

REPORT NUMBER: SPNCAP-CAL-11-010

**NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST**

**General Motor LLC
2011 Chevrolet Malibu 1LS
4-Door Sedan**

NHTSA NUMBER: MB0109

**PREPARED BY:
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October 19, 2010

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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FINAL REPORT ACCEPTANCE BY OCWS:

Division Chief, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

Technical Report Documentation Page

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16. Abstract A 32.2 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject 2011 Chevrolet Malibu 1LS 4-Door Sedan in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. This test was conducted at the Calspan Corporation Crash Test Facility in Buffalo, New York, on August 23, 2010. The impact velocity was 32.3 km/h, and the ambient temperature at the struck (driver's) side of the vehicle was 21.7°C. The test vehicle post-test maximum crush was 400 mm at level 3. The test vehicle's occupant performance is as follows:																						
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="width: 45%;">Measurement Description</th> <th colspan="3" style="text-align: center;">Driver ATD (SID-IIs)</th> </tr> <tr> <th style="width: 15%;">Units</th> <th style="width: 15%;">Threshold</th> <th style="width: 25%;">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₈)</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">1000</td> <td style="text-align: center;">236</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td style="text-align: center;">Gs</td> <td style="text-align: center;">82</td> <td style="text-align: center;">40.3</td> </tr> <tr> <td>Combined Ace tabular and Iliac Pelvic Force</td> <td style="text-align: center;">N</td> <td style="text-align: center;">5525</td> <td style="text-align: center;">2741</td> </tr> </tbody> </table>				Measurement Description	Driver ATD (SID-IIs)			Units	Threshold	Result	Head Injury Criteria (HIC ₃₈)	N/A	1000	236	Resultant Lower Spine Acceleration	Gs	82	40.3	Combined Ace tabular and Iliac Pelvic Force	N	5525	2741
Measurement Description	Driver ATD (SID-IIs)																					
	Units	Threshold	Result																			
Head Injury Criteria (HIC ₃₈)	N/A	1000	236																			
Resultant Lower Spine Acceleration	Gs	82	40.3																			
Combined Ace tabular and Iliac Pelvic Force	N	5525	2741																			
The two 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 Pole Part 572V SID-IIs		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Adm. Technical Ref. Division, 1200 New Jersey Ave. SE 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 MY 2011 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-09-D-00126. The purpose of this test is to generate comparative side impact performance in a 2011 Chevrolet Malibu 1LS 4-Door Sedan manufactured by General Motors LLC. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated January 2010.

SECTION 2

SUMMARY OF NCAP SIDE IMPACT TEST

A rigid pole side test was conducted on a 2011 Chevrolet Malibu 1LS 4-Door Sedan. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.3 km/h. The test was conducted by Calspan Corporation Transportation Research Group on August 23, 2010. Pre-test and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure, dated January 2010. Camera locations and other pertinent camera information are included in this report.

The Part 572V (SID-IIs) Dummy was instrumented accordingly:

Head CG Triaxial Accelerometers
 Thorax Upper, Middle, and Lower Rib Displacement Potentiometers
 Abdomen Upper and Lower Rib Displacement Potentiometers
 Lower Spine Triaxial Accelerometers
 Iliac Load Cell
 Acetabulum Load Cell

Appendix B contains the vehicle and dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report.

The following table summarizes the results of the test:

Dummy	HIC (36ms)	Resultant Lower Spine Acceleration	Pelvic Force (N)
SID-IIs 5th percentile female	236	40.3	Iliac Wing = 215
			Acetabular = 2627
			Sum = 2741

SUPPLEMENTAL RESTRAINT INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	No	NA		
Side Airbag 1 (Side Curtain)	Yes	Yes	Yes	Yes
Side Airbag 2 (Side Torso/Pelvis)	Yes	Yes	No	NA
Seat Belt Pretensioner	Yes	Yes	No	NA
Seat Belt Load Limiter	Yes	Yes	No	NA

GENERAL COMMENTS: None

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

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

Test Vehicle: 2011 Chevrolet Malibu 1LS NHTSA No: MB0109
 Test Program: Side Pole NCAP Test Date: August 23, 2010

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MB0109
Model Year	2011
Make	Chevrolet
Model	Malibu 1LS
Body Style	4-Door Sedan
VIN	1G1ZB5E12BF111996
Body Color	Mocha Steel Metallic
Delivery Date	7/22/2010
Odometer Reading (km/mi)	76 mi
Dealer	Paddo Chevrolet
Transmission	6-Speed
Final Drive	Front Wheel
Type/No. Cylinders	VVT/ 4 Cylinders
Engine Displacement (L)	2.4
Engine Placement	Lateral
Roof Rack	No
Sunroof/T-Top	No
Tinted Glass	No
Traction Control	Yes
Power Brakes	Yes
Front Disc	Yes
Rear Disc	Yes

Anti-Lock Brakes	Yes
All-Wheel Drive	No
Power Steering	Yes
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	No
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Pretensioners	Yes
Load Limiters	Yes
Automatic Door Locks	Yes
Bucket Seats	Yes
Tilt Steering	Yes
Other	-
Other	-

Does owner's manual provide instructions to turn off automatic door locks?

No

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors LLC
Date of Manufacture	6/10

GVWR (kg)	1998
GAWR Front (kg)	1044
GAWR Rear (kg)	952

VEHICLE SEATING AND WEIGHT CAPACITY DATA

	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3		5.0
Vehicle Capacity Weight (VCW) (kg)				416.0
DSC X 68.04 kg				340.2
Rated Cargo and Luggage Weight (RCLW) (kg)				75.8

(A)

(B)

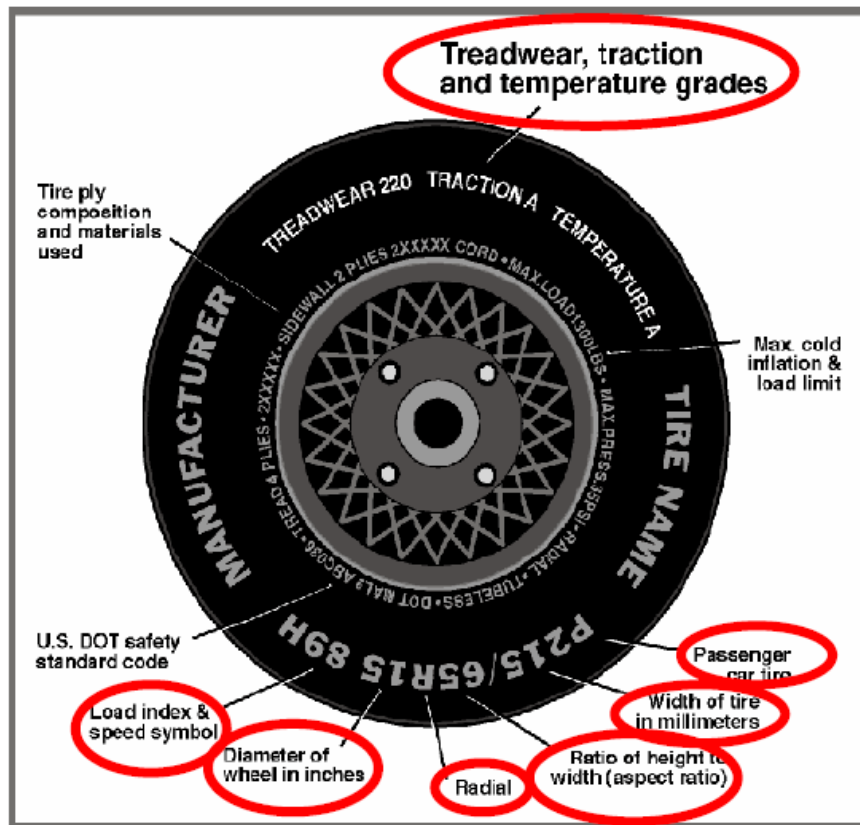
(A-B)

VEHICLE SEAT TYPE

Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	X	-	-		-	X	-
Rear or Second Row Seat	-	X	-	-	X	-	-
Third row seat							

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

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0109
Test Program:	Side Pole NCAP	Test Date	August 23, 2010



Measured Parameter	Front	Rear
Maximum Tire Pressure	300	300
Cold Pressure (kPa)	210	210
Recommended Tire Size	P215/55R17	P215/55R17
Tire Size on Vehicle	P215/55R17	P215/55R17
Tire Model	FR710	FR710
Tire Manufacturer	Firestone	Firestone
Treadwear	560	560
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	1 Ply Polyester + 2 Steel	1 Ply Polyester + 2 Steel
Tire Plies Body	1 Ply Polyester	1 Ply Polyester
Load Index/Speed Symbol	93S	93S
Tire Material	-	-
DOT Safety Code Right	W2PJ 710 2310	W2PJ 710 2310
DOT Safety Code Left	W2PJ 710 2310	W2PJ 710 2310

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

Test Vehicle: 2011 Chevrolet Malibu 1LS NHTSA No: MB0109
 Test Program: Side Pole NCAP Test Date: August 23, 2010

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	483.0	320.0	803.0	498.5	373.0	871.5	504.0	378.5	882.5
Right	kg	459.0	300.0	759.0	462.5	350.0	812.5	468.0	345.5	813.5
Ratio	%	60.3%	39.7%		57.1%	42.9%		57.3%	42.7%	
Totals	kg	942.0	620.0	1562.0	961.0	723.0	1684.0	972.0	724.0	1696.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1562.0	(A)
Actual Weight of 1 P572V ATD (SID-1Is) Dummy Used	kg	51.3	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	75.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1689.1	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

	Units	As Delivered	As Tested	Fully Loaded
Driver Door Sill Angle (front-to-rear)*	Deg.	-0.3	-0.5	-0.6
Front Passenger Sill Angle (front-to-rear)*	Deg.	-0.5	-0.5	-0.5
Front Bumper Angle (left-to-right)**	Deg.	0.8	0.8	0.8
Rear Bumper Angle (left-to-right)**	Deg.	0.8	0.7	0.6
Vehicle CG (Aft of Front Axle)	mm	1134.1	1226.7	1219.7
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	21.5	26.7	31.0

* Front up is positive

** Left up is positive

GENERAL VEHICLE TEST DATA

Measurement Description	Units	Value
Weight of Ballast in Cargo Area	kg	54.0
Weight of Vehicle Components Removed	kg	0.0

Vehicle parts removed to make Target Vehicle Test Weight:

None

TEST VEHICLE IMPACT POINT DATA

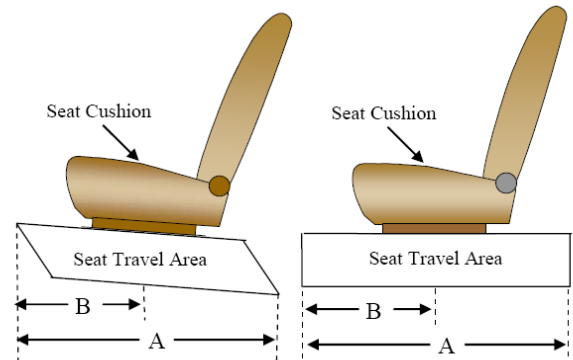
Measured Parameter	Units	Value
Vertical Impact Reference Line (Aft of Front Axle)	mm	1101
Actual Impact Point (Aft of Front Axle)	mm	1091
Impact Point Difference (- forward / + rearward)	mm	-10

DATA SHEET NO. 2
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2011 Chevrolet Malibu 1LS NHTSA No: MB0109
 Test Program: Side Pole NCAP Test Date: August 23, 2010

SEAT FORE/AFT POSITIONS

The front outboard seat was placed in the most forward locking detent while maintaining the seat cushion mid-angle position.

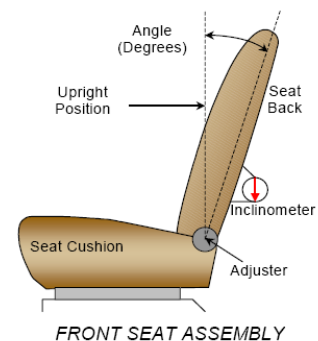


SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel (mm)	Placed in Detent # or Position (mm)
Driver Seat	240	0 (Full forward)
Front Passenger Seat	240	0 (Full forward)
Rear Seat – Struck Side	NA	Fixed
Rear-Seat – Non-Struck Side	NA	Fixed

SEAT BACK ANGLE POSITION

The seat back was set to the detent to achieve the head level requirement for the SID-IIs final position. The published driver seat back angle was measured from the outboard seat back with the ATD in the seat.



SEAT BACK ANGLE

	Degrees	Detent
Driver Seat Back Angle with Seated Dummy	8.9	-
Front Passenger Seat Back Angle	8.9	-
Struck Side Rear Seat Back Angle	NA	Fixed
Non-Struck Side Rear Passenger Seat Back Angle	NA	Fixed

SEAT BELT UPPER ANCHORAGES

The left front outboard seating position was placed in the highest position.

SEAT BELT UPPER ANCHORAGE POSITIONING

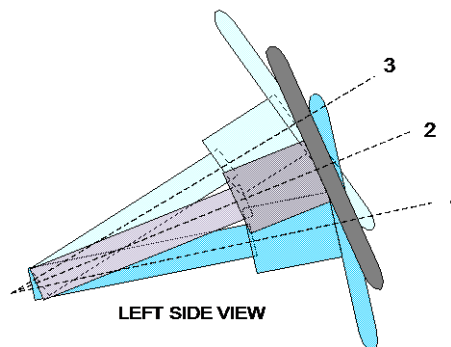
	Total # of Positions	Placed in Position #
Driver Seat	4	0 (highest)

DATA SHEET NO. 2 (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0109
Test Program:	Side Pole NCAP	Test Date:	August 23, 2010

STEERING COLUMN ADJUSTMENT

A flat plate was placed on the top and bottom of the steering wheel. The inclinometer was placed on the flat plate to measure the angle



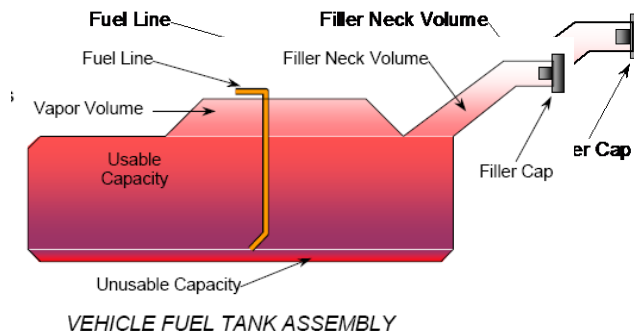
STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONING

	Degrees	Fore/Aft Position (mm)
Lowermost, Position No. 1	20.0	
Geometric Center, Position No. 2	22.0	
Uppermost, Position No. 3	24.0	
Telescoping Steering Wheel Travel		50
Test Position	22.0	25

FUEL PUMP

The fuel pump will operate when the key is in the "ON" position.
 The fuel filler pipe is located on the right rear side of vehicle.



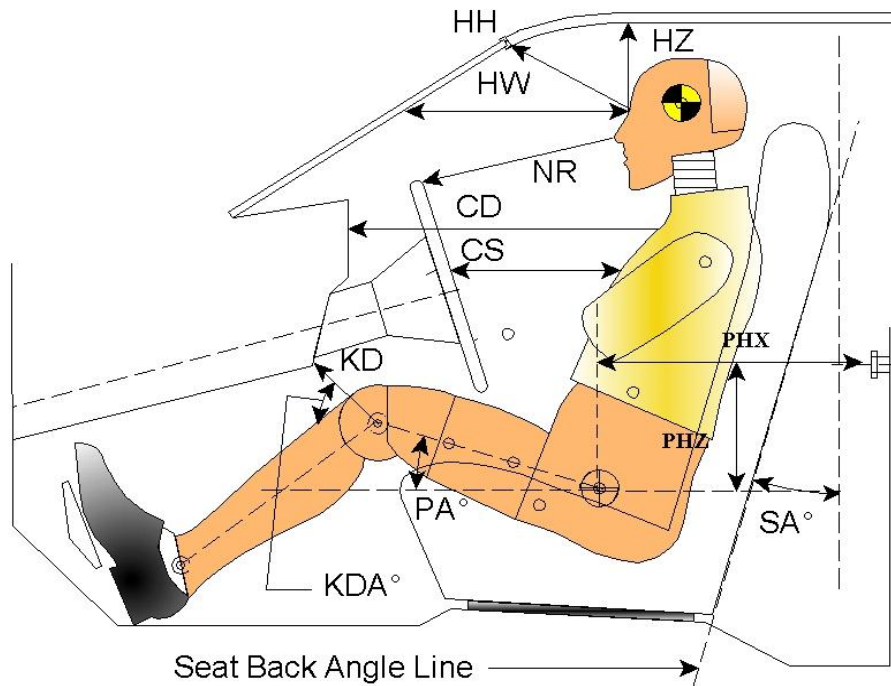
VEHICLE FUEL TANK ASSEMBLY

FUEL TANK CAPACITY DATA

	Liters
Usable Capacity of "Standard Tank"	61.7
Usable Capacity of "Optional Tank"	N/A
Usable Capacity of Standard Tank as Specified in Owner's Manual	61.7
Usable Capacity of Optional Tank as Specified in Owner's Manual	N/A
92-94% of Usable Capacity	56.8 – 58.0
Actual Amount of Solvent Used in Test	57.4
1/3 of Usable Capacity	20.6

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0109
Test Program:	Side Pole NCAP	Test Date	August 23, 2010



DUMMY ID# 304

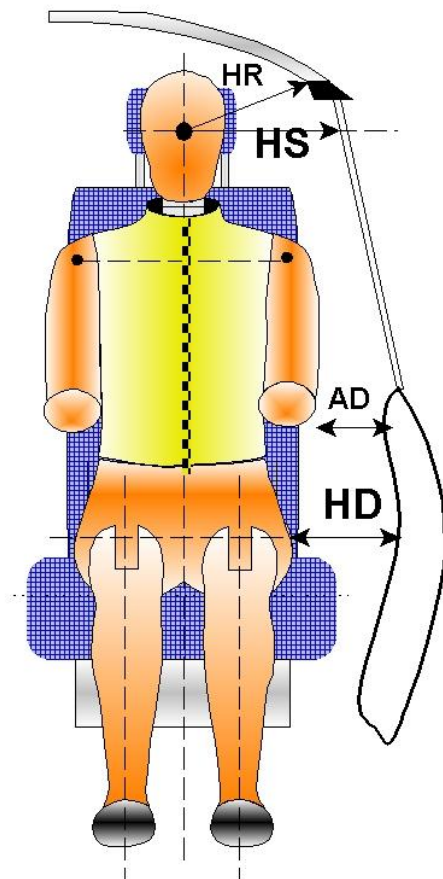
Code	Measurement Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	229	
HW	Head to Windshield	545	
HZ	Head to Roof	150 *	
NR	Nose to Rim	240	
CD	Chest to Dash	399	
CS	Chest to Steering Wheel	186	
KDL/KDAL°	Left Knee to Dash	110	30
KDR/KDAR°	Right Knee to Dash	85	30
PA°	Pelvic Angle		17.7
PHX	H-Point to Striker (X-Axis)	330	
PHZ	H-Point to Striker (Z-Axis)	112	
SA°	Seat Back Angle		8.9 **

* Measured to survivor

** Measured from outboard seat back

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0109
Test Program:	Side Pole NCAP	Test Date	August 23, 2010

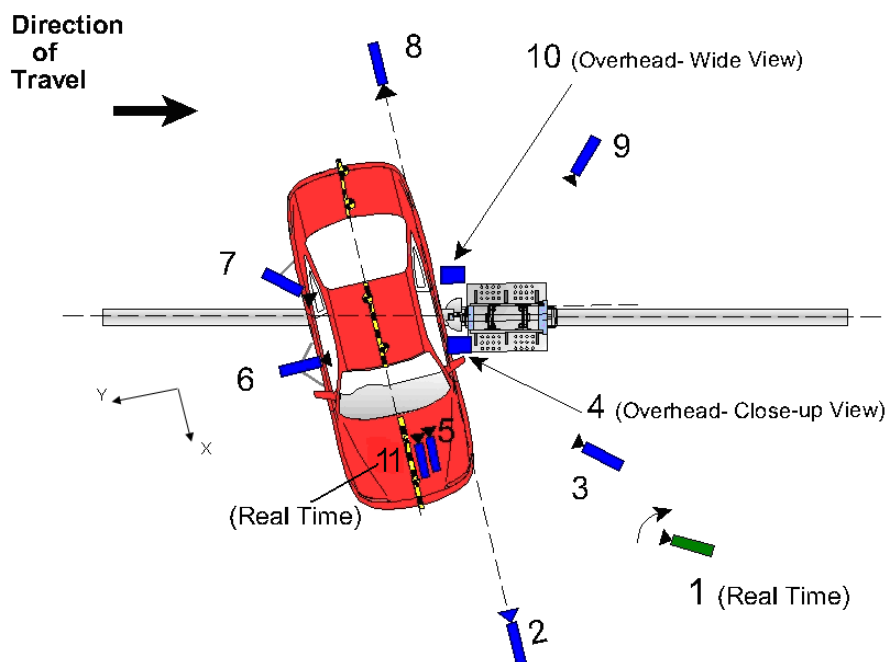


DUMMY ID# 304

Code	Measurement Description	Length (mm)
HR	Head To Side Header	205
HS	Head to Side Window	360
AD	Arm to Door	167
HD	H-Point to Door	168

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0109
Test Program:	Side Pole NCAP	Test Date	August 23, 2010



REFERENCE (from Point of Impact for X and Y; from Ground for Z):
+ X = Forward of vehicle, + Y = Right of vehicle, + Z = Down

Camera No.	View	Coordinates (mm)			Lens (mm)	Film Speed (fps)
		X*	Y*	Z*		
1	Real time (24-30 fps) pan view of impact	-	-	-	-	24
2	Front ground level - impact view	6256	1920	975	24	1000
3	Impact side 45° - forward pole view	1115	1890	2180	24	1000
4	Overhead Close-up view of impact	-40	210	4375	28	1000
5	Dummy front view				25	500
6	Dummy side view				12.5	500
7	Dummy rear oblique view				12.5	500
8	Rear ground level – impact view	-6406	2135	1085	28	1000
9	45 Degree Rear Impact View	-3160	2905	1325	24	1000
10	Overhead wide-view of impact	310	160	4375	14	1000
11	Real-time (24-30 fps) – dummy front view	-	--	-	-	24

* All measurements accurate to ± 6 mm.

NOTE: Vehicle was at a 15° angle to the rigid pole.

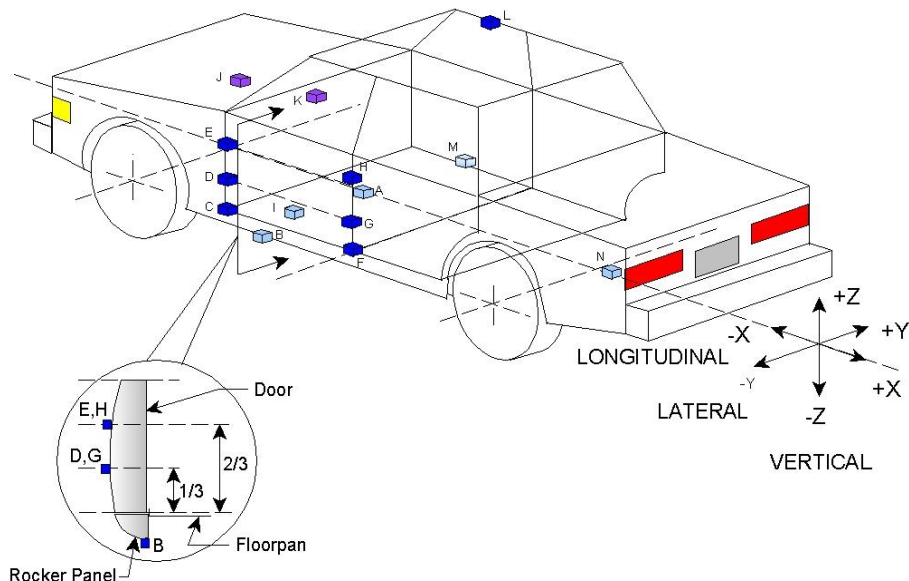
INSTRUMENTATION

	Number of Channels
Driver Dummy	16
Vehicle Structure	21
Pole Load Cells	6
Contact Switches	0
Total No. of Data Channels	43

** Vehicle manufacturer requested that some contact switches not be installed on ATD.

DATA SHEET NO. 6
VEHICLE ACCELEROMETER DATA

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0109
Test Program:	Side Pole NCAP	Test Date	August 23, 2010

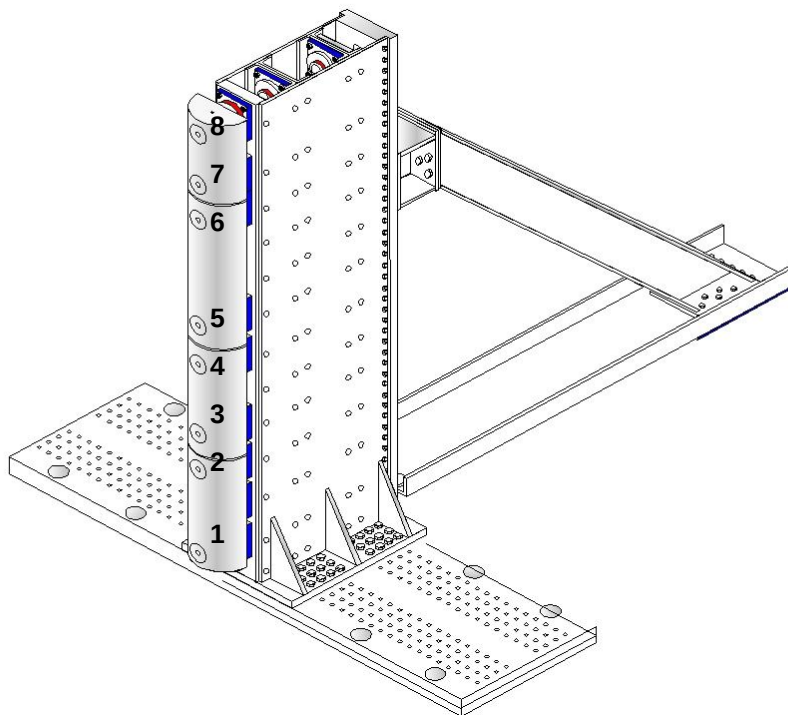


	Accelerometer/Sensor Location			
	ID	Coordinates (mm)		
		X	Y	Z
A	Vehicle CG Accel.	2651.0	-14.0	465.0
	Vehicle CG Sensor	2651.0	-14.0	465.0
B	Left Floor Sill	3064.0	-652.0	341.0
C	A Pillar Sill	3325.0	-646.0	343.0
D	A Pillar Low	3349.0	-659.0	510.0
E	A Pillar Mid	3317.0	-666.0	985.0
F	B Pillar Sill	2354.0	-676.0	419.0
G	B Pillar Low	2322.0	-675.0	584.0
H	B Pillar Mid	2276.0	-677.0	885.0
I	Driver Seat	2605.0	-572.0	310.0
L	Engine Top	4155.0	-244.0	542.0
J	Firewall	3767.0	-4.0	834.0
K	Right Roof	2372.0	599.0	1372.0
M	Right Floor Sill	3009.0	657.0	350.0
N	Rear Floorpan	1046.0	47.0	557.0

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0109
Test Program:	Side Pole NCAP	Test Date	August 23, 2010

FOIL 300K RIGID POLE



Load Cell Locations	
ID	Height From Ground (mm)
1	172
2	659
3	850
4	1333
5	1525
6	2008
7	--
8	--

**DATA SHEET NO. 8
POST-TEST OBSERVATIONS**

Test Vehicle: 2011 Chevrolet Malibu 1LS NHTSA No: MB0109
Test Program: Side Pole NCAP Test Date: August 23, 2010

TEST DUMMY INFORMATION AND CONTACT

Description	Driver Dummy
Dummy Type/Serial No.	SID-IIs/ 304
Head Contact	Side of Head - Side Curtain Airbag Rear of Head – Head Restraint
Upper Torso Contact	Side Torso/Pelvis Airbag; Seat Back
Lower Torso Contact	Side Torso/Pelvis Airbag; Seat Back
Left Knee Contact	Door
Right Knee Contact	No Contact

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Left Side Doors	Jammed Shut	Closed and operational
Right Side Doors	Closed and operational	Closed and operational
Hatch and Other Doors	NA	Closed and operational
Seat Movement	None	None
Seat Back Failure	None	None

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	B-Pillar Intrusion caused by pole impact
Sill Separation	No separation
Windshield Damage	Severe cracking on left side of windshield
Window Damage	Left front window shattered during impact
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

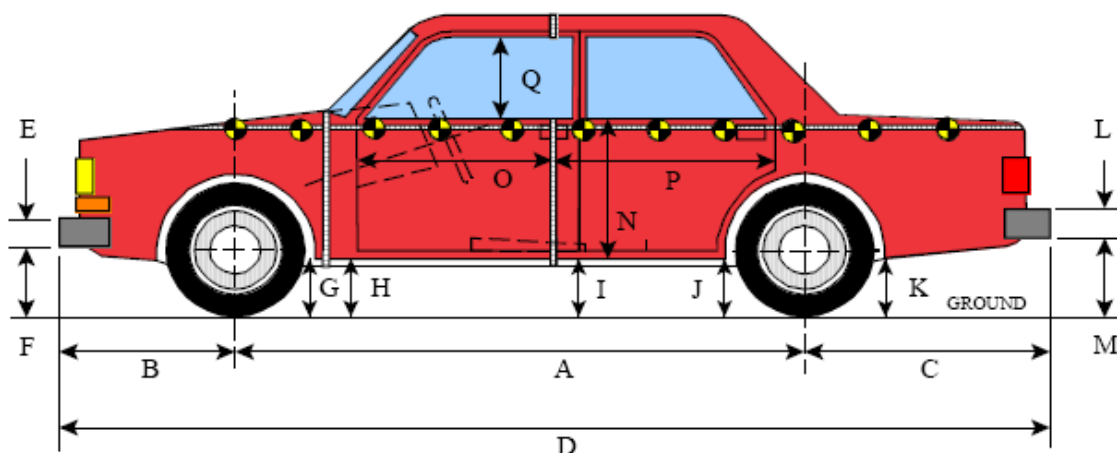
Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	No	NA		
Side Airbag 1 (Side Curtain)	Yes	Yes	Yes	Yes
Side Airbag 2 (Side Torso/Pelvis)	Yes	Yes	No	NA
Seat Belt Pretensioner	Yes	Yes	No	NA
Seat Belt Load Limiter	Yes	Yes	No	NA

VEHICLE SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset from Vertical Impact Reference Line	mm	+/- 38	-10
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	32.3
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	32.5

DATA SHEET NO. 9
VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0109
Test Program:	Side Pole NCAP	Test Date	August 23, 2010



LEFT SIDE VIEW

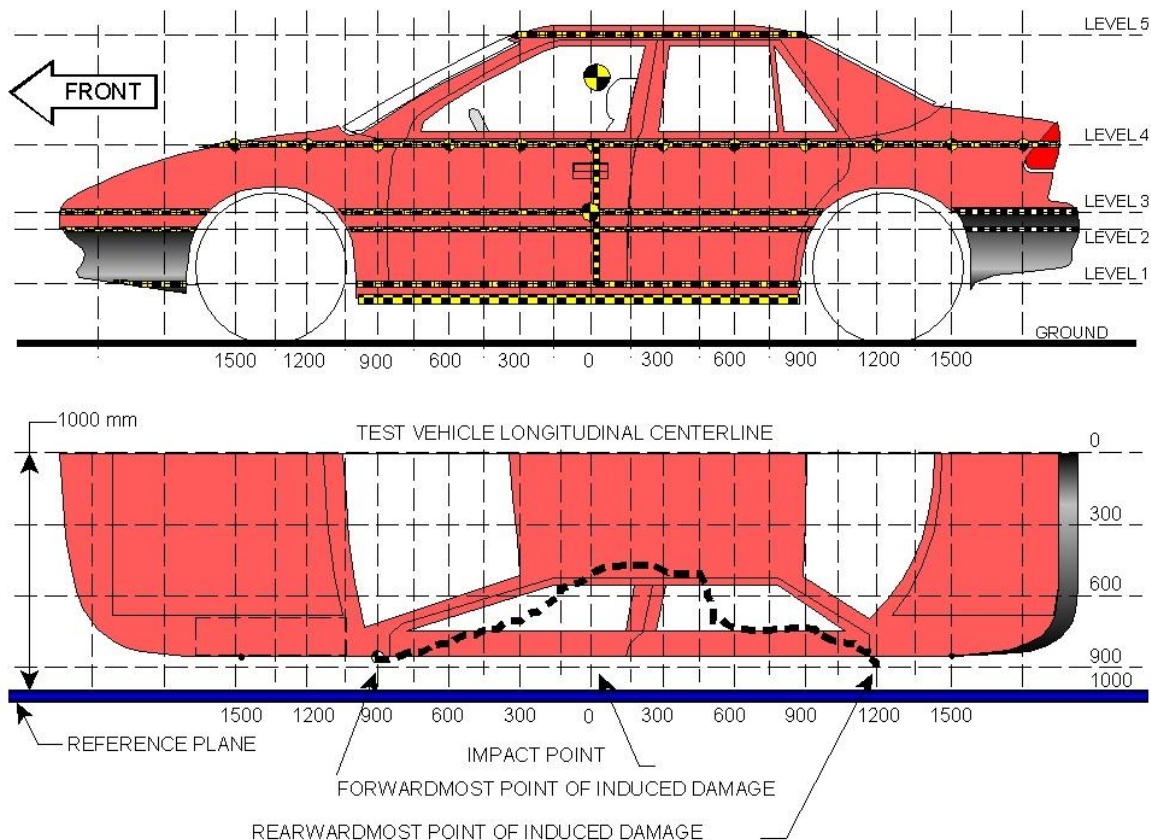
All MEASUREMENTS IN (mm) WITH TOLERANCE OF ± 3 mm

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Vehicle Wheelbase	2857	2870	-13
B	Front Axle to FSOV	982	1015	-33
C	Rear Axle to RSOV	1030	1030	0
D1	Total Vehicle Length at Left Side	4719	4629	90
D2	Total Vehicle Length at Centerline	4869	4819	50
D3	Total Vehicle Length at Right Side	4720	4709	11
E	Front Bumper Thickness	75	65	10
F	Front Bumper Bottom to Ground	356	417	-61
G	Sill Height at Front Wheel Well	145	140	5
H	Sill Height at Front Door Leading Edge	159	155	4
I	Sill Height at B Pillar	177	181	-4
J1	Sill Height at Rear Wheel Well	190	214	-24
J2	Pinch Weld Height at Rear Wheel Well	192	212	-20
K	Sill Height Aft of Rear Wheel Well	210	214	-4
L	Rear Bumper Thickness	285	285	0
M	Rear Bumper Bottom to Ground	395	386	9
N	Sill Height to Window Bottom Sill	700	700	0
O	Front Door Leading Edge to Impact CL	665	662	3
P	Rear Door Trailing Edge to Impact CL	1450	1405	44
Q	Front Window Opening	435	396	39
R	Right Side Length	4720	4709	11
S	Left Side Length	4719	4629	90
T	Vehicle Width at B Post	1782	1632	150

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0109
Test Program:	Side Pole NCAP	Test Date	August 23, 2010



Level	Measurement Description	Height Above Ground (mm)
1	Sill Top	322.2
2	Occupant H-Point	553.2
3	Mid-Door	679.2
4	Window Sill	876.0
5	Window Top	1372.5

NOTE: The above measurements should be taken along the vertical impact reference line. Vehicle measurements forward of the vertical impact reference line are negative.

DATA SHEET NO. 10 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0109
Test Program:	Side Pole NCAP	Test Date	August 23, 2010

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1500	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
-1350	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
-1200	--	--	--	741	--	--	--	--	819	--	--	--	--	-78	--
-1050	--	--	--	792	--	--	--	--	859	--	--	--	--	-67	--
-900	--	--	895	822	--	--	--	938	880	--	--	--	-43	-58	--
-750	--	893	886	833	--	--	923	918	874	--	--	-30	-32	-41	--
-600	864	885	886	842	--	837	869	882	858	--	27	16	4	-16	--
-450	865	884	887	849	--	761	768	784	777	--	104	116	103	72	--
-300	866	884	887	856	--	679	688	694	684	--	187	196	193	172	--
-150	867	884	888	861	--	586	585	585	583	--	281	299	303	278	--
0	866	883	888	865	527	497	490	488	486	417	369	393	400	379	110
150	865	883	888	868	585	545	528	518	511	433	320	355	370	357	152
300	864	883	888	894	588	649	637	632	607	461	215	246	256	287	127
450	864	882	888	871	590	724	725	732	721	485	140	157	156	150	105
600	864	882	886	871	589	763	766	768	750	509	101	116	118	121	80
750	863	880	885	870	587	803	799	799	777	531	60	81	86	93	56
900	863	879	883	869	584	843	831	828	803	549	20	48	55	66	35
1050	862	877	881	866	580	883	863	854	828	562	-21	14	27	38	18
1200	861	874	878	863	567	921	889	876	852	563	-60	-15	2	11	4
1350	860	882	876	846	418	969	931	905	863	419	-109	-49	-29	-17	-1
1500	--	--	888	850	--	--	--	894	897	--	--	--	-6	-47	--

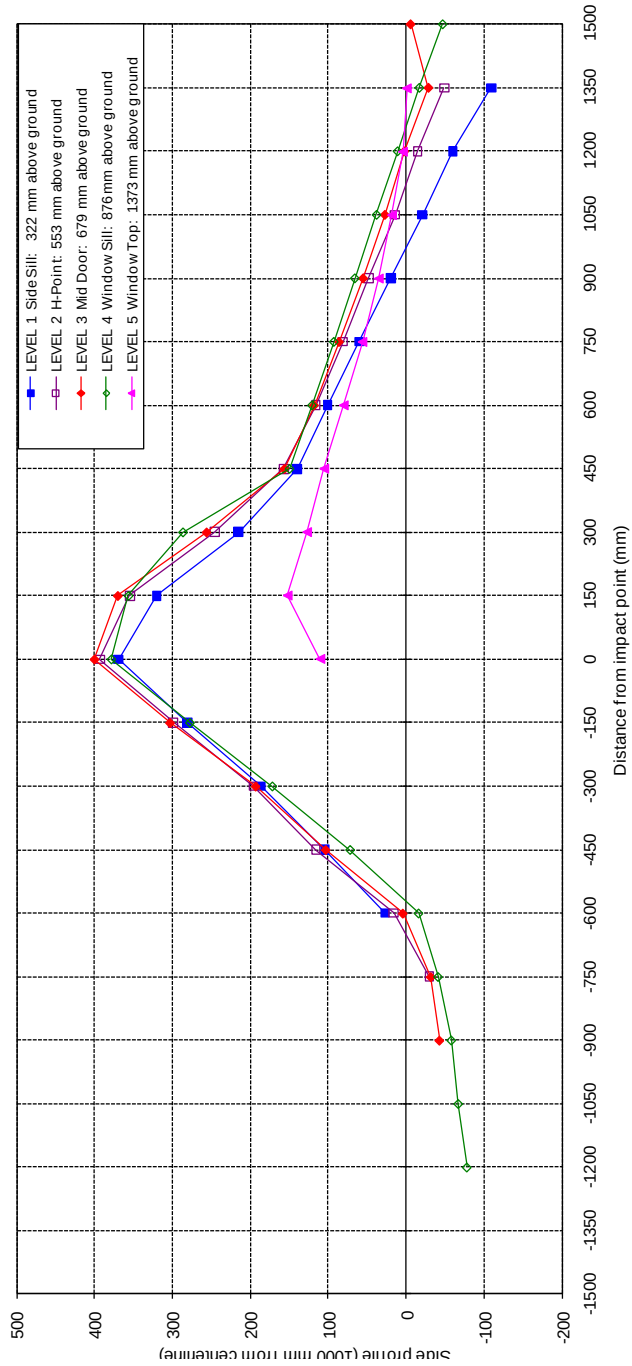
MAXIMUM CRUSH DATA

	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush (mm)	369	393	400	379	152
Distance From Impact (mm)	0	0	0	0	150

NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to test based on an estimated impact point. The final distance to impact is determined after the final dummy positioning and the pole is aligned with the center of gravity of the dummy's head.

