

REPORT NUMBER: NCAP-MGA-2002-002

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

**2002 BUICK RENDEZVOUS 4 DOOR
NHTSA NUMBER: M20100**

**PREPARED BY:
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BURLINGTON, WI 53105**



Test Date: January 22, 2002

Report Date: January 29, 2002

FINAL REPORT

**PREPARED FOR:
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NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
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WASHINGTON, D.C. 20590**

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

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Date of Acceptance

COTR, NCAP Frontal Impact Program

Date of Acceptance

Technical Report Documentation Page

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16. Abstract A 35 mph (56.3 km/h) frontal barrier impact was conducted on a 2002 Buick Rendezvous 4 door at MGA Research Corporation on January 22, 2002. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The impact velocity was 56.6 km/h. The ambient temperature at the barrier face at the time of impact was 21 degrees Celsius. The vehicle's maximum post test static crush is 451 mm located to the left of the vehicle centerline. The test vehicle is equipped with a 3-point continuous belt system and an airbag in both front outboard seating positions. With respect to FMVSS 208 "Occupant Crash Protection", the occupant injury criteria summary is as follows: <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="text-align: left;"><u>Measurement Description</u></th> <th style="text-align: left;"><u>Units</u></th> <th style="text-align: left;"><u>Threshold</u></th> <th style="text-align: left;"><u>Driver ATD</u></th> <th style="text-align: left;"><u>Pass. ATD</u></th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC)</td> <td>N/A</td> <td>1000</td> <td>788</td> <td>941</td> </tr> <tr> <td>Max. Thorax Accel. (3msec Clip)</td> <td>G's</td> <td>60</td> <td>56</td> <td>53</td> </tr> <tr> <td>Left Femur force</td> <td>Newtons</td> <td>10009</td> <td>6158</td> <td>6588</td> </tr> <tr> <td>Right Femur force</td> <td>Newtons</td> <td>10009</td> <td>5712</td> <td>7488</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	788	941	Max. Thorax Accel. (3msec Clip)	G's	60	56	53	Left Femur force	Newtons	10009	6158	6588	Right Femur force	Newtons	10009	5712	7488
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17. Key Words 56.3 km/h NCAP Frontal Barrier Impact Test New Car Assessment Program (NCAP) 2002/Buick/Rendezvous/4 door NHTSA No: M20100		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration. Technical Ref. Division, Room 5108 (NAD-52) 400 Seventh Street, S.W. Washington, D.C. 20590																										
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SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

This 56.6 kph frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under contract number DTNH22-01-D-12005. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact in excess of the current 48.3 kph requirements.

SUMMARY

A load cell barrier consisting of 30 load cells was impacted by a 2002 Buick Rendezvous 4 door at a velocity of 56.6 kph. The test was performed at MGA Research Corporation on January 22, 2002. Pre-and post-test photographs of the vehicle and dummies can be found in Appendix A.

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

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

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

The 115 channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

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

The maximum static crush of the vehicle was 451 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's head, chest, and abdomen contacted the airbag. The back of head contacted the headrest. The driver's knees contacted the knee bolster. The passenger's head, chest, and abdomen contacted the airbag. The back of 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)	Belt Spool (mm)	Belt Stretch (mm/m)
Driver	788	56	32	6158	5712	140	175
Passenger	941	53	31	6588	7488	121	*

* No valid data collected

SECTION 2
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

NHTSA No.: M20100
 Test Date: 1/22/2002

CONVERSION FACTORS USED IN THIS REPORT*

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

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

DATA SHEET NO. 1
CRASH TEST SUMMARY

Test Vehicle: 2002/Buick/Rendezvous/4 door
Test Program: NCAP

NHTSA No.: M20100
Test Date: 1/22/2002

PRIMARY IMPACT DATA

Measured Parameter	Units	Value
Velocity at Impact	km/hr	56.6
Test Weight	kg	2147.3
Average Rebound	mm	466
Maximum Static Crush	mm	451
Impact Angle	degrees	90.2

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Front Door Opening	Opened without tools	Opened without tools
Rear Door Opening	Opened without tools	Opened without tools
Seat Track Shift (mm)	14	2
Seat Back Failure	None	None

TEST DUMMY INFORMATION

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

16mm MOVIE COVERAGE

High Speed	16
Real Time	1
Total	17

Driver ATD Sensors	50
Passenger ATD Sensors	50
Belt Assessment Sensors	6
Vehicle Structure Accelerometers	9
Rigid Barrier Load Cells	6
Total	121

DATA SHEET NO. 2

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

NHTSA No.: M20100
 Test Date: 1/22/2002

TEST VEHICLE INFORMATION

Manufacturer	Buick
Model	Rendezvous
Body Style	4 door
NHTSA No.	M20100
VIN	3G5DB03E22S504023
Color	White
Delivery Date	1/3/02
Odometer Reading (mile)	198
Dealer	Zimbrick
Transmission	Automatic
Final Drive	AWD
Number of Cylinders	6
Engine Displacement (L)	3.4
Engine Placement	transverse

TEST VEHICLE OPTIONS

Driver Airbag	Yes
Passenger Airbag	Yes
Power Windows	Yes
Power Steering	Yes
Power Door Locks	Yes
Tilt Wheel	Yes
Air Conditioning	Yes
Power Brakes	Yes
Disc Brakes, Front	Yes
Disc Brakes, Rear	Yes
Anti-lock Brakes	Yes
AM/FM/Cassette	Yes
Anti-theft System	Yes
Cruise Control	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors of Mexico	GVWR (kg)	2470
Date of Manufacture	4/01	GAWR Front (kg)	1260
		GAWR Rear (kg)	1230

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	240	240
Cold Pressure (kPa)	240	240
Recommended Tire Size	P215/70R16	P215/70R16
Tire Size on Vehicle	P215/70R16	P215/70R16
Tire Manufacturer	Firestone	Firestone

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Number Of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				607.4
Cargo Wt. (RCLW) (kg)				136.1

DATA SHEET NO. 2...(continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

NHTSA No.: M20100
 Test Date: 1/22/2002

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	543.4	383.7		602.8	469.0	
Right	kg	551.1	384.2		605.6	469.9	
Ratio	%	58.8	41.2		56.3	43.7	
Totals	kg	1094.5	767.9	1862.4	1208.4	938.9	2147.3

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1862.4
Weight of 2 P572E ATDs	kg	156.0
Rated Cargo/Luggage Weight (RCLW)	kg	136.1
Calculated Vehicle Target Weight (TVTW)	kg	2154.5

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG(aft of front axle)
As Delivered	mm	768	769	802	802	1177
As Tested	mm	754	757	784	781	1248
Post Test	mm	887	814	794	758	

Vehicle Wheelbase (mm): 2854

Weight of Ballast secured in cargo area (kg): 83.9

Vehicle Components Removed:

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

FUEL SYSTEM DATA

Fuel System Capacity From Owner's Manual (L): 68.1

Usable Capacity Figure Furnished by COTR (L): 68.1

Actual Test Volume (L): 65.1

Test Fluid Type: Stoddard Solvent ; Specific Gravity: 0.77

Is Vehicle Fuel Pump Electric or Mechanical? electric

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

DATA SHEET NO. 3
POST IMPACT DATA

Test Vehicle: 2002/Buick/Rendezvous/4 door
Test Program: NCAP

NHTSA No.: M20100
Test Date: 1/22/2002

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	55.5 – 57.1	56.6
Trap No. 1 Entry Distance	mm	<1524	1300
Trap No. 1 Exit Distance	mm	<1524	300
Trap No. 2 Velocity (Redundant)	km/h	55.5 – 57.1	56.5
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	4534	4141	393
Center	mm	4676	4240	436
Right Side	mm	4541	4145	396

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	613
Center	mm	385
Right Side	mm	400
Average	mm	466

DATA SHEET NO. 4
TEST VEHICLE INFORMATION

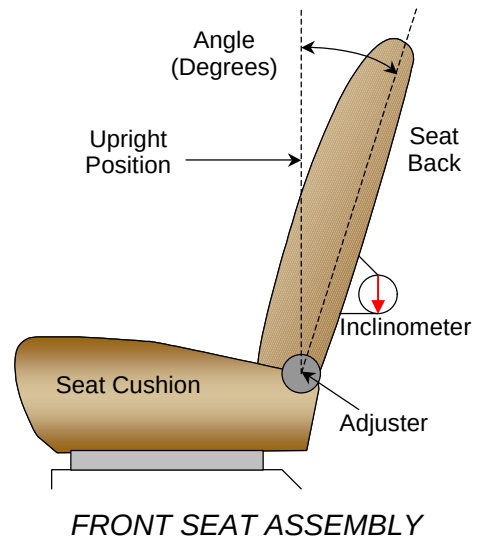
Test Vehicle: 2002/Buick/Rendezvous/4 door
Test Program: NCAP

NHTSA No.: M20100
Test Date: 1/22/2002

NORMAL DESIGN RIDING POSITION

The driver and passenger seat back is positioned to the manufacturer's designated angle. The procedure is as follows: The seat back angle is 20.5 degrees measured within 200 mm of the top of the seat back on a flat outboard surface.

Driver seat back angle: 20.5 degrees
Passenger seat back angle: 20.3 degrees



SEAT FORE/AFT POSITIONS

The driver and passenger seats are manually operated. The total travel on the driver and passenger seats is 17 positions. The fore/aft position is set at the middle position for both driver and passenger.

Driver seat fore/aft total travel: 17 seat positions
Passenger seat fore/aft total travel: 17 seat positions
Driver seat fore/aft position: 9th position, 1st as one
Passenger seat fore/aft position: 9th position, 1st as one

SEAT BELT UPPER ANCHORAGE

The D ring is placed in the third of 5 positions, top as 1.

DATA SHEET NO. 4...(continued)
TEST VEHICLE INFORMATION

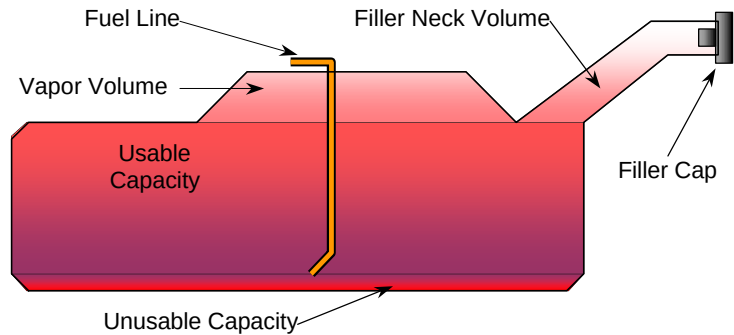
Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

NHTSA No.: M20100
 Test Date: 1/22/2002

FUEL TANK CAPACITY DATA

The "Usable Capacity" of the standard equipment fuel tank is: 68.1 liters
 The "Usable Capacity" of any optional equipment fuel tank is: n/a liters
 The "Usable Capacity" used for certification to FMVSS 301 requirements: 68.1 liters
 Actual amount of Stoddard solvent added to vehicle for certification test: 65.1 liters

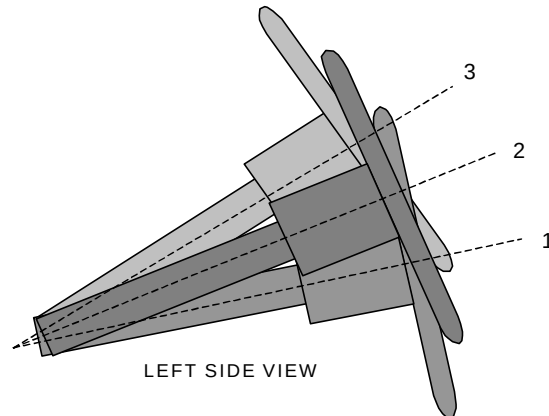
The test vehicle is equipped with an electric fuel pump. With the ignition on, the fuel pump will operate for 3 seconds and stop. With the engine running, the pump will run continuously. The fuel filler door is located on the left rear fender.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

There are 7 detents with the top detent as "1". Set the wheel to the 4th detent. Place an inclinometer along the shaft of the steering column to measure the steering column angle. The inclinometer should read 28 degrees.



STEERING COLUMN ASSEMBLY

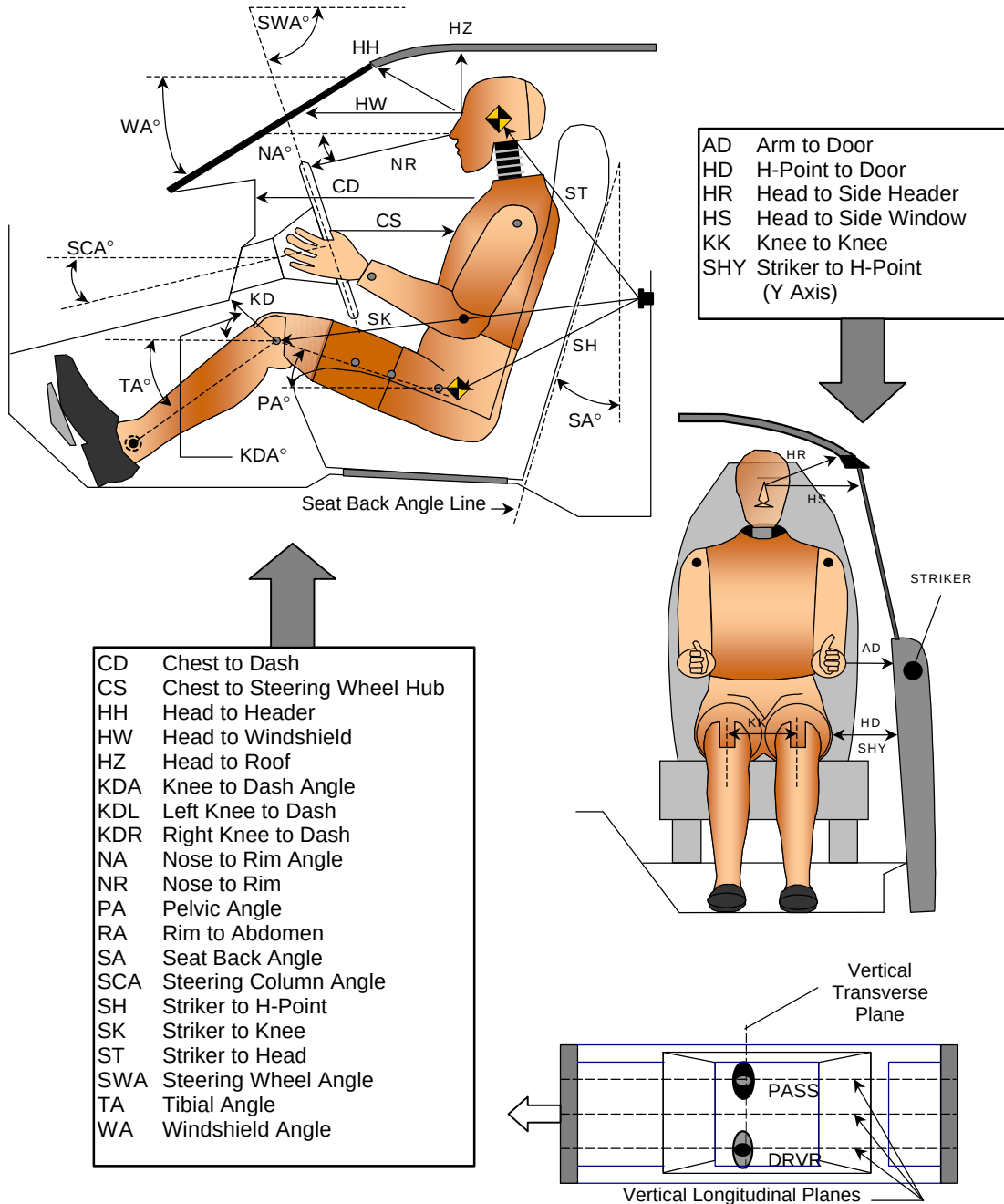
Lowermost, position 1: 17.2
 Geometric center, position 2: 27.0
 Uppermost, position 3: 37.2

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

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

NHTSA No.: M20100
 Test Date: 1/22/2002

DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS



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

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

NHTSA No.: M20100
 Test Date: 1/22/2002

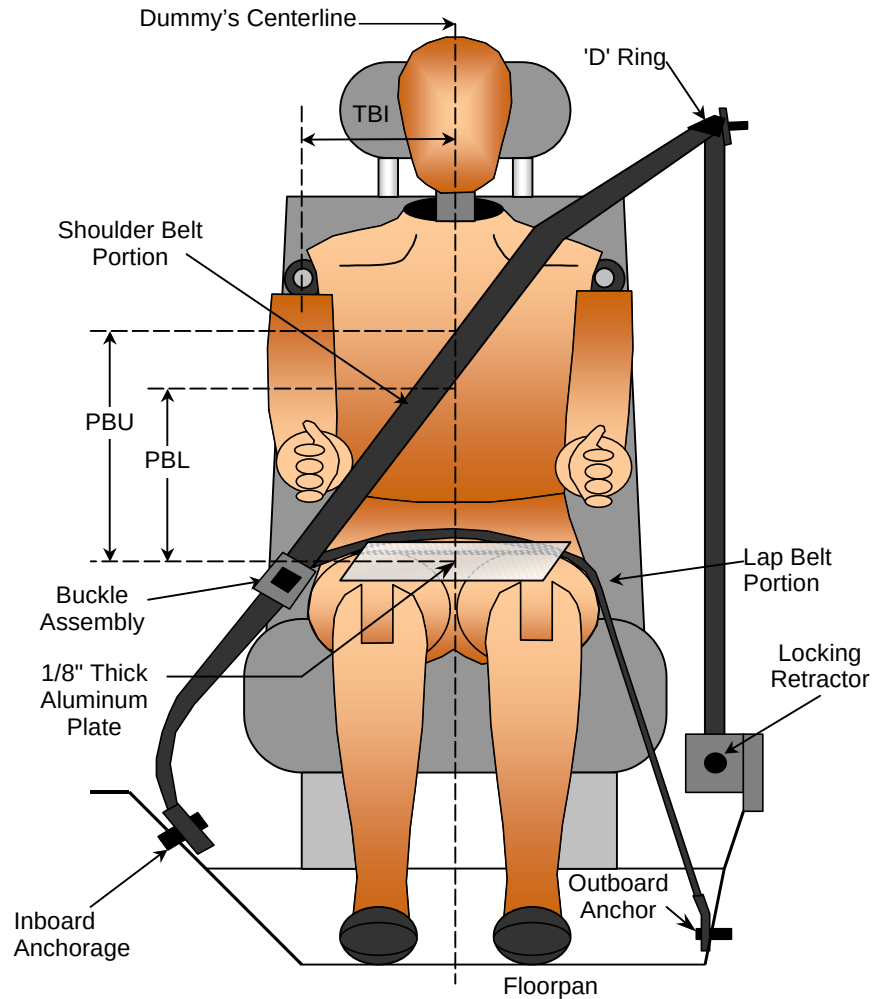
TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA	Windshield Angle		32.5		
SWA	Steering Wheel Angle		63.0		
SCA	Steering Column Angle		28.8		
SA	Seat Back Angle		20.5		20.3
HZ	Head to Roof (Z)	219	90.0	230	90.0
HH	Head to Header	449	15.1	440	16.9
HW	Head to Windshield	649	0.0	663	0.0
HR	Head to Side Header (Y)	200		243	
NR	Nose to Rim	422	15.6		
CD	Chest to Dash	581		514	
CS	Chest to Steering Hub	340	12.7		
RA	Rim to Abdomen	191	0.0		
KDL	Left Knee to Dash	204	0.0	152	
KDR	Right Knee to Dash	159		166	0.0
PA	Pelvic Angle		24.1		23.9
TA	Tibia Angle		49.0		52.8
KK	Knee to Knee (Y)	270		268	
SK	Striker to Knee	611	89.8	637	89.5
ST	Striker to Head	635	8.4	627	9.2
SH	Striker to H-Point	185	93.6	211	100.9
SHY	Striker to H-Point (Y)	268		252	
HS	Head to Side Window	354		349	
HD	H-Point to Door (Y)	189		176	
AD	Arm to Door (Y)	100		109	
AA	Ankle to Ankle	263		220	

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

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

NHTSA No.: M20100
 Test Date: 1/22/2002



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	342	334
PBL - To surface of reference to belt lower edge	mm	254	246

DATA SHEET NO. 7

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

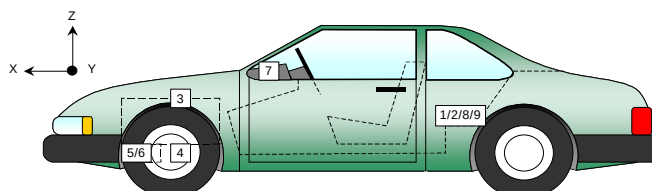
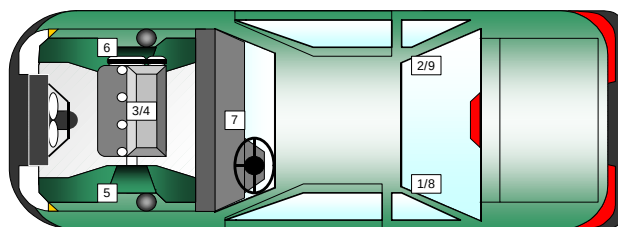
NHTSA No.: M20100
 Test Date: 1/22/2002

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	1925	-495	455	G's	5.8	200	36.4	51
2	Right Rear X-Member X	1925	495	455	G's	3.4	200	35.0	49
3	Engine Top X	4055	-35	820	G's	31.4	62	131.6	27
4	Engine Bottom X	3665	100	185	G's	53.7	42	127.2	34
5	Left Brake Caliper X	3875	-705	270	G's	47.9	60	108.0	44
6	Right Brake Caliper X	3865	705	270	G's	*	*	*	*
7	Instrument Panel X	3300	0	1120	G's	33.6	28	68.3	36
8	Left Rear X-Member Z	1925	-495	455	G's	9.6	58	14.0	21
9	Right Rear X-Member Z	1925	495	455	G's	10.5	51	14.9	71

* No Valid Data After 55 msec.

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



DATA SHEET NO. 8
HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

NHTSA No.: M20100
 Test Date: 1/22/02

HEAD PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	13.2	189	66.3	76	6.2	200	83.9	83
Head CG	Y	G's	1.3	44	14.4	87	8.4	62	7.4	90
Head CG	Z	G's	21.7	55	9.9	101	33.8	66	5.5	112
Head CG Resultant	N/A	G's	68.8	74			86.7	83		

CHEST PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	5.4	192	61.0	84	2.5	199	53.4	72
Chest CG	Y	G's	3.0	109	12.4	84	3.9	70	5.2	97
Chest CG	Z	G's	6.4	75	7.7	103	10.8	71	4.7	114
Chest CG Resultant	N/A	G's	62.4	84			54.5	72		

FEMUR PEAK FORCES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Femur	Z	Newtons	211	173	6158	58	430	39	6588	52
Right Femur	Z	Newtons	500	46	5712	62	1281	46	7488	52

* Passenger Left Femur – No valid data after 58 msec.

SEAT BELT SENSOR PEAK VALUES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Lap Belt Force	N/A	Newtons	*	*			1648	53		
Shoulder Belt	N/A	Newtons	5023	86			5160	71		

* No valid data collected

HEAD INJURY CRITERIA (HIC)

Location	Driver				Passenger			
	HIC	Avg G's	T ¹	T ²	HIC	Avg G's	T ¹	T ²
Head CG Primary	788	57.4	59.3	90.9	941	68.8	71.9	95.9

CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Primary	56	82.7	85.7	53	71.1	74.1

DATA SHEET NO. 8... (continued)

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

NHTSA No.: M20100
 Test Date: 1/22/02

PELVIC PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Pelvis	X	G's	2.0	149	69.4	51	3.6	33	68.4	52
Pelvis	Y	G's	7.9	104	9.5	63	10.7	56	4.9	38
Pelvis	Z	G's	6.8	53	16.8	55	5.1	39	16.4	76

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Neck Force	X	Newtons	782	75	334	56	1300	71	114	46
Neck Force	Y	Newtons	277	83	197	126	170	108	339	70
Neck Force	Z	Newtons	1672	81	321	95	965	67	262	112
Neck Moment	X	N•m	15.3	91	15.6	131	15.6	66	3.0	57
Neck Moment	Y	N•m	63.5	73	27.4	119	131.9	71	16.8	128
Neck Moment	Z	N•m	20.1	93	11.8	166	16.4	121	6.3	180

FOOT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Foot Aft	X	G's	17.8	69	46.4	58	30.0	54	156.2	37
Left Foot Aft	Z	G's	35.7	84	60.9	34	13.5	75	135.1	42
Left Foot Fore	Z	G's	39.9	28	103.5	38	158.3	45	202.5	36
Right Foot Aft	X	G's	43.2	69	90.9	51	18.5	42	151.2	31
Right Foot Aft	Z	G's	15.4	69	97.8	54	15.6	81	139.0	31
Right Foot	Z	G's	142.3	60	152.5	46	337.8	36	422.2	31

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	70.7	37	33.9	35	44.9	42	53.3	45
Left Lower Moment	Y	N•m	61.9	66	22.2	80	259.4	57	81.8	37
Left Lower Force	Z	Newtons	75	72	2149	37	109	138	3040	44
Left Upper Moment	X	N•m	10.2	37	66.0	36	55.8	43	14.8	185
Left Upper Moment	Y	N•m	30.0	184	97.5	77	24.9	126	108.5	38
Left Upper Force	Z	Newtons	177	128	1658	37	111	125	2242	44
Right Lower Moment	X	N•m	28.0	50	136.7	60	40.2	54	52.4	37
Right Lower Moment	Y	N•m	162.9	61	52.8	50	502.3	53	131.3	31
Right Lower Force	Z	Newtons	478	49	1357	56	344	63	4592	38
Right Upper Moment	X	N•m	86.6	51	63.3	60	41.6	39	28.7	37
Right Upper Moment	Y	N•m	29.7	155	101.1	56	43.6	51	134.3	31
Right Upper Force	Z	Newtons	638	49	1548	61	219	108	3745	38

* Passenger Right Lower Tibia Mx – Data clipped from 49 – 53 msec.

DATA SHEET NO. 8... (continued)

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

NHTSA No.: M20100
 Test Date: 1/22/02

CHEST PEAK DISPLACEMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	mm			31.6	71			31.4	75

HEAD REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	13.2	189	65.7	71	6.6	200	84.2	82
Head CG	Y	G's	1.5	33	14.4	87	7.9	62	8.3	90
Head CG	Z	G's	21.6	55	10.0	100	34.4	66	5.2	112
Head CG	N/A	G's	68.6	71			86.9	82		

CHEST REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	5.3	192	60.4	84	2.5	200	53.5	72
Chest CG	Y	G's	3.9	103	10.8	84	4.5	72	5.0	97
Chest CG	Z	G's	6.4	75	7.4	103	10.8	71	4.9	114
Chest CG	N/A	G's	61.5	84			54.5	72		

REDUNDANT HEAD INJURY CRITERIA (HIC)

Location	Driver				Passenger			
	HIC	Avg G's	T ¹	T ²	HIC	Avg G's	T ¹	T ²
Head CG Redundant	745	56.1	59.2	90.8	921	68.5	71.9	95.6

REDUNDANT CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Redundant	55	82.6	85.6	53	70.9	73.9

DATA SHEET NO. 9
SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

NHTSA No.: M20100
 Test Date: 1/22/2002

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	342	334
PBL - Top surface of reference to belt lower edge	mm	254	246

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Retractor reel to "D" ring	mm	793	793
Shoulder belt length as measured on ATD	mm	886	900
Lap belt length as measured on ATD	mm	908	896
Remainder of belt on reel	mm	443	441
Total belt length for continuous webbing systems	mm	3030	3030

SHOULDER BELT SPOOL-OUT DATA

Measurement Description	Units	Driver	Passenger
As determined by film analysis	mm	140	121

BELT STRETCH DATA

Measurement Description	Units	Driver	Passenger
As determined electronically	mm/m	175	*

* No valid data collected

DATA SHEET NO. 10
SUMMARY OF FMVSS 212 DATA

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

NHTSA No.: M20100
 Test Date: 1/22/2002

Windshield Mounting Details:

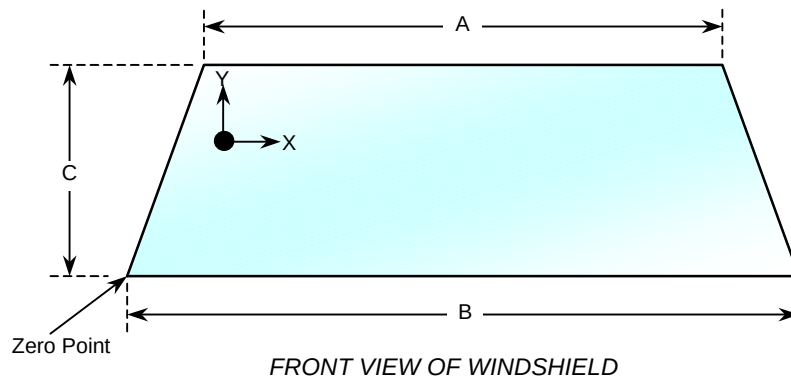
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

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	2345	2345	100
Right Side	2340	2340	100
Total	4685	4685	100



WINDSHIELD DIMENSIONS

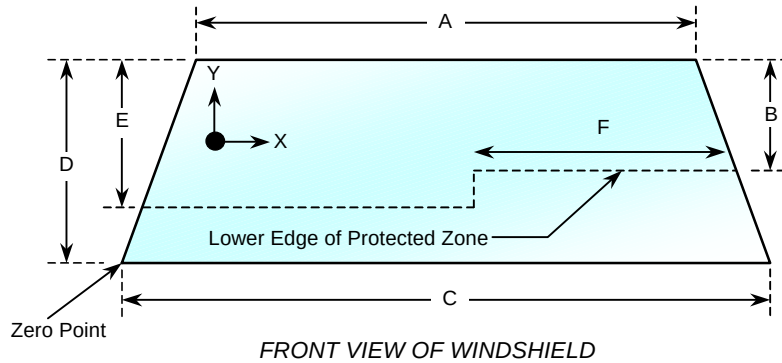
Item	Units	Segment Length	Molding Width
A	mm	1321	25
B	mm	1498	7
C	mm	936	17

DATA SHEET NO. 11

WINDSHIELD ZONE INTRUSION FMVSS 219 (Partial) DATA

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

NHTSA No.: M20100
 Test Date: 1/22/2002



Item	Units	Value
A	mm	1321
B	mm	602
C	mm	1498
D	mm	936
E	mm	608
F	mm	515

AREA OF PROTECTED ZONE FAILURES - NONE

- A. Provide coordinates of the area that the protected zone was penetrated more than 0.25 inches by a vehicle component other than one that is normally in contact with the windshield. **None**

X	Y

- B. Provide coordinates of the area beneath the protected zone that the inner surface of the windshield was penetrated by a vehicle component. **None**

X	Y

DATA SHEET NO. 12

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Test Vehicle: 2002/Buick/Rendezvous/4 door
Test Program: NCAP

NHTSA No.: M20100
Test Date: 1/22/2002

Temperature at Time of Impact: 21° C Test Time: 12:20 PM

Stoddard Solvent Spillage Measurements

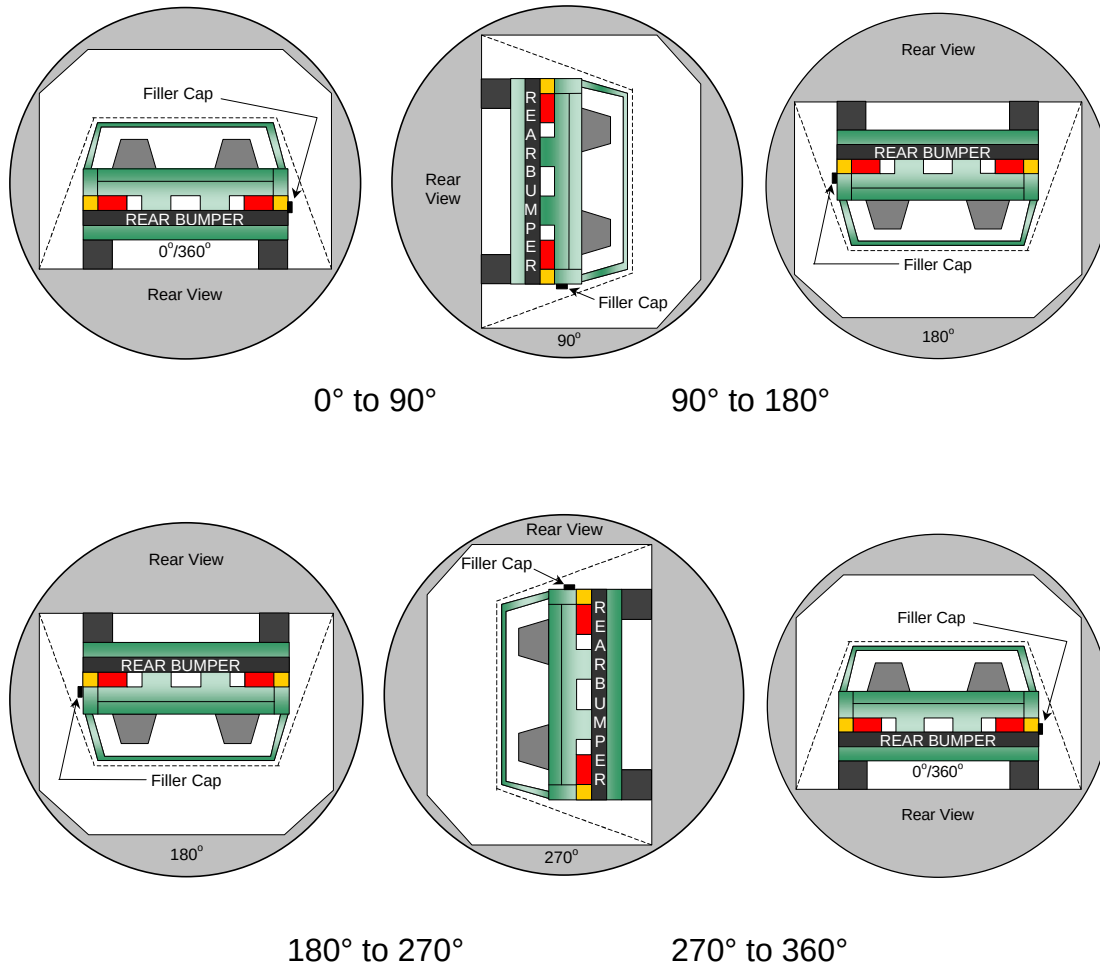
- A. From impact until vehicle motion ceases: 0 oz.
 (Maximum Allowable = 1 ounce)
- B. For the 5 minute period after motion ceases: 0 oz.
 (Maximum Allowable = 5 ounces)
- C. For the following 25 minutes: 0 oz.
 (Maximum Allowable = 1 oz./minute)
- D. Spillage : None

DATA SHEET NO. 13
FMVSS 301 STATIC ROLLOVER DATA

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

NHTSA No.: M20100
 Test Date: 1/22/2002

Test Time: 12:20 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:

Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage (oz.)
0° to 90°	165	300	0
90° to 180°	152	300	0
180° to 270°	136	300	0
270° to 360°	162	300	0

DATA SHEET NO. 14
VEHICLE MEASUREMENTS

Test Vehicle: 2002/Buick/Rendezvous/4 door
Test Program: NCAP

NHTSA No.: M20100
Test Date: 1/22/2002

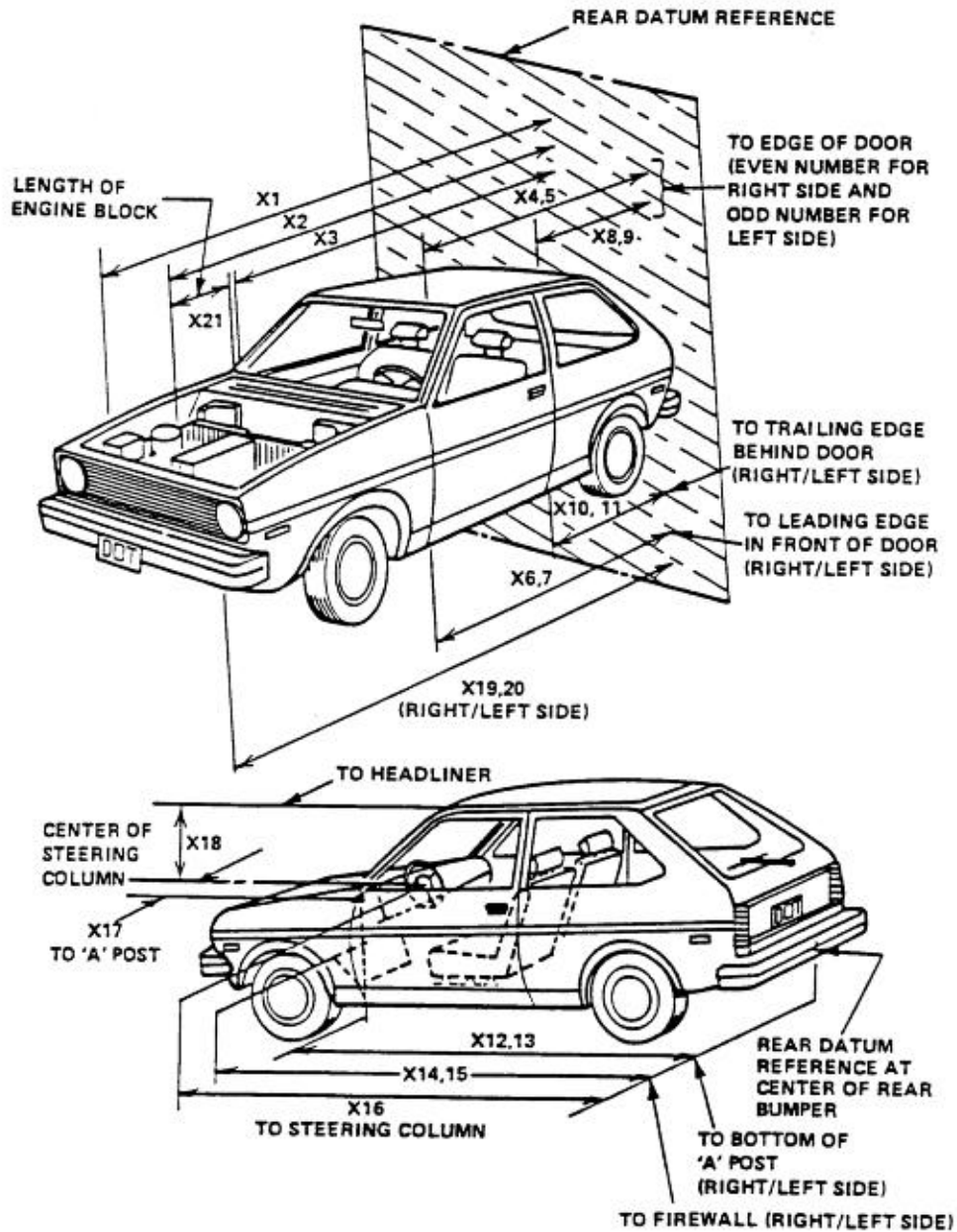
No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total length of vehicle at centerline	mm	4676	4240	436
2	RSOV to front of engine	mm	4133	3840	293
3	RSOV to firewall centerline	mm	3897	3856	41
4	RSOV to leading edge of right door	mm	3301	3312	-11
5	RSOV to leading edge of left door	mm	3299	3303	-4
6	RSOV to lower leading edge of right door	mm	3229	3223	6
7	RSOV to lower leading edge of left door	mm	3224	3218	6
8	RSOV to upper leading edge of right door	mm	2182	2189	-7
9	RSOV to upper leading edge of left door	mm	2179	2182	-3
10	RSOV to lower trailing edge of right door	mm	2199	2198	1
11	RSOV to lower trailing edge of left door	mm	2193	2185	8
12	RSOV to bottom of right 'A' pillar	mm	3232	3227	5
13	RSOV to bottom of left 'A' pillar	mm	3230	3228	2
14	RSOV to firewall on right side	mm	3869	3857	12
15	RSOV to firewall on left side	mm	3859	3825	34
16	RSOV to steering column	mm	2791	2779	12
17	Center of steering column to left 'A' pillar	mm	384	306	78
18	Center of steering column to headlining	mm	423	317	106
19	RSOV to right side of front bumper	mm	4571	4145	426
20	RSOV to left side of front bumper	mm	4534	4141	393
21	Length of engine block	mm	374	374	0
RD	RSOV to right side of dash panel	mm	3008	3016	-8
CD	RSOV to center of dash panel	mm	3014	3056	-42
LD	RSOV to left side of dash panel	mm	3057	3131	-74

DATA SHEET NO. 14...(continued)

VEHICLE MEASUREMENTS

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

NHTSA No.: M20100
 Test Date: 1/22/2002



DATA SHEET NO. 15
CAMERA LOCATIONS

Test Vehicle: 2002/Buick/Rendezvous/4 door
Test Program: NCAP

NHTSA No.: M20100
Test Date: 1/22/2002

No.	Camera View	Location (mm) *			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Side View				18	32
2	Left Front View	1000	-2362	1913	25	1064
3	Steering Column Top	2100	-2818	1555	25	1005
4	Steering Column Bottom	2070	-2818	1015	15	707
5	Driver Close-up	1293	-3350	1532	50	1015
6	Driver Angle	4788	-5005	2037	50	1639
7	Onboard Driver				13	1010
8	Onboard Passenger				13	881
9	Right Overall	2035	7032	1610	13	1000
10	Right Passenger Half	1032	7275	1422	25	909
11	Right Close-up	1480	10280	1471	50	1105
12	Right Angle	4864	5925	2118	50	1070
13	Windshield	-220	0	2532	13	1015
14	Top Driver	-122	-470	1758	13	1010
15	Top Passenger	-128	470	1762	13	1010
16	Pit Front	252	0	-5000	13	1005
17	Pit Rear	1202	80	-5000	13	1015

*COORDINATES:

+X = film plane rearward of barrier

+Y = film plane to right of monorail centerline

+Z = film plane above ground level

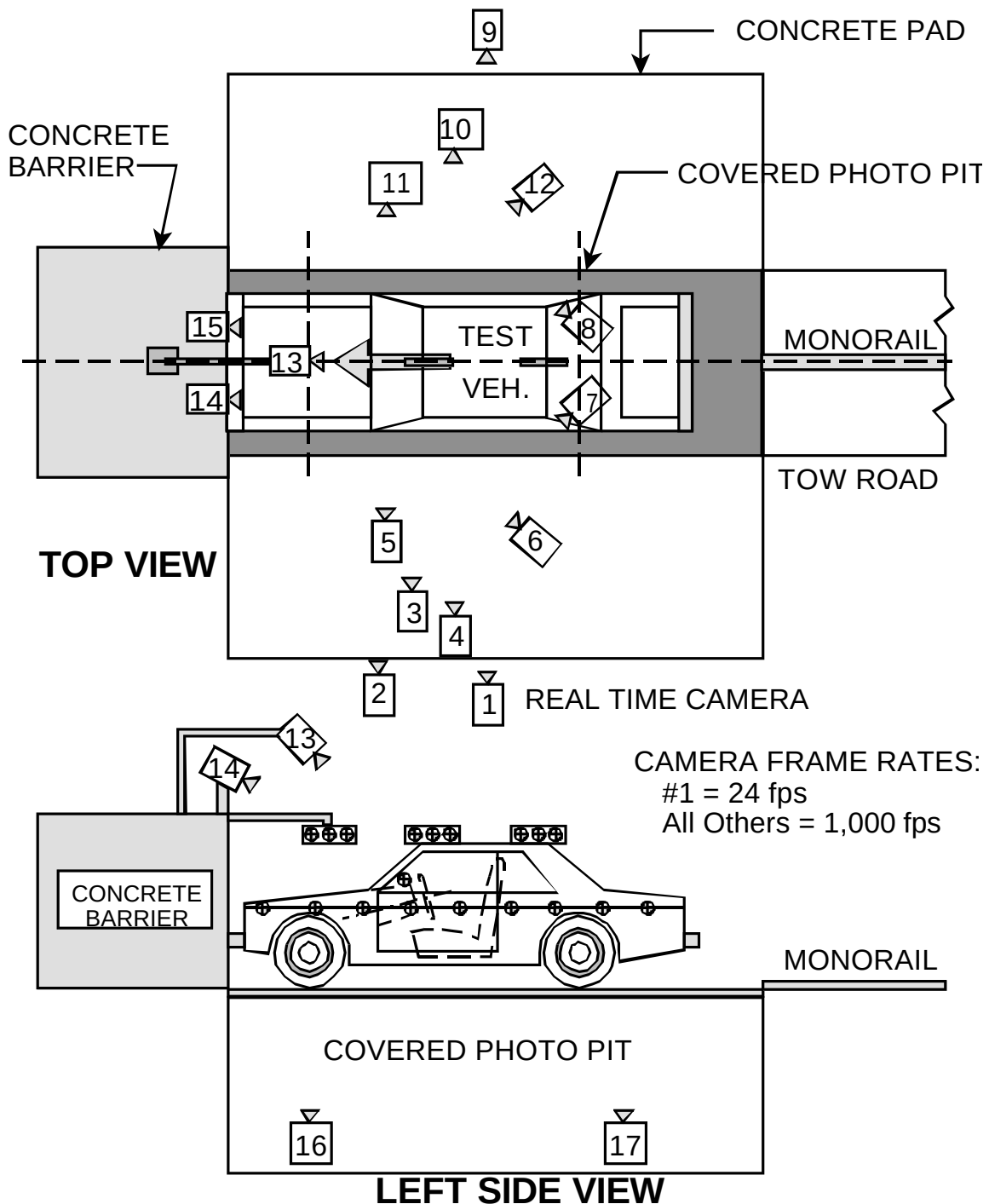
DATA SHEET NO. 15...(continued)

CAMERA LOCATIONS

Test Vehicle: 2002/Buick/Rendezvous/4 door
Test Program: NCAP

NHTSA No.: M20100
Test Date: 1/22/2002

CAMERA POSITIONS FOR FRONTAL IMPACTS

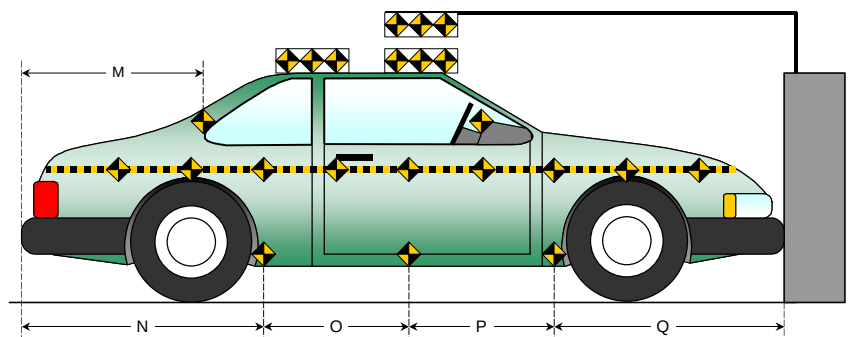
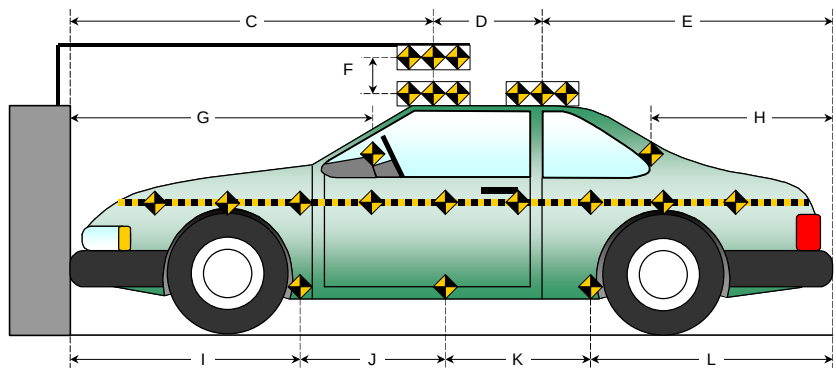
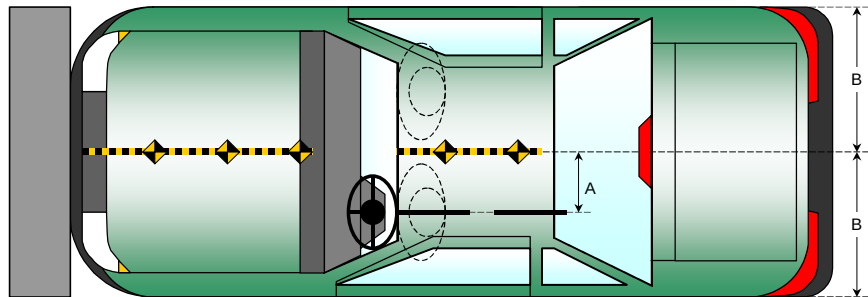


DATA SHEET NO. 16
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

NHTSA No.: M20100
 Test Date: 1/22/2002

Item	Value
A	407
B	930
C	2186
D	610
E	1880
F	305
G	1652
H	1215
I	1449
J	844
K	847
L	1536
M	1245
N	1475
O	846
P	849
Q	1506



DATA SHEET NO. 17
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

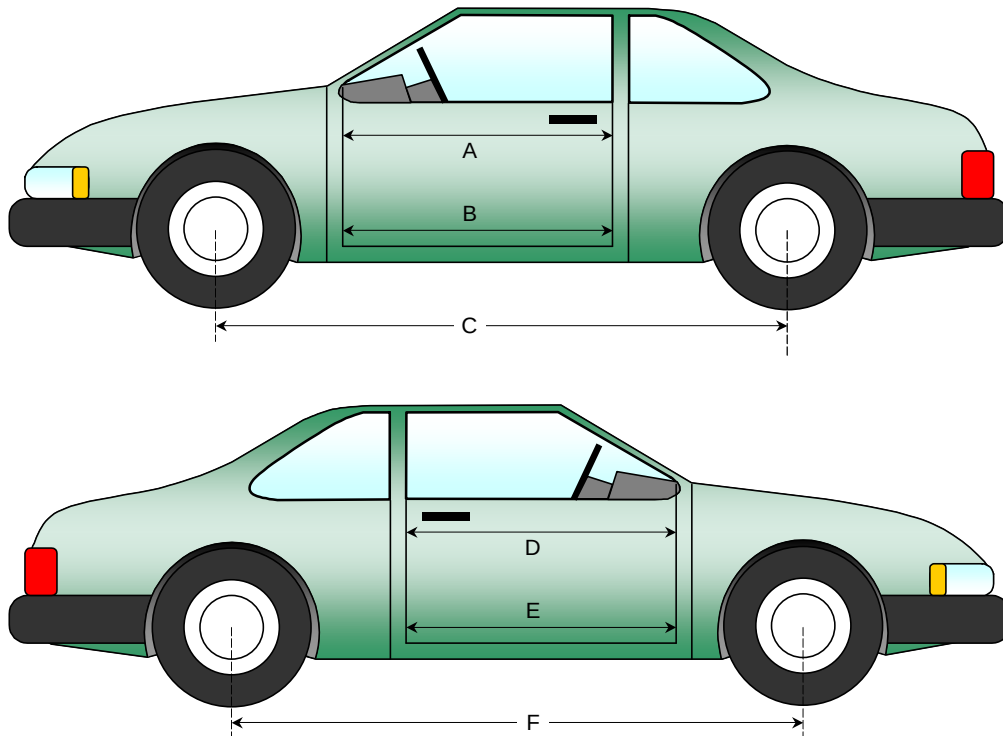
NHTSA No.: M20100
 Test Date: 1/22/2002

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1035	1029	6
B	Left Side Lower	mm	940	936	4
D	Right Side Upper	mm	1035	1024	11
E	Right Side Lower	mm	944	938	6

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2854	2750	104
F	Right Side Wheelbase	mm	2854	2736	118



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

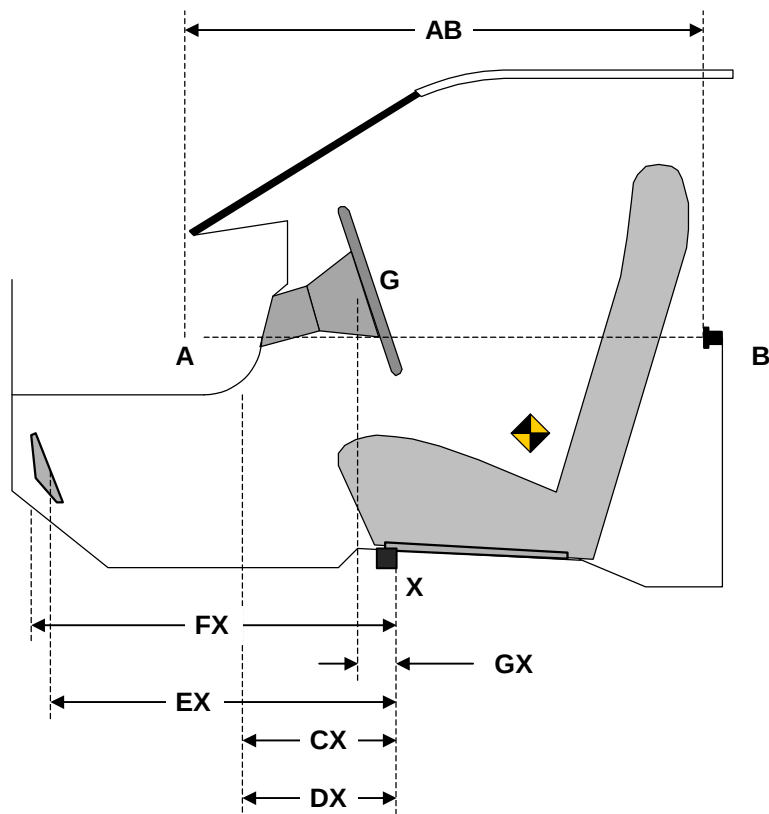
Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

NHTSA No.: M20100
 Test Date: 1/22/2002

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside window jam)	mm	995	995	0
CX	Left Knee Bolster to X	mm	340	299	41
DX	Right Knee Bolster to X	mm	340	283	57
EX	Brake Pedal to X	mm	607	455	152
FX	Foot Rest to X	mm	642	610	32
GX	Center of Steering Column Wheel Hub to X	mm	135	143	-8

X = Left Front Seat Front Outboard Anchor Bolt Head



DRIVER COMPARTMENT

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

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

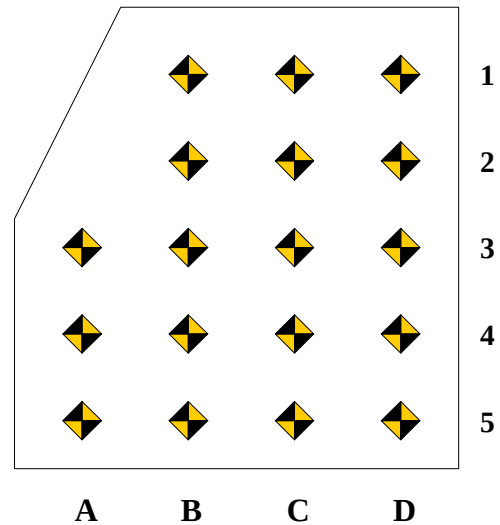
NHTSA No.: M20100
 Test Date: 1/22/2002

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		760	775	775		682	691	667		78	84	108
2		695	710	710		662	664	611		33	46	99
3		625	625	625		624	622	618		1	3	7
4	535	535	535	535	533	535	530	530	2	0	5	5
5	415	415	415	415	412	410	410	412	3	5	5	3

DRIVER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1		0	-40	-40		53	35	3		-53	-75	-43
2		-75	-85	-85		-35	-51	-50		-40	-34	-35
3		-120	-125	-125		-119	-126	-146		-1	1	21
4	-125	-120	-125	-125	-109	-112	-115	-118	-16	-8	-10	-7
5	-105	-105	-105	-105	-91	-96	-100	-108	-14	-9	-5	3

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

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

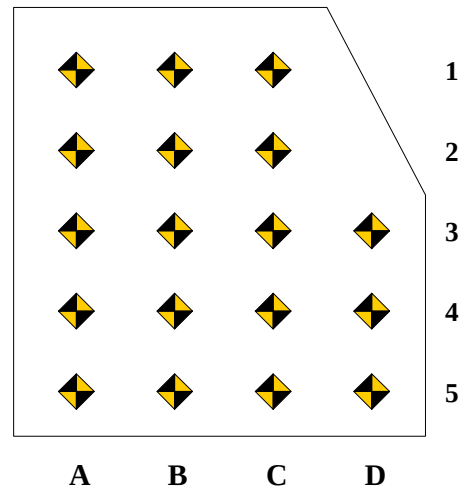
NHTSA No.: M20100
 Test Date: 1/22/2002

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	755	755	755		587	563	497		168	192	258	
2	690	690	690		579	553	528		111	137	162	
3	625	625	625	625	574	557	533	541	51	68	92	84
4	535	535	535	535	524	524	523	521	11	11	12	14
5	415	415	415	415	411	412	414	413	4	3	1	2

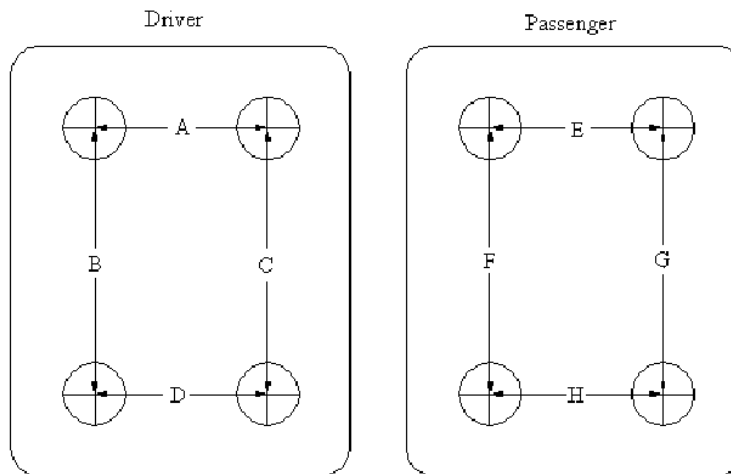
PASSENGER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	0	0	0		98	112	121		-98	-112	-121	
2	-65	-65	-65		12	23	36		-77	-88	-101	
3	-125	-125	-125	-125	-82	-70	-60	-42	-43	-55	-65	-83
4	-125	-125	-120	-125	-123	-126	-130	-118	-2	1	10	-7
5	-115	-115	-115	-115	92	-102	-114	-109	-207	-13	-1	-6

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

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

NHTSA No.: M20100
 Test Date: 1/22/2002



UNDERBODY FLOORBOARD DEFORMATION

Measurement	Pre-Test	Post-Test	Difference
A	317	264	53
B	193	193	0
C	210	210	0
D	313	260	53
E	267	268	-1
F	337	335	2
G	367	375	-8
H	256	265	-9

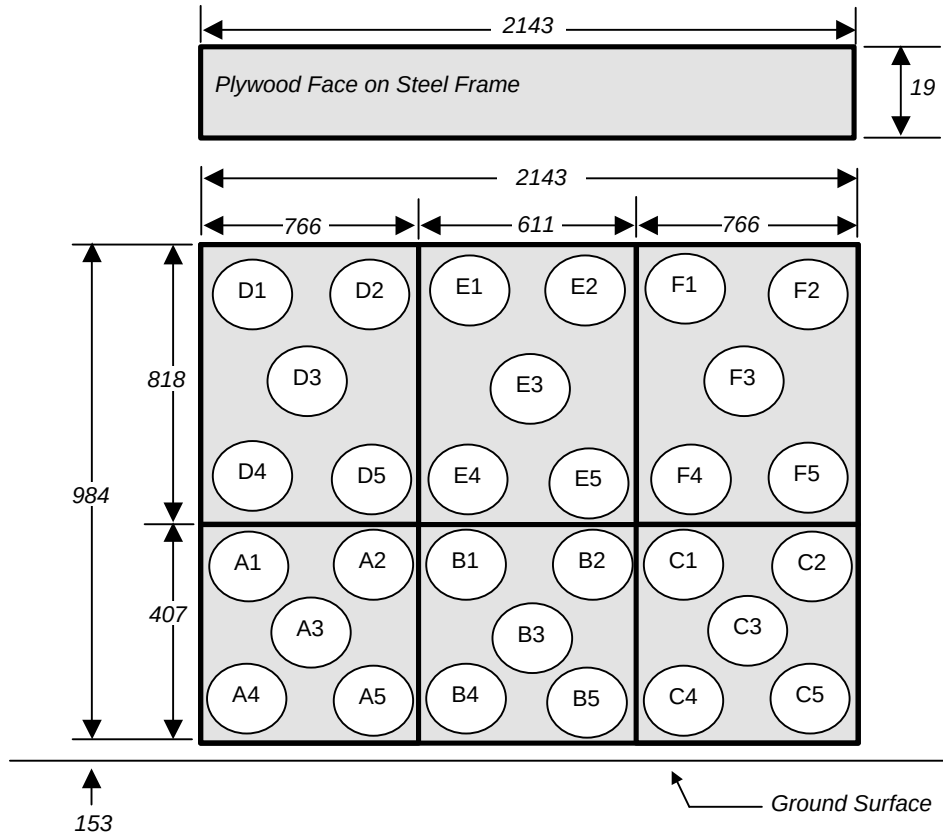
DATA SHEET NO. 18

LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2002/Buick/Rendezvous/4 door
 Test Program: NCAP

NHTSA No.: M20100
 Test Date: 1/22/2002

30 Load Cell Rigid Barrier Load Cell Locations on Fixed Barrier



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

6 Groups of 5 Load Cells Each

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

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

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

Test Vehicle: 2002/Buick/Rendezvous/4 door
Test Program: NCAP

NHTSA No.: M20100
Test Date: 1/22/2002

VEHICLE INFORMATION

VIN: 3G5DB03E22S504023 Wheelbase (mm) : 2854
Vehicle Size Category: SUV Test Weight (kg) : 2147.3

ACCELEROMETER DATA

Accelerometer Locations: As per measurements on Page 13
Cal. Procedure/Interval: MGA procedure / 6 month
Integration Algorithm: Trapezoidal Linearity: > 99%
Impact Velocity (km/h): 56.6
Velocity Change (km/h): 66.5 Time of Separation (msec): 123

CRUSH PROFILE

Collision Deformation Classification: frontal Midpoint of Damage: C/L
Damage Region Length (mm): 1506 Impact Mode: frontal

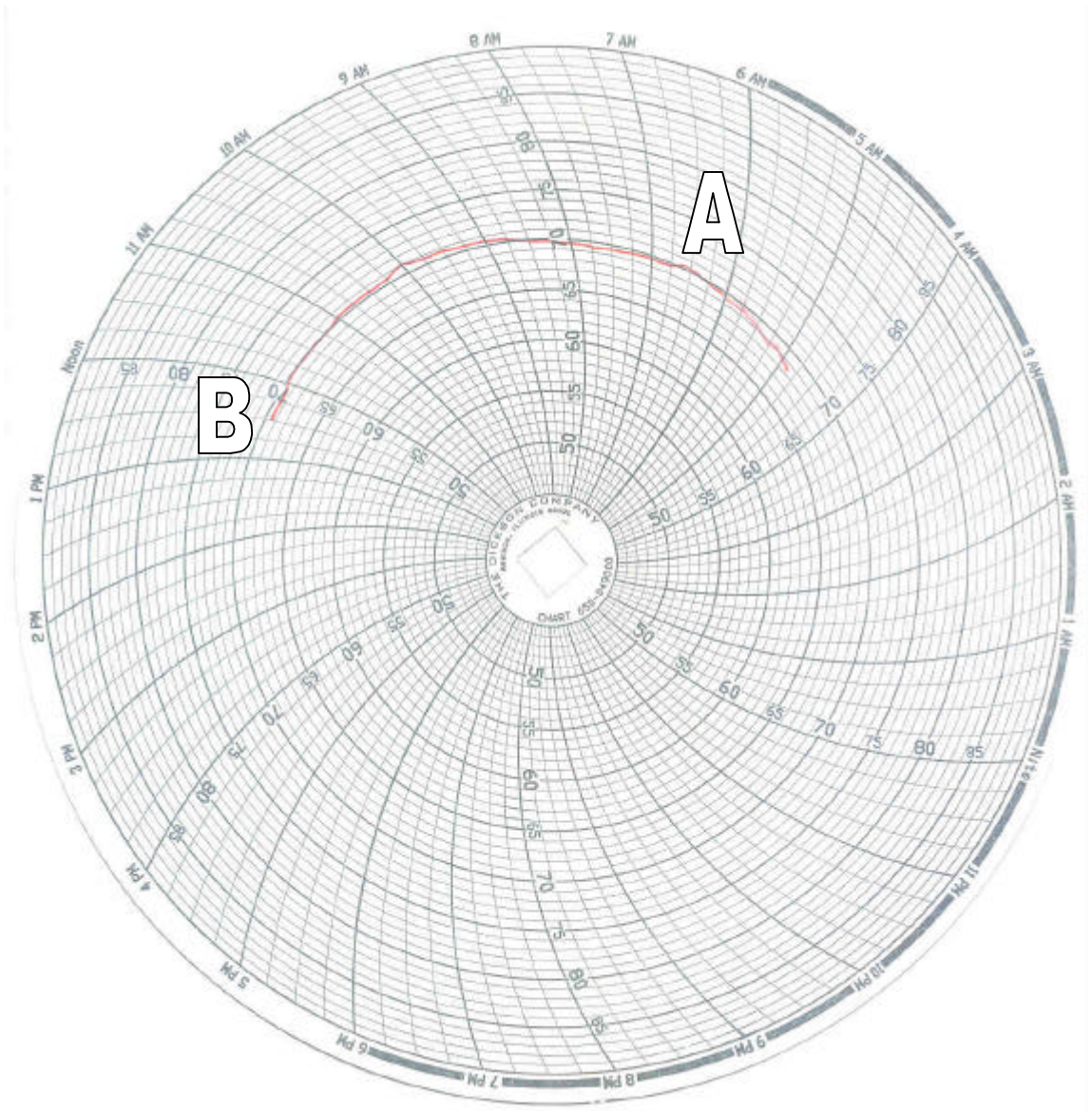
No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4534	4141	393
C2	Crush zone 2 at left side	mm	4622	4171	451
C3	Crush zone 3 at left side	mm	4666	4220	446
C4	Crush zone 4 at right side	mm	4665	4230	435
C5	Crush zone 5 at right side	mm	4626	4216	410
C6	Crush zone 6 at right side	mm	4541	4145	396

DATA SHEET NO. 20

DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2002/Buick/Rendezvous/4 door
Test Program: NCAP

NHTSA No.: M20100
Test Date: 1/22/2002



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

B = Test conducted at 12:20 p.m.

APPENDIX A
PHOTOGRAPHS

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Pre-Test Front View of Test Vehicle

A-2.



Post-Test Front View of Test Vehicle



Pre-Test Rear View of Test Vehicle



Post-Test Rear View of Test Vehicle

A-5.



