

REPORT NUMBER: NCAPSIDE-MGA-2006-006

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST**

**GM DAEWOO AUTO & TECHNOLOGY COMPANY
2006 CHEVROLET AVEO SPECIAL VALUE MODEL 4-DR
NHTSA NUMBER: M60109**

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



Test Date: January 5, 2006

Report Date: February 7, 2006

FINAL REPORT

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

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-03-D-12005.

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Date: 2/07/06

Technical Report Documentation Page

1. Report No. NCAPSIDE-MGA-2006-006	2. Government Accession No. 	3. Recipient's Catalog No. 																						
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact Testing of 2006 Chevrolet Aveo Special 4-Dr NHTSA No.: M60109		5. Report Date February 7, 2006																						
		6. Performing Organization Code MGA																						
7. Author(s) Shefalika Naik, Project Engineer		8. Performing Organization Report No. NCAPSIDE-MGA-2006-006																						
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		10. Work Unit No. 																						
		11. Contract or Grant No. DTNH22-03-D-12005																						
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Rulemaking, Office of Crashworthiness Standards 400 Seventh Street, SW, Room 5311 Washington, D.C. 20590		13. Type of Report and Period Covered: <i>Final Report</i> 01/05/06 to 2/07/06																						
		14. Sponsoring Agency Code NVS-111																						
15. Supplementary Notes 																								
16. Abstract A 55/28 km/h 90° Moving Deformable Barrier NCAP side impact was conducted on the subject 2006 Chevrolet Aveo Special 4-Dr to obtain new car assessment and research data indicant of FMVSS No. 214D performance. The test was conducted at MGA Research Corporation, in Burlington, Wisconsin, on January 5, 2006. The impact velocity of the Moving Deformable Barrier (MDB) was 62.1 km/h, and the ambient temperature at the struck side (drivers) of the vehicle was 21°C. The target vehicle's maximum post test static crush was 335 mm at level 2. The test vehicle's occupant performance is as follows: <table style="margin-left: auto; margin-right: auto; border: none;"> <thead> <tr> <th></th> <th style="text-align: center;"><u>DRIVER</u></th> <th style="text-align: center;"><u>PASS.</u></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib (LUR) Accel., g</td> <td style="text-align: center;">54.0</td> <td style="text-align: center;">57.8</td> </tr> <tr> <td>Left Lower Rib (LLR) Accel., g</td> <td style="text-align: center;">63.1</td> <td style="text-align: center;">70.3</td> </tr> <tr> <td>Lower Spine (T₁₂) Accel., g</td> <td style="text-align: center;">81.4</td> <td style="text-align: center;">68.5</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td style="text-align: center;">72.3</td> <td style="text-align: center;">69.4</td> </tr> <tr> <td>Pelvis (PEV) Accel., g</td> <td style="text-align: center;">123.5</td> <td style="text-align: center;">101.3</td> </tr> <tr> <td>HIC</td> <td style="text-align: center;">256.7</td> <td style="text-align: center;">480.5</td> </tr> </tbody> </table> 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.					<u>DRIVER</u>	<u>PASS.</u>	Left Upper Rib (LUR) Accel., g	54.0	57.8	Left Lower Rib (LLR) Accel., g	63.1	70.3	Lower Spine (T ₁₂) Accel., g	81.4	68.5	Thoracic Trauma Index (TTI)	72.3	69.4	Pelvis (PEV) Accel., g	123.5	101.3	HIC	256.7	480.5
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17. Key Words New Car Assessment Program (NCAP) Side Impact Side Impact Hybrid III Dummy (SID/HIII) Occupant Side Impact Protection		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Adm. Technical Ref. Division, Room 5108 (NPO-230) 400 Seventh Street, S.W. Washington, D.C. 20590																						
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 146	22. Price 																					

Form DOT F1700.7 (8-72)

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SECTION 1

PURPOSE AND TEST PROCEDURE

PURPOSE

This side impact test was conducted as part of the FY' 2006 test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-03-D-12005. The purpose of this test was to evaluate side impact protection in a 2006 Chevrolet Aveo Special 4-Dr manufactured by GM Daewoo Auto & Technology Company.

TEST PROCEDURE

The side impact test was conducted in accordance with the Laboratory Test Procedure for New Car Assessment Program Side Impact Testing dated November 2002 and the corresponding MGA Research Corporation Test Procedure MGA-NHTSA5. 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 NCAP SIDE IMPACT TEST

A model year 2006 Chevrolet Aveo Special 4-Dr was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.1 km/h. The specified impact velocity range is from 61.1 to 62.7 km/h. The test (target) vehicle was stationary and positioned 63° to the line of forward motion. The weight of the vehicle as tested was 1326.5 kg and the test weight of the MDB was 1360.8 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on January 5, 2006.

One (1) real-time motion picture camera and nine (9) high-speed motion picture cameras were used to document the impact event. The pre-test and post-test conditions were recorded by one (1) real-time motion picture camera. Camera locations and pertinent camera information are documented in the data sheets. Pre- and post-test photographs of the vehicle and Side Impact Dummies (SID/HIIIs) can be found in Appendix A. Two 50th percentile adult male SID/HIIIs were placed in the driver and left rear passenger designated seating positions according to instructions specified in the Laboratory Test Procedure for New Car Assessment Program Side Impact Testing dated November 2002. Each SID/HIII was instrumented in the following locations:

- 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)
- Head Center of Gravity (CG) tri-axial accelerometers (X, Y and Z axes primary and redundant)
- Upper Neck load cell (Fx, Fy, Fz, Mx, My, Mz)

The test vehicle was instrumented with twenty (20) structural accelerometers and the MDB was instrumented with six (6) accelerometers and two (2) contact switches on the bumper to compare left side to right side bumper impact timing. All data channels were recorded with a fully self contained on-board DTS TDAS Pro Data Acquisition System. The data was digitally sampled at 10,000 samples per second and processed per Appendix V of the Test Procedure.

2.2 GENERAL COMMENTS

The test vehicle sustained a maximum static crush of 335 mm at level 2, 1350 mm rearward of the left vertical impact point. The driver and passenger SID/HIIIs, Serial Nos. 271 and 904 respectively, were calibrated just prior to this test.

Appendix A contains the still photograph prints. Appendix B contains the SID/HIII response data traces. Appendix C contains the dummy calibration data.

The occupant data is summarized below:

ATD position	HIC	T ¹	T ²	TTI (G's)	Peak Pelvis (G's)
Driver	256.7	31.4	67.4	72.3	123.5
Passenger	480.5	39.6	63.6	69.4	101.3

SUPPLEMENTAL RESTRAINT INFORMATION

Restraint Information	Left Front (Driver)		Left Rear (Passenger)	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	No	None	
Side Torso Airbag	None		None	
Head Airbag	None		None	
Combination Airbag	Yes	Yes	None	
Curtain Airbag	None		None	

The test data can be found on the NHTSA website at www.nhtsa.dot.gov.

TEST NOTES

The trunk opened during test. See Appendix A for photographs.

The fuel tank door opened during test. See Appendix A for photographs.

DATA SHEET NO. 1**GENERAL TEST AND VEHICLE PARAMETER DATA**Test Vehicle: 2006 Chevrolet Aveo Special 4-DrNHTSA No. M60109Test Program: NCAP Side ImpactTest Date: 01/05/06**TEST VEHICLE INFORMATION**

Make	Chevrolet
Model	Aveo
Body Style	Sedan
NHTSA No.	M60109
VIN	KL1TD56666B577937
Color	Silver
Delivery Date	12/21/05
Odometer Reading (mile)	59
Dealer	Piemonte's Dundee Chevrolet
Transmission	Manual
Final Drive	Front
Number of Cylinders	4
Engine Displacement (L)	1.6
Engine Placement	Lateral
Automatic Door Locks (ADL)	No
Owner's Manual Details Instructions on Disabling ADLs	NA

TEST VEHICLE OPTIONS

Driver Front Airbag	Yes
Driver Side Curtain Airbag	No
Driver Side Torso Airbag	No
Driver Combination Airbag	Yes
Rear Passenger Side/Curtain Airbag	No
Rear Passenger Side Torso Airbag	No
Power Steering	Yes
Power Door Locks	No
Tilt Wheel	Yes
Anti-lock Brakes	Yes
Traction Control	No
All Wheel Drive	No
Power Seats	No
Pretensioners	Yes
Load Limiters	Yes
Bucket Seats	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	GM Daewoo Auto & Technology Company
Date of Manufacture	10/05

GVWR (kg)	1519
GAWR Front (kg)	830
GAWR Rear (kg)	802

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench		
Number Of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				390
Cargo Wt. (RCLW) (kg)				49.0

DATA SHEET NO. 1 (continued)**GENERAL TEST AND VEHICLE PARAMETER DATA**Test Vehicle: 2006 Chevrolet Aveo Special 4-DrNHTSA No. M60109Test Program: NCAP Side ImpactTest Date: 01/05/06**TEST VEHICLE WEIGHTS**

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	345.3	224.0		390.4	314.3	
Right	kg	339.2	215.0		356.1	265.7	
Ratio	%	60.9	39.1		56.2	43.8	
Totals	kg	684.5	439.0	1123.5	746.5	580.0	1326.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1123.5
Weight of 2 P572E ATDs	kg	161.5
Rated Cargo/Luggage Weight (RCLW)	kg	49.0
Calculated Vehicle Target Weight (TVTW)	kg	1334.0

* Actual As Tested Weight (ATW) will be TVTW -5/-10 kg

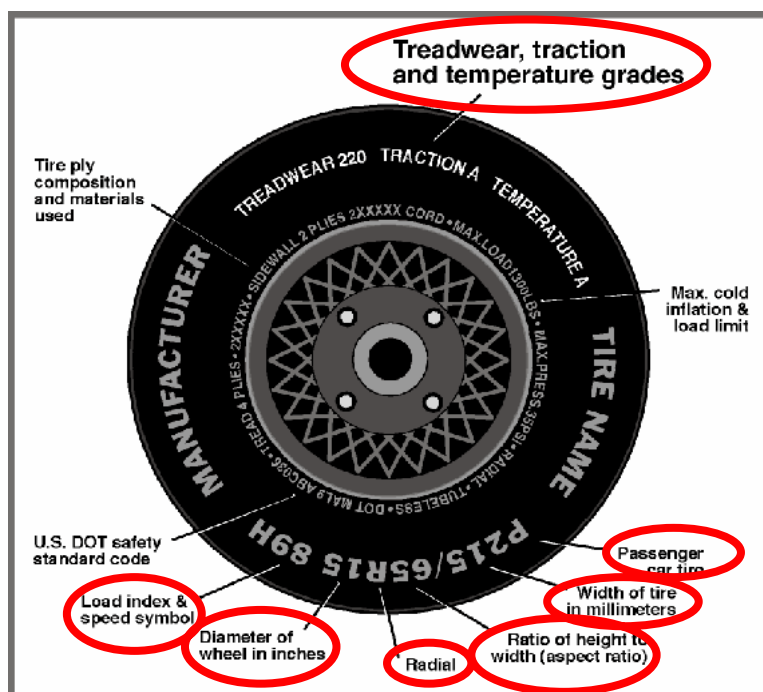
Weight of Ballast in Cargo Area: 7.9 kg**TEST VEHICLE ATTITUDES AND CG**

	Units	LF	RF	LR	RR	CG(aft of front axle)
As Delivered	mm	674	678	639	647	969
As Tested	mm	634	653	609	624	1086
Fully Loaded	mm	633	630	585	606	

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2482
Target Impact Point Aft of Front Axle	mm	301
Actual Impact Point Aft of Front Axle	mm	294

DATA SHEET NO. 2
TEST VEHICLE TIRE INFORMATION



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	NA	NA
Cold / Test Pressure (kPa)	210	210
Recommended Tire Size	P185/60R14	P185/60R14
Tire Size on Vehicle	P185/60R14	P185/60R14
Tire Manufacturer	Kumho	Kumho
Tire Name	Steel Radial 722	Steel Radial 722
Tire Type	M+S	M+S
Tire Width (mm)	185	185
Ratio of Height to Width (aspect ratio)	60	60
Radial	R	R
Wheel Diameter	14	14
Load Index & Speed Symbol	82H	82H
Treadwear	NA	NA
Traction Grade	NA	NA
Temperature Grade	NA	NA

DATA SHEET NO. 3 **TEST VEHICLE INFORMATION**

Test Vehicle: 2006 Chevrolet Aveo Special 4-Dr
 Test Program: NCAP Side Impact

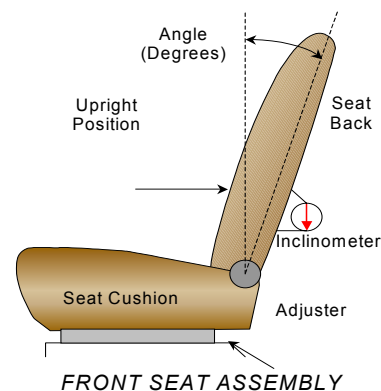
NHTSA No. M60109
 Test Date: 01/05/06

NORMAL DESIGN RIDING POSITION

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

Driver seat back angle: 12.5° on seat frame

Passenger seat back angle: non adjustable

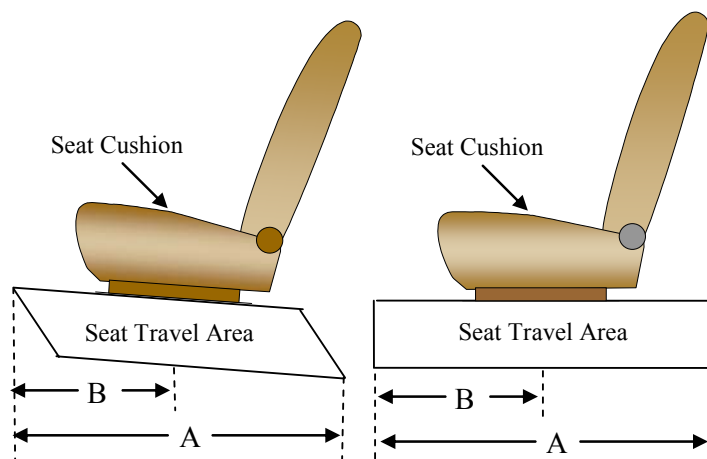


SEAT FORE/AFT POSITIONS

Forward-most measurements and rearward-most measurements should be taken from the bottom of the seat cushion (including the plastic base if applicable).

SEAT FORE/AFT POSITIONS		
	Total Fore/Aft Travel	Placed in position #
Driver Seat	19 detents	10 th detent*
Rear Seat	Non adjustable	Non adjustable

* forward-most detent defined as 0



ADJUSTABLE D RING

The adjustable D Ring was placed in the 2nd of the 5 notches, with top most notch as 0

DATA SHEET NO. 3 (CONTINUED)

TEST VEHICLE INFORMATION

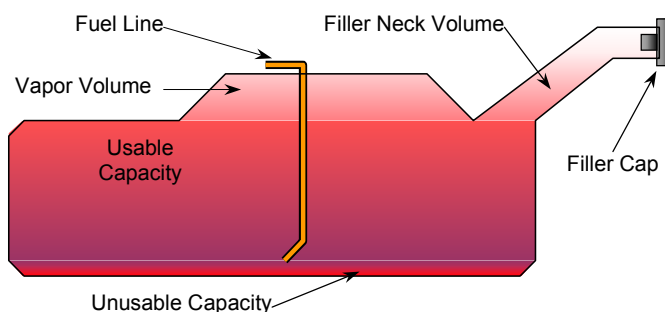
Test Vehicle: 2006 Chevrolet Aveo Special 4-Dr
Test Program: NCAP Side Impact

NHTSA No. M60109
Test Date: 01/05/06

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	44.7
Usable Capacity of "Optional" Tank	
92-94% of Usable Capacity	41.1 – 42.0
Actual Amount of Solvent used	41.3
1/3 of Usable Capacity	14.9

The vehicle is equipped with electric fuel pump. The pump operates normally when the vehicles electrical system is activated. The fuel pump will operate about 3 seconds when ignition is on to provide proper fuel rail pressure.

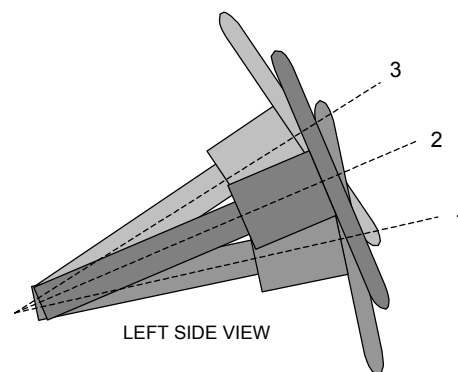


VEHICLE FUEL TANK ASSEMBLY

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 moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed on the plate and the angle is measured.

The steering wheel is not adjustable.



STEERING COLUMN ASSEMBLY

	Degrees
Lowermost position No. 1	19.6
Geometric center position No. 2	21.9
Uppermost position No. 3	24.2

DATA SHEET NO. 4**MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS**Test Vehicle: 2006 Chevrolet Aveo Special 4-DrNHTSA No. M60109Test Program: NCAP Side ImpactTest Date: 01/05/06**MDB SPECIFICATIONS**

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheel base of Framework Carriage	2588
C.G. Location aft of Front Axle	1101

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	473.5	219.5	
Right	kg	308.3	359.5	
Ratio	%	57.5	42.5	
Totals	kg	781.8	579.0	1360.8

SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.1
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.1
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.8

POST TEST OBSERVATIONS**MDB LEFT EDGE IMPACT POINT DATA**

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	7 mm left
Vertical Offset	mm	+/-20	7 mm up

DATA SHEET NO. 5**POST TEST OBSERVATIONS**

Test Vehicle: 2006 Chevrolet Aveo Special 4-Dr
 Test Program: NCAP Side Impact

NHTSA No. M60109
 Test Date: 01/05/06

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat SID/HIII	Rear Seat SID/HIII
Dummy Type / Serial No.	SID HIII / 271	SID HIII / 904
Head Contact	Airbag, Passenger Headrest, Driver Headrest	C-Pillar, Headrest
Upper Torso Contact	Airbag, Door Panel	Door Panel
Lower Torso Contact	Door Panel	Door Panel
Left Knee Contact	Door Panel	Door Panel
Right Knee Contact	Left Knee	Left Knee

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Locked/Unlocked Doors	Doors were unlocked	Doors were unlocked
Left Side Door Opening	Door remained closed and latched	Door remained closed and latched
Right Side Door Opening	Door remained closed and latched; Door opened without tools	Door remained closed and latched; Door opened without tools
Seat Movement	0	0
Seat Back Failure	None	None

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No Separation
Sill Separation	None
Windshield Damage	None
Window Damage	Left Front Driver and Left Rear Passenger Window Broke
Other Notable Effects	The trunk and the fuel cap door opened during test. See Appendix A for photographs.

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

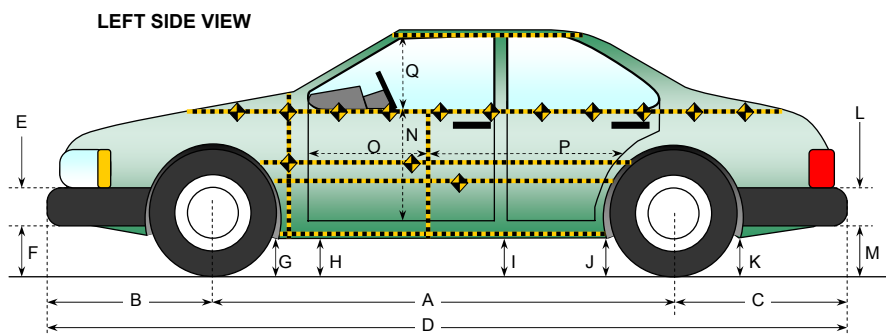
Restraint Type	Occupant Location 01		Occupant Location 04	
	Installed	Operation	Installed	Operation
Front Airbag	Yes	No	None	
Side Airbag	None		None	
Head Airbag	None		None	
Combination Airbag	Yes	Yes	None	
Curtain Airbag	None		None	
Seat Belt Pretensioner	Yes		None	
Seat Belt Load Limiter	Yes		None	

DATA SHEET NO. 6

VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2006 Chevrolet Aveo Special 4-Dr
 Test Program: NCAP Side Impact

NHTSA No. M60109
 Test Date: 01/05/06



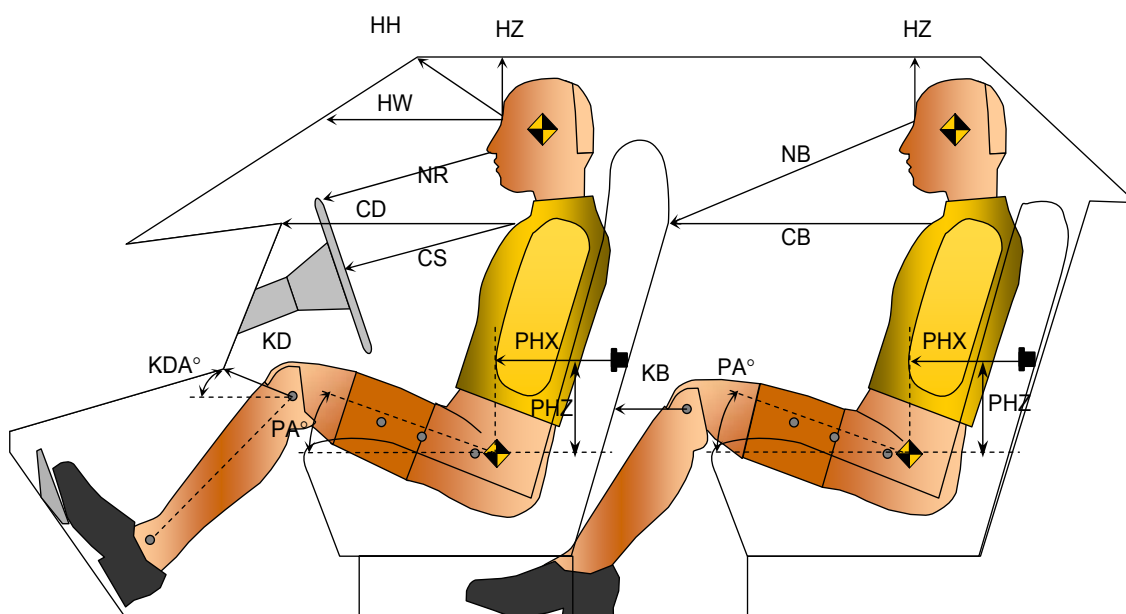
All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2482	2461	21
B	Front Axle to FSOV	808	784	24
C	Rear Axle to RSOV	936	927	9
D	Total Length at Centerline	4226	4172	54
E	Front Bumper Thickness	162	162	0
F	Front Bumper Bottom to Ground	276	285	-9
G	Sill Height at Front Wheel Well	163	185	-22
H	Sill Height at Front Door Leading Edge	164	184	-20
I	Sill Height at "B" Pillar	165	221	-56
J1	Sill Height at Rear Wheel Well	161	174	-13
J2	Pinch Weld Height at Rear Wheel Well	160	172	-12
K	Sill Height Aft of Rear Wheel Well	220	215	5
L	Rear Bumper Thickness	170	170	0
M	Rear Bumper Bottom to Ground	331	351	-20
N	Sill Height to Window Bottom Sill	671	512	159
O	Front Door Leading Edge to Impact CL	722	698	24
P	Rear Door Trailing Edge to Impact CL	1273	1172	101
Q	Front Window Opening	428	436	-8
R	Right Side Length	3575	3581	-6
S	Left Side Length	3576	3529	47
T	Vehicle Width at "B" Post	1664	1383	281

DATA SHEET NO. 7
SID/HII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2006 Chevrolet Aveo Special 4-Dr
 Test Program: NCAP Side Impact

NHTSA No. M60109
 Test Date: 01/05/06

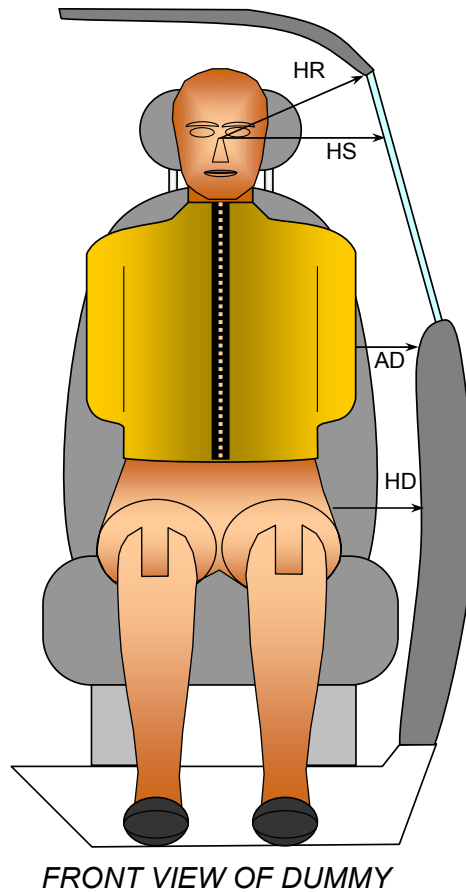


Driver Code	Pass. Code	Measurement Description	Driver S/N 271		Passenger S/N 904	
			Length(mm)	Angle(°)	Length(mm)	Angle(°)
HH		Head to Header	449			
HW		Head to Windshield	720			
HZ	HZ	Head to Roof	185		122	
NR	NB	Nose to Rim/Nose to Seatback	503		595	
CD	CB	Chest to Dash or Seatback	614		492	
CS		Chest to Steering Wheel	394			
KDL	KBL	Left Knee to Dash or Seatback	157	28.6	145	28.2
KDR	KBR	Right Knee to Dash or Seatback	137	40.2	142	28.6
PA	PA	Pelvic Angle		23.5		23.1
PHX	PHX	H-Point to Striker (X-Axis)	197		314	
PHZ	PHZ	H-Point to Striker (Z-Axis)	139		261	

DATA SHEET NO. 8
SID/HIII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2006 Chevrolet Aveo Special 4-Dr
 Test Program: NCAP Side Impact

NHTSA No. M60109
 Test Date: 01/05/06

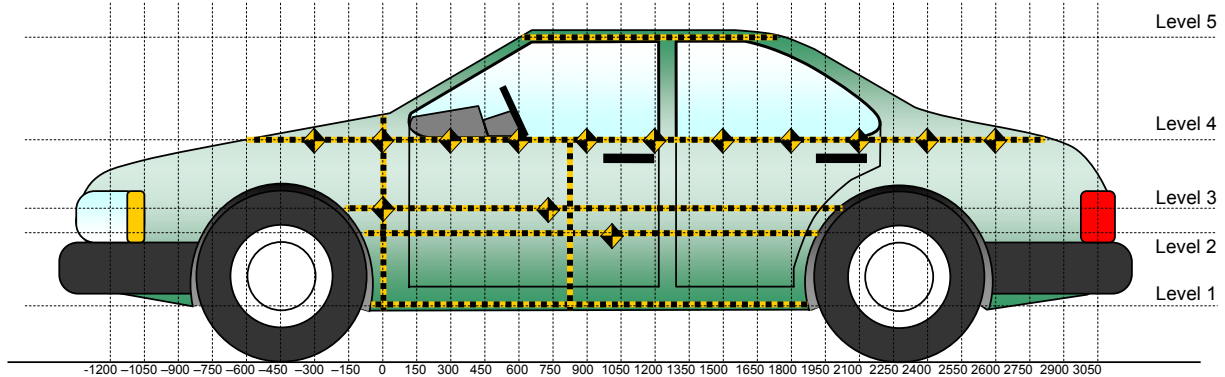


Code	Measurement Description	Units	Driver S/N 271	Passenger S/N 904
HR	Head to Side Header	mm	205	139
HS	Head to Side Window	mm	315	279
AD	Arm to Door	mm	107	82
HD	H-Point to Door	mm	151	180

DATA SHEET NO. 9 **VEHICLE SIDE MEASUREMENTS**

Test Vehicle: 2006 Chevrolet Aveo Special 4-Dr
 Test Program: NCAP Side Impact

NHTSA No. M60109
 Test Date: 01/05/06



All Measurements Shown in mm

LEFT SIDE VIEW

Measurements are taken with vehicle in the as tested condition.
 Measurements along the vertical 800 mm.
 All measurements below in mm.

Level	Measurement Description	Maximum Exterior Static Crush	Distance From Impact	Height Above Ground
5	Window	101	1350	1385
4	Window Sill	272	1500	921
3	Mid Door	310	1500	635
2	Occupant H-Point	335	1350	563
1	Sill Top	154	900	256
	Maximum Penetration	335		

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2006 Chevrolet Aveo Special 4-Dr
Test Program: NCAP Side Impact

NHTSA No. M60109
Test Date: 01/05/06

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-600				380					386					6	
-450				361					375					14	
-300				342					363					21	
-150			266	330				341	354				75	24	
0		269	275	320			376	361	353			107	86	33	
150	322	275	274	315		408	496	472	377		86	221	198	62	
300	320	273	270	311		444	537	535	451		124	264	265	140	
450	319	273	268	308		455	553	544	483		136	280	276	175	
600	318	272	265	308		452	560	545	492		134	288	280	184	
750	319	271	264	309	532	457	572	548	505	569	138	301	284	196	37
900	319	270	263	310	527	473	586	548	521	581	154	316	285	211	54
1050	319	269	263	312	529	467	592	554	539	600	148	323	291	227	71
1200	316	270	263	315	534	463	597	560	567	627	147	327	297	252	93
1350	317	268	265	320	538	468	603	568	591	639	151	335	303	271	101
1500	316	269	267	323	539	429	589	577	595	623	113	320	310	272	84
1650	316	270	269	330	541	394	570	579	574	609	78	300	310	244	68
1800	316	272	272	336	544	340	541	546	519	593	24	269	274	183	49
1950		269	275	342	550		348	412	442	584		79	137	100	34
2100			266	351	560			308	377	585			42	26	25
2250			272	362				300	390				28	28	
2400			299	374				315	398				16	24	
2550			313	389				327	408				14	19	
2700			332	405				344	416				12	11	
2850				430					434					4	

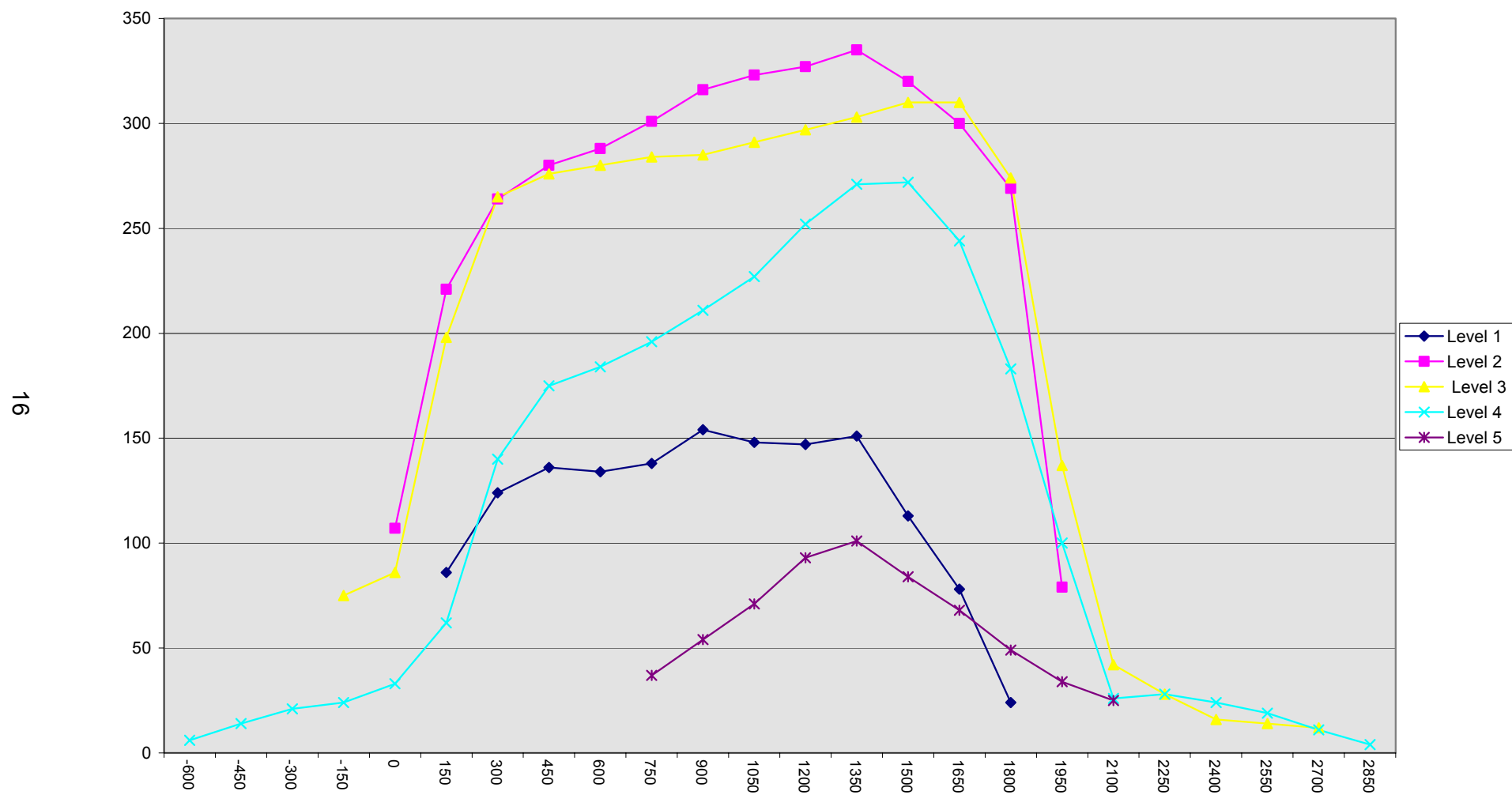
Reference plane is parallel to test vehicle longitudinal centerline.

Given dimensions = Reference plane to car body

DATA SHEET NO. 10... (continued)
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2006 Chevrolet Aveo Special 4-Dr
Test Program: NCAP Side Impact

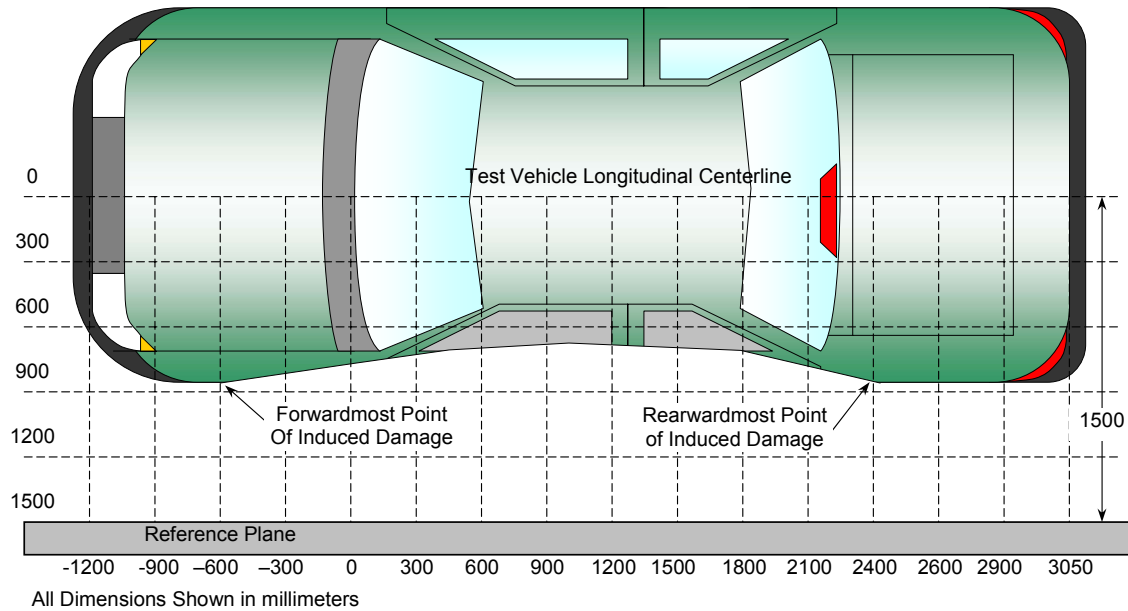
NHTSA No. M60109
Test Date: 01/05/06



DATA SHEET NO. 11 **VEHICLE DAMAGE PROFILE DISTANCES**

Test Vehicle: 2006 Chevrolet Aveo Special 4-Dr
 Test Program: NCAP Side Impact

NHTSA No. M60109
 Test Date: 01/05/06



TOP VIEW

DAMAGE PROFILE DISTANCES

DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	2850	4	430	434	4
2	2202	4	357	381	24
3	1415	2	268	594	326
4	750	2	271	572	301
5	76	2	272	393	121
6	-600	4	380	386	6

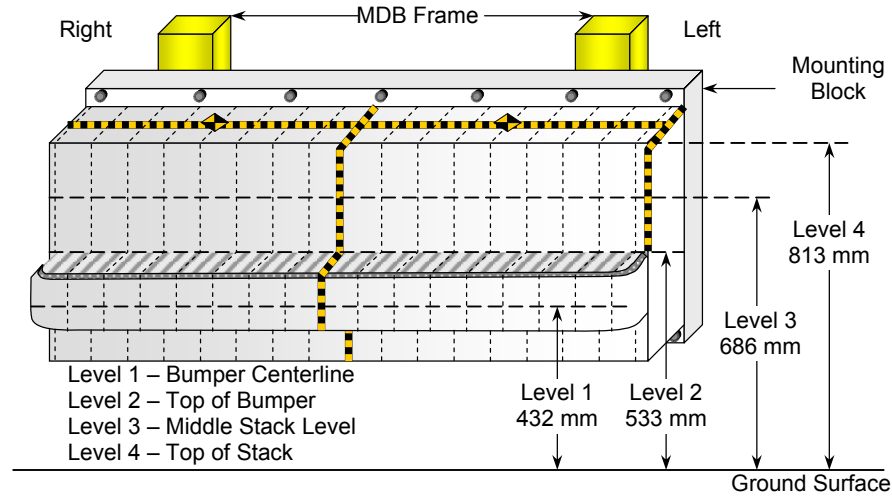
Reference plane is parallel to test vehicle longitudinal centerline.
 Given dimensions = Reference plane to car body.