DATA SHEET NO. 10 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0109
Test Program:	Side Pole NCAP	Test Date	August 23, 2010



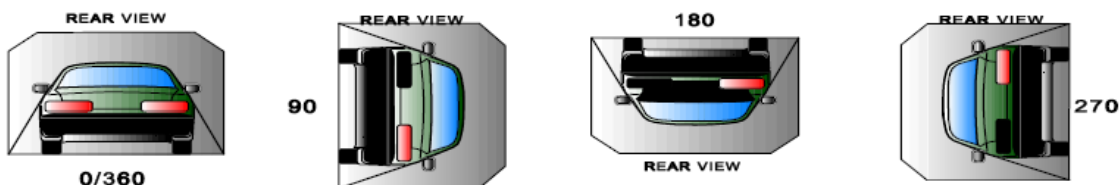
DATA SHEET NO. 11
FMVSS NO. 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2011 Chevrolet Malibu 1LS NHTSA No: MB0109
 Test Program: Side Pole NCAP Test Date: August 23, 2010

Test Time: 4:25 PM Temperature: 21.1 ° C

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

FMVSS 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0 to 90	1:08	5:00	6:08
90 to 180	1:03	5:00	6:03
180 to 270	0.59	5:00	5:59
270 to 360	1:11	5:00	6:11

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

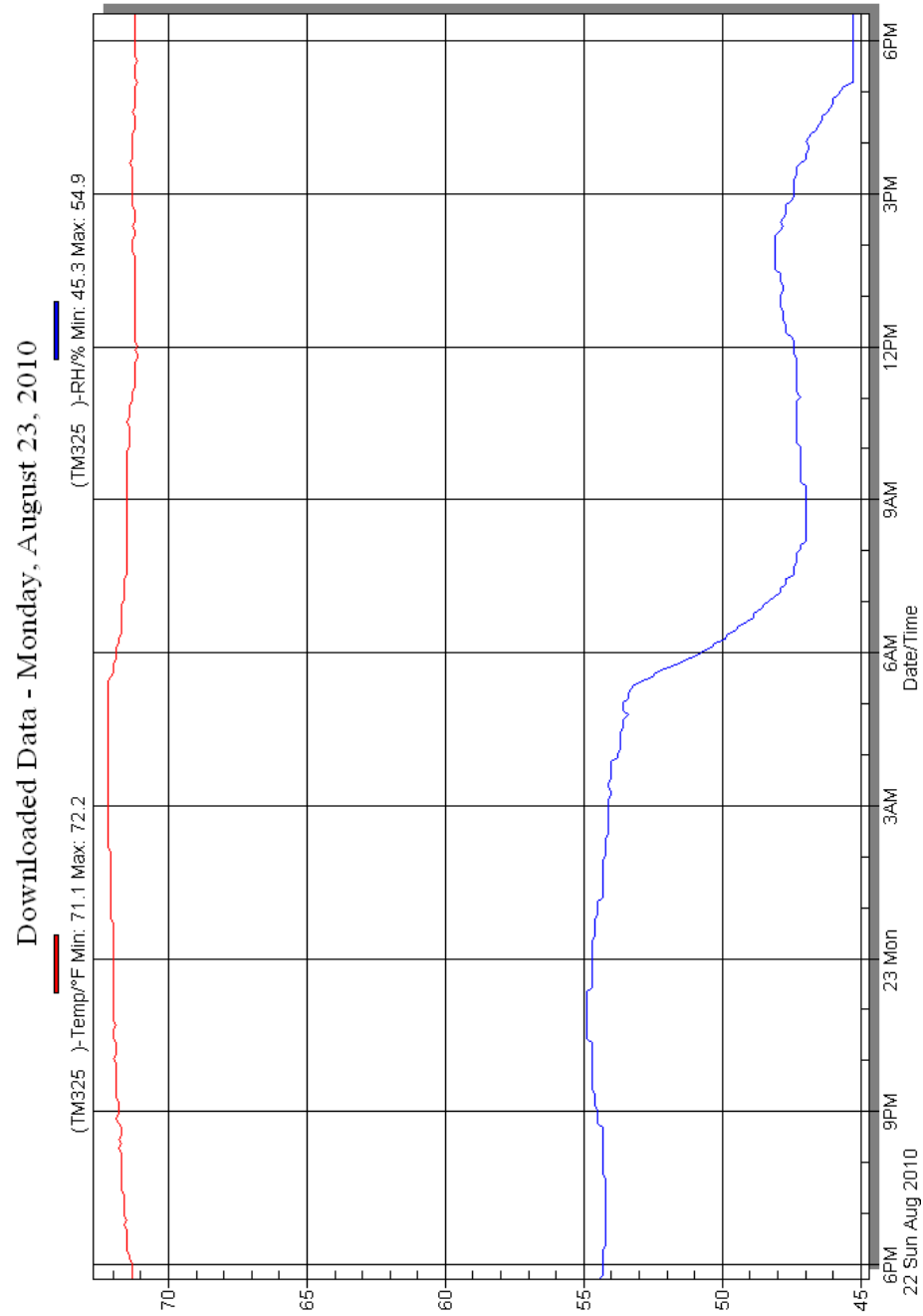
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0 to 90	0	0	0	0
90 to 180	0	0	0	0
180 to 270	0	0	0	0
270 to 360	0	0	0	0

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0 to 90	None
90 to 180	None
180 to 270	None
270 to 360	None

DATA SHEET NO. 12
DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0109
Test Program:	Side Pole NCAP	Test Date	August 23, 2010



**APPENDIX A
PHOTOGRAPHS**

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51	Pre-Test View of Fuel Filler Car or Fuel Filler Neck	A-30
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67	Monroney Label	A-38
68	Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-38



Figure A-1: As-Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



Figure A-2: As-Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle



Figure A-3: Pre-Test Frontal View of Test Vehicle



Figure A-4: Post-Test Frontal View of Test Vehicle



Figure A-5: Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle



Figure A-6: Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle



Figure A-7: Pre-Test Left Side View of Test Vehicle



Figure A-8: Post-Test Left Side View of Test Vehicle



Figure A-9: Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



Figure A-10: Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



Figure A-11: Pre-Test Rear View of Test Vehicle



Figure A-12: Post-Test Rear View of Test Vehicle



Figure A-13: Pre-Test Right Side View of Test Vehicle



Figure A-14: Post-Test Right Side View of Test Vehicle



Figure A-15: Pre-Test Overhead View of Test Vehicle and Pole



Figure A-16: Post-Test Overhead View of Test Vehicle and Pole



Figure A-17: Pre-Test Left Side View of Pole Positioned Against Side of Vehicle at Ideal Impact Point



Figure A-18: Pre-Test Right Side View of Pole Positioned Against Side of Vehicle at Ideal Impact Point

Photograph Not Available

Figure A-19: Pre-Test Close-Up View of Impact Point Target



Figure A-20: Post-Test Close-Up View of Impact Point Target Showing Impact Location



Figure A-21: Pre-Test Front Close-Up View of Dummy

Photograph Not Available

Figure A-22: Post-Test Front Close-Up View of Dummy



Figure A-23: Pre-Test Left Side View of Dummy Showing Belt, Chalking, and Contact Switches (Door Open)



Figure A-24: Pre-Test Left Side View of Dummy Shoulder and Door Top View



Figure A-25: Post-Test Left Side View of Dummy Shoulder and Door Top View

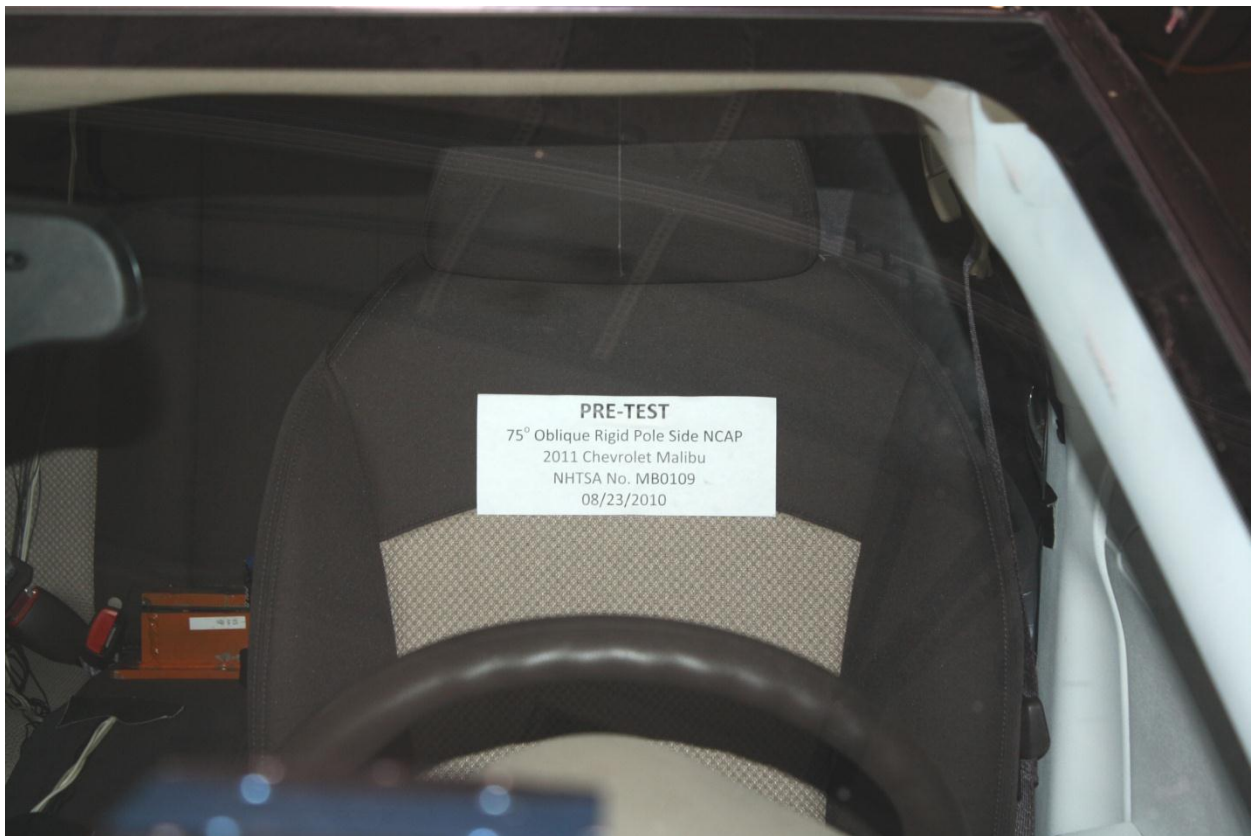


Figure A-26: Pre-Test Frontal View of Seat Back Prior to Dummy Positioning



Figure A-27: Pre-Test Frontal View of Dummy Head and Shoulders in Relation to Head Restraint

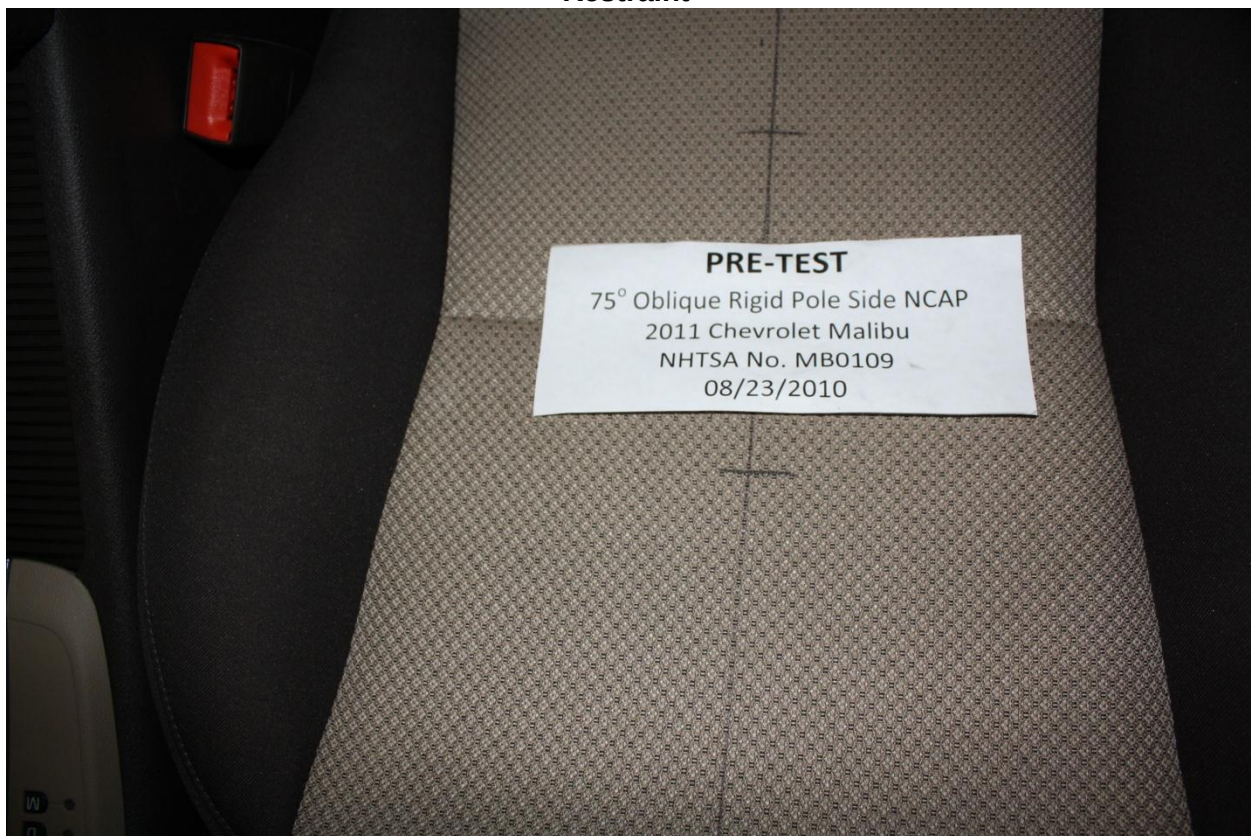


Figure A-28: Pre-Test Frontal View of Seat Pan Prior to Dummy Positioning

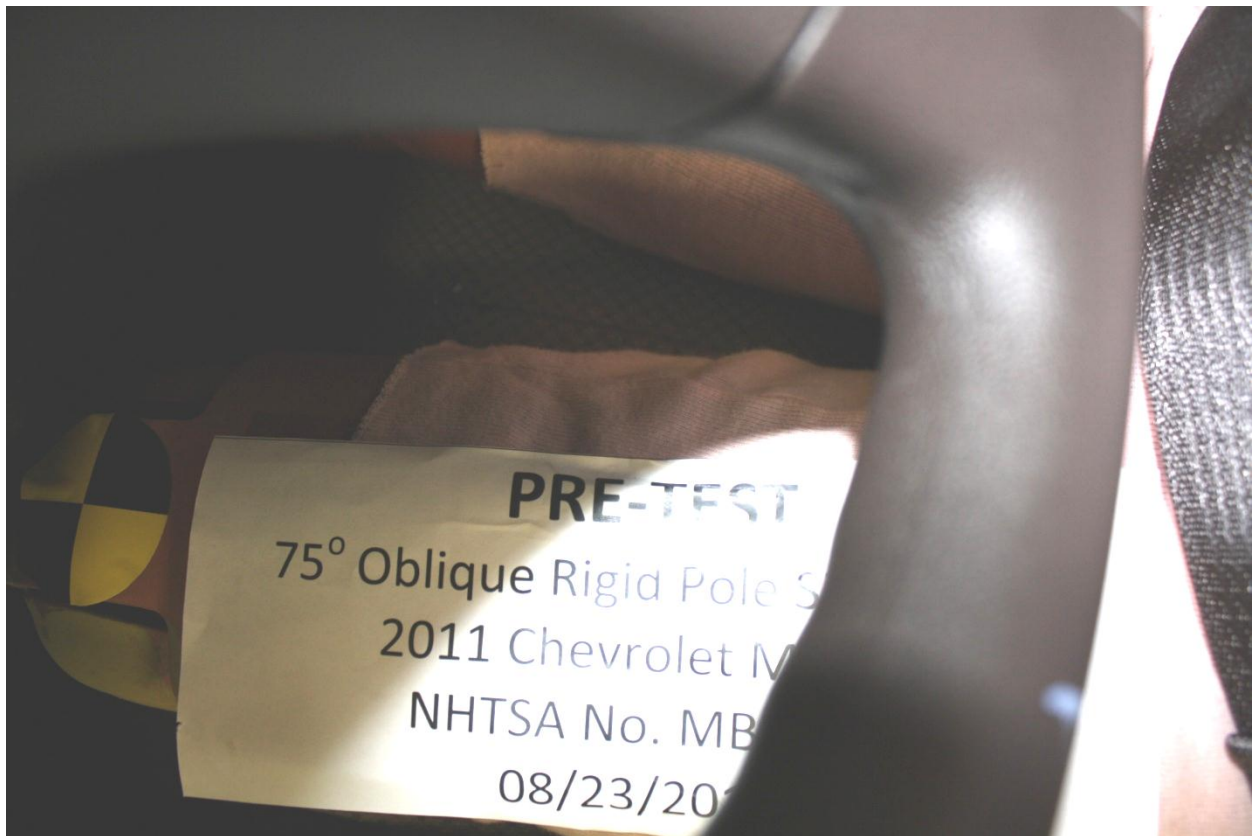


Figure A-29: Pre-Test Overhead View of Dummy Thighs on Seat Pan

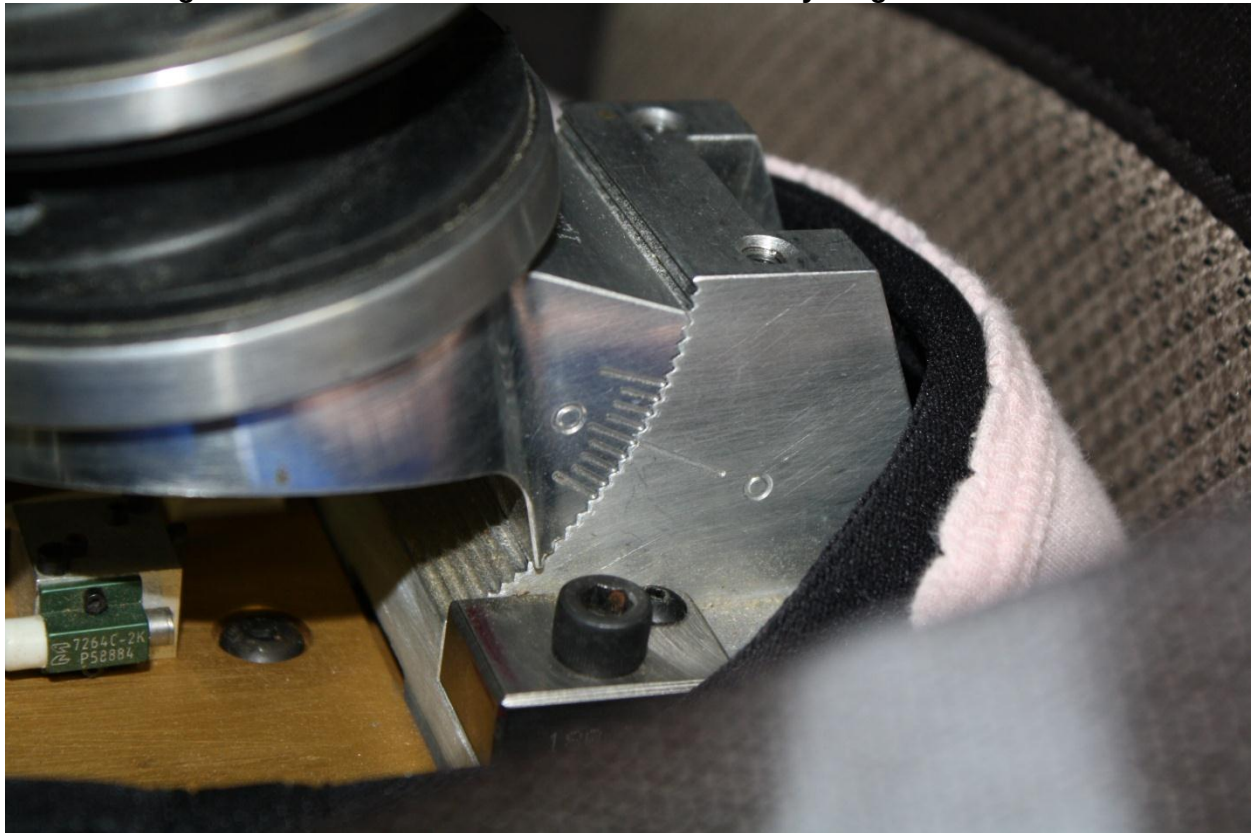


Figure A-30: Pre-Test View of Dummy's Neck Showing Position of Adjustable Neck Bracket

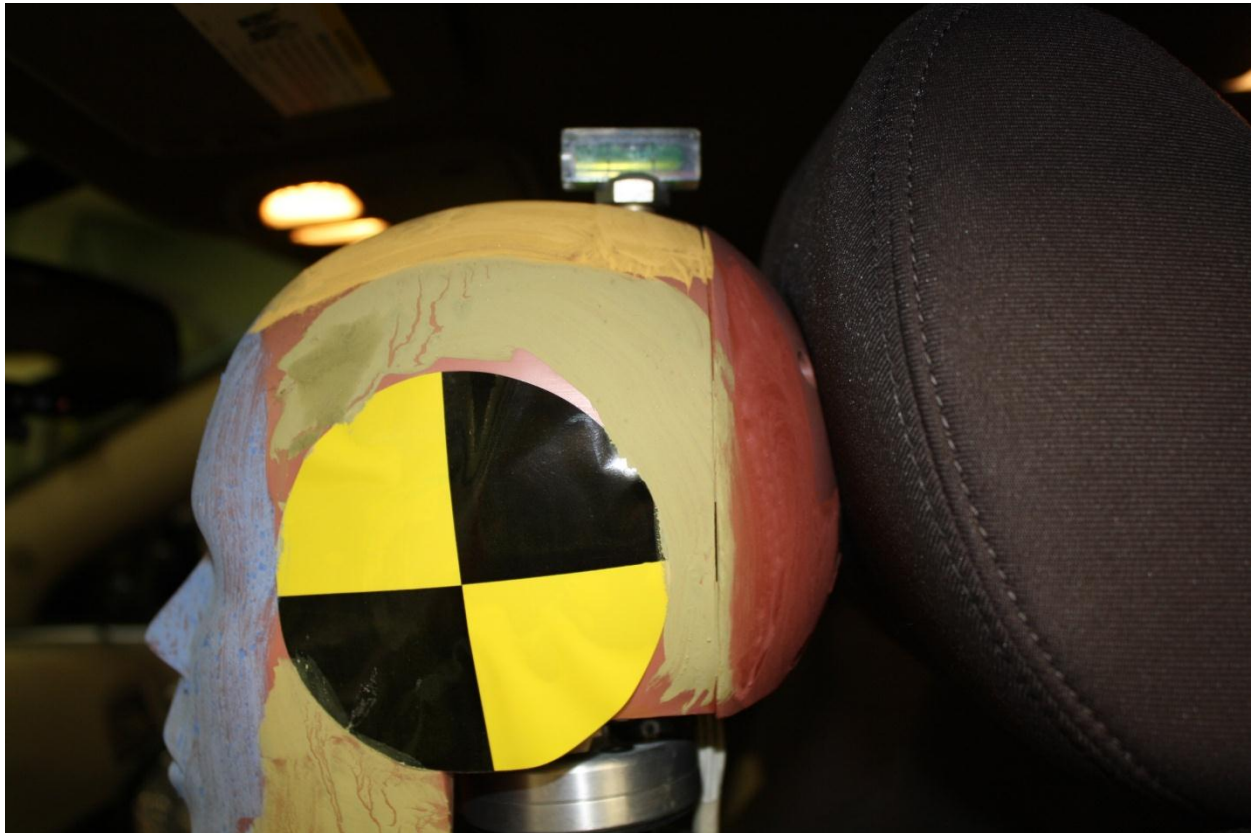


Figure A-31: Pre-Test View of Dummy's Head Showing Dummy's Head is Level



Figure A-32: Pre-Test Placement of Dummy's Feet

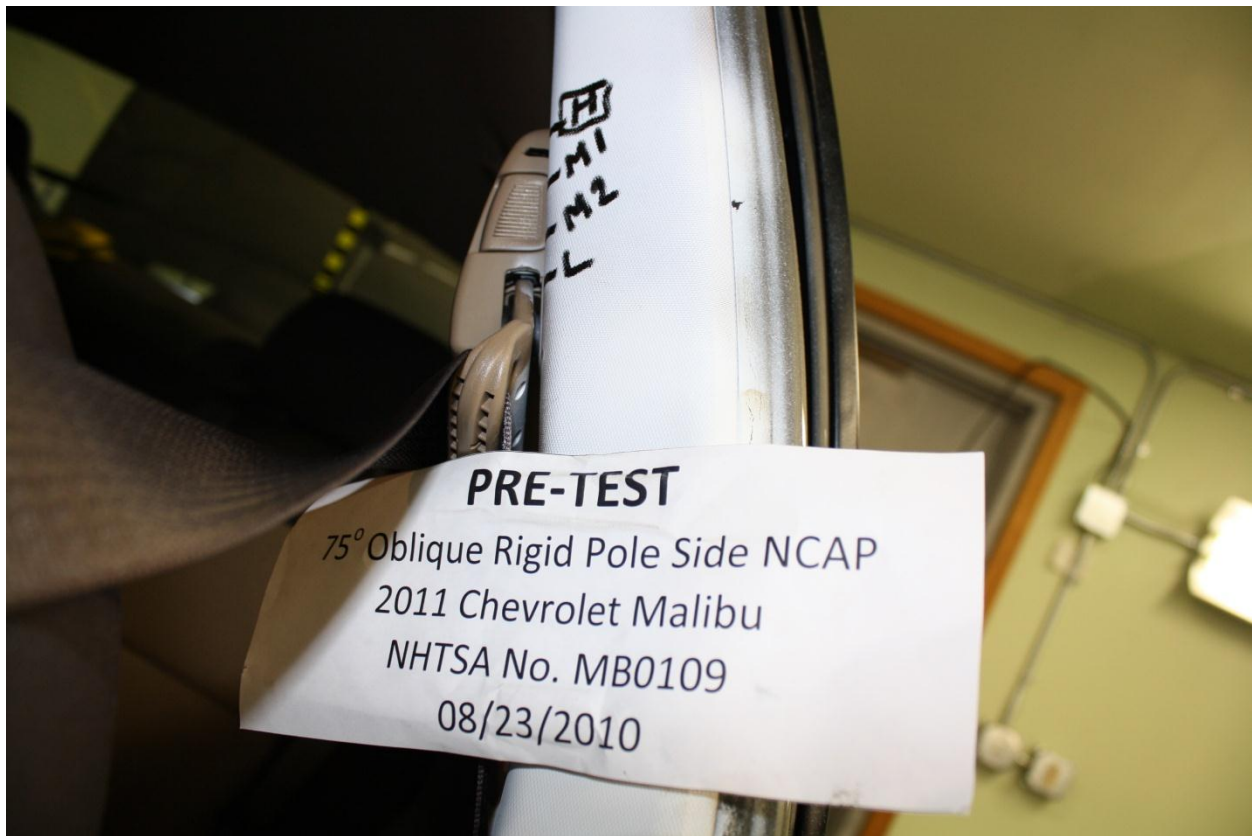


Figure A-33: Pre-Test View of Belt Anchorage for Dummy to Show Position

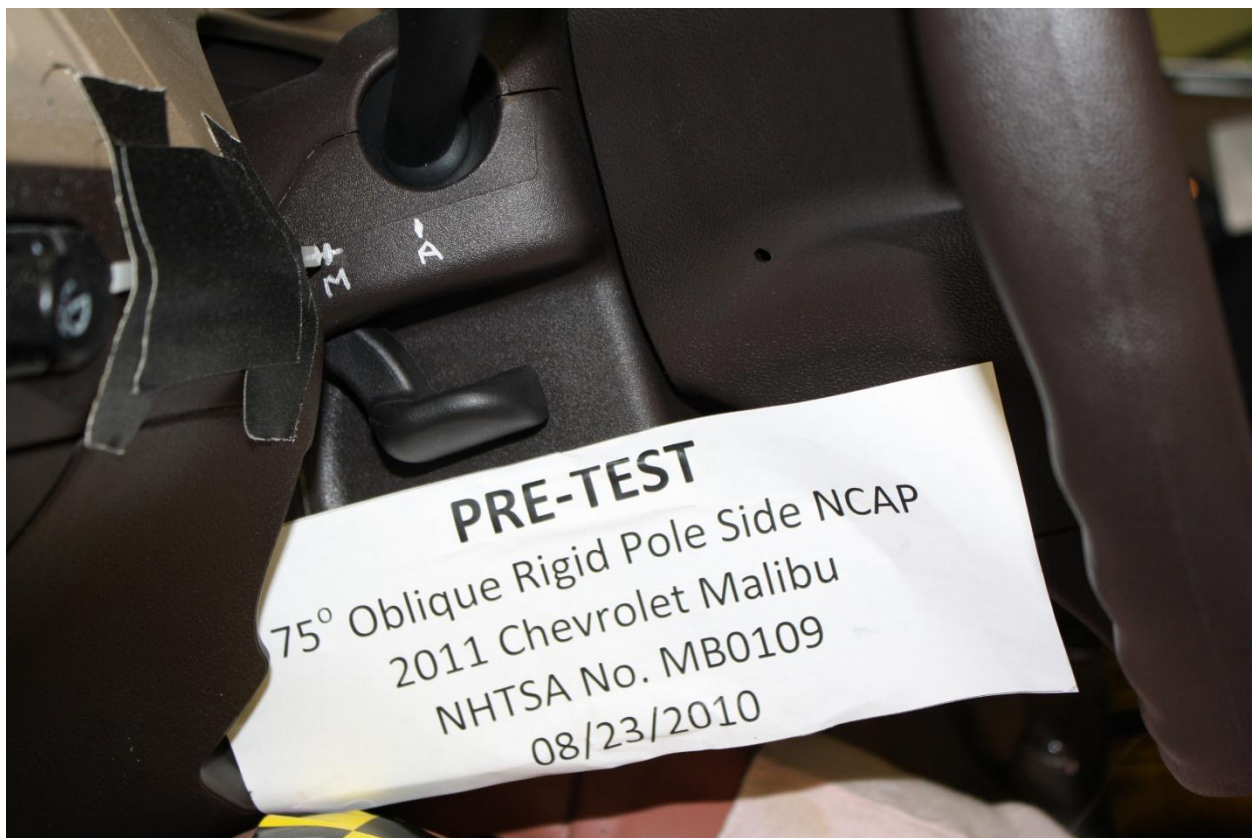


Figure A-34: Pre-Test Left Side View of Steering Wheel to Show Position

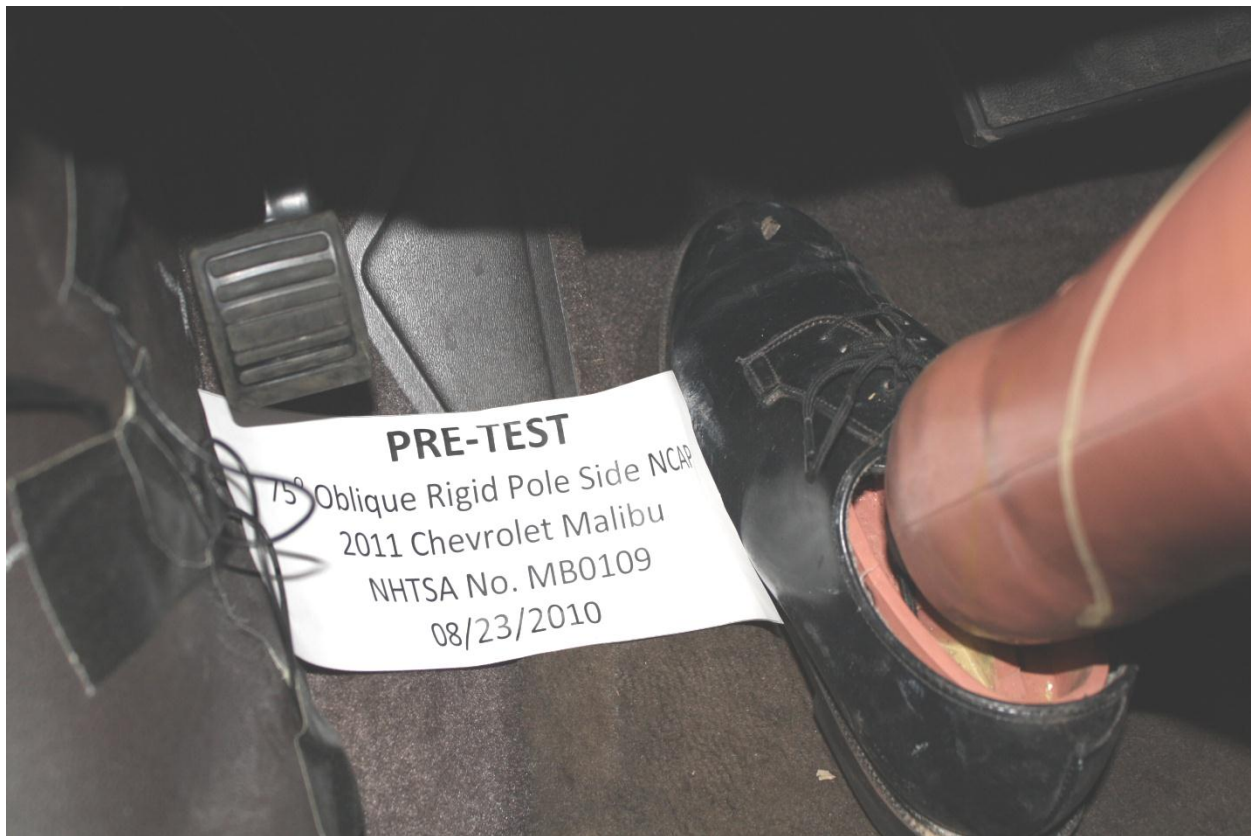


Figure A-35: Pre-Test View of Parking Brake



Figure A-36: Pre-Test Close-Up Left Side View of Driver Seat Track Showing Test Position

Photograph Not Available

Figure A-37: Pre-Test Close-Up Left Side View of Driver Seat Back Showing Test Position



Figure A-38: Pre-Test Close-Up View of Driver Seat Back or Head Restraint Showing Seat Back Test Position



Figure A-39: Pre-Test Dummy and Door Clearance View



Figure A-40: Post-Test Dummy and Door Clearance View



Figure A-41: Pre-Test Right Side View of Dummy and Front Seat Occupant Compartment



Figure A-42: Post-Test Right Side View of Dummy and Front Seat Occupant Compartment



