

REPORT NUMBER: MCW-DOT-06SN03

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST

GENERAL MOTORS
2006 BUICK LUCERNE 4 DOOR SEDAN
NHTSA NUMBER: M60100

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FINAL REPORT

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16. Abstract A 55/28 km/h 90° Moving Deformable Barrier (MDB) New Car Assessment Program (NCAP) side impact was conducted on the subject 2006 Buick Lucerne 4 door sedan to obtain new car assessment and research data indicant of FMVSS No. 214D performance. The test was conducted at the Medical College of Wisconsin (MCW) in Milwaukee, Wisconsin on 07 February2006. The impact velocity of the Moving Deformable Barrier (MDB) was 62.0 km/h, and the ambient temperature at the struck side (driver's) of the vehicle was 21 °C. The target vehicle's maximum post test static crush was 311mm at level three. The test vehicle's occupant performance is as follows:					
		<u>Units</u>	<u>DRIVER</u>	<u>PASS.</u>	
Left upper rib (LUR) acceleration		G	54.1	64.6	
Left lower rib (LLR) acceleration		G	52.3	68.3	
Lower spine (T ₁₂) acceleration		G	73.6	66.8	
Thoracic Trauma Index (TTI)			64	68	
Pelvis (PEV) acceleration		G	77	71	
HIC			263.6	237.1	
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 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		
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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-42005. The purpose of this test was to evaluate side impact protection of a 2006 Buick Lucerne 4 door sedan manufactured by General Motors.

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. The procedures for receiving, inspection, testing, and reporting of test results are described in the test procedures and are not repeated in this report.

SECTION 2

SUMMARY OF NCAP SIDE IMPACT TEST

A 2006 Buick Lucerne 4 door sedan (test vehicle) was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) modeling a 90° impact as if the test vehicle were moving forward at 28 km/h perpendicular to and across the path of the MDB traveling forward at 55 km/h. Here the test vehicle was stationary and positioned 27° from perpendicular to the MDB tow road guidance system and the MDB was towed 27° ("crabbed") from the guidance system. [See p 26.] The 1936.4 kg test vehicle was impacted by the 1360.3 kg MDB traveling at a speed of 62.0 km/h (measured inline with the guidance system.) The test was conducted at the Medical College of Wisconsin on 07 February 2006.

Two (2) 50th percentile adult male Hybrid III-Side Impact Dummies (SID/HIIIs) were placed in designated seating positions within the test vehicle: one (1) driver, and one (1) left rear passenger; serial numbers 056 and 058 respectively. Each SID/HIII was instrumented in the following locations:

- Left upper rib uni-axial (Y) accelerometers (primary and redundant)
- Left lower rib uni-axial (Y) accelerometers (primary and redundant)
- Lower thoracic spine uni-axial (Y) accelerometers (primary and redundant)
- Pelvis uni-axial (Y) accelerometers (primary and redundant)
- Head center of gravity tri-axial (X, Y, Z) accelerometers
- Upper neck tri-axial (X, Y, Z) force load cells and tri-axial (X, Y, Z) moment load cells

The test vehicle was instrumented with nineteen (19) structural accelerometers and the MDB was instrumented with six (6) accelerometers. All data channels were recorded with a fully self contained on-board DTS TDAS Pro Data Acquisition System. The data were digitally sampled at 12.5 kHz and processed according to SAEJ211-1 (March 1995).

One (1) real-time video camera and nine (9) high-speed video 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 dummies can be found in Appendix A.

All of the above was conducted in accordance to the Laboratory Test Procedure for New Car Assessment Program Side Impact Testing dated November 2002.

2.2 GENERAL COMMENTS

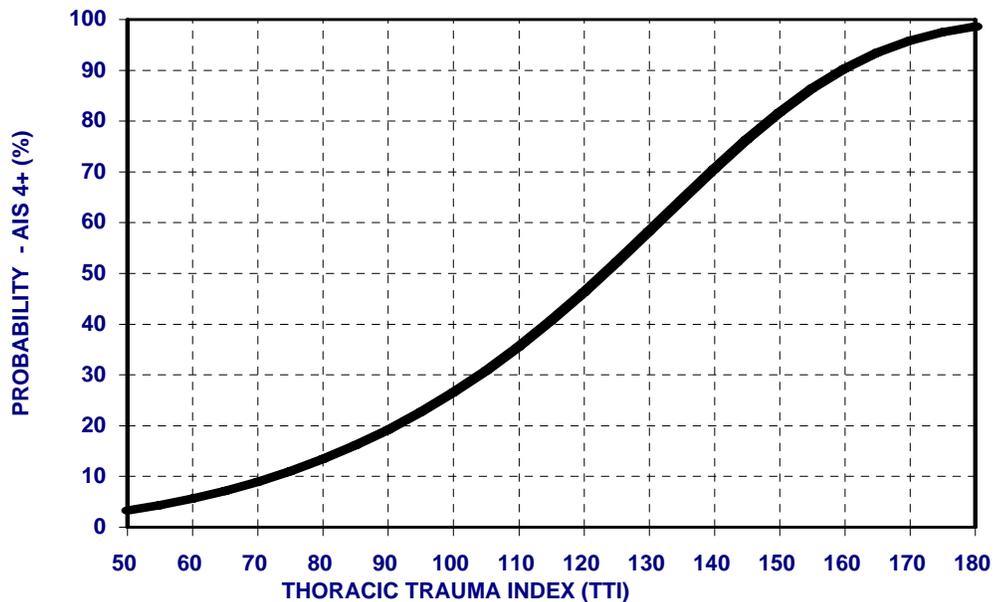
The test vehicle sustained a maximum static crush of 311 mm at level three, 1650 mm rearward of the vertical impact line.

Test summaries, post test observations, vehicle, MDB, camera, and occupant measurements are presented in datasheets 1-16. Appendix A contains the still photograph prints. Appendix B contains selected driver and passenger SID/HIII's response data traces. Appendix C contains the SID/HIII's configuration and performance verification data.

OCCUPANT SUMMARY		
Injury criteria	Driver (P1)	Left rear passenger (P4)
HIC36	263.6	237.1
T1 (ms)	33.2	41.8
T2 (ms)	59.8	63.0
TTI	64	68
Maximum pelvic acceleration (G)	77	71

Head Injury Criterion (HIC) is the standardized calculation using resultant head acceleration to assess head injury. Generally, a higher HIC represents an increase in the likelihood of a serious head injury. HIC36 specifies a time ‘window’ of 36 milliseconds over which the integral is calculated. T1 and T2 represent the time of the lower and upper bounds of the window in which the HIC is calculated.

The Thoracic Trauma Index (TTI) is computed from the crash test dummy’s accelerations at the upper rib, lower rib, and lower spine to quantify the risk of a serious thorax injury during a typical near side impact crash. The injury risk curve is shown below. The vertical axis of the curve is the probability of sustaining an Abbreviated Injury Scale (AIS) level 4 or greater injury. AIS is an anatomical scoring system used to assess a ‘threat to life’ associated with a specific injury; injuries are ranked on a scale of 1 to 6, with 1 being ‘minor’, 4 ‘severe’ and 6 an ‘un survivable’ injury. A lower TTI corresponds to a decreased probability of a severe thorax injury. (www.trauma.org)



The maximum pelvic acceleration is used to assess the likelihood of injury to the pelvis during a side impact crash. Higher pelvic accelerations correspond to an increase in the likelihood of sustaining a severe pelvis injury.

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION				
Restraint type	Left front (driver) occupant Location 01		Left rear (passenger) occupant Location 04	
	Installed	Operation	Installed	Operation
Front airbag	Steering wheel	Did not deploy	Not installed	N/a
Side airbag	Seat	Deployed	Not installed	N/a
Head airbag	Not installed	N/a	Not installed	N/a
Curtain airbag	Yes	Deployed	Yes	Deployed
Seat belt pretensioner	Yes	N/a	Not installed	N/a
Seat belt load limiter	Yes	N/a	Yes	N/a

These test data and report can be found in detail on the NHTSA website at www.nhtsa.dot.gov.

A brief summary of the crash test can be located at www.safercar.gov

TEST NOTES

- It was observed that the automatic leveling system (ALS) of the test vehicle would consistently adjust and maintain the ride height (as measured at the left rear pinch weld – measurement 'J2' p. 16) to 150-151 mm. This ride height was outside the manufacturer's tolerance. The COTR specified a ride height of approximately 200 mm. Therefore the ride height was manually raised using the following procedure:
 - Two people (>400 lbs total) stood on the rear bumper compressing the rear suspension.
 - The engine was started and the ALS adjusted and maintained the ride height (with the people on the rear bumper) to ~150 mm.
 - The electrical connections to the ALD were broken (and remained so throughout testing) and the engine was turned off.
 - The people stepped off the rear bumper and the vehicle rose to a ride height of 203 mm (and it was observed that manually lifting at the driver's side rear wheel well produced little or no increase in the ride height).
 - Standard attitude measurement procedures were then followed.

**DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA**

VEHICLE INFORMATION	
Year	2006
Make	Buick
Model	Lucerne
Body style	4 door sedan
NHTSA number	M60100
MCW test ID	06SN03
VIN	1G4HP572764160750
Color	Black
Build date	January 2006
Engine No. of cylinders	6
Engine Displacement (L)	3.8
Engine Placement	Lateral
Transmission	4 speed automatic
Final drive	Front wheel drive
Delivery date	27Jan2006
Odometer reading	92 miles

VEHICLE OPTIONS	
Air conditioning	Yes
Anti-lock brakes	Yes
AM/FM cassette radio	Yes
All wheel drive	No
Clock	Yes
Console	Yes
Cruise/speed control	Yes
Disc brakes, front	Yes
Disc brakes, rear	Yes
Power brakes	Yes
Power door locks	Yes
Power steering	Yes
Power windows	Yes
Rear window defroster	Yes
Roof rack	No
Tilt steering wheel	Yes

CERTIFICATION LABEL INFORMATION			
Manufacturer	General Motors Corporation	GVWR (kg)	2144
		GAWR front(kg)	1145
Date of manufacture	January 2006	GAWR rear (kg)	999

SEAT INFORMATION			
	Number of occupants	Seat type	Seat back type
Front	2	Bucket	Adjustable
Back	3	Contoured	Fixed
Third	N/a	N/a	N/a
Total	5		

CARGO CAPACITY CALCULATION			
	Units	Value	Reference label
Vehicle maximum capacity	kg	420.0	(A)
Number of occupants (5) X 68.04 kg	kg	340.2	(B)
Cargo capacity (RCLW) †	kg	79.8†	(C) = (A)-(B) †

† Note if RCLW is > 136.1 kg (300 lbs), use 136.1 kg

**DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA (CONTINUED)**

TEST VEHICLE MASS INFORMATION				
	Units	As delivered	As tested	Fully loaded
Left front	kg	525.7	565.6	568.8
Right front	kg	520.7	531.2	531.2
Left rear	kg	324.4	433.2	436.4
Right rear	kg	332.9	406.4	408.1
Total front	kg	1046.7	1096.8	1100.0
% Total front	%	61.4	56.6	56.6
Total rear	kg	657.3	839.6	844.5
% Total rear	%	68.6	43.4	43.4
Total	kg	1703.7	1936.4	1944.5

As delivered mass is vehicle mass with maximum fluids

Fully loaded mass is the as delivered mass + 1 or 2 ATD's + RCLW

As tested mass is the mass of test vehicle with 1 or 2 ATD's + instrumentation + ballast (if necessary)

CALCULATION OF TEST VEHICLE TARGET MASS			
	Units	Value	Reference label
As delivered test vehicle mass	kg	1703.7	(D)
Maximum cargo capacity (RCLW)	kg	79.8	(C)
Mass of SID Hill's (1 or 2)	kg	161.0	(E)
Test vehicle target mass (TVT_W)	kg	1944.5	(D) + (C) + (E)

As tested mass must 4.5 kg to 9 kg less than the test vehicle target mass

BALLAST INFORMATION	
Mass of ballast added (kg)	4.5
Location	Trunk
<u>Components removed from test vehicle</u> None	

IMPACT LOCATION ON TEST VEHICLE	
Wheelbase	2932 mm
Nominal impact point	508 mm rearward of front axle centerline
Actual impact point	505 mm rearward of front axle centerline

**DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA (CONTINUED)**

TEST VEHICLE ATTITUDES				
	Units	As delivered	As tested	Fully loaded
Left front	mm	767†	758‡	753†
Right front	mm	773†	764‡	759†
Left rear	mm	778†	784‡	720†
Right rear	mm	776†	796‡	732†
CG (X)	mm	2011	1272	1272

As tested attitudes must be between as delivered and fully loaded attitudes

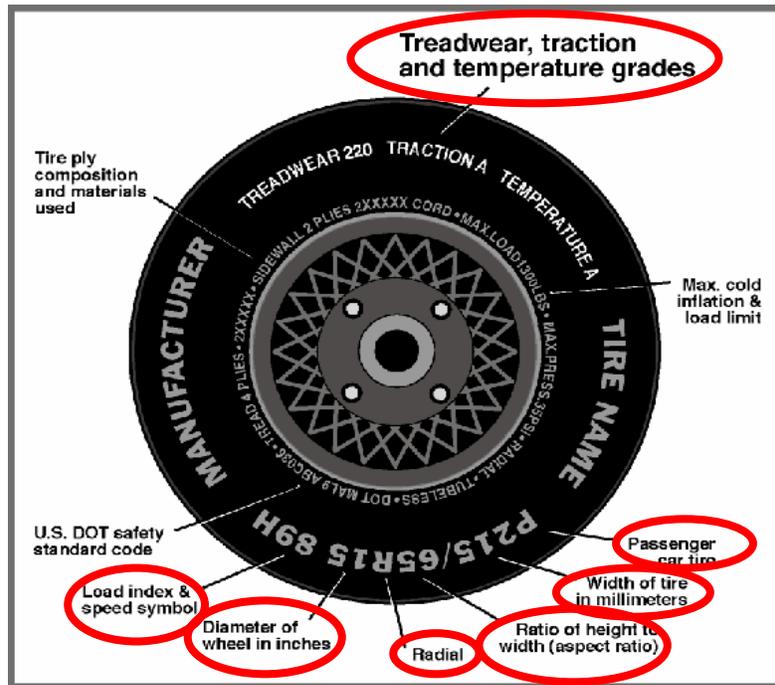
CG (X) measured rearward from front axle centerline

† Note as delivered and fully loaded attitude measurements were taken with the a defective automatic leveling device (see test notes)

‡As tested attitudes were taken following the procedure listed in the test notes to compensate for the defective automatic leveling device.

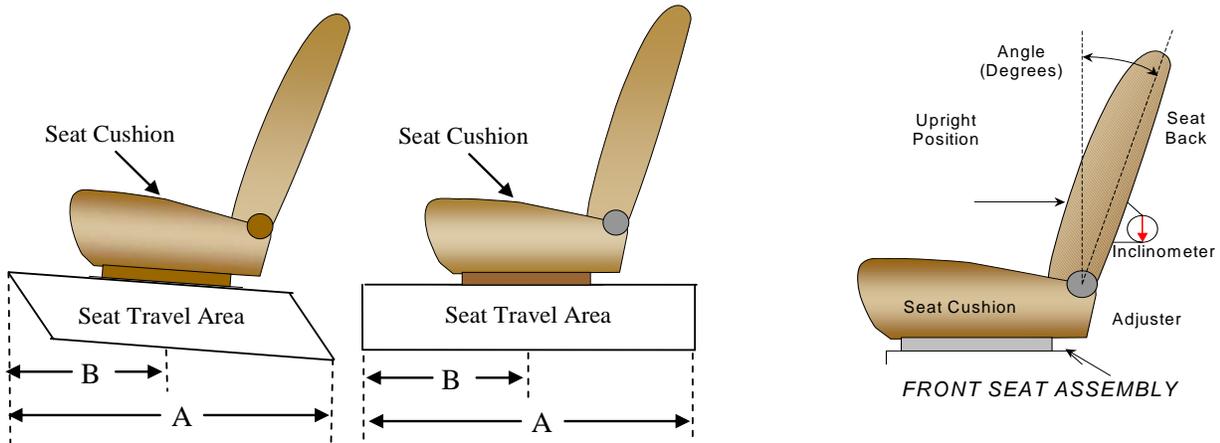
AUTOMATIC DOOR LOCK (ADL) INFORMATION				
	Left front	Left rear	Right front	Right rear
ADL present	Yes	Yes	Yes	Yes
ADL deactivated	No	No	No	No
Deactivation method	Unable to deactivate			
Door lock status	Locked	Locked	Locked	Locked

**DATA SHEET NO. 2
TEST VEHICLE TIRE INFORMATION**



TIRE INFORMATION		
Measured Parameter	Front	Rear
Maximum tire pressure (kPa)	275	275
Cold / test pressure (kPa)	225	225
Recommended tire size	P225/60R16	P225/60R16
Tire size on vehicle	P225/60R16	P225/60R16
Tire manufacturer	Bridgestone	Bridgestone
Tire name	Insignia SE	Insignia SE
Tire type	Passenger	Passenger
Tire width (mm)	225	225
Ratio of height to width (aspect ratio)	60	60
Radial	Radial	Radial
Wheel diameter (inches)	16	16
Load index & speed symbol	97S	97S
Tread wear	980	980
Traction grade	B	B
Temperature grade	B	B

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



Seat fore/aft positions

The total seat travel was measured from forward most position to rearmost position, irrespective of vertical seat height in those positions. The seat was set at the longitudinal mid position with vertical adjustment at the lowest position obtainable for both the driver and passenger.

SEAT FORE/AFT POSITION		
	Left front seat	Left rear seat
Type	Power	Fixed
Fore/aft total travel (mm)	280	N/a
Number of detents	N/a (Power)	N/a
Test position	140 mm from full forward	N/a

Seat back position

The driver and passenger seat back is positioned according to the manufacturers designated angle.

SEAT BACK POSITION		
	Left front seat	Left rear seat
Total number of detents	25	N/a
Test position	8 th notch from full upright ‡	N/a
Seat back angle in test position	24.0°	N/a
Location of measurement	Behind AB module	N/a
Seat back angle @ head rest post	14.1°	N/a

‡Full upright = notch 0

Seat belt position

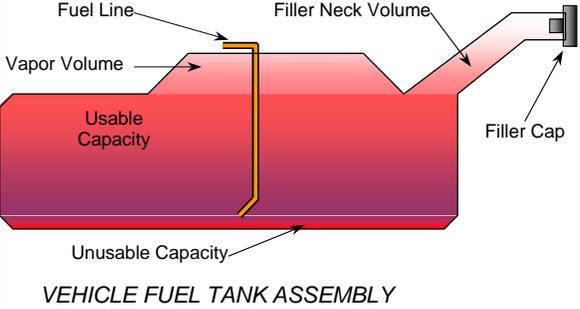
The adjustable anchorage locations are positioned according to the manufacture's specifications.