DATA SHEET NO. 12

DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2006 Chevrolet Aveo Special 4-Dr
 Test Program: NCAP Side Impact

NHTSA No. M60109
 Test Date: 01/05/06



DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C _L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	47	9	-3	-3	3	21	19	25	14	16	22	28	39	48	80	135	202
2	26	-2	-1	0	1	11	11	8	8	12	15	20	21	26	40	85	137
3	41	30	25	27	26	19	21	25	27	39	46	43	45	48	61	74	111
4	79	58	52	54	58	60	64	67	69	72	75	79	85	88	99	128	145

All Dimensions in mm

DATA SHEET NO. 13

VEHICLE ACCELEROMETER LOCATIONS

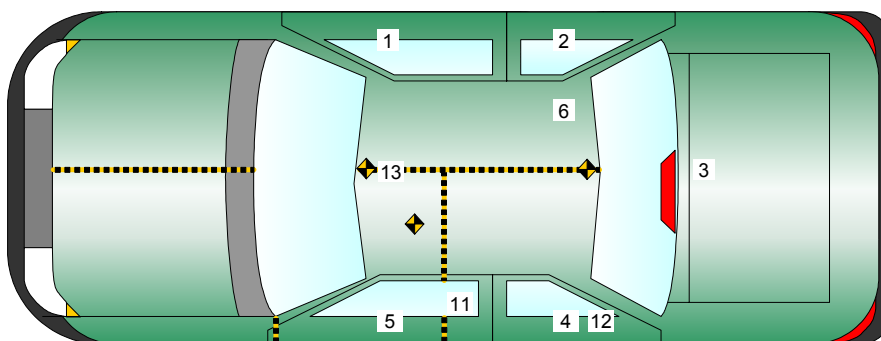
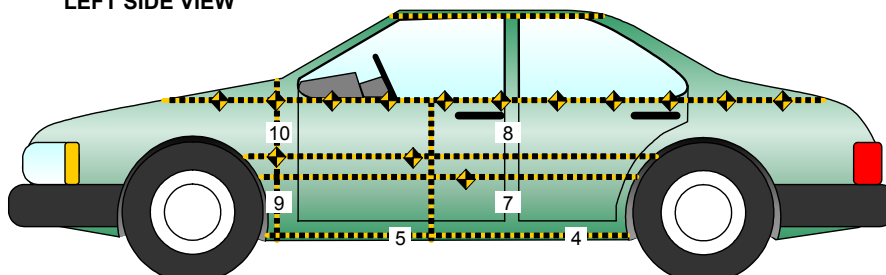
Test Vehicle: 2006 Chevrolet Aveo Special 4-Dr

NHTSA No. M60109

Test Program: NCAP Side Impact

Test Date: 01/05/06

LEFT SIDE VIEW



Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Right Sill at Front Seat	2345	645	225
2	Right Sill at Rear Seat	1624	647	235
3	Rear Floorpan Above Axle	985	-105	440
4	Left Sill at Rear Door	1632	-647	220
5	Left Sill at Front Door	2425	-645	210
6	Rear Occupant Compartment	1664	280	296
7	Left Lower B-Post	1903	-684	630
8	Left Middle B-Post	1864	-692	998
9	Left Lower A-Post	2979	-710	524
10	Left Middle A-Post	2989	-714	893
11	Front Seat Track			
12	Rear Seat Track or Structure			
13	Vehicle CG	2404	0	383

Reference Points

X - Test Vehicle Rear Bumper (+ forward)

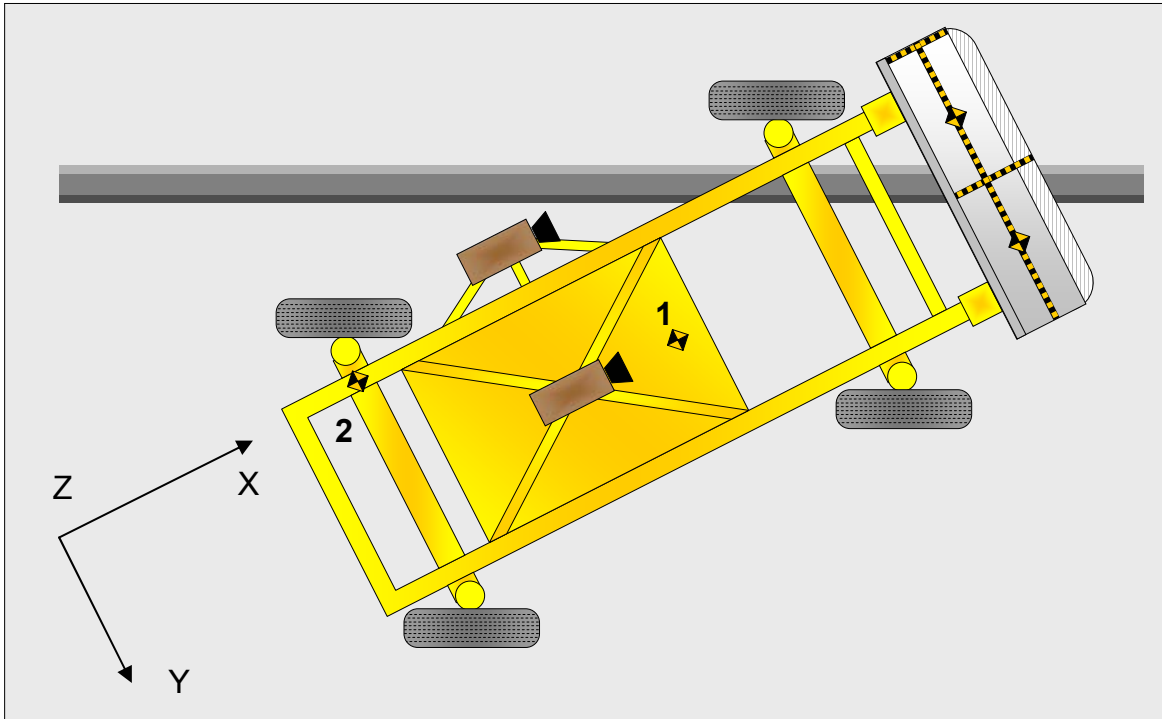
Y - Test Vehicle Centerline (+ to right)

Z - Ground Plane (+ down)

DATA SHEET NO. 14
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2006 Chevrolet Aveo Special 4-Dr
 Test Program: NCAP Side Impact

NHTSA No. M60109
 Test Date: 01/05/06



Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	MDB CG	-1092	0	-483
2	MDB Rear	-2591	-625	-622

Reference Points X - MDB Front Axle (+ forward)
 Y - MDB Centerline (+ to right)
 Z - Ground Plane (+ down)

DATA SHEET NO. 15
VEHICLE STRUCTURAL MEASUREMENTS

Test Vehicle: 2006 Chevrolet Aveo Special 4-Dr
Test Program: NCAP Side Impact

NHTSA No. M60109
Test Date: 01/05/06

	Elements	Pre-Test (mm)
1	Total Length	4226
2	Total Width	1664
3	Bumper Top Height	610
4	Bumper Bottom Height	457
5	Longitudinal Member Top Height	585
6	Distance between Longitudinal Members	890
7	Longitudinal Member Width	48
8	Engine Top Height	863
9	Engine Bottom Height	250
10	Engine and gearbox width	880
11	Front bumper-engine distance	472
12	Front shock absorber fixing height	905
13	Bonnet leading edge height	768
14	Front shock absorber fixing width	1110
15	Front bumper – front axle distance	808
16	Front axle – a pillar distance	410
17	A-pillar – B-pillar distance	1093
18	B-Pillar – rear axle distance	983
19	B-pillar – C-pillar distance	960
20	Roof sill bottom height	1476
21	Roof sill top height	1524
22	Floor sill bottom height	275
23	Floor sill top height	365

DATA SHEET NO. 16

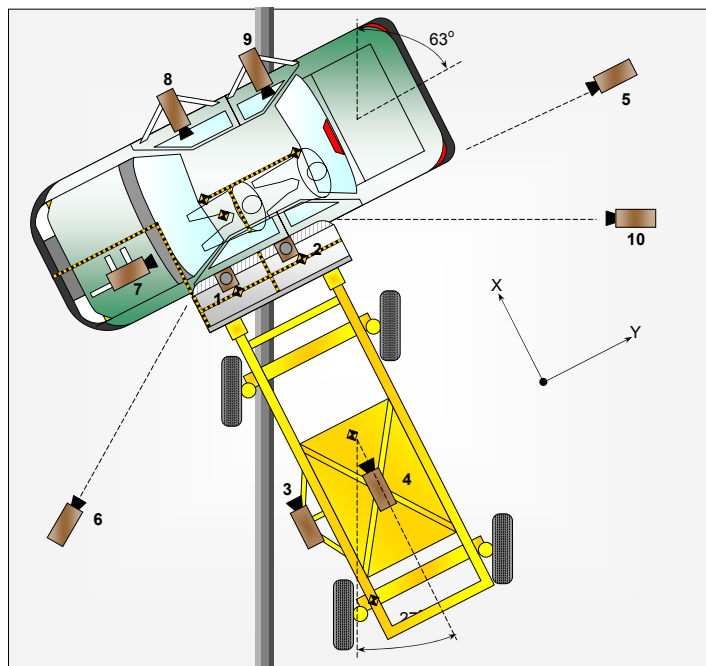
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2006 Chevrolet Aveo Special 4-Dr

NHTSA No. M60109

Test Program: NCAP Side Impact

Test Date: 01/05/06



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Close-up	780	-105	4840	50	1000
2	Overhead Overall	115	-310	5460	14	1000
3	MDB Onboard, Impact Point Close-up				50	1000
4	MDB Onboard, Centerline of Impact				25	1000
5	Right Side, Ground Level, Overall	-2835	7400	1315	35	1000
6	Left Side, Ground Level, Overall	2605	-3070	1340	24	1000
7	Vehicle Onboard Front SID/HIII, Front				12.5	500
8	Vehicle Onboard Front SID/HIII, Side				8	500
9	Vehicle Onboard Rear SID/HIII, Side				8	500
10	Real Time Coverage				13	24

Reference Points X - Impact Line
Y - MDB Left Edge Impact Point
Z - Ground Plane

DATA SHEET NO. 17
SUMMARY OF FMVSS 301 DATA

Test Vehicle: 2006 Chevrolet Aveo Special 4-Dr NHTSA No. M60109
Test Program: NCAP Side Impact Test Date: 01/05/06

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21° C Test Time: 11:33 am

Stoddard Solvent Spillage Measurements

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

DATA SHEET NO. 17
SUMMARY OF FMVSS 301 DATA

Test Vehicle: 2006 Chevrolet Aveo Special 4-Dr
 Test Program: NCAP Side Impact

NHTSA No. M60109
 Test Date: 01/05/06

FMVSS 301 STATIC ROLLOVER DATA

			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: Charcoal Canister
0° to 90°			
90° to 180°			
180° to 270°			
270° to 360°			

Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Separation of Minutes	Spillage (oz.)
0° to 90°	140	480	1-5	2.25
			6	0.35
			7	0.35
			8	0.2
90° to 180°	155	480	1-5	0.3
			6	0
			7	0
			8	0
180° to 270°	130	300	1-5	0
270° to 360°	150	300	1-5	0

Total Spillage: 3.45 oz

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PHOTOGRAPHS

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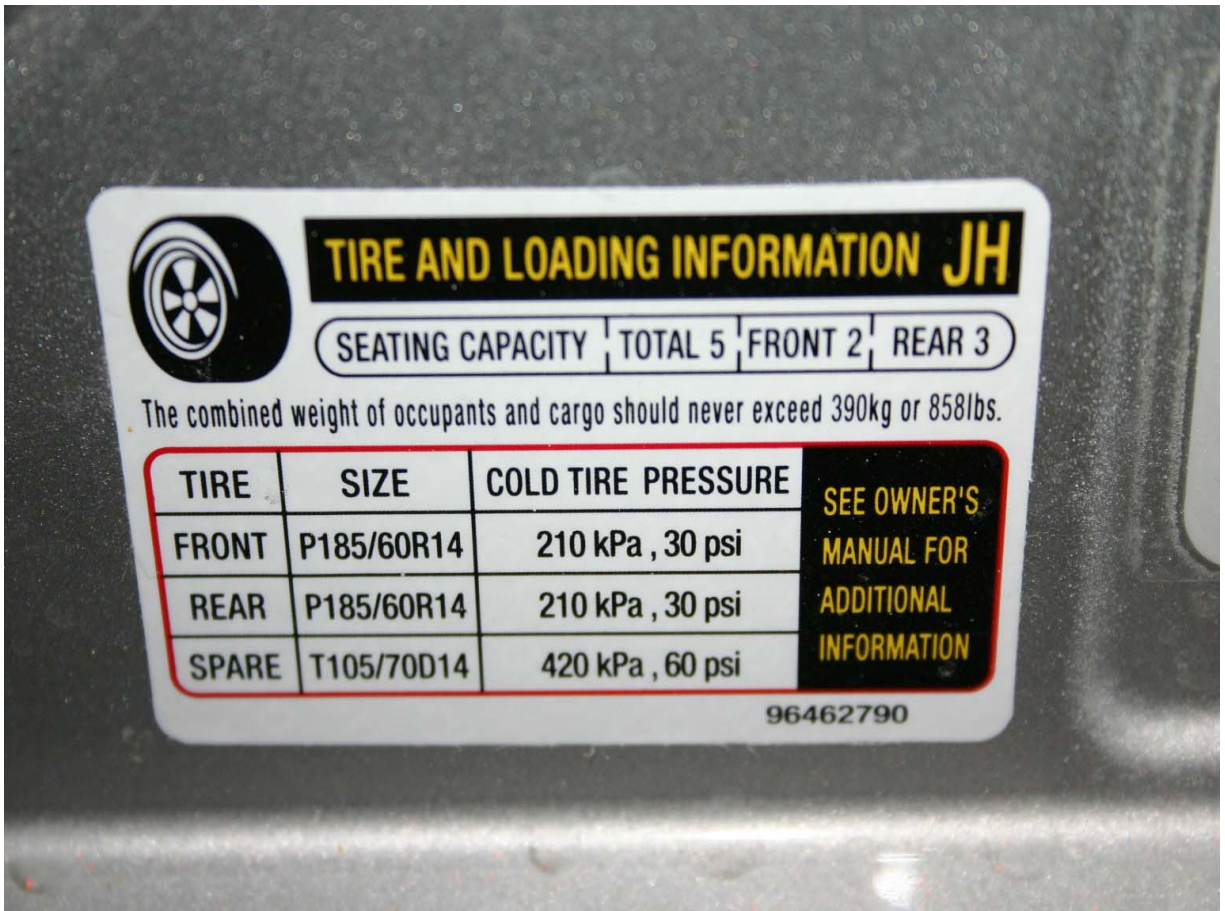
Left Front $\frac{3}{4}$ View, As Received



Right Rear $\frac{3}{4}$ View, As Received



Manufacturer's Label



Tire Placard



Pre-Test Front View



Post-Test Front View



Pre-Test Left Front $\frac{3}{4}$ View



Post-Test Left Front $\frac{3}{4}$ View



Pre-Test Left Side View



Post-Test Left Side View



Pre-Test Left Rear $\frac{3}{4}$ View



Post-Test Left Rear $\frac{3}{4}$ View



Pre-Test Rear View



Post-Test Rear View



Pre-Test Right Rear $\frac{3}{4}$ View



Post-Test Right Rear $\frac{3}{4}$ View



Pre-Test Right Side View



Post-Test Right Side View



Pre-Test Right Front $\frac{3}{4}$ View



Post-Test Right Front $\frac{3}{4}$ View



Pre-Test Overhead View



Post-Test Overhead View



Pre-Test Overhead Close-up View



Post-Test Overhead Close-up View



Pre-Test Left Impact Point



Post-Test Left Impact Point



Pre-Test Front $\frac{3}{4}$ View of Left Side Doors



Post-Test Front $\frac{3}{4}$ View of Left Side Doors



Pre-Test Rear $\frac{3}{4}$ View of Left Side Doors



Post-Test Rear $\frac{3}{4}$ View of Left Side Doors



Pre-Test Left Front Door



Post-Test Left Front Door



Pre-Test Left Rear Door



Post-Test Left Rear Door



Pre-Test Driver Dummy (Door Open)



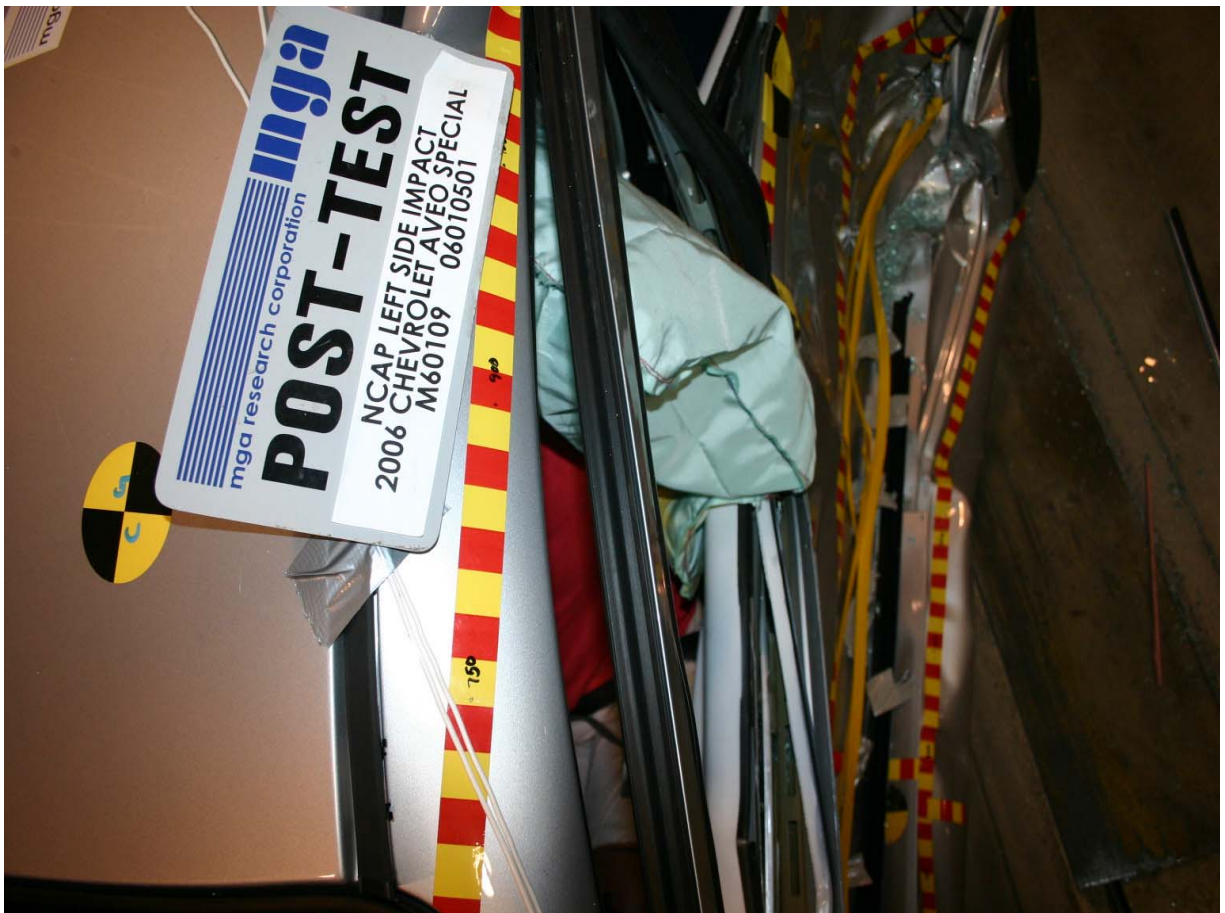
Pre-Test Driver Dummy (Through Window)



Post-Test Driver Dummy (Through Window)



Pre-Test Driver Dummy Clearance From Door



Post-Test Driver Dummy Clearance From Door



Pre-Test Driver Dummy Right Side View



Post-Test Driver Dummy Right Side View



Pre-Test Passenger Dummy (Door Open)



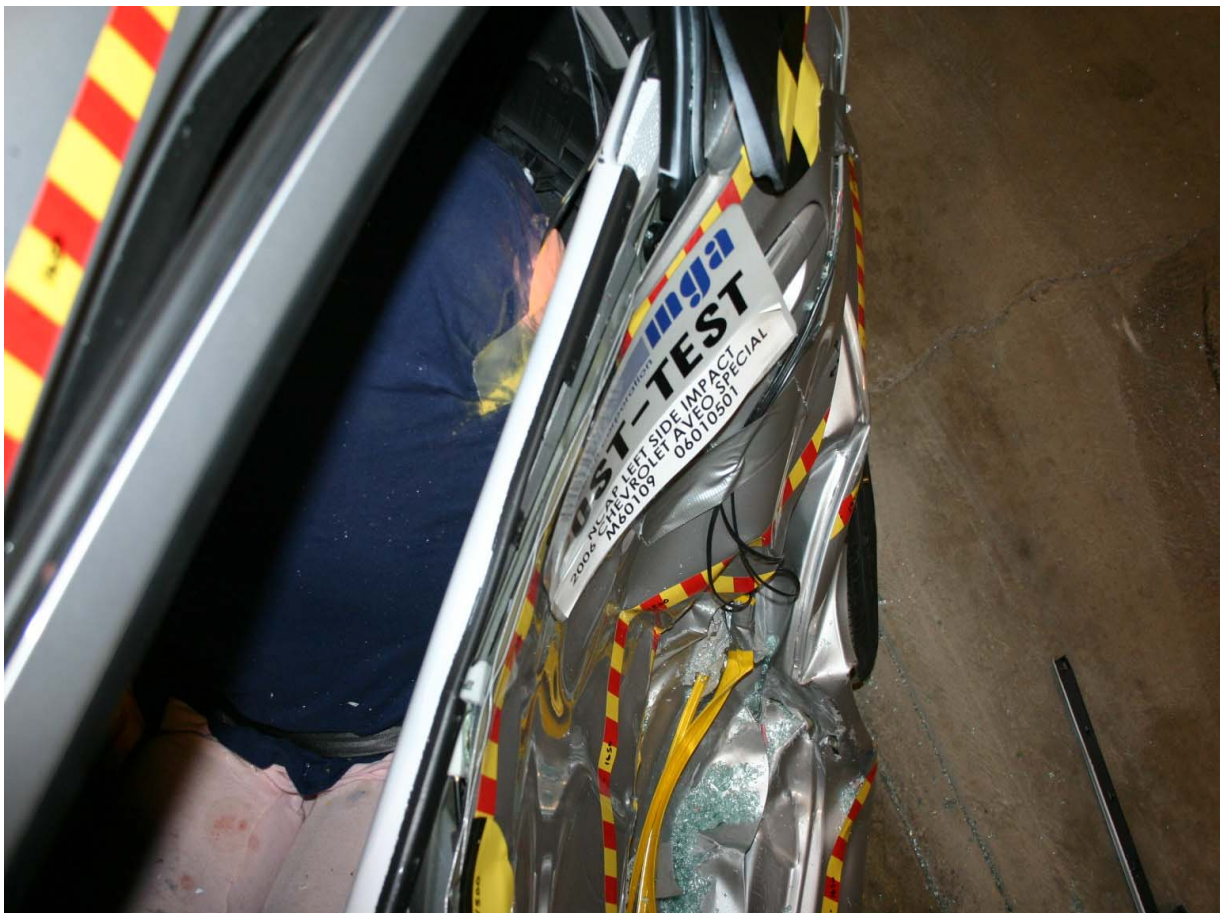
Pre-Test Passenger Dummy (Through Window)



Post-Test Passenger Dummy (Through Window)



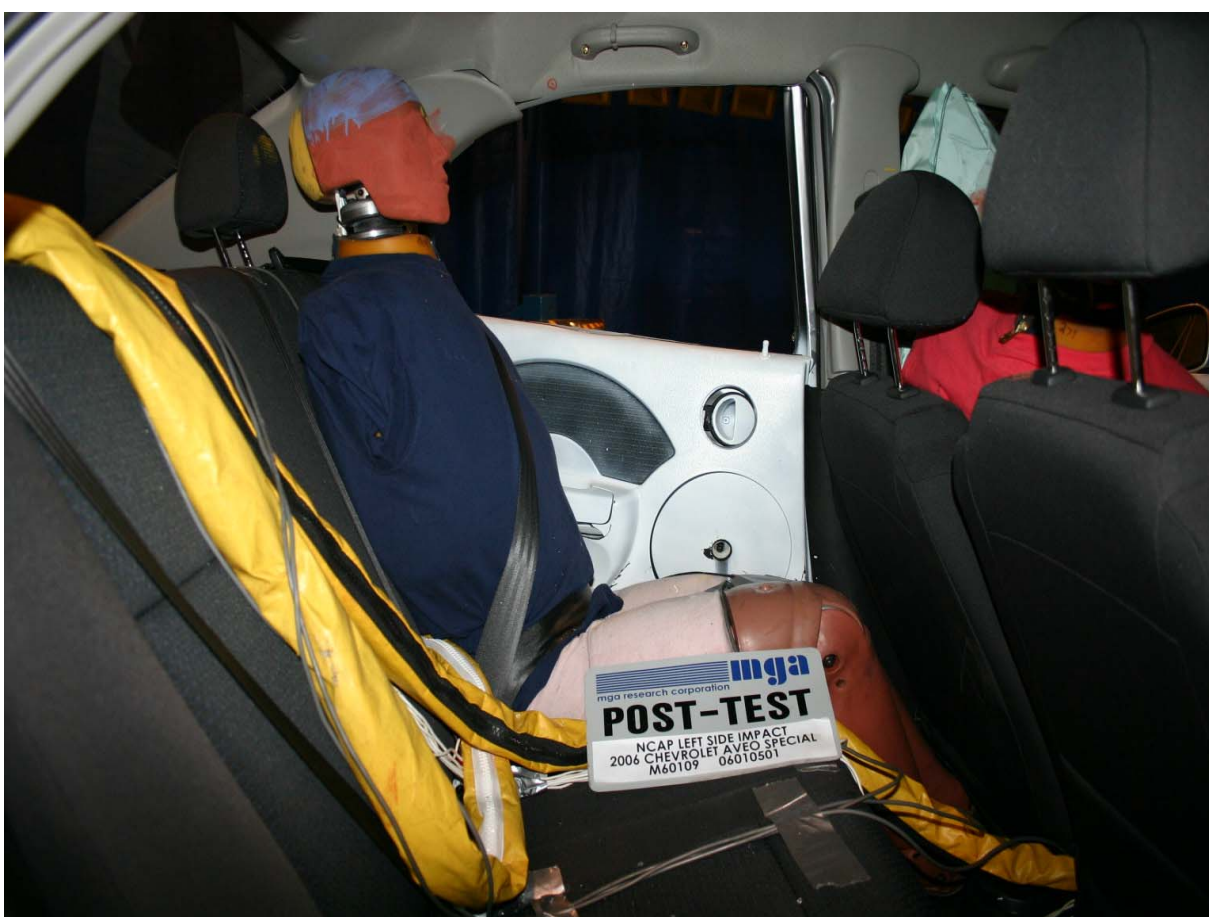
Pre-Test Passenger Dummy Clearance From Door



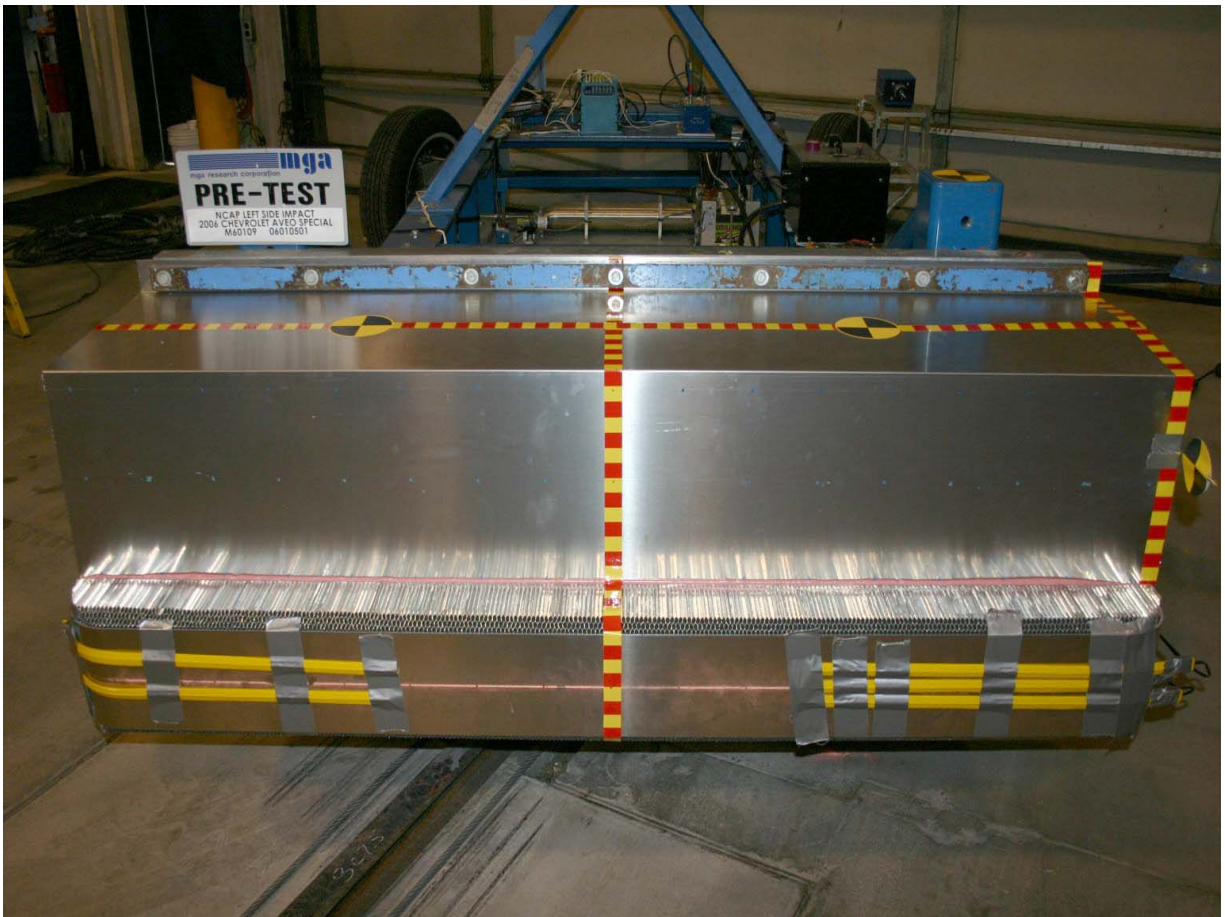
Post-Test Passenger Dummy Clearance From Door



Pre-Test Passenger Dummy Right Side View



Post-Test Passenger Dummy Right Side View



Pre-Test Front View of Deformable Barrier



Post-Test Front View of Deformable Barrier



Pre-Test Top View of Deformable Barrier



Post-Test Top View of Deformable Barrier



Pre-Test Right Side View of Deformable Barrier



Post-Test Right Side View of Deformable Barrier



Pre-Test Left Side View of Deformable Barrier



Post-Test Left Side View of Deformable Barrier



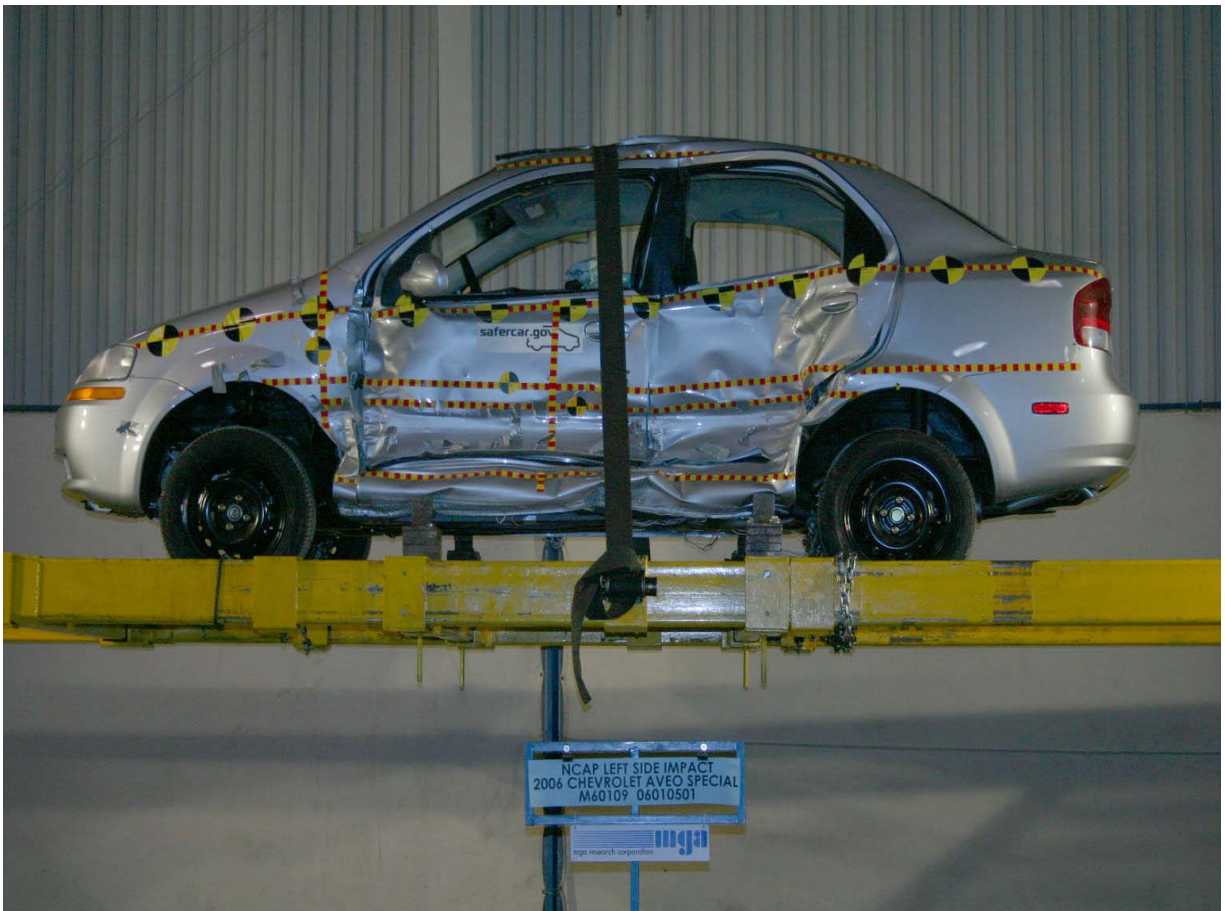
Vehicle on Rollover Device (90 Degrees)



Vehicle on Rollover Device (180 Degrees)



Vehicle on Rollover Device (270 Degrees)



Vehicle on Rollover Device (360 Degrees)

