

REPORT NUMBER: NCAP-CAL-11-001

**NEW CAR ASSESSMENT PROGRAM (NCAP)
Moving Deformable Barrier Side Impact Test**

**Toyota Motor Manufacturing
2011 Toyota Sienna
7-Passenger Minivan**

NHTSA NUMBER: MB5104

**PREPARED BY:
CALSPAN CORPORATION
P.O. BOX 400
BUFFALO, NEW YORK 14225**



Test Date: June 17, 2010

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
MAIL CODE: NVS-111
1200 NEW JERSEY AVE SE, ROOM W43-410
WASHINGTON, D.C. 20590**

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Date: September 1, 2010

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

1. Report No. NCAP-CAL-11-001	2. Government Accession No.	3. Recipient's Catalog No.																																													
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact Testing of 2011 Toyota Sienna 7-Passenger Minivan NHTSA No.: MB5104		5. Report Date June 17, 2010																																													
		6. Performing Organization Code CAL																																													
7. Author(s) Vincent M. Paolini, Project Engineer		8. Performing Organization Report No. tr2446																																													
9. Performing Organization Name and Address Calspan Corporation Transportation Sciences Center P.O. Box 400 Buffalo, New York 14225		10. Work Unit No.																																													
		11. Contract or Grant No. DTNH22-09-D-00126																																													
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards 1200 New Jersey Ave., SE, Room W43-410 Washington, D.C. 20590		13. Type of Report and Period Covered: <i>Final Report</i> June 2010																																													
		14. Sponsoring Agency Code NPS-10																																													
15. Supplementary Notes																																															
16. Abstract A 55/28 kph 90° Impact Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2011 Toyota Sienna 7-Passenger Minivan in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted at the Calspan Corporation Crash Test Facility in Buffalo, New York, on June 17, 2010. The impact velocity of the Moving Deformable Barrier (MDB) was 61.8 km/h, and the ambient temperature at the struck side (driver side) of the vehicle was 21.7°C. The target vehicle's maximum post test static crush was 250 mm at level 3. The test vehicle's performance was as follows: <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th colspan="2"></th> <th colspan="2" style="text-align: center;">Driver ATD (ES-2re)</th> </tr> <tr> <th style="text-align: left;">Measurement Description</th> <th style="text-align: center;">Units</th> <th style="text-align: center;">Threshold</th> <th style="text-align: center;">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">1000</td> <td style="text-align: center;">54</td> </tr> <tr> <td>Maximum Thorax Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">44</td> <td style="text-align: center;">18</td> </tr> <tr> <td>Total Abdominal Force</td> <td style="text-align: center;">N</td> <td style="text-align: center;">2500</td> <td style="text-align: center;">719</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td style="text-align: center;">N</td> <td style="text-align: center;">6000</td> <td style="text-align: center;">2903</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th colspan="2"></th> <th colspan="2" style="text-align: center;">Passenger ATD (SID-IIs)</th> </tr> <tr> <th style="text-align: left;">Measurement Description</th> <th style="text-align: center;">Units</th> <th style="text-align: center;">Threshold</th> <th style="text-align: center;">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">1000</td> <td style="text-align: center;">107</td> </tr> <tr> <td>Lower Spine Acceleration</td> <td style="text-align: center;">G</td> <td style="text-align: center;">82</td> <td style="text-align: center;">42</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td style="text-align: center;">N</td> <td style="text-align: center;">5525</td> <td style="text-align: center;">2654</td> </tr> </tbody> </table>						Driver ATD (ES-2re)		Measurement Description	Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	54	Maximum Thorax Rib Deflection	mm	44	18	Total Abdominal Force	N	2500	719	Pubic Symphysis Force	N	6000	2903			Passenger ATD (SID-IIs)		Measurement Description	Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	107	Lower Spine Acceleration	G	82	42	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2654
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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 MDB ES-2re 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 Room W43-410 Washington, D.C. 20590																																													
19. Security Class. (of this report) Unclassified	20. Security Class. (of this page) Unclassified	21. No. of Pages 266	22. Price																																												

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PURPOSE

This moving deformable barrier side impact test is part of the MY New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number DTNH22-09-D-00126. The purpose of this test is to generate comparative side impact performance in a 2011 Toyota Sienna 7-Passenger Minivan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated January 2010.

SUMMARY

A 2011 Toyota Sienna 7-Passenger Minivan was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.8 km/h (38.4mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Calspan Corporation Transportation Sciences Center on June 17, 2010. Pretest and post-test photographs of the test vehicle, the MDB and the dummies (ES-2re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated January 2010. The side impact event was documented by nine high-speed cameras. Camera locations are included in this report.

The Dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)
Head Accelerometers
Chest Rib 1 to Rib 3 Potentiometers
Abdomen Forward, Middle, and Rear Load Cells
Pubic Load Cell
Lower Spine Accelerometers

PASSENGER ATD (SID-IIs)
Head Accelerometers
Chest Upper, Middle, and Lower Rib Load Cells
Abdomen Upper and Lower Rib Load Cells
Acetabulum Load Cell
Iliac Load Cell
Lower Spine Accelerometers

Dummy injury values were recorded as follows:

	Driver ATD (ES-2re)		
Measurement Description	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	54.0
Maximum Thorax Rib Deflection	mm	44	18
Total Abdominal Force	N	2500	719
Pubic Symphysis Force	N	6000	2903

	Passenger ATD (SID-IIs)		
Measurement Description	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	107
Lower Spine Resultant Acceleration	G	82	42
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2654

Supplemental restraint information is given below:

SUPPLEMENTAL RESTRAINT INFORMATION

Restraint Type	Left Front (Driver)		Left Rear (Passenger)	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No	NA	NA
Knee Airbag	No	NA	NA	NA
Side Airbag – Side Curtain	Yes	Yes	Yes	Yes
Side Airbag – Torso	Yes	Yes	No	NA
Seat Belt Pretensioner	Yes	Yes	No	NA
Seat Belt Load Limiter	Yes	Yes	No	NA

GENERAL COMMENTS

None

SECTION 2
DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Toyota Sienna
Test Program: Side NCAP MDB

NHTSA No.: MB5104
Test Date: June 17, 2010

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MB5104
Model Year	2011
Make	Toyota Motor Manufacturing
Model	Sienna
Body Style	7-Passenger Minivan
VIN	5TDZK3DC0BS014343
Body Color	Red
Delivery Date	6/2/2010
Odometer Reading (km/mi)	85 miles
Dealer	Hoselton
Transmission	6-Speed
Final Drive	Automatic
Type/No. Cylinders	V6
Engine Displacement (L)	3.5
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	Yes
Driver Torso/Pelvis Airbag	No
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	No
Other	No

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Toyota Motor Manufacturing
Date of Manufacture	2/10

GVWR (kg)	2715
GAWR Front (kg)	1405
GAWR Rear (kg)	1405

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	2	3	7
Capacity Weight (VCW) (kg)				750.0
DSC x 68.04 (kg)				476.3
Cargo Weight (RCLW) (kg)				273.7 *

(A)

(B)

(A-B)

* Maximum allowable RCLW is 136 kg

VEHICLE SEAT TYPE

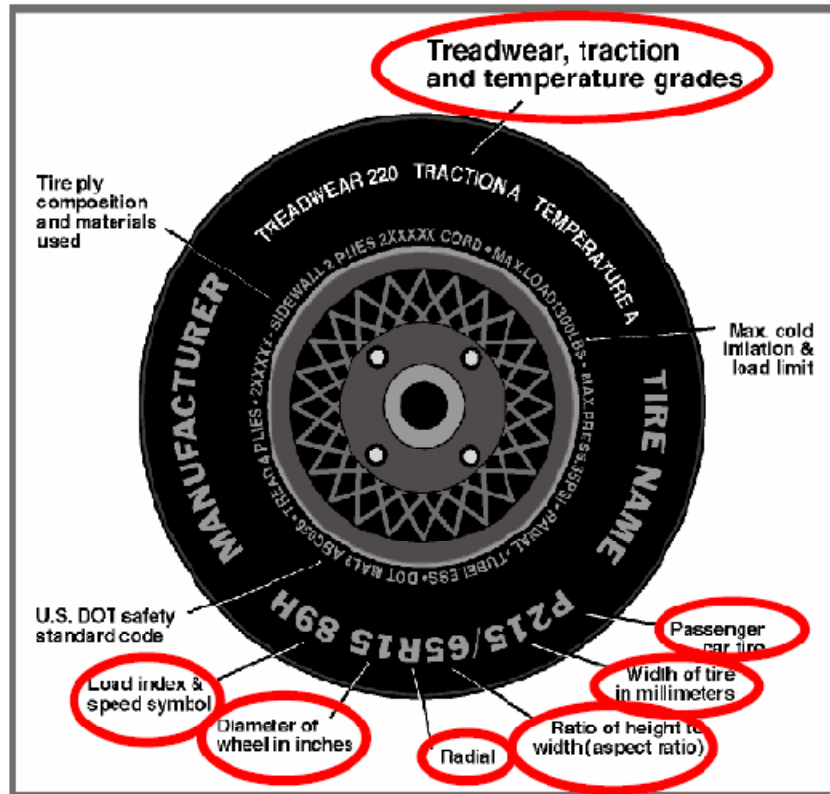
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	X	-	-		-	X	-
Rear or Second Row Seat	X	-	-	-	-	X	-
Third row seat	-	-	X	-	X	-	-

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

Test Vehicle: 2011 Toyota Sienna
 Test Program: Side NCAP MDB

NHTSA No.: MB5104
 Test Date: June 17, 2010

VEHICLE TIRE INFORMATION



	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	P235/60R17	P235/60R17
Tire Size on Vehicle	P235/60R17	P235/60R17
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Turanza	Turanza
Treadwear	560	560
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	1 Rayon + 2 Steel + 1 Nylon	1 Rayon + 2 Steel + 1 Nylon
Tire Plies Body	2 Rayon	2 Rayon
Load Index/Speed Symbol	100T	100T
Tire Material	-	-
DOT Safety Code Right	W20U CKD 0210	W20U CKD 0210
DOT Safety Code Left	W20U CKD 0210	W20U CKD 0210

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

Test Vehicle: 2011 ToyotaSienna
 Test Program: Side NCAP MDB

NHTSA No.: MB5104
 Test Date: June 17, 2010

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	566.0	419.0	985.0	621.5	547.0	1168.5	597.0	557.0	1154.0
Right	kg	545.5	406.5	952.0	542.5	483.0	1025.5	546.0	503.0	1049.0
Ratio	%	57.4	42.6	-	53.1	46.9	-	51.9	48.1	-
Totals	kg	1111.5	825.5	1937.0	1164.0	1030.0	2194.0	1143.0	1060.0	2203.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1937.0	(A)
Sum of Actual Weight of 2 P572 ATDS Used	kg	129.3	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	136.0	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	2202.3	(A+B+C)

TEST VEHICLE ATTITUDE AND CG

Measurement Description	Units	LF	RF	RR	LR	CG (aft of front axle)
Fully Loaded	mm	770	779	767	757	
As Tested (Fully Loaded $\pm$ 10 mm at each wheel well)	mm	766	780	775	761	1422

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	3028
Total Vehicle Length at Left Side	mm	5023
Total Vehicle Length at Centerline	mm	5098
Total Vehicle Length at Right Side	mm	5020
Weight of Ballast in Cargo Area	kg	105
Weight of Vehicle Components Removed	kg	None
Amount of Stoddard Solvent in Fuel Tank	L	72.7

Vehicle components removed to make Target Vehicle Test Weight:

None

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measured Parameter	Units	Value
Target Impact Point Aft of Front Axle	mm	508
Actual Impact Point Aft of Front Axle	mm	519

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

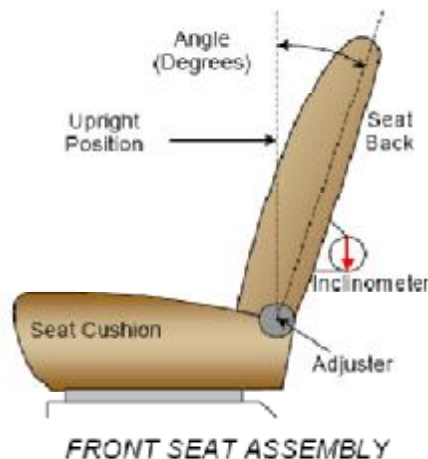
Test Vehicle: 2011 Toyota Sienna
 Test Program: Side NCAP MDB

NHTSA No.: MB5104
 Test Date: June 17, 2010

NORMAL DESIGN RIDING POSITION

Driver seat: An inclinometer was placed on the head restraint post and the seat was positioned to -3.7 degrees with the ATD in Seat.

Passenger Seat: The seat back was set to the forward-most locked position to achieve the head level requirement for the SID-IIs final position.



SEAT BACK ANGLES

	Degrees
Driver w/ Seated Dummy	-3.7
Passenger w/ Seated Dummy	-

SEAT FORE/AFT POSITIONS

The front outboard seat was placed in the mid-travel position while maintaining the seat cushion mid-angle position. The rear outboard seat was placed in the most rearward fore/aft position. The rear seat position did not have a cushion angle adjustment.

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	340	12 (Mid)
Rear Seat	366	23 (Full rear)

SEAT BELT UPPER ANCHORAGES

The driver seating position was placed in the first detent down from full up position. The left rear outboard seating position was placed in the lowest position.

SEAT BELT UPPER ANCHORAGES

	Total # of Positions	Placed in Position #
Driver Seat	4	2
Rear Seat	4	4

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

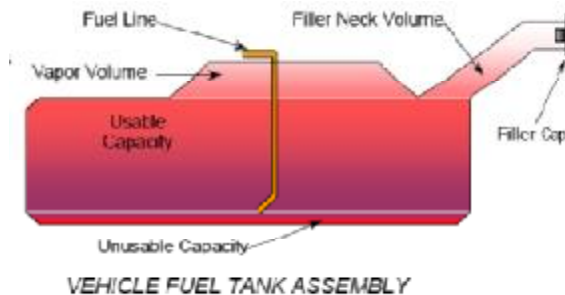
Test Vehicle: 2011 Toyota Sienna
 Test Program: Side NCAP MDB

NHTSA No.: MB5104
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FUEL TANK CAPACITY

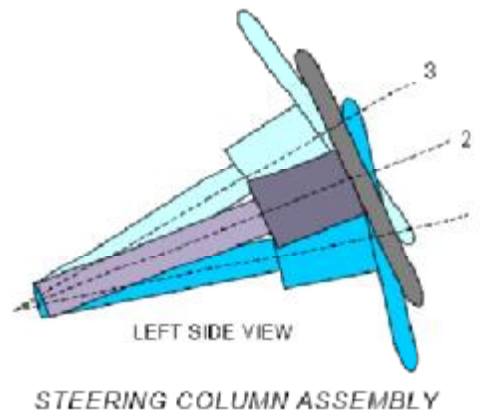
	Liters
Usable Capacity of "Standard Tank"	78.0
Usable Capacity of "Optional Tank"	NA
Usable Capacity Used for FMVSS 301	72.7
Actual Amount of Solvent Used	72.7

The fuel pump will operate when the key is in the "ON" position for approximately two seconds. The fuel filler pipe is located left rear side of vehicle.



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



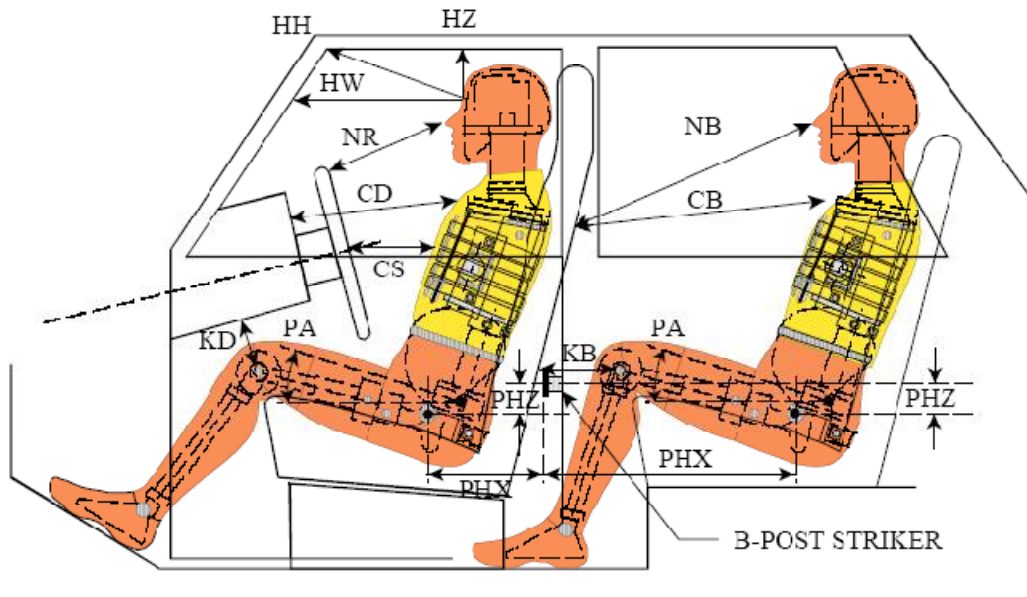
STEERING COLUMN POSITIONING

	Degrees	Fore/Aft Position (mm)
Lowermost - Position 1	24.7	
Geometric Center - Position 2	26.7	
Uppermost - Position 3	28.7	
Telescoping Steering Wheel Travel		40
Test Position	26.7	20

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Toyota Sienna
 Test Program: Side NCAP MDB

NHTSA No.: MB5104
 Test Date: June 17, 2010



LEFT SIDE VIEW

NOTE: 2-DOOR VEHICLE SHOWN.
 REAR DUMMY PHX & PHZ
 MEASUREMENTS FOR A 4-DOOR
 VEHICLE WOULD USE THE C POST
 STRIKER AS A REFERENCE POINT

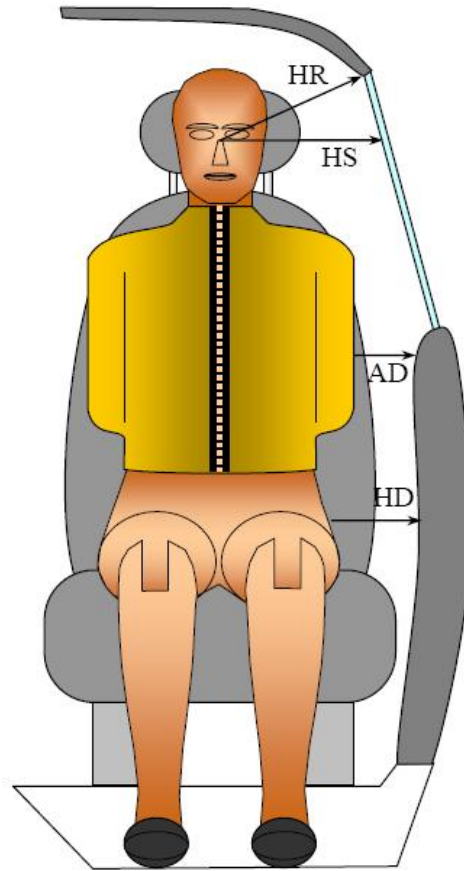
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver S/N F033		Passenger S/N 300	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	470	45		
HW		Header to Windshield	710	0		
HZ	HZ	Head to Roof	215	90	297	90
NR	NB	Nose to Rim/Seat Back	490	13	703	9
CD	CB	Chest to Dash/Seat Back	560	7	710	5
CS		Chest to Steering Wheel	335	0		
KDL	KBL	Left Knee to Dash/Seat Back	185	11	533	12
KDR	KBR	Right Knee to Dash/Seat Back	165	10	530	12
PA	PA	Pelvic Angle		24.5		
PHX	PHX	H-Point to Striker (X-Axis)	232	-	250	-
PHZ	PHZ	H-Point to Striker (Z-Axis)	153	-	205	-
SA	SA	Seat Back Angle		2.7		

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Toyota Sienna
Test Program: Side NCAP MDB

NHTSA No.: MB5104
Test Date: June 17, 2010



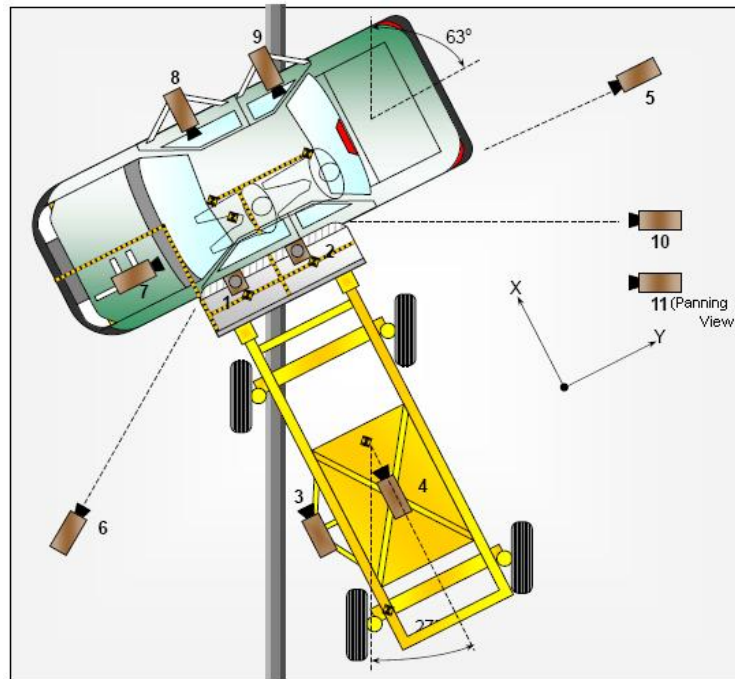
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Description	Units	Driver S/N 033	Passenger S/N 300
HR	Head to Side Header	mm	233	263
HS	Head to Side Window	mm	345	375
AD	Arm to Door	mm	123	165
HD	H-point to Door	mm	145	240

DATA SHEET NO. 5
CAMERA LOCATIONS AND DATA

Test Vehicle: 2011 Toyota Sienna
Test Program: Side NCAP MDB

NHTSA No.: MB5104
Test Date: June 17, 2010



CAMERA LOCATIONS AND DATA

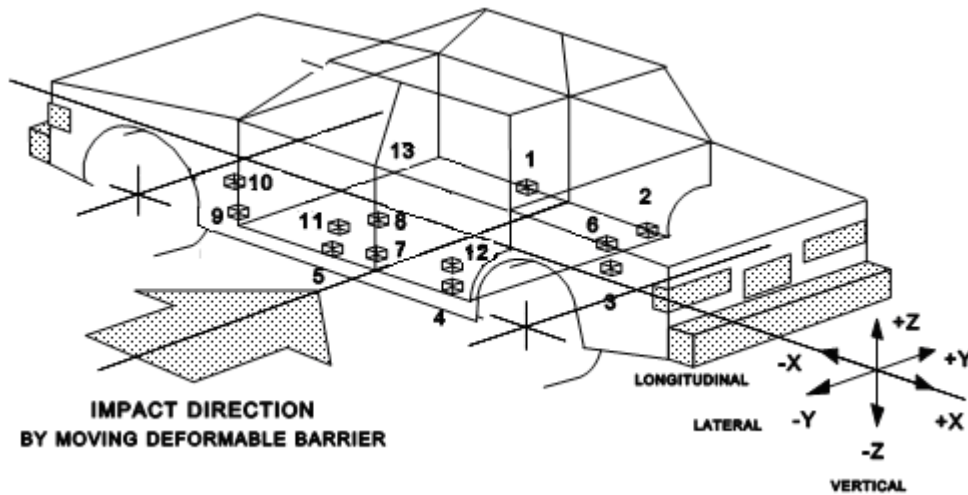
No.	Camera View	Location			Angle	Lens (mm)	Film Speed (fps)
		X	Y	Z			
1	Overhead Overall	72	812	4880	-90	20	1000
2	Overhead Close-up	195	855	4880	-90	28	1000
3	Left Impact Point (MDB)	-1470	0	-847	0	25	500
4	Side Overall (MDB)	-1140	838	-1587	-17	12.5	500
5	Rear	35	10990	875	0	50	1000
6	Left Front	-2065	-1660	975	-5	24	1000
7	Driver Front (OB)	590	-660	1470	-3	25	500
8	Driver Side (OB)	1560	550	1020	9	12.5	500
9	Passenger Side (OB)	1450	1740	1110	6	12.5	500
10	Real-time Left Rear	-	-	-	-	-	24
11	Real-time Inrun	-	-	-	-	-	24

Reference: Impact Point projected to Ground
+X = To Front of MDB, +Y = To Right of MDB, +Z = Down
**All measurements accurate to ± 6 mm.*

DATA SHEET NO. 6
VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2011 Toyota Sienna
Test Program: Side NCAP MDB

NHTSA No.: MB5104
Test Date: June 17, 2010



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

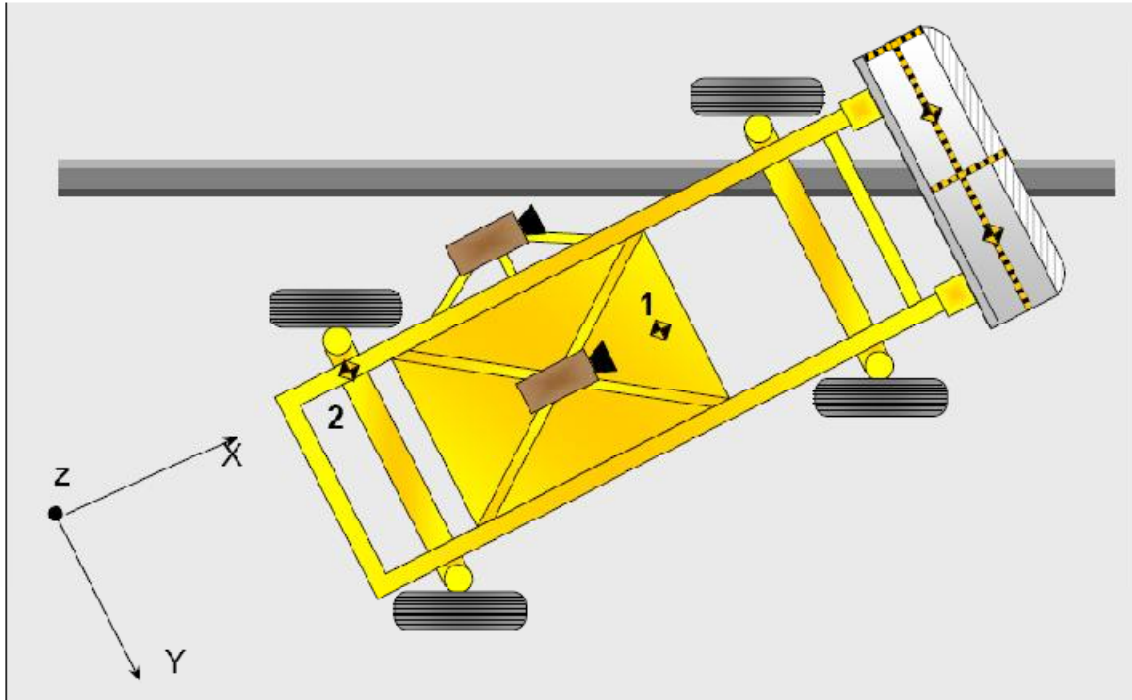
Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Right Sill at Front Seat	3350	763	415
2	Right Sill at Rear Seat	2303	697	435
3	Rear Floorpan Above Axle	833	-5	306
4	Left Sill at Rear Door	2325	-700	432
5	Left Sill at Front Door	3345	-764	405
6	Rt. Rear Occ. Compartment	2387	379	433
7	B-Post Lower	2648	-759	519
8	B-Post Middle	2626	-771	1004
9	A-Post Lower	3660	-745	498
10	A-Post Middle	-	-	-
11	Front Seat Track	-	-	-
12	Rear Seat Structure	1908	-651	517
13	Vehicle CG	3146	1	442

Reference: X – Rear surface of vehicle (+ forward)
Y – Vehicle centerline (+ to right)
Z – Ground plane (+ up)

DATA SHEET NO. 7
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2011 Toyota Sienna
 Test Program: Side NCAP MDB

NHTSA No.: MB5104
 Test Date: June 17, 2010



MDB ACCELEROMETER LOCATIONS

Loc No.	Accelerometer Locations	Measurements		
		X	Y	Z
1	MDB CG	1859	0	-330
2	MDB Rear	386	-660	-660

Reference: *X – Face of MDB (+ rearward)*
 Y – MDB centerline (+ to right)
 Z – Ground plane (+ up)

DATA SHEET NO. 8
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2011 Toyota Sienna
 Test Program: Side NCAP MDB

NHTSA No.: MB5104
 Test Date: June 17, 2010

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measured Parameter	Units	Maximum Crush	Above Ground
1	Sill Top Height	mm	53	319
2	Occupant H-Point	mm	222	609
3	Mid Door	mm	250	742
4	Window Sill	mm	147	1038
5	Window Top	mm	4	1670
	Maximum Penetration	mm	250	742

INSTRUMENTATION

Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	21
MDB Accelerometers	5
Total No. of Contact Switches	2 *
Total	60

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

CAMERA COVERAGE

High-Speed Vehicle Onboard	3
High-Speed Offboard	4
High-Speed MDB Onboard	2
Real-Time Panning	2
Total	11

DATA SHEET NO. 9
MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS

Test Vehicle: 2011 Toyota Sienna
 Test Program: Side NCAP MDB

NHTSA No.: MB5104
 Test Date: June 17, 2010

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1250
Overall Length Including Honeycomb Frame	4120
Wheel Base of Framework Carriage	2590
CG Location of Front Axle	1104

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	409.5	281.5	691.0
Right	kg	372.5	299.0	671.5
Ratio	%	57.4	42.6	-
Totals	kg	782.0	580.5	1362.5

SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.8
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.8
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.5

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Right	258
B	Top of Bumper	533	700	Right	150
C	Mid-Level	686	800	Right	114
D	Top of Stack	813	800	Left	112

MDB INSTRUMENTATION

Accelerometers	5
Contact Switches	2

**DATA SHEET NO. 10
POST TEST OBSERVATIONS**

Test Vehicle: 2011 Toyota Sienna
Test Program: Side NCAP MDB

NHTSA No.: MB5104
Test Date: June 17, 2010

TEST DUMMY INFORMATION AND CONTACT

Description	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Dummy Type/Serial No.	F033	300
Head Contact	Side Curtain Airbag	Side Curtain Airbag
Upper Torso Contact	Torso Airbag	Door Trim
Lower Torso Contact	Door Trim	Door Trim
Left Knee Contact	Door Trim	Door Trim
Right Knee Contact	No Contact	No Contact

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Left Side Doors	Jammed shut	Jammed shut
Right Side Doors	Jammed shut	Jammed shut
Hatch and Other Doors	Remained closed and operational	Remained 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	The left side B-Pillar was pushed inboard during test event
Sill Separation	No visible tears or separations
Windshield Damage	None
Window Damage	Left Front Window shattered; Left Rear Window intact
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	No	NA
Side Airbag 1 – Side Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 – Side Torso	Yes	Yes	No	NA
Seat Belt Pretensioner	Yes	Yes	No	No
Seat Belt Load Limiter	Yes	Yes	No	No

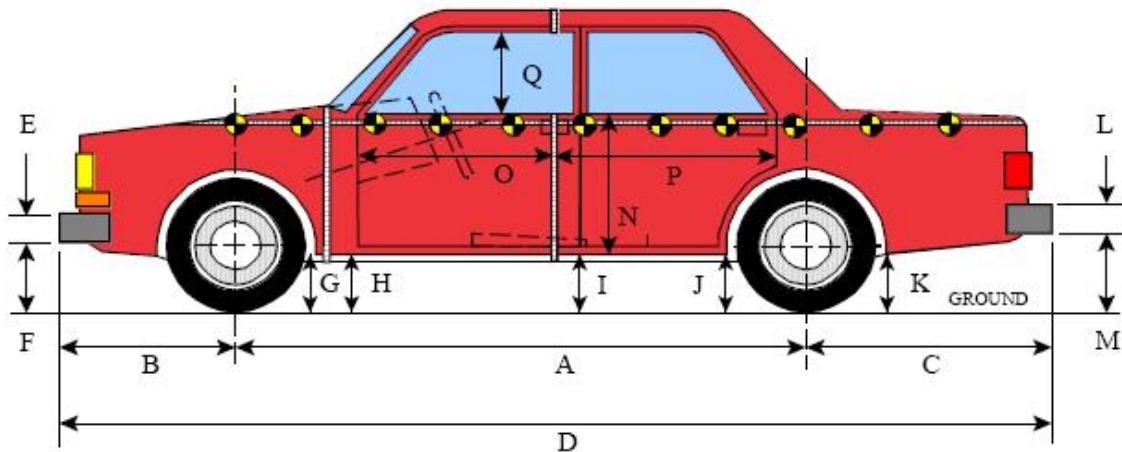
MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	-11
Vertical Offset	mm	+/- 20	+7

DATA SHEET NO. 11
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Toyota Sienna
 Test Program: Side NCAP MDB

NHTSA No.: MB5104
 Test Date: June 17, 2010



LEFT SIDE VIEW

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

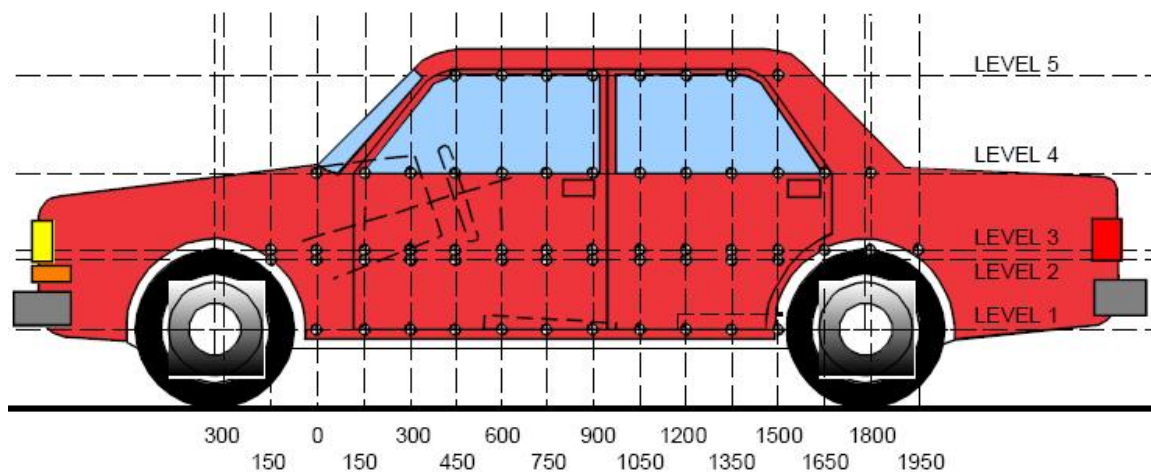
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3028	3026	2
B	Front Axle to FSOV	960	963	-3
C	Rear Axle to RSOV	1109	1111	-2
D	Total Length at Centerline	5098	5100	2
E	Front Bumper Thickness	185	185	0
F	Front Bumper Bottom to Ground	462	470	-8
G	Sill Height at Front Wheel Well	198	199	-1
H	Sill Height at Front Door Leading Edge	244	251	-7
I	Sill Height at B Pillar	214	239	-25
J1	Sill Height at Rear Wheel Well	212	223	-11
J2	Pinch Weld Height at Rear Wheel Well	193	216	-23
K	Sill Height Aft of Rear Wheel Well	221	230	-9
L	Rear Bumper Thickness	155	155	0
M	Rear Bumper Bottom to Ground	354	362	-8
N	Sill Height to Window Bottom Sill	684	772	-88
O	Front Door Leading Edge to Impact CL	915	875	40
P	Rear Door Trailing Edge to Impact CL	1331	1300	31
Q	Front Window Opening	541	536	5
R	Right Side Length	5020	5023	-3
S	Left Side Length	5023	5060	-37
T	Vehicle Width at B Post	1985	1767	218

DATA SHEET NO. 12
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Toyota Sienna
 Test Program: Side NCAP MDB

NHTSA No.: MB5104
 Test Date: June 17, 2010



LEFT SIDE VIEW

Level	Measurement Description	Height Above Ground (mm)
1	Sill Top	319
2	Occupant H-Point	609
3	Mid-Door	742
4	Window Sill	1038
5	Window Top	1670

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. 12 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Toyota Sienna
 Test Program: Side NCAP MDB

NHTSA No.: MB5104
 Test Date: June 17, 2010

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900	--	987	964	801	--	--	1000	973	805	--	--	-13	-9	-4	--
-750	--	--	990	863	--	--	--	989	867	--	--	--	1	-4	--
-600	--	--	--	898	--	--	--	--	901	--	--	--	--	-3	--
-450	--	--	--	915	--	--	--	--	915	--	--	--	--	0	--
-300	--	--	993	922	--	--	--	991	920	--	--	--	2	2	--
-150	--	993	989	928	--	--	990	984	923	--	--	3	5	5	--
0	965	983	983	933	--	960	904	924	921	--	5	79	59	12	--
150	953	979	986	938	--	902	851	834	879	--	51	128	152	59	--
300	951	980	987	945	--	907	828	786	860	--	44	152	201	85	--
450	951	981	989	950	--	909	816	766	844	--	42	165	223	106	--
600	951	982	990	956	656	907	807	758	844	658	44	175	232	112	-2
750	952	983	991	960	702	906	796	741	845	701	46	187	250	115	1
900	952	983	991	958	708	906	790	743	844	704	46	193	248	114	4
1050	952	983	992	966	713	899	797	769	833	716	53	186	223	133	-3
1200	952	983	992	948	715	914	761	761	803	733	38	222	231	145	-18
1350	952	982	991	970	714	913	766	759	823	748	39	216	232	147	-34
1500	952	981	991	971	715	917	774	767	838	763	35	207	224	133	-48
1650	951	979	990	971	713	930	784	783	851	776	21	195	207	120	-63
1800	952	977	988	971	710	927	795	802	861	790	25	182	186	110	-80
1950	962	977	986	969	707	1020	848	888	870	800	-58	129	98	99	-93
2100	975	990	987	968	703	983	930	958	907	811	-8	60	29	61	-108
2250	--	--	994	967	698	--	--	991	971	699	--	--	3	-4	-1
2400	--	--	996	964	691	--	--	993	954	692	--	--	3	10	-1
2550	--	--	--	960	682	--	--	--	954	683	--	--	--	6	-1
2700	--	--	992	957	672	--	--	992	953	674	--	--	0	4	-2
2850	--	988	980	951	661	--	992	982	950	663	--	-4	-2	1	-2

MAXIMUM CRUSH DATA

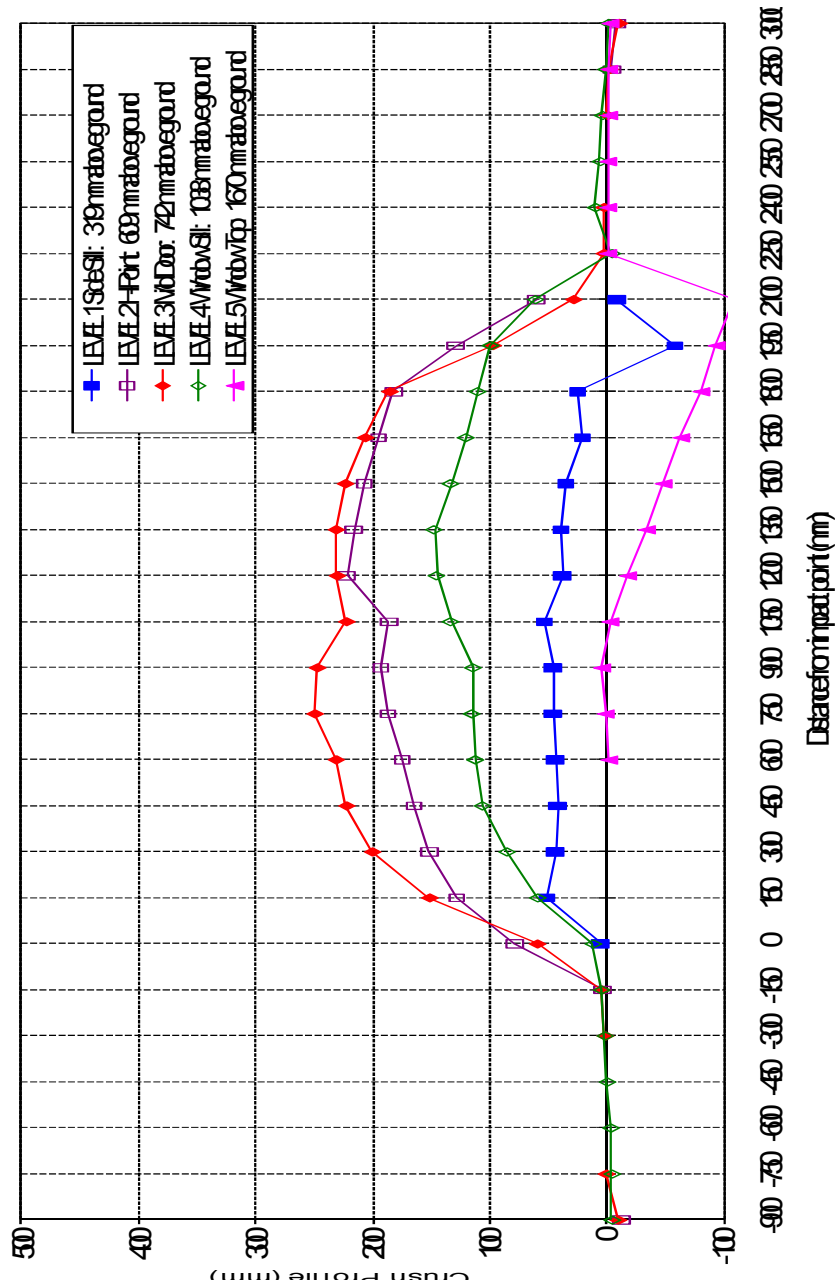
	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush (mm)	53	222	250	147	-108
Distance From Impact (mm)	1050	1200	750	1350	2100

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.