SEAT BELT ADJUSTABLE ANCHORAGE (D-RING)		
	Left Front Seat	Left Rear Seat
Adjustable anchor present	Yes	No
Total travel (mm)	60 mm	N/a
Test position	2 nd notch from top	N/a

**DATA SHEET NO. 3
TEST VEHICLE INFORMATION (continued)**

Fuel tank information

STODDARD INFORMATION		
Description	Units	Value
Usable capacity of standard equipment fuel tank	L	70.0
Usable capacity of optional equipment fuel tank	L	0
Usable capacity of vehicle used for certification testing to requirements	L	0
Amount of stoddard added for test	L	65.1
% Usable capacity (92%-94%)	%	93
Operational instructions	None	
Electric fuel pump present	Yes	
Operating condition of test vehicle for fuel pump operation	The fuel pump is commanded on within 25 milliseconds of 'run/crank' exceeding 6 volts. The fuel pump will continue to run for 2 seconds. At the end of 2 seconds the pump will be on whenever the engine is turning and 'run/crank' is high.	

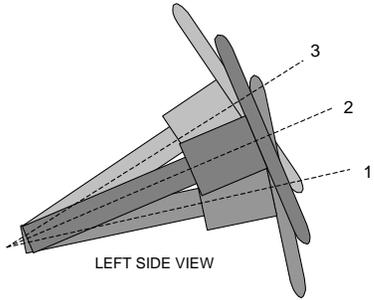


The diagram illustrates the internal structure of a vehicle fuel tank assembly. It shows a fuel line entering the tank, a filler neck with a filler cap, and a fuel line exiting. The tank is divided into sections: Usable Capacity (the main volume), Vapor Volume (the space above the fuel), and Unusable Capacity (the space at the bottom of the tank). The Filler Neck Volume is the space within the neck above the fuel level. The diagram is labeled 'VEHICLE FUEL TANK ASSEMBLY'.

Steering wheel information

Steering wheel and column adjustments are placed according to the manufacturer's specifications.

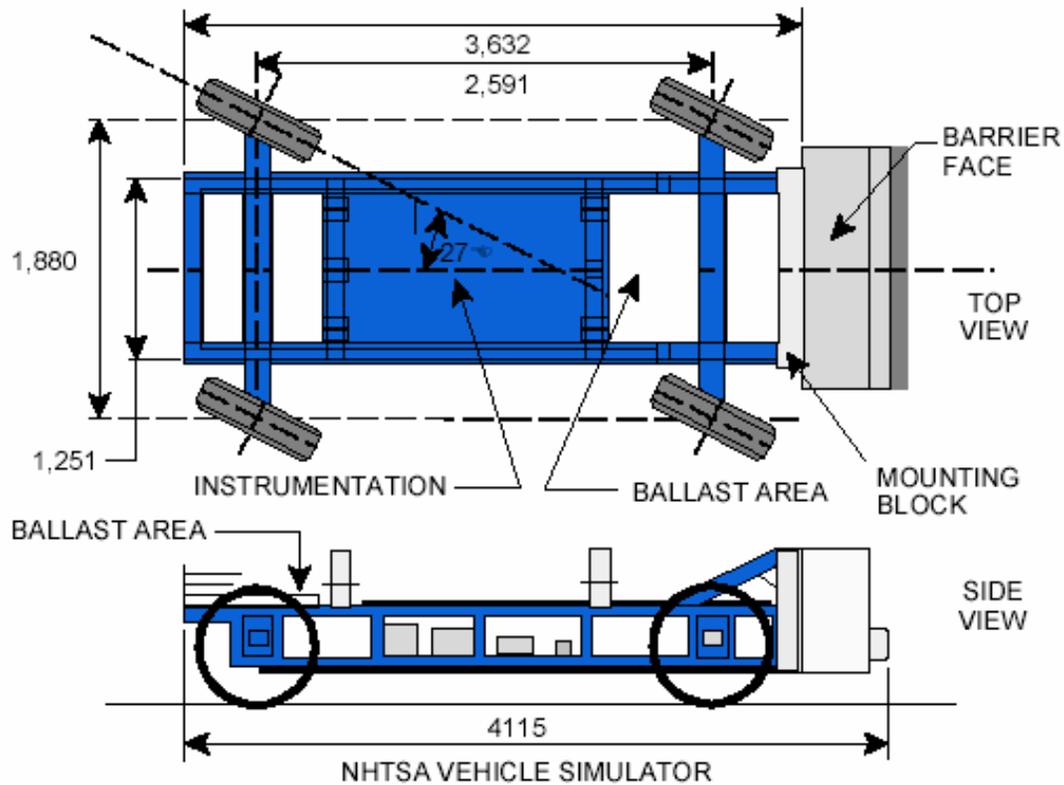
ADJUSTABLE STEERING COLUMN		
Adjustable column	Yes	
Steering wheel angle in upper most position	29.5°	
Steering wheel angle lower position	9.3°	
Steering wheel fore/aft travel	N/a	
Number of detents	5	
Test position	2 nd detent (0 is full upright) 19.4°	



The diagram shows a left side view of a steering column assembly. It features a steering wheel mounted on a column. Three callout numbers are present: 1 points to the steering wheel, 2 points to the steering column, and 3 points to the steering shaft. The diagram is labeled 'LEFT SIDE VIEW' and 'STEERING COLUMN ASSEMBLY'.

**DATA SHEET NO. 4
MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS**

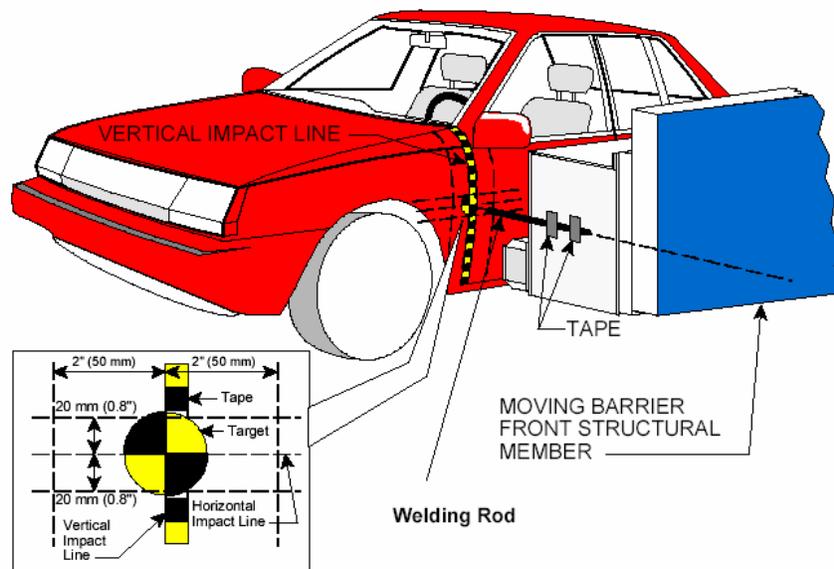
MDB SPECIFICATIONS				
	Units	Specification	Range	Value
Overall Width of Framework Carriage	mm	1251	1226-1276	1245
Overall Length w/Impactor Face	mm	4115	4090-4140	4101
Overall Length w/o Impactor Face	mm	3632	3607-3657	3617
Longitudinal Cg from Front Axle	mm	1123	1098-1148	1135
Track Width	mm	1880	1855-2005	1864
Mass	kg	1361	1356.5-1365.5	1357.1
MOI (X)	kg-m ²	508	483-533	496
MOI (Y)	kg-m ²	2263	2150-2376	2227
MOI (Z)	kg-m ²	2572	2443-2701	2609



DATA SHEET NO. 4
MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS (Continued)

MDB MASS INFORMATION		
	Units	As tested
Left front	kg	458.3
Right front	kg	307.7
Left rear	kg	228.4
Right rear	kg	365.9
Total front	kg	766.0
% Total front	%	56.3
Total rear	kg	594.3
%Total rear	%	43.7
Total	kg	1360.3

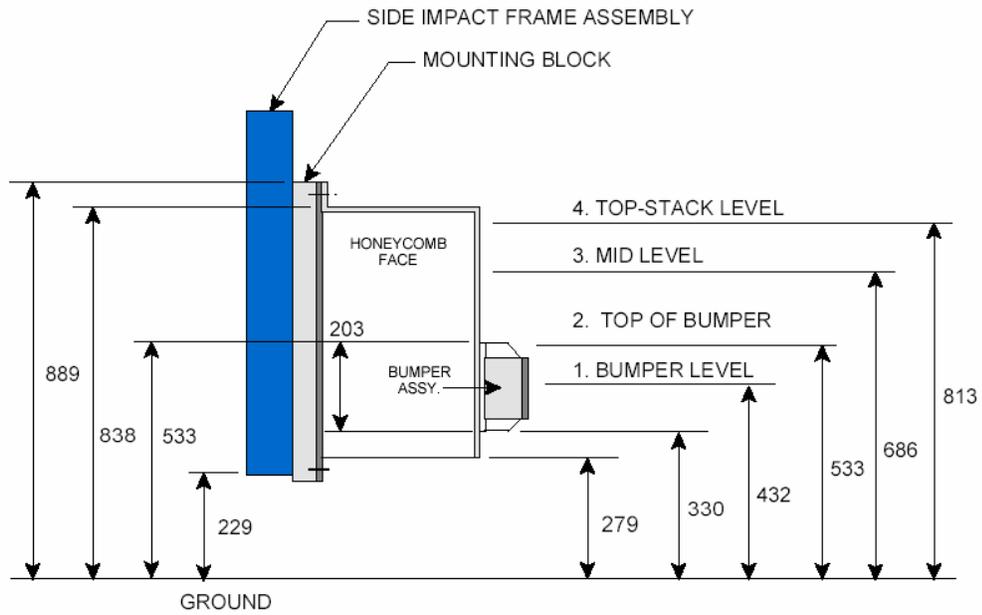
IMPACT SPEED				
	Units	Specification	Range	Value
Primary speed trap	kmh	61.9	61.1-62.7	62.0
Redundant speed trap	kmh	61.9	61.1-62.7	61.8



IMPACT POINT INFORMATION		
Vertical impact line is	508 mm rearward of front axle centerline	
Actual impact is	505 mm rearward of front axle centerline	
Measurement	Value	Tolerance
Impact point distance from vertical impact line	3 mm forward	+/- 50 mm
Impact point distance from horizontal impact line	10 mm below	+/- 20 mm

**DATA SHEET NO. 4
MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS (Continued)**

HONEYCOMB FACE CLEARANCE					
	Units	Specification	Range	Left	Right
Bottom of barrier	mm	279	276-282	277	278
Bottom of bumper	mm	330	327-333	331	330
Top of bumper	mm	533	530-536	532	532
Top of barrier	mm	838	835-841	836	838



RIGHT SIDE VIEW

**DATA SHEET NUMBER 5
POST TEST OBSERVATIONS**

TEST DUMMY INFORMATION AND CONTACT POINTS		
Description	Left front seat	Left rear seat
Dummy type / serial no.	SID HIII/056	SID HIII/058
Head contact	To side curtain airbag	To side header and side curtain airbag
Upper torso contact	To seat mounted side airbag	To left rear door panel
Lower torso contact	To seat mounted side airbag and left front door panel at arm rest	To left rear door panel at arm rest
Left leg contact	To left front door panel below arm rest	To left rear door panel below arm rest
Left knee contact	To left front door panel at arm rest	To Left rear door panel in front of arm rest

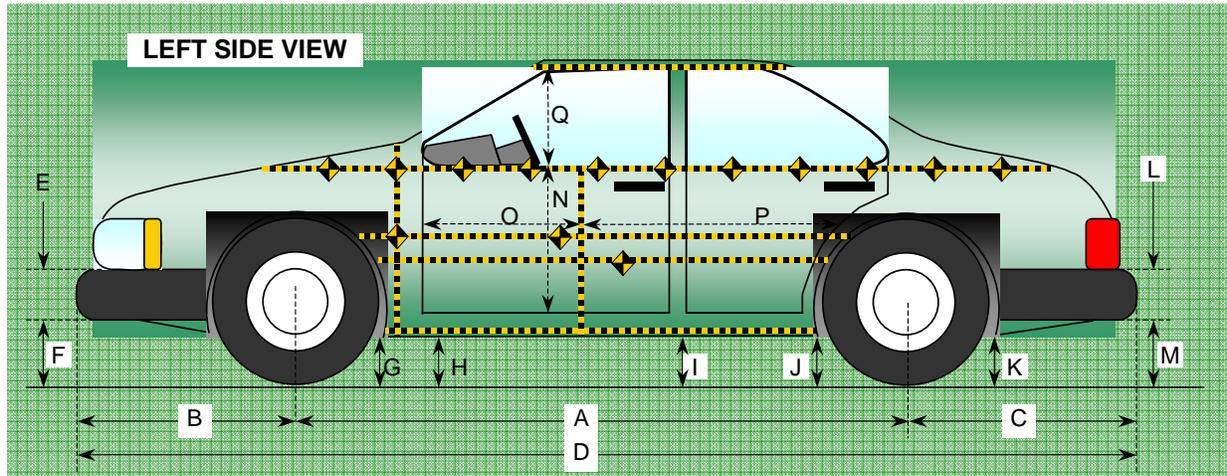
POST TEST DOOR OPENING AND SEAT TRACK INFORMATION		
Description	Front	Rear
Locked/unlocked doors	Locked	Locked
Left side door opening	Closed/latched/inoperable	Closed/latched/inoperable
Right side door opening	Closed/latched/operable	Closed/latched/operable
Seat movement	None	None
Seat back failure	None	None

POST TEST STRUCTURAL OBSERVATIONS	
Critical areas of performance	Observations/conclusions
Pillar performance	None
Sill separation	None
Windshield damage	Cracked along driver a-pillar
Window damage	Left front and rear windows broke on impact
Other notable effects	None

**DATA SHEET NUMBER 5
POST TEST OBSERVATIONS (continued)**

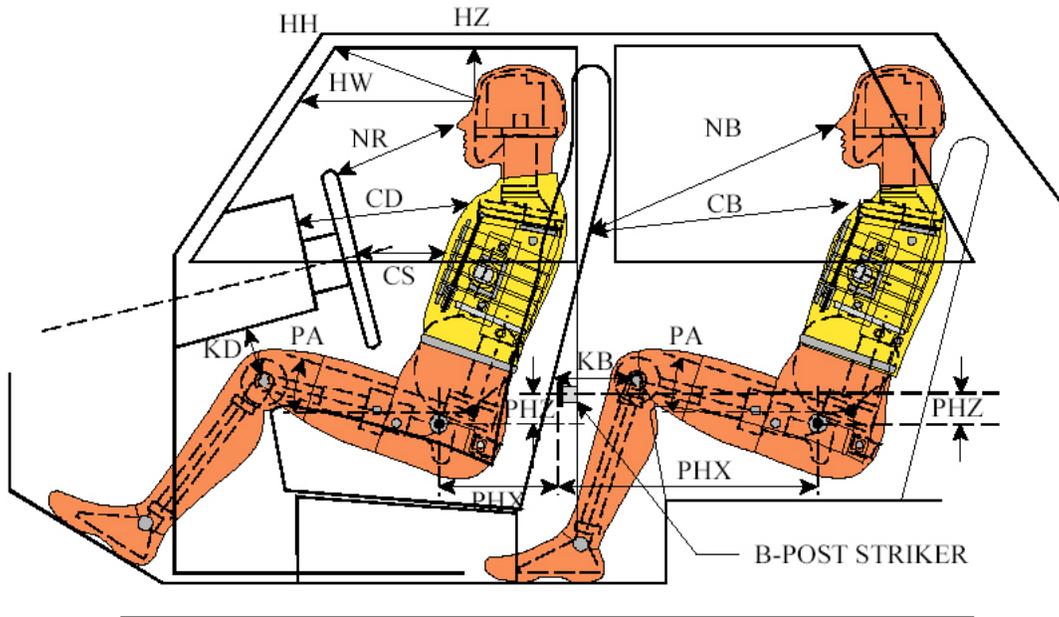
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION				
Restraint Type	Left front (Driver) occupant Location 01		Left rear (passenger) occupant Location 04	
	Installed	Operation	Installed	Operation
Front airbag	Steering wheel	Did not deploy	Not installed	N/a
Side airbag	Seat	Deployed	Not installed	N/a
Head airbag	Not installed	N/a	Not installed	N/a
Curtain airbag	Yes	Deployed	Yes	Deployed
Seat belt pretensioner	Yes	N/a	Not installed	N/a
Seat belt load limiter	Yes	N/a	Yes	N/a

DATA SHEET NUMBER 6
VEHICLE PRE AND POST MEASUREMENTS



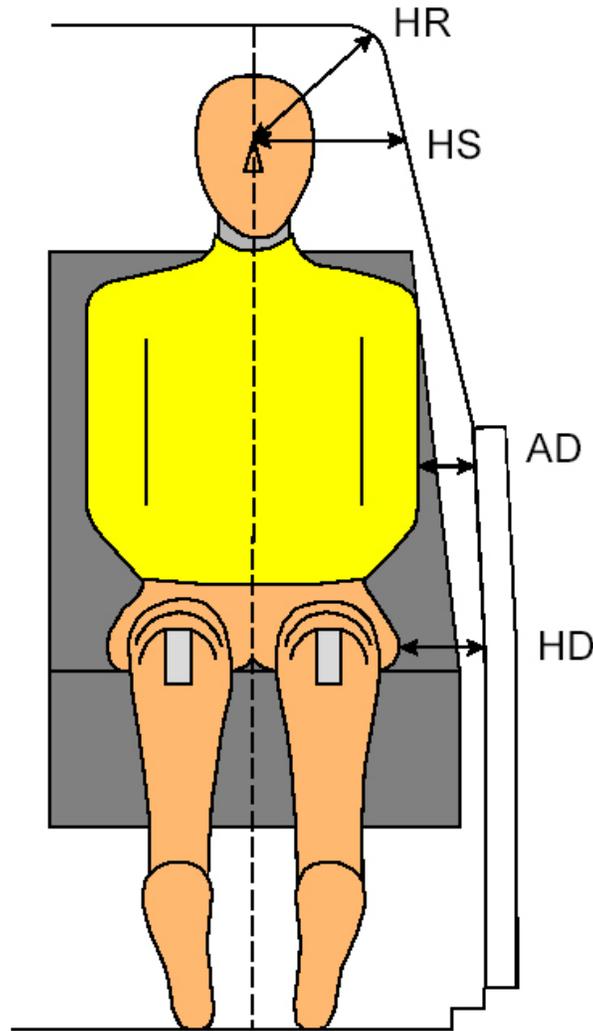
VEHICLE DIMENSIONS				
Code	Description	Pre test	Post test	Change
		mm	mm	mm
A	Wheelbase	2932	2885	-47
B	Front axle to front side of vehicle	919	923	4
C	Rear axle to rear side of vehicle	1032	1024	-8
D	Total length at centerline	5161	5133	-28
E	Front bumper thickness	246	246	0
F	Front bumper bottom to ground	242	256	14
G	Sill height at front wheel well	230	240	10
H	Sill height at front door leading edge	233	238	5
I	Sill height at b-pillar	247	294	47
J1	Sill height at rear wheel well	262	290	28
J2	Pinch weld height at rear wheel well	203	223	20
K	Sill height aft of rear wheel well	314	339	25
L	Rear bumper thickness	248	248	0
M	Rear bumper bottom to ground	423	423	0
N	Sill height to window bottom sill	770	735	-35
O	Front door leading edge to impact C/L	1109	1092	-17
P	Rear door trailing edge to impact C/L	975	890	-85
Q	Front window opening	420	424	4
R	Right side length	4883	4877	-6
S	Left side length	4883	4832	-51
T	Vehicle width at b-pillar	1857	1629	-228