Figure A-43: Pre-Test Inner Door Panel View



Figure A-44: Post-Test Inner Door Panel View Showing Dummy Contact Location



Figure A-45: Post-Test Dummy Close-Up Head Contact with Vehicle View

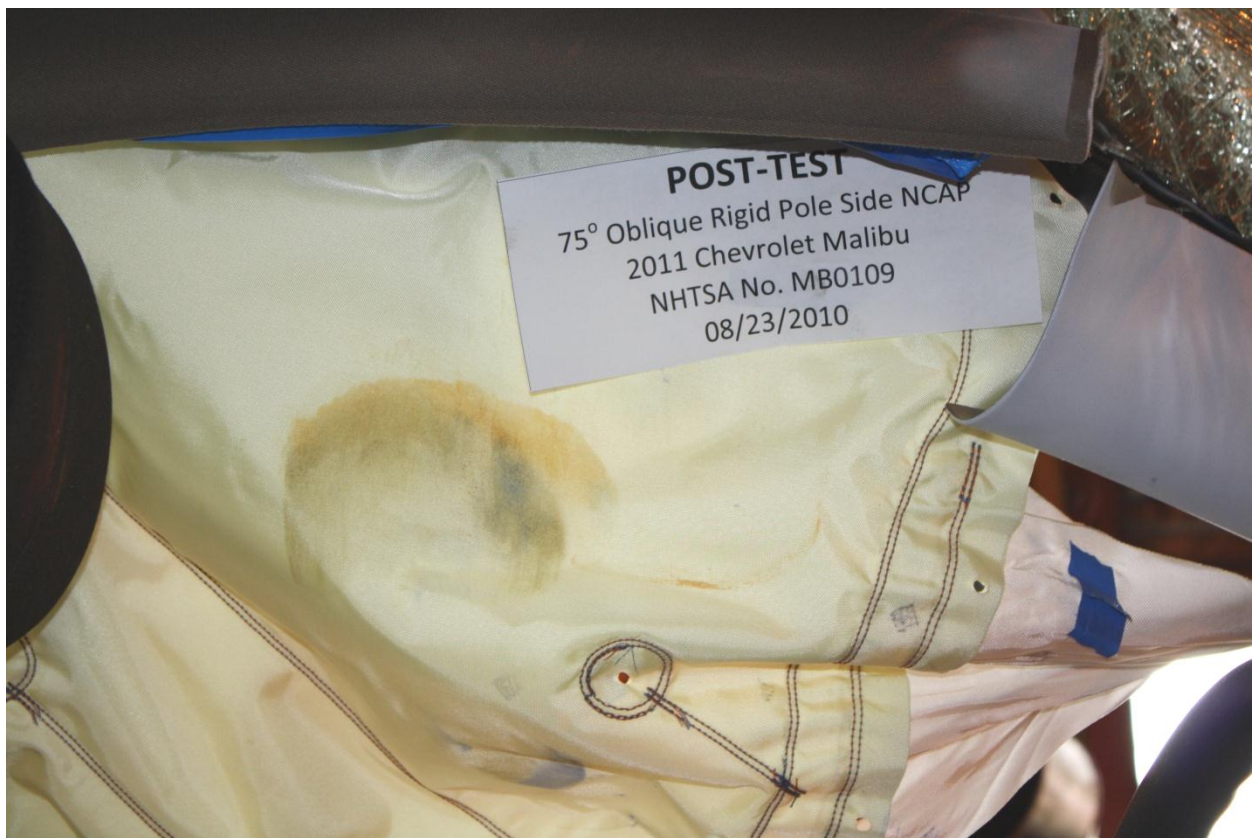


Figure A-46: Post-Test Dummy Close-Up Head Contact with Side Airbag View



Figure A-47: Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View

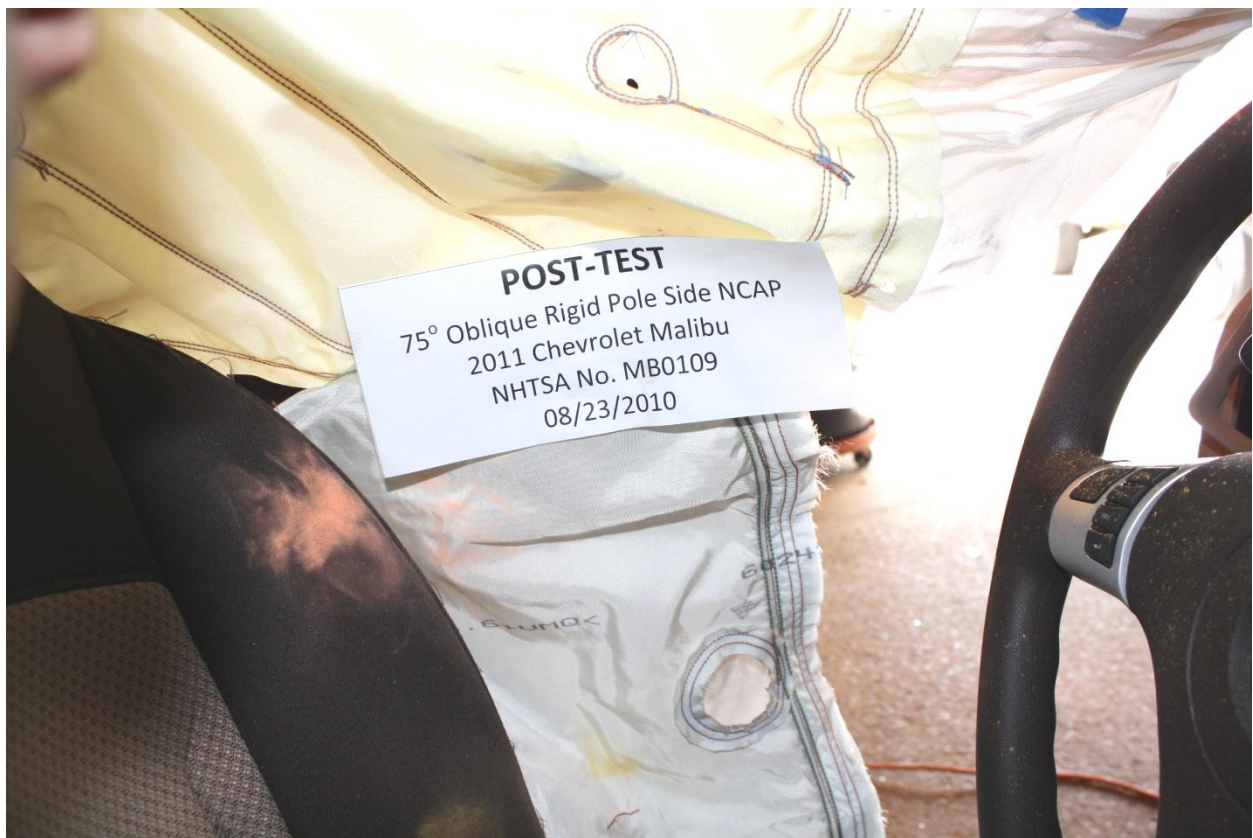


Figure A-48: Post-Test Dummy Close-Up Torso Contact with Side Airbag View



Figure A-49: Post-Test Dummy Close-Up Pelvis Contact View

Photograph Not Available – No Contact

Figure A-50: Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View

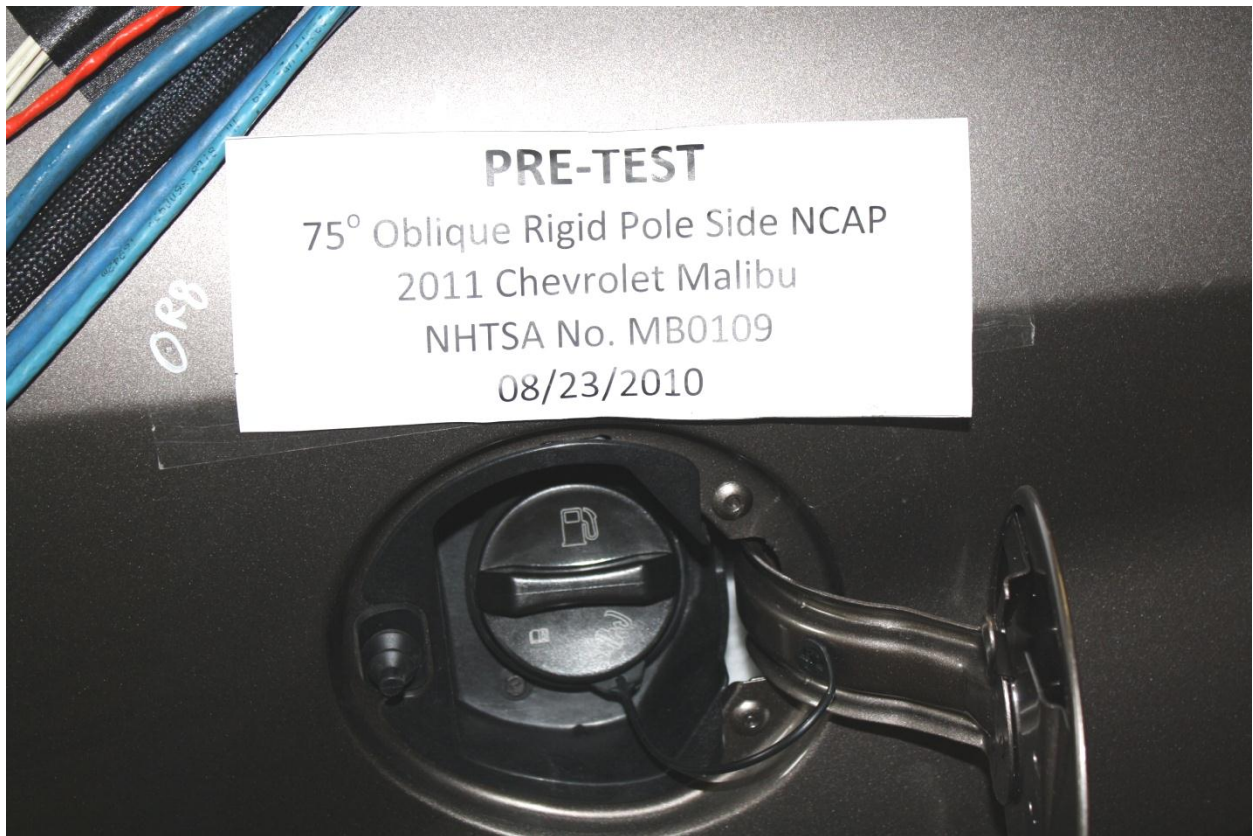


Figure A-51: Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



Figure A-52: Post-Test View of Fuel Filler Cap or Fuel Filler Neck



Figure A-53: Close-Up View of Vehicle's Certification Label



Figure A-54: Close-Up View of Vehicle's Tire Information Placard or Label

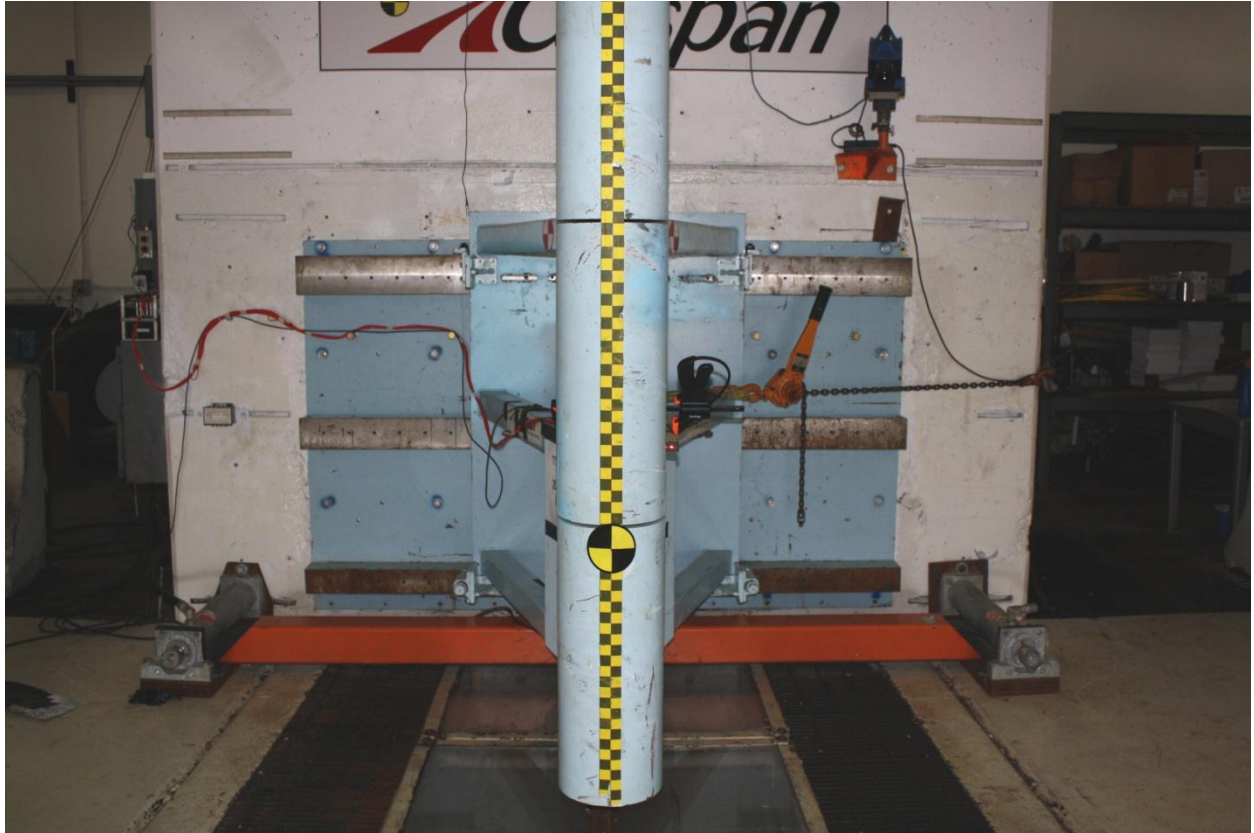


Figure A-55: Pre-Test Pole Barrier Front View

Photograph Not Available

Figure A-56: Post-Test Pole Barrier Front View

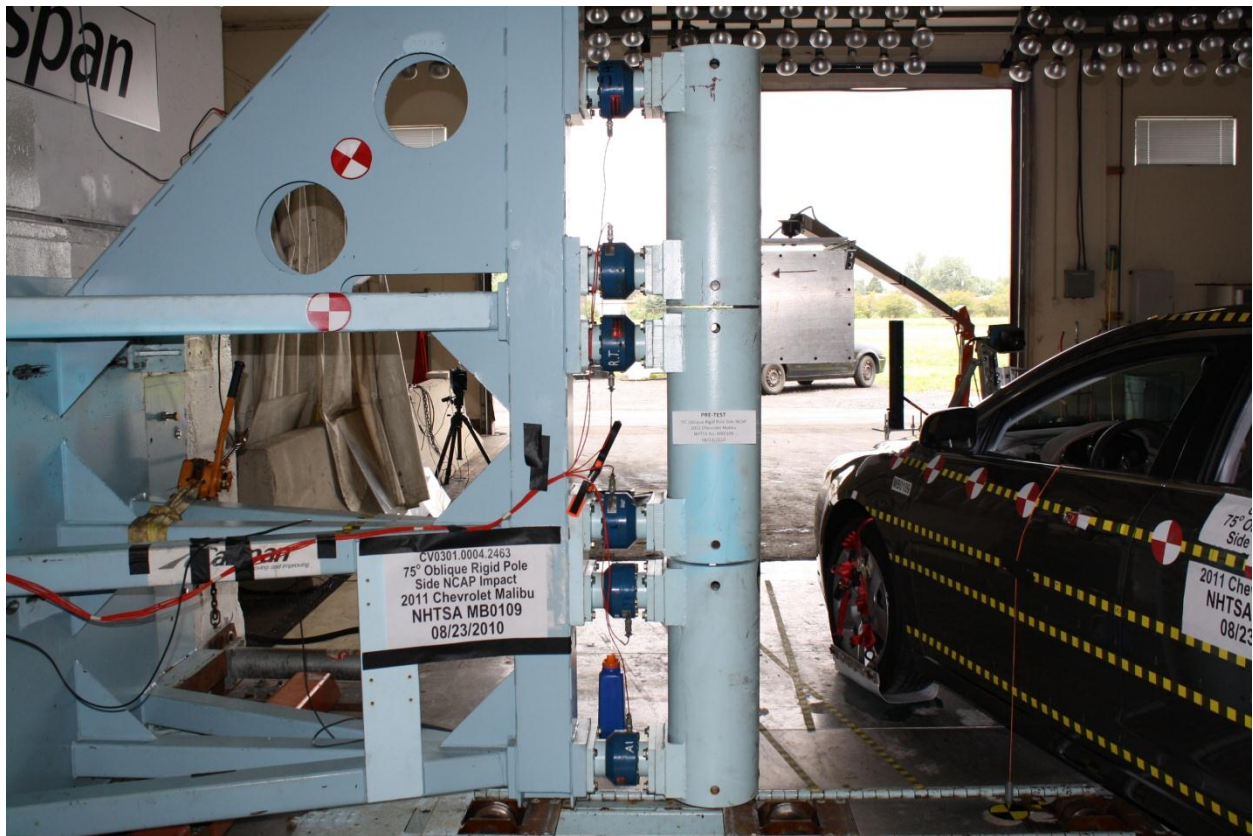


Figure A-57: Pre-Test Pole Barrier Side View

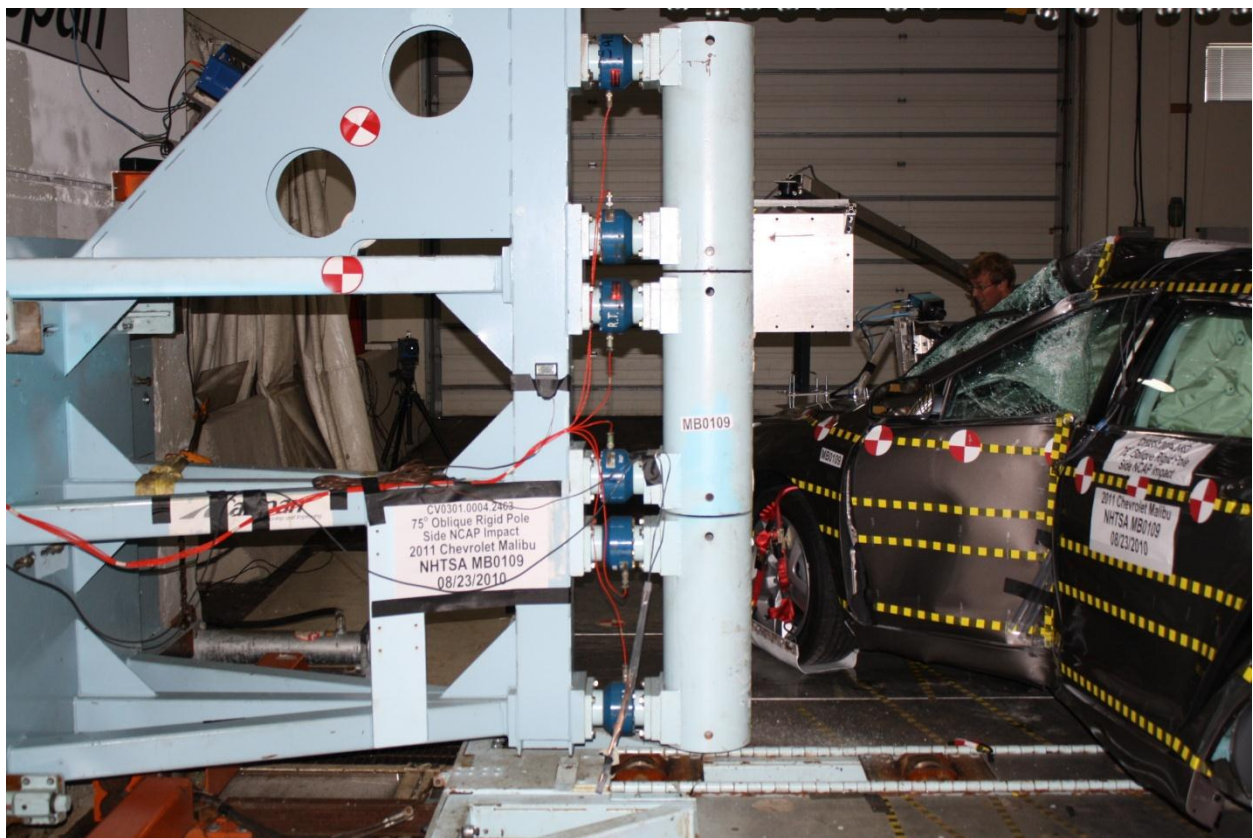


Figure A-58: Post-Test Pole Barrier Side View

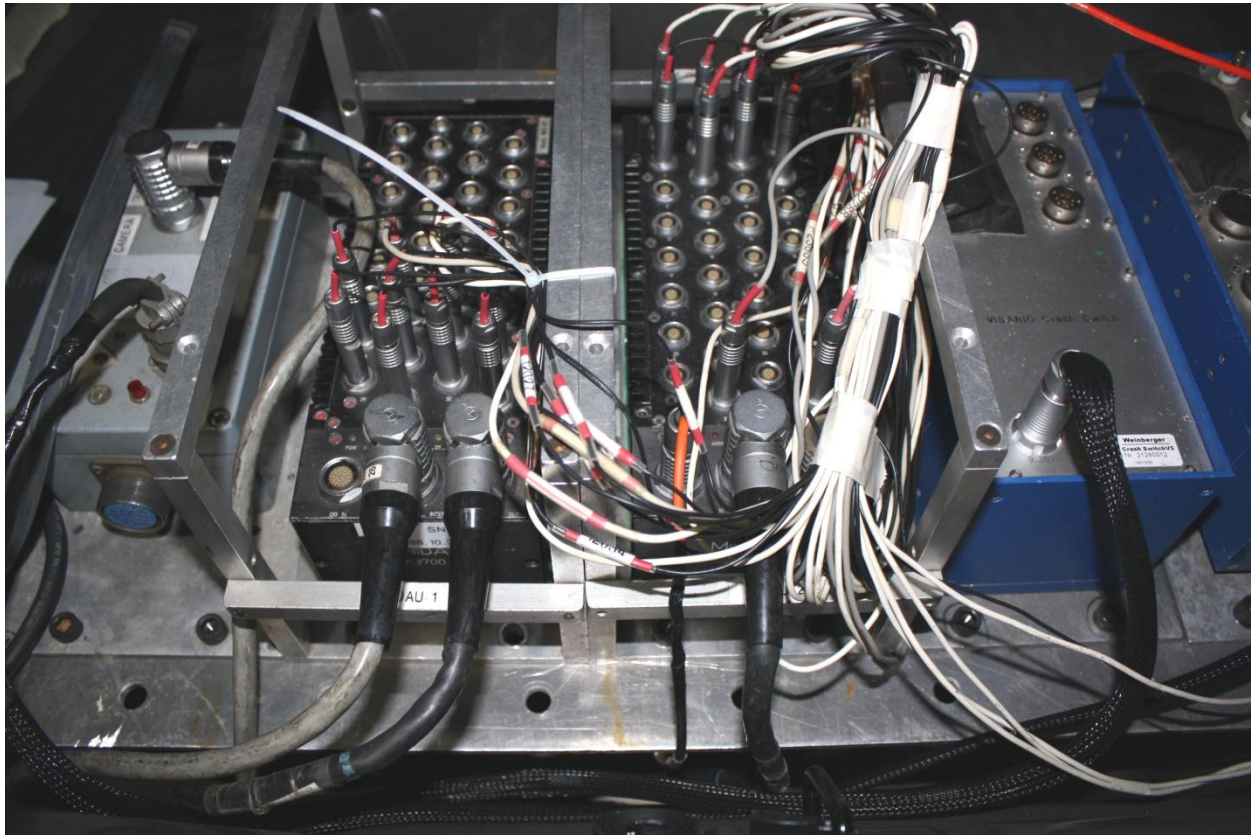


Figure A-59: Pre-Test Ballast View



Figure A-60: Post-Test Primary and Redundant Speed Trap Read-Out



Figure A-61: FMVSS No. 301 Rollover 0°



Figure A-62: FMVSS No. 301 Rollover 90°



Figure A-63: FMVSS No. 301 Rollover 180°

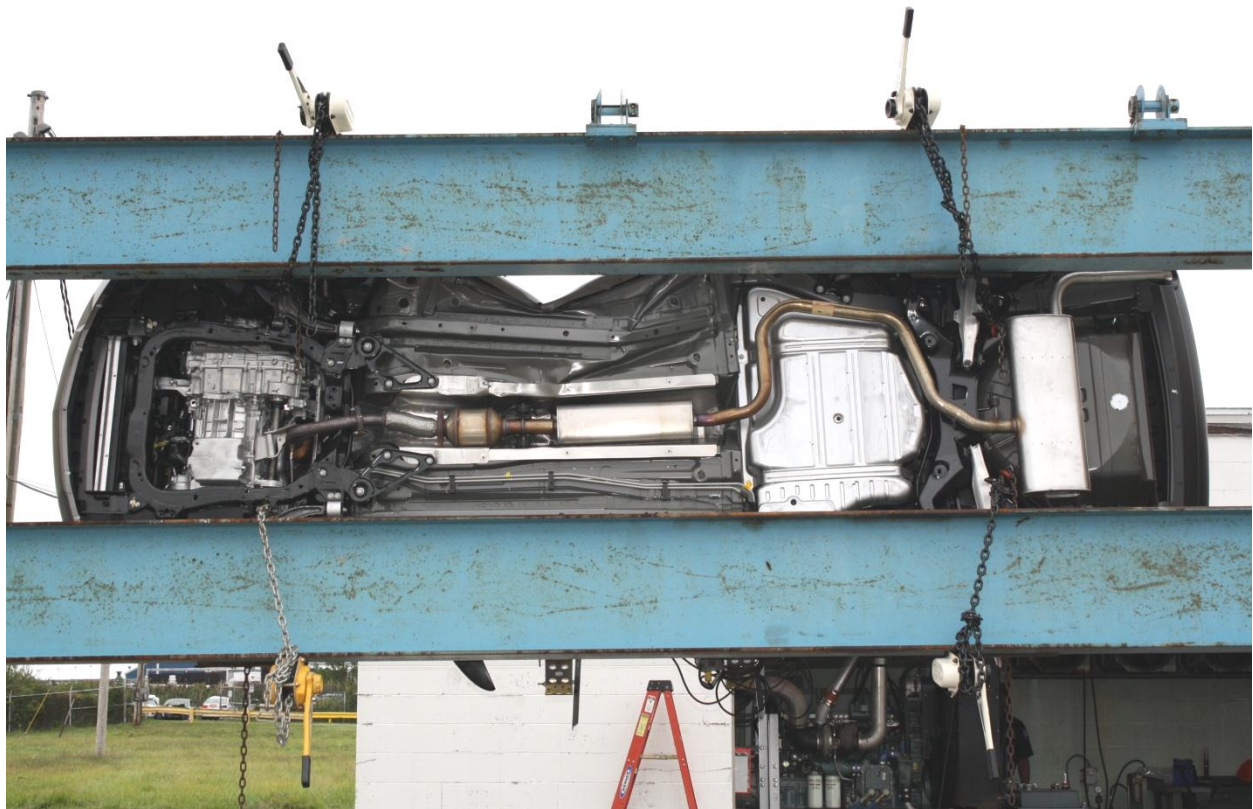


Figure A-64: FMVSS No. 301 Rollover 270°



Figure A-65: FMVSS No. 301 Rollover 360°



Figure A-66: Impact Event (Impact Side)

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

No.		Page
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2	Driver Head Acceleration (Y) Primary vs. Time	B-5
3	Driver Head Acceleration(Z) Primary vs. Time	B-5
4	Driver Head Resultant Primary vs. Time	B-5
5	Driver Lower Spine T12 Acceleration (X) vs. Time	B-6
6	Driver Lower Spine T12 Acceleration (Y) vs. Time	B-6
7	Driver Lower Spine T12 Acceleration (Z) vs. Time	B-6
8	Driver Lower Spine Y12 Resultant Acceleration vs. Time	B-6
9	Driver Iliac Wing Force on Impact Side (Y) vs. Time	B-7
10	Driver Acetabulum Force on Impact Side (Y) vs. Time	B-7
11	Driver Total Pelvis Force on Impact Side (Y) vs. Time	B-7

The following additional data for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at www.NHTSA.dot.gov.

Additional Driver Dummy Instrumentation Data

Driver Head Acceleration (X) Redundant
Driver Head Acceleration (Y) Redundant
Driver Head Acceleration (Z) Redundant
Driver Upper Thorax Rib Deflection (Y)
Driver Middle Thorax Rib Deflection (Y)
Driver Lower Thorax Rib Deflection (Y)
Driver Upper Abdomen Rib Deflection (Y)
Driver Lower Abdomen Rib Deflection (Y)
Driver Shoulder Contact Switch
Driver Torso Contact Switch
Driver Pelvis Contact Switch

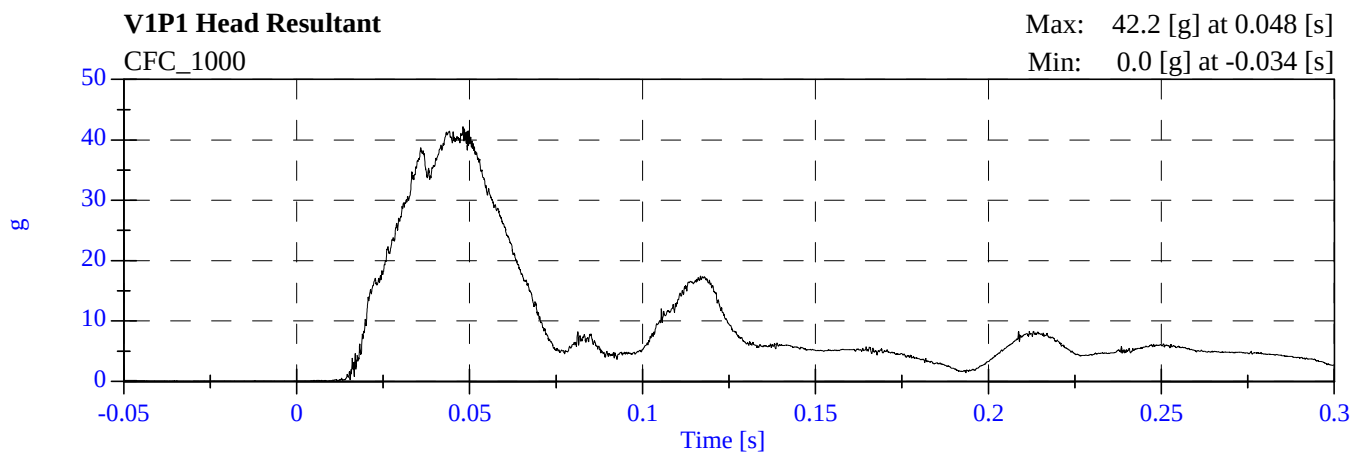
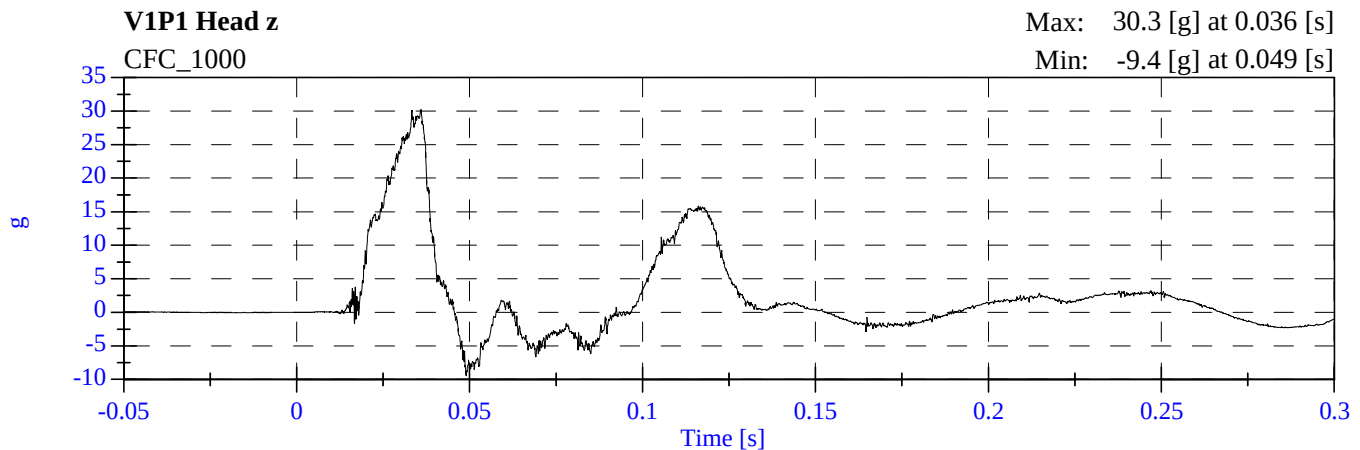
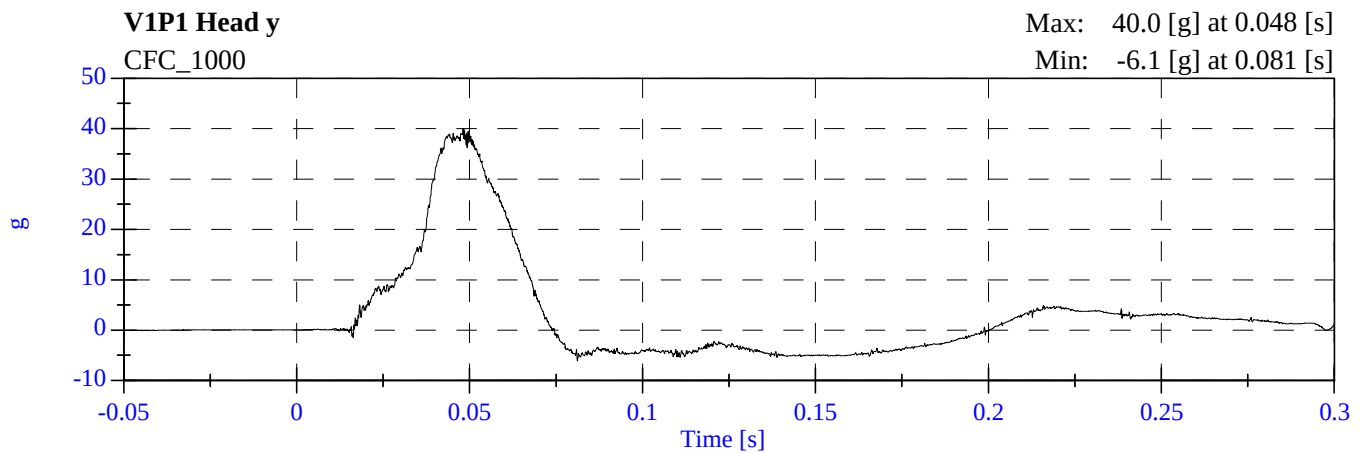
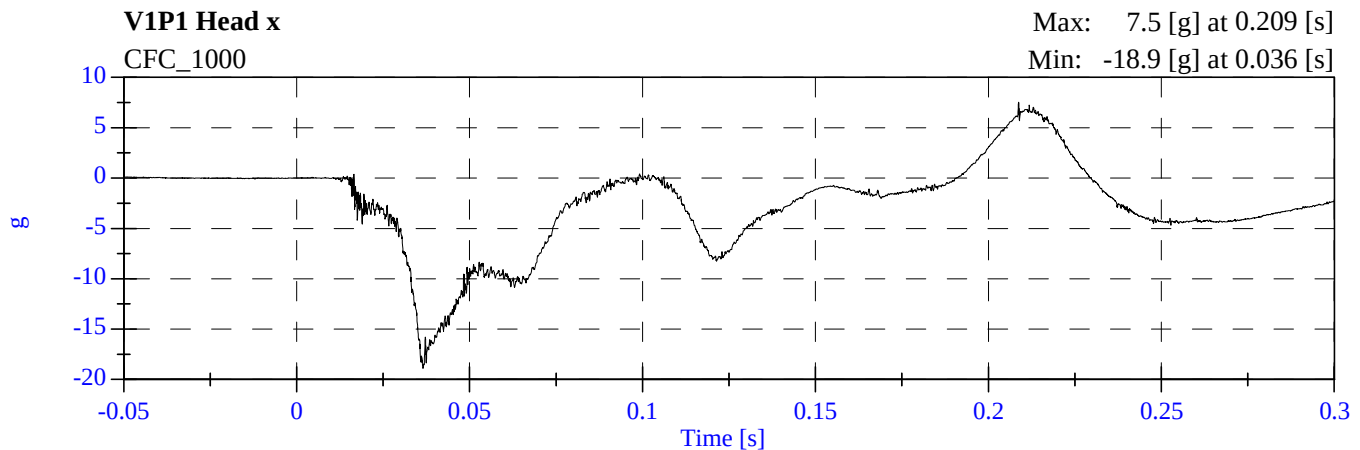
Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Vehicle Center of Gravity Angular Rate About X (Roll)
Vehicle Center of Gravity Angular Rate About Y (Pitch)
Vehicle Center of Gravity Angular Rate About Z (Yaw)
Left Floor Sill Acceleration (Y)
Left A-Pillar Sill Acceleration (Y)
Left Lower A-Pillar Acceleration (Y)
Left Mid A-Pillar Acceleration (Y)
Left B-Pillar Sill Acceleration (Y)
Left Lower B-Pillar Acceleration (Y)
Left Mid B-Pillar Acceleration (Y)
Driver Seat Track at Dummy H-Point Acceleration (Y)
Engine Top Acceleration (X)
Engine Top Acceleration (Y)
Firewall Center Acceleration (Y)
Right Roof at Vertical Impact Reference Line Acceleration (Y)
Right Sill at Vertical Impact Reference Line Acceleration (Y)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)
Driver Side Airbag Timing
Driver Side Curtain Airbag Timing

Pole Instrumentation Data

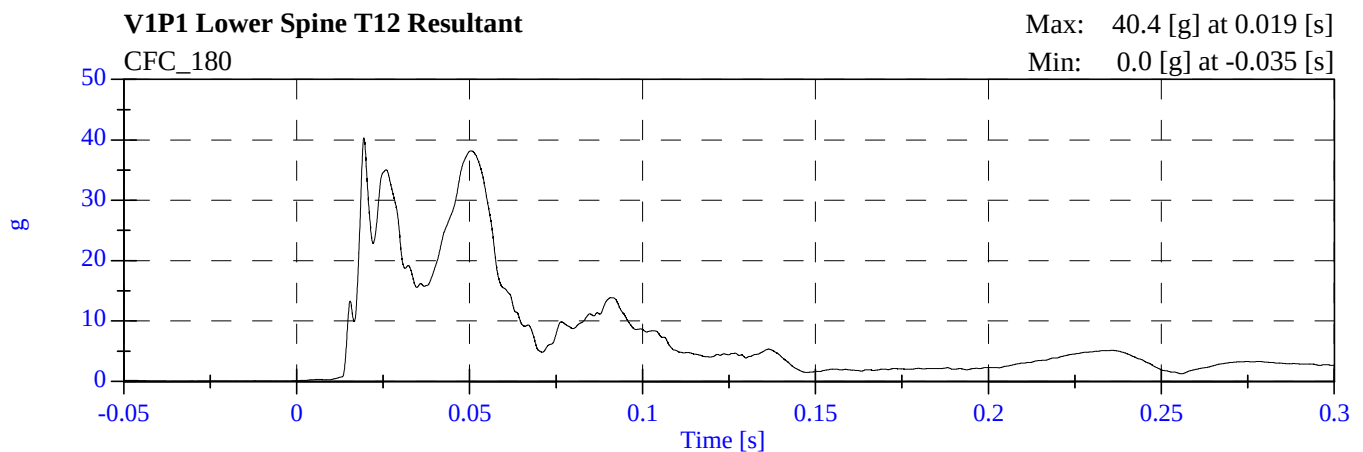
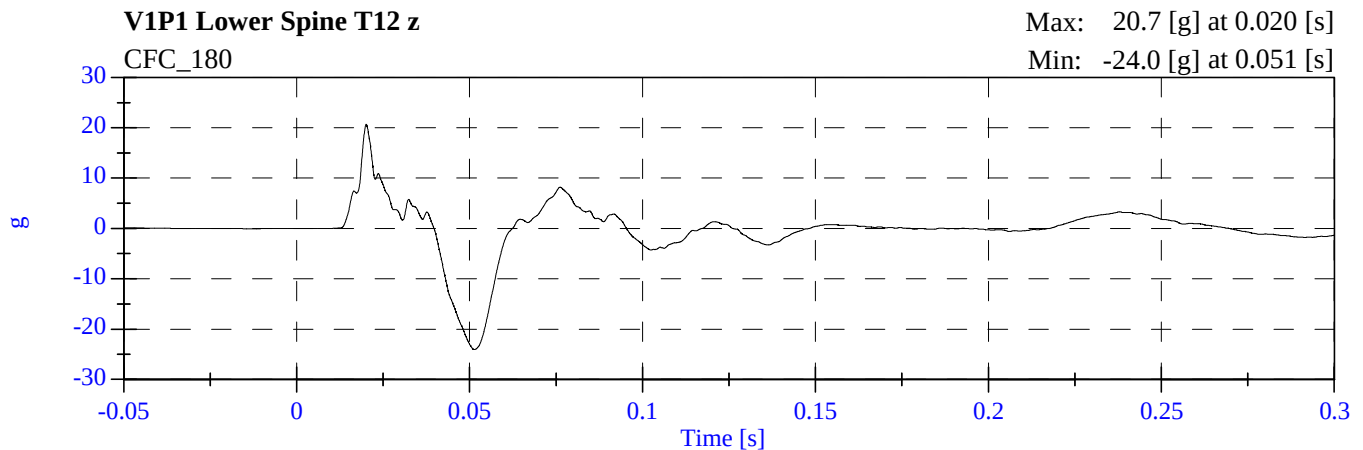
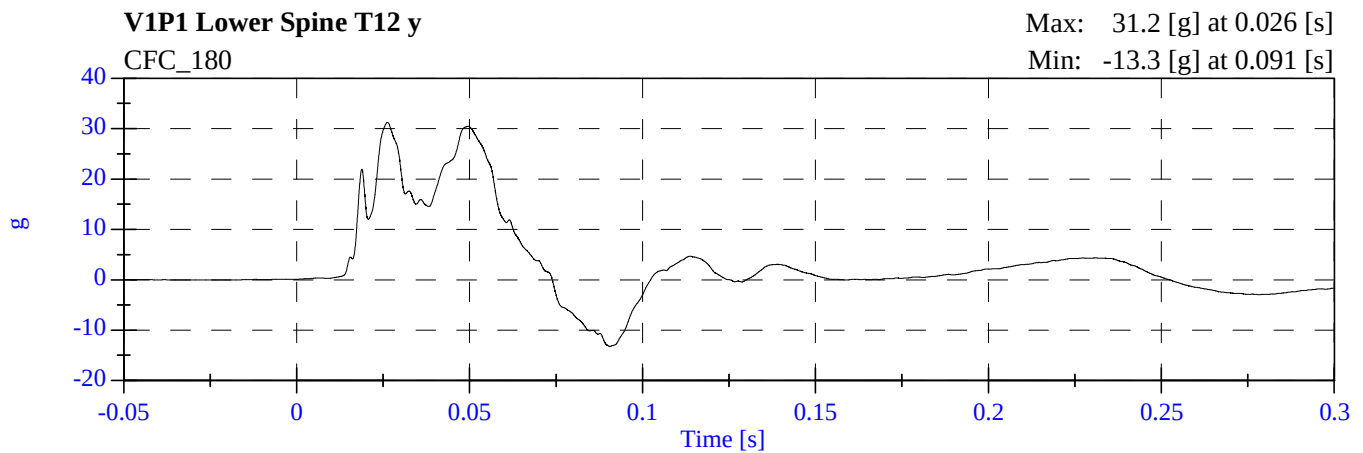
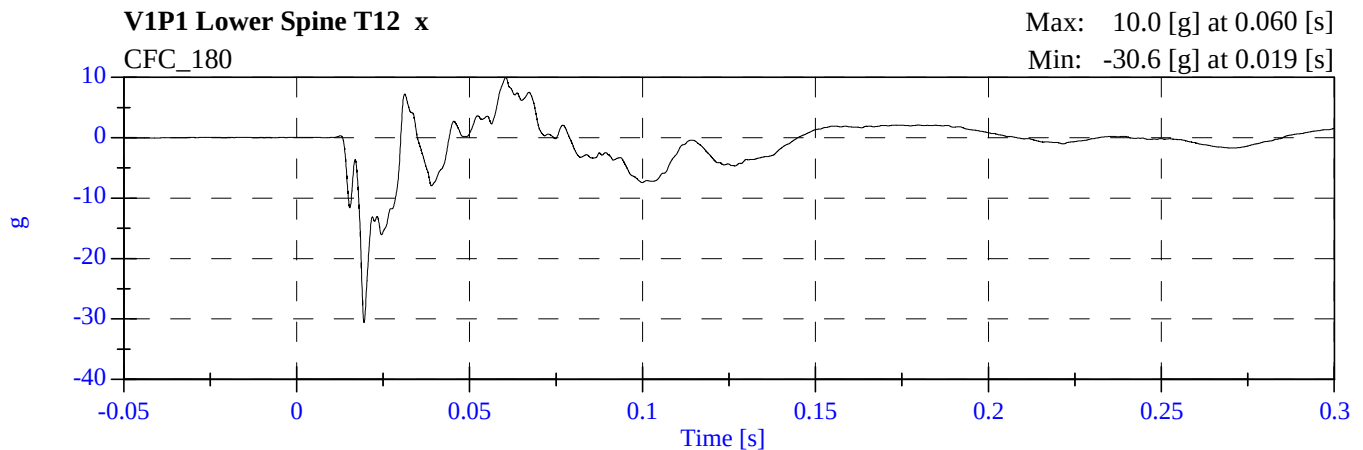
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Load Cell Pole Barrier #2 Force (Y)
Load Cell Pole Barrier #3 Force (Y)
Load Cell Pole Barrier #4 Force (Y)
Load Cell Pole Barrier #5 Force (Y)
Load Cell Pole Barrier #6 Force (Y)
Load Cell Pole Barrier #7 Force (Y)
Load Cell Pole Barrier #8 Force (Y)

Side Pole NCAP 2011 Chevrolet Malibu MB0109 - August 23, 2010

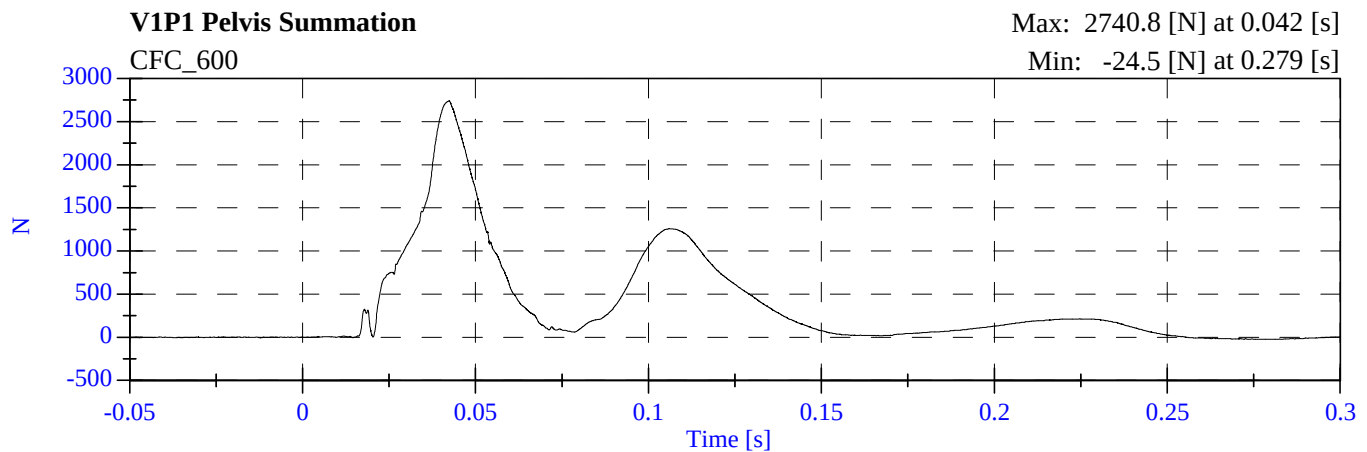
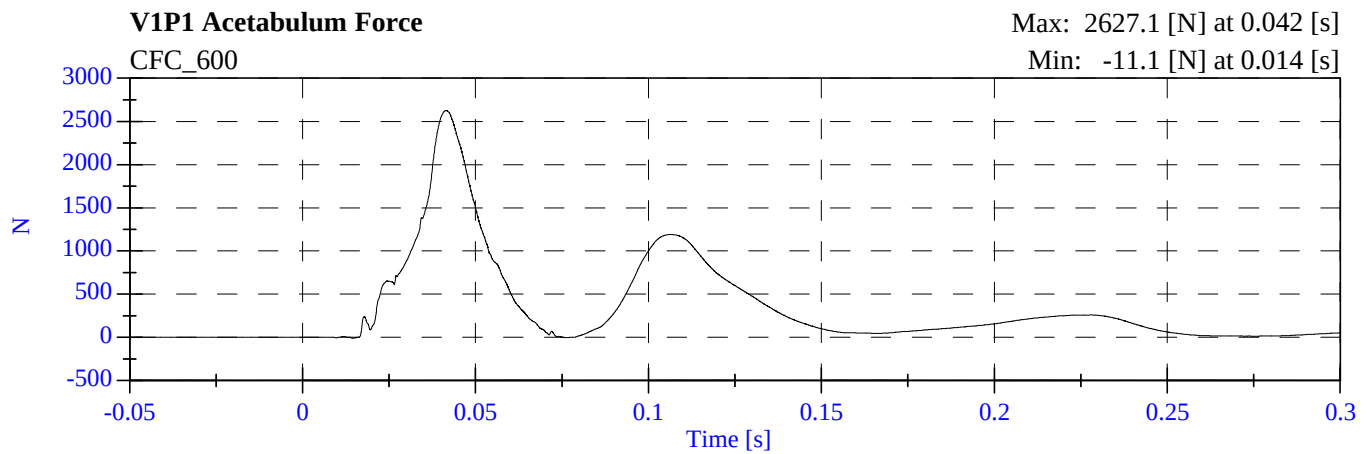
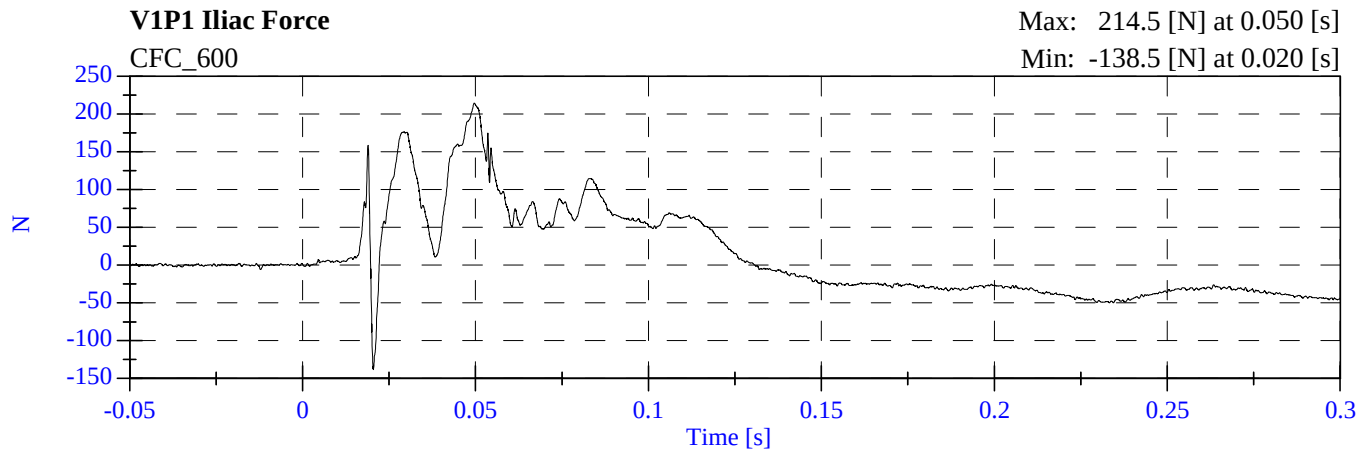