DATA SHEET NO. 12 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Toyota Sienna
 Test Program: Side NCAP MDB

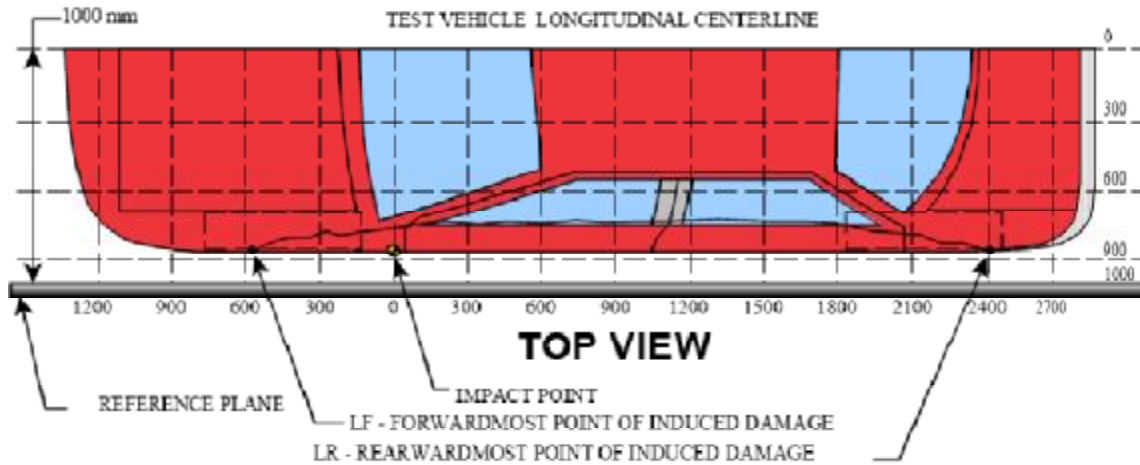
NHTSA No.: MB5104
 Test Date: June 17, 2010



DATA SHEET NO. 13
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2011 Toyota Sienna
 Test Program: Side NCAP MDB

NHTSA No.: MB5104
 Test Date: June 17, 2010



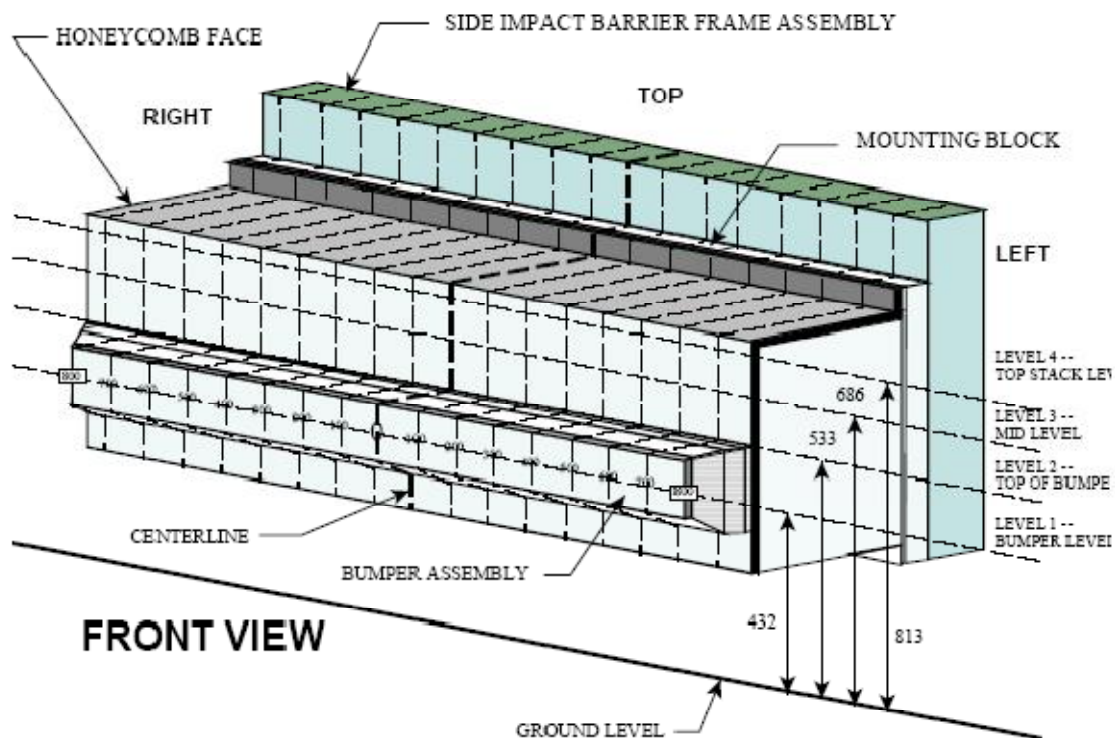
DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Maximum Static Crush (mm)
1	2250	3	6	9	3
2	1770	3	12	202	190
3	1290	3	9	240	231
4	810	3	9	258	249
5	0	3	13	218	205
6	-150	3	11	16	5

DATA SHEET NO. 14
EXTERIOR STATIC CRUSH FOR IMPACTOR FACE

Test Vehicle: 2011 Toyota Sienna
 Test Program: Side NCAP MDB

NHTSA No.: MB5104
 Test Date: June 17, 2010



NOTE: Dimensions are shown in millimeters, mm

DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	258	258	253	253	250	248	247	244	239	233	224	217	212	208	206	203	198
2	147	150	149	146	141	140	134	123	128	124	119	118	114	106	105	101	109
3	114	91	69	63	56	62	73	87	59	42	37	40	41	43	48	62	85
4	109	84	66	49	39	36	45	64	88	59	43	43	47	54	64	86	112

DATA SHEET NO. 15
FMVSS NO. 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2011 Toyota Sienna
 Test Program: Side NCAP MDB

NHTSA No.: MB5104
 Test Date: June 17, 2010

Test Time: 3:13 PM Temperature: 21.7° 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 NO. 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	1:06	5:00	6:06
180 to 270	1:04	5:00	6:04
270 to 360	1:07	5:00	6:07

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

Test Vehicle: 2011 Toyota Sienna
Test Program: Side NCAP MDB

NHTSA No.: MB5104
Test Date: June 17, 2010



APPENDIX A
PHOTOGRAPHS

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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

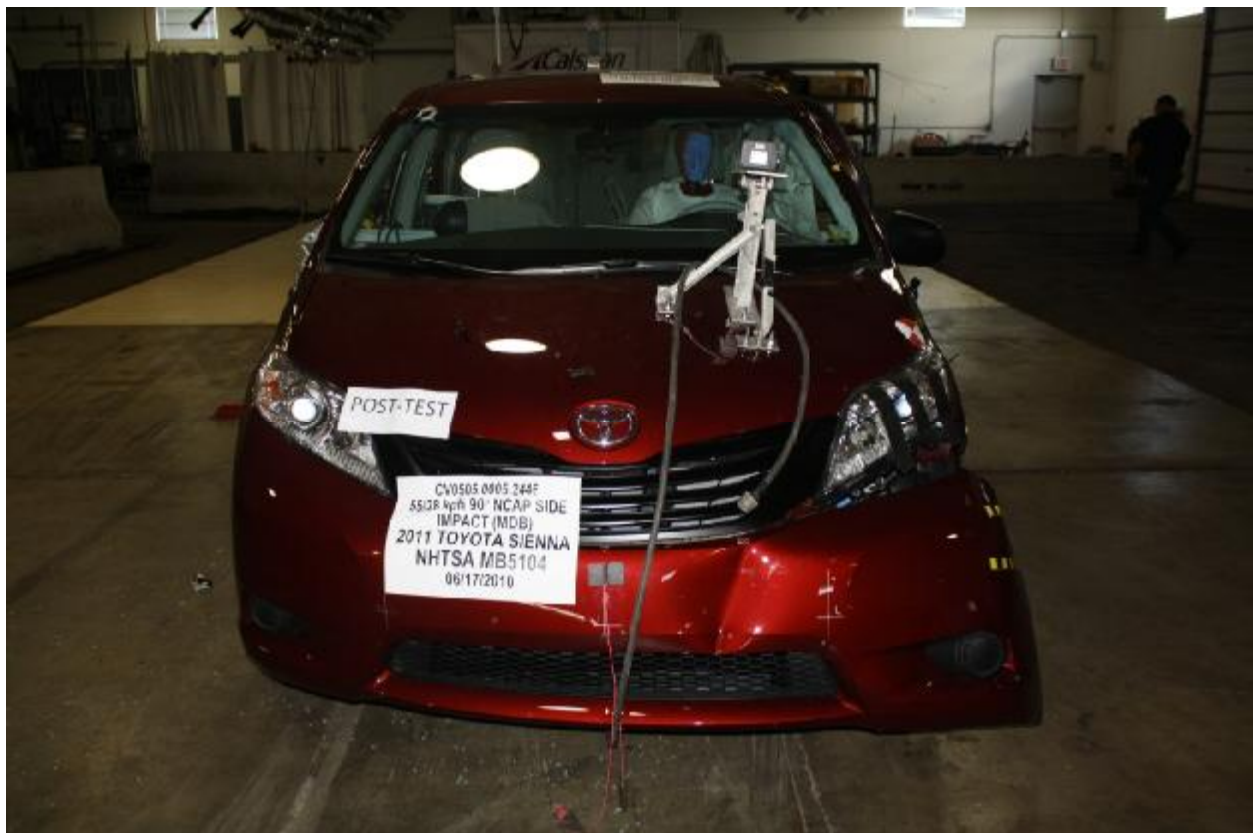


Figure A-4: Post-Test Frontal View of Test Vehicle



Figure A-5: Pre-Test Left Front Three- Quarter View of Test Vehicle



Figure A-6: Post-Test Left Front Three-Quarter View of Test Vehicle



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



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



Figure A-9: Pre-Test Left Rear Three-Quarter View of Test Vehicle



Figure A-10: Post-Test Left Rear Three-Quarter 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 MDB Positioned against Side of Target Vehicle at Ideal Impact Point



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



Figure A-17: Pre-Test Left Side View of MDB Positioned against Side of Target Vehicle at Ideal Impact Point



Figure A-18: Pre-Test Left Side View of MDB Positioned against Side of Target Vehicle at Ideal Impact Point



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



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



Figure A-21: Pre-Test Left Front Door Latch Close- Up



Figure A-22: Post-Test Left Front Door Latch Close Up



Figure A-23: Pre-Test Left Rear Door Latch Up



Figure A-24: Post-Test Left Rear Door Latch Close Up



Figure A-25: Pre-Test Front Close-Up View of Driver Dummy



Figure A-26: Post-Test Front Close-Up View of Driver Dummy



Figure A-27: Pre-Test Left Side View of Driver Dummy Showing Belt_Chalking_and Contact Switches



Figure A-28: Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View

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Figure A-29: Post-Test Left Side View of Driver Dummy Shoulder and Door Top View



Figure A-30: Pre-Test Frontal View of Driver Seat Back prior to Dummy Positioning

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Figure A-31: Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint



Figure A-32: Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning

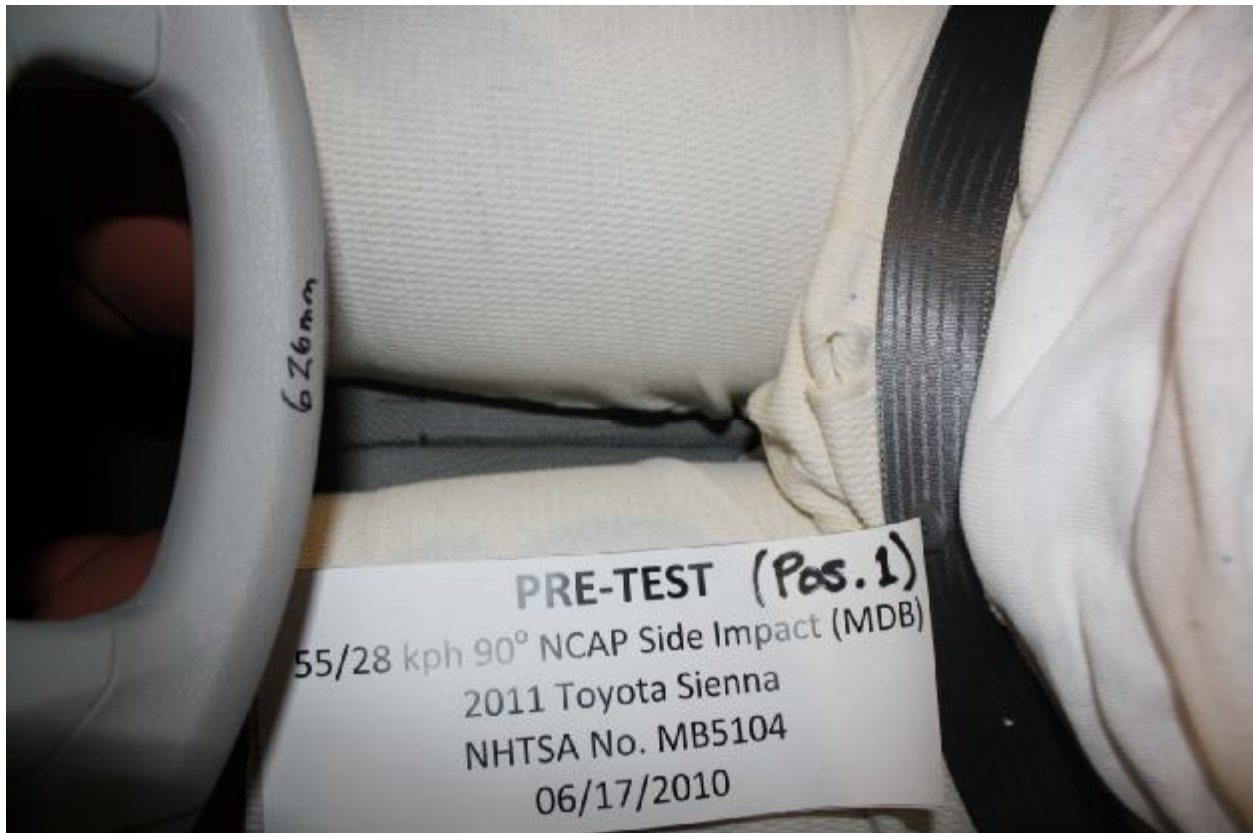


Figure A-33: Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan



Figure A-34: Pre-Test Placement of Driver Dummy's Feet

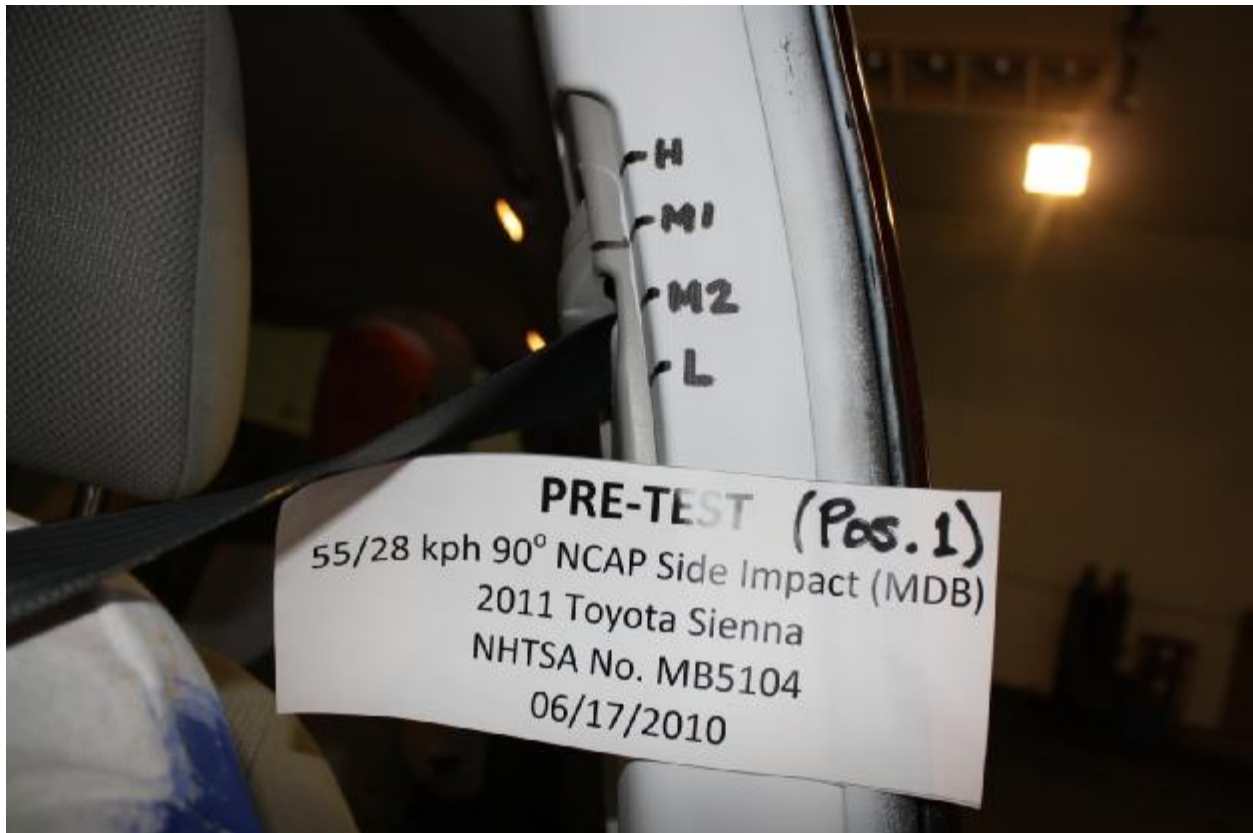


Figure A-35: Pre-Test View of Belt Anchorage for Driver Dummy to Show Position



Figure A-36: Pre-Test Left Side View of Steering Wheel to Show Position



Figure A-37: Pre-Test View of Parking Brake



Figure A-38: Pre-Test Close-Up Left Side View of Driver Seat Track Showing Test Position

PHOTO NOT AVAILABLE

Figure A-39: Pre-test Close-Up Left Side View of Driver Seat Back Showing Test Position

PHOTO NOT AVAILABLE

Figure A-40: Pre-Test Close-Up View of Driver Seat Back or Head Restraint Showing Seat Back Test Position

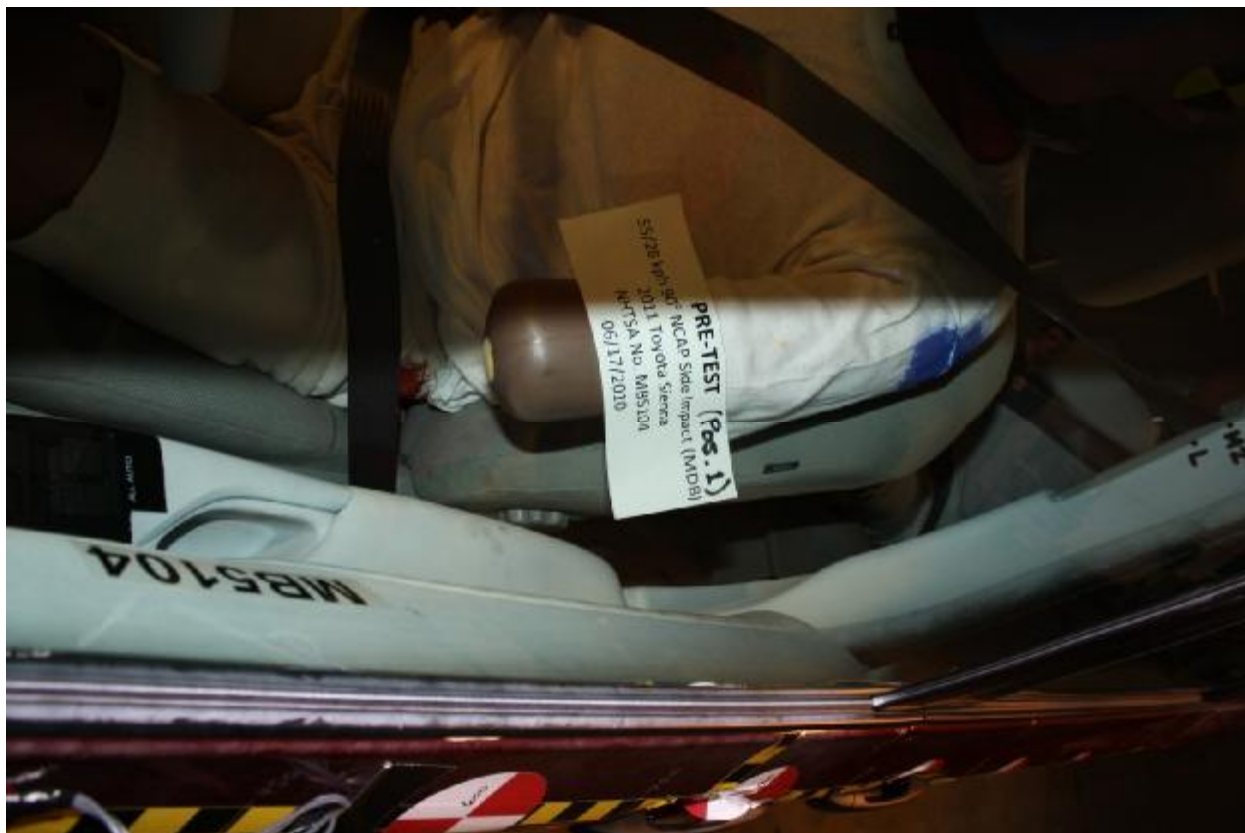


Figure A-41: Pre-Test Driver Dummy and Door Clearance View



Figure A-42: Post-Test Driver Dummy and Door Clearance View



Figure A-43: Pre-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment



Figure A-44: Post-Test Right Side View of Driver Dummy and Front Seat Occupant Compartment



Figure A-45: Pre-Test Driver Inner Door Panel View



Figure A-46: Post-Test Driver Inner Door Panel View Showing Driver Dummy Contact Locations

PHOTO NOT AVAILABLE

Figure 47: Post-Test Driver Dummy Close-Up Head Contact with Vehicle View

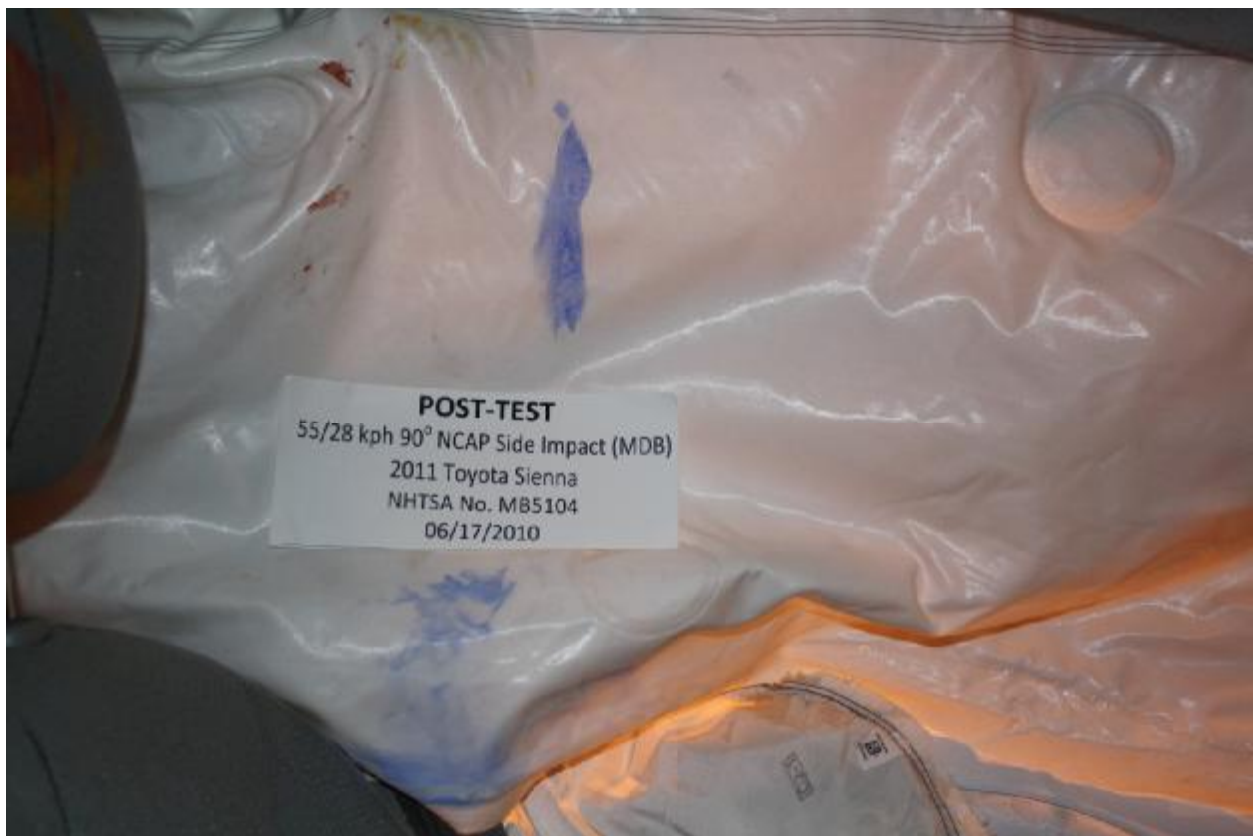


Figure A-48: Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View

PHOTO NOT AVAILABLE

Figure A-49: Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View

PHOTO NOT AVAILABLE

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

PHOTO NOT AVAILABLE

Figure A-51: Post-Test Driver Dummy Close-Up Pelvis Contact View

PHOTO NOT AVAILABLE

Figure A-52: Post-Test Driver Dummy Close-Up Pelvis Contact with Side Airbag View



Figure A-53: Pre-Test Left Side View of Rear Passenger Dummy Showing Belt, Chalking, and Contact Switches



Figure A-54: Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View

PHOTO NOT AVAILABLE

Figure A-55: Post-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View



Figure A-56: Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning

PHOTO NOT AVAILABLE

Figure A-57: Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint



Figure A-58: Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning

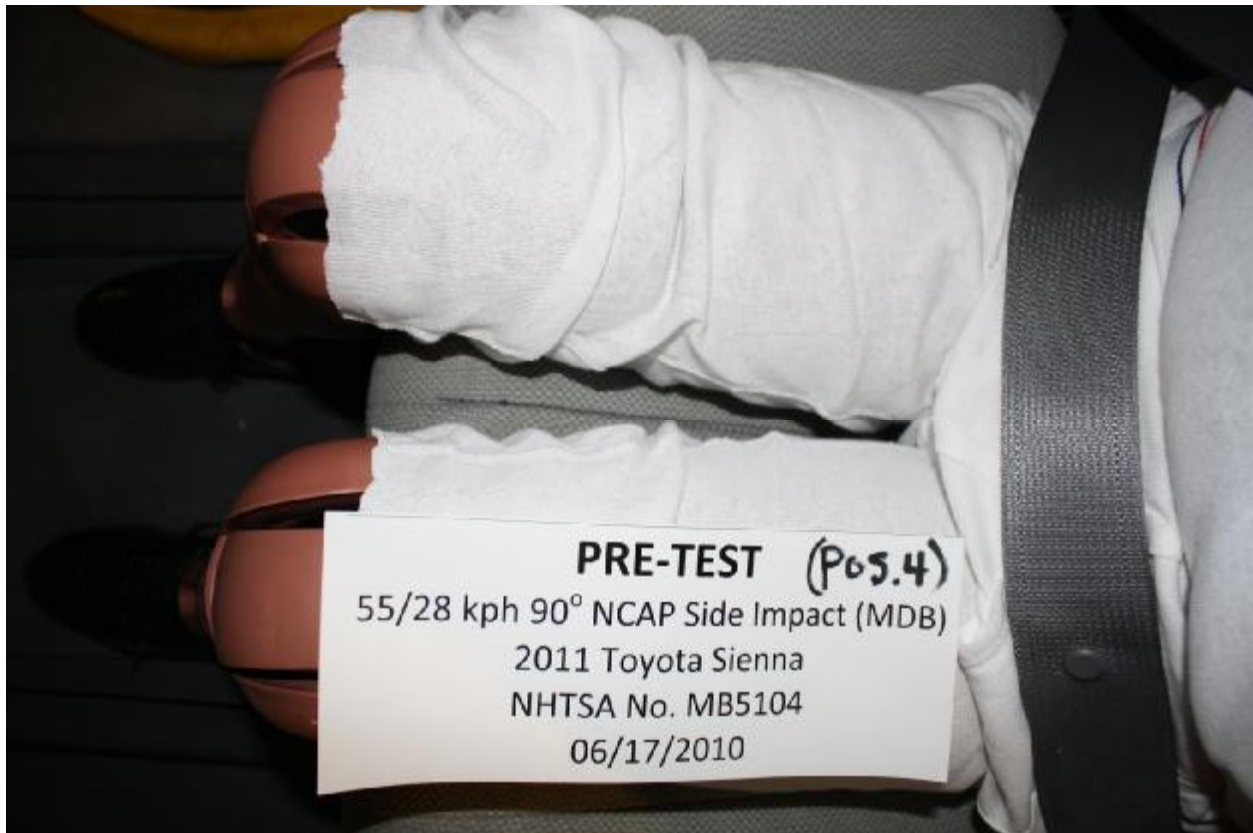


Figure A-59: Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan



Figure A-60: Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket

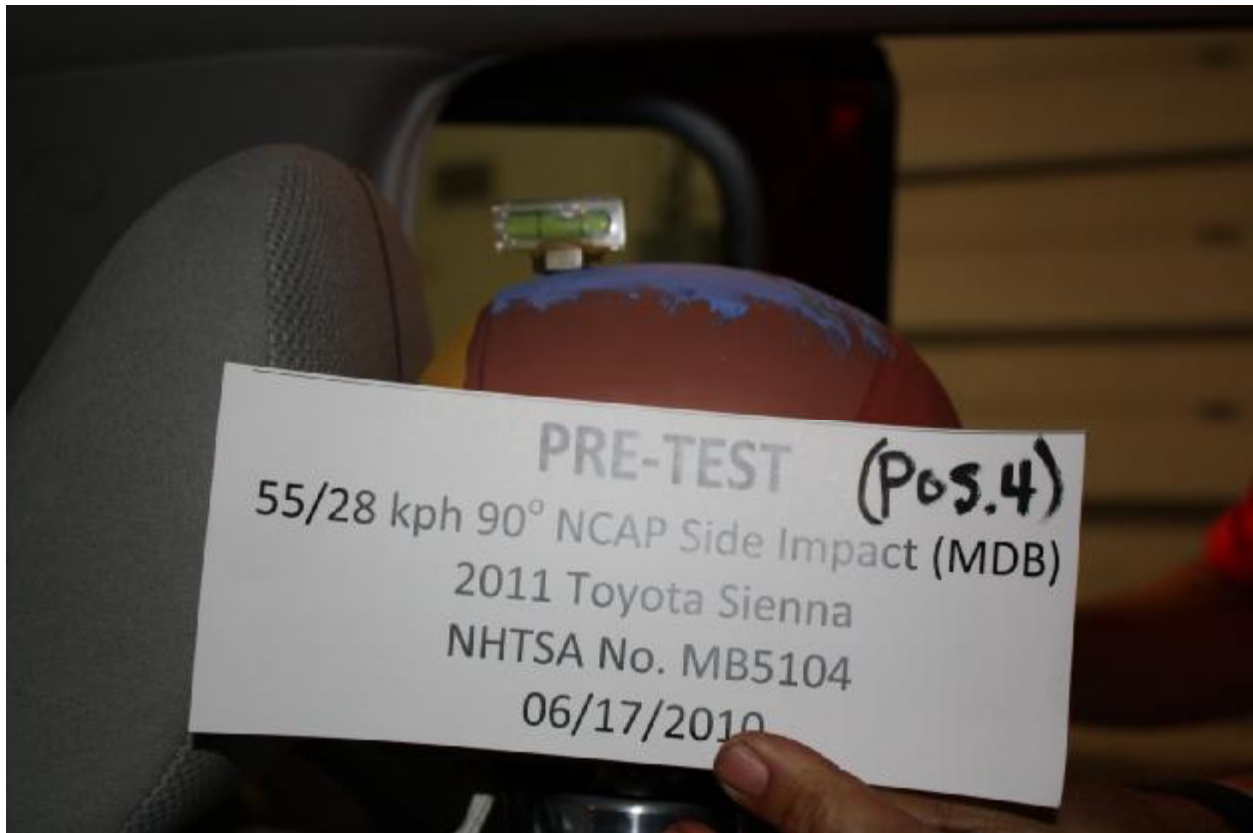


Figure A-61: Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level



Figure A-62: Pre-Test Placement of Rear Passenger Dummy's Feet

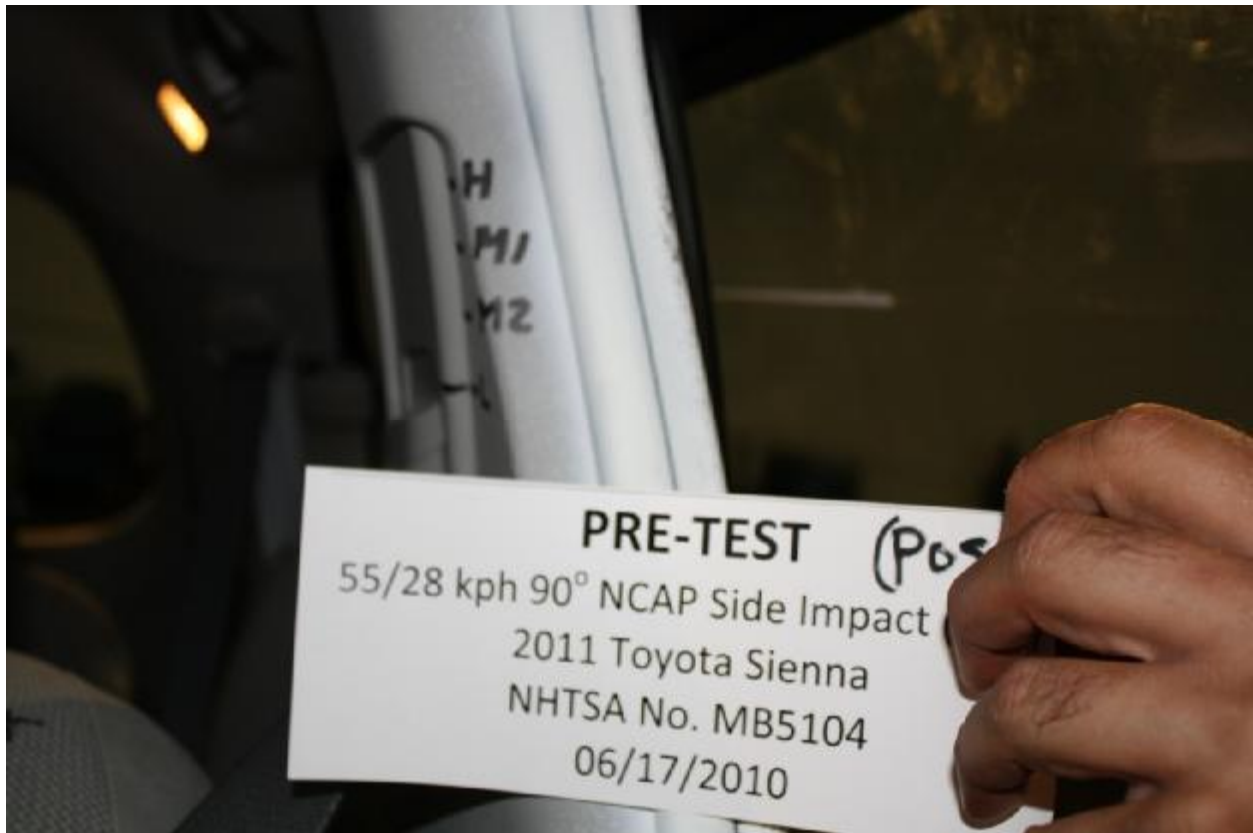


Figure A-63: Pre-Test View of Belt Anchorage for Rear Passenger Dummy to Show Position