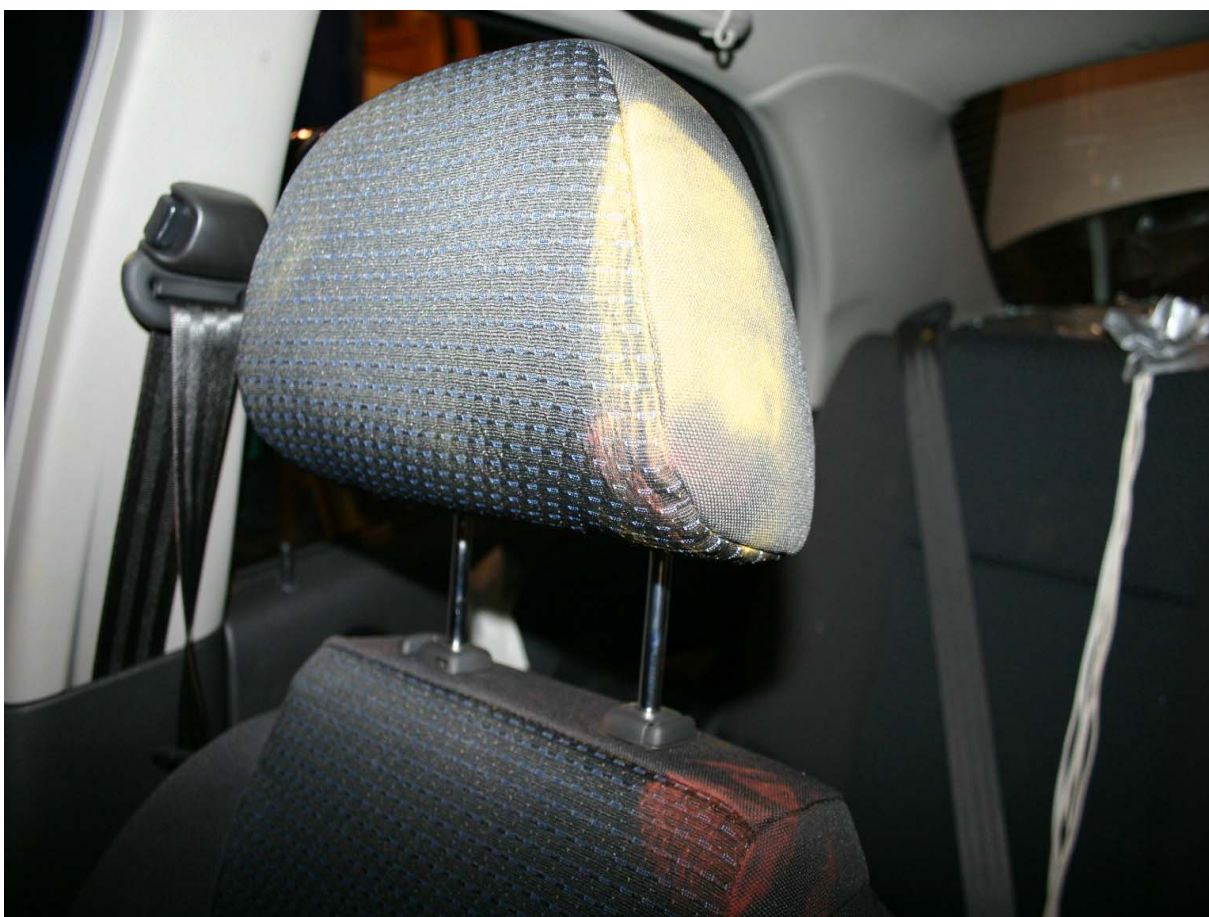


100,00 ms • 5 Jan 2006 11:42 • T0: 21 • 1,000 fps • Frame: 121

Vehicle Impact



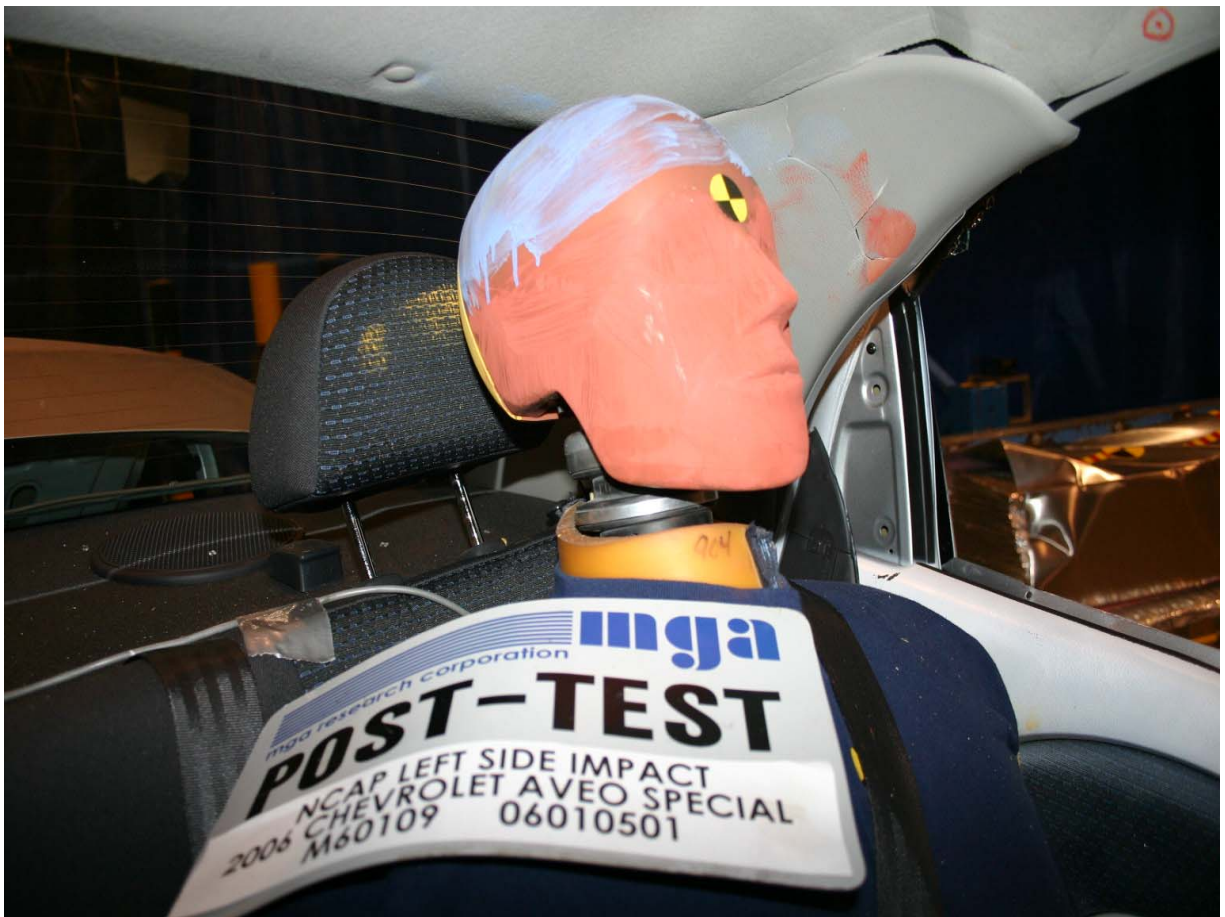
Post-Test Driver Dummy Head Contact



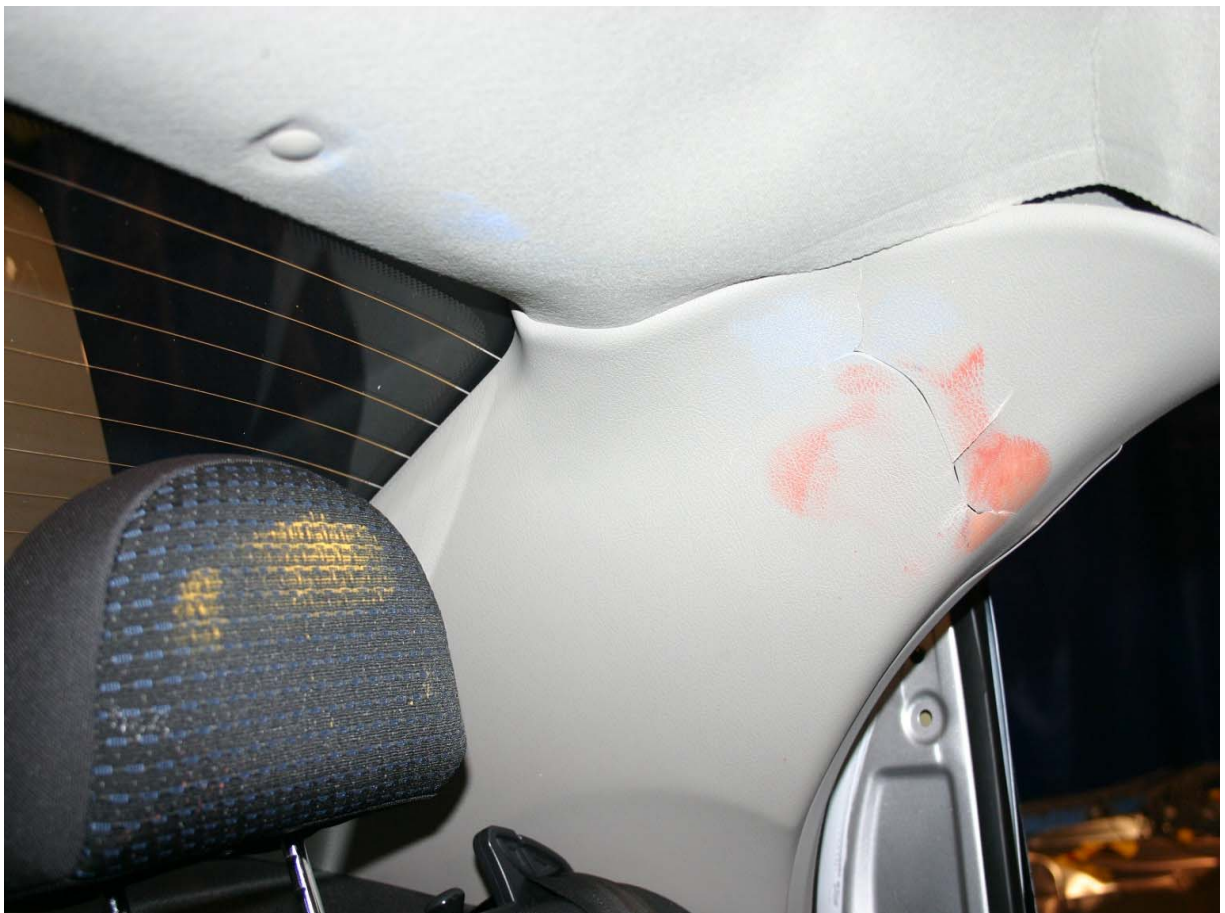
Post-Test Driver Dummy Head Contact (Passenger Headrest)



Post-Test Driver Dummy Torso Contact



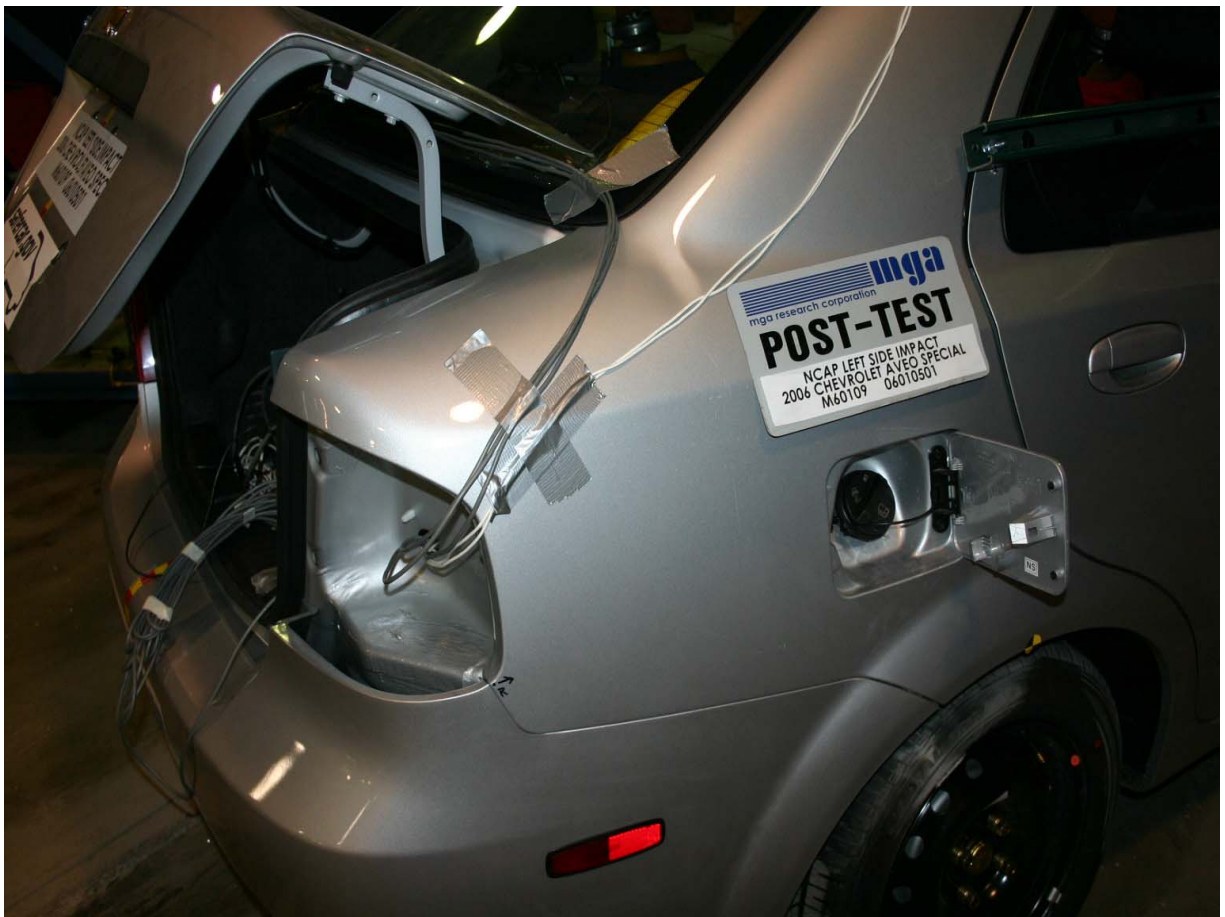
Post-Test Passenger Dummy Head Contact



Post-Test Passenger Dummy Head Contact (C-Pillar)



Post-Test Passenger Dummy Torso Contact



Fuel Filler Cap Door After Impact



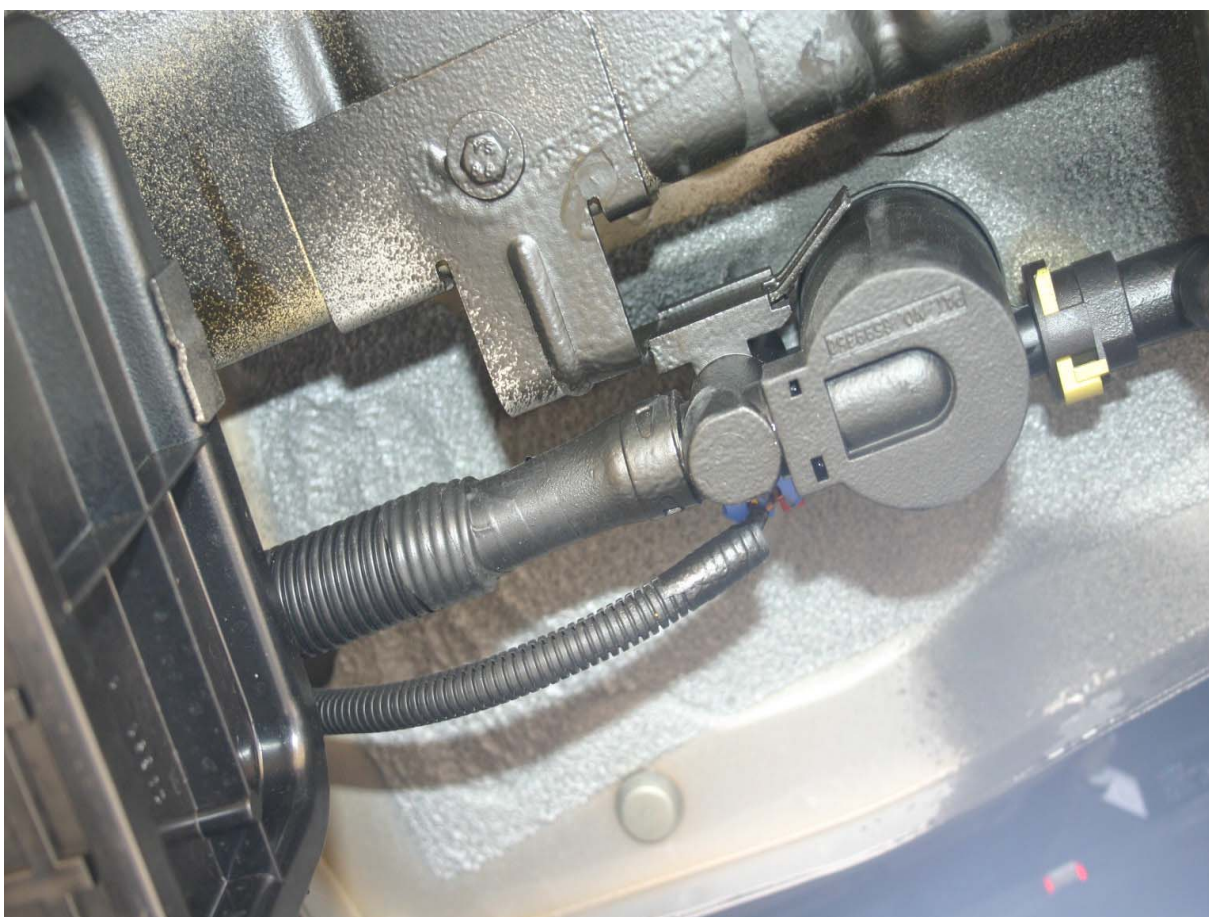
Trunk After Impact



Fuel Leakage



Fuel Leakage Location View #1



Fuel Leakage Location View #2

APPENDIX B

SID/HIII RESPONSE DATA TRACES

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The following dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.dot.gov

Driver Head X Primary

Driver Head Y Primary

Driver Head Z Primary

Driver Head X Redundant

Driver Head Y Redundant

Driver Head Z Redundant

Driver Upper Neck Force X

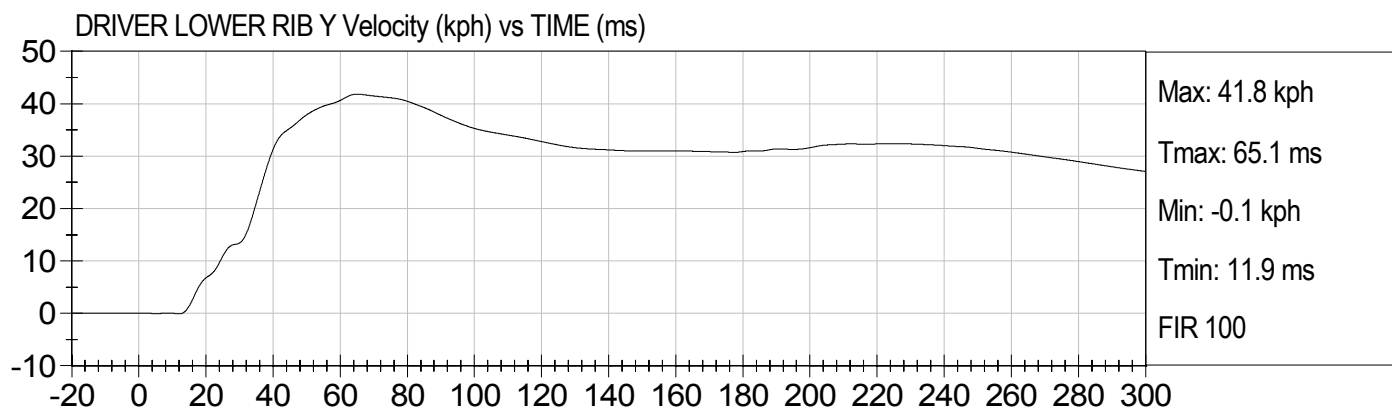
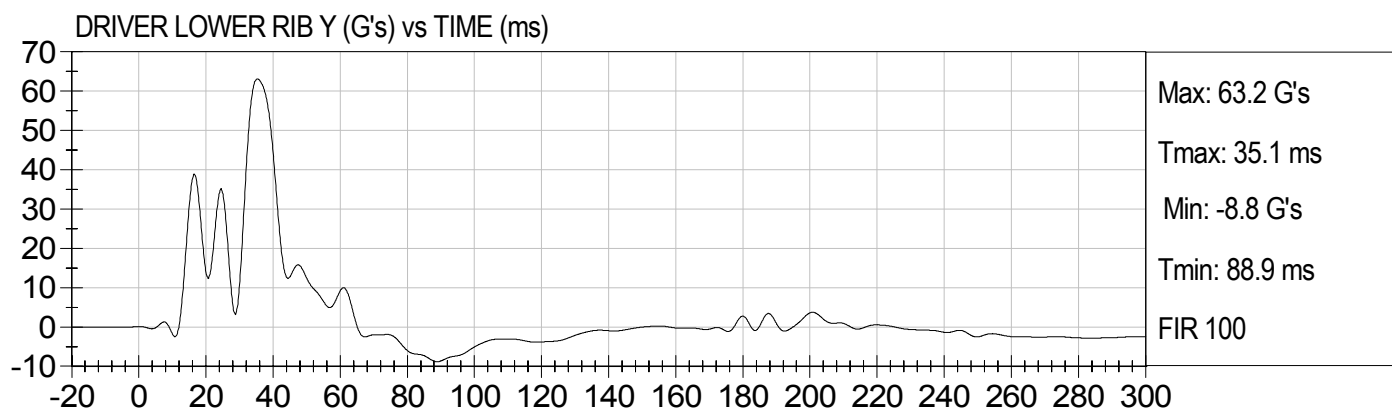
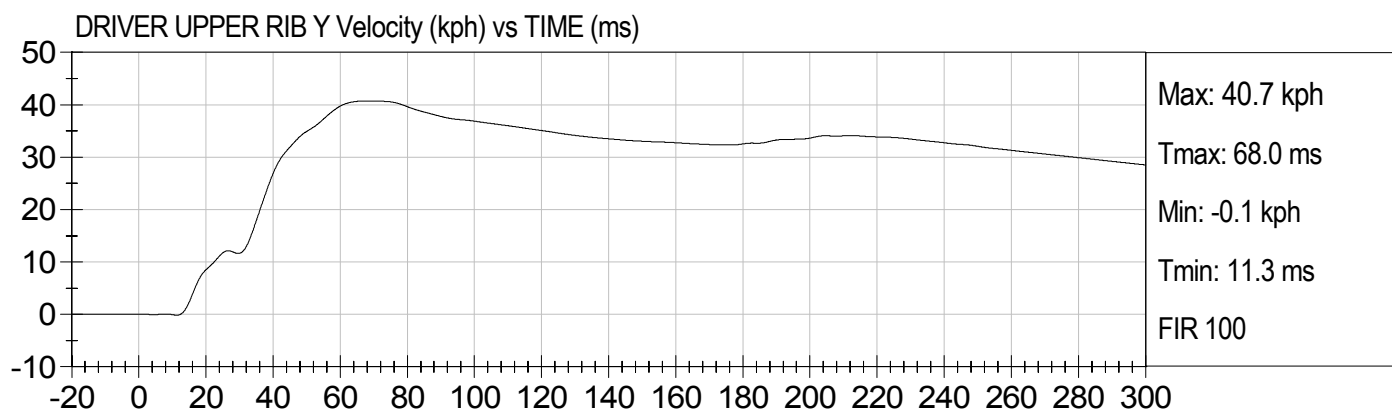
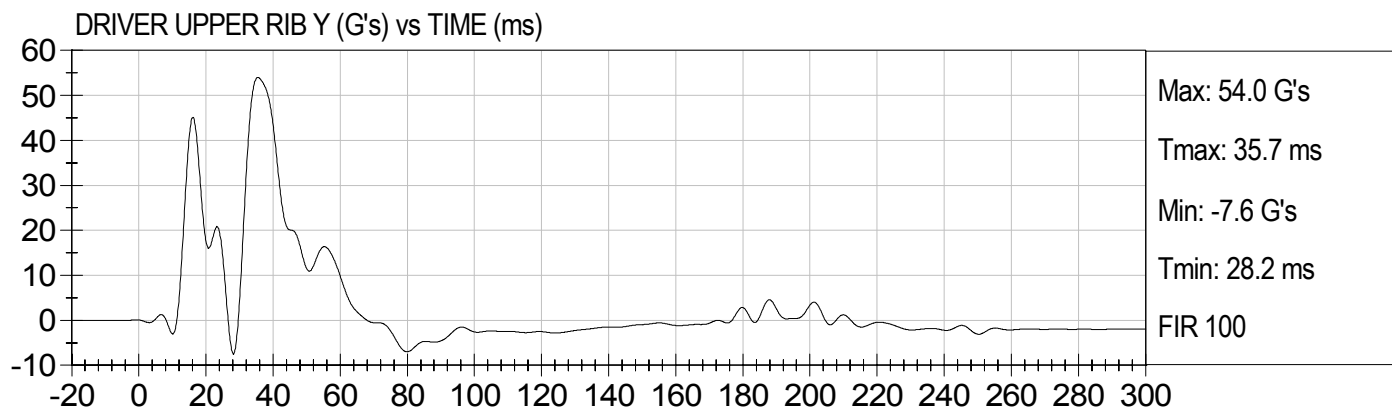
Driver Upper Neck Force Y

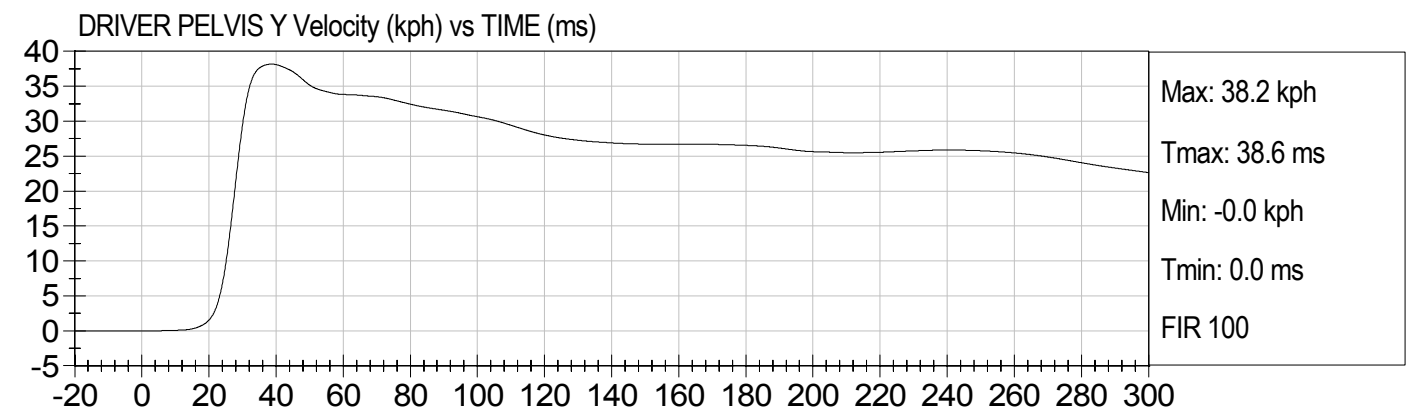
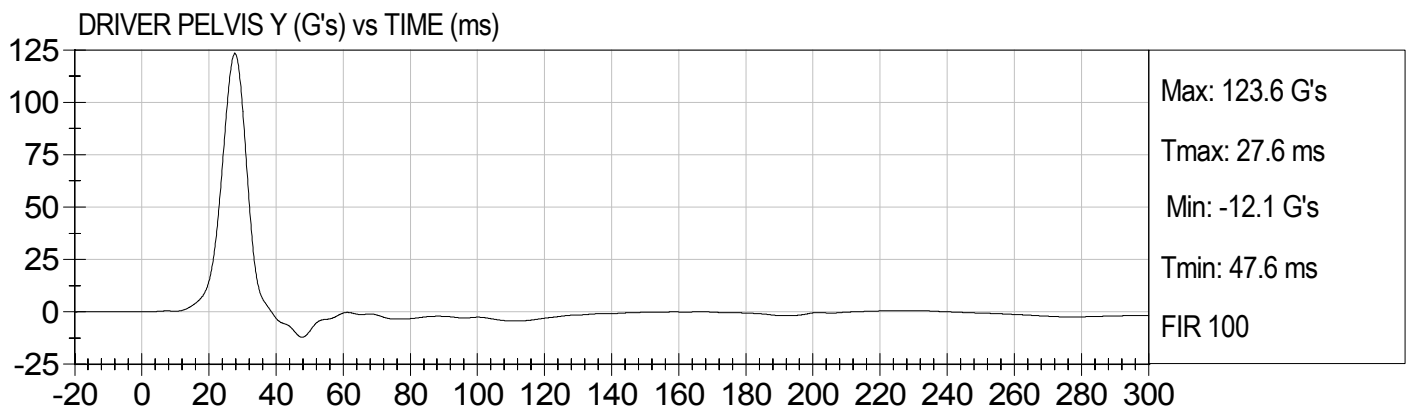
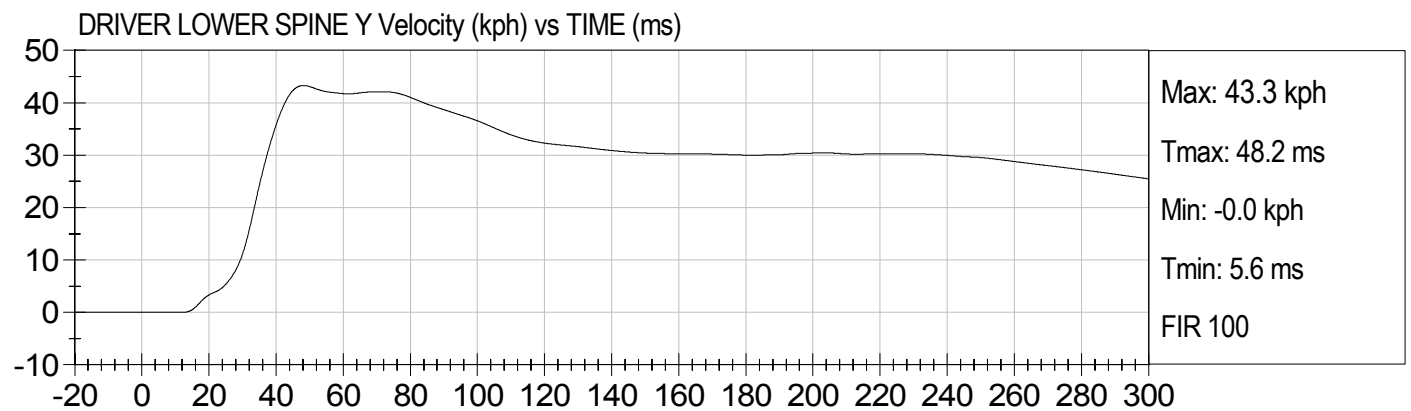
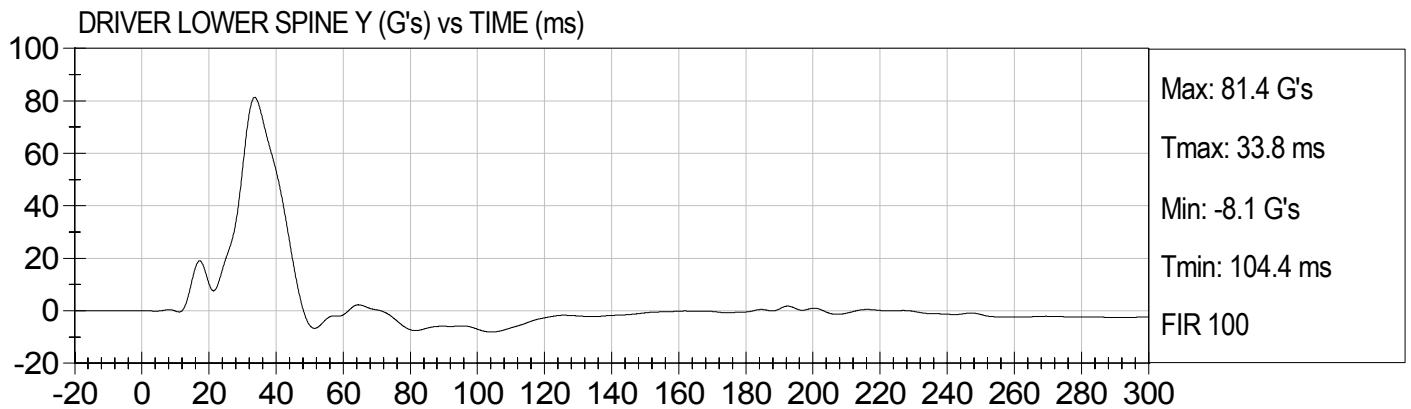
Driver Upper Neck Force Z

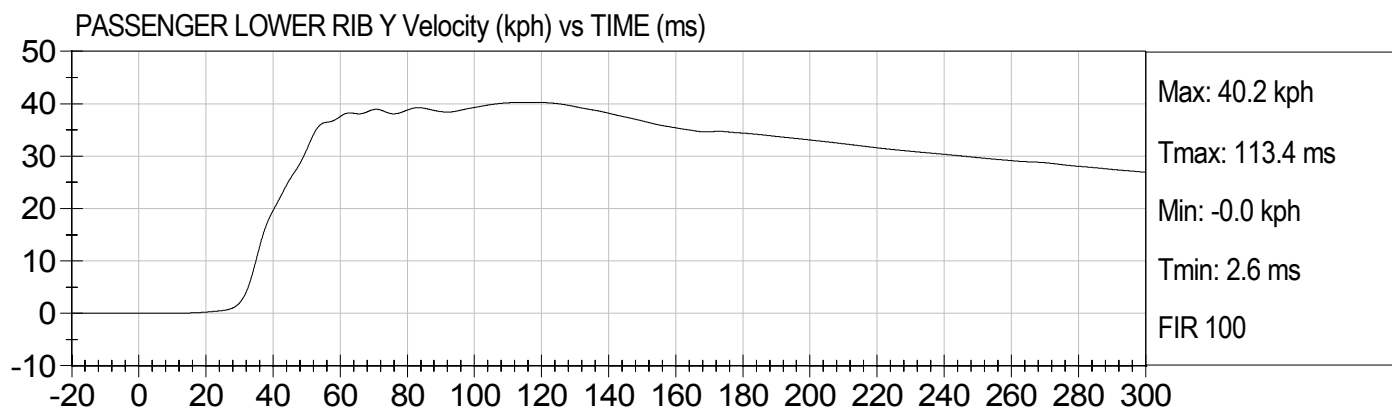
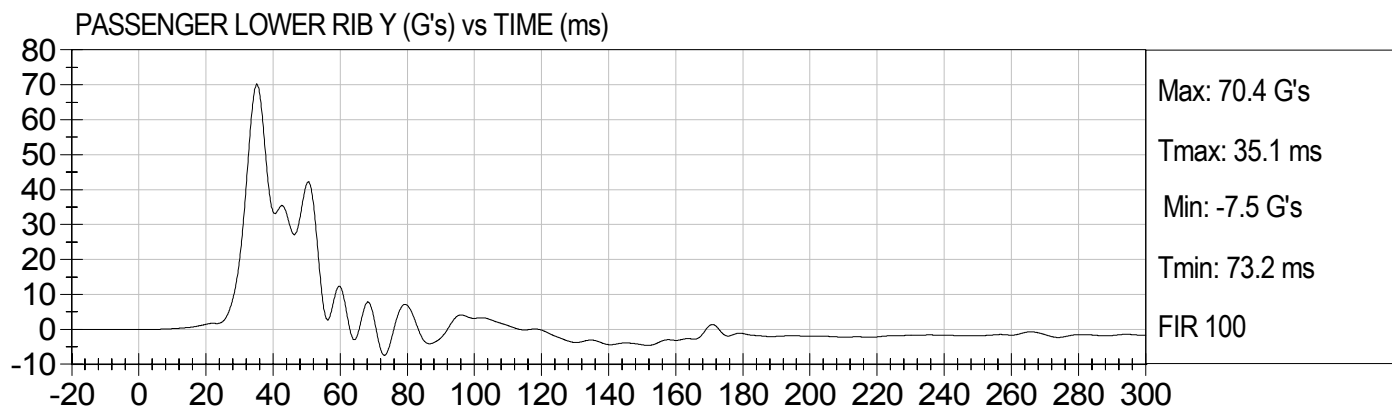
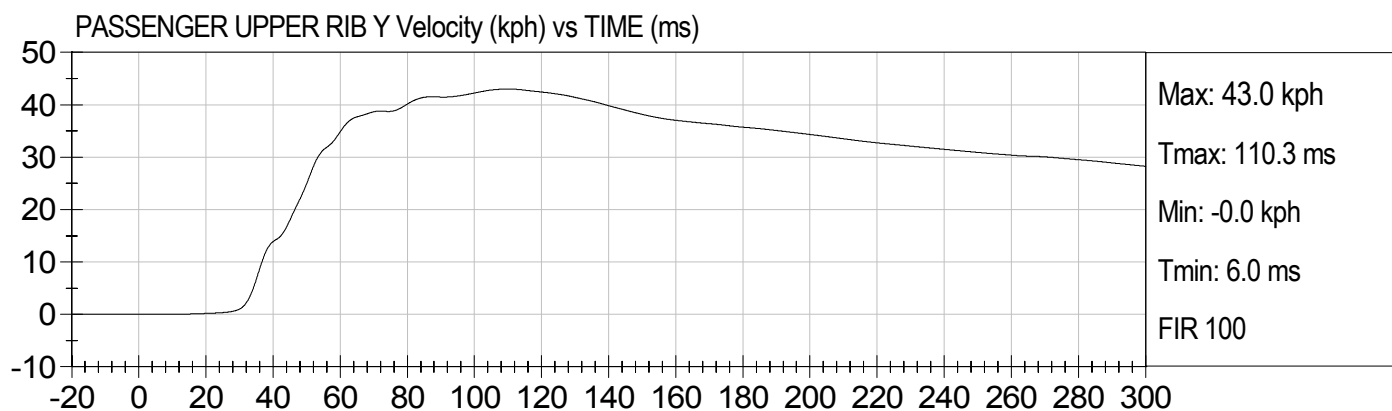
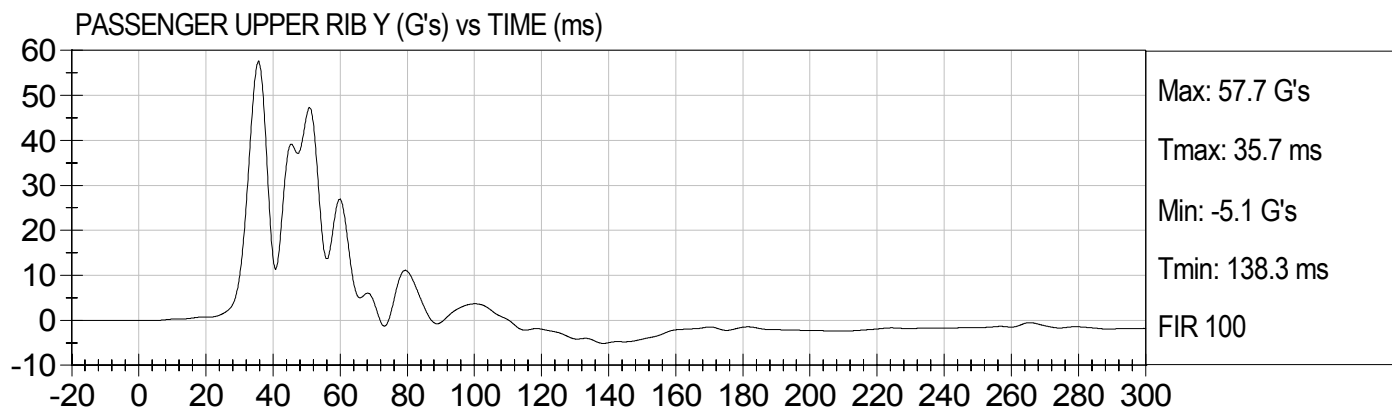
Driver Upper Neck Moment X