**DATA SHEET NUMBER 7
SID HIII LONGITUDINAL CLEARANCES**



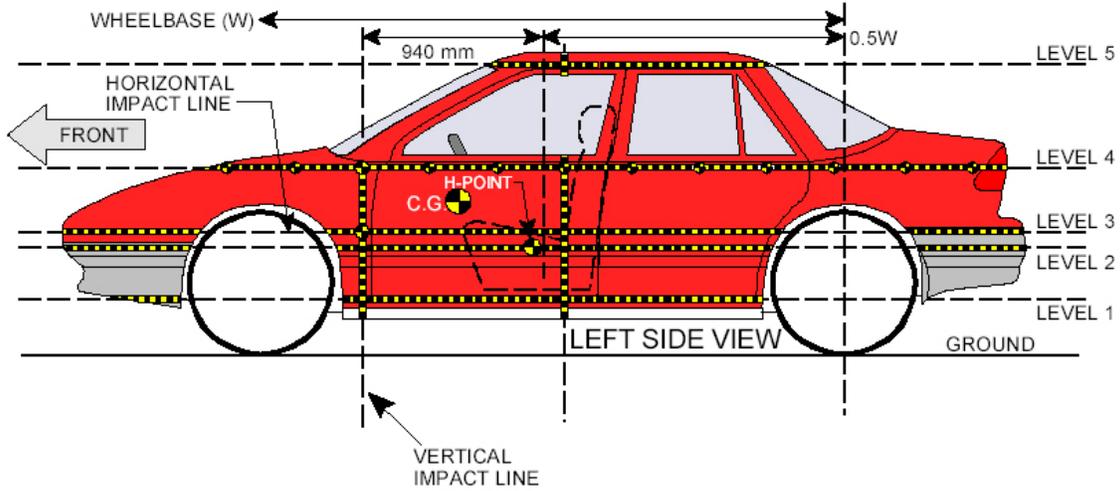
SID HIII LONGITUDINAL CLEARANCE MEASUREMENTS					
Driver code	Pass. code	Measurement description	Units	Left front seat	Left rear seat
		ATD serial number	-	SIDHIII/056	SIDHIII/058
HH	-	Head to header	mm	455	N/a
HW	-	Head to windshield	mm	686	N/a
HZ	HZ	Head to roof	mm	205	151
NR	NB	Nose to rim/nose to seatback	mm	484	677
CD	CB	Chest to dash or seatback	mm	568	607
CS	-	Chest to steering wheel	mm	365	N/a
KDL	KBL	Left knee to dash or seatback length	mm	166	270
KDA	KBA	Left knee to dash or seatback angle	°	35.7	12.8
KDR	KBR	Right Knee to dash or seatback length	mm	155	276
KDA	KDA	Right knee to dash or seatback angle	°	29.7	15.0
PA	PA	Pelvic angle	°	23.1	23.1
PHX	PHX	H-Point to striker (x-axis)	mm	170	222
PHZ	PHZ	H-Point to striker (z-axis)	mm	149	242

**DATA SHEET NUMBER 8
SID HIII LATERAL CLEARANCES**



SID HIII LATERAL CLEARANCE MEASUREMENTS				
Code	Measurement description	Units	Left front seat	Left rear seat
-	ATD serial number	-	SIDHIII/056	SIDHIII/058
HR	Head to side header	mm	201	170
HS	Head to side window	mm	353	336
-	Shoulder to door	mm	150	109
AD	Arm to door	mm	160	120
HD	H-Point to door	mm	181	174

**DATA SHEET 9
VEHICLE SIDE MEASUREMENTS**



VEHICLE STATIC CRUSH SUMMARY				
Level	Description	Height above ground (mm)	Maximum static crush (mm)	Longitudinal (X) distance from impact point (mm)
5	Window top	1395	129	1500
4	Window sill	977	263	1200
3	Mid-door	627	311	1650
2	Driver H-point	503	291	1650
1	Axle centerline or sill top	267	115	1200
Maximum static crush		311 mm at level three- 1650 mm rearward from vertical impact line		

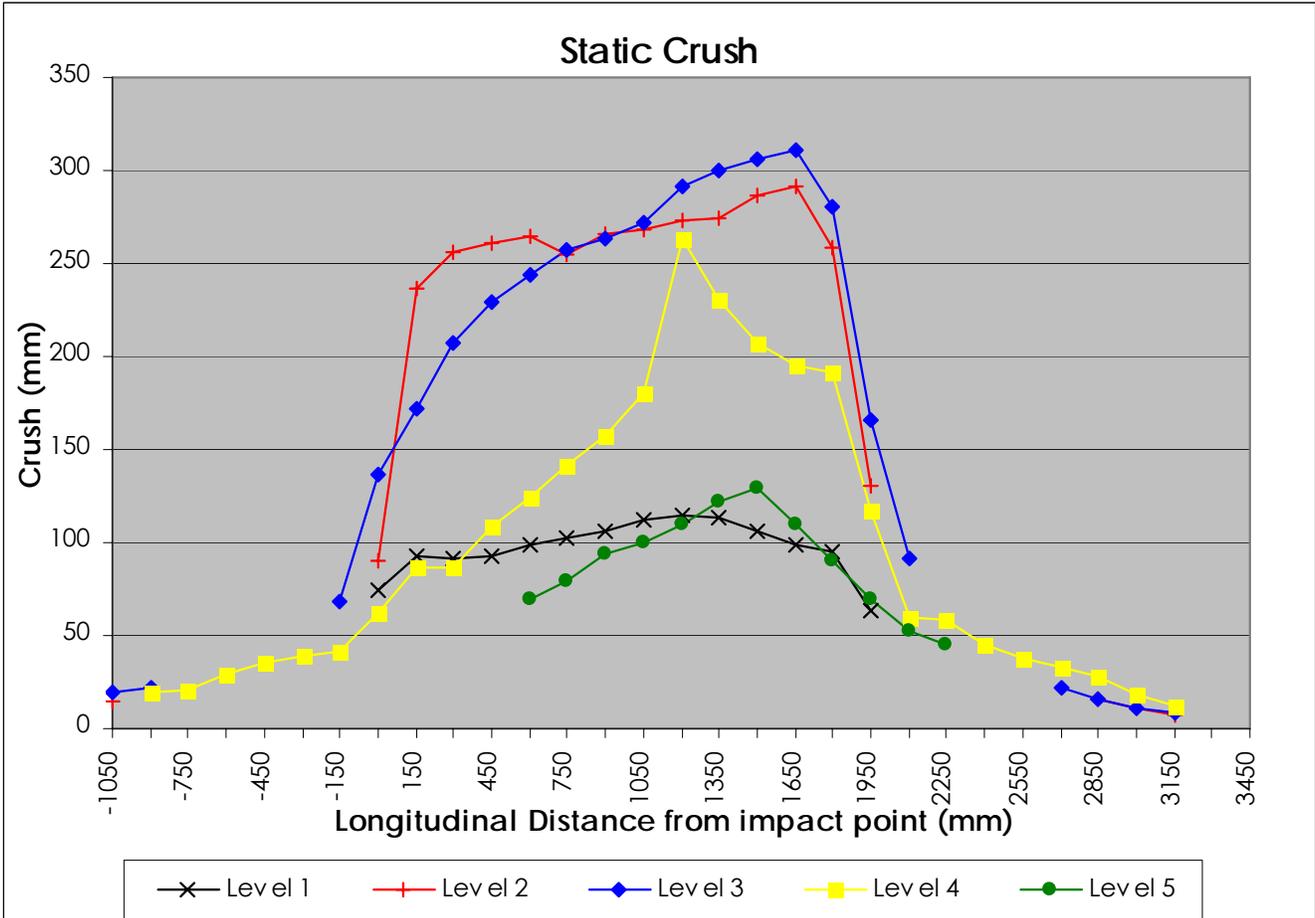
Height measurements taken 750 mm rearward from vertical impact line.

**DATA SHEET 10
VEHICLE STATIC CRUSH PROFILE**

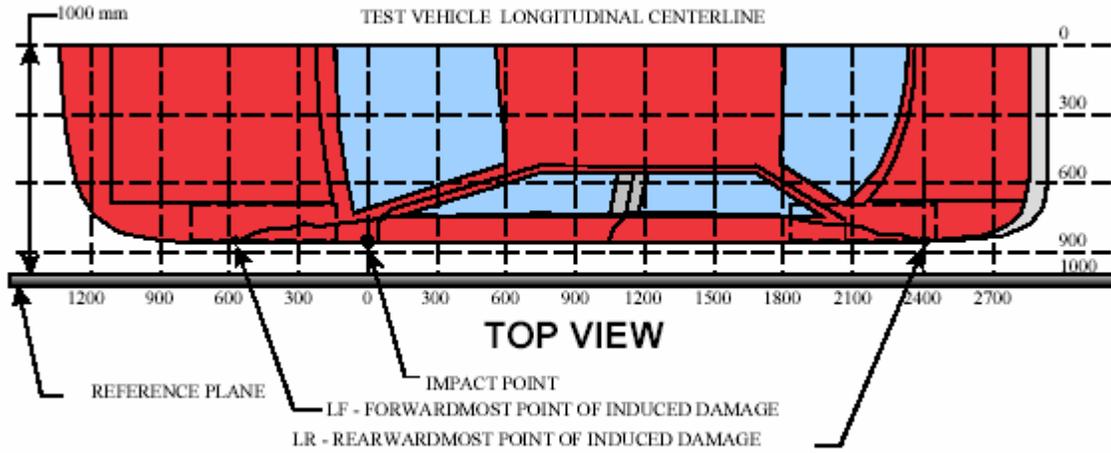
Note: All dimensions are in millimeters with a tolerance of ±3 mm

TEST VEHICLE STATIC CRUSH																
Level	1			2			3			4			5			
Height	267			503			627			977			1395			
	Pre	Post	Crush	Pre	Post	Crush										
-1050				185	200	15	185	205	20							
-900							152	174	22	245	264	19				
-750										240	261	21				
-600										236	265	29				
-450										230	265	35				
-300										227	266	39				
-150							136	204	68	224	265	41				
0	191	266	75	146	236	90	140	277	137	222	284	62				
150	190	283	93	145	382	237	132	304	172	224	310	86				
300	189	281	92	145	401	256	131	338	207	225	312	87				
450	187	280	93	145	406	261	130	359	229	225	333	108				
600	185	284	99	145	410	265	130	374	244	226	350	124	447	516	69	
750	185	287	102	145	400	255	130	387	257	227	368	141	474	553	79	
900	185	291	106	143	409	266	130	393	263	228	385	157	490	584	94	
1050	186	298	112	143	411	268	131	403	272	229	409	180	498	598	100	
1200	188	303	115	145	418	273	134	426	292	230	493	263	503	613	110	
1350	190	303	113	147	422	275	136	436	300	232	462	230	505	627	122	
1500	192	298	106	149	435	286	138	444	306	235	442	207	505	634	129	
1650	195	294	99	151	442	291	141	452	311	239	434	195	503	613	110	
1800	197	292	95	153	412	259	144	424	280	243	434	191	495	585	90	
1950	199	263	64	152	282	130	147	313	166	246	363	117	487	556	69	
2100							140	232	92	250	310	60	476	529	53	
2250										252	310	58	457	502	45	
2400										258	303	45				
2550										265	303	38				
2700							147	169	22	274	307	33				
2850				179	195	16	187	203	16	286	314	28				
3000				218	229	11	215	226	11	305	323	18				
3150				239	246	7	238	247	9	322	334	12				
3330																
3450																

DATA SHEET 10
VEHICLE STATIC CRUSH PROFILE (continued)

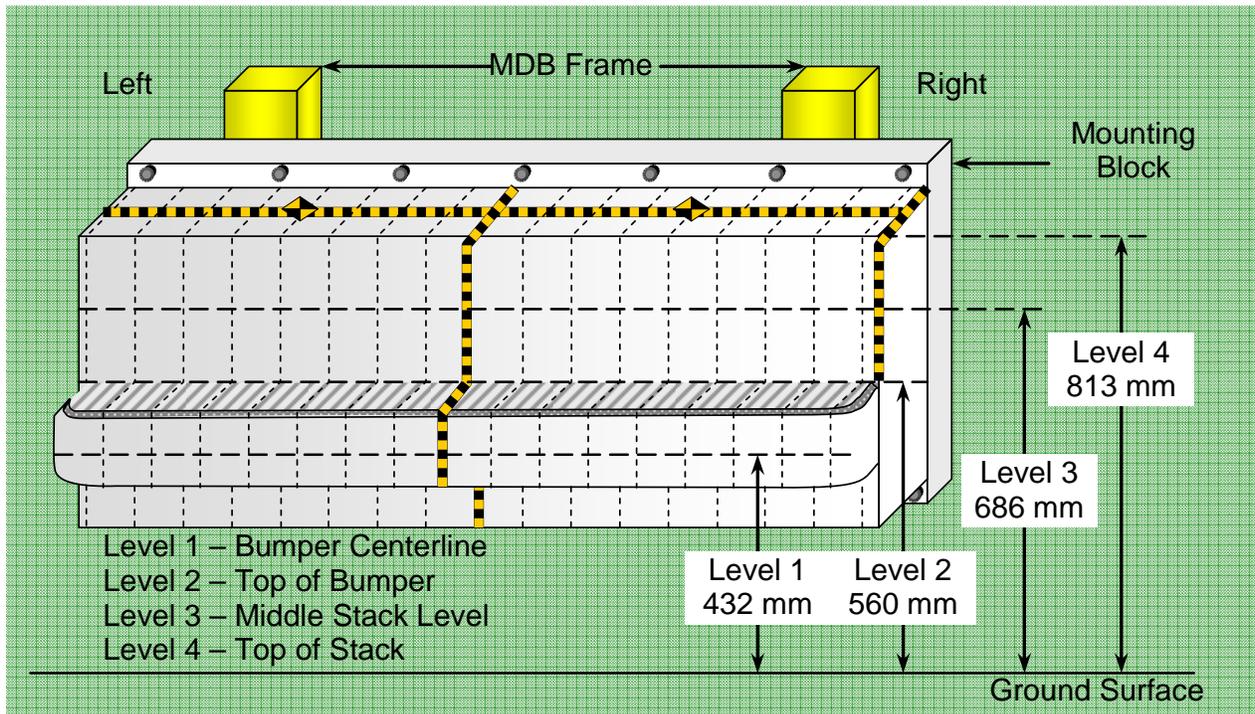


DATA SHEET 11
VEHICLE DAMAGE PROFILE DISTANCES (DPD)



DPD MEASUREMENTS				
	DPD measurement (mm)	Pre test (mm)	Post test (mm)	Crush (mm)
1	-450	164	164	0
2	180	164	311	147
3	810	164	395	231
4	1440	164	441	277
5	2070	164	233	69
6	2700	164	169	0

**DATA SHEET 12
DEFORMABLE BARRIER STATIC CRUSH**

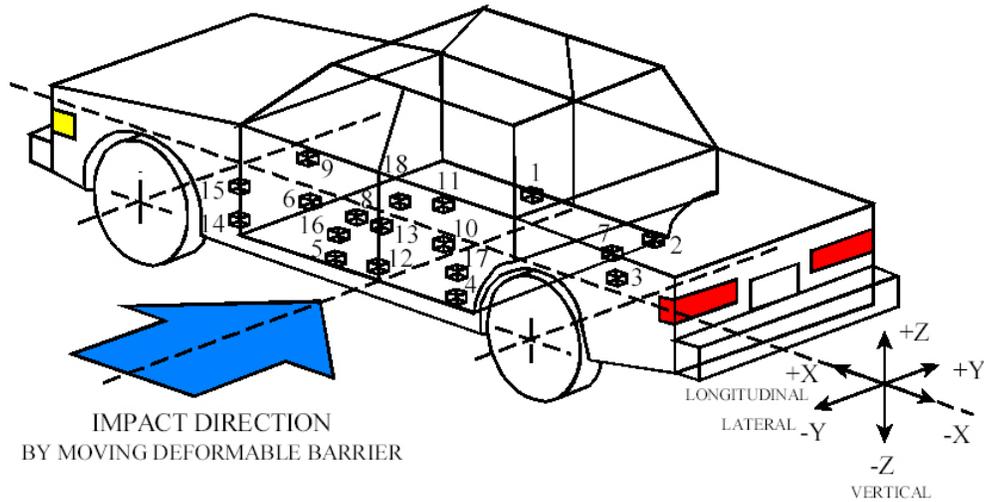


DEFORMABLE BARRIER FACE SUMMARY		
Barrier face manufacturer		Plascore
Serial number		206A1105 185B1205
Level	Description	Maximum crush
1	Center of bumper	163
2	Top of bumper	93
3	Middle of stack	75
4	Top of stack	76
Maximum post test intrusion is 163 mm at level 1		