Pre-Test Left Side View of Test Vehicle



Post-Test Left Side View of Test Vehicle



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



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



Pre-Test Right Side View of Test Vehicle



Post-Test Right Side View of Test Vehicle



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



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



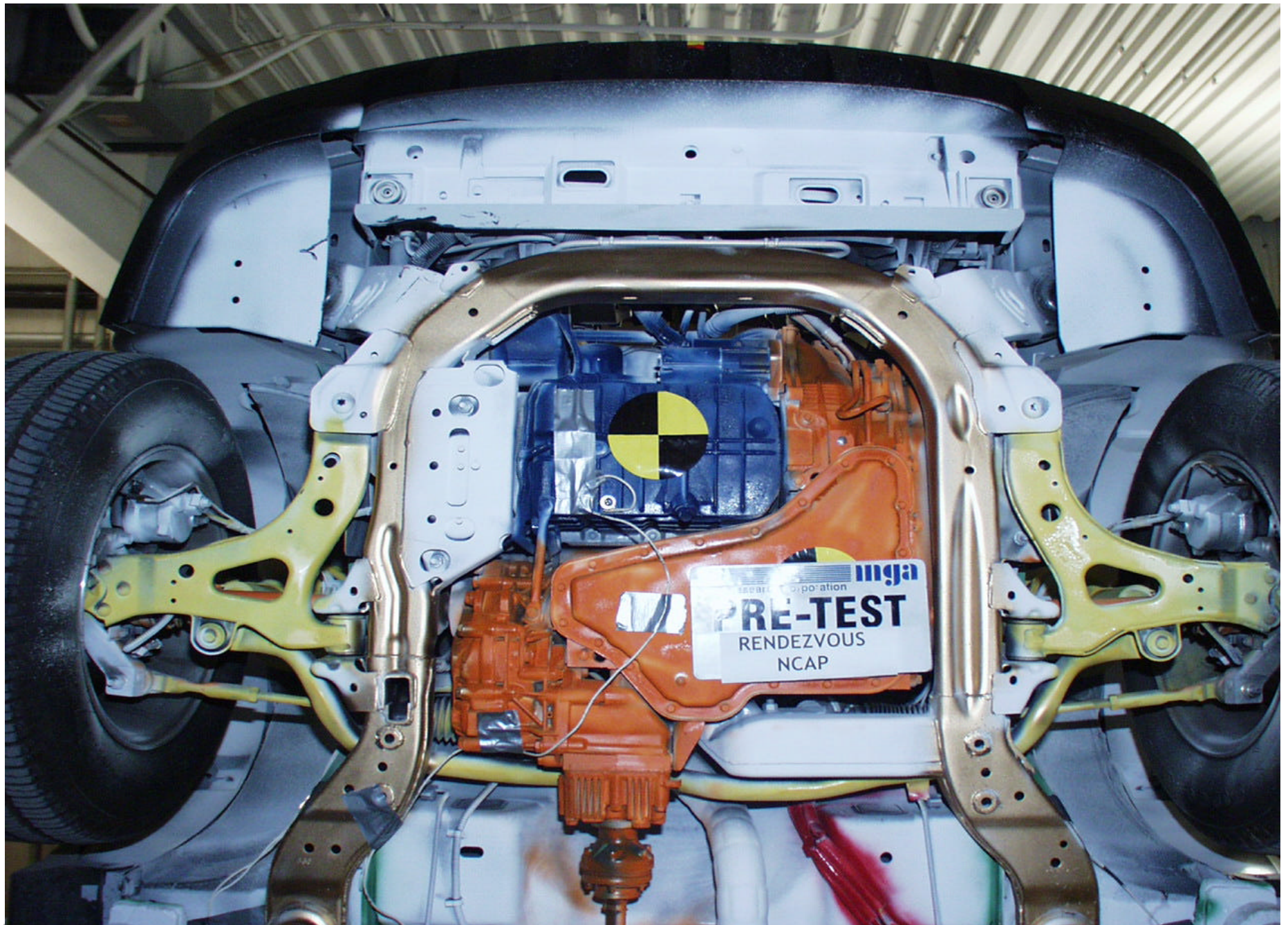
Pre-Test Fuel Filler Cap View



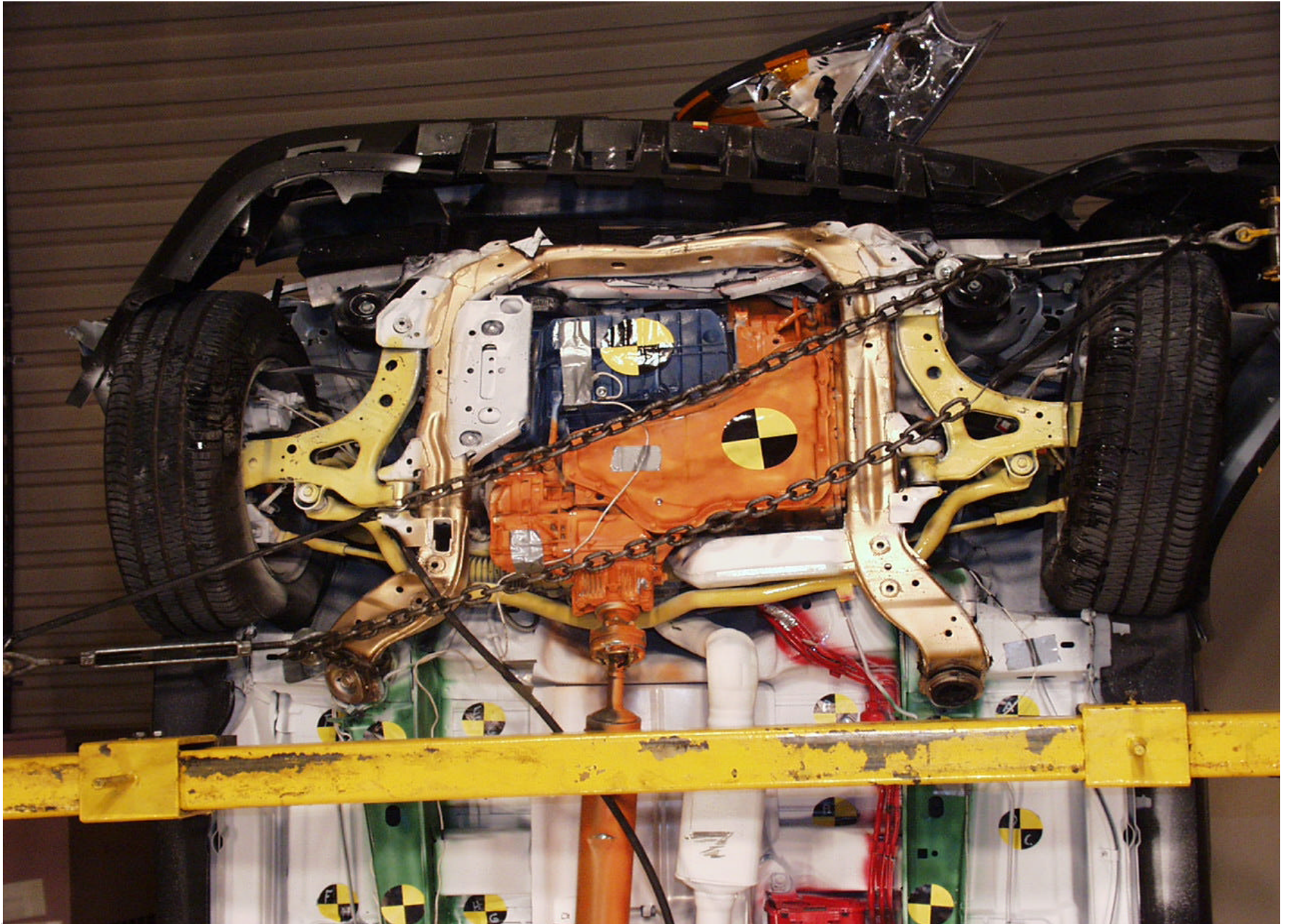
Pre-Test Engine Compartment View



Post-Test Engine Compartment View



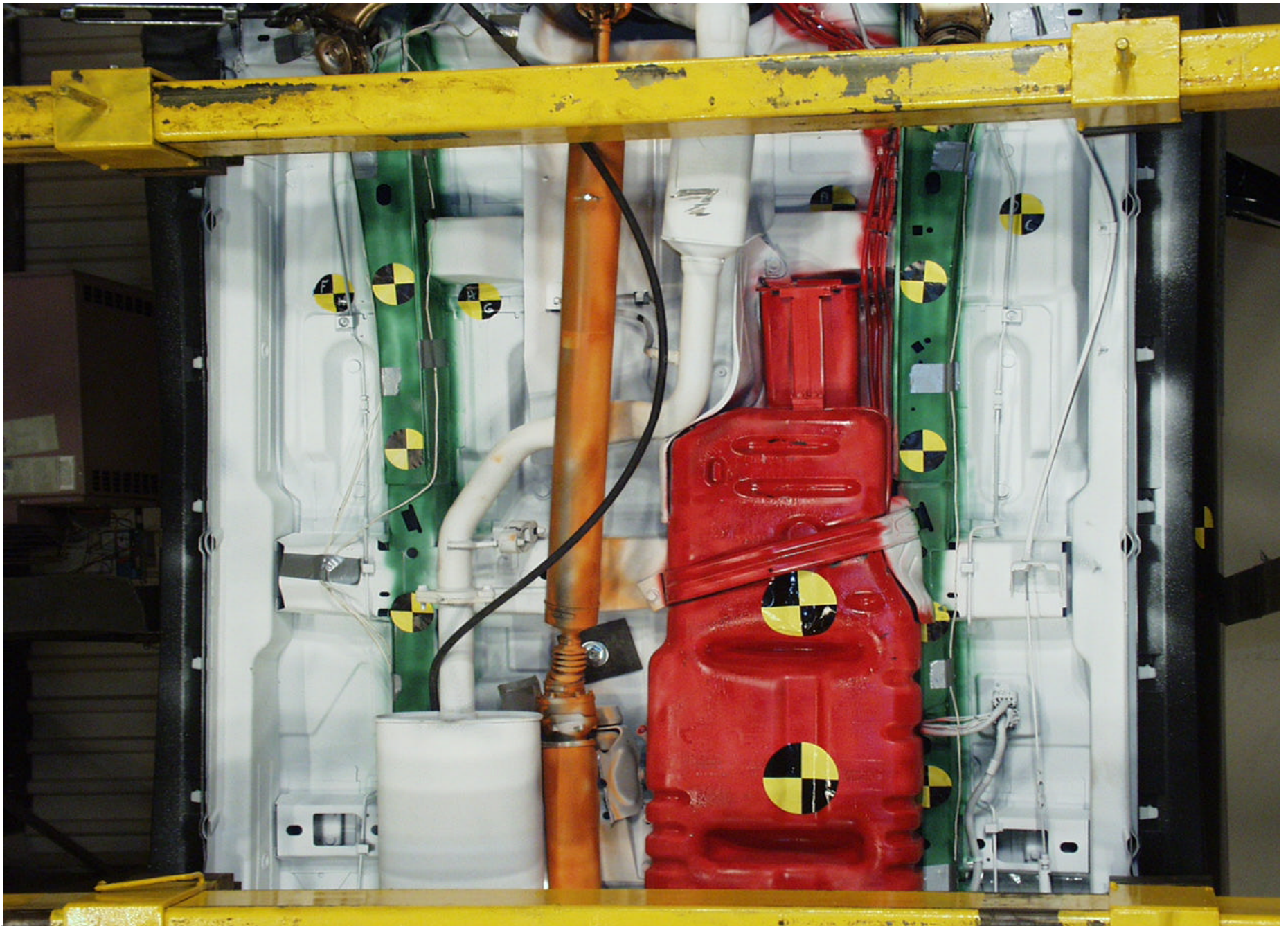
Pre-Test Front Underbody View



Post-Test Front Underbody View



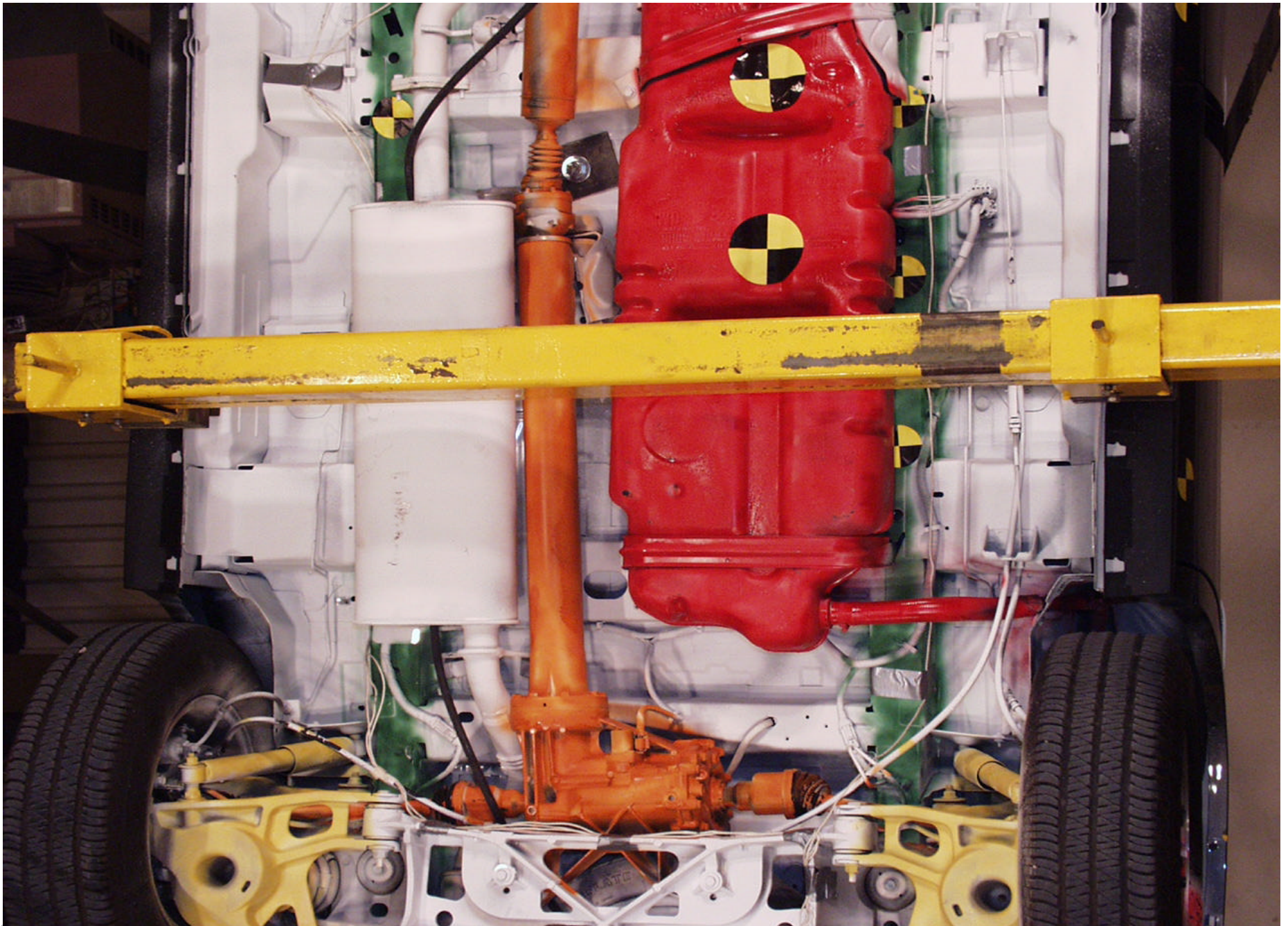
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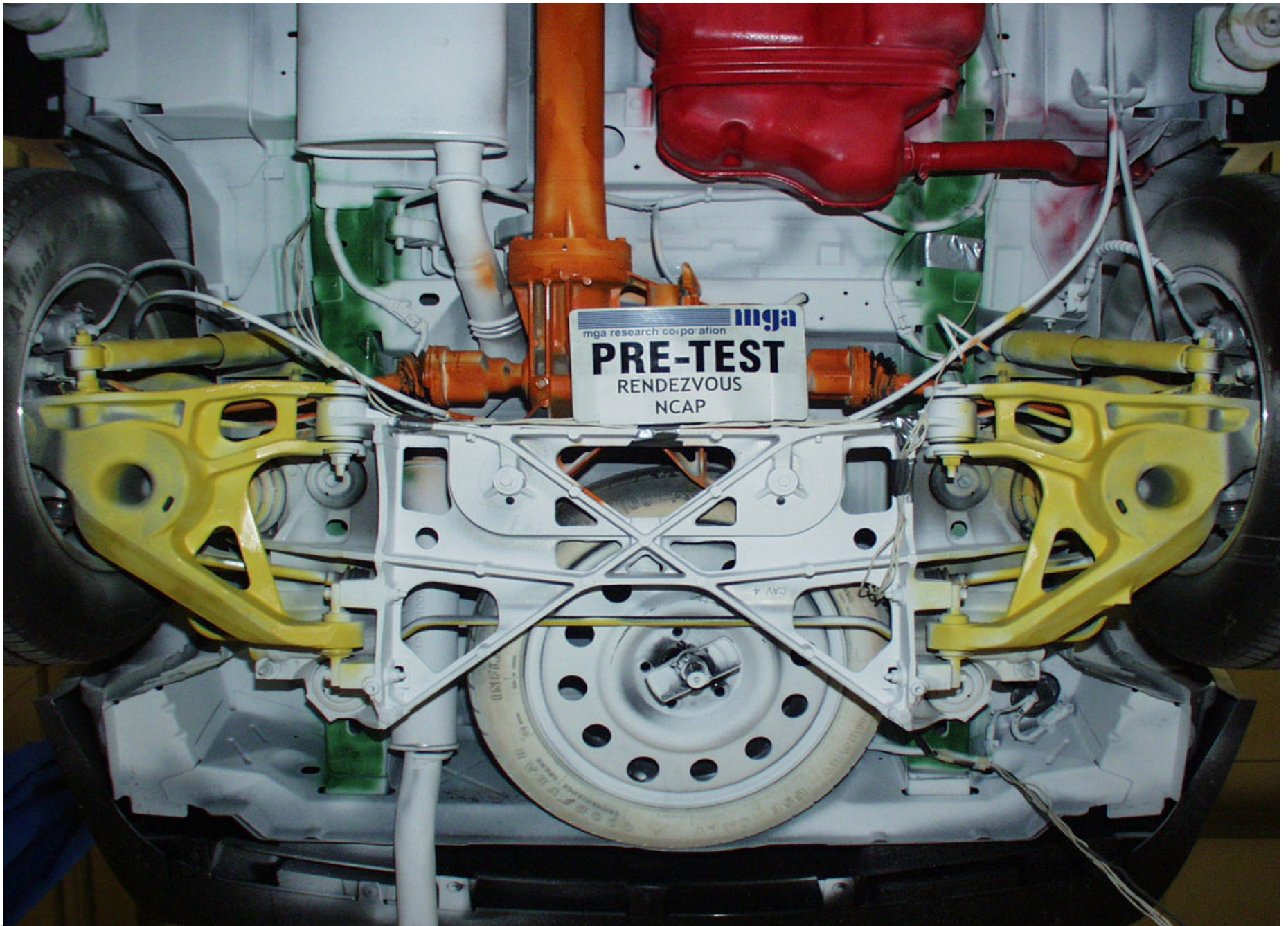
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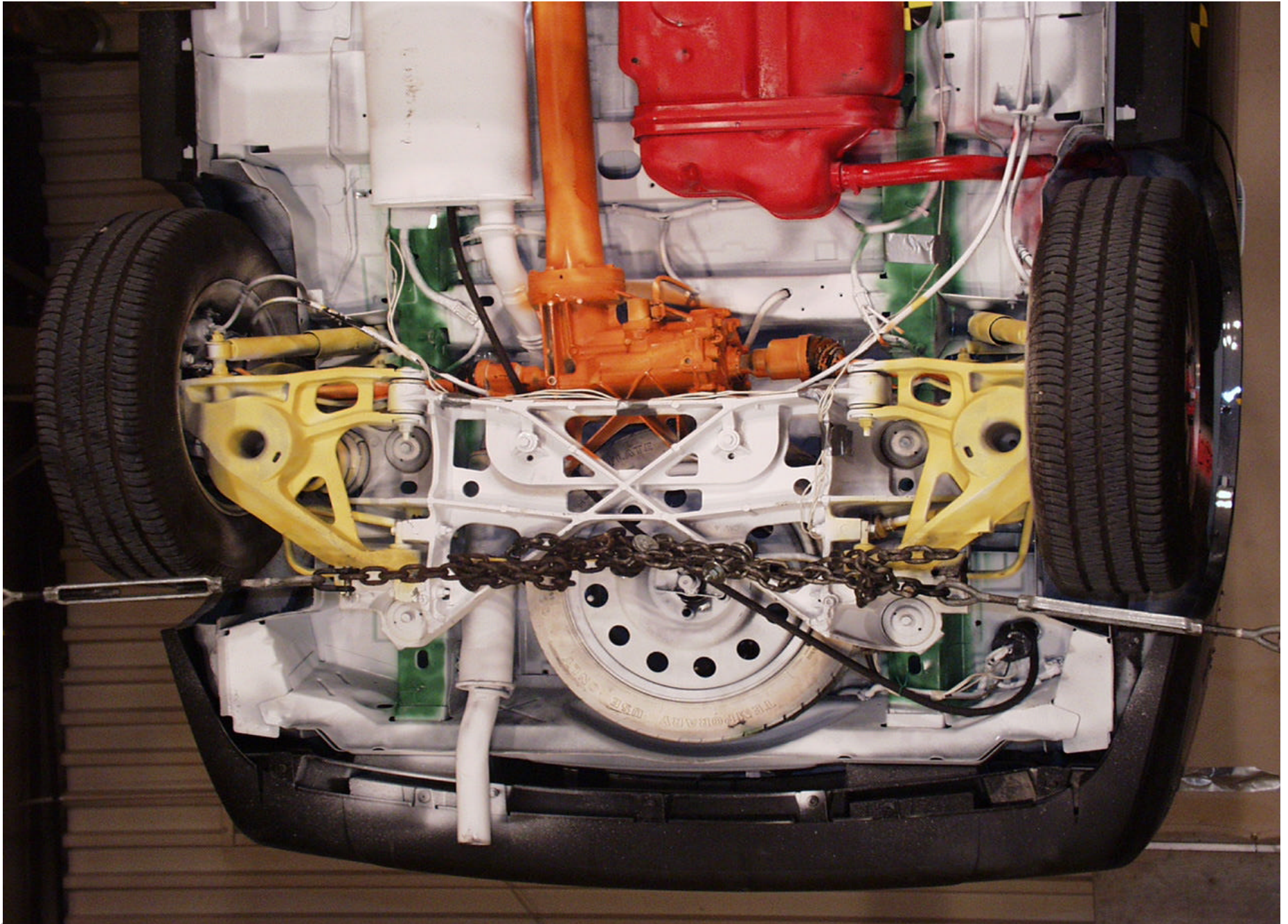
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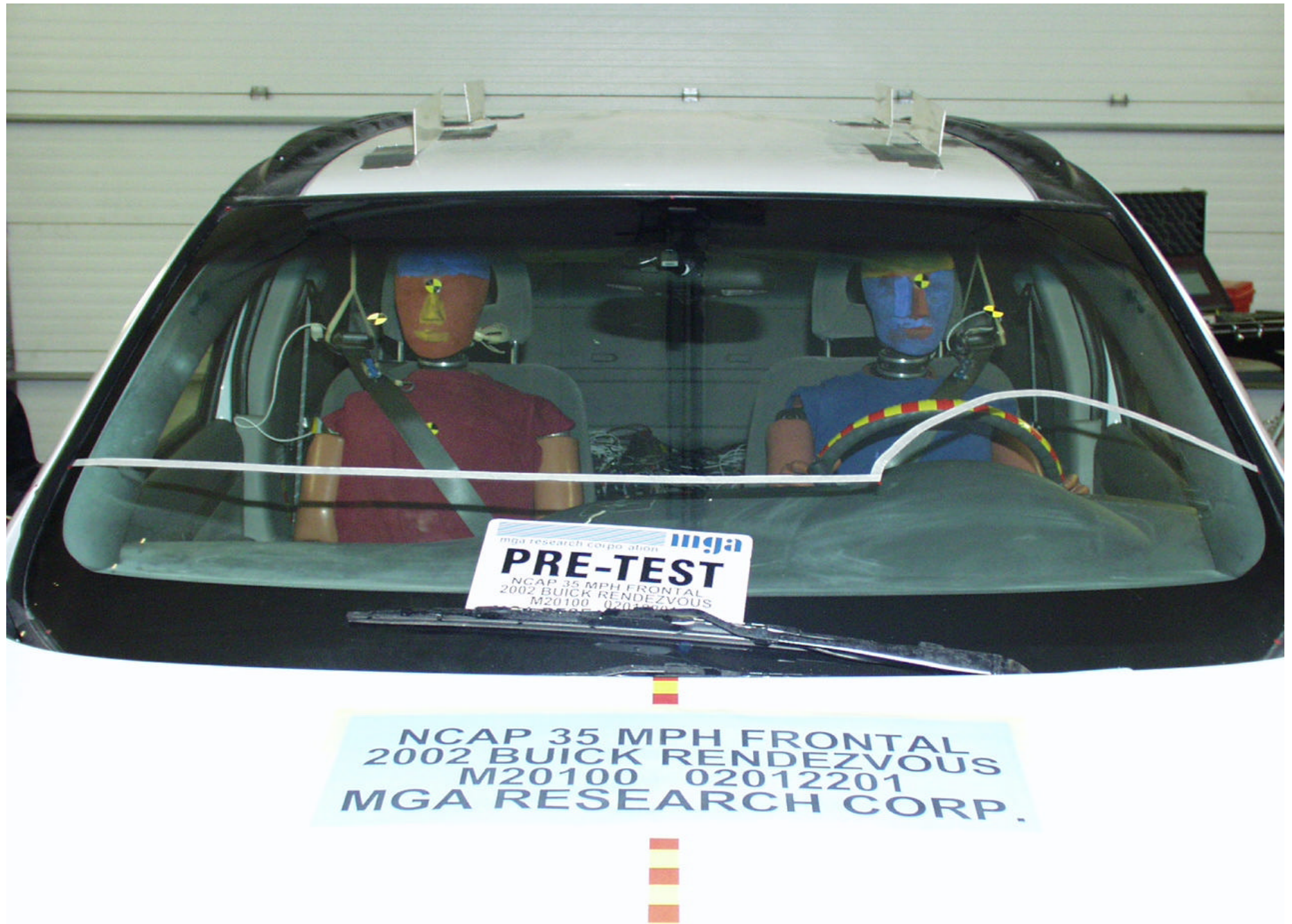
Post-Test Mid Rear Underbody



Pre-Test Rear Underbody View



Post-Test Rear Underbody View



Pre-Test Windshield View



Post-Test Windshield View



Pre-Test Driver Dummy Position Left Side View



Post-Test Driver Dummy Position Left Side View



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



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



Pre-Test Driver Seat Position View



Post-Test Driver Seat Position View



Pre-Test Driver Dummy Knee Position



Post-Test Driver Dummy Knee Position

A-34.



Post-Test Driver Airbag Contact



Post-Test Driver Knee Contact View



Pre-Test Driver Windshield View

Post-Test Driver Windshield View

A-38.



Pre-Test Passenger Dummy Position Right Side View



Post-Test Passenger Dummy Position Right Side View



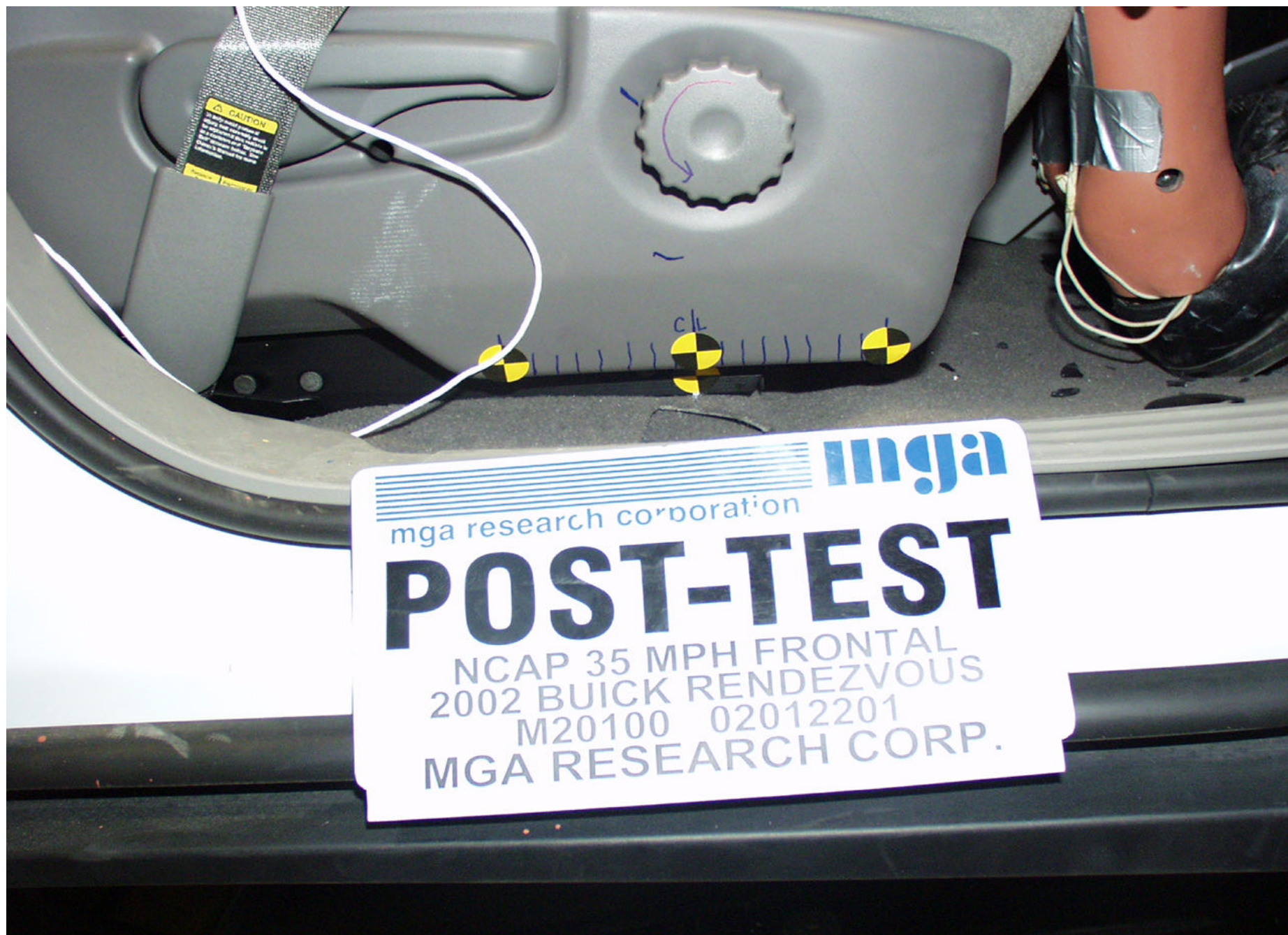
Pre-Test Pass. Dummy Position Right Side View (Door Open)



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



Pre-Test Passenger Seat Position View



Post-Test Passenger Seat Position View



Pre-Test Passenger Dummy Knee Position



Post-Test Passenger Dummy Knee Position



Post-Test Passenger Airbag View



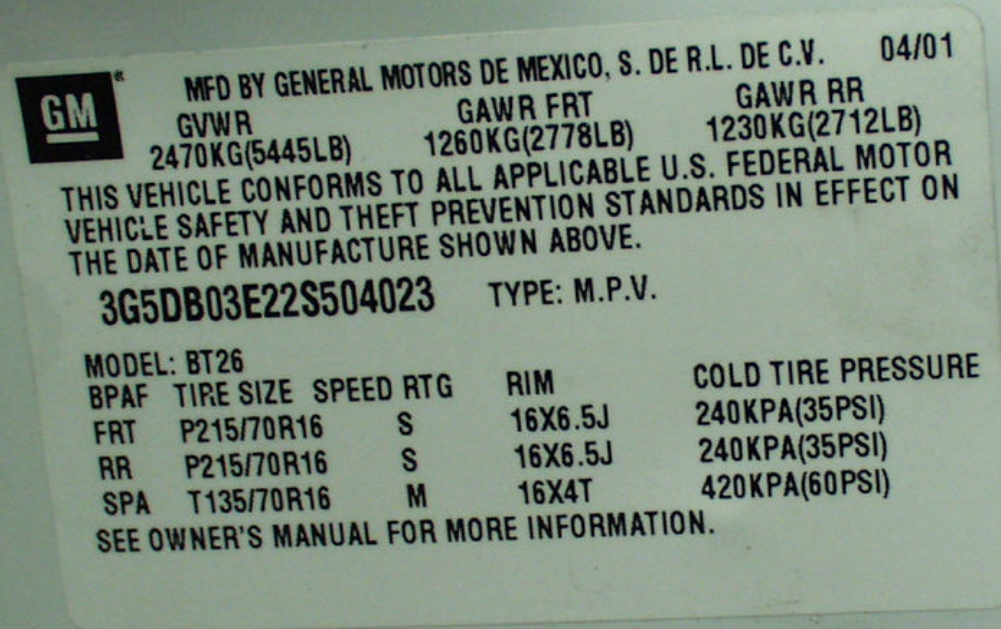
Post-Test Passenger Knee Contact View



Pre-Test Passenger Windshield View



Post-Test Passenger Windshield View

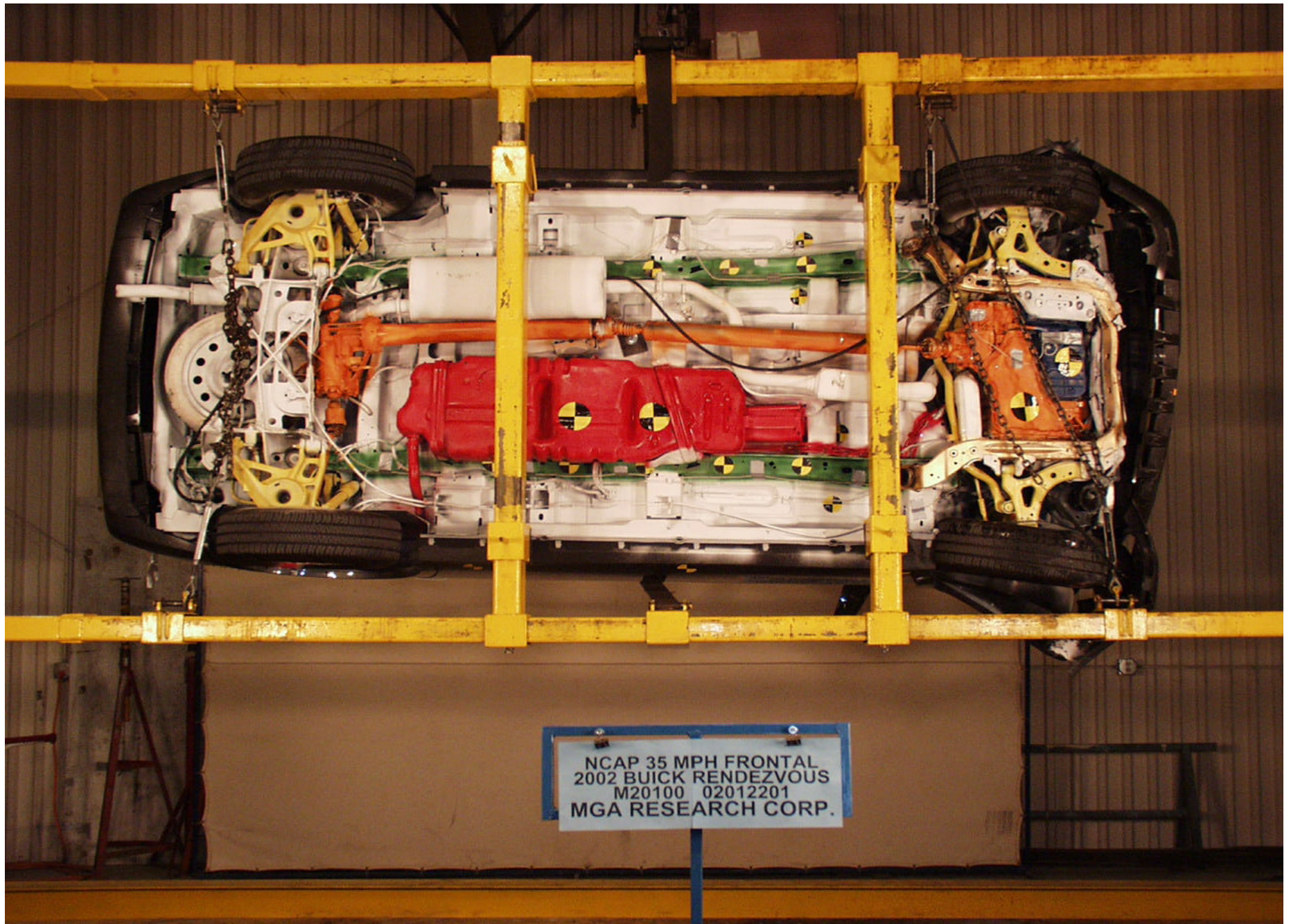


Vehicle Certification Label

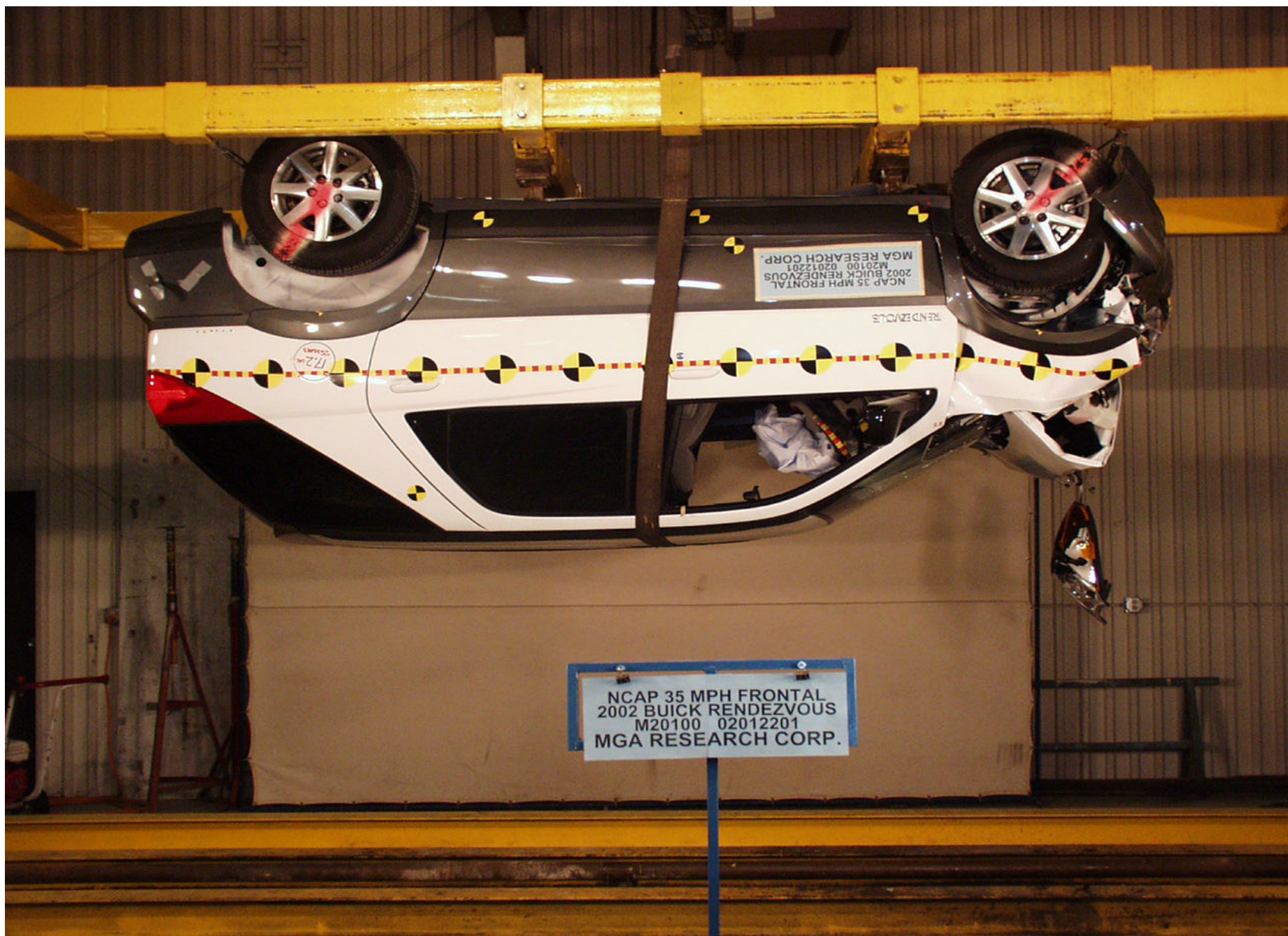


Vehicle Impact

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Rollover 90



Rollover 180

A-54.



Rollover 270



APPENDIX B

DUMMY AND VEHICLE RESPONSE DATA TRACES

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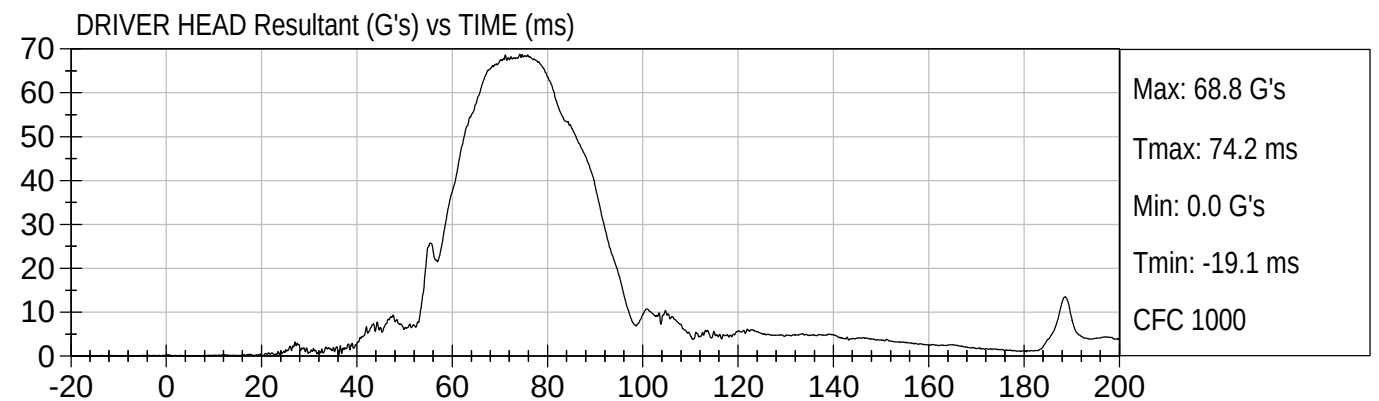
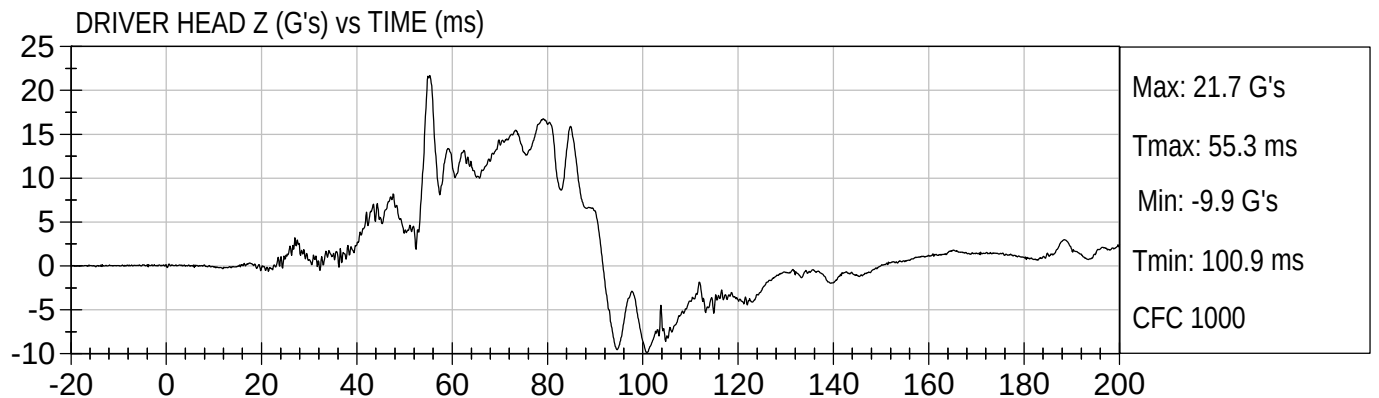
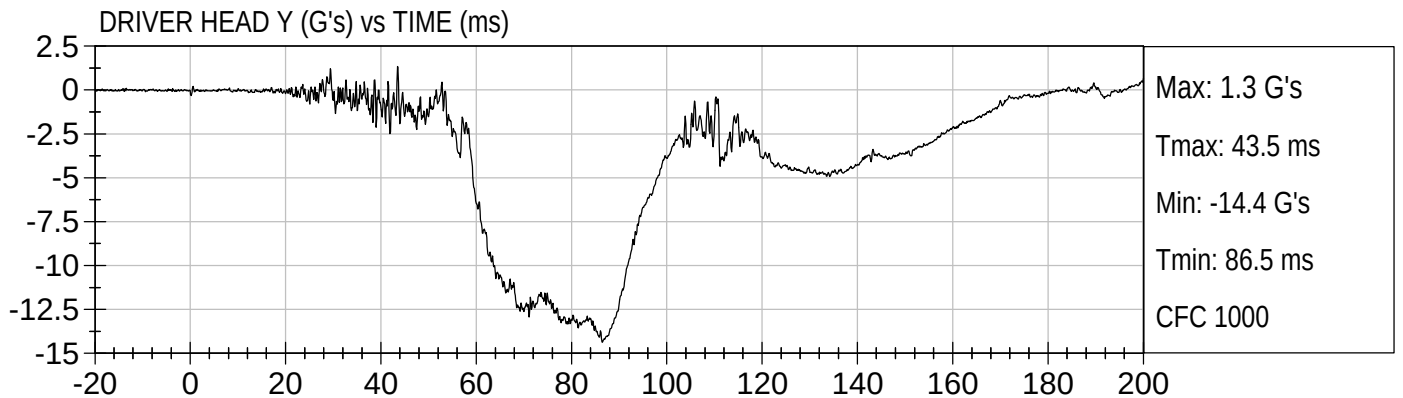
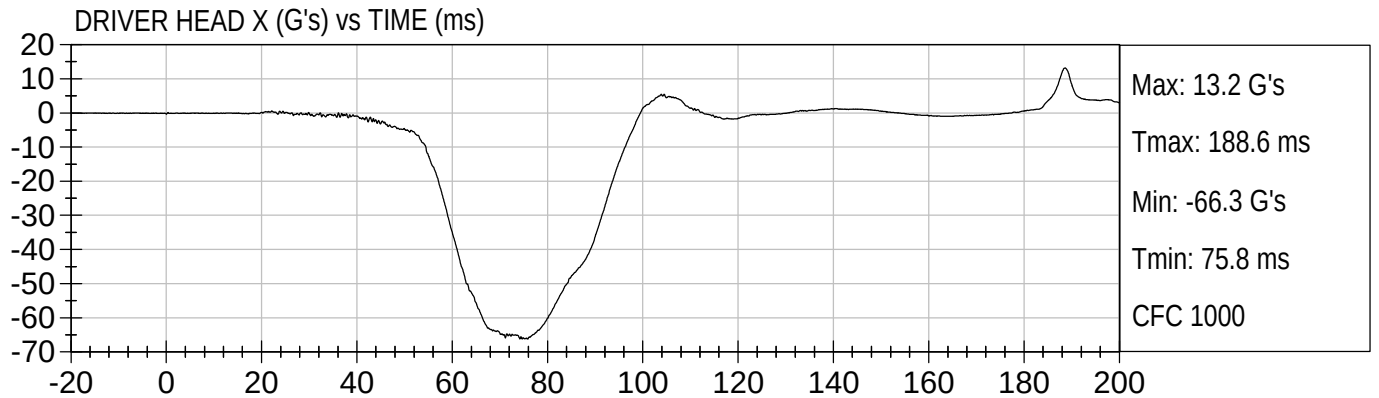
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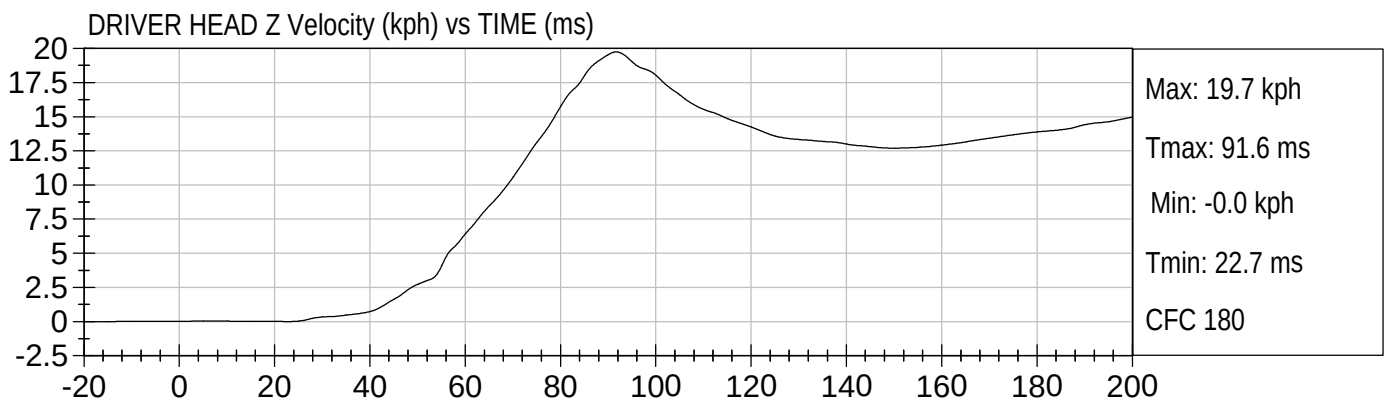
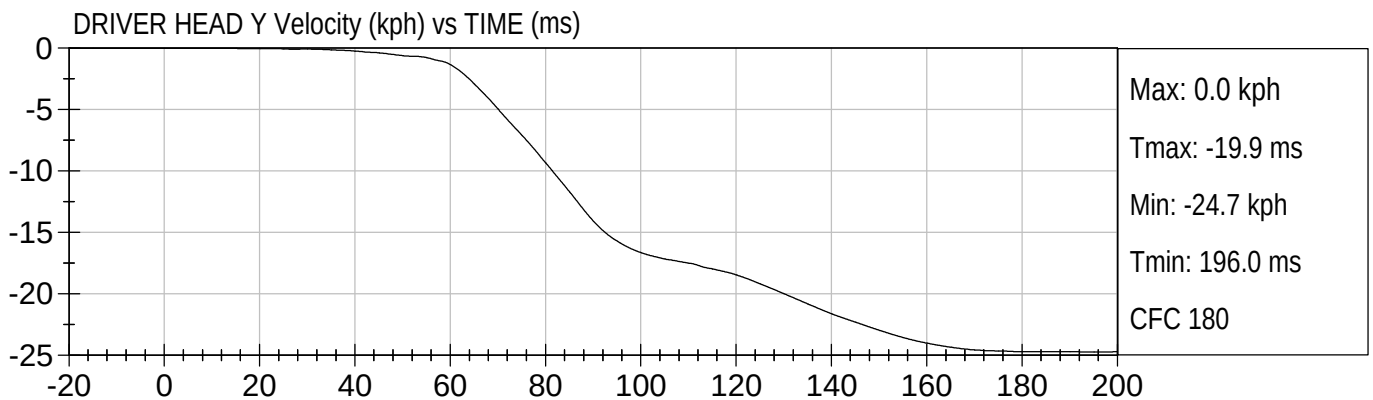
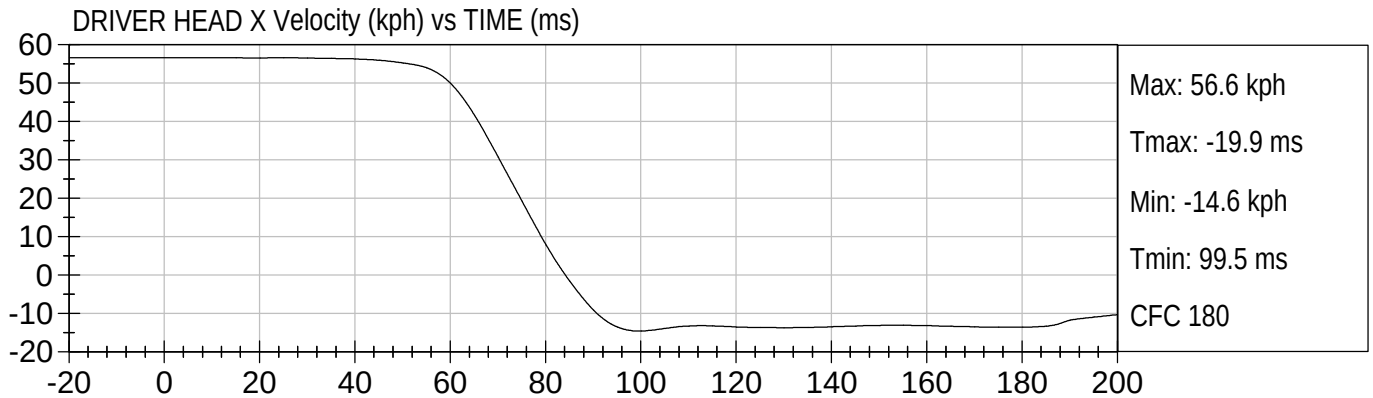
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35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

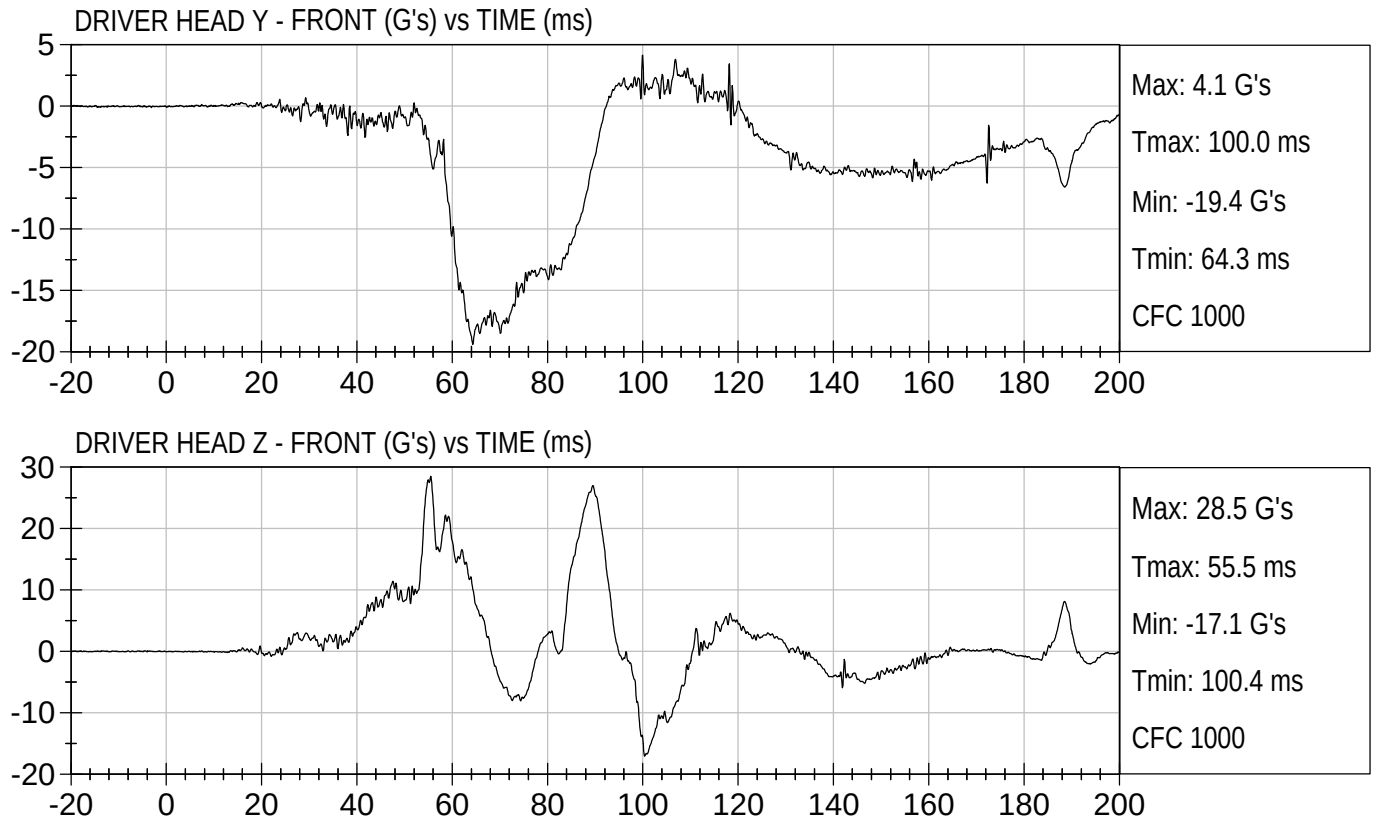






35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

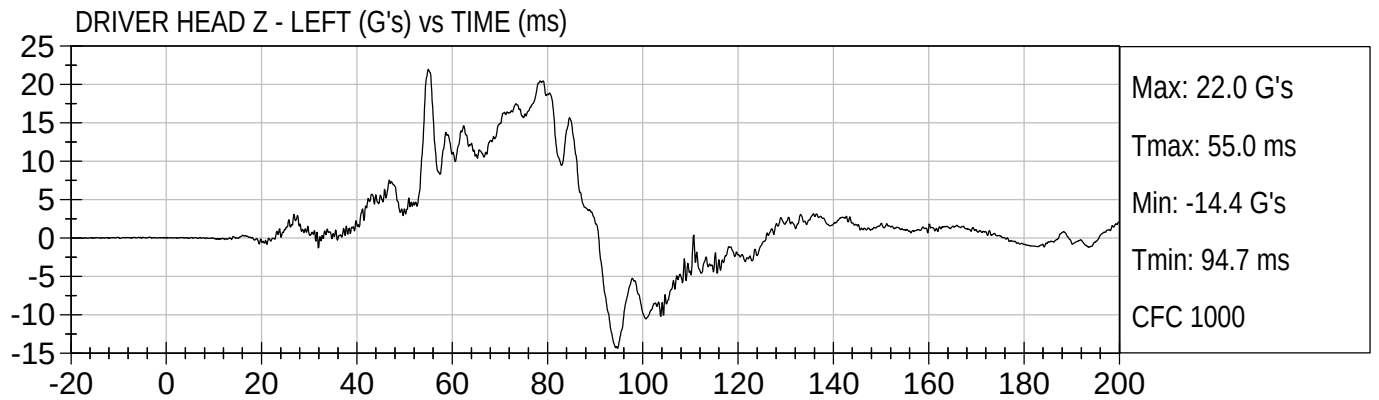
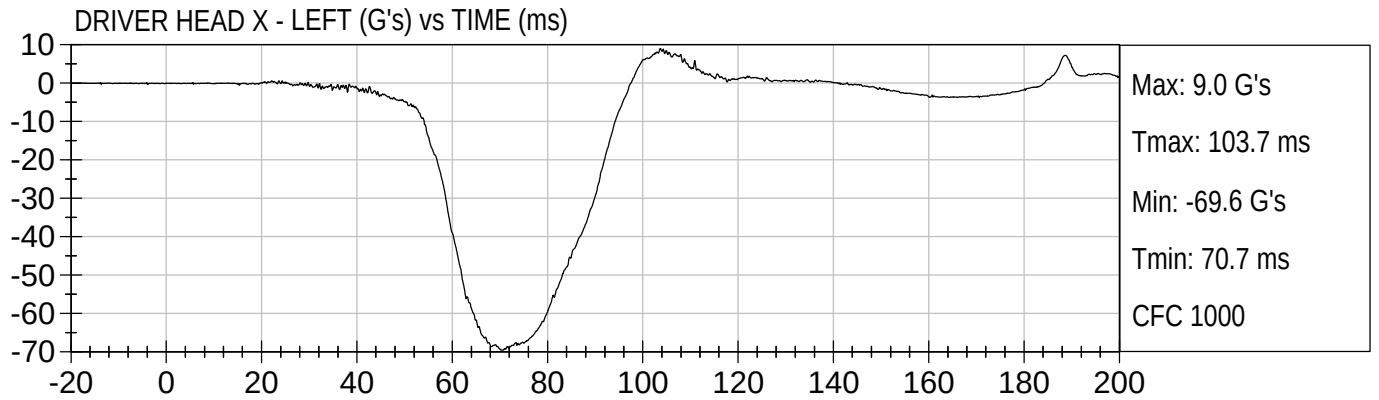
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35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

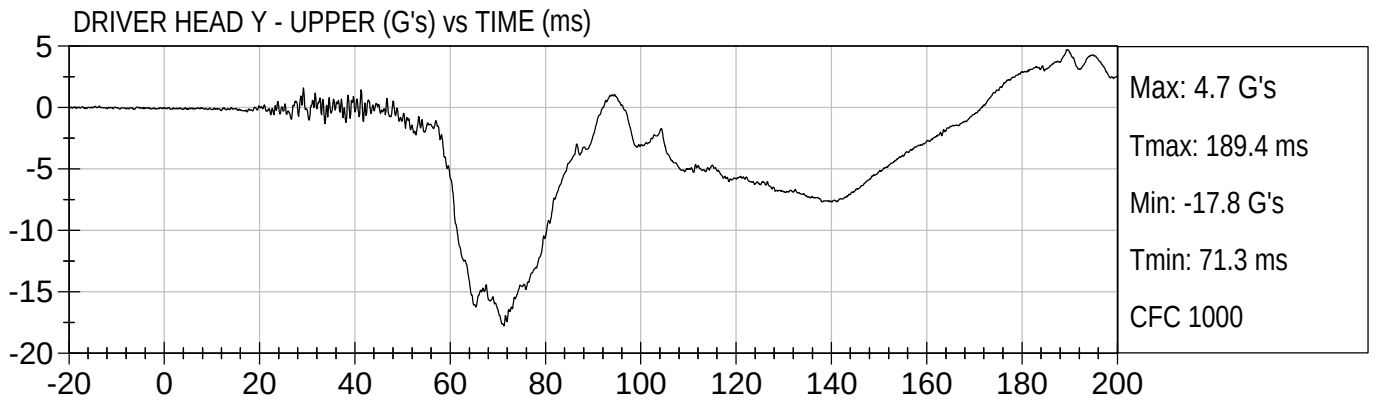
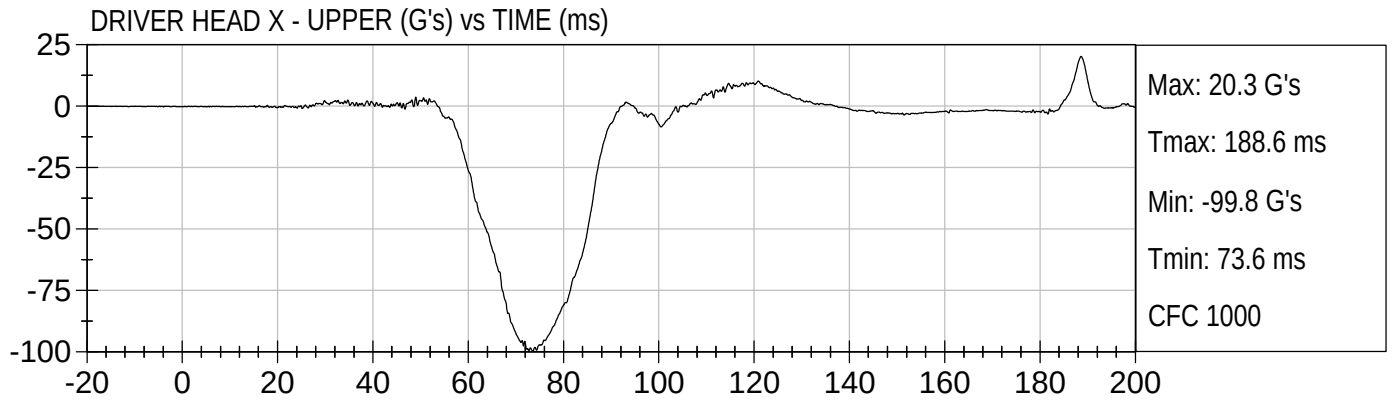
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Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

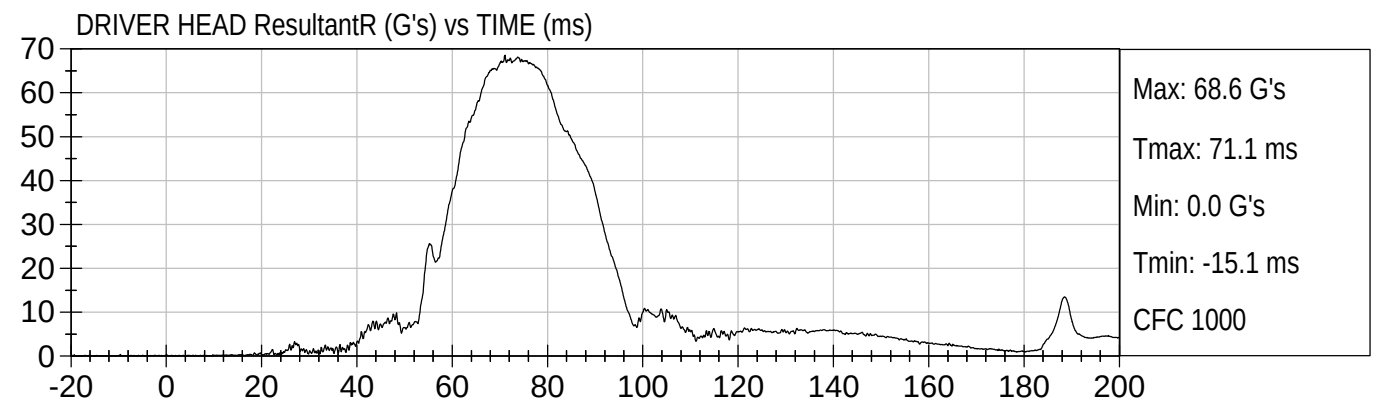
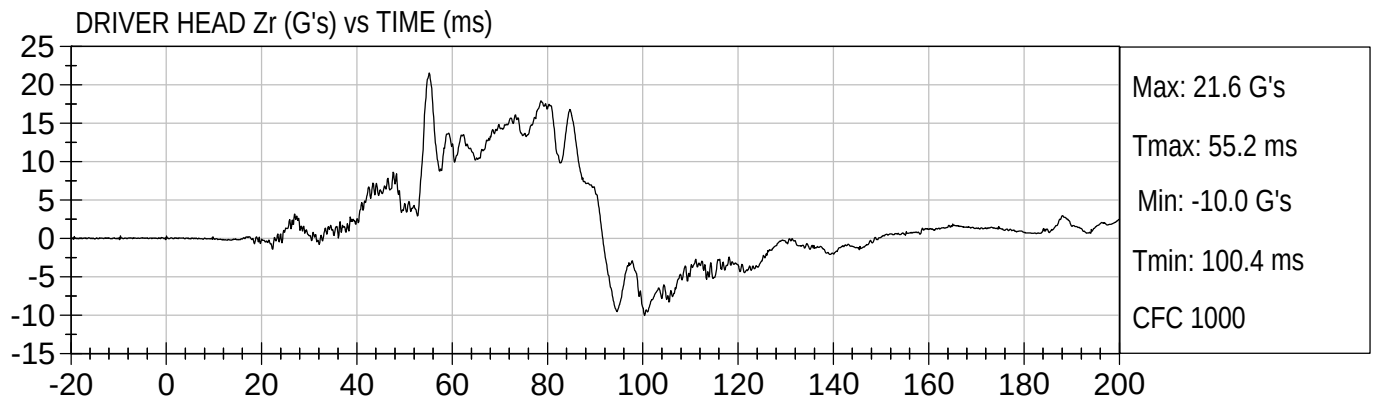
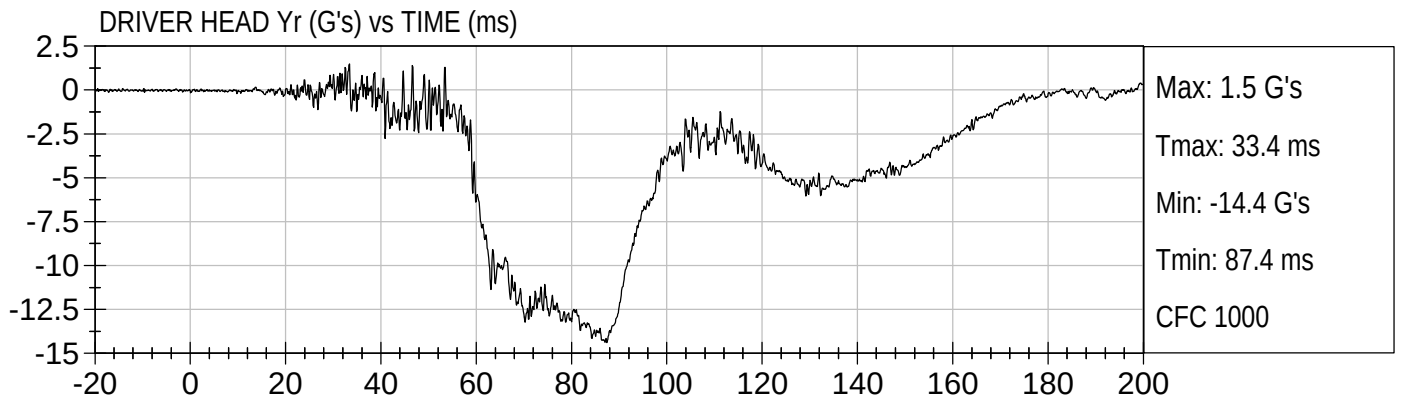
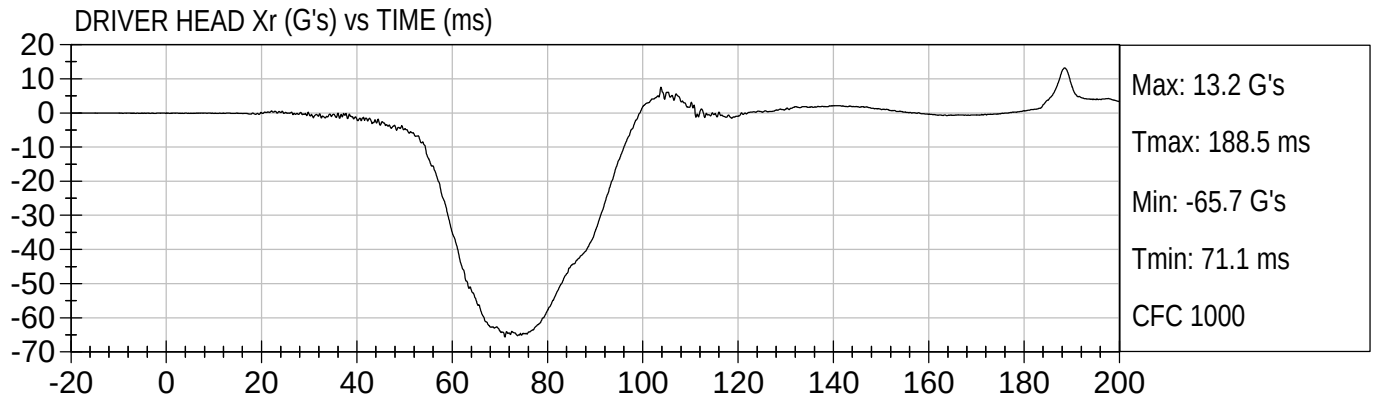
Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

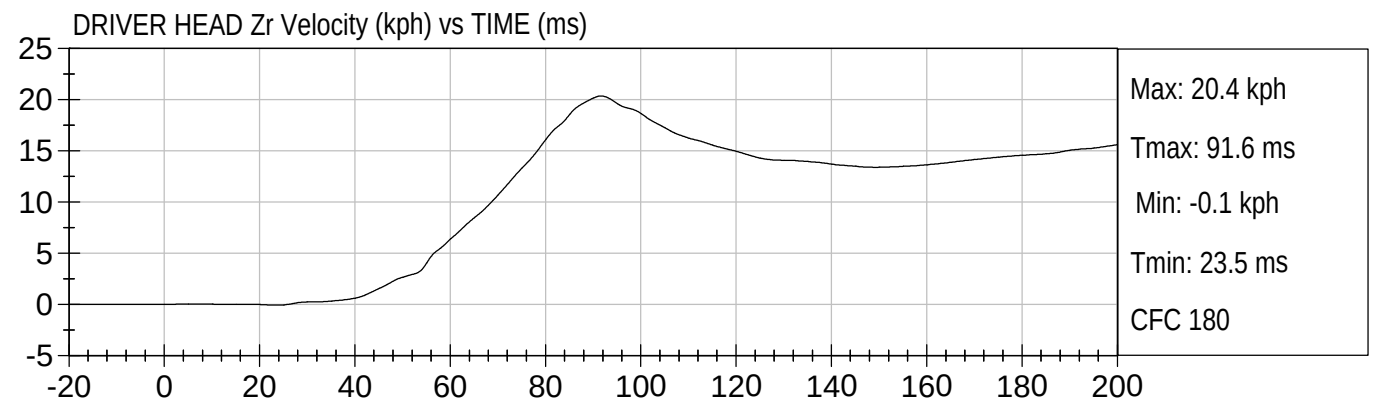
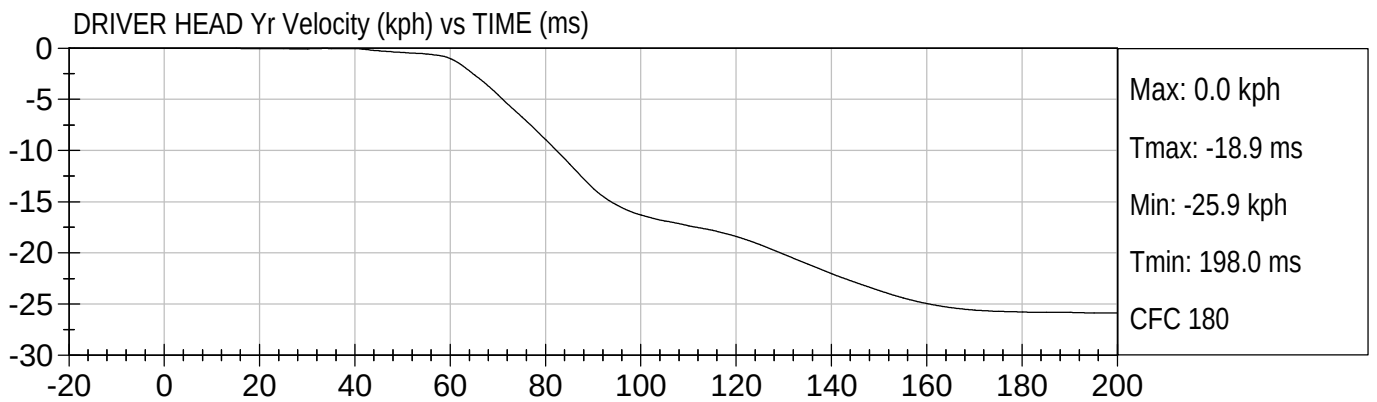
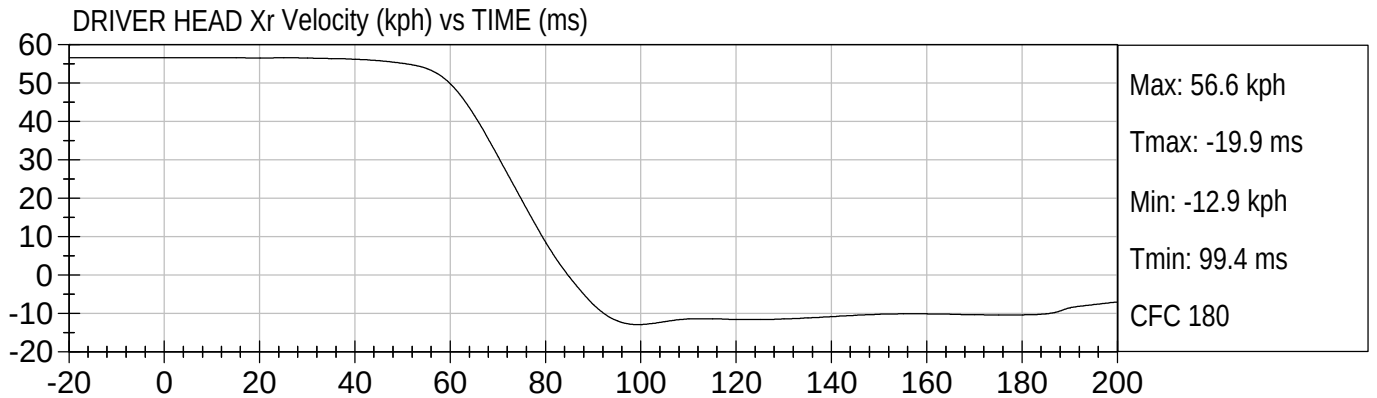




35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)



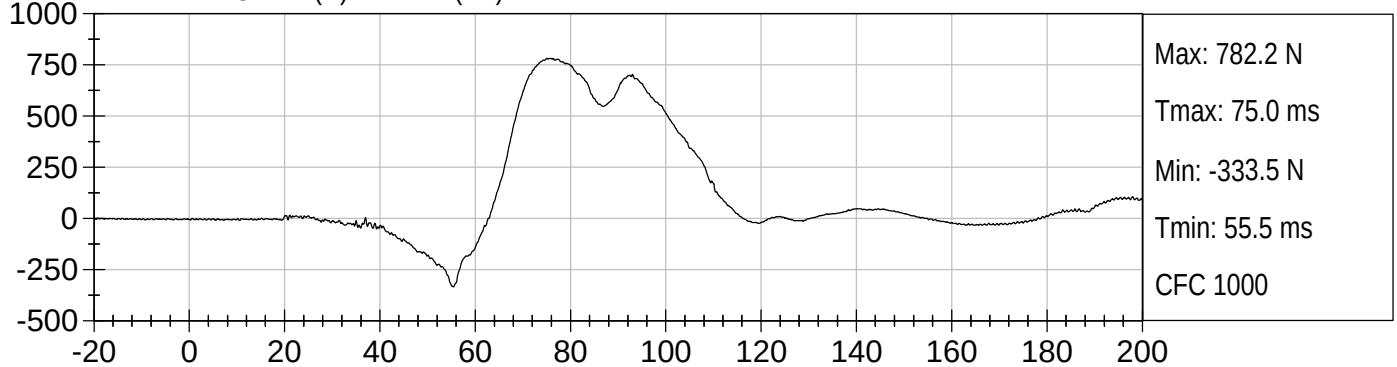




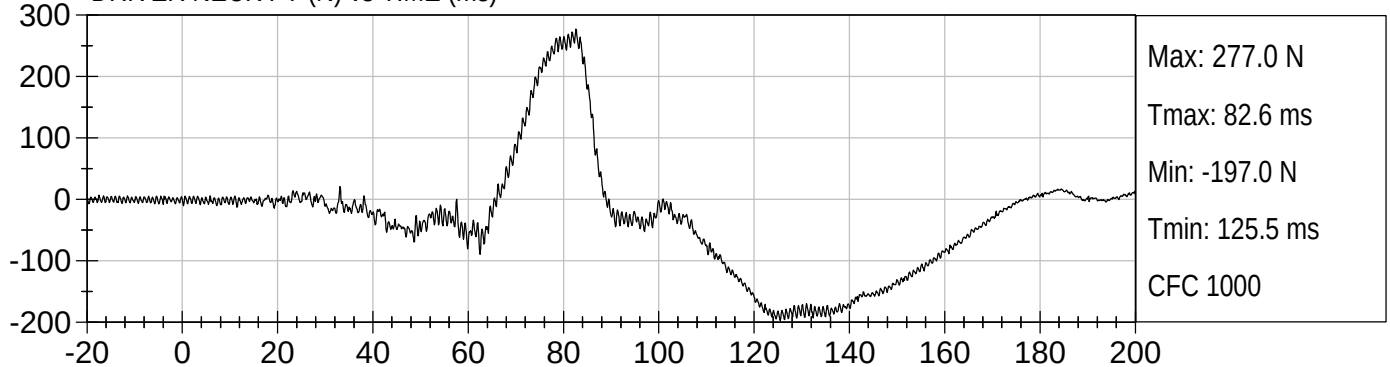
35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

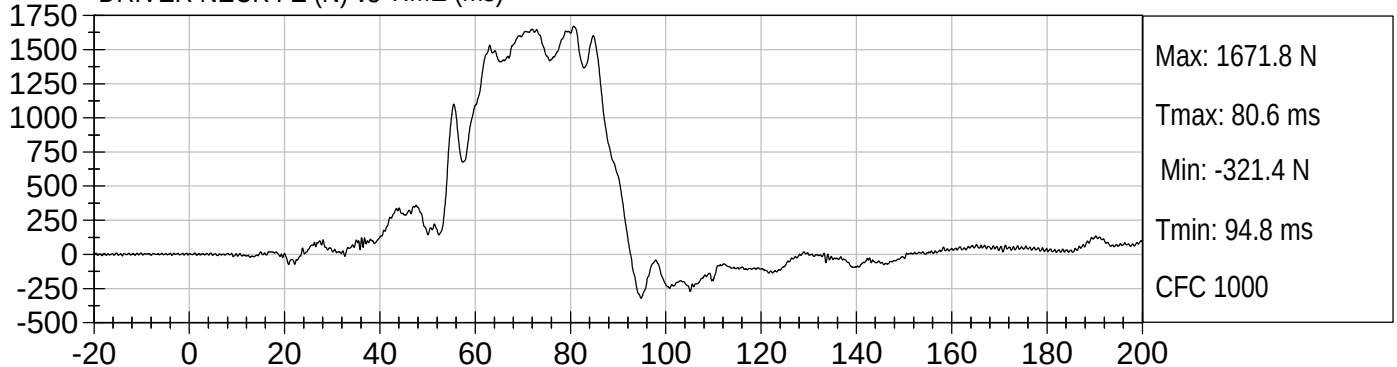
DRIVER NECK FX (N) vs TIME (ms)



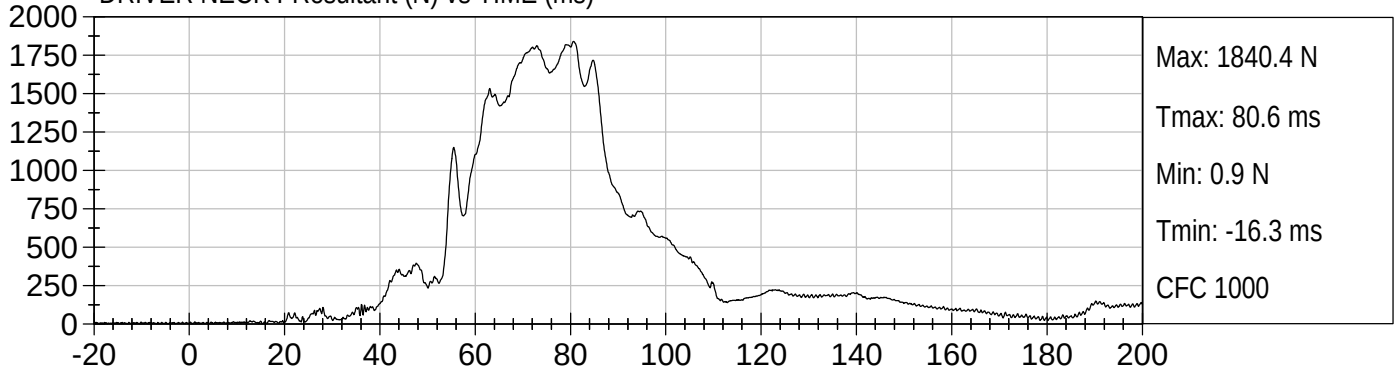
DRIVER NECK FY (N) vs TIME (ms)



DRIVER NECK FZ (N) vs TIME (ms)



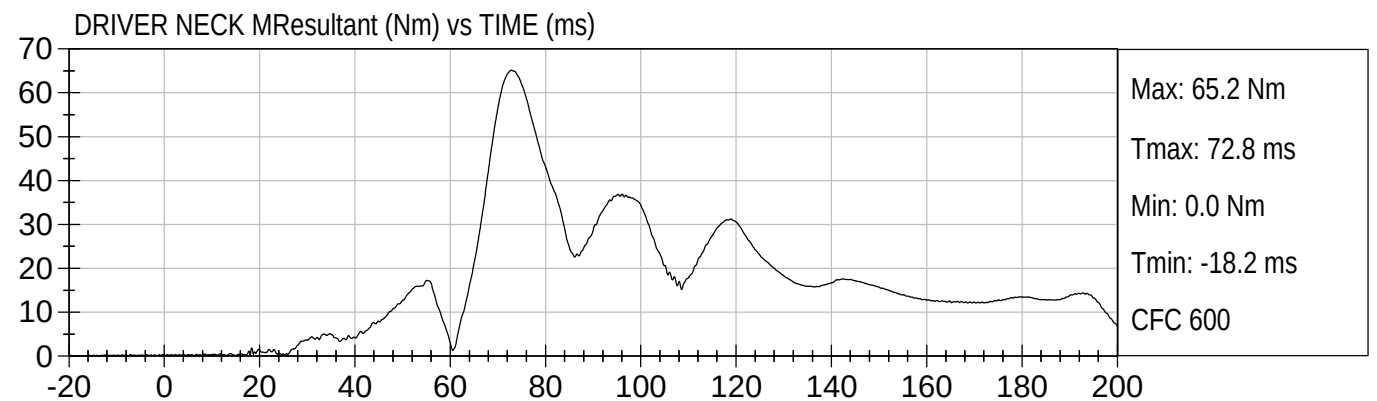
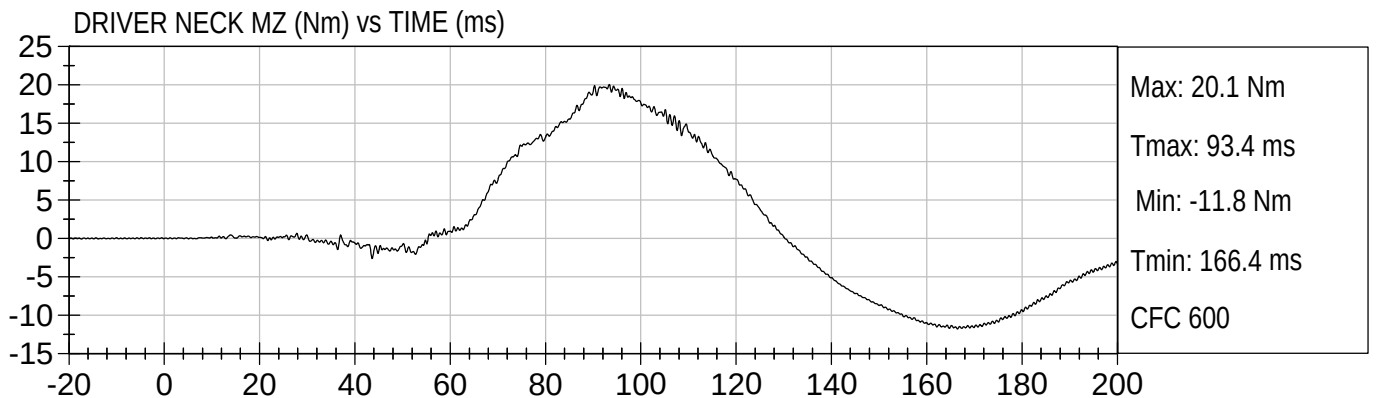
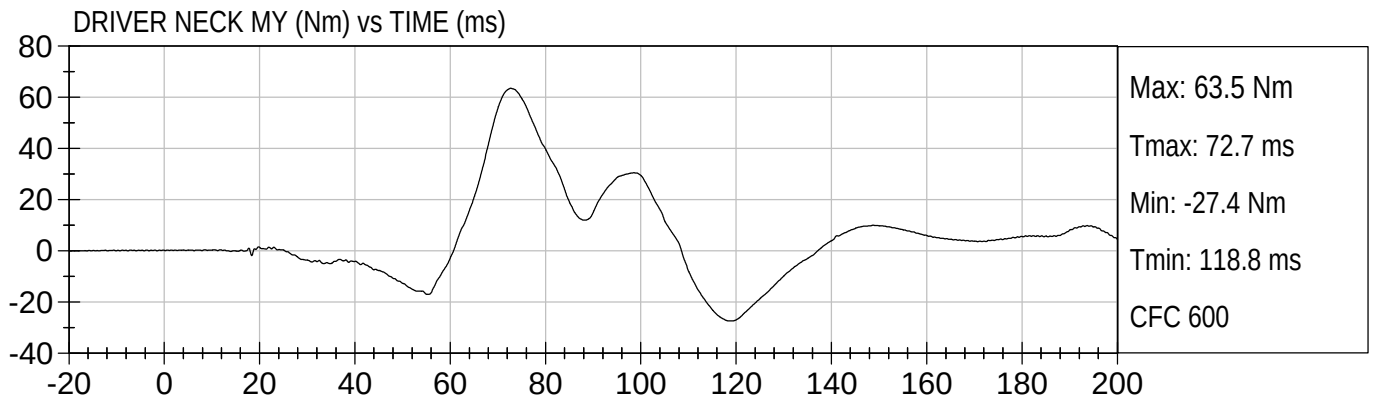
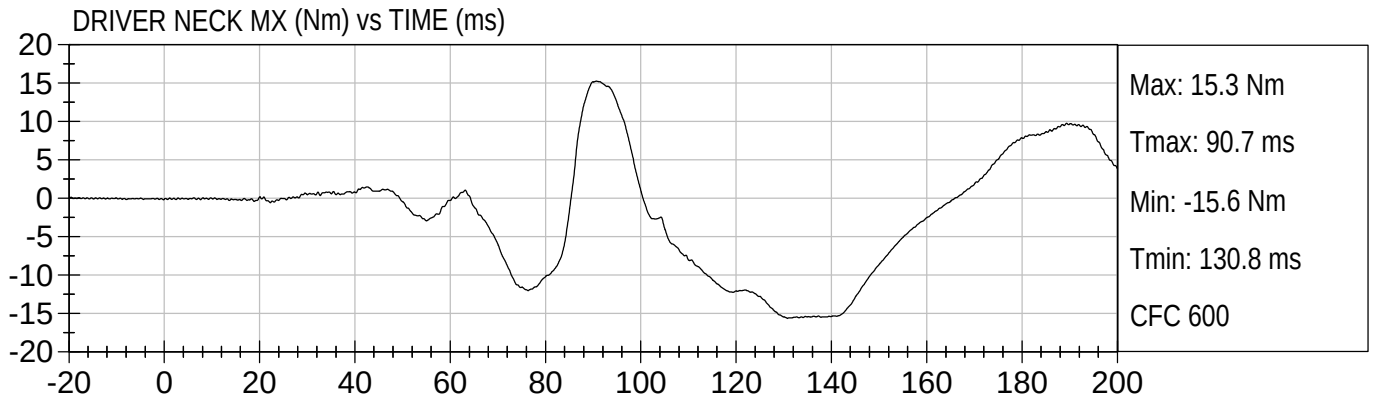
DRIVER NECK FResultant (N) vs TIME (ms)