Side Pole NCAP 2011 Chevrolet Malibu

MB0109 - August 23, 2010



Side Pole NCAP 2011 Chevrolet Malibu MB0109 - August 23, 2010



APPENDIX C
DUMMY CALIBRATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

SID-IIs No: 304

CONFIGURED FOR LEFT SIDE IMPACT

SID-IIsD External Measurements

NHTSA ATD S/N 304

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	778	Yes
B	Shoulder Pivot Height	437.0 - 453.0	439	Yes
C	H-Point Height	79.0 - 89.0	83	Yes
D	H-Point from Seat Back	141.0 - 151.0	146	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	104	Yes
F	Thigh Clearance	119.0 - 135.0	126	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	43	Yes
I	Head Depth	178.0 - 188.0	182	Yes
J	Head Circumference	541.0 - 551.0	546	Yes
K	Buttock to Knee Length	514.0 - 540.0	528	Yes
L	Popliteal Height	343.0 - 369.0	353	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	398	Yes
N	Buttock Popliteal Length	416.0 - 442.0	428	Yes
O	Chest Depth without Jacket	195.0 - 211.0	204	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	318	Yes
R	Arm Length	249.0 - 259.0	251	Yes
S	Knee Joint to Seat back	478.0 - 493.0	485	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	353	Yes
W	Foot Width (right)	78.0 - 94.0	80	Yes
W	Foot Width (left)	78.0 - 94.0	80	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	870	Yes
Z	Waist Circumference	761.0 - 791.0	782	Yes

Technician: A. Rudniski

Date: 8/18/2010



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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 304		
Test ID:	Head Drop	Test Date:	8/16/2010
Test Number:	1	Test Time:	5:44:10 PM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	53 %RH P
Resultant Acceleration	115.0 -- 137.0	121.6 g P
Oscillation	0.0 -- 15.0	6.3 % P
Fore-Aft Acceleration	-15.0 -- 15.0	6.8 g P

All test parameters are within specifications

Technician: A. Rudniski Signature: _____

Supervisor: D. Travale Signature: _____

Test ID: **Head Drop**

Test Time: **5:44:10 PM**

Test Date: **8/16/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P58737	3/25/2010
Endevco	7264-2000	P52100	3/25/2010
Endevco	7264-2000	P52099	3/25/2010

Test ID: **Head Drop**

Test Time: **5:44:10 PM**

Test Date: **8/16/2010**

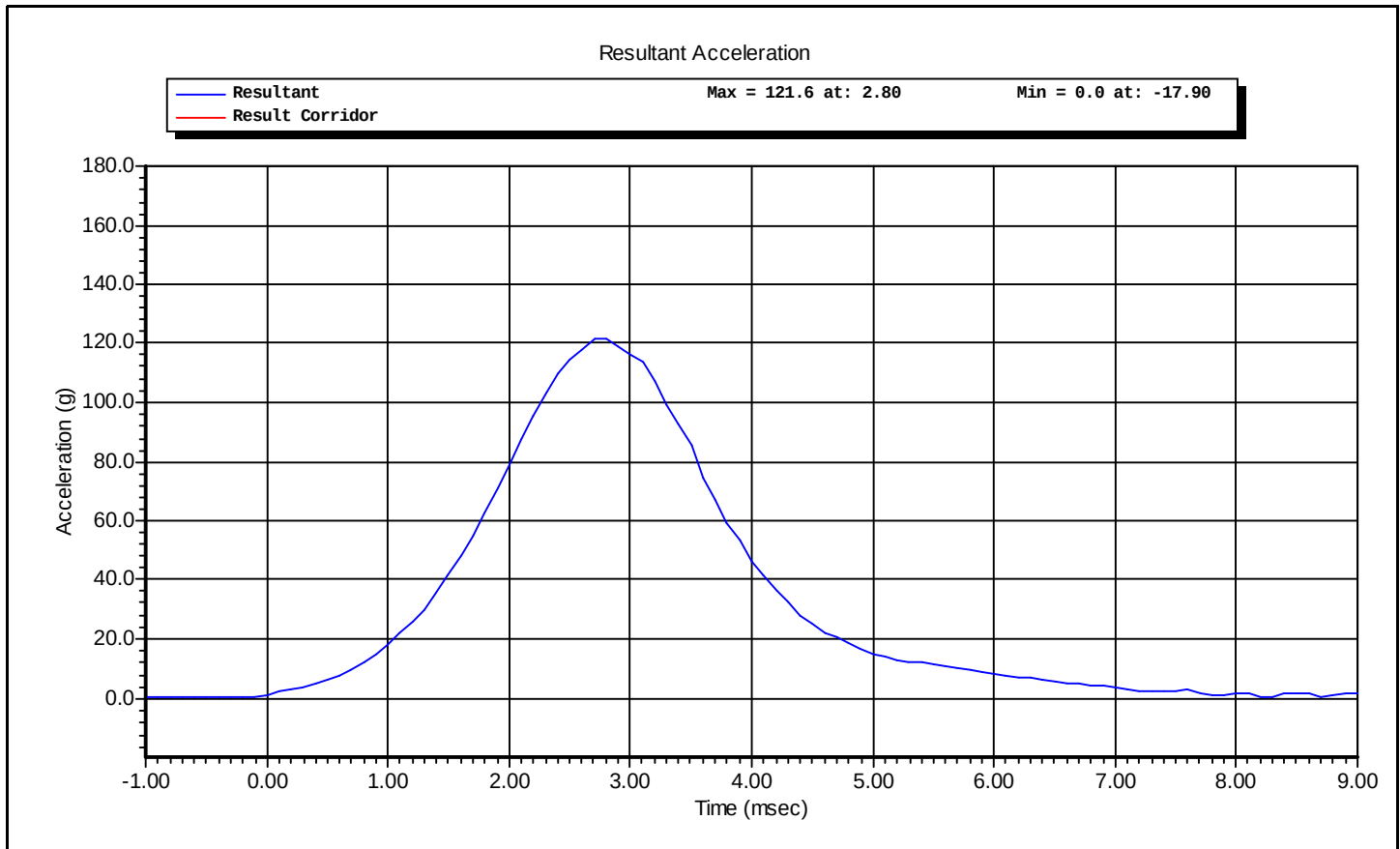


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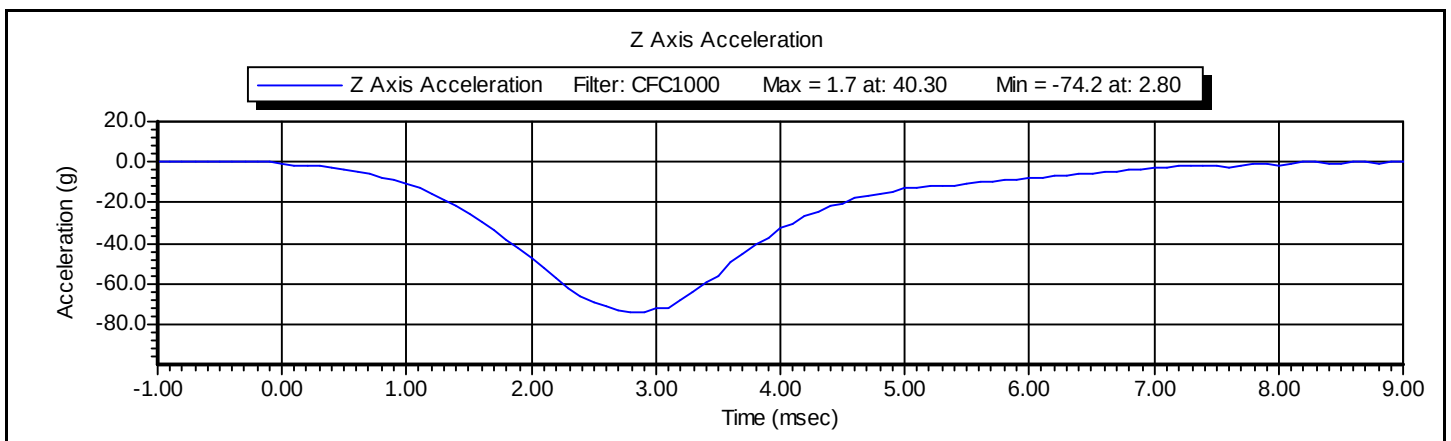
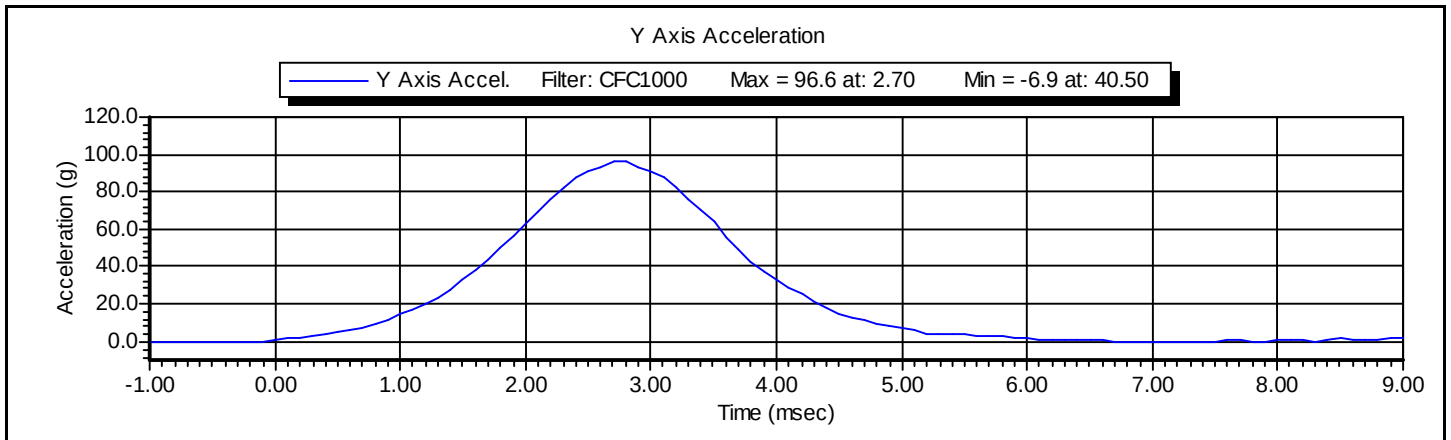
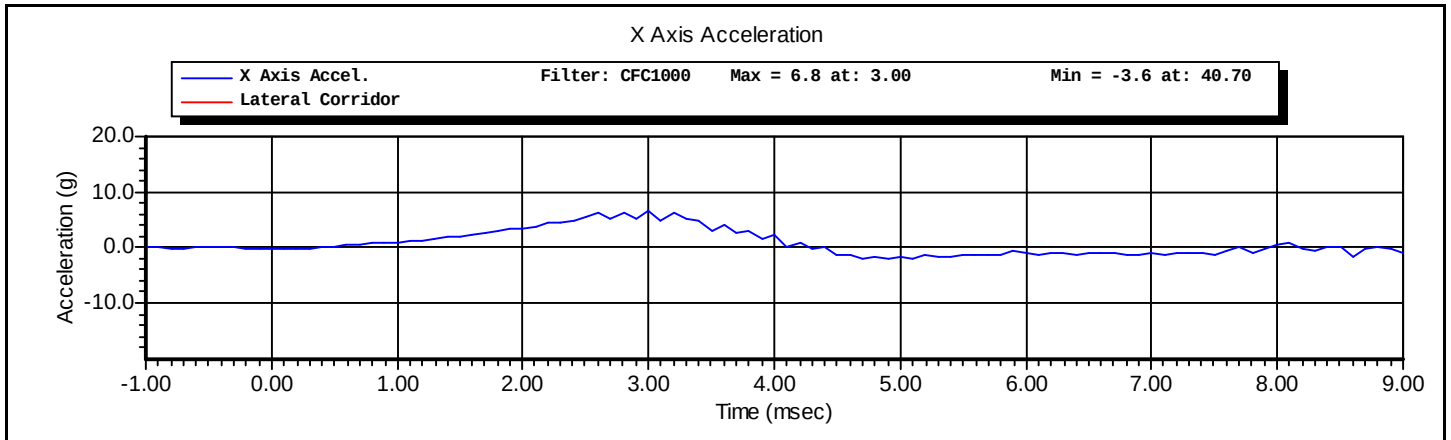
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 304		
Test ID:	Head Drop	Test Date:	8/16/2010
Test Number:	1	Test Time:	5:44:10 PM



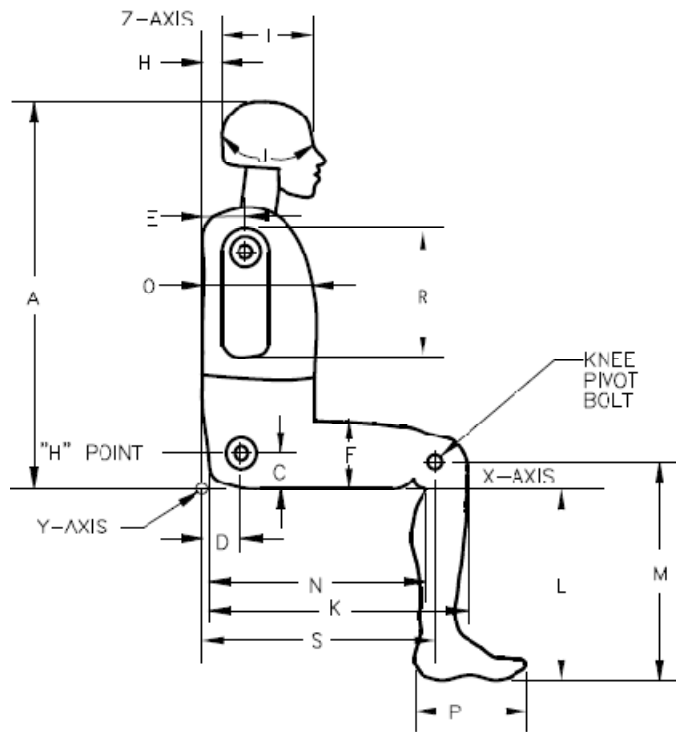
Test ID: Head Drop

Test Time: 5:44:10 PM

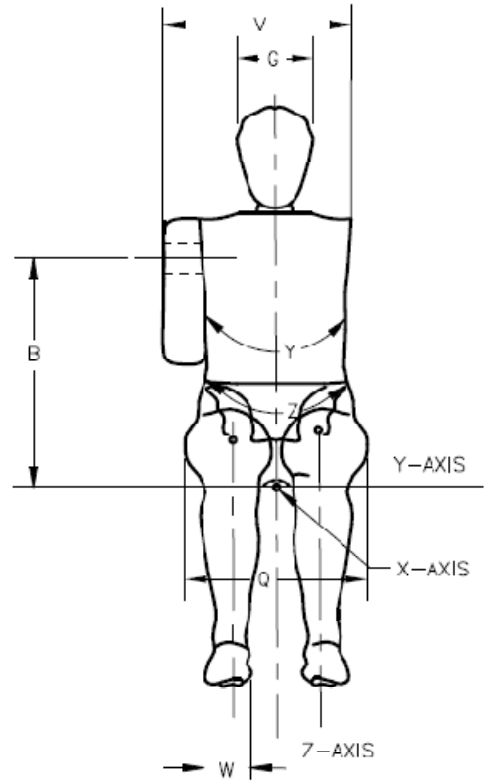
Test Date: 8/16/2010



SID-IIsD External Dimension Reference Diagram



SIDE VIEW



FRONT VIEW



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VERIFICATION REPORT

Test Name:	Neck Pendulum	Revision:	8/24/2009
Sub Test Name:	Left Side	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 304		
Test ID:	Neck Flexion	Test Date:	8/16/2010
Test Number:	2	Test Time:	6:25:39 PM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	50 %RH P
Velocity	5.51 -- 5.63	5.53 m/s P
Pendulum Impulse at 10 ms	2.20 -- 2.80	2.23 m/s P
Pendulum Impulse at 15 ms	3.30 -- 4.10	3.34 m/s P
Pendulum Impulse at 20 ms	4.40 -- 5.40	4.67 m/s P
Pendulum Impulse at 25 ms	5.40 -- 6.10	5.66 m/s P
Pendulum Impulse between 25 and 100 ms	5.50 -- 6.20	5.89 m/s P
Max D Plane Rotation	71.0 -- 81.0	73.2 degrees P
Time at Max Rotation	50.0 -- 70.0	62.9 ms P
Moment about OC	-44.0 -- -36.0	-40.0 Nm P
Moment Decay to Zero	102.0 -- 126.0	116.5 ms P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

Test ID: **Neck Flexion**

Test Time: **6:25:39 PM**

Test Date: **8/16/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
Denton	1716A	LC-576 Fy	2/15/2010
Denton	1716A	LC-576 Mx	2/15/2010
DentonATD	78051-342	184	4/30/2010
DentonATD	78051-342	174	4/30/2010
DentonATD	78051-342	185	4/30/2010

Test ID: **Neck Flexion**

Test Time: **6:25:39 PM**

Test Date: **8/16/2010**



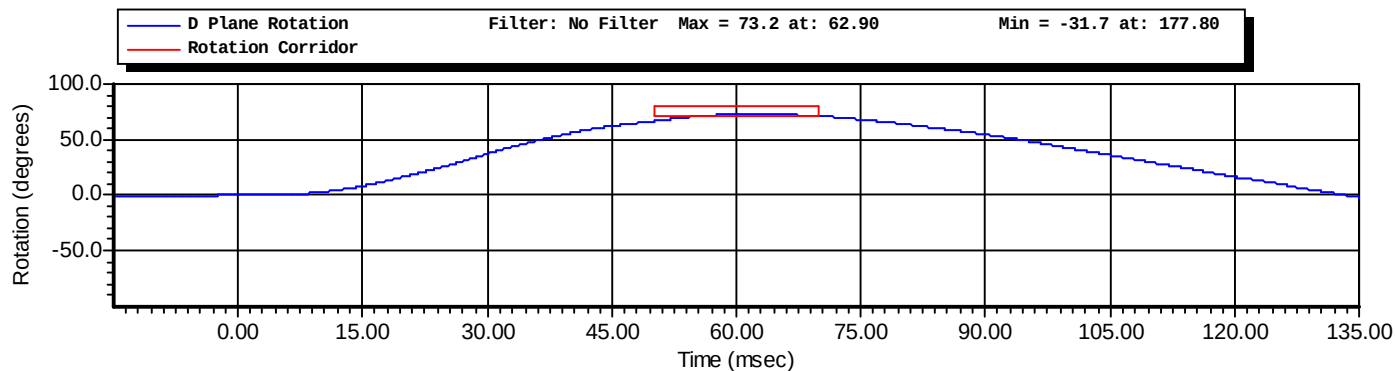
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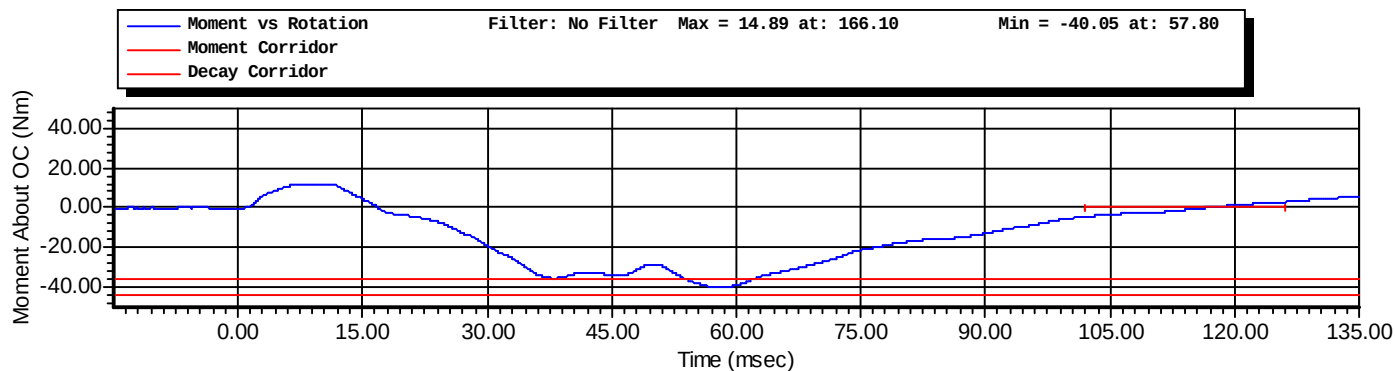
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Test Name:	Neck Pendulum	Revision:	8/24/2009
Sub Test Name:	Left Side	Spec Type:	NHTSA
ATD Type:	SID-IIIs		
ATD Serial Number:	SID 304		
Test ID:	Neck Flexion	Test Date:	8/16/2010
Test Number:	2	Test Time:	6:25:39 PM

D Plane Rotation



Moment About Occipital Condyle

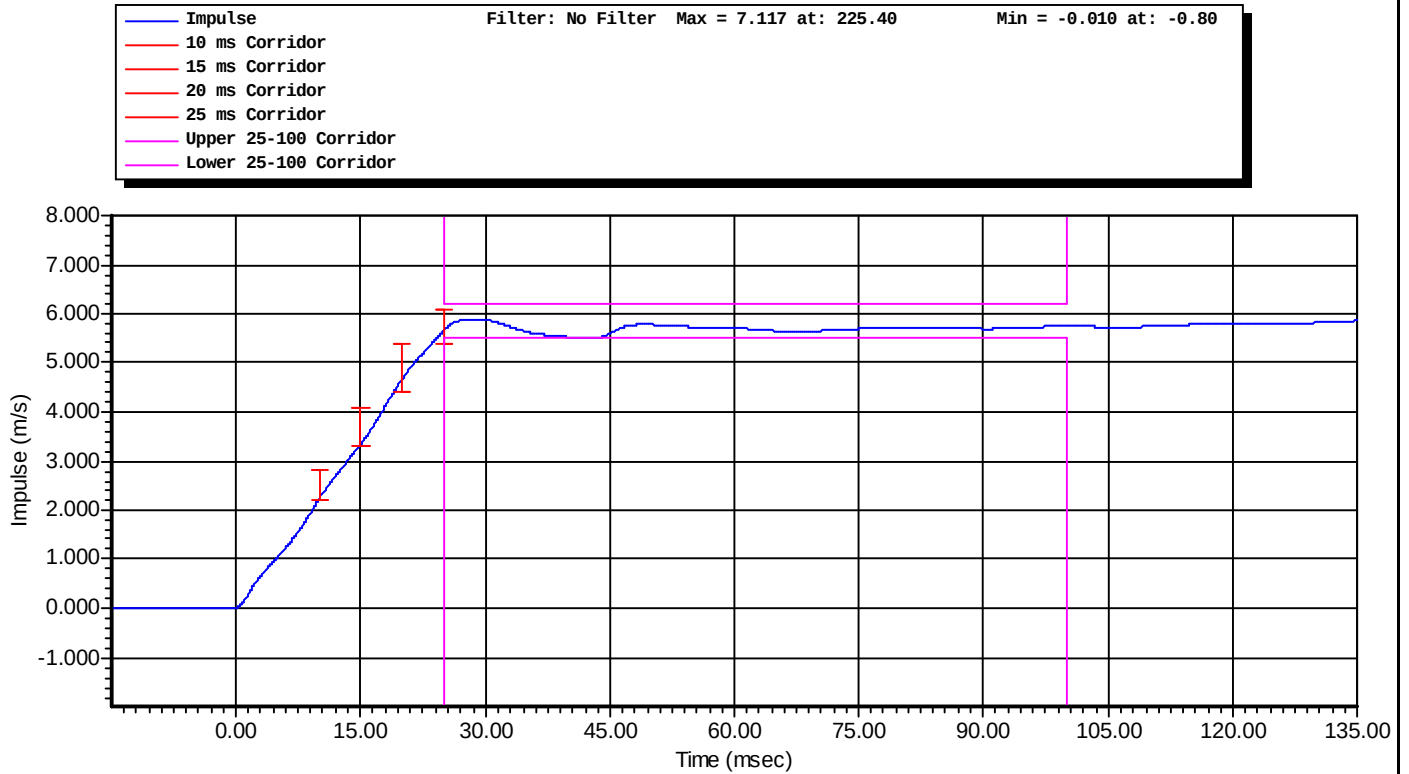


Test ID: Neck Flexion

Test Time: 6:25:39 PM

Test Date: 8/16/2010

Pendulum Impulse





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VERIFICATION REPORT

Test Name:	Shoulder Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 303		
Test ID:	Shoulder	Test Date:	8/18/2010
Test Number:	1	Test Time:	9:59:42 AM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.20 deg C P
Humidity	10.0 -- 70.0	57.0 %RH P
Velocity	4.20 -- 4.40	4.35 m/s P
Probe Acceleration	13.0 -- 18.0	15.8 g P
Shoulder Deflection	28.0 -- 37.0	31.56 mm P
T1 Acceleration	17.0 -- 22.0	20.4 g P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____
Supervisor: **D. Travale** Signature: _____

Test ID: **Shoulder**

Test Time: **9:59:42 AM**

Test Date: **8/18/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66927	4/20/2010
Servo	180-3885	DS-1154	3/26/2010
Endevco	7264-2000	P58884	3/29/2010

Test ID: **Shoulder**

Test Time: **9:59:42 AM**

Test Date: **8/18/2010**

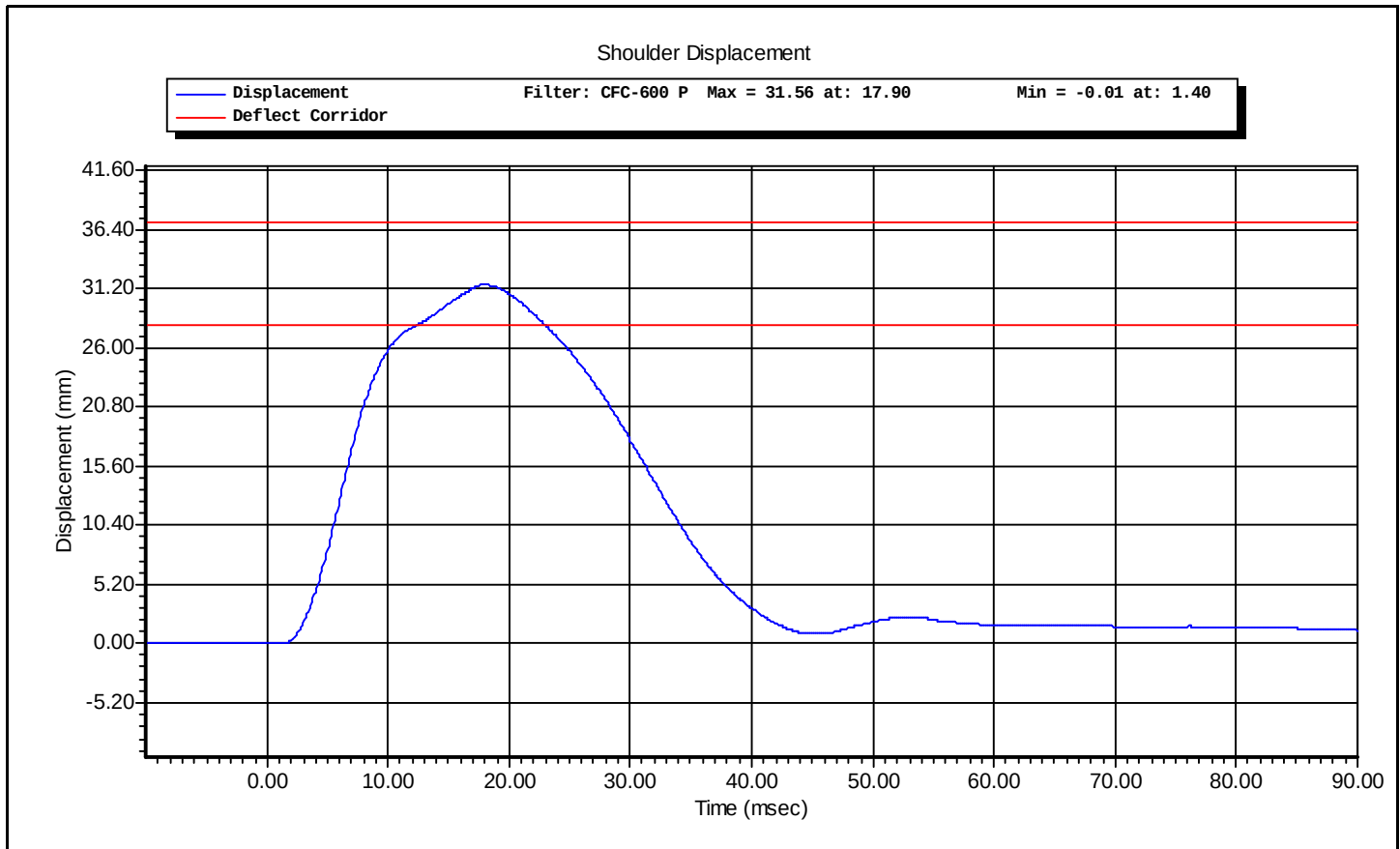


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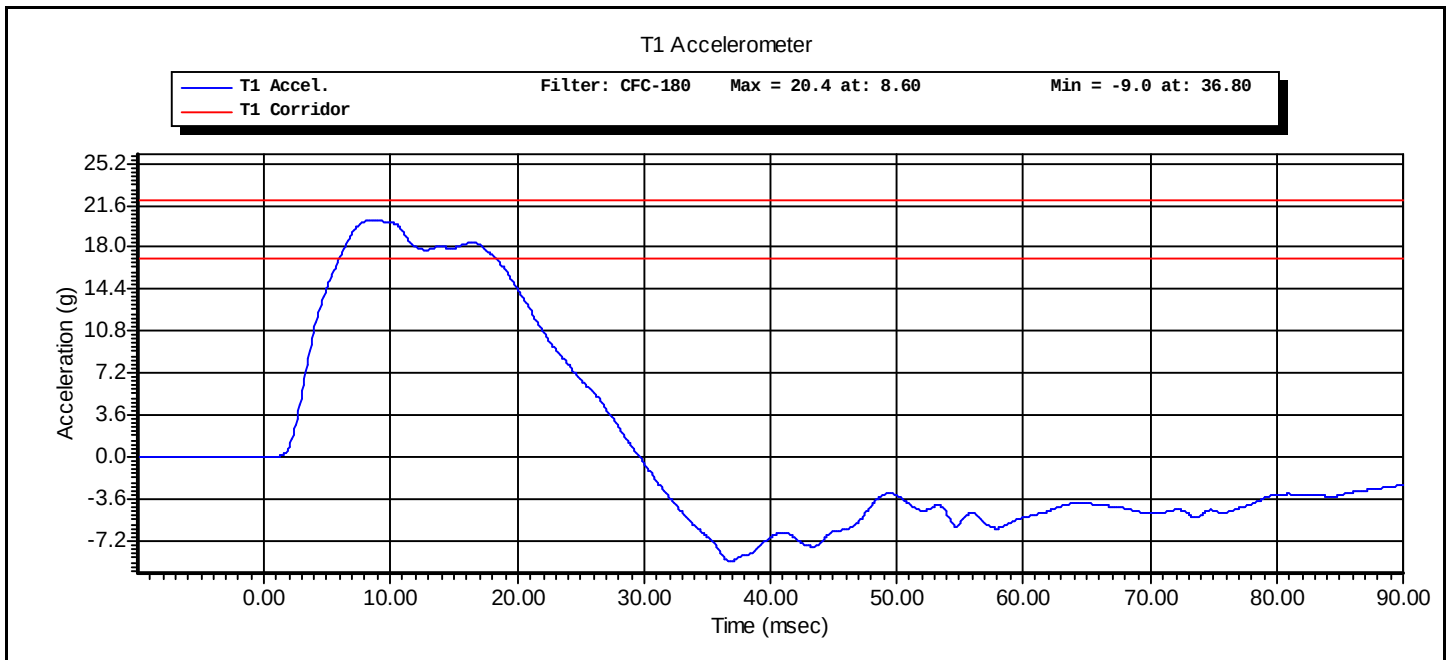
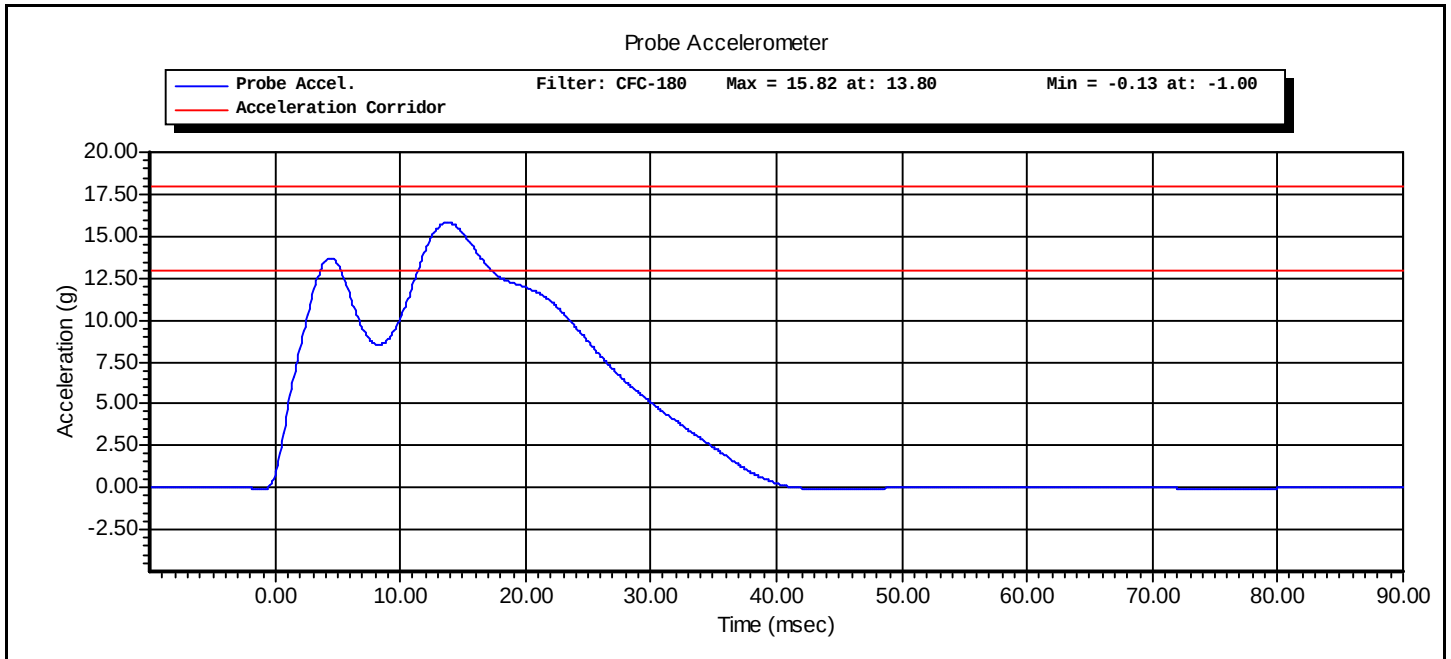
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 303		
Test ID:	Shoulder	Test Date:	8/18/2010
Test Number:	1	Test Time:	9:59:42 AM



Test ID: **Shoulder**

Test Time: **9:59:42 AM**

Test Date: **8/18/2010**





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VERIFICATION REPORT

Test Name:	Thorax Impact with Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 304		
Test ID:	Thorax With Arm	Test Date:	8/18/2010
Test Number:	1	Test Time:	12:55:37 PM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	22.2 deg C	P
Humidity	10	--	70	52 %RH	P
Velocity	6.60	--	6.80	6.68 m/s	P
Probe Acceleration after 5ms	30.0	--	36.0	33.6 g	P
Upper Thorax Rib Deflection	25.0	--	32.0	27.8 mm	P
Mid Thorax Rib Deflection	30.0	--	36.0	31.6 mm	P
Lower Thorax Rib Deflection	32.0	--	38.0	33.4 mm	P
Upper Spine Acceleration ("y")	34.0	--	43.0	42.3 g	P
Lower Spine Acceleration ("y")	29.0	--	37.0	34.2 g	P
Shoulder Deflection	31.0	--	40.0	36.6 mm	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____
Supervisor: **D. Travale** Signature: _____

Test ID: **Thorax With Arm** Test Time: **12:55:37 PM**

Test Date: **8/18/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66927	4/20/2010
Servo	180-3885	DS-1188	3/26/2010
Servo	180-3885	DS-1269	3/26/2010
Servo	180-3885	DS-1260	3/26/2010
Endevco	7264-2000	P58884	3/29/2010
Endevco	7264-2000	P58839	3/29/2010
Servo	180-3885	DS-1154	3/26/2010

