REPORT NUMBER: 201-MGA-2006-003

SAFETY COMPLIANCE TESTING FOR FMVSS 201
RIGID POLE SIDE IMPACT TEST

HYUNDAI MOTOR COMPANY
2006 HYUNDAI ACCENT GLS 4-DR
NHTSA NUMBER: C60516

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

TEST DATE: SEPTEMBER 14, 2006

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF VEHICLE SAFETY COMPLIANCE
400 SEVENTH STREET, SW, ROOM 6111 (NVS-220)
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-01033.

Prepared by: _____ Date: September 21, 2006
Ben Fischer, Project Engineer

Reviewed by: David J. Winkelbauer Date: September 21, 2006
David Winkelbauer, Director of Operations

FINAL REPORT ACCEPTED BY:

_____
COTR, Side Impact

10.4.2006
Date of Acceptance

Technical Report Documentation Page

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7. Author(s) Ben Fischer, Project Engineer		*8. Performing Organization Report No.* 201-MGA-2006-003	
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		*10. Work Unit No.* *11. Contract or Grant No.* DTNH22-01-D-01033	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance 400 Seventh St., S.W. Washington, D.C. 20590		*13. Type of Report and Period Covered* Final Report – 9/14/06 to 10/04/06 *14. Sponsoring Agency Code* NVS-220	
15. Supplementary Notes			
16. Abstract A rigid pole side impact test was conducted on a 2006 Hyundai Accent GLS 4-Dr. 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 September 14, 2006. The impact velocity of the vehicle was 28.2 kph, and the ambient temperature at the struck side (driver's) of the target vehicle at the time of impact was 21^{o}C. The post-test maximum crush was 350 mm at level 3. The test vehicle's occupant performance is as follows: HIC: REQUIREMENT ≤ 1000; DRIVER 407 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) 400 Seventh Street, S.W. Washington, D.C. 20590	
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PURPOSE AND TEST PROCEDURE

1.1 PURPOSE

This rigid pole side impact test is conducted as part of the FY' 2006 test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract No. DTNH22-01-D-01033. The purpose of this test was to evaluate occupant protection in interior impact in a 2006 Hyundai Accent GLS 4-Dr. manufactured by Hyundai Motor Company.

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 2006 Hyundai Accent GLS 4-Dr. The subject vehicle was towed into a rigid pole at a velocity of 28.2 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 1303.2 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on September 14, 2006.

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 350 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		407
TTI*	G's	36.8
Pelvis*	G's	49.6
Neck Force X*	N	151
Neck Force Y*	N	342
Neck Force Z*	N	855
Neck Moment X*	Nm	-37.8
Neck Moment Y*	Nm	-12.1
Neck Moment Z*	Nm	16.4

* 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 test:

- A Pillar Upper Y
- B Pillar Upper Y
- Left Roof Y
- Right Roof Y

There was no valid data collected for Vehicle CG Y after 40 msec.

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

Test Vehicle: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006

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: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006

TEST VEHICLE INFORMATION

Make	Hyundai
Model	Accent
Body Style	Sedan
NHTSA No.	C60516
VIN	KMHCN46C16U019760
Color	Sand Beige
Delivery Date	9/7/06
Odometer Reading (mile)	112
Dealer	Arrow Hyundai
Transmission	Automatic
Final Drive	Front
Number of Cylinders	4
Engine Displacement (L)	1.6
Engine Placement	Lateral

TEST VEHICLE OPTIONS

Front Airbag	Yes
Side Airbags	Side and Curtain
Power Windows	No
Power Steering	Yes
Power Door Locks	No
Tilt Wheel	Yes
Air Conditioning	No
Power Brakes	Yes
Disc Brakes, Front	Yes
Disc Brakes, Rear	Yes
Anti-lock Brakes	Yes
AM/FM/CD	Yes
Anti-theft System	No
Cruise Control	No

DATA FROM CERTIFICATION LABEL

Manufactured By	Hyundai Motor Company
Date of Manufacture	DEC/20/05

GVWR (kg)	1650
GAWR Front (kg)	870
GAWR Rear (kg)	850

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	210	210
Recommended Tire Size	P185/65R14	P185/65R14
Tire Size on Vehicle	P185/65R14	P185/65R14
Tire Manufacturer	Kumho	Kumho

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Buckets	Bench		
Number Of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				385
Cargo Wt. (RCLW) (kg)				45

DATA SHEET NO. 1... (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	379.8	229.6		417.8	267.2	
Right	kg	350.7	223.4		373.3	244.9	
Ratio	%	61.7	38.3		60.7	39.3	
Totals	kg	730.5	453.0	1183.5	791.1	512.1	1303.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1183.5
Weight of SID/HIII Side Impact Dummy	kg	80.7
Rated Cargo/Luggage Weight (RCLW)	kg	45
Calculated Vehicle Target Weight (TVTW)	kg	1309.2

TEST VEHICLE ATTITUDES

	Units	As Delivered	Fully Loaded	Ready For Test
Right Front	mm	661	644	716
Left Front	mm	651	630	714
Right Rear	mm	639	608	723
Left Rear	mm	639	605	714
Right Door Sill Angle	deg	0.5 ND	0.2 NU	0.4 ND
Left Door Sill Angle	deg	0.4 ND	0.1 NU	0.2 ND
Front Bumper Angle	deg	0.5 LD	0.7 LD	0.7 LD
Rear Bumper Angle	deg	0.6 LD	0.8 LD	0.7 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	2499
Total Vehicle Length at Left Side	mm	3412
Total Vehicle Length at Centerline	mm	4378
Total Vehicle Length at Right Side	mm	3412
Total Vehicle Width at B-Post	mm	1698
Weight of Ballast in Cargo Area	kg	0
Amount of Stoddard Solvent in Fuel Tank	liters	41.7

DATA SHEET NO. 1… (Continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006

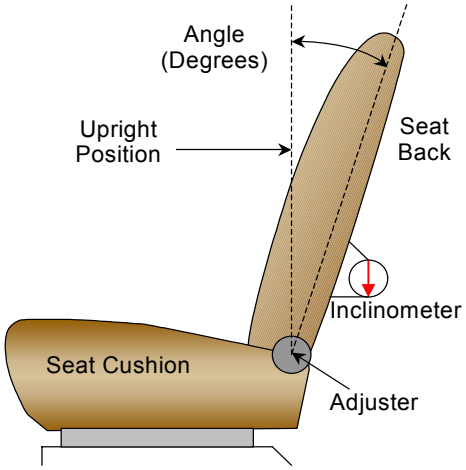
TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Target Impact Point Aft of Front Axle	mm	1317
Actual Impact Point Aft of Front Axle	mm	1322

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: Test detent (with the forward-most detent defined as 0) is 5.

Initial driver seat back angle: 5th detent (1st as 0)
Final driver seat back angle: 1st detent (1st as 0)



FRONT SEAT ASSEMBLY

SEAT FORE/AFT POSITIONS

Manufacturer: Manual adjustable, 22 total detents
Seat position: The fore/aft was set to 7th position from the full forward locking position as 0.

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: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006

FUEL TANK CAPACITY DATA

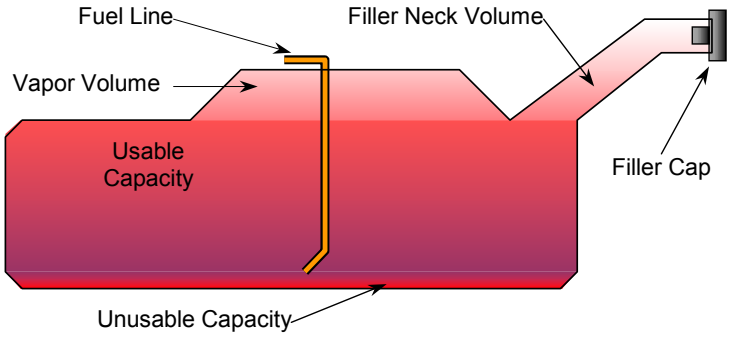
The "Usable Capacity" of the standard equipment fuel tank is: 45.0 liters

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

92-94% of "Usable Capacity" for certification to FMVSS 301 requirements: 41.4 – 42.3 liters

Actual amount of Stoddard solvent added to vehicle for certification test 41.7 liters

The vehicle is equipped with electric fuel pump.

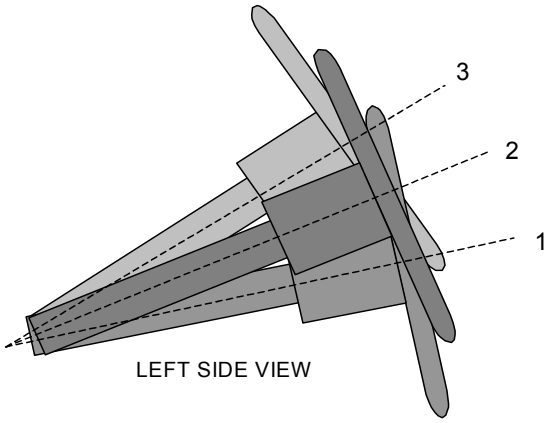


VEHICLE FUEL TANK ASSEMBLY

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 at 24.9 degrees.



STEERING COLUMN ASSEMBLY

DATA SHEET NO. 2

TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	379.8	229.6		417.8	267.2	
Right	kg	350.7	223.4		373.3	244.9	
Weight Ratio	%	61.7	38.3		60.7	39.3	
Totals	kg	730.5	453.0	1183.5	791.1	512.1	1303.2

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measured Parameter	Units	Maximum Crush	Above Ground
Level 1	Sill Top Height	mm	280	326
Level 2	Occupant H-Point	mm	336	574
Level 3	Mid Door	mm	350	643
Level 4	Window Sill	mm	282	1023
Level 5	Window Top	mm	152	1430
N/A	Maximum Penetration	mm	350	643

INSTRUMENTATION

SID/HIII Instrumentation	17
Vehicle Structure Accelerometers	20
Total	37

CAMERAS

Onboard Vehicle	3
Offboard Vehicle	8
Total	11

IMPACT POINT DATA

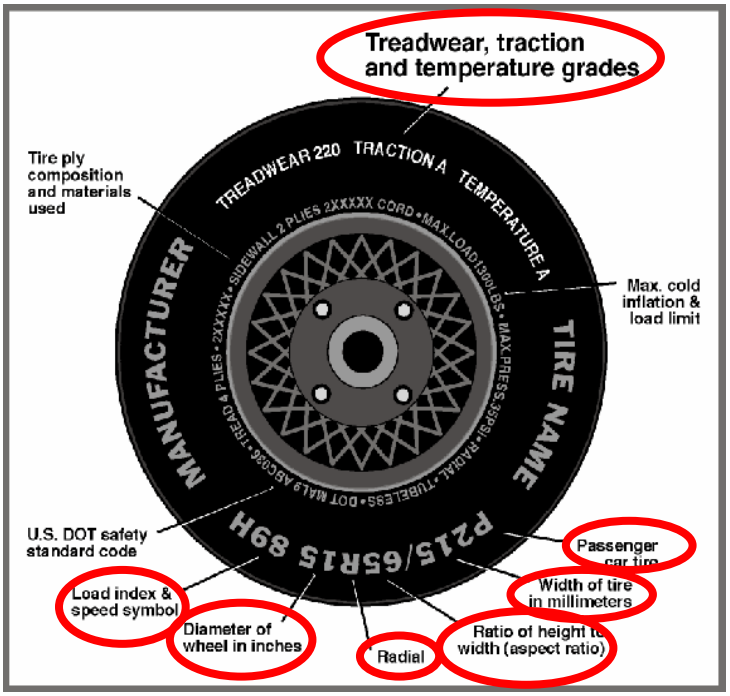
Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 38	5 rearward

DATA SHEET NO. 3

TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006

Vehicle Year	2006	Vehicle Make	Hyundai
VIN	KMHCN46C16U019760	Vehicle Model	Accent



	Front	Rear
Tire Manufacturer	Kumho	Kumho
Tire Name	Solus HP4 Plus	Solus HP4 Plus
Tire Type	P	P
Tire Width (mm)	185	185
Ratio of Height to Width (aspect ratio)	65	65
Radial	R	R
Wheel Diameter	14	14
Load Index & Speed Symbol	85H	85H
Treadwear		
Traction Grade		
Temperature Grade		

DATA SHEET NO. 4

POST TEST OBSERVATIONS

Test Vehicle: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Left Front Seating Position
Dummy Type / Serial No.	SID/HIII / 036
Head Contact	Curtain Airbag, Headrest
Upper Torso Contact	Side Airbag
Lower Torso Contact	Side Airbag
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	Yes
Curtain	Yes

ARMREST LOCATION AND SEAT CRUSH

	Driver
Front Armrest (from bottom of window)	254
Front Seat Back Crush	74
Front Seat Cushion Crush	96

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 5

SID/HIII INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006

THORAX AND PELVIS PEAK ACCELERATIONS (FIR 100 Filtered)

Location	Axis	Units	Driver			
			Max	Time	Min	Time
Upper Rib (LUR)	Y	G's	28.3	20	-3.2	165
Upper Rib (LUR) (R)	Y	G's	29.5	20	-4.2	164
Lower Rib (LLR)	Y	G's	27.8	43	-3.8	13
Lower Rib (LLR) (R)	Y	G's	27.5	51	-3.6	13
Lower Spine (T_{12})	Y	G's	45.3	46	-10.6	89
Lower Spine (T_{12}) (R)	Y	G's	45.1	46	-11.0	89
Pelvis (PEV)	Y	G's	49.6	45	-10.3	86
Pelvis (PEV) (R)	Y	G's	49.8	45	-10.2	86

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

Location	Driver			
	LUR	T_{12}	TTI(g)	PEV(g)
Rib, Spine, and Pelvis	28.3	45.3	36.8	49.6
Rib, Spine, and Pelvis (R)	29.5	45.1	37.3	49.8

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

Location	Axis	Units	Driver			
			Max	Time	Min	Time
Neck Force	X	N	151	232	-150	52
Neck Force	Y	N	342	44	-287	202
Neck Force	Z	N	855	46	-165	274
Neck Moment	X	Nm	13.8	118	-37.8	58
Neck Moment	Y	Nm	7.6	44	-12.1	245
Neck Moment	Z	Nm	16.4	58	-9.6	236

HEAD CG PEAK ACCELERATIONS (SAE CLASS 1000 Filtered)

Location	Axis	Units	Driver			
			Max	Time	Min	Time
Head CG	X	G's	4.1	224	-10.7	61
Head CG	Y	G's	62.8	54	-7.9	210
Head CG	Z	G's	12.5	46	-2.7	24
Head CG Resultant		G's	63.4	54		

HEAD INJURY CRITERIA (SAE CLASS 1000 Filtered)

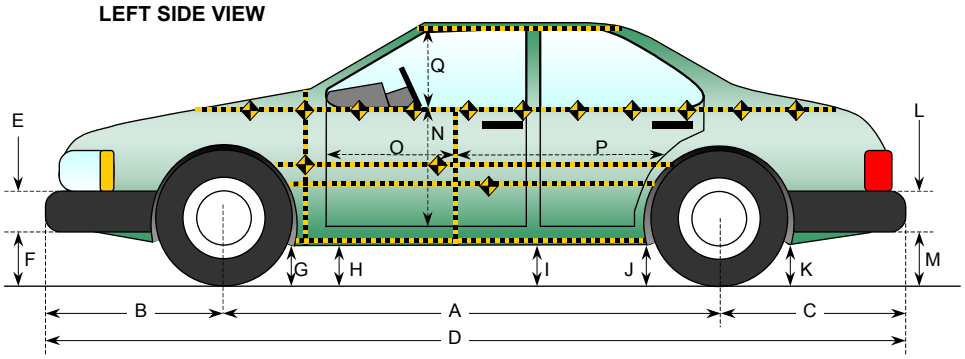
Location	Driver		
	HIC	T1	T2
Head CG Resultant	407	43.4	64.6

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: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006



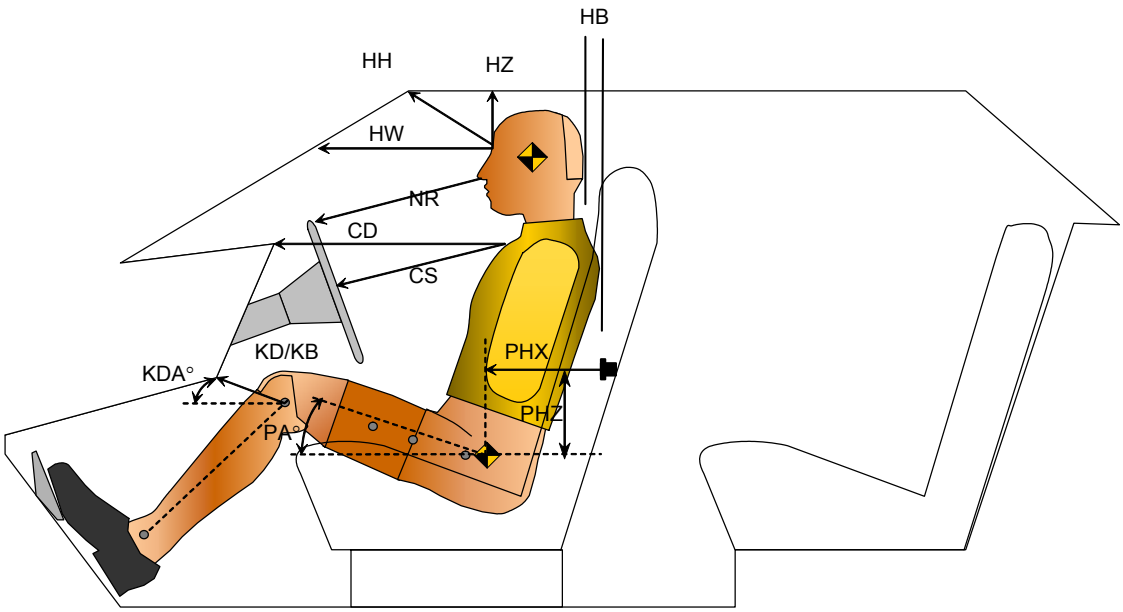
All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2499	2421	78
B	Front Axle to FSOV	838	816	22
C	Rear Axle to RSOV	1041	936	105
D	Total Length at Centerline	4378	4173	205
E	Front Bumper Thickness	177	177	0
F	Front Bumper Bottom to Ground	482	475	7
G	Sill Height at Front Wheel Well	303	290	13
H	Sill Height at Front Door Leading Edge	299	300	-1
I	Sill Height at "B" Pillar	303	312	-9
J1	Sill Height at Rear Wheel Well	290	318	-28
J2	Pinch Weld Height at Rear Wheel Well	288	324	-36
K	Sill Height Aft of Rear Wheel Well	329	383	-54
L	Rear Bumper Thickness	182	182	0
M	Rear Bumper Bottom to Ground	488	488	0
N	Sill Height to Window Bottom Sill	700	696	4
O	Front Door Leading Edge to Impact CL	833	828	5
P	Rear Door Trailing Edge to Impact CL	1056	1089	-33
Q	Front Window Opening	417	399	18
R	Right Side Length	3412	3421	-9
S	Left Side Length	3412	3297	115
T	Vehicle Width at "B" Post	1698	1481	217

DATA SHEET NO. 7

SID/HIII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006

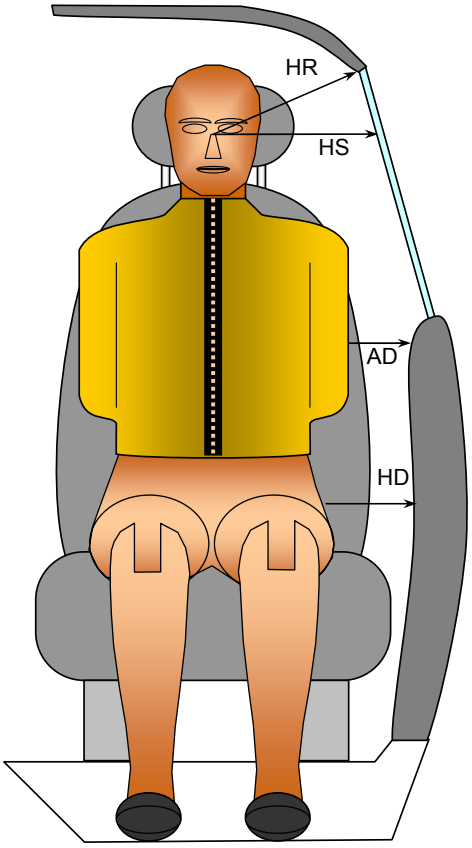


Driver Code	Measurement Description	Driver	
		Length(mm)	Angle(°)
HH	Head to Header	282	
HW	Head to Windshield	498	
HZ	Head to Roof	137	
NR	Nose to Rim	351	
CD	Chest to Dash	432	
CS	Chest to Steering Wheel	272	
KDL	Left Knee to Dash	124	18.7
KDR	Right Knee to Dash	112	21.5
PA	Pelvic Angle		26.2
PHX	H-Point to Striker (X-Axis)	223	
PHZ	H-Point to Striker (Z-Axis)	154	
HB	Head to Seatback Clearance	54	

DATA SHEET NO. 8

SID/HIII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006



FRONT VIEW OF DUMMY

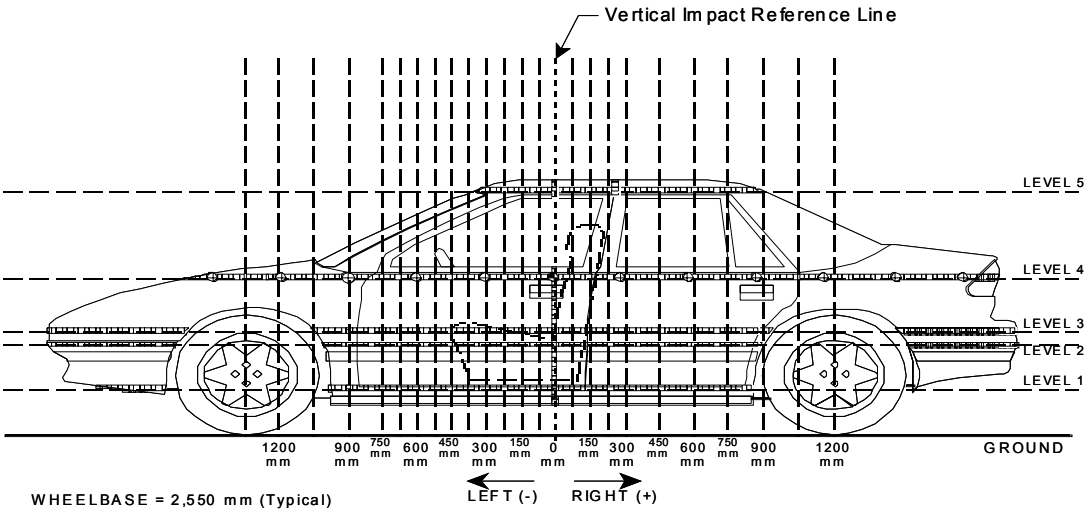
Code	Measurement Description	Units	Driver
HR	Head to Side Header	mm	179
HS	Head to Side Window	mm	244
AD	Arm to Door	mm	110
HD	H-Point to Door	mm	139

DATA SHEET NO. 9

VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006

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	1430
4	Window Sill	mm	1023
3	Mid Door	mm	643
2	Occupant H-Point	mm	574
1	Sill Top	mm	326

DATA SHEET NO. 10

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1575				382					379					-3	
-1425				365					372					7	
-1275				353					373					20	
-1125				347					359					12	
-975		261	263	341			265	267	347			4	4	6	
-825	305	269	267	336		302	264	262	337		-3	-5	-5	1	
-750	308	268	266	337		319	281	280	343		11	13	14	6	
-675	306	267	265	337		334	297	300	351		28	30	35	14	
-600	305	267	264	337		346	316	320	367		41	49	56	30	
-525	303	266	263	336		359	339	348	400		56	73	85	64	
-450	303	266	263	336		371	367	381	433		68	101	118	97	
-375	302	265	261	335		392	398	415	462		90	133	154	127	
-300	301	265	261	336		422	432	451	495		121	167	190	159	
-225	300	264	261	337	539	440	474	491	527	607	140	210	230	190	68
-150	300	263	260	338	536	492	513	529	561	623	192	250	269	223	87
-75	299	263	260	339	533	556	573	578	601	656	257	310	318	262	123
0	300	263	260	337	534	580	599	610	619	686	280	336	350	282	152
75	302	263	259	339	536	578	591	590	616	672	276	328	331	277	136
150	301	263	259	340	538	528	527	536	560	665	227	264	277	220	127
225	306	264	260	341	539	474	455	459	535	655	168	191	199	194	116
375	308	264	262	344	542	408	405	406	495	622	100	141	144	151	80
525	308	267	263	346	542	352	366	361	466	591	44	99	98	120	49
675	311	268	265	349	542	325	328	324	437	569	14	60	59	88	27
825	308	271	268	352	543	289	291	286	406	556	-19	20	18	54	13
975		260	268	357	555		261	245	374	556		1	-23	17	1
1125			258	362				256	343				-2	-19	
1275			261	368				259	362				-2	-6	
1425			286	380				283	380				-3	0	
1575			308	398				309	395				1	-3	
1725			334	423				334	422				0	-1	

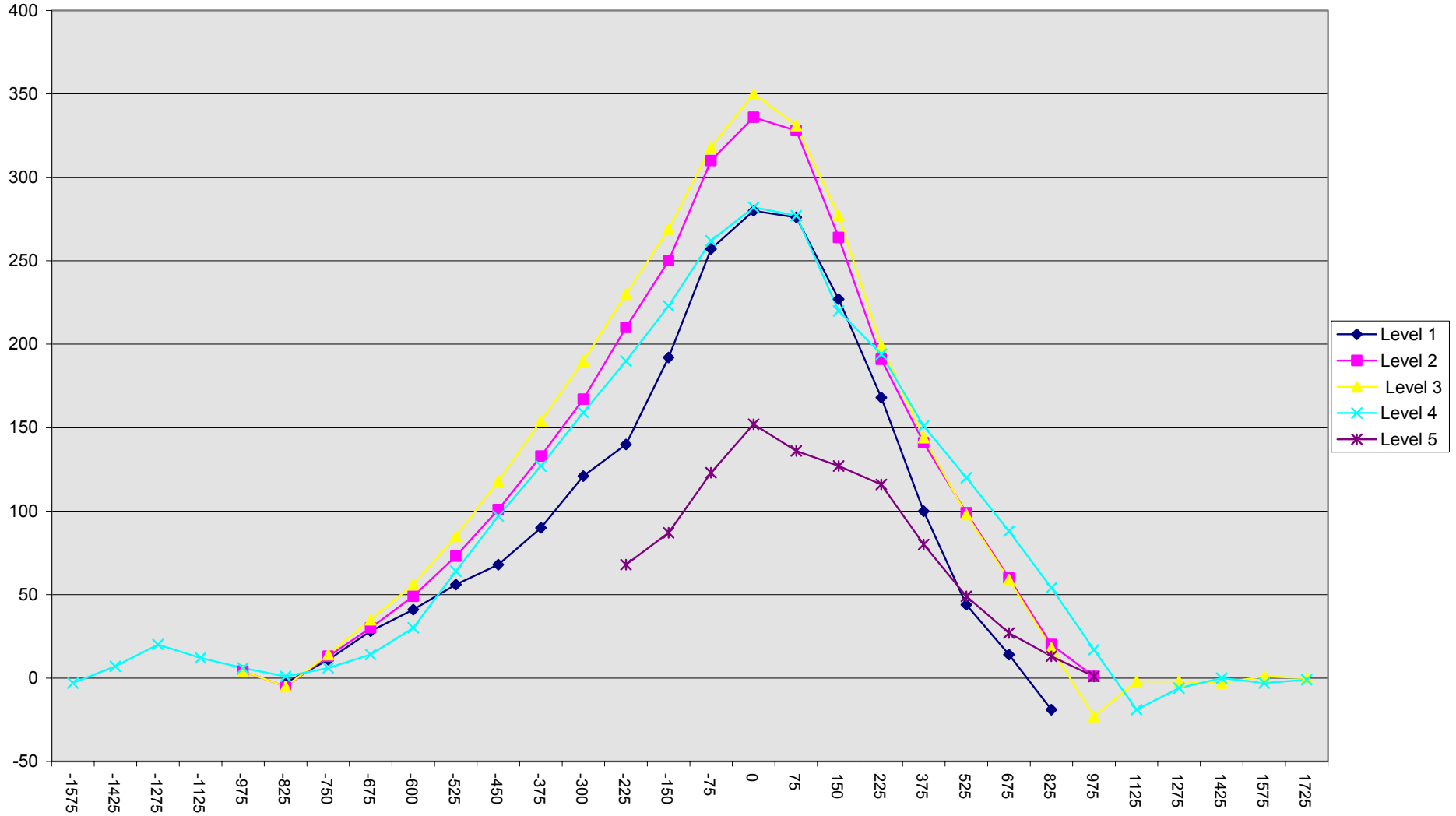
Reference plane is parallel to test vehicle longitudinal centerline Units = mm

Given dimensions = Reference plane to car body

DATA SHEET NO. 10... (continued)

VEHICLE EXTERIOR CRUSH PROFILES

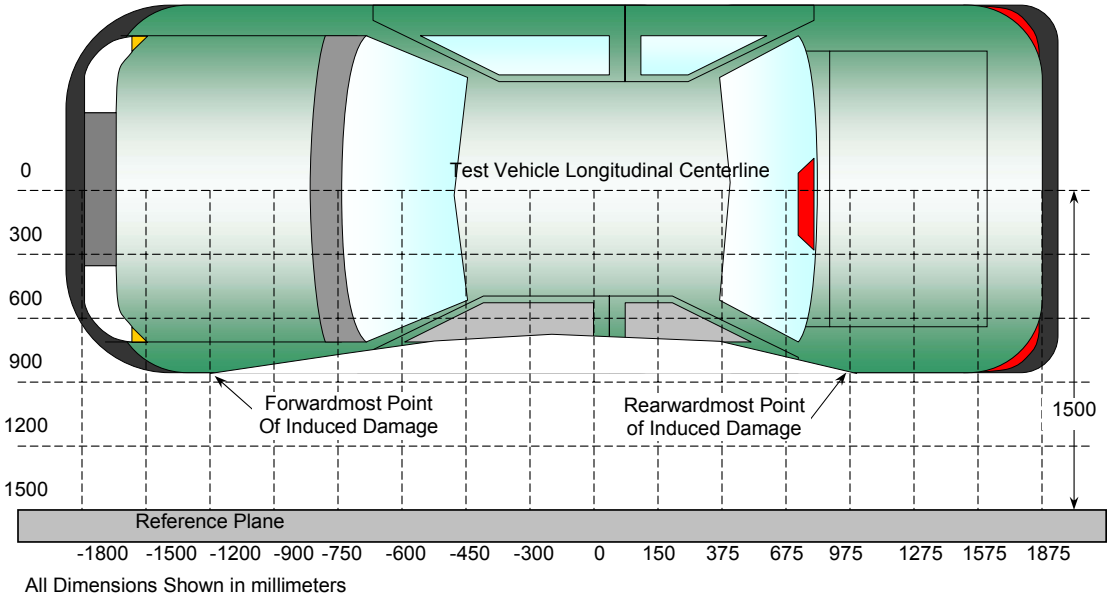
Test Vehicle: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006



DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006



TOP VIEW

Damage Profile Distances

DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	975 mm	4	357	374	17
2	605 mm	4	348	452	104
3	250 mm	3	261	448	187
4	-105 mm	3	260	565	305
5	-470 mm	3	263	368	105
6	-825 mm	4	336	337	1

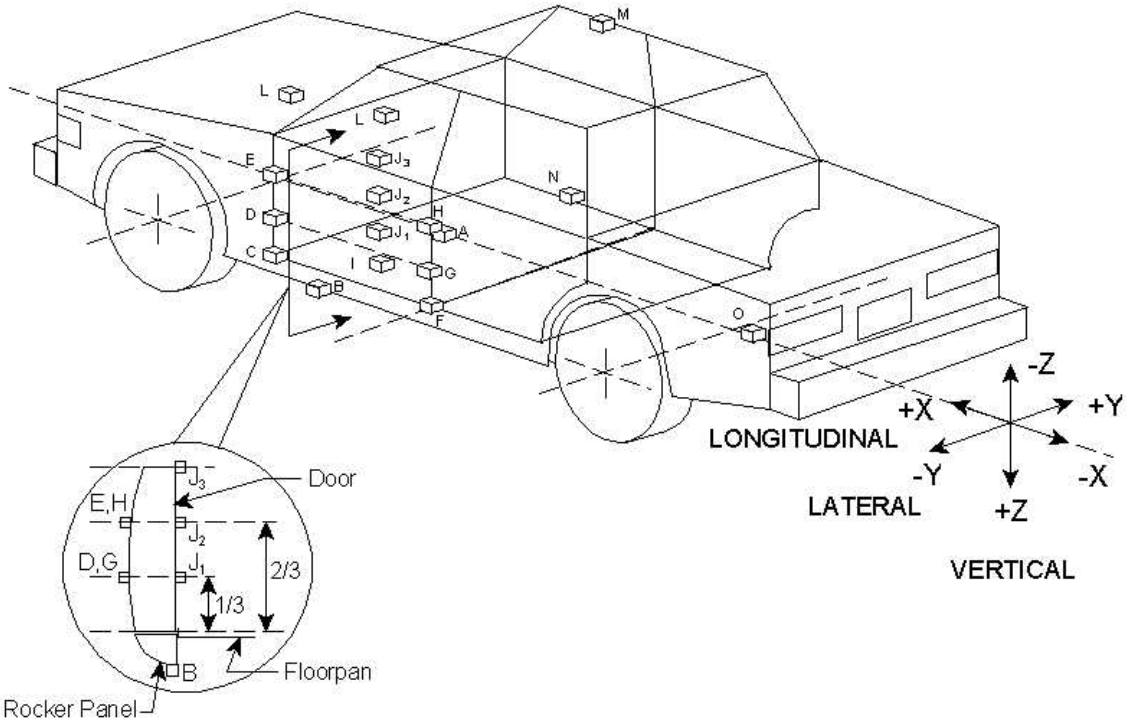
Reference plane is parallel to test vehicle longitudinal centerline

Given dimensions = Reference plane to car body

DATA SHEET NO. 12

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006



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

No.	Location
L	Driver Seat
M1	Driver Door Rib
M2	Driver Door Pelvis
M3	Driver Door Knee
N	Engine
O	Firewall
Q	Right Floor Sill
R	Rear Deck

DATA SHEET NO. 12... (continued)

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006

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	2.8	71	-4.1	34
		Y	*	*	*	*
		Z	12.8	30	-3.9	0.0
		RES	19.5	28		
B	Left Floor	Y	20.7	22	-1.9	31
C	A Pillar Sill	Y	12.2	28	-1.6	0
D	A Pillar Low	Y	14.1	49	-1.4	2
E	A Pillar Mid	Y	15.5	49	-2.0	0
G	B Pillar Sill	Y	37.6	27	-1.9	0
H	B Pillar Low	Y	60.3	12	-22.7	21
I	B Pillar Mid	Y	71.6	16	-1.7	224
L	Driver Seat	Y	46.8	28	-3.9	65
M1	Driver Door Upper	Y	35.0	17	-25.7	21
M2	Driver Door Mid	Y	71.3	11	-53.0	18
M3	Driver Door Lower	Y	55.1	56	-57.9	23
N	Engine	X	6.4	87	-5.6	37
		Y	10.8	73	-2.6	221
O	Firewall	Y	11.4	47	-1.5	300
Q	Right Floor Sill	Y	11.0	41	-0.7	280
R	Rear Deck	X	6.3	39	-3.5	12
		Y	12.5	54	-1.3	194

* No valid data collected after 40 msec.