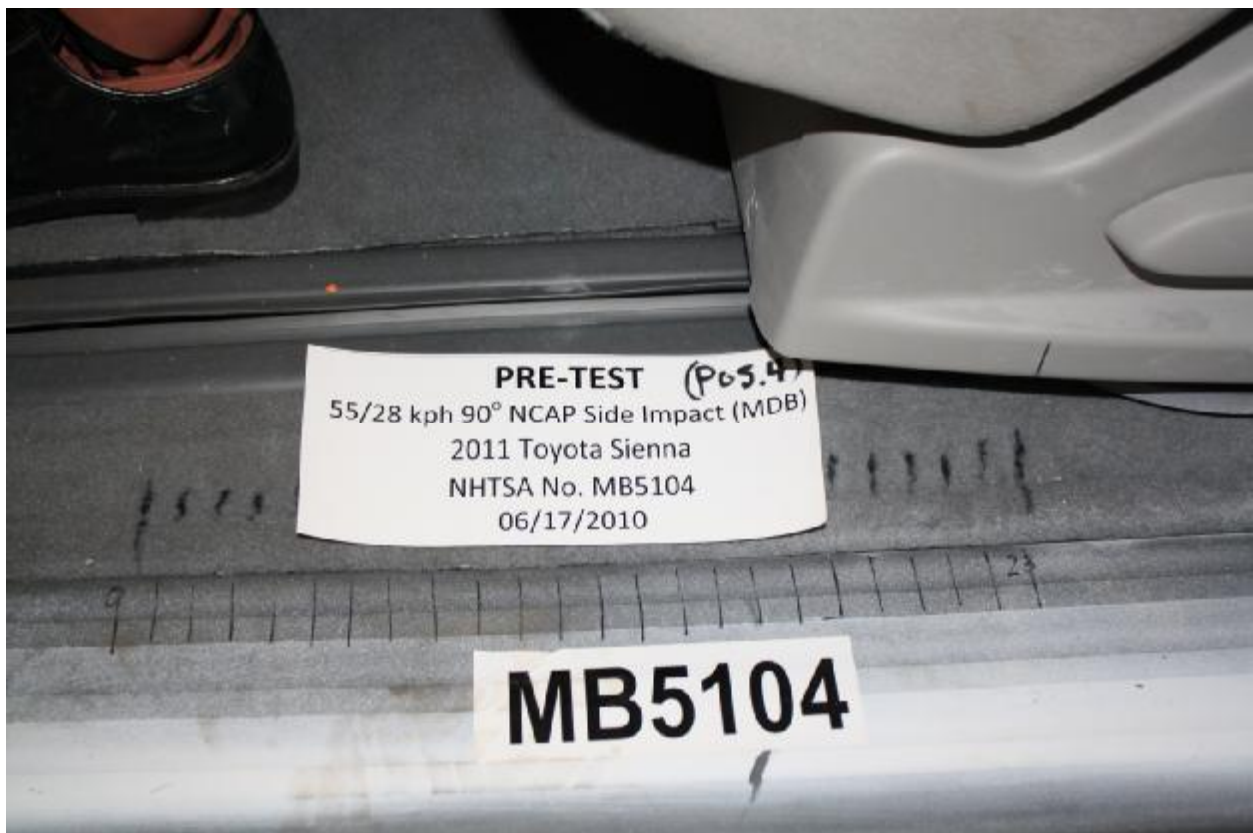


Figure A-64: Pre-Test Close-Up Left Side View of Rear Passenger Seat Track Showing Test Position

PHOTO NOT AVAILABLE

Figure A-65: Pre-Test Close-Up Left Side View of Rear Passenger Seat Back Showing Test Position

PHOTO NOT AVAILABLE

Figure A-66: Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint Showing Seat Back Test Position



Figure A-67: Pre-Test Rear Passenger Dummy and Door Clearance View



Figure A-68: Post-Test Rear Passenger Dummy and Door Clearance View



Figure A-69: Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



Figure A-70: Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



Figure A-71: Pre-Test Rear Passenger Inner Door Panel View



Figure A-72: Post-Test Rear Passenger Inner Door Panel View Showing Rear Passenger Dummy Contact Locations

PHOTO NOT AVAILABLE

Figure A-73: Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View



Figure A-74: Post-Test Rear Passenger Dummy Close-Up Head Contact with Side Airbag View

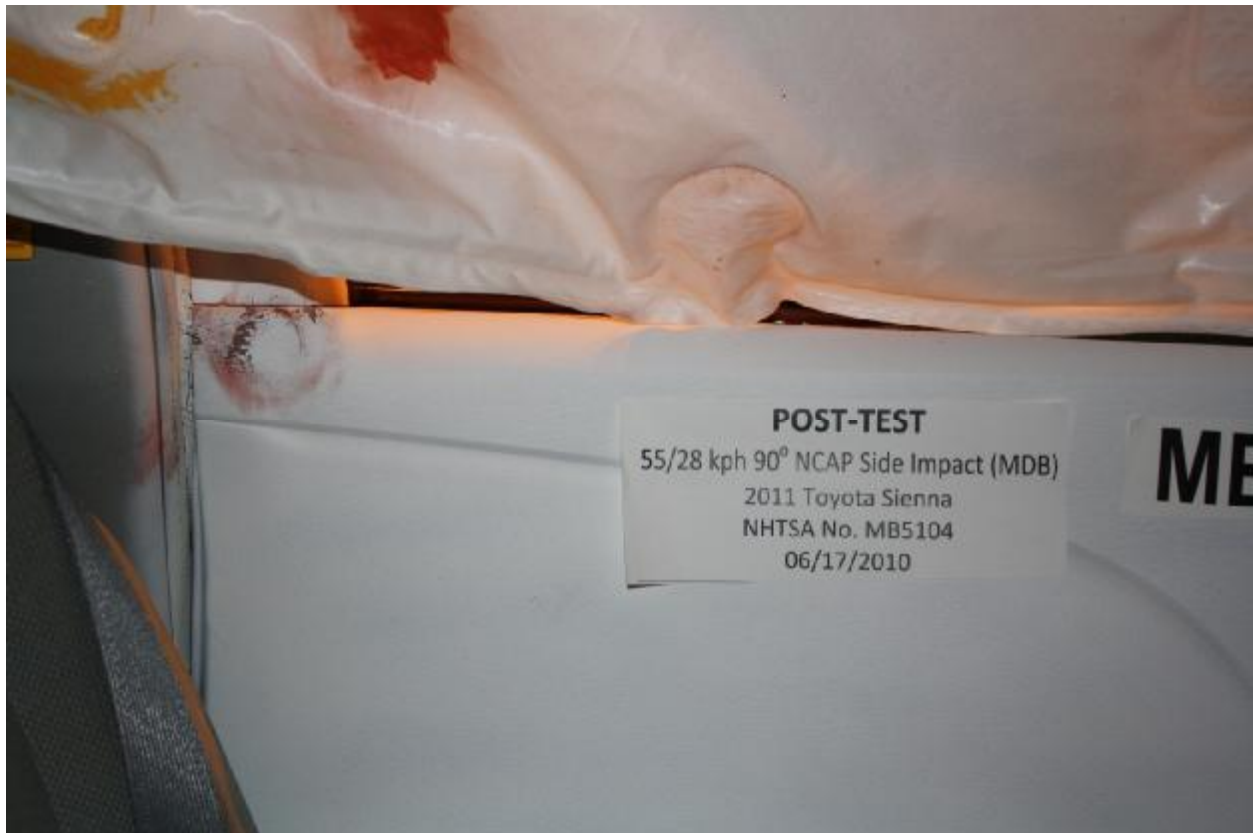


Figure A-75: Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View

PHOTO NOT AVAILABLE

Figure A-76: Post-Test Rear Passenger Dummy Close-Up Torso Contact with Side Airbag View

PHOTO NOT AVAILABLE

Figure A-77: Post-Test Rear Passenger Dummy Close-Up Pelvis Contact View

PHOTO NOT AVAILABLE

Figure A-78: Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Airbag View

PHOTO NOT AVAILABLE

Figure A-79: Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



Figure A-80: Post-Test View of Fuel Filler Cap or Fuel Filler Neck



Figure A-81: Pre-Test Front View of MDB Impactor Face



Figure A-82: Post-Test Front View of MDB Impactor Face



Figure A-83: Pre-Test Top View of MDB Impactor Face



Figure A-84: Post-Test Top View of MDB Impactor Face



Figure A-85: Pre-Test Left Side View of MDB Impactor Face



Figure A-86: Post-Test Left Side View of MDB Impactor Face



Figure A-87: Pre-Test Right Side View of MDB Impactor Face



Figure A-88: Post-Test Right Side View of MDB Impactor Face



Figure A-89: Close-Up View of Vehicle's Certification Label

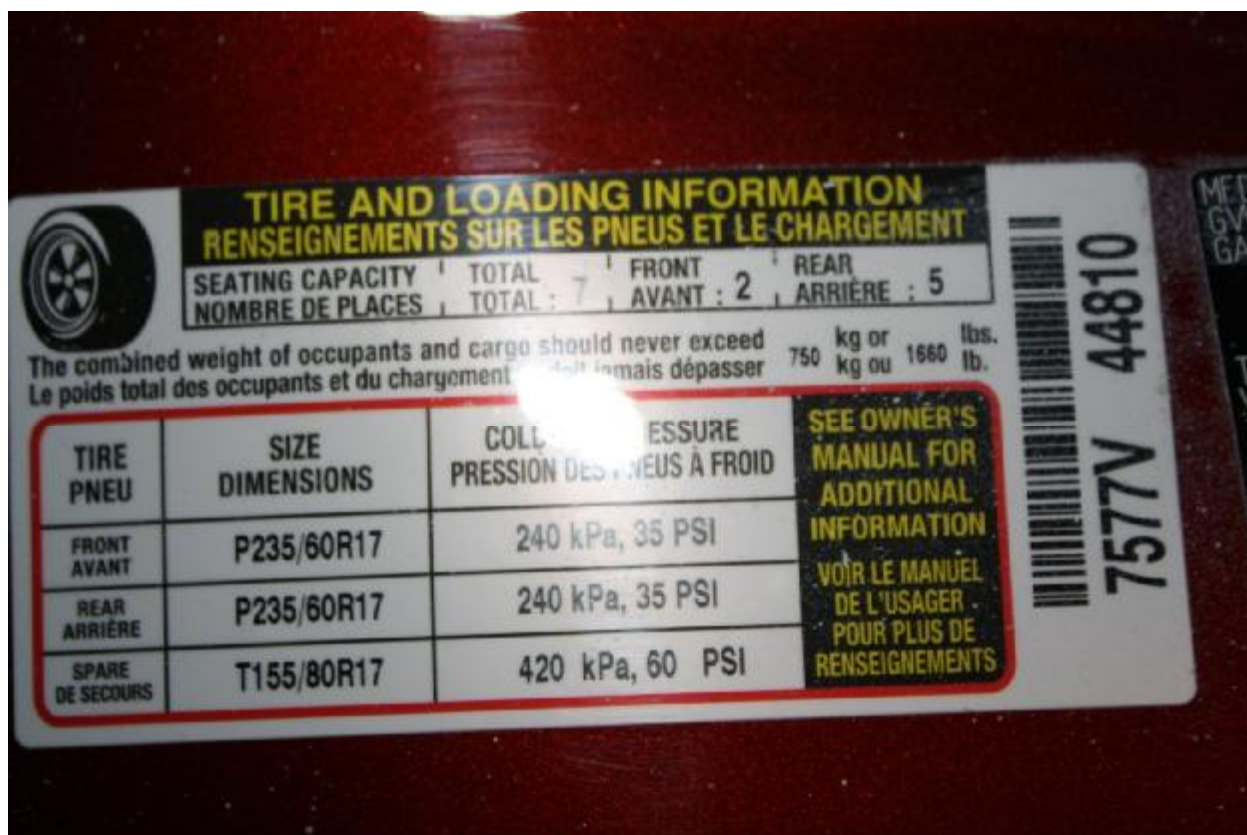


Figure A-90: Close-Up View of Vehicle's Tire Information Placard or Label

PHOTO NOT AVAILABLE

Figure A-91: Pre-Test Ballast View



Figure A-92: Post-Test Primary and Redundant Speed Trap Read-Out



Figure A-93: FMVSS No. 301/305 Rollover 0°

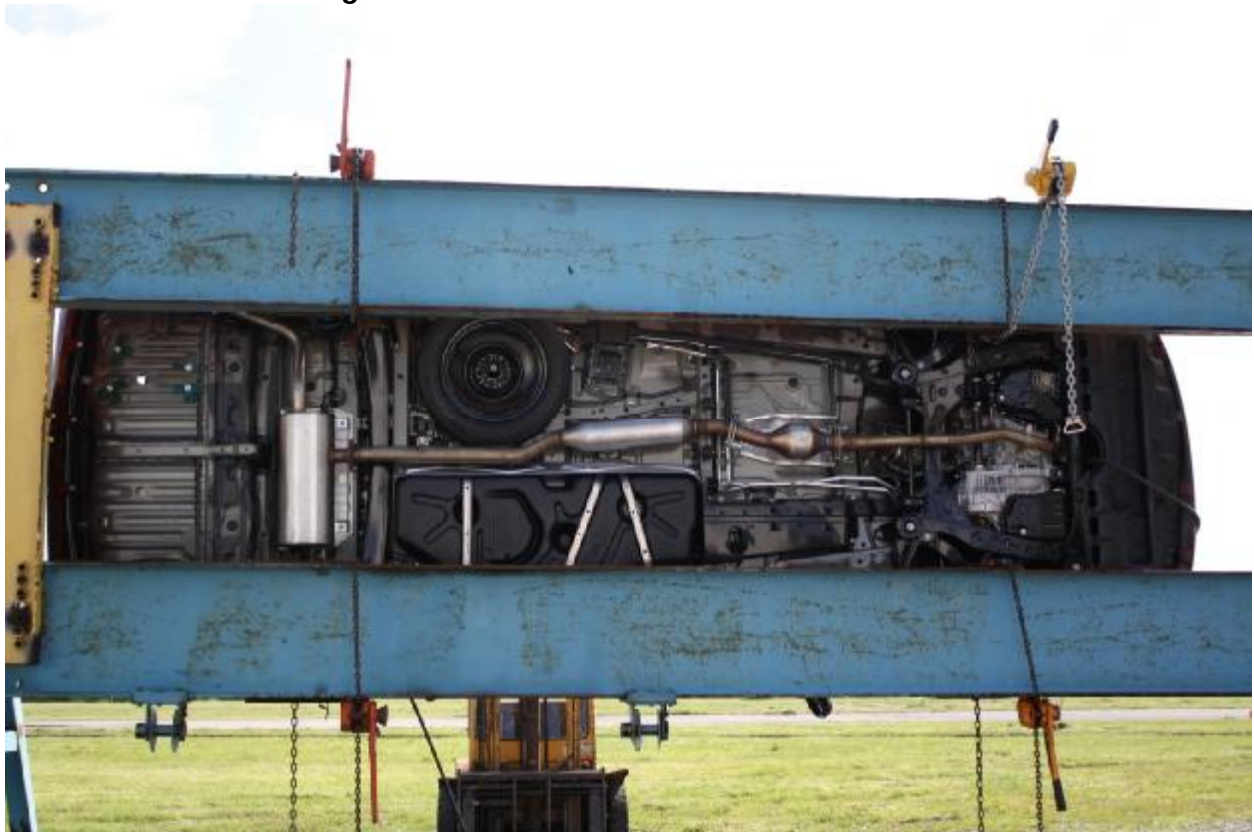


Figure A-94: FMVSS No. 301/305 Rollover 90°



Figure A-95: FMVSS No. 301/305 Rollover 180°



Figure A-96: FMVSS No. 301/305 Rollover 270°



Figure A-97: FMVSS No. 301/305 Rollover 360°

PHOTO NOT AVAILABLE

Figure A-98: Impact Event (Impact Side)

1.3. Adjustable components (seats, mirrors, steering wheel) Head restraints

Head restraints are provided for all seats.

Front and second outside seats



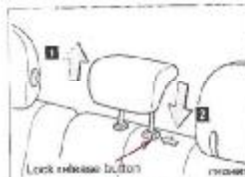
1 Up

Pull the head restraints up.

2 Down

Push the head restraint down while pressing the lock release button.

Second center* and third center seats



1 Up

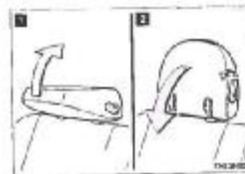
Pull the head restraints up.

2 Down

Push the head restraint down while pressing the lock release button.

*: 8-passenger models only

Third outside seats



1 To use

Pull the head restraints up.

2 To fold

Push the head restraint down while pressing the lever downward.

Figure A-101: Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

APPENDIX B
DUMMY RESPONSE DATA

The following data plots shall be included in this appendix:

TABLE OF DATA PLOTS
Driver & Passenger Dummy Instrumentation Plots
FILTERED DATA

No.	Description	Page
1	Driver Head Acceleration (X) Primary vs. Time	B-4
2	Driver Head Acceleration (Y) Primary vs. Time	B-4
3	Driver Head Acceleration (Z) Primary vs. Time	B-5
4	Driver Head Resultant Acceleration Primary vs. Time	B-5
5	Driver Upper Thorax Rib Deflection (Y) vs. Time	B-6
6	Driver Middle Thorax Rib Deflection (Y) vs. Time	B-6
7	Driver Lower Thorax Rib Deflection (Y) vs. Time	B-7
8	Driver Thorax Rib Deflection Maximum vs. Time	B-7
9	Driver Anterior Abdominal Force (Y) vs. Time	B-8
10	Driver Middle Abdominal Force (Y) vs. Time	B-8
11	Driver Posterior Abdominal Force (Y) vs. Time	B-9
12	Driver Total Abdominal Force (Y) vs. Time	B-9
13	Driver Pubic Symphysis Force (Y) vs. Time	B-10
14	Passenger Head Acceleration (X) vs. Time Primary	B-10
15	Passenger Head Acceleration (Y) vs. Time Primary	B-11
16	Passenger Head Acceleration (Z) vs. Time Primary	B-11
17	Passenger Head Resultant Acceleration Primary vs. Time	B-12
18	Passenger Lower Spine T12 Acceleration (X) vs. Time	B-12
19	Passenger Lower Spine T12 Acceleration (Y) vs. Time	B-13
20	Passenger Lower Spine T12 Acceleration (Z) vs. Time	B-13
21	Passenger Lower Spine T12 Resultant Acceleration vs. Time	B-14
22	Passenger Iliac Force on Impact Side (Y) vs. Time	B-14
23	Passenger Acetabulum Force on Impact Side (Y) vs. Time	B-15
24	Passenger Total Pelvic Force on Impact Side (Y) vs. Time	B-15

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.

Driver & Passenger Dummy Instrumentation Data

Driver Lower Spine T12 Acceleration (X)
Driver Lower Spine T12 Acceleration (Y)
Driver Lower Spine T12 Acceleration (Z)
Passenger Upper Thorax Rib Deflection (Y)
Passenger Middle Thorax Rib Deflection (Y)
Passenger Lower Thorax Rib Deflection (Y)
Passenger Upper Abdomen Rib Deflection (Y)
Passenger Lower Abdomen Rib Deflection (Y)
Driver Head Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
Driver Shoulder Contact Switch
Driver Torso Contact Switch
Driver Pelvis Contact Switch
Passenger Head Acceleration Redundant (X)
Passenger Head Acceleration Redundant (Y)
Passenger Head Acceleration Redundant (Z)
Passenger Shoulder Contact Switch
Passenger Torso Contact Switch
Passenger Pelvis Contact Switch

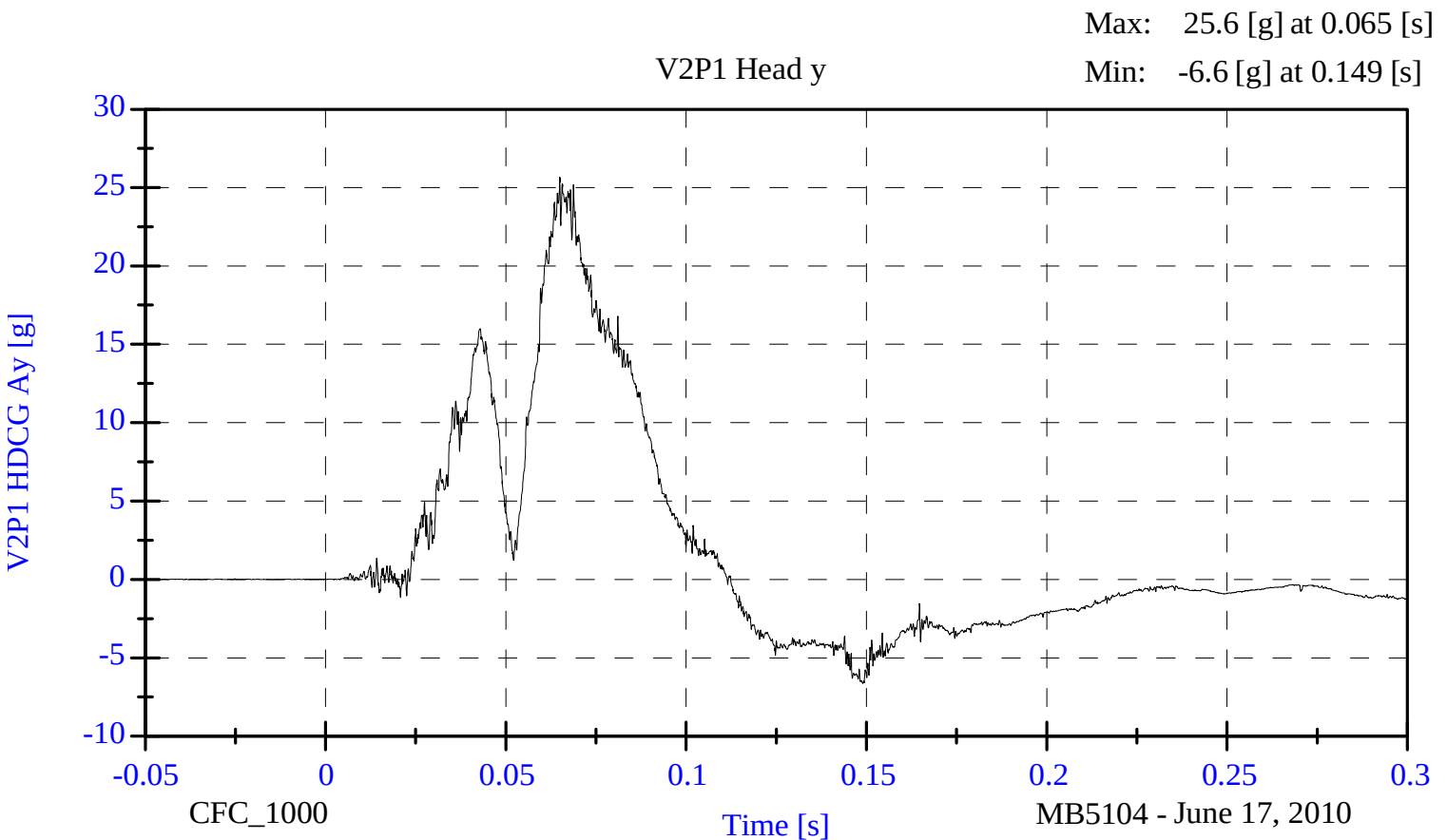
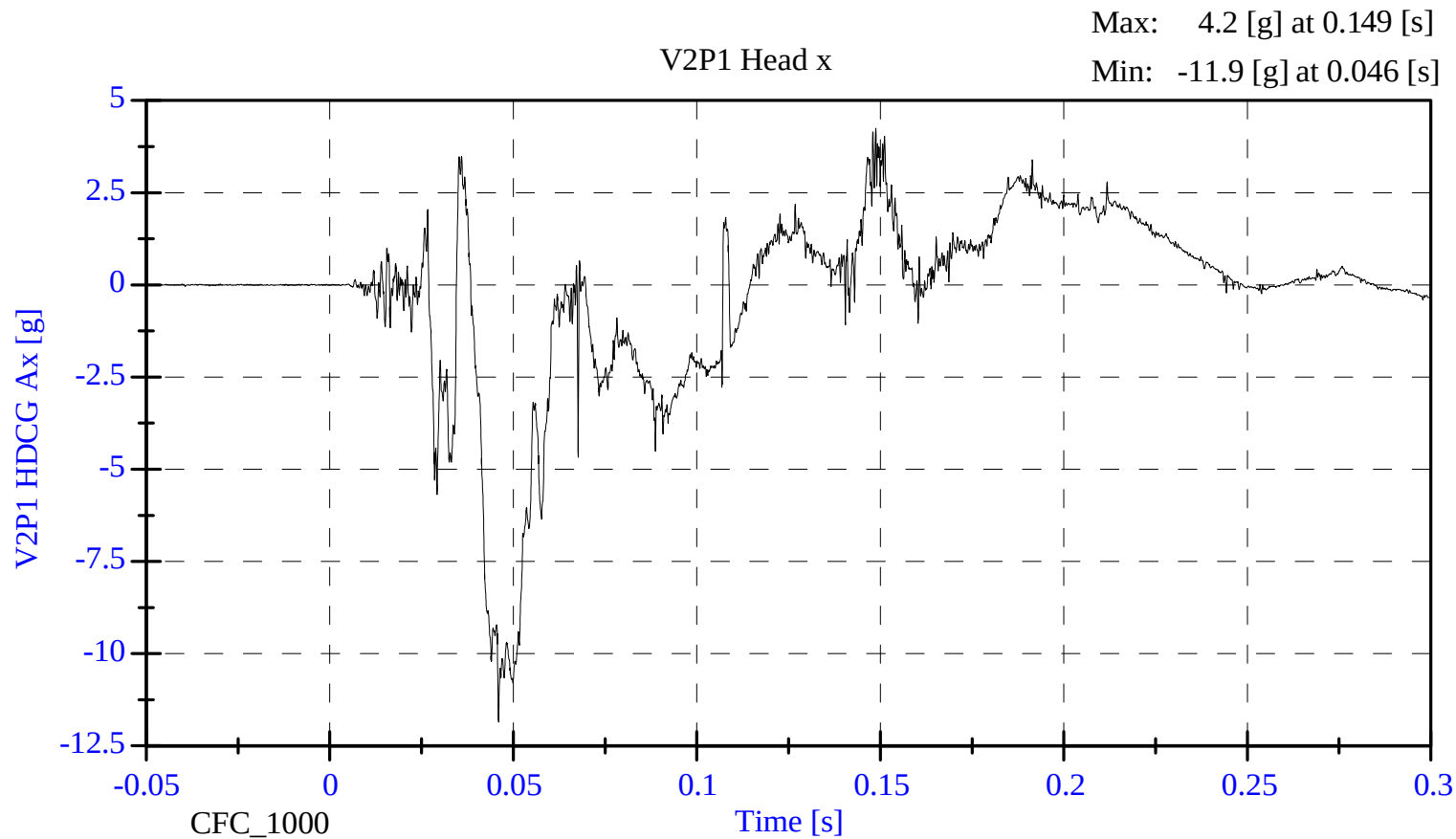
Vehicle Instrumentation Data

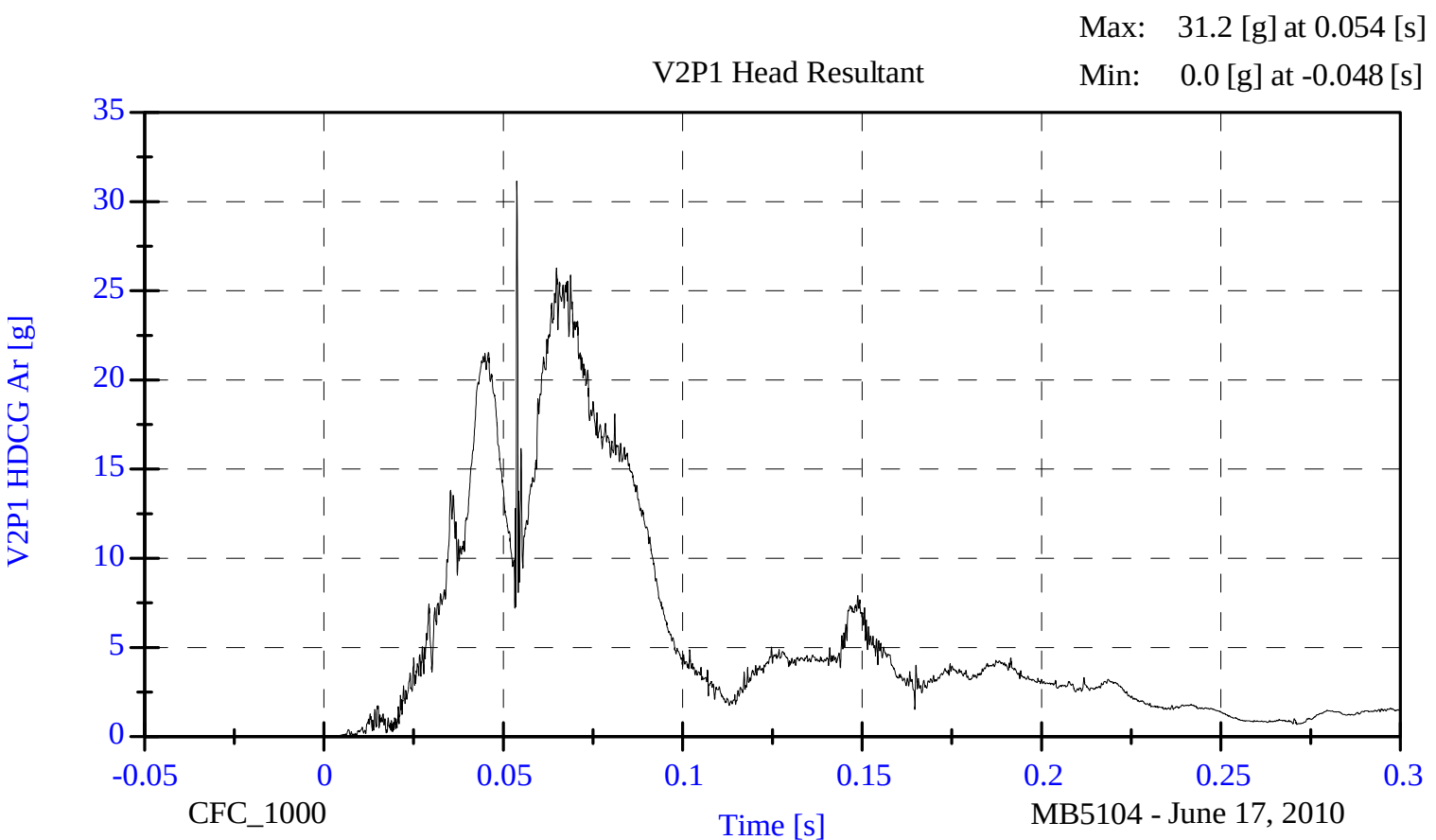
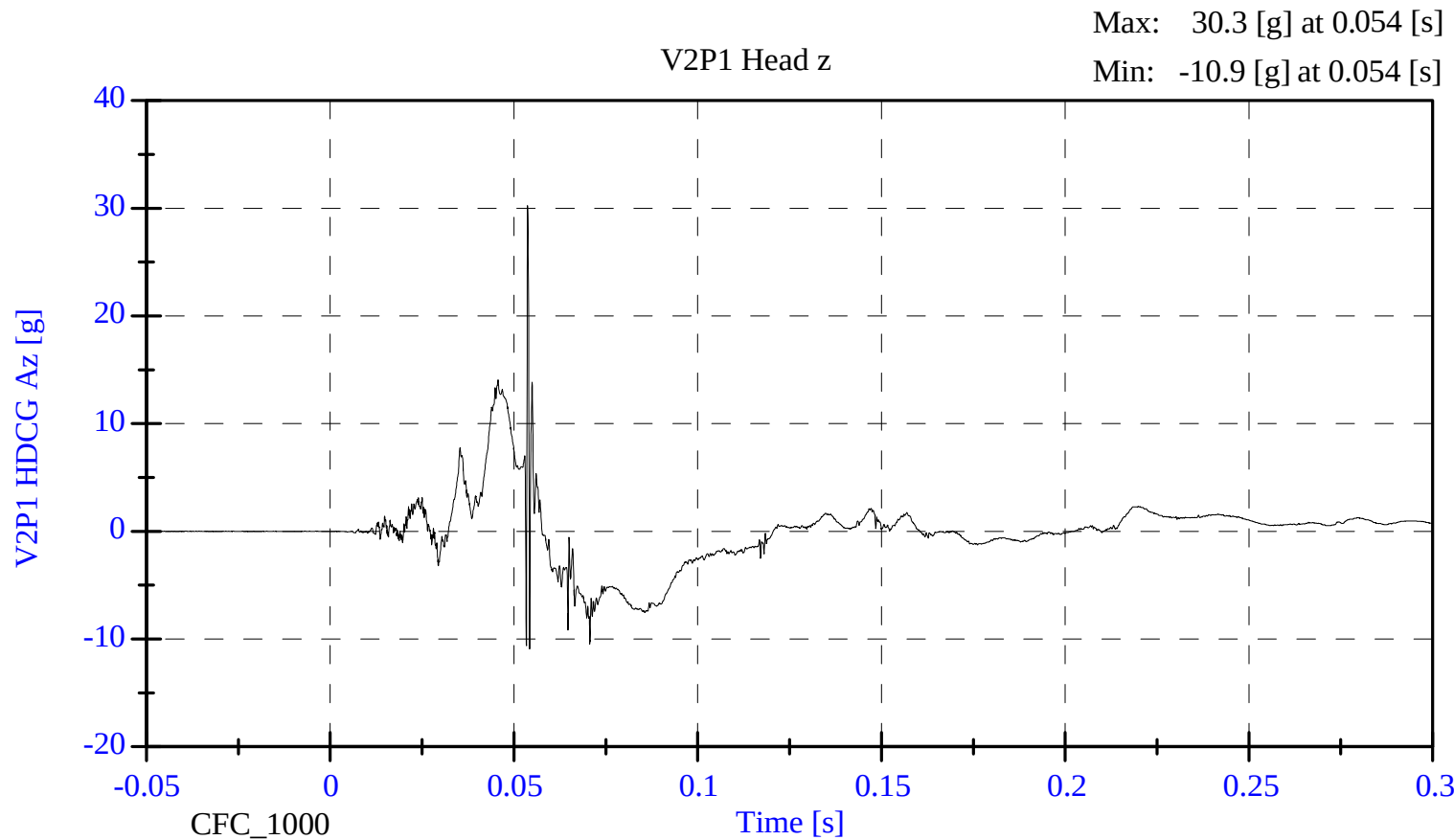
Driver Side Airbag Timing
Driver Side Curtain Airbag Timing
Passenger Side Airbag Timing (if applicable)
Passenger Side Curtain Airbag Timing (if different from Driver)
Right Side Sill at Front Seat Acceleration (X)
Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (Z)
Right Side Sill at Rear Seat Acceleration (X)
Right Side Sill at Rear Seat Acceleration (Y)
Right Side Sill at Rear Seat Acceleration (Z)
Rear Floorpan Above Axle Acceleration (X)
Rear Floorpan Above Axle Acceleration (Y)
Rear Floorpan Above Axle Acceleration (Z)
Left Side Sill at Front Seat Acceleration (Y)
Left Side Sill at Rear Seat Acceleration (Y)
Right Rear Occupant Compartment Acceleration (Y)
Lower A-Post Acceleration (Y)
Upper A-Post Acceleration (Y)
Lower B-Post Acceleration (Y)
Upper B-Post Acceleration (Y)
Front Seat Track Acceleration (Y)

Rear Seat Track Acceleration (Y)
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)