Test ID: **Thorax With Arm** Test Time: **12:55:37 PM**

Test Date: **8/18/2010**

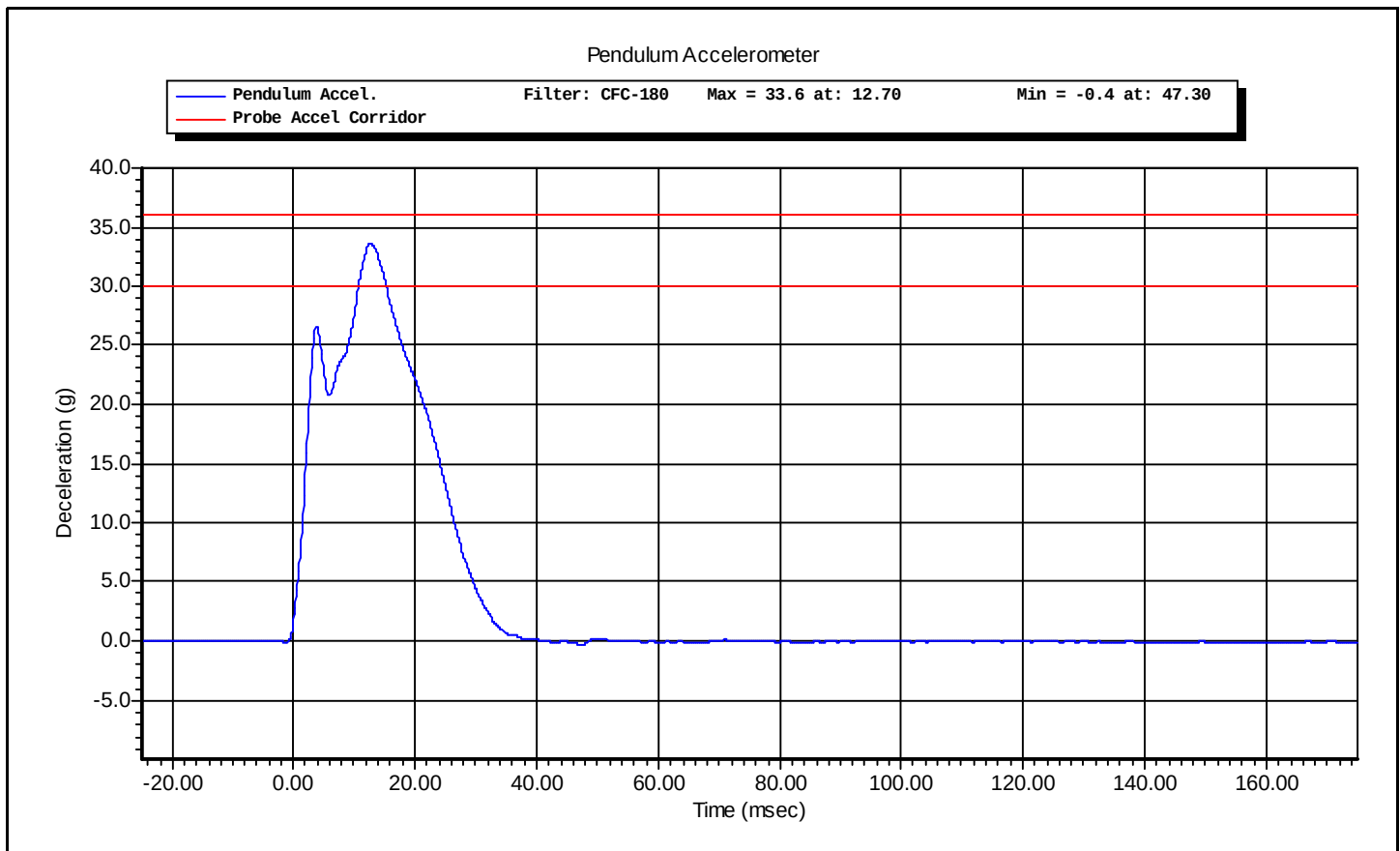


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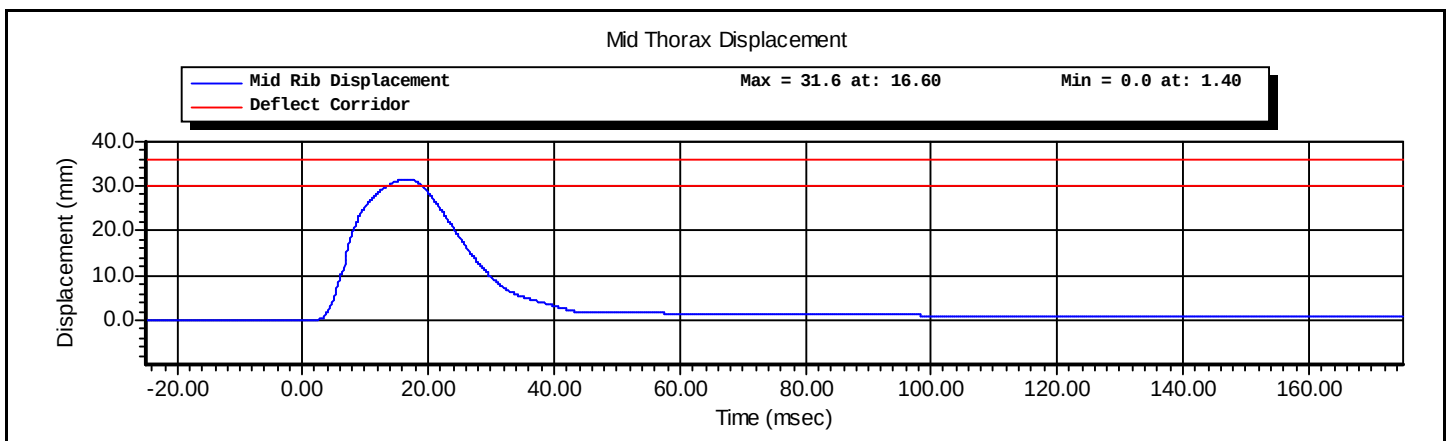
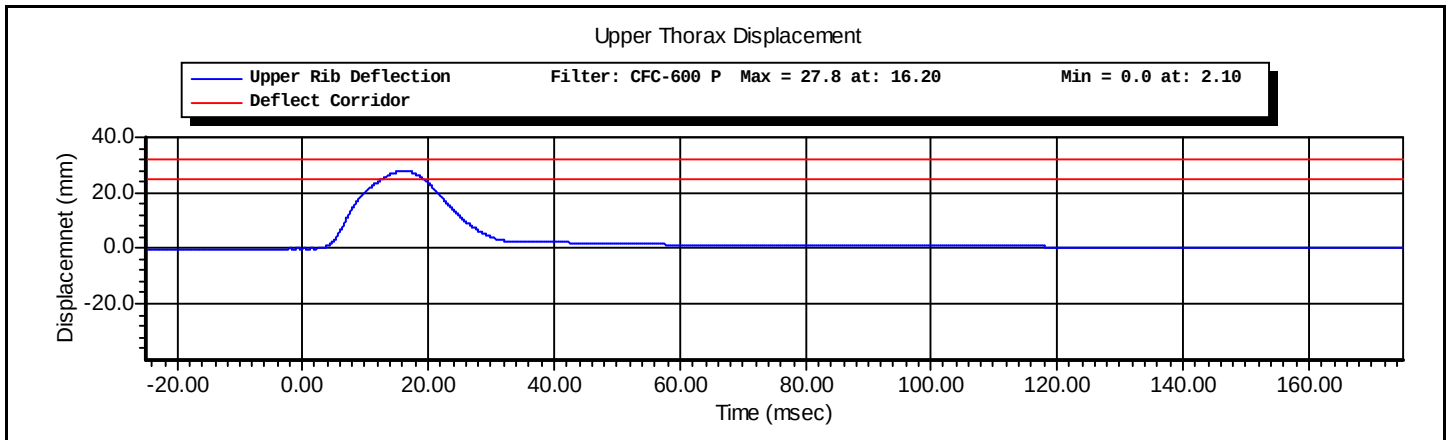
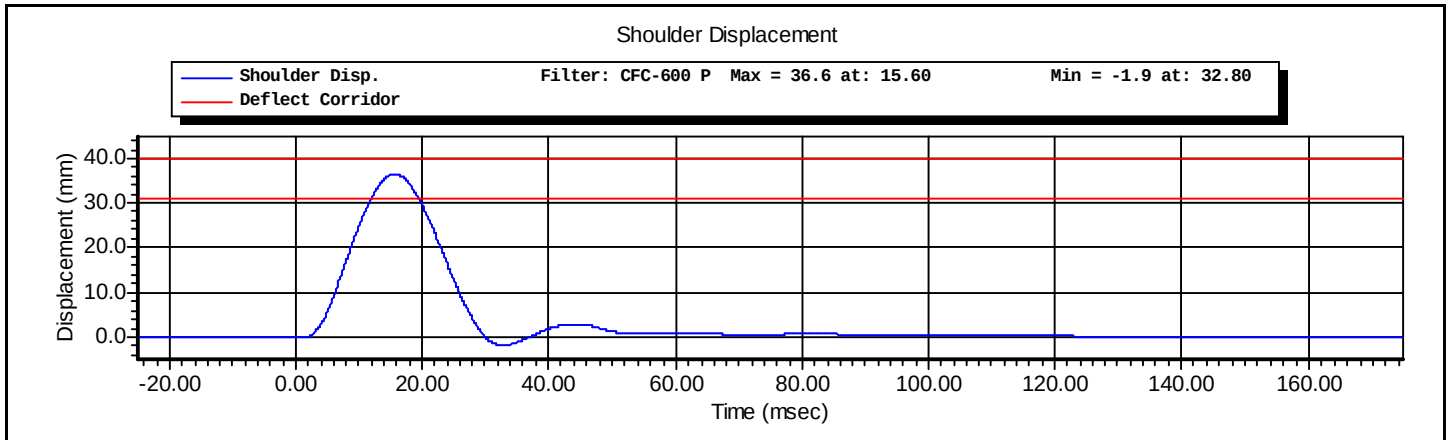
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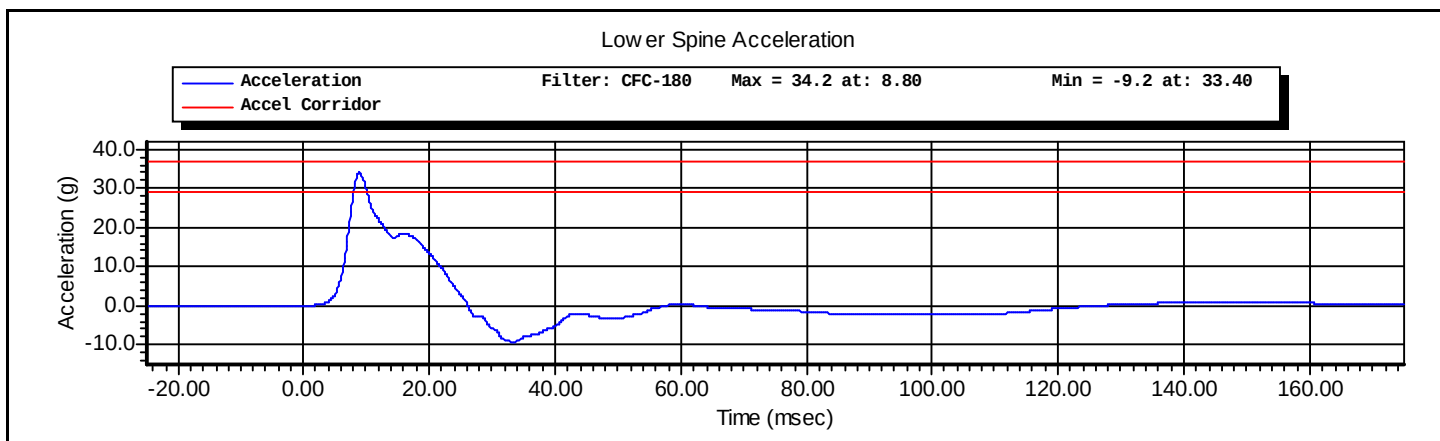
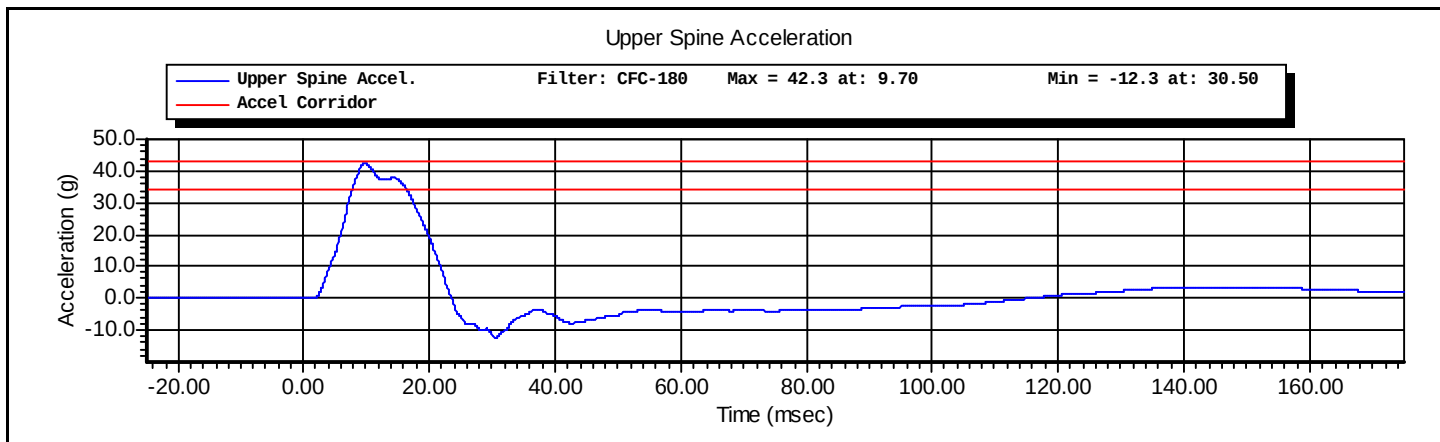
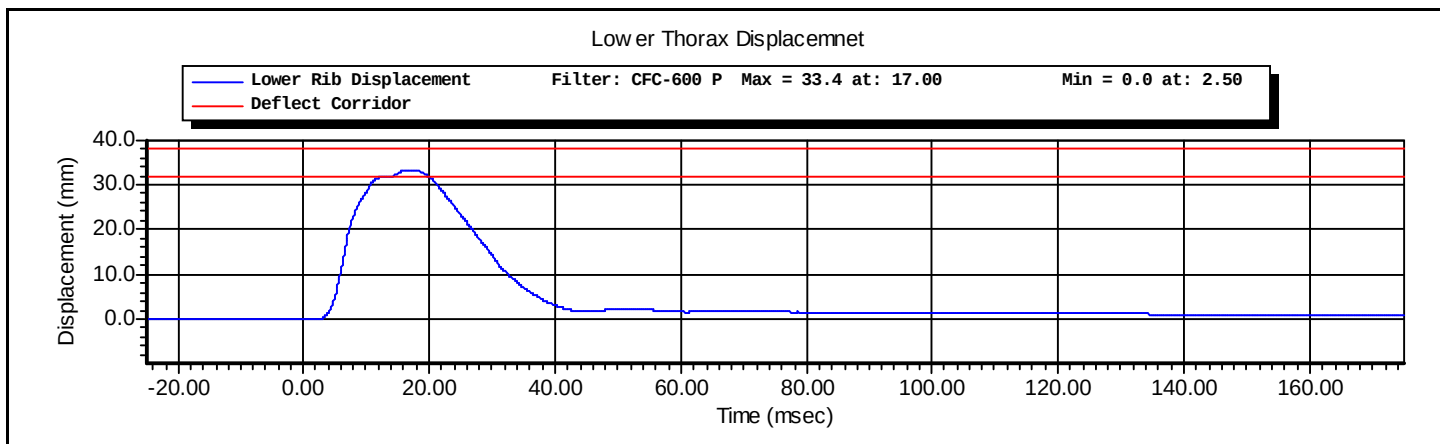
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 304		
Test ID:	Thorax With Arm	Test Date:	8/18/2010
Test Number:	1	Test Time:	12:55:37 PM



Test ID: **Thorax With Arm** Test Time: **12:55:37 PM**

Test Date: **8/18/2010**







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VERIFICATION REPORT

Test Name:	Thorax Impact without Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 304		
Test ID:	Thorax Without Arm	Test Date:	8/18/2010
Test Number:	1	Test Time:	11:22:34 AM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	22.2 deg C	P
Humidity	10	--	70	53 %RH	P
Velocity	4.20	--	4.40	4.32 m/s	P
Probe Acceleration	14.0	--	18.0	16.7 g	P
Upper Thorax Rib Deflection	32.0	--	40.0	36.7 mm	P
Mid Thorax Rib Deflection	39.0	--	45.0	41.8 mm	P
Lower Thorax Rib Deflection	35.0	--	43.0	38.4 mm	P
Upper Spine Acceleration T1	13.0	--	17.0	16.4 g	P
Lower Spine Acceleration T12	7.0	--	11.0	10.1 g	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____
Supervisor: **D. Travale** Signature: _____

Test ID: **Thorax Without Arm** Test Time: **11:22:34 AM**

Test Date: **8/18/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66927	4/20/2010
Servo	180-3885	DS-1188	3/26/2010
Servo	180-3885	DS-1269	3/26/2010
Servo	180-3885	DS-1260	3/26/2010
Endevco	7264-2000	P58884	3/29/2010
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Test ID: **Thorax Without Arm** Test Time: **11:22:34 AM**

Test Date: **8/18/2010**

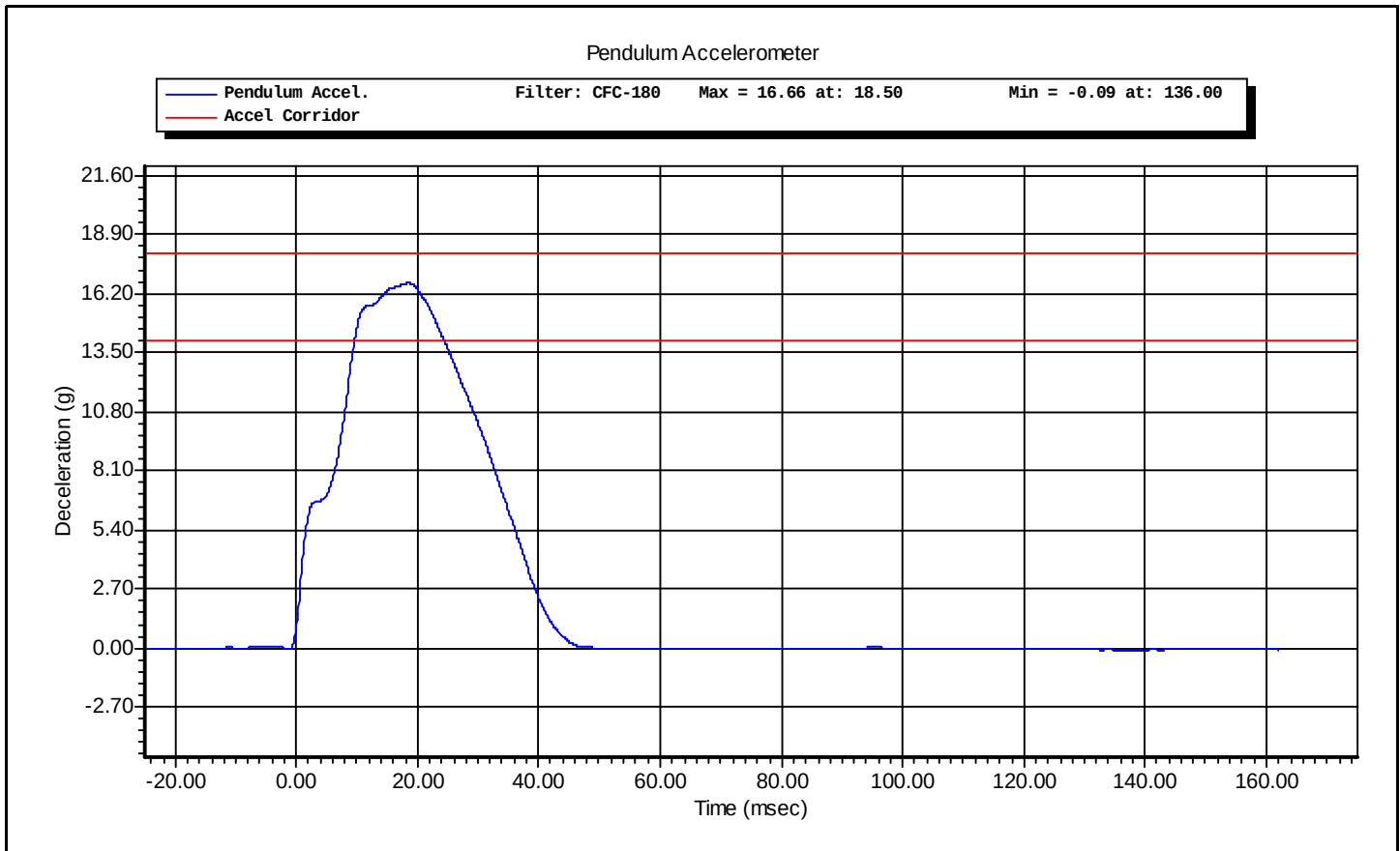


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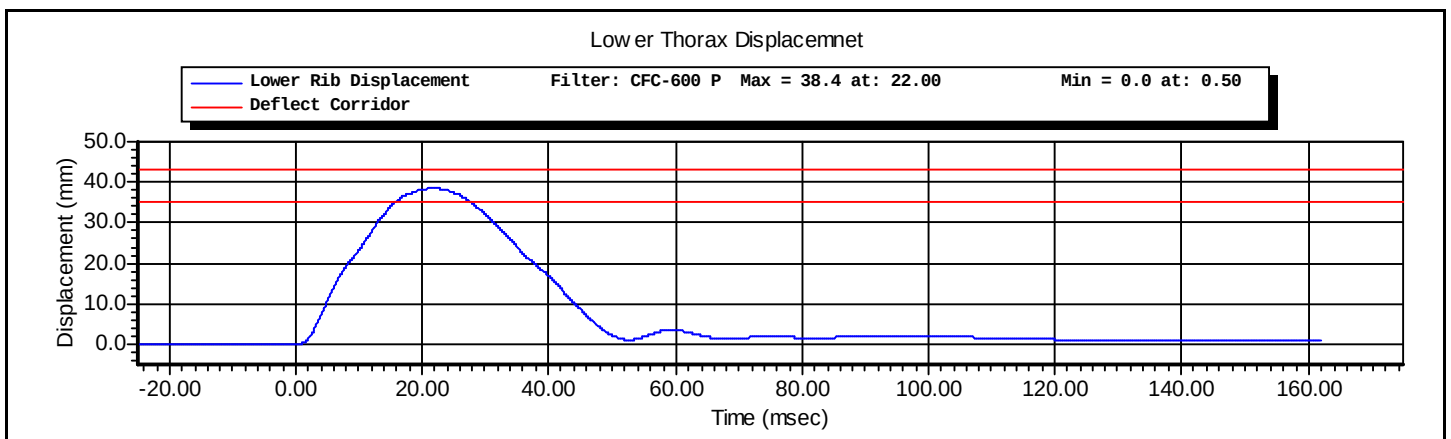
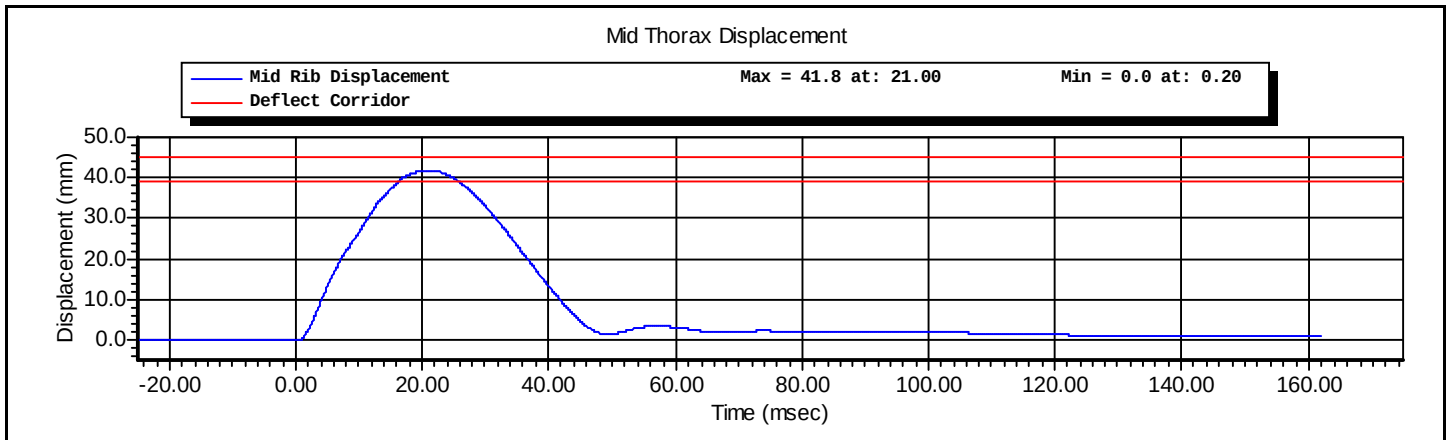
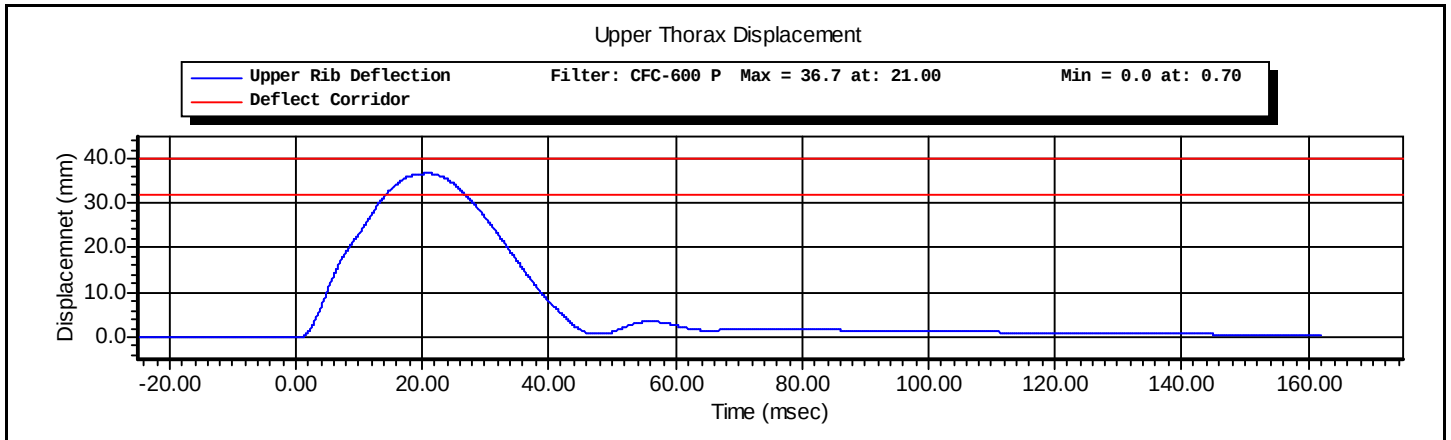
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Test Name:	Thorax Impact without Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 304		
Test ID:	Thorax Without Arm	Test Date:	8/18/2010
Test Number:	1	Test Time:	11:22:34 AM

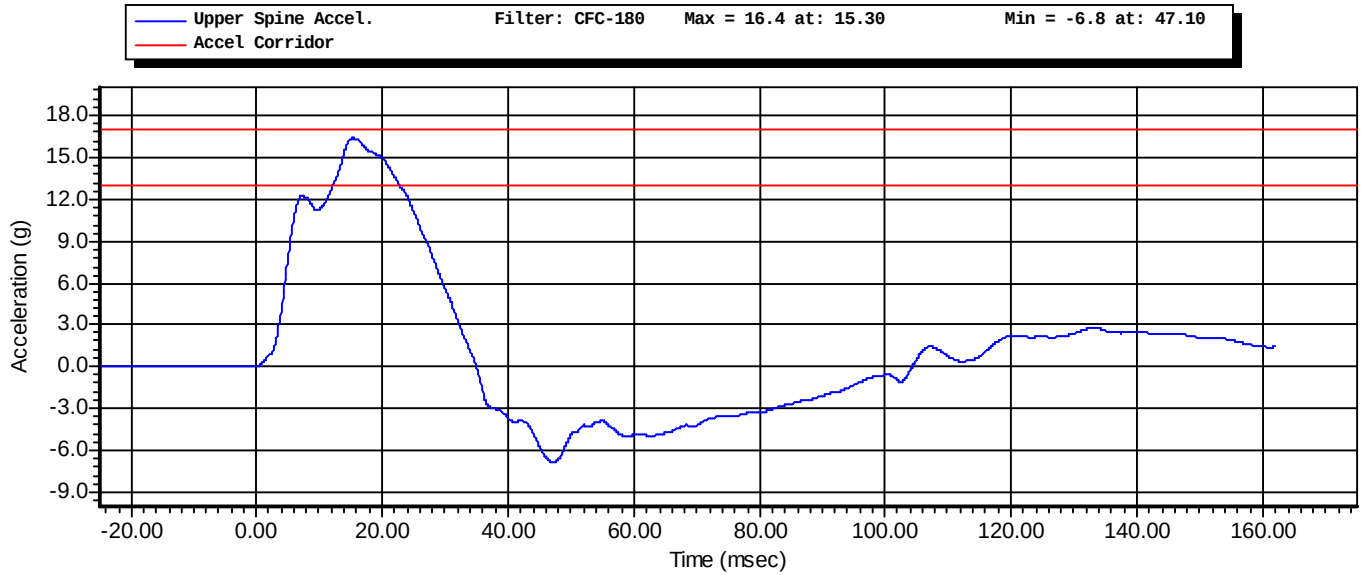


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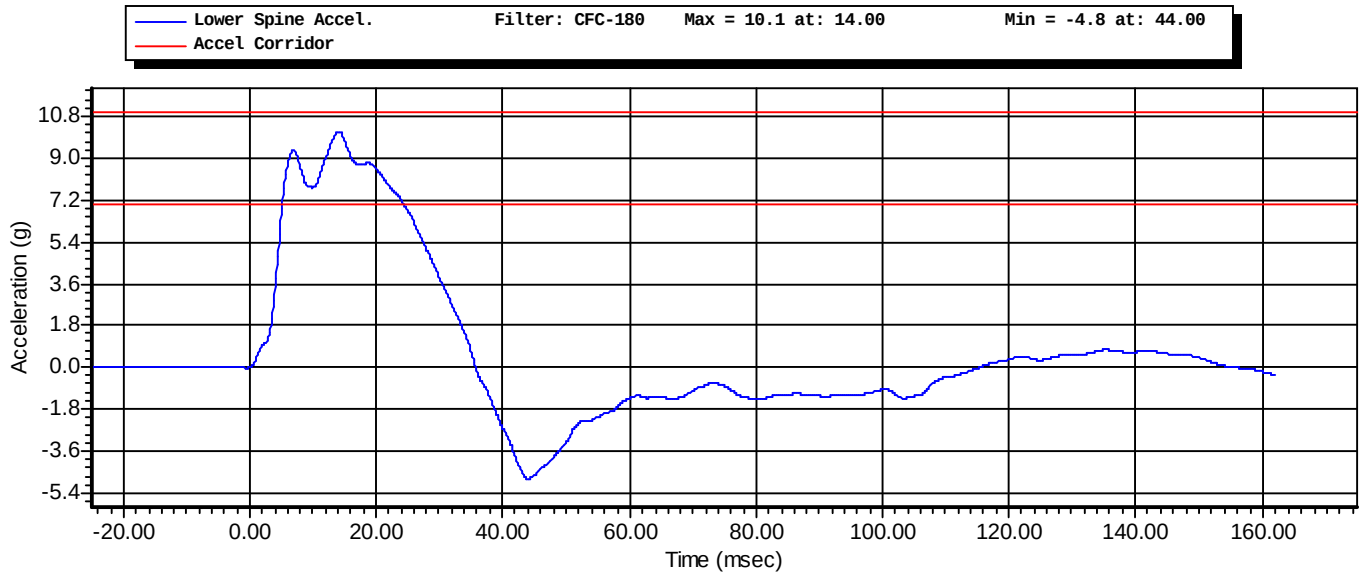
Test Date: 8/18/2010



Upper Spine Acceleration



Lower Spine Acceleration





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VERIFICATION REPORT

Test Name:	Abdominal Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 304		
Test ID:	Abdomen	Test Date:	8/18/2010
Test Number:	1	Test Time:	9:30:10 AM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10 -- 70	58 %RH P
Velocity	4.20 -- 4.40	4.36 m/s P
Probe Acceleration	12.0 -- 16.0	15.8 g P
Upper Abdominal Rib Deflection	36.0 -- 47.0	39.7 mm P
Lower Abdominal Rib Deflection	33.0 -- 44.0	39.0 mm P
Lower Spine Acceleration - T12	9.0 -- 14.0	12.2 g P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____
Supervisor: **D. Travale** Signature: _____

Test ID: **Abdomen**

Test Time: **9:30:10 AM**

Test Date: **8/18/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66927	4/20/2010
Servo	180-3885	DS-1207	3/26/2010
Servo	180-3885	DS-1204	3/26/2010
Endevco	7264-2000	P58839	3/29/2010

Test ID: **Abdomen**

Test Time: **9:30:10 AM**

Test Date: **8/18/2010**



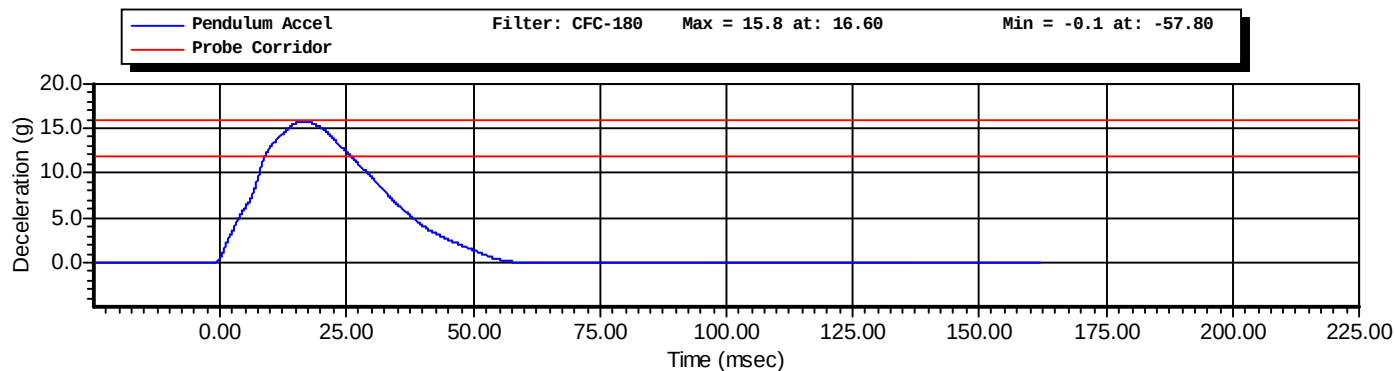
www.calspan.com

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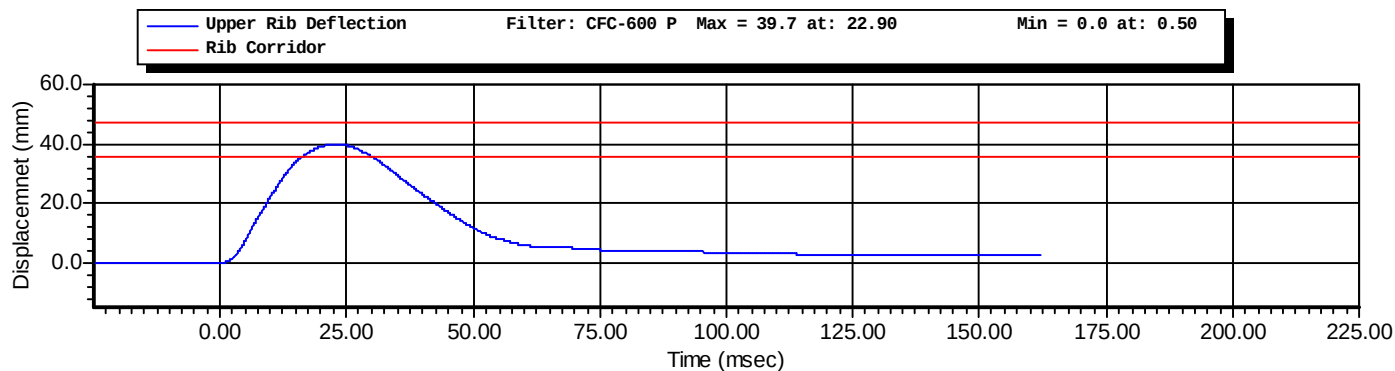
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	Abdominal Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 304		
Test ID:	Abdomen	Test Date:	8/18/2010
Test Number:	1	Test Time:	9:30:10 AM

Pendulum Accelerometer



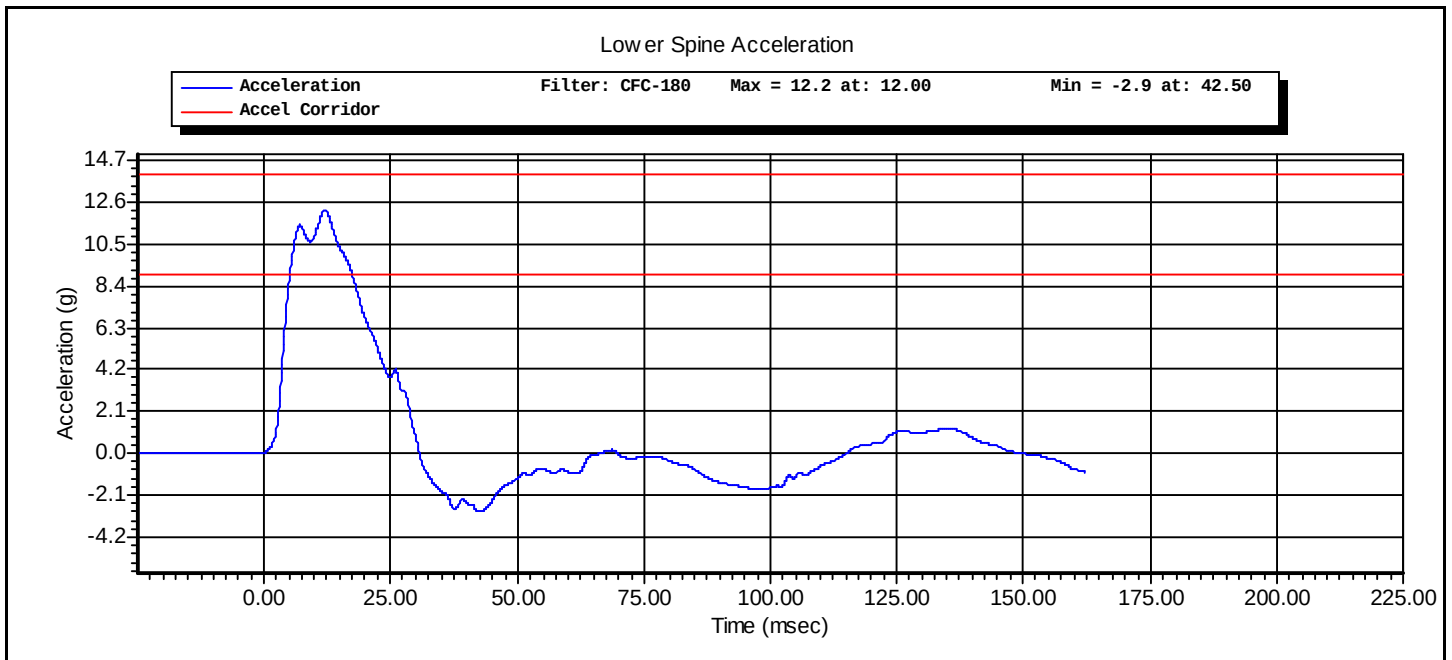
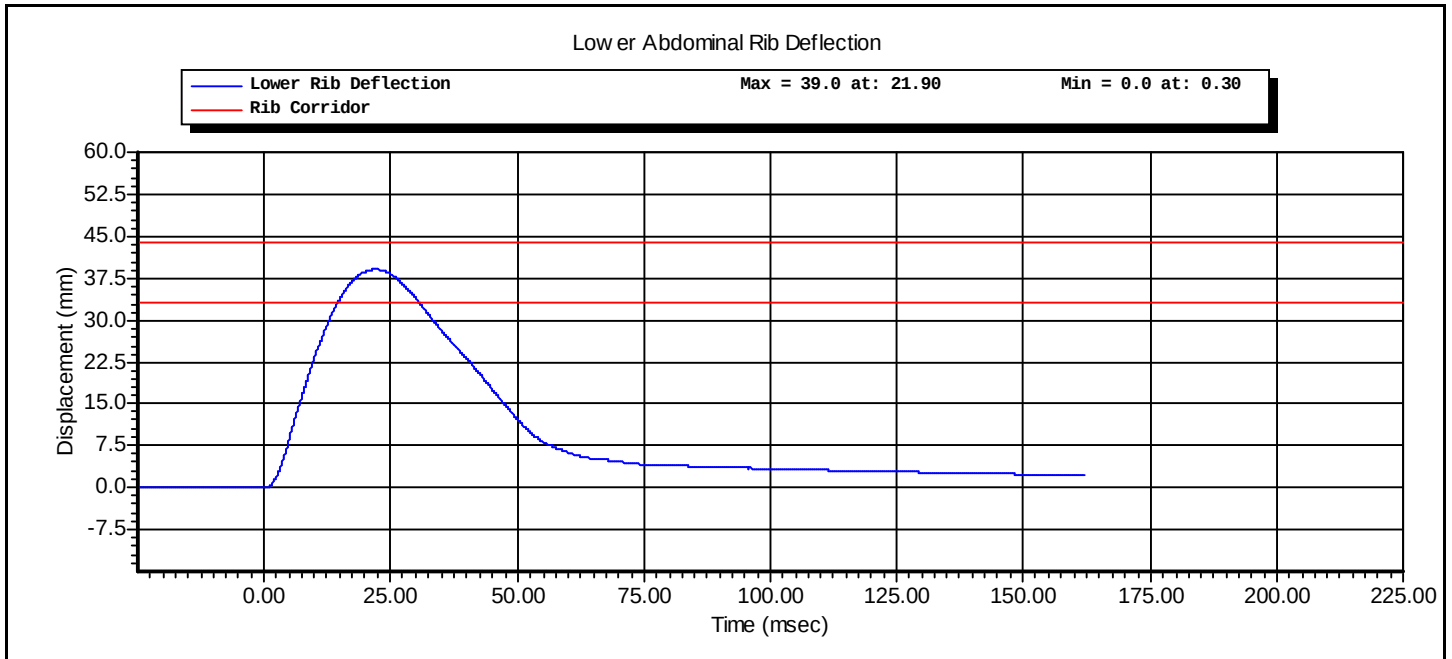
Upper Abdominal Rib Deflection



