REPORT NUMBER: 201-MGA-2007-002

SAFETY COMPLIANCE TESTING FOR FMVSS 201
RIGID POLE SIDE IMPACT TEST

GENERAL MOTORS OF CANADA LTD.
2007 BUICK LACROSSE CX
NHTSA NUMBER: C70116

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

TEST DATE: AUGUST 22, 2007

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF VEHICLE SAFETY COMPLIANCE
1200 NEW JERSEY AVENUE, SE
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 DTNH22-06-C-00030.

Prepared by:  Date: October 17, 2007

Ben Fischer, Project Engineer

Reviewed by:  Date: October 17, 2007

David Winkelbauer, Director of Operations

FINAL REPORT ACCEPTED BY:

_____

COTR, Side Impact

_____

Date of Acceptance

Technical Report Documentation Page

1. Report No. 201-MGA-2007-002	*2. Government Accession No.*	*3. Recipient's Catalog No.*	
4. Title and Subtitle Final Report of FMVSS 201 Safety Compliance Rigid Pole Side Impact Test of a 2007 Buick Lacrosse CX NHTSA No.: C70116		*5. Report Date* October 17, 2007 *6. Performing Organization Code* MGA	
7. Author(s) Ben Fischer, Project Engineer		*8. Performing Organization Report No.* 201-MGA-2007-002	
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		*10. Work Unit No.* *11. Contract or Grant No.* DTNH22-06-C-00030	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance 1200 New Jersey Avenue, SE, Washington, D.C. 20590		*13. Type of Report and Period Covered* Final Report – 8/22/07 to 10/17/07 *14. Sponsoring Agency Code* NVS-200	
15. Supplementary Notes			

16. Abstract

A rigid pole side impact test was conducted on a 2007 Buick Lacrosse CX in accordance with FMVSS 201, "Occupant Protection in Interior Impact", S6.2(b)(3) and the Office of Vehicle Safety Compliance Test Procedure No. TP-201P-02 "Rigid Pole Side Impact Test". The test was conducted at MGA Research Corporation in Burlington, Wisconsin on August 22, 2007.

The impact velocity of the vehicle was 28.3 kph, and the ambient temperature at the struck side (driver's) of the target vehicle at the time of impact was 21°C. The post-test maximum crush was 397 mm at level 3. The test vehicle's occupant performance is as follows:

	REQUIREMENT	DRIVER
HIC	≤ 1000	428

The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.

17. Key Words Compliance Testing Rigid Pole Side Impact Test FMVSS 201		*18. Distribution Statement* Copies of this report are available from: National Highway Traffic Safety Adm. Technical Ref. Division, (NPO-230) 1200 New Jersey Avenue, SE Washington, D.C. 20590	
19. Security Classif. (of this report) Unclassified	*20. Security Classif. (of this page)* Unclassified	*21. No. of Pages* 141	22. Price

Form DOT F17007.7 (8-72)

TABLE OF CONTENTS

SECTION 1
PURPOSE AND TEST PROCEDURE

1.1 PURPOSE

This rigid pole side impact test is conducted as part of the FY' 2007 test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract No. DTNH22-06-C-00030. The purpose of this test was to evaluate occupant protection in interior impact in a 2007 Buick Lacrosse CX manufactured by General Motors of Canada Ltd.

1.2 TEST PROCEDURE

The rigid pole side impact test was conducted in accordance with the current National Highway Traffic Safety Administration (NHTSA), Office of Vehicle Safety Compliance (OVSC), laboratory test procedure TP-201P-02, dated October 21, 2001 and the corresponding MGA Research Corporation Test Procedure MGA-NHTSA8. The procedures for receiving, inspection, testing, and reporting of test results are described in the test procedures and are not repeated in this report.

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes.

SECTION 2
SUMMARY OF RIGID POLE SIDE IMPACT TEST

2.1 SUMMARY OF RIGID POLE SIDE IMPACT TEST

A rigid pole side impact test was performed on a 2007 Buick Lacrosse CX. The subject vehicle was towed into a rigid pole at a velocity of 28.3 km/h. The specified impact velocity range is from 27.2 to 28.8 km/h. The test vehicle was positioned 90° to the line of forward motion. The weight of the vehicle as tested was 1755.0 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on August 22, 2007.

One (1) real-time motion picture camera and eleven (11) high-speed motion picture cameras were used to document the impact event. Camera locations and pertinent camera information are documented in the data sheets. Pre- and post-test photographs of the vehicle and SID/HIII can be found in Appendix A. One SID/HIII was placed in the left front outboard designated seating position according to instructions specified in the TP-201P-02 dated October 21, 2001. The SID/HIII was instrumented in the following locations:

- Head Center of Gravity (CG) tri-axial accelerometers (X, Y, and Z axis)
- Upper Neck 6 channel load cell (X, Y, Z force and moment)
- Left Upper Rib (LUR) uni-axial accelerometer (Y-axis primary and redundant)
- Left Lower Rib (LLR) uni-axial accelerometer (Y-axis primary and redundant)
- Lower Thoracic Spine (T12) uni-axial accelerometer (Y-axis primary and redundant)
- Pelvic (PEV) section uni-axial accelerometer (Y-axis primary and redundant)

The test vehicle was instrumented with twenty (20) structural accelerometers. All data channels were recorded with a fully self contained on-board DTS TDAS Pro. The data was digitally sampled at 10,000 samples per second and processed per Section 12.2 of the Test Procedure.

2.2 GENERAL COMMENTS

The test vehicle sustained a maximum static crush of 397 mm at level 3, at the vertical impact line. The driver SID/HIII, Serial No. 036, was calibrated just prior to this test. The SID/HIII's injury criteria are summarized as follows:

Measurements	Units	Driver
HIC		428
TTI*	G's	91.6
Pelvis*	G's	60.6
Neck Force X*	N	-228
Neck Force Y*	N	-404
Neck Force Z*	N	771
Neck Moment X*	Nm	-71.3
Neck Moment Y*	Nm	-17.4
Neck Moment Z*	Nm	18.1

* For Information Purposes Only

Test summaries and post-test observations are presented in Section 3. The vehicle, camera, and occupant measurements are presented in Section 4. Appendix A contains the still photograph prints. Appendix B contains the SID/HIII and vehicle data traces. Appendix C contains the SID/HIII's configuration and performance verification data. Appendix D contains the calibration information data.

TEST NOTES

The following channels were not used in this test:

Right Roof Y

There was no valid data collected for:

Vehicle CG X

Lower Rib Y Redundant

SECTION 3
SIDE IMPACT DUMMY (SID/HIII) AND VEHICLE TEST DATA

Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007

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	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

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007

TEST VEHICLE INFORMATION

Make	Buick
Model	Lacrosse
Body Style	Sedan
NHTSA No.	C70116
VIN	2G4WC582271246529
Color	Stone Gray Metallic
Delivery Date	7/23/07
Odometer Reading (mile)	51
Dealer	Ricart Automotive
Transmission	4 Speed Automatic
Final Drive	Front
Number of Cylinders	6
Engine Displacement (L)	3.8
Engine Placement	Lateral

TEST VEHICLE OPTIONS

Front Airbag	Yes
Side Airbags	Curtain
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/CD	Yes
Anti-theft System	Yes
Cruise Control	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors of Canada Ltd.
Date of Manufacture	06/07

GVWR (kg)	2039
GAWR Front (kg)	1110
GAWR Rear (kg)	929

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	210	210
Recommended Tire Size	P225/60R16	P225/60R16
Tire Size on Vehicle	P225/60R16	P225/60R16
Tire Manufacturer	Goodyear	Goodyear

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Number Of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				416
Cargo Wt. (RCLW) (kg)				76

DATA SHEET NO. 1... (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	502.1	289.4		548.9	336.6	
Right	kg	512.1	299.4		543.4	326.1	
Ratio	%	63.3	36.7		62.2	37.8	
Totals	kg	1014.2	588.8	1603.0	1092.3	662.7	1755.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1603.0
Weight of SID/HIII Side Impact Dummy	kg	80.7
Rated Cargo/Luggage Weight (RCLW)	kg	76
Calculated Vehicle Target Weight (TVTW)	kg	1759.7

TEST VEHICLE ATTITUDES

	Units	As Delivered	Fully Loaded	Ready For Test
Right Front	mm	729	724	839
Left Front	mm	729	715	837
Right Rear	mm	734	694	839
Left Rear	mm	733	680	840
Right Door Sill Angle	deg	1.0 ND	0.0	0.4 ND
Left Door Sill Angle	deg	0.5 ND	0.1 BD	0.4 ND
Front Bumper Angle	deg	0.3 LD	0.7 LD	0.4 LD
Rear Bumper Angle	deg	0.0	0.4 LD	0.4 LD

ND = NOSE DOWN, BD = BACK DOWN, LD = LEFT DOWN, RD = RIGHT DOWN, RU = RIGHT UP

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2806
Total Vehicle Length at Left Side	mm	4207
Total Vehicle Length at Centerline	mm	5012
Total Vehicle Length at Right Side	mm	4207
Total Vehicle Width at B-Post	mm	1814
Weight of Ballast in Cargo Area	kg	0
Amount of Stoddard Solvent in Fuel Tank	liters	61.3

DATA SHEET NO. 1… (Continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

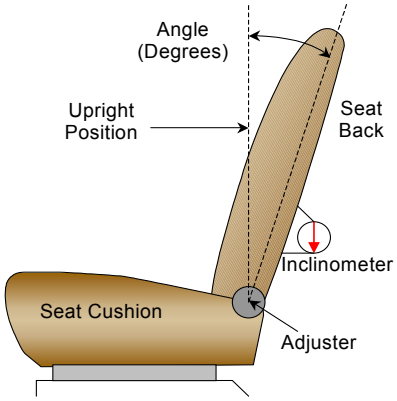
Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Target Impact Point Aft of Front Axle	mm	1397
Actual Impact Point Aft of Front Axle	mm	1383

NORMAL DESIGN RIDING POSITION

The driver's seat back is positioned to the manufacturer's designated angle. The procedure for the seat is as follows: Place a level across the head rest posts and place the inclinometer on top of the level. The inclinometer on the level should read 14.9 degrees from horizontal.



FRONT SEAT ASSEMBLY

Initial driver seat back angle: 14.6 degrees on head rest post
Final driver seat back angle: 12.7 degrees on head rest post

SEAT FORE/AFT POSITIONS

Manufacturer: Total travel - 261 millimeters; Test position – 130.5 millimeters
Seat position: The fore/aft was set 130 mm from full forward.

SEAT BELT UPPER ANCHORAGE

The test vehicle is equipped with adjustable "D" ring anchorage for the driver's seat position. The total number of detents is 4. The driver's "D" ring anchorage was placed at the 1st detent (with the upper-most detent defined as 0).

DATA SHEET NO. 1… (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007

FUEL TANK CAPACITY DATA

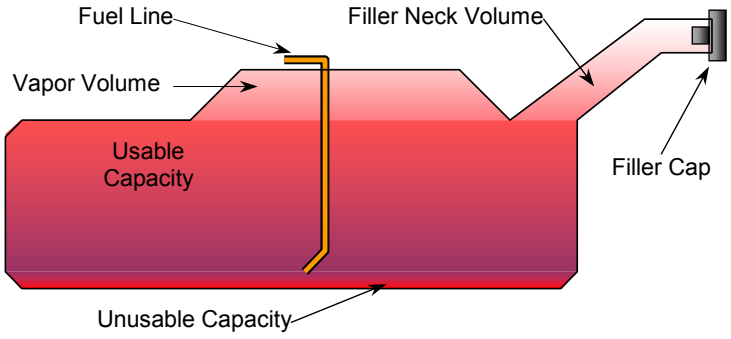
The "Usable Capacity" of the standard equipment fuel tank is: 65.9 liters

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

92-94% of "Usable Capacity" for certification to FMVSS 301 requirements: 60.6 – 61.9 liters

Actual amount of Stoddard solvent added to vehicle for certification test 61.3 liters

The vehicle is equipped with electric fuel pump. Pump will run when the engine is running. Also, it will run for 3 seconds when the ignition key is turned to the "on" position without starting the engine.

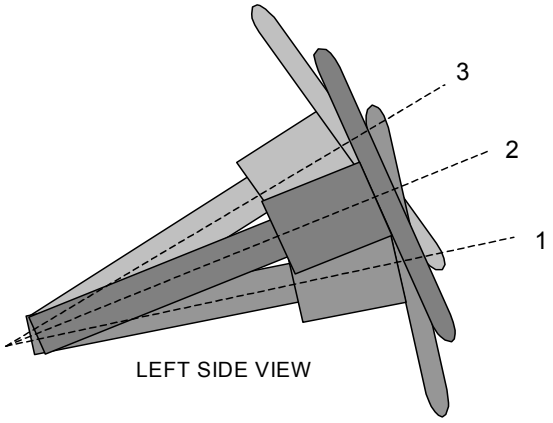


VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes, when it is moved through its full range of motion.

The steering column was placed in position 5 (with the upper-most detent defined as 0).



STEERING COLUMN ASSEMBLY

DATA SHEET NO. 2

TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	502.1	289.4		548.9	336.6	
Right	kg	512.1	299.4		543.4	326.1	
Weight Ratio	%	63.3	36.7		62.2	37.8	
Totals	kg	1014.2	588.8	1603.0	1092.3	662.7	1755.0

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measured Parameter	Units	Maximum Crush	Above Ground
Level 1	Sill Top Height	mm	327	309
Level 2	Occupant H-Point	mm	390	548
Level 3	Mid Door	mm	397	660
Level 4	Window Sill	mm	340	964
Level 5	Window Top	mm	152	1405
N/A	Maximum Penetration	mm	397	660

INSTRUMENTATION

SID/HIII Instrumentation	17
Vehicle Structure Accelerometers	20
Total	37

HIGH SPEED CAMERAS

Onboard Vehicle	3
Offboard Vehicle	8
Total	11

IMPACT POINT DATA

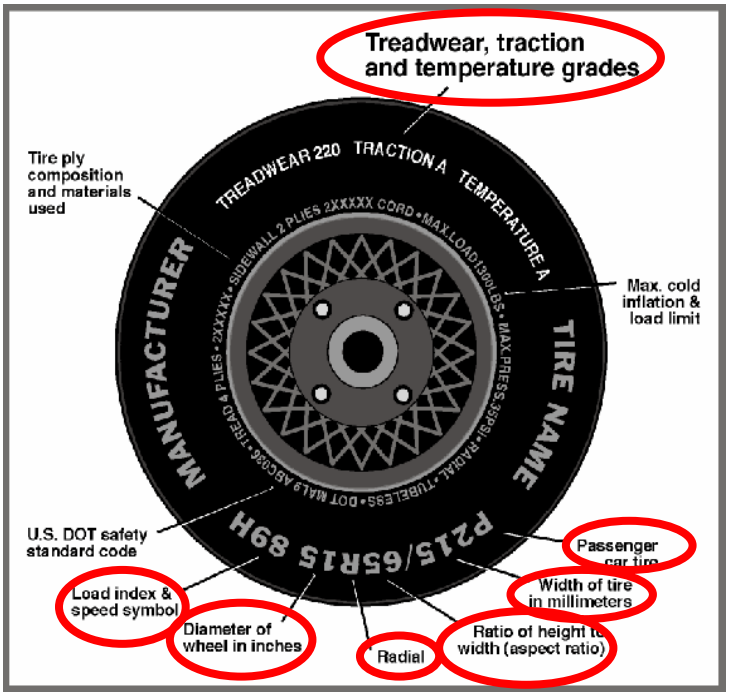
Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 38	14 forward

DATA SHEET NO. 3

TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007

Vehicle Year	2007	Vehicle Make	Buick
VIN	2G4WC582271246529	Vehicle Model	Lacrosse CX



	Front	Rear
Tire Manufacturer	Goodyear	Goodyear
Tire Name	Integrity	Integrity
Tire Type	P	P
Tire Width (mm)	225	225
Ratio of Height to Width (aspect ratio)	60	60
Radial	R	R
Wheel Diameter	16	16
Load Index & Speed Symbol	97S	97S
Treadwear	460	460
Traction Grade	A	A
Temperature Grade	B	B

DATA SHEET NO. 4

POST TEST OBSERVATIONS

Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Left Front Seating Position
Dummy Type / Serial No.	SID/HIII / 036
Head Contact	Curtain Airbag, Headliner
Upper Torso Contact	Door Trim Panel
Lower Torso Contact	Door Trim Panel
Left Knee Contact	Door Panel
Right Knee Contact	Left Knee

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Left Side Door Opening	Door remained closed and latched	Door remained closed and latched
Right Side Door Opening	Door remained closed and latched	Door remained closed and latched
Seat Movement	0	0
Seat Back Failure	None	None

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No failures
Sill Separation	None
Windshield Damage	Cracked
Window Damage	Left side windows down for test
Other Notable Effects	None

AIRBAG DEPLOYMENT

	Driver
Front	No
Side	Not Applicable
Curtain	Yes

ARMREST LOCATION AND SEAT CRUSH

	Driver
Front Armrest (from bottom of window)	264
Front Seat Back Crush	148
Front Seat Cushion Crush	243

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 5

SID/HIII INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007

THORAX AND PELVIS PEAK ACCELERATIONS (FIR 100 Filtered)

Location	Axis	Units	Driver			
			Max	Time	Min	Time
Upper Rib (LUR)	Y	G's	104.2	43	-8.5	166
Upper Rib (LUR) (R)	Y	G's	102.3	43	-6.3	86
Lower Rib (LLR)	Y	G's	97.0	43	-15.6	85
Lower Rib (LLR) (R)	Y	G's	No valid data collected			
Lower Spine (T_{12})	Y	G's	78.9	46	-21.7	80
Lower Spine (T_{12}) (R)	Y	G's	75.0	46	-19.4	80
Pelvis (PEV)	Y	G's	60.6	44	-18.6	82
Pelvis (PEV) (R)	Y	G's	60.3	44	-18.4	82

THORACIC TRAUMA INDEX (TTI) AND PELVIC ACCELERATION (FIR 100 Filtered)

Location	Driver			
	LUR	T_{12}	TTI(g)	PEV(g)
Rib, Spine, and Pelvis	104.2	78.9	91.6	60.6
Rib, Spine, and Pelvis (R)	102.3	75.0	88.7	60.3

UPPER NECK FORCES AND MOMENTS (SAE CLASS 1000/600 Filtered)

Location	Axis	Units	Driver			
			Max	Time	Min	Time
Neck Force	X	N	150	197	-228	60
Neck Force	Y	N	388	55	-404	185
Neck Force	Z	N	771	59	-468	70
Neck Moment	X	Nm	17.7	115	-71.3	53
Neck Moment	Y	Nm	17.1	104	-17.4	182
Neck Moment	Z	Nm	18.1	60	-15.5	101

HEAD CG PEAK ACCELERATIONS (SAE CLASS 1000 Filtered)

Location	Axis	Units	Driver			
			Max	Time	Min	Time
Head CG	X	G's	5.5	200	-6.4	64
Head CG	Y	G's	70.7	60	-10.2	184
Head CG	Z	G's	12.1	48	-3.6	51
Head CG Resultant		G's	71.3	60		

HEAD INJURY CRITERIA (SAE CLASS 1000 Filtered)

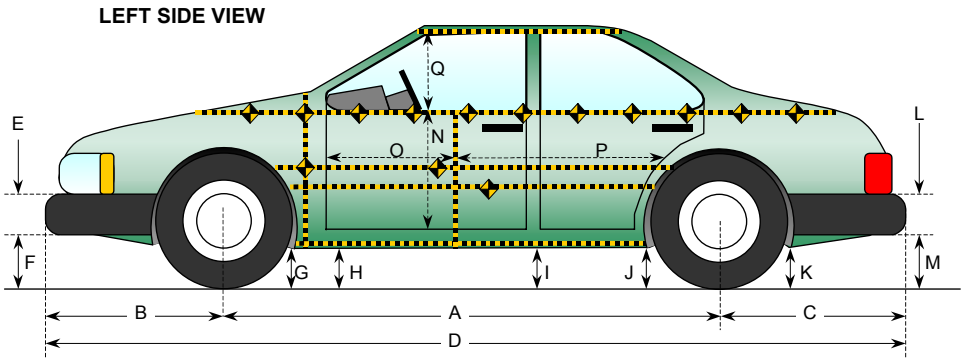
Location	Driver		
	HIC	T1	T2
Head CG Resultant	428	51.3	70.4

Positive Acceleration Polarities: Longitudinal (X) = + Forward
(Conforms to SAE J211) Lateral (Y) = + Right
Vertical (Z) = + Down

DATA SHEET NO. 6

VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007



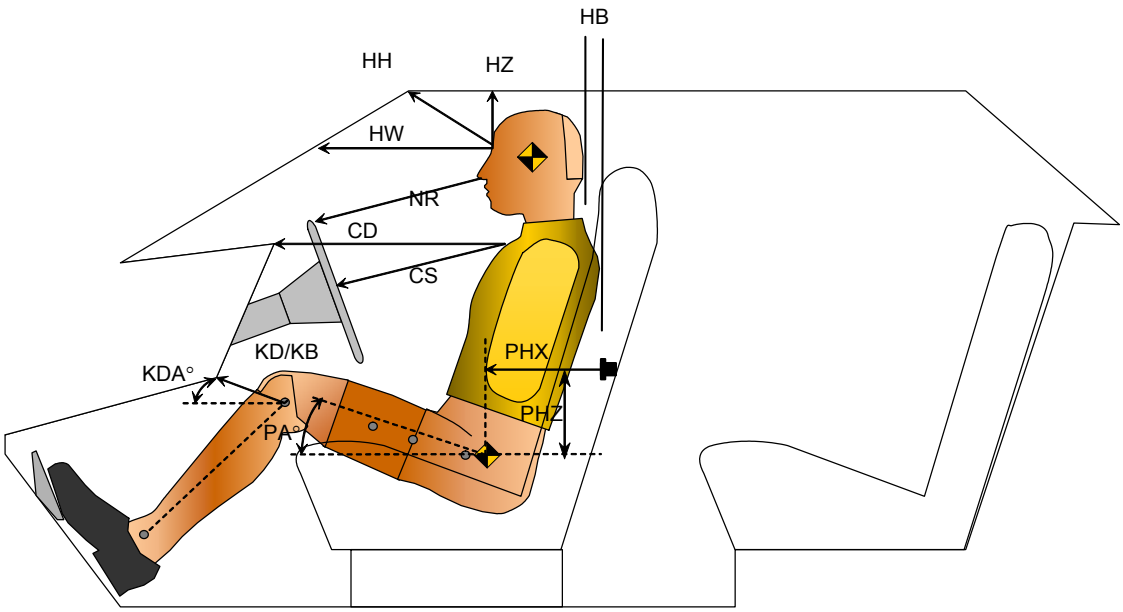
All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2806	2552	254
B	Front Axle to FSOV	1109	1103	6
C	Rear Axle to RSOV	1097	1114	-17
D	Total Length at Centerline	5012	4769	243
E	Front Bumper Thickness	105	105	0
F	Front Bumper Bottom to Ground	505	538	-33
G	Sill Height at Front Wheel Well	312	288	24
H	Sill Height at Front Door Leading Edge	320	290	30
I	Sill Height at "B" Pillar	321	299	22
J1	Sill Height at Rear Wheel Well	318	320	-2
J2	Pinch Weld Height at Rear Wheel Well	320	318	2
K	Sill Height Aft of Rear Wheel Well	395	395	0
L	Rear Bumper Thickness	240	240	0
M	Rear Bumper Bottom to Ground	490	463	27
N	Sill Height to Window Bottom Sill	725	706	19
O	Front Door Leading Edge to Impact CL	693	658	35
P	Rear Door Trailing Edge to Impact CL	1050	1097	-47
Q	Front Window Opening	435	418	17
R	Right Side Length	4207	4234	-27
S	Left Side Length	4207	4045	162
T	Vehicle Width at "B" Post	1814	1579	235

DATA SHEET NO. 7

SID/HIII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007

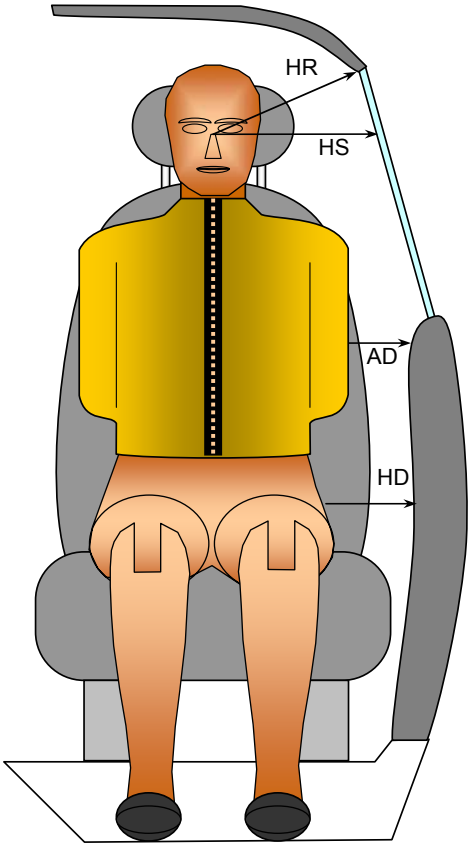


Driver Code	Measurement Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	307	
HW	Head to Windshield	581	
HZ	Head to Roof	143	
NR	Nose to Rim	366	
CD	Chest to Dash	498	
CS	Chest to Steering Wheel	301	
KDL	Left Knee to Dash	175	38.3
KDR	Right Knee to Dash	181	48.2
PA	Pelvic Angle		23.2
PHX	H-Point to Striker (X-Axis)	149	
PHZ	H-Point to Striker (Z-Axis)	126	
HB	Head to Seatback Clearance	51	

DATA SHEET NO. 8

SID/HIII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007



FRONT VIEW OF DUMMY

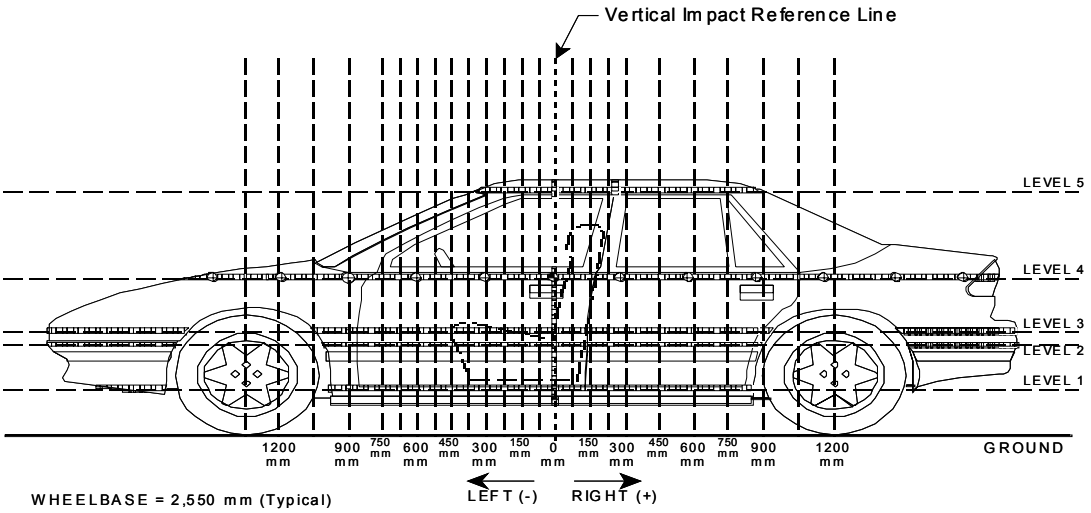
Code	Measurement Description	Units	Driver
HR	Head to Side Header	mm	178
HS	Head to Side Window	mm	311
AD	Arm to Door	mm	103
HD	H-Point to Door	mm	142

DATA SHEET NO. 9

VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007

PRETEST AND POST TEST EXTERIOR PROFILE MEASUREMENTS



LEFT SIDE VIEW

Measurements are taken with vehicle in the as tested condition.
Measurements along the vertical 0 mm.

Level	Measurement Description	Units	Height Above Ground
5	Window	mm	1405
4	Window Sill	mm	964
3	Mid Door	mm	660
2	Occupant H-Point	mm	548
1	Sill Top	mm	309

DATA SHEET NO. 10

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-750	230	195	191	260		262	214	206	268		32	19	15	8	
-600	230	197	194	258		296	249	248	272		66	52	54	14	
-525	231	197	194	257		334	311	330	319		103	114	136	62	
-450	232	197	194	257		354	352	366	350		122	155	172	93	
-375	232	196	194	257		376	392	406	392		144	196	212	135	
-300	233	196	194	257	523	397	434	447	430	591	164	238	253	173	68
-225	233	195	193	257	513	428	483	489	478	593	195	288	296	221	80
-150	234	195	193	257	509	513	534	533	529	609	279	339	340	272	100
-75	234	194	193	257	506	545	557	573	581	630	311	363	380	324	124
0	234	194	193	258	506	561	584	590	598	658	327	390	397	340	152
75	234	194	193	258	506	536	561	576	584	652	302	367	383	326	146
150	235	195	193	259	507	471	498	515	530	650	236	303	322	271	143
225	234	195	194	259	507	426	404	408	467	651	192	209	214	208	144
300	233	195	194	259	508	400	372	381	431	627	167	177	187	172	119
375	233	195	195	259	509	370	347	353	412	614	137	152	158	153	105
450	233	196	195	259	511	339	325	330	399	605	106	129	135	140	94
525	232	196	195	259	513	305	303	308	385	594	73	107	113	126	81
600	232	196	195	259	514	276	273	280	369	582	44	77	85	110	68
750	231	195	194	260	515	245	247	255	351	572	14	52	61	91	57
900	229	193	193	265	517	212	216	209	331	554	-17	23	16	66	37
1050	226	191	189	267	524	170	189	180	307	541	-56	-2	-9	40	17
1200			187	268	537			161	278	547			-26	10	10

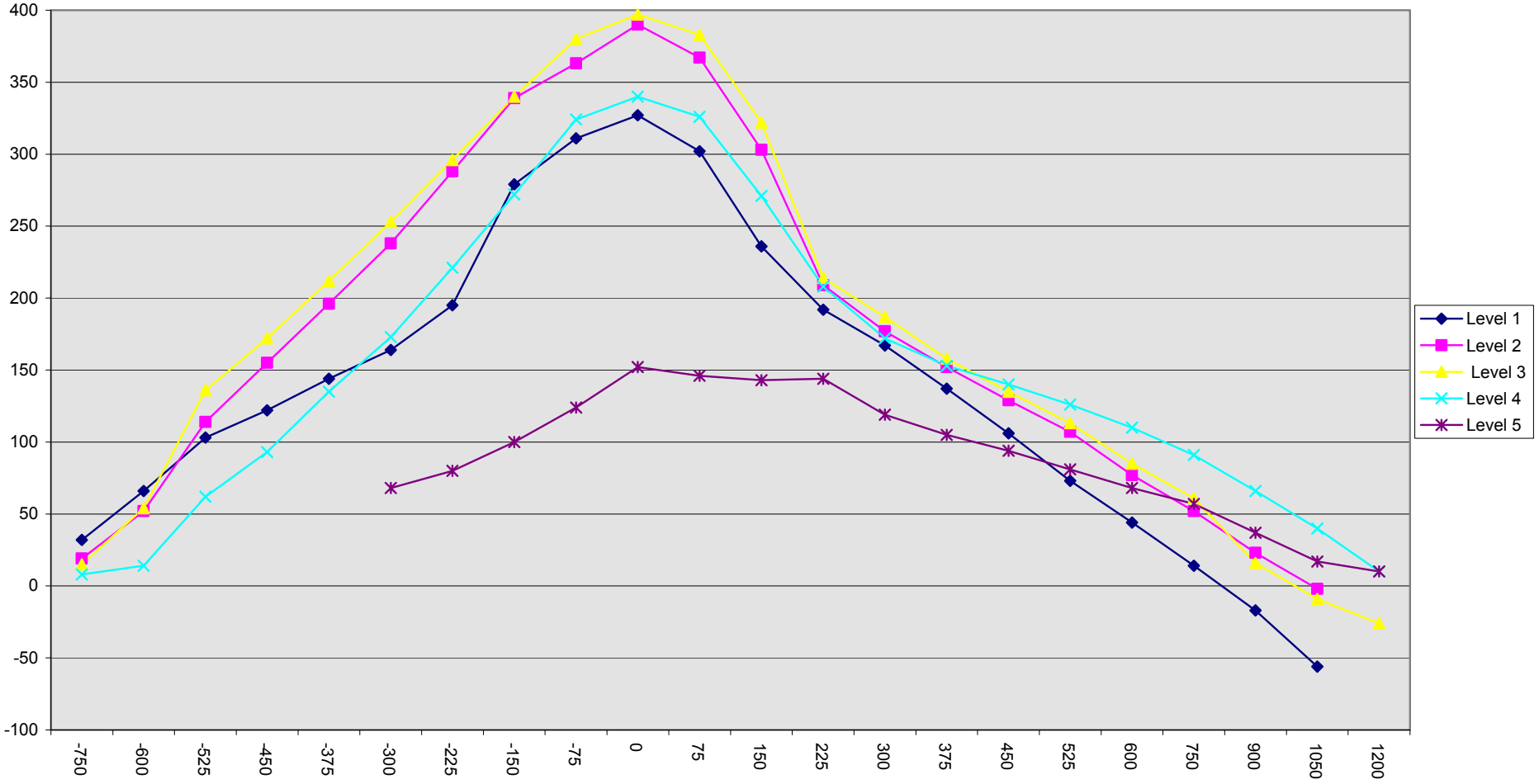
Reference plane is parallel to test vehicle longitudinal centerline Units = mm

Given dimensions = Reference plane to car body

DATA SHEET NO. 10... (continued)

VEHICLE EXTERIOR CRUSH PROFILES

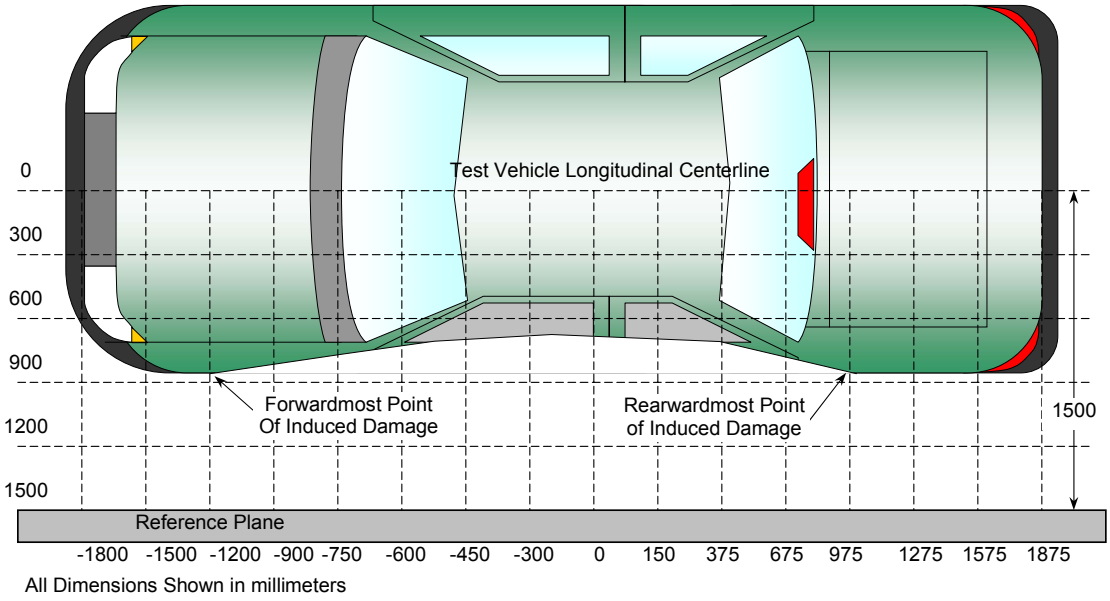
Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007



DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007



TOP VIEW

Damage Profile Distances

DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	1200 mm	4	268	278	10
2	800 mm	4	262	346	84
3	405 mm	4	259	406	147
4	15 mm	4	258	592	334
5	-360 mm	4	257	398	141
6	-750 mm	4	260	268	8

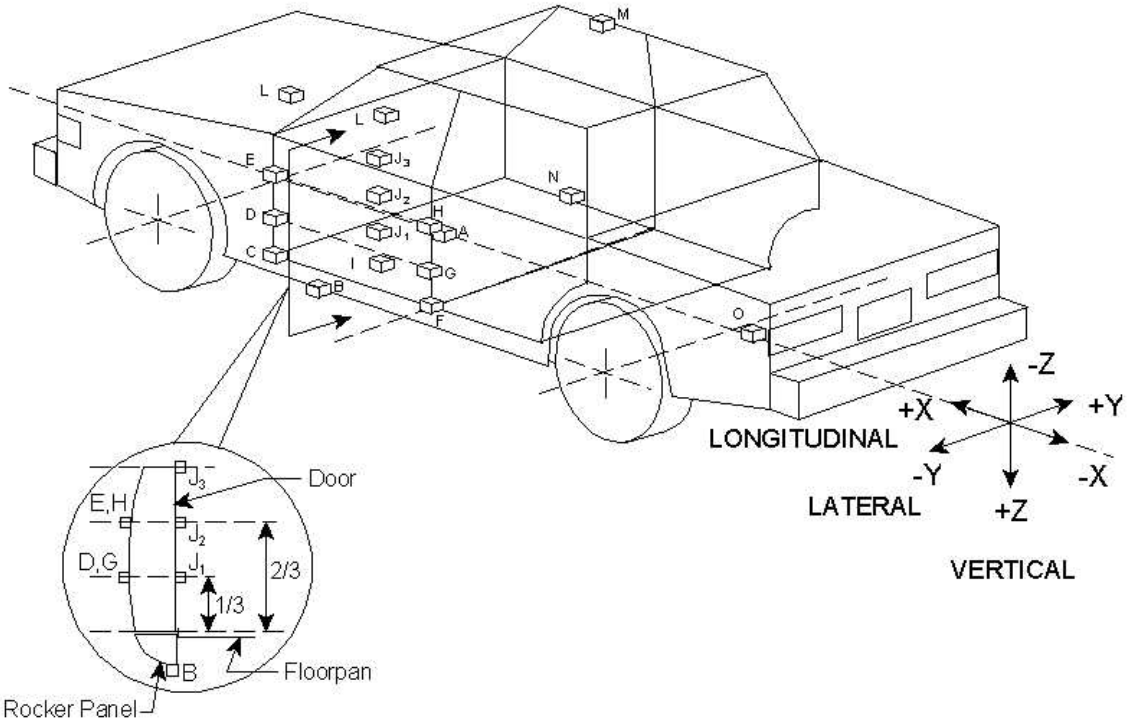
Reference plane is parallel to test vehicle longitudinal centerline

Given dimensions = Reference plane to car body

DATA SHEET NO. 12

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007



No.	Location
A	Vehicle CG
B	Left Floor Sill
C	A Pillar Sill
D	A Pillar Low
E	A Pillar Mid
F	B Pillar Sill
G	B Pillar Low
H	B Pillar Mid
I	Driver Seat

No.	Location
J1	Driver Door Lower / Knee
J2	Driver Door Mid / Pelvis
J3	Driver Door Upper / Rib
K	Engine
L	Firewall
M	Right Roof
N	Right Floor Sill
O	Rear Deck

DATA SHEET NO. 12... (continued)

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007

VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Peak Values (G's)				
		Axis	Max	Time	Min	Time
A	Vehicle CG	X	No Valid Data Collected			
		Y	17.1	44	-2.5	59
		Z	9.4	89	-7.1	52
		RES	17.3	44		
B	Left Floor	Y	40.2	19	-1.3	36
C	A Pillar Sill	Y	14.0	25	-2.7	5
D	A Pillar Low	Y	10.7	30	-1.5	3
E	A Pillar Mid	Y	12.3	52	-2.0	5
F	B Pillar Sill	Y	85.3	21	-6.5	14
G	B Pillar Low	Y	37.4	8	-2.3	44
H	B Pillar Mid	Y	34.5	15	-6.1	43
I	Driver Seat	Y	62.0	22	-20.6	37
J1	Driver Door Lower / Knee	Y	32.2	27	-12.0	33
J2	Driver Door Mid / Pelvis	Y	32.6	26	-18.6	20
J3	Driver Door Upper / Rib	Y	51.8	17	-9.2	71
K	Engine	X	4.3	122	-6.5	48
		Y	19.2	74	-3.7	265
L	Firewall	Y	8.6	53	-1.0	6
M	Right Roof	Y				
N	Right Floor Sill	Y	9.7	58	-0.6	200
O	Rear Deck	X	3.1	26	-1.2	9
		Y	10.5	48	-1.1	219

Positive Acceleration Polarities: Longitudinal (X) = + Forward
(Conforms to SAE J211) Lateral (Y) = + Right
Vertical (Z) = + Down

DATA SHEET NO. 12... (continued)

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007

VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

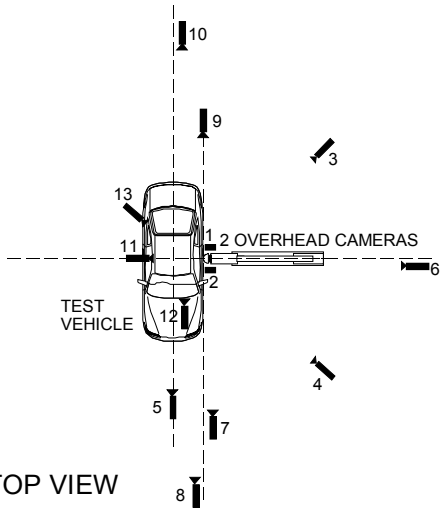
Loc. No.	Accelerometer Location	Measurements (mm)			
		Axis	Pre-Test	Post-Test	Difference
A	Vehicle CG	X	2738	2564	-174
		Y	0	-126	126
		Z	344	329	15
B	Left Floor Sill	X	3076	2916	-160
		Y	-725	-509	216
		Z	232	239	-7
C	A Pillar Sill	X	3449	3290	-159
		Y	-729	-623	106
		Z	230	215	15
D	A Pillar Low	X	3196	3224	28
		Y	-806	-697	109
		Z	527	548	-21
E	A Pillar Mid	X	3165	3196	31
		Y	-809	-706	-103
		Z	735	737	-2
F	B Pillar Sill	X	2311	2210	-101
		Y	-716	-541	175
		Z	309	327	-18
G	B Pillar Low	X	2304	2207	-97
		Y	-726	-449	-277
		Z	593	613	-20
H	B Pillar Mid	X	2268	2176	-92
		Y	-709	-466	-243
		Z	878	878	0
I	Driver Seat	X	2506	2374	-132
		Y	-595	-476	119
		Z	211	264	-53
J1	Driver Door Lower / Knee	X	2992	2819	-173
		Y	-758	-652	106
		Z	437	451	-14
J2	Driver Door Mid / Pelvis	X	3091	2924	-167
		Y	-755	-604	151
		Z	547	585	-38
J3	Driver Door Upper / Rib	X	2866	2762	-104
		Y	-761	-518	243
		Z	914	934	-20
K	Engine	X	4044	3952	-92
		Y	0	0	0
		Z	859	885	-26
L	Firewall	X	3805	3629	-176
		Y	58	58	0
		Z	873	880	-7
N	Right Floor Sill	X	2698	2628	-70
		Y	738	828	90
		Z	215	236	-21
O	Rear Deck	X	1047	1044	-3
		Y	0	0	0
		Z	522	522	0

Ref. Points: X-Rear of Vehicle (+ forward); Y-Vehicle Centerline (+ to right); Z-Ground Plane (+ down)

DATA SHEET NO. 13

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007



TOP VIEW

No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Overall	0	0	5050	16	1000
2	Overhead Close-Up	500	0	5050	50	1000
3	Left Side 45° Rearward Pole View	-2715	3980	1210	24	1000
4	Right Side 45° Forward Pole View	-2800	-3900	1180	24	1000
5	Real Time				13	24
6*	Left Side Rear Pole View					
7	Front Ground Level Vehicle/Pole Impact	-90	-1190	1500	35	1000
8	Front Ground Level Vehicle Roof Targets and Vehicle/Pole Impact	900	-1600	1250	24	1000
9	Rear Ground Level Vehicle/Pole Impact	-50	1230	1590	35	1000
10	Rear Ground Level	860	1710	1315	24	1000
11	Test Vehicle Onboard Driver Side View				8	1000
12	Test Vehicle Onboard Driver Front View				12.5	1000
13	Test Vehicle Onboard Driver ¾ Rear View				8	1000

Reference Points X - + Forward of Impact
Y - + Right of Impact
Z - + Ground Plane Down

* Camera 6 was not used for this test.