35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

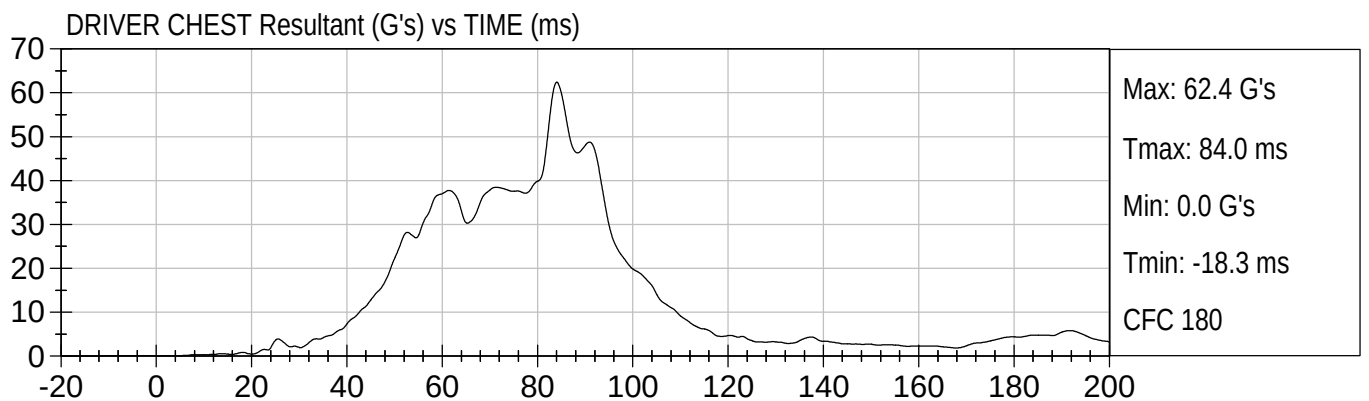
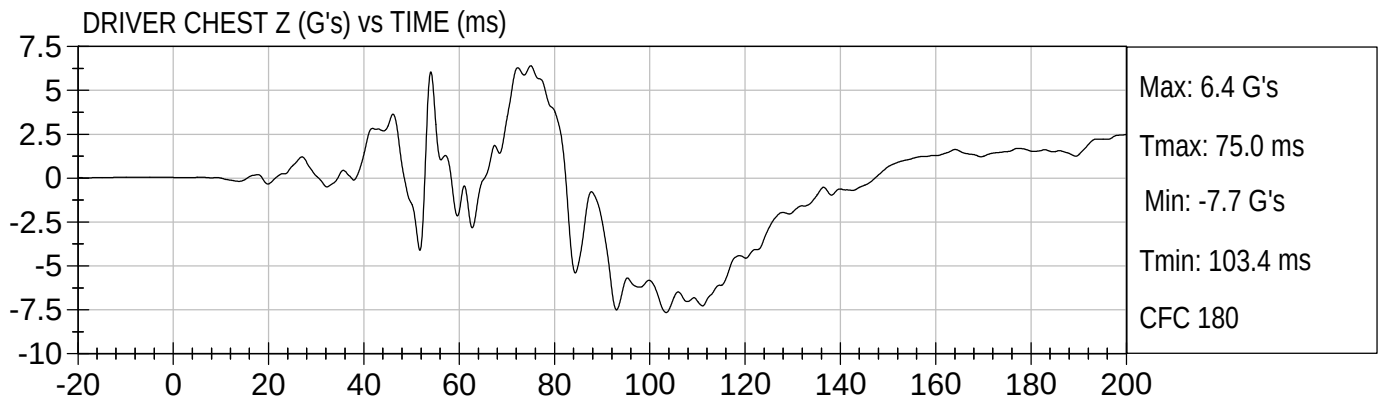
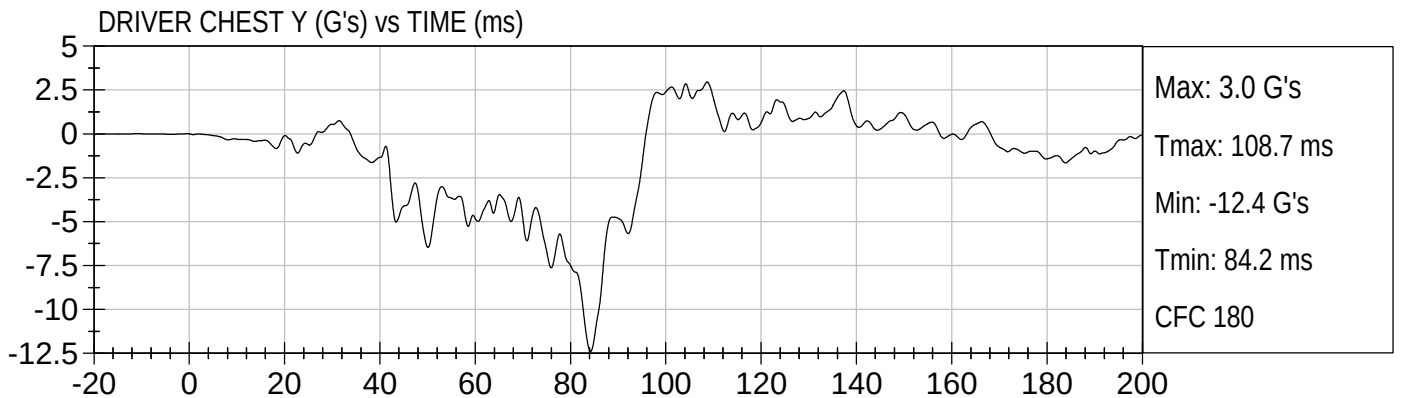
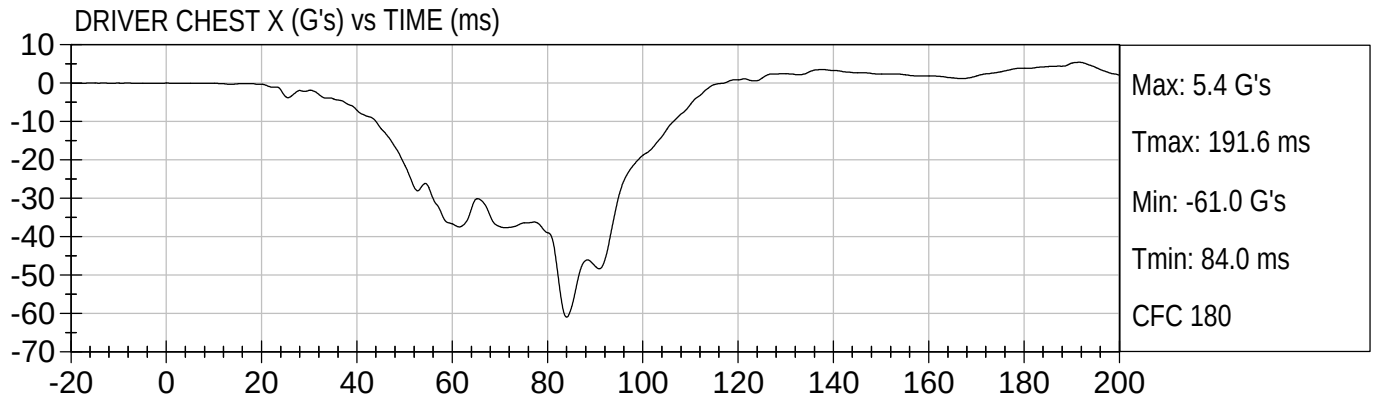
Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

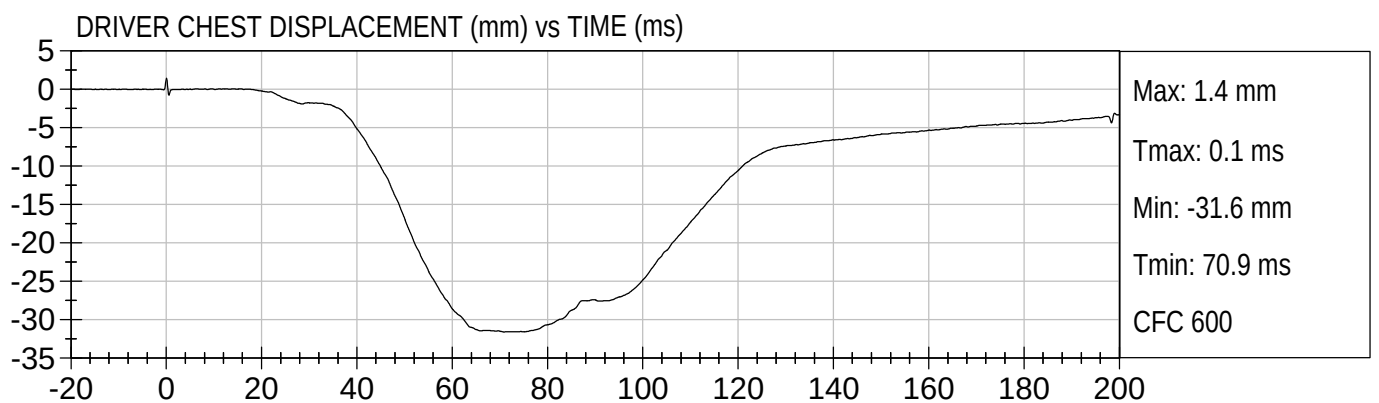
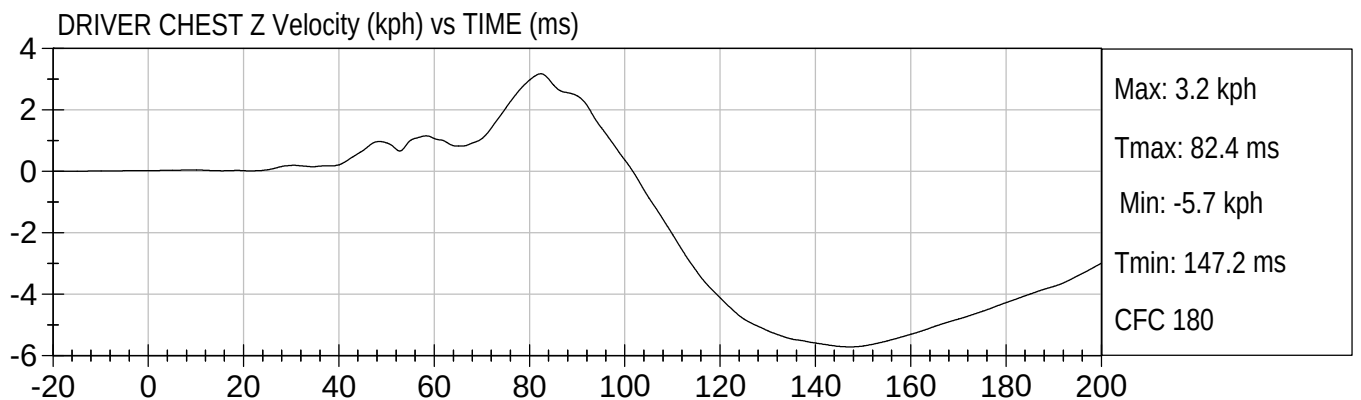
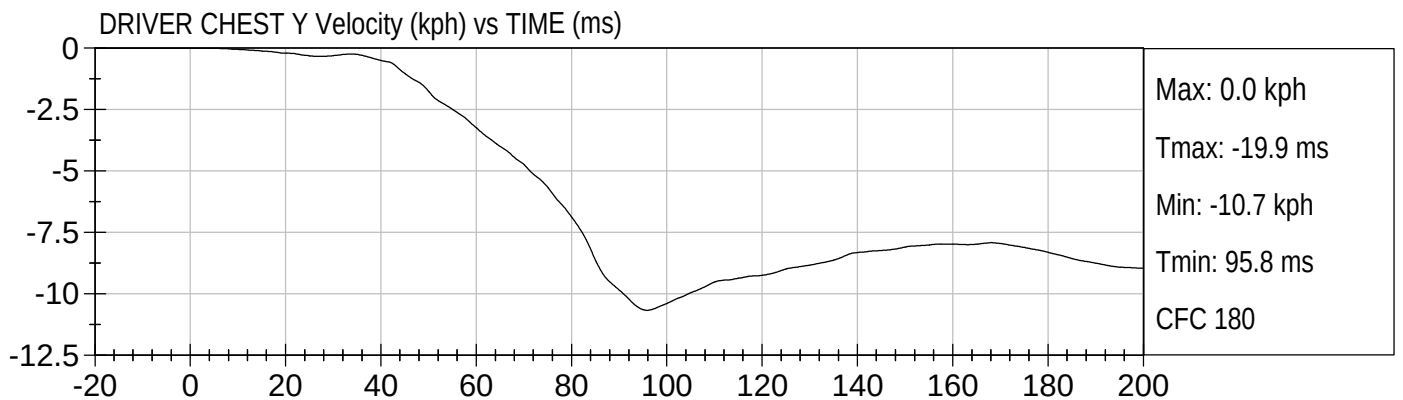
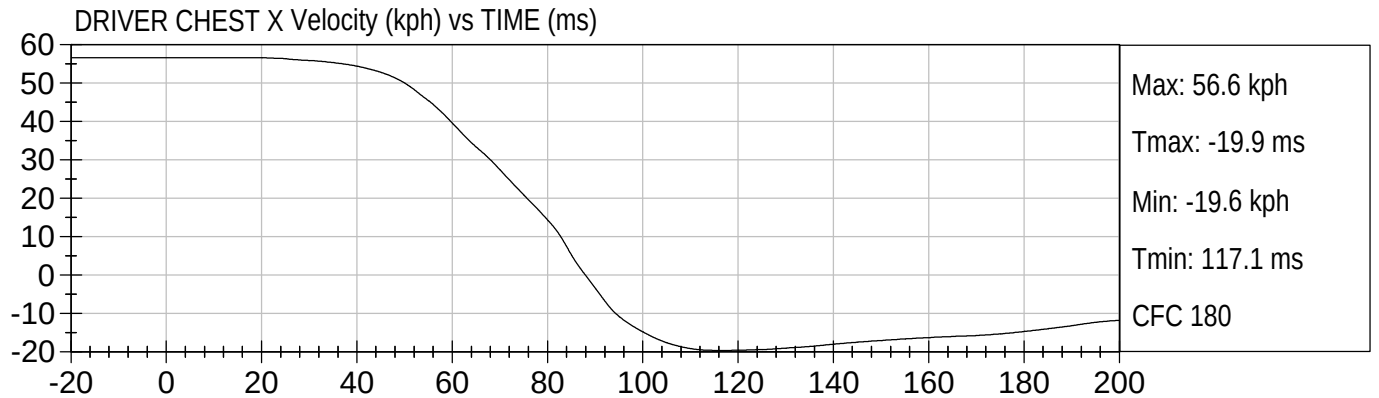




35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

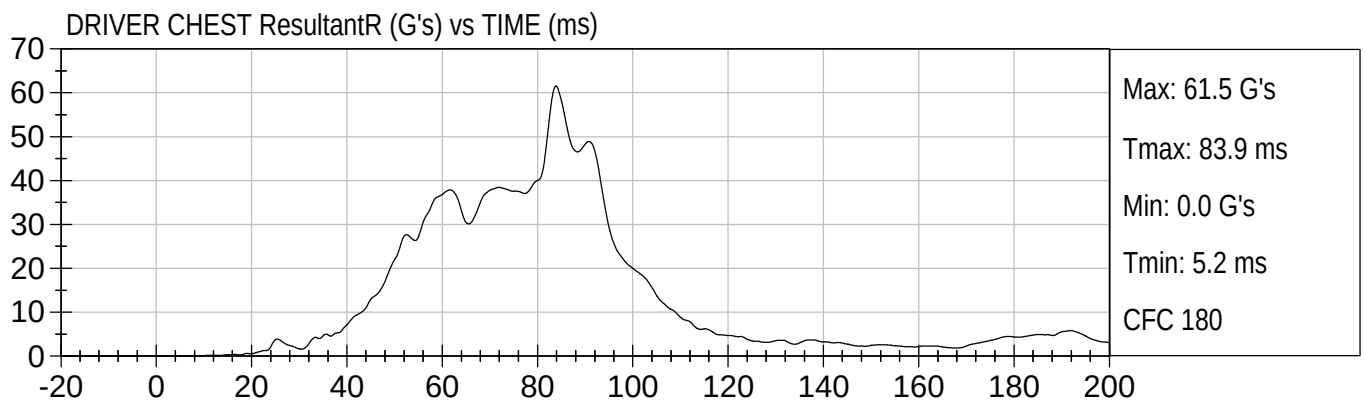
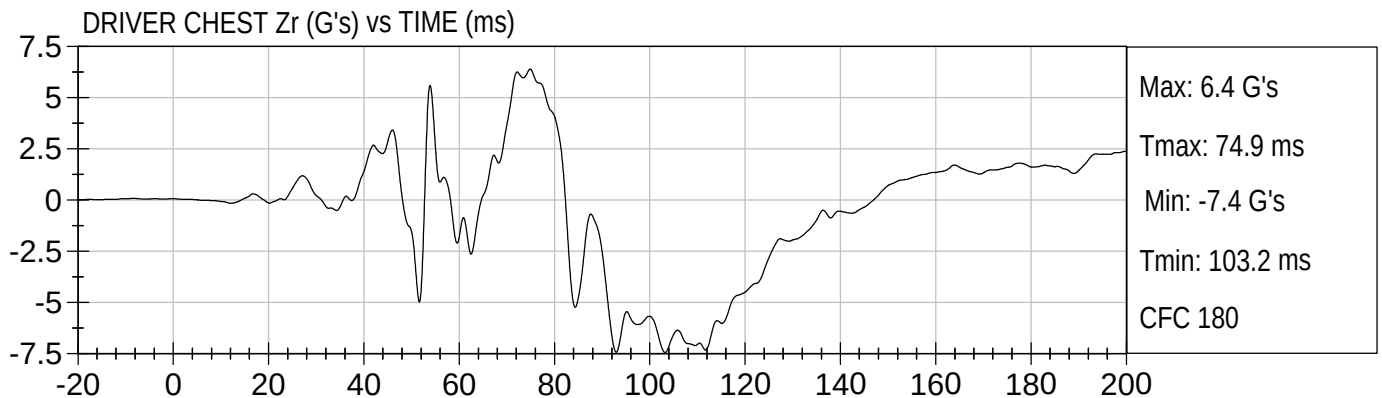
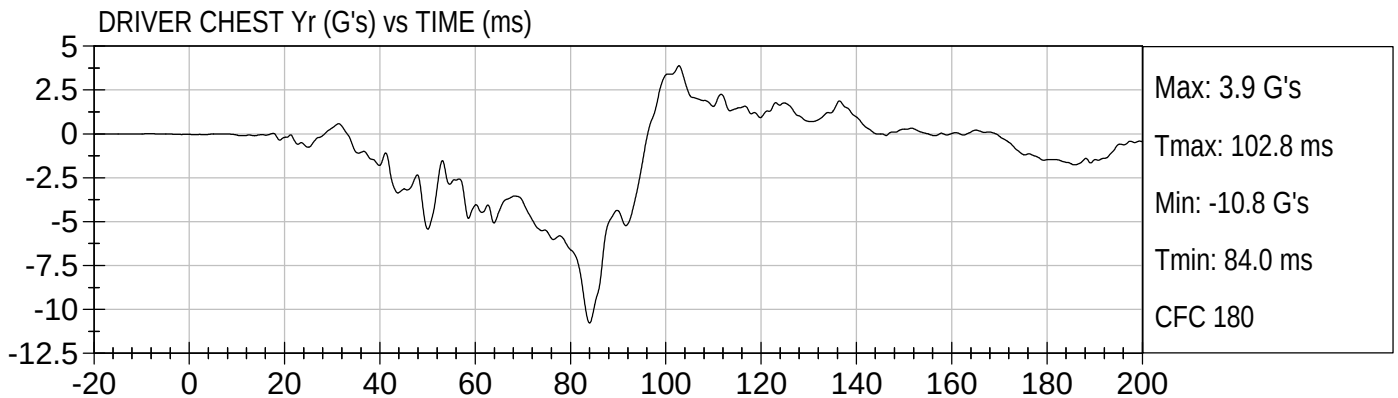
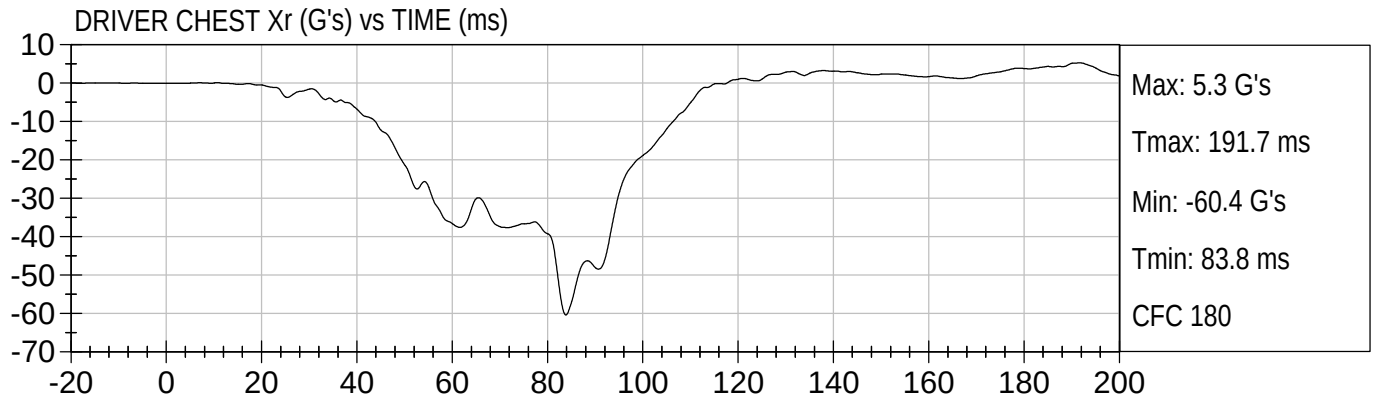


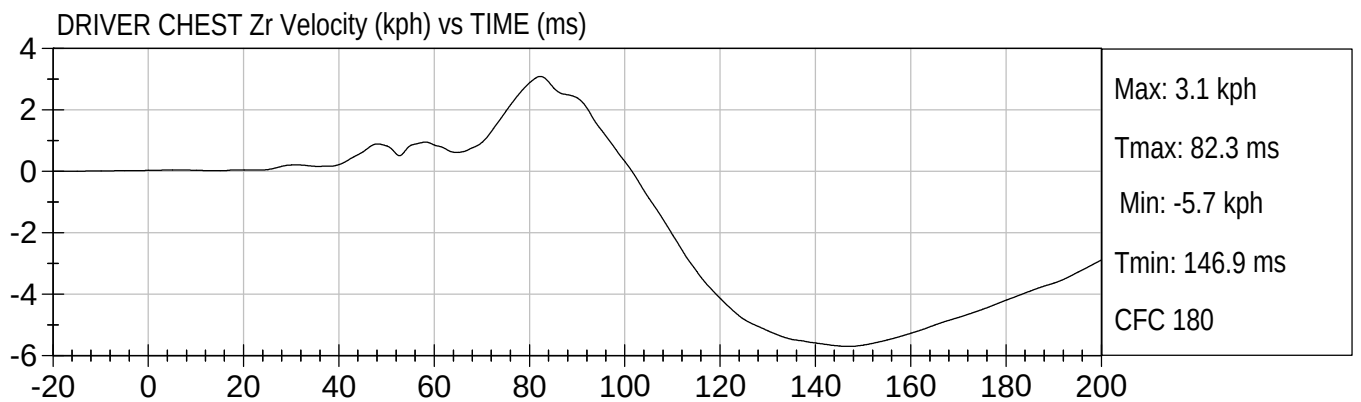
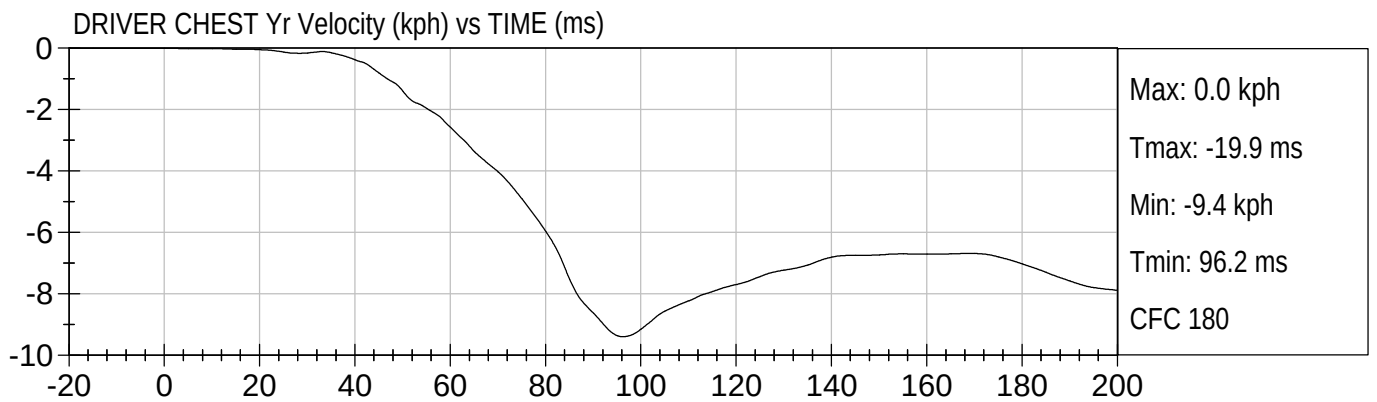
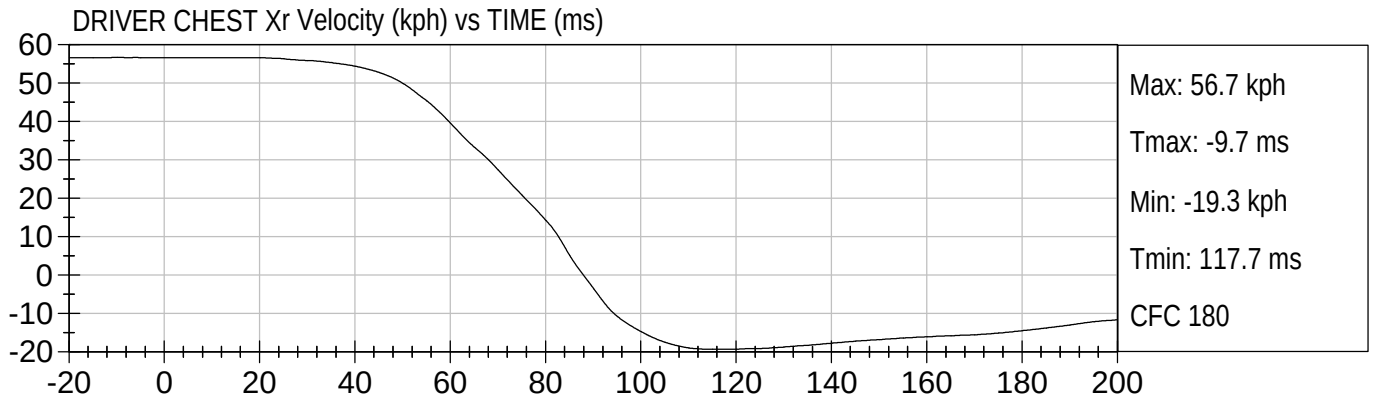




35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

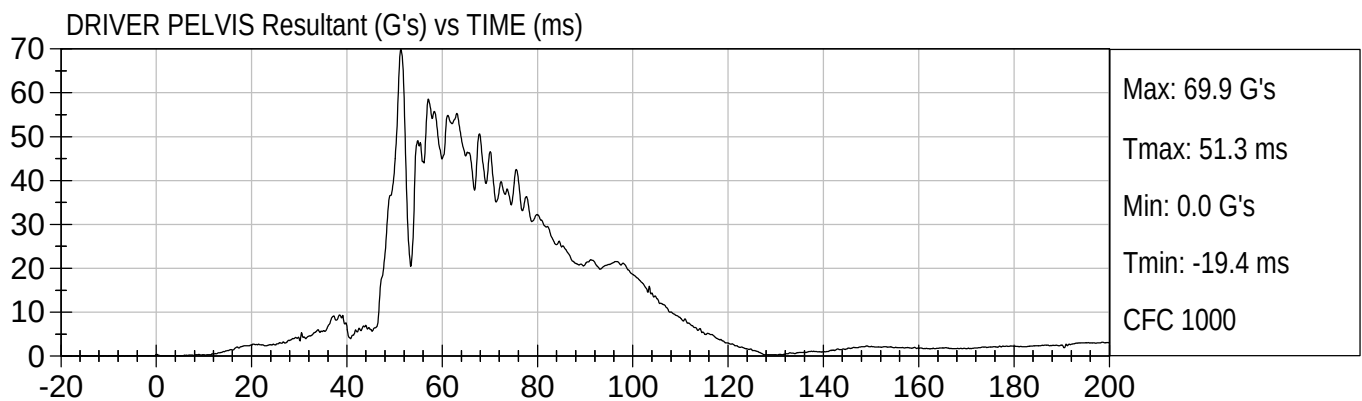
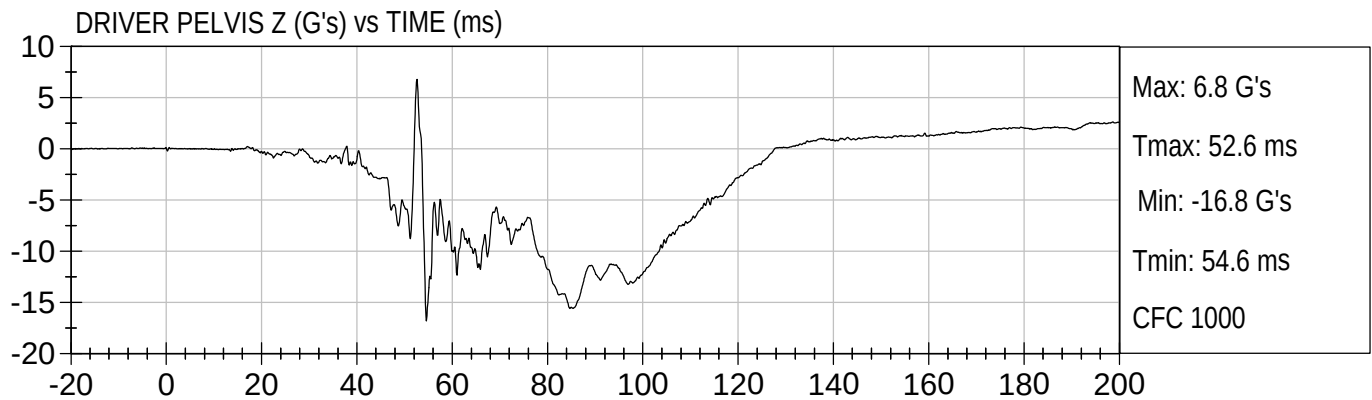
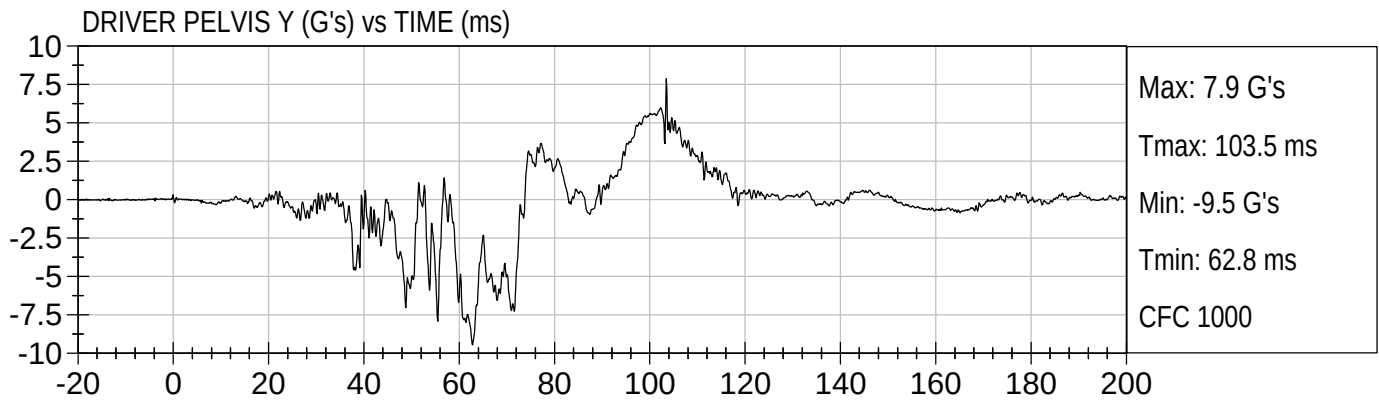
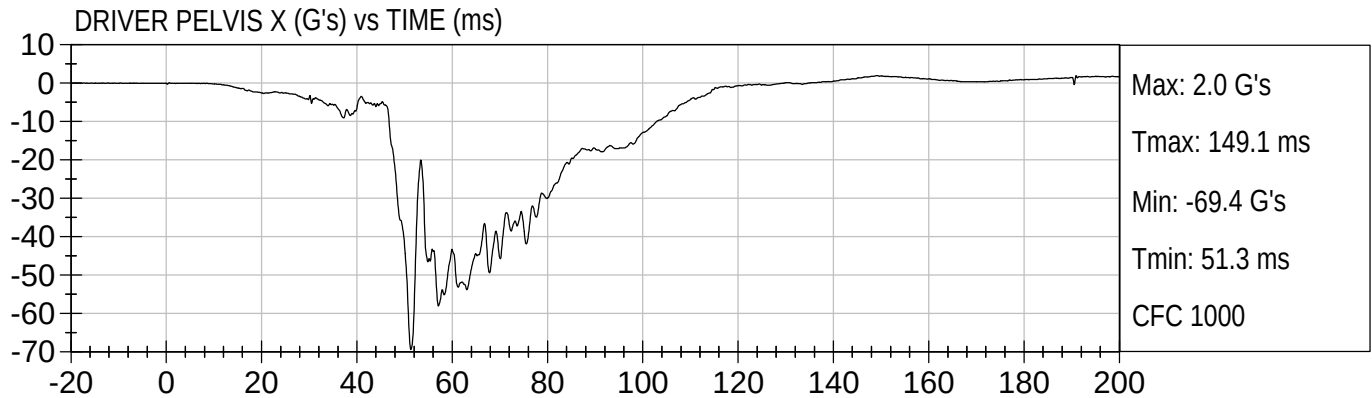


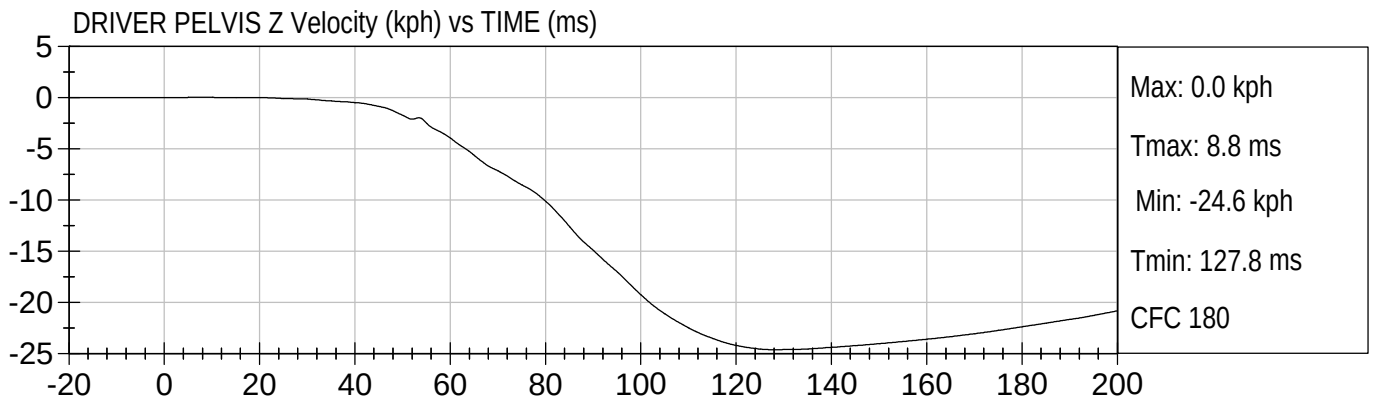
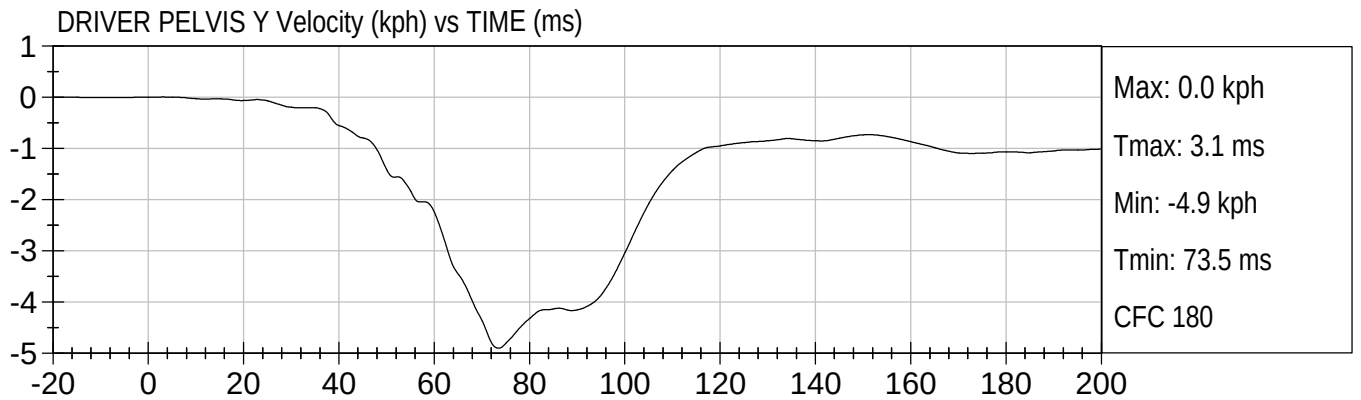
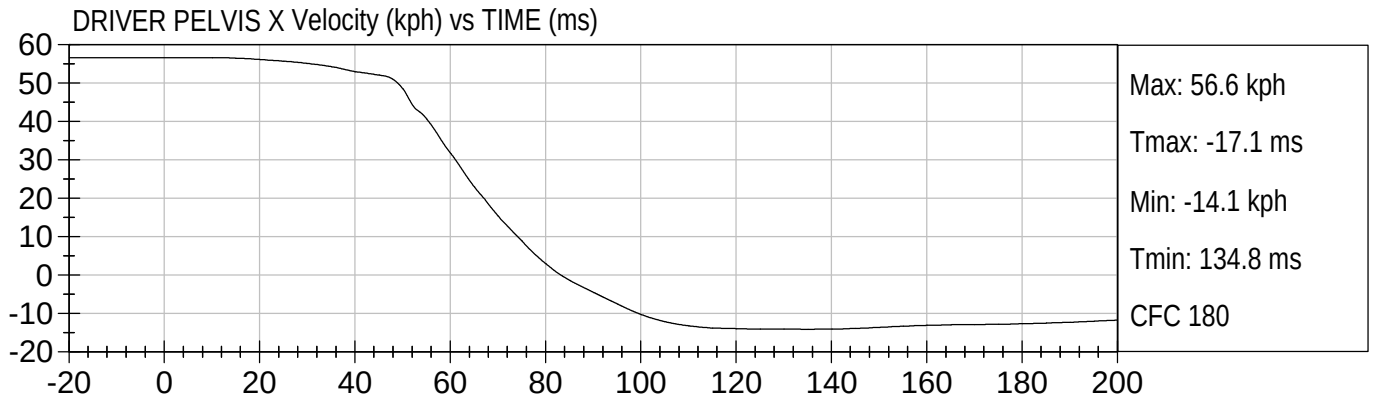




35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

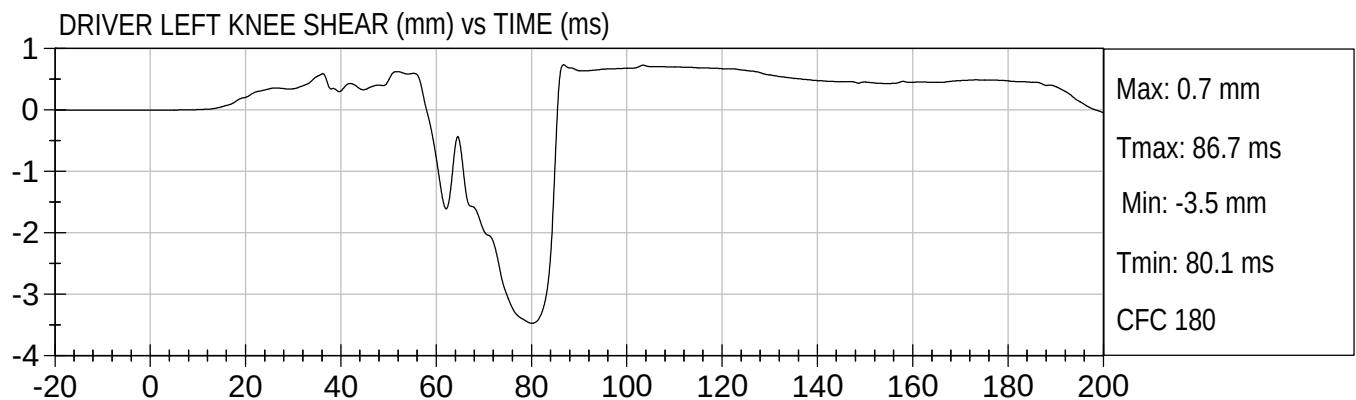
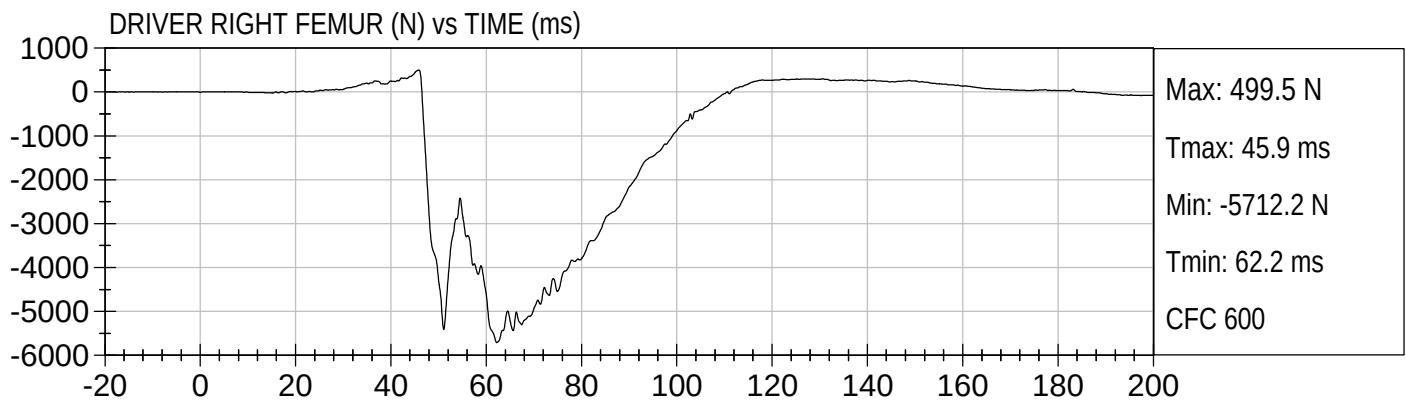
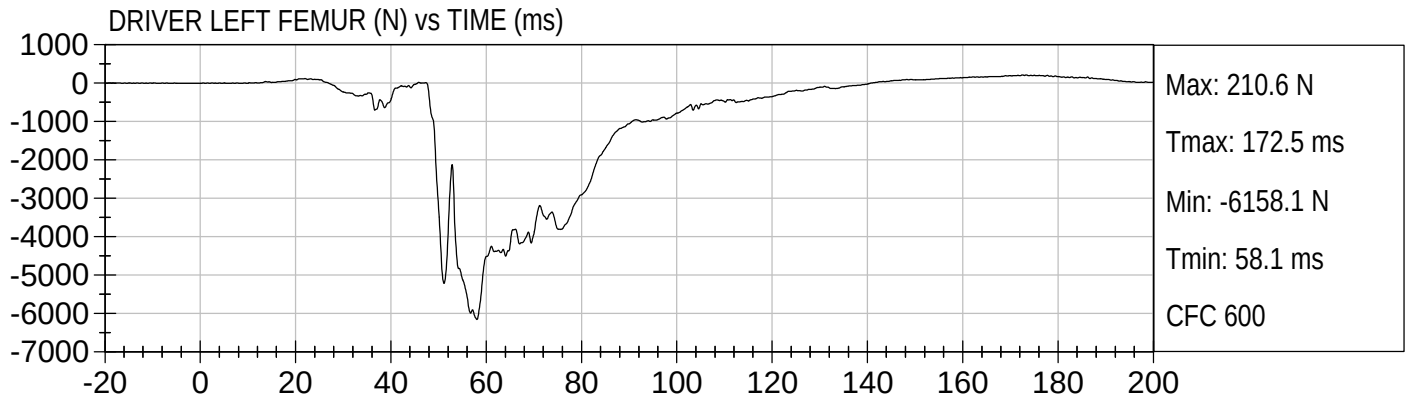






35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)



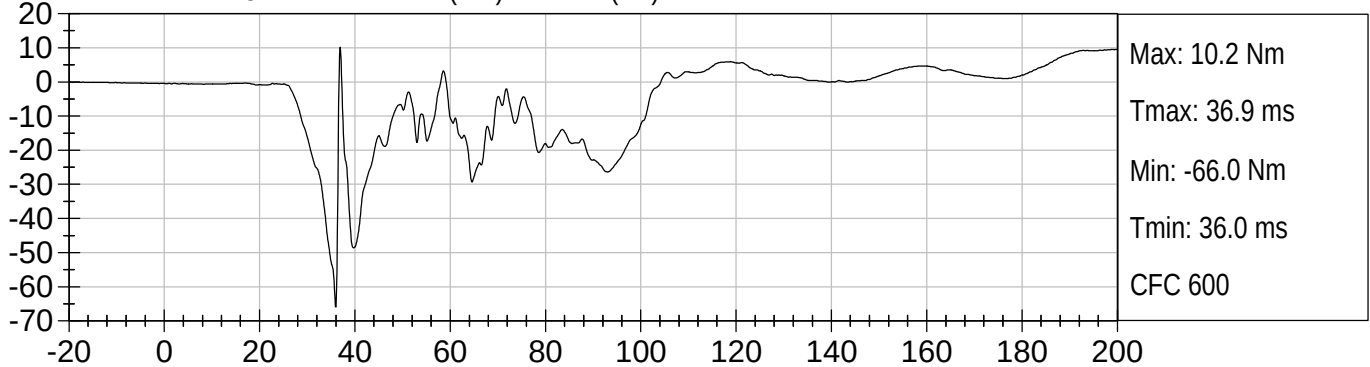
DRIVER RIGHT KNEE SHEAR (mm) vs TIME (ms)
NO VALID DATA COLLECTED



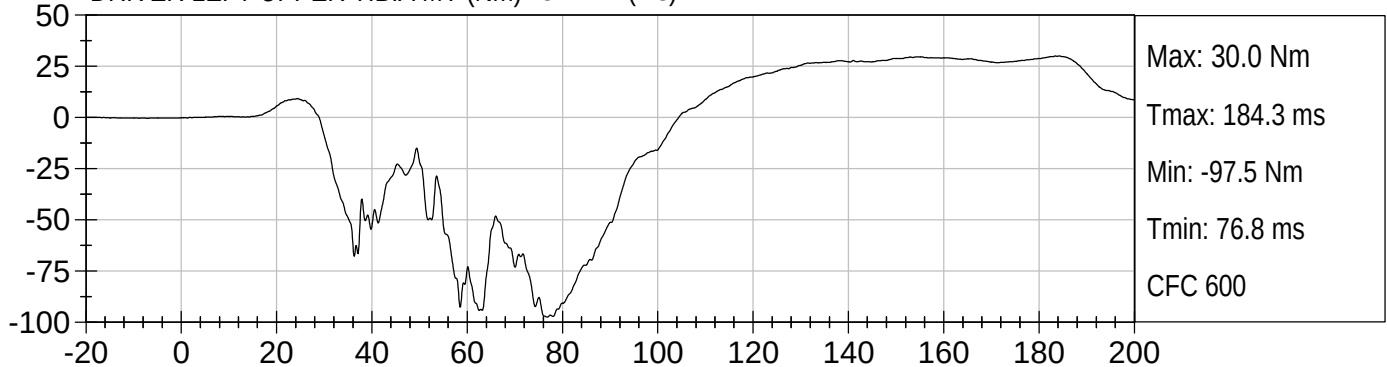
35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

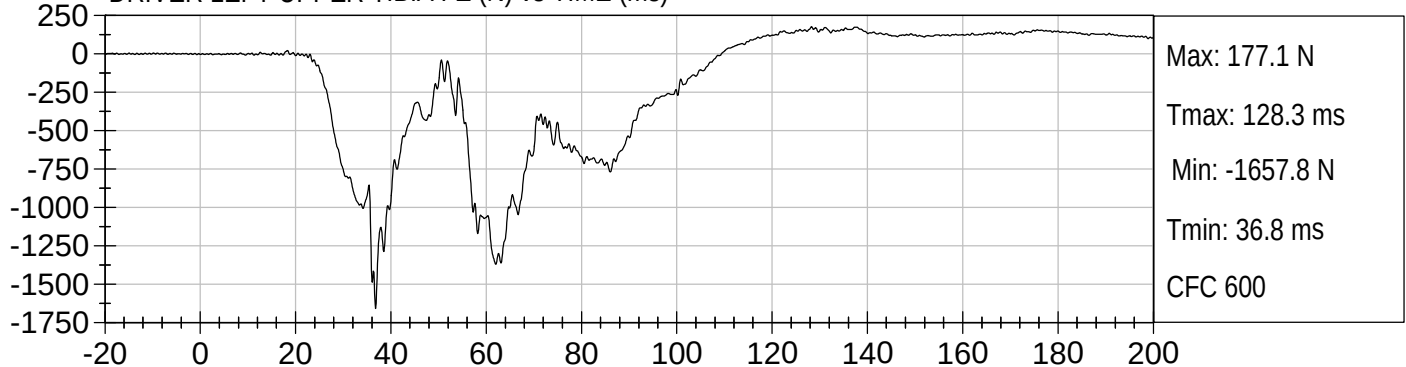
DRIVER LEFT UPPER TIBIA MX (Nm) vs TIME (ms)



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



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

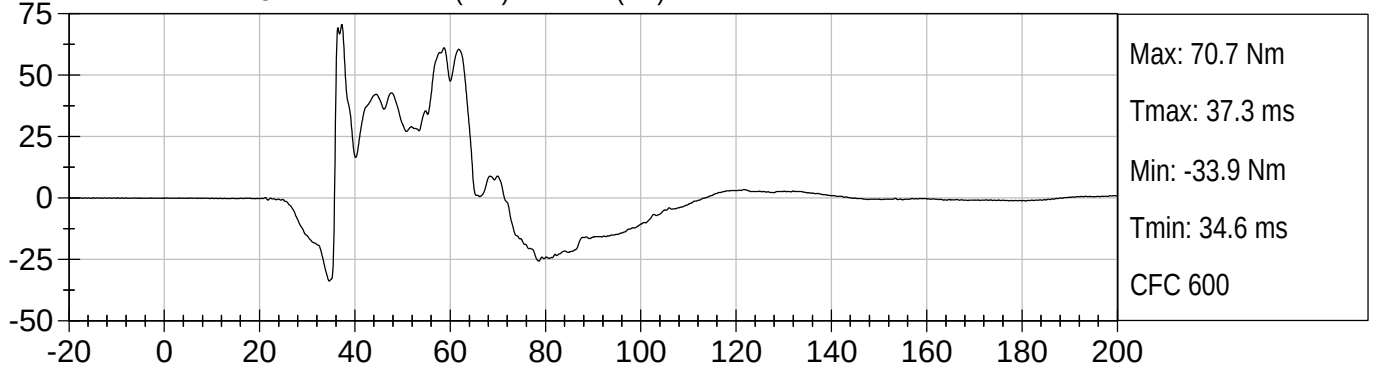




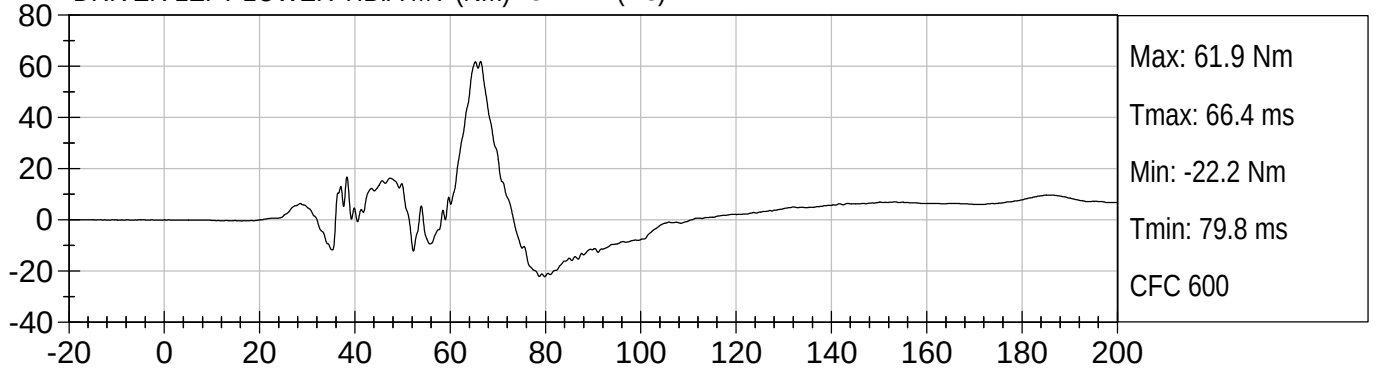
35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

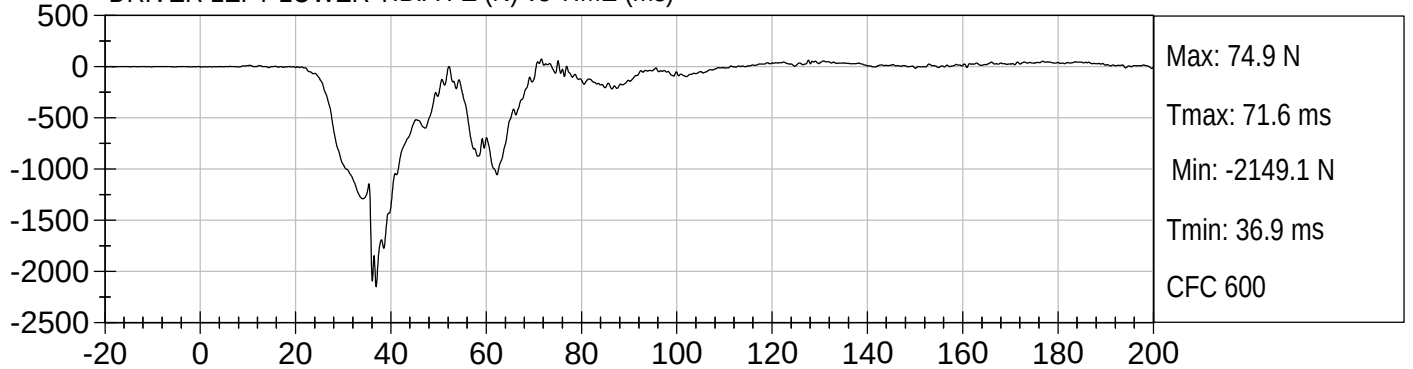
DRIVER LEFT LOWER TIBIA MX (Nm) vs TIME (ms)



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



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

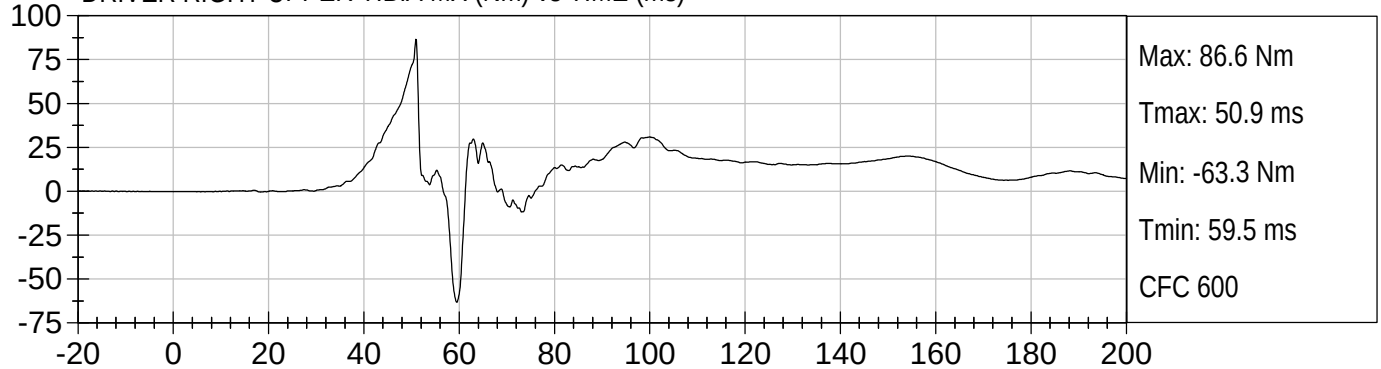




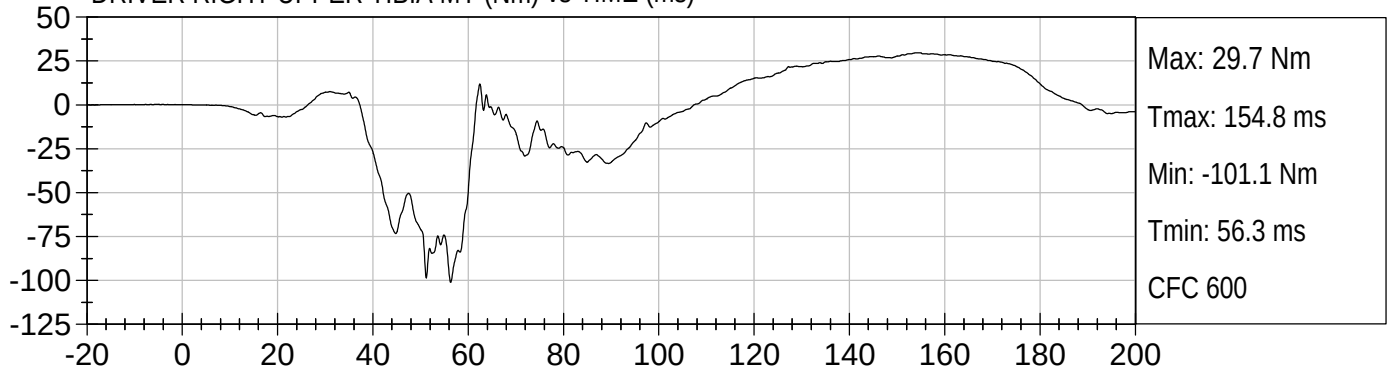
35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

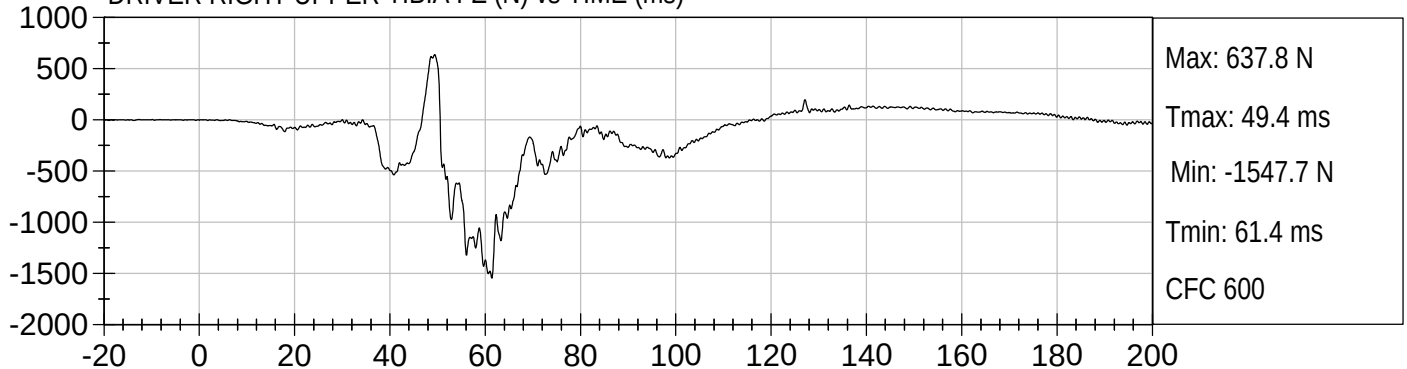
DRIVER RIGHT UPPER TIBIA MX (Nm) vs TIME (ms)



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



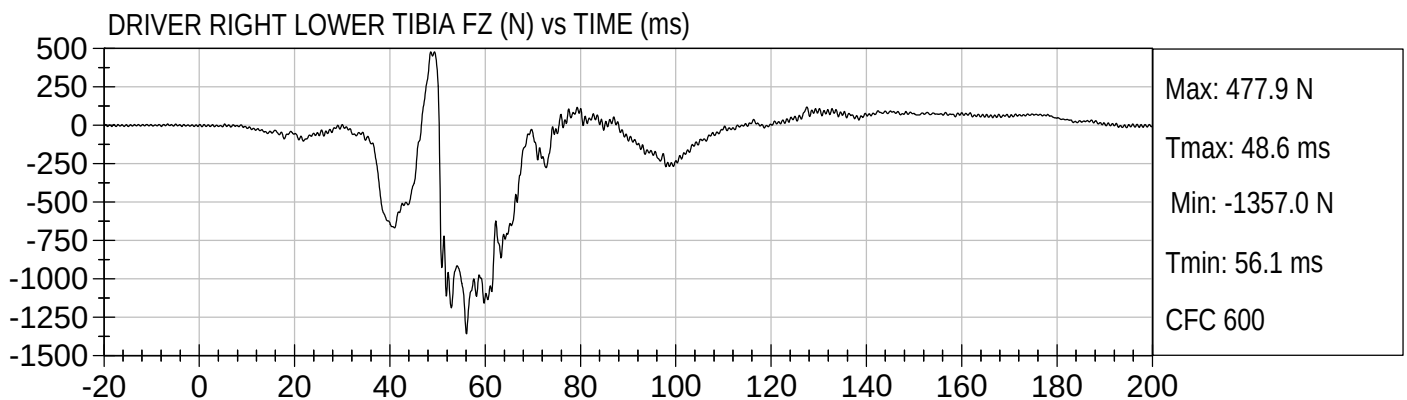
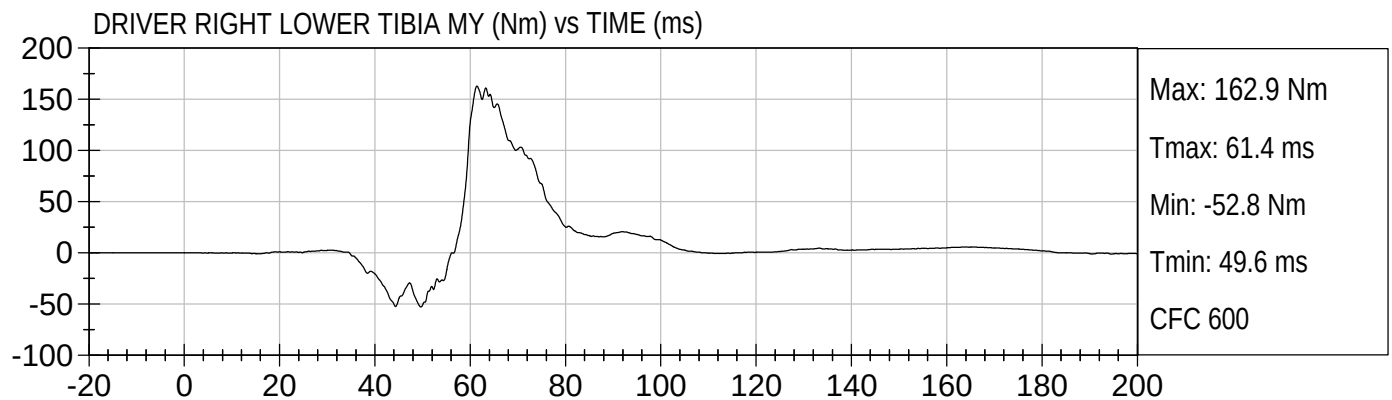
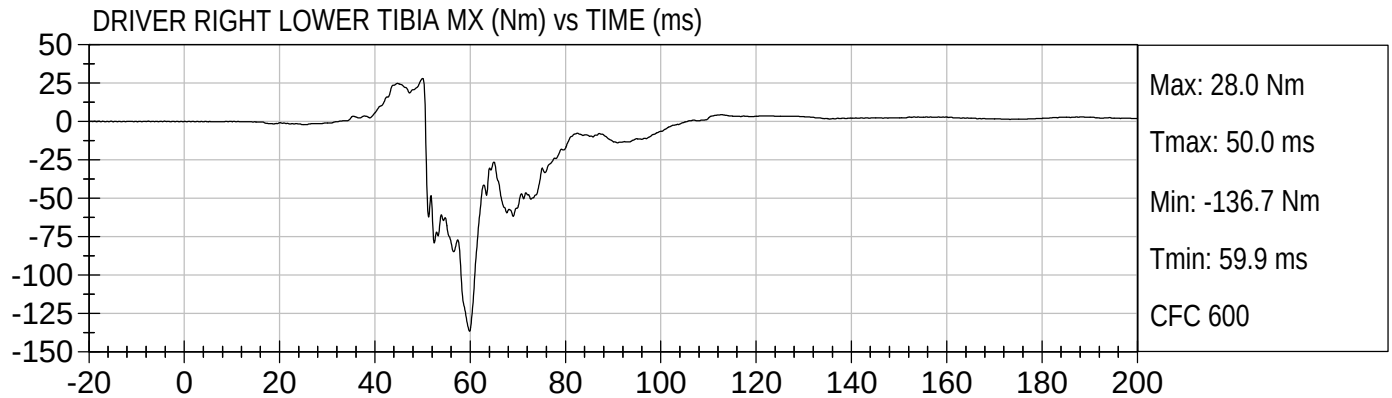
DRIVER RIGHT UPPER TIBIA FZ (N) vs TIME (ms)





35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

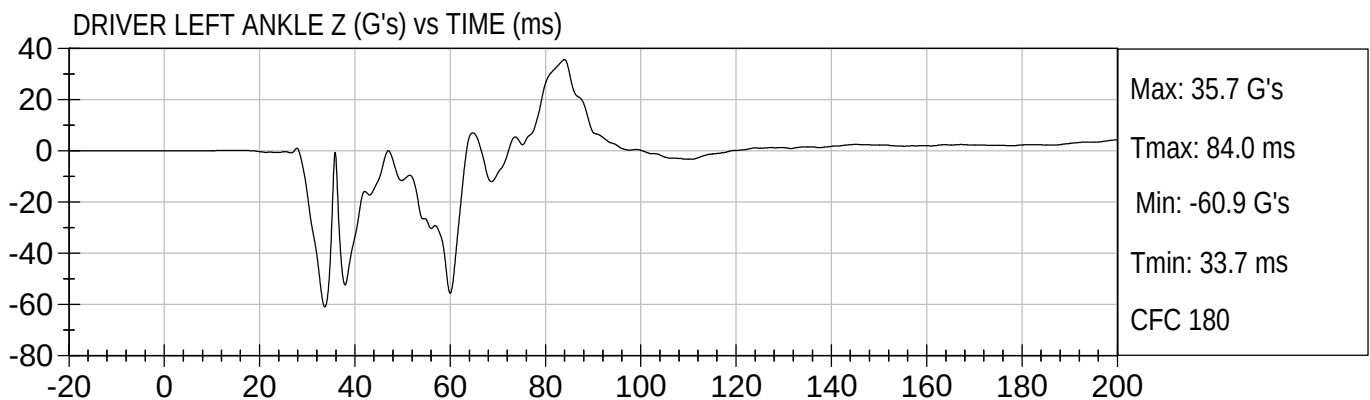
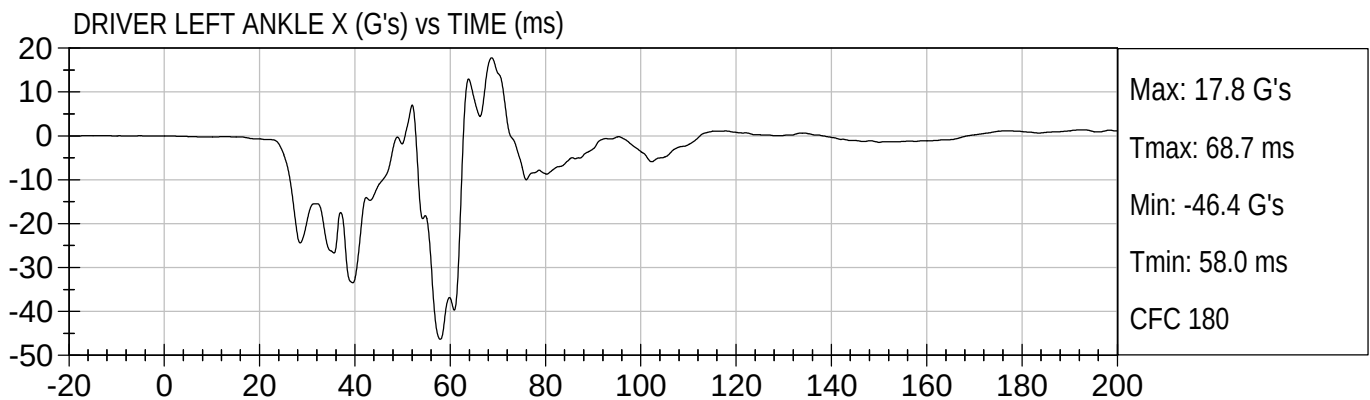
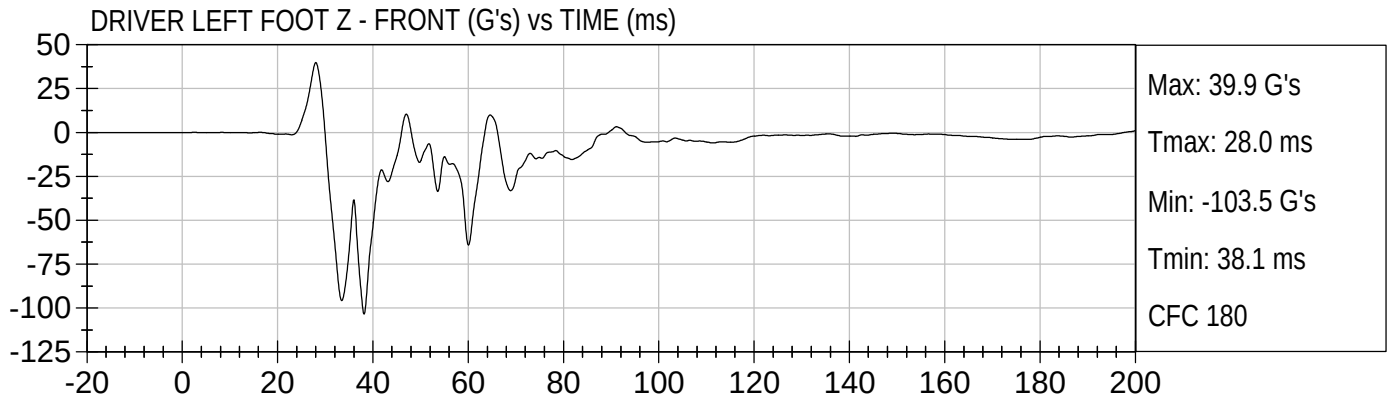
Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

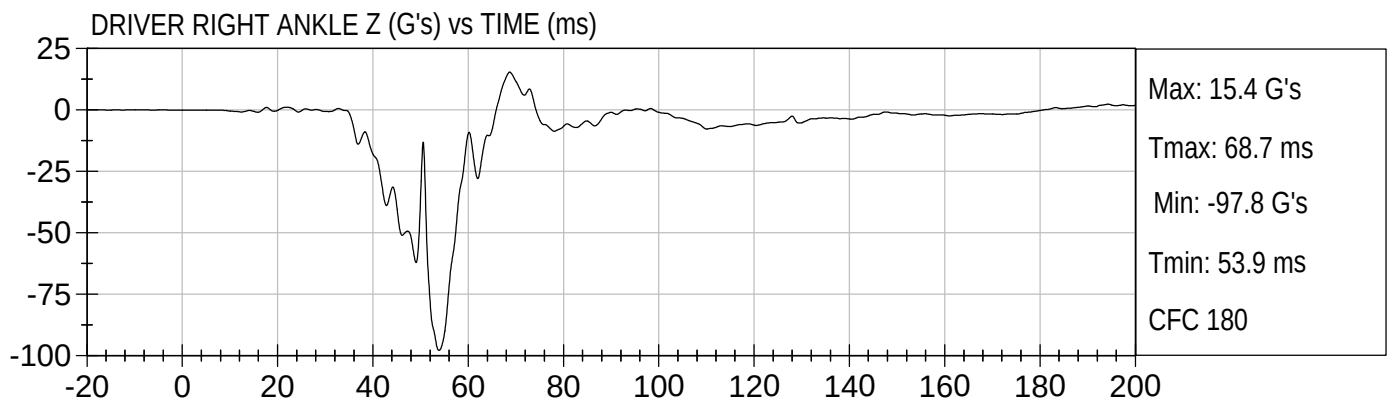
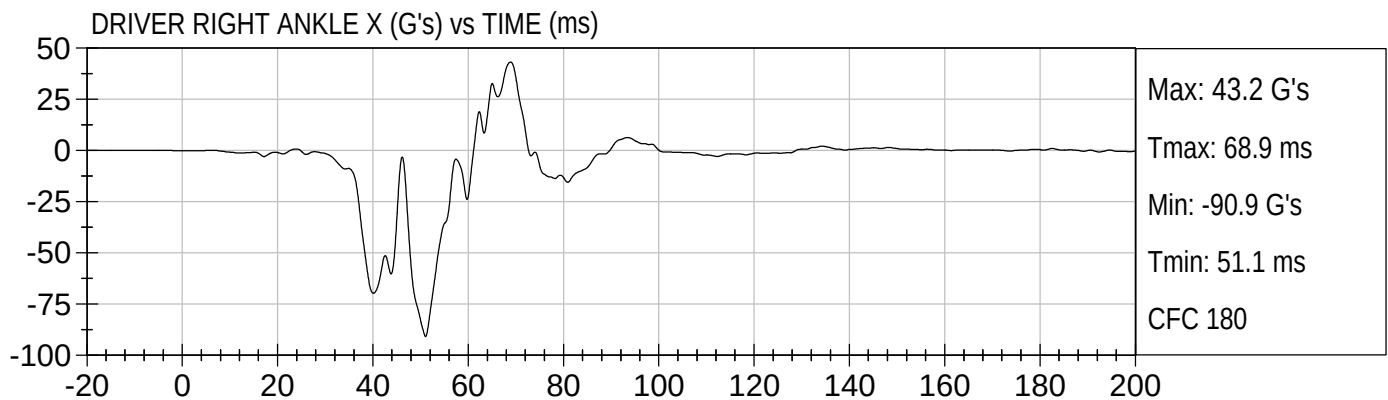
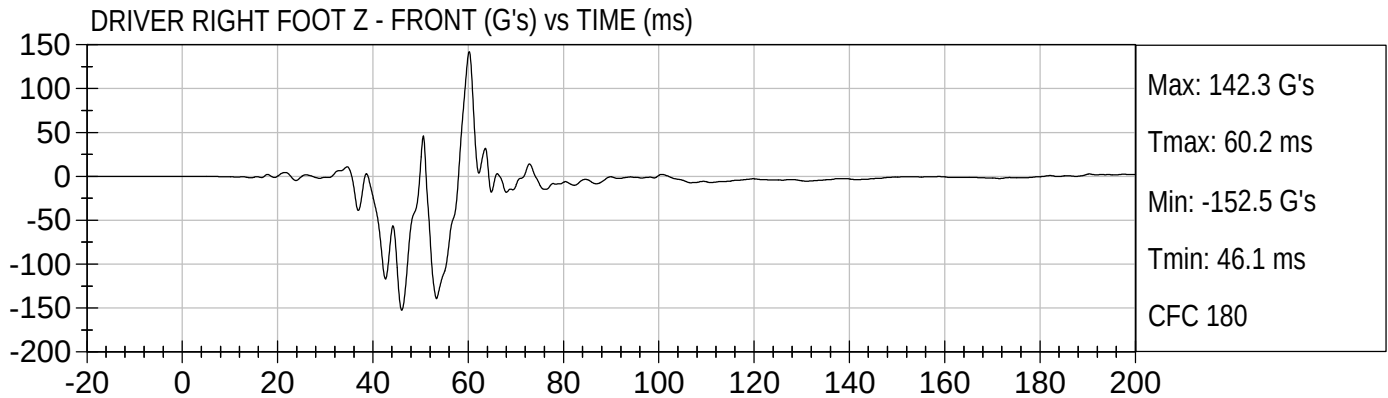
Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