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: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006

VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

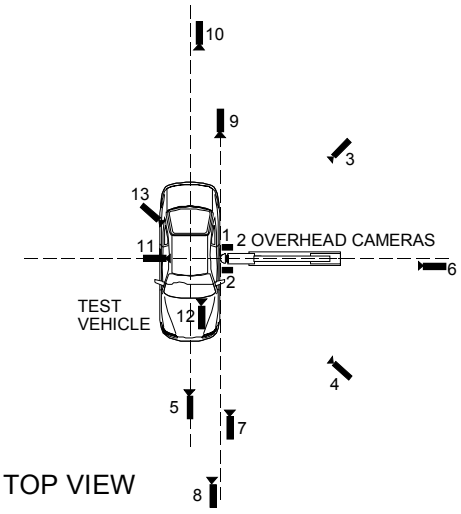
Loc. No.	Accelerometer Location	Measurements (mm)			
		Axis	Pre-Test	Post-Test	Difference
A	Vehicle CG	X	2551	2517	-34
		Y	0	0	0
		Z	338	335	3
B	Left Floor Sill	X	2688	2594	94
		Y	-680	-617	63
		Z	204	226	-22
C	A Pillar Sill	X	2930	2832	98
		Y	-680	-573	107
		Z	203	220	-17
D	A Pillar Low	X	2905	2809	-96
		Y	-820	-735	85
		Z	546	556	-10
E	A Pillar Mid	X	2906	2811	-95
		Y	-786	-739	47
		Z	776	786	-10
G	B Pillar Sill	X	1928	1926	-2
		Y	-680	-521	159
		Z	210	255	-45
H	B Pillar Low	X	1984	1908	-76
		Y	-680	-576	104
		Z	574	581	-7
I	B Pillar Mid	X	1915	1869	-46
		Y	-690	-504	186
		Z	847	849	-2
L	Driver Seat	X	2049	1944	-105
		Y	-559	-402	157
		Z	396	274	122
M1	Driver Door Rib	X	2590	2494	-96
		Y	-752	-678	74
		Z	850	871	-21
M2	Driver Door Pelvis	X	2599	2505	-94
		Y	-726	-654	72
		Z	692	713	-21
M3	Driver Door Knee	X	2600	2487	-113
		Y	-734	-660	74
		Z	535	558	-23
N	Engine	X	3675	3646	-29
		Y	0	-25	-25
		Z	794	798	-4
O	Firewall	X	3313	3286	-27
		Y	0	-52	-52
		Z	890	885	5
Q	Right Floor Sill	X	2320	2317	-3
		Y	680	733	53
		Z	212	226	-14
R	Rear Deck	X	935	938	3
		Y	0	0	0
		Z	273	340	-67

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: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006



TOP VIEW

No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Overall	210	0	5050	14	1000
2	Overhead Close-Up	0	35	5670	19	1000
3	Left Side 45° Rearward Pole View	-2135	-2970	1340	24	1000
4	Right Side 45° Forward Pole View	-2070	3155	1340	24	1000
5	Real Time				13	24
6*	Left Side Rear Pole View					
7	Front Ground Level Vehicle/Pole Impact	-165	6610	1240	35	1000
8	Front Ground Level Vehicle Roof Targets and Vehicle/Pole Impact	625	5945	1150	24	1000
9	Rear Ground Level Vehicle/Pole Impact	155	-6815	1240	35	1000
10	Rear Ground Level	665	-5580	1150	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:	2006 Hyundai Accent GLS 4-Dr.	NHTSA No.	C60516
Test Program:	FMVSS 201P	Test Date:	September 14, 2006

Test Time: 10:00 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)

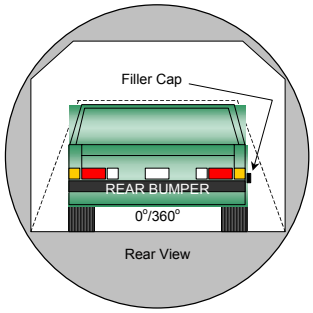
C. For the following 25 minutes: 0
(Maximum allowable = 1 oz./minute)

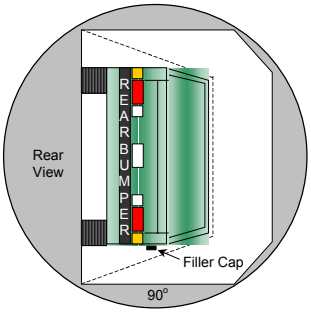
D. Spillage Details: None

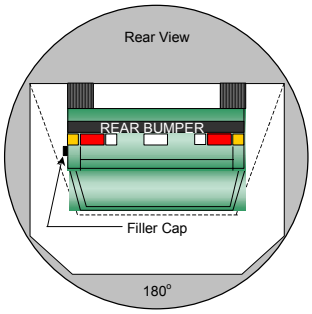
DATA SHEET NO. 15

FMVSS 301 STATIC ROLLOVER DATA SHEET

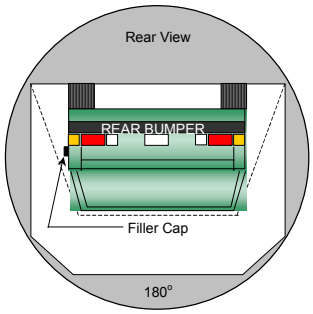
Test Vehicle: 2006 Hyundai Accent GLS 4-Dr. NHTSA No. C60516
Test Program: FMVSS 201P Test Date: September 14, 2006

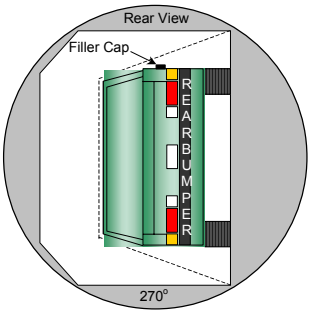


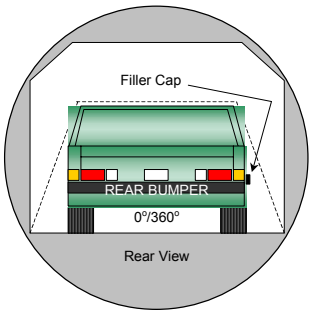




0° to 90° 90° to 180°







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°	120	300	0
90° to 180°	112	300	0
180° to 270°	112	300	0
270° to 360°	120	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 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)

Post-Test Driver Dummy Head Contact

Post-Test Driver Dummy Thorax Contact

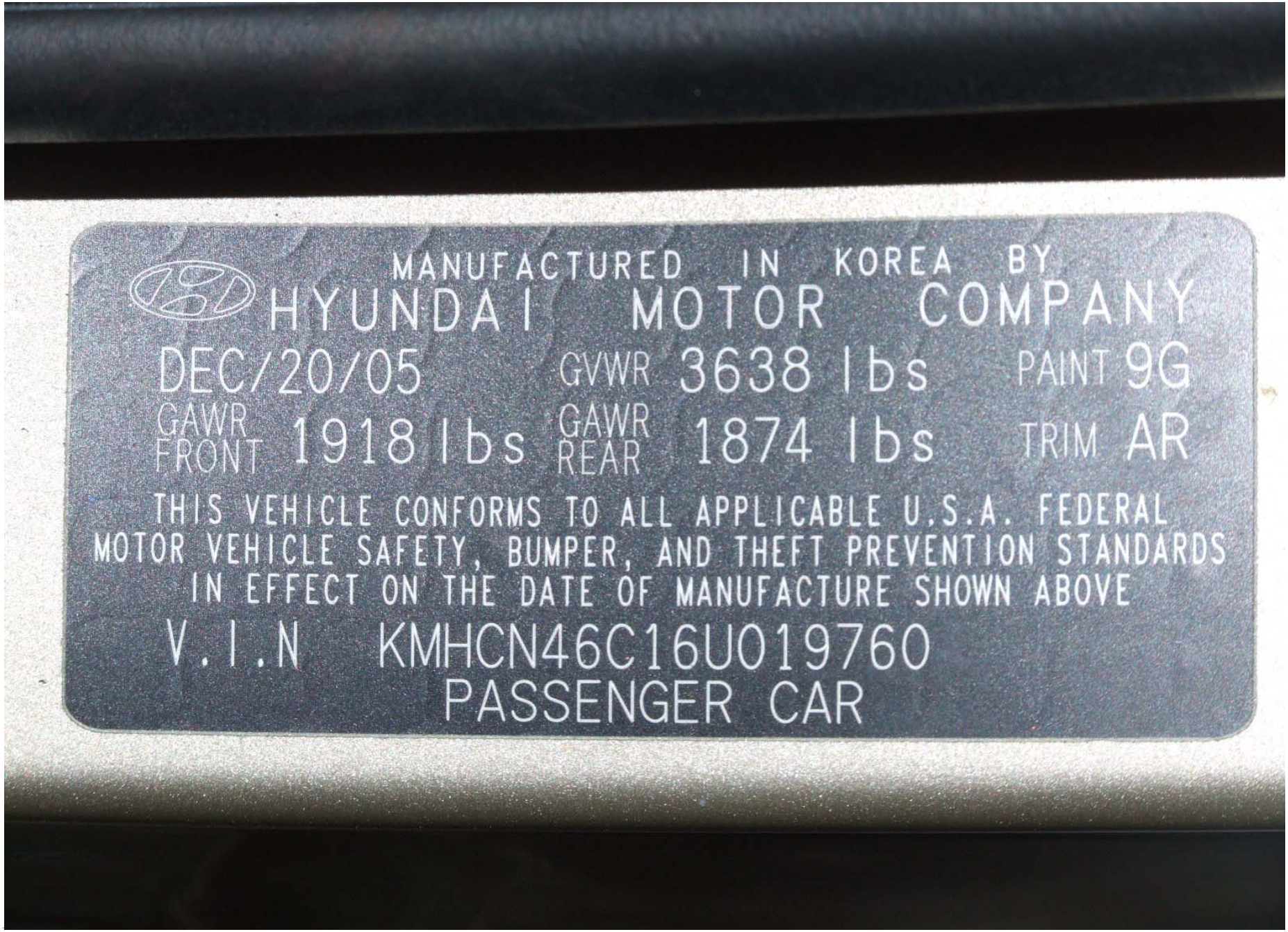
Post-Test Driver Dummy Contact

Post-Test Impact Point on Vehicle

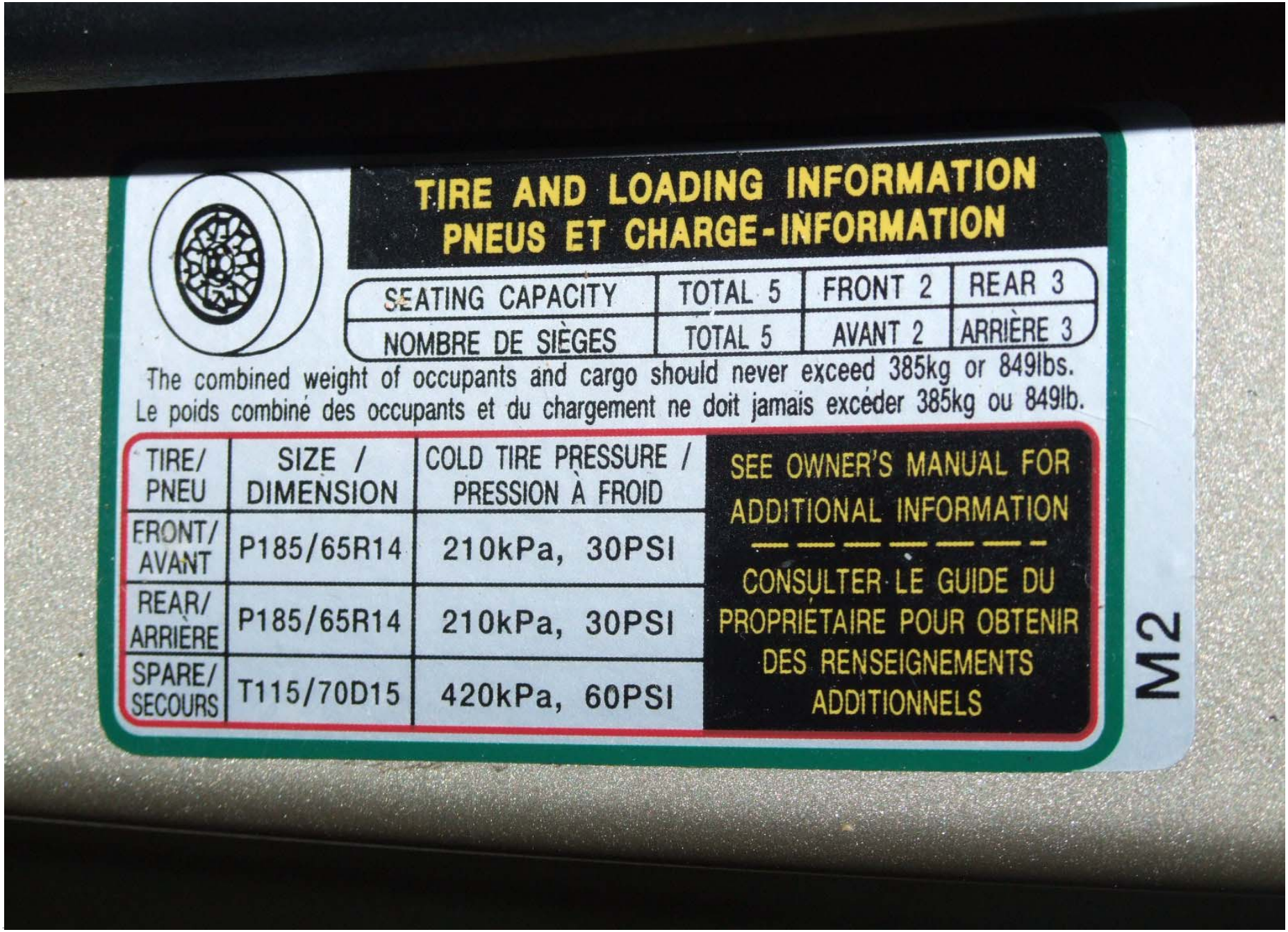
Pre-Test Impact Zone Close-up View

Post-Test Impact Zone Close-up View

Vehicle Impact



Vehicle Certification Label



Tire Placard

Pre-Test Fuel Filler Cap

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

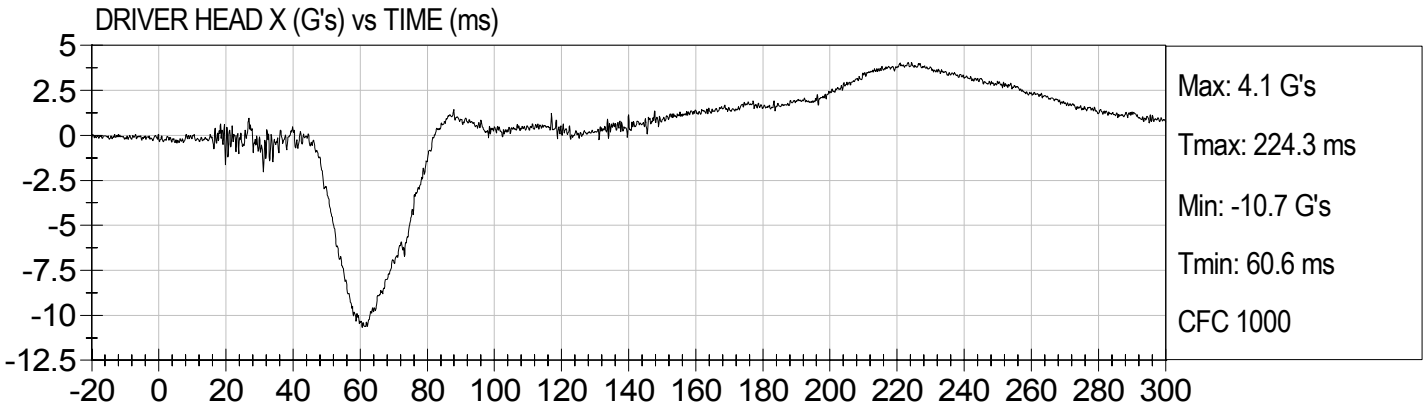
APPENDIX B

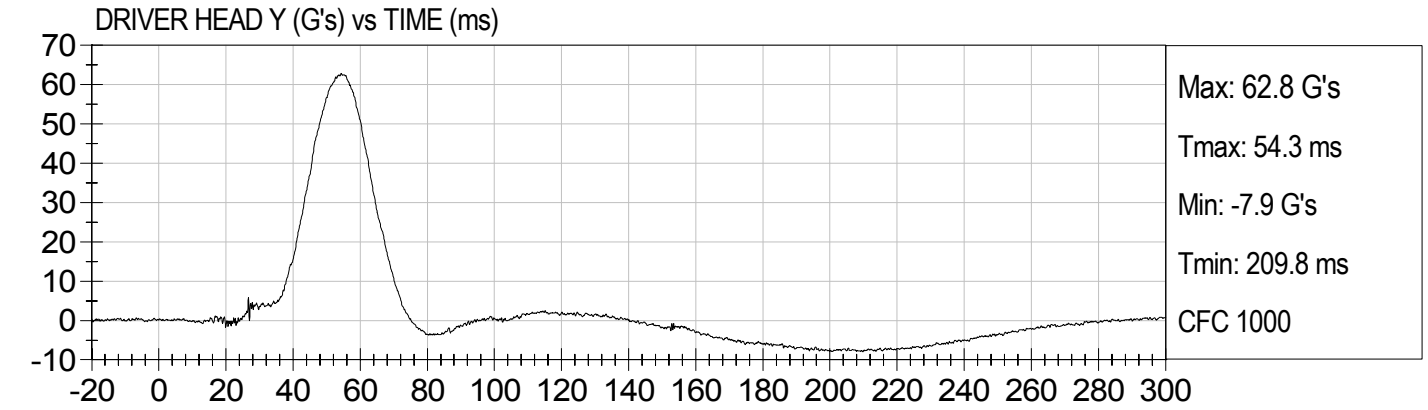
SID/HIII AND VEHICLE RESPONSE DATA

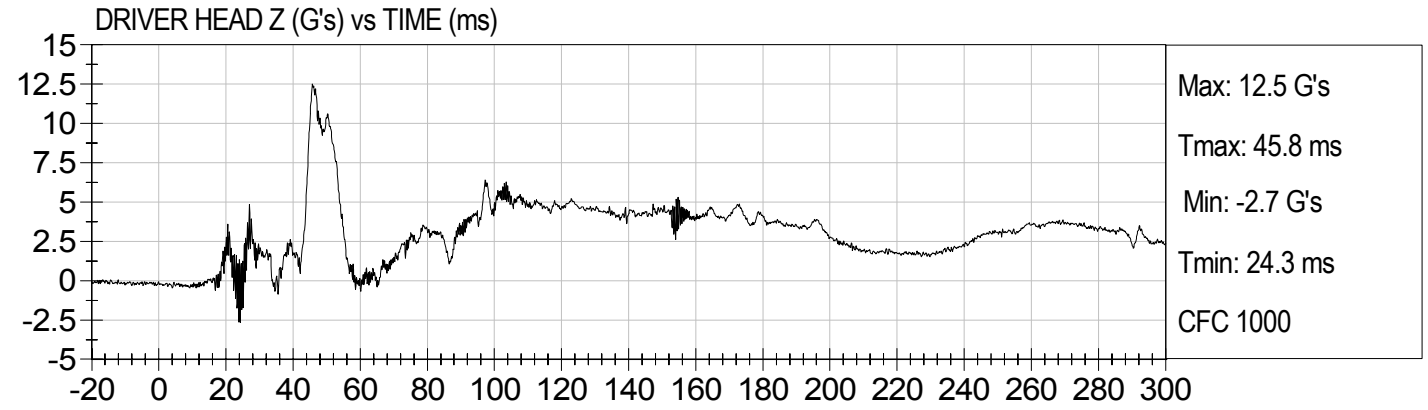
TABLE OF DATA PLOTS

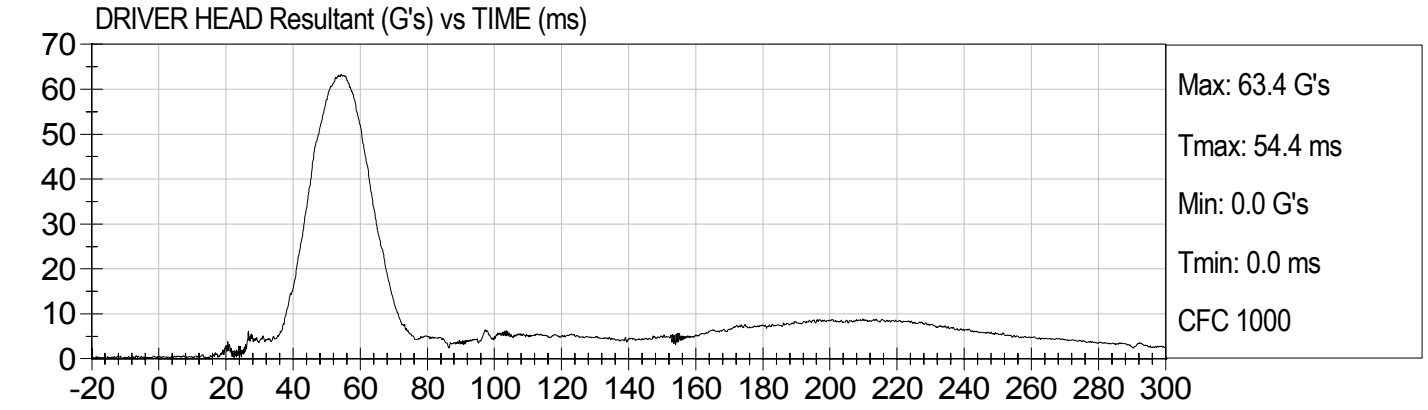
FMVSS 201P RIGID POLE SIDE IMPACT
2006 HYUNDAI ACCENT

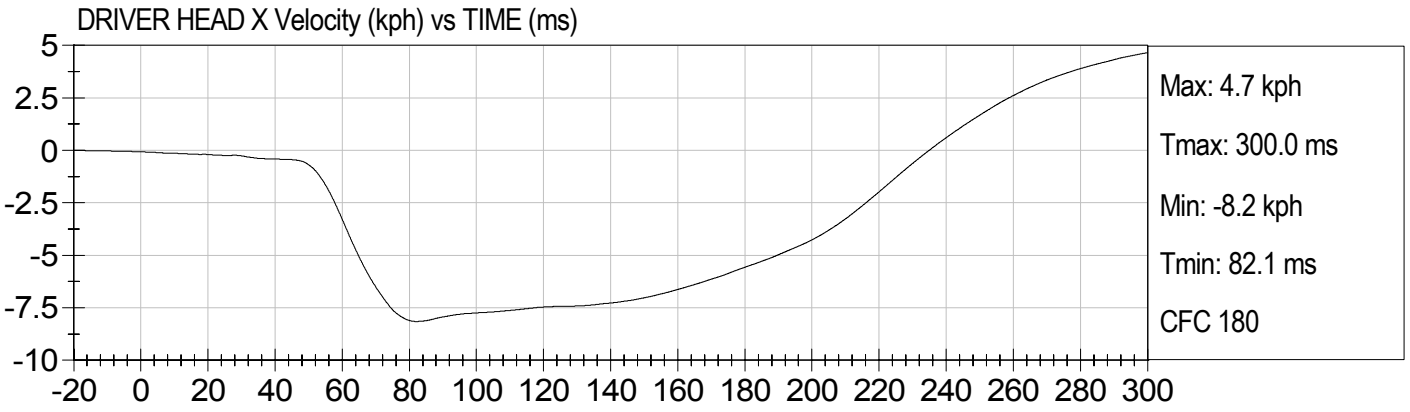
Test Date: 09/14/2006
Speed: 17.5 mph (28.2 km/h)

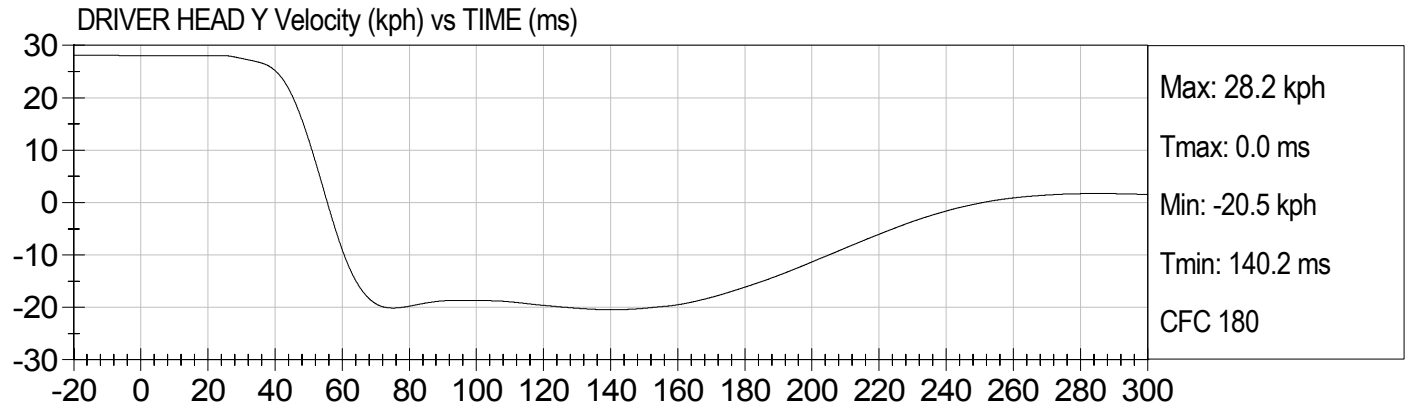


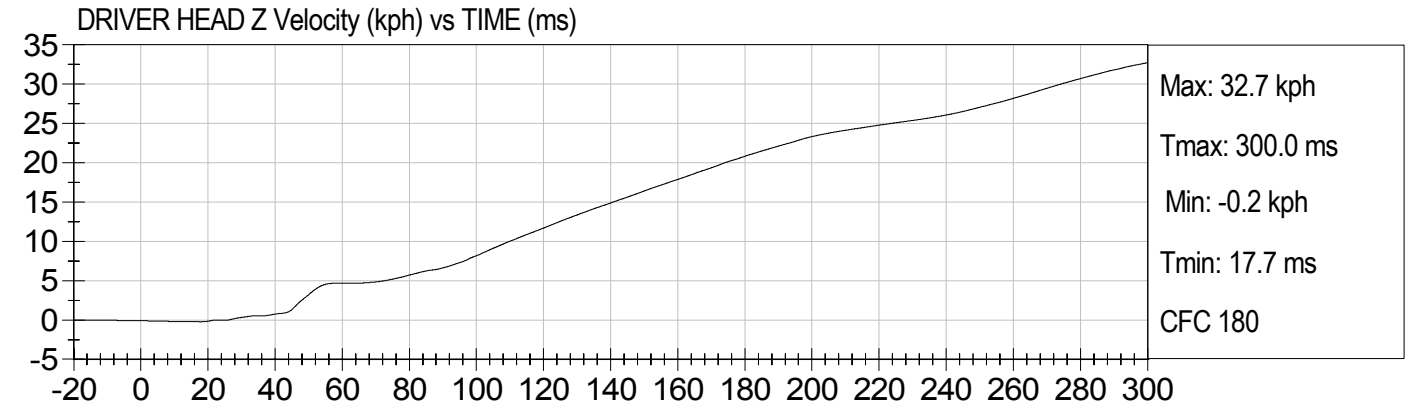







DRIVER HEAD X Velocity (kph) vs TIME (ms)
5
2.5
0
-2.5
-5
-7.5
-10
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 4.7 kph
Tmax: 300.0 ms
Min: -8.2 kph
Tmin: 82.1 ms
CFC 180

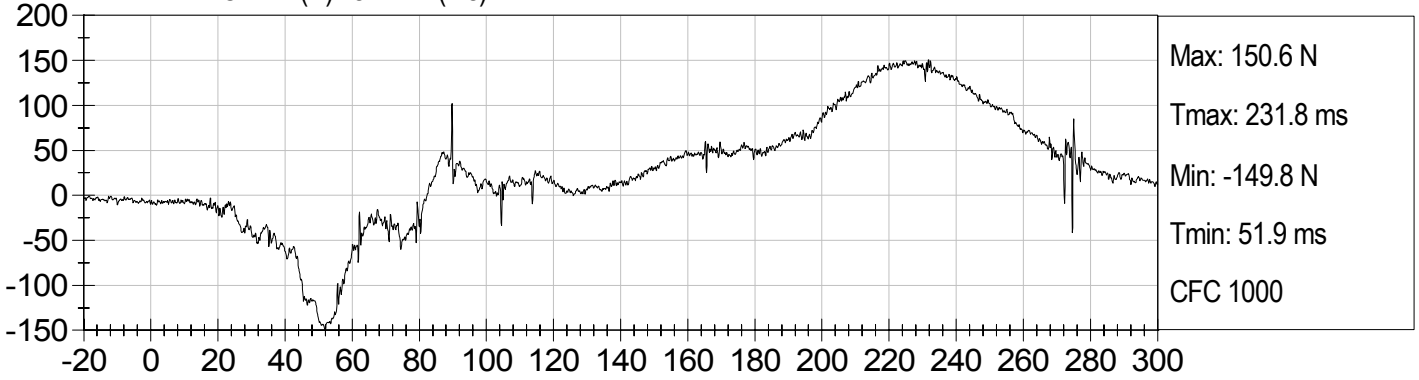

DRIVER HEAD Y Velocity (kph) vs TIME (ms)
30
20
10
0
-10
-20
-30
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 28.2 kph
Tmax: 0.0 ms
Min: -20.5 kph
Tmin: 140.2 ms
CFC 180


DRIVER HEAD Z Velocity (kph) vs TIME (ms)
35
30
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 32.7 kph
Tmax: 300.0 ms
Min: -0.2 kph
Tmin: 17.7 ms
CFC 180

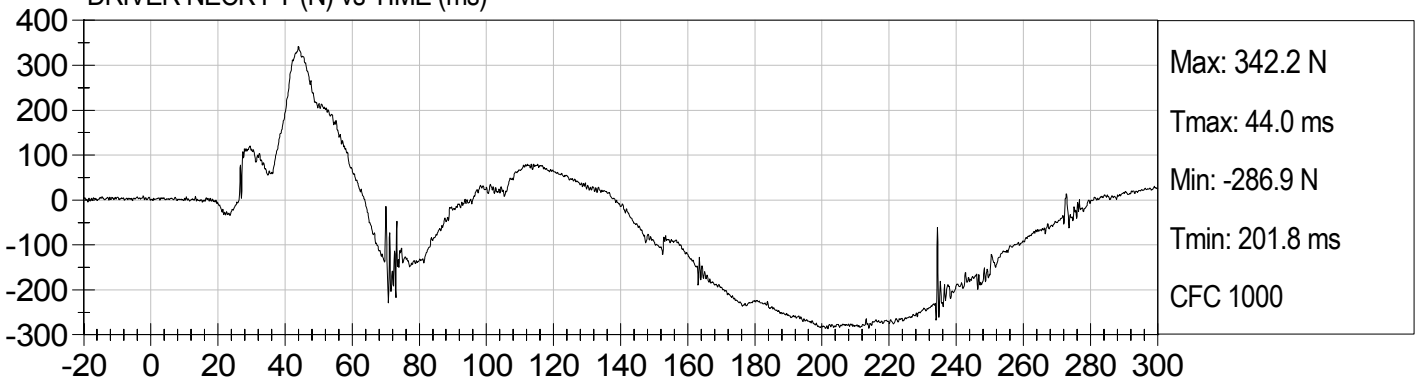
FMVSS 201P RIGID POLE SIDE IMPACT
2006 HYUNDAI ACCENT

Test Date: 09/14/2006
Speed: 17.5 mph (28.2 km/h)

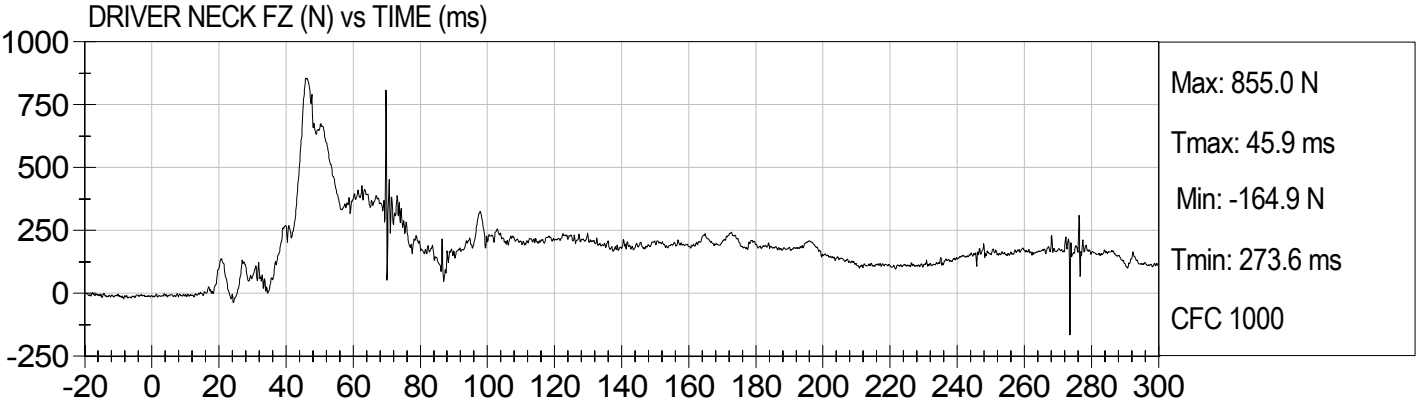
DRIVER NECK FX (N) vs TIME (ms)



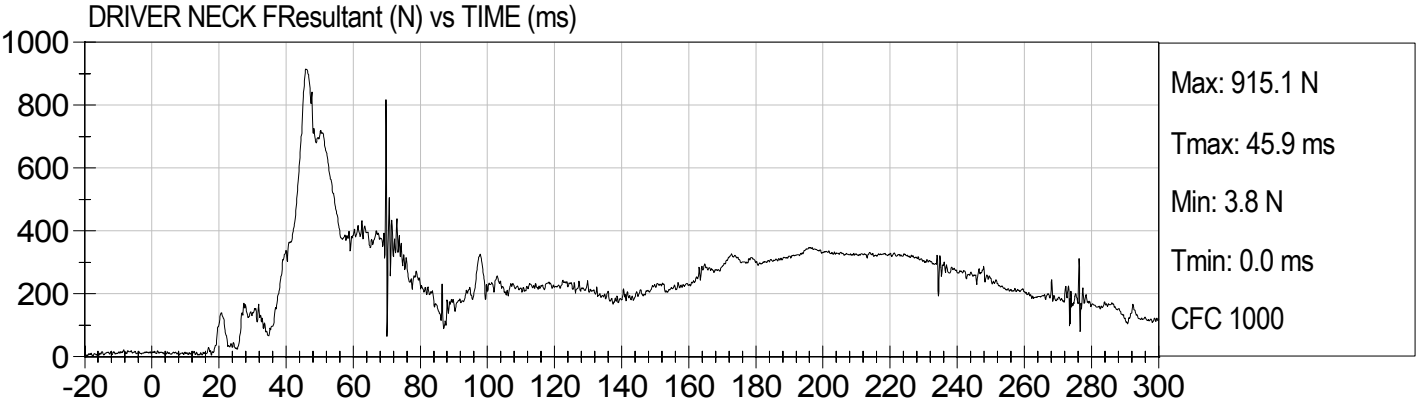
DRIVER NECK FY (N) vs TIME (ms)



DRIVER NECK FZ (N) vs TIME (ms)



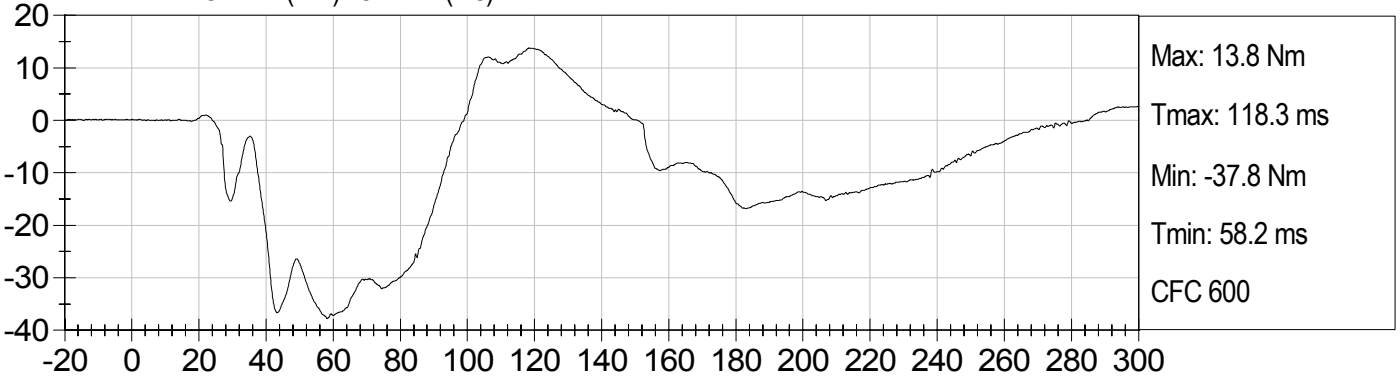
DRIVER NECK FResultant (N) vs TIME (ms)



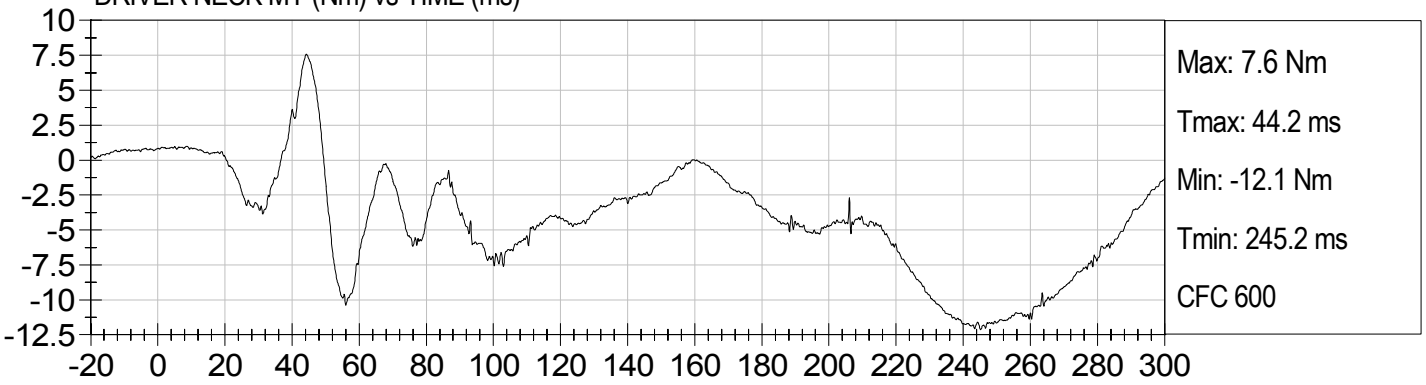
FMVSS 201P RIGID POLE SIDE IMPACT
2006 HYUNDAI ACCENT

Test Date: 09/14/2006
Speed: 17.5 mph (28.2 km/h)

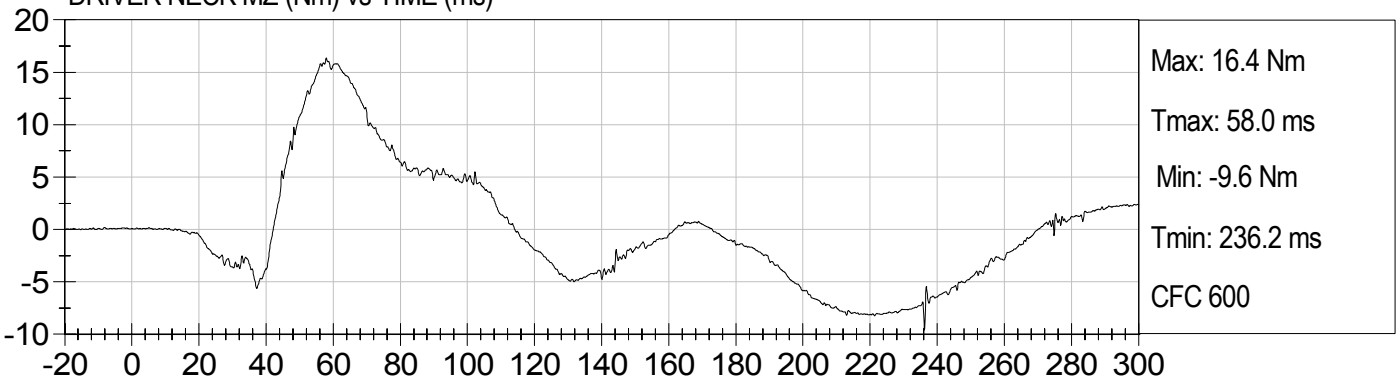
DRIVER NECK MX (Nm) vs TIME (ms)