DATA SHEET NO. 14

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Test Vehicle:	2007 Buick Lacrosse CX	NHTSA No.	C70116
Test Program:	FMVSS 201P	Test Date:	August 22, 2007

Test Time: 9:57 AM Temperature at Time of Impact: 21°C

Stoddard Solvent Spillage Measurements

A. From impact until vehicle motion ceases: 0
(Maximum Allowable = 1 ounce)

B. For the 5 minute period after motion ceases: 0
(Maximum allowable = 5 ounces)

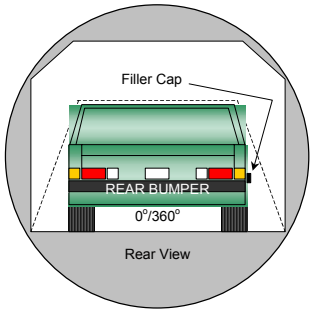
C. For the following 25 minutes: 0
(Maximum allowable = 1 oz./minute)

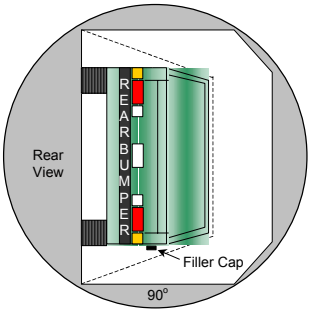
D. Spillage Details: None

DATA SHEET NO. 15

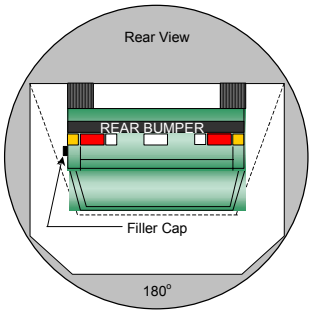
FMVSS 301 STATIC ROLLOVER DATA SHEET

Test Vehicle: 2007 Buick Lacrosse CX NHTSA No. C70116
Test Program: FMVSS 201P Test Date: August 22, 2007

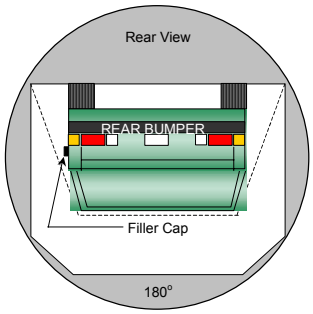




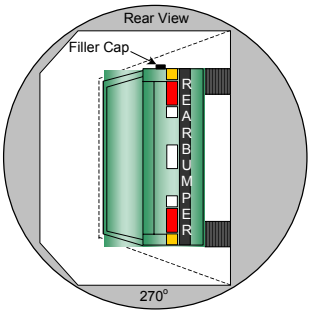
0° to 90°

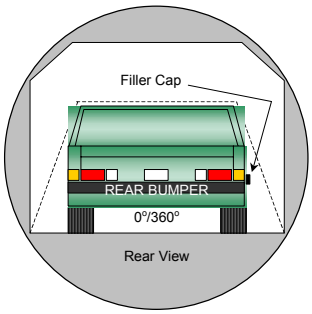


90° to 180°



180° to 270°





270° to 360°

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

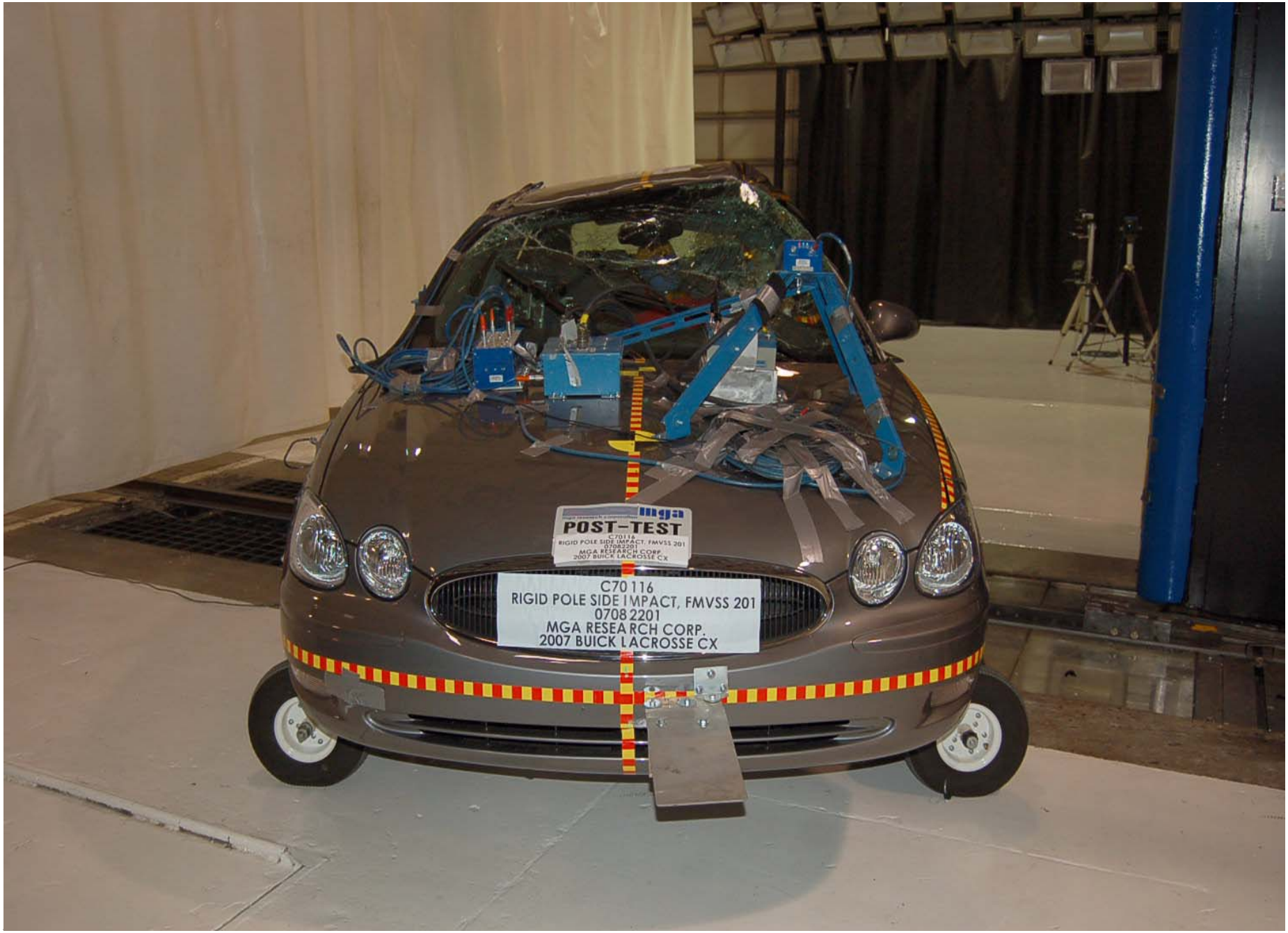
Rollover Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage (oz.)
0° to 90°	122	300	0
90° to 180°	113	300	0
180° to 270°	107	300	0
270° to 360°	117	300	0

APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Pre-Test Front View of Test Vehicle



Post-Test Front View of Test Vehicle

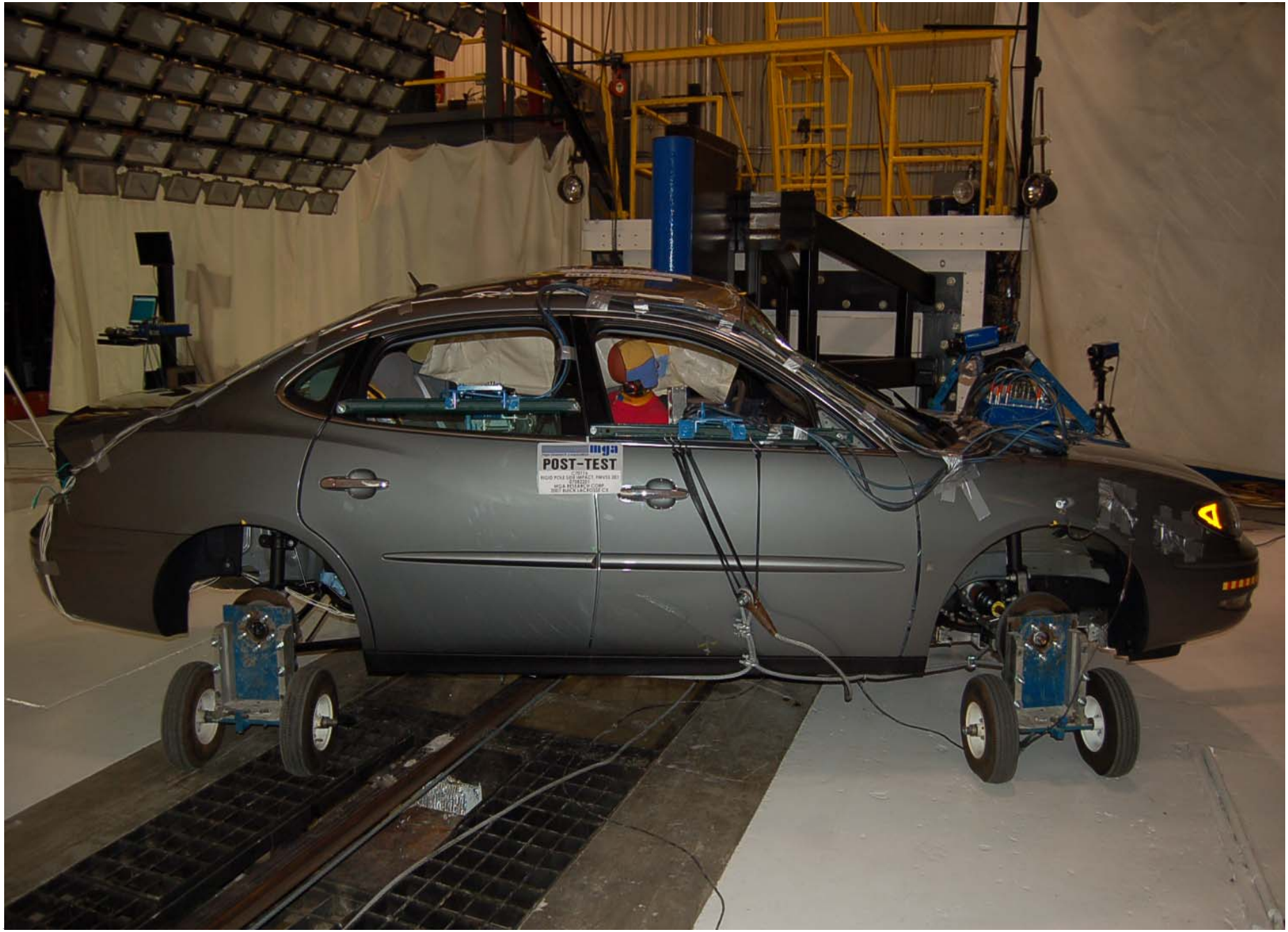
Pre-Test Rear View of Test Vehicle

Post-Test Rear View of Test Vehicle

Pre-Test Left Side View of Test Vehicle

Post-Test Left Side View of Test Vehicle

Pre-Test Right Side View of Test Vehicle



Post-Test Right Side View of Test Vehicle

Pre-Test Left Rear Three-Quarter View

Post-Test Left Rear Three-Quarter View

Pre-Test Left Front Three-Quarter View

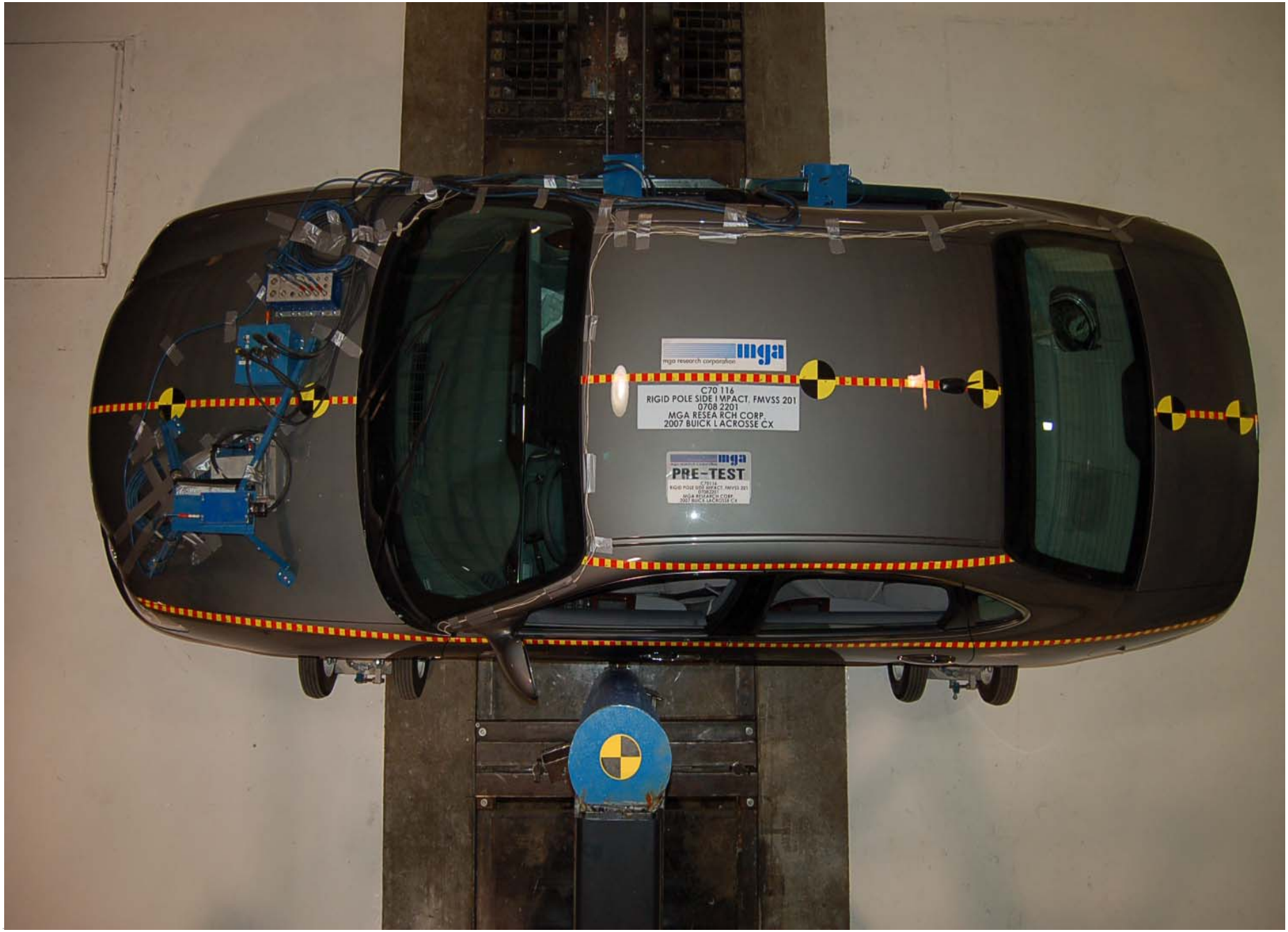
Post-Test Left Front Three-Quarter View

Pre-Test Right Rear Three-Quarter View

Post-Test Right Rear Three-Quarter View

Pre-Test Right Front Three-Quarter View

Post-Test Right Front Three-Quarter View



Pre-Test Overhead View of Test Vehicle

Post-Test Overhead View of Test Vehicle

Pre-Test Overhead View of Test Vehicle (Closeup)

Post-Test Overhead View of Test Vehicle (Closeup)

Pre-Test Driver Dummy Right Side View

Post-Test Driver Dummy Right Side View

Pre-Test Driver Dummy Left Side View

Post-Test Driver Dummy Left Side View

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

Pre-Test Driver Dummy Shoulder and Door Top View

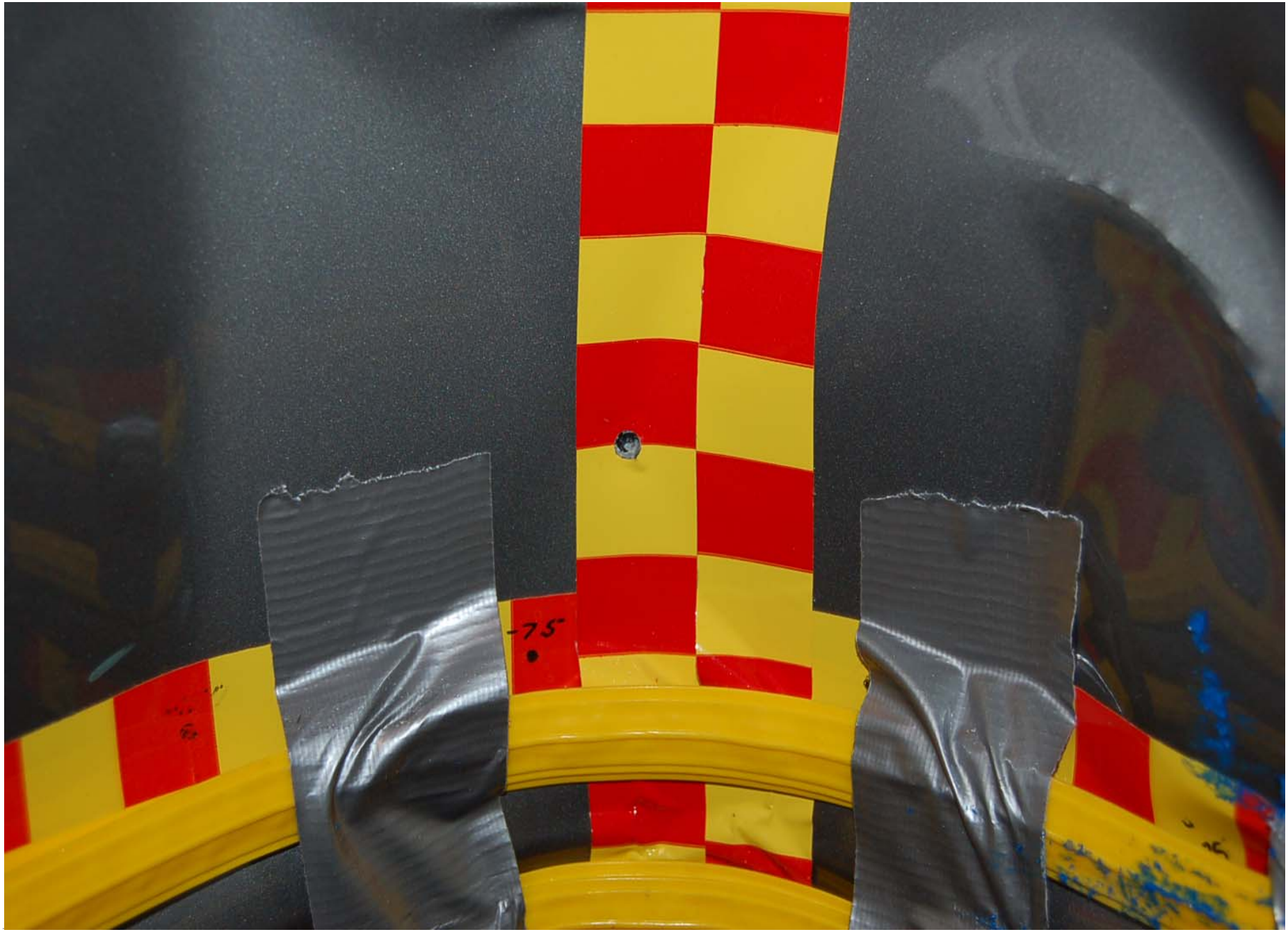
Post-Test Driver Dummy Shoulder and Door Top View

Post-Test Driver Dummy Head Contact (headliner, CAB)

Post-Test Driver Dummy Thorax Contact

Post-Test Driver Dummy Thorax Contact

Post-Test Driver Dummy Contact

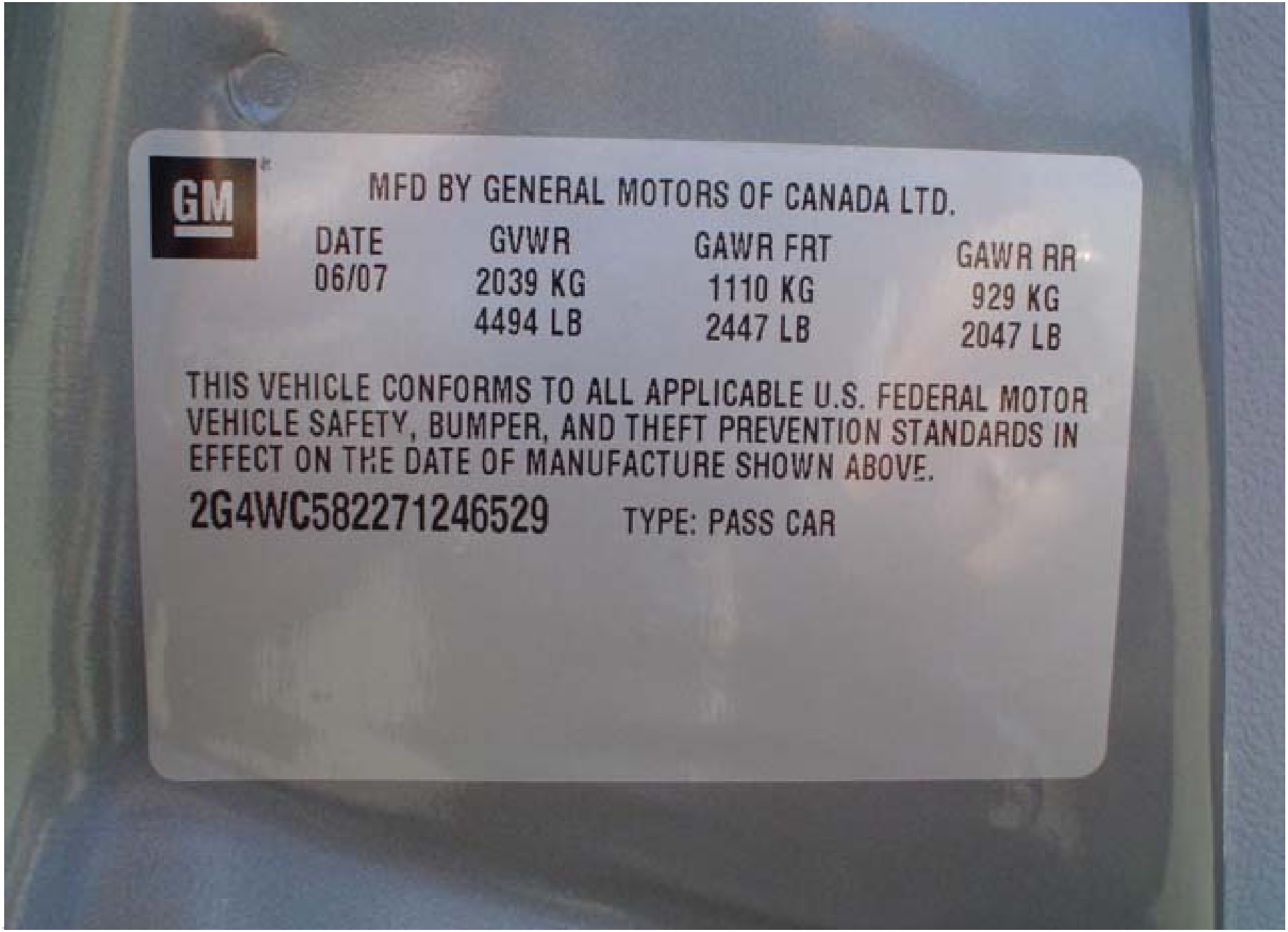


Post-Test Impact Point on Vehicle

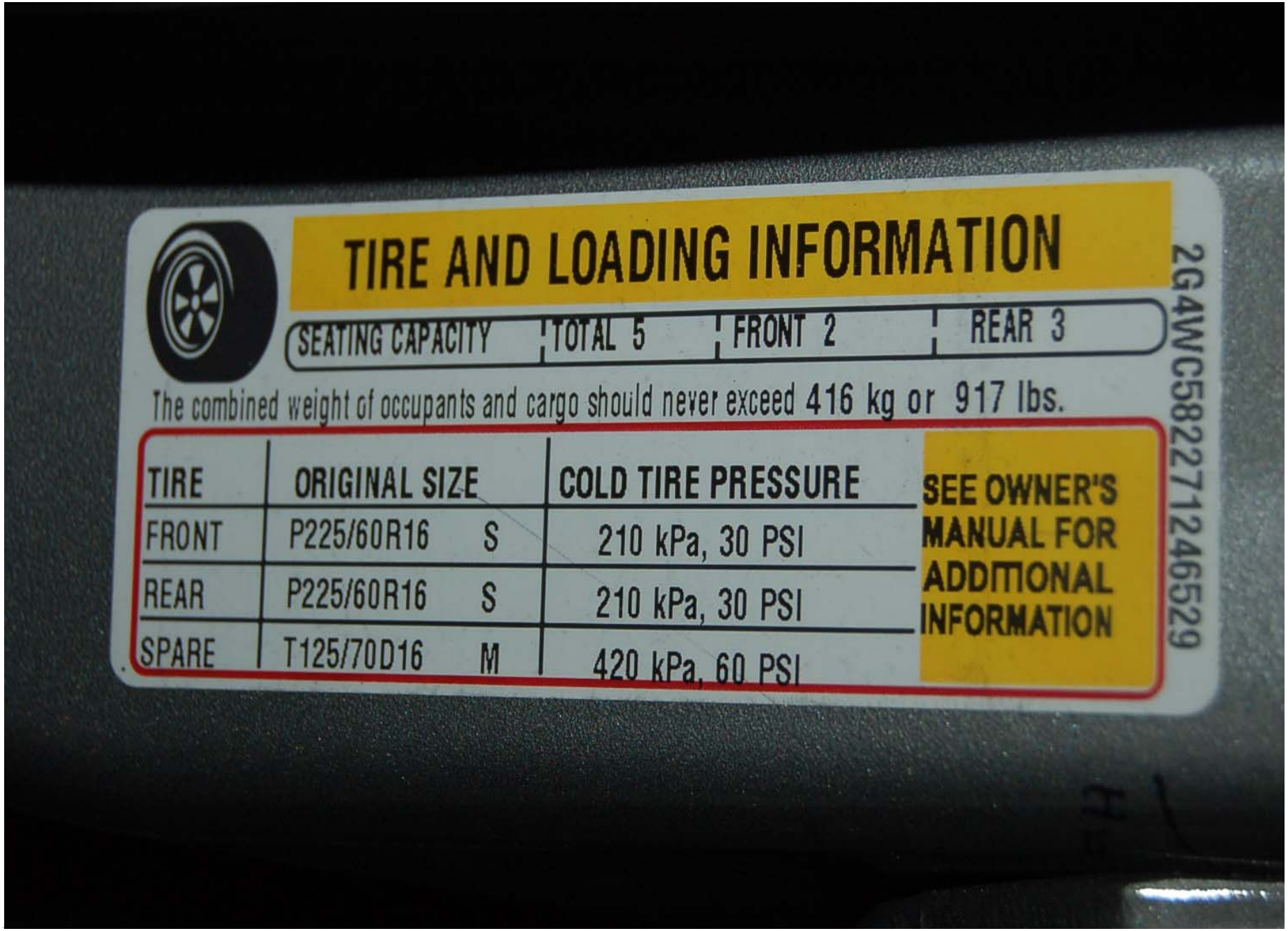
Pre-Test Impact Zone Close-up View

Post-Test Impact Zone Close-up View

Vehicle Impact



Vehicle Certification Label



Tire Placard

Pre-Test Fuel Filler Cap

Post-Test Fuel Filler Cap

Pre-Test Left Front Wheel Dolly

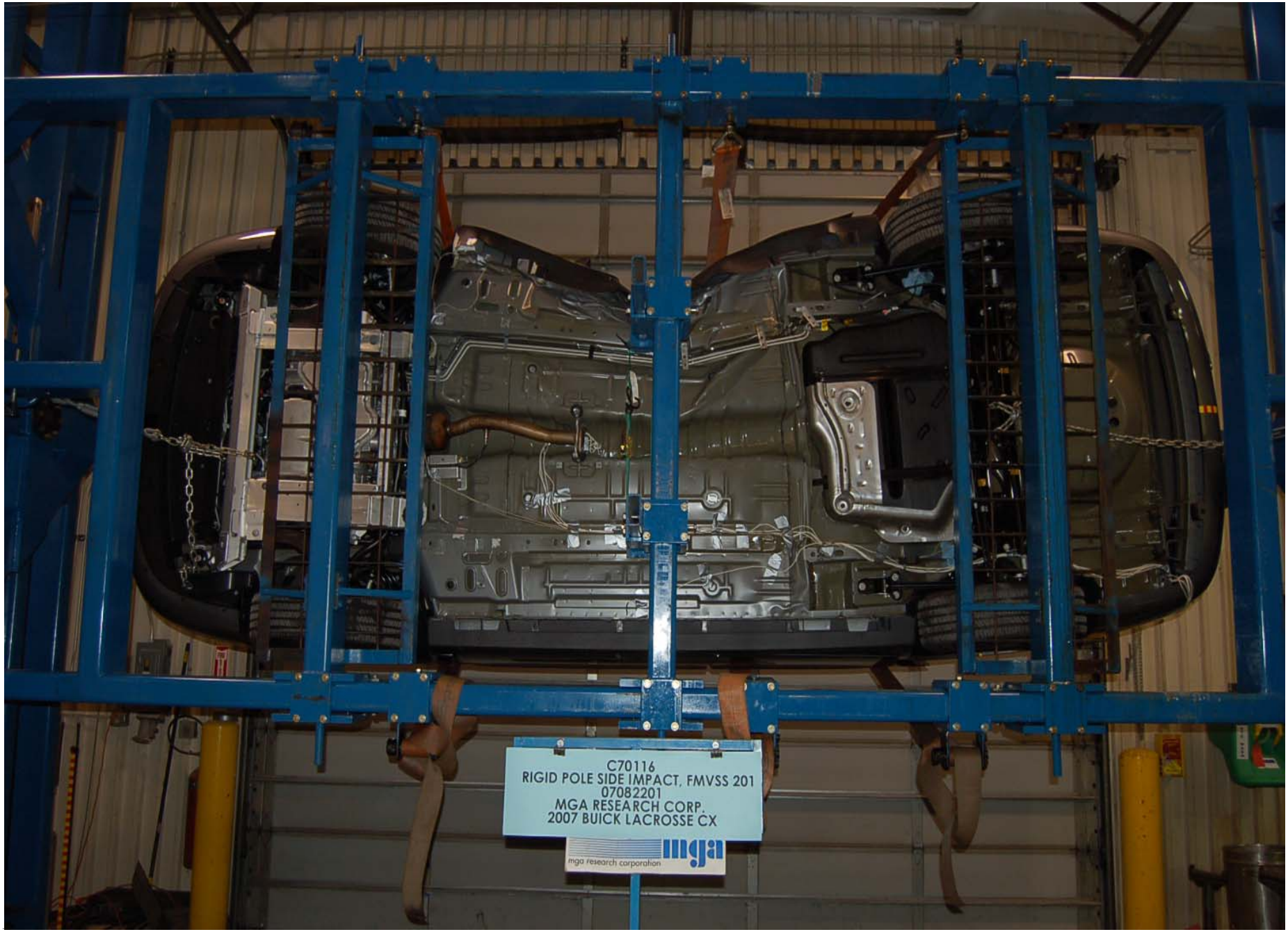
Pre-Test Right Front Wheel Dolly

Pre-Test Left Rear Wheel Dolly

Pre-Test Right Rear Wheel Dolly

Rollover 90 Degrees

Rollover 180 Degrees



Rollover 270 Degrees

Rollover 360 Degrees

APPENDIX B

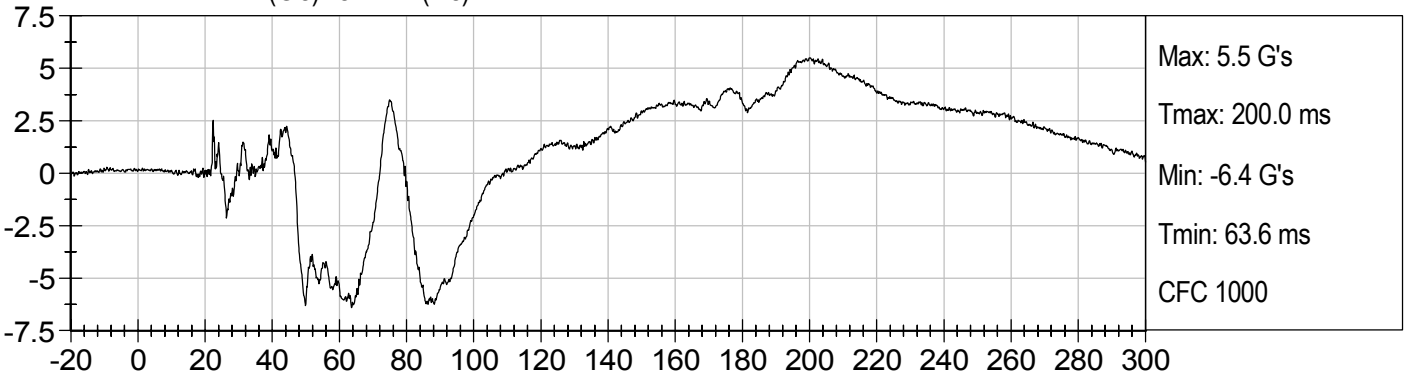
SID/HIII AND VEHICLE RESPONSE DATA

TABLE OF DATA PLOTS

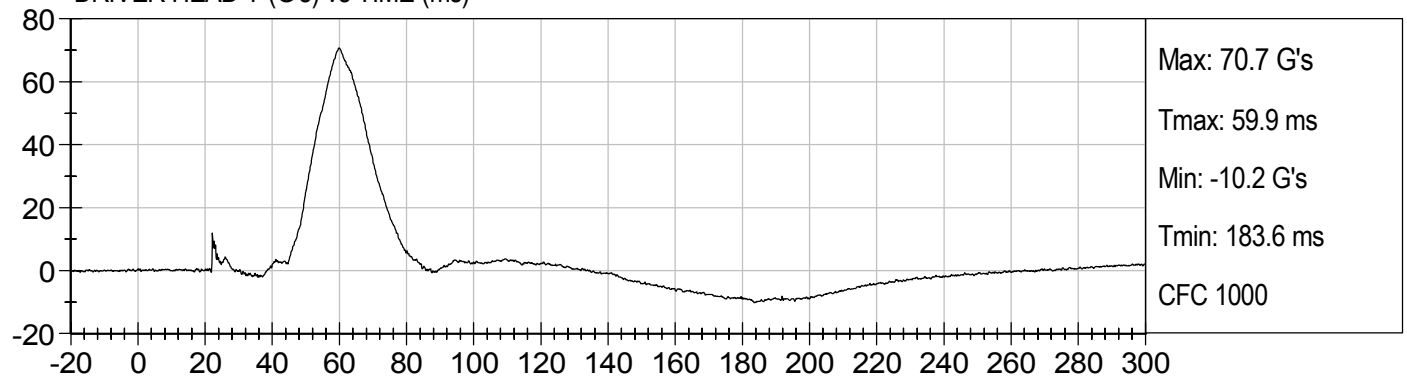
RIGID POLE SIDE IMPACT
2007 BUICK LACROSSE C70116

Test Date: 08/22/2007
Speed: 17.6 mph (28.3 km/h)

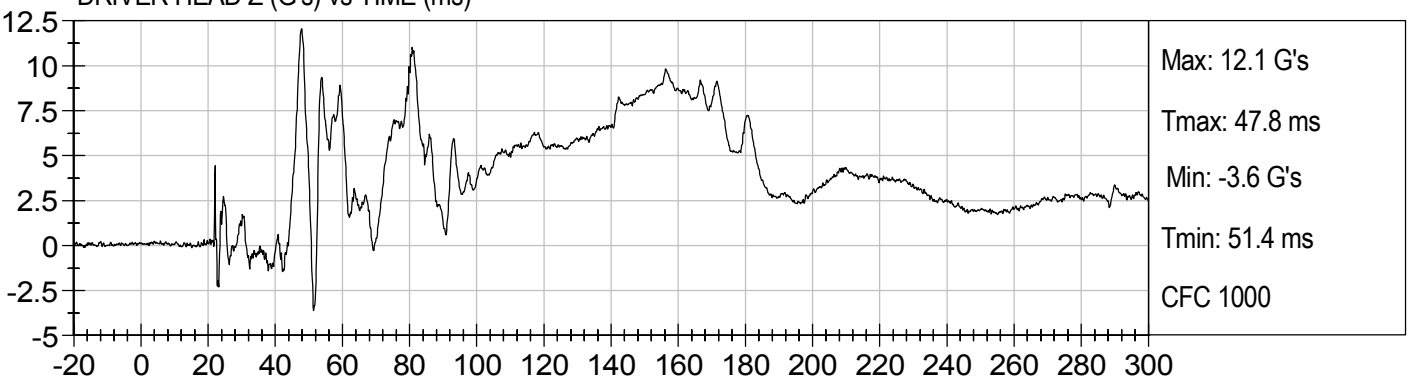
DRIVER HEAD X (G's) vs TIME (ms)



