

REPORT NUMBER: NCAP-MGA-2005-002

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

**TOYOTA MOTOR CORPORATION
2005 Toyota Corolla
NHTSA NUMBER: M55108**

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



Test Date: September 17, 2004

Final Report Date: October 8, 2004

FINAL REPORT

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

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Manager, New Car Assessment Program

Date of Acceptance

COTR, NCAP Frontal Impact Program

Date of Acceptance

Technical Report Documentation Page

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16. Abstract A 35.1 mph (56.5 km/h) frontal barrier impact was conducted on a 2005 Toyota Corolla at MGA Research Corporation on September 17, 2004. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The impact velocity was 56.5 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 603 mm located at the vehicle centerline. The test vehicle is equipped with a 3-point continuous belt system and an airbag in both front outboard seating positions. With respect to FMVSS 208 "Occupant Crash Protection", the occupant injury criteria summary is as follows: <table border="1" 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>374</td> <td>332</td> </tr> <tr> <td>Max. Thorax Accel. (3ms Clip)</td> <td>G's</td> <td>60</td> <td>38</td> <td>42</td> </tr> <tr> <td>Left Femur Force</td> <td>Newton</td> <td>10009</td> <td>-1441</td> <td>-1930</td> </tr> <tr> <td>Right Femur Force</td> <td>Newton</td> <td>10009</td> <td>-1365</td> <td>-1312</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	374	332	Max. Thorax Accel. (3ms Clip)	G's	60	38	42	Left Femur Force	Newton	10009	-1441	-1930	Right Femur Force	Newton	10009	-1365	-1312
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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 Toyota Corolla at a velocity of 56.5 kph. The test was performed at MGA Research Corporation on September 17, 2004. Pre-and post-test photographs of the vehicle and dummies can be found in Appendix A.

One real-time camera and fifteen 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. 066) and right-front passenger (position 2) ATD (Serial No. 065) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 162 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 603 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 and the steering column. The passenger's head, chest and abdomen contacted the airbag. The passenger's head contacted the headrest. The passenger's knees contacted the glove box.

The occupant data is summarized below:

ATD position	HIC	Clip (g)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver	373.8	38.4	-22.7	-1441	-1365
Passenger	332.0	42.2	-21.3	-1930	-1312

TEST NOTES

The following channels did not collect any data:

Driver Head Xr
Driver Neck FX
Passenger Left Foot Z – Front after 60 ms
Top of Engine X after 60 ms
Instrument Panel X after 75 ms

SECTION 2
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

Test Vehicle: 2005 Toyota Corolla
 Test Program: 35mph Frontal Impact

NHTSA No.: M55108
 Test Date: 09/17/04

CONVERSION FACTORS USED IN THIS REPORT*

Quantity	Typical Application	English Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	mile/h	km/h	1.609
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.573
Pressure	Tire Pressure	lbf/in 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 Toyota Corolla
Test Program: 35mph Frontal Impact

NHTSA No.: M55108
Test Date: 09/17/04

PRIMARY IMPACT DATA

Measured Parameter	Units	Value
Velocity at Impact	km/hr	56.5
Test Weight	kg	1379.0
Average Rebound	mm	1622
Maximum Static Crush	mm	603
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 / 066	HIII 50 th / 065
Head Contact	Airbag, Headrest	Airbag, Headrest
Chest Contact	Airbag	Airbag
Abdomen Contact	Airbag	Airbag
Left Knee Contact	Knee Bolster, Steering Column	Glove Box
Right Knee Contact	Knee Bolster, Steering Column	Glove Box

16mm MOVIE COVERAGE

High Speed	15
Real Time	1
Total	16

Driver ATD Sensors	48
Passenger ATD Sensors	52
Belt Assessment Sensors	6
Vehicle Structure Accelerometers	9
Total	115

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

Test Vehicle: 2005 Toyota Corolla
 Test Program: 35mph Frontal Impact

NHTSA No.: M55108
 Test Date: 09/17/04

TEST VEHICLE INFORMATION

Manufacturer	Toyota
Model	Corolla
Body Style	4-Door Sedan
NHTSA No.	M55108
VIN	1NXBR30E85Z371754
Color	Desert Sand
Delivery Date	8/19/04
Odometer Reading (mile)	42
Dealer	Wilde Toyota
Transmission	Automatic
Final Drive	Overdrive
Number of Cylinders	4
Engine Displacement (L)	1.8
Engine Placement	Lateral
Automatic Door Lock (ADL)	No
Owner's 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	Yes
Telescope Wheel	Yes
Air Conditioning	Yes
Power Brakes	Yes
Disc Brakes, Front	Yes
Disc Brakes, Rear	No
Anti-lock Brakes	Yes
AM/FM/CD	Yes
Anti-theft System	Yes
Cruise Control	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	New United Motor Manufacturing	GVWR (kg)	1626
Date of Manufacture	06/04	GAWR Front (kg)	855
		GAWR Rear (kg)	780

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	308	308
Cold Pressure (kPa)	210	210
Recommended Tire Size	P195/65R15	P195/65R15
Tire Size on Vehicle	P195/65R15	P195/65R15
Tire Manufacturer	Goodyear	Goodyear

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Number Of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				390
Cargo Wt. (RCLW) (kg)				49.9

DATA SHEET NO. 2... (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2005 Toyota Corolla
 Test Program: 35mph Frontal Impact

NHTSA No.: M55108
 Test Date: 09/17/04

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	372.9	223.6		424.1	282.6	
Right	kg	355.6	225.9		388.3	284.0	
Ratio	%	61.8	38.2		58.9	41.1	
Totals	kg	728.5	449.5	1178.0	812.4	566.6	1379.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1178.0
Weight of 2 P572E ATDs	kg	156.0
Rated Cargo/Luggage Weight (RCLW)	kg	49.9
Calculated Vehicle Target Weight (TVTW)	kg	1383.9

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG(aft of front axle)
As Delivered	mm	682	683	707	707	991
As Tested	mm	673	675	675	677	1067
Post Test	mm	659	641	680	645	

Vehicle Wheelbase (mm): 2596

Weight of Ballast secured in cargo area (kg): 0.0

Vehicle Components Removed: Trunk lid, rear bumper, RR taillight, trunk interior, spare tire, jack

Ballast weight does not include instrumentation and data acquisition system.

FUEL SYSTEM DATA

Fuel System Capacity From Owner's Manual (L): 50.0

Usable Capacity Figure Furnished by COTR (L): 50.0

Actual Test Volume (L): 17.0

Test Fluid Type: Stoddard Solvent; Specific Gravity: 0.77

Is Vehicle Fuel Pump Electric or Mechanical? Electric

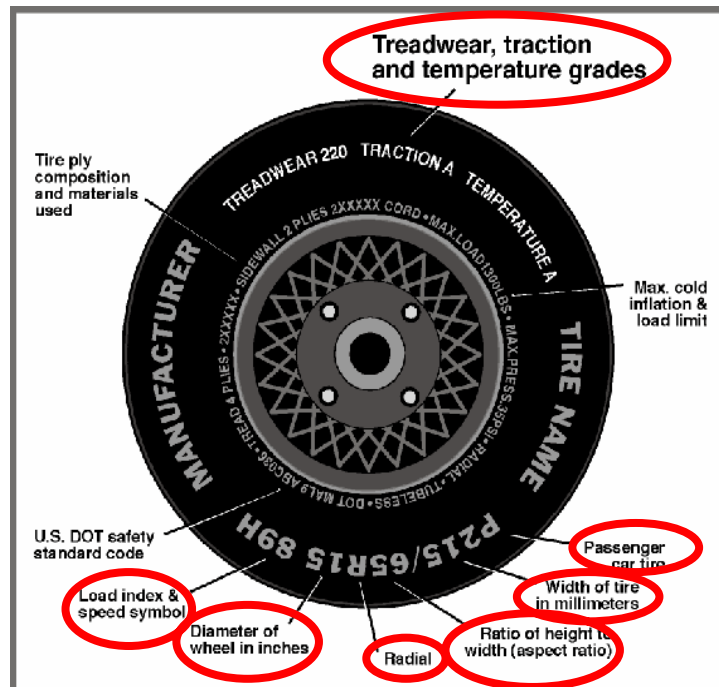
If electric, does pump operate with ignition switch "ON" & engine "OFF"? Yes

DATA SHEET NO. 3
TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2005 Toyota Corolla
 Test Program: 35mph Frontal Impact

NHTSA No.: M55108
 Test Date: 09/17/04

Vehicle Year	2005	Vehicle Make	Toyota
VIN	1NXBR30E85Z371754	Vehicle Model	Corolla



	Front	Rear
Tire Manufacturer	Good year	Good year
Tire Name	Integrity	Integrity
Tire Type	P	P
Tire Width (mm)	195	195
Ratio of Height to Width (aspect ratio)	65	65
Radial	R	R
Wheel Diameter	15	15
Load Index & Speed Symbol	86S	86S
Treadwear	460	460
Traction Grade	A	A
Temperature Grade	B	B

DATA SHEET NO. 4
POST IMPACT DATA

Test Vehicle: 2005 Toyota Corolla
Test Program: 35mph Frontal Impact

NHTSA No.: M55108
Test Date: 09/17/04

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

VEHICLE STATIC CRUSH

Measured Parameter	Units	Pre-Test	Post-Test	Difference
Left Side	mm	4335	3916	419
Center	mm	4529	3926	603
Right Side	mm	4335	4033	302

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	1671
Center	mm	1660
Right Side	mm	1535
Average	mm	1622

DATA SHEET NO. 5
TEST VEHICLE INFORMATION

Test Vehicle: 2005 Toyota Corolla
Test Program: 35mph Frontal Impact

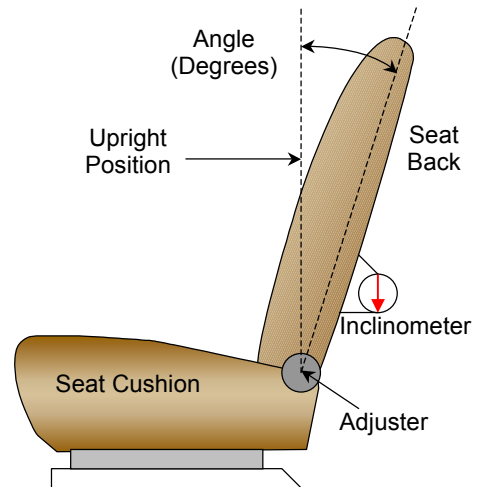
NHTSA No.: M55108
Test Date: 09/17/04

NORMAL DESIGN RIDING POSITION

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

Driver seat back angle: 3rd detent with forwardmost detent defined as 0.

Passenger seat back angle: 4th detent with forwardmost detent defined as 0.



FRONT SEAT ASSEMBLY

SEAT FORE/AFT POSITIONS

The driver and the passenger seat were manually operated.

Driver seat fore/aft total travel: 17 positions

Driver seat fore/aft position: 8th position with the forward most defined as 0

Passenger seat fore/aft total travel: 17 positions

Passenger seat fore/aft position: 8th position with the forward most defined as 0

DATA SHEET NO. 5... (continued)

TEST VEHICLE INFORMATION

Test Vehicle: 2005 Toyota Corolla
Test Program: 35mph Frontal Impact

NHTSA No.: M55108
Test Date: 09/17/04

FUEL TANK CAPACITY DATA

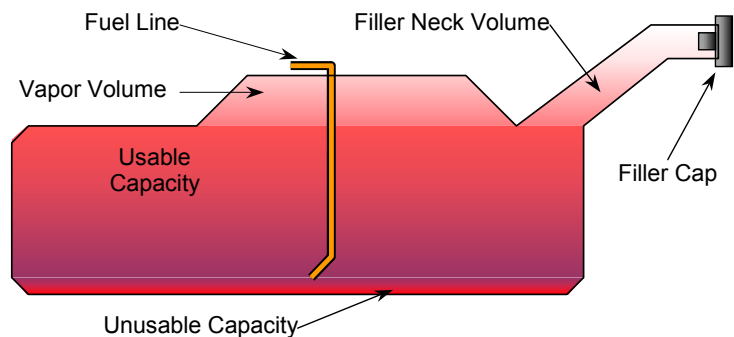
The "Usable Capacity" of the standard equipment fuel tank is: 50.0 liters

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

The "Usable Capacity" used for certification to FMVSS 301 requirements: 50.0 liters

Actual amount of Stoddard solvent added to vehicle for certification test: 17.0 liters

The fuel pump will pump fuel when the ignition is on.



VEHICLE FUEL TANK ASSEMBLY

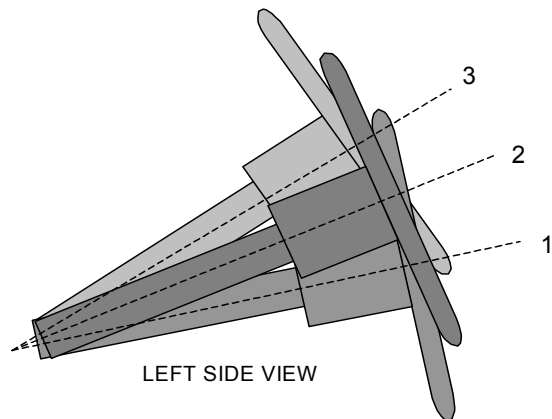
STEERING COLUMN ADJUSTMENT

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: 25.5°

Geometric Center, Position 2: 27.3°

Uppermost, Position 3: 29.1°



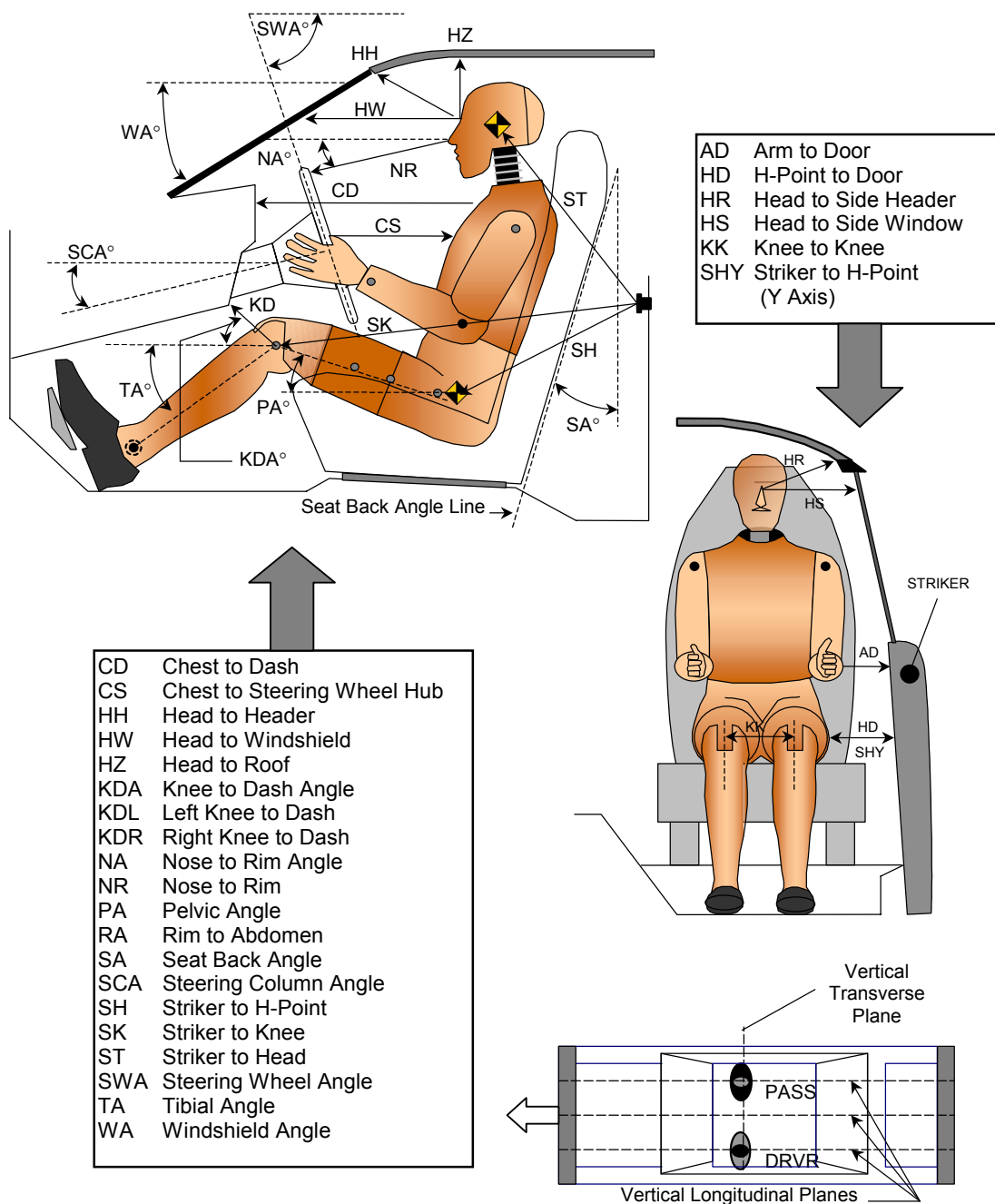
STEERING COLUMN ASSEMBLY

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

Test Vehicle: 2005 Toyota Corolla
 Test Program: 35mph Frontal Impact

NHTSA No.: M55108
 Test Date: 09/17/04

DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS



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

Test Vehicle: 2005 Toyota Corolla
 Test Program: 35mph Frontal Impact

NHTSA No.: M55108
 Test Date: 09/17/04

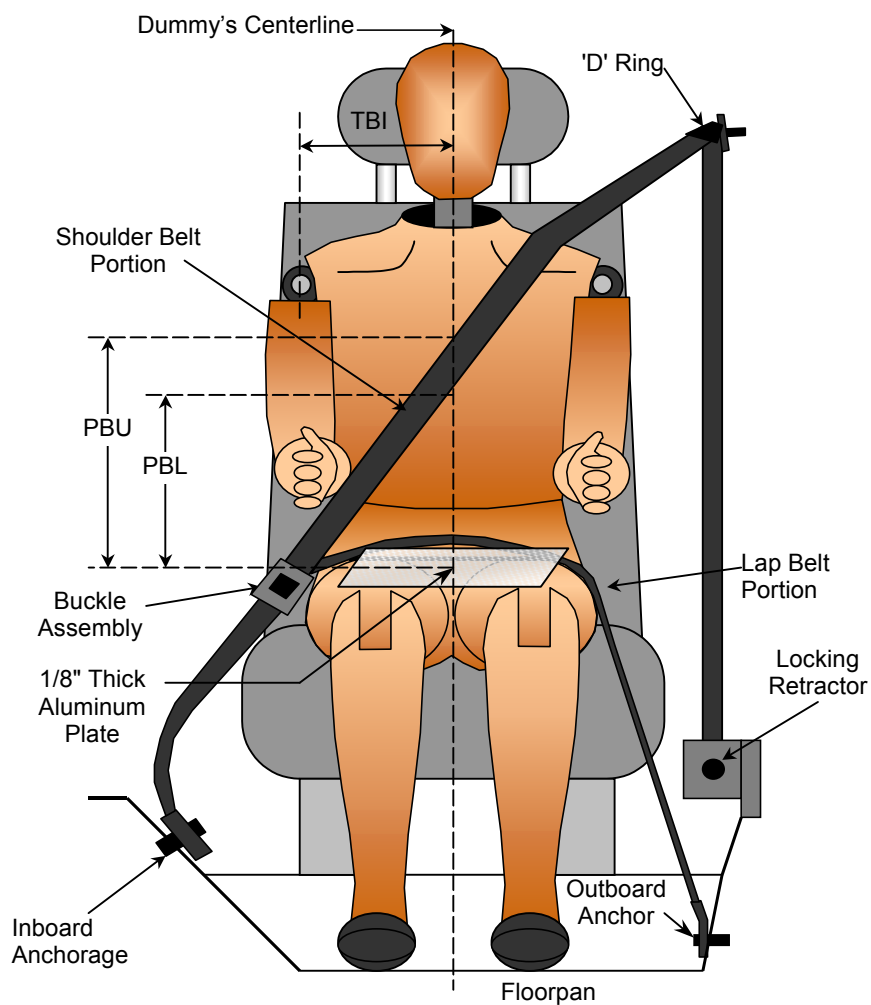
TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA	Windshield Angle		26.6		
SWA	Steering Wheel Angle		62.4		
SCA	Steering Column Angle		27.3		
SA	Seat Back Angle (headrest post)		2.5		0.3
HZ	Head to Roof (Z)	191	90.0	158	90.0
HH	Head to Header	324	22.7	317	21.3
HW	Head to Windshield	607	0.0	545	0.0
HR	Head to Side Header (Y)	195		177	
NR	Nose to Rim	436	12.3		
CD	Chest to Dash	532		555	
CS	Chest to Steering Hub	340	10.3		
RA	Rim to Abdomen	207	0.0		
KDL	Left Knee to Dash	142	27.1	135	
KDR	Right Knee to Dash	131		130	30.8
PA	Pelvic Angle		22.4		23.9
TA	Tibia Angle		55.4		47.7
KK	Knee to Knee (Y)	295		255	
SK	Striker to Knee	585	98.0	613	100.1
ST	Striker to Head	420	15.4	464	22.3
SH	Striker to H-Point	299	134.3	294	129.1
SHY	Striker to H-Point (Y)	247		234	
HS	Head to Side Window	290		271	
HD	H-Point to Door (Y)	149		126	
AD	Arm to Door (Y)	104		97	
AA	Ankle to Ankle	314		171	

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

Test Vehicle: 2005 Toyota Corolla
 Test Program: 35mph Frontal Impact

NHTSA No.: M55108
 Test Date: 09/17/04



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
TBI - Dummy centerline to shoulder bolt	mm	170	170
PBU - Top surface of reference to belt upper edge	mm	325	387
PBL - To surface of reference to belt lower edge	mm	242	307

DATA SHEET NO. 8

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2005 Toyota Corolla
 Test Program: 35mph Frontal Impact

NHTSA No.: M55108
 Test Date: 09/17/04

VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)			Peak Values				
		X	Y	Z	Units	Max	Time	Min	Time
1	Left Rear X-Member X	1855	-307	265	G's	3.1	10	-38.9	58
2	Right Rear X-Member X	1855	307	265	G's	2.3	10	-39.1	56
3	Engine Top X	3760	0	855	G's	*	*	*	*
4	Engine Bottom X	3742	0	230	G's	104.7	41	-171.1	30
5	Left Brake Caliper X	3677	675	251	G's	21.8	60	-90.5	54
6	Right Brake Caliper X	3677	675	252	G's	7.2	69	-63.4	42
7	Instrument Panel X	2950	0	1085	G's	**	**	**	**
8	Left Rear X-Member Z	1855	-307	265	G's	13.7	39	-8.6	10
9	Right Rear X-Member Z	1855	307	265	G's	16.1	14	-12.3	48

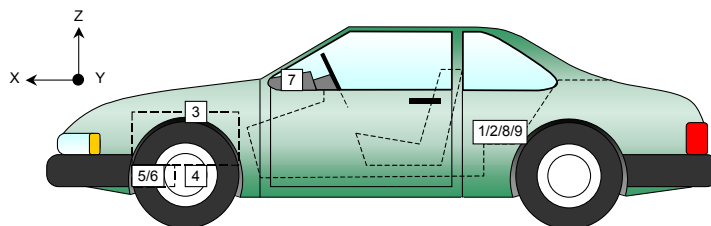
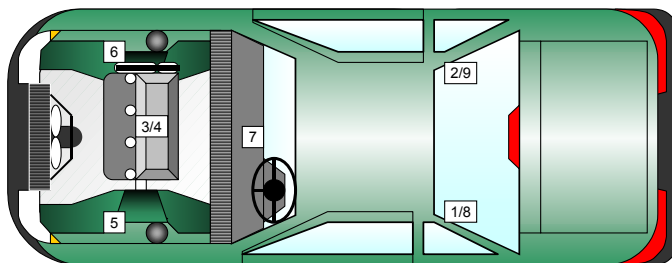
* No valid data collected after 60 ms

** No valid data collected after 75 ms

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 Toyota Corolla
 Test Program: 35mph Frontal Impact

NHTSA No.: M55108
 Test Date: 09/17/04

HEAD PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	10.6	238	-53.9	83	6.8	293	-42.4	83
Head CG	Y	G's	3.2	91	-2.6	27	3.6	26	-15.7	83
Head CG	Z	G's	19.6	68	-3.8	97	17.4	66	-10.9	102
Head CG Resultant	N/A	G's	54.1	83			45.1	84		

CHEST PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	2.8	277	-39.5	68	1.9	191	-42.4	76
Chest CG	Y	G's	3.6	94	-2.8	34	1.7	44	-12.4	77
Chest CG	Z	G's	6.5	51	-6.0	110	8.2	67	-6.0	86
Chest CG Resultant	N/A	G's	39.7	68			44.1	77		

FEMUR PEAK FORCES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Femur	Z	Newtons	843	77	-1441	53	618	62	-1930	49
Right Femur	Z	Newtons	318	98	-1365	53	355	59	-1312	75

SEAT BELT SENSOR PEAK VALUES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Lap Belt Force	N/A	Newtons	8792	66			7657	71		
Shoulder Belt Force	N/A	Newtons	5668	53			4711	50		

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	373.8	40.4	62.3	98.3	332.0	38.5	63.3	99.3

CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Primary	38.4	67.3	70.3	42.2	73.8	77.6

DATA SHEET NO. 9... (continued)

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2005 Toyota Corolla
Test Program: 35mph Frontal Impact

NHTSA No.: M55108
Test Date: 09/17/04

PELVIC PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Pelvis	X	G's	6.3	105	-49.0	71	6.6	107	-47.2	71
Pelvis	Y	G's	3.4	92	-5.2	48	4.3	47	-10.2	61
Pelvis	Z	G's	2.7	278	-30.7	75	2.4	190	-29.3	78

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Neck Force	X	Newtons	*	*	*	*	445	81	-290	45
Neck Force	Y	Newtons	78	95	-55	34	145	110	-155	73
Neck Force	Z	Newtons	1116	64	-230	278	972	63	-450	157
Neck Moment	X	N•m	4.9	142	-11.1	94	30.1	96	-5.0	200
Neck Moment	Y	N•m	33.3	153	-24.4	282	22.8	177	-16.7	96
Neck Moment	Z	N•m	3.3	81	-1.8	99	23.1	99	-11.8	166

* No valid data collected

FOOT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Foot Aft	X	G's	24.9	99	-36.2	49	10.0	92	-49.0	46
Left Foot Aft	Z	G's	3.0	102	-38.9	43	29.4	59	-48.6	66
Left Foot Fore	Z	G's	9.7	102	-63.9	43	*	*	*	*
Right Foot Aft	X	G's	16.9	99	-111.5	49	16.4	87	-43.8	64
Right Foot Aft	Z	G's	3.8	74	-58.4	47	3.9	99	-42.7	64
Right Foot Fore	Z	G's	23.0	63	-127.3	46	20.9	54	-52.0	33

* No valid data collected after 60ms

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	2.6	202	-8.6	63	2.0	267	-44.8	92
Left Lower Moment	Y	N•m	99.3	100	-33.3	62	57.9	46	-71.9	62
Left Lower Force	Z	Newtons	46	154	-1417	94	283	133	-2457	83
Left Upper Moment	X	N•m	9.8	181	-23.9	32	1.1	215	-10.2	48
Left Upper Moment	Y	N•m	37.4	103	-92.5	63	43.9	87	-25.4	63
Left Upper Force	Z	Newtons	61	121	-1023	92	467	16	-2958	85
Right Lower Moment	X	N•m	42.2	63	-13.5	47	7.1	65	-7.2	58
Right Lower Moment	Y	N•m	36.9	96	-43.7	49	31.9	87	-26.1	62
Right Lower Force	Z	Newtons	61	116	-2656	62	441	155	-2242	84
Right Upper Moment	X	N•m	34.5	50	-25.1	78	14.2	65	-11.8	24
Right Upper Moment	Y	N•m	32.8	109	-76.5	50	17.0	181	-85.5	75
Right Upper Force	Z	Newtons	88	114	-2276	62	565	181	-1735	84

DATA SHEET NO. 9... (continued)

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2005 Toyota Corolla
 Test Program: 35mph Frontal Impact

NHTSA No.: M55108
 Test Date: 09/17/04

CHEST PEAK DISPLACEMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest	X	mm			-22.7	74			-21.3	72

HEAD REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	*	*	*	*	6.8	293	-42.9	79
Head CG	Y	G's	4.9	73	-4.7	56	3.5	26	-14.8	84
Head CG	Z	G's	19.8	68	-3.4	98	21.3	66	-11.3	101
Head CG Resultant	N/A	G's	*	*			45.3	84		

* No valid data collected

CHEST REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	2.8	278	-41.5	83	2.6	186	-42.8	74
Chest CG	Y	G's	4.3	72	-2.9	31	1.9	25	-9.8	76
Chest CG	Z	G's	6.9	51	-5.9	110	8.9	68	-5.3	86
Chest CG Resultant	N/A	G's	41.6	83			43.6	74		

REDUNDANT HEAD INJURY CRITERIA (HIC)

Location	Driver				Passenger			
	HIC	Avg.	T ¹	T ²	HIC	Avg.	T ¹	T ²
Head CG Primary Redundant	*	*	*	*	337.9	38.8	63.5	99.5

* Redundant HIC could not be calculated

REDUNDANT CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Primary Redundant	39.5	81.3	84.3	41.3	73.2	76.9

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

Test Vehicle: 2005 Toyota Corolla
Test Program: 35mph Frontal Impact

NHTSA No.: M55108
Test Date: 09/17/04

SEAT BELT PLACEMENT MEASUREMENTS

Measurement Description	Units	Driver	Passenger
TBI - Dummy centerline to shoulder bolt	mm	170	170
PBU - Top surface of reference to belt upper edge	mm	325	387
PBL - Top surface of reference to belt lower edge	mm	242	307

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Retractor reel to "D" ring	mm	247	247
Shoulder belt length as measured on ATD	mm	831	828
Lap belt length as measured on ATD	mm	852	920
Remainder of belt on reel	mm	927	876
Total belt length for continuous webbing systems	mm	2857	2871

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 Toyota Corolla
 Test Program: 35mph Frontal Impact

NHTSA No.: M55108
 Test Date: 09/17/04

Windshield Mounting Details:

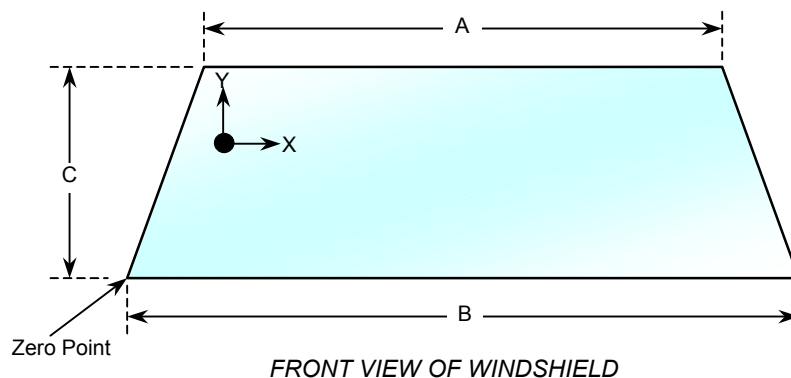
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

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

Temperature of windshield molding during test: 21 °C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% of Retention
Left Side	2068	2068	100
Right Side	2068	2068	100
Total	4136	4136	100



WINDSHIELD DIMENSIONS

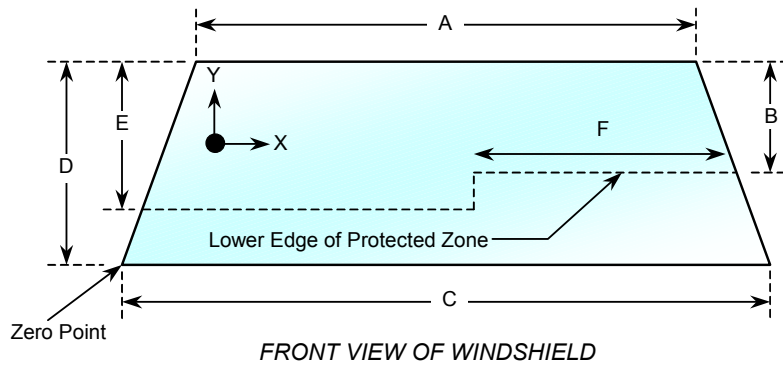
Item	Units	Segment Length	Molding Width
A	mm	1085	15
B	mm	1390	10
C	mm	830	10

DATA SHEET NO. 12

WINDSHIELD ZONE INTRUSION FMVSS 219 (Partial) DATA

Test Vehicle: 2005 Toyota Corolla
 Test Program: 35mph Frontal Impact

NHTSA No.: M55108
 Test Date: 09/17/04



Item	Units	Value
A	mm	1085
B	mm	530
C	mm	1390
D	mm	830
E	mm	525
F	mm	505

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 Toyota Corolla
Test Program: 35mph Frontal Impact

NHTSA No.: M55108
Test Date: 09/17/04

Temperature at Time of Impact: 21° C Test Time: 2:47 pm

Stoddard Solvent Spillage Measurements

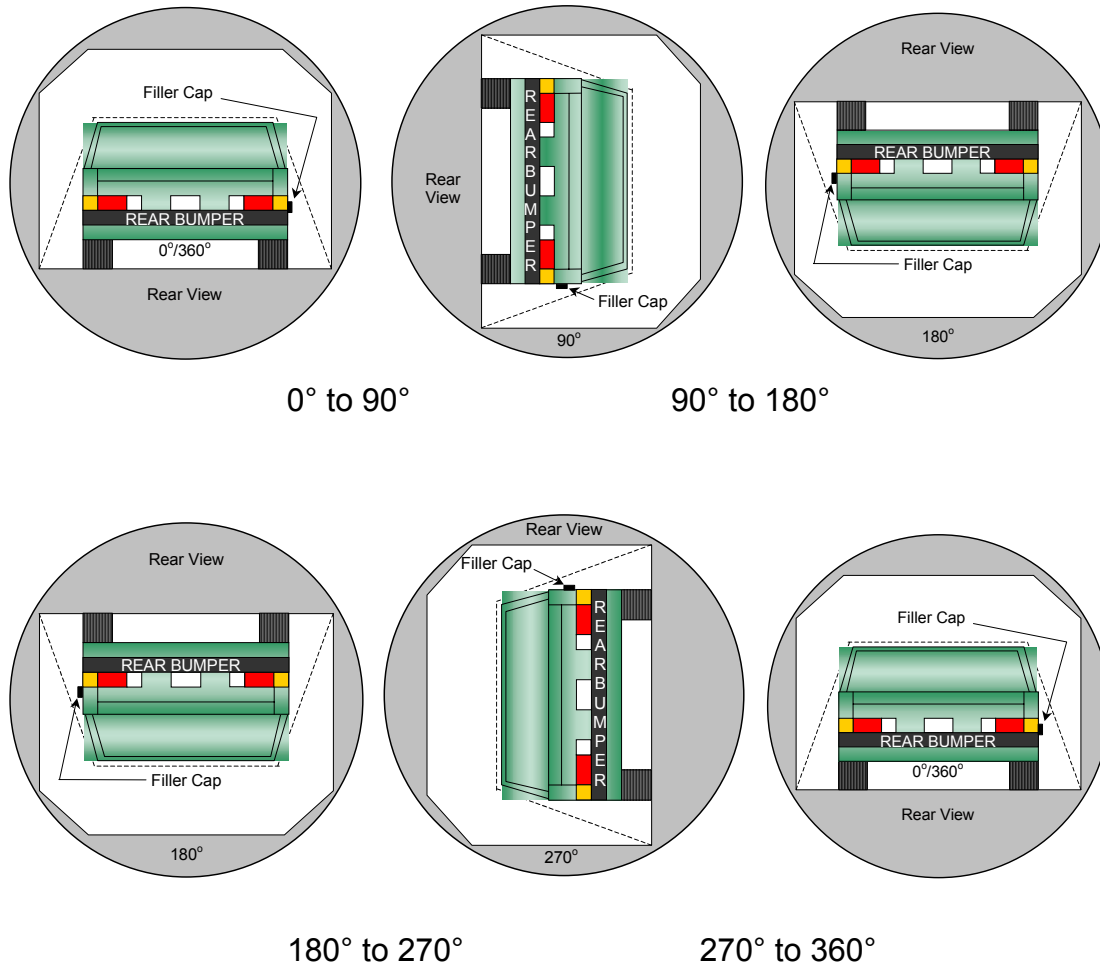
- A. From impact until vehicle motion ceases: 0 oz.
 (Maximum Allowable = 1 ounce)
- B. For the 5 minute period after motion ceases: 0 oz.
 (Maximum Allowable = 5 ounces)
- C. For the following 25 minutes: 0 oz.
 (Maximum Allowable = 1 oz. /minute)
- D. Spillage: None

DATA SHEET NO. 14
FMVSS 301 STATIC ROLLOVER DATA

Test Vehicle: 2005 Toyota Corolla
 Test Program: 35mph Frontal Impact

NHTSA No.: M55108
 Test Date: 09/17/04

Test Time: 2:47 pm



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

Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage (oz.)
0° to 90°	163	300	0
90° to 180°	165	300	0
180° to 270°	146	300	0
270° to 360°	170	300	0

DATA SHEET NO. 15
VEHICLE MEASUREMENTS

Test Vehicle: 2005 Toyota Corolla
Test Program: 35mph Frontal Impact

NHTSA No.: M55108
Test Date: 09/17/04

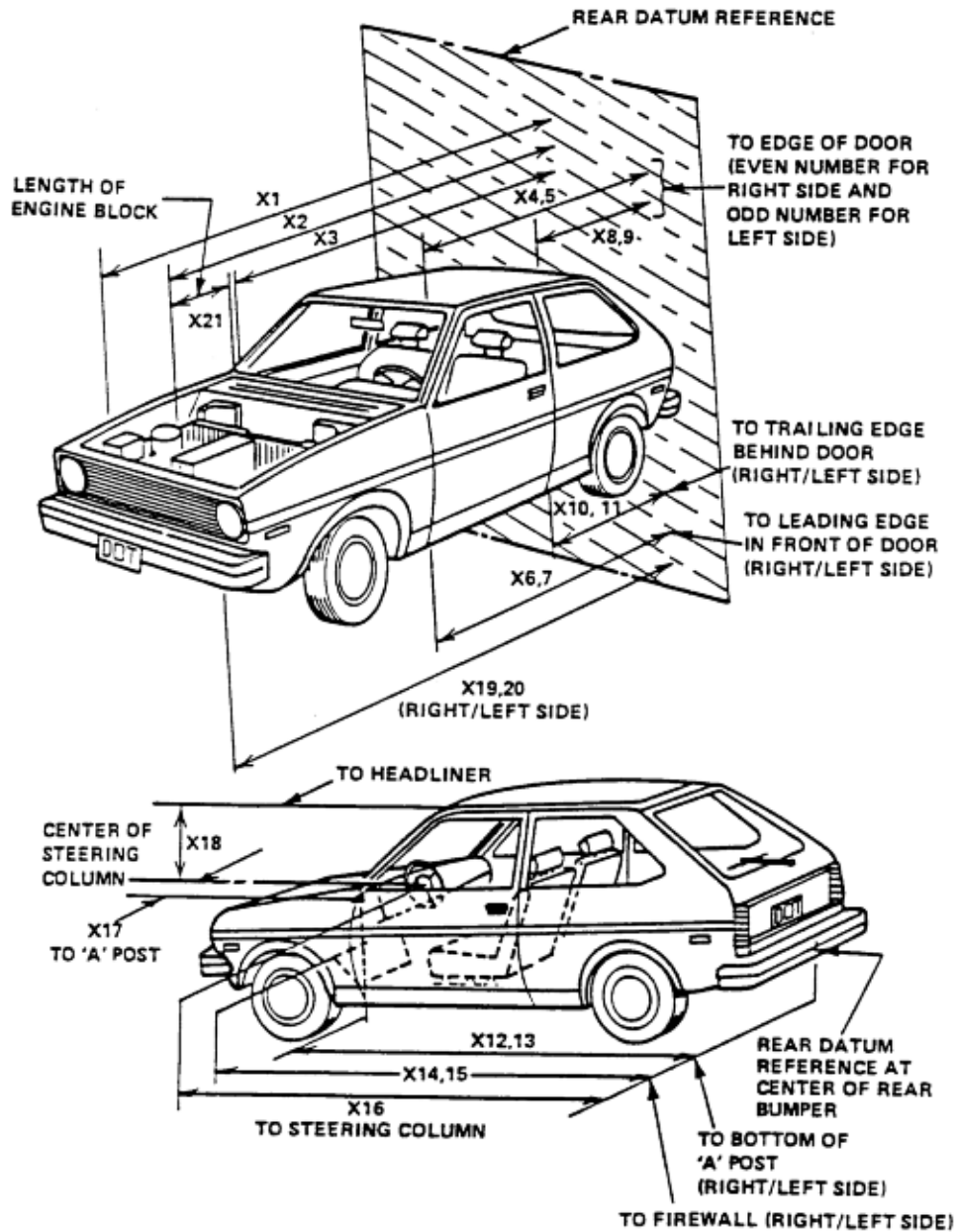
No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total length of vehicle at centerline	mm	4529	3926	603
2	RSOV to front of engine	mm	3989	3707	282
3	RSOV to firewall centerline	mm	3539	3481	58
4	RSOV to leading edge of right door	mm	3100	3128	-28
5	RSOV to leading edge of left door	mm	3100	3129	-29
6	RSOV to lower leading edge of right door	mm	3081	3085	-4
7	RSOV to lower leading edge of left door	mm	3088	3086	2
8	RSOV to upper leading edge of right door	mm	2105	2124	-19
9	RSOV to upper leading edge of left door	mm	2108	2125	-17
10	RSOV to lower trailing edge of right door	mm	2070	2074	-4
11	RSOV to lower trailing edge of left door	mm	2070	2072	-2
12	RSOV to bottom of right 'A' pillar	mm	3155	3152	3
13	RSOV to bottom of left 'A' pillar	mm	3153	3148	5
14	RSOV to firewall on right side	mm	3490	3417	73
15	RSOV to firewall on left side	mm	3492	3434	58
16	RSOV to steering column	mm	2681	2620	61
17	Center of steering column to left 'A' pillar	mm	346	322	24
18	Center of steering column to headlining	mm	435	412	23
19	RSOV to right side of front bumper	mm	4335	4033	302
20	RSOV to left side of front bumper	mm	4335	3916	419
21	Length of engine block	mm	563	563	0
RD	RSOV to right side of dash panel	mm	2930	2940	-10
CD	RSOV to center of dash panel	mm	3015	3035	-20
LD	RSOV to left side of dash panel	mm	2945	2955	-10

DATA SHEET NO. 15... (continued)

VEHICLE MEASUREMENTS

Test Vehicle: 2005 Toyota Corolla
 Test Program: 35mph Frontal Impact

NHTSA No.: M55108
 Test Date: 09/17/04



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

Test Vehicle: 2005 Toyota Corolla
Test Program: 35mph Frontal Impact

NHTSA No.: M55108
Test Date: 09/17/04

Target Vehicle Structural Measurement

	Elements	Pre-Test (mm)
1	Total Length	4529
2	Total Width	1704
3	Bumper Top Height	650
4	Bumper Bottom Height	505
5	Longitudinal Member Top Height	335
6	Distance between Longitudinal Members	1020
7	Longitudinal Member Width	67
8	Engine Top Height	930
9	Engine Bottom Height	295
10	Engine and gearbox width	895
11	Front bumper-engine distance	410
12	Front shock absorber fixing height	972
13	Bonnet leading edge height	860
14	Front shock absorber fixing width	1140
15	Front bumper – front axle distance	930
16	Front axle – a pillar distance	430
17	A-pillar – B-pillar distance	1075
18	B-Pillar – rear axle distance	1094
19	B-pillar – C-pillar distance	1000
20	Roof sill bottom height	1415
21	Roof sill top height	1465
22	Floor sill bottom height	260
23	Floor sill top height	317

DATA SHEET NO. 16
CAMERA LOCATIONS

Test Vehicle: 2005 Toyota Corolla
Test Program: 35mph Frontal Impact

NHTSA No.: M55108
Test Date: 09/17/04

No.	Camera View	Location (mm) *			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Side View				13	24
2	Left Front View	1435	-8175	1520	24	1000
3	Steering Column Top	1980	-6290	1570	19	1000
4	Steering Column Bottom	1965	-6290	1040	19	1000
5	Driver Close-up	1090	-8570	1725	52	1000
6	Driver Angle	6240	-5200	2113	50	1000
7	Right Overall	2370	7670	1535	19	1000
8	Right Passenger Half	980	7730	1500	19	1000
9	Right Close-up	1615	8340	1520	50	1000
10	Right Angle	6450	4660	2050	50	1000
11	Windshield	255	0	2750	19	1000
12	Top Driver	95	-460	1745	13	1000
13	Top Passenger	55	470	1695	13	1000
14	Pit Front	1025	0	-3150	24	1000
15	Pit Rear	3100	0	-3150	24	1000
16	Left Rear Dummy Closeup	2550	-4760	1990	35	1000

*COORDINATES:

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

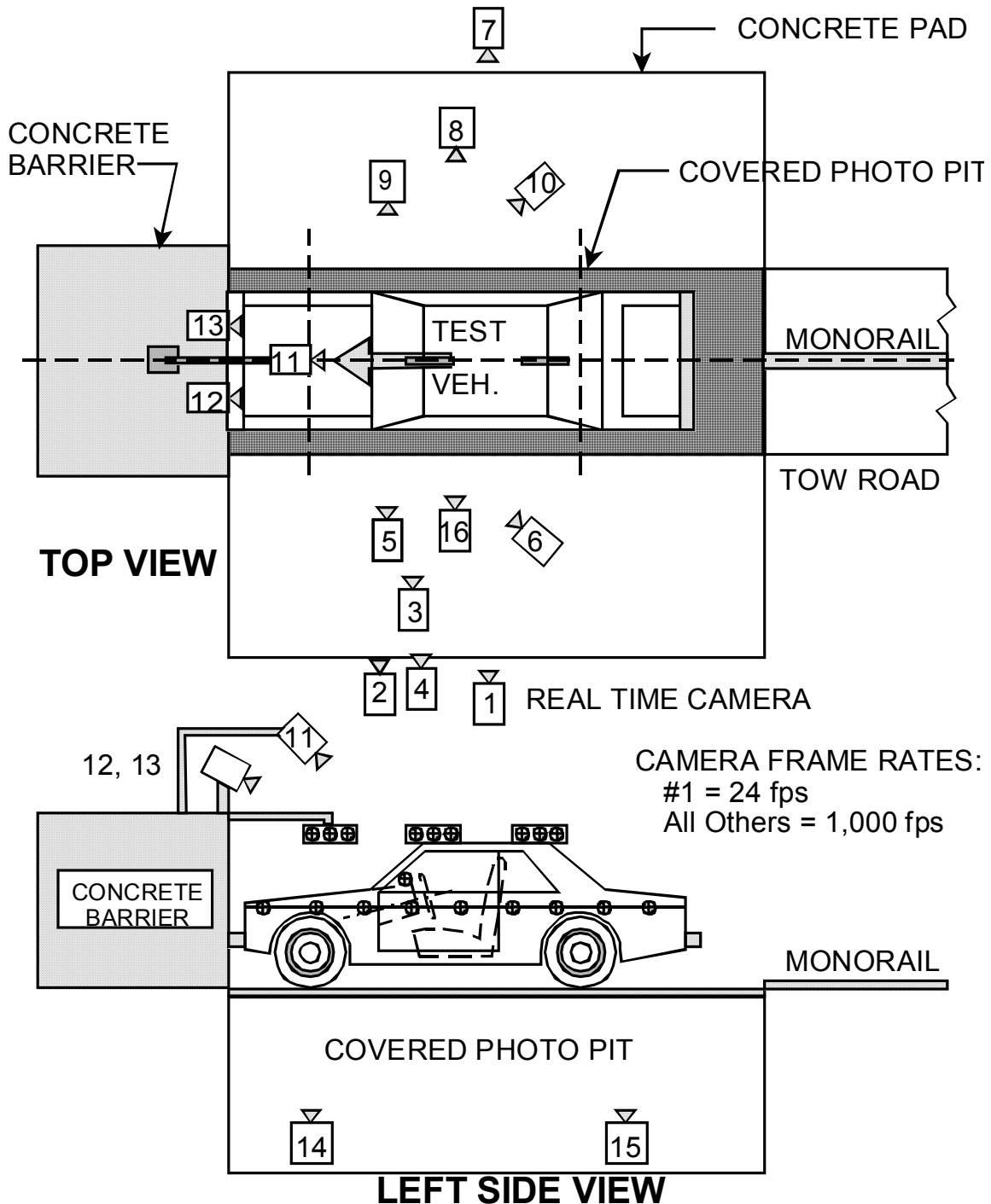
DATA SHEET NO. 16... (continued)

CAMERA LOCATIONS

Test Vehicle: 2005 Toyota Corolla
Test Program: 35mph Frontal Impact

NHTSA No.: M55108
Test Date: 09/17/04

CAMERA POSITIONS FOR FRONTAL IMPACTS



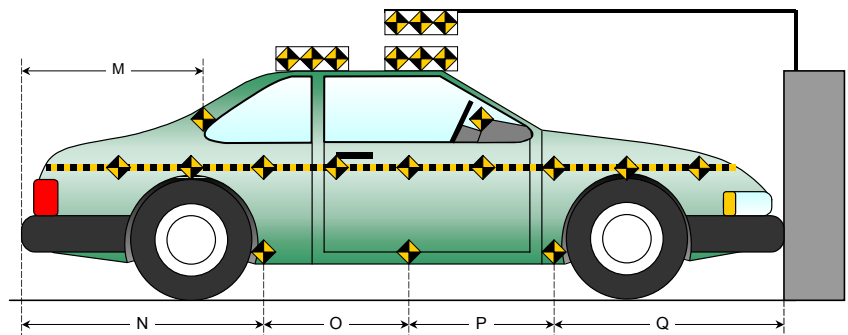
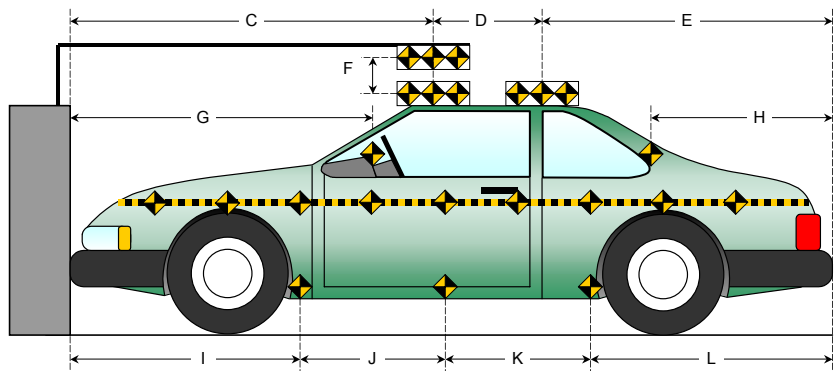
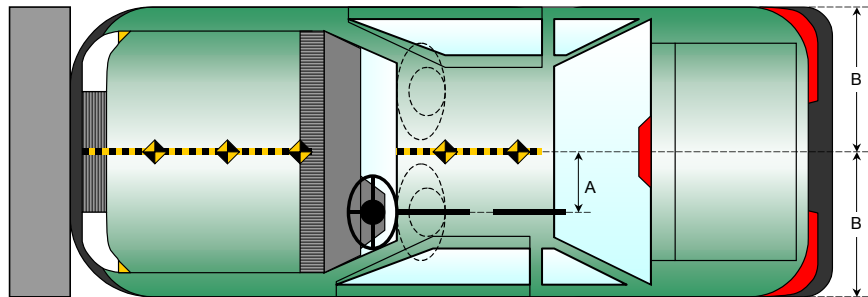
DATA SHEET NO. 17

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2005 Toyota Corolla
 Test Program: 35mph Frontal Impact

NHTSA No.: M55108
 Test Date: 09/17/04

Item	Value
A	345
B	852
C	2268
D	609
E	1652
F	
G	
H	985
I	1391
J	875
K	875
L	1388
M	990
N	1388
O	870
P	880
Q	1391



DATA SHEET NO. 18
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2005 Toyota Corolla
 Test Program: 35mph Frontal Impact

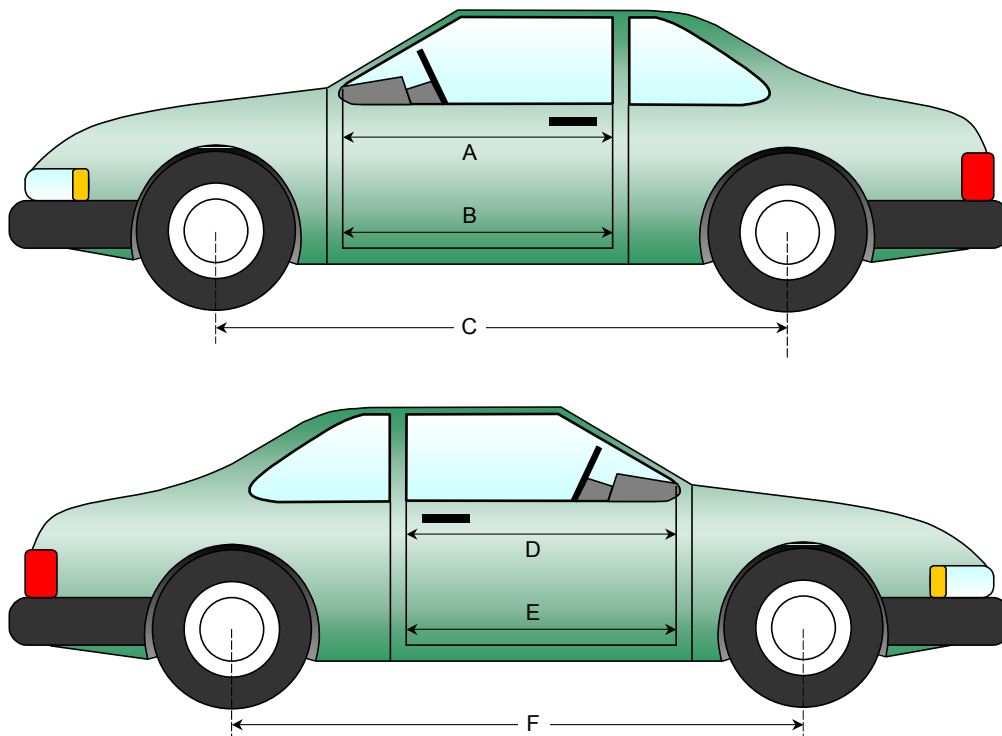
NHTSA No.: M55108
 Test Date: 09/17/04

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	948	947	1
B	Left Side Lower	mm	864	862	2
D	Right Side Upper	mm	952	953	-1
E	Right Side Lower	mm	838	836	2

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2596	2563	33
F	Right Side Wheelbase	mm	2596	2555	41



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

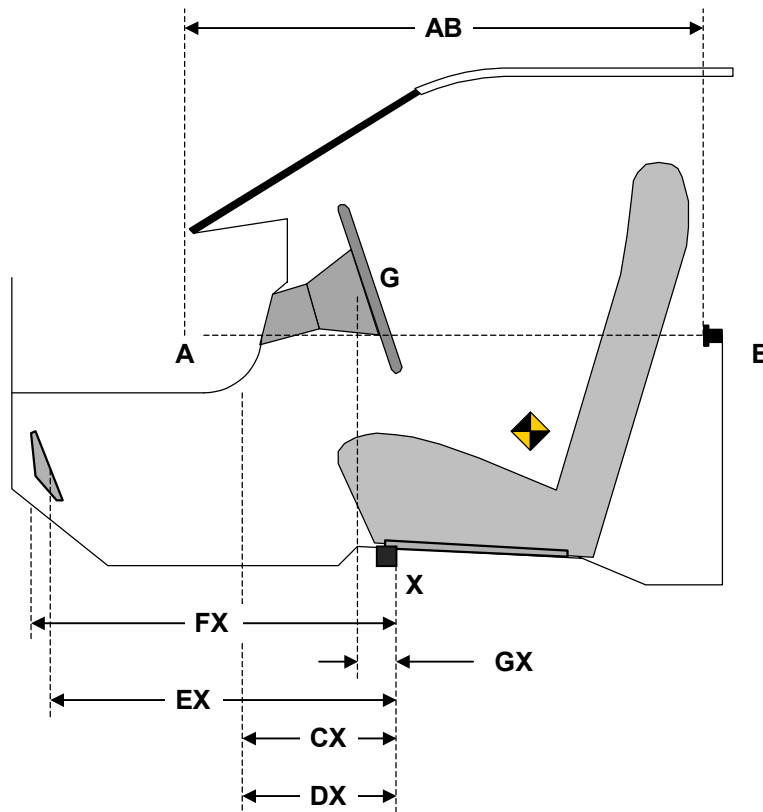
Test Vehicle: 2005 Toyota Corolla
 Test Program: 35mph Frontal Impact

NHTSA No.: M55108
 Test Date: 09/17/04

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside window jam)	mm	948	947	1
CX	Left Knee Bolster to X	mm	312	333	-21
DX	Right Knee Bolster to X	mm	299	339	-40
EX	Brake Pedal to X	mm	556	554	2
FX	Foot Rest to X	mm	562	537	25
GX	Center of Steering Column Wheel Hub to X	mm	117	159	-42

X = Front of Seat Track (stationary)



DRIVER COMPARTMENT

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

Test Vehicle: 2005 Toyota Corolla
 Test Program: 35mph Frontal Impact

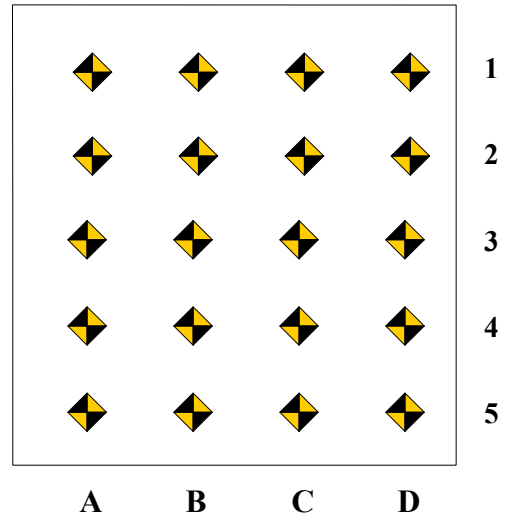
NHTSA No.: M55108
 Test Date: 09/17/04

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

Columns A through D are evenly spaced.

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

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



DRIVER FLOOR PAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1		638	641	632		612	611	612		26	30	20
2		582	580	577		566	565	565		16	15	12
3	512	510	501	506	505	505	507	509	7	5	-6	-3
4	381	379	382	381	385	382	386	384	-4	-3	-4	-3
5	250	249	251	250	253	251	254	253	-3	-2	-3	-3

DRIVER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1		-10	-4	-6		-5	-7	-10		-5	3	4
2		-55	-57	-61		-59	-63	-70		4	6	9
3	-105	-107	-100	-106	-112	-119	-125	-124	7	12	25	18
4	-113	-106	-99	-105	-114	-120	-119	-117	1	14	20	12
5	-107	-96	-95	-65	-114	-109	-112	-76	7	13	17	11

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

Test Vehicle: 2005 Toyota Corolla
 Test Program: 35mph Frontal Impact

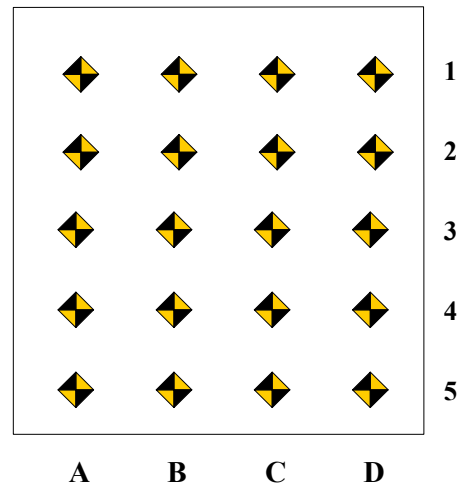
NHTSA No.: M55108
 Test Date: 09/17/04

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

Columns A through D are evenly spaced.

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

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



PASSENGER FLOOR PAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	645	645	645		632	631	628		13	14	17	
2	590	590	575		577	576	558		13	14	17	
3	540	535	521	513	518	521	511	503	22	14	10	10
4	400	380	370	368	376	381	380	380	24	-1	-10	-12
5	250	250	245	255	224	246	243	246	26	4	2	9

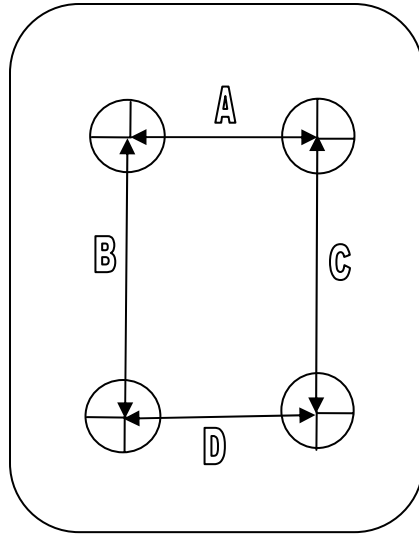
PASSENGER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-20	-15	-15		-34	-23	-8		14	8	-7	
2	-65	-55	-55		-81	-72	-64		16	17	9	
3	-100	-100	-100	-105	-125	-123	-118	-111	25	23	18	6
4	-95	-102	-102	-105	-123	-122	-117	-116	28	20	15	11
5	-65	-100	-95	-111	-73	-113	-106	-113	8	13	11	2

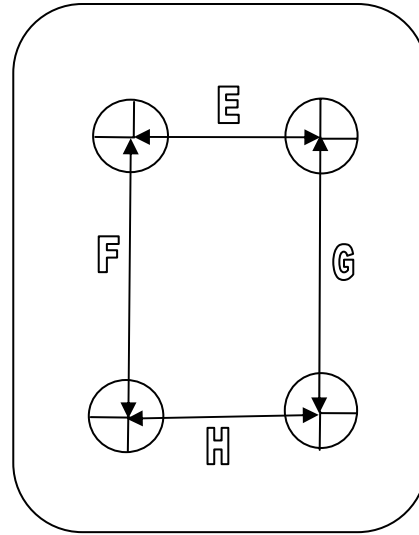
DATA SHEET NO. 18... (continued)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2005 Toyota Corolla
 Test Program: 35mph Frontal Impact

NHTSA No.: M55108
 Test Date: 09/17/04



Driver



Passenger

UNDERBODY FLOORBOARD DEFORMATION

Measurement	Pre-Test	Post-Test	Difference
A	245	236	9
B	315	316	-1
C	315	315	0
D	250	235	15
E	280	271	9
F	318	315	3
G	332	332	0
H	280	285	-5

DATA SHEET NO. 19

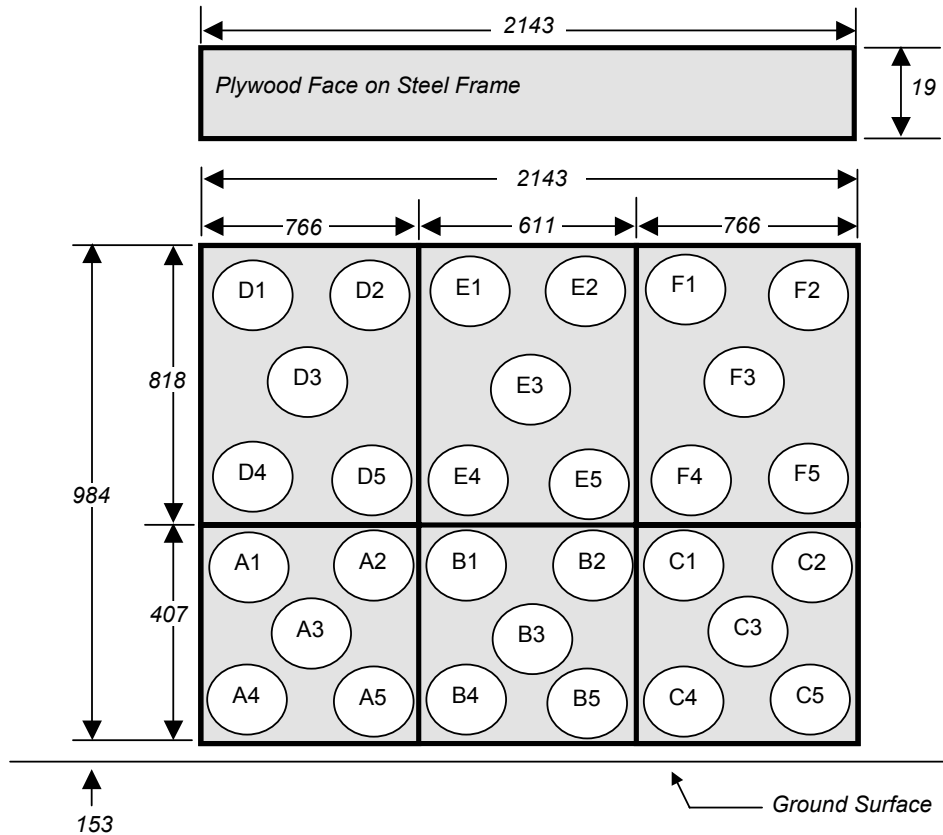
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2005 Toyota Corolla
 Test Program: 35mph Frontal Impact

NHTSA No.: M55108
 Test Date: 09/17/04

30 Load Cell Rigid Barrier

Load Cell Locations on Fixed Barrier



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

6 Groups of 5 Load Cells Each

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

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

DATA SHEET NO. 20**ACCIDENT INVESTIGATION DIVISION DATA**

Test Vehicle: 2005 Toyota Corolla
Test Program: 35mph Frontal Impact

NHTSA No.: M55108
Test Date: 09/17/04

VEHICLE INFORMATION

VIN: 1NXBR30E85Z371754 Wheelbase (mm) : 2596
Vehicle Size Category: 4-door Sedan Test Weight (kg) : 1379.0

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): 56.5
Velocity Change (km/h): 63.4 Time of Separation (msec): 107

CRUSH PROFILE

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

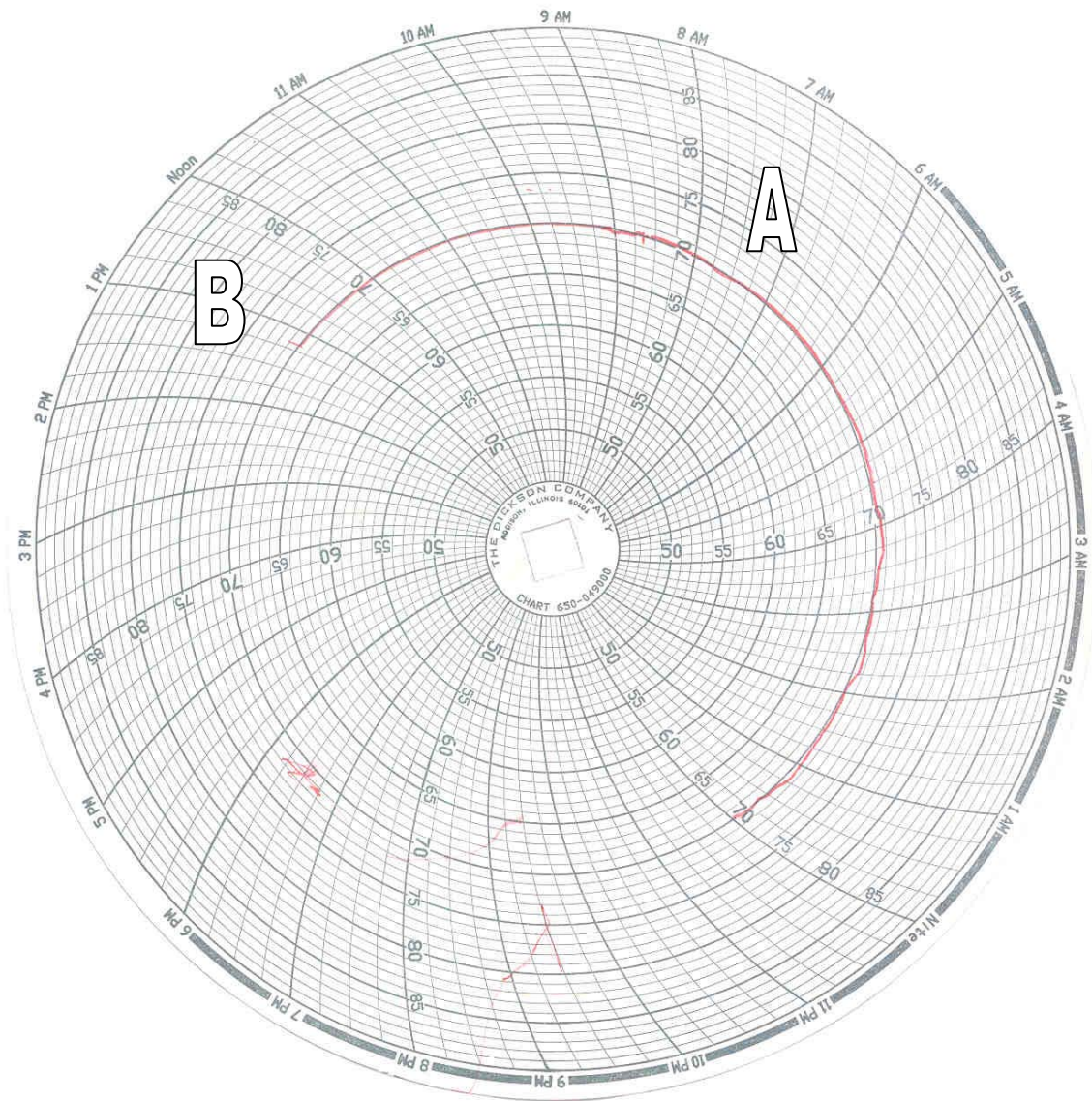
No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4335	3916	419
C2	Crush zone 2 at left side	mm	4444	3916	528
C3	Crush zone 3 at left side	mm	4495	3948	547
C4	Crush zone 4 at right side	mm	4495	3906	589
C5	Crush zone 5 at right side	mm	4444	4014	430
C6	Crush zone 6 at right side	mm	4335	4033	302
L	C1 TO C6	mm	1520	1482	38

DATA SHEET NO. 21

DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2005 Toyota Corolla
Test Program: 35mph Frontal Impact

NHTSA No.: M55108
Test Date: 09/17/04



A = Dummies installed in vehicle at 7:00 am

B = Test conducted at 12:03 pm

APPENDIX A
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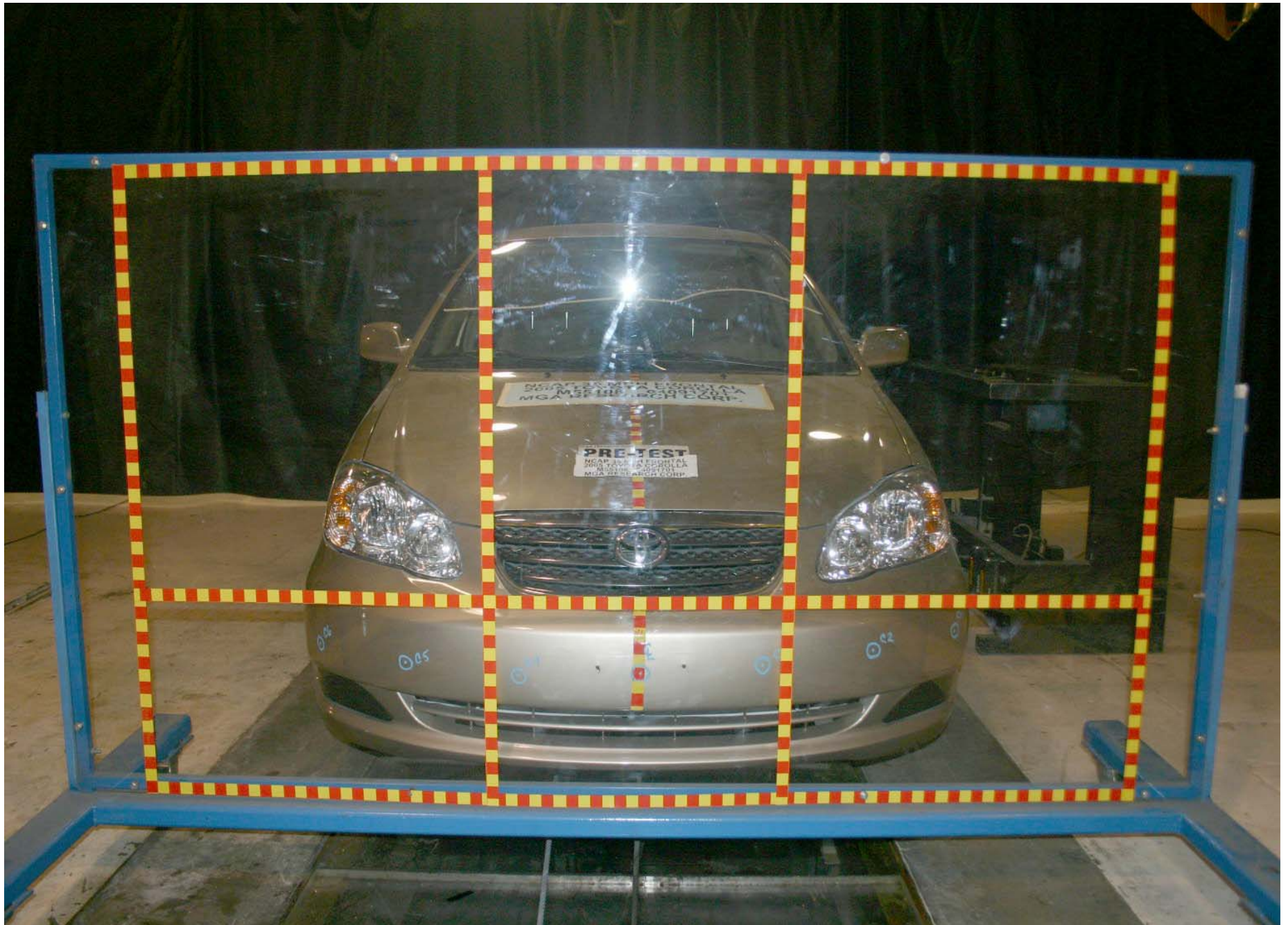
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Load Cell Location

MFD BY: NEW UNITED MOTOR MANUFACTURING
INC. 06/04

GVWR 3585LB GAWR FR 1885LB RR 1720LB
THIS VEHICLE CONFORMS TO ALL APPLICABLE
FEDERAL MOTOR VEHICLE SAFETY BUMPER AND
THEFT PREVENTION STANDARDS IN EFFECT ON
THE DATE OF MANUFACTURE SHOWN ABOVE.