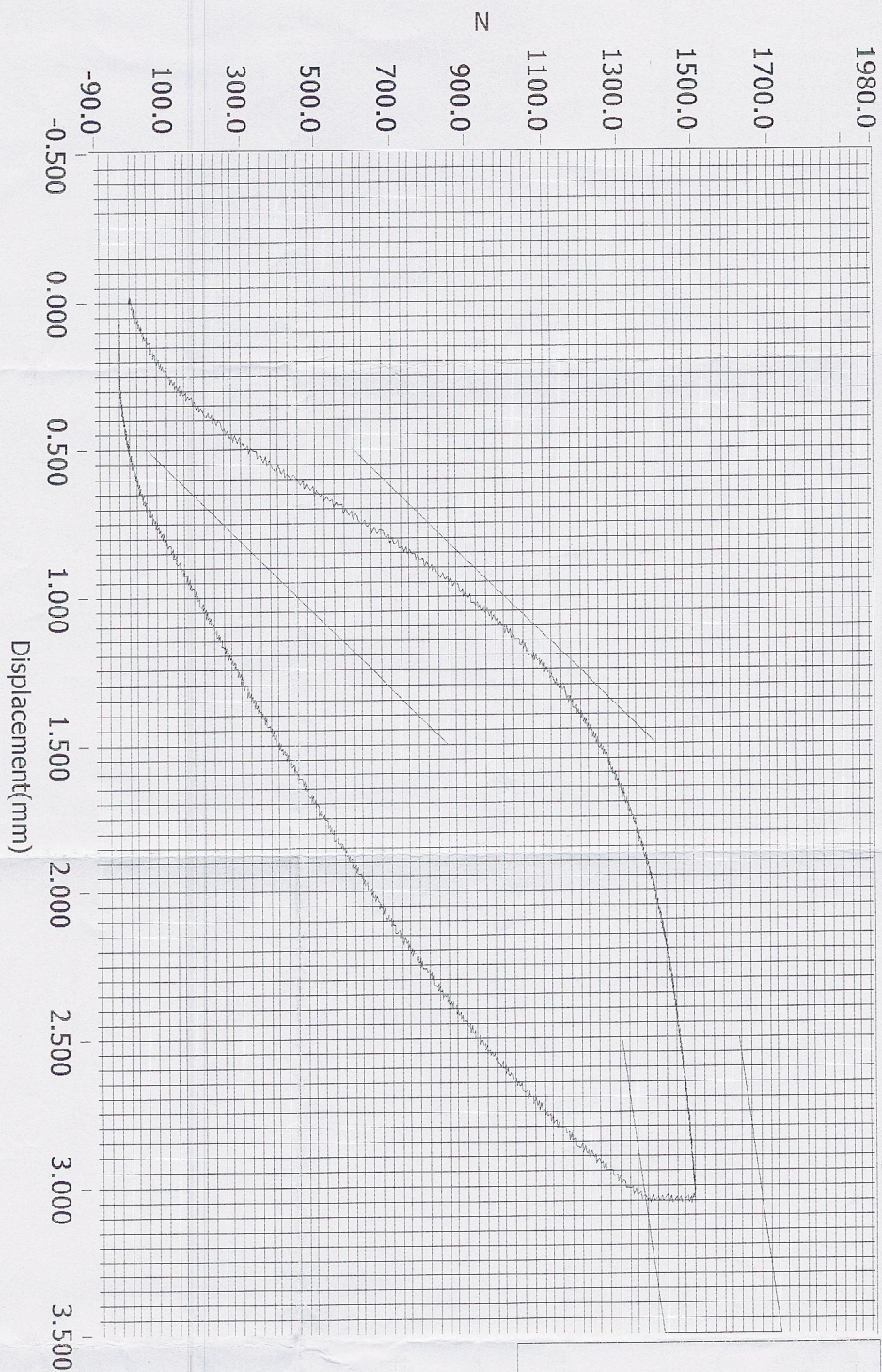
Test ID: **Abdomen**

Test Time: **9:30:10 AM**

Test Date: **8/18/2010**



Resultant Data - SIDIIs Plug Compression



Loading Curve	<
Boundary Limit Upper	<
Boundary Limit Lower	<
Peak Load Upper	<
Peak Load Lower	<
Peak Defl Upper	<
Peak Defl Lower	<

ATD Calibration Lab

Test ID

Part Serial Number

Test Date

Test Time

Cert ID

ATD Serial Number

ATD Type

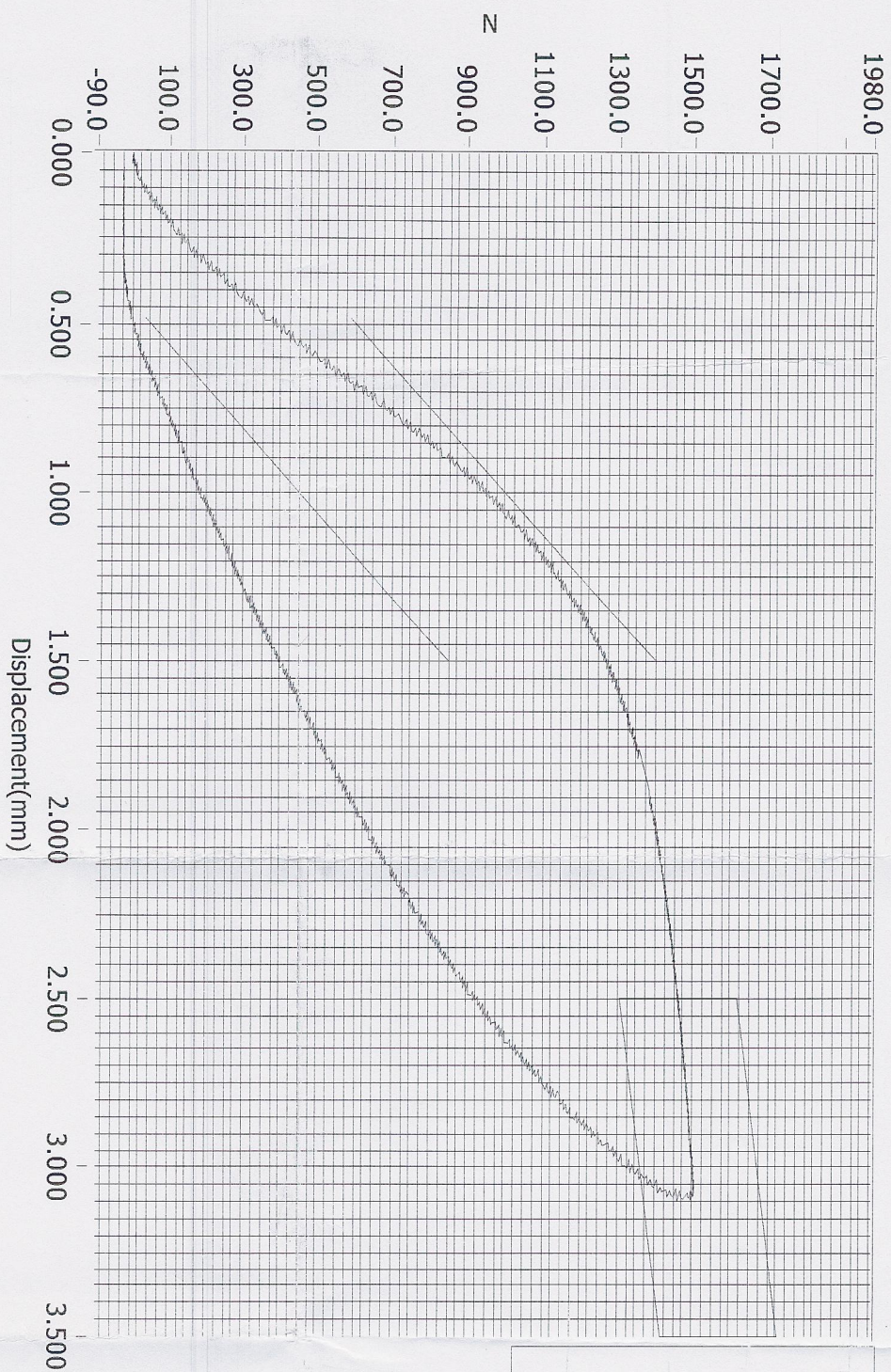
12896

SIDIIs

Current Date : 7/17/2007

Current Time : 15:02:37

Resultant Data - SIDIIs Plug Compression



Loading Curve	<
Boundary Limit Upper	<
Boundary Limit Lower	<
Peak Load Upper	<
Peak Load Lower	<
Peak Defl Upper	<
Peak Defl Lower	<

ATD Calibration Lab

Test ID

Part Serial Number

Test Date

Test Time

Cert ID

ATD Serial Number

ATD Type

11968

SIDIIs

Current Date : 6/26/2007

Current Time : 15:18:37



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VERIFICATION REPORT

Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Acetabulum Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 304		
Test ID:	Pelvis Acetabulum	Test Date:	8/17/2010
Test Number:	1	Test Time:	11:37:54 AM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	55 %RH P
Velocity	6.60 -- 6.80	6.69 m/s P
Peak Probe Acceleration	38.0 -- 47.0	43.4 g P
Peak Pelvis Acceleration	34.0 -- 42.0	36.4 g P
Peak Acetabulum Force	3.60 -- 4.30	4.06 kN P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____
Supervisor: **D. Travale** Signature: _____

Test ID: **Pelvis Acetabulum** Test Time: **11:37:54 AM**

Test Date: **8/17/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66927	4/20/2010
Endevco	7264-2000	P49217	4/12/2010
DentonATD	3249J	LC-267Fy	4/9/2010

Test ID: **Pelvis Acetabulum** Test Time: **11:37:54 AM**

Test Date: **8/17/2010**



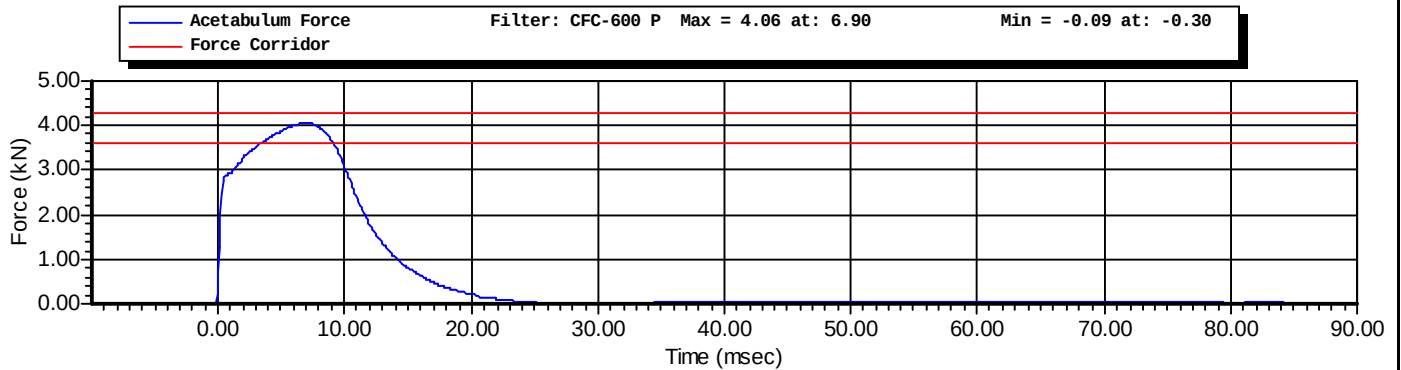
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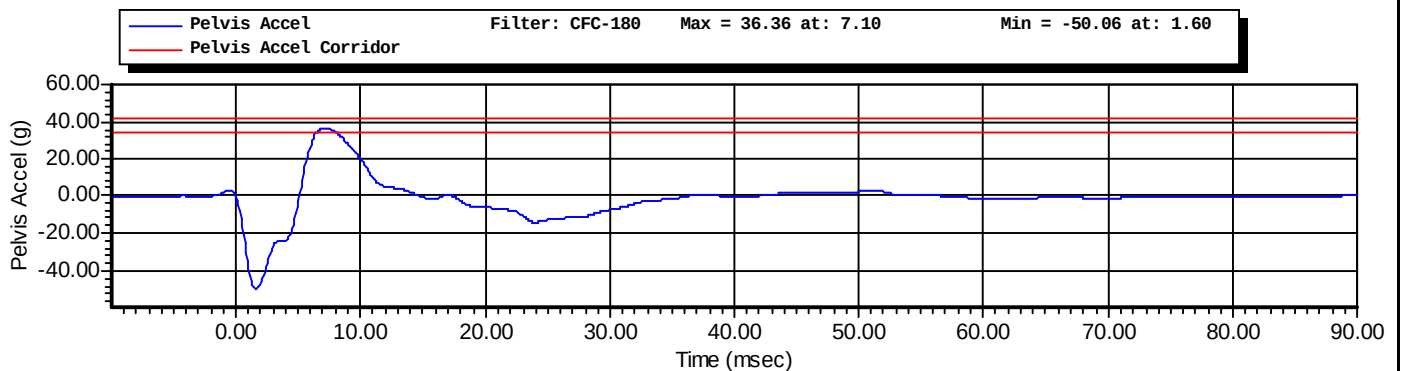
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Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Acetabulum Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 304		
Test ID:	Pelvis Acetabulum	Test Date:	8/17/2010
Test Number:	1	Test Time:	11:37:54 AM

Acetabulum Force

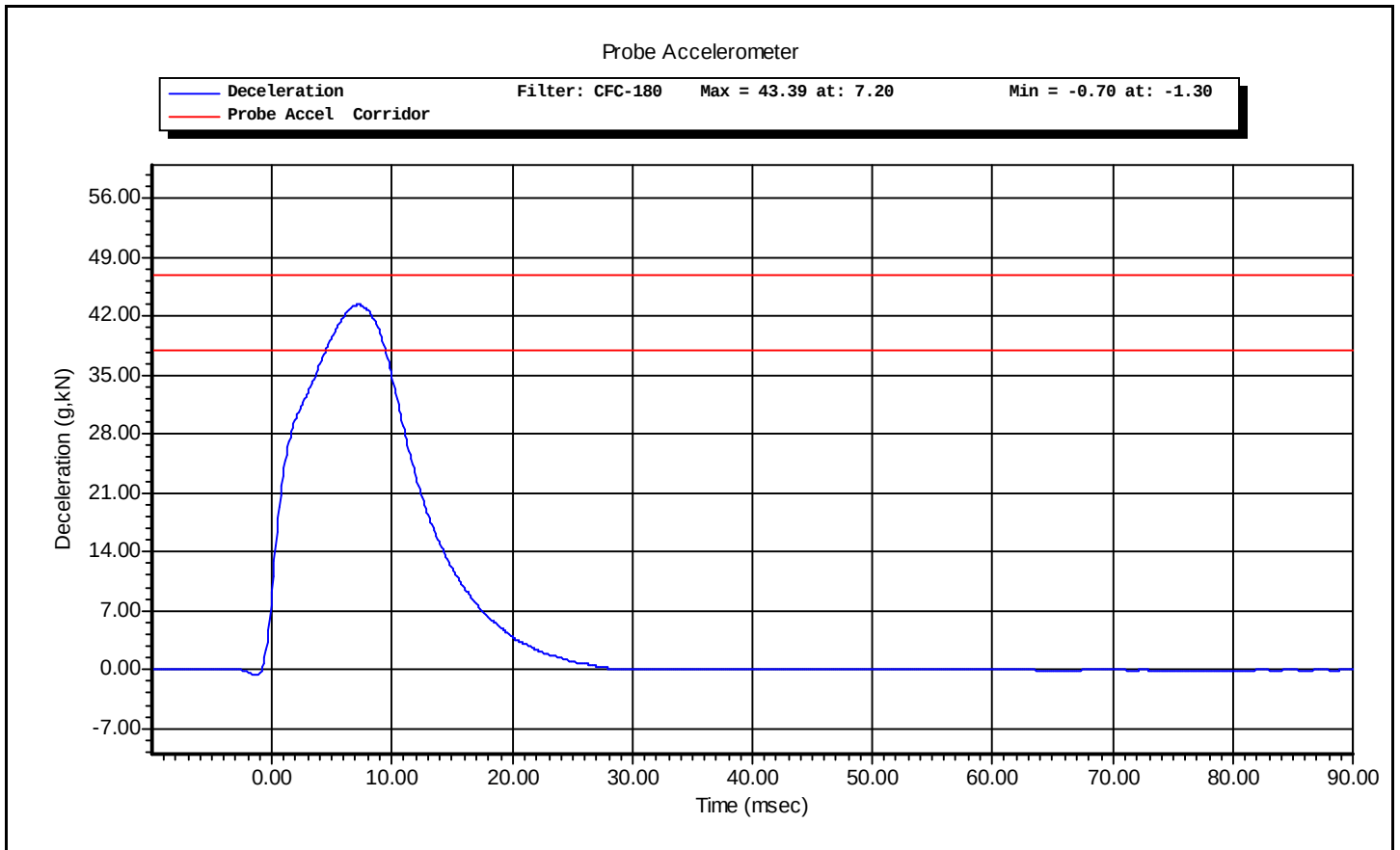


Pelvis Accelerometer



Test ID: **Pelvis Acetabulum** Test Time: **11:37:54 AM**

Test Date: **8/17/2010**





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VERIFICATION REPORT

Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Iliac Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 304		
Test ID:	Pelvis Iliac	Test Date:	8/17/2010
Test Number:	1	Test Time:	11:03:29 AM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	53 %RH P
Velocity	4.20 -- 4.40	4.30 m/s P
Peak Probe Acceleration	36.0 -- 45.0	39.6 g P
Peak Pelvis Acceleration	28.0 -- 39.0	32.0 g P
Peak Iliac Force	4.10 -- 5.10	4.52 kN P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____
Supervisor: **D. Travale** Signature: _____

Test ID: **Pelvis Iliac**

Test Time: **11:03:29 AM**

Test Date: **8/17/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66927	4/20/2010
Endevco	7264-2000	P49217	4/12/2010
DentonATD	3228J	LC-281 Fy	4/9/2010

Test ID: **Pelvis Iliac**

Test Time: **11:03:29 AM**

Test Date: **8/17/2010**

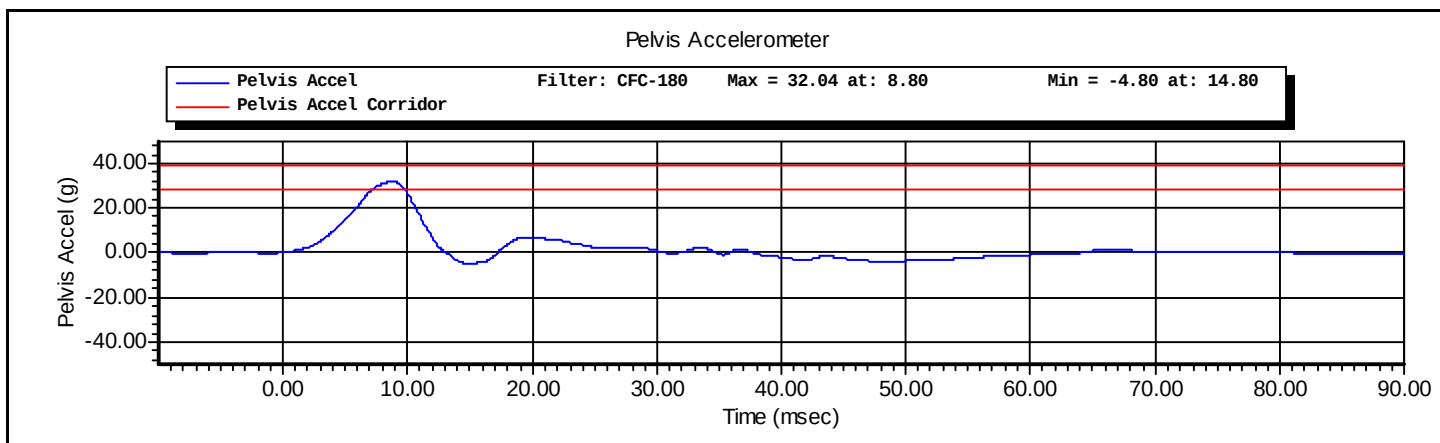
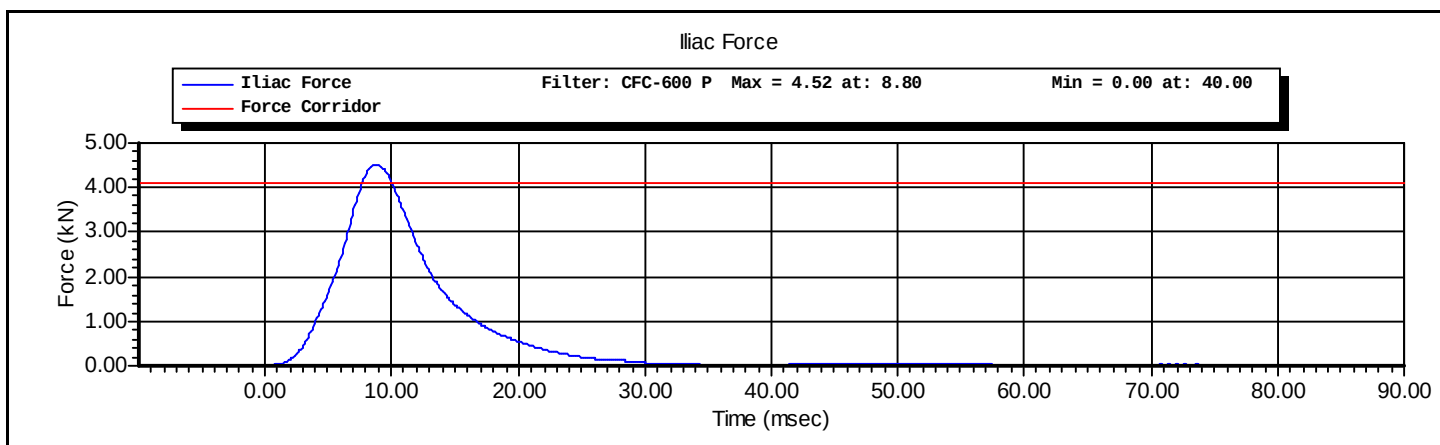


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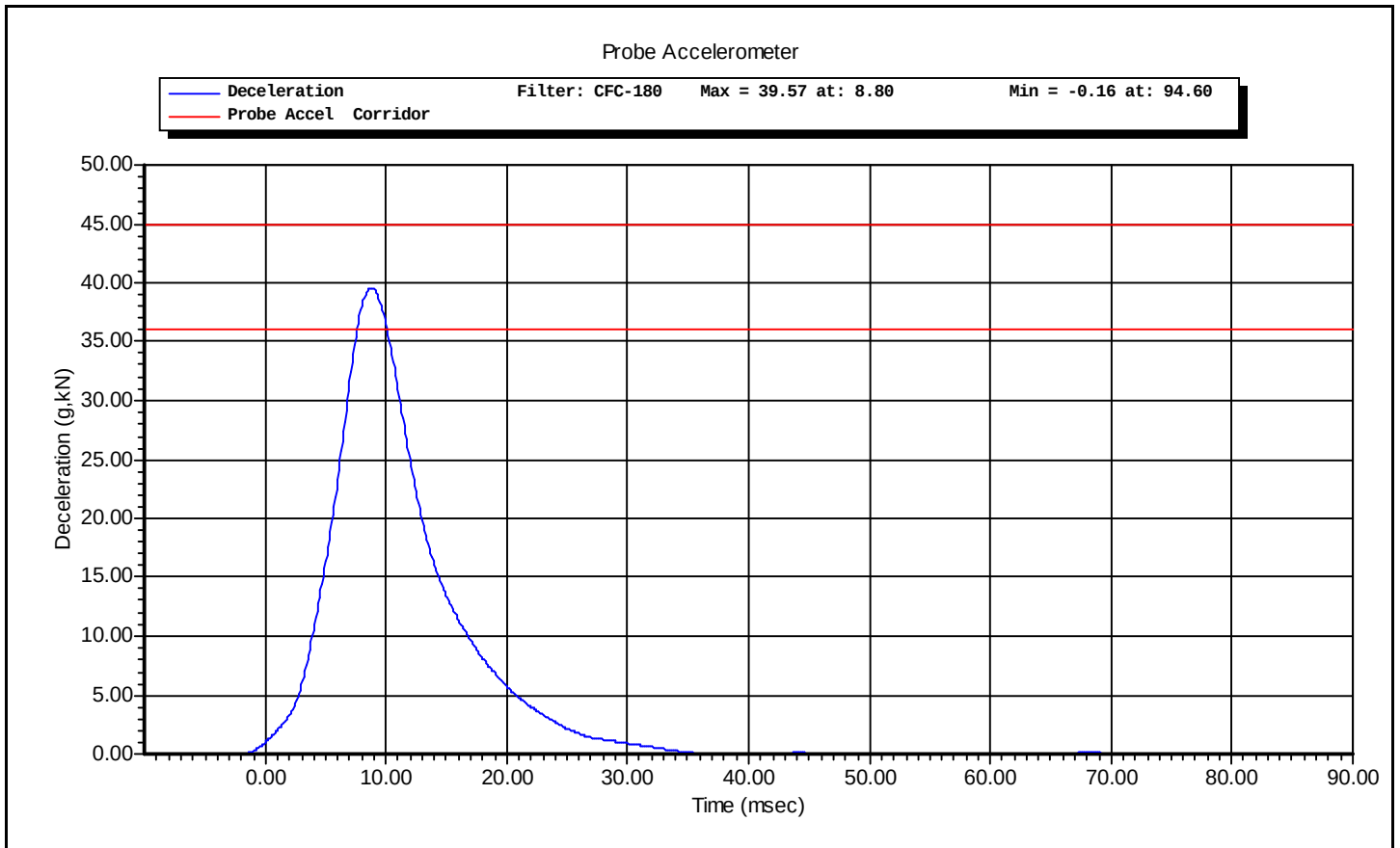
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Sub Test Name:	Iliac Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 304		
Test ID:	Pelvis Iliac	Test Date:	8/17/2010
Test Number:	1	Test Time:	11:03:29 AM



Test ID: **Pelvis Iliac**

Test Time: **11:03:29 AM**

Test Date: **8/17/2010**



CALIBRATION TEST RESULTS

POST-TEST

SID-IIs No: 304

CONFIGURED FOR LEFT SIDE IMPACT

SID-IIsD External Measurements

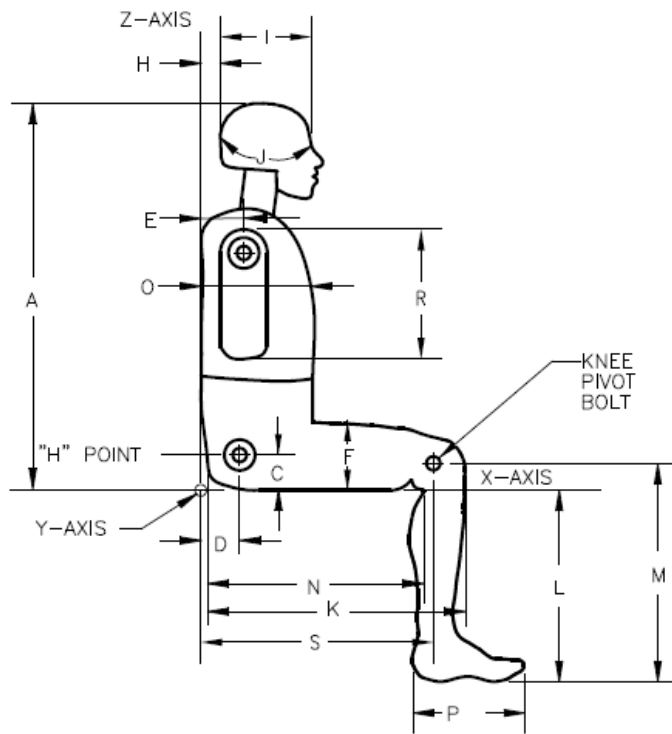
NHTSA ATD S/N 304

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	786	Yes
B	Shoulder Pivot Height	437.0 - 453.0	446	Yes
C	H-Point Height (reference)	79.0 - 89.0	84	Yes
D	H-Point from Seat Back (reference)	141.0 - 151.0	146	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	99	Yes
F	Thigh Clearance	119.0 - 135.0	128	Yes
G	Head Breadth	140.0 - 148.0	149	Yes
H	Head Back from Backline	40.0 - 46.0	43	Yes
I	Head Depth	178.0 - 188.0	184	Yes
J	Head Circumference	541.0 - 551.0	545	Yes
K	Buttock to Knee Length	514.0 - 540.0	523	Yes
L	Popliteal Height	343.0 - 369.0	356	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	397	Yes
N	Buttock Popliteal Length	416.0 - 442.0	428	Yes
O	Chest Depth without Jacket	195.0 - 211.0	200	Yes
P	Foot Length (right)	216.0 - 232.0	224	Yes
P	Foot Length (left)	216.0 - 232.0	224	Yes
Q	Hip Breadth	313.0 - 323.0	320	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to Seat back	478.0 - 493.0	484	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	352	Yes
W	Foot Width (right)	78.0 - 94.0	82	Yes
W	Foot Width (left)	78.0 - 94.0	82	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	861	Yes
Z	Waist Circumference	761.0 - 791.0	780	Yes

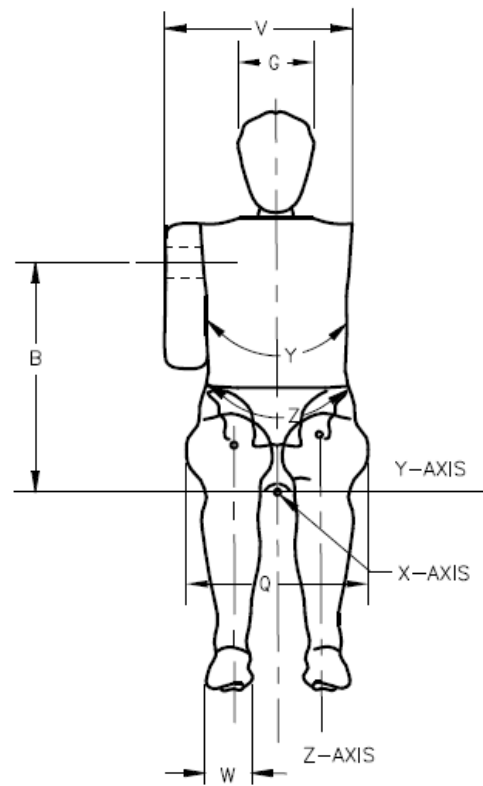
Technician: S. Zito III

Date: 9/28/2010

SID-IIsD External Dimension Reference Diagram



SIDE VIEW



FRONT VIEW



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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 304		
Test ID:	Head Drop	Test Date:	9/28/2010
Test Number:	1	Test Time:	9:11:52 AM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	22.2 deg C	P
Humidity	10	--	70	63 %RH	P
Resultant Acceleration	115.0	--	137.0	117.7 g	P
Oscillation	0.0	--	15.0	2.3 %	P
Fore-Aft Acceleration	-15.0	--	15.0	-3.5 g	P

All test parameters are within specifications

Technician: **S. Zito** Signature: _____

Supervisor: **D. Travale** Signature: _____

Test ID: **Head Drop**

Test Time: **9:11:52 AM**

Test Date: **9/28/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P66931	4/20/2010
Endevco	7264-2000	P66943	7/27/2010
Endevco	7264-2000	P66943	7/27/2010

Test ID: **Head Drop**

Test Time: **9:11:52 AM**

Test Date: **9/28/2010**

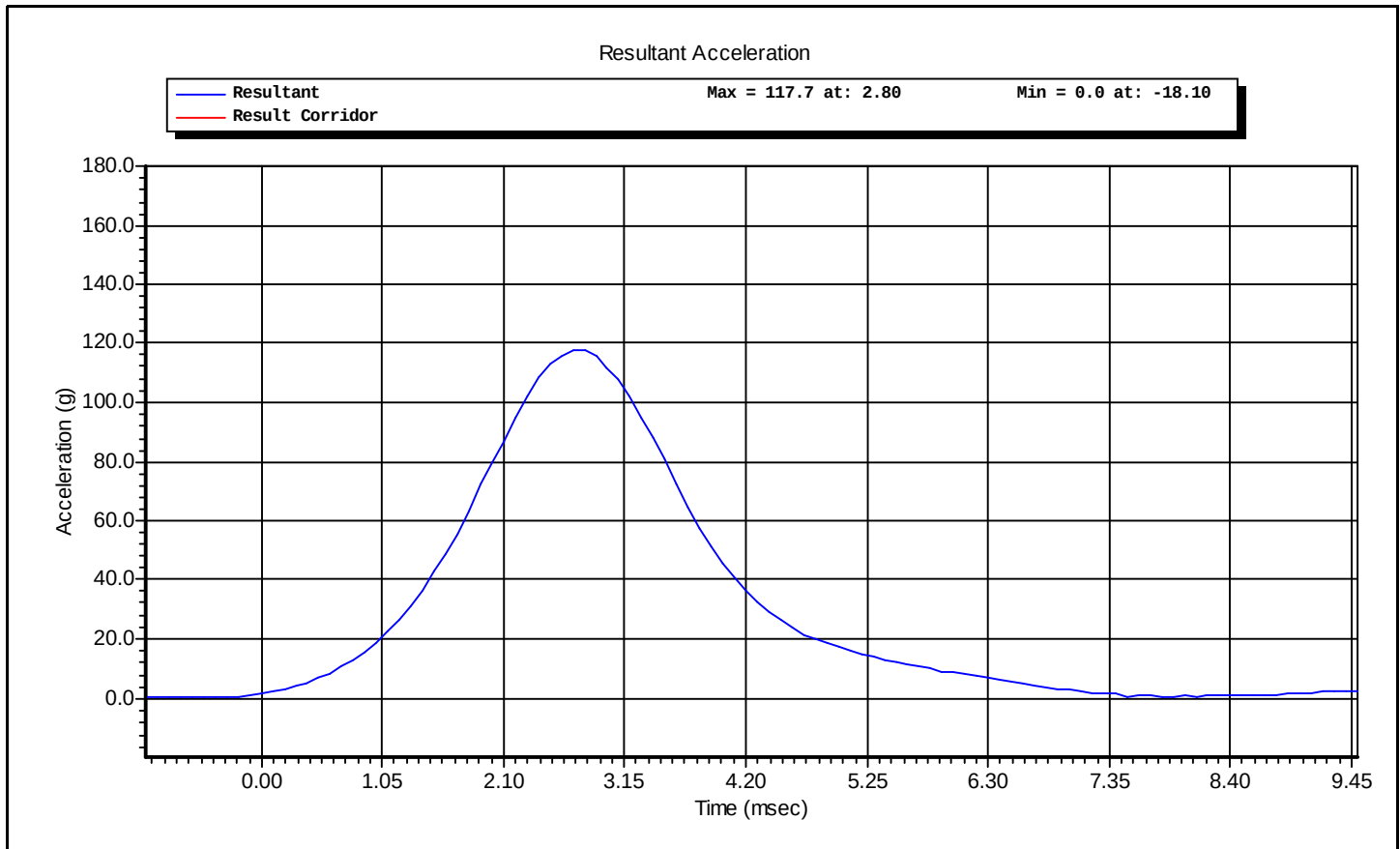


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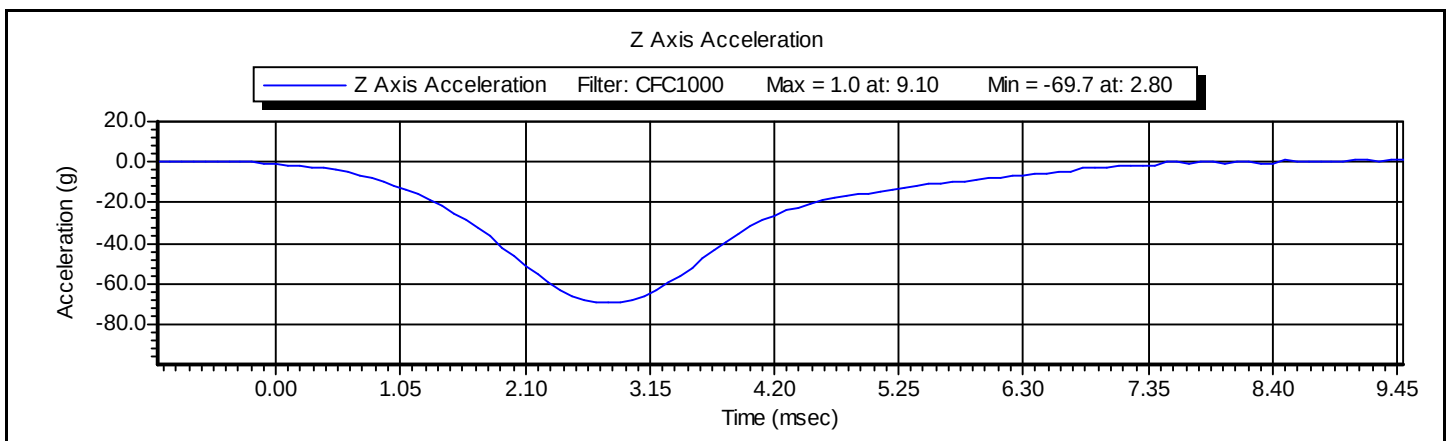
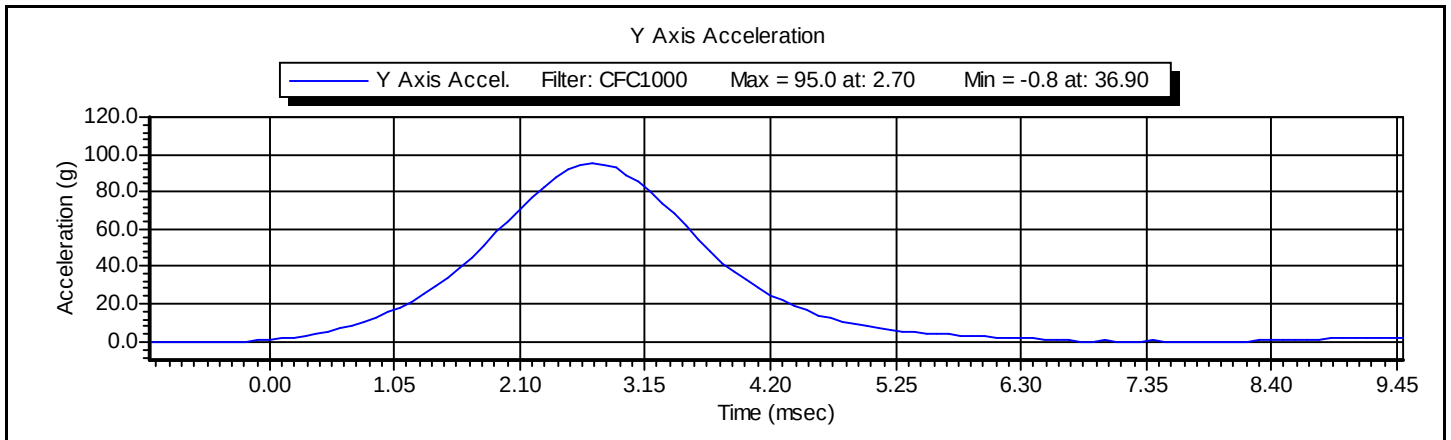
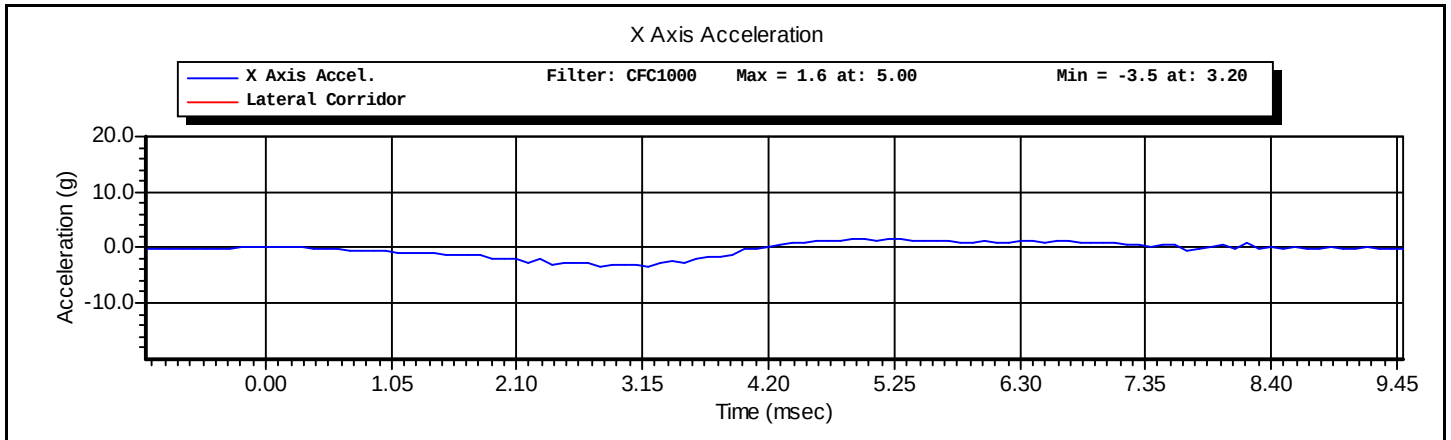
Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 304		
Test ID:	Head Drop	Test Date:	9/28/2010
Test Number:	1	Test Time:	9:11:52 AM



Test ID: **Head Drop**

Test Time: **9:11:52 AM**

Test Date: **9/28/2010**





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VERIFICATION REPORT

Test Name:	Neck Pendulum	Revision:	8/24/2009
Sub Test Name:	Left Side	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 304		
Test ID:	Neck Flexsion	Test Date:	9/28/2010
Test Number:	1	Test Time:	10:38:49 AM