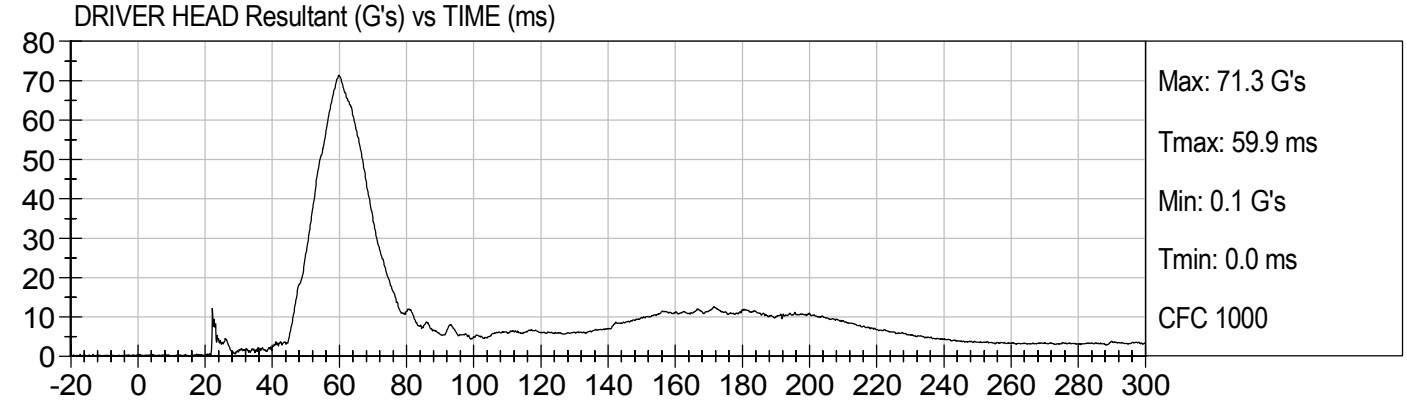
DRIVER HEAD Y (G's) vs TIME (ms)



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



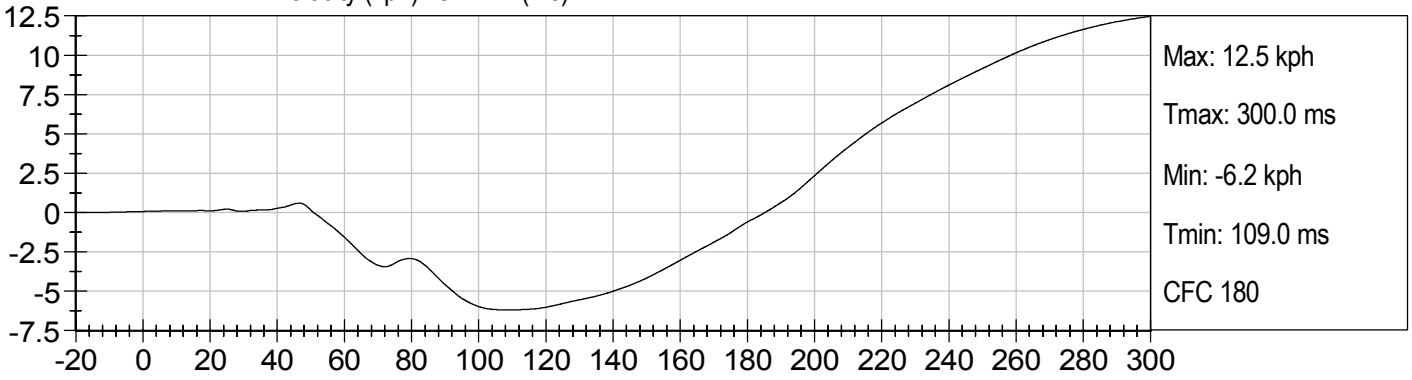
DRIVER HEAD Resultant (G's) vs TIME (ms)



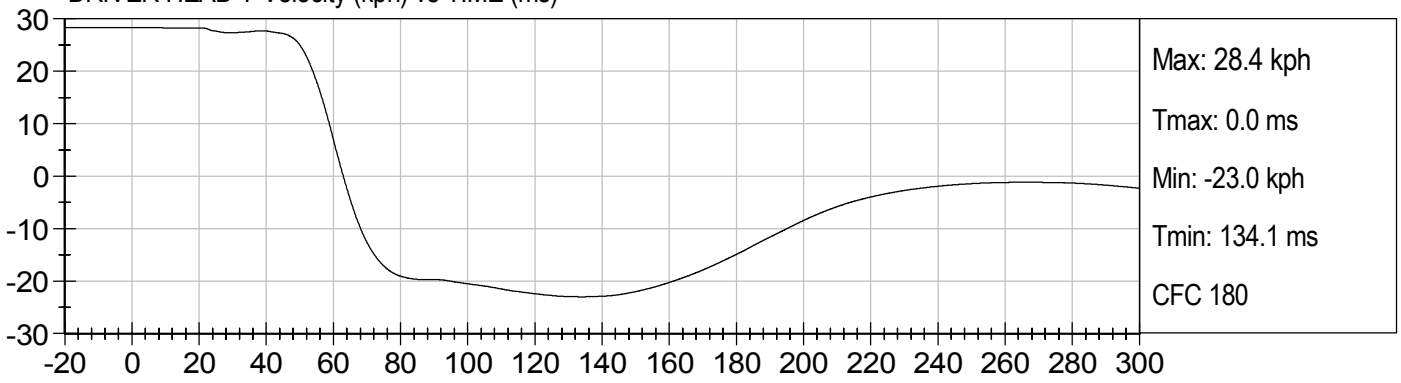
RIGID POLE SIDE IMPACT
2007 BUICK LACROSSE C70116

Test Date: 08/22/2007
Speed: 17.6 mph (28.3 km/h)

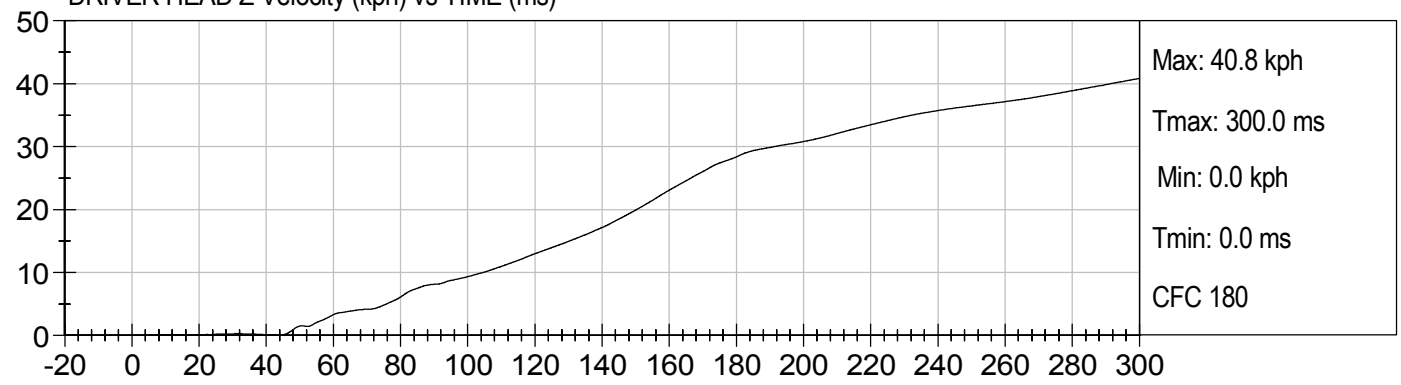
DRIVER HEAD X Velocity (kph) vs TIME (ms)



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

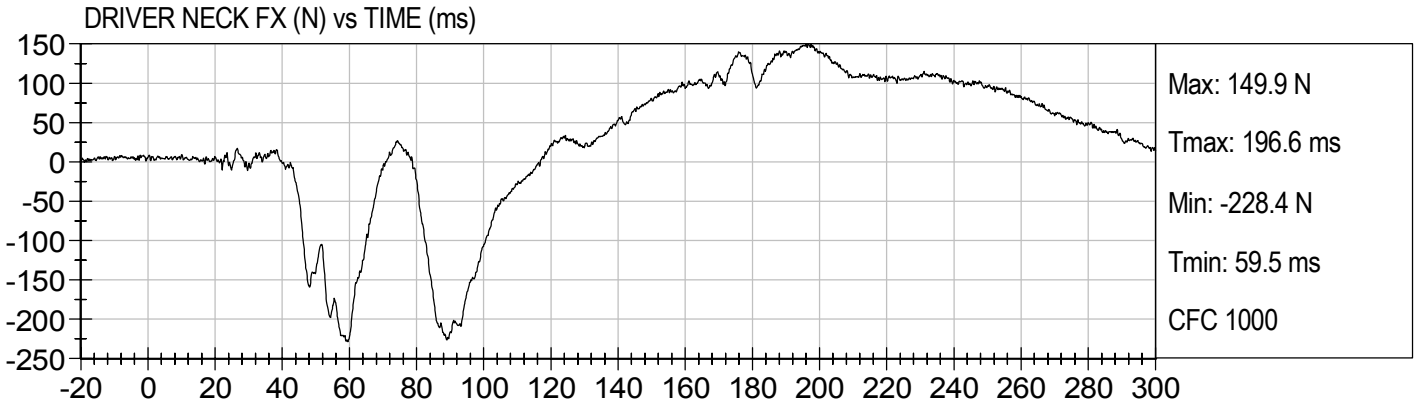


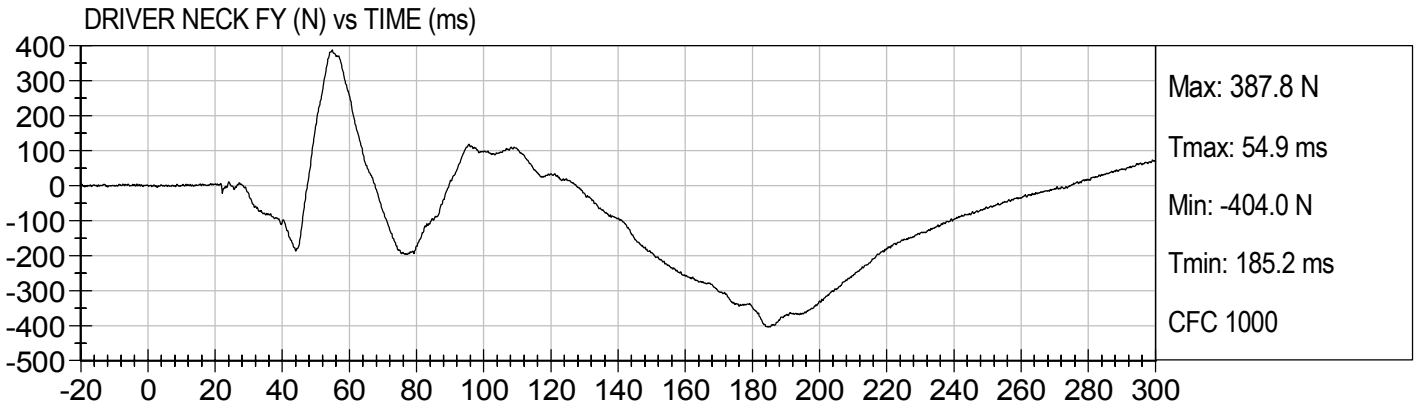
DRIVER HEAD Z Velocity (kph) vs TIME (ms)

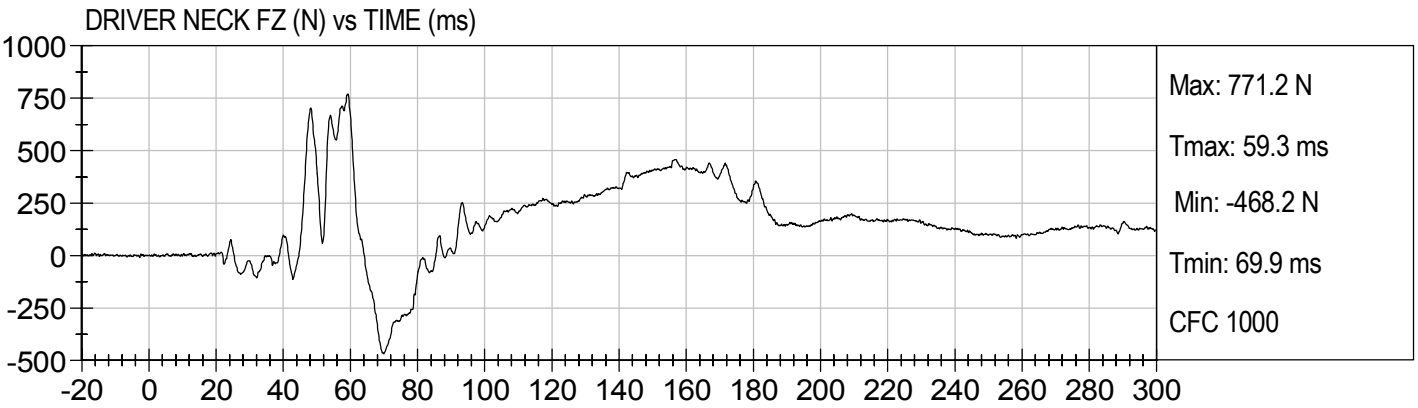


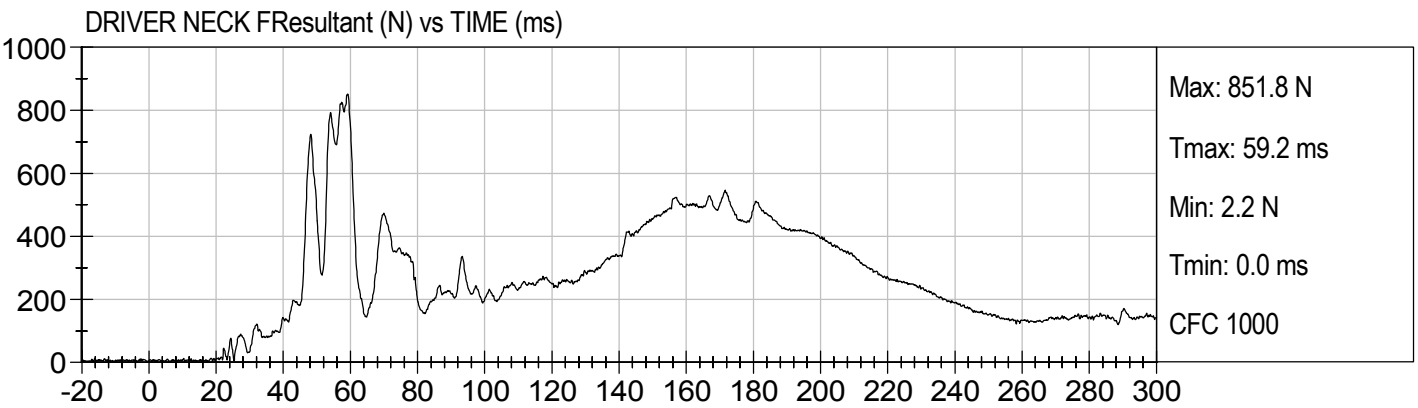
RIGID POLE SIDE IMPACT
2007 BUICK LACROSSE C70116

Test Date: 08/22/2007
Speed: 17.6 mph (28.3 km/h)





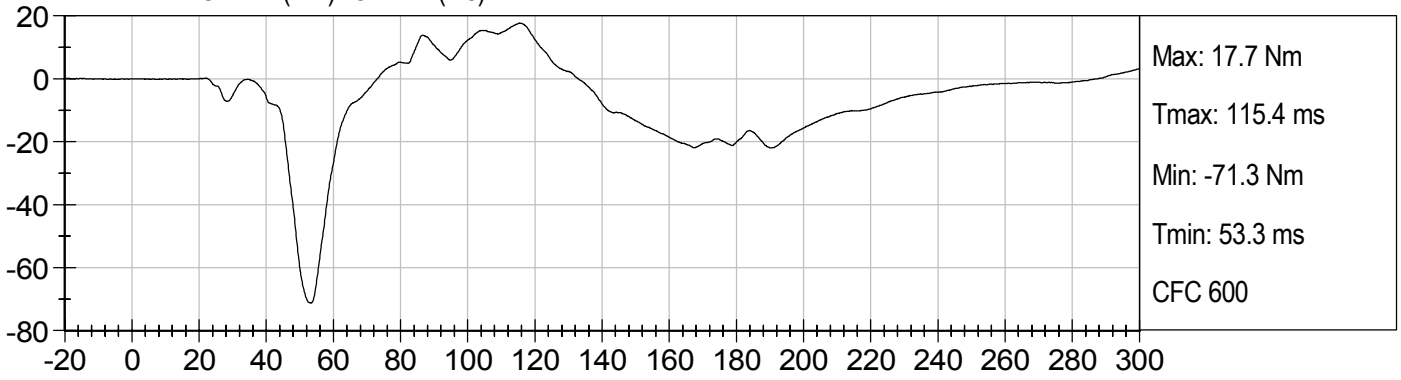




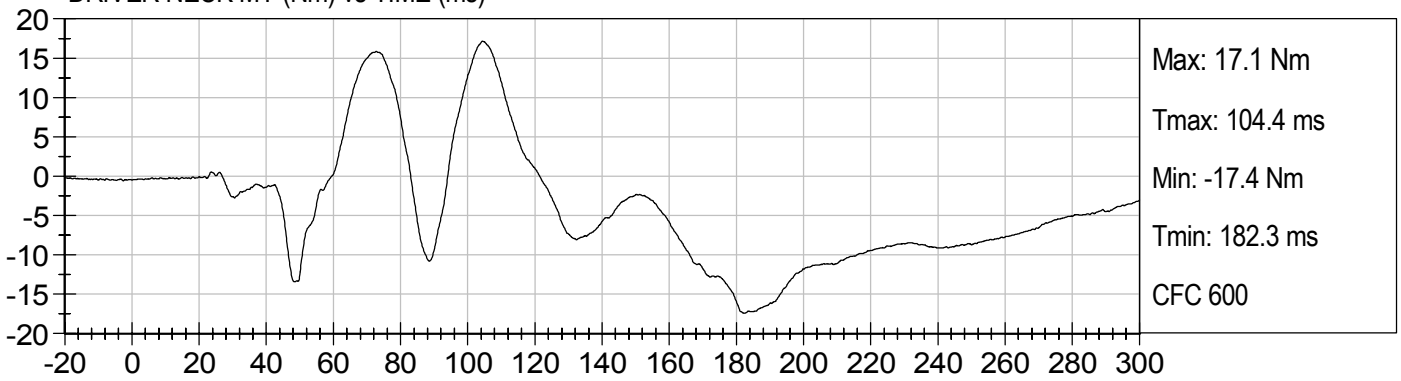
RIGID POLE SIDE IMPACT
2007 BUICK LACROSSE C70116

Test Date: 08/22/2007
Speed: 17.6 mph (28.3 km/h)

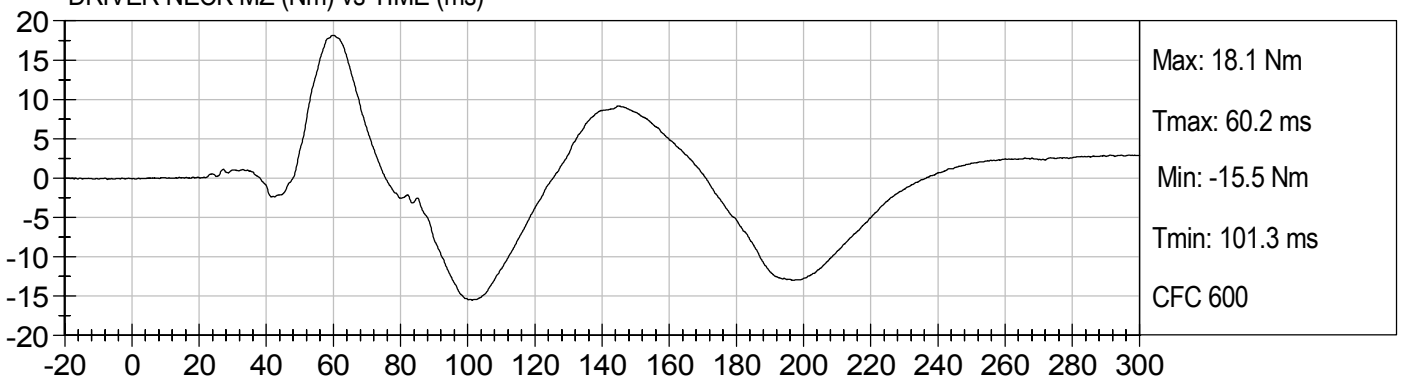
DRIVER NECK MX (Nm) vs TIME (ms)



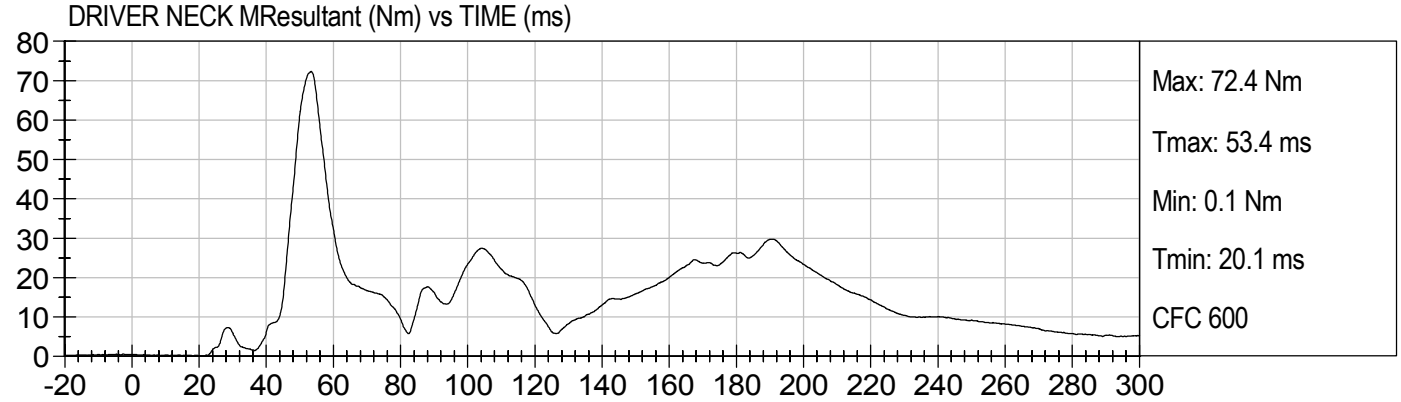
DRIVER NECK MY (Nm) vs TIME (ms)



DRIVER NECK MZ (Nm) vs TIME (ms)



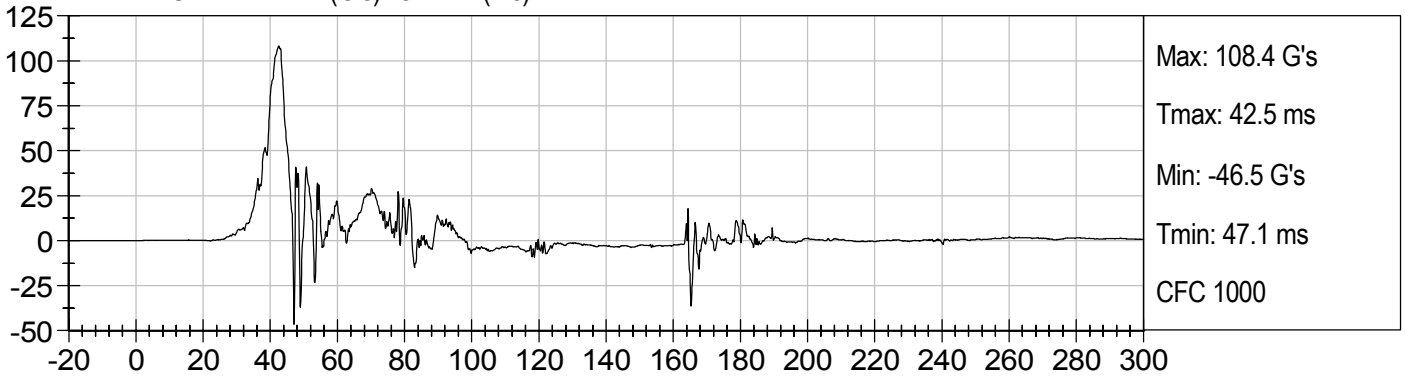
DRIVER NECK MResultant (Nm) vs TIME (ms)



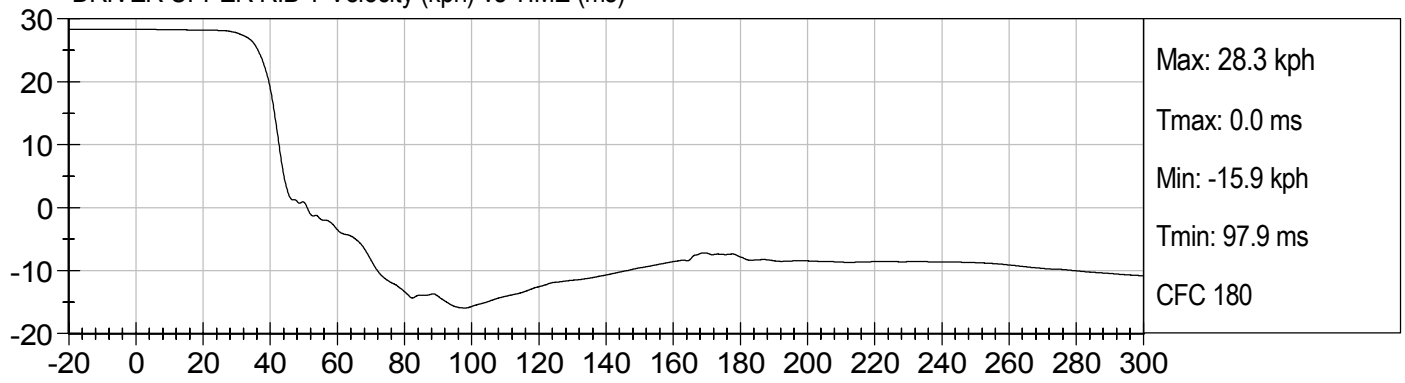
RIGID POLE SIDE IMPACT
2007 BUICK LACROSSE C70116

Test Date: 08/22/2007
Speed: 17.6 mph (28.3 km/h)

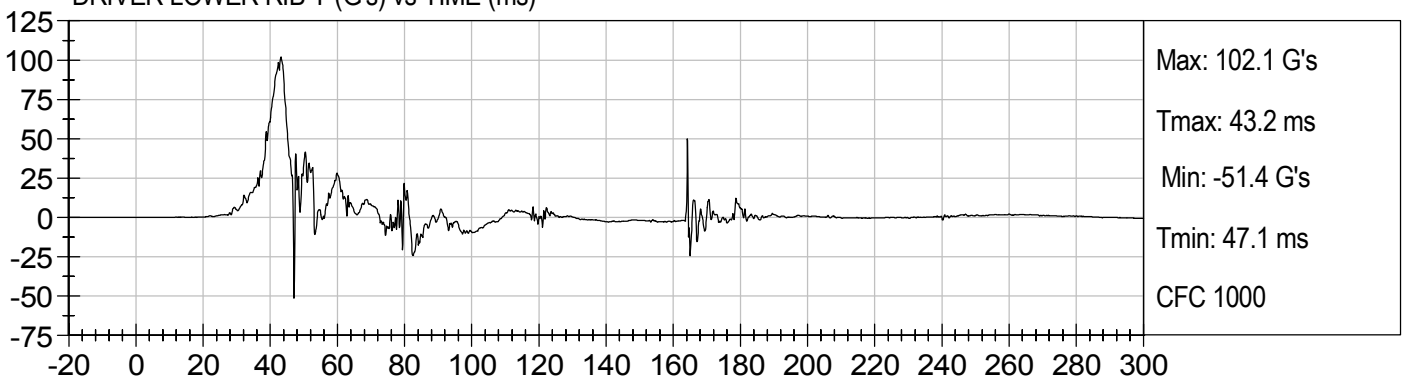
DRIVER UPPER RIB Y (G's) vs TIME (ms)



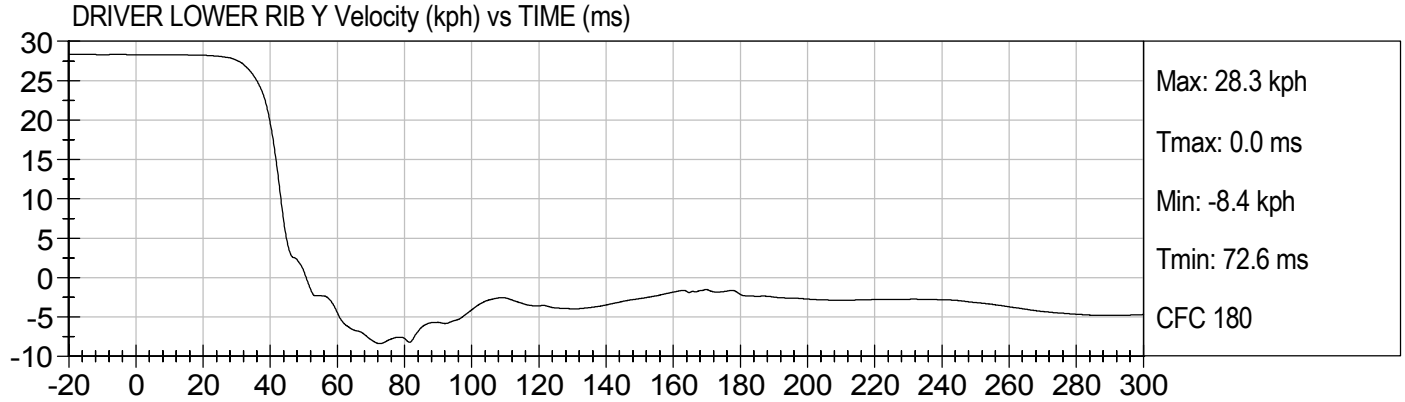
DRIVER UPPER RIB Y Velocity (kph) vs TIME (ms)



DRIVER LOWER RIB Y (G's) vs TIME (ms)



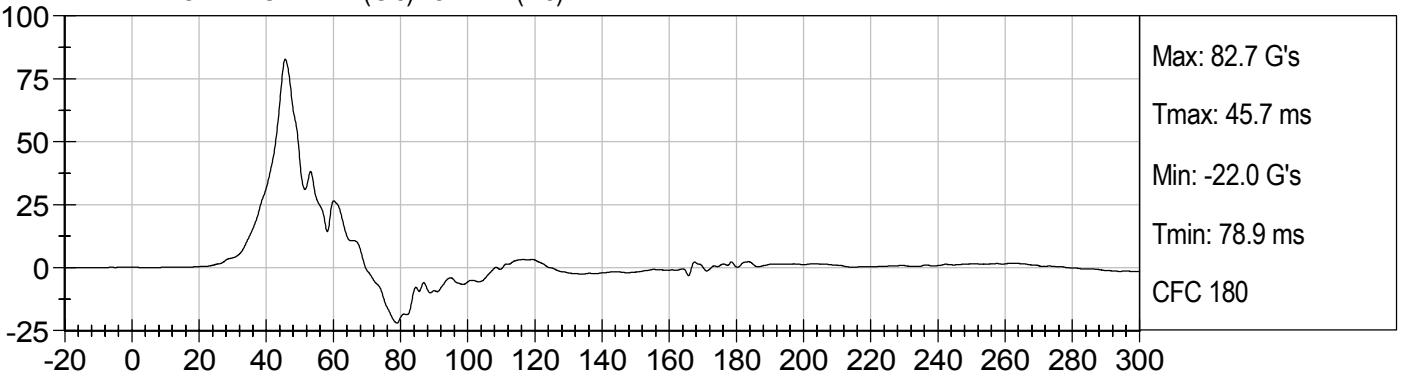
DRIVER LOWER RIB Y Velocity (kph) vs TIME (ms)



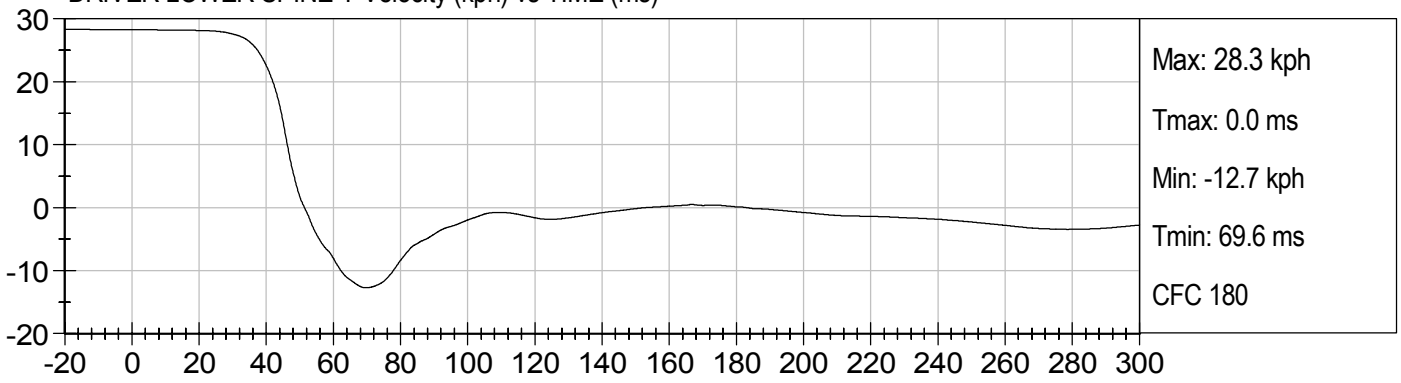
RIGID POLE SIDE IMPACT
2007 BUICK LACROSSE C70116

Test Date: 08/22/2007
Speed: 17.6 mph (28.3 km/h)

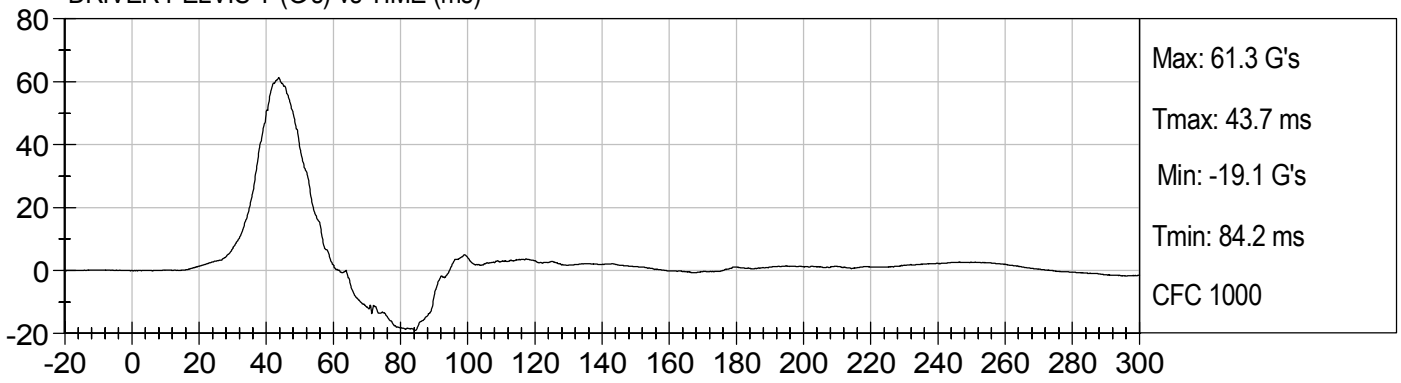
DRIVER LOWER SPINE Y (G's) vs TIME (ms)



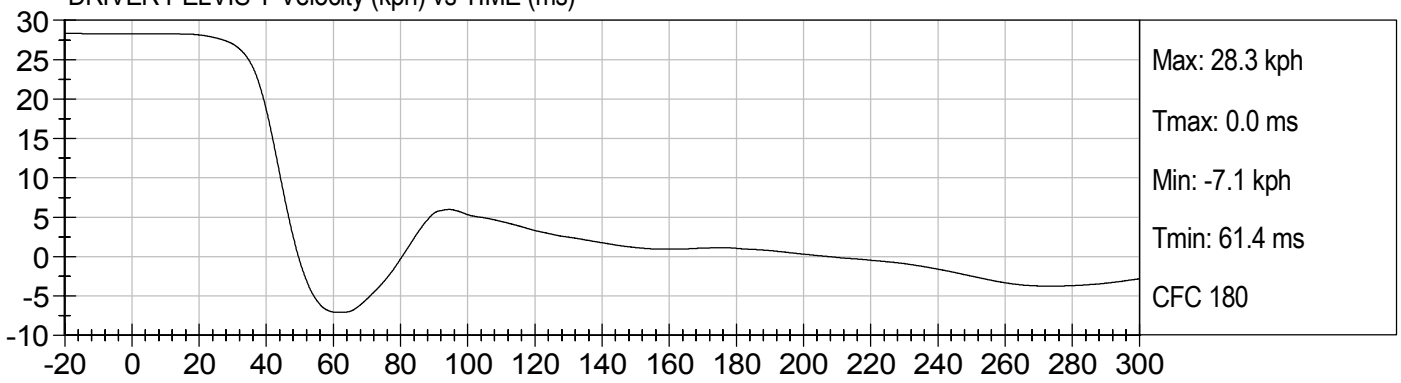
DRIVER LOWER SPINE Y Velocity (kph) vs TIME (ms)



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



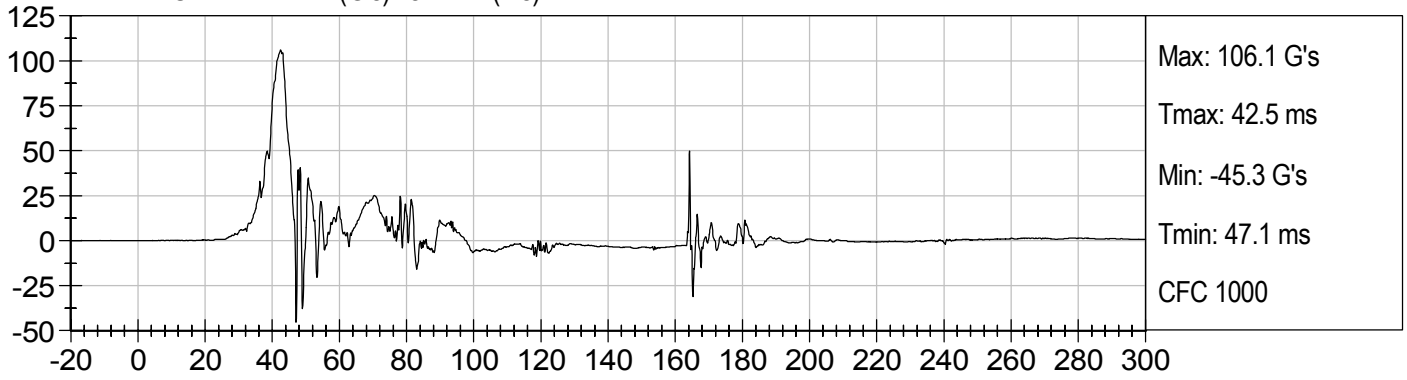
DRIVER PELVIS Y Velocity (kph) vs TIME (ms)



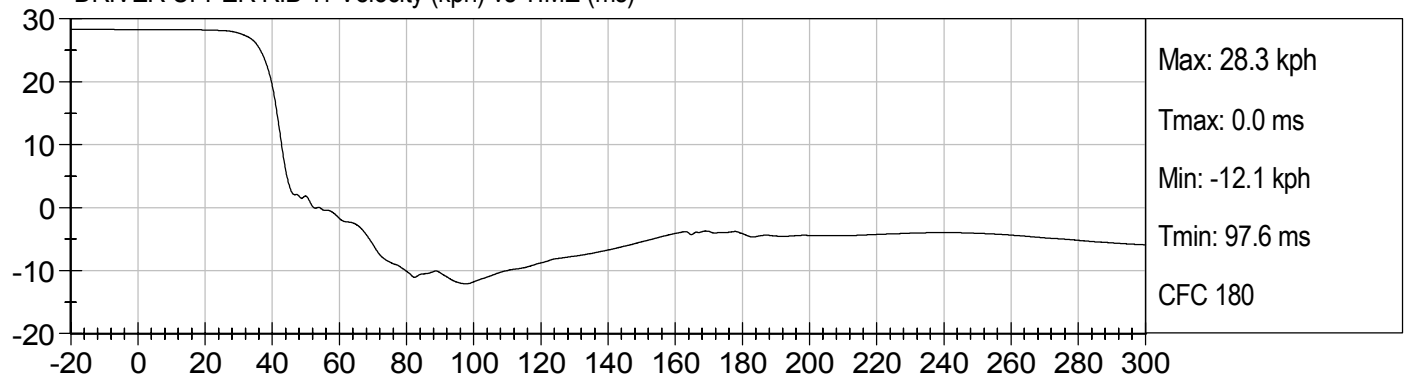
RIGID POLE SIDE IMPACT
2007 BUICK LACROSSE C70116

Test Date: 08/22/2007
Speed: 17.6 mph (28.3 km/h)

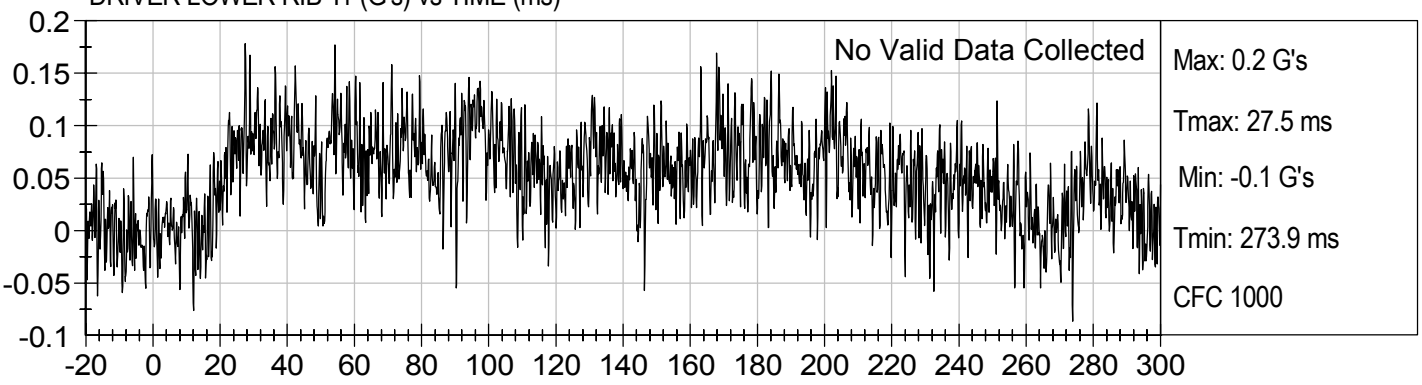
DRIVER UPPER RIB Yr (G's) vs TIME (ms)