1NXBR30E85Z371754 PASS CAR



C/TR: 4Q2/FB41
A/TM: -02A/A245E

MODEL: ZZE130L-DEPNKA

BA3517395

Vehicle Certification Label

TIRE AND LOADING INFORMATION

SEATING CAPACITY: TOTAL 5
FRONT 2: REAR 3
 The combined weight of occupants and cargo should never exceed 390kg or 860lbs.

ORIGINAL TIRE SIZE COLD TIRE INFLATION PRESSURE
P195/65R15 FRONT 210kPa, 30PSI
 REAR 210kPa, 30PSI

COMPACT SPARE TIRE COLD TIRE INFLATION PRESSURE
T125/70R16 420kPa, 60PSI

SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION

INFORMATION SUR LES PNEUS ET LE CHARGEMENT

NOMBRE DE PLACES ASSISES: TOTAL 5
AVANT 2: ARRIERE 3
 Le poids total des occupants et du chargement ne doit jamais être supérieur à 390kg ou 860lb.

DIMENSION DES PNEUS D'ORIGINE **P195/65R15**

ROUE DE SECOURS COMPACTE **T125/70R16**

PRESSION DE GONFLAGE A FROID
AVANT 210kPa, 30PSI
ARRIERE 210kPa, 30PSI

PRESSION DE GONFLAGE A FROID
420kPa, 60PSI

POUR DE PLUS AMPLES INFORMATIONS, VOIR LE MANUEL DU PROPRIETAIRE

N 2

02500

CAUTION

B

Tire Placard



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



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



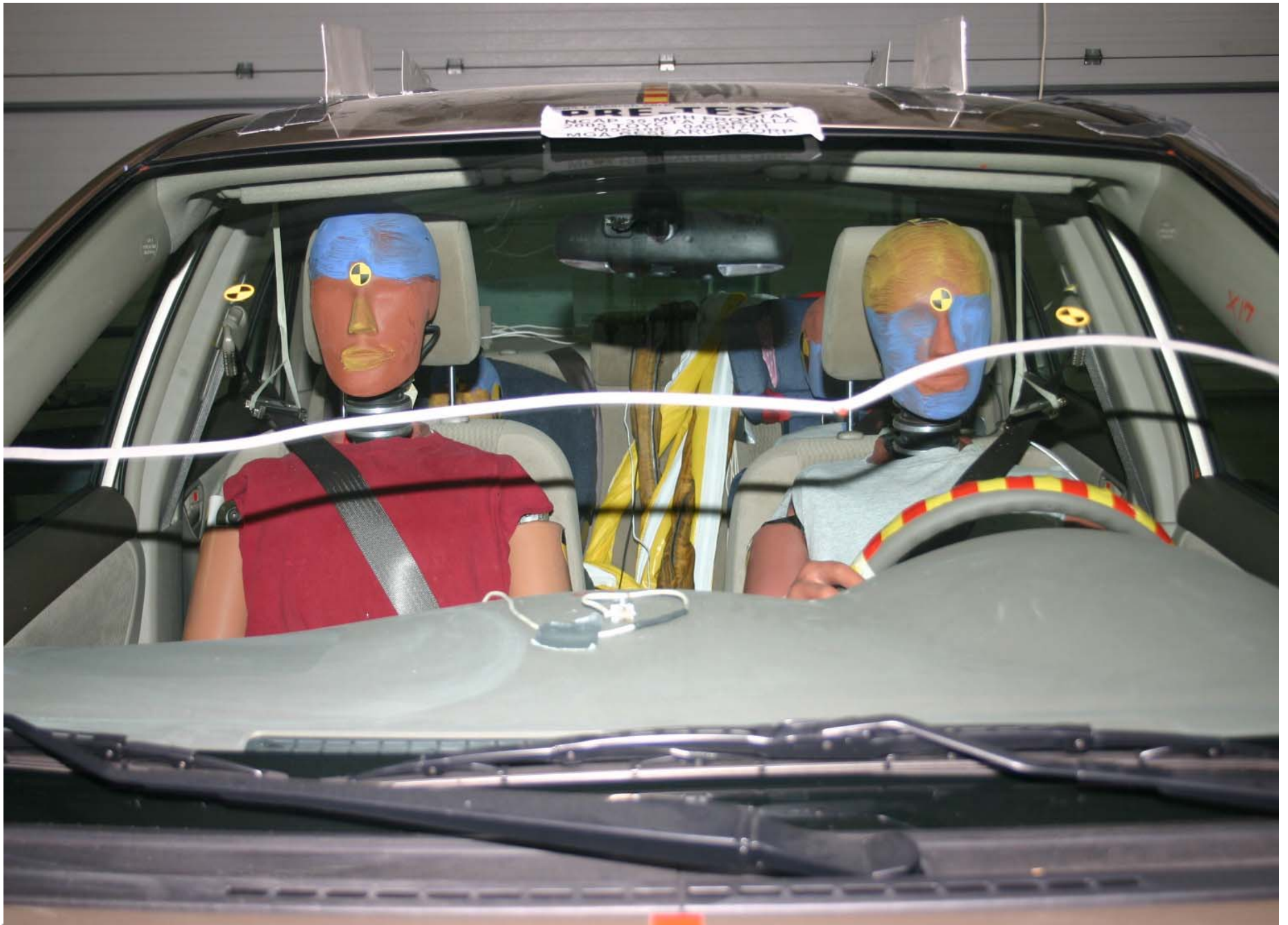
Post-Test Left Rear Three-Quarter View of Test Vehicle



Post-Test Left Side Three-Quarter View of Doors After Impact



Post-Test Right Side Three-Quarter View of Doors After Impact



Pre-Test Windshield View



Post-Test Windshield View



Pre-Test Engine Compartment View



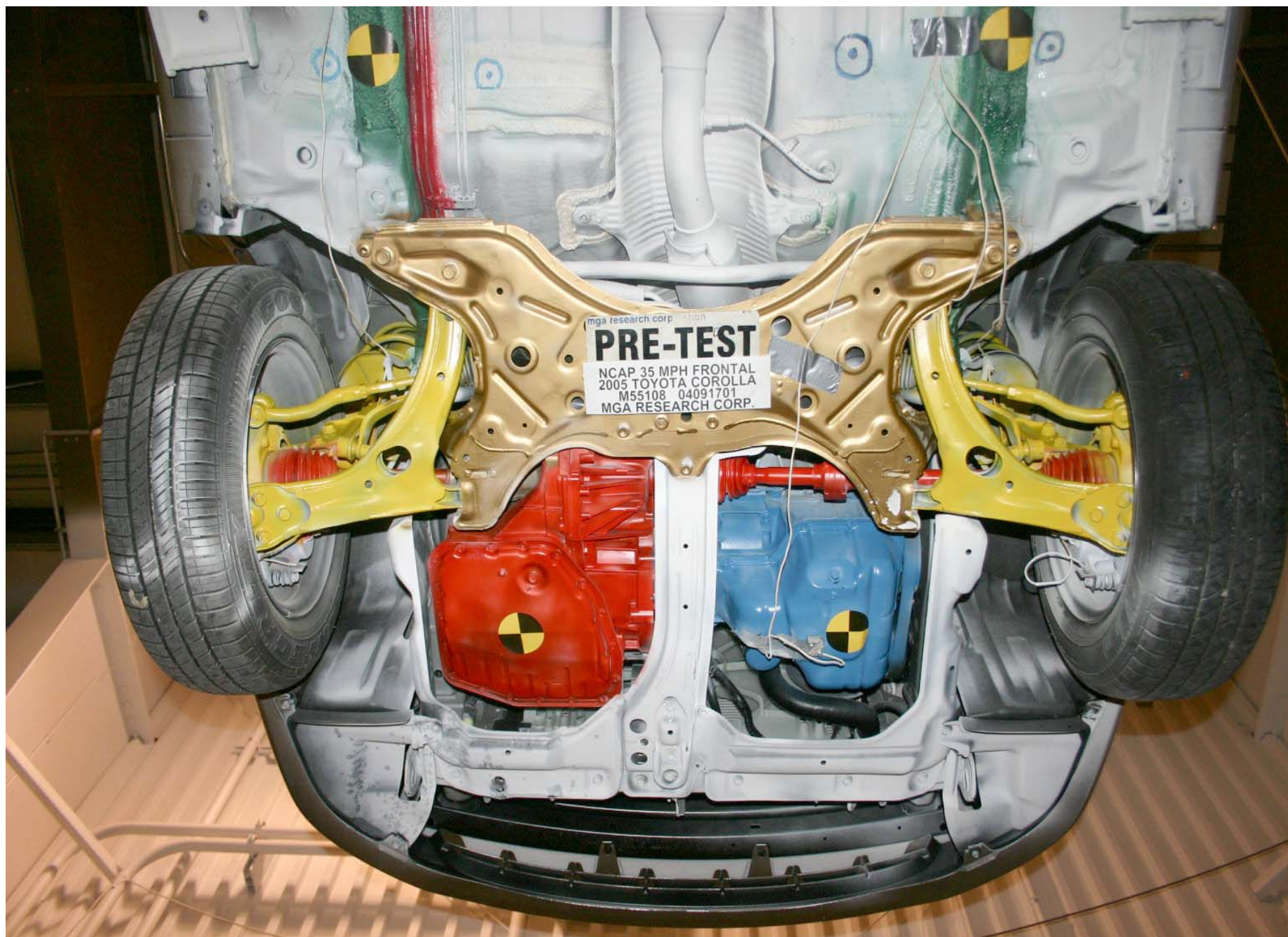
Post-Test Engine Compartment View



Pre-Test Fuel Filler Cap View



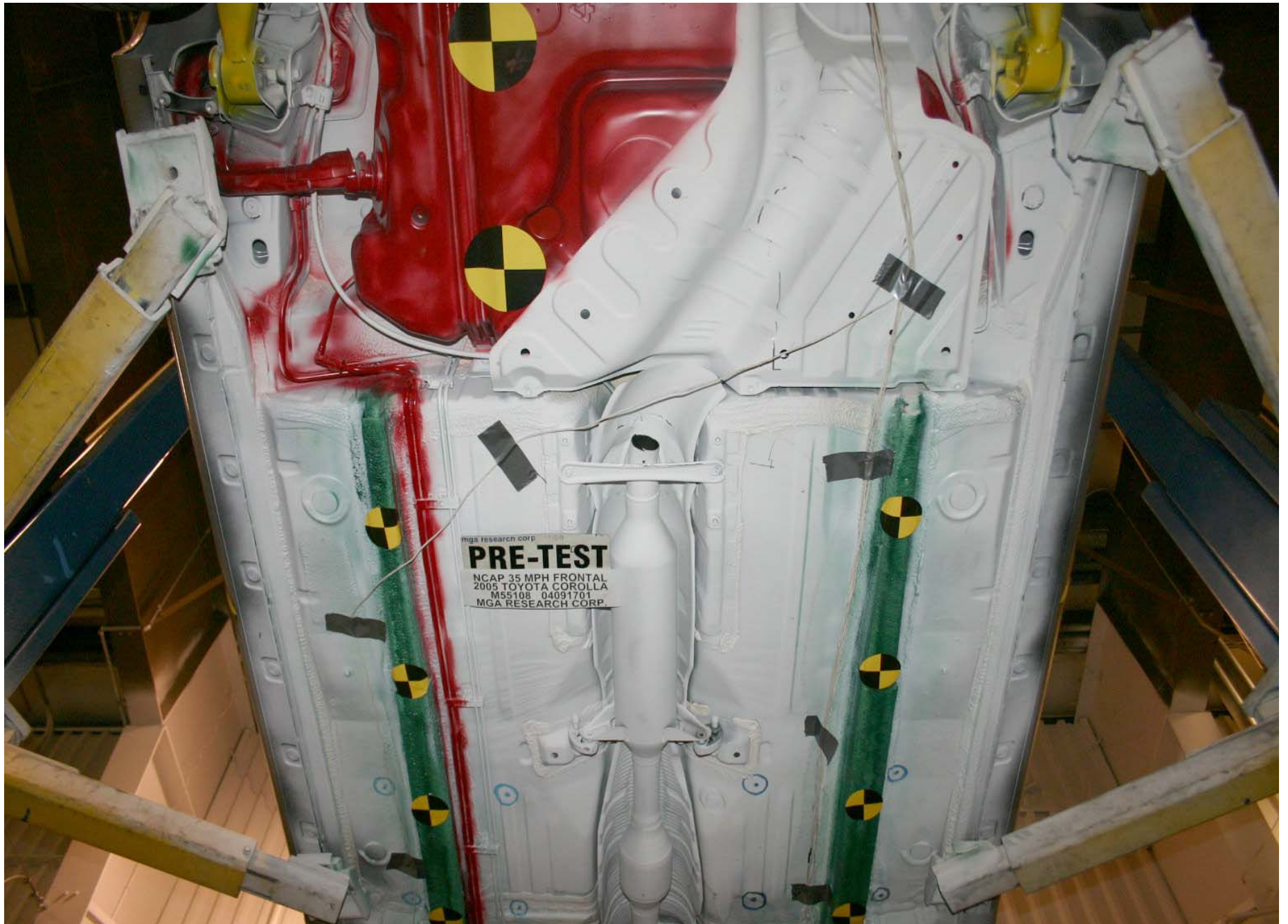
Post-Test Fuel Filler Cap View



Pre-Test Front Underbody View



Post-Test Front Underbody View



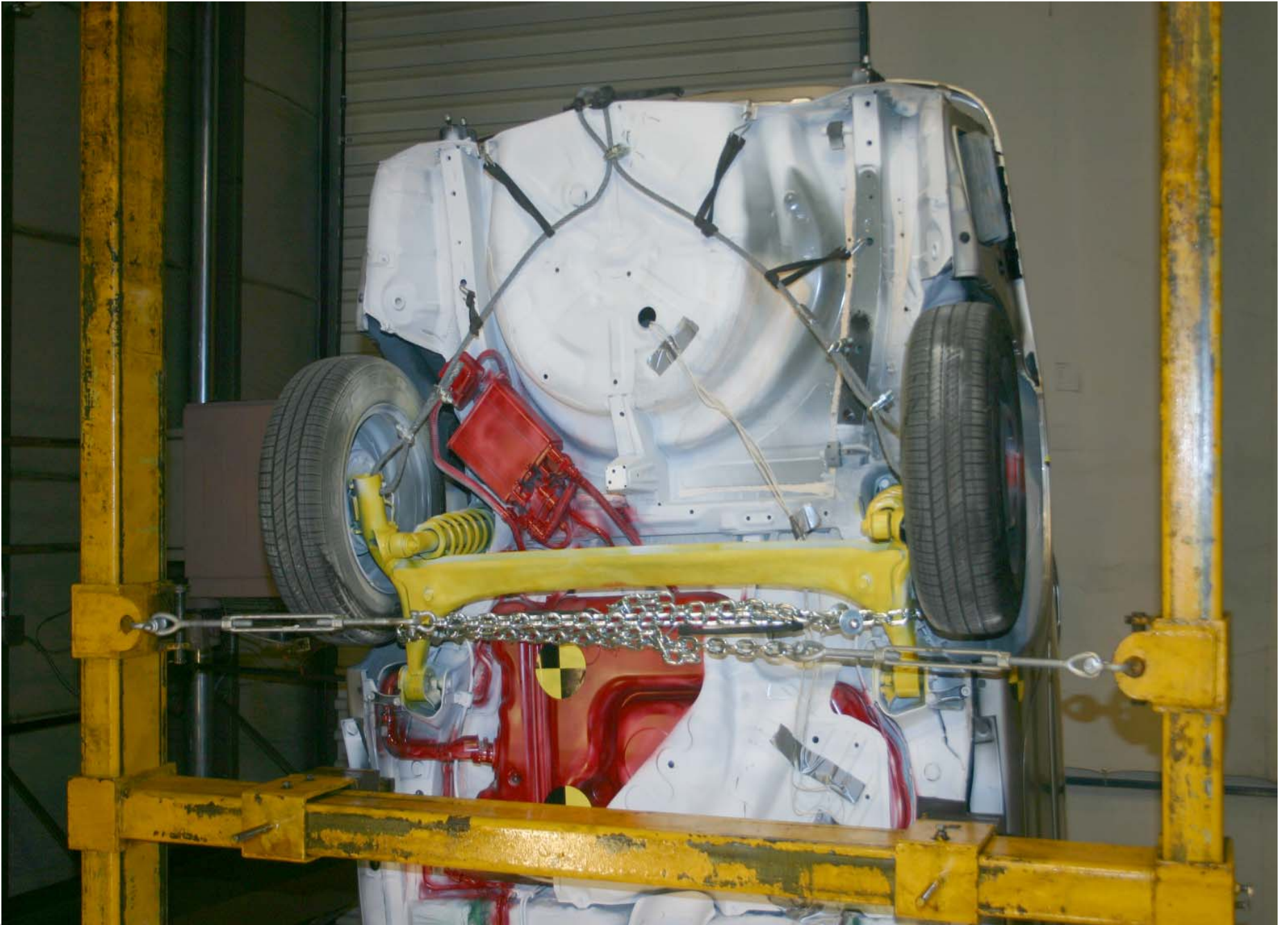
Pre-Test Mid Underbody



Post-Test Mid Underbody



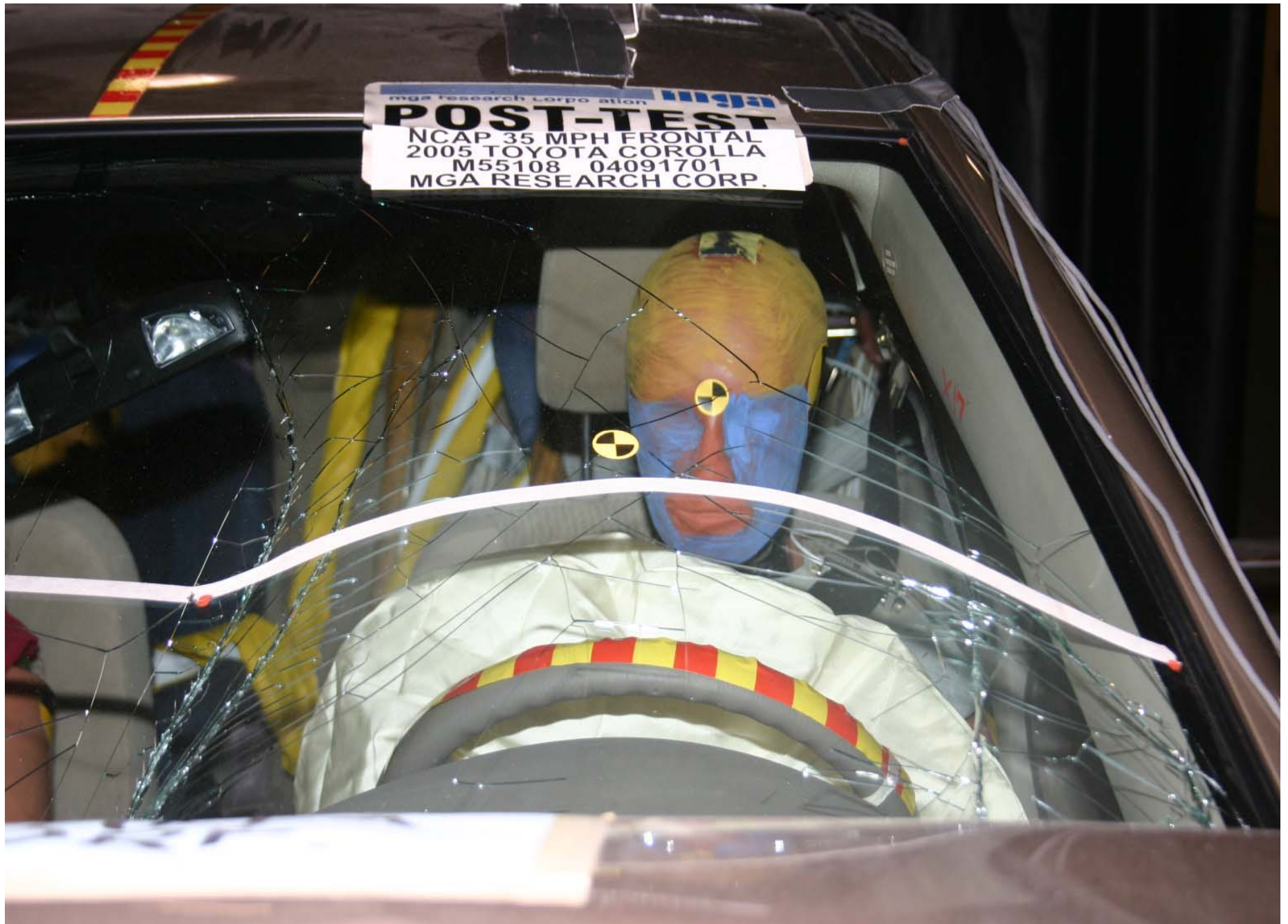
Pre-Test Rear Underbody View



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



Pre-Test Driver Side Floor Pan View



Post-Test Driver Side Floor Pan View



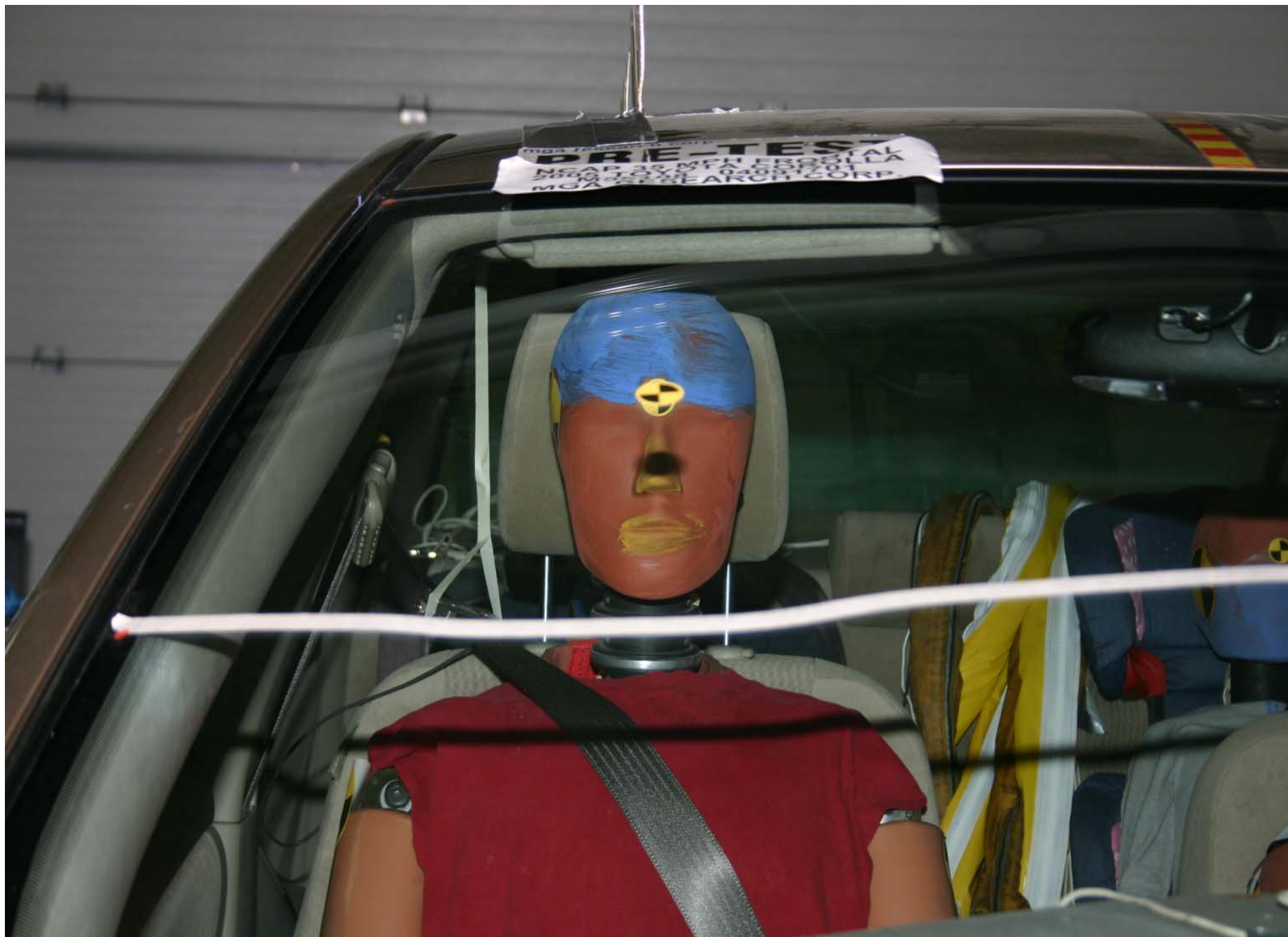
Post-Test Driver Dummy Head Contact



Post-Test Driver Dummy Knee Contact



Post-Test Driver Dummy Airbag Contact



Pre-Test Passenger Dummy Front View (head position)



Post-Test Passenger Dummy Front View (head position)



Pre-Test Passenger Dummy Position Right Side View

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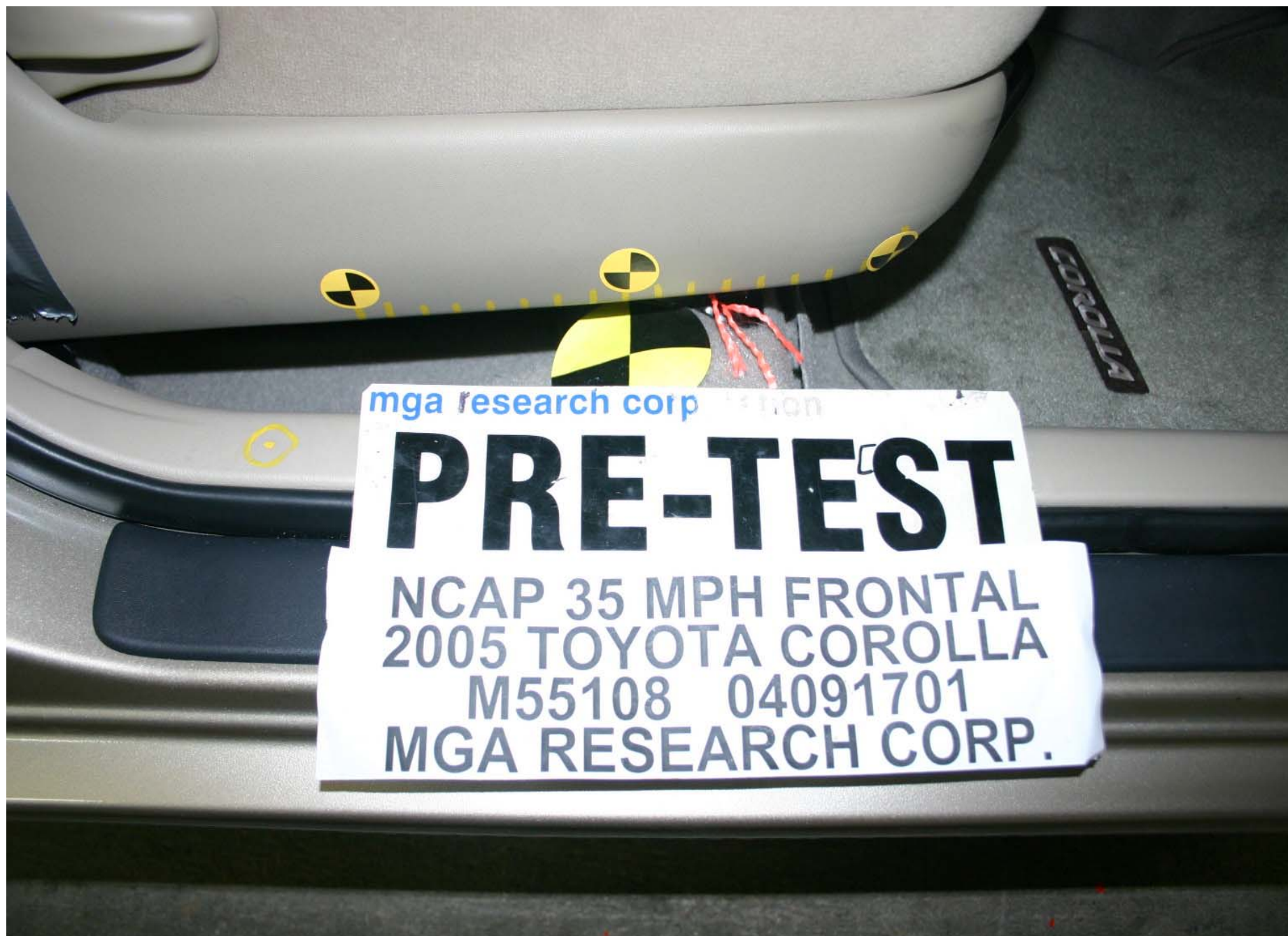
Post-Test Passenger Dummy Position Right Side View



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



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



Pre-Test Passenger Dummy Seat Position



Post-Test Passenger Dummy Seat Position



Pre-Test Passenger Dummy Feet Position



Post-Test Passenger Dummy Feet Position



Pre-Test Passenger Side Knee Bolster View



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 Knee Contact

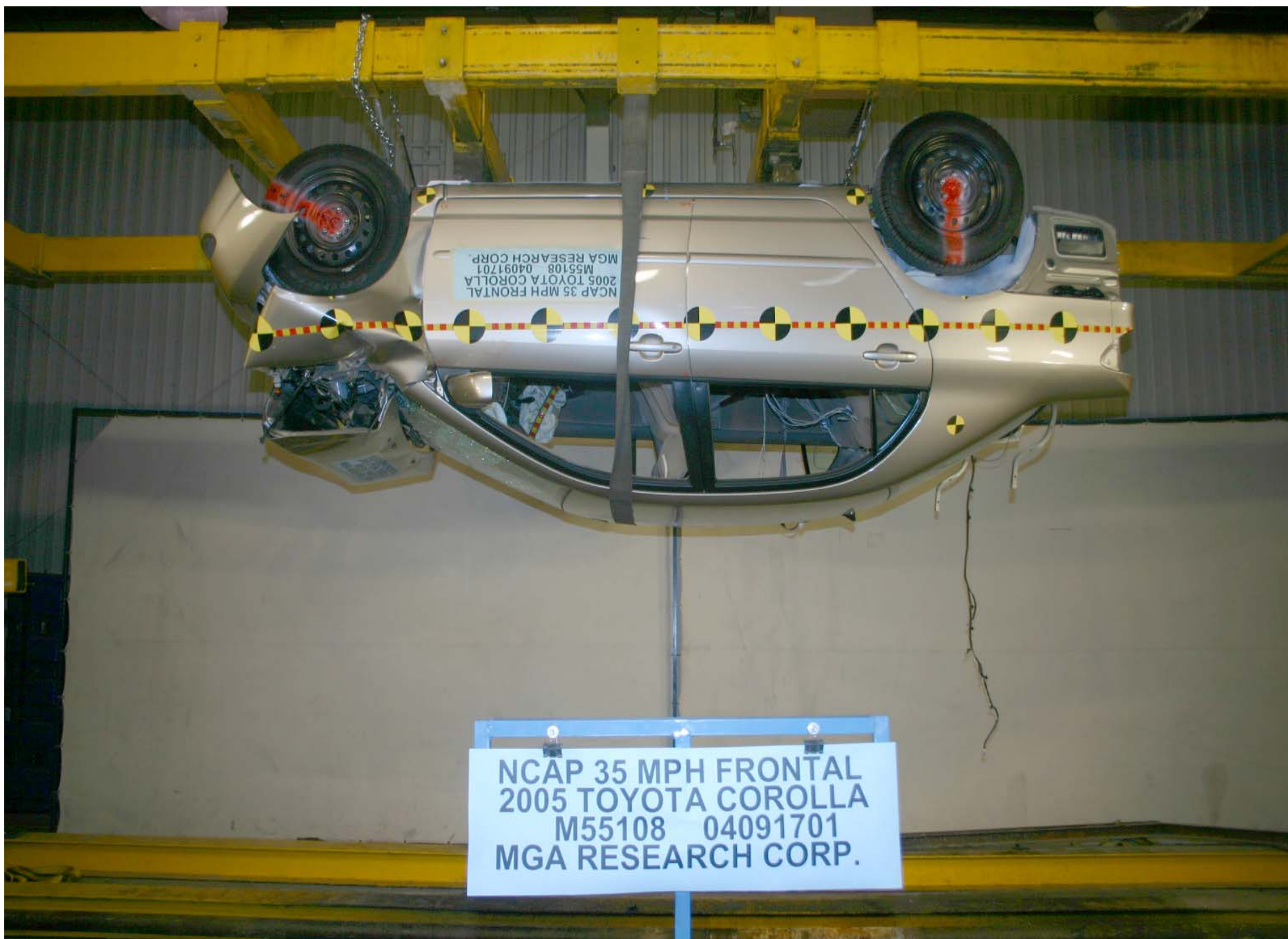


Post-Test Passenger Dummy Airbag Contact



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Rollover 90 Degrees



Rollover 180 Degrees

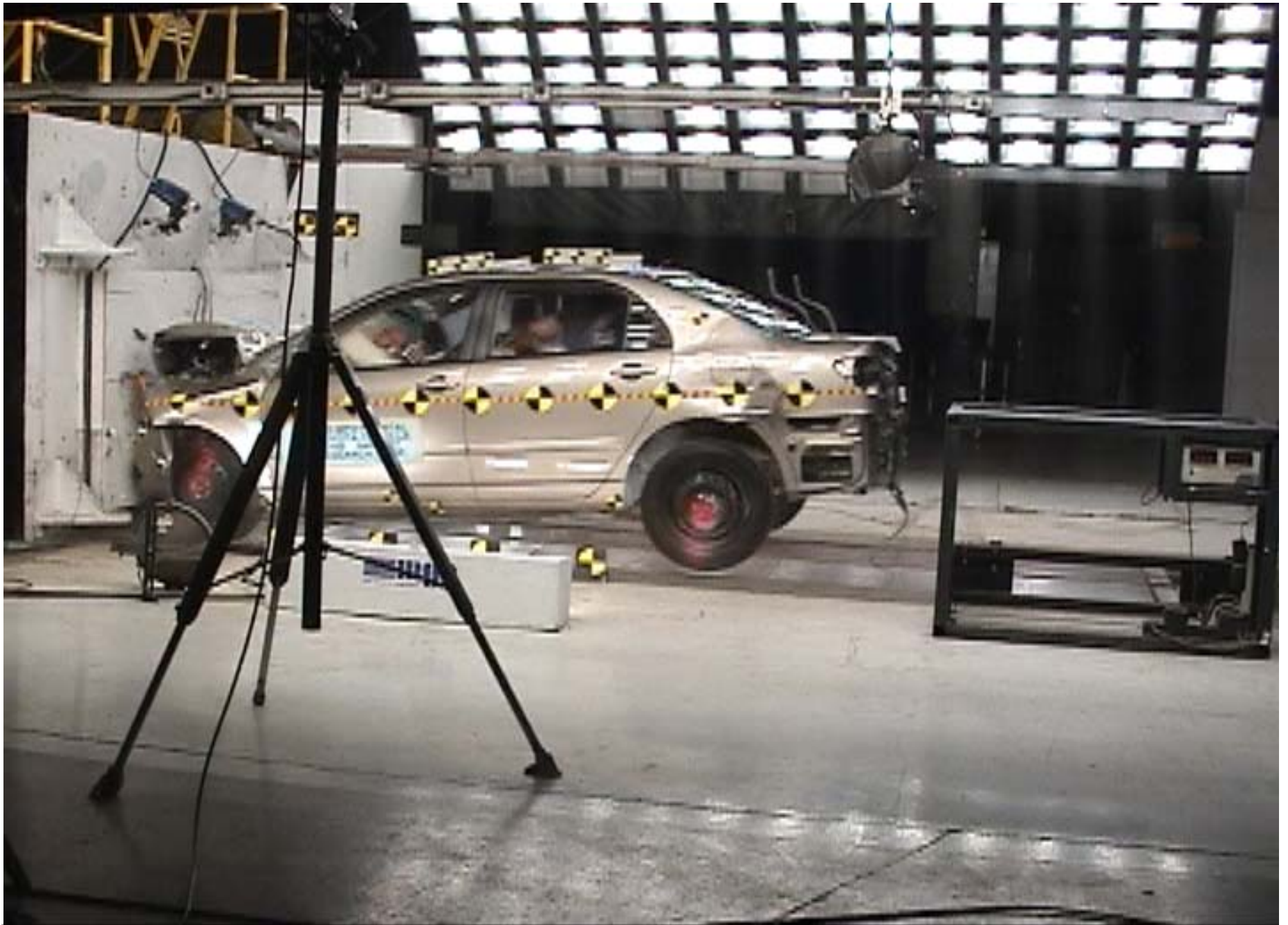
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Rollover 270 Degrees



Rollover 360 Degrees



Vehicle Impact

APPENDIX B

DUMMY AND VEHICLE RESPONSE DATA TRACES

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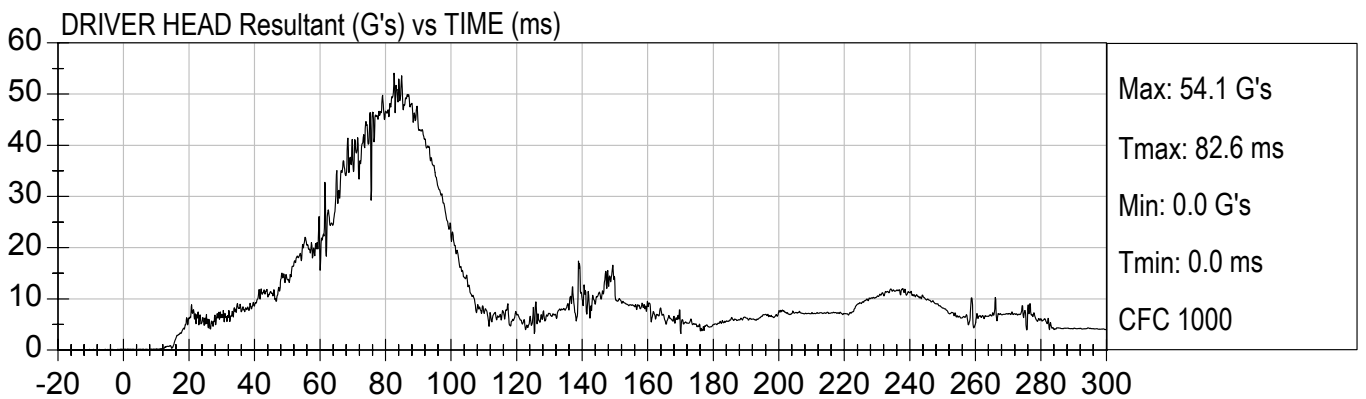
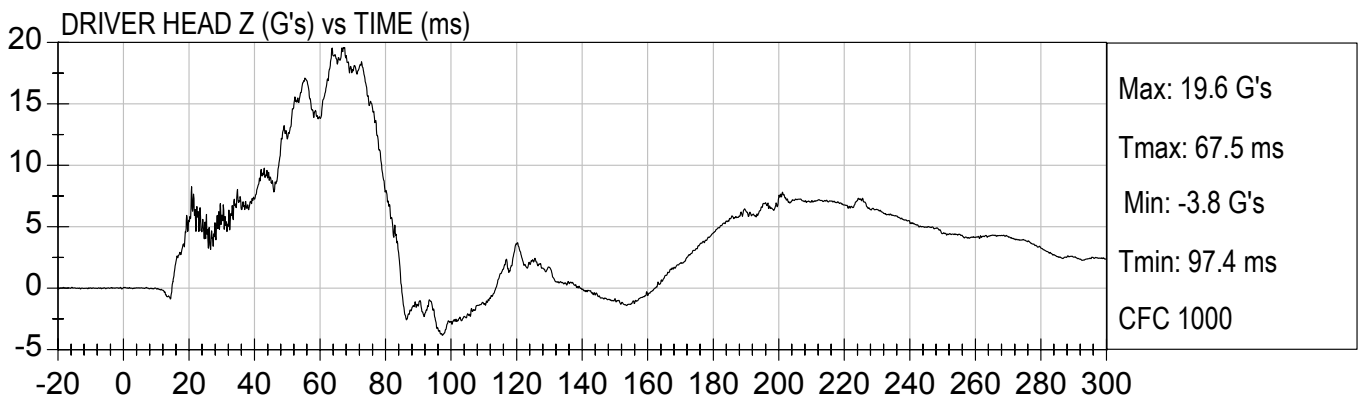
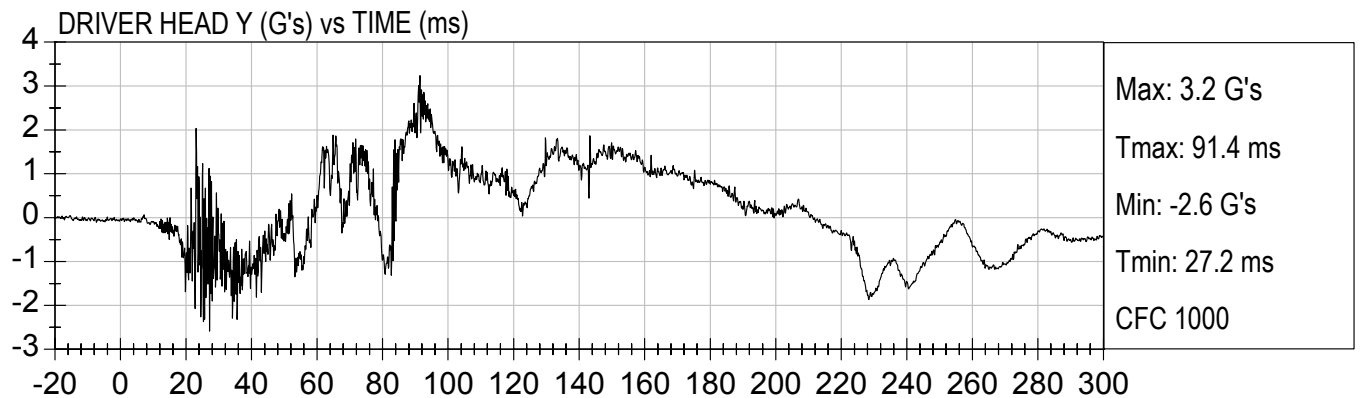
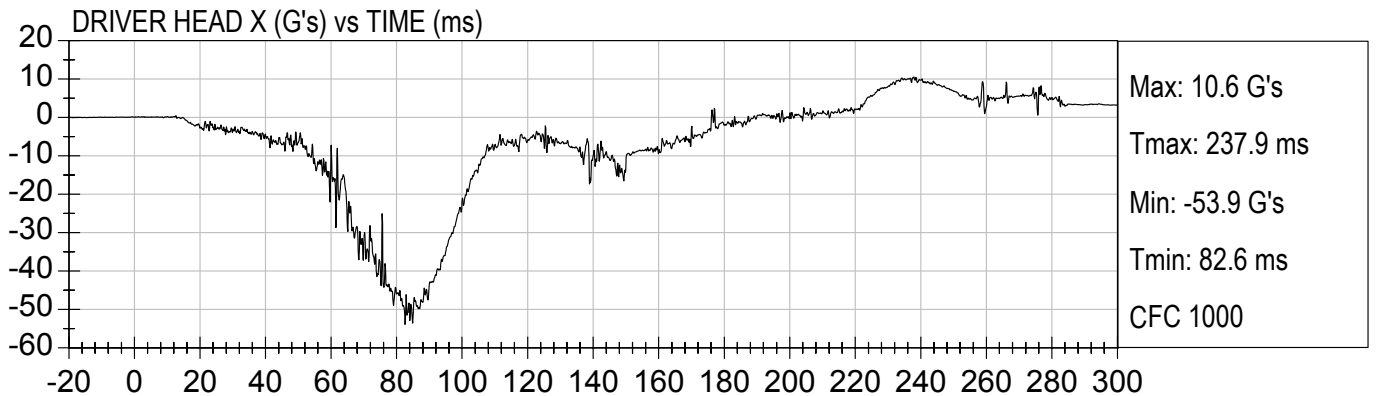
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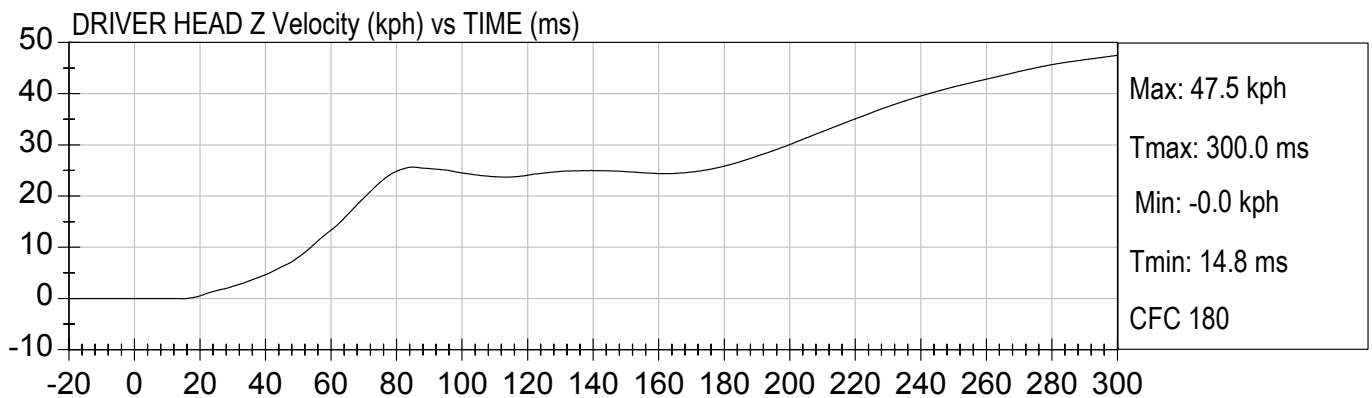
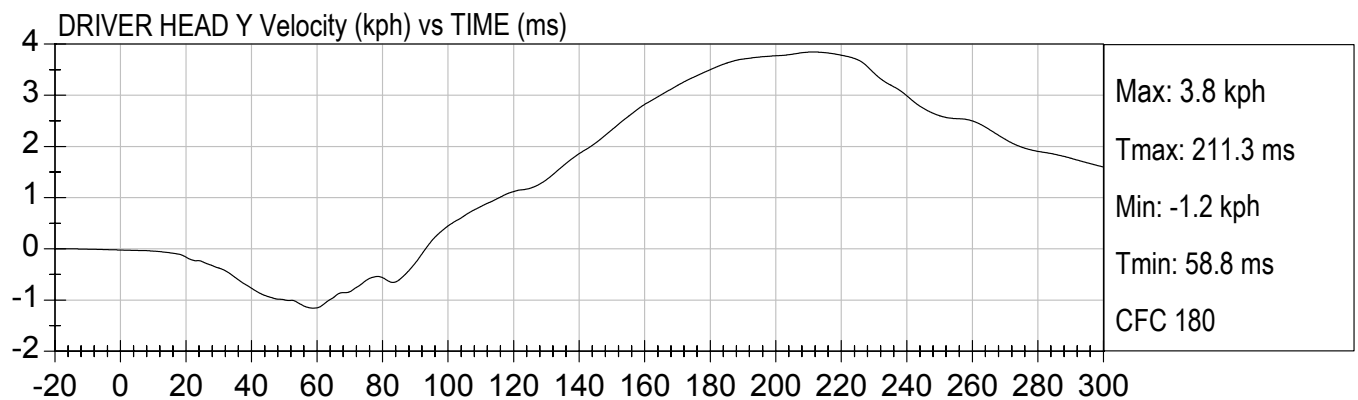
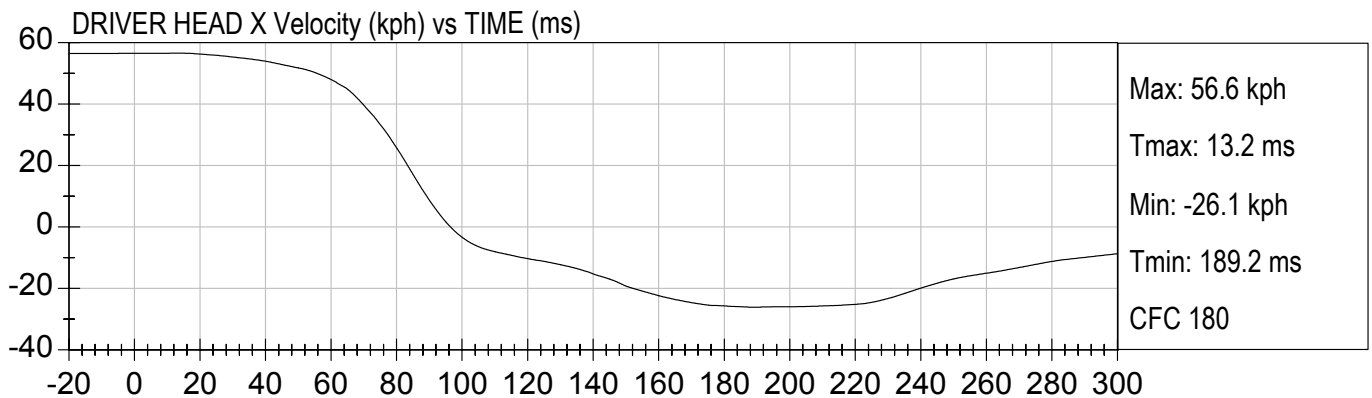
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35MPH NCAP FRONTAL
2005 TOYOTA COROLLA (M55108)

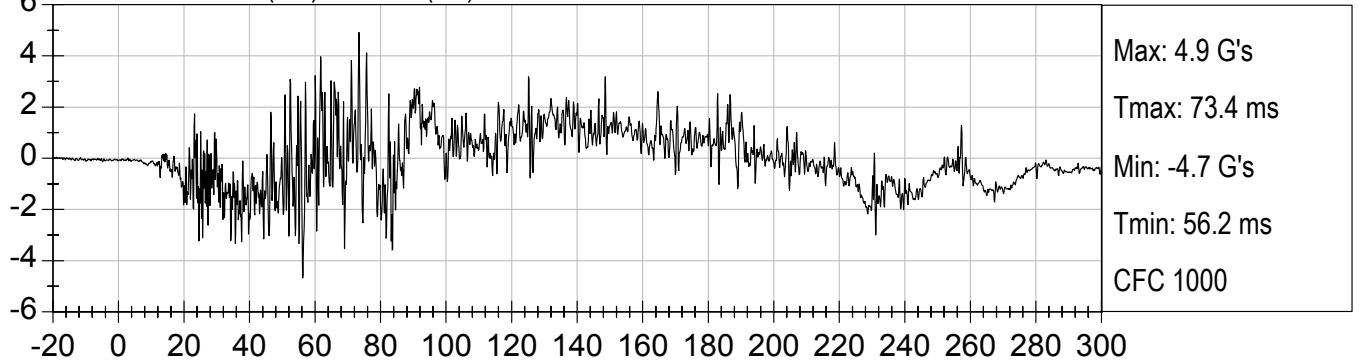
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Speed: 35.1 mph (56.5 km/h)



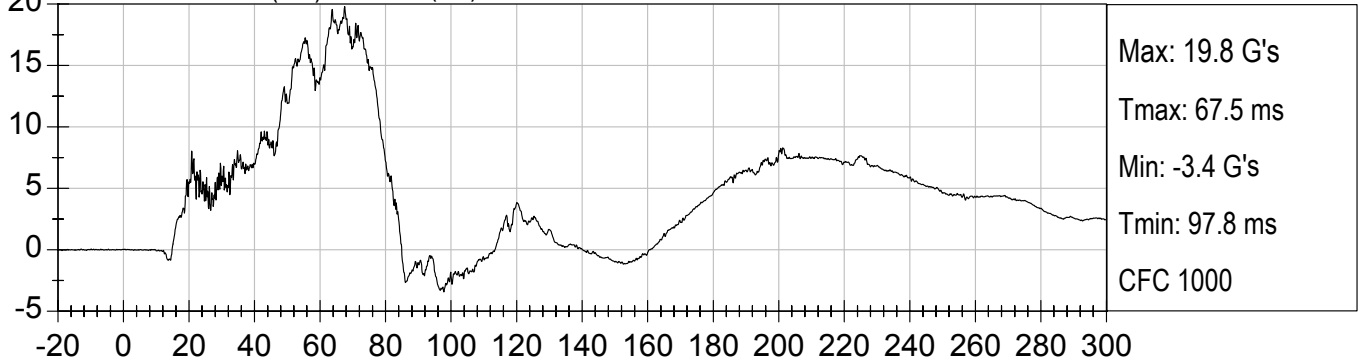




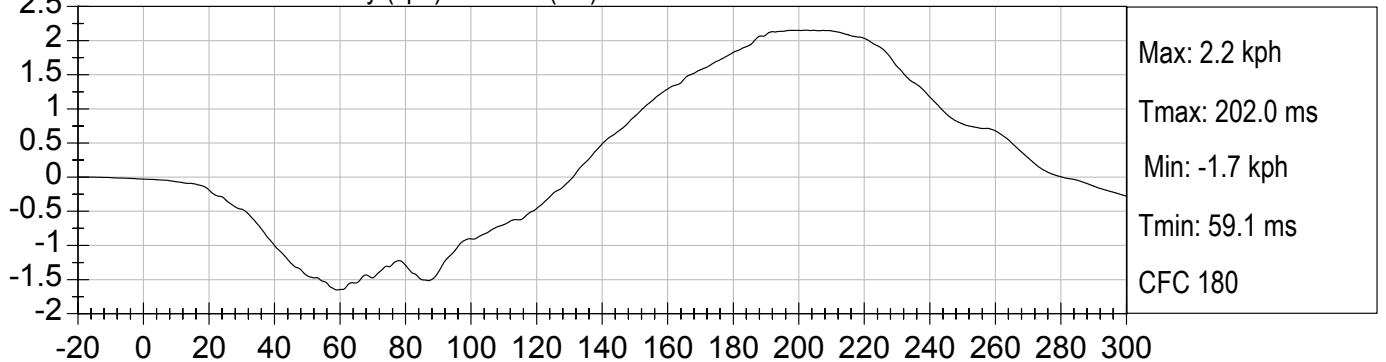
DRIVER HEAD Yr (G's) vs TIME (ms)



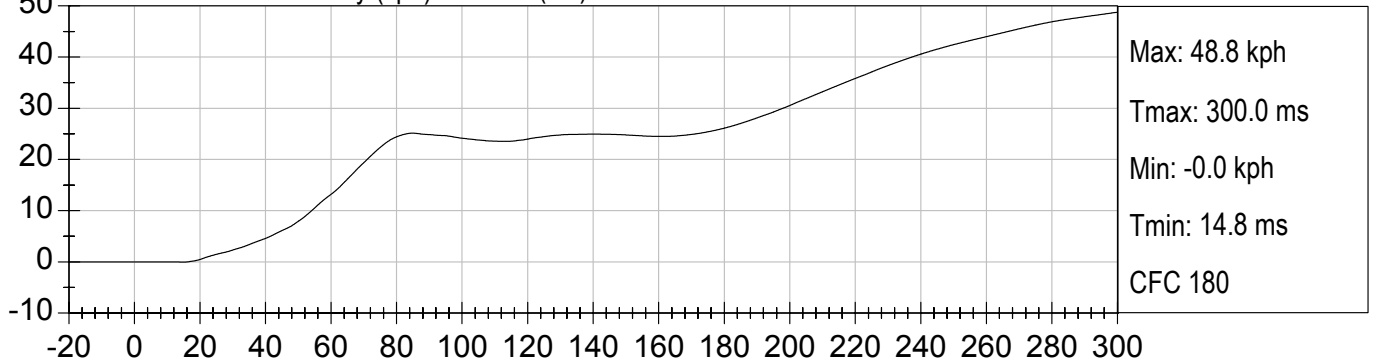
DRIVER HEAD Zr (G's) vs TIME (ms)



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



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

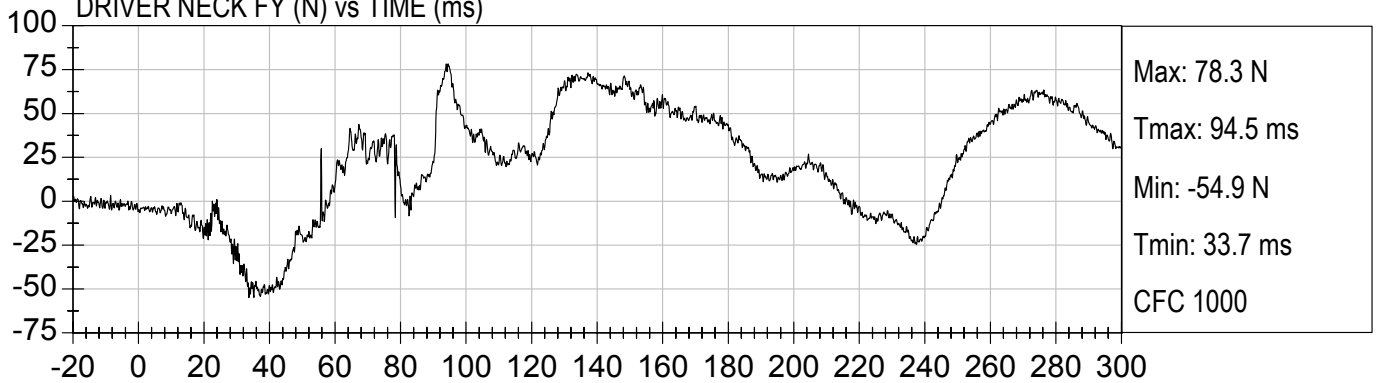




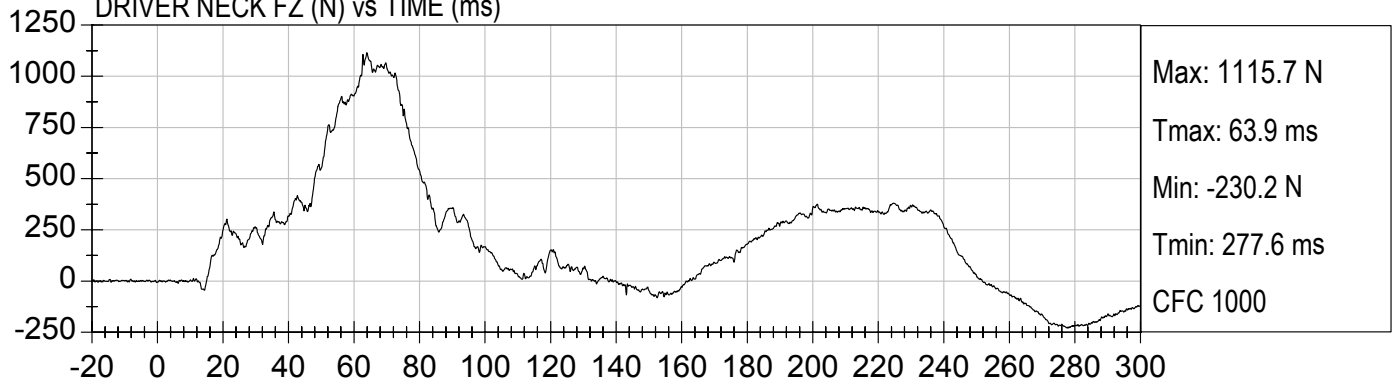
35MPH NCAP FRONTAL
2005 TOYOTA COROLLA (M55108)

Test Date: 09/17/04
Speed: 35.1 mph (56.5 km/h)

DRIVER NECK FY (N) vs TIME (ms)



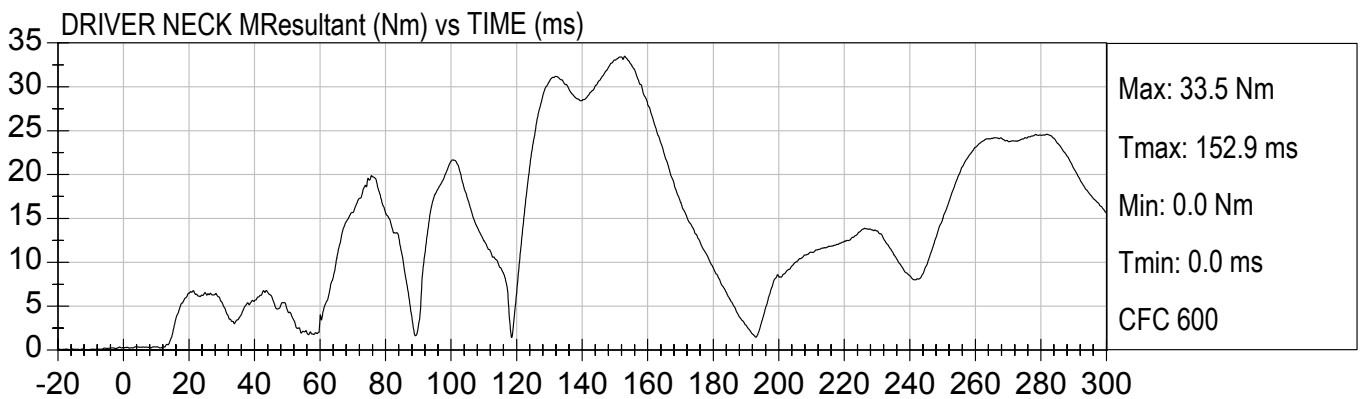
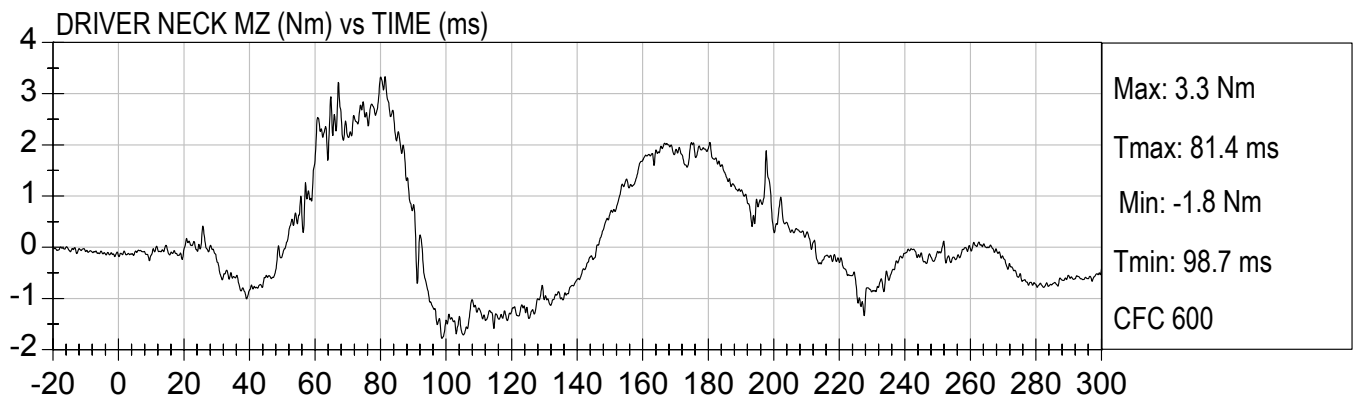
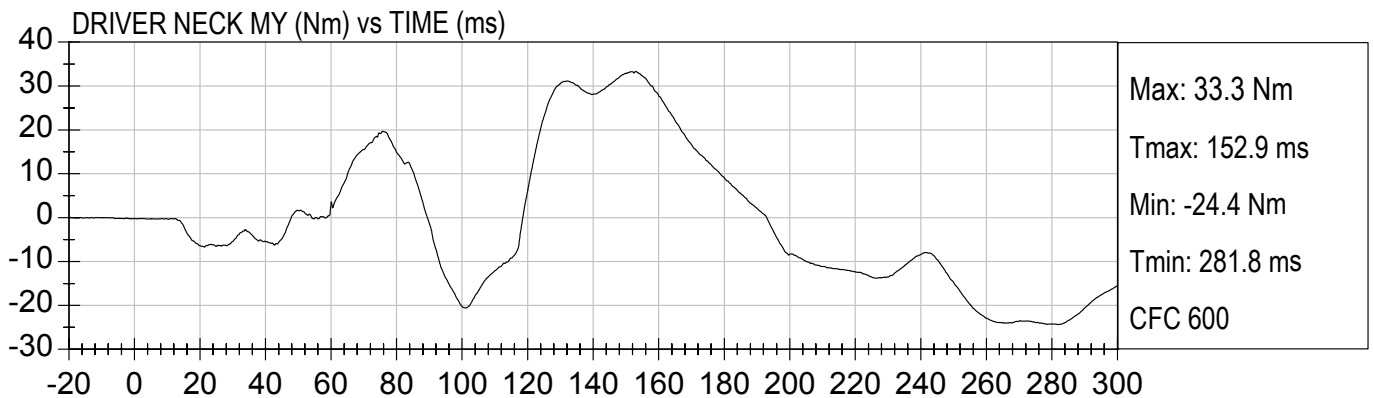
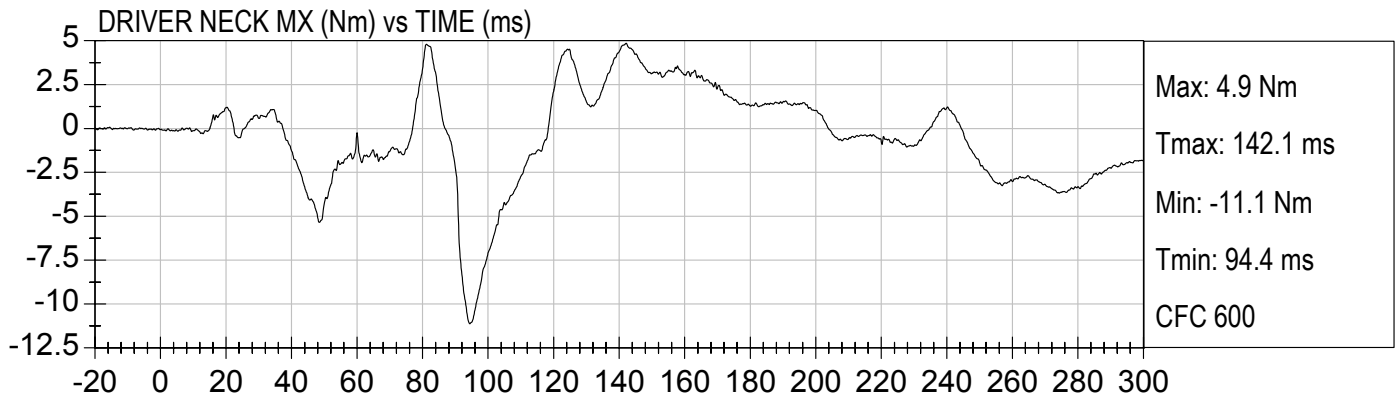
DRIVER NECK FZ (N) vs TIME (ms)





35MPH NCAP FRONTAL
2005 TOYOTA COROLLA (M55108)

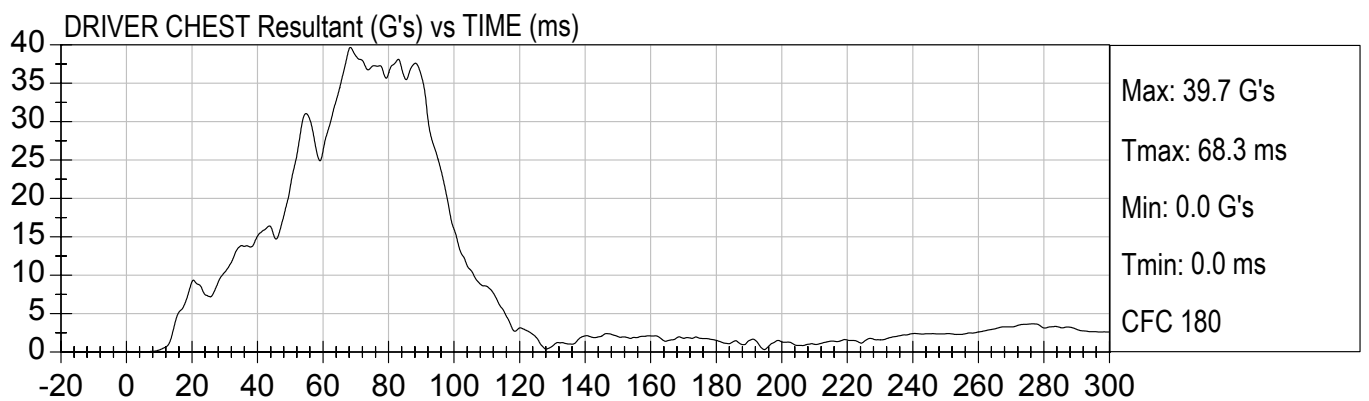
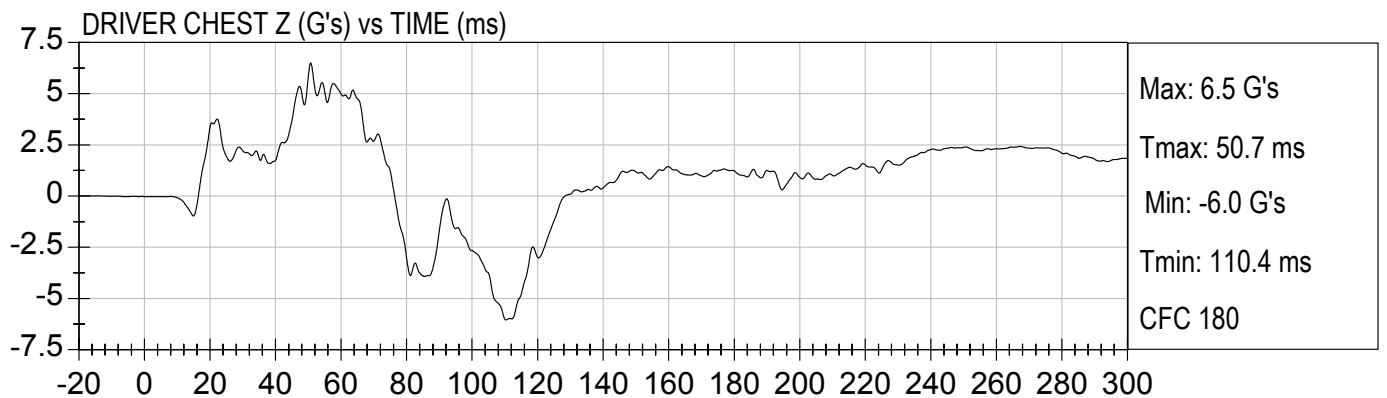
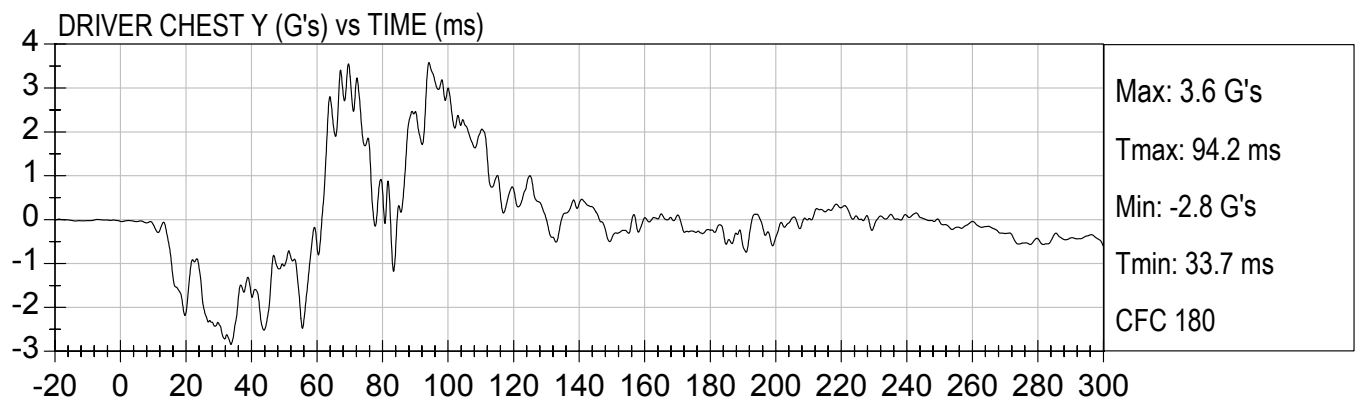
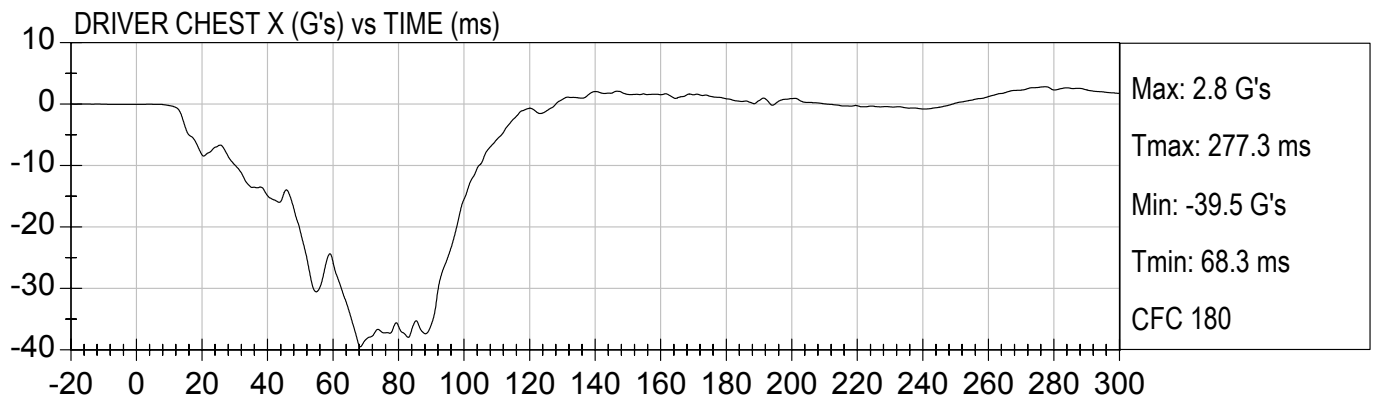
Test Date: 09/17/04
Speed: 35.1 mph (56.5 km/h)