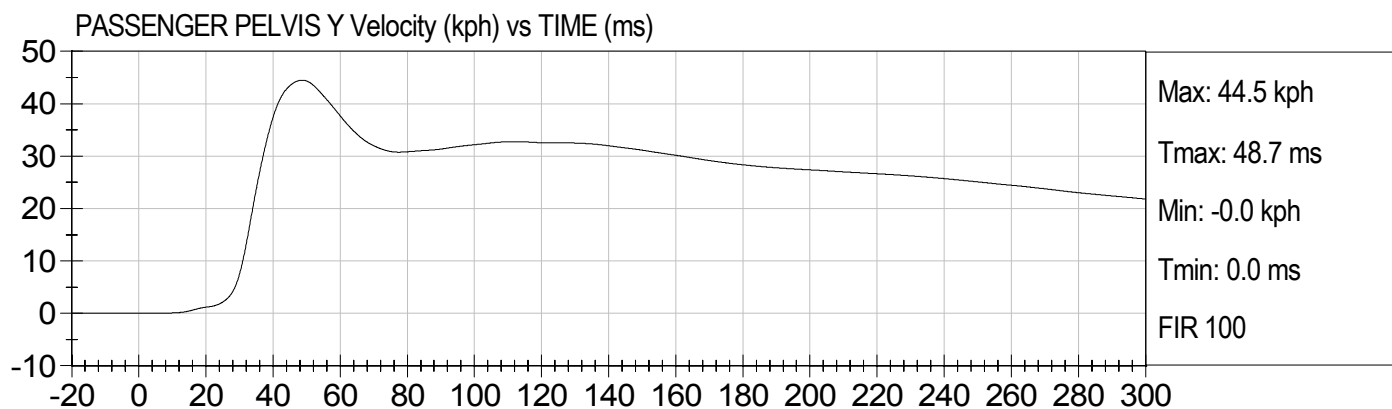
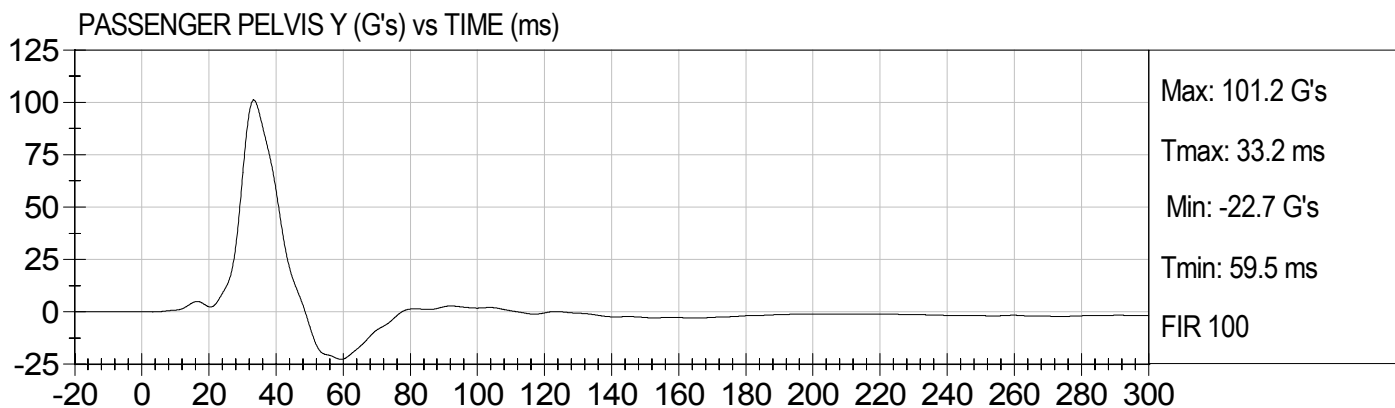
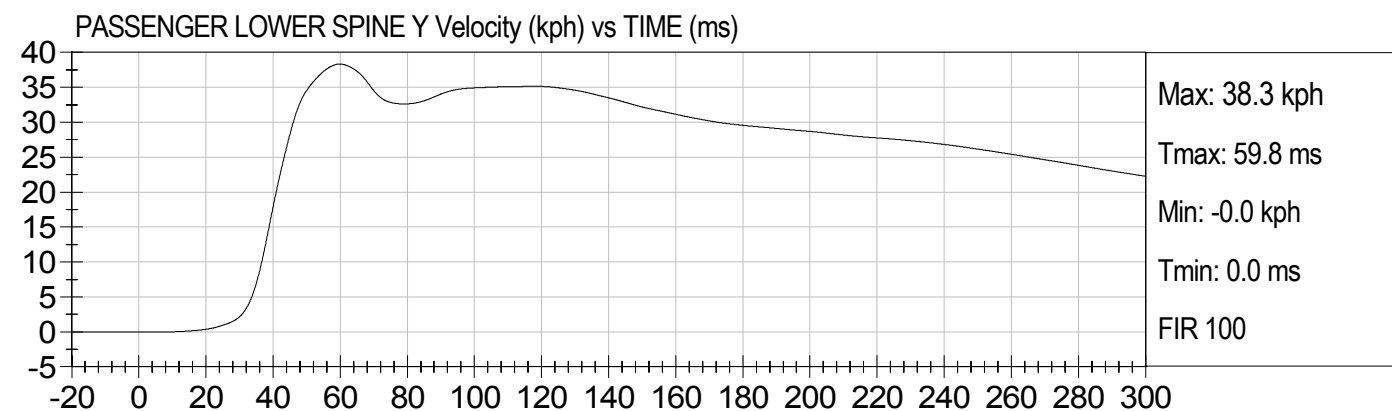
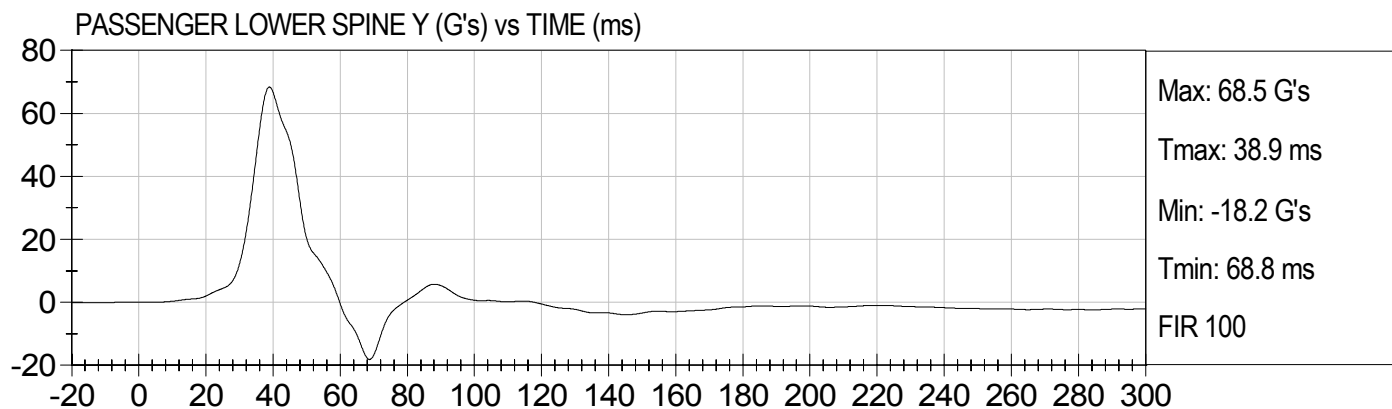
Driver Upper Neck Moment Y
Driver Upper Neck Moment Z
Driver Upper Rib Redundant Y
Driver Lower Rib Redundant Y
Driver Lower Spine Redundant Y
Driver Pelvis Redundant Y
Driver Thorax Contact
Driver Pelvis Contact
Passenger Head X Primary
Passenger Head Y Primary
Passenger Head Z Primary
Passenger Head X Redundant
Passenger Head Y Redundant
Passenger Head Z Redundant
Passenger Upper Neck Force X
Passenger Upper Neck Force Y
Passenger Upper Neck Force Z
Passenger Upper Neck Moment X
Passenger Upper Neck Moment Y
Passenger Upper Neck Moment Z
Passenger Upper Rib Redundant Y
Passenger Lower Rib Redundant Y
Passenger Lower Spine Redundant Y
Passenger Pelvis Redundant Y
Passenger Thorax Contact
Passenger Pelvis Contact
Vehicle Right Sill at Front Seat X
Vehicle Right Sill at Front Seat Y
Vehicle Right Sill at Front Seat Z
Vehicle Right Sill at Rear Seat X
Vehicle Right Sill at Rear Seat Y
Vehicle Right Sill at Rear Seat Z

Vehicle Rear Floor Above Axle X
Vehicle Rear Floor Above Axle Y
Vehicle Rear Floor Above Axle Z
Vehicle Left Sill at Rear Door Y
Vehicle Left Sill at Front Door Y
Vehicle Right Rear Occupant Compartment
Vehicle B-Post Lower Y
Vehicle B-Post Middle Y
Vehicle A-Post Lower Y
Vehicle A-Post Middle Y
Vehicle Left Front Seat Track
Vehicle CG X
Vehicle CG Y
Vehicle CG Z
MDB CG X
MDB CG Y
MDB CG Z
MDB Rear X
MDB Rear Y
MDB Rear Z
MDB Left Bumper Contact
MDB Right Bumper Contact









APPENDIX C
DUMMY CALIBRATION DATA

CERTIFICATION DATA

Dummy Serial Number: 271

Calibration Test Results Summary

Dummy Serial Number: 271

Pre-Test Calibration

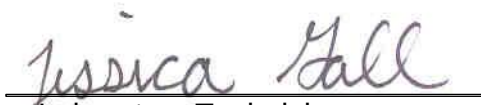
External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SID Calibration Data Sheet
Side Impact Dummy
External Measurements

ATD Serial No: 271

Test I.D: D05273

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	905	Pass
RH - Rib Height	mm	501 - 521	502	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	239	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	526	Pass
SW - Knee Pivot to Floor	mm	490 - 505	497	Pass
HW - Hip Width	mm	356 - 391	371	Pass
Overall Test Results			Pass	


Laboratory Technician


Approved By

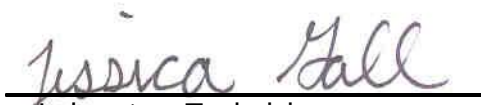
10/10/2005
Test Date

SID Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration (Lateral)

ATD Serial No: 271

Test I.D: D052731

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	31	Pass
Peak Resultant Acceleration	G's	120 to 150	136	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	9	Pass
Overall Test Results				Pass


Laboratory Technician

10/07/2005
Test Date


Approved By



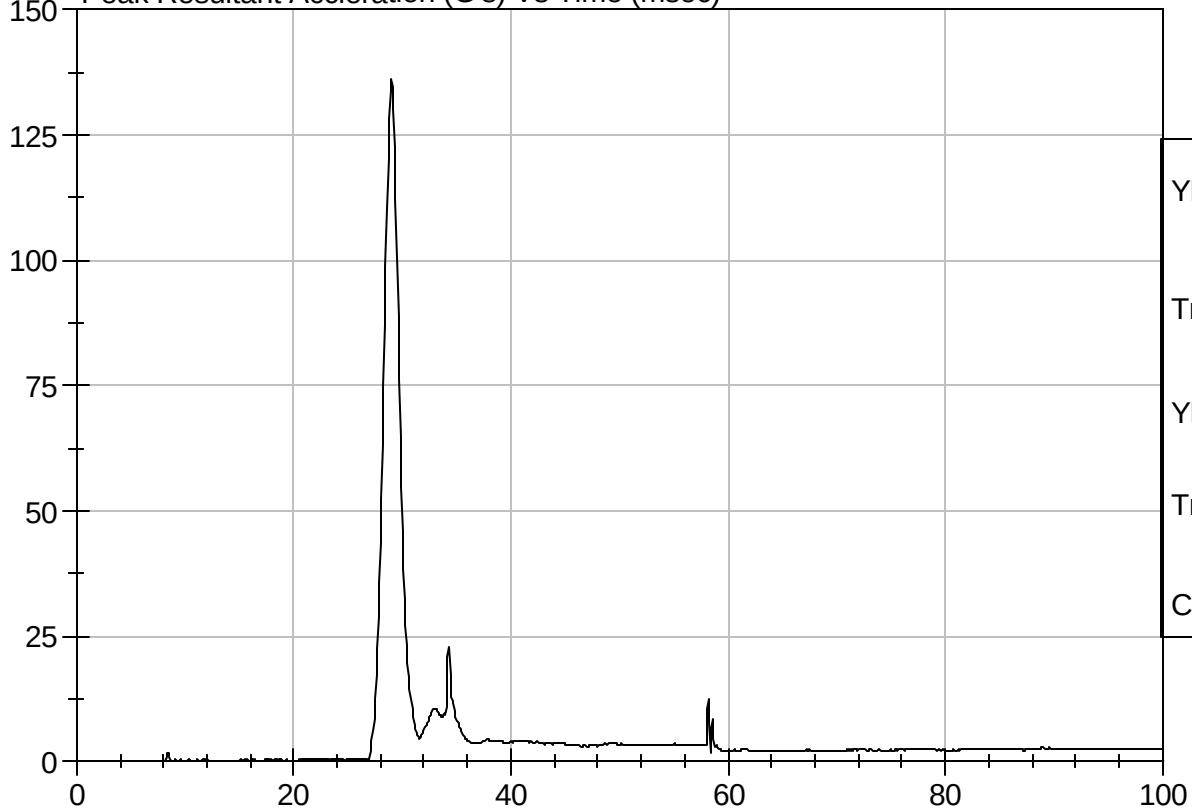
Test Description: Head Drop

Test Date: 10/07/2005

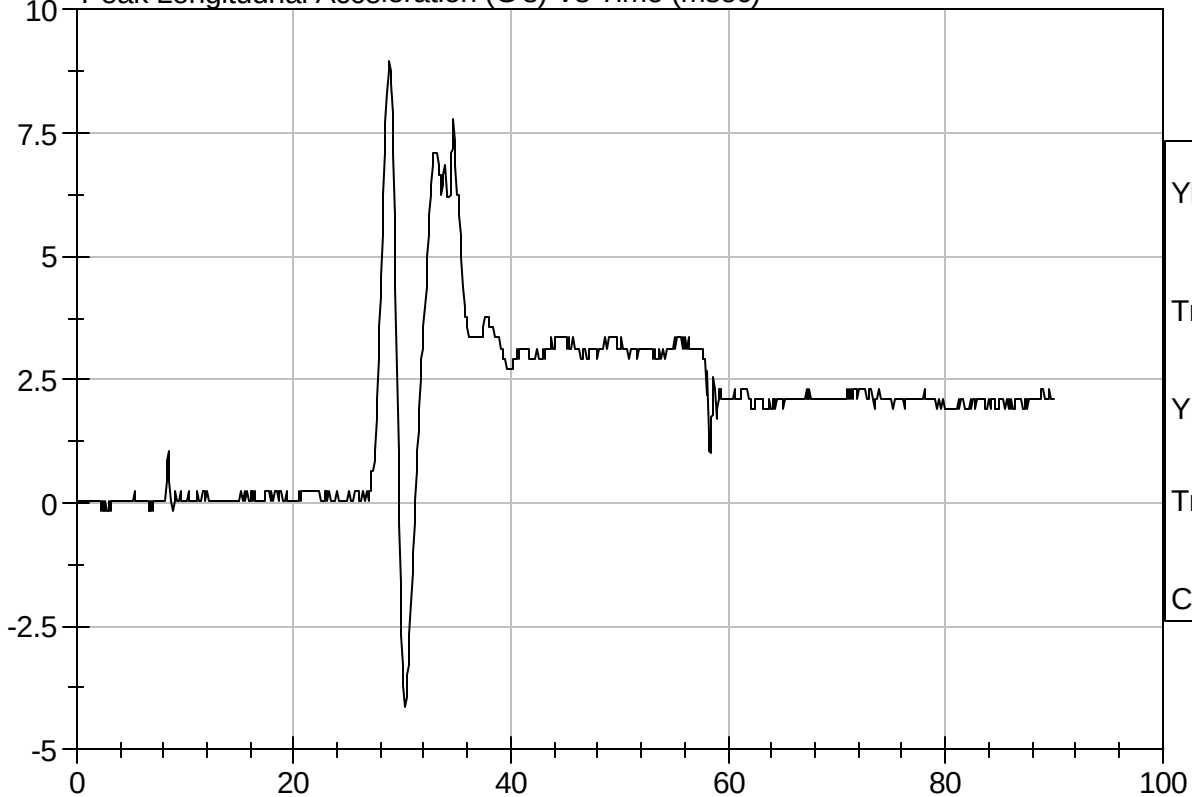
Component: D052731

Speed: 0 ft/s, 0.00 m/s

Peak Resultant Acceleration (G's) Vs Time (msec)



Peak Longitudnal Acceleration (G's) Vs Time (msec)

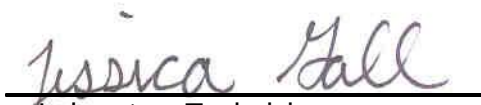


SID Calibration Data Sheet
Side Impact Dummy
Thorax Impact Test

ATD Serial No: 271

Test I.D: D052732

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	22.1	Pass
Laboratory Relative Humidity	%	10 to 70	32	Pass
Probe Velocity	m/s	4.22 - 4.31	4.31	Pass
Upper Rib	G's	37 - 46	45	Pass
Lower Rib	G's	37 - 46	45	Pass
Lower Spine	G's	15 - 22	19	Pass
Overall Test Results				Pass


Laboratory Technician

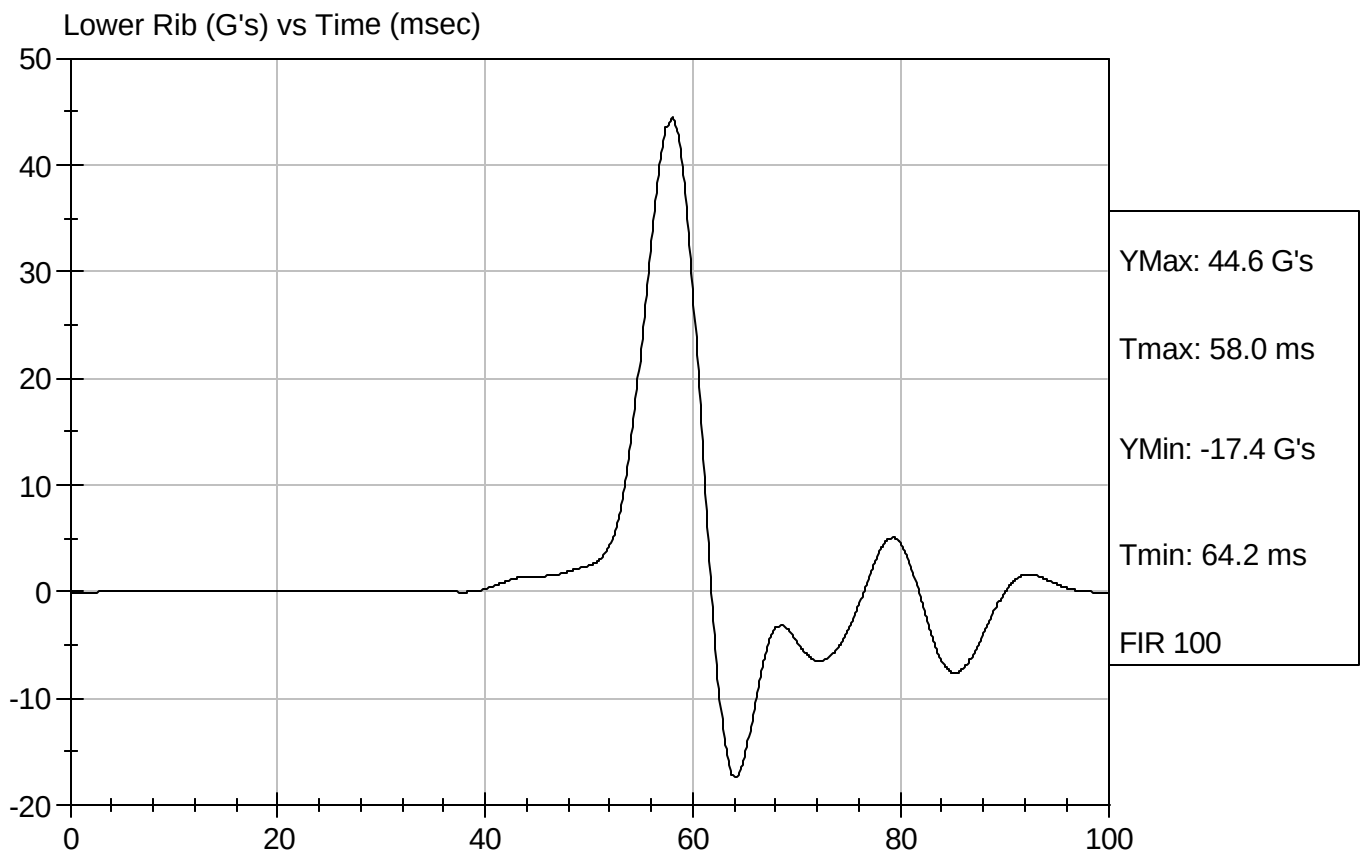
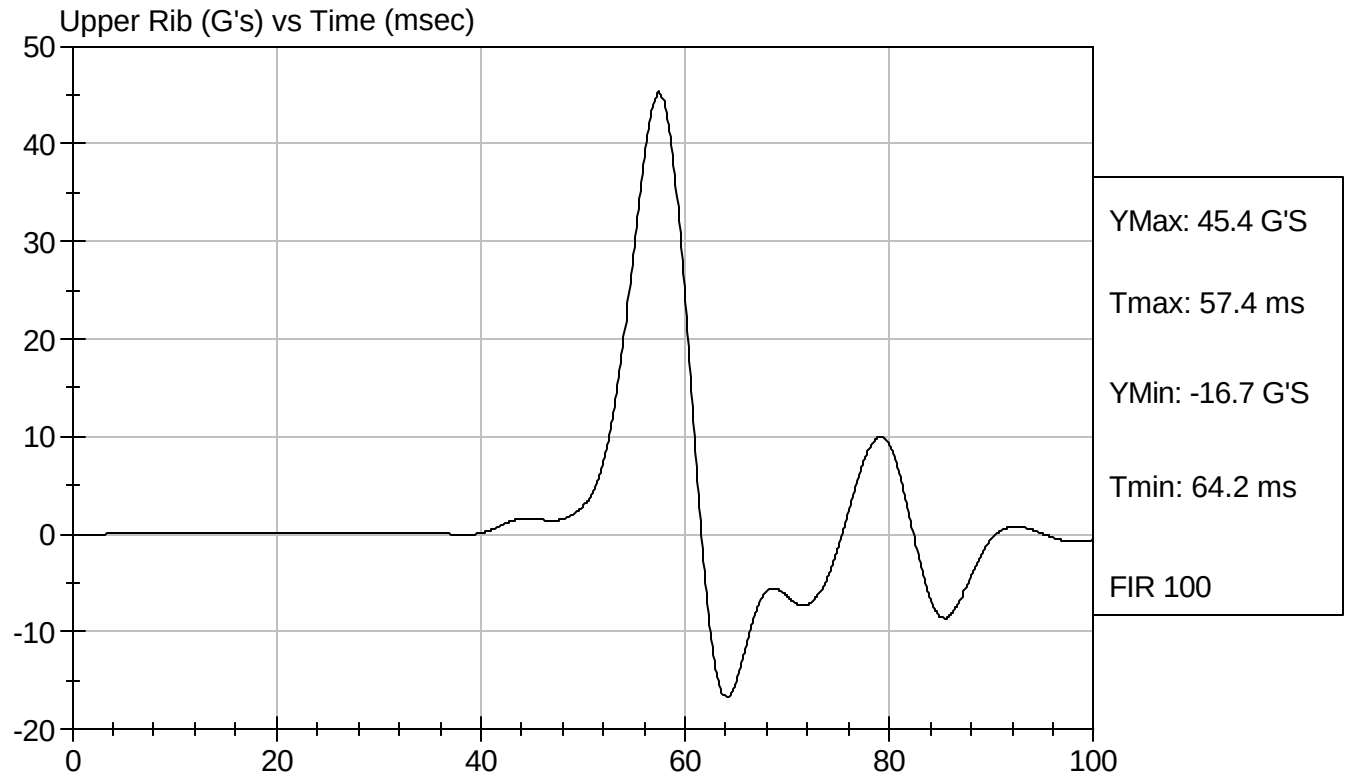

Approved By

10/07/2005
Test Date



Test Desc: Thorax Impact
Component ID: D052732

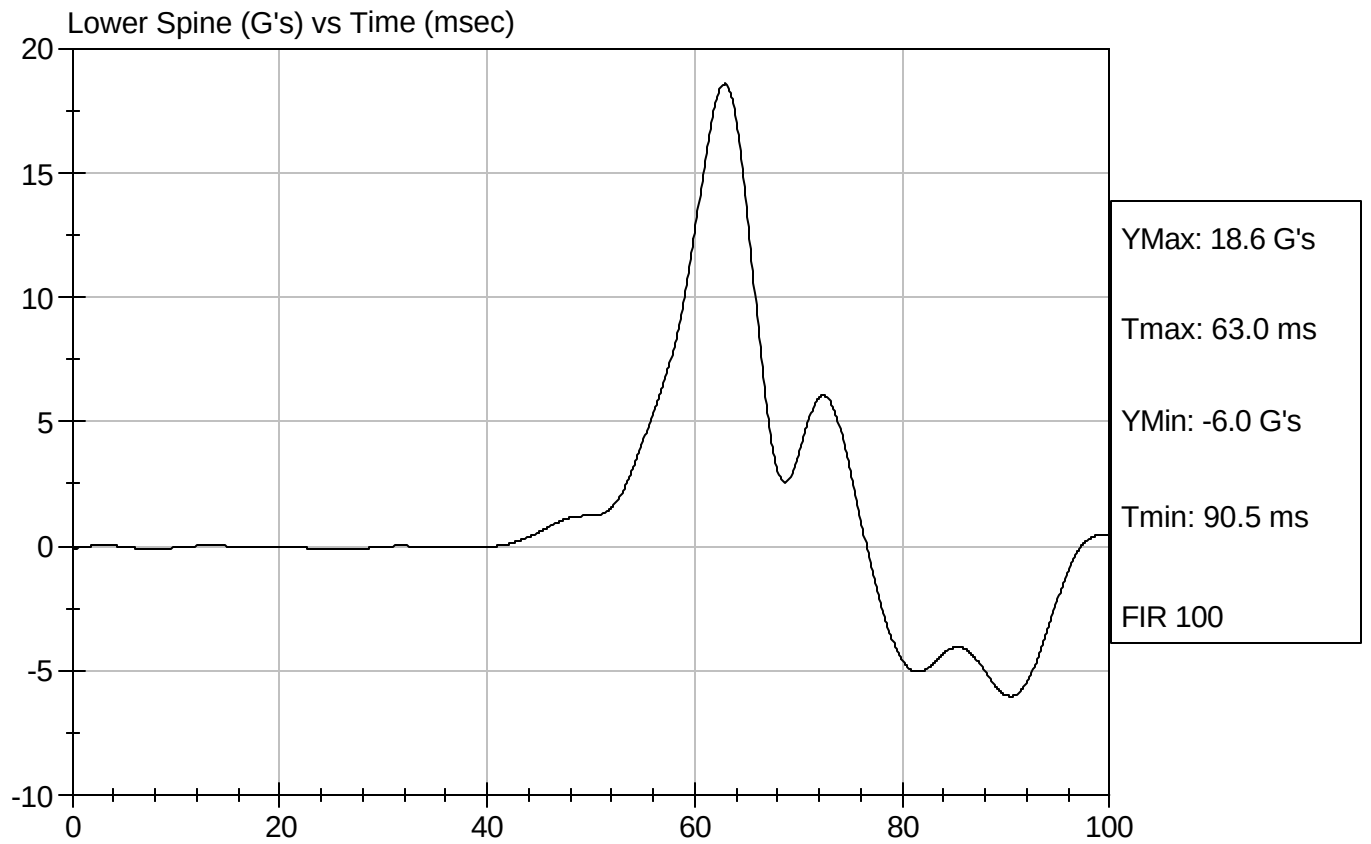
Test Date: 10/07/2005
Speed: 14.16 ft/sec, 4.31 m/sec





Test Desc: Thorax Impact
Component ID: D052732

Test Date: 10/07/2005
Speed: 14.16 ft/sec, 4.31 m/sec



SID Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Test

ATD Serial No: 271

Test I.D: D052733

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	32	Pass
Probe Velocity	m/s	4.27 - 4.33	4.32	Pass
Pelvis Acceleration	G's	40 - 60	41	Pass
			Overall Test Results	Pass

Jessica Hall
Laboratory Technician

10/07/2005

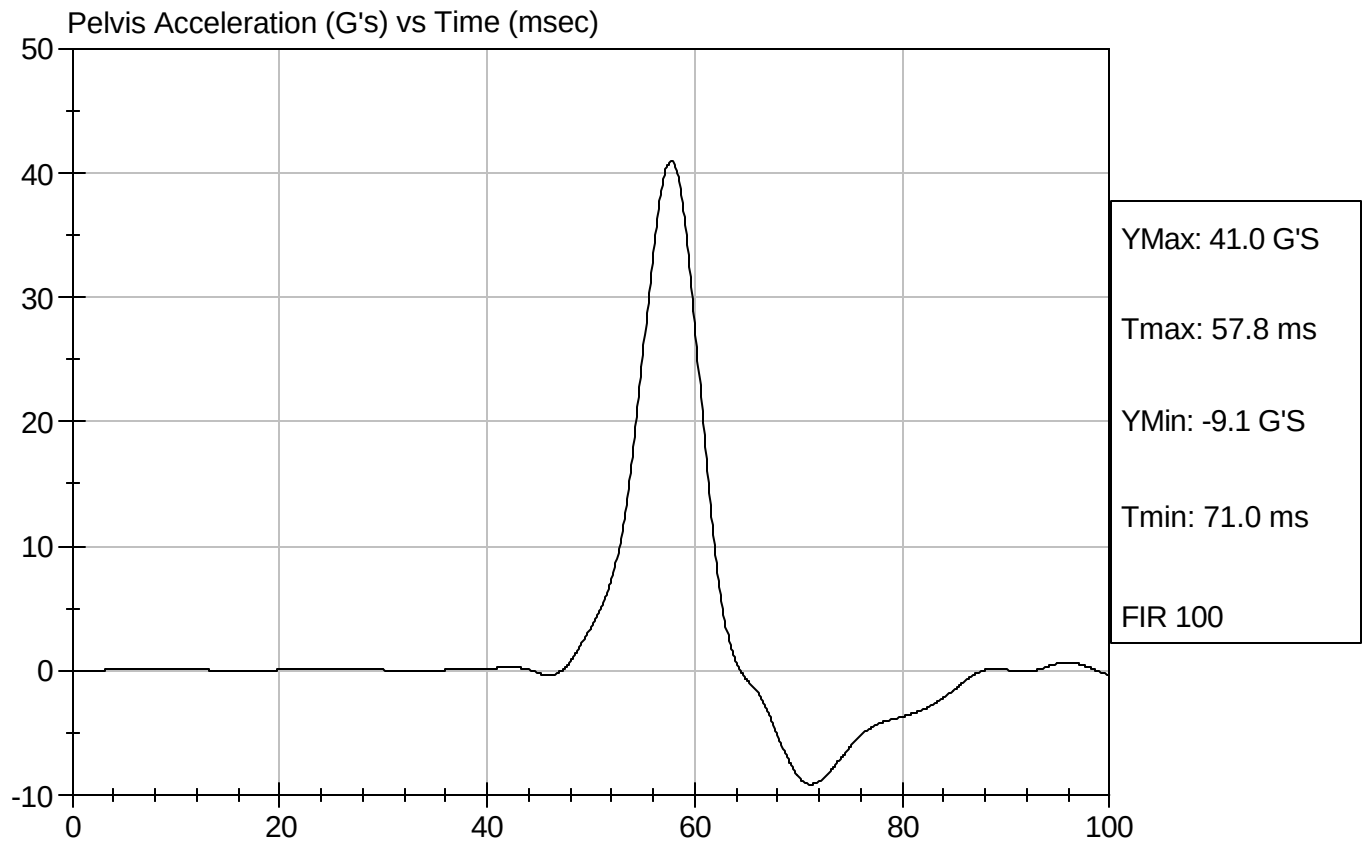
Test Date

David Winkelbauer
Approved By



Test Desc: Pelvis Impact
Component ID: D052733

Test Date: 10/07/2005
Speed: 14.16 ft/sec, 4.32 m/sec



SID Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 271

Test I.D: D052734

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Force At 12.7 mm	N	104 -162	144	Pass
Force At 19 mm	N	163 - 222	203	Pass
Force At 25.4 mm	N	222 - 280	276	Pass
Force At 33 mm	N	325 - 391	389	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