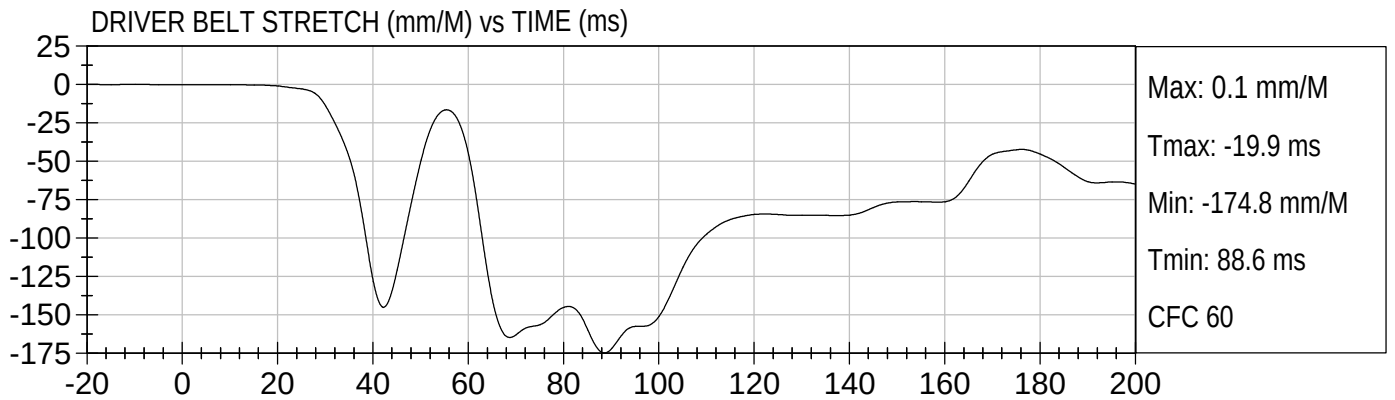
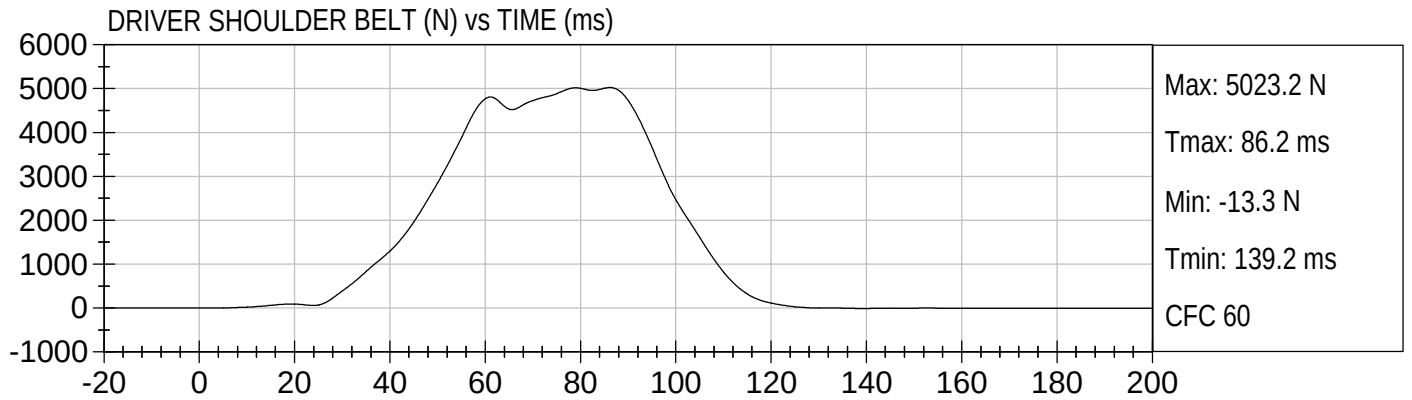
Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

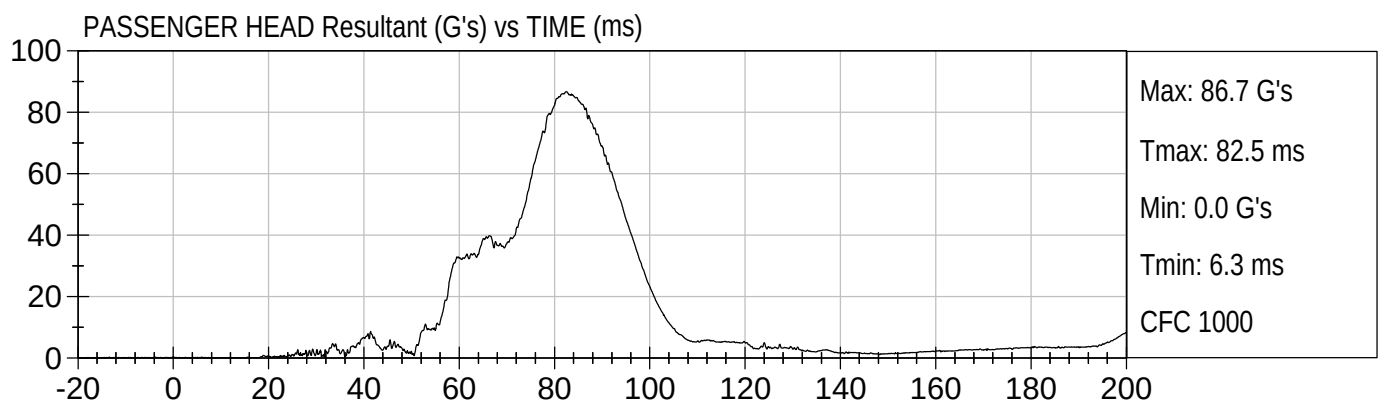
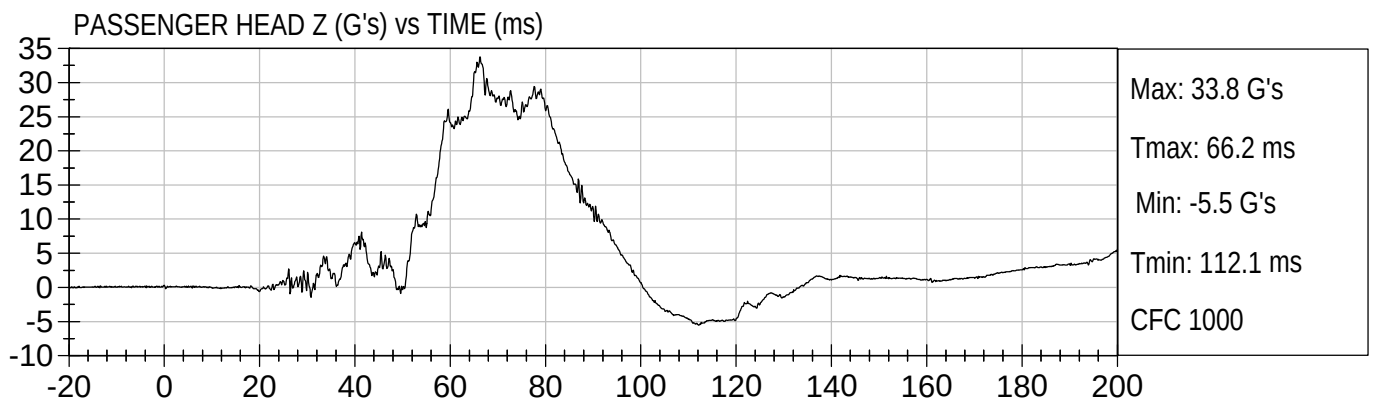
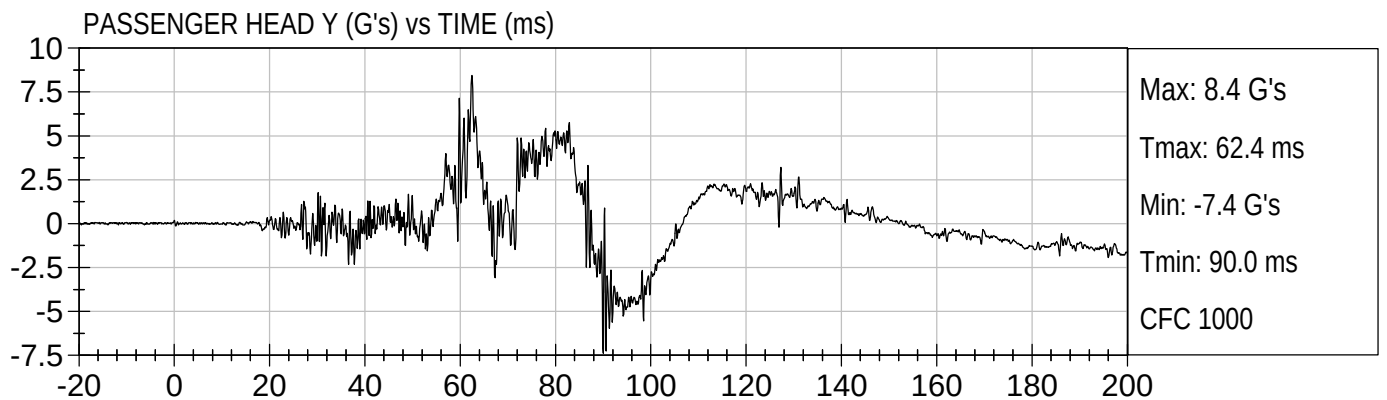
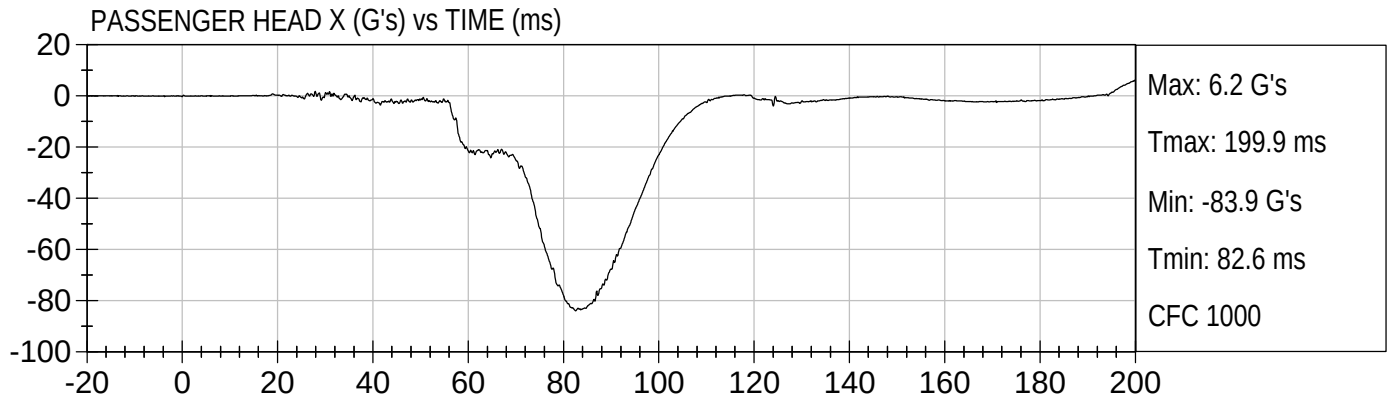


DRIVER LAP BELT (N) vs TIME (ms)
NO VALID DATA COLLECTED



35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

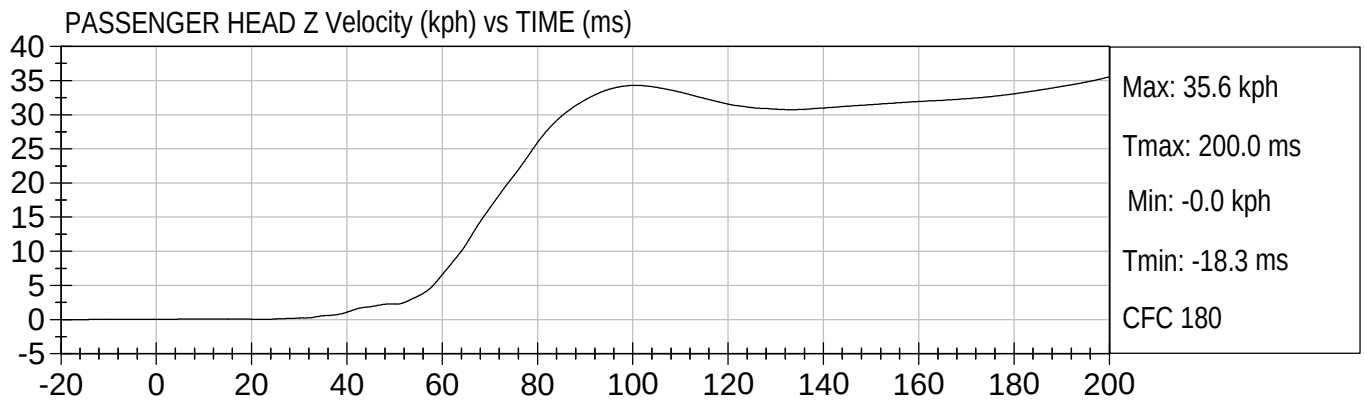
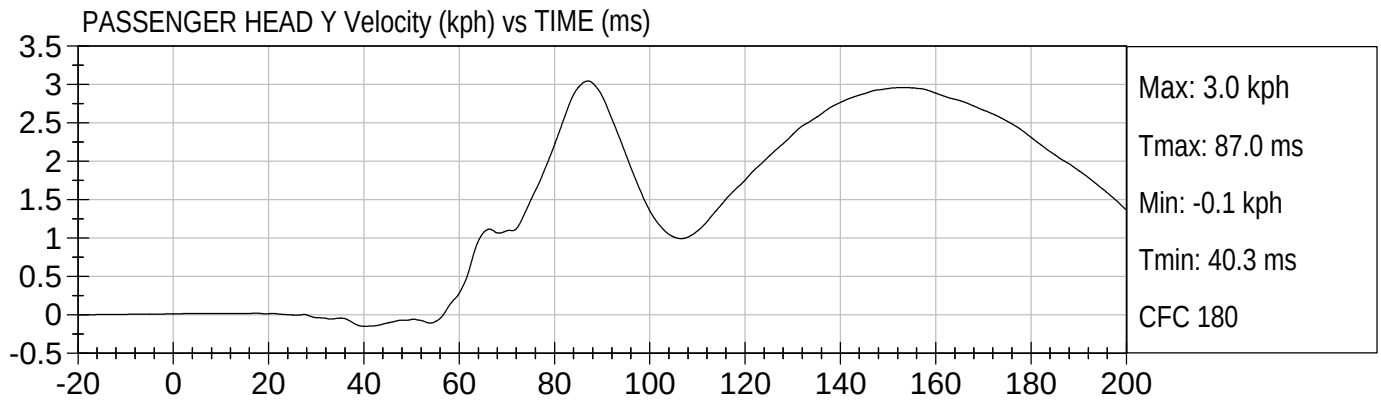
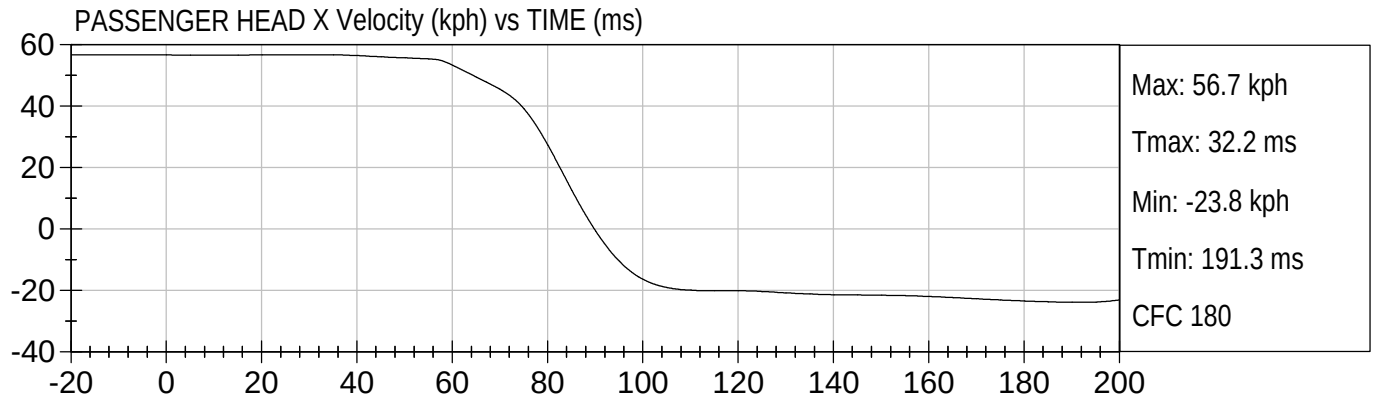
Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

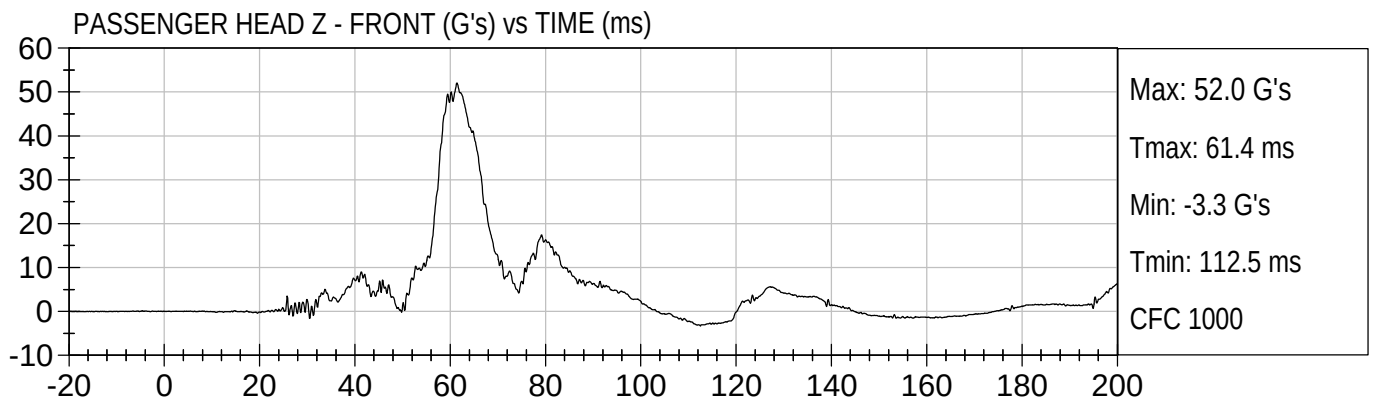
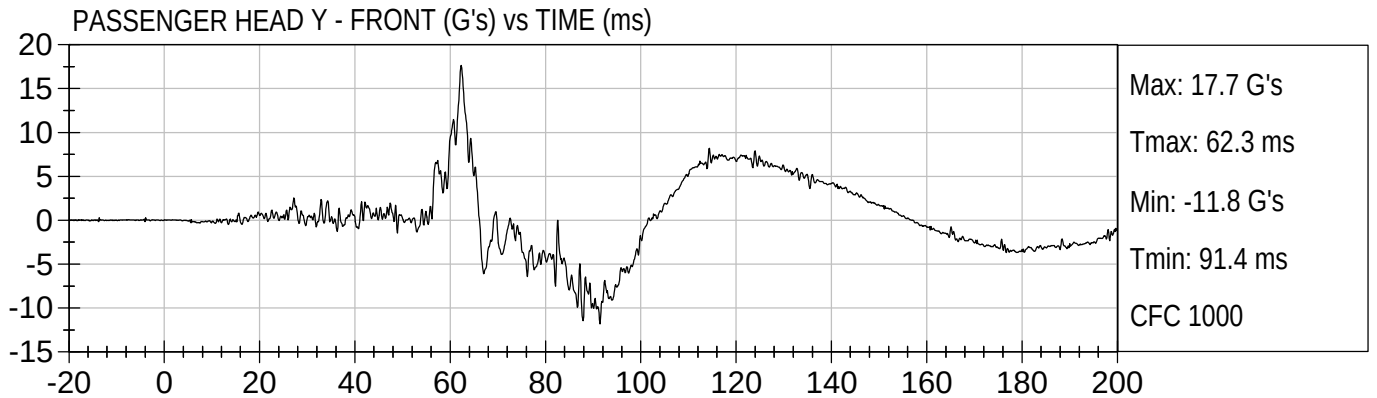
Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

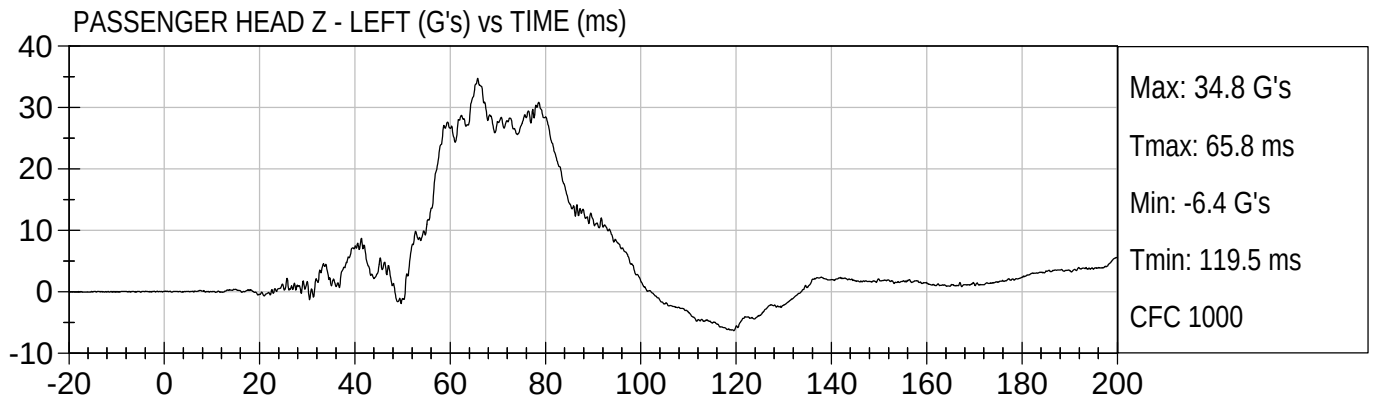
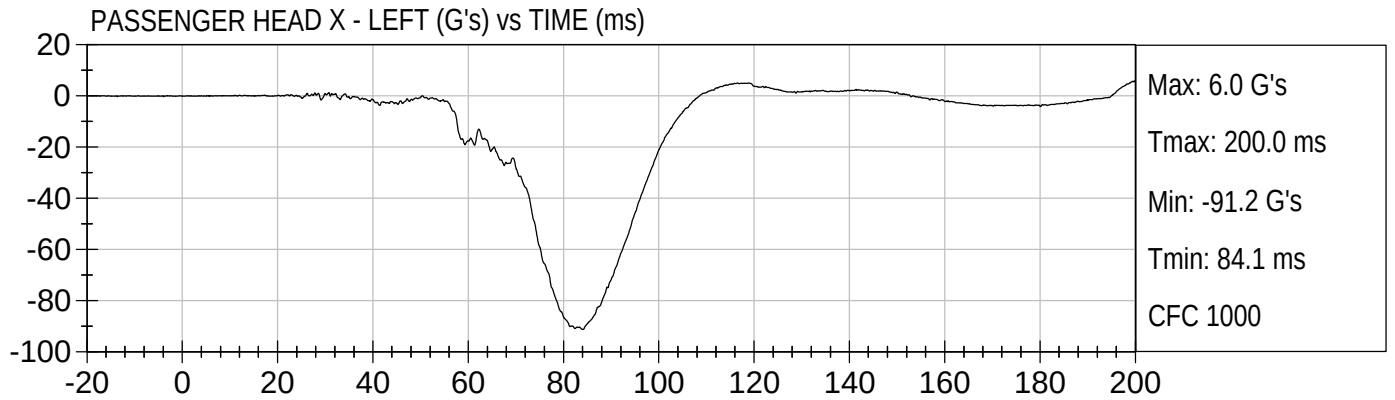
Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

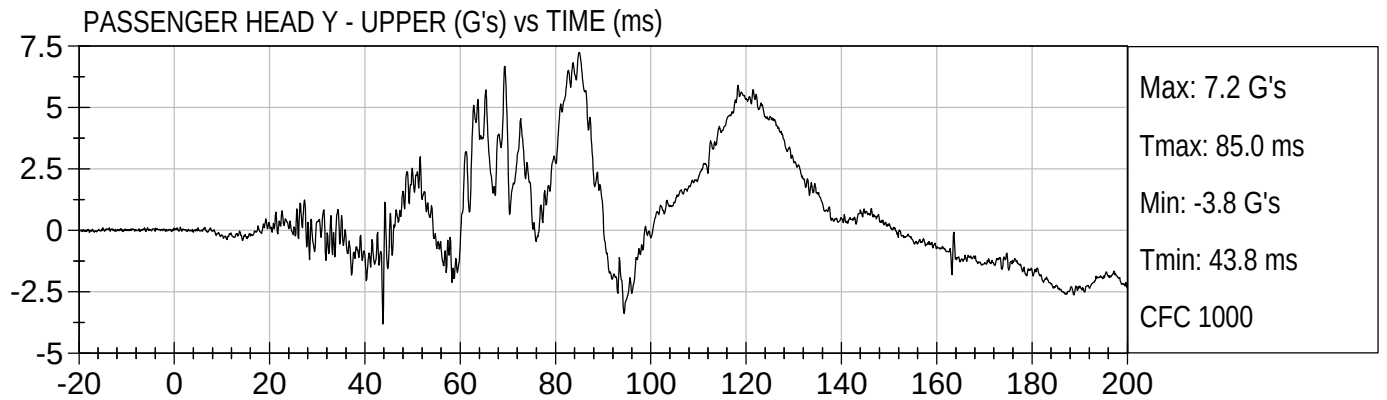
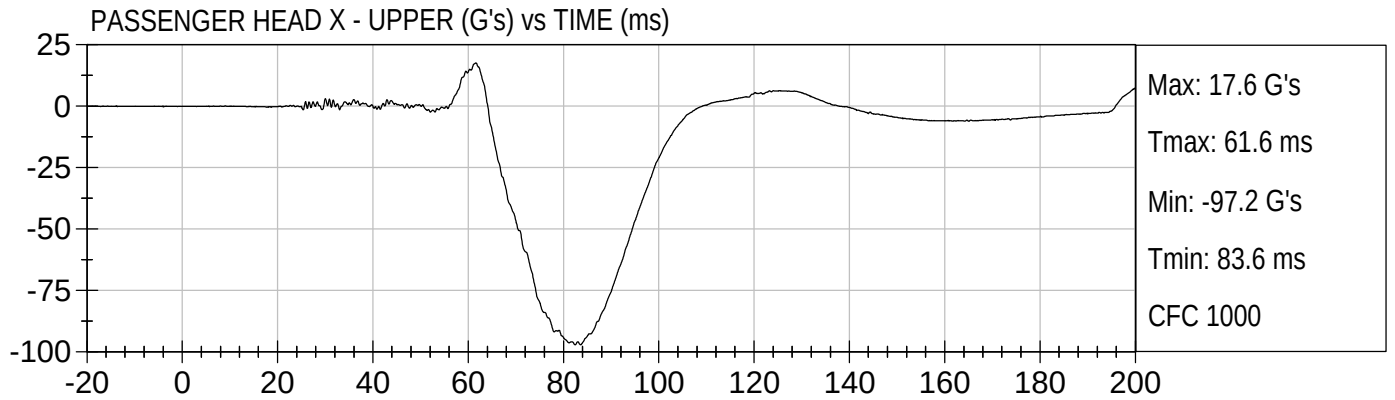
Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

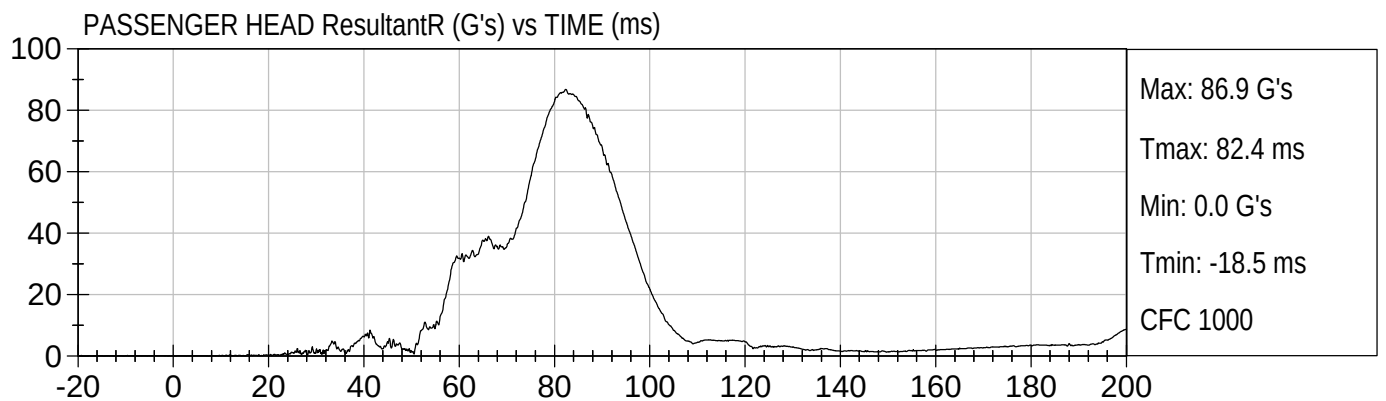
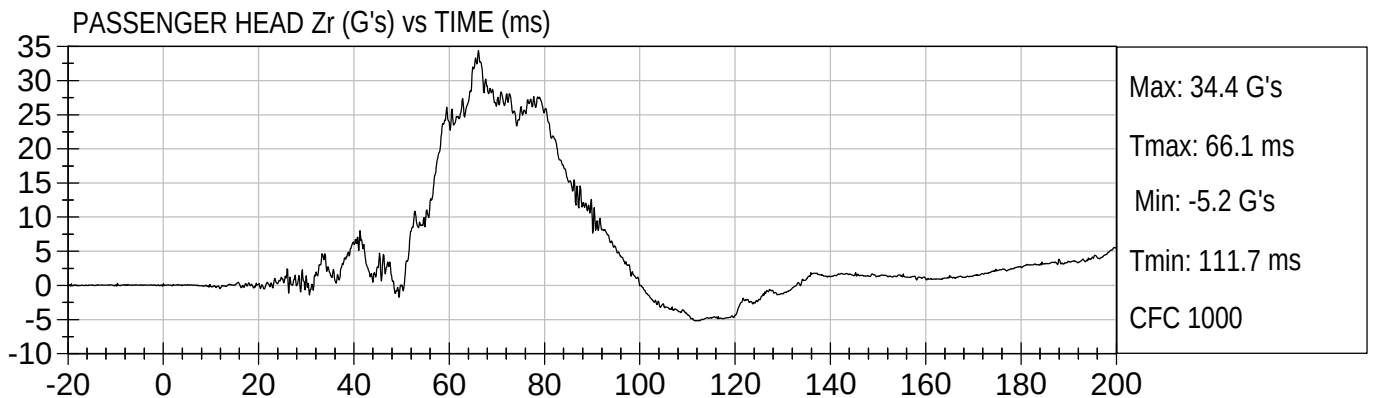
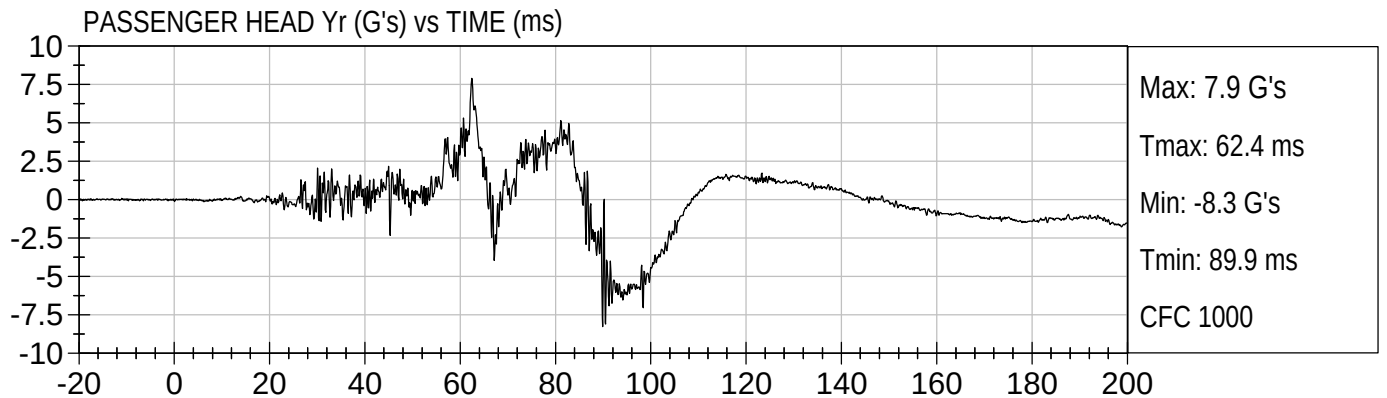
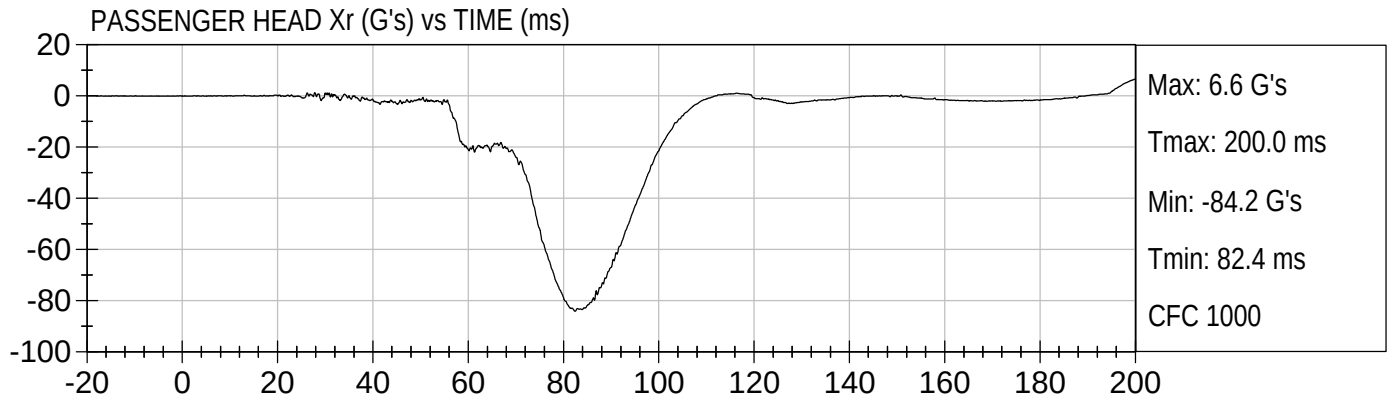
Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

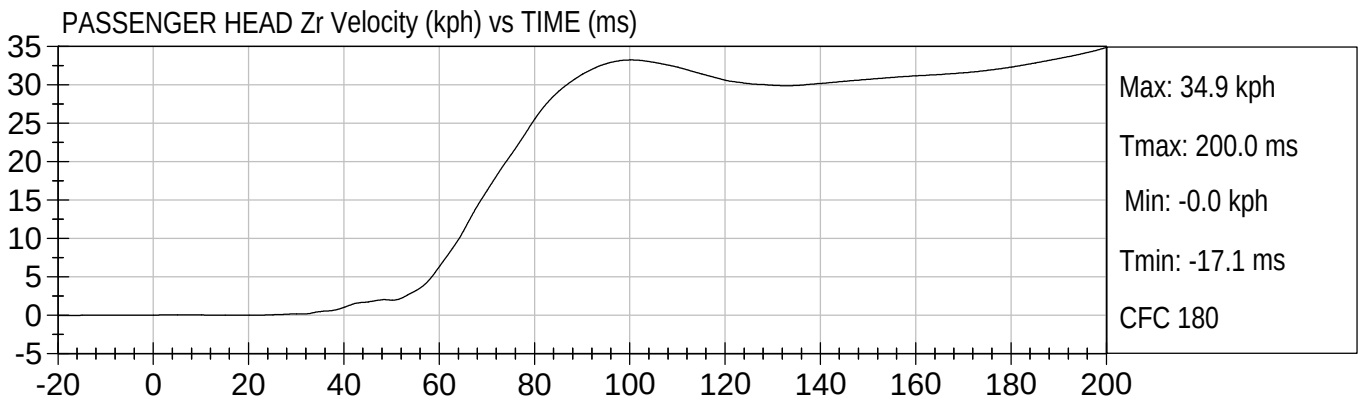
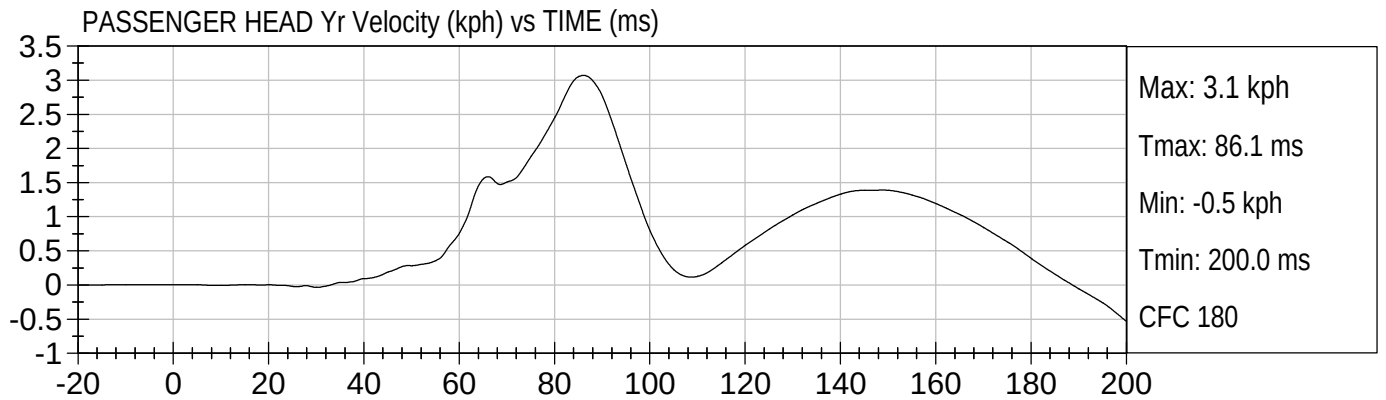
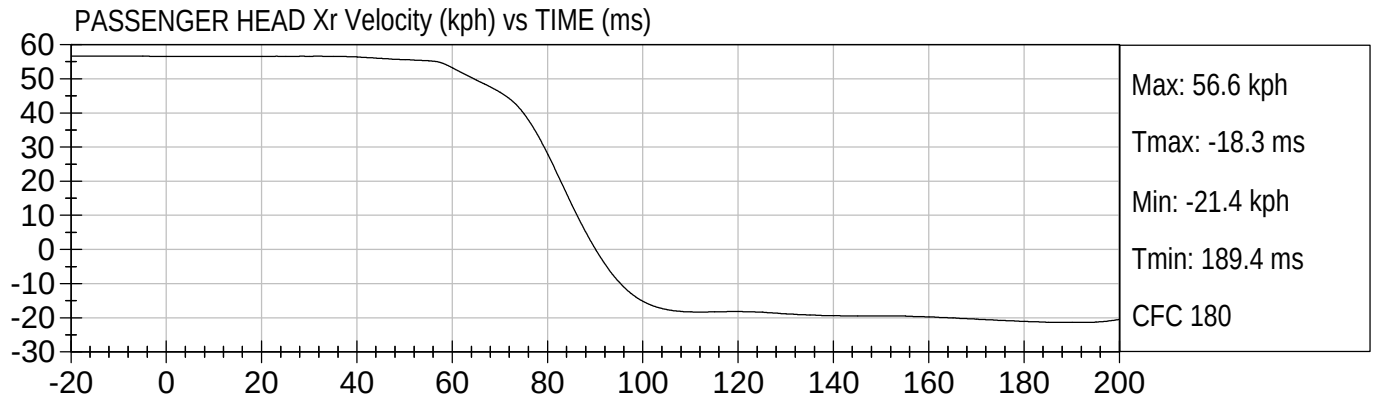




35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

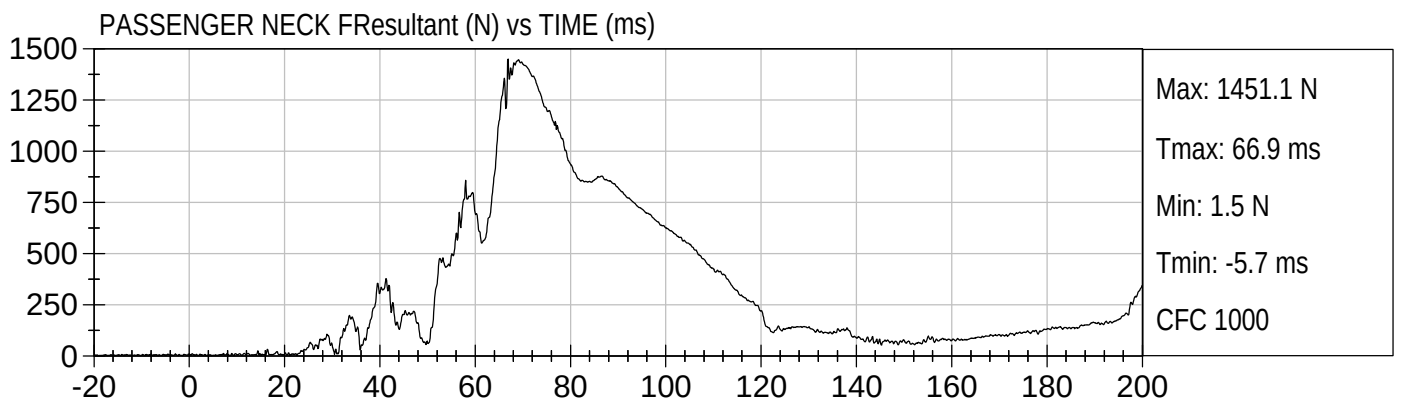
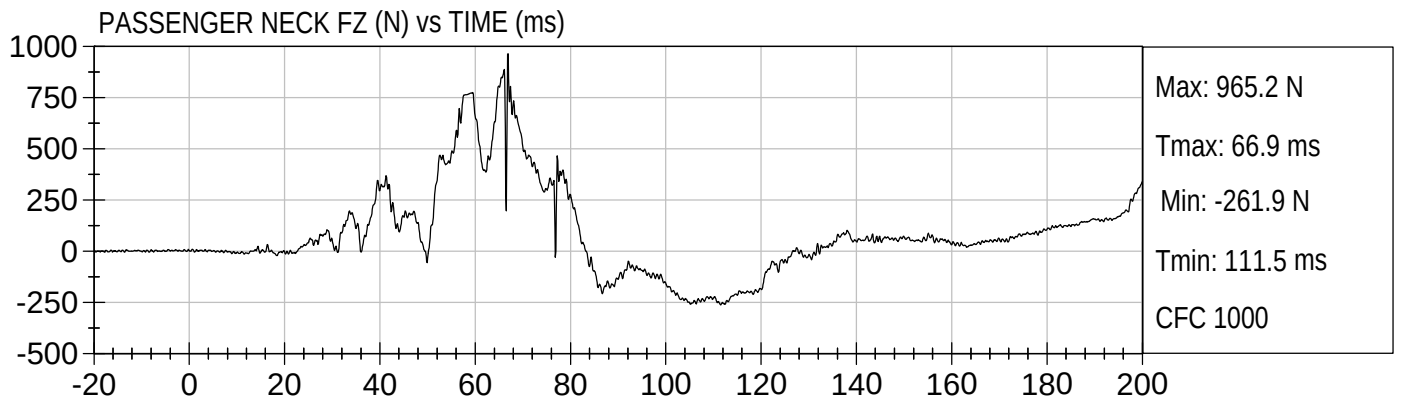
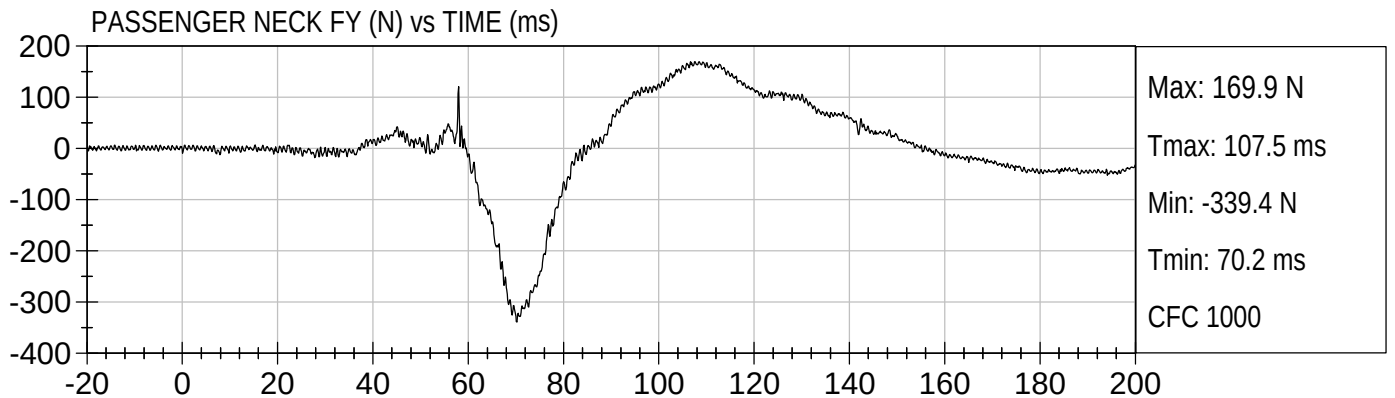
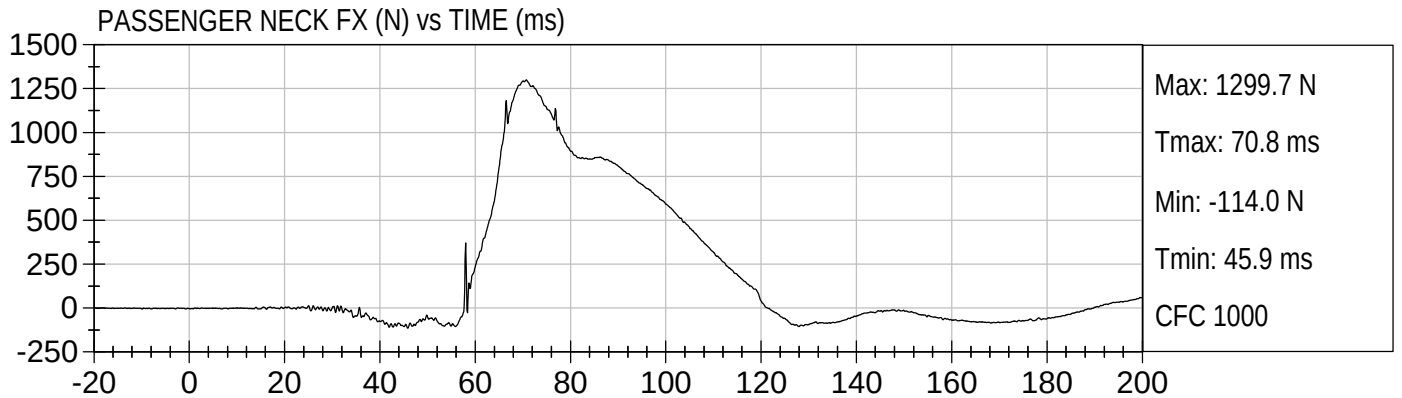






35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

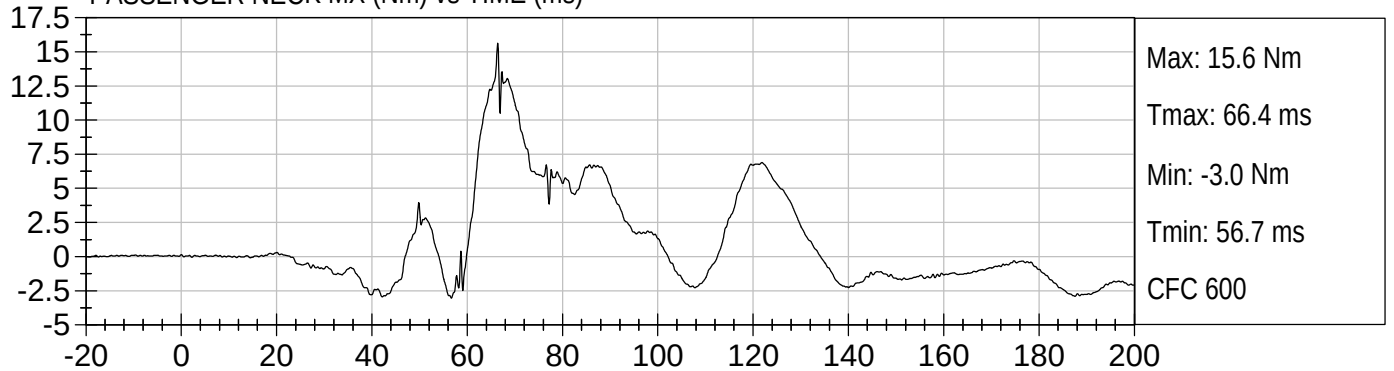




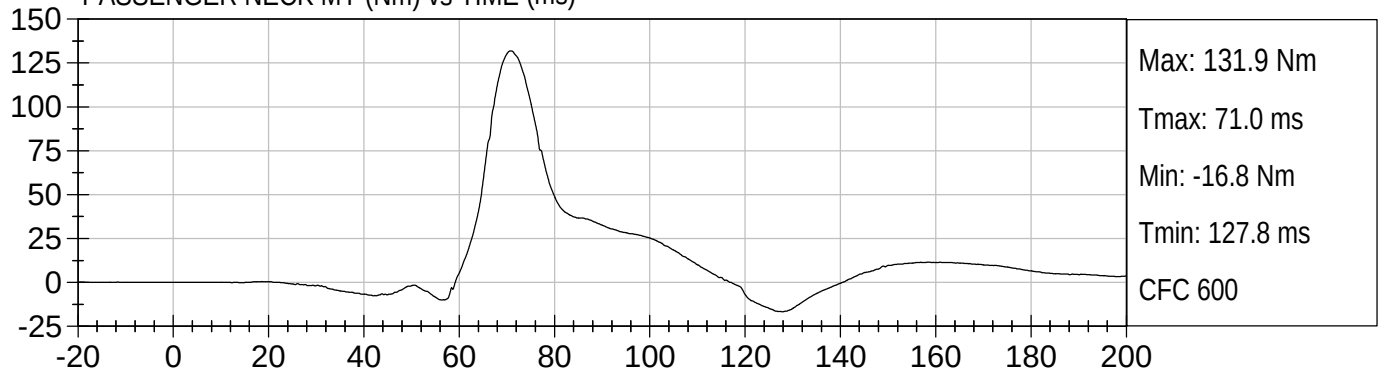
35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

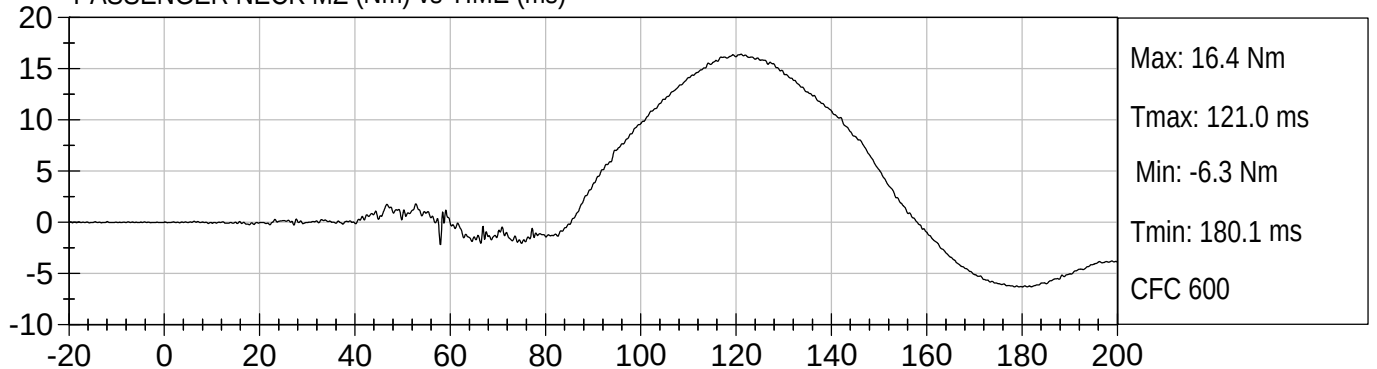
PASSENGER NECK MX (Nm) vs TIME (ms)



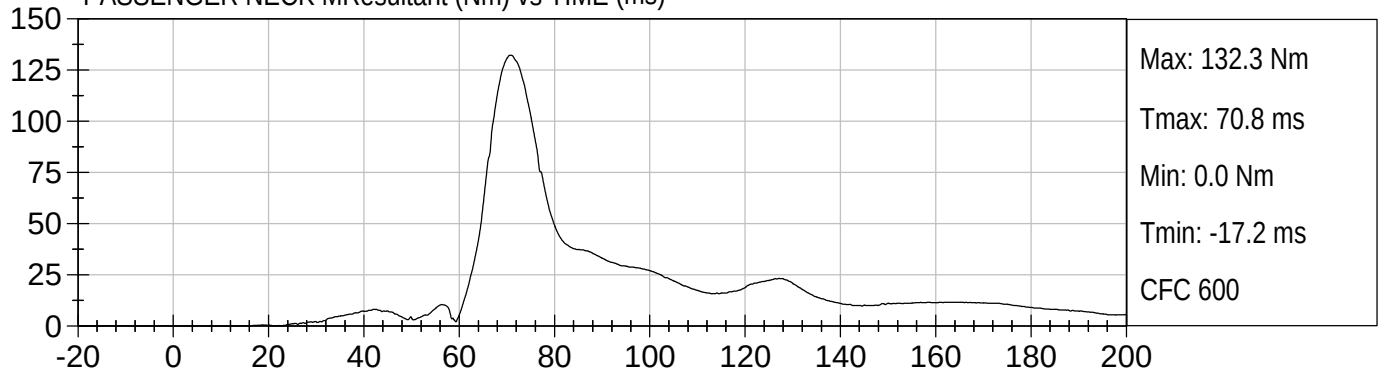
PASSENGER NECK MY (Nm) vs TIME (ms)



PASSENGER NECK MZ (Nm) vs TIME (ms)



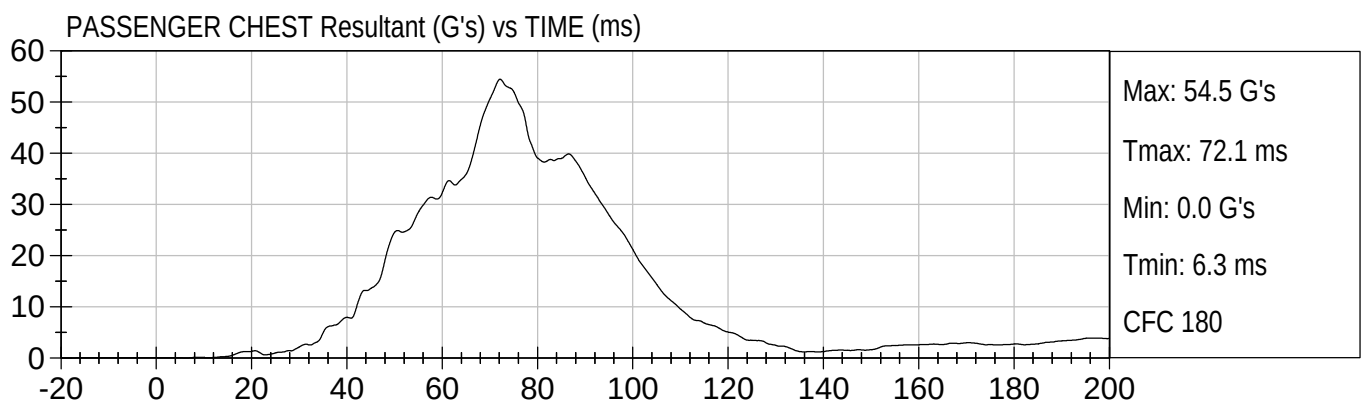
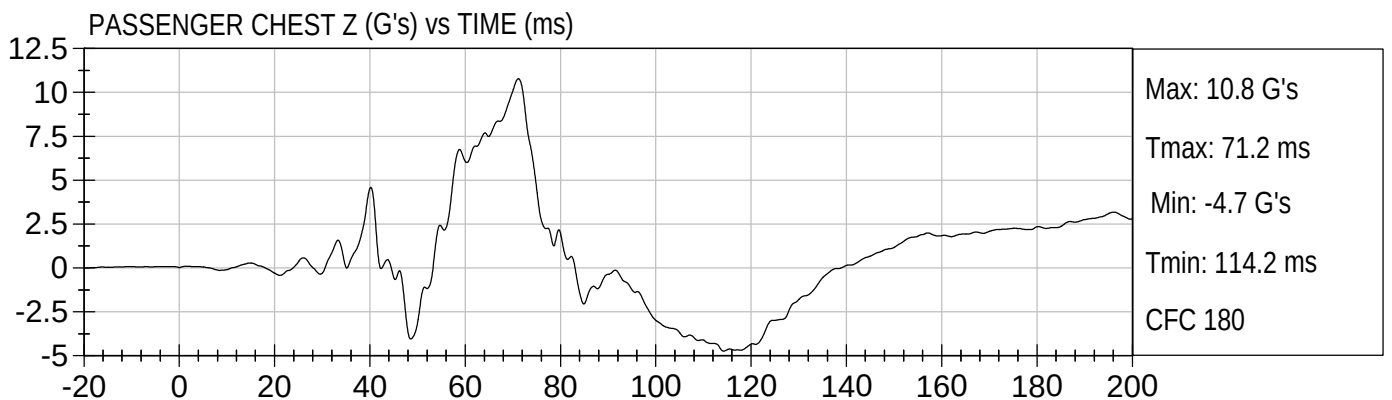
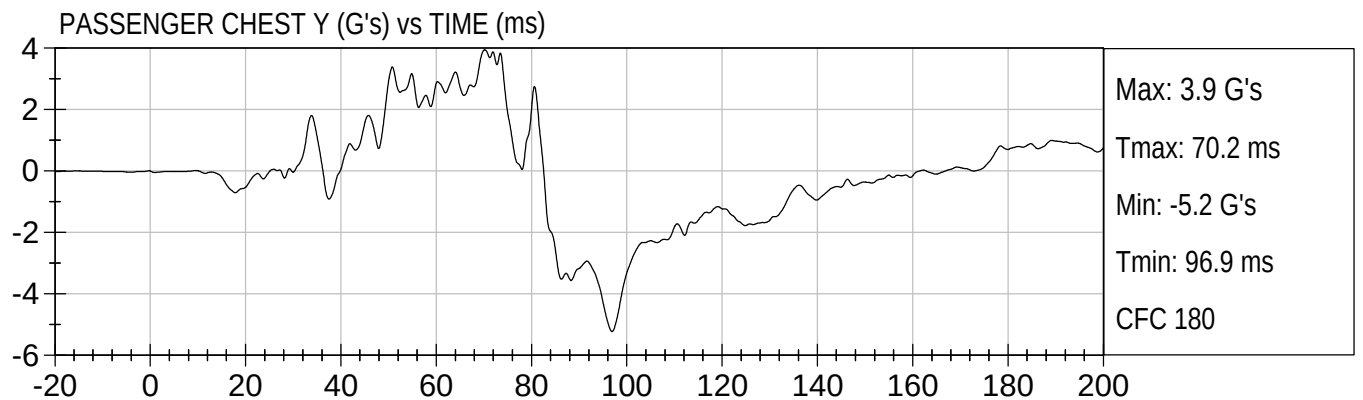
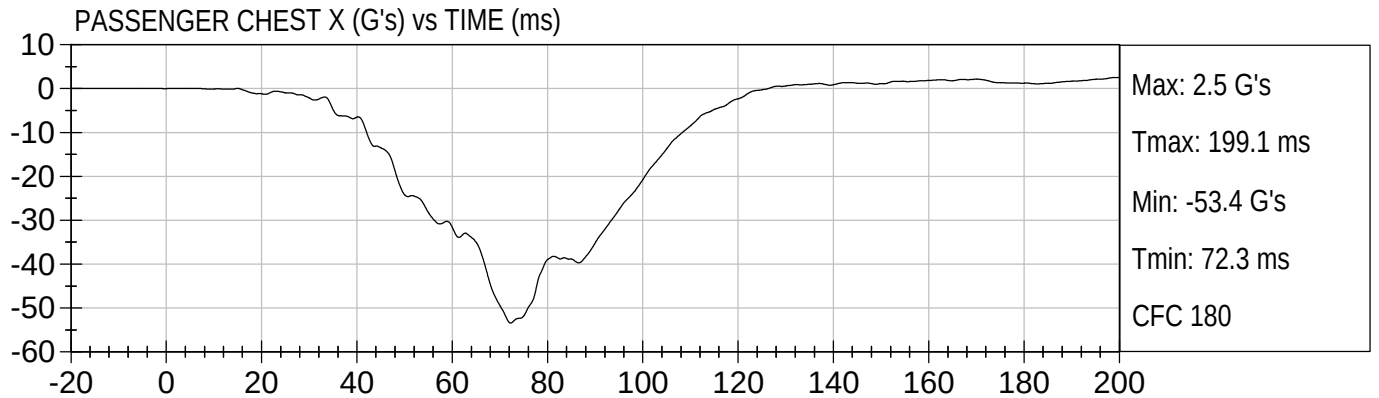
PASSENGER NECK MResultant (Nm) vs TIME (ms)

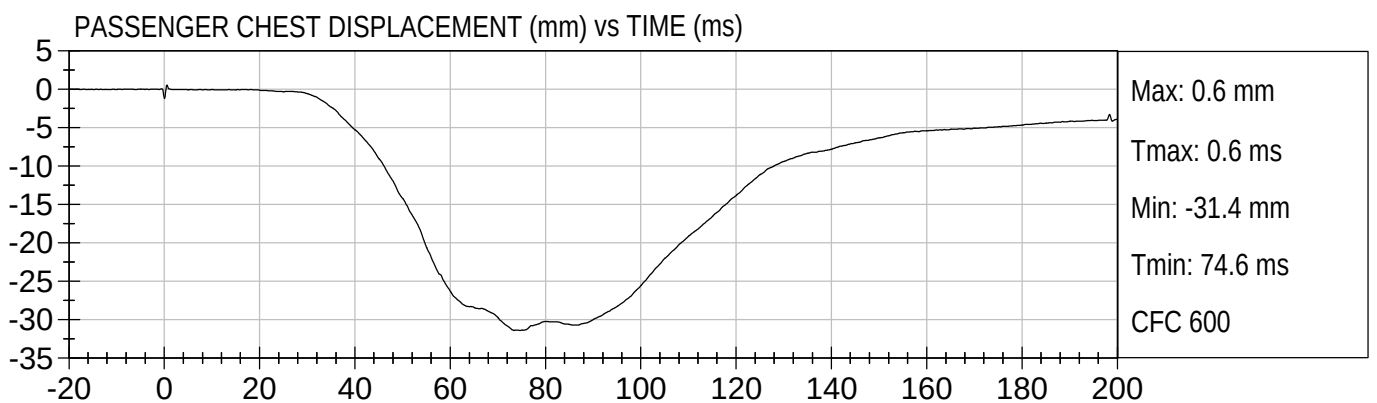
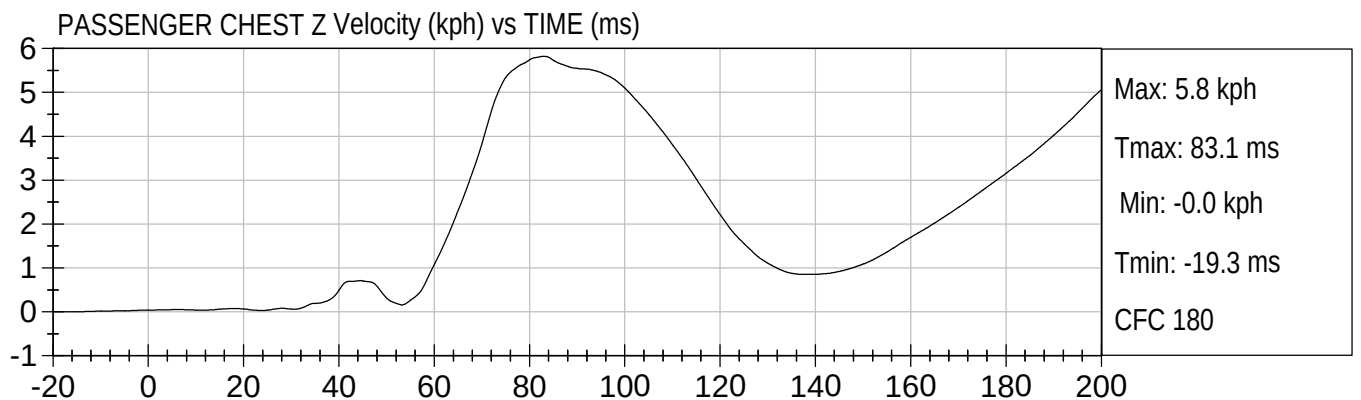
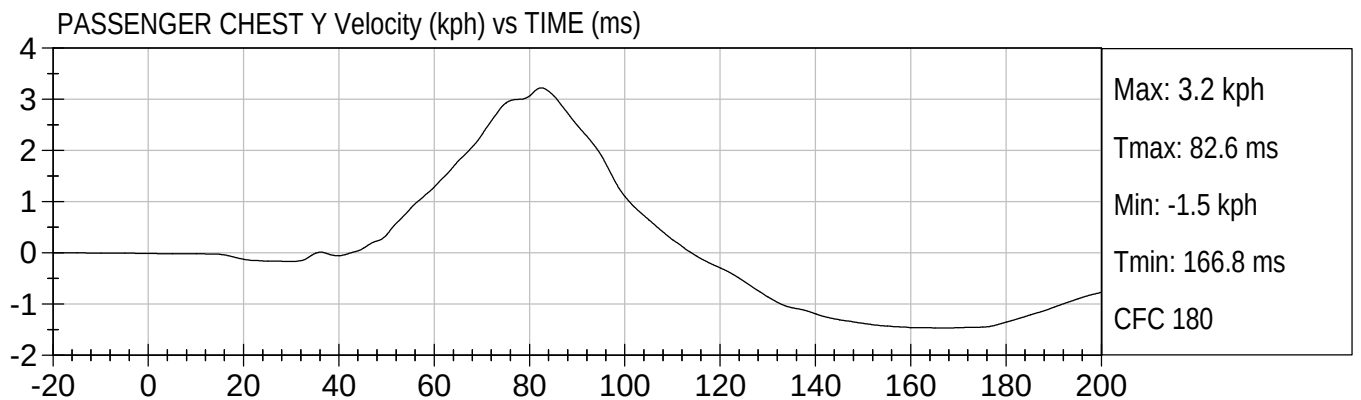
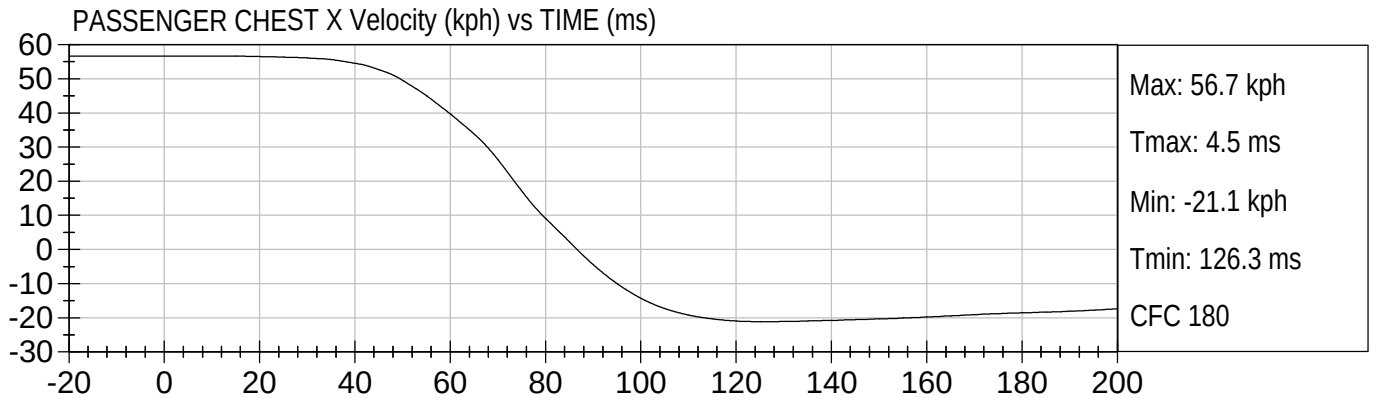




35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

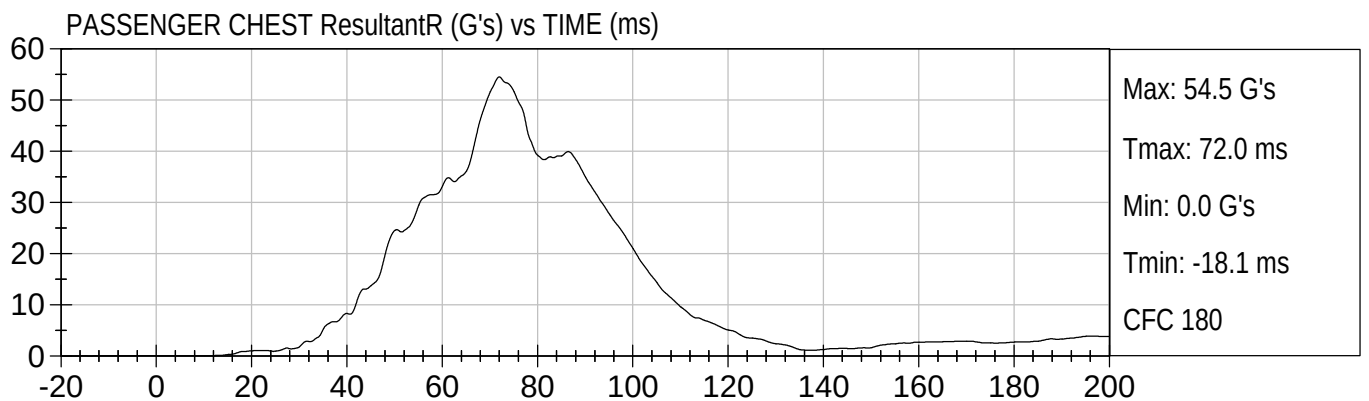
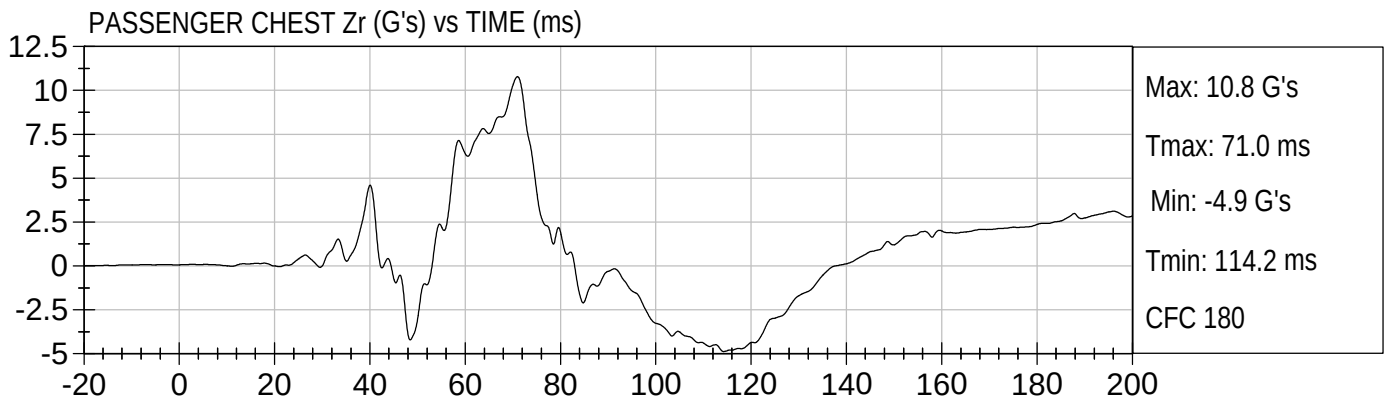
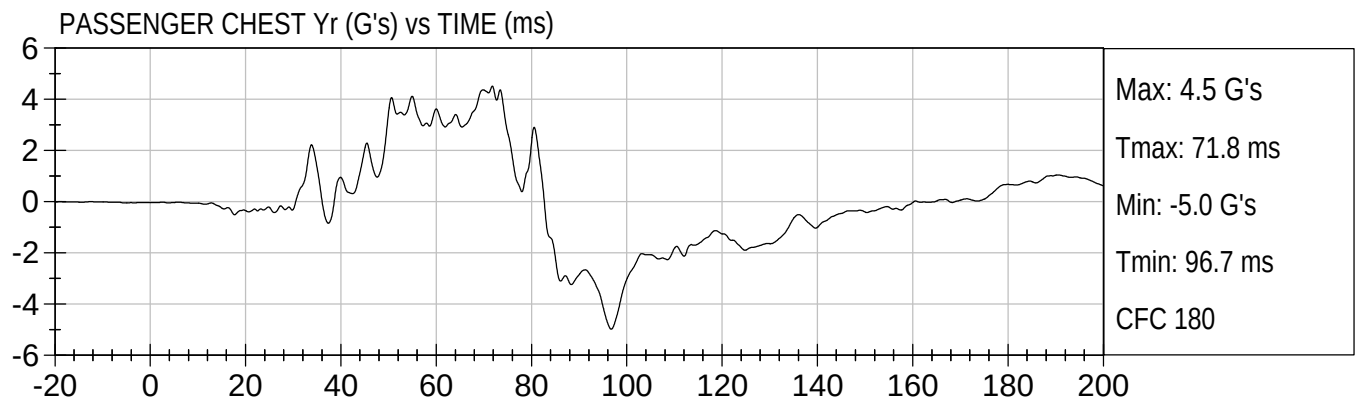
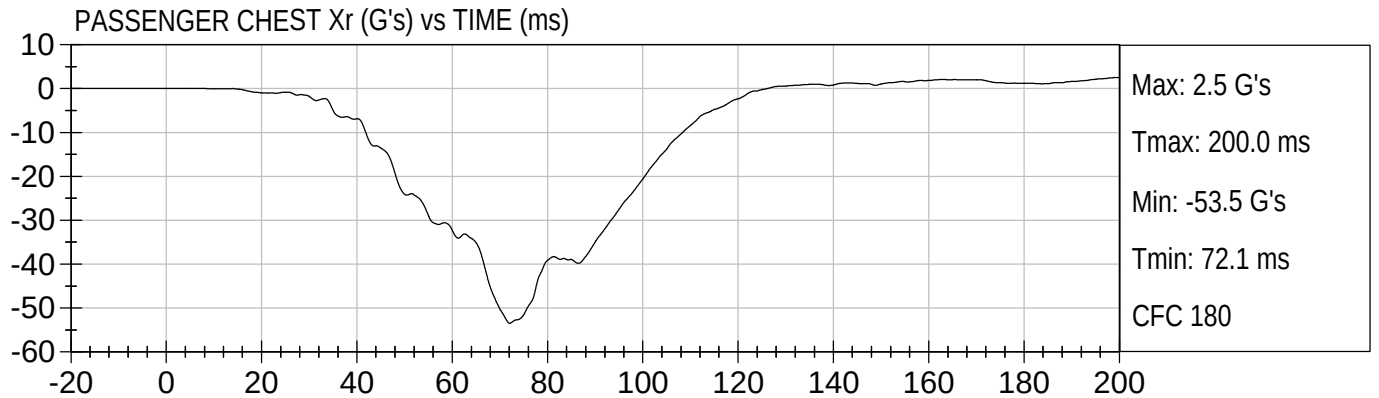