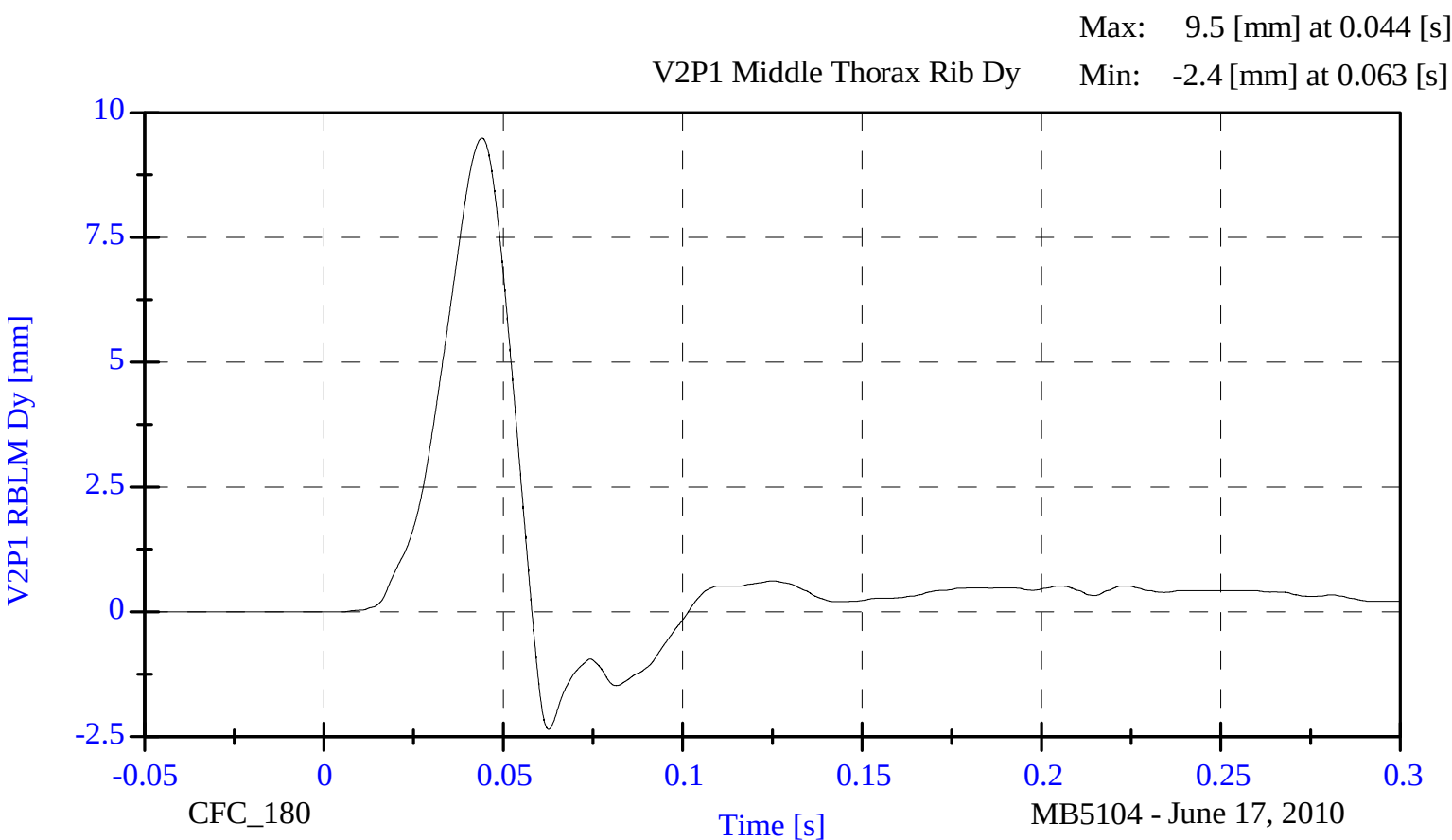
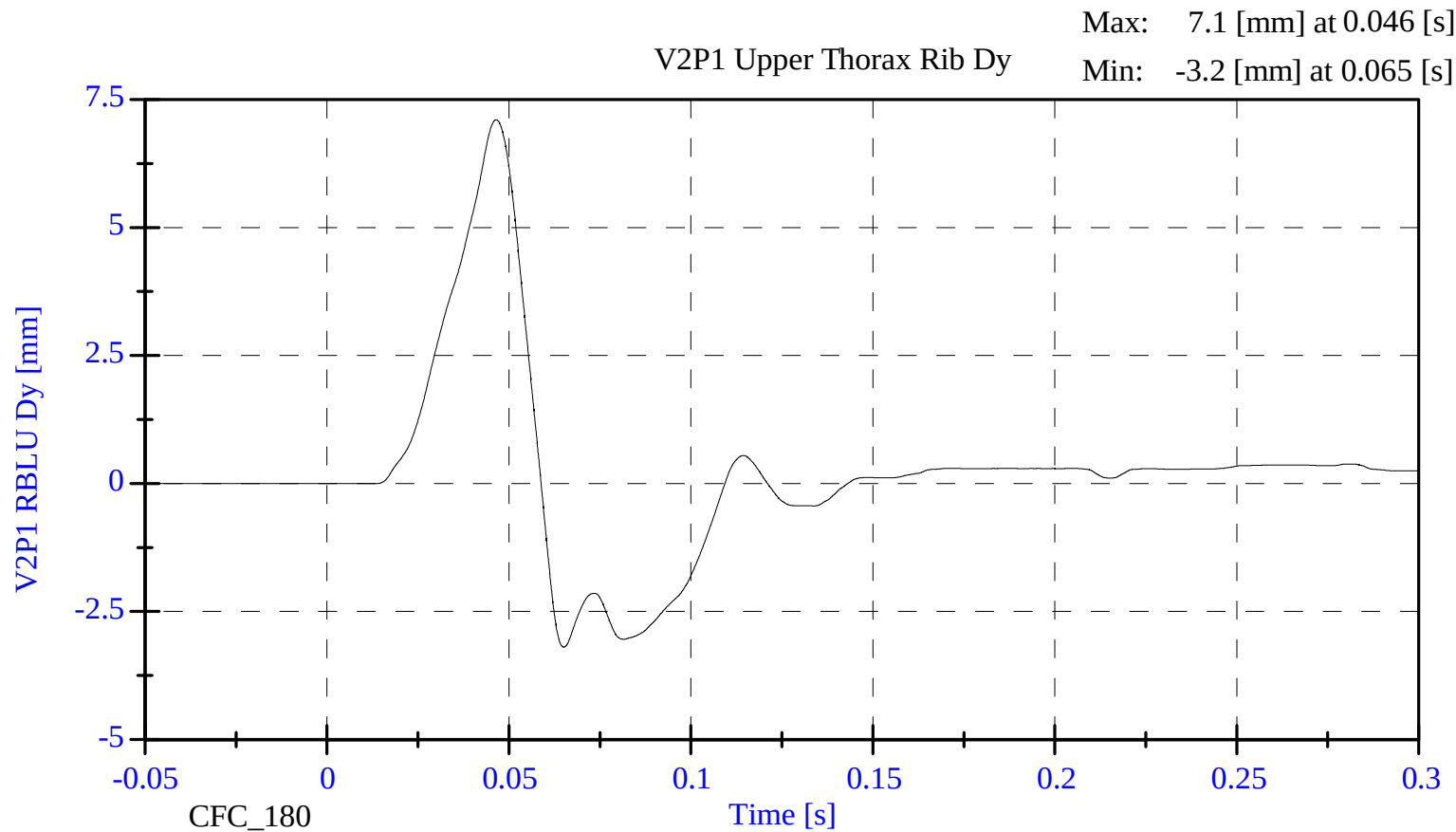
MDB Instrumentation Data

MDB Center of Gravity Acceleration (X)
MDB Center of Gravity Acceleration (Y)
MDB Center of Gravity Acceleration (Z)
MDB Rear Acceleration (X)
MDB Rear Acceleration (Y)
Left MDB Contact Switch
Right MDB Contact Switch

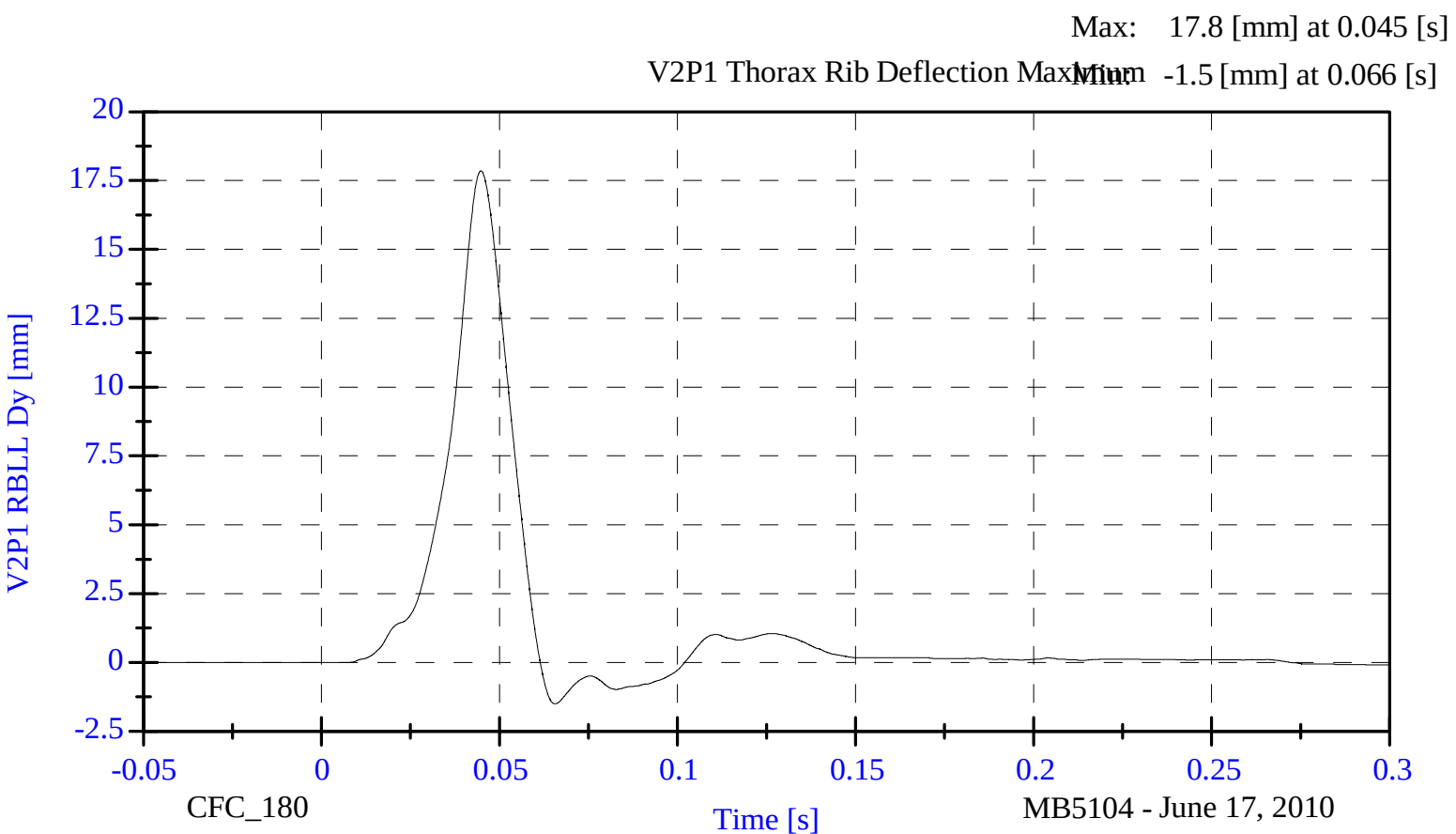
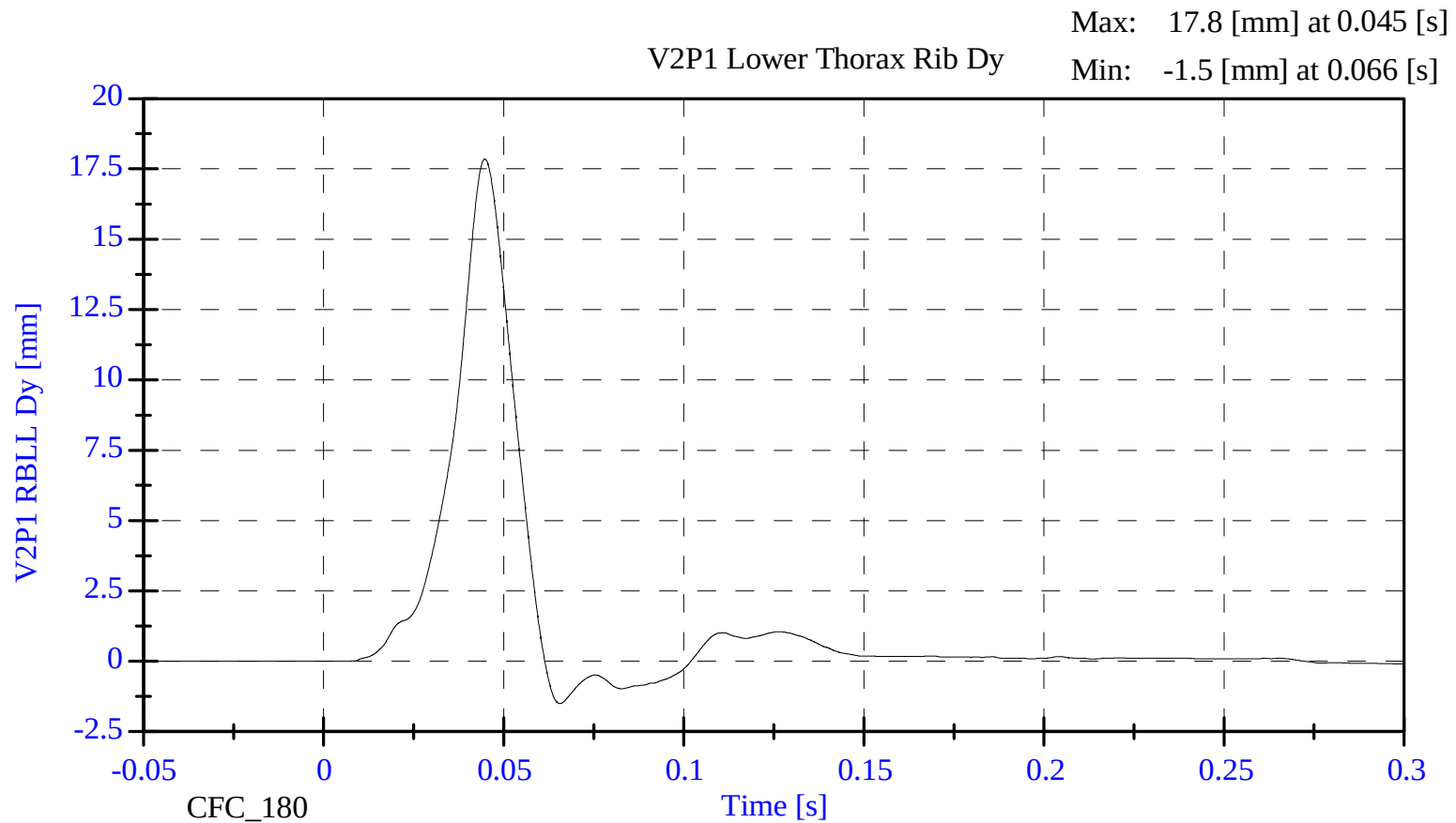


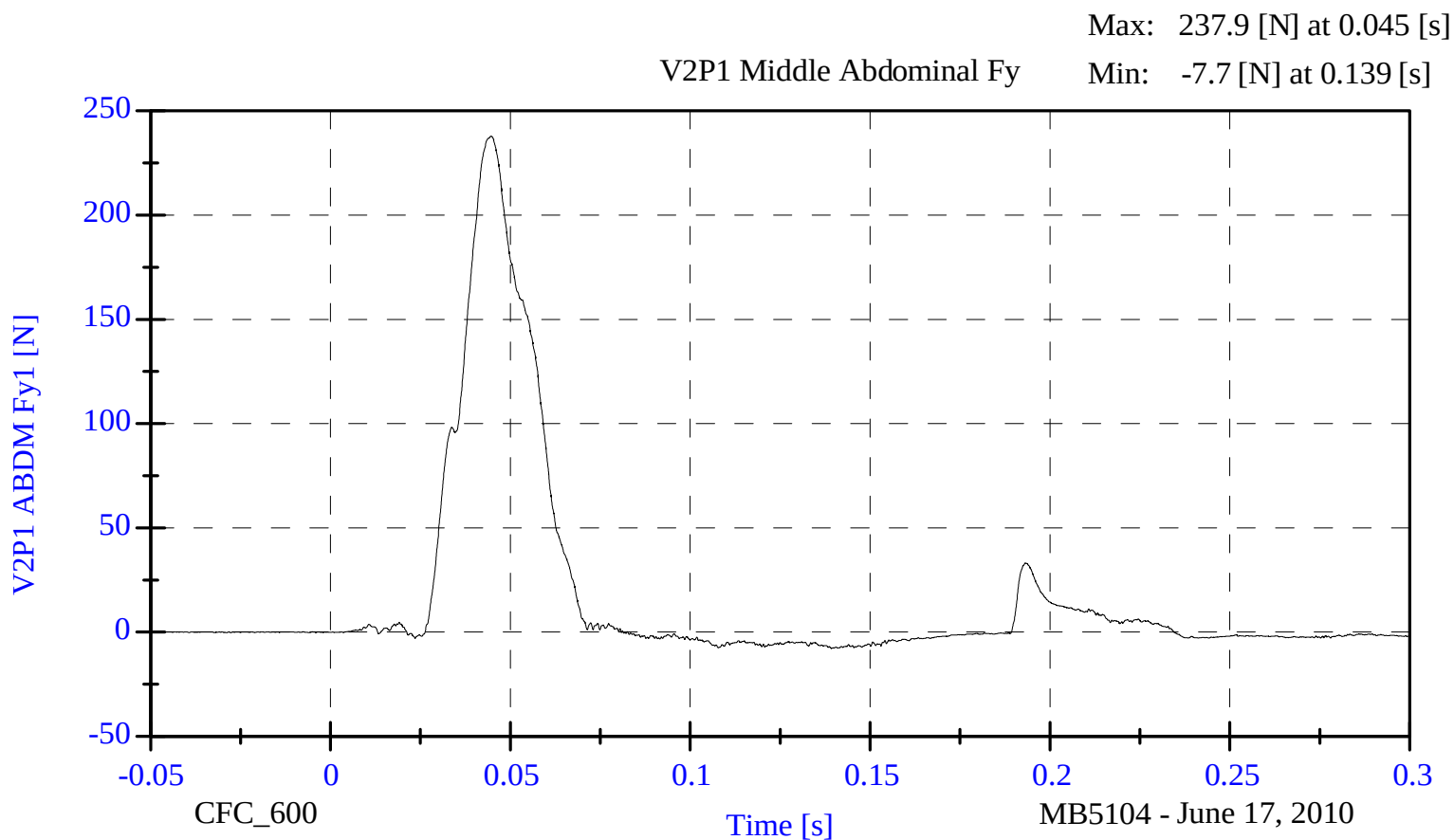
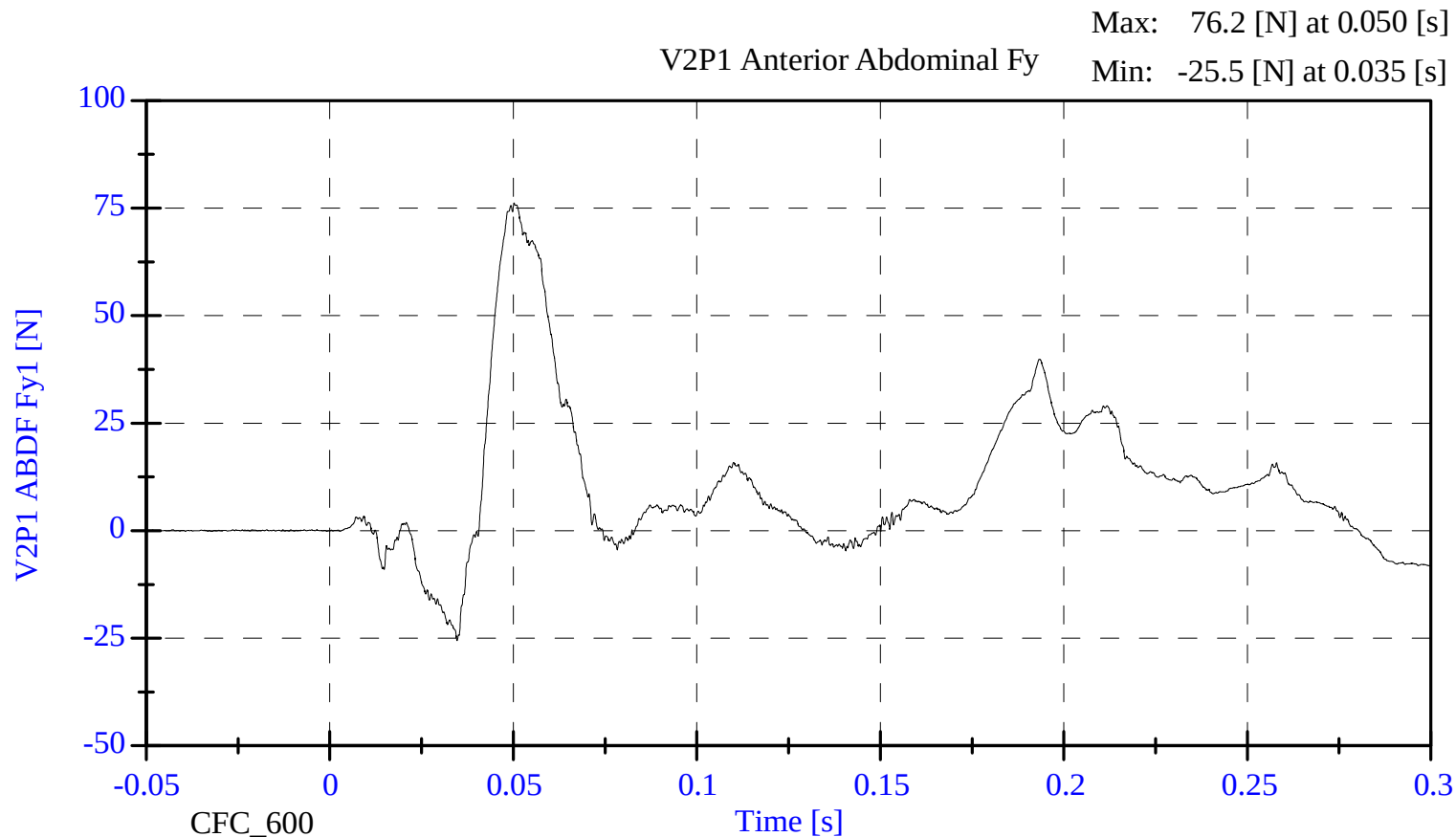


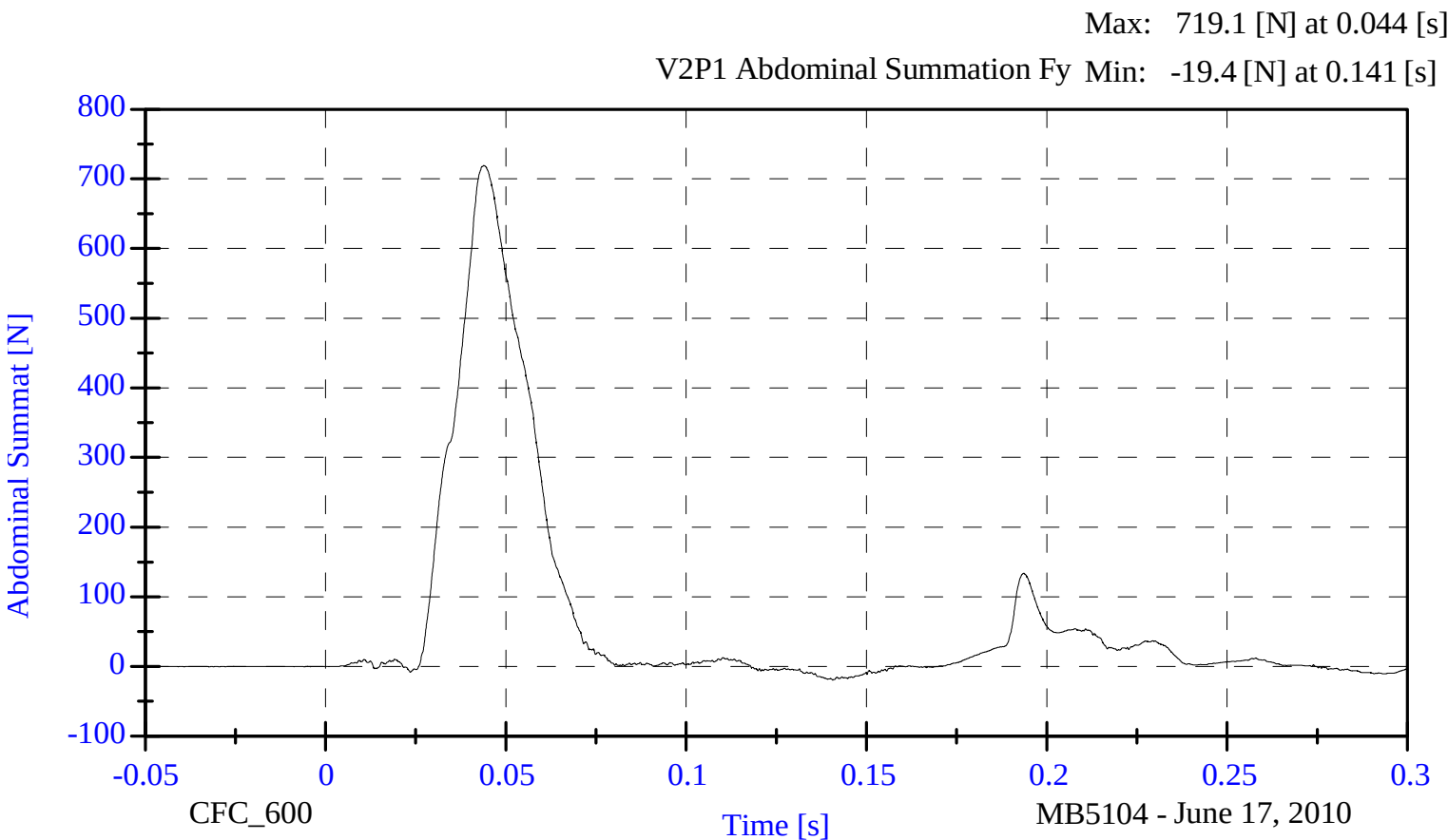
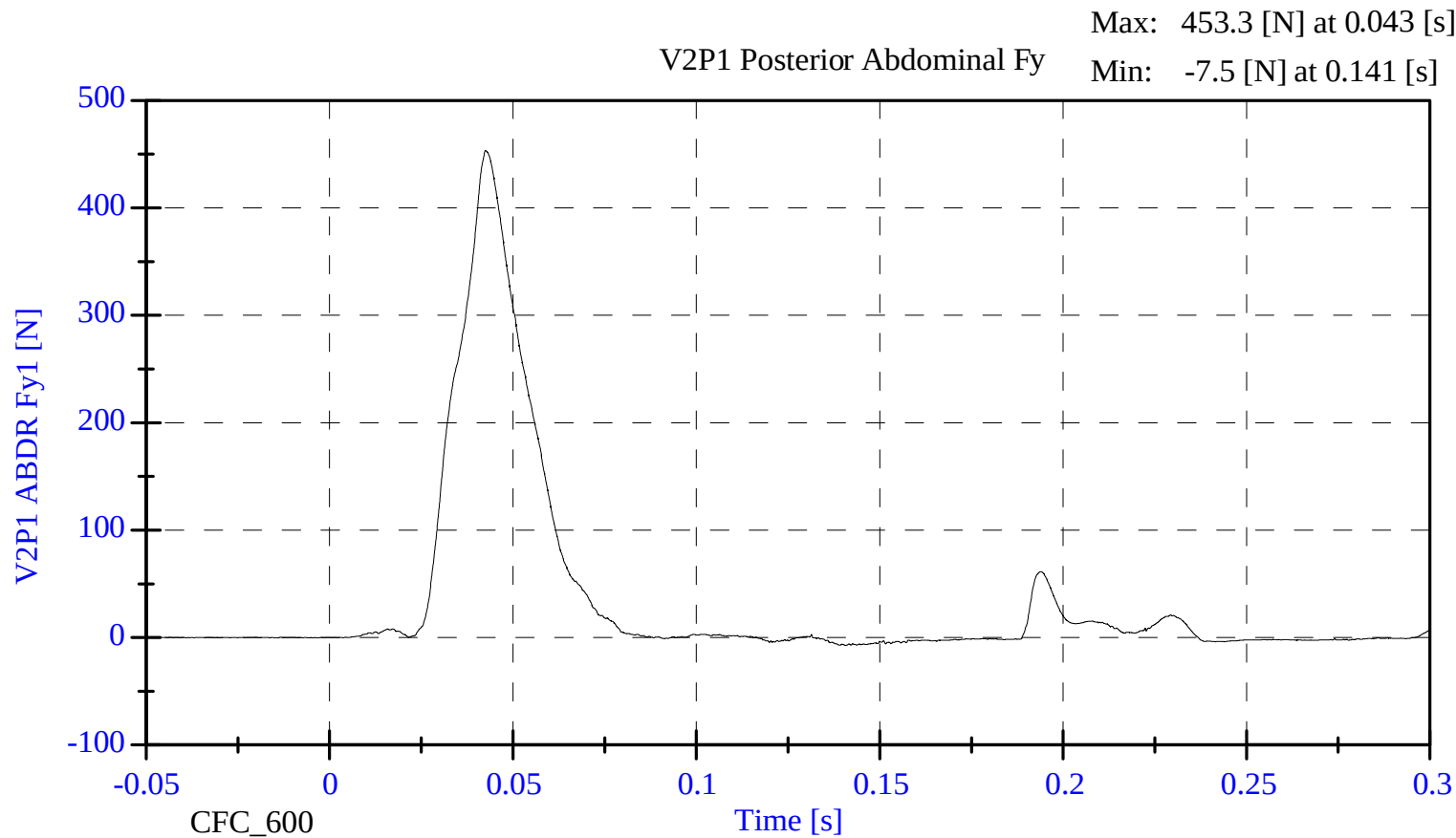
MB5104 - June 17, 2010

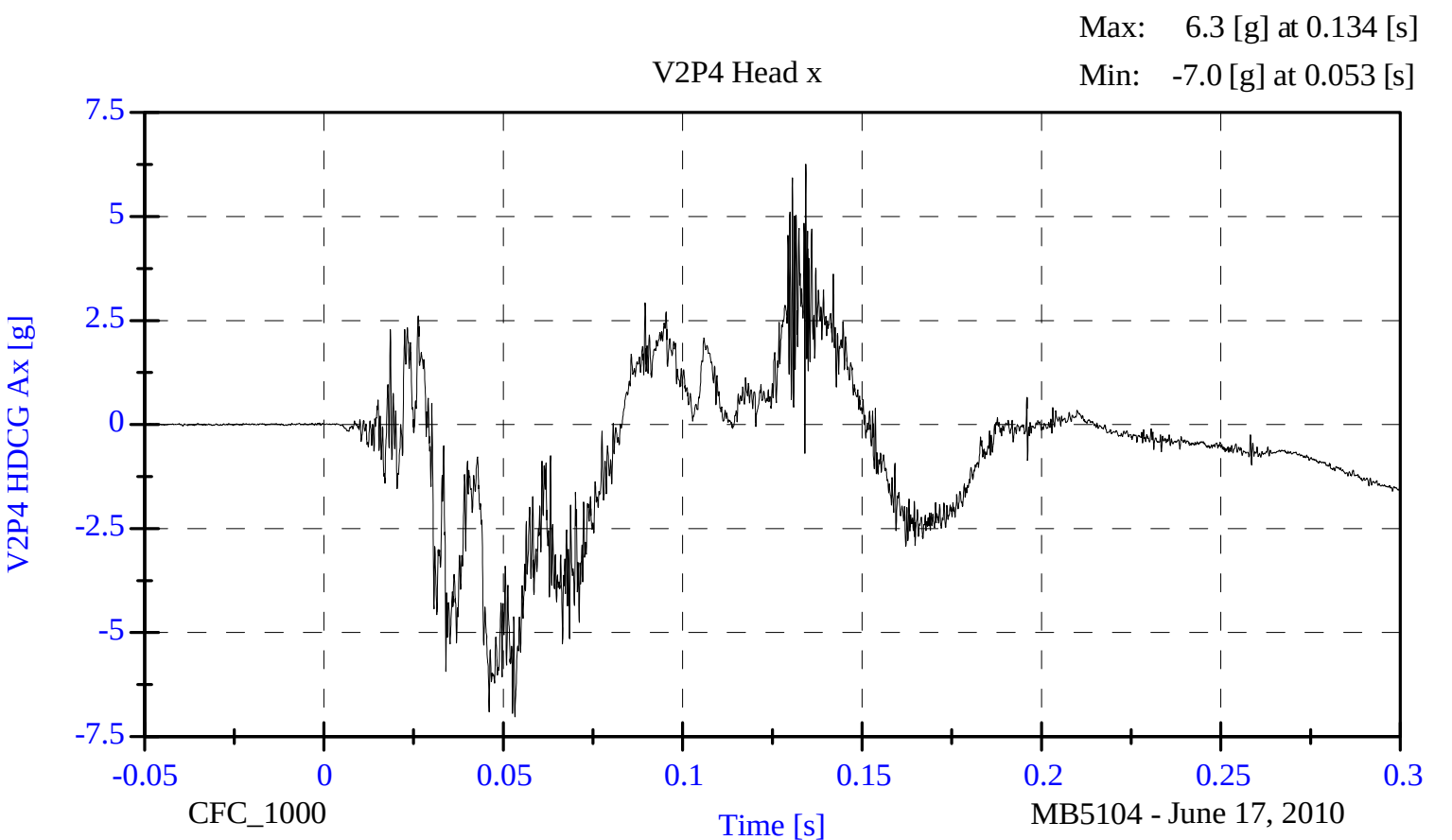
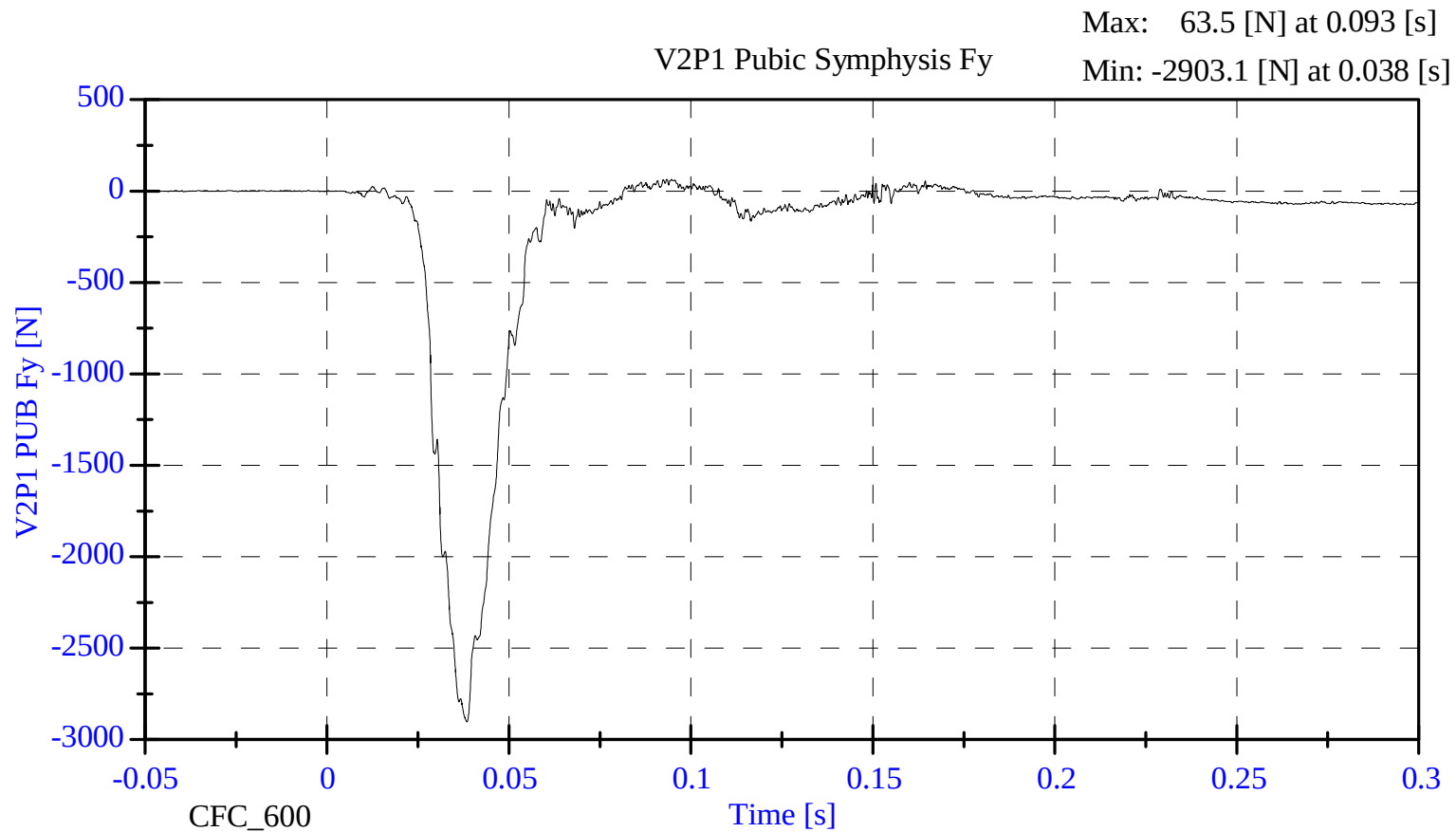