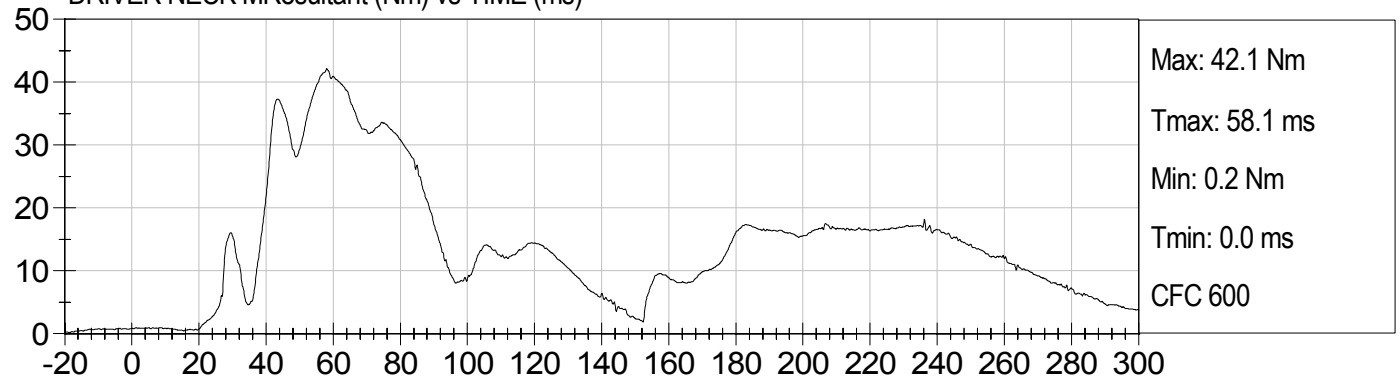
DRIVER NECK MY (Nm) vs TIME (ms)



DRIVER NECK MZ (Nm) vs TIME (ms)



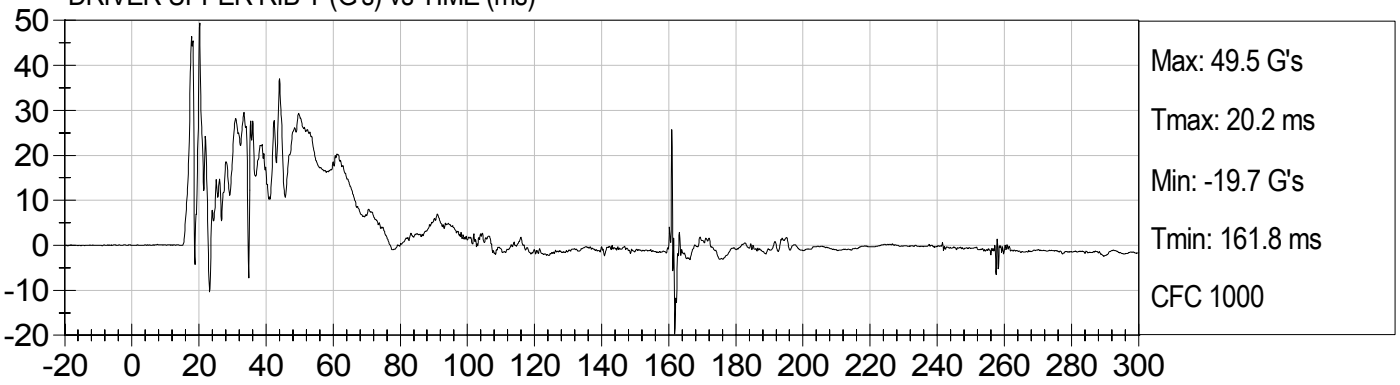
DRIVER NECK MResultant (Nm) vs TIME (ms)



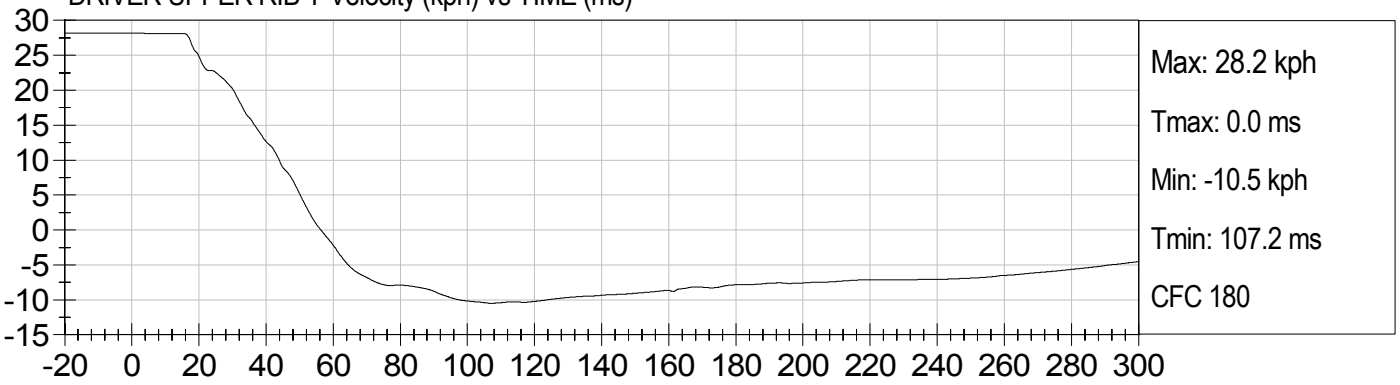
FMVSS 201P RIGID POLE SIDE IMPACT
2006 HYUNDAI ACCENT

Test Date: 09/14/2006
Speed: 17.5 mph (28.2 km/h)

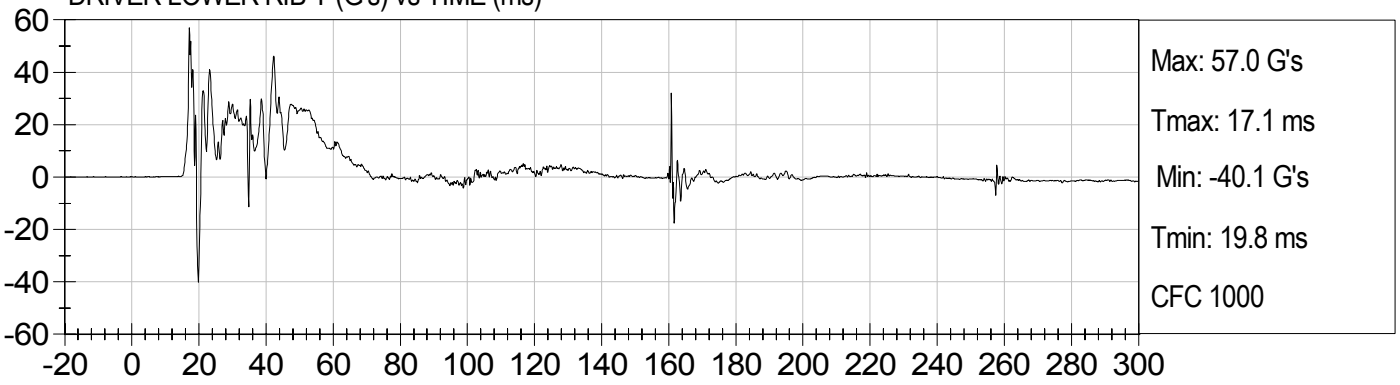
DRIVER UPPER RIB Y (G's) vs TIME (ms)



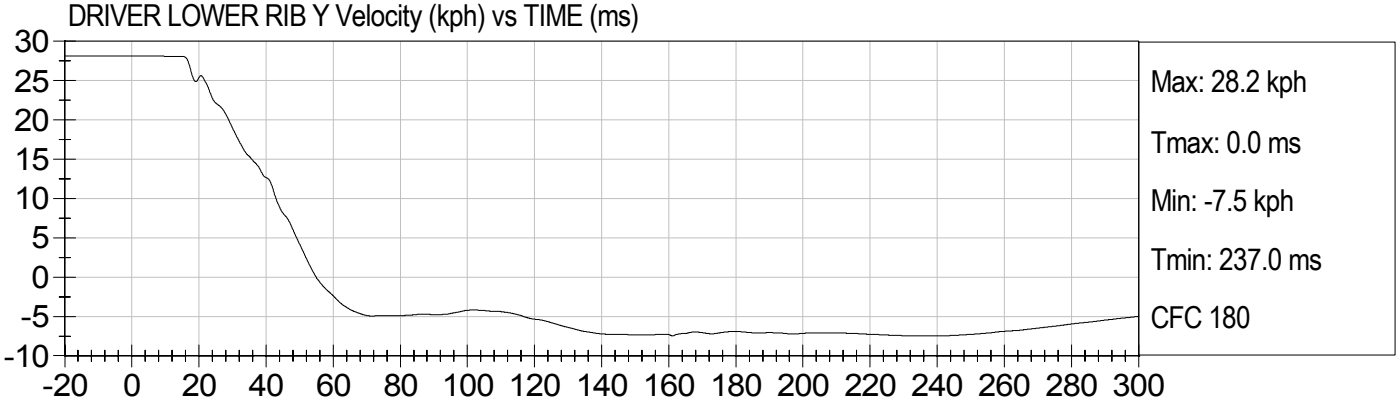
DRIVER UPPER RIB Y Velocity (kph) vs TIME (ms)



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



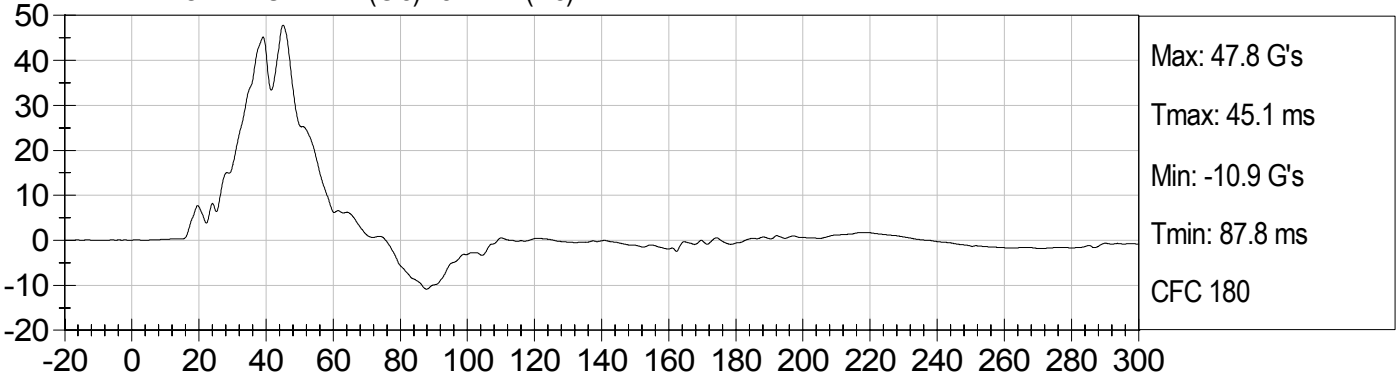
DRIVER LOWER RIB Y Velocity (kph) vs TIME (ms)



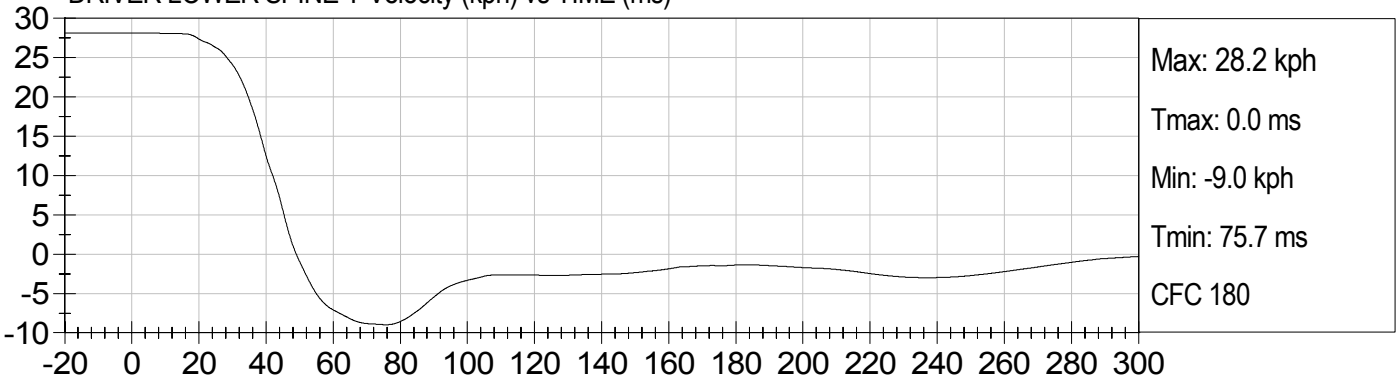
FMVSS 201P RIGID POLE SIDE IMPACT
2006 HYUNDAI ACCENT

Test Date: 09/14/2006
Speed: 17.5 mph (28.2 km/h)

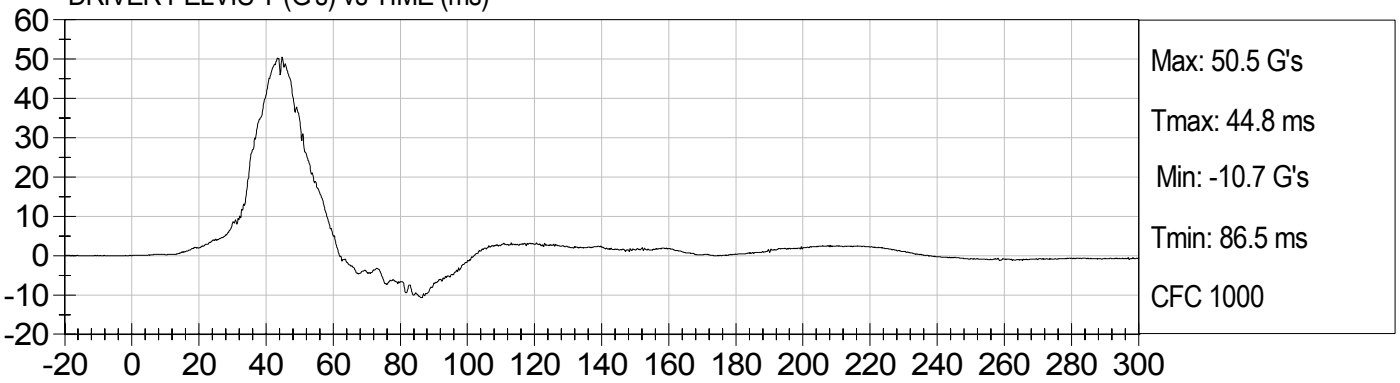
DRIVER LOWER SPINE Y (G's) vs TIME (ms)



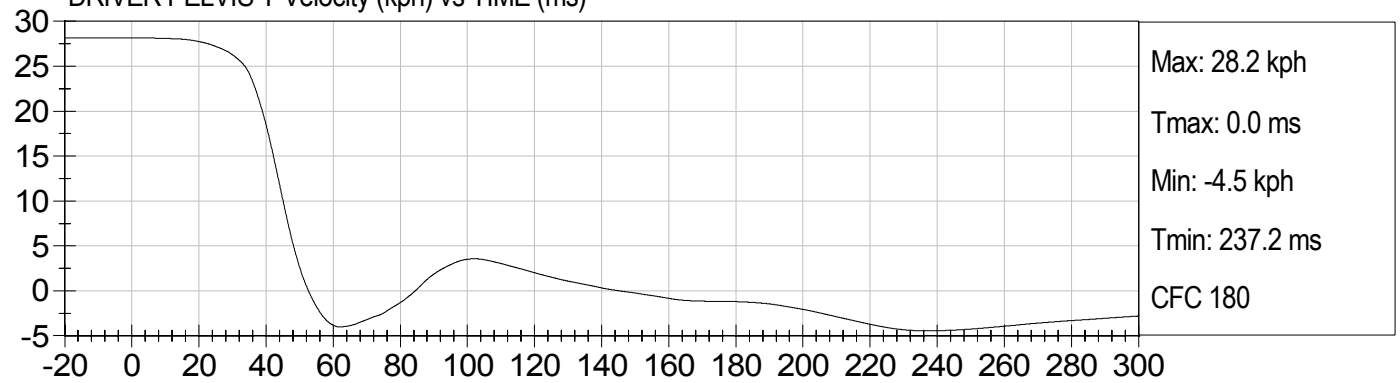
DRIVER LOWER SPINE Y Velocity (kph) vs TIME (ms)



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



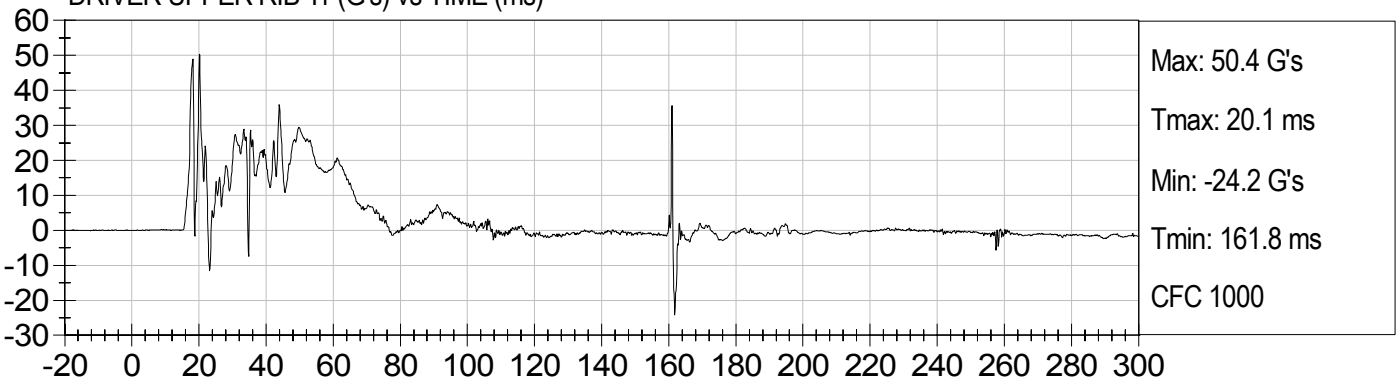
DRIVER PELVIS Y Velocity (kph) vs TIME (ms)



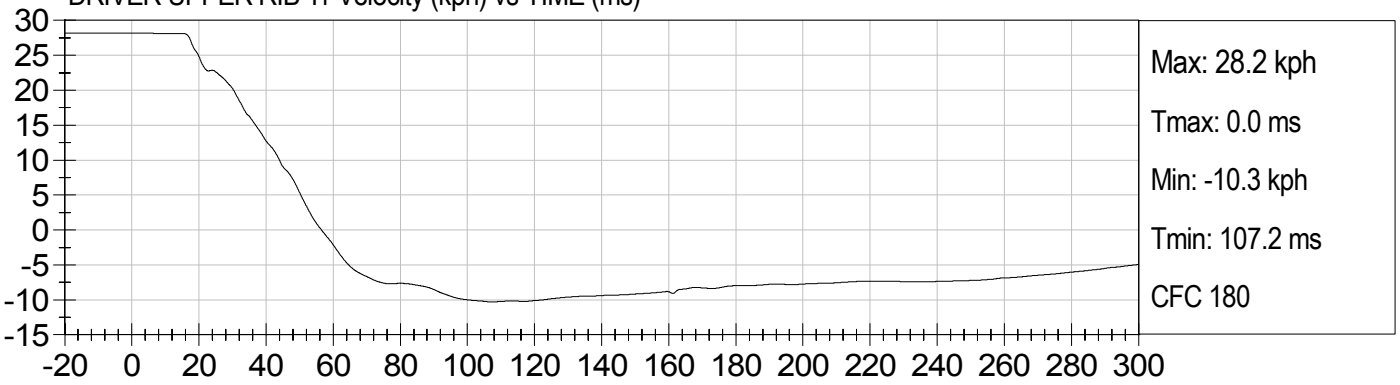
FMVSS 201P RIGID POLE SIDE IMPACT
2006 HYUNDAI ACCENT

Test Date: 09/14/2006
Speed: 17.5 mph (28.2 km/h)

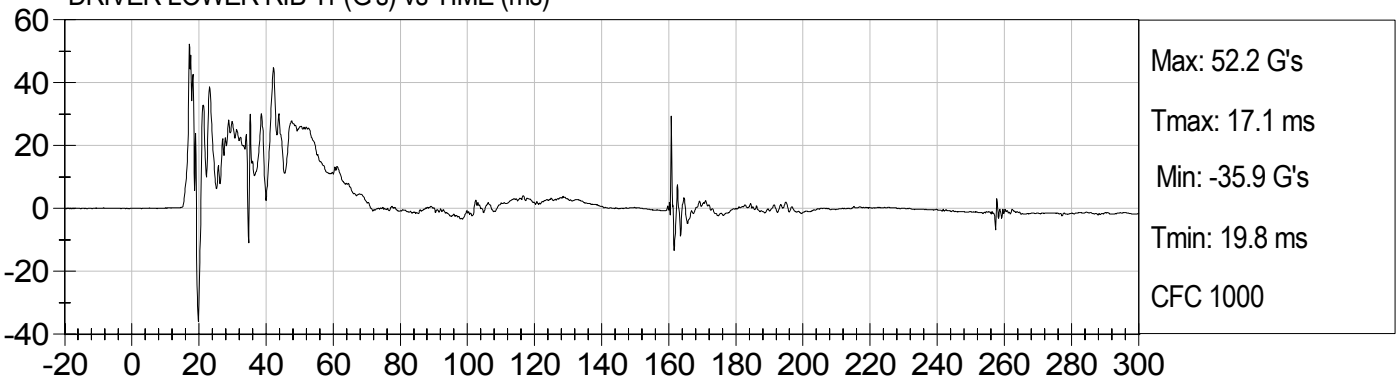
DRIVER UPPER RIB Yr (G's) vs TIME (ms)



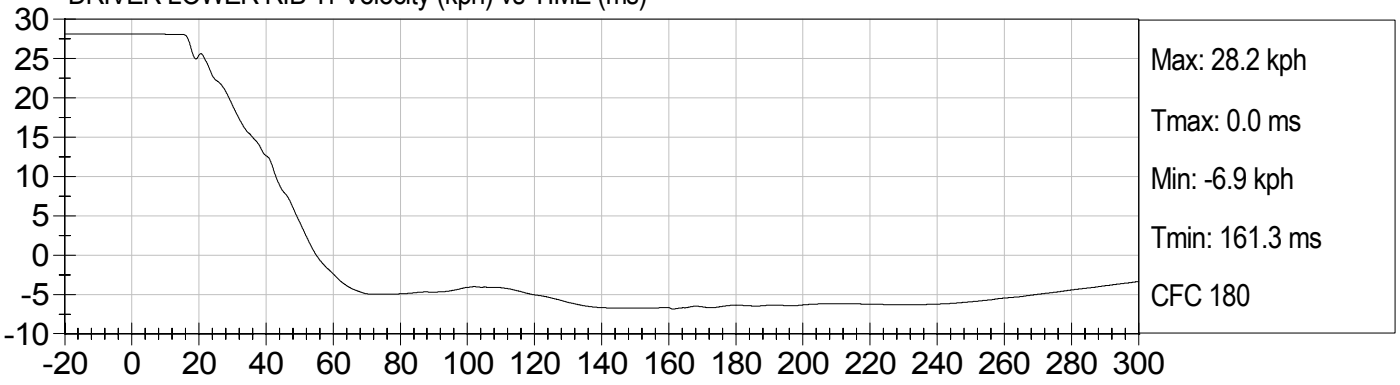
DRIVER UPPER RIB Yr Velocity (kph) vs TIME (ms)



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



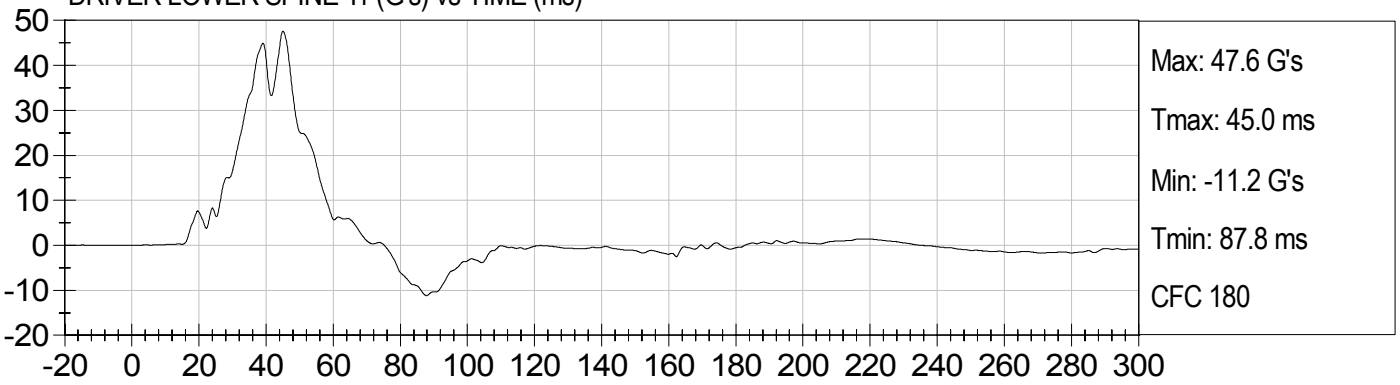
DRIVER LOWER RIB Yr Velocity (kph) vs TIME (ms)



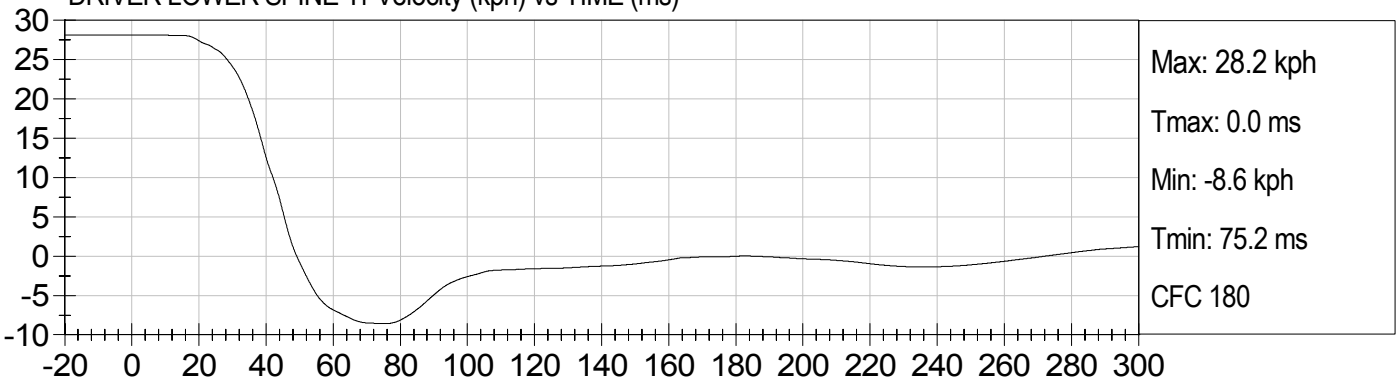
FMVSS 201P RIGID POLE SIDE IMPACT
2006 HYUNDAI ACCENT

Test Date: 09/14/2006
Speed: 17.5 mph (28.2 km/h)

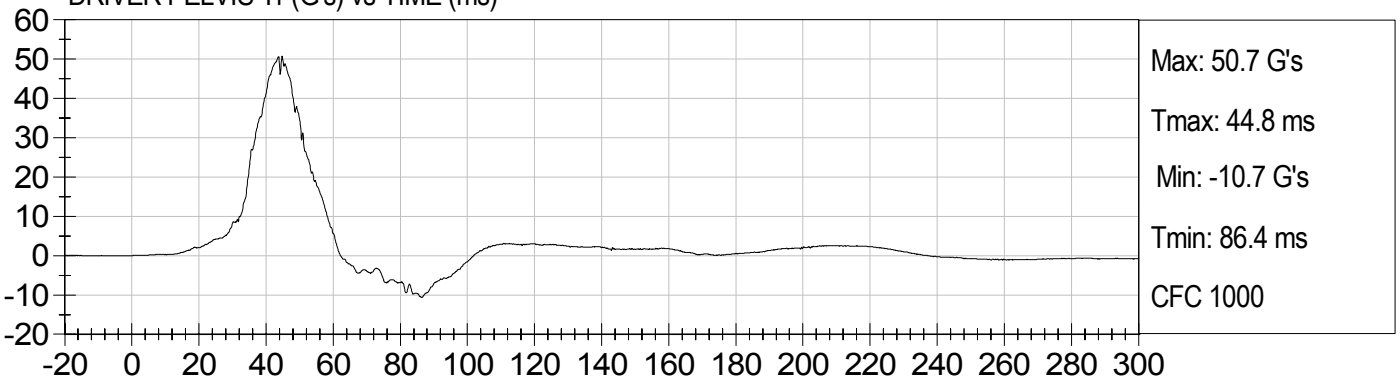
DRIVER LOWER SPINE Yr (G's) vs TIME (ms)



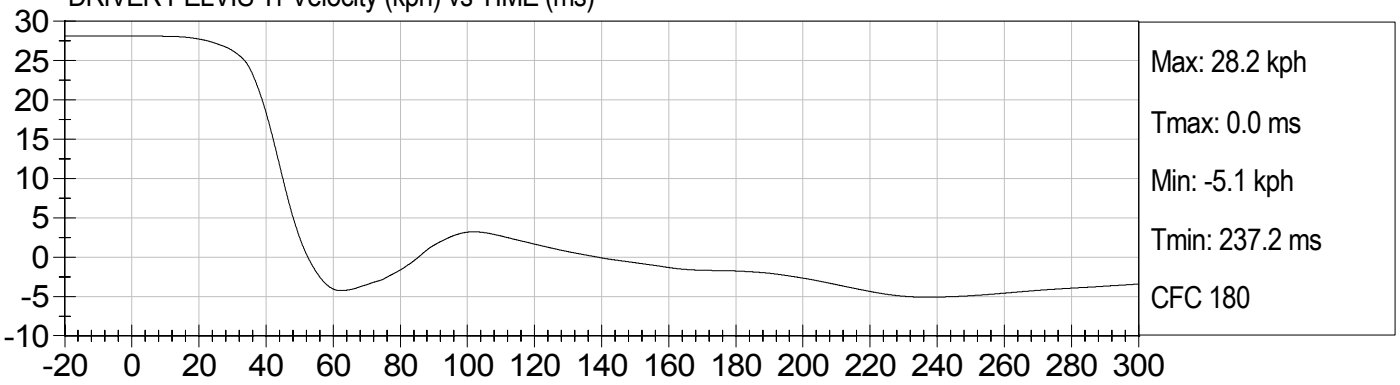
DRIVER LOWER SPINE Yr Velocity (kph) vs TIME (ms)



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



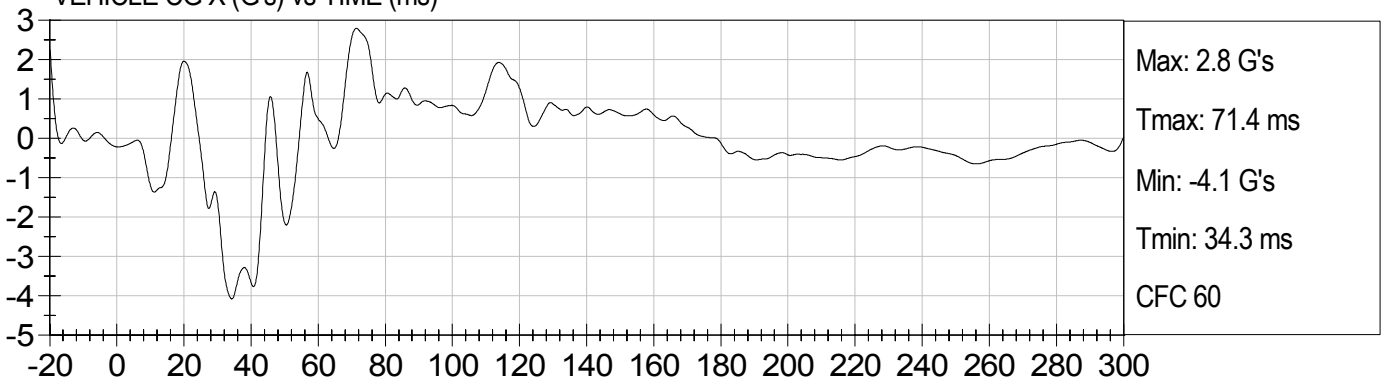
DRIVER PELVIS Yr Velocity (kph) vs TIME (ms)



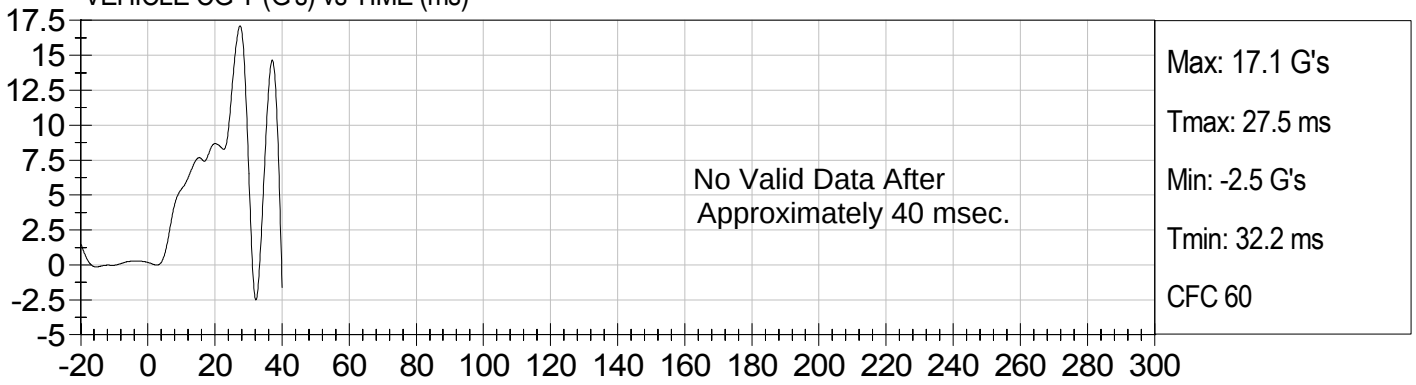
FMVSS 201P RIGID POLE SIDE IMPACT
2006 HYUNDAI ACCENT

Test Date: 09/14/2006
Speed: 17.5 mph (28.2 km/h)

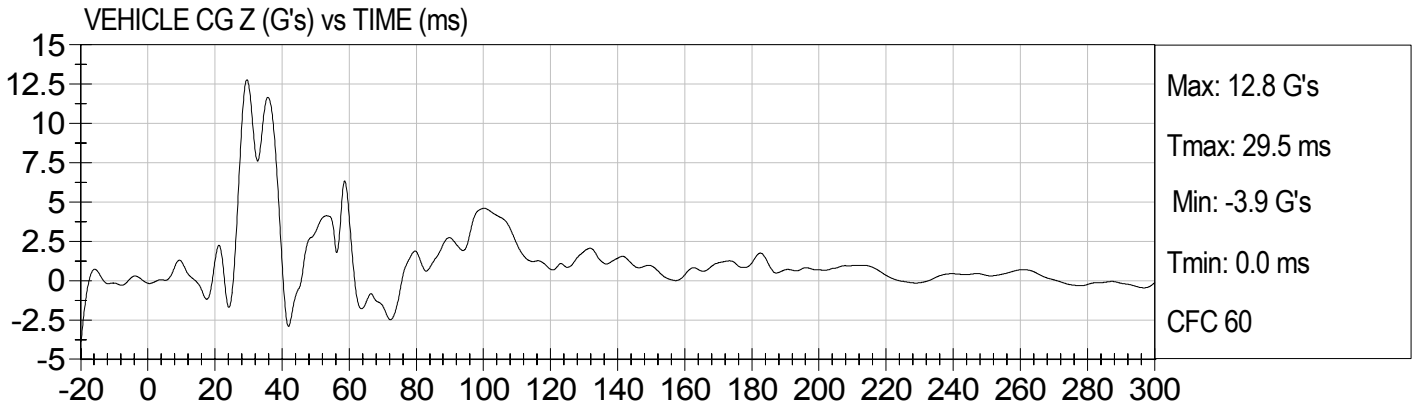
VEHICLE CG X (G's) vs TIME (ms)



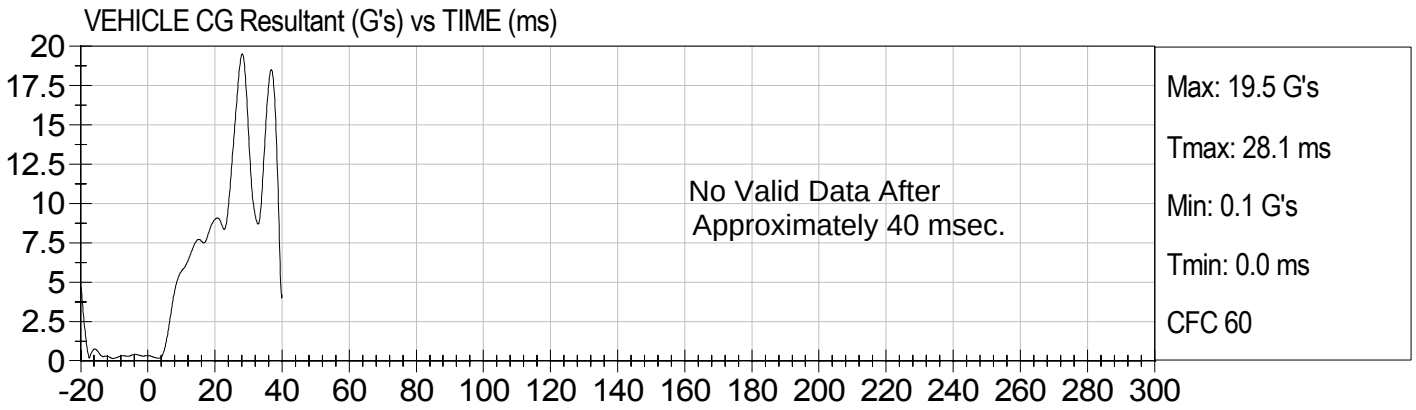
VEHICLE CG Y (G's) vs TIME (ms)

