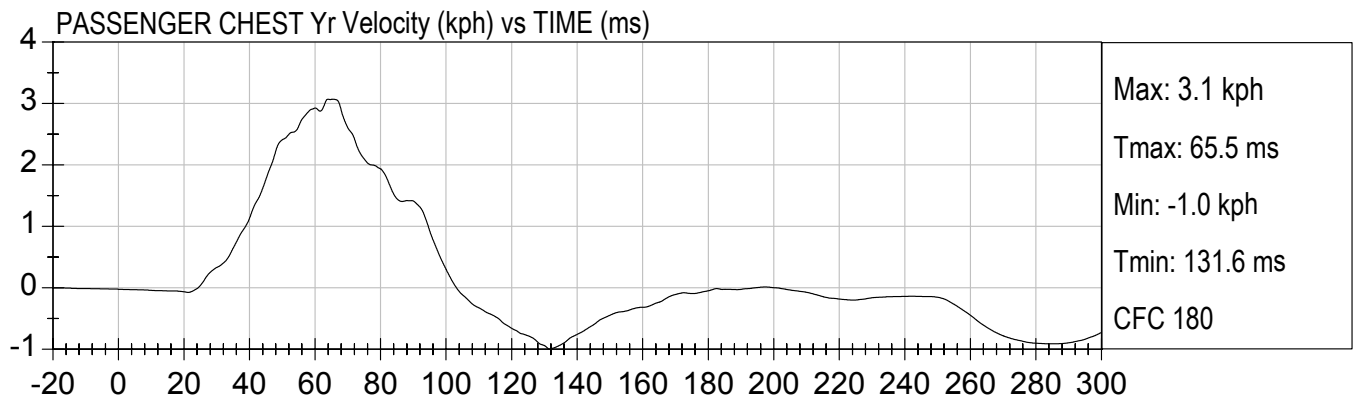
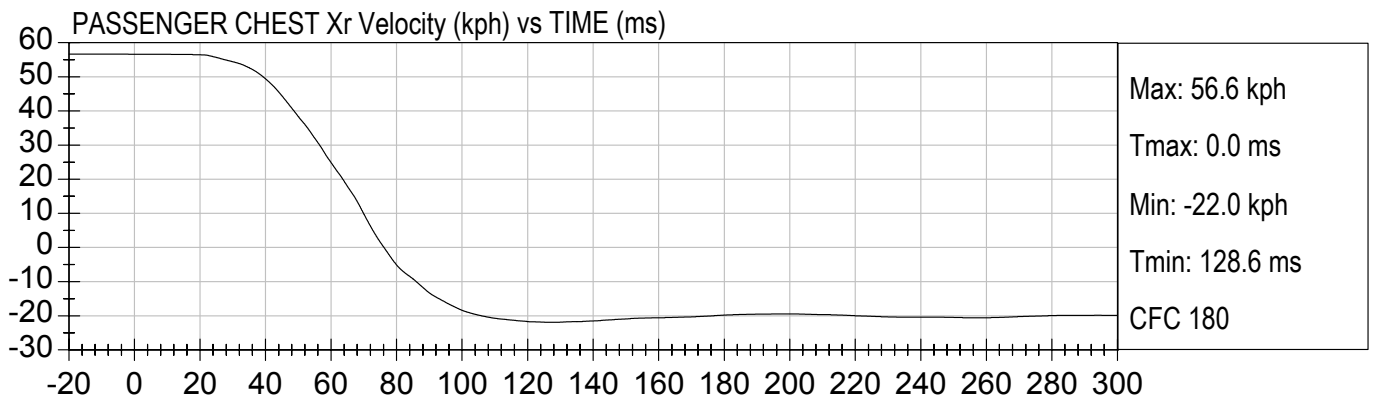


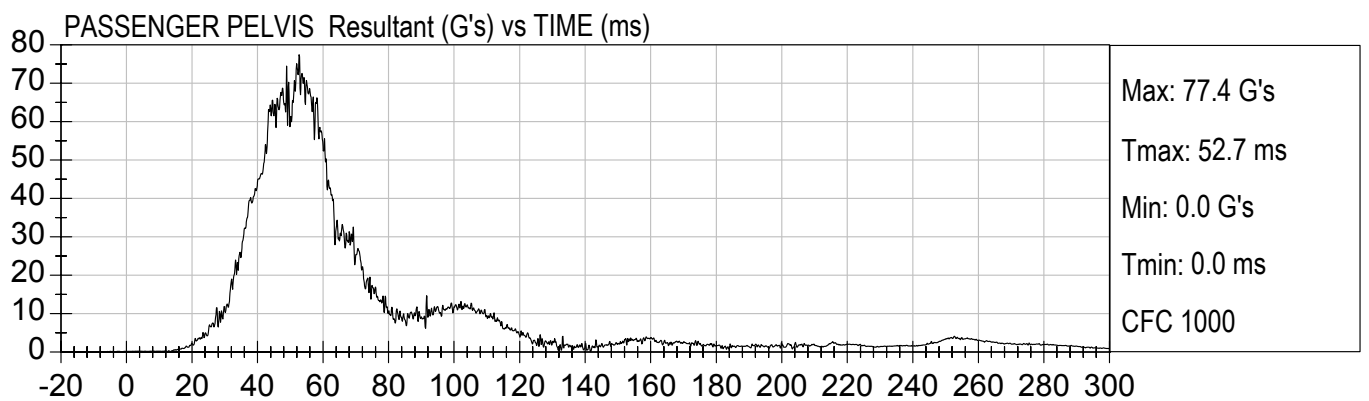
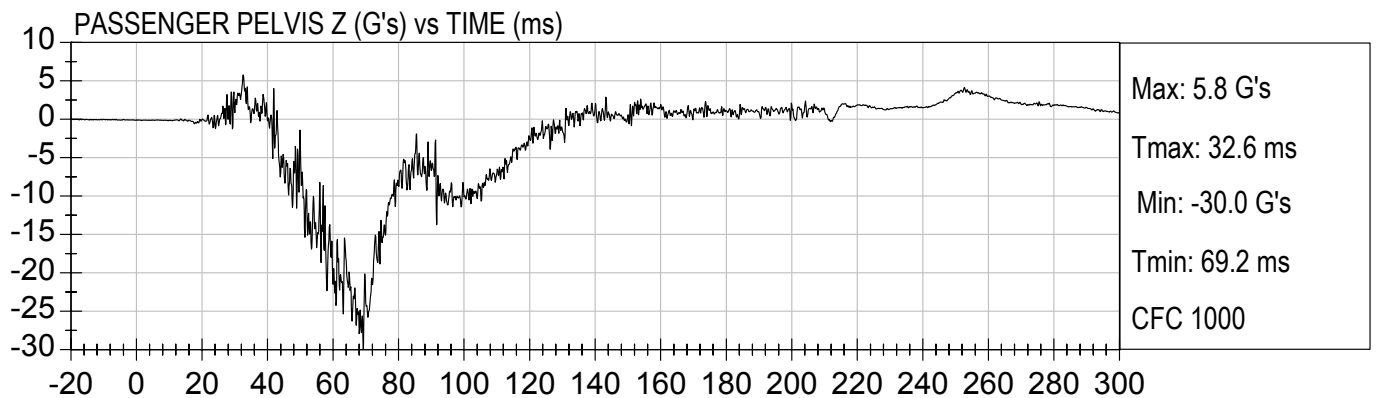
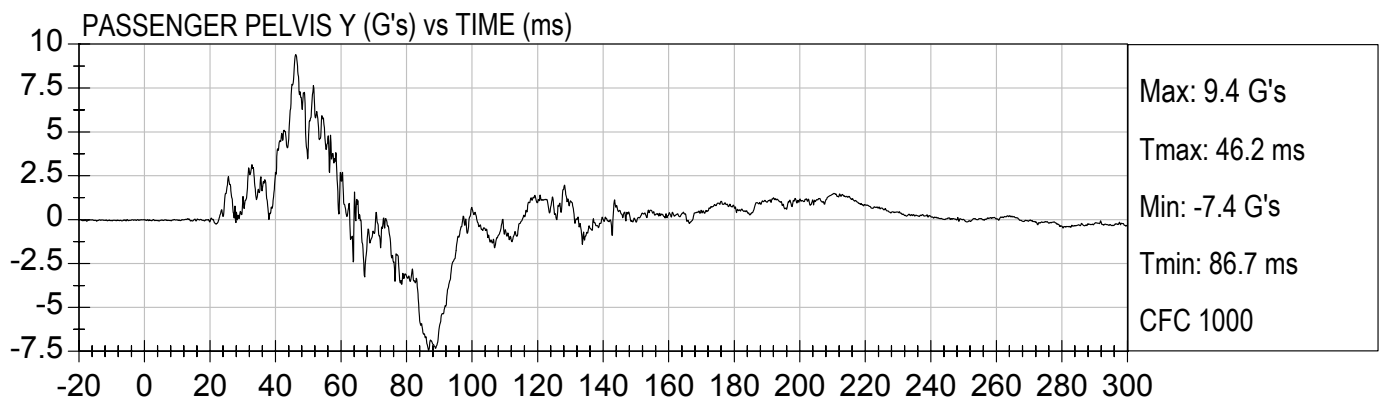
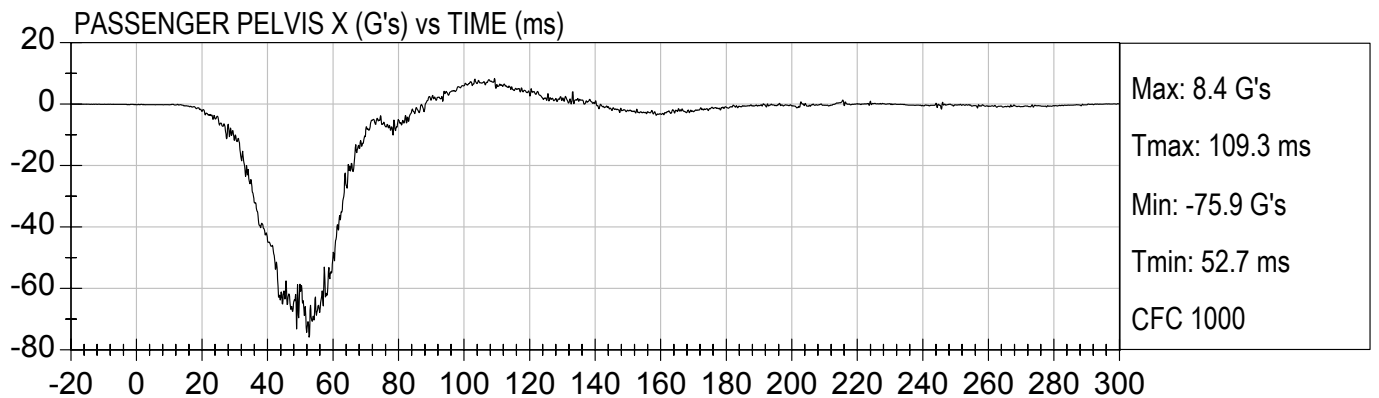


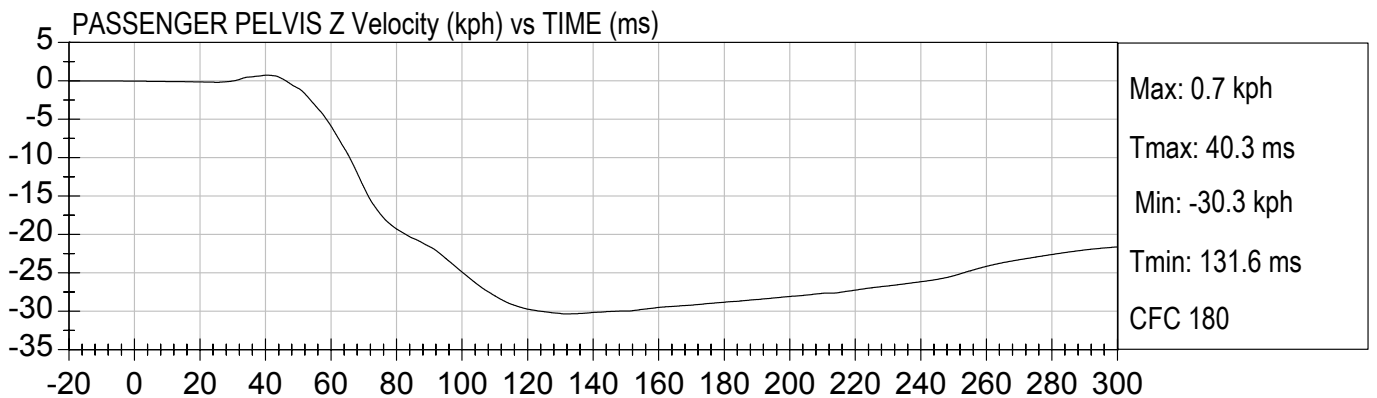
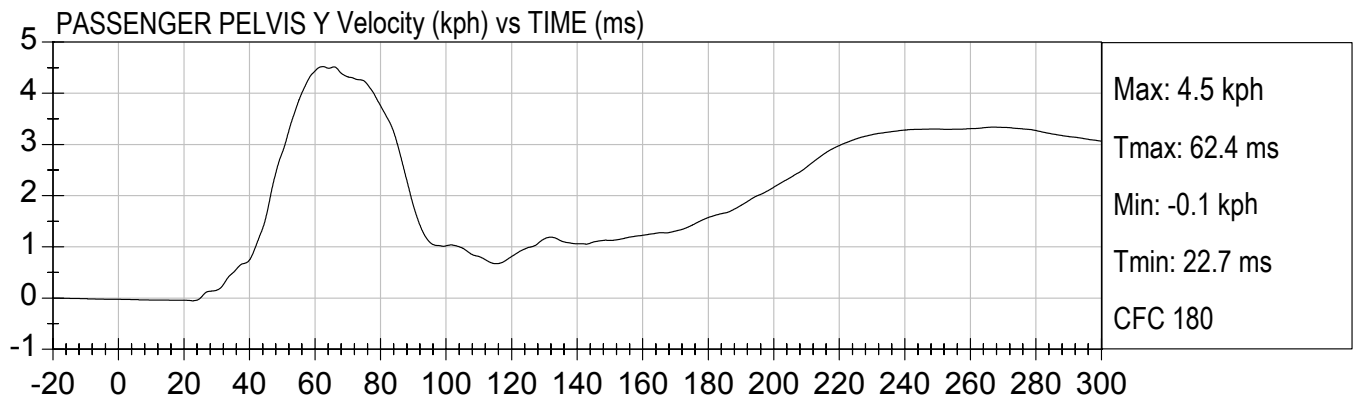
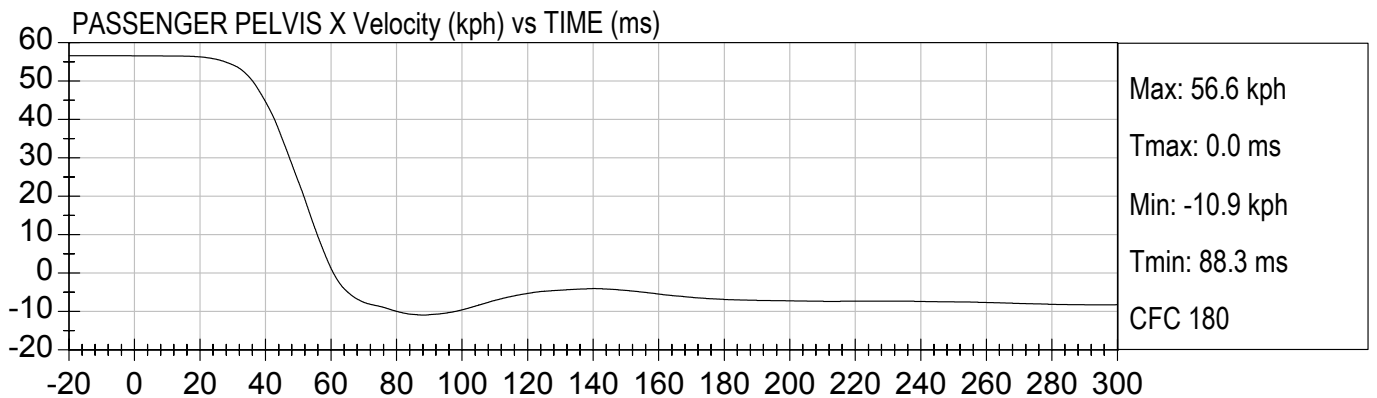


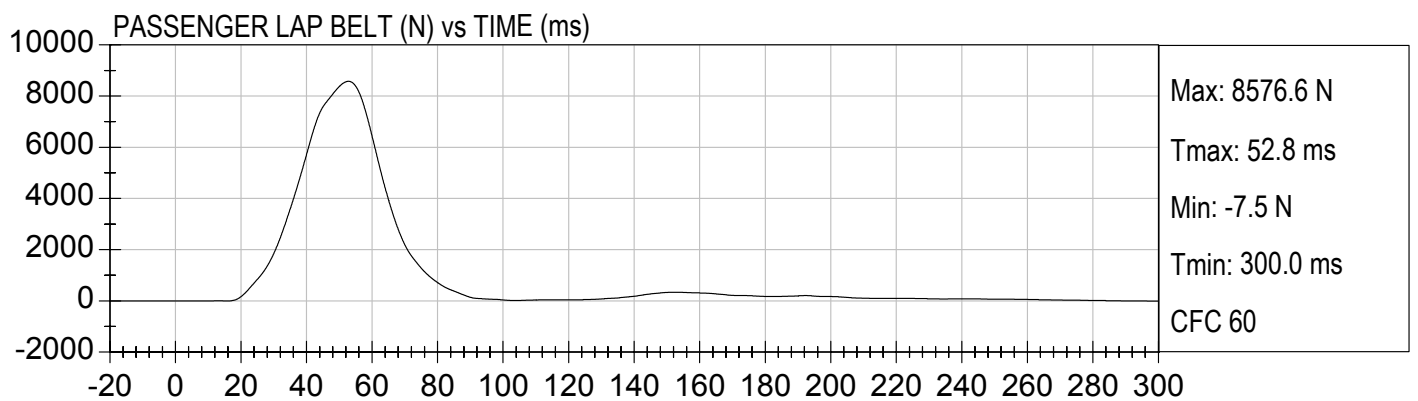
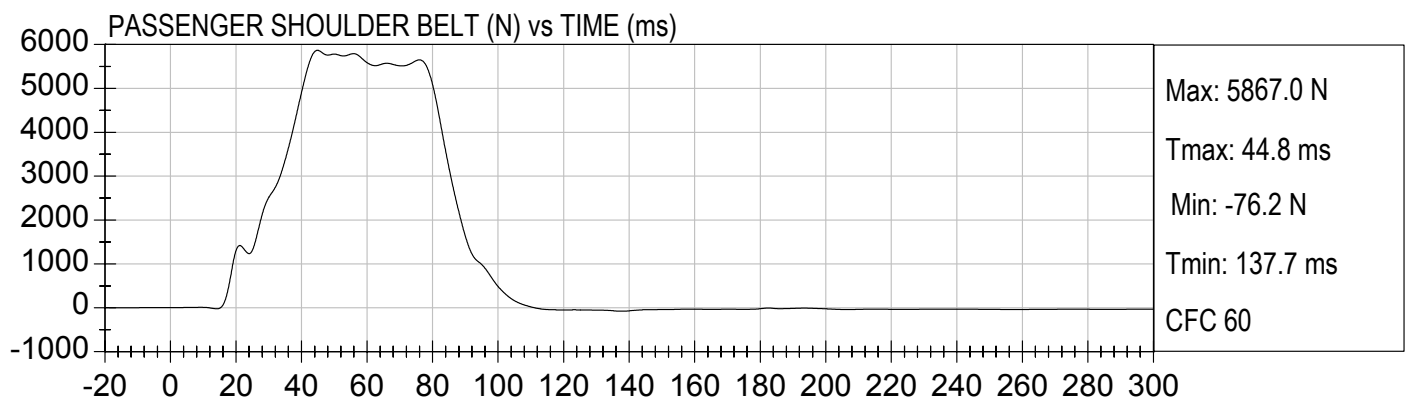
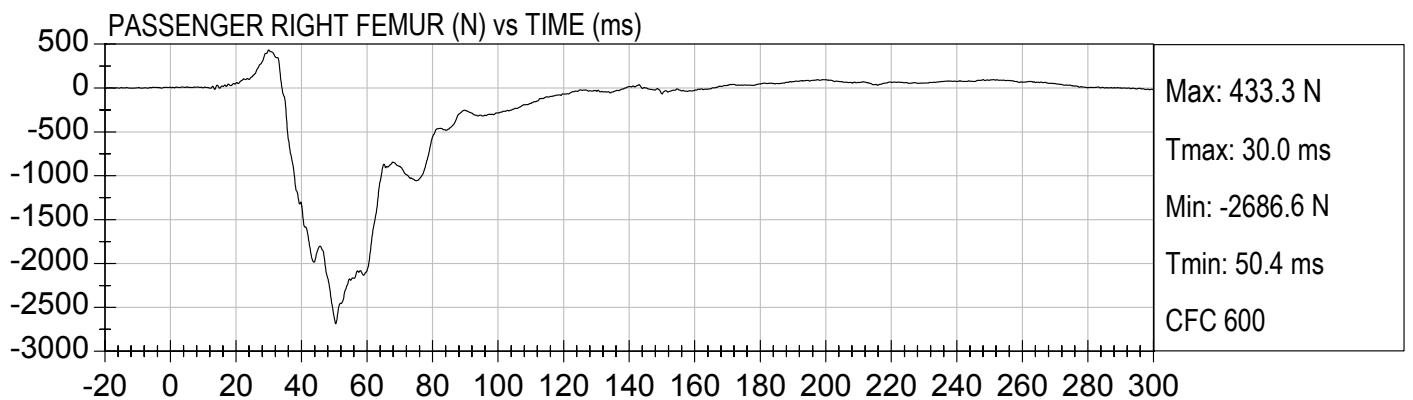
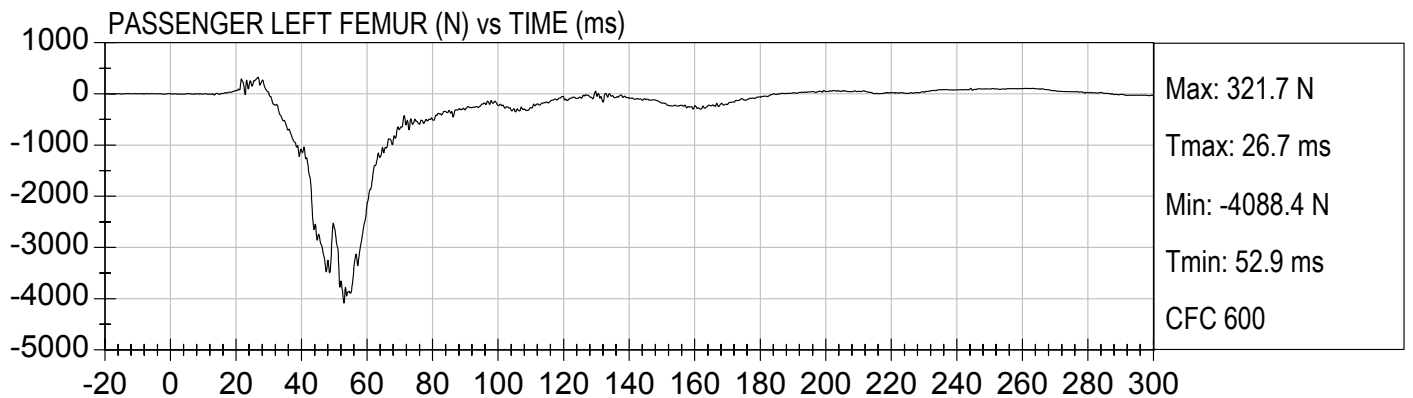






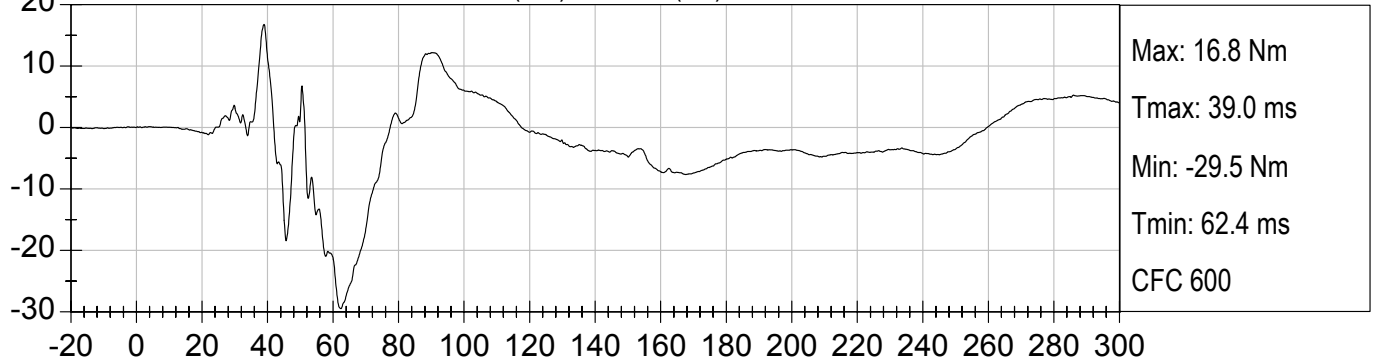




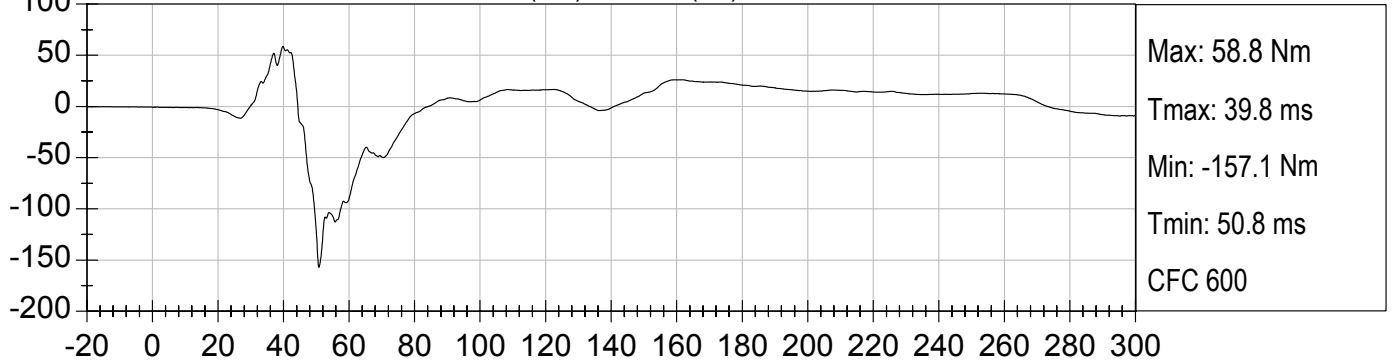




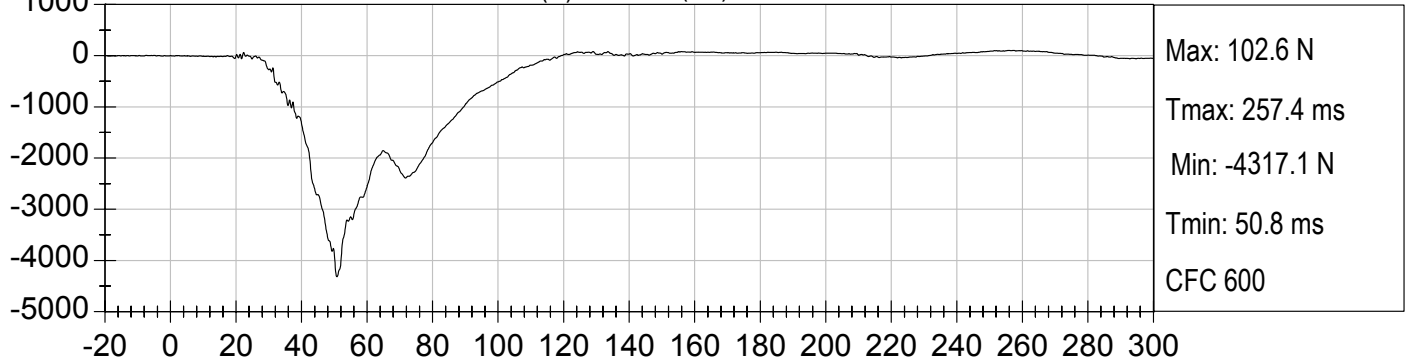
PASSENGER LEFT UPPER TIBIA MX (Nm) vs TIME (ms)