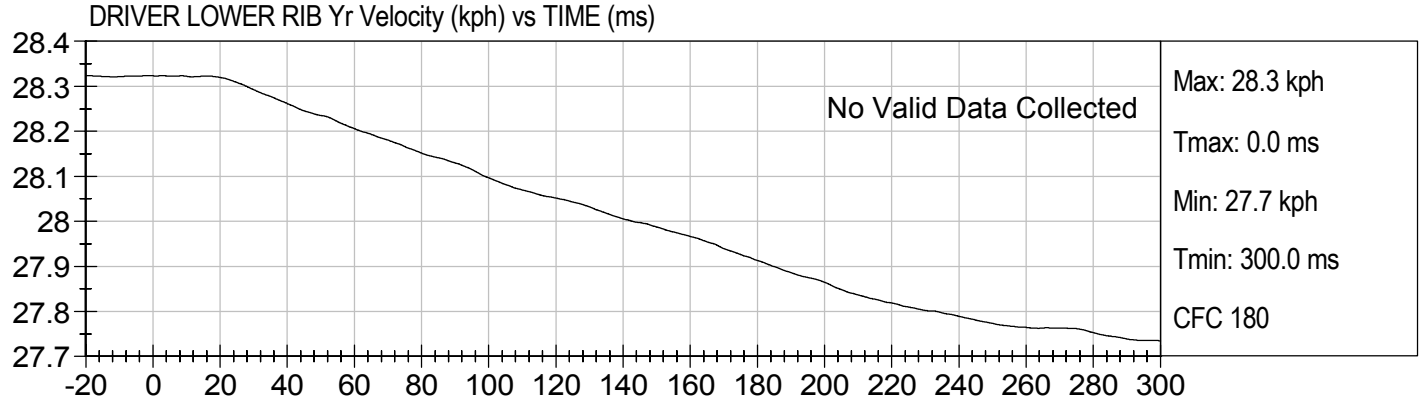
DRIVER UPPER RIB Yr Velocity (kph) vs TIME (ms)



DRIVER LOWER RIB Yr (G's) vs TIME (ms)



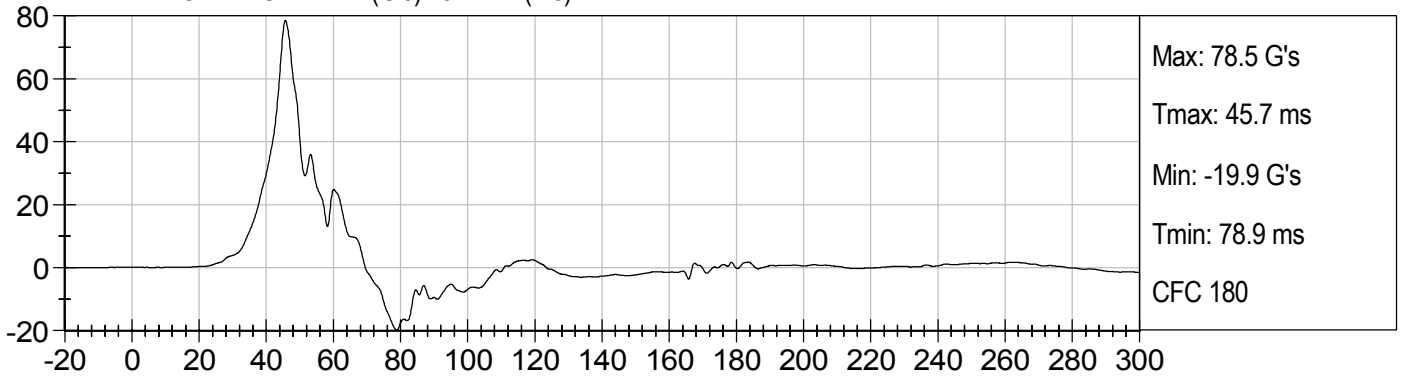
DRIVER LOWER RIB Yr Velocity (kph) vs TIME (ms)



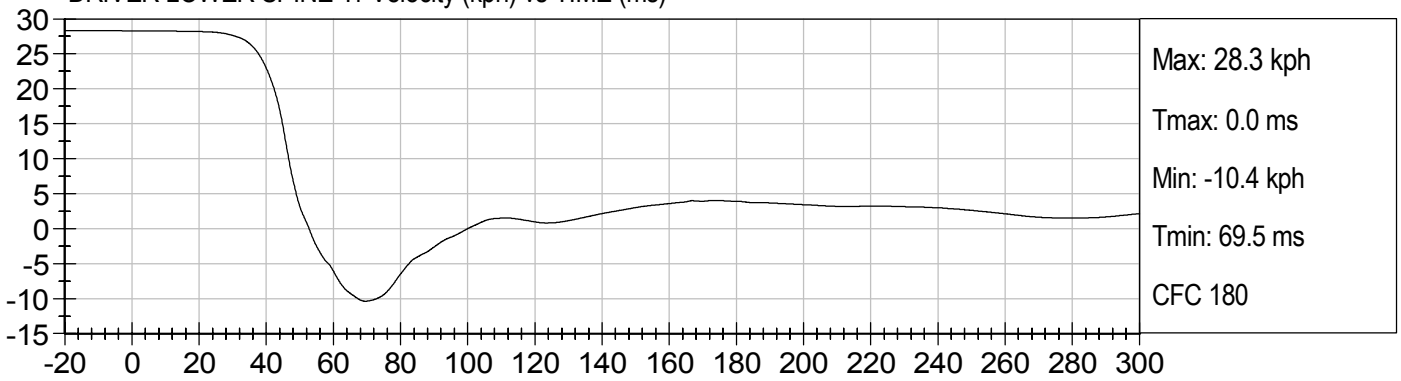
RIGID POLE SIDE IMPACT
2007 BUICK LACROSSE C70116

Test Date: 08/22/2007
Speed: 17.6 mph (28.3 km/h)

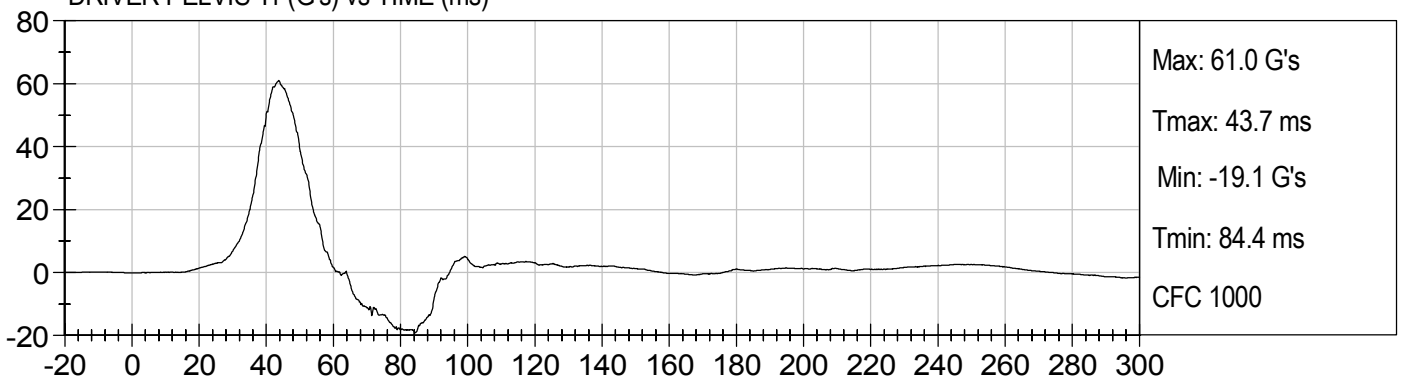
DRIVER LOWER SPINE Yr (G's) vs TIME (ms)



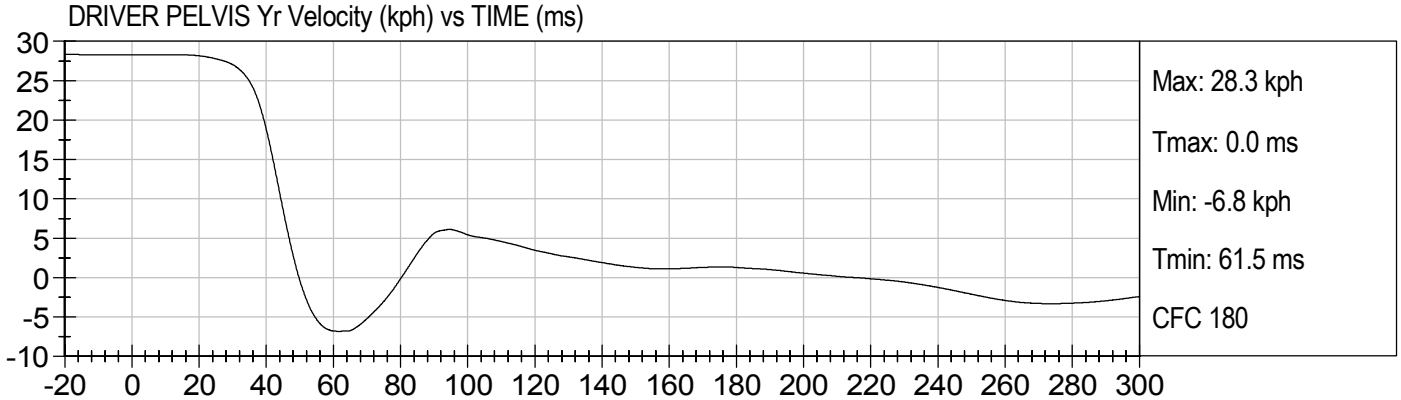
DRIVER LOWER SPINE Yr Velocity (kph) vs TIME (ms)



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



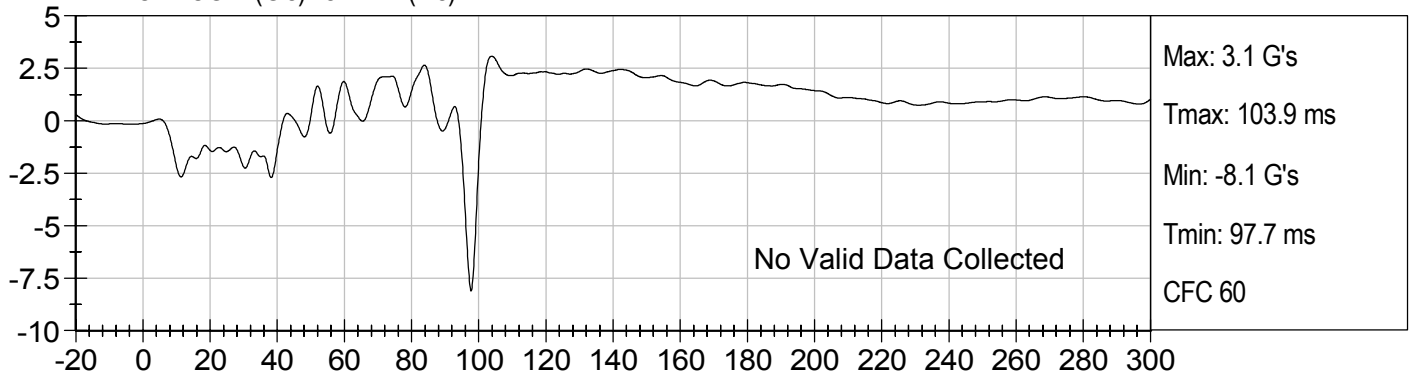
DRIVER PELVIS Yr Velocity (kph) vs TIME (ms)



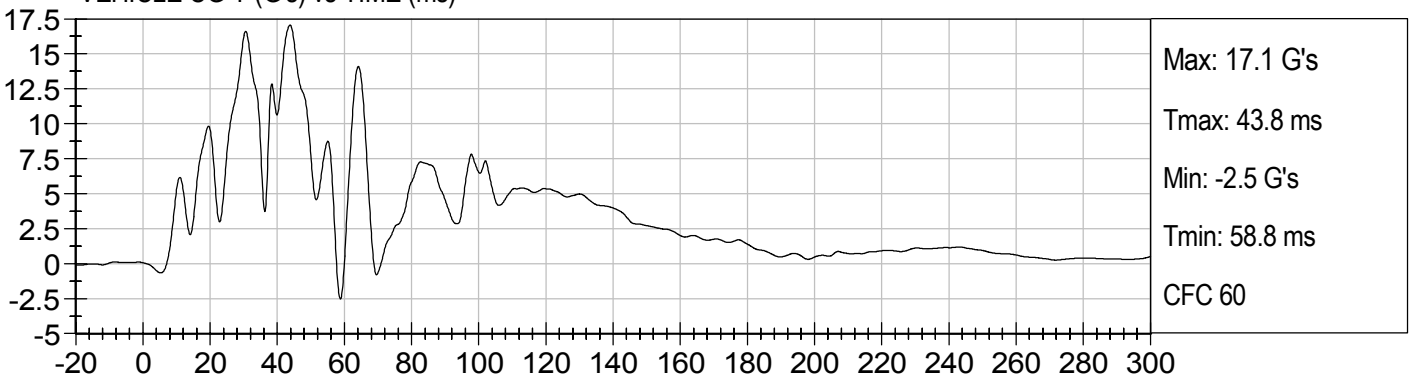
RIGID POLE SIDE IMPACT
2007 BUICK LACROSSE C70116

Test Date: 08/22/2007
Speed: 17.6 mph (28.3 km/h)

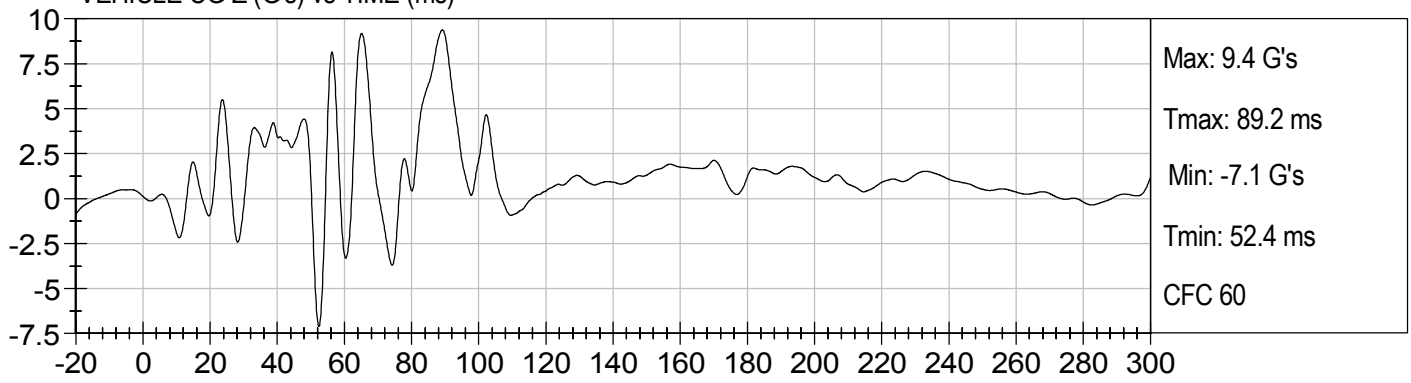
VEHICLE CG X (G's) vs TIME (ms)



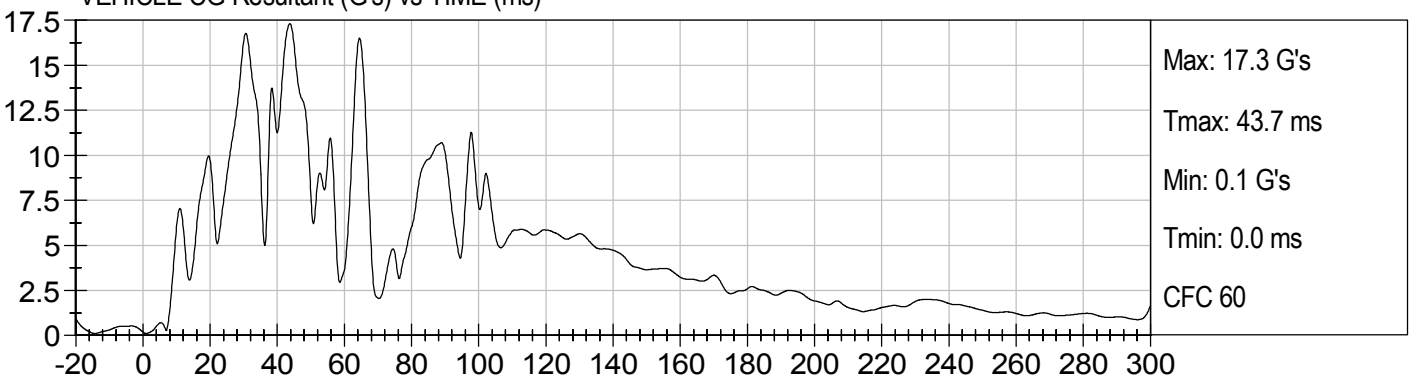
VEHICLE CG Y (G's) vs TIME (ms)

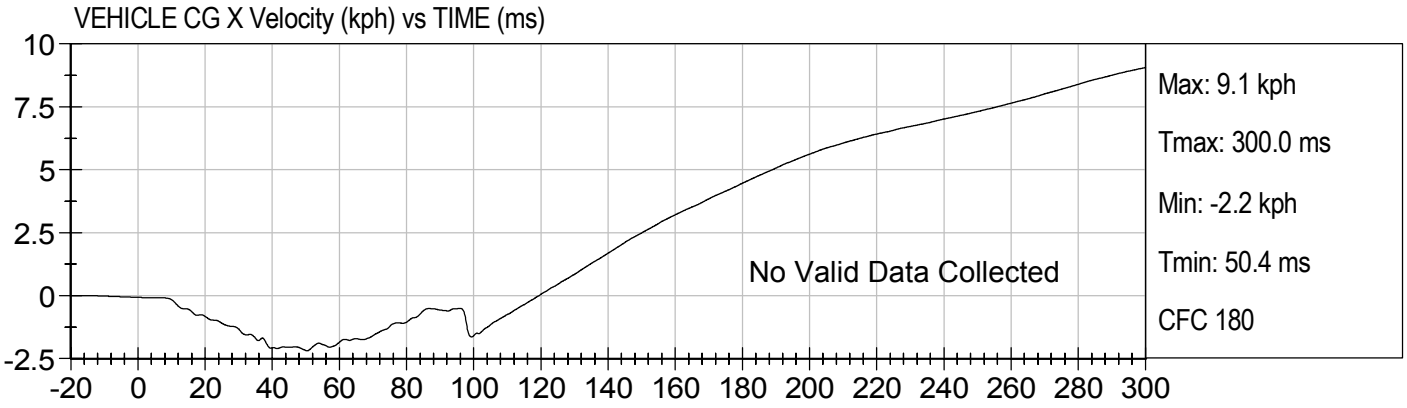


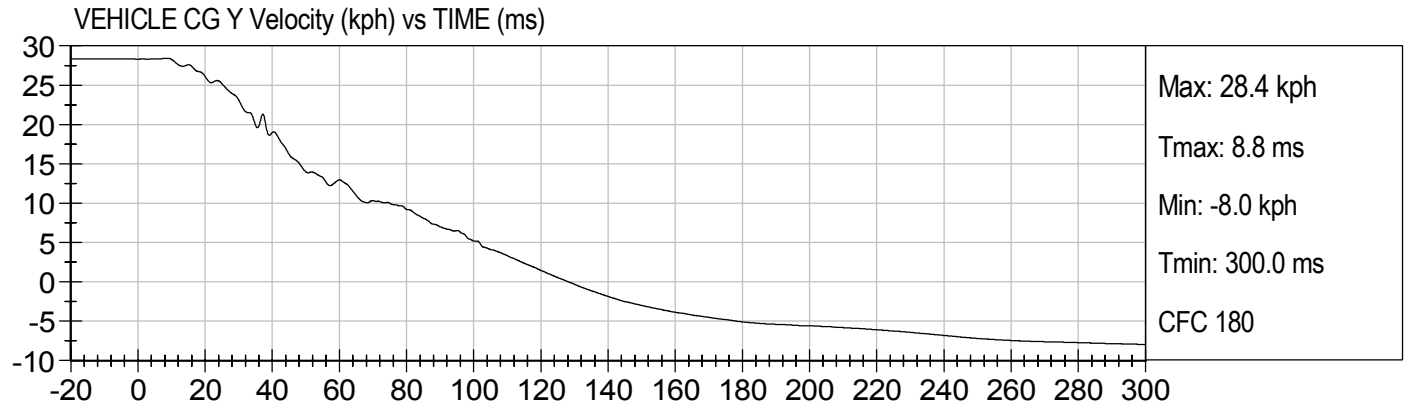
VEHICLE CG Z (G's) vs TIME (ms)

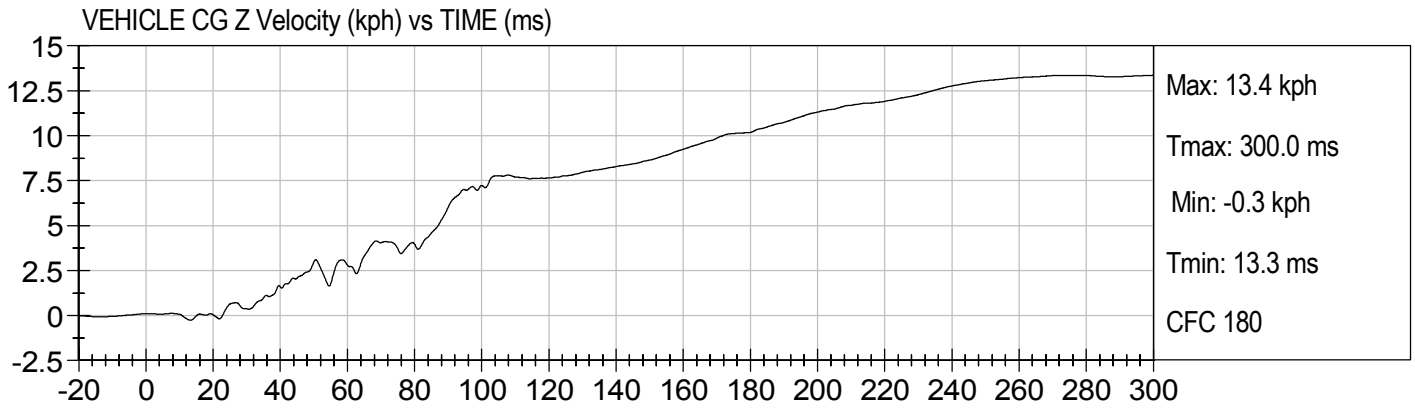


VEHICLE CG Resultant (G's) vs TIME (ms)




VEHICLE CG X Velocity (kph) vs TIME (ms)
10
7.5
5
2.5
0
-2.5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
No Valid Data Collected
Max: 9.1 kph
Tmax: 300.0 ms
Min: -2.2 kph
Tmin: 50.4 ms
CFC 180

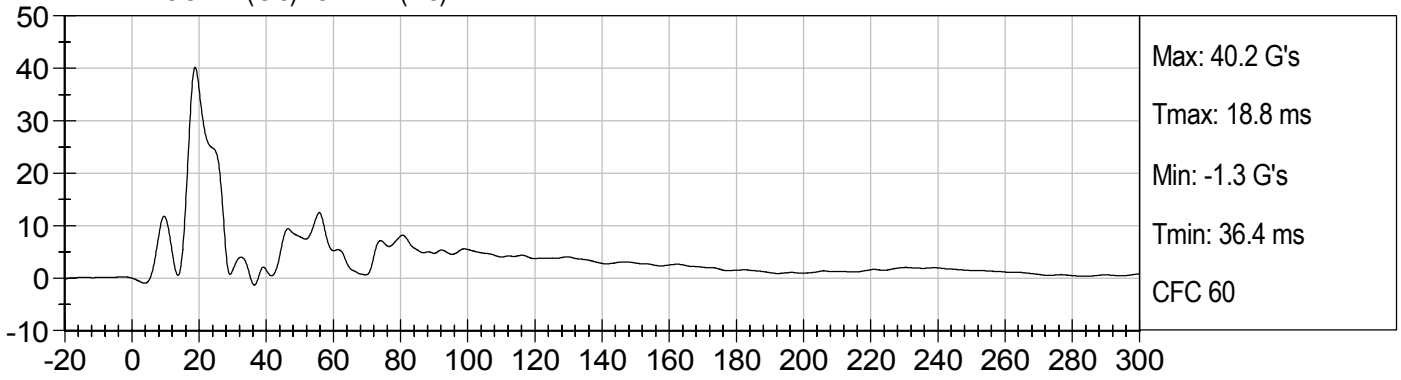

VEHICLE CG Y Velocity (kph) vs TIME (ms)
30
25
20
15
10
5
0
-5
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 28.4 kph
Tmax: 8.8 ms
Min: -8.0 kph
Tmin: 300.0 ms
CFC 180


VEHICLE CG Z Velocity (kph) vs TIME (ms)
15
12.5
10
7.5
5
2.5
0
-2.5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 13.4 kph
Tmax: 300.0 ms
Min: -0.3 kph
Tmin: 13.3 ms
CFC 180

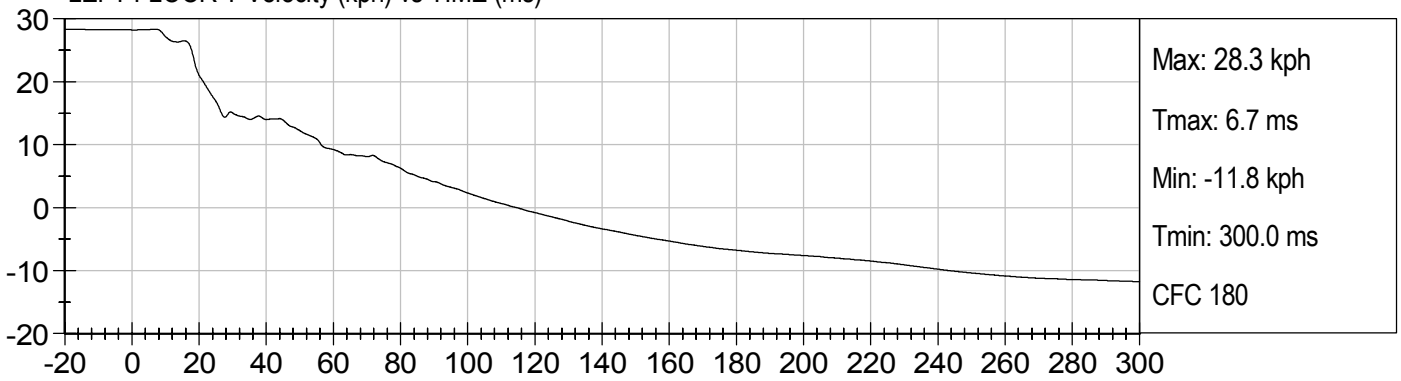
RIGID POLE SIDE IMPACT
2007 BUICK LACROSSE C70116

Test Date: 08/22/2007
Speed: 17.6 mph (28.3 km/h)

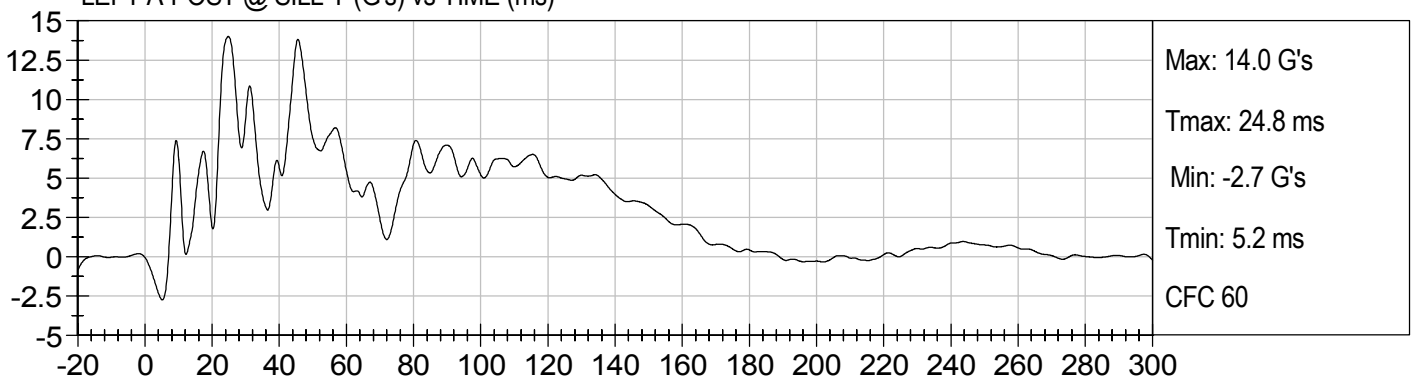
LEFT FLOOR Y (G's) vs TIME (ms)



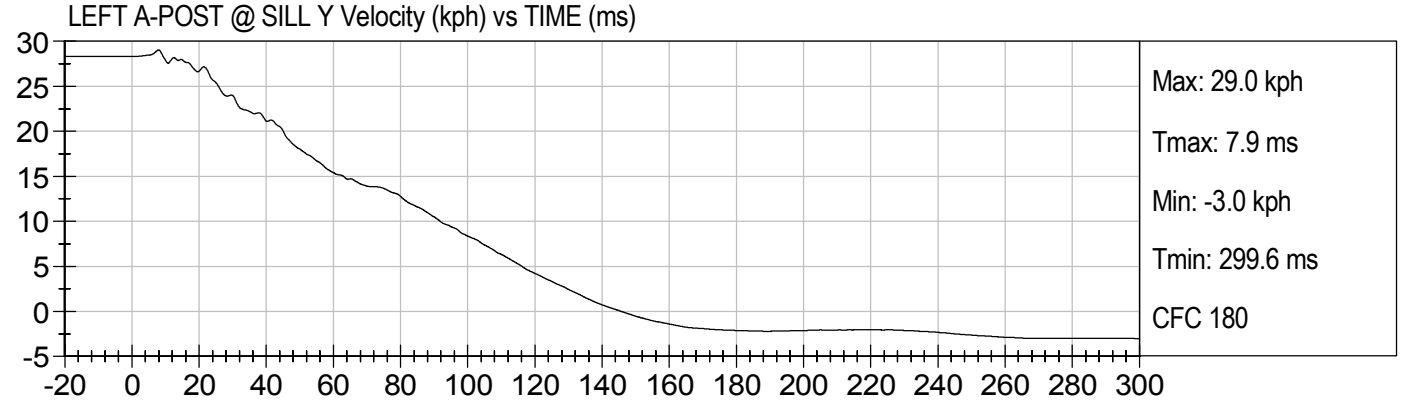
LEFT FLOOR Y Velocity (kph) vs TIME (ms)



LEFT A-POST @ SILL Y (G's) vs TIME (ms)



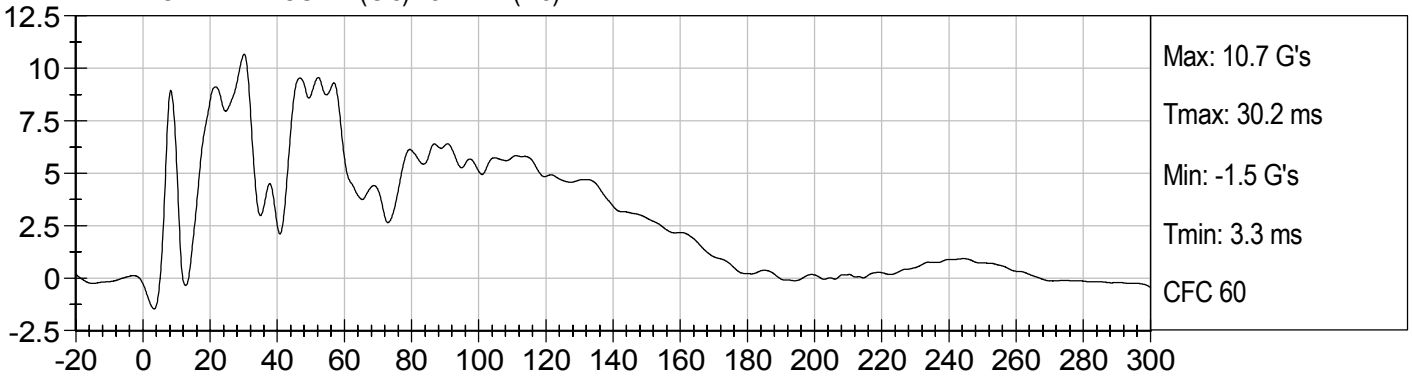
LEFT A-POST @ SILL Y Velocity (kph) vs TIME (ms)



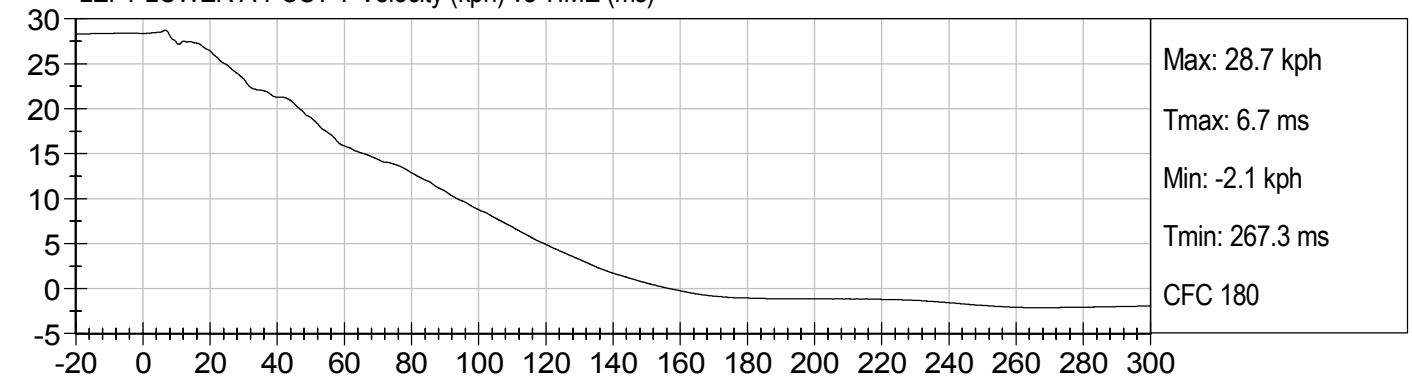
RIGID POLE SIDE IMPACT
2007 BUICK LACROSSE C70116

Test Date: 08/22/2007
Speed: 17.6 mph (28.3 km/h)

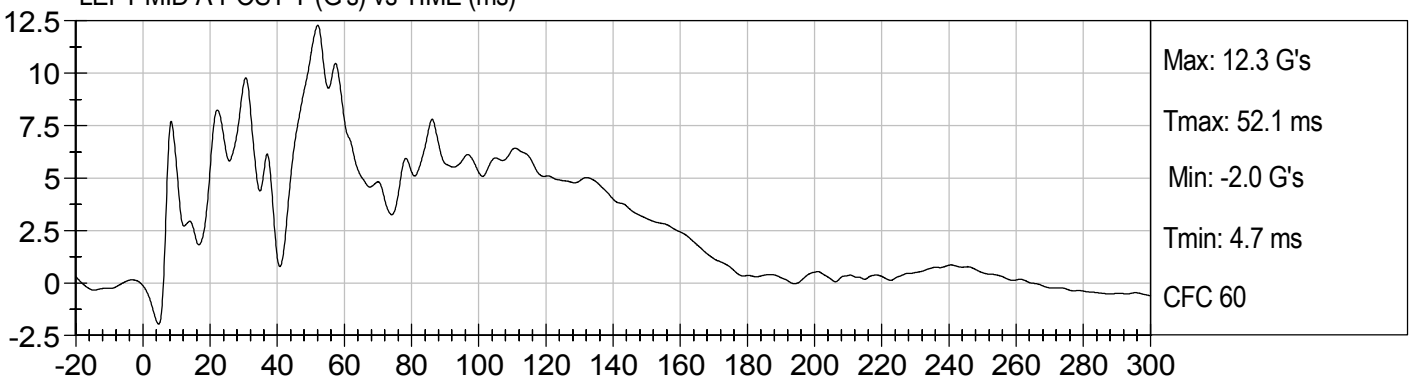
LEFT LOWER A-POST Y (G's) vs TIME (ms)



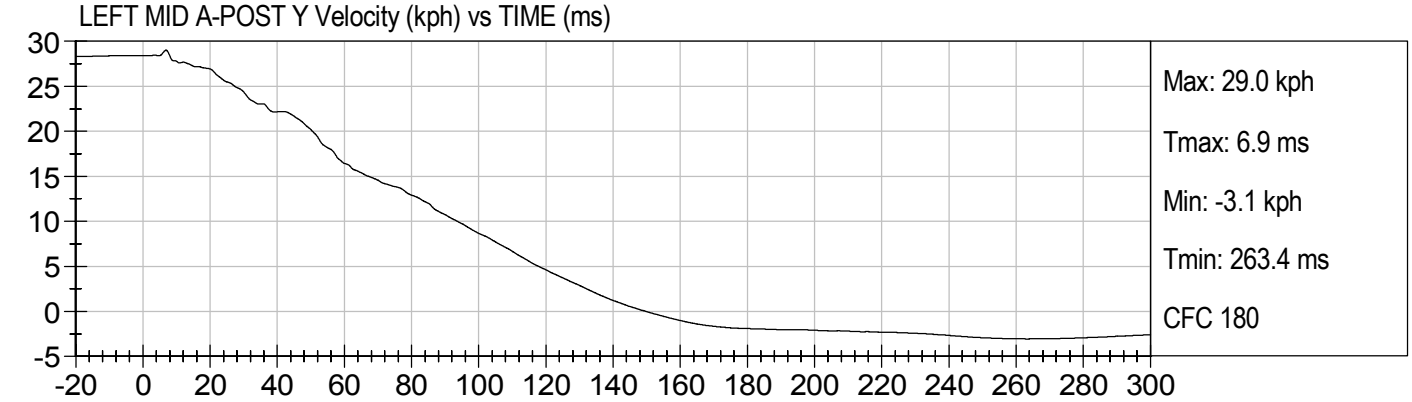
LEFT LOWER A-POST Y Velocity (kph) vs TIME (ms)



LEFT MID A-POST Y (G's) vs TIME (ms)



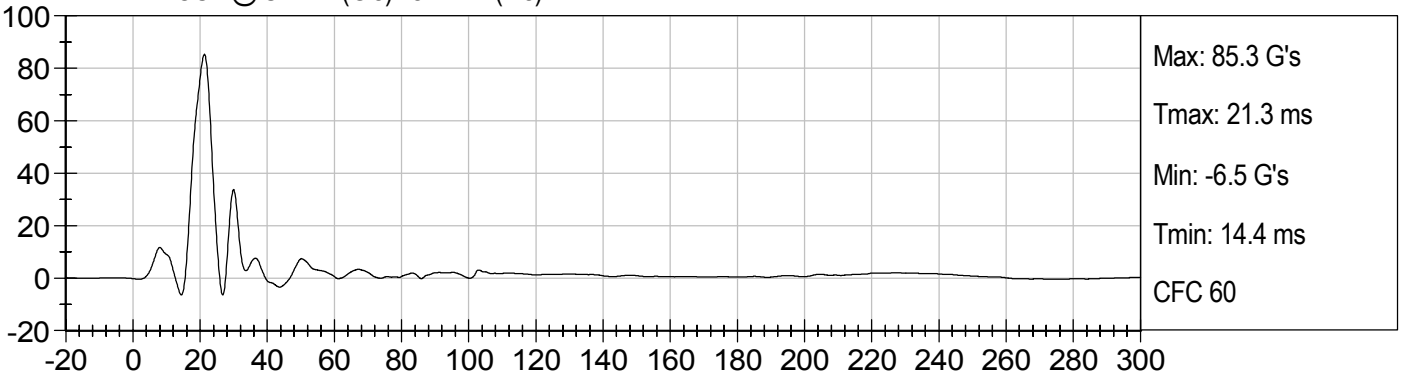
LEFT MID A-POST Y Velocity (kph) vs TIME (ms)



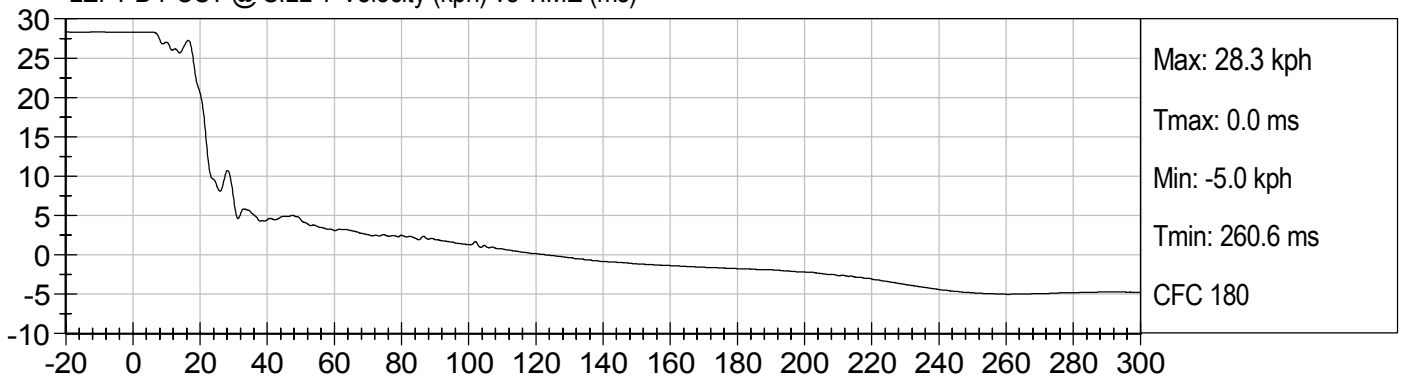
RIGID POLE SIDE IMPACT
2007 BUICK LACROSSE C70116