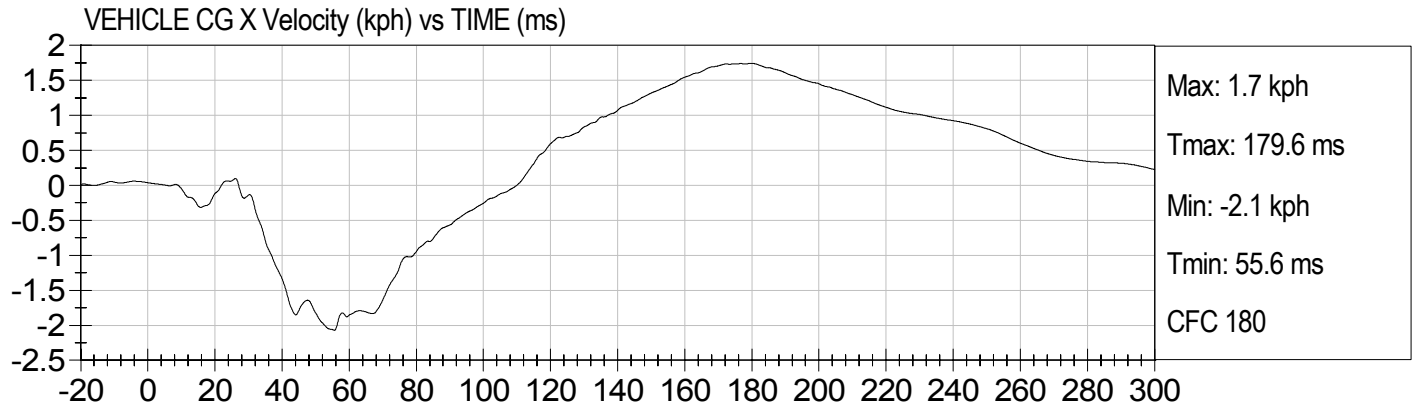


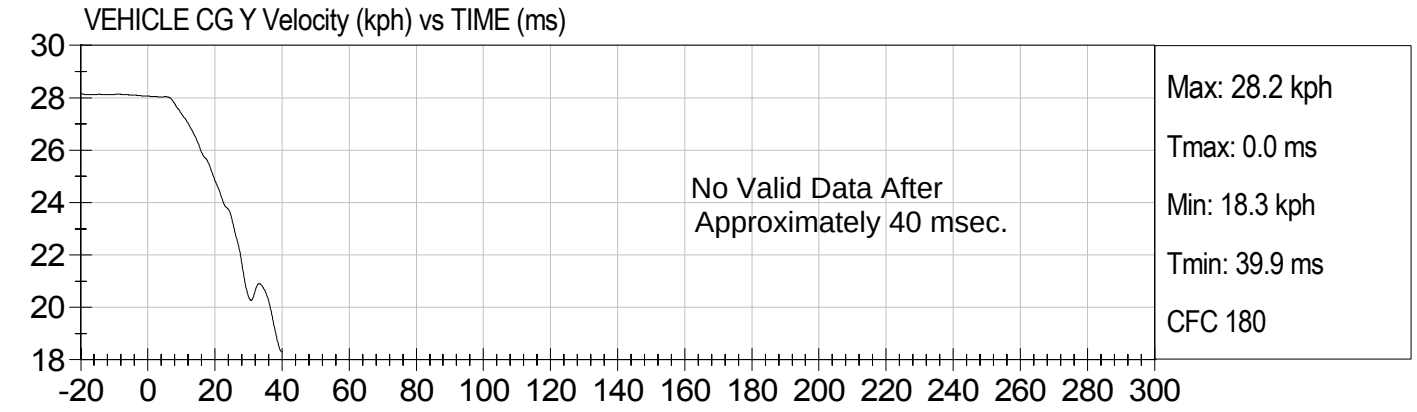
VEHICLE CG Z (G's) vs TIME (ms)

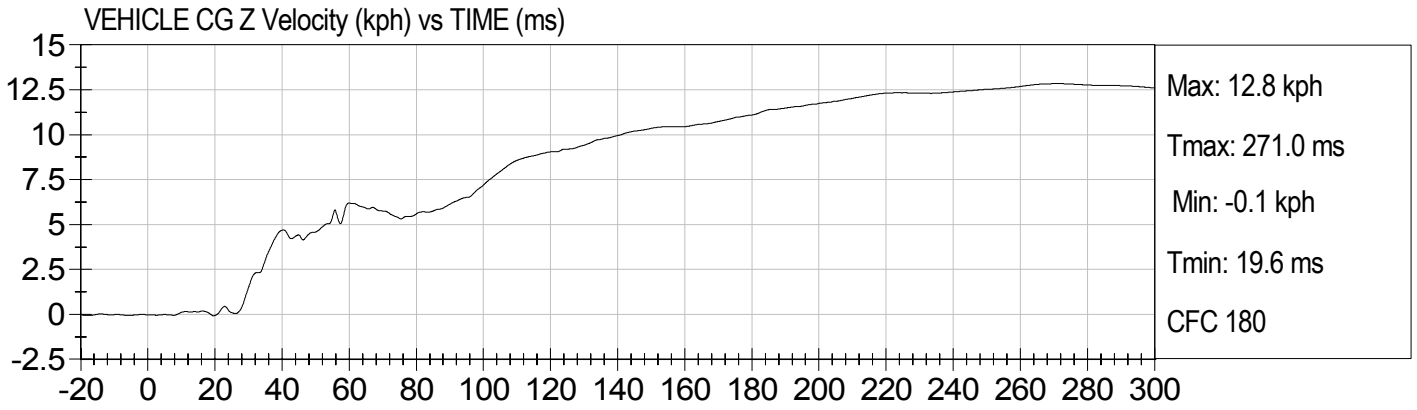


VEHICLE CG Resultant (G's) vs TIME (ms)




VEHICLE CG X Velocity (kph) vs TIME (ms)
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 1.7 kph
Tmax: 179.6 ms
Min: -2.1 kph
Tmin: 55.6 ms
CFC 180

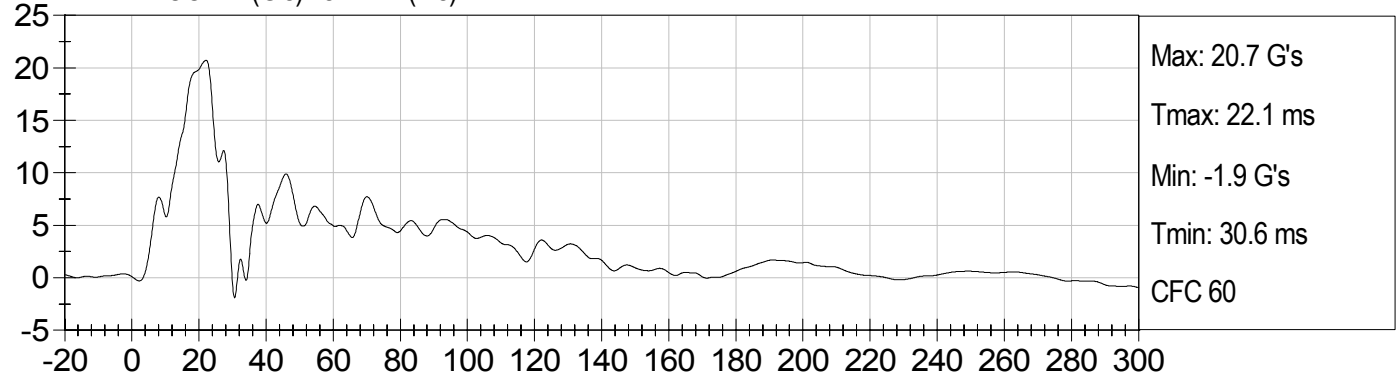

VEHICLE CG Y Velocity (kph) vs TIME (ms)
30
28
26
24
22
20
18
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
No Valid Data After
Approximately 40 msec.
Max: 28.2 kph
Tmax: 0.0 ms
Min: 18.3 kph
Tmin: 39.9 ms
CFC 180


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: 12.8 kph
Tmax: 271.0 ms
Min: -0.1 kph
Tmin: 19.6 ms
CFC 180

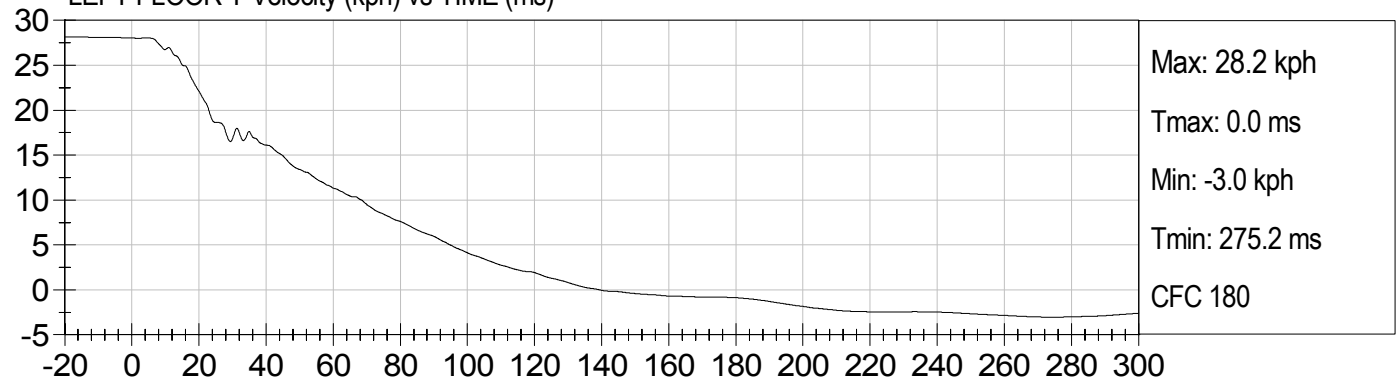
FMVSS 201P RIGID POLE SIDE IMPACT
2006 HYUNDAI ACCENT

Test Date: 09/14/2006
Speed: 17.5 mph (28.2 km/h)

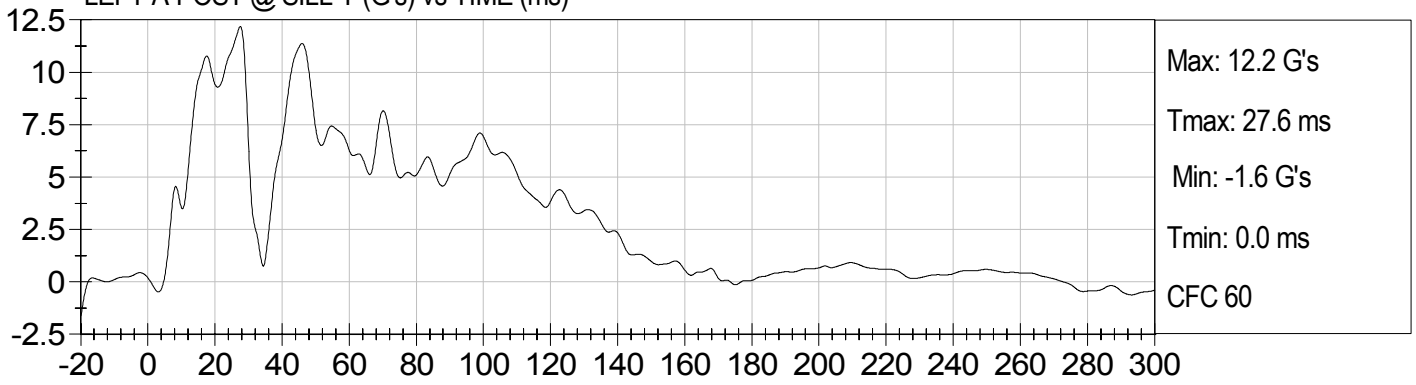
LEFT FLOOR Y (G's) vs TIME (ms)



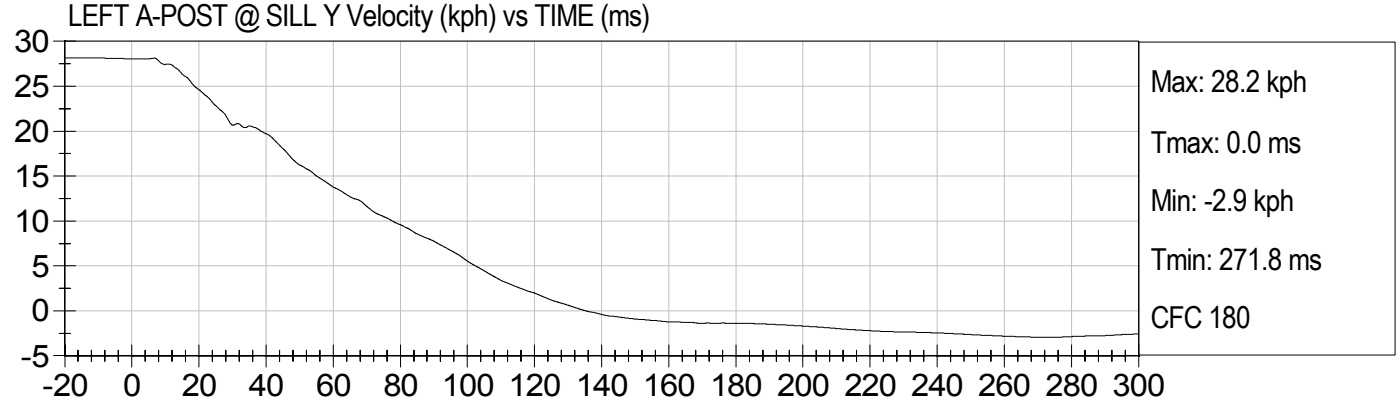
LEFT FLOOR Y Velocity (kph) vs TIME (ms)



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



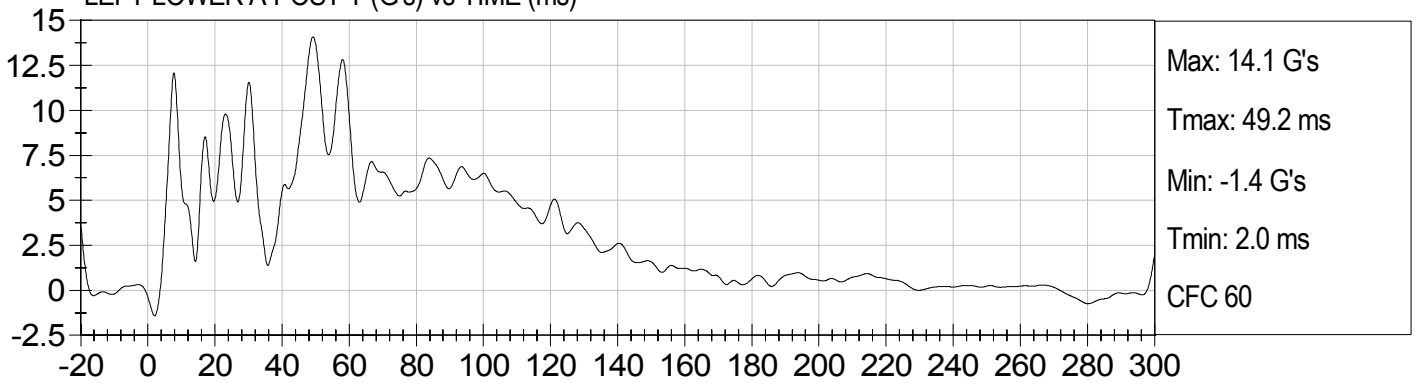
LEFT A-POST @ SILL Y Velocity (kph) vs TIME (ms)



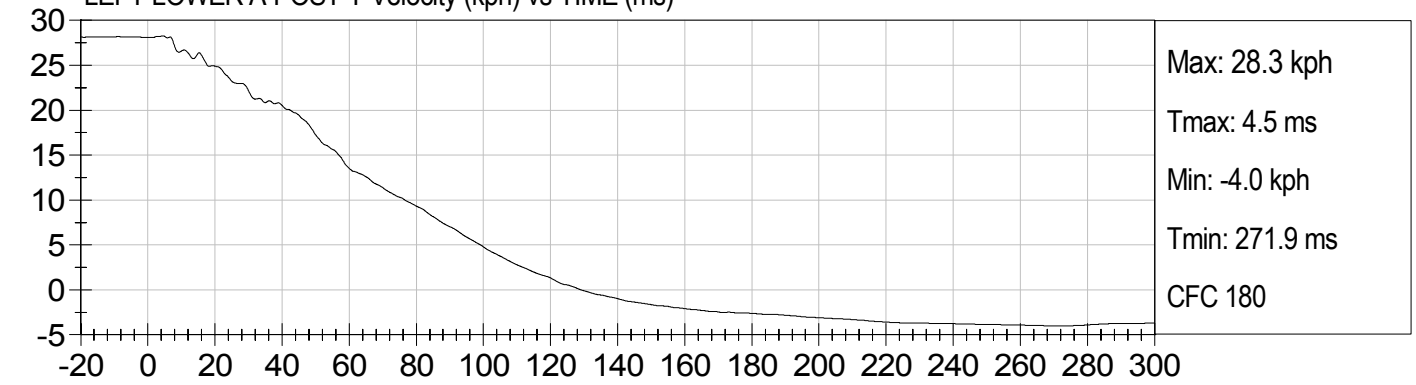
FMVSS 201P RIGID POLE SIDE IMPACT
2006 HYUNDAI ACCENT

Test Date: 09/14/2006
Speed: 17.5 mph (28.2 km/h)

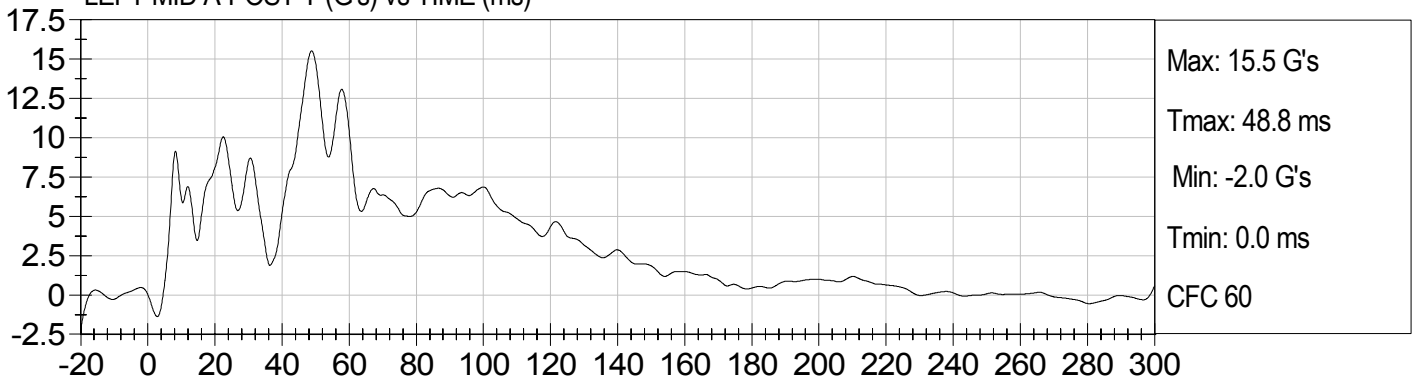
LEFT LOWER A-POST Y (G's) vs TIME (ms)



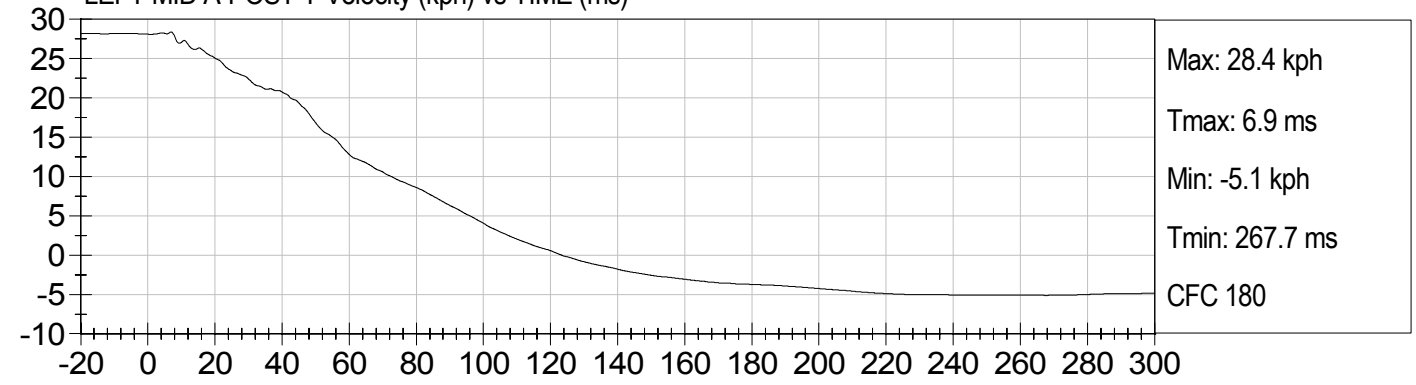
LEFT LOWER A-POST Y Velocity (kph) vs TIME (ms)



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



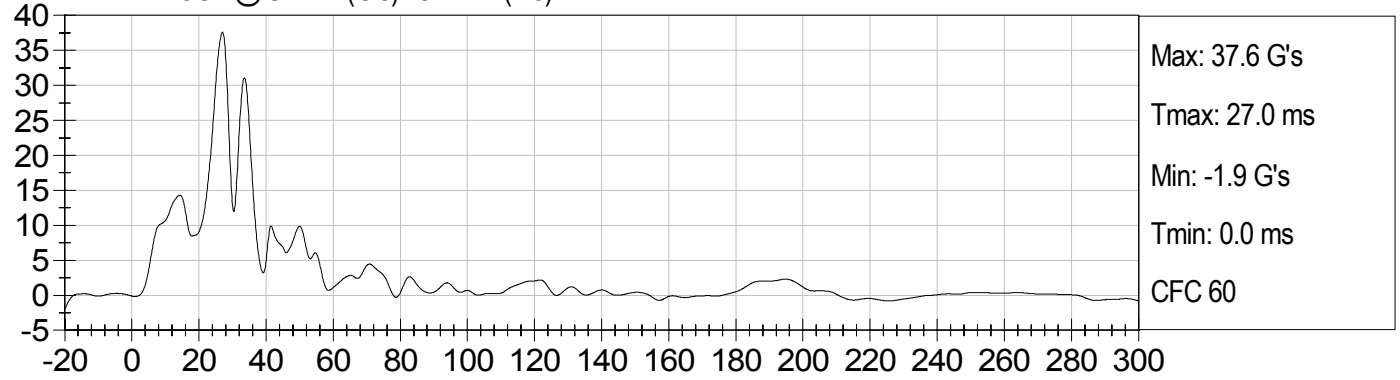
LEFT MID A-POST Y Velocity (kph) vs TIME (ms)



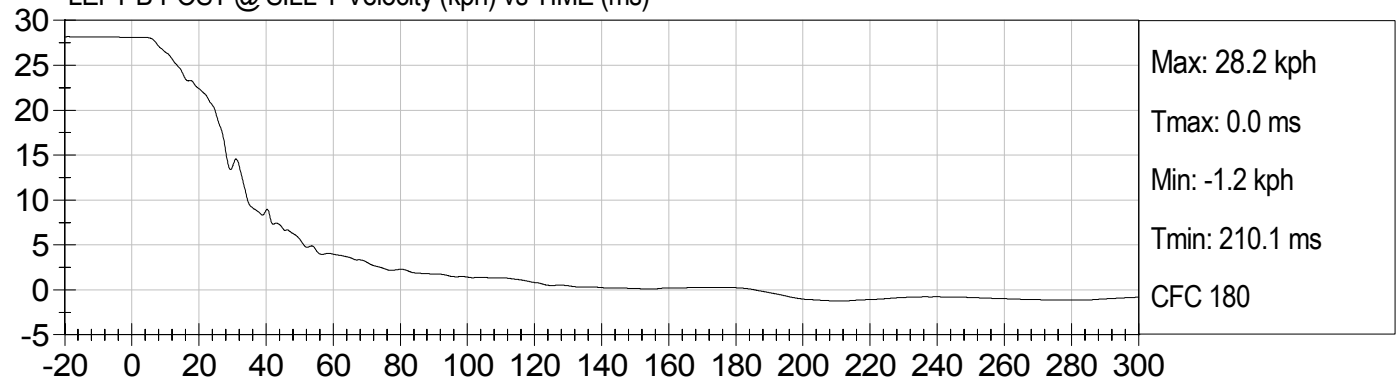
FMVSS 201P RIGID POLE SIDE IMPACT
2006 HYUNDAI ACCENT

Test Date: 09/14/2006
Speed: 17.5 mph (28.2 km/h)

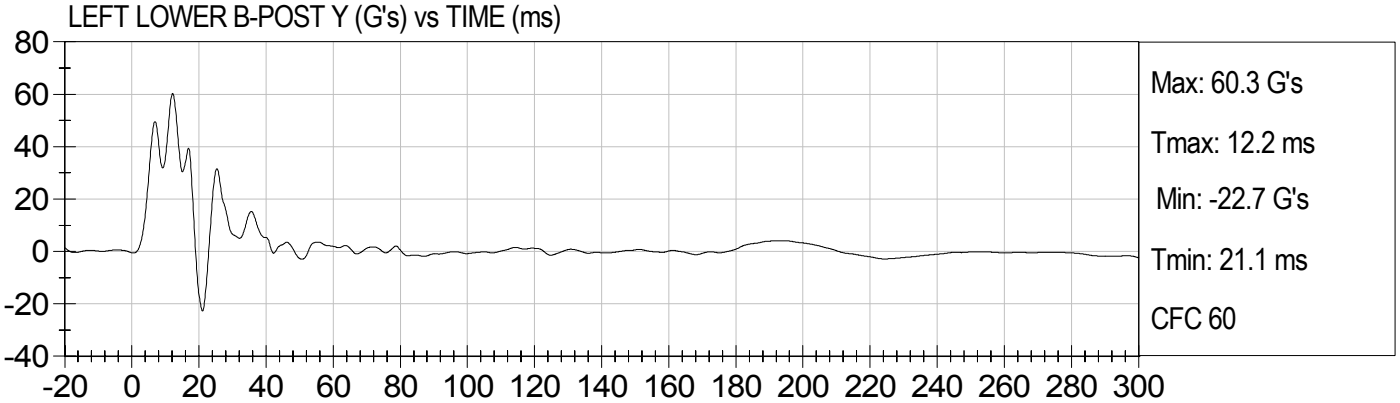
LEFT B-POST @ SILL Y (G's) vs TIME (ms)



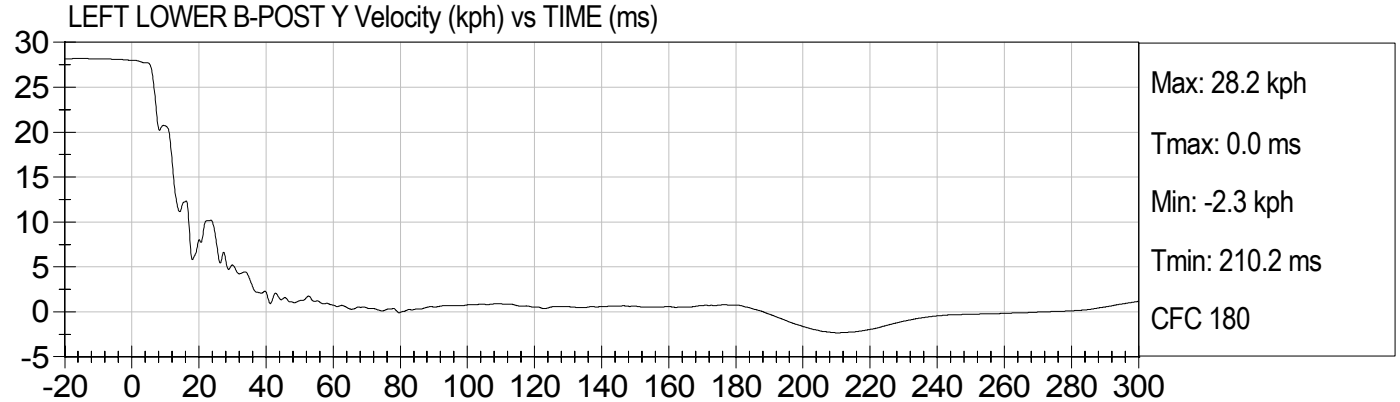
LEFT B-POST @ SILL Y Velocity (kph) vs TIME (ms)



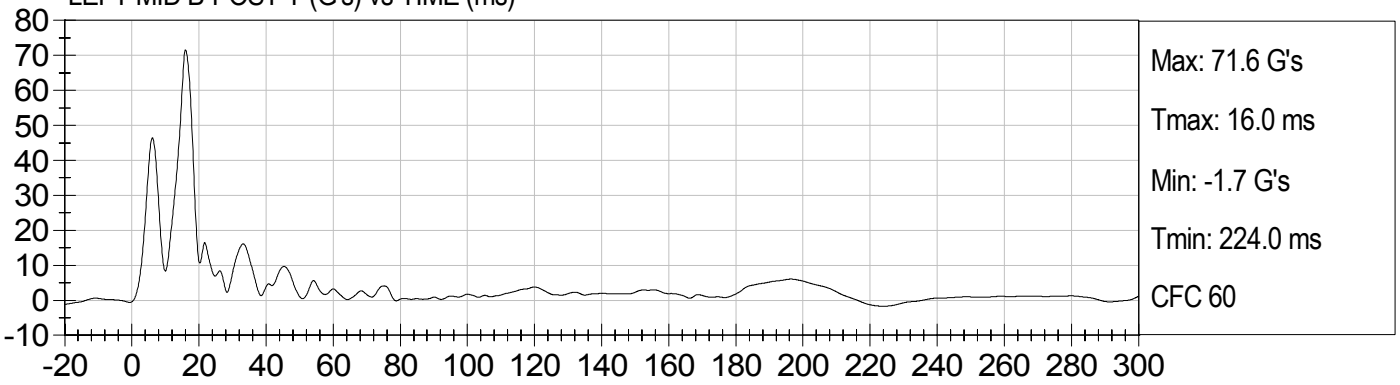
LEFT LOWER B-POST Y (G's) vs TIME (ms)



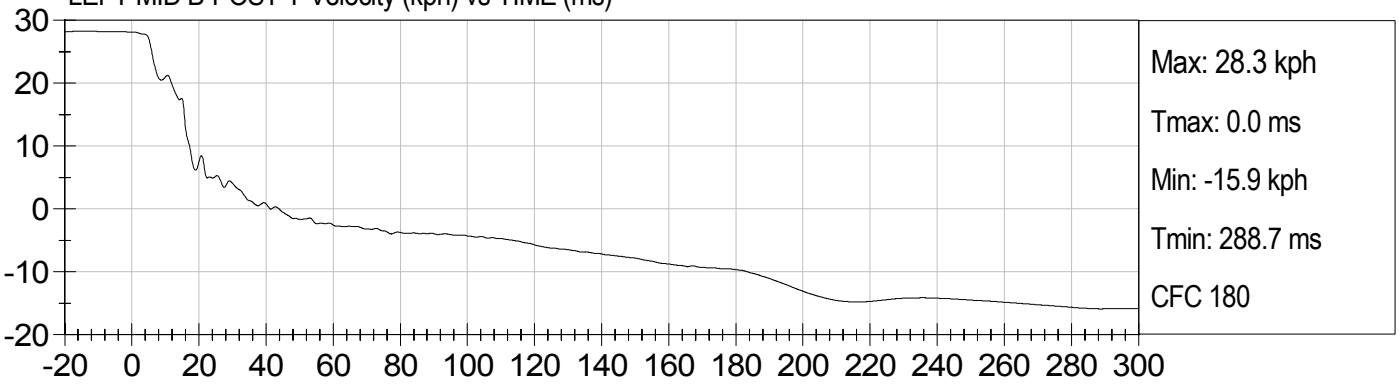
LEFT LOWER B-POST Y Velocity (kph) vs TIME (ms)



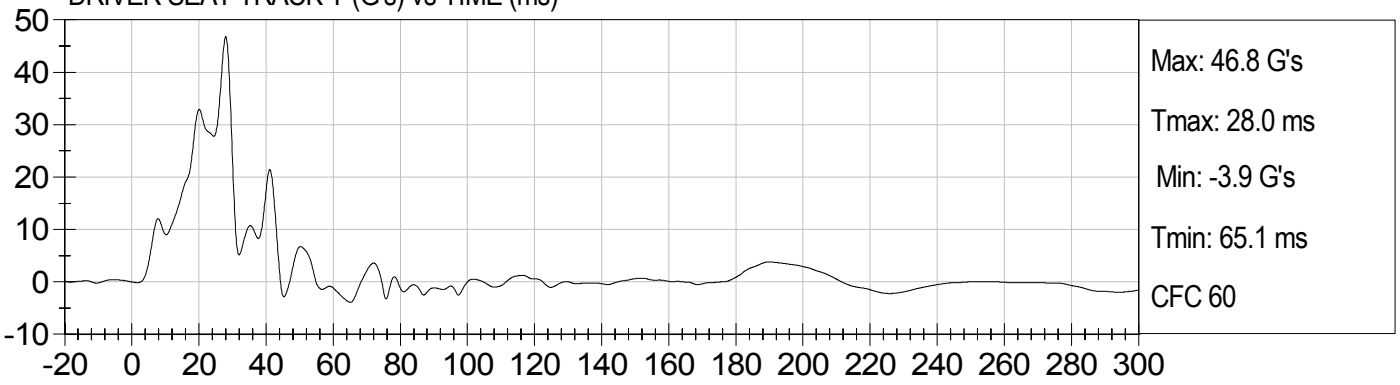
LEFT MID B-POST Y (G's) vs TIME (ms)



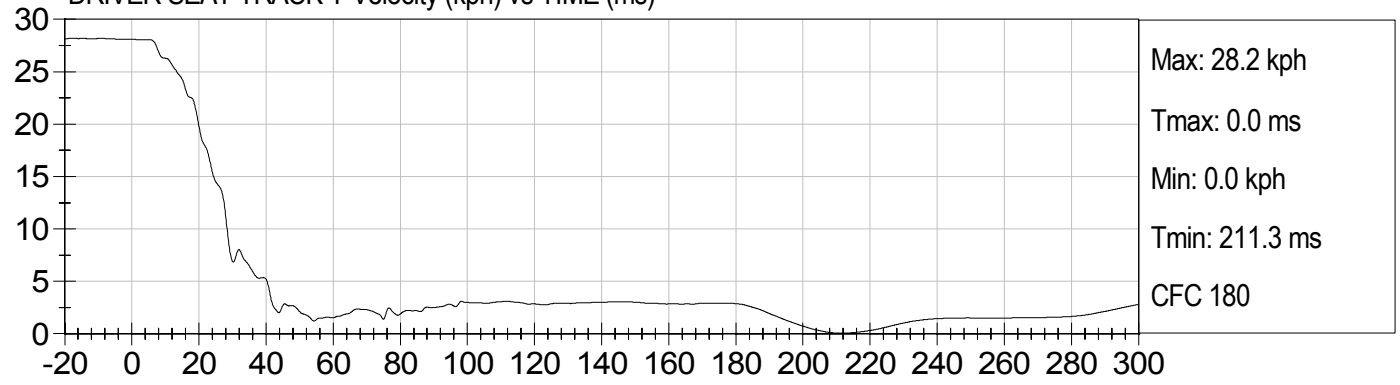
LEFT MID B-POST Y Velocity (kph) vs TIME (ms)