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

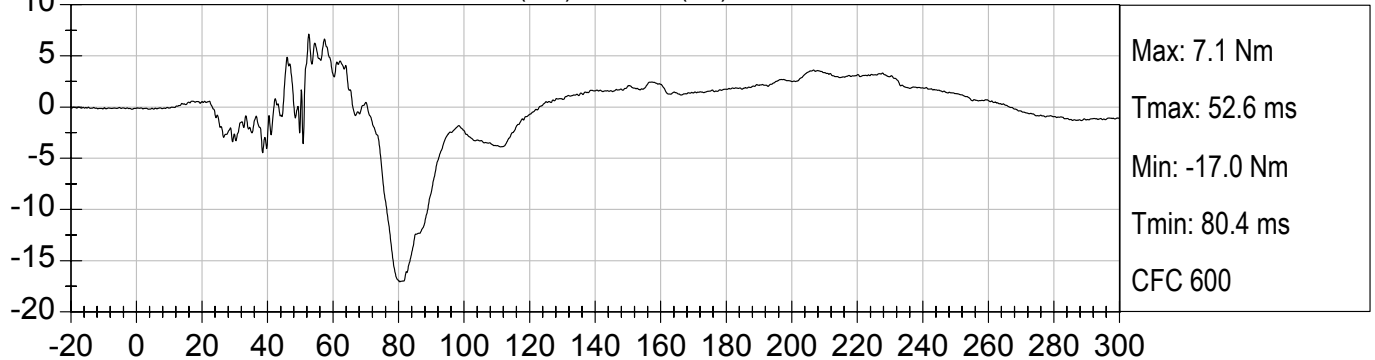


PASSENGER LEFT UPPER TIBIA FZ (N) vs TIME (ms)

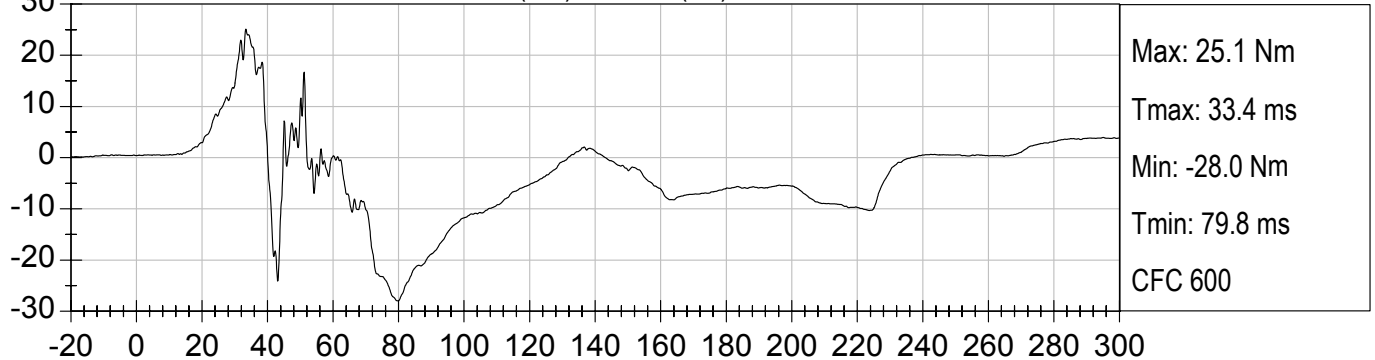




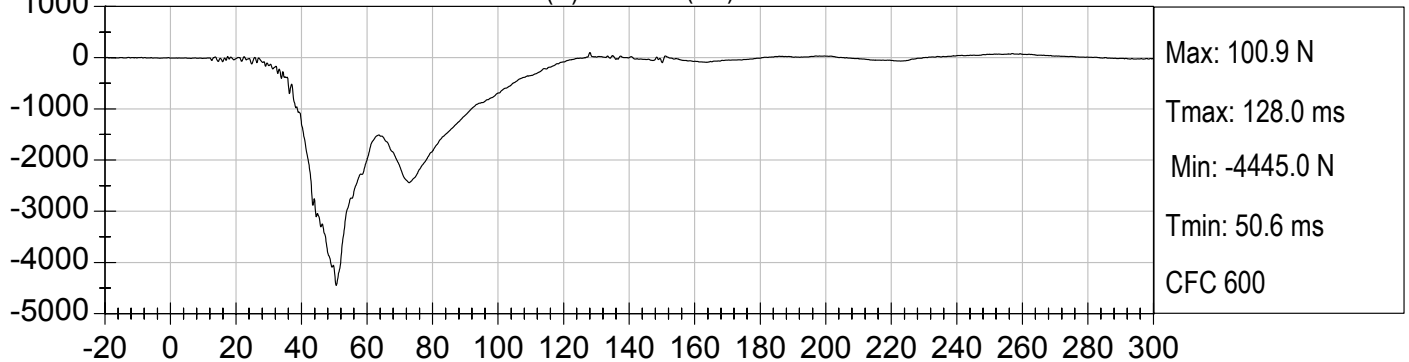
PASSENGER LEFT LOWER TIBIA MX (Nm) vs TIME (ms)

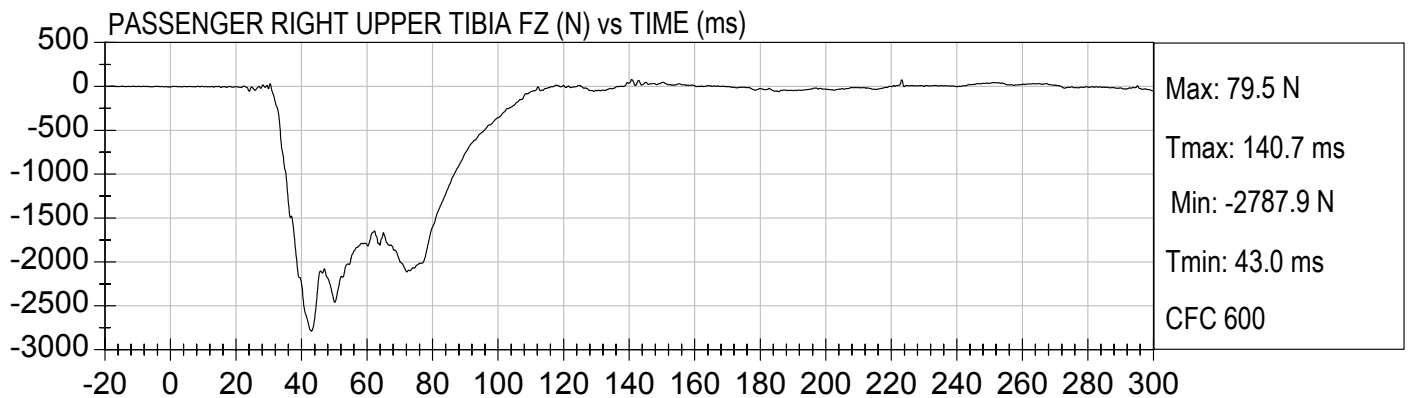
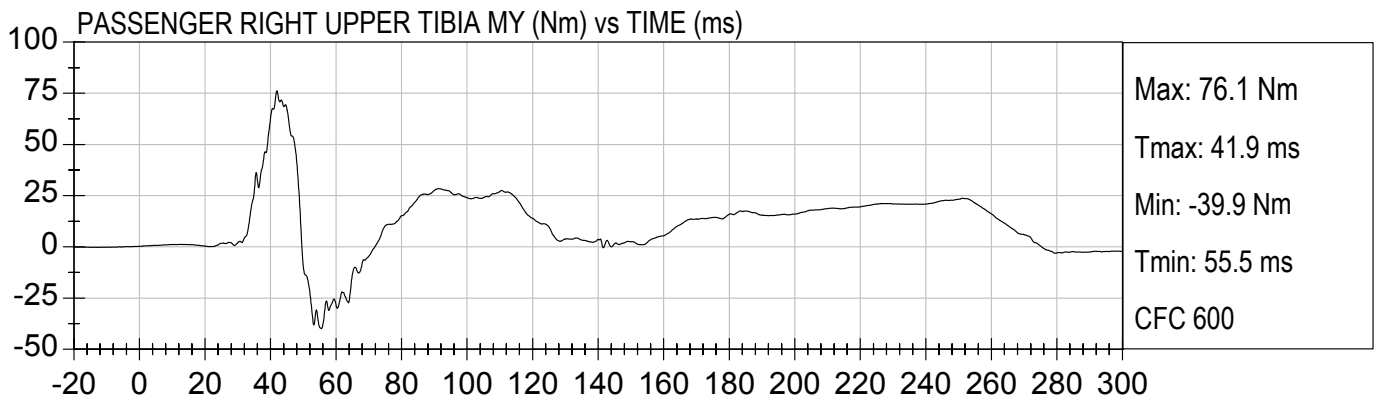
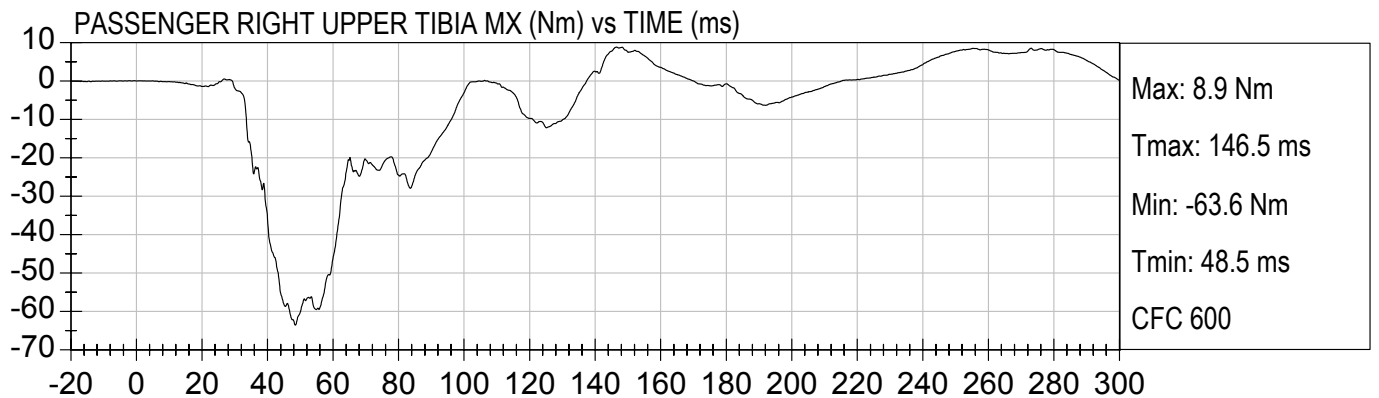


PASSENGER LEFT LOWER TIBIA MY (Nm) vs TIME (ms)



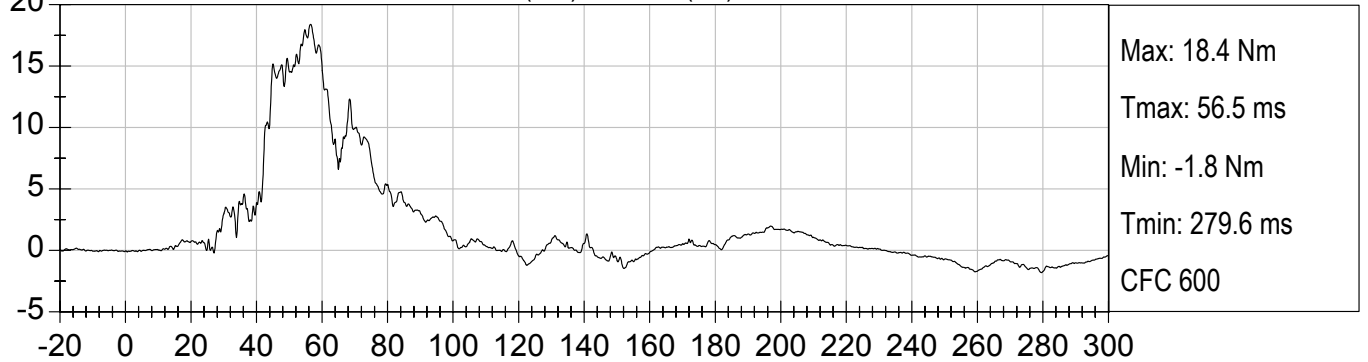
PASSENGER LEFT LOWER TIBIA FZ (N) vs TIME (ms)



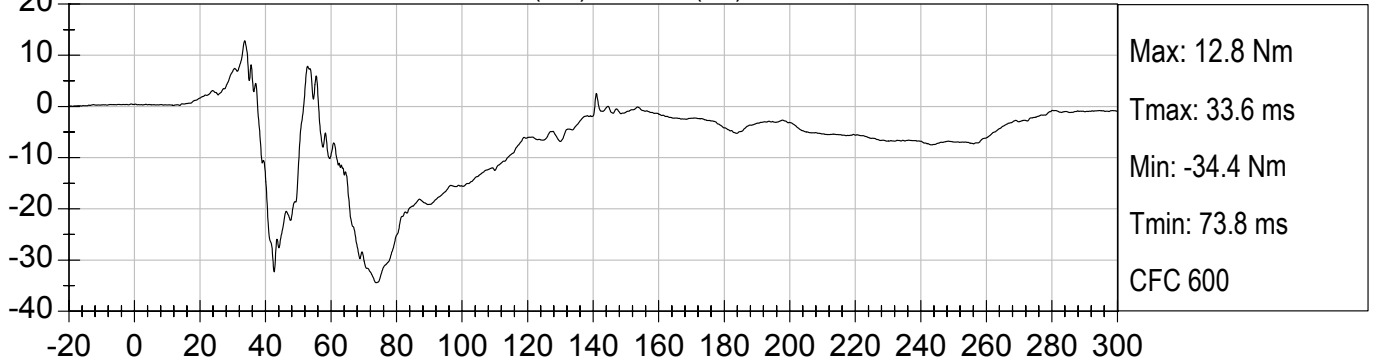




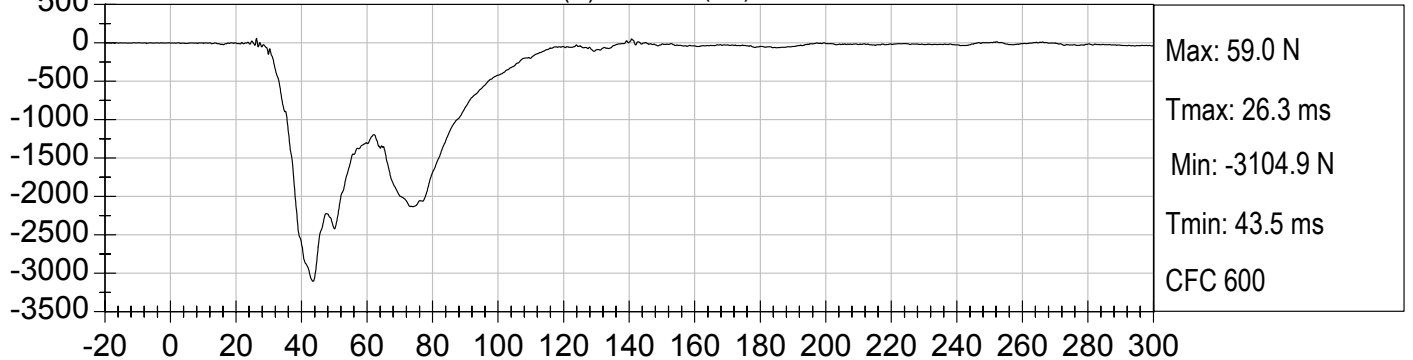
PASSENGER RIGHT LOWER TIBIA MX (Nm) vs TIME (ms)

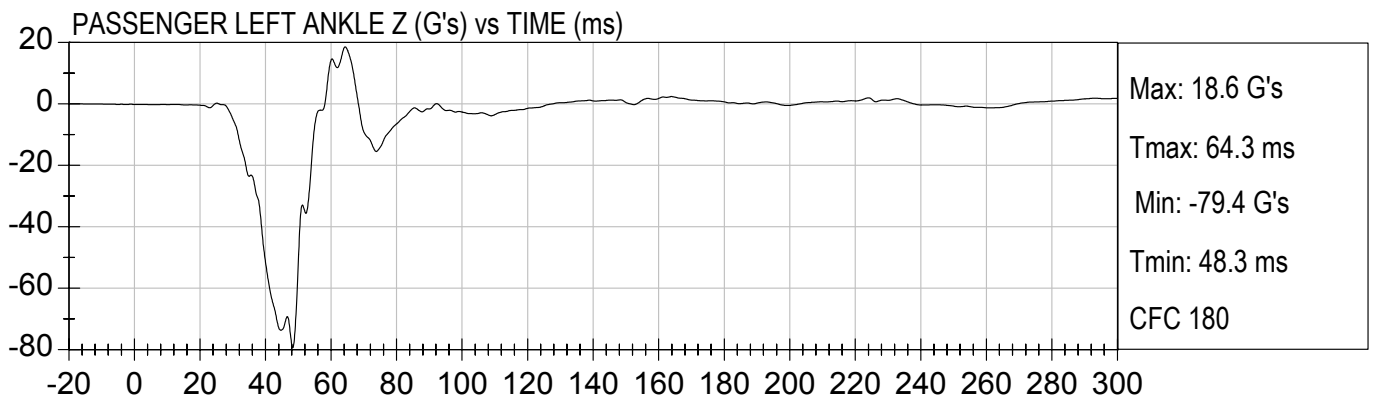
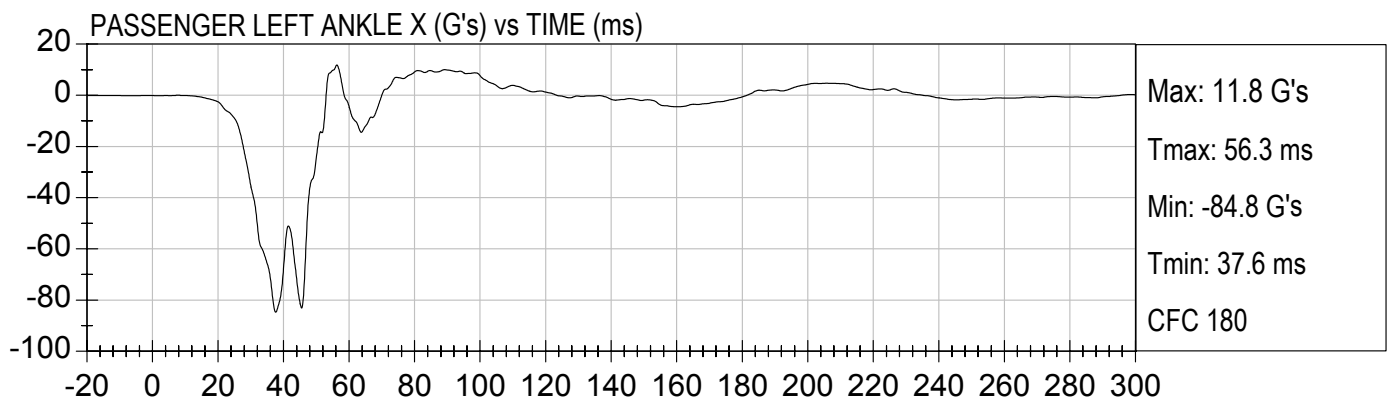
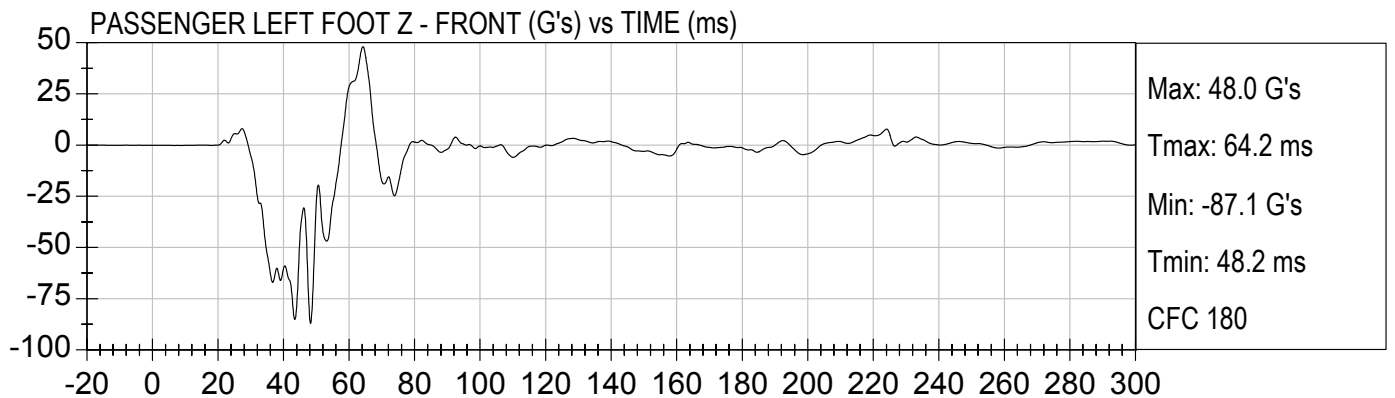


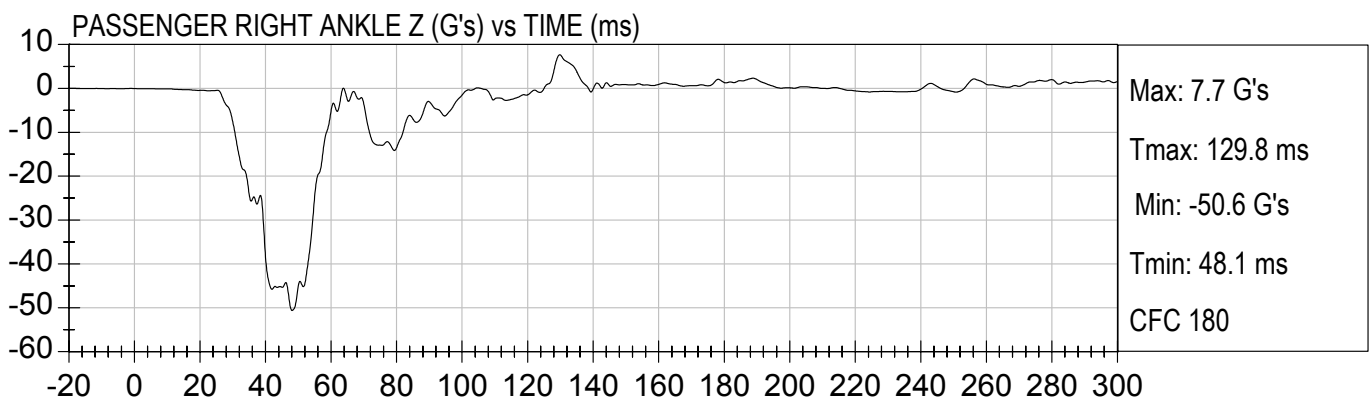
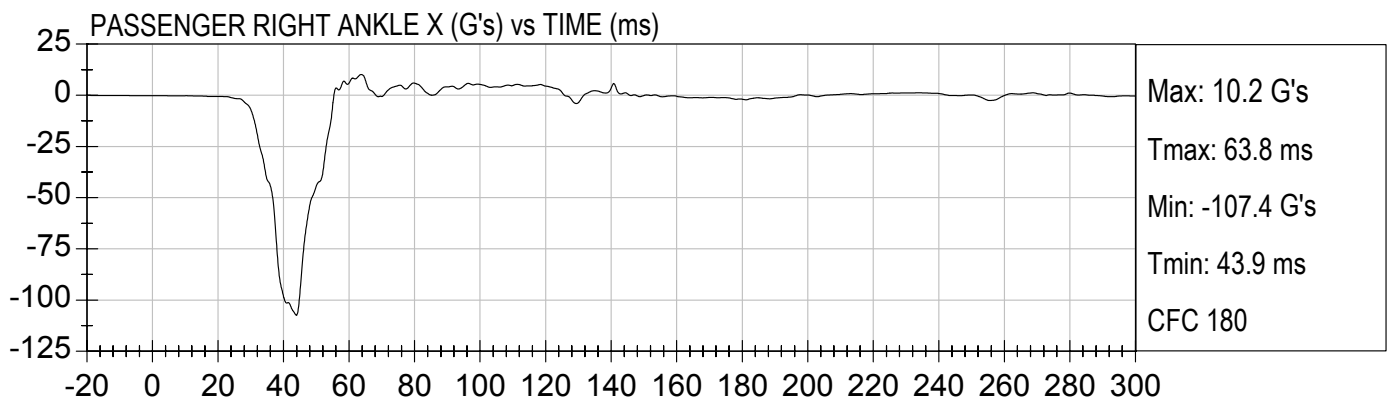
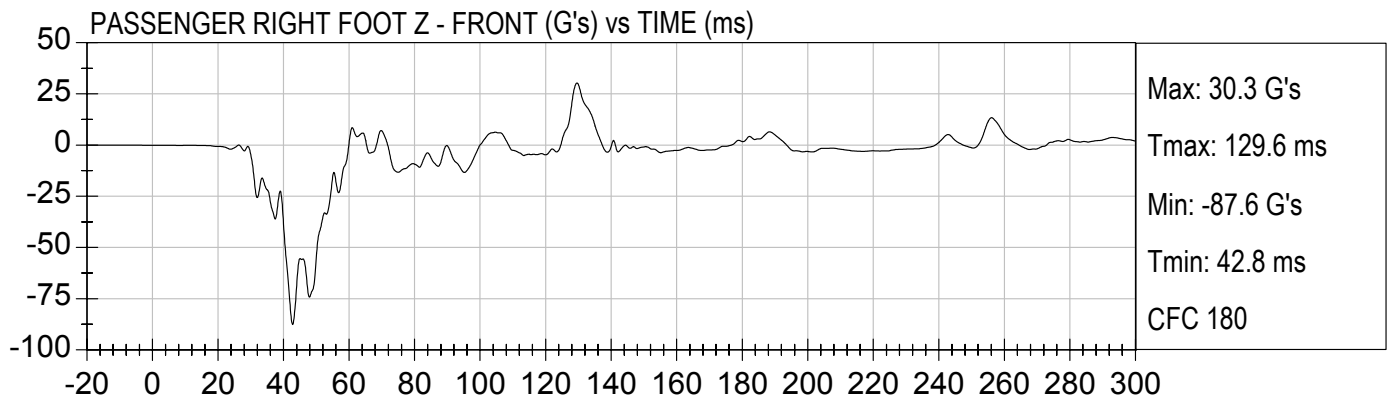
PASSENGER RIGHT LOWER TIBIA MY (Nm) vs TIME (ms)