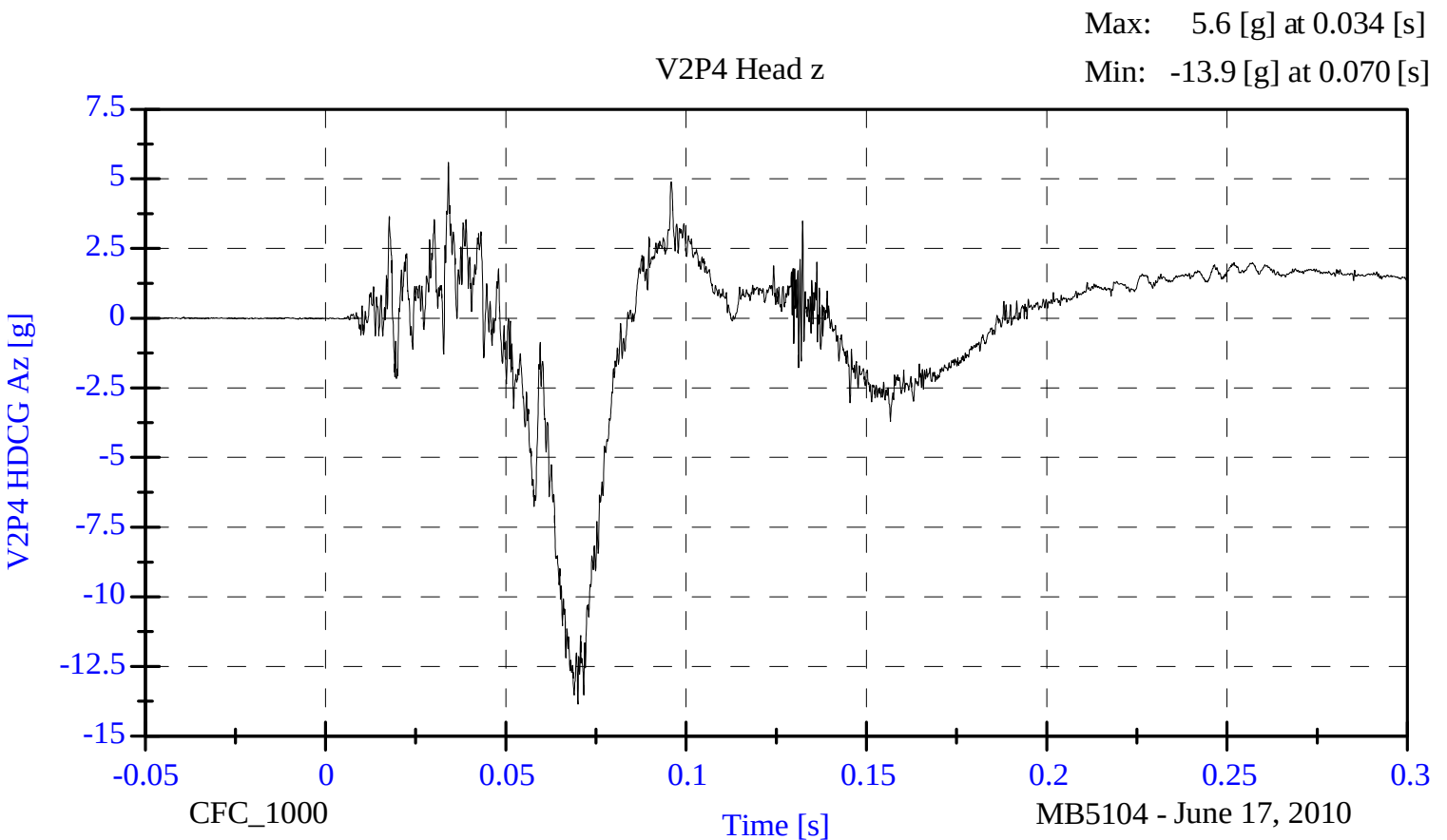
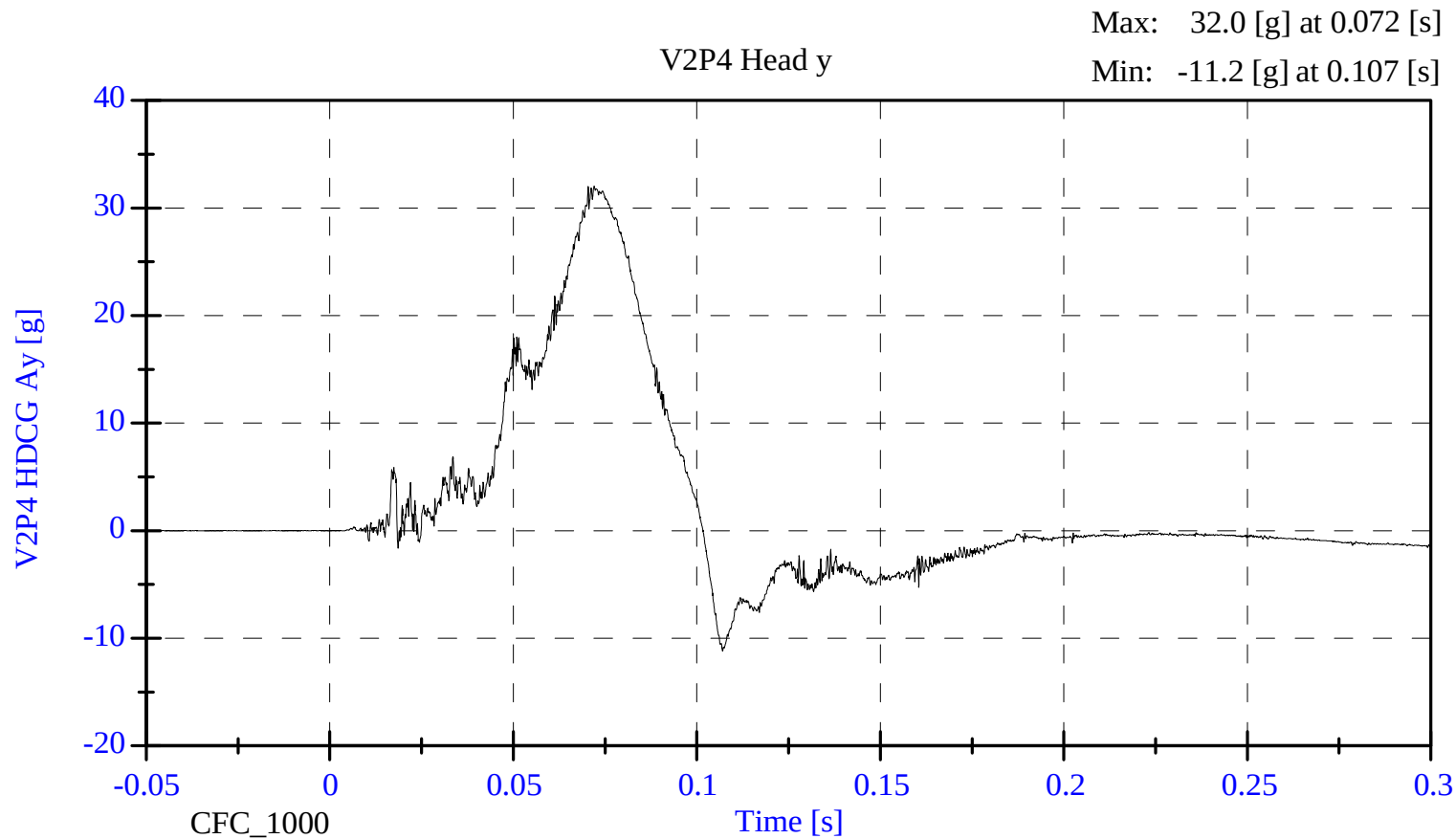
MB5104 - June 17, 2010

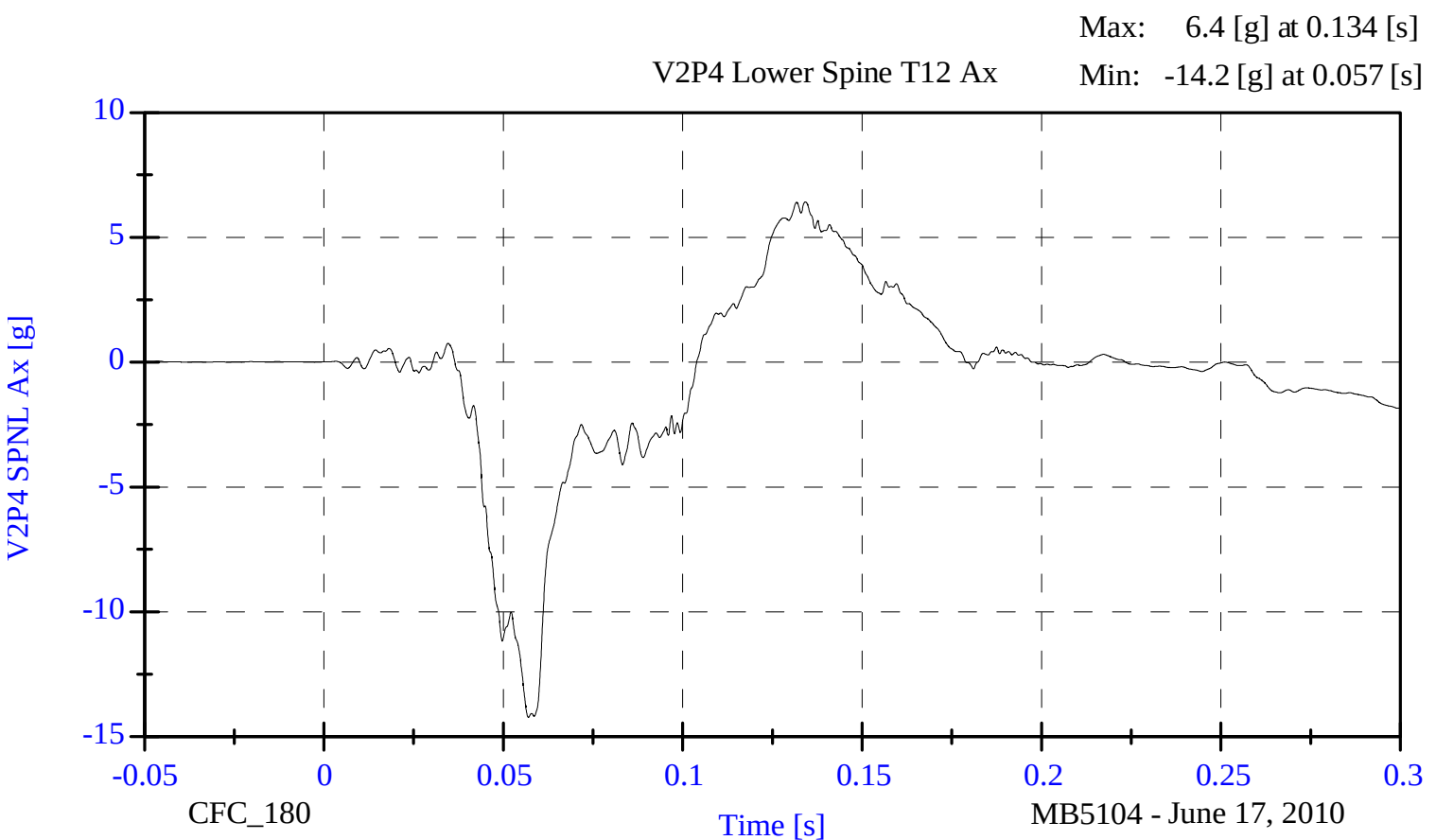
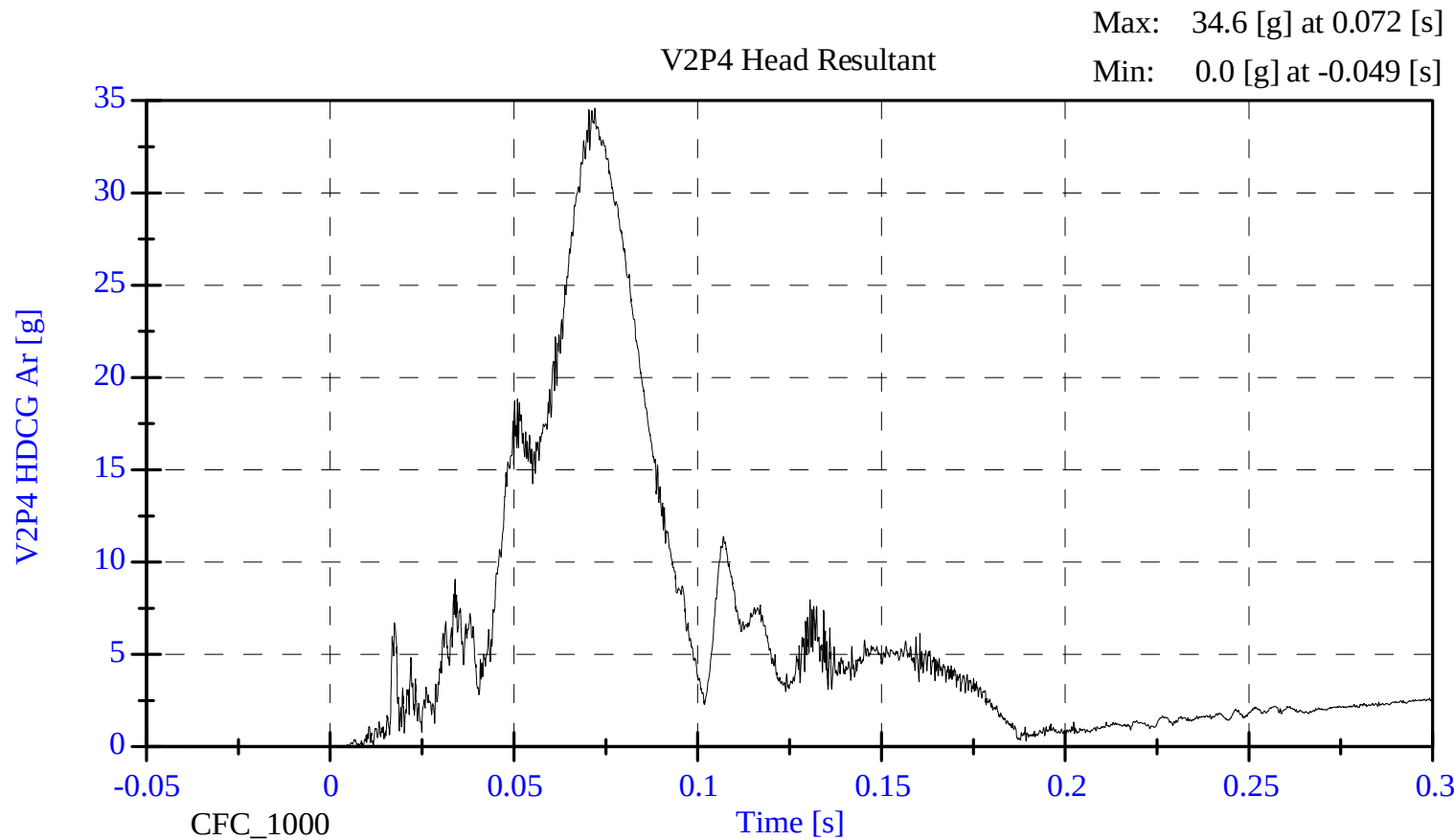


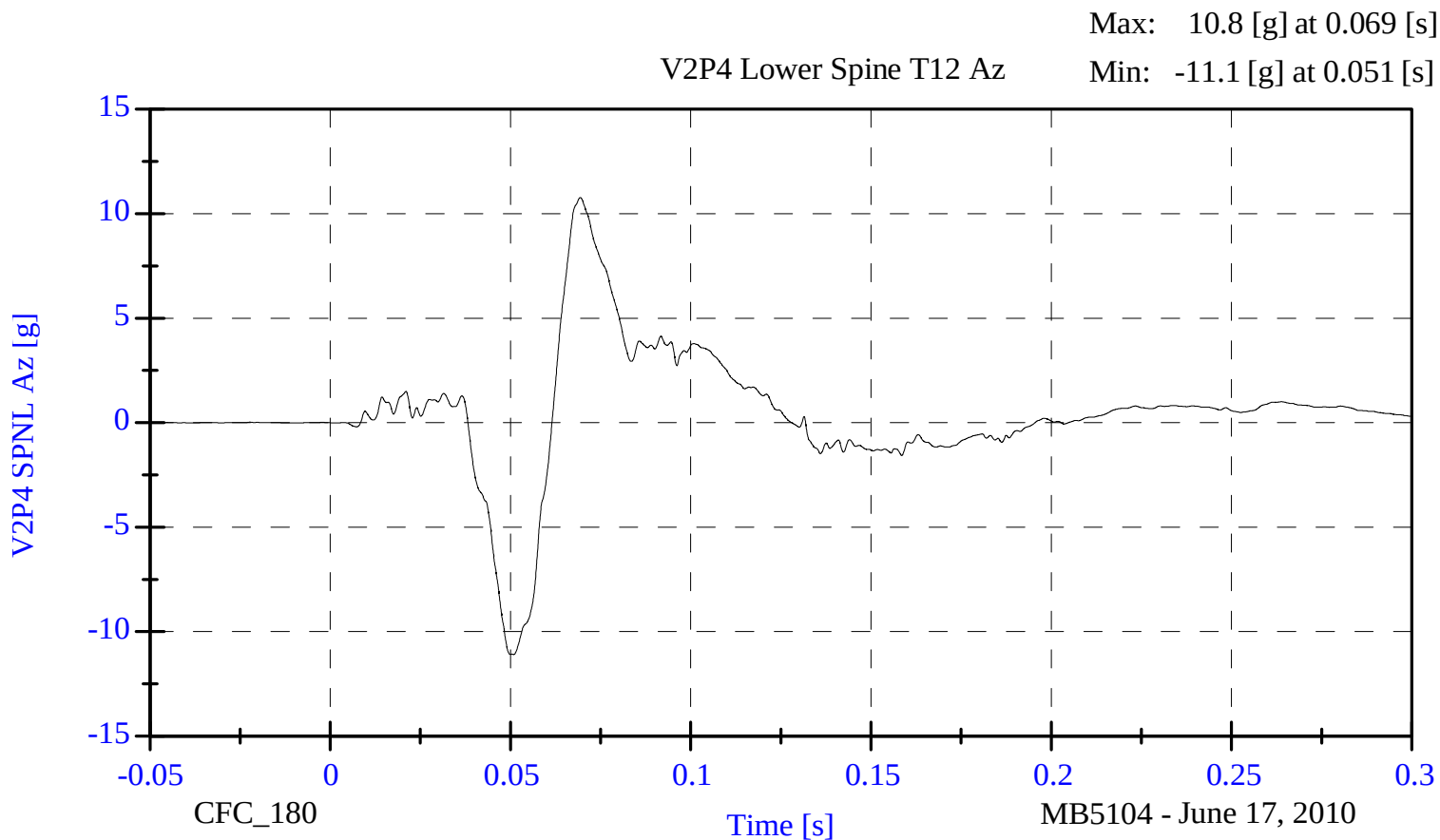
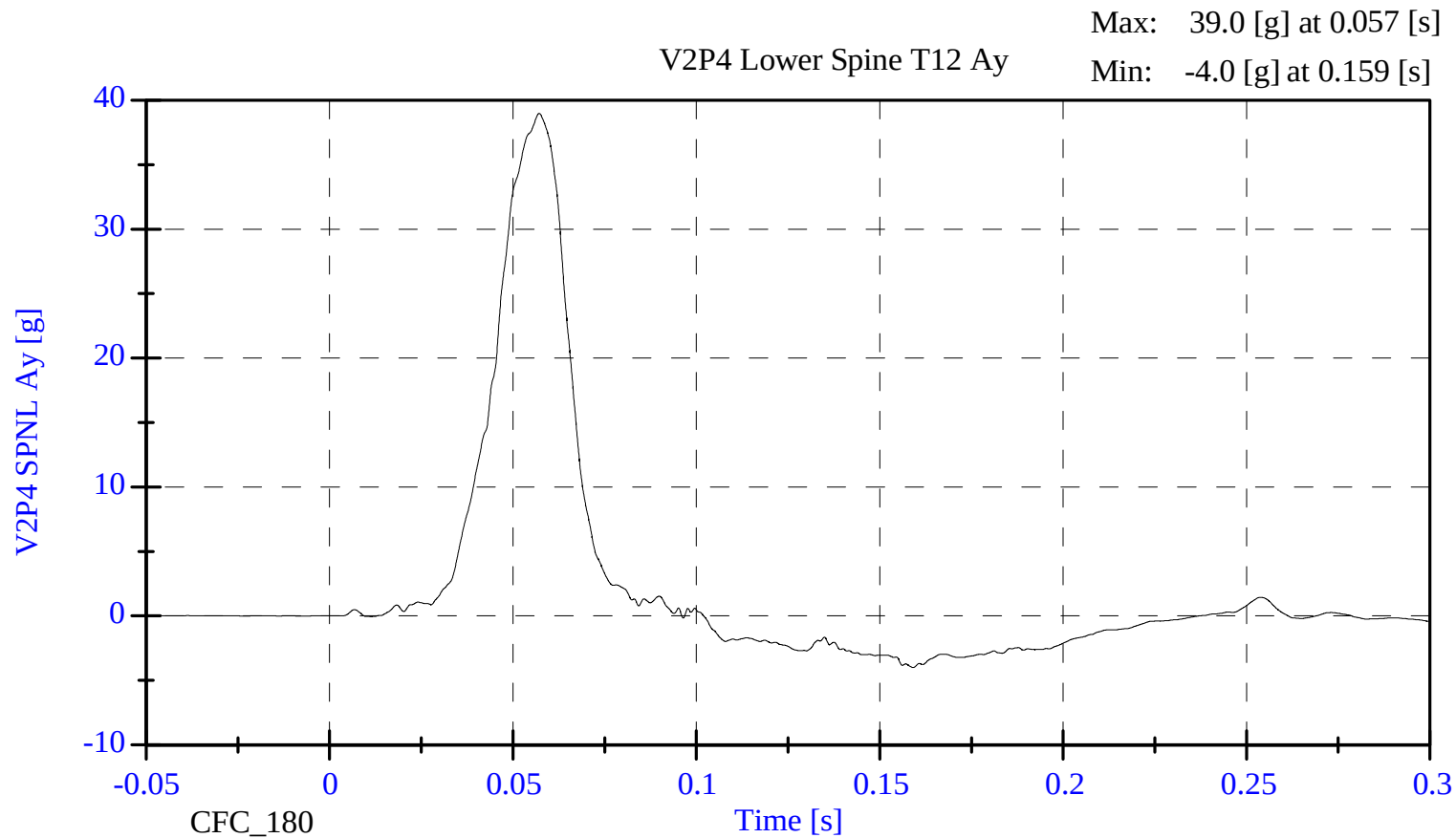


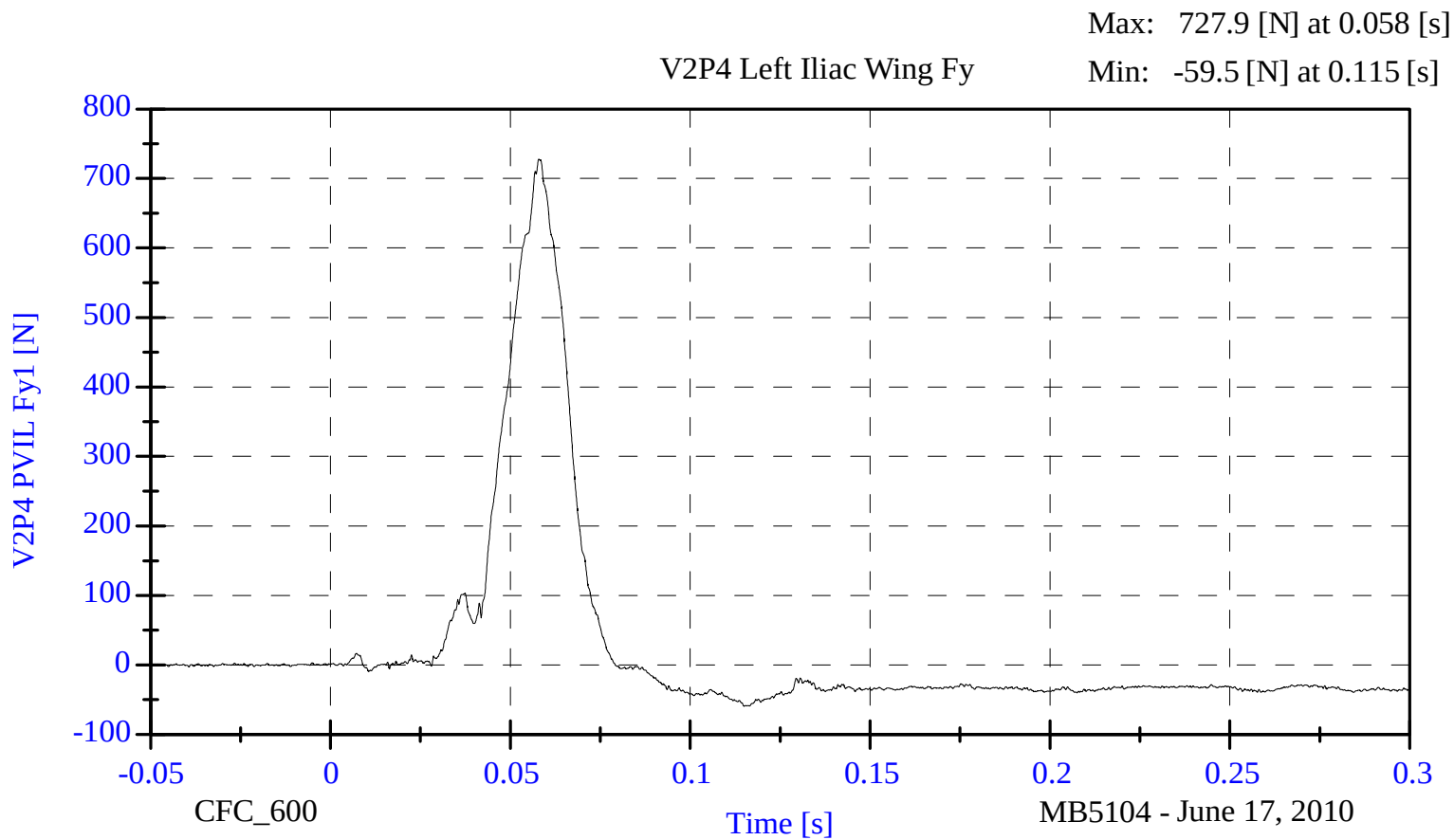
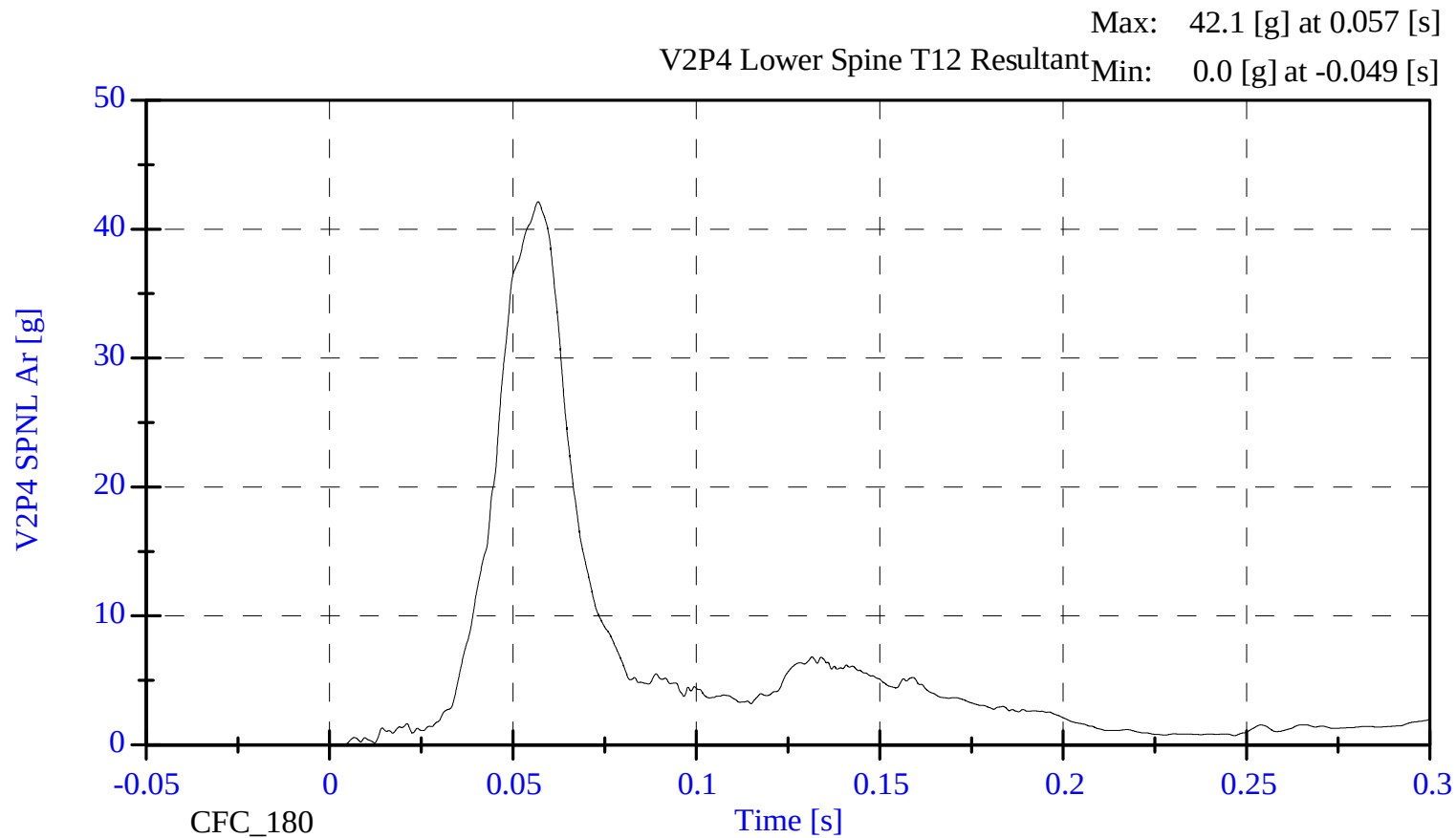


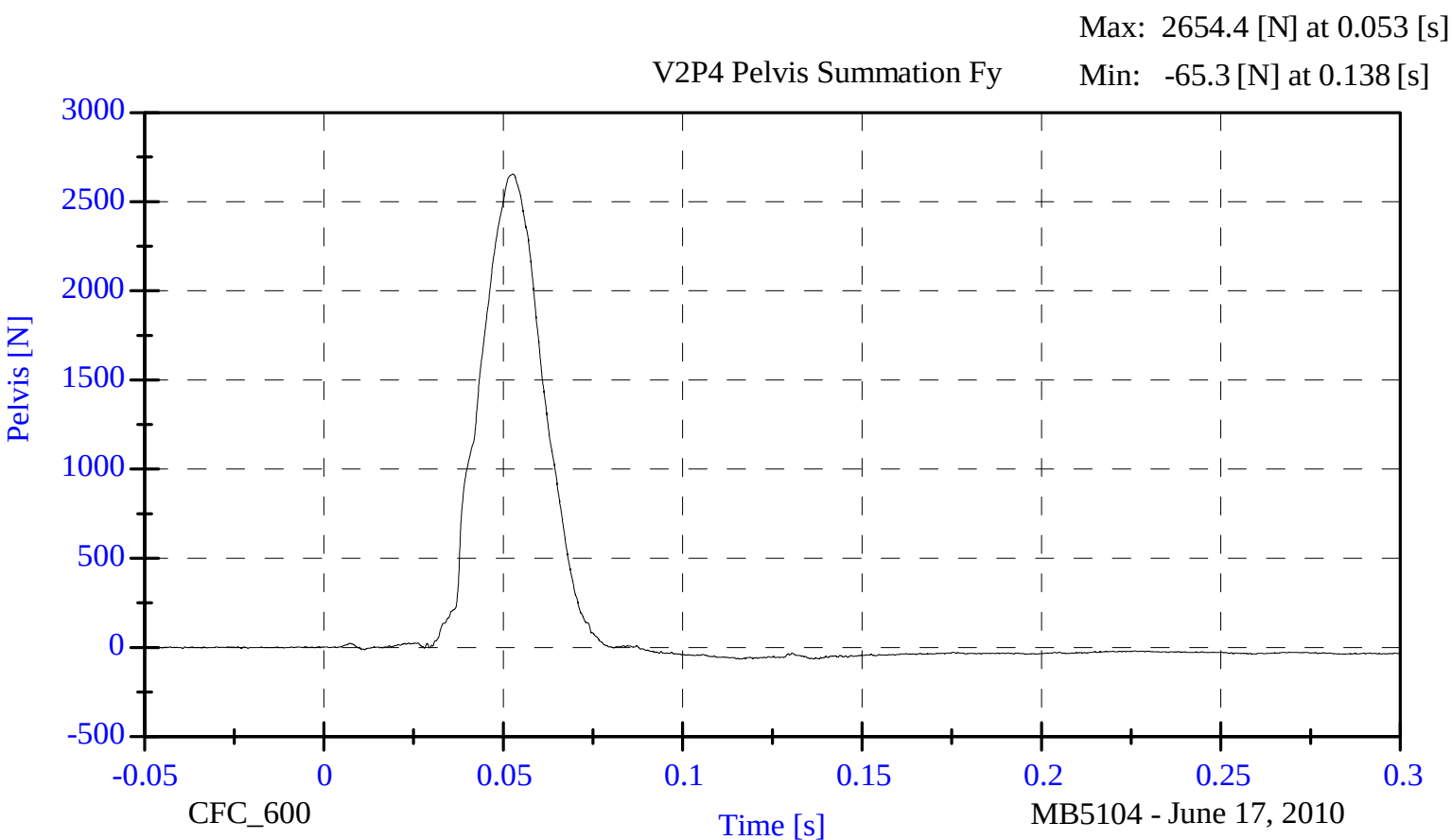
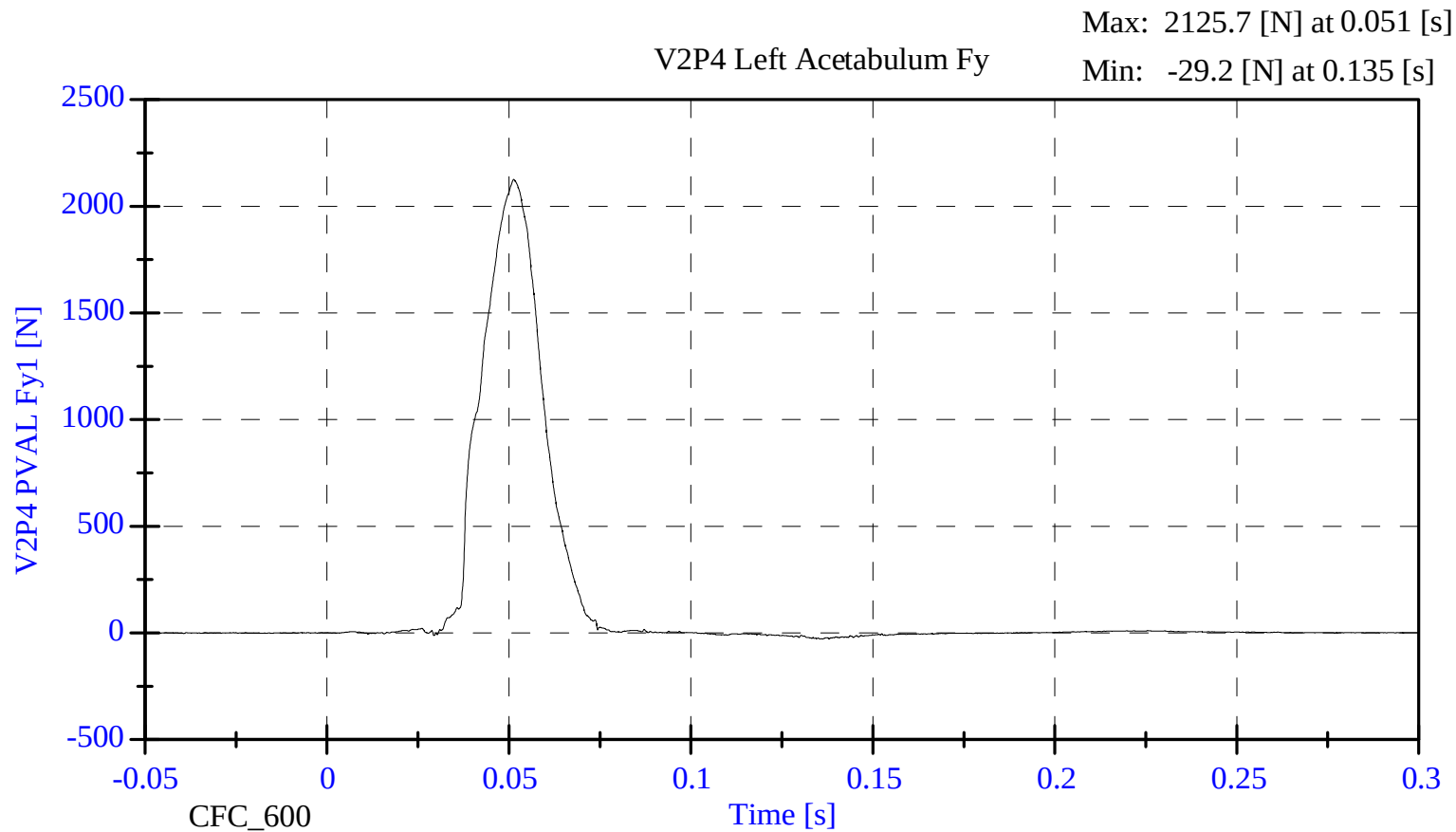












APPENDIX C
DUMMY CALIBRATION DATA

CALIBRATION TEST RESULTS

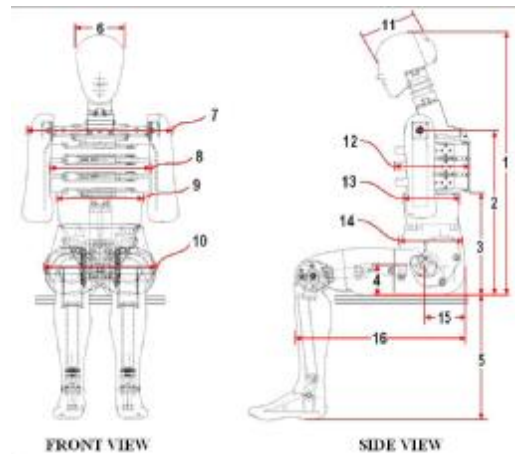
PRE-TEST

Es-2re No: F033

CONFIGURED FOR LEFT SIDE IMPACT

ES-2re External Measurements

S/N F033



Dim. No.	Description	Specification (mm)	Result	Pass/Fail
1	Sitting Height	900-918	906	Pass
2	Seat to Shoulder Joint	558-572	570	Pass
3	Seat to Lower Face of Thoracic Spine Box	346-356	354	Pass
4	Seat to Hip Joint (center of bolt)	97-103	101	Pass
5	Sole to Seat, Sitting	333-451	436	Pass
6	Head Width	152-158	153	Pass
7	Shoulder/Arm Width	461-479	466	Pass
8	Thorax Width	322-332	324	Pass
9	Abdomen Width	273-287	284	Pass
10	Pelvis Lap Width	359-373	368	Pass
11	Head Depth	196-206	202	Pass
12	Thorax Depth	262-272	267	Pass
13	Abdomen Depth	194-204	201	Pass
14	Pelvis Depth	235-245	236	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150-160	158	Pass
16	Back of Buttocks to Front Knee	597-615	603	Pass

Technician : A. Rudniski

Date: 06/09/2010



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

VERIFICATION REPORT

Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Head Drop	Test Date:	6/8/2010
Test Number:	1	Test Time:	3:10:23 PM

Component Part Number	Component Serial Number
455-1007	8473

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10 -- 70	34 %RH P
Resultant Acceleration	125 -- 155	140 g P
Oscillation	0.0 -- 15.0	5.7 % P
Fore-Aft Acceleration	-15.00 -- 15.00	5.50 g P

All test parameters are within specifications

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

Test ID: Head Drop

Test Time: 3:10:23 PM

Test Date: 6/8/2010



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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	P50078	5/26/2010
Endevco	7264-2000	P51949	5/26/2010
Endevco	7264-2000	05H10-M16	5/26/2010

Test ID: **Head Drop**

Test Time: **3:10:23 PM**

Test Date: **6/8/2010**



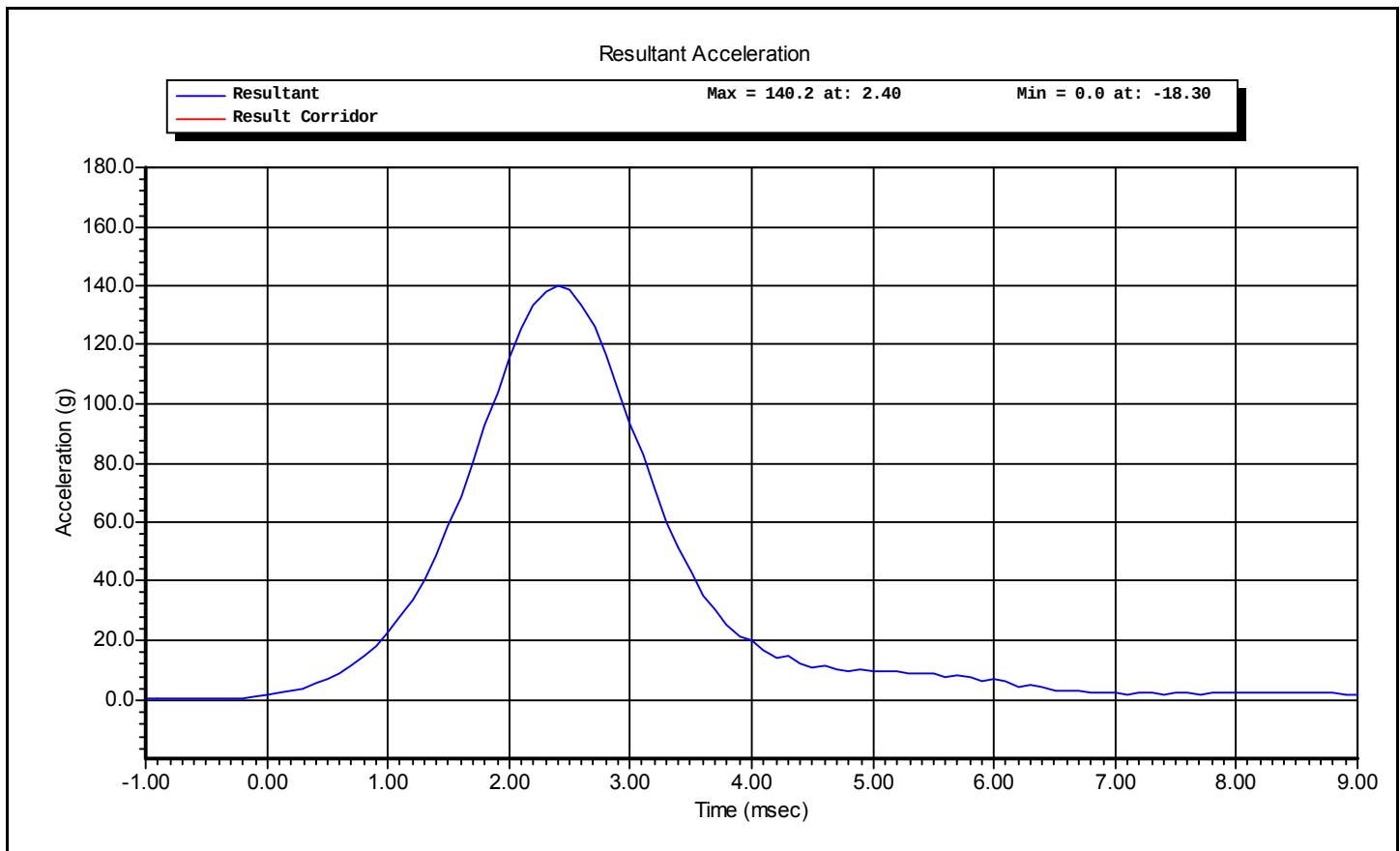
www.calspan.com

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Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Head Drop	Test Date:	6/8/2010
Test Number:	1	Test Time:	3:10:23 PM