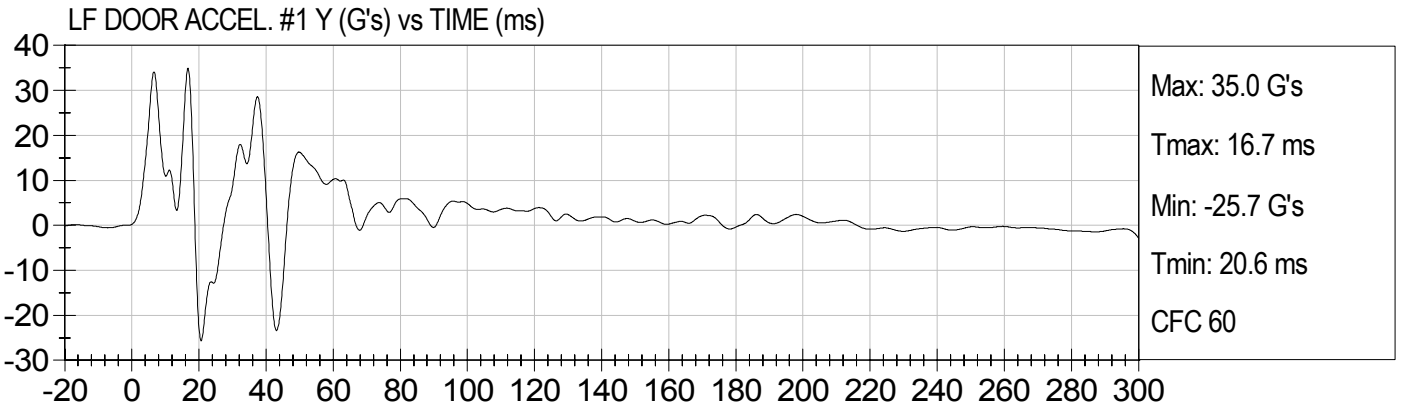


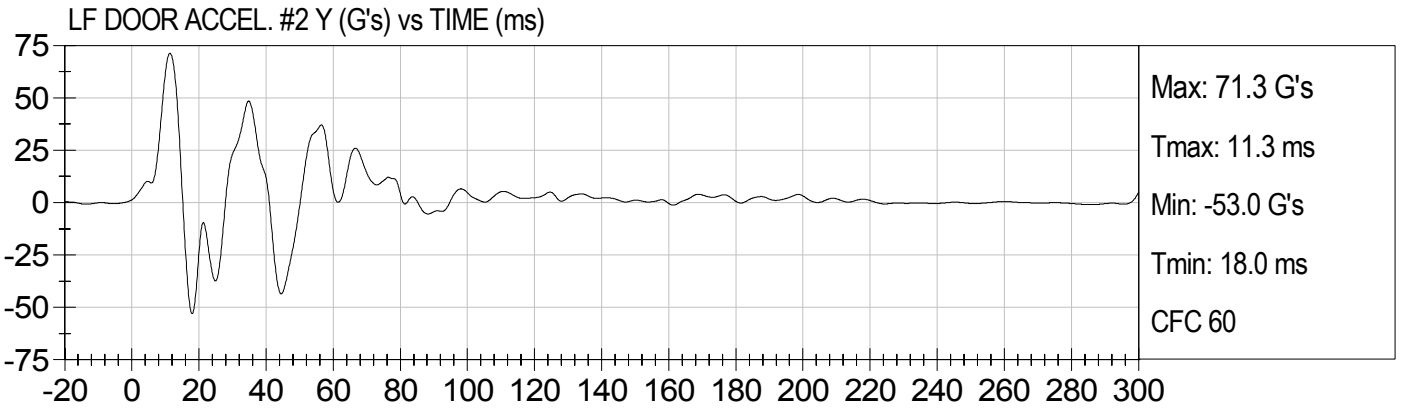
DRIVER SEAT TRACK Y (G's) vs TIME (ms)

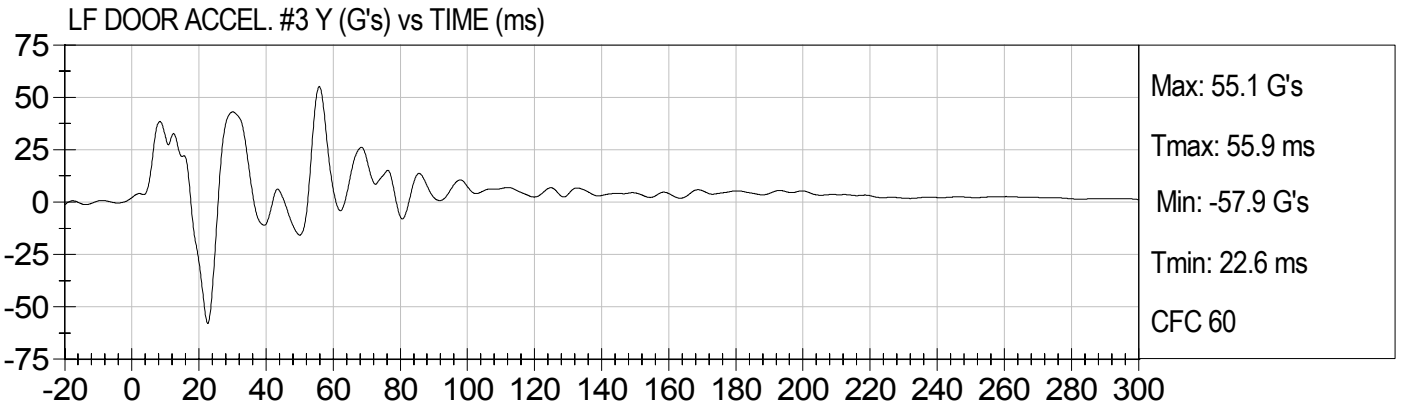


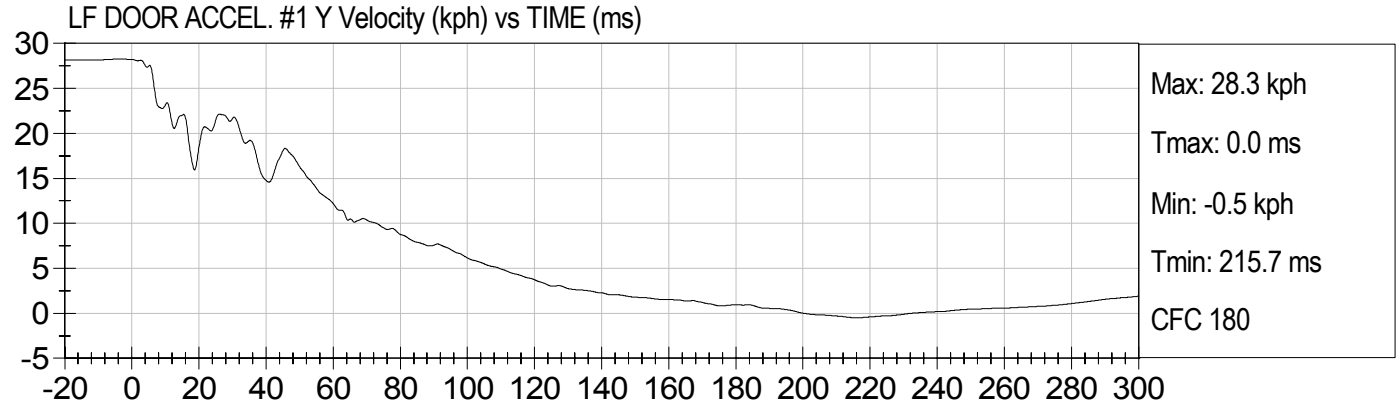
DRIVER SEAT TRACK Y Velocity (kph) vs TIME (ms)

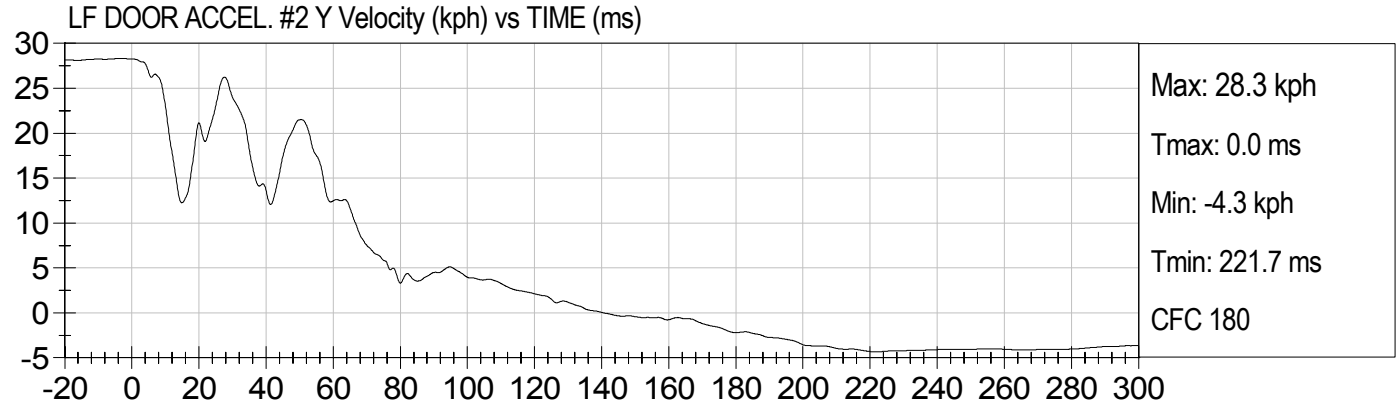


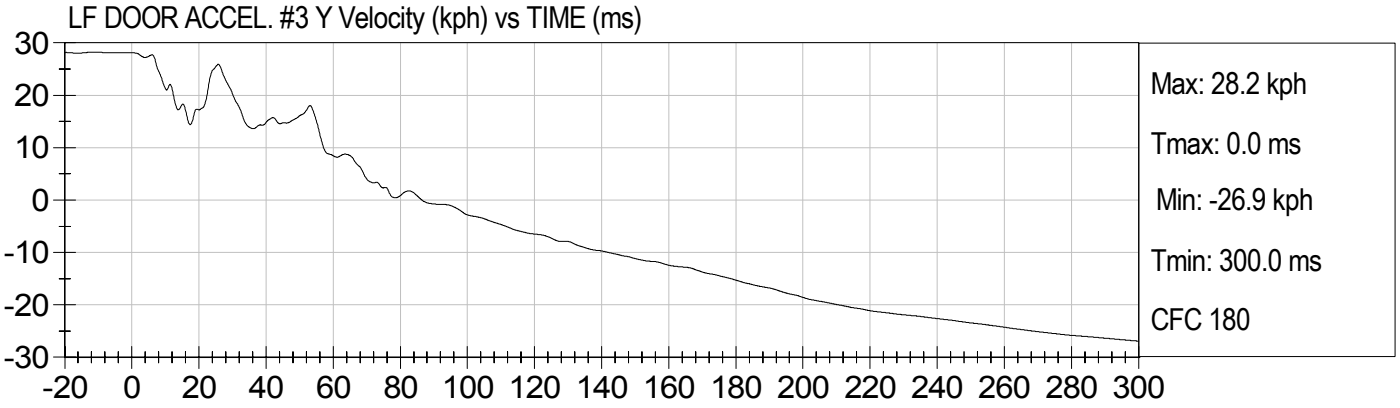

LF DOOR ACCEL. #1 Y (G's) vs TIME (ms)
40
30
20
10
0
-10
-20
-30
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 35.0 G's
Tmax: 16.7 ms
Min: -25.7 G's
Tmin: 20.6 ms
CFC 60


LF DOOR ACCEL. #2 Y (G's) vs TIME (ms)
75
50
25
0
-25
-50
-75
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 71.3 G's
Tmax: 11.3 ms
Min: -53.0 G's
Tmin: 18.0 ms
CFC 60


LF DOOR ACCEL. #3 Y (G's) vs TIME (ms)
75
50
25
0
-25
-50
-75
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 55.1 G's
Tmax: 55.9 ms
Min: -57.9 G's
Tmin: 22.6 ms
CFC 60

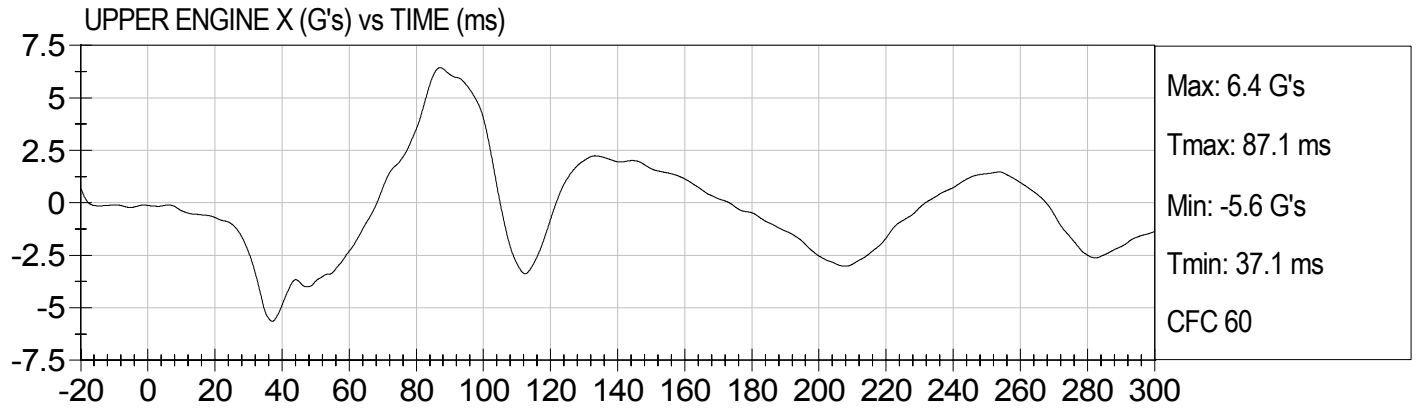

LF DOOR ACCEL. #1 Y Velocity (kph) vs TIME (ms)
30
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 28.3 kph
Tmax: 0.0 ms
Min: -0.5 kph
Tmin: 215.7 ms
CFC 180

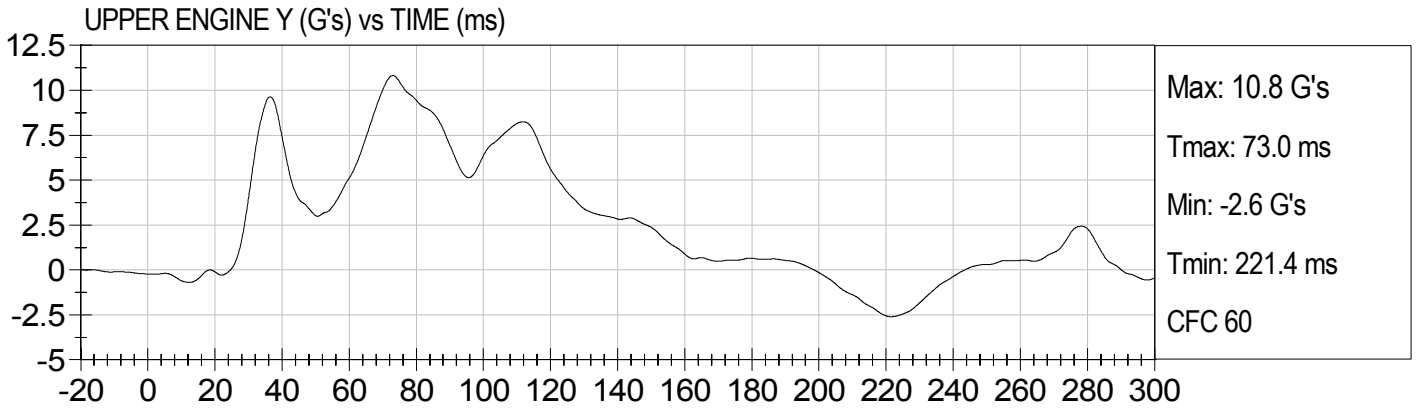

LF DOOR ACCEL. #2 Y Velocity (kph) vs TIME (ms)
30
25
20
15
10
5
0
-5
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 28.3 kph
Tmax: 0.0 ms
Min: -4.3 kph
Tmin: 221.7 ms
CFC 180

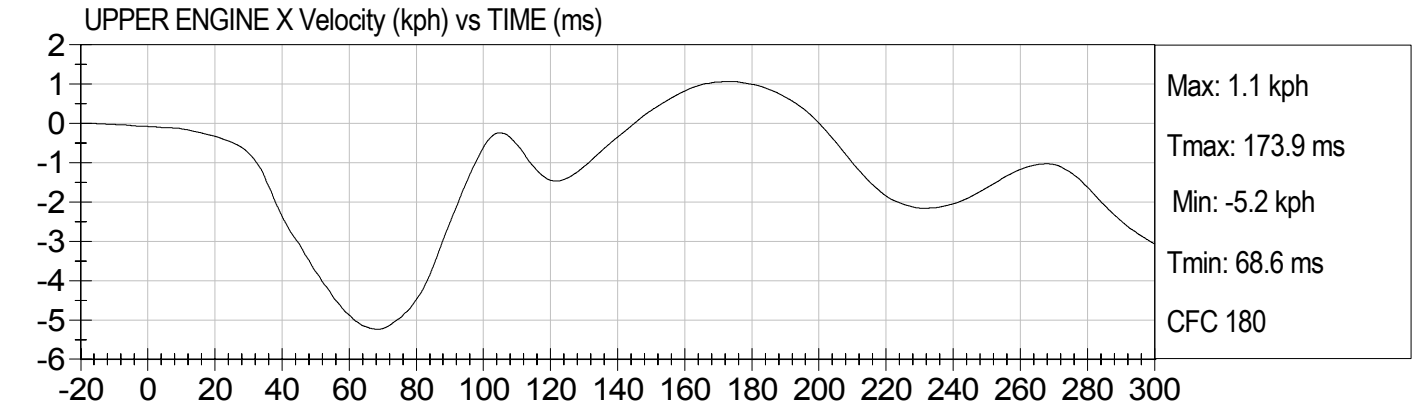

LF DOOR ACCEL. #3 Y Velocity (kph) vs TIME (ms)
30
20
10
0
-10
-20
-30
-20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
Max: 28.2 kph
Tmax: 0.0 ms
Min: -26.9 kph
Tmin: 300.0 ms
CFC 180

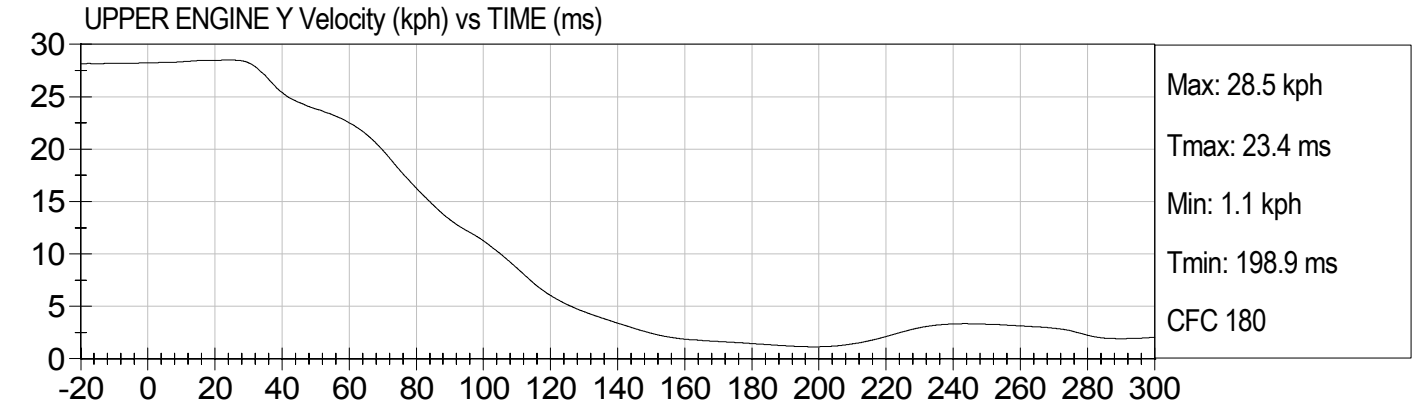
FMVSS 201P RIGID POLE SIDE IMPACT
2006 HYUNDAI ACCENT

Test Date: 09/14/2006
Speed: 17.5 mph (28.2 km/h)





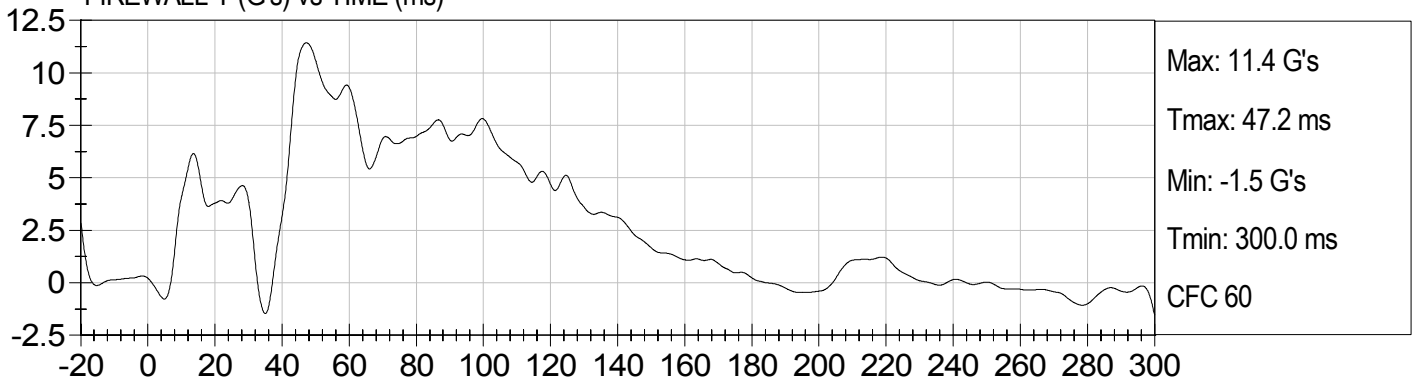




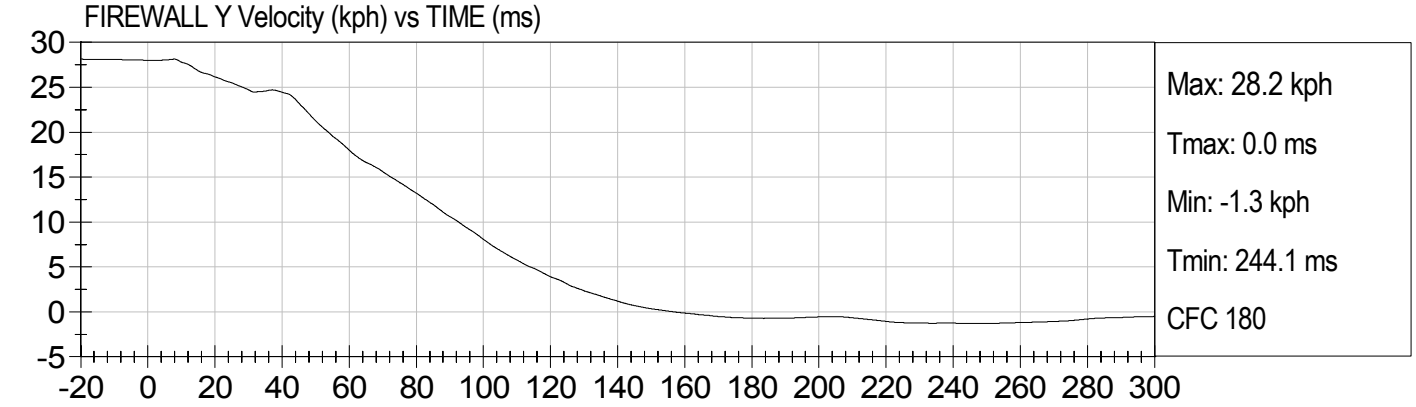
FMVSS 201P RIGID POLE SIDE IMPACT
2006 HYUNDAI ACCENT

Test Date: 09/14/2006
Speed: 17.5 mph (28.2 km/h)

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

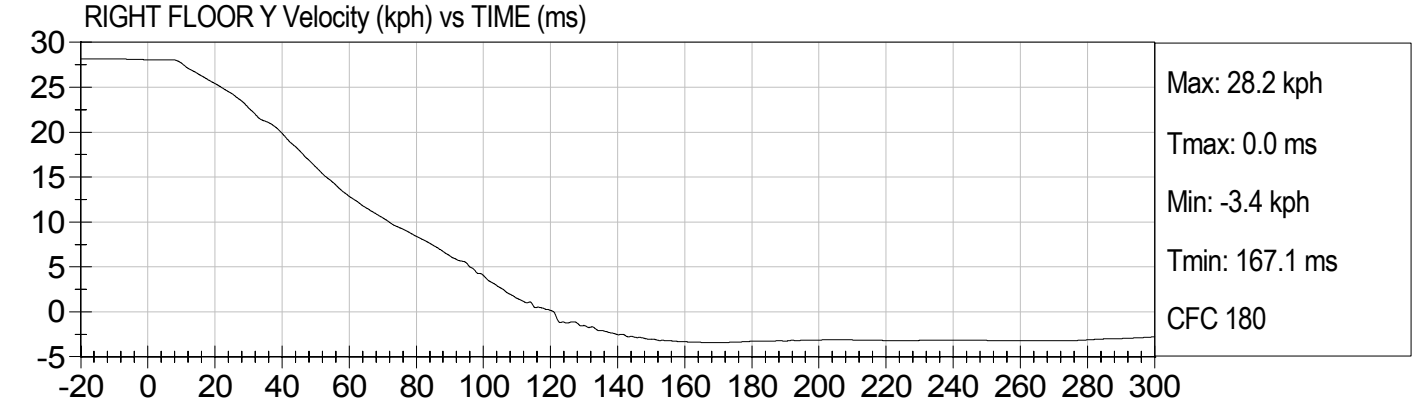


FIREWALL Y Velocity (kph) vs TIME (ms)



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

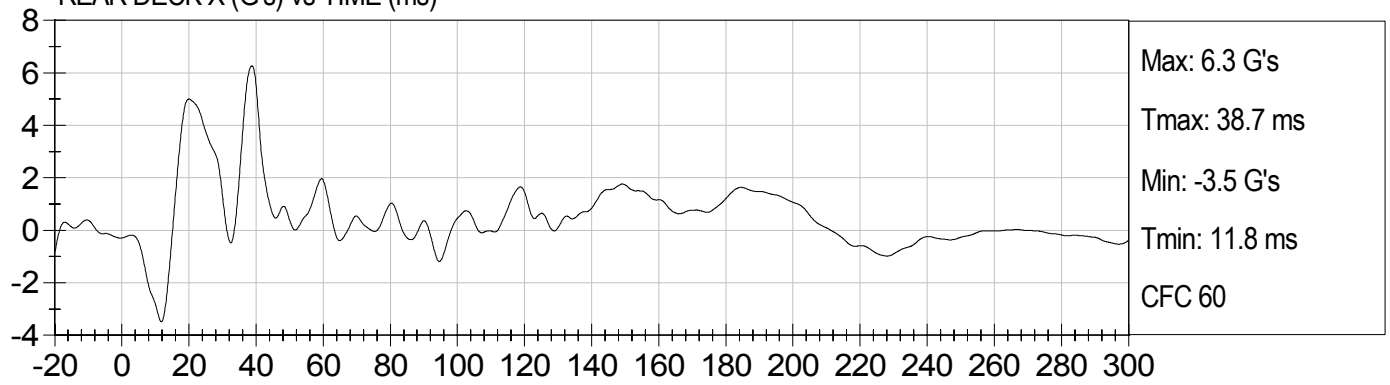
RIGHT FLOOR Y Velocity (kph) vs TIME (ms)



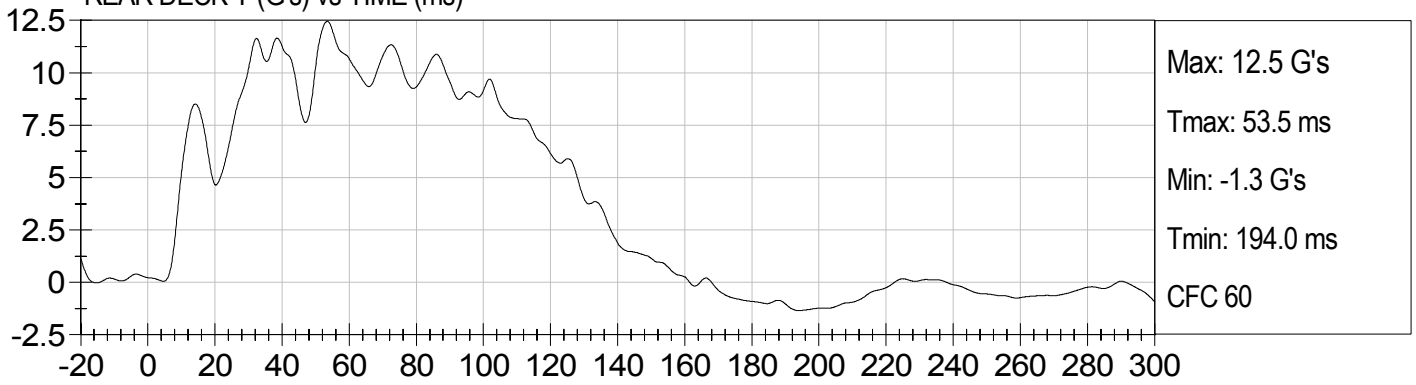
FMVSS 201P RIGID POLE SIDE IMPACT
2006 HYUNDAI ACCENT

Test Date: 09/14/2006
Speed: 17.5 mph (28.2 km/h)

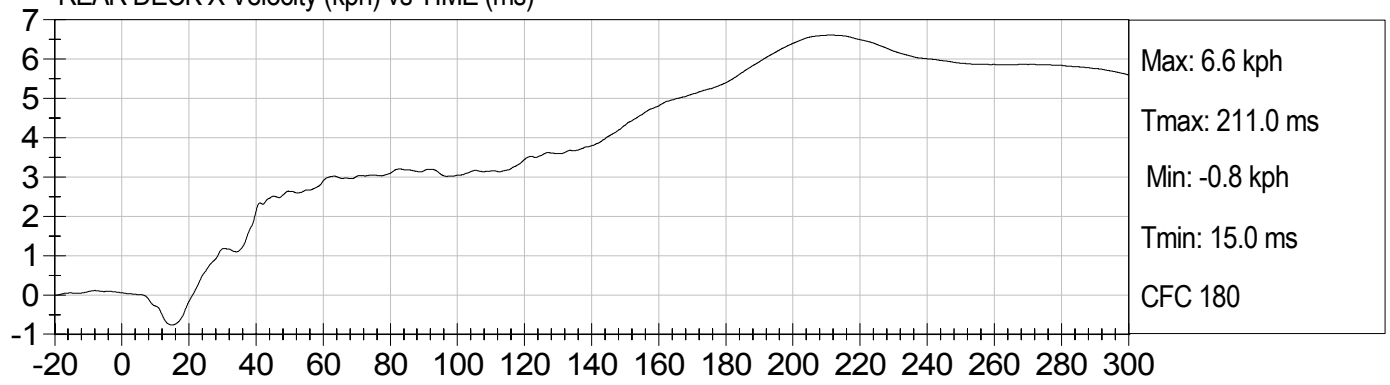
REAR DECK X (G's) vs TIME (ms)



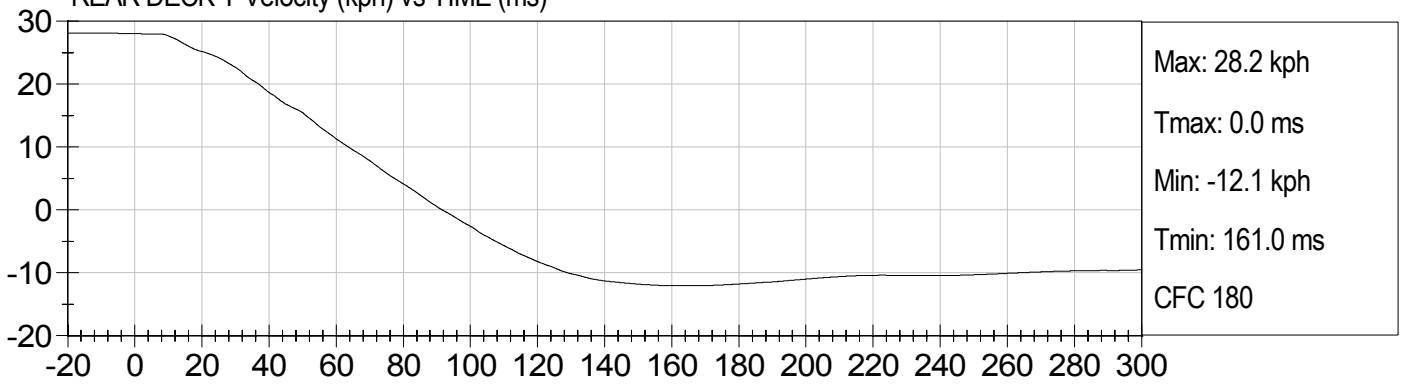
REAR DECK Y (G's) vs TIME (ms)



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



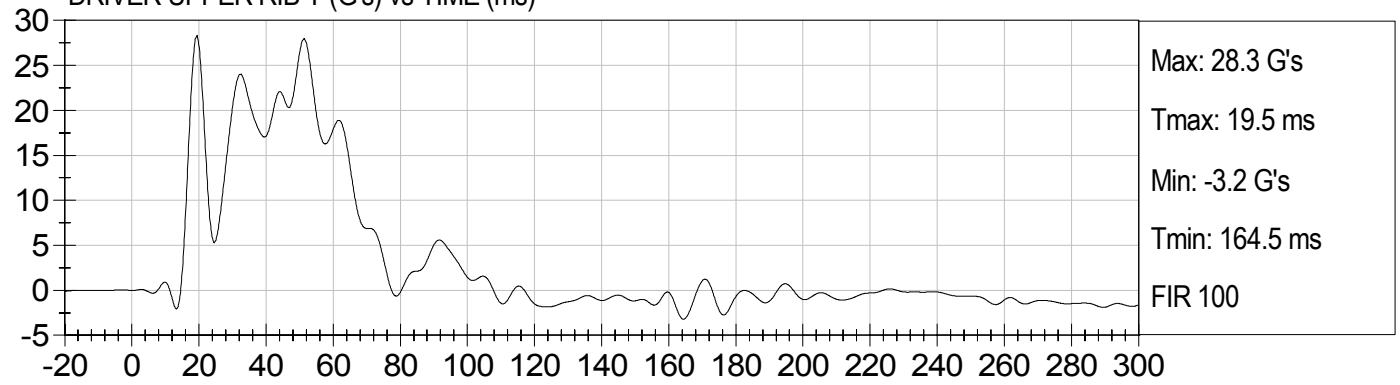
REAR DECK Y Velocity (kph) vs TIME (ms)



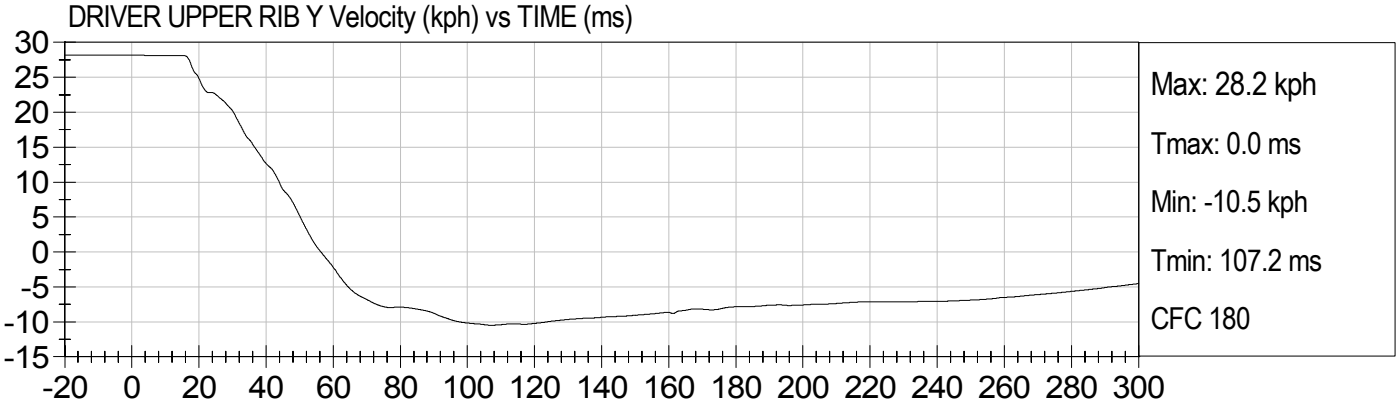
FMVSS 201P RIGID POLE SIDE IMPACT
2006 HYUNDAI ACCENT

Test Date: 09/14/2006
Speed: 17.5 mph (28.2 km/h)

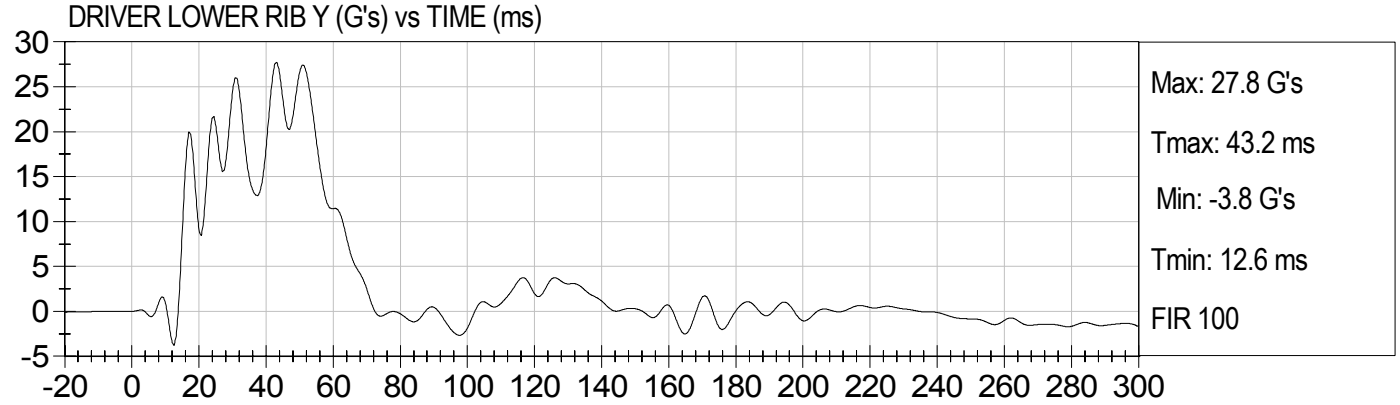
DRIVER UPPER RIB Y (G's) vs TIME (ms)



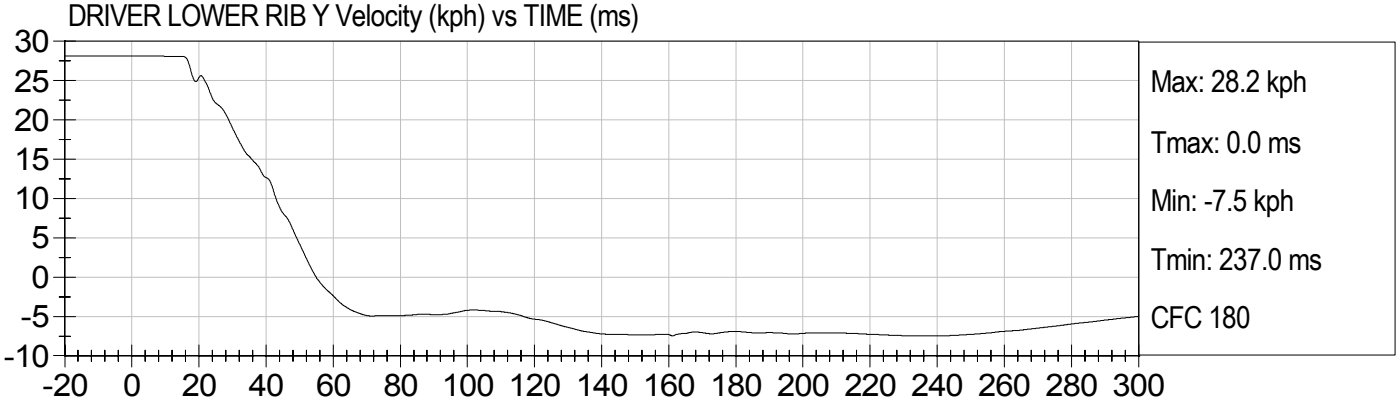
DRIVER UPPER RIB Y Velocity (kph) vs TIME (ms)



