REPORT NUMBER: 201-MGA-2008-001

SAFETY COMPLIANCE TESTING FOR FMVSS 201
RIGID POLE SIDE IMPACT TEST

FUJI HEAVY INDUSTRIES LTD.
2008 SUBARU IMPREZA 4-DOOR
NHTSA NUMBER: C85501

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

TEST DATE: JUNE 3, 2008

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: Joe Fleck
Joe Fleck, Project Engineer Date: September 19, 2008

Reviewed by: David Winkelbauer
David Winkelbauer, Director of Operations Date: September 19, 2008

FINAL REPORT ACCEPTED BY:

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COTR, Side Impact

_____
Date of Acceptance

Technical Report Documentation Page

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15. Supplementary Notes

16. Abstract

A rigid pole side impact test was conducted on a 2008 Subaru Impreza 4-Door 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 June 3, 2008.

The impact velocity of the vehicle was 28.5 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 314 mm at level 3. The test vehicle's occupant performance is as follows:

	REQUIREMENT	DRIVER
HIC	≤ 1000	387

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	
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SECTION 1
PURPOSE AND TEST PROCEDURE

1.1 PURPOSE

This rigid pole side impact test is conducted as part of the FY' 2008 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 2008 Subaru Impreza 4-Door manufactured by Fuji Heavy Industries 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 2008 Subaru Impreza 4-Door. The subject vehicle was towed into a rigid pole at a velocity of 28.5 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 1564.9 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on June 3, 2008.

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 seventeen (17) 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 OVSC Test Procedure.

2.2 GENERAL COMMENTS

The test vehicle sustained a maximum static crush of 314 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		387
TTI*	G's	42.8
Pelvis*	G's	45.7
Neck Force X*	N	193
Neck Force Y*	N	-375
Neck Force Z*	N	439
Neck Moment X*	Nm	-30.4
Neck Moment Y*	Nm	-13.4
Neck Moment Z*	Nm	23.2

* 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
Driver Door Lower
Driver Door Mid
Driver Door Upper
Left Lower A-Post Y after 20 msec.

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

Test Vehicle: 2008 Subaru Impreza 4-Door NHTSA No. C85501
Test Program: FMVSS 201P Test Date: June 3, 2008

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: 2008 Subaru Impreza 4-Door
Test Program: FMVSS 201P

NHTSA No. C85501
Test Date: June 3, 2008

TEST VEHICLE INFORMATION

Make	Subaru
Model	Impreza
Body Style	Sedan
NHTSA No.	C85501
VIN	JF1GH61668H805243
Color	Topaz Gold Metallic
Delivery Date	12/18/2007
Odometer Reading (mile)	178
Dealer	Harms Motors
Transmission	Automatic
Final Drive	4WD
Number of Cylinders	4
Engine Displacement (L)	2.5
Engine Placement	Longitudinal

TEST VEHICLE OPTIONS

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Fuji Heavy Industries Ltd.
Date of Manufacture	07/07

GVWR (kg)	1950
GAWR Front (kg)	990
GAWR Rear (kg)	1000

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	230	220
Recommended Tire Size	P205/55R16	P205/55R16
Tire Size on Vehicle	P205/55R16	P205/55R16
Tire Manufacturer	Bridgestone	Bridgestone

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Number Of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				408
Cargo Wt. (RCLW) (kg)				68

DATA SHEET NO. 1... (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2008 Subaru Impreza 4-Door NHTSA No. C85501
Test Program: FMVSS 201P Test Date: June 3, 2008

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	411.0	313.0		444.5	365.6	
Right	kg	395.5	302.5		409.2	345.6	
Ratio	%	56.7	43.3		54.5	45.5	
Totals	kg	806.5	615.5	1422.0	853.7	711.2	1564.9

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1422.0
Weight of SID/HIII Side Impact Dummy	kg	80.7
Rated Cargo/Luggage Weight (RCLW)	kg	68
Calculated Vehicle Target Weight (TVTW)	kg	1570.7

TEST VEHICLE ATTITUDES

	Units	As Delivered	Fully Loaded	Ready For Test
Right Front	mm	686	684	822
Left Front	mm	679	667	818
Right Rear	mm	689	668	801
Left Rear	mm	679	656	808
Right Door Sill Angle	deg	0.0	0.5 NU	0.3 NU
Left Door Sill Angle	deg	0.0	0.5 ND	0.1 ND
Front Bumper Angle	deg	0.2 RD	0.3 LD	0.1 LD
Rear Bumper Angle	deg	0.0	0.2 LD	0.1 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	2624
Total Vehicle Length at Left Side	mm	3614
Total Vehicle Length at Centerline	mm	4394
Total Vehicle Length at Right Side	mm	3614
Total Vehicle Width at B-Post	mm	1730
Weight of Ballast in Cargo Area	kg	0
Amount of Stoddard Solvent in Fuel Tank	liters	55.6

DATA SHEET NO. 1... (Continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2008 Subaru Impreza 4-Door
Test Program: FMVSS 201P
NHTSA No. C85501
Test Date: June 3, 2008

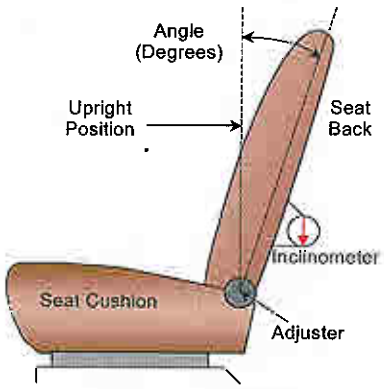
TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Target Impact Point Aft of Front Axle	mm	1375
Actual Impact Point Aft of Front Axle	mm	1363

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 Position = 12 degrees

Initial driver seat back angle: 11.5 degrees on head rest post
Final driver seat back angle: 7.3 degrees on head rest post



FRONT SEAT ASSEMBLY

SEAT FORE/AFT POSITIONS

Initial Seat position: The fore/aft was set 8th notch (forward-most as 0)
Final Seat position: The fore/aft was set 5th notch (forward-most as 0)

SEAT BELT UPPER ANCHORAGE

The test vehicle is equipped with adjustable "D" ring anchorage for the driver's seat position. The driver's "D" ring anchorage was placed in the 1st position down from full up.

DATA SHEET NO. 1... (continued)

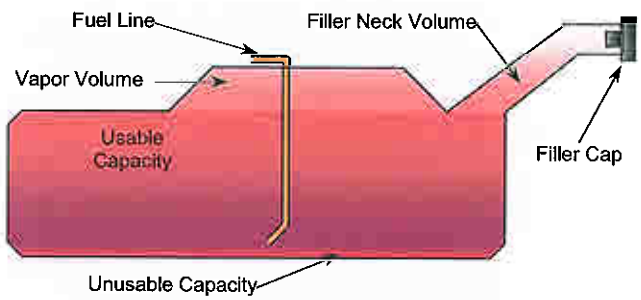
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2008 Subaru Impreza 4-Door NHTSA No. C85501
Test Program: FMVSS 201P Test Date: June 3, 2008

FUEL TANK CAPACITY DATA

The "Usable Capacity" of the standard equipment fuel tank is: 60.2 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: 55.4 – 56.6 liters
Actual amount of Stoddard solvent added to vehicle for certification test 55.6 liters

The vehicle is equipped with electric fuel pump. Pump will operate in a few seconds to maintain pressure in fuel line, but after reaching specified pressure, it will automatically stop.

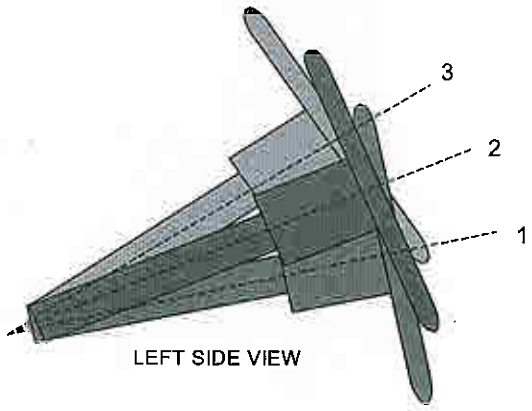


VEHICLE FUEL TANK ASSEMBLY

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 the mid position at 67.8 degrees.



STEERING COLUMN ASSEMBLY

DATA SHEET NO. 2

TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2008 Subaru Impreza 4-Door
Test Program: FMVSS 201P

NHTSA No. C85501
Test Date: June 3, 2008

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	411.0	313.0		444.5	365.6	
Right	kg	395.5	302.5		409.2	345.6	
Weight Ratio	%	56.7	43.3		54.5	45.5	
Totals	kg	806.5	615.5	1422.0	853.7	711.2	1564.9

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measured Parameter	Units	Maximum Crush	Above Ground
Level 1	Sill Top Height	mm	268	375
Level 2	Occupant H-Point	mm	307	678
Level 3	Mid Door	mm	314	752
Level 4	Window Sill	mm	256	1082
Level 5	Window Top	mm	88	1527
N/A	Maximum Penetration	mm	314	752

INSTRUMENTATION

SID/HIII Instrumentation	17
Vehicle Structure Accelerometers	17
Total	34

HIGH SPEED CAMERAS

Onboard Vehicle	3
Offboard Vehicle	8
Total	11

IMPACT POINT DATA

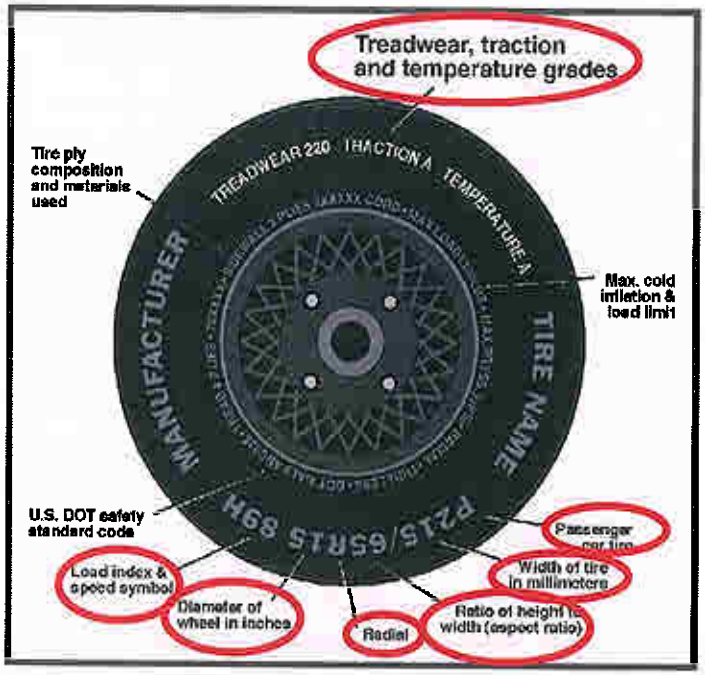
Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 38	12 forward

DATA SHEET NO. 3

TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2008 Subaru Impreza 4-Door NHTSA No. C85501
Test Program: FMVSS 201P Test Date: June 3, 2008

Vehicle Year	2008	Vehicle Make	Subaru
VIN	JF1GH61668H805243	Vehicle Model	Impreza



	Front	Rear
Tire Manufacturer	Bridgestone	Bridgestone
Tire Name	Potenza	Potenza
Tire Type	P	P
Tire Width (mm)	205	205
Ratio of Height to Width (aspect ratio)	55	55
Radial	R	R
Wheel Diameter	16	16
Load Index & Speed Symbol	89V	89V
Treadwear	260	260
Traction Grade	A	A
Temperature Grade	A	A

DATA SHEET NO. 4

POST TEST OBSERVATIONS

Test Vehicle: 2008 Subaru Impreza 4-Door NHTSA No. C85501
Test Program: FMVSS 201P Test Date: June 3, 2008

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, Door 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	Yes
Curtain	Yes

ARMREST LOCATION AND SEAT CRUSH

	Driver
Front Armrest (from bottom of window)	249
Front Seat Back Crush	116
Front Seat Cushion Crush	68

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 5

SID/HIII INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2008 Subaru Impreza 4-Door NHTSA No. C85501
Test Program: FMVSS 201P Test Date: June 3, 2008

THORAX AND PELVIS PEAK ACCELERATIONS (FIR 100 Filtered)

Location	Axis	Units	Driver			
			Max	Time	Min	Time
Upper Rib (LUR)	Y	G's	46.5	51	-4.1	13
Upper Rib (LUR) (R)	Y	G's	46.4	51	-4.2	13
Lower Rib (LLR)	Y	G's	42.2	53	-9.6	81
Lower Rib (LLR) (R)	Y	G's	41.6	53	-9.5	81
Lower Spine (T_{12})	Y	G's	39.1	48	-13.2	86
Lower Spine (T_{12}) (R)	Y	G's	39.0	48	-13.7	86
Pelvis (PEV)	Y	G's	45.7	40	-16.1	72
Pelvis (PEV) (R)	Y	G's	46.0	40	-16.4	72

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

Location	Driver			
	LUR	T_{12}	TTI(g)	PEV(g)
Rib, Spine, and Pelvis	46.5	39.1	42.8	45.7
Rib, Spine, and Pelvis (R)	46.4	39.0	42.7	46.0

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

Location	Axis	Units	Driver			
			Max	Time	Min	Time
Neck Force	X	N	193	217	-163	61
Neck Force	Y	N	66	33	-375	76
Neck Force	Z	N	439	52	-167	72
Neck Moment	X	Nm	6.4	107	-30.4	58
Neck Moment	Y	Nm	8.6	73	-13.4	59
Neck Moment	Z	Nm	23.2	63	-5.8	105

HEAD CG PEAK ACCELERATIONS (SAE CLASS 1000 Filtered)

Location	Axis	Units	Driver			
			Max	Time	Min	Time
Head CG	X	G's	5.3	217	-13.6	67
Head CG	Y	G's	59.4	60	-5.8	165
Head CG	Z	G's	8.3	99	-3.3	25
Head CG Resultant		G's	60.0	60		

HEAD INJURY CRITERIA (SAE CLASS 1000 Filtered)

Location	Driver		
	HIC	T1	T2
Head CG Resultant	387	50.4	74.7

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

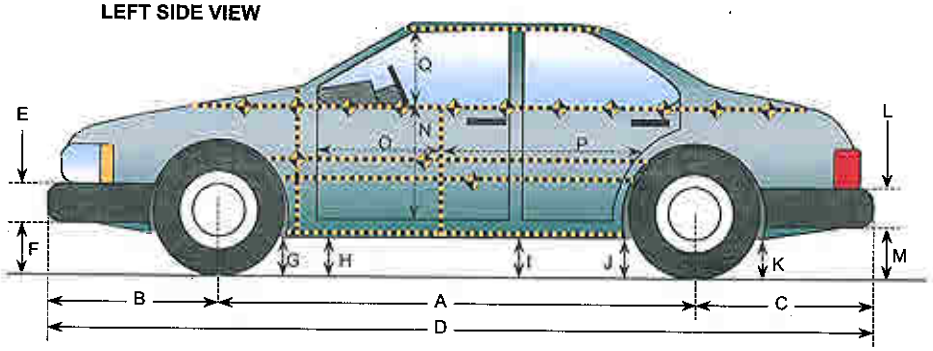
DATA SHEET NO. 6

VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2008 Subaru Impreza 4-Door
Test Program: FMVSS 201P

NHTSA No. C85501
Test Date: June 3, 2008

LEFT SIDE VIEW



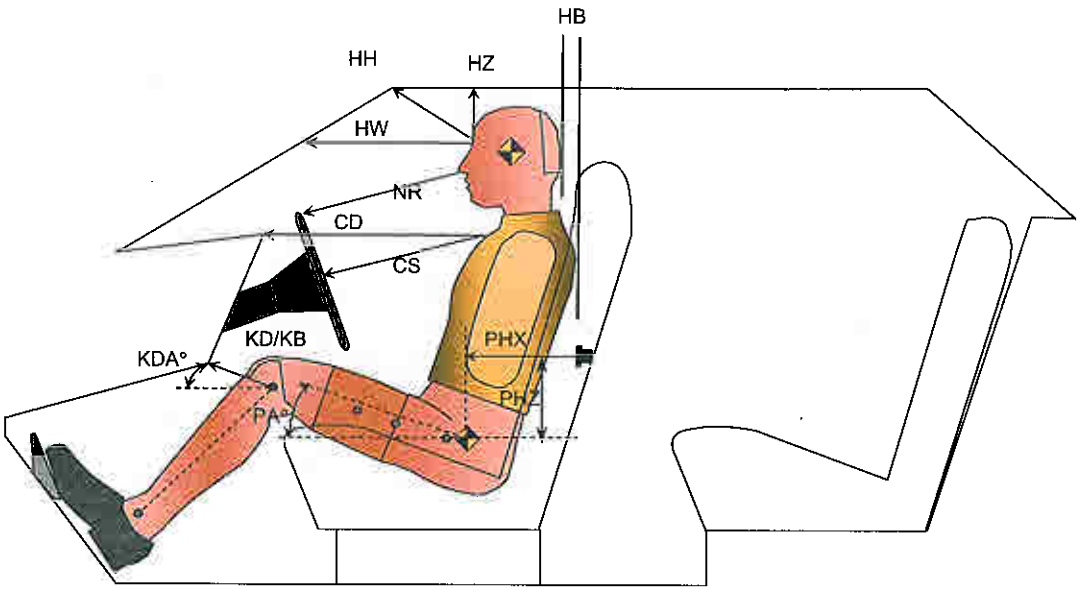
All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2625	2527	98
B	Front Axle to FSOV	966	965	1
C	Rear Axle to RSOV	803	805	-2
D	Total Length at Centerline	4394	4297	97
E	Front Bumper Thickness	118	118	0
F	Front Bumper Bottom to Ground	390	395	-5
G	Sill Height at Front Wheel Well	174	189	-15
H	Sill Height at Front Door Leading Edge	183	194	-11
I	Sill Height at "B" Pillar	169	190	-21
J1	Sill Height at Rear Wheel Well	168	231	-63
J2	Pinch Weld Height at Rear Wheel Well	170	230	-60
K	Sill Height Aft of Rear Wheel Well	237	278	-41
L	Rear Bumper Thickness	269	269	0
M	Rear Bumper Bottom to Ground	429	461	-32
N	Sill Height to Window Bottom Sill	713	700	13
O	Front Door Leading Edge to Impact CL	928	894	34
P	Rear Door Trailing Edge to Impact CL	980	1015	-35
Q	Front Window Opening	419	410	9
R	Right Side Length	3614	3638	-24
S	Left Side Length	3614	3521	-24
T	Vehicle Width at "B" Post	1730	1566	164

DATA SHEET NO. 7

SID/HIII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2008 Subaru Impreza 4-Door
Test Program: FMVSS 201P
NHTSA No. C85501
Test Date: June 3, 2008

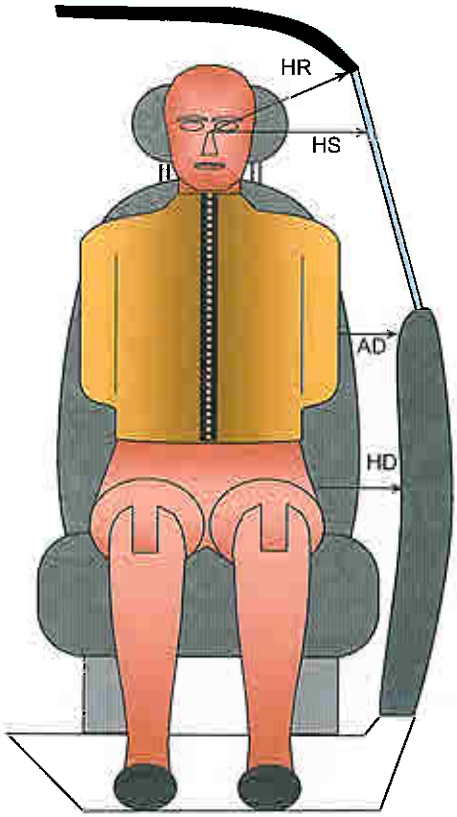


Driver Code	Measurement Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	284	
HW	Head to Windshield	544	
HZ	Head to Roof	183	
NR	Nose to Rim	367	
CD	Chest to Dash	486	
CS	Chest to Steering Wheel	273	
KDL	Left Knee to Dash	133	27.6
KDR	Right Knee to Dash	130	16.4
PA	Pelvic Angle		25.2
PHX	H-Point to Striker (X-Axis)	215	
PHZ	H-Point to Striker (Z-Axis)	173	
HB	Head to Seatback Clearance	53	

DATA SHEET NO. 8

SID/HIII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2008 Subaru Impreza 4-Door
Test Program: FMVSS 201P
NHTSA No. C85501
Test Date: June 3, 2008



FRONT VIEW OF DUMMY

Code	Measurement Description	Units	Driver
HR	Head to Side Header	mm	214
HS	Head to Side Window	mm	343
AD	Arm to Door	mm	62
HD	H-Point to Door	mm	143

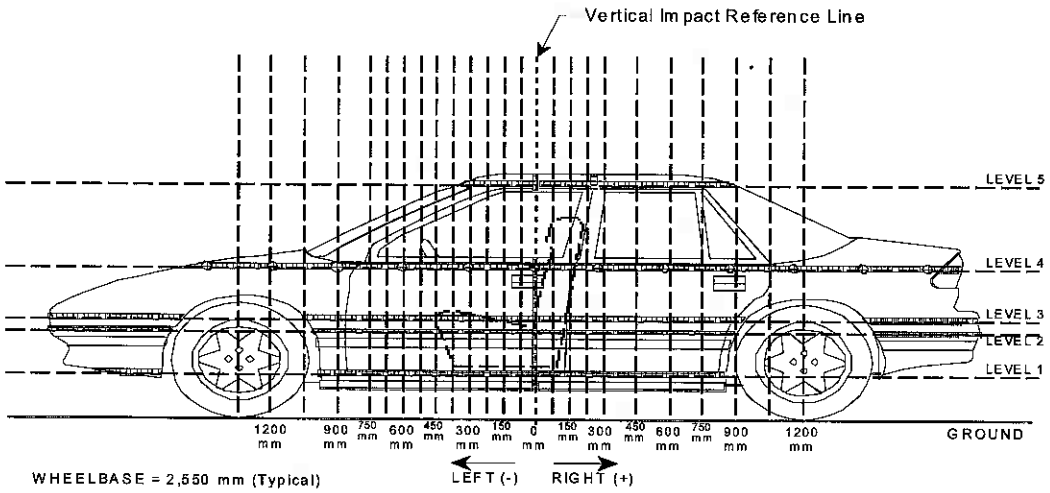
DATA SHEET NO. 9

VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2008 Subaru Impreza 4-Door
Test Program: FMVSS 201P

NHTSA No. C85501
Test Date: June 3, 2008

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	1527
4	Window Sill	mm	1082
3	Mid Door	mm	752
2	Occupant H-Point	mm	678
1	Sill Top	mm	375

DATA SHEET NO. 10

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2008 Subaru Impreza 4-Door NHTSA No. C85501
Test Program: FMVSS 201P Test Date: June 3, 2008

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1200				325					334					9	
-1050		231	234	322			236	240	327			5	6	5	
-900	275	239	239	317		278	243	246	322		3	4	7	5	
-825	281	239	239	318		289	263	268	321		8	24	29	3	
-750	282	238	239	316		326	283	288	329		44	45	49	13	
-675	282	238	238	316		339	299	295	339		57	61	57	23	
-600	282	237	237	316		351	309	308	366		69	72	71	50	
-525	282	236	237	315		371	328	339	395		89	92	102	80	
-450	281	236	236	315		386	356	372	421		105	120	136	106	
-375	281	236	236	315		409	386	407	453		128	150	171	138	
-300	281	235	235	315		440	420	445	480		159	185	210	165	
-225	280	235	235	316	510	494	469	476	514	567	214	234	241	198	57
-150	280	235	235	315	510	536	520	525	541	583	256	285	290	226	73
-75	280	235	235	315	509	548	542	549	571	597	268	307	314	256	88
0	280	235	235	316	510	525	526	532	550	579	245	291	297	234	69
75	280	236	236	318	516	462	471	474	498	578	182	235	238	180	62
150	280	236	237	320	520	432	373	376	463	574	152	137	139	143	54
300	280	237	238	323	525	369	335	334	423	562	89	98	96	100	37
450	280	237	238	327	528	324	297	293	400	555	44	60	55	73	27
600	279	238	240	333	534	277	272	258	378	548	-2	34	18	45	14
750	273	238	242	338	544	236	253	236	355	550	-37	15	-6	17	6
900		233	239	346	553		216	227	437	560		-17	-12	91	7
1050			233	356	565			225	402	574			-8	46	9
1200			232	365	584			227	367	582			-5	2	-2

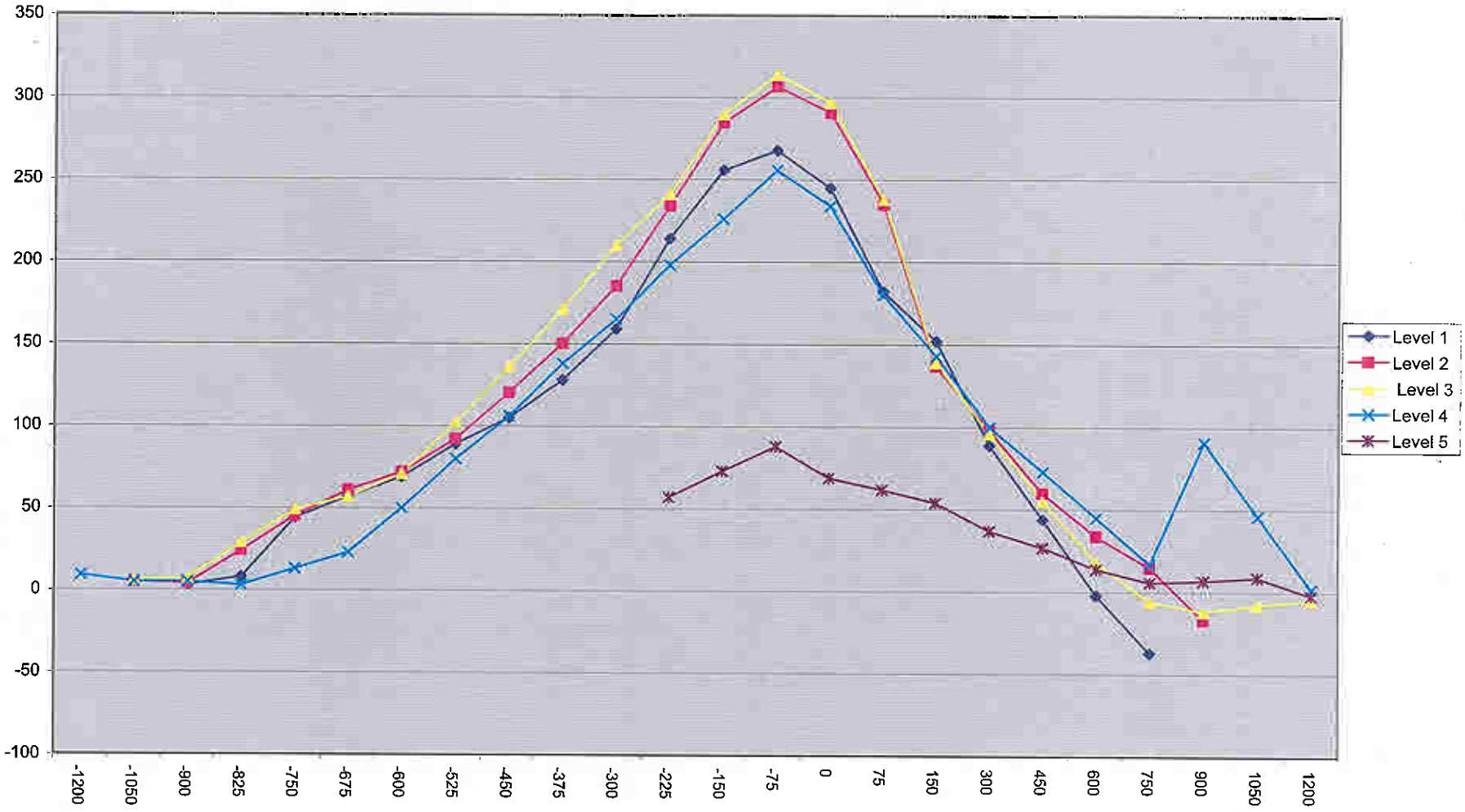
Reference plane is parallel to test vehicle longitudinal centerline Units = mm

Given dimensions = Reference plane to car body

DATA SHEET NO. 10... (continued)

VEHICLE EXTERIOR CRUSH PROFILES

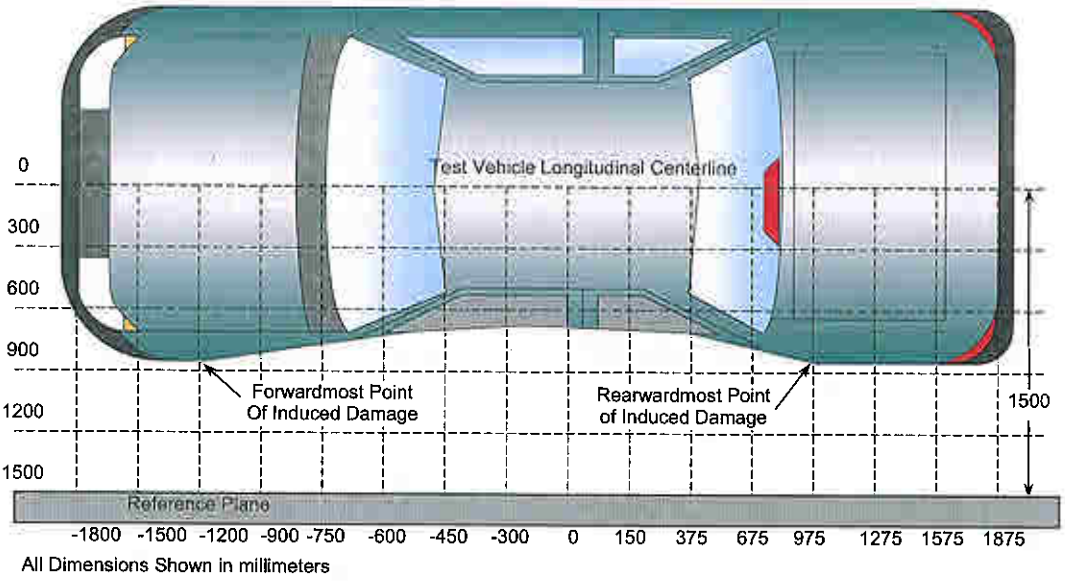
Test Vehicle: 2008 Subaru Impreza 4-Door NHTSA No. C85501
Test Program: FMVSS 201P Test Date: June 3, 2008



DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2008 Subaru Impreza 4-Door NHTSA No. C85501
Test Program: FMVSS 201P Test Date: June 3, 2008



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	4	365	367	2
2	725	4	338	355	17
3	240	4	322	435	113
4	-240	3	235	470	235
5	-720	3	239	290	51
6	-1200	4	325	334	9

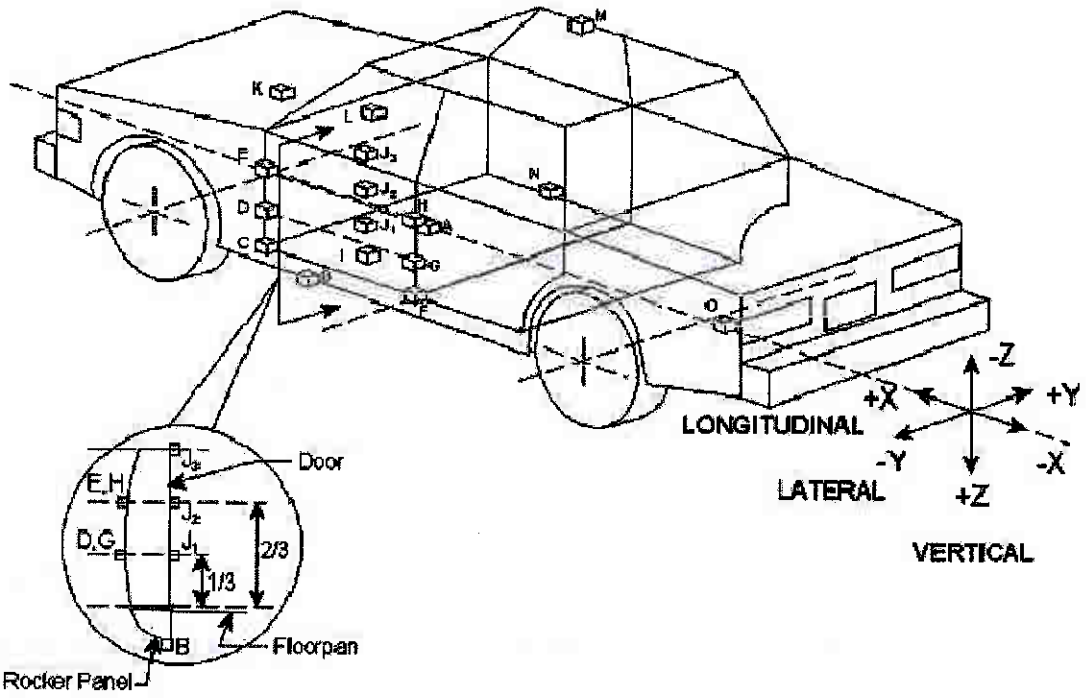
Reference plane is parallel to test vehicle longitudinal centerline

Given dimensions = Reference plane to car body

DATA SHEET NO. 12

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

[illegible]	2008 [illegible]	[illegible]	65501
[illegible]	[illegible]01P	[illegible]	[illegible]8,2008



[illegible]	
A	[illegible]G
B	[illegible]
C	[illegible]
D	[illegible]
E	[illegible]
F	[illegible]
G	[illegible]
H	[illegible]
I	[illegible]

[illegible]	
1	[illegible]
2	[illegible]
3	[illegible]
K	[illegible]
L	[illegible]
M	[illegible]
N	[illegible]
O	[illegible]

DATA SHEET NO. 12... (continued)

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2008 Subaru Impreza 4-Door NHTSA No. C85501
Test Program: FMVSS 201P Test Date: June 3, 2008

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	1.3	97	-11.6	57
		Y	21.5	28	-11.9	56
		Z	7.1	34	-7.1	44
		RES	21.9	28		
B	Left Floor	Y	30.5	18	-14.5	33
C	A Pillar Sill	Y	17.1	28	-0.7	173
D	A Pillar Low	Y	12.5	8	-71.4	25
E	A Pillar Mid	Y	15.8	47	-2.4	3
F	B Pillar Sill	Y	34.9	16	-1.2	203
G	B Pillar Low	Y	53.4	15	-2.1	27
H	B Pillar Mid	Y	41.8	6	-1.9	59
I	Driver Seat	Y	66.5	22	-35.0	29
J1	Driver Door Lower / Knee	Y				
J2	Driver Door Mid / Pelvis	Y				
J3	Driver Door Upper / Rib	Y				
K	Engine	X	3.9	92	-7.7	45
		Y	18.4	58	-4.1	204
L	Firewall	Y	11.8	48	-0.8	5
M	Right Roof	Y				
N	Right Floor Sill	Y	13.4	30	-0.7	277
O	Rear Deck	X	4.7	21	-2.5	12
		Y	12.5	53	-1.5	178

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: 2008 Subaru Impreza 4-Door NHTSA No. C85501
Test Program: FMVSS 201P Test Date: June 3, 2008

VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

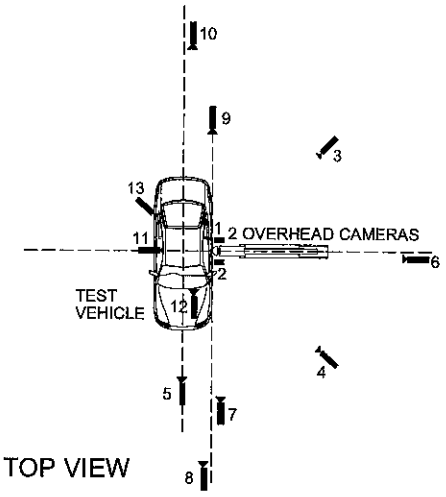
Loc. No.	Accelerometer Location	Measurements (mm)			
		Axis	Pre-Test	Post-Test	Difference
A	Vehicle CG	X	2258	2227	-31
		Y	0	20	20
		Z	463	479	-16
B	Left Floor Sill	X	2537	2434	-103
		Y	-710	-635	75
		Z	201	220	-19
C	A Pillar Sill	X	2976	2873	-103
		Y	-714	-675	39
		Z	195	203	-8
D	A Pillar Low	X	2904	2815	-89
		Y	-693	-671	22
		Z	536	545	-9
E	A Pillar Mid	X	2916	2822	-94
		Y	-752	-745	7
		Z	752	758	-6
F	B Pillar Sill	X	1870	1852	-18
		Y	708	602	-106
		Z	201	242	-41
G	B Pillar Low	X	1868	1824	-44
		Y	-698	-566	132
		Z	523	561	-38
H	B Pillar Mid	X	1853	1818	-35
		Y	-692	-588	104
		Z	768	795	-27
I	Driver Seat	X	1681	1723	42
		Y	-571	-461	110
		Z	315	310	5
J1	Driver Door Lower / Knee	X			
		Y			
		Z			
J2	Driver Door Mid / Pelvis	X			
		Y			
		Z			
J3	Driver Door Upper / Rib	X			
		Y			
		Z			
K	Engine	X	3640	3555	-85
		Y	0	0	0
		Z	845	851	-6
L	Firewall	X	3240	3162	-78
		Y	-52	-52	0
		Z	836	843	-7
N	Right Floor Sill	X	2118	2112	-6
		Y	712	708	-4
		Z	202	225	-23
O	Rear Deck	X	642	642	0
		Y	-20	-20	0
		Z	503	500	3

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: 2008 Subaru Impreza 4-Door NHTSA No. C85501
Test Program: FMVSS 201P Test Date: June 3, 2008



TOP VIEW

No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Overall	350	0	5050	14	1000
2	Overhead Close-Up	30	-225	5050	50	1000
3	Left Side 45° Rearward Pole View	-2380	3980	1210	24	1000
4	Right Side 45° Forward Pole View	-2280	-3900	1180	24	1000
5	Real Time				13	24
6*	Left Side Rear Pole View					
7	Front Ground Level Vehicle/Pole Impact	30	-1600	1250	24	1000
8	Front Ground Level Vehicle Roof Targets and Vehicle/Pole Impact	280	-1190	1500	35	1000
9	Rear Ground Level Vehicle/Pole Impact	-80	1710	1315	24	1000
10	Rear Ground Level	260	1230	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: 2008 Subaru Impreza 4-Door NHTSA No. C85501
Test Program: FMVSS 201P Test Date: June 3, 2008

Test Time: 10:25 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)

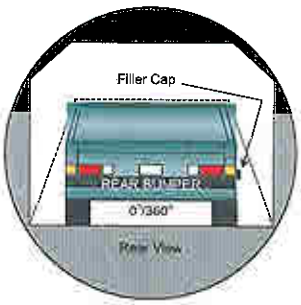
C. For the following 25 minutes: 0
(Maximum allowable = 1 oz./minute)

D. Spillage Details: None

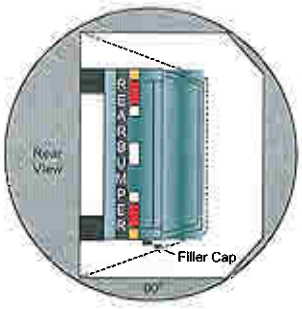
DATA SHEET NO. 15

FMVSS 301 STATIC ROLLOVER DATA SHEET

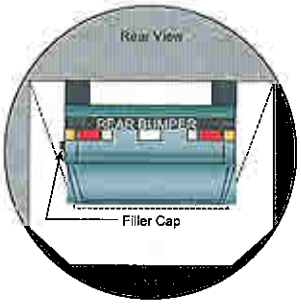
Test Vehicle: 2008 Subaru Impreza 4-Door NHTSA No. C85501
Test Program: FMVSS 201P Test Date: June 3, 2008

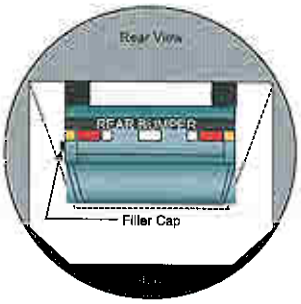


0° to 90°

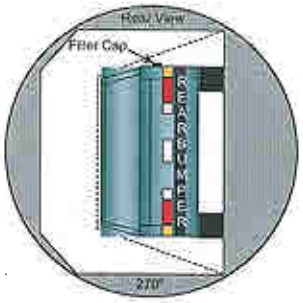


90° to 180°





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°	118	300	0
90° to 180°	116	300	0
180° to 270°	111	300	0
270° to 360°	116	300	0

APPENDIX A

PHOTOGRAPHS

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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

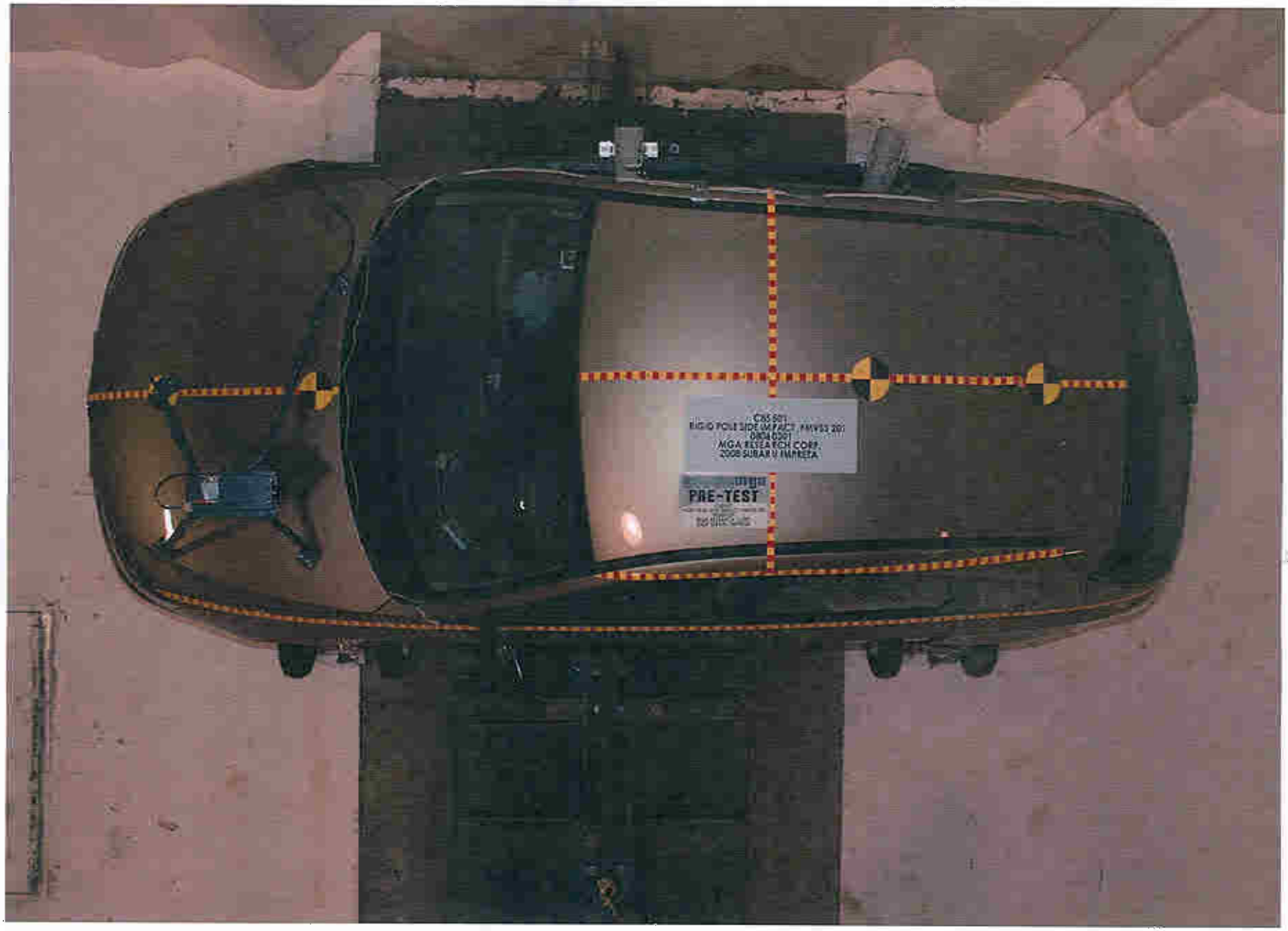
Post-Test Left Front Three-Quarter View

Pre-Test Right Rear Three-Quarter View

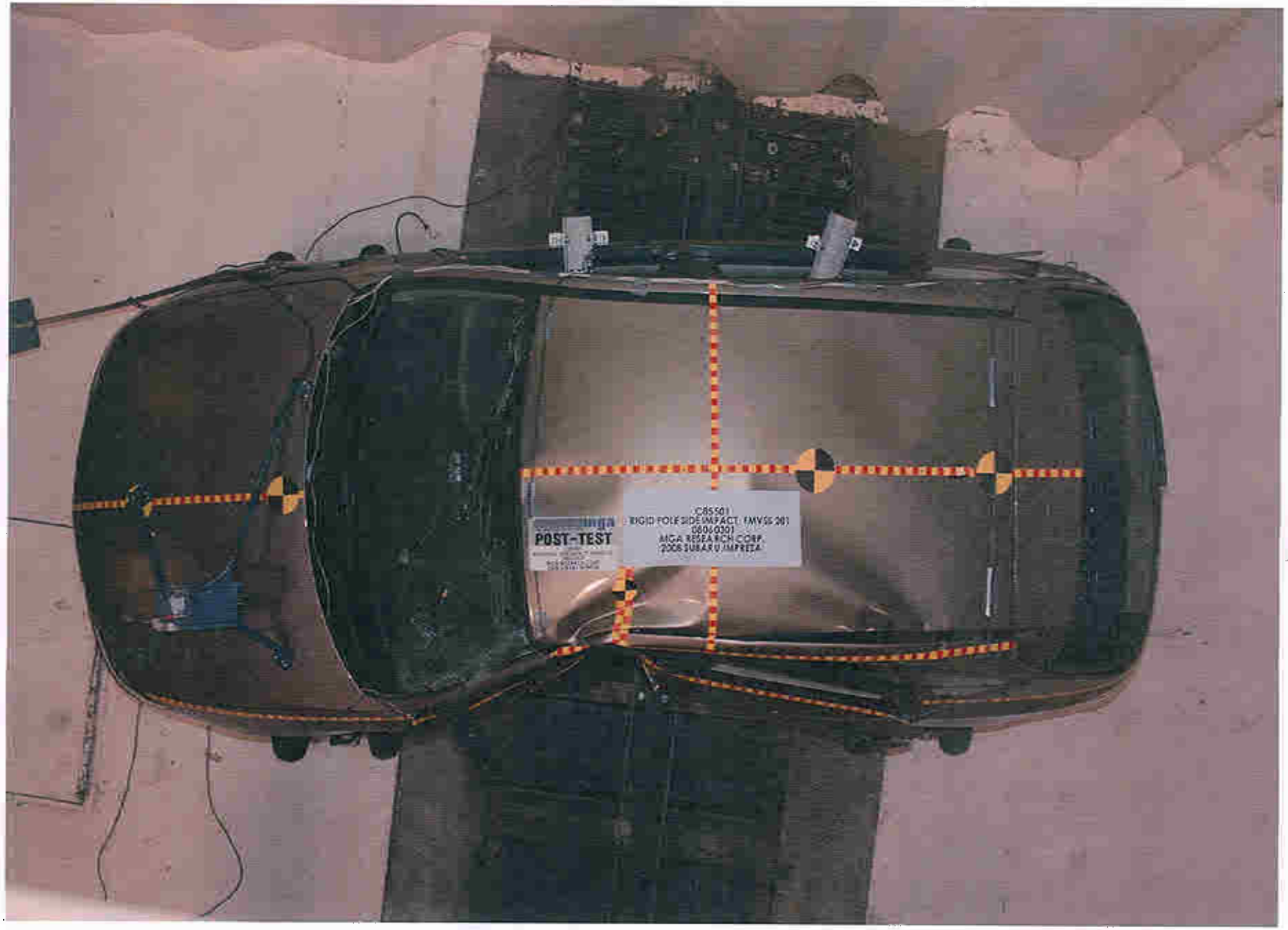
Post-Test Right Rear Three-Quarter View

Pre-Test Right Front Three-Quarter View

Post-Test Right Front Three-Quarter View



Pre-Test Overhead View of Test Vehicle



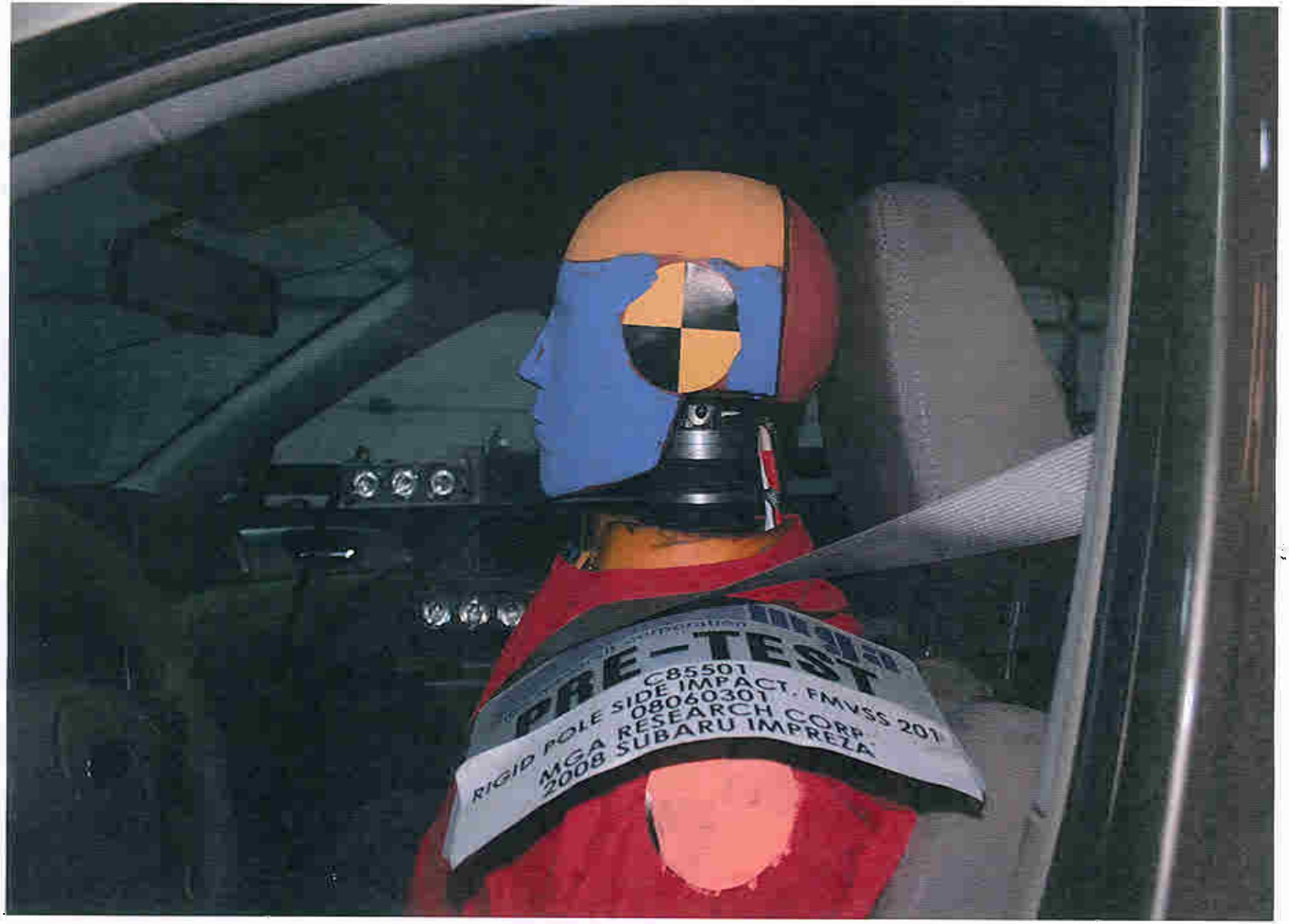
Post-Test Overhead View of Test Vehicle

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 Head Contact (CAB & Headrest)

Post-Test Driver Dummy Upper ThoraxContact

Post-Test Driver Dummy Lower ThoraxContact

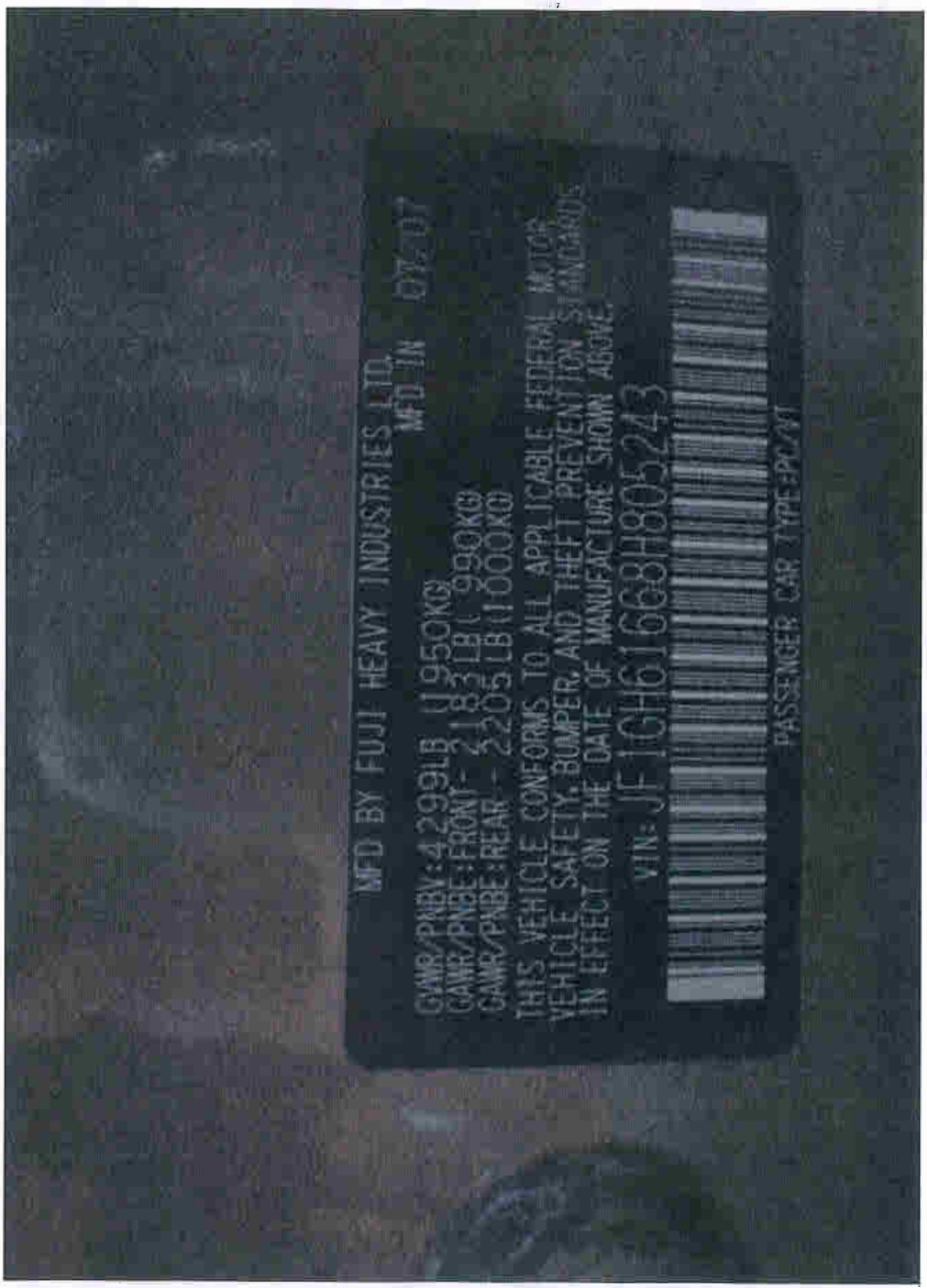
Post-Test Driver Dummy Contact

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

Post-Test Left Front Wheel Dolly

Pre-Test Right Front Wheel Dolly

Post-Test Right Front Wheel Dolly

Pre-Test Left Rear Wheel Dolly

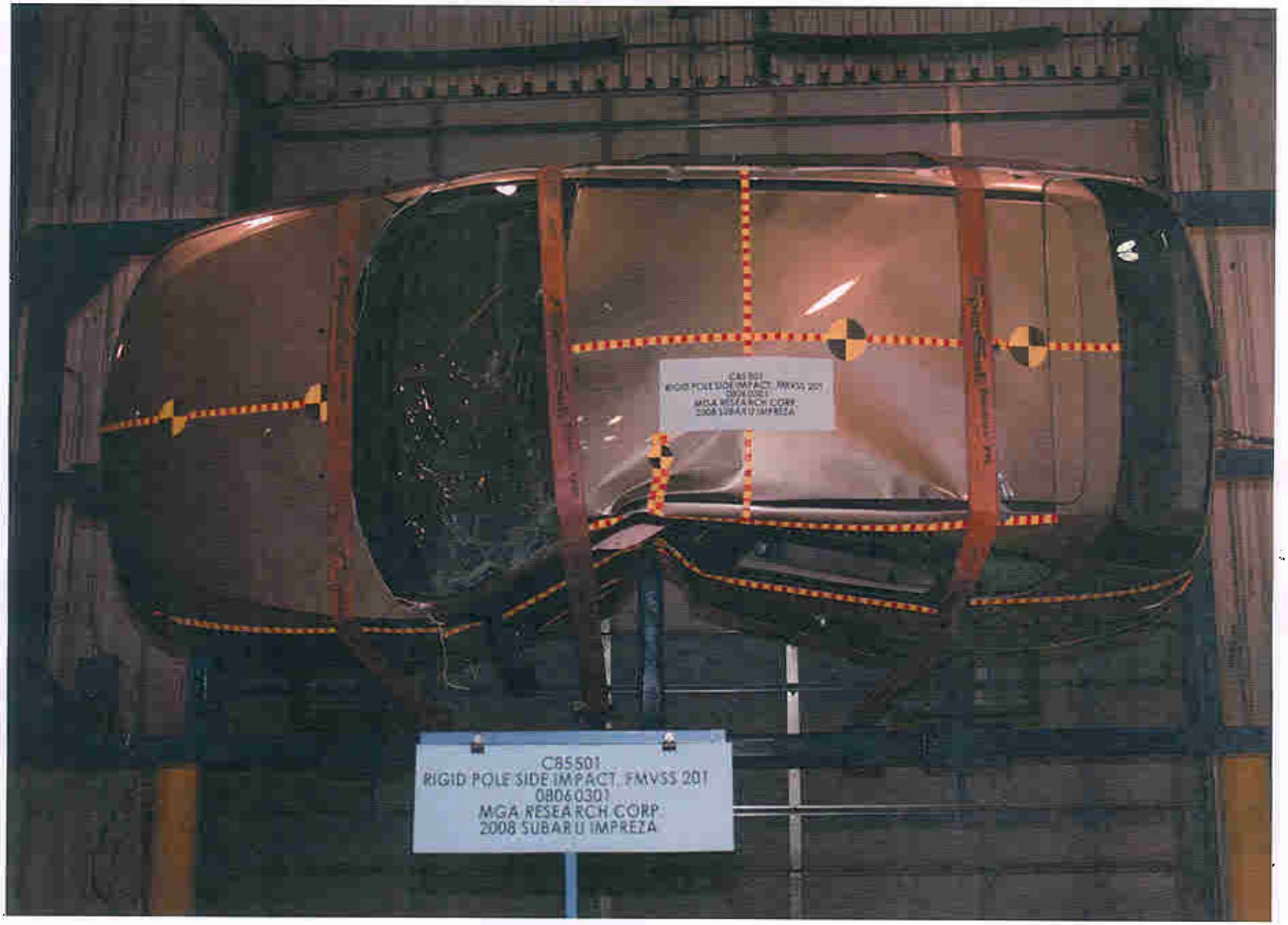
Post-Test Left Rear Wheel Dolly

Pre-Test Right Rear Wheel Dolly

Post-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

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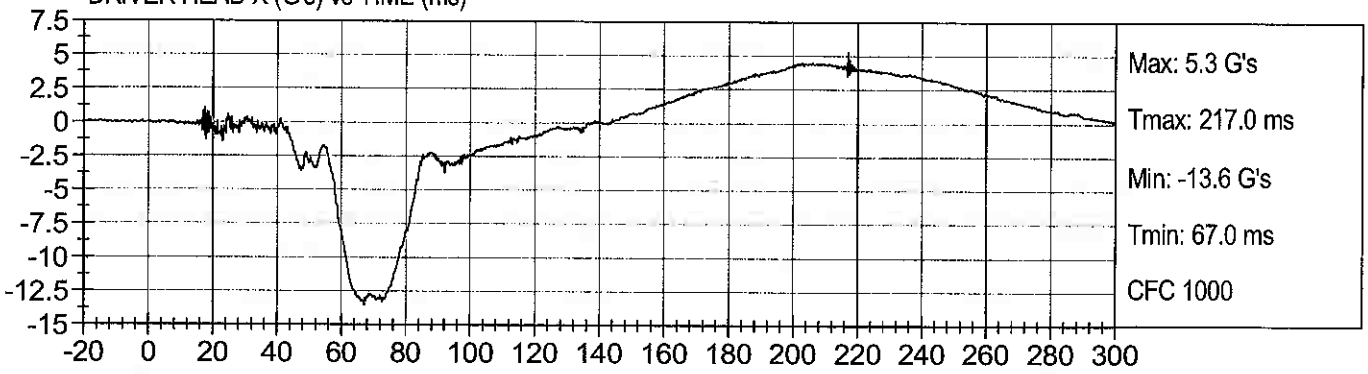
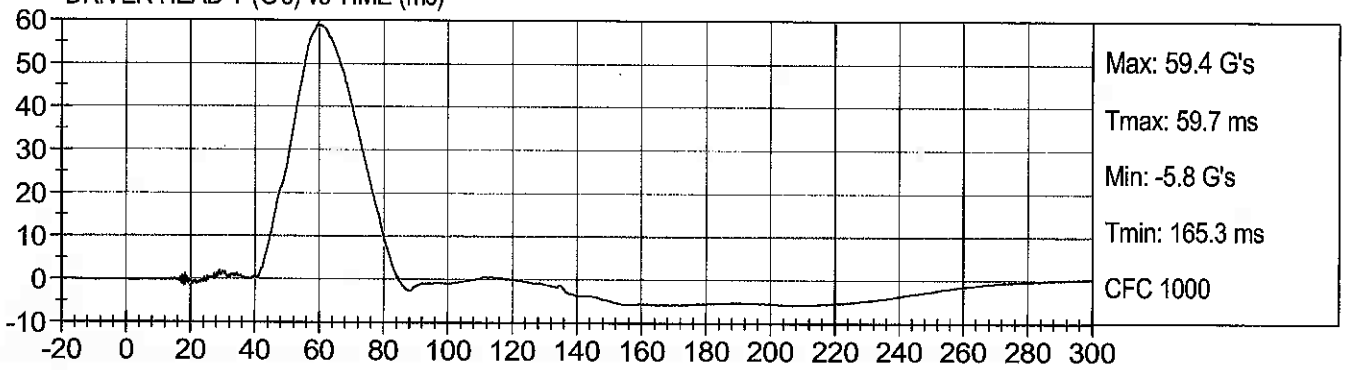
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

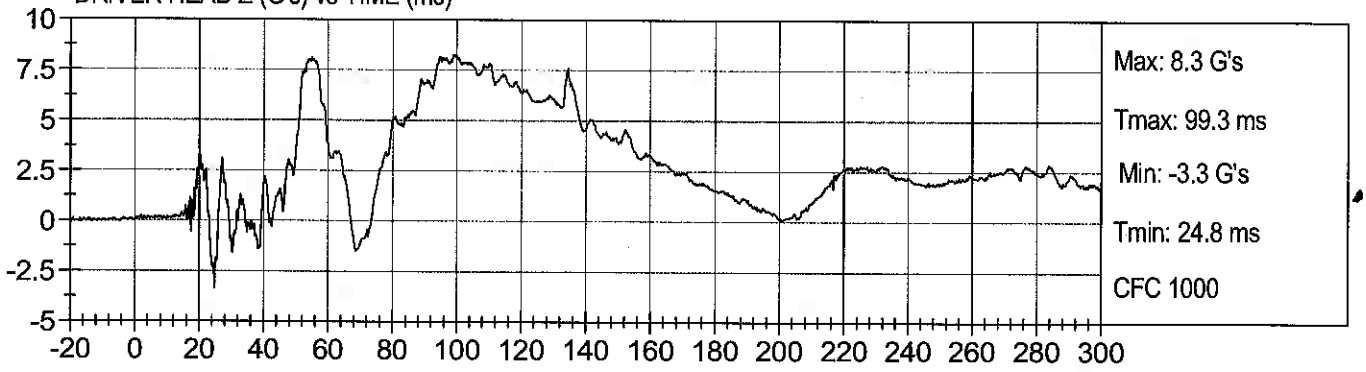
DRIVER HEAD X (G's) vs TIME (ms)



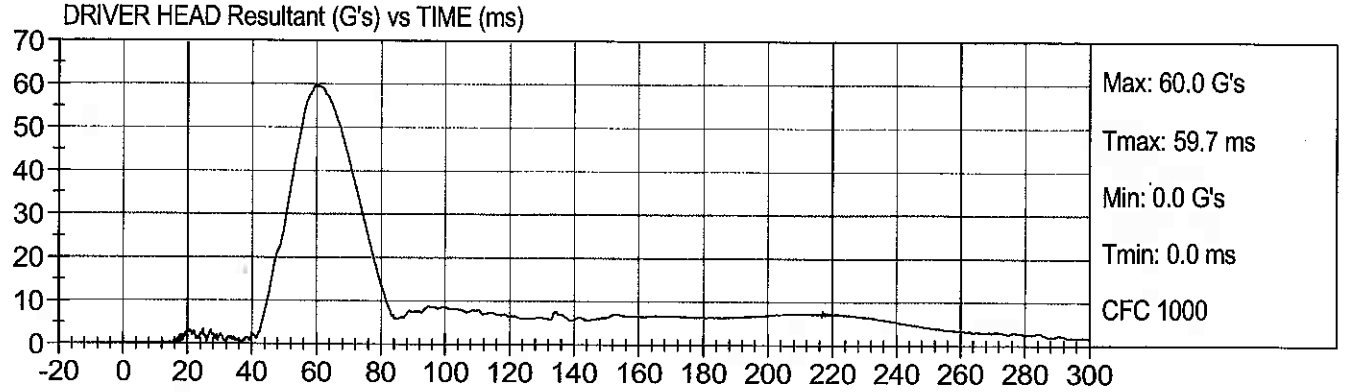
DRIVER HEAD Y (G's) vs TIME (ms)



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



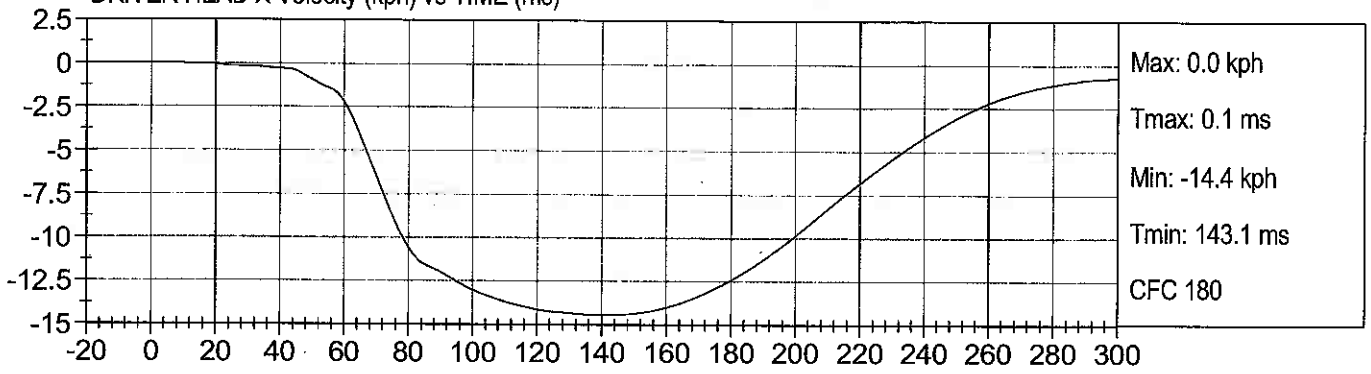
DRIVER HEAD Resultant (G's) vs TIME (ms)



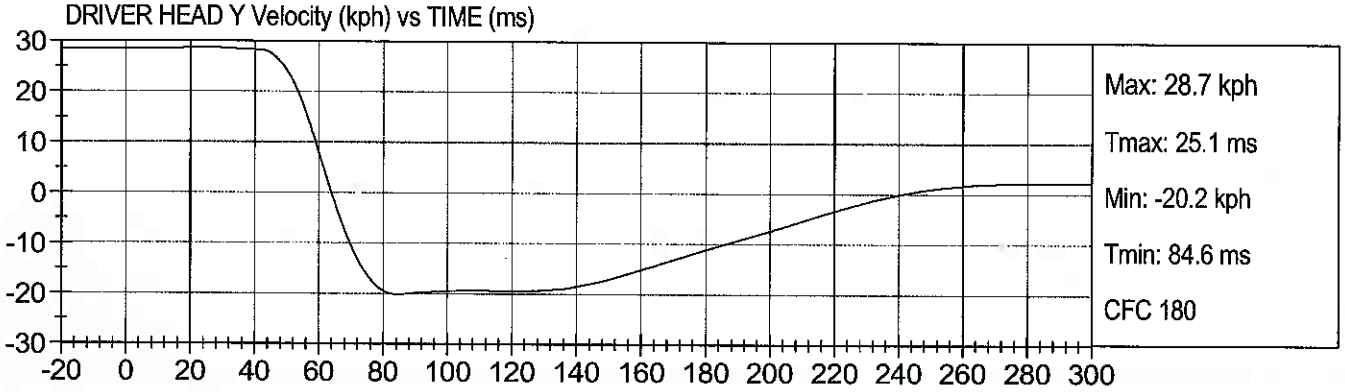
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

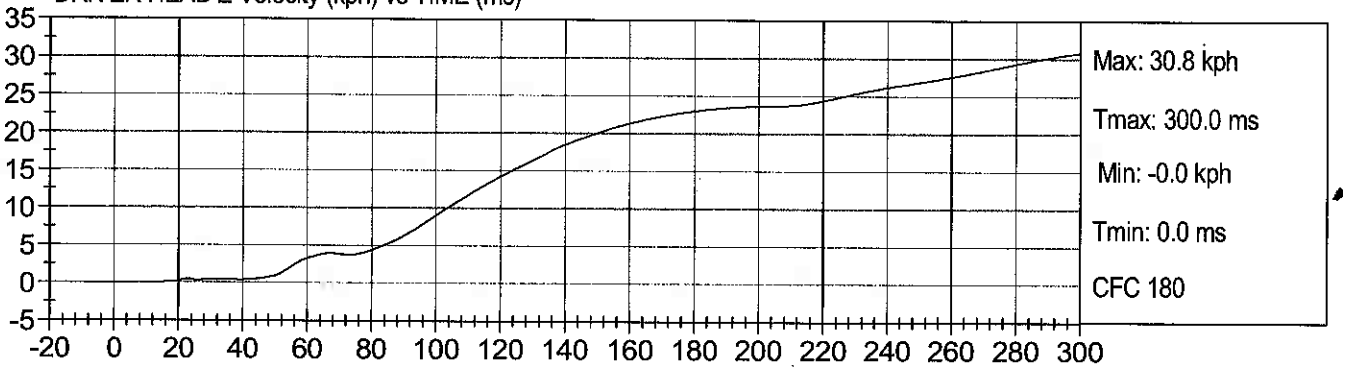
DRIVER HEAD X Velocity (kph) vs TIME (ms)