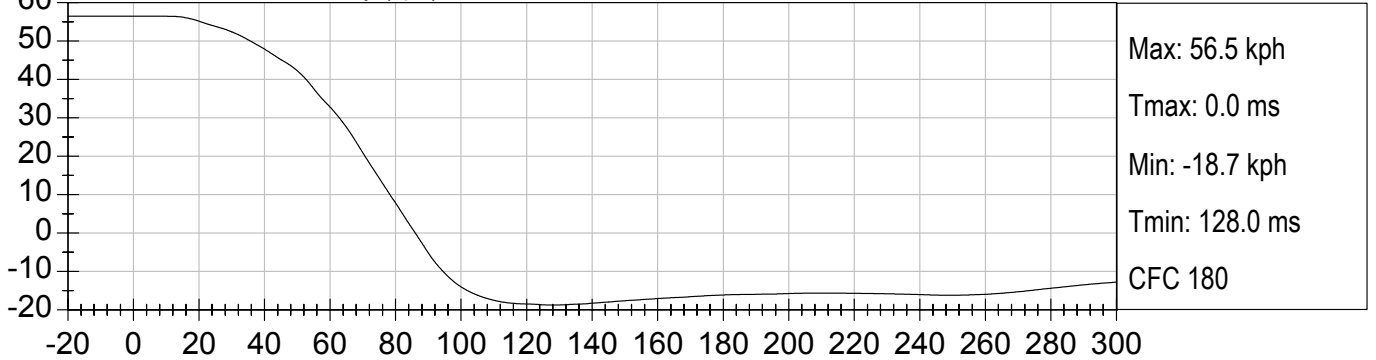
35MPH NCAP FRONTAL
2005 TOYOTA COROLLA (M55108)

Test Date: 09/17/04
Speed: 35.1 mph (56.5 km/h)

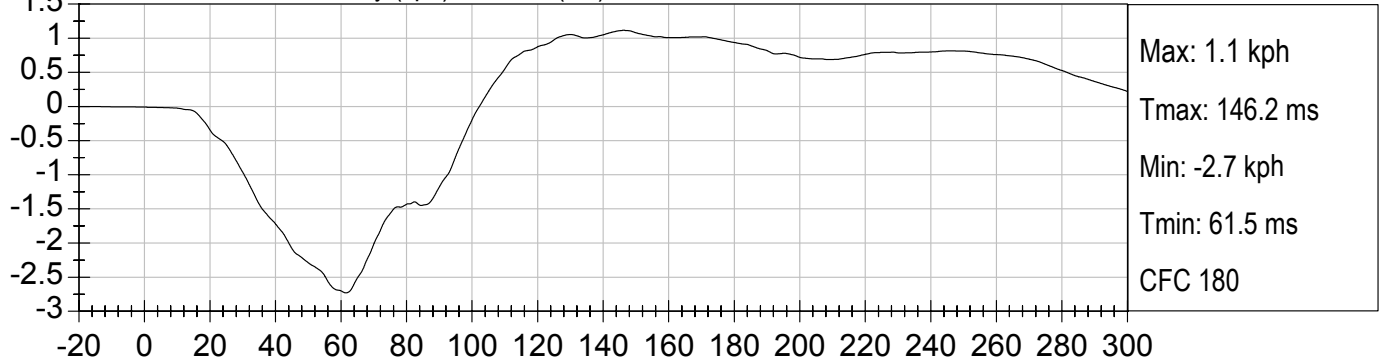




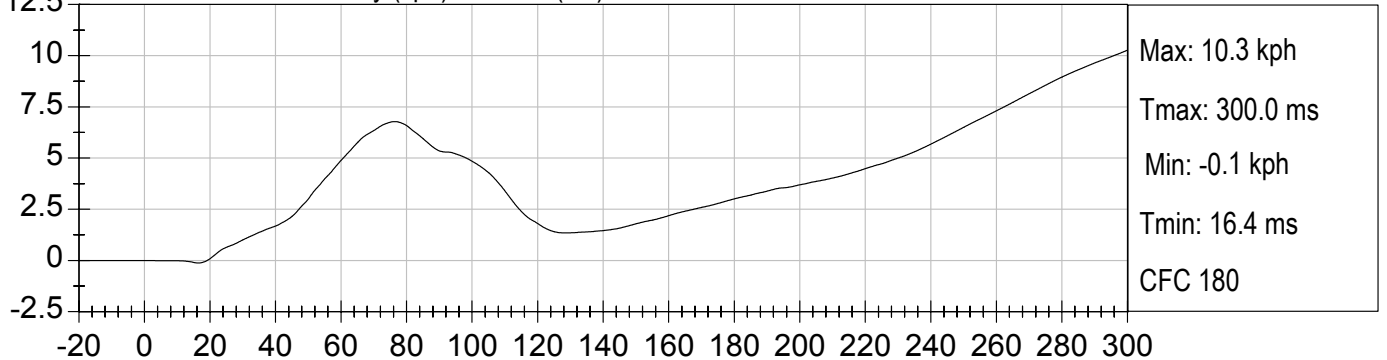
DRIVER CHEST X Velocity (kph) vs TIME (ms)



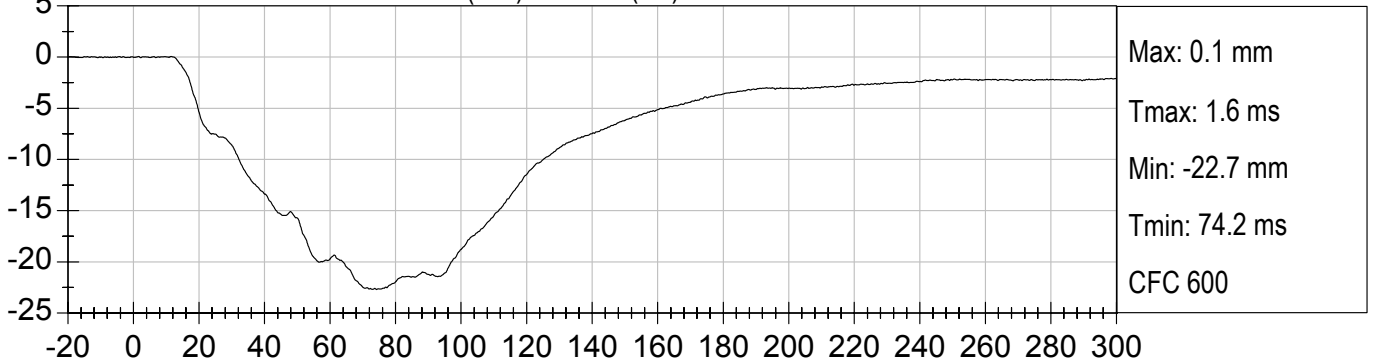
DRIVER CHEST Y Velocity (kph) vs TIME (ms)

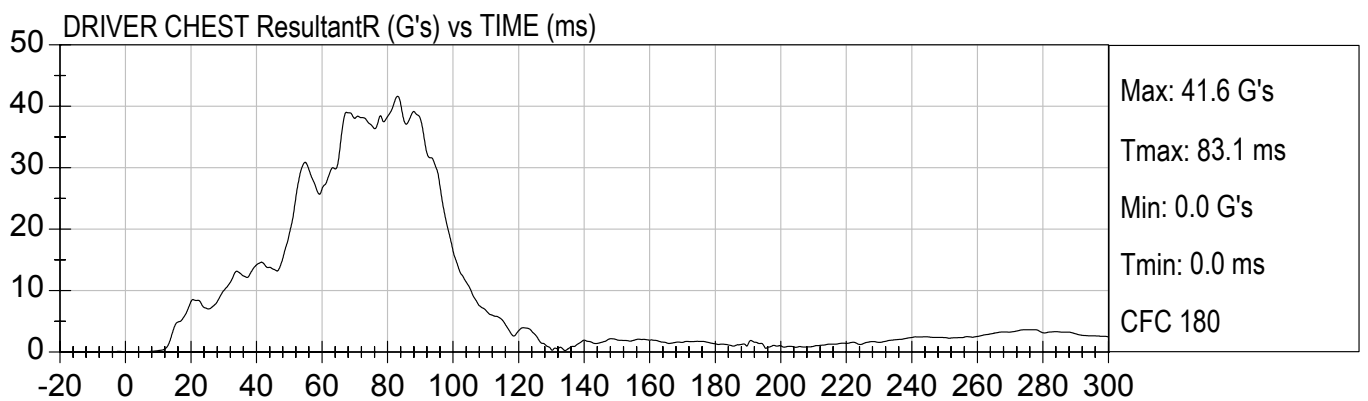
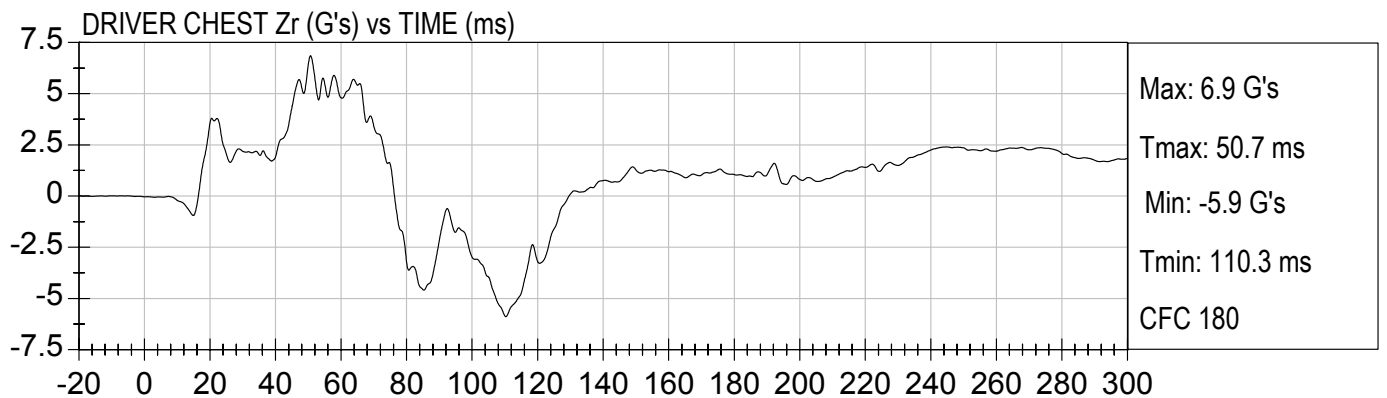
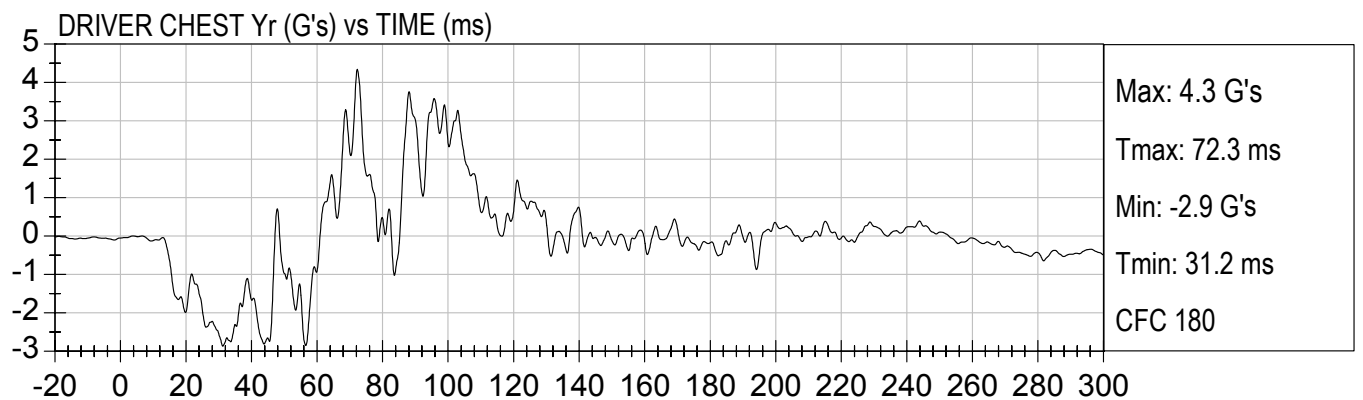
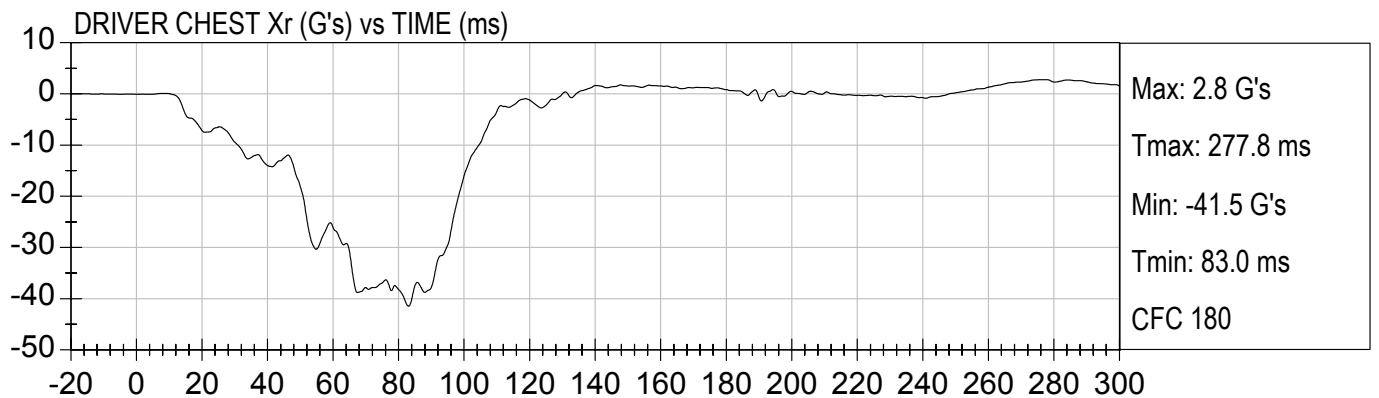


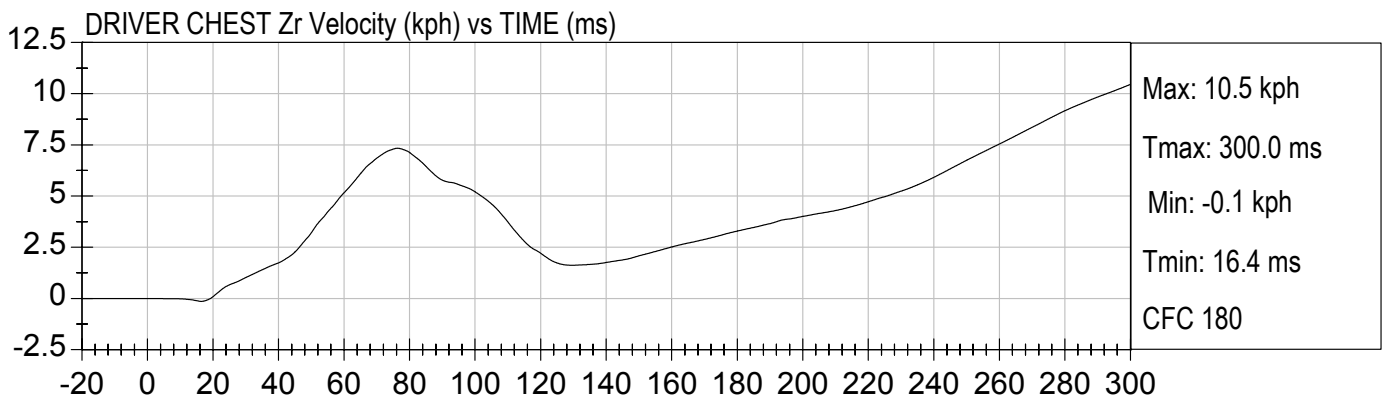
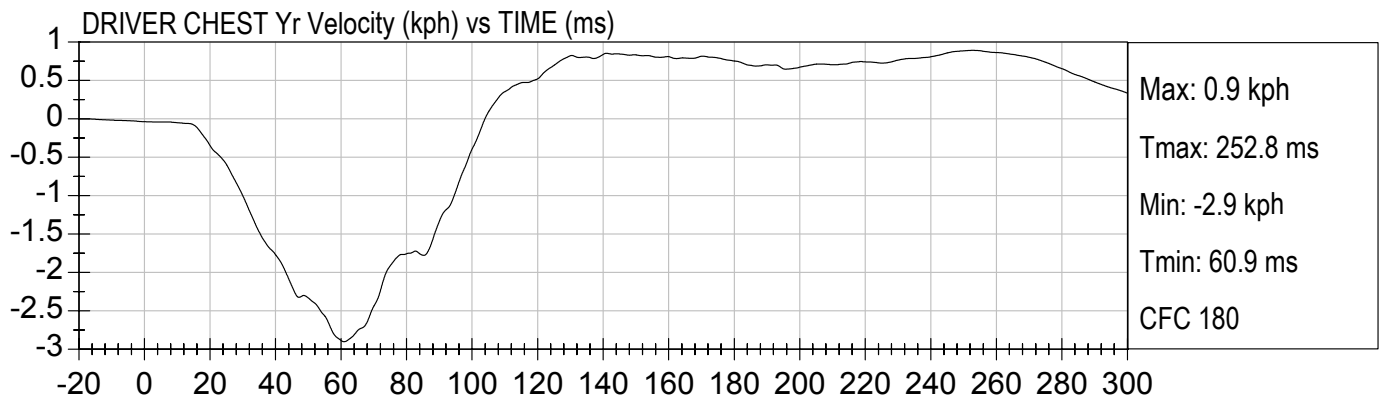
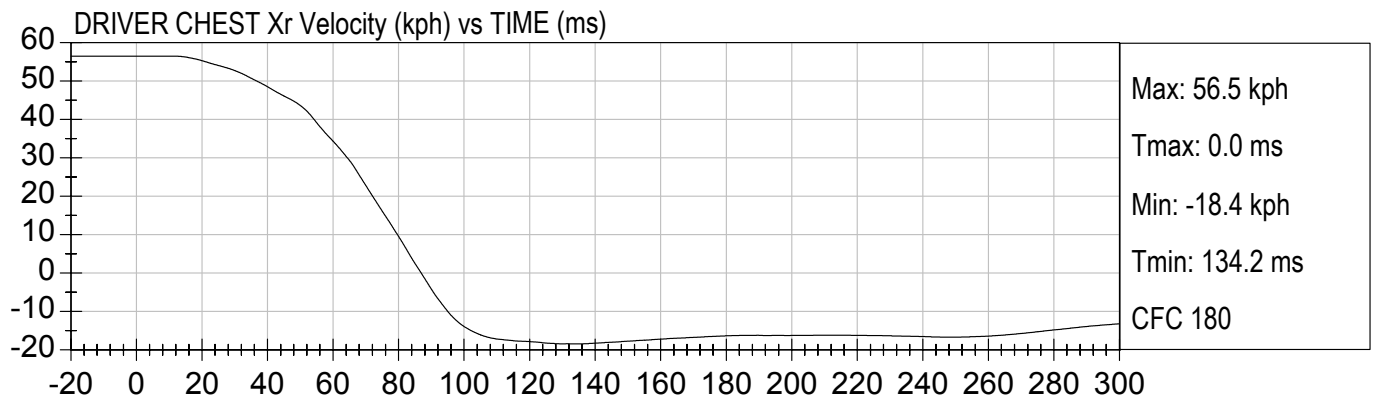
DRIVER CHEST Z Velocity (kph) vs TIME (ms)

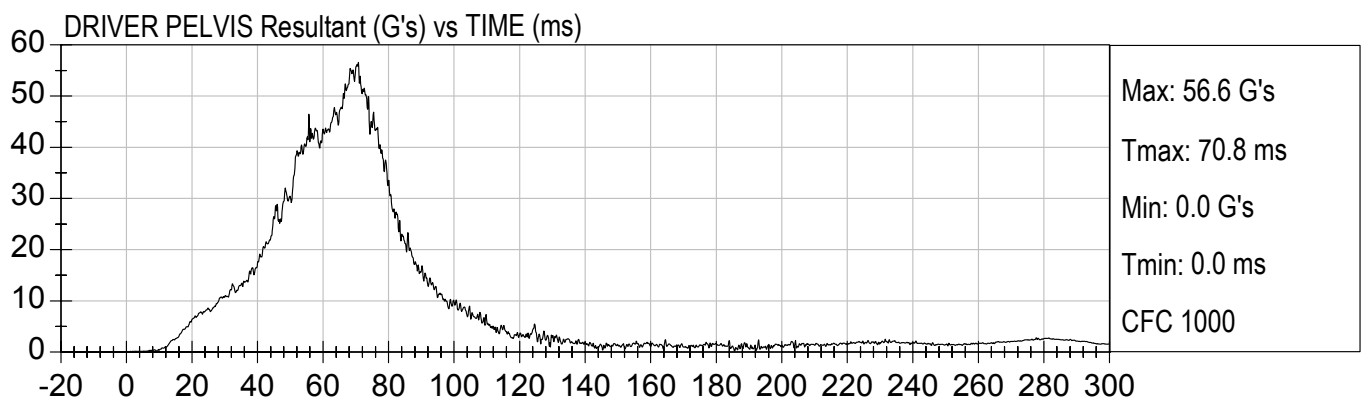
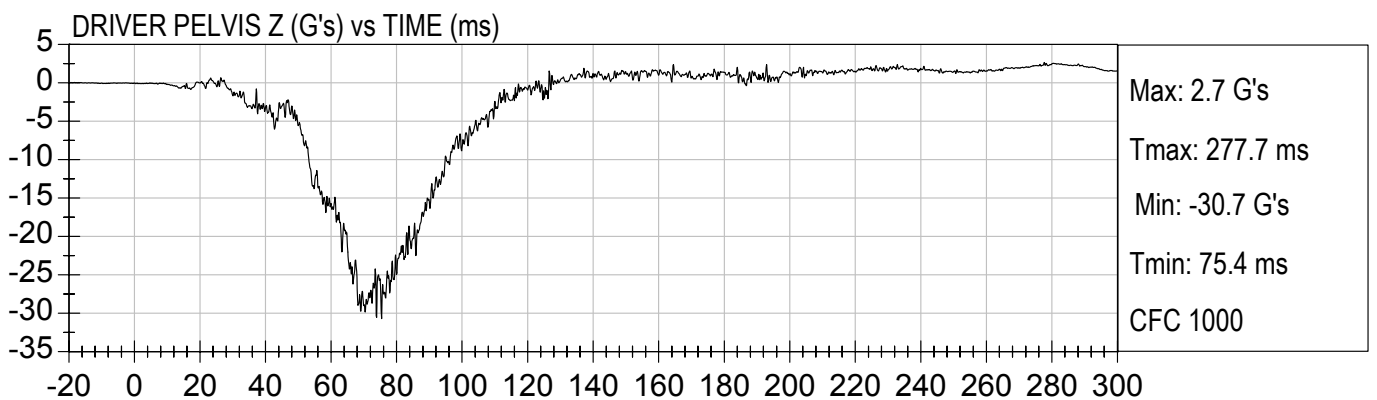
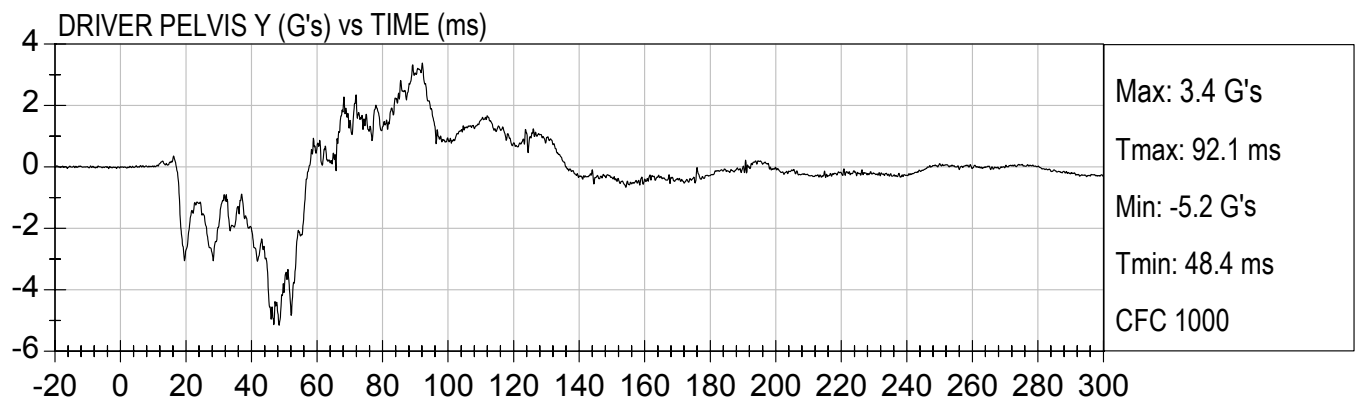
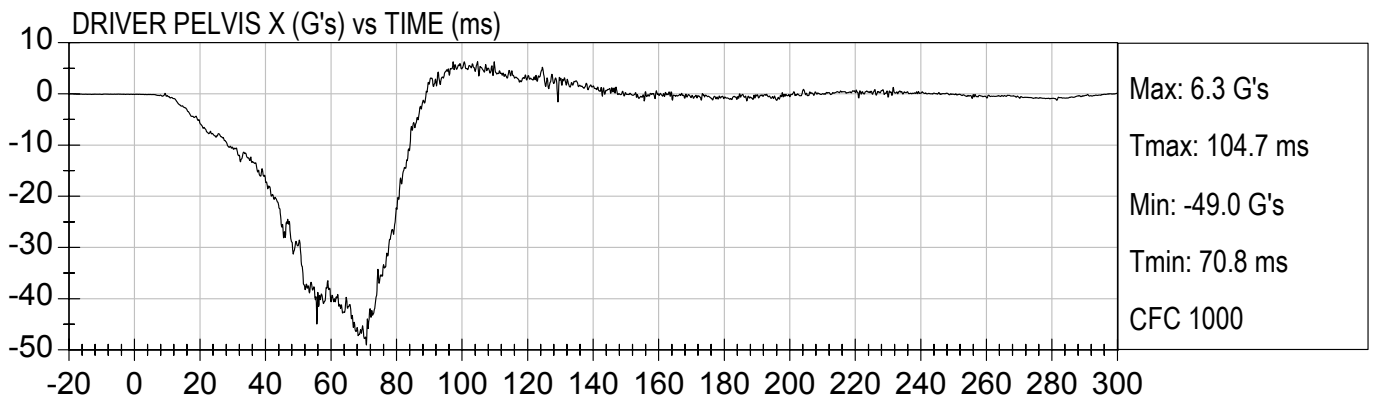


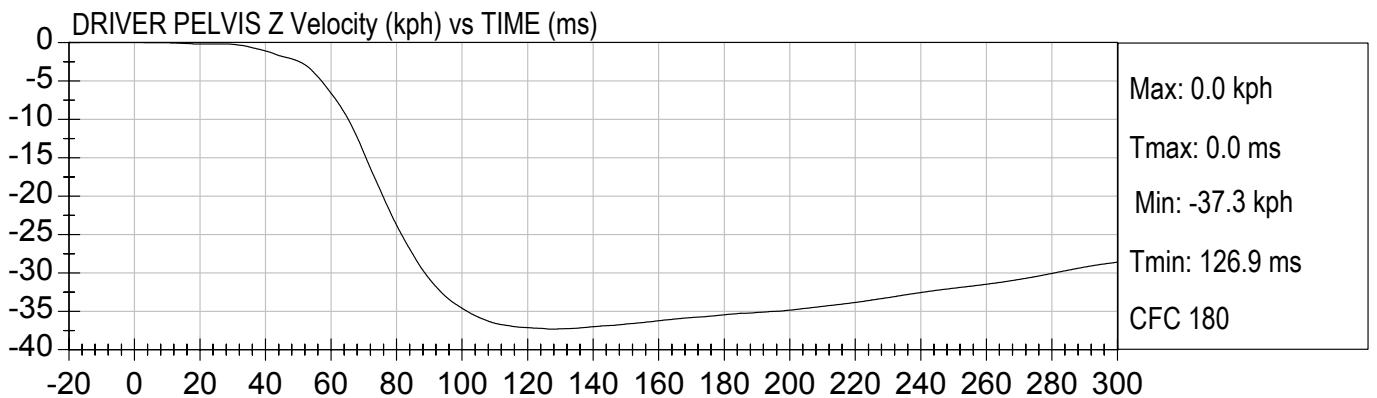
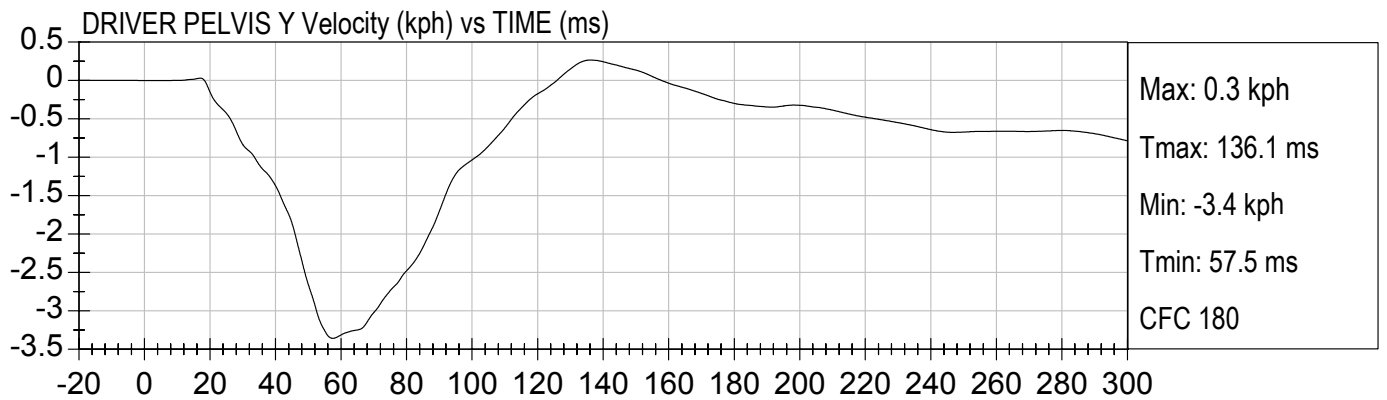
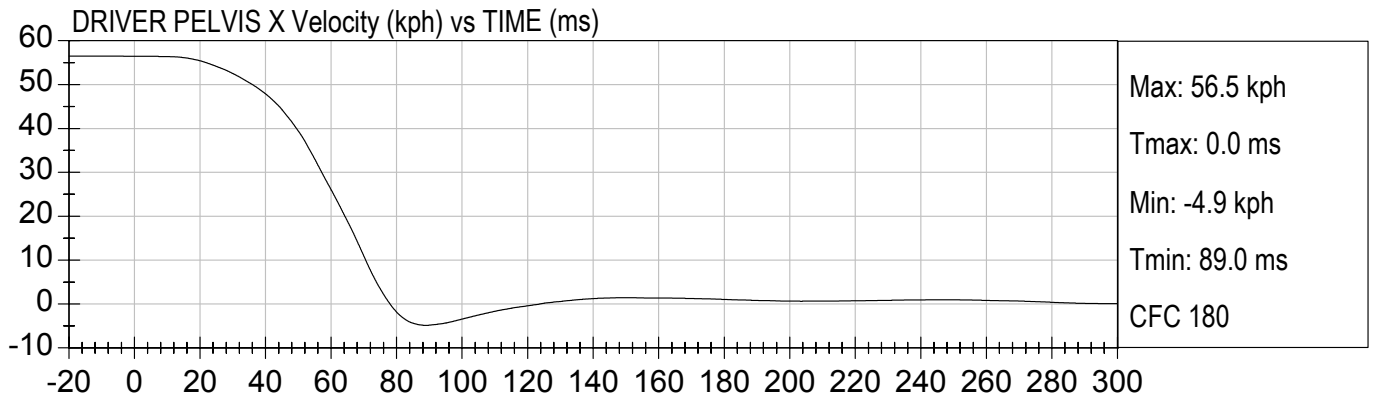
DRIVER CHEST DISPLACEMENT (mm) vs TIME (ms)







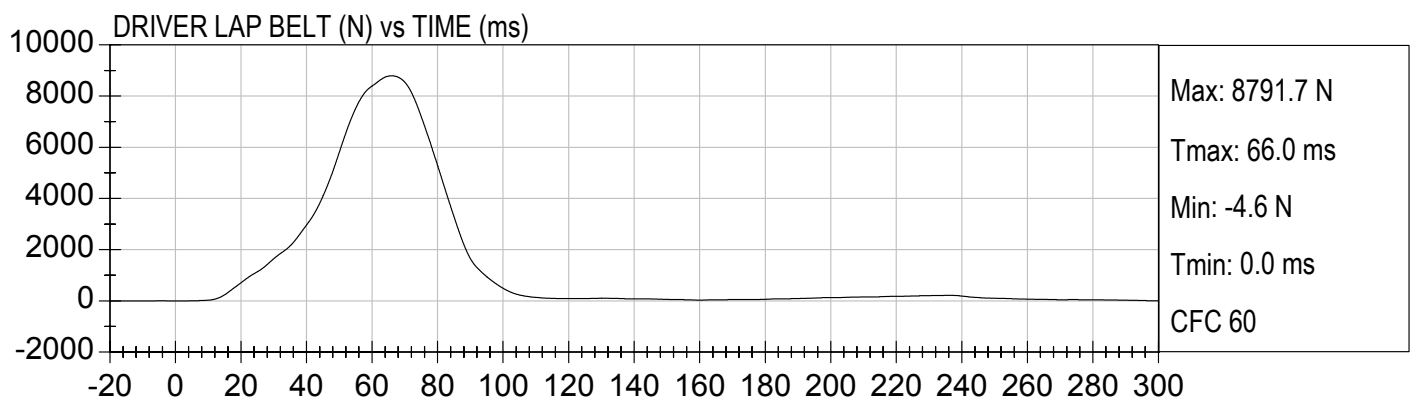
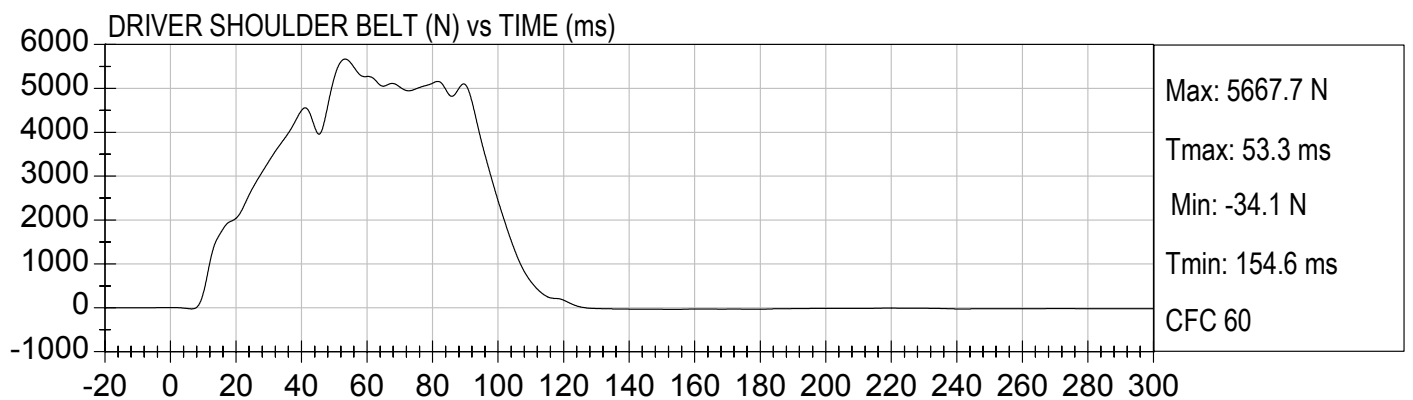
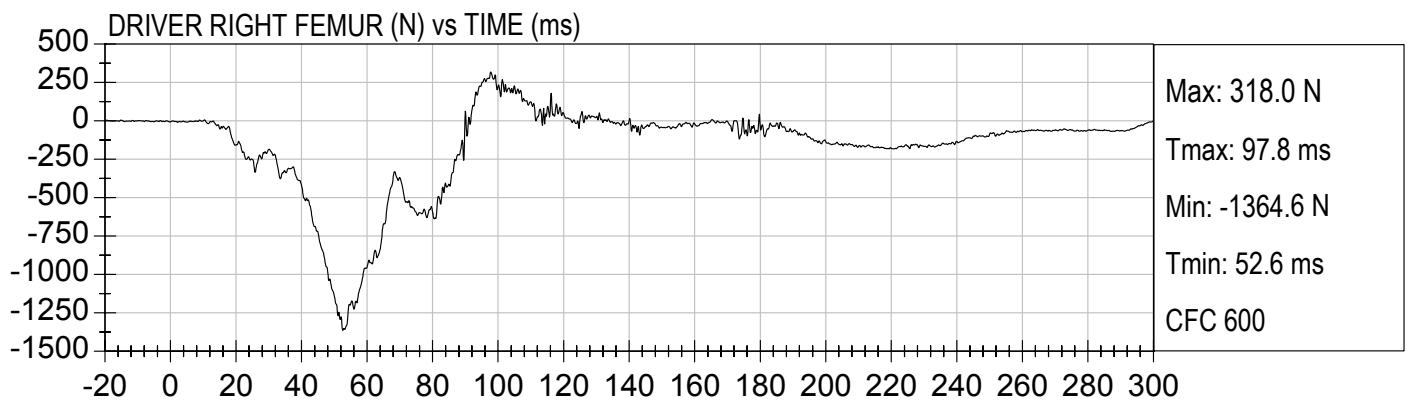
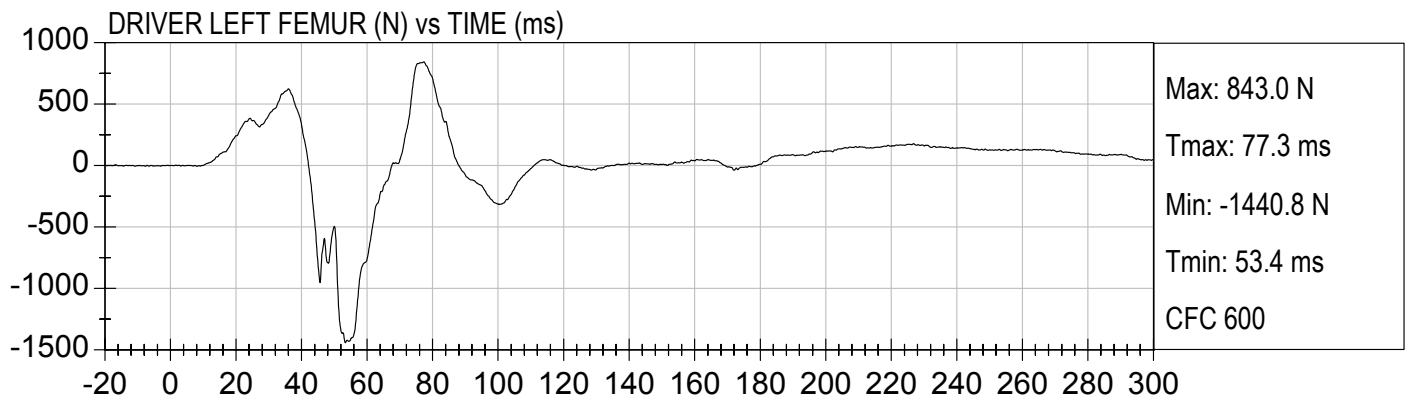






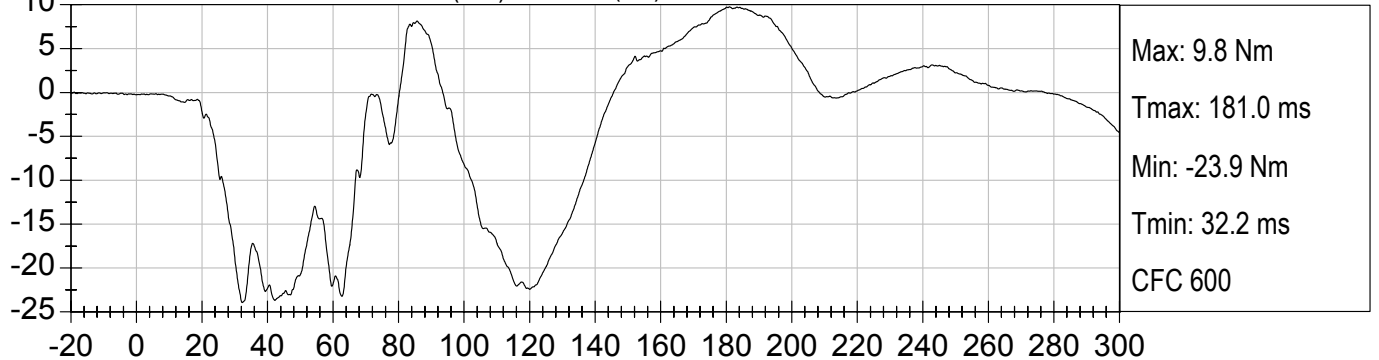
35MPH NCAP FRONTAL
2005 TOYOTA COROLLA (M55108)

Test Date: 09/17/04
Speed: 35.1 mph (56.5 km/h)

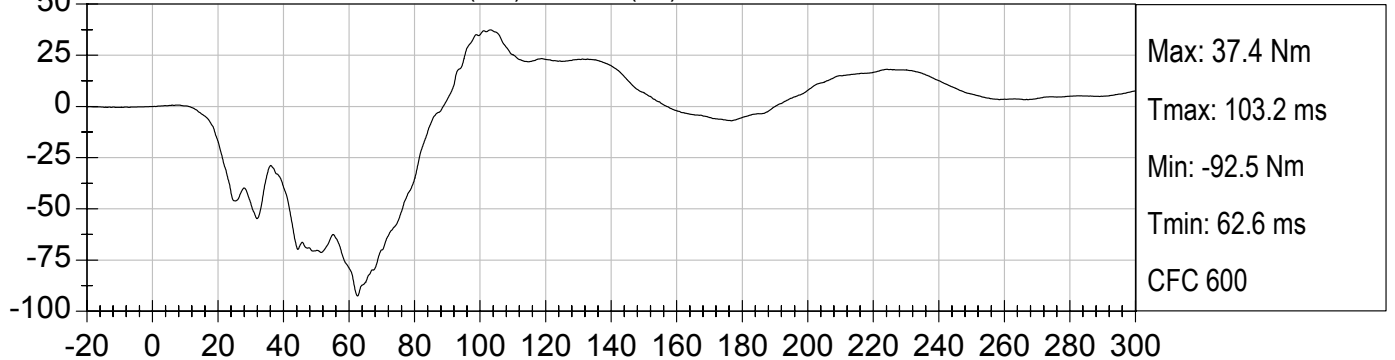




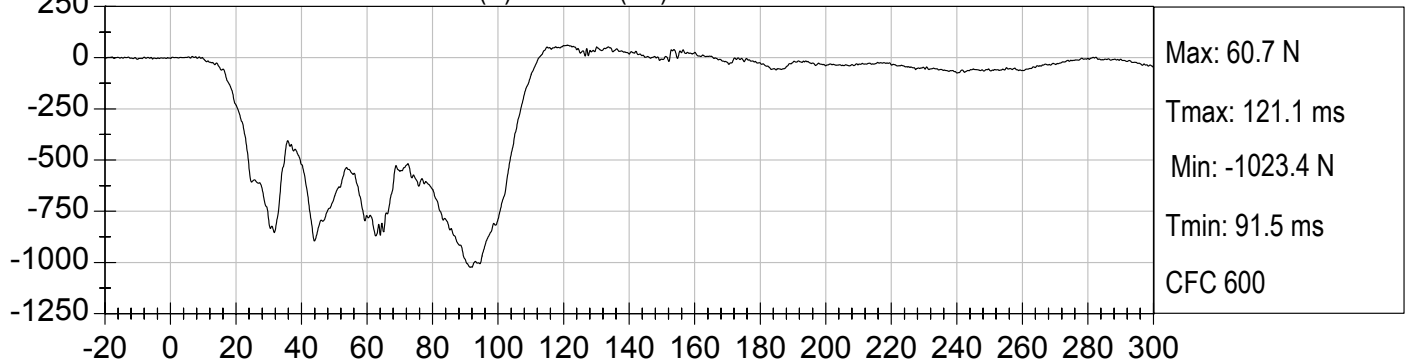
DRIVER LEFT UPPER TIBIA MX (Nm) vs TIME (ms)

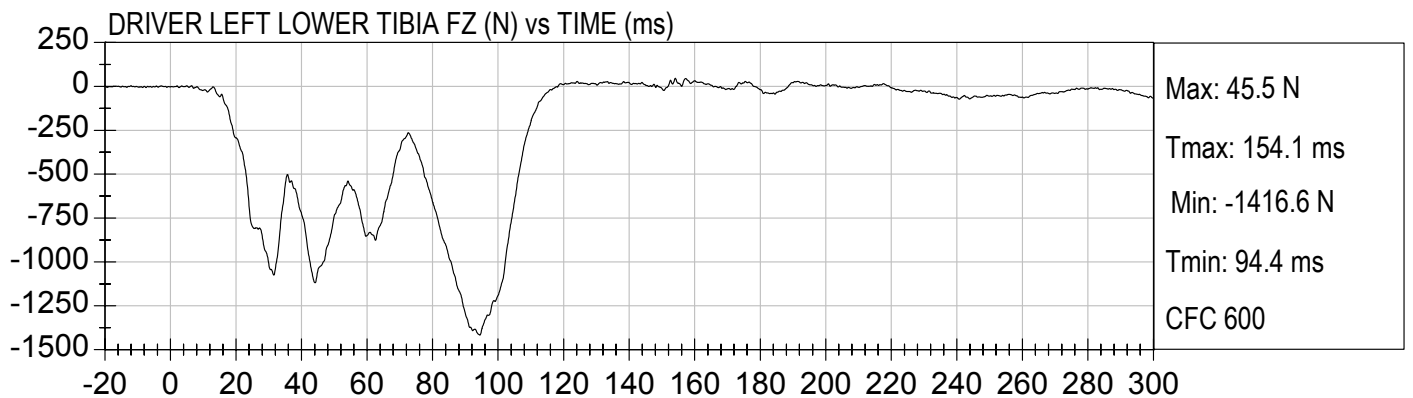
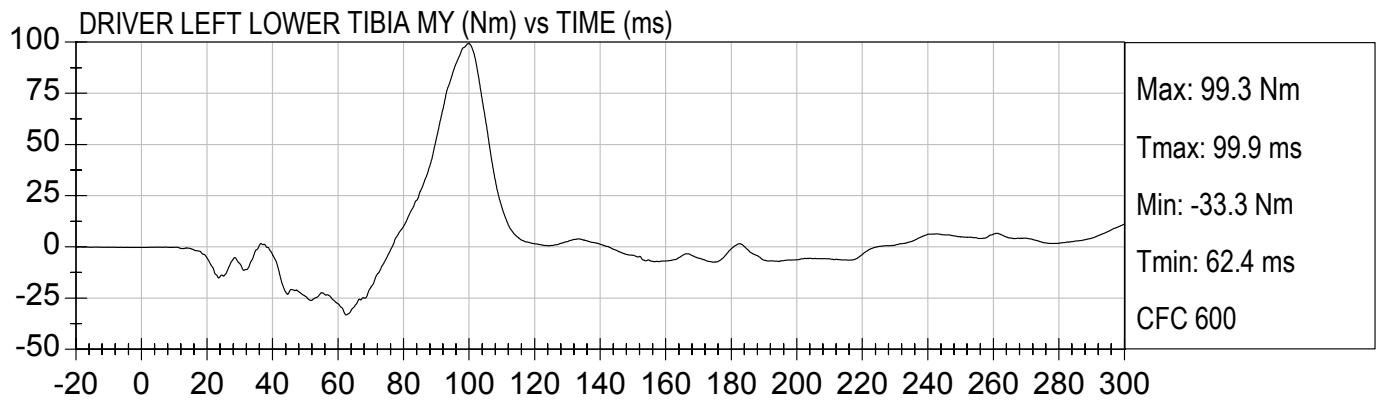
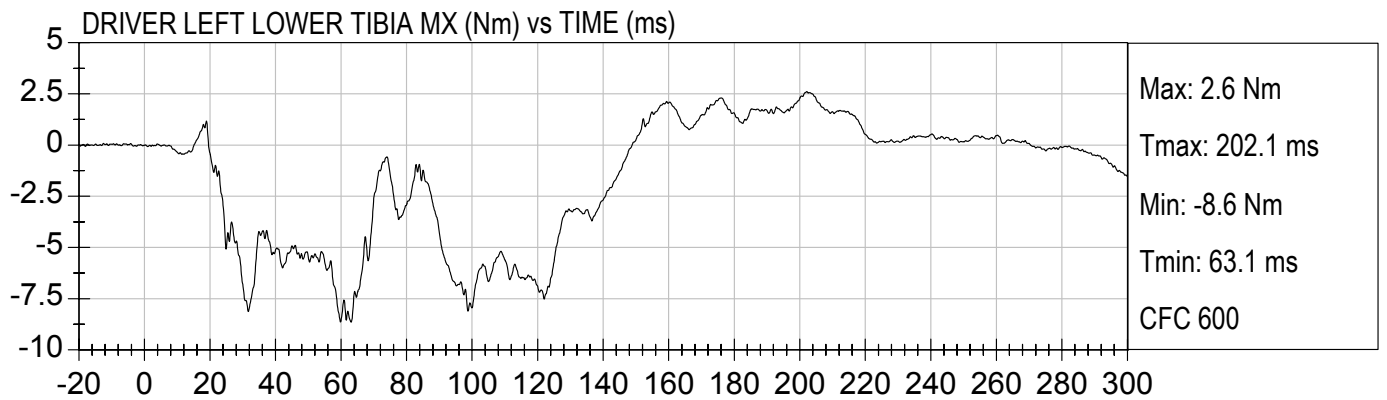


DRIVER LEFT UPPER TIBIA MY (Nm) vs TIME (ms)



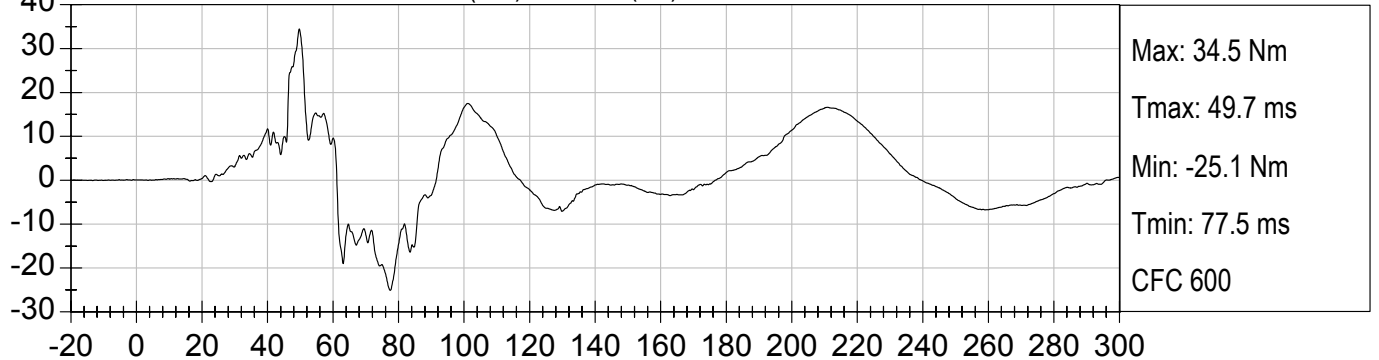
DRIVER LEFT UPPER TIBIA FZ (N) vs TIME (ms)



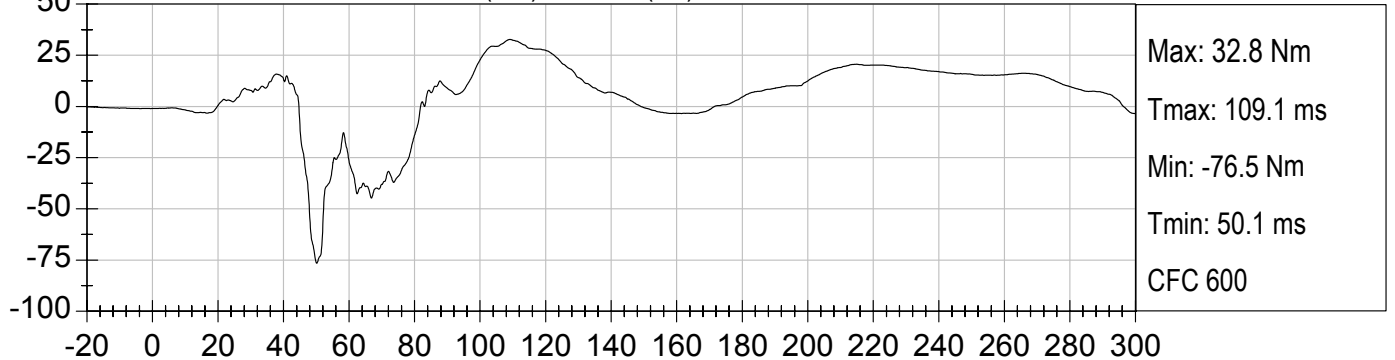




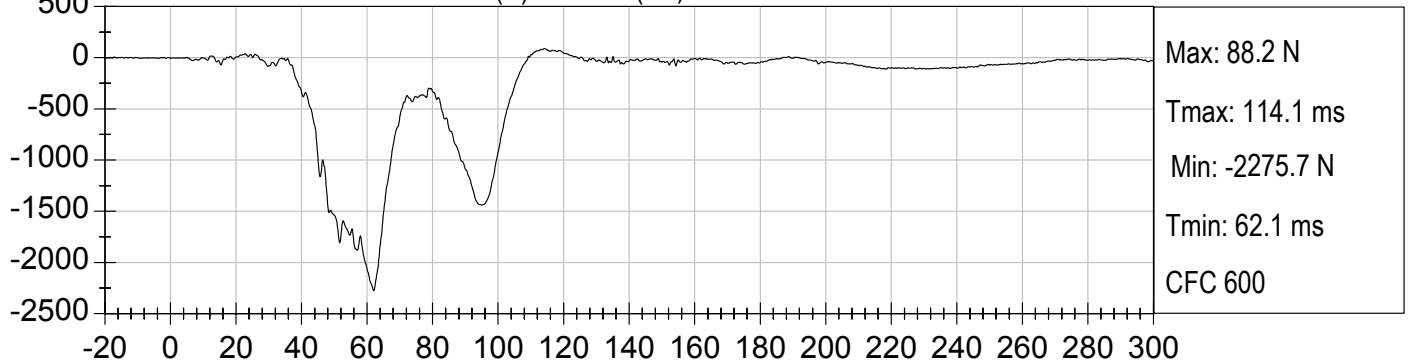
DRIVER RIGHT UPPER TIBIA MX (Nm) vs TIME (ms)



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

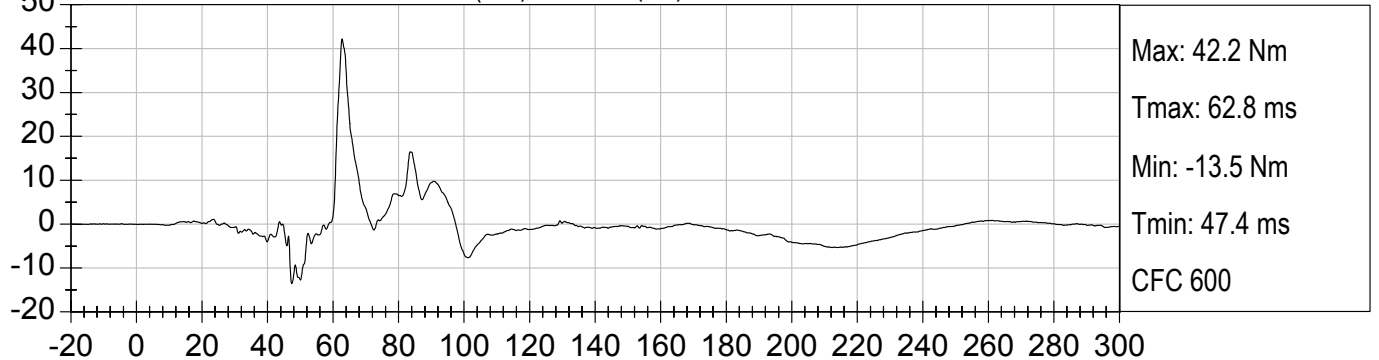


DRIVER RIGHT UPPER TIBIA FZ (N) vs TIME (ms)

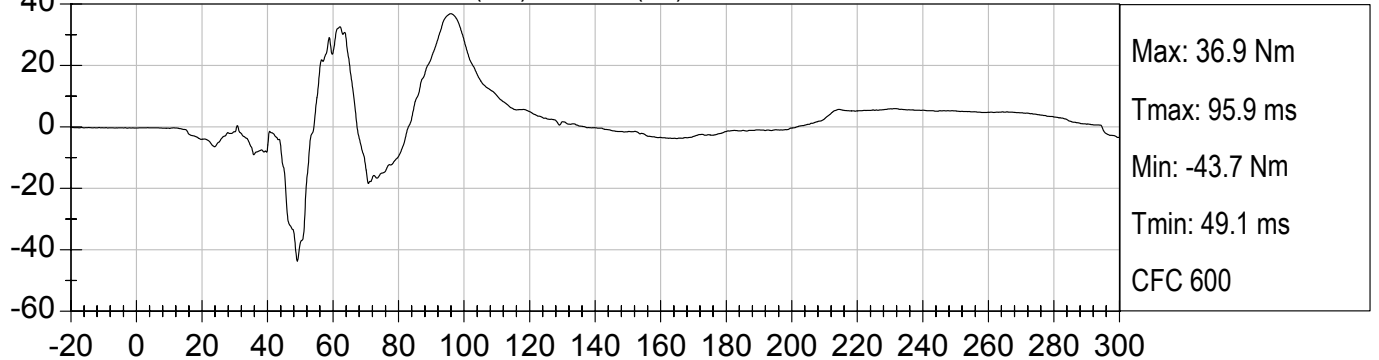




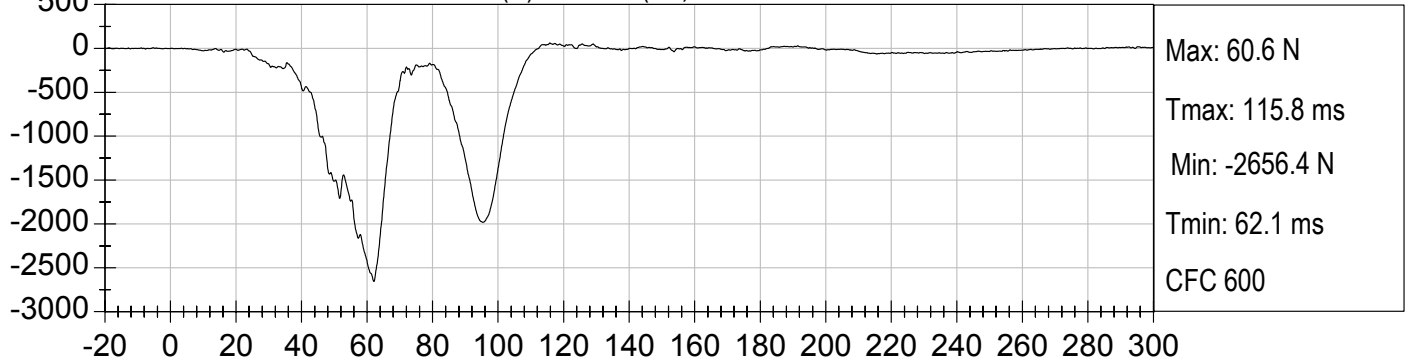
DRIVER RIGHT LOWER TIBIA MX (Nm) vs TIME (ms)

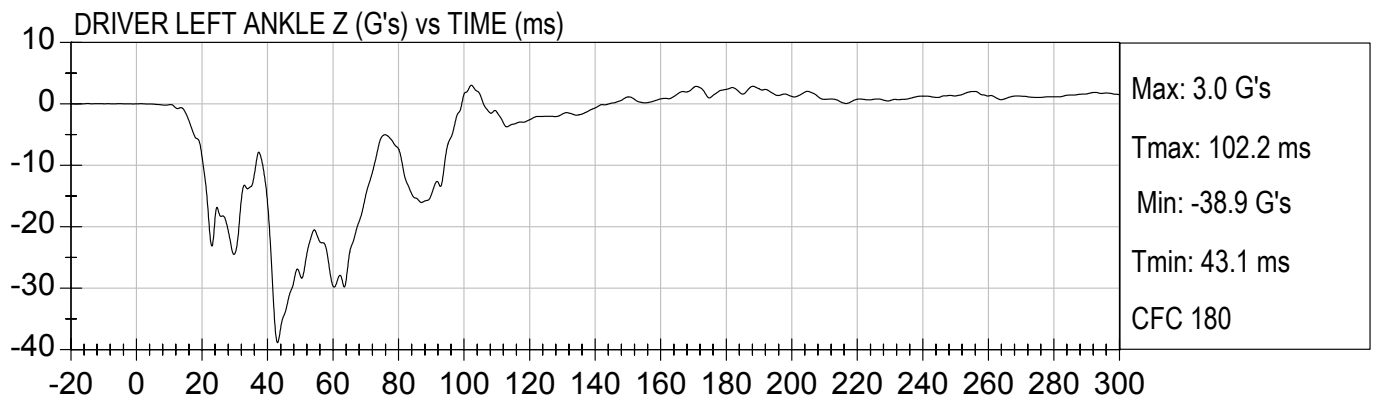
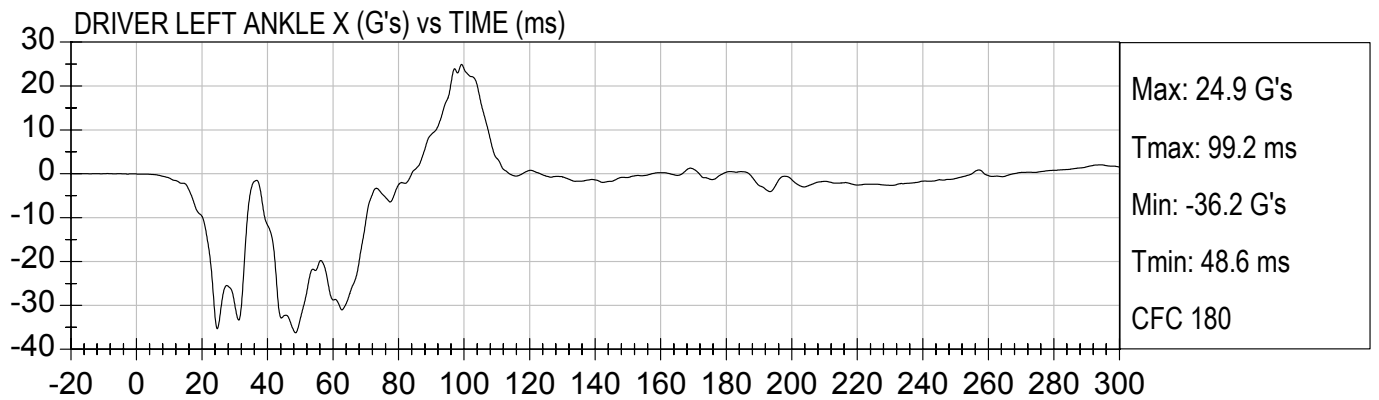
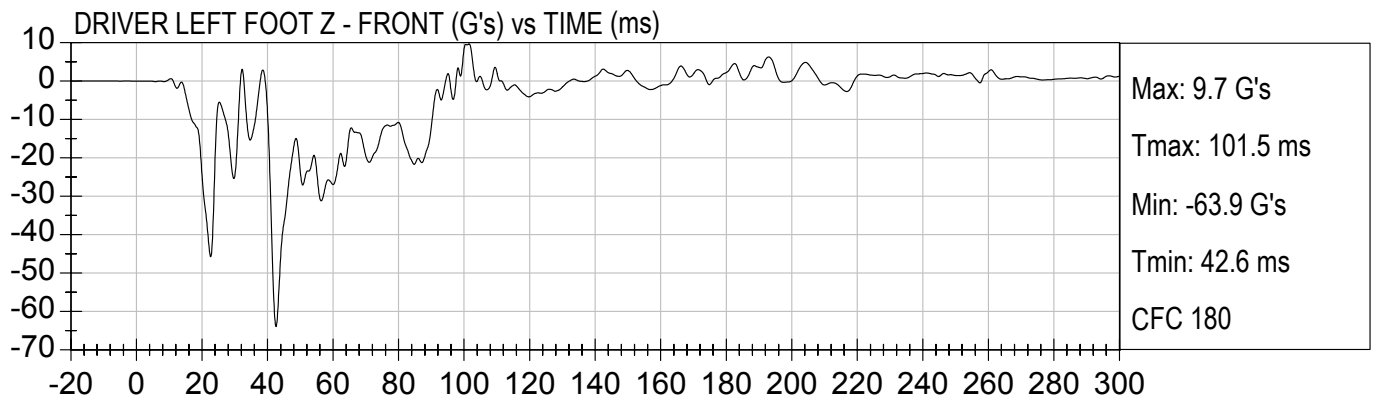


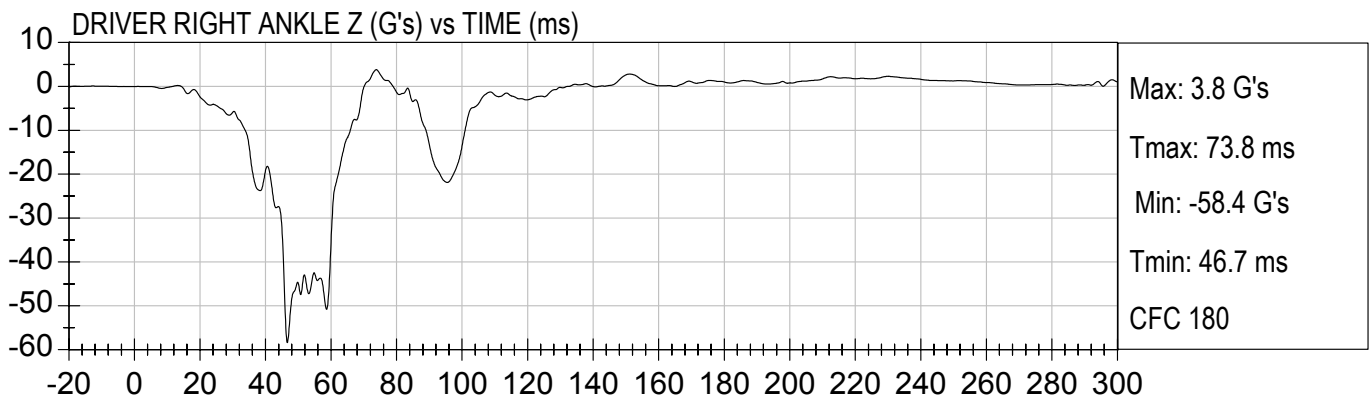
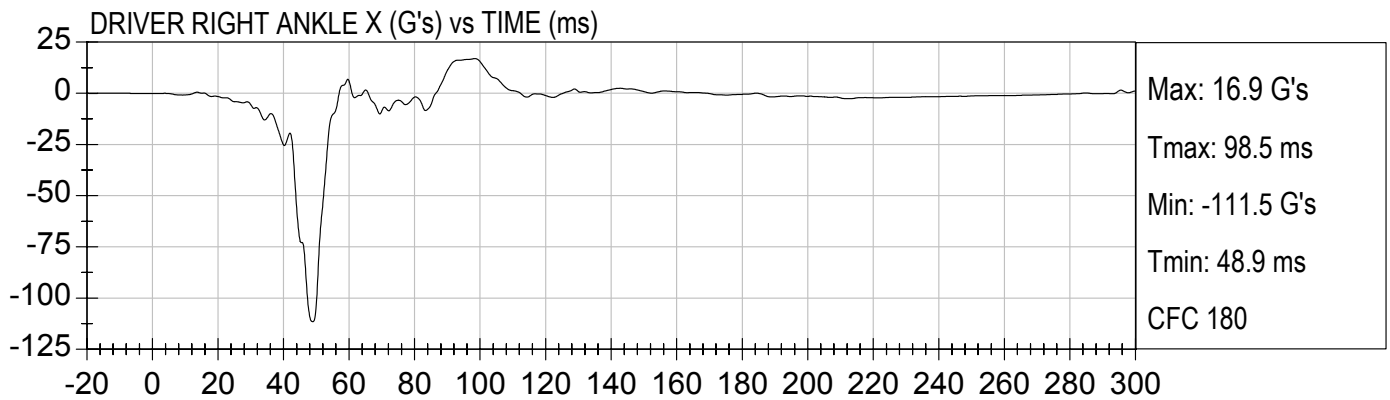
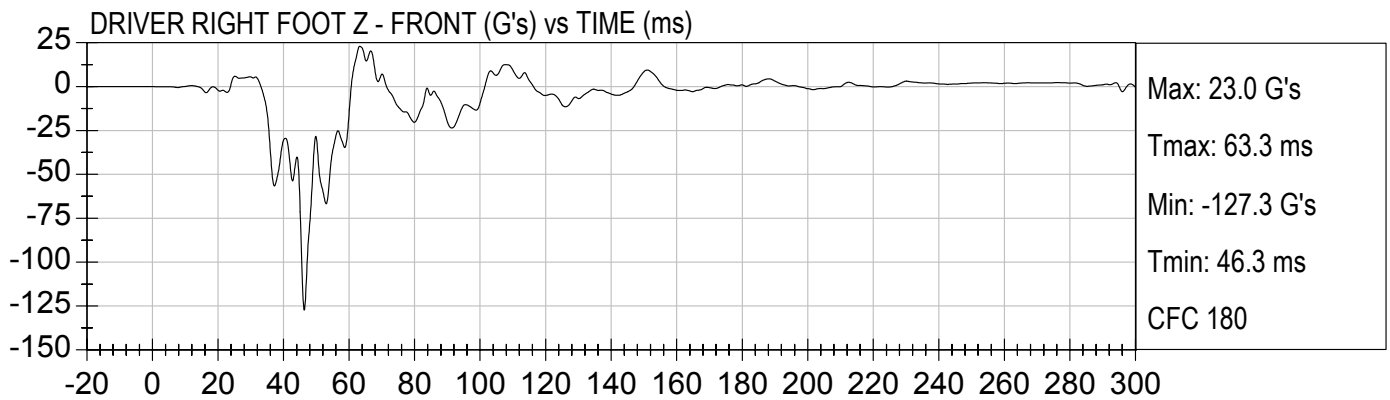
DRIVER RIGHT LOWER TIBIA MY (Nm) vs TIME (ms)