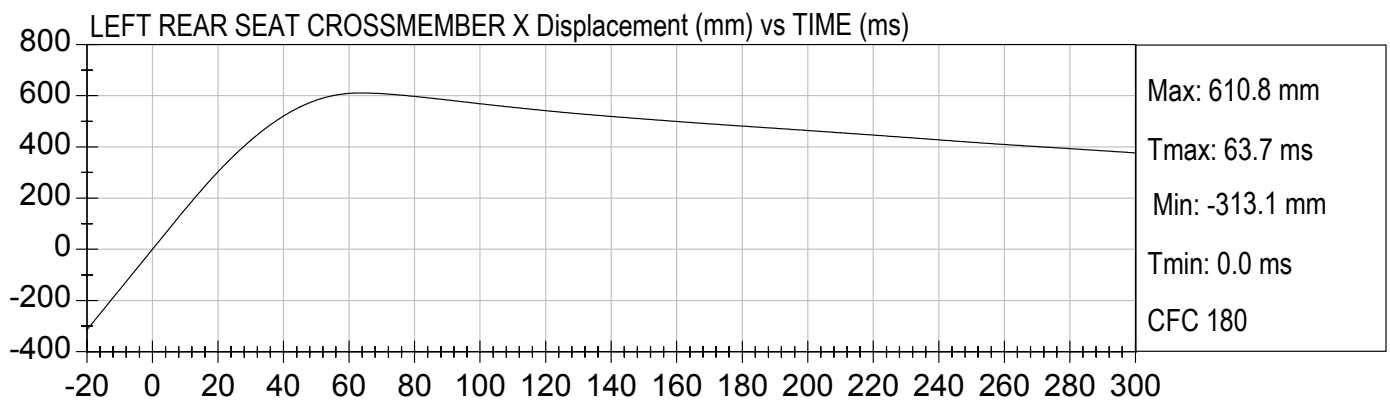
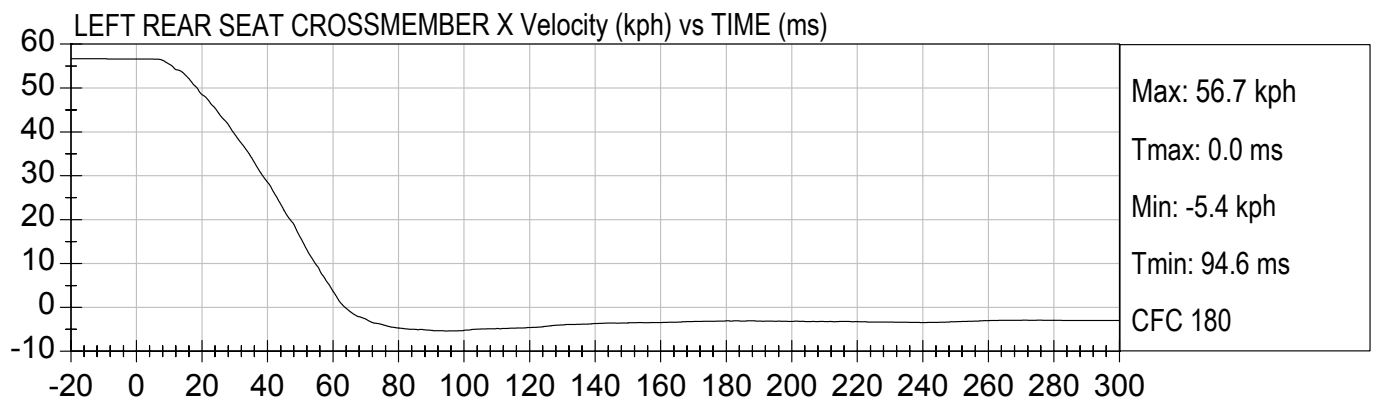
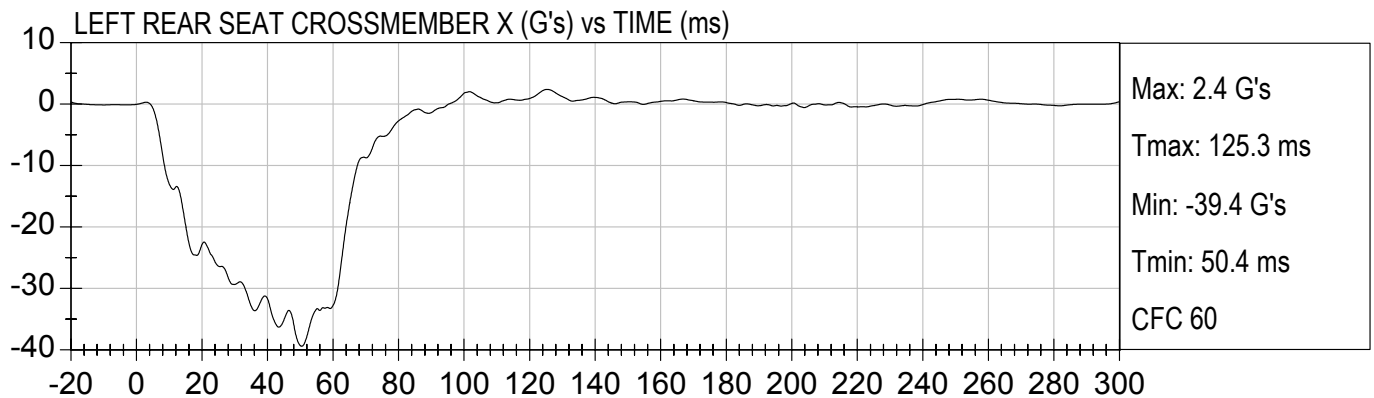


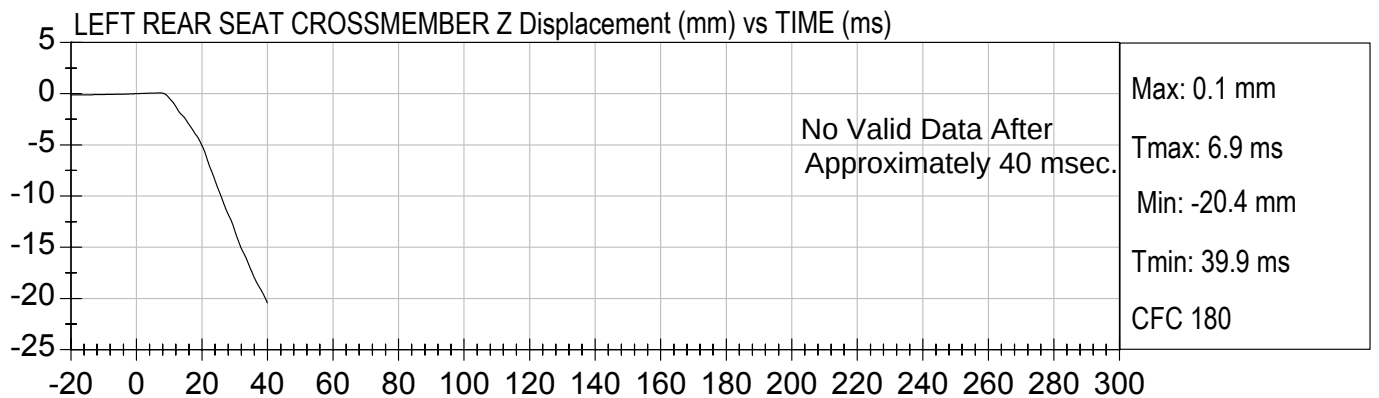
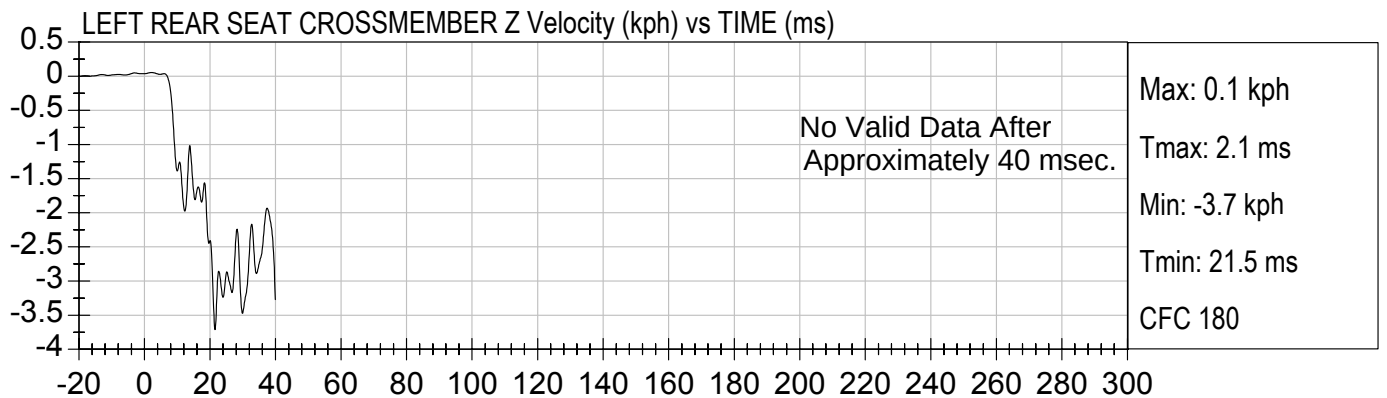
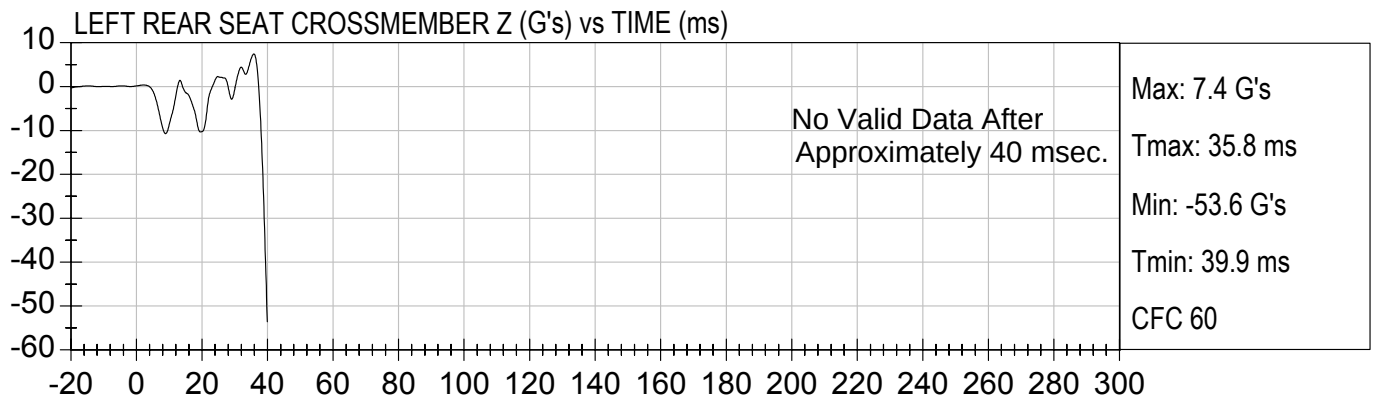
PASSENGER RIGHT LOWER TIBIA FZ (N) vs TIME (ms)

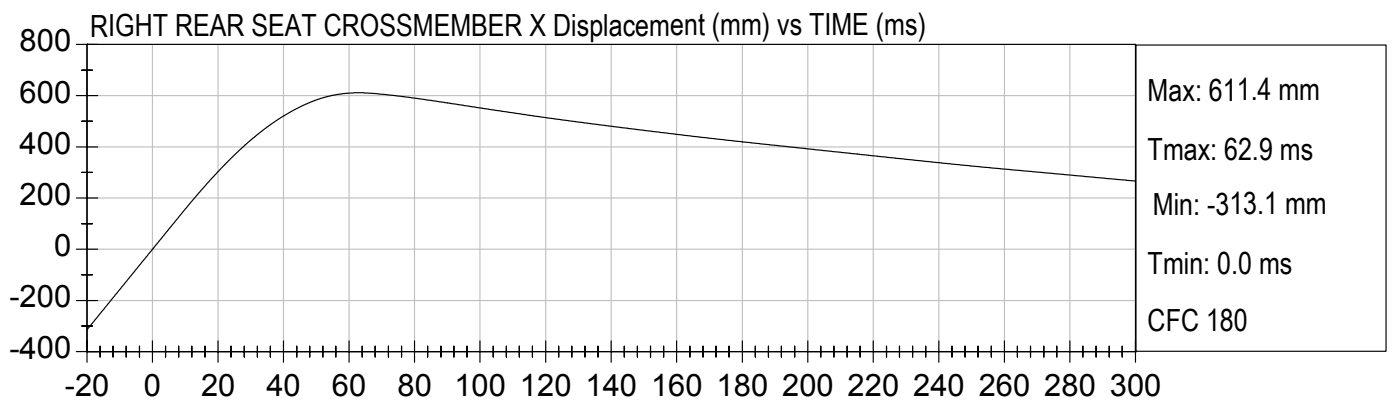
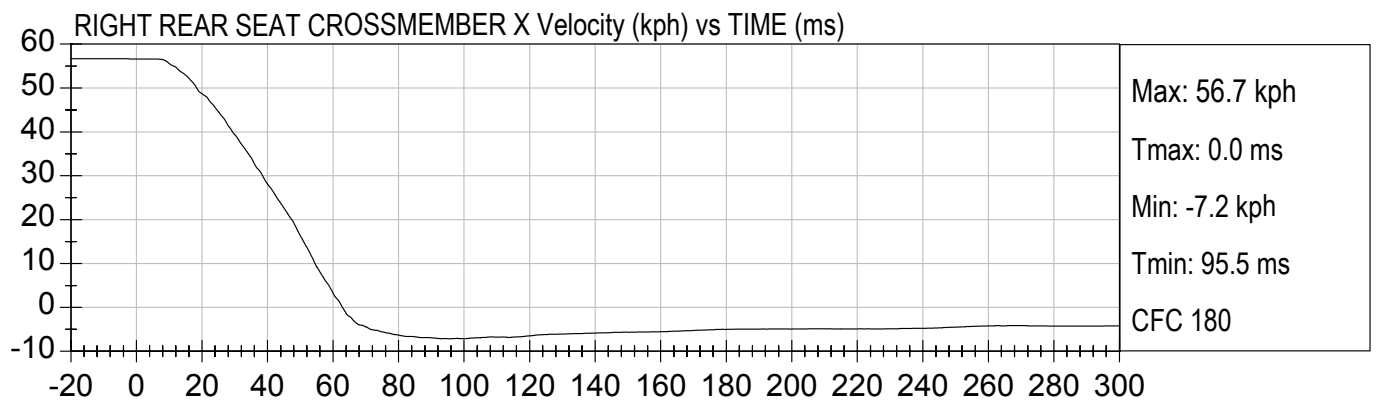
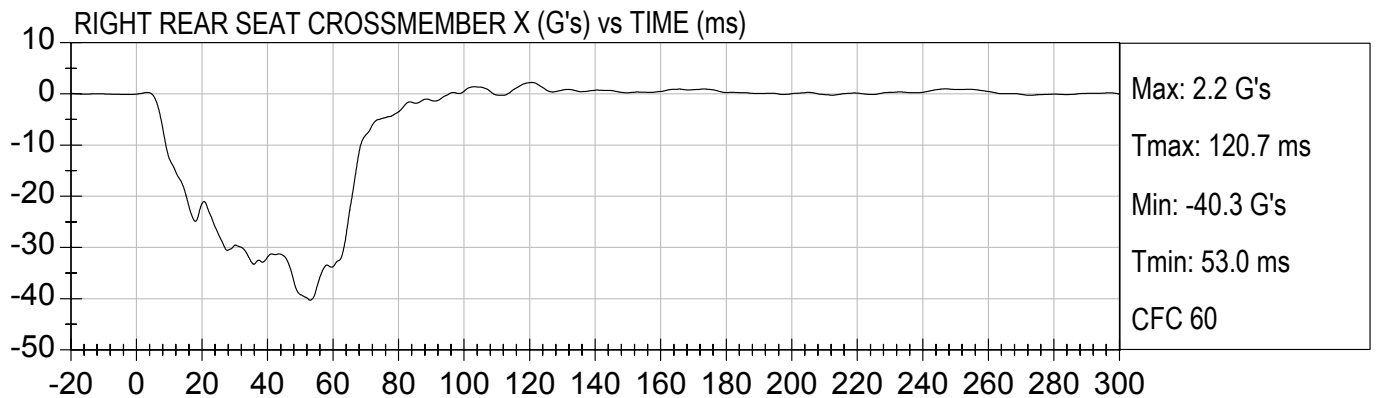






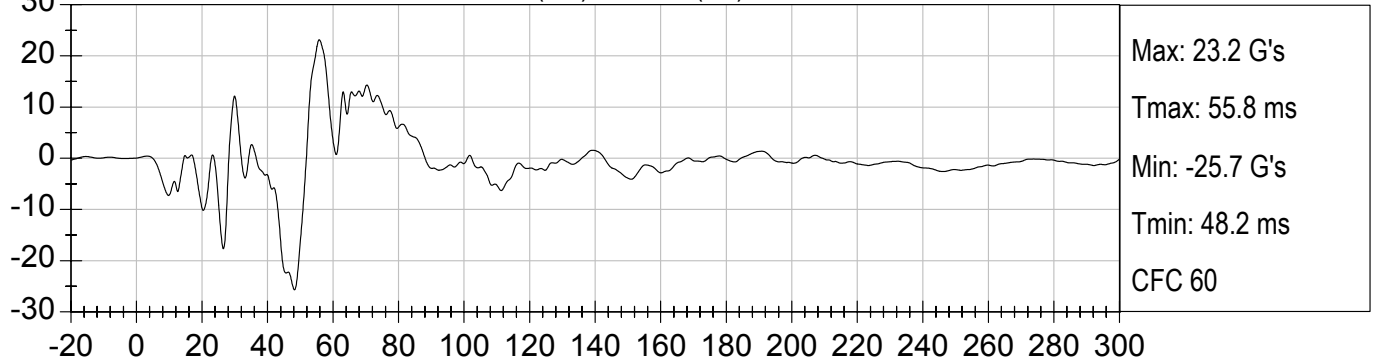




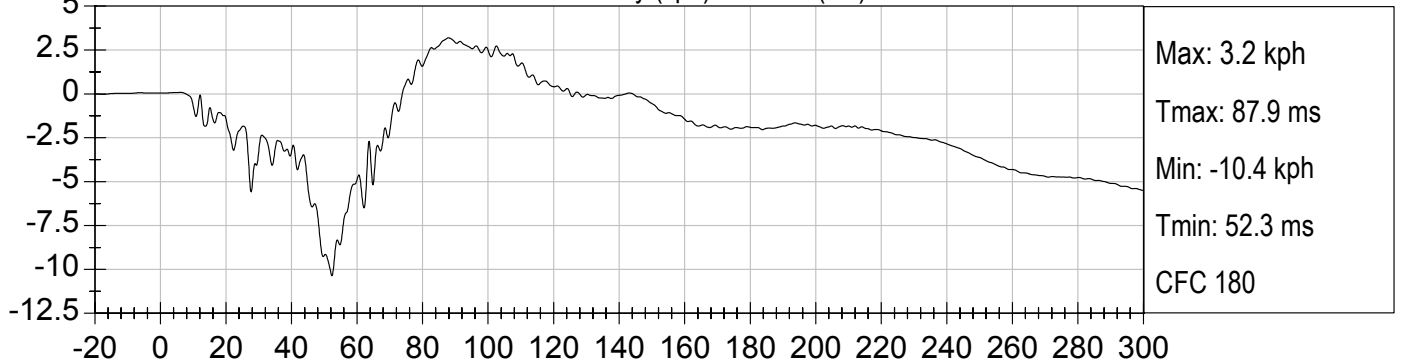




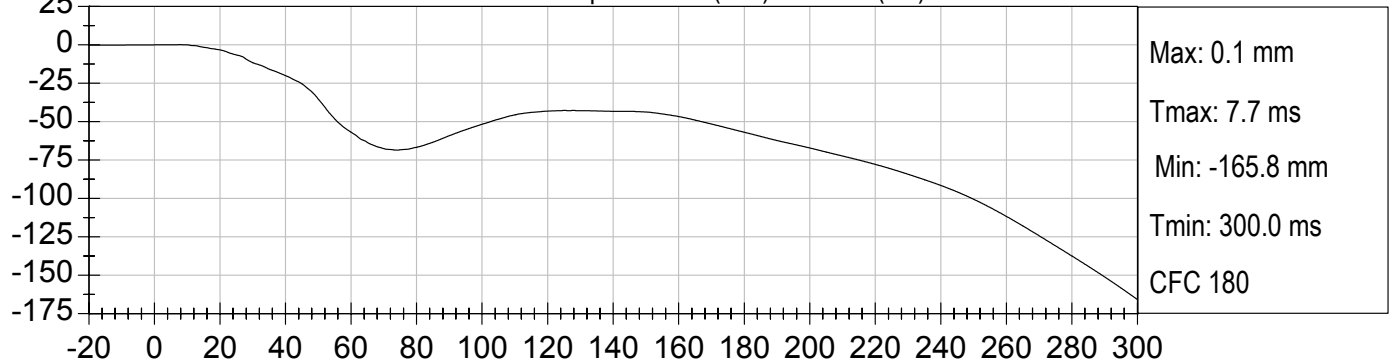
RIGHT REAR SEAT CROSSMEMBER Z (G's) vs TIME (ms)

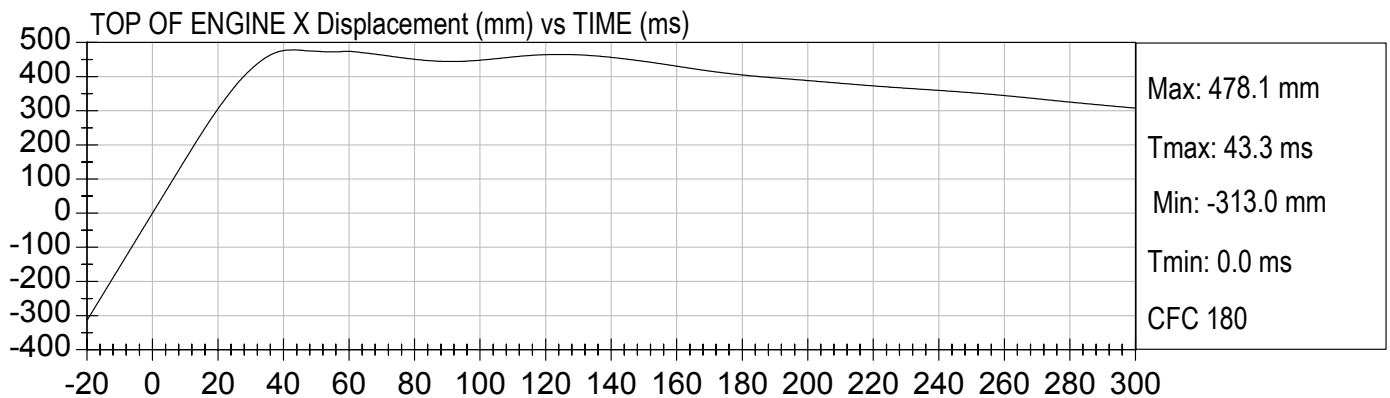
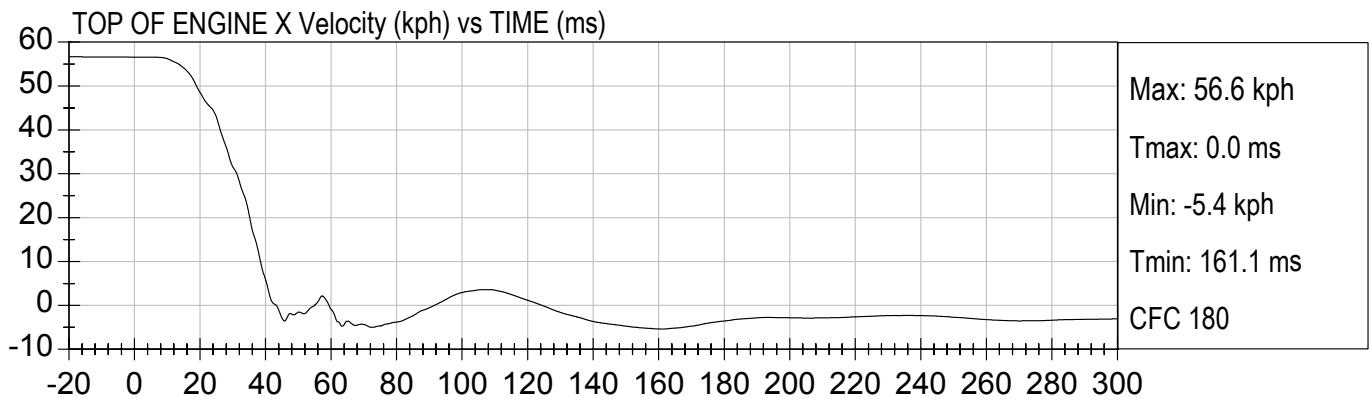
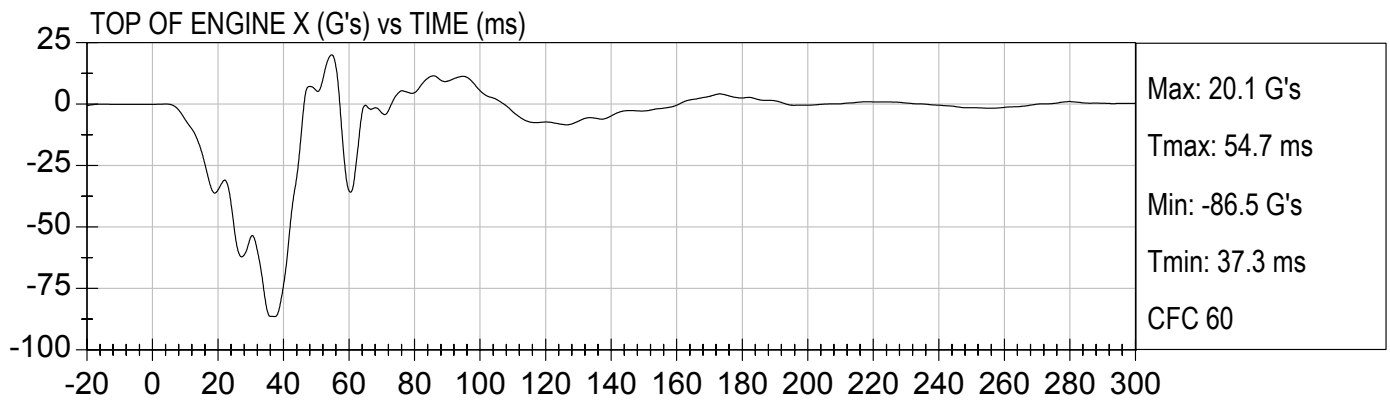