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



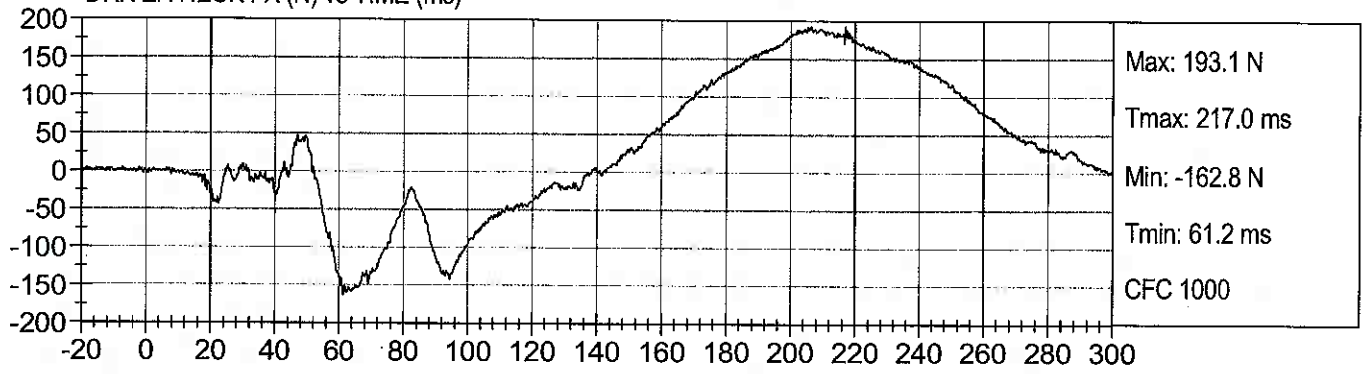
DRIVER HEAD Z Velocity (kph) vs TIME (ms)



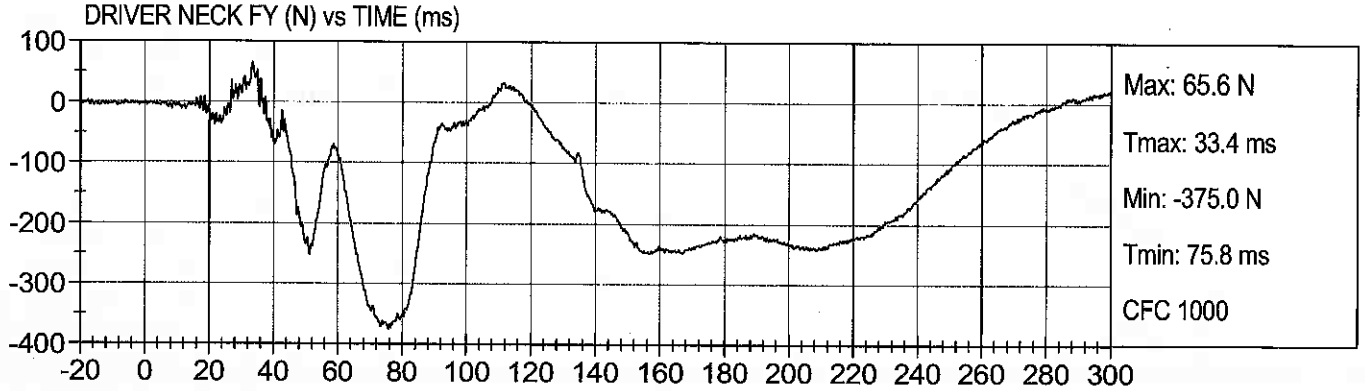
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

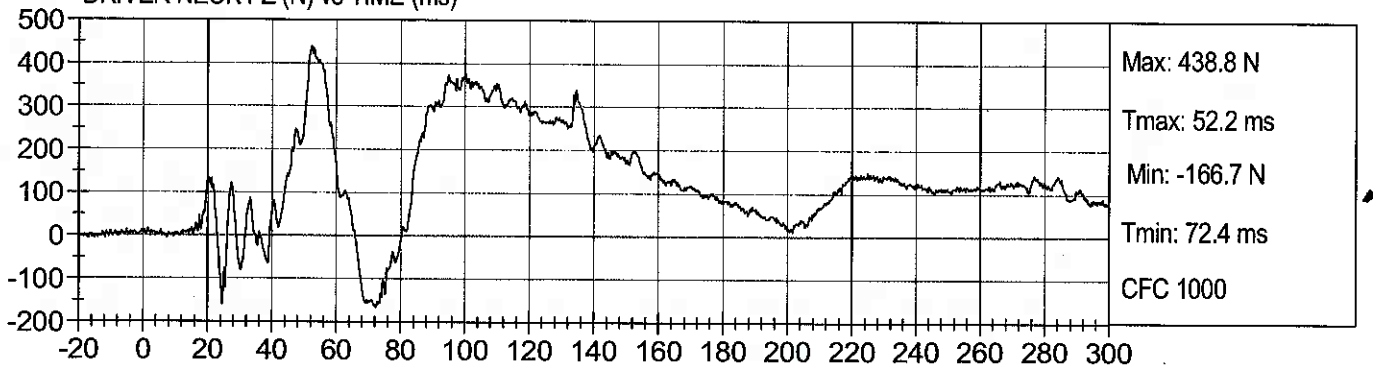
DRIVER NECK FX (N) vs TIME (ms)



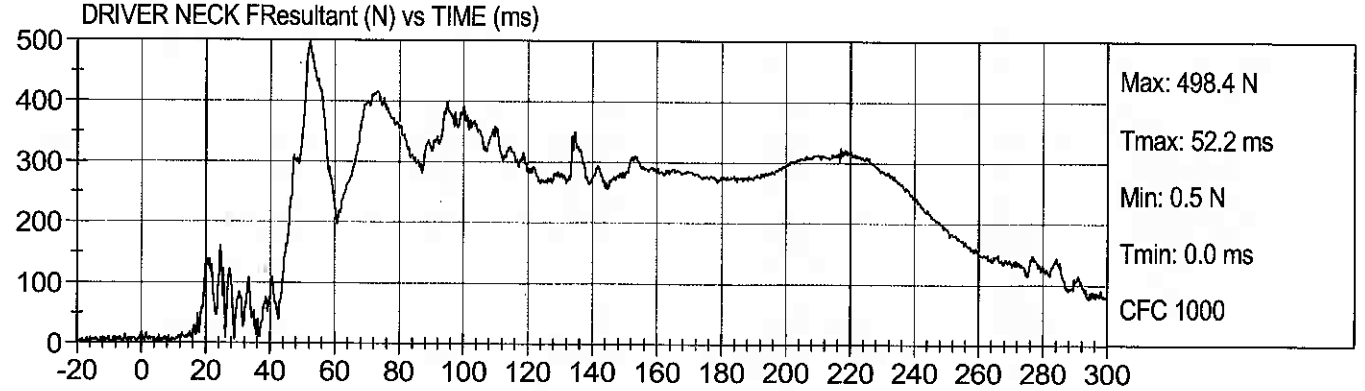
DRIVER NECK FY (N) vs TIME (ms)



DRIVER NECK FZ (N) vs TIME (ms)



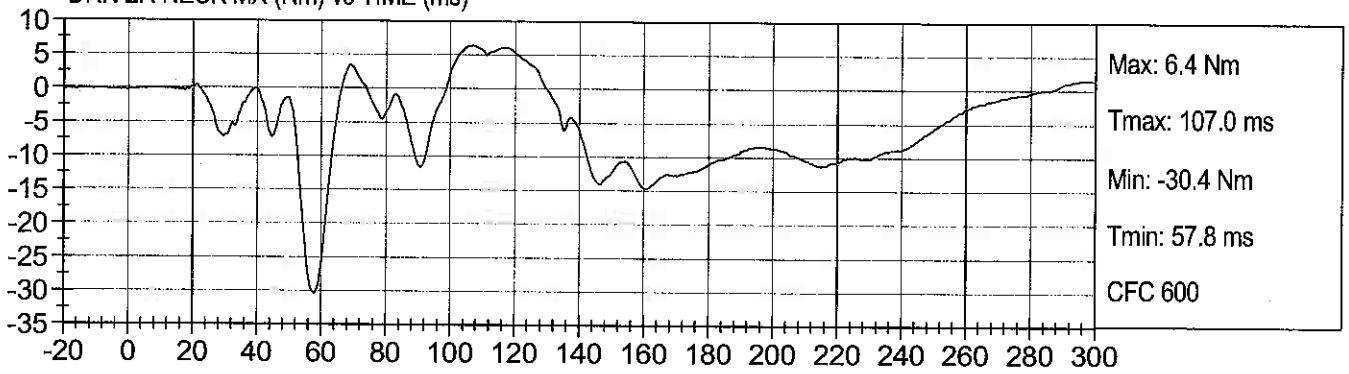
DRIVER NECK FResultant (N) vs TIME (ms)



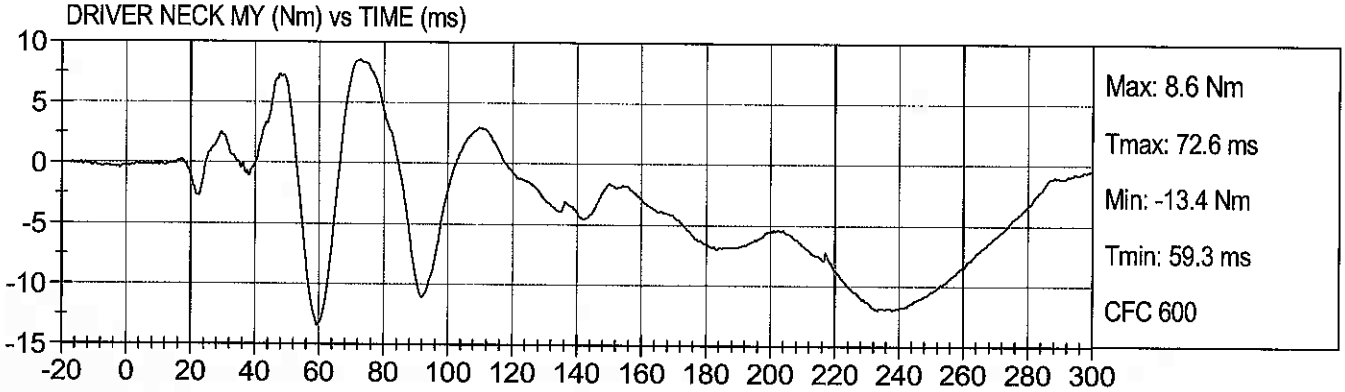
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

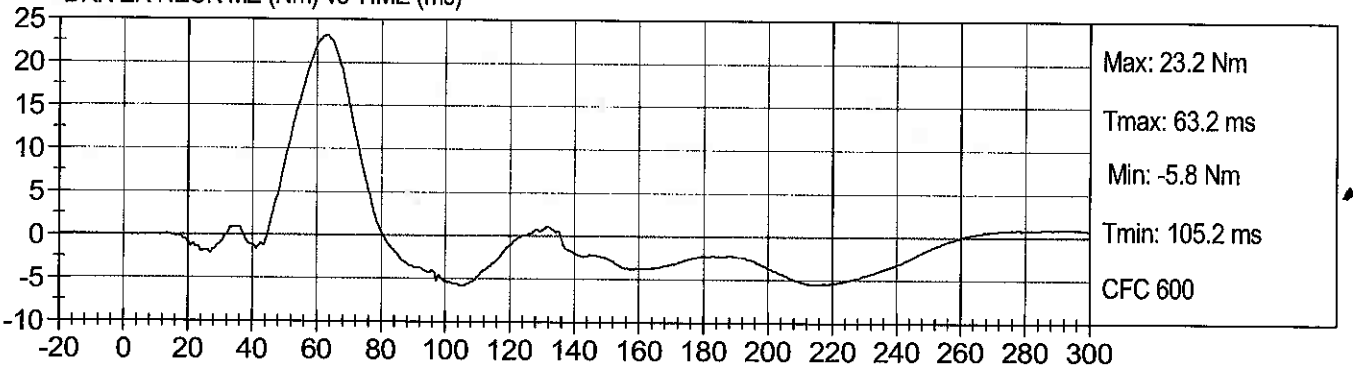
DRIVER NECK MX (Nm) vs TIME (ms)



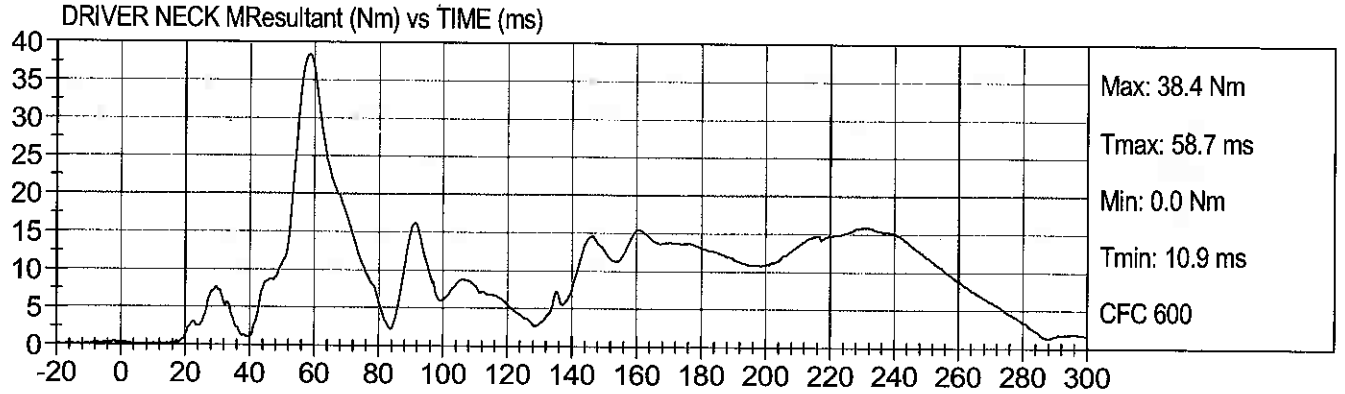
DRIVER NECK MY (Nm) vs TIME (ms)



DRIVER NECK MZ (Nm) vs TIME (ms)



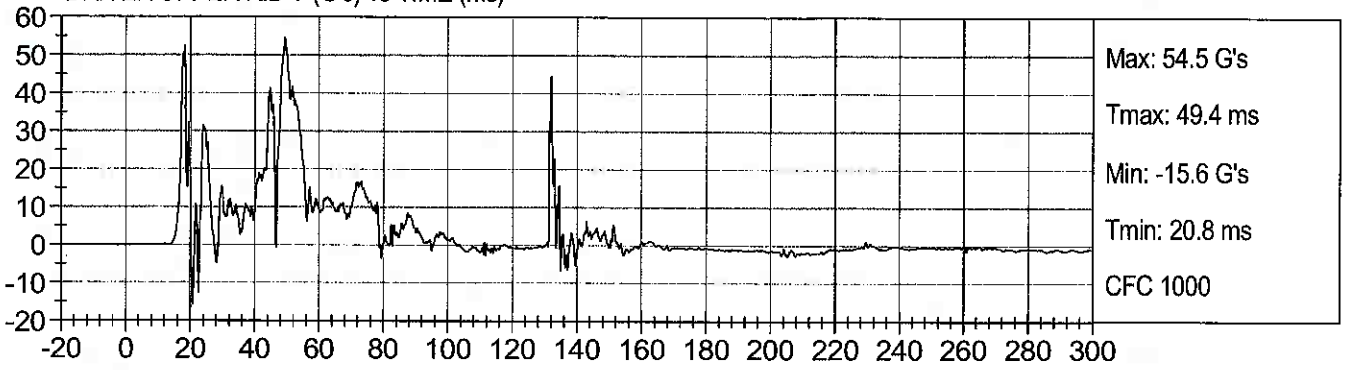
DRIVER NECK MResultant (Nm) vs TIME (ms)



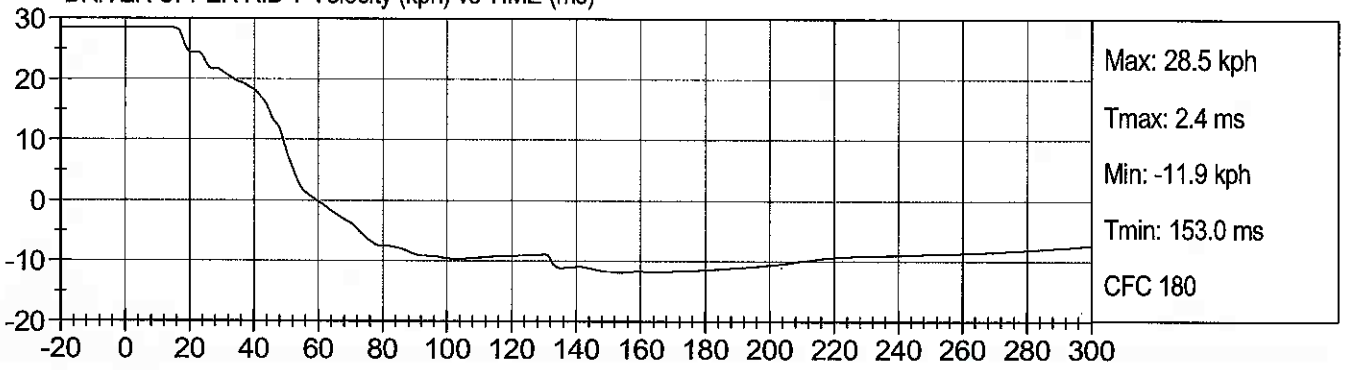
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

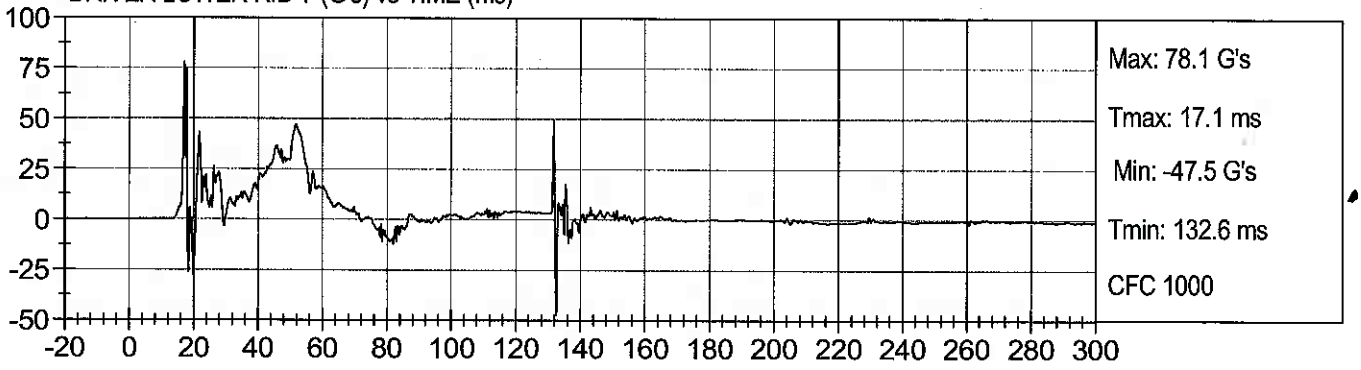
DRIVER UPPER RIB Y (G's) vs TIME (ms)



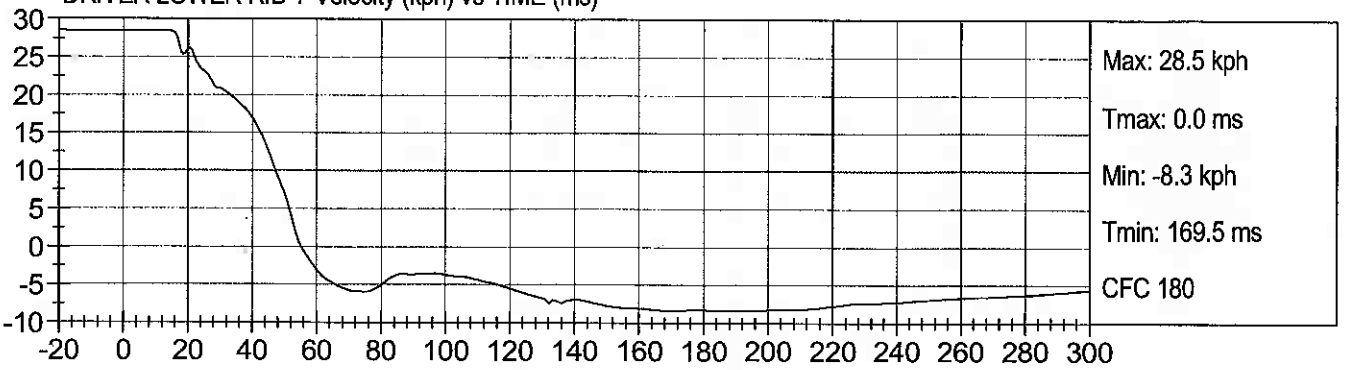
DRIVER UPPER RIB Y Velocity (kph) vs TIME (ms)



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



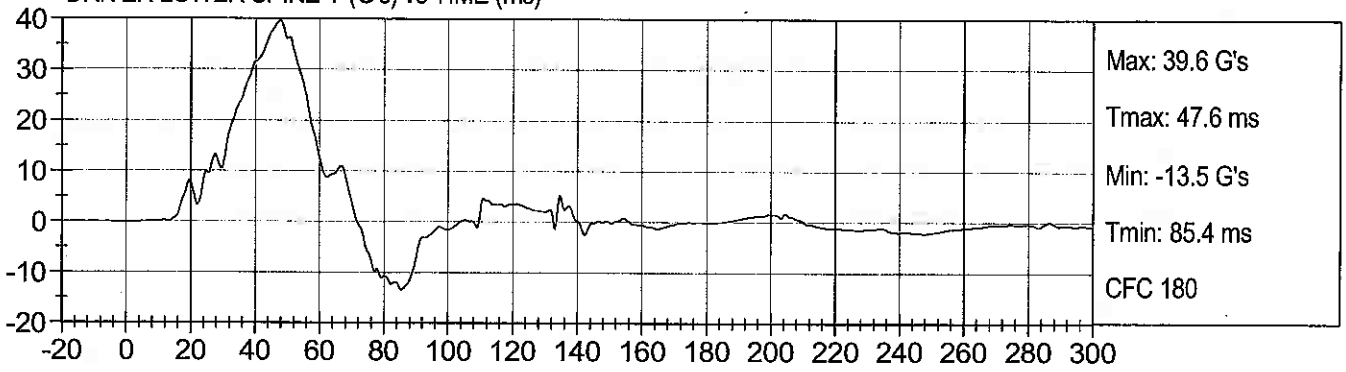
DRIVER LOWER RIB Y Velocity (kph) vs TIME (ms)



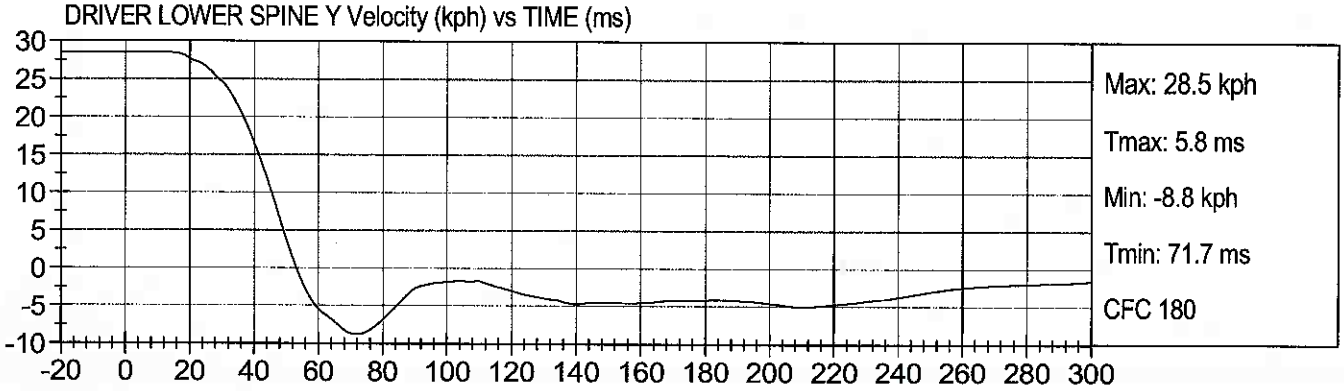
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

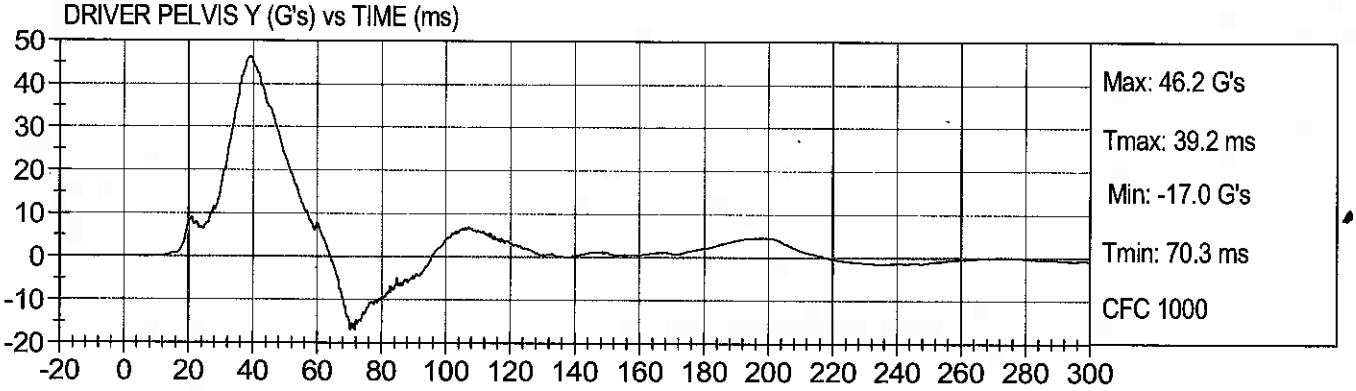
DRIVER LOWER SPINE Y (G's) vs TIME (ms)



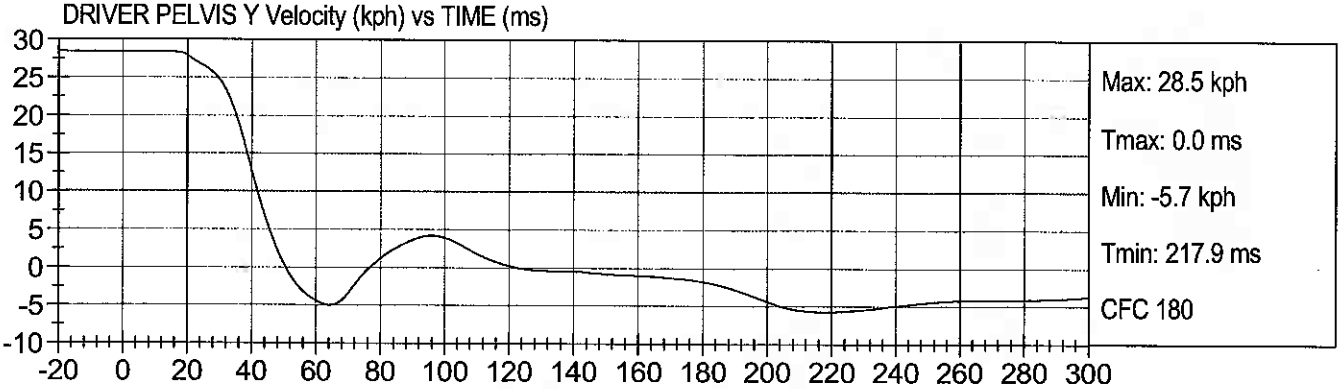
DRIVER LOWER SPINE Y Velocity (kph) vs TIME (ms)



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



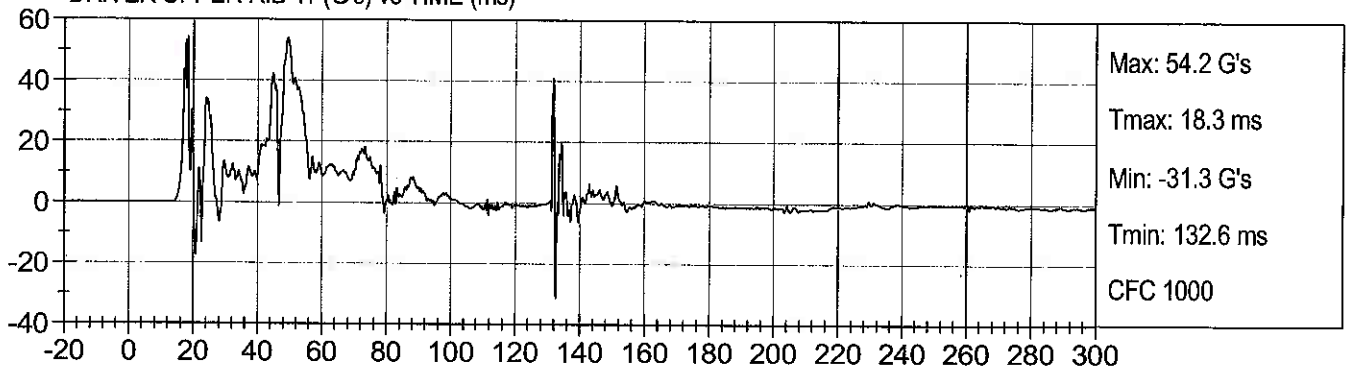
DRIVER PELVIS Y Velocity (kph) vs TIME (ms)



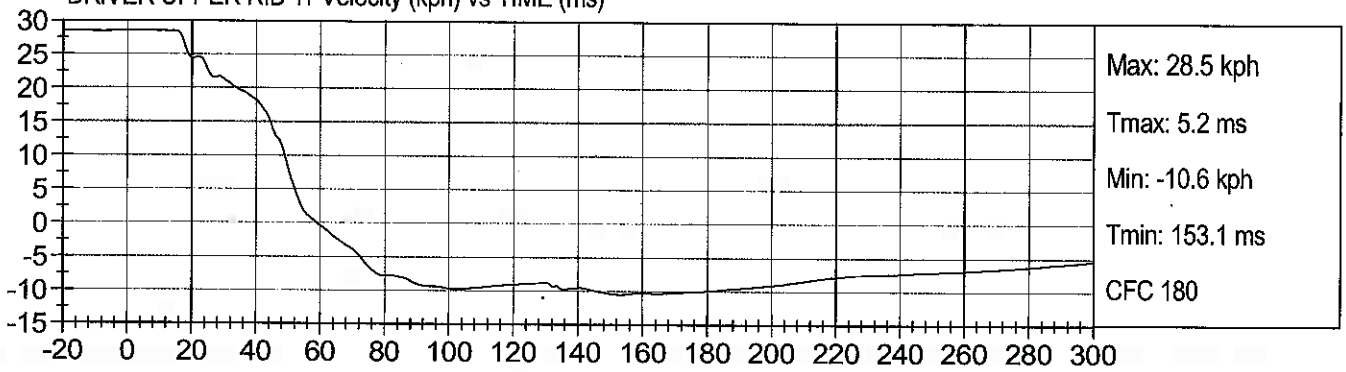
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

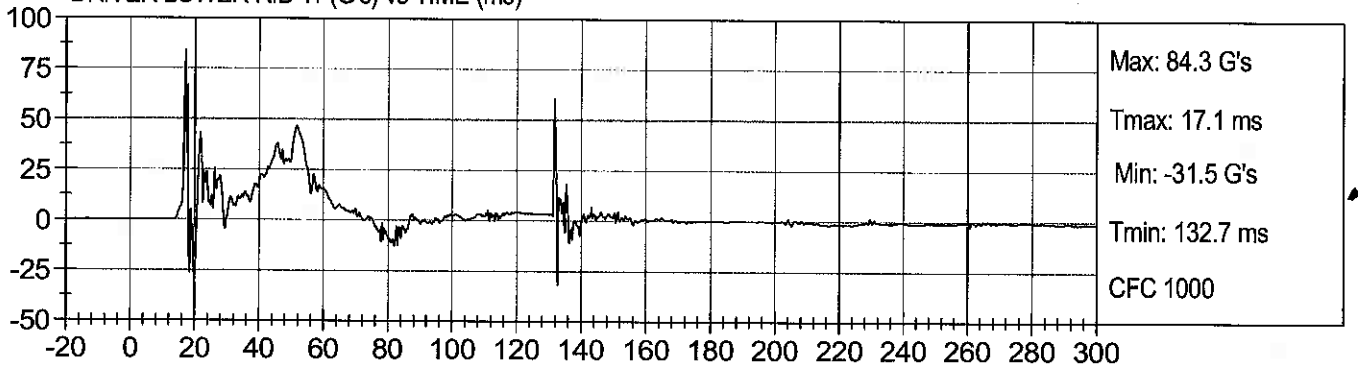
DRIVER UPPER RIB Yr (G's) vs TIME (ms)



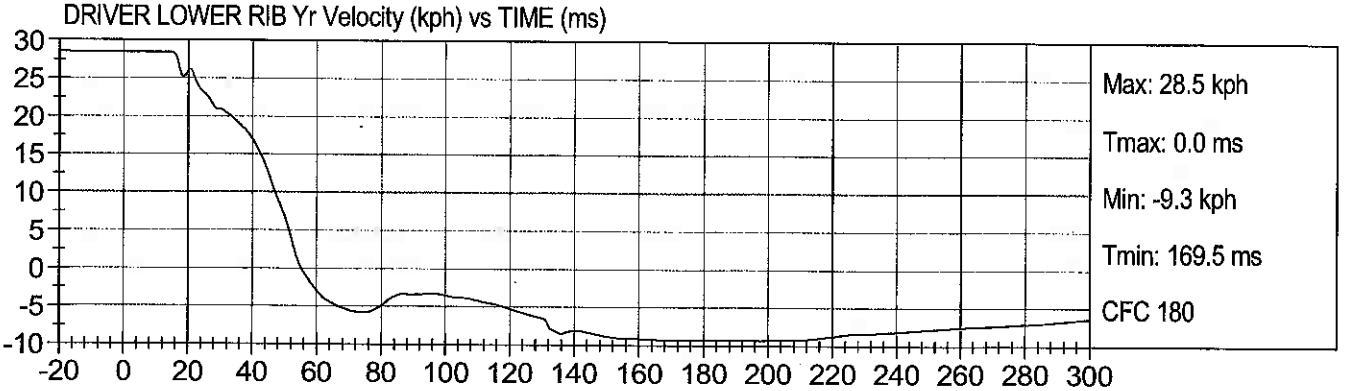
DRIVER UPPER RIB Yr Velocity (kph) vs TIME (ms)



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



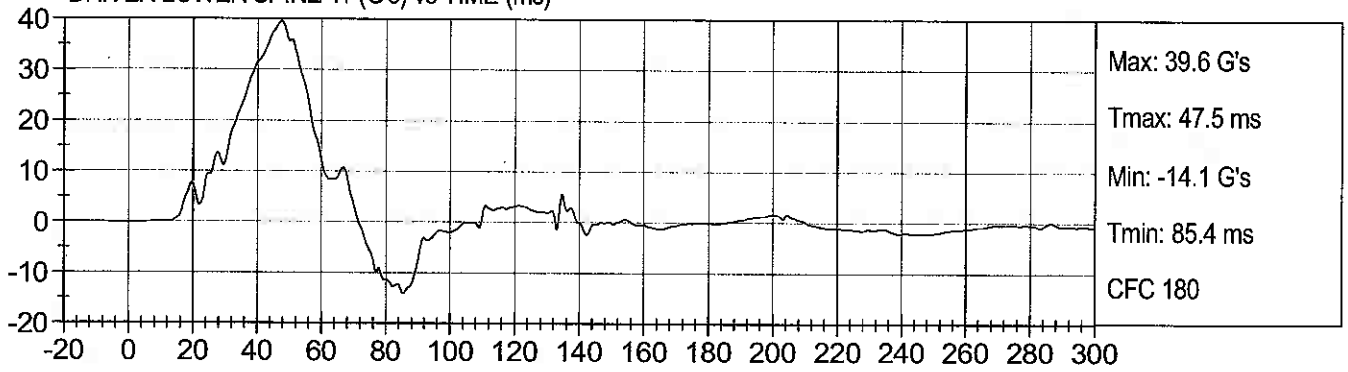
DRIVER LOWER RIB Yr Velocity (kph) vs TIME (ms)