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





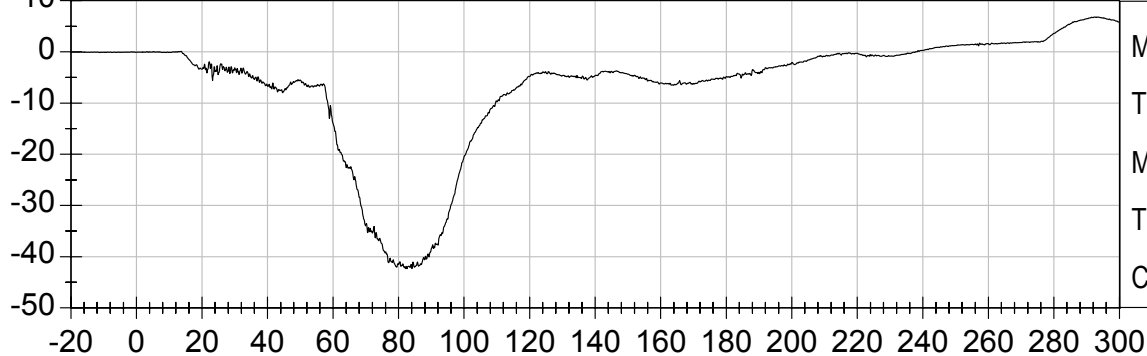




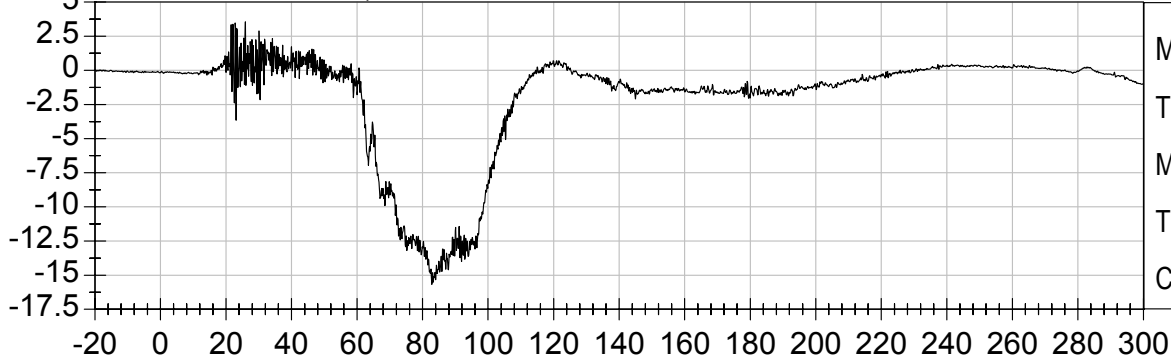
35MPH NCAP FRONTAL
2005 TOYOTA COROLLA (M55108)

Test Date: 09/17/04
Speed: 35.1 mph (56.5 km/h)

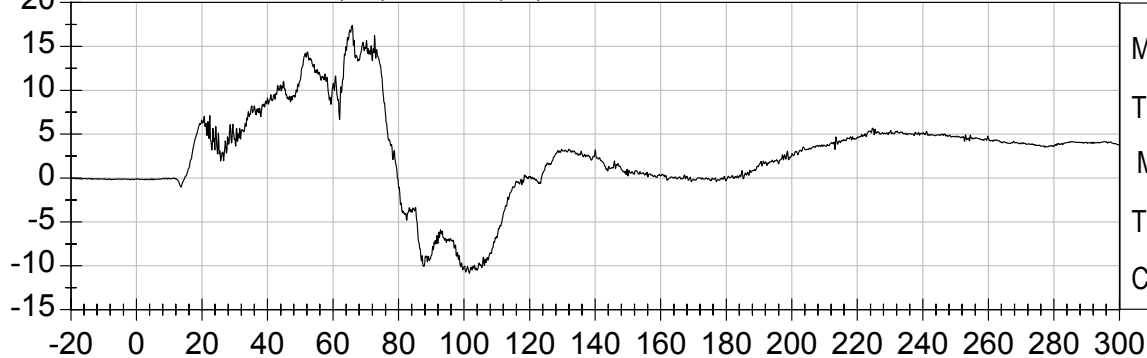
PASSENGER HEAD X (G's) vs TIME (ms)



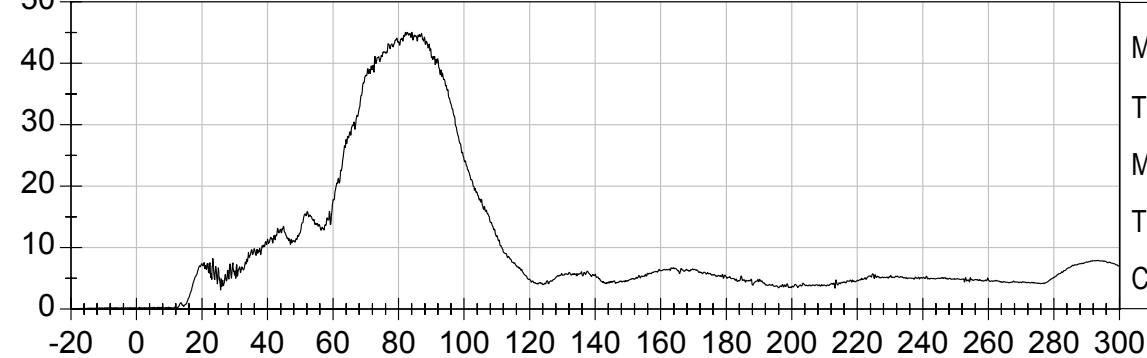
PASSENGER HEAD Y (G's) vs TIME (ms)

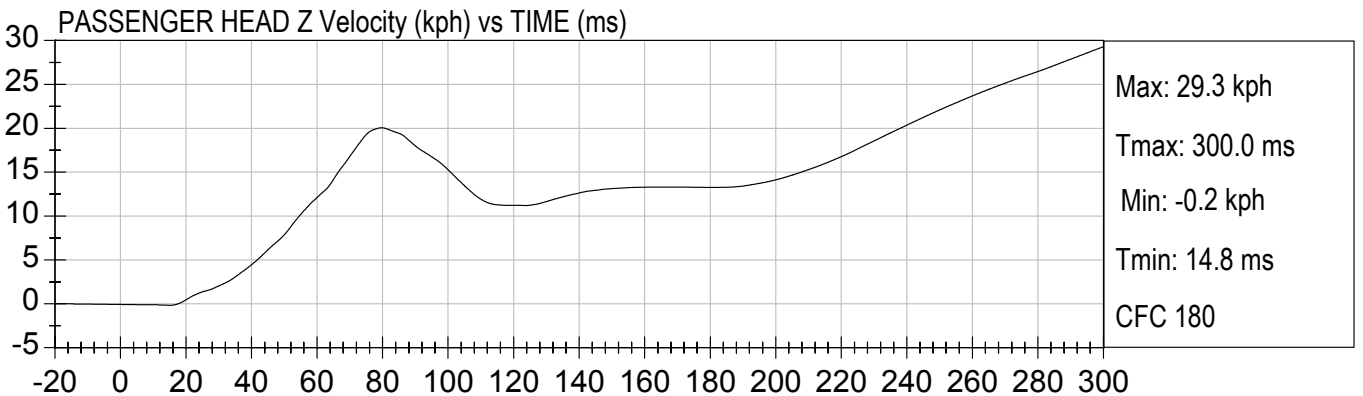
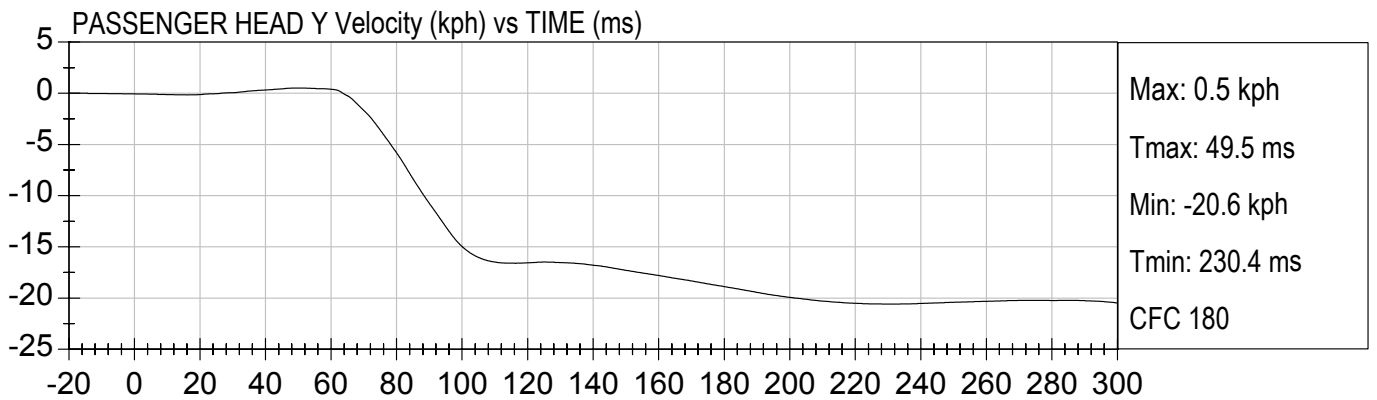
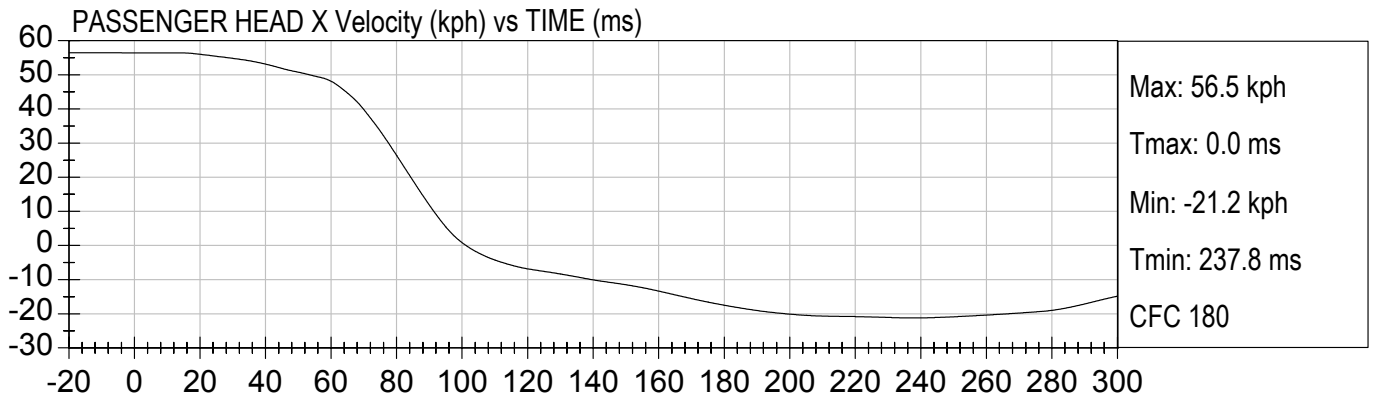


PASSENGER HEAD Z (G's) vs TIME (ms)



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



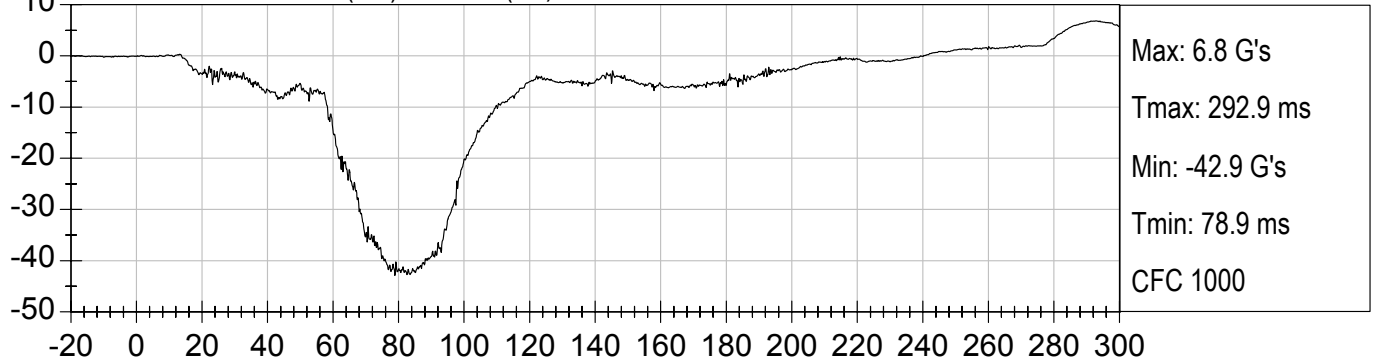




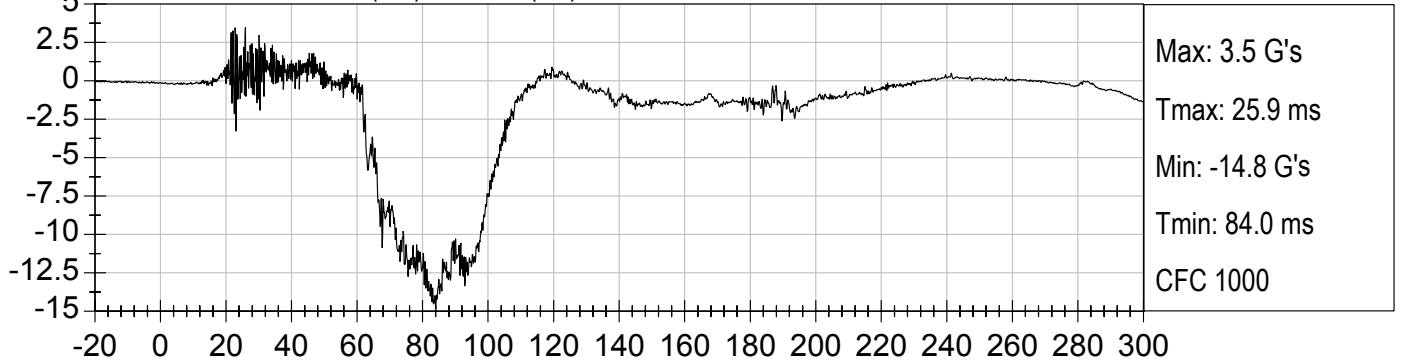
35MPH NCAP FRONTAL
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Speed: 35.1 mph (56.5 km/h)

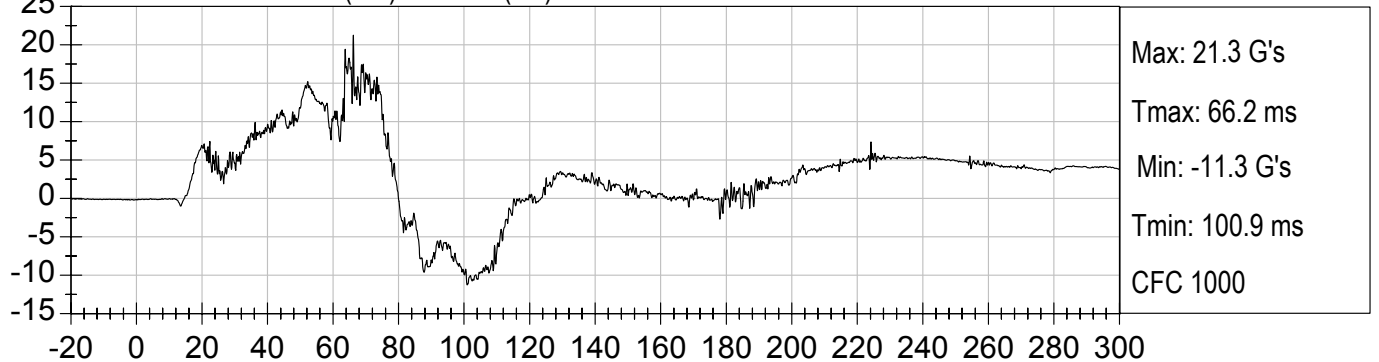
PASSENGER HEAD Xr (G's) vs TIME (ms)



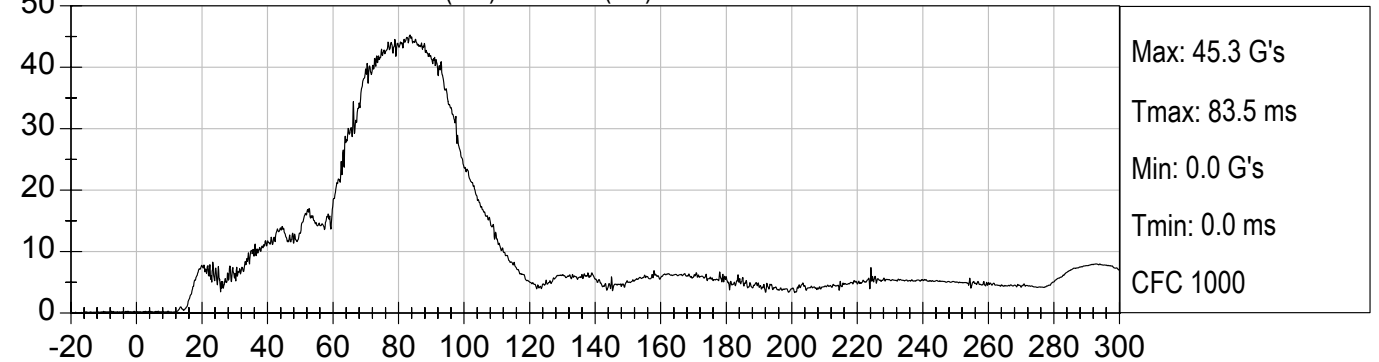
PASSENGER HEAD Yr (G's) vs TIME (ms)

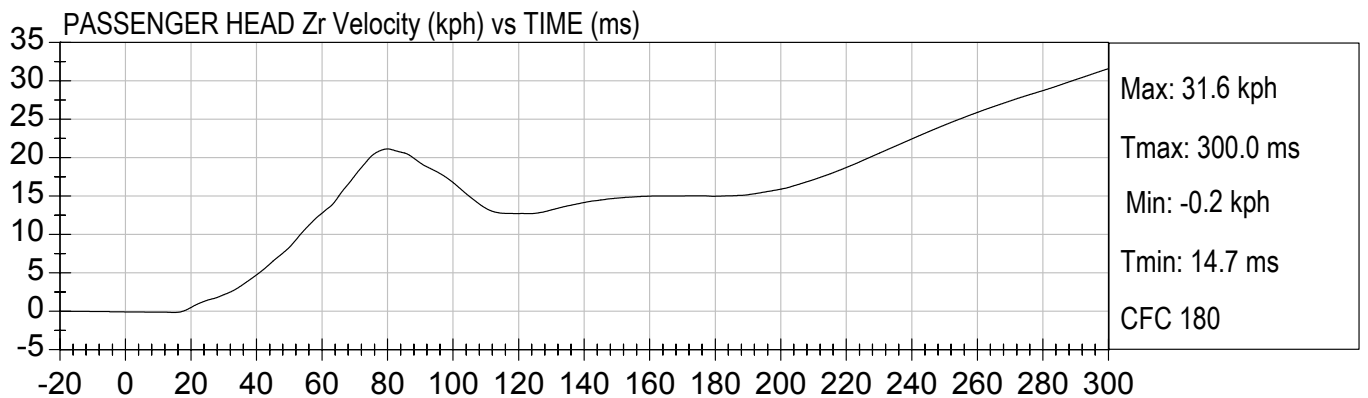
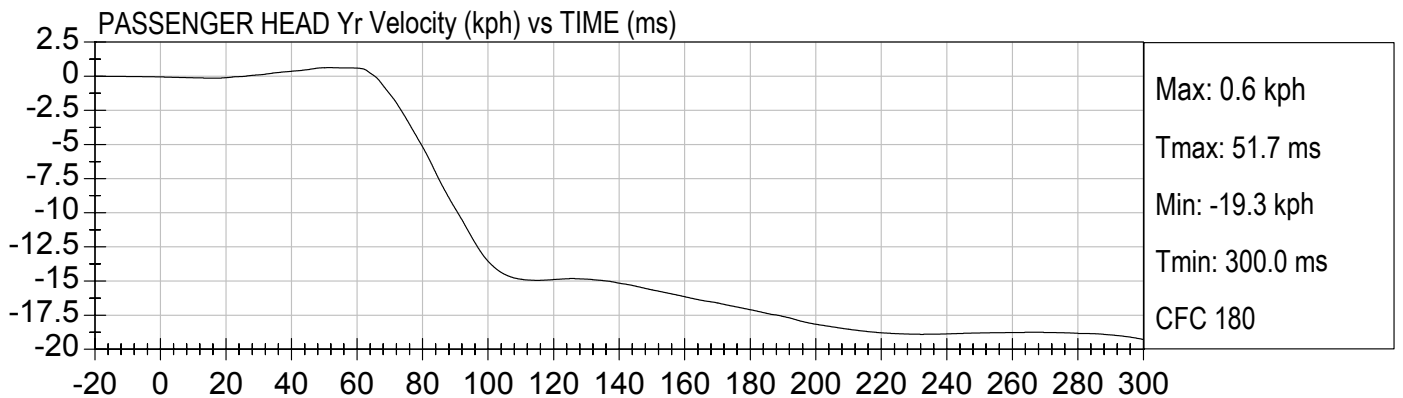
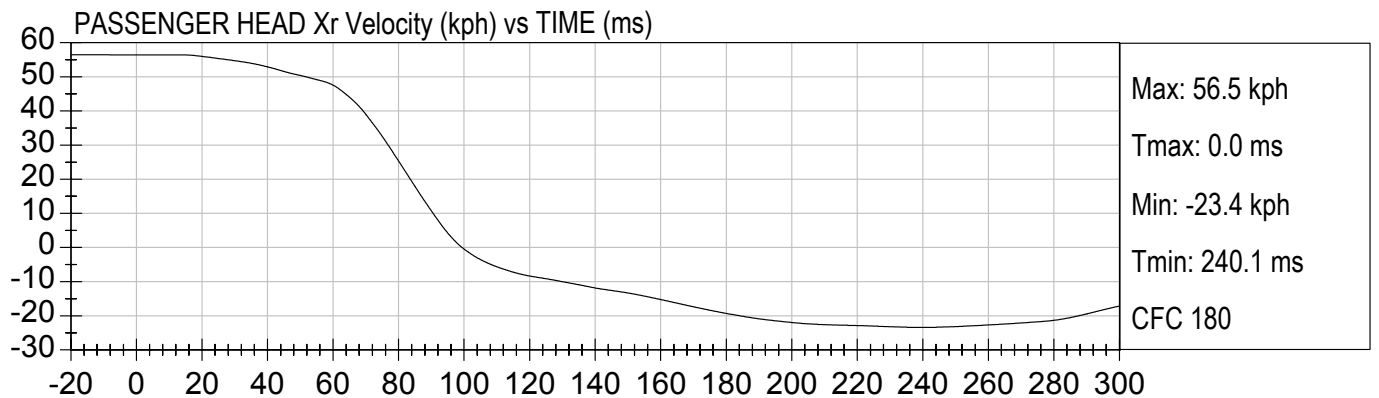


PASSENGER HEAD Zr (G's) vs TIME (ms)



PASSENGER HEAD ResultantR (G's) vs TIME (ms)

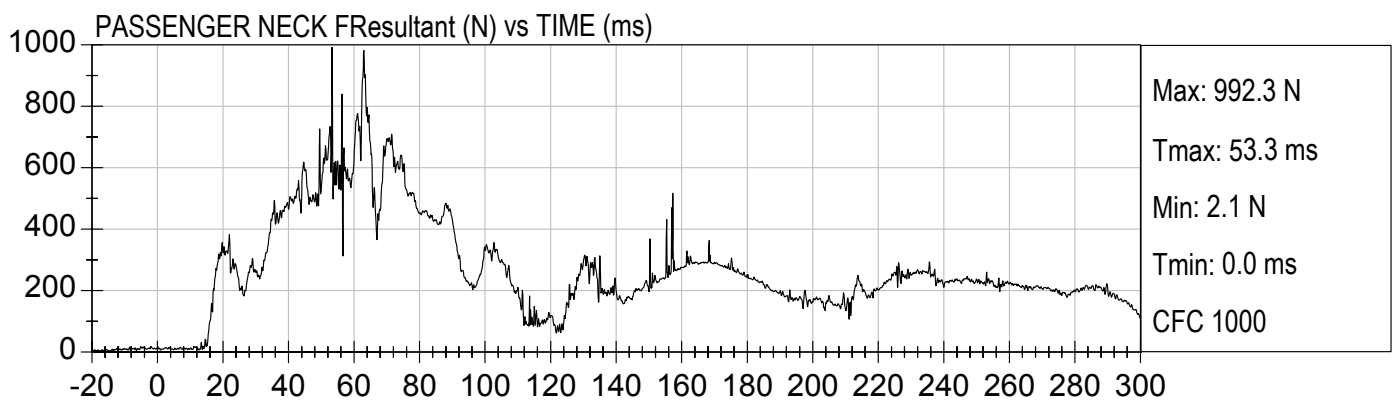
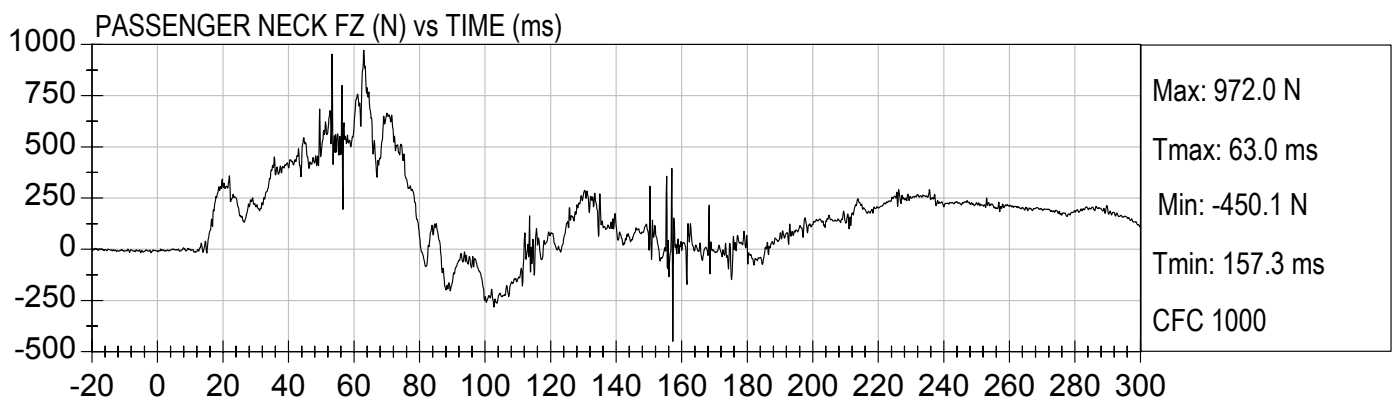
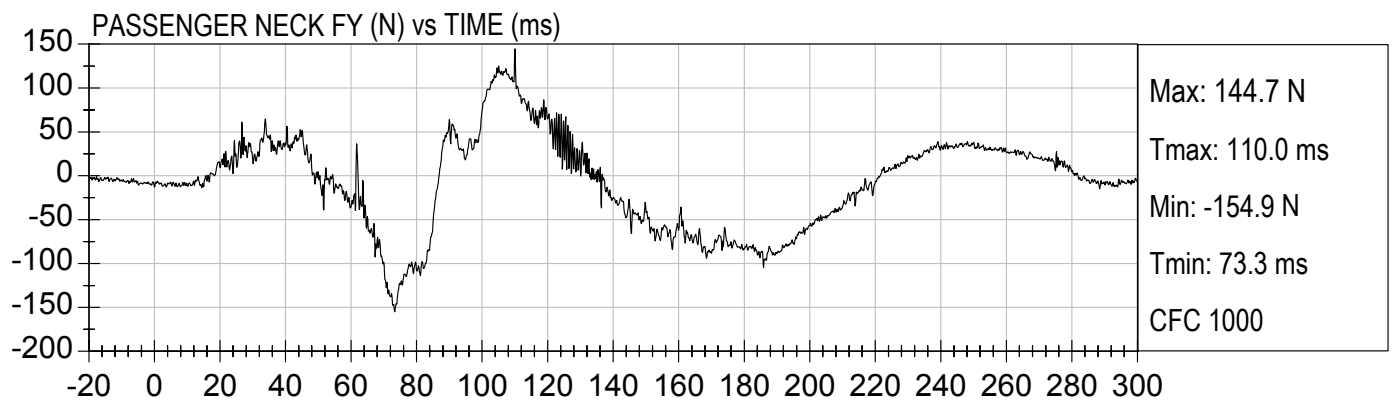
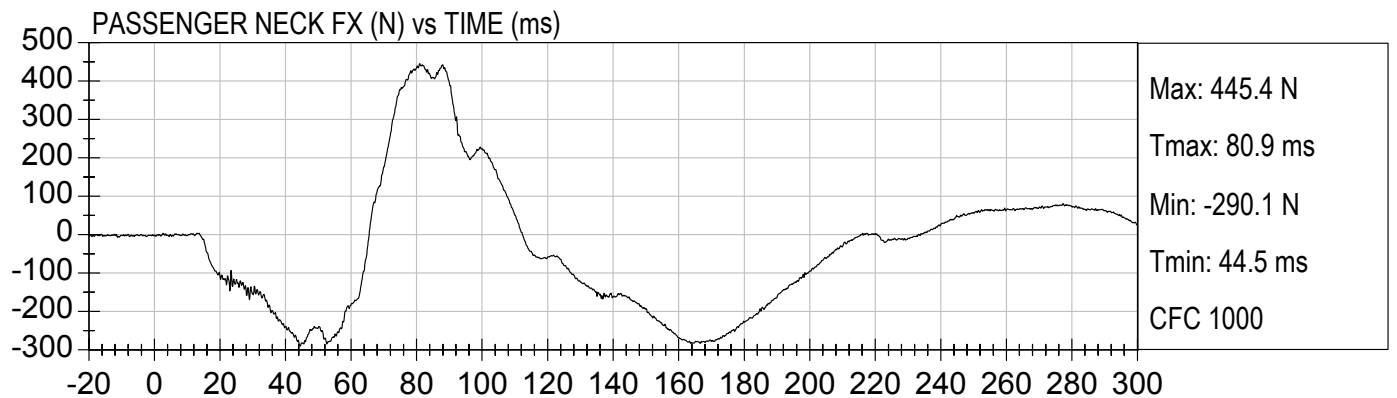






35MPH NCAP FRONTAL
2005 TOYOTA COROLLA (M55108)

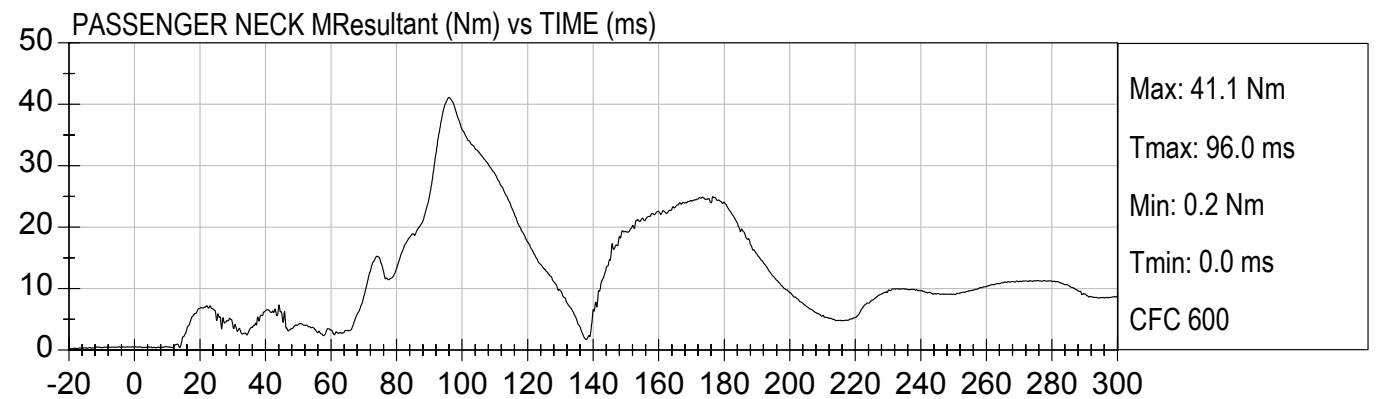
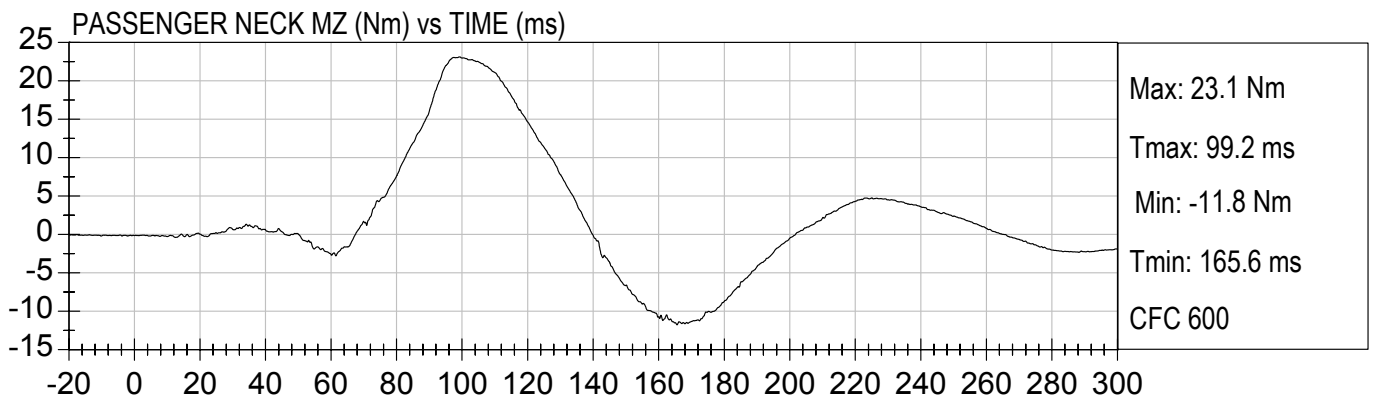
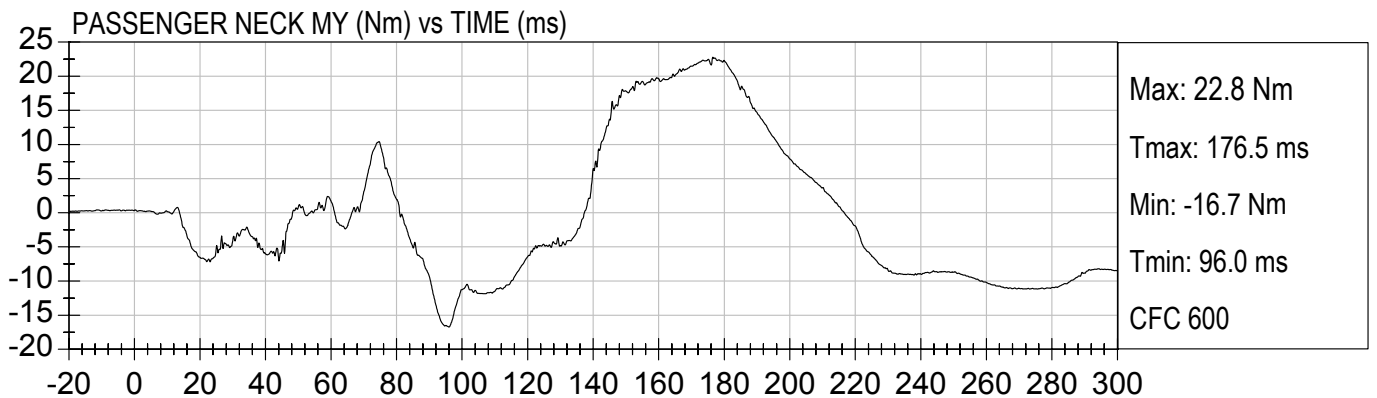
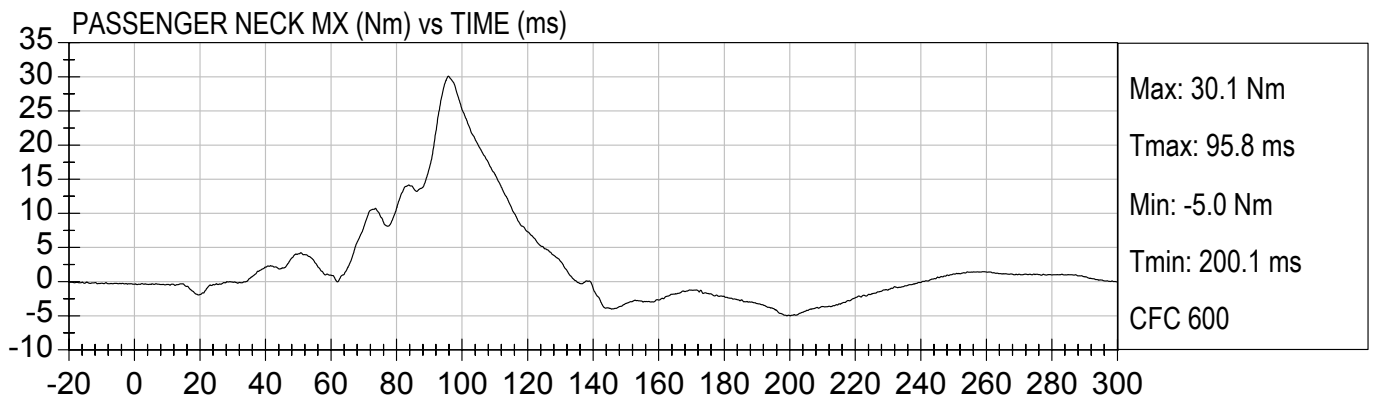
Test Date: 09/17/04
Speed: 35.1 mph (56.5 km/h)





35MPH NCAP FRONTAL
2005 TOYOTA COROLLA (M55108)

Test Date: 09/17/04
Speed: 35.1 mph (56.5 km/h)

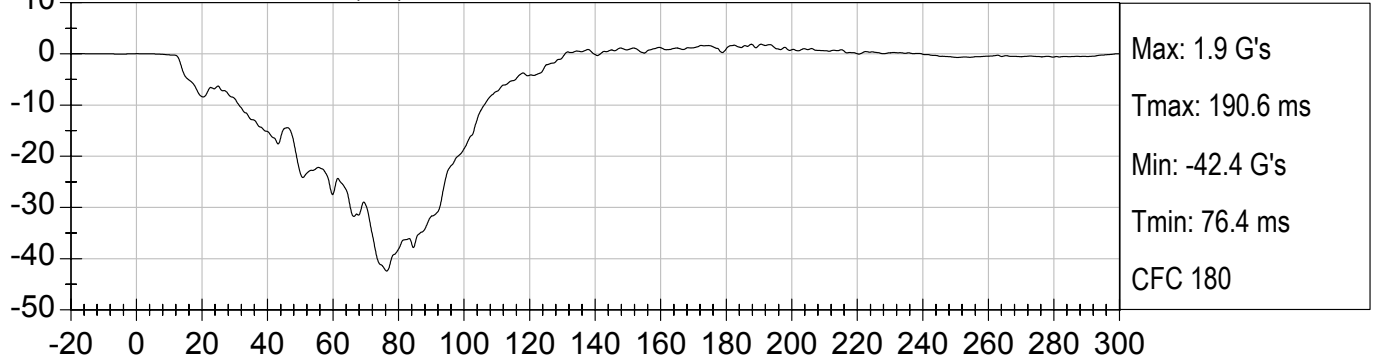




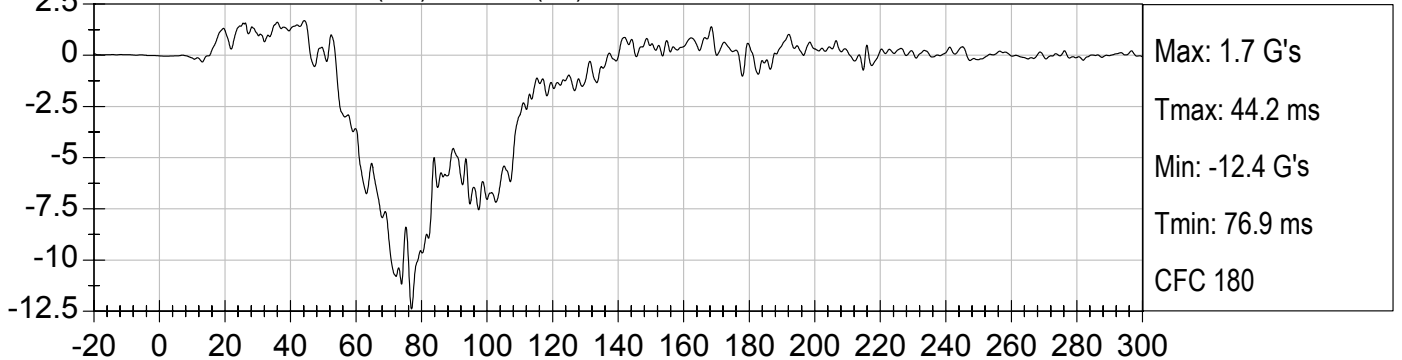
35MPH NCAP FRONTAL
2005 TOYOTA COROLLA (M55108)

Test Date: 09/17/04
Speed: 35.1 mph (56.5 km/h)

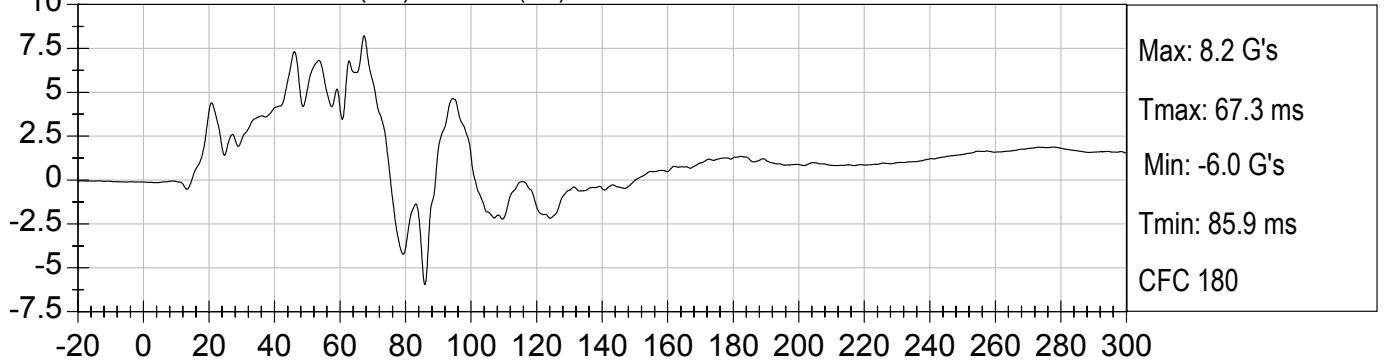
PASSENGER CHEST X (G's) vs TIME (ms)



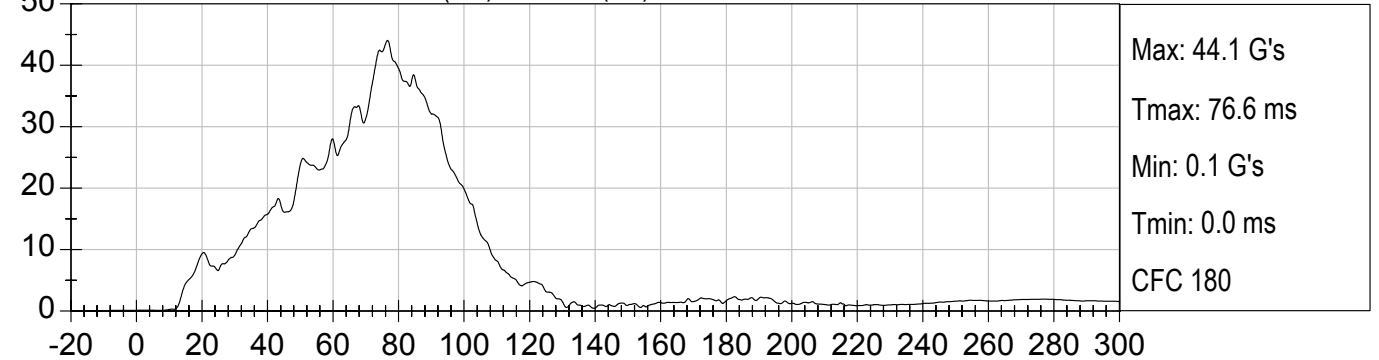
PASSENGER CHEST Y (G's) vs TIME (ms)



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

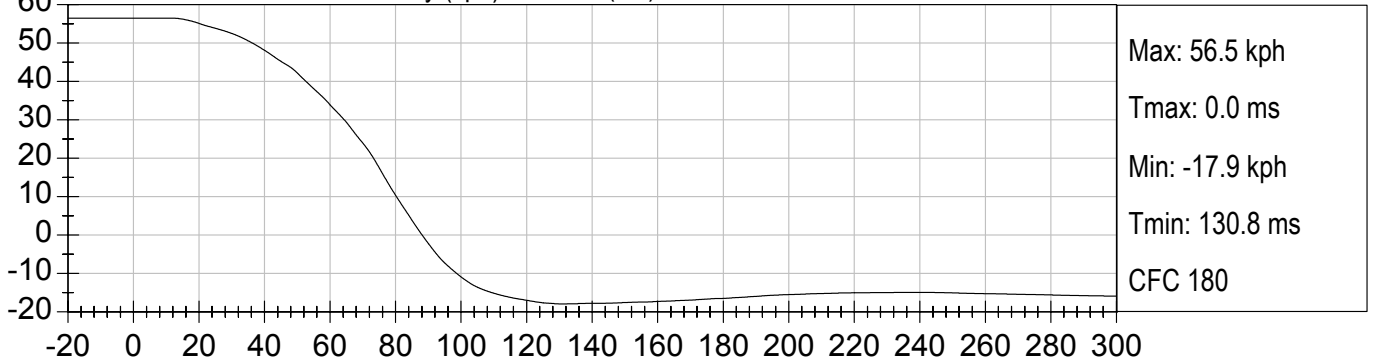


PASSENGER CHEST Resultant (G's) vs TIME (ms)

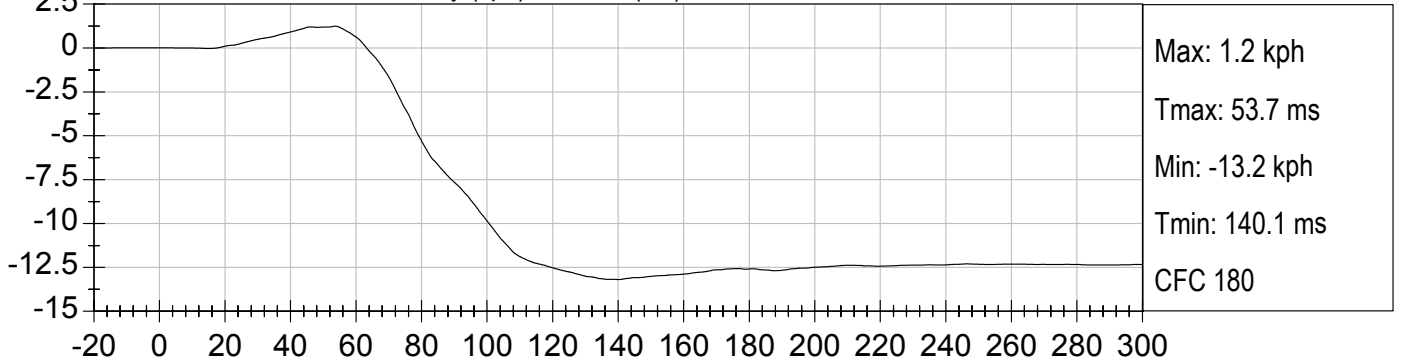




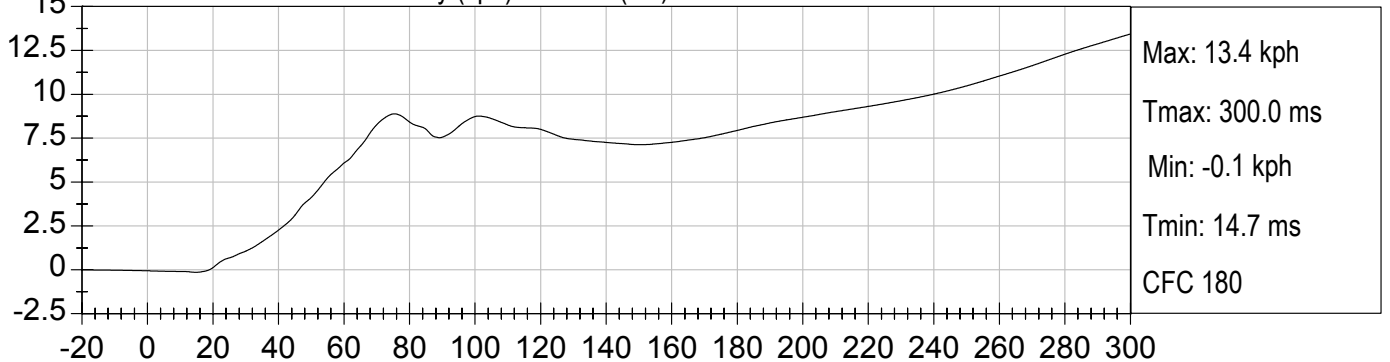
PASSENGER CHEST X Velocity (kph) vs TIME (ms)



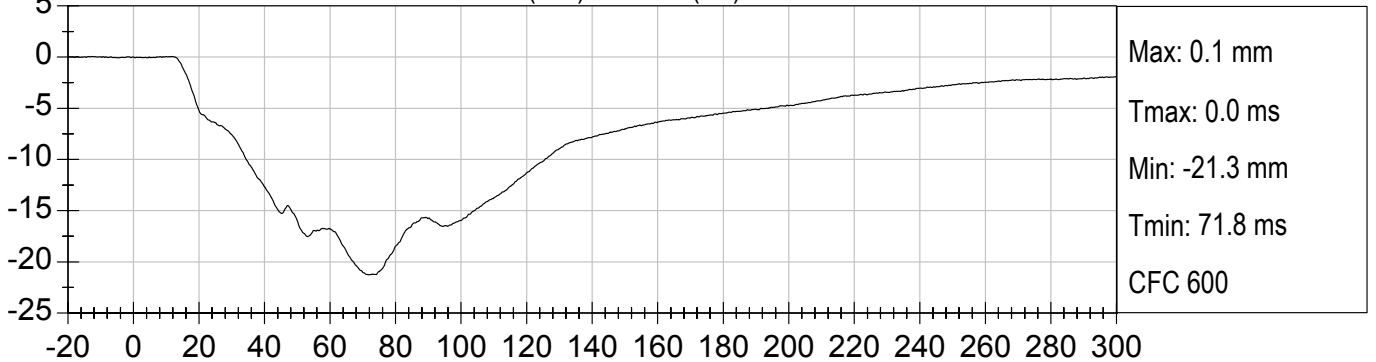
PASSENGER CHEST Y Velocity (kph) vs TIME (ms)



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



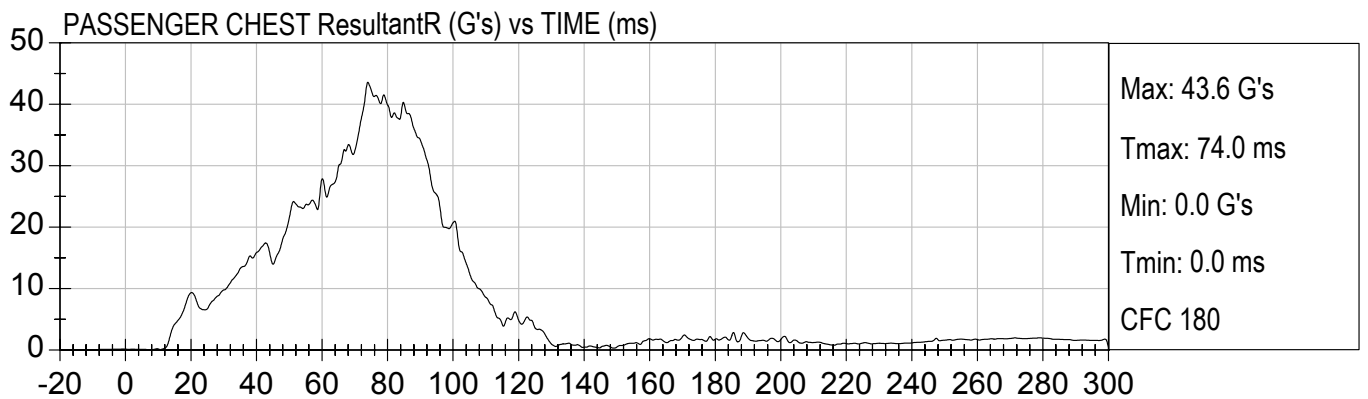
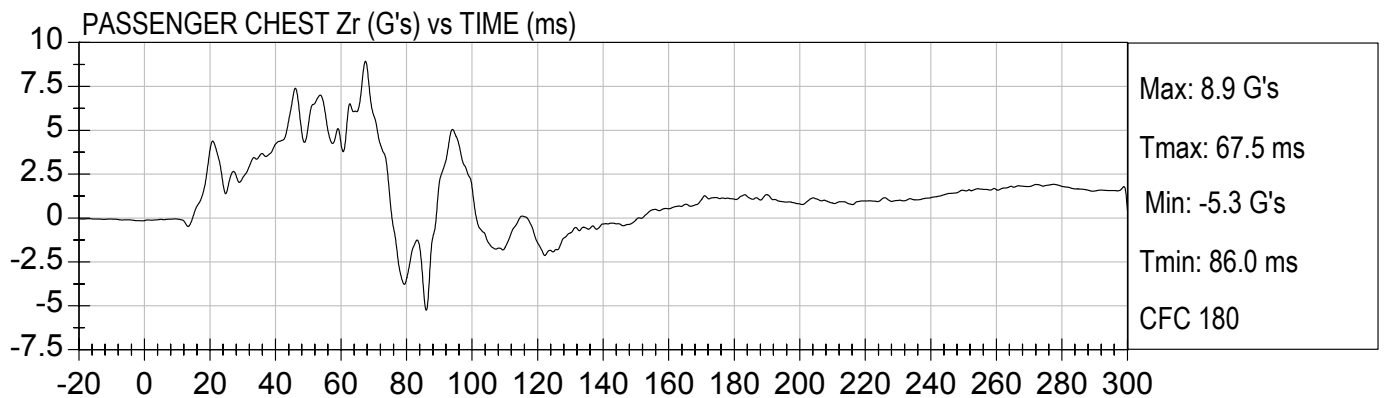
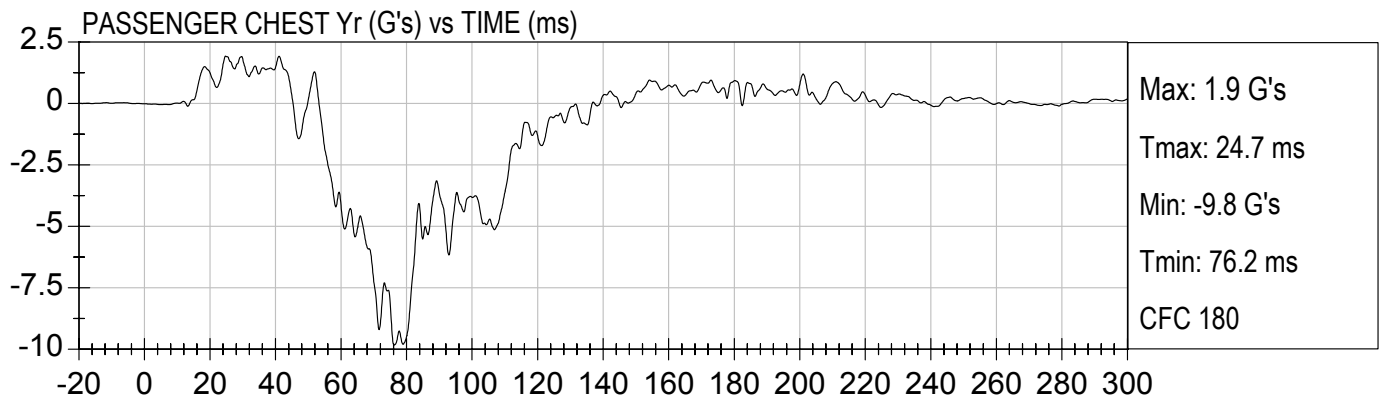
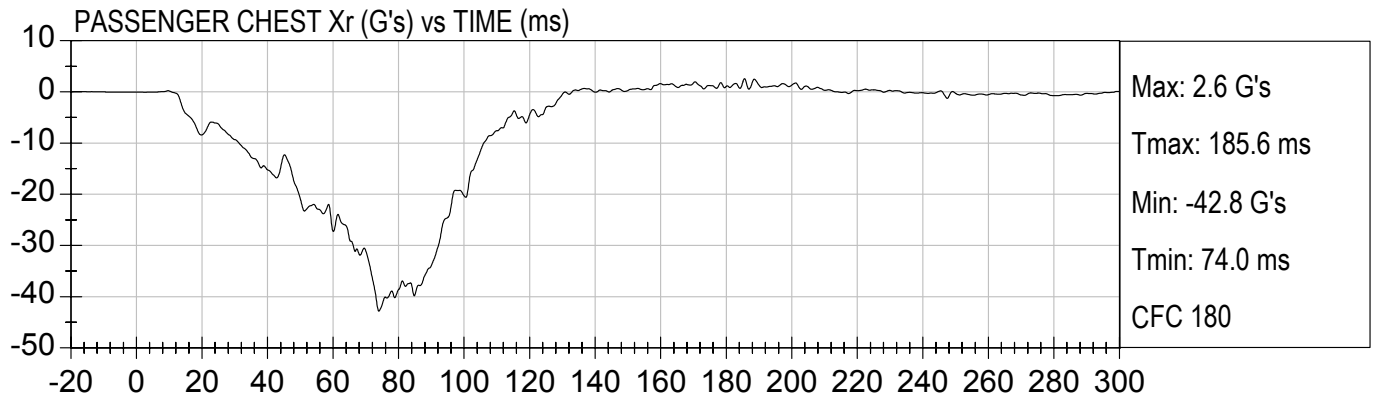
PASSENGER CHEST DISPLACEMENT (mm) vs TIME (ms)

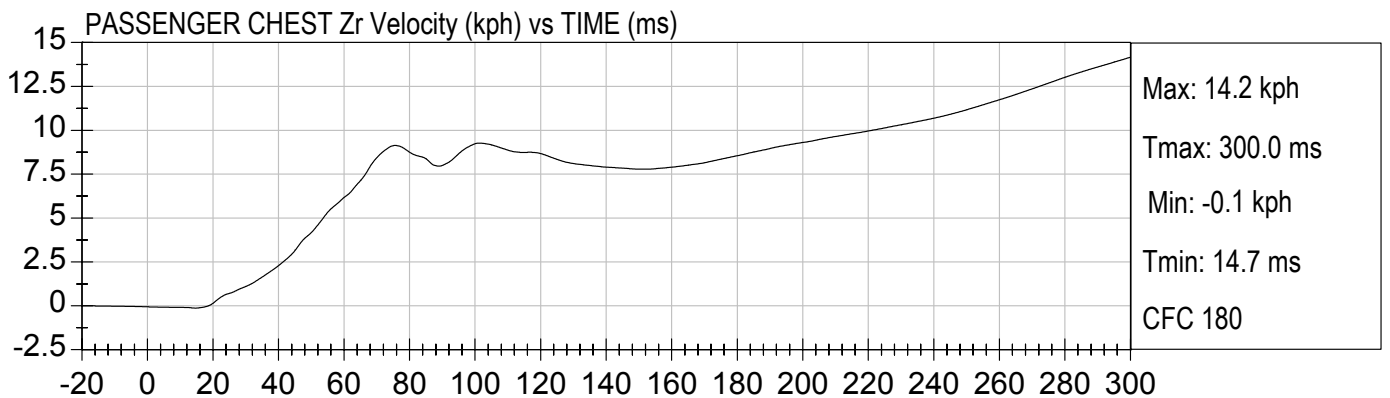
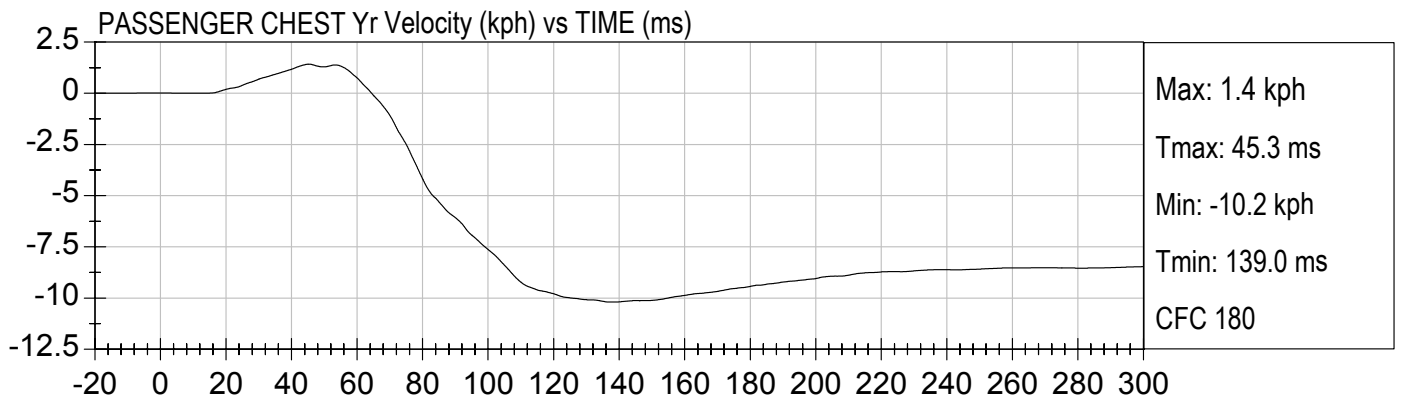
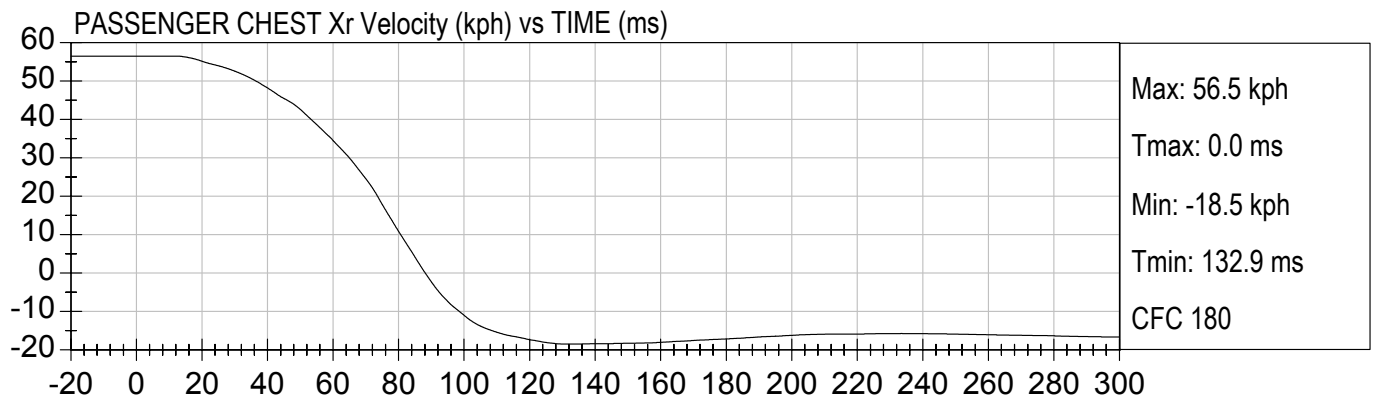




35MPH NCAP FRONTAL
2005 TOYOTA COROLLA (M55108)

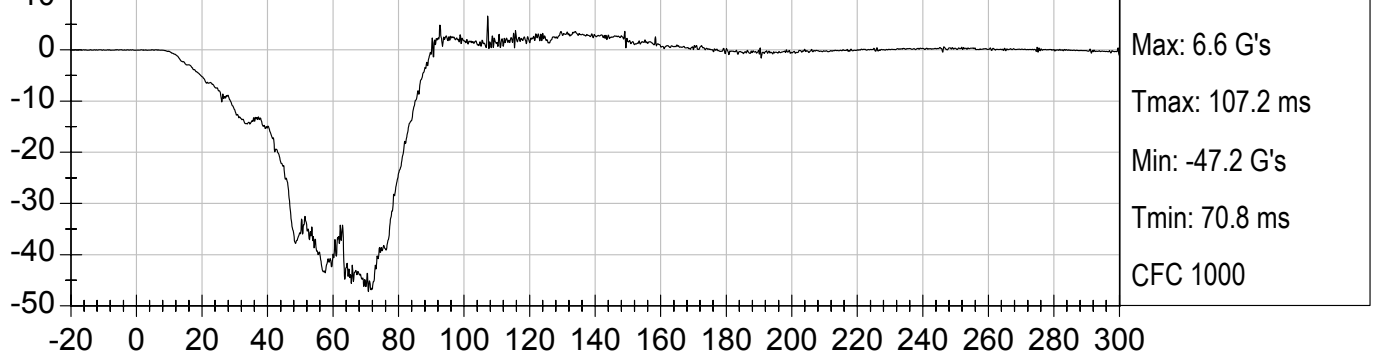
Test Date: 09/17/04
Speed: 35.1 mph (56.5 km/h)



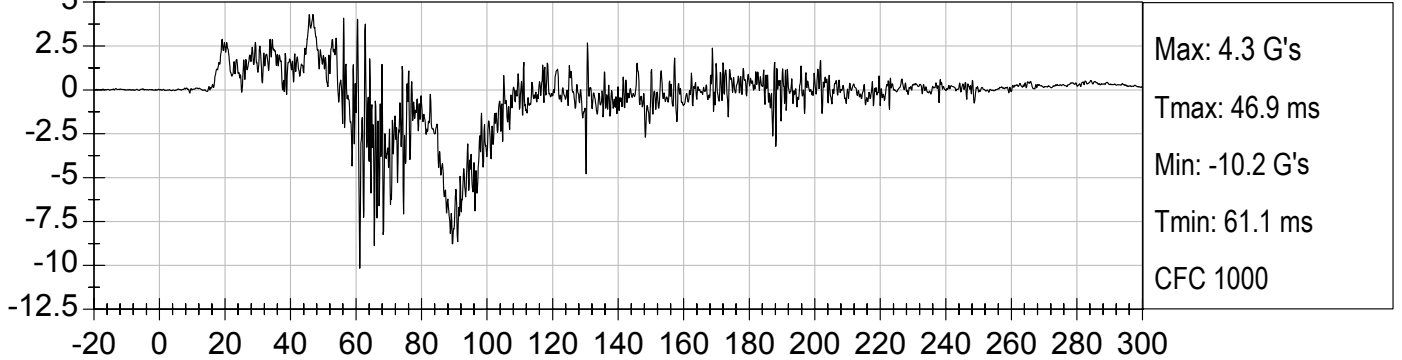




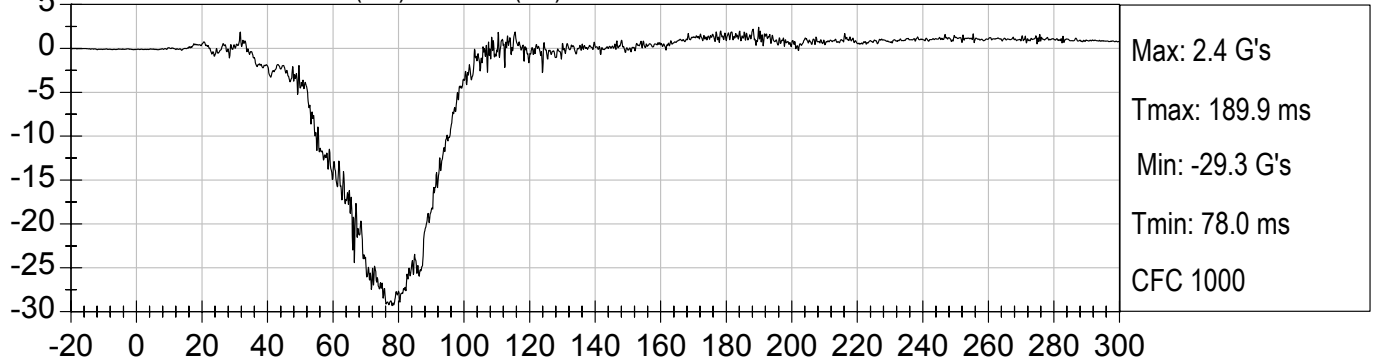
PASSENGER PELVIS X (G's) vs TIME (ms)



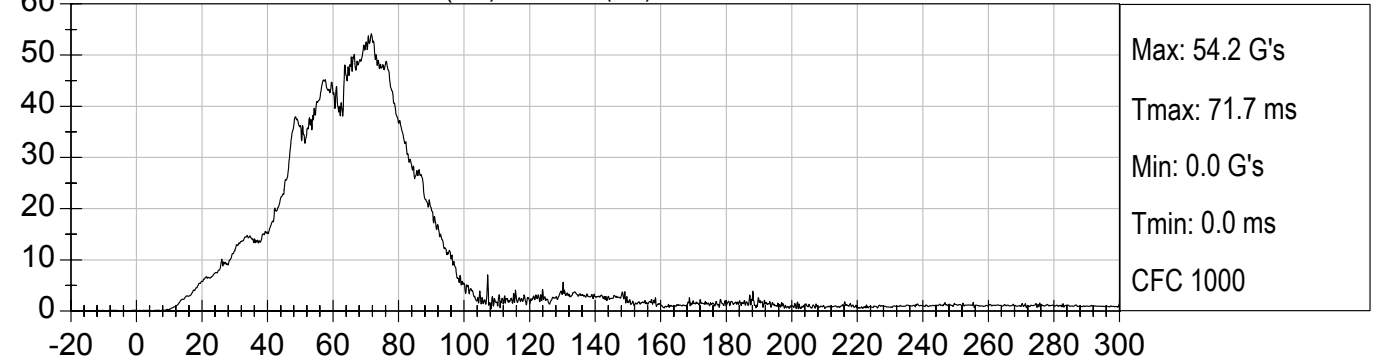
PASSENGER PELVIS Y (G's) vs TIME (ms)

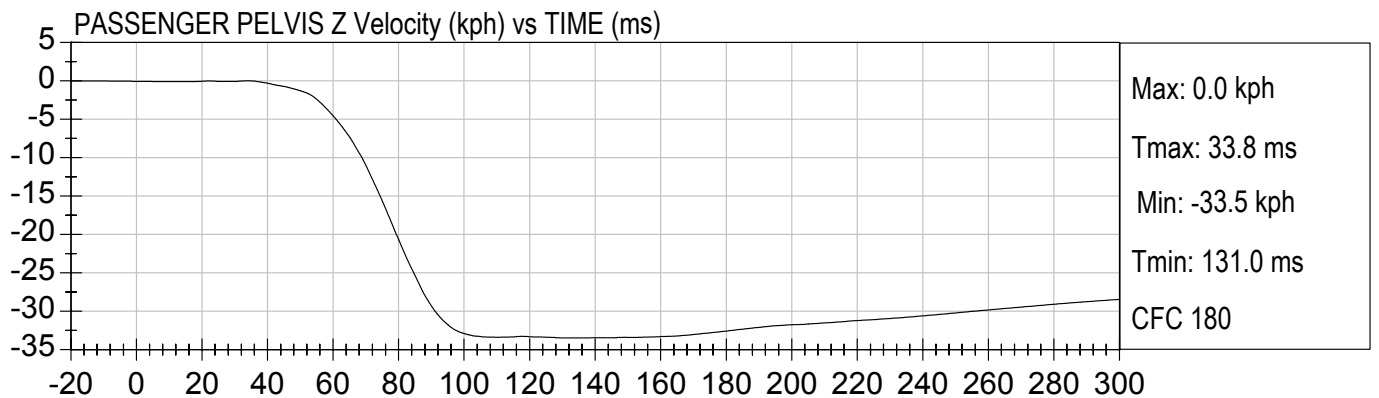
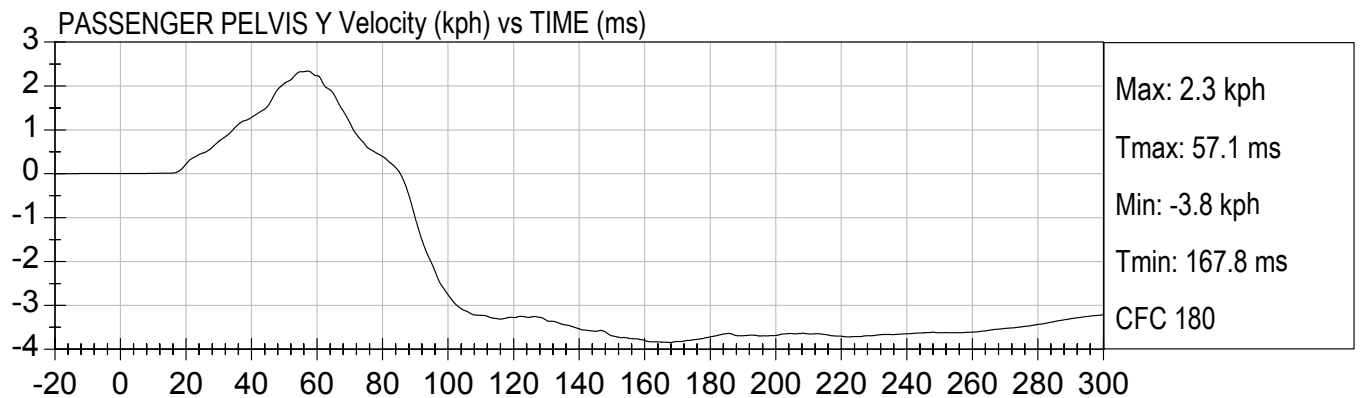
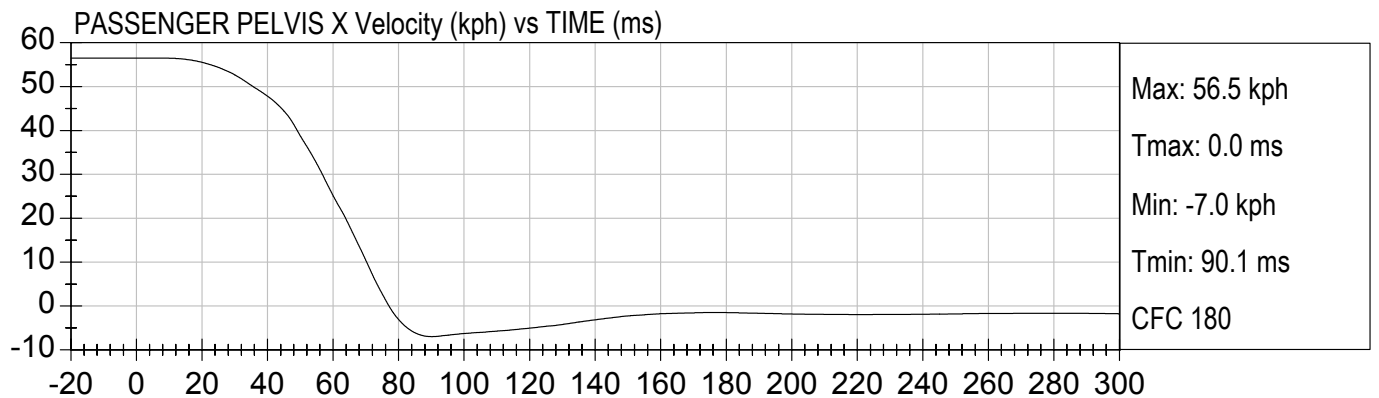