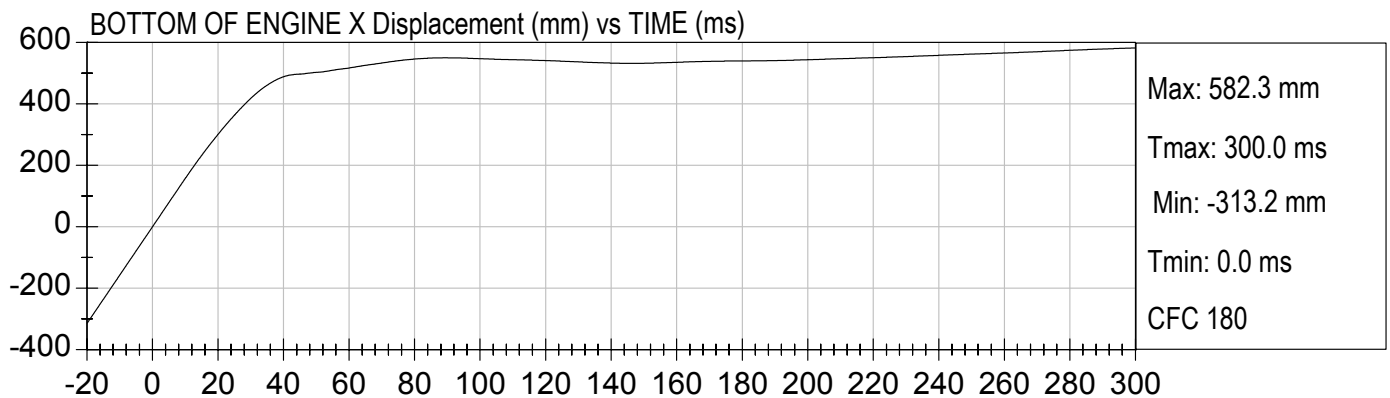
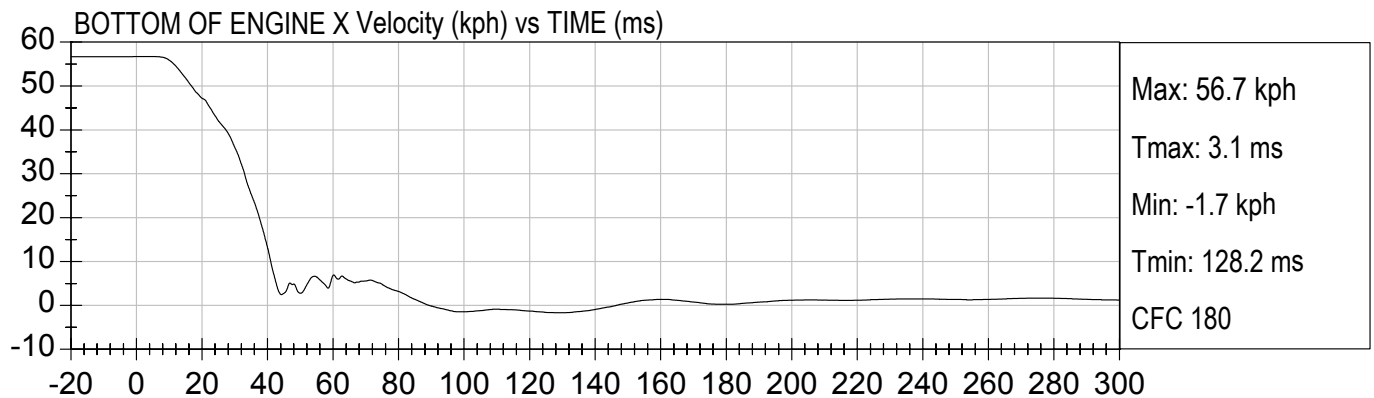
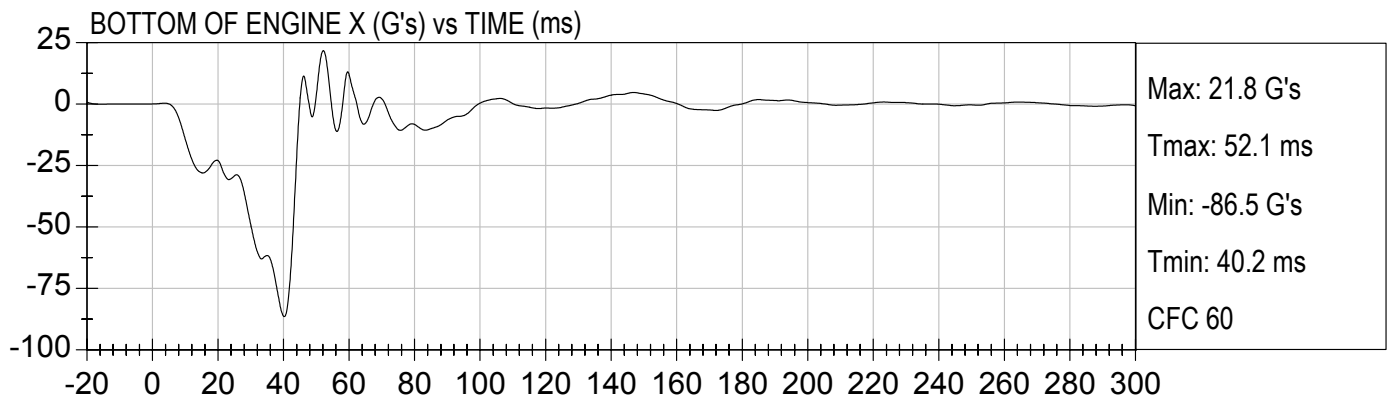
RIGHT REAR SEAT CROSSMEMBER Z Velocity (kph) vs TIME (ms)

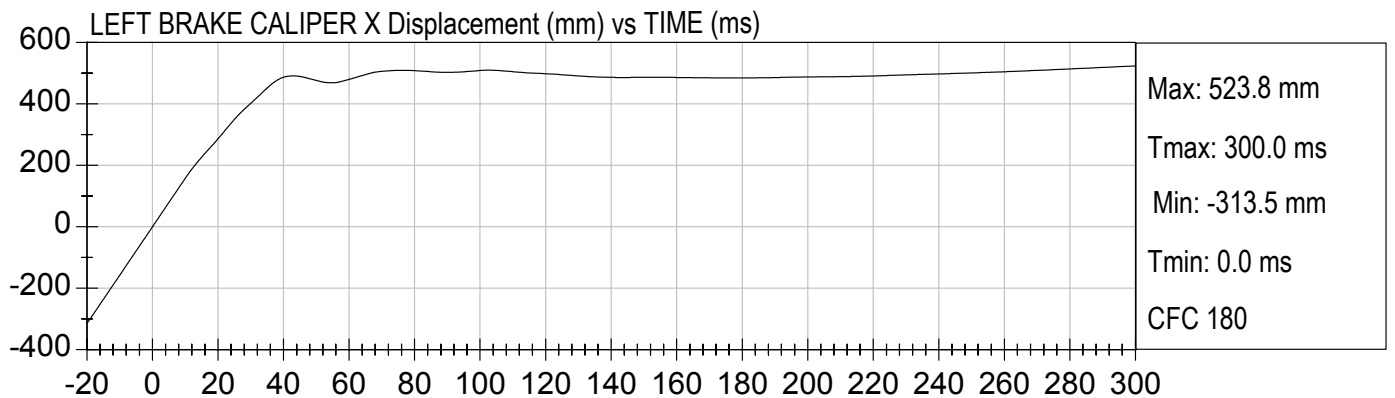
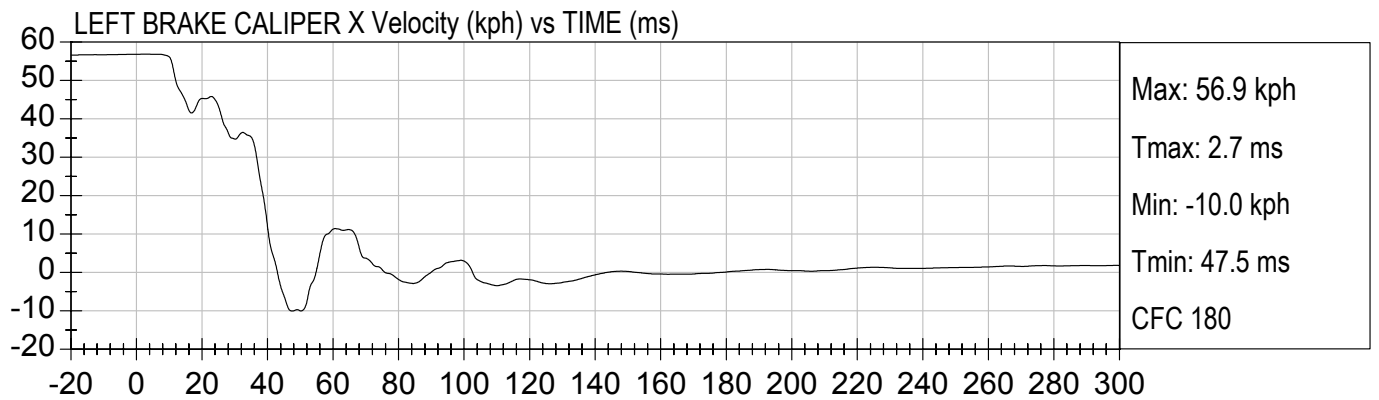
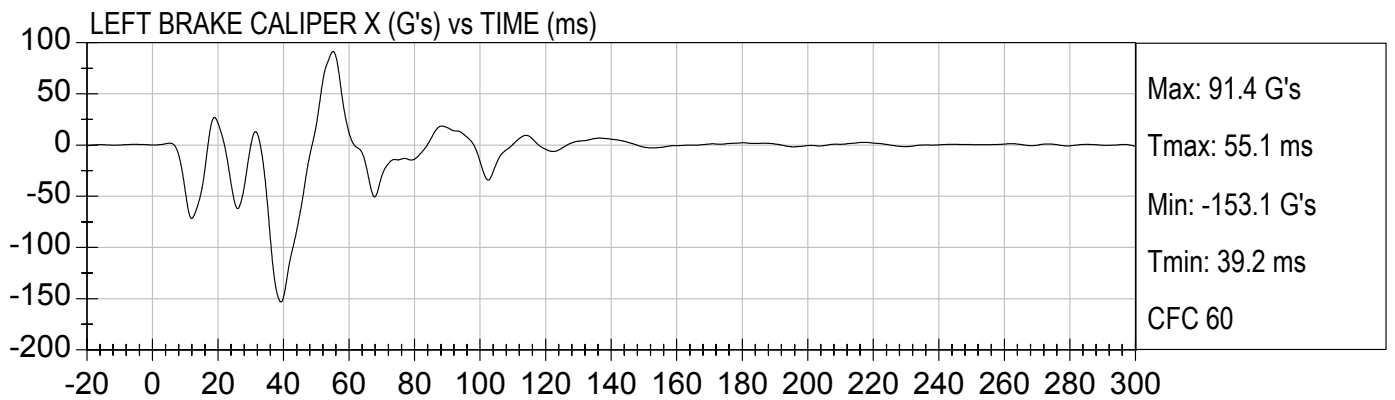


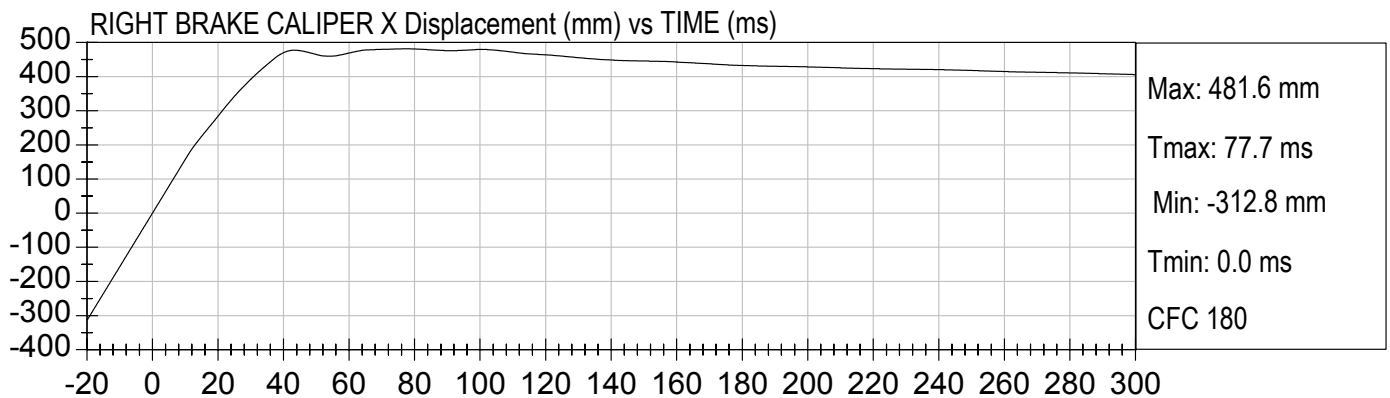
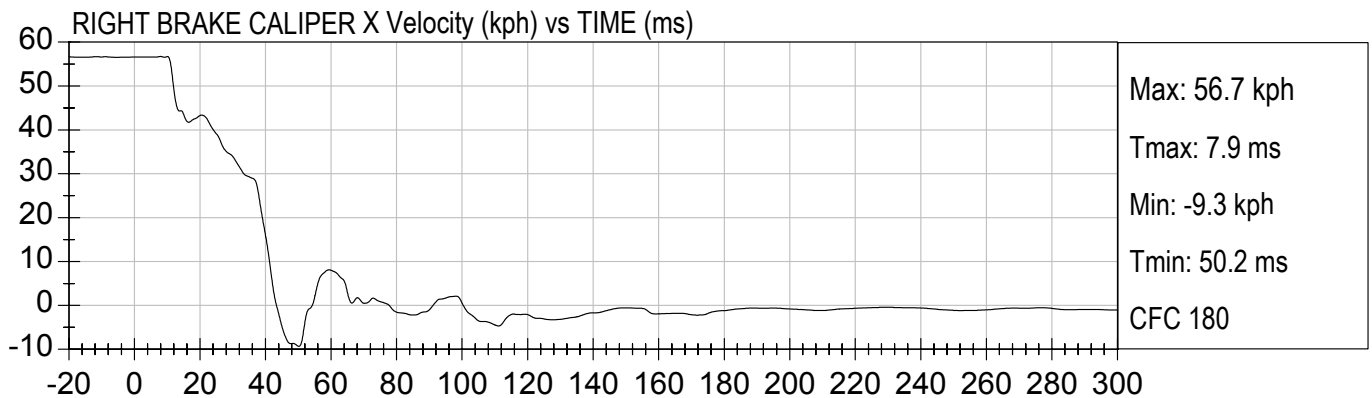
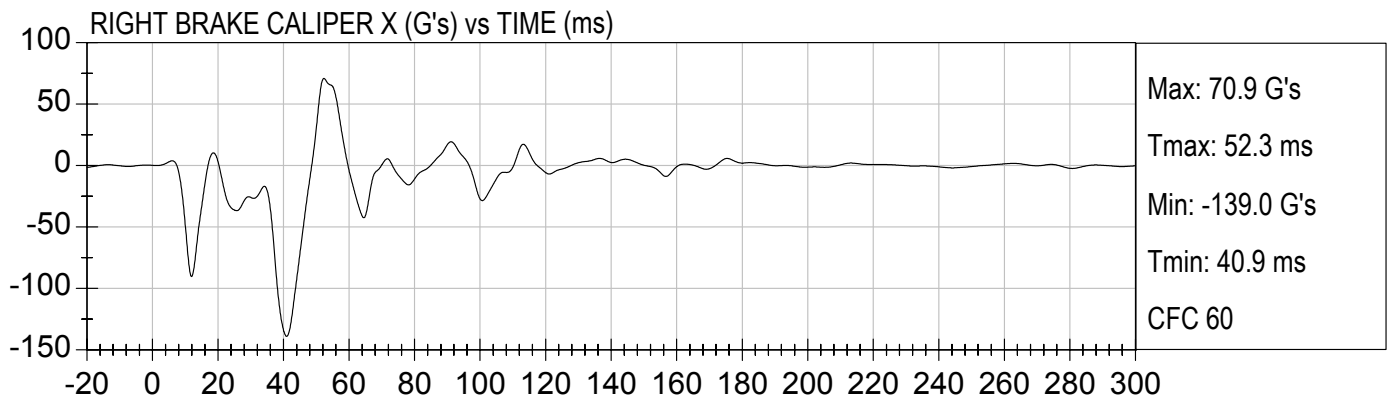
RIGHT REAR SEAT CROSSMEMBER Z Displacement (mm) vs TIME (ms)

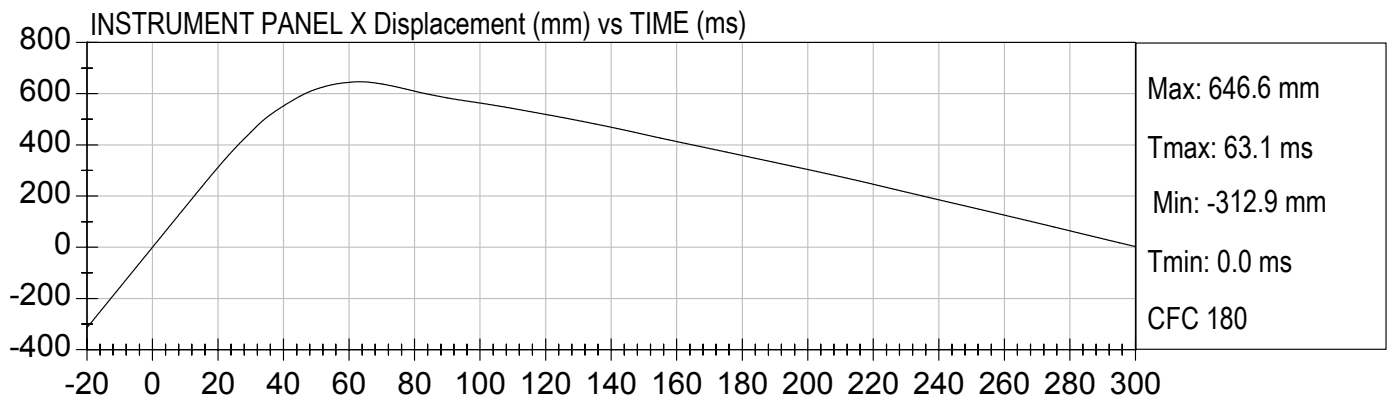
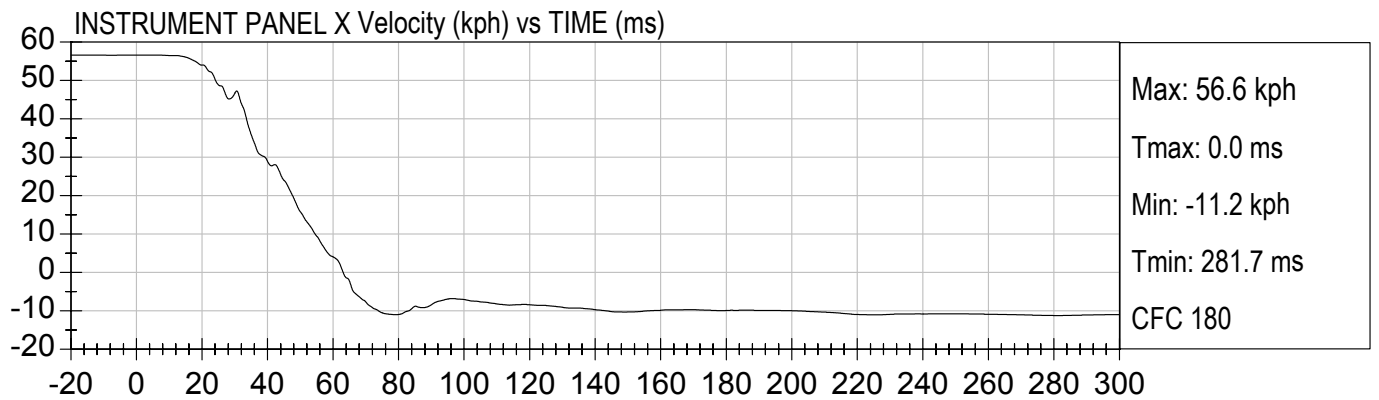
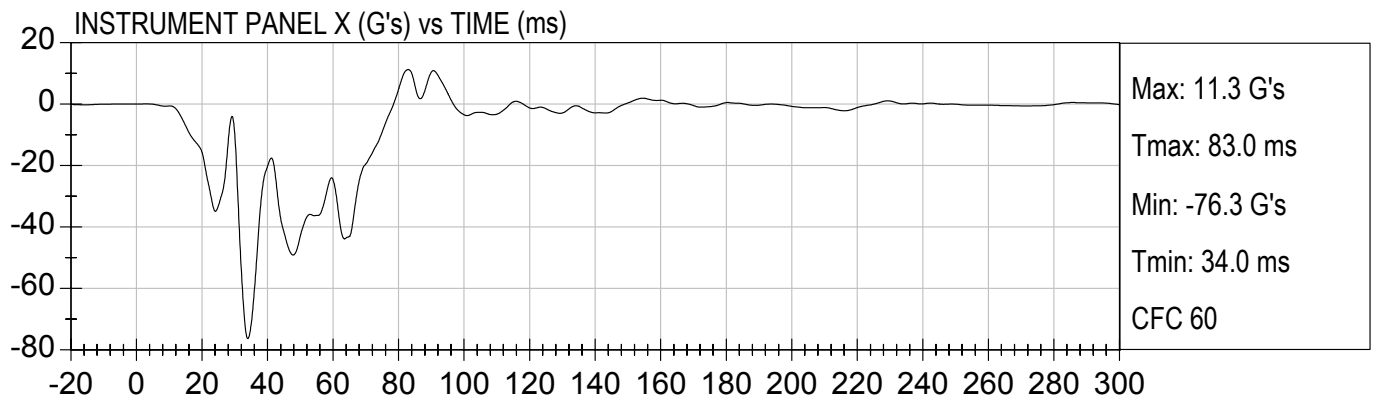


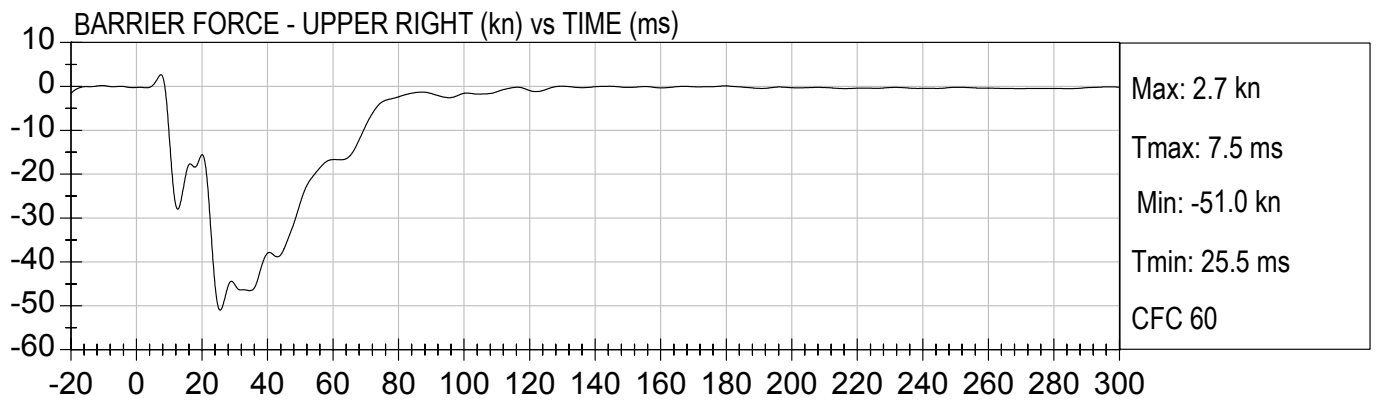
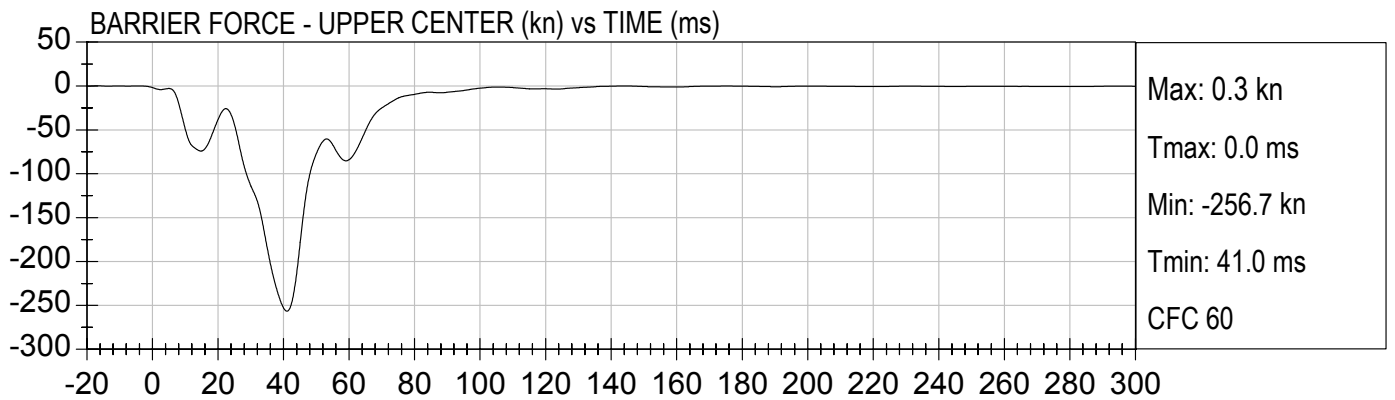
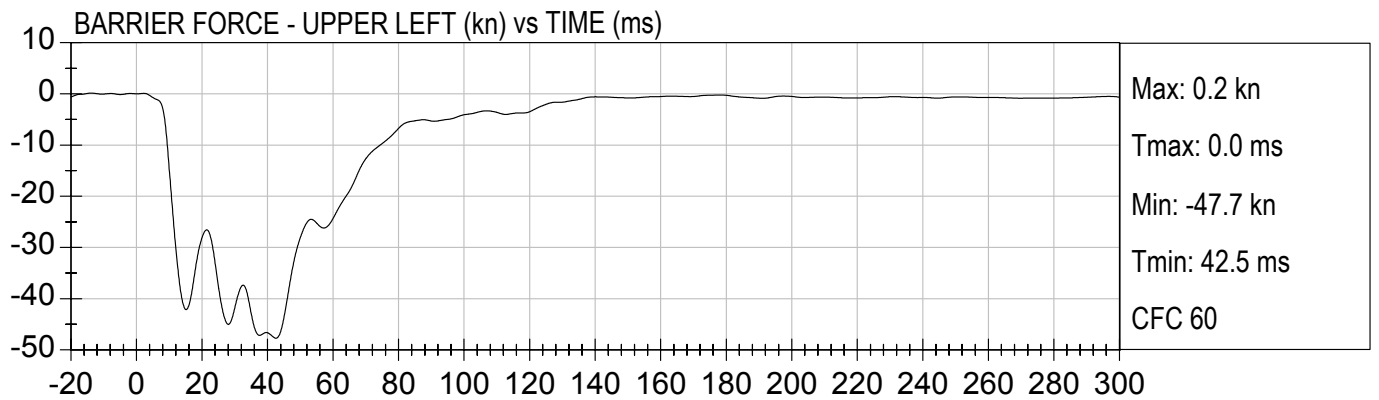


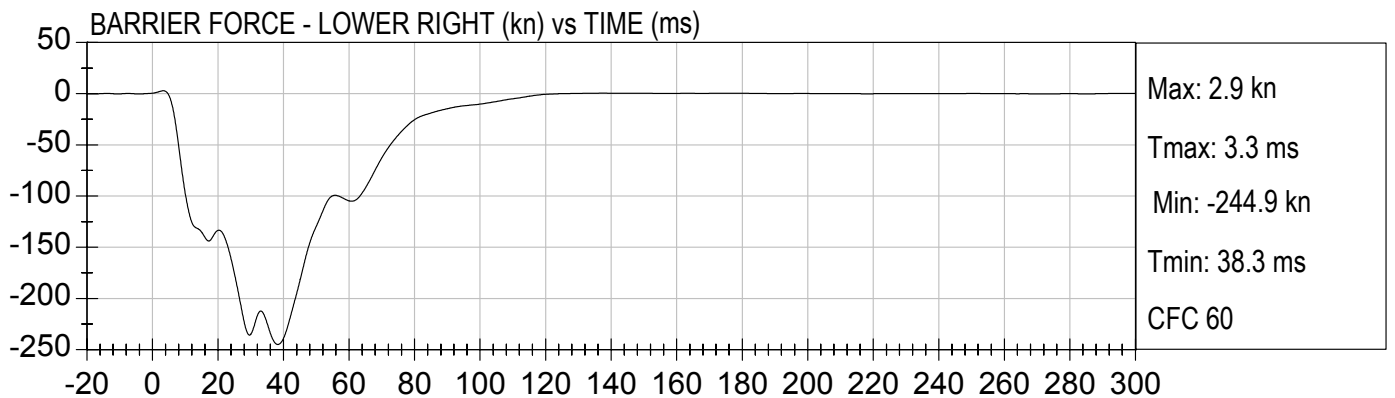
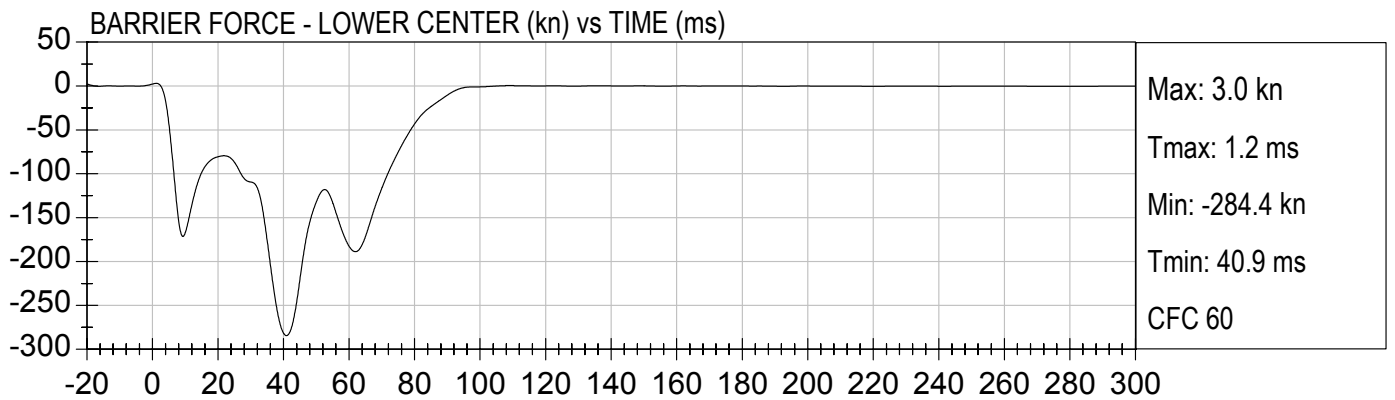
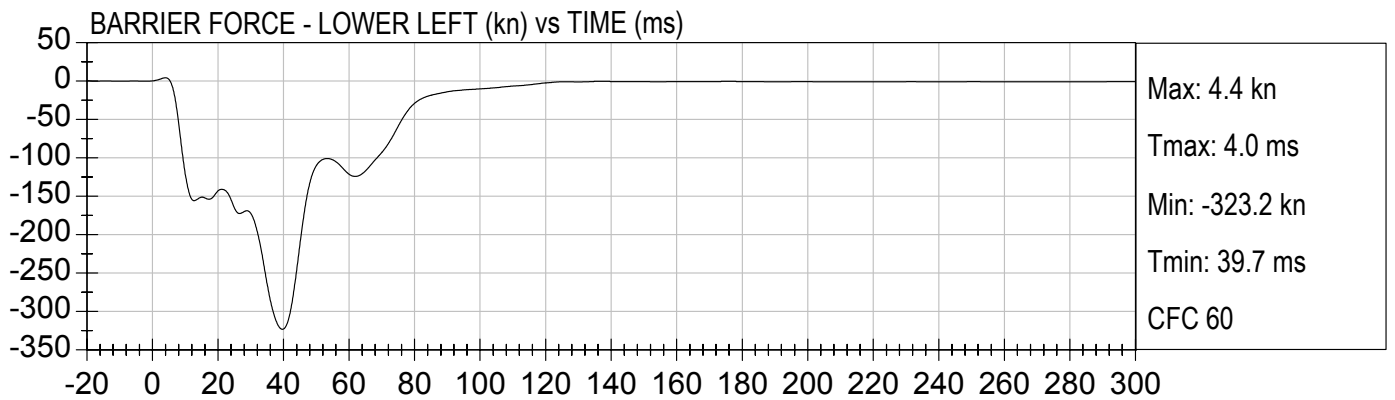