Component Part Number	Component Serial Number
Neck - 180-2000	AB8329

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	63 %RH P
Velocity	5.51 -- 5.63	5.55 m/s P
Pendulum Impulse at 10 ms	2.20 -- 2.80	2.55 m/s P
Pendulum Impulse at 15 ms	3.30 -- 4.10	3.80 m/s P
Pendulum Impulse at 20 ms	4.40 -- 5.40	5.12 m/s P
Pendulum Impulse at 25 ms	5.40 -- 6.10	5.84 m/s P
Pendulum Impulse between 25 and 100 ms	5.50 -- 6.20	5.87 m/s P
Max D Plane Rotation	71.0 -- 81.0	72.7 degrees P
Time at Max Rotation	50.0 -- 70.0	60.6 ms P
Moment about OC	-44.0 -- -36.0	-42.7 Nm P
Moment Decay to Zero	102.0 -- 126.0	114.2 ms P

All test parameters are within specifications

Technician: **S. Zito** Signature: _____
Supervisor: **D. Travale** Signature: _____

Test ID: **Neck Flexsion**

Test Time: **10:38:49 AM**

Test Date: **9/28/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
Denton	1716A	LC-576 Fy	2/15/2010
Denton	1716A	LC-576 Mx	2/15/2010
DentonATD	78051-342	184	4/30/2010
DentonATD	78051-342	174	4/30/2010
DentonATD	78051-342	185	4/30/2010

Test ID: **Neck Flexion**

Test Time: **10:38:49 AM**

Test Date: **9/28/2010**



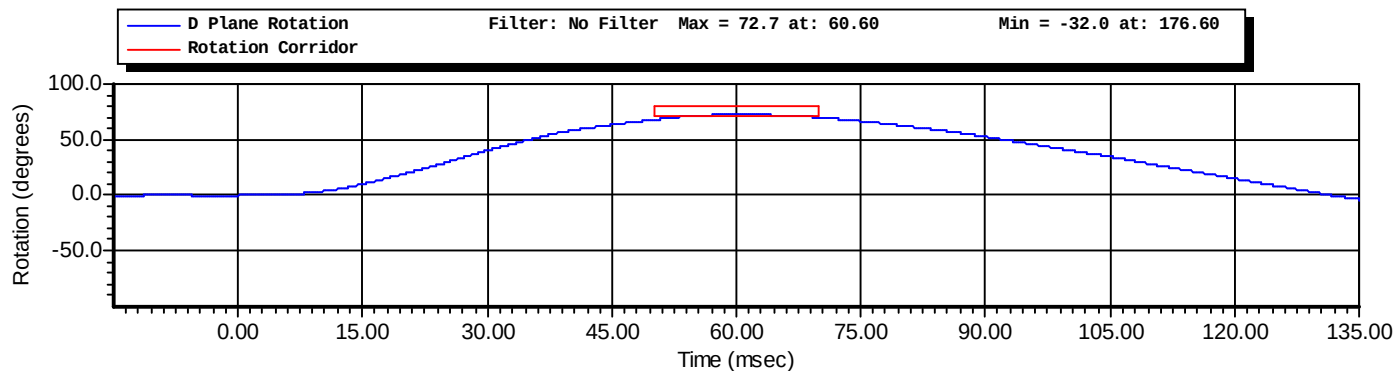
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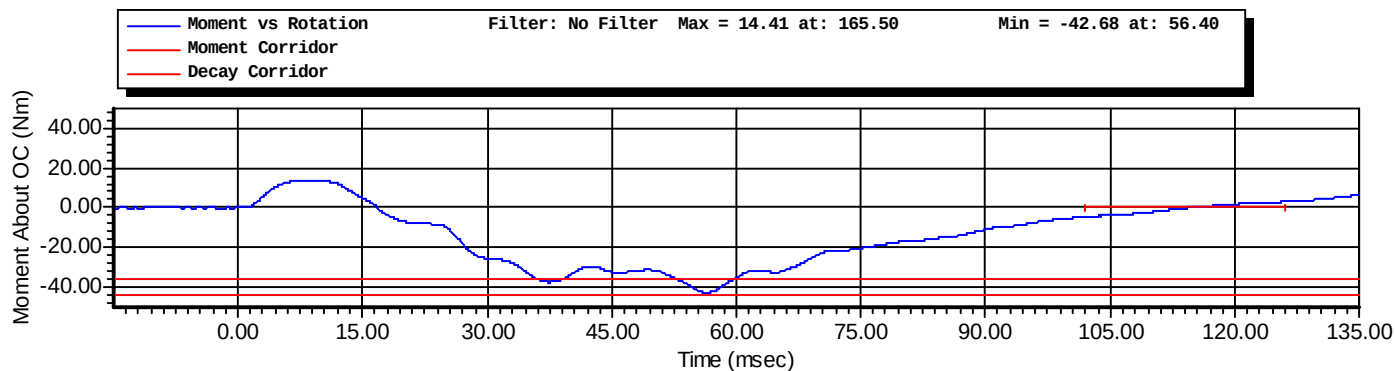
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	Neck Pendulum	Revision:	8/24/2009
Sub Test Name:	Left Side	Spec Type:	NHTSA
ATD Type:	SID-IIIs		
ATD Serial Number:	SID 304		
Test ID:	Neck Flexion	Test Date:	9/28/2010
Test Number:	1	Test Time:	10:38:49 AM

D Plane Rotation



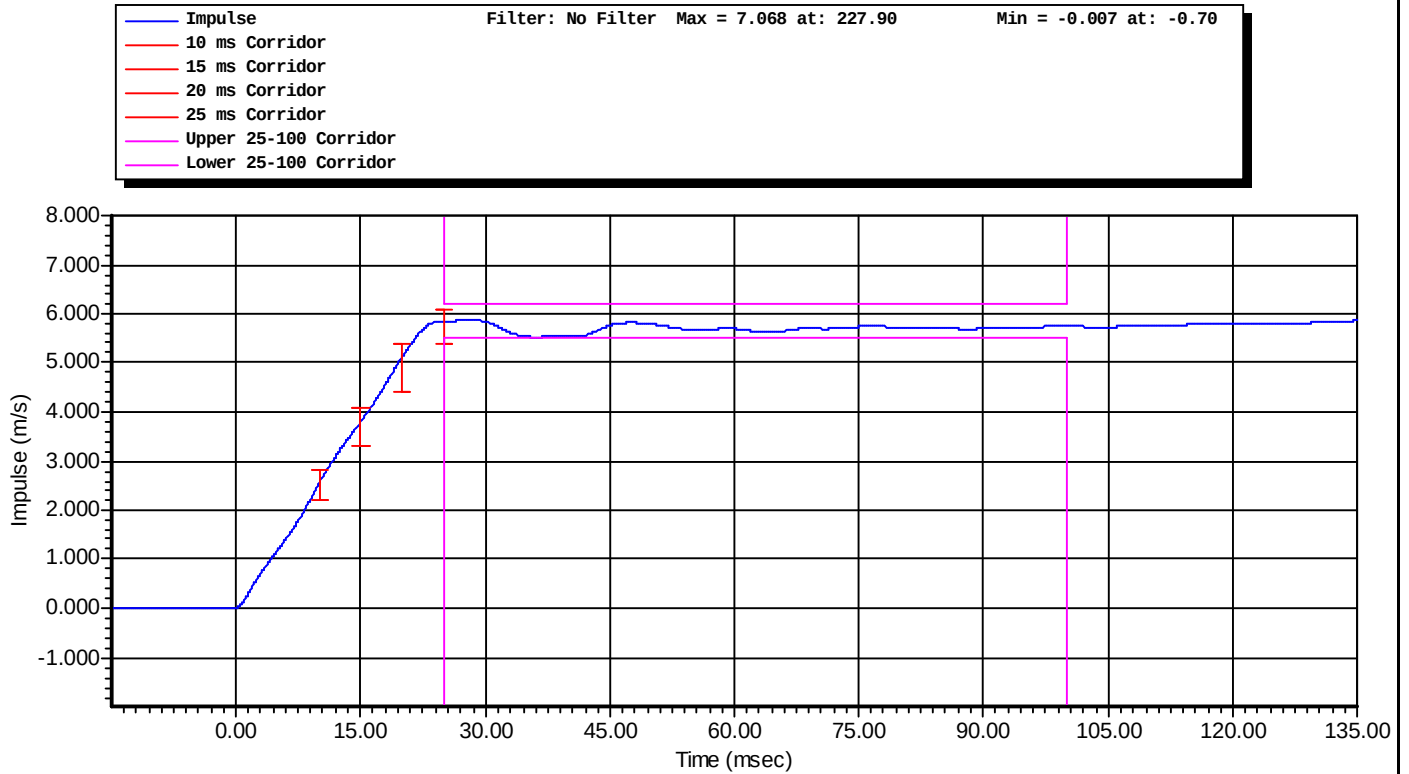
Moment About Occipital Condyle



Test ID: Neck Flexion Test Time: 10:38:49 AM

Test Date: 9/28/2010

Pendulum Impulse





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VERIFICATION REPORT

Test Name:	Shoulder Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	304		
Test ID:	Shoulder	Test Date:	9/17/2010
Test Number:	1	Test Time:	9:11:42 AM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.10 deg C P
Humidity	10.0 -- 70.0	49.0 %RH P
Velocity	4.20 -- 4.40	4.36 m/s P
Probe Acceleration	13.0 -- 18.0	15.9 g P
Shoulder Deflection	28.0 -- 37.0	29.1 mm P
T1 Acceleration	17.0 -- 22.0	21.2 g P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____
Supervisor: **D. Travale** Signature: _____

Test ID: **Shoulder**

Test Time: **9:11:42 AM**

Test Date: **9/17/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66927	4/20/2010
Servo	180-3885	DS-1154	3/26/2010
Endevco	7264-2000	P58884	3/29/2010

Test ID: **Shoulder**

Test Time: **9:11:42 AM**

Test Date: **9/17/2010**

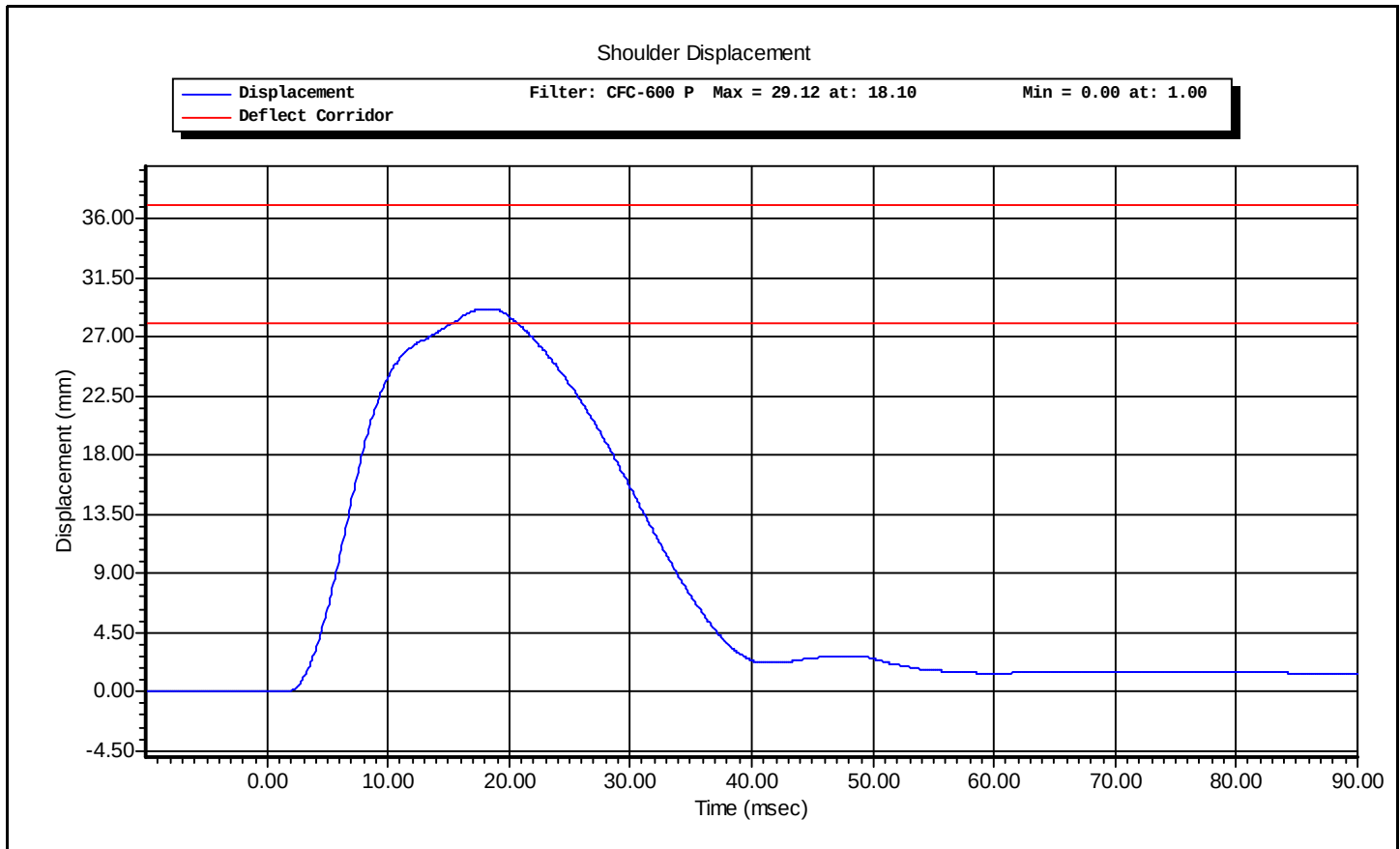


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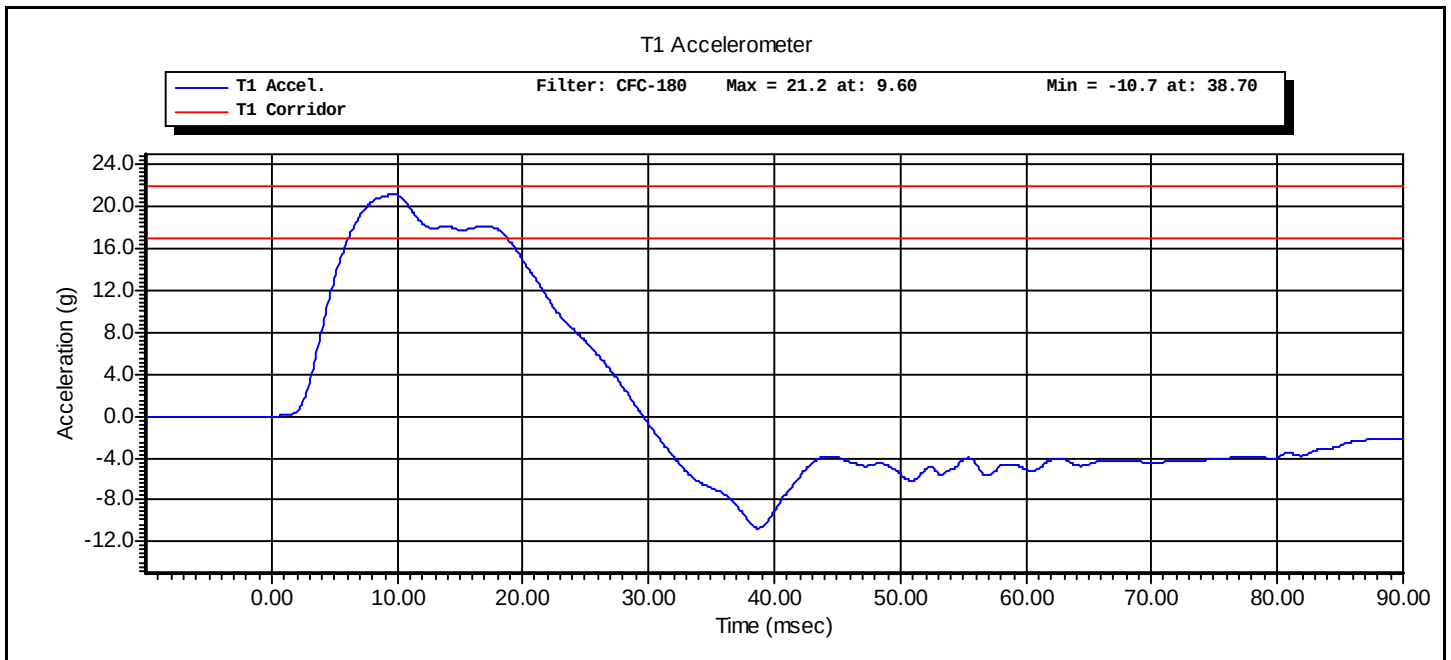
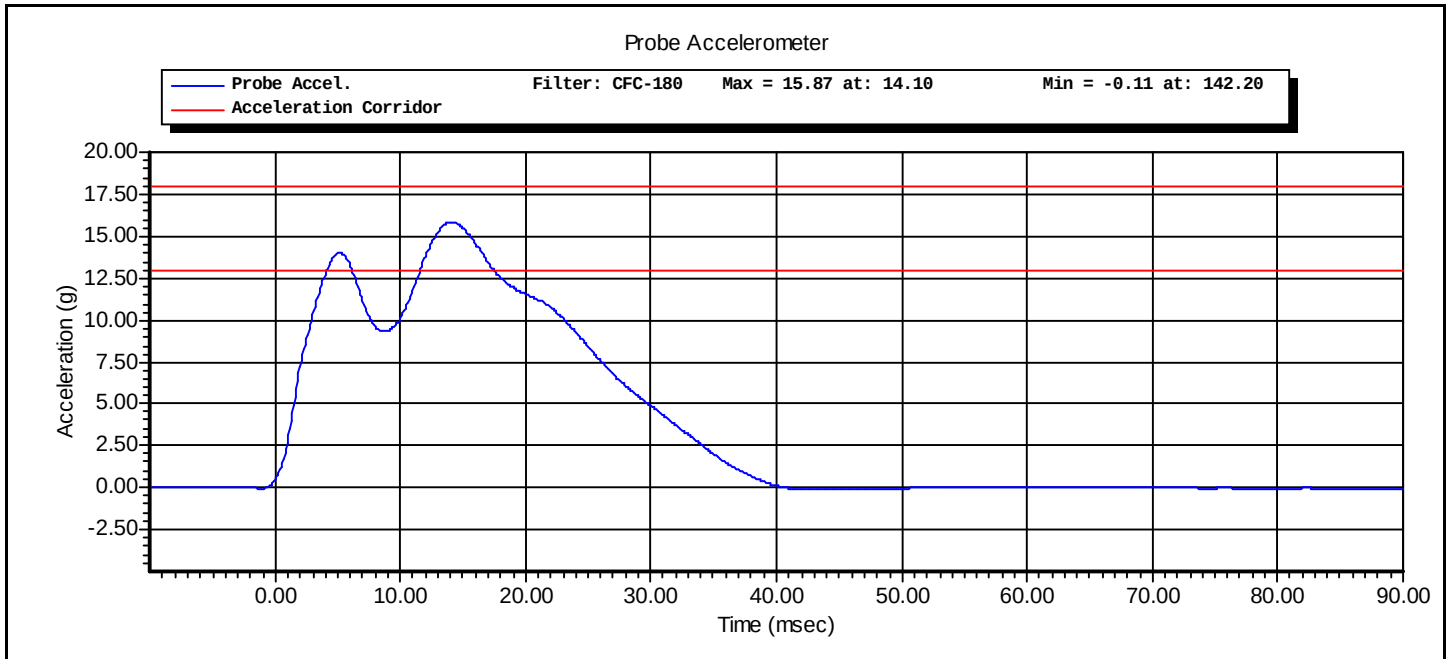
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	304		
Test ID:	Shoulder	Test Date:	9/17/2010
Test Number:	1	Test Time:	9:11:42 AM



Test ID: **Shoulder**

Test Time: **9:11:42 AM**

Test Date: **9/17/2010**





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VERIFICATION REPORT

Test Name:	Thorax Impact with Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 304		
Test ID:	Thorax With Arm	Test Date:	9/17/2010
Test Number:	1	Test Time:	2:13:03 PM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	22.2 deg C	P
Humidity	10	--	70	40 %RH	P
Velocity	6.60	--	6.80	6.65 m/s	P
Probe Acceleration after 5ms	30.0	--	36.0	34.1 g	P
Upper Thorax Rib Deflection	25.0	--	32.0	27.1 mm	P
Mid Thorax Rib Deflection	30.0	--	36.0	31.1 mm	P
Lower Thorax Rib Deflection	32.0	--	38.0	33.5 mm	P
Upper Spine Acceleration ("y")	34.0	--	43.0	42.0 g	P
Lower Spine Acceleration ("y")	29.0	--	37.0	33.4 g	P
Shoulder Deflection	31.0	--	40.0	34.6 mm	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____
Supervisor: **D. Travale** Signature: _____

Test ID: **Thorax With Arm** Test Time: **2:13:03 PM**

Test Date: **9/17/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66927	4/20/2010
Servo	180-3885	DS-1188	3/26/2010
Servo	180-3885	DS-1269	3/26/2010
Servo	180-3885	DS-1260	3/26/2010
Endevco	7264-2000	P58884	3/29/2010
Endevco	7264-2000	P58839	3/29/2010
Servo	180-3885	DS-1154	3/26/2010

Test ID: **Thorax With Arm** Test Time: **2:13:03 PM**

Test Date: **9/17/2010**

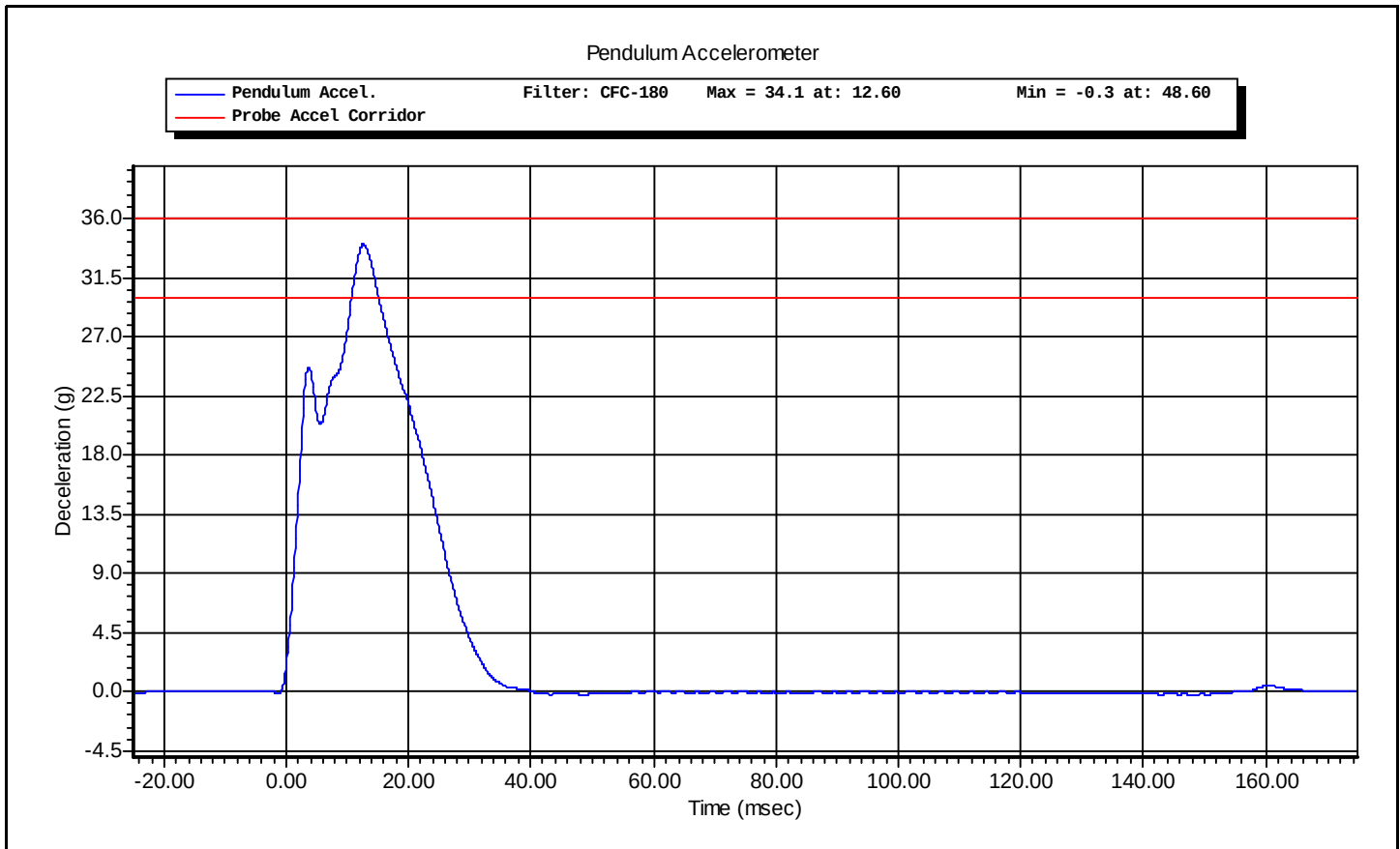


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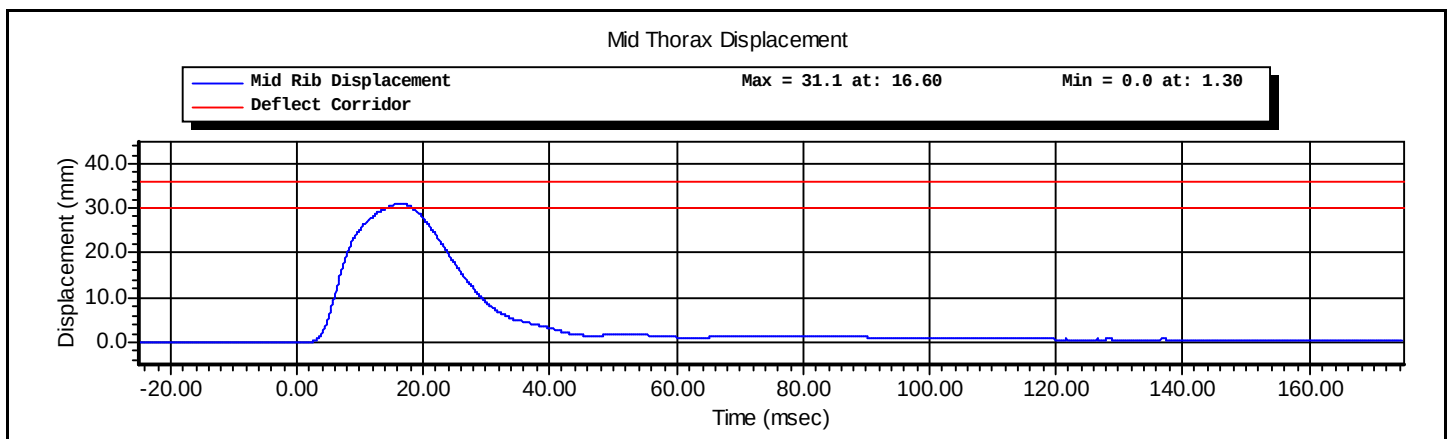
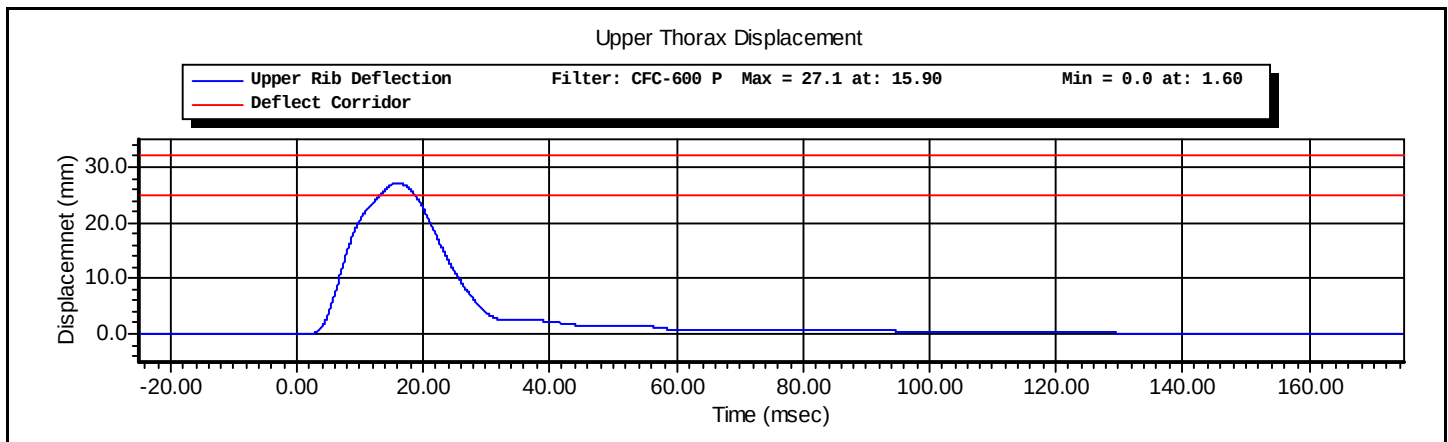
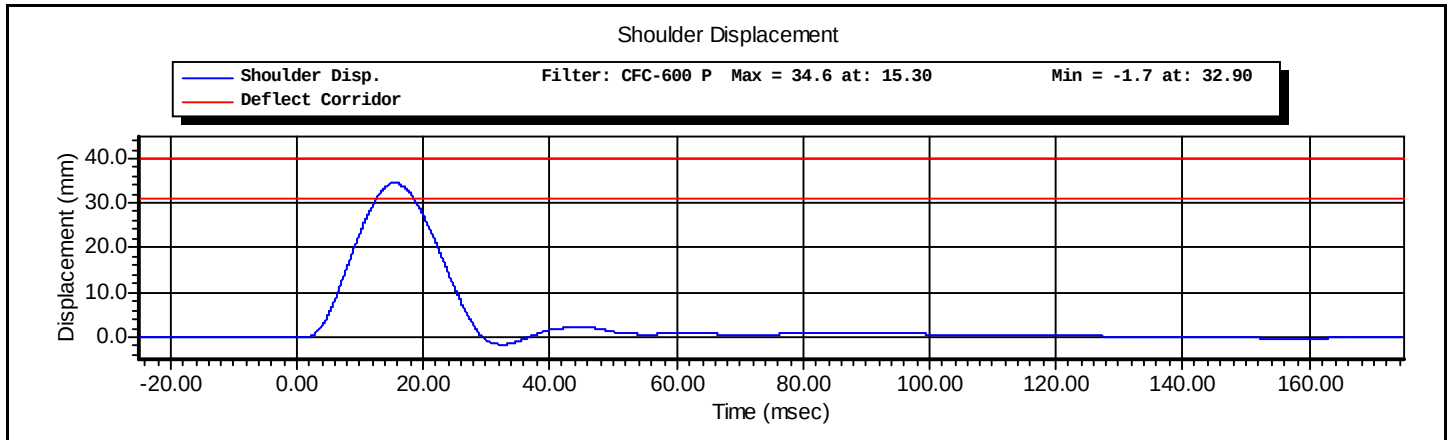
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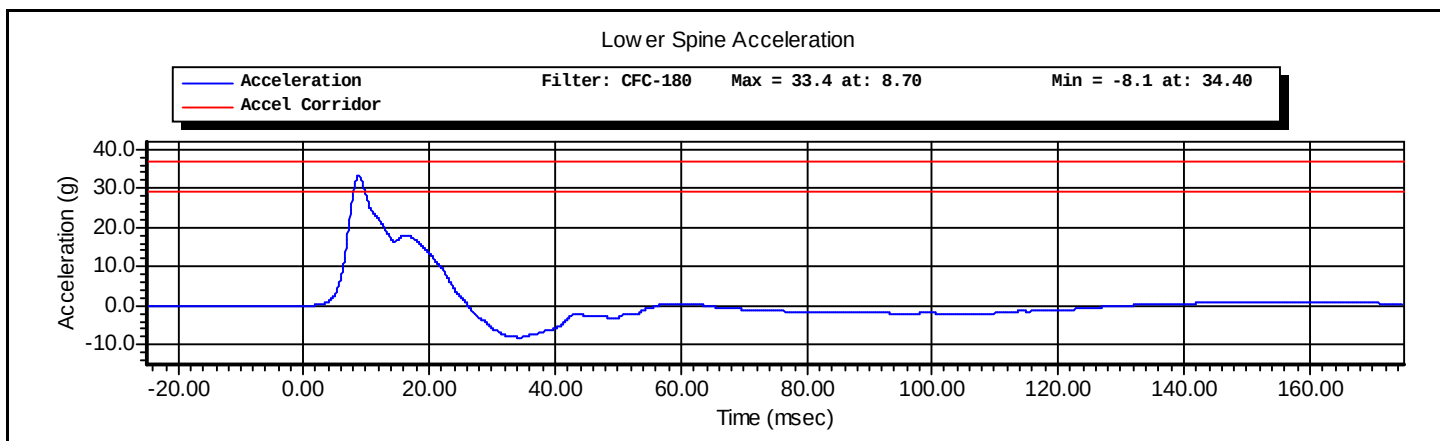
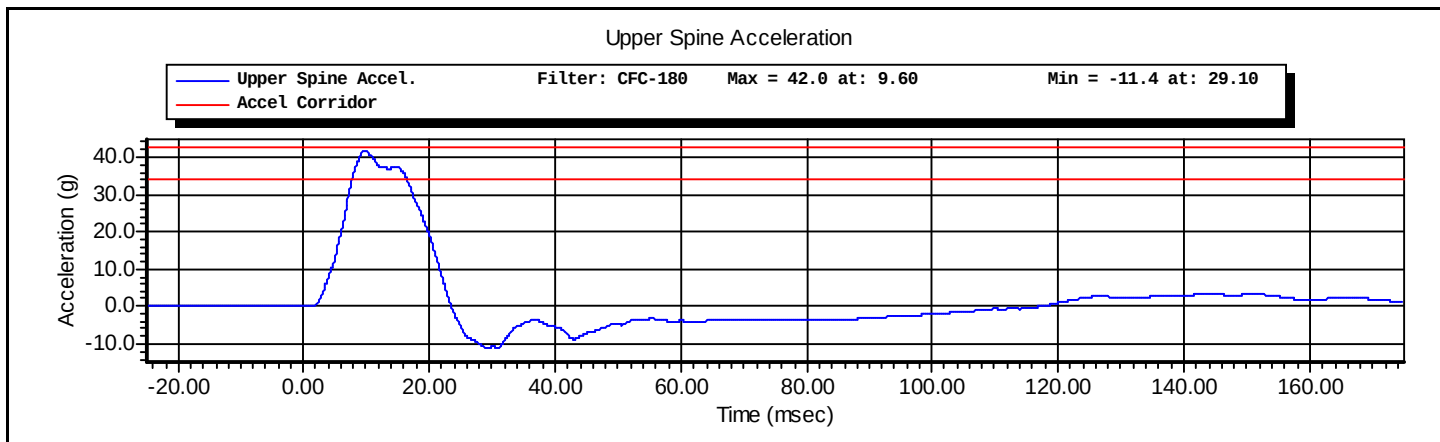
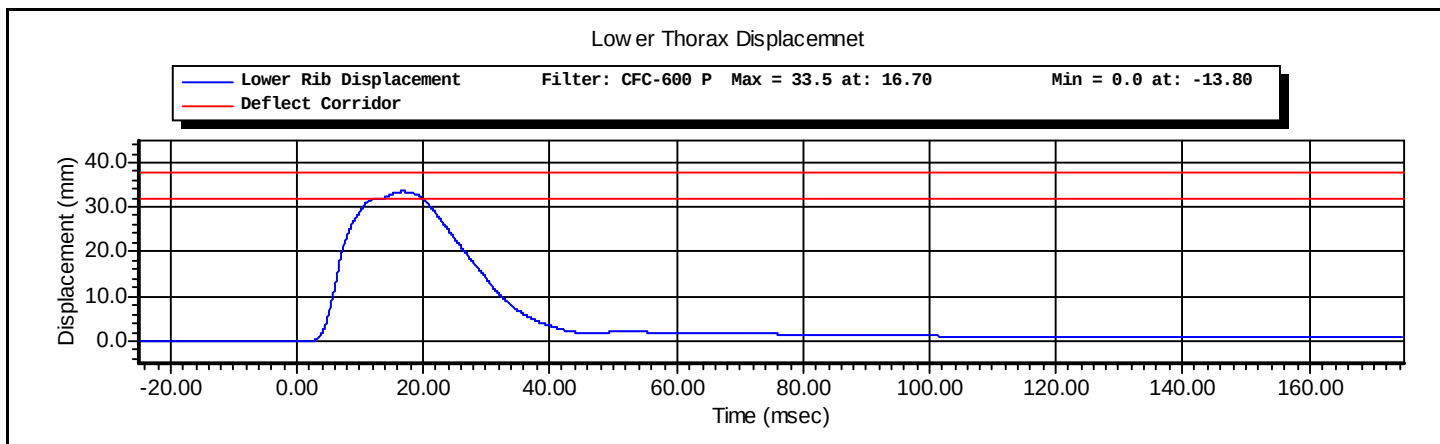
Test Name:	Thorax Impact with Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 304		
Test ID:	Thorax With Arm	Test Date:	9/17/2010
Test Number:	1	Test Time:	2:13:03 PM



Test ID: **Thorax With Arm** Test Time: **2:13:03 PM**

Test Date: **9/17/2010**







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VERIFICATION REPORT

Test Name:	Thorax Impact without Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	304		
Test ID:	Thorax Without Arm	Test Date:	9/17/2010
Test Number:	3	Test Time:	11:09:01 AM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	22.2 deg C	P
Humidity	10	--	70	49 %RH	P
Velocity	4.20	--	4.40	4.27 m/s	P
Probe Acceleration	14.0	--	18.0	16.6 g	P
Upper Thorax Rib Deflection	32.0	--	40.0	35.9 mm	P
Mid Thorax Rib Deflection	39.0	--	45.0	40.9 mm	P
Lower Thorax Rib Deflection	35.0	--	43.0	37.8 mm	P
Upper Spine Acceleration T1	13.0	--	17.0	16.8 g	P
Lower Spine Acceleration T12	7.0	--	11.0	10.1 g	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____
Supervisor: **D. Travale** Signature: _____

Test ID: **Thorax Without Arm** Test Time: **11:09:01 AM**

Test Date: **9/17/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66927	4/20/2010
Servo	180-3885	DS-1188	3/26/2010
Servo	180-3885	DS-1269	3/26/2010
Servo	180-3885	DS-1260	3/26/2010
Endevco	7264-2000	P58884	3/29/2010
Endevco	7264-2000	P58839	3/29/2010