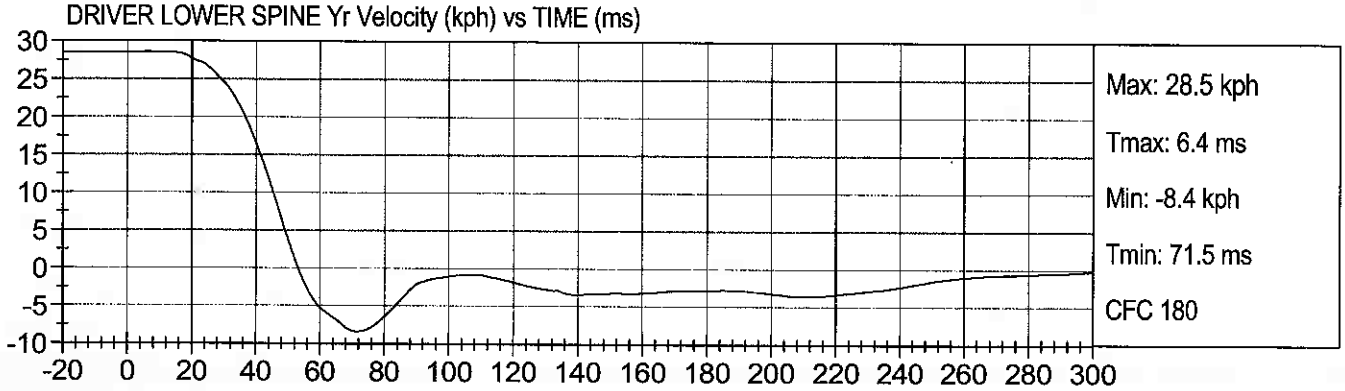
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

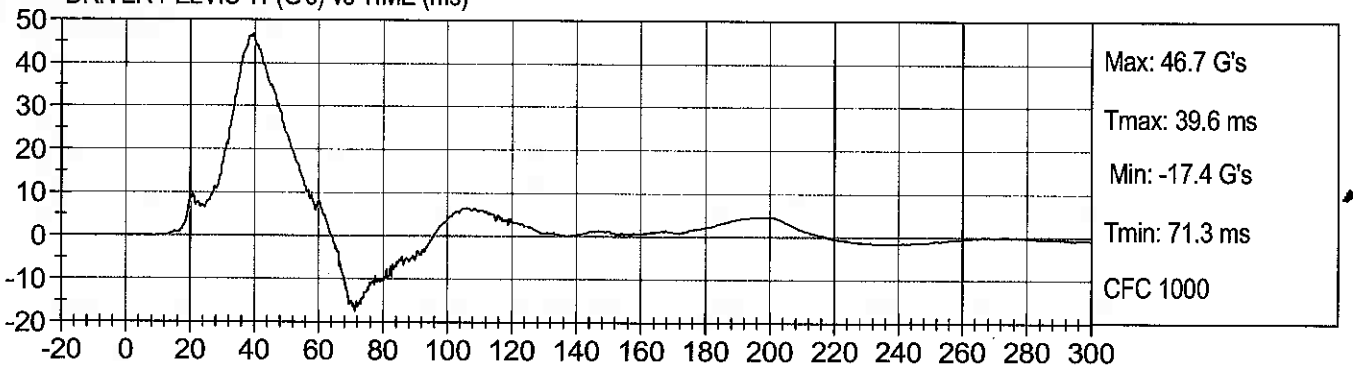
DRIVER LOWER SPINE Yr (G's) vs TIME (ms)



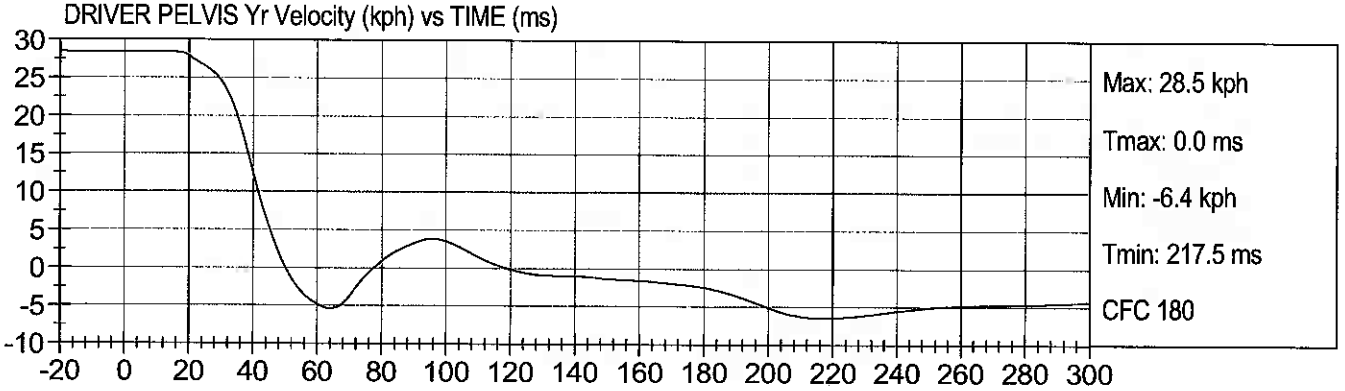
DRIVER LOWER SPINE Yr Velocity (kph) vs TIME (ms)



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



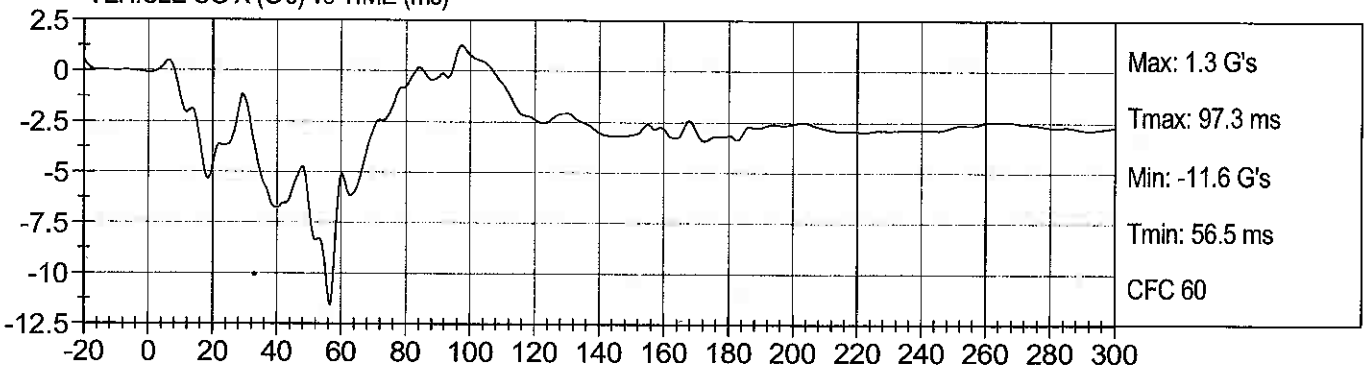
DRIVER PELVIS Yr Velocity (kph) vs TIME (ms)



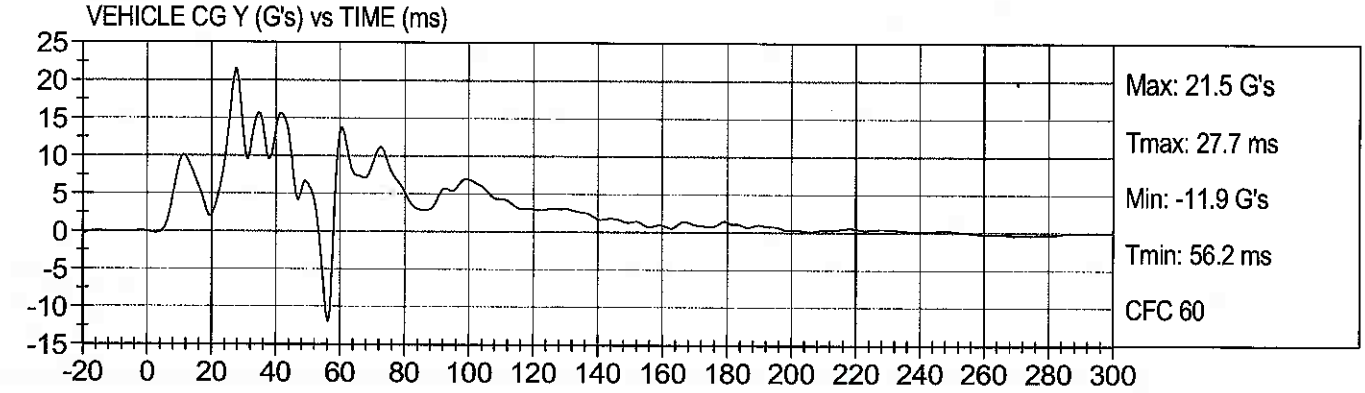
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

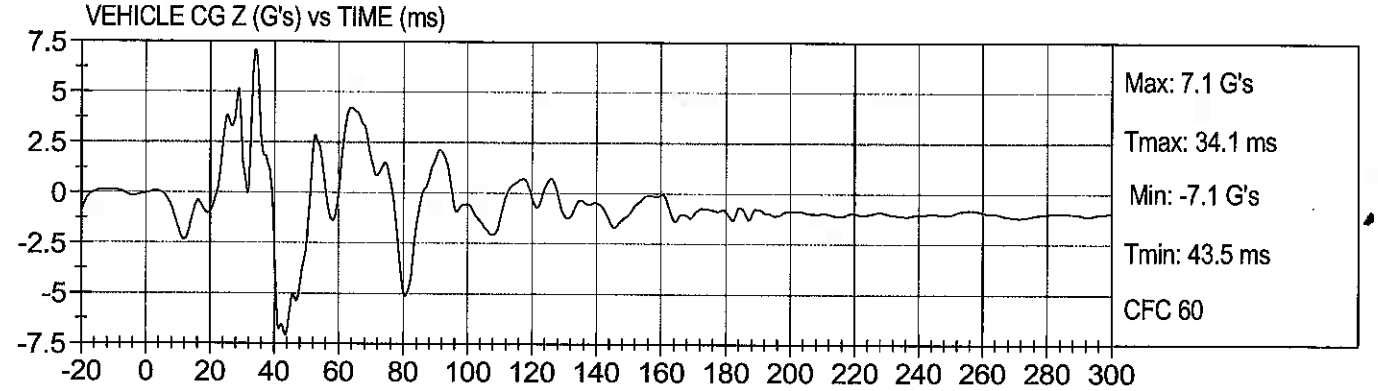
VEHICLE CG X (G's) vs TIME (ms)



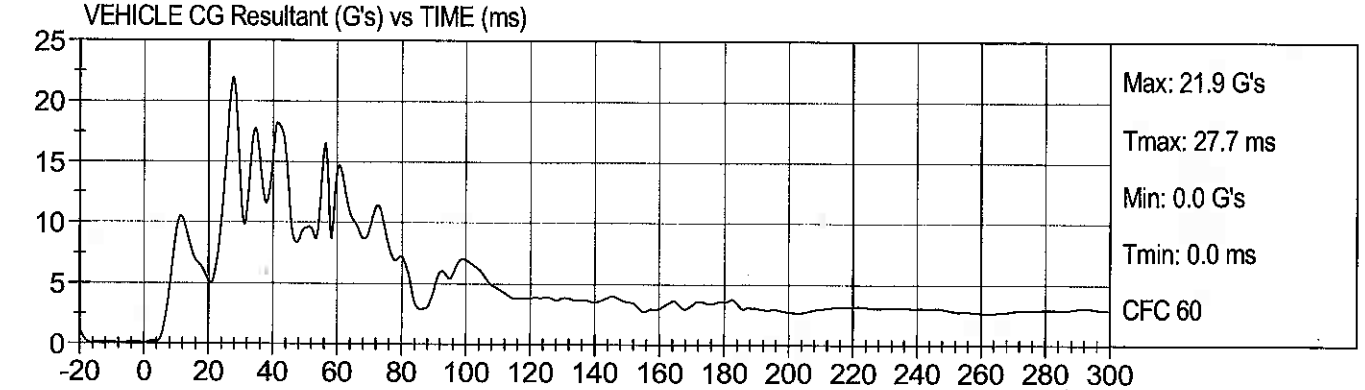
VEHICLE CG Y (G's) vs TIME (ms)



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



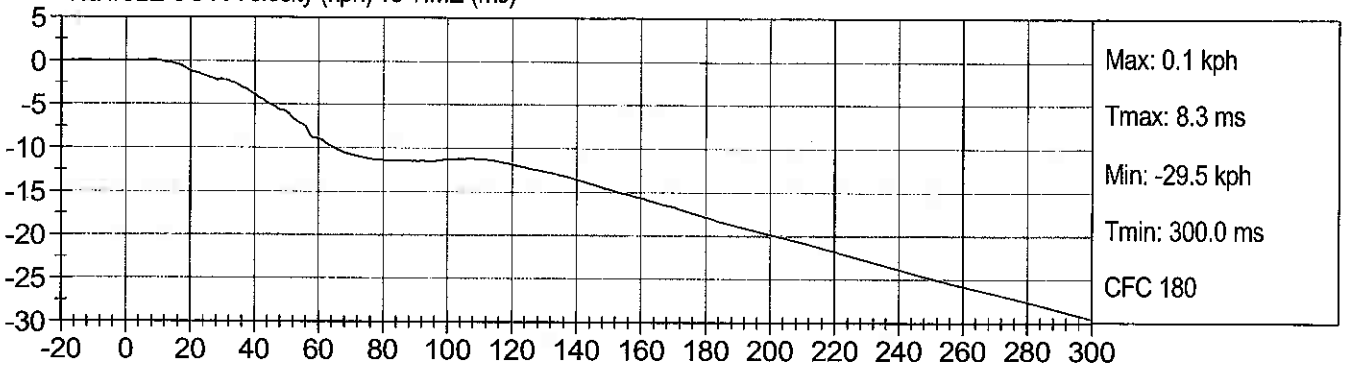
VEHICLE CG Resultant (G's) vs TIME (ms)



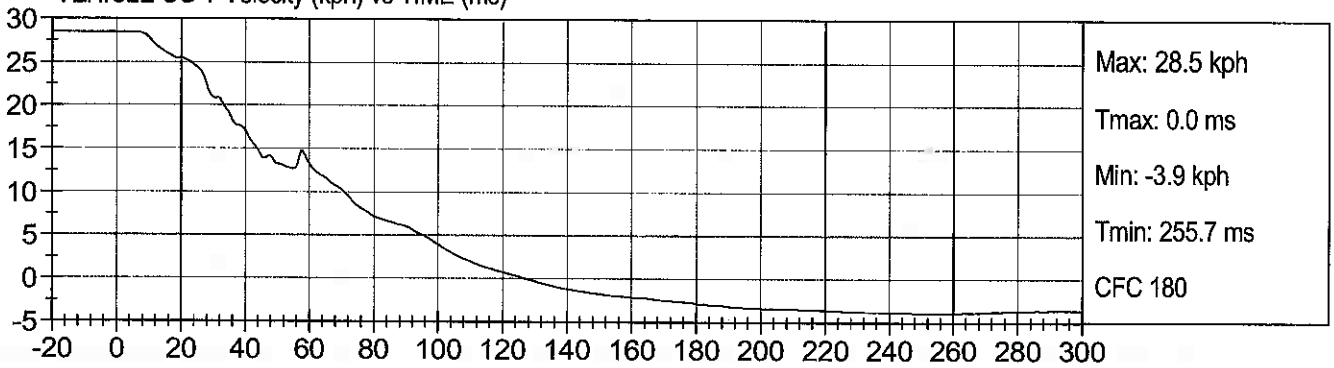
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

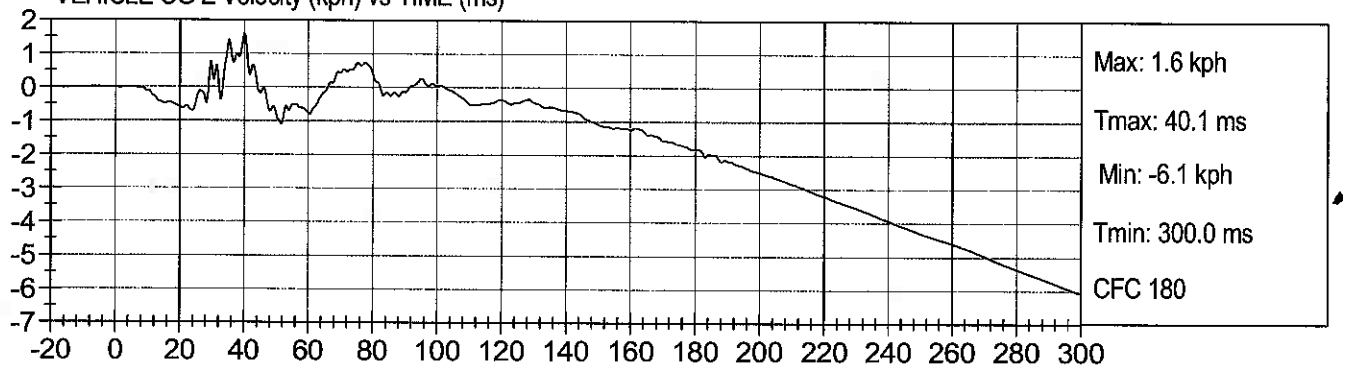
VEHICLE CG X Velocity (kph) vs TIME (ms)



VEHICLE CG Y Velocity (kph) vs TIME (ms)



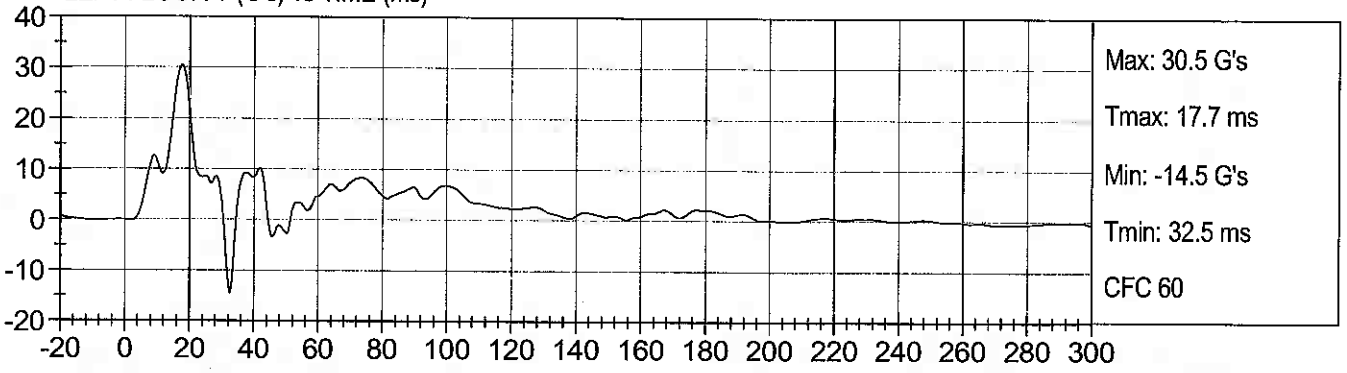
VEHICLE CG Z Velocity (kph) vs TIME (ms)



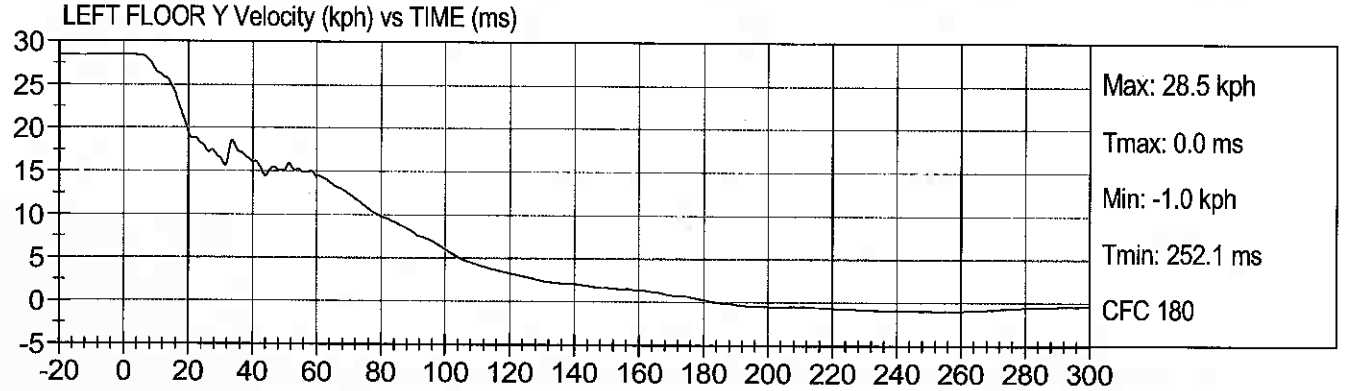
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

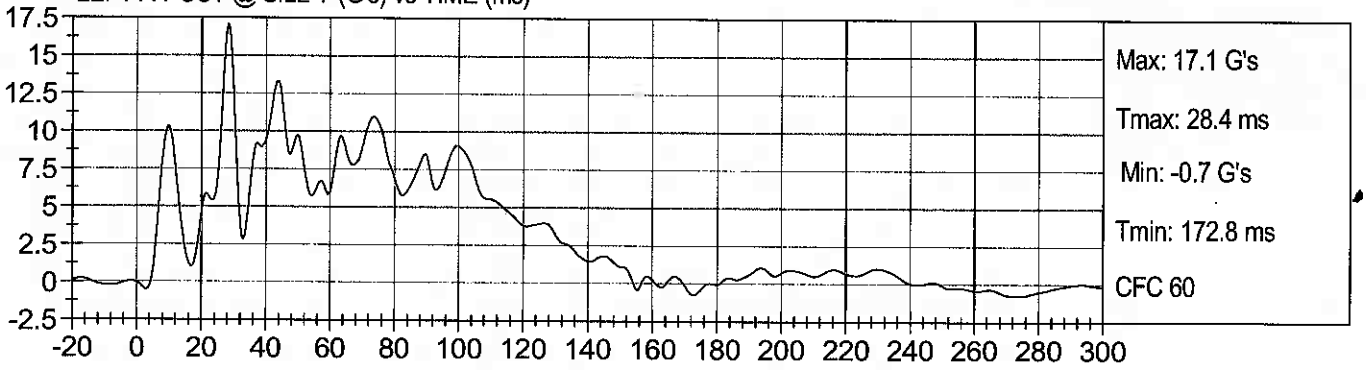
LEFT FLOOR Y (G's) vs TIME (ms)



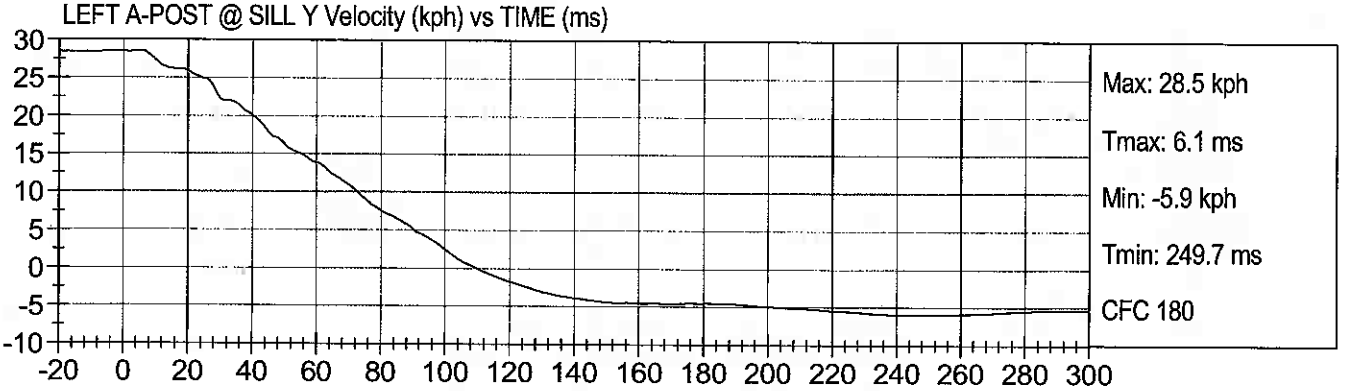
LEFT FLOOR Y Velocity (kph) vs TIME (ms)



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



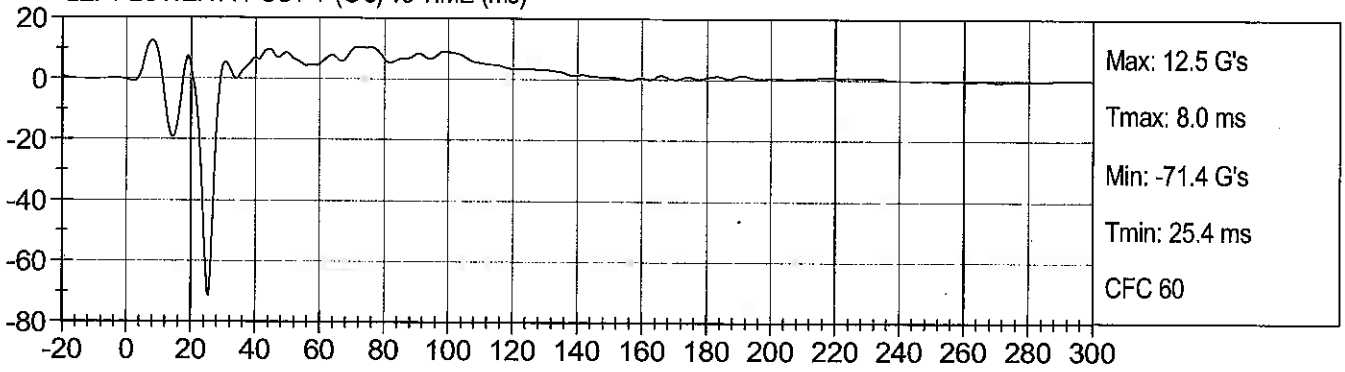
LEFT A-POST @ SILL Y Velocity (kph) vs TIME (ms)



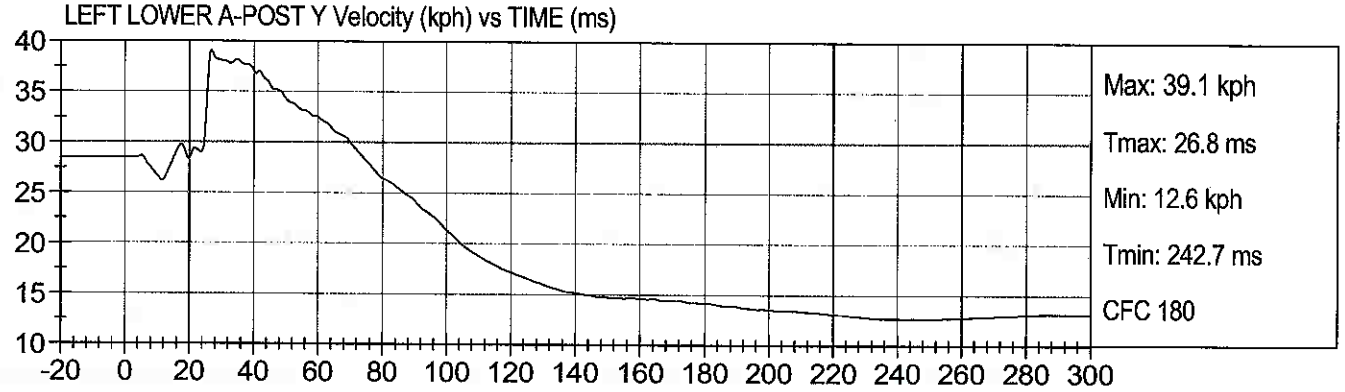
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

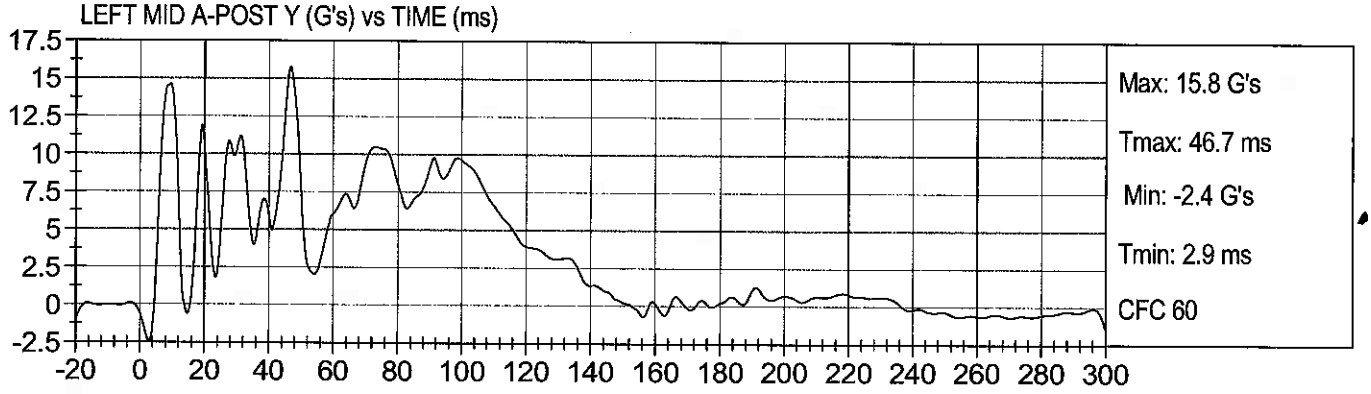
LEFT LOWER A-POST Y (G's) vs TIME (ms)



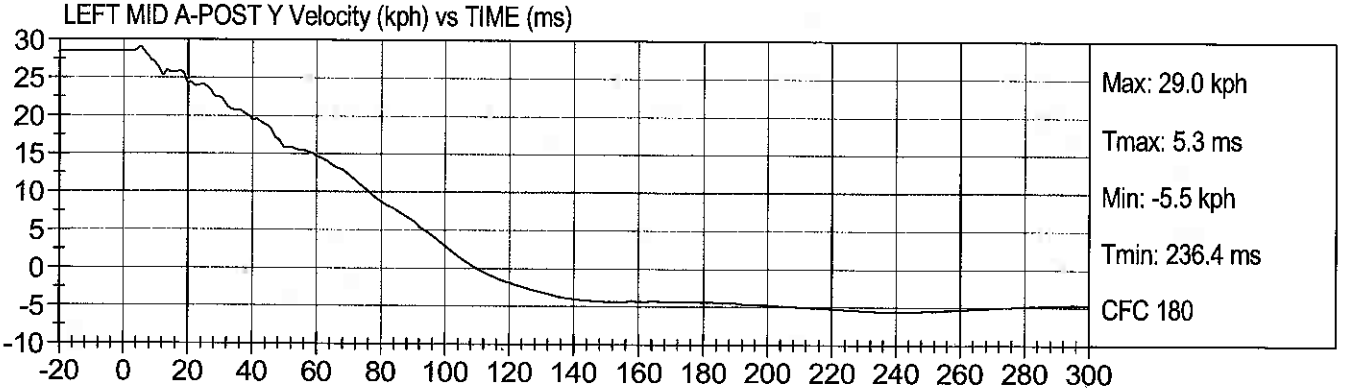
LEFT LOWER A-POST Y Velocity (kph) vs TIME (ms)



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



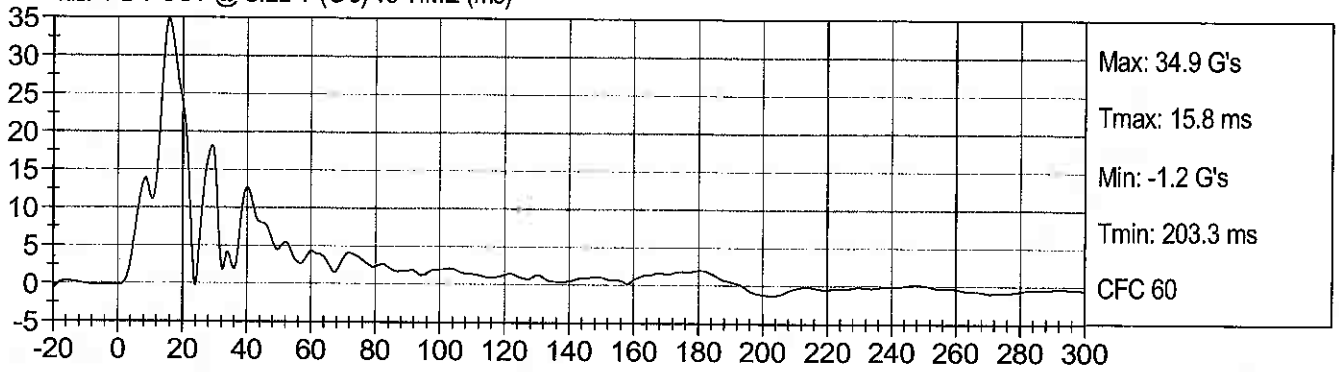
LEFT MID A-POST Y Velocity (kph) vs TIME (ms)



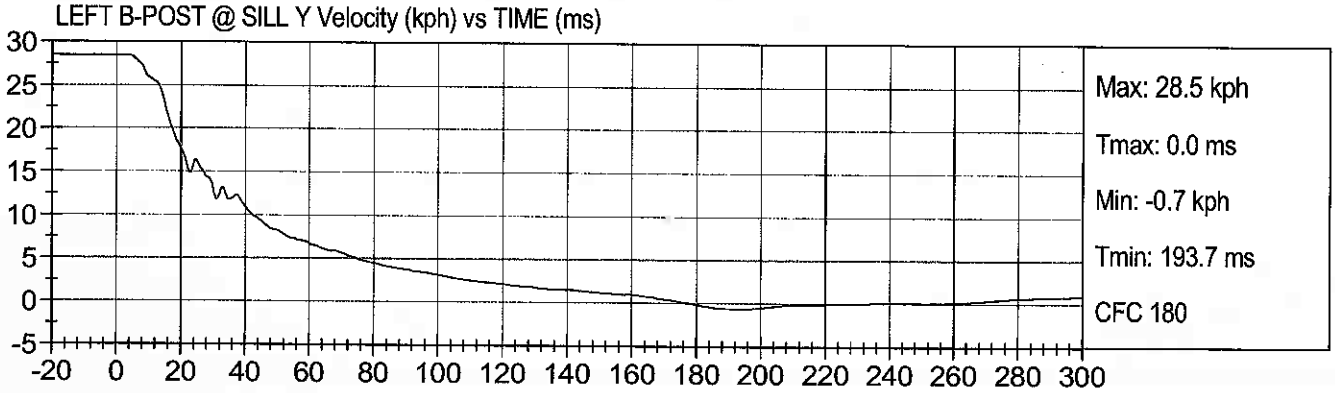
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