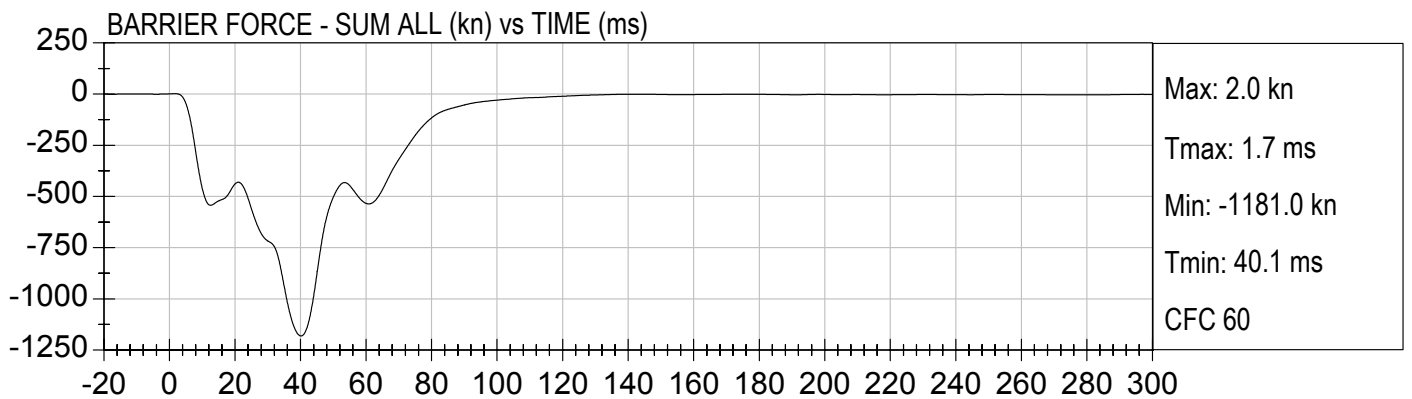
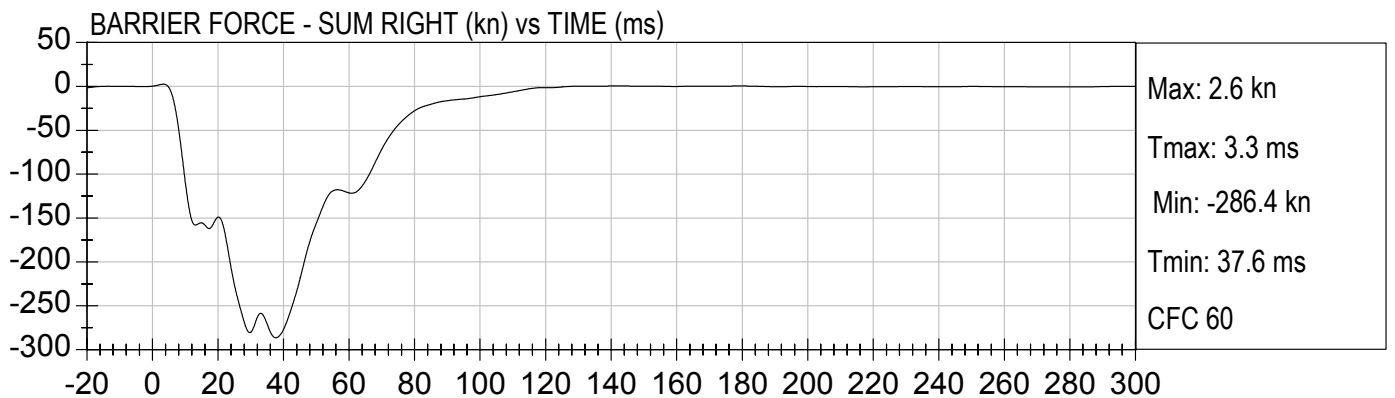
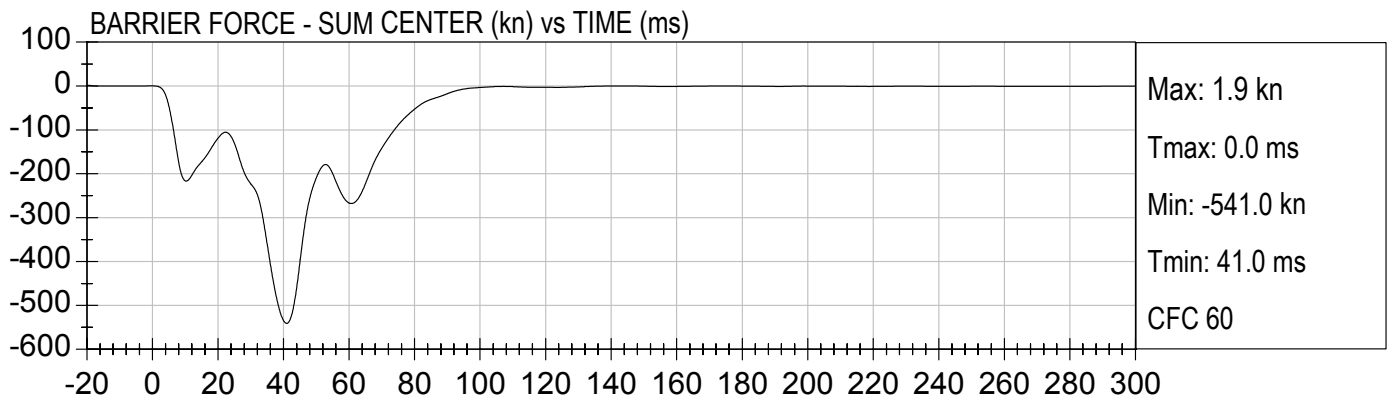
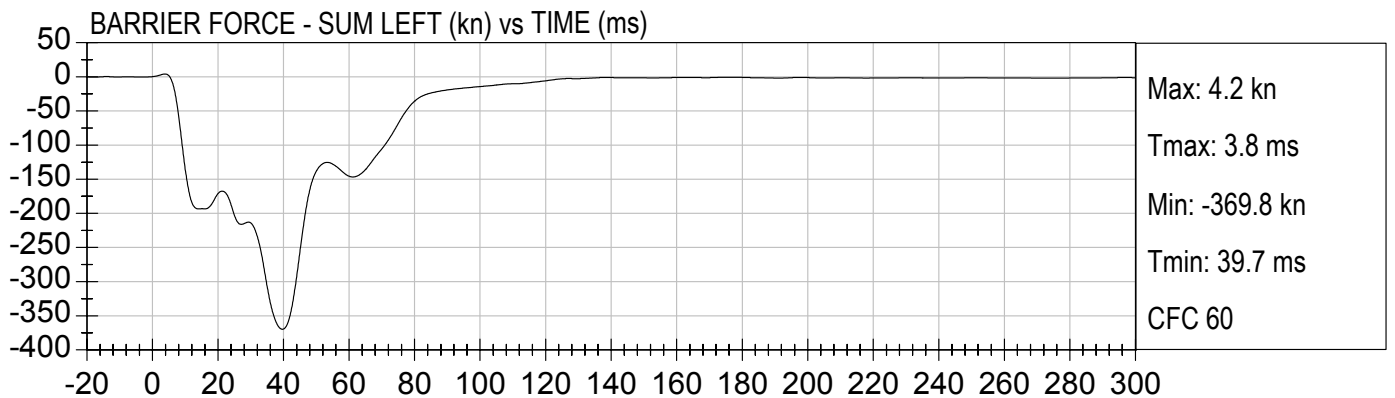


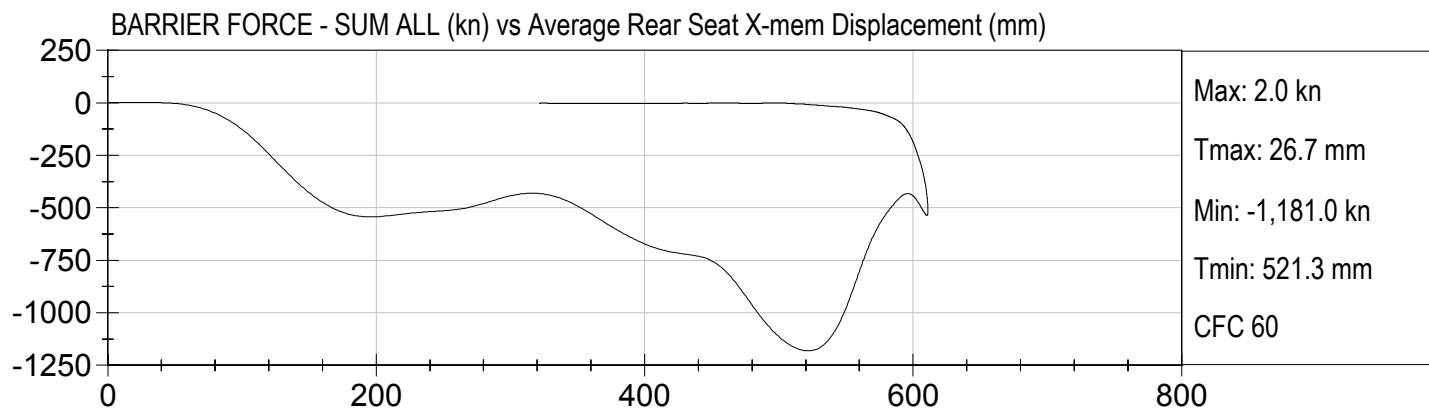












APPENDIX C
DUMMY CALIBRATION DATA TRACES AND TABLES

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

ATD Serial No: 065

Test ID: D042901

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	18	Pass
Peak Resultant Acceleration	G's	225 - 275	260	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	8.1	Pass
Unimodal	Yes/No	NA	Yes	Pass
Oscillations	Yes/No	within 10% of peak	Yes	Pass
Overall Test Results				Pass


Laboratory Technician


Approved By

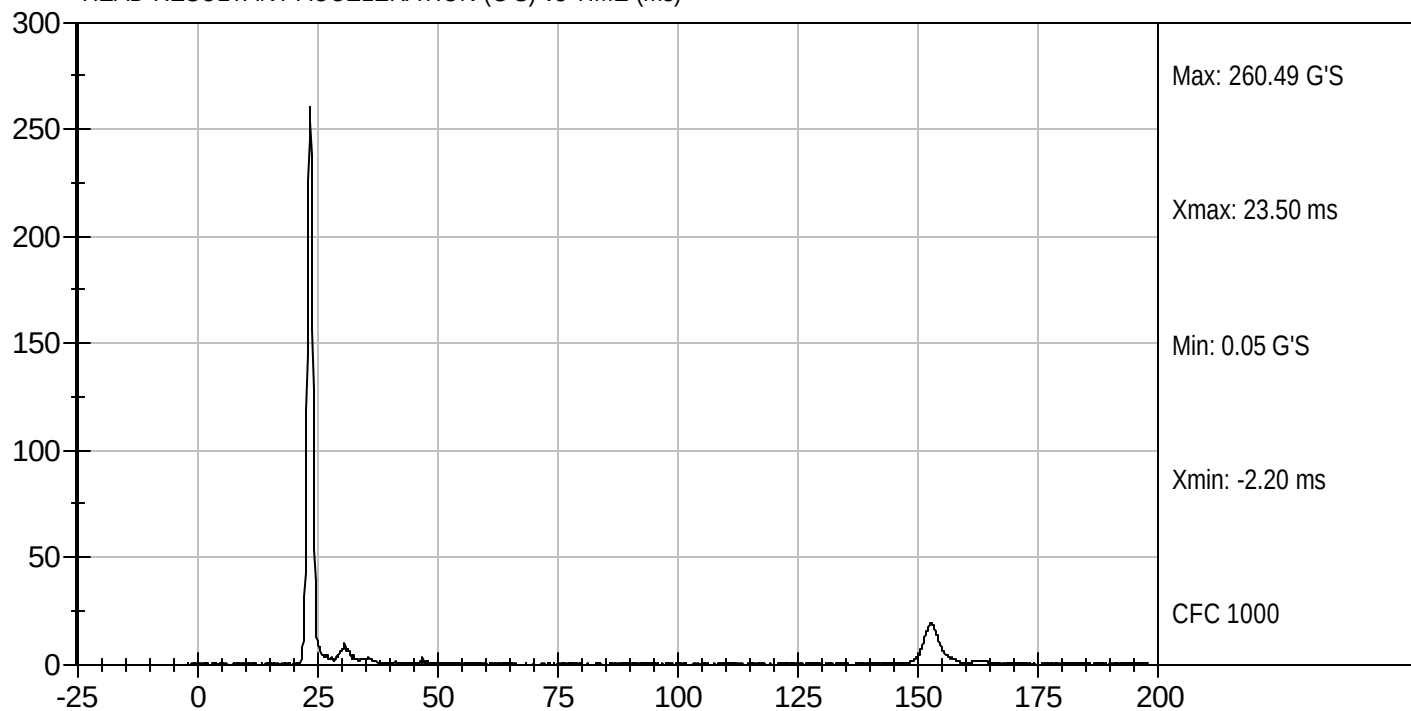
12/21/2004
Test Date



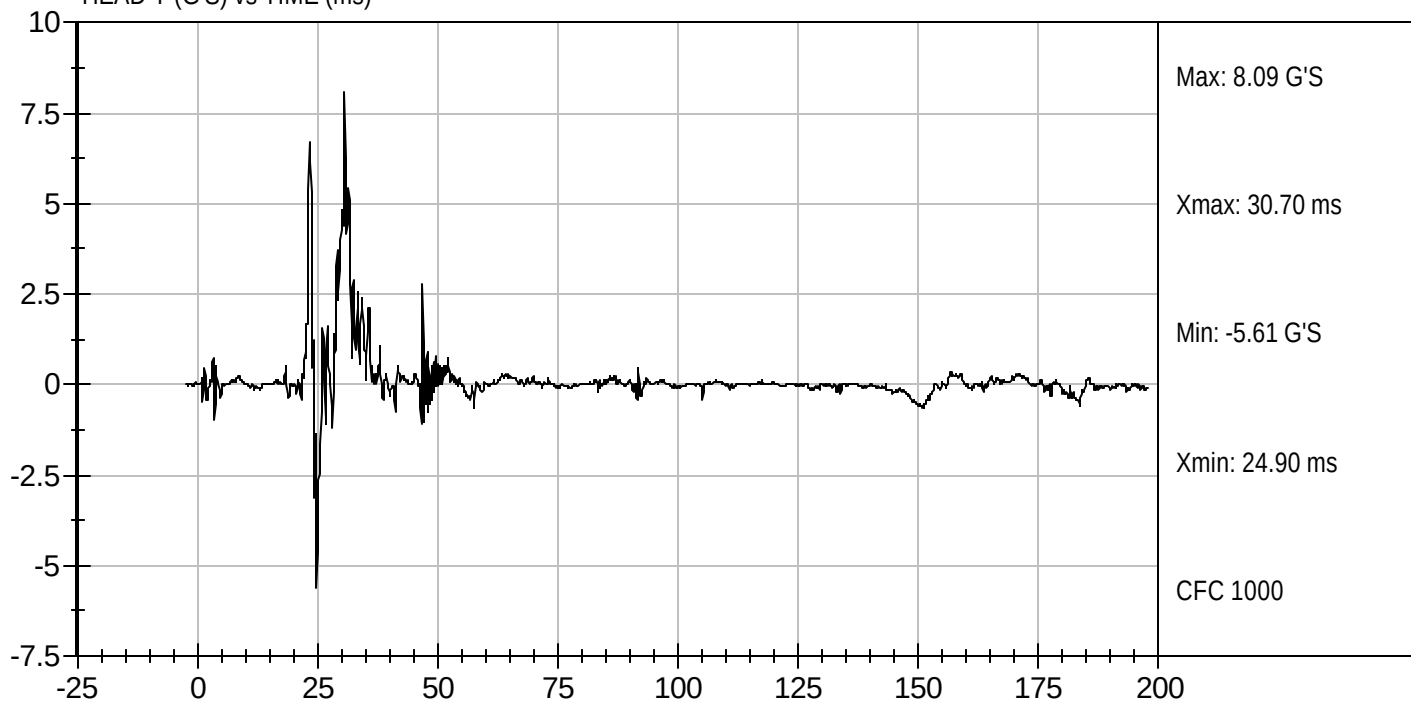
Test Desc: Head Drop
Componet ID: D042901

Test Date: 12/21/2004
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: D042902

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity		%	10 to 70	15	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.97	Pass
Pendulum Deceleration	10 msec	G's	22.50 to 27.50	23.98	Pass
	20 msec	G's	17.60 to 22.60	20.32	Pass
	30 msec	G's	12.50 to 18.50	15.05	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 29.0	14.99	Pass
Deceleration Decay Time to Cross 5 G's		msec	34.0 to 42.0	37.1	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	74.0	Pass
	Time	msec	57.0 to 64.0	58.8	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	113.0 to 128.0	113.7	Pass
Moment About Occipital Condyle	Maximum	N m	88.1 to 108.5	96.4	Pass
	Time	msec	47.0 to 58.0	50.4	Pass
Positive Moment Decay Time To Zero Crossing		msec	97.0 to 107.0	103.8	Pass
Overall Test Results					Pass


 Laboratory Technician

12/21/2004
 Test Date

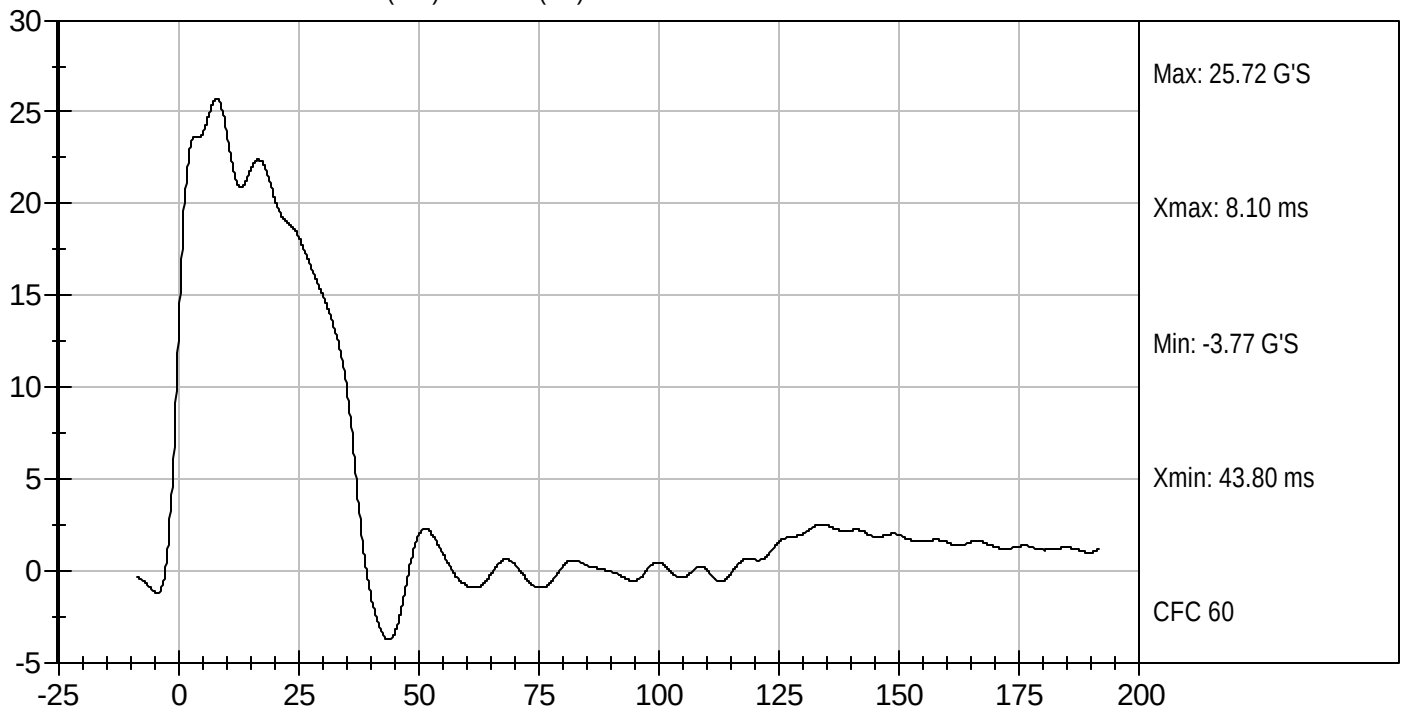

 Approved By



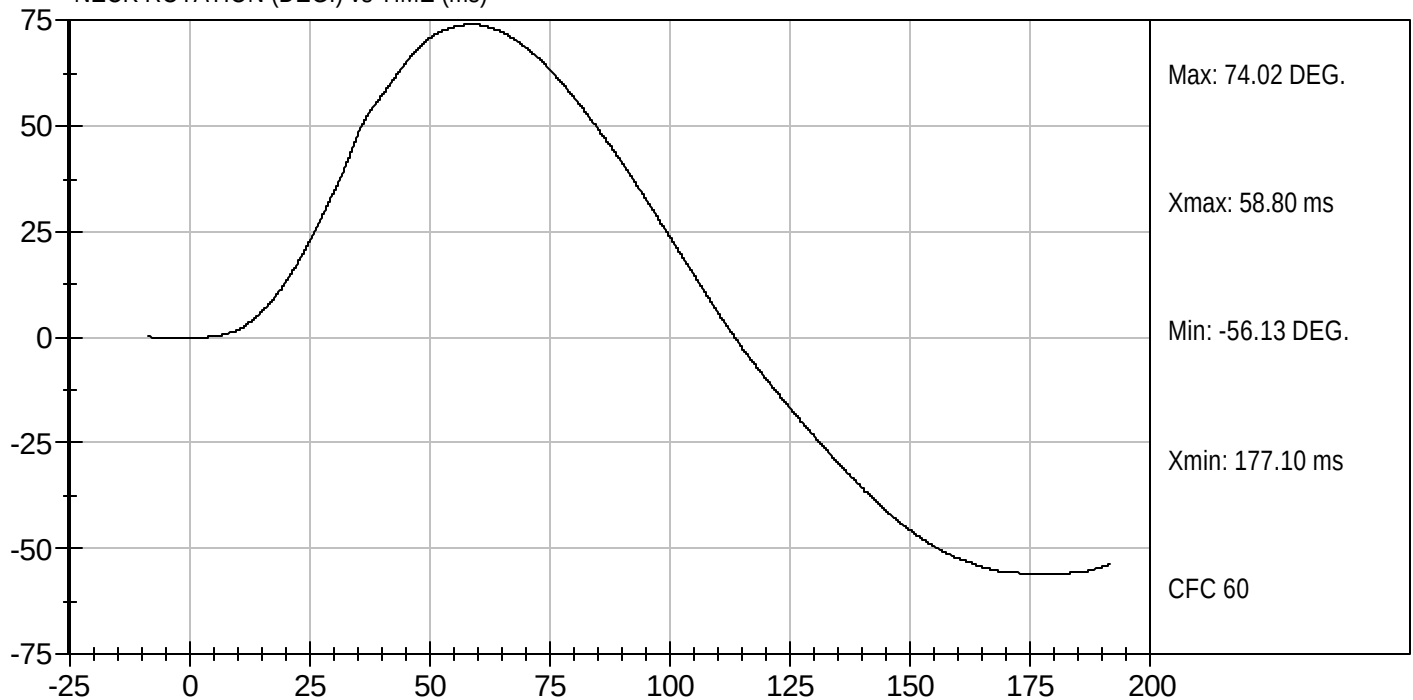
Test Desc: Neck Flexion
Componet ID: D042902

Test Date: 12/21/2004
Velocity: 22.87 ft/s, 6.97 m/s

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



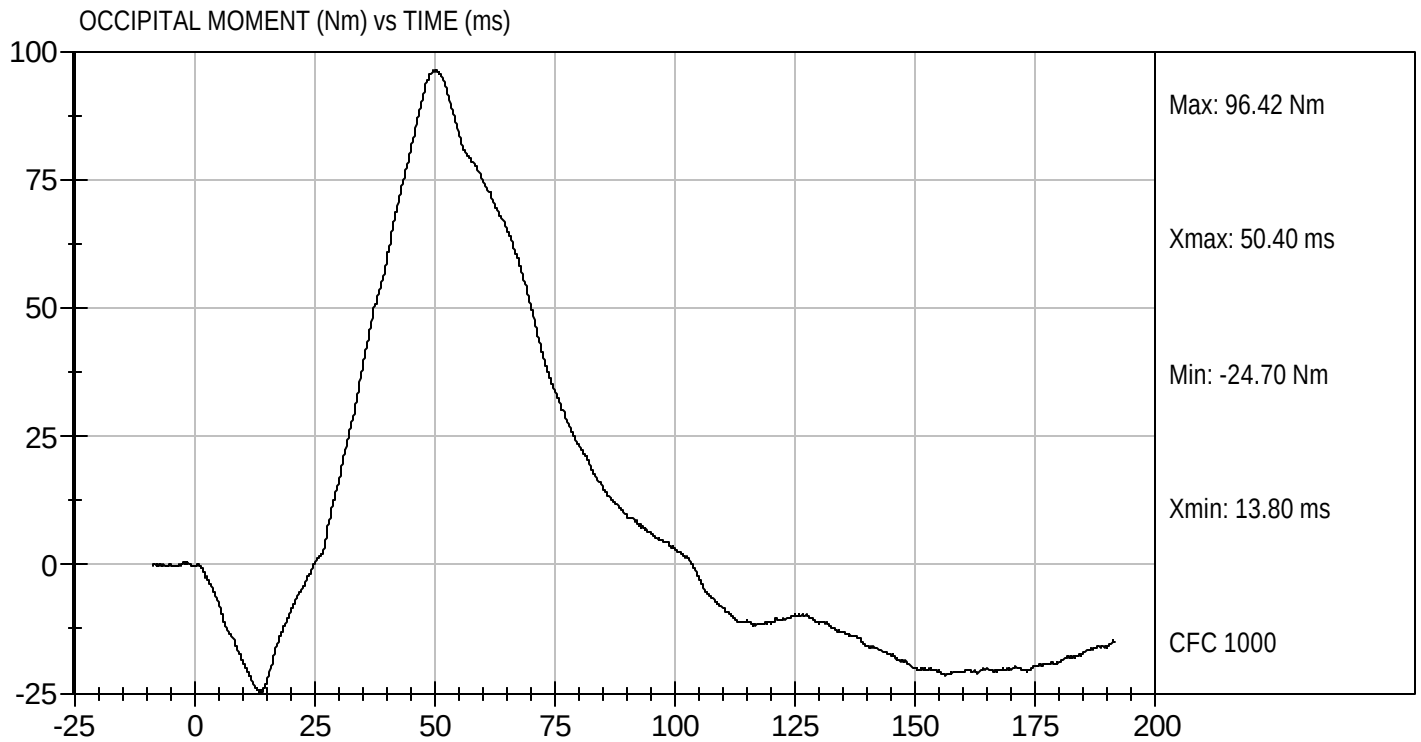
NECK ROTATION (DEG.) vs TIME (ms)