Test ID: **Thorax Without Arm** Test Time: **11:09:01 AM**

Test Date: **9/17/2010**

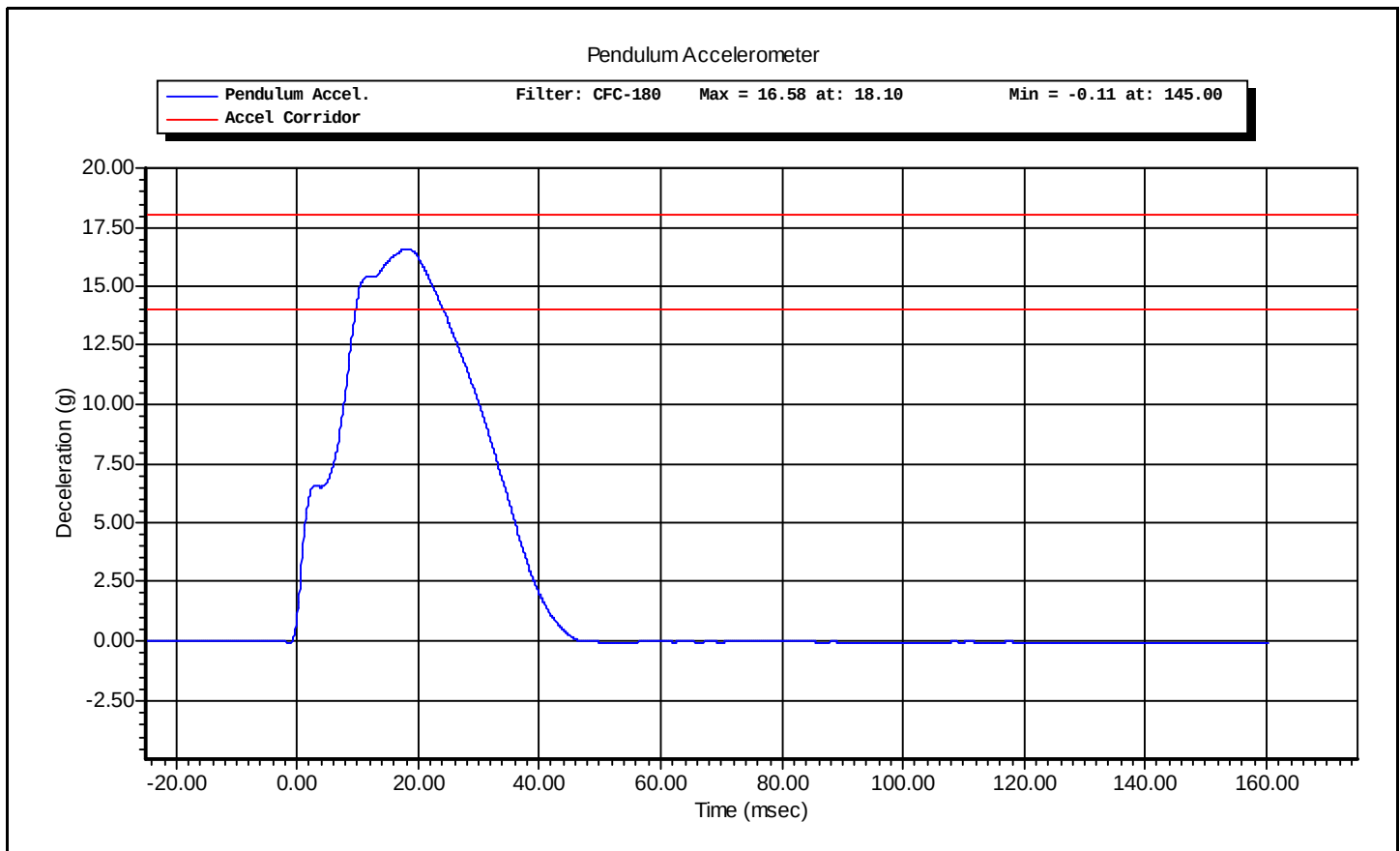


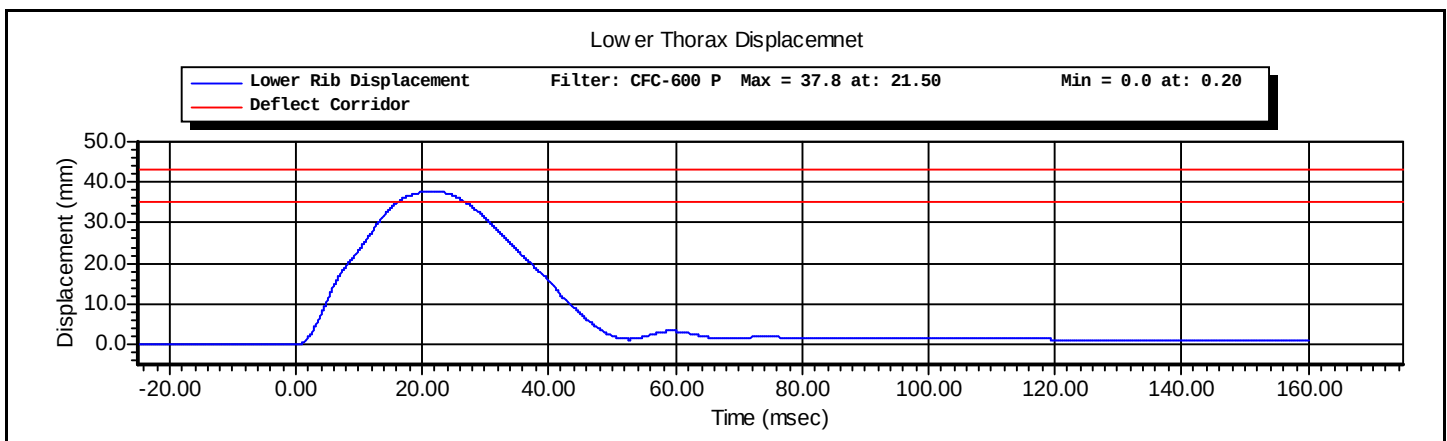
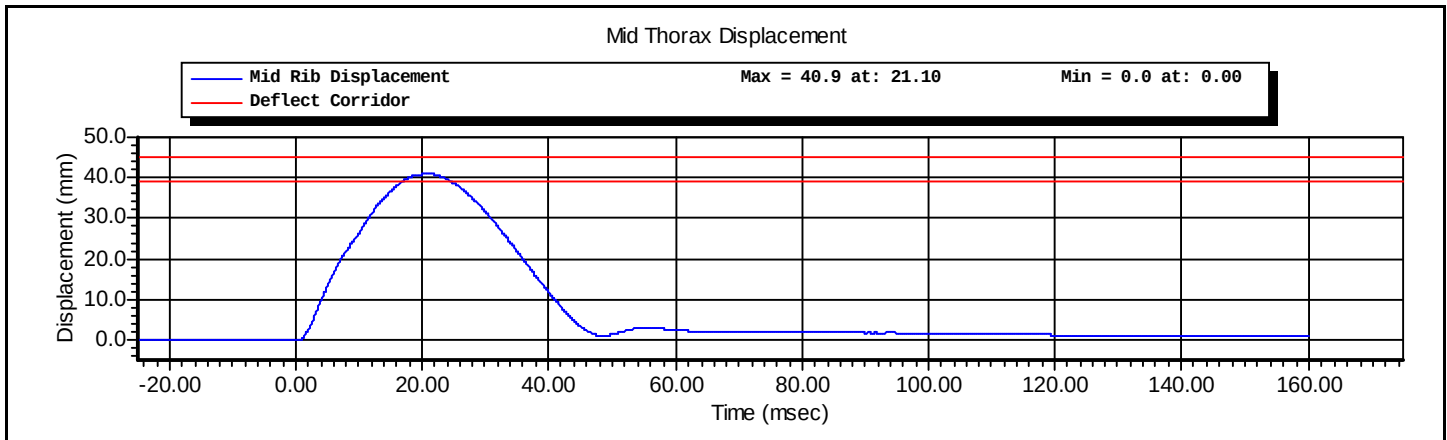
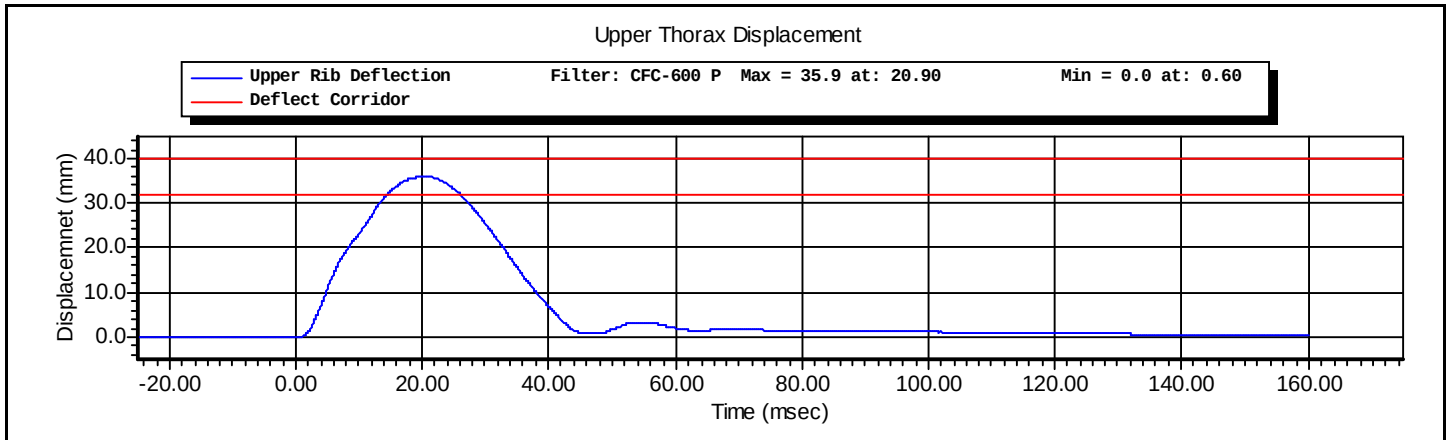
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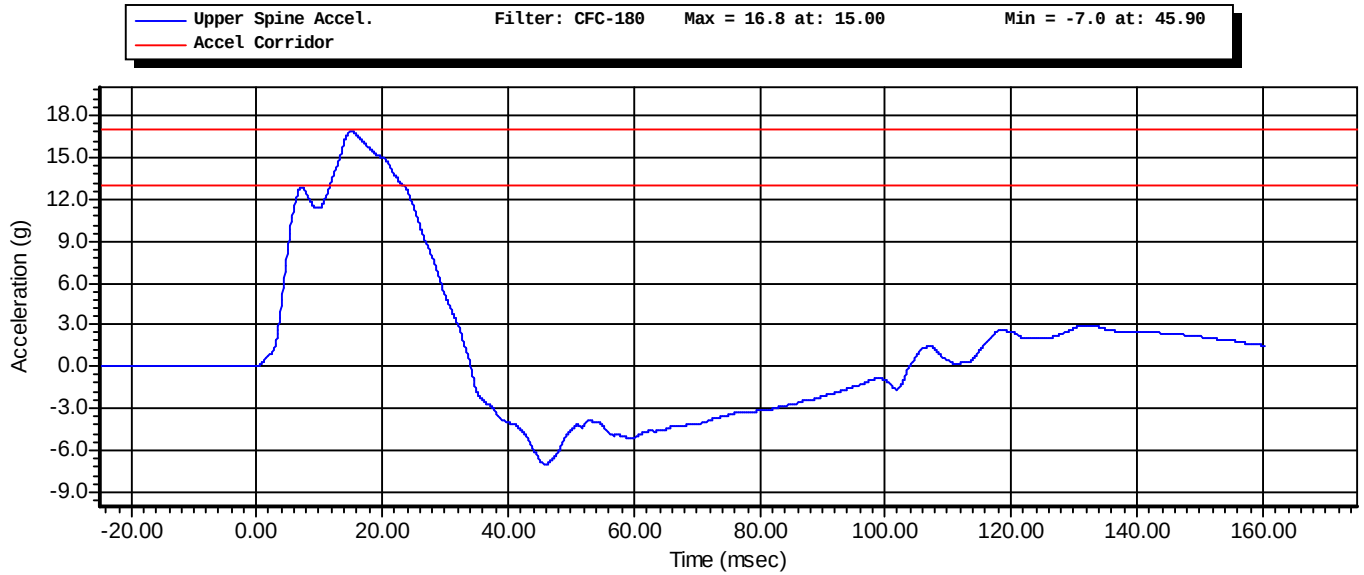
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Test Name:	Thorax Impact without Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	304		
Test ID:	Thorax Without Arm	Test Date:	9/17/2010
Test Number:	3	Test Time:	11:09:01 AM

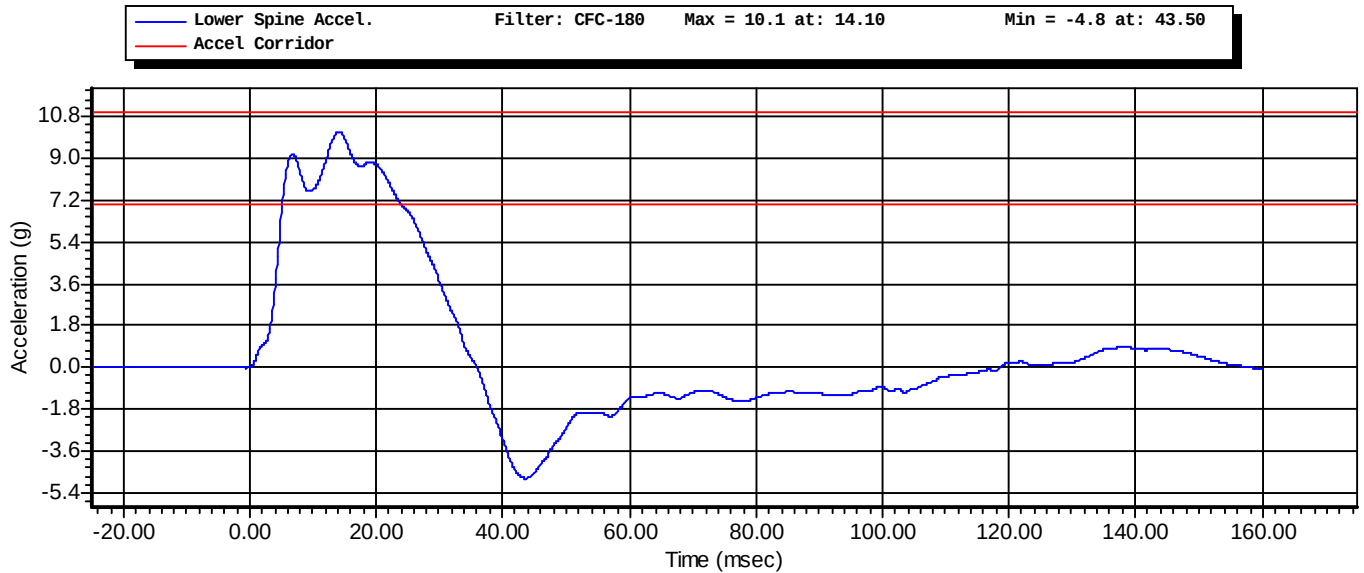




Upper Spine Acceleration



Lower Spine Acceleration





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VERIFICATION REPORT

Test Name:	Abdominal Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	304		
Test ID:	Abdomen	Test Date:	9/17/2010
Test Number:	1	Test Time:	11:40:27 AM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	22.2 deg C	P
Humidity	10	--	70	48 %RH	P
Velocity	4.20	--	4.40	4.36 m/s	P
Probe Acceleration	12.0	--	16.0	15.6 g	P
Upper Abdominal Rib Deflection	36.0	--	47.0	40.6 mm	P
Lower Abdominal Rib Deflection	33.0	--	44.0	39.5 mm	P
Lower Spine Acceleration - T12	9.0	--	14.0	11.9 g	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

Test ID: **Abdomen**

Test Time: **11:40:27 AM**

Test Date: **9/17/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66927	4/20/2010
Servo	180-3885	DS-1207	3/26/2010
Servo	180-3885	DS-1204	3/26/2010
Endevco	7264-2000	P58839	3/29/2010

Test ID: **Abdomen**

Test Time: **11:40:27 AM**

Test Date: **9/17/2010**

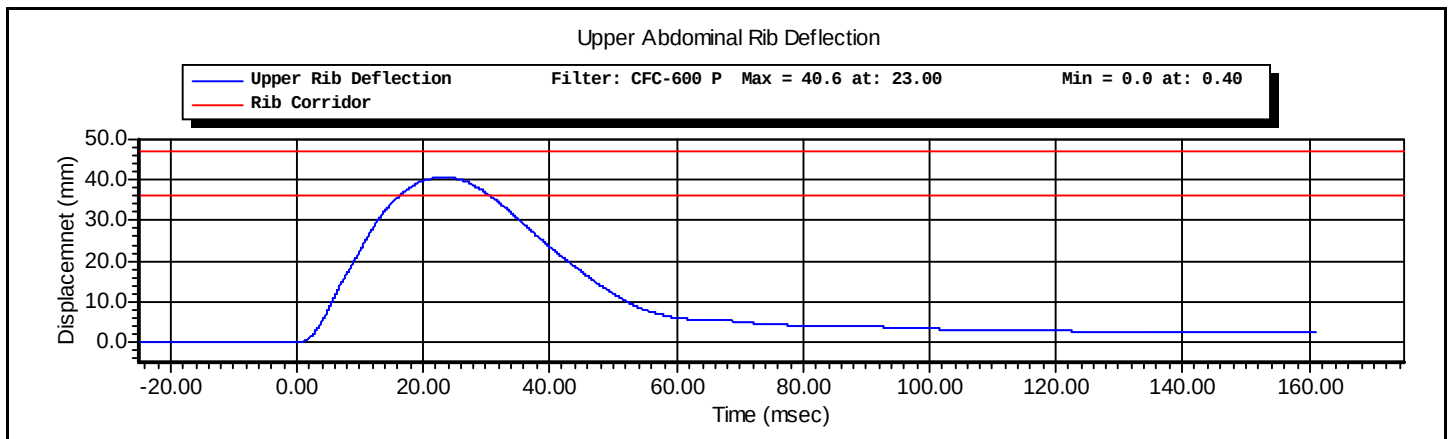
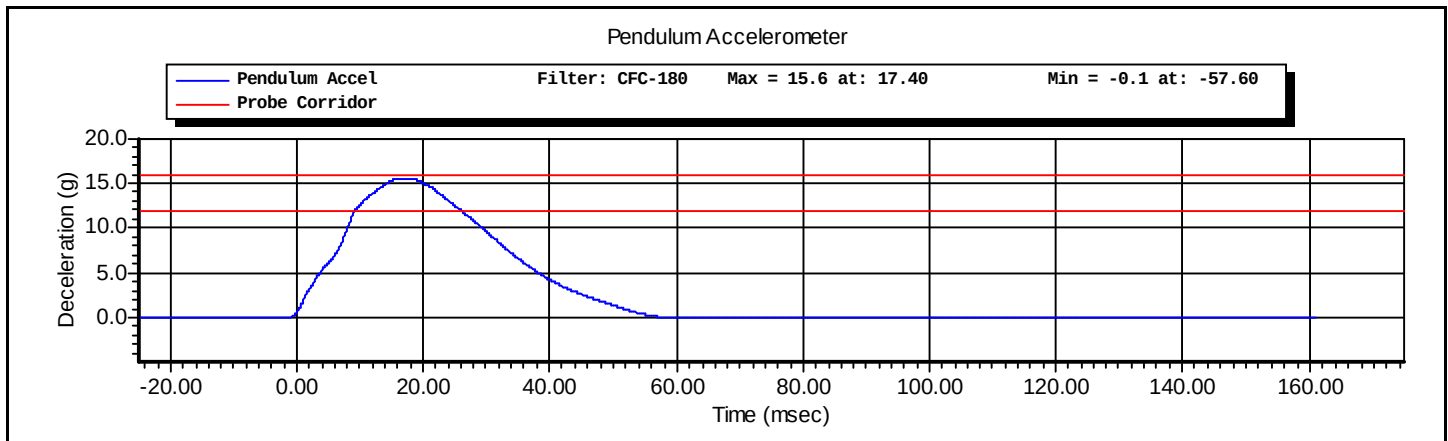


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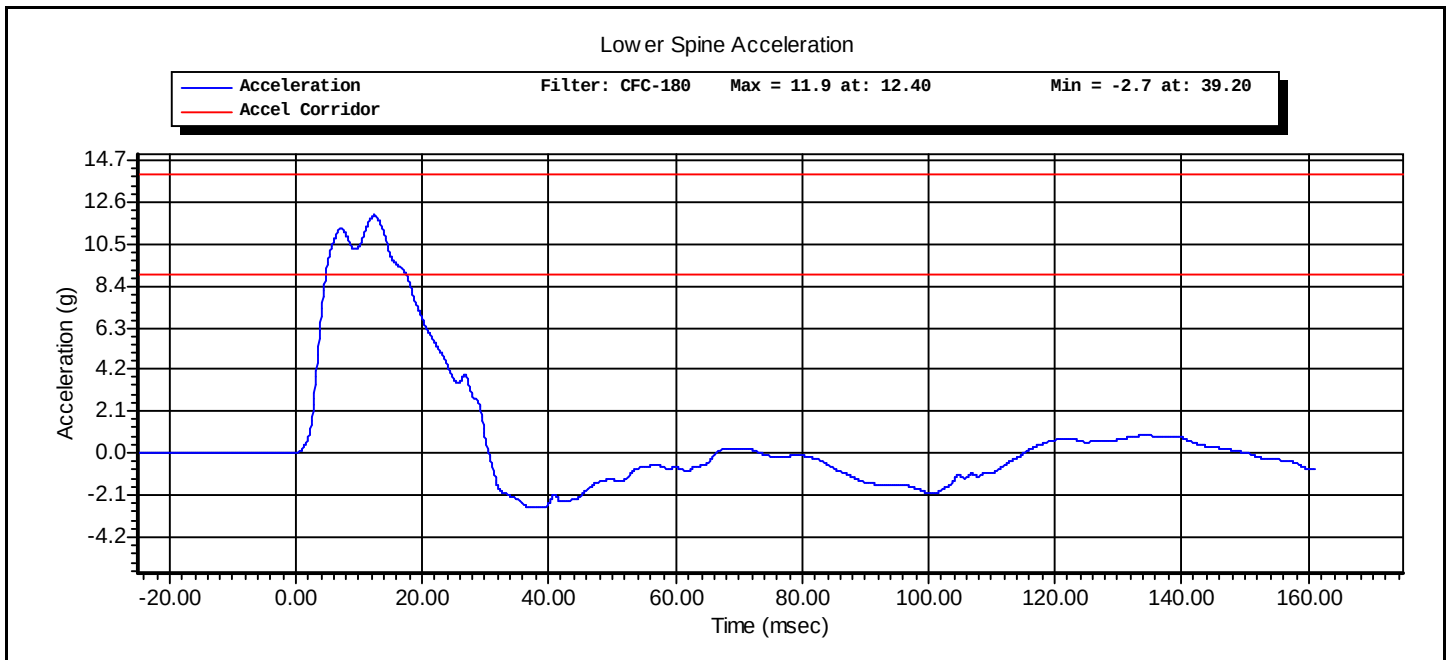
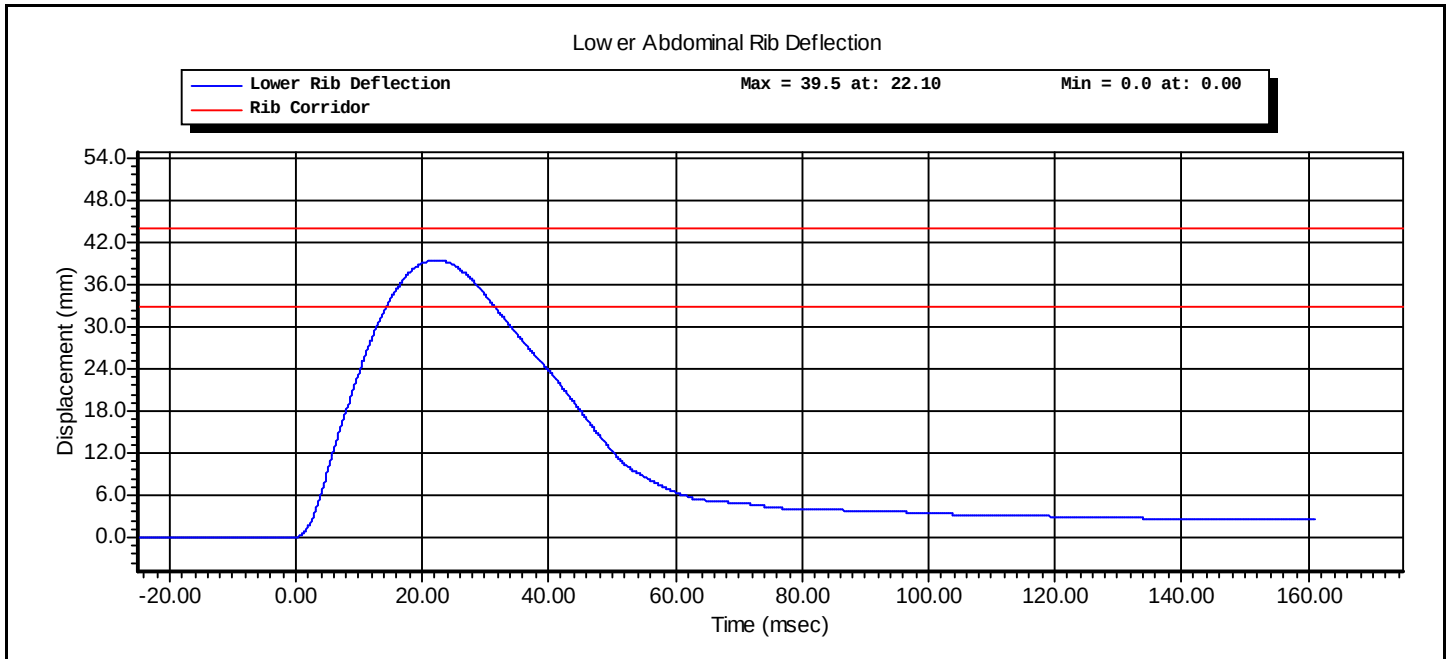
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	304		
Test ID:	Abdomen	Test Date:	9/17/2010
Test Number:	1	Test Time:	11:40:27 AM



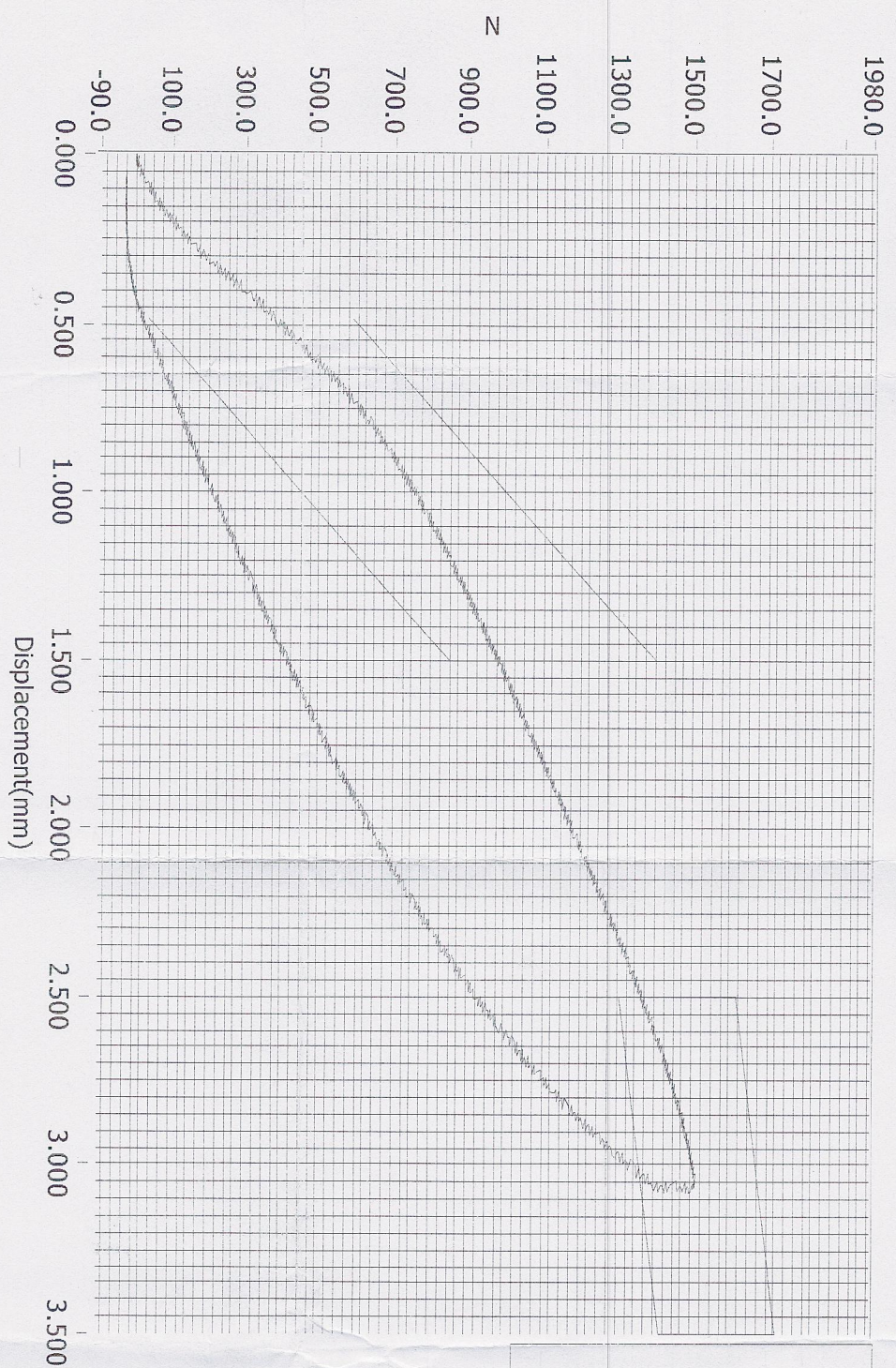
Test ID: **Abdomen**

Test Time: **11:40:27 AM**

Test Date: **9/17/2010**



Resultant Data - SIDIIs Plug Compression



Loading Curve	<
Boundary Limit Upper	<
Boundary Limit Lower	<
Peak Load Upper	<
Peak Load Lower	<
Peak Defl Upper	<
Peak Defl Lower	<

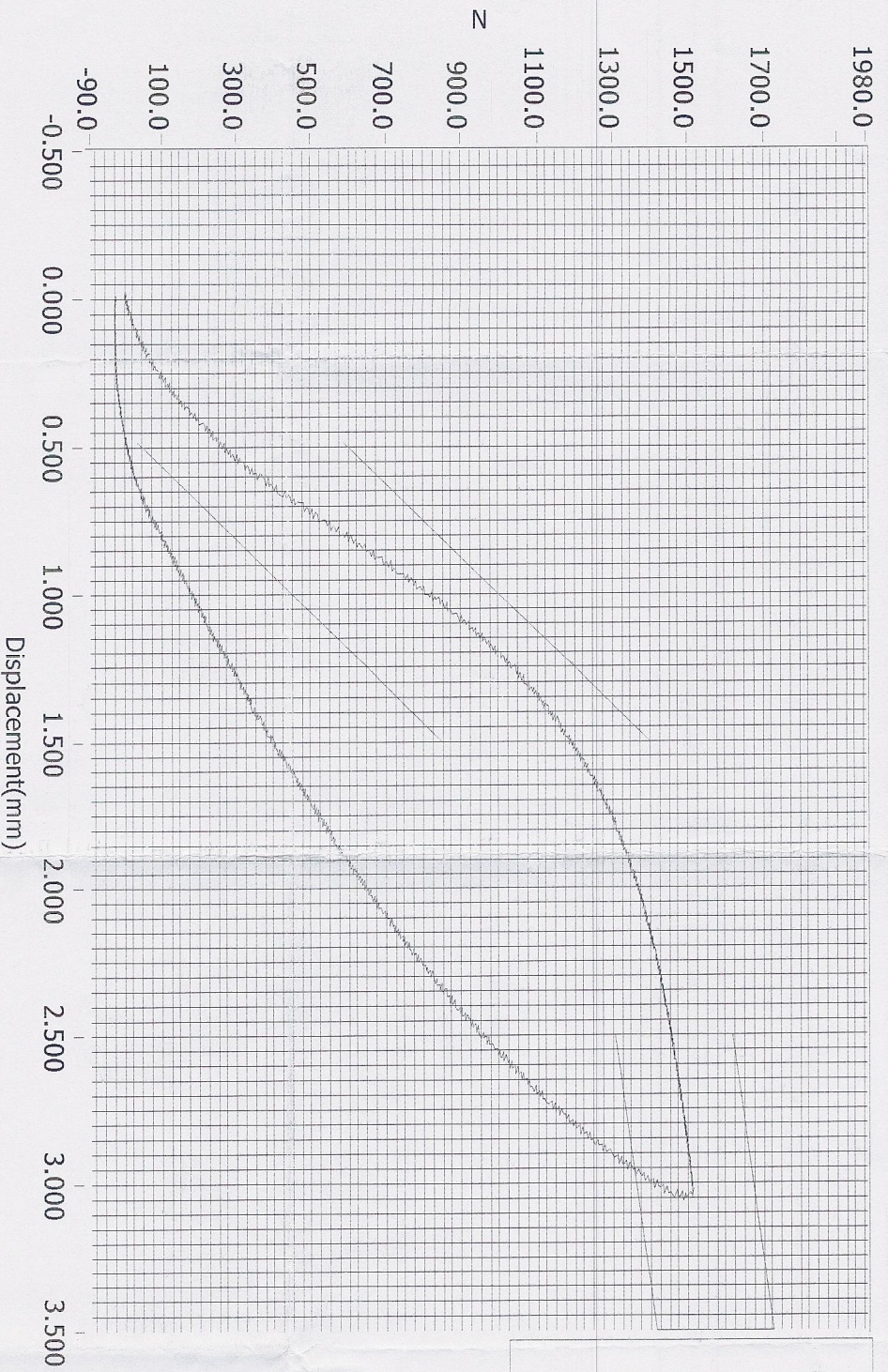
ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
Cert ID	ATD Serial Number	ATD Type	
	12785	SIDIIs	

Current Date : 7/16/2007

Current Time : 15:35:56

Resultant Data - SIDIIs Plug Compression



Loading Curve	<
Boundary Limit Upper	<
Boundary Limit Lower	<
Peak Load Upper	<
Peak Load Lower	<
Peak Defl Upper	<
Peak Defl Lower	<

ATD Calibration Lab

Test ID

Part Serial Number

Test Date

Test Time

Cert ID

ATD Serial Number

ATD Type

12539

SIDIIs

Current Date : 7/10/2007

Current Time : 13:03:26



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VERIFICATION REPORT

Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Acetabulum Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	304		
Test ID:	Pelvis Acetabulum	Test Date:	9/17/2010
Test Number:	1	Test Time:	12:13:50 PM

Comments:

Pelvis Plug Used for Certification:
FTSS S/N 12785
Force @ 3mm = 1504N

Pelvis Plug Used for Full Scale Test:
FTSS S/N 12539
Force @ 3mm = 1508N

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	22.2 deg C	P
Humidity	10	--	70	49 %RH	P
Velocity	6.60	--	6.80	6.67 m/s	P
Peak Probe Acceleration	38.0	--	47.0	43.1 g	P
Peak Pelvis Acceleration	34.0	--	42.0	38.1 g	P
Peak Acetabulum Force	3.60	--	4.30	4.04 kN	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

Test ID: **Pelvis Acetabulum** Test Time: **12:13:50 PM**

Test Date: **9/17/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66927	4/20/2010
Endevco	7264-2000	P49217	4/12/2010
DentonATD	3249J	LC-267Fy	4/9/2010

Test ID: **Pelvis Acetabulum** Test Time: **12:13:50 PM**

Test Date: **9/17/2010**



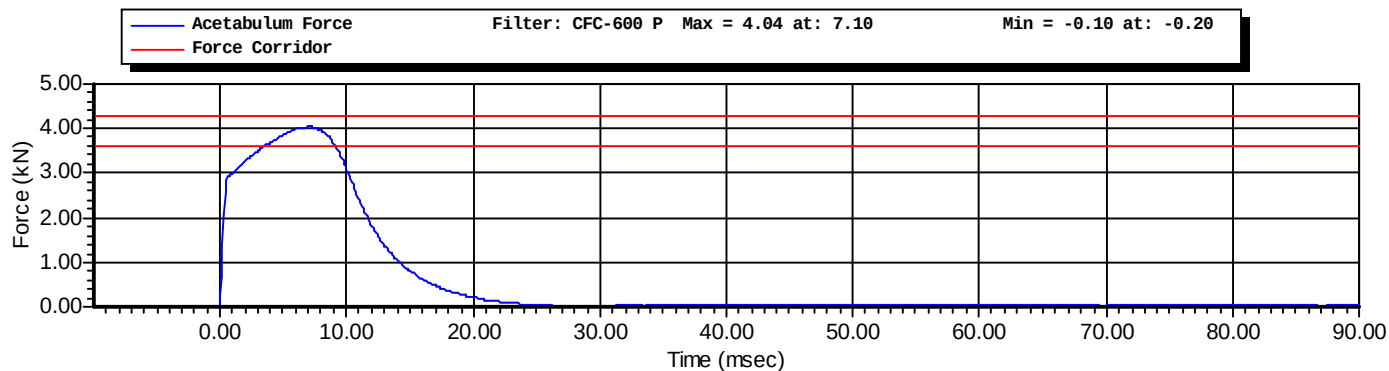
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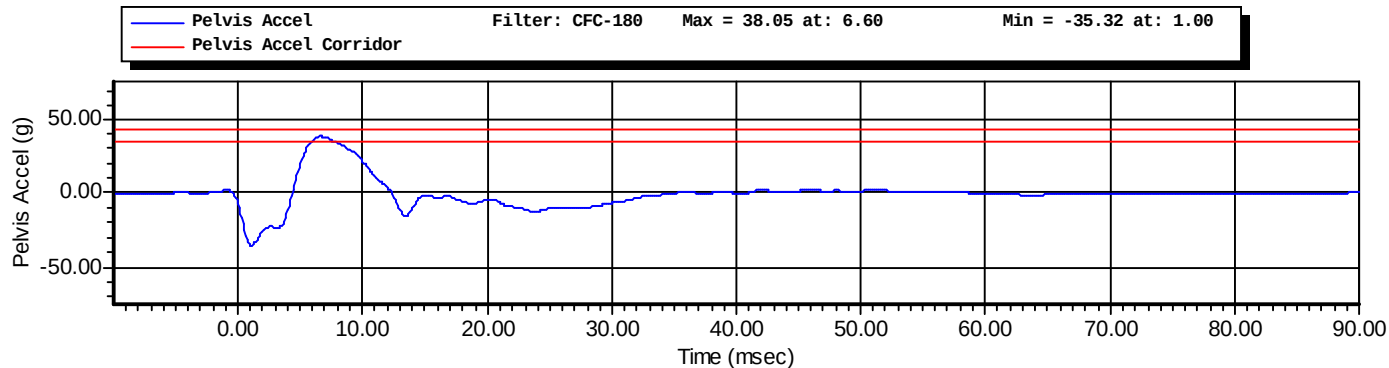
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Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Acetabulum Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	304		
Test ID:	Pelvis Acetabulum	Test Date:	9/17/2010
Test Number:	1	Test Time:	12:13:50 PM

Acetabulum Force

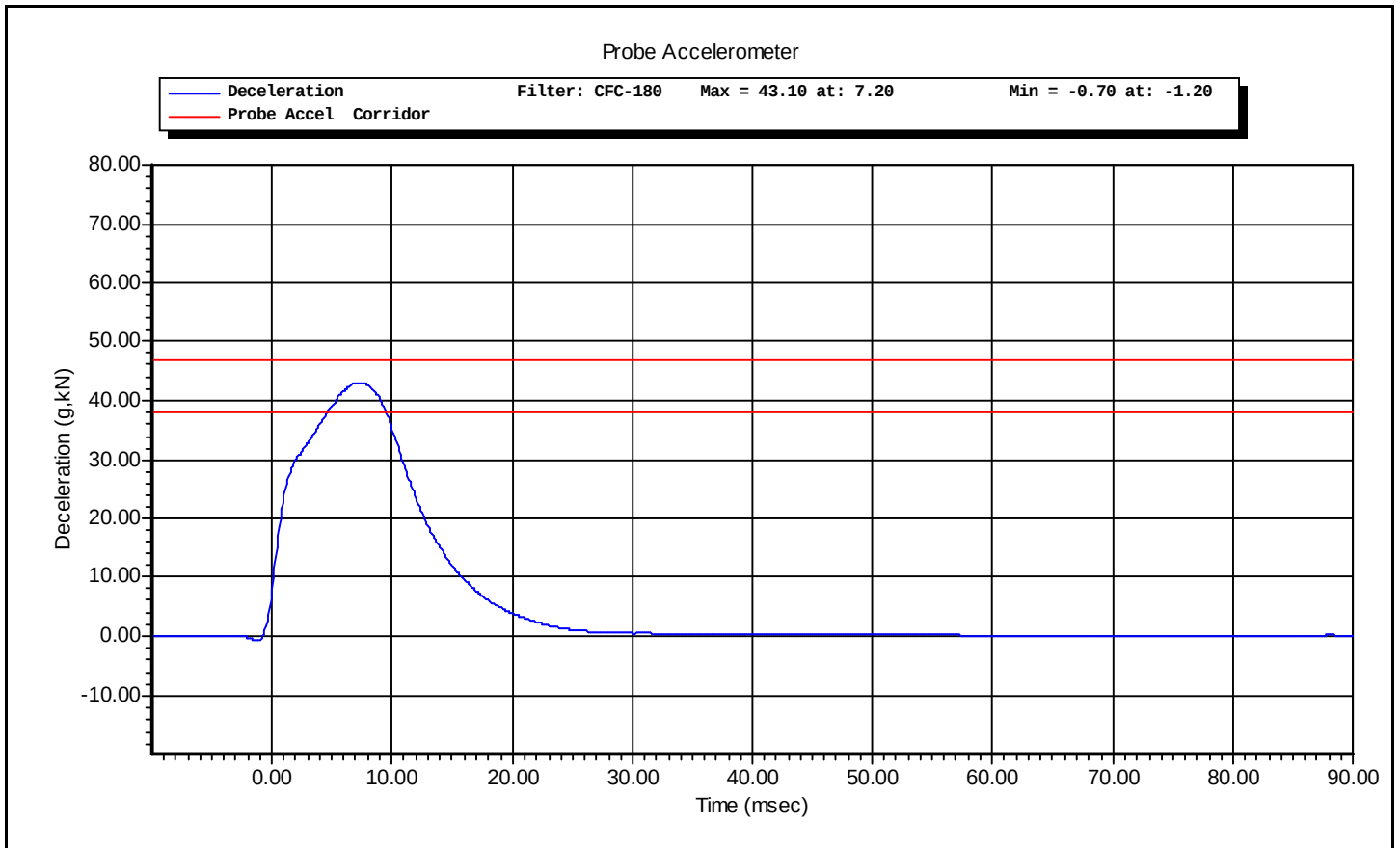


Pelvis Accelerometer



Test ID: **Pelvis Acetabulum** Test Time: **12:13:50 PM**

Test Date: **9/17/2010**





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VERIFICATION REPORT

Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Iliac Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 304		
Test ID:	Pelvis Iliac	Test Date:	9/27/2010
Test Number:	1	Test Time:	3:36:17 PM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.0 deg C P
Humidity	10 -- 70	52 %RH P
Velocity	4.20 -- 4.40	4.33 m/s P
Peak Probe Acceleration	36.0 -- 45.0	42.4 g P
Peak Pelvis Acceleration	28.0 -- 39.0	37.4 g P
Peak Iliac Force	4.10 -- 5.10	4.98 kN P

All test parameters are within specifications

Technician: **S. Zito** Signature: _____
Supervisor: **D. Travale** Signature: _____

Test ID: **Pelvis Iliac**

Test Time: **3:36:17 PM**

Test Date: **9/27/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66927	4/20/2010
Endevco	7264-2000	P49217	4/12/2010
DentonATD	3228J	LC-281 Fy	4/9/2010

Test ID: **Pelvis Iliac**

Test Time: **3:36:17 PM**

Test Date: **9/27/2010**

Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Iliac Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 304		
Test ID:	Pelvis Iliac	Test Date:	9/27/2010
Test Number:	1	Test Time:	3:36:17 PM