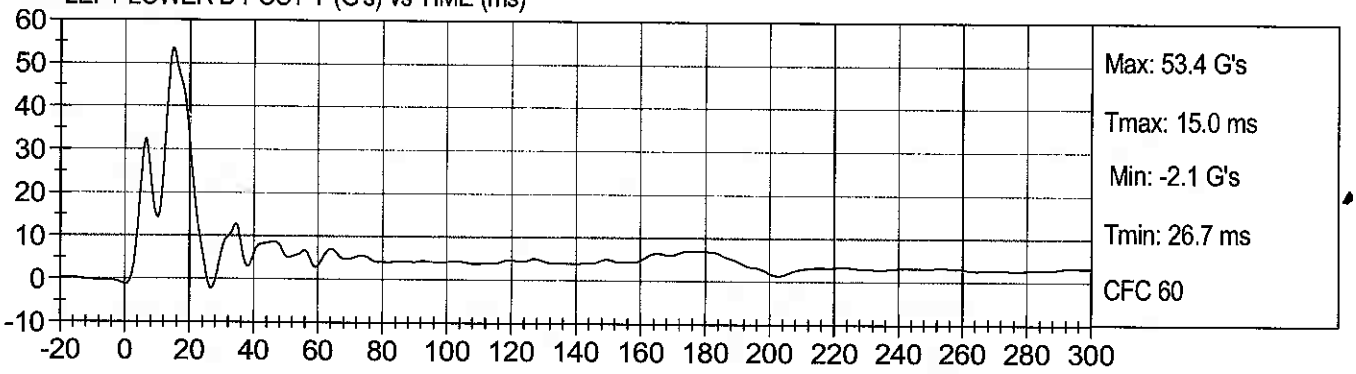
LEFT B-POST @ SILL Y (G's) vs TIME (ms)



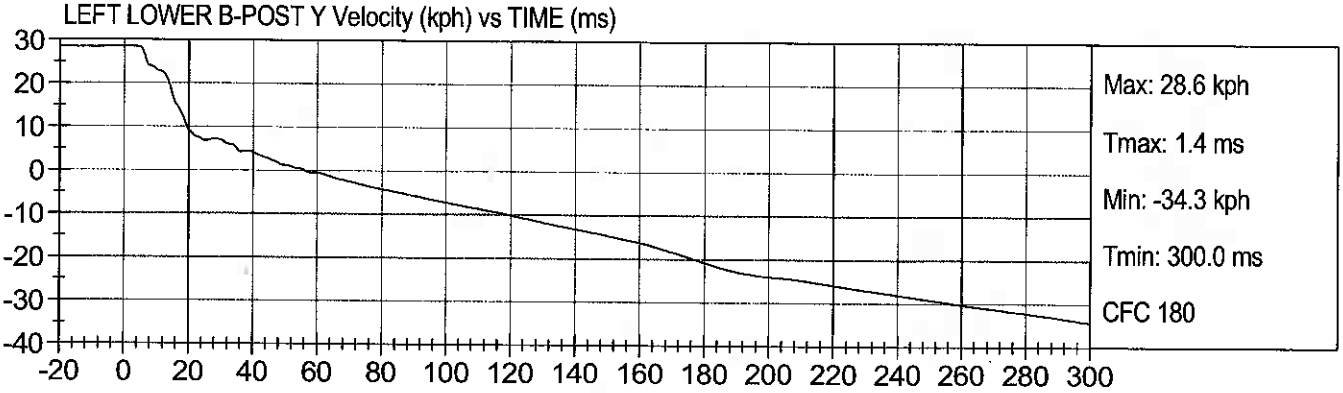
LEFT B-POST @ SILL Y Velocity (kph) vs TIME (ms)



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



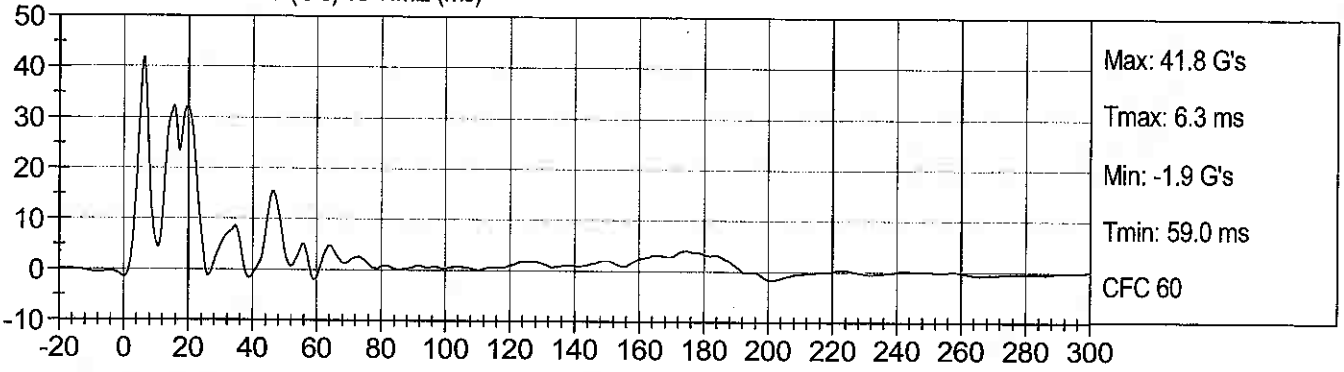
LEFT LOWER B-POST Y Velocity (kph) vs TIME (ms)



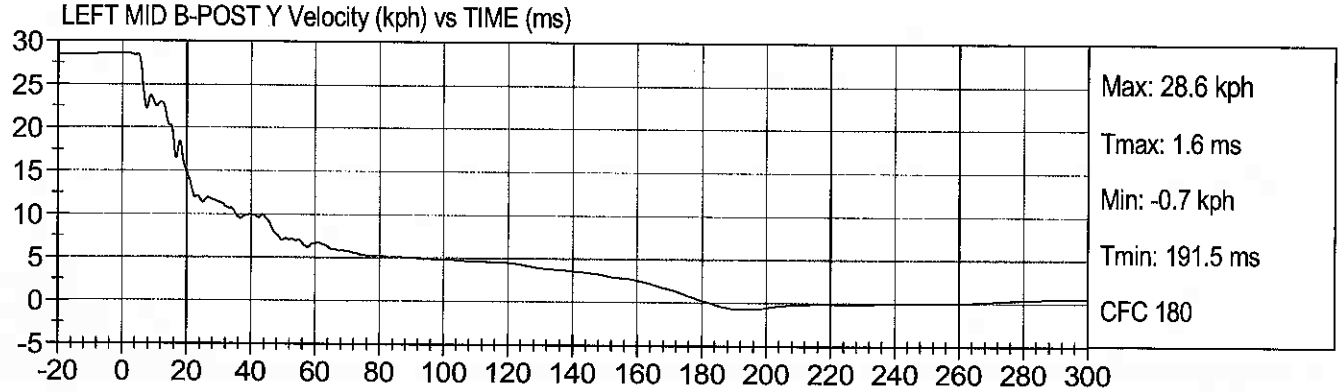
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

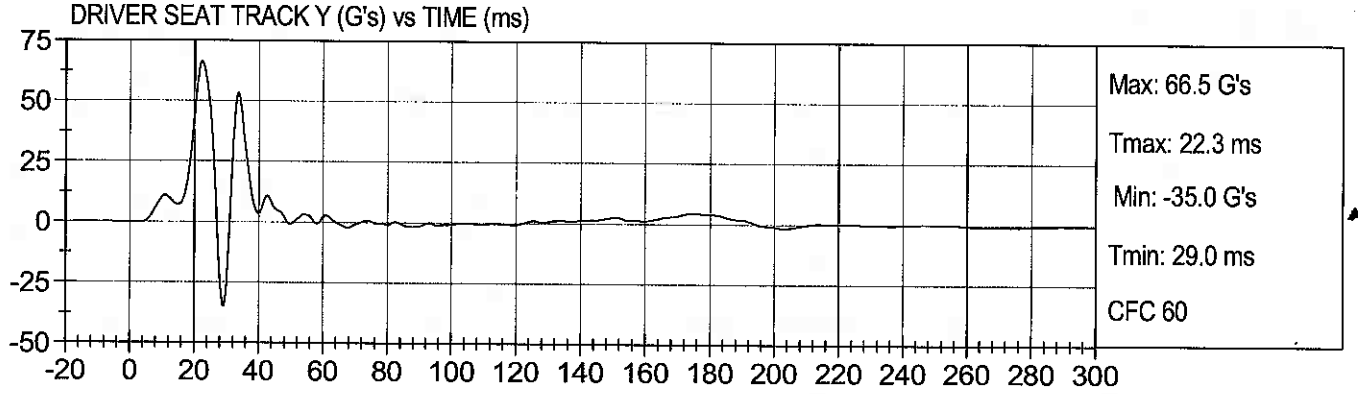
LEFT MID B-POST Y (G's) vs TIME (ms)



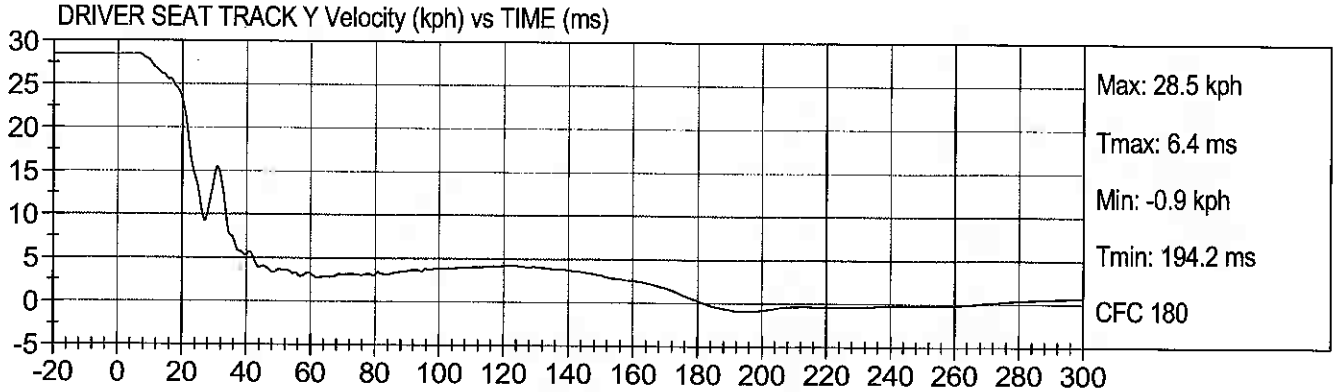
LEFT MID B-POST Y Velocity (kph) vs TIME (ms)



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



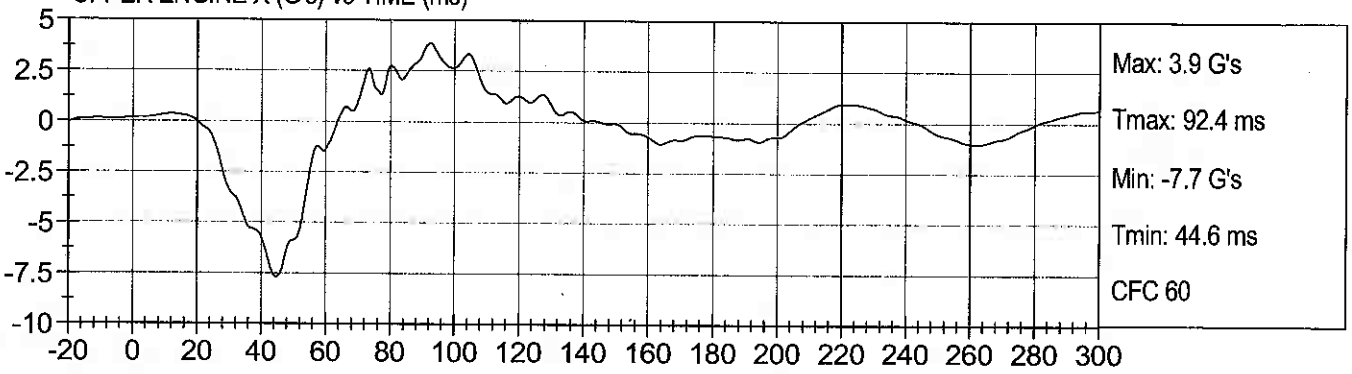
DRIVER SEAT TRACK Y Velocity (kph) vs TIME (ms)



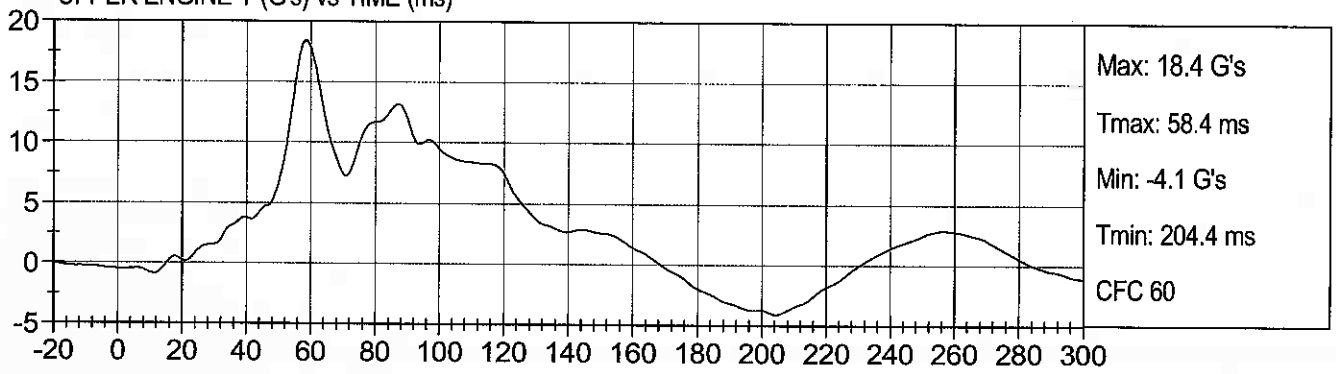
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

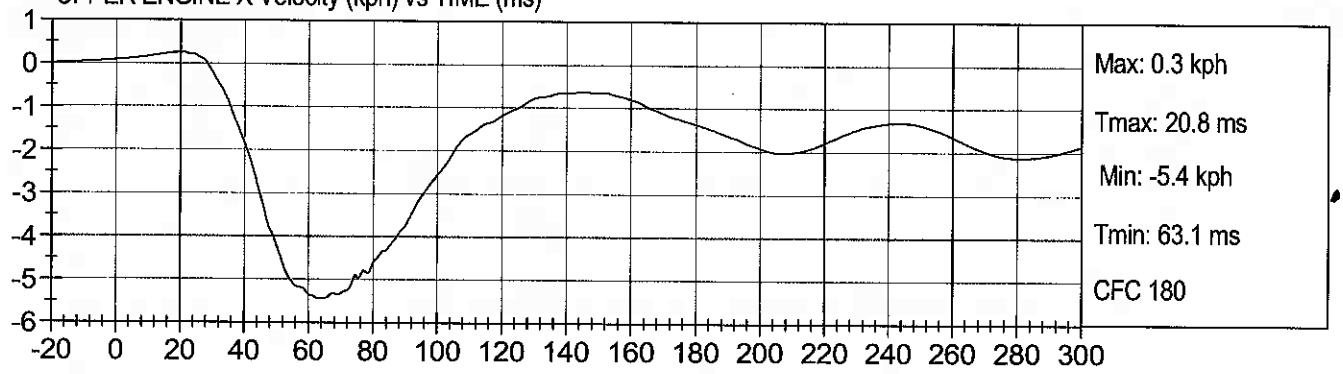
UPPER ENGINE X (G's) vs TIME (ms)



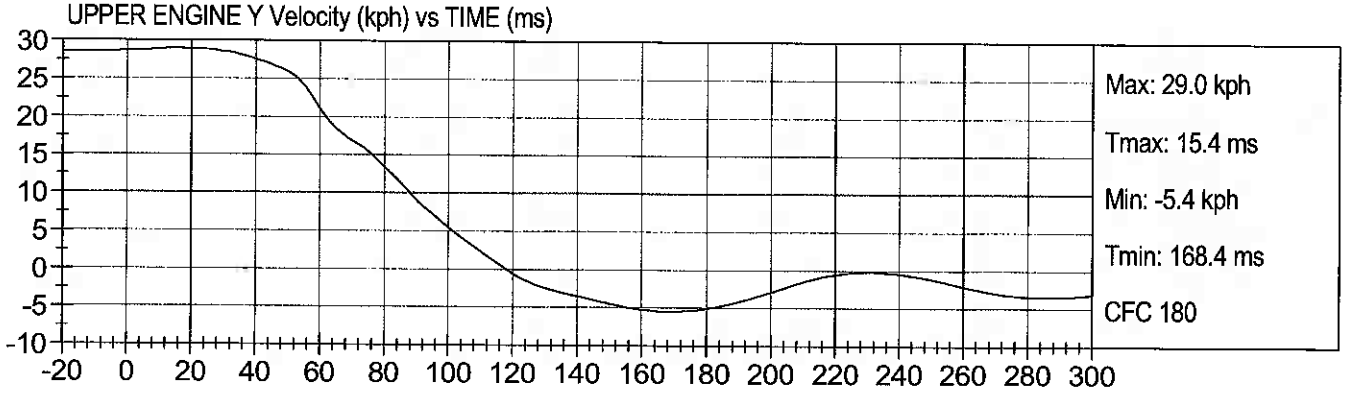
UPPER ENGINE Y (G's) vs TIME (ms)



UPPER ENGINE X Velocity (kph) vs TIME (ms)



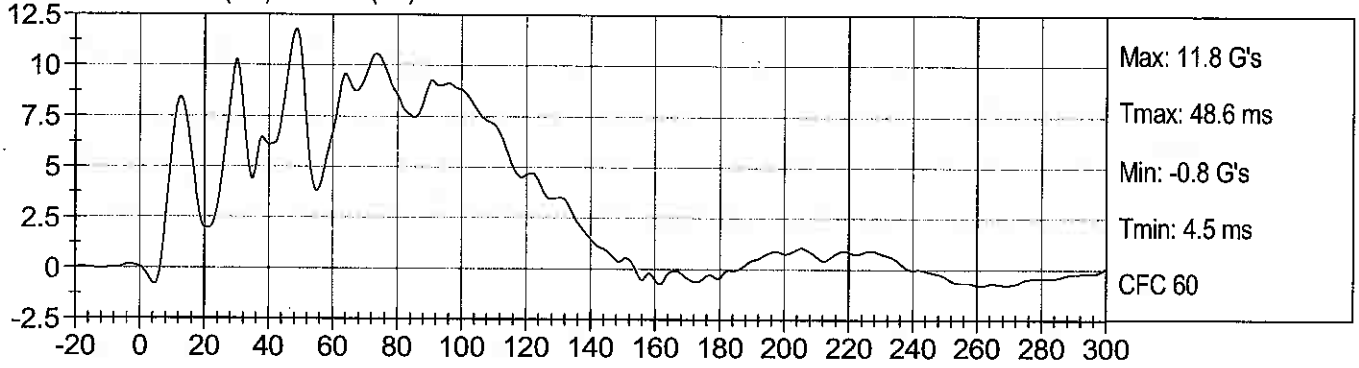
UPPER ENGINE Y Velocity (kph) vs TIME (ms)



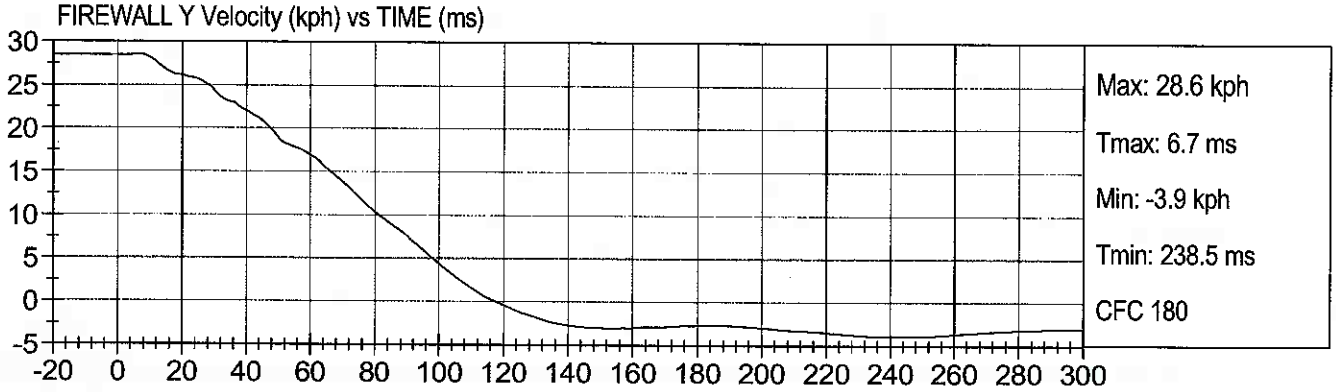
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

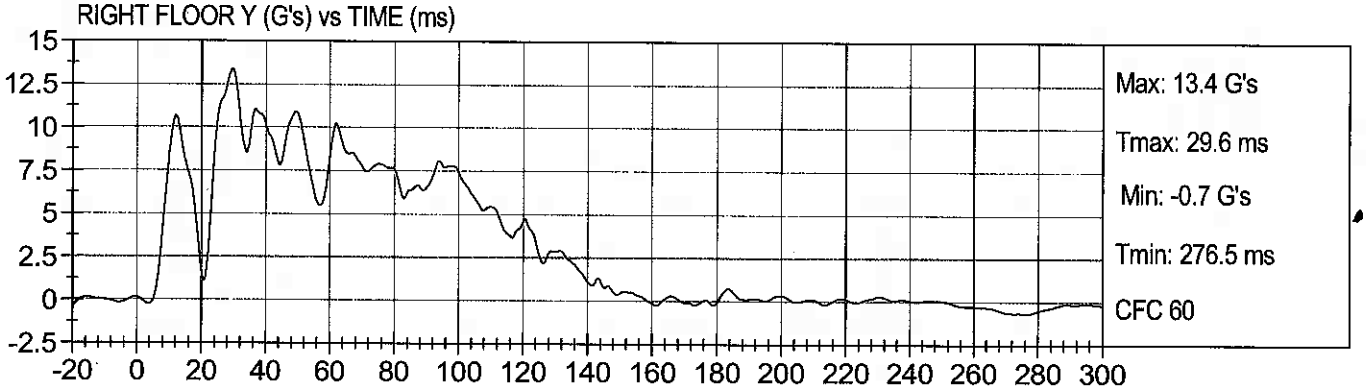
FIREWALL Y (G's) vs TIME (ms)



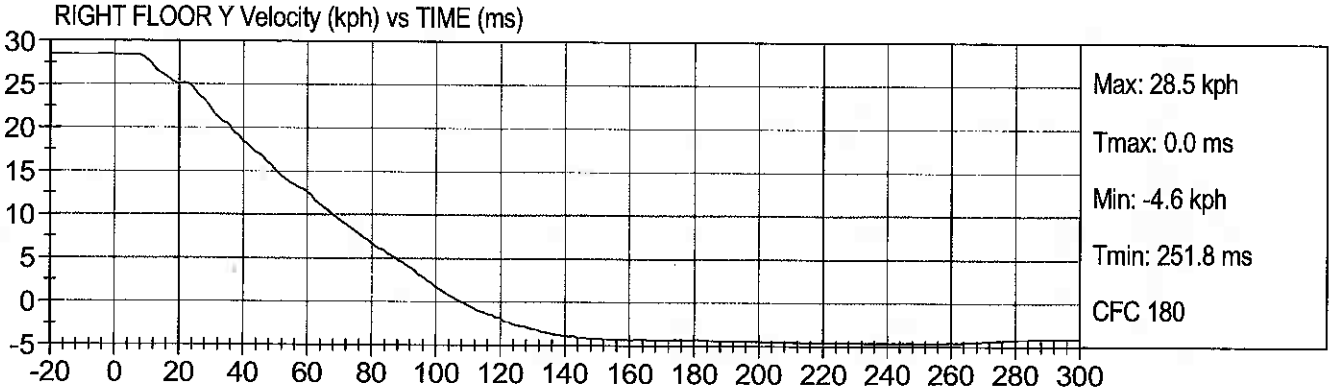
FIREWALL Y Velocity (kph) vs TIME (ms)



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



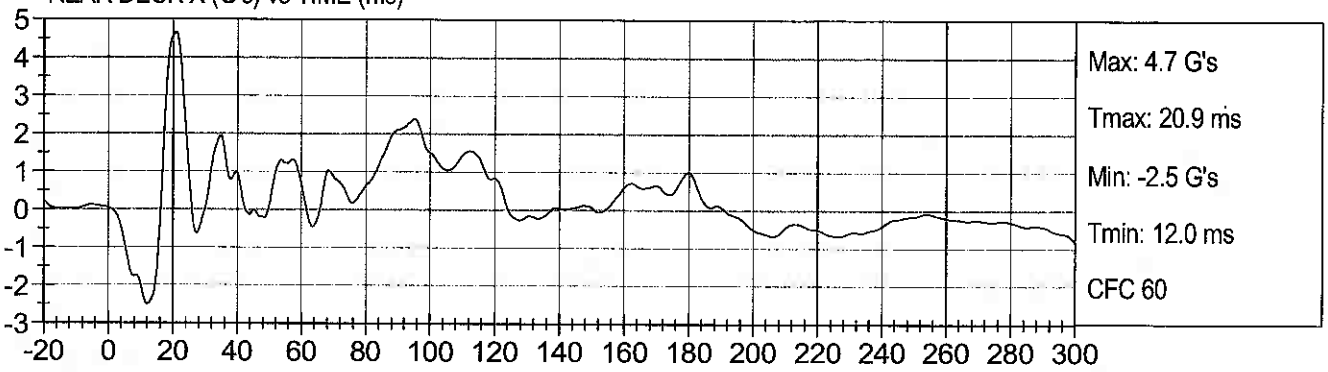
RIGHT FLOOR Y Velocity (kph) vs TIME (ms)



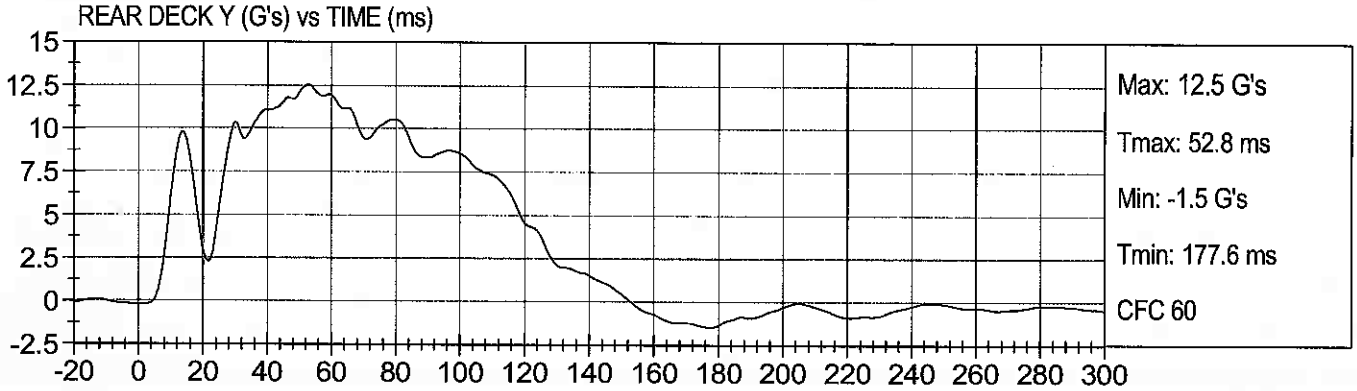
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

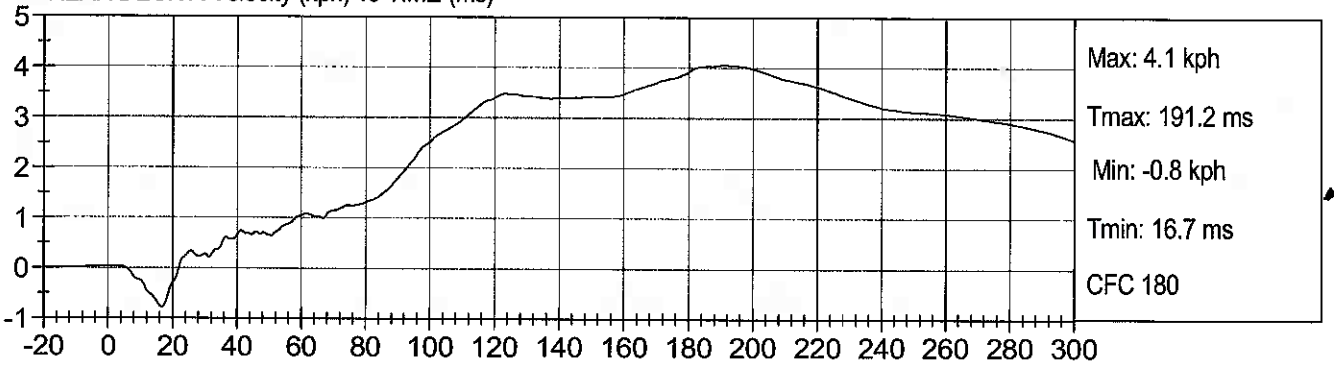
REAR DECK X (G's) vs TIME (ms)



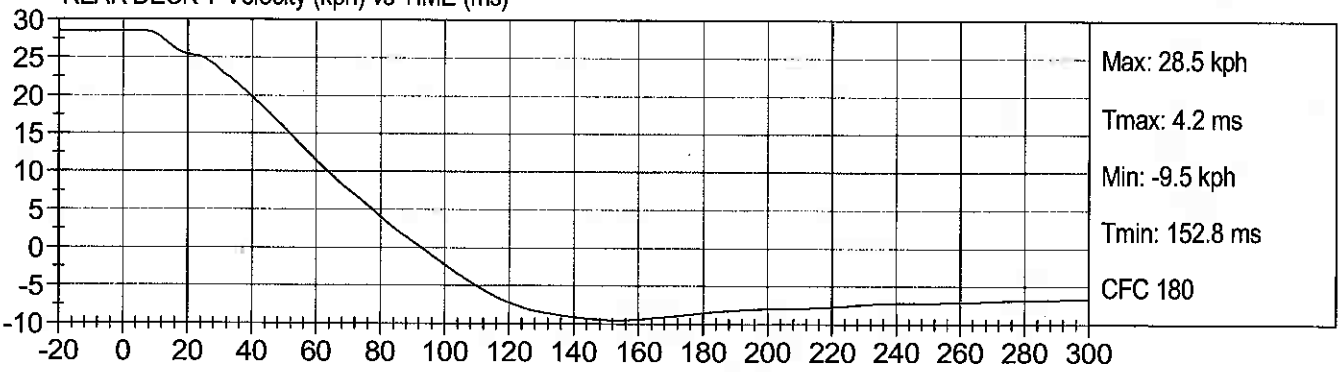
REAR DECK Y (G's) vs TIME (ms)



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



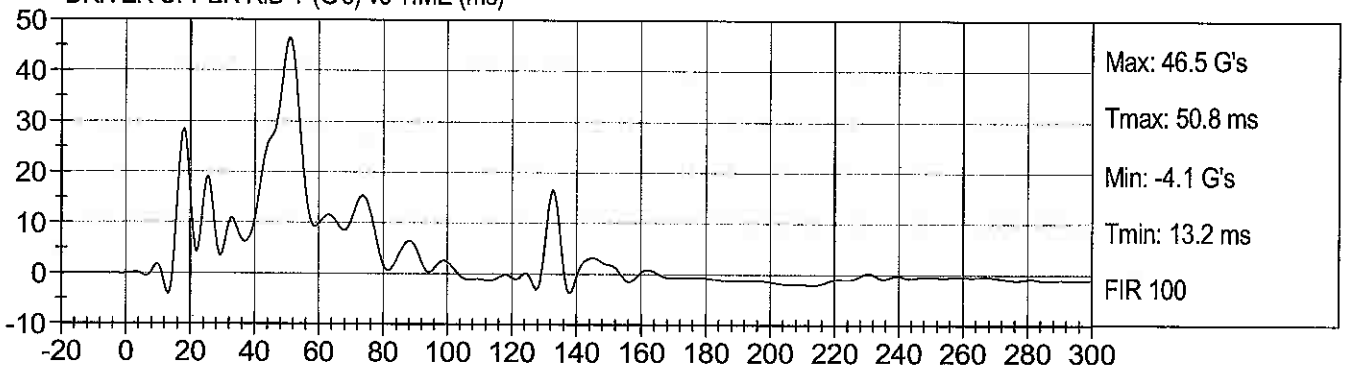
REAR DECK Y Velocity (kph) vs TIME (ms)



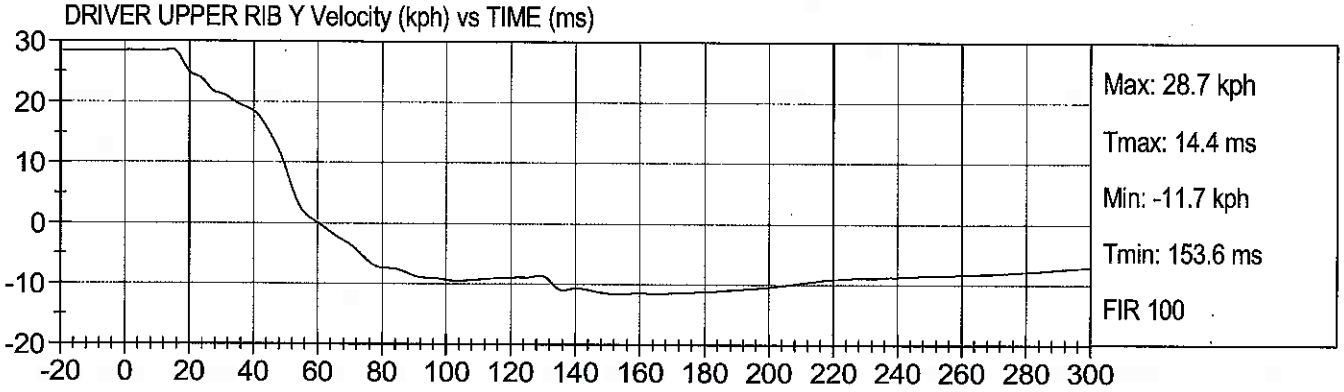
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

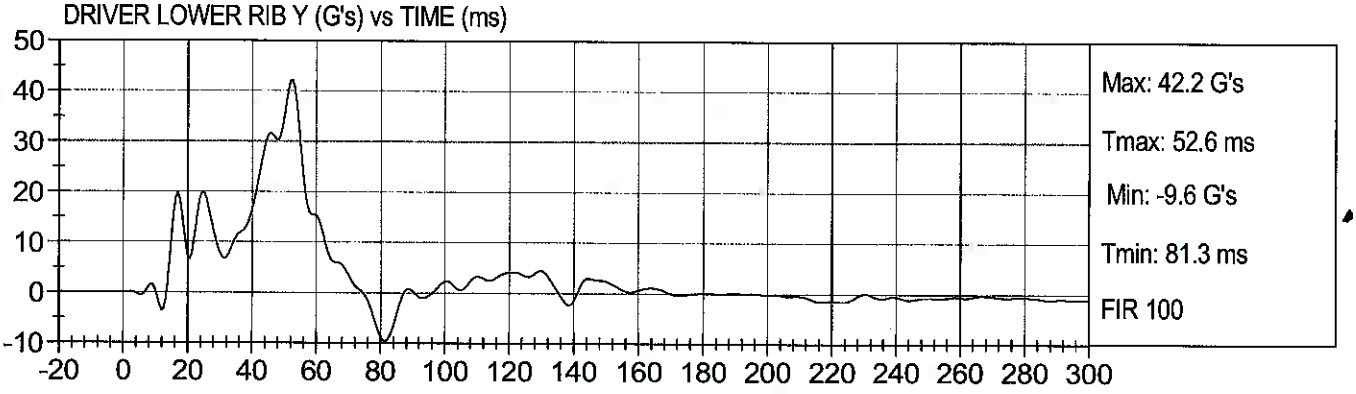
DRIVER UPPER RIB Y (G's) vs TIME (ms)