BARRIER STATIC CRUSH																	
	Distance left of center								Cl	Distance right of center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
4	42	4	-11	-7	-2	28	30	30	33	24	23	25	28	33	38	37	76
3	42	5	8	11	14	18	35	37	24	15	14	-16	15	17	22	39	75
2	67	66	67	60	59	60	14	56	50	53	53	52	51	48	48	64	93
1	163	173	149	145	142	142	140	137	135	133	130	129	125	123	123	126	128

all values in mm

DATA SHEET 13
VEHICLE ACCELEROMETER LOCATIONS



TEST VEHICLE ACCELEROMETER LOCATIONS				
Loc. no.	Accelerometer location	Measurements (mm)		
		X	Y	Z
1	Right sill at front seat	2923	769	432
2	Right sill at rear seat	2037	771	444
3	Rear floor pan above axle	1066	1	89
4	Left sill at rear door	2033	-752	436
5	Left sill at front door	2909	-754	430
6	Left front door C/L	N/a†	N/a†	N/a†
7	Rear occupant compartment	2068	383	294
8	Left front door mid-rear	N/a†	N/a†	N/a†
9	Left front door upper C/L	N/a†	N/a†	N/a†
10	Left rear door mid-rear	N/a†	N/a†	N/a†
11	Left rear door upper C/L	N/a†	N/a†	N/a†
12	Left lower b-pillar	N/a‡	N/a‡	N/a‡
13	Left middle b-pillar	N/a‡	N/a‡	N/a‡
14	Left lower a-pillar	3528	-842	98
15	Left middle a-pillar	3519	-826	-81
16	Front seat track	2712	-670	402
17	Rear seat track or structure	2072	-356	294
18	Vehicle CG	3053	43	153

Origin

- X Rear bumper
- Y Midline of vehicle
- Z Top of rear bumper

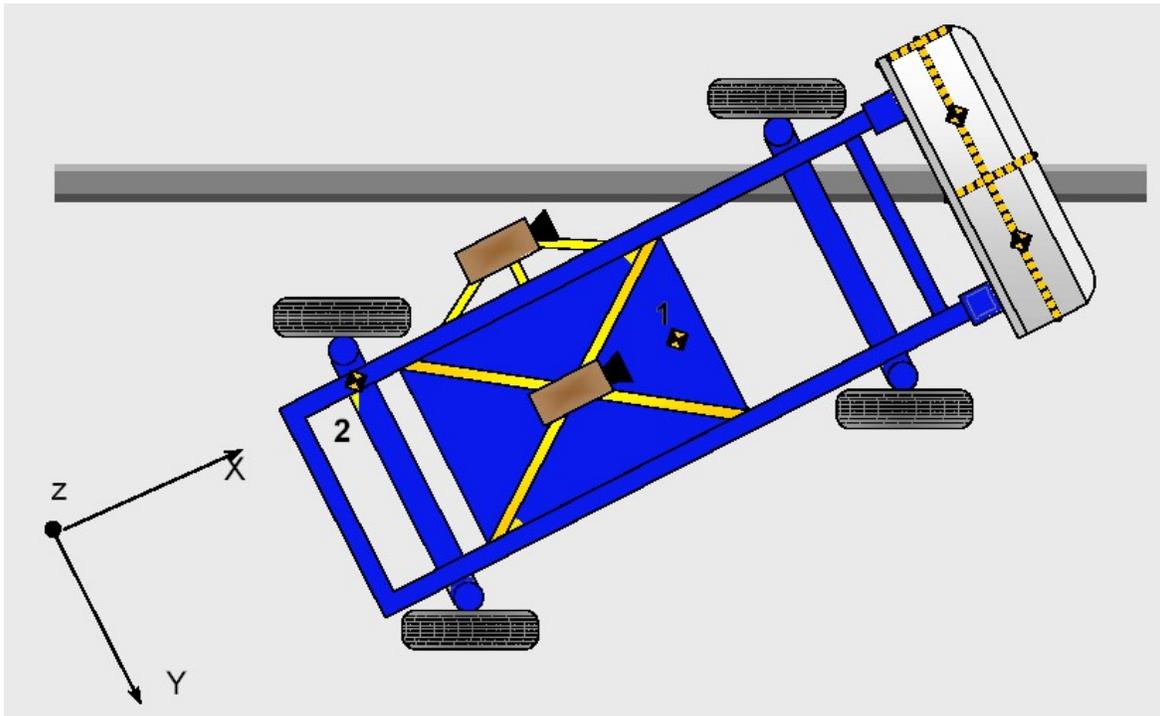
Orientation

- X +(X) Forward
- Y +(Y) Right
- Z +(Z) Down

† Front and rear door accelerometers not installed as per NCAP policy (02Nov05)

‡ B-pillar accelerometers excluded at manufacturer's request due to concerns about interference with driver seat mounted airbag

DATA SHEET 14
MDB ACCELEROMETER LOCATIONS



MDB ACCELEROMETER LOCATIONS			
Location	Measurements (mm)		
	X	Y	Z
Center of gravity	1113	-1	311
Right rear	2812	-614	585

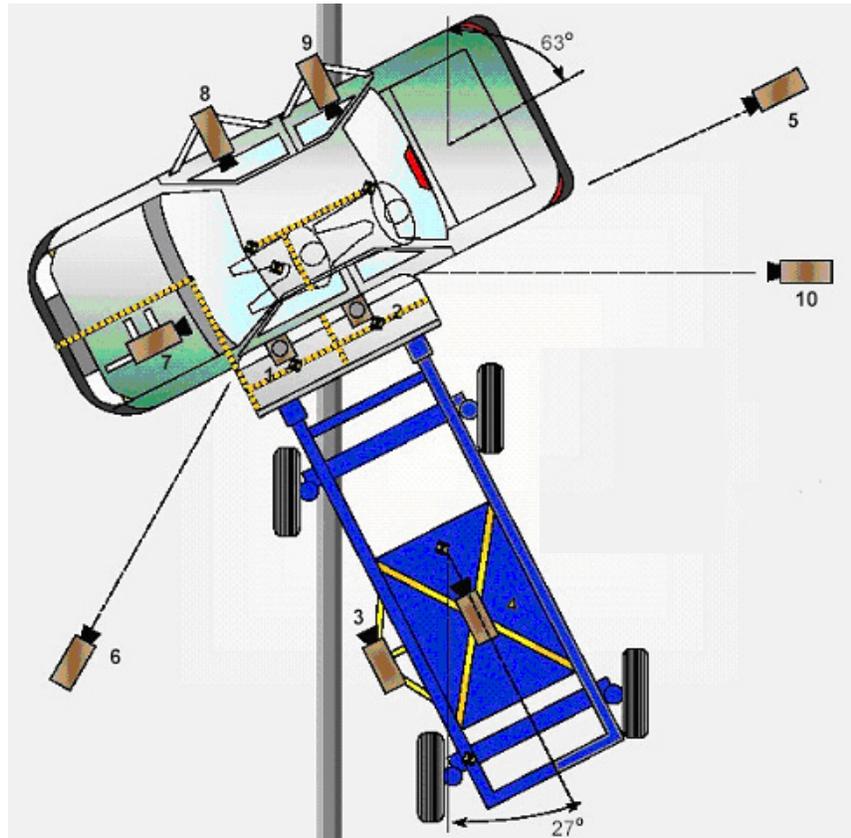
Origin

X Rear structural member
Y Midline of MDB
Z Middle of rear structural member

Orientation

X +(X) Forward
Y +(Y) Right
Z +(Z) Down

DATA SHEET 15
HIGH-SPEED CAMERA LOCATIONS AND DATA SUMMARY



	View	Coordinates †			Angle	Lens	Rate
		X	Y	Z			
		mm	mm	mm	°	mm	fps
1	Overhead view of test vehicle	-249	-640	4812	90	8	1000
2	Overhead close-up view of impact plane	-550	-125	4340	90	16	1000
3	MDB onboard close-up view of impact point	-1542	-1026	25	0	25	1000
4	MDB onboard view of driver dummy	-1415	-1891	780	5	13	1000
5	Right side ground level overall view	-668	-1184	879	7	25	1000
6	Left side ground level overall view	-2311	4575	848	10	35	1000
7	Test vehicle onboard driver front view				15	25	1000
8	Test vehicle onboard driver side view				10	12.5	1000
9	Test vehicle onboard passenger side view				10	12.5	1000
10	Real-time film coverage of test	-	-	-	-	-	-

†

Origin

X
Y
Z

Impact Point
Impact Point
Impact Point

Orientation

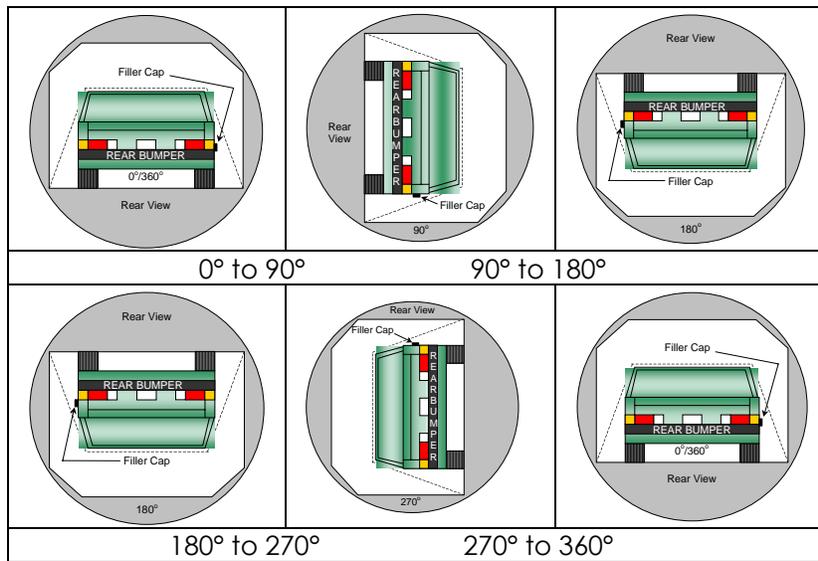
X +(X) Forward
Y +(Y) Right
Z +(Z) Down

DATA SHEET 16
FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21° C Test Time: 2:51 pm

STODDARD SOLVENT SPILLAGE MEASUREMENTS				
Period	Description	Maximum allowable spillage	Spillage	
			Amount	Location
A	From impact until vehicle motion ceases	1 oz	0 oz.	N/a
B	5 minutes after vehicle motion ceases	5 oz	0 oz.	N/a
C	Next 25 minutes	1 oz/minute	0 oz.	N/a

FMVSS 301 STATIC ROLLOVER



FMVSS301 STATIC ROLLOVER DATA			
Test phase	Rotation time (sec.)	Hold time (sec.)	Total time (sec.)
Tolerance	60-180	>= 300	-
0° to 90°	64	300	364
90° to 180°	64	300	364
180° to 270°	65	300	365
270° to 360°	65	300	365

DATA SHEET 16
FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA (CONTINUED)

FMVSS301 STATIC ROLLOVER - SPILLAGE				
	First five minutes (oz)	Sixth minute (oz)	Seventh minute (oz)	Eighth minute (oz)
Max allowable leakage	5.0	1.0	1.0	1.0
0° to 90°	0	0	0	N/a
90° to 180°	0	0	0	N/a
180° to 270°	0	0	0	N/a
270° to 360°	0	0	0	N/a

SPILLAGE LOCATION(S)	
0° to 90°	N/a
90° to 180°	N/a
180° to 270°	N/a
270° to 360°	N/a

APPENDIX A
PHOTOGRAPHS

LIST OF PHOTOGRAPHS

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A-4	Tire placard	A-5
A-5	Pre test front view of test vehicle	A-6
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A-8	Post test left front $\frac{3}{4}$ view of test vehicle	A-7
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A-11	Pre test left rear $\frac{3}{4}$ view of test vehicle	A-9
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A-22	Post test overhead view	A-14
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A-24	Post test overhead close-up	A-15
A-25	Pre test impact point	A-16
A-26	Post test impact point	A-16
A-27	Pre test front $\frac{3}{4}$ view of left side doors	A-17
A-28	Post test front $\frac{3}{4}$ view of left side doors	A-17
A-29	Pre test rear $\frac{3}{4}$ view of left side doors	A-18
A-30	Post test rear $\frac{3}{4}$ view of left side doors	A-18
A-31	Pre test left front door	A-19
A-32	Post test left front door	A-19
A-33	Pre test left rear door	A-20
A-34	Post test left rear door	A-20
A-35	Pre test driver, left side view	A-21
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A-40	Post test driver, right side view	A-23
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Figure	Photograph Description	Page
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A-53	Pre test right side view of MDB barrier face	A-30
A-54	Post test right side view of MDB barrier face	A-30
A-55	Pre test left side view of MDB barrier face	A-31
A-56	Post test left side view of MDB barrier face	A-31
A-57	Pre test overhead view of MDB barrier face	A-32
A-58	Post test overhead view of MDB barrier face	A-32
A-59	FMVSS301 0 degrees	A-33
A-60	FMVSS301 90 degrees	A-33
A-61	FMVSS301 180 degrees	A-34
A-62	FMVSS301 270 degrees	A-34
A-63	FMVSS301 360 degrees	A-35
A-64	Impact	A-35