Test Date: 08/22/2007
Speed: 17.6 mph (28.3 km/h)

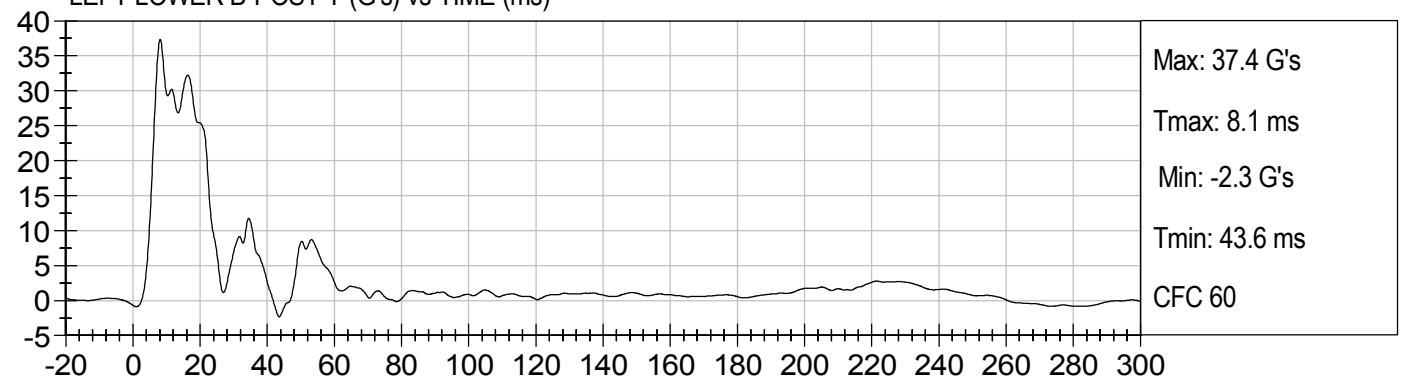
LEFT B-POST @ SILL Y (G's) vs TIME (ms)



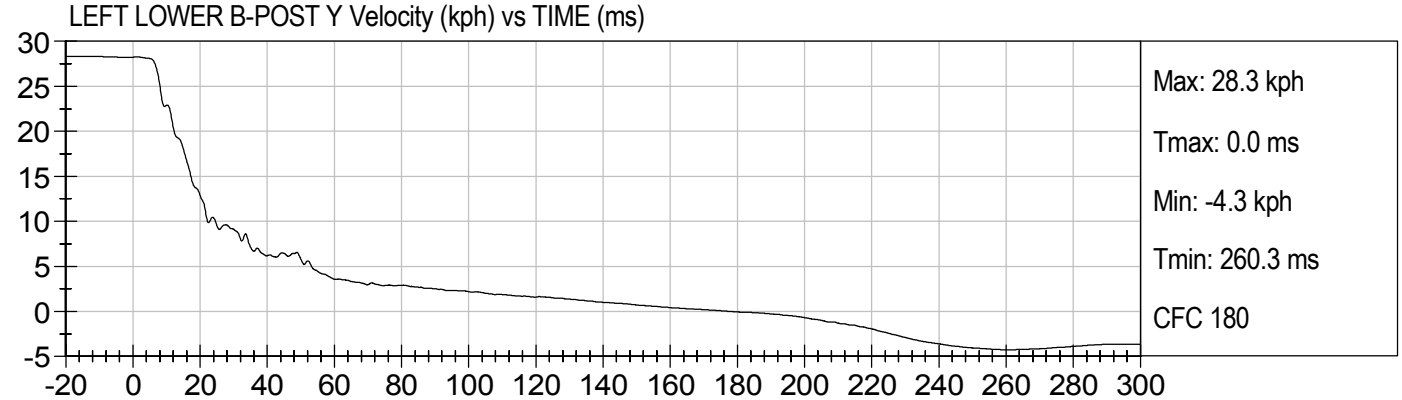
LEFT B-POST @ SILL Y Velocity (kph) vs TIME (ms)



LEFT LOWER B-POST Y (G's) vs TIME (ms)



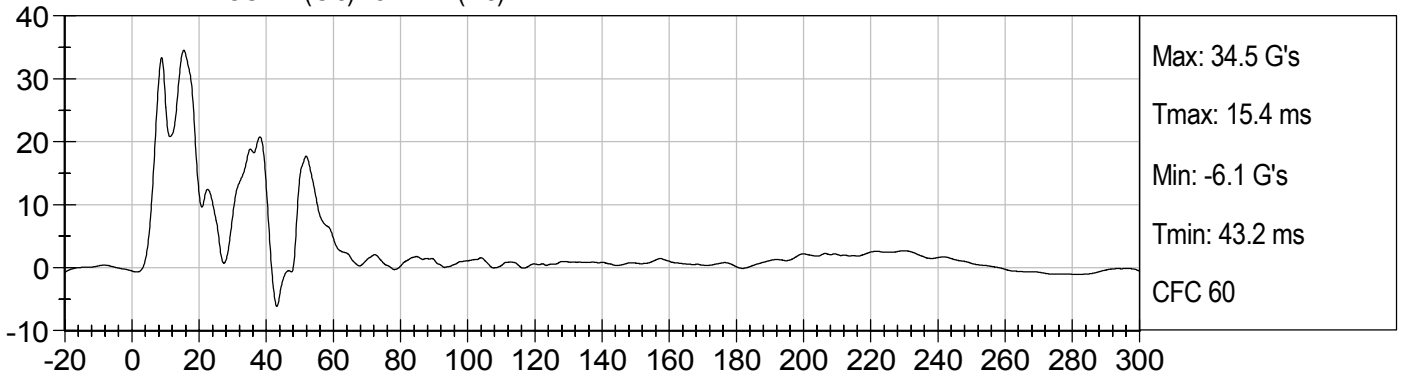
LEFT LOWER B-POST Y Velocity (kph) vs TIME (ms)



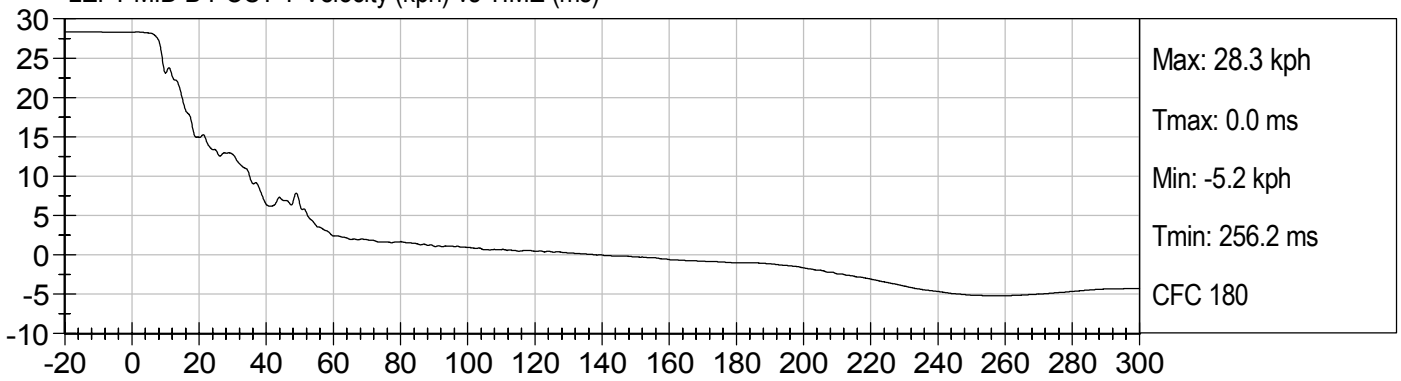
RIGID POLE SIDE IMPACT
2007 BUICK LACROSSE C70116

Test Date: 08/22/2007
Speed: 17.6 mph (28.3 km/h)

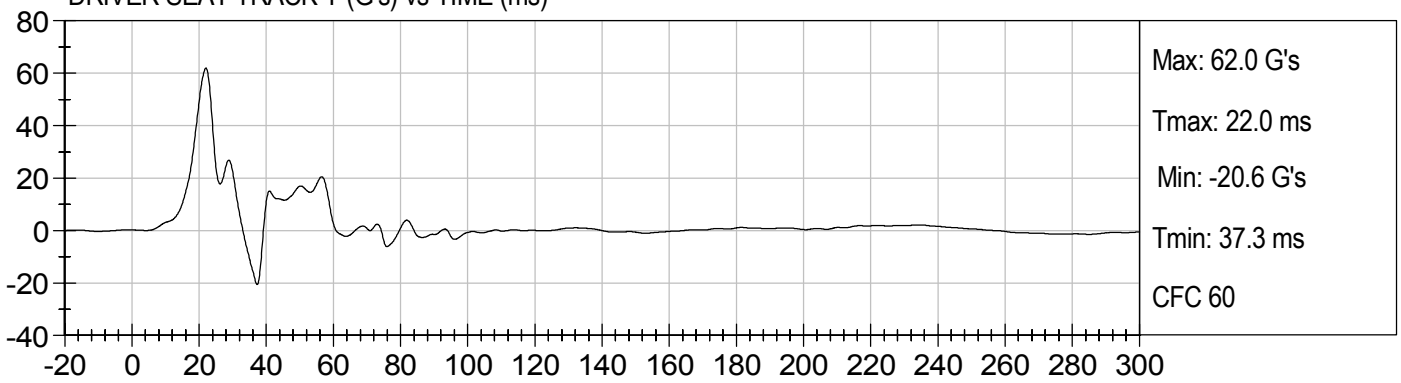
LEFT MID B-POST Y (G's) vs TIME (ms)



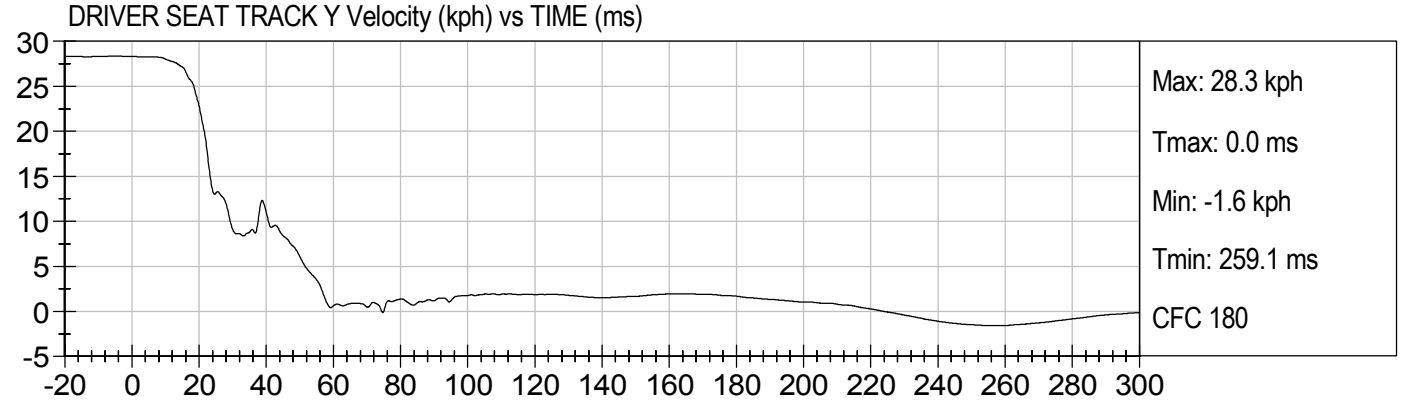
LEFT MID B-POST Y Velocity (kph) vs TIME (ms)



DRIVER SEAT TRACK Y (G's) vs TIME (ms)

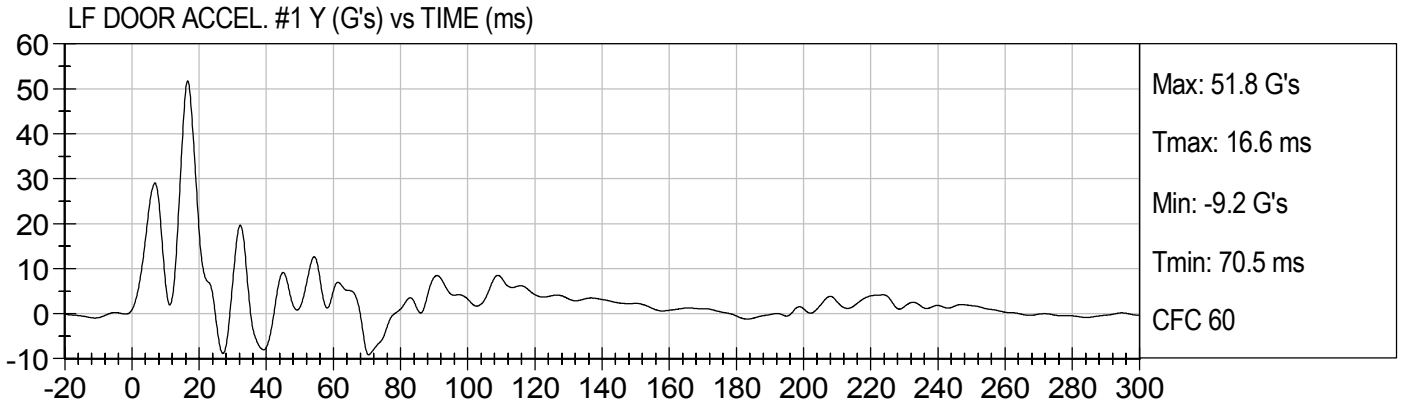


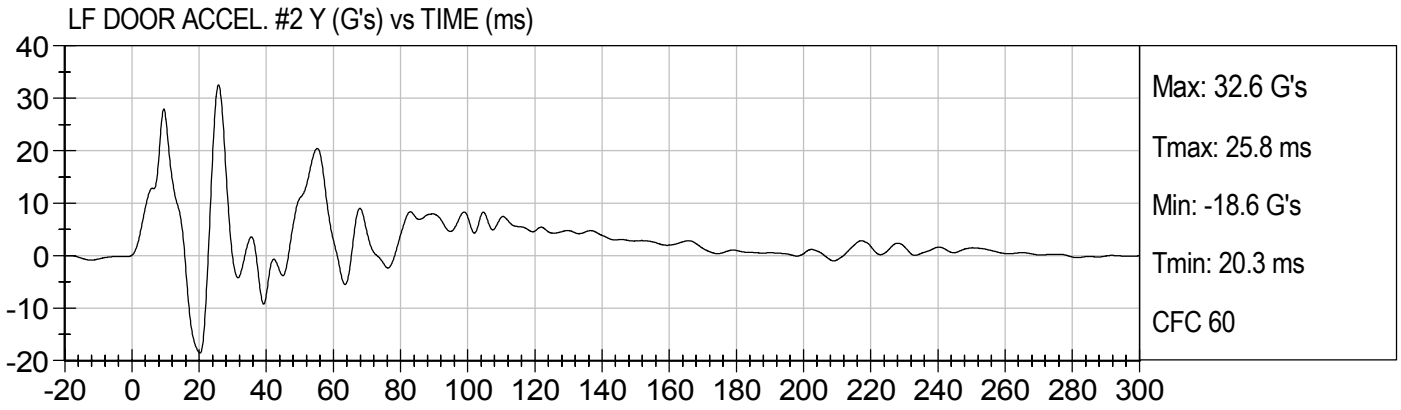
DRIVER SEAT TRACK Y Velocity (kph) vs TIME (ms)

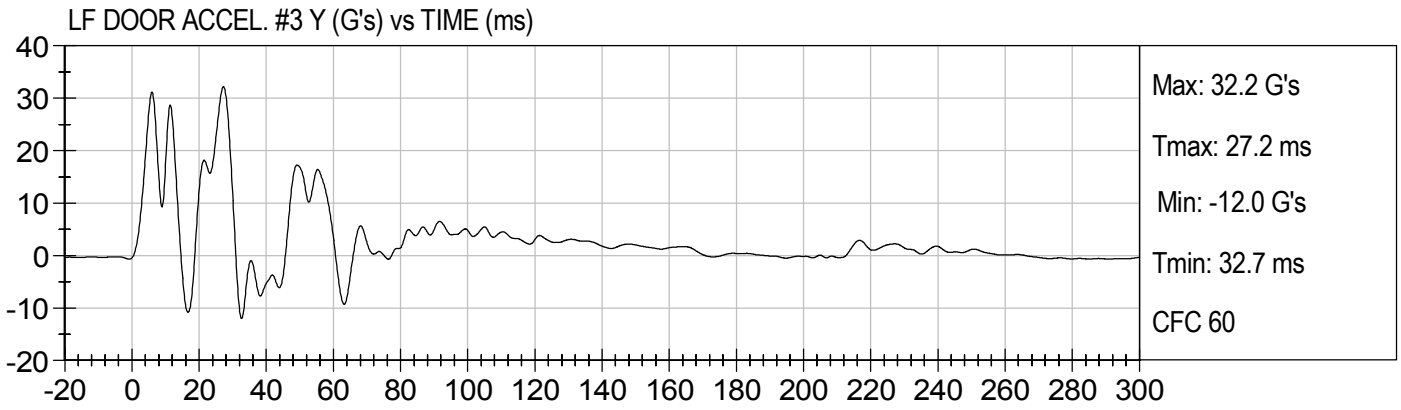


RIGID POLE SIDE IMPACT
2007 BUICK LACROSSE C70116

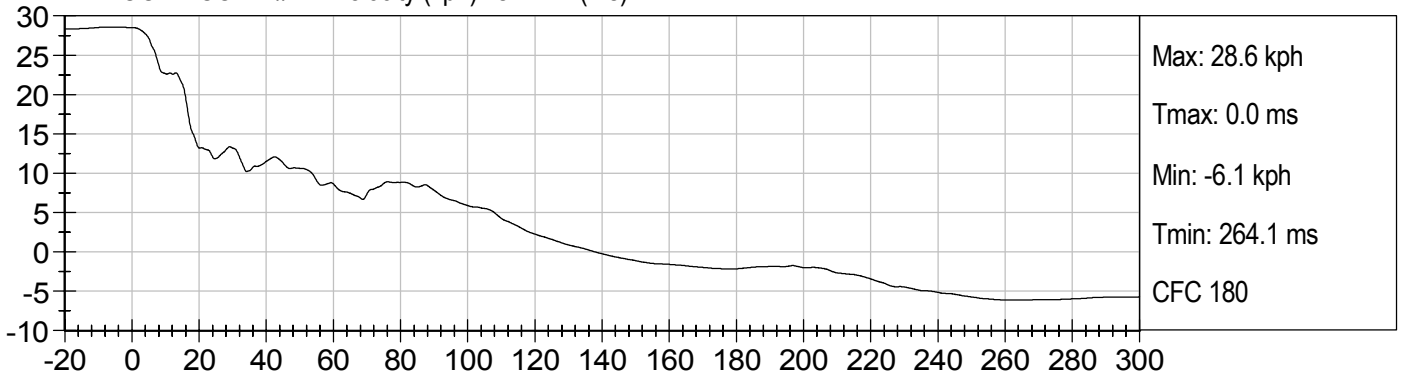
Test Date: 08/22/2007
Speed: 17.6 mph (28.3 km/h)



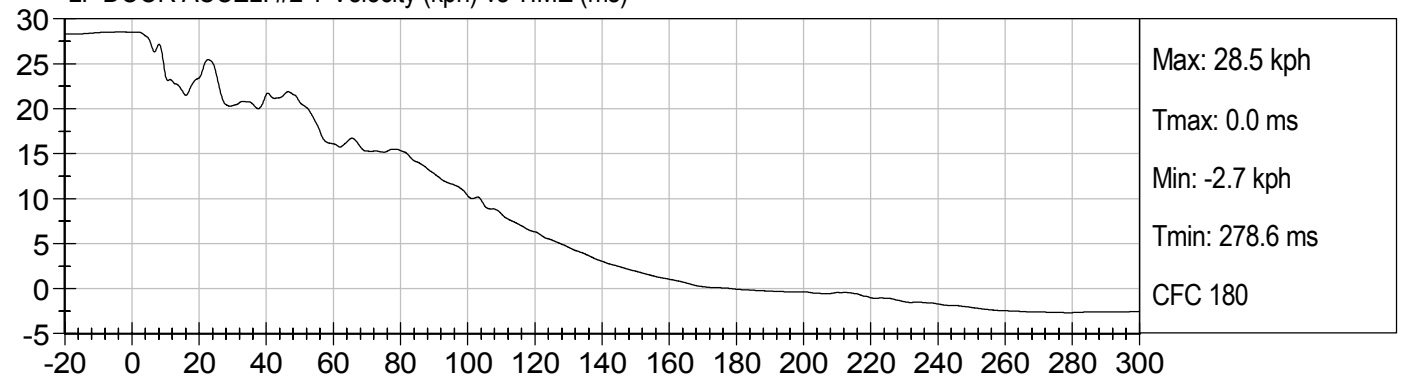




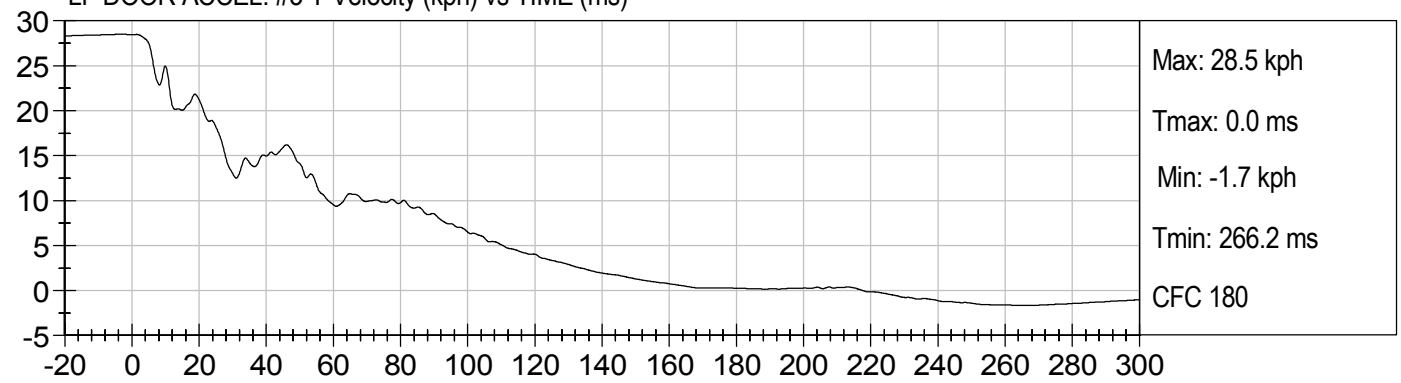
LF DOOR ACCEL. #1 Y Velocity (kph) vs TIME (ms)



LF DOOR ACCEL. #2 Y Velocity (kph) vs TIME (ms)

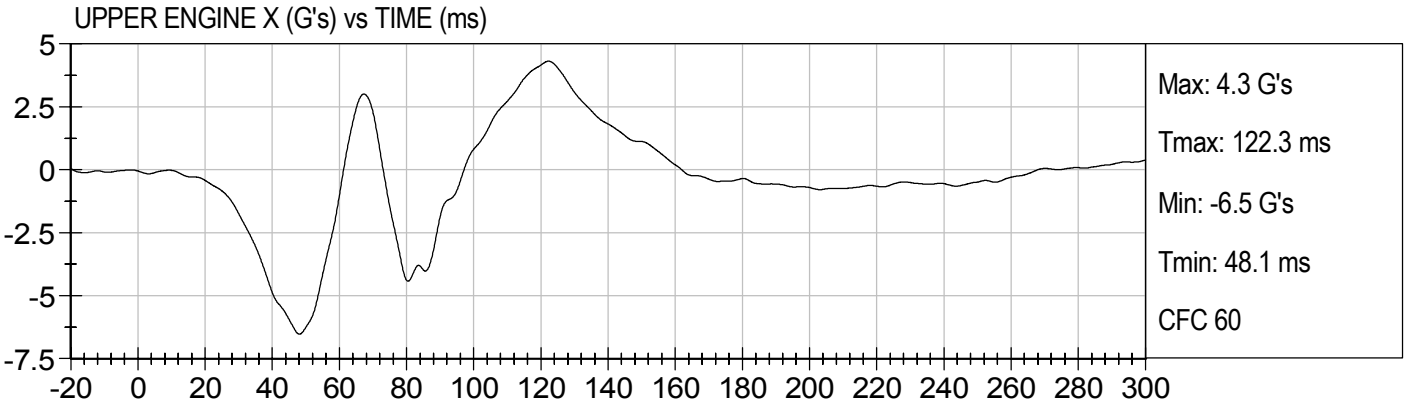


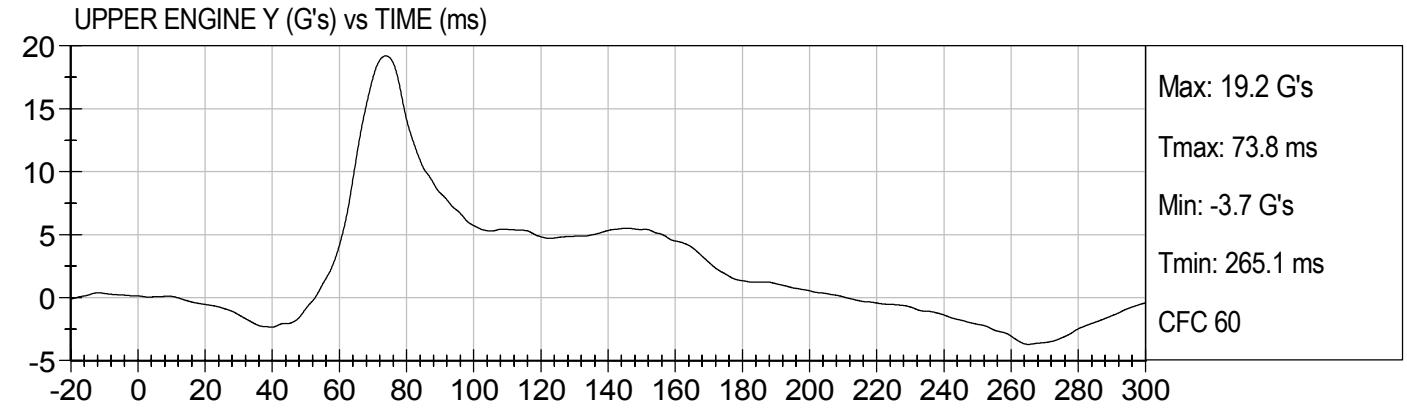
LF DOOR ACCEL. #3 Y Velocity (kph) vs TIME (ms)

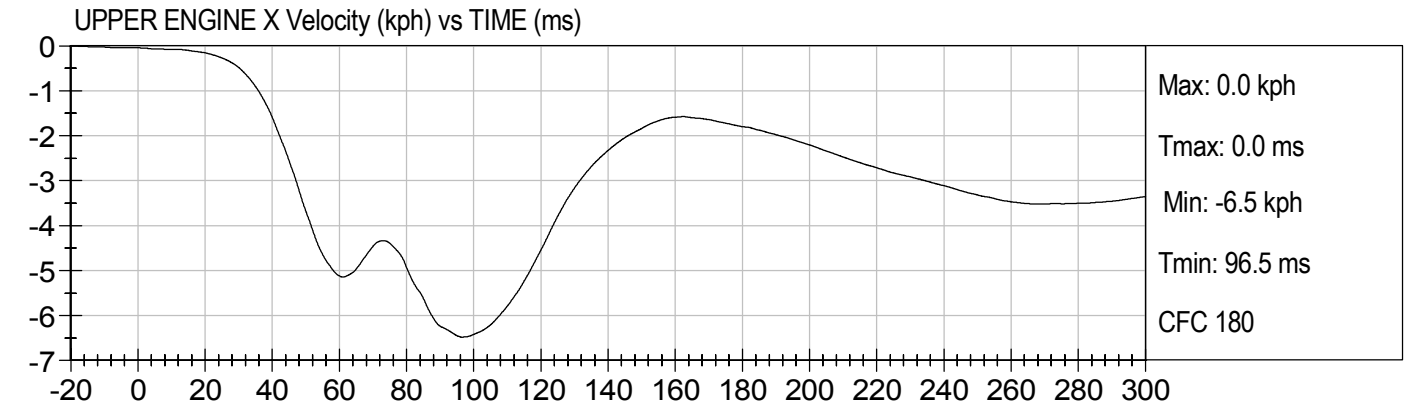


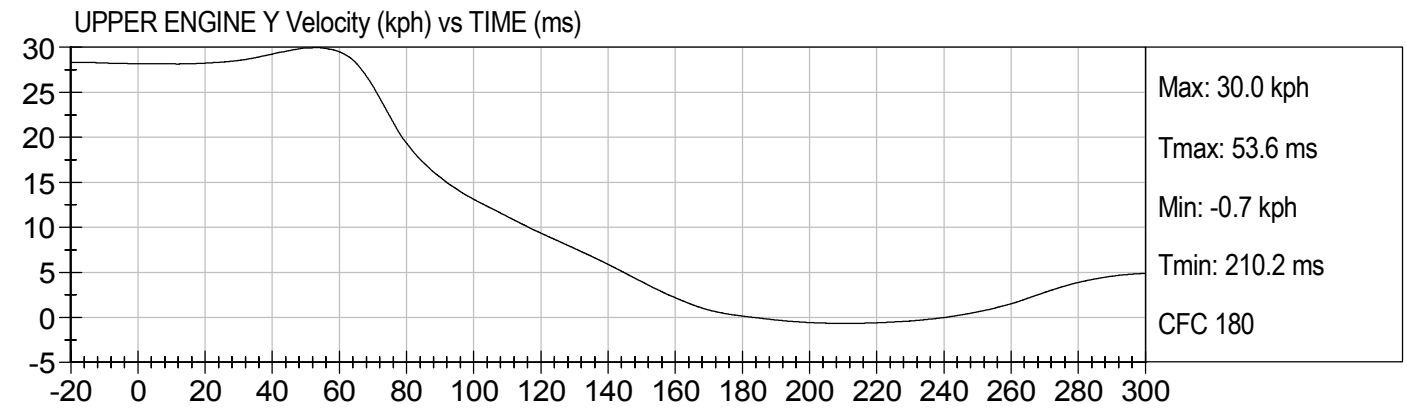
RIGID POLE SIDE IMPACT
2007 BUICK LACROSSE C70116

Test Date: 08/22/2007
Speed: 17.6 mph (28.3 km/h)





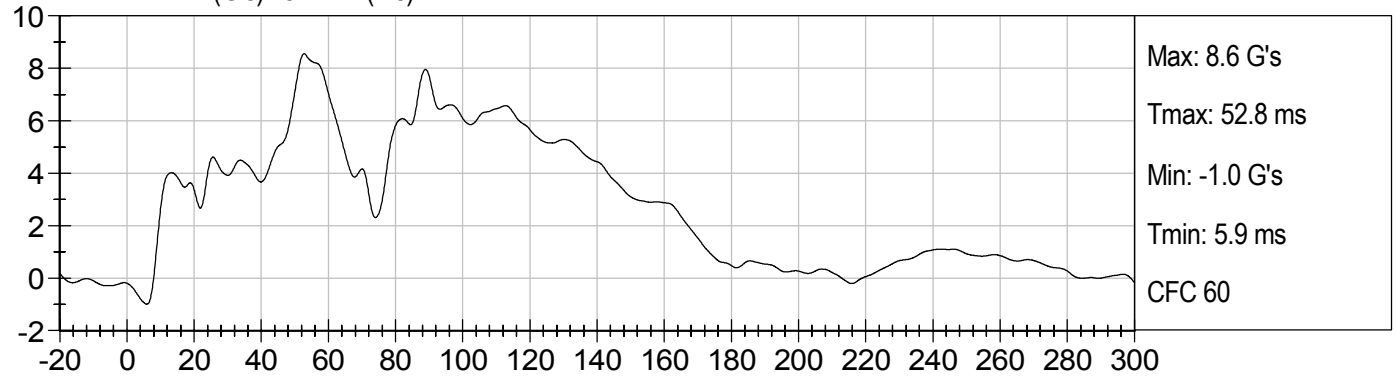




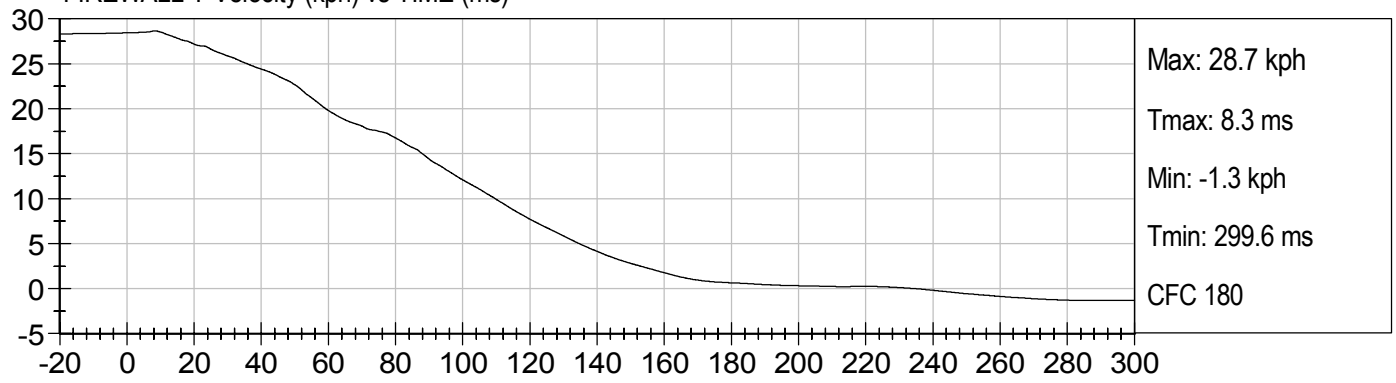
RIGID POLE SIDE IMPACT
2007 BUICK LACROSSE C70116

Test Date: 08/22/2007
Speed: 17.6 mph (28.3 km/h)

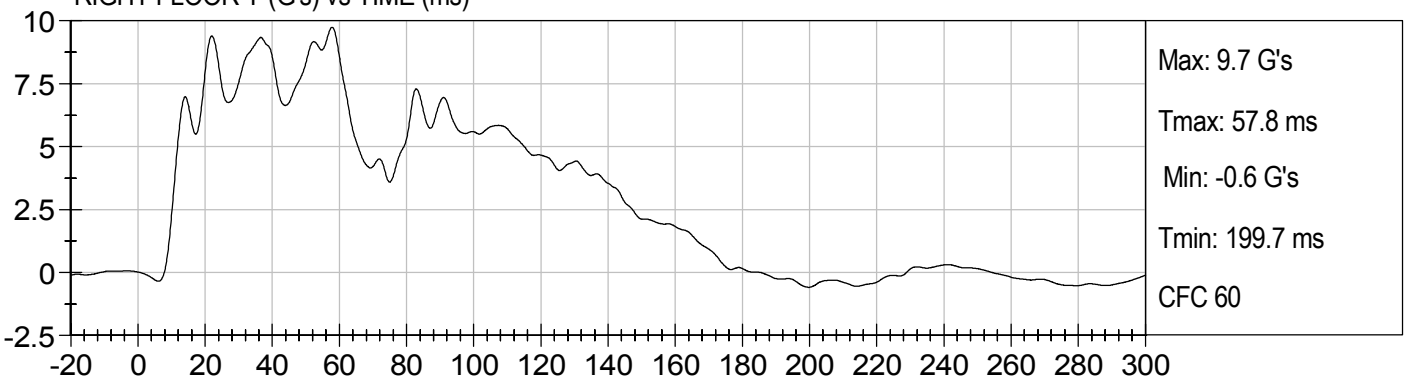
FIREWALL Y (G's) vs TIME (ms)



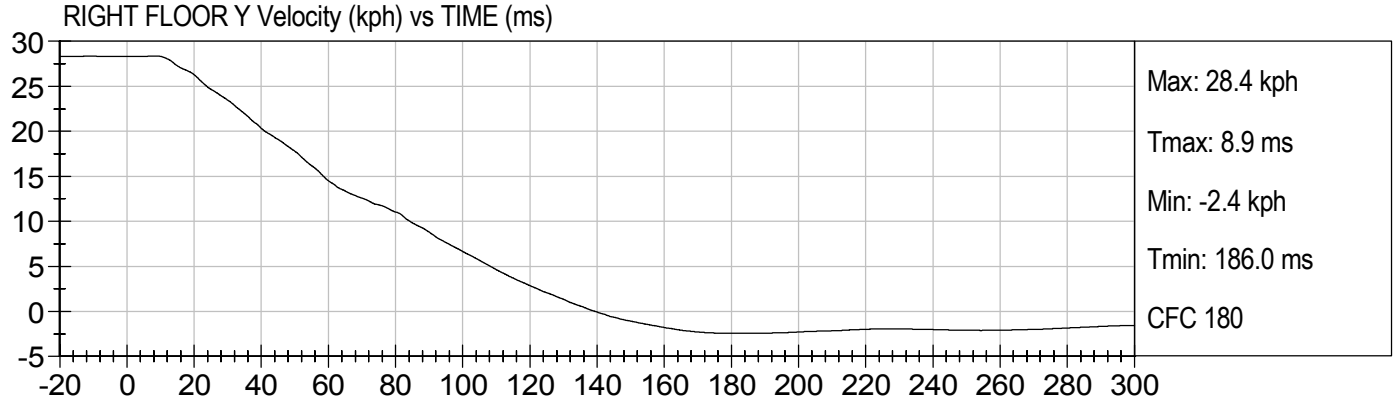
FIREWALL Y Velocity (kph) vs TIME (ms)



RIGHT FLOOR Y (G's) vs TIME (ms)



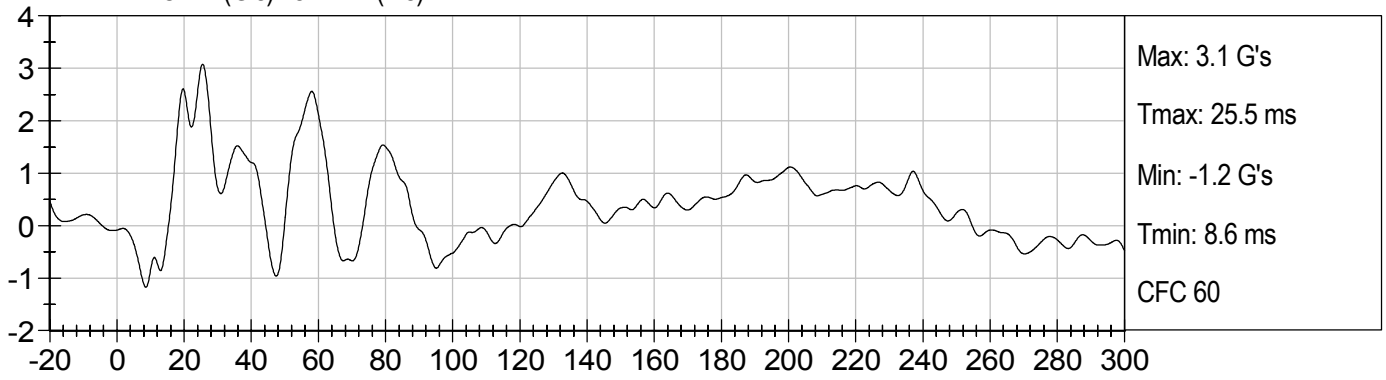
RIGHT FLOOR Y Velocity (kph) vs TIME (ms)



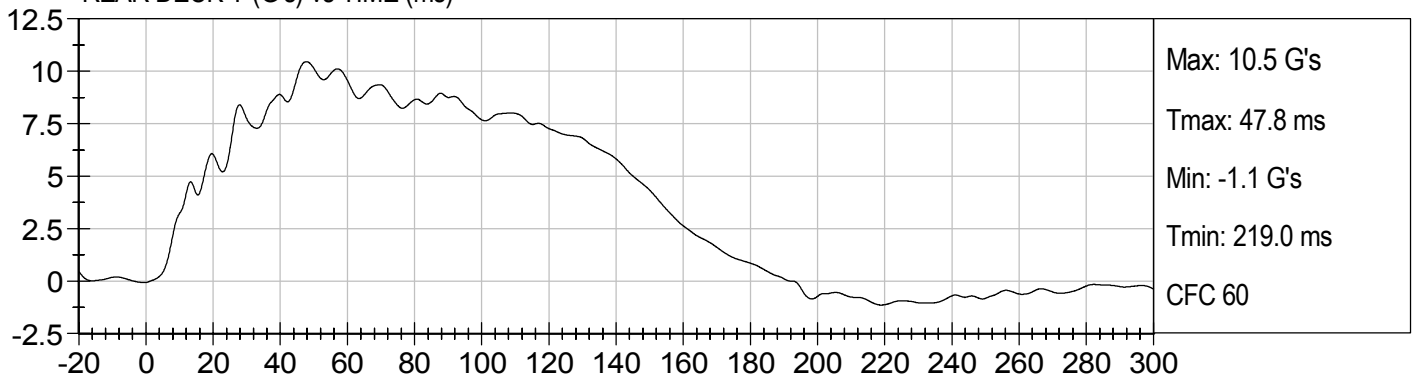
RIGID POLE SIDE IMPACT
2007 BUICK LACROSSE C70116