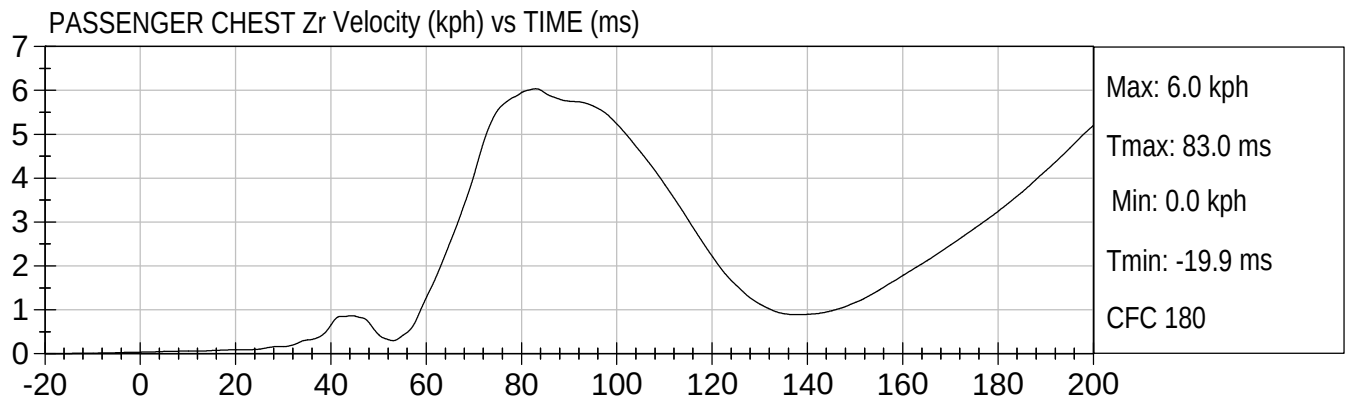
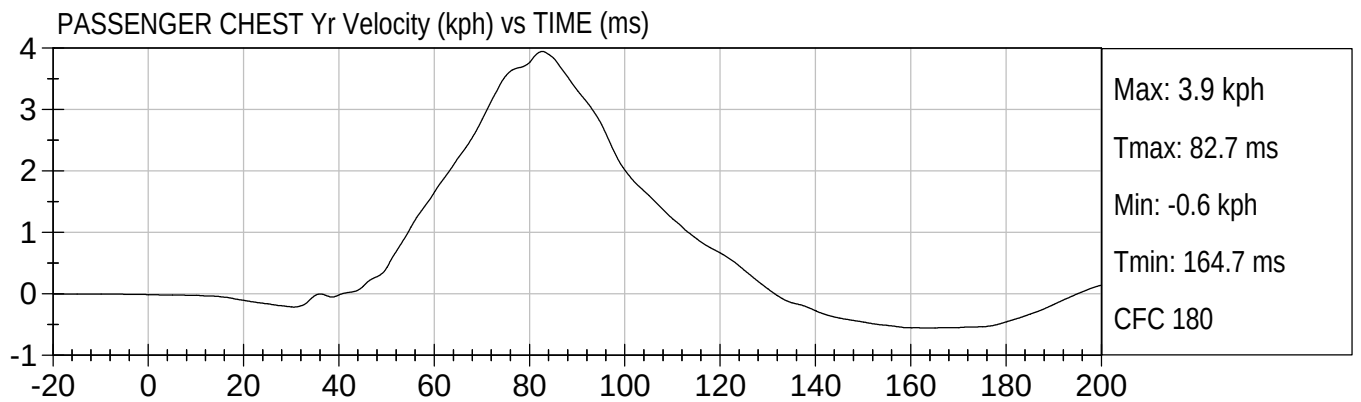
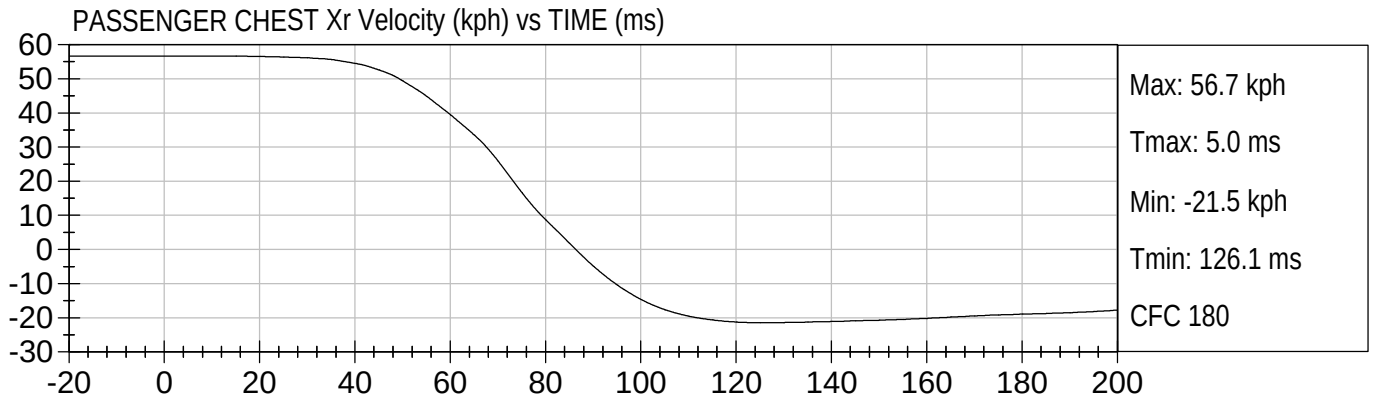




35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)



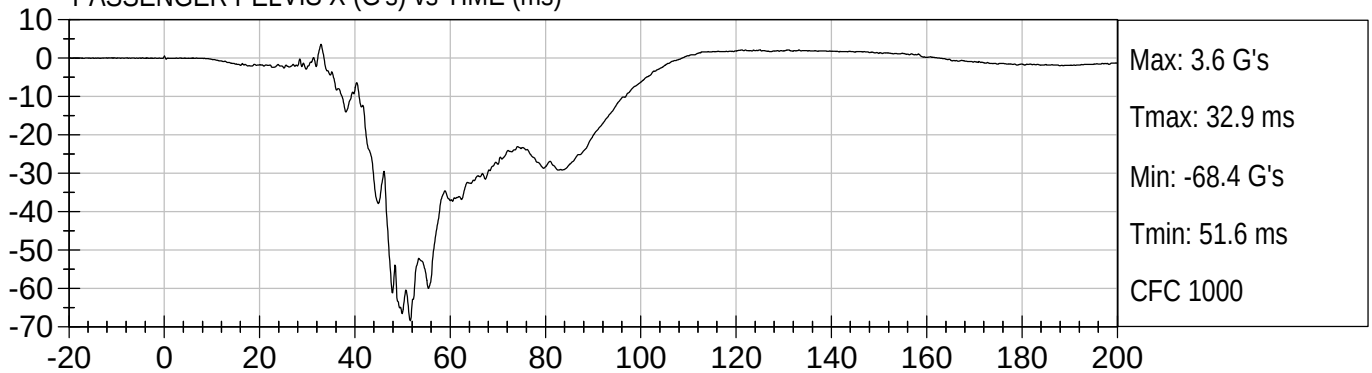




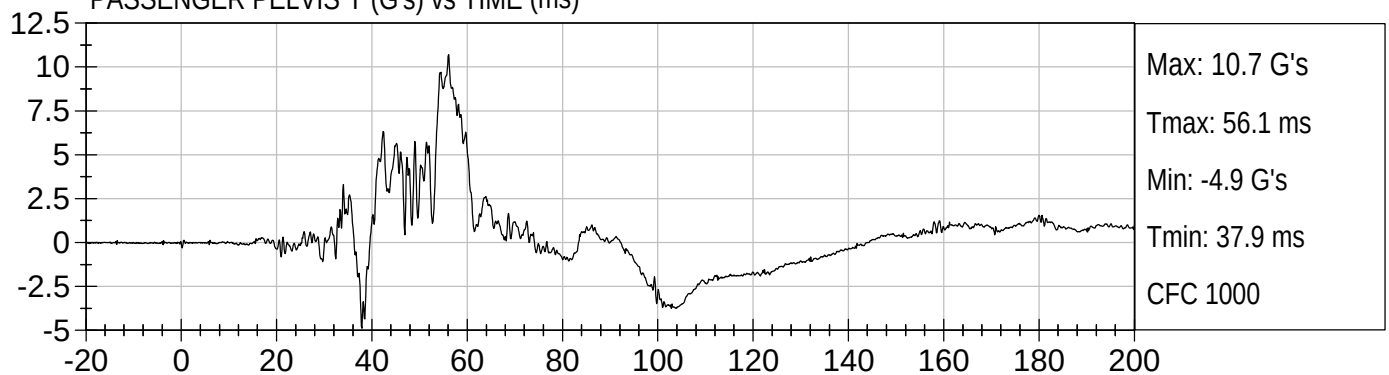
35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

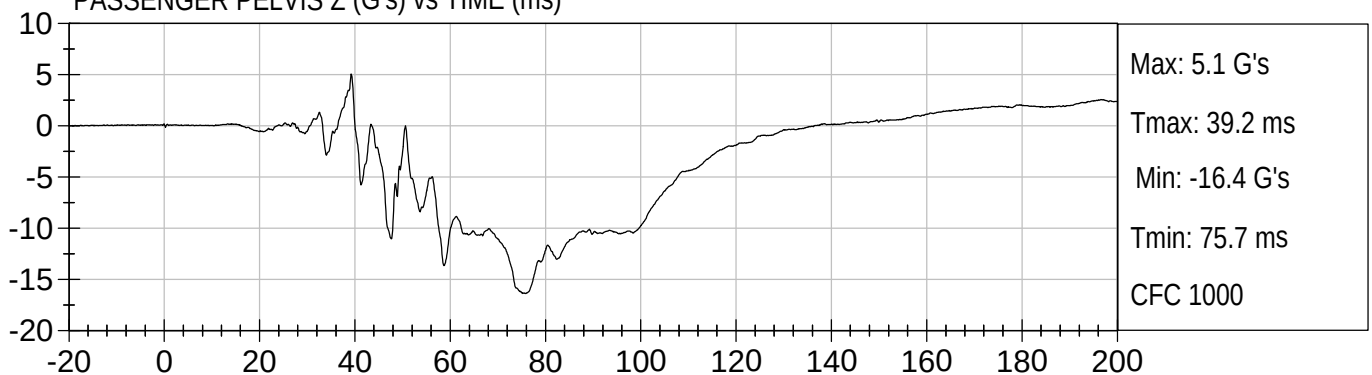
PASSENGER PELVIS X (G's) vs TIME (ms)



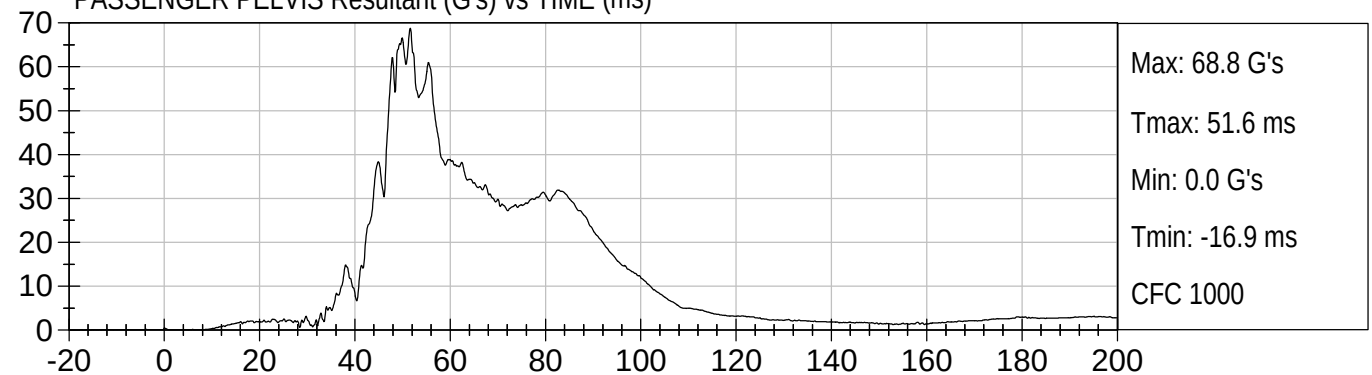
PASSENGER PELVIS Y (G's) vs TIME (ms)

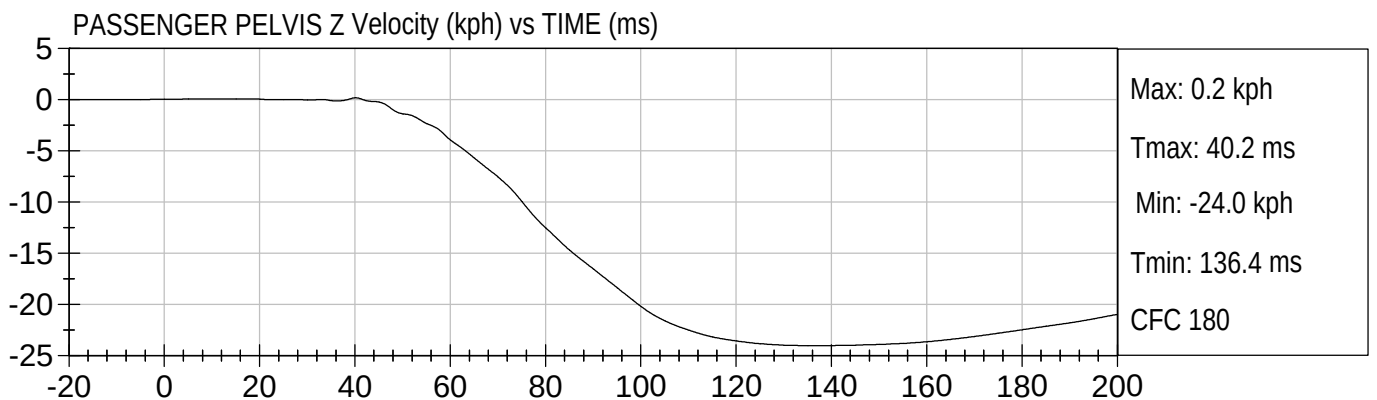
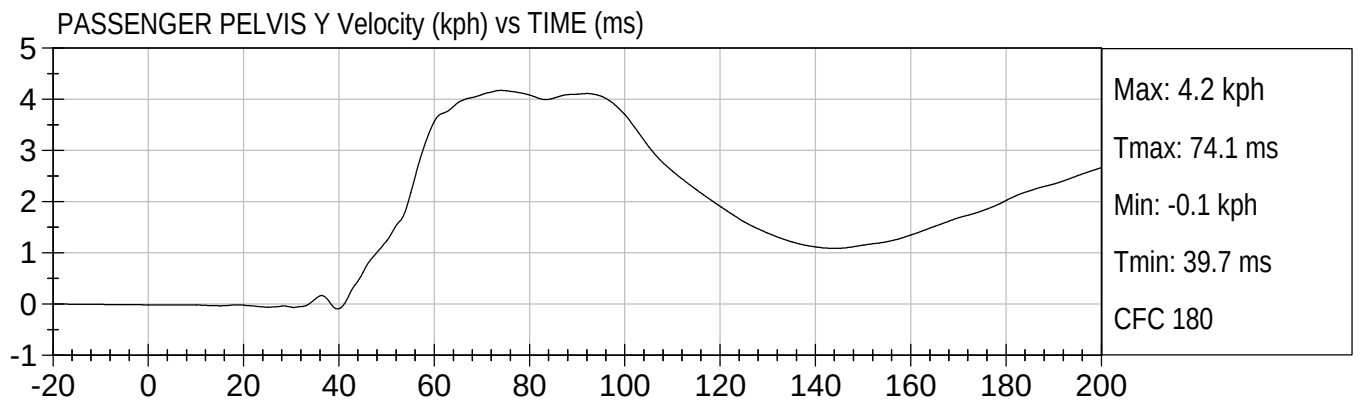
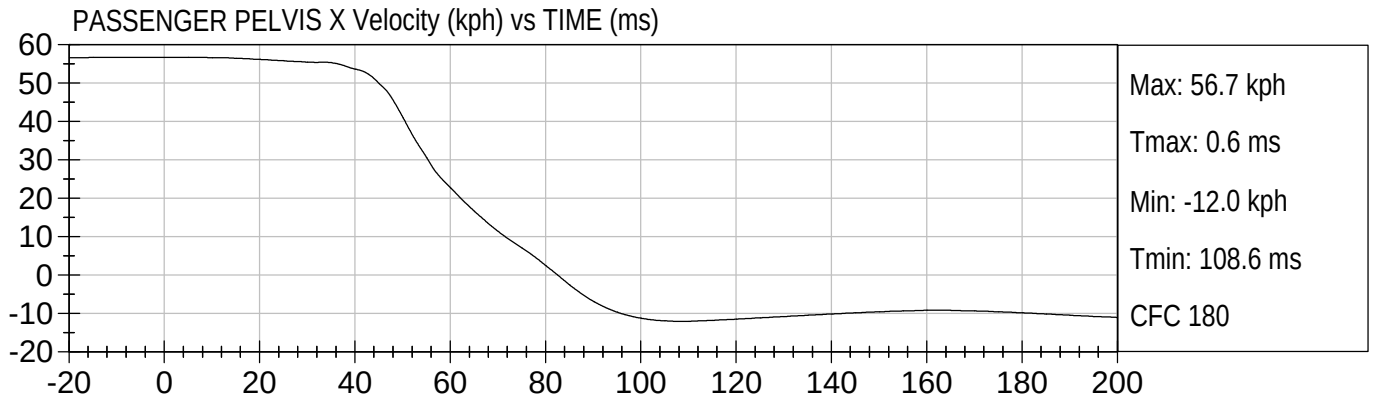


PASSENGER PELVIS Z (G's) vs TIME (ms)



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

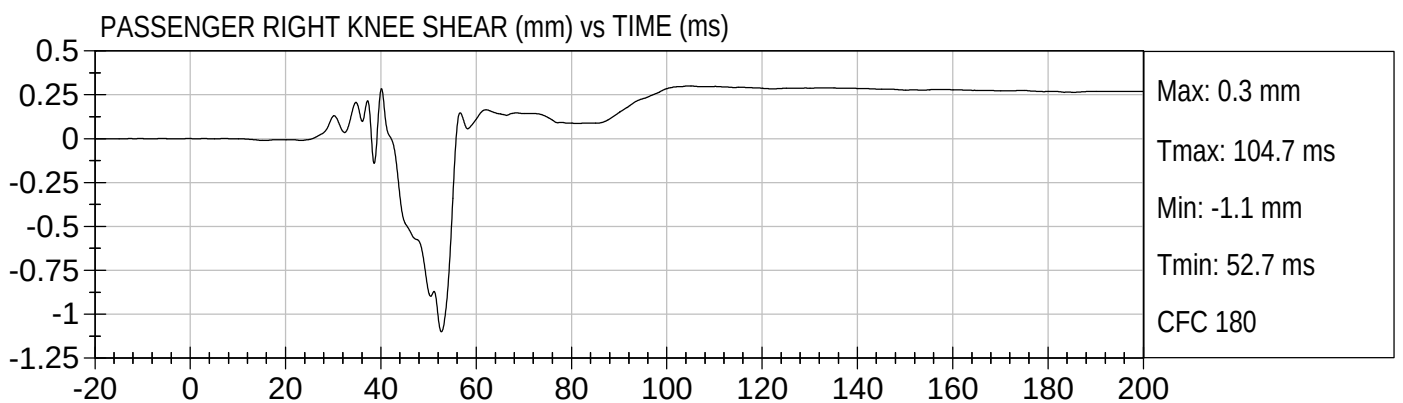
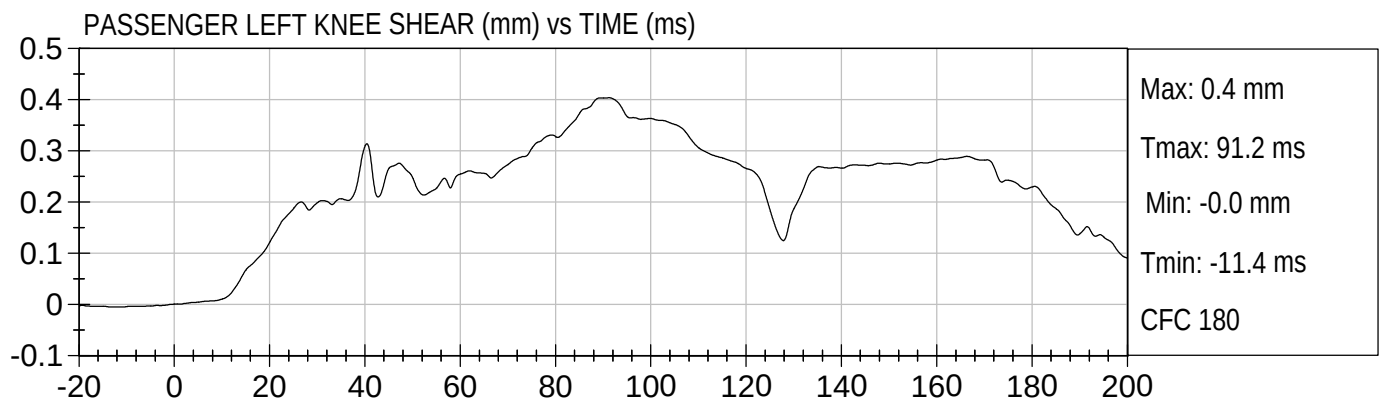
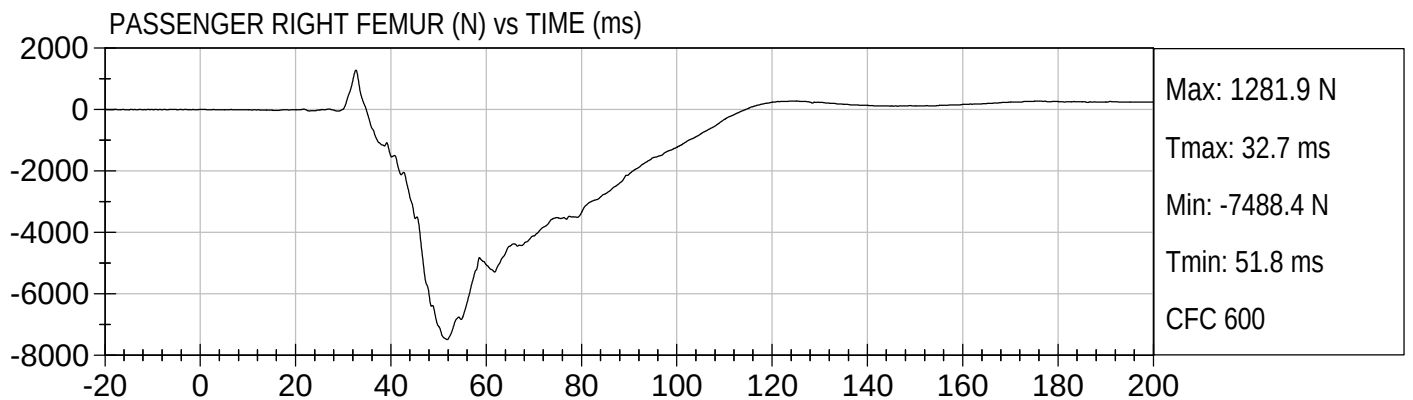
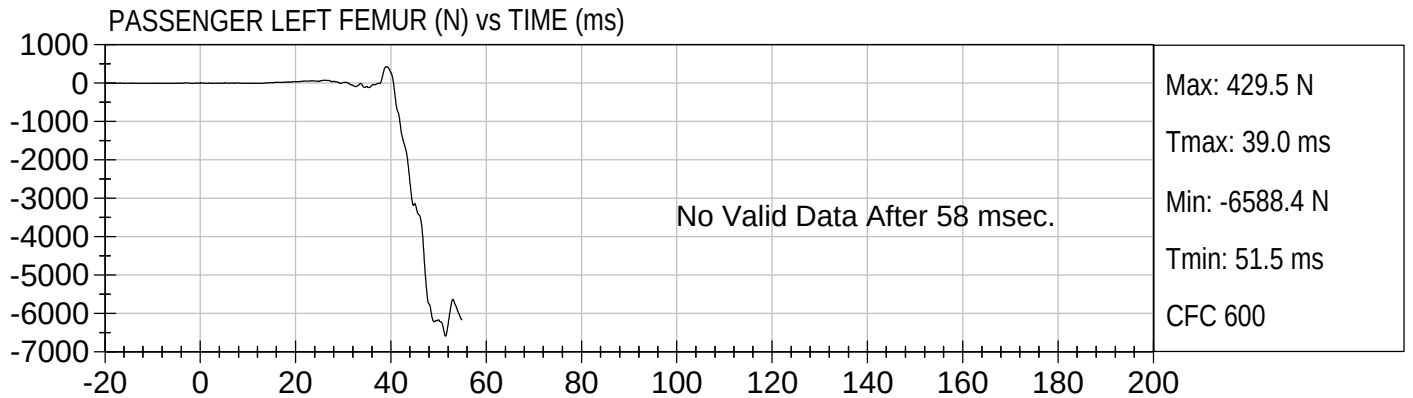






35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

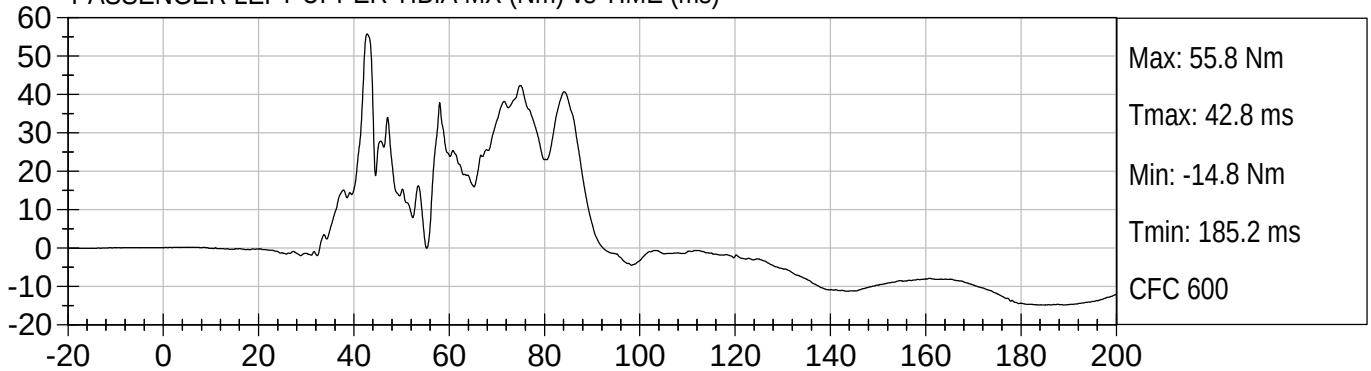




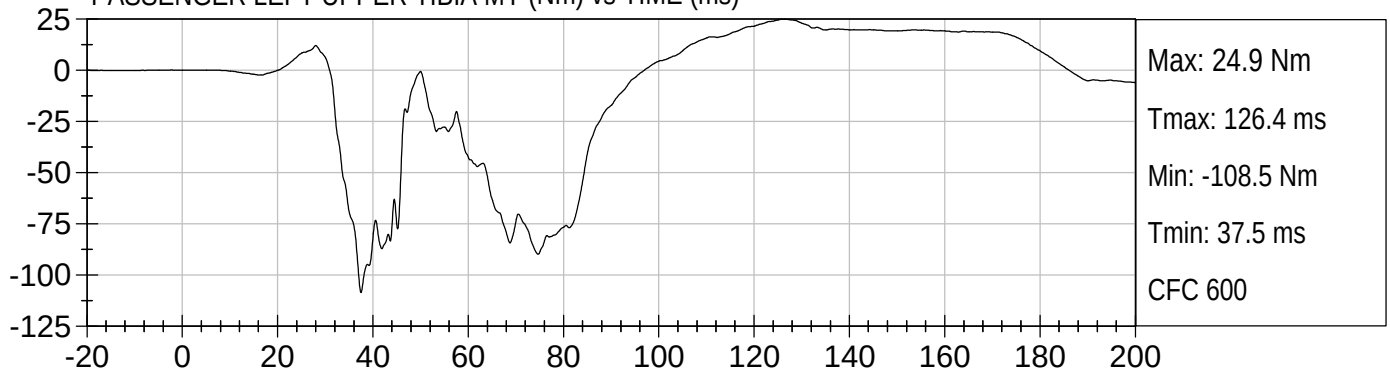
35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

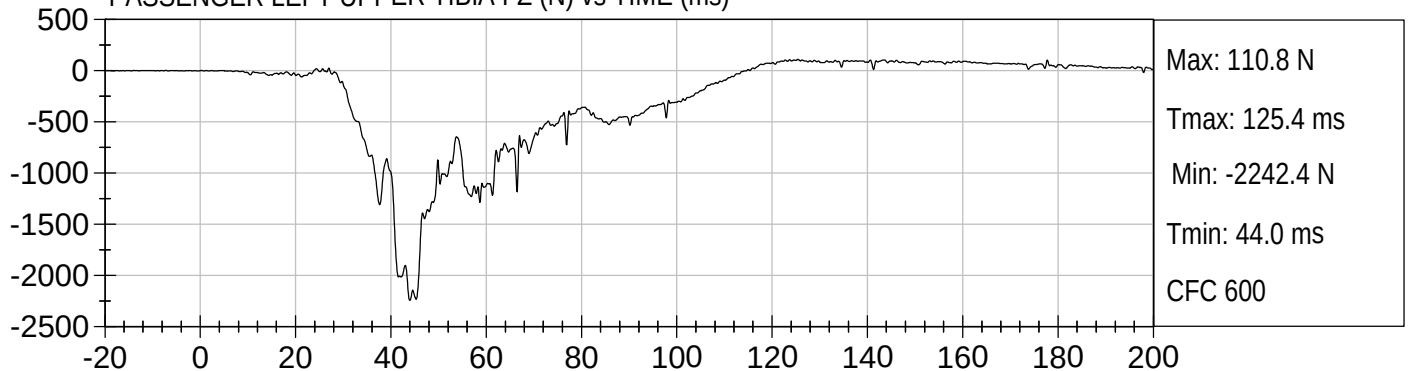
PASSENGER LEFT UPPER TIBIA MX (Nm) vs TIME (ms)



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



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

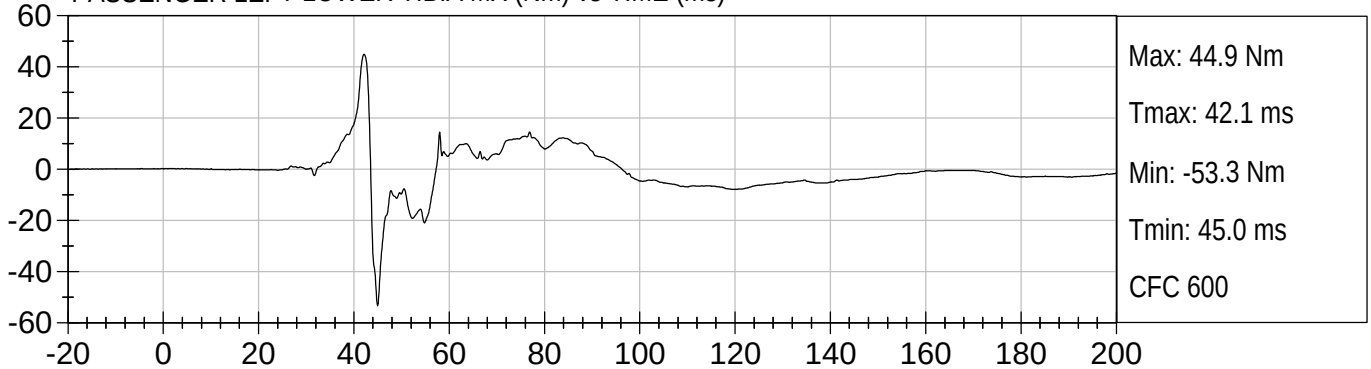




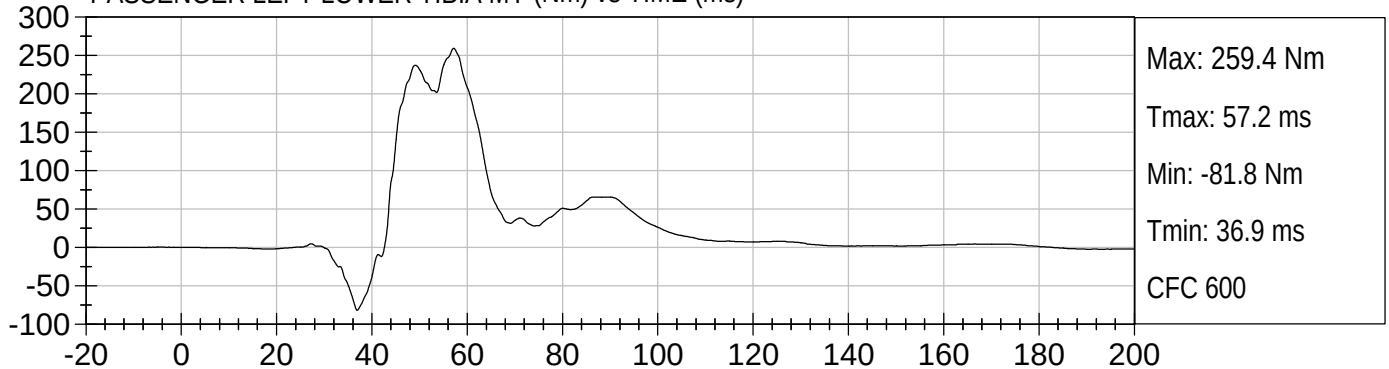
35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

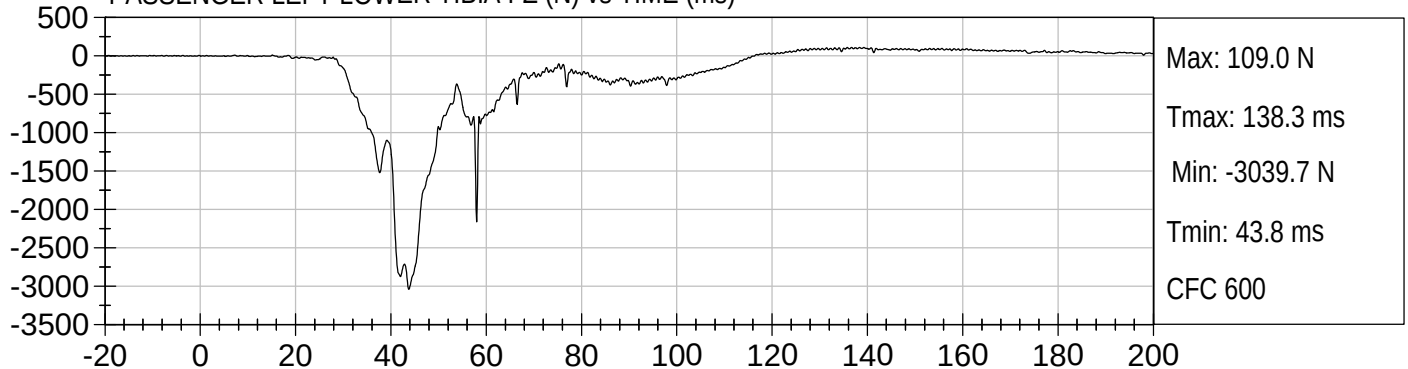
PASSENGER LEFT LOWER TIBIA MX (Nm) vs TIME (ms)



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



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

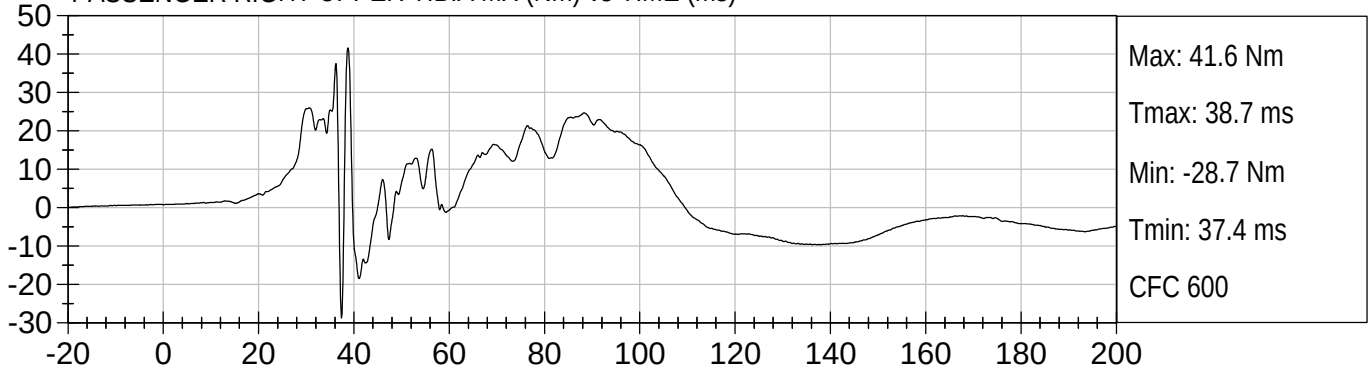




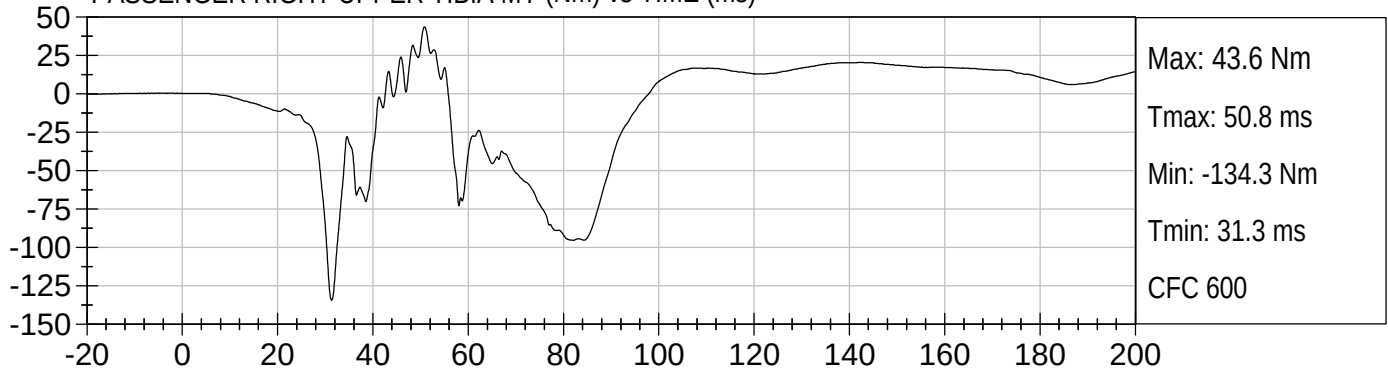
35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

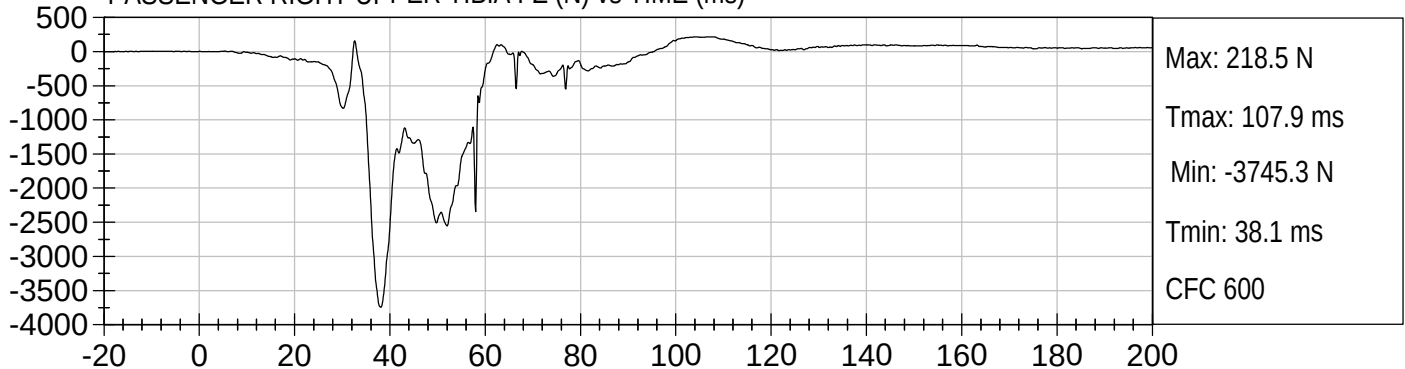
PASSENGER RIGHT UPPER TIBIA MX (Nm) vs TIME (ms)



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



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

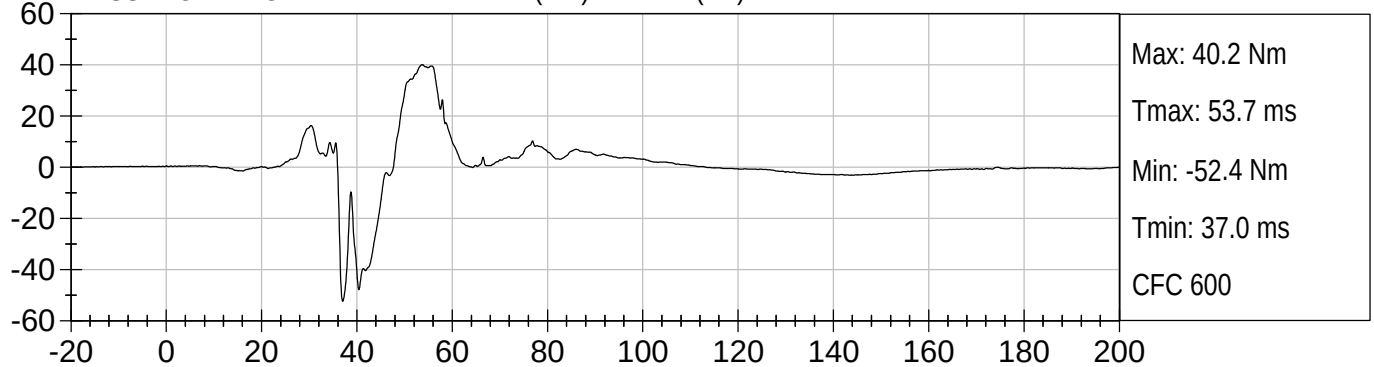




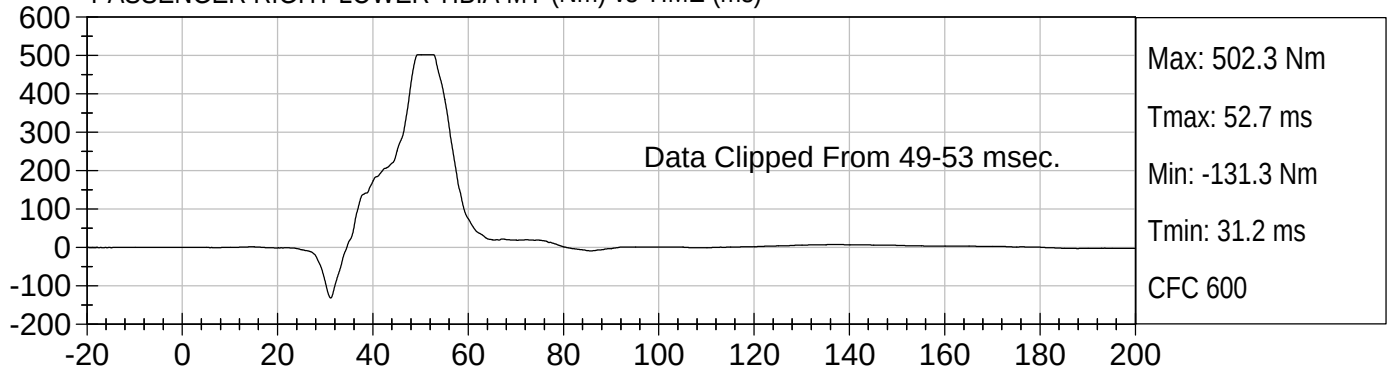
35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

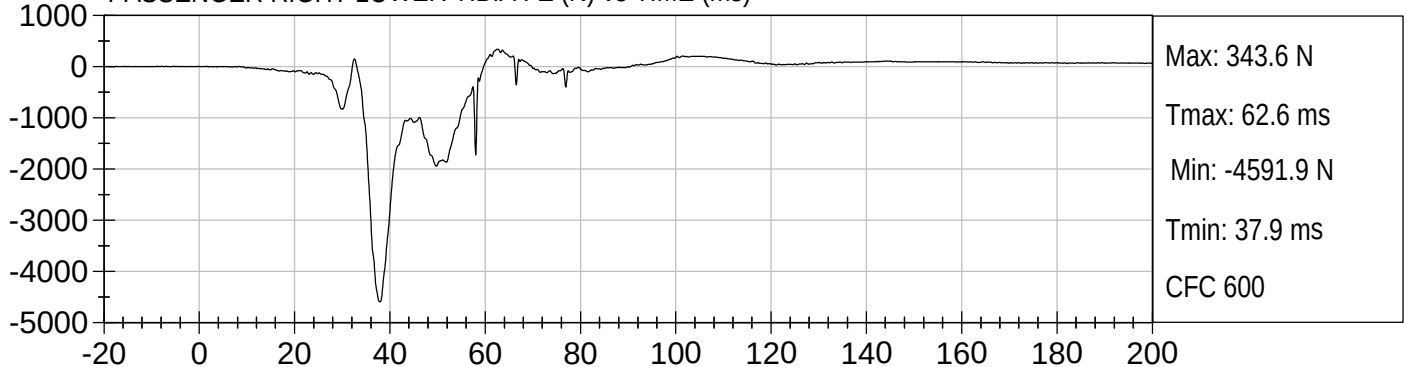
PASSENGER RIGHT LOWER TIBIA MX (Nm) vs TIME (ms)



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



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

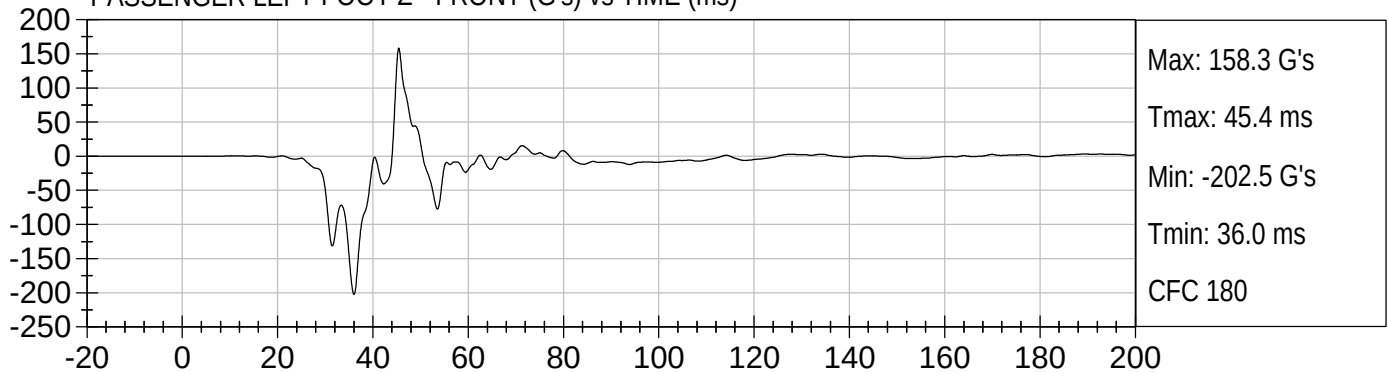




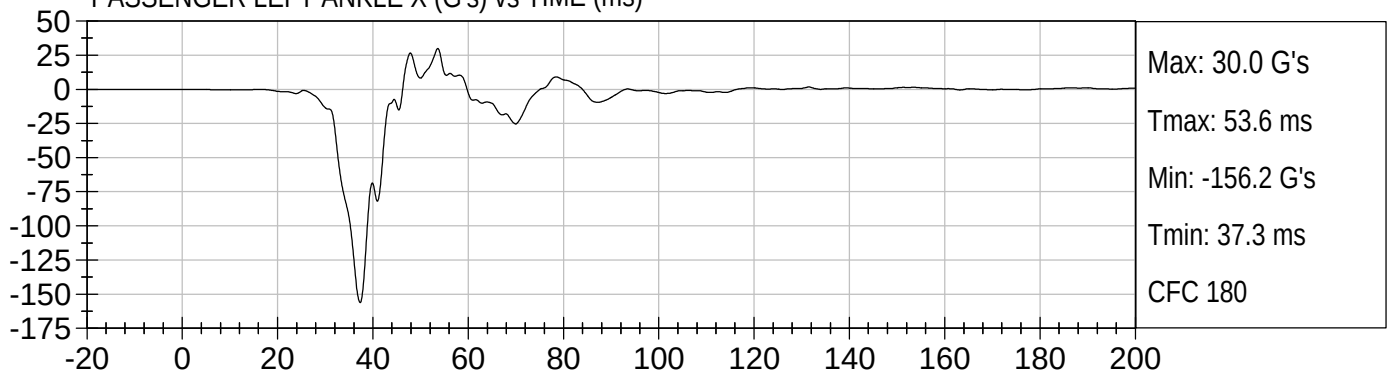
35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

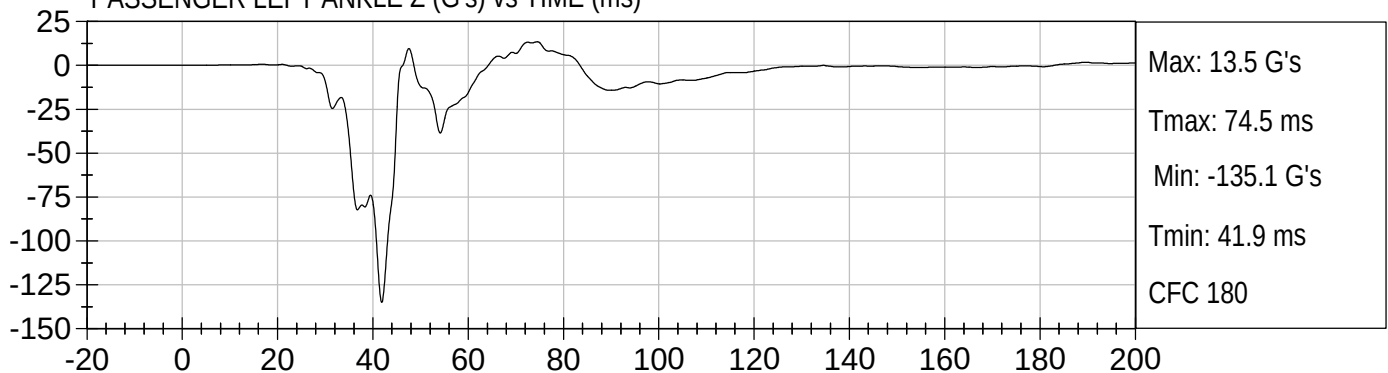
PASSENGER LEFT FOOT Z - FRONT (G's) vs TIME (ms)



PASSENGER LEFT ANKLE X (G's) vs TIME (ms)



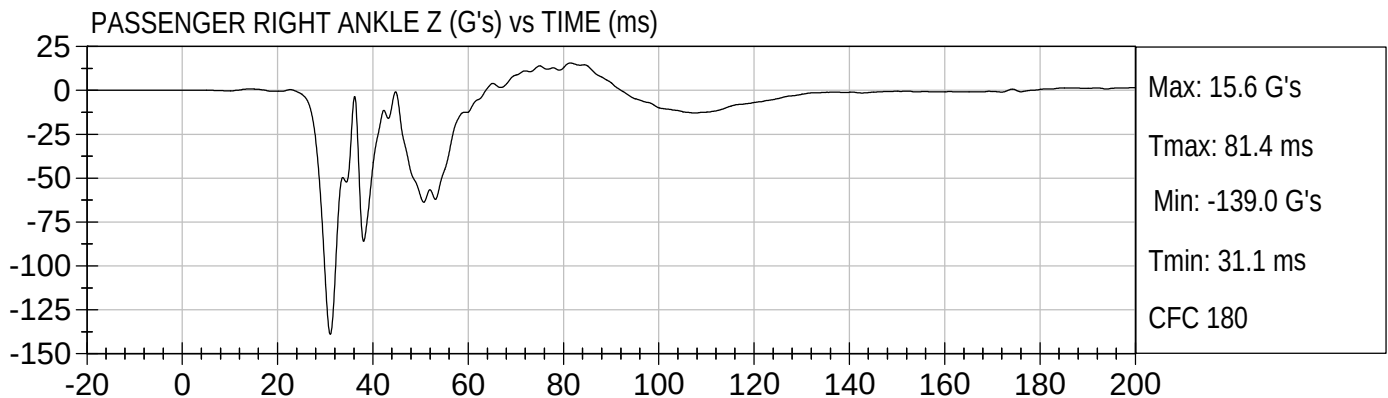
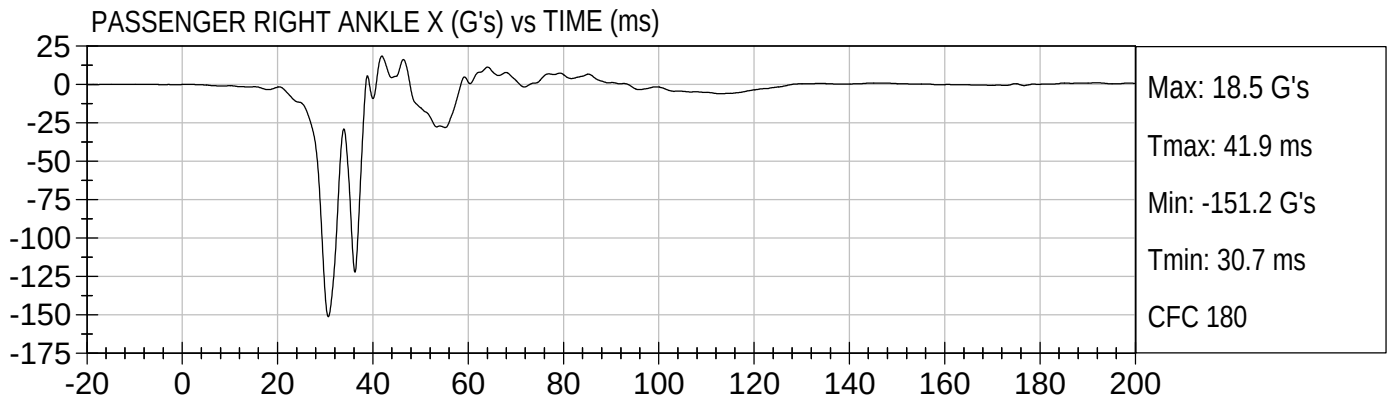
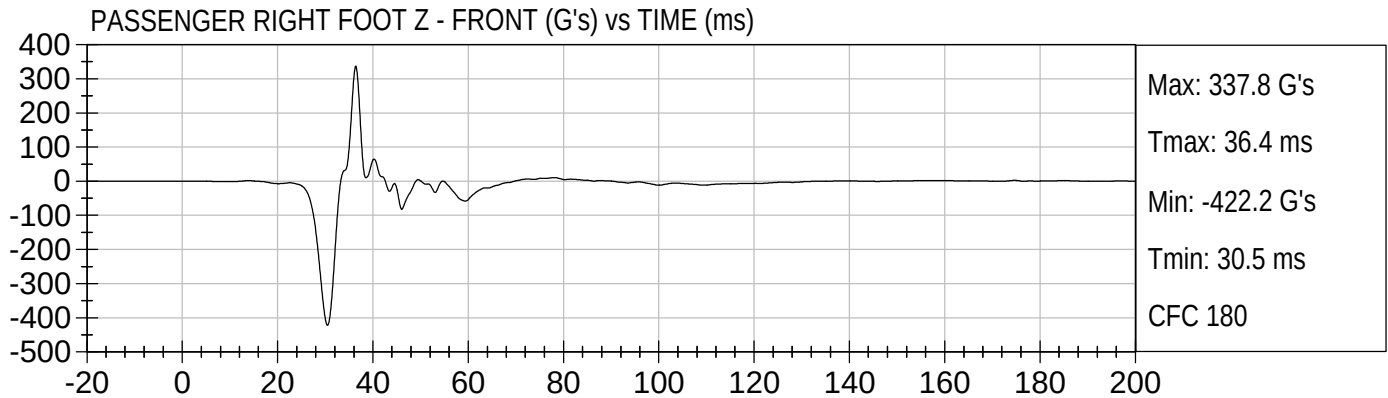
PASSENGER LEFT ANKLE Z (G's) vs TIME (ms)





35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

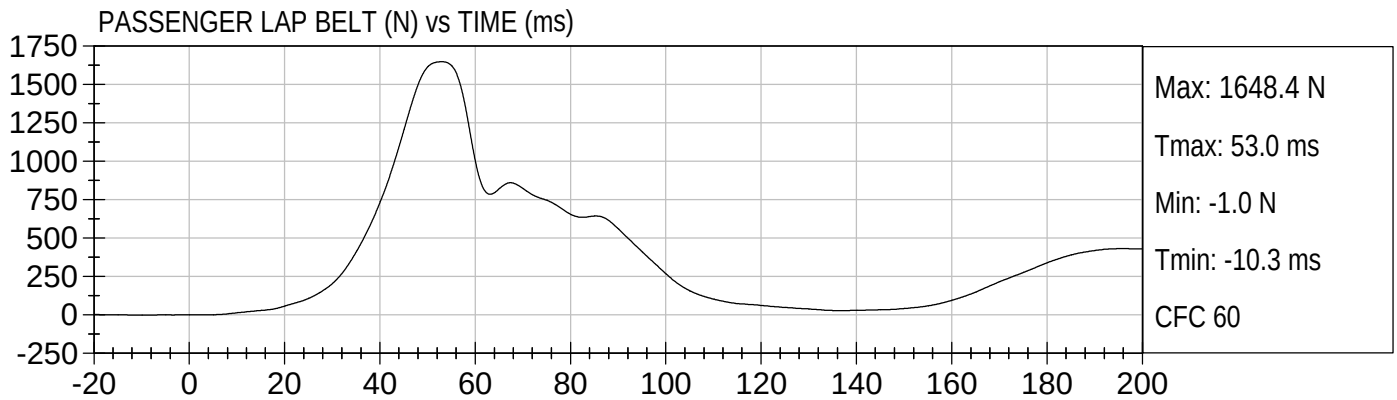
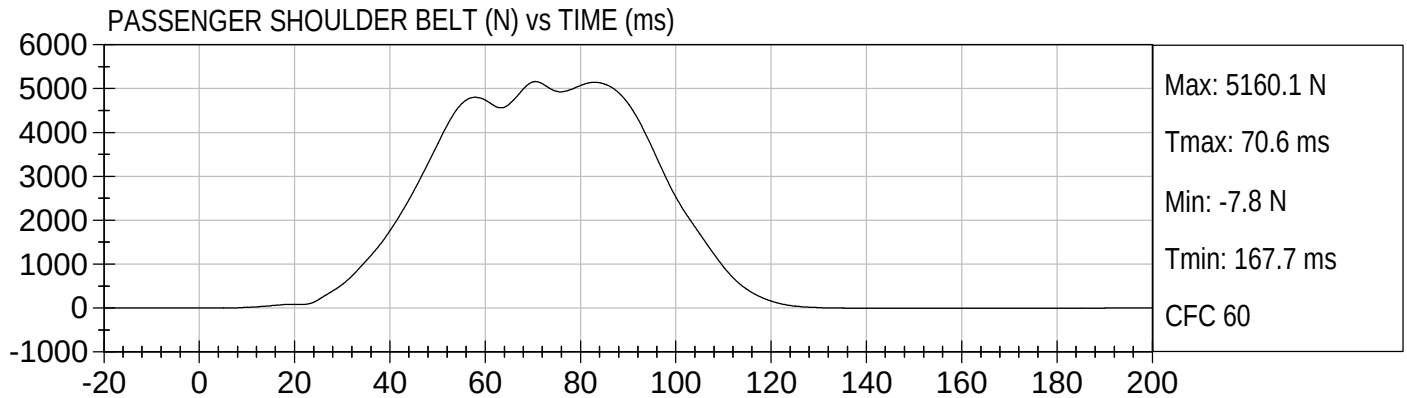
Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)



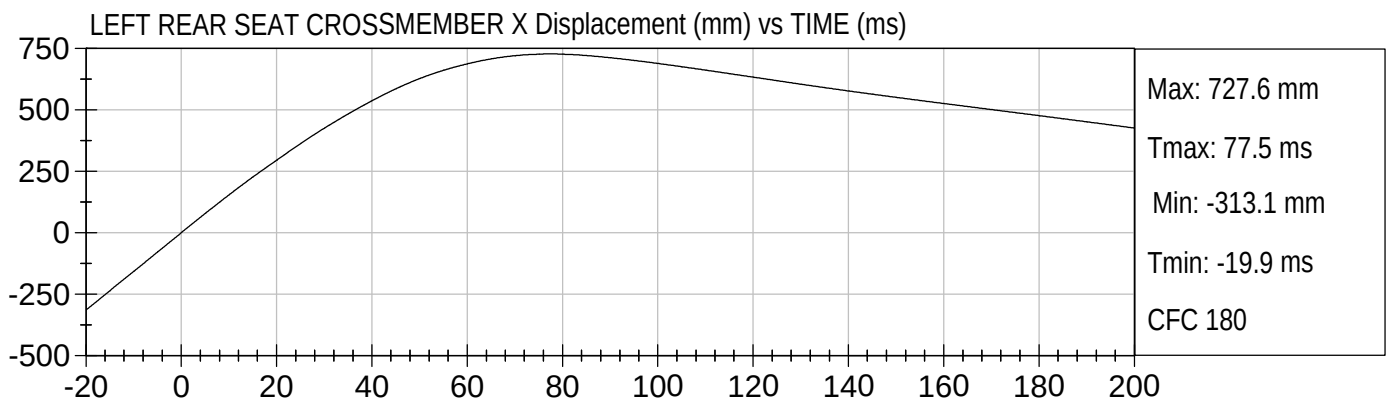
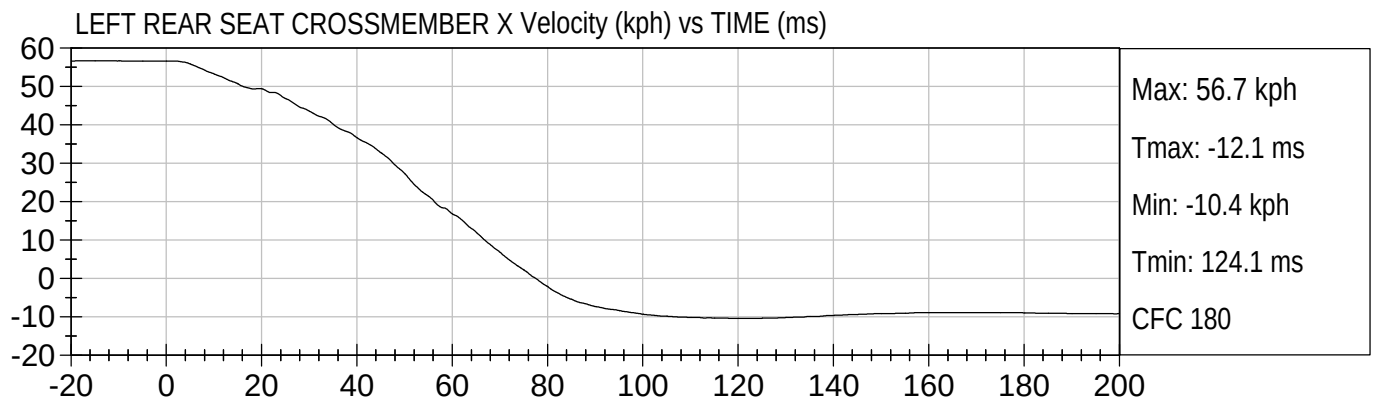
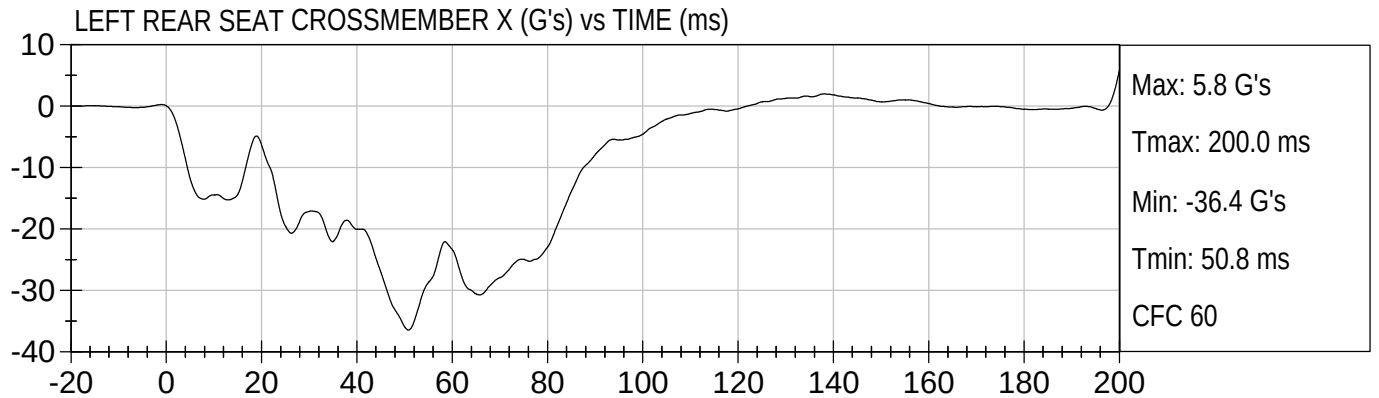


35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)



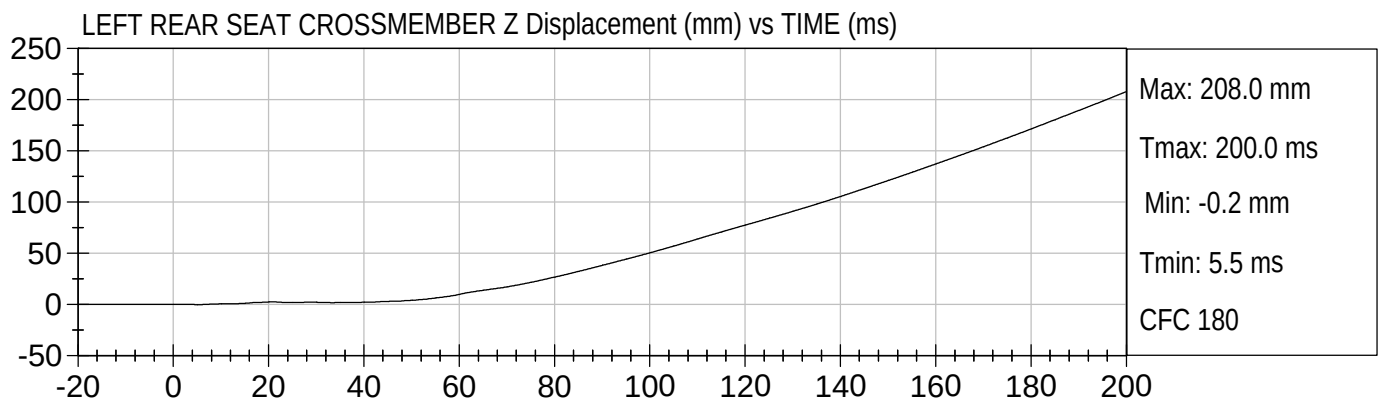
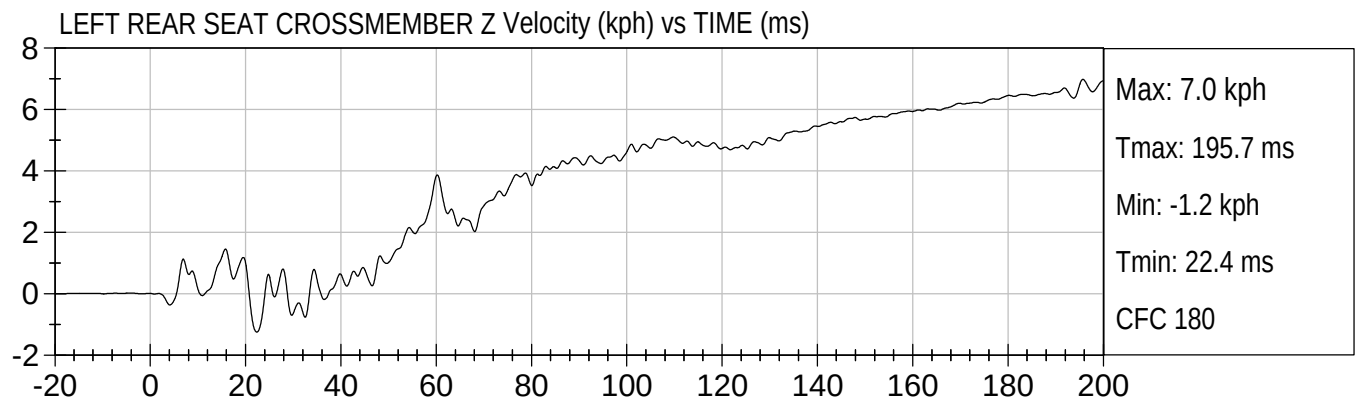
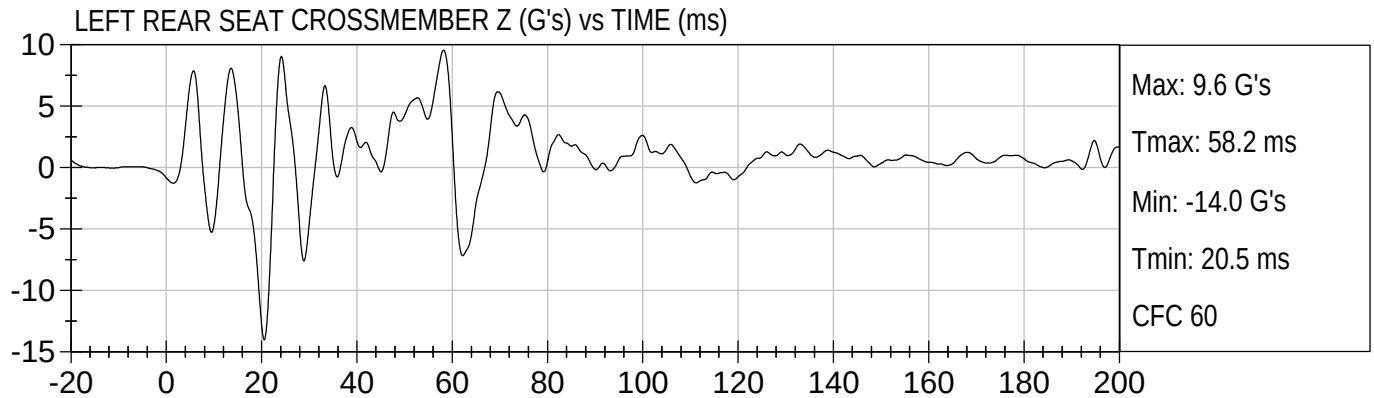
PASSENGER BELT STRETCH (mm/M) vs TIME (ms)
NO VALID DATA COLLECTED





35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

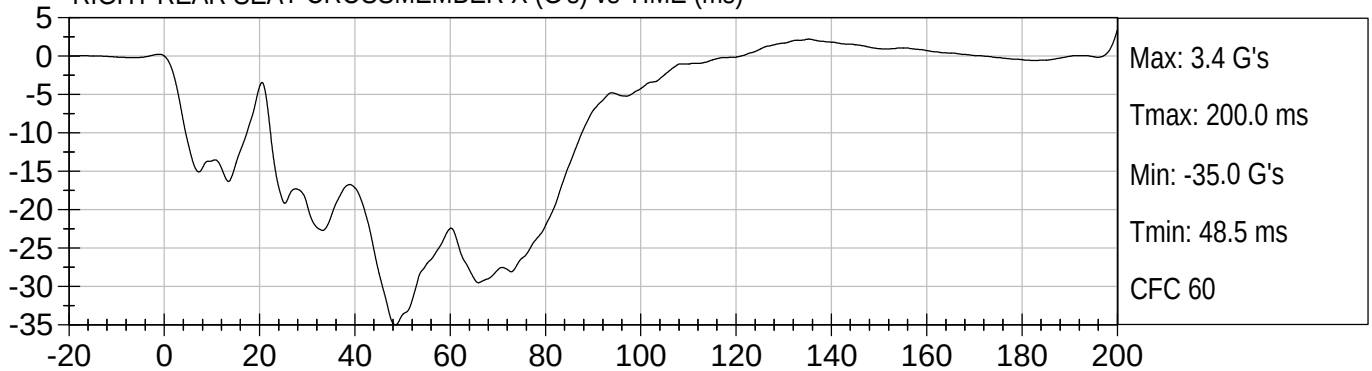




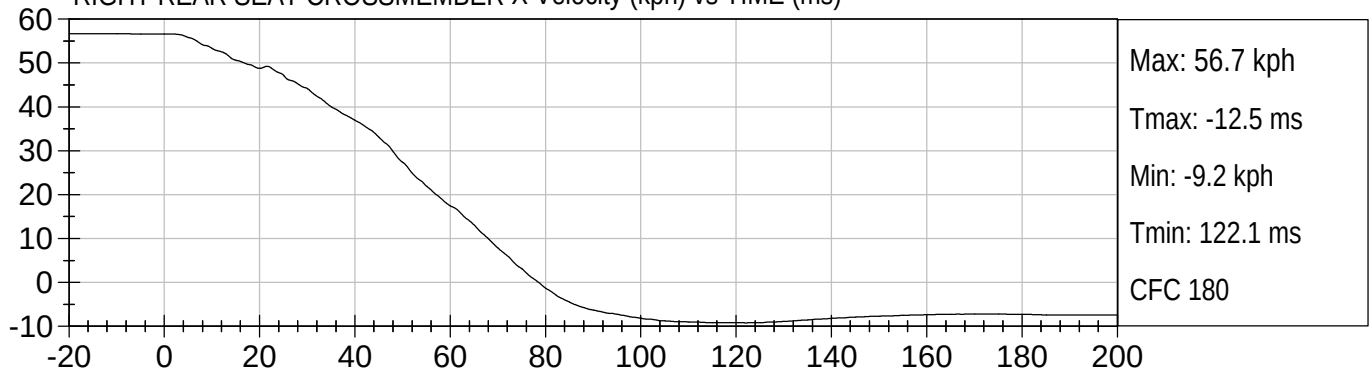
35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

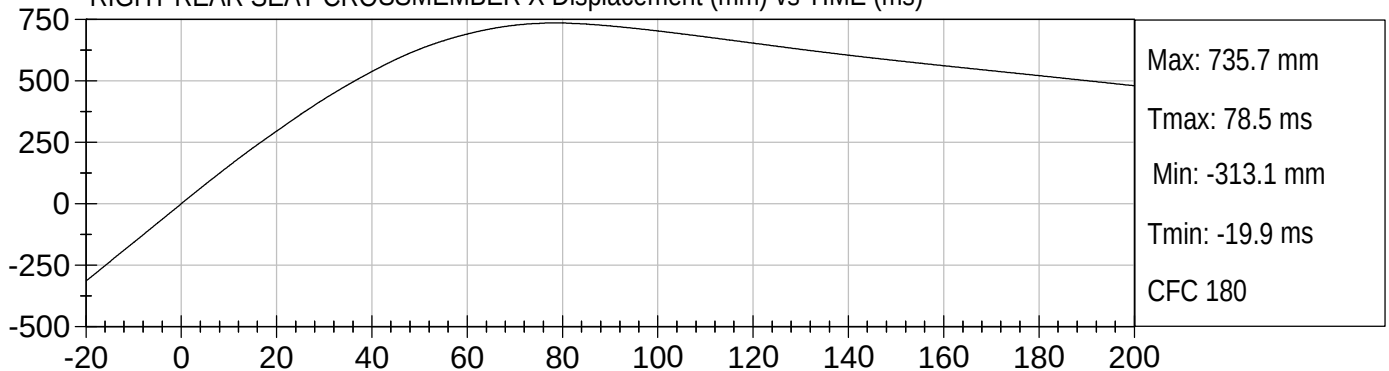
RIGHT REAR SEAT CROSSMEMBER X (G's) vs TIME (ms)