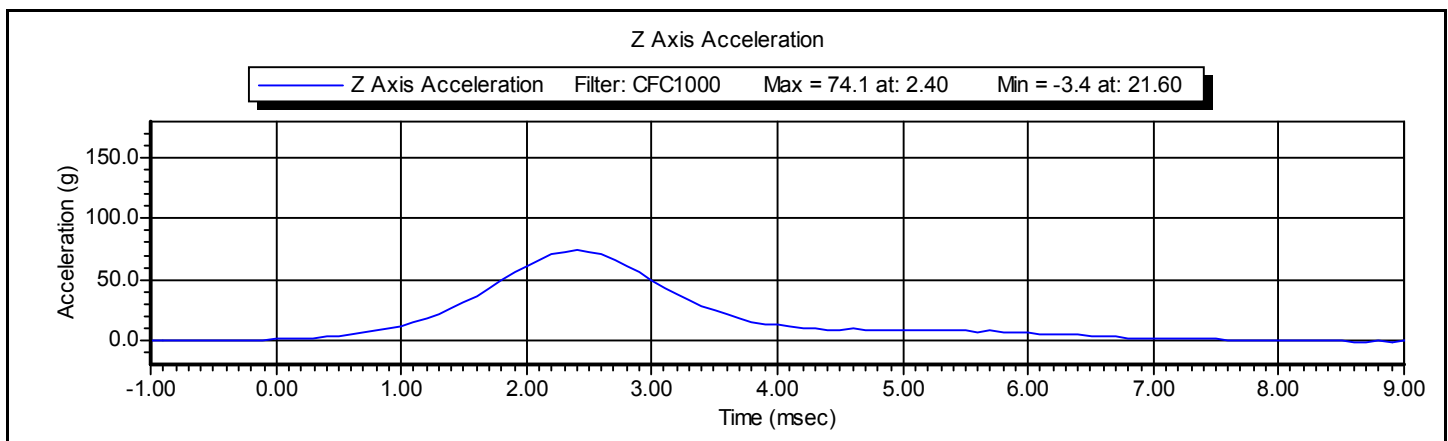
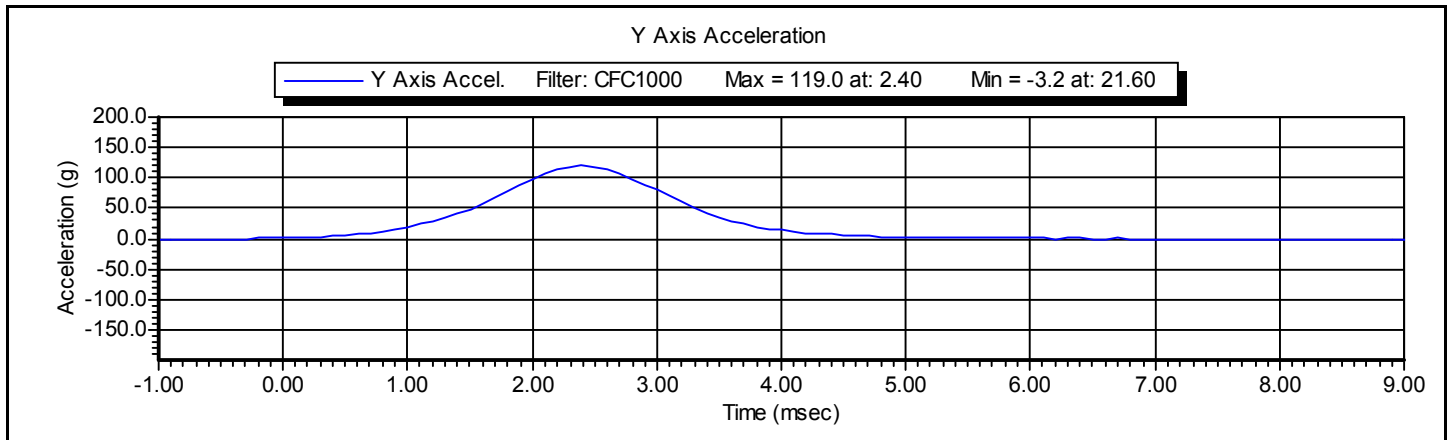
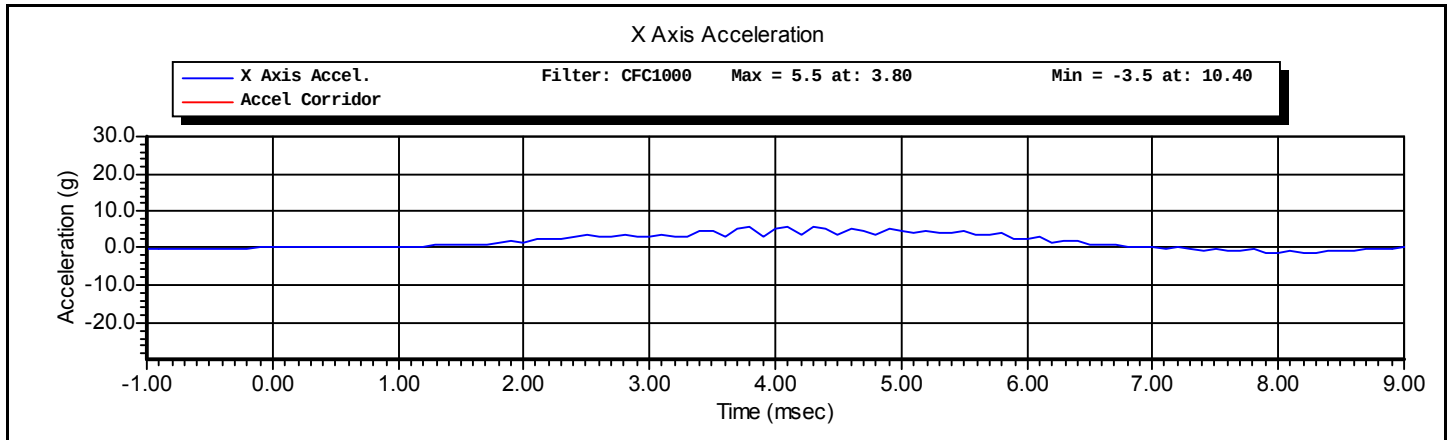
Component Part Number	Component Serial Number
455-1007	8473



Test ID: **Head Drop**

Test Time: **3:10:23 PM**

Test Date: **6/8/2010**





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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Neck Flexion	Test Date:	6/8/2010
Test Number:	1	Test Time:	2:58:12 PM

Component Part Number	Component Serial Number
175-2001	07085

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10 -- 70	34 %RH P
Velocity	3.30 -- 3.50	3.42 m/s P
Maximum Neck Flexion Angle	49.0 -- 59.0	51.9 degrees P
Time At Maximum Neck Flexion	54.0 -- 66.0	59.5 ms P
Decay to Zero Degrees	53.0 -- 88.0	57.1 ms P
Velocity Corridor	--	P

All test parameters are within specifications

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

Test ID: **Neck Flexion**

Test Time: **2:58:12 PM**

Test Date: **6/8/2010**



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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
DentonATD	7000428	094	4/27/2010
DentonATD	7000428	095	4/27/2010
DentonATD	7000428	093	4/27/2010

Test ID: **Neck Flexion**

Test Time: **2:58:12 PM**

Test Date: **6/8/2010**



www.calspan.com

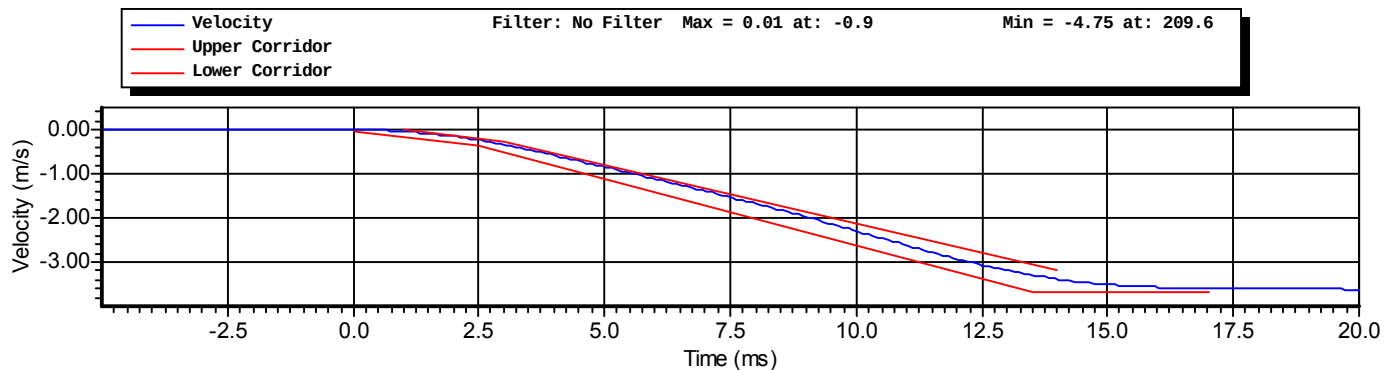
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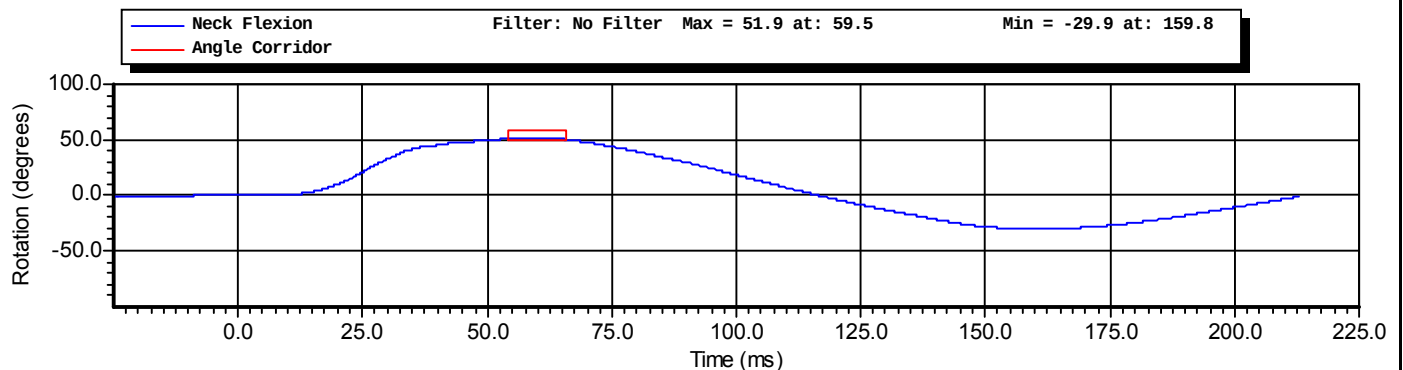
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Neck Flexion	Test Date:	6/8/2010
Test Number:	1	Test Time:	2:58:12 PM

Component Part Number	Component Serial Number
175-2001	07085

Pendulum Velocity



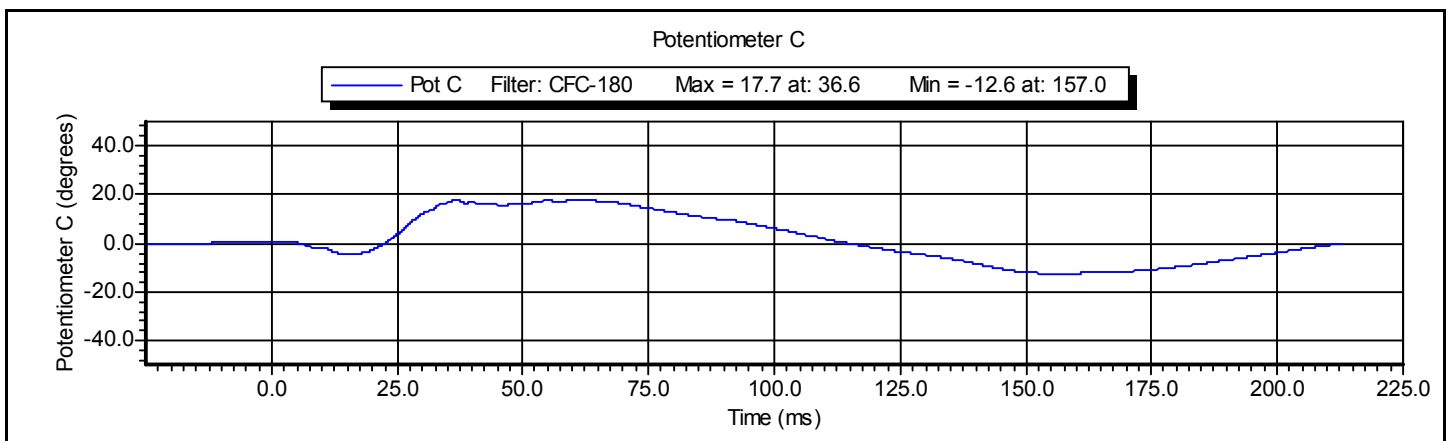
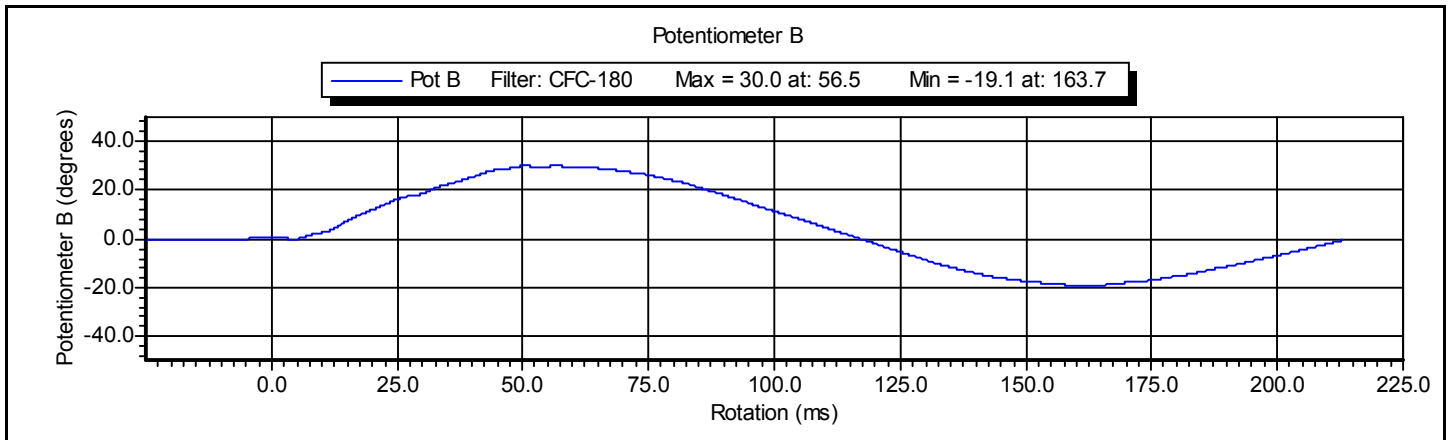
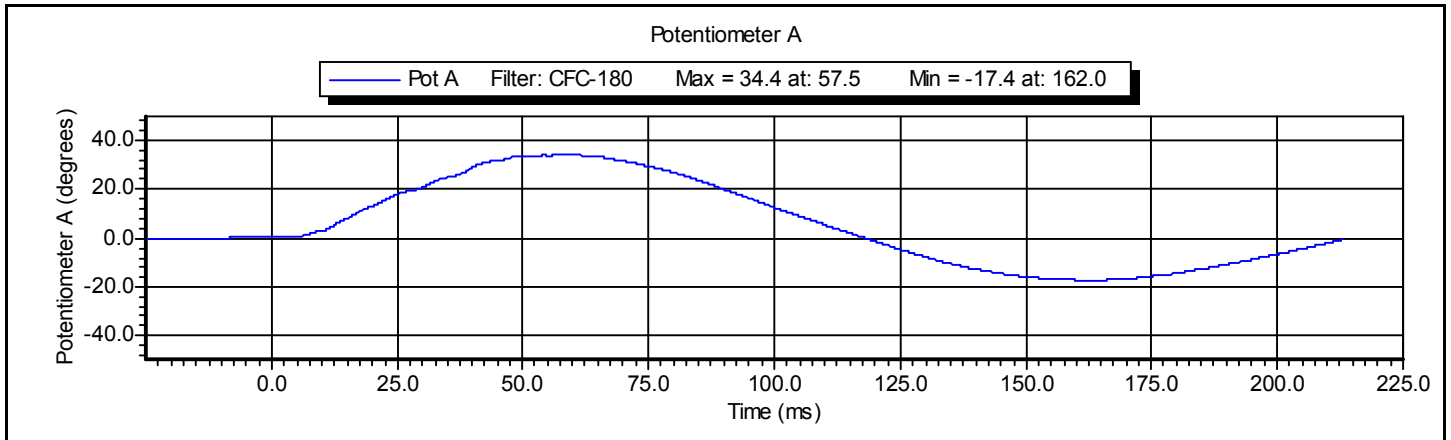
Neck Flexion Angle



Test ID: Neck Flexion

Test Time: 2:58:12 PM

Test Date: 6/8/2010





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VERIFICATION REPORT

Test Name:	Shoulder Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Shoulder	Test Date:	6/7/2010
Test Number:	1	Test Time:	2:09:27 PM

Component Part Number	Component Serial Number
960715-313	

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10.0 -- 70.0	46.0 %RH P
Velocity	4.20 -- 4.40	4.33 m/s P
Pendulum Acceleration	-10.50 -- -7.50	-10.06 g P

All test parameters are within specifications

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

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

Test ID: **Shoulder**

Test Time: **2:09:27 PM**

Test Date: **6/7/2010**



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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	P16576	4/6/2010

Test ID: **Shoulder**

Test Time: **2:09:27 PM**

Test Date: **6/7/2010**



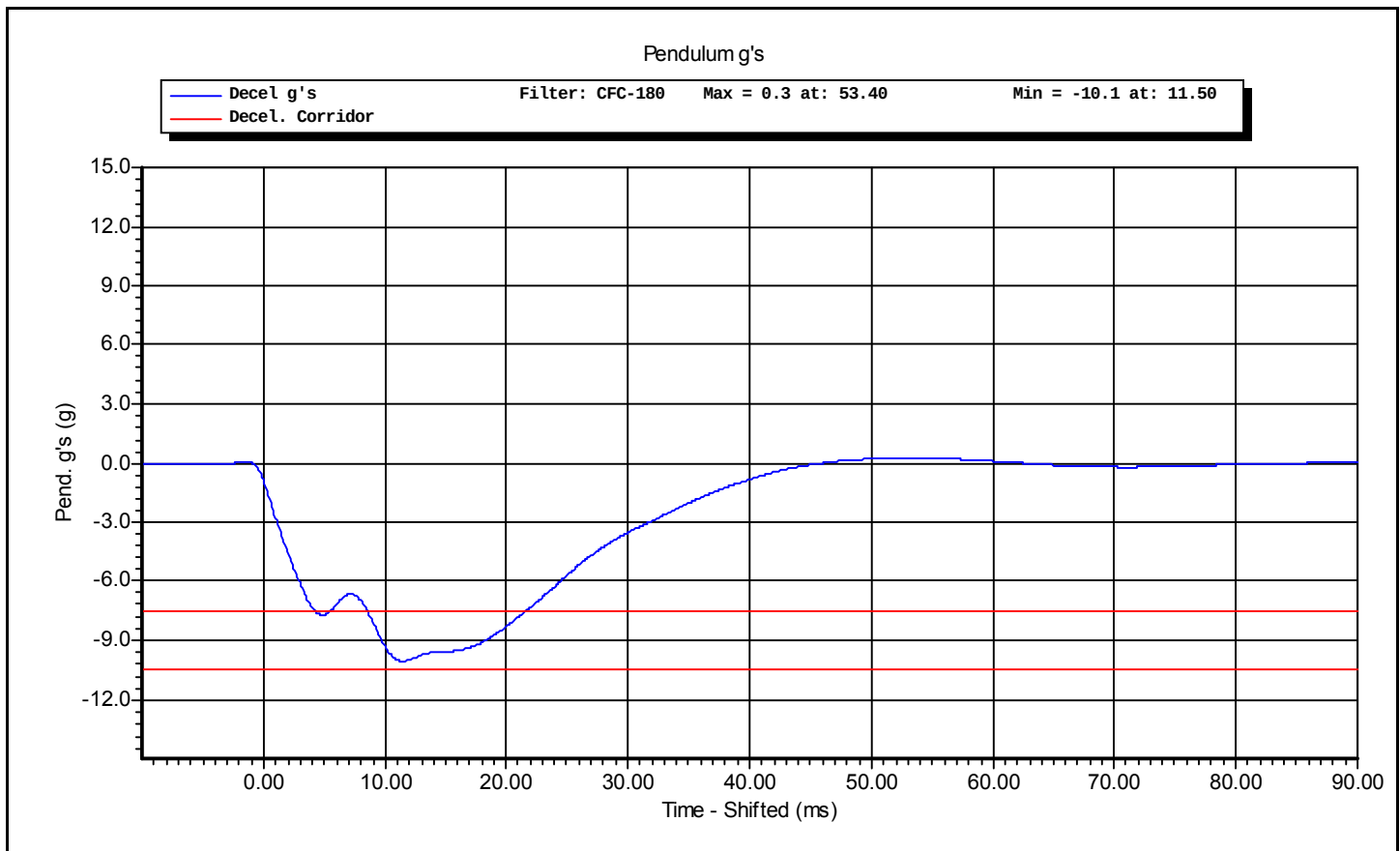
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Test Name:	Shoulder Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Shoulder	Test Date:	6/7/2010
Test Number:	1	Test Time:	2:09:27 PM

Component Part Number	Component Serial Number
960715-313	



Test ID: **Shoulder**

Test Time: **2:09:27 PM**

Test Date: **6/7/2010**



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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Upper Rib 4 m/s	Test Date:	6/7/2010
Test Number:	1	Test Time:	3:15:33 PM

Component Part Number	Component Serial Number
175-4020A	UPPER

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	45.0 %RH P
Velocity	3.90 -- 4.10	3.99 m/s P
Rib Displacement	-51.00 -- -46.00	-47.91 mm P
Drop Height	807.0 -- 823.0	815.0 mm P

All test parameters are within specifications

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

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

Test ID: **Upper Rib 4 m/s**

Test Time: **3:15:33 PM**

Test Date: **6/7/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-179	4/23/2010
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P23137	1/22/2010

Test ID: **Upper Rib 4 m/s**

Test Time: **3:15:33 PM**

Test Date: **6/7/2010**



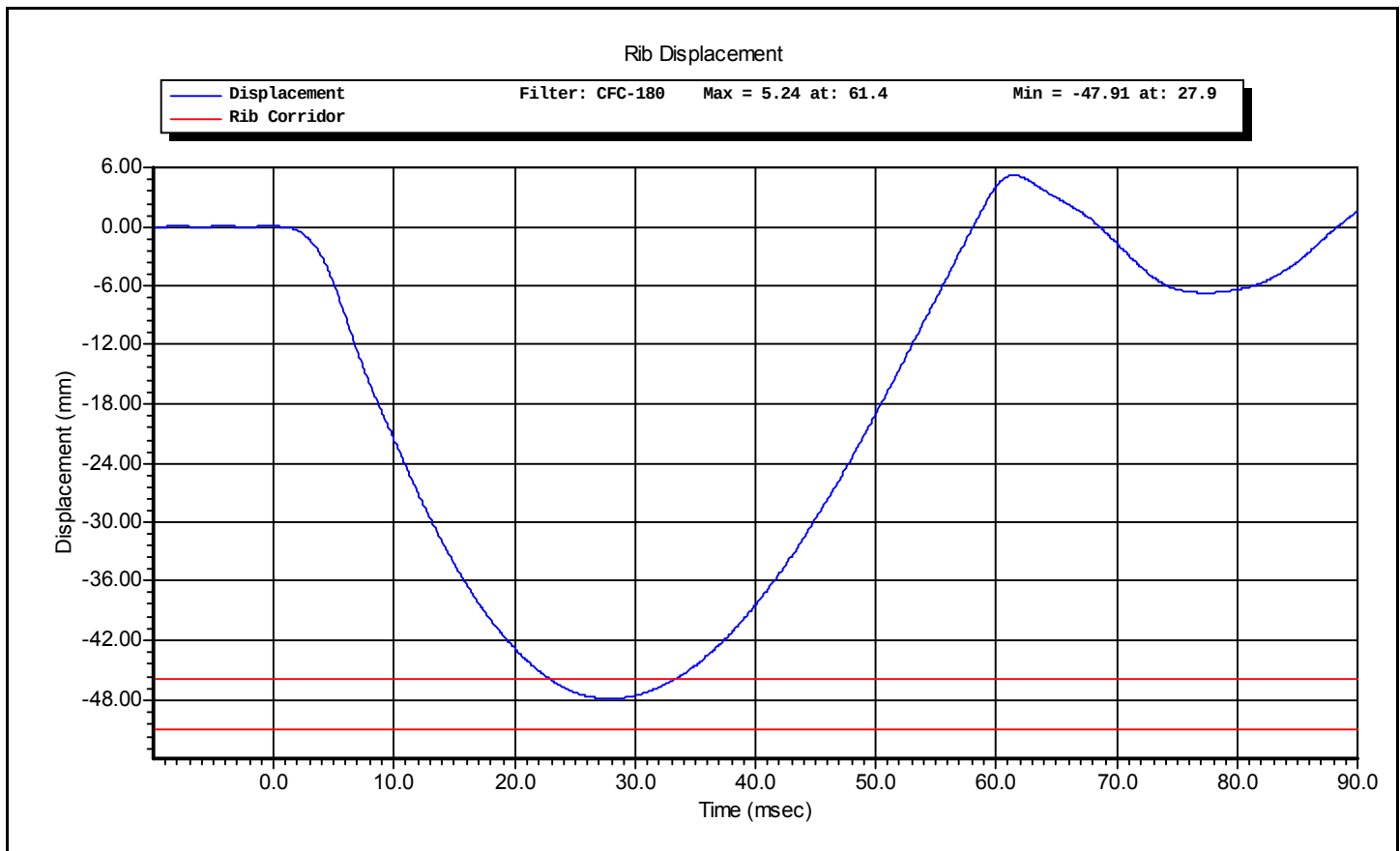
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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Upper Rib 4 m/s	Test Date:	6/7/2010
Test Number:	1	Test Time:	3:15:33 PM

Component Part Number	Component Serial Number
175-4020A	UPPER



Test ID: Upper Rib 4 m/s Test Time: 3:15:33 PM

Test Date: 6/7/2010



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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Rib Upper 3 m/s	Test Date:	6/7/2010
Test Number:	1	Test Time:	3:26:18 PM

Component Part Number	Component Serial Number
175-4020A	UPPER

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	45.0 %RH P
Velocity	2.90 -- 3.10	2.97 m/s P
Rib Displacement	-40.00 -- -36.00	-36.43 mm P
Drop Height	454 -- 464	459 mm P

All test parameters are within specifications

Technician: A. Rudniski Signature: _____

Supervisor: D. Travale Signature: _____

Test ID: Rib Upper 3 m/s

Test Time: 3:26:18 PM

Test Date: 6/7/2010



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-179	4/23/2010
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P23137	1/22/2010

Test ID: **Rib Upper 3 m/s**

Test Time: **3:26:18 PM**

Test Date: **6/7/2010**



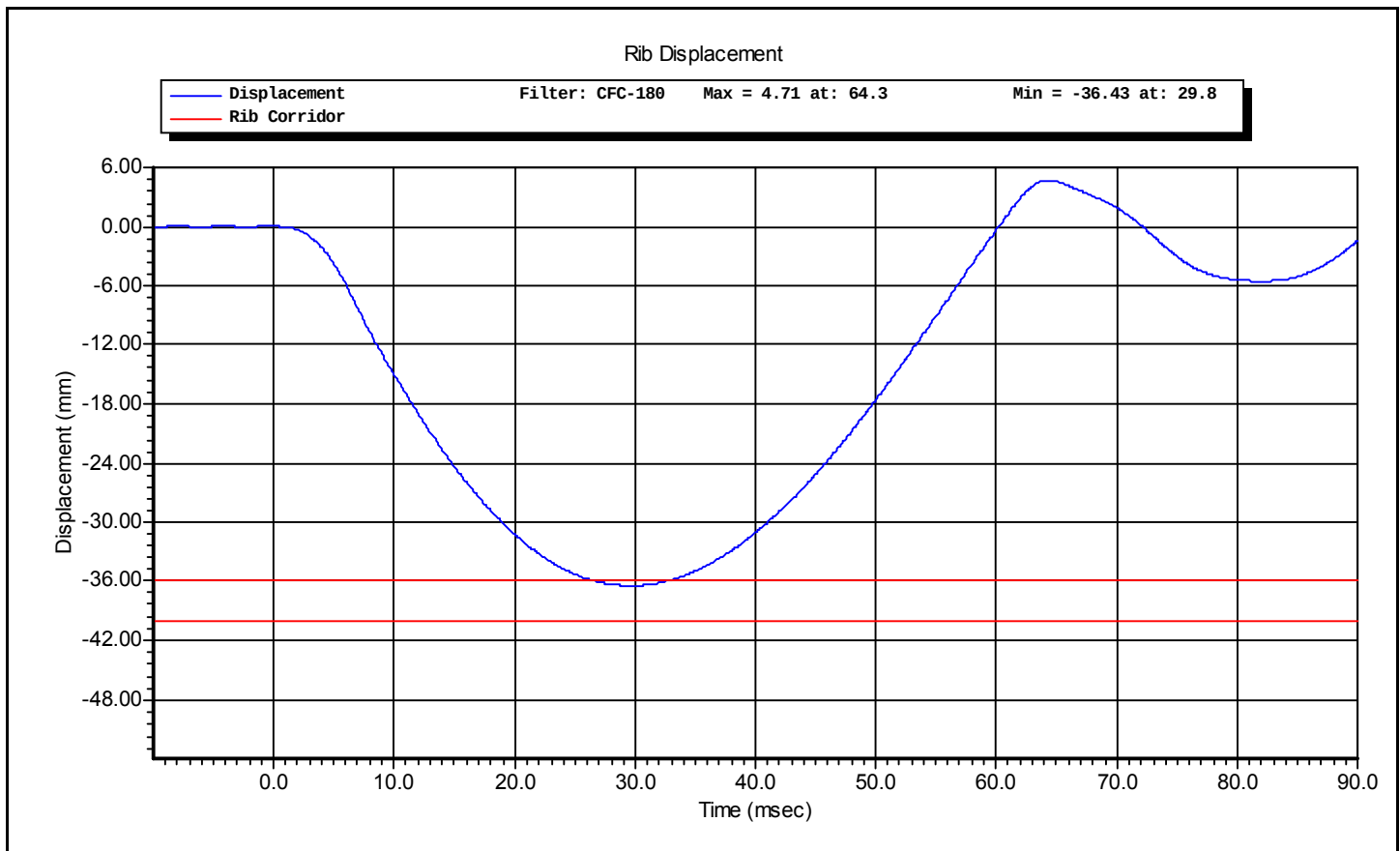
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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Rib Upper 3 m/s	Test Date:	6/7/2010
Test Number:	1	Test Time:	3:26:18 PM

Component Part Number	Component Serial Number
175-4020A	UPPER



Test ID: Rib Upper 3 m/s Test Time: 3:26:18 PM

Test Date: 6/7/2010



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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Middle Rib 4 m/s	Test Date:	6/7/2010
Test Number:	1	Test Time:	3:34:15 PM

Component Part Number	Component Serial Number
175-4020A	MIDDLE

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	45.0 %RH P
Velocity	3.90 -- 4.10	4.01 m/s P
Rib Displacement	-51.00 -- -46.00	-47.12 mm P
Drop Height	807.0 -- 823.0	815.0 mm P

All test parameters are within specifications

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

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

Test ID: **Middle Rib 4 m/s**

Test Time: **3:34:15 PM**

Test Date: **6/7/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-185	4/23/2010
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P23137	1/22/2010

Test ID: **Middle Rib 4 m/s**

Test Time: **3:34:15 PM**

Test Date: **6/7/2010**



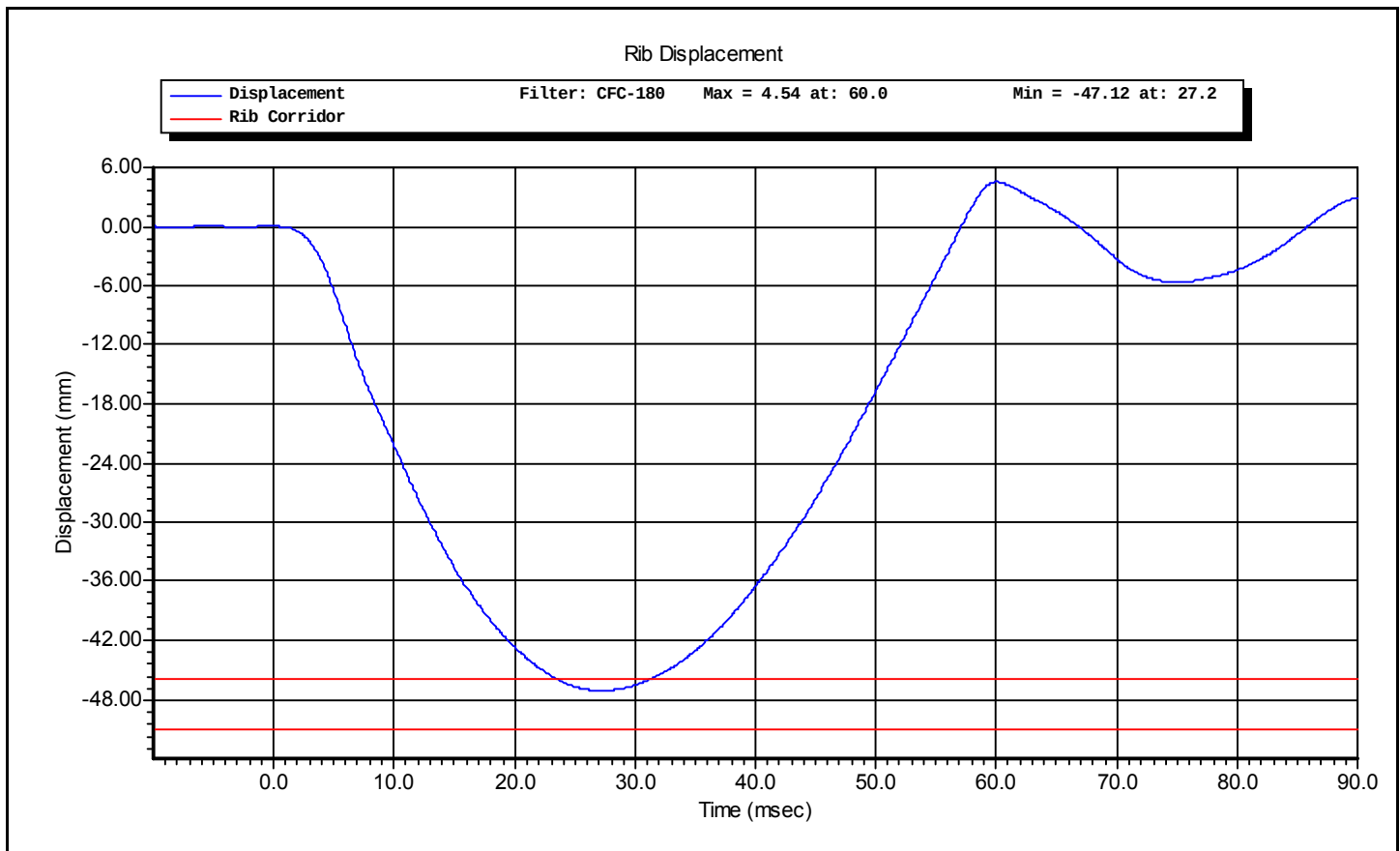
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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Middle Rib 4 m/s	Test Date:	6/7/2010
Test Number:	1	Test Time:	3:34:15 PM

Component Part Number	Component Serial Number
175-4020A	MIDDLE



Test ID: Middle Rib 4 m/s Test Time: 3:34:15 PM

Test Date: 6/7/2010



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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Middle Rib 3 m/s	Test Date:	6/7/2010
Test Number:	1	Test Time:	3:41:54 PM

Component Part Number	Component Serial Number
175-4020A	MIDDLE

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	44.0 %RH P
Velocity	2.90 -- 3.10	3.00 m/s P
Rib Displacement	-40.00 -- -36.00	-36.59 mm P
Drop Height	454 -- 464	459 mm P

All test parameters are within specifications

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

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

Test ID: **Middle Rib 3 m/s** Test Time: **3:41:54 PM**

Test Date: **6/7/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-185	4/23/2010
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P23137	1/22/2010