Test Desc: Neck Flexion
Componet ID: D042902

Test Date: 12/21/2004
Velocity: 22.87 ft/s, 6.97 m/s



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

ATD Serial No: 065

Test I.D: D042903

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	15	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.04	Pass
Pendulum Deceleration	10 msec	G's	17.20 to 21.20	19.49	Pass
	20 msec	G's	14.00 to 19.00	16.65	Pass
	30 msec	G's	11.00 to 16.00	14.19	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 22.0	14.15	Pass
Deceleration Decay Time to Cross 5 G's		msec	38.0 to 46.0	39.8	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	100.3	Pass
	Time	msec	72.0 to 82.0	78.8	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	147.0 to 174.0	157.8	Pass
Moment About Occipital Condyle	Maximum	N m	-52.9 to -79.9	-68.2	Pass
	Time	msec	65.0 to 79.0	72.6	Pass
Negative Moment Decay Time To Zero Crossing		msec	120.0 to 148.0	146.5	Pass
Overall Test Results					Pass



Laboratory Technician

12/21/2004

Test Date



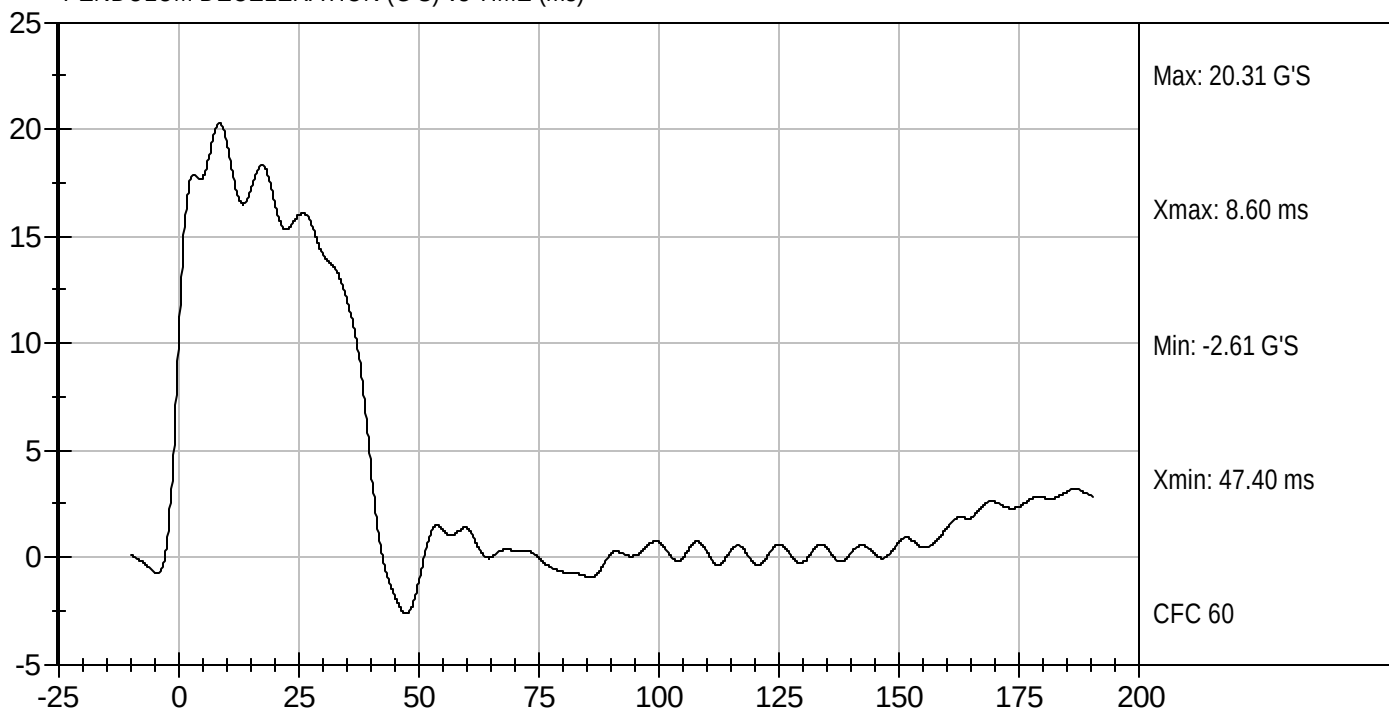
Approved By



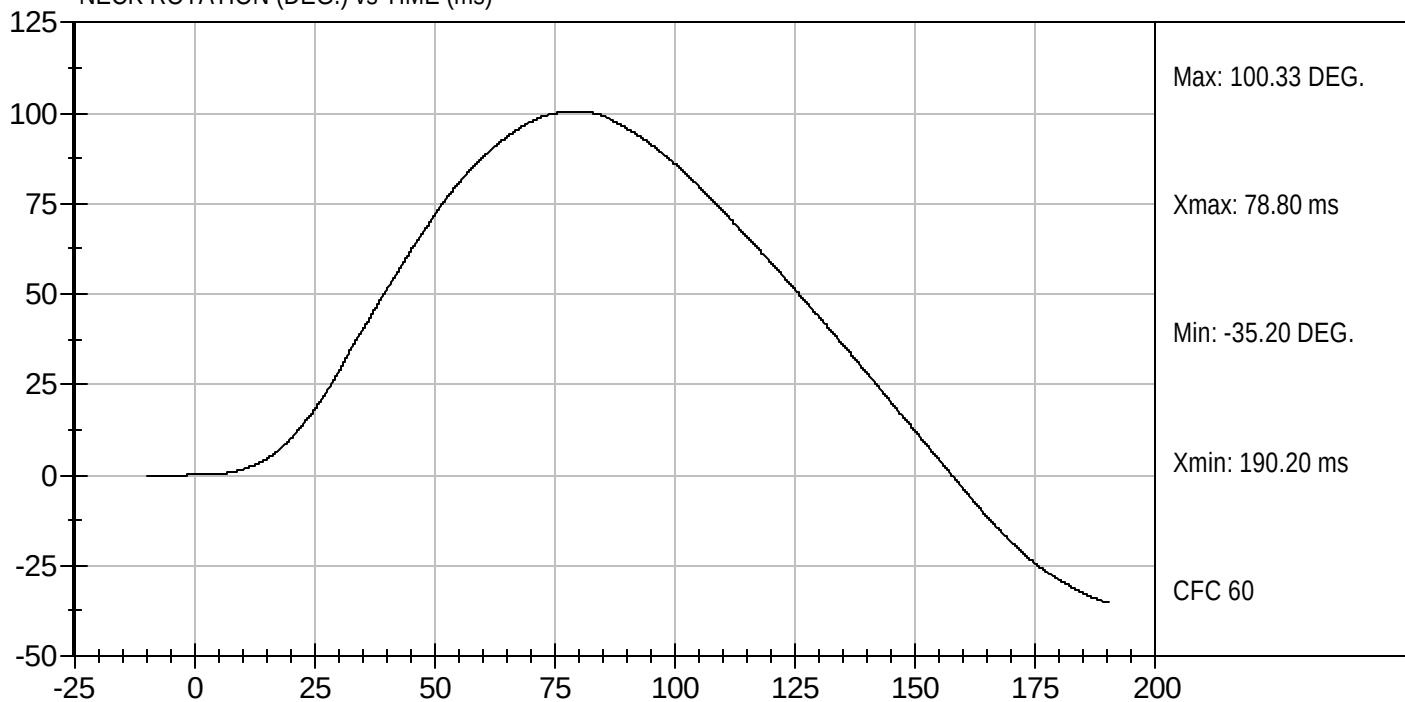
Test Desc: Neck Extension
Componet ID: D042903

Test Date: 12/21/2004
Velocity: 19.8 ft/s, 6.04 m/s

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



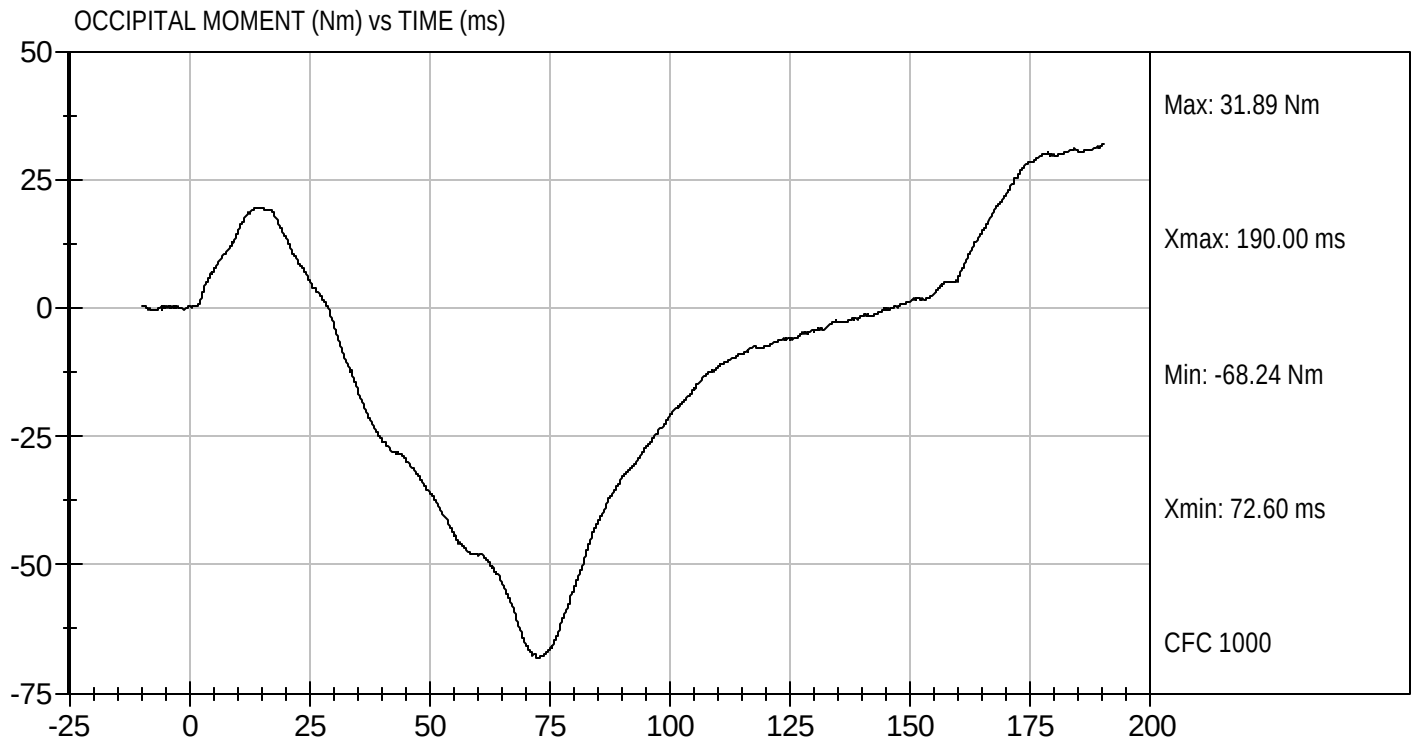
NECK ROTATION (DEG.) vs TIME (ms)





Test Desc: Neck Extension
Componet ID: D042903

Test Date: 12/21/2004
Velocity: 19.8 ft/s, 6.04 m/s



MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 065

Test I.D: D042904

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	13	Pass
Probe Velocity	m/s	6.58 to 6.82	6.63	Pass
Peak Probe Force	N	5159 to 5893	5,727	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.81	Pass
Internal Hysteresis	%	69 to 85	69	Pass
Overall Test Results			Pass	


Laboratory Technician

12/21/2004

Test Date

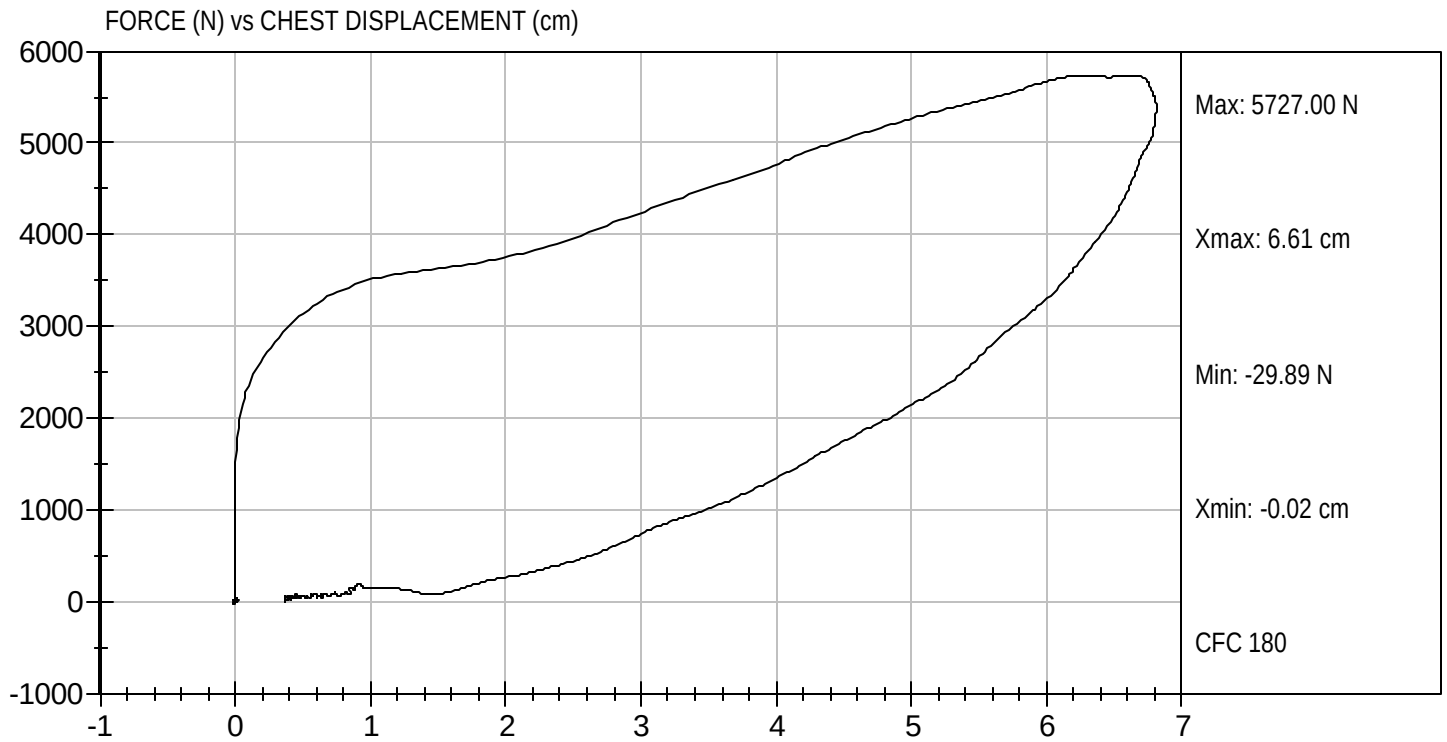


Approved By



Test Desc: Thorax Impact
Componet ID: D042904

Test Date: 12/21/2004
Velocity: 21.75 ft/s, 6.63 m/s



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

ATD Serial No: 065

Test I.D: D042905

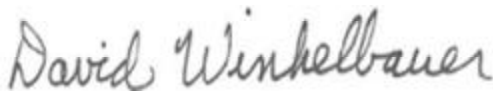
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	15	Pass
Probe Velocity	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	5,243	Pass
Overall Test Results				Pass



Laboratory Technician

12/21/2004

Test Date

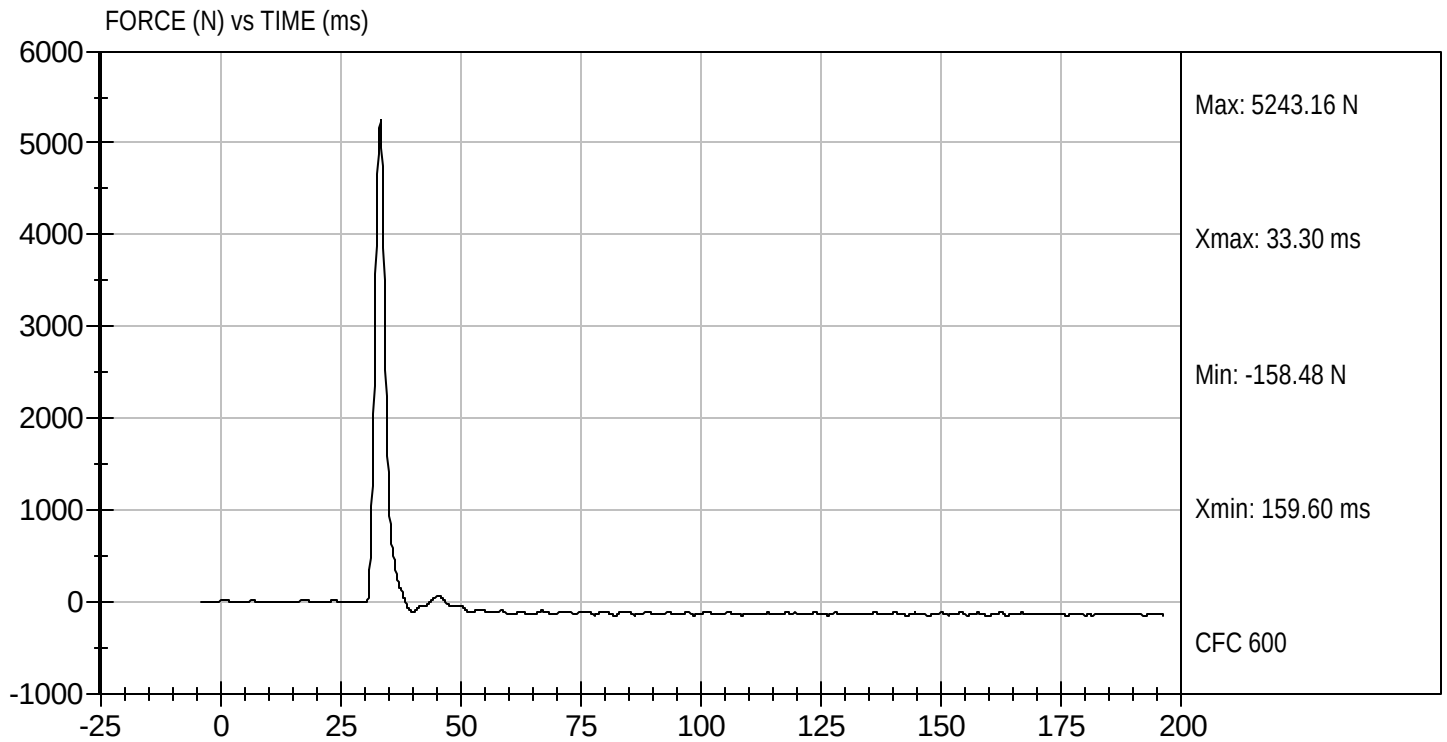


Approved By



Test Desc: Right Knee
Componet ID: D042905

Test Date: 12/21/2004
Velocity: 6.87 ft/s, 2.09 m/s



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

ATD Serial No: 065

Test I.D: D042906

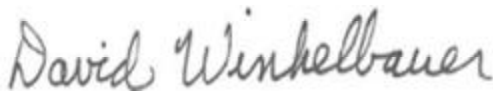
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	15	Pass
Probe Velocity	m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force	Newtons	4715 to 5782	5,181	Pass
Overall Test Results				Pass



Laboratory Technician

12/21/2004

Test Date

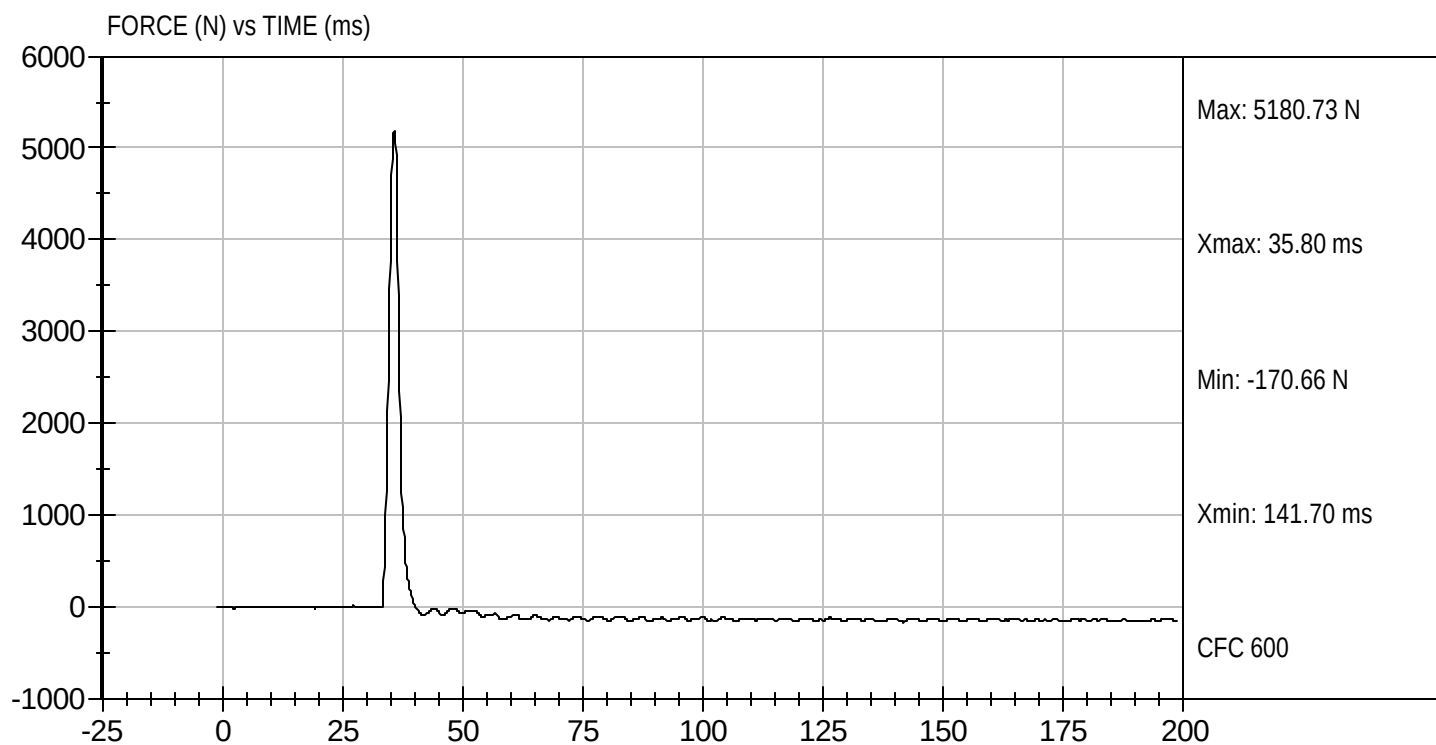


Approved By



Test Desc: Left Knee
Componet ID: D042906

Test Date: 12/21/2004
Velocity: 6.89 ft/s, 2.10 m/s



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

ATD Serial No: 065

Test I.D: D042900

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.1	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	18	18	Pass
Rotation Rate	deg/sec	5 -10	8	8	Pass
30 Degrees	Nm	94.9 Nm Max	74.7	74.9	Pass
150 ft-lbf / 203.4 Nm	Deg	40- 50 Degree Max Rotation	43	43	Pass
Overall Test Results					Pass