Figure A-1: Left front 3/4 view, as delivered



Figure A-2: Right rear 3/4 view, as delivered

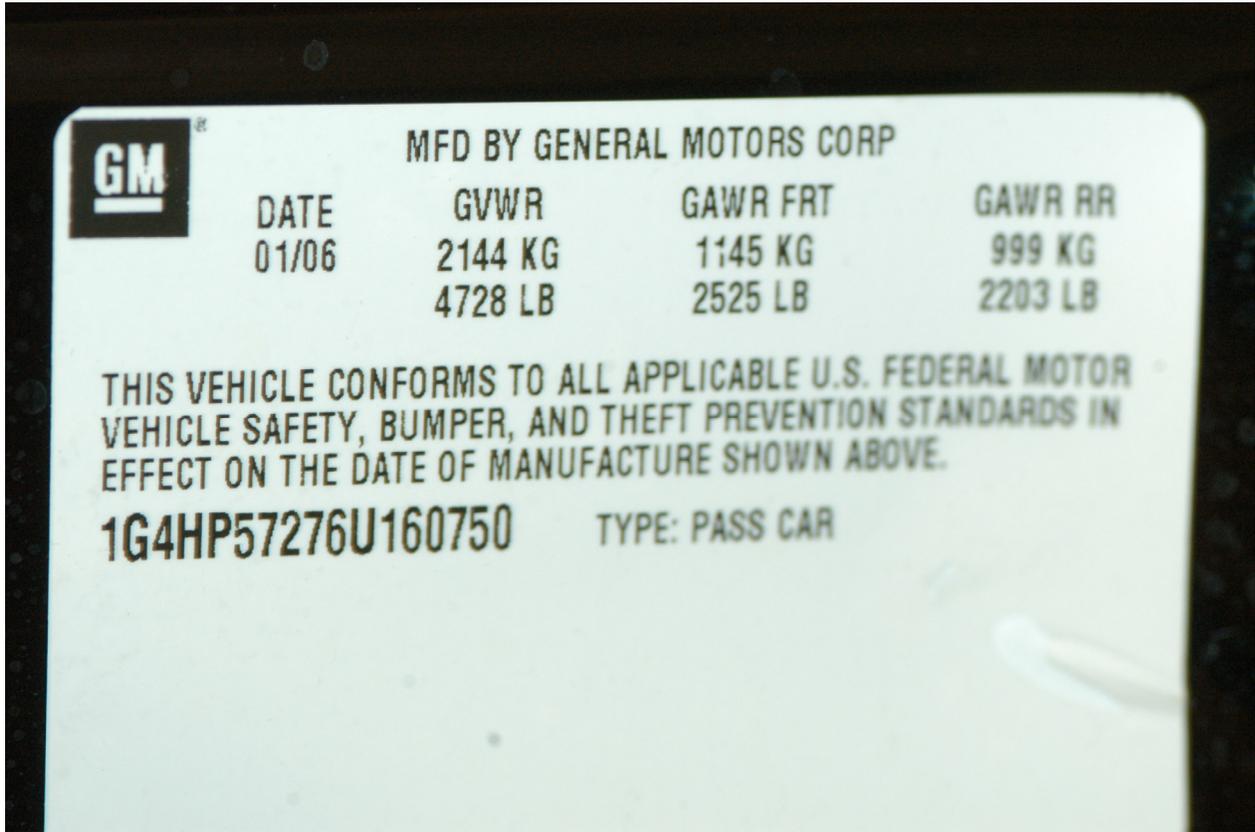


Figure A-3: Manufacturer's label

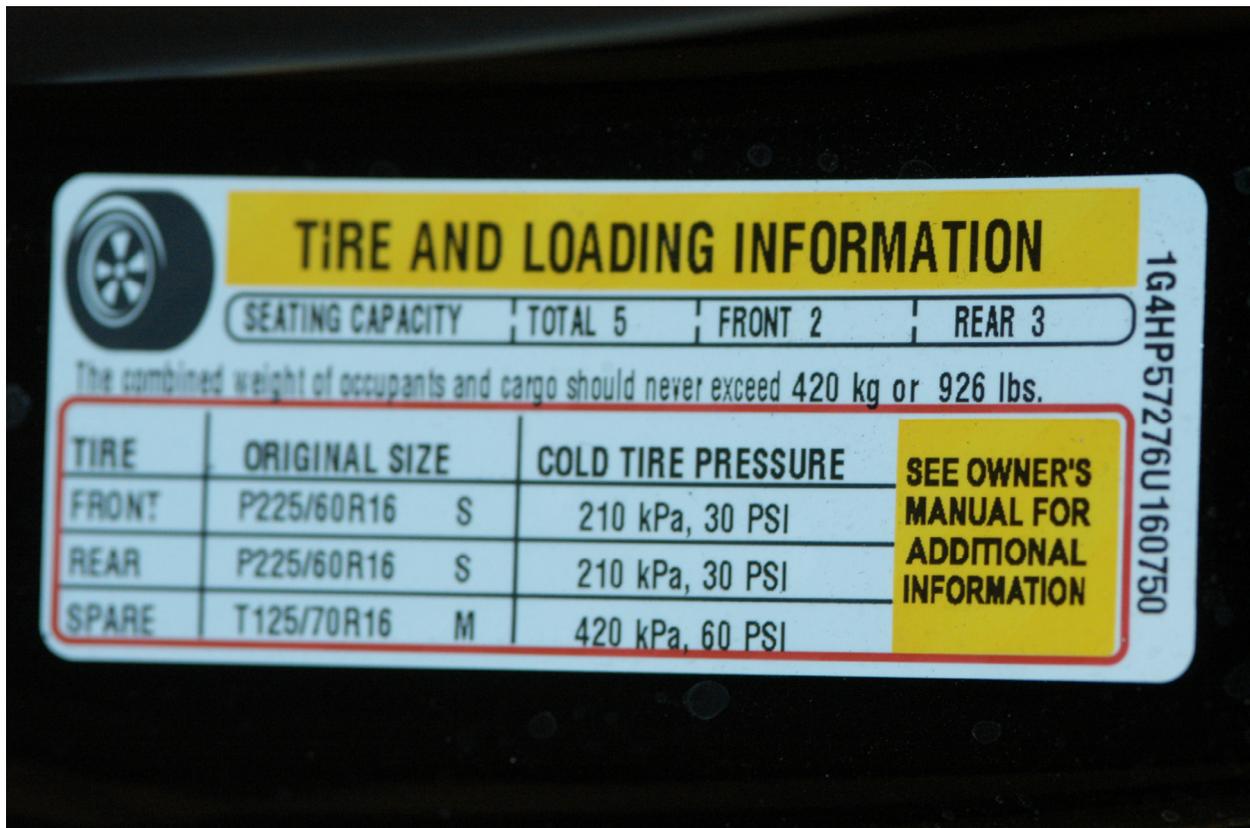


Figure A-4: Tire placard



Figure A-5: Pre test front view of test vehicle



Figure A-6: Post test front view of test vehicle



Figure A-7: Pre test left front 3/4 view of test vehicle



Figure A-8: Post test left front 3/4 view of test vehicle



Figure A-9: Pre test left side view of test vehicle



Figure A-10: Post test left side view of test vehicle



Figure A-11: Pre test left rear 3/4 view of test vehicle

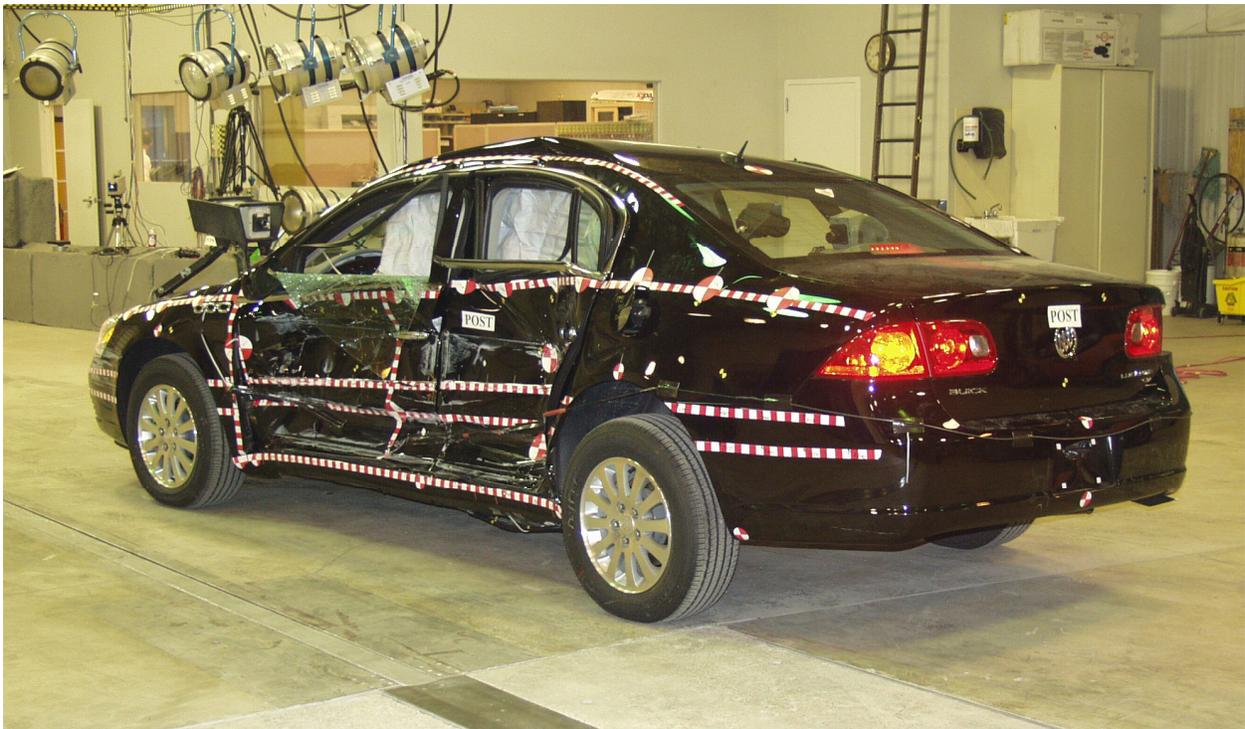


Figure A-12: Post test left rear 3/4 view of test vehicle



Figure A-13: Pre test rear view of test vehicle



Figure A-14: Post test rear view of test vehicle



Figure A-15: Pre test right rear 3/4 view of test vehicle



Figure A-16: Post test right rear 3/4 view of test vehicle



Figure A-17: Pre test right side view of test vehicle



Figure A-18: Post test right side view of test vehicle



Figure A-19: Pre test right front 3/4 view of test vehicle



Figure A-20: Post test right front 3/4 view of test vehicle

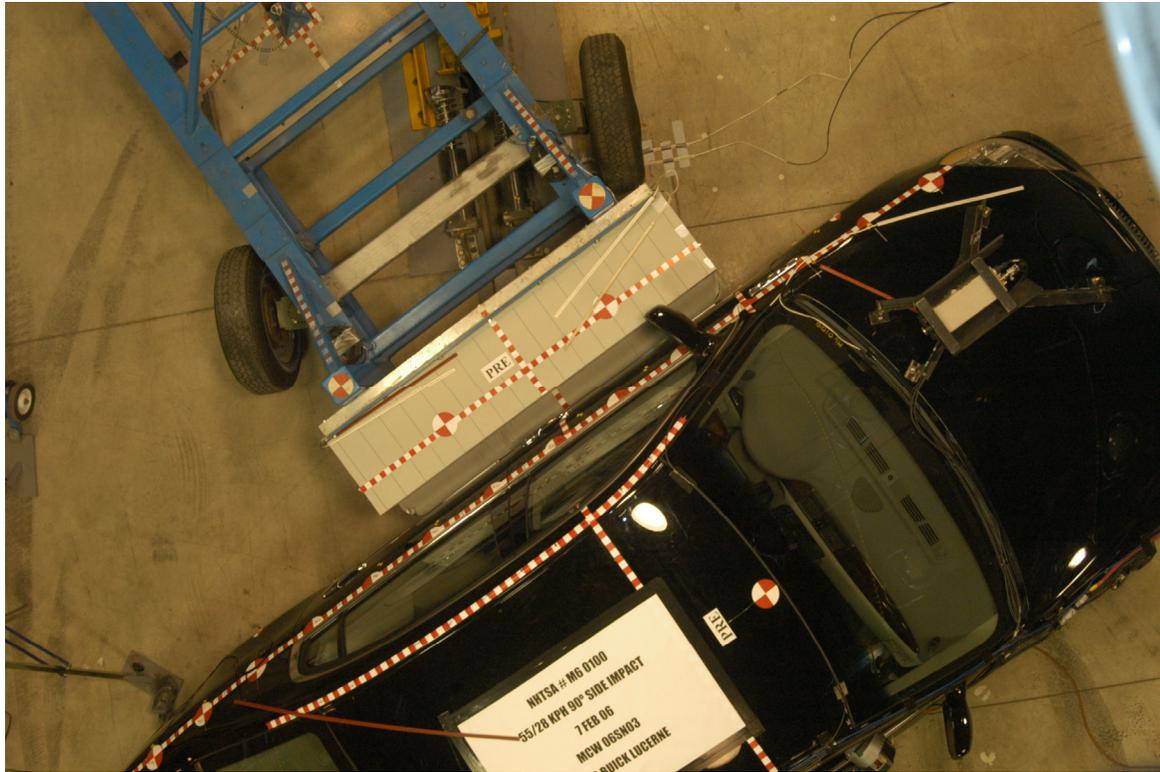


Figure A-21: Pre test overhead view



Figure A-22: Post test overhead view

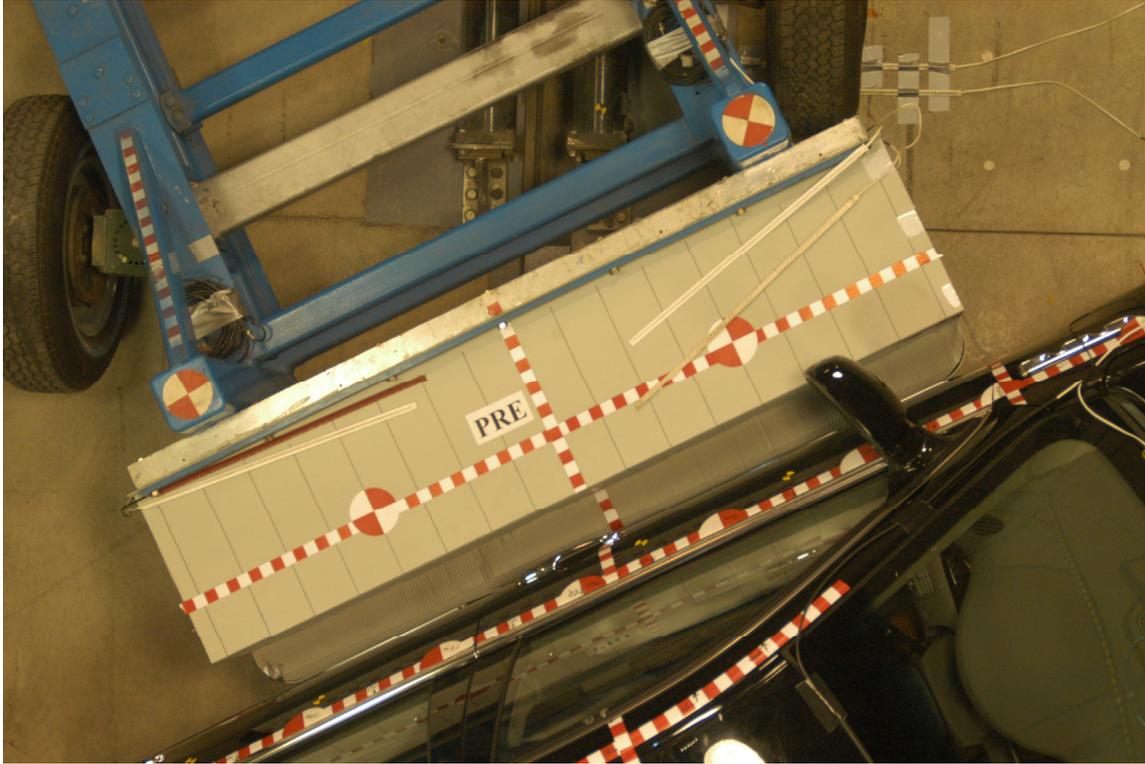


Figure A-23: Pre test overhead close-up view



Figure A-24: Post test overhead view



Figure A-25: Pre test impact point



Figure A-26: Post test impact point



Figure A-27: Pre test front 3/4 view of left side doors



Figure A-28: Post test front 3/4 view of left side doors



Figure A-29: Pre test rear 3/4 view of left side doors



Figure A-30: Post test rear 3/4 view of left side doors



Figure A-31: Pre test left front door

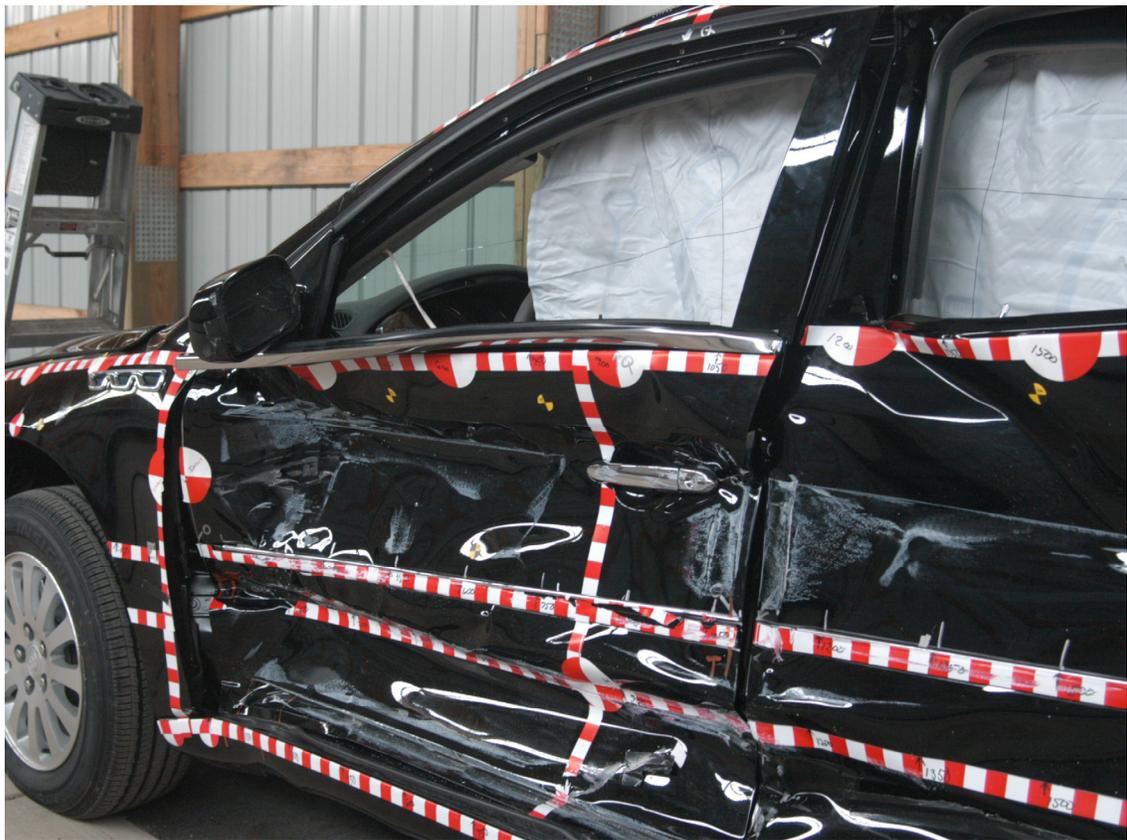


Figure A-32: Post test left front door



Figure A-33: Pre test left rear door



Figure A-34: Post test left rear door



Figure A-35: Pre test driver left side view



Figure A-36: Post test driver left side view



Figure A-37: Pre test driver shoulder clearance



Figure A-38: Post test driver shoulder clearance



Figure A-39: Pre test driver right side view



Figure A-40: Post test driver right side view



Figure A-41: Post test driver contact locations (1)



Figure A-42: Post test driver contact locations (2)



Figure A-43: Pre test passenger left side view



Figure A-44: Post test passenger left side view



Figure A-45: Pre test passenger shoulder clearance



Figure A-46: Post test passenger shoulder clearance



Figure A-47: Pre test passenger right side view



Figure A-48: Post test passenger right side view



Figure A-49: Post test passenger contact locations (1)



Figure A-50: Post test passenger contact locations (2)