PASSENGER PELVIS Z (G's) vs TIME (ms)



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

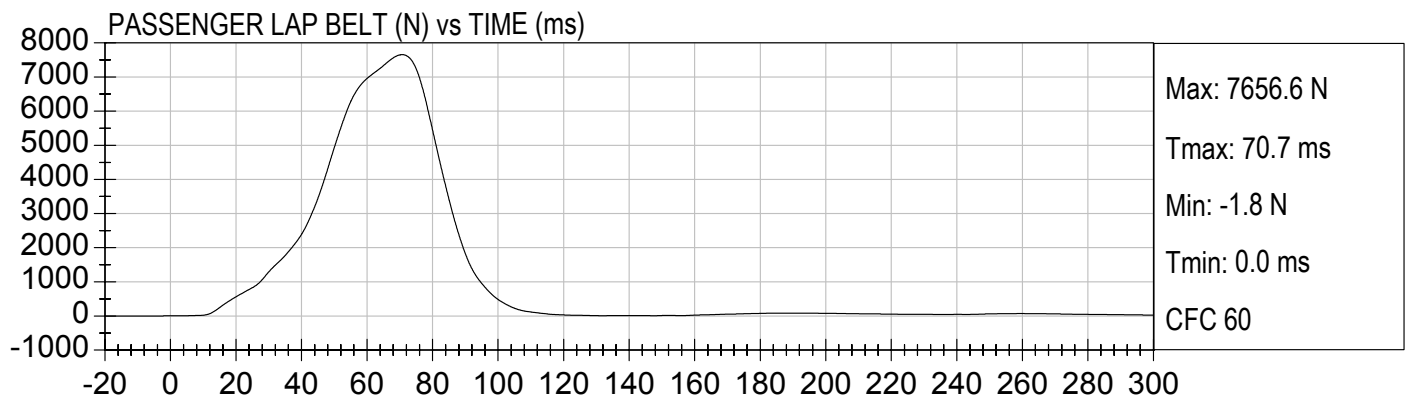
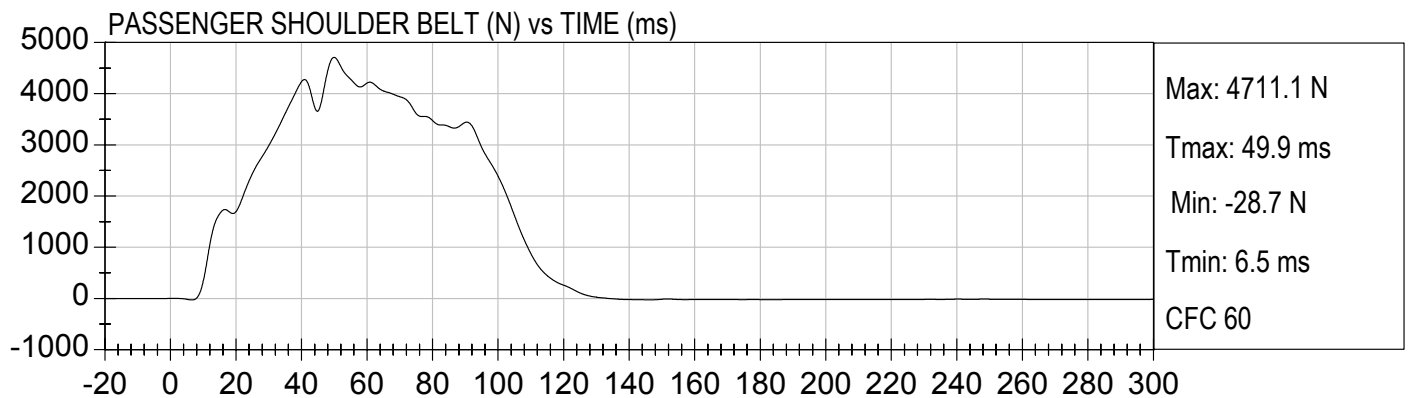
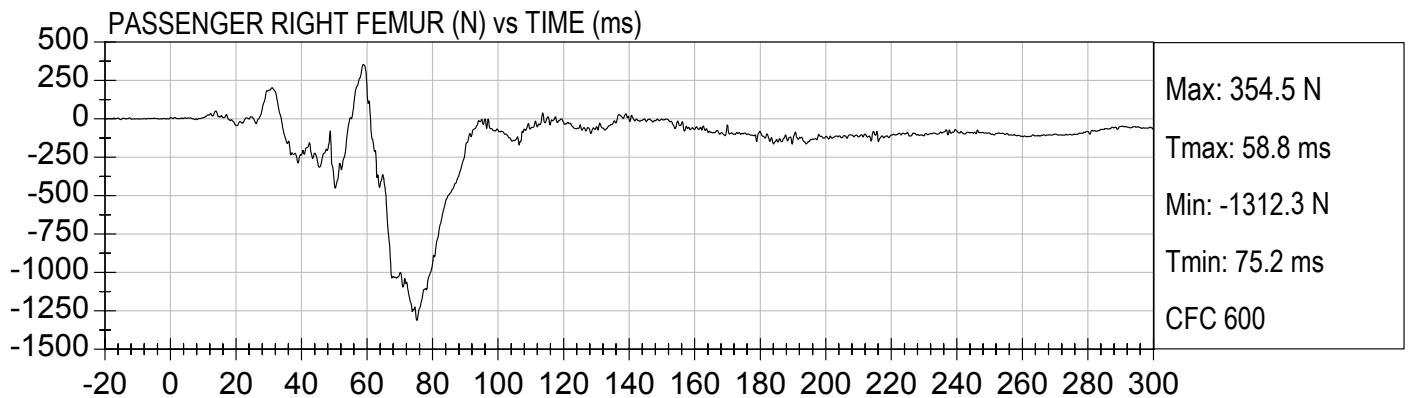
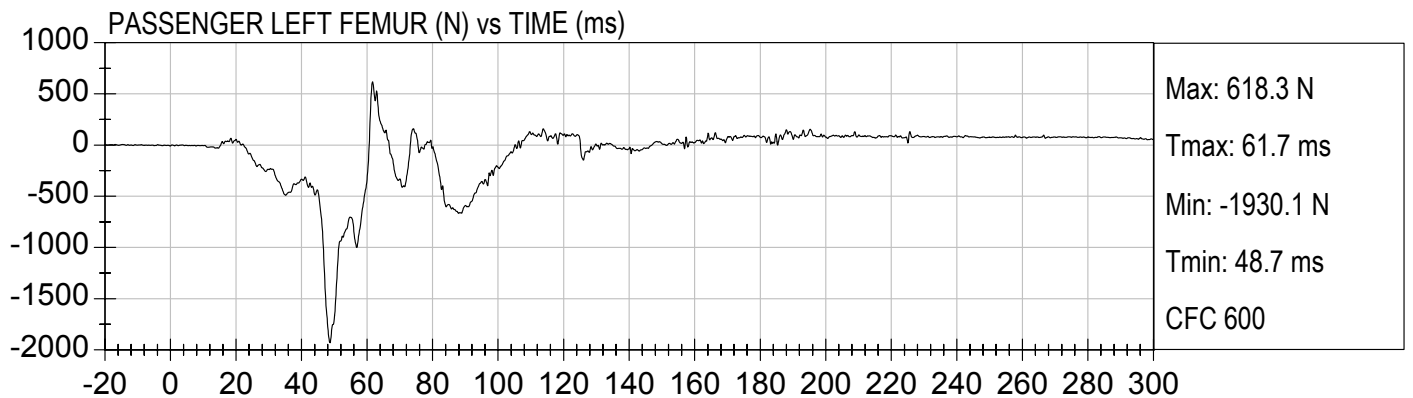


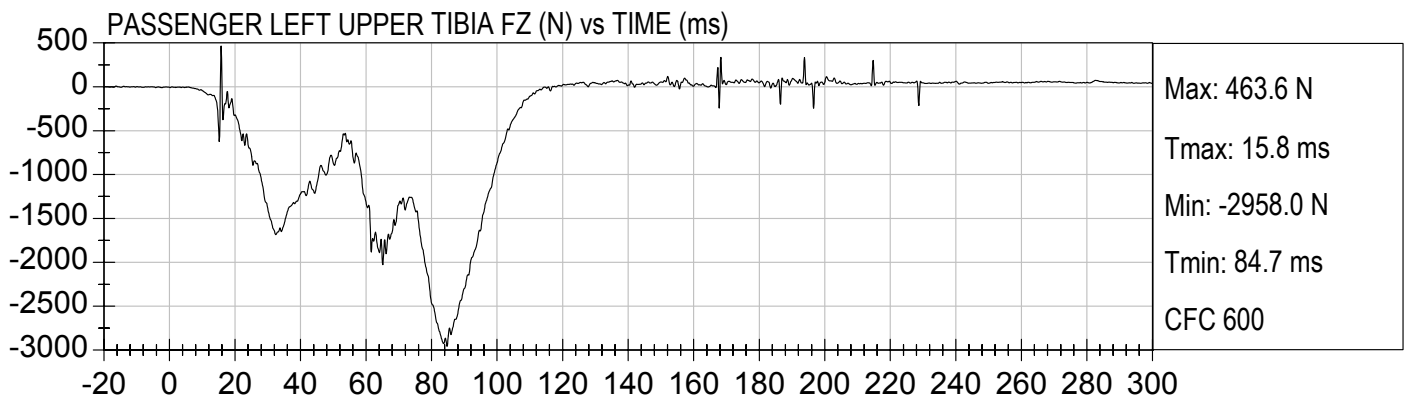
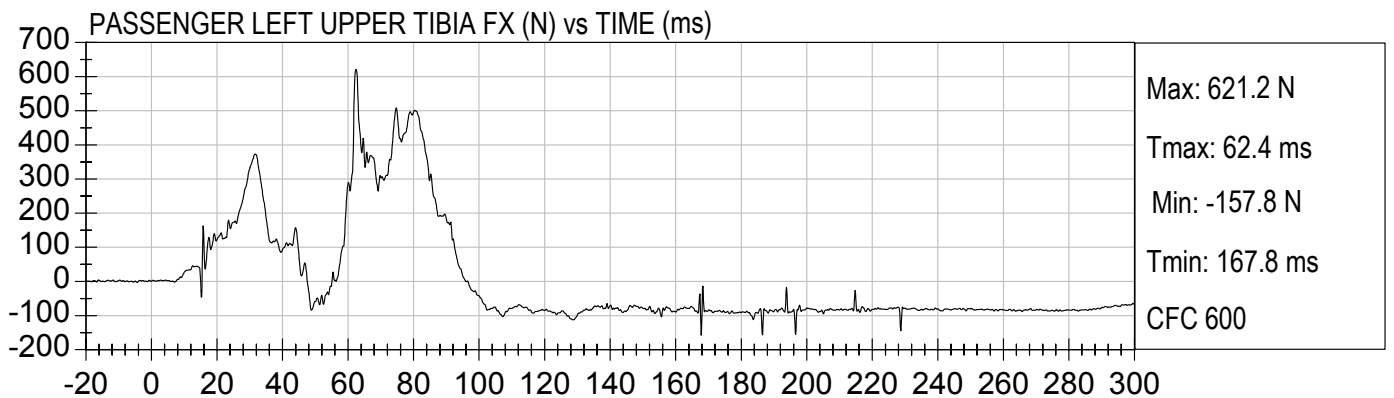
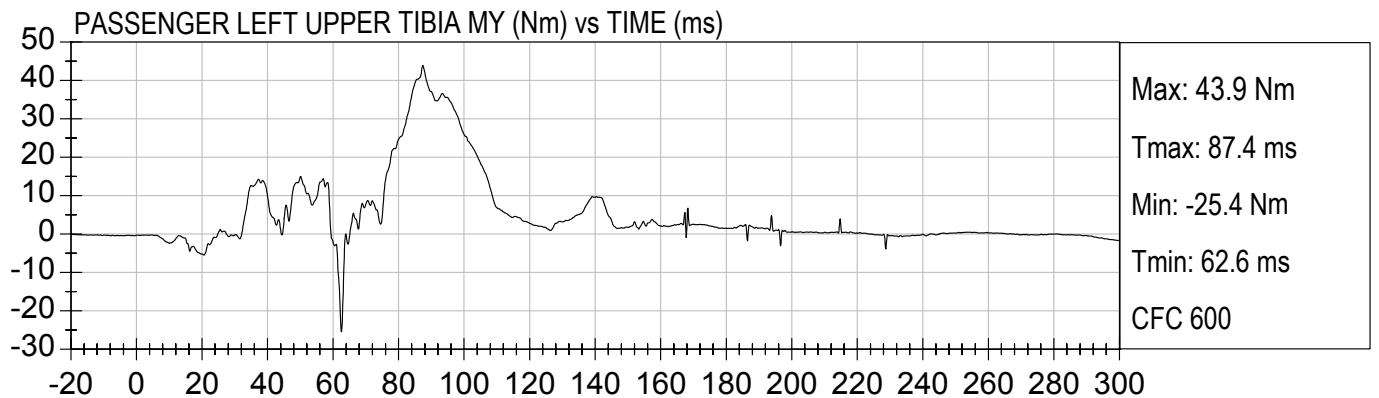
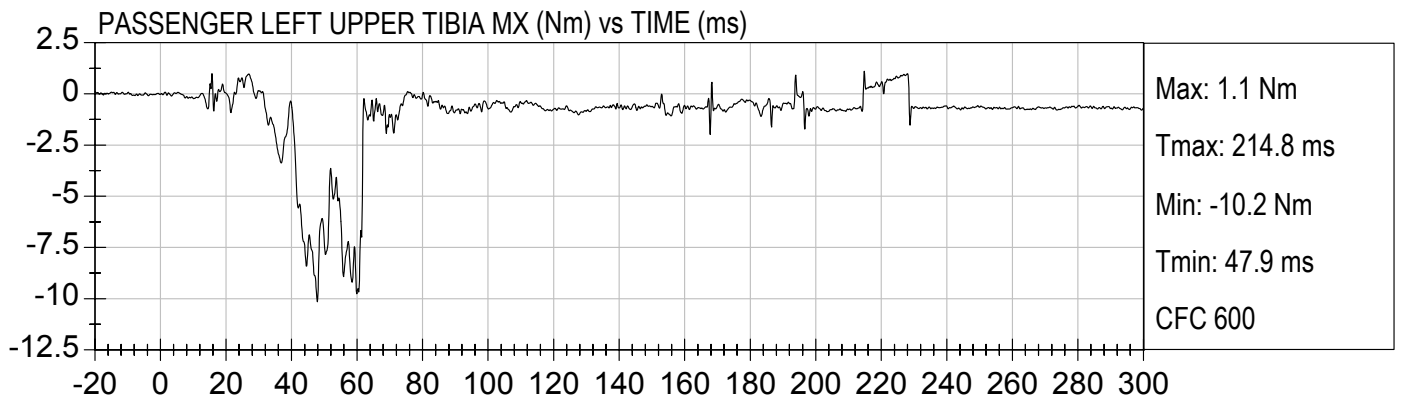




35MPH NCAP FRONTAL
2005 TOYOTA COROLLA (M55108)

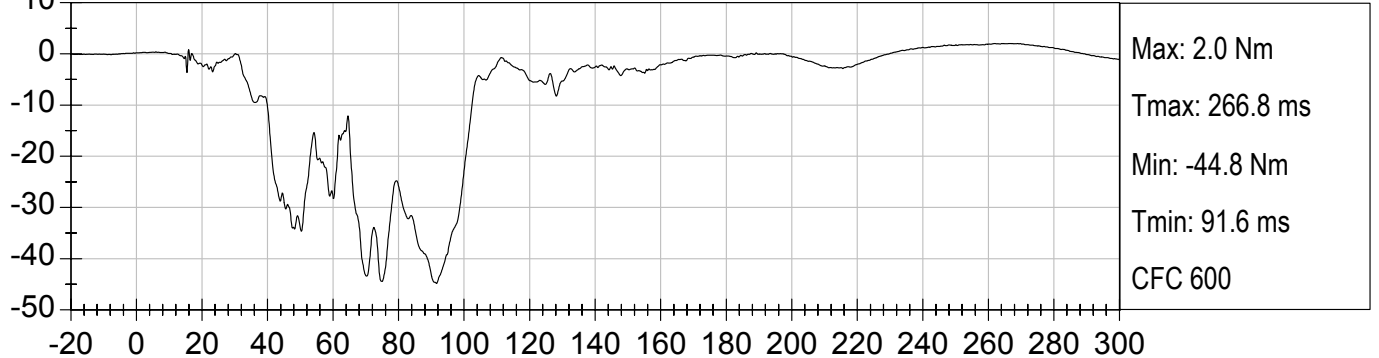
Test Date: 09/17/04
Speed: 35.1 mph (56.5 km/h)



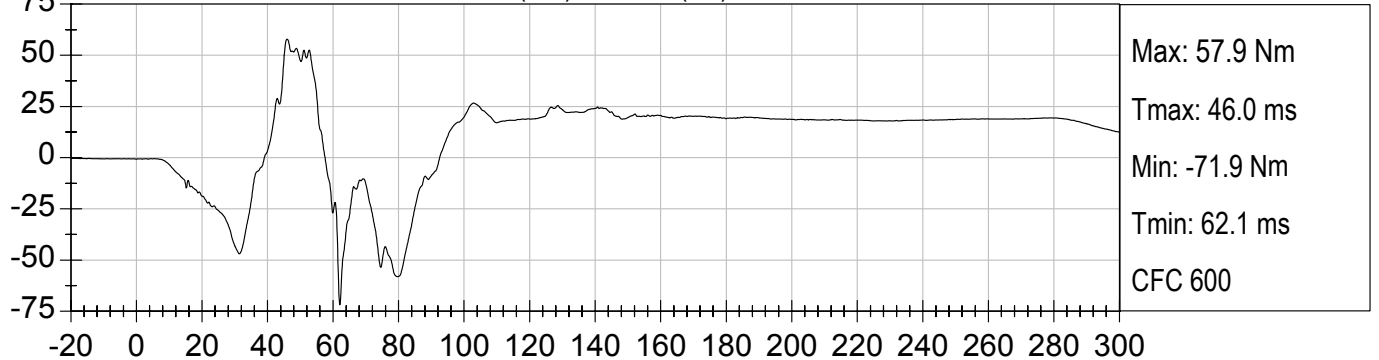




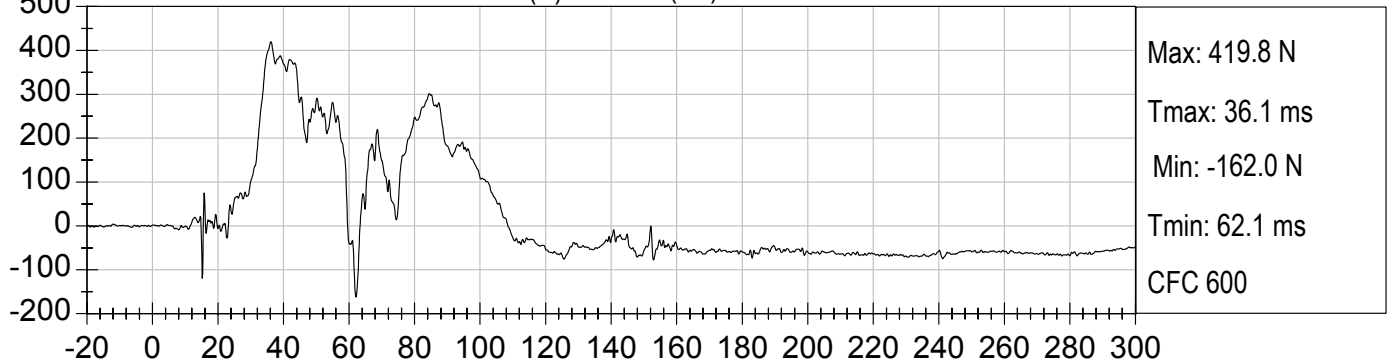
PASSENGER LEFT LOWER TIBIA MX (Nm) vs TIME (ms)



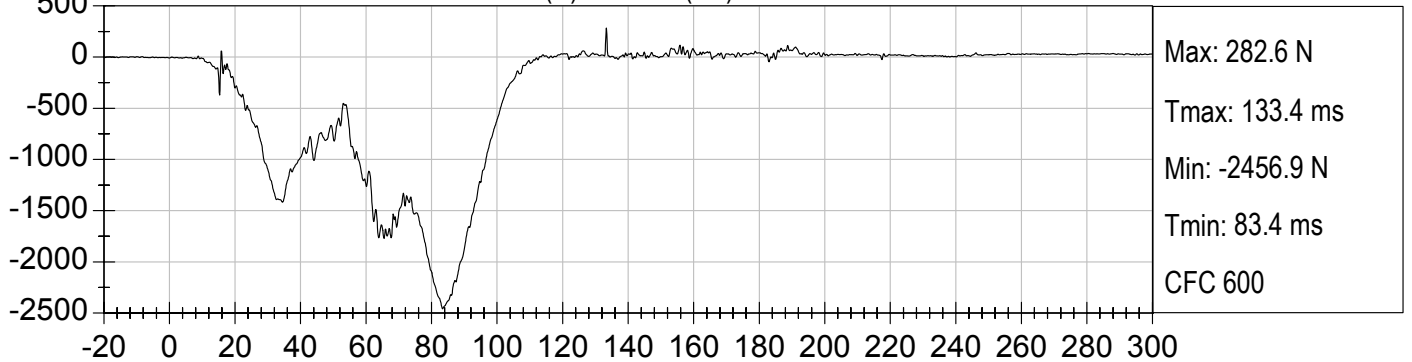
PASSENGER LEFT LOWER TIBIA MY (Nm) vs TIME (ms)



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



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

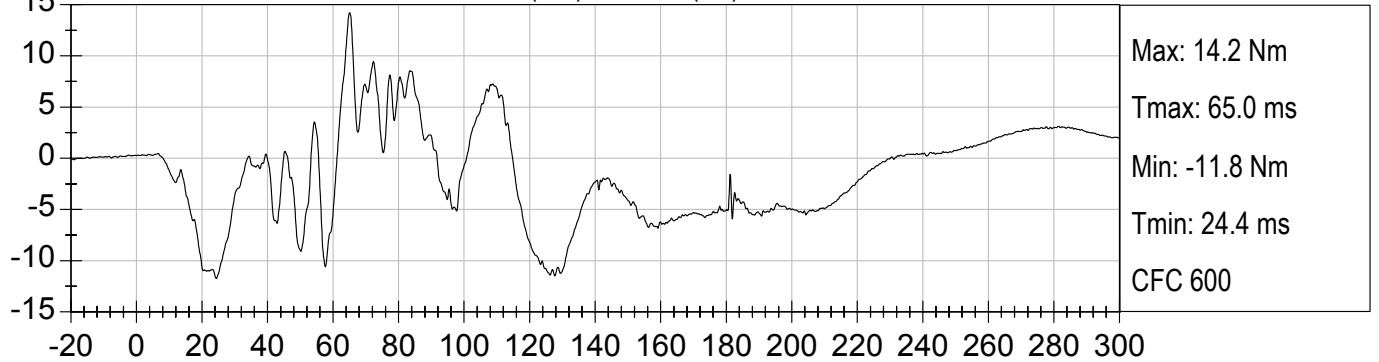




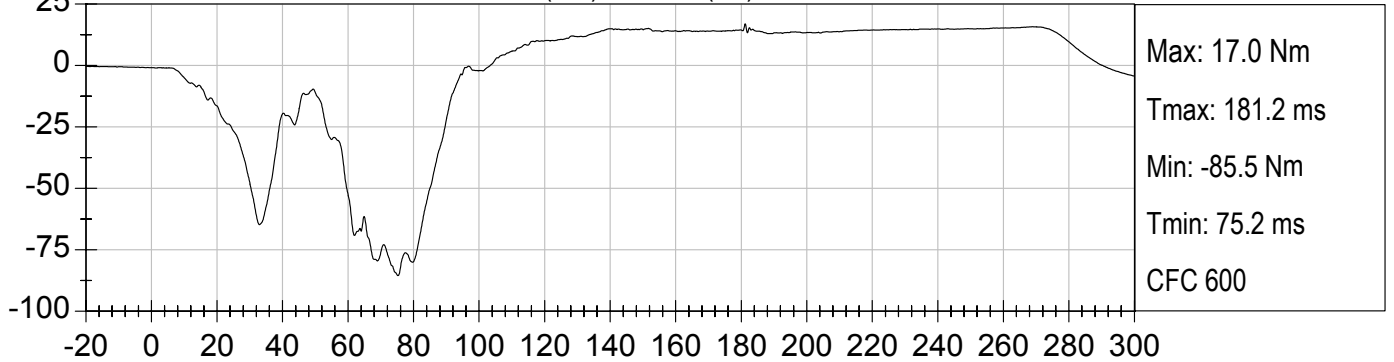
35MPH NCAP FRONTAL
2005 TOYOTA COROLLA (M55108)

Test Date: 09/17/04
Speed: 35.1 mph (56.5 km/h)

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



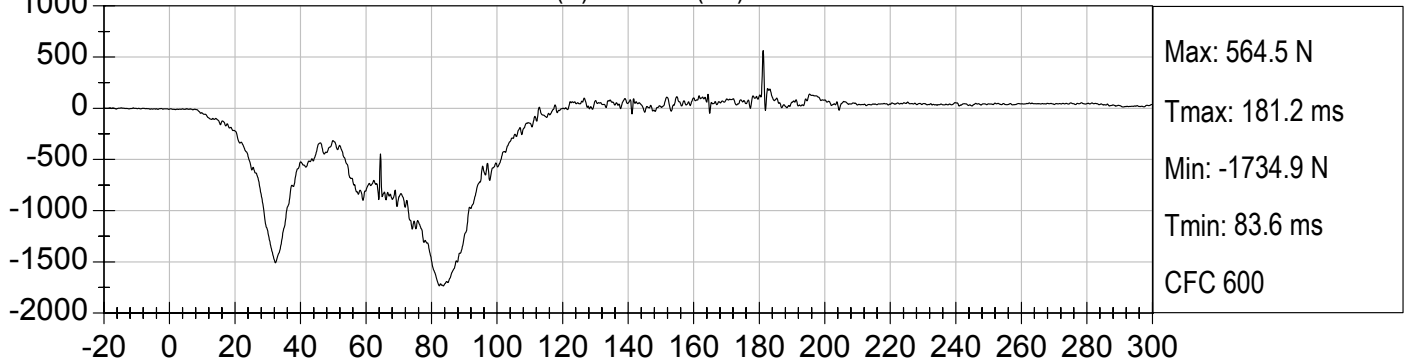
PASSENGER RIGHT UPPER TIBIA MY (Nm) vs TIME (ms)



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



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

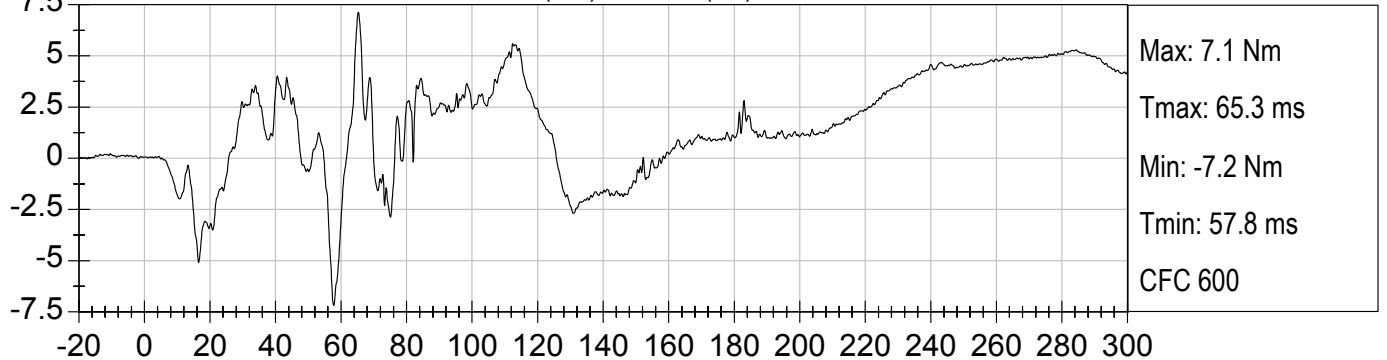




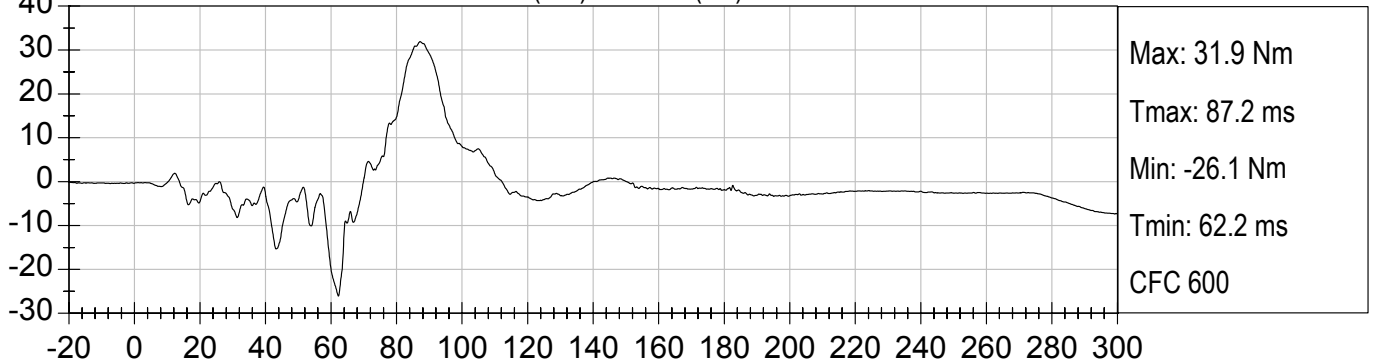
35MPH NCAP FRONTAL
2005 TOYOTA COROLLA (M55108)

Test Date: 09/17/04
Speed: 35.1 mph (56.5 km/h)

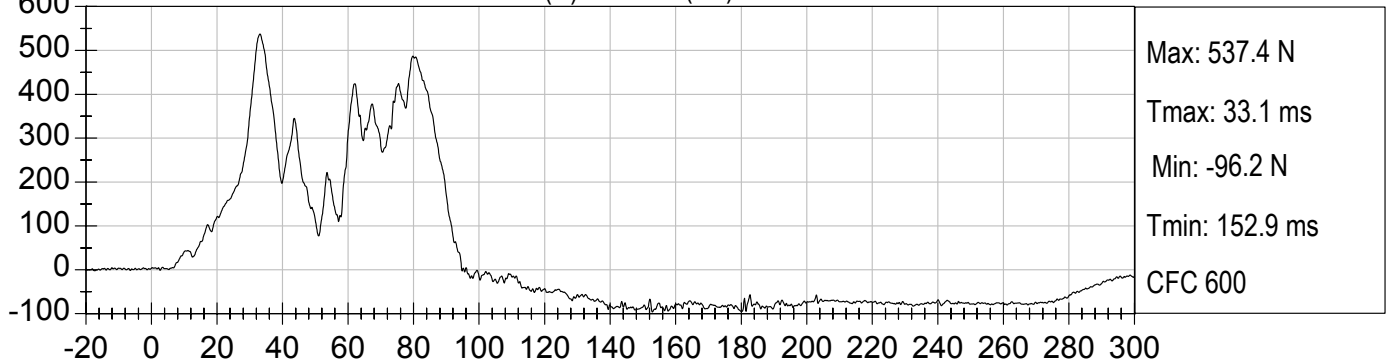
PASSENGER RIGHT LOWER TIBIA MX (Nm) vs TIME (ms)



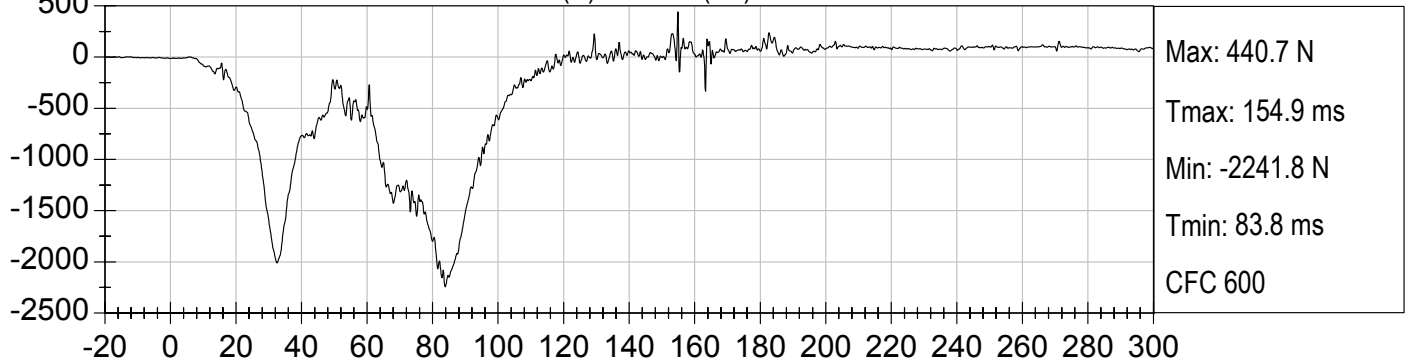
PASSENGER RIGHT LOWER TIBIA MY (Nm) vs TIME (ms)

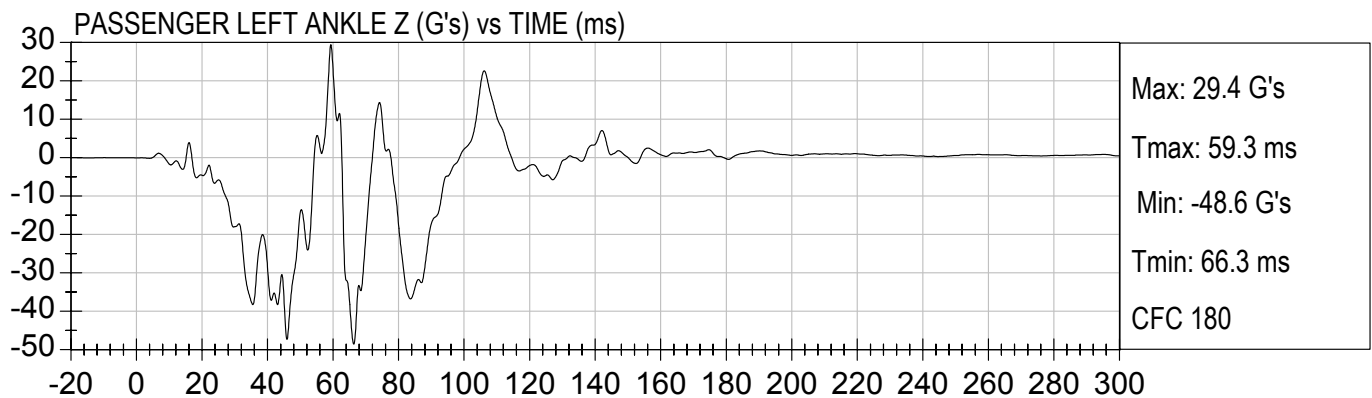
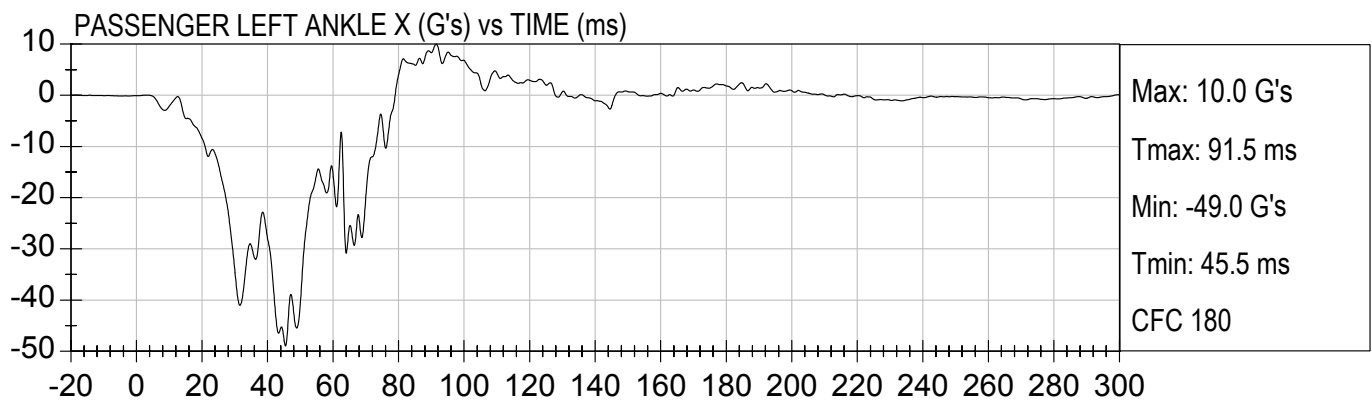
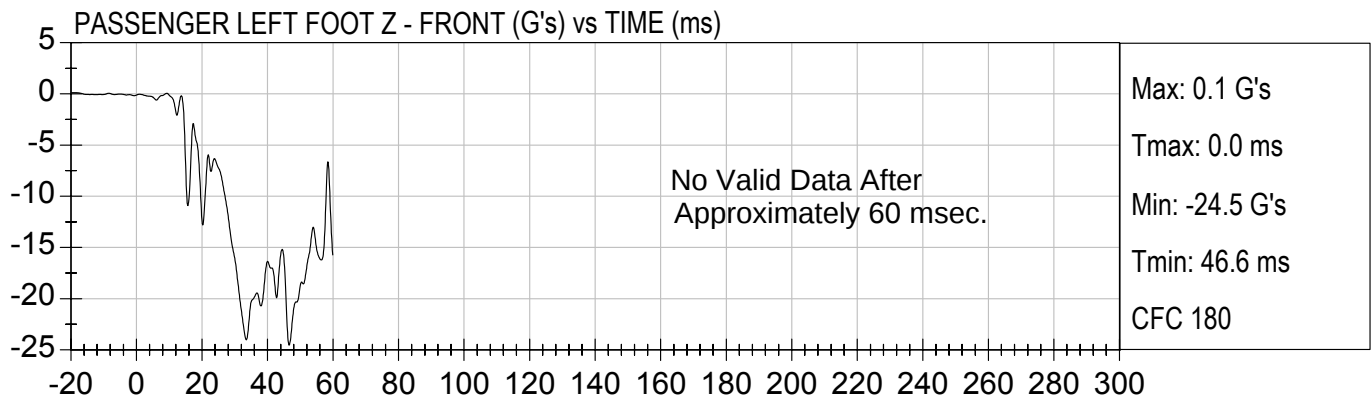


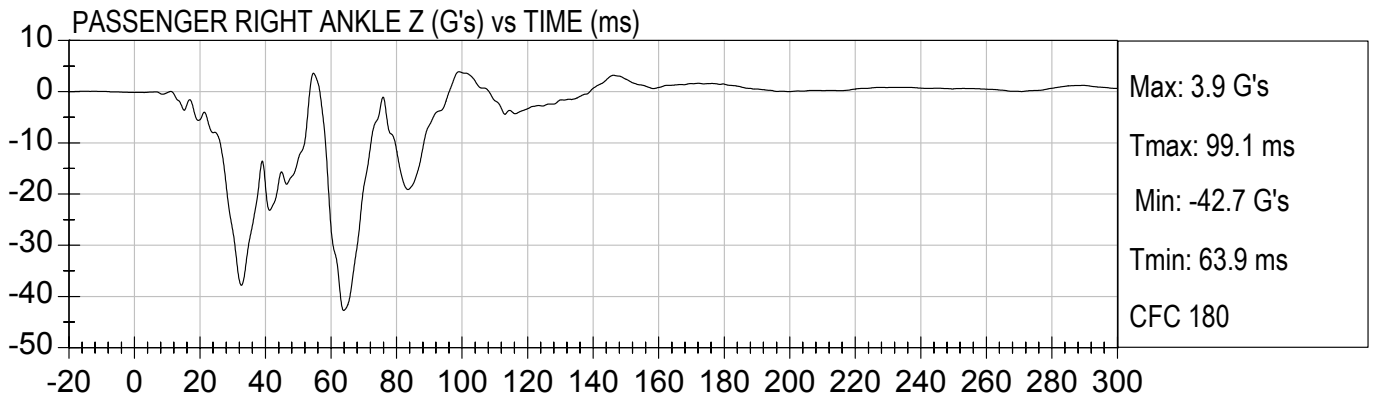
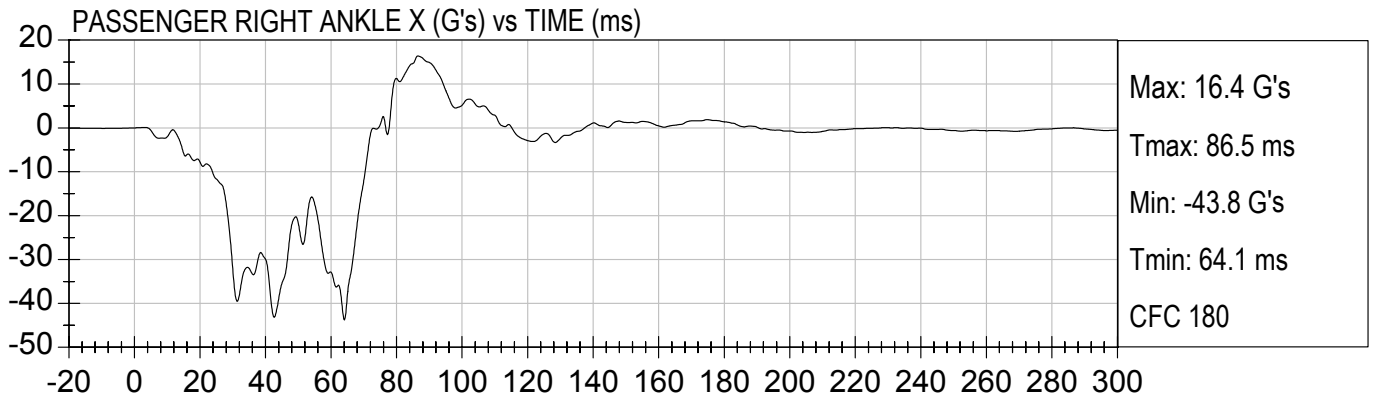
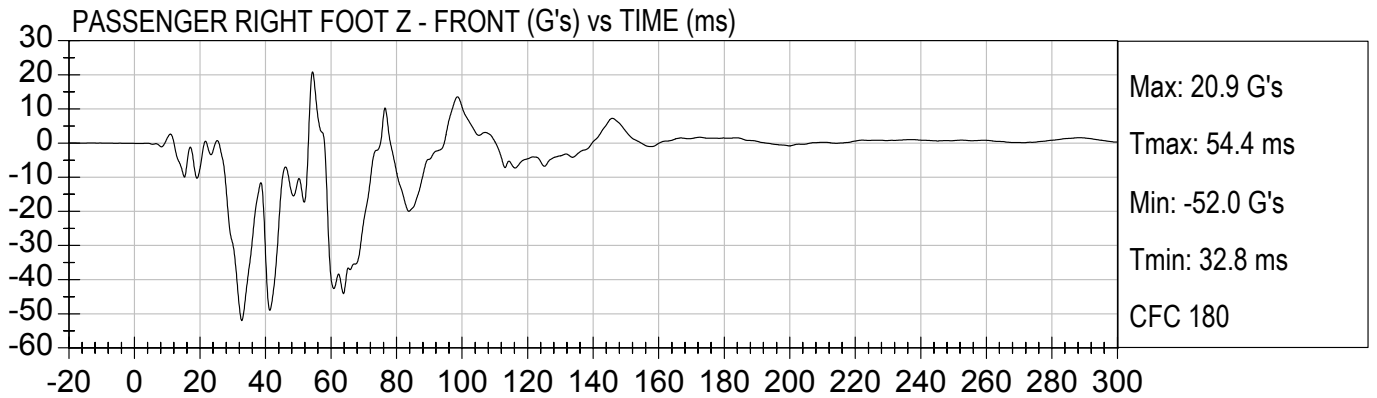
PASSENGER RIGHT LOWER TIBIA FX (N) vs TIME (ms)

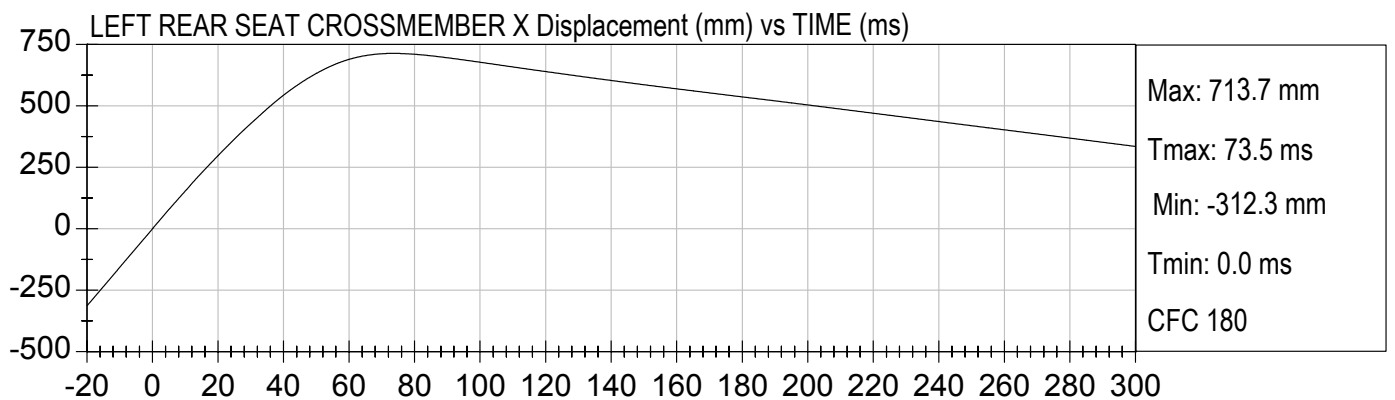
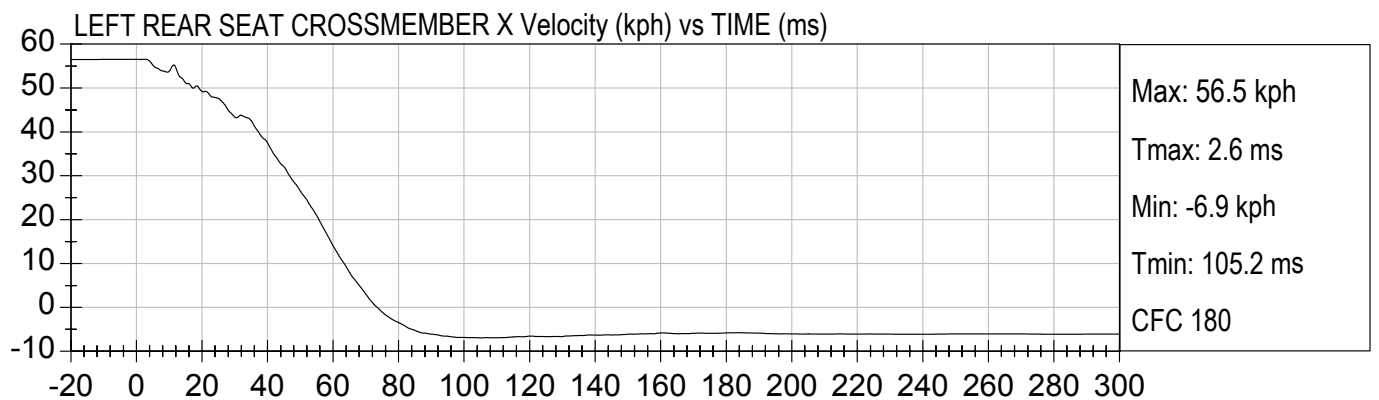
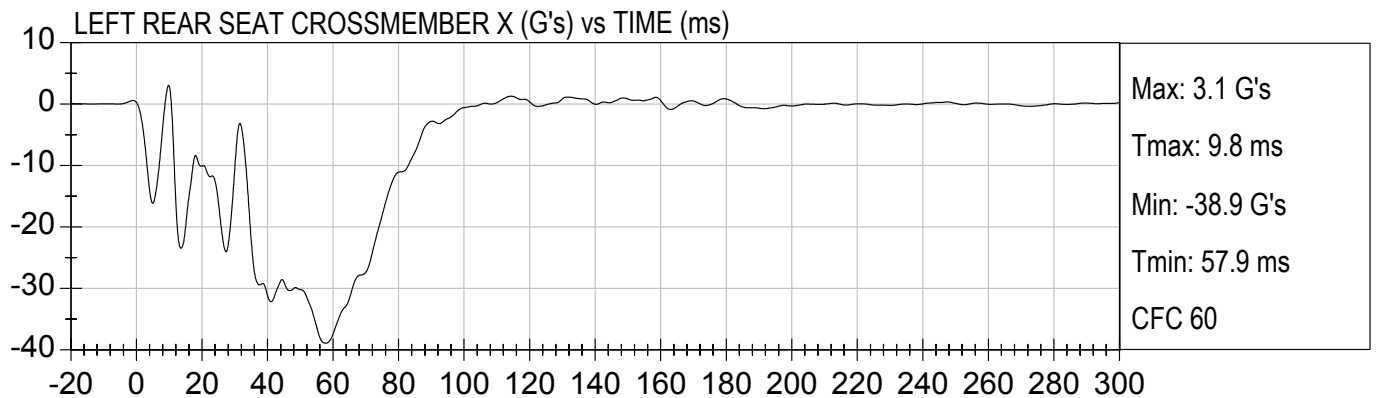


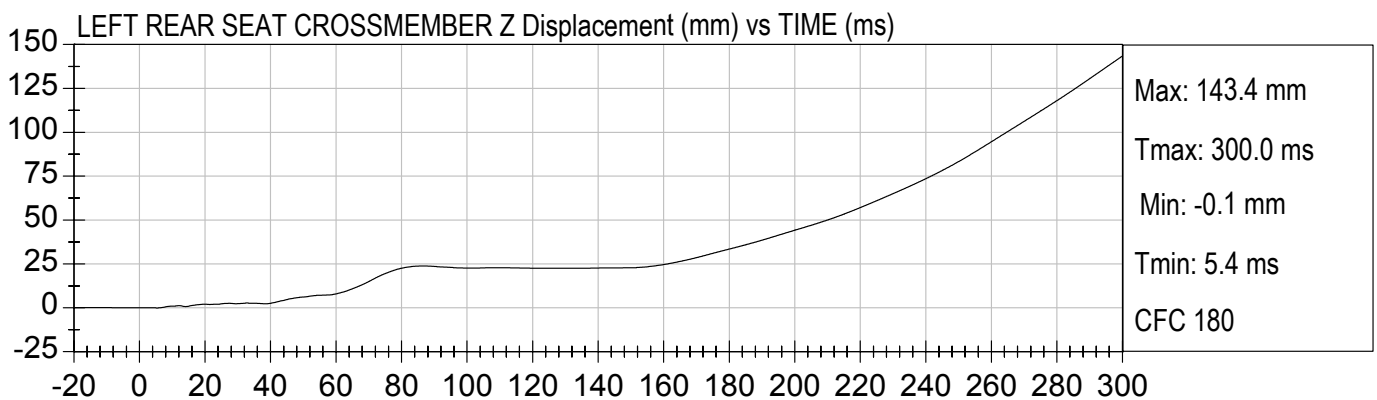
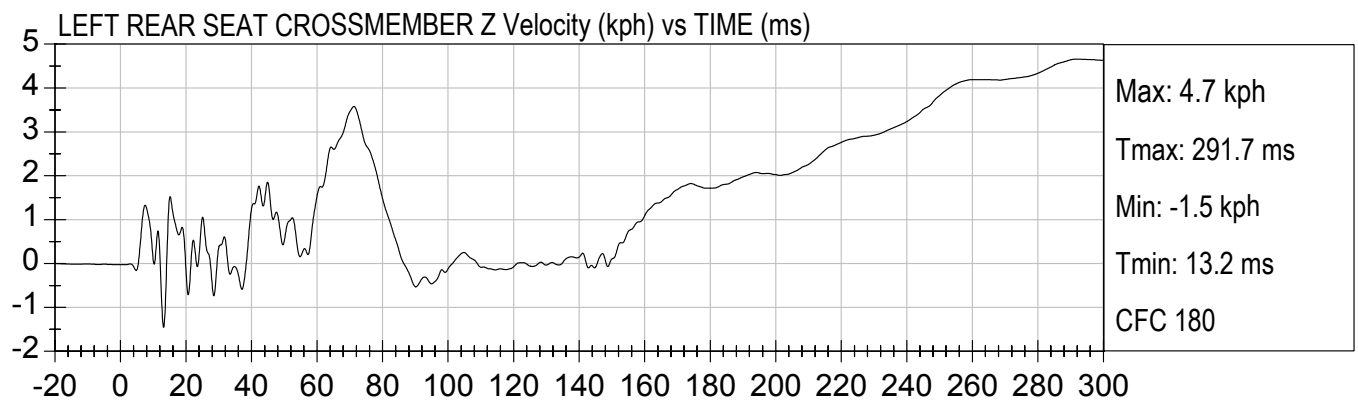
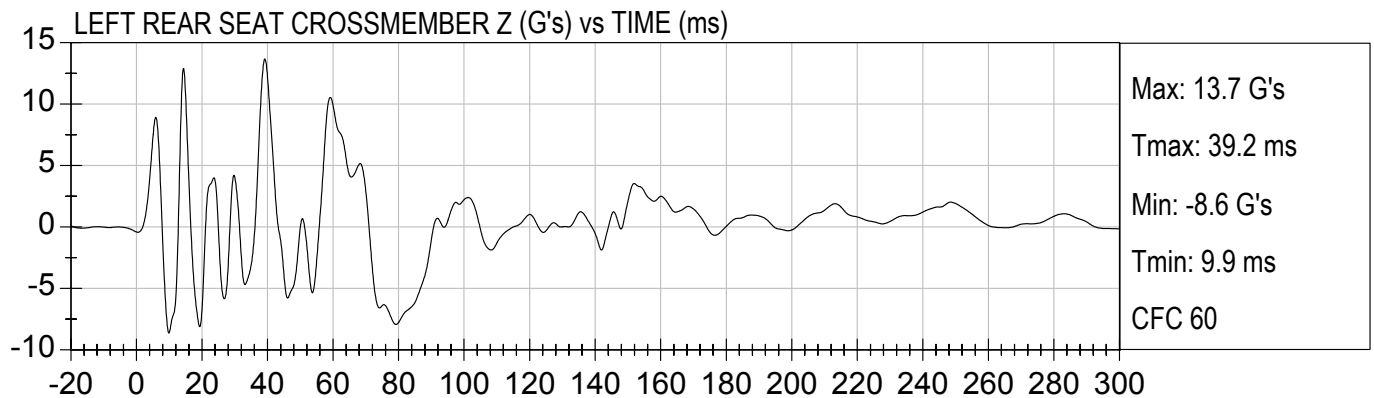
PASSENGER RIGHT LOWER TIBIA FZ (N) vs TIME (ms)

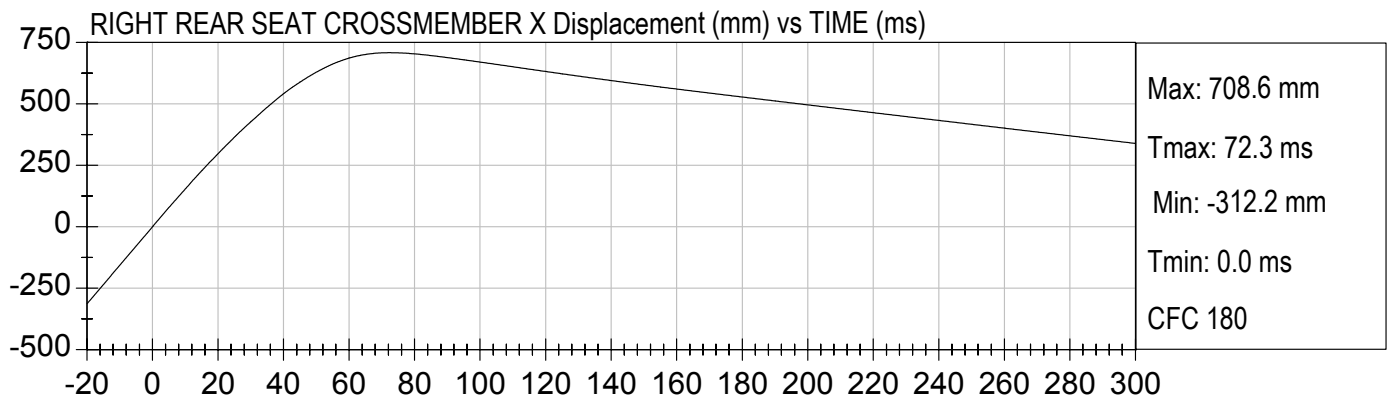
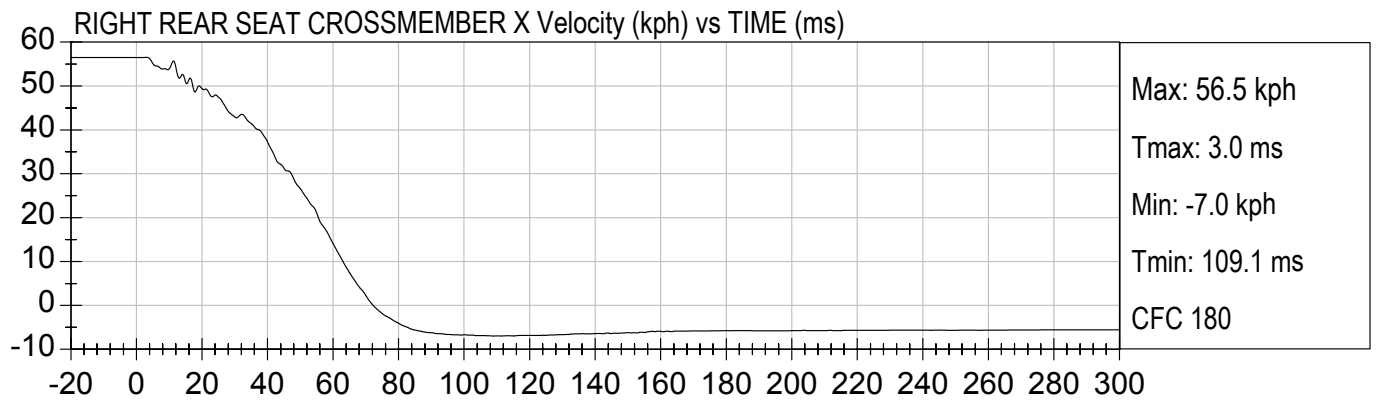
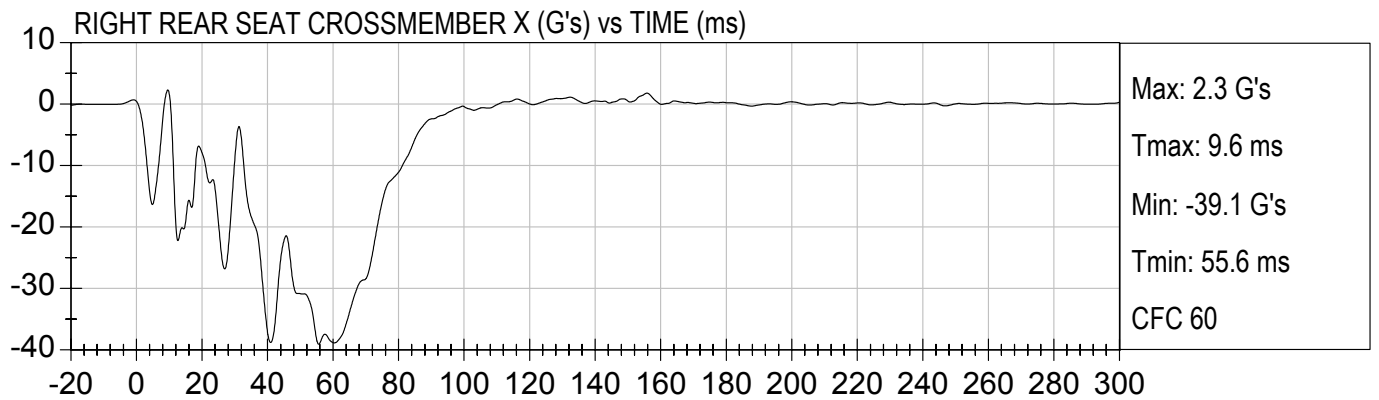


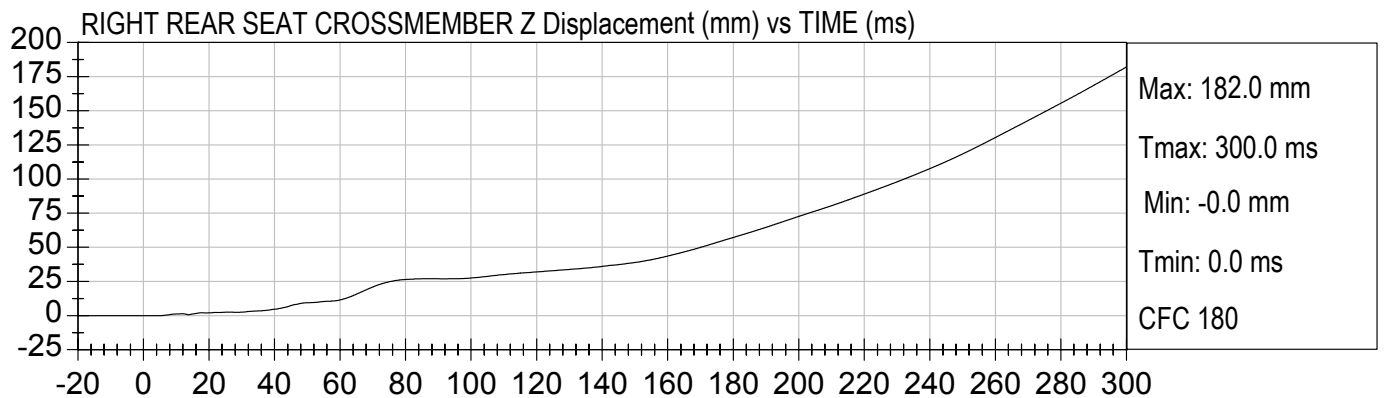
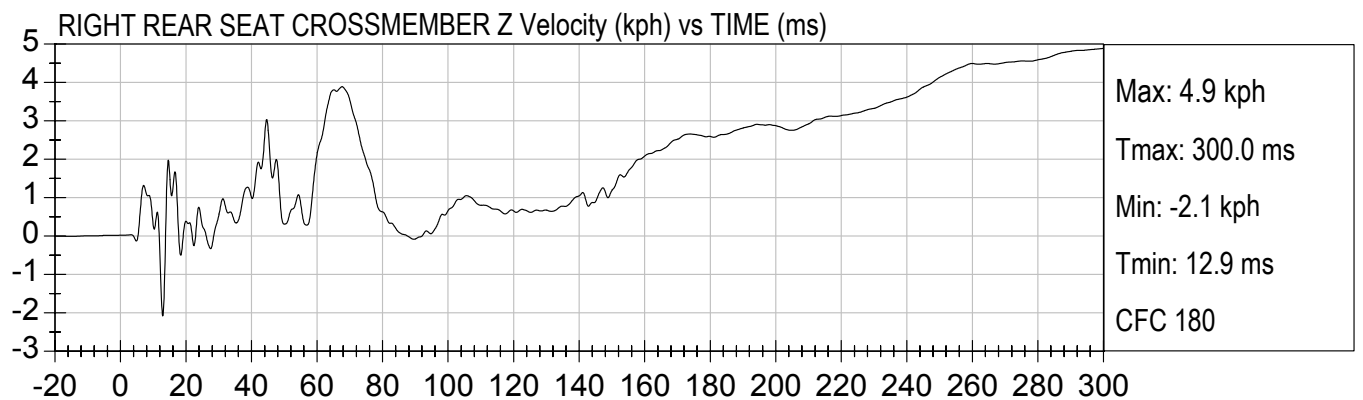
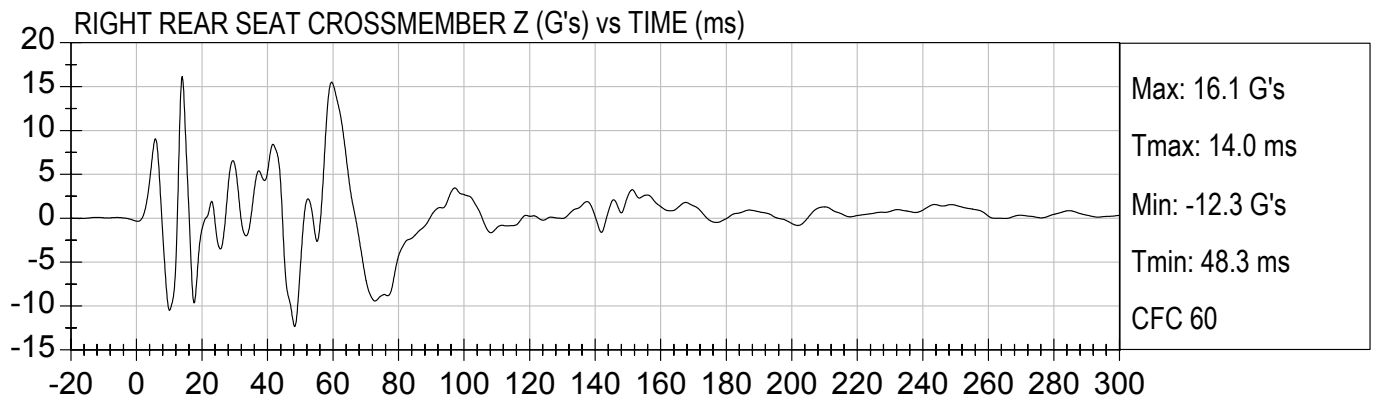


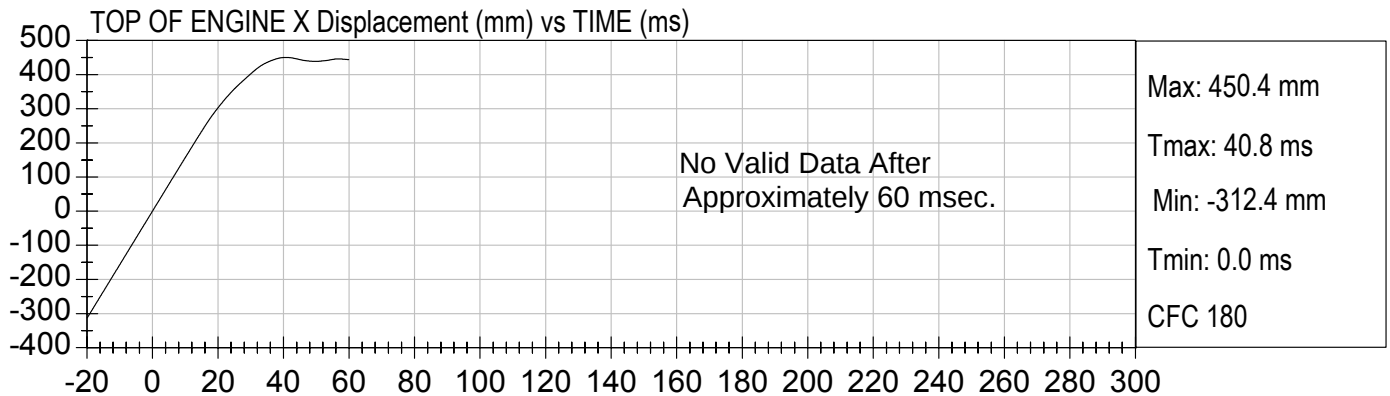
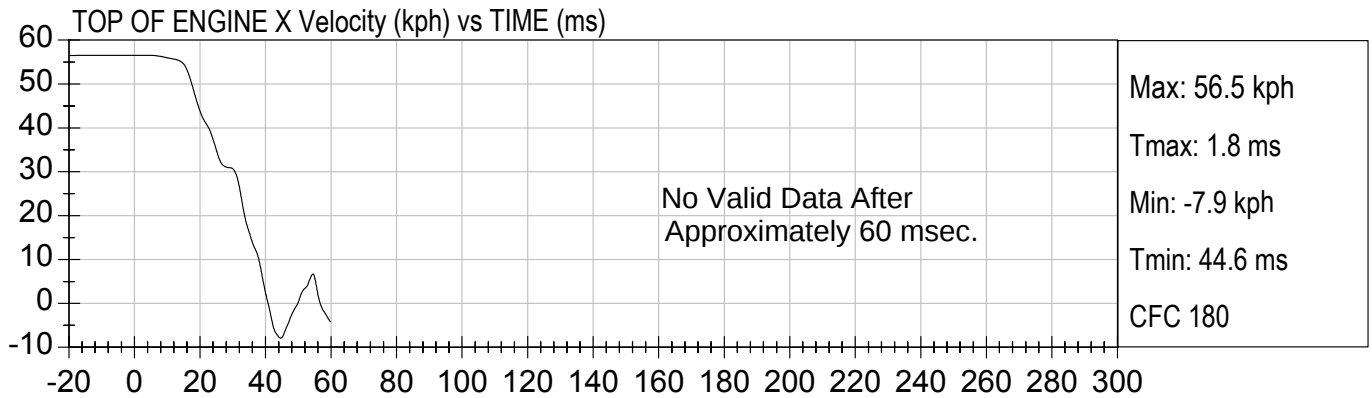
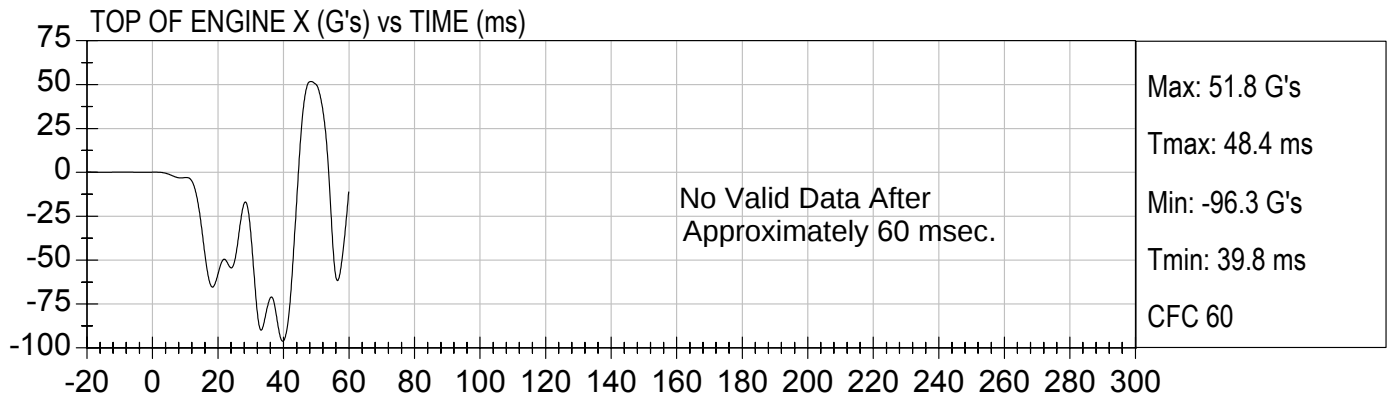