 Laboratory Technician

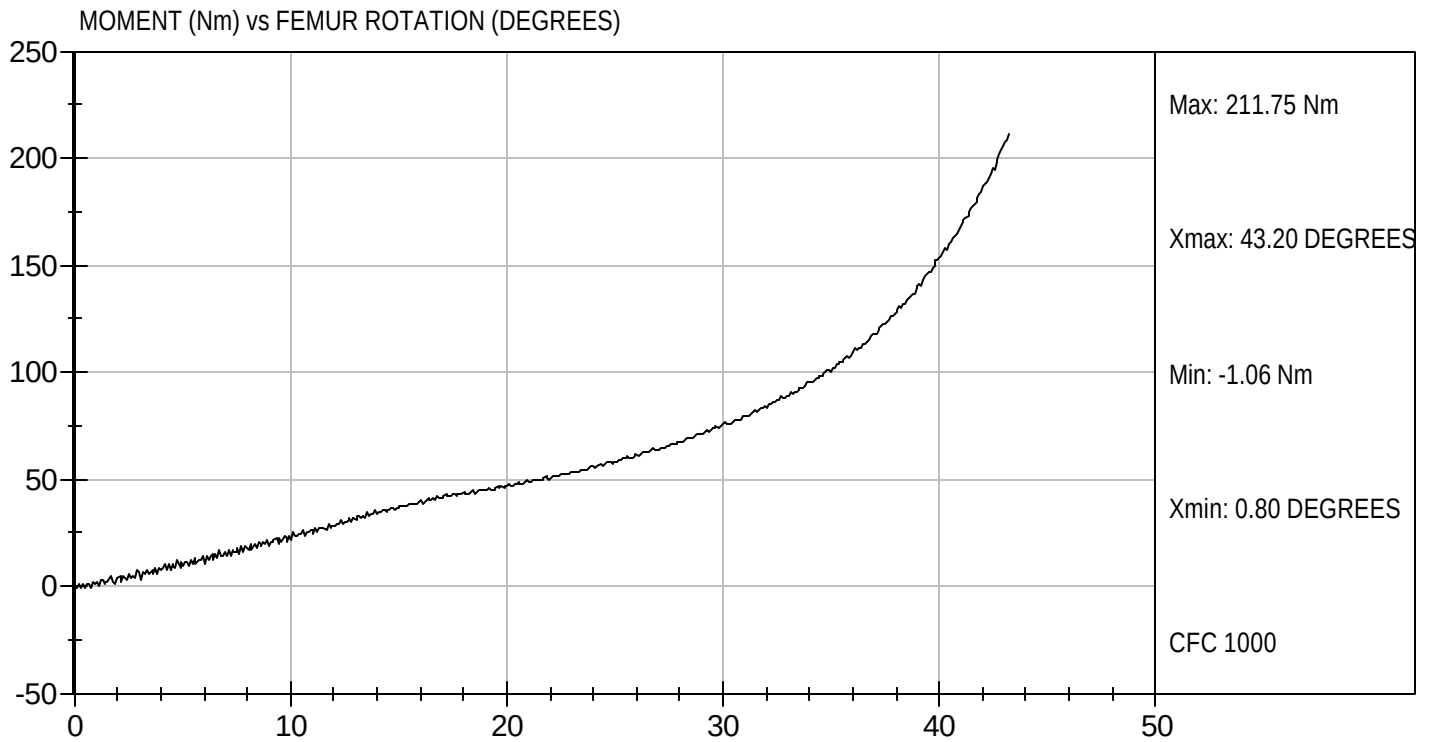
12/21/2004
 Test Date


 Approved By



Test Desc: Hip Femur Flexion
Componet ID: D042909

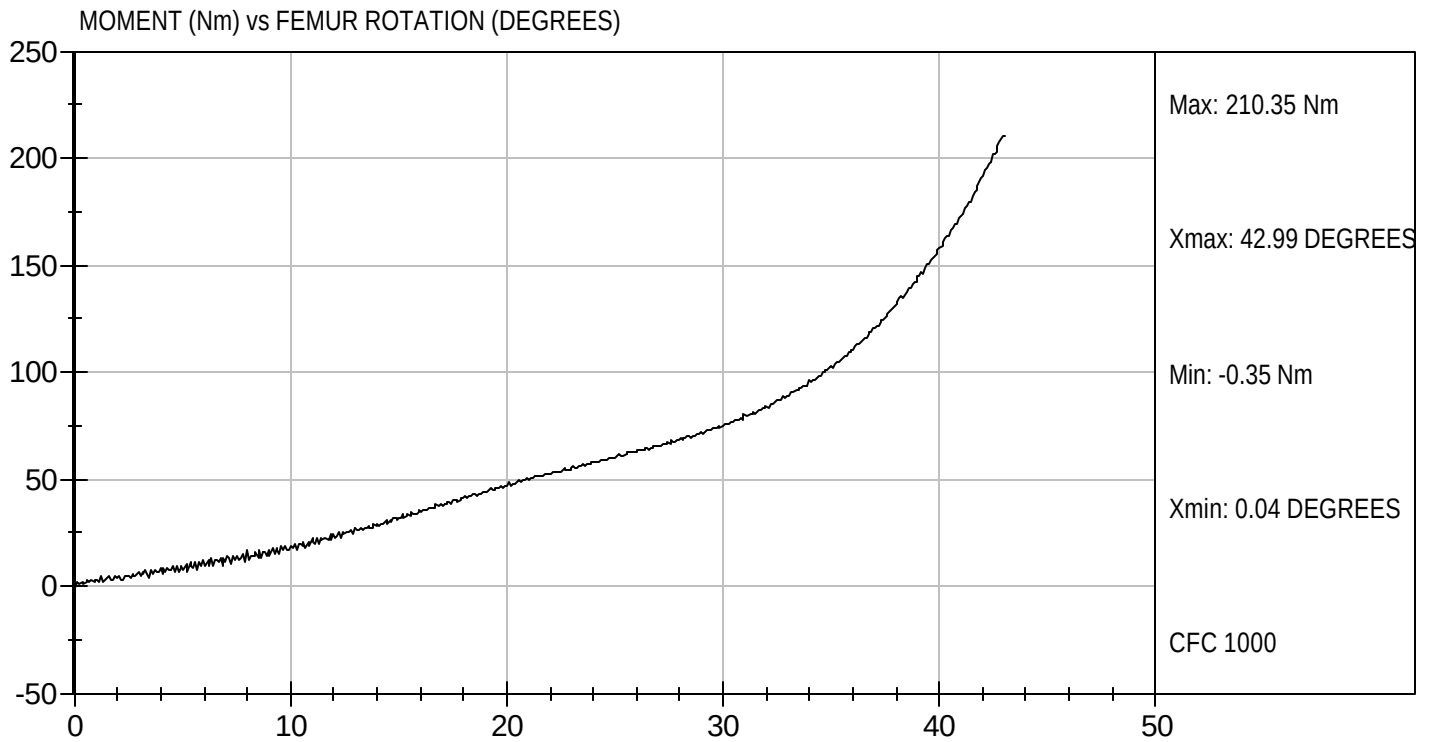
Test Date: 12/21/2004
Velocity: 0 ft/s, 0.00 m/s





Test Desc: Hip Femur Flexion
Componet ID: D042900

Test Date: 12/21/2004
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: D042911

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	18	Pass
Peak Resultant Acceleration	G's	225 - 275	240	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	7.6	Pass
Unimodal	Yes/No	NA	Yes	Pass
Oscillations	Yes/No	within 10% of peak	Yes	Pass
Overall Test Results				Pass


Laboratory Technician


Approved By

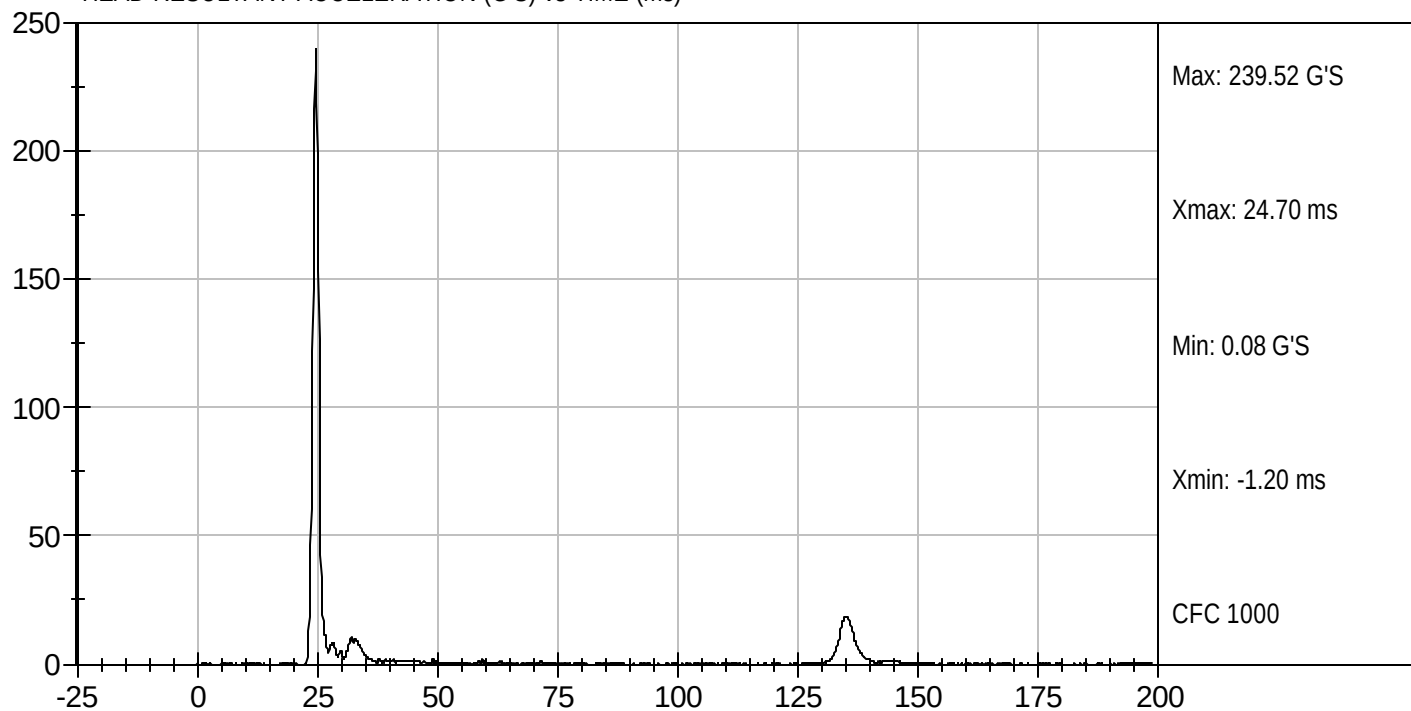
12/21/2004
Test Date



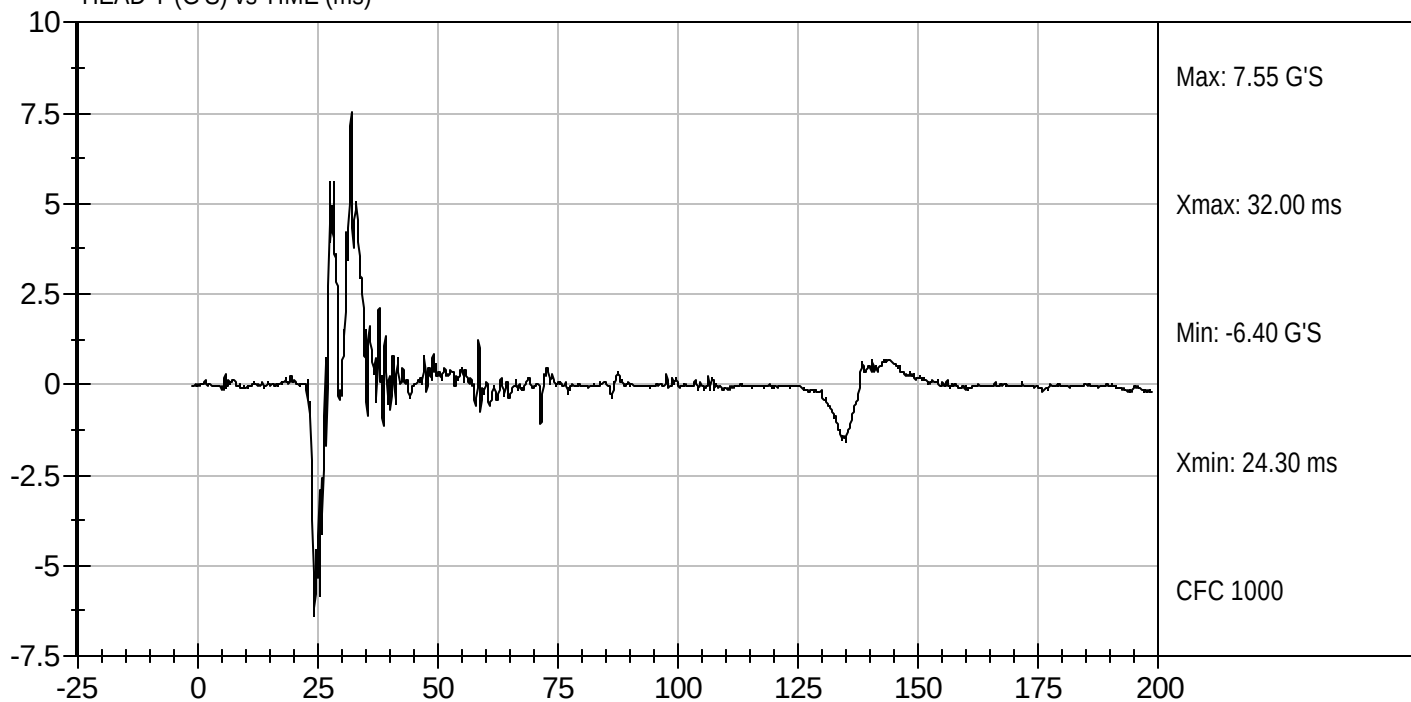
Test Desc: Head Drop
Componet ID: D042911

Test Date: 12/21/2004
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: D042912

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity		%	10 to 70	16	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.98	Pass
Pendulum Deceleration	10 msec	G's	22.50 to 27.50	25.25	Pass
	20 msec	G's	17.60 to 22.60	19.43	Pass
	30 msec	G's	12.50 to 18.50	13.41	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 29.0	13.36	Pass
Deceleration Decay Time to Cross 5 G's		msec	34.0 to 42.0	37.8	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	72.6	Pass
	Time	msec	57.0 to 64.0	57.9	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	113.0 to 128.0	114.0	Pass
Moment About Occipital Condyle	Maximum	N m	88.1 to 108.5	92.9	Pass
	Time	msec	47.0 to 58.0	51.7	Pass
Positive Moment Decay Time To Zero Crossing		msec	97.0 to 107.0	101.8	Pass
Overall Test Results					Pass



Laboratory Technician

12/21/2004

Test Date



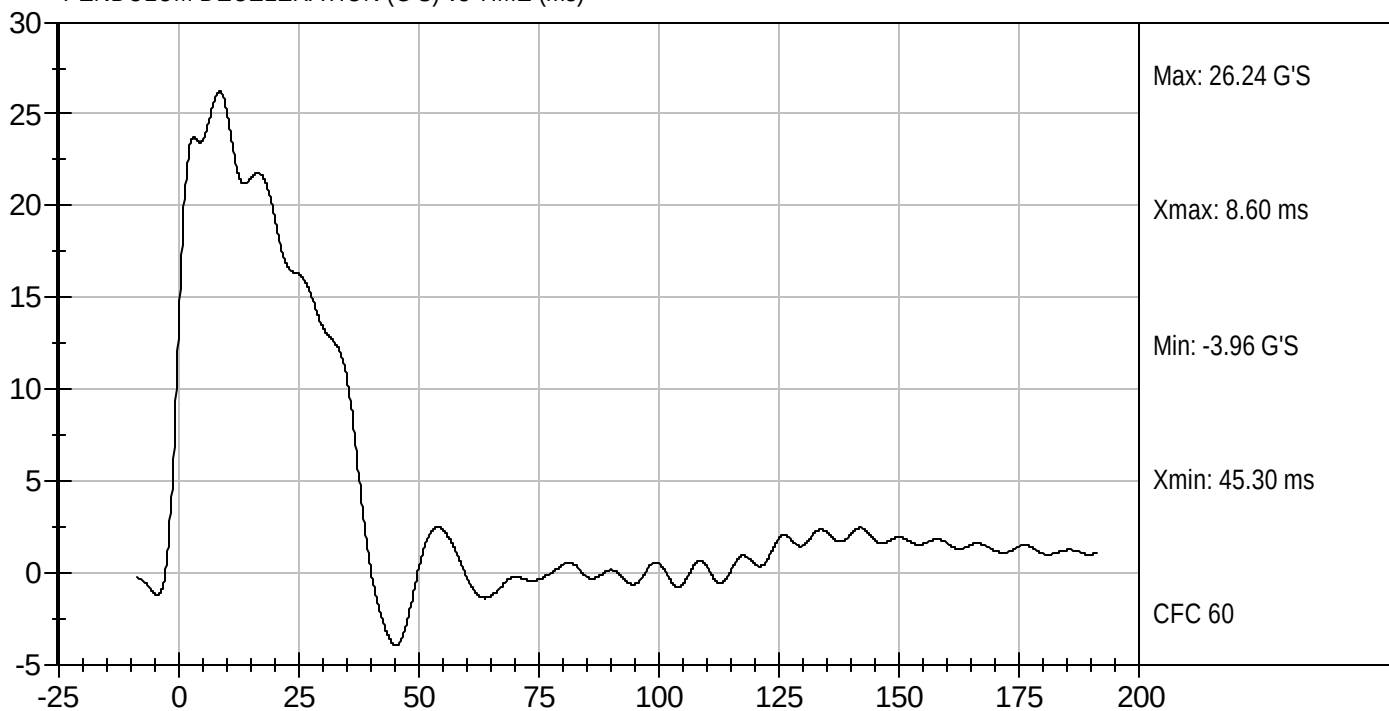
Approved By



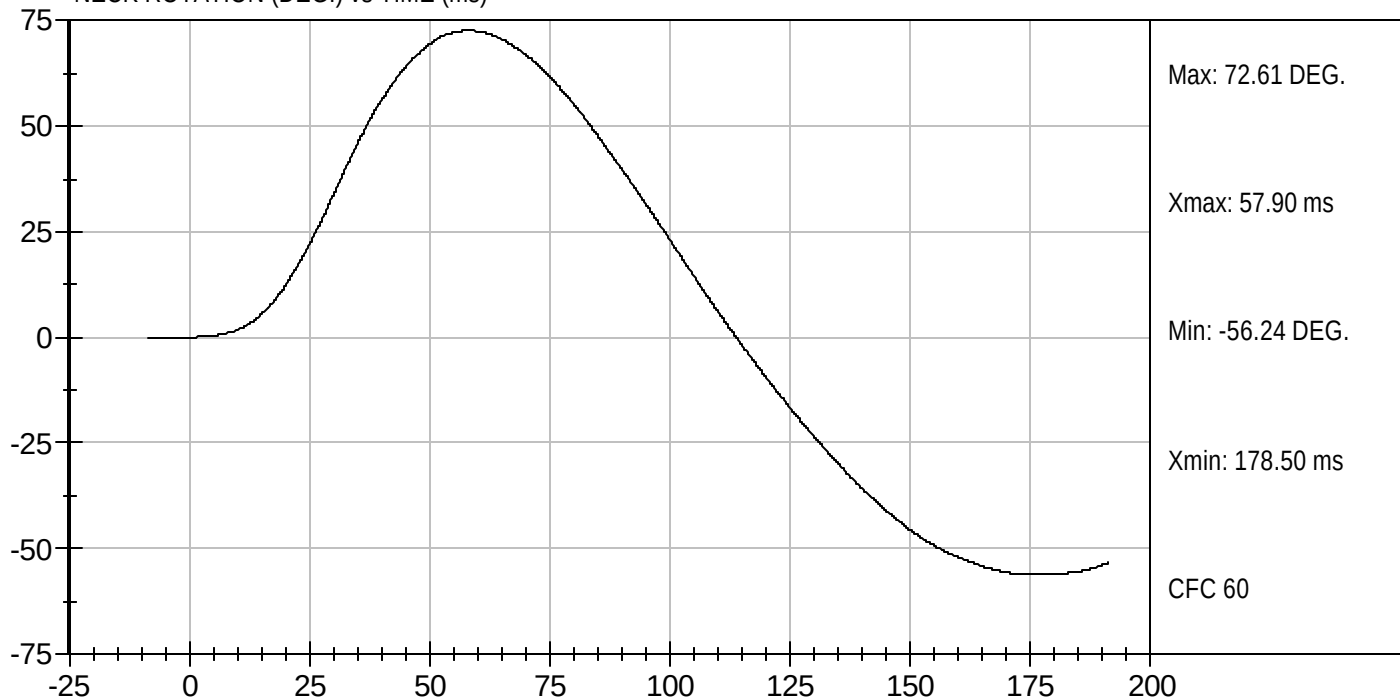
Test Desc: Neck Flexion
Componet ID: D042912

Test Date: 12/21/2004
Velocity: 22.9 ft/s, 6.98 m/s

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



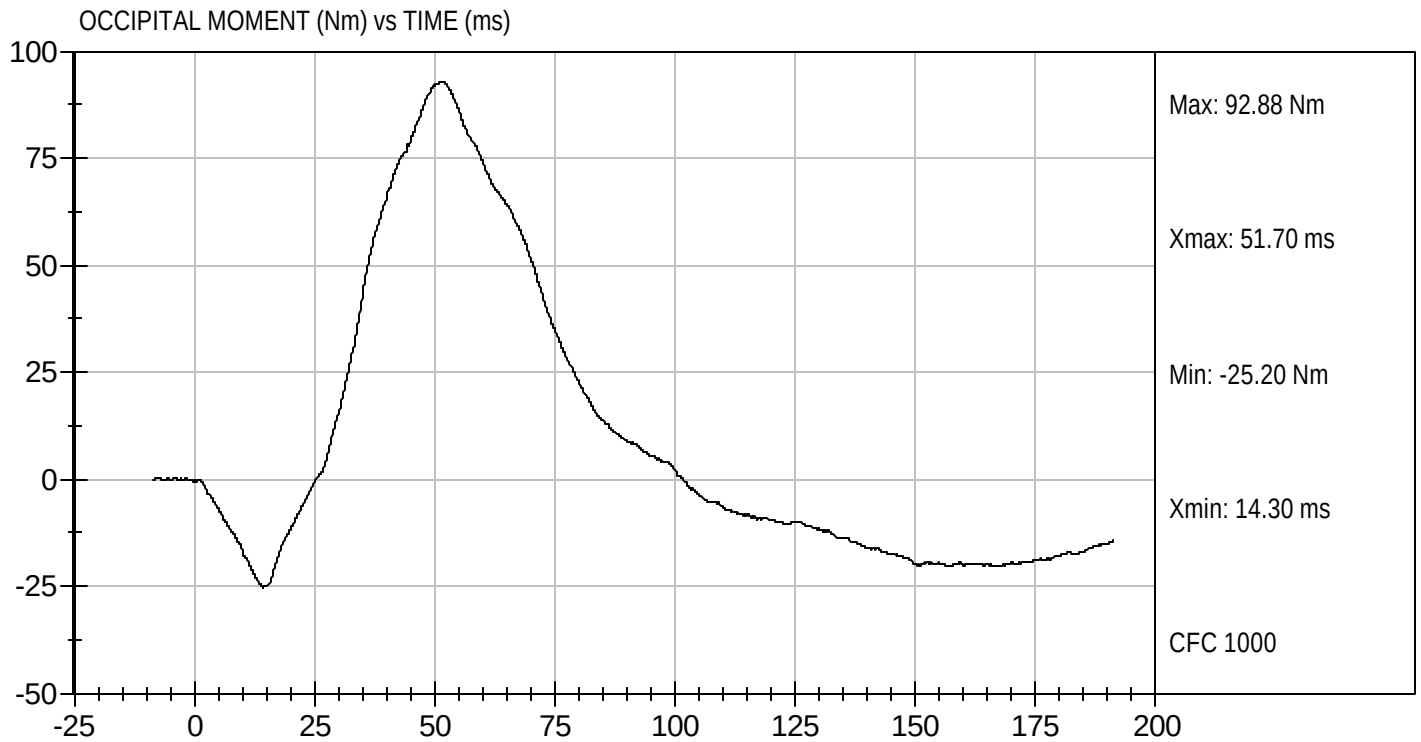
NECK ROTATION (DEG.) vs TIME (ms)





Test Desc: Neck Flexion
Componet ID: D042912

Test Date: 12/21/2004
Velocity: 22.9 ft/s, 6.98 m/s



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

ATD Serial No: 066

Test I.D: D042913

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity		%	10 to 70	15	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.09	Pass
Pendulum Deceleration	10 msec	G's	17.20 to 21.20	19.07	Pass
	20 msec	G's	14.00 to 19.00	16.46	Pass
	30 msec	G's	11.00 to 16.00	11.43	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 22.0	11.97	Pass
Deceleration Decay Time to Cross 5 G's		msec	38.0 to 46.0	43.0	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	99.2	Pass
	Time	msec	72.0 to 82.0	81.1	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	147.0 to 174.0	159.0	Pass
Moment About Occipital Condyle	Maximum	N m	-52.9 to -79.9	-65.5	Pass
	Time	msec	65.0 to 79.0	75.2	Pass
Negative Moment Decay Time To Zero Crossing		msec	120.0 to 148.0	146.2	Pass
Overall Test Results					Pass



Laboratory Technician

12/21/2004

Test Date



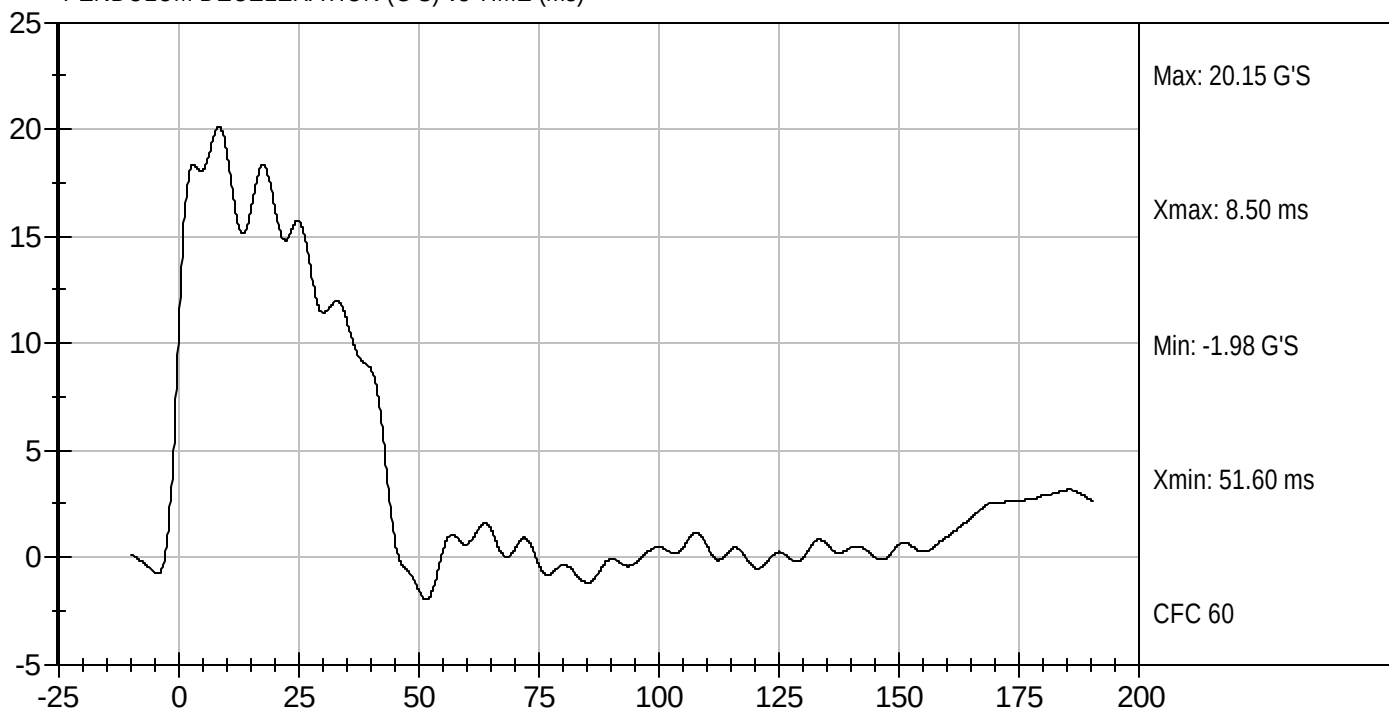
Approved By



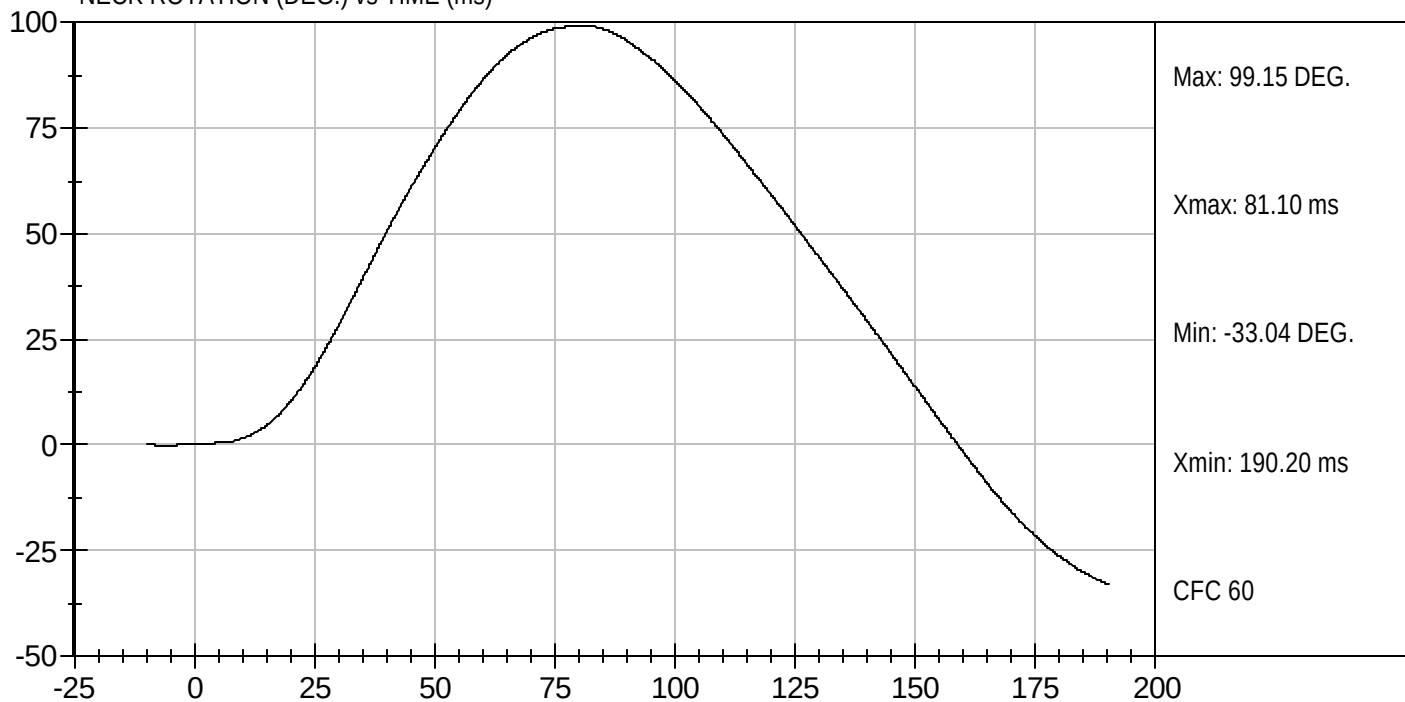
Test Desc: Neck Extension
Componet ID: D042913