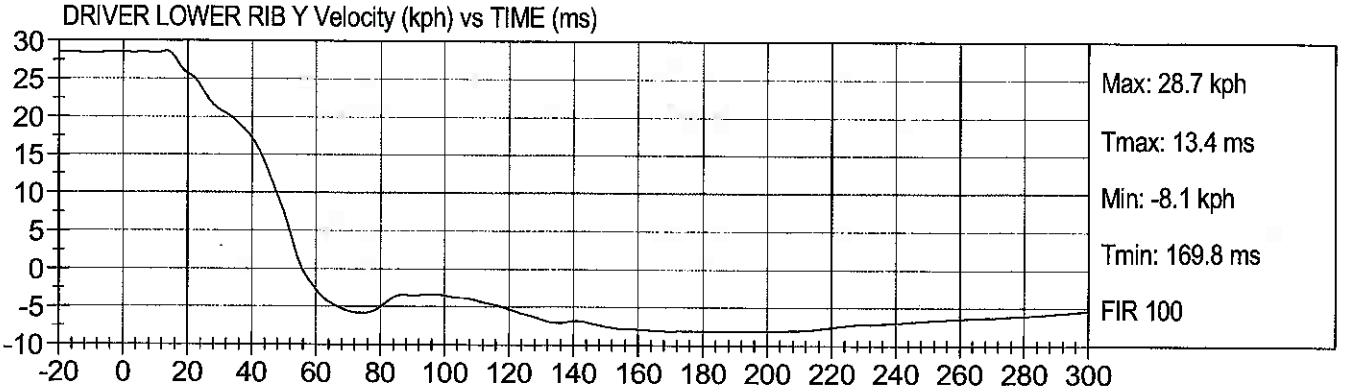
DRIVER UPPER RIB Y Velocity (kph) vs TIME (ms)



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



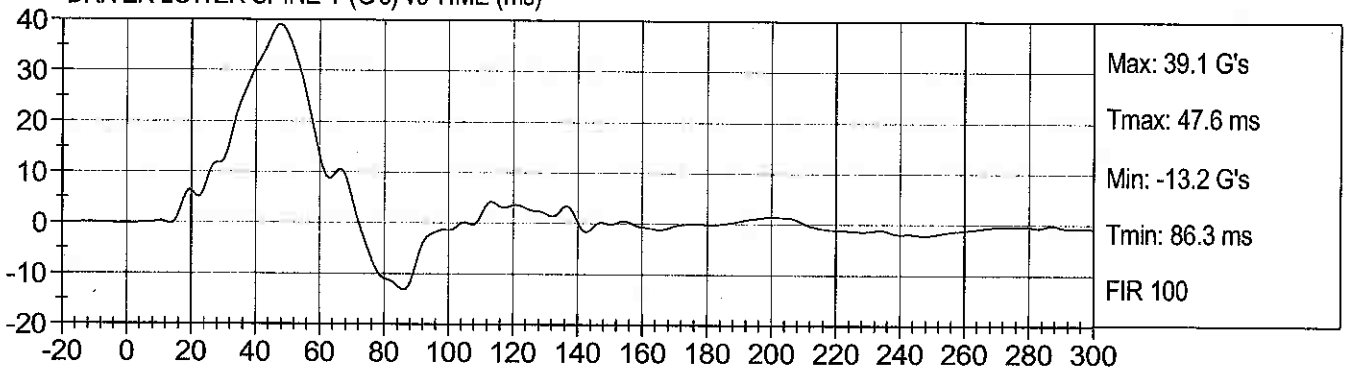
DRIVER LOWER RIB Y Velocity (kph) vs TIME (ms)



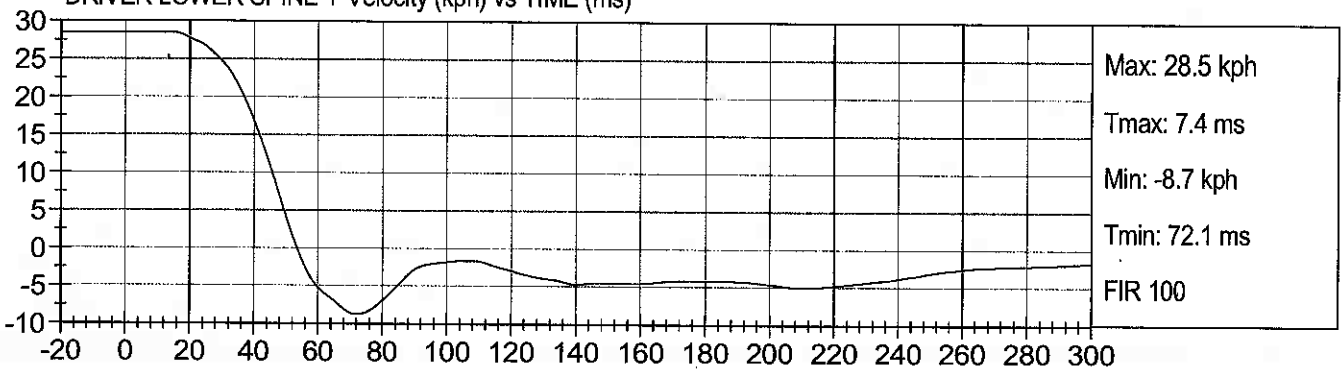
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

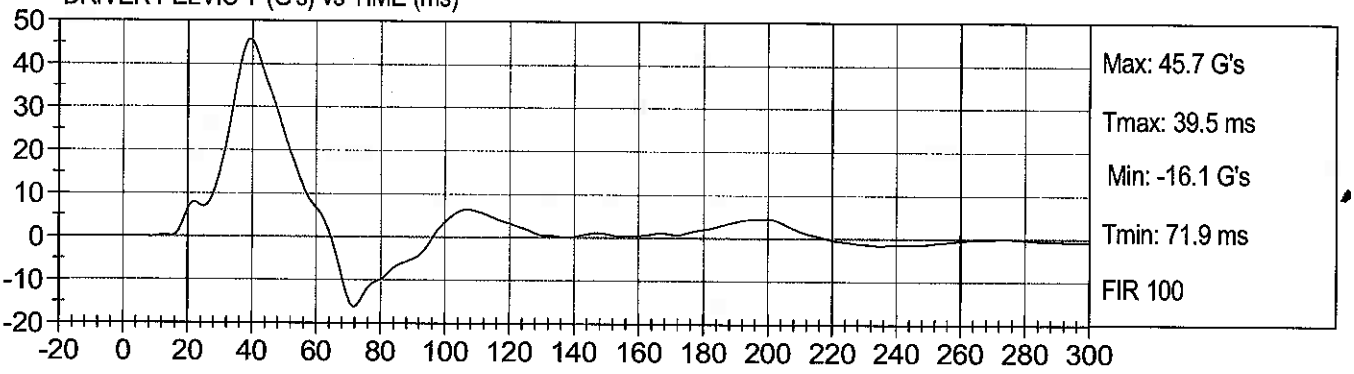
DRIVER LOWER SPINE Y (G's) vs TIME (ms)



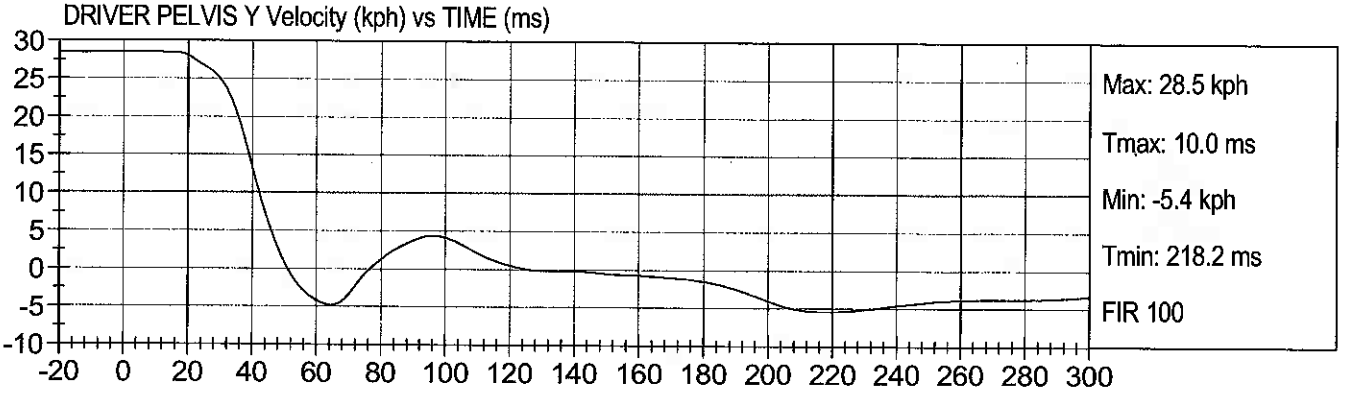
DRIVER LOWER SPINE Y Velocity (kph) vs TIME (ms)



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



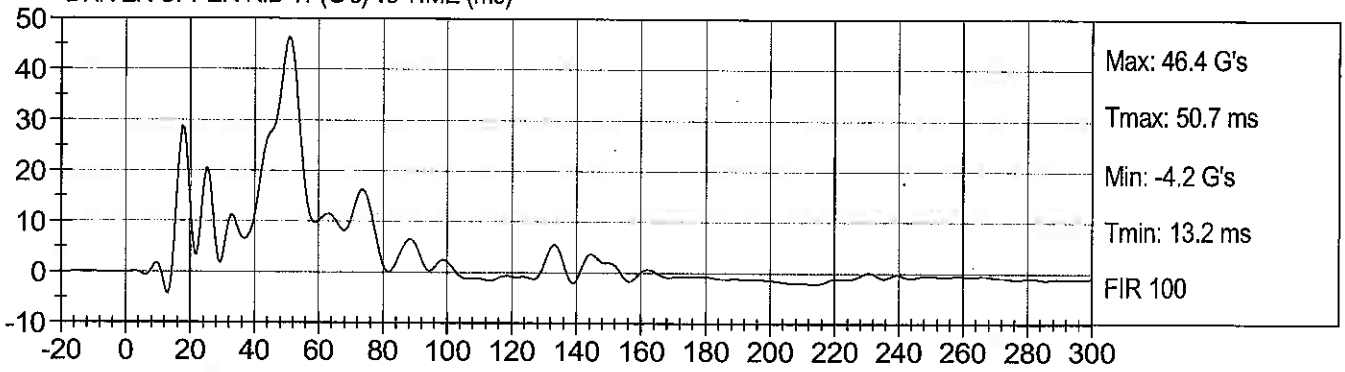
DRIVER PELVIS Y Velocity (kph) vs TIME (ms)



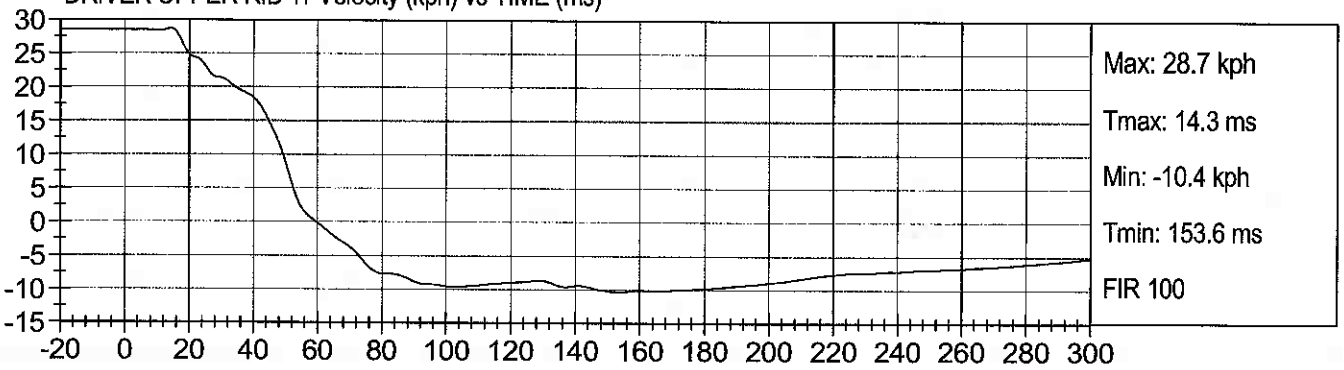
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

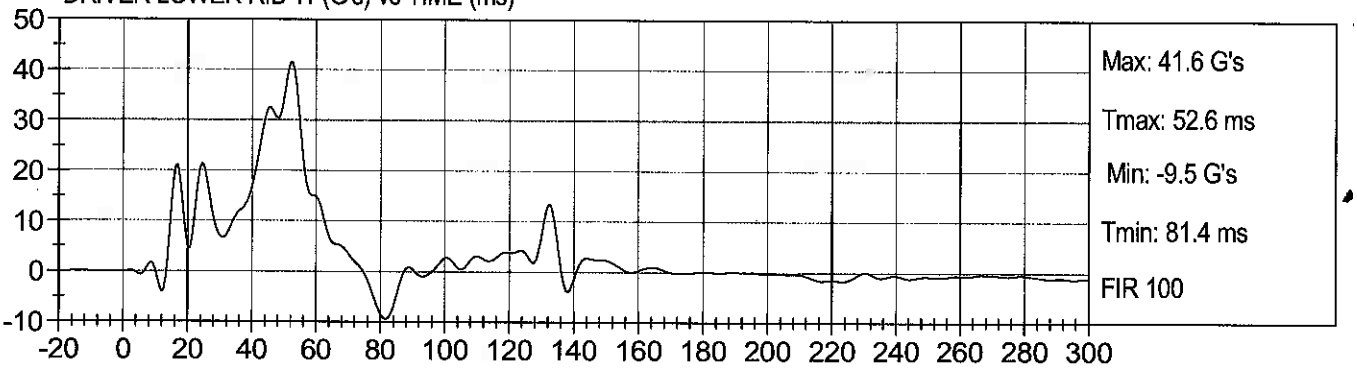
DRIVER UPPER RIB Yr (G's) vs TIME (ms)



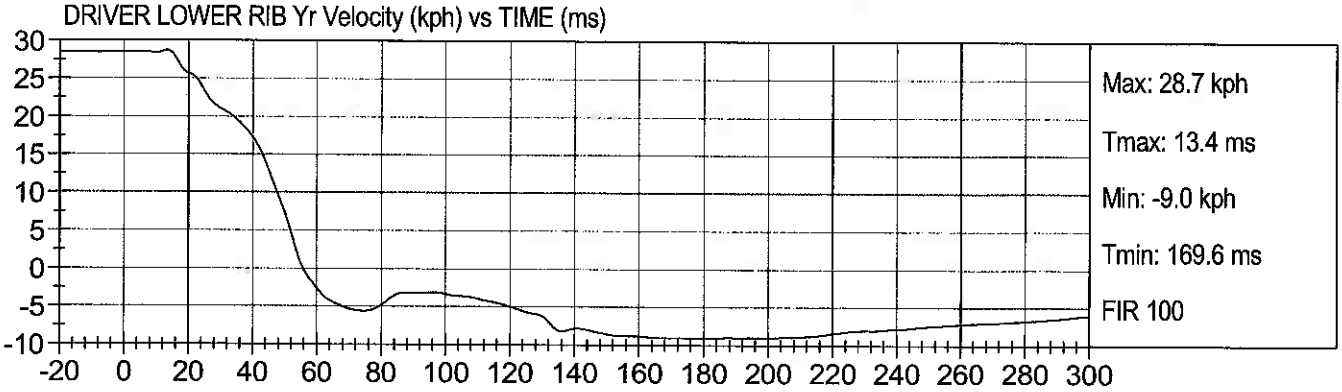
DRIVER UPPER RIB Yr Velocity (kph) vs TIME (ms)



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



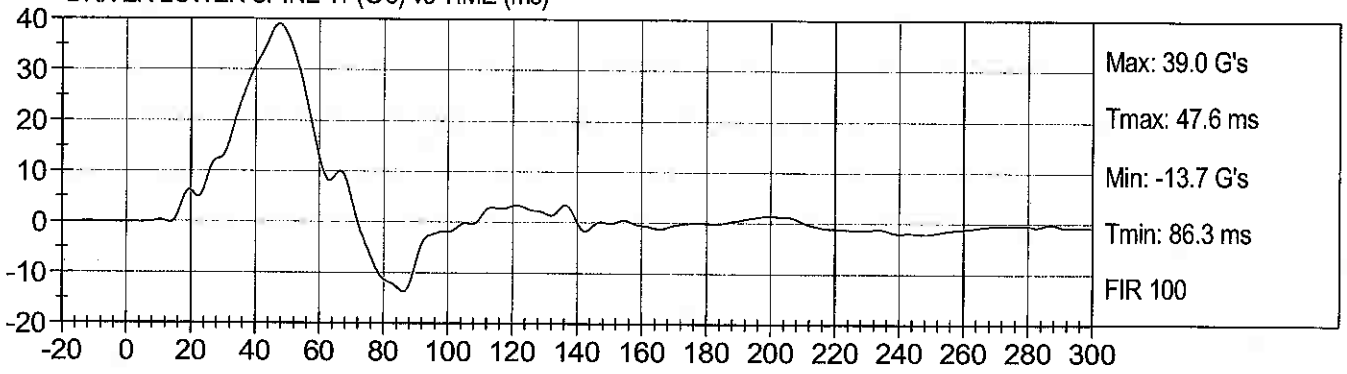
DRIVER LOWER RIB Yr Velocity (kph) vs TIME (ms)



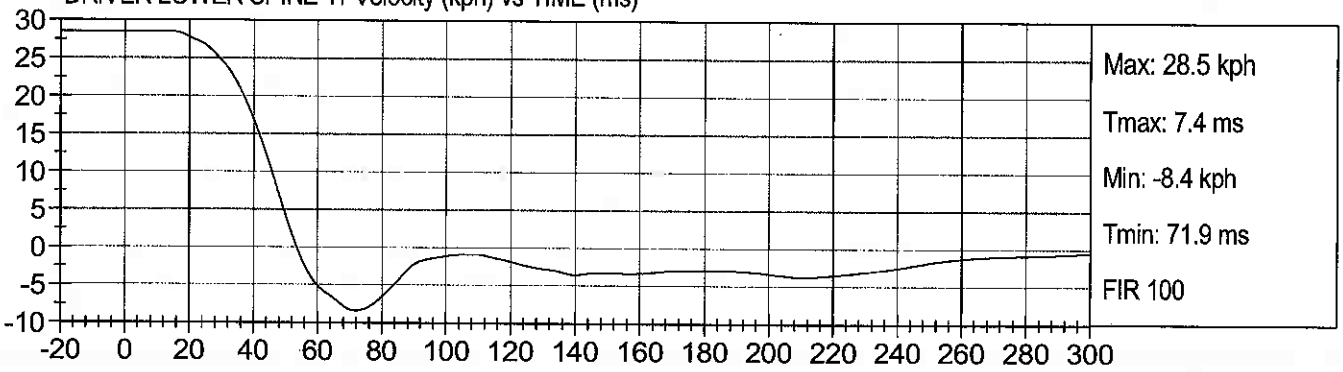
RIGID POLE SIDE IMPACT
2008 SUBARU IMPREZA C85501

Test Date: 06/03/2008
Speed: 17.7 mph (28.5 km/h)

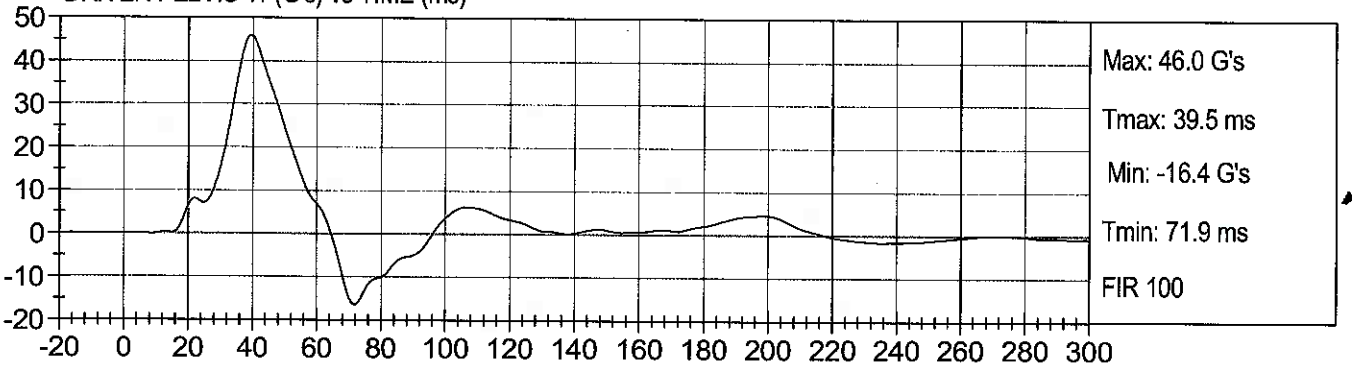
DRIVER LOWER SPINE Yr (G's) vs TIME (ms)



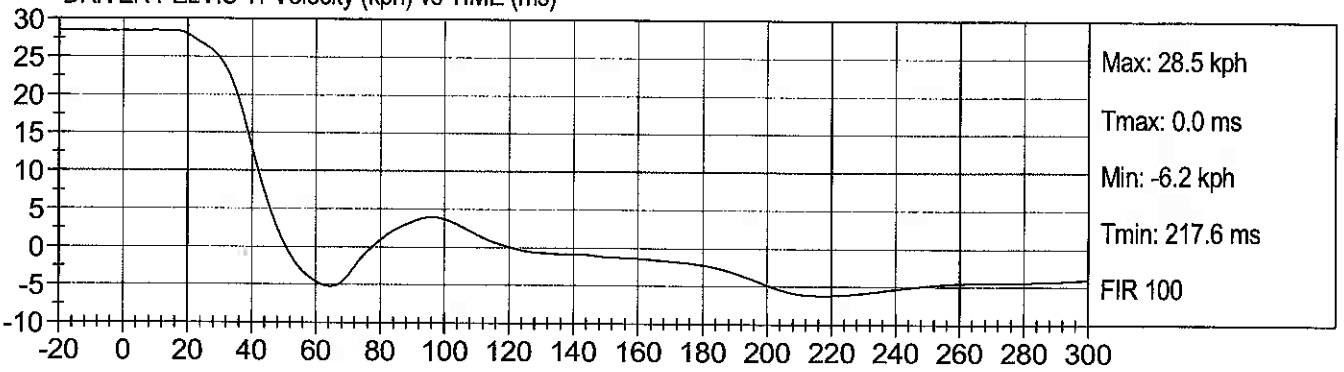
DRIVER LOWER SPINE Yr Velocity (kph) vs TIME (ms)



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



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

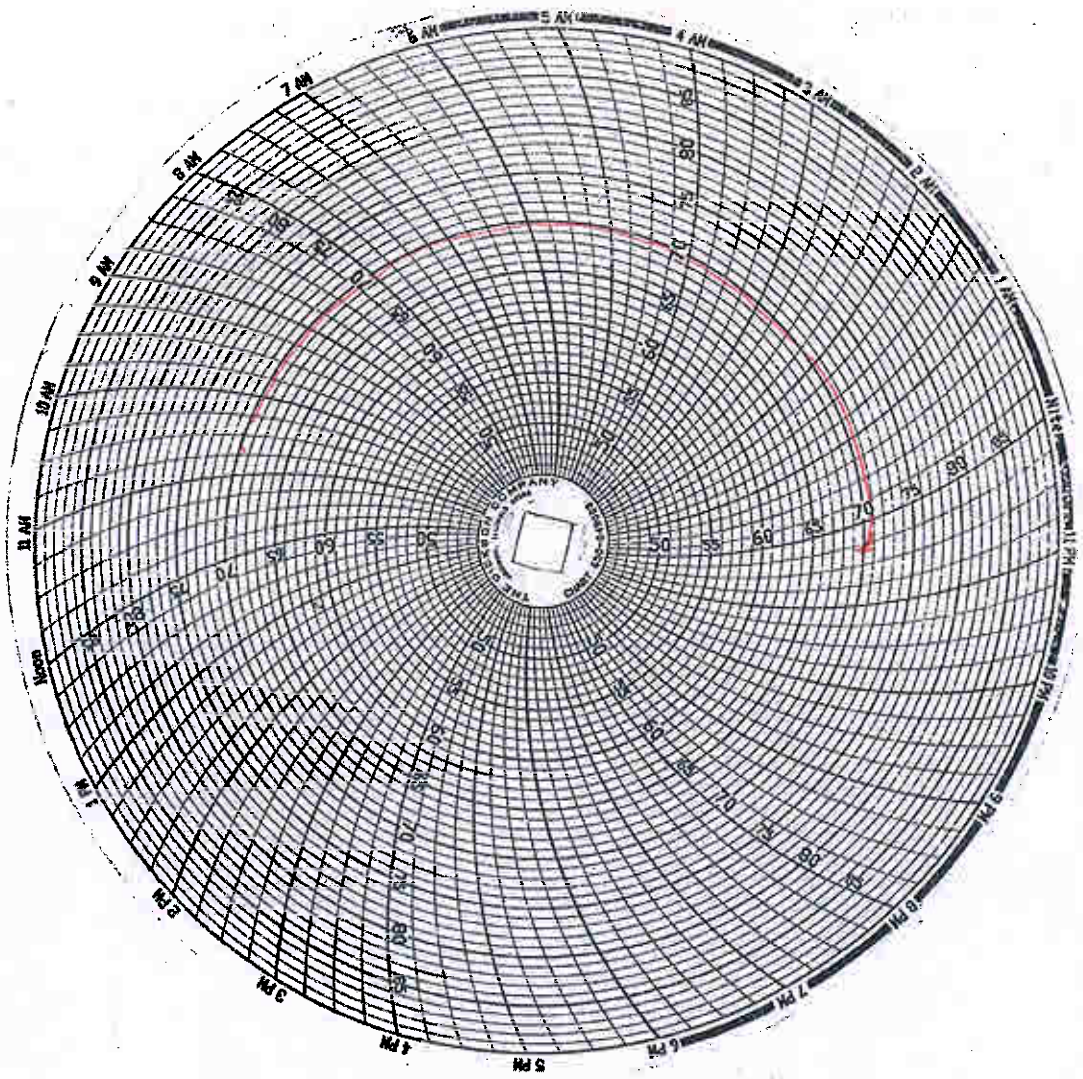


APPENDIX C

SID/HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Vehicle and Dummy Temperature

Test Vehicle: 2008 Subaru Impreza 4-Door
Test Program: FMVSS 201P
NHTSA No. C85501
Test Date: June 3, 2008



SID/HIII Calibration Data Sheet

Side Impact Dummy

Head Drop Calibration (Lateral)

ATD Serial No: 036 **Test I.D:** D08AG1

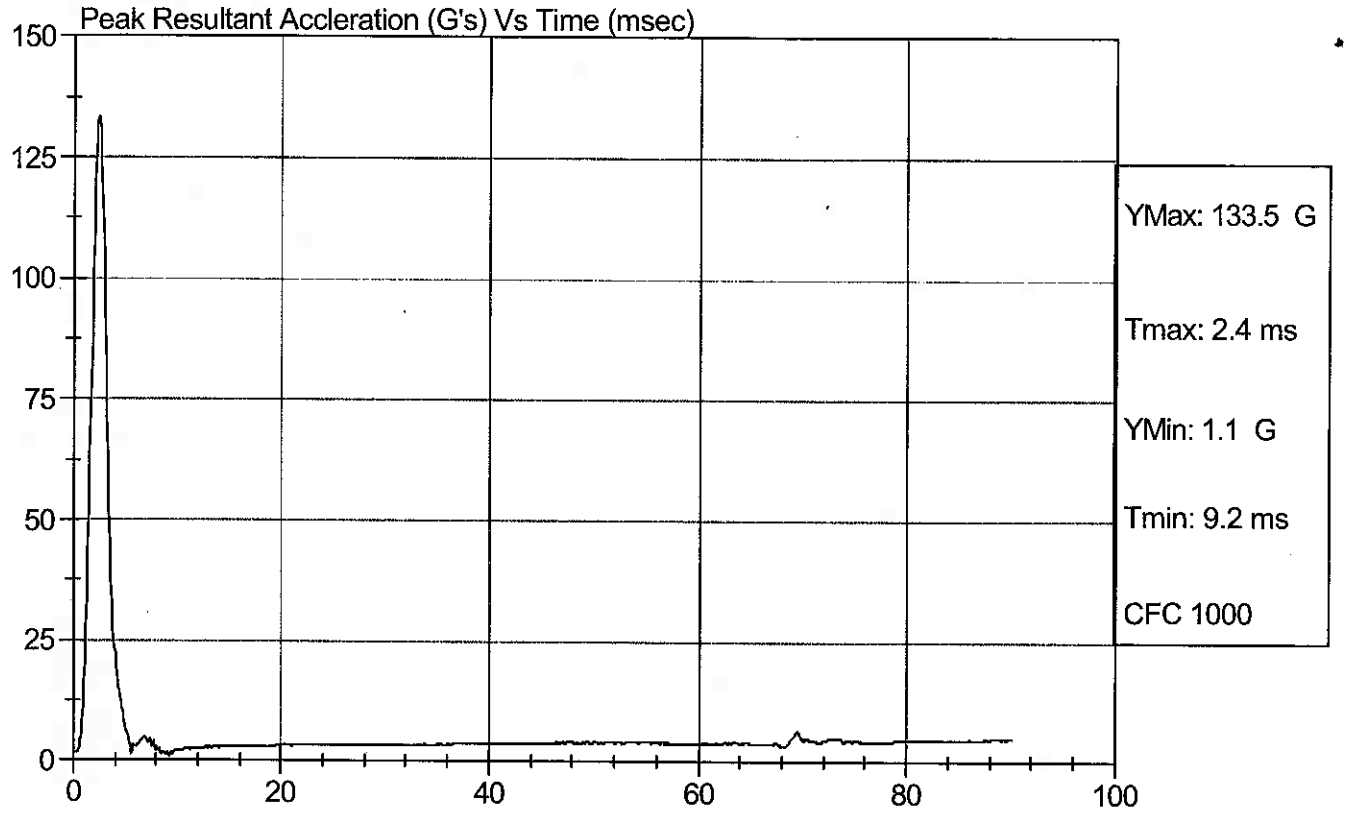
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	28	Pass
Peak Resultant Acceleration	G's	120 to 150	134	Pass
Is Resultant Curve Unimodal?	N/A	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-13.0	Pass
		Overall Test Results		Pass

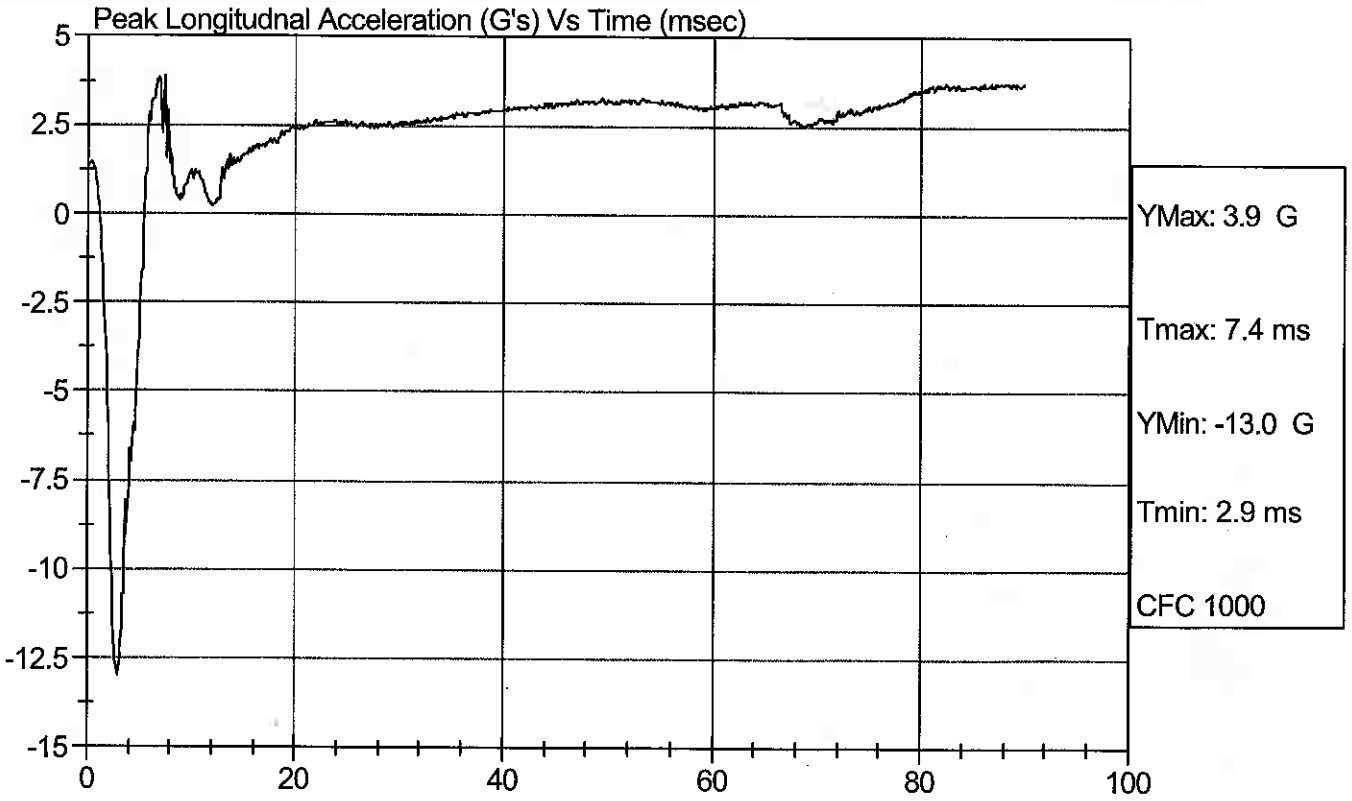
Laboratory Technician

5/29/08
Test Date

Approved By

mga	Test Description: Head Drop	Test Date: 5/29/08
	Component: D08AG1	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:** D08872

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	19	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	40	Pass
Lower Spine	G's	15 - 22	18	Pass
		Overall Test Results		Pass