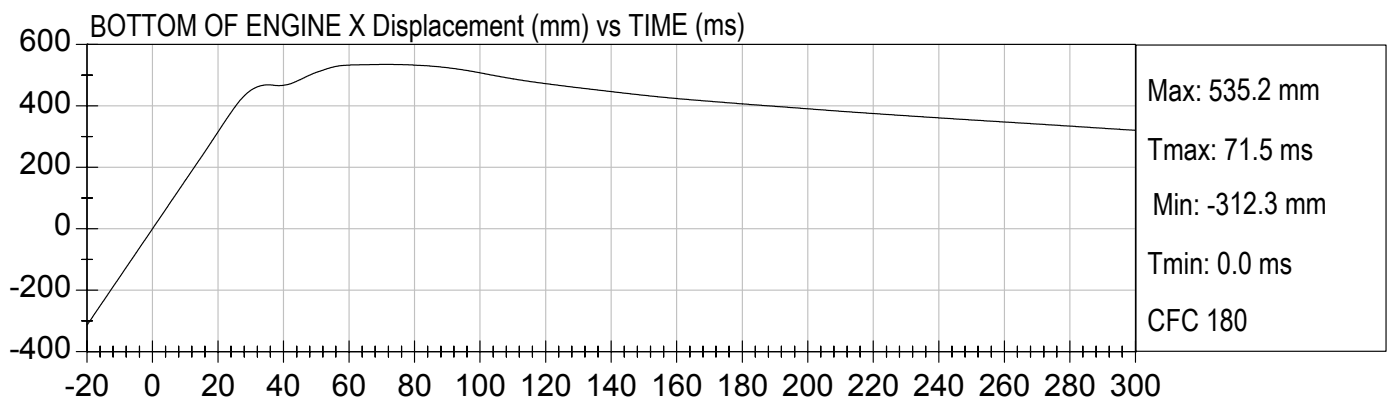
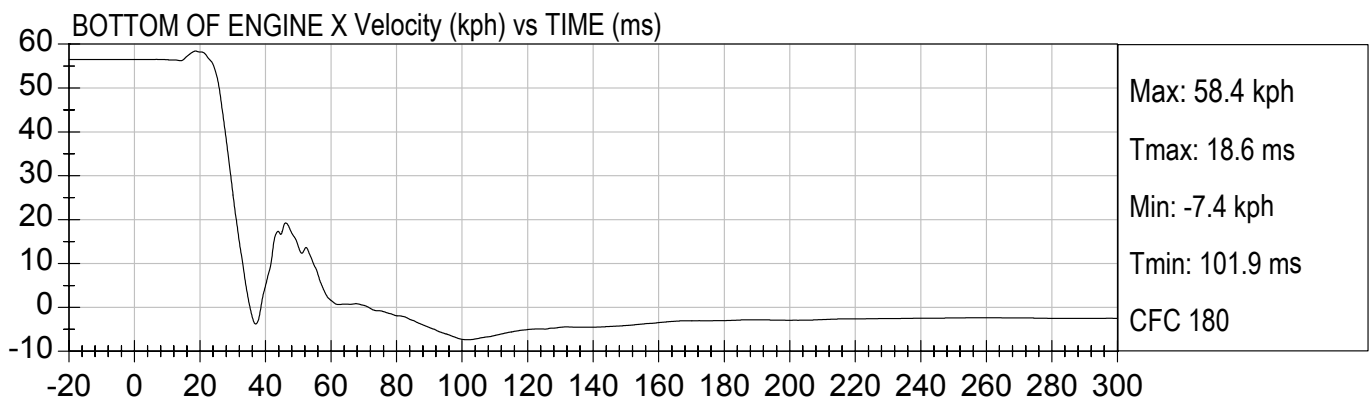
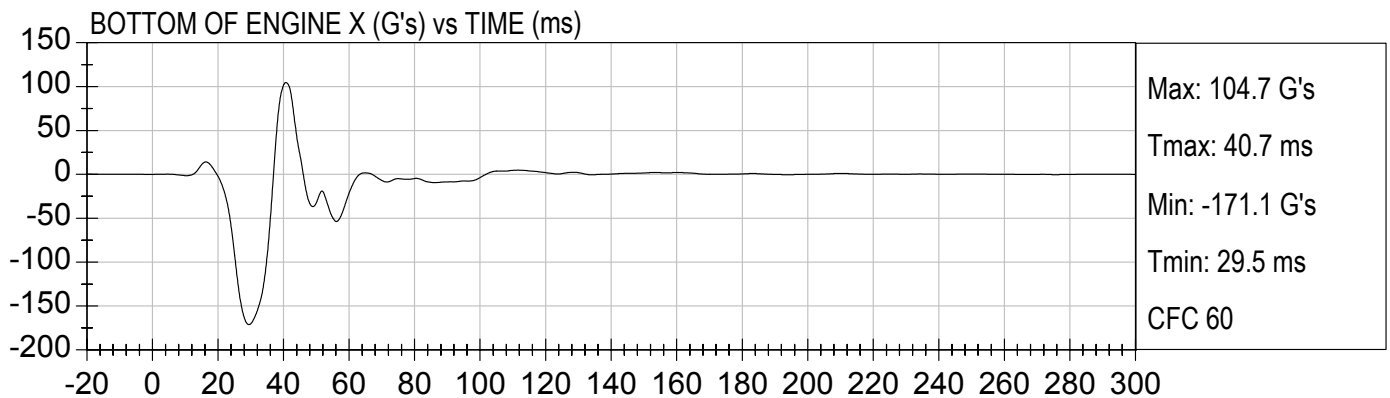


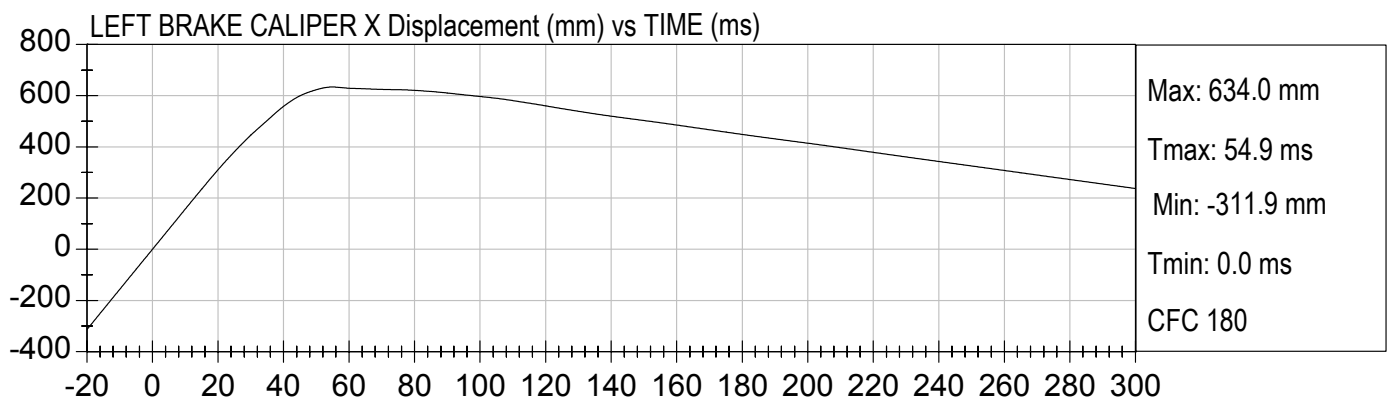
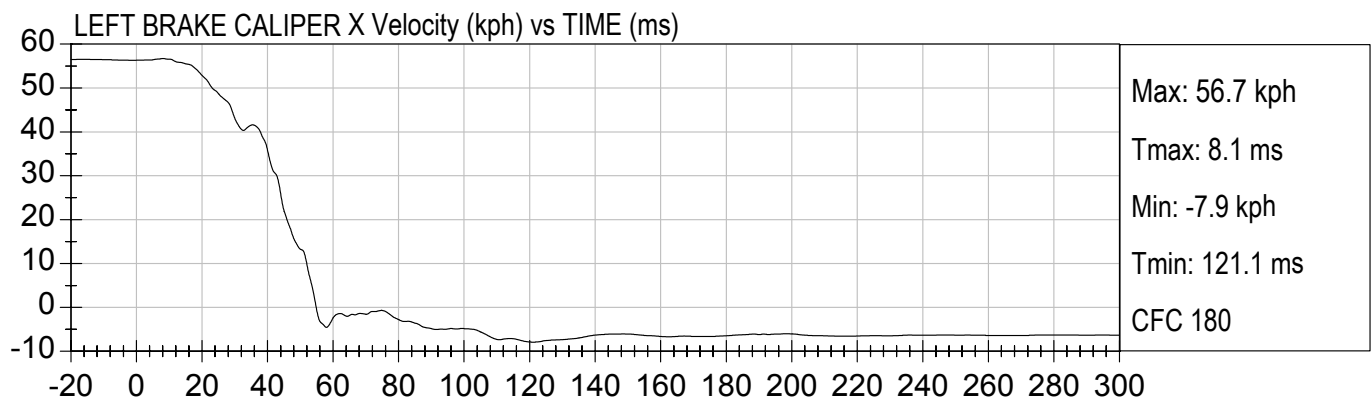
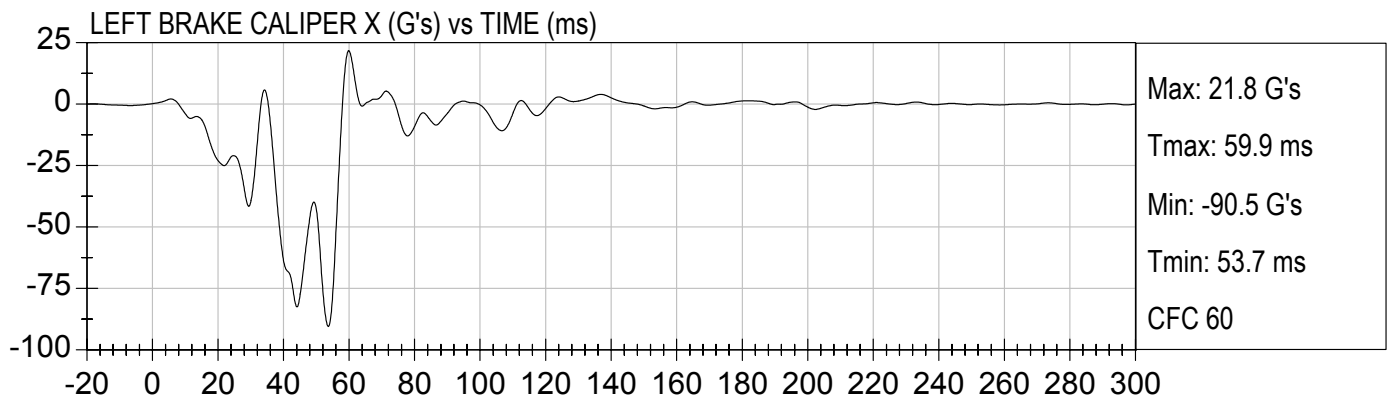


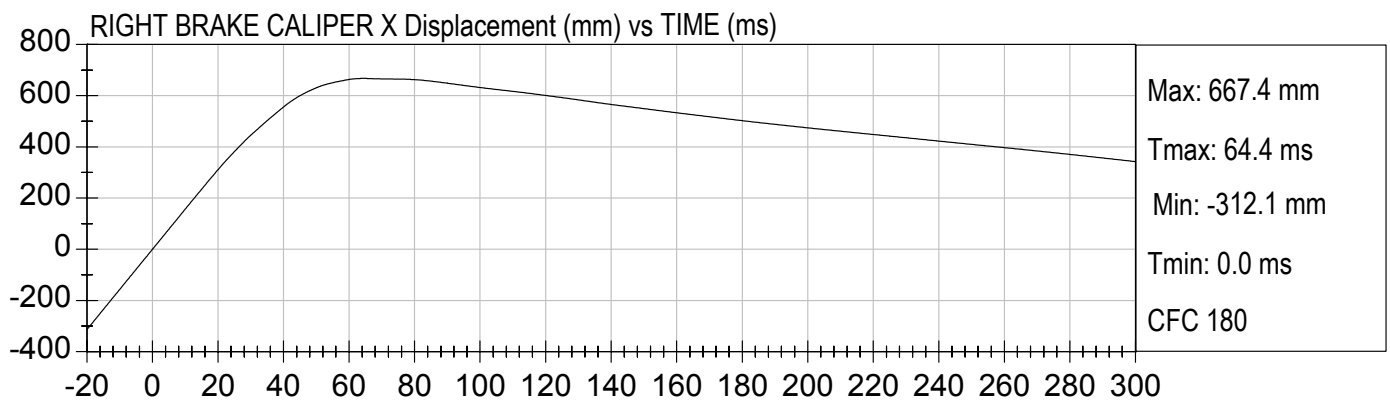
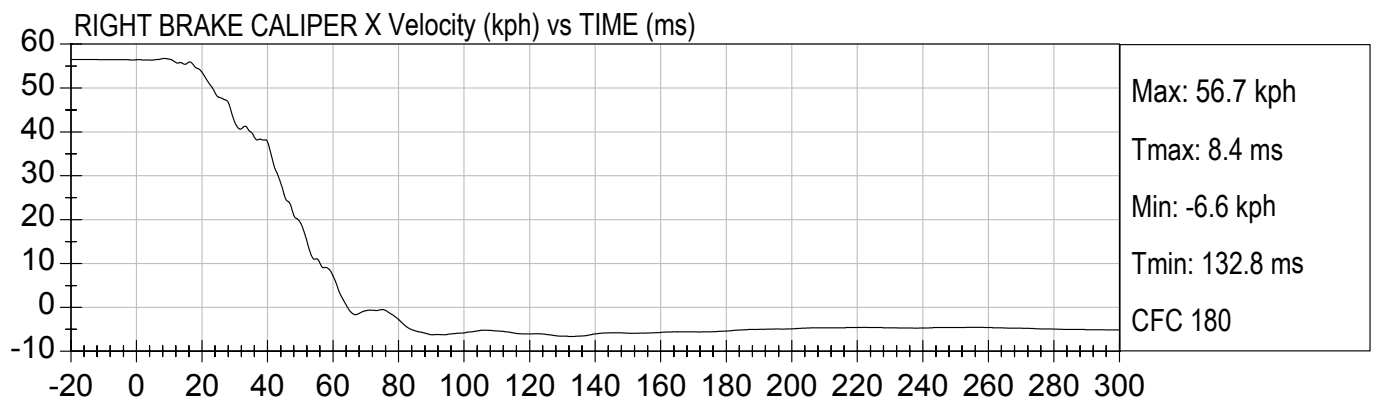
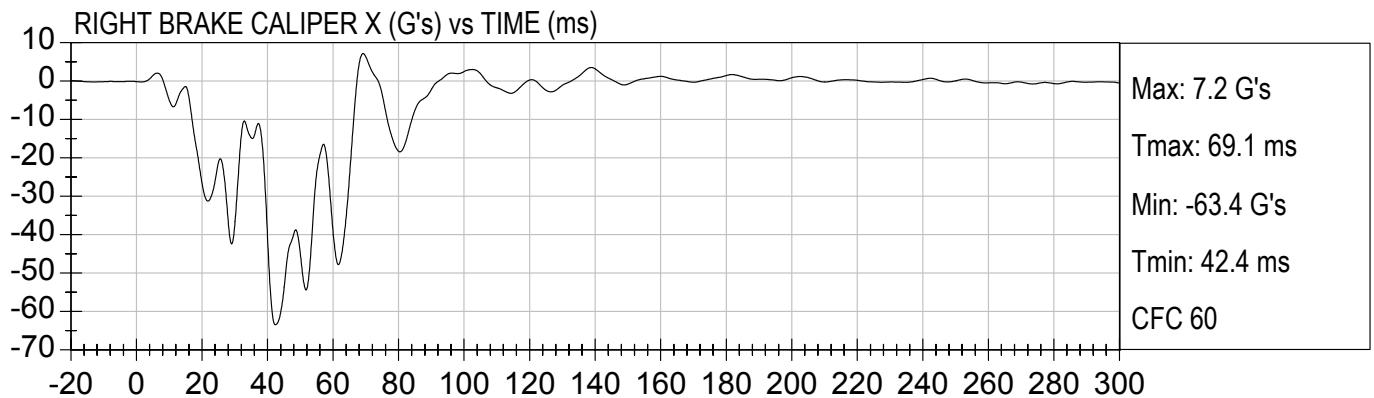






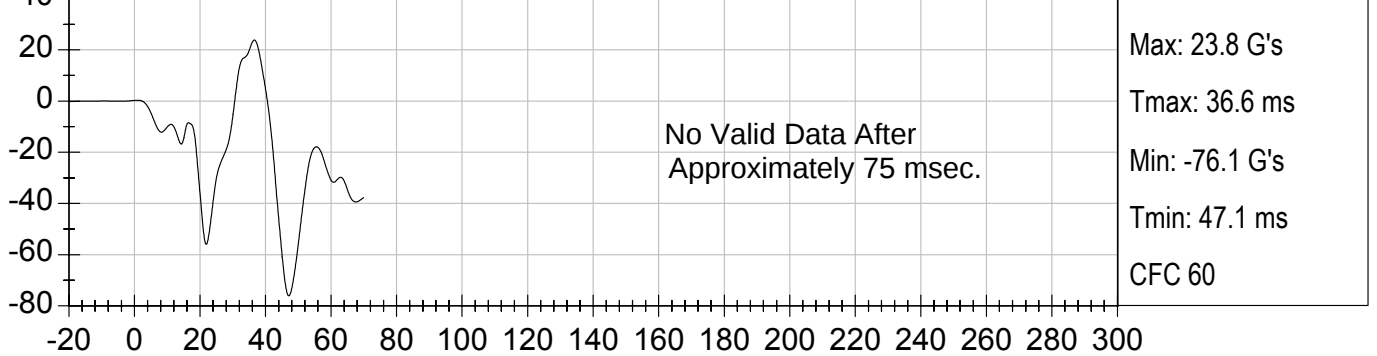




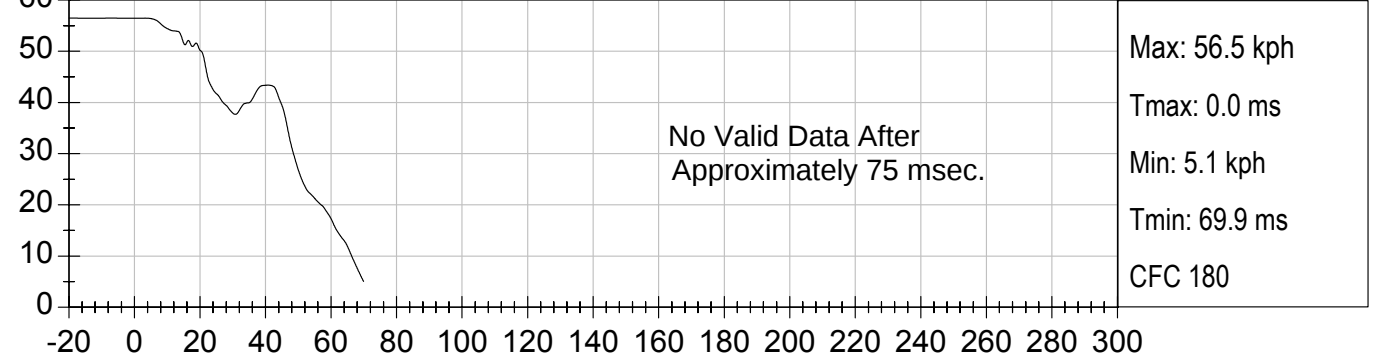




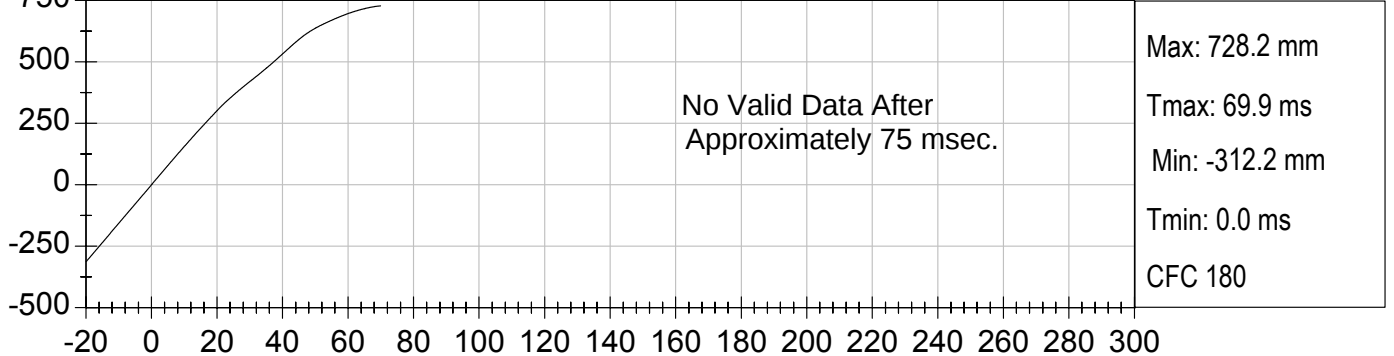
INSTRUMENT PANEL X (G's) vs TIME (ms)

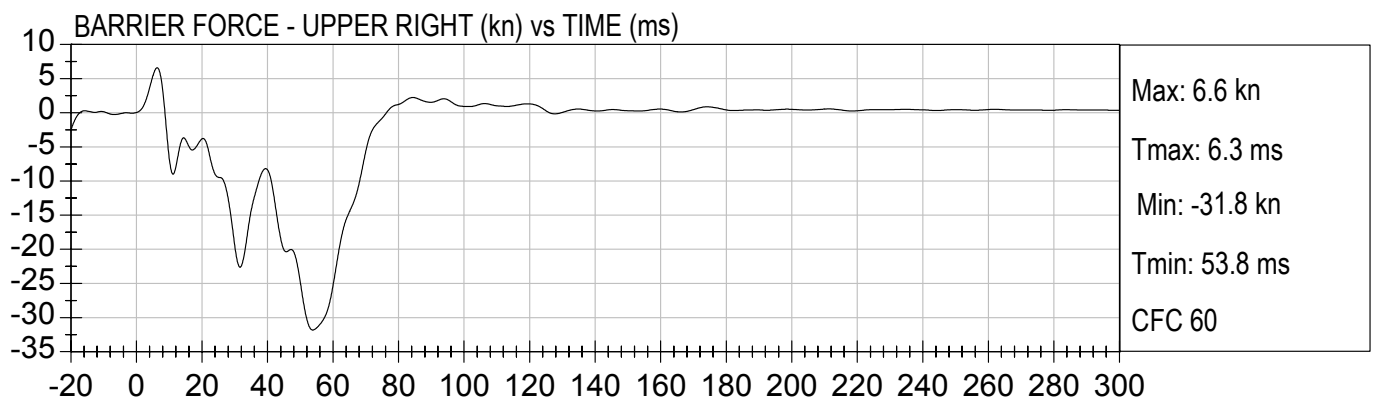
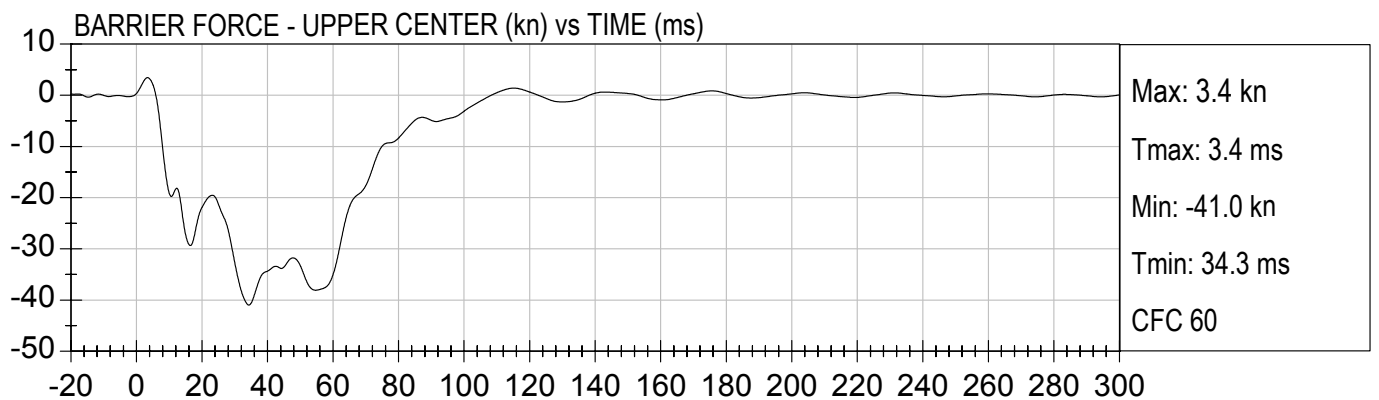
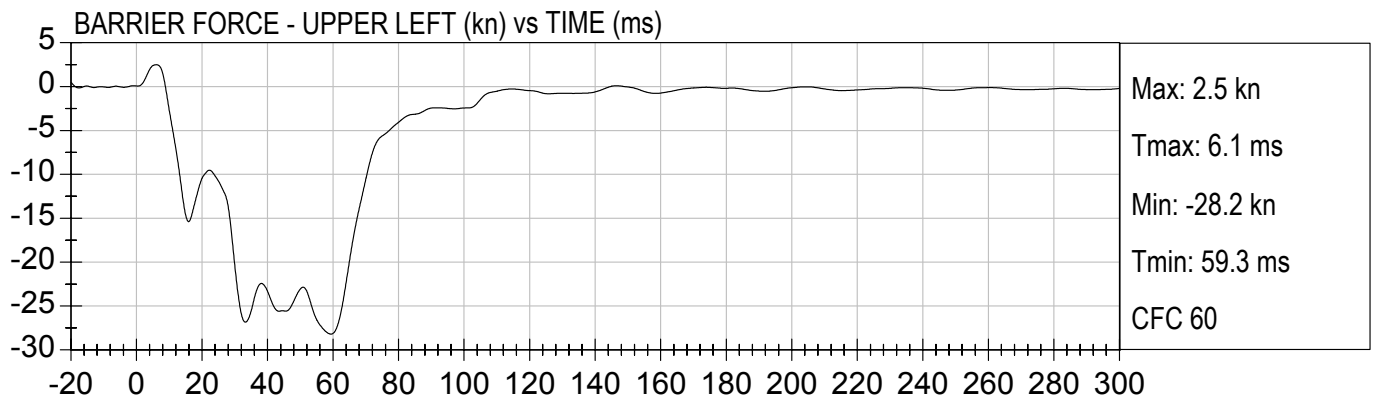


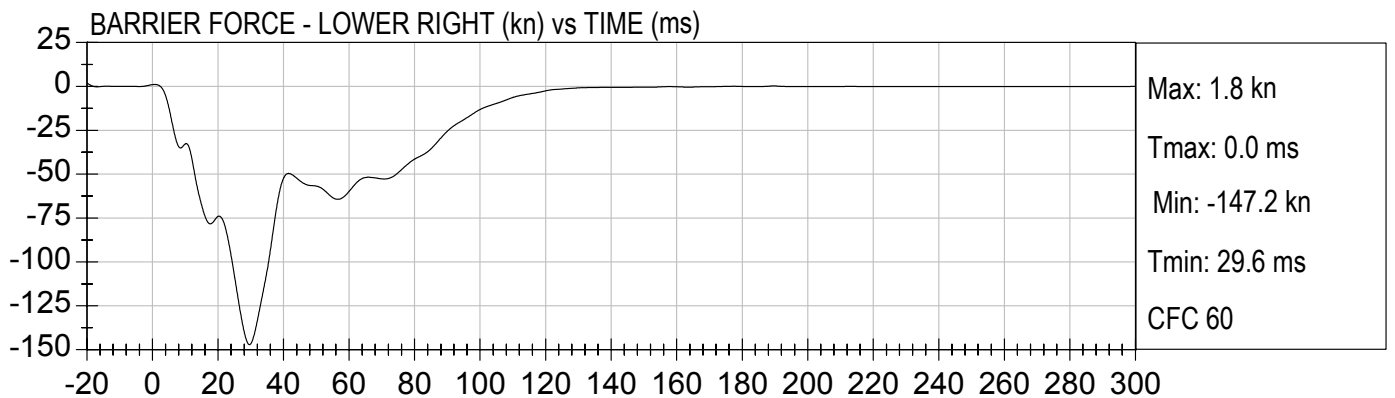
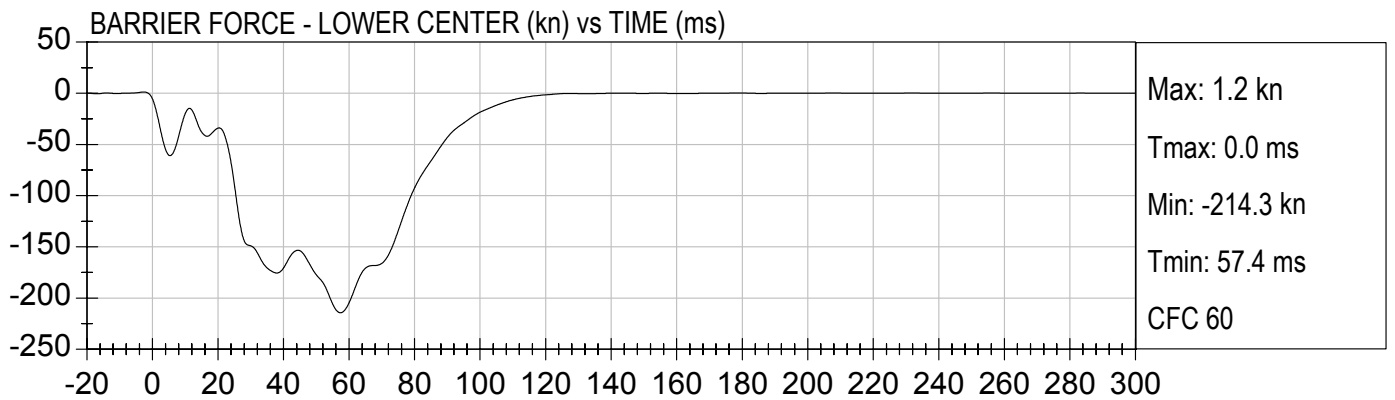
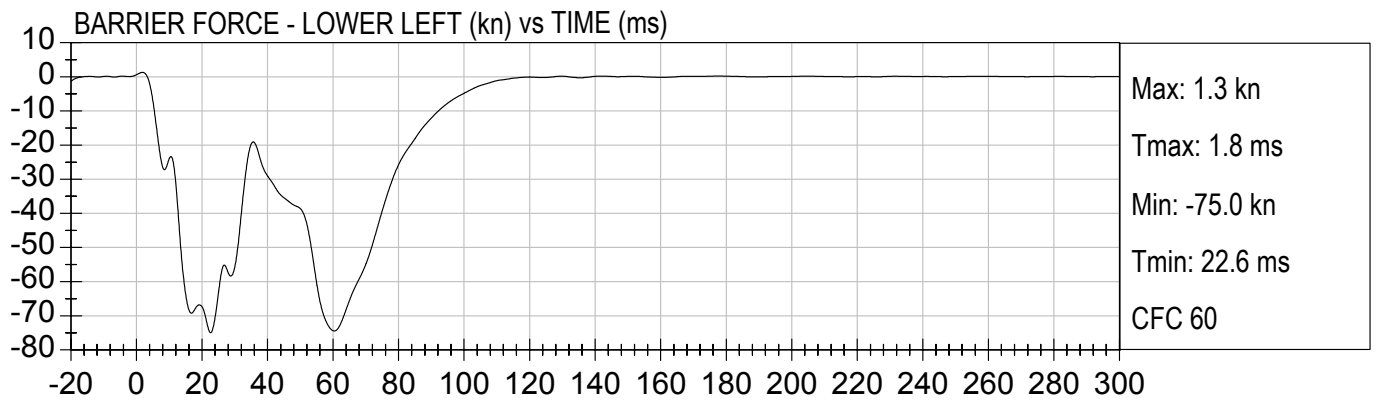
INSTRUMENT PANEL X Velocity (kph) vs TIME (ms)



INSTRUMENT PANEL X Displacement (mm) vs TIME (ms)



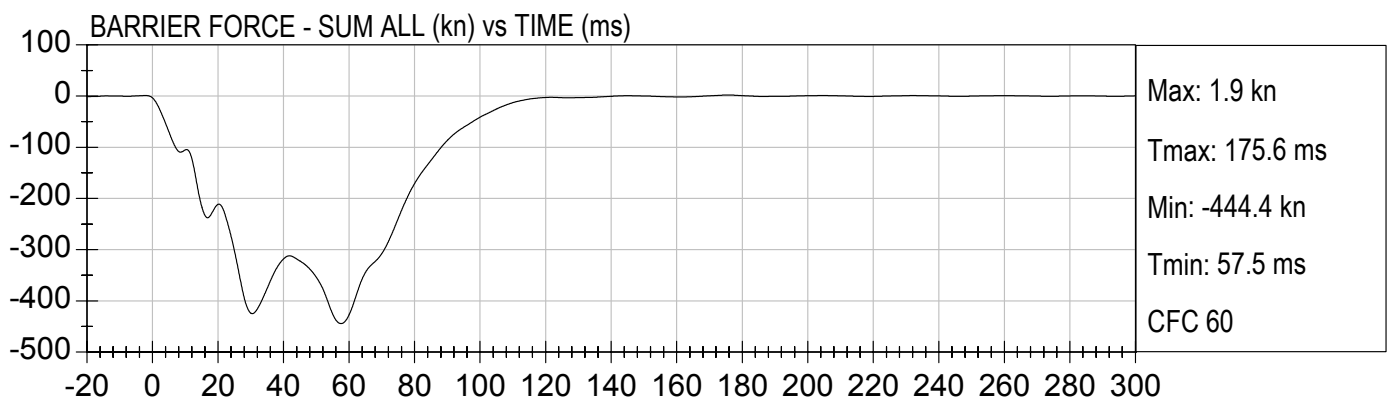
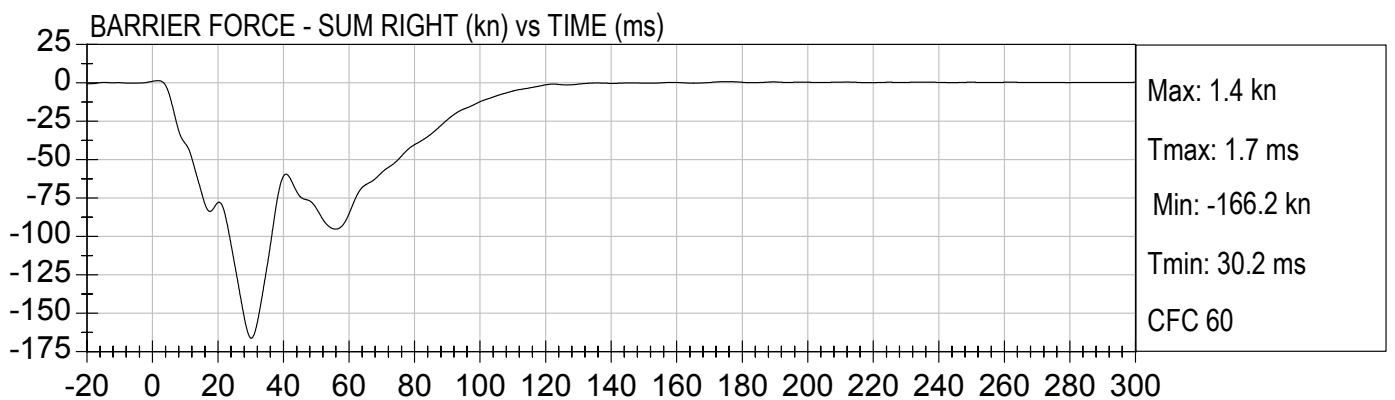
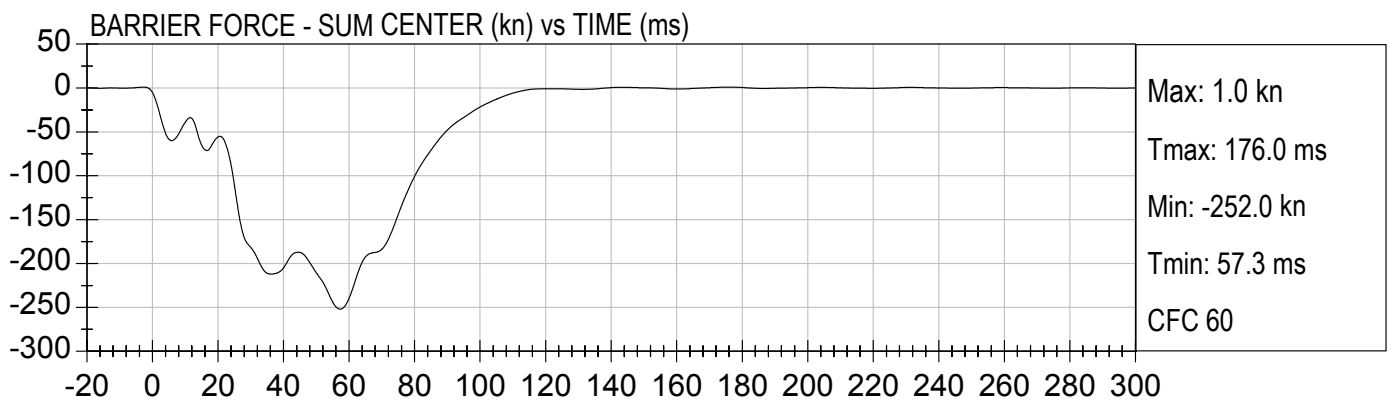
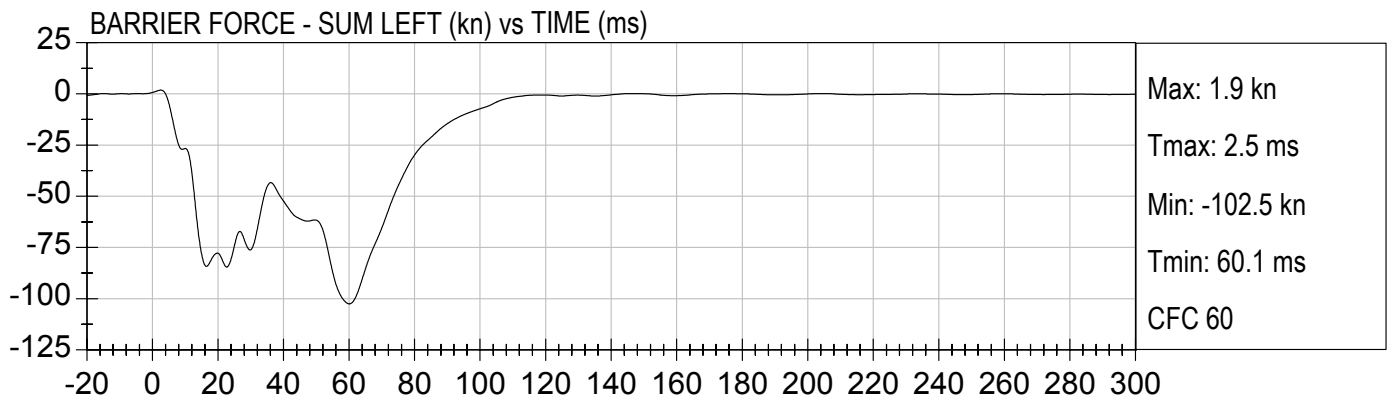






35MPH NCAP FRONTAL
2005 TOYOTA COROLLA (M55108)

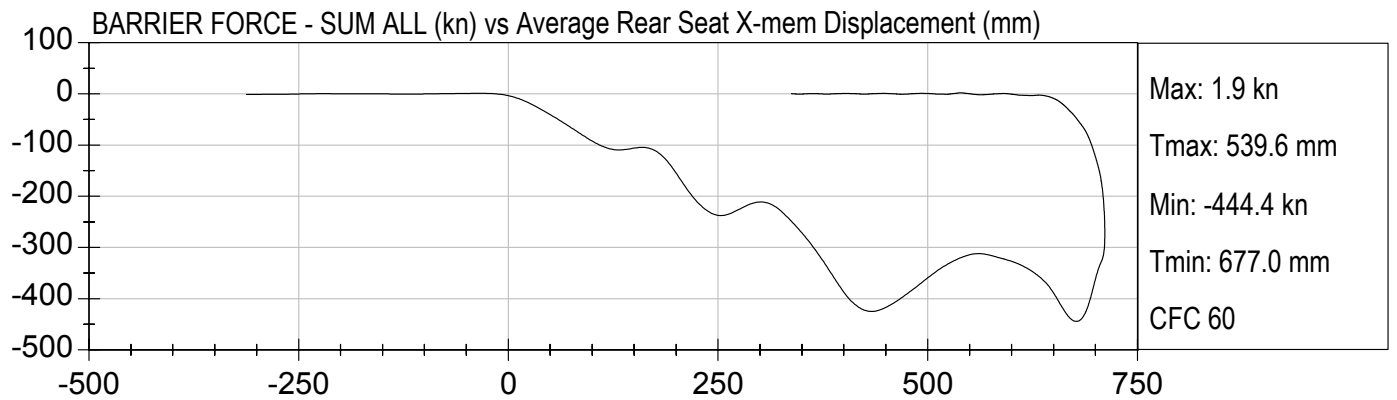
Test Date: 09/17/04
Speed: 35.1 mph (56.5 km/h)





35MPH NCAP FRONTAL
2005 TOYOTA COROLLA (M55108)

Test Date: 09/17/04
Speed: 35.1 mph (56.5 km/h)



APPENDIX C
DUMMY CALIBRATION DATA TRACES AND TABLES

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

ATD Serial No: 066

Test ID: D041781

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.6	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Peak Resultant Acceleration	G's	225 - 275	239	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	9.2	Pass
Unimodal	Yes/No	NA	Yes	Pass
Oscillations	Yes/No	within 10% of peak	Yes	Pass
Overall Test Results				Pass


Laboratory Technician

08/02/2004
Test Date

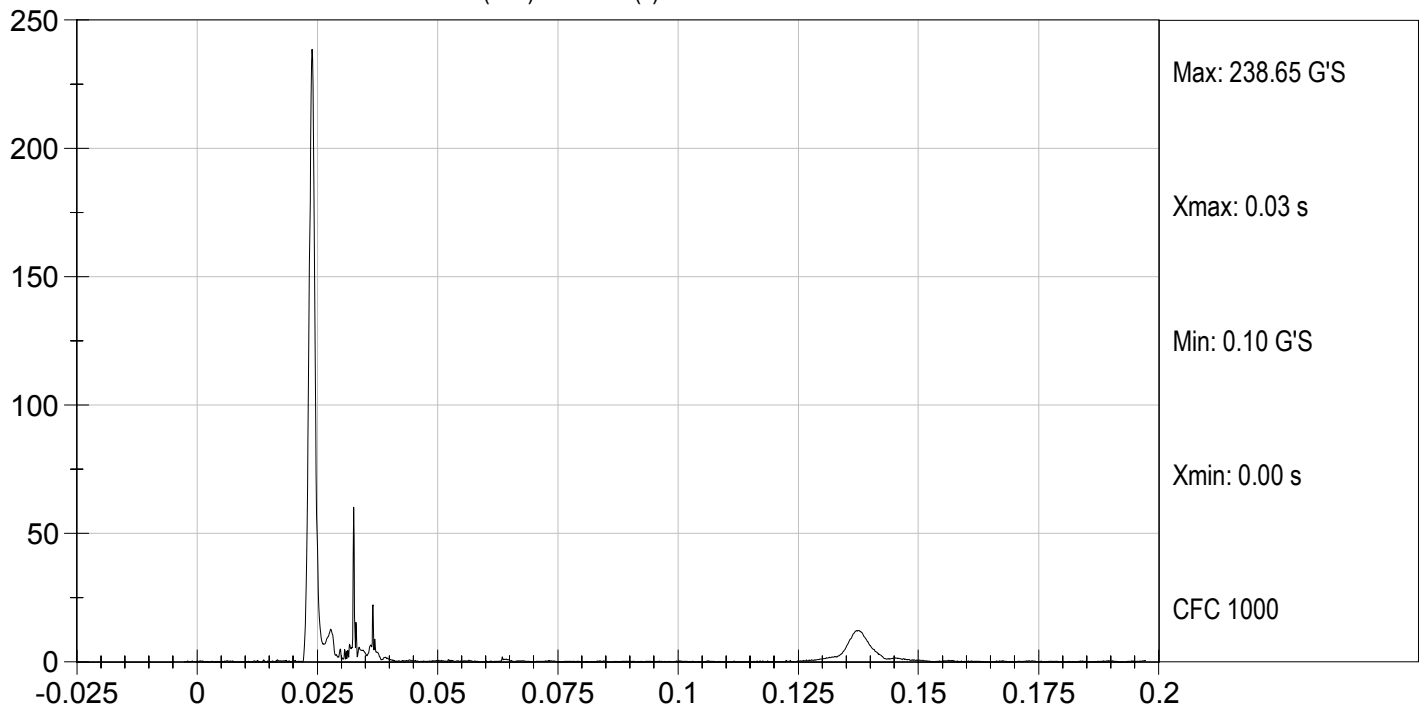

Approved By



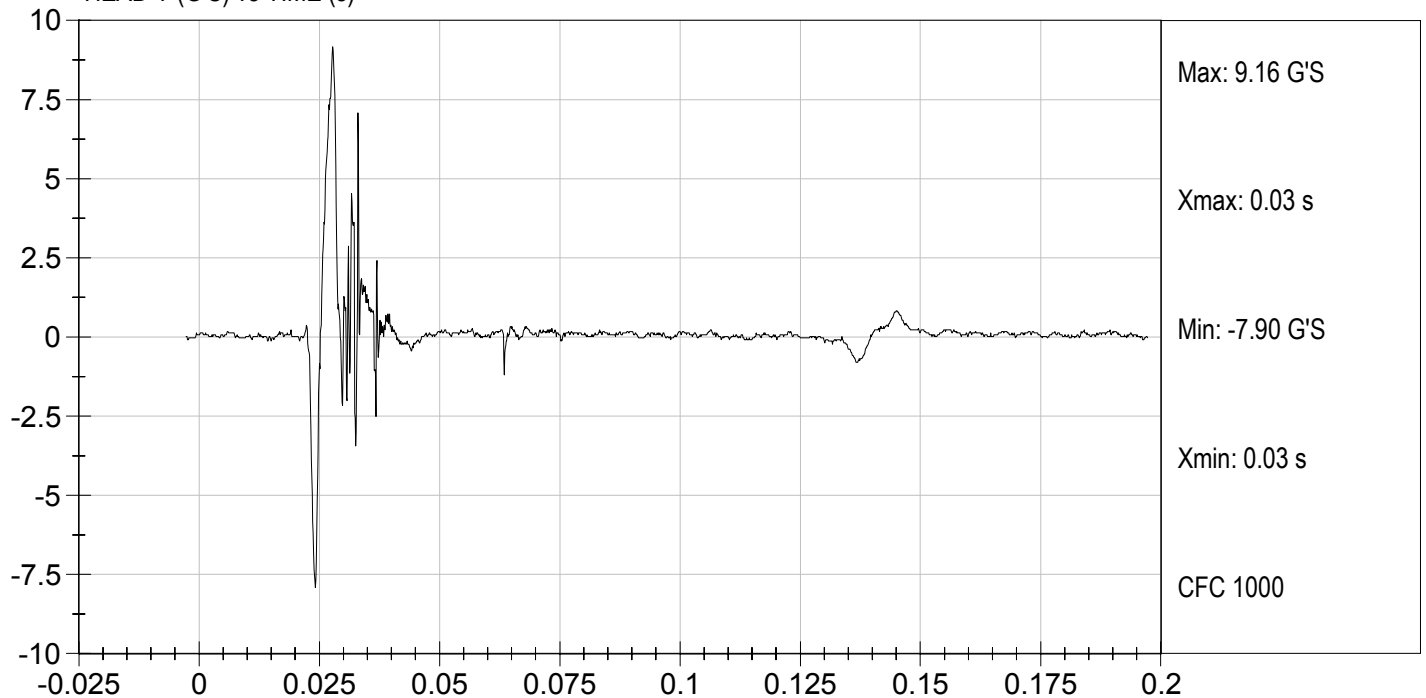
Test Desc: Head Drop
Componet ID: D041781

Test Date: 08/02/2004
Velocity: 0 ft/s, 0.00 m/s

PEAK RESULTANT ACCELERATION (G'S) vs TIME (s)



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



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

ATD Serial No: 066

Test I.D: D041782

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity		%	10 to 70	47	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.00	Pass
Pendulum Deceleration	10 msec	G's	22.50 to 27.50	22.75	Pass
	20 msec	G's	17.60 to 22.60	19.95	Pass
	30 msec	G's	12.50 to 18.50	14.40	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 29.0	14.28	Pass
Deceleration Decay Time to Cross 5 G's		msec	34.0 to 42.0	38.8	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	73.2	Pass
	Time	msec	57.0 to 64.0	58.3	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	113.0 to 128.0	116.1	Pass
Moment About Occipital Condyle	Maximum	N m	88.1 to 108.5	93.0	Pass
	Time	msec	47.0 to 58.0	51.3	Pass
Positive Moment Decay Time To Zero Crossing		msec	97.0 to 107.0	102.2	Pass
Overall Test Results					Pass


 Laboratory Technician

08/03/2004
 Test Date

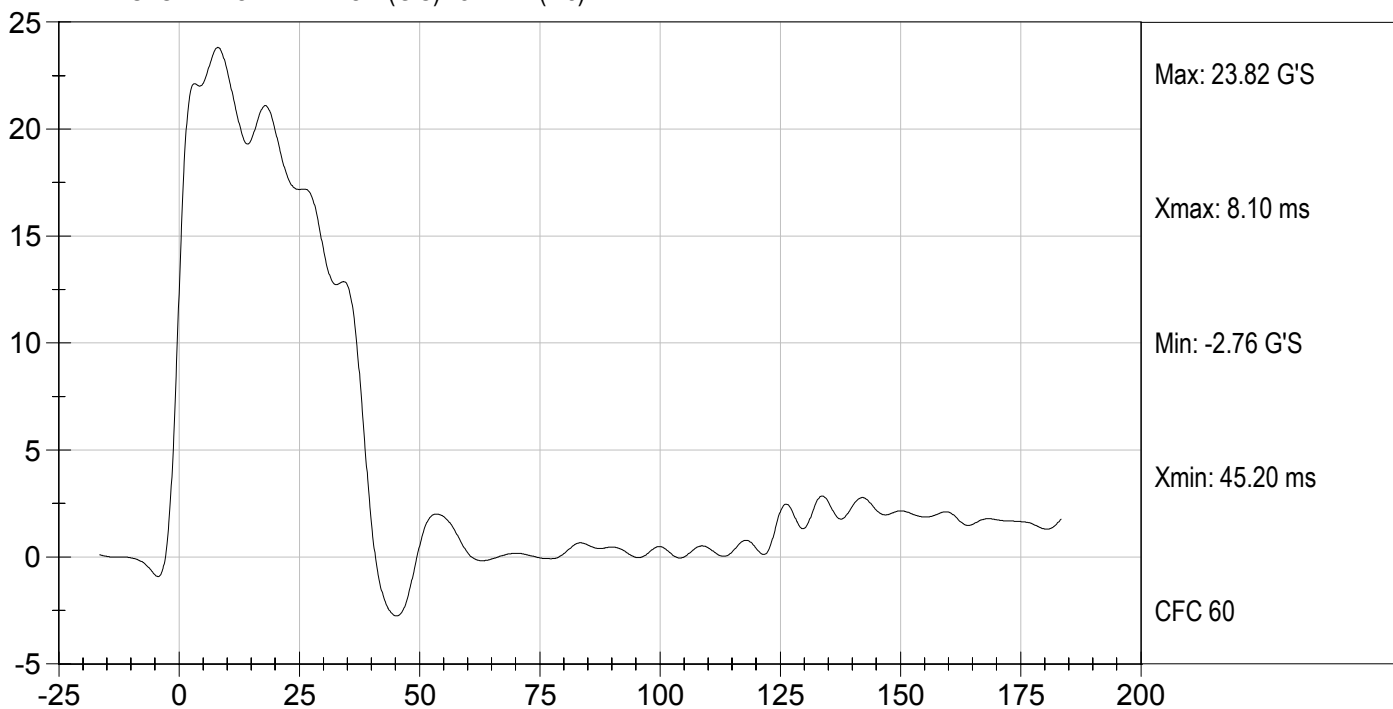

 Approved By



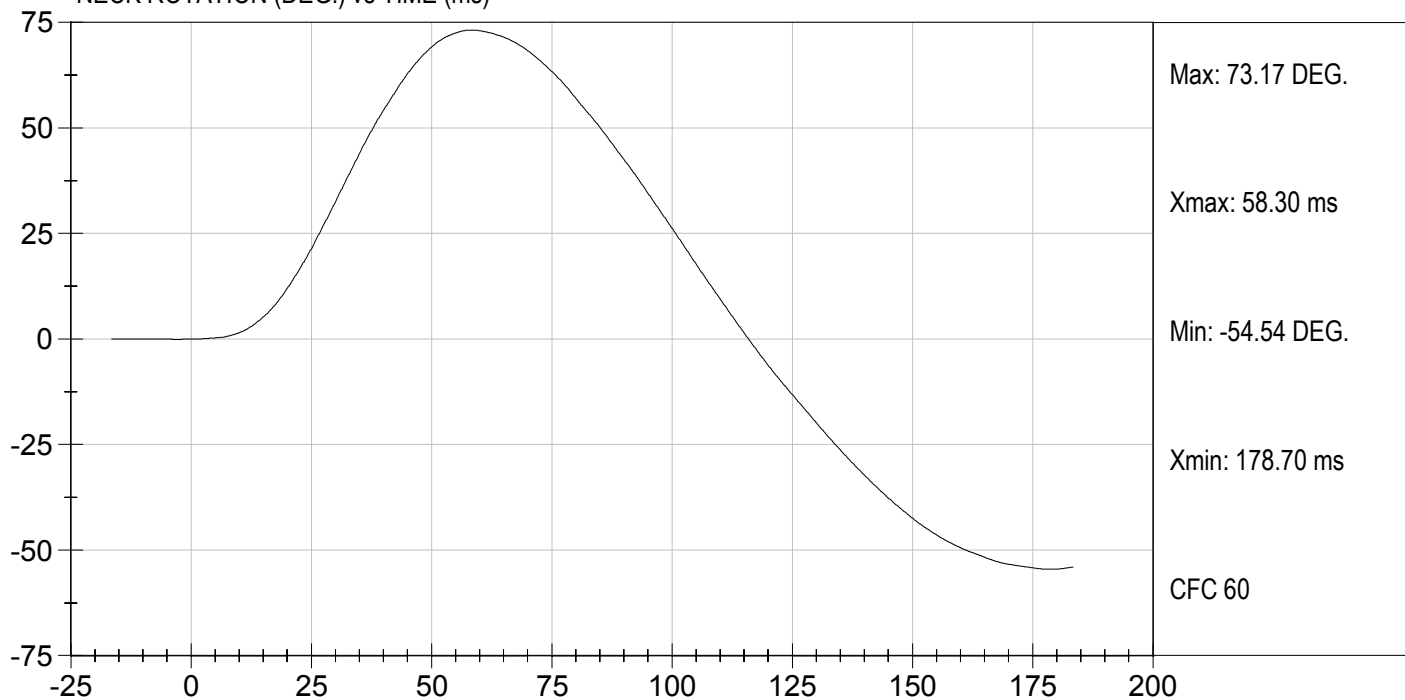
Test Desc: Neck Flexion
Componet ID: D041782

Test Date: 08/03/2004
Velocity: 22.95 ft/s, 7.00 m/s

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



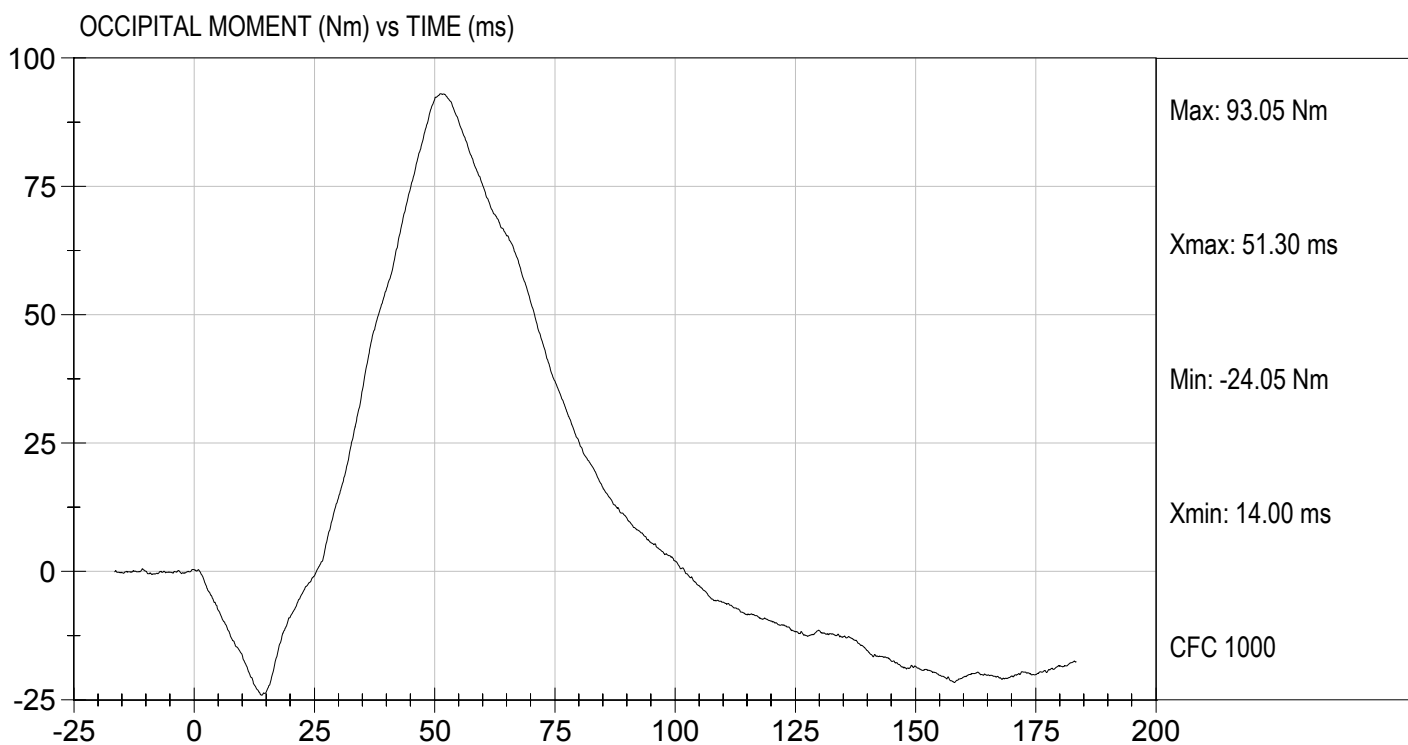
NECK ROTATION (DEG.) vs TIME (ms)





Test Desc: Neck Flexion
Componet ID: D041782

Test Date: 08/03/2004
Velocity: 22.95 ft/s, 7.00 m/s



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

ATD Serial No: 066

Test I.D: D041783

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.0	Pass
Laboratory Relative Humidity		%	10 to 70	48	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.06	Pass
Pendulum Deceleration	10 msec	G's	17.20 to 21.20	18.44	Pass
	20 msec	G's	14.00 to 19.00	16.27	Pass
	30 msec	G's	11.00 to 16.00	12.23	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 22.0	12.18	Pass
Deceleration Decay Time to Cross 5 G's		msec	38.0 to 46.0	42.7	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	100.6	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	158.4	Pass
Moment About Occipital Condyle	Maximum	N m	-52.9 to -79.9	-65.9	Pass
	Time	msec	65.0 to 79.0	73.3	Pass
Positive Moment Decay Time To Zero Crossing		msec	120.0 to 148.0	145.4	Pass
Overall Test Results					Pass


 Laboratory Technician

08/03/2004
 Test Date

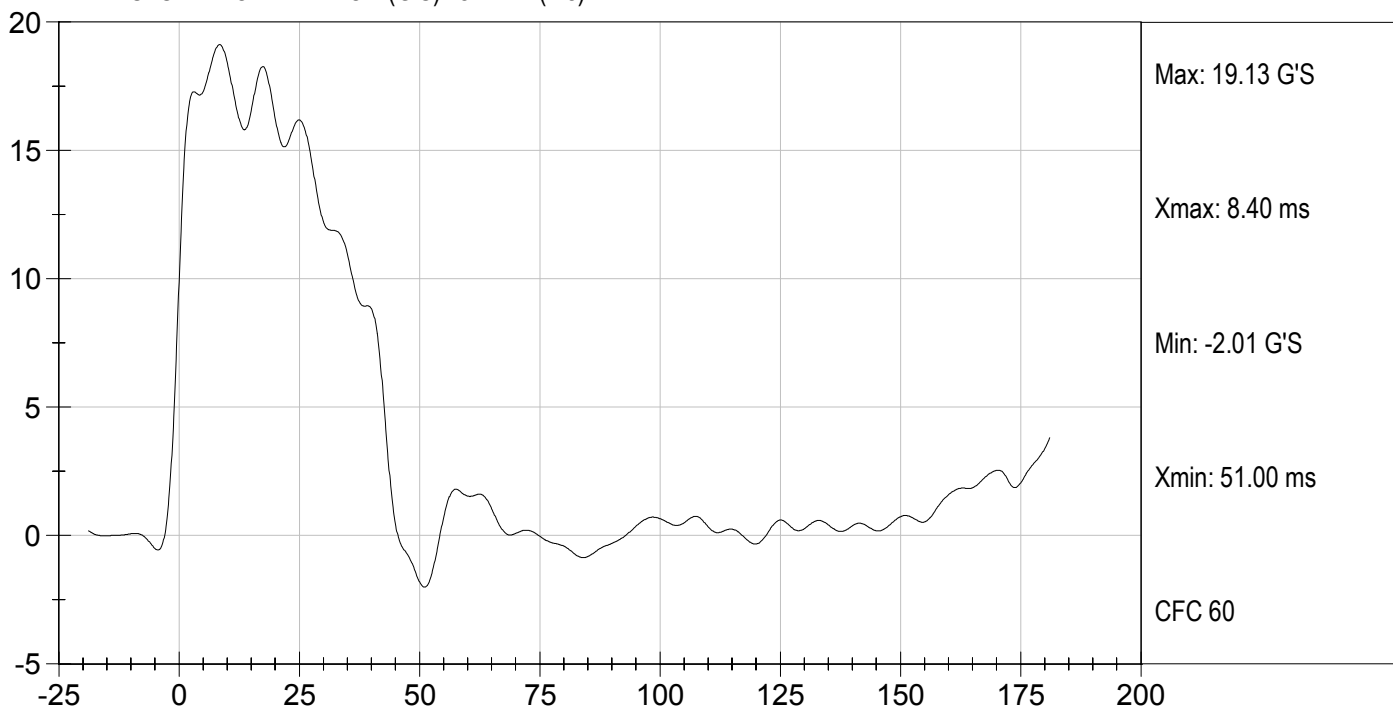

 Approved By



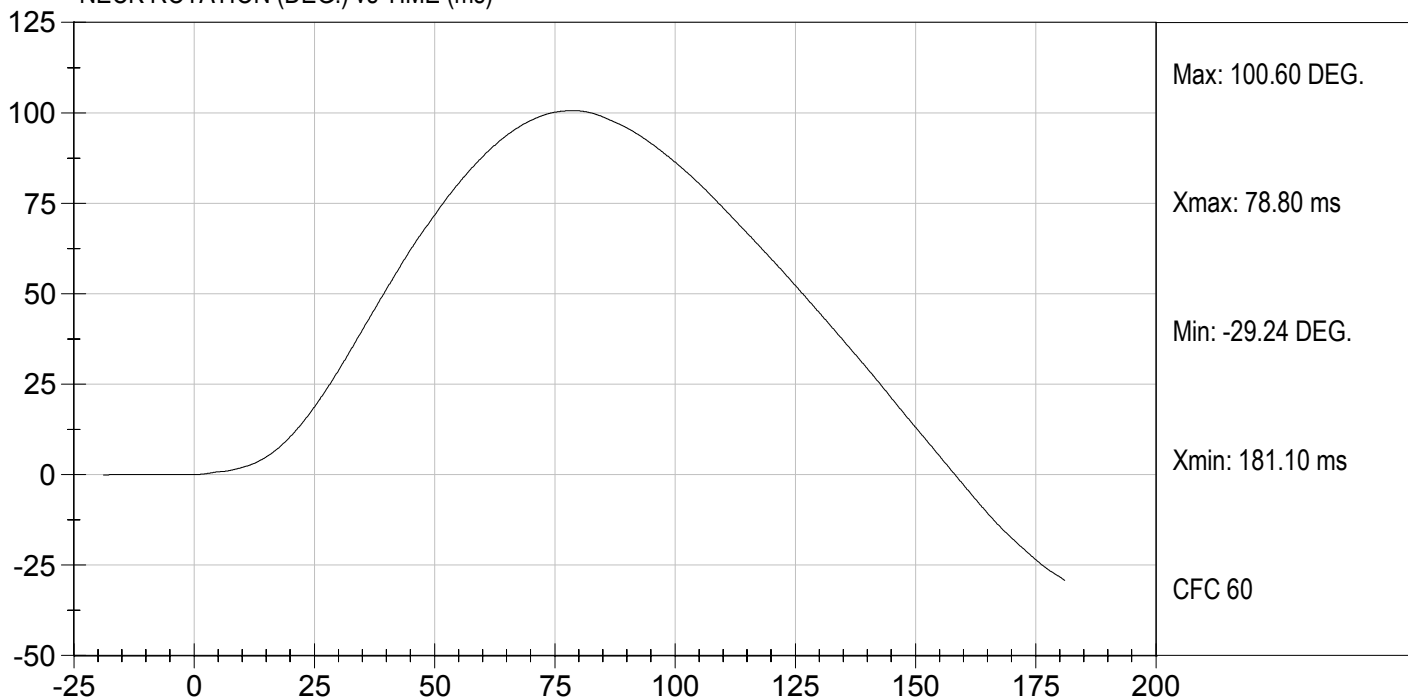
Test Desc: Neck Extension
Componet ID: D041783

Test Date: 08/03/2004
Velocity: 19.87 ft/s, 6.06 m/s

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



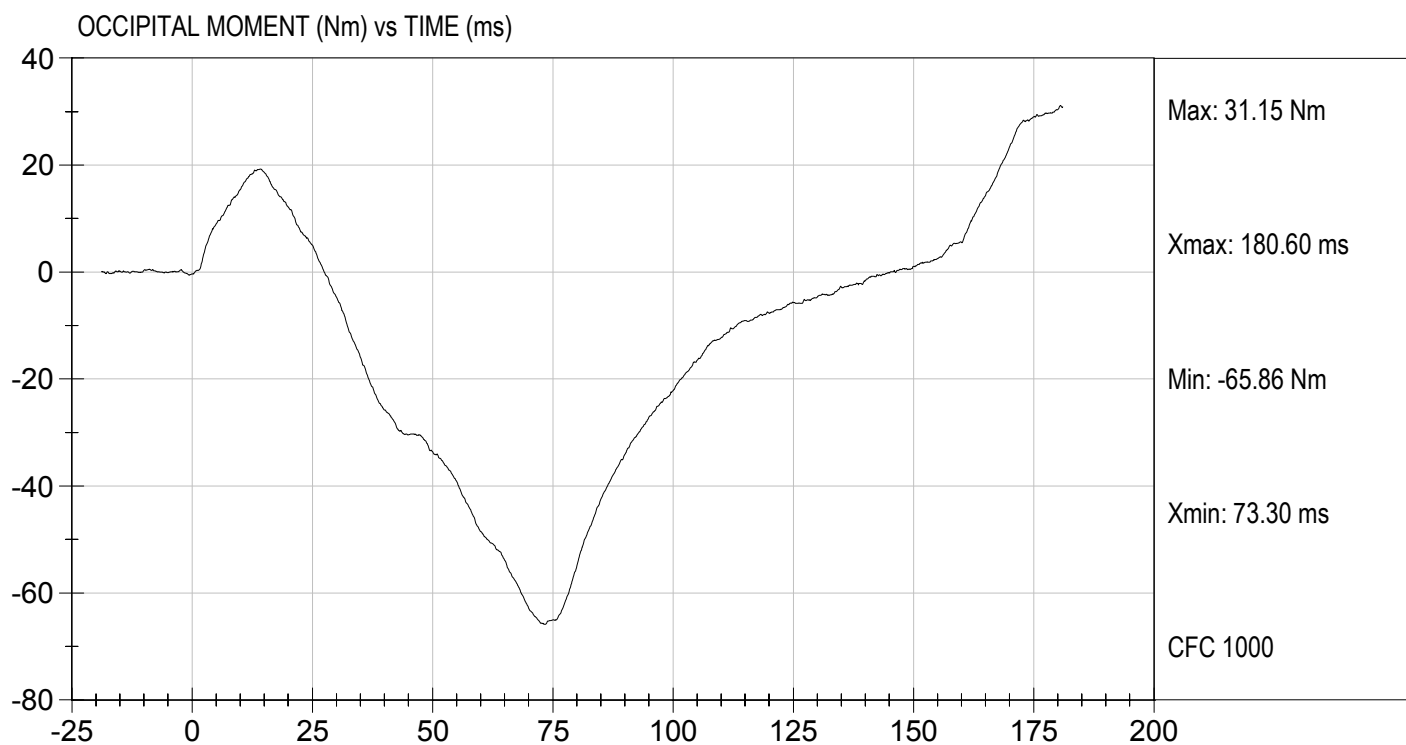
NECK ROTATION (DEG.) vs TIME (ms)





Test Desc: Neck Extension
Componet ID: D041783

Test Date: 08/03/2004
Velocity: 19.87 ft/s, 6.06 m/s



MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 066

Test I.D: D041784

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Probe Velocity	m/s	6.58 to 6.82	6.71	Pass
Peak Probe Force	N	5159 to 5893	5,665	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.88	Pass
Internal Hysteresis	%	69 to 85	71	Pass
Overall Test Results				Pass



Laboratory Technician

08/03/2004

Test Date

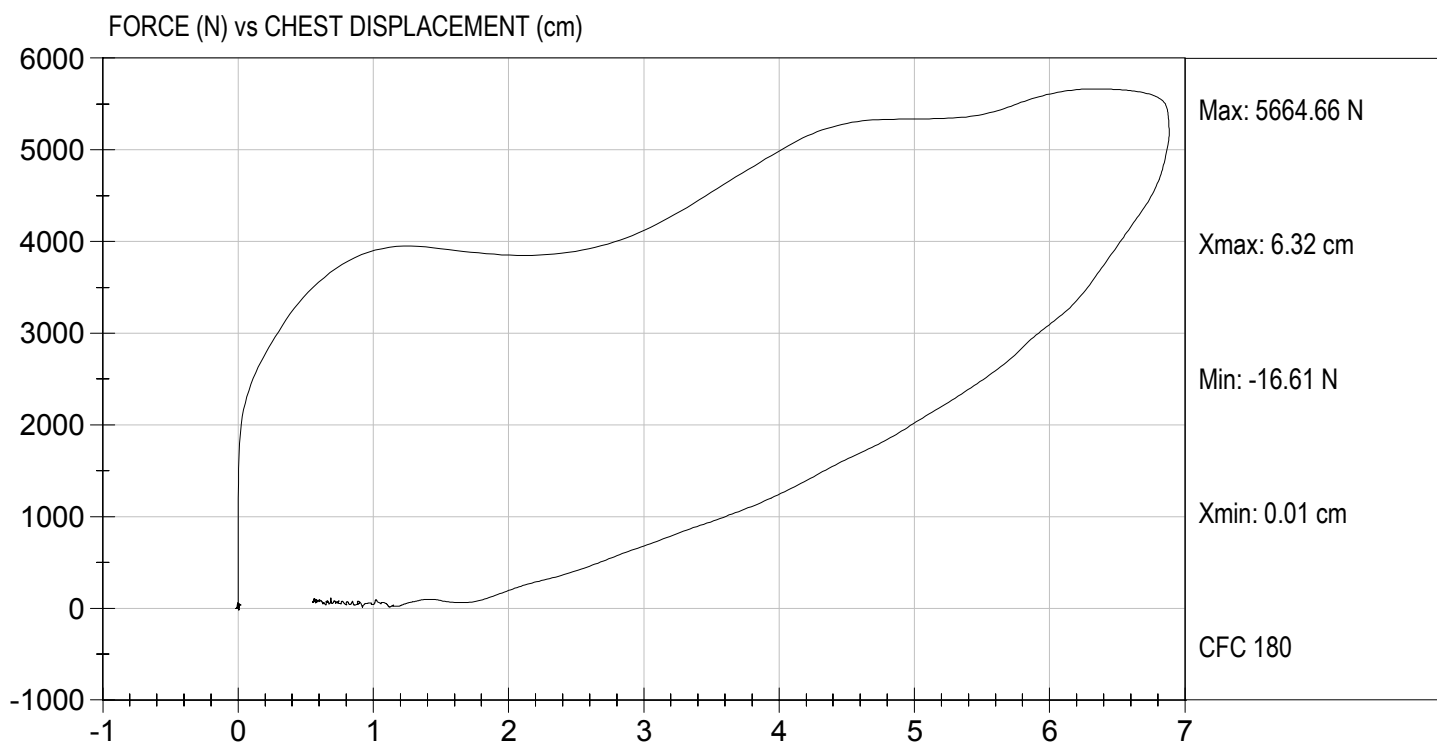


Approved By



Test Desc: Thorax Impact
Componet ID: D041784

Test Date: 08/03/2004
Velocity: 22.03 ft/s, 6.71 m/s



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

ATD Serial No: 066

Test I.D: D041785

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	47	Pass
Probe Velocity	m/sec	2.07 to 2.13	2.13	Pass
Peak Probe Force	Newtons	4715 to 5782	4,799	Pass
Overall Test Results				Pass