Test Date: 12/21/2004
Velocity: 19.97 ft/s, 6.09 m/s

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



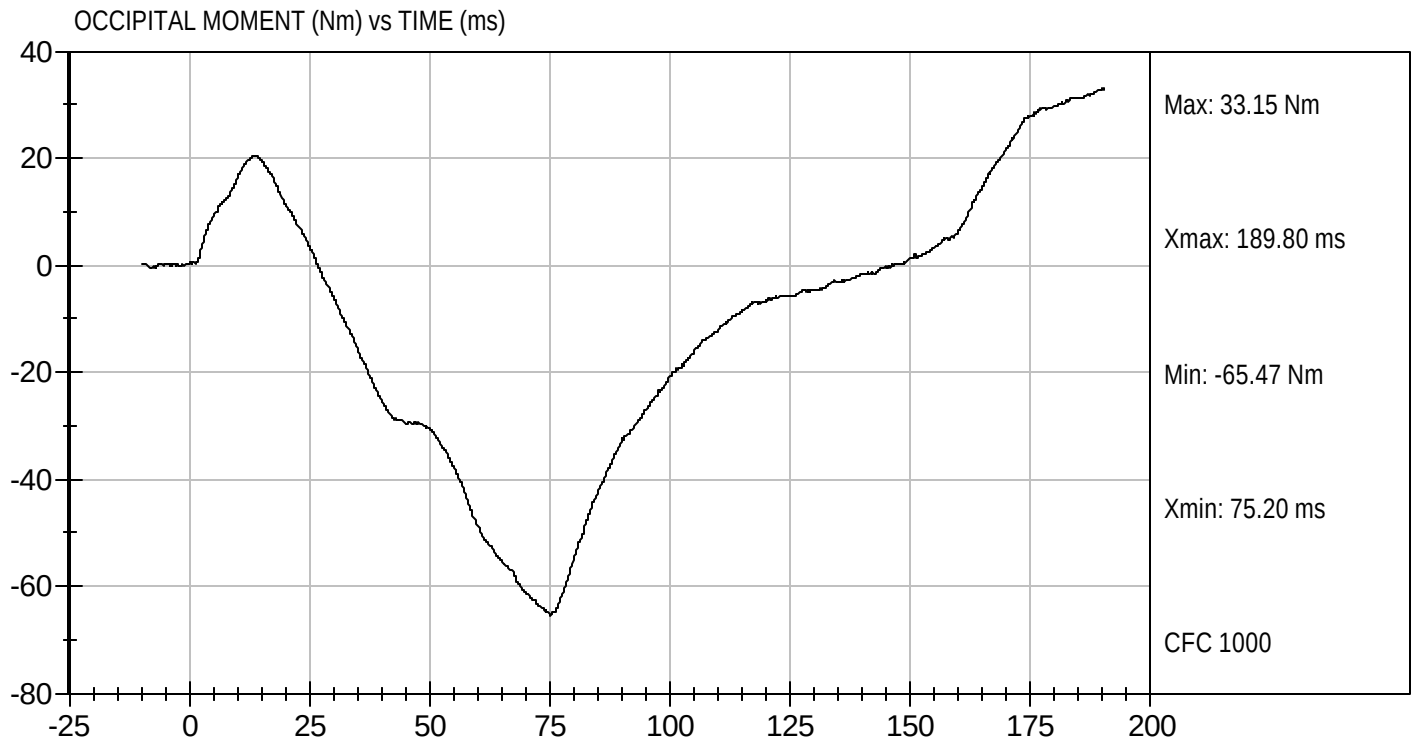
NECK ROTATION (DEG.) vs TIME (ms)





Test Desc: Neck Extension
Componet ID: D042913

Test Date: 12/21/2004
Velocity: 19.97 ft/s, 6.09 m/s



MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 066

Test I.D: D042914

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	13	Pass
Probe Velocity	m/s	6.58 to 6.82	6.72	Pass
Peak Probe Force	N	5159 to 5893	5,707	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	7.01	Pass
Internal Hysteresis	%	69 to 85	69	Pass
Overall Test Results				Pass



Laboratory Technician

12/21/2004

Test Date

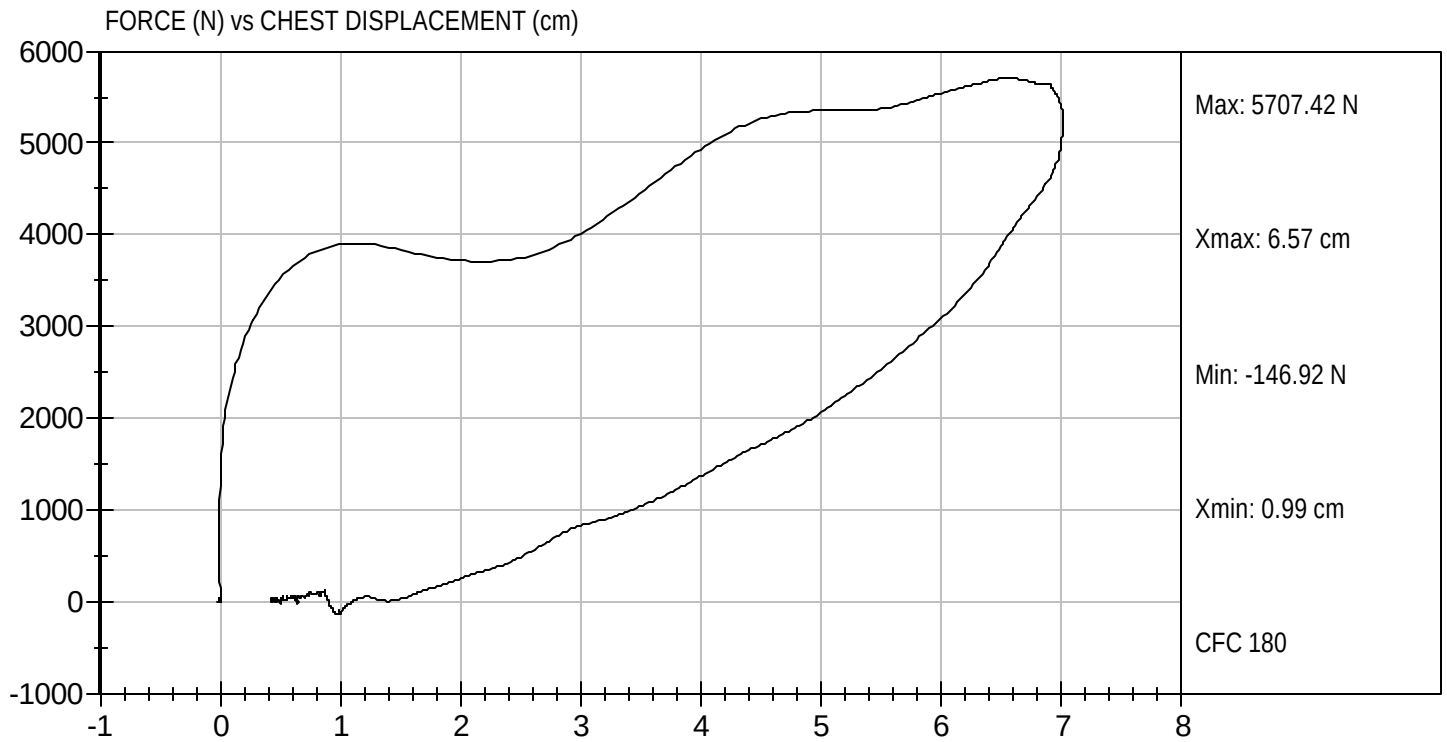


Approved By



Test Desc: Thorax Impact
Componet ID: D042914

Test Date: 12/21/2004
Velocity: 22.04 ft/s, 6.72 m/s



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

ATD Serial No: 066

Test I.D: D042915

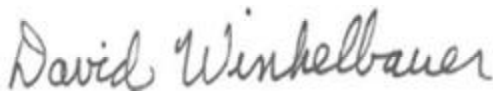
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	15	Pass
Probe Velocity	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	4,977	Pass
Overall Test Results				Pass



Laboratory Technician

12/21/2004

Test Date

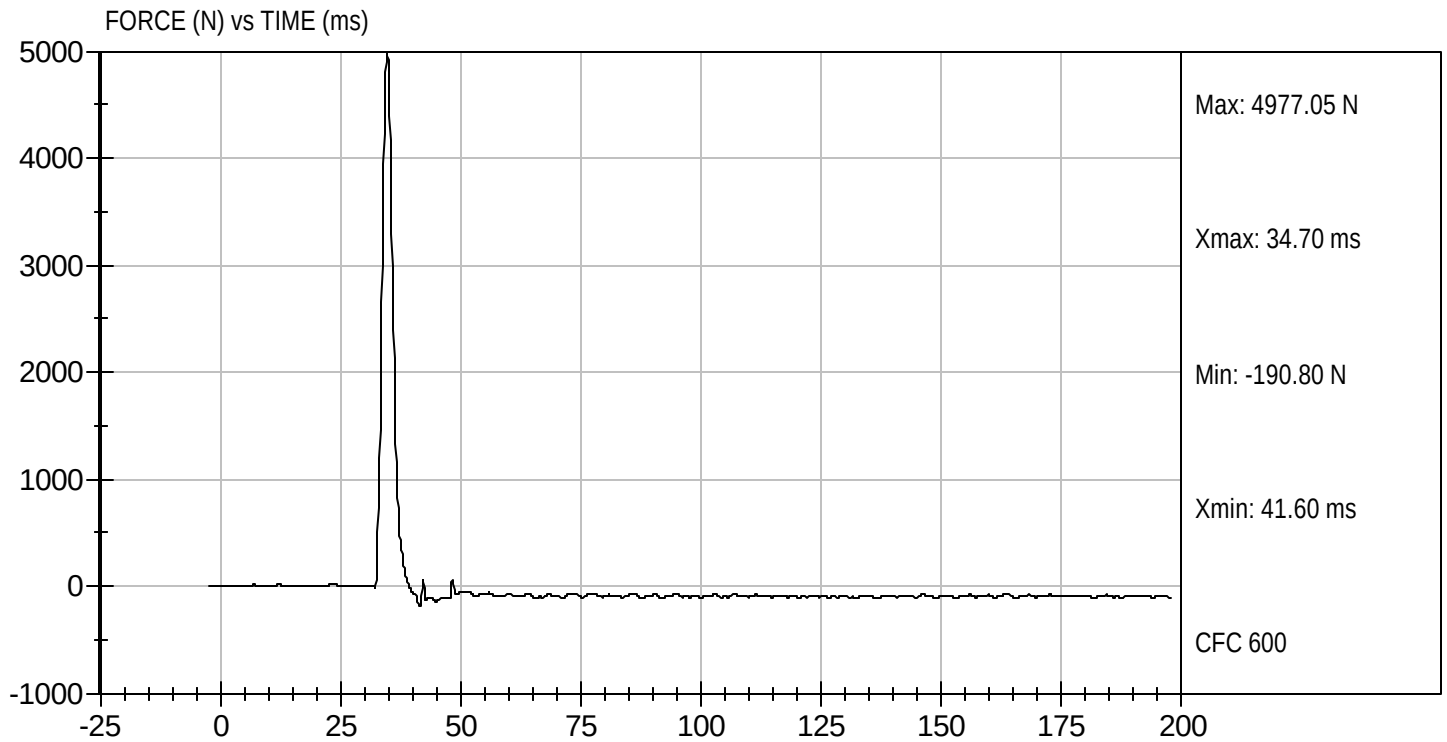


Approved By



Test Desc: Right Knee
Componet ID: D042915

Test Date: 12/21/2004
Velocity: 6.86 ft/s, 2.09 m/s



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

ATD Serial No: 066

Test I.D: D042916

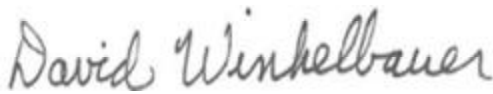
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	15	Pass
Probe Velocity	m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force	Newtons	4715 to 5782	4,825	Pass
Overall Test Results				Pass



Laboratory Technician

12/21/2004

Test Date

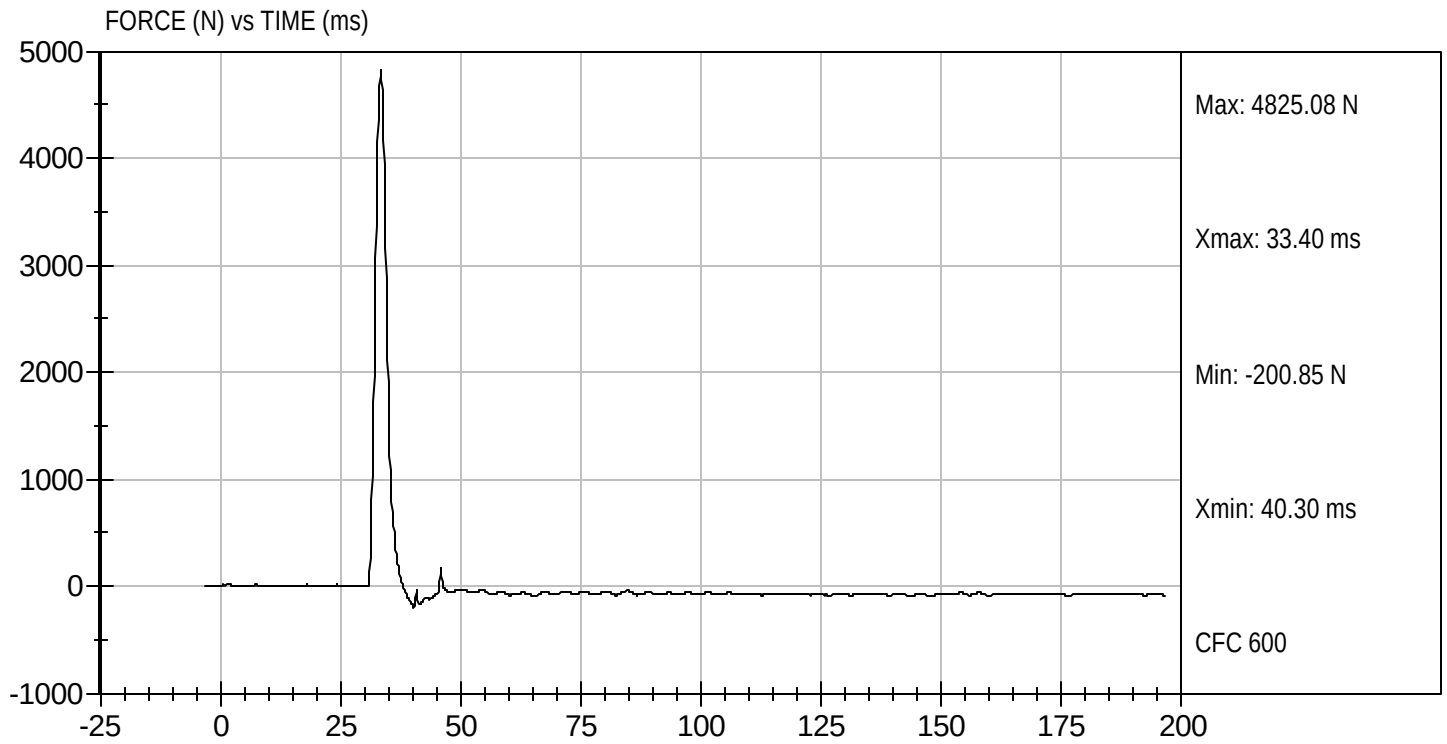


Approved By



Test Desc: Left Knee
Componet ID: D042916

Test Date: 12/21/2004
Velocity: 6.88 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: D042910

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.1	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	18	18	Pass
Rotation Rate	deg/sec	5 -10	8	8	Pass
30 Degrees	Nm	94.9 Nm Max	94.6	80.8	Pass
150 ft-lbf / 203.4 Nm	Deg	40- 50 Degree Max Rotation	41	40	Pass
Overall Test Results					Pass


 Laboratory Technician

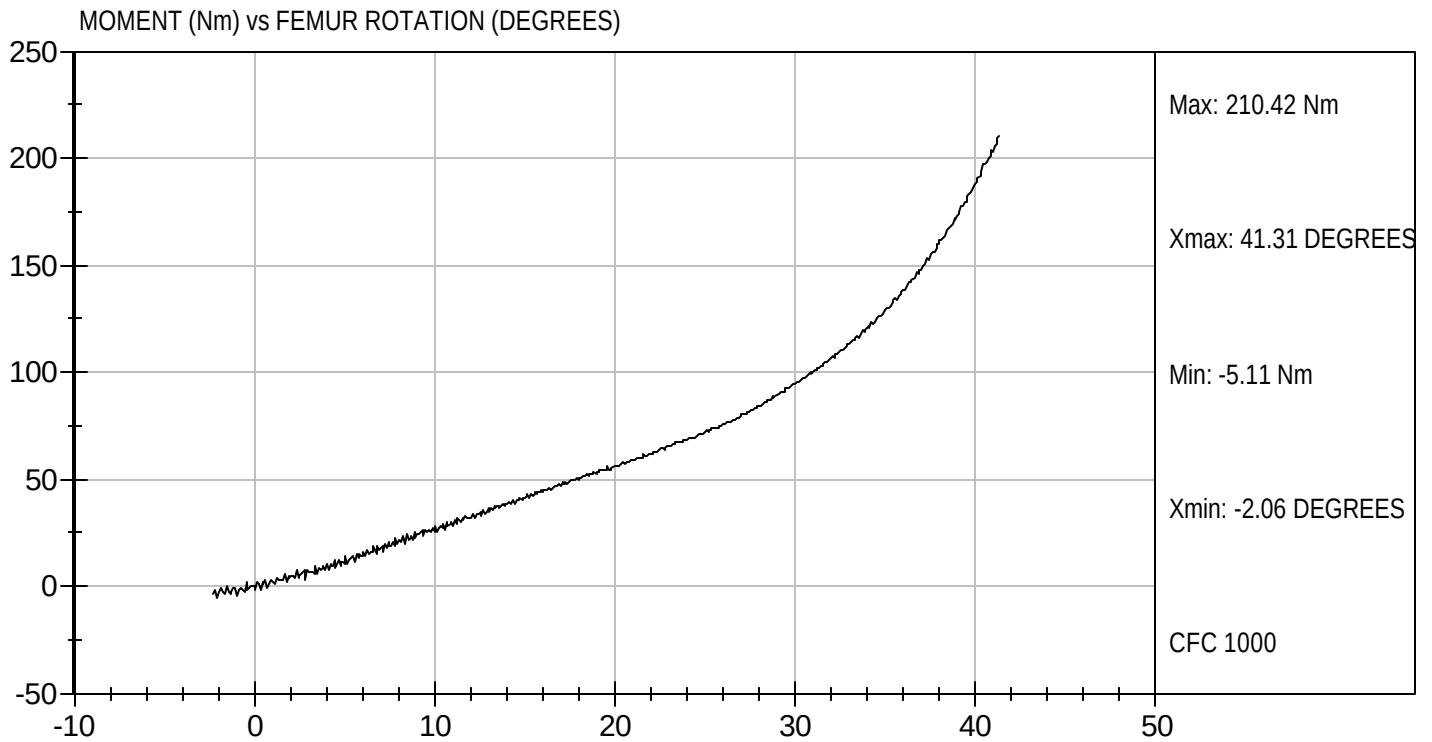
12/21/2004
 Test Date


 Approved By



Test Desc: Hip Femur Flexion
Componet ID: D042919

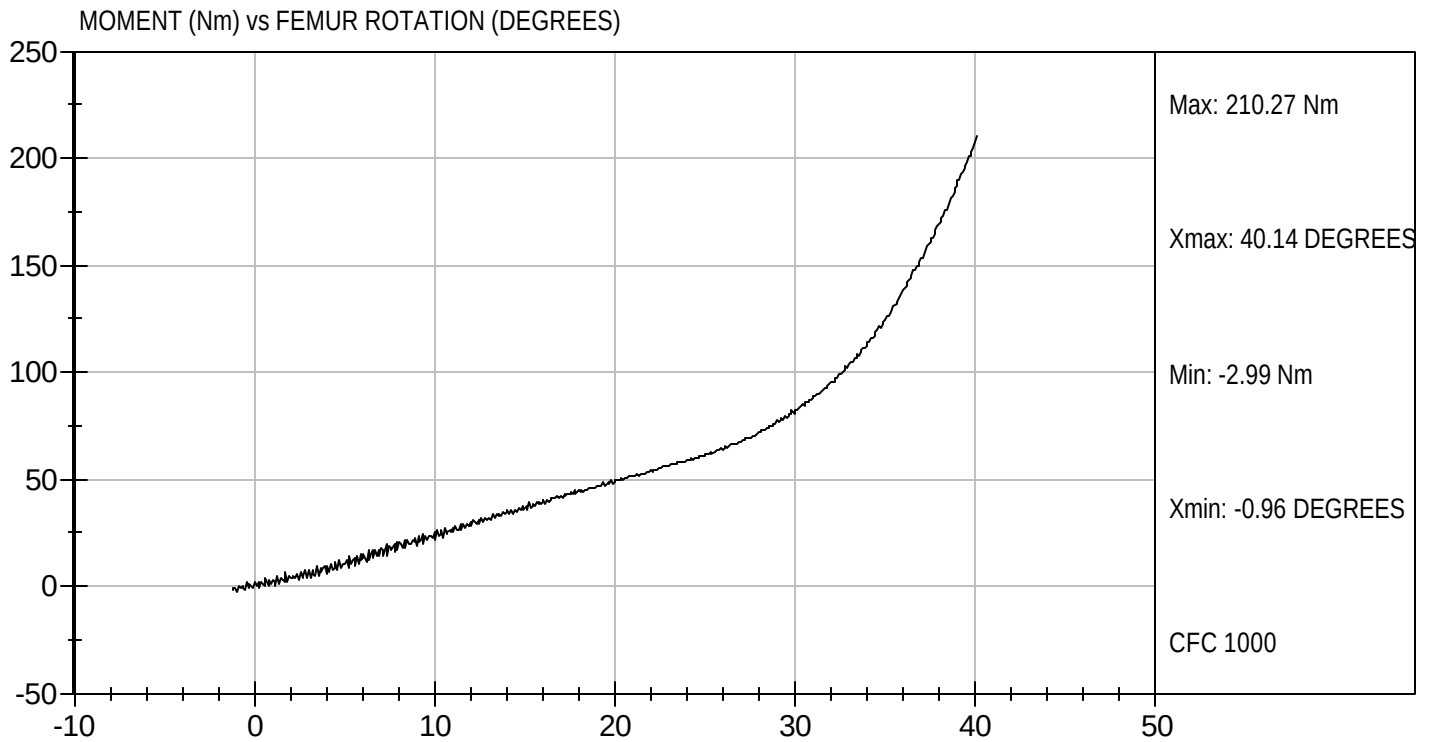
Test Date: 12/21/2004
Velocity: 0 ft/s, 0.00 m/s





Test Desc: Hip Femur Flexion
Componet ID: D042910

Test Date: 12/21/2004
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	08/04/04
Head Y	P27025	Endevco	08/04/04
Head Z	P22692	Endevco	08/04/04
Head X Redundant	J10431	Endevco	08/04/04
Head Y Redundant	P26986	Endevco	08/04/04
Head Z Redundant	AN9E3	Endevco	08/04/04
Neck Load Cell	443	Denton	07/20/04
Chest X	AMT78	Endevco	08/04/04
Chest Y	AP1Y8	Endevco	08/04/04
Chest Z	J11361	Endevco	08/04/04
Chest Deflection Gauge	065	Servo	08/03/04
Chest X Redundant	ALFP5	Endevco	08/04/04
Chest Y Redundant	AP138	Endevco	08/04/04
Chest Z Redundant	AJ9Y3	Endevco	08/04/04
Pelvis X	AJ9D8	Endevco	11/12/04
Pelvis Y	AJ4J3	Endevco	11/12/04
Pelvis Z	AF0M3	Endevco	11/12/04
Left Femur Load Cell	262	Denton	07/20/04
Right Femur Load Cell	261	Denton	07/20/04
Left Upper Tibia Load Cell	266	Denton	07/22/04
Left Lower Tibia Load Cell	179	Denton	07/22/04
Right Upper Tibia Load Cell	263	Denton	07/22/04
Right Lower Tibia Load Cell	174	Denton	07/22/04
Left Foot Z – Front	AMTL6	Endevco	09/17/04
Left Ankle X	AMTG3	Endevco	09/17/04
Left Ankle Z	ALC37	Endevco	09/17/04
Right Foot Z – Front	J21970	Endevco	09/17/04
Right Ankle X	J22033	Endevco	09/17/04
Right Ankle Z	J21691	Endevco	09/17/04
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	09/17/04
Head Y	J13535	Endevco	10/25/04
Head Z	A28-H02	Entran	09/17/04
Head X Redundant	A27-Z12	Entran	09/17/04
Head Y Redundant	AH097	Endevco	10/25/04
Head Z Redundant	L17-Z14	Entran	9/17/04
Neck Load Cell	442	Denton	07/20/04
Chest X	P22086	Endevco	08/04/04
Chest Y	AJ9D2	Endevco	08/04/04
Chest Z	P24265	Endevco	08/04/04
Chest Deflection Gauge	066	Servo	08/03/04
Chest X Redundant	P22652	Endevco	08/04/04
Chest Y Redundant	AJ417	Endevco	08/04/04
Chest Z Redundant	P22150	Endevco	08/04/04
Pelvis X	J13851	Endevco	08/02/04
Pelvis Y	AJ808	Endevco	08/02/04
Pelvis Z	AH0F0	Endevco	08/02/04
Left Femur Load Cell	259	Denton	07/20/04
Right Femur Load Cell	256	Denton	07/20/04
Left Upper Tibia Load Cell	107	Denton	07/22/04
Left Lower Tibia Load Cell	136	Denton	07/22/04
Right Upper Tibia Load Cell	103	Denton	07/22/04
Right Lower Tibia Load Cell	133	Denton	07/22/04
Left Foot Z – Front	A05-A20	Entran	08/04/04
Left Ankle X	A05-A21	Entran	08/04/04
Left Ankle Z	A07-J01	Entran	08/04/04
Right Foot Z – Front	ANBP7	Endevco	07/23/04
Right Ankle X	L30-Z18	Entran	08/04/04
Right Ankle Z	A12-A11	Entran	08/04/04
Shoulder Belt Load Cell	157	Denton	08/18/04
Lap Belt Load Cell	194	Denton	12/07/04

INSTRUMENTS FOR VEHICLE

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	L17-D29	Entran	12/02/04
Left Rear Seat Crossmember Z	L17-D06	Entran	08/24/04
Right Rear Seat Crossmember X	K18-J03	Entran	12/02/04
Right Rear Seat Crossmember Z	K18-D25	Entran	12/02/04
Top of Engine X	J21-Z06	Entran	12/01/04
Bottom of Engine X	J25-R16	Entran	12/01/04
Left Brake Caliper X	J25-R14	Entran	12/01/04
Right Brake Caliper X	J23-M14	Entran	12/01/04
Instrument Panel X	A29-F14	Entran	11/02/04