Test ID: **Middle Rib 3 m/s**

Test Time: **3:41:54 PM**

Test Date: **6/7/2010**



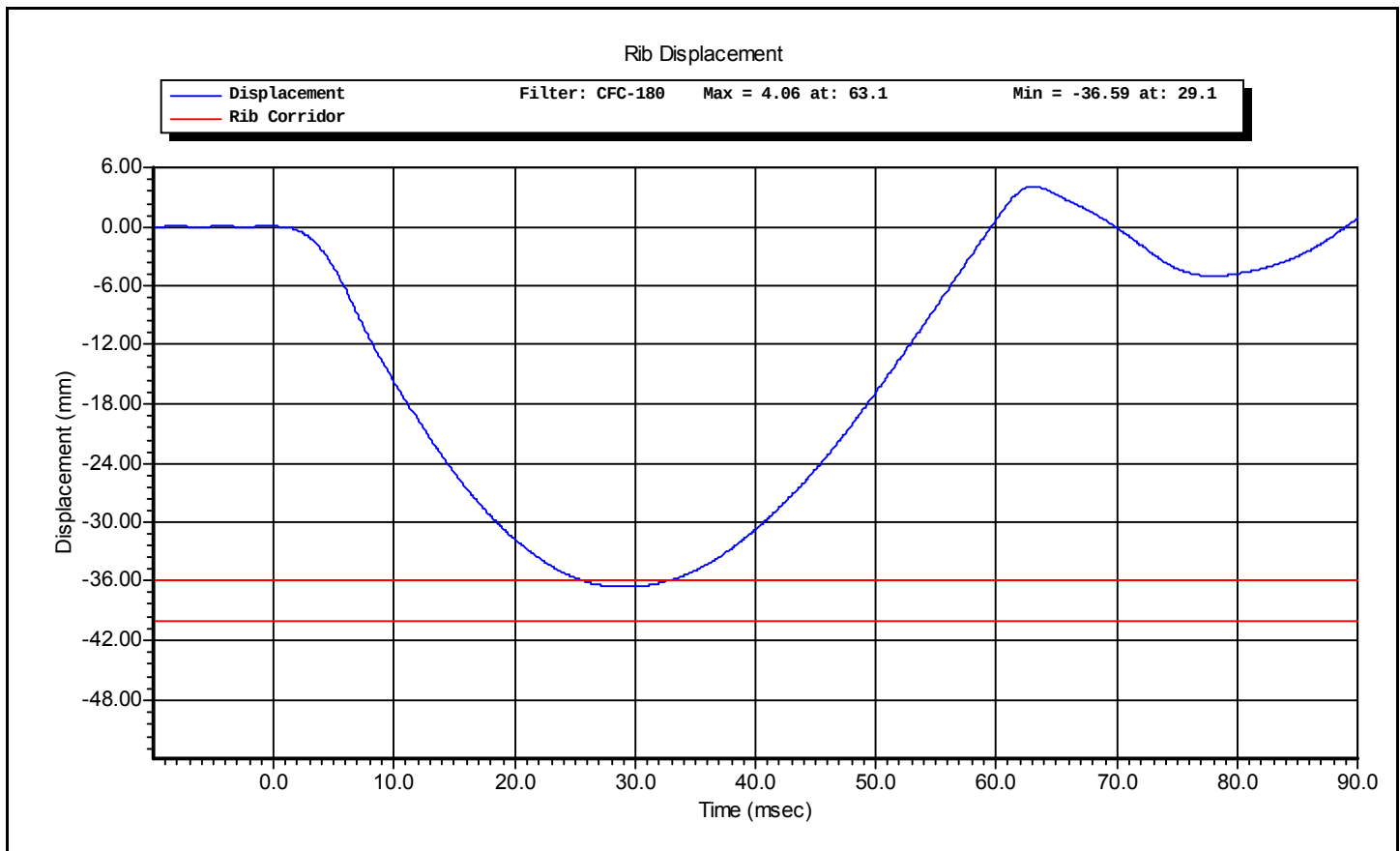
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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Middle Rib 3 m/s	Test Date:	6/7/2010
Test Number:	1	Test Time:	3:41:54 PM

Component Part Number	Component Serial Number
175-4020A	MIDDLE



Test ID: Middle Rib 3 m/s Test Time: 3:41:54 PM

Test Date: 6/7/2010



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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Lower Rib 4 m/s	Test Date:	6/7/2010
Test Number:	1	Test Time:	3:48:14 PM

Component Part Number	Component Serial Number
175-4020A	LOWER

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	44.0 %RH P
Velocity	3.90 -- 4.10	4.00 m/s P
Rib Displacement	-51.00 -- -46.00	-47.40 mm P
Drop Height	807.0 -- 823.0	815.0 mm P

All test parameters are within specifications

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

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

Test ID: **Lower Rib 4 m/s**

Test Time: **3:48:14 PM**

Test Date: **6/7/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-178	4/23/2010
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P23137	1/22/2010

Test ID: **Lower Rib 4 m/s**

Test Time: **3:48:14 PM**

Test Date: **6/7/2010**



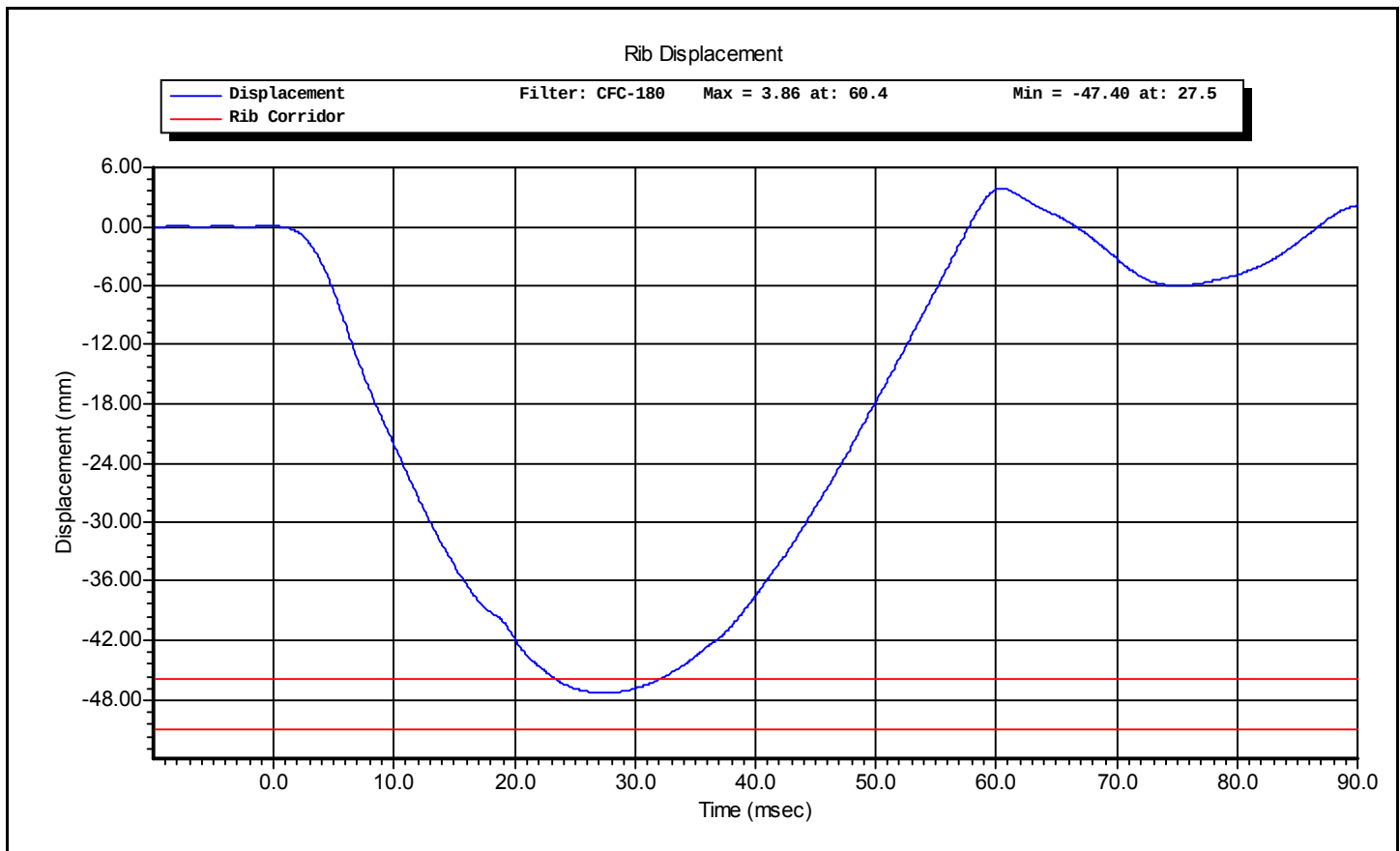
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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Lower Rib 4 m/s	Test Date:	6/7/2010
Test Number:	1	Test Time:	3:48:14 PM

Component Part Number	Component Serial Number
175-4020A	LOWER



Test ID: Lower Rib 4 m/s Test Time: 3:48:14 PM

Test Date: 6/7/2010



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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Lower Rib 3 m/s	Test Date:	6/7/2010
Test Number:	1	Test Time:	3:55:05 PM

Component Part Number	Component Serial Number
175-4020A	LOWER

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	44.0 %RH P
Velocity	2.90 -- 3.10	3.00 m/s P
Rib Displacement	-40.00 -- -36.00	-36.87 mm P
Drop Height	454 -- 464	459 mm P

All test parameters are within specifications

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

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

Test ID: **Lower Rib 3 m/s**

Test Time: **3:55:05 PM**

Test Date: **6/7/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-178	4/23/2010
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P23137	1/22/2010

Test ID: **Lower Rib 3 m/s**

Test Time: **3:55:05 PM**

Test Date: **6/7/2010**



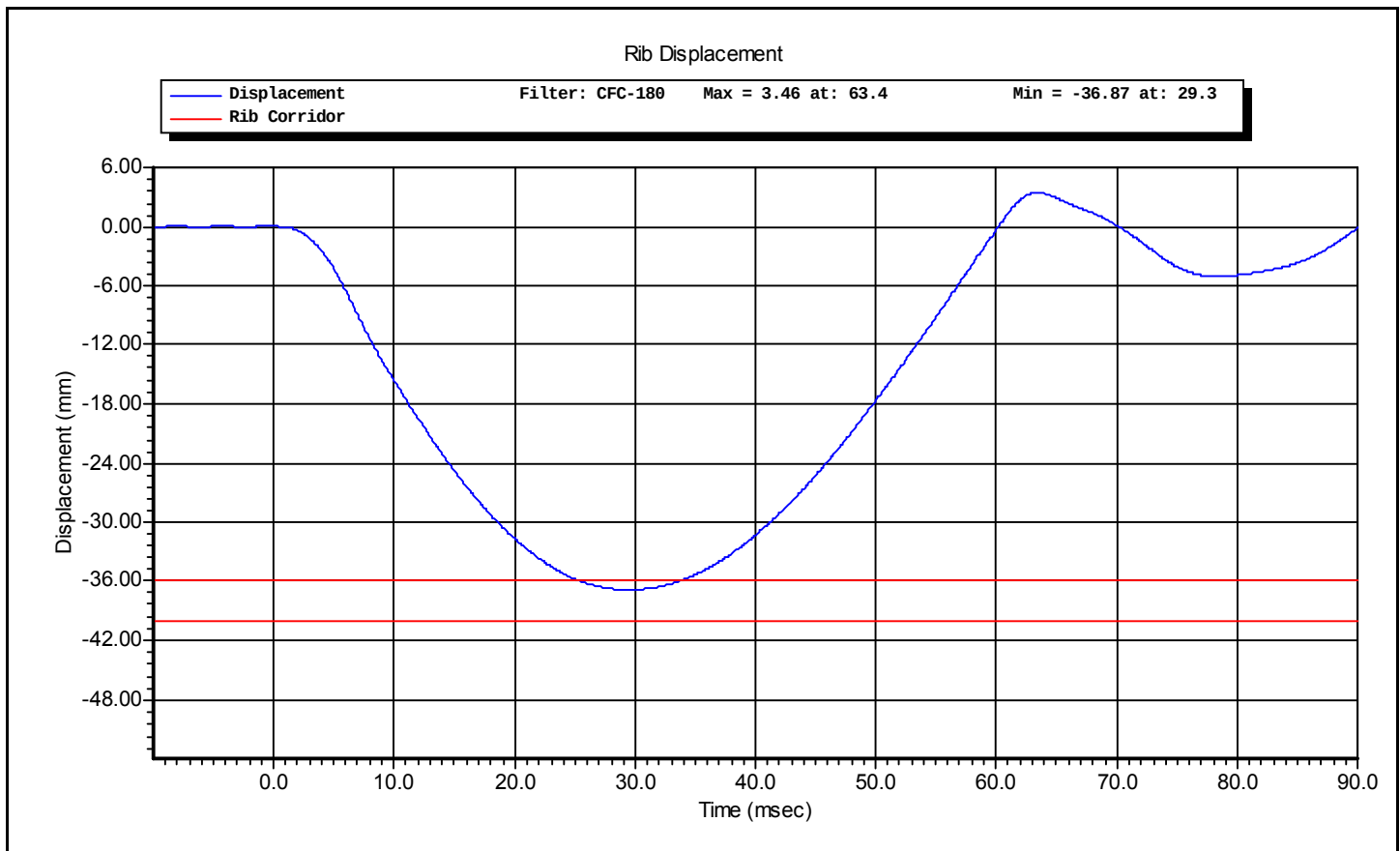
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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Lower Rib 3 m/s	Test Date:	6/7/2010
Test Number:	1	Test Time:	3:55:05 PM

Component Part Number	Component Serial Number
175-4020A	LOWER



Test ID: Lower Rib 3 m/s Test Time: 3:55:05 PM

Test Date: 6/7/2010



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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	8/15/2008
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Thorax	Test Date:	6/8/2010
Test Number:	1	Test Time:	8:39:53 AM

Component Part Number	Component Serial Number
Upper Rib - 175-4002	UPPER
Middle Rib - 175-4002	MIDDLE
Lower Rib - 175-4002	LOWER

Comments:

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	20.6 deg C	P
Humidity	10.0	--	70.0	45.0 %RH	P
Velocity	5.40	--	5.60	5.51 m/s	P
Upper Rib Displacement	34.0	--	41.0	36.3 mm	P
Middle Rib Displacement	37.0	--	45.0	40.4 mm	P
Lower Rib Displacement	37.0	--	44.0	40.2 mm	P
Impactor Force	5100	--	6200	5860 N	P

All test parameters are within specifications

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

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

Test ID: **Thorax**

Test Time: **8:39:53 AM**

Test Date: **6/8/2010**



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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	P16576	4/6/2010
Honeywell	MLT-38000	DS-179	4/23/2010
Honeywell	MLT-38000	DS-185	4/23/2010
Honeywell	MLT-38000	DS-178	4/23/2010

Test ID: **Thorax**

Test Time: **8:39:53 AM**

Test Date: **6/8/2010**



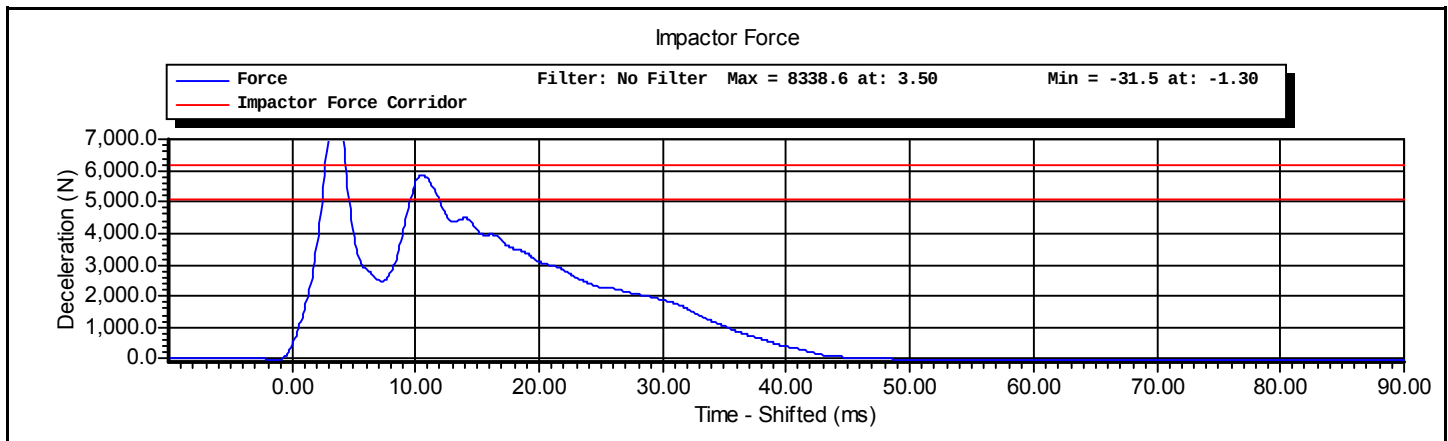
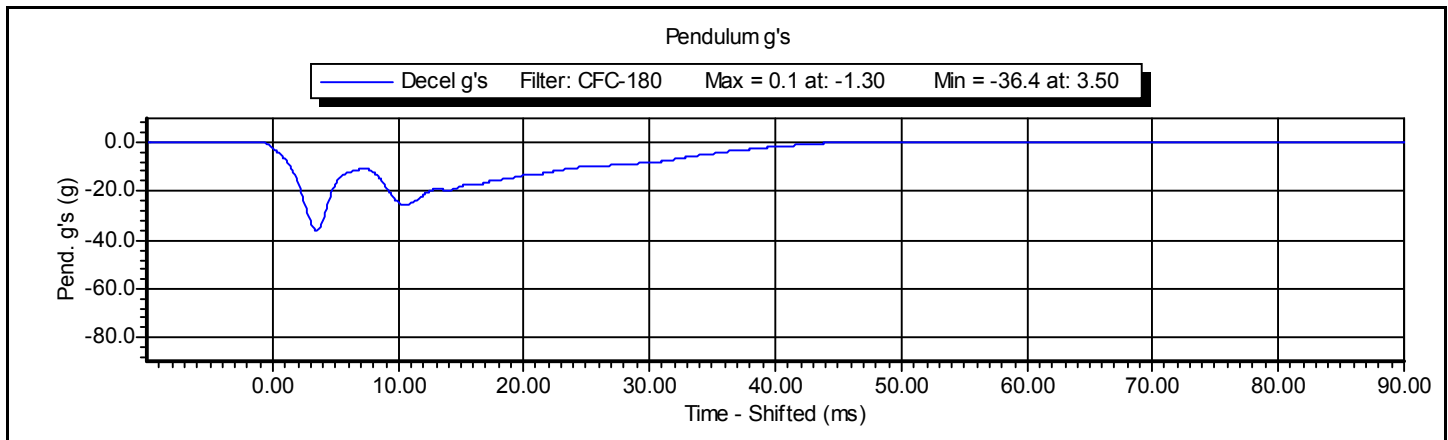
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Test Name:	Thorax Impact	Revision:	8/15/2008
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Thorax	Test Date:	6/8/2010
Test Number:	1	Test Time:	8:39:53 AM

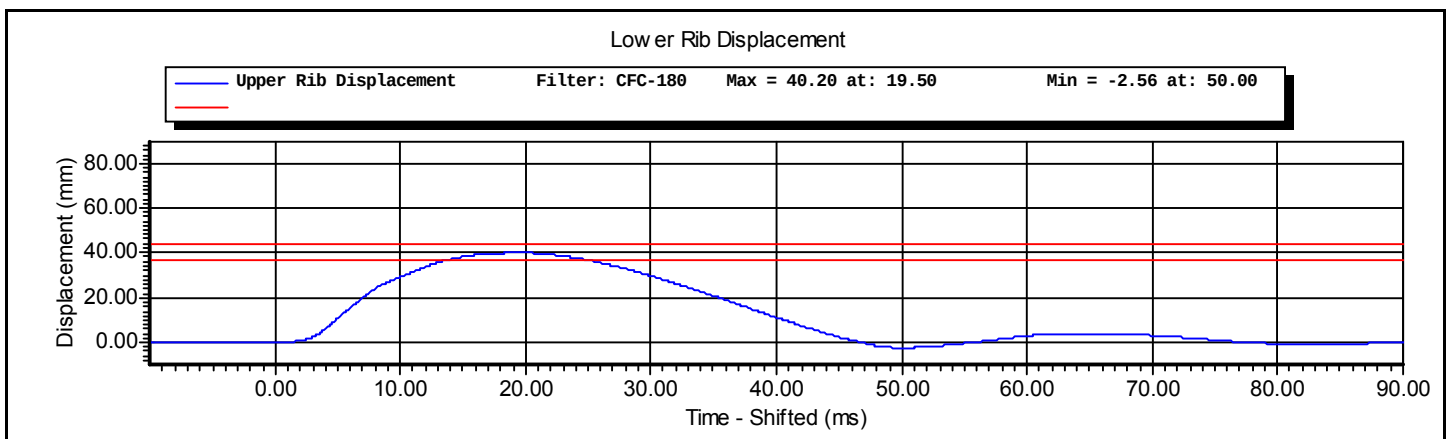
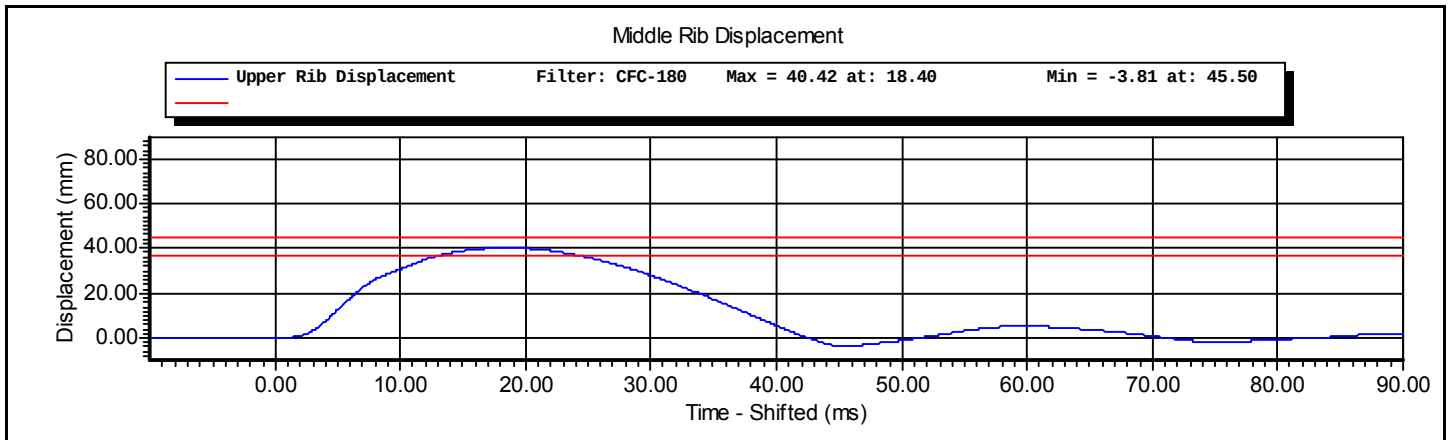
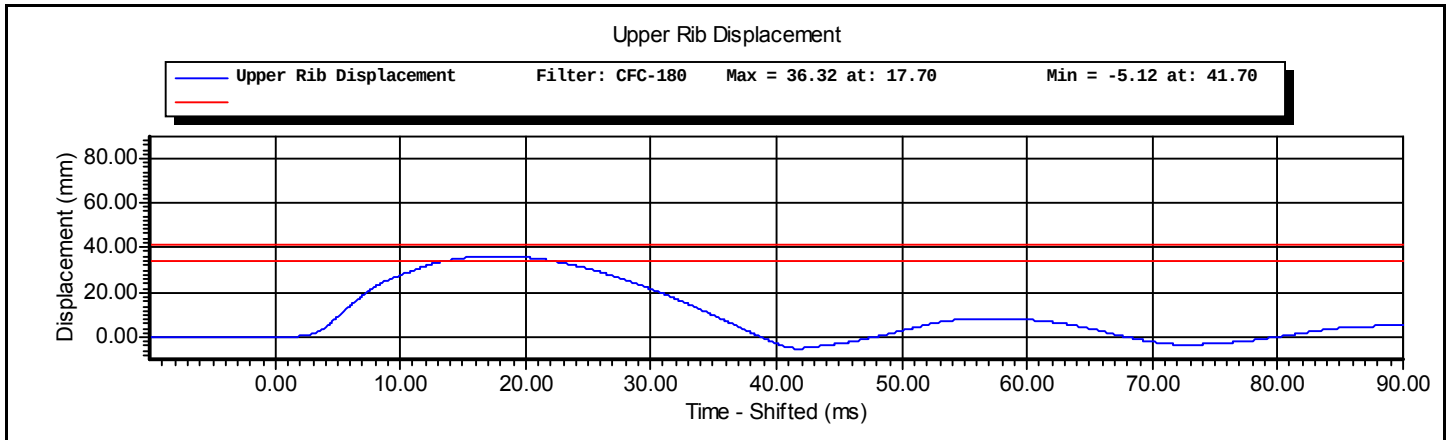
Component Part Number	Component Serial Number
Upper Rib - 175-4002	UPPER



Test ID: Thorax

Test Time: 8:39:53 AM

Test Date: 6/8/2010





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VERIFICATION REPORT

Test Name:	Abdominal Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Abdominal Impact	Test Date:	6/7/2010
Test Number:	1	Test Time:	4:25:37 PM

Component Part Number	Component Serial Number
FTSS-0004	07/136

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	43 %RH P
Velocity	3.90 -- 4.10	4.02 m/s P
Peak Abdominal Force	-2.70 -- -2.20	-2.48 kN P
Time At Peak Abdominal Force	10.0 -- 12.3	12.2 ms P
Maximum Pendulum Force	-4.80 -- -4.00	-4.30 kN P
Time at Peak Pendulum Force	10.6 -- 13.0	12.7 ms P

All test parameters are within specifications

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

Test ID: **Abdominal Impact** Test Time: **4:25:37 PM**

Test Date: **6/7/2010**



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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	P16576	4/6/2010
Denton	2631	LC-1524	4/22/2010
Denton	2631	LC-1523	4/22/2010
Denton	2631	LC-1530	4/22/2010

Test ID: **Abdominal Impact** Test Time: **4:25:37 PM**

Test Date: **6/7/2010**



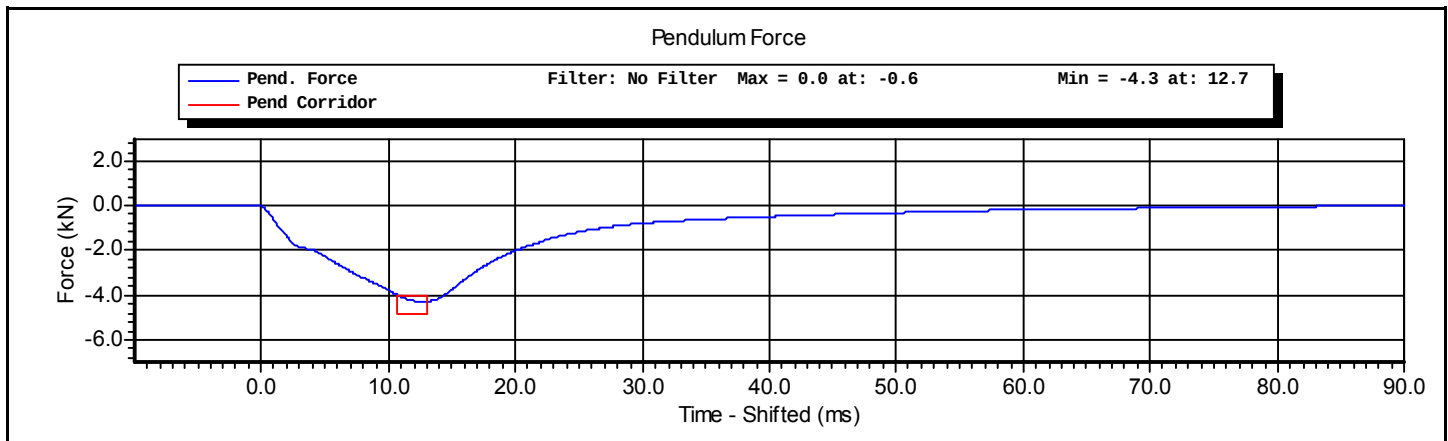
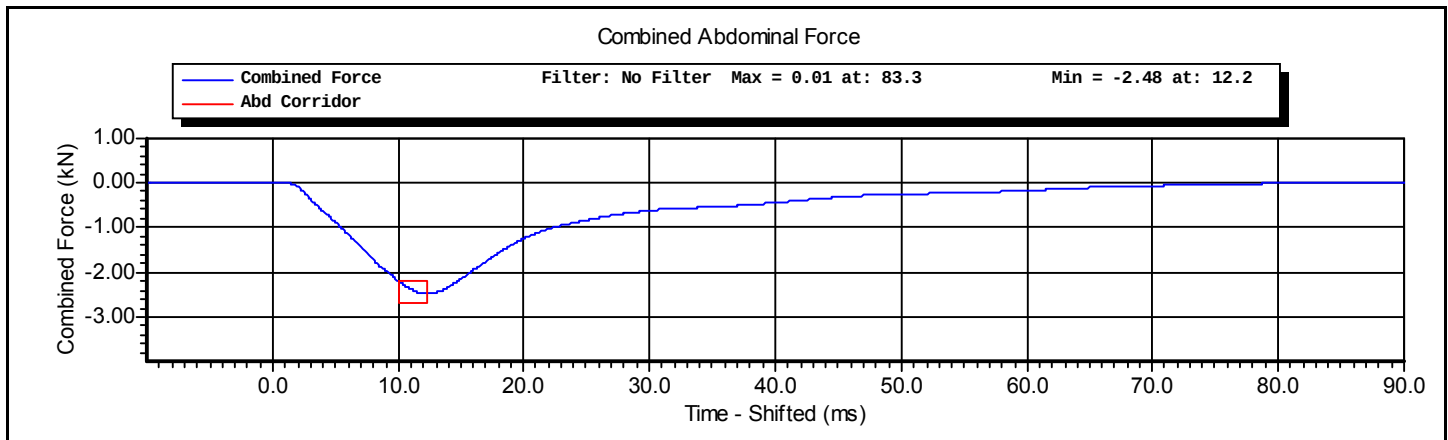
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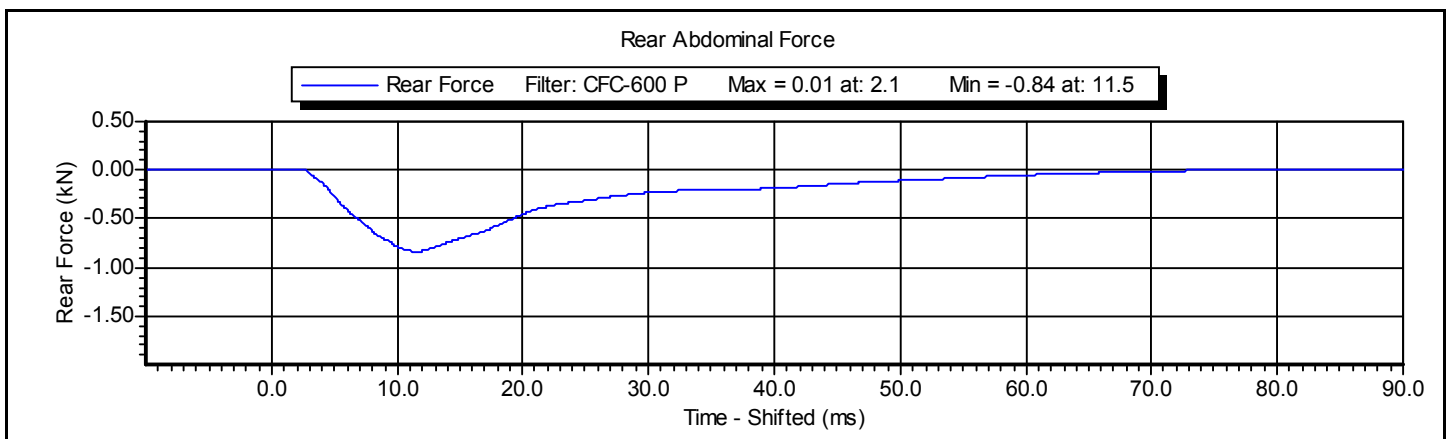
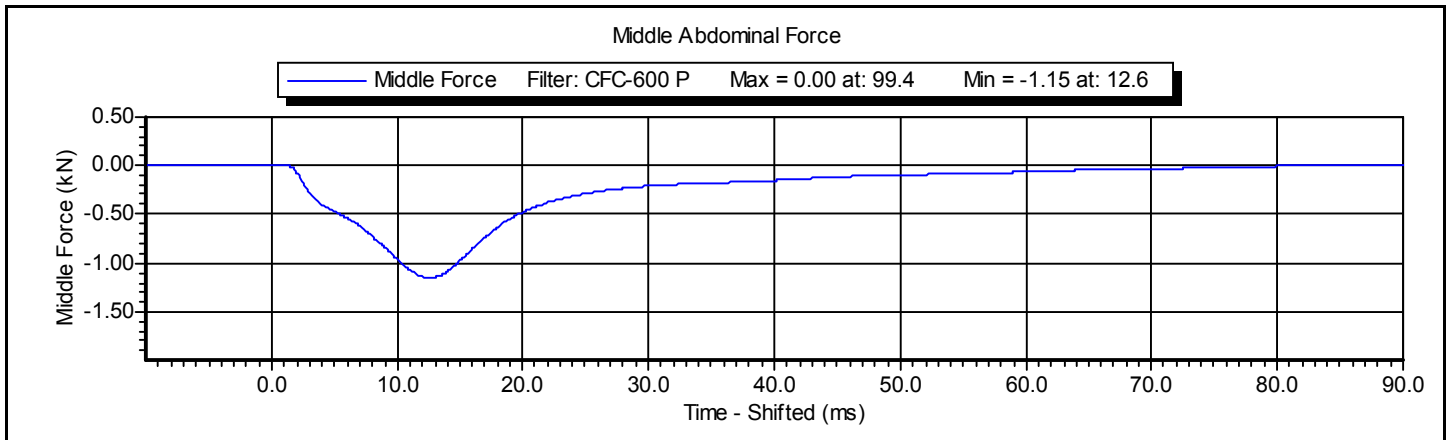
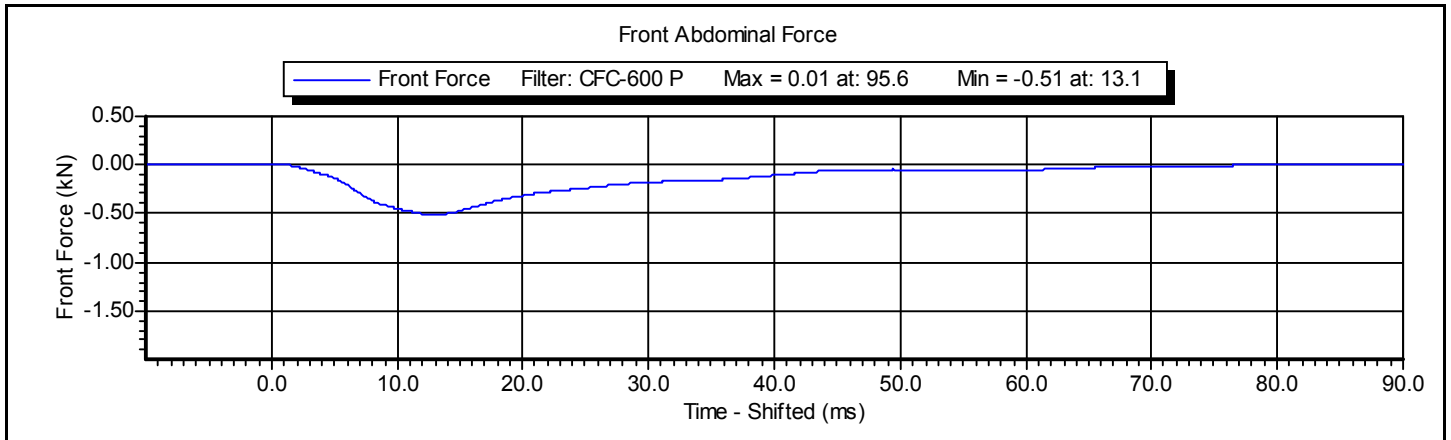
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Abdominal Impact	Test Date:	6/7/2010
Test Number:	1	Test Time:	4:25:37 PM

Component Part Number	Component Serial Number
FTSS-0004	07/136



Test ID: **Abdominal Impact** Test Time: **4:25:37 PM**

Test Date: **6/7/2010**





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VERIFICATION REPORT

Test Name:	Lumbar Spine	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Lumbar Spine	Test Date:	6/15/2010
Test Number:	1	Test Time:	2:03:52 PM

Component Part Number	Component Serial Number
175-5501	15-0545

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10 -- 70	50 %RH P
Velocity	5.95 -- 6.15	6.14 m/s P
Maximum Headform Flexion Angle	45.0 -- 55.0	48.9 degrees P
Time at Maximum Headform Flexion Angle	39.0 -- 53.0	42.0 ms P
Decay to Zero Degrees	37.0 -- 57.0	40.0 ms P
Velocity Corridor	--	P

All test parameters are within specifications

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

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

Test ID: **Lumbar Spine**

Test Time: **2:03:52 PM**

Test Date: **6/15/2010**



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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
DentonATD	7000428	094	4/27/2010
DentonATD	7000428	095	4/27/2010
DentonATD	7000428	093	4/27/2010