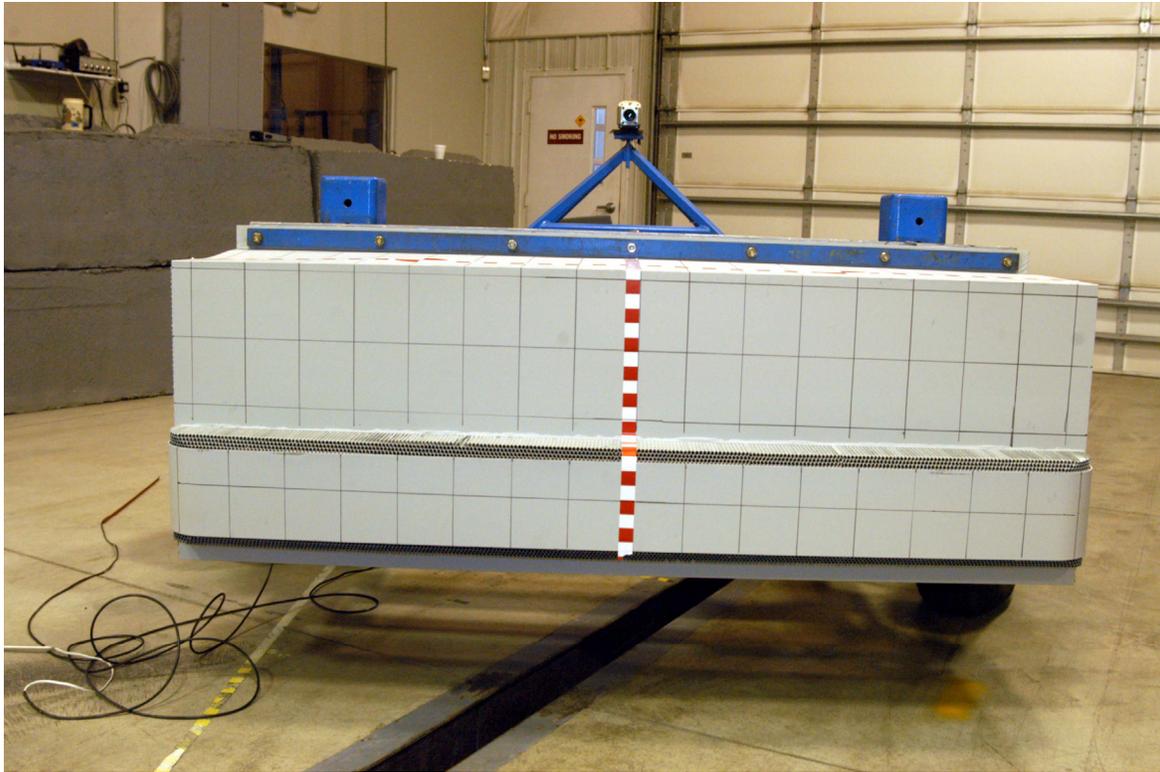


Figure A-51: Pre test front view of MDB barrier face



Figure A-52: Post test front view of MDB barrier face

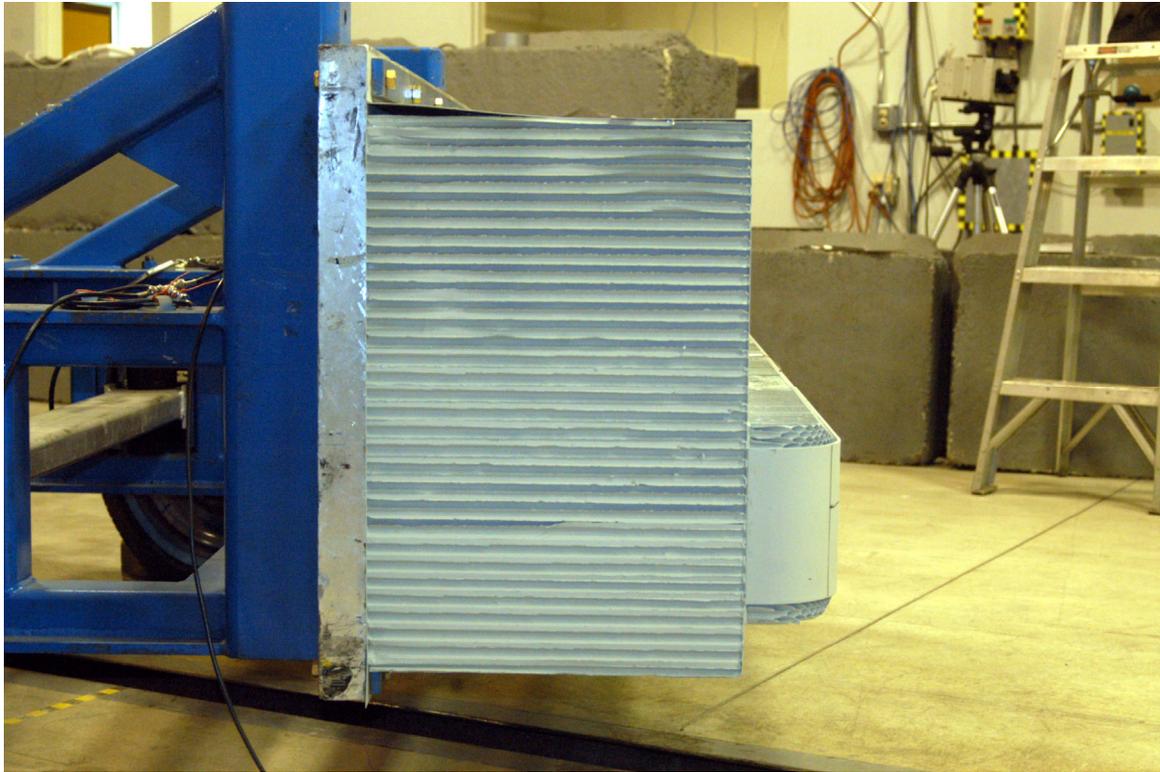


Figure A-53: Pre test right side view of MDB barrier face



Figure A-54: Post test right side view of MDB barrier face



Figure A-55: Pre test left side view of MDB barrier face



Figure A-56: Post test left side view of MDB barrier face

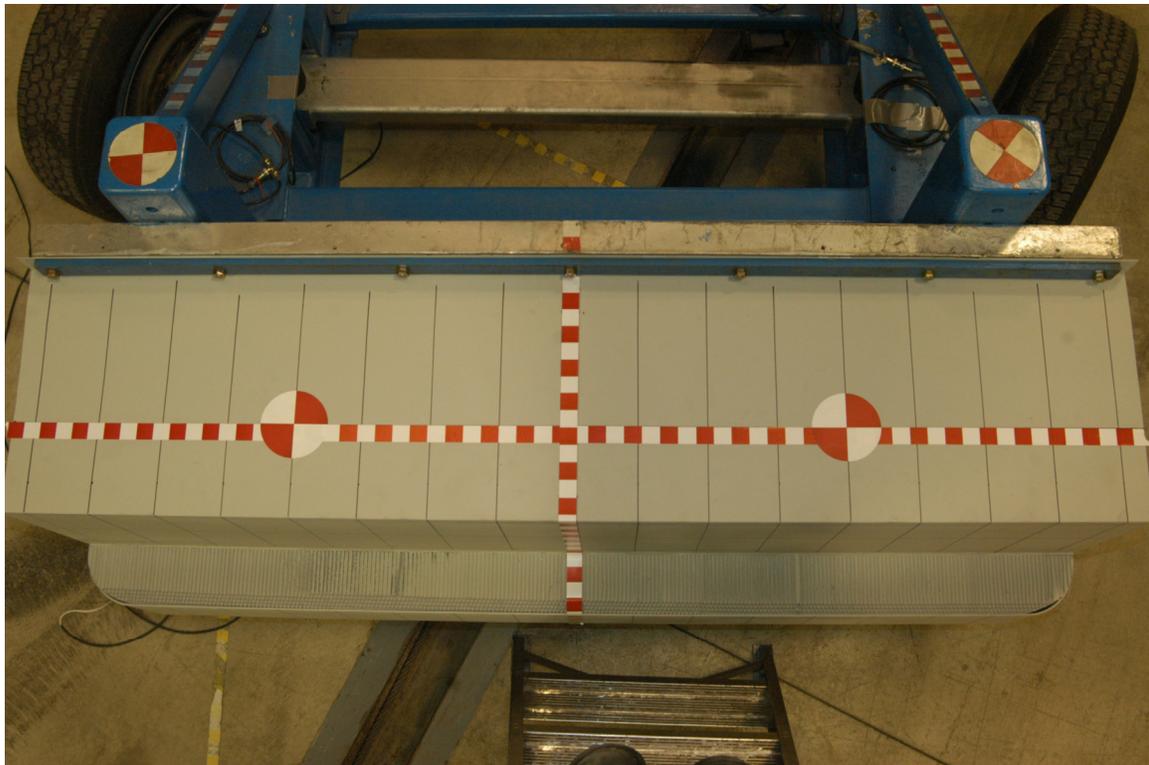


Figure A-57: Pre test overhead view of MDB barrier face

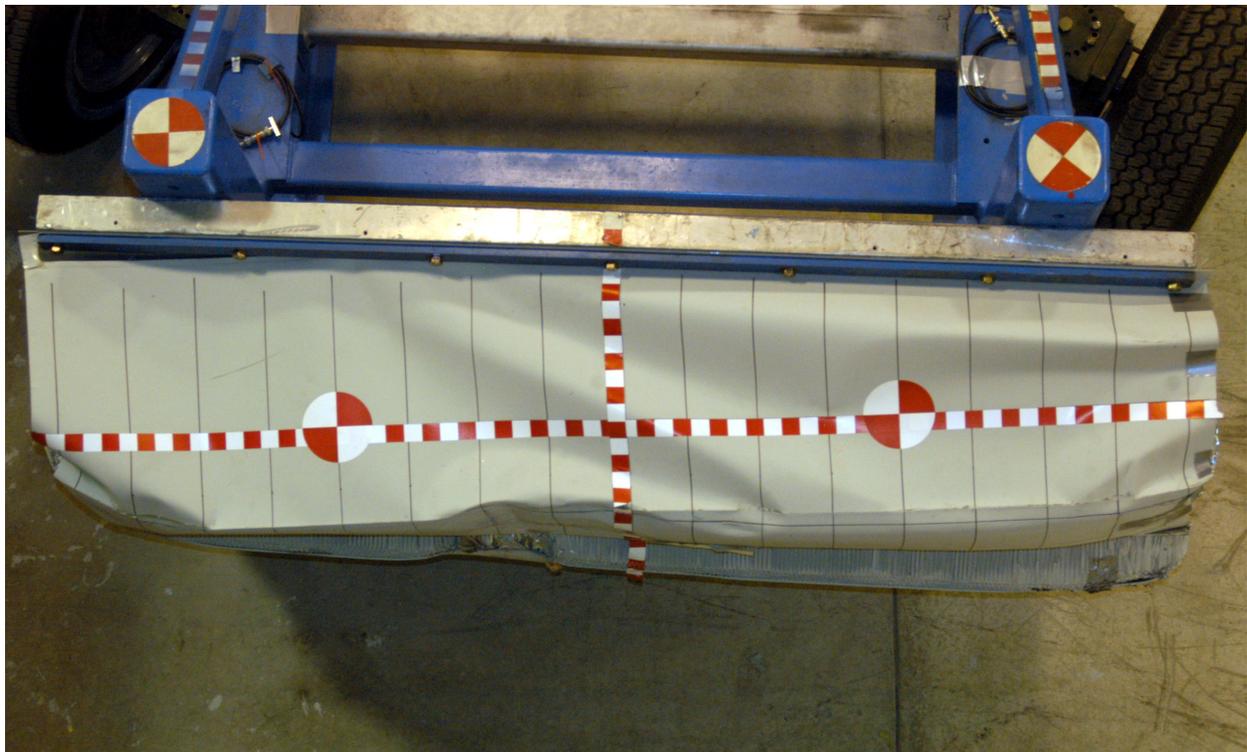


Figure A-58: Post test left side view of MDB barrier face



Figure A-59: FMVSS 301 0 degrees

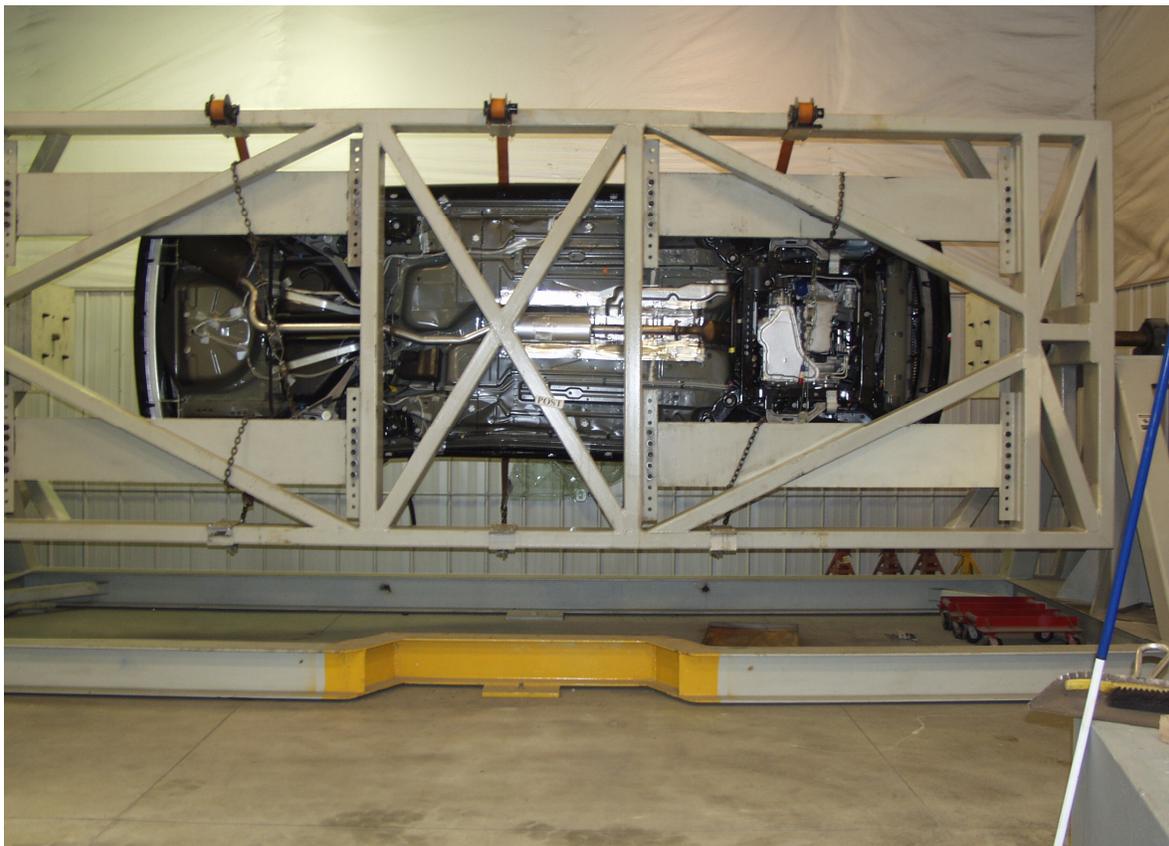


Figure A-60: FMVSS 301 90 degrees



Figure A-61: FMVSS 301 180 degrees



Figure A-62: FMVSS 301 270 degrees



Figure A-63: FMVSS 301 360 degrees



Figure A-64: Impact

**APPENDIX B
SID/HIII, VEHICLE AND MDB RESPONSE DATA**

The following plots are provided in the test report

Data Plot	Description	Page
B-1	Driver upper rib(y) acceleration - primary – FIR100	B-4
B-2	Driver lower rib(y) acceleration - primary – FIR100	B-5
B-3	Driver lower spine (y) acceleration - primary – FIR100	B-6
B-4	Driver pelvis (y) acceleration - primary – FIR100	B-7
B-5	Passenger upper rib(y) acceleration - primary – FIR100	B-8
B-6	Passenger lower rib(y) acceleration - primary – FIR100	B-9
B-7	Passenger lower spine (y) acceleration - primary – FIR100	B-10
B-8	Passenger pelvis (y) acceleration - primary – FIR100	B-11

The following dummy, vehicle, and MDB response data can be found in the R&D section of the NHTSA website at: www-nrd.nhtsa.dot.gov/database/nrd-11/veh_db.html.

Description
Driver head (x) acceleration
Driver head (y) acceleration
Driver head (z) acceleration
Driver upper neck (x) force
Driver upper neck (y) force
Driver upper neck (z) force
Driver upper neck (x) moment
Driver upper neck (y) moment
Driver upper neck (z) moment
Driver upper rib (y) acceleration – redundant
Driver lower rib (y) acceleration – redundant
Driver lower spine (y) acceleration – redundant
Driver pelvis (y) acceleration – redundant
Passenger head (x) acceleration
Passenger head (y) acceleration
Passenger head (z) acceleration
Passenger upper neck (x) force
Passenger upper neck (y) force
Passenger upper neck (z) force
Passenger upper neck (x) moment
Passenger upper neck (y) moment
Passenger upper neck (z) moment
Passenger upper rib (y) acceleration – redundant
Passenger lower rib (y) acceleration – redundant
Passenger lower spine (y) acceleration – redundant
Passenger pelvis (y) acceleration – redundant
Vehicle right side sill at front seat (x) acceleration
Vehicle right side sill at front seat (y) acceleration
Vehicle right side sill at front seat (z) acceleration
Vehicle right side sill at rear seat (x) acceleration
Vehicle right side sill at rear seat (y) acceleration
Vehicle right side sill at rear seat (z) acceleration
Vehicle rear floor pan above axle (x) acceleration
Vehicle rear floor pan above axle (y) acceleration
Vehicle rear floor pan above axle (z) acceleration
Vehicle left side sill at rear seat (y) acceleration
Vehicle left side sill at front seat (y) acceleration
Vehicle right rear occupant compartment (y) acceleration

Vehicle left lower b-pillar (y) acceleration
Vehicle left middle b-pillar (y) acceleration
Vehicle left lower a-pillar (y) acceleration
Vehicle left middle a-pillar (y) acceleration
Vehicle front seat track (y) acceleration
Vehicle rear seat track/structure (y) acceleration
Vehicle center of gravity (x) acceleration
Vehicle center of gravity (y) acceleration
Vehicle center of gravity (z) acceleration
MDB center of gravity (x) acceleration
MDB center of gravity (y) acceleration
MDB center of gravity (z) acceleration
MDB rear (x) acceleration
MDB rear (y) acceleration