Test Date: 08/22/2007
Speed: 17.6 mph (28.3 km/h)

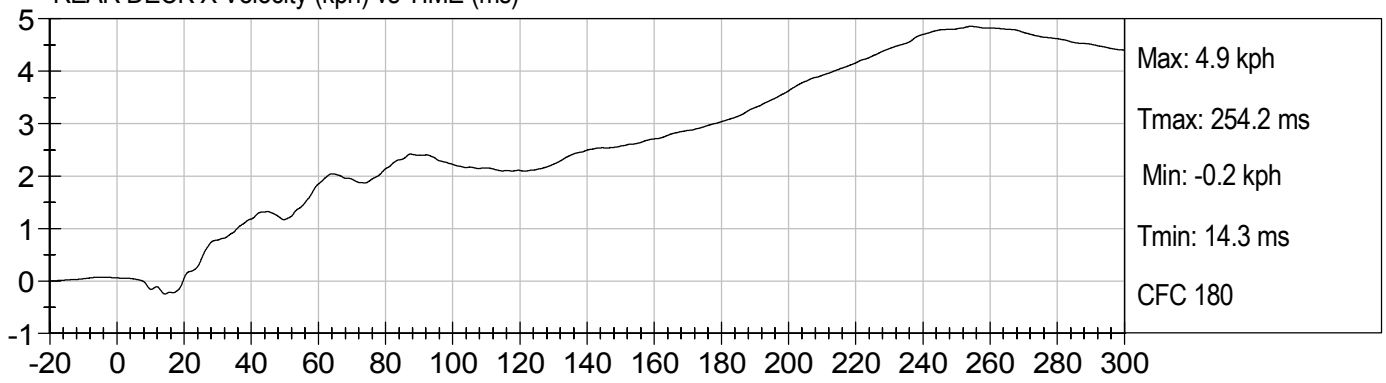
REAR DECK X (G's) vs TIME (ms)



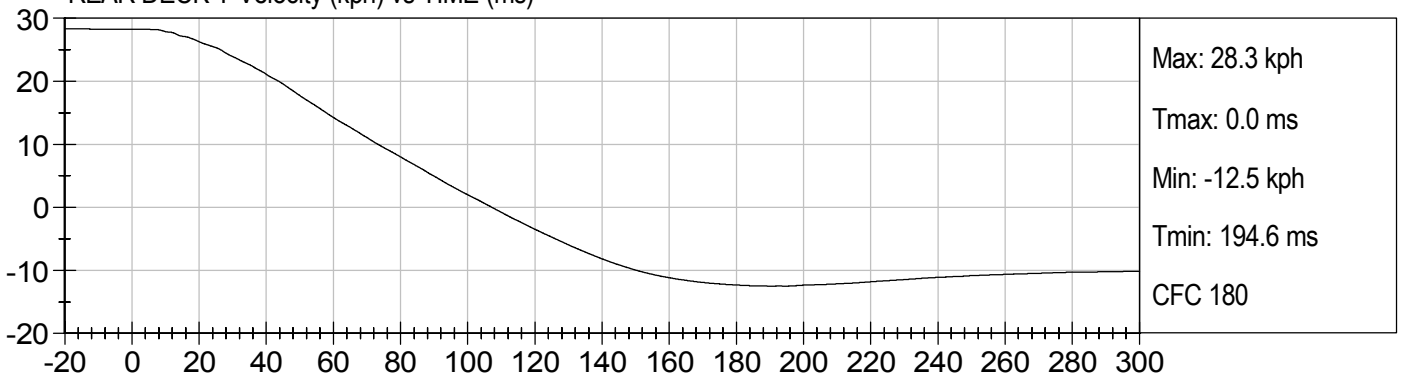
REAR DECK Y (G's) vs TIME (ms)



REAR DECK X Velocity (kph) vs TIME (ms)



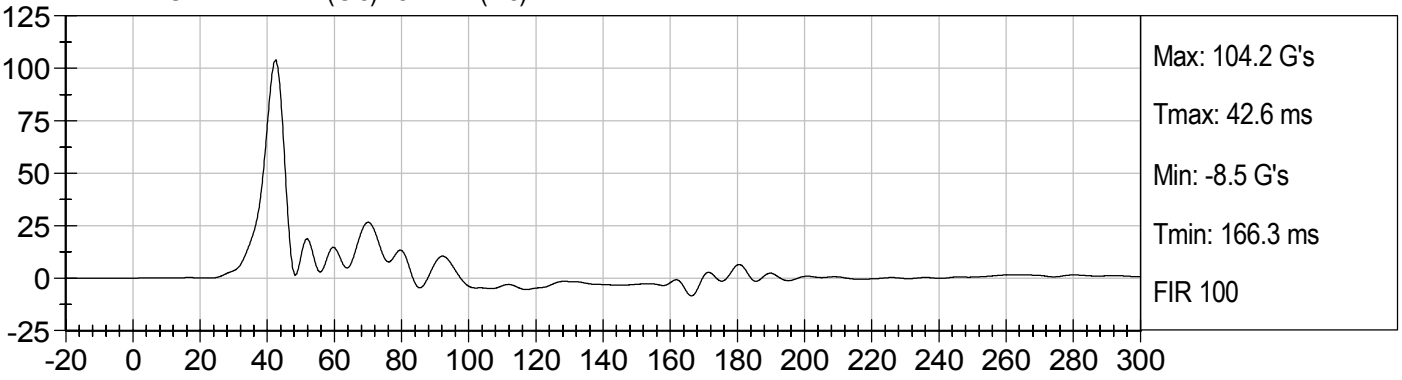
REAR DECK Y Velocity (kph) vs TIME (ms)



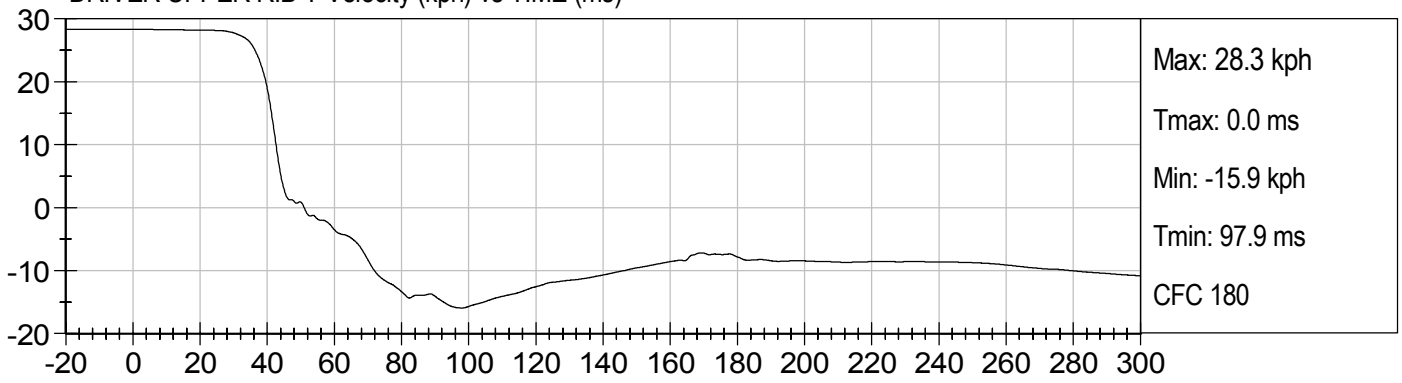
RIGID POLE SIDE IMPACT
2007 BUICK LACROSSE C70116

Test Date: 08/22/2007
Speed: 17.6 mph (28.3 km/h)

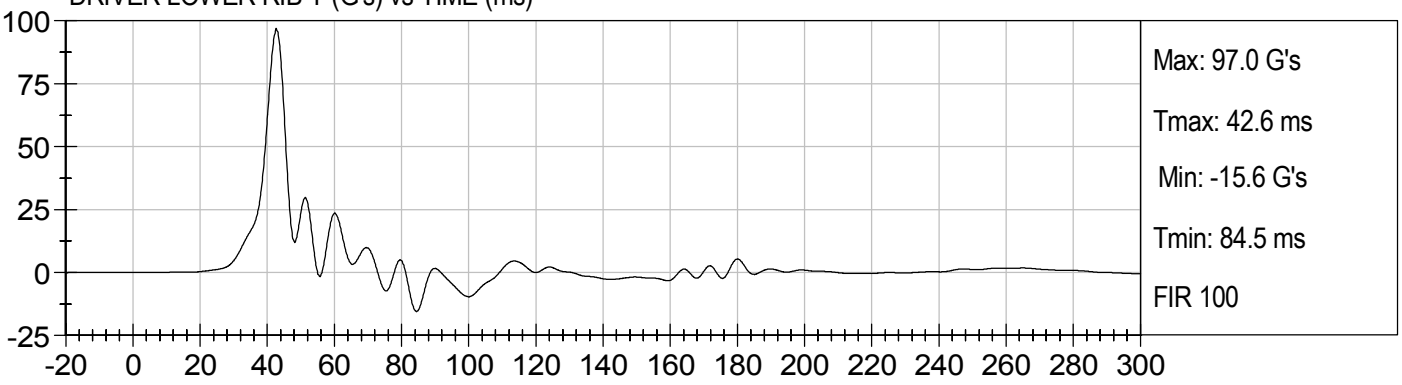
DRIVER UPPER RIB Y (G's) vs TIME (ms)



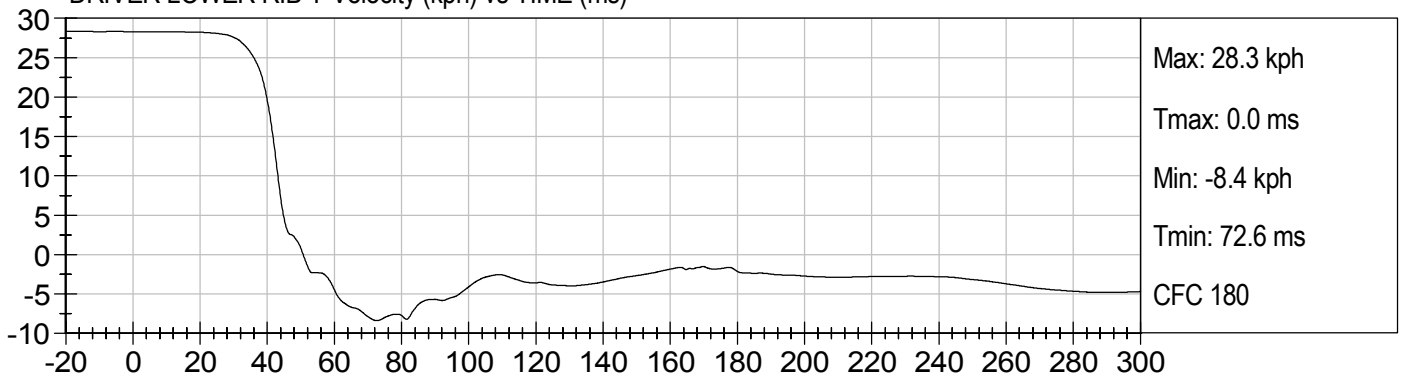
DRIVER UPPER RIB Y Velocity (kph) vs TIME (ms)



DRIVER LOWER RIB Y (G's) vs TIME (ms)



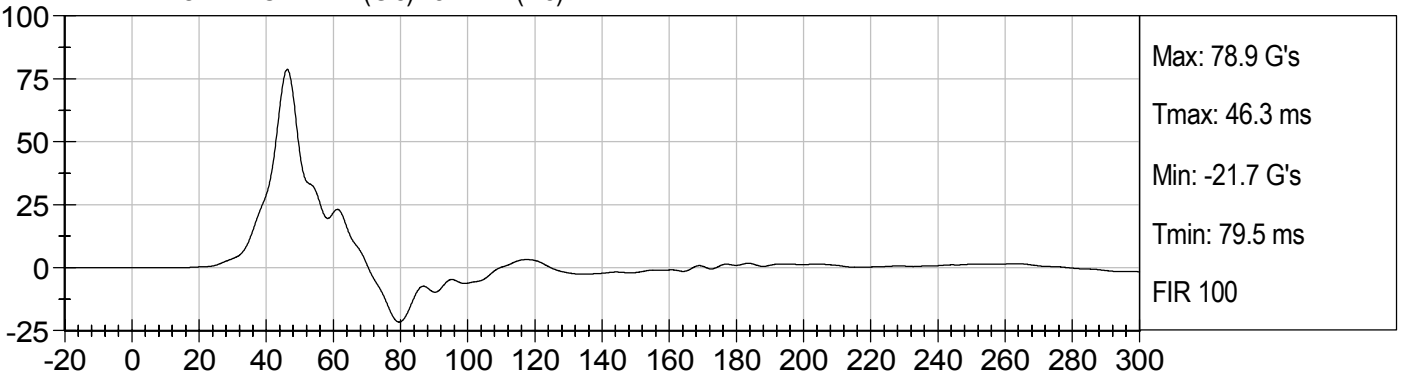
DRIVER LOWER RIB Y Velocity (kph) vs TIME (ms)



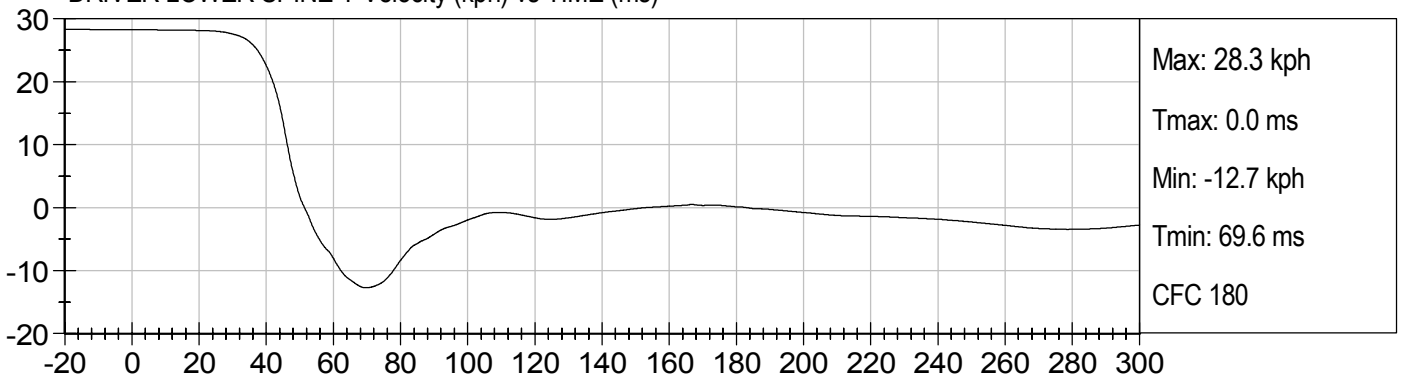
RIGID POLE SIDE IMPACT
2007 BUICK LACROSSE C70116

Test Date: 08/22/2007
Speed: 17.6 mph (28.3 km/h)

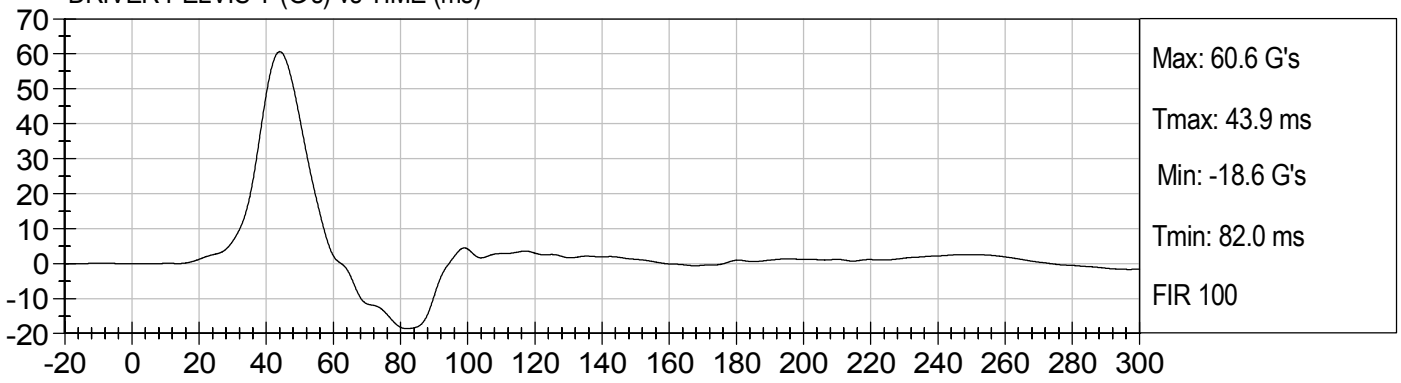
DRIVER LOWER SPINE Y (G's) vs TIME (ms)



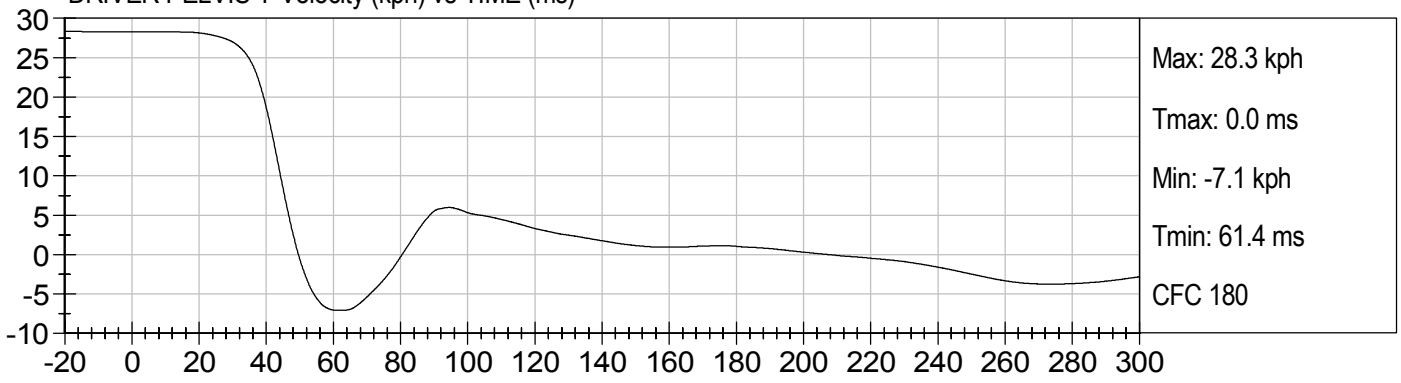
DRIVER LOWER SPINE Y Velocity (kph) vs TIME (ms)

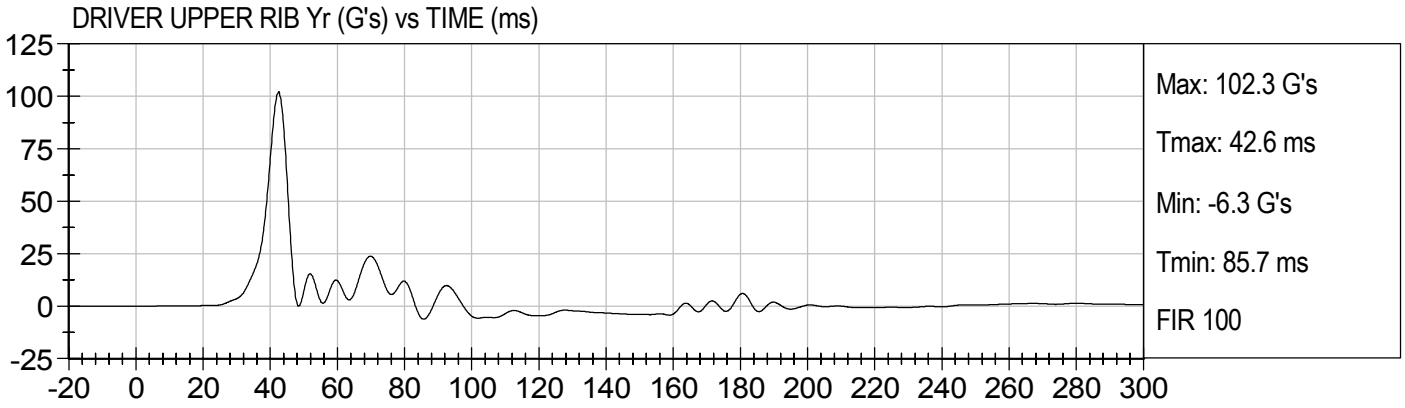


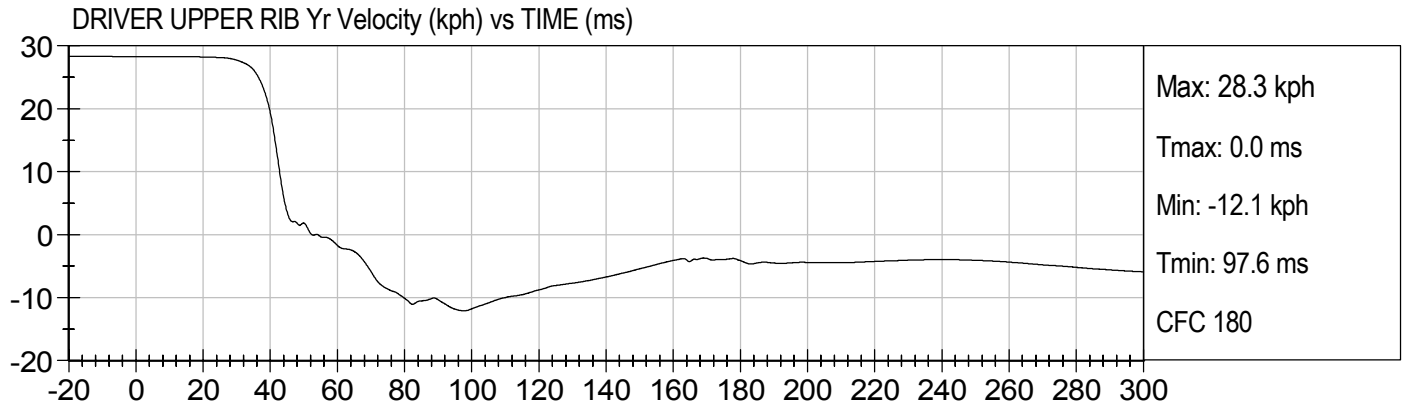
DRIVER PELVIS Y (G's) vs TIME (ms)



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



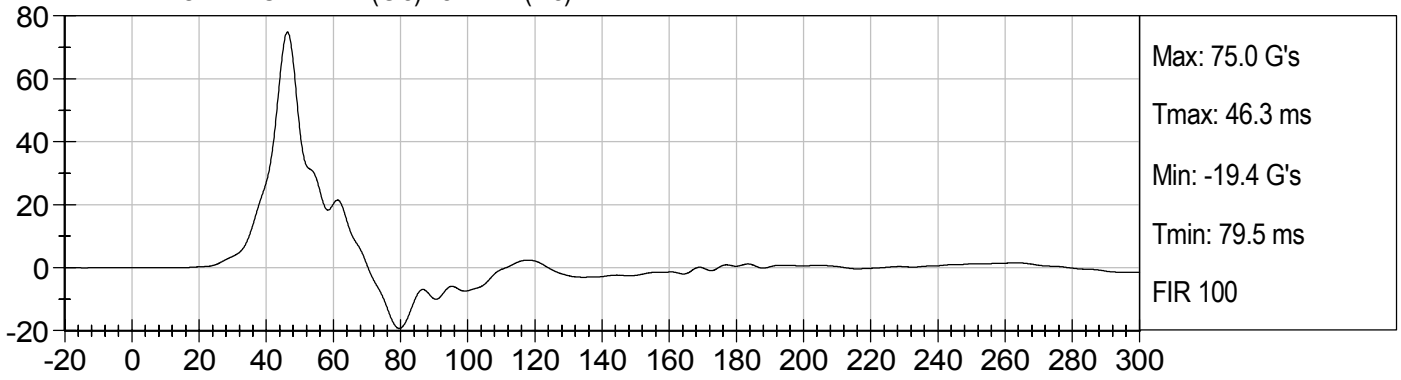

DRIVER UPPER RIB Yr (G's) vs TIME (ms)
125
100
75
50
25
0
-25
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 102.3 G's
Tmax: 42.6 ms
Min: -6.3 G's
Tmin: 85.7 ms
FIR 100


DRIVER UPPER RIB Yr Velocity (kph) vs TIME (ms)
30
20
10
0
-10
-20
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 28.3 kph
Tmax: 0.0 ms
Min: -12.1 kph
Tmin: 97.6 ms
CFC 180

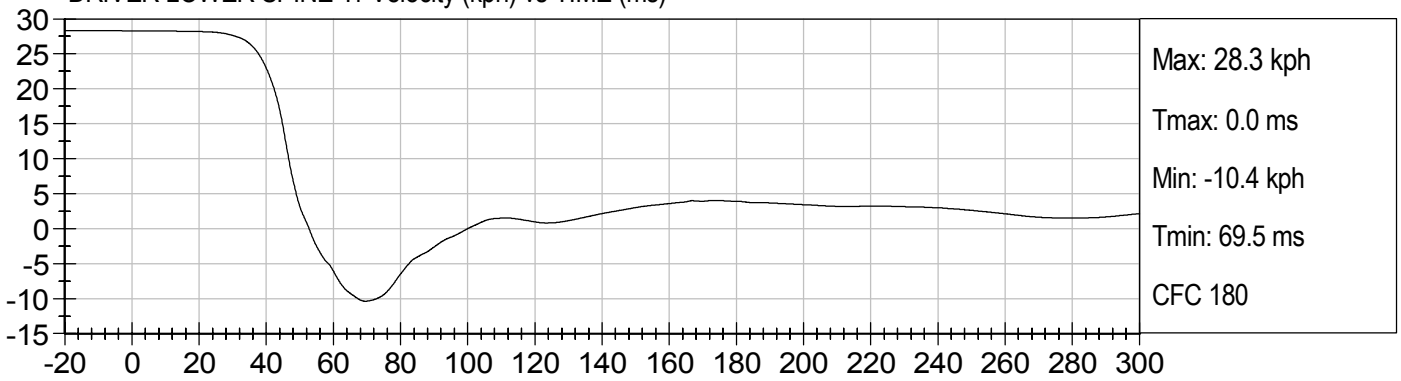
RIGID POLE SIDE IMPACT
2007 BUICK LACROSSE C70116

Test Date: 08/22/2007
Speed: 17.6 mph (28.3 km/h)

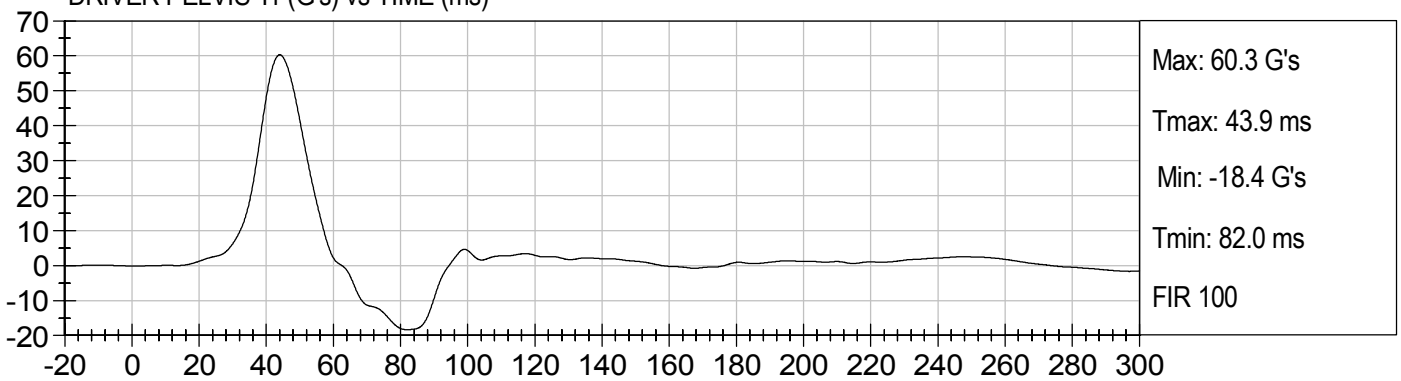
DRIVER LOWER SPINE Yr (G's) vs TIME (ms)



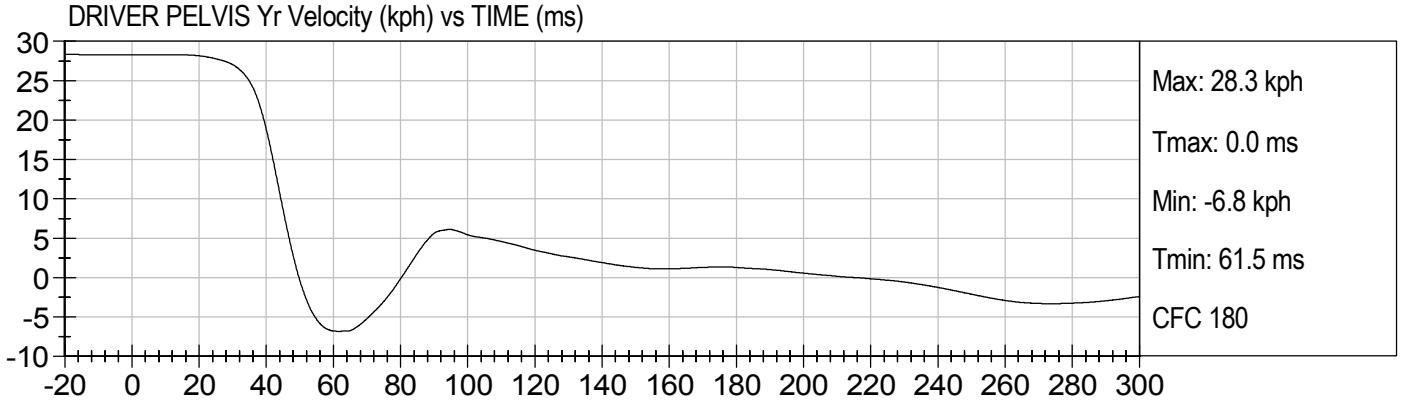
DRIVER LOWER SPINE Yr Velocity (kph) vs TIME (ms)



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



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

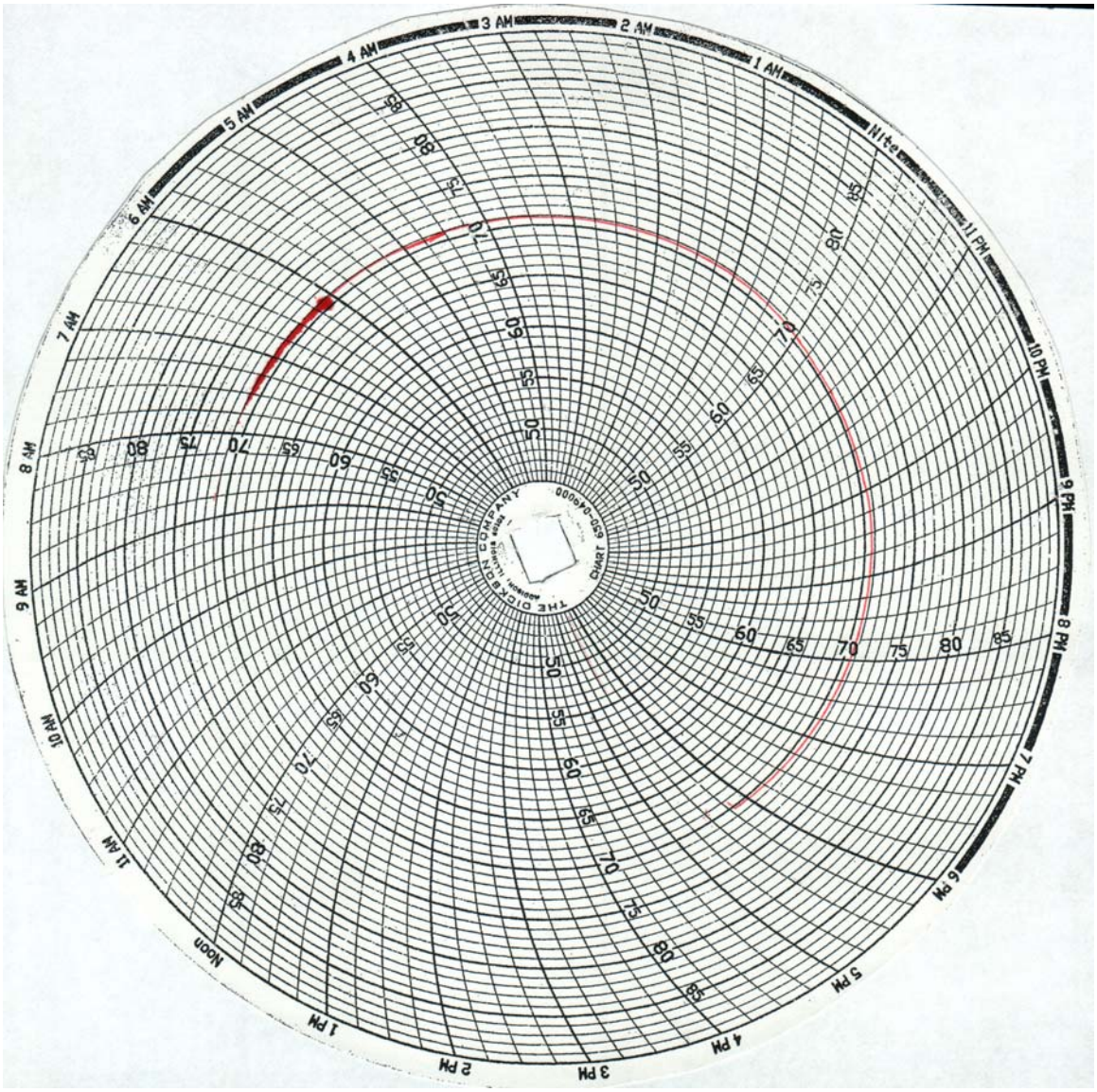


APPENDIX C

SID/HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Vehicle and Dummy Temperature

Test Vehicle:	2007 Buick Lacrosse CX	NHTSA No.	C70116
Test Program:	FMVSS 201P	Test Date:	August 22, 2007



SID/HIII Calibration Data Sheet

Side Impact Dummy

Head Drop Calibration (Lateral)

ATD Serial No: 036 **Test I.D:** D072391

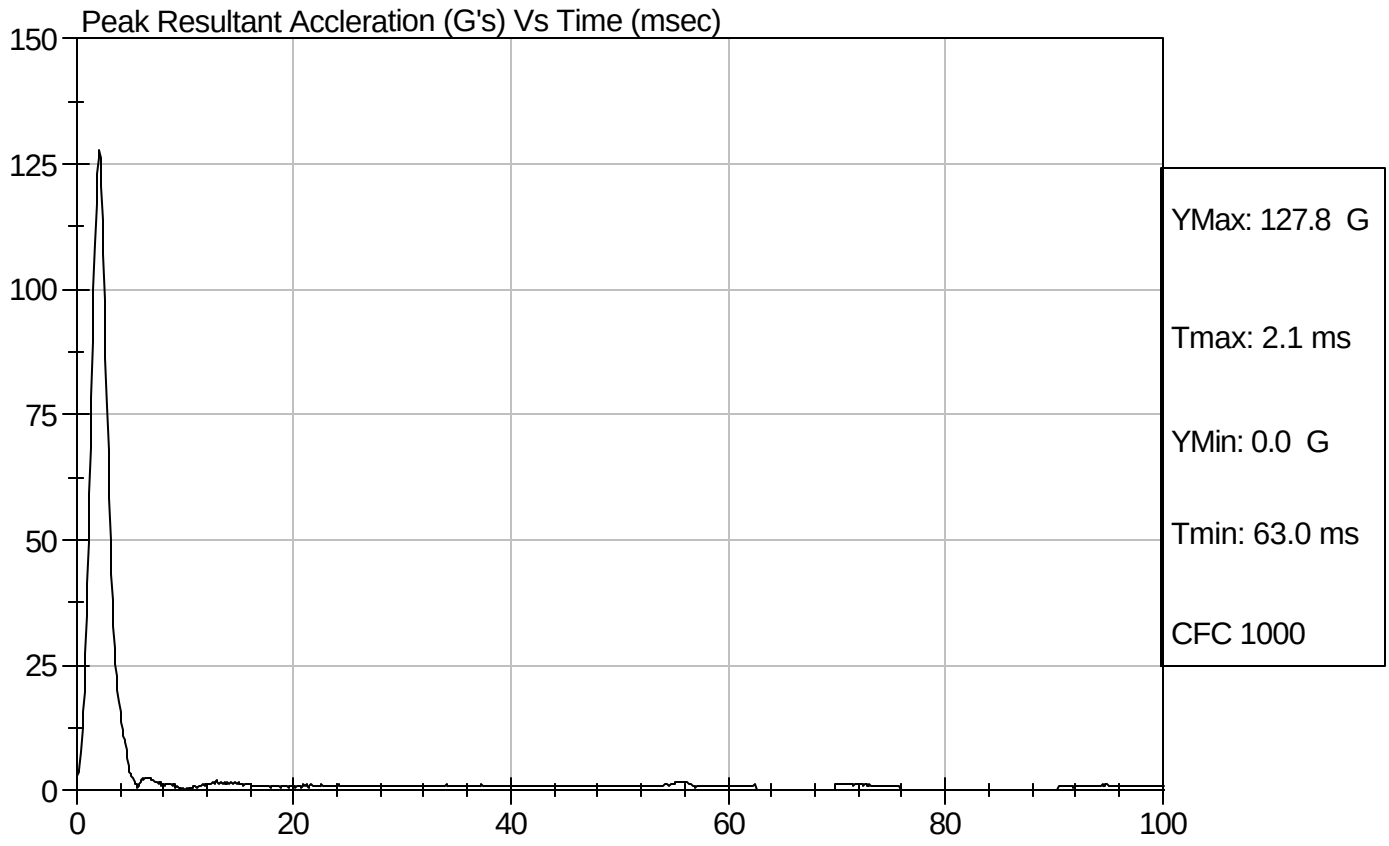
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.6	Pass
Laboratory Relative Humidity	%	10 to 70	41	Pass
Peak Resultant Acceleration	G's	120 to 150	128	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-7.5	Pass
		Overall Test Results		Pass

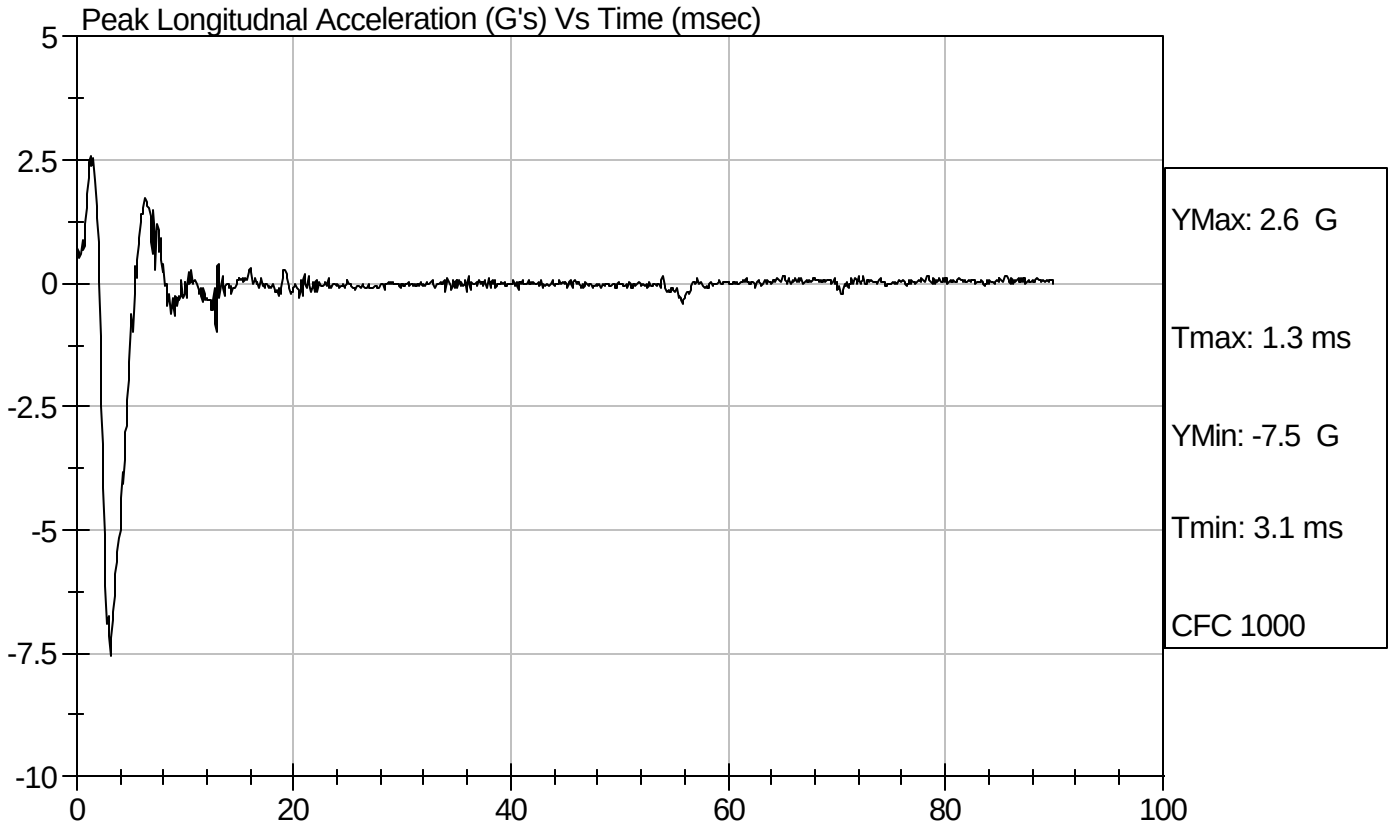
Jessica Gall
Laboratory Technician

8/16/07
Test Date

David Winkelbauer
Approved By

mga	Test Description: Head Drop	Test Date: 8/16/07
	Component: D072391	Speed: 0 ft/s, 0.00 m/s