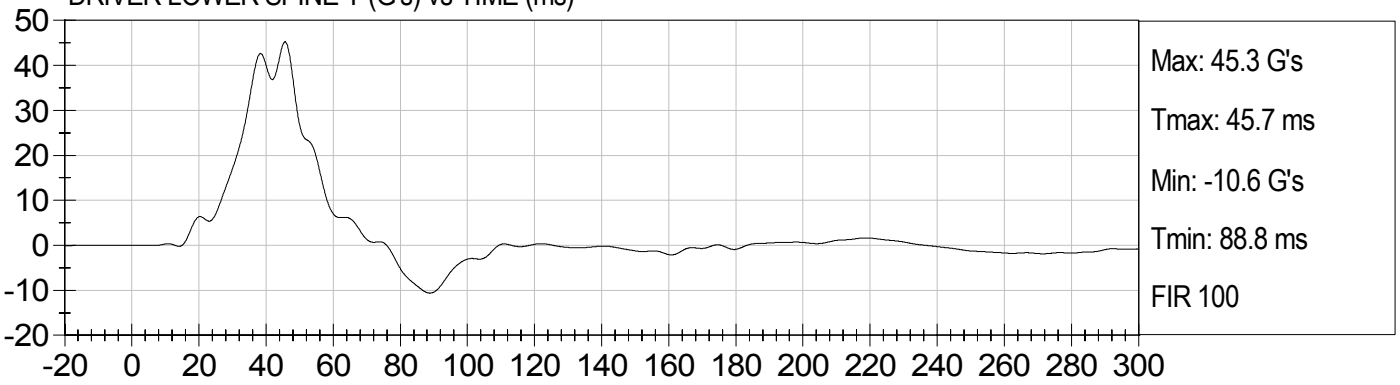
DRIVER LOWER RIB Y (G's) vs TIME (ms)



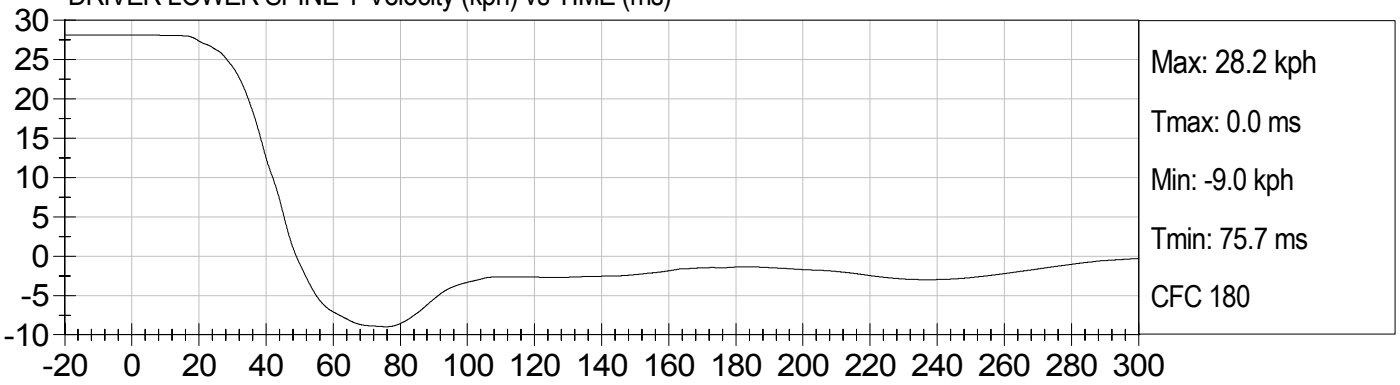
DRIVER LOWER RIB Y Velocity (kph) vs TIME (ms)



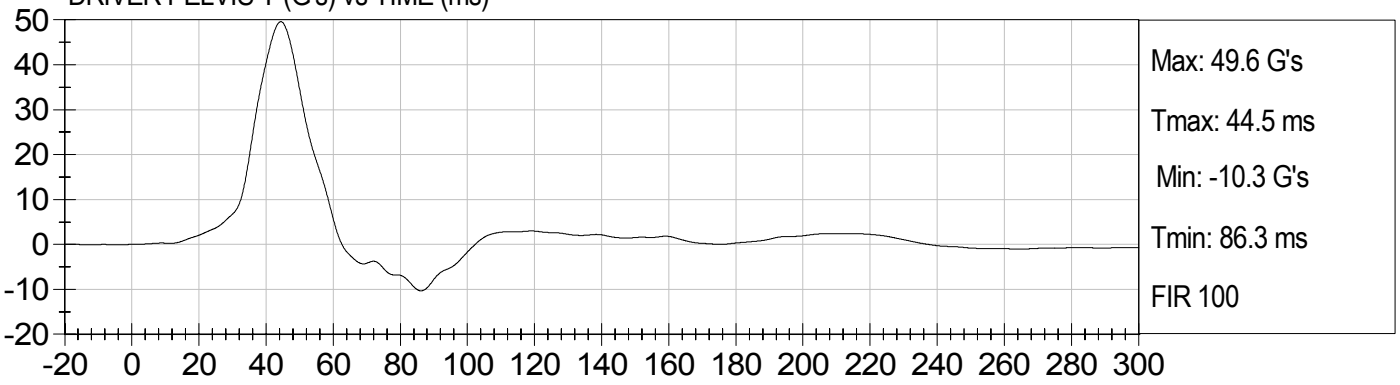
DRIVER LOWER SPINE Y (G's) vs TIME (ms)



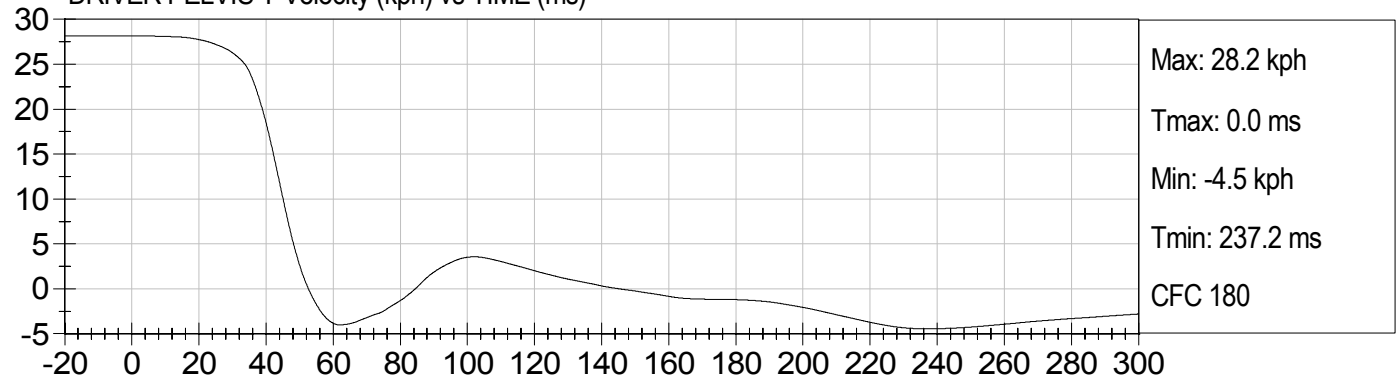
DRIVER LOWER SPINE Y Velocity (kph) vs TIME (ms)



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



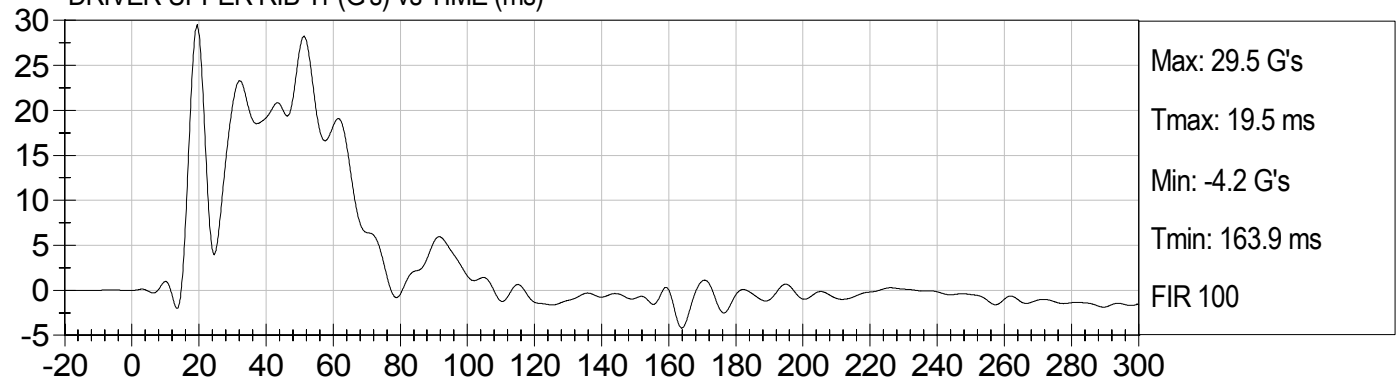
DRIVER PELVIS Y Velocity (kph) vs TIME (ms)



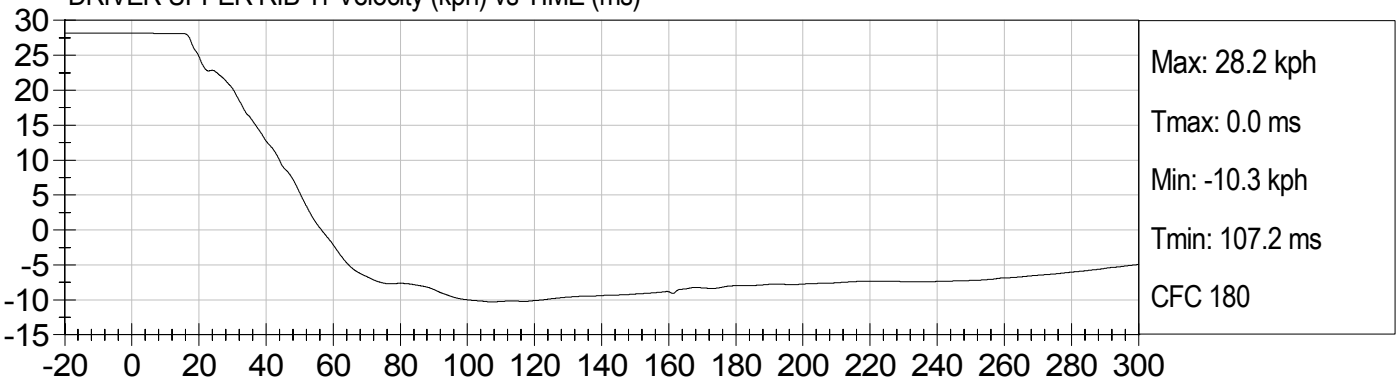
FMVSS 201P RIGID POLE SIDE IMPACT
2006 HYUNDAI ACCENT

Test Date: 09/14/2006
Speed: 17.5 mph (28.2 km/h)

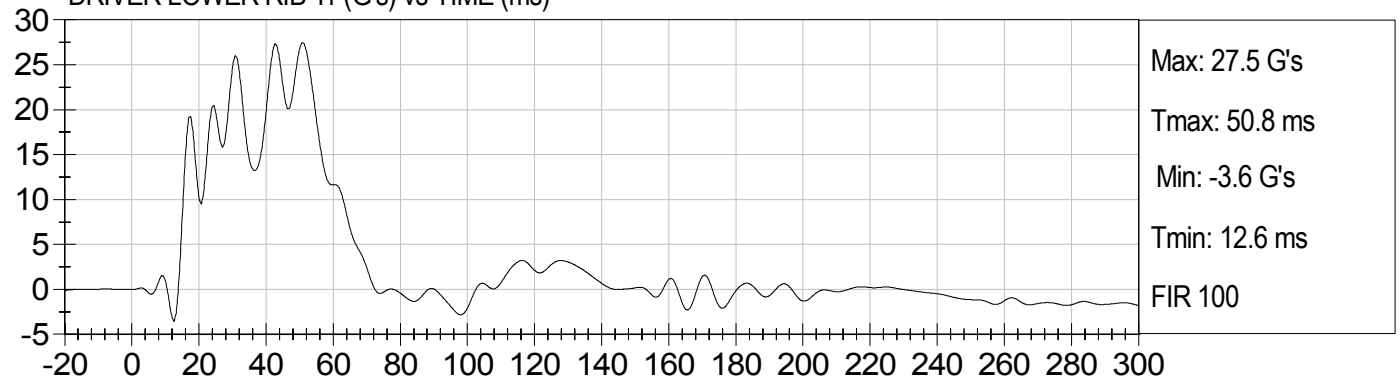
DRIVER UPPER RIB Yr (G's) vs TIME (ms)



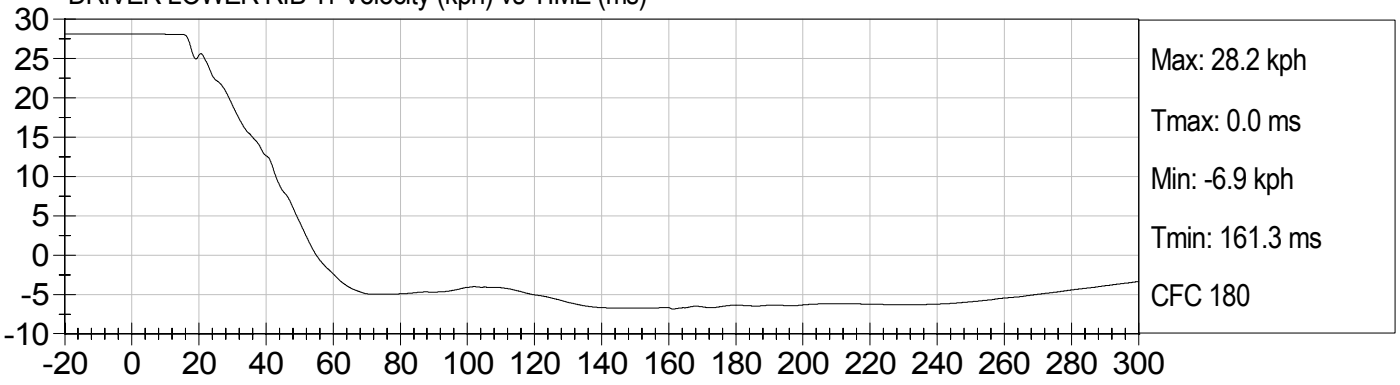
DRIVER UPPER RIB Yr Velocity (kph) vs TIME (ms)



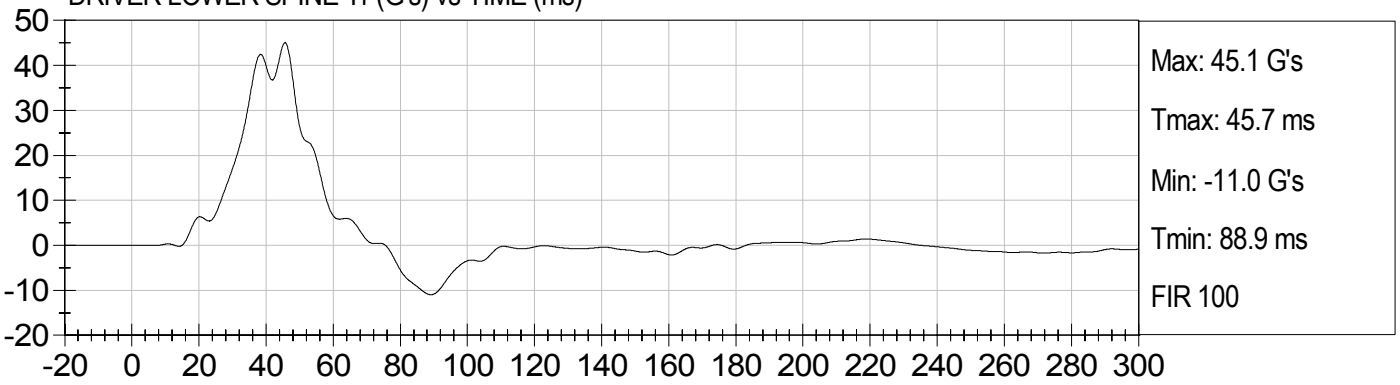
DRIVER LOWER RIB Yr (G's) vs TIME (ms)



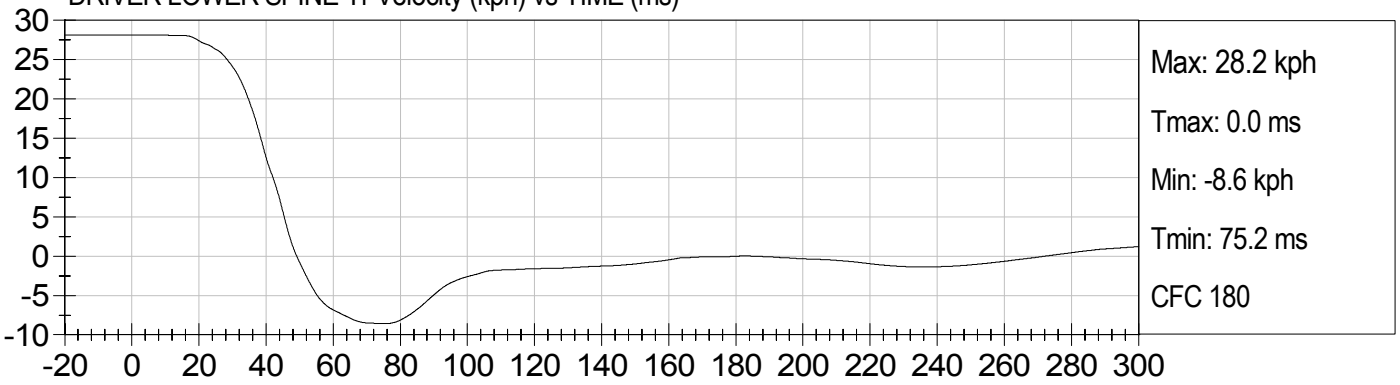
DRIVER LOWER RIB Yr Velocity (kph) vs TIME (ms)



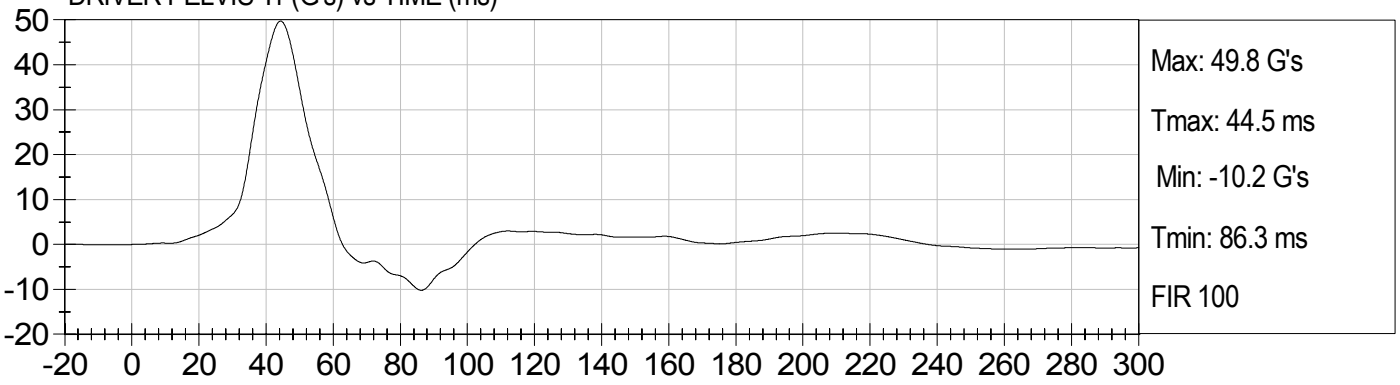
DRIVER LOWER SPINE Yr (G's) vs TIME (ms)



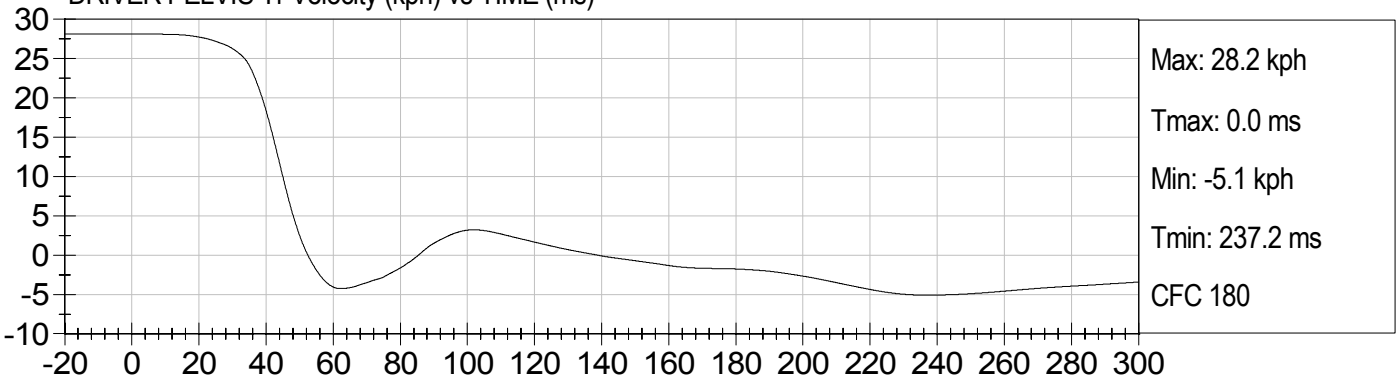
DRIVER LOWER SPINE Yr Velocity (kph) vs TIME (ms)



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



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

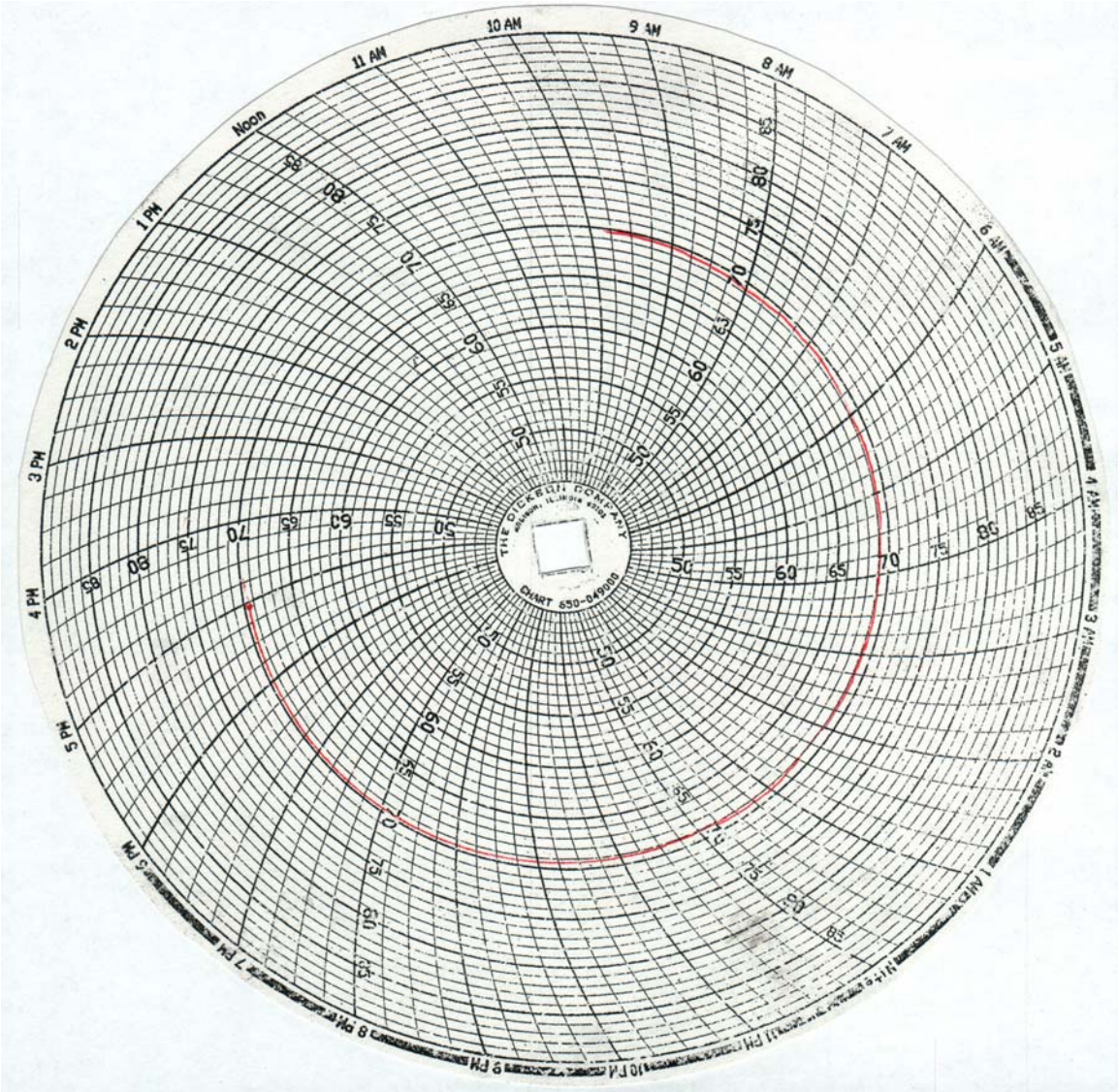


APPENDIX C

SID/HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Vehicle and Dummy Temperature

Test Vehicle:	2006 Hyundai Accent GLS 4-Dr.	NHTSA No.	C60516
Test Program:	FMVSS 201P	Test Date:	September 14, 2006



SID/HIII Calibration Data Sheet

Side Impact Dummy

Head Drop Calibration (Lateral)

ATD Serial No: 036 **Test I.D:** D062671

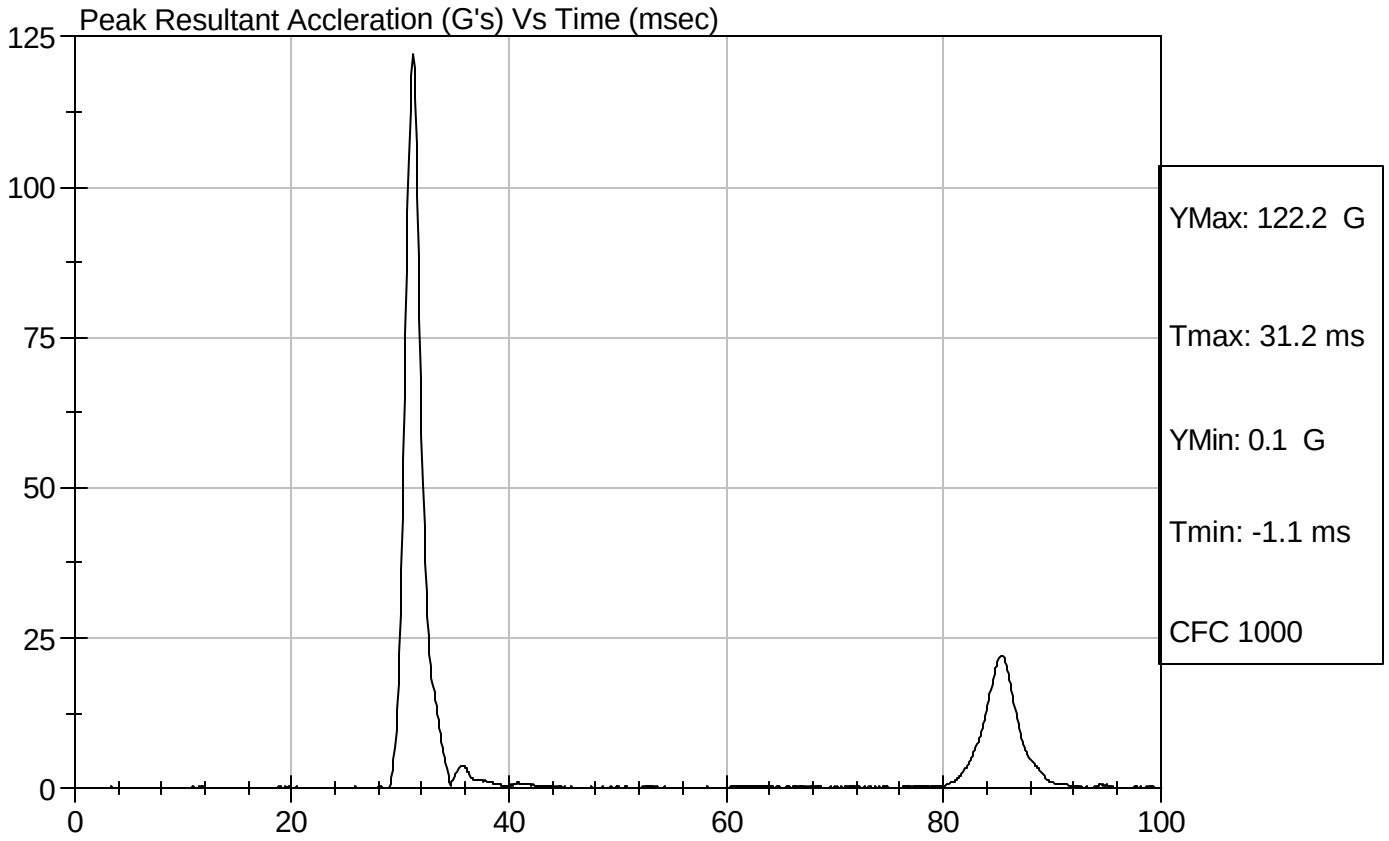
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Peak Resultant Acceleration	G's	120 to 150	122	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-9.9	Pass
		Overall Test Results		Pass

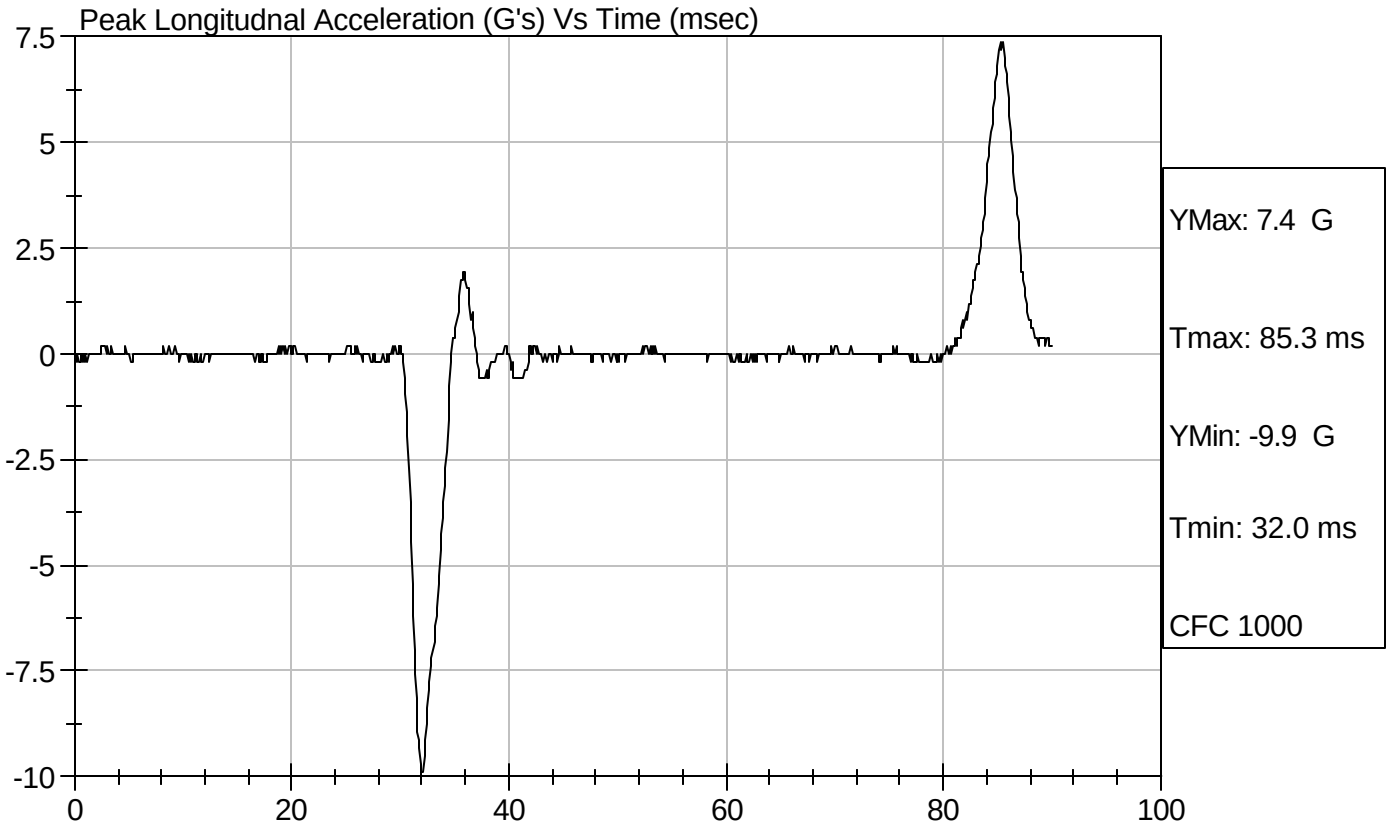
Jessica Hall
Laboratory Technician

09/06/2006
Test Date

David Winkelbauer
Approved By

	Test Description: Head Drop	Test Date: 09/06/2006
	Component: D062671	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:** D062672

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Probe Velocity	m/s	4.27 - 4.33	4.28	Pass
Upper Rib	G's	37 - 46	43	Pass
Lower Rib	G's	37 - 46	45	Pass
Lower Spine	G's	15 - 22	17	Pass
		Overall Test Results		Pass

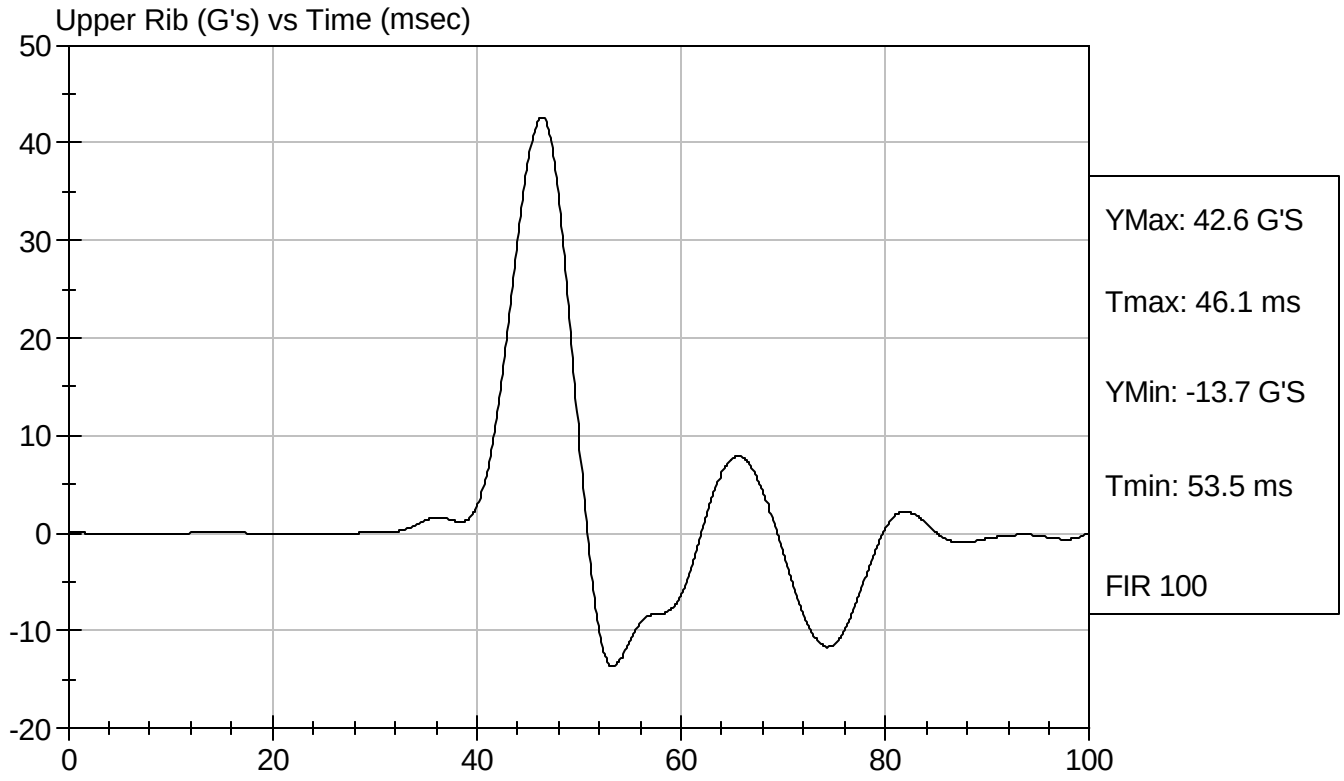
Jessica Hall
Laboratory Technician

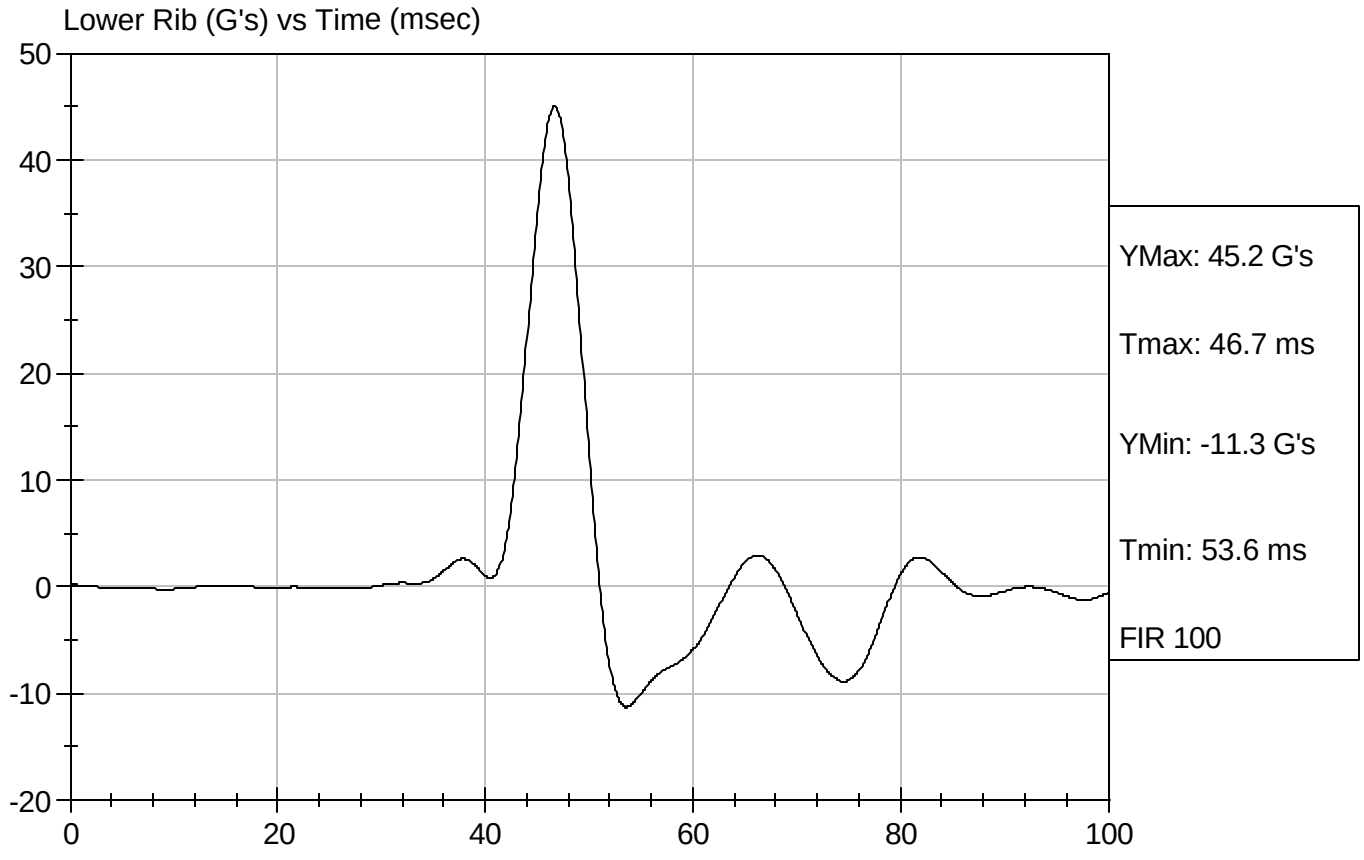
09/06/2006
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Component ID: D062672