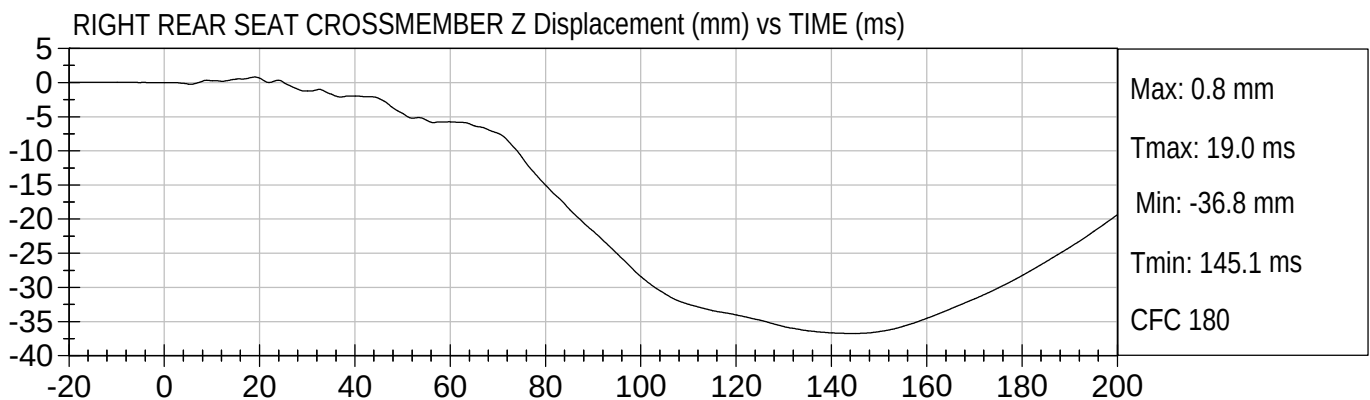
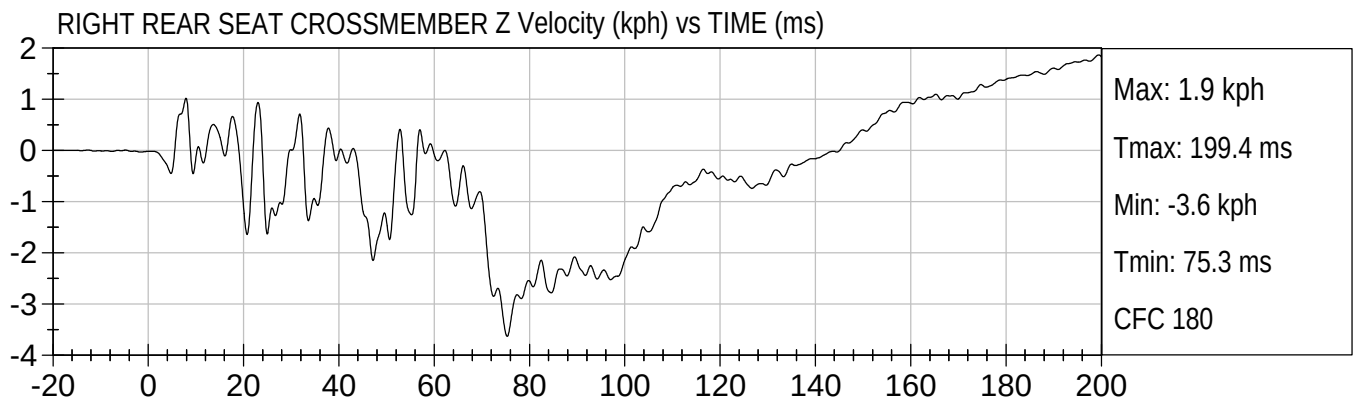
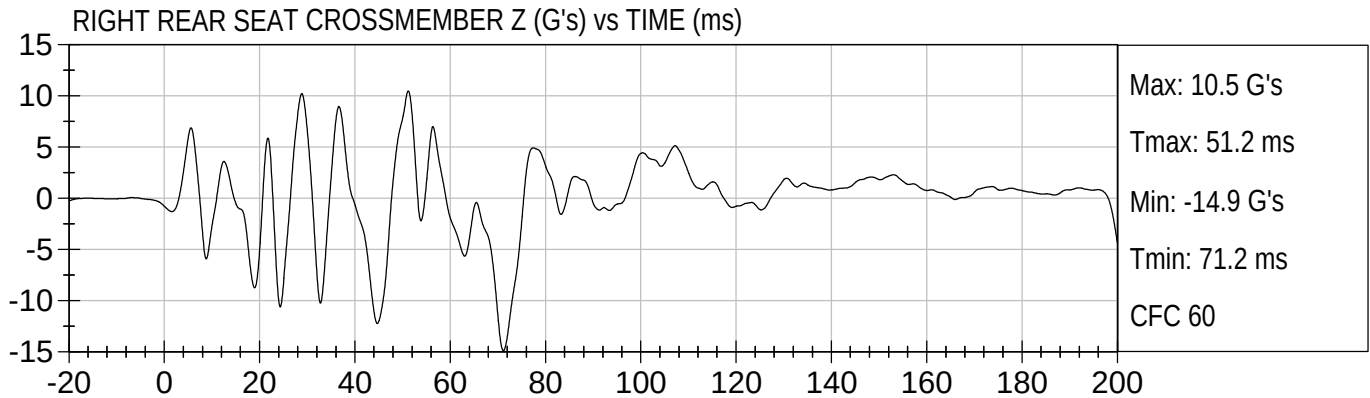


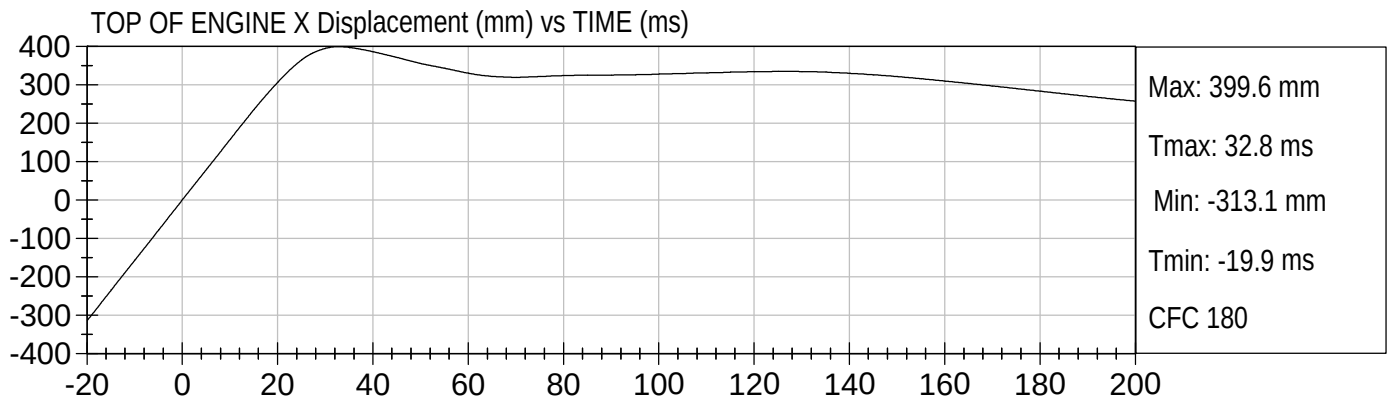
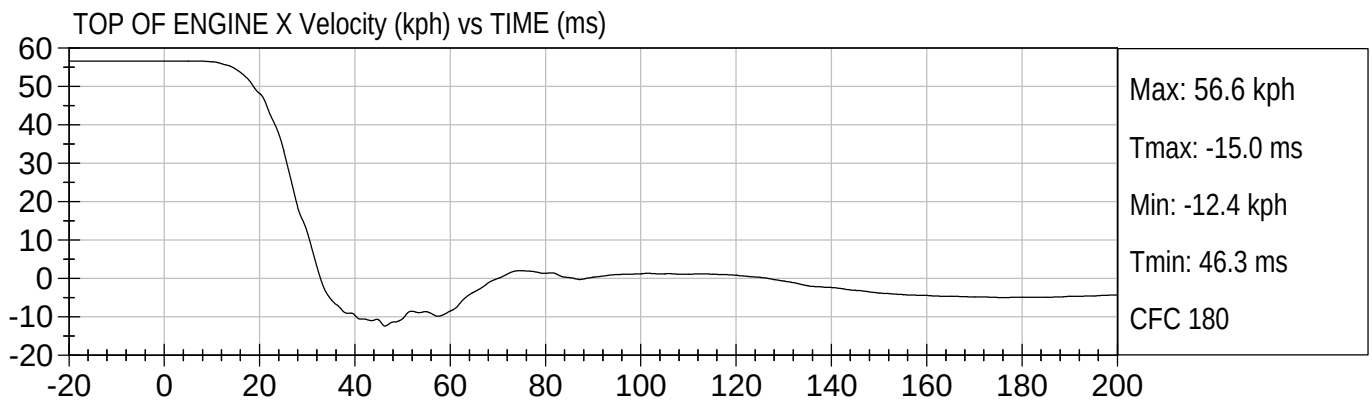
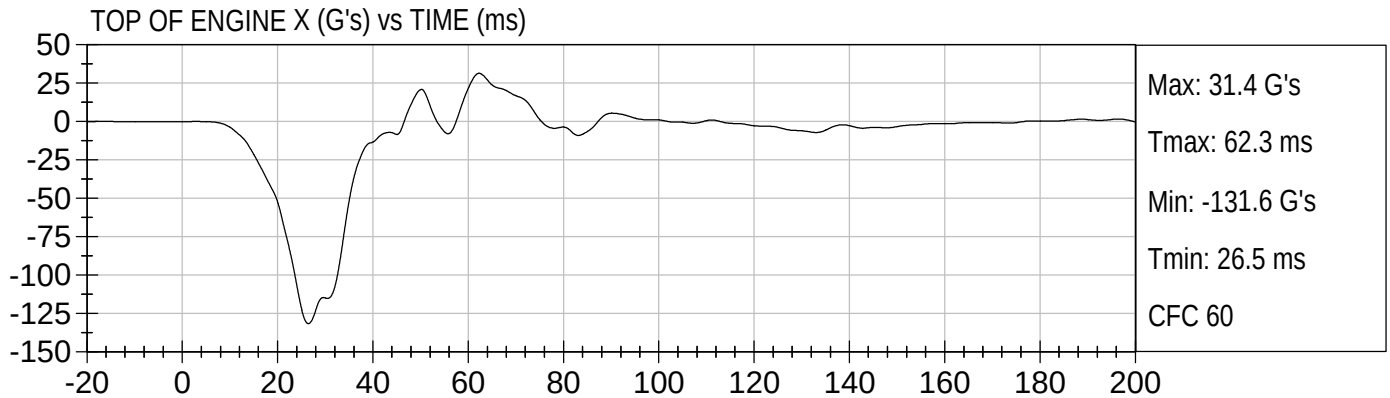
RIGHT REAR SEAT CROSSMEMBER X Velocity (kph) vs TIME (ms)



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



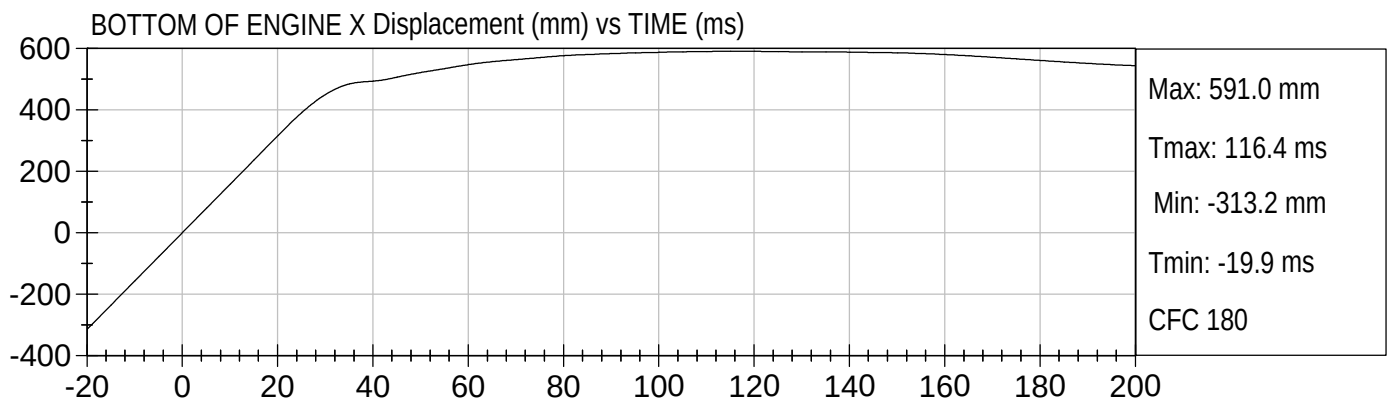
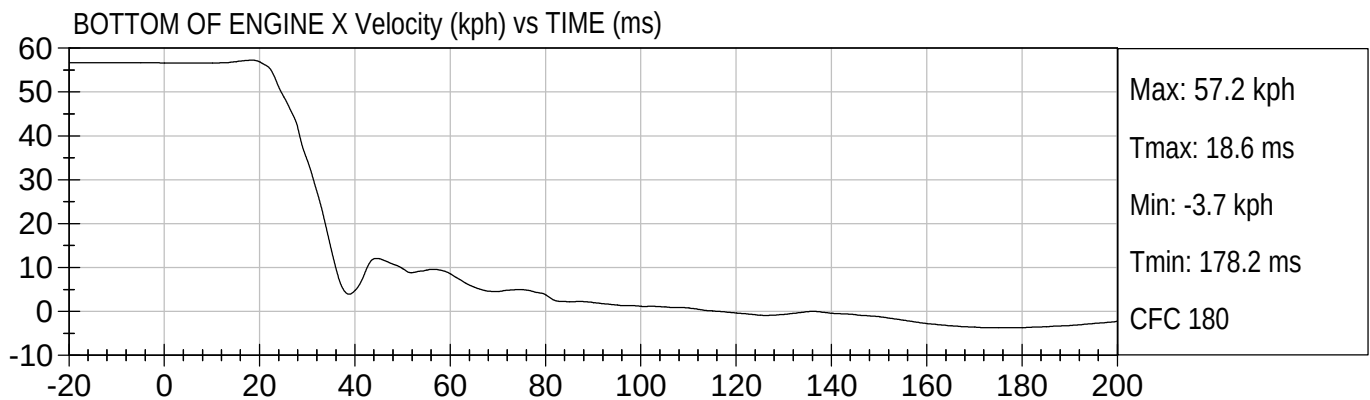
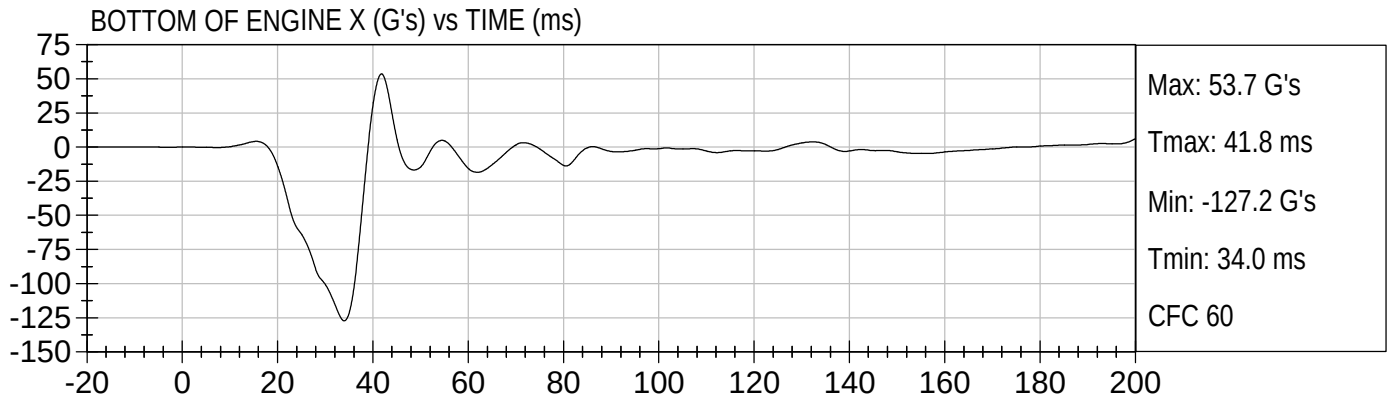






35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

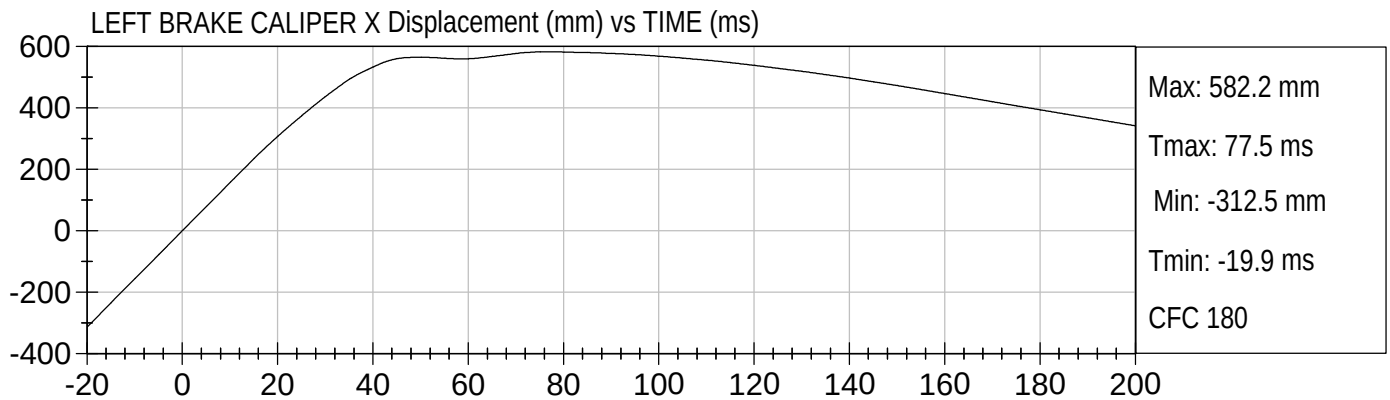
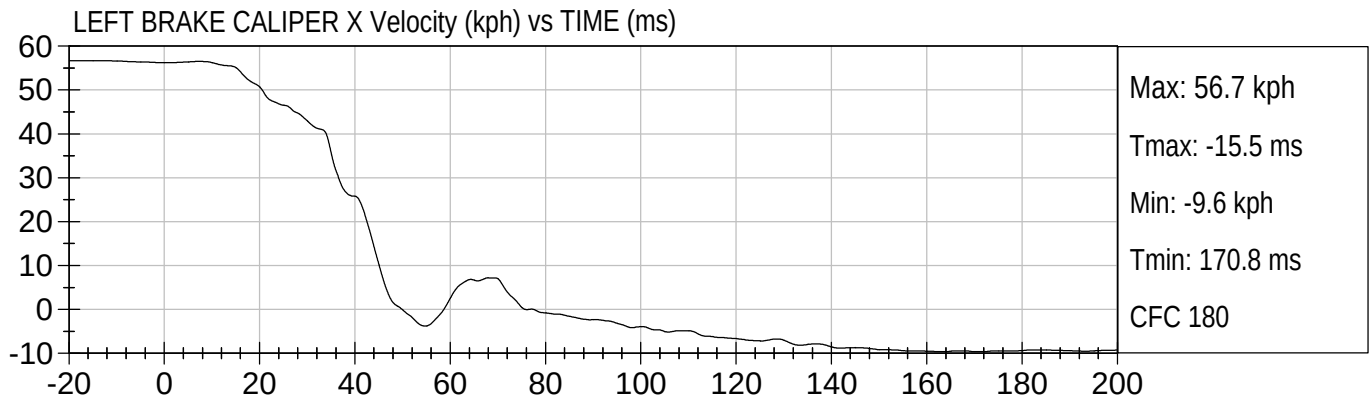
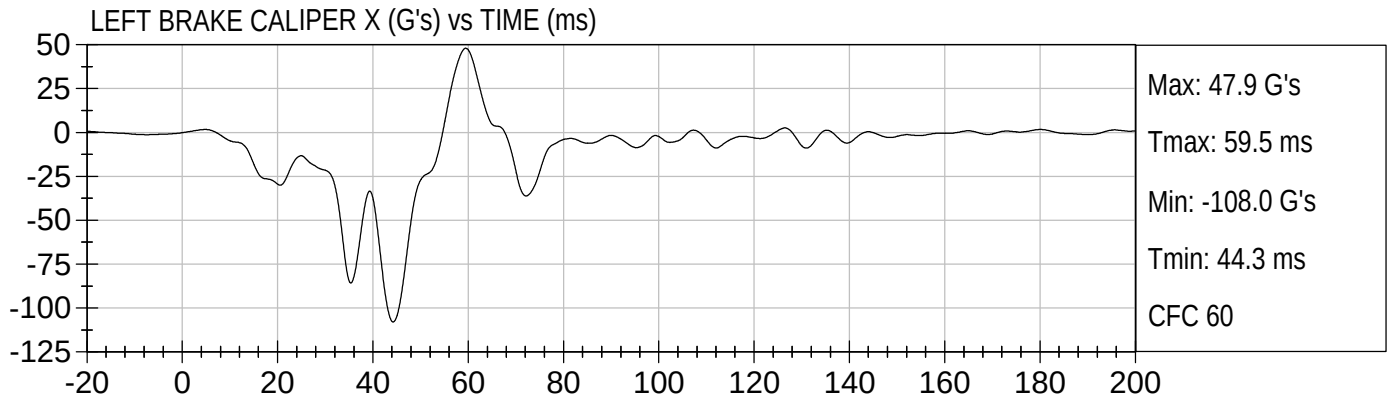
Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

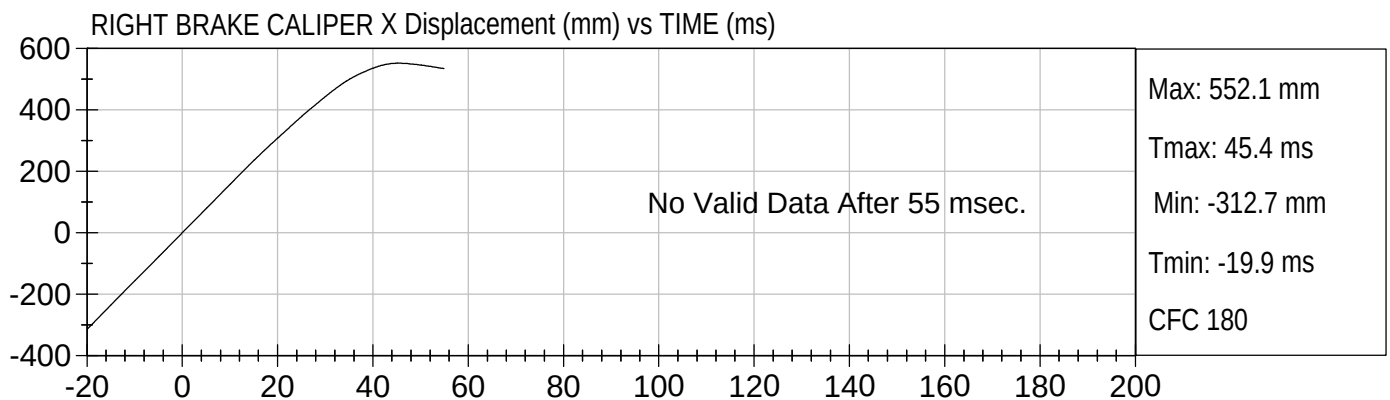
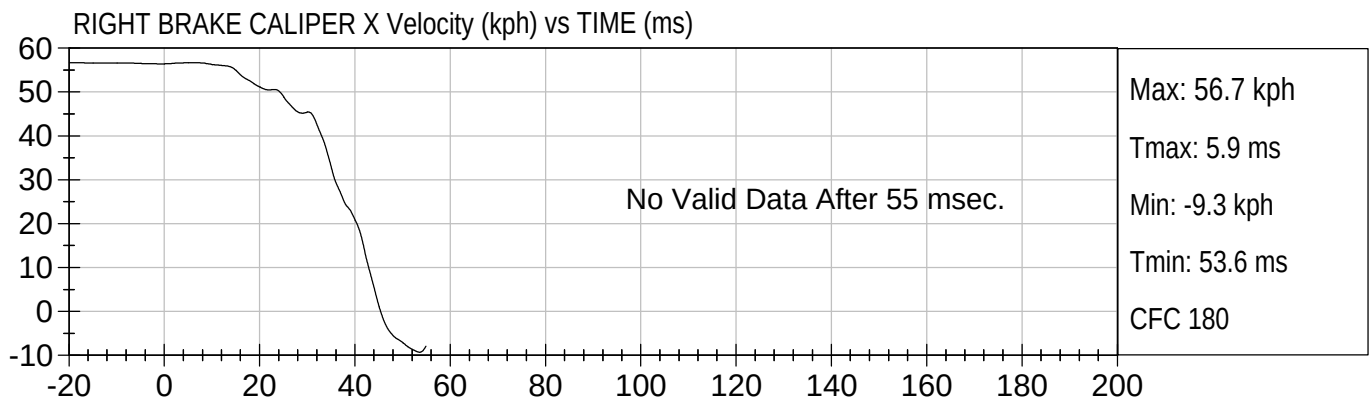
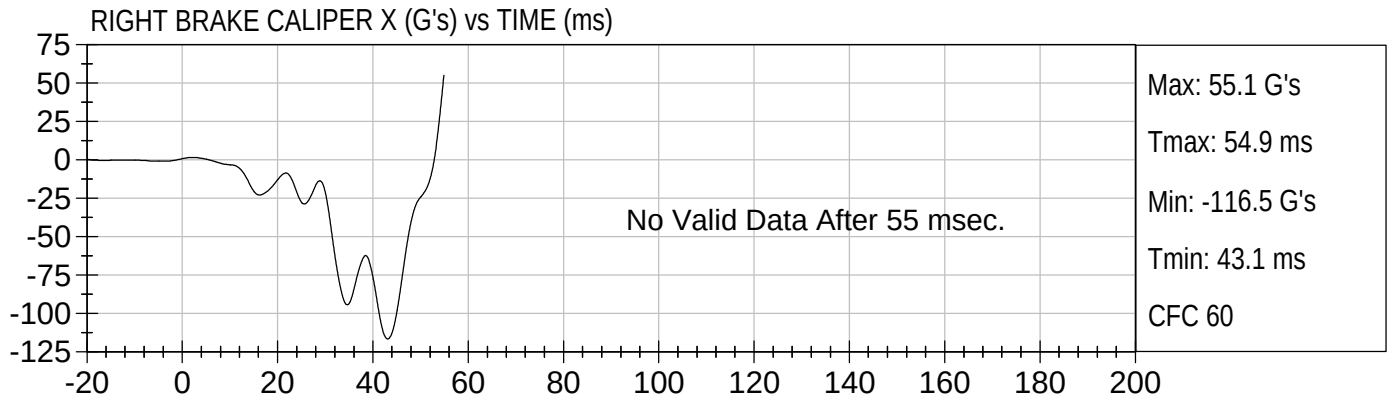




35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

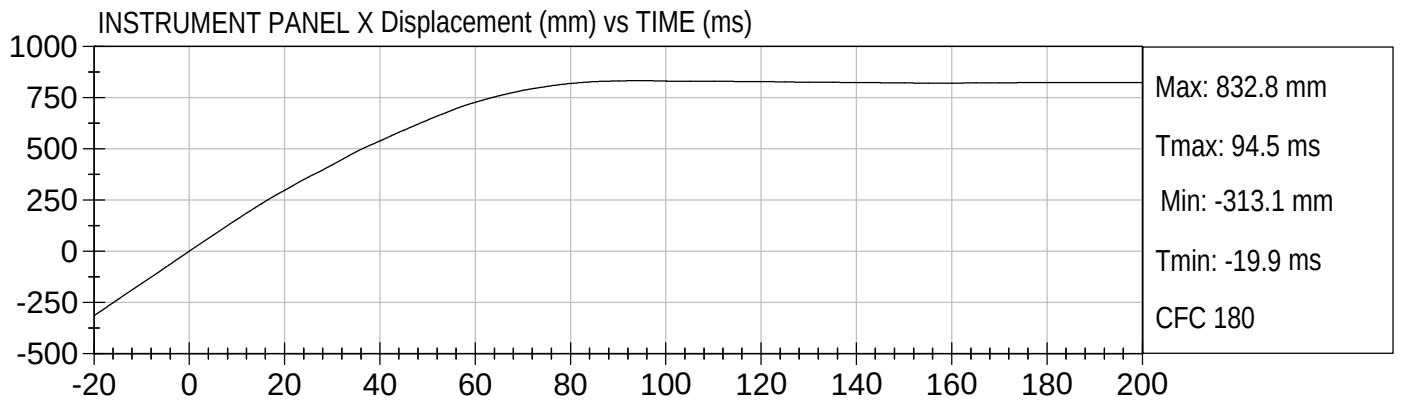
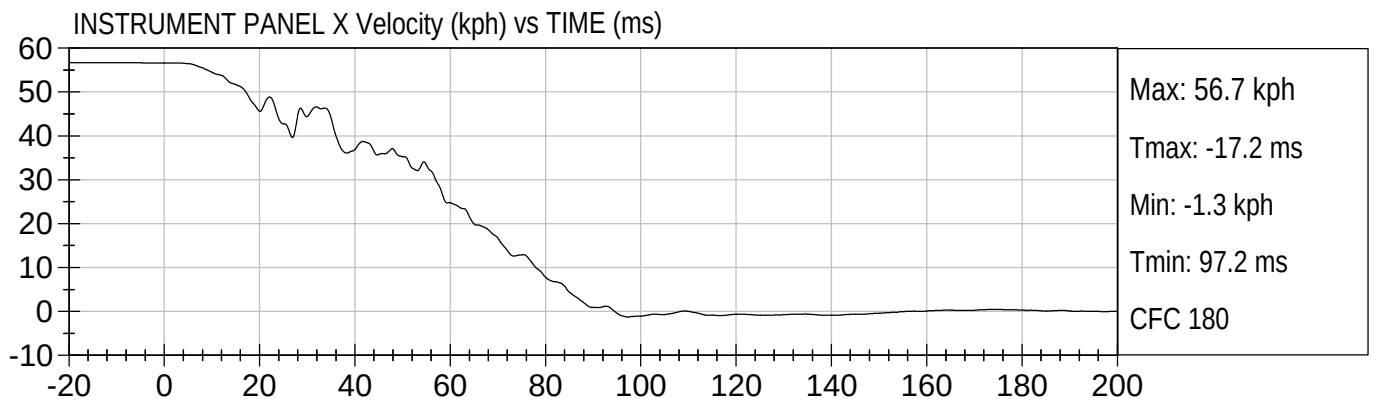
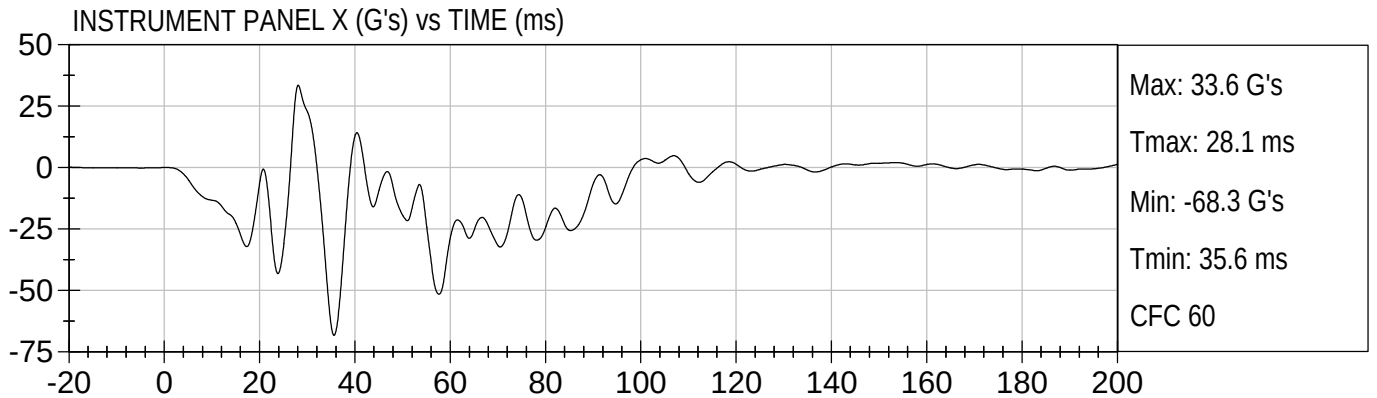






35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

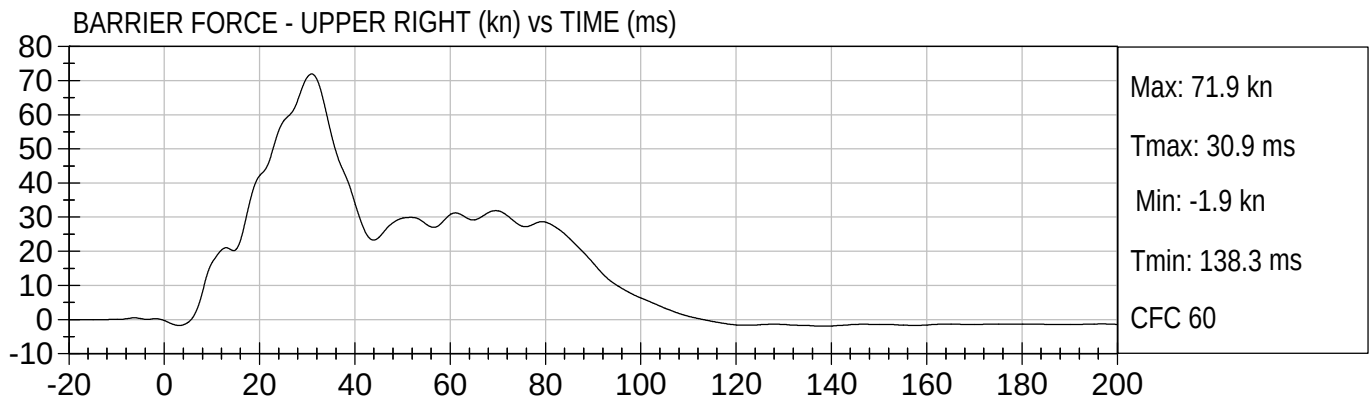
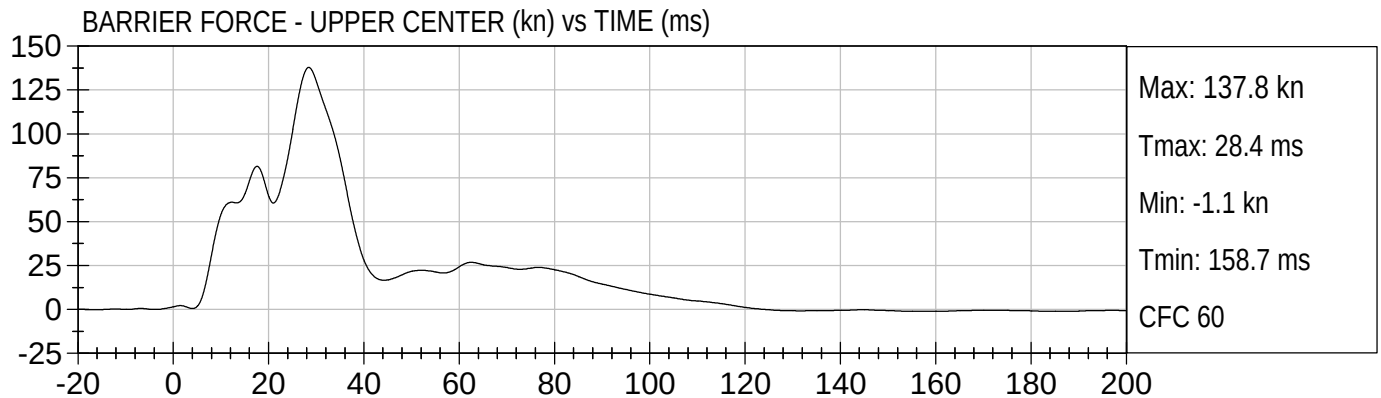
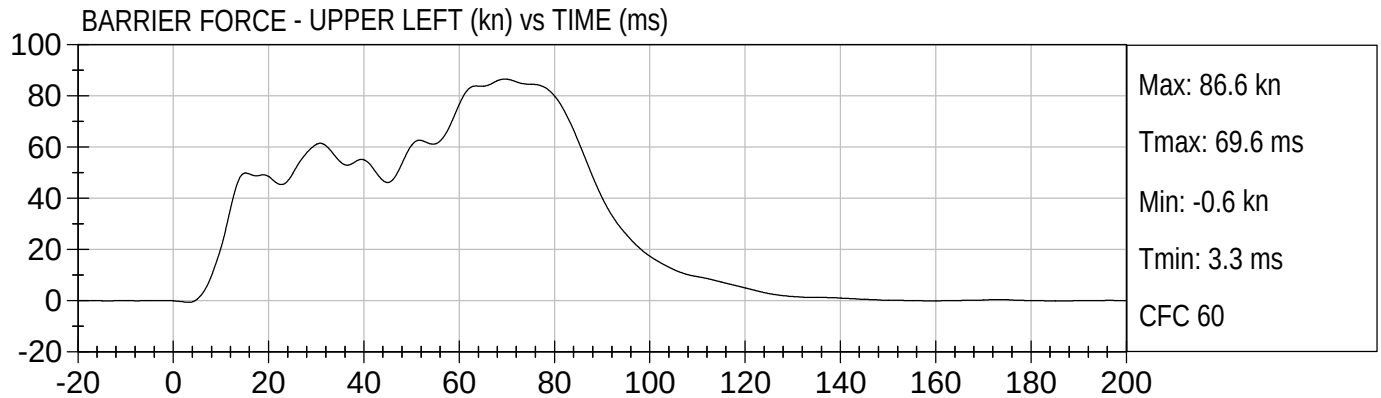
Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

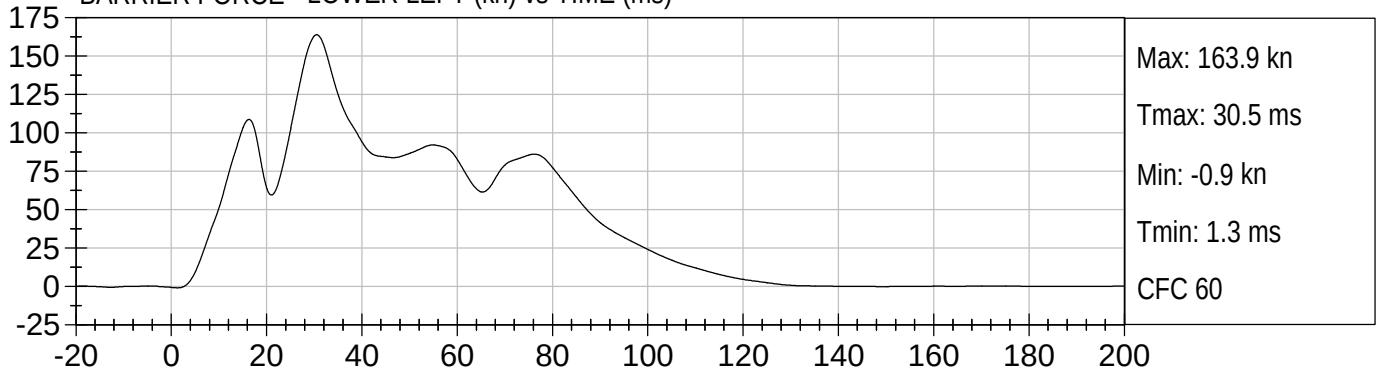




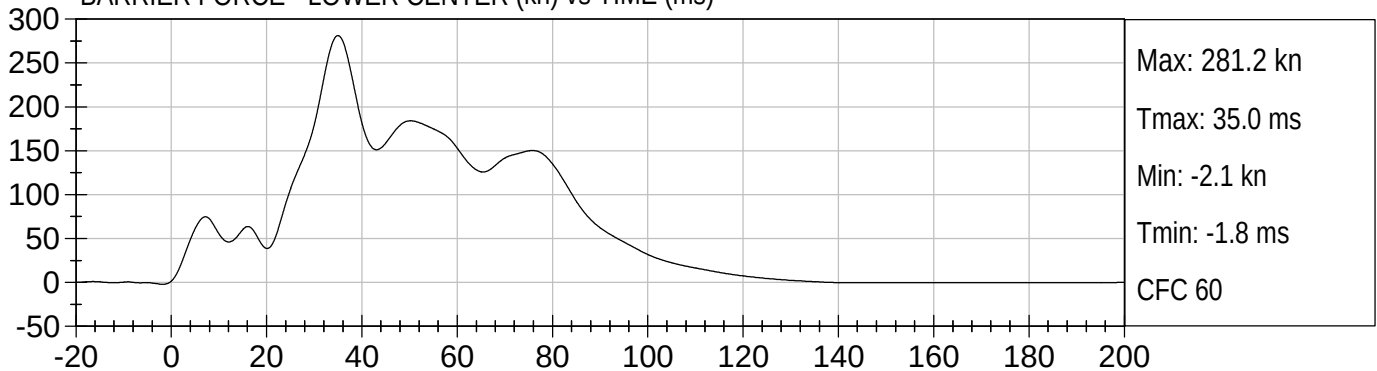
35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)

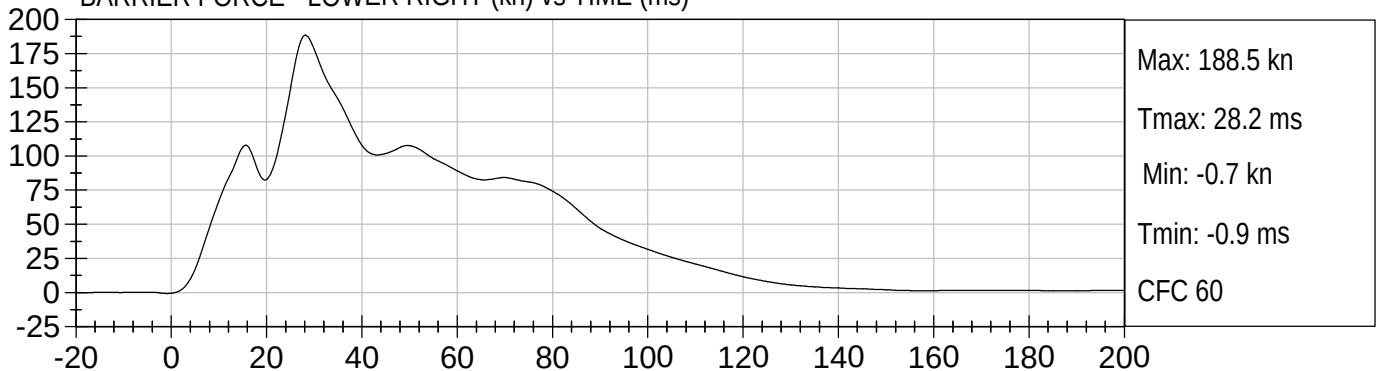
BARRIER FORCE - LOWER LEFT (kn) vs TIME (ms)



BARRIER FORCE - LOWER CENTER (kn) vs TIME (ms)



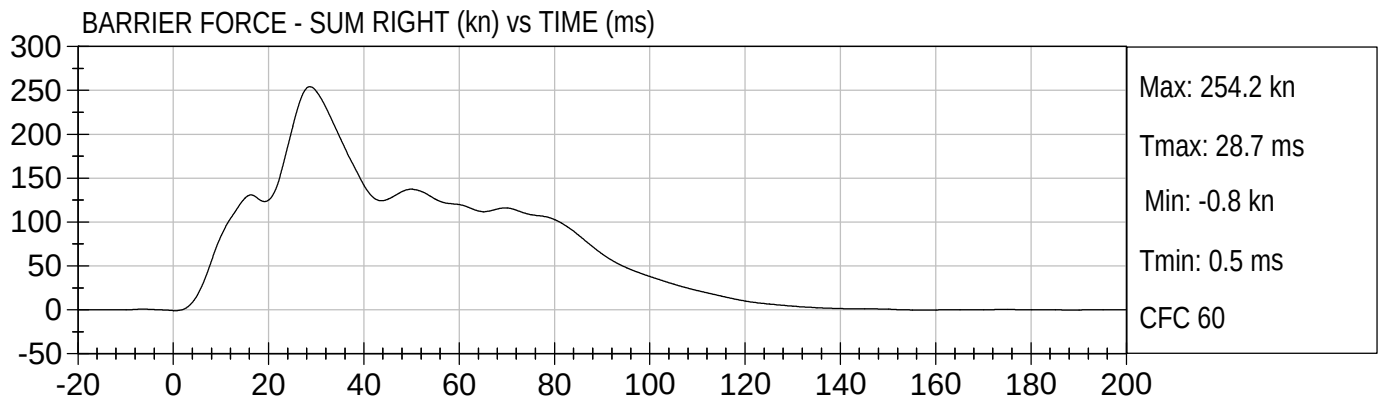
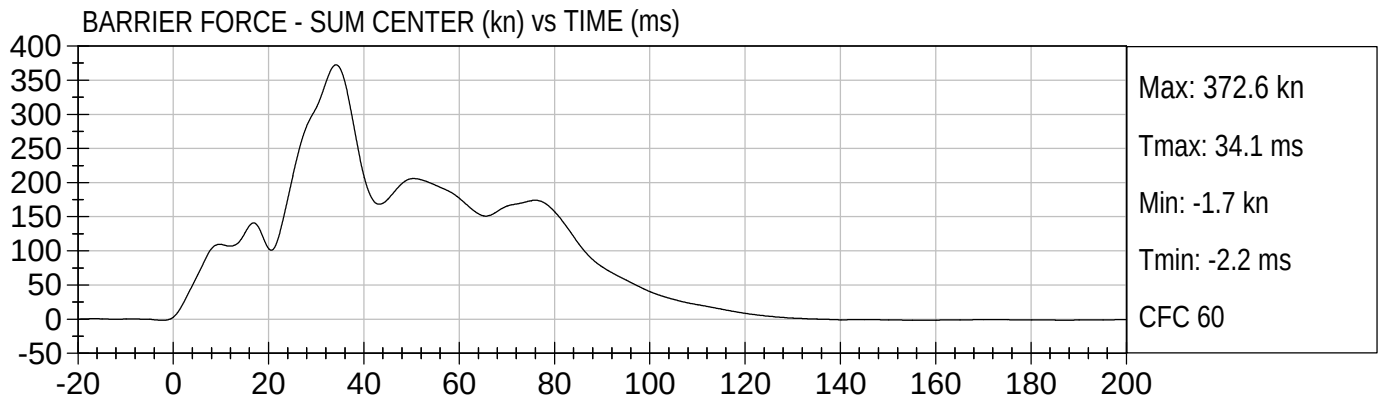
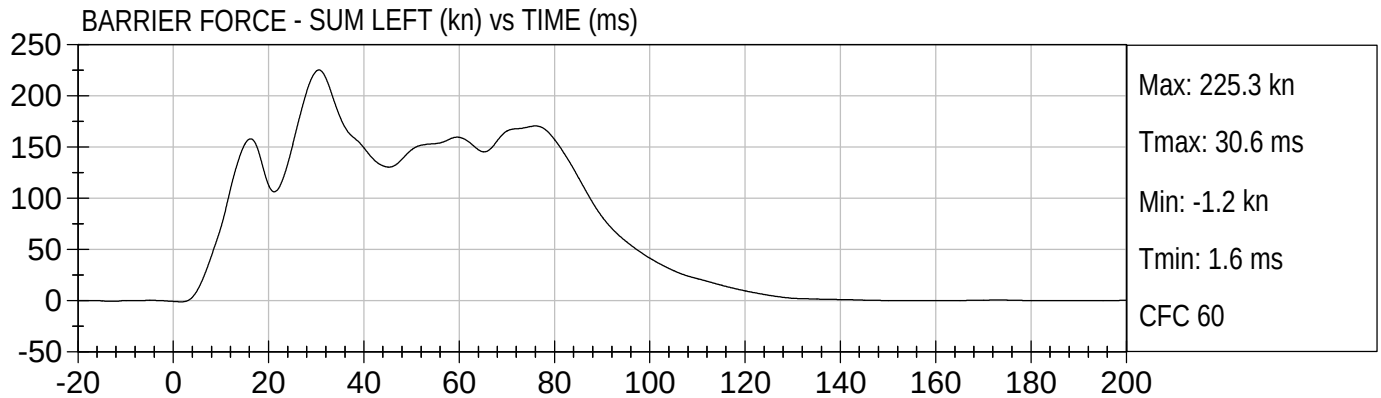
BARRIER FORCE - LOWER RIGHT (kn) vs TIME (ms)





35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

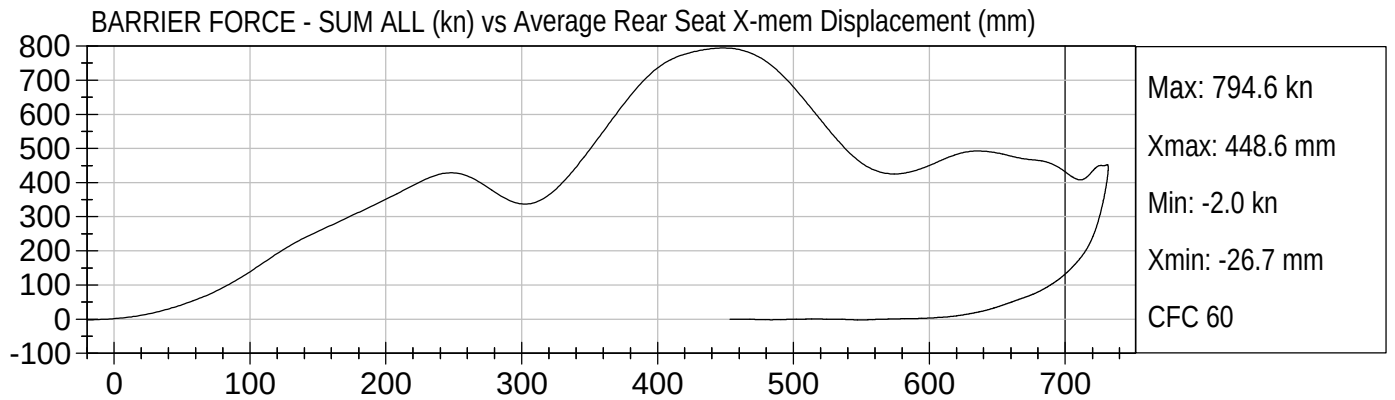
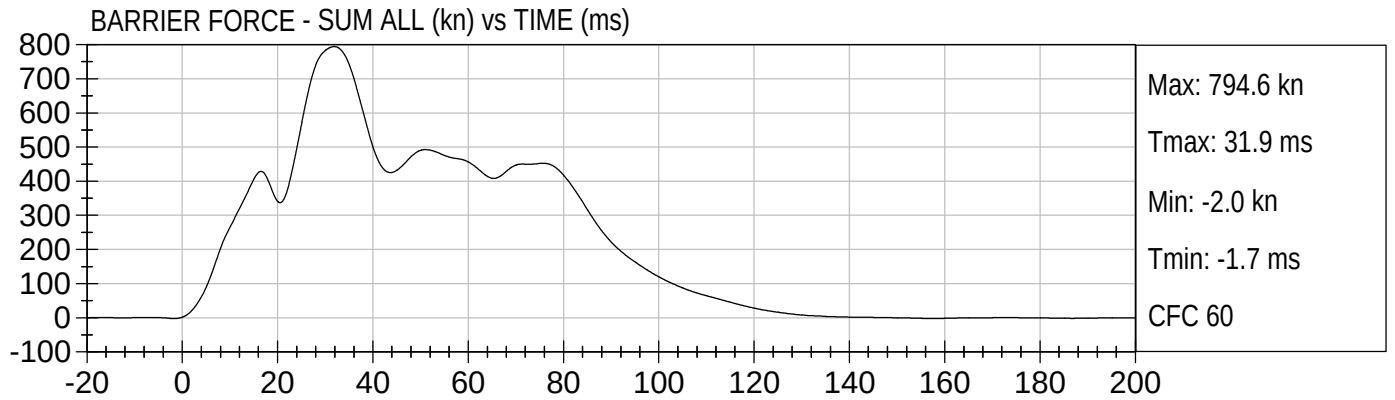
Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT
2002 BUICK RENDEZVOUS

Test Date: 01/22/2002
Speed: 35.2 mph (56.6 km/h)



APPENDIX C

DUMMY CALIBRATION DATA TRACES AND TABLES

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

ATD Serial No.: 066

Test I.D.: D011776

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	32	Pass
Probe Velocity	m/s	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	4715 to 5782	5145	Pass
Overall Test Results				Pass

Laboratory Technician

11/28/01

Test Date

Approved By



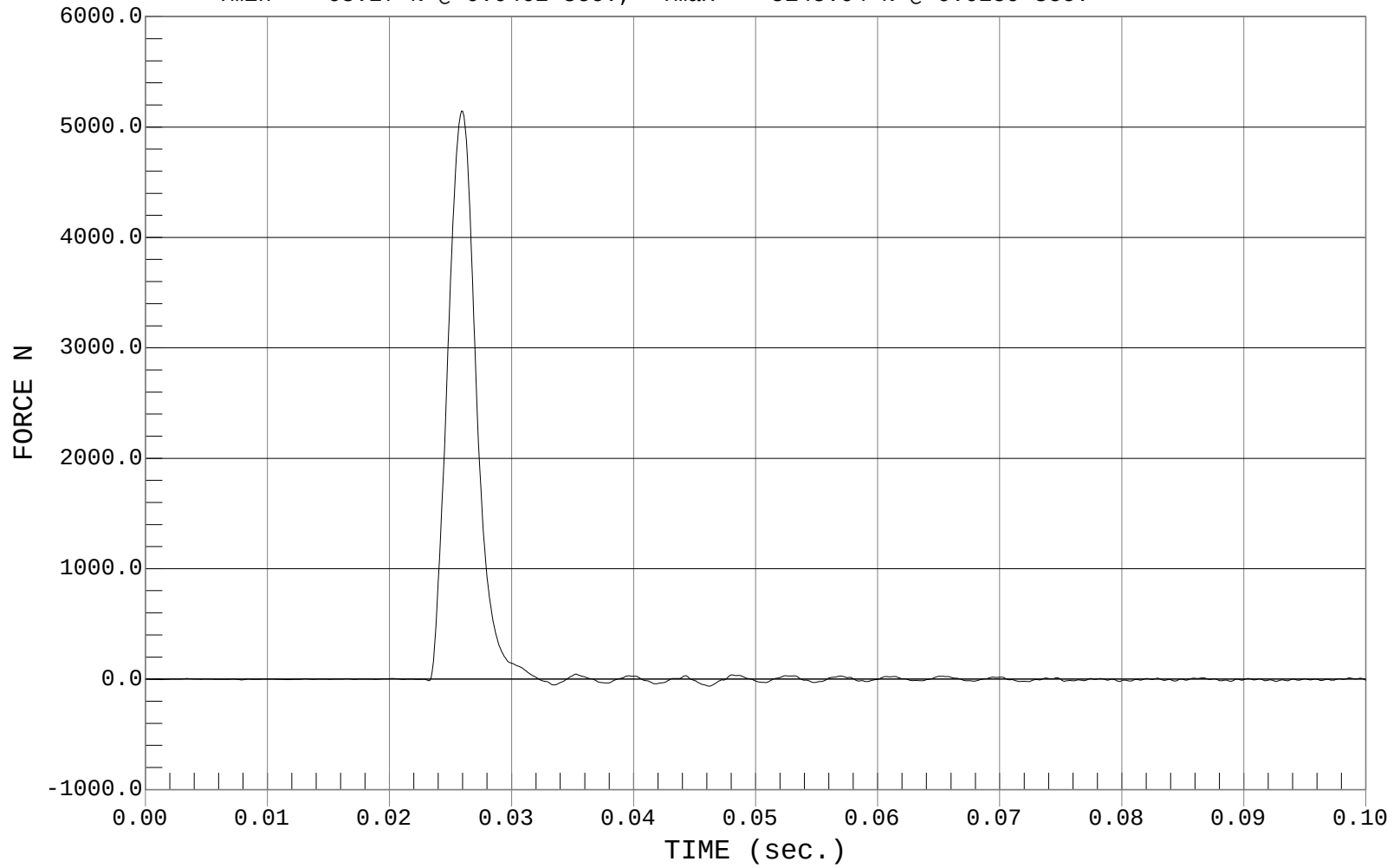
LEFT KNEE IMPACT

Test Desc.: Dummy Calibration - Left Knee Impact
Component: Dummy #066

Test Date: 11-28-01
Speed: 6.92 FT/SEC, 2.11 M/SEC

1 FORCE, D01776FF.F09

Ymin = -63.27 N @ 0.0462 sec., Ymax = 5145.04 N @ 0.0259 sec.



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

ATD Serial No.: 066

Test I.D.: D011775

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	32	Pass
Probe Velocity	m/s	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	4715 to 5782	5193	Pass
Overall Test Results				Pass

Laboratory Technician

11/28/01

Test Date

Approved By



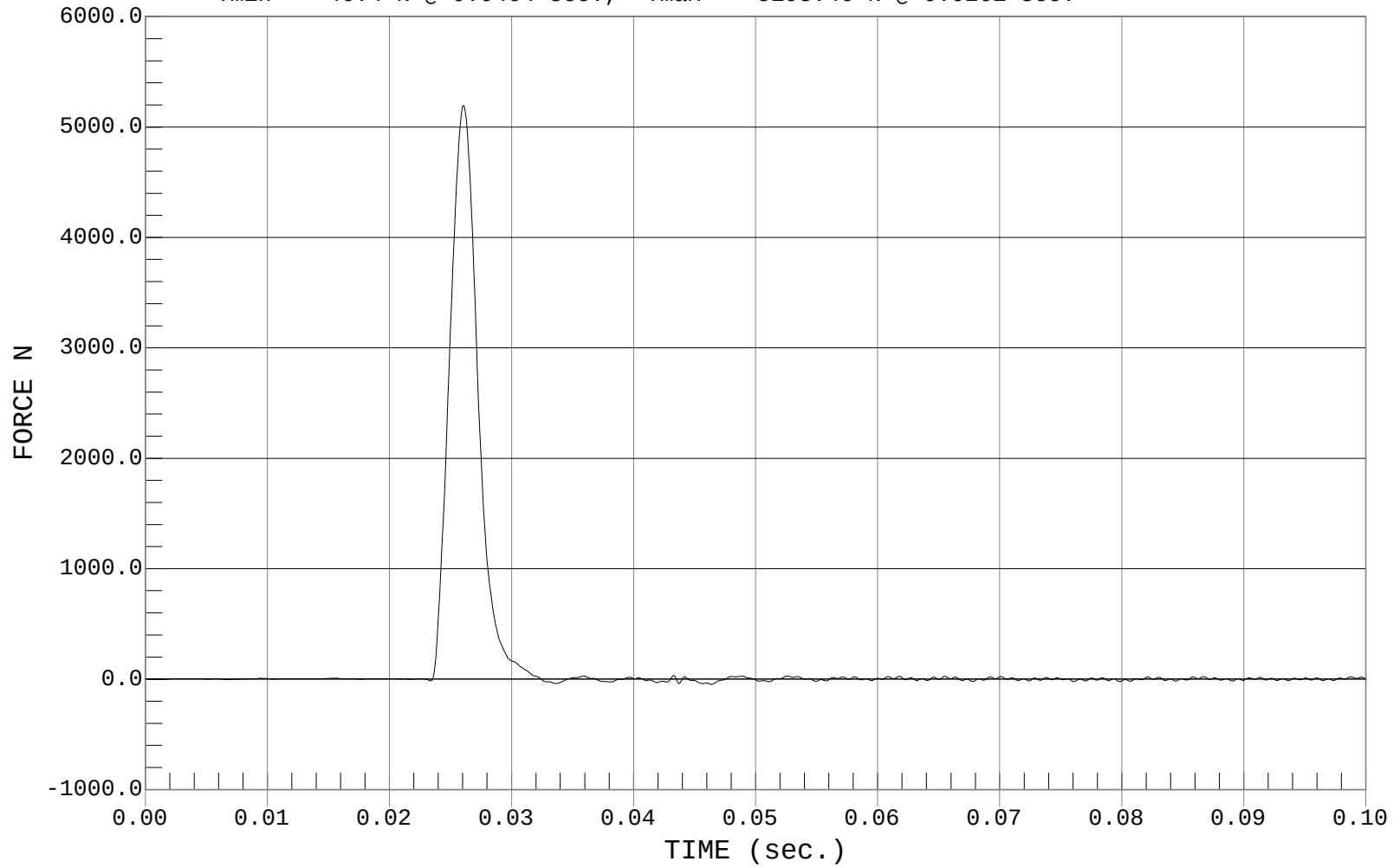
RIGHT KNEE IMPACT

Test Desc.: Dummy Calibration - Right Knee Impact
Component: Dummy #066

Test Date: 11-28-01
Speed: 6.93 FT/SEC, 2.11 M/SEC

— 1 FORCE, D01775FF.F09

Ymin = -46.4 N @ 0.0464 sec., Ymax = 5193.46 N @ 0.0261 sec.



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

ATD Serial No.: 066

Test I.D.: D011771

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	243.8	Pass
Peak Probe Force	G's	$\leq \pm 15.0$	4.0	Pass
Is Acceleration Unimodal?	Yes/No	< 10% Peak	Yes	Pass
Overall Test Results				Pass

Laboratory Technician

11/26/01

Test Date

Approved By



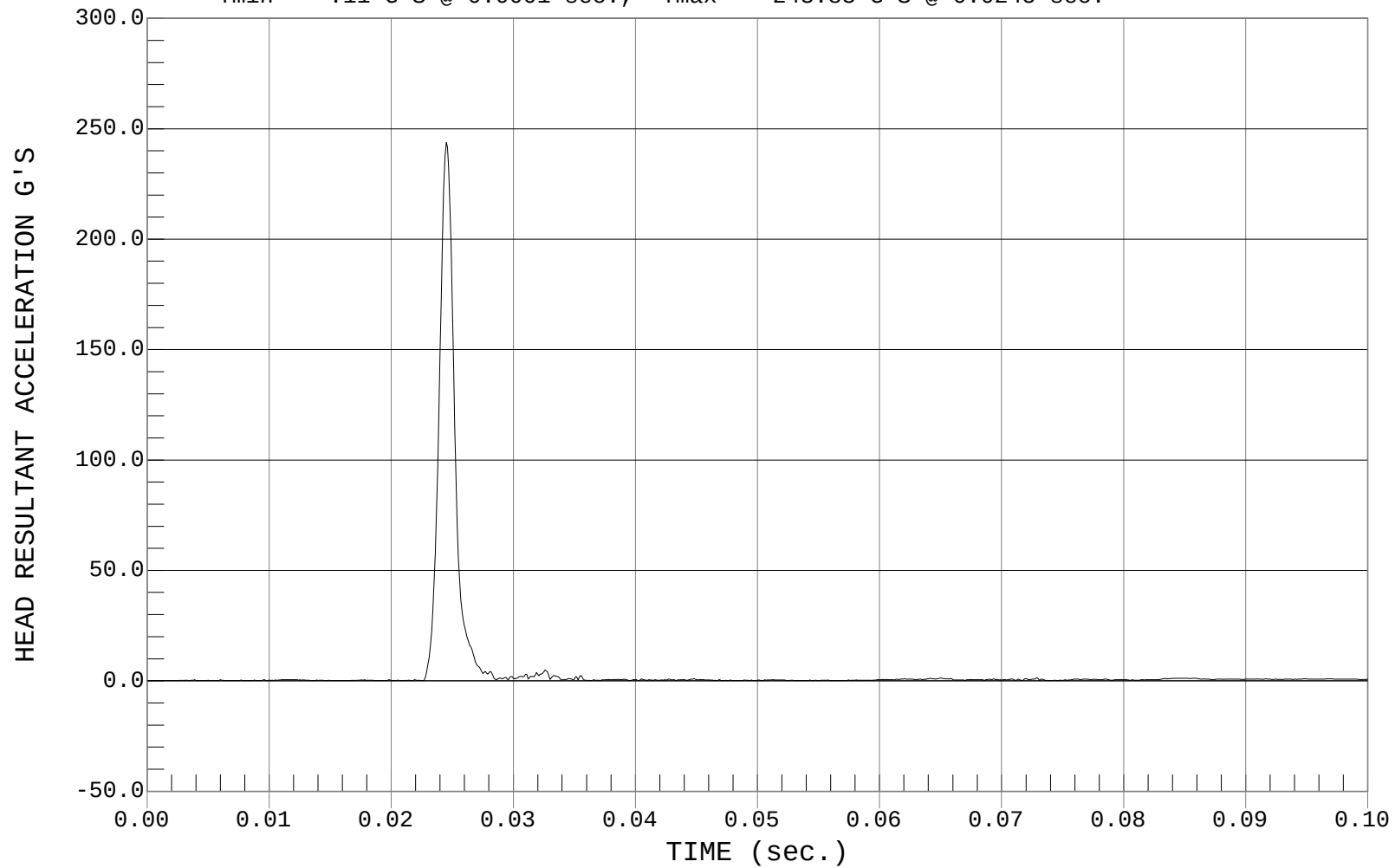
PEAK RESULTANT ACCELERATION

Test Desc.: Dummy Calibration - Head Drop
Component: Dummy #066

Test Date: 11-26-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 HEAD RESULTANT ACCELERATION, D01771AV.A01

Ymin = .11 G'S @ 0.0001 sec., Ymax = 243.83 G'S @ 0.0245 sec.





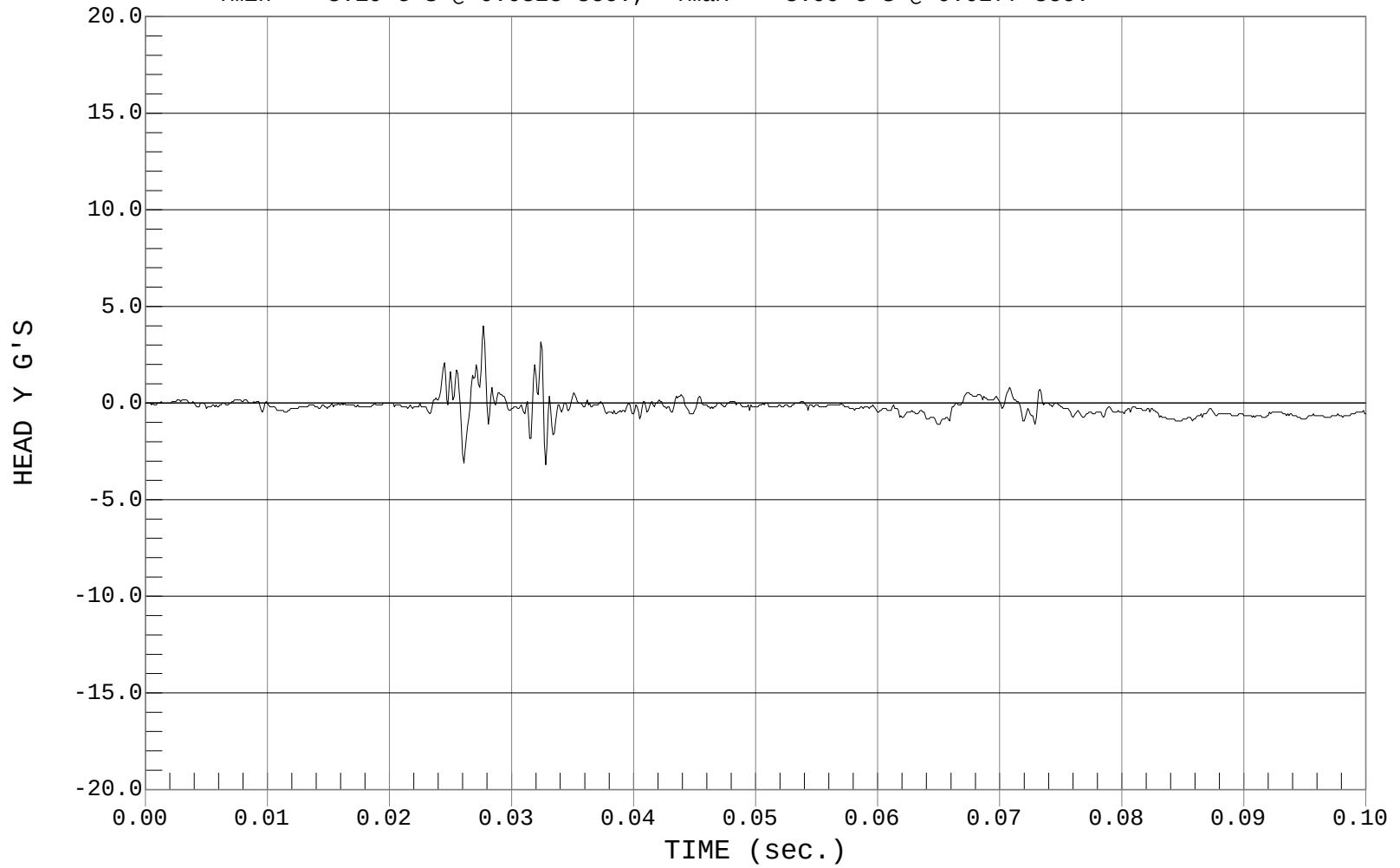
PEAK LATERAL ACCELARATION

Test Desc.: Dummy Calibration - Head Drop
Component: Dummy #066

Test Date: 11-26-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 HEAD Y, D01771AR.A02

Ymin = -3.19 G'S @ 0.0328 sec., Ymax = 3.99 G'S @ 0.0277 sec.



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

ATD Serial No.: 066

Test I.D.: D011774

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	36	Pass
Probe Velocity	m/s	6.58 to 6.82	6.68	Pass
Peak Probe Force	Newtons	5159 to 5893	5606	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.58	Pass
Internal Hysteresis	%	69 to 85	74	Pass
Overall Test Results				Pass

Laboratory Technician

12/03/01

Test Date

Approved By



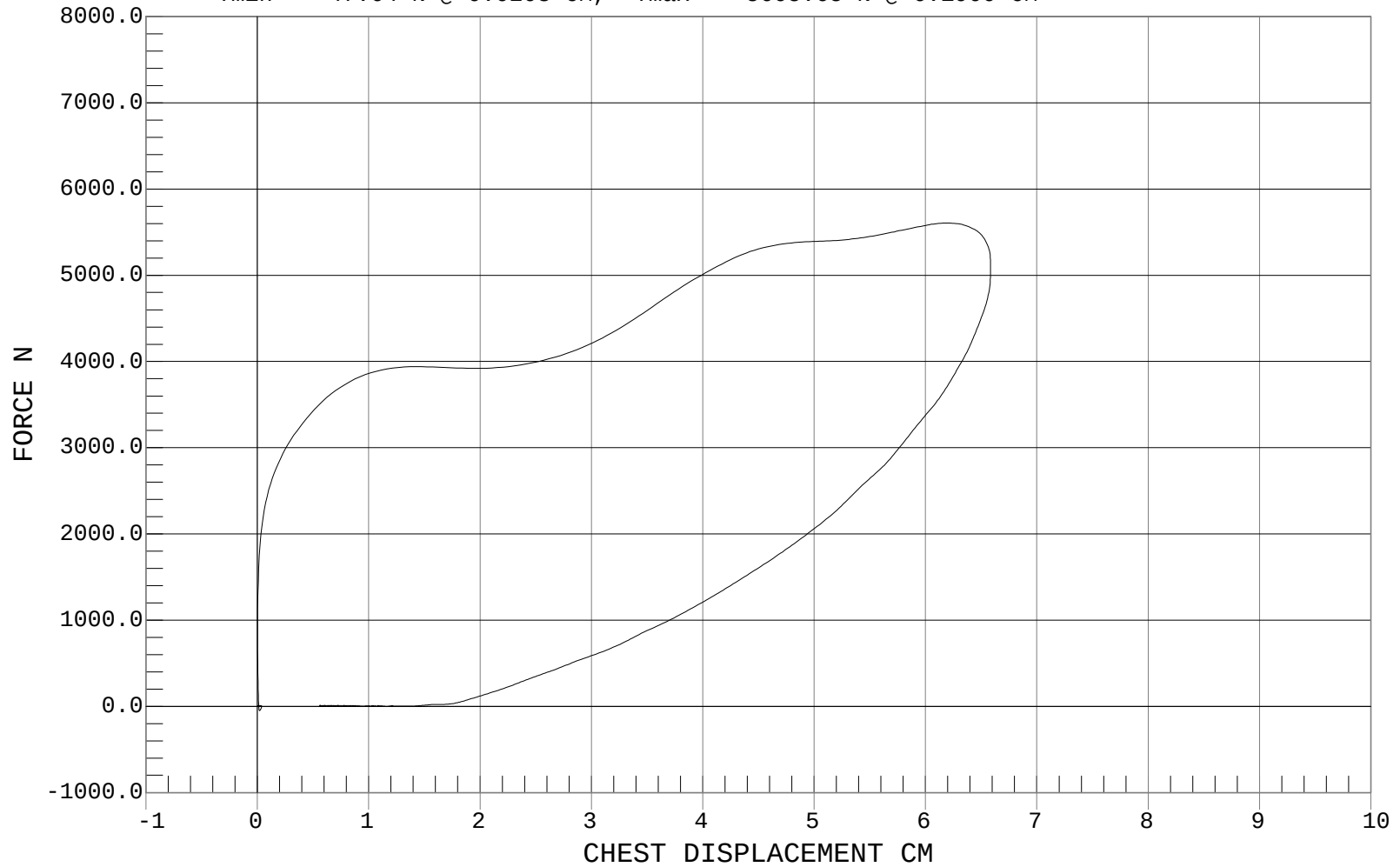
THORAX IMPACT

Test Desc.: Dummy Calibration - Chest Impact
Component: Dummy #066

Test Date: 12-03-01
Speed: 21.93 FT/SEC, 6.68 M/SEC

— 1 FORCE, D01774CH.FVD

Ymin = -47.64 N @ 0.0203 CM, Ymax = 5605.65 N @ 6.1900 CM



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

ATD Serial No.: 066

Test I.D.: D011772

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity		%	10 to 70	32	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.03	Pass
Pendulum Deceleration	10 msec.	G's	22.50 to 27.50	22.87	Pass
	20 msec.	G's	17.60 to 22.60	20.27	Pass
	30 msec.	G's	12.50 to 18.50	17.01	Pass
Peak Pendulum Decel. After 30 msec.		G's	≤29.0	17.0	Pass
Deceleration Decay, Time to Cross 5 G's		msec.	34.0 to 42.0	36.5	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	71.4	Pass
	Time	msec.	57.0 to 64.0	57.2	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec.	113.0 to 128.0	115.2	Pass
Moment About Occipital Condyle	Maximum	N· m	84.1 to 108.5	97.3	Pass
	Time	msec.	47.0 to 58.0	49.6	Pass
Positive Moment Decay Time To Zero Crossing		msec.	97.0 to 107.0	99.8	Pass
Overall Test Results				Pass	

Laboratory Technician

11/28/01

Test Date

Approved By



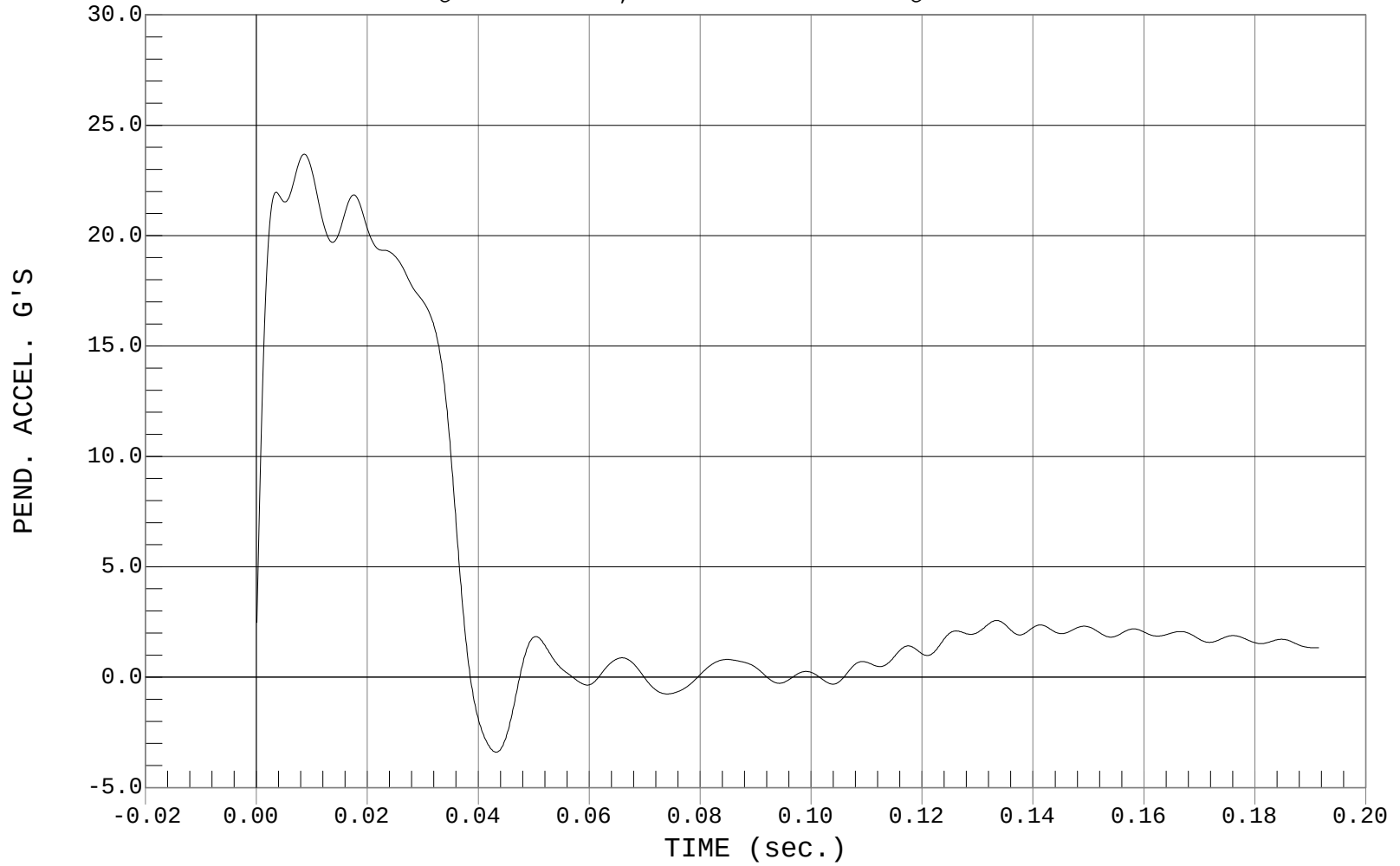
PENDULUM DECELERATION

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #066

Test Date: 11-28-01
Speed: 23.06 FT/SEC, 7.03 M/SEC

— 1 PEND. ACCEL., D01772AF.A04

Ymin = -3.4 G'S @ 0.0432 sec., Ymax = 23.69 G'S @ 0.0086 sec.