SID/HIII Calibration Data Sheet

Side Impact Dummy

Thorax Impact Test

ATD Serial No: 036 **Test I.D:** D072392

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Probe Velocity	m/s	4.22 - 4.31	4.23	Pass
Upper Rib	G's	37 - 46	42	Pass
Lower Rib	G's	37 - 46	39	Pass
Lower Spine	G's	15 - 22	16	Pass
		Overall Test Results		Pass

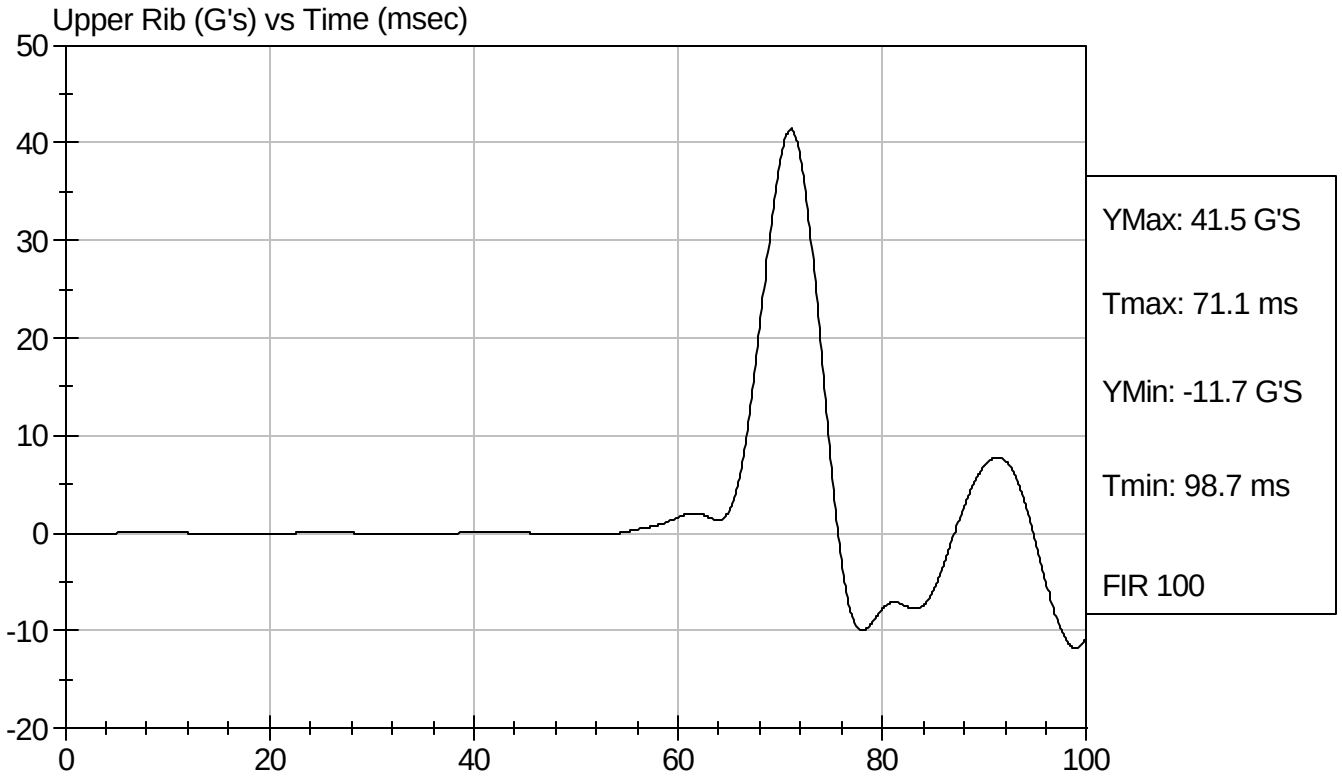
Jessica Hall
Laboratory Technician

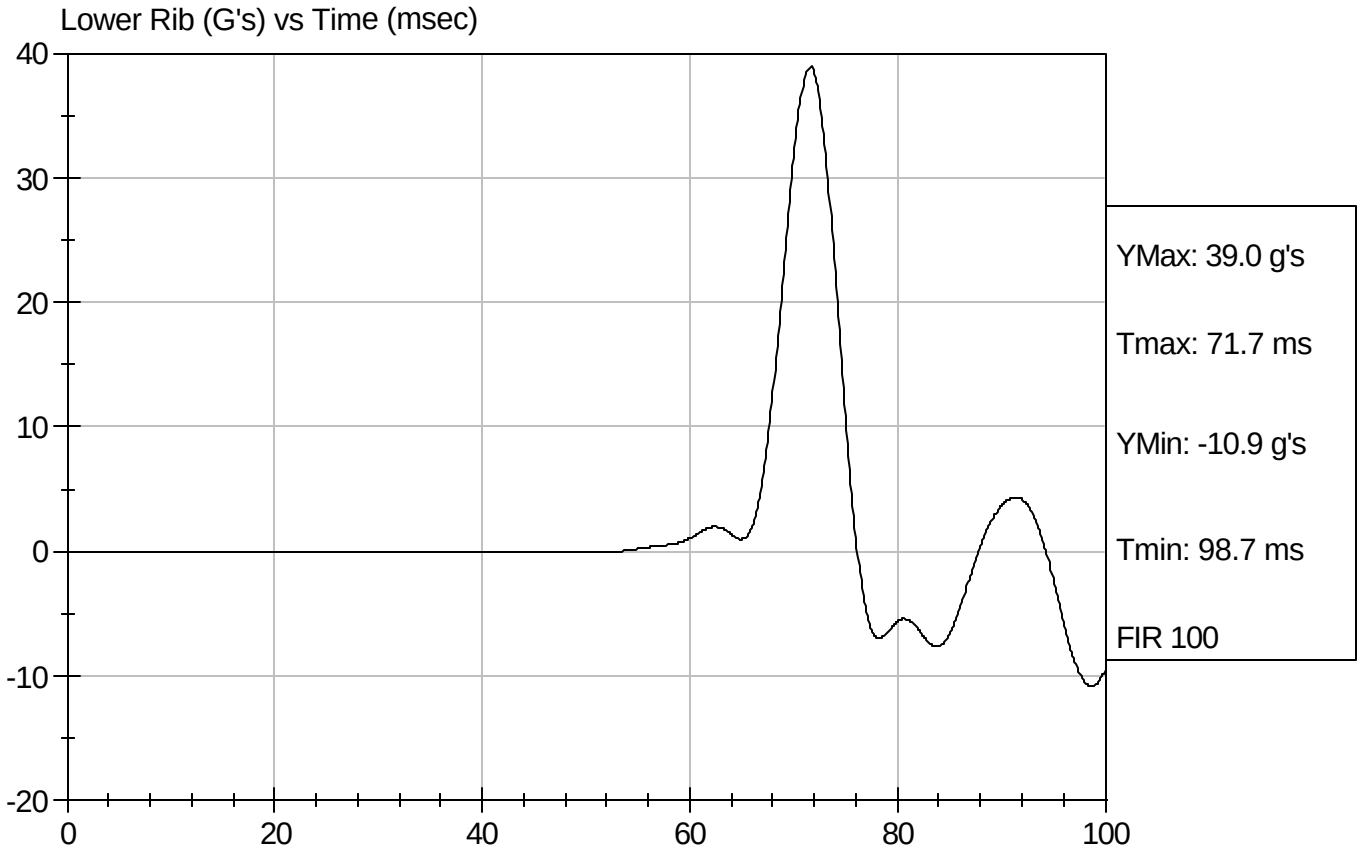
8/17/07
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Component ID: D072392

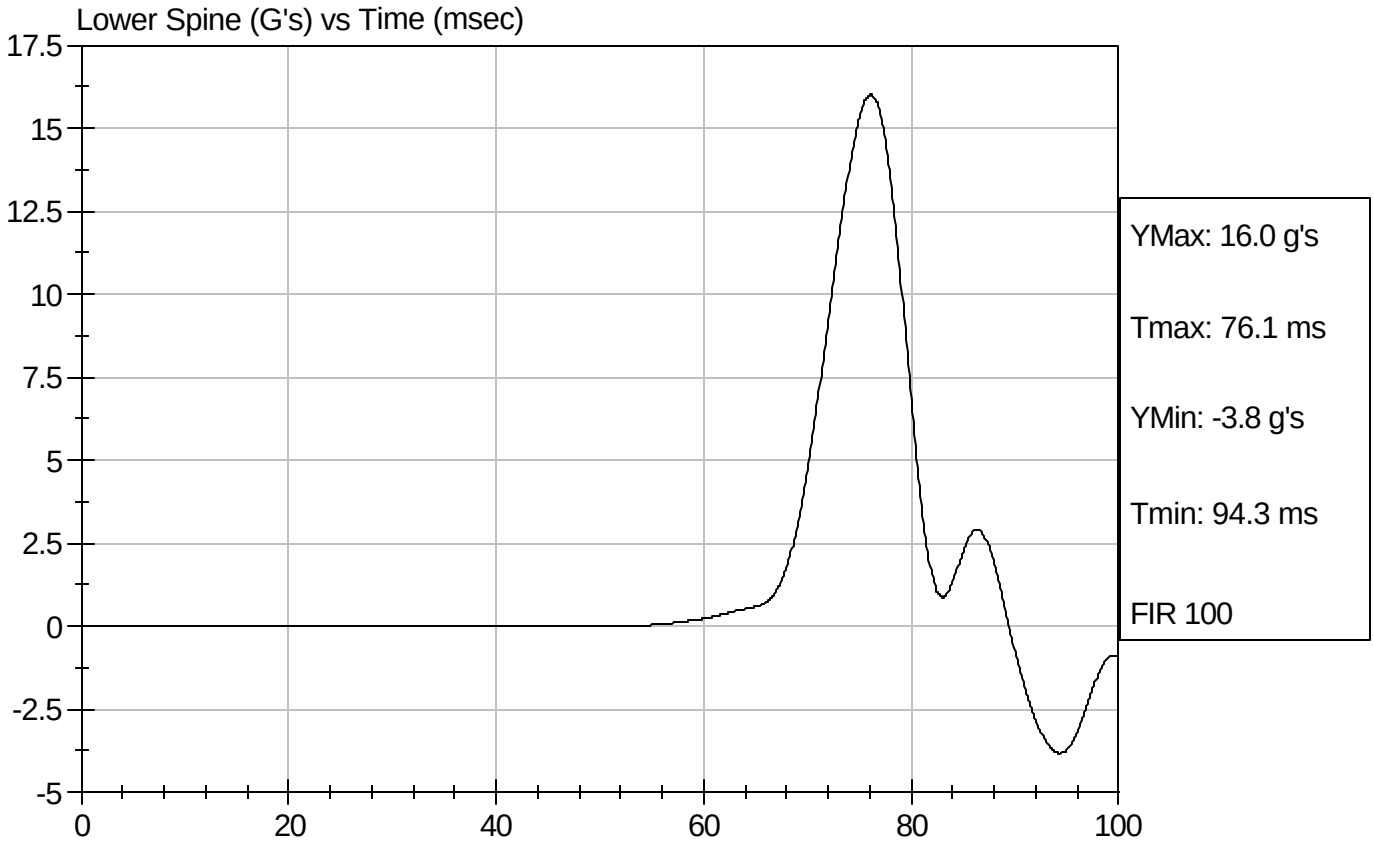
Test Date: 8/17/07
Speed: 13.89 ft/sec, 4.23 m/sec





Test Desc: Thorax Impact
Component ID: D072392

Test Date: 8/17/07
Speed: 13.89 ft/sec, 4.23 m/sec



SID/HIII Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 036 **Test I.D:** D072393

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	41	Pass
		Overall Test Results		Pass

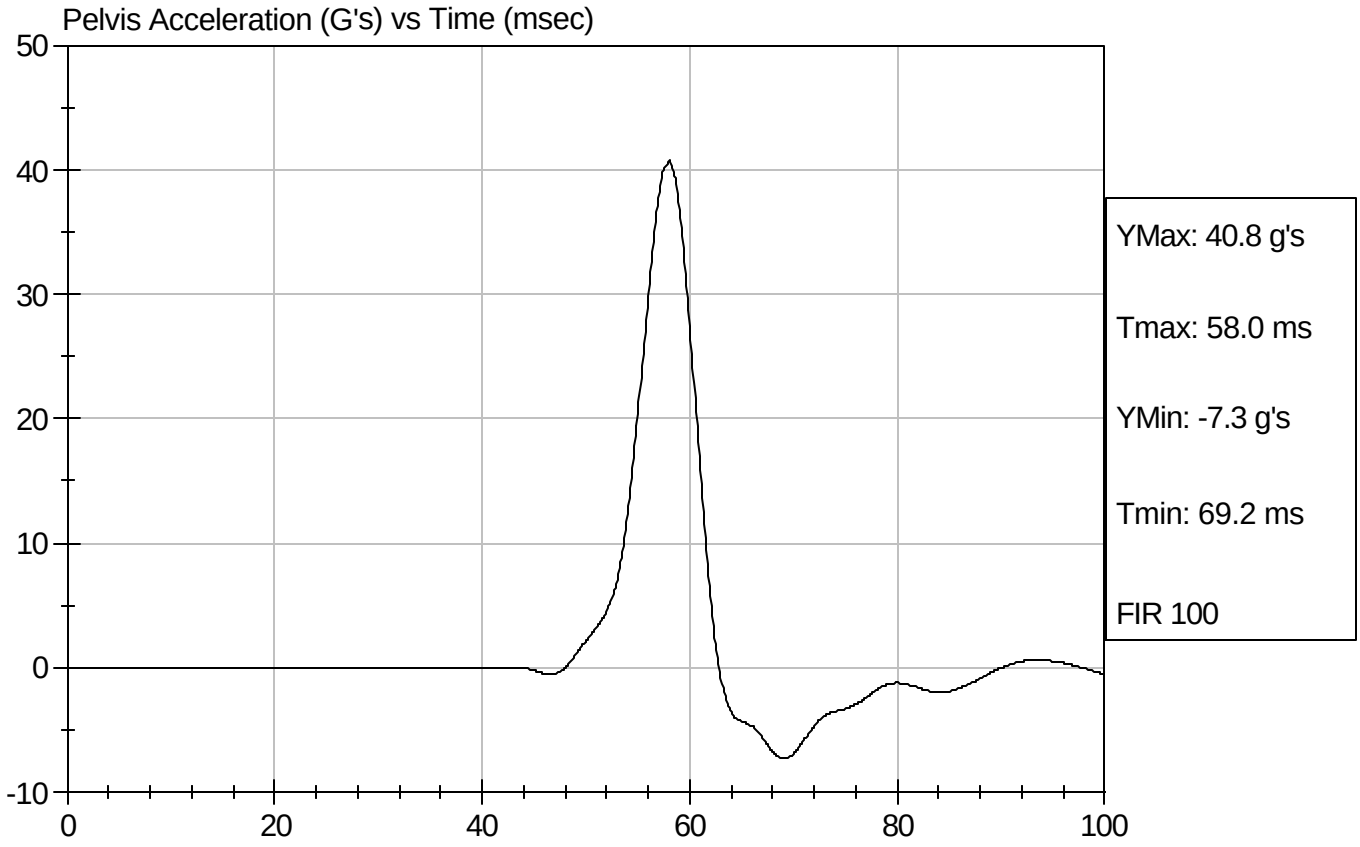
Jessica Gall
Laboratory Technician

8/17/07
Test Date

David Winkelbauer
Approved By

Test Desc: Pelvis Impact
Component ID: D072393

Test Date: 8/17/07
Speed: 14.12 ft/sec, 4.30 m/sec



SID/HIII Calibration Data Sheet

Side Impact Dummy

Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 036 **Test I.D:** D072394

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Force At 12.7 mm	N	104 -162	150	Pass
Force At 19 mm	N	163 - 222	210	Pass
Force At 25.4 mm	N	222 - 280	278	Pass
Force At 33 mm	N	325 - 391	374	Pass
		Overall Test Results		Pass

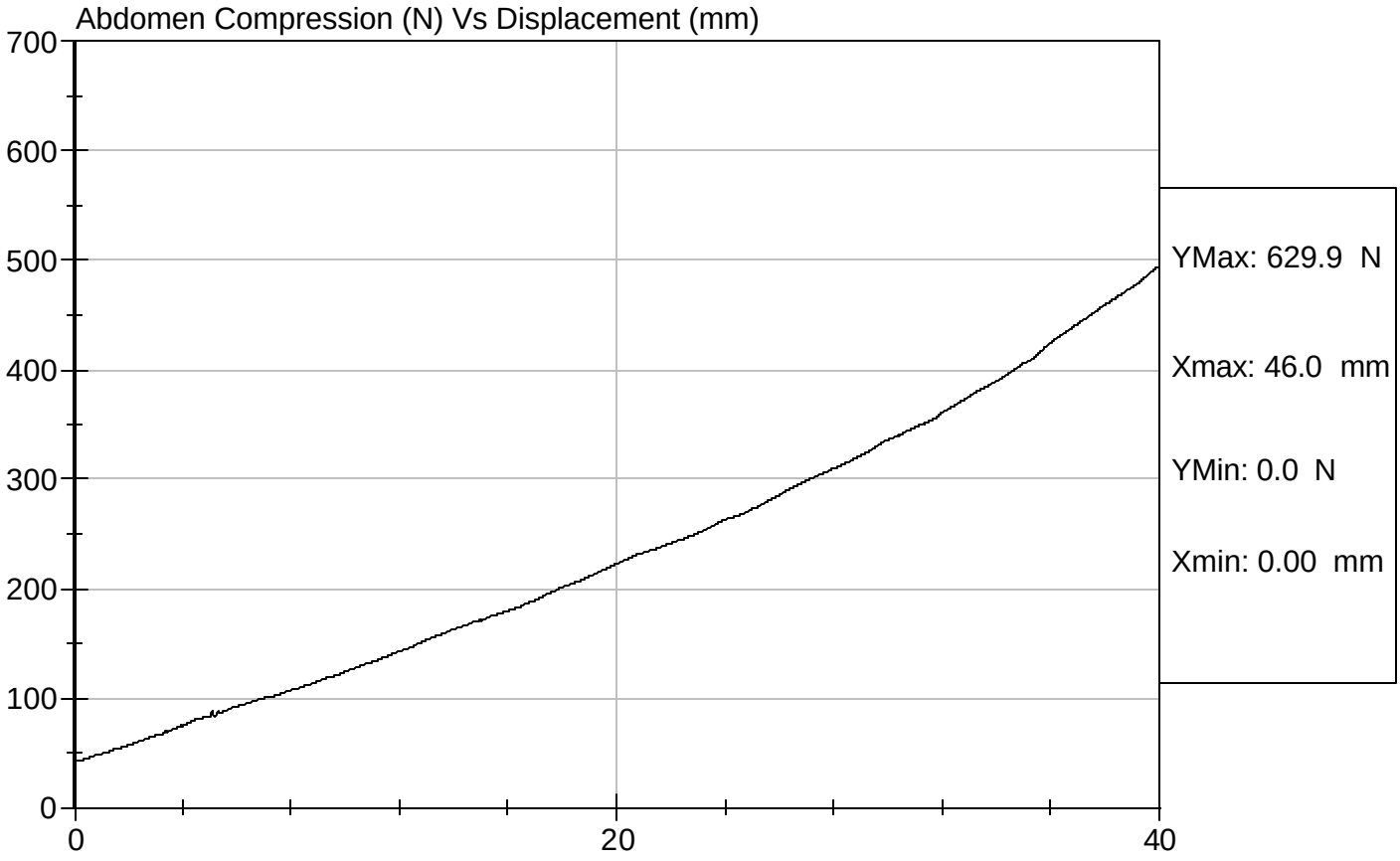
Jessica Gall
Laboratory Technician

8/16/07
Test Date

David Winkelbauer
Approved By

Test Description: Abdomen Compression Test Date: 8/16/07

Component: D072394 Speed: 0 ft/sec, 0 m/sec



SID/HIII Calibration Data Sheet

Side Impact Dummy

Lumbar Flexion Calibration

ATD Serial No: 036 **Test I.D:** D072395

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	40	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	136.8	Pass
Force At 30 deg	N	151.2 - 204.6	176.7	Pass
Force At 40 deg	N	204.6 - 258.0	227.1	Pass
Return Angle	Deg	12 Maximum	6	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

8/16/07
Test Date

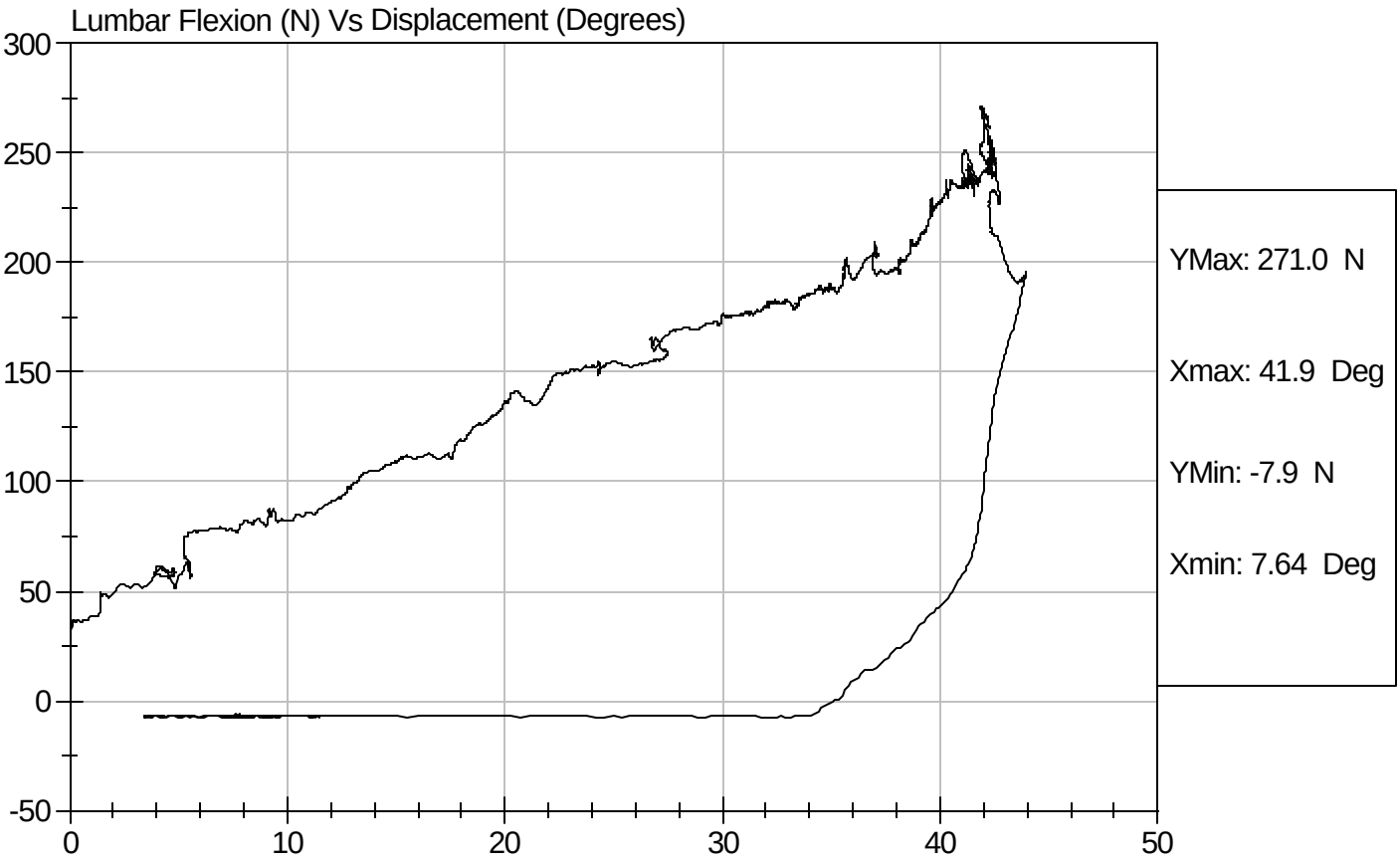
David Winkelbauer
Approved By

Test Description: Lumbar Flexion

Test Date: 8/16/07

Component: D072395

Speed: 0 ft/sec, m/sec



SID/HIII Calibration Data Sheet

Side Impact Dummy

Neck Pendulum Test

ATD Serial No: 036 **Test I.D:** D072399

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.7	Pass
Laboratory Relative Humidity		%	10 to 70	40	Pass
Impact Velocity		m/s	6.89 to 7.13	6.96	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.32	Pass
	20 msec	m/s	4.12 to 5.10	4.34	Pass
	30 msec	m/s	5.73 to 7.01	5.92	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.42	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	70	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	59	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	75	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	55	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	10	Pass

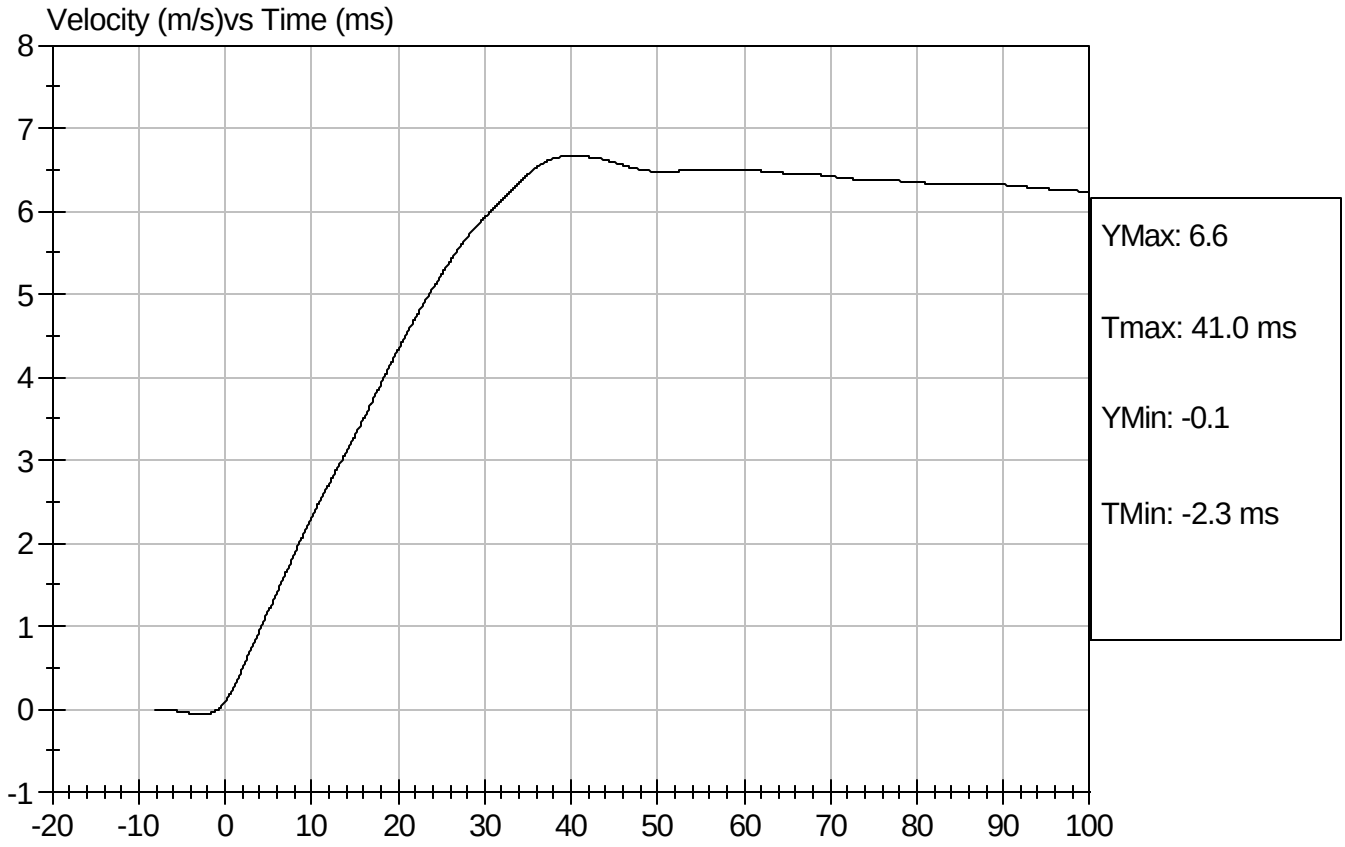
Jessica Hall
Laboratory Technician

8/16/07
Test Date

David Winkelbauer
Approved By

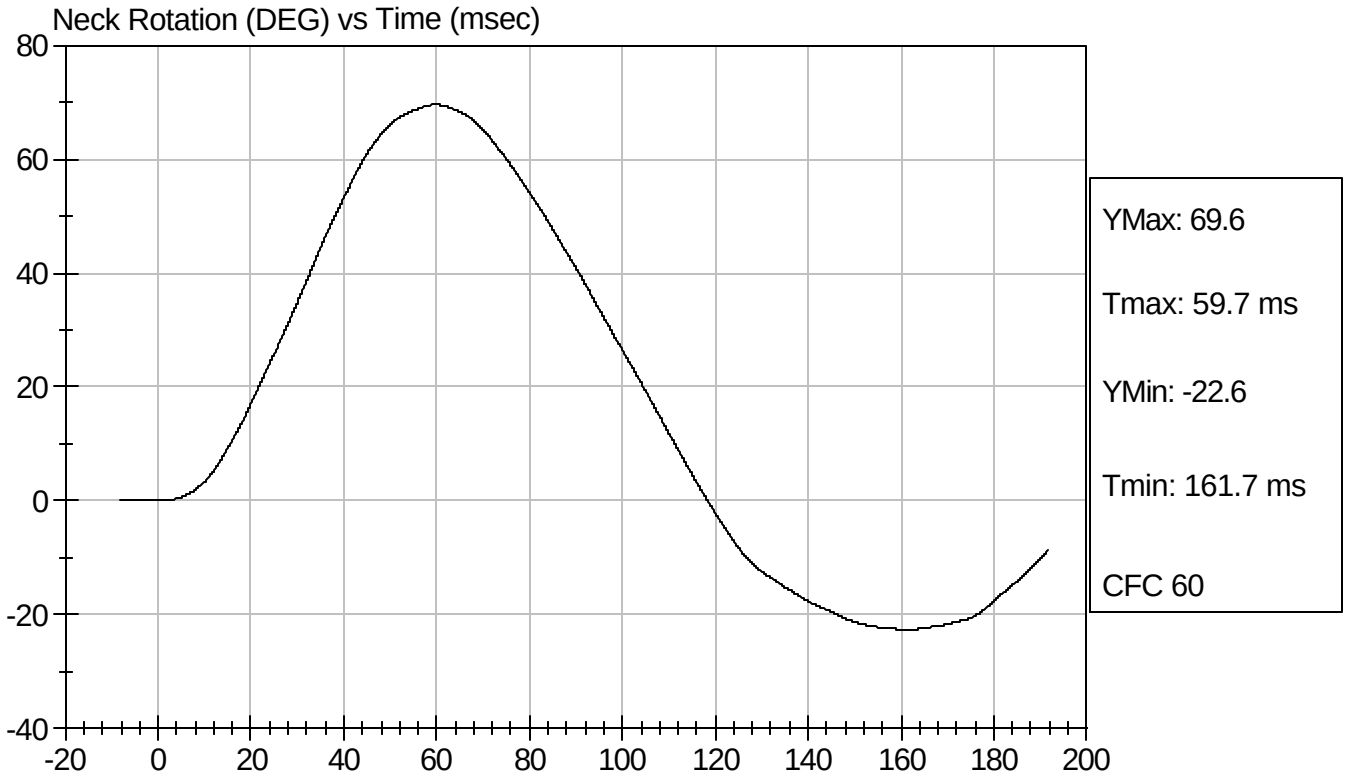
Test Desc: Neck Bending
Component ID: D072399

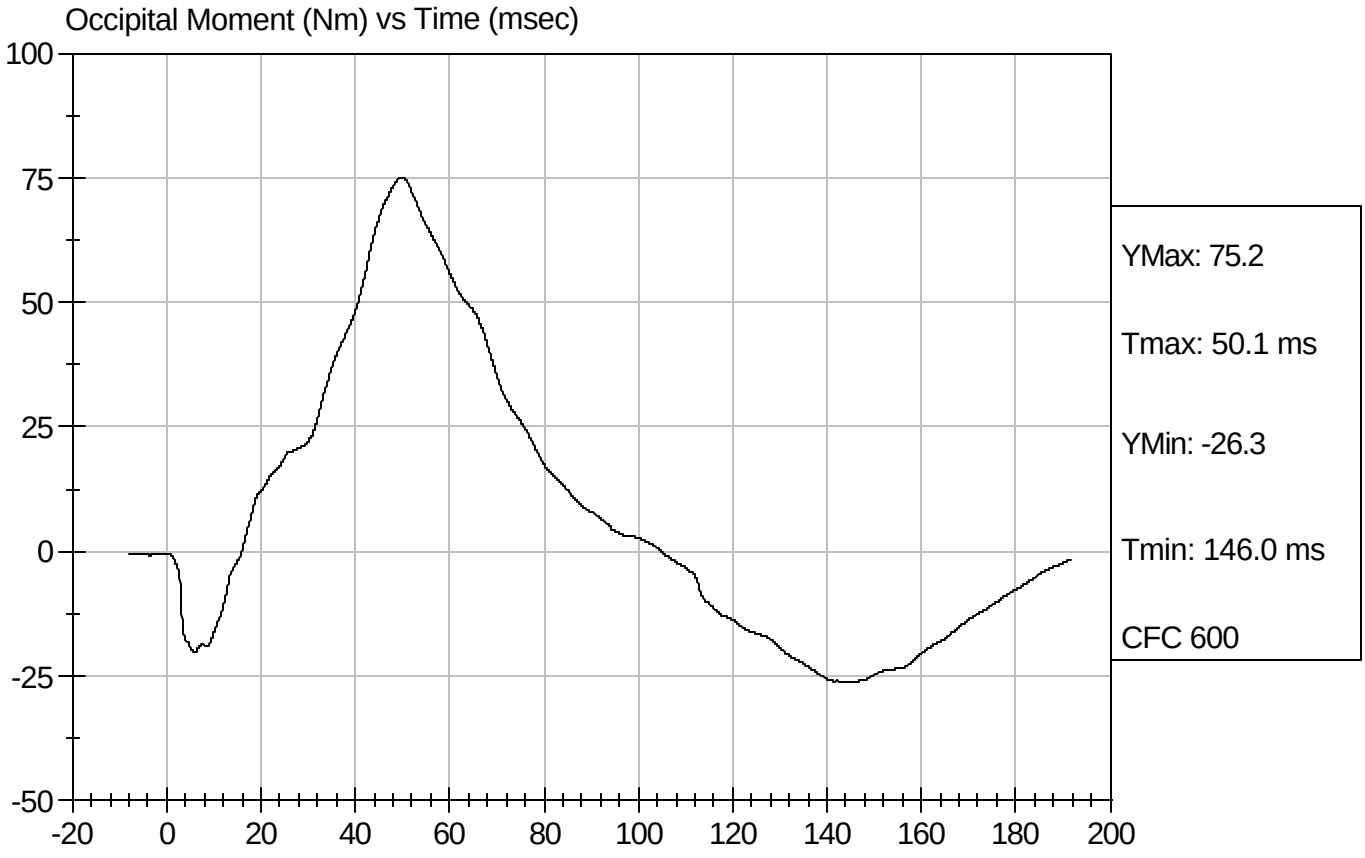
Test Date: 8/16/07
Speed: 22.831 ft/sec, 6.96 m/sec



Test Desc: Neck Bending
Component ID: D072399

Test Date: 8/16/07
Speed: 22.831 ft/sec, 6.96 m/sec





SID/HIII Calibration Data Sheet

Side Impact Dummy

Head Drop Calibration (Lateral)

ATD Serial No: 036 **Test I.D:** D072501

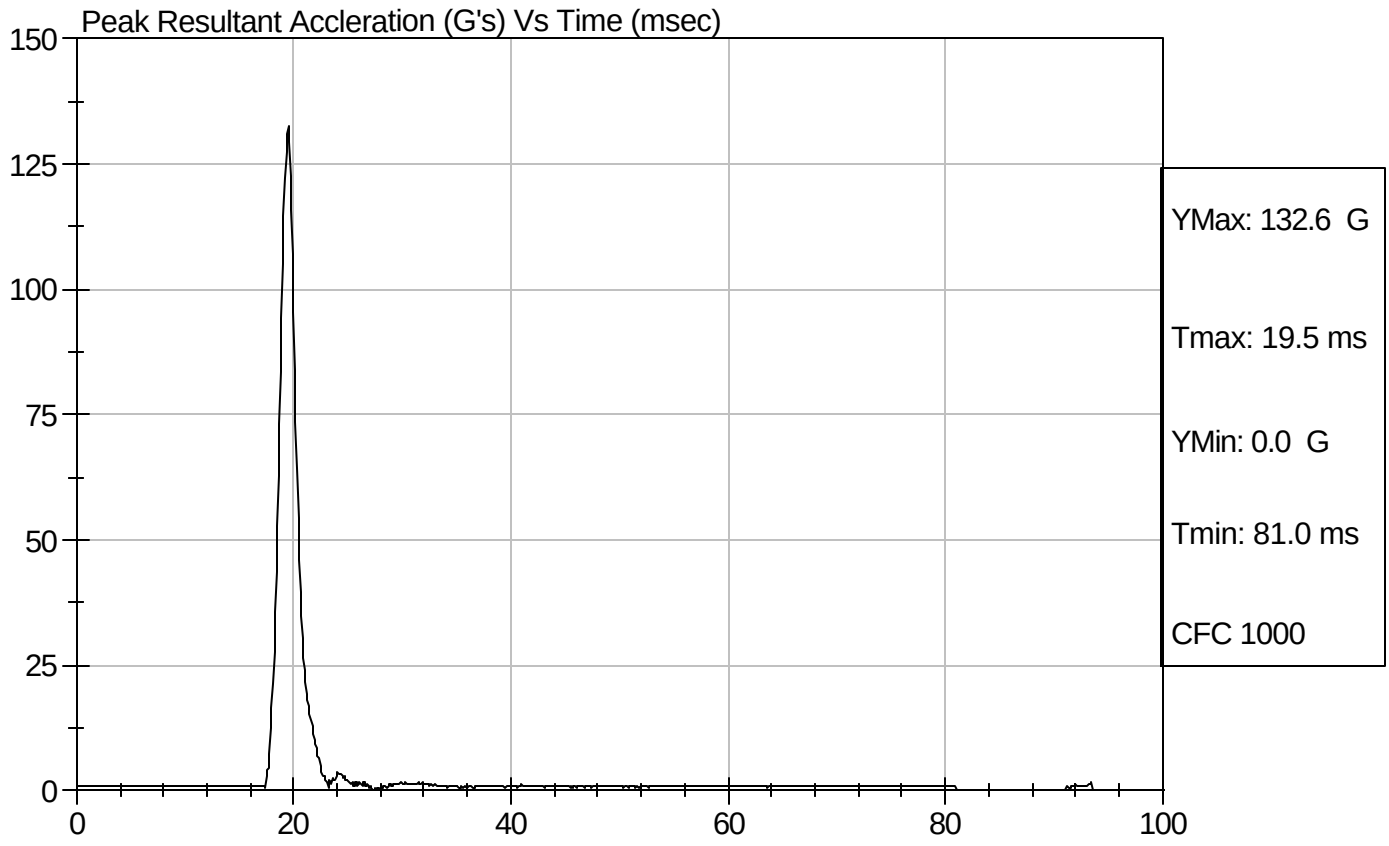
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	51	Pass
Peak Resultant Acceleration	G's	120 to 150	133	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-8.6	Pass
		Overall Test Results		Pass