10/07/2005
Test Date

David Winkelbauer
Approved By

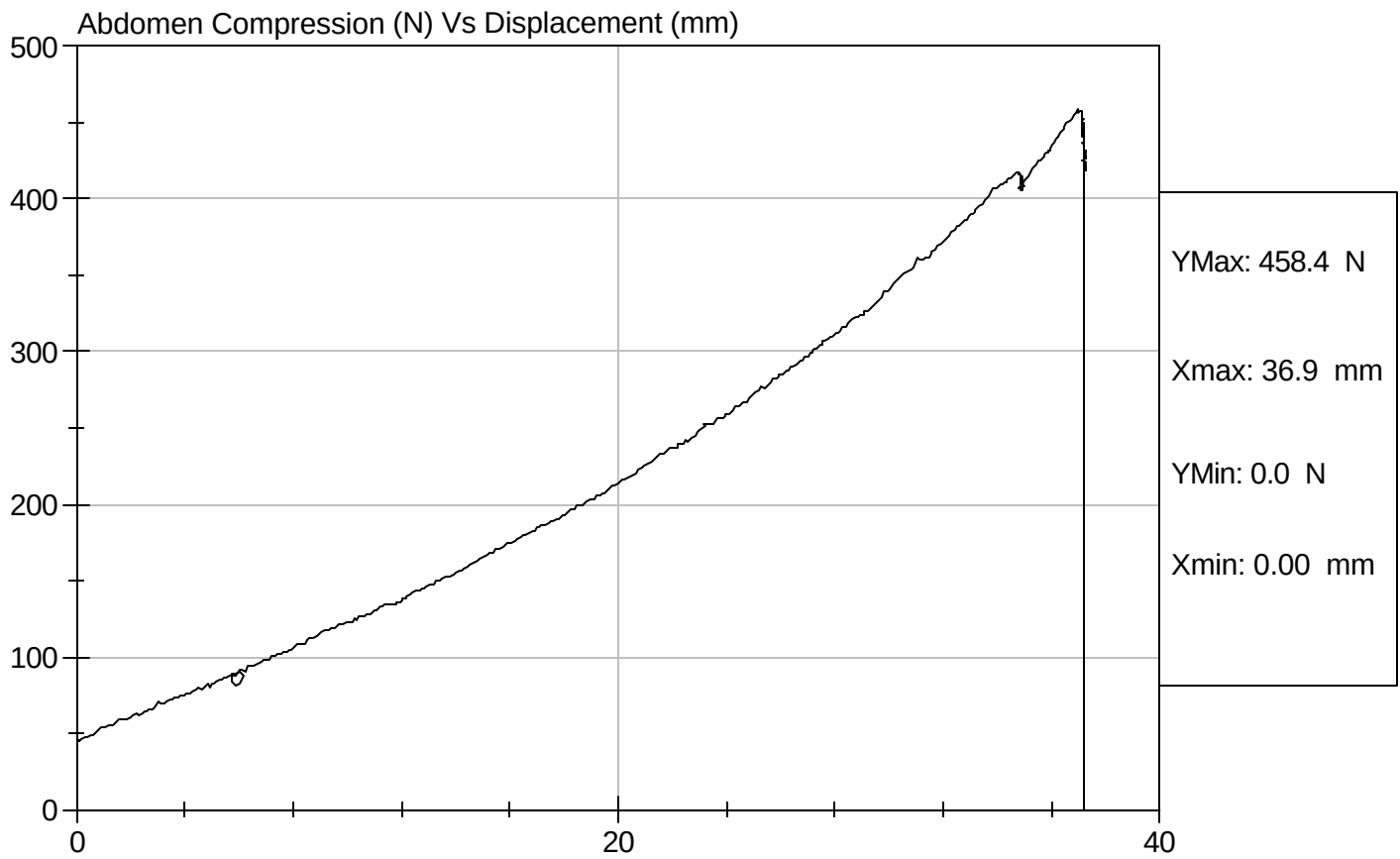


Test Description: Abdomen Compression

Test Date: 10/07/2005

Component: D052734

Speed: 0 ft/sec, 0 m/sec

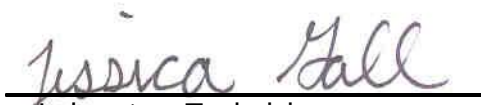


SID Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No: 271

Test I.D: D052735

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	123.4	Pass
Force At 30 deg	N	151.2 - 204.6	185.6	Pass
Force At 40 deg	N	204.6 - 258.0	224.4	Pass
Return Angle	Deg	12 Maximum	4	Pass
Overall Test Results			Pass	


Laboratory Technician


Approved By

10/07/2005

Test Date

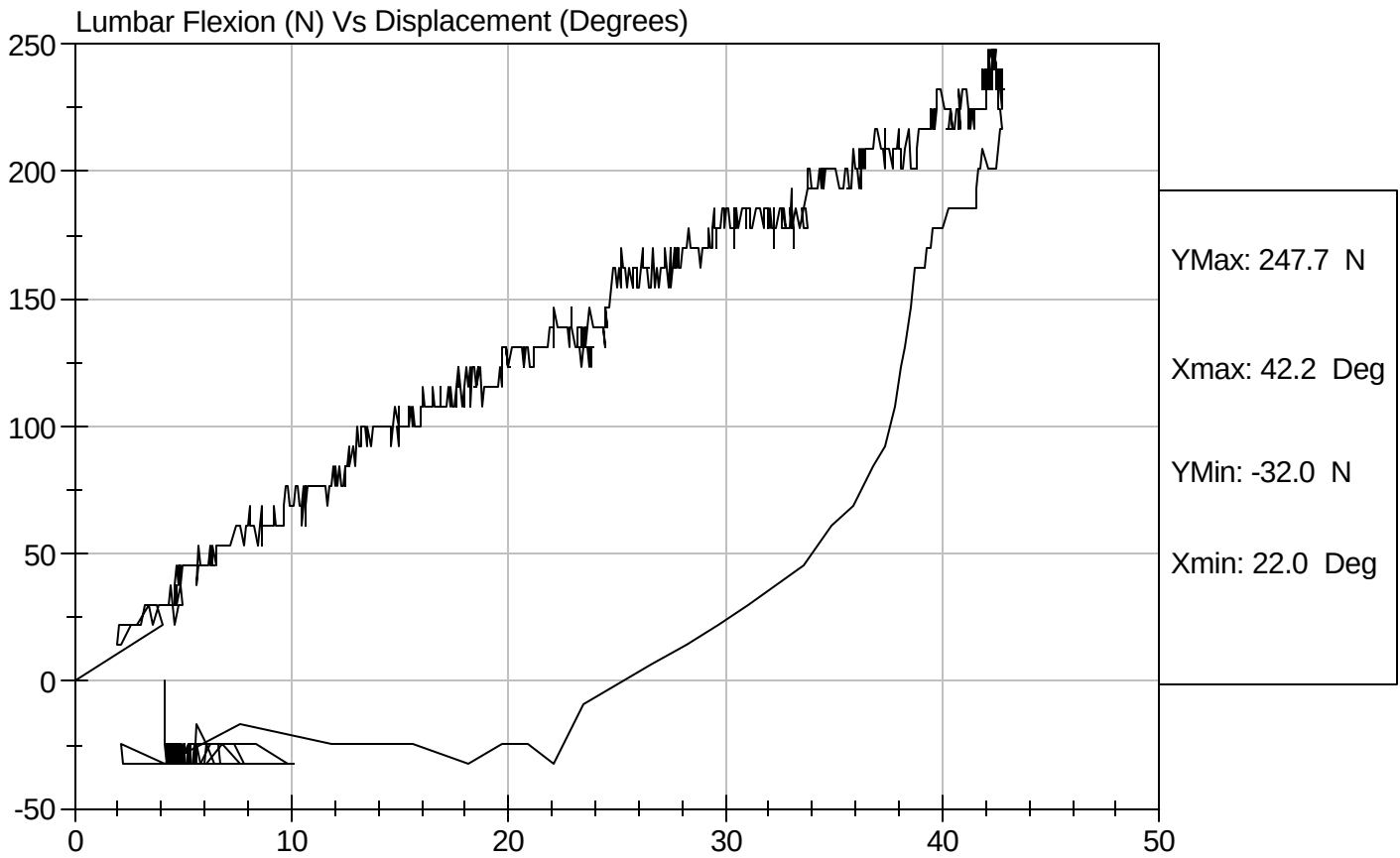


Test Description: Lumbar Flexion

Test Date: 10/07/2005

Component: D052735

Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet
Side Impact Dummy (SID)
Neck Pendulum Test

ATD Serial No: 271

Test I.D: D052739

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	22.1	Pass
Laboratory Relative Humidity		%	10 to 70	32	Pass
Impact Velocity		m/s	6.89 to 7.13	7.07	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.34	Pass
	20 msec	m/s	4.12 to 5.10	4.63	Pass
	30 msec	m/s	5.73 to 7.01	6.51	Pass
	40 to 70 msec	m/s	6.27 to 7.64	7.20	Pass
Midsagittal Plane Max Rotation		deg	66 to 82	78	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	61	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	78	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	62	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	13	Pass


 Laboratory Technician

10/10/2005

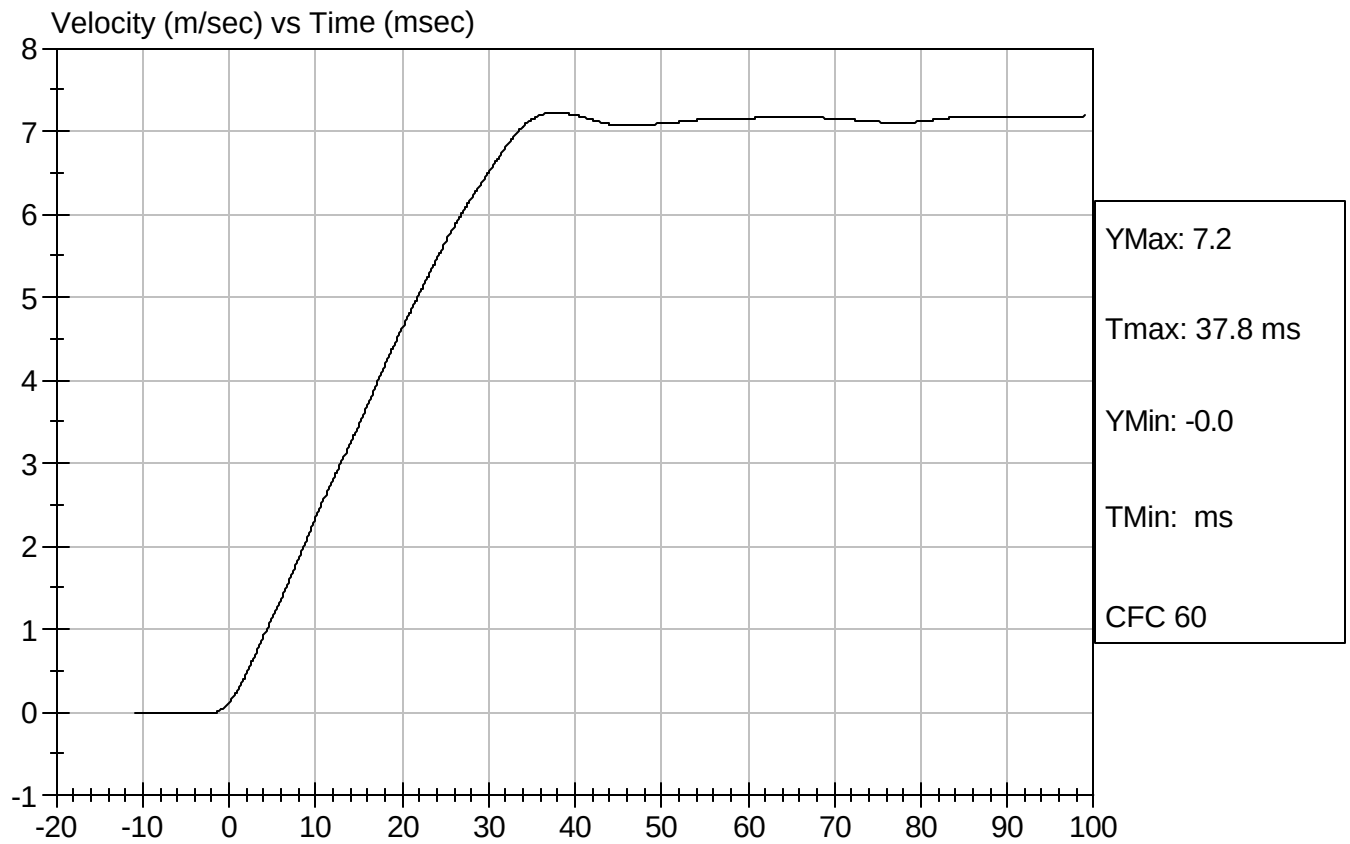
Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D052739

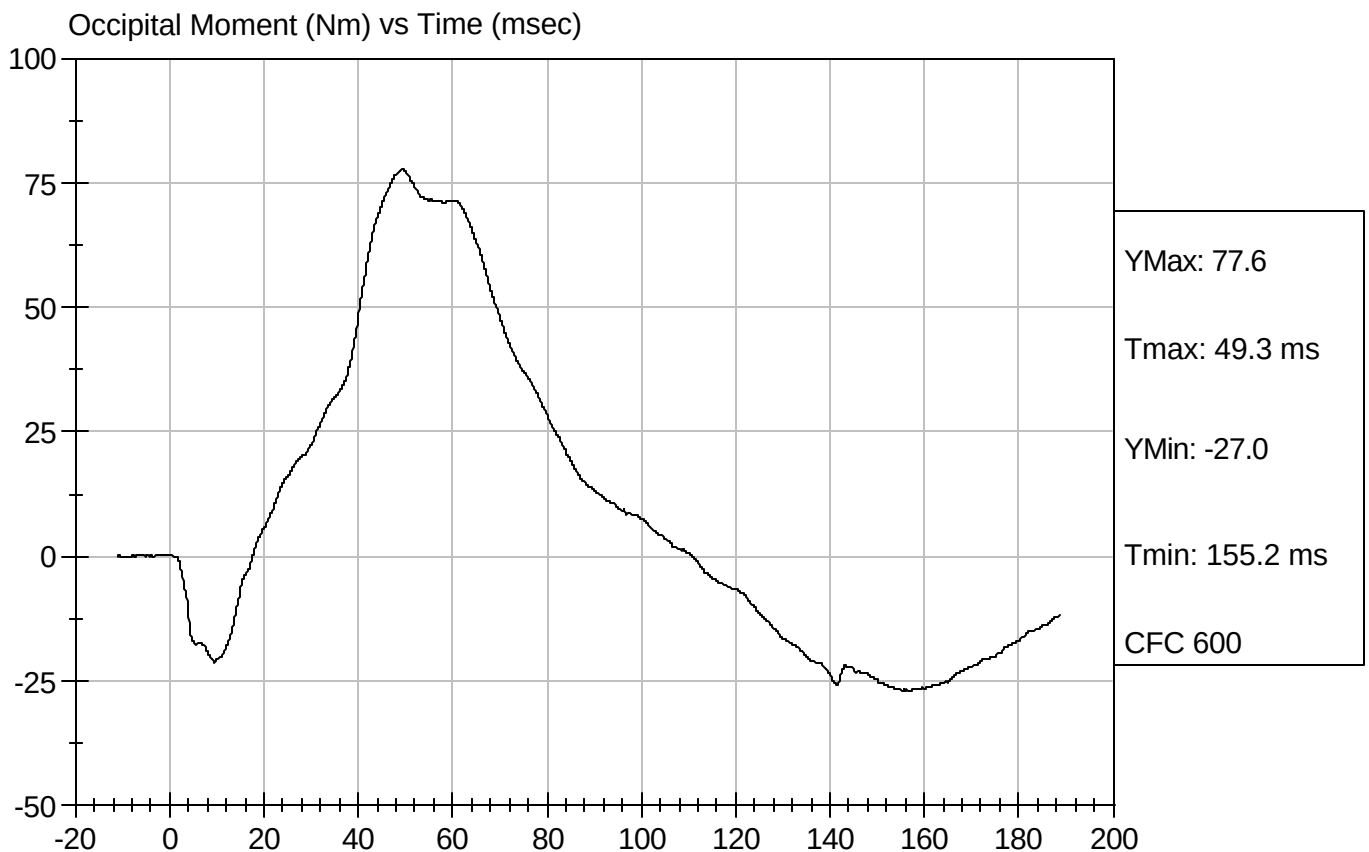
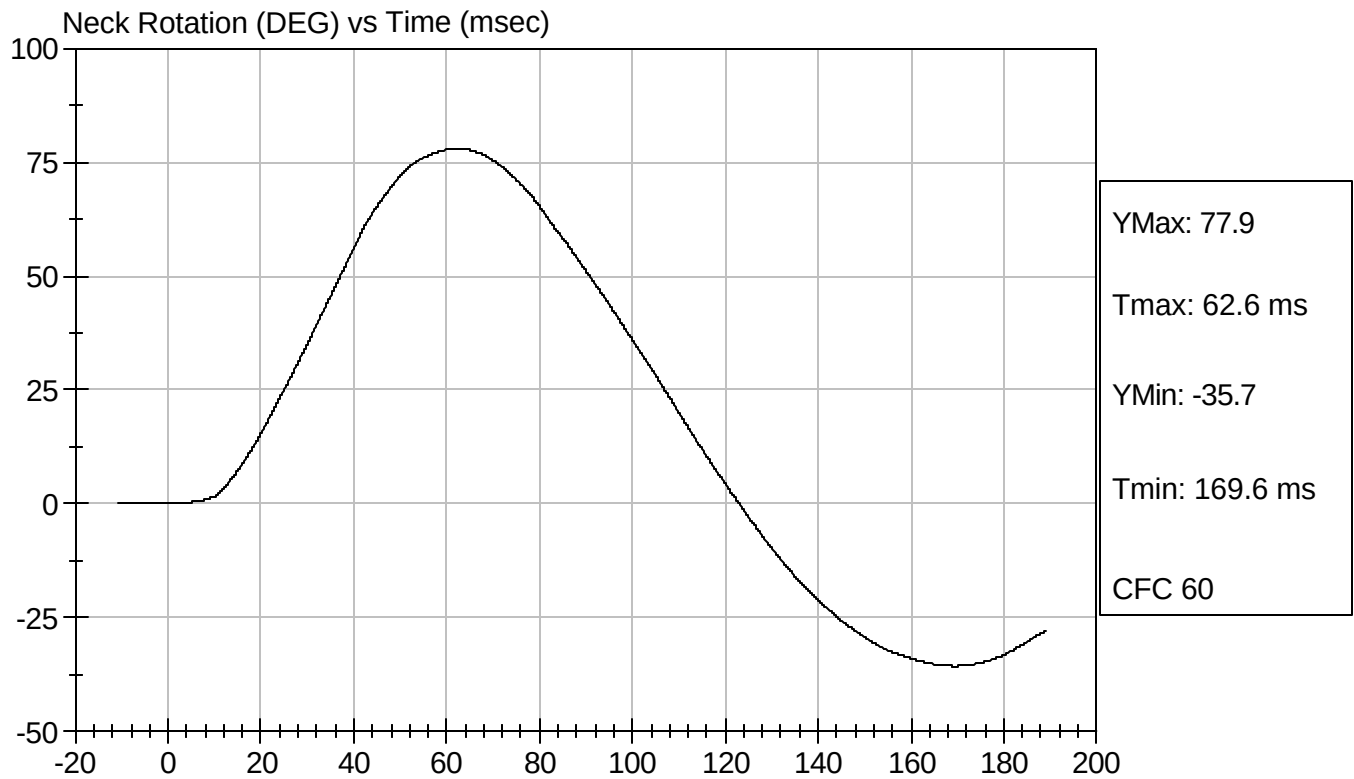
Test Date: 10/10/2005
Speed: 23.21 ft/sec, 7.07 m/sec





Test Desc: Neck Bending
Component ID: D052739

Test Date: 10/10/2005
Speed: 23.21 ft/sec, 7.07 m/sec



Calibration Test Results Summary

Dummy Serial Number: 271

Post-Test Calibration

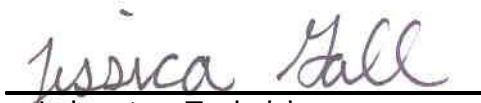
External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SID Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration (Lateral)

ATD Serial No: 271

Test I.D: D06061

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	19	Pass
Peak Resultant Acceleration	G's	120 to 150	144	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-8	Pass
Overall Test Results				Pass


Laboratory Technician

01/06/2006

Test Date


Approved By



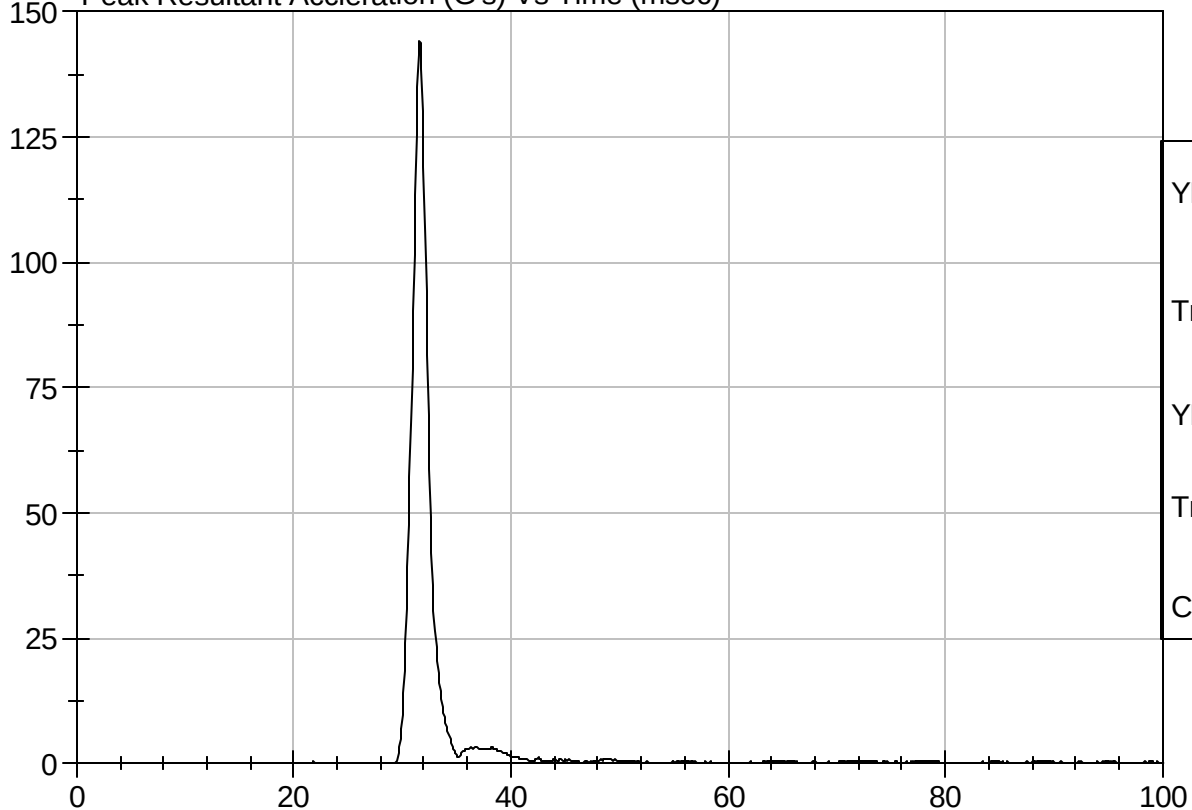
Test Description: Head Drop

Test Date: 01/06/2006

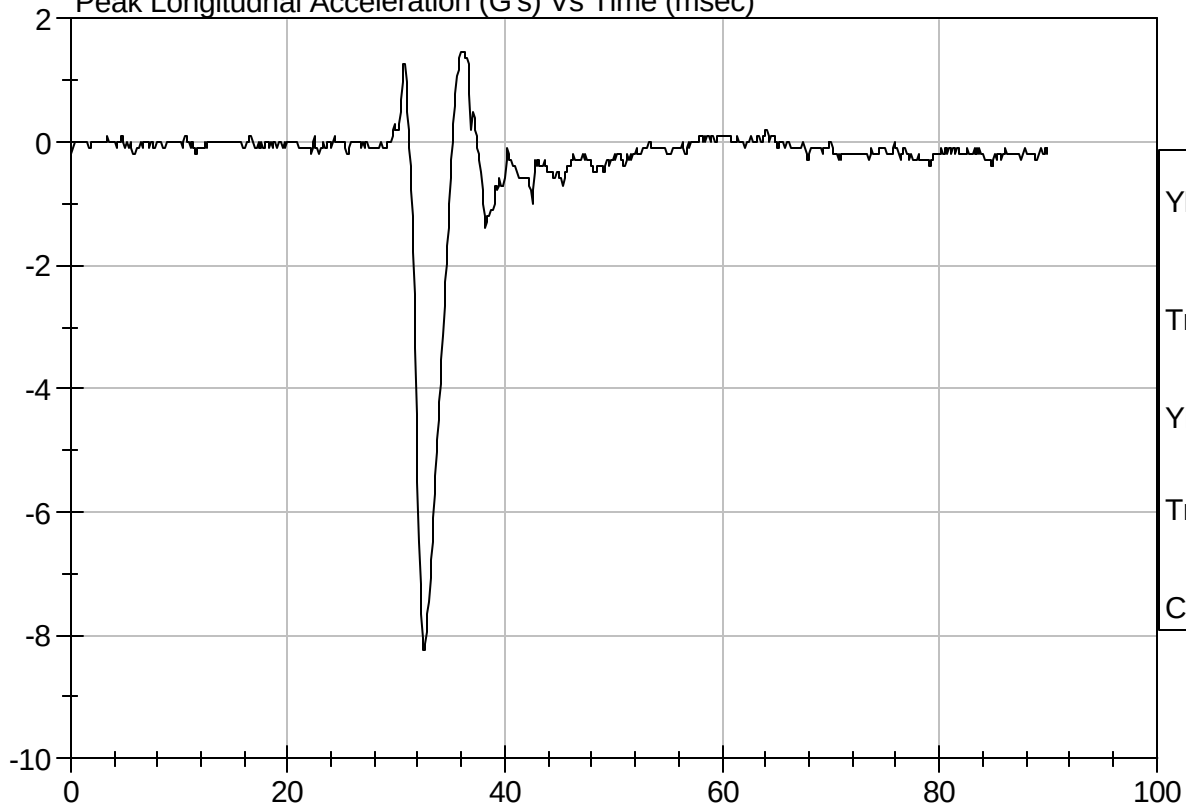
Component: D06061

Speed: 0 ft/s, 0.00 m/s

Peak Resultant Acceleration (G's) Vs Time (msec)



Peak Longitudnal Acceleration (G's) Vs Time (msec)

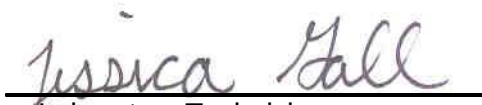


SID Calibration Data Sheet
Side Impact Dummy
Thorax Impact Test

ATD Serial No: 271

Test I.D: D06062

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Probe Velocity	m/s	4.22 - 4.31	4.29	Pass
Upper Rib	G's	37 - 46	46	Pass
Lower Rib	G's	37 - 46	45	Pass
Lower Spine	G's	15 - 22	20	Pass
Overall Test Results				Pass


Laboratory Technician

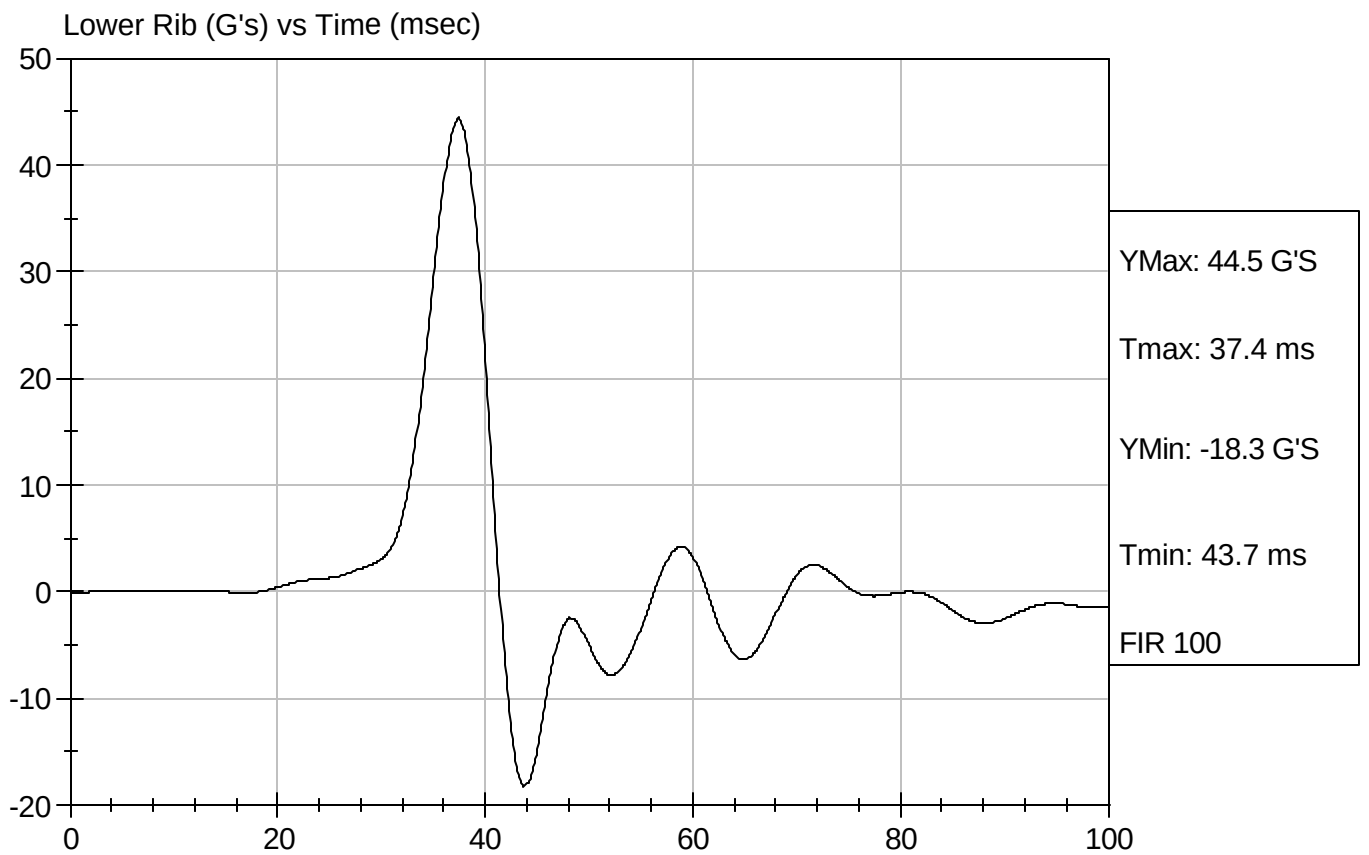
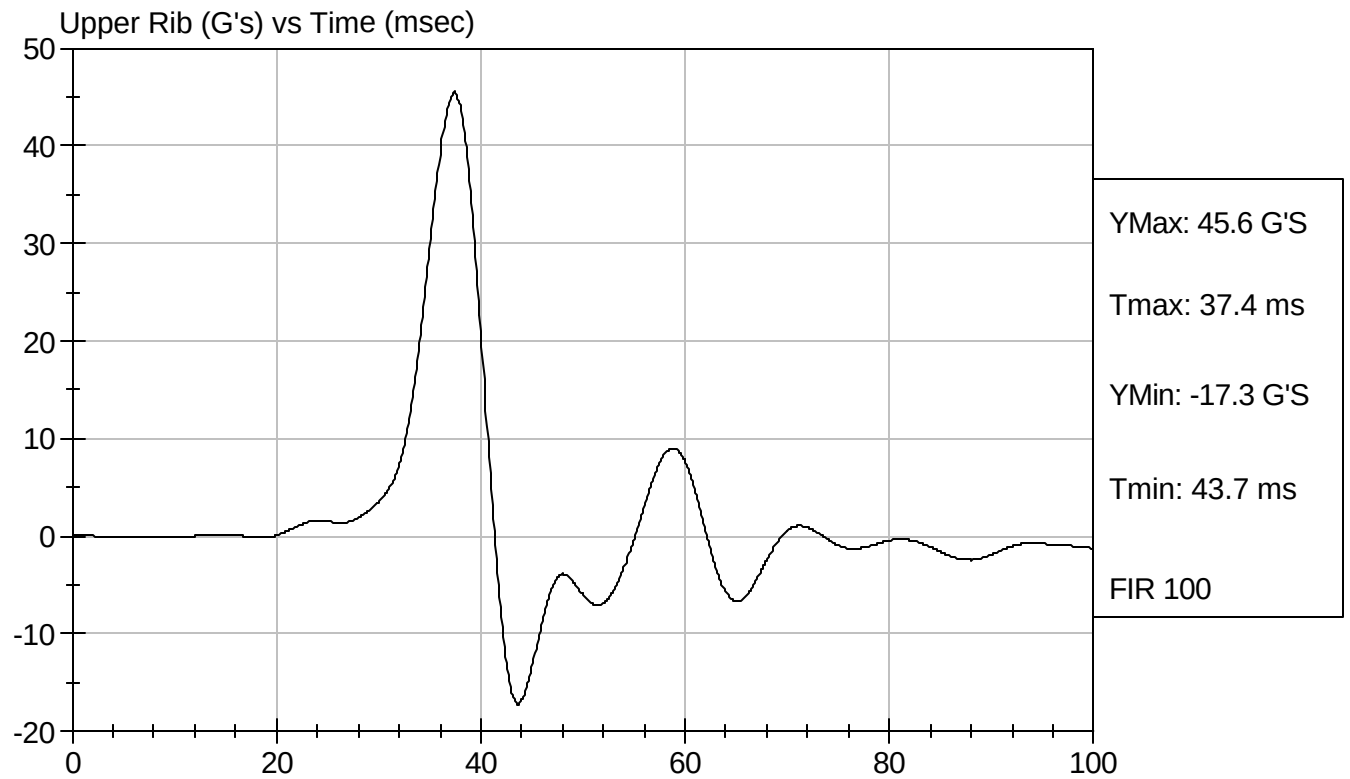

Approved By

01/06/2006
Test Date



Test Desc: Thorax Impact
Component ID: D06062

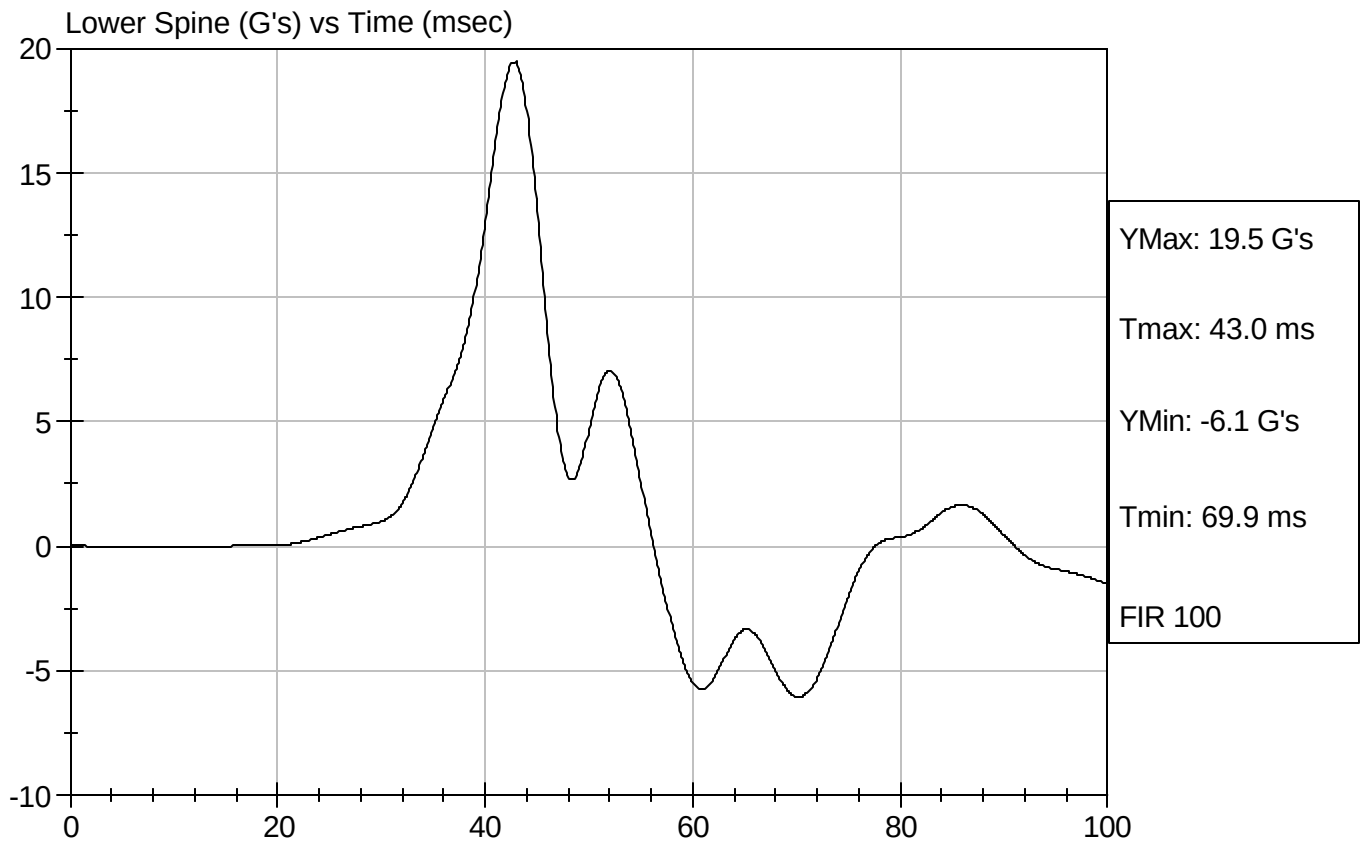
Test Date: 01/06/2006
Speed: 14.07 ft/sec, 4.29 m/sec





Test Desc: Thorax Impact
Component ID: D06062

Test Date: 01/06/2006
Speed: 14.07 ft/sec, 4.29 m/sec



SID Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Test

ATD Serial No: 779

Test I.D: D06063

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Probe Velocity	m/s	4.27 - 4.33	4.29	Pass
Pelvis Acceleration	G's	40 - 60	45	Pass
			Overall Test Results	Pass