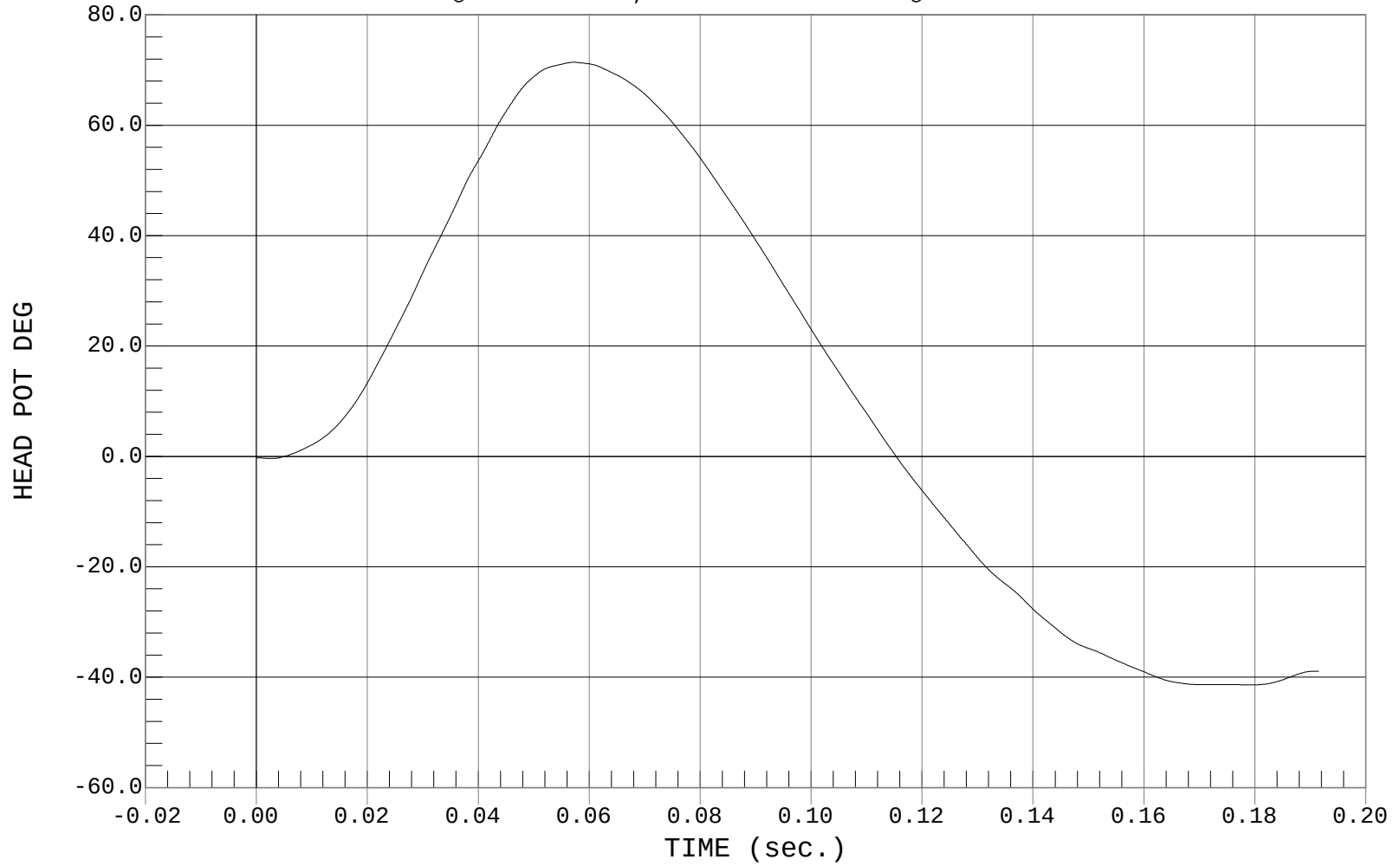
NECK ROTATION

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #066

Test Date: 11-28-01
Speed: 23.06 FT/SEC, 7.03 M/SEC

— 1 HEAD POT, D01772DU.D05

Ymin = -41.4 DEG @ 0.1793 sec., Ymax = 71.4 DEG @ 0.0572 sec.





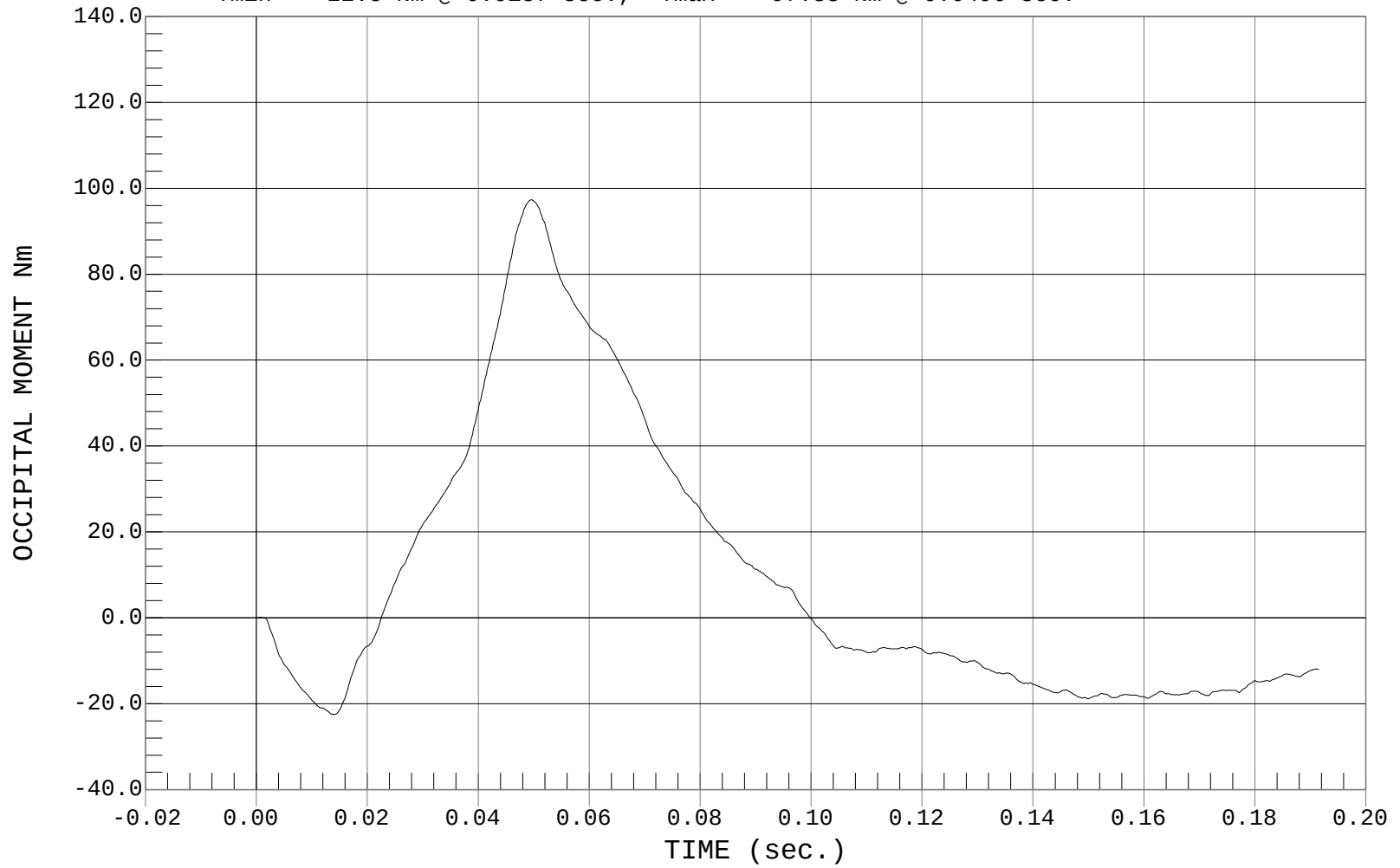
OCCIPITAL MOMENT

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #066

Test Date: 11-28-01
Speed: 23.06 FT/SEC, 7.03 M/SEC

— 1 OCCIPITAL MOMENT, D01772NK.MNT

Ymin = -22.5 Nm @ 0.0137 sec., Ymax = 97.33 Nm @ 0.0496 sec.



Hybrid III Calibration Data Sheet

50th Percentile Male

Neck Extension Test

ATD Serial No.: 066

Test I.D.: D011773

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity		%	10 to 70	32	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.07	Pass
Pendulum Deceleration	10 msec.	G's	17.20 to 21.20	17.29	Pass
	20 msec.	G's	14.00 to 19.00	15.45	Pass
	30 msec.	G's	11.00 to 16.00	13.45	Pass
Peak Pendulum Deceleration After 30 msec.		G's	≤22.0	13.5	Pass
Deceleration Decay Time to Cross 5 G's		msec.	38.0 to 46.0	41.9	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	94.4	Pass
	Time	msec.	72.0 to 82.0	79.0	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec.	147.0 to 174.0	159.5	Pass
Moment About Occipital Condyle	Minimum	N·m	-52.9 to -79.9	-57.1	Pass
	Time	msec.	65.0 to 79.0	75.0	Pass
Negative Moment Decay Time To Zero Crossing		msec.	120.0 to 148.0	141.2	Pass
Overall Test Results				Pass	

Laboratory Technician

11/28/01

Test Date

Approved By



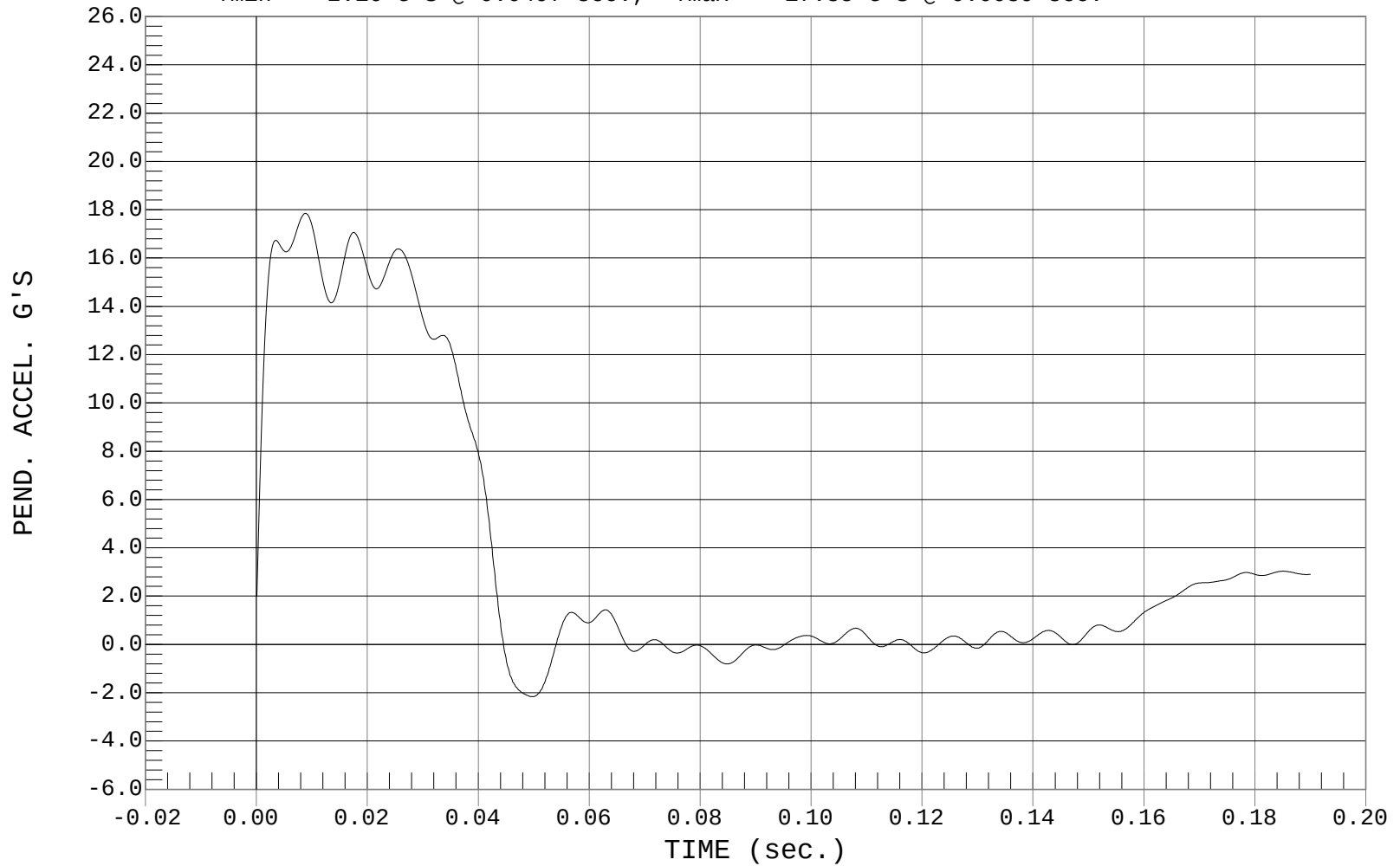
PENDULUM DECELERATION

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #066

Test Date: 11-28-01
Speed: 19.91 FT/SEC, 6.07 M/SEC

— 1 PEND. ACCEL., D01773AF.A04

Ymin = -2.16 G'S @ 0.0497 sec., Ymax = 17.85 G'S @ 0.0089 sec.





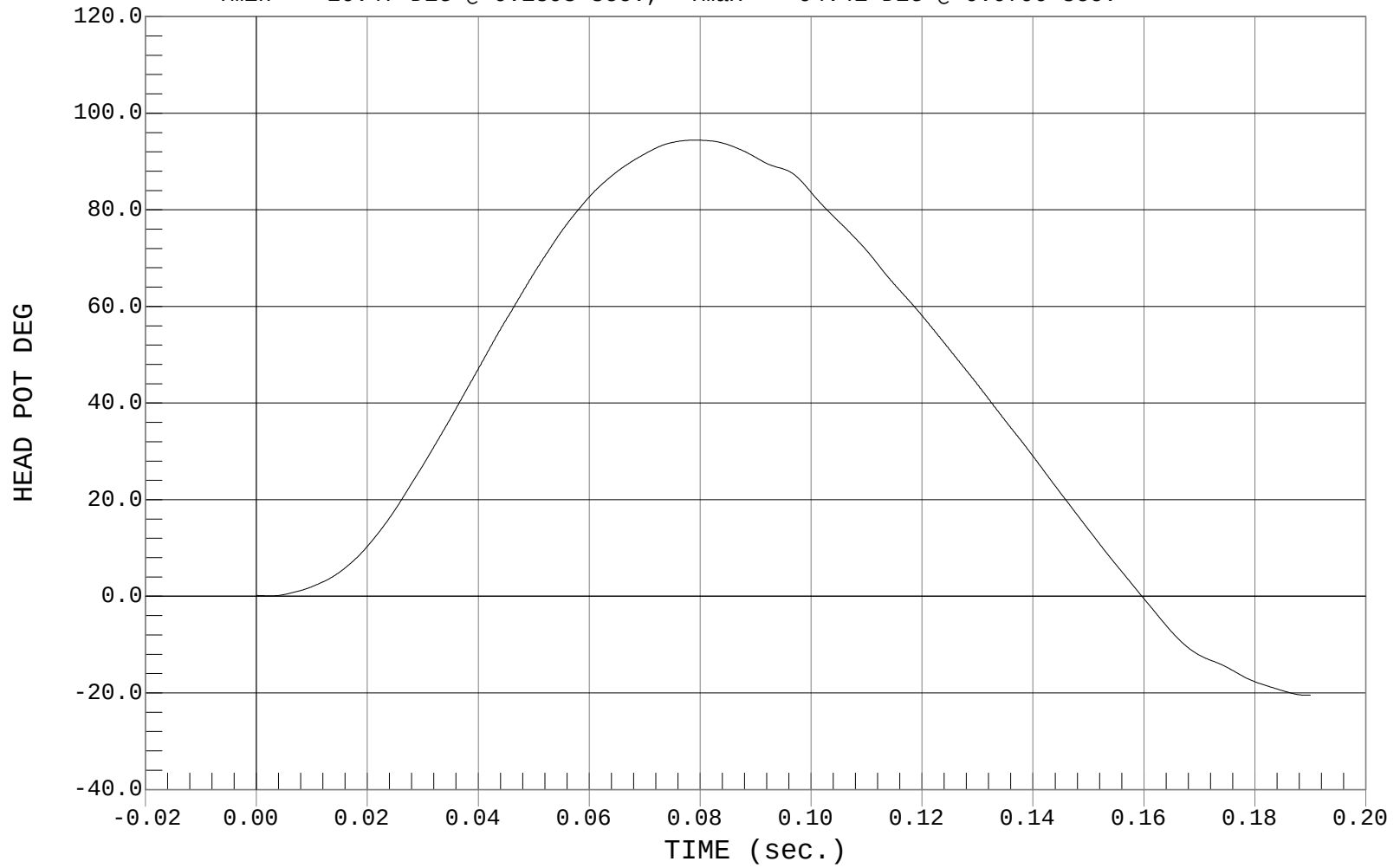
NECK ROTATION

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #066

Test Date: 11-28-01
Speed: 19.91 FT/SEC, 6.07 M/SEC

— 1 HEAD POT, D01773DU.D05

Ymin = -20.47 DEG @ 0.1893 sec., Ymax = 94.41 DEG @ 0.0790 sec.





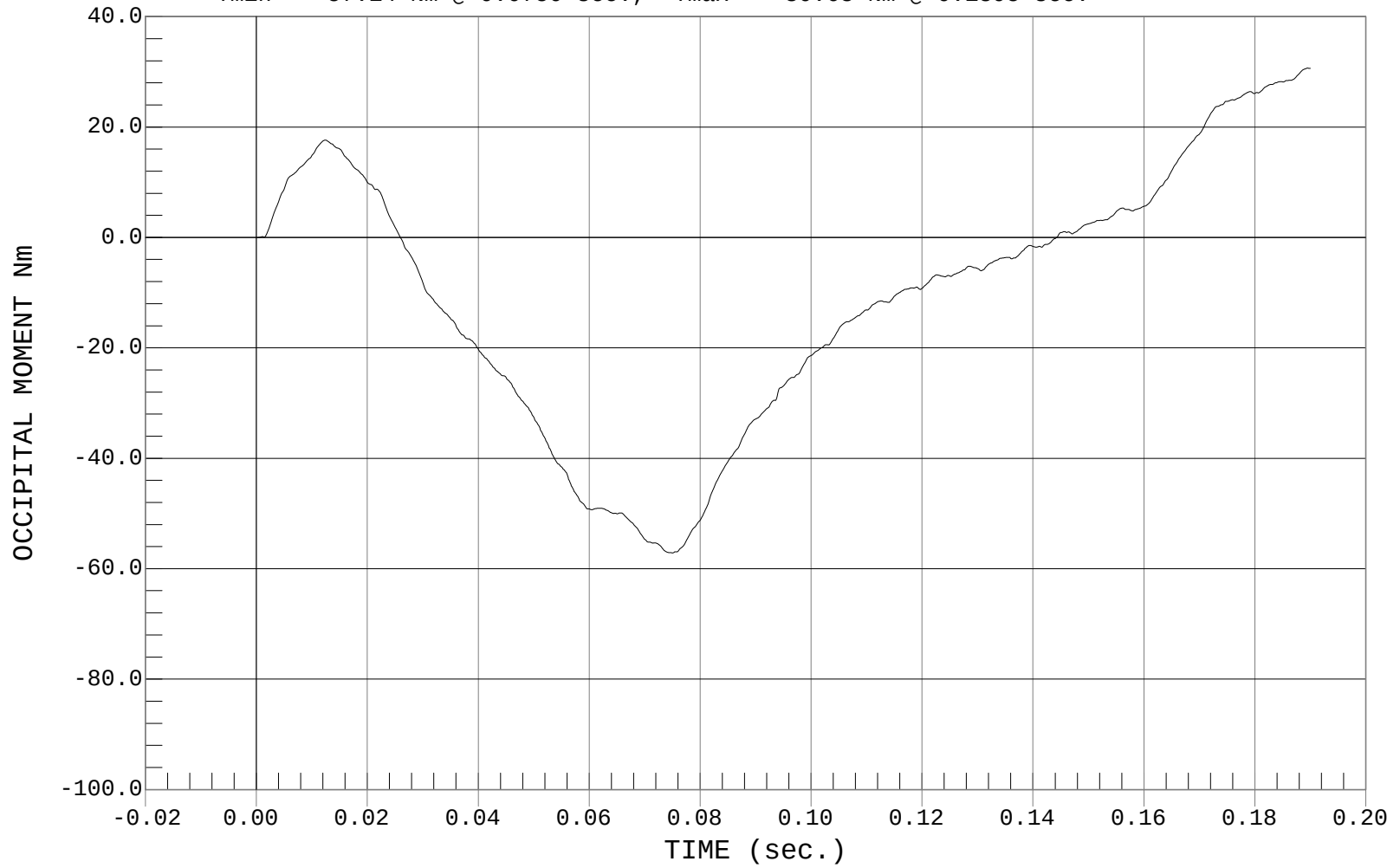
OCCIPITAL MOMENT

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #066

Test Date: 11-28-01
Speed: 19.91 FT/SEC, 6.07 M/SEC

— 1 OCCIPITAL MOMENT, D01773NK.MNT

Ymin = -57.14 Nm @ 0.0750 sec., Ymax = 30.68 Nm @ 0.1895 sec.



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

ATD Serial No.: 066

Test I.D.: D011779/0

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Temperature	°C	18.9 to 25.6	21.1	21.1	Pass
Relative Humidity	%	10 to 70	33	33	Pass
Rotation Rate	deg/sec	5 – 10	Yes	Yes	Pass
30 Degrees	Nm	94.9 Nm Max.	75.8	65.7	Pass
150 ft-lbf / 203.4 Nm	Deg	40 – 50 Degree Max. rotation	45	45	Pass
Overall Test Results					Pass

Laboratory Technician

11/29/01

Test Date

Approved By



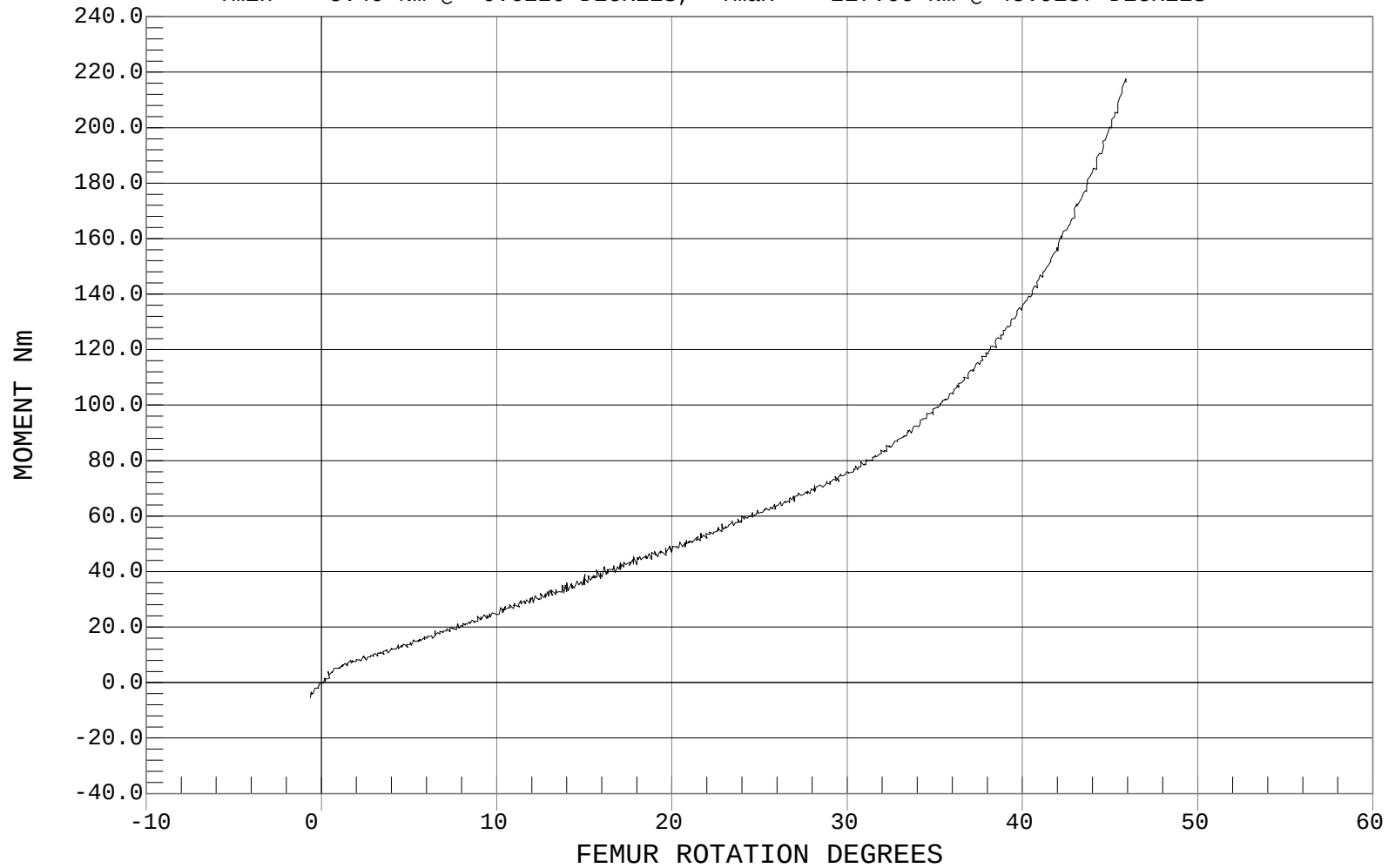
HIP-FEMUR FLEXION

Test Desc.: DUMMY CALIBRATION - HIP-FEMUR FLEXION
Component: DUMMY # 066 RIGHT FEMUR

Test Date: 11-29-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 MOMENT, D01779FC.F14

Ymin = -5.49 Nm @ -0.6220 DEGREES, Ymax = 217.66 Nm @ 45.9137 DEGREES





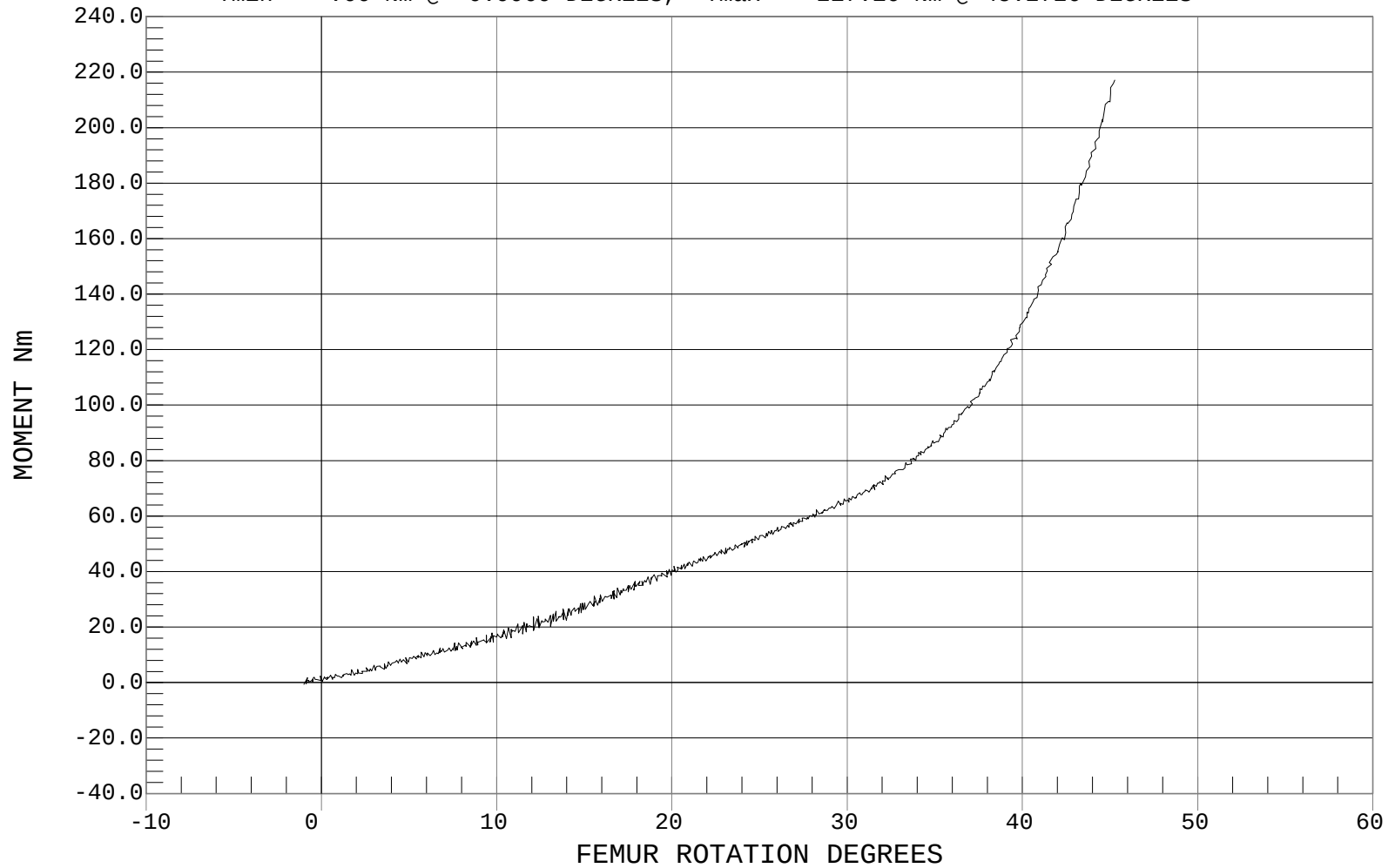
HIP-FEMUR FLEXION

Test Desc.: DUMMY CALIBRATION - HIP-FEMUR FLEXION
Component: DUMMY # 066 LEFT FEMUR

Test Date: 11-29-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 MOMENT, D01770FC.F14

Ymin = -.66 Nm @ -0.9909 DEGREES, Ymax = 217.16 Nm @ 45.2726 DEGREES



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

ATD Serial No.: 066

Test I.D.: D011777

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	°C	18.9 to 25.6	21.1	Pass
Relative Humidity	%	10 to 70	31	Pass
Velocity	m/s	2.7 – 2.8	2.7	Pass
Impact Force @ 10 mm	kN	-1.72 to -1.26	-1.39	Pass
Impact Force @ 18 mm	kN	-3.10 to -2.27	-2.51	Pass
Overall Test Results				Pass

Laboratory Technician

12/01/01

Test Date

Approved By



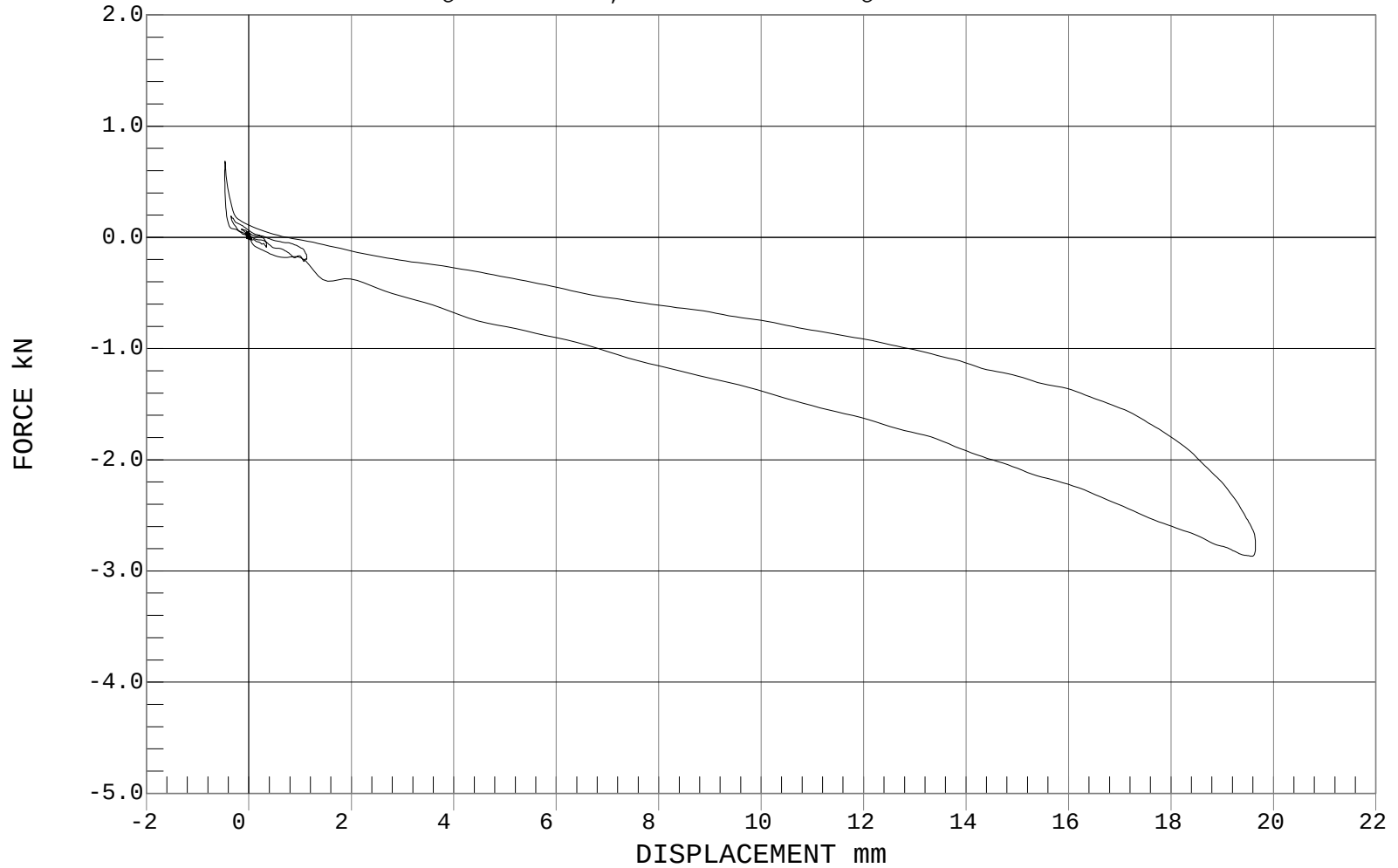
RIGHT KNEE SLIDER

Test Desc.: Dummy Calibration - Right Knee Slider
Component: Dummy #066

Test Date: 12-01-01
Speed: 8.94 FT/SEC, 2.73 M/SEC

— 1 FORCE, D01777FC.F05

Ymin = -2.87 kN @ 19.5847 mm, Ymax = .68 kN @ -0.4638 mm



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

ATD Serial No.: 066

Test I.D.: D011778

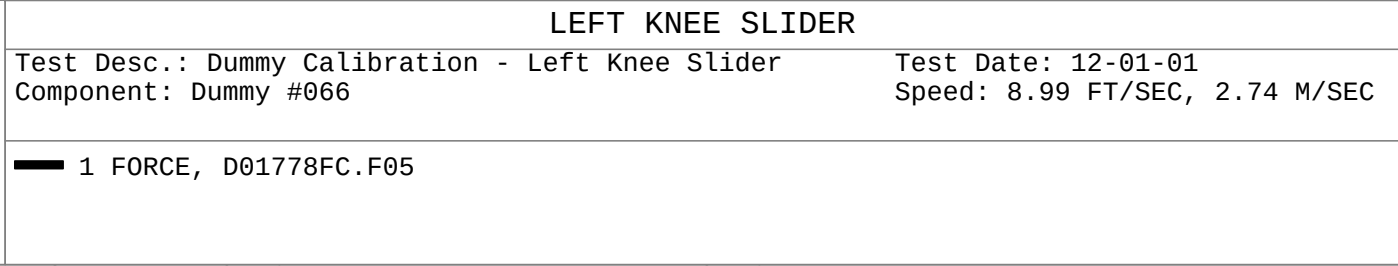
Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	°C	18.9 to 25.6	21.1	Pass
Relative Humidity	%	10 to 70	31	Pass
Velocity	m/s	2.7 – 2.8	2.7	Pass
Impact Force @ 10 mm	kN	-1.72 to -1.26	-1.51	Pass
Impact Force @ 18 mm	kN	-3.10 to -2.27	-2.78	Pass
Overall Test Results				Pass

Laboratory Technician

12/01/01

Test Date

Approved By



1 FORCE, D01778FC.F05

C-24

Hybrid III Calibration Data Sheet

50th Percentile Male

External Measurements

ATD Serial No.: 066

Test I.D.: D01177

External Measurement Data				
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.4 to 22.1	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	36	Pass
A – Total sitting height	mm	879 to 889	881	Pass
B – Shoulder pivot height	mm	506 to 521	513	Pass
C – “H” point height	mm	84 to 89	86	Pass
D – “H” point from seat back	mm	135 to 140	137	Pass
E – Shoulder pivot from back	mm	84 to 94	91	Pass
F – Thigh clearance	mm	140 to 156	145	Pass
G – Elbow back to wrist pivot	mm	290 to 305	292	Pass
H – Skull cap to back line	mm	41 to 46	43	Pass
I – Shoulder to elbow length	mm	330 to 345	335	Pass
J – Elbow rest height	mm	191 to 211	196	Pass
K – Buttock to knee length	mm	579 to 605	592	Pass
L – Popliteal length	mm	429 to 455	445	Pass
M – Knee pivot height	mm	485 to 500	493	Pass
N – Buttock popliteal length	mm	452 to 478	457	Pass
O – Chest depth	mm	213 to 229	218	Pass
P – Foot breadth	mm	252 to 267	264	Pass
V – Shoulder breadth	mm	422 to 437	427	Pass
W – Foot length	mm	91 to 107	99	Pass
Y – Chest circumference	mm	970 to 1001	988	Pass
Z – Waist circumference	mm	836 to 866	859	Pass
AA – Location for chest circumference	mm	429 to 434	432	Pass
BB – Location for waist circumference	mm	226 to 231	229	Pass
Overall Test Results				Pass

Laboratory Technician

12/03/01

Test Date

Approved By

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

ATD Serial No.: 065

Test I.D.: D011766

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	32	Pass
Probe Velocity	m/s	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	4715 to 5782	5414	Pass
Overall Test Results				Pass

Laboratory Technician

11/28/01

Test Date

Approved By



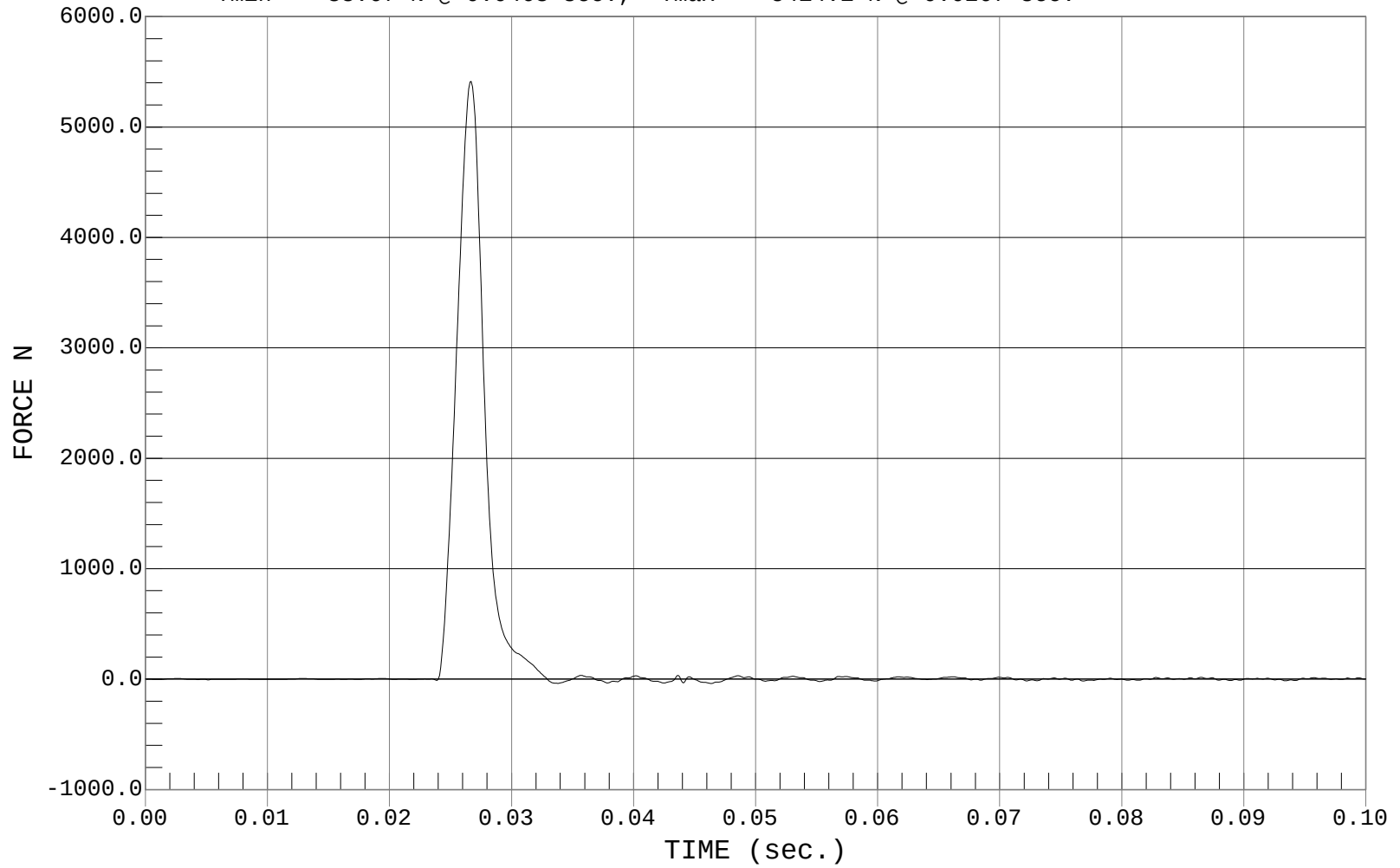
LEFT KNEE IMPACT

Test Desc.: Dummy Calibration - Left Knee Impact
Component: Dummy #065

Test Date: 11-28-01
Speed: 6.93 FT/SEC, 2.11 M/SEC

— 1 FORCE, D01766FF.F09

Ymin = -38.67 N @ 0.0463 sec., Ymax = 5414.1 N @ 0.0267 sec.



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

ATD Serial No.: 065

Test I.D.: D011765

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	32	Pass
Probe Velocity	m/s	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	4715 to 5782	5585	Pass
Overall Test Results				Pass

Laboratory Technician

11/28/01

Test Date

Approved By



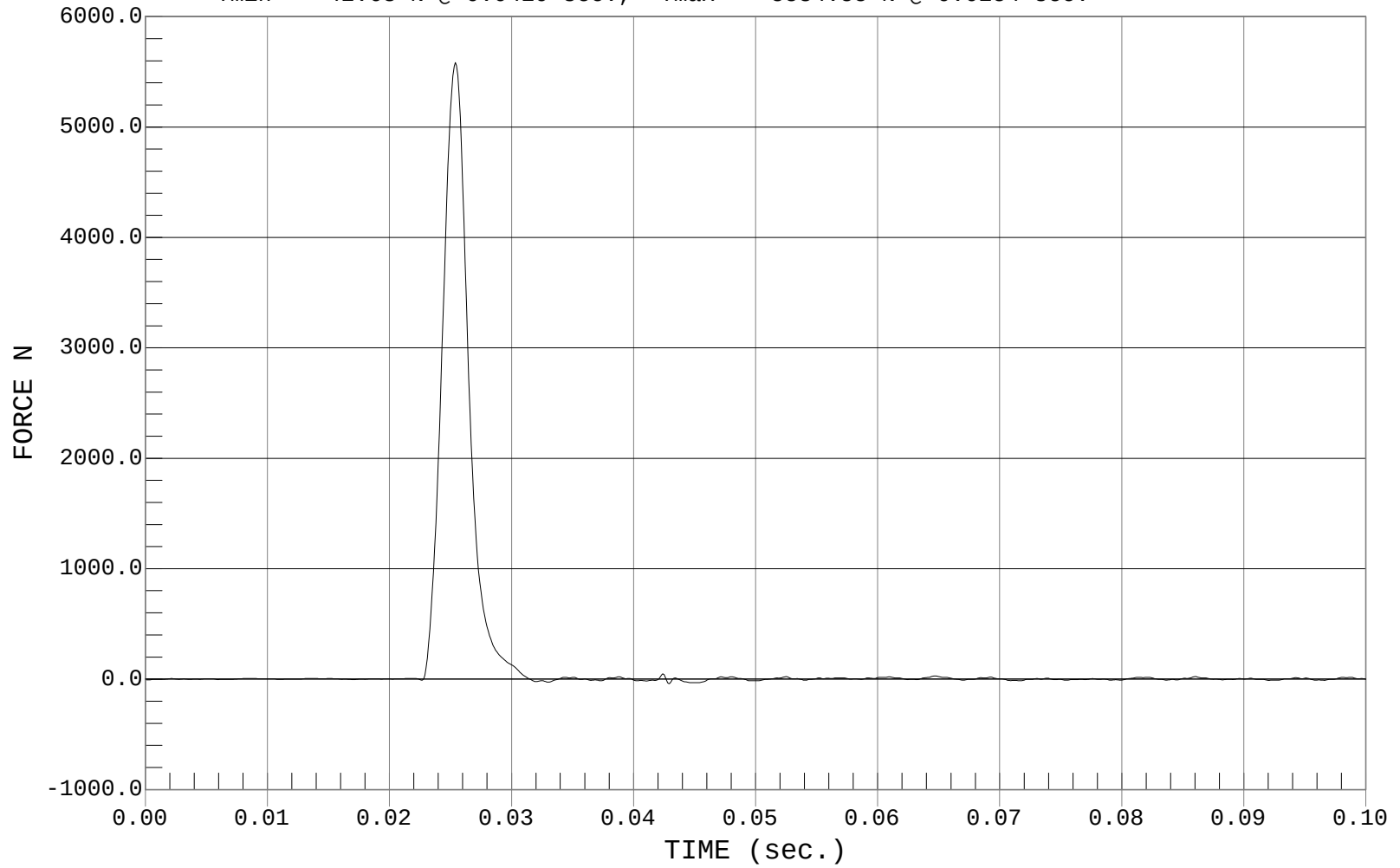
RIGHT KNEE IMPACT

Test Desc.: Dummy Calibration - Right Knee Impact
Component: Dummy #065

Test Date: 11-28-01
Speed: 6.93 FT/SEC, 2.11 M/SEC

— 1 FORCE, D01765FF.F09

Ymin = -42.63 N @ 0.0429 sec., Ymax = 5584.55 N @ 0.0254 sec.



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

ATD Serial No.: 065

Test I.D.: D011761

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	243.8	Pass
Peak Lateral Acceleration	G's	$\leq \pm 15.0$	-6.8	Pass
Is Acceleration Unimodal?	Yes/No	< 10% Peak	Yes	Pass
Overall Test Results				Pass

Laboratory Technician

11/26/01

Test Date

Approved By

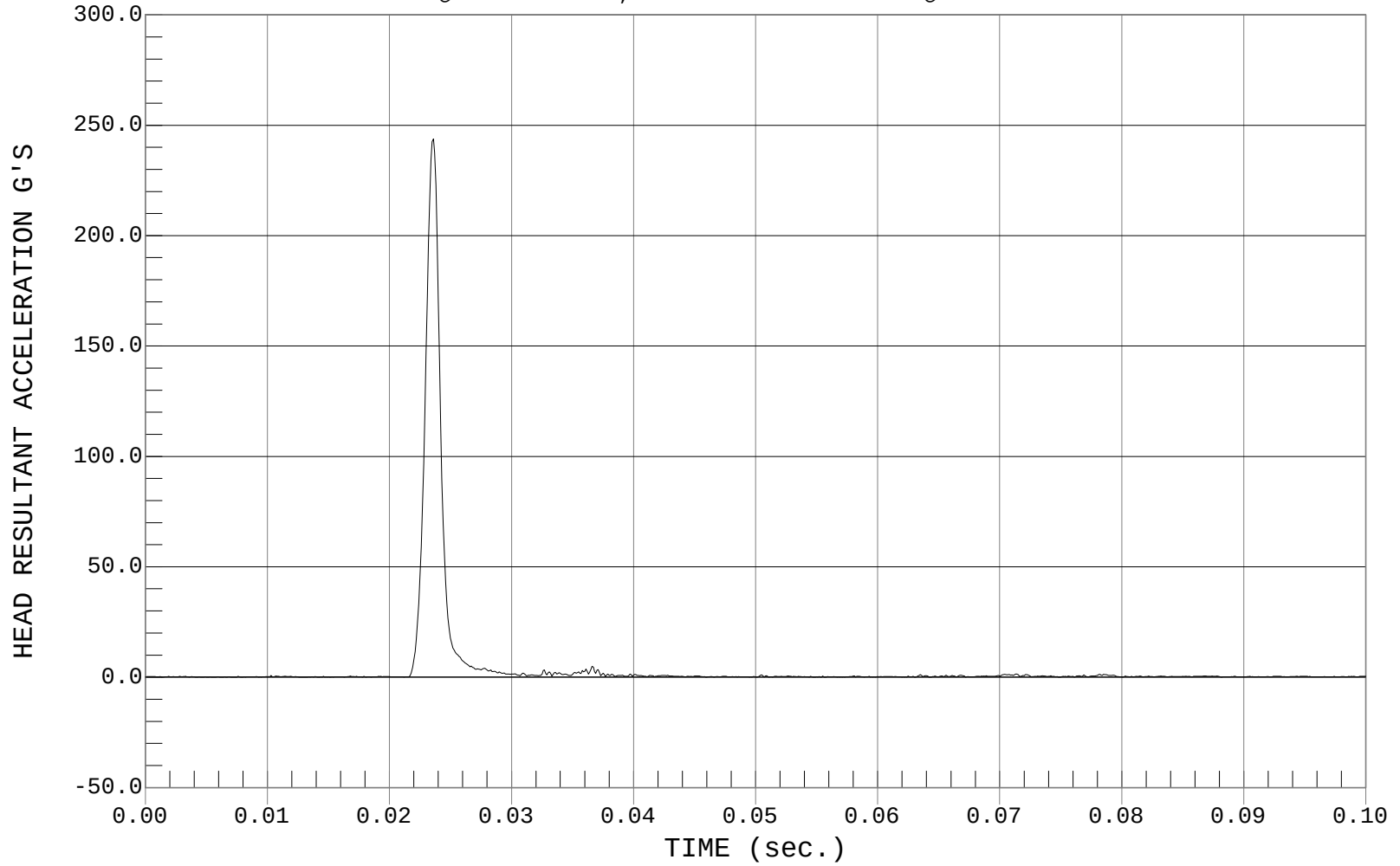


PEAK RESULTANT ACCELERATION

Test Desc.: Dummy Calibration - Head Drop
Component: Dummy #065

Test Date: 11-26-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

Ymin = .06 G'S @ 0.0014 sec., Ymax = 243.79 G'S @ 0.0236 sec.





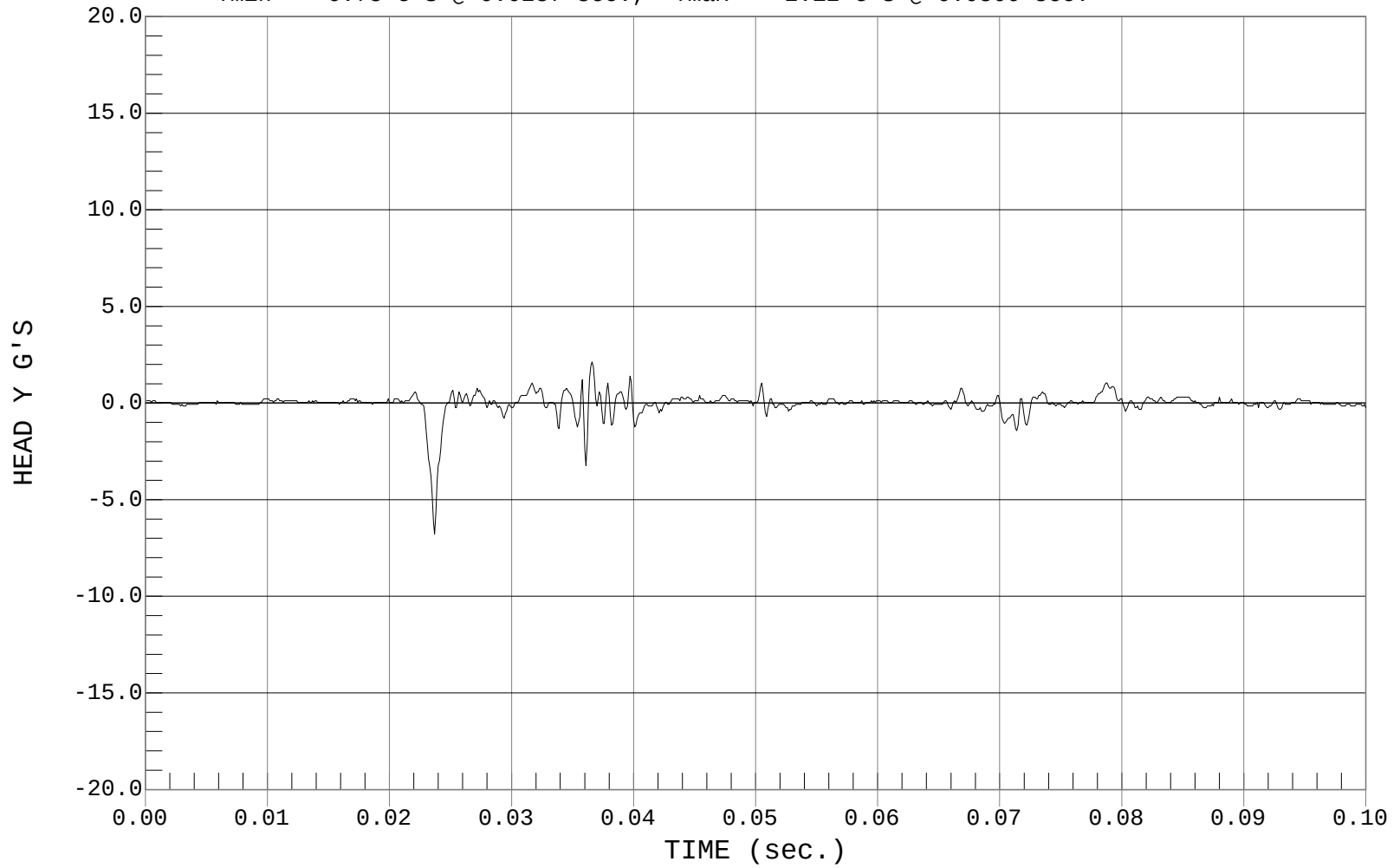
PEAK LATERAL ACCELARATION

Test Desc.: Dummy Calibration - Head Drop
Component: Dummy #065

Test Date: 11-26-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 HEAD Y, D01761AR.A02

Ymin = -6.78 G'S @ 0.0237 sec., Ymax = 2.12 G'S @ 0.0366 sec.



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

ATD Serial No.: 065

Test I.D.: D011764

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	36	Pass
Probe Velocity	m/s	6.58 to 6.82	6.71	Pass
Peak Probe Force	Newtons	5159 to 5893	5792	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.95	Pass
Internal Hysteresis	%	69 to 85	70	Pass
Overall Test Results				Pass

Laboratory Technician

12/3/01
Test Date

Approved By



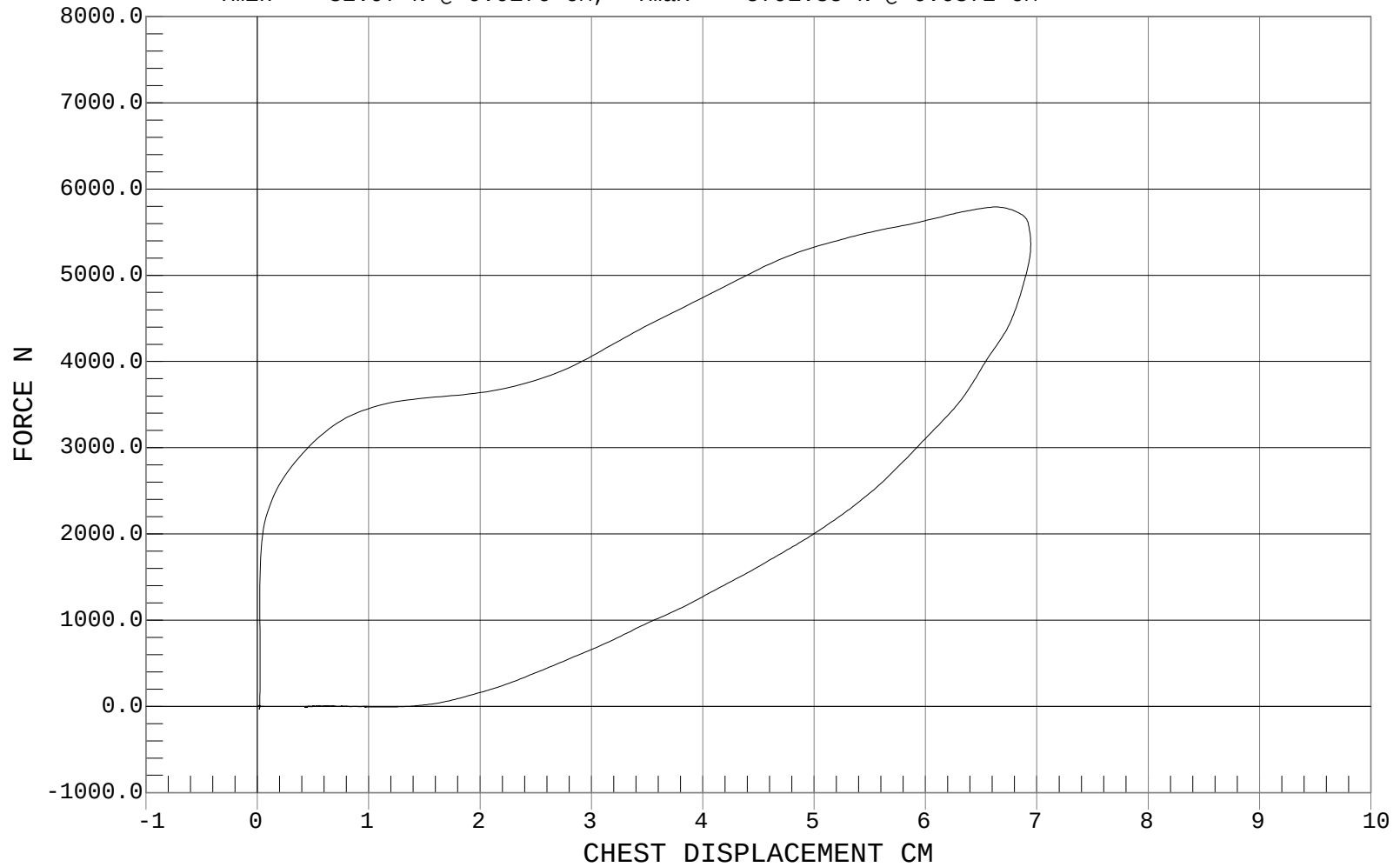
THORAX IMPACT

Test Desc.: Dummy Calibration - Chest Impact
Component: Dummy #065

Test Date: 12-03-01
Speed: 22.01 FT/SEC, 6.71 M/SEC

— 1 FORCE, D01764CH.FVD

Ymin = -32.97 N @ 0.0176 CM, Ymax = 5791.85 N @ 6.6372 CM



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

ATD Serial No.: 065

Test I.D.: D011762

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	20.8	Pass
Laboratory Relative Humidity		%	10 to 70	32	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.01	Pass
Pendulum Deceleration	10 msec.	G's	22.50 to 27.50	22.91	Pass
	20 msec.	G's	17.60 to 22.60	19.36	Pass
	30 msec.	G's	12.50 to 18.50	15.95	Pass
Peak Pendulum Deceleration After 30 msec.		G's	≤29.0	16.0	Pass
Deceleration Decay Time to Cross 5 G's		msec.	34.0 to 42.0	37.2	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	73.0	Pass
	Time	msec.	57.0 to 64.0	58.7	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec.	113.0 to 128.0	115.9	Pass
Moment About Occipital Condyle	Maximum	N· m	84.1 to 108.5	92.7	Pass
	Time	msec.	47.0 to 58.0	50.6	Pass
Positive Moment Decay Time To Zero Crossing		msec.	97.0 to 107.0	104.1	Pass
Overall Test Results				Pass	

Laboratory Technician

11/28/01

Test Date

Approved By



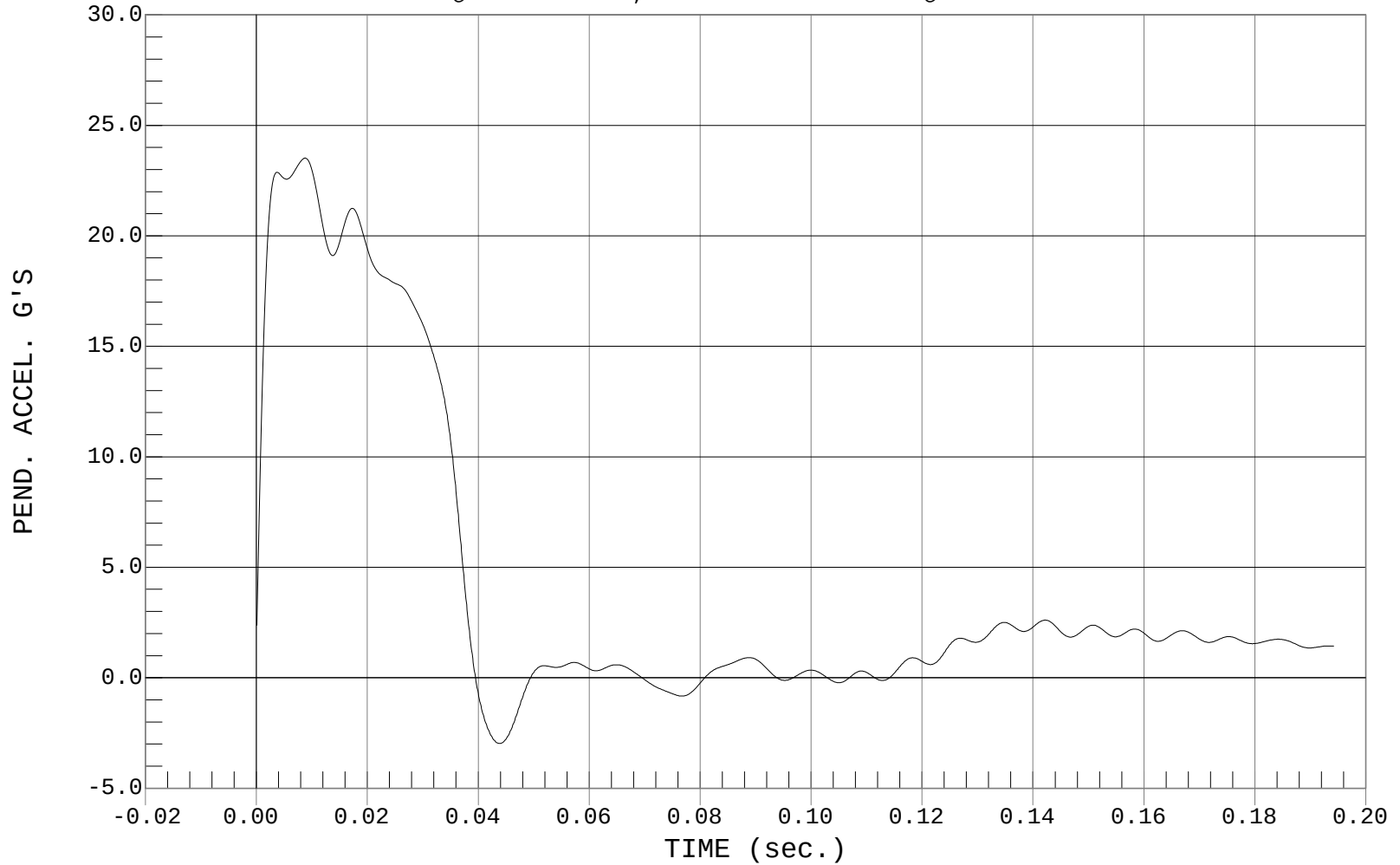
PENDULUM DECELERATION

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #065

Test Date: 11-28-01
Speed: 23.01 FT/SEC, 7.01 M/SEC

— 1 PEND. ACCEL., D01762AF.A04

Ymin = -2.98 G'S @ 0.0439 sec., Ymax = 23.52 G'S @ 0.0088 sec.





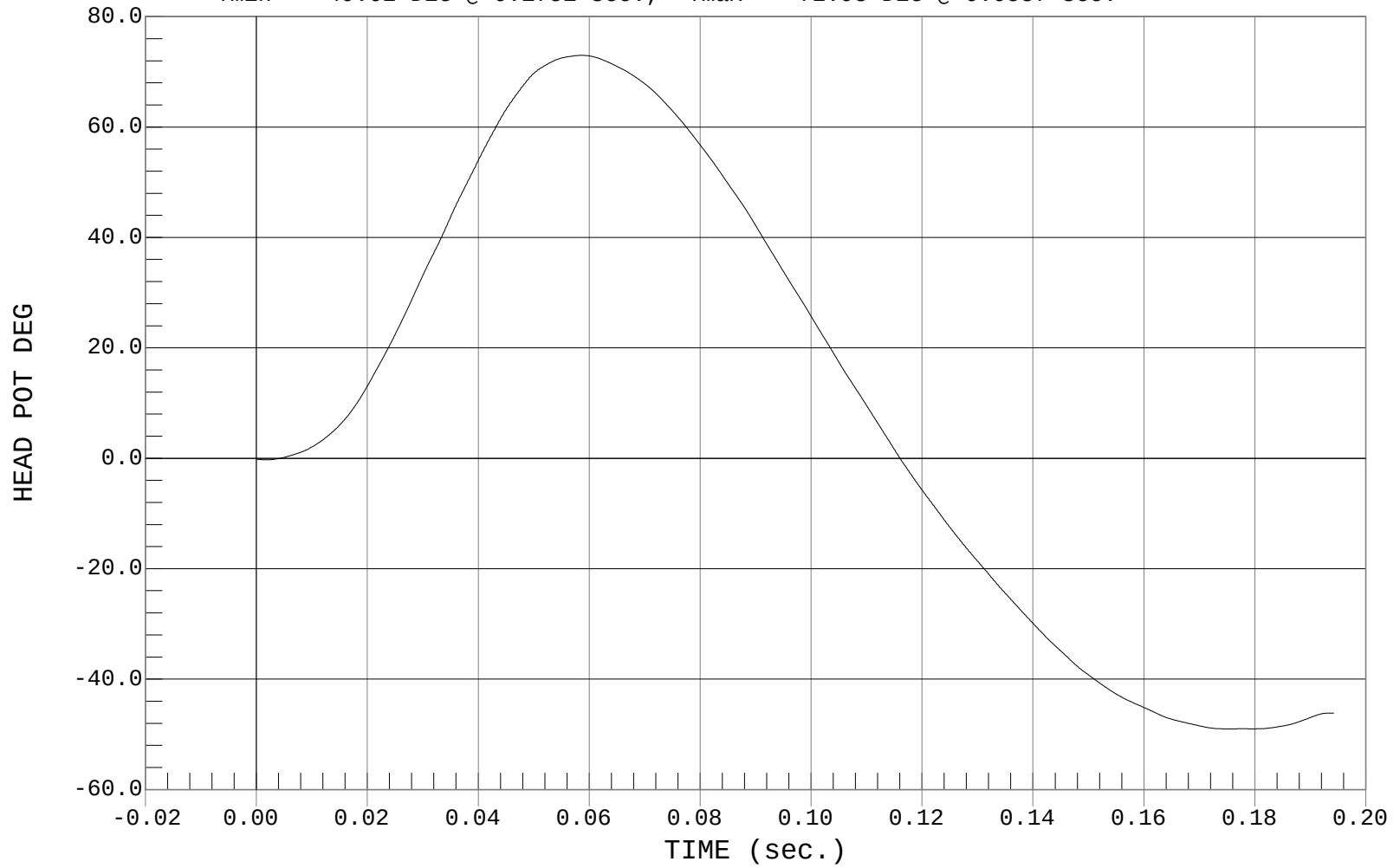
NECK ROTATION

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #065

Test Date: 11-28-01
Speed: 23.01 FT/SEC, 7.01 M/SEC

— 1 HEAD POT, D01762DU.D05

Ymin = -49.02 DEG @ 0.1751 sec., Ymax = 72.98 DEG @ 0.0587 sec.



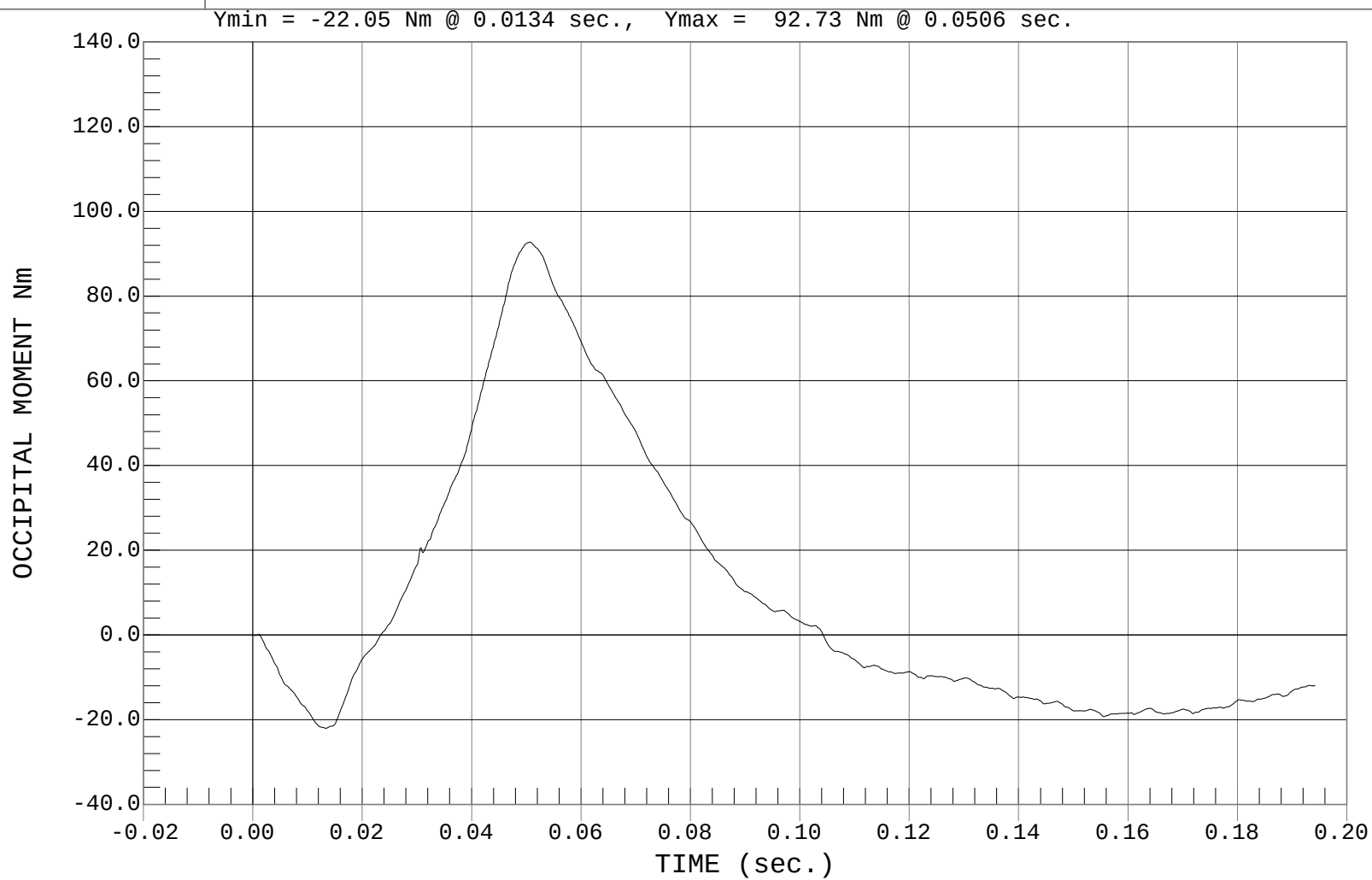


OCCIPITAL MOMENT

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #065

Test Date: 11-28-01
Speed: 23.01 FT/SEC, 7.01 M/SEC

— 1 OCCIPITAL MOMENT, D01762NK.MNT



Hybrid III Calibration Data Sheet

50th Percentile Male

Neck Extension Test

ATD Serial No.: 065

Test I.D.: D011763

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity		%	10 to 70	31	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.09	Pass
Pendulum Deceleration	10 msec.	G's	17.20 to 21.20	18.91	Pass
	20 msec.	G's	14.00 to 19.00	17.32	Pass
	30 msec.	G's	11.00 to 16.00	12.06	Pass
Peak Pendulum Deceleration After 30 msec.		G's	≤22.0	12.7	Pass
Deceleration Decay Time to Cross 5 G's		msec.	38.0 to 46.0	38.3	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	99.1	Pass
	Time	msec.	72.0 to 82.0	78.9	Pass
"D" Plane Rotation Decay Time To Zero Crossing		msec.	147.0 to 174.0	158.6	Pass
Moment About Occipital Condyle	Minimum	N·m	-52.9 to -79.9	-63.4	Pass
	Time	msec.	65.0 to 79.0	72.6	Pass
Negative Moment Decay Time To Zero Crossing		msec.	120.0 to 148.0	143.7	Pass
Overall Test Results				Pass	

Laboratory Technician

11/28/01

Test Date

Approved By



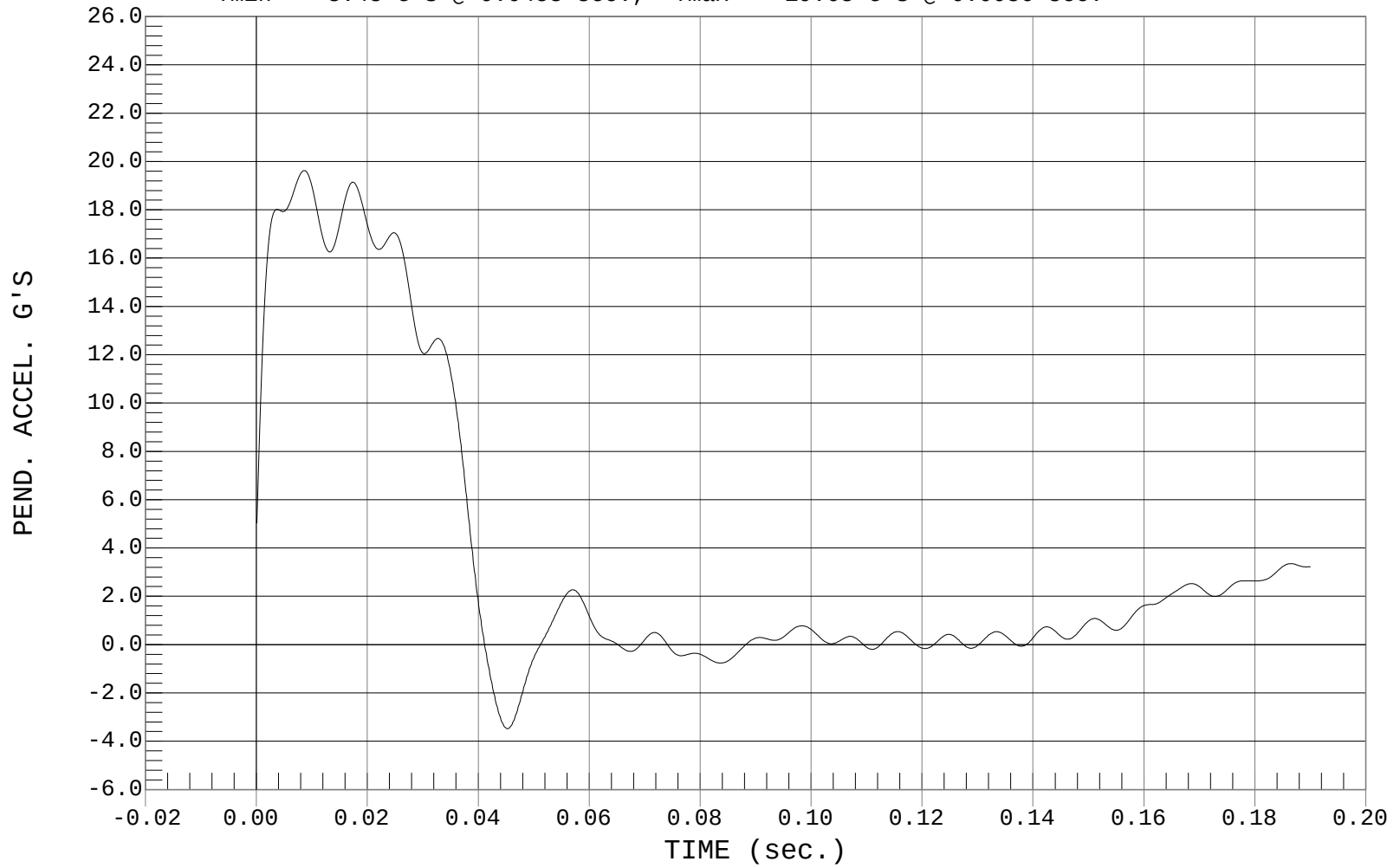
PENDULUM DECELERATION

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #065

Test Date: 11-28-01
Speed: 19.98 FT/SEC, 6.09 M/SEC

— 1 PEND. ACCEL., D01763AF.A04

Ymin = -3.48 G'S @ 0.0453 sec., Ymax = 19.63 G'S @ 0.0086 sec.