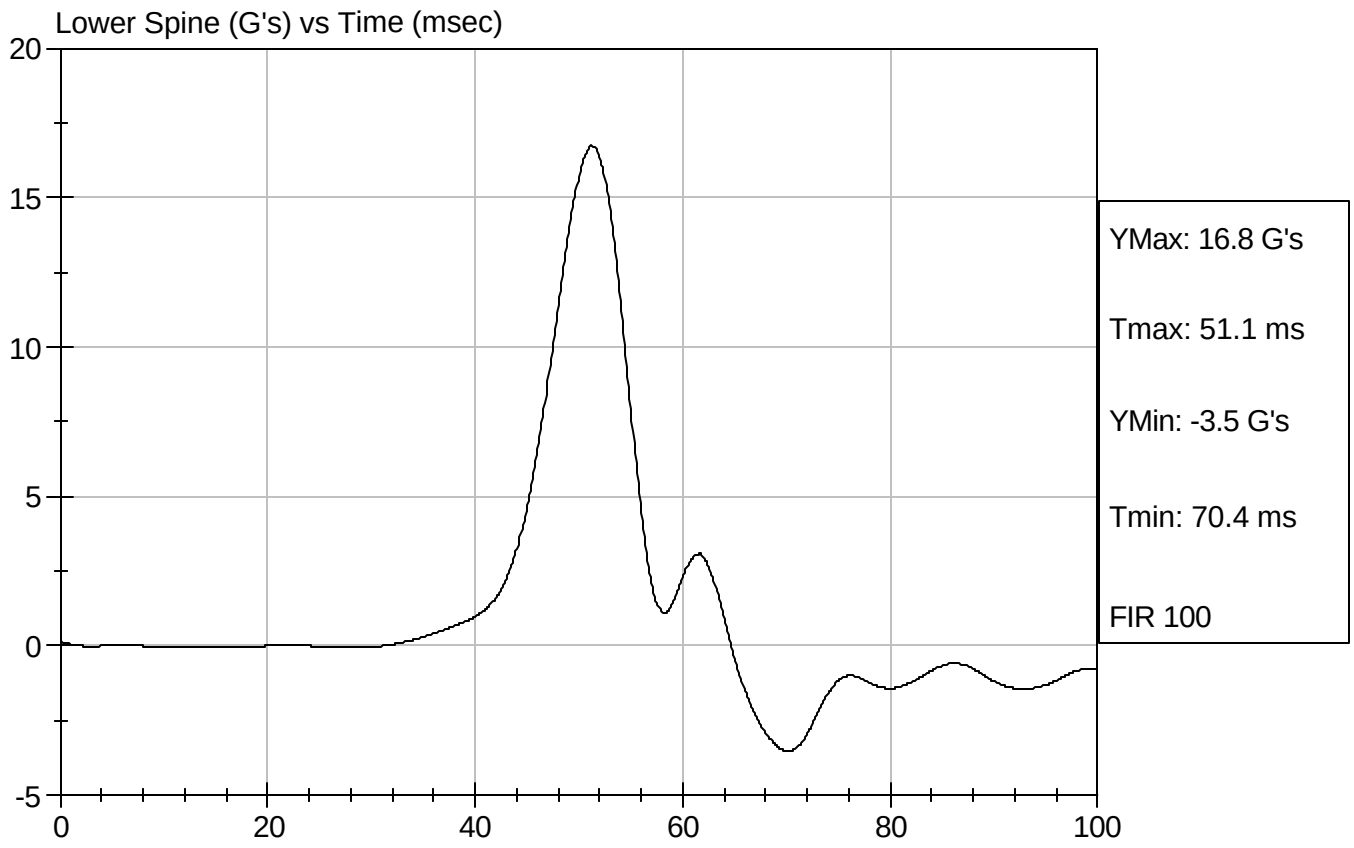
Test Date: 09/06/2006
Speed: 14.05 ft/sec, 4.28 m/sec





Test Desc: Thorax Impact
Component ID: D062672

Test Date: 09/06/2006
Speed: 14.05 ft/sec, 4.28 m/sec



SID/HIII Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 036 **Test I.D:** D062673

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.6	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	46	Pass
		Overall Test Results		Pass

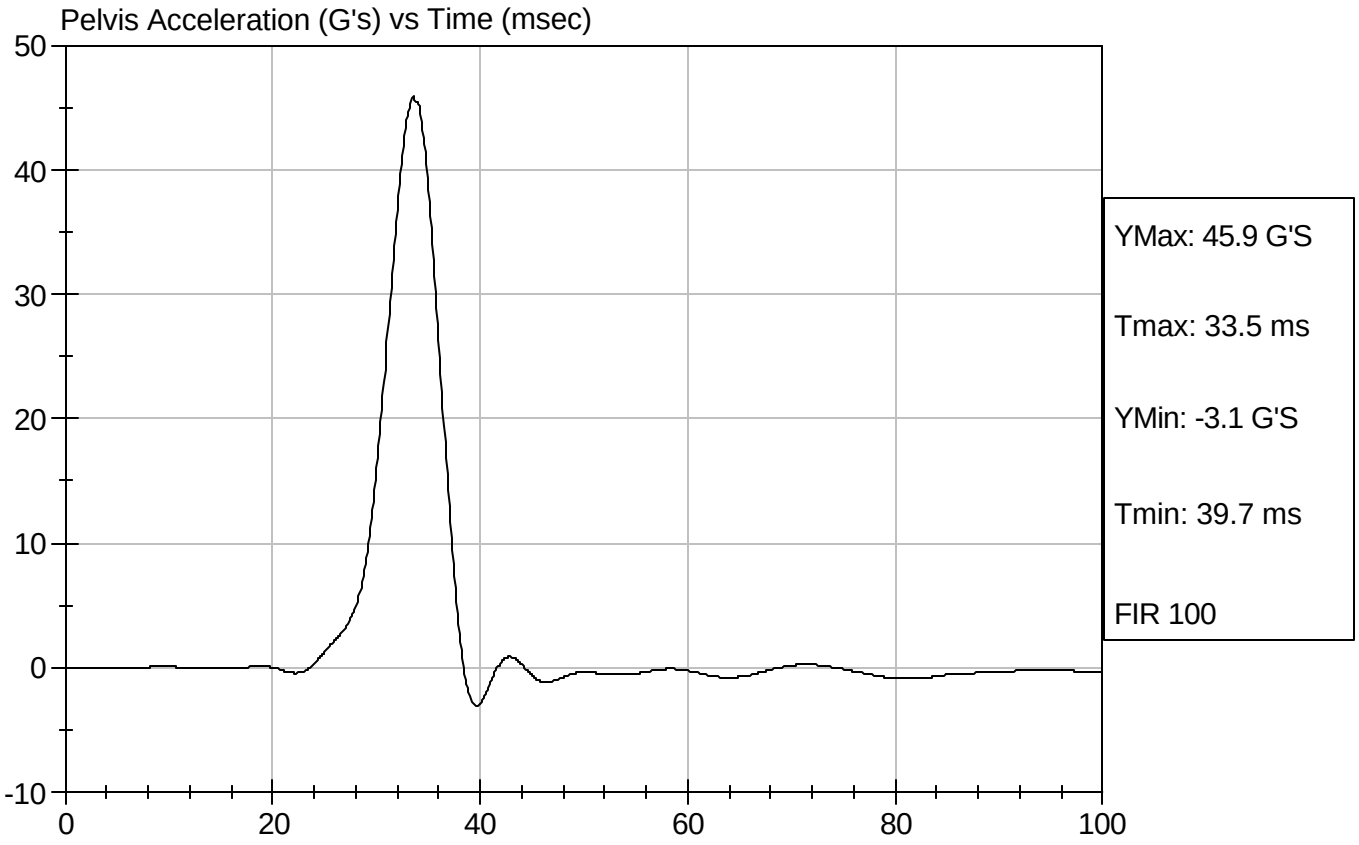
Jessica Hall
Laboratory Technician

09/06/2006
Test Date

David Winkelbauer
Approved By

Test Desc: Pelvis Impact
Component ID: D062673

Test Date: 09/06/2006
Speed: 14.11 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:** D062674

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Force At 12.7 mm	N	104 -162	154	Pass
Force At 19 mm	N	163 - 222	207	Pass
Force At 25.4 mm	N	222 - 280	279	Pass
Force At 33 mm	N	325 - 391	380	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

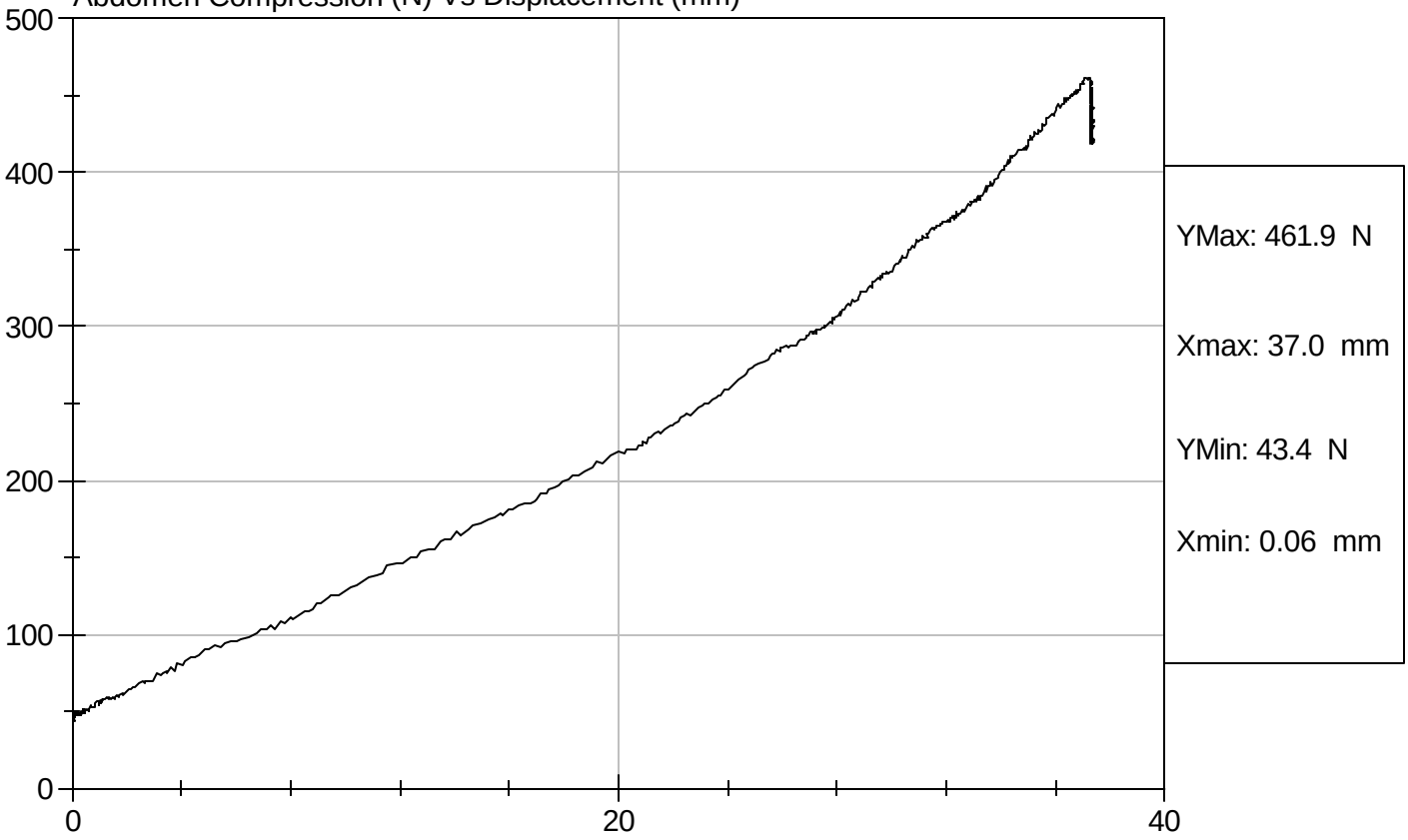
09/06/2006
Test Date

David Winkelbauer
Approved By

Test Description: Abdomen Compression Test Date: 09/06/2006

Component: D062674 Speed: 0 ft/sec, 0 m/sec

Abdomen Compression (N) Vs Displacement (mm)



SID/HIII Calibration Data Sheet

Side Impact Dummy

Lumbar Flexion Calibration

ATD Serial No: 036 **Test I.D:** D062675

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	116.3	Pass
Force At 30 deg	N	151.2 - 204.6	196.4	Pass
Force At 40 deg	N	204.6 - 258.0	212.4	Pass
Return Angle	Deg	12 Maximum	4	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

09/06/2006
Test Date

David Winkelbauer
Approved By

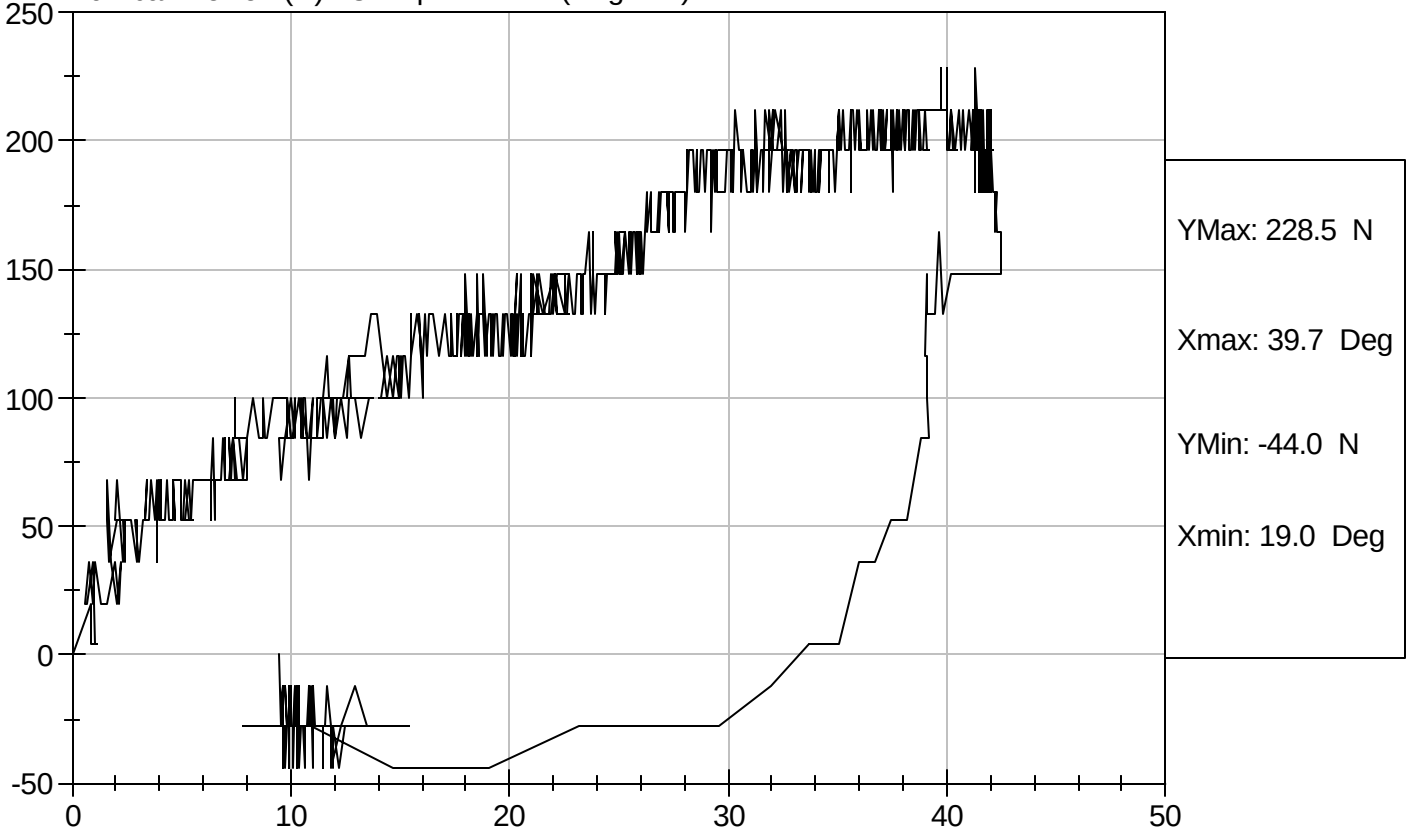
Test Description: Lumbar Flexion

Test Date: 09/06/2006

Component: D062675

Speed: 0 ft/sec, 0 m/sec

Lumbar Flexion (N) Vs Displacement (Degrees)



SID/HIII Calibration Data Sheet

Side Impact Dummy (SID)

Neck Pendulum Test

ATD Serial No: 036 **Test I.D:** D062678

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	45	Pass
Impact Velocity		m/s	6.89 to 7.13	7.01	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.25	Pass
	20 msec	m/s	4.12 to 5.10	4.41	Pass
	30 msec	m/s	5.73 to 7.01	6.12	Pass
	40 to 70 msec	m/s	6.27 to 7.64	7.16	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	69	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	58	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	76	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	56	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	11	Pass

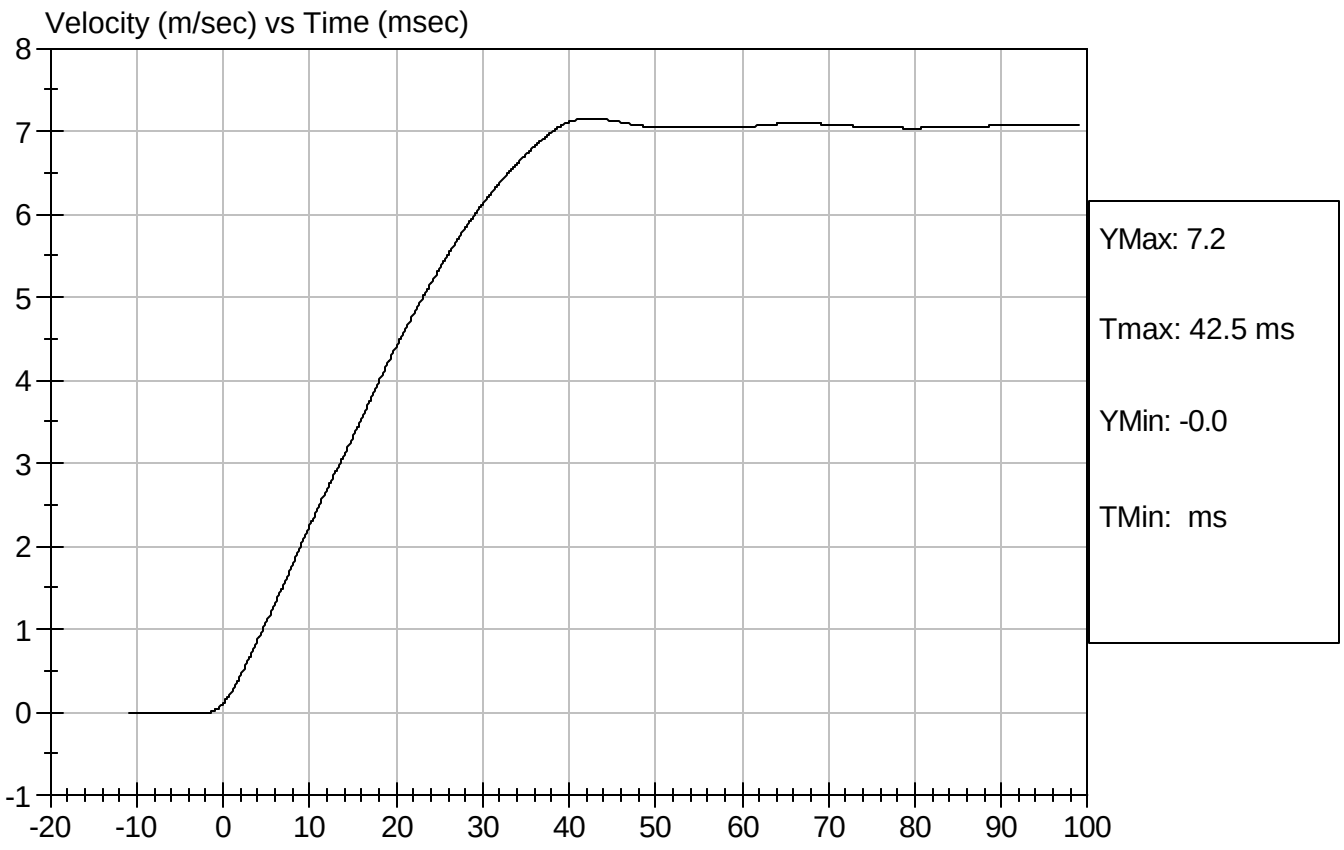
Jessica Hall
Laboratory Technician

09/06/2006
Test Date

David Winkelbauer
Approved By

Test Desc: Neck Bending
Component ID: D062678

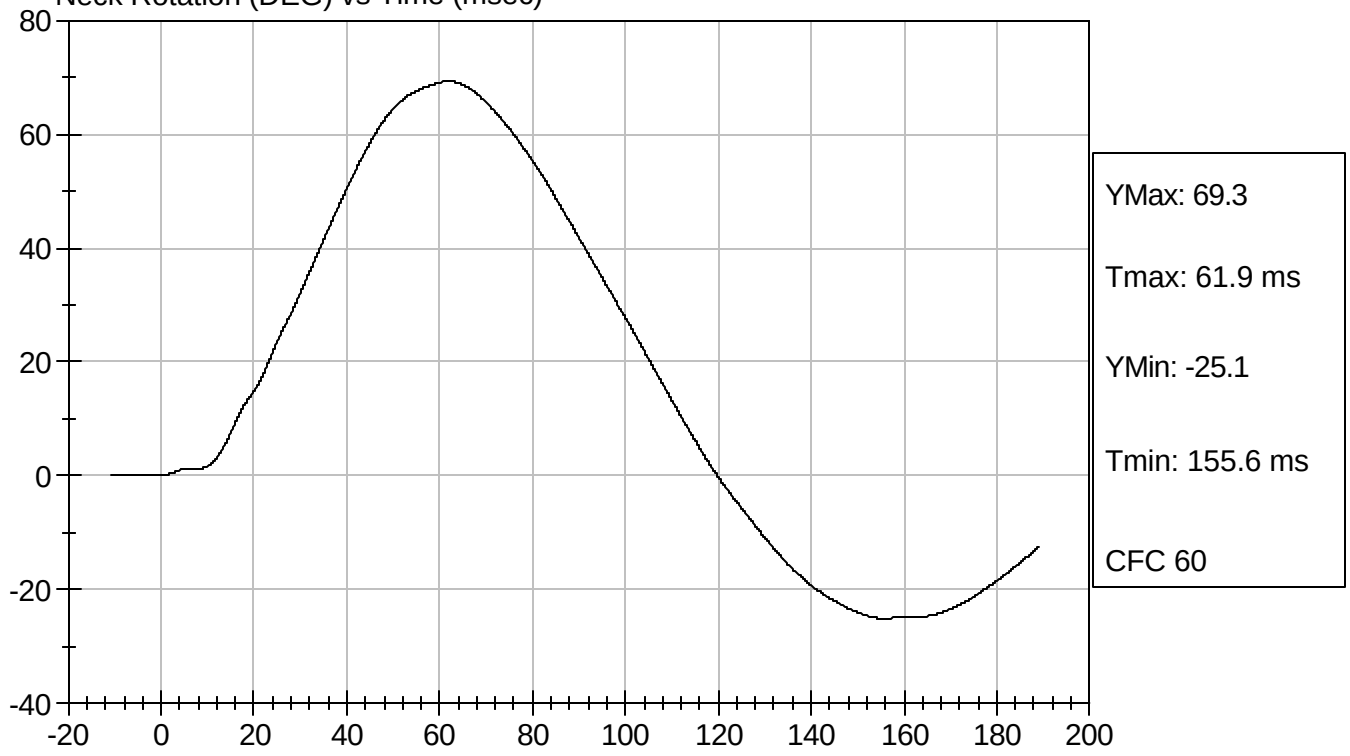
Test Date: 09/06/2006
Speed: 23.0 ft/sec, 7.01 m/sec



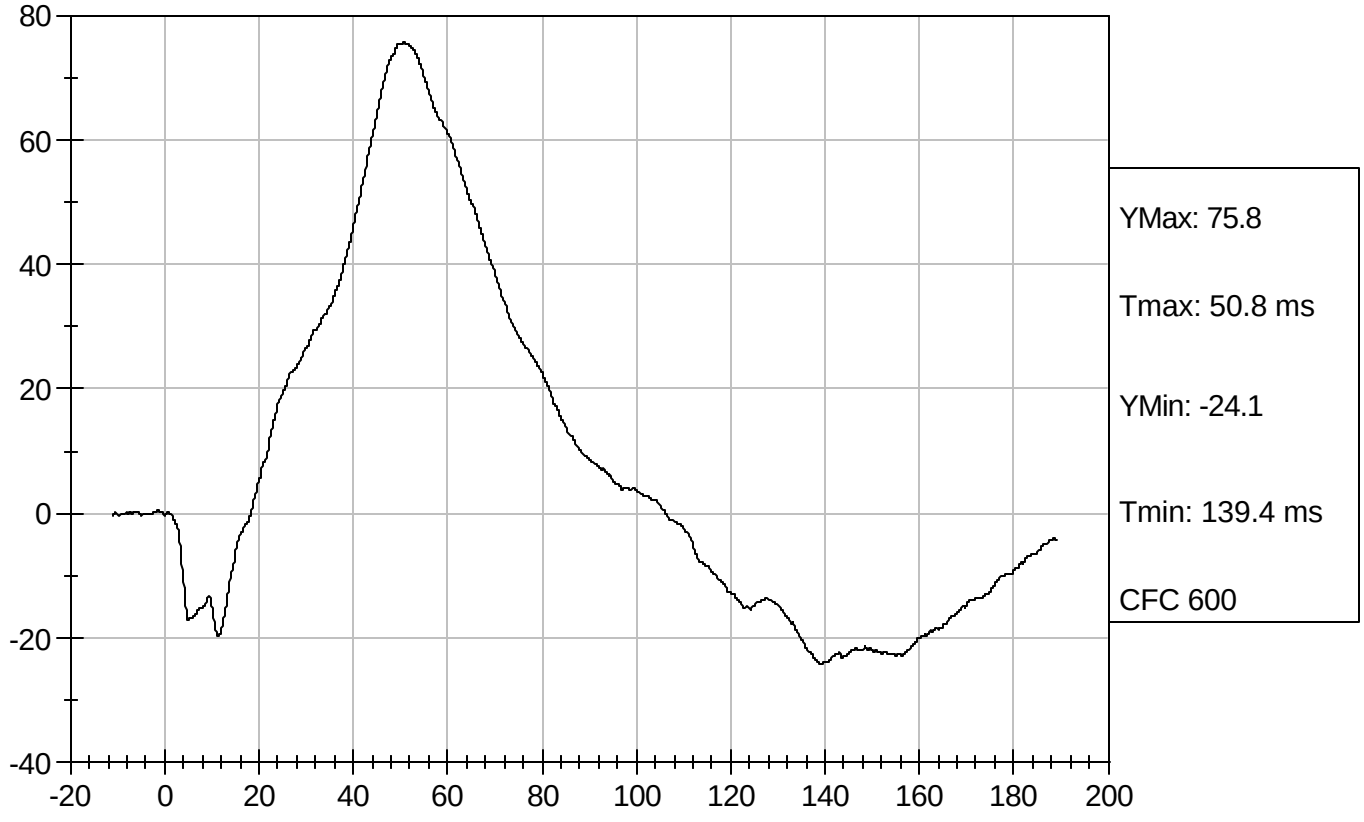
Test Desc: Neck Bending
Component ID: D062678

Test Date: 09/06/2006
Speed: 23.0 ft/sec, 7.01 m/sec

Neck Rotation (DEG) vs Time (msec)



Occipital Moment (Nm) vs Time (msec)



SID/HIII Calibration Data Sheet

Side Impact Dummy

Head Drop Calibration (Lateral)

ATD Serial No: 036 **Test I.D:** D062801

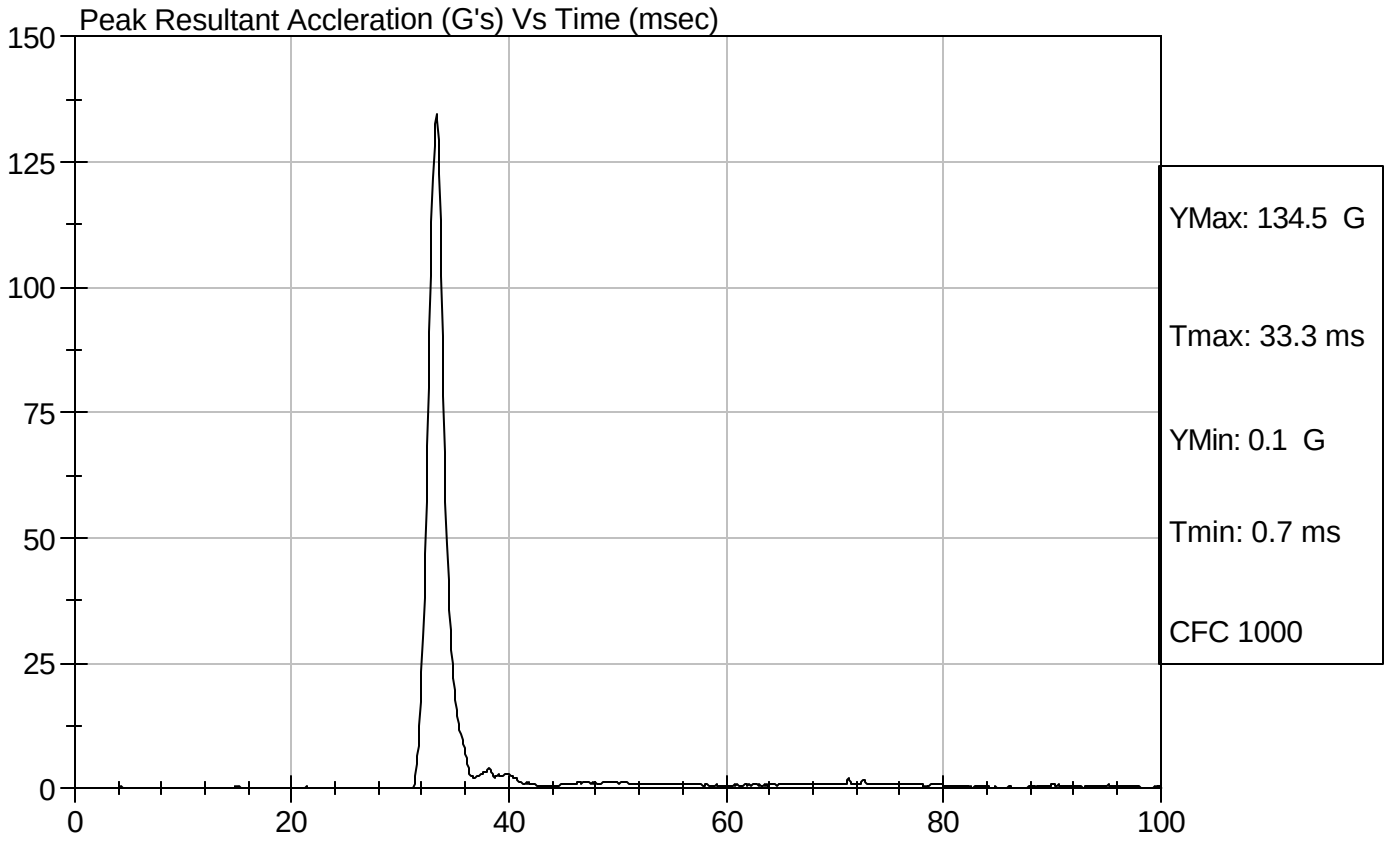
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Peak Resultant Acceleration	G's	120 to 150	135	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-5.1	Pass
		Overall Test Results		Pass

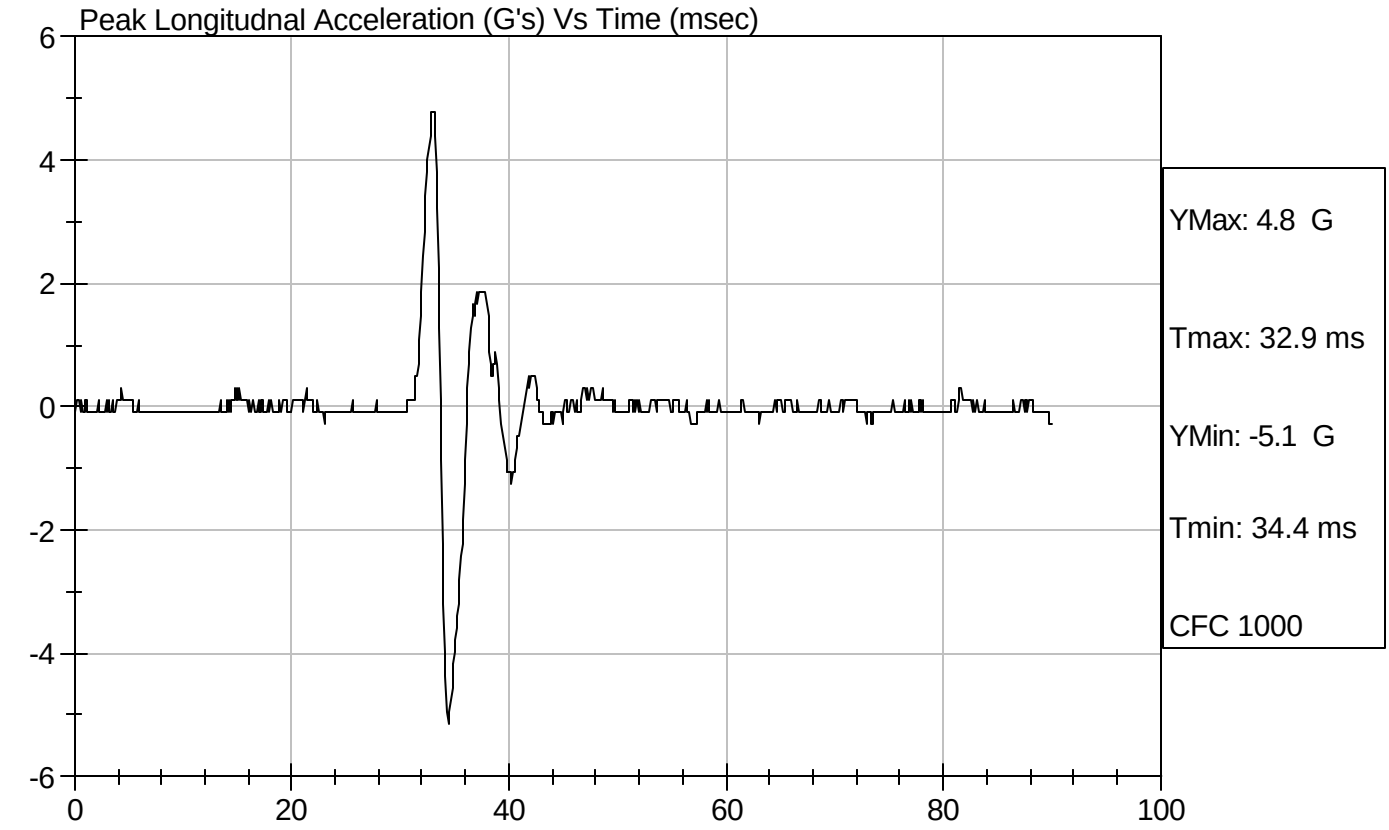
Jessica Hall
Laboratory Technician

09/14/2006
Test Date

David Winkelbauer
Approved By

	Test Description: Head Drop	Test Date: 09/14/2006
	Component: D062801	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:** D062802