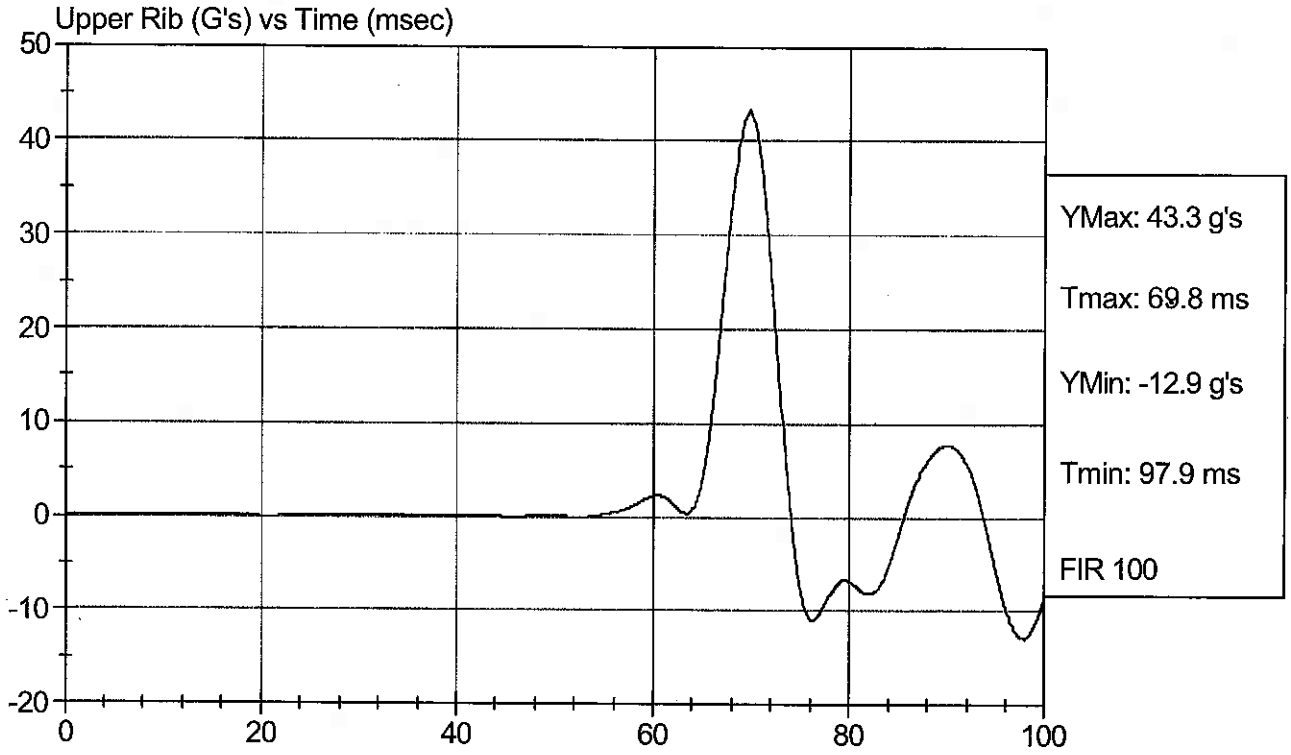
Laboratory Technician

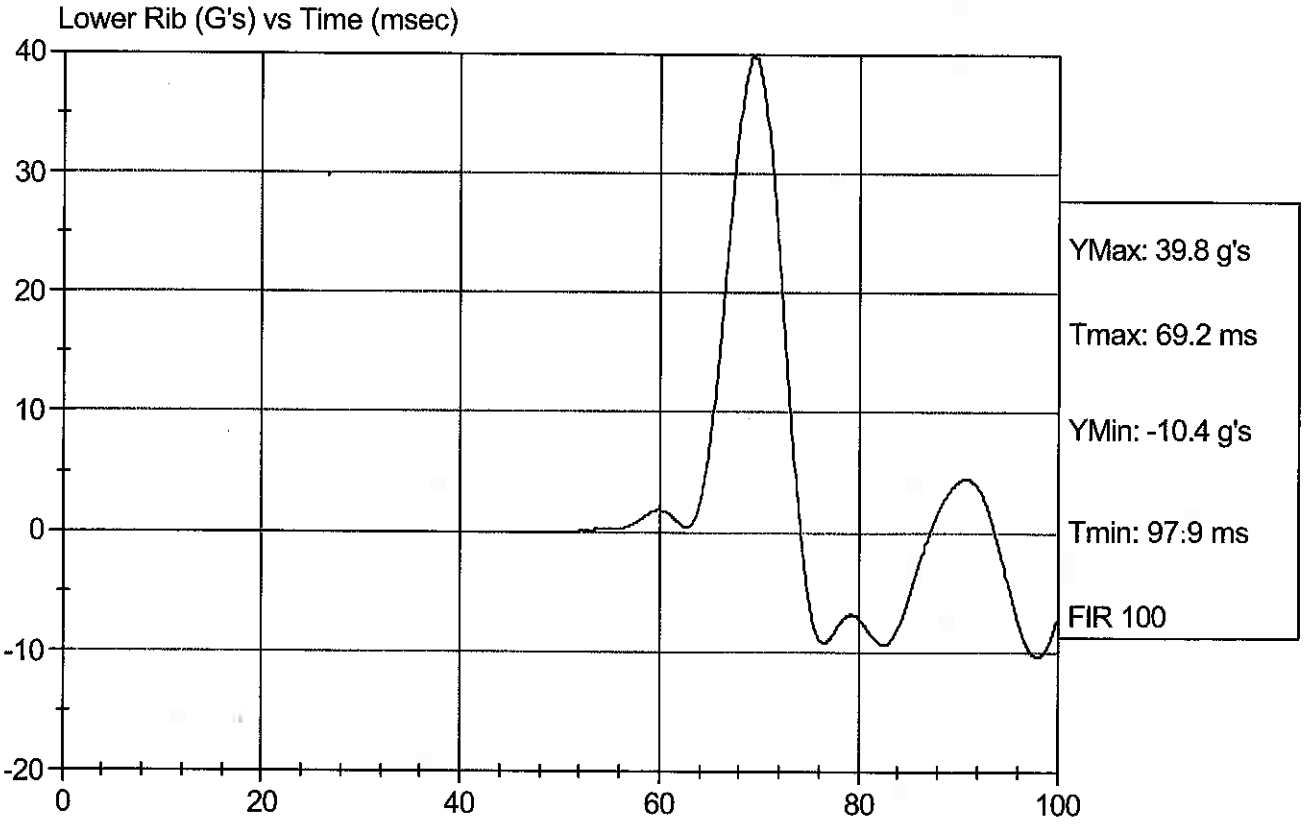
3/24/08
Test Date

Approved By

Test Desc: Thorax Impact
Component ID: D08872

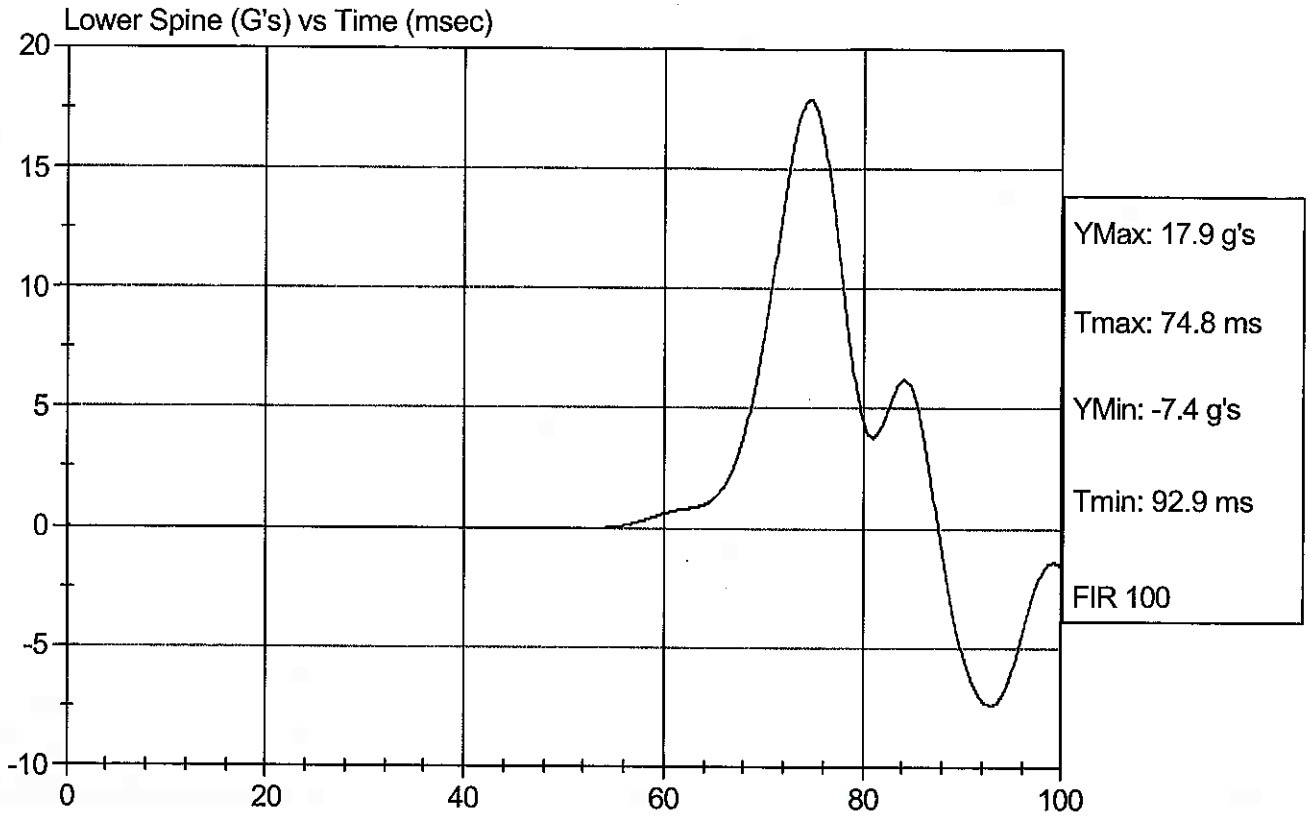
Test Date: 3/24/08
Speed: 14.01 ft/sec, 4.27 m/sec





Test Desc: Thorax Impact
Component ID: D08872

Test Date: 3/24/08
Speed: 14.01 ft/sec, 4.27 m/sec



SID/HIII Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 036 **Test I.D:** D08873

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	19	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	44	Pass
		Overall Test Results		Pass

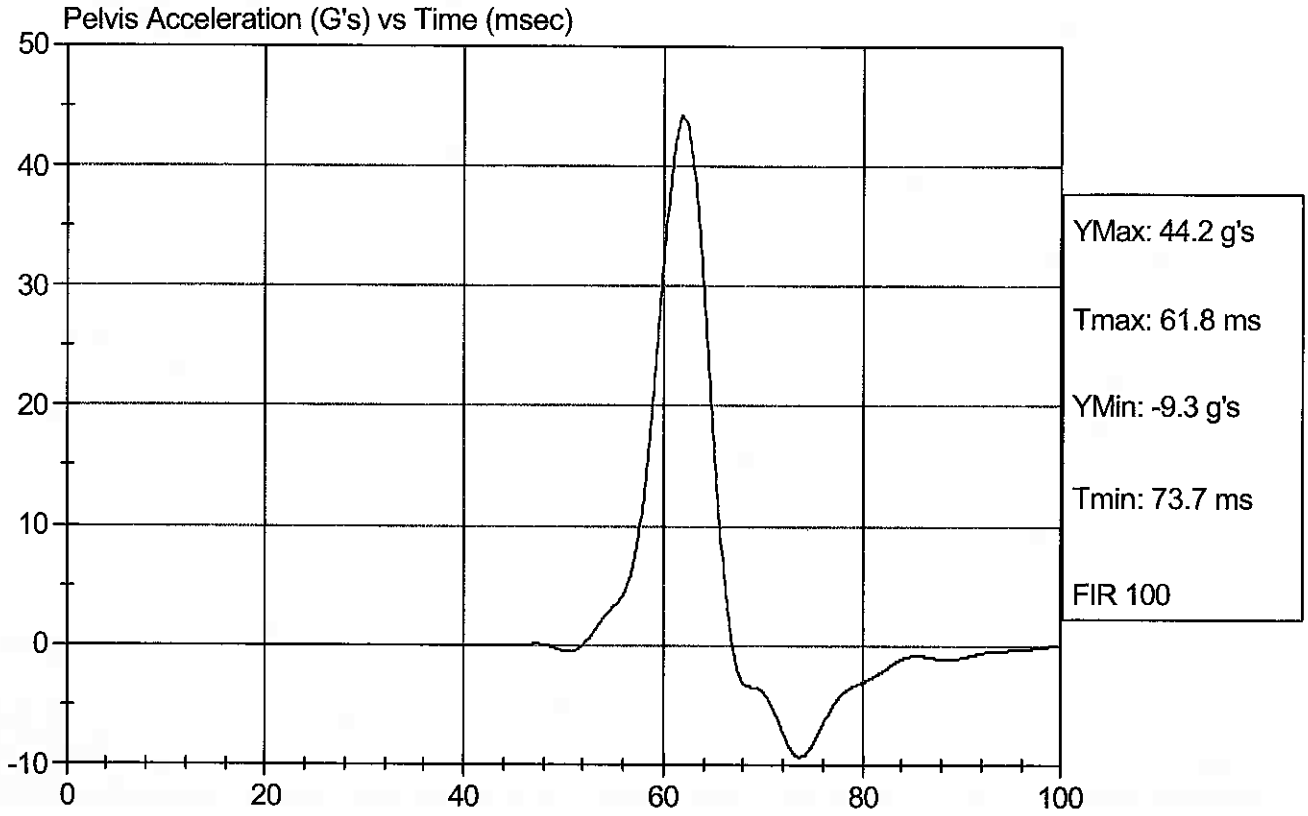
Laboratory Technician

3/24/08
Test Date

Approved By

Test Desc: Pelvis Impact
Component ID: D08873

Test Date: 3/24/08
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:** D08874

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Force At 12.7 mm	N	104 -162	133	Pass
Force At 19 mm	N	163 - 222	189	Pass
Force At 25.4 mm	N	222 - 280	247	Pass
Force At 33 mm	N	325 - 391	333	Pass
		Overall Test Results		Pass

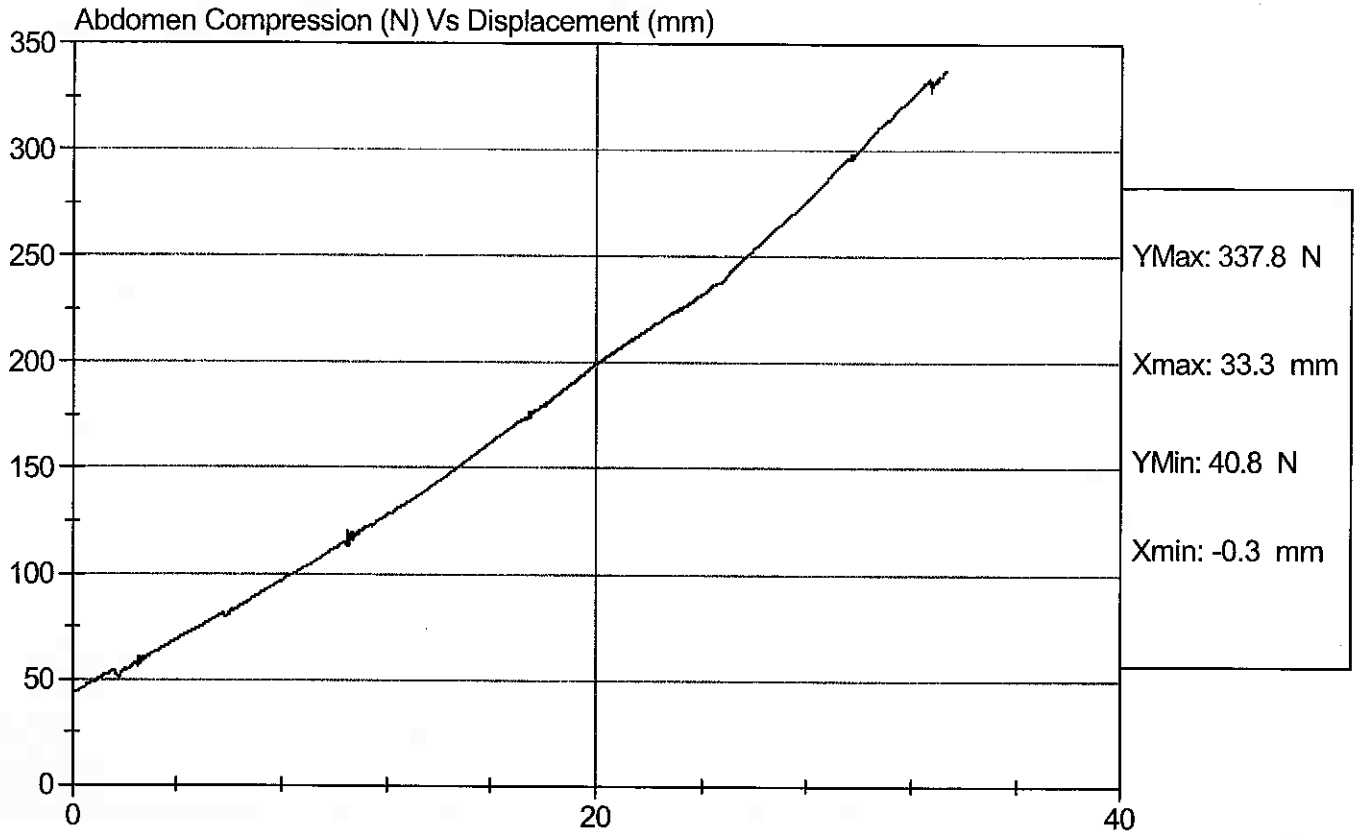
Laboratory Technician

3/25/08
Test Date

Approved By

Test Description: Abdomen Compression | Test Date: 3/25/08

Component: D08874 | 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:** D08875

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	126.0	Pass
Force At 30 deg	N	151.2 - 204.6	160.9	Pass
Force At 40 deg	N	204.6 - 258.0	223.0	Pass
Return Angle	Deg	12 Maximum	6	Pass
		Overall Test Results		Pass

Laboratory Technician

3/25/08
Test Date

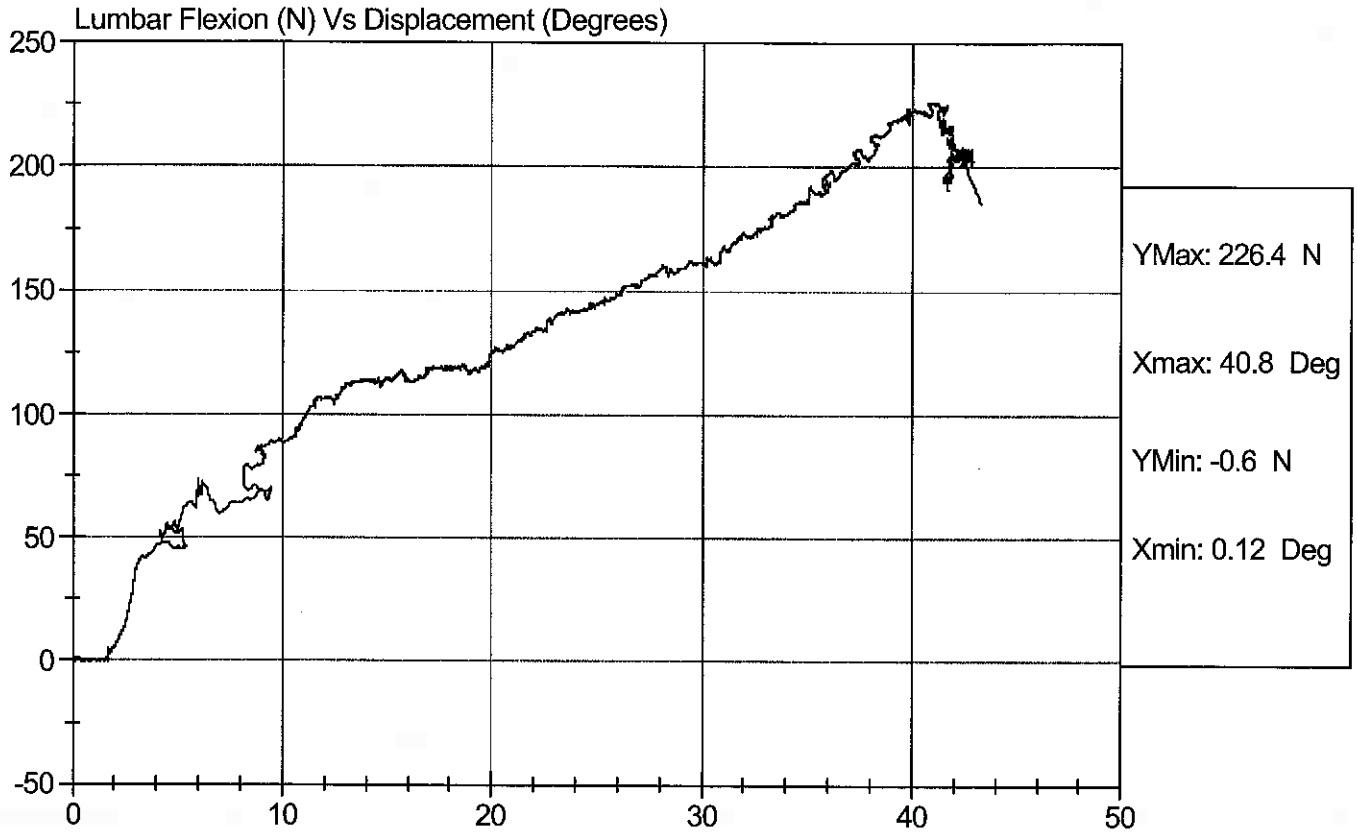
Approved By

Test Description: Lumbar Flexion

Test Date: 3/25/08

Component: D08875

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:** D08AG9

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	41	Pass
Impact Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.45	Pass
	20 msec	m/s	4.12 to 5.10	4.67	Pass
	30 msec	m/s	5.73 to 7.01	6.40	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.59	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	74	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	59	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	13	Pass

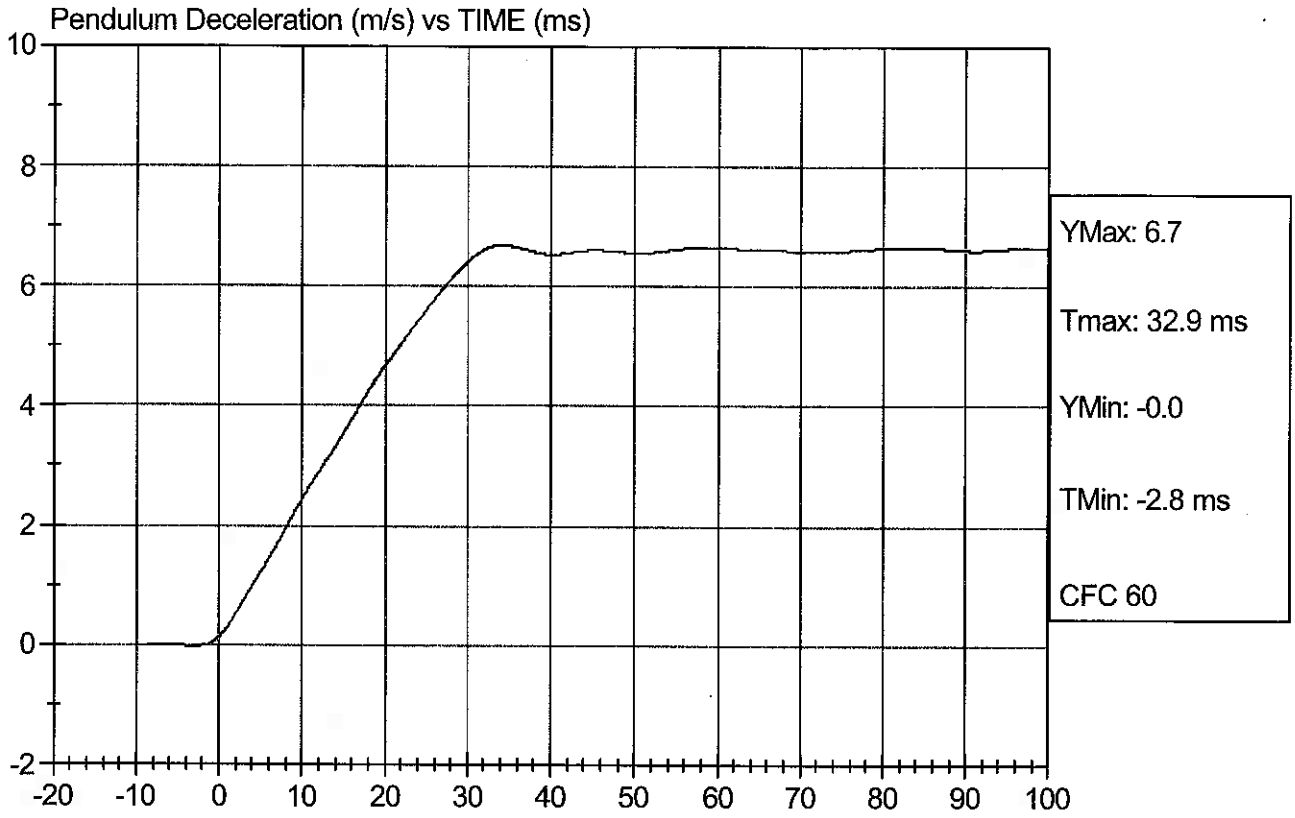
Laboratory Technician

5/30/08
Test Date

Approved By

Test Desc: Neck Bending
Component ID: D08AG9

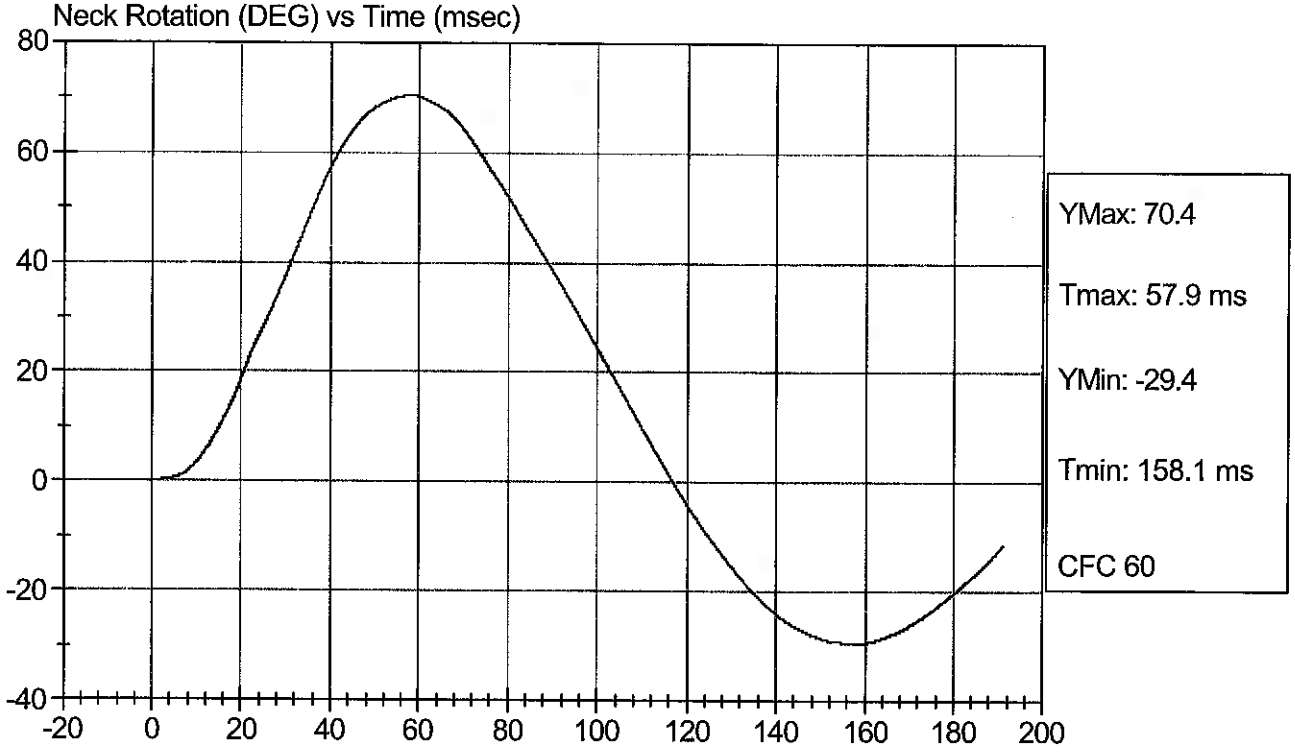
Test Date: 5/30/08
Speed: 23.148 ft/sec, 7.06 m/sec



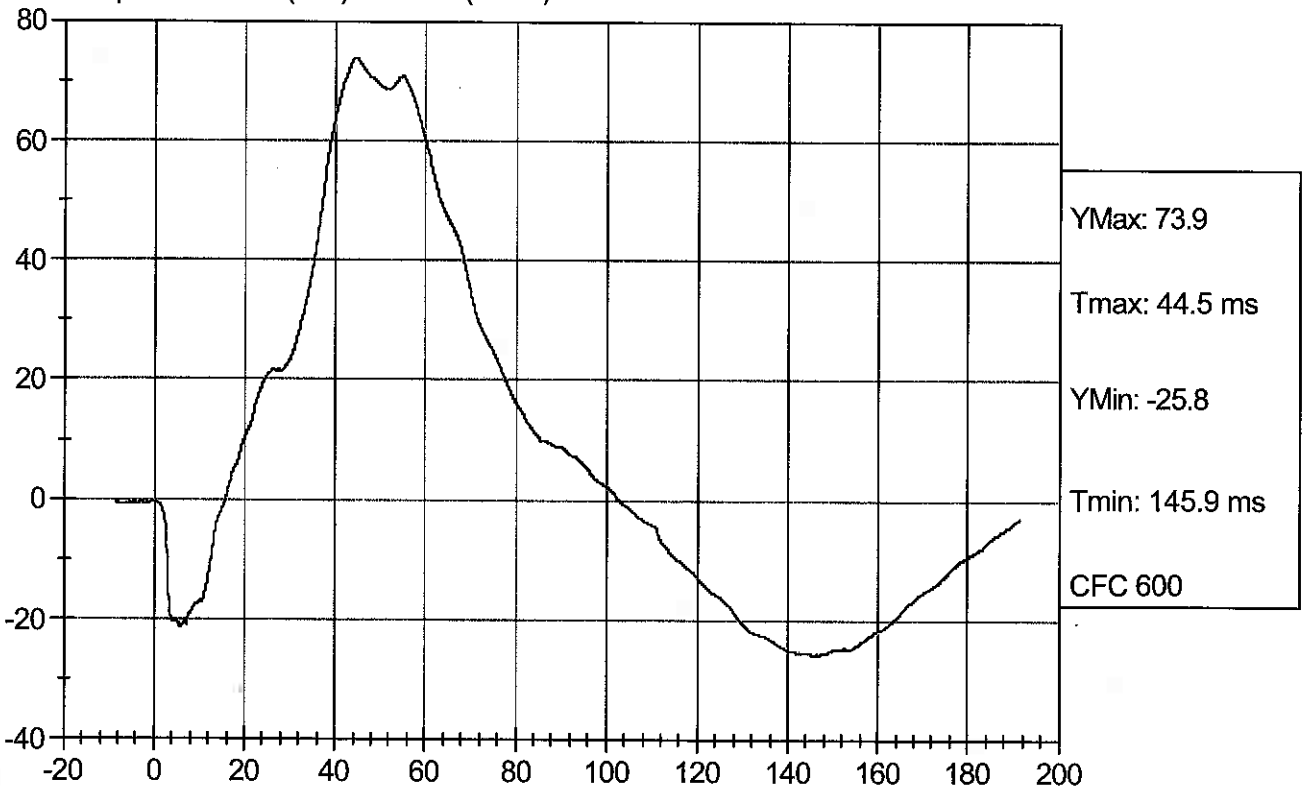
Test Desc: Neck Bending
Component ID: D08AG9

Test Date: 5/30/08
Speed: 23.148 ft/sec, 7.06 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:** D081521

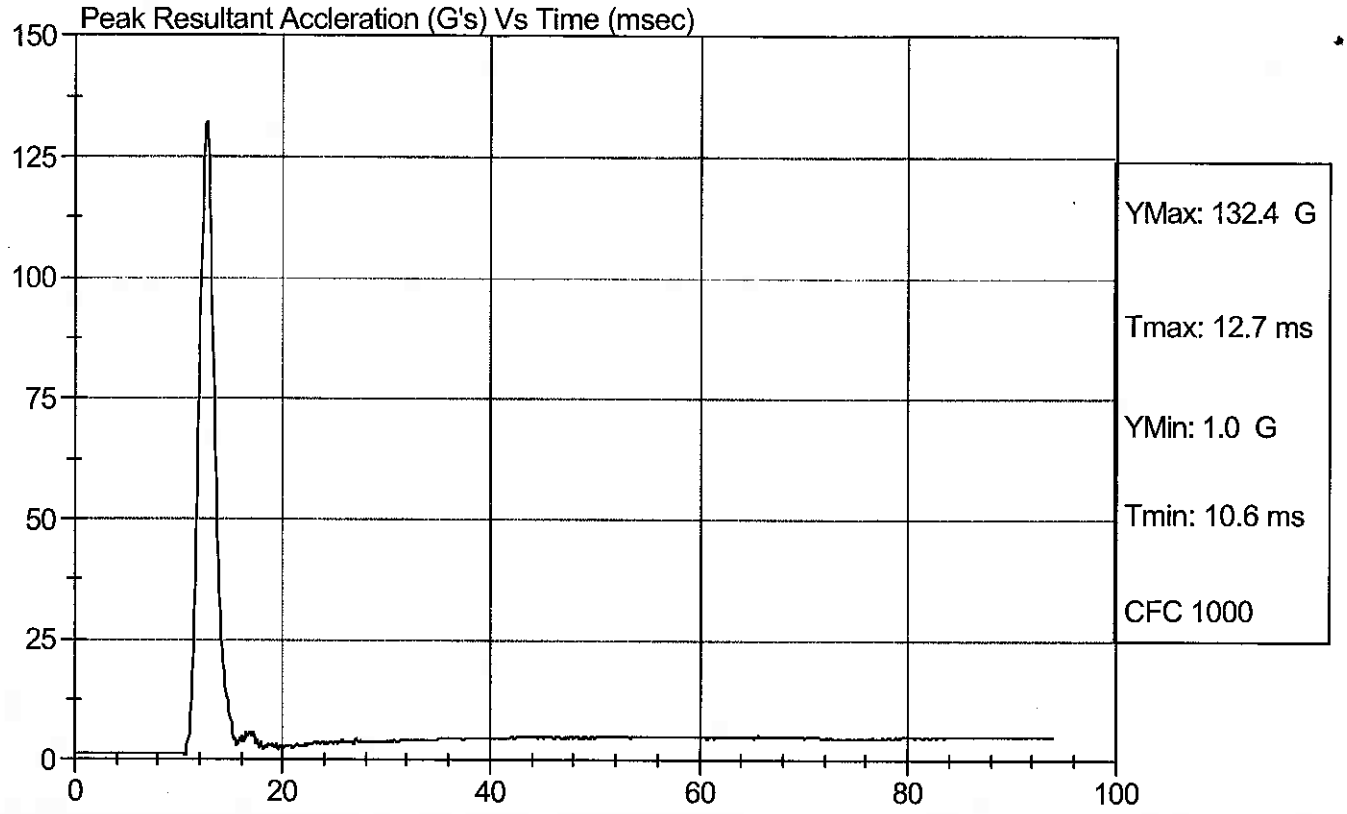
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	47	Pass
Peak Resultant Acceleration	G's	120 to 150	132	Pass
Is Resultant Curve Unimodal?	N/A	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-9.1	Pass
		Overall Test Results		Pass

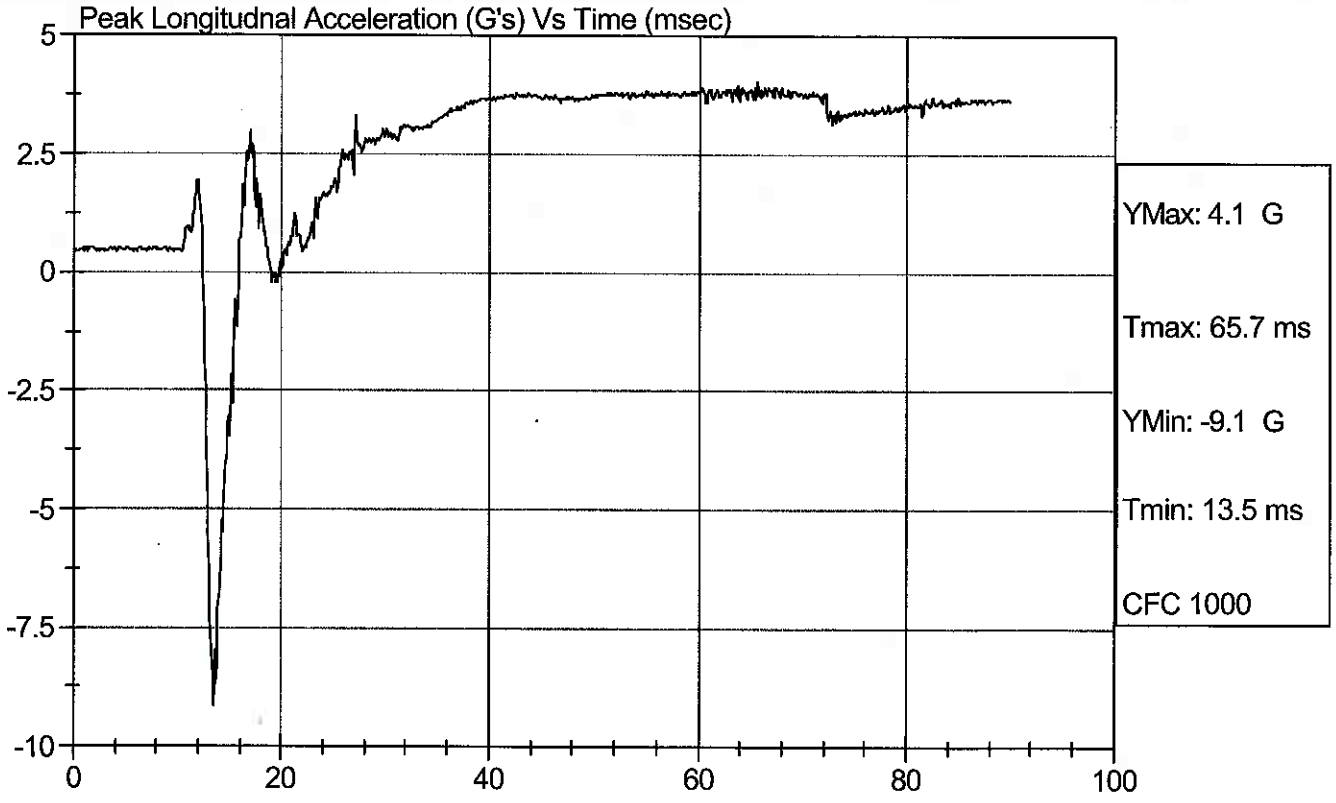
Laboratory Technician

6/3/08
Test Date

Approved By

mga	Test Description: Head Drop	Test Date: 6/3/08
	Component: D081521	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:** D081522