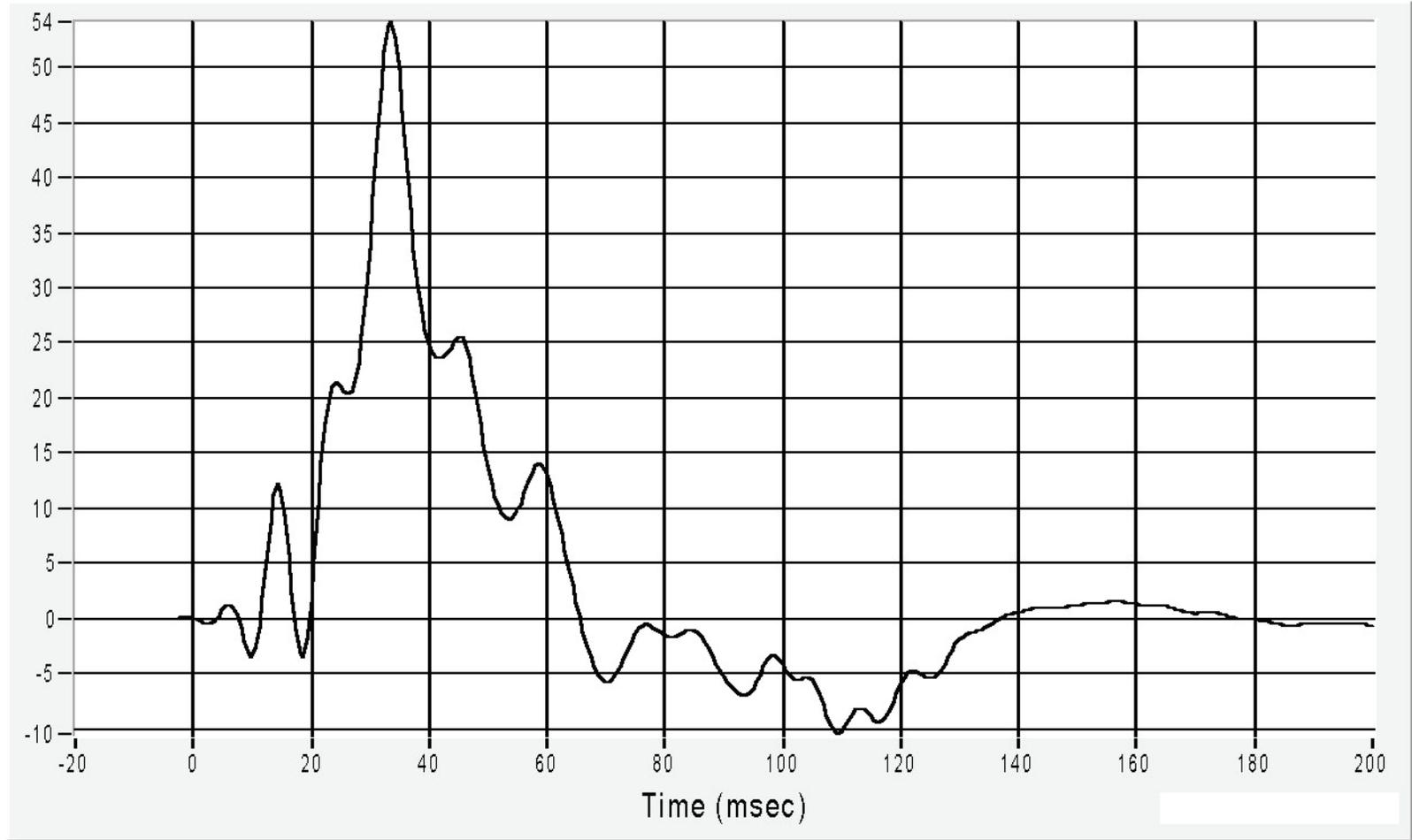
Driver Upper Rib (Y) Acceleration

Acceleration (G's) FIR100

Max 54.1 G at 33.8 msec

Min -10.4 G at 109.4 msec

B-3



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7 February 2006

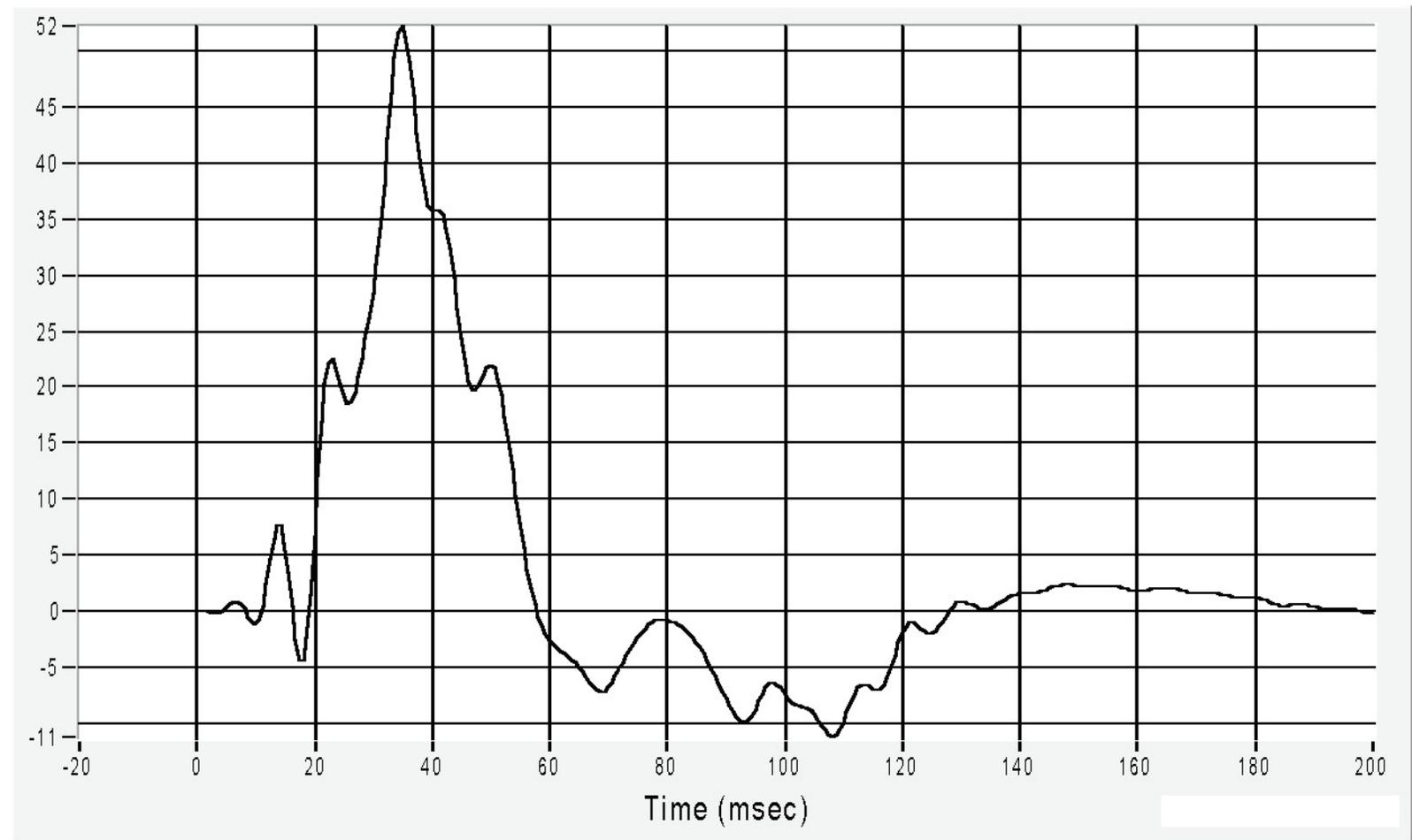
Medical College of Wisconsin
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Driver Lower Rib (Y) Acceleration

Acceleration (G's) FIR100

Max 52.3 G at 35.0 msec

Min -11.3 G at 108.1 msec



B-4

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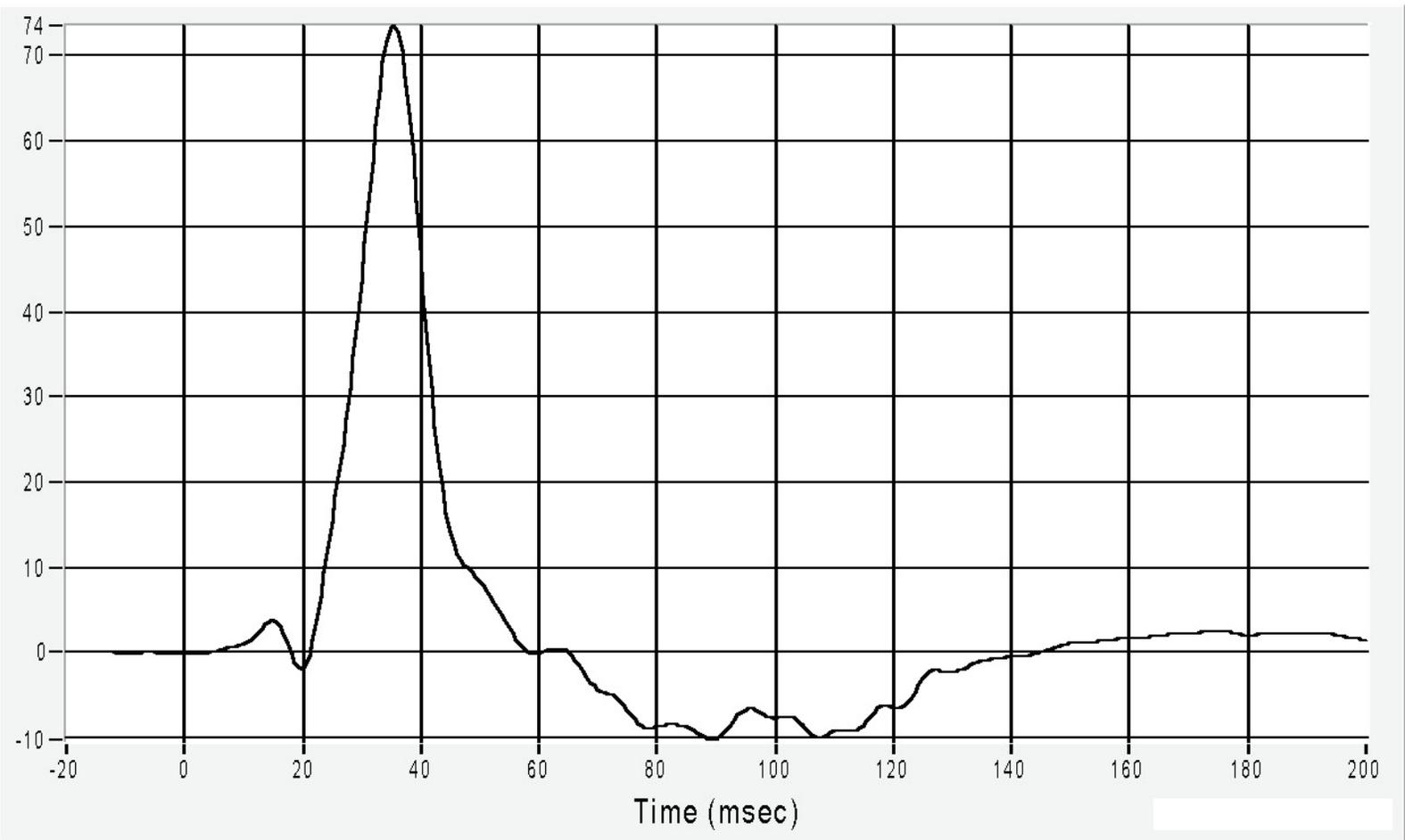
Driver Lower Spine (Y) Acceleration

Acceleration (G's) FIR100

Max 73.6 G at 35.6 msec

Min -10.2 G at 89.4 msec

B-5



06SN03 - 2006 BUICK LUCERNE 4-DOOR SEDAN
7 February 2006

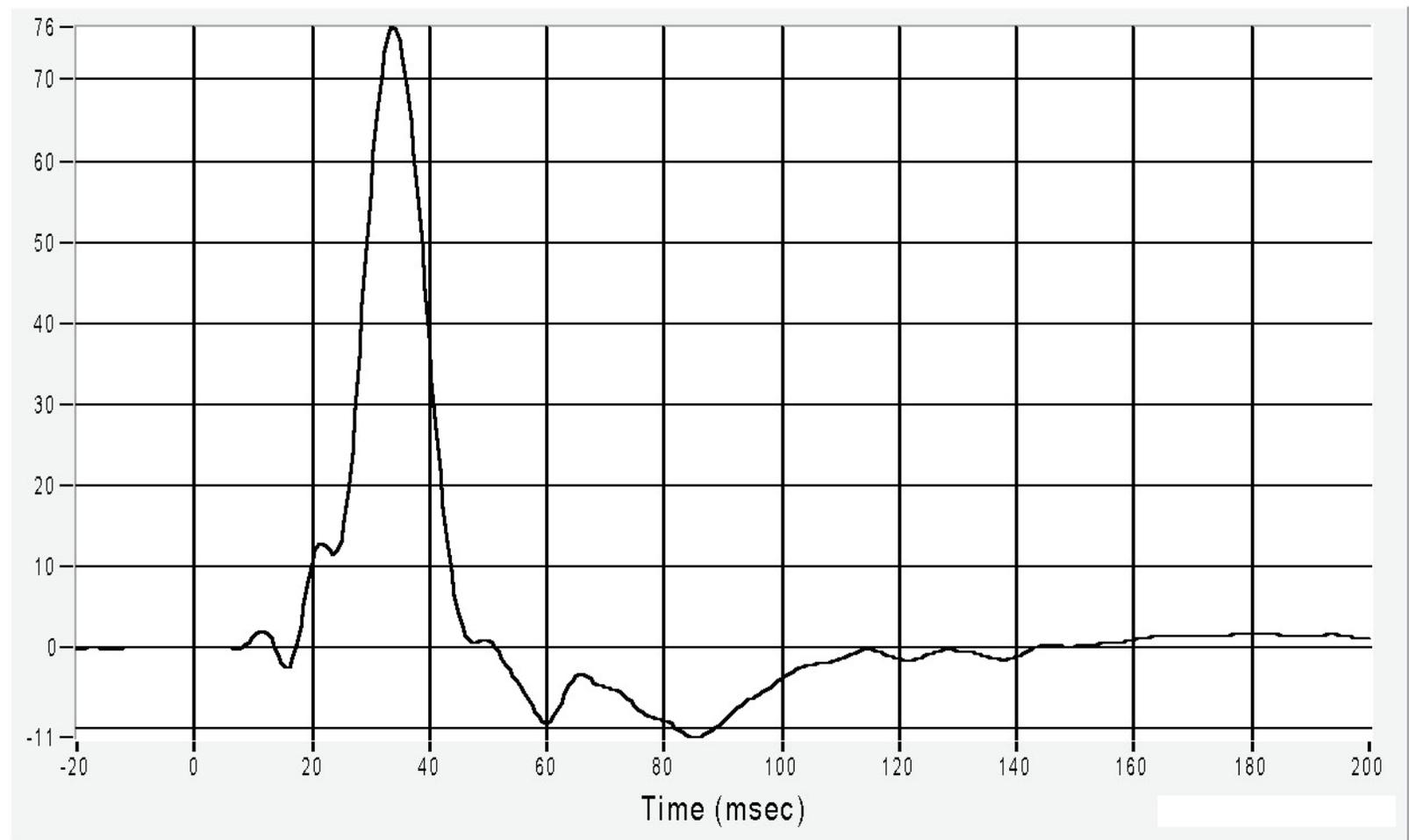
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Driver Pelvic (Y) Acceleration

Acceleration (G's) FIR100

Max 76.5 G at 33.8 msec

Min -11.0 G at 85.6 msec



B-6

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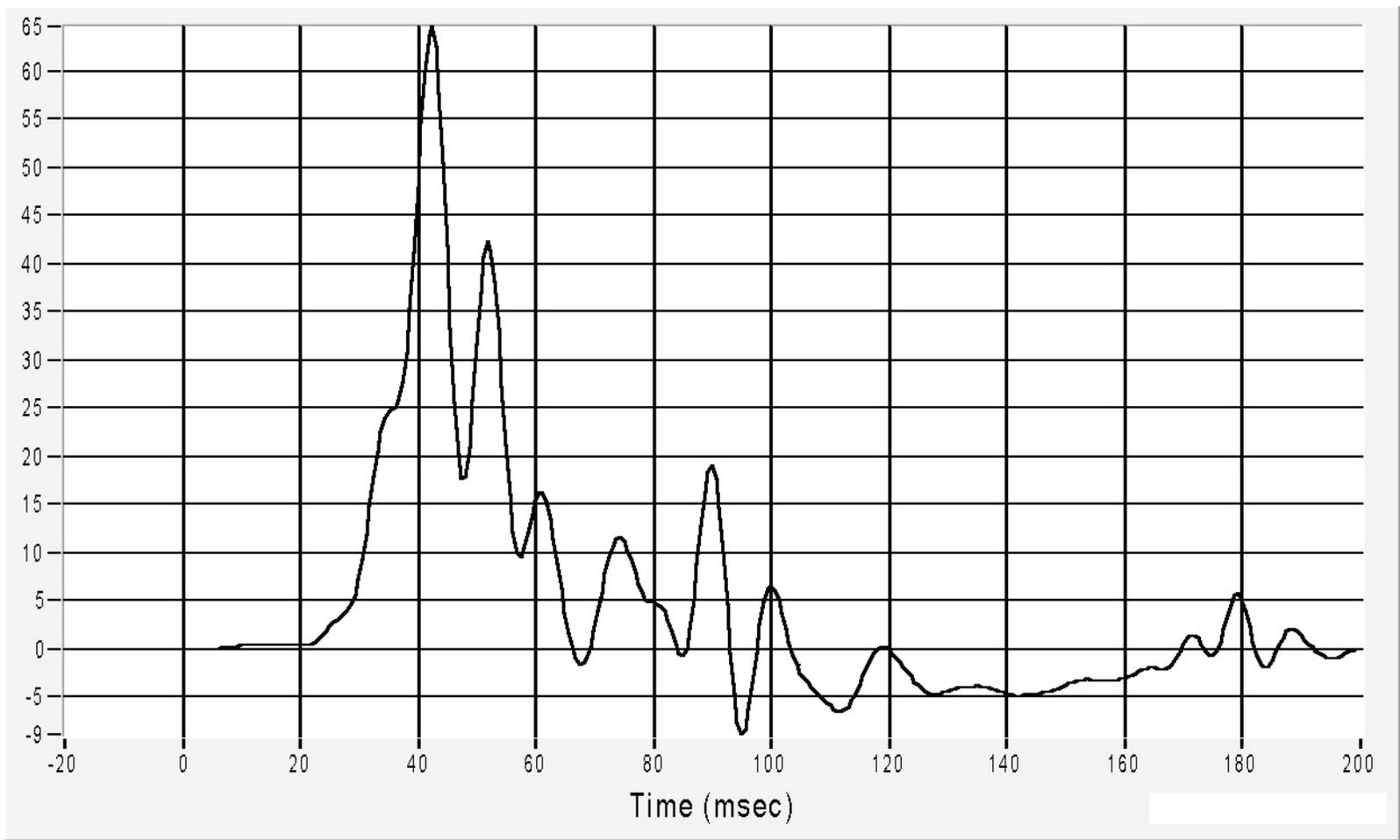
Passenger Upper Rib (Y) Acceleration

Acceleration (G's) FIR100

Max 64.6 G at 42.5 msec

Min -8.9 G at 95.0 msec

B-7



06SN03 - 2006 BUICK LUCERNE 4-DOOR SEDAN

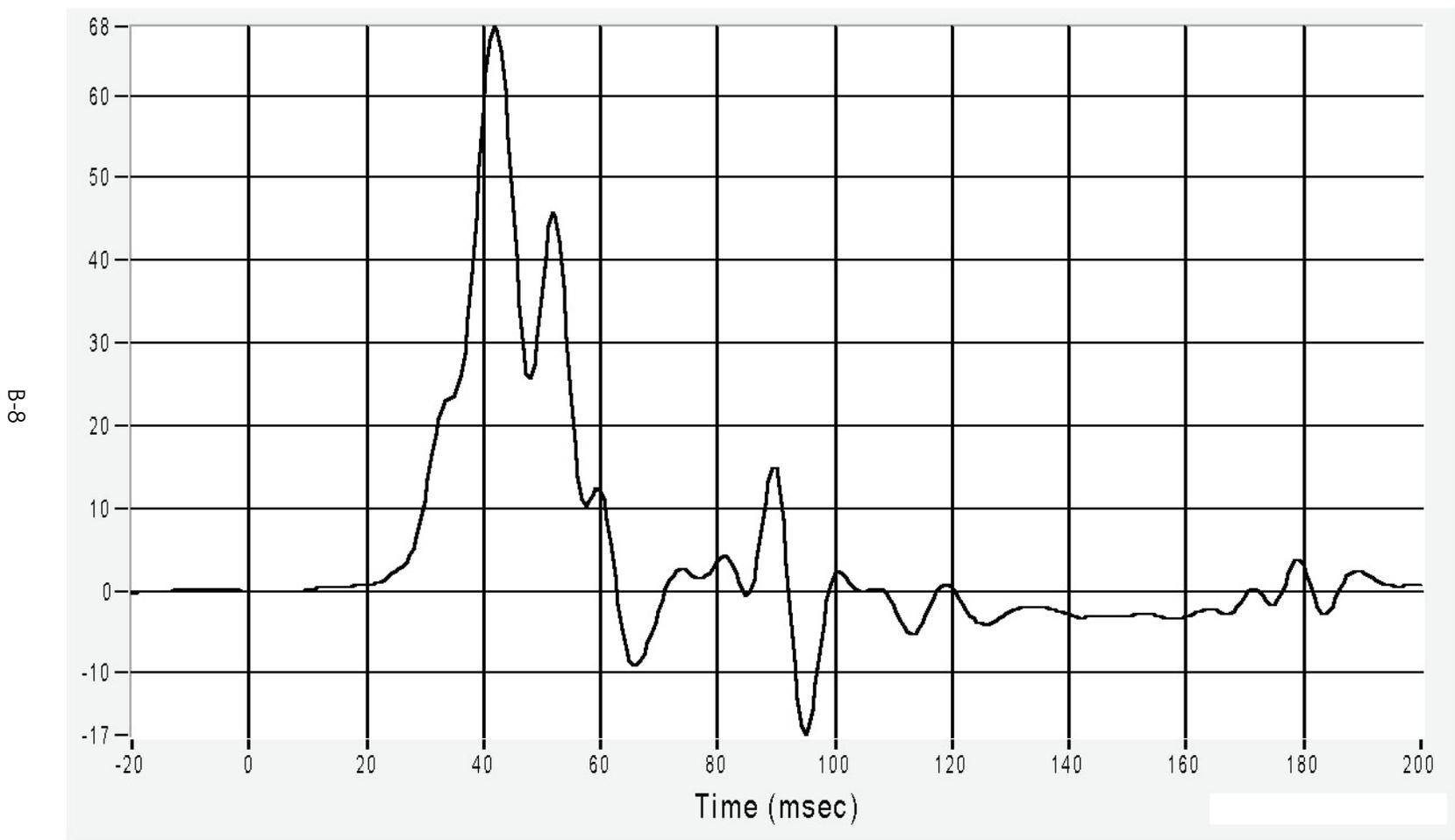
7 February 2006

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Passenger Lower Rib (Y) Acceleration