Jessica Hall
Laboratory Technician

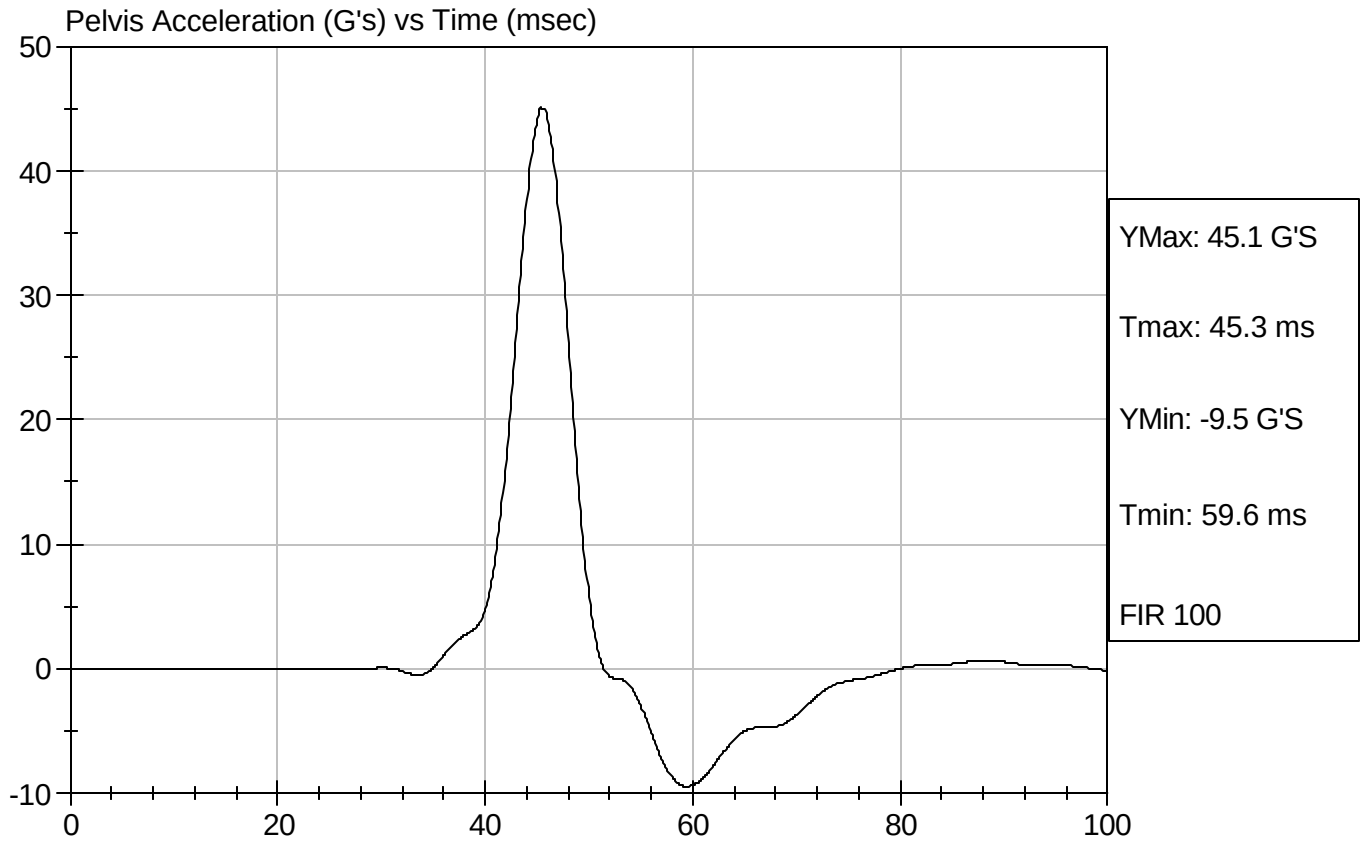
David Winkelbauer
Approved By

01/06/2006
Test Date



Test Desc: Pelvis Impact
Component ID: D06063

Test Date: 01/06/2006
Speed: 14.0777 ft/sec, 4.29 m/sec

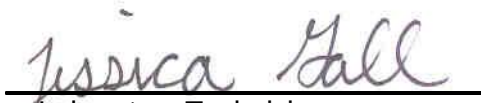


SID Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 271

Test I.D: D06064

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.6	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Force At 12.7 mm	N	104 -162	147	Pass
Force At 19 mm	N	163 - 222	204	Pass
Force At 25.4 mm	N	222 - 280	272	Pass
Force At 33 mm	N	325 - 391	0	Pass
Overall Test Results				Pass


Laboratory Technician


Approved By

01/06/2006
Test Date

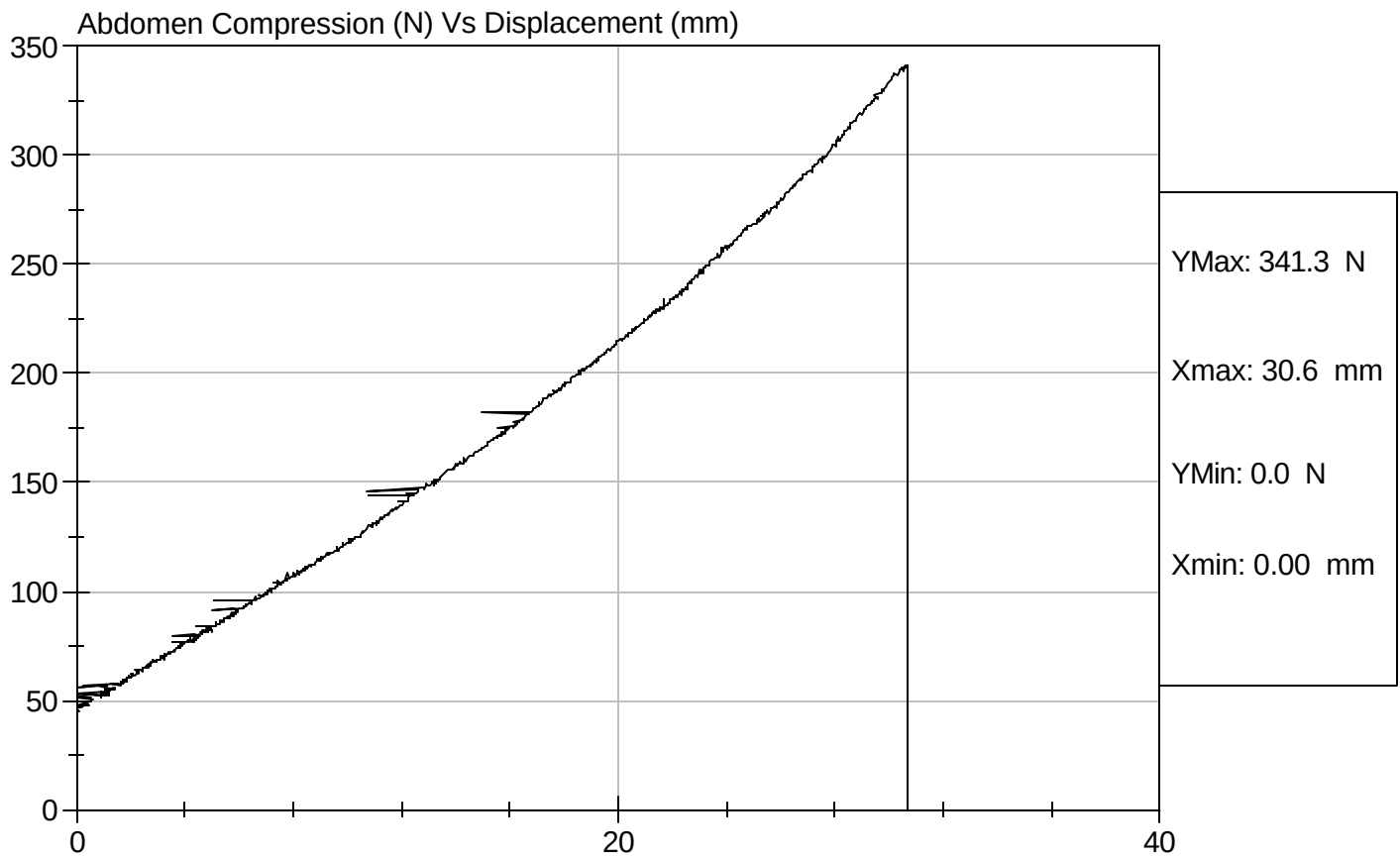


Test Description: Abdomen Compression

Test Date: 01/06/2006

Component: D06064

Speed: 0 ft/sec, 0 m/sec

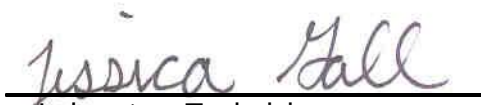


SID Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No: 271

Test I.D: D06065

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.5	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	117.5	Pass
Force At 30 deg	N	151.2 - 204.6	161.8	Pass
Force At 40 deg	N	204.6 - 258.0	220.7	Pass
Return Angle	Deg	12 Maximum	1	Pass
			Overall Test Results	Pass


Laboratory Technician


Approved By

01/06/2006

Test Date

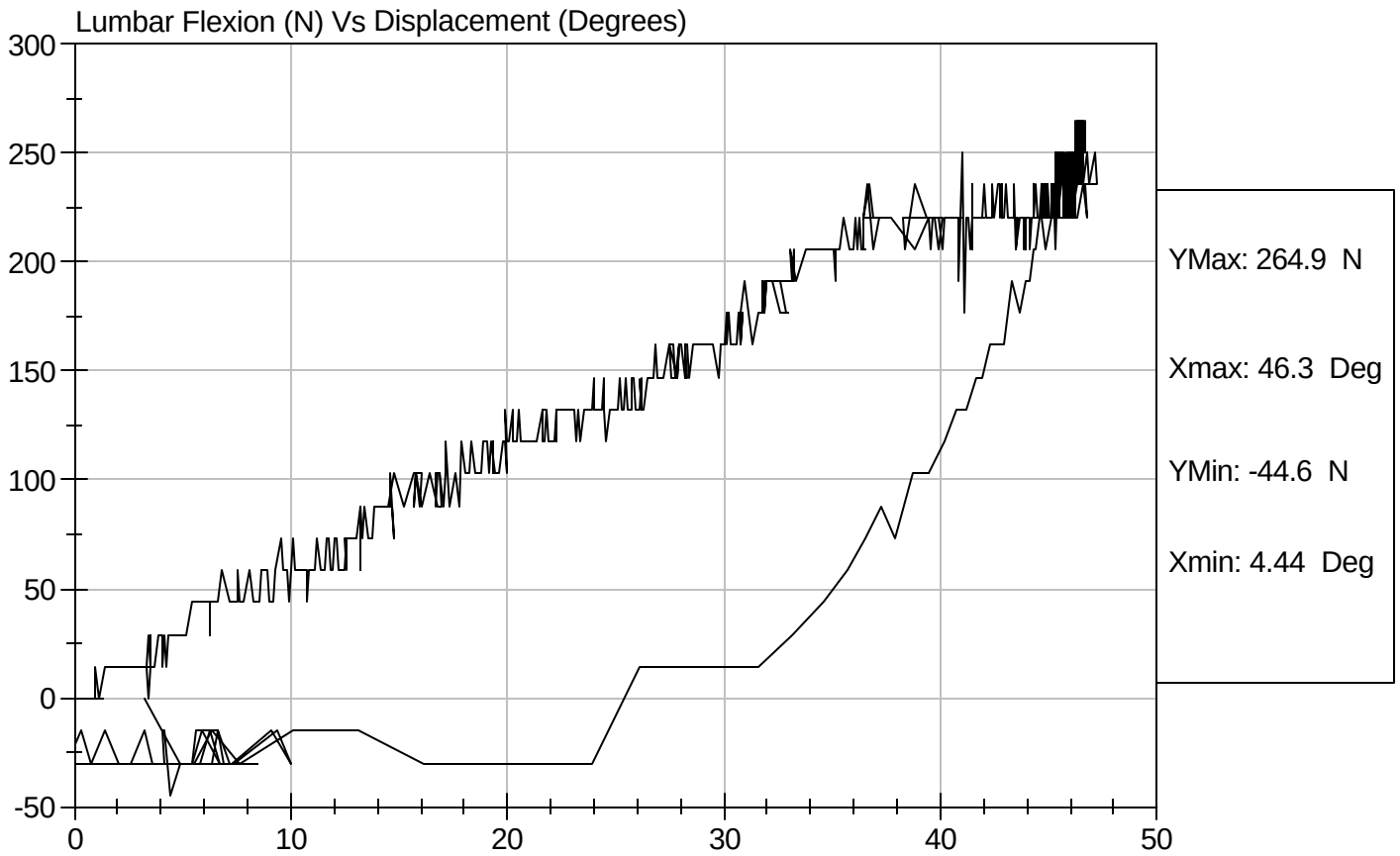


Test Description: Lumbar Flexion

Test Date: 01/06/2006

Component: D06065

Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet
Side Impact Dummy (SID)
Neck Pendulum Test

ATD Serial No: 271

Test I.D: D06069

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.7	Pass
Laboratory Relative Humidity		%	10 to 70	19	Pass
Impact Velocity		m/s	6.89 to 7.13	6.91	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.43	Pass
	20 msec	m/s	4.12 to 5.10	4.74	Pass
	30 msec	m/s	5.73 to 7.01	6.67	Pass
	40 to 70 msec	m/s	6.27 to 7.64	7.17	Pass
Midsagittal Plane Max Rotation		deg	66 to 82	76	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	61	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	79	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	60	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	13	Pass


 Laboratory Technician

01/06/2006

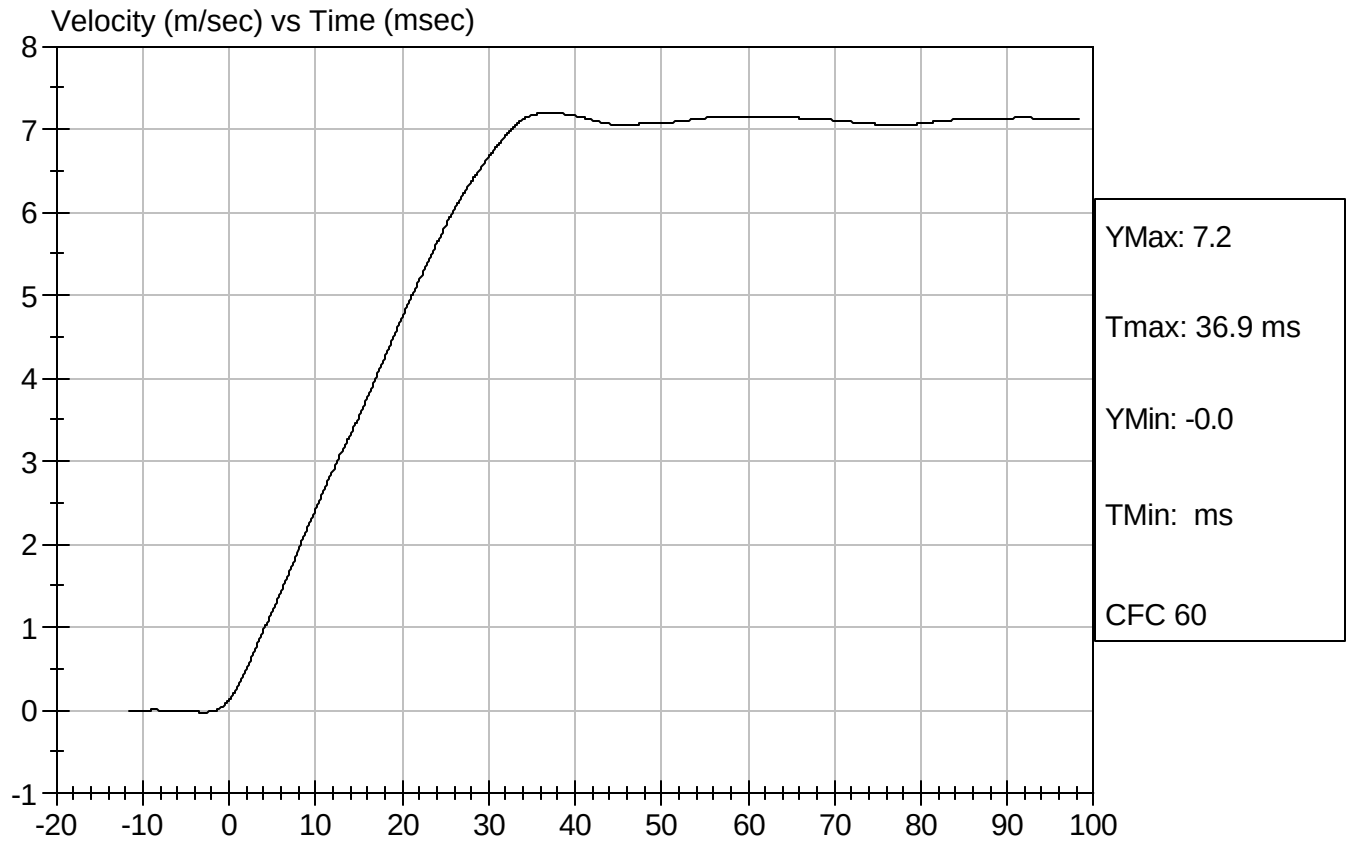
Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D06069

Test Date: 01/06/2006
Speed: 22.68 ft/sec, 6.91 m/sec

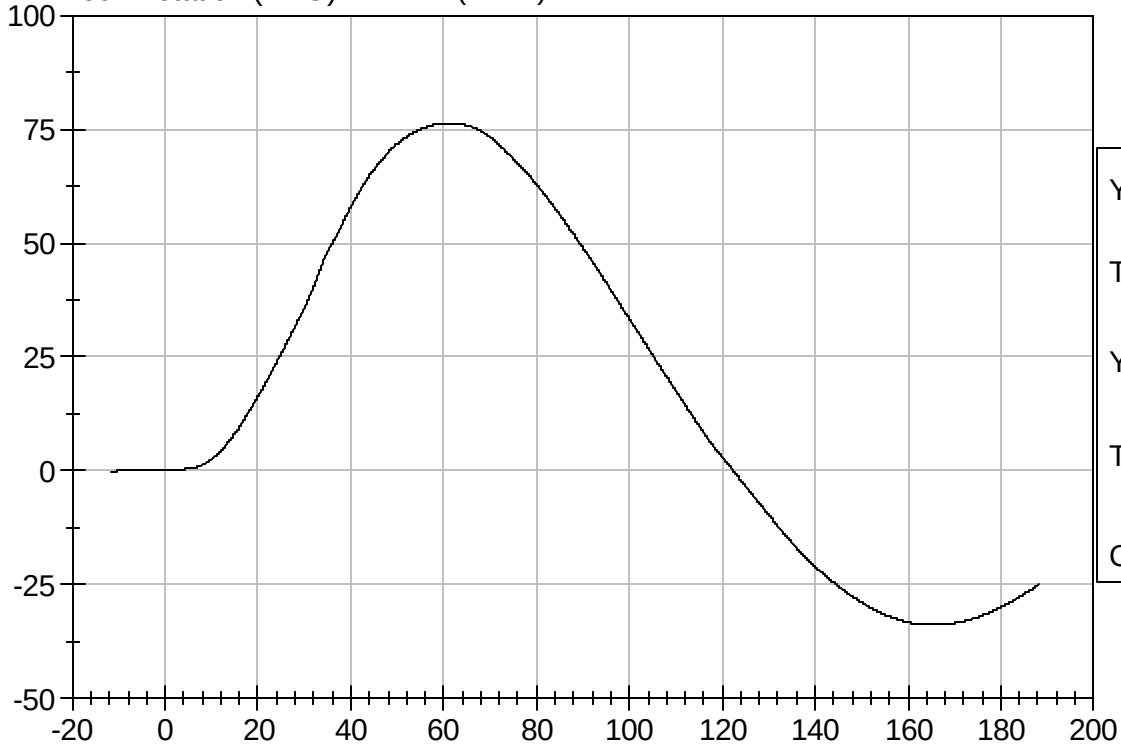




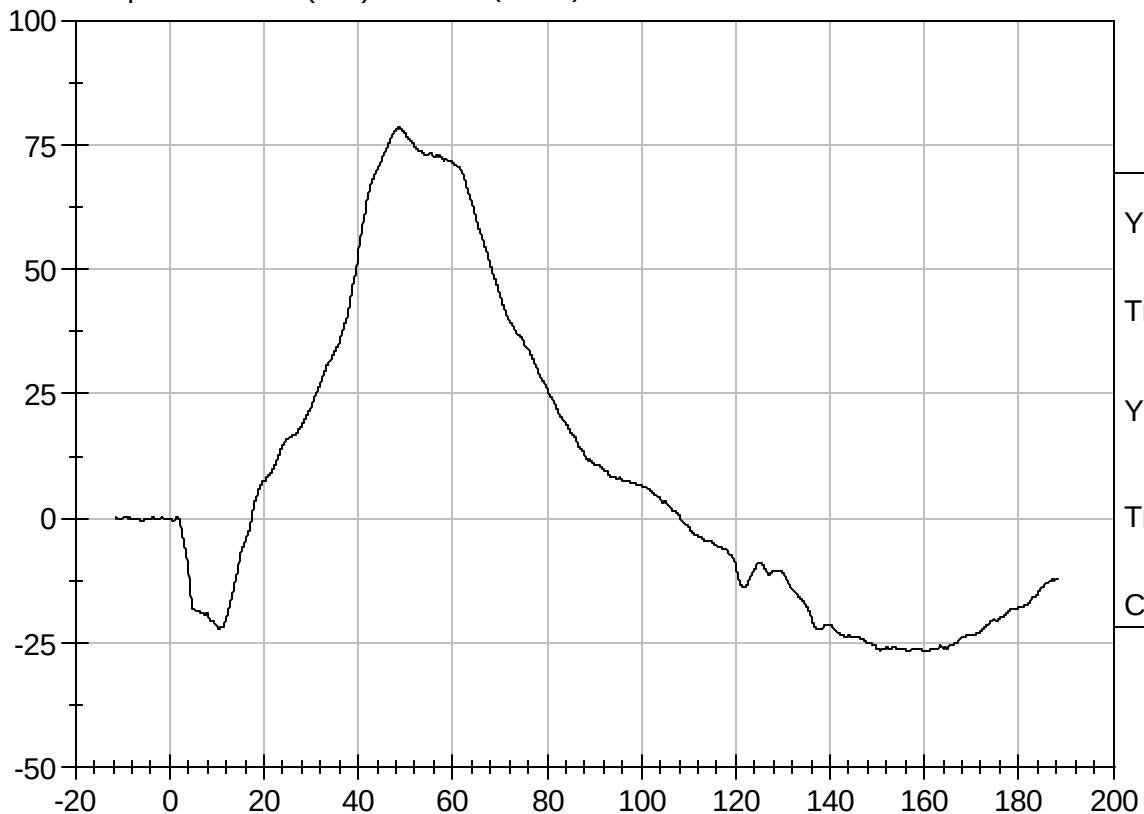
Test Desc: Neck Bending
Component ID: D06069

Test Date: 01/06/2006
Speed: 22.68 ft/sec, 6.91 m/sec

Neck Rotation (DEG) vs Time (msec)



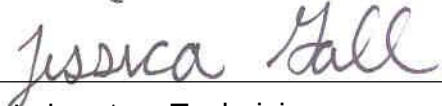
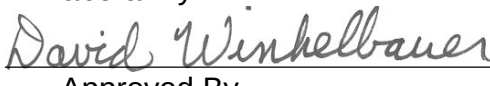
Occipital Moment (Nm) vs Time (msec)



SID Calibration Data Sheet
Side Impact Dummy
Inspection Checklist

ATD Serial No: 271

Test Part	Items Checked	Result
Skin	Visual inspection	Pass
Head	Visual, ballast, accelerometer mount	Pass
Neck	Visual	Pass
Spine Box	Visual, ballast, accelerometer mount	Pass
Rib Cage	Visual, measure	Pass
Sternum	Visual	Pass
Lumbar Spine	Visual	Pass
Abdomen	Visual	Pass
Pelvis	Visual, palpate, accelerometer mount	Pass
Upper Legs	Visual	Pass
Knees	Visual	Pass
Lower Legs	Visual, range of motion	Pass
Ankles	Visual, range of motion	Pass
Feet	Visual, range of motion	Pass
Joints	1 to 2 g range	Pass
Other		Pass


Laboratory Technician

Approved By

01/09/2006

Test Date

CERTIFICATION DATA

Dummy Serial Number: 904

Calibration Test Results Summary

Dummy Serial Number: 904

Pre-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SID Calibration Data Sheet
Side Impact Dummy
External Measurements

ATD Serial No: 904

Test I.D: D05270

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	903	Pass
RH - Rib Height	mm	501 - 521	509	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	240	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	525	Pass
SW - Knee Pivot to Floor	mm	490 - 505	500	Pass
HW - Hip Width	mm	356 - 391	368	Pass
Overall Test Results			Pass	

Jessica Hall
Laboratory Technician

10/05/2005

Test Date

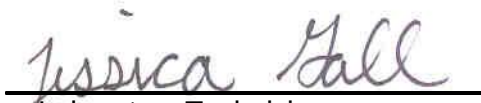
David Winkelbauer
Approved By

SID Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration (Lateral)

ATD Serial No: 904

Test I.D: D052701

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	48	Pass
Peak Resultant Acceleration	G's	120 to 150	143	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	8	Pass
Overall Test Results				Pass


Laboratory Technician

10/05/2005

Test Date


Approved By



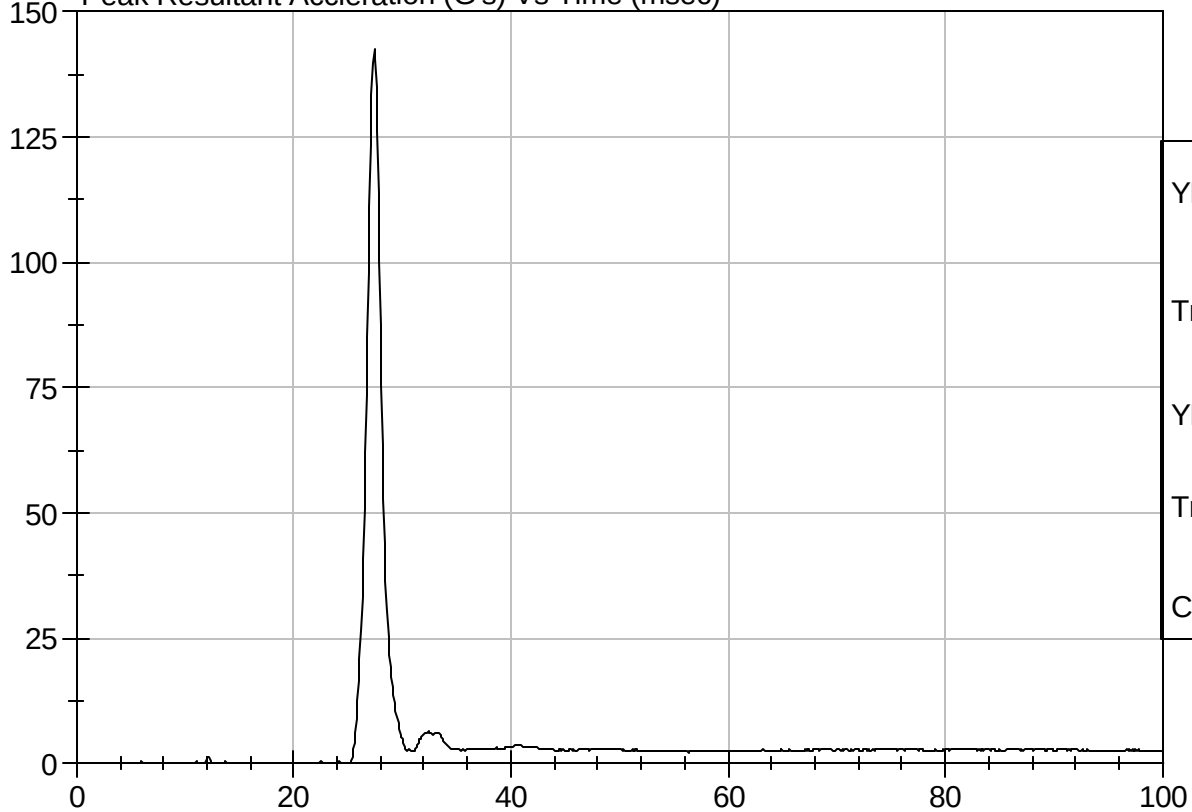
Test Description: Head Drop

Test Date: 10/05/2005

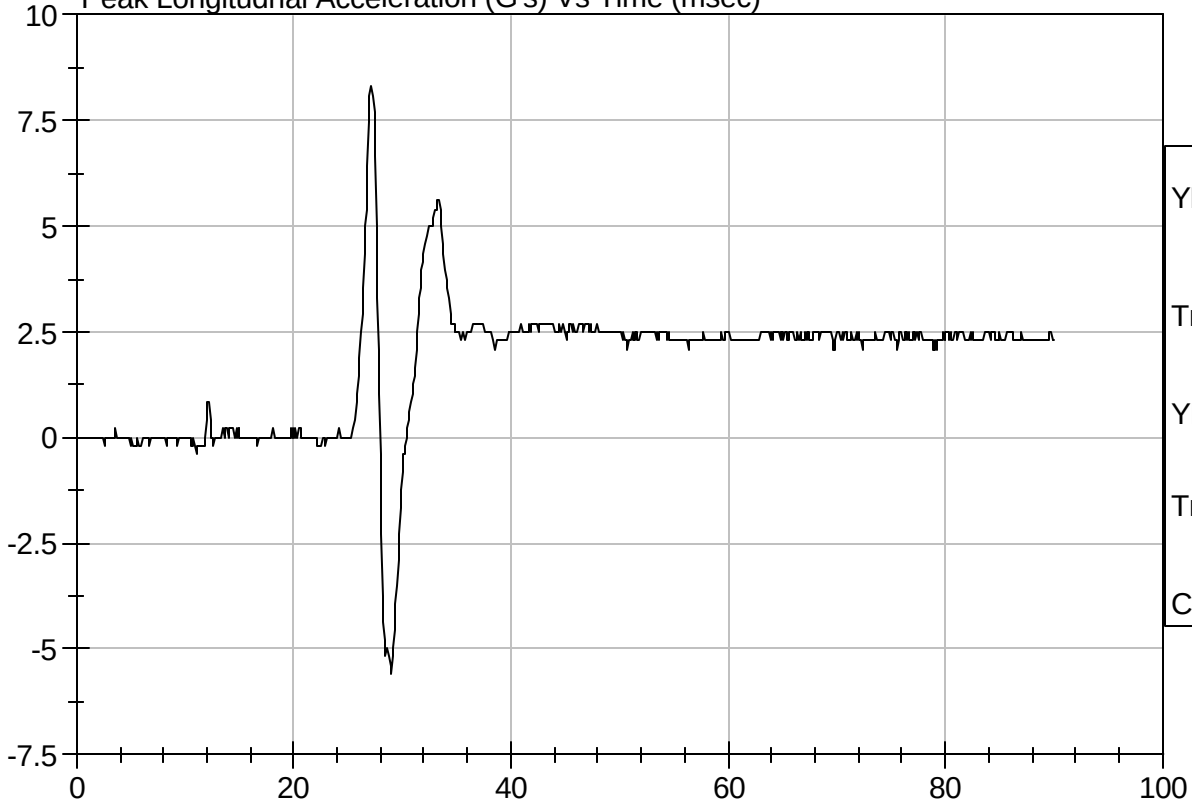
Component: D052701

Speed: 0 ft/s, 0.00 m/s

Peak Resultant Acceleration (G's) Vs Time (msec)



Peak Longitudnal Acceleration (G's) Vs Time (msec)

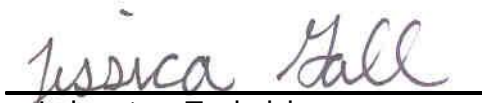


SID Calibration Data Sheet
Side Impact Dummy
Thorax Impact Test

ATD Serial No: 904

Test I.D: D052702

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	22.1	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Probe Velocity	m/s	4.22 - 4.31	4.31	Pass
Upper Rib	G's	37 - 46	43	Pass
Lower Rib	G's	37 - 46	41	Pass
Lower Spine	G's	15 - 22	20	Pass
Overall Test Results				Pass


Laboratory Technician

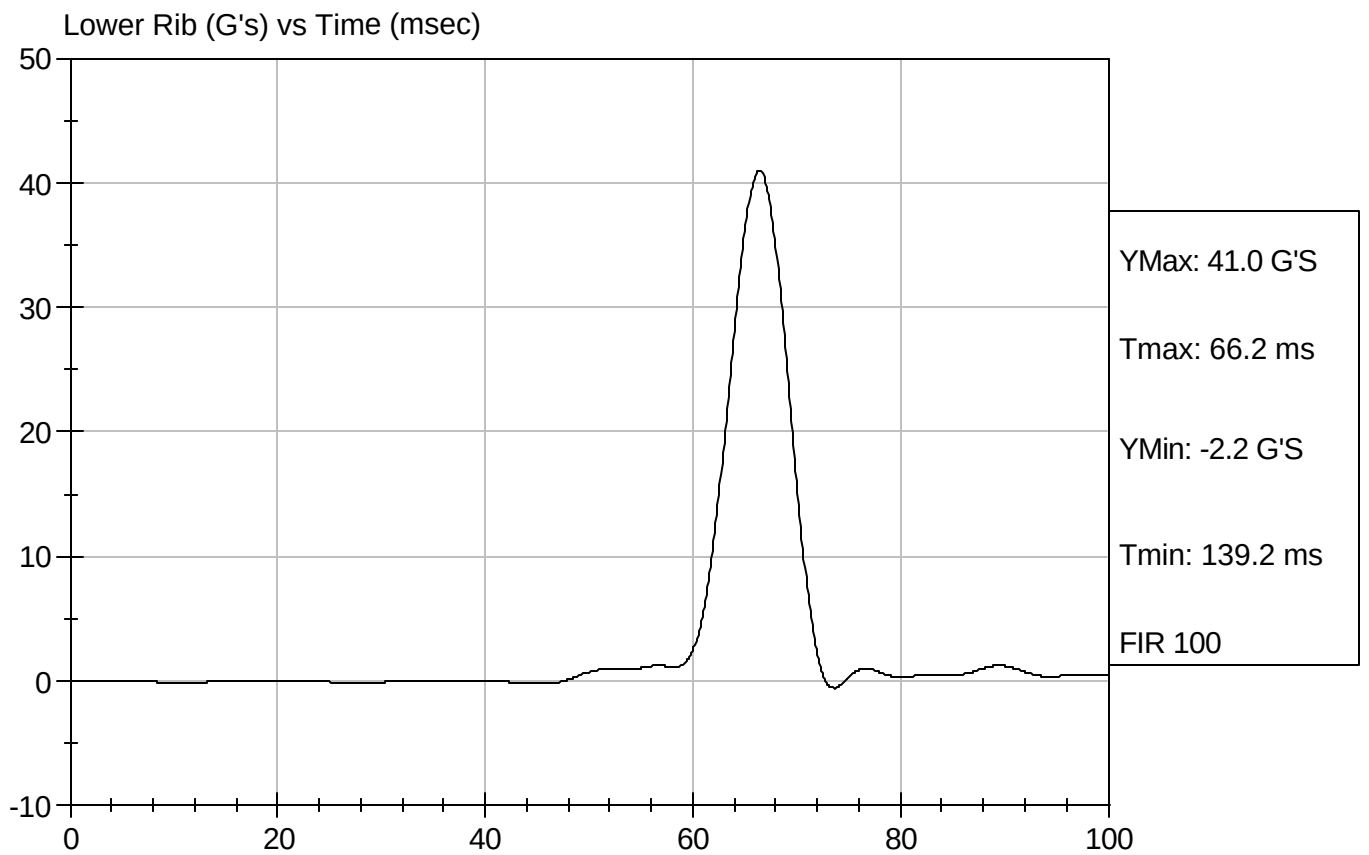
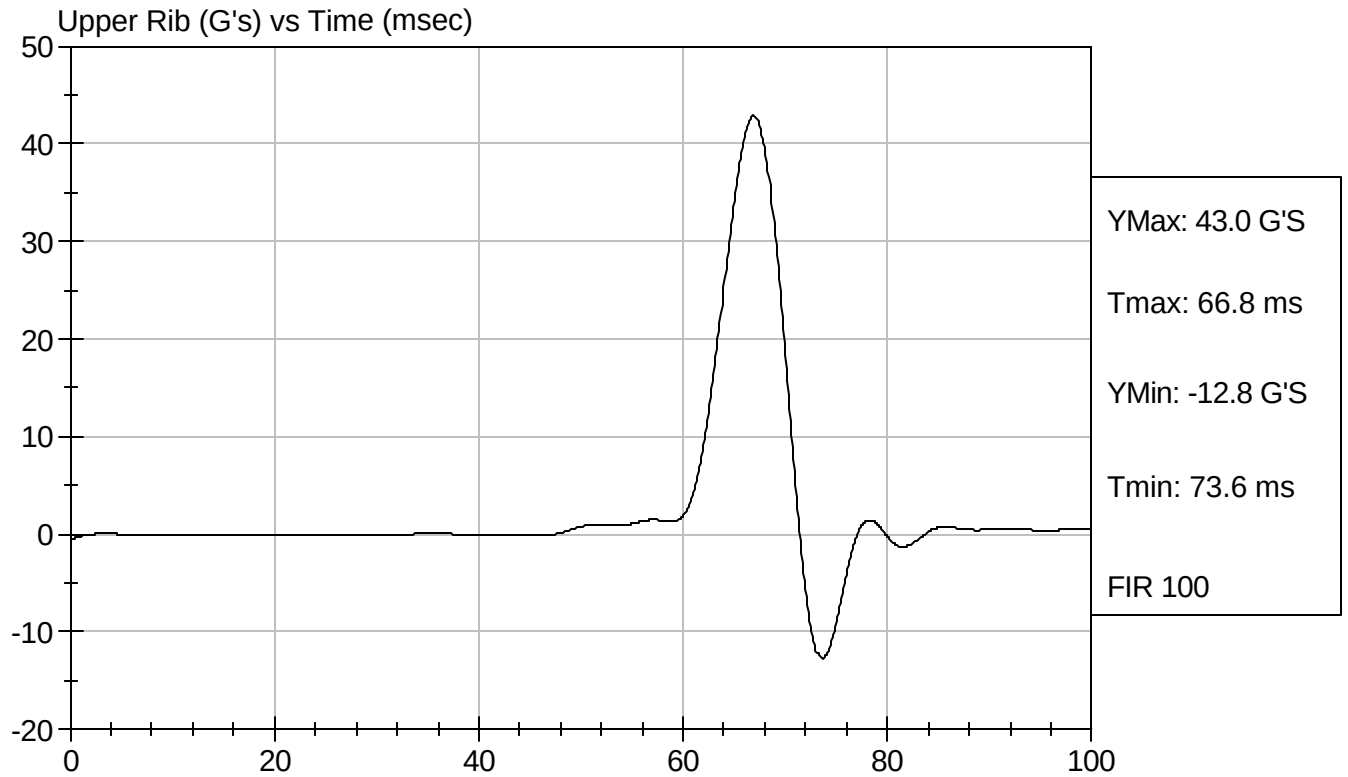
10/05/2005
Test Date