Test ID: **Lumbar Spine**

Test Time: **2:03:52 PM**

Test Date: **6/15/2010**



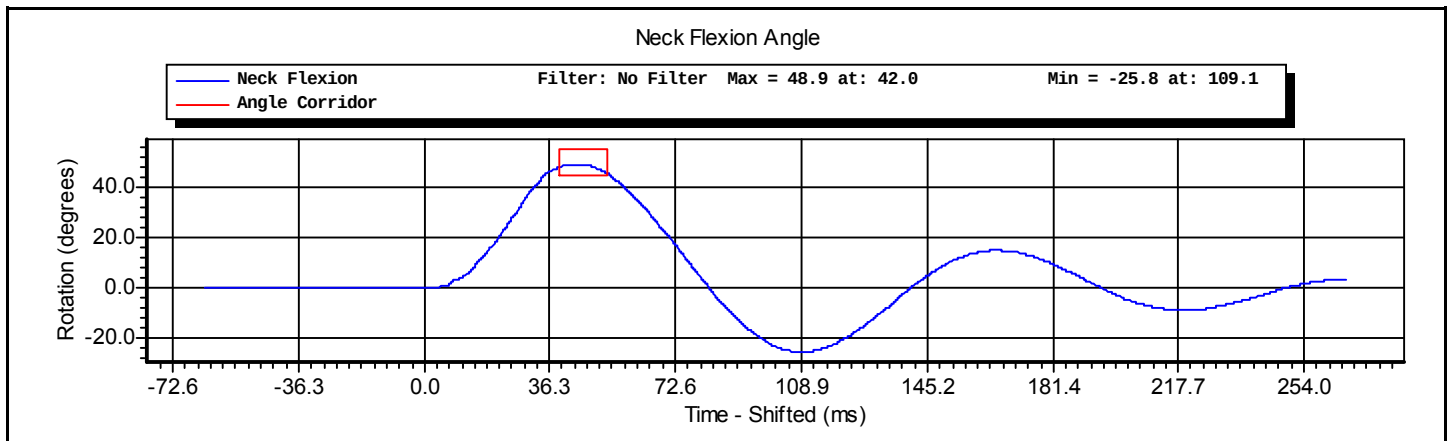
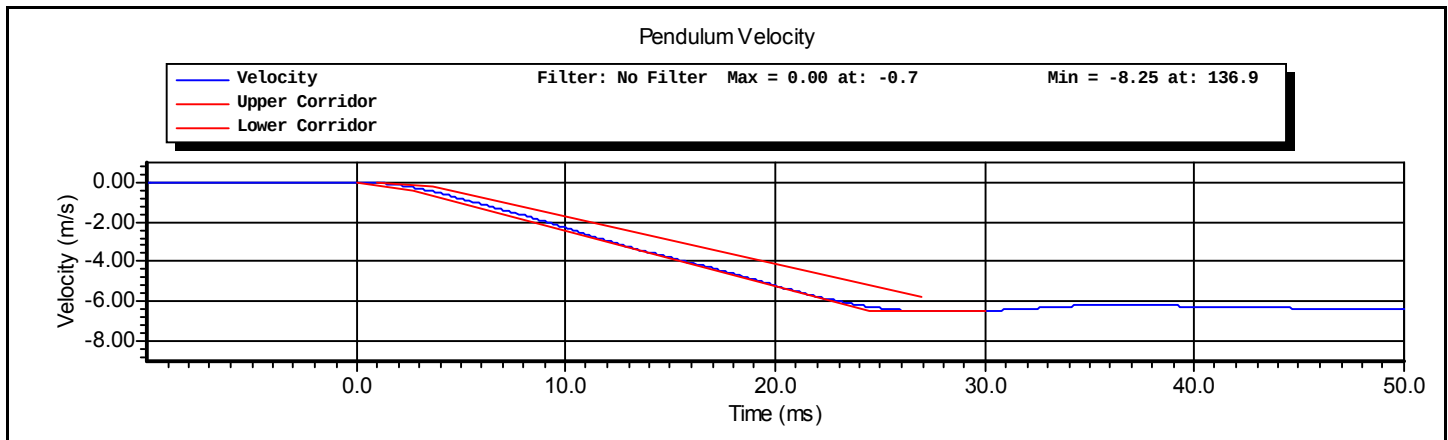
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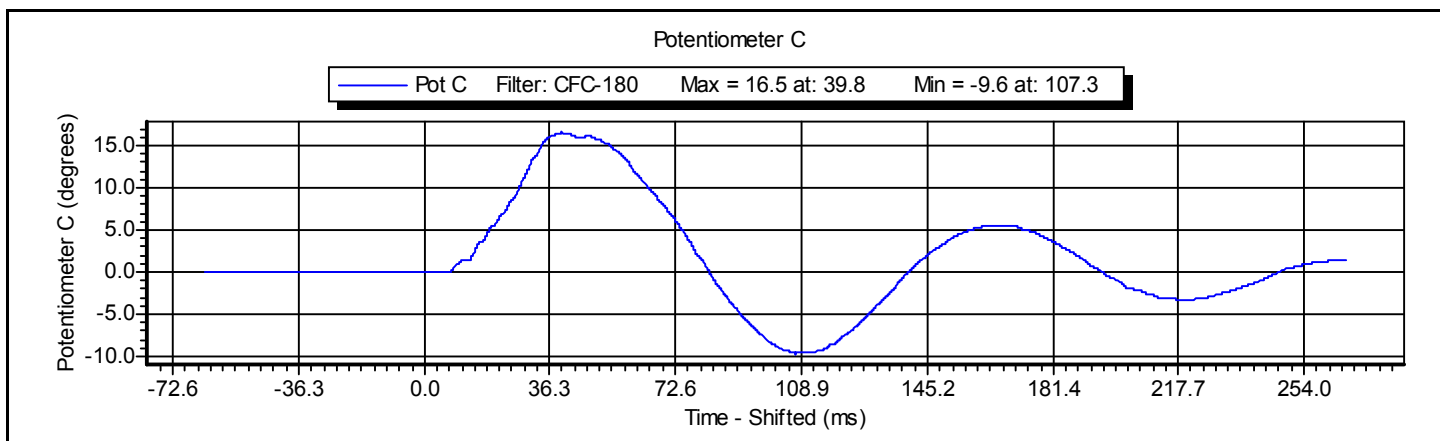
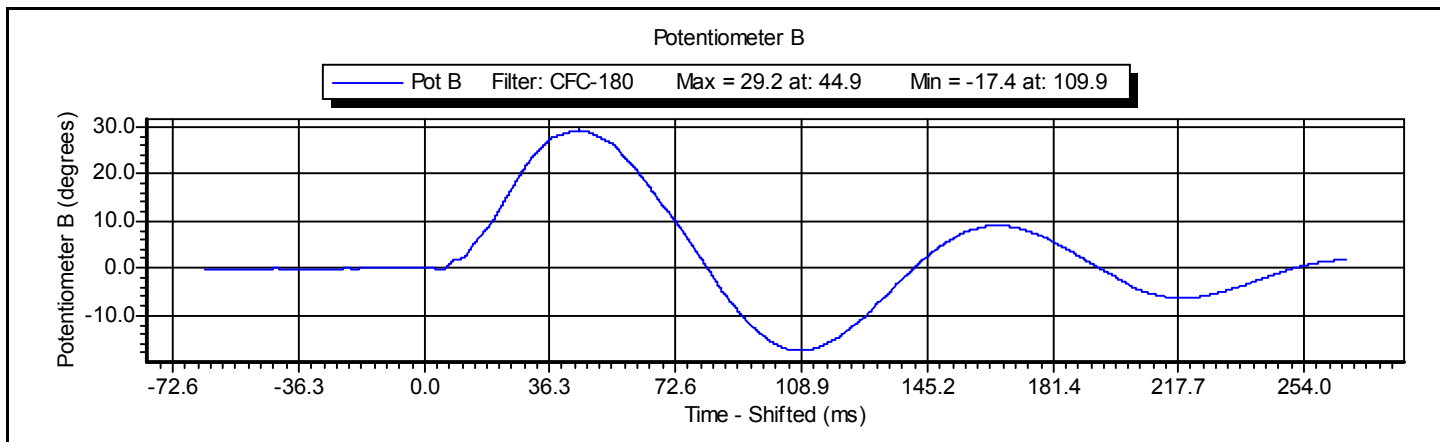
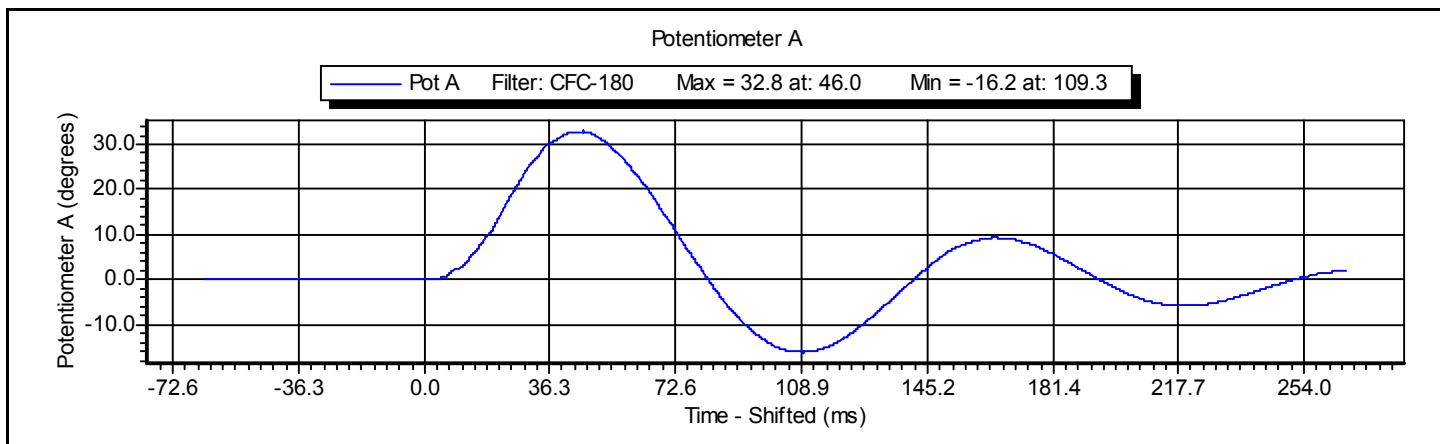
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Lumbar Spine	Test Date:	6/15/2010
Test Number:	1	Test Time:	2:03:52 PM

Component Part Number	Component Serial Number
175-5501	15-0545



Test ID: Lumbar Spine Test Time: 2:03:52 PM

Test Date: 6/15/2010





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VERIFICATION REPORT

Test Name:	Pelvis Impact New	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Pelvis Impact	Test Date:	6/7/2010
Test Number:	1	Test Time:	1:39:09 PM

Component Part Number	Component Serial Number
455-4003	

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.1 deg C P
Humidity	10 -- 70	46 %RH P
Velocity	4.20 -- 4.40	4.31 m/s P
Peak Pendulum Force	-5.40 -- -4.70	-4.98 kN P
Time at Peak Pendulum Force	11.80 -- 16.10	13.23 ms P
Peak Pubic Symphysis Force	-1.59 -- -1.23	-1.42 kN P
Time at Peak Pubic Symphysis Force	12.20 -- 17.00	15.53 ms P

All test parameters are within specifications

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

Test ID: **Pelvis Impact**

Test Time: **1:39:09 PM**

Test Date: **6/7/2010**



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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	P16576	4/6/2010
Denton	3096	LC-456Fy	4/22/2010

Test ID: **Pelvis Impact**

Test Time: **1:39:09 PM**

Test Date: **6/7/2010**



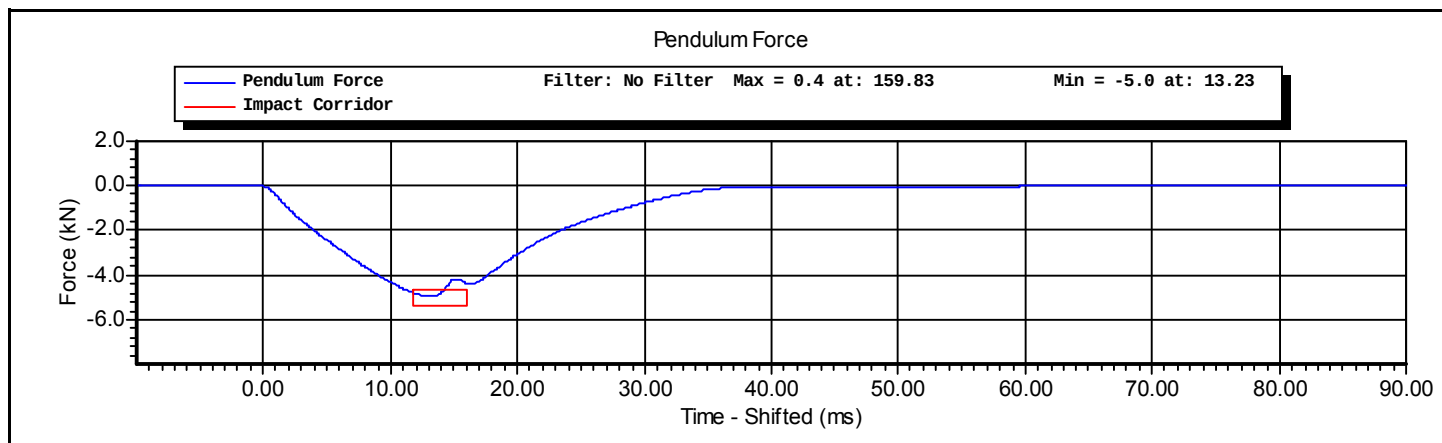
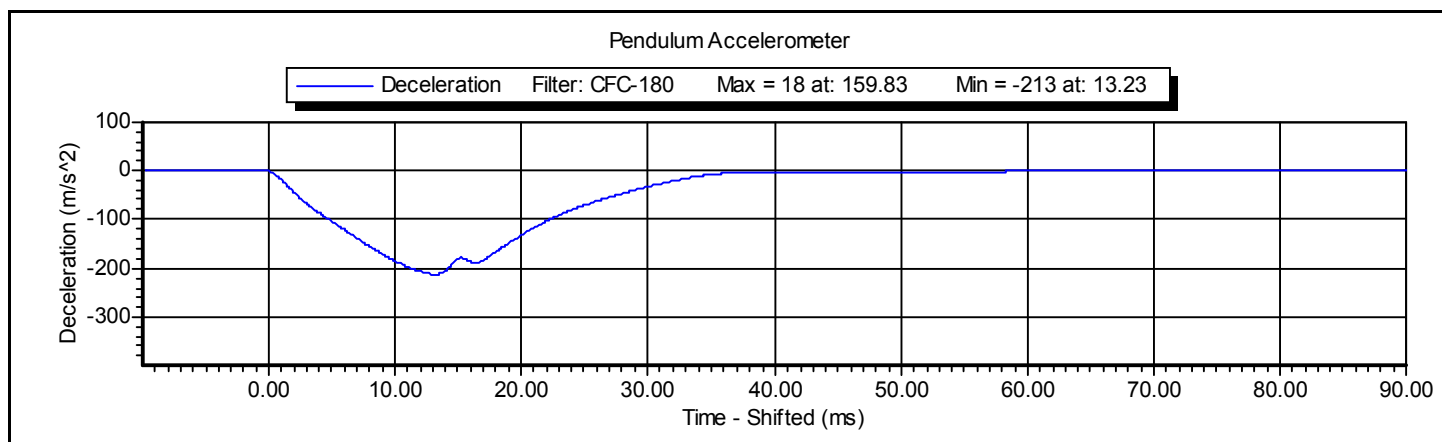
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Test Name:	Pelvis Impact New	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Pelvis Impact	Test Date:	6/7/2010
Test Number:	1	Test Time:	1:39:09 PM

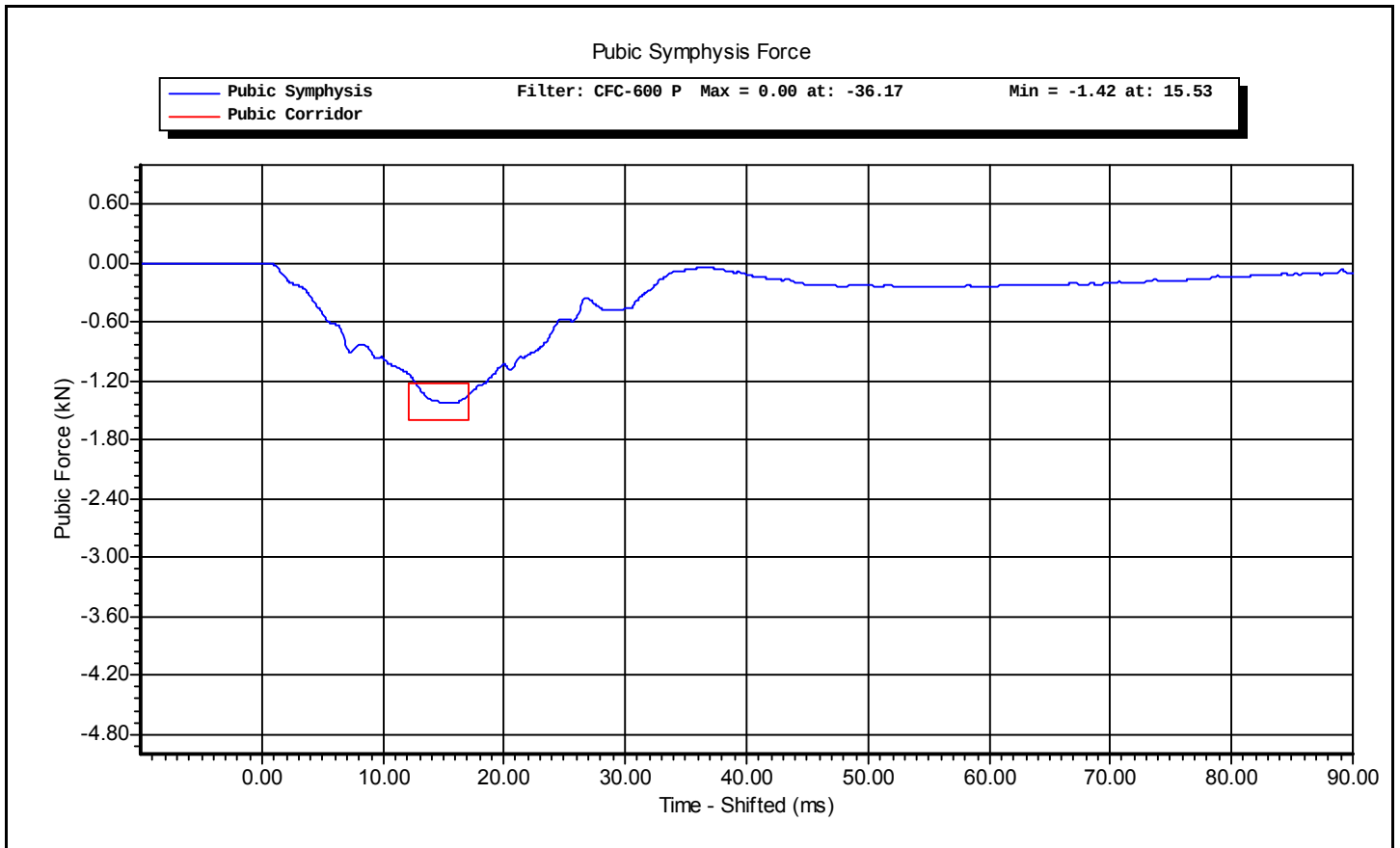
Component Part Number	Component Serial Number
455-4003	



Test ID: **Pelvis Impact**

Test Time: **1:39:09 PM**

Test Date: **6/7/2010**



CALIBRATION TEST RESULTS

PRE-TEST

SID-IIs No: 300

CONFIGURED FOR LEFT SIDE IMPACT

SID-IIsD External Measurements

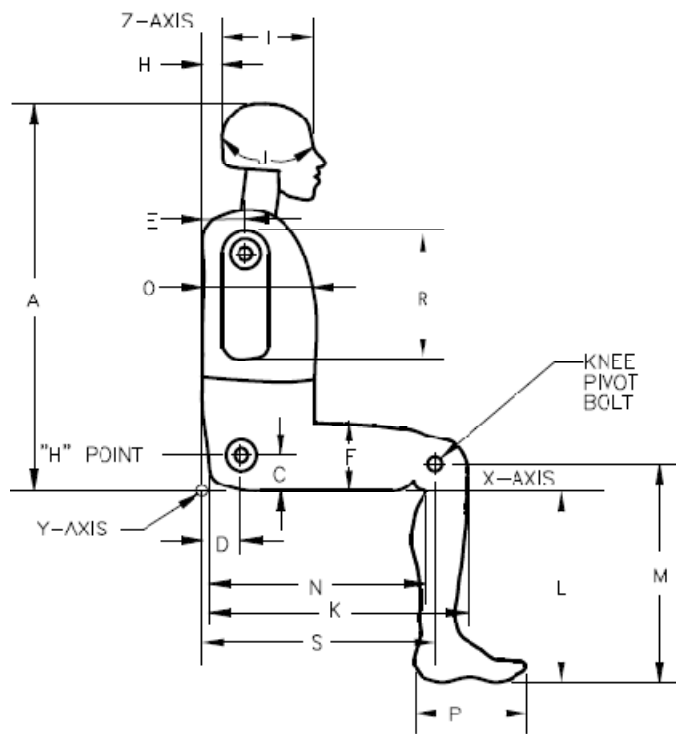
NHTSA ATD S/N 230

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	780	Yes
B	Shoulder Pivot Height	437.0 - 453.0	443	Yes
C	H-Point Height	79.0 - 89.0	86	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	105	Yes
F	Thigh Clearance	119.0 - 135.0	125	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	526	Yes
L	Popliteal Height	343.0 - 369.0	354	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	396	Yes
N	Buttock Popliteal Length	416.0 - 442.0	426	Yes
O	Chest Depth without Jacket	195.0 - 211.0	201	Yes
P	Foot Length (right)	216.0 - 232.0	221	Yes
P	Foot Length (left)	216.0 - 232.0	221	Yes
Q	Hip Breadth	313.0 - 323.0	315	Yes
R	Arm Length	249.0 - 259.0	252	Yes
S	Knee Joint to Seat back	478.0 - 493.0	482	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	351	Yes
W	Foot Width (right)	78.0 - 94.0	85	Yes
W	Foot Width (left)	78.0 - 94.0	85	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	874	Yes
Z	Waist Circumference	761.0 - 791.0	778	Yes

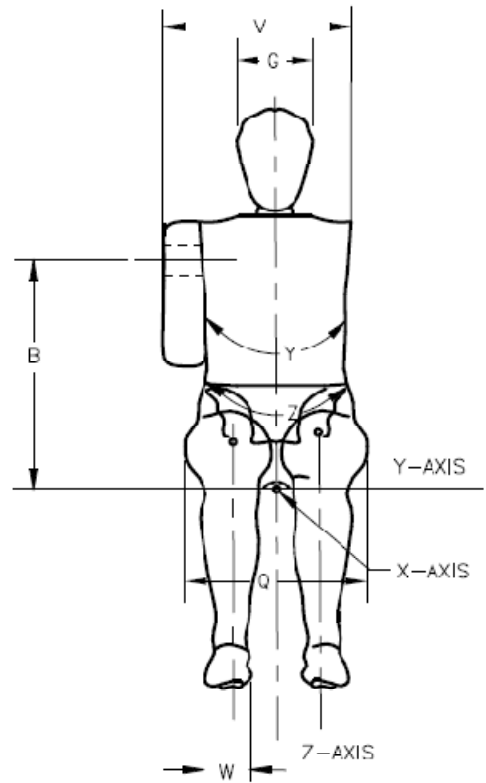
Technician : A. Rudniski

Date: 6/11/2010

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 300		
Test ID:	Head Drop	Test Date:	6/9/2010
Test Number:	1	Test Time:	10:38:02 AM

Component Part Number	Component Serial Number
Head Skin - 180-1002	1355

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	20.6 deg C P
Humidity	10 -- 70	51 %RH P
Resultant Acceleration	115.0 -- 137.0	119.0 g P
Oscillation	0.0 -- 15.0	2.1 % P
Fore-Aft Acceleration	-15.0 -- 15.0	-2.4 g P

All test parameters are within specifications

Technician: A. Rudniski Signature: _____

Supervisor: D. Travale Signature: _____

Test ID: **Head Drop**

Test Time: **10:38:02 AM**

Test Date: **6/9/2010**



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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	P51699	4/7/2010
Endevco	7264-2000	P51699	4/7/2010
Endevco	7264-2000	P51699	4/7/2010

Test ID: **Head Drop**

Test Time: **10:38:02 AM**

Test Date: **6/9/2010**



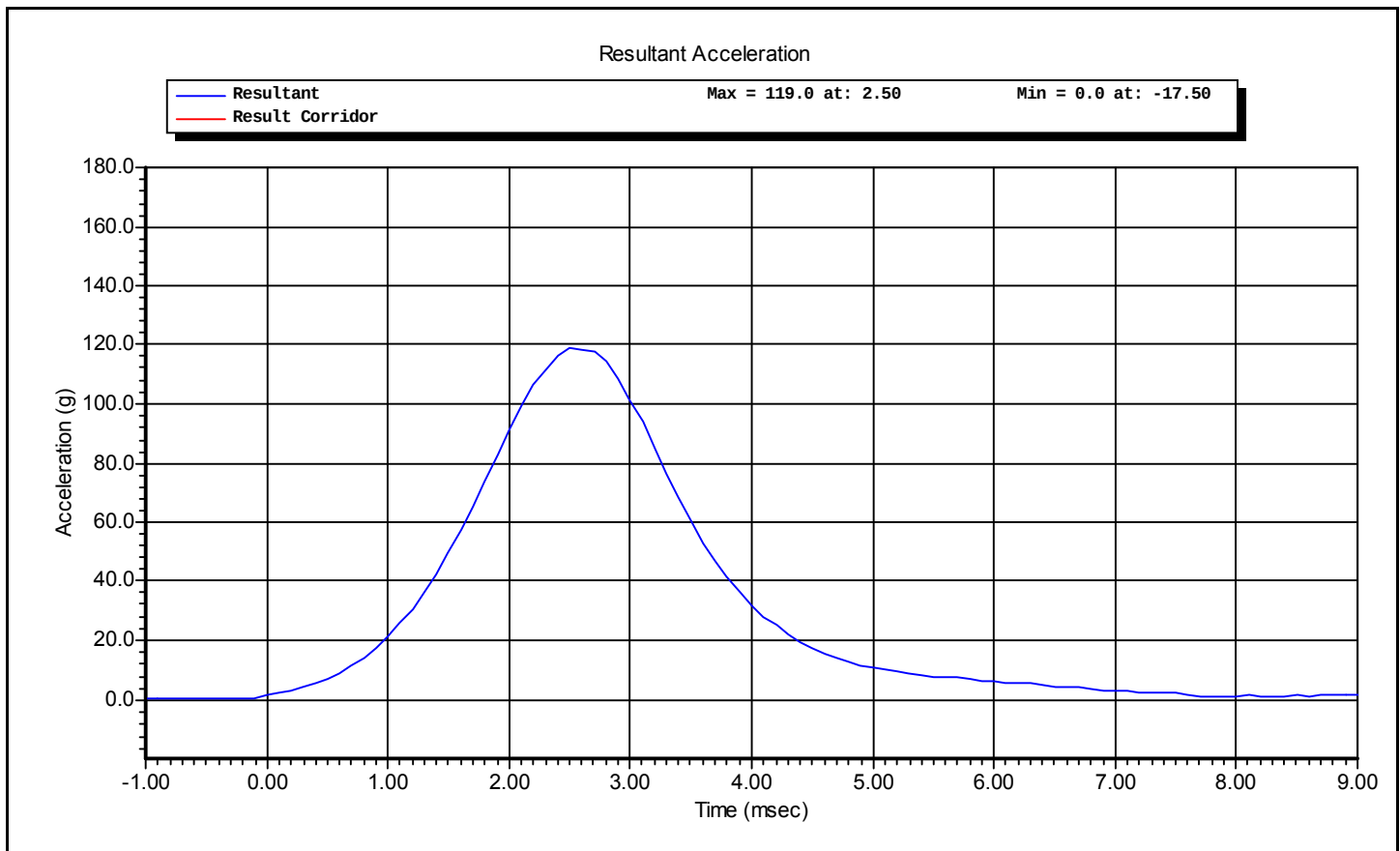
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Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 300		
Test ID:	Head Drop	Test Date:	6/9/2010
Test Number:	1	Test Time:	10:38:02 AM

Component Part Number	Component Serial Number
Head Skin - 180-1002	1355



Test ID: **Head Drop**

Test Time: **10:38:02 AM**

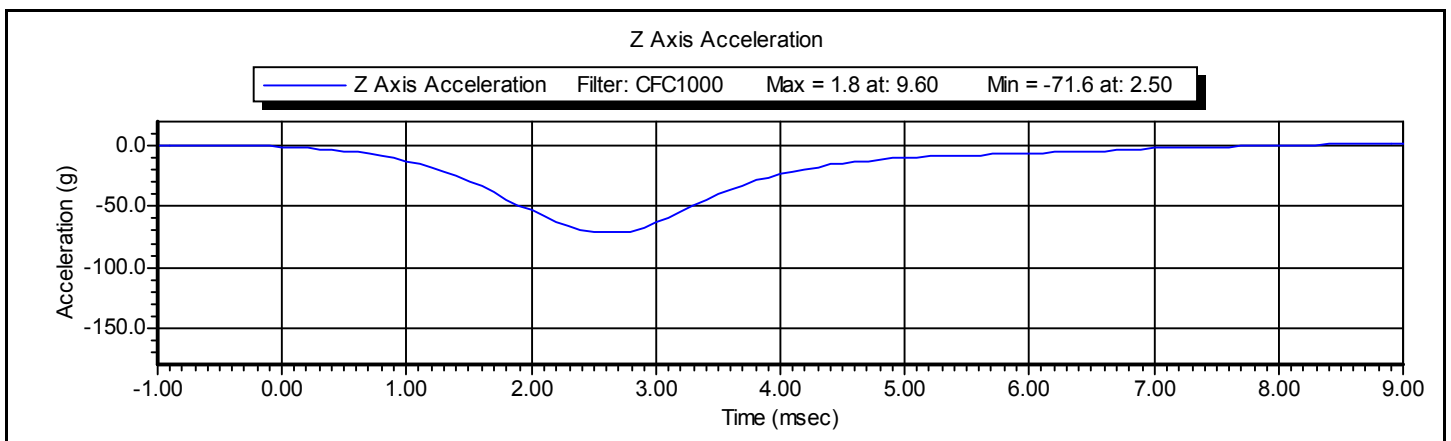
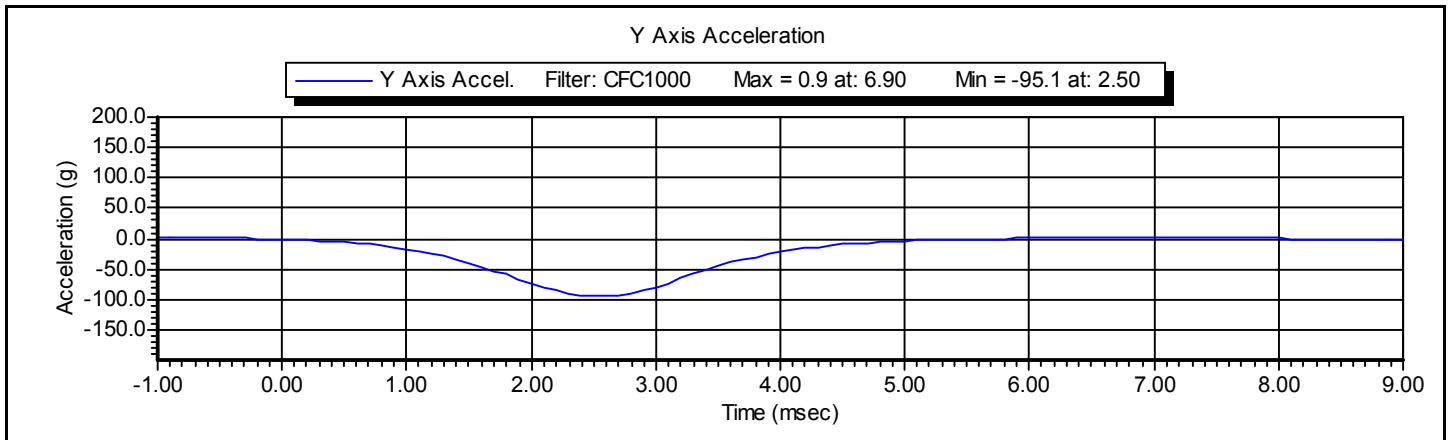
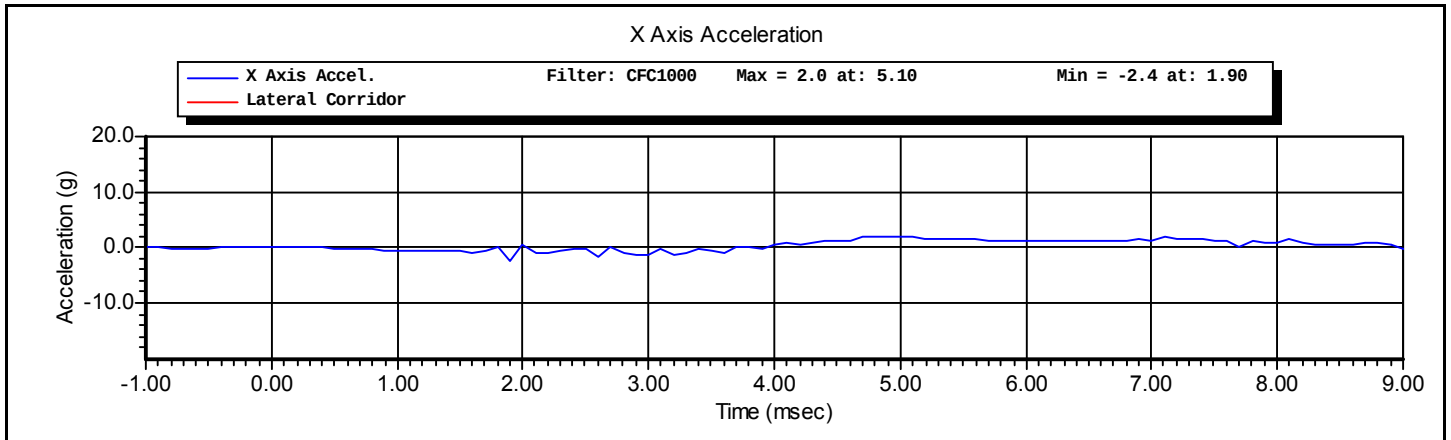
Test Date: **6/9/2010**



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Test ID: **Head Drop**

Test Time: **10:38:02 AM**

Test Date: **6/9/2010**



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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 300		
Test ID:	Neck Flexion	Test Date:	6/9/2010
Test Number:	1	Test Time:	1:05:51 PM

Component Part Number	Component Serial Number
Neck - 180-2001	787

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	20.6 deg C P
Humidity	10 -- 70	55 %RH P
Velocity	5.51 -- 5.63	5.58 m/s P
Pendulum Impulse at 10 ms	2.20 -- 2.80	2.54 m/s P
Pendulum Impulse at 15 ms	3.30 -- 4.10	3.75 m/s P
Pendulum Impulse at 20 ms	4.40 -- 5.40	5.08 m/s P
Pendulum Impulse at 25 ms	5.40 -- 6.10	5.86 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	72.2 degrees P
Time at Max Rotation	50.0 -- 70.0	60.5 ms P
Moment about OC	-44.0 -- -36.0	-43.5 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: **1:05:51 PM**

Test Date: **6/9/2010**



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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	1/12/2010
Denton	1716A	LC-576 Mx	1/12/2010
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: **1:05:51 PM**

Test Date: **6/9/2010**



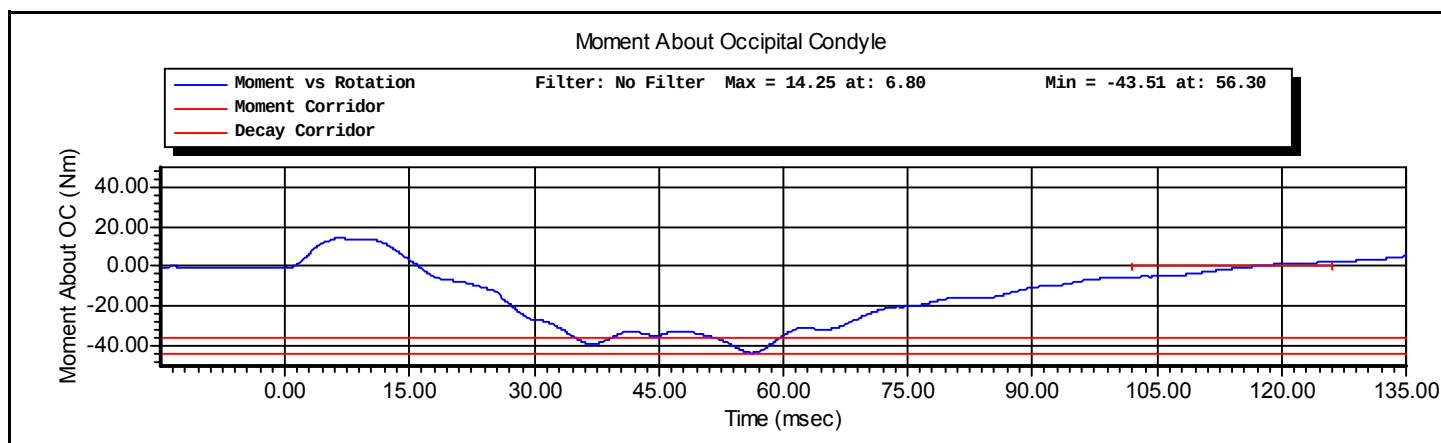
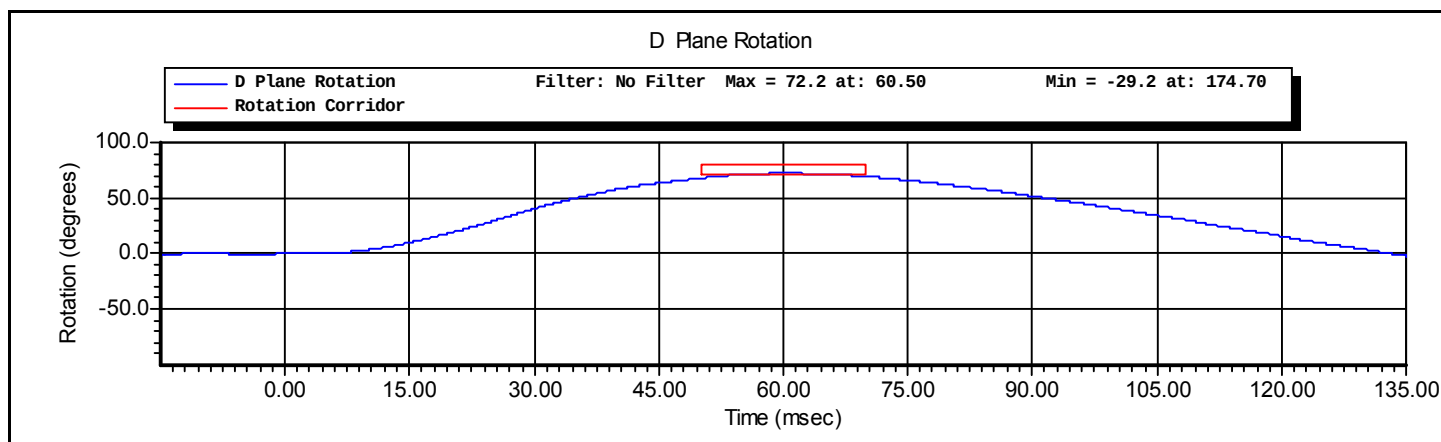
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Test Name:	Neck Pendulum	Revision:	8/24/2009
Sub Test Name:	Left Side	Spec Type:	NHTSA
ATD Type:	SID-IIIs		
ATD Serial Number:	SID 300		
Test ID:	Neck Flexion	Test Date:	6/9/2010
Test Number:	1	Test Time:	1:05:51 PM

Component Part Number	Component Serial Number
Neck - 180-2001	787