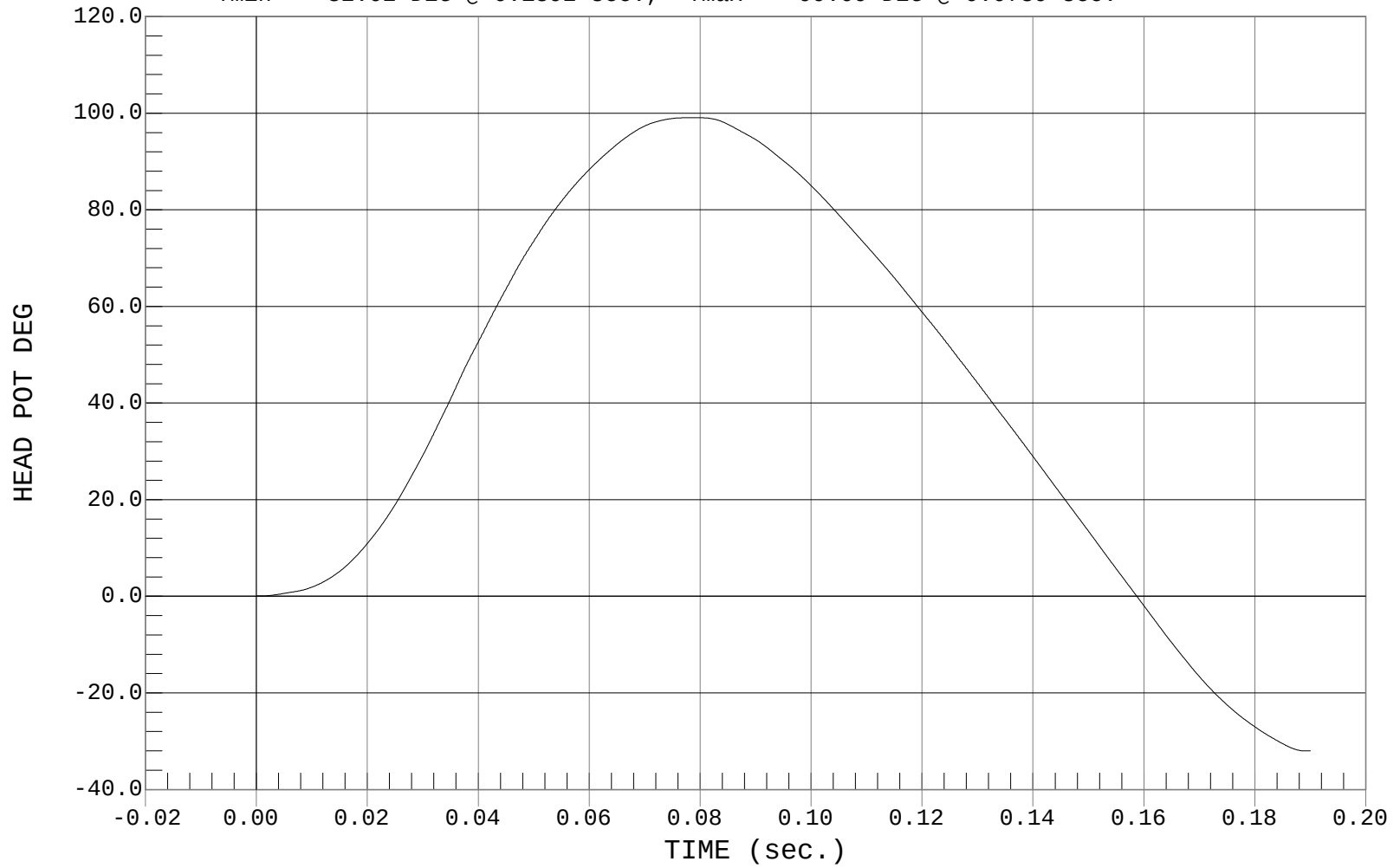
NECK ROTATION

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #065

Test Date: 11-28-01
Speed: 19.98 FT/SEC, 6.09 M/SEC

— 1 HEAD POT, D01763DU.D05

Ymin = -32.02 DEG @ 0.1892 sec., Ymax = 99.09 DEG @ 0.0789 sec.





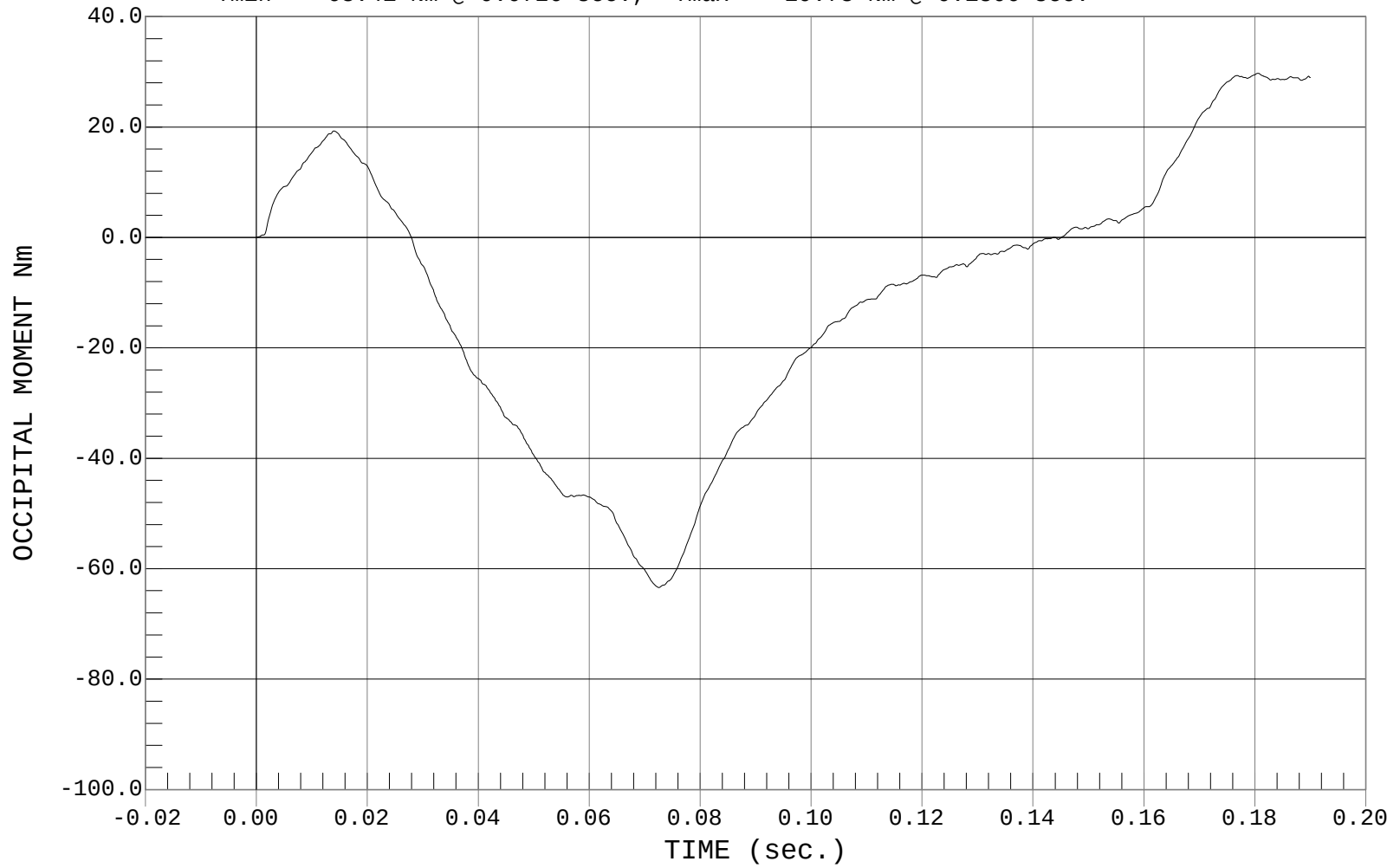
OCCIPITAL MOMENT

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #065

Test Date: 11-28-01
Speed: 19.98 FT/SEC, 6.09 M/SEC

— 1 OCCIPITAL MOMENT, D01763NK.MNT

Ymin = -63.41 Nm @ 0.0726 sec., Ymax = 29.73 Nm @ 0.1806 sec.



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

ATD Serial No.: 065

Test I.D.: D011769/0

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Temperature	°C	18.9 to 25.6	21.1	21.1	Pass
Relative Humidity	%	10 to 70	33	33	Pass
Rotation Rate	deg/sec	5 – 10	Yes	Yes	Pass
30 Degrees	Nm	94.9 Nm Max.	63.5	65.5	Pass
150 ft-lbf / 203.4 Nm	Deg	40 – 50 Degree Max. rotation	47	45	Pass
Overall Test Results					Pass

Laboratory Technician

11/29/01

Test Date

Approved By



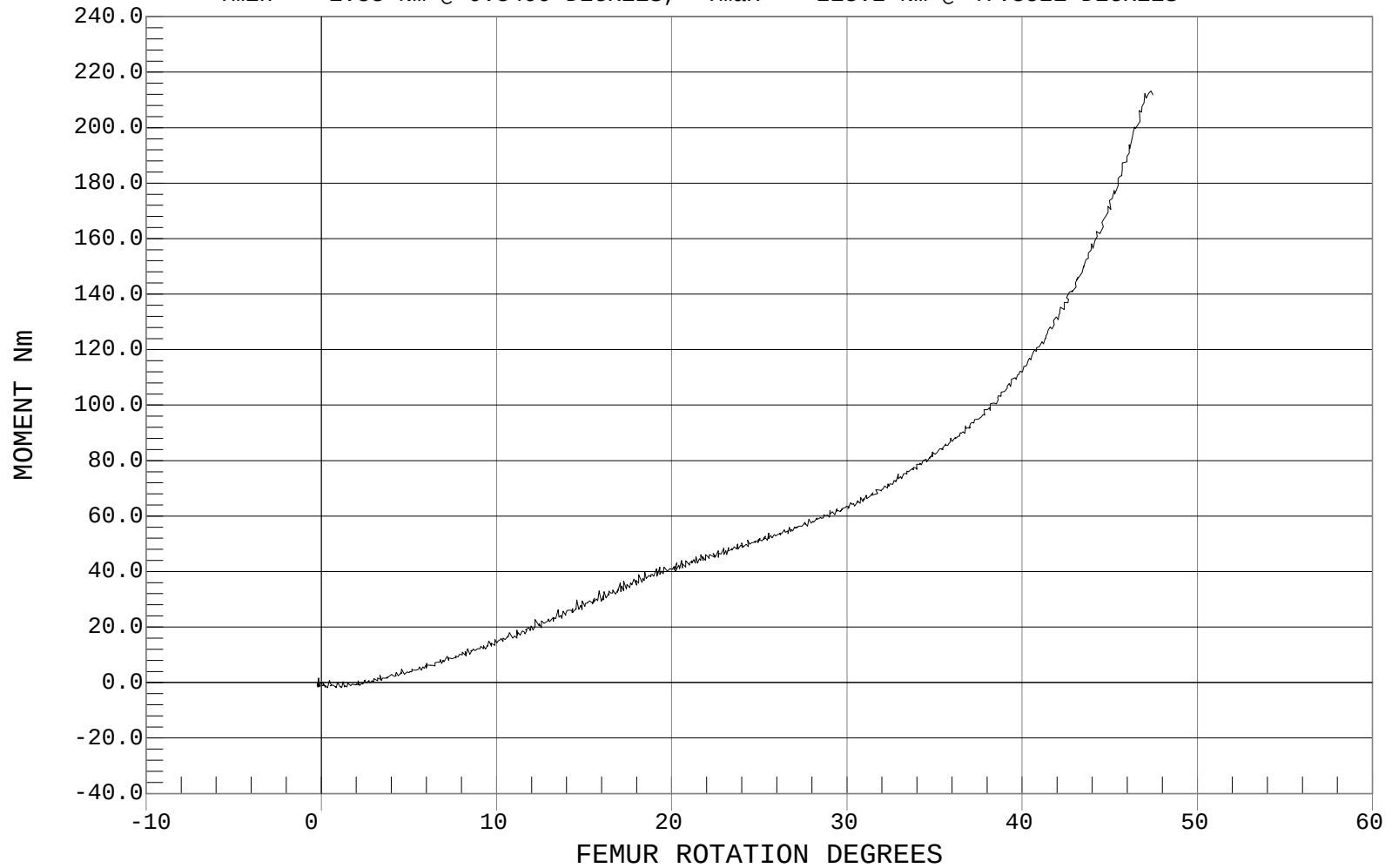
HIP-FEMUR FLEXION

Test Desc.: DUMMY CALIBRATION - HIP-FEMUR FLEXION
Component: DUMMY # 065 RIGHT FEMUR

Test Date: 11-29-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

1 MOMENT, D01769FC.F14

Ymin = -1.83 Nm @ 0.3499 DEGREES, Ymax = 213.2 Nm @ 47.3521 DEGREES





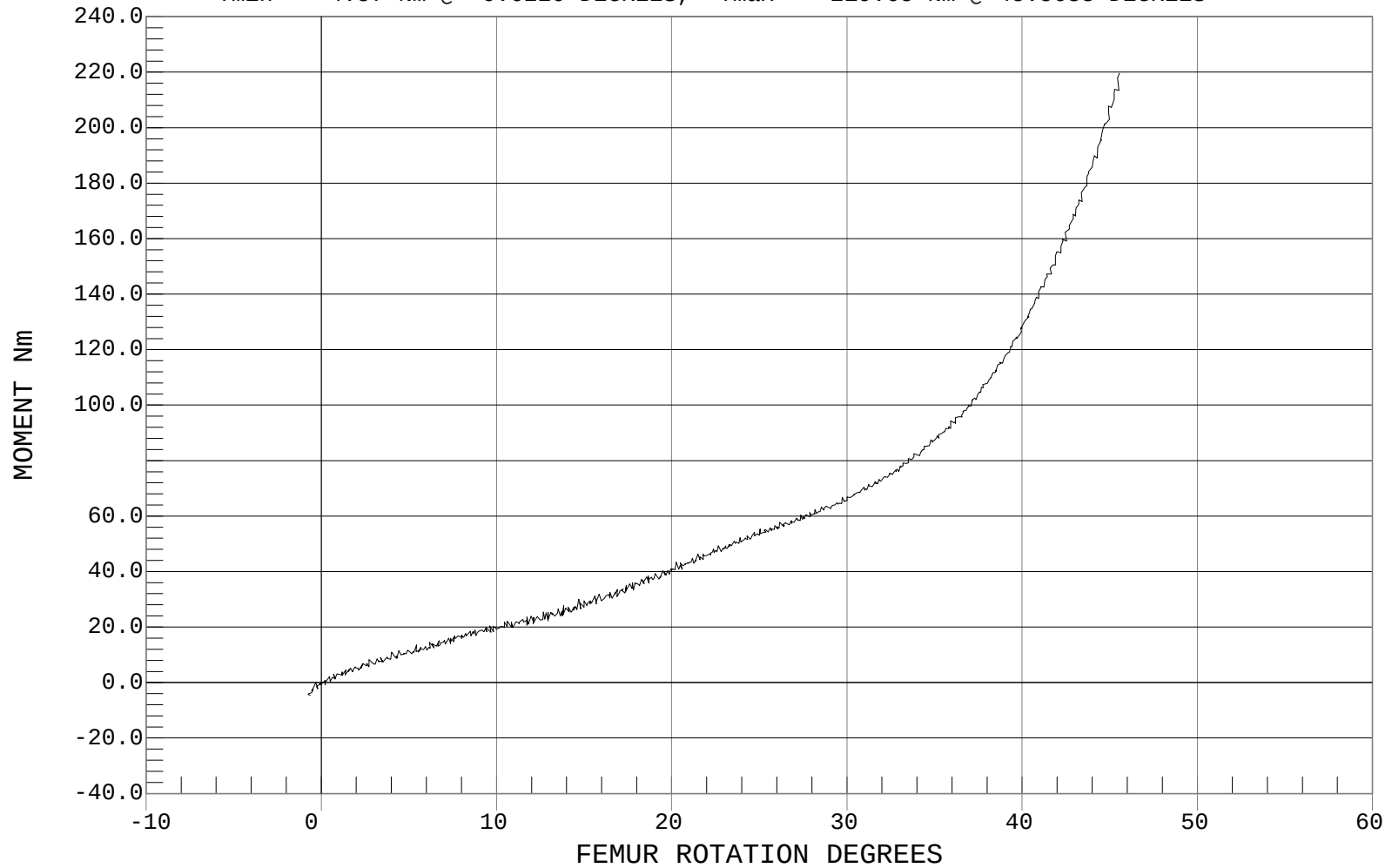
HIP-FEMUR FLEXION

Test Desc.: DUMMY CALIBRATION - HIP-FEMUR FLEXION
Component: DUMMY # 065 LEFT FEMUR

Test Date: 11-29-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 MOMENT, D01760FC.F14

Ymin = -4.57 Nm @ -0.6220 DEGREES, Ymax = 219.65 Nm @ 45.5638 DEGREES



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

ATD Serial No.: 065

Test I.D.: D011767

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	°C	18.9 to 25.6	21.1	Pass
Relative Humidity	%	10 to 70	30	Pass
Velocity	m/s	2.7 – 2.8	2.7	Pass
Impact Force @ 10 mm	kN	-1.72 to -1.26	-1.66	Pass
Impact Force @ 18 mm	KN	-3.10 to -2.27	-2.62	Pass
Overall Test Results				Pass

Laboratory Technician

12/01/01

Test Date

Approved By



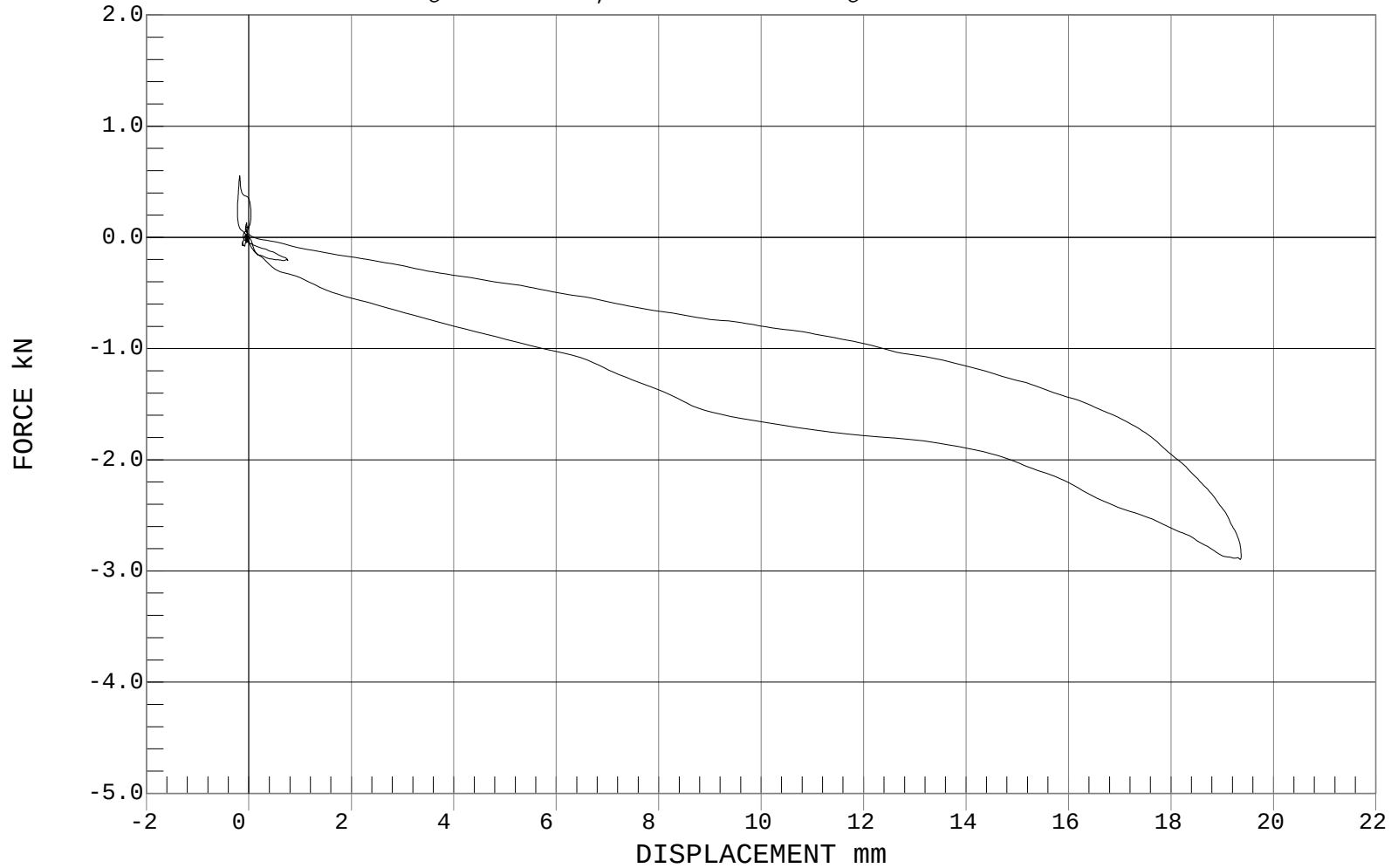
RIGHT KNEE SLIDER

Test Desc.: Dummy Calibration - Right Knee Slider
Component: Dummy #065

Test Date: 12-01-01
Speed: 8.99 FT/SEC, 2.74 M/SEC

— 1 FORCE, D01767FC.F05

Ymin = -2.9 kN @ 19.3520 mm, Ymax = .55 kN @ -0.1796 mm



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

ATD Serial No.: 065

Test I.D.: D011768

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	°C	18.9 to 25.6	21.1	Pass
Relative Humidity	%	10 to 70	30	Pass
Velocity	m/s	2.7 – 2.8	2.7	Pass
Impact Force @ 10 mm	kN	-1.72 to -1.26	-1.36	Pass
Impact Force @ 18 mm	kN	-3.10 to -2.27	-2.39	Pass
Overall Test Results				Pass

Laboratory Technician

12/01/01
Test Date

Approved By



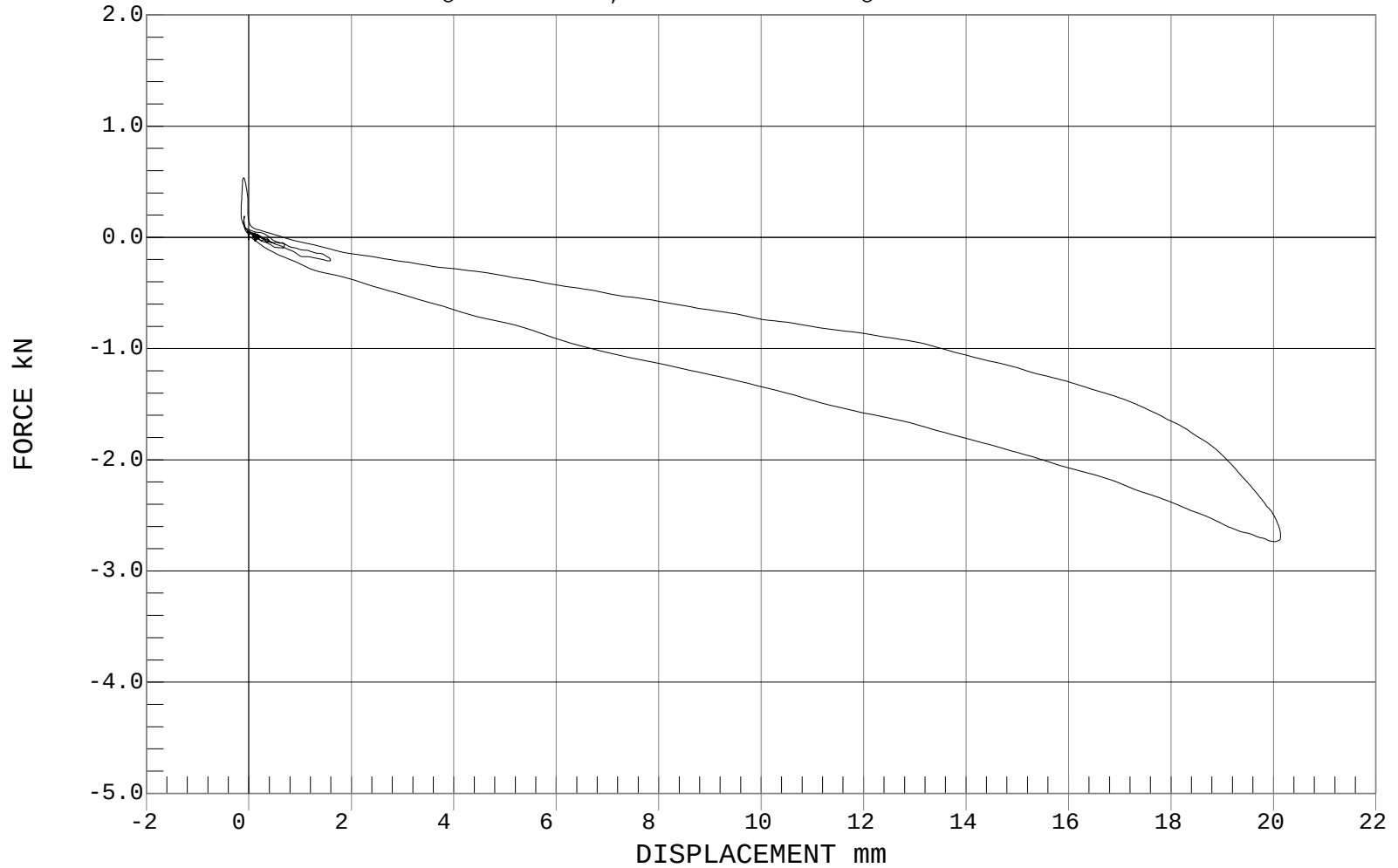
LEFT KNEE SLIDER

Test Desc.: Dummy Calibration - Left Knee Slider
Component: Dummy #065

Test Date: 12-01-01
Speed: 8.89 FT/SEC, 2.71 M/SEC

1 FORCE, D01768FC.F05

Ymin = -2.74 kN @ 20.0198 mm, Ymax = .53 kN @ -0.0967 mm



Hybrid III Calibration Data Sheet

50th Percentile Male

External Measurements

ATD Serial No.: 065

Test I.D.: D01176

External Measurement Data				
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.4 to 22.1	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	36	Pass
A – Total sitting height	mm	879 to 889	884	Pass
B – Shoulder pivot height	mm	506 to 521	511	Pass
C – “H” point height	mm	84 to 89	86	Pass
D – “H” point from seat back	mm	135 to 140	137	Pass
E – Shoulder pivot from back	mm	84 to 94	89	Pass
F – Thigh clearance	mm	140 to 155	145	Pass
G – Elbow back to wrist pivot	mm	290 to 305	292	Pass
H – Skull cap to back line	mm	41 to 46	43	Pass
I – Shoulder to elbow length	mm	330 to 345	335	Pass
J – Elbow rest height	mm	191 to 211	196	Pass
K – Buttock to knee length	mm	579 to 605	589	Pass
L – Popliteal length	mm	429 to 455	442	Pass
M – Knee pivot height	mm	485 to 500	495	Pass
N – Buttock popliteal length	mm	452 to 478	467	Pass
O – Chest depth	mm	213 to 229	221	Pass
P – Foot breadth	mm	252 to 267	262	Pass
V – Shoulder breadth	mm	422 to 437	424	Pass
W – Foot length	mm	91 to 107	99	Pass
Y – Chest circumference	mm	970 to 1001	985	Pass
Z – Waist circumference	mm	836 to 866	856	Pass
AA – Location for chest circumference	mm	429 to 434	432	Pass
BB – Location for waist circumference	mm	226 to 231	229	Pass
Overall Test Results				Pass

Laboratory Technician

12/03/01

Test Date

Approved By

APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION

INSTRUMENTS FOR DRIVER DUMMY NO. 066

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	AAMN8	Endevco	11/14/01
Head Y	ACC61	Endevco	11/14/01
Head Z	ACCW9	Endevco	11/14/01
Head Y – Front	AJ7P2	Endevco	11/15/01
Head Z – Front	J23774	Endevco	11/15/01
Head X – Left	J20382	Endevco	11/15/01
Head Z – Left	J28988	Endevco	11/15/01
Head X – Upper	J22036	Endevco	11/15/01
Head Y - Upper	J20569	Endevco	11/15/01
Head X Redundant	J19884	Endevco	11/15/01
Head Y Redundant	J21988	Endevco	11/15/01
Head Z Redundant	J28986	Endevco	11/15/01
Neck Load Cell	442	Denton	9/7/01
Chest X	ACCY1	Endevco	11/14/01
Chest Y	ACCC8	Endevco	11/14/01
Chest Z	ACCT7	Endevco	11/14/01
Chest Deflection Gauge	066	Servo	11/28/01
Chest X Redundant	ALDC3	Endevco	11/16/01
Chest Y Redundant	ALA92	Endevco	11/16/01
Chest Z Redundant	ALDM8	Endevco	11/16/01
Pelvis X	AJ820	Endevco	8/29/01
Pelvis Y	AGTG8	Endevco	8/29/01
Pelvis Z	AJ8Y6	Endevco	8/29/01
Left Femur Load Cell	262	Denton	11/30/01
Right Femur Load Cell	261	Denton	11/30/01
Left Knee Shear	13462	Denton	12/1/01
Right Knee Shear	18921	Denton	12/1/01
Left Upper Tibia Load Cell	109	Denton	11/19/01

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Lower Tibia Load Cell	138	Denton	11/16/01
Right Upper Tibia Load Cell	106	Denton	11/19/01
Right Lower Tibia Load Cell	135	Denton	11/16/01
Left Foot Z – Front	AHWK8	Endevco	11/16/01
Left Ankle X	AH0D1	Endevco	11/16/01
Left Ankle Z	AH0M0	Endevco	11/16/01
Right Foot Z – Front	J21612	Endevco	11/16/01
Right Ankle X	J22034	Endevco	11/16/01
Right Ankle Z	J21724	Endevco	11/16/01
Shoulder Belt Load Cell	195	Denton	11/7/01
Lap Belt Load Cell	191	Denton	11/7/01
Belt Stretch Potentiometer	02	Servo	12/4/01

INSTRUMENTS FOR PASSENGER DUMMY NO. 065

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	ACCY6	Endevco	11/14/01
Head Y	ACCH1	Endevco	11/14/01
Head Z	AAMW5	Endevco	11/14/01
Head Y – Front	J20165	Endevco	11/15/01
Head Z – Front	J28708	Endevco	11/15/01
Head X – Left	J27513	Endevco	11/15/01
Head Z – Left	J23946	Endevco	11/15/01
Head X – Upper	J20580	Endevco	11/15/01
Head Y - Upper	J23914	Endevco	11/15/01
Head X Redundant	J18724	Endevco	11/15/01
Head Y Redundant	J14235	Endevco	11/15/01
Head Z Redundant	AJ5R0	Endevco	11/15/01
Neck Load Cell	443	Denton	7/18/01
Chest X	ACC78	Endevco	11/14/01
Chest Y	ACCE6	Endevco	11/14/01
Chest Z	ACCY3	Endevco	11/14/01
Chest Deflection Gauge	065	Servo	11/28/01
Chest X Redundant	J19927	Endevco	11/15/01
Chest Y Redundant	J14674	Endevco	11/15/01
Chest Z Redundant	J18736	Endevco	11/15/01
Pelvis X	AJ9N4	Endevco	11/16/01
Pelvis Y	ALFL9	Endevco	11/16/01
Pelvis Z	AJ808	Endevco	11/16/01
Left Femur Load Cell	260	Denton	11/30/01
Right Femur Load Cell	259	Denton	11/30/01
Left Knee Shear	14690	Denton	12/1/01
Right Knee Shear	14682	Denton	12/1/01
Left Upper Tibia Load Cell	105	Denton	11/19/01

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Lower Tibia Load Cell	134	Denton	11/16/01
Right Upper Tibia Load Cell	103	Denton	11/19/01
Right Lower Tibia Load Cell	133	Denton	11/16/01
Left Foot Z – Front	AMP44	Endevco	7/16/01
Left Ankle X	AMRR4	Endevco	7/16/01
Left Ankle Z	ALCR0	Endevco	7/16/01
Right Foot Z – Front	AJ9J7	Endevco	11/16/01
Right Ankle X	AJ819	Endevco	11/16/01
Right Ankle Z	AJ7A2	Endevco	11/16/01
Shoulder Belt Load Cell	197	Denton	11/7/01
Lap Belt Load Cell	190	Denton	11/6/01
Belt Stretch Potentiometer	01	Servo	12/4/01

INSTRUMENTS FOR VEHICLE AND LABORATORY

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	I25-F08	Entran	1/16/02
Left Rear Seat Crossmember Z	I25-F07	Entran	1/14/02
Right Rear Seat Crossmember X	D11-F14	Entran	1/16/02
Right Rear Seat Crossmember Z	E03-H06	Entran	1/16/02
Top of Engine X	K19-A11	Entran	1/15/02
Bottom of Engine X	G13-F10	Entran	1/16/02
Left Brake Caliper X	J10-E03	Entran	1/15/02
Right Brake Caliper X	H14-N08	Entran	9/12/01
Instrument Panel X	I25-F09	Entran	1/16/02

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

APPENDIX E

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT INSTRUCTIONS

Safety Belts: They're for Everyone

This part of the manual tells you how to use safety belts properly. It also tells you some things you should not do with safety belts.

And it explains the air bag system.

CAUTION:

Don't let anyone ride where he or she can't wear a safety belt properly. If you are in a crash and you're not wearing a safety belt, your injuries can be much worse. You can hit things inside the vehicle or be ejected from it. You can be seriously injured or killed. In the same crash, you might not be if you are buckled up. Always fasten your safety belt, and check that your passengers' belts are fastened properly too.

CAUTION:

It is extremely dangerous to ride in a cargo area, inside or outside of a vehicle. In a collision, people riding in these areas are more likely to be seriously injured or killed. Do not allow people to ride in any area of your vehicle that is not equipped with seats and safety belts. Be sure everyone in your vehicle is in a seat and using a safety belt properly.



Your vehicle has a light that comes on as a reminder to buckle up. See "Safety Belt Reminder Light" in the Index.

In most states and Canadian provinces, the law says to wear safety belts. Here's why: *They work.*

1-21

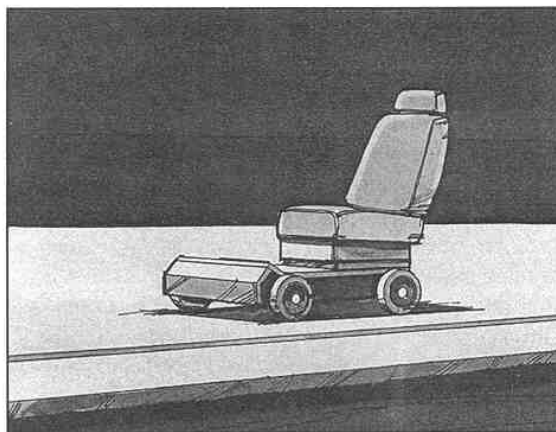
You never know if you'll be in a crash. If you do have a crash, you don't know if it will be a bad one.

A few crashes are mild, and some crashes can be so serious that even buckled up a person wouldn't survive. But most crashes are in between. In many of them, people who buckle up can survive and sometimes walk away. Without belts they could have been badly hurt or killed.

After more than 30 years of safety belts in vehicles, the facts are clear. In most crashes buckling up does matter ... a lot!

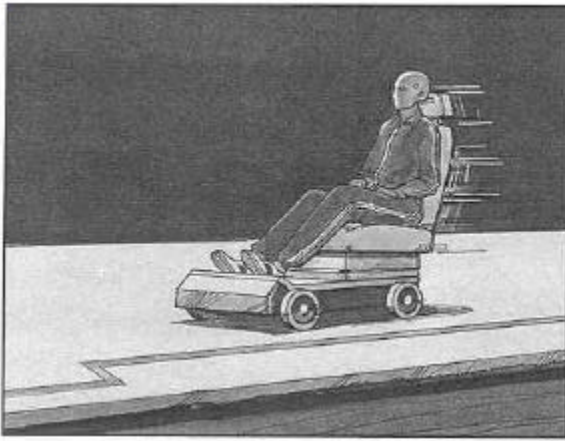
Why Safety Belts Work

When you ride in or on anything, you go as fast as it goes.

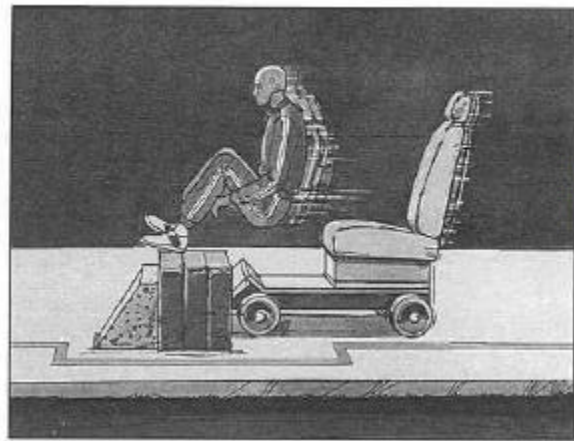


Take the simplest vehicle. Suppose it's just a seat on wheels.

1-22



Put someone on it.

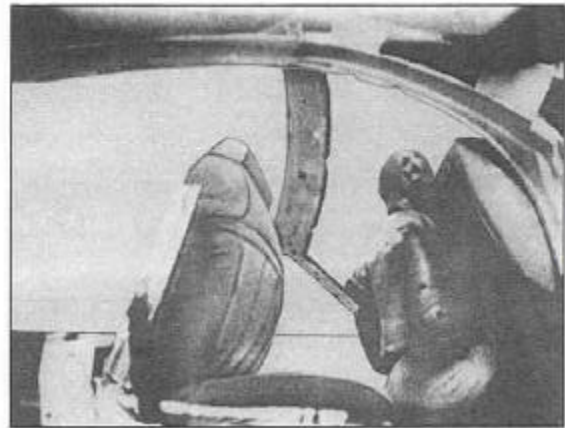


Get it up to speed. Then stop the vehicle. The rider doesn't stop.

1-23

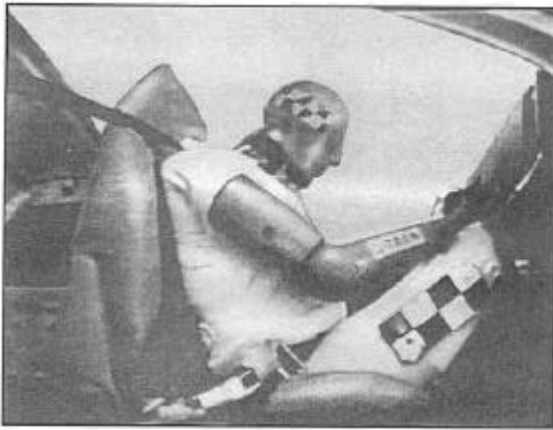


The person keeps going until stopped by something.
In a real vehicle, it could be the windshield ...



... or the instrument panel ...

1-24



or the safety belts!

With safety belts, you slow down as the vehicle does. You get more time to stop. You stop over more distance, and your strongest bones take the forces. That's why safety belts make such good sense.

Here Are Questions Many People Ask About Safety Belts -- and the Answers

Q: Won't I be trapped in the vehicle after an accident if I'm wearing a safety belt?

A: You *could* be -- whether you're wearing a safety belt or not. But you can unbuckle a safety belt, even if you're upside down. And your chance of being conscious during and after an accident, so you *can* unbuckle and get out, is *much* greater if you are belted.

Q: If my vehicle has air bags, why should I have to wear safety belts?

A: Air bags are in many vehicles today and will be in most of them in the future. But they are supplemental systems only; so they work *with* safety belts -- not instead of them. Every air bag system ever offered for sale has required the use of safety belts. Even if you're in a vehicle that has air bags, you still have to buckle up to get the most protection. That's true not only in frontal collisions, but especially in side and other collisions.

1-25

Q: If I'm a good driver, and I never drive far from home, why should I wear safety belts?

A: You may be an excellent driver, but if you're in an accident -- even one that isn't your fault -- you and your passengers can be hurt. Being a good driver doesn't protect you from things beyond your control, such as bad drivers.

Most accidents occur within 25 miles (40 km) of home. And the greatest number of serious injuries and deaths occur at speeds of less than 40 mph (65 km/h).

Safety belts are for everyone.

How to Wear Safety Belts Properly

Adults

This part is only for people of adult size.

Be aware that there are special things to know about safety belts and children. And there are different rules for smaller children and babies. If a child will be riding in your vehicle, see the part of this manual called "Children." Follow those rules for everyone's protection.

First, you'll want to know which restraint systems your vehicle has.

We'll start with the driver position.

Driver Position

This part describes the driver's restraint system.

Lap-Shoulder Belt

The driver has a lap-shoulder belt. Here's how to wear it properly.

1. Close and lock the door.
2. Adjust the seat so you can sit up straight.
To see how, see "Seats" in the Index.

1-26



3. Pick up the latch plate and pull the belt across you. Don't let it get twisted.

The shoulder belt may lock if you pull the belt across you very quickly. If this happens, let the belt go back slightly to unlock it. Then pull the belt across you more slowly.

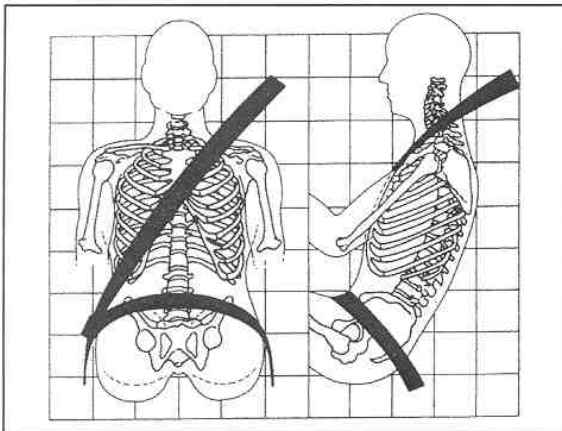
4. Push the latch plate into the buckle until it clicks. Pull up on the latch plate to make sure it is secure. If the belt isn't long enough, see "Safety Belt Extender" at the end of this section.

Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.



5. To make the lap part tight, pull down on the buckle end of the belt as you pull up on the shoulder belt.

1-27



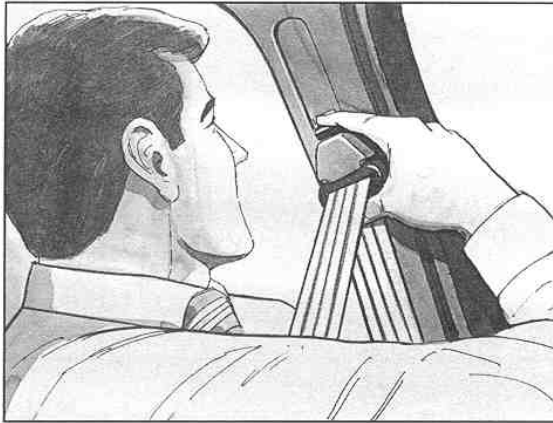
The lap part of the belt should be worn low and snug on the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces.

The safety belt locks if there's a sudden stop or crash, or if you pull the belt very quickly out of the retractor.

1-28

Shoulder Belt Height Adjuster

Before you begin to drive, move the shoulder belt adjuster to the height that is right for you.

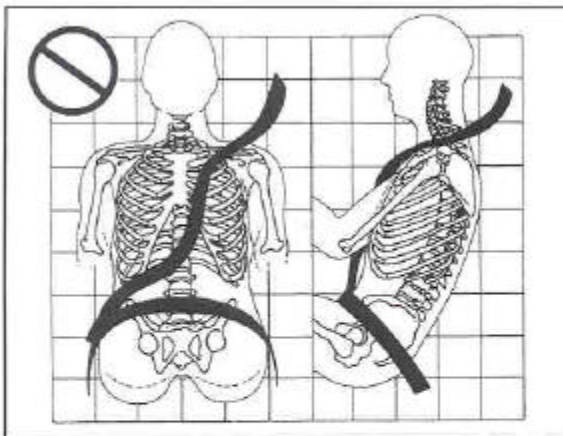


To move it down, push down on the button and move the height adjuster to the desired position. You can move the adjuster up just by pushing up on the shoulder belt guide. After you move the adjuster to where you want it, try to move it down without pushing the button down to make sure it has locked into position.

Adjust the height so that the shoulder portion of the belt is centered on your shoulder. The belt should be away from your face and neck, but not falling off your shoulder.

1-29

Q: What's wrong with this?



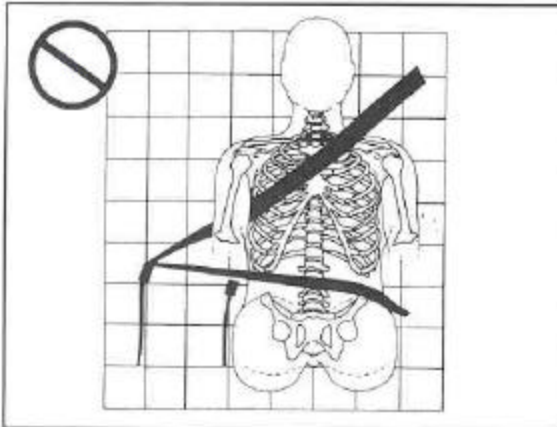
CAUTION:

You can be seriously hurt if your shoulder belt is too loose. In a crash, you would move forward too much, which could increase injury. The shoulder belt should fit against your body.

A: The shoulder belt is too loose. It won't give nearly as much protection this way.

1-30

Q: What's wrong with this?



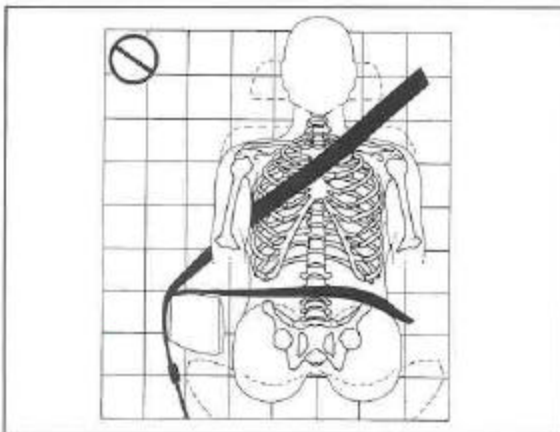
A: The belt is buckled in the wrong place.

⚠ CAUTION:

You can be seriously injured if your belt is buckled in the wrong place like this. In a crash, the belt would go up over your abdomen. The belt forces would be there, not at the pelvic bones. This could cause serious internal injuries. Always buckle your belt into the buckle nearest you.

1-31

Q: What's wrong with this?



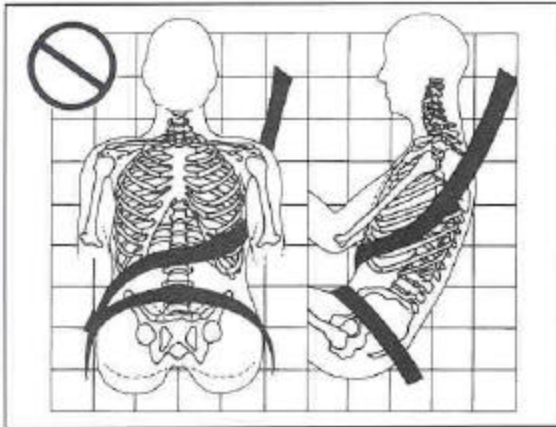
A: The belt is over an armrest.

⚠ CAUTION:

You can be seriously injured if your belt goes over an armrest like this. The belt would be much too high. In a crash, you can slide under the belt. The belt force would then be applied at the abdomen, not at the pelvic bones, and that could cause serious or fatal injuries. Be sure the belt goes under the armrests.

1-32

Q: What's wrong with this?



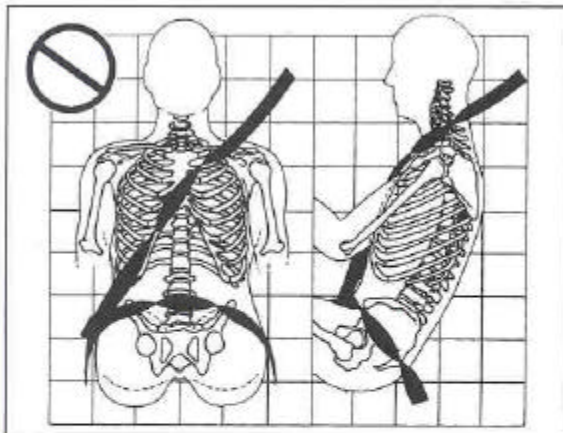
A: The shoulder belt is worn under the arm. It should be worn over the shoulder at all times.

⚠ CAUTION:

You can be seriously injured if you wear the shoulder belt **under** your arm. In a crash, your body would move too far forward, which would increase the chance of head and neck injury. Also, the belt would apply too much force to the ribs, which aren't as strong as shoulder bones. You could also severely injure internal organs like your liver or spleen.

1-33

Q: What's wrong with this?

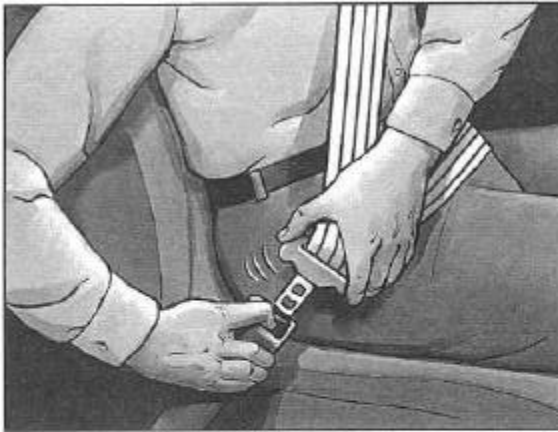


A: The belt is twisted across the body.

⚠ CAUTION:

You can be seriously injured by a twisted belt. In a crash, you wouldn't have the full width of the belt to spread impact forces. If a belt is twisted, make it straight so it can work properly, or ask your dealer to fix it.

1-34

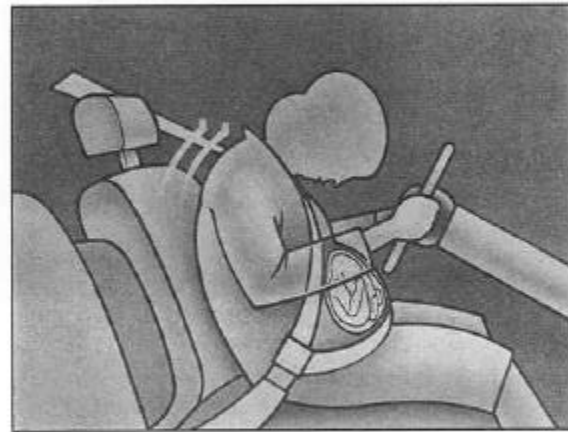


To unlatch the belt, just push the button on the buckle. The belt should go back out of the way.

Before you close the door, be sure the belt is out of the way. If you slam the door on it, you can damage both the belt and your vehicle.

Safety Belt Use During Pregnancy

Safety belts work for everyone, including pregnant women. Like all occupants, they are more likely to be seriously injured if they don't wear safety belts.



A pregnant woman should wear a lap-shoulder belt, and the lap portion should be worn as low as possible, below the rounding, throughout the pregnancy.

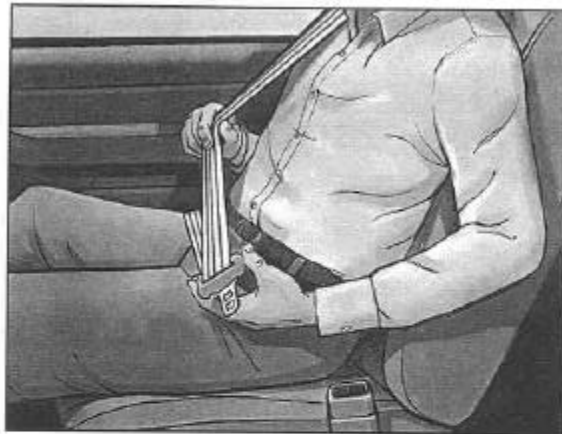
1-35

The best way to protect the fetus is to protect the mother. When a safety belt is worn properly, it's more likely that the fetus won't be hurt in a crash. For pregnant women, as for anyone, the key to making safety belts effective is wearing them properly.

Right Front Passenger Position

To learn how to wear the right front passenger's safety belt properly, see "Driver Position" earlier in this section.

The right front passenger's safety belt works the same way as the driver's safety belt -- except for one thing. If the belt stops before it reaches the buckle, tilt the latch plate and keep pulling until you can buckle the belt.



1-36

Air Bag Systems

This part explains the frontal and side impact air bag systems.

Your vehicle has four air bags -- a frontal air bag for the driver, another frontal air bag for the right front passenger, a side impact air bag for the driver, and another side impact air bag for the right front passenger.

Frontal air bags are designed to help reduce the risk of injury from the force of an inflating frontal air bag. But these air bags must inflate very quickly to do their job and comply with federal regulations.

Here are the most important things to know about the air bag systems:

CAUTION:

You can be severely injured or killed in a crash if you aren't wearing your safety belt -- even if you have air bags. Wearing your safety belt during a crash helps reduce your chance of hitting things inside the vehicle or being ejected from it. Air bags are designed to work with safety belts but don't replace them.

CAUTION: (Continued)

CAUTION: (Continued)

Frontal air bags for the driver and right front passenger are designed to work only in moderate to severe crashes where the front of your vehicle hits something. They aren't designed to inflate at all in rollover, rear or low-speed frontal crashes, or in many side crashes. And, for some unrestrained occupants, frontal air bags may provide less protection in frontal crashes than more forceful air bags have provided in the past. The side impact air bags for the driver and right front passenger are designed to inflate only in moderate to severe crashes where something hits the side of your vehicle. They aren't designed to inflate in frontal, in rollover or in rear crashes. Everyone in your vehicle should wear a safety belt properly -- whether or not there's an air bag for that person.

1-37

CAUTION:

Both frontal and side impact air bags inflate with great force, faster than the blink of an eye. If you're too close to an inflating air bag, as you would be if you were leaning forward, it could seriously injure you. Safety belts help keep you in position for air bag inflation before and during a crash. Always wear your safety belt, even with frontal air bags. The driver should sit as far back as possible while still maintaining control of the vehicle. Front occupants should not lean on or sleep against the door.

CAUTION:

Anyone who is up against, or very close to, any air bag when it inflates can be seriously injured or killed. Air bags plus lap-shoulder belts offer the best protection for adults, but not for young children and infants. Neither the vehicle's safety belt system nor its air bag system is designed for them. Young children and infants need the protection that a child restraint system can provide. Always secure children properly in your vehicle. To read how, see the part of this manual called "Children."

1-38



There is an air bag readiness light on the instrument panel, which shows the air bag symbol.

The system checks the air bag electrical system for malfunctions. The light tells you if there is an electrical problem. See "Air Bag Readiness Light" in the Index for more information.

How the Air Bag Systems Work

Where are the air bags?



The driver's frontal air bag is in the middle of the steering wheel.

1-39

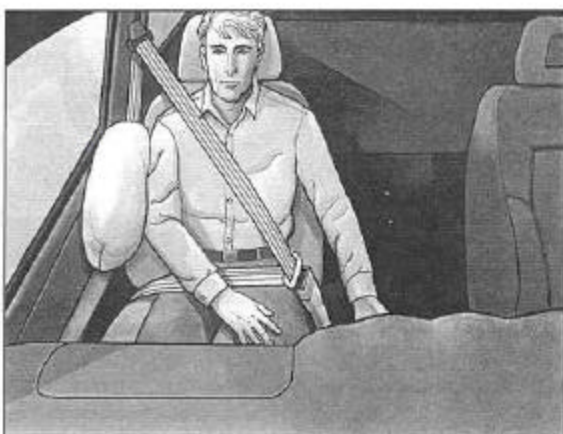


The right front passenger's frontal air bag is in the instrument panel on the passenger's side.



The driver's side impact air bag is in the side of the driver's seatback closest to the door.

1-40



The right front passenger's side impact air bag is in the side of the passenger's seatback closest to the door.

⚠ CAUTION:

If something is between an occupant and an air bag, the bag might not inflate properly or it might force the object into that person causing severe injury or even death. The path of an inflating air bag must be kept clear. Don't put anything between an occupant and an air bag, and don't attach or put anything on the steering wheel hub or on or near any other air bag covering. Don't let seat covers block the inflation path of a side impact air bag.

1-41

When should an air bag inflate?

The driver's and right front passenger's frontal air bags are designed to inflate in moderate to severe frontal or near-frontal crashes. But they are designed to inflate only if the impact speed is above the system's designed "threshold level."

In addition, your vehicle has "dual stage" frontal air bags, which adjust the amount of restraint according to crash severity. For moderate frontal impacts, these air bags inflate at a level less than full deployment. For more severe frontal impacts, full deployment occurs. If the front of your vehicle goes straight into a wall that doesn't move or deform, the threshold level for the reduced deployment is about 12 to 18 mph (19 to 29 km/h), and the threshold level for a full deployment is about 18 to 24 mph (29 to 38.5 km/h). The threshold level can vary, however, with specific vehicle design, so that it can be somewhat above or below this range.

If your vehicle strikes something that will move or deform, such as a parked car, the threshold level will be higher. The driver's and right front passenger's frontal air bags are not designed to inflate in rollovers, rear impacts, or in many side impacts because inflation would not help the occupant.

The side impact air bags are designed to inflate in moderate to severe side crashes. A side impact air bag will inflate if the crash severity is above the system's designed "threshold level." The threshold level can vary with specific vehicle design. Side impact air bags are not designed to inflate in frontal or near-frontal impacts, rollovers or rear impacts, because inflation would not help the occupant. A side impact air bag will only deploy on the side of the vehicle that is struck.

In any particular crash, no one can say whether an air bag should have inflated simply because of the damage to a vehicle or because of what the repair costs were. For frontal air bags, inflation is determined by the angle of the impact and how quickly the vehicle slows down in frontal and near-frontal impacts. For side impact air bags, inflation is determined by the location and severity of the impact.

What makes an air bag inflate?

In an impact of sufficient severity, the air bag sensing system detects that the vehicle is in a crash. For both frontal and side impact air bags, the sensing system triggers a release of gas from the inflator, which inflates the air bag. The inflator, air bag and related hardware are all part of the air bag modules inside the steering wheel, instrument panel and the side of the front seatbacks closest to the door.

1-42

How does an air bag restrain?

In moderate to severe frontal or near frontal collisions, even belted occupants can contact the steering wheel or the instrument panel. In moderate to severe side collisions, even belted occupants can contact the inside of the vehicle. The air bag supplements the protection provided by safety belts. Air bags distribute the force of the impact more evenly over the occupant's upper body, stopping the occupant more gradually. But the frontal air bags would not help you in many types of collisions, including rollovers, rear impacts, and many side impacts, primarily because an occupant's motion is not toward the air bag. Side impact air bags would not help you in many types of collisions, including frontal or near frontal collisions, rollovers, and rear impacts, primarily because an occupant's motion is not toward those air bags. Air bags should never be regarded as anything more than a supplement to safety belts, and then only in moderate to severe frontal or near-frontal collisions for the driver's and right front passenger's frontal air bags, and only in moderate to severe side collisions for the driver's and right front passenger's side impact air bags.

What will you see after an air bag inflates?

After an air bag inflates, it quickly deflates, so quickly that some people may not even realize the air bag inflated. Some components of the air bag module -- the steering wheel hub for the driver's air bag, the instrument panel for the right front passenger's bag, the side of the seatback closest to the door for the driver and right front passenger's side impact air bags -- will be hot for a short time. The parts of the bag that come into contact with you may be warm, but not too hot to touch. There will be some smoke and dust coming from the vents in the deflated air bags. Air bag inflation doesn't prevent the driver from seeing or being able to steer the vehicle, nor does it stop people from leaving the vehicle.

CAUTION:

When an air bag inflates, there is dust in the air. This dust could cause breathing problems for people with a history of asthma or other breathing trouble. To avoid this, everyone in the vehicle should get out as soon as it is safe to do so. If you have breathing problems but can't get out of the vehicle after an air bag inflates, then get fresh air by opening a window or a door.

1-43

In many crashes severe enough to inflate an air bag, windshields are broken by vehicle deformation. Additional windshield breakage may also occur from the right front passenger air bag.

- Air bags are designed to inflate only once. After an air bag inflates, you'll need some new parts for your air bag system. If you don't get them, the air bag system won't be there to help protect you in another crash. A new system will include air bag modules and possibly other parts. The service manual for your vehicle covers the need to replace other parts.
- Your vehicle is equipped with an electronic frontal sensor, which helps the sensing system distinguish between a moderate frontal impact and a more severe frontal impact. Your vehicle is also equipped with a crash sensing and diagnostic module, which records information about the frontal air bag system. The module records information about the readiness of the system, when the system commands air bag inflation and driver's safety belt usage at deployment. The module also records speed, engine rpm, brake and throttle data.

- Let only qualified technicians work on your air bag systems. Improper service can mean that an air bag system won't work properly. See your dealer for service.

NOTICE:

If you damage the covering for the driver's or the right front passenger's air bag, or the air bag covering on the driver's and right front passenger's seatback, the bag may not work properly. You may have to replace the air bag module in the steering wheel, both the air bag module and the instrument panel for the right front passenger's air bag, or both the air bag module and seatback for the driver's and right front passenger's side impact air bag. Do not open or break the air bag coverings.

1-44

Servicing Your Air Bag-Equipped Vehicle

Air bags affect how your vehicle should be serviced. There are parts of the air bag systems in several places around your vehicle. Your dealer and the service manual have information about servicing your vehicle and the air bag systems. To purchase a service manual, see "Service and Owner Publications" in the Index.

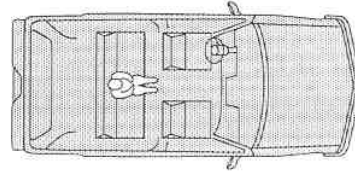
CAUTION:

For up to 10 seconds after the ignition key is turned off and the battery is disconnected, an air bag can still inflate during improper service. You can be injured if you are close to an air bag when it inflates. Avoid yellow connectors. They are probably part of the air bag systems. Be sure to follow proper service procedures, and make sure the person performing work for you is qualified to do so.

The air bag systems do not need regular maintenance.

Center Passenger Position

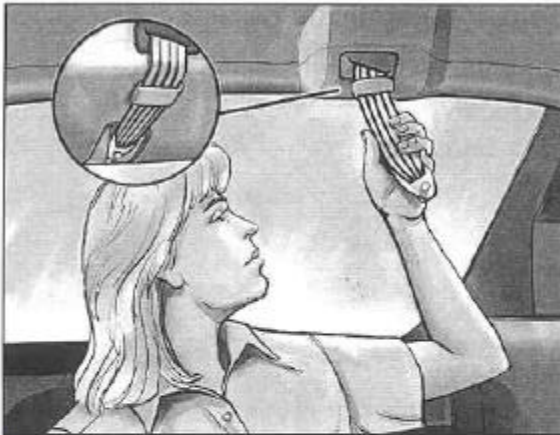
Lap-Shoulder Belt



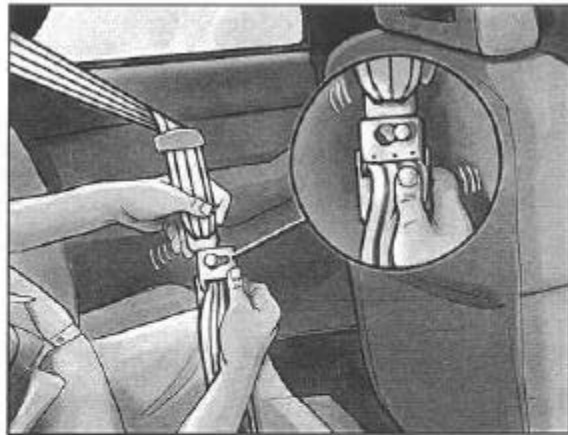
If your vehicle has a bench seat, someone can sit in the center position.

When you sit in the center seating position, you have a lap safety belt, which has no retractor. You also have a shoulder belt, which has a retractor. In order to have the protection of the shoulder belt, you must first connect it to the lap belt.

1-45

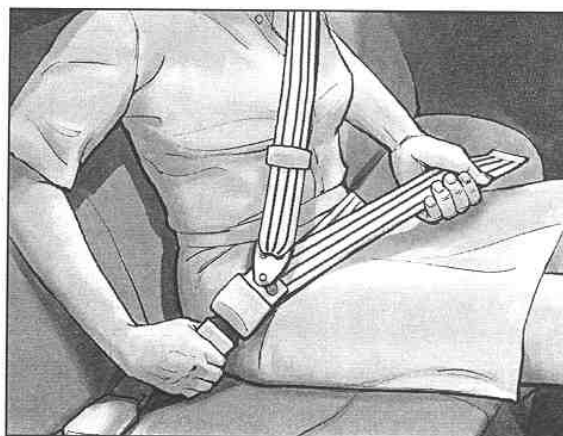
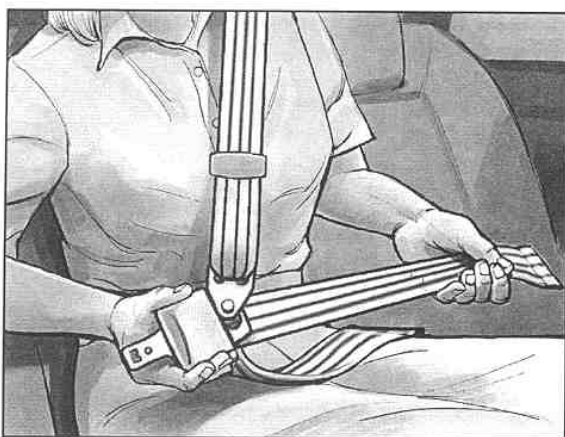


Remove the shoulder belt from its stowage location in the roof and pull it all the way down to the lap belt.



Insert the metal knob on the shoulder belt into the keyhole on the lap belt buckle as shown. Be sure to slide the shoulder belt part into the keyhole until it locks into place.

1-46



To make the lap belt longer, tilt the latch plate and pull it along the belt. To make the belt shorter, pull its free end as shown until the belt is snug.

Buckle, position and release the lap-shoulder belt the same way as the other lap-shoulder belts. If the belt isn't long enough, see "Safety Belt Extender" at the end of this section.

Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.

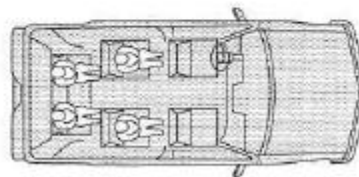
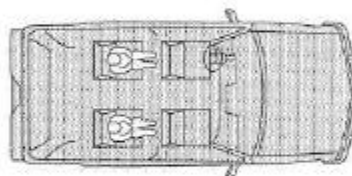
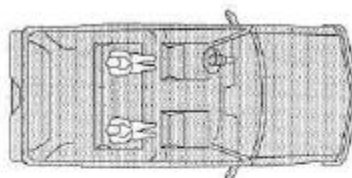
1-47

Rear Seat Passengers

It's very important for rear seat passengers to buckle up! Accident statistics show that unbelted people in the rear seat are hurt more often in crashes than those who are wearing safety belts.

Rear passengers who aren't safety belted can be thrown out of the vehicle in a crash. And they can strike others in the vehicle who are wearing safety belts.

Rear Seat Outside Passenger Positions



1-48

Lap-Shoulder Belt

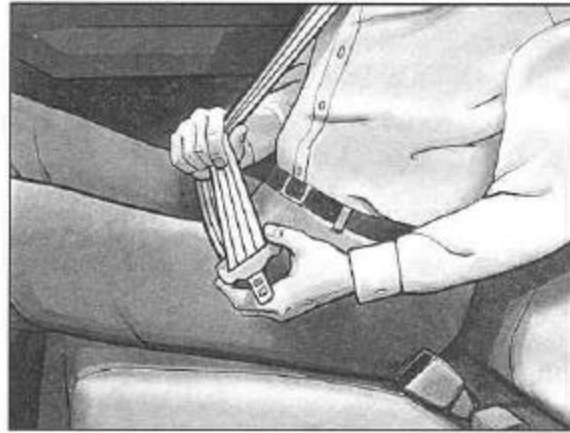
The positions next to the windows have lap-shoulder belts. Here's how to wear one properly.



1. Pick up the latch plate and pull the belt across you. Don't let it get twisted.

The shoulder belt may lock if you pull the belt across you very quickly. If this happens, let the belt go back slightly to unlock it. Then pull the belt across you more slowly.

2. Push the latch plate into the buckle until it clicks.



If the belt stops before it reaches the buckle, tilt the latch plate and keep pulling until you can buckle it.

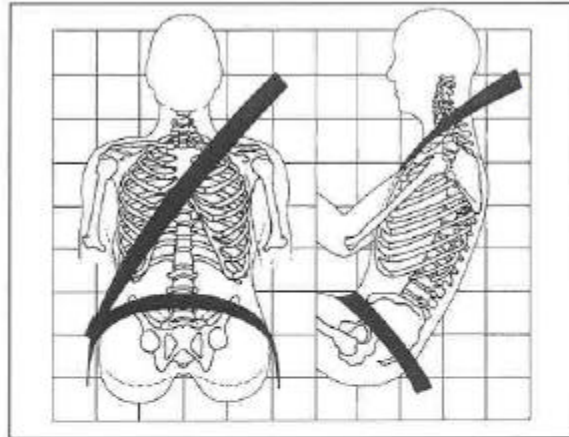
Pull up on the latch plate to make sure it is secure.

If the belt is not long enough, see "Safety Belt Extender" at the end of this section. Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.

1-49



3. To make the lap part tight, pull down on the buckle end of the belt as you pull up on the shoulder part.



The lap part of the belt should be worn low and snug on the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces.

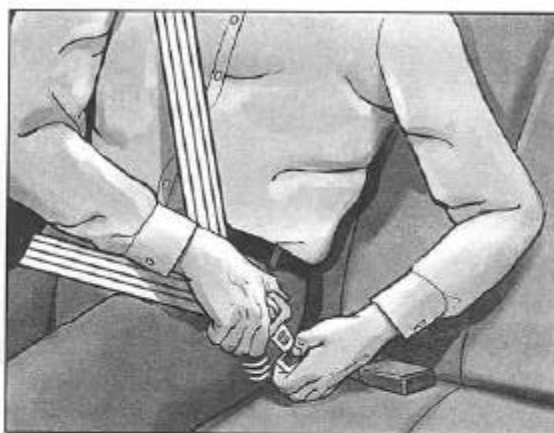
1-50

The safety belt locks if there's a sudden stop or a crash, or if you pull the belt very quickly out of the retractor.

Each position next to the windows in the second row has a shoulder belt height adjuster. Move the shoulder belt adjuster to the height that is right for you.

To move it down, push down on the button and move the height adjuster to the desired position. You can move the height adjuster up just by pushing up on the shoulder belt guide. After you move the adjuster to where you want it, try to move it down without pushing the button down to make sure it has locked into position.

Adjust the height so that the shoulder portion of the belt is centered on your shoulder. The belt should be away from your face and neck, but not falling off your shoulder.



To unlatch the belt, just push the button on the buckle.

⚠ CAUTION:

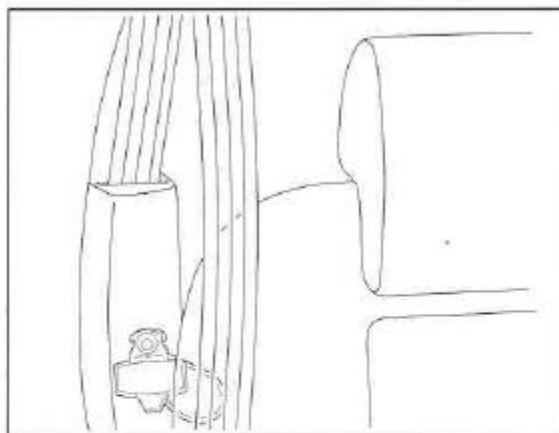
You can be seriously hurt if your shoulder belt is too loose. In a crash, you would move forward too much, which could increase injury. The shoulder belt should fit against your body.

1-51

Rear Safety Belt Comfort Guides for Children and Small Adults

Your vehicle may have rear shoulder belt comfort guides. This feature will provide added safety belt comfort for older children who have outgrown booster seats and for small adults. When installed on a shoulder belt, the comfort guide better positions the belt away from the neck and head.

There is one guide for each passenger position in the second row rear seat. To provide added safety belt comfort for children who have outgrown child restraints and for smaller adults, the comfort guides may be installed on the shoulder belts. Here's how to install a comfort guide and use the safety belt:



Second Row Outside Positions

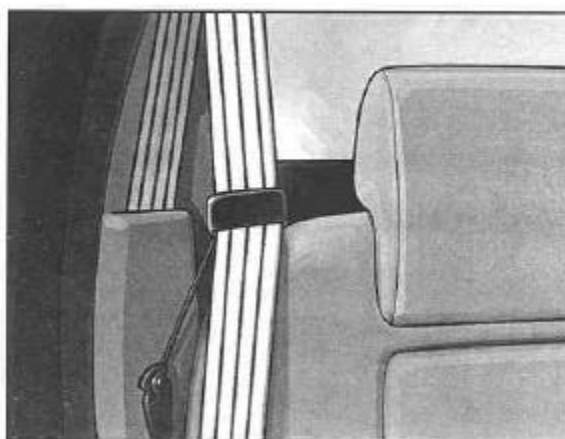
1-52

For second row outside positions do the following:

1. Remove the guide from its storage clip located on the sidewall next to the outer side of each outside passenger position.



2. Place the guide over the belt and insert the two edges of the belt into the slots of the guide.



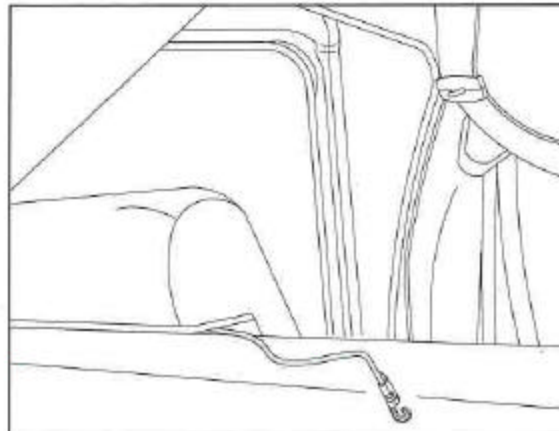
3. Be sure that the belt is not twisted and it lies flat. The guide must be on top of the belt.

1-53



4. Buckle, position and release the safety belt as described in "Rear Seat Passenger Positions" earlier in this section. Make sure that the shoulder belt crosses the shoulder.

To remove and store the comfort guides, squeeze the belt edges together so that you can take them out of the guides. Pull the guide upward to expose its storage clip, and then slide the guide onto the clip. Turn the guide and clip inward, leaving only the loop of elastic cord exposed.

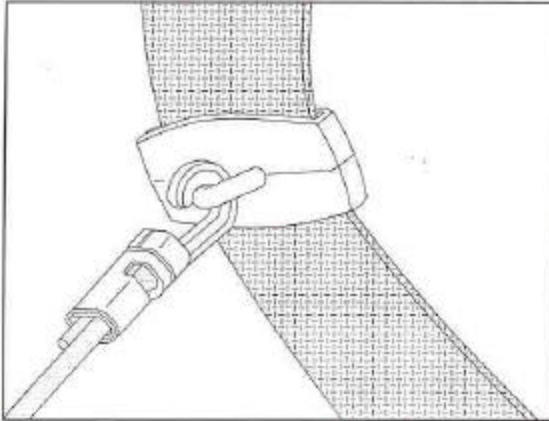


Second Row Center Position

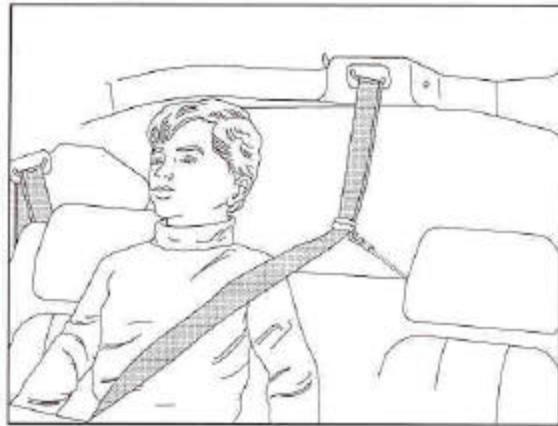
1-54

For second row center position do the following:

1. Remove the elastic cord from under the head restraint of the second row driver's side position.



2. Attach the elastic cord to the comfort guide on the center passenger shoulder belt.



3. Be sure that the belt is not twisted and it lies flat. The guide must be on top of the belt.
4. Buckle, position and release the safety belt as described in "Center Passenger Position" earlier in this section. Make sure that the shoulder belt crosses the shoulder.

To remove and store the elastic cord, remove it from the comfort guide. The elastic cord will go back under the head restraint.