Approved By



Test Desc: Thorax Impact
Component ID: D052702

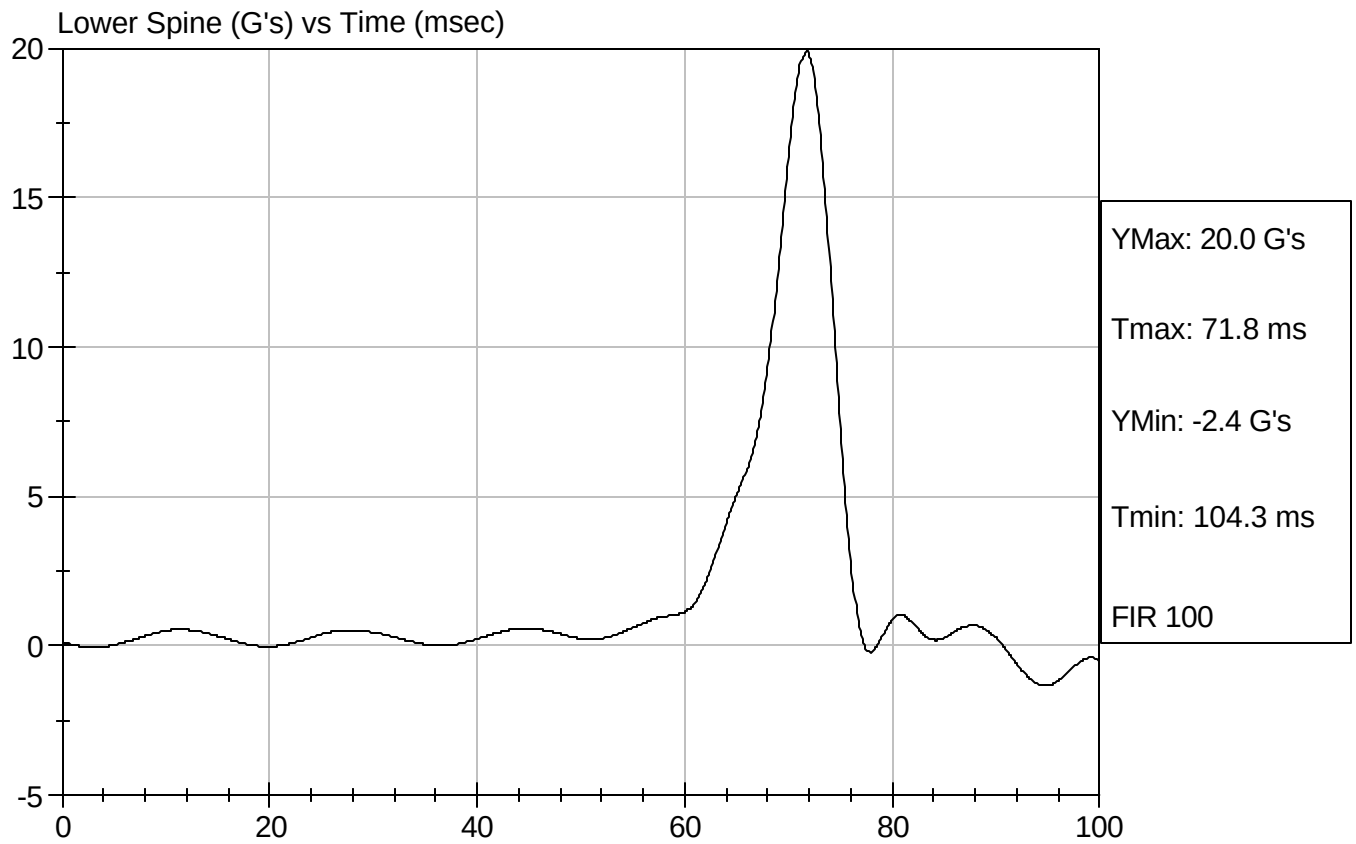
Test Date: 10/05/2005
Speed: 14.13 ft/sec, 4.31 m/sec





Test Desc: Thorax Impact
Component ID: D052702

Test Date: 10/05/2005
Speed: 14.13 ft/sec, 4.31 m/sec



SID Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Test

ATD Serial No: 904

Test I.D: D052703

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Probe Velocity	m/s	4.27 - 4.33	4.31	Pass
Pelvis Acceleration	G's	40 - 60	42	Pass
			Overall Test Results	Pass

Jessica Hall
Laboratory Technician

10/05/2005

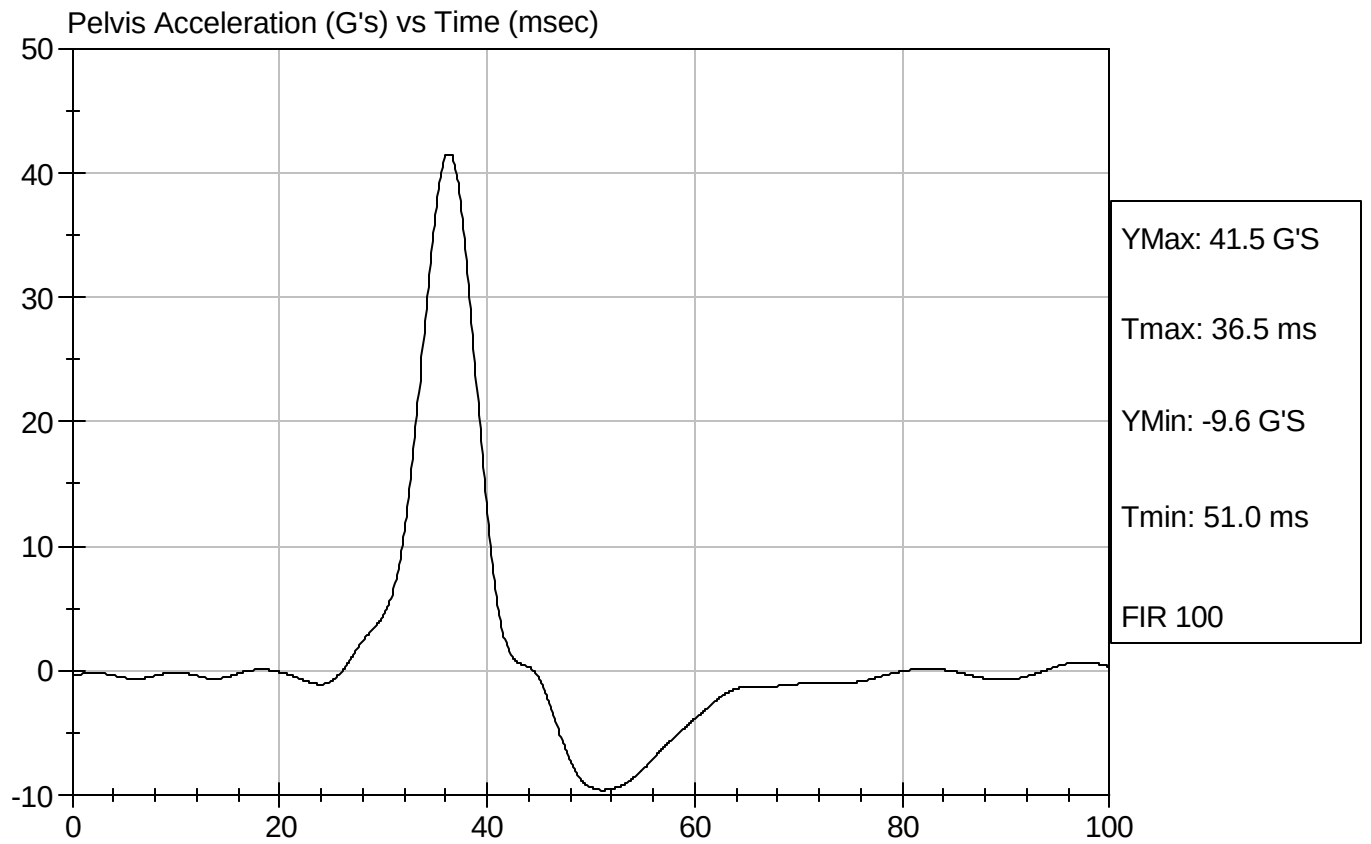
Test Date

David Winkelbauer
Approved By



Test Desc: Pelvis Impact
Component ID: D052703

Test Date: 10/05/2005
Speed: 14.13 ft/sec, 4.31 m/sec

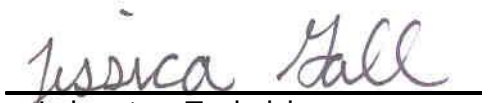


SID Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 904

Test I.D: D052704

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 12.7 mm	N	104 -162	146	Pass
Force At 19 mm	N	163 - 222	203	Pass
Force At 25.4 mm	N	222 - 280	271	Pass
Force At 33 mm	N	325 - 391	391	Pass
Overall Test Results				Pass


Laboratory Technician

10/05/2005
Test Date


Approved By

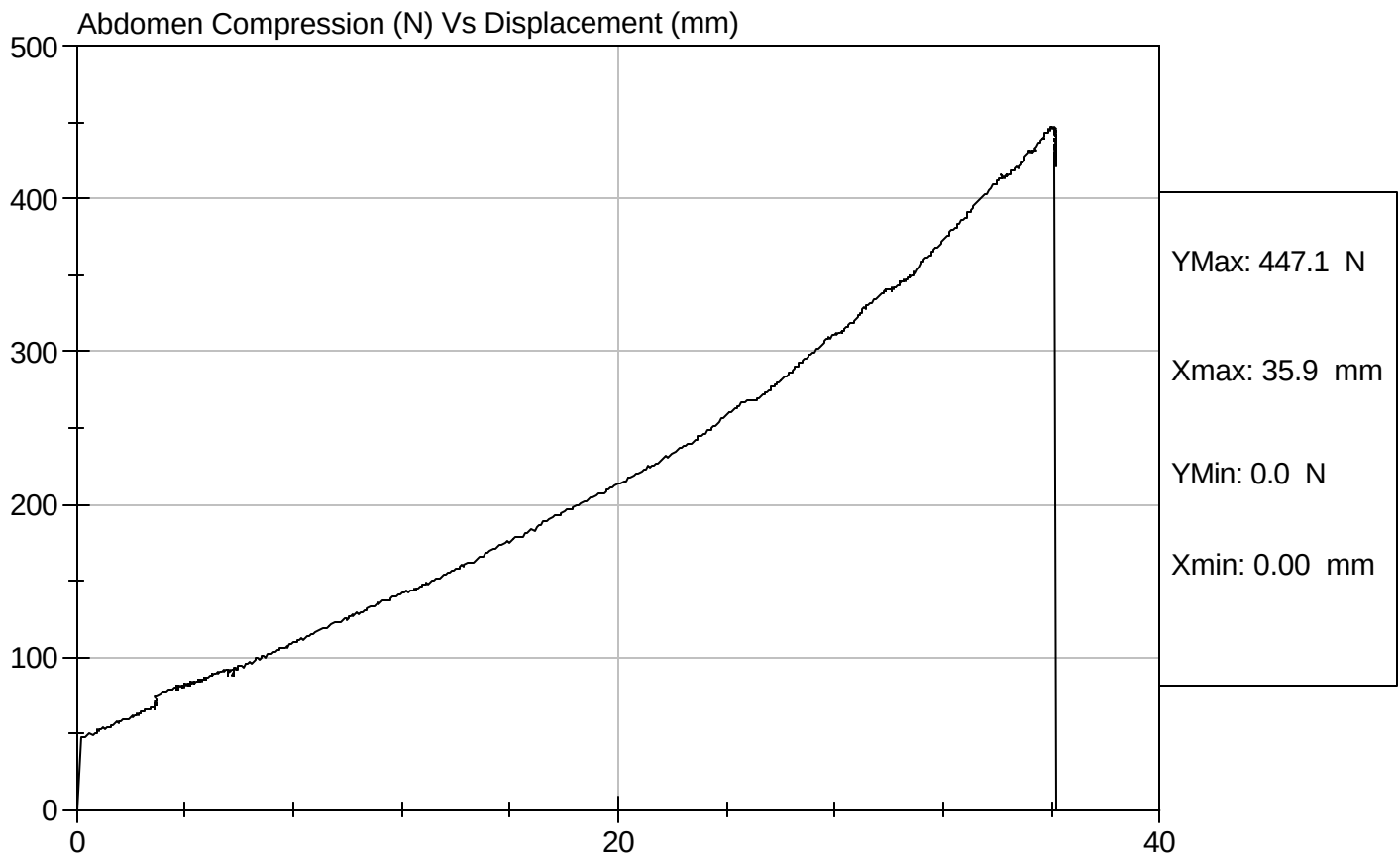


Test Description: Abdomen Compression

Test Date: 10/05/2005

Component: D052704

Speed: 0 ft/sec, 0 m/sec

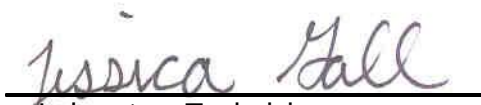


SID Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No: 904

Test I.D: D052705

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	22.1	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	131.2	Pass
Force At 30 deg	N	151.2 - 204.6	162.3	Pass
Force At 40 deg	N	204.6 - 258.0	208.9	Pass
Return Angle	Deg	12 Maximum	5	Pass
			Overall Test Results	Pass


Laboratory Technician


Approved By

10/05/2005

Test Date

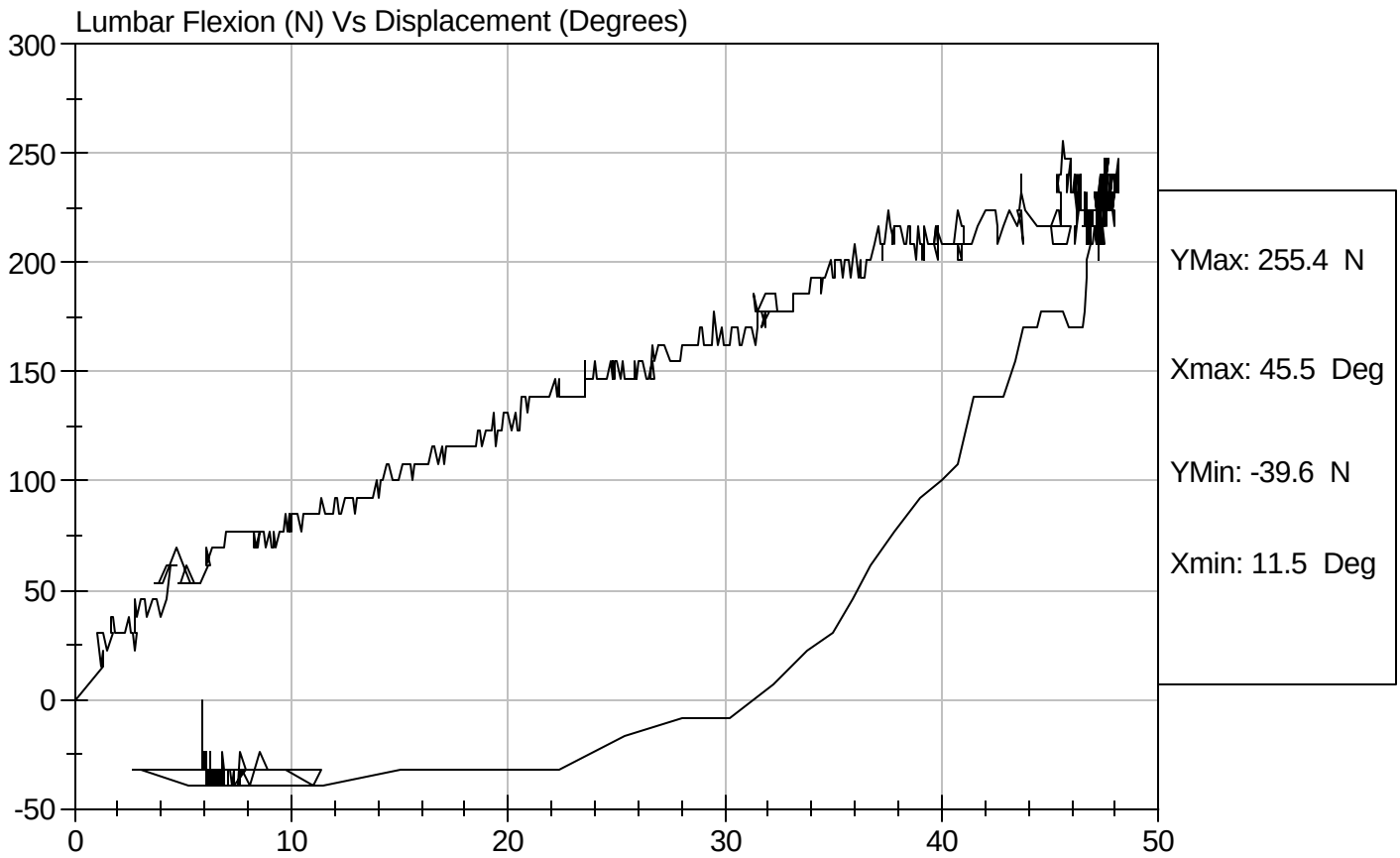


Test Description: Lumbar Flexion

Test Date: 10/05/2005

Component: D052705

Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet
Side Impact Dummy (SID)
Neck Pendulum Test

ATD Serial No: 904

Test I.D: D052709

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity		%	10 to 70	46	Pass
Impact Velocity		m/s	6.89 to 7.13	7.12	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.26	Pass
	20 msec	m/s	4.12 to 5.10	4.53	Pass
	30 msec	m/s	5.73 to 7.01	6.34	Pass
	40 to 70 msec	m/s	6.27 to 7.64	7.41	Pass
Midsagittal Plane Max Rotation		deg	66 to 82	74	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	59	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	80	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	60	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	12	Pass


 Laboratory Technician

10/05/2005

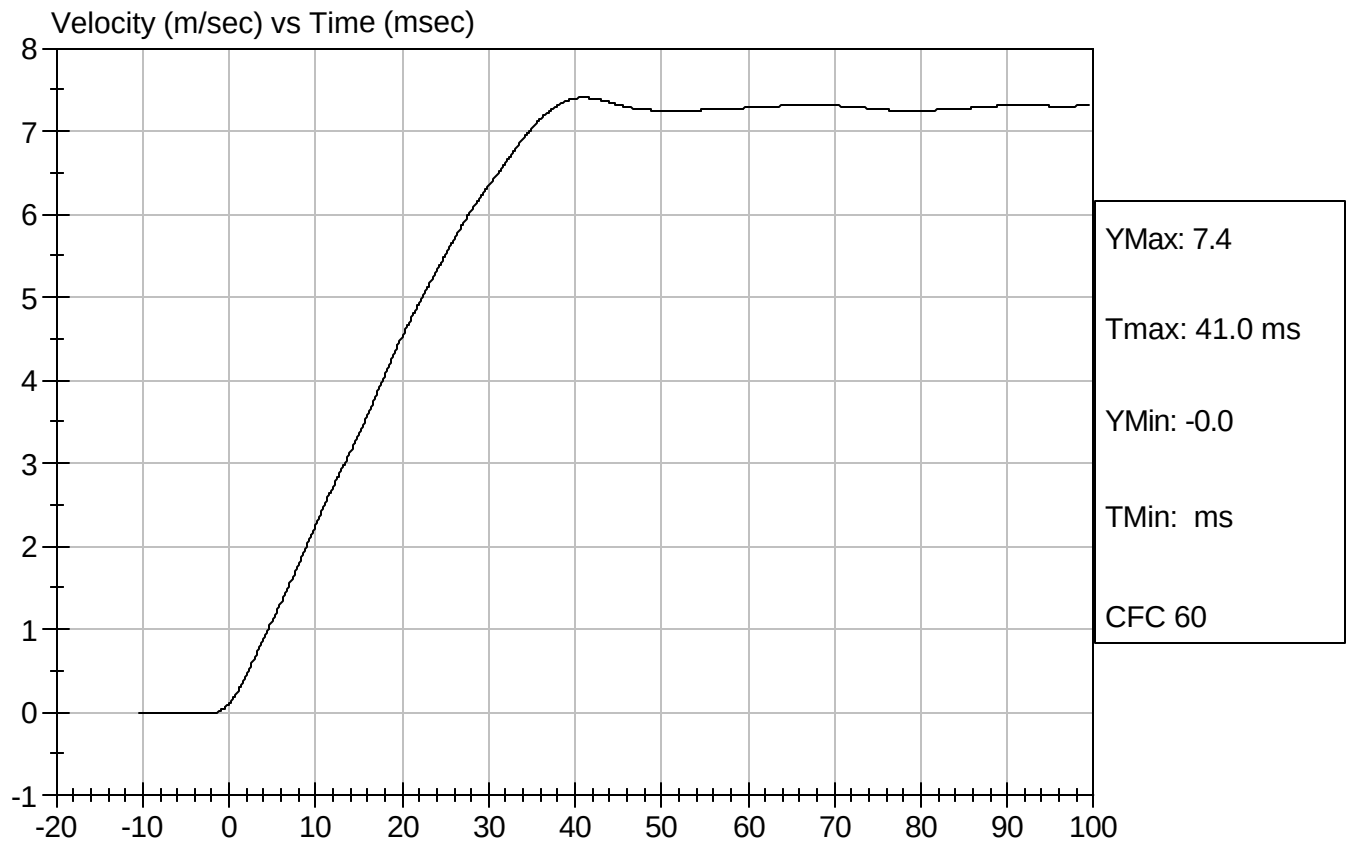
Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D052709

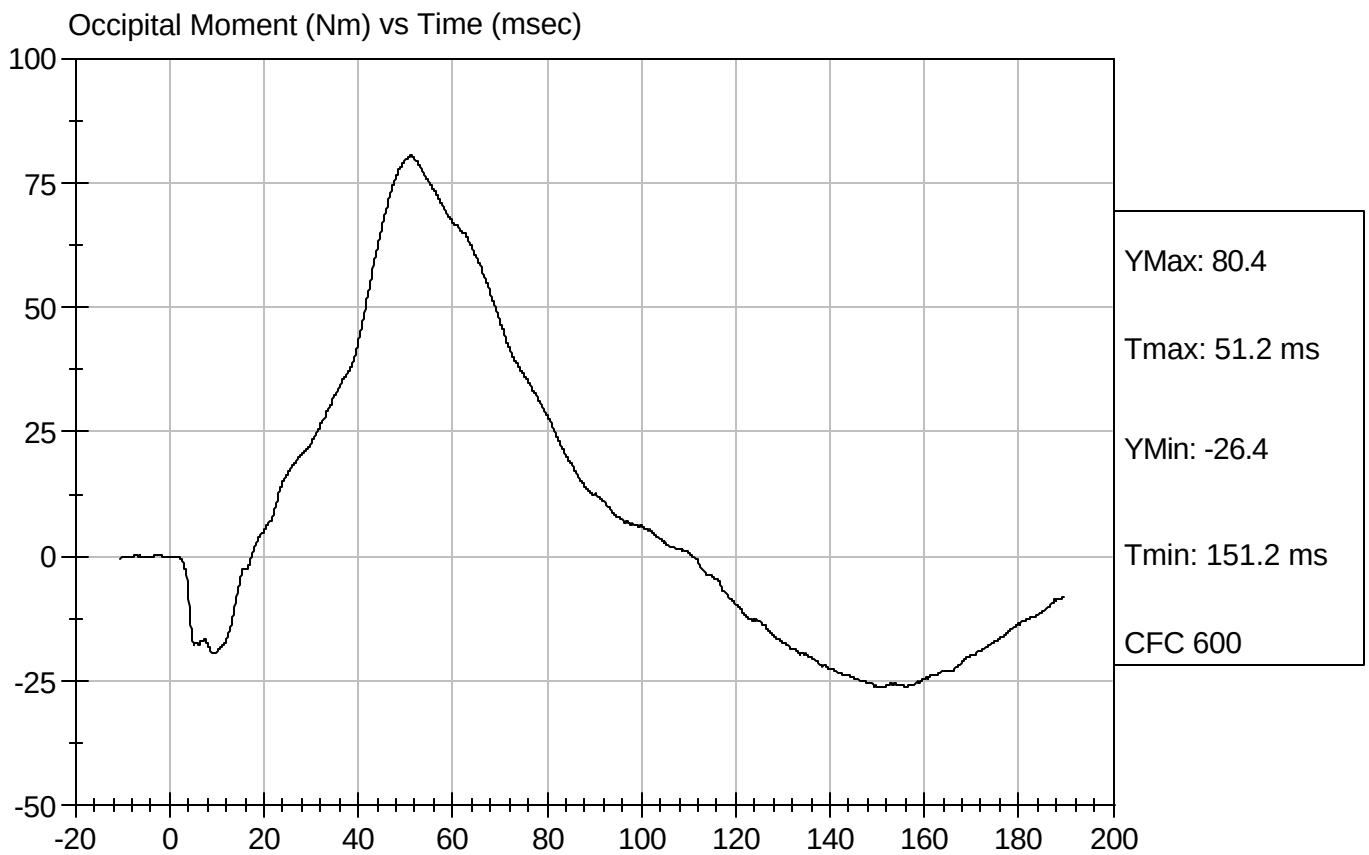
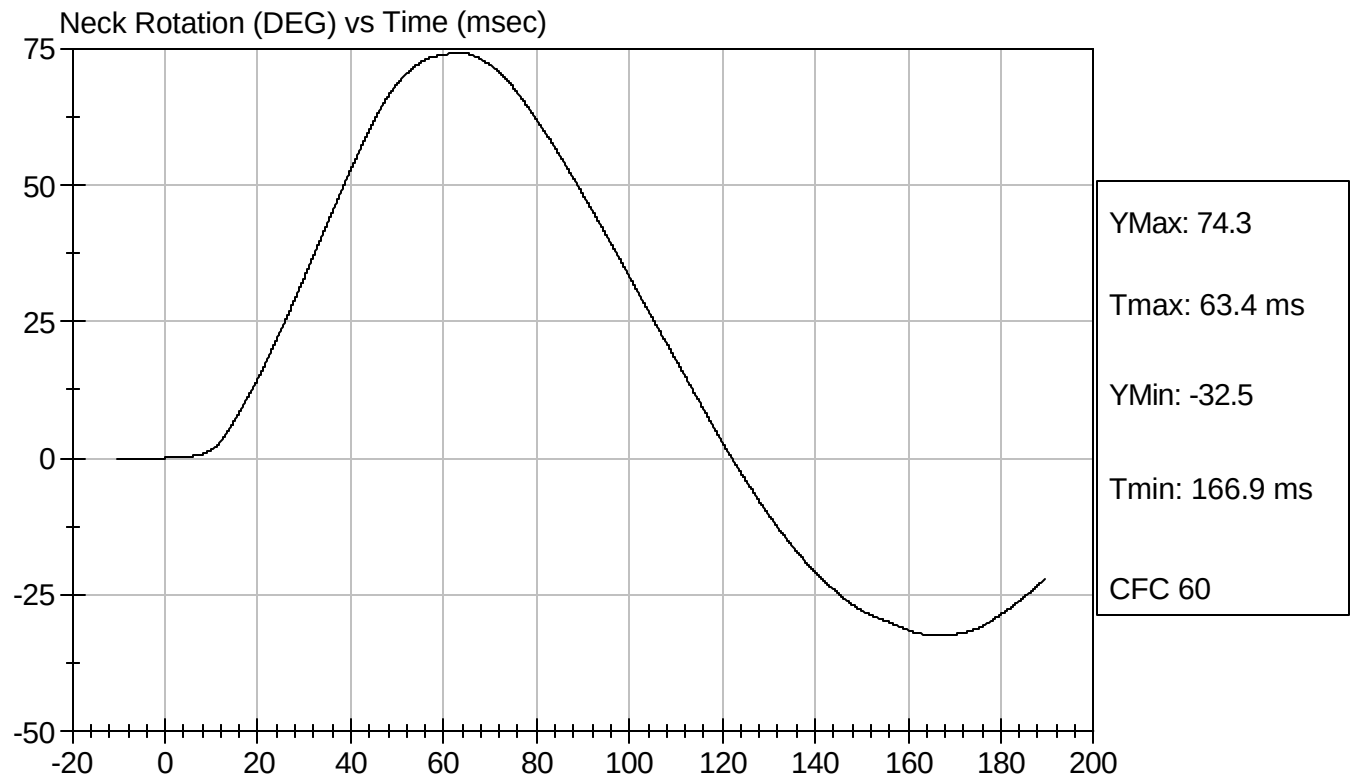
Test Date: 10/05/2005
Speed: 23.35 ft/sec, 7.12 m/sec





Test Desc: Neck Bending
Component ID: D052709

Test Date: 10/05/2005
Speed: 23.35 ft/sec, 7.12 m/sec



Calibration Test Results Summary

Dummy Serial Number: 904

Post-Test Calibration

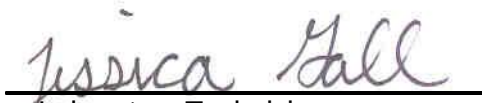
External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SID Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration (Lateral)

ATD Serial No: 904

Test I.D: D06071

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Peak Resultant Acceleration	G's	120 to 150	143	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-10	Pass
Overall Test Results				Pass


Laboratory Technician

01/06/2006

Test Date


Approved By



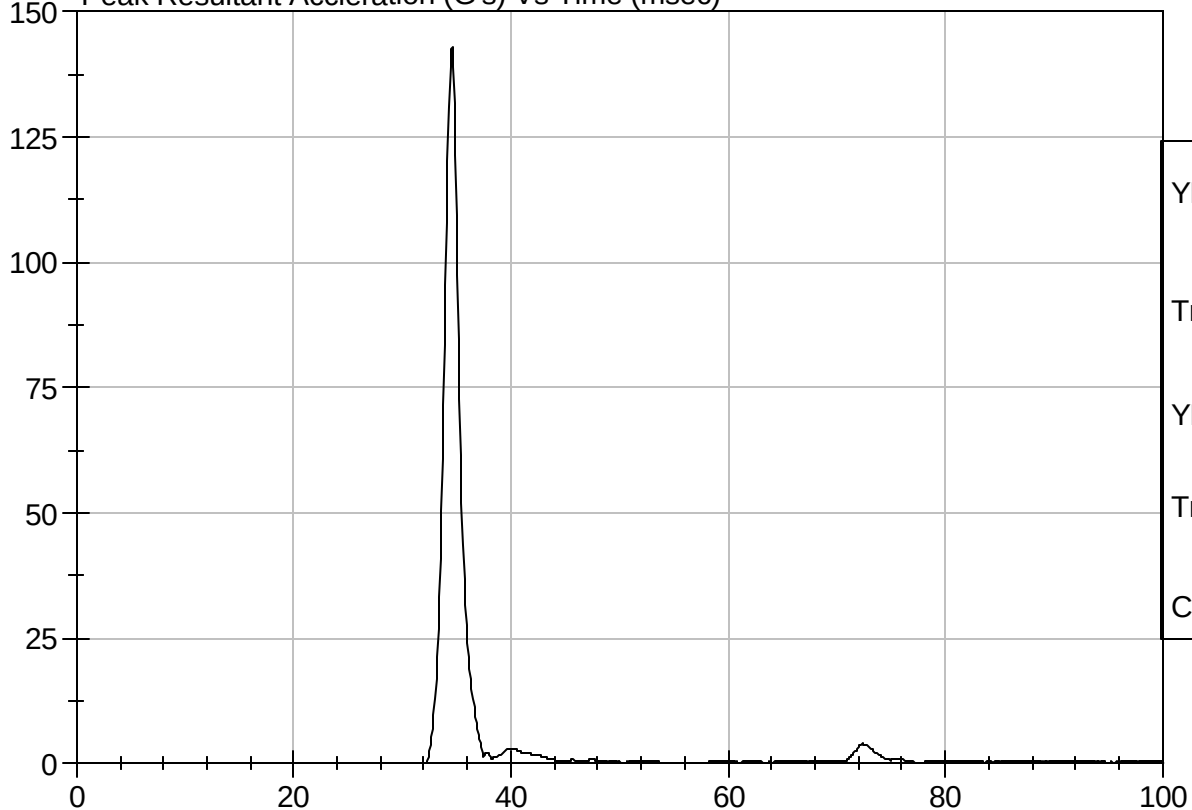
Test Description: Head Drop

Test Date: 01/06/2006

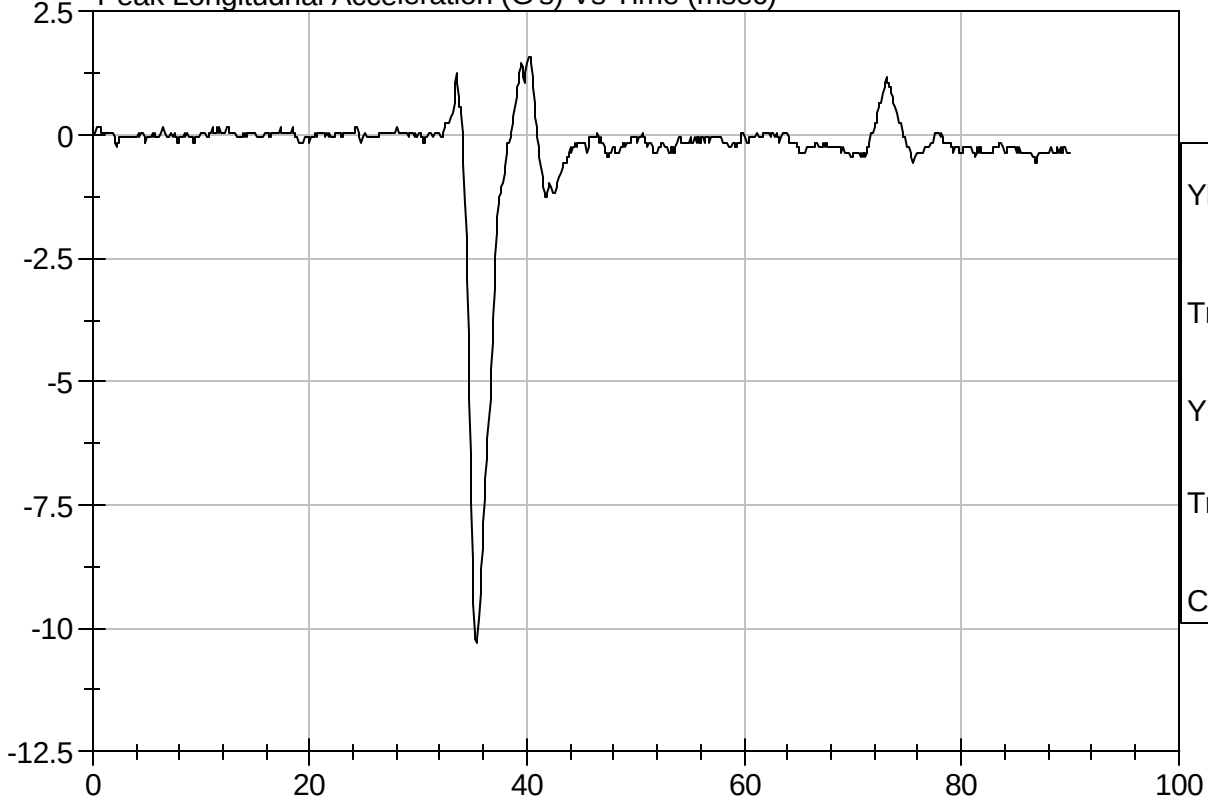
Component: D06071

Speed: 0 ft/s, 0.00 m/s

Peak Resultant Acceleration (G's) Vs Time (msec)



Peak Longitudinal Acceleration (G's) Vs Time (msec)

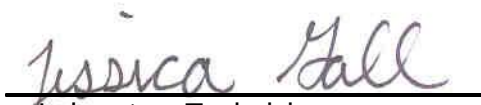


SID Calibration Data Sheet
Side Impact Dummy
Thorax Impact Test

ATD Serial No: 904

Test I.D: D06072

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Probe Velocity	m/s	4.22 - 4.31	4.23	Pass
Upper Rib	G's	37 - 46	38	Pass
Lower Rib	G's	37 - 46	38	Pass
Lower Spine	G's	15 - 22	22	Pass
Overall Test Results				Pass