Laboratory Technician

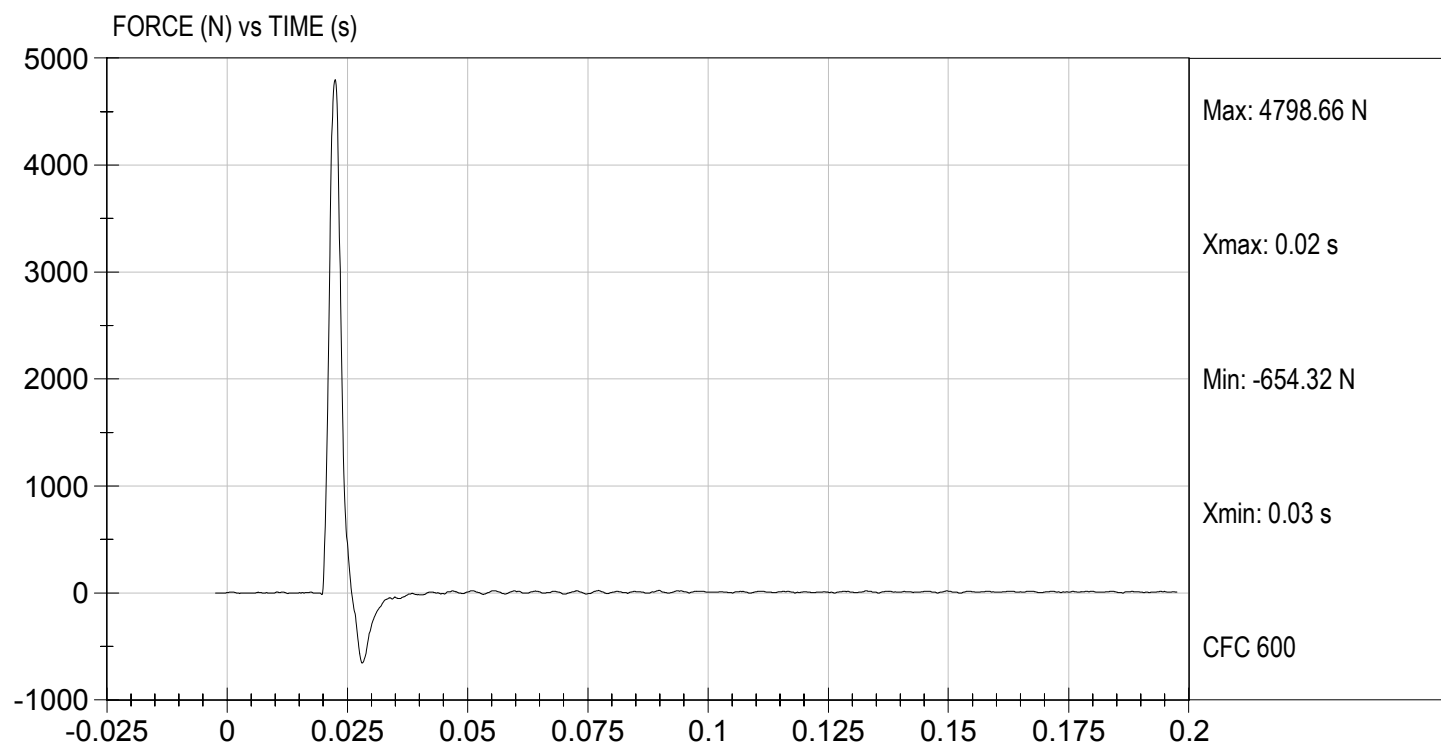
08/03/2004
Test Date


Approved By



Test Desc: Right Knee
Componet ID: D041785

Test Date: 08/03/2004
Velocity: 7.0 ft/s, 2.13 m/s



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

ATD Serial No: 066

Test I.D: D041786

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	47	Pass
Probe Velocity	m/sec	2.07 to 2.13	2.08	Pass
Peak Probe Force	Newtons	4715 to 5782	5,071	Pass
Overall Test Results				Pass


Laboratory Technician

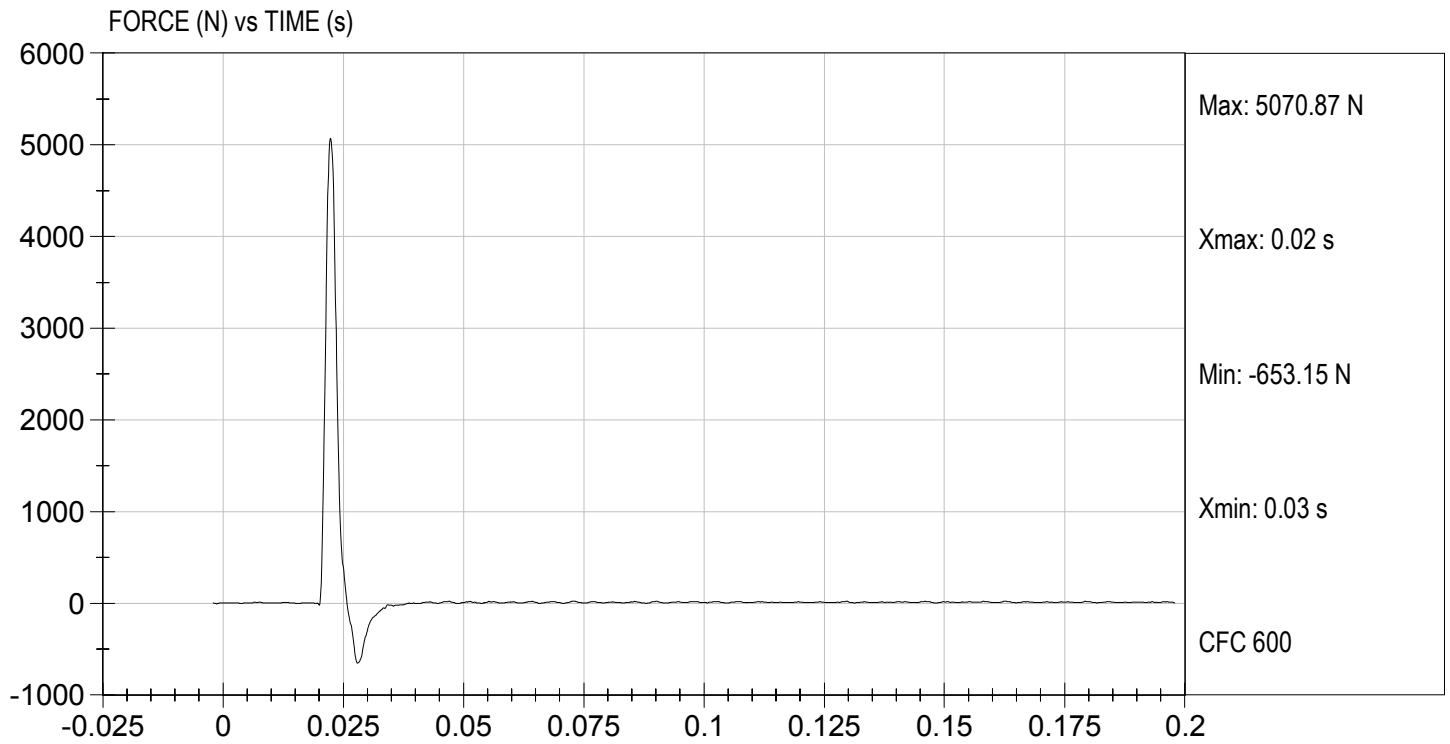
08/03/2004
Test Date


Approved By



Test Desc: Right Knee
Componet ID: D041786

Test Date: 08/03/2004
Velocity: 6.84 ft/s, 2.08 m/s



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

ATD Serial No: 066

Test I.D: D041780

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	49	49	Pass
Rotation Rate	deg/sec	5 -10	8	8	Pass
30 Degrees	Nm	94.9 Nm Max	84.5	73.1	Pass
150 ft-lbf / 203.4 Nm	Deg	40- 50 Degree Max Rotation	41	40	Pass
Overall Test Results					Pass


Laboratory Technician

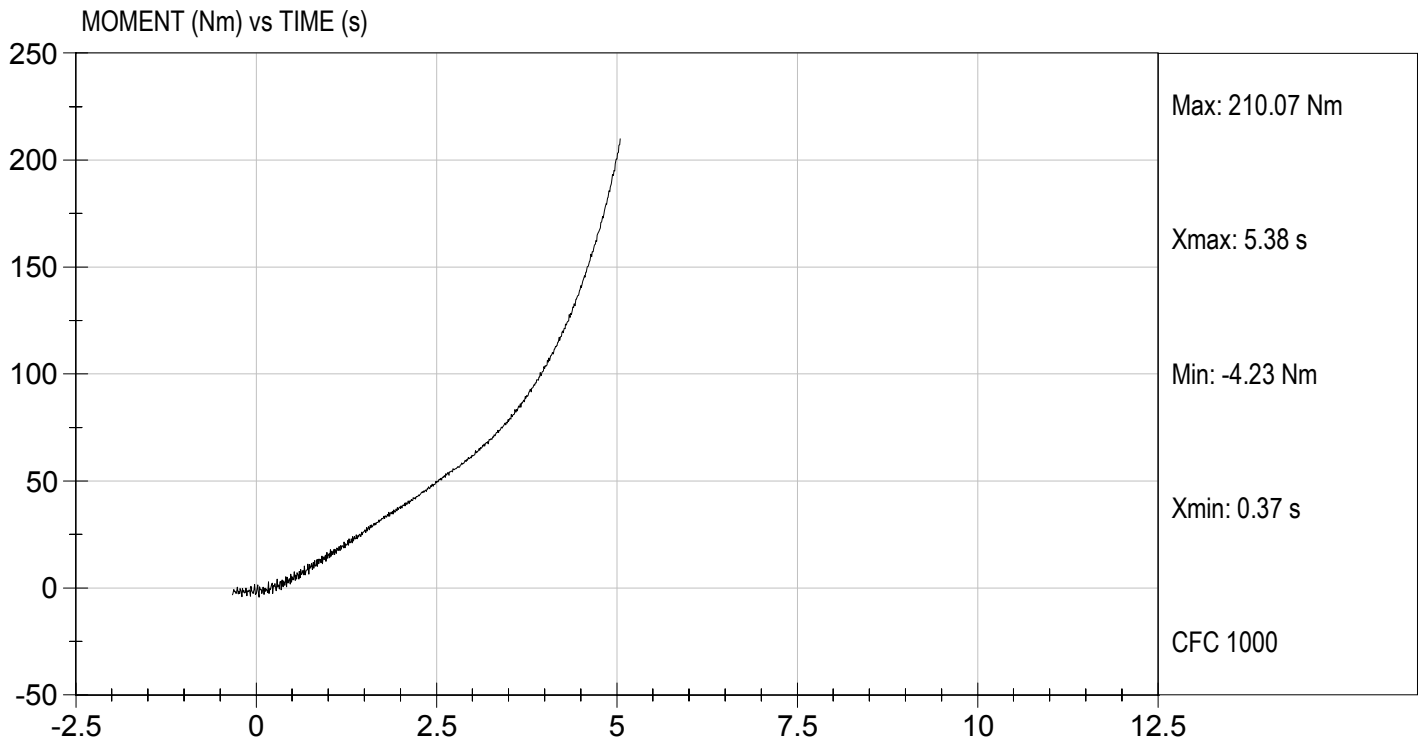
08/02/2004
Test Date


Approved By



Test Desc: Hip Femur Flexion
Componet ID: D041789

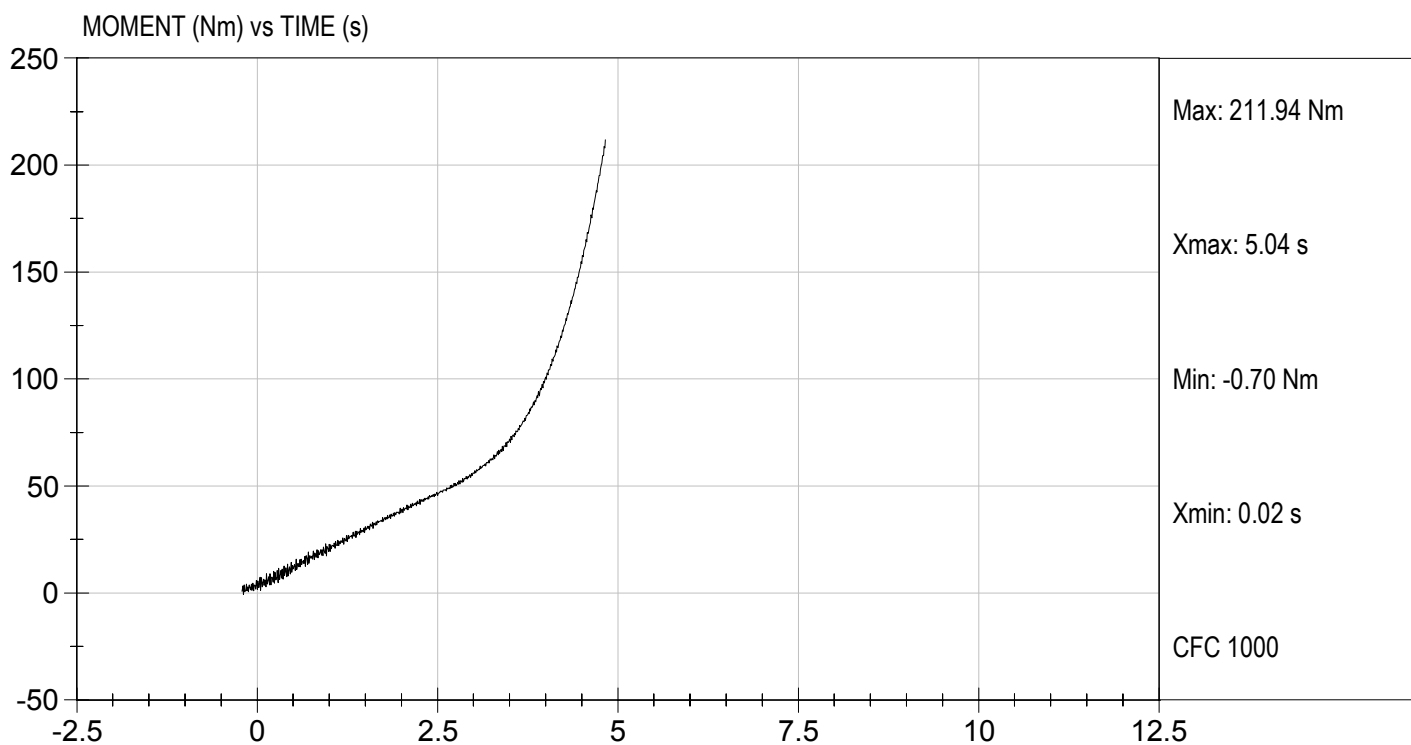
Test Date: 08/02/2004
Velocity: 0 ft/s, 0.00 m/s





Test Desc: Hip Femur Flexion
Componet ID: D041780

Test Date: 08/02/2004
Velocity: 0 ft/s, 0.00 m/s



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

ATD Serial No: 065

Test ID: D041771

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.6	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	46	Pass
Peak Resultant Acceleration	G's	225 - 275	248	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	6.7	Pass
Unimodal	Yes/No	NA	Yes	Pass
Oscillations	Yes/No	within 10% of peak	Yes	Pass
Overall Test Results				Pass


Laboratory Technician

08/02/2004
Test Date

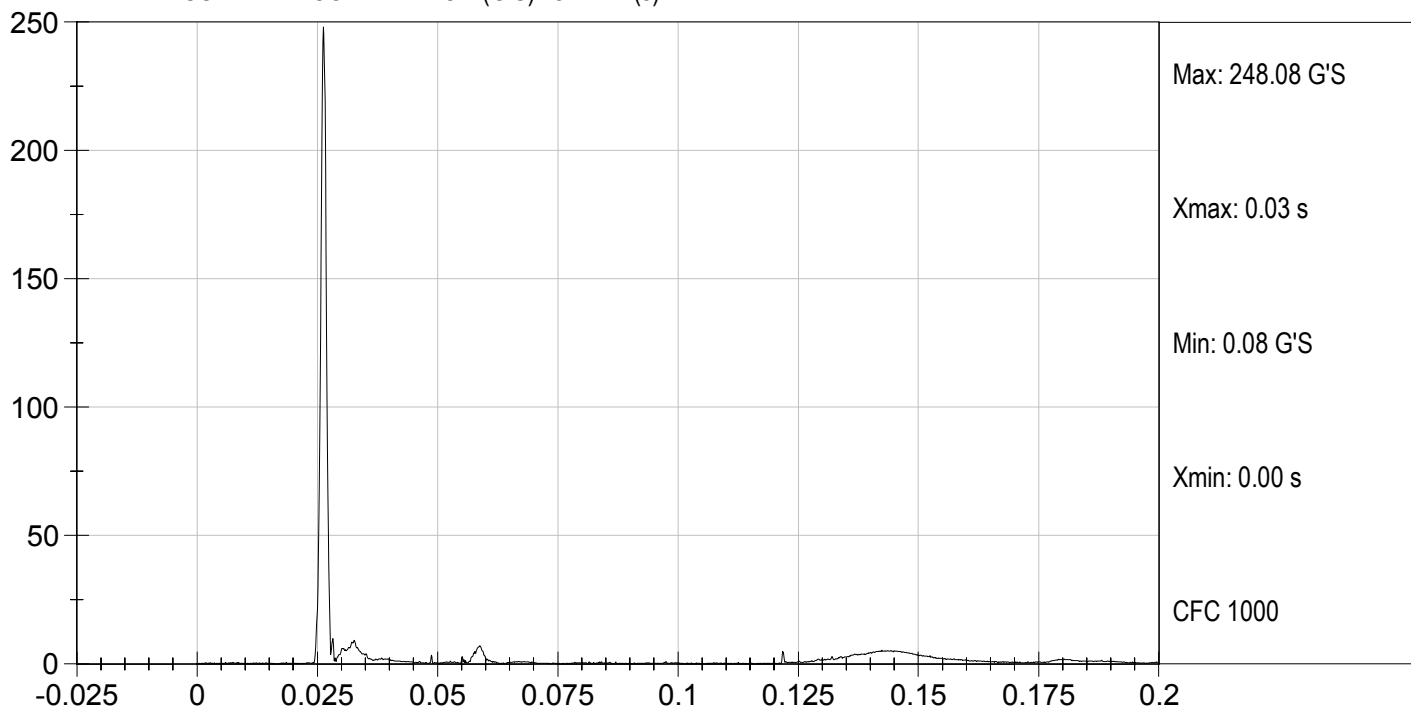

Approved By



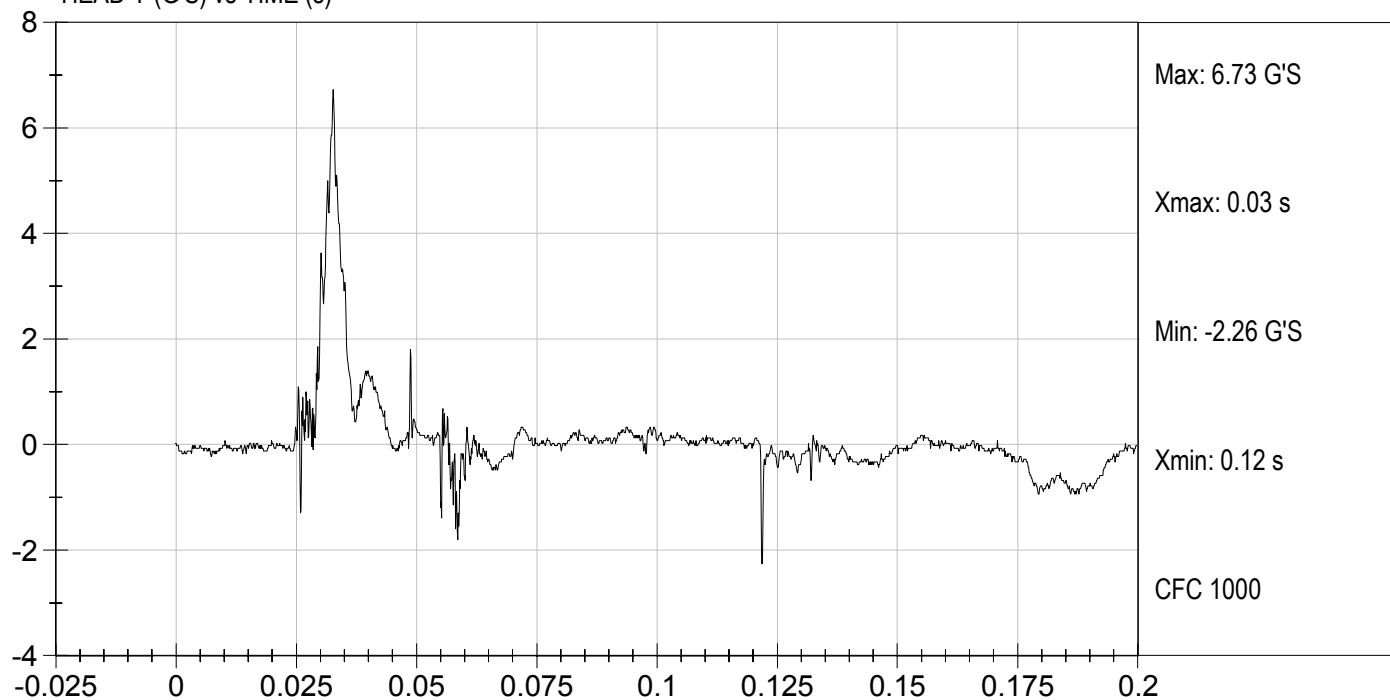
Test Desc: Head Drop
Componet ID: D041771

Test Date: 08/02/2004
Velocity: 0 ft/s, 0.00 m/s

PEAK RESULTANT ACCELERATION (G'S) vs TIME (s)



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



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

ATD Serial No: 065

Test I.D: D041772

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.7	Pass
Laboratory Relative Humidity		%	10 to 70	46	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.98	Pass
Pendulum Deceleration	10 msec	G's	22.50 to 27.50	22.69	Pass
	20 msec	G's	17.60 to 22.60	19.62	Pass
	30 msec	G's	12.50 to 18.50	14.00	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 29.0	13.92	Pass
Deceleration Decay Time to Cross 5 G's		msec	34.0 to 42.0	39.2	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	68.7	Pass
	Time	msec	57.0 to 64.0	59.9	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec	113.0 to 128.0	119.3	Pass
Moment About Occipital Condyle	Maximum	N m	88.1 to 108.5	95.5	Pass
	Time	msec	47.0 to 58.0	52.2	Pass
Positive Moment Decay Time To Zero Crossing		msec	97.0 to 107.0	105.2	Pass
Overall Test Results					Pass


 Laboratory Technician

08/02/2004
 Test Date

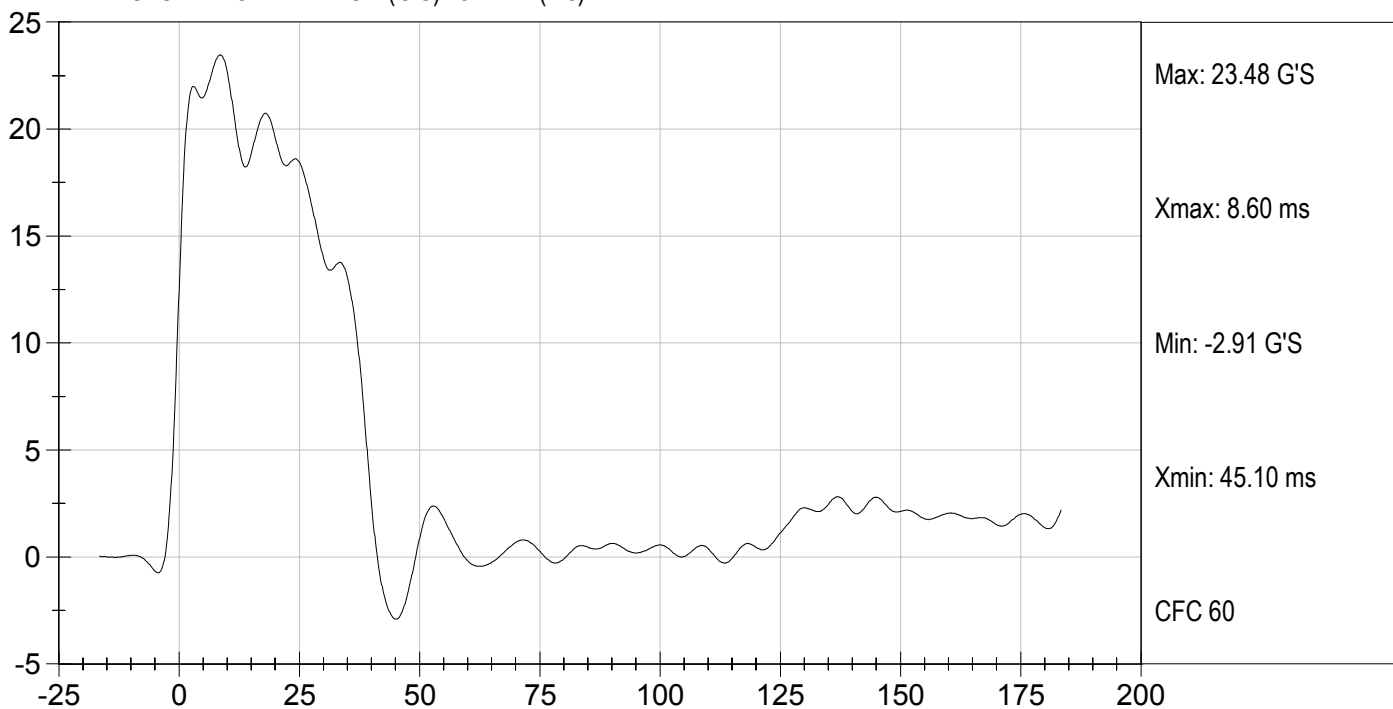

 Approved By



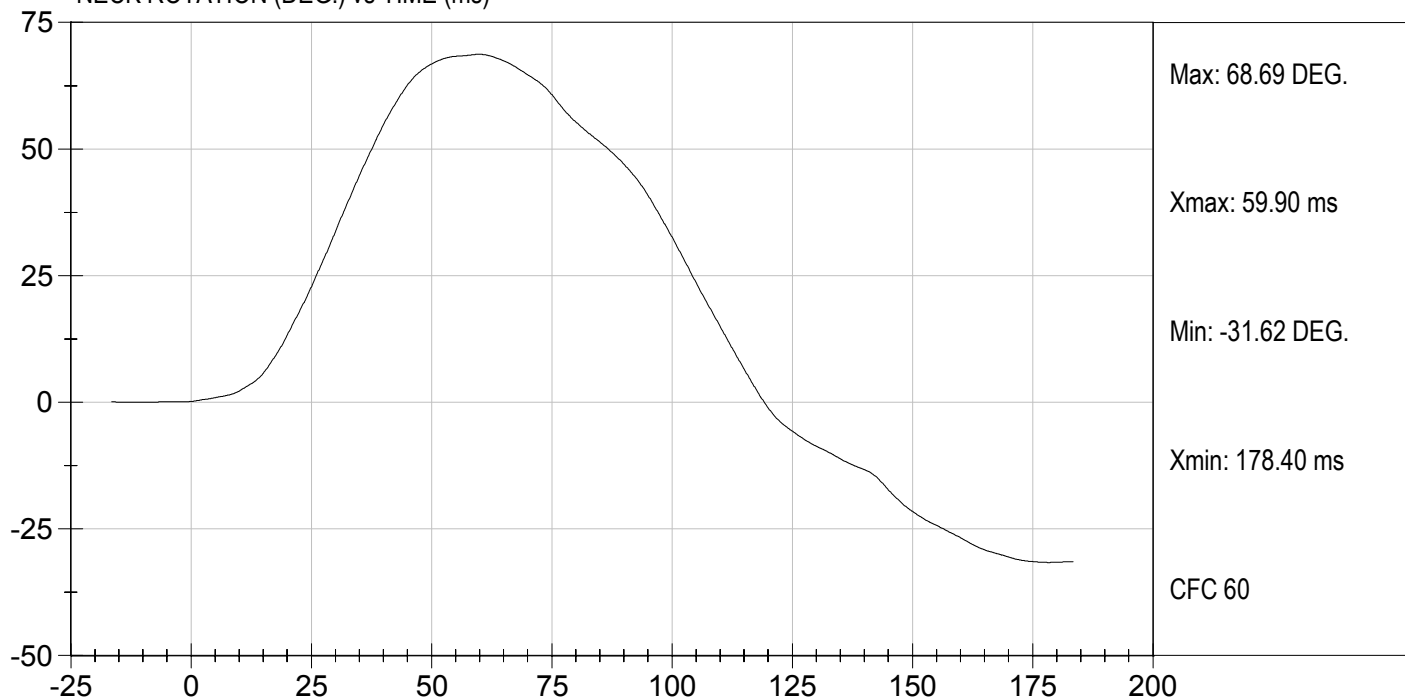
Test Desc: Neck Flexion
Componet ID: D041772

Test Date: 08/02/2004
Velocity: 22.9 ft/s, 6.98 m/s

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



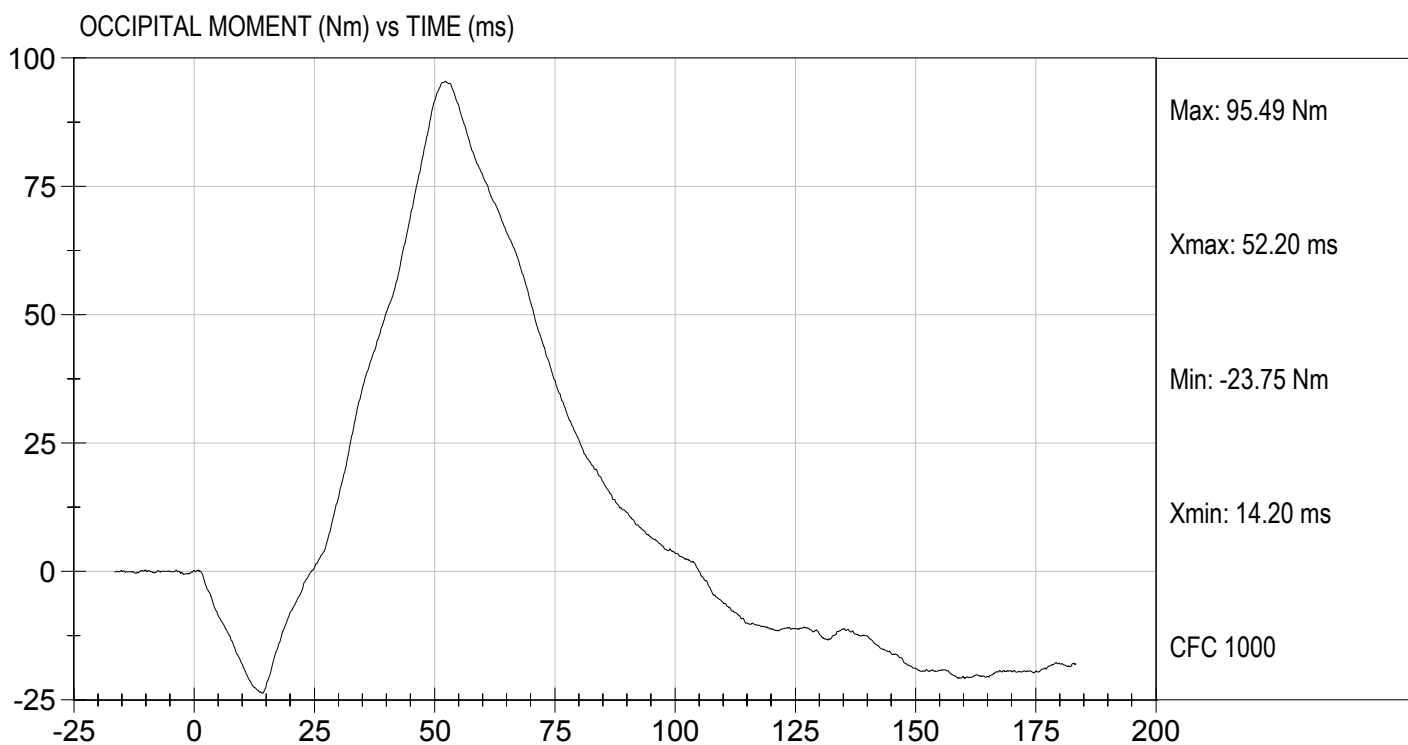
NECK ROTATION (DEG.) vs TIME (ms)





Test Desc: Neck Flexion
Componet ID: D041772

Test Date: 08/02/2004
Velocity: 22.9 ft/s, 6.98 m/s



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

ATD Serial No: 065

Test I.D: D041773

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity		%	10 to 70	46	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.05	Pass
Pendulum Deceleration	10 msec	G's	17.20 to 21.20	18.46	Pass
	20 msec	G's	14.00 to 19.00	16.54	Pass
	30 msec	G's	11.00 to 16.00	11.73	Pass
Peak Pendulum Deceleration After 30 msec		G's	<= 22.0	11.80	Pass
Deceleration Decay Time to Cross 5 G's		msec	38.0 to 46.0	42.1	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	101.1	Pass
	Time	msec	72.0 to 82.0	80.5	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	-65.0	Pass
	Time	msec	65.0 to 79.0	74.7	Pass
Positive Moment Decay Time To Zero Crossing		msec	120.0 to 148.0	145.6	Pass
Overall Test Results					Pass


 Laboratory Technician

08/03/2004
 Test Date

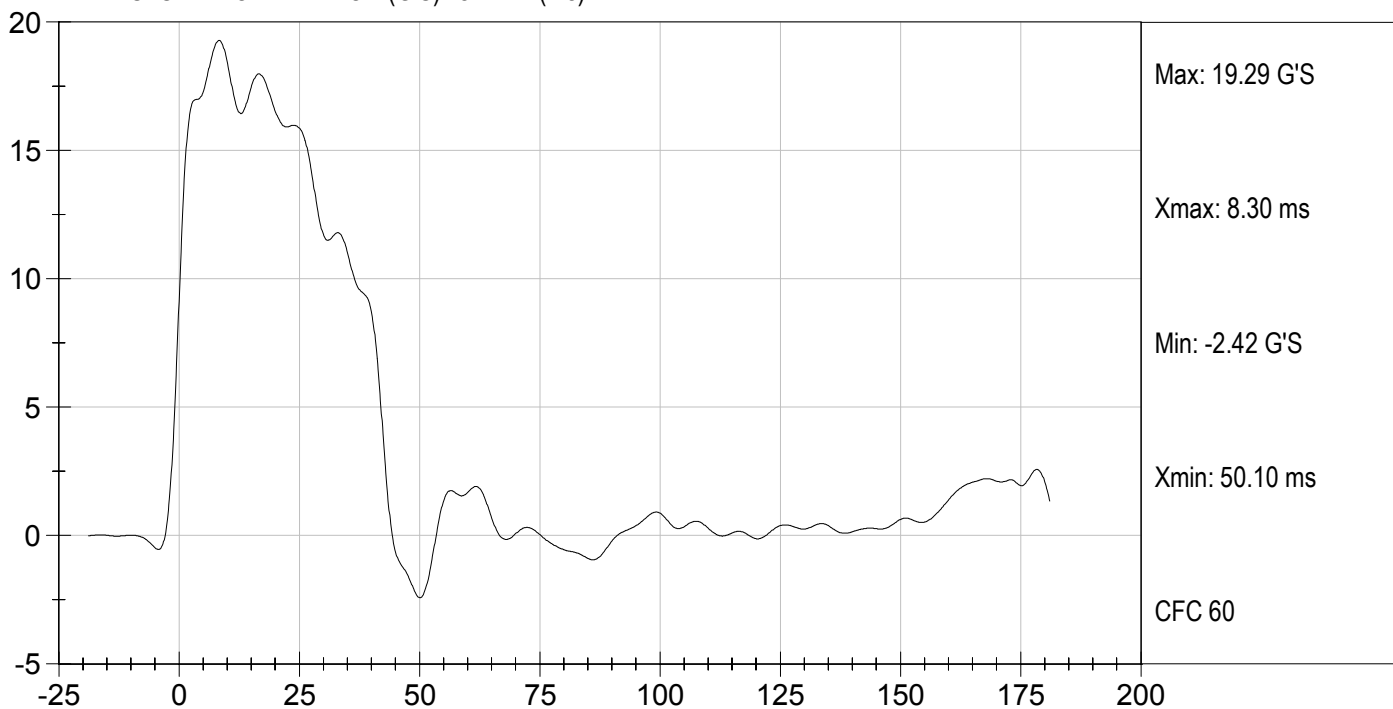

 Approved By



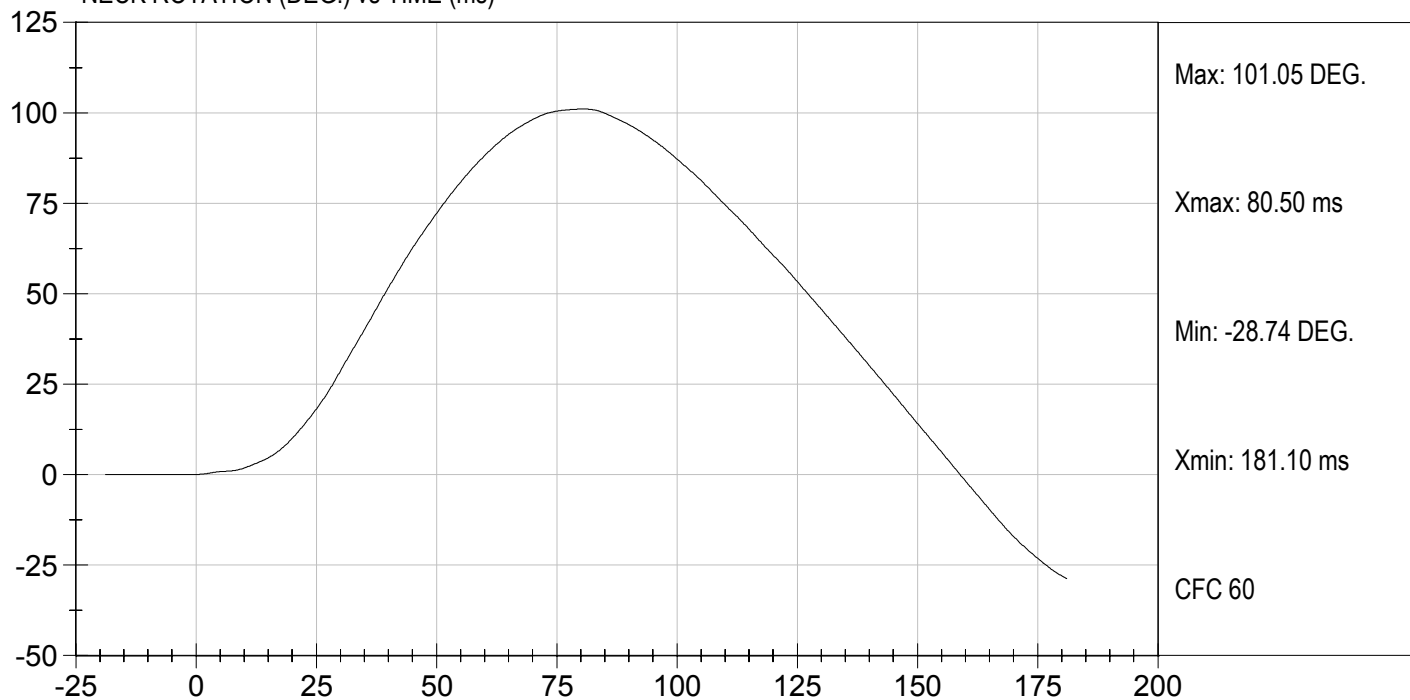
Test Desc: Neck Extension
Componet ID: D041773

Test Date: 08/03/2004
Velocity: 19.85 ft/s, 6.05 m/s

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



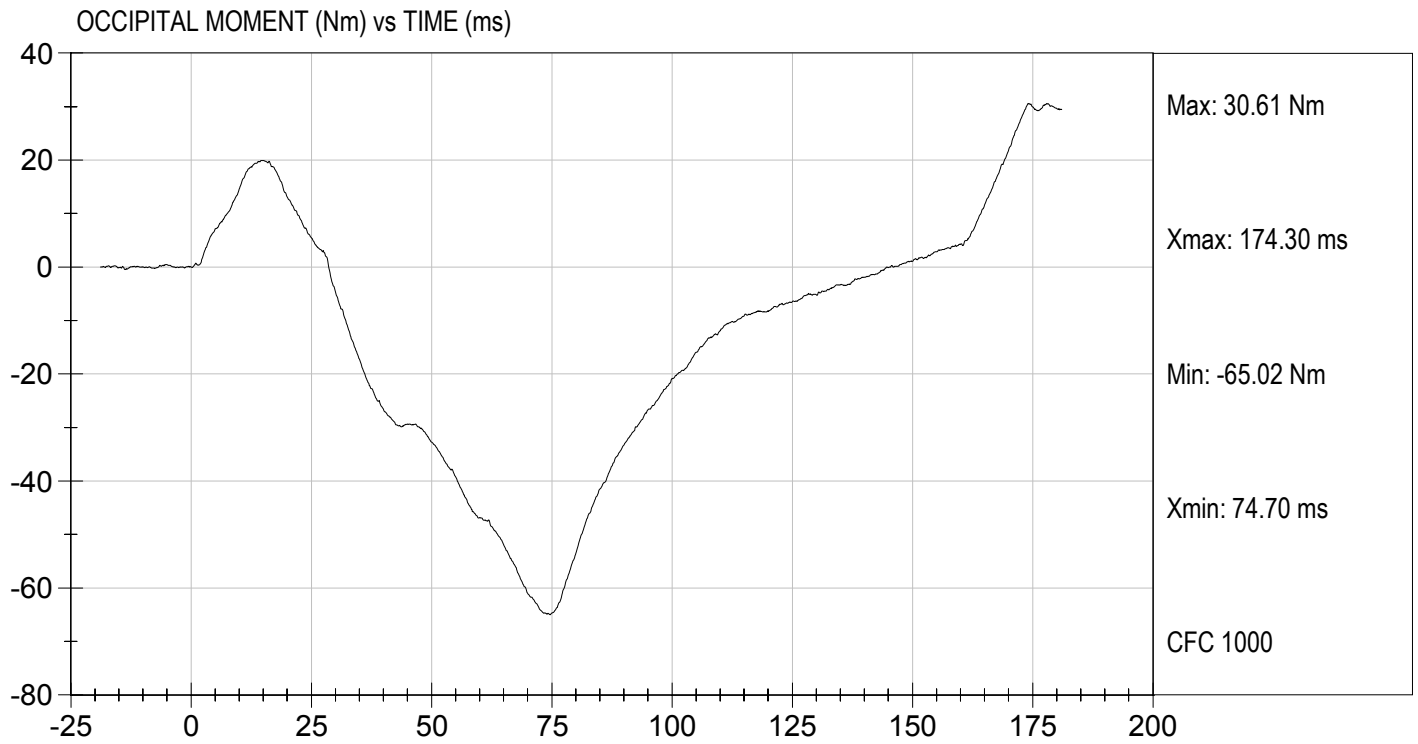
NECK ROTATION (DEG.) vs TIME (ms)





Test Desc: Neck Extension
Componet ID: D041773

Test Date: 08/03/2004
Velocity: 19.85 ft/s, 6.05 m/s



MGA RESEARCH CORPORATION
THORAX IMPACT
HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 065

Test I.D: D041774

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Probe Velocity	m/s	6.58 to 6.82	6.80	Pass
Peak Probe Force	N	5159 to 5893	5,648	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.68	Pass
Internal Hysteresis	%	69 to 85	73	Pass
Overall Test Results				Pass



Laboratory Technician

08/03/2004

Test Date

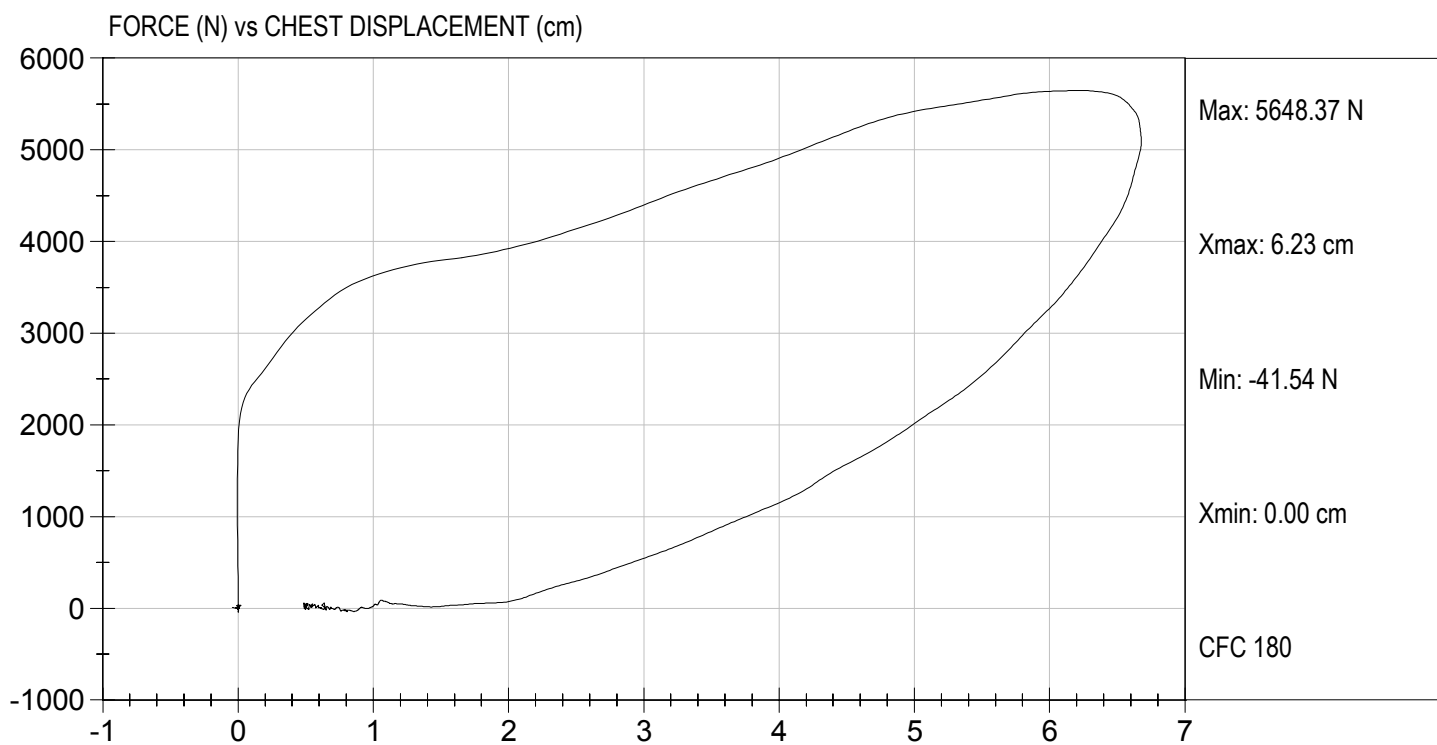


Approved By



Test Desc: Thorax Impact
Componet ID: D041774

Test Date: 08/03/2004
Velocity: 22.31 ft/s, 6.80 m/s



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

ATD Serial No: 065

Test I.D: D041775

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	48	Pass
Probe Velocity	m/sec	2.07 to 2.13	2.07	Pass
Peak Probe Force	Newtons	4715 to 5782	5,334	Pass
Overall Test Results				Pass


Laboratory Technician

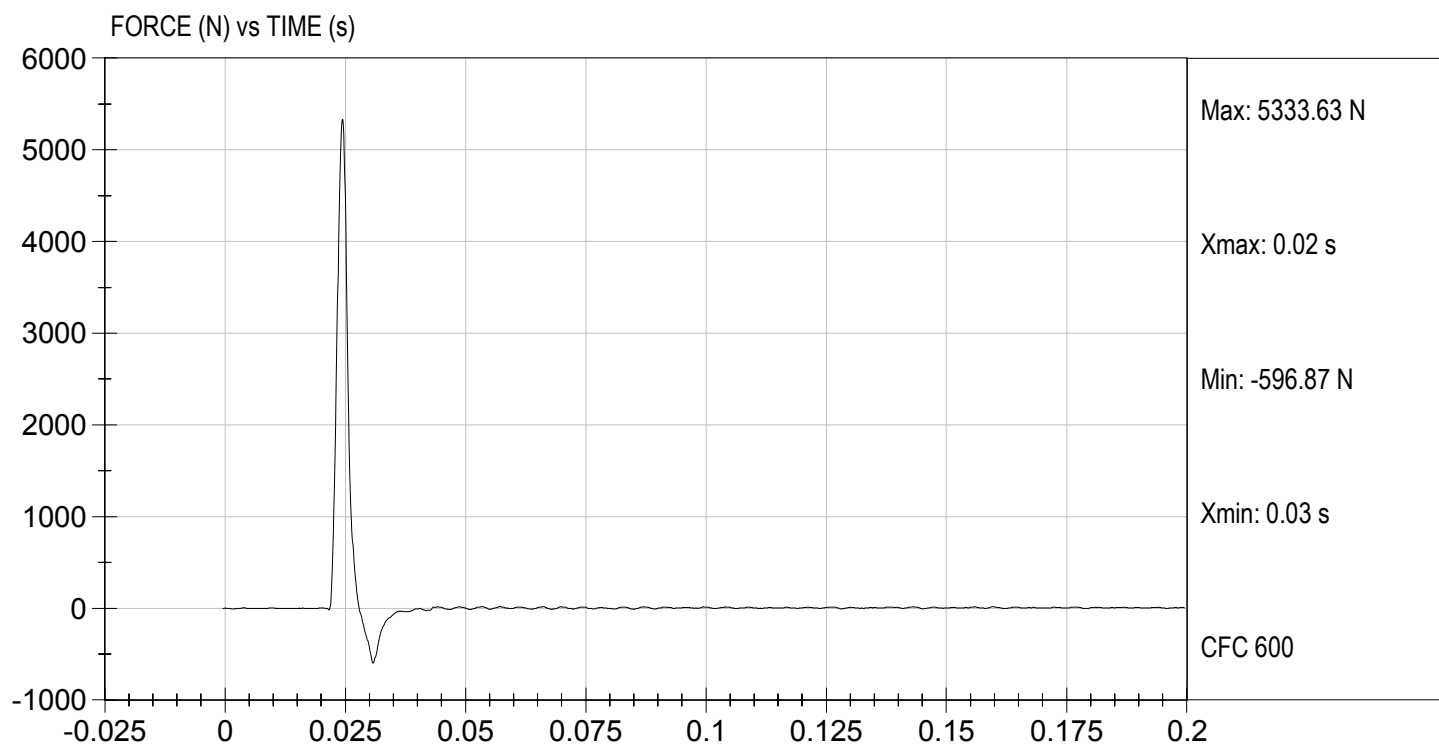

Approved By

08/03/2004
Test Date



Test Desc: Right Knee
Componet ID: D041775

Test Date: 08/03/2004
Velocity: 6.79 ft/s, 2.07 m/s



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

ATD Serial No: 065

Test I.D: D041776

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	48	Pass
Probe Velocity	m/sec	2.07 to 2.13	2.12	Pass
Peak Probe Force	Newtons	4715 to 5782	5,731	Pass
Overall Test Results				Pass


Laboratory Technician

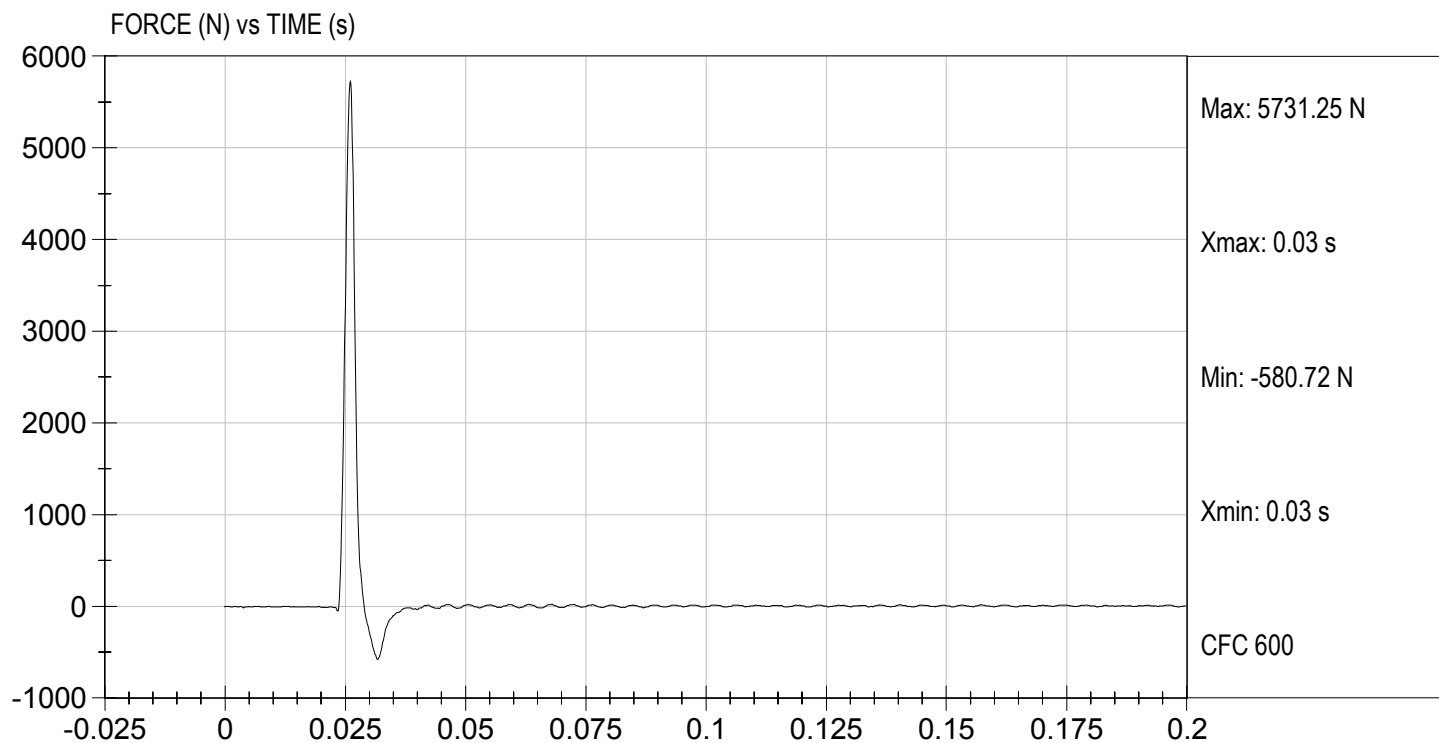
08/03/2004
Test Date


Approved By



Test Desc: Left Knee
Componet ID: D041776

Test Date: 08/03/2004
Velocity: 6.97 ft/s, 2.12 m/s



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

ATD Serial No: 065

Test I.D: D041770

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.0	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	48	48	Pass
Rotation Rate	deg/sec	5 -10	8	8	Pass
30 Degrees	Nm	94.9 Nm Max	73.3	79.2	Pass
150 ft-lbf / 203.4 Nm	Deg	40- 50 Degree Max Rotation	42	40	Pass
Overall Test Results					Pass


Laboratory Technician

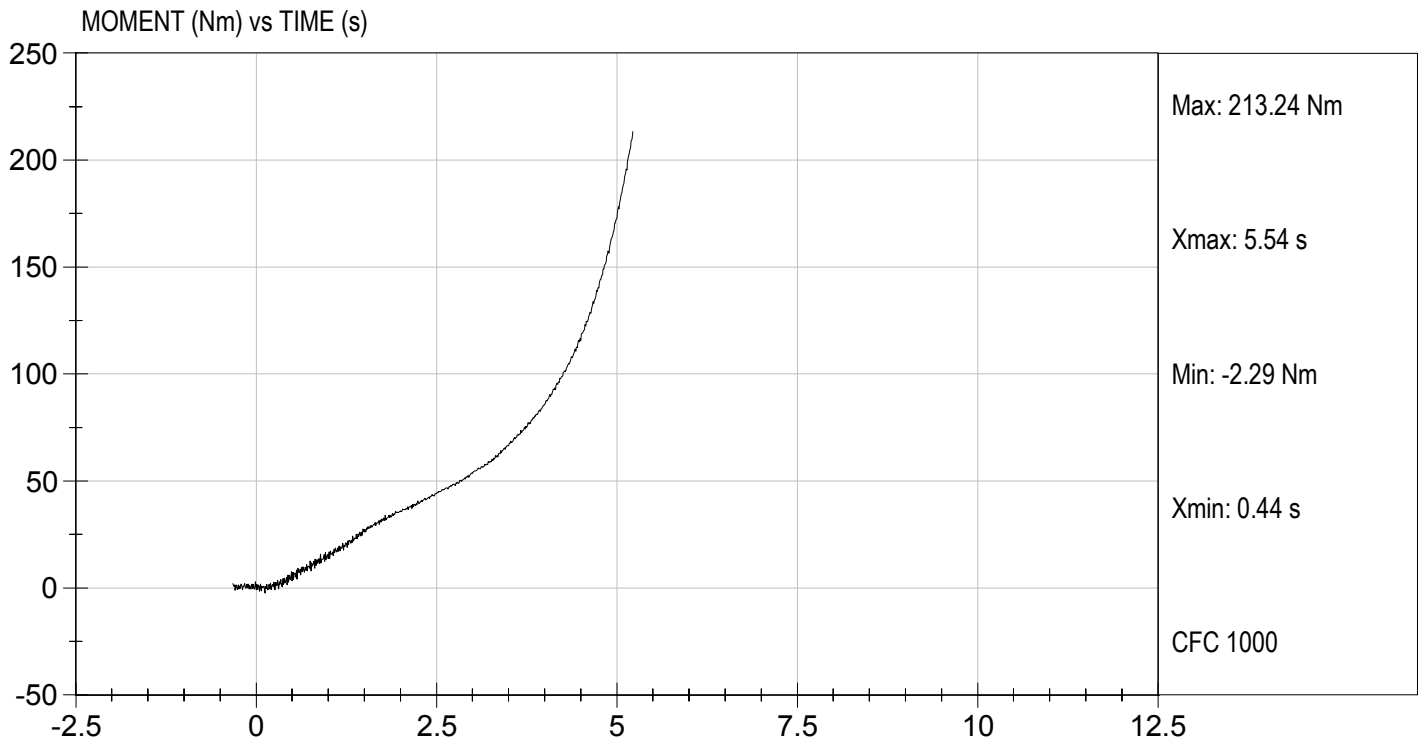
08/02/2004
Test Date


Approved By



Test Desc: Hip Femur Flexion
Componet ID: D041779

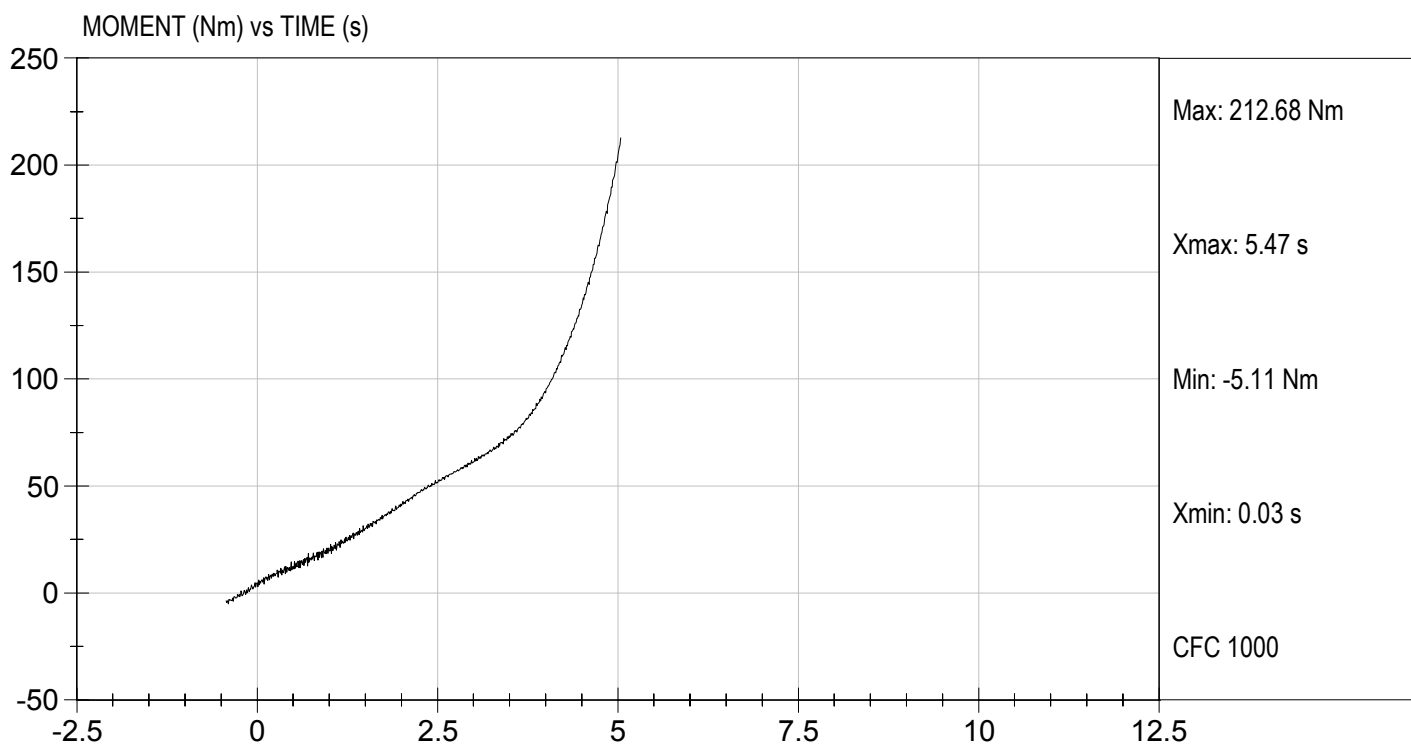
Test Date: 08/02/2004
Velocity: 0 ft/s, 0.00 m/s





Test Desc: Hip Femur Flexion
Componet ID: D041770

Test Date: 08/02/2004
Velocity: 0 ft/s, 0.00 m/s



APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION

INSTRUMENTS FOR DRIVER DUMMY NO. 066

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	F28-N05	Entran	9/10/04
Head Y	F23-F22	Entran	9/10/04
Head Z	F11-H03	Entran	9/10/04
Head X Redundant	AMTA3	Endevco	6/28/04
Head Y Redundant	AJ420	Endevco	6/28/04
Head Z Redundant	D07-N11	Entran	9/15/04
Head Y - Front	J13938	Endevco	8/04/04
Head Z - Front	ANAT6	Endevco	8/04/04
Head X - Left	AP2A4	Endevco	8/04/04
Head Z - Left	AP2D8	Endevco	8/04/04
Head X - Upper	AP1T8	Endevco	8/04/04
Head Y- Upper	AP2D7	Endevco	8/04/04
Neck Load Cell	442	Denton	7/20/04
Chest X	P22086	Endevco	8/04/04
Chest Y	AJ9D2	Endevco	8/04/04
Chest Z	P24265	Endevco	8/04/04
Chest Deflection Gauge	066	Servo	8/03/04
Chest X Redundant	P22652	Endevco	8/04/04
Chest Y Redundant	AJ417	Endevco	8/04/04
Chest Z Redundant	P22150	Endevco	8/04/04
Pelvis X	J13851	Endevco	8/02/04
Pelvis Y	AJ808	Endevco	8/02/04
Pelvis Z	AH0F0	Endevco	8/02/04
Left Femur Load Cell	256	Denton	7/20/04
Right Femur Load Cell	259	Denton	7/20/04
Left Upper Tibia Load Cell	107	Denton	7/22/04
Left Lower Tibia Load Cell	136	Denton	7/22/04
Right Upper Tibia Load Cell	103	Denton	7/22/04
Right Lower Tibia Load Cell	133	Denton	7/22/04
Left Foot Z – Front	A05-A20	Entran	8/04/04
Left Ankle X	A05-A21	Entran	8/04/04
Left Ankle Z	A07-J01	Entran	8/04/04

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Right Foot Z – Front	ANBP7	Endevco	7/23/04
Right Ankle X	L30-Z18	Entran	8/04/04
Right Ankle Z	A12-A11	Entran	8/04/04
Shoulder Belt Load Cell	157	Denton	8/18/04
Lap Belt Load Cell	192	Denton	4/12/04

INSTRUMENTS FOR PASSENGER DUMMY NO. 065

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	P27020	Endevco	8/04/04
Head Y	P27025	Endevco	8/04/04
Head Z	P22692	Endevco	8/04/04
Head X Redundant	J10431	Endevco	8/04/04
Head Y Redundant	P26986	Endevco	8/04/04
Head Z Redundant	AN9E3	Endevco	8/04/04
Head Y - Front	J19173	Endevco	8/04/04
Head Z - Front	J13656	Endevco	8/04/04
Head X - Left	J13424	Endevco	8/04/04
Head Z - Left	J14007	Endevco	8/04/04
Head X - Upper	J33415	Endevco	8/04/04
Head Y- Upper	J13630	Endevco	8/04/04
Neck Load Cell	443	Denton	7/20/04
Chest X	AMT78	Endevco	8/04/04
Chest Y	AP1Y8	Endevco	8/04/04
Chest Z	J11361	Endevco	8/04/04
Chest Deflection Gauge	065	Servo	8/03/04
Chest X Redundant	ALFP5	Endevco	8/04/04
Chest Y Redundant	AP138	Endevco	8/04/04
Chest Z Redundant	AJ9Y3	Endevco	8/04/04
Pelvis X	P26988	Endevco	5/25/04
Pelvis Y	AMP12	Endevco	5/25/04
Pelvis Z	AJ4K2	Endevco	5/25/04
Left Femur Load Cell	262	Denton	7/20/04
Right Femur Load Cell	261	Denton	7/20/04
Left Upper Tibia Load Cell	266	Denton	7/22/04
Left Lower Tibia Load Cell	179	Denton	7/22/04
Right Upper Tibia Load Cell	263	Denton	7/22/04
Right Lower Tibia Load Cell	174	Denton	7/22/04
Left Foot Z – Front	L20-A38	Entran	4/06/04
Left Ankle X	AHTB2	Endevco	4/08/04
Left Ankle Z	AJ9A7	Endevco	5/25/04

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Right Foot Z – Front	P10148	Endevco	5/25/04
Right Ankle X	P26999	Endevco	5/25/04
Right Ankle Z	J12465	Endevco	5/25/04
Shoulder Belt Load Cell	172	Denton	8/18/04
Lap Belt Load Cell	193	Denton	4/12/04

INSTRUMENTS FOR VEHICLE AND LABORATORY

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	K20-J10	Entran	6/04/04
Left Rear Seat Crossmember Z	K07-R15	Entran	6/04/04
Right Rear Seat Crossmember X	K07-R18	Entran	8/25/04
Right Rear Seat Crossmember Z	J10-E12	Entran	8/25/04
Top of Engine X	H20-R08	Entran	5/28/04
Bottom of Engine X	K20-J09	Entran	9/13/04
Left Brake Caliper X	L20-B12	Entran	7/02/04
Right Brake Caliper X	K18-D14	Entran	6/04/04
Instrument Panel X	I12-F01	Entran	7/02/04
Left Rear Seat Back X	L17-D29	Entran	7/02/04
Left Rear Seat Back Y	K18-D22	Entran	7/02/04
Left Rear Seat Back Z	G10-F04	Entran	4/19/04