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.6	Pass
Laboratory Relative Humidity	%	10 to 70	52	Pass
Probe Velocity	m/s	4.22 - 4.31	4.27	Pass
Upper Rib	G's	37 - 46	40	Pass
Lower Rib	G's	37 - 46	42	Pass
Lower Spine	G's	15 - 22	18	Pass
		Overall Test Results		Pass

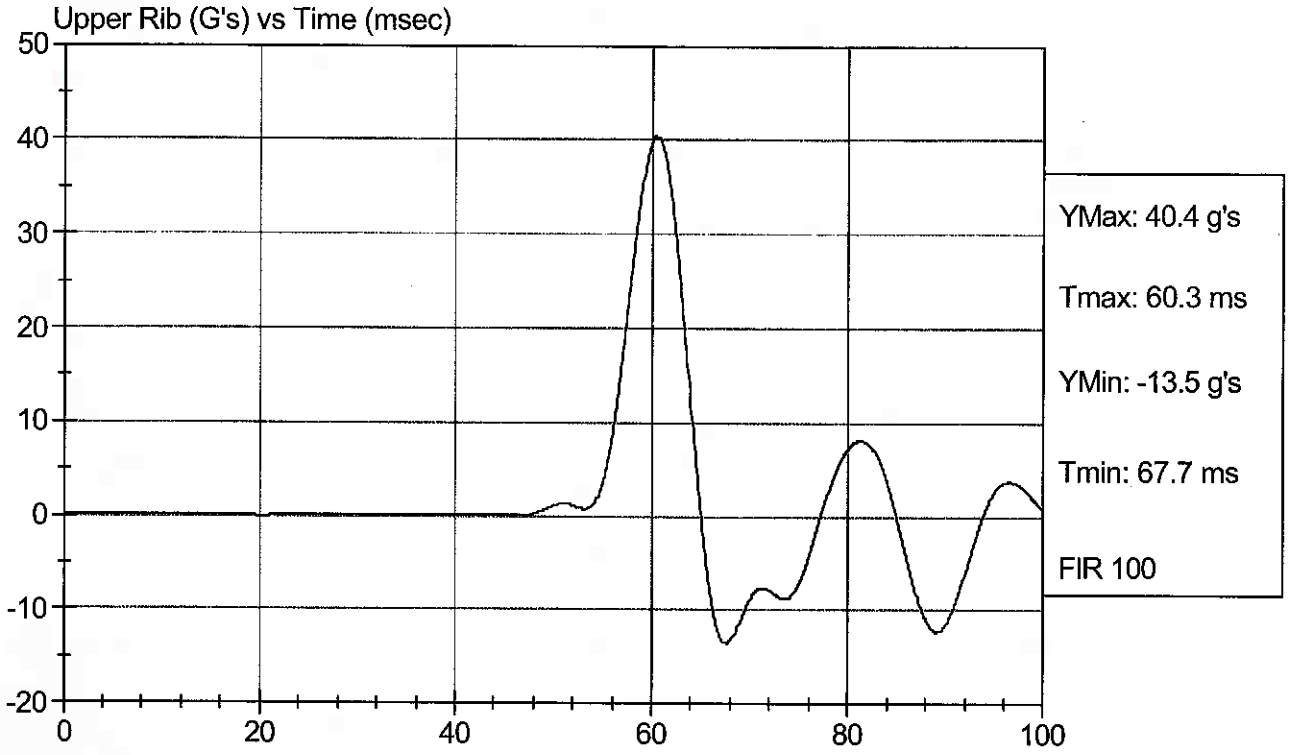
Laboratory Technician

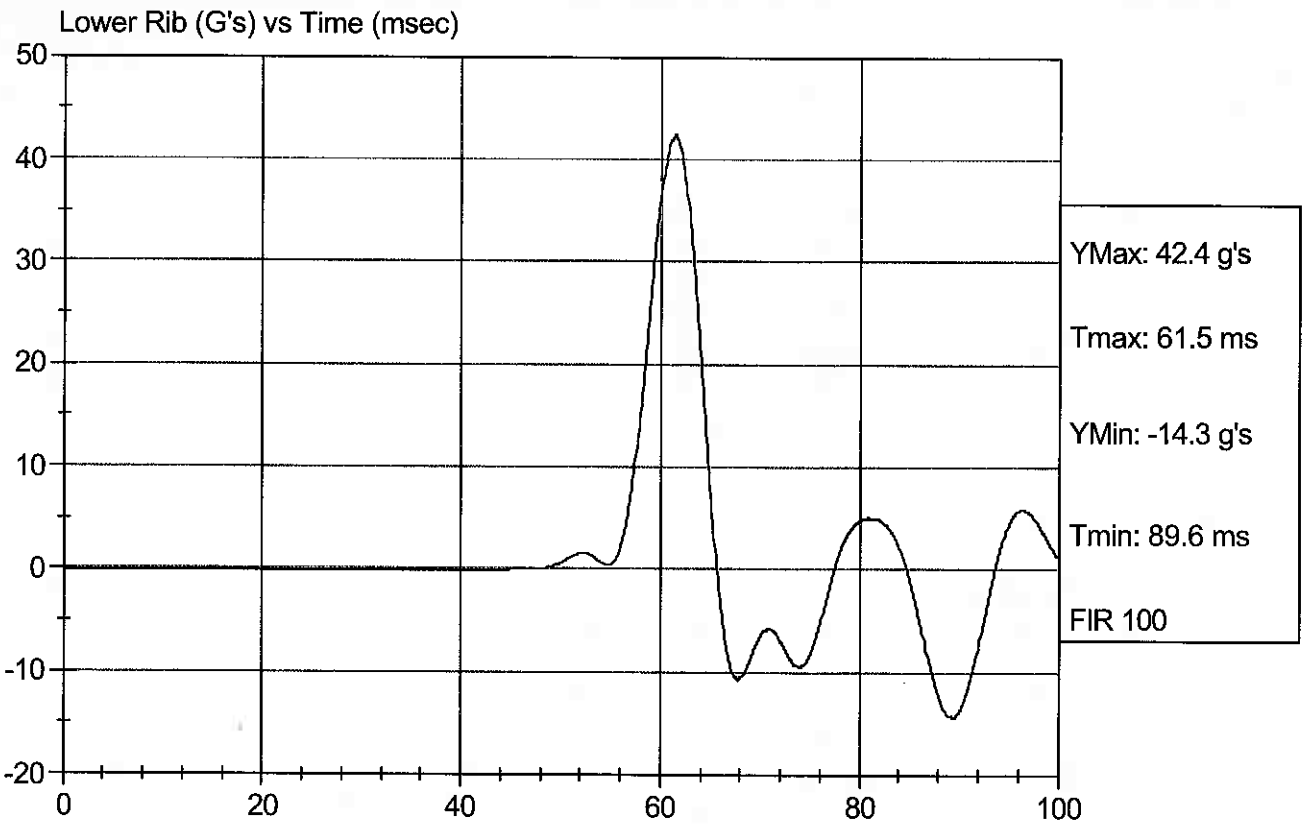
6/3/08
Test Date

Approved By

Test Desc: Thorax Impact
Component ID: D081522

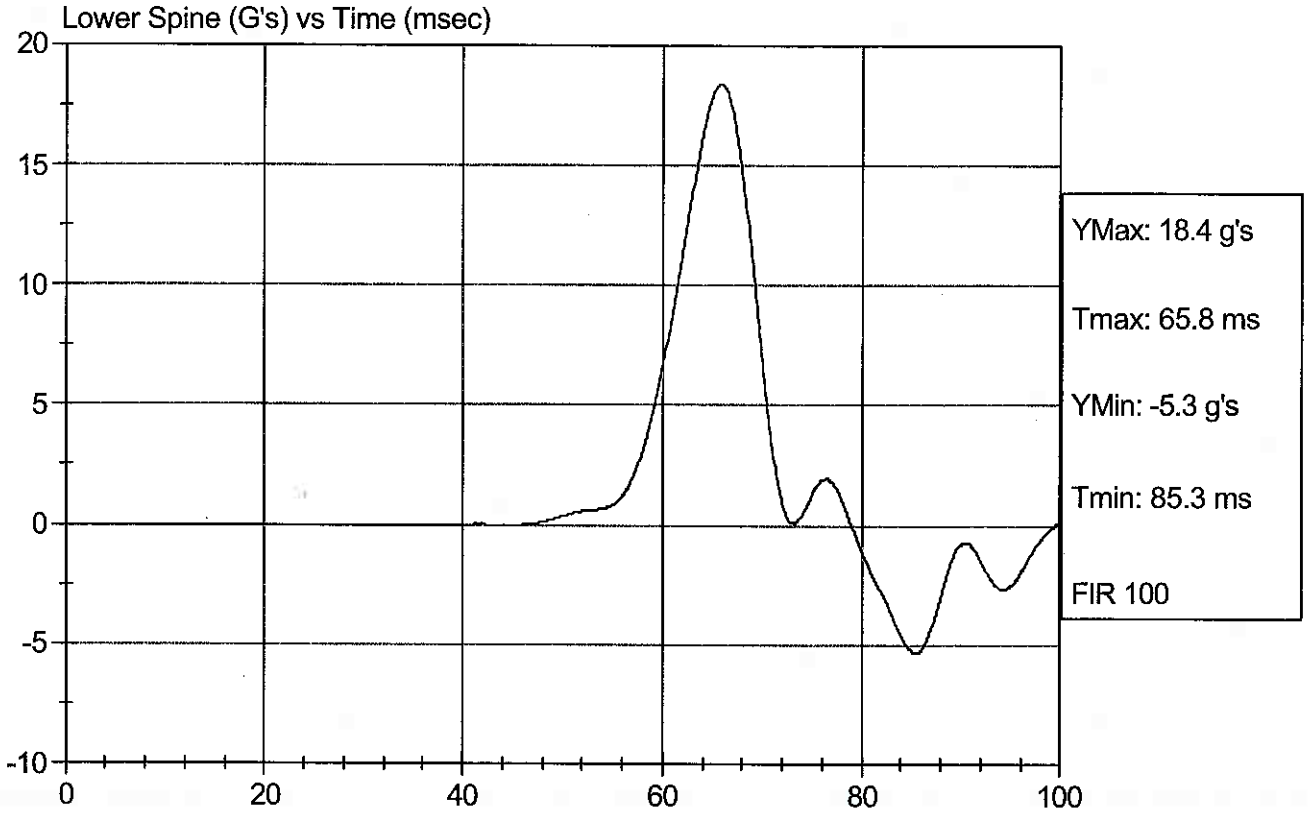
Test Date: 6/3/08
Speed: 14.01 ft/sec, 4.27 m/sec





Test Desc: Thorax Impact
Component ID: D081522

Test Date: 6/3/08
Speed: 14.01 ft/sec, 4.27 m/sec



SID/HIII Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 036 **Test I.D:** D081523

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	52	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	42	Pass
		Overall Test Results		Pass

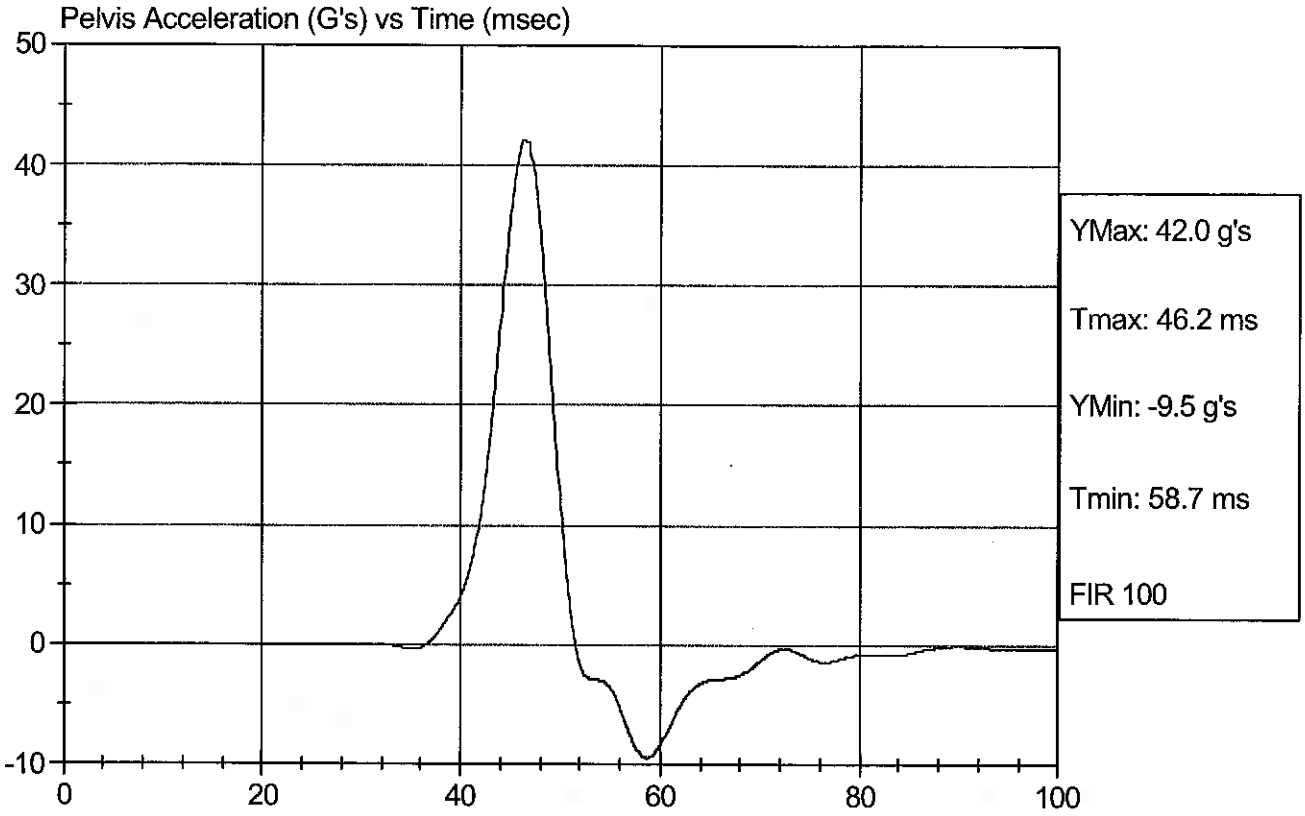
Laboratory Technician

6/3/08
Test Date

Approved By

Test Desc: Pelvis Impact
Component ID: D081523

Test Date: 6/3/08
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:** D081524

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	47	Pass
Force At 12.7 mm	N	104 -162	147	Pass
Force At 19 mm	N	163 - 222	199	Pass
Force At 25.4 mm	N	222 - 280	264	Pass
Force At 33 mm	N	325 - 391	362	Pass
		Overall Test Results		Pass

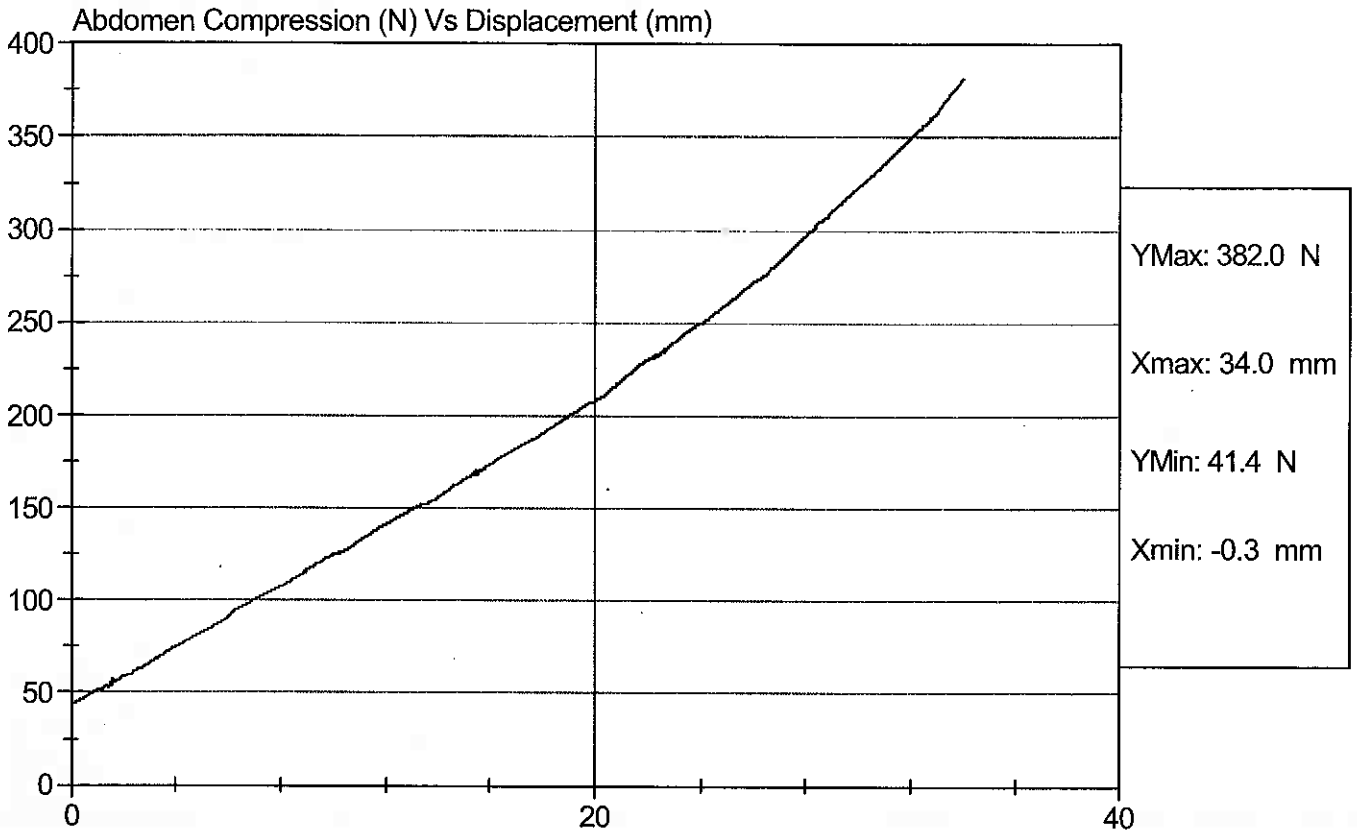
Laboratory Technician

6/3/08
Test Date

Approved By

Test Description: Abdomen Compression Test Date: 6/3/08

Component: D081524 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:** D081525

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	47	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	128.1	Pass
Force At 30 deg	N	151.2 - 204.6	169.5	Pass
Force At 40 deg	N	204.6 - 258.0	235.9	Pass
Return Angle	Deg	12 Maximum	6	Pass
		Overall Test Results		Pass

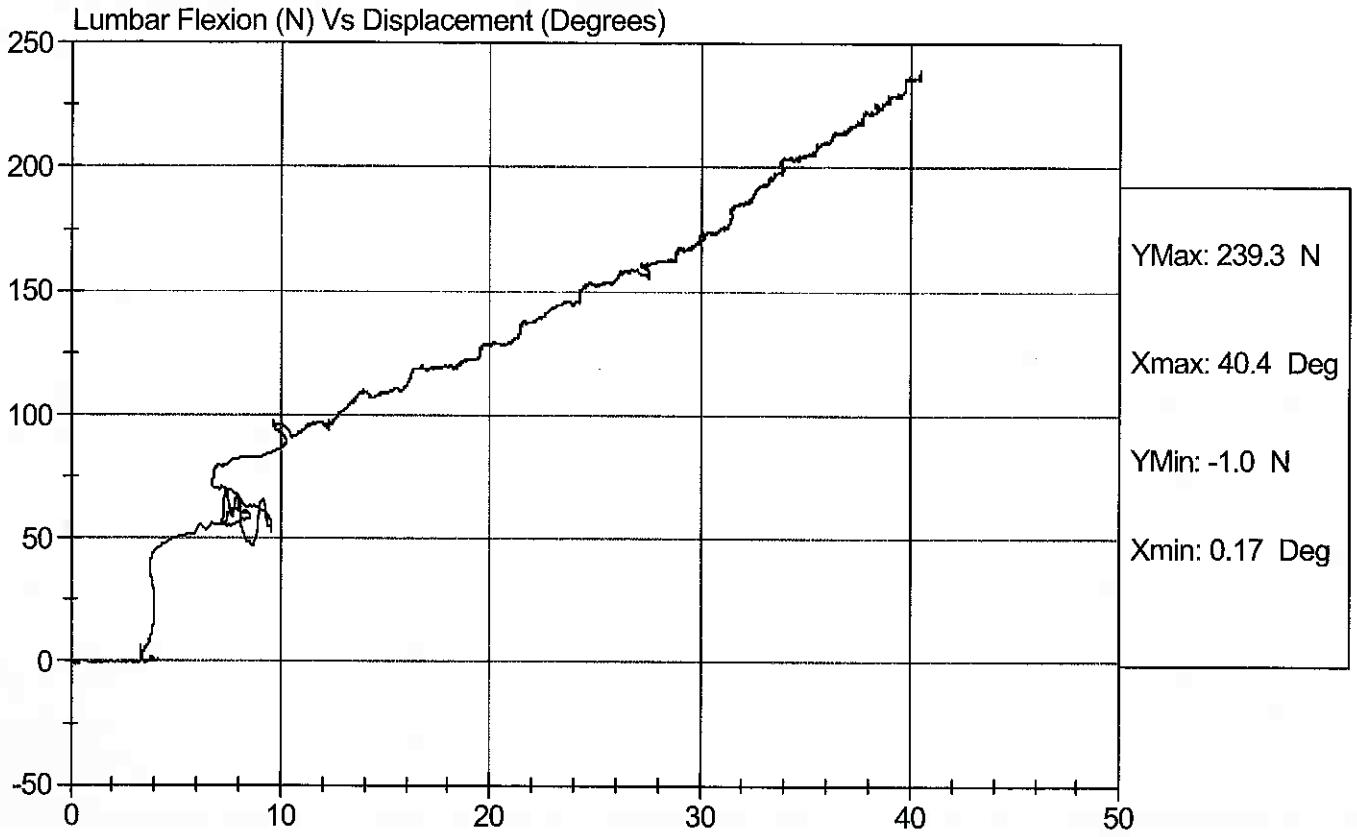
Laboratory Technician

6/2/08
Test Date

Approved By

Test Description: Lumbar Flexion | Test Date: 6/2/08

Component: D081525 | 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:** D081529

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	47	Pass
Impact Velocity		m/s	6.89 to 7.13	6.96	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.50	Pass
	20 msec	m/s	4.12 to 5.10	4.69	Pass
	30 msec	m/s	5.73 to 7.01	6.59	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.63	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	70	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	60	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	74	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	62	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	15	Pass

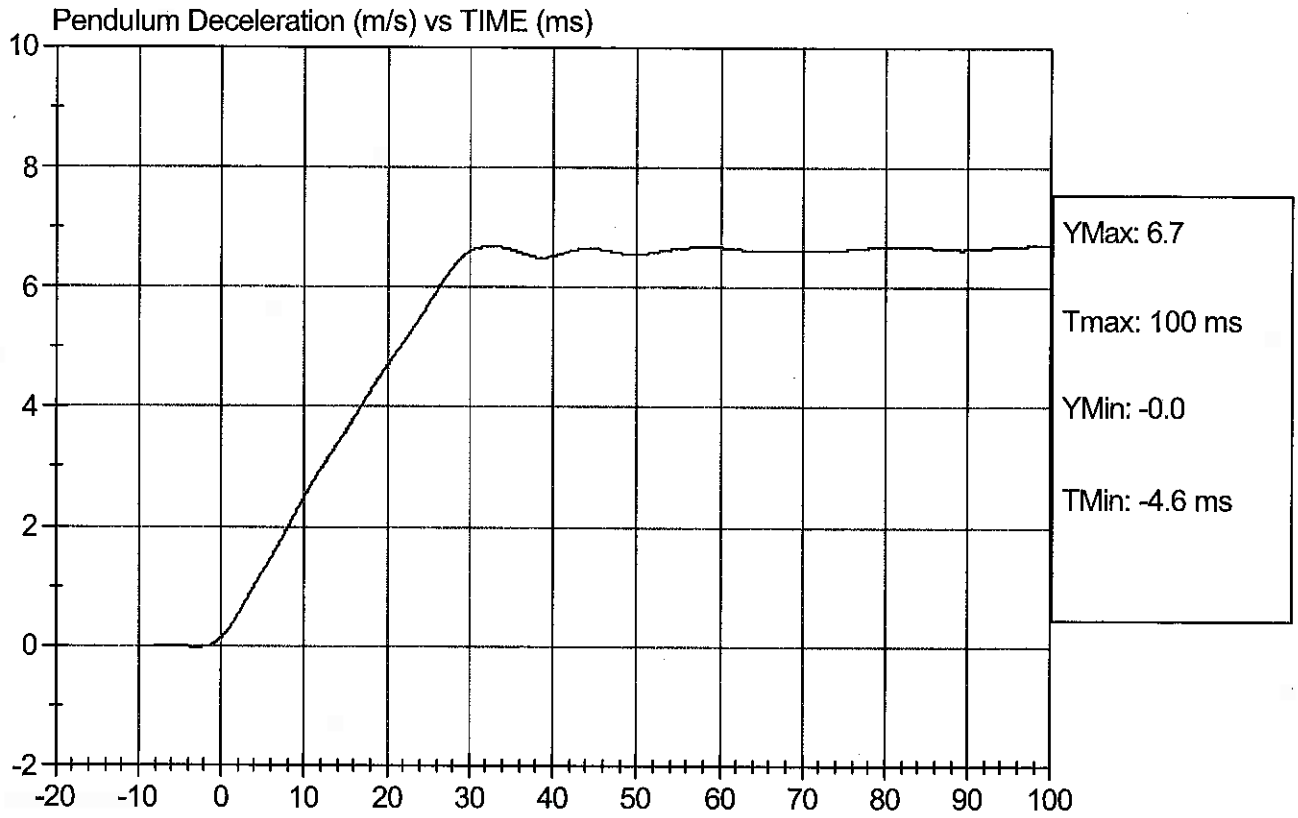
Laboratory Technician

6/3/08
Test Date

Approved By

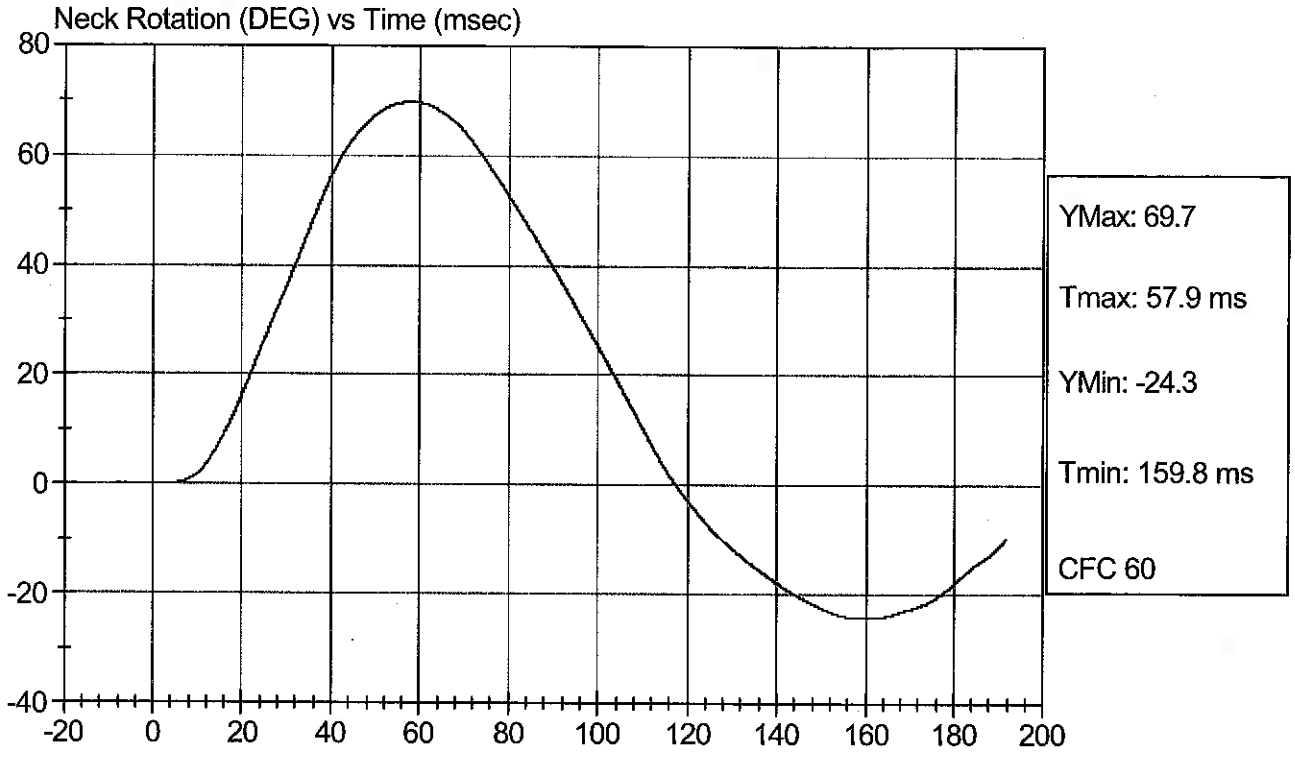
Test Desc: Neck Bending
Component ID: D081529

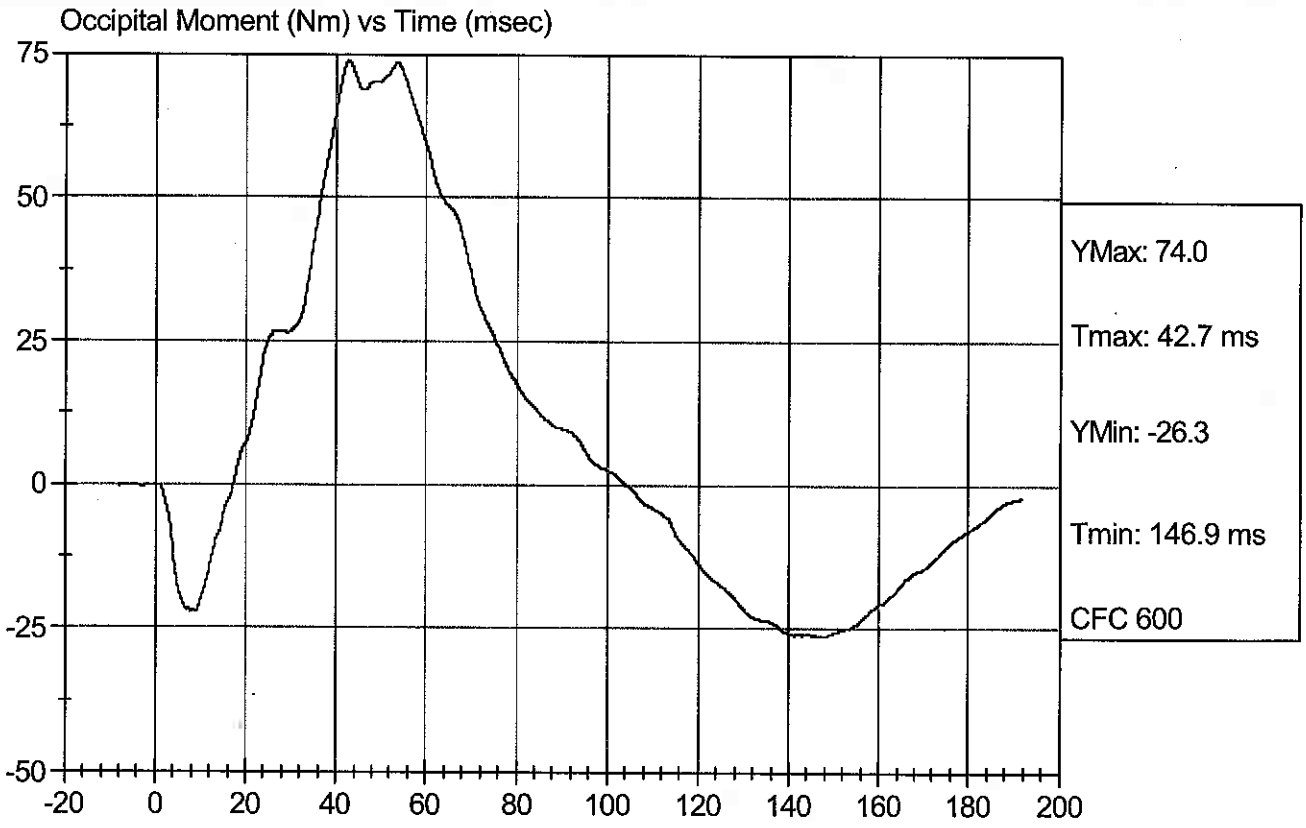
Test Date: 6/3/08
Speed: 22.831 ft/sec, 6.96 m/sec



Test Desc: Neck Bending
Component ID: D081529

Test Date: 6/3/08
Speed: 22.831 ft/sec, 6.96 m/sec





APPENDIX D

CALIBRATION INFORMATION DATA

DUMMY AND VEHICLE CALIBRATION DATA

	INSTRUMENTS FOR DRIVER S/N 036		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head CG X	AGH70	Endevco	1/25/2008
Head CG Y	AGH78	Endevco	1/25/2008
Head CG Z	C10727	Endevco	1/25/2008
Neck Load Cell	1673	Denton	5/22/2008
Upper Rib Y	P49509	Endevco	1/24/2008
Lower Rib Y	P49455	Endevco	1/24/2008
Lower Spine Y	P49457	Endevco	1/24/2008
Pelvis Y	P49498	Endevco	1/24/2008
Upper Rib Redundant Y	P49505	Endevco	1/24/2008
Lower Rib Redundant Y	P49496	Endevco	1/24/2008
Lower Spine Redundant Y	P49497	Endevco	1/24/2008
Pelvis Redundant Y	P49508	Endevco	1/24/2008

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Vehicle CG X	A29-M05	Entran	2/21/2008
Vehicle CG Y	G29-X03	Entran	2/21/2008
Vehicle CG Z	G29-X36	Entran	2/21/2008
Left Floor Y	04J14-J11	Entran	4/23/2008
Left A-Post @ Sill Y	A07-R11	Entran	2/06/2008
Left Lower A-Post Y	P27001	Endevco	4/11/2008
Left Mid A-Post Y	P24154	Endevco	2/06/2008
Left B-Post @ Sill Y	AJ820	Endevco	1/09/2008
Left Lower B-Post Y	A22-R03	Entran	4/11/2008
Left Mid B-Post Y	A28-H08	Entran	2/14/2008
Driver Seat Track Y	F09-N03	Entran	4/11/2008
Upper Engine X	A22-R02	Entran	4/11/2008
Upper Engine Y	J23-M09	Entran	4/23/2008
Firewall Y	P48202	Endevco	1/09/2008
Right Floor Sill Y	B05-J12	Entran	4/21/2008
Rear Deck X	H06-L18	Entran	1/09/2008
Rear Deck Y	H06-L13	Entran	1/09/2008