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Upper Rib	G's	37 - 46	44	Pass
Lower Rib	G's	37 - 46	44	Pass
Lower Spine	G's	15 - 22	18	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

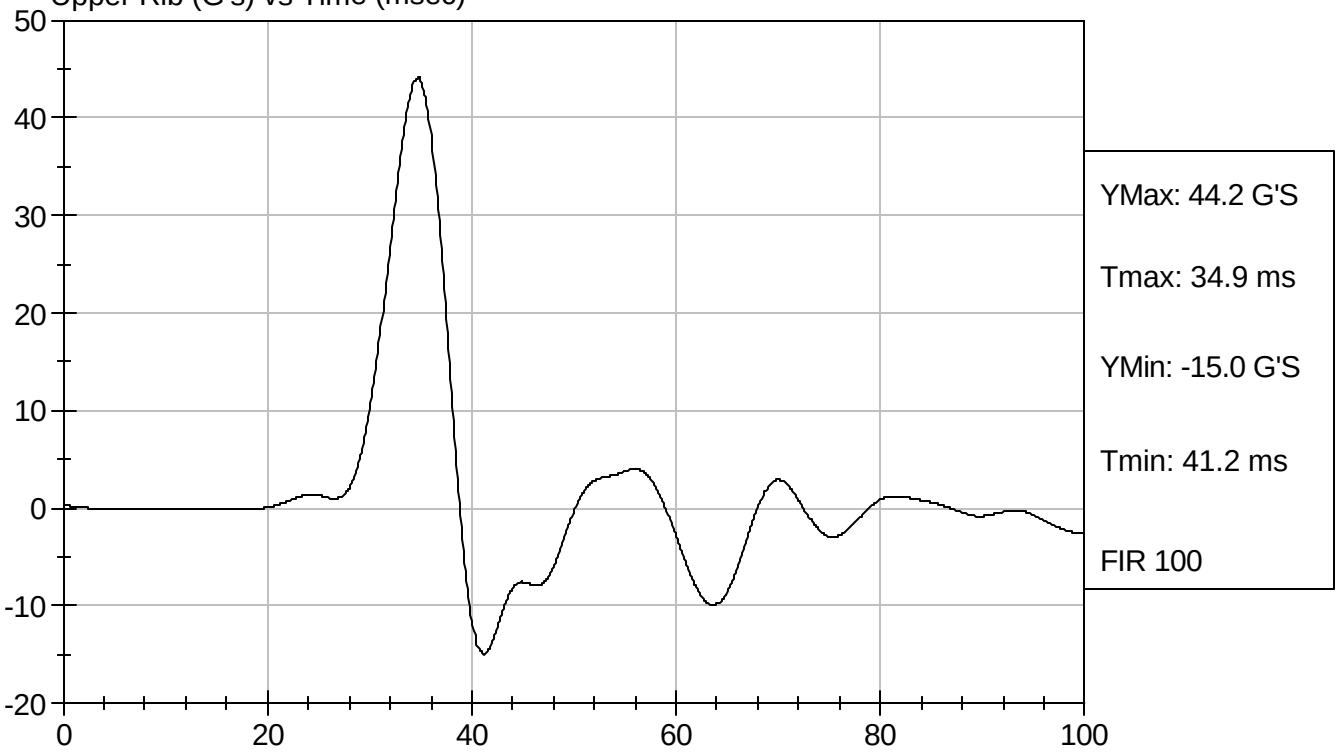
09/15/2006
Test Date

David Winkelbauer
Approved By

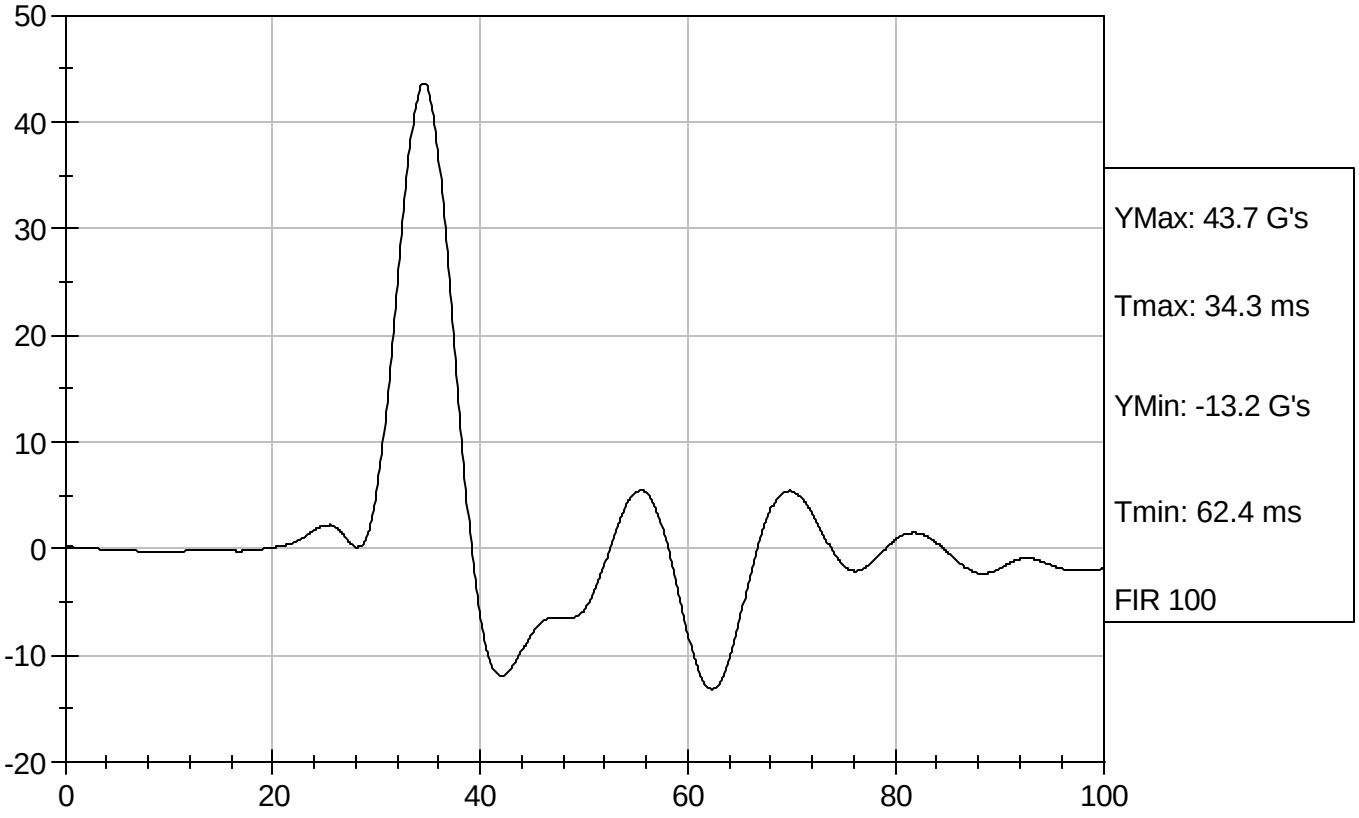
Test Desc: Thorax Impact
Component ID: D062802

Test Date: 09/15/2006
Speed: 14.10 ft/sec, 4.30 m/sec

Upper Rib (G's) vs Time (msec)

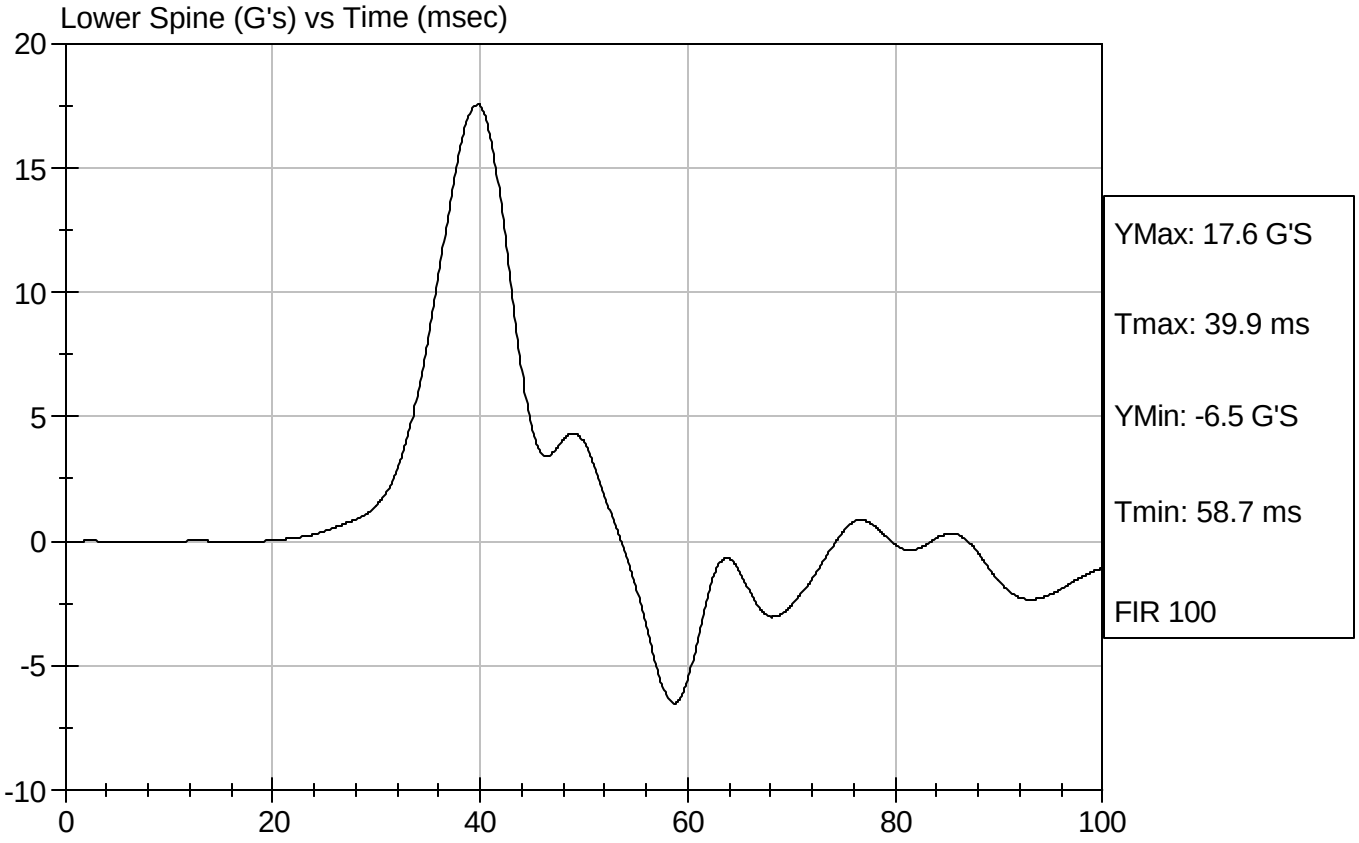


Lower Rib (G's) vs Time (msec)



Test Desc: Thorax Impact
Component ID: D062802

Test Date: 09/15/2006
Speed: 14.10 ft/sec, 4.30 m/sec



SID/HIII Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 036 **Test I.D:** D062803

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Probe Velocity	m/s	4.27 - 4.33	4.29	Pass
Pelvis Acceleration	G's	40 - 60	46	Pass
		Overall Test Results		Pass

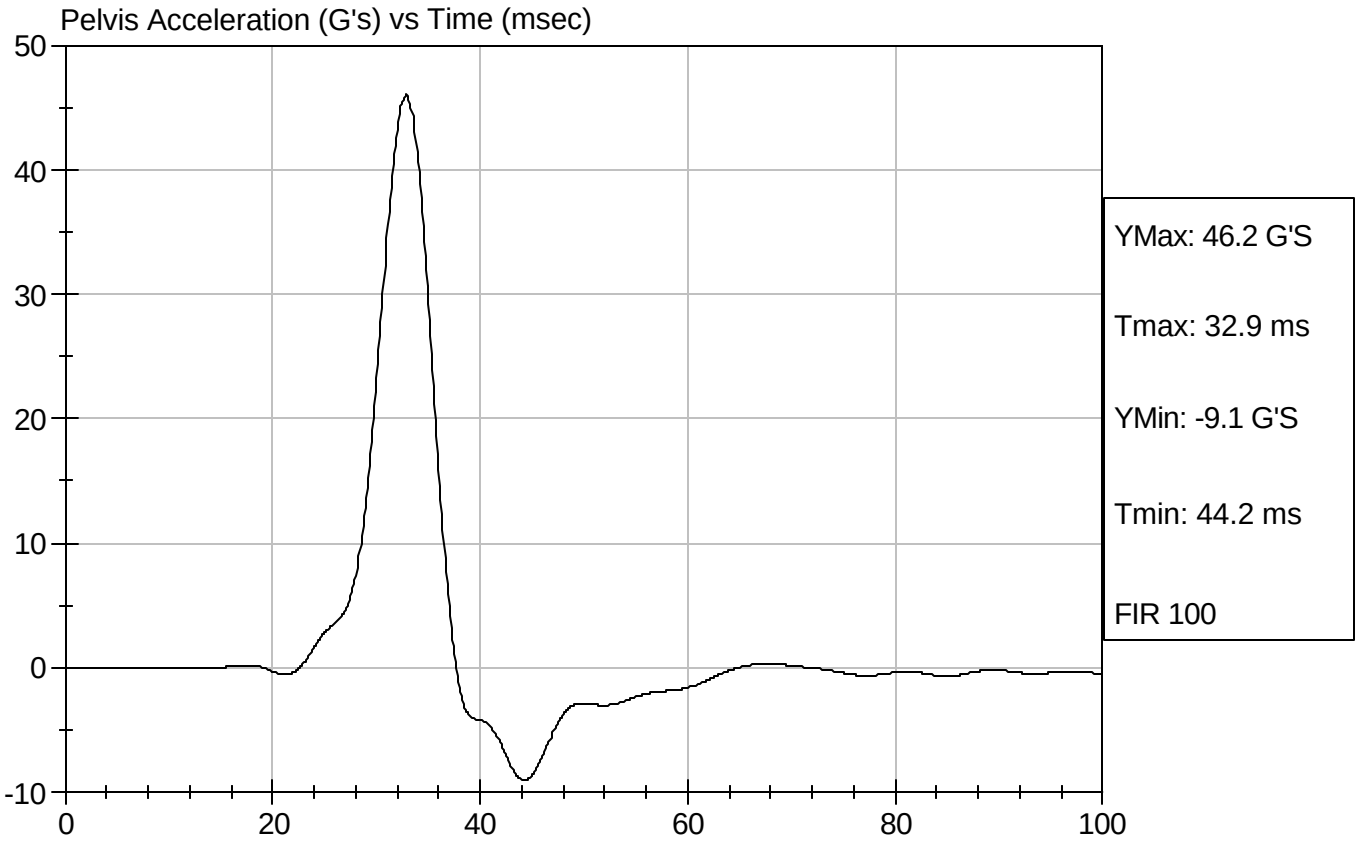
Jessica Hall
Laboratory Technician

09/15/2006
Test Date

David Winkelbauer
Approved By

Test Desc: Pelvis Impact
Component ID: D062803

Test Date: 09/15/2006
Speed: 14.08 ft/sec, 4.29 m/sec



SID/HIII Calibration Data Sheet

Side Impact Dummy

Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 036 **Test I.D:** D062804

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.6	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Force At 12.7 mm	N	104 -162	149	Pass
Force At 19 mm	N	163 - 222	200	Pass
Force At 25.4 mm	N	222 - 280	264	Pass
Force At 33 mm	N	325 - 391	364	Pass
		Overall Test Results		Pass

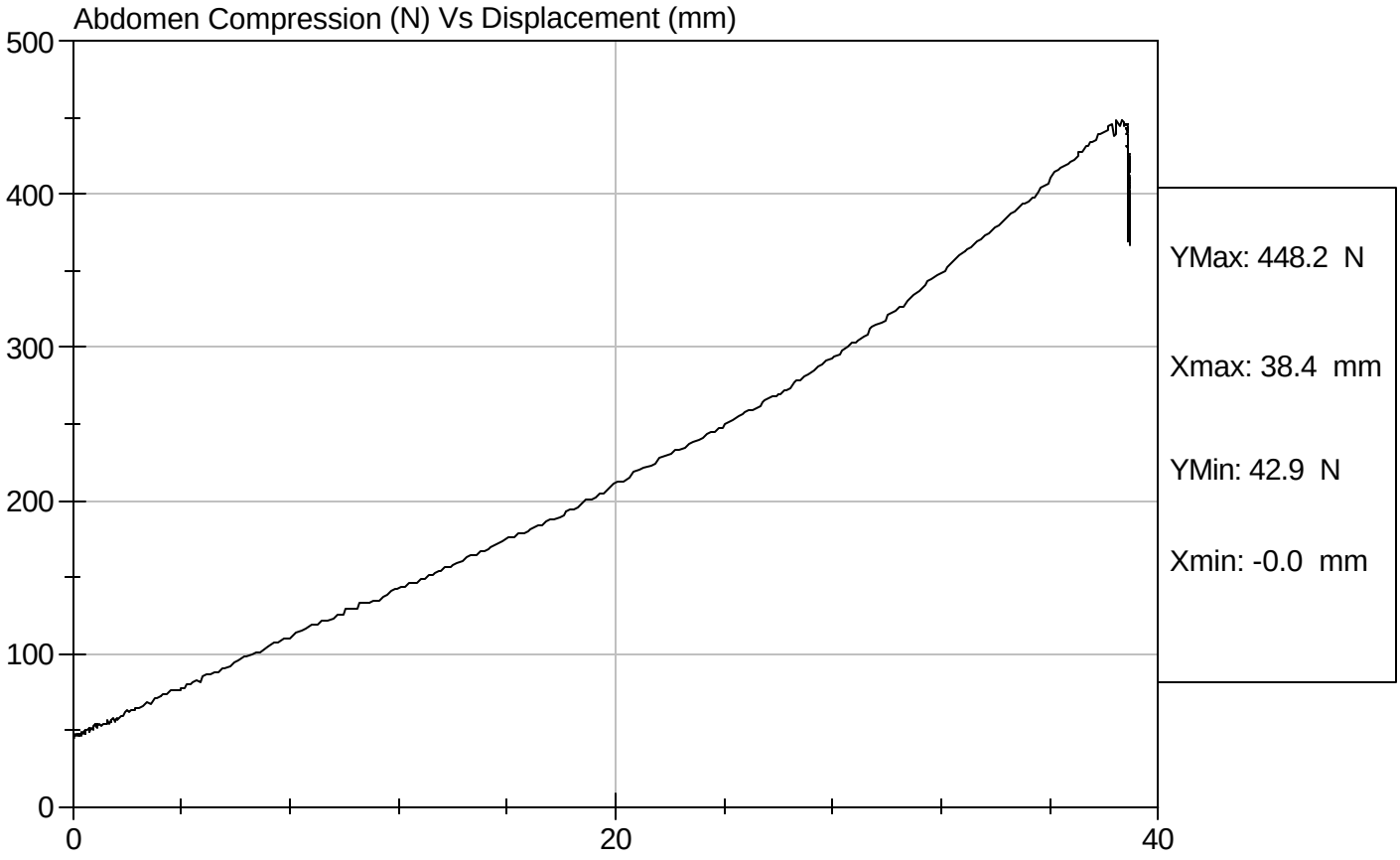
Jessica Hall
Laboratory Technician

09/15/2006
Test Date

David Winkelbauer
Approved By

Test Description: Abdomen Compression | Test Date: 09/15/2006

Component: D062804 | 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:** D062805

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.6	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	118.0	Pass
Force At 30 deg	N	151.2 - 204.6	182.1	Pass
Force At 40 deg	N	204.6 - 258.0	230.1	Pass
Return Angle	Deg	12 Maximum	5	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

09/14/2006
Test Date

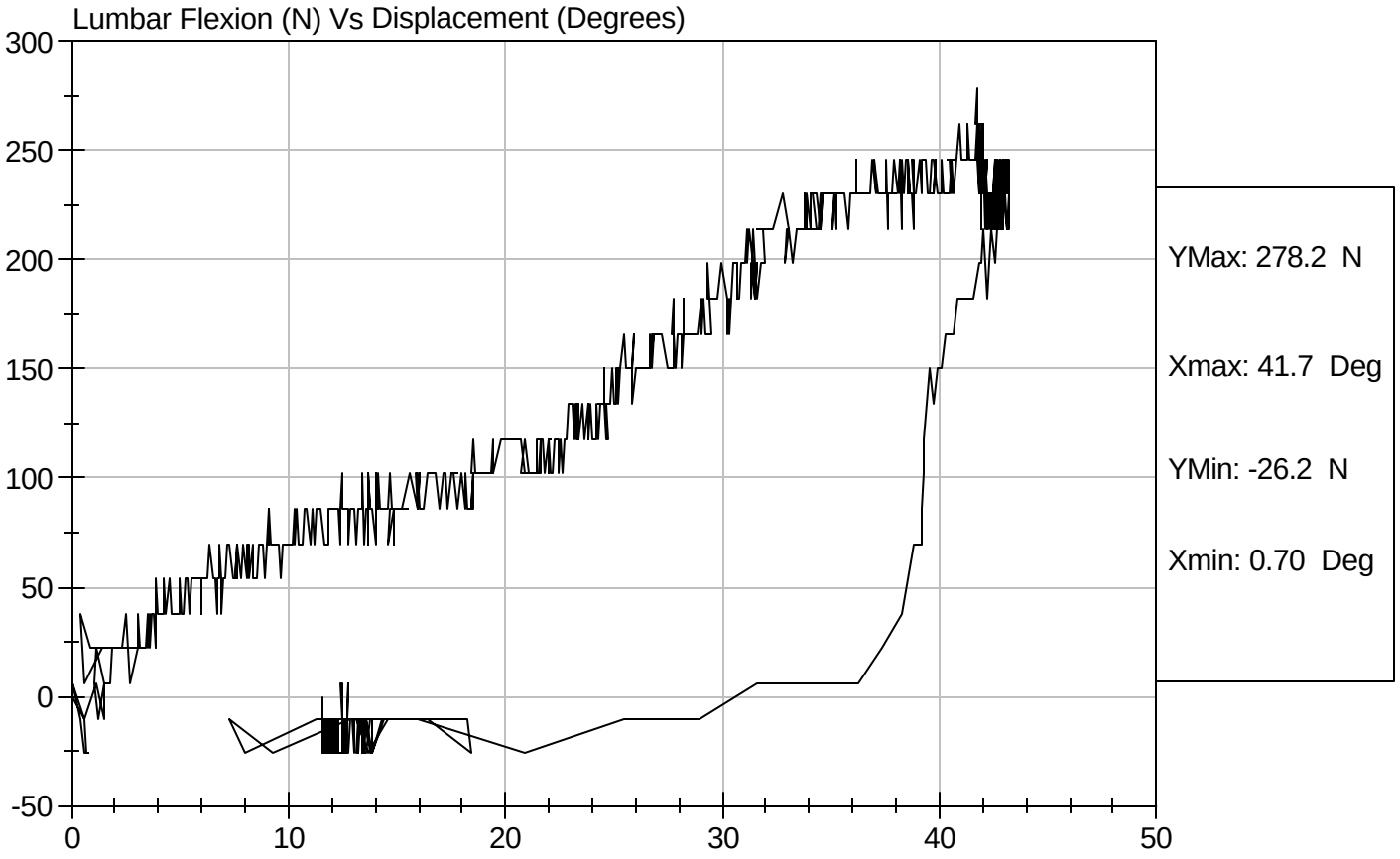
David Winkelbauer
Approved By

Test Description: Lumbar Flexion

Test Date: 09/14/2006

Component: D062805

Speed: 0 ft/sec, 0 m/sec



SID/HIII Calibration Data Sheet

Side Impact Dummy (SID)

Neck Pendulum Test

ATD Serial No: 036 **Test I.D:** D062809

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.8	Pass
Laboratory Relative Humidity		%	10 to 70	44	Pass
Impact Velocity		m/s	6.89 to 7.13	6.91	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.28	Pass
	20 msec	m/s	4.12 to 5.10	4.47	Pass
	30 msec	m/s	5.73 to 7.01	6.24	Pass
	40 to 70 msec	m/s	6.27 to 7.64	7.14	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	69	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	58	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	74	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	55	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	11	Pass

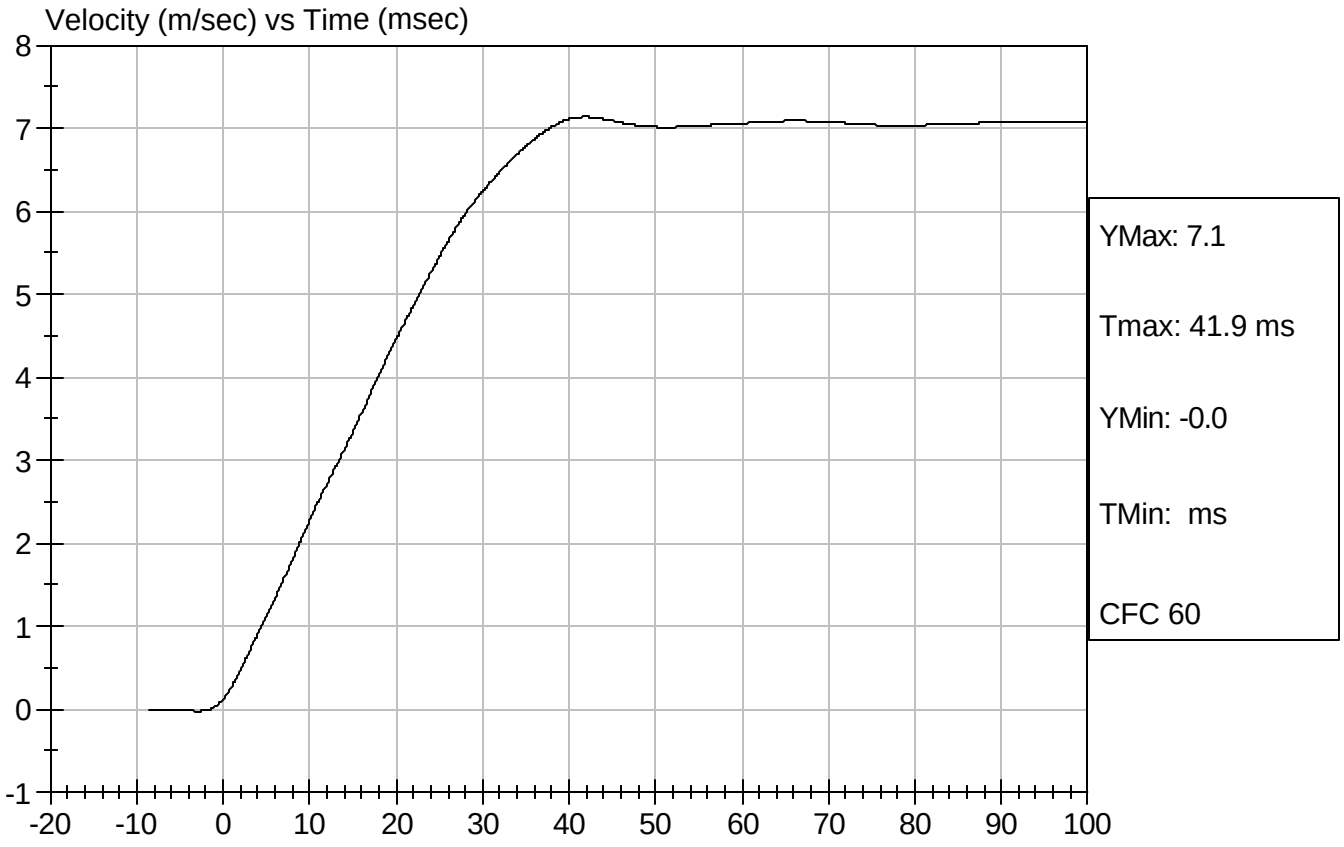
Jessica Hall
Laboratory Technician

09/14/2006
Test Date

David Winkelbauer
Approved By

Test Desc: Neck Bending
Component ID: D062809

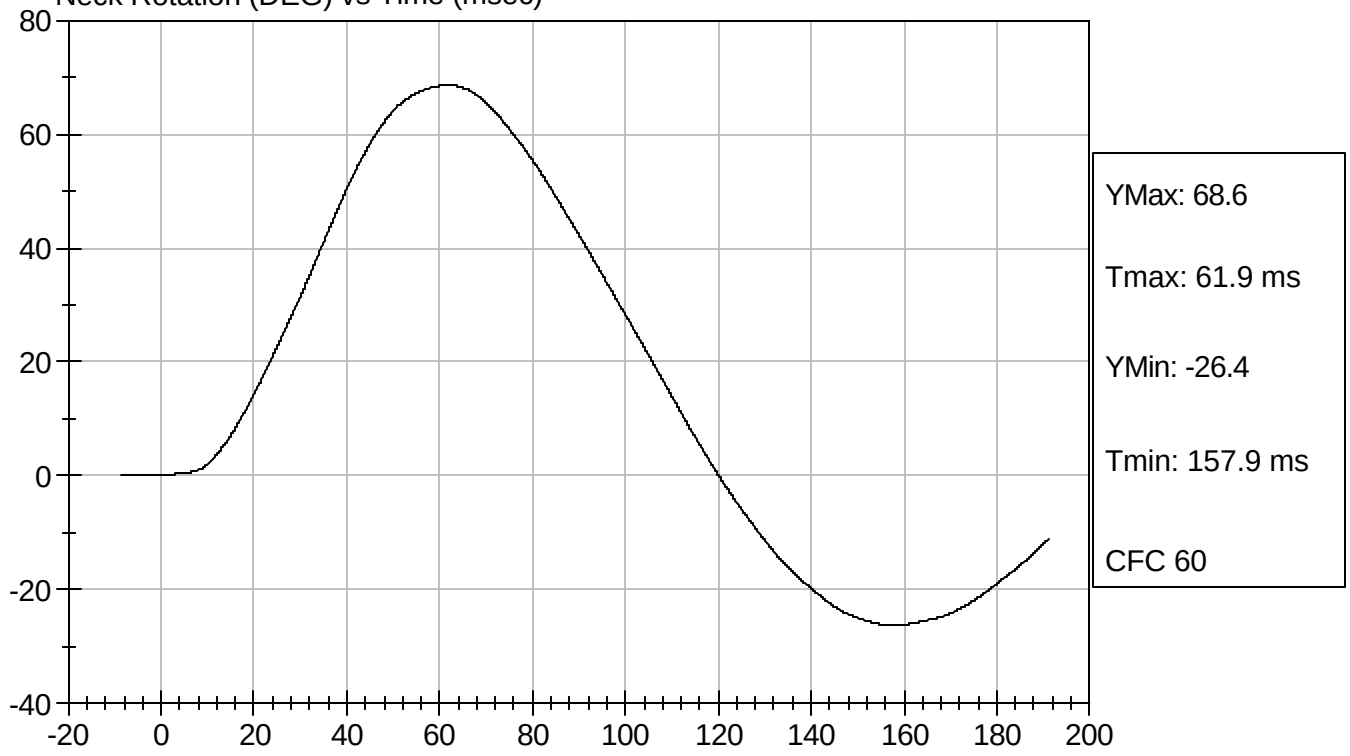
Test Date: 09/14/2006
Speed: 22.68 ft/sec, 6.91 m/sec



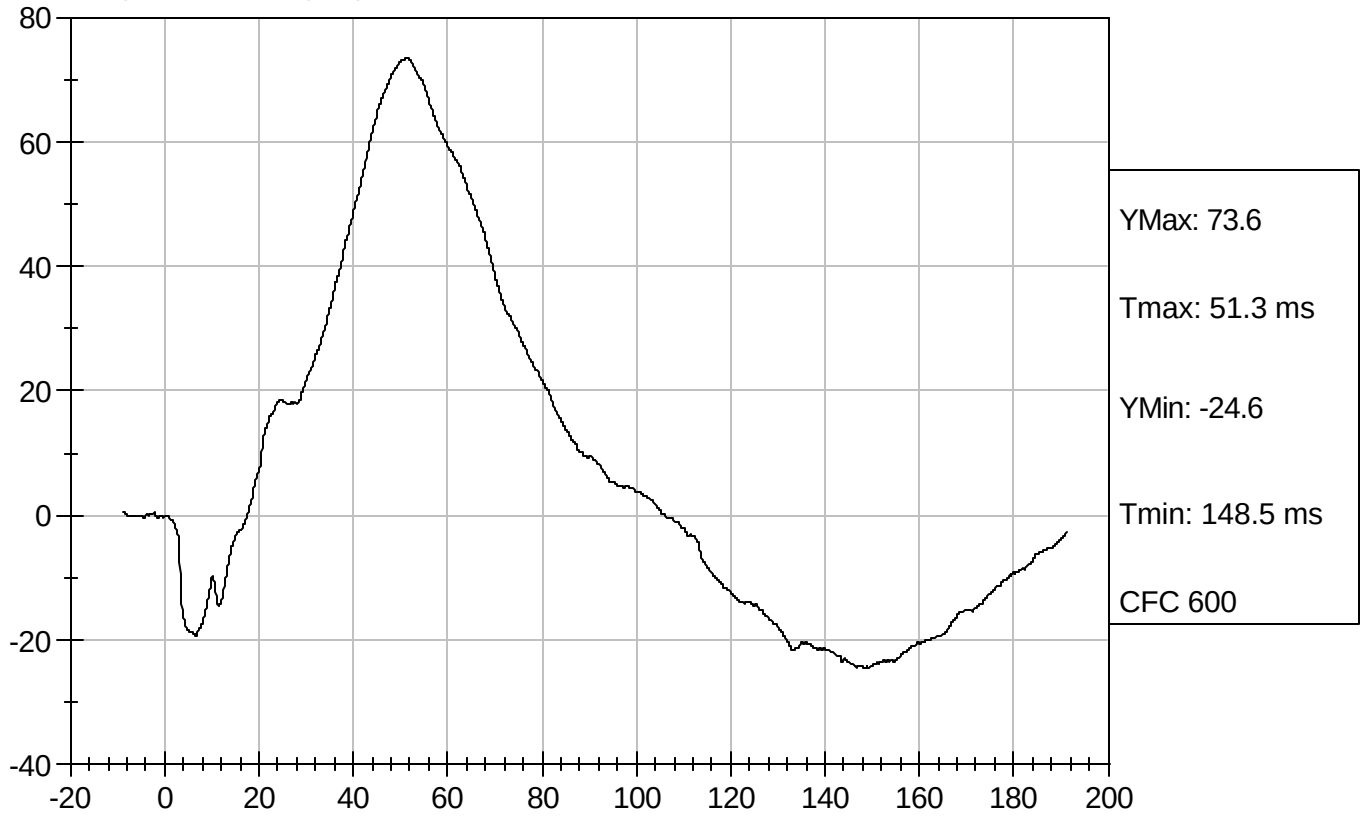
Test Desc: Neck Bending
Component ID: D062809

Test Date: 09/14/2006
Speed: 22.68 ft/sec, 6.91 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	C12811	Endevco	04/11/06
Head CG Y	AH5N9	Endevco	04/11/06
Head CG Z	AH5L1	Endevco	04/12/06
Neck Load Cell	174	FTSS	04/28/06
Upper Rib Y	P49454	Endevco	06/07/06
Lower Rib Y	P49499	Endevco	06/07/06
Lower Spine Y	A27-Z24	Entran	08/23/06
Pelvis Y	P22694	Endevco	05/31/06
Upper Rib Redundant Y	P49453	Endevco	06/07/06
Lower Rib Redundant Y	C23-Y08	Entran	05/31/06
Lower Spine Redundant Y	A27-Z23	Entran	08/23/06
Pelvis Redundant Y	A07-R09	Entran	06/07/06

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Vehicle CG X	P47972	Endevco	08/02/06
Vehicle CG Y	P47971	Endevco	08/02/06
Vehicle CG Z	P47973	Endevco	08/02/06
Left Floor Y	AALH1	Endevco	05/02/06
Left A-Post @ Sill Y	AGTY4	Endevco	08/03/06
Left Lower A-Post Y	AHWK8	Endevco	07/18/06
Left Mid A-Post Y	AH0A2	Endevco	04/26/06
Left B-Post @ Sill Y	AP2A4	Endevco	05/15/06
Left Lower B-Post Y	A07-R10	Entran	08/03/06
Left Mid B-Post Y	H06-L17	Entran	06/27/06
Driver Seat Track Y	AJ420	Endevco	08/03/06
LF Door Accel. #1 Y	H06-L35	Entran	06/21/06
LF Door Accel. #2 Y	F29-X11	Entran	07/18/06
LF Door Accel. #3 Y	J14-J10	Entran	04/04/06
Upper Engine X	AGM47	Endevco	07/18/06
Upper Engine Y	D11-Z14	Entran	07/13/06
Firewall Y	J14-J16	Entran	04/04/06
Right Floor Sill Y	AP179	Endevco	08/03/06
Rear Deck X	H06-L01	Entran	06/21/06
Rear Deck Y	E05-Z48	Entran	06/21/06