APPENDIX E
DUMMY HEAD RESPONSE DATA TRACES

TABLE OF DATA PLOTS

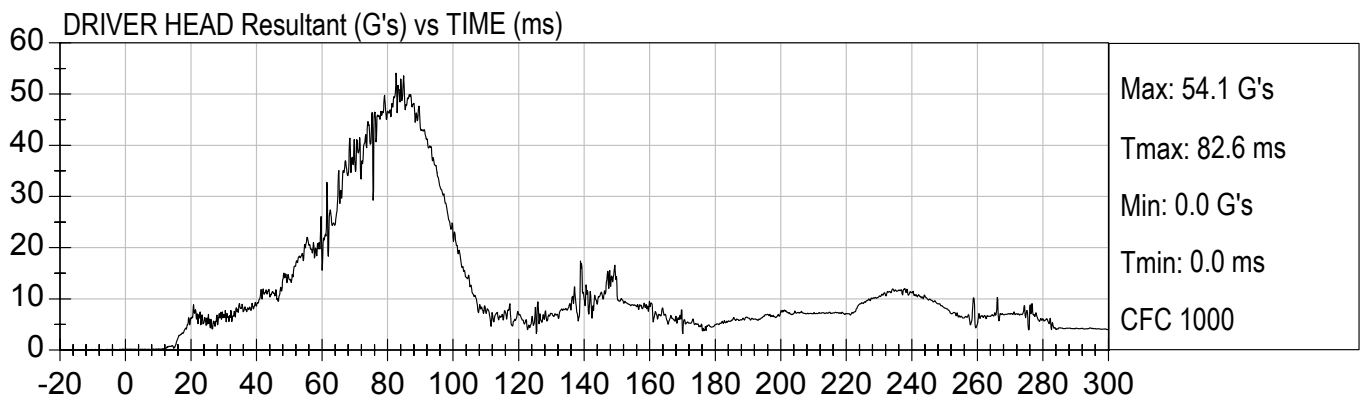
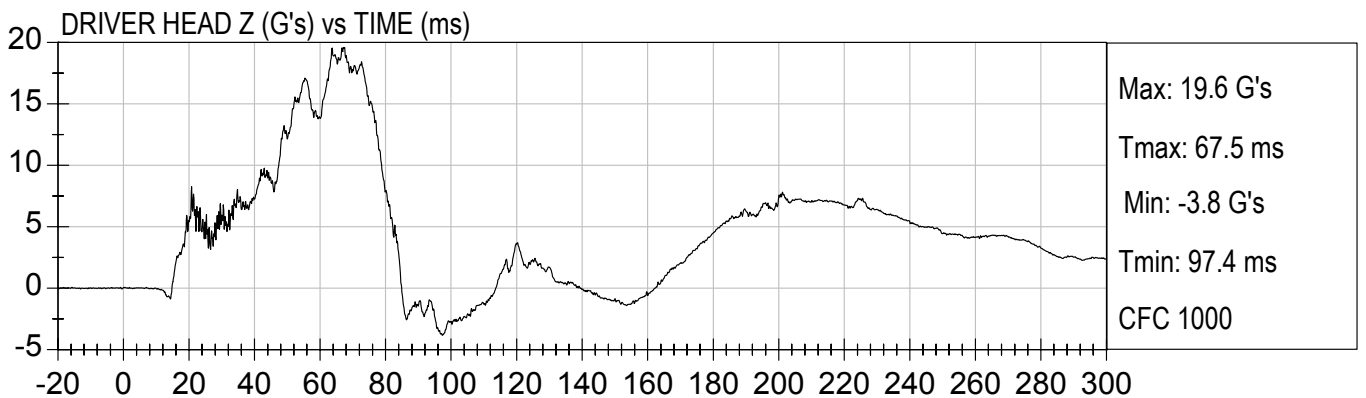
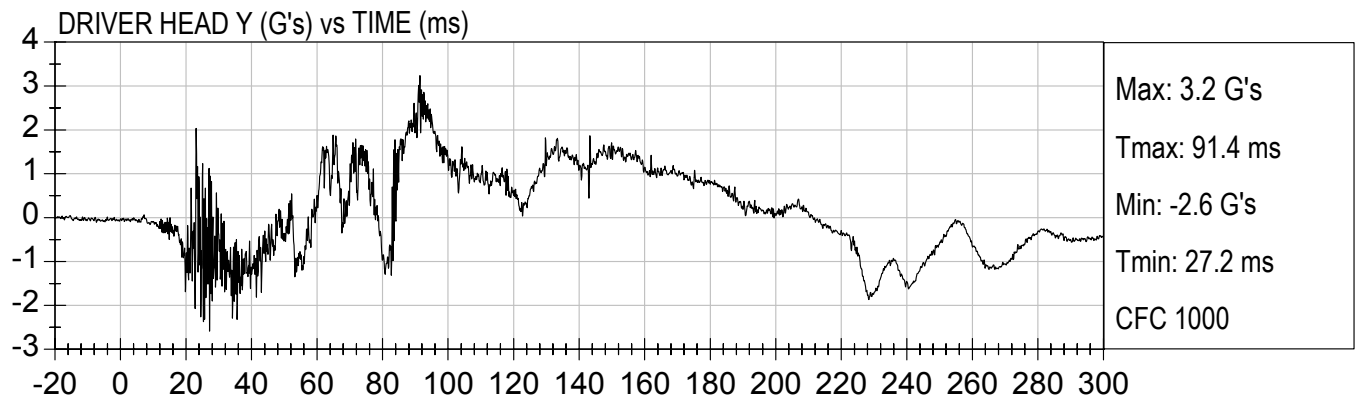
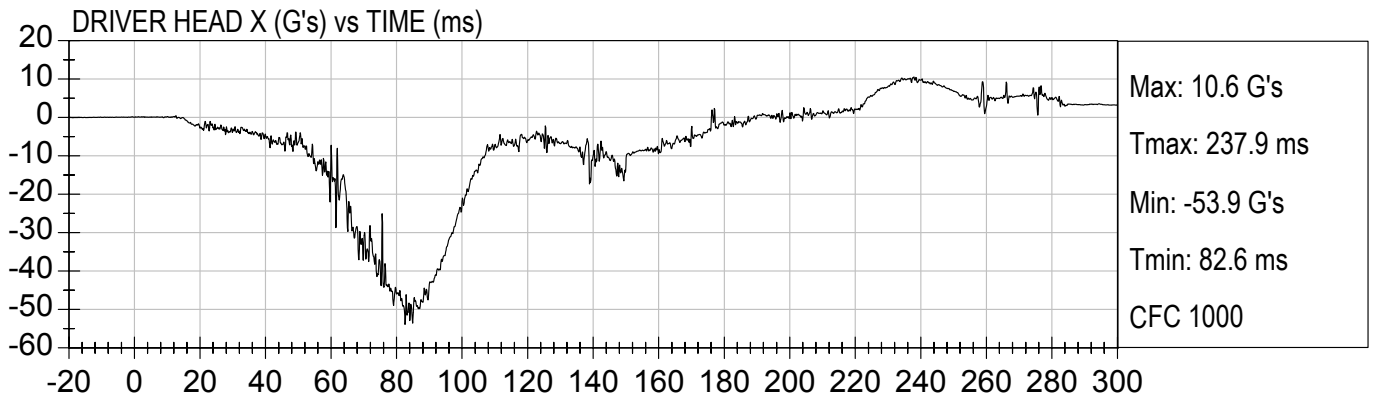
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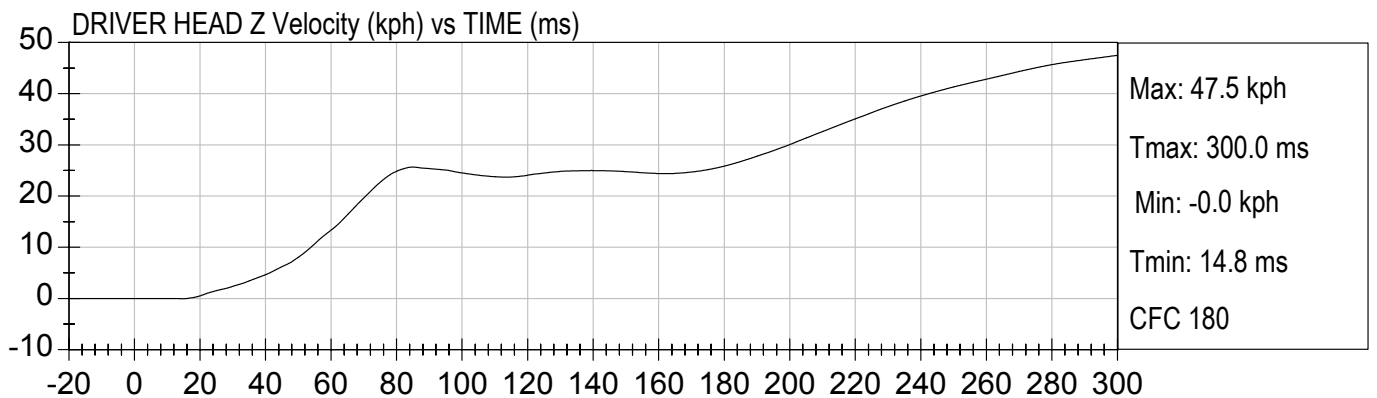
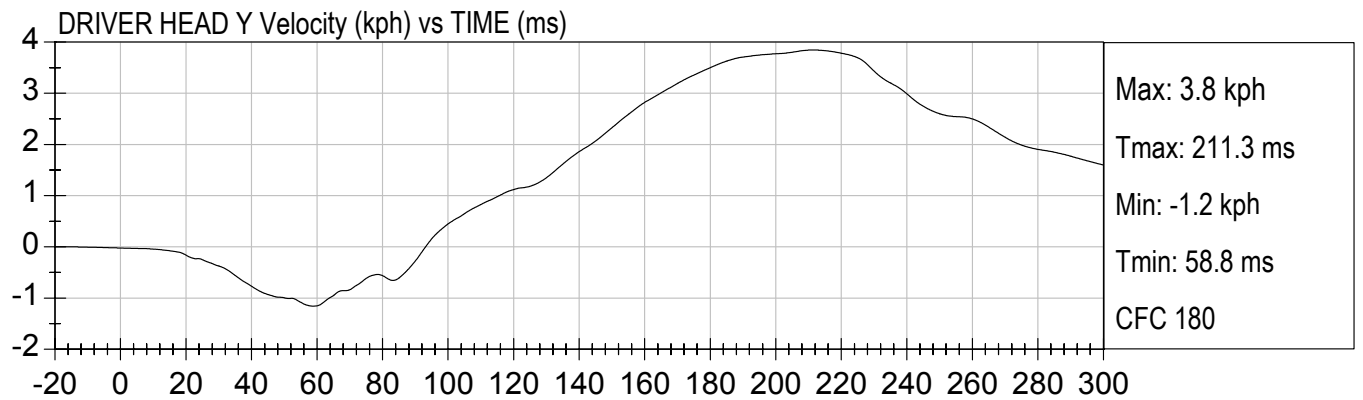
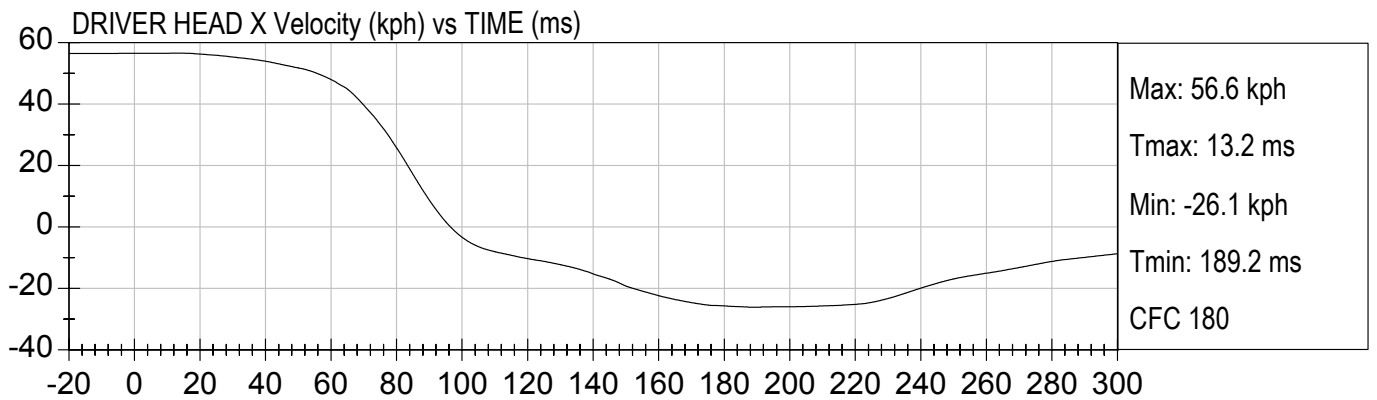
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35MPH NCAP FRONTAL
2005 TOYOTA COROLLA (M55108)

Test Date: 09/17/04
Speed: 35.1 mph (56.5 km/h)



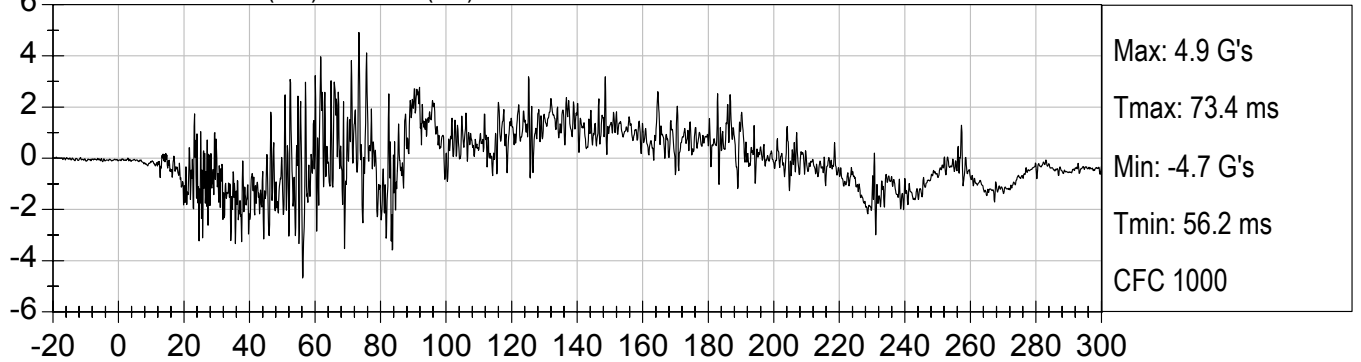




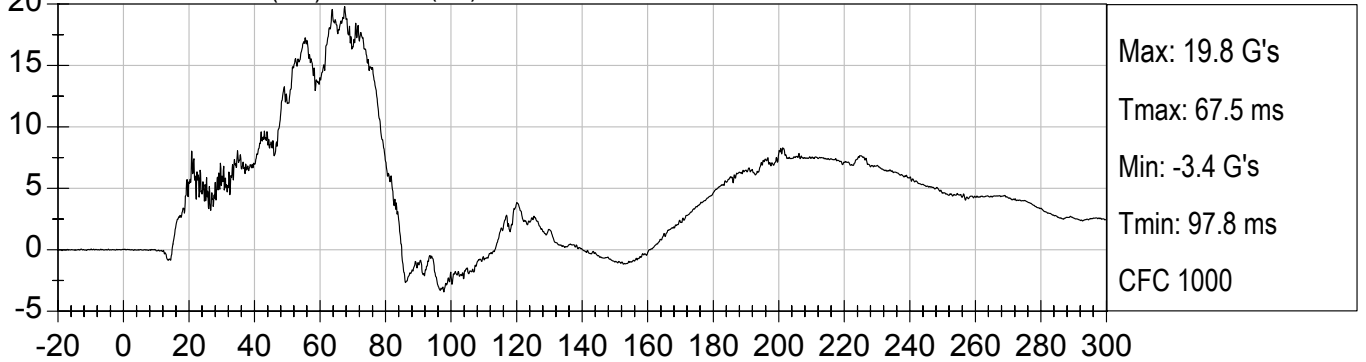
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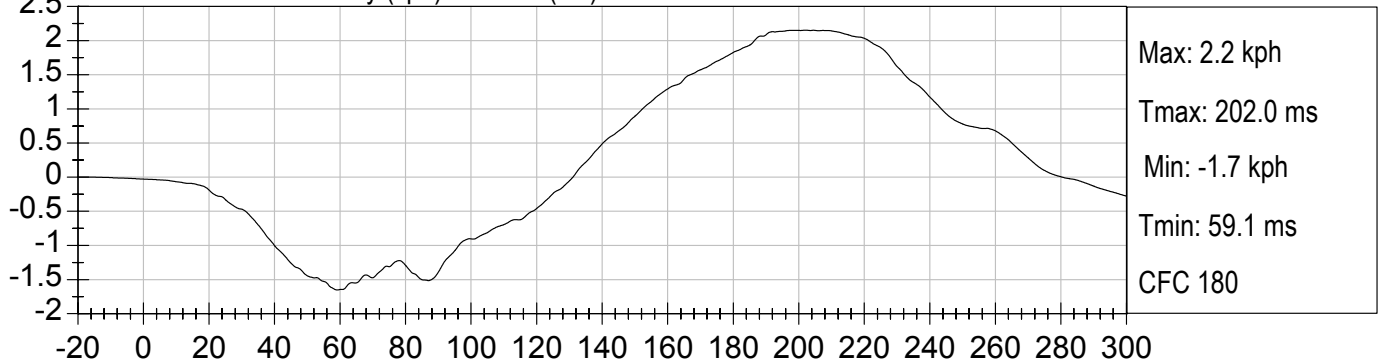
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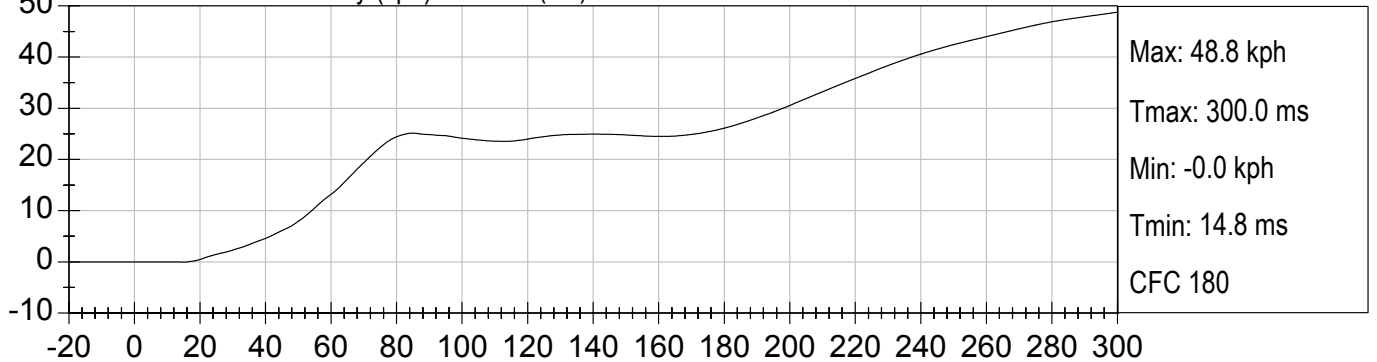
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DRIVER HEAD Yr Velocity (kph) vs TIME (ms)



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

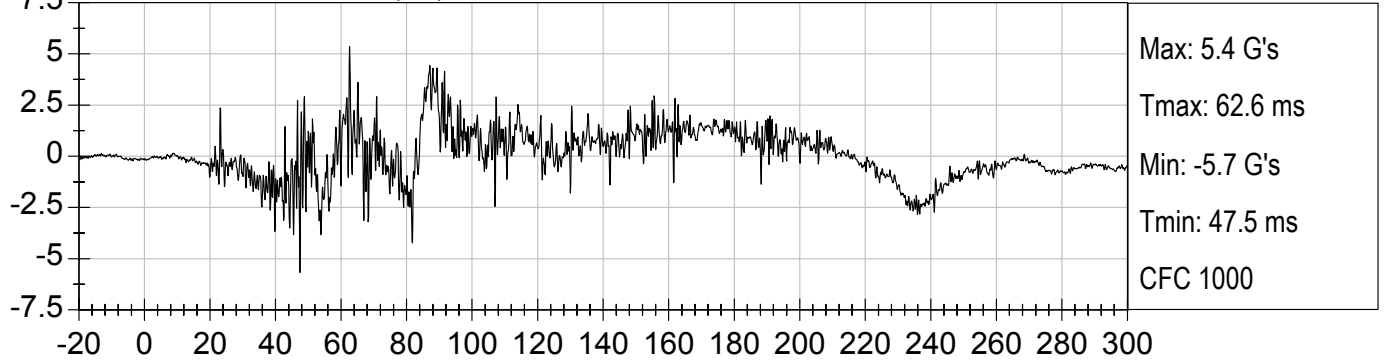




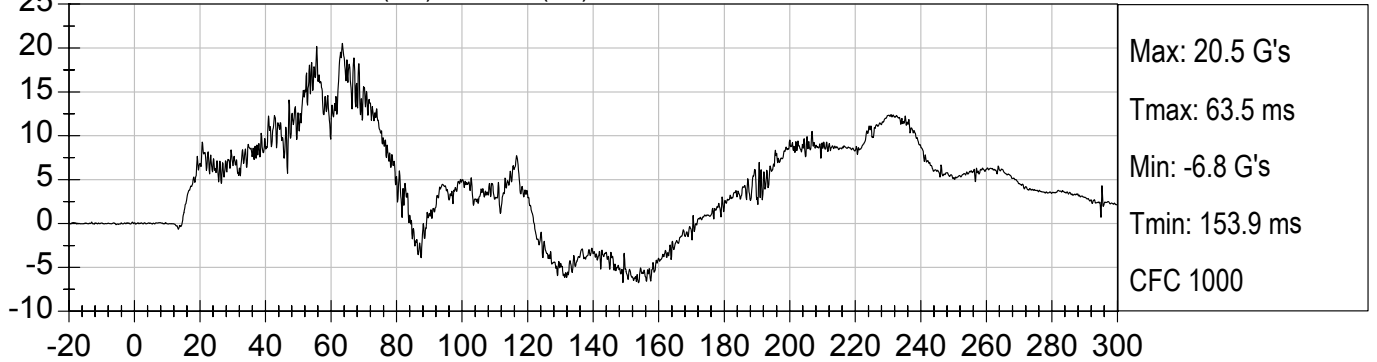
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2005 TOYOTA COROLLA (M55108)

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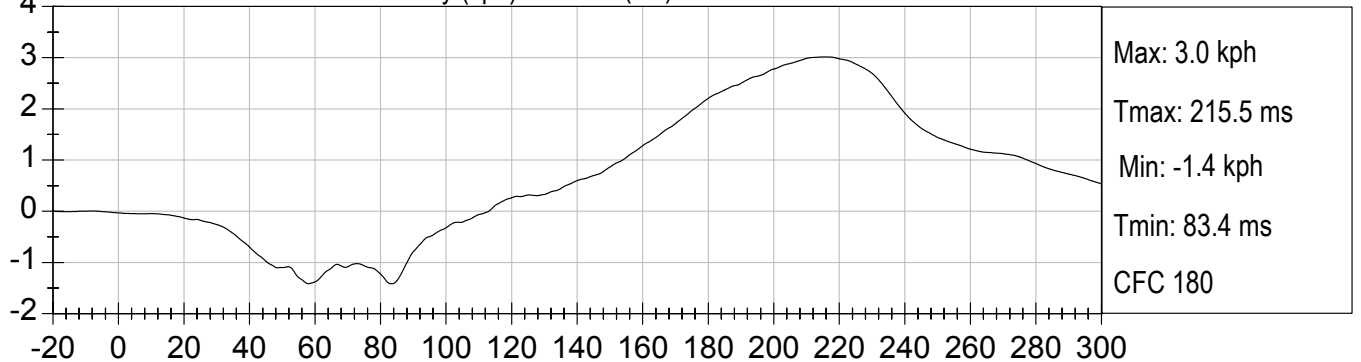
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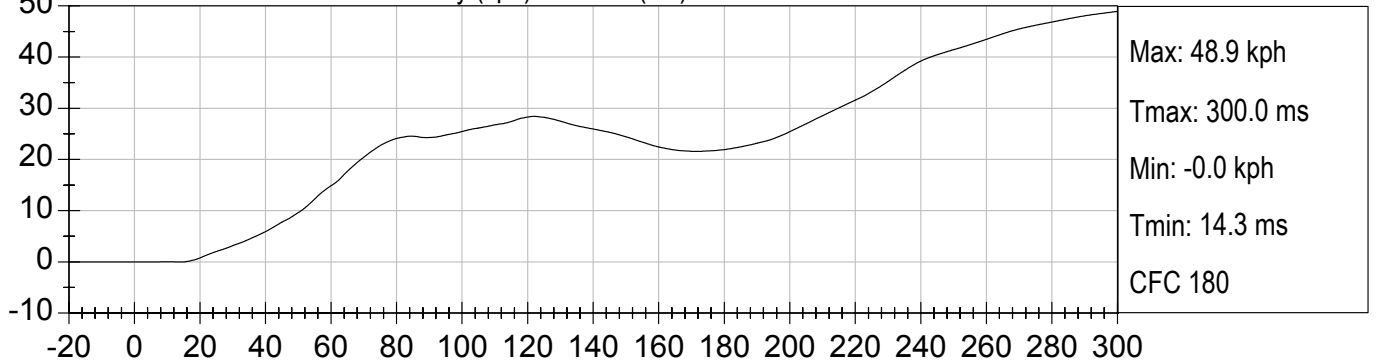
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DRIVER HEAD Y - FRONT Velocity (kph) vs TIME (ms)



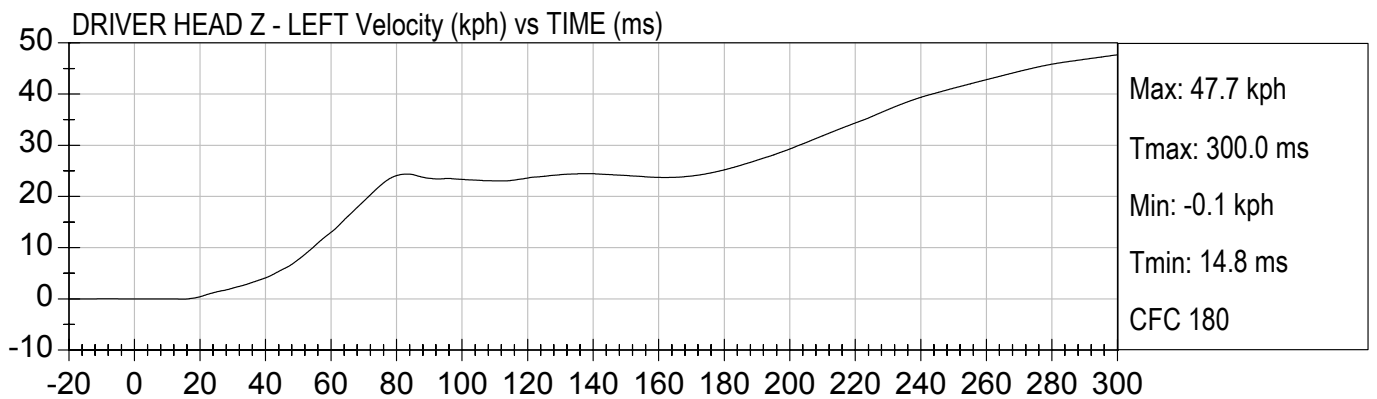
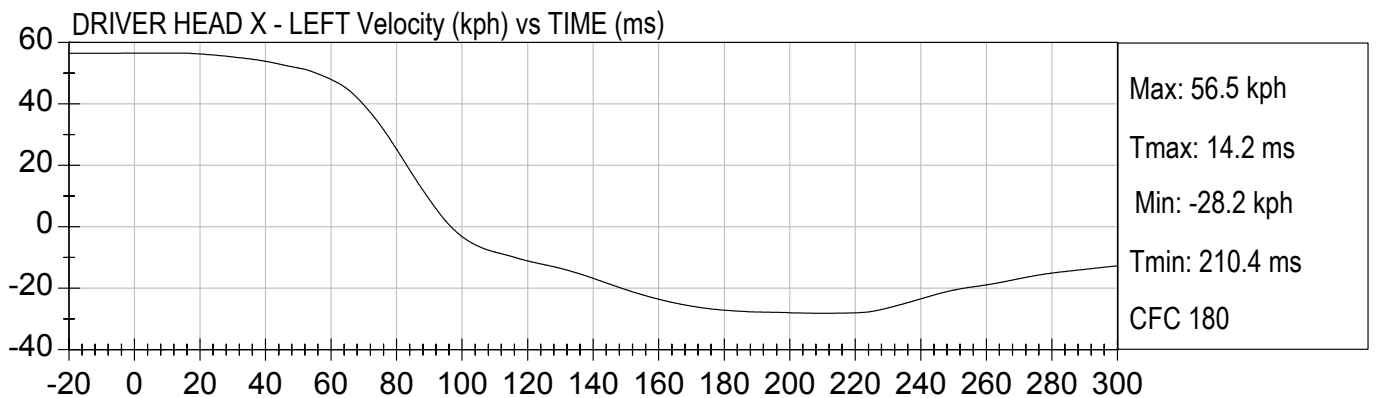
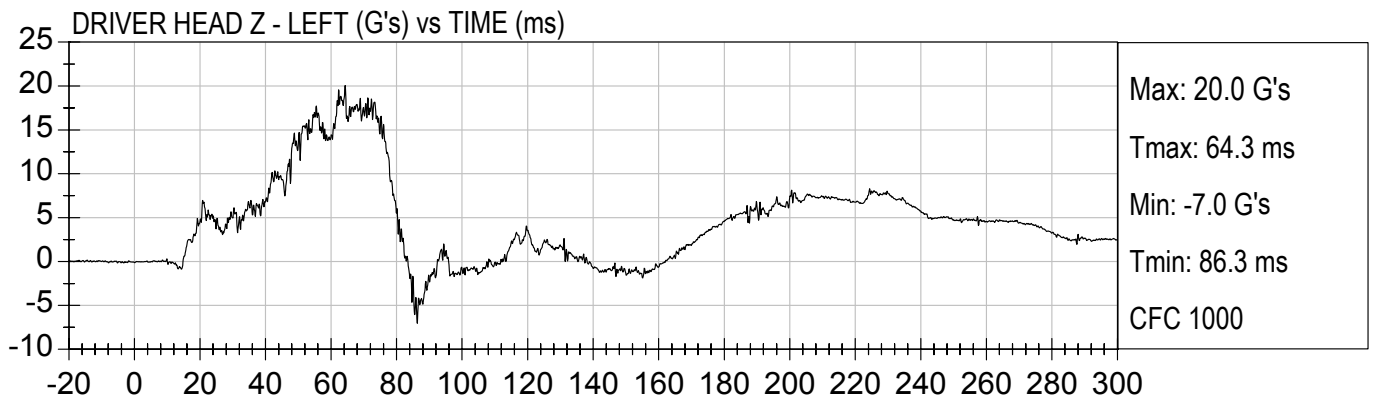
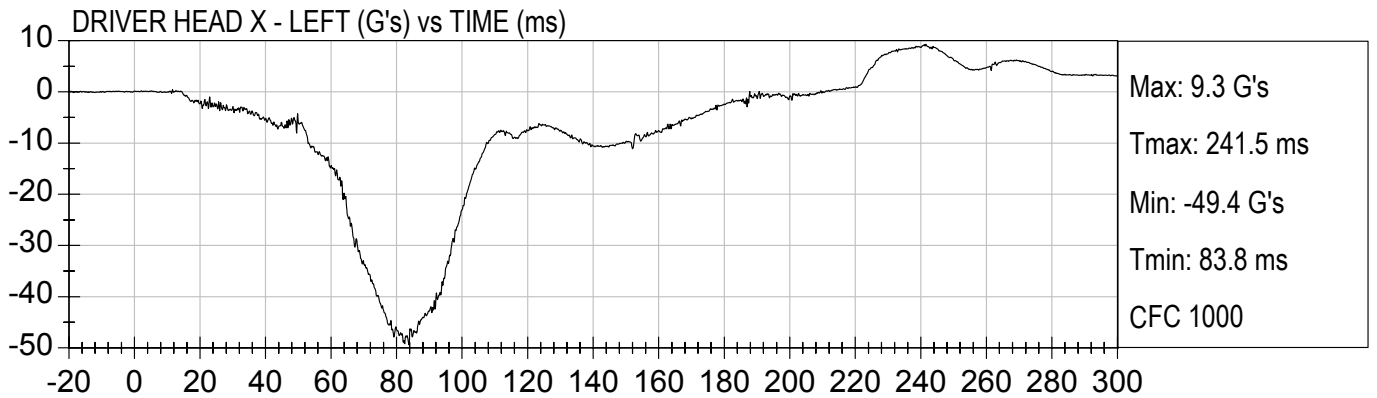
DRIVER HEAD Z - FRONT Velocity (kph) vs TIME (ms)





35MPH NCAP FRONTAL
2005 TOYOTA COROLLA (M55108)

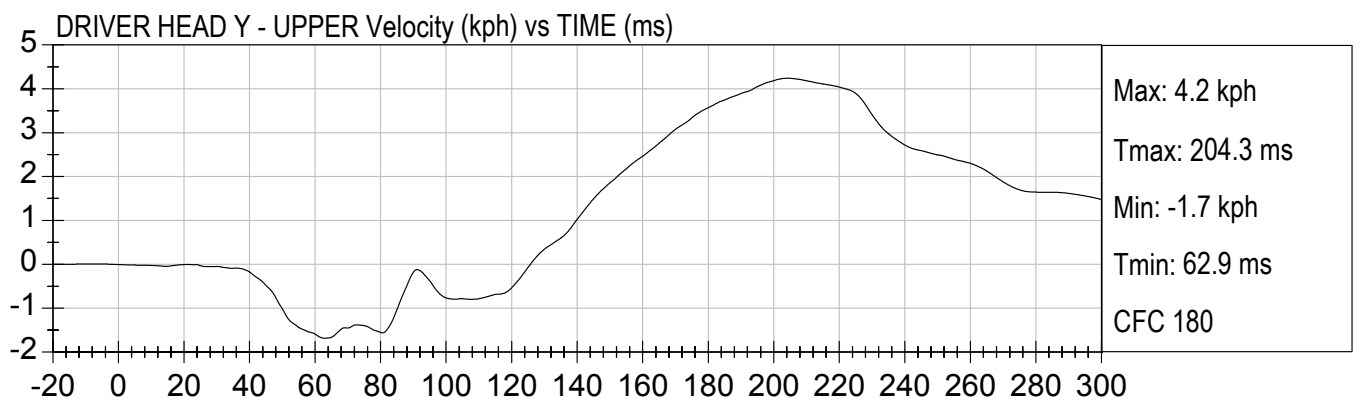
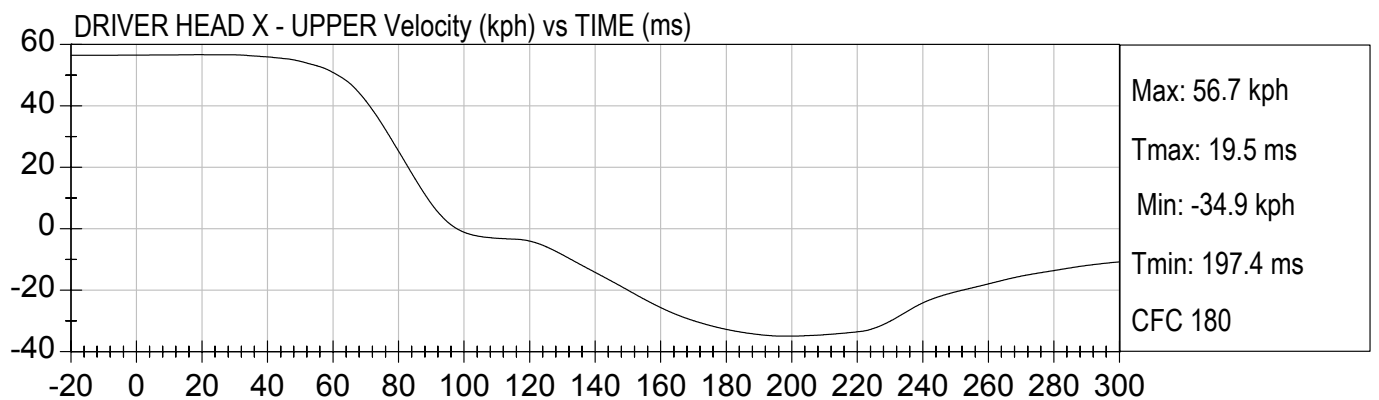
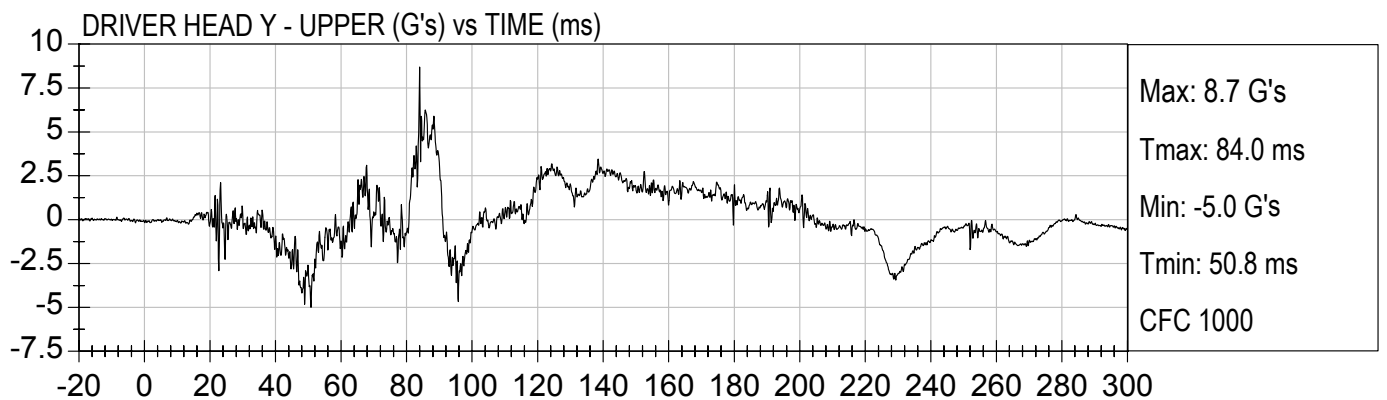
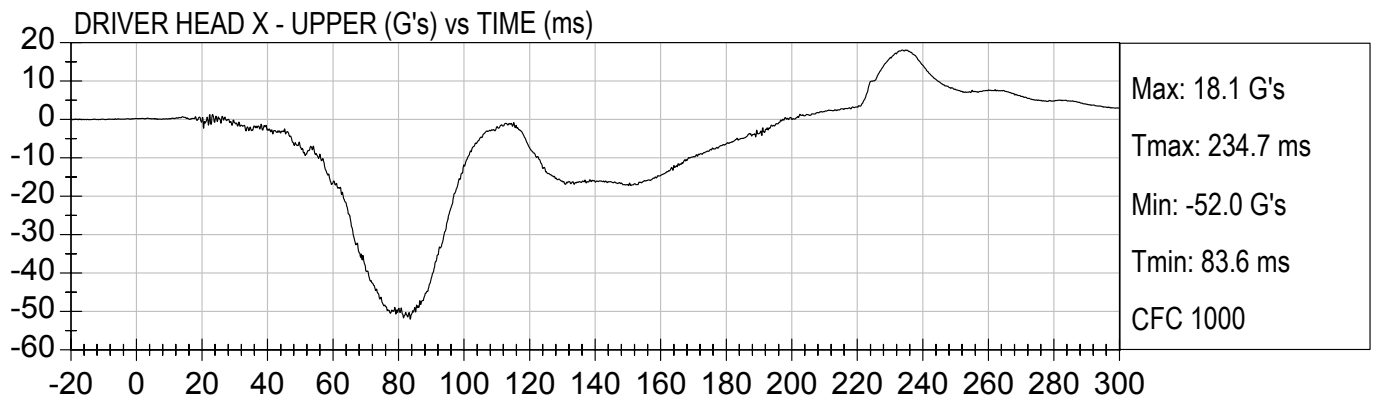
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35MPH NCAP FRONTAL
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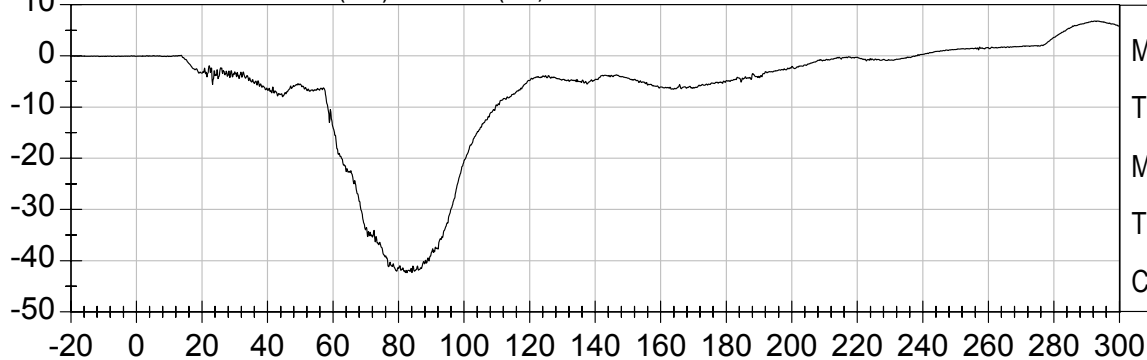




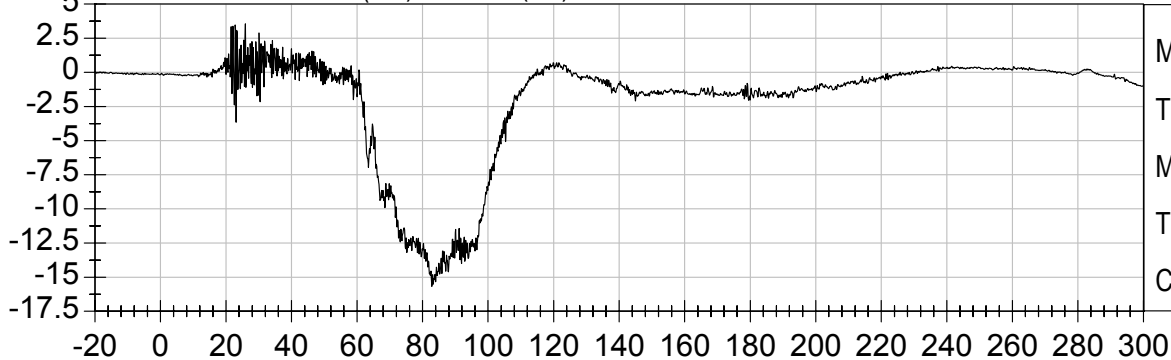
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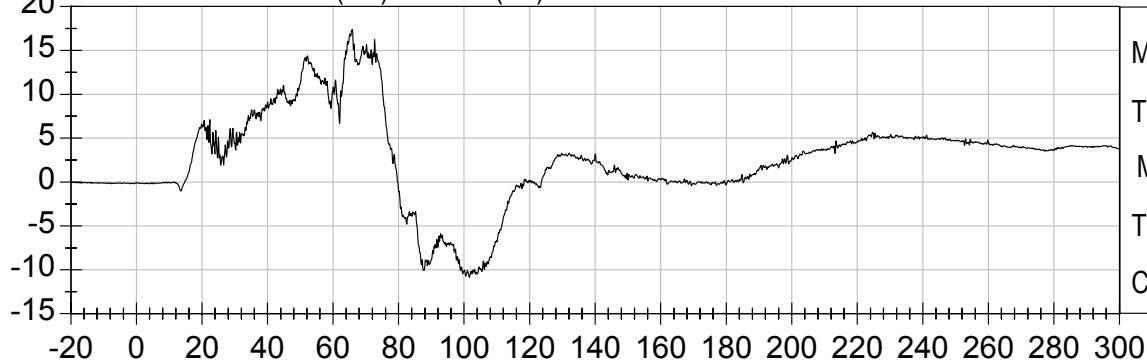
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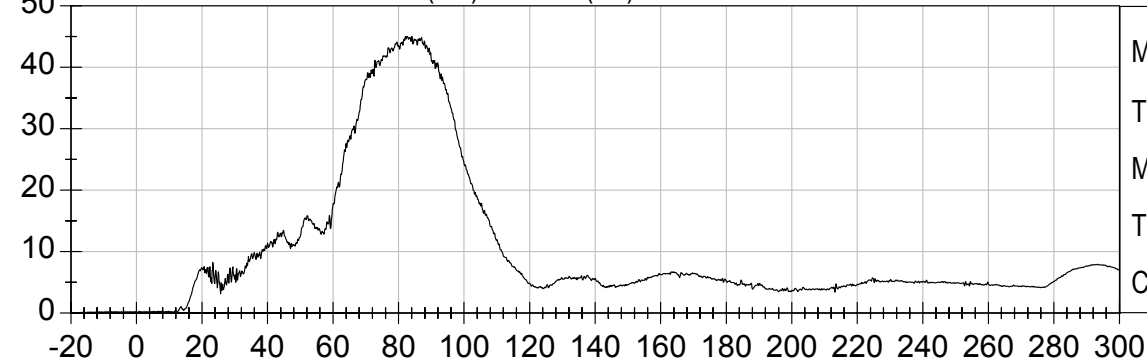
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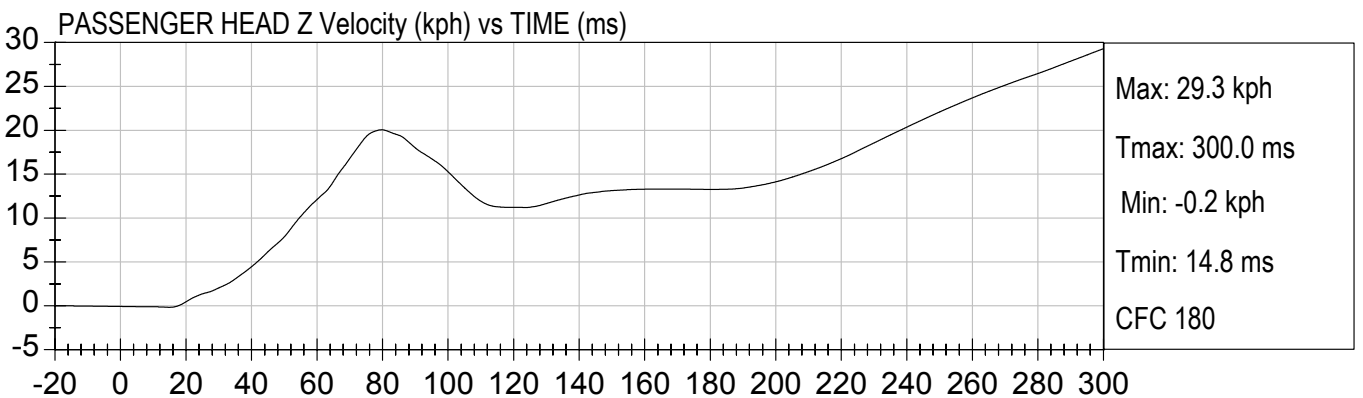
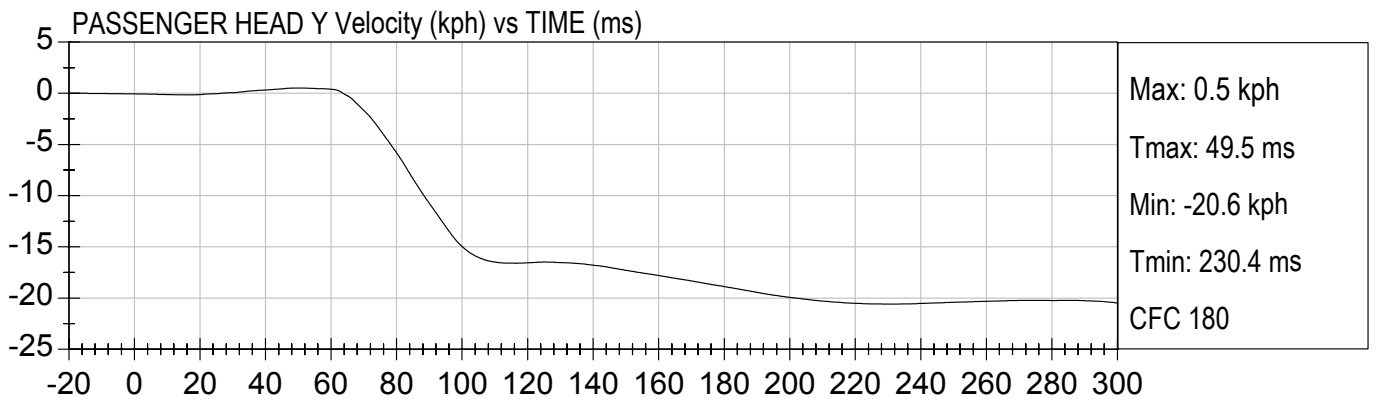
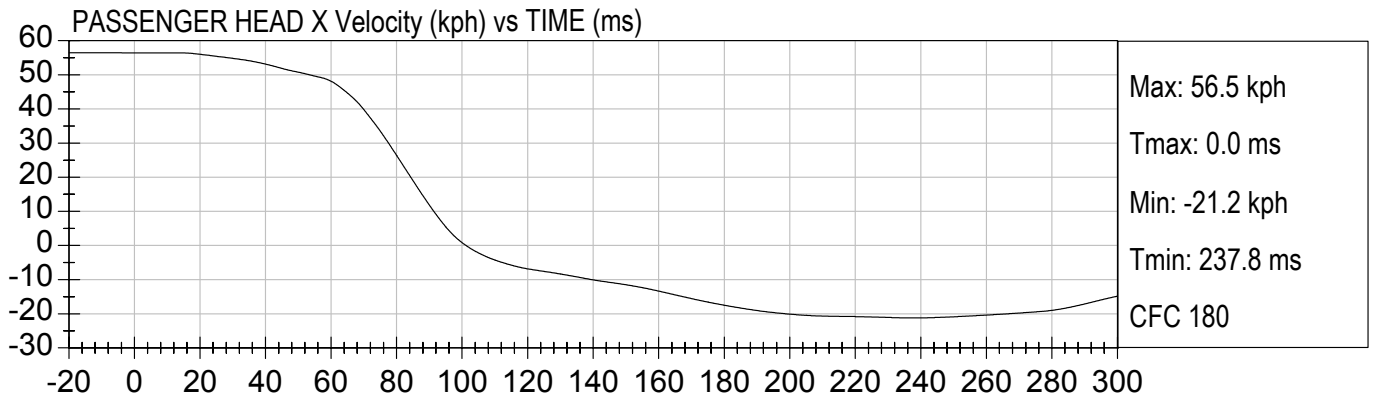


PASSENGER HEAD Z (G's) vs TIME (ms)



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



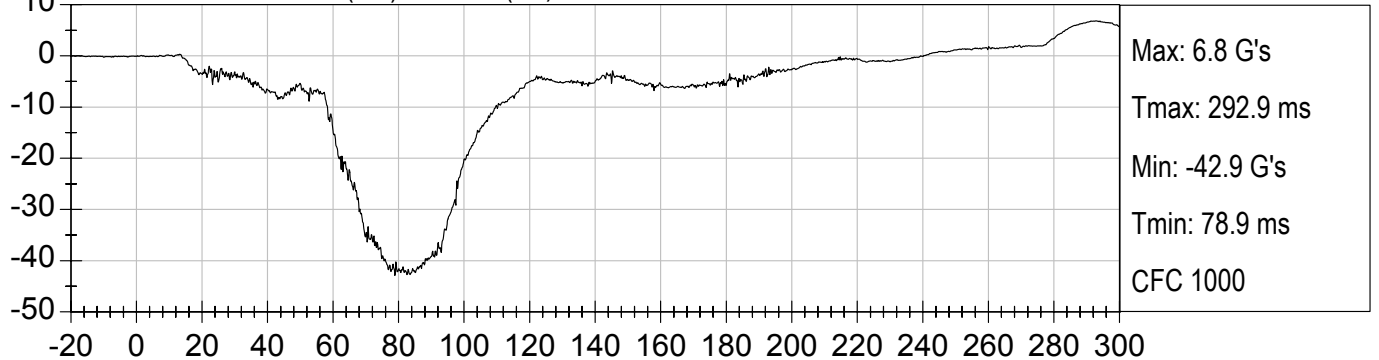




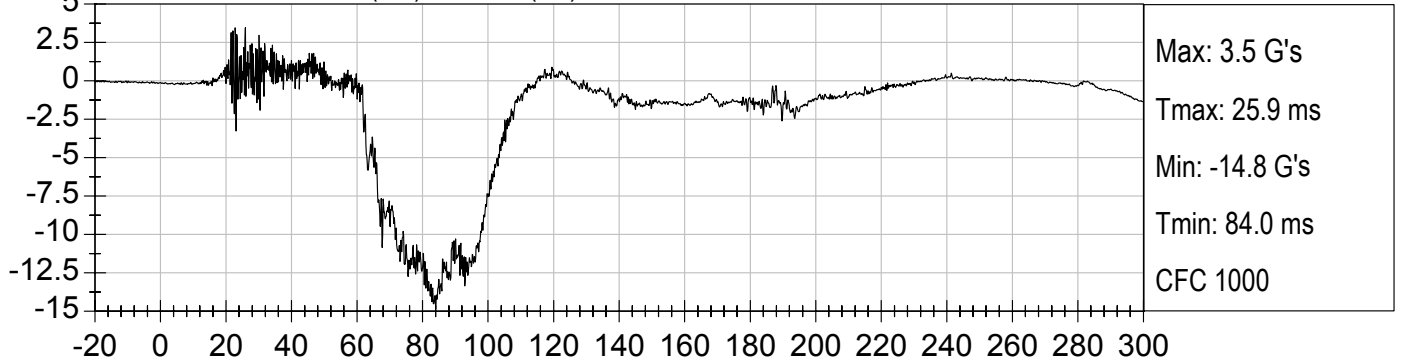
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2005 TOYOTA COROLLA (M55108)

Test Date: 09/17/04
Speed: 35.1 mph (56.5 km/h)

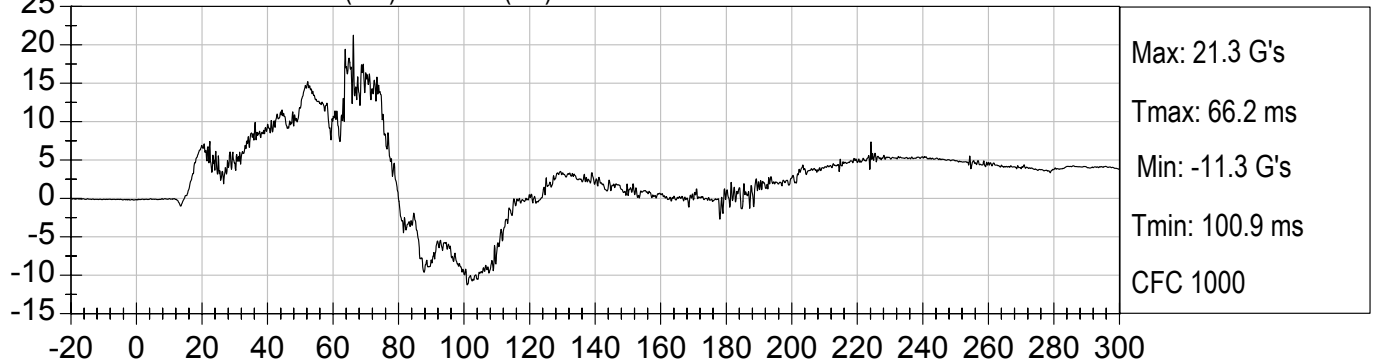
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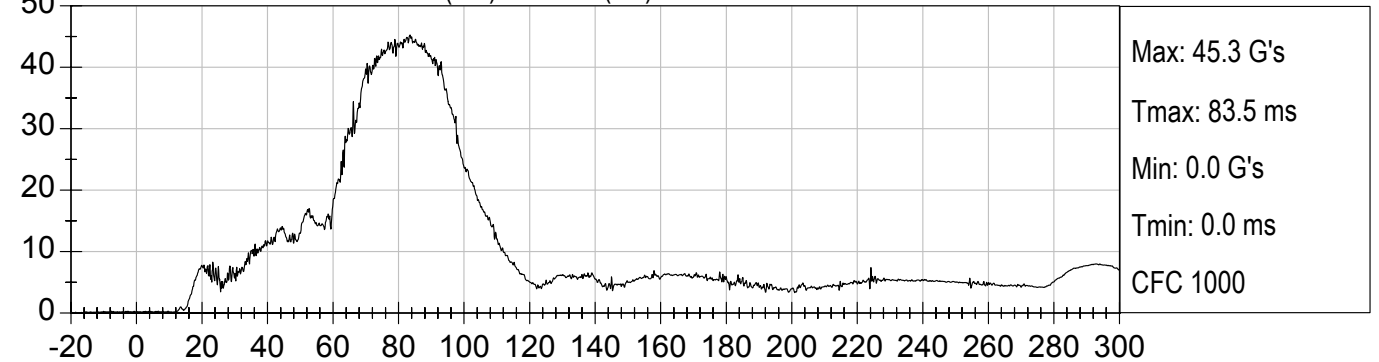
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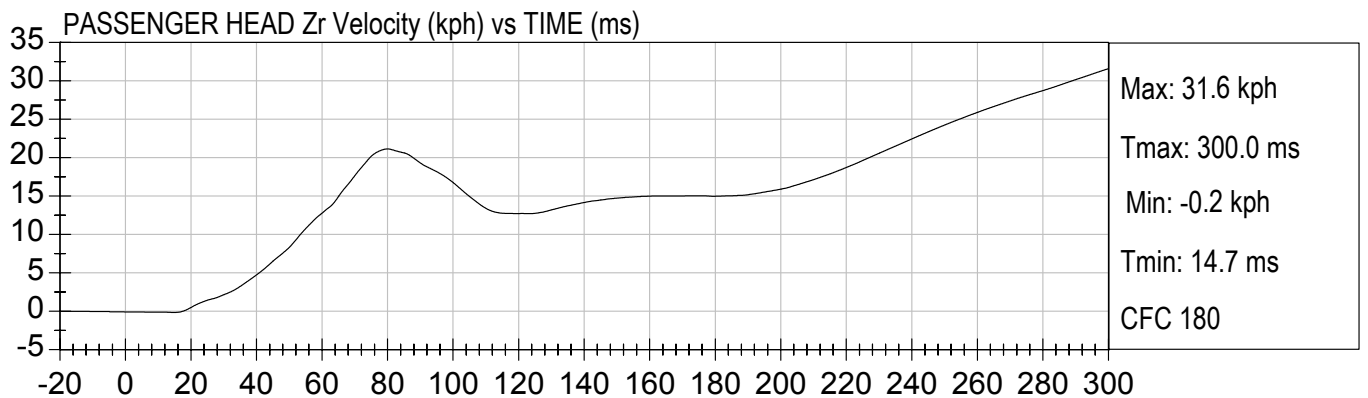
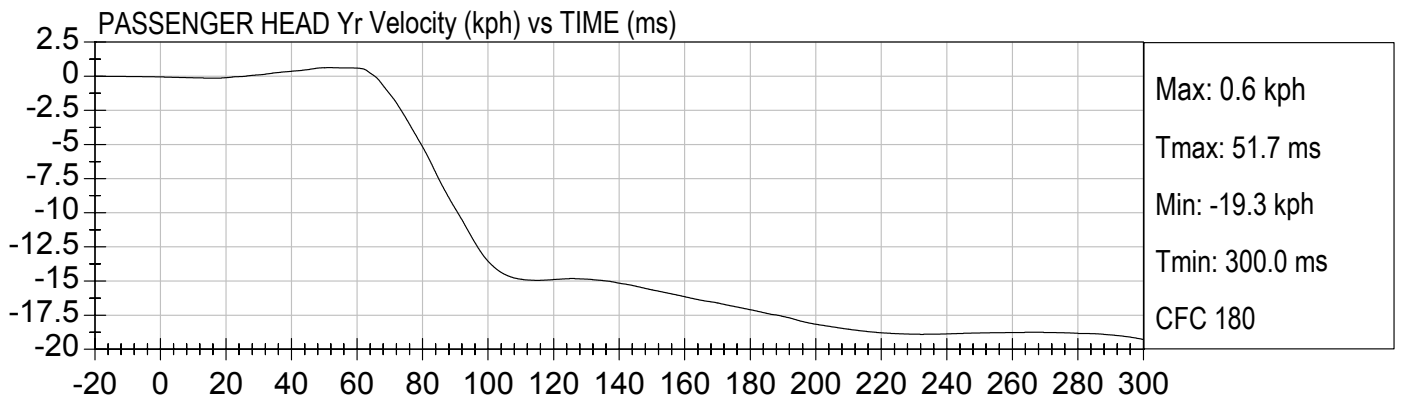
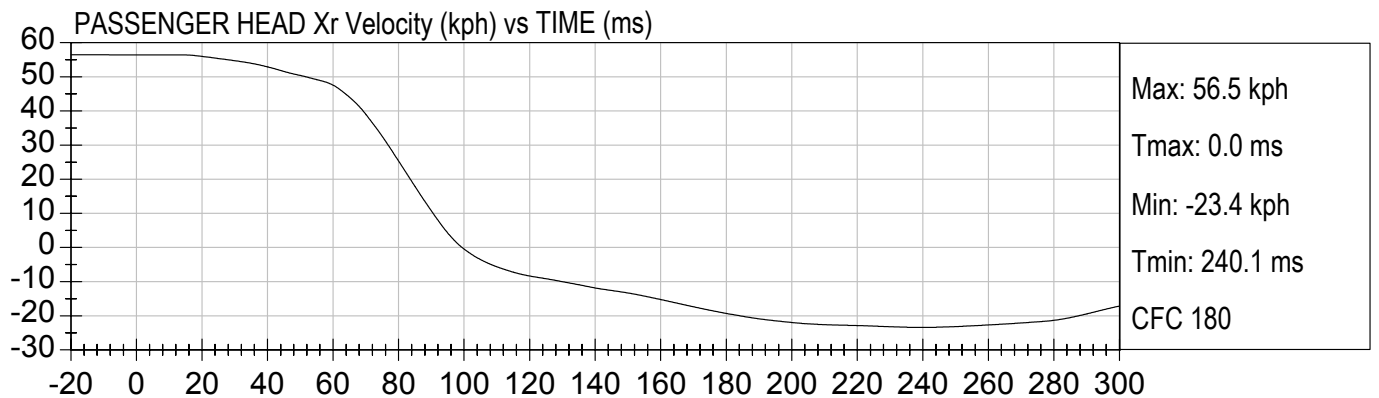


PASSENGER HEAD Zr (G's) vs TIME (ms)



PASSENGER HEAD ResultantR (G's) vs TIME (ms)

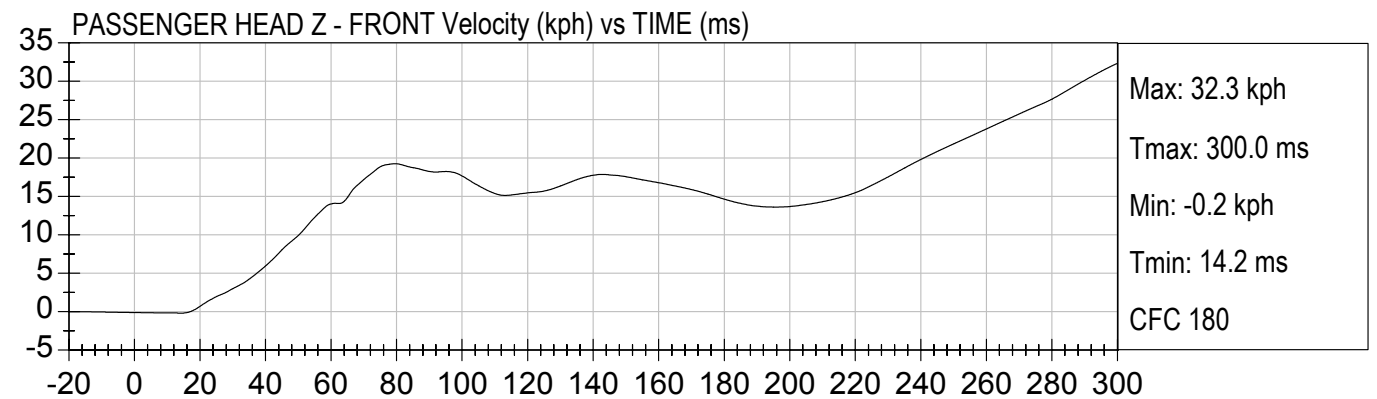
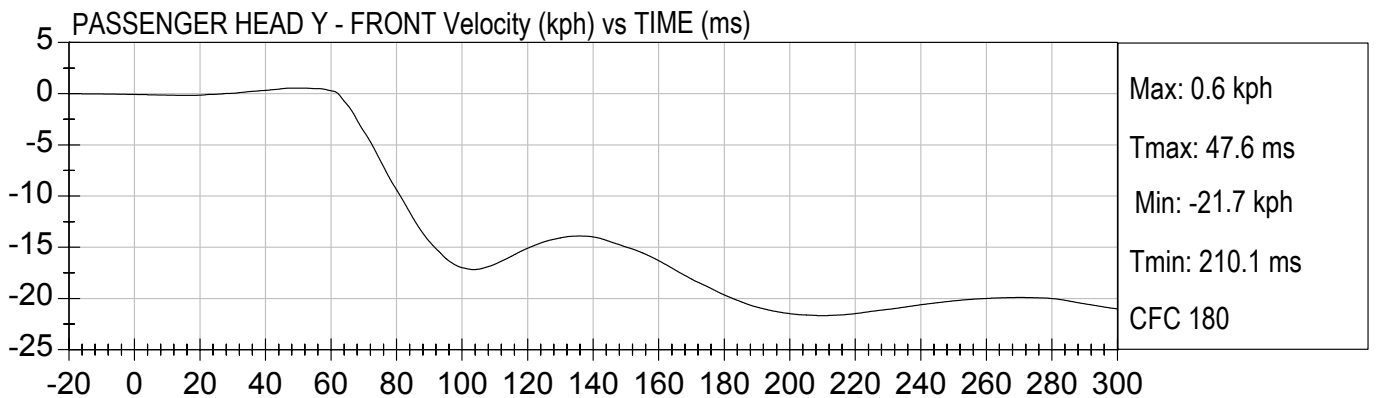
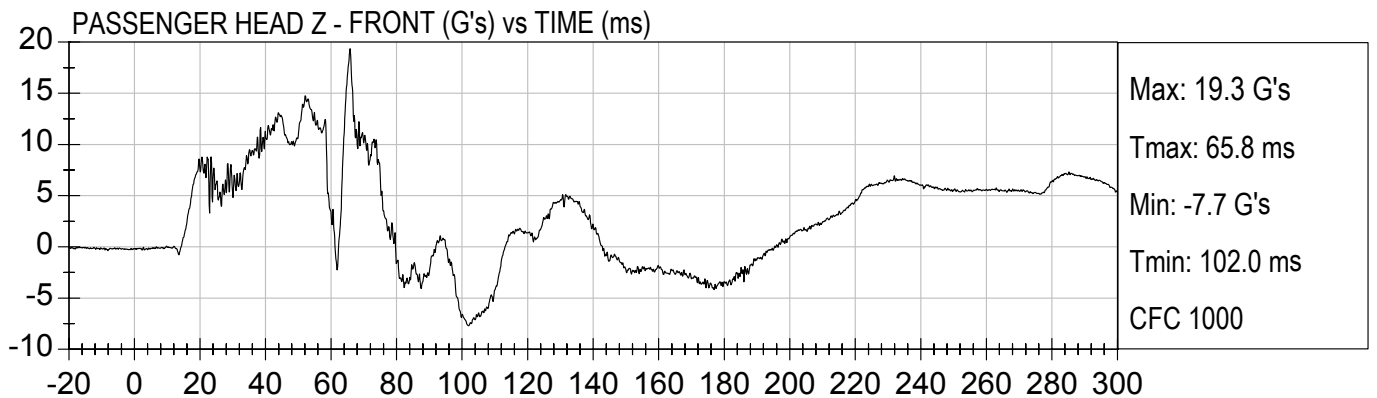
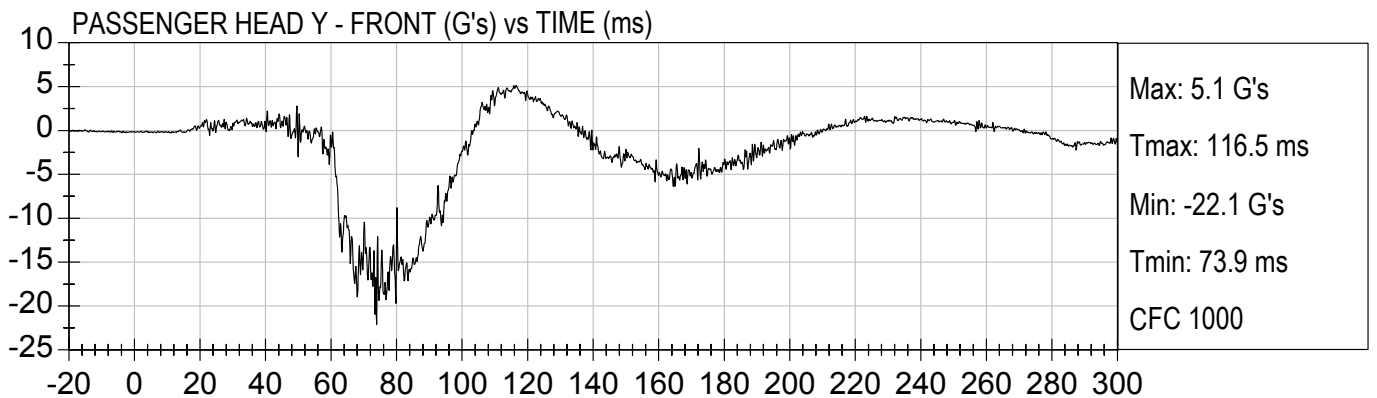






35MPH NCAP FRONTAL
2005 TOYOTA COROLLA (M55108)

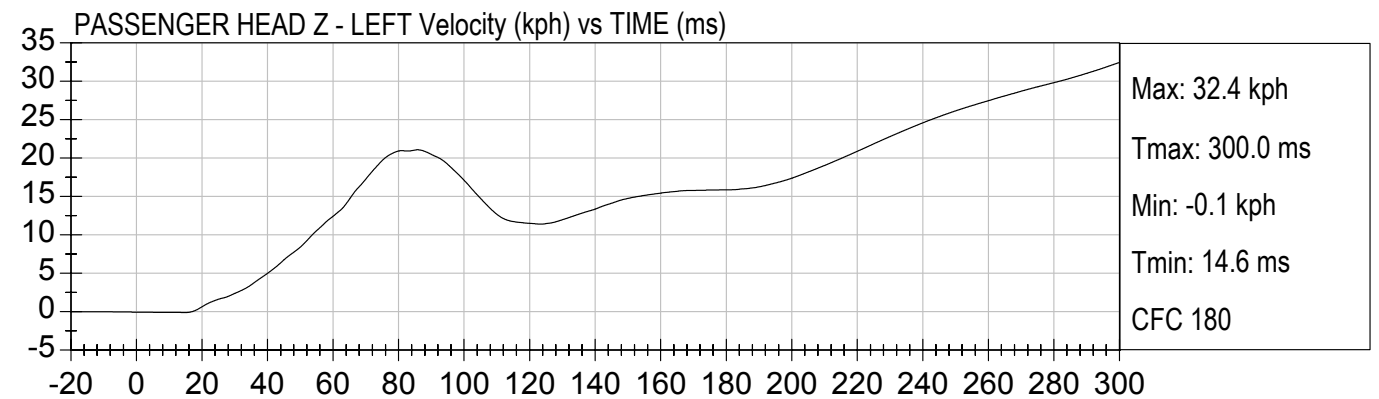
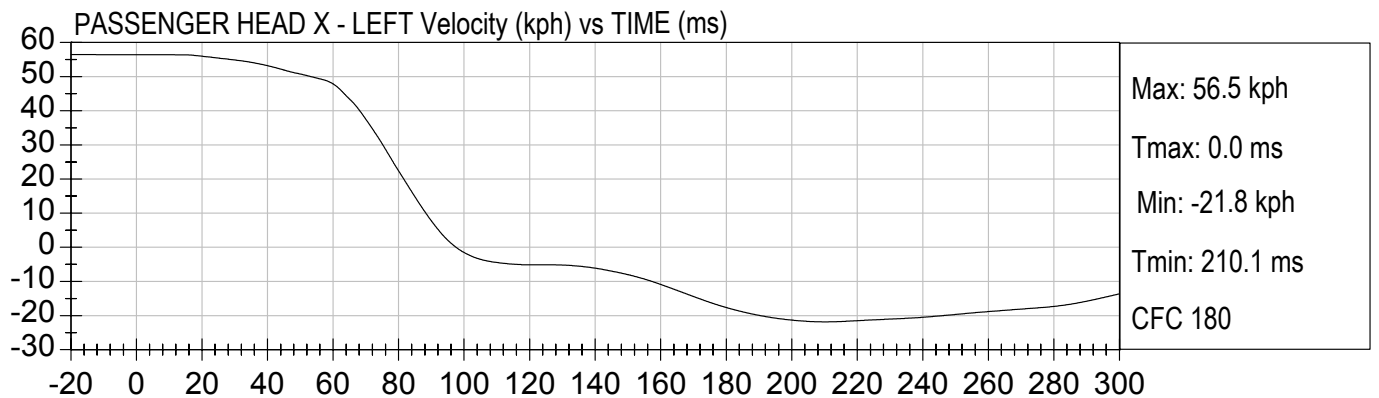
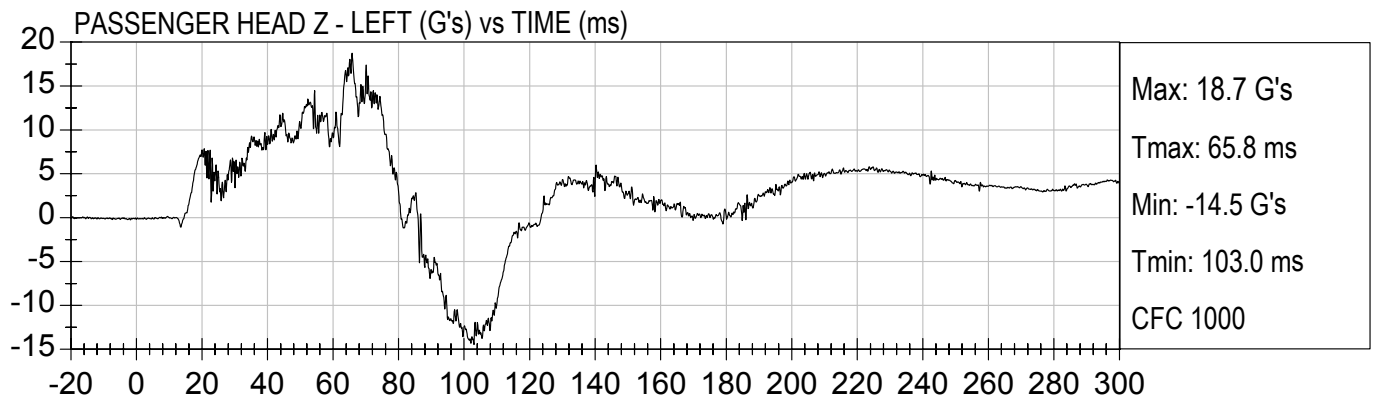
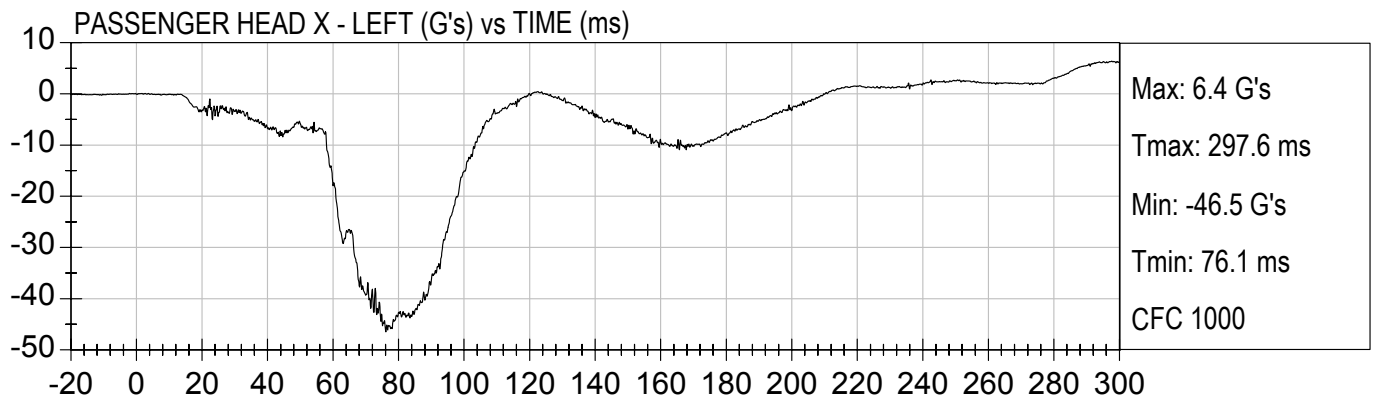
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35MPH NCAP FRONTAL
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Test Date: 09/17/04
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