Acceleration (G's) FIR100

Max 68.3 G at 41.9 msec
Min -17.5 G at 95.0 msec



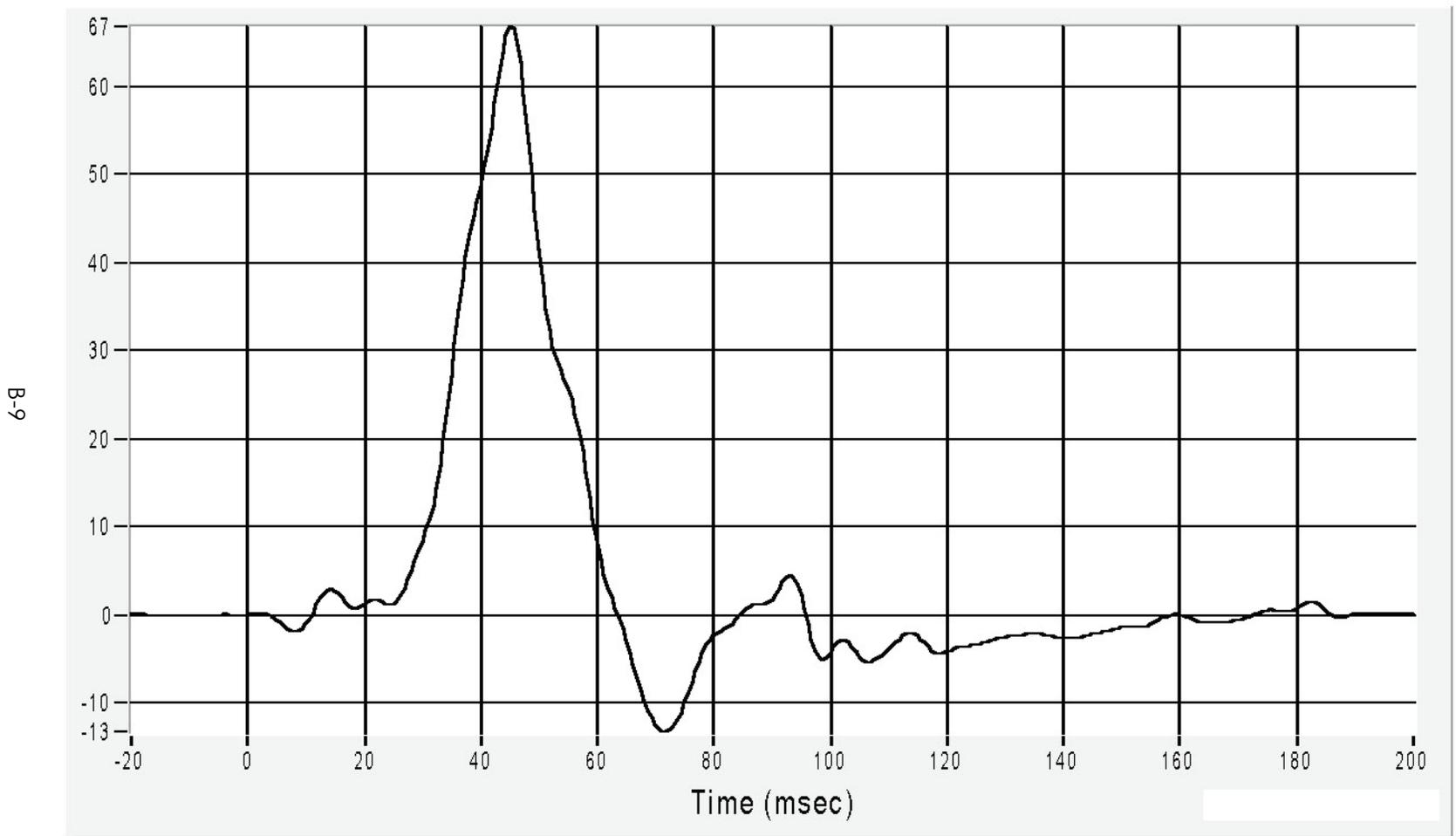
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7 February 2006

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Passenger Lower Spine (Y) Acceleration

Acceleration (G's) FIR100

Max 66.8 G at 45.0 msec
Min -13.3 G at 71.9 msec

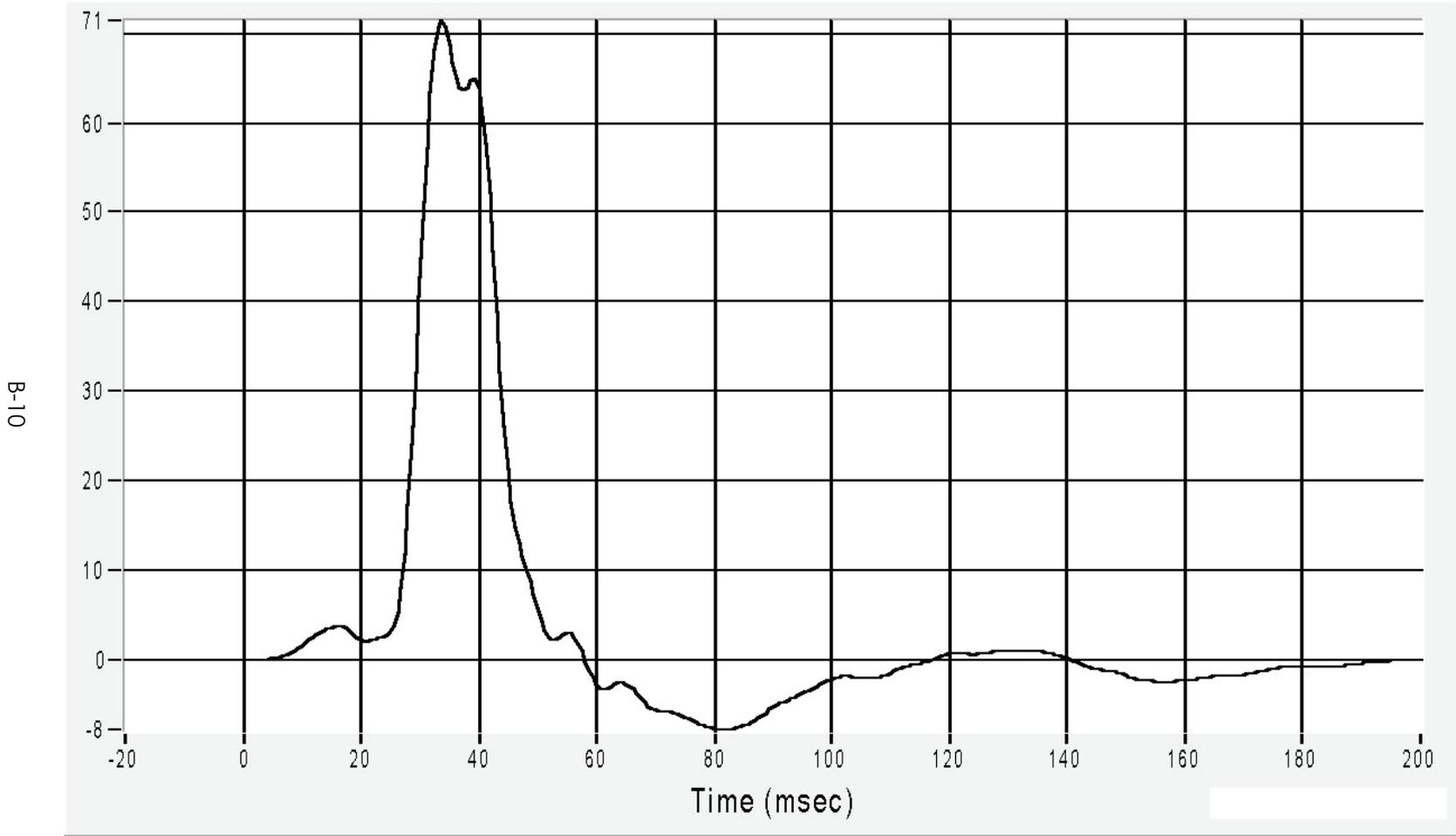


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7 February 2006

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Passenger Pelvic (Y) Acceleration
Acceleration (G's) FIR100

Max 71.4 G at 33.8 msec
Min -7.8 G at 81.9 msec



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APPENDIX C
DUMMY CALIBRATION DATA

**VERIFICATION TEST RESULTS SUMMARY
PRE AND POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial Number SID H3 056 Test Sequences 03 and 04

TEST	PRE		POST	
	COMMENTS	BY	COMMENTS	BY
EXTERNAL DIMENSIONS	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
THORACIC SHOCK ABSORBER TEST	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
LATERAL THORAX IMPACT TEST	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
LATERAL PELVIS IMPACT TEST	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
ABDOMINAL COMPRESSION	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
LUMBAR FLEXION	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
HYBRID III LATERAL NECK TEST	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
HYBRID III LATERAL HEAD DROP	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer

SID Serial Number SID H3 058 Test Sequences 03 and 04

TEST	PRE		POST	
	COMMENTS	BY	COMMENTS	BY
EXTERNAL DIMENSIONS	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
THORACIC SHOCK ABSORBER TEST	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
LATERAL THORAX IMPACT TEST	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
LATERAL PELVIS IMPACT TEST	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
ABDOMINAL COMPRESSION	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
LUMBAR FLEXION	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
HYBRID III LATERAL NECK TEST	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
HYBRID III LATERAL HEAD DROP	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer

**SUMMARY
SID H3 PRE AND POST VERIFICATION
CONFIGURED FOR LEFT SIDE IMPACT**

TEST PARAMETER	SPEC	SID H3 056		SID H3 058	
		PRE	POST	PRE	POST
MEASUREMENTS					
Date	-	05Feb06	06Mar06	05Feb06	21Mar06
Sequential Test Number	-	03	04	03	04
Temperature (°C)	18.9-25.5	20.5	19.8	20.8	21.0
Relative Humidity (%)	10-70	32.2	26.9	30.4	31.0
SH – Seated Height (mm)	889-909	907	906	909	909
RH – Rib Height (mm)	501-521	502	503	512	514
HP – Hip Pivot Height (mm)	99	99/99	99/99	99/99	99/99
RD – Rib From Back Line (mm)	229-241	229	229	229	229
KH – Knee Pivot from Back Line (mm)	511-526	520/520	517/520	520/521	518/522
KV – Knee Pivot to Floor (mm)	490-505	504/496	505/498	496/500	500/502
HW – Hip Width (mm)	356-391	364	364	362	363
THORAX IMPACTS					
Date	-	05Feb06	06Mar06	06Feb06	22Mar06
Sequential Test Number	-	03	04	03	04
Temperature (°C)	18.9-25.5	20.7	19.1	19.4	20.0
Relative Humidity (%)	10-70	32.4	24.9	29.4	32.0
Probe Speed (m/s)	4.21-4.33	4.28	4.28	4.29	4.29
Upper Rib Acceleration (G)	37-46	41.0	41.3	40.3	43.5
Lower Rib Acceleration (G)	37-46	40.4	39.6	39.2	38.6
Lower Spine Acceleration (G)	15-22	20.5	20.1	20.1	21.3
PELVIS IMPACTS					
Date	-	05Feb06	06Mar06	06Feb06	22Mar06
Sequential Test Number	-	03	04	03	04
Temperature (°C)	18.9-25.5	20.9	19.4	19.7	20.0
Relative Humidity (%)	10-70	31.1	24.4	28.3	32.0
Probe Speed (m/s)	4.21-4.33	4.28	4.28	4.29	4.29
Pelvis Acceleration (G)	40-60	56.0	51.9	49.4	49.1
THORACIC SHOCK ABSORBER					
Shock Absorber ID Number	-	1746	1746	31310164	31310164
Damper Setting	1-10	5.9	5.9	5	5
Date	-	20Jan06	02Mar06	20Jan06	02Mar06
Sequential Test Number	-	1	2	1	2
Temperature	18.9-25.5	21.4	20.8	21.0	20.9
Relative Humidity	10-70	23.4	22.8	23.4	21.9
Probe Speed (m/s) Low	3.05	3.08	3.05	3.05	3.06
Force (N)	836 – 1125	967.8	977.6	862.0	881.1
Displacement (mm)	30 – 35	30.3	31.0	30.5	30.8
Probe Speed (m/s) Middle	4.27	4.30	4.30	4.27	4.28
Force (N)	1730 – 2099	1822.3	1834.1	1740.5	1808.5
Displacement (mm)	32 – 37	34.0	33.7	35.1	36.0
Probe Speed (m/s) High	6.10	6.09	6.10	6.10	6.11
Force (N)	3741 – 4448	3964.0	4108.7	3962.4	3998.2
Displacement (mm)	33 - 40	37.2	38.8	37.4	37.9

TEST PARAMETER	SPEC	SID H3 056		SID H3 058	
		PRE	POST	PRE	POST
ABDOMINAL COMPRESSION					
Date	-	01Feb06	17Feb06	01Feb06	06Mar06
Sequential Test Number	-	03	04	03	04
Temperature (°C)	18.9-25.5	20.5	20.6	20.5	19.4
Relative Humidity (%)	10-70	33.5	26.2	33.4	21.2
Force at 13 mm (N)	104-162	136.6	143.1	147.7	137.8
Force at 19 mm (N)	163-221	191.3	194.4	206.2	181.5
Force at 25 mm (N)	222-280	254.2	244.0	260.5	235.7
Force at 33 mm (N)	325-391	352.2	334.1	376.9	338.9
LUMBAR FLEXION					
Date	-	02Feb06	16Feb06	02Feb06	03Mar06
Sequential Test Number	-	03	04	03	04
Temperature (°C)	18.9-25.5	20.2	21.9	20.6	20.4
Relative Humidity (%)	10-70	31.5	28.9	31.7	21.2
Force at 0° (N)	0-26.7	0	0	0	0
Force at 0° (N)	97.8-151.2	124	111.7	137	102
Force at 0° (N)	151.2-204.6	180	163.4	157	155
Force at 0° (N)	204.6-258	234	220.3	230	213
Return Angle	12° Maximum	6.5	8.1	5.8	4.4
HYBRID III LATERAL NECK					
Date	-	04Feb06	01Mar06	02Feb06	21Mar06
Sequential Test Number	-	03	04	03	04
Temperature (°C)	18.9-25.5	21.3	21.9	20.6	20.0
Relative Humidity (%)	10-70	31.5	23.9	33.0	29.0
Pendulum Speed (m/s)	6.89-7.13	7.08	7.07	7.07	7.00
Pendulum Pulse 10ms (m/s)	1.96-2.55	2.38	2.18	2.08	2.13
Pendulum Pulse 20ms (m/s)	4.12-5.10	4.71	4.51	4.21	4.18
Pendulum Pulse 30ms (m/s)	5.73-7.01	6.64	6.77	6.17	6.31
Pendulum Pulse 40 –70 ms (m/s)	6.27-7.64	6.64	6.73	7.41	7.17
Max Head rotation (deg)	66-82	73.9	69.5	77.1	78.3
Head angle crosses zero (ms)	58-67	58.2	59.0	59.4	63.9
Peak Moment (Nm)	73-88	81.5	85.1	73.7	74.4
Moment crosses zero (ms)	49-63	49.5	53.9	53.4	59.8
Max rotation wrt pk. moment (ms)	2-15	6.4	8.8	13.2	8.6
HYBRID III LATERAL HEAD DROP					
Date	-	01Feb06	16Feb06	01Feb06	28Feb06
Sequential Test Number	-	03	04	03	04
Temperature (°C)	18.9-25.5	20.6	21.6	20.6	20.1
Relative Humidity (%)	10-70	30.8	28.1	32.5	29.6
Resultant Max (G)	120-150	121.8	125.8	130.1	143.5
Longitudinal Max (G)	<15	4.2	6.1	1.7	5.5

**DUMMY INSPECTION LIST
PRE AND POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

		SID H3 056		SID H3 058	
		PRE	POST	PRE	POST
	Date	06Feb06	09Feb06	06Feb06	09Feb06
	Performed By	Mark Meyer	Mark Meyer	Mark Meyer	Mark Meyer
PART	INSPECTION	RESULT	RESULT	RESULT	RESULT
Skin	Visual	Pass	Pass	Pass	Pass
Head	Visual, Ballast, Accelerometer Mount	Pass	Pass	Pass	Pass
Neck	Visual and Palpated, Cable Torque	Pass	Pass	Pass	Pass
Spine Box	Visual, Ballast, Weldment, Accelerometer Mount	Pass	Pass	Pass	Pass
Rib Cage	Visual, Palpated, Measured, Stiffness	Pass	Pass	Pass	Pass
Sternum	Visual	Pass	Pass	Pass	Pass
Lumbar Spine	Visual	Pass	Pass	Pass	Pass
Abdomen	Visual	Pass	Pass	Pass	Pass
Pelvis	Visual, Palpated, Accelerometer Mount	Pass	Pass	Pass	Pass
Upper Legs	Visual	Pass	Pass	Pass	Pass
Knees	Visual, Stops, Inserts	Pass	Pass	Pass	Pass
Lower Legs	Visual, Range of Motion	Pass	Pass	Pass	Pass
Ankles	Visual, Range of Motion	Pass	Pass	Pass	Pass
Feet	Visual, Range of Motion	Pass	Pass	Pass	Pass
Joints	1 to 2 G Range	Pass	Pass	Pass	Pass
Other		N/a	N/a	N/a	N/a