Laboratory Technician


Approved By

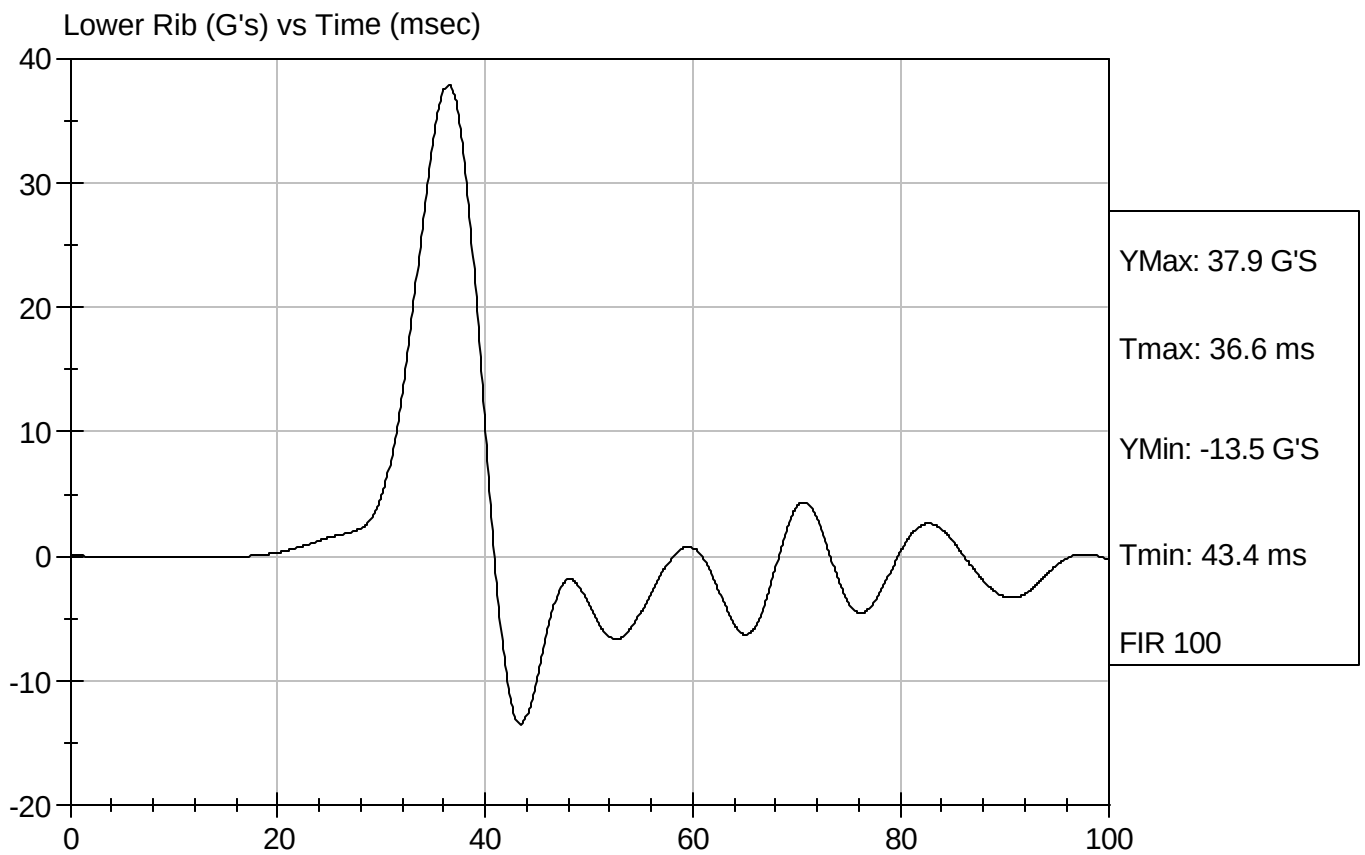
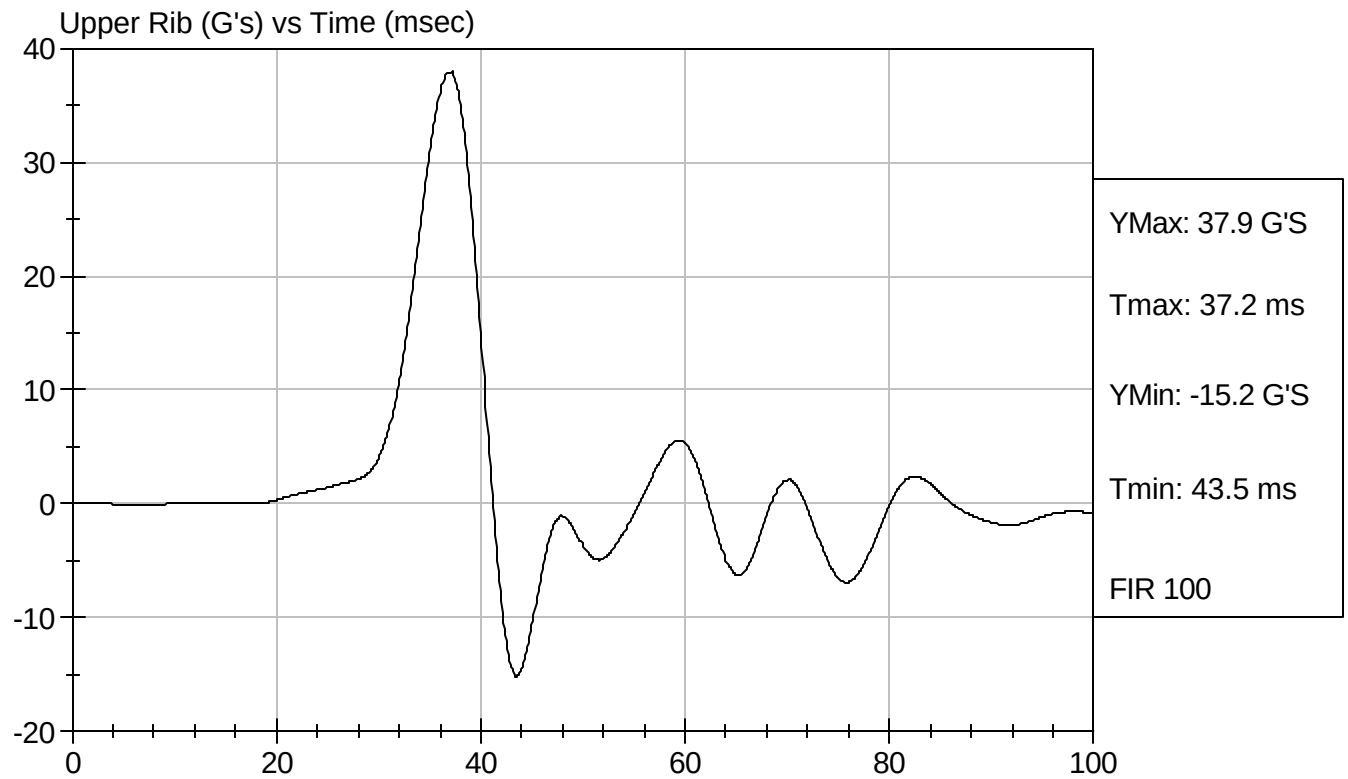
01/06/2006

Test Date



Test Desc: Thorax Impact
Component ID: D06072

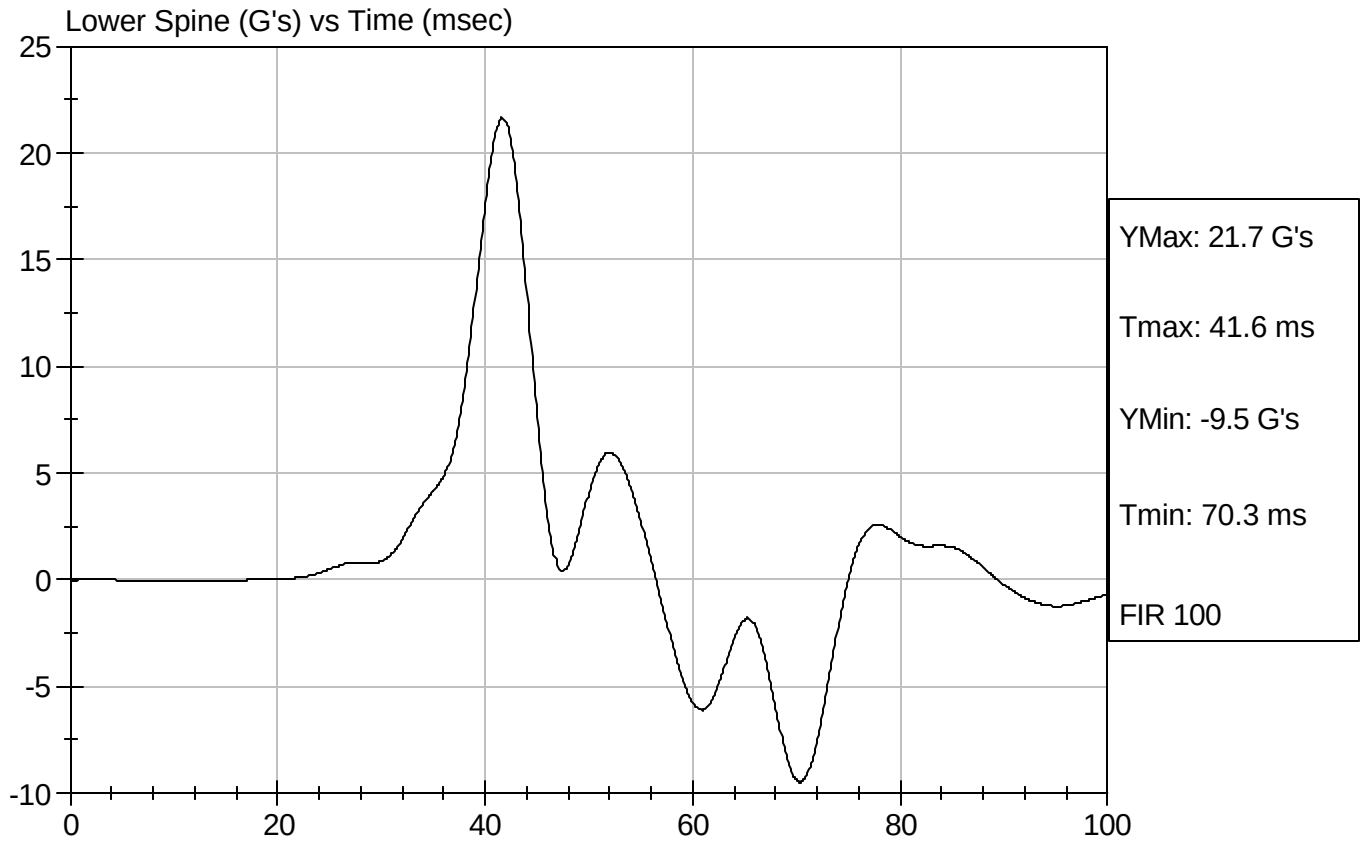
Test Date: 01/06/2006
Speed: 13.87 ft/sec, 4.23 m/sec





Test Desc: Thorax Impact
Component ID: D06072

Test Date: 01/06/2006
Speed: 13.87 ft/sec, 4.23 m/sec

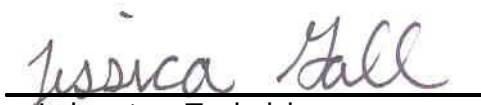


SID Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Test

ATD Serial No: 904

Test I.D: D06073

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	19	Pass
Probe Velocity	m/s	4.27 - 4.33	4.28	Pass
Pelvis Acceleration	G's	40 - 60	44	Pass
			Overall Test Results	Pass


Laboratory Technician

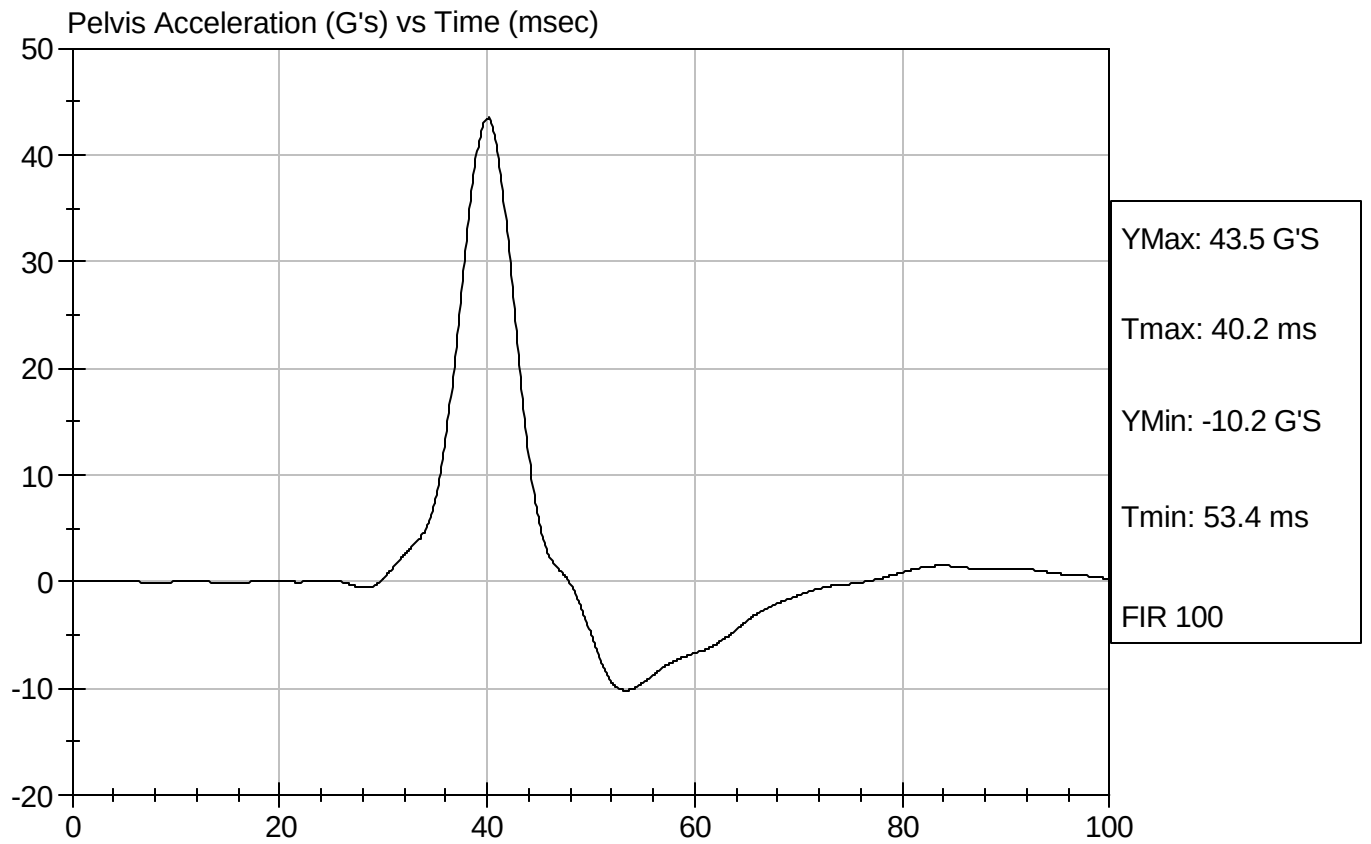

Approved By

01/06/2006
Test Date



Test Desc: Pelvis Impact
Component ID: D06073

Test Date: 01/06/2006
Speed: 14.04 ft/sec, 4.28 m/sec

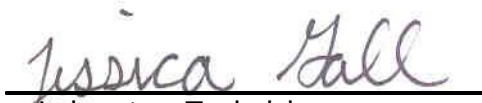


SID Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 904

Test I.D: D06074

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Force At 12.7 mm	N	104 -162	142	Pass
Force At 19 mm	N	163 - 222	199	Pass
Force At 25.4 mm	N	222 - 280	266	Pass
Force At 33 mm	N	325 - 391	370	Pass
Overall Test Results				Pass


Laboratory Technician

01/06/2006
Test Date


Approved By

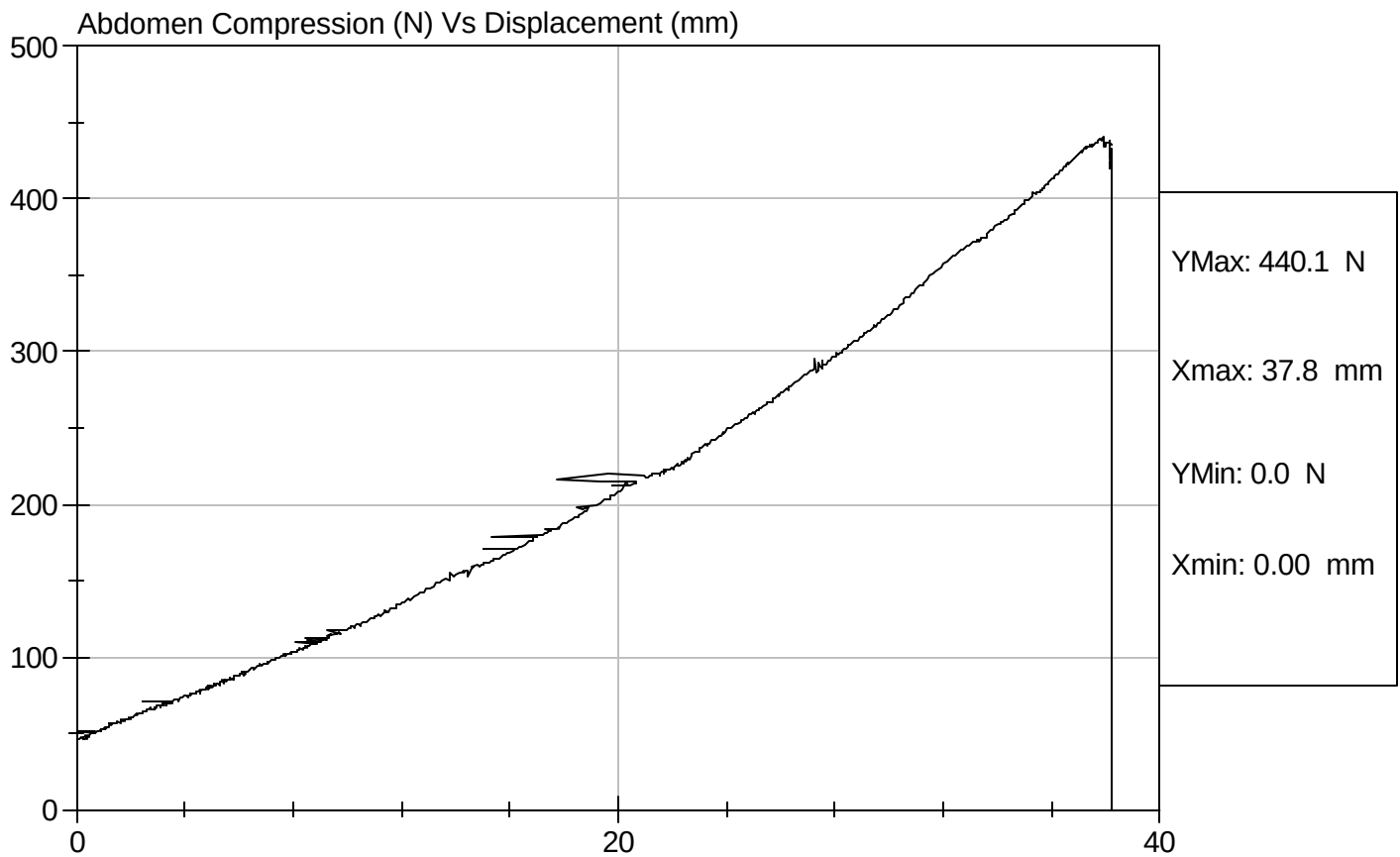


Test Description: Abdomen Compression

Test Date: 01/06/2006

Component: D06074

Speed: 0 ft/sec, 0 m/sec

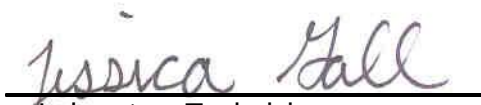


SID Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No: 904

Test I.D: D06075

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.4	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	147.2	Pass
Force At 30 deg	N	151.2 - 204.6	191.4	Pass
Force At 40 deg	N	204.6 - 258.0	250.4	Pass
Return Angle	Deg	12 Maximum	1	Pass
			Overall Test Results	Pass


Laboratory Technician


Approved By

01/06/2006

Test Date

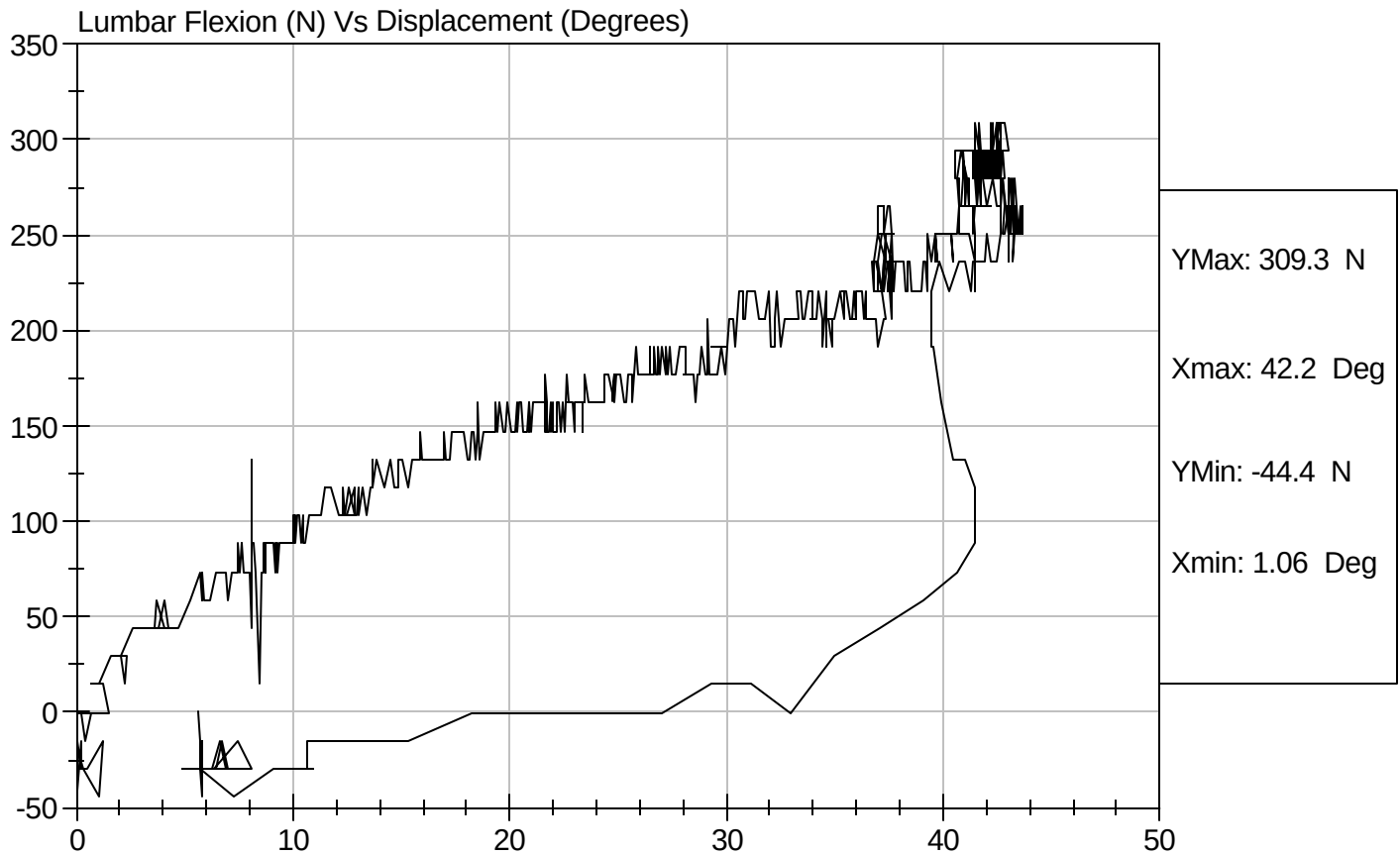


Test Description: Lumbar Flexion

Test Date: 01/06/2006

Component: D06075

Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet
Side Impact Dummy (SID)
Neck Pendulum Test

ATD Serial No: 904

Test I.D: D06079

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.6	Pass
Laboratory Relative Humidity		%	10 to 70	19	Pass
Impact Velocity		m/s	6.89 to 7.13	7.09	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.31	Pass
	20 msec	m/s	4.12 to 5.10	4.54	Pass
	30 msec	m/s	5.73 to 7.01	6.19	Pass
	40 to 70 msec	m/s	6.27 to 7.64	7.22	Pass
Midsagittal Plane Max Rotation		deg	66 to 82	71	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	60	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	76	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	53	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	5	Pass


 Laboratory Technician

01/06/2006

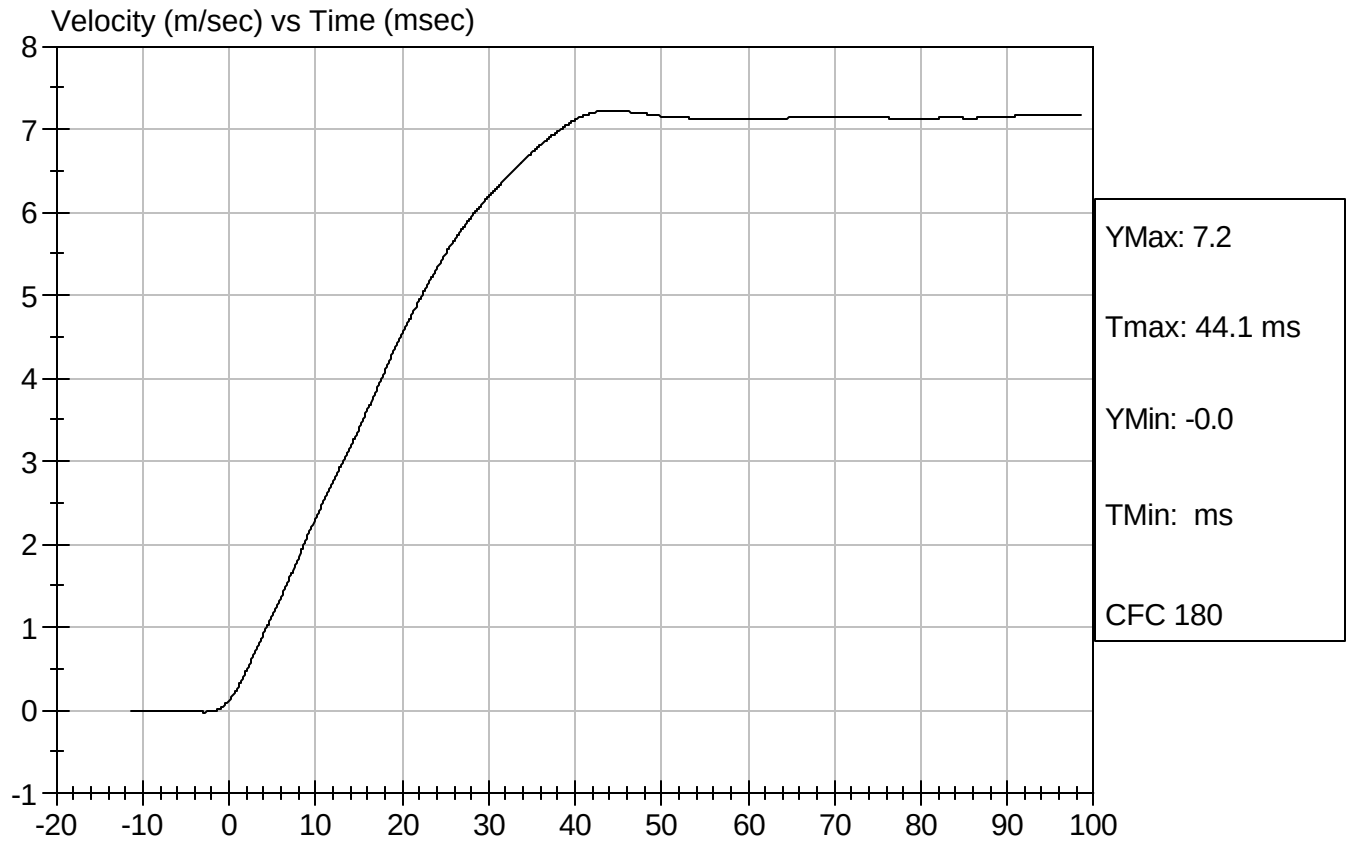
Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D06079

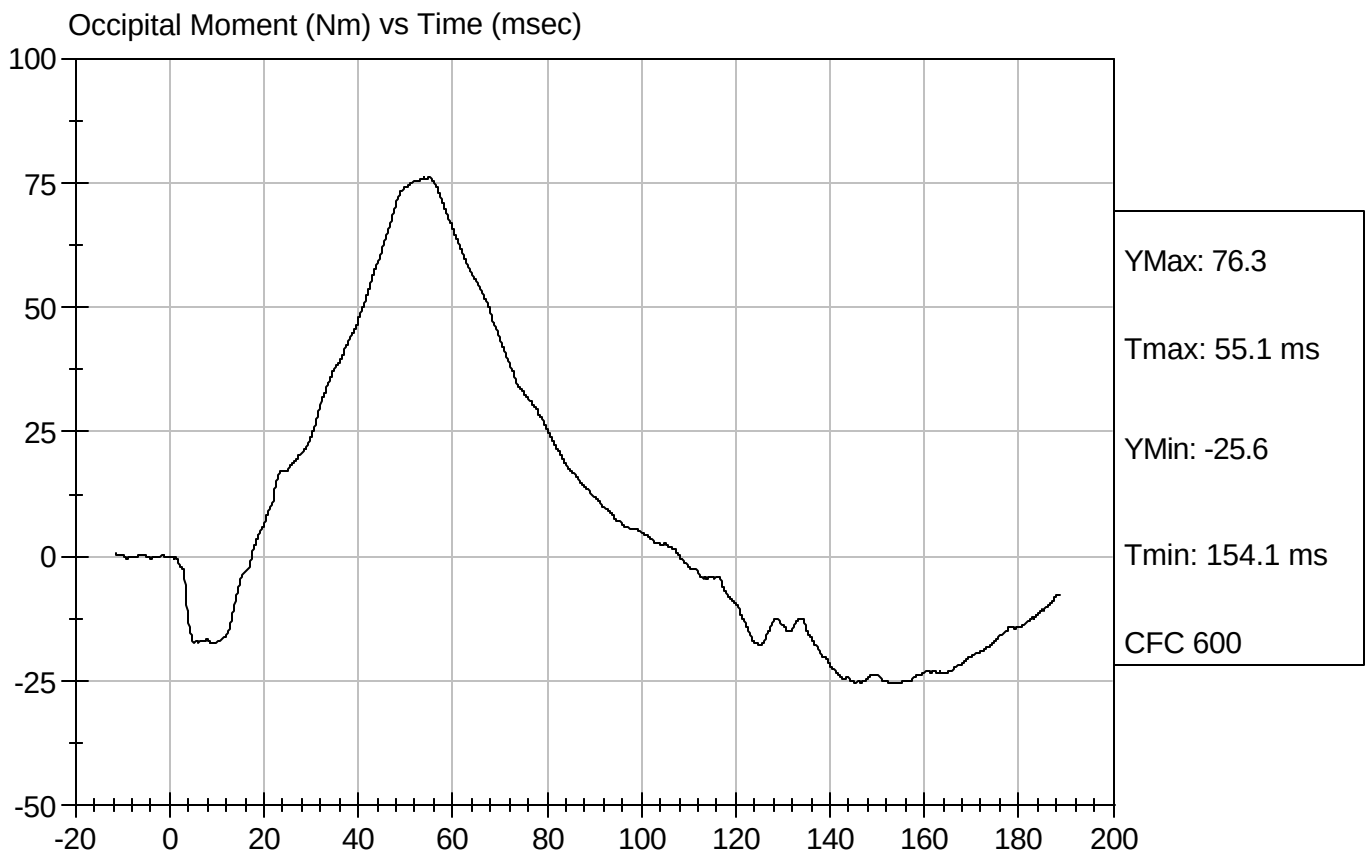
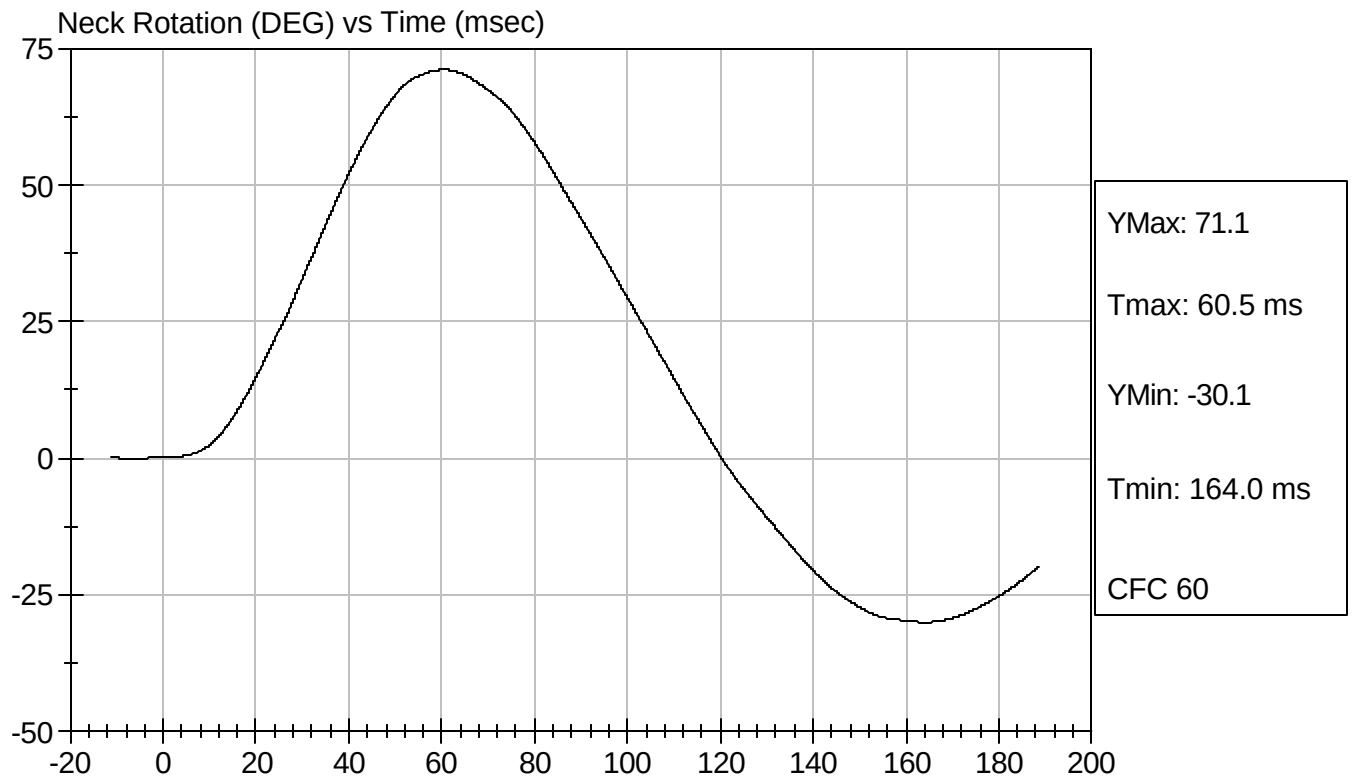
Test Date: 01/06/2006
Speed: 23.27 ft/sec, 7.09 m/sec





Test Desc: Neck Bending
Component ID: D06079

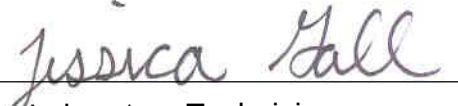
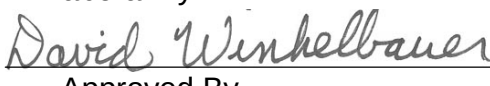
Test Date: 01/06/2006
Speed: 23.27 ft/sec, 7.09 m/sec



SID Calibration Data Sheet
Side Impact Dummy
Inspection Checklist

ATD Serial No: 904

Test Part	Items Checked	Result
Skin	Visual inspection	Pass
Head	Visual, ballast, accelerometer mount	Pass
Neck	Visual	Pass
Spine Box	Visual, ballast, accelerometer mount	Pass
Rib Cage	Visual, measure	Pass
Sternum	Visual	Pass
Lumbar Spine	Visual	Pass
Abdomen	Visual	Pass
Pelvis	Visual, palpate, accelerometer mount	Pass
Upper Legs	Visual	Pass
Knees	Visual	Pass
Lower Legs	Visual, range of motion	Pass
Ankles	Visual, range of motion	Pass
Feet	Visual, range of motion	Pass
Joints	1 to 2 g range	Pass
Other		Pass


 Laboratory Technician

 Approved By

01/09/2006

Test Date