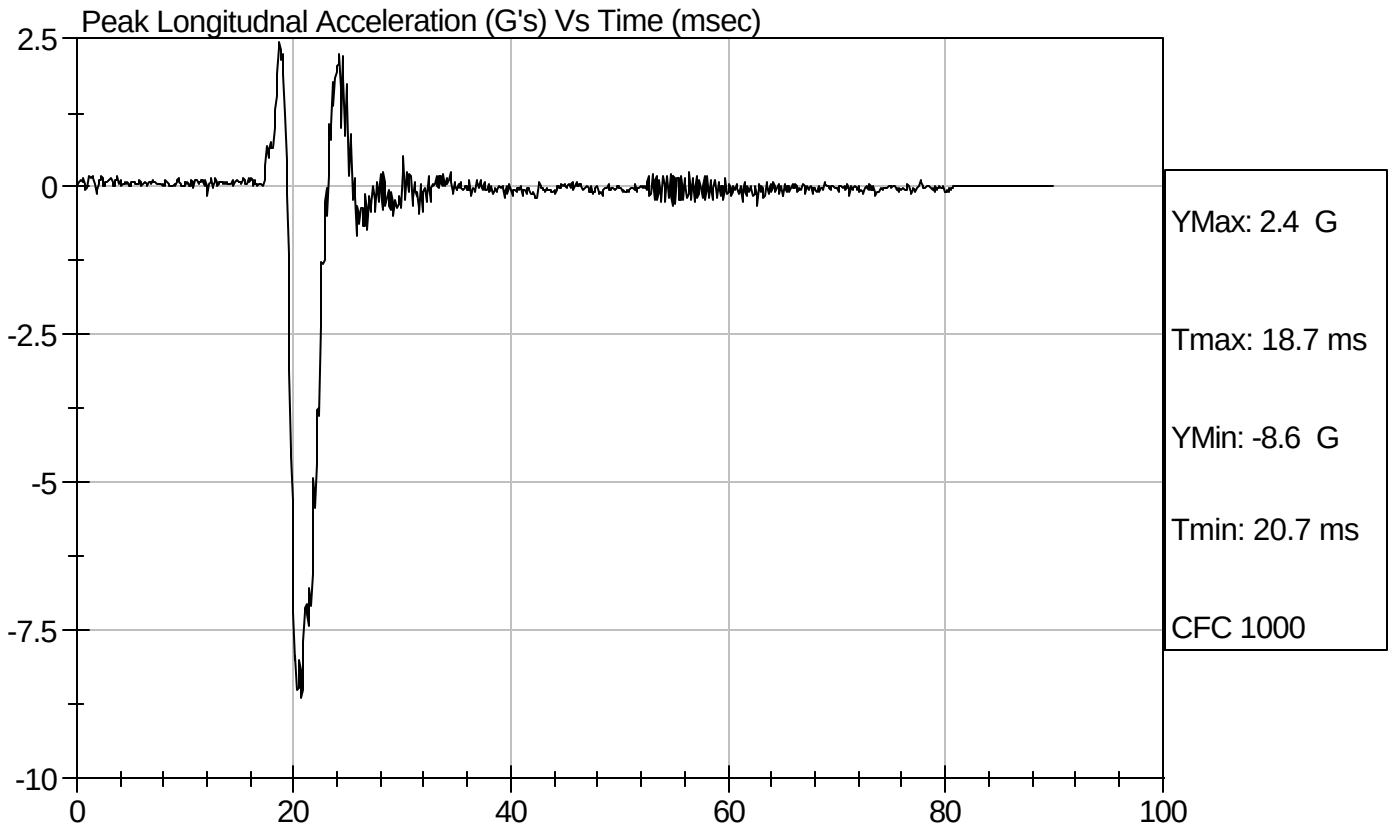
Jessica Hall
Laboratory Technician

8/22/07
Test Date

David Winkelbauer
Approved By

mga	Test Description: Head Drop	Test Date: 8/22/07
	Component: D072501	Speed: 0 ft/s, 0 m/s





SID/HIII Calibration Data Sheet

Side Impact Dummy

Thorax Impact Test

ATD Serial No: 036 **Test I.D:** D072502

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	48	Pass
Probe Velocity	m/s	4.22 - 4.31	4.27	Pass
Upper Rib	G's	37 - 46	43	Pass
Lower Rib	G's	37 - 46	39	Pass
Lower Spine	G's	15 - 22	17	Pass
		Overall Test Results		Pass

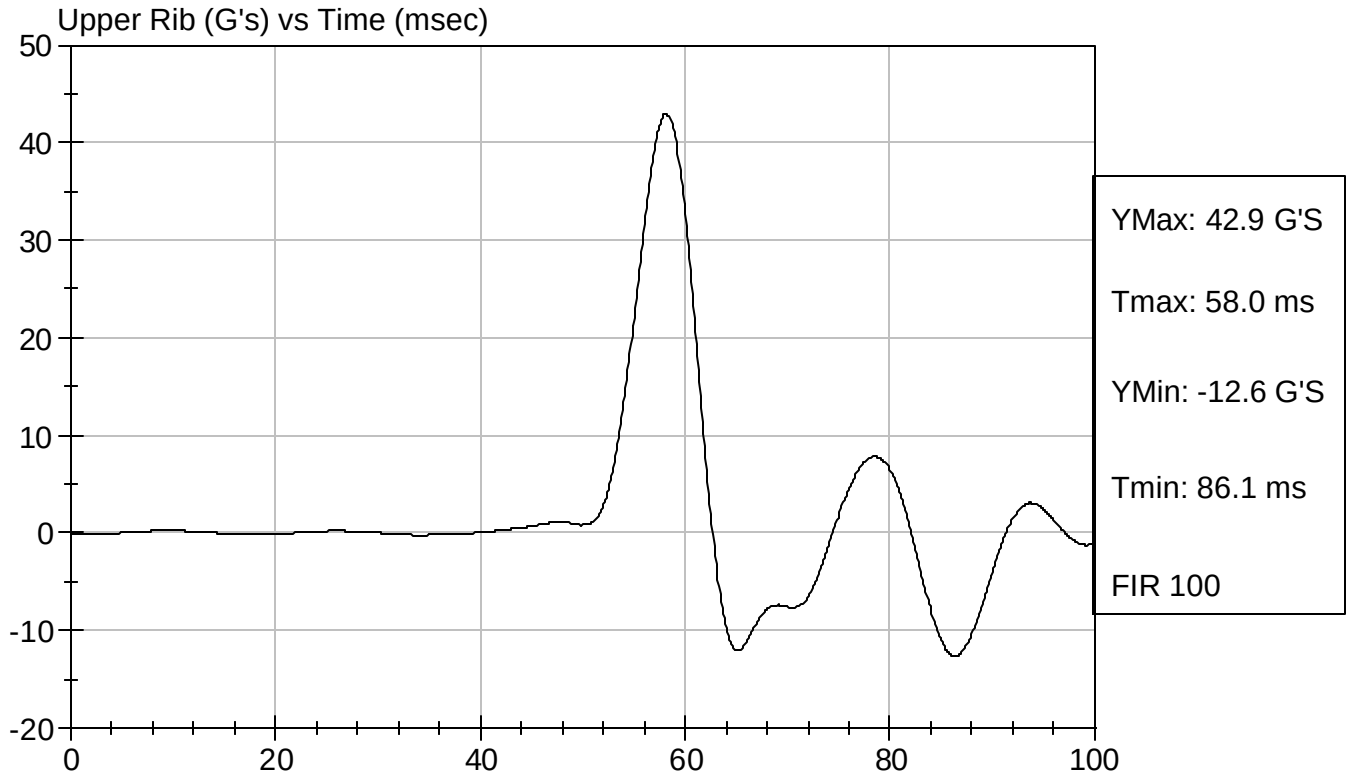
Jessica Hall
Laboratory Technician

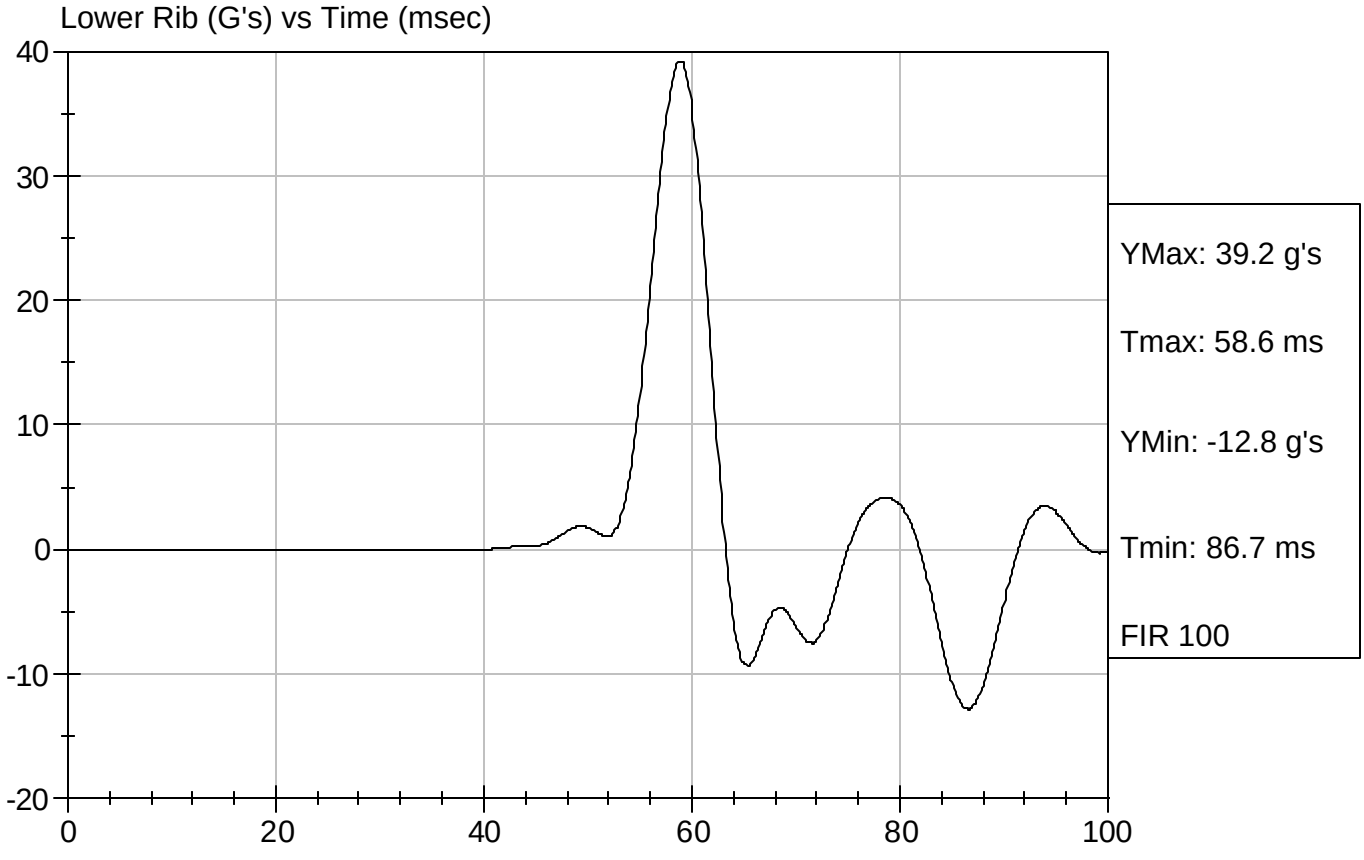
8/22/07
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Component ID: D072502

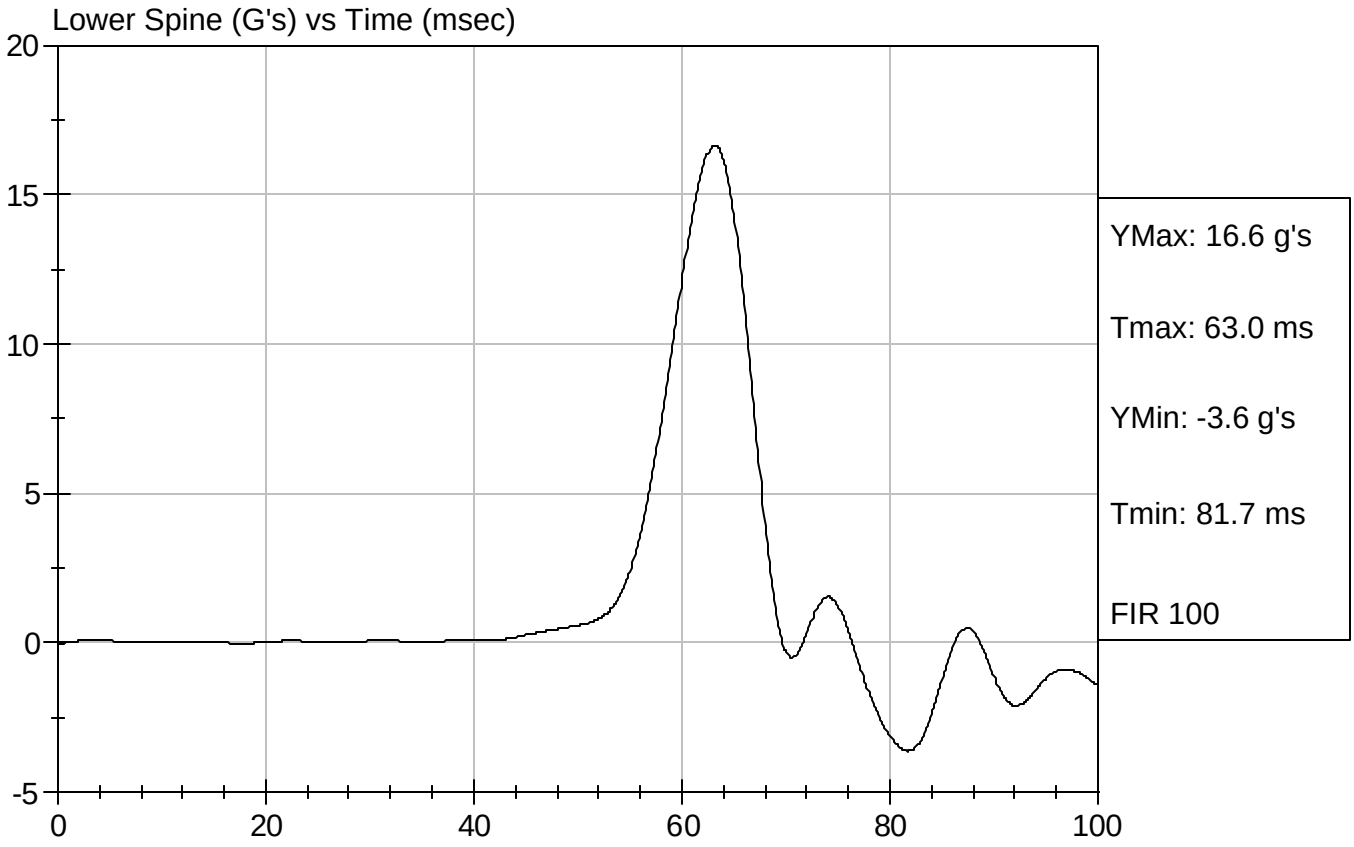
Test Date: 8/22/07
Speed: 14.005 ft/sec, 4.27 m/sec





Test Desc: Thorax Impact
Component ID: D072502

Test Date: 8/22/07
Speed: 14.005 ft/sec, 4.27 m/sec



SID/HIII Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 036 **Test I.D:** D072503

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	48	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	42	Pass
		Overall Test Results		Pass

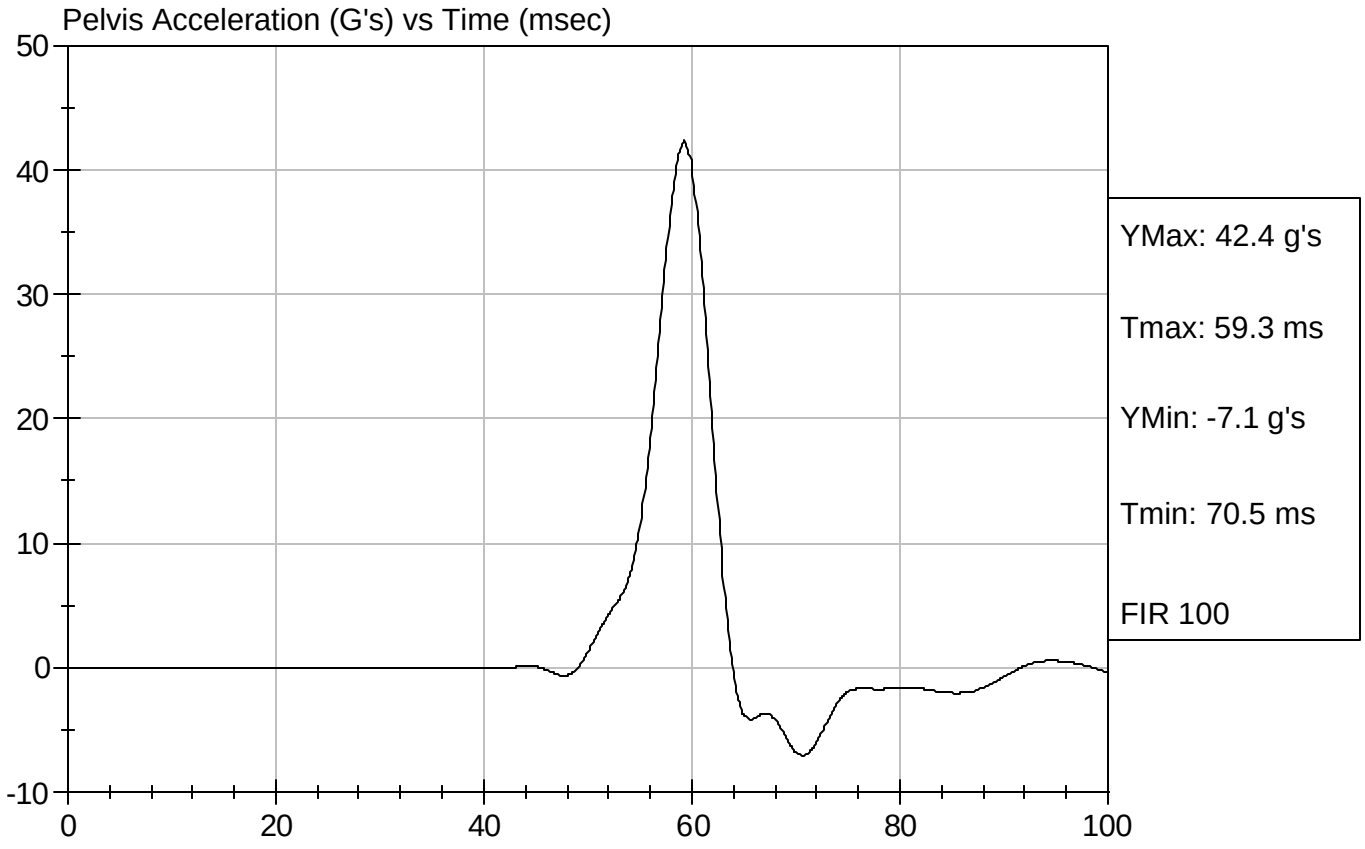
Jessica Gall
Laboratory Technician

8/22/07
Test Date

David Winkelbauer
Approved By

Test Desc: Pelvis Impact
Component ID: D072503

Test Date: 8/22/07
Speed: 14.124 ft/sec, 4.30 m/sec



SID/HIII Calibration Data Sheet

Side Impact Dummy

Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 036 **Test I.D:** D072504

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	50	Pass
Force At 12.7 mm	N	104 -162	144	Pass
Force At 19 mm	N	163 - 222	205	Pass
Force At 25.4 mm	N	222 - 280	279	Pass
Force At 33 mm	N	325 - 391	385	Pass
		Overall Test Results		Pass

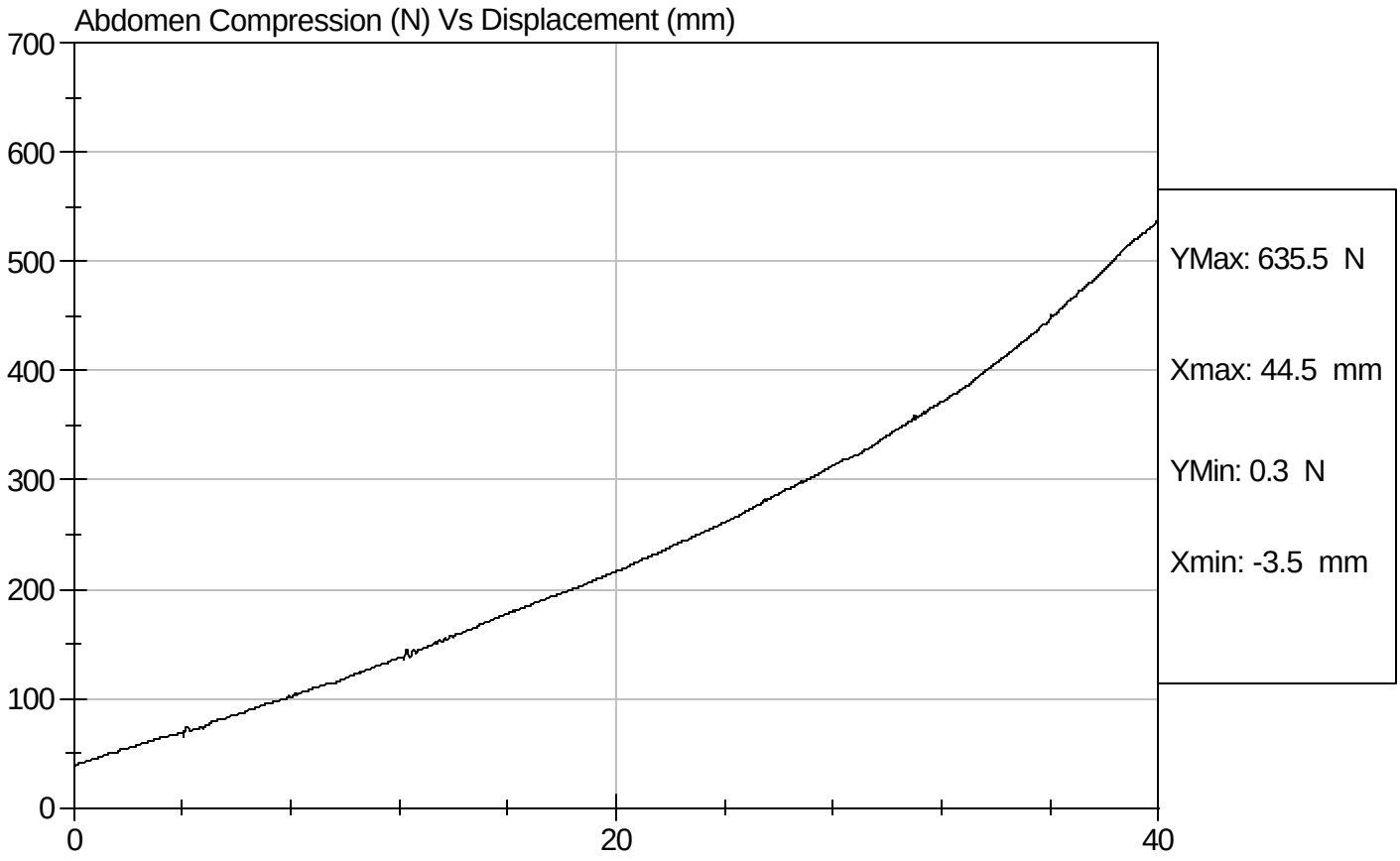
Jessica Gall
Laboratory Technician

8/22/07
Test Date

David Winkelbauer
Approved By

Test Description: Abdomen Compression Test Date: 8/22/07

Component: D072504 Speed: 0 ft/sec, 0 m/sec



SID/HIII Calibration Data Sheet

Side Impact Dummy

Lumbar Flexion Calibration

ATD Serial No: 036 **Test I.D:** D072505

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	51	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	120.1	Pass
Force At 30 deg	N	151.2 - 204.6	171.2	Pass
Force At 40 deg	N	204.6 - 258.0	241.1	Pass
Return Angle	Deg	12 Maximum	4	Pass
		Overall Test Results		Pass

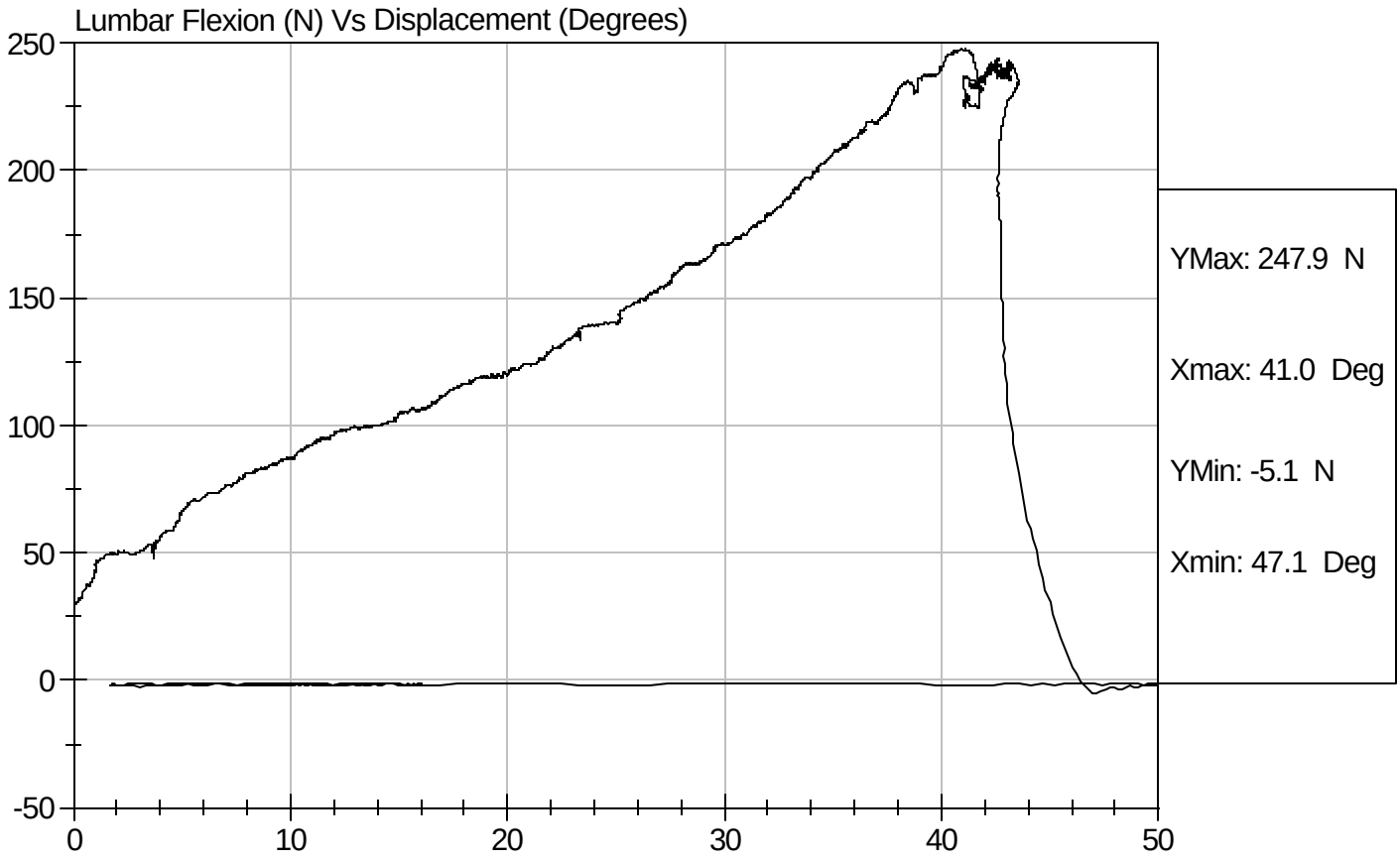
Jessica Hall
Laboratory Technician

8/22/07
Test Date

David Winkelbauer
Approved By

Test Description: Lumbar Flexion | Test Date: 8/22/07

Component: D072505 | Speed: 0 ft/sec, 0 m/sec



SID/HIII Calibration Data Sheet

Side Impact Dummy

Neck Pendulum Test

ATD Serial No: 036 **Test I.D:** D072509

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.0	Pass
Laboratory Relative Humidity		%	10 to 70	51	Pass
Impact Velocity		m/s	6.89 to 7.13	6.96	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.45	Pass
	20 msec	m/s	4.12 to 5.10	4.76	Pass
	30 msec	m/s	5.73 to 7.01	6.34	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.79	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	70	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	63	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	74	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	57	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	11	Pass

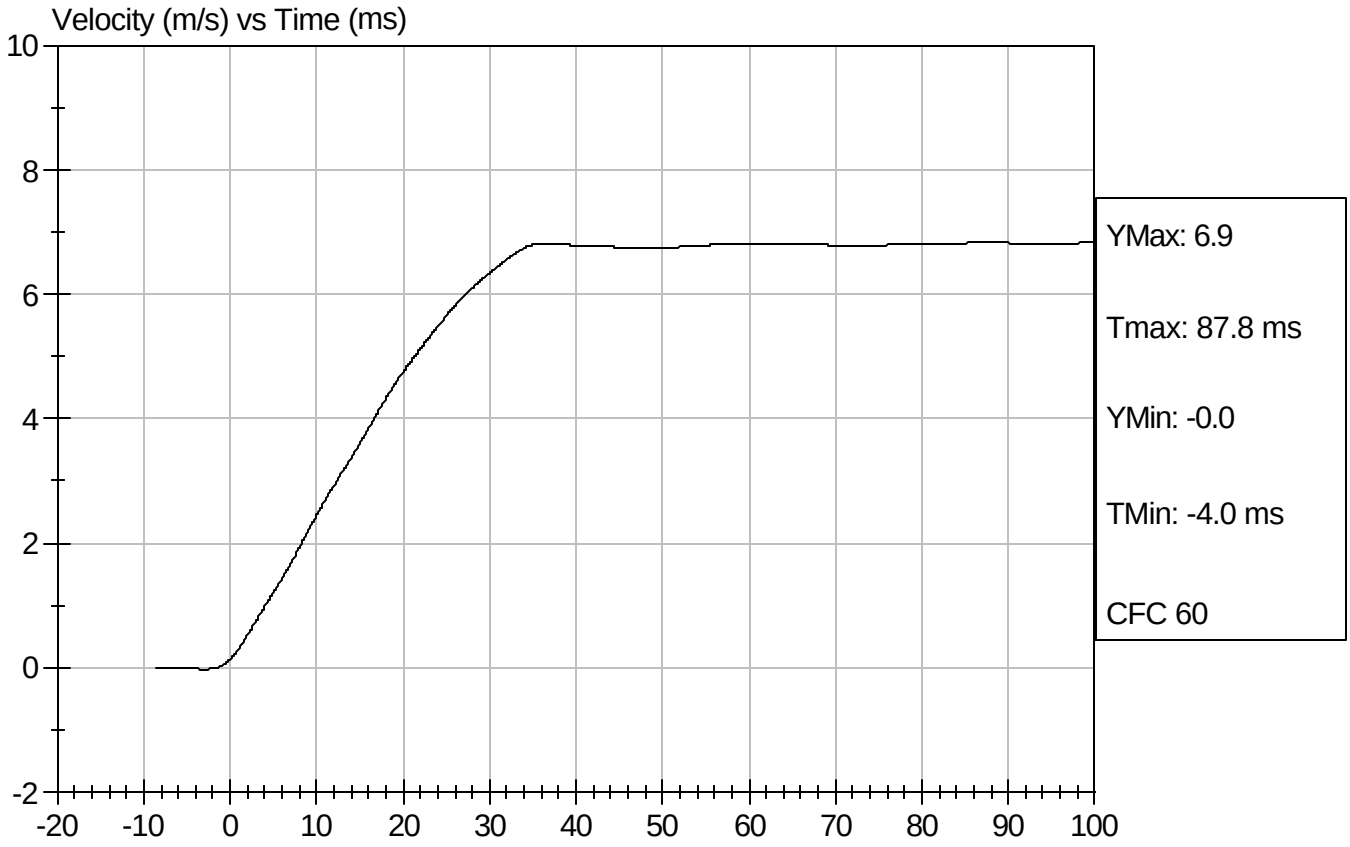
Jessica Hall
Laboratory Technician

8/22/07
Test Date

David Winkelbauer
Approved By

Test Desc: Neck Bending
Component ID: D072509

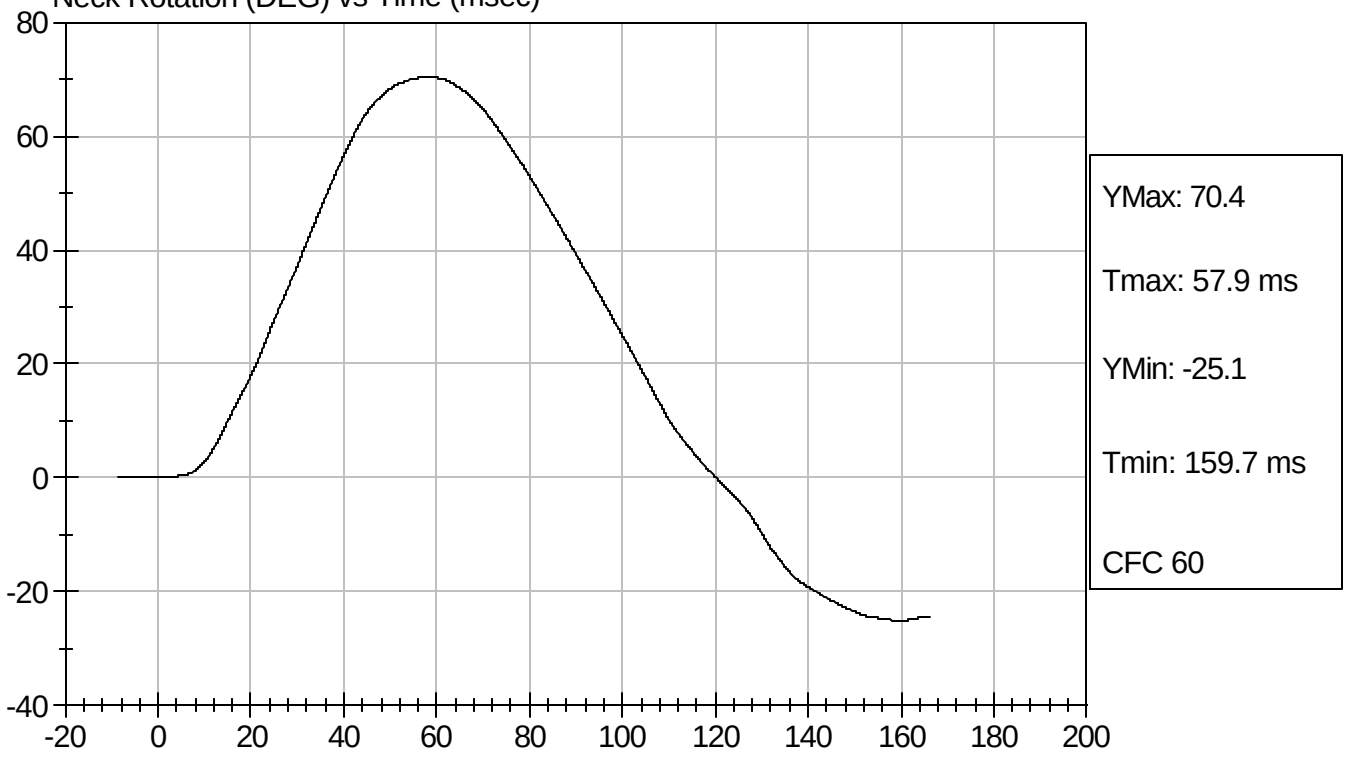
Test Date: 8/22/07
Speed: 22.831 ft/sec, 6.96 m/sec



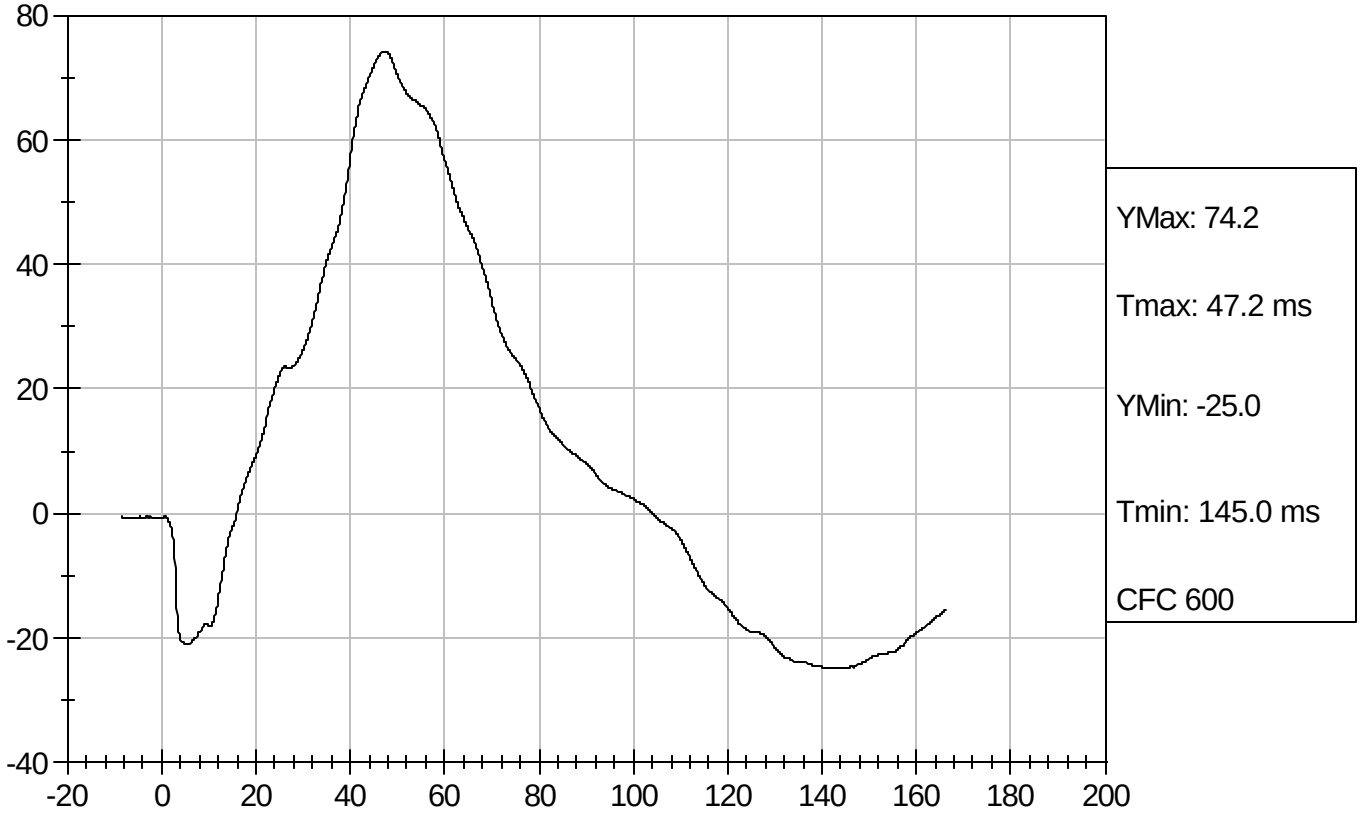
Test Desc: Neck Bending
Component ID: D072509

Test Date: 8/22/07
Speed: 22.831 ft/sec, 6.96 m/sec

Neck Rotation (DEG) vs Time (msec)



Occipital Moment (Nm) vs Time (msec)



APPENDIX D

CALIBRATION INFORMATION DATA

DUMMY AND VEHICLE CALIBRATION DATA

	INSTRUMENTS FOR DRIVER S/N 036		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head CG X	C10727	Endevco	5/02/2007
Head CG Y	AGH70	Endevco	5/02/2007
Head CG Z	AGH78	Endevco	5/2/2007
Neck Load Cell	252	Denton	8/14/2007
Upper Rib Y	P47103	Endevco	7/25/2007
Lower Rib Y	H10-L06	Entran	5/17/2007
Lower Spine Y	J14-J19	Entran	7/25/2007
Pelvis Y	E20-R04	Entran	7/25/2007
Upper Rib Redundant Y	G04-Z45	Entran	7/23/2007
Lower Rib Redundant Y	F29-Z02	Entran	6/28/2007
Lower Spine Redundant Y	J23-M11	Entran	7/25/2007
Pelvis Redundant Y	F22-Z01	Entran	7/25/2007

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Vehicle CG X	H06-L35	Entran	6/27/2007
Vehicle CG Y	E05-Z47	Entran	6/27/2007
Vehicle CG Z	04J14-J10	Entran	4/12/2007
Left Floor Y	J23808	Endevco	6/27/2007
Left A-Post @ Sill Y	AGM47	Endevco	6/27/2007
Left Lower A-Post Y	J20392	Endevco	7/24/2007
Left Mid A-Post Y	J20298	Endevco	7/24/2007
Left B-Post @ Sill Y	AALH1	Endevco	5/14/2007
Left Lower B-Post Y	ANAT6	Endevco	5/14/2007
Left Mid B-Post Y	AP2D7	Endevco	5/14/2007
Driver Seat Track Y	J13652	Endevco	8/16/2007
LF Door Accel. #1 Y	AH1F9	Endevco	7/24/2007
LF Door Accel. #2Y	AGTY4	Endevco	7/24/2007
LF Door Accel. #3 Y	AH097	Endevco	7/24/2007
Upper Engine X	J13630	Endevco	4/12/2007
Upper Engine Y	J10420	Endevco	4/12/2007
Firewall Y	AJ411	Endevco	5/14/2007
Right Floor Sill Y	E05-Z12	Entran	7/24/2007
Rear Deck X	AH0A2	Endevco	4/12/2007
Rear Deck Y	AJ462	Endevco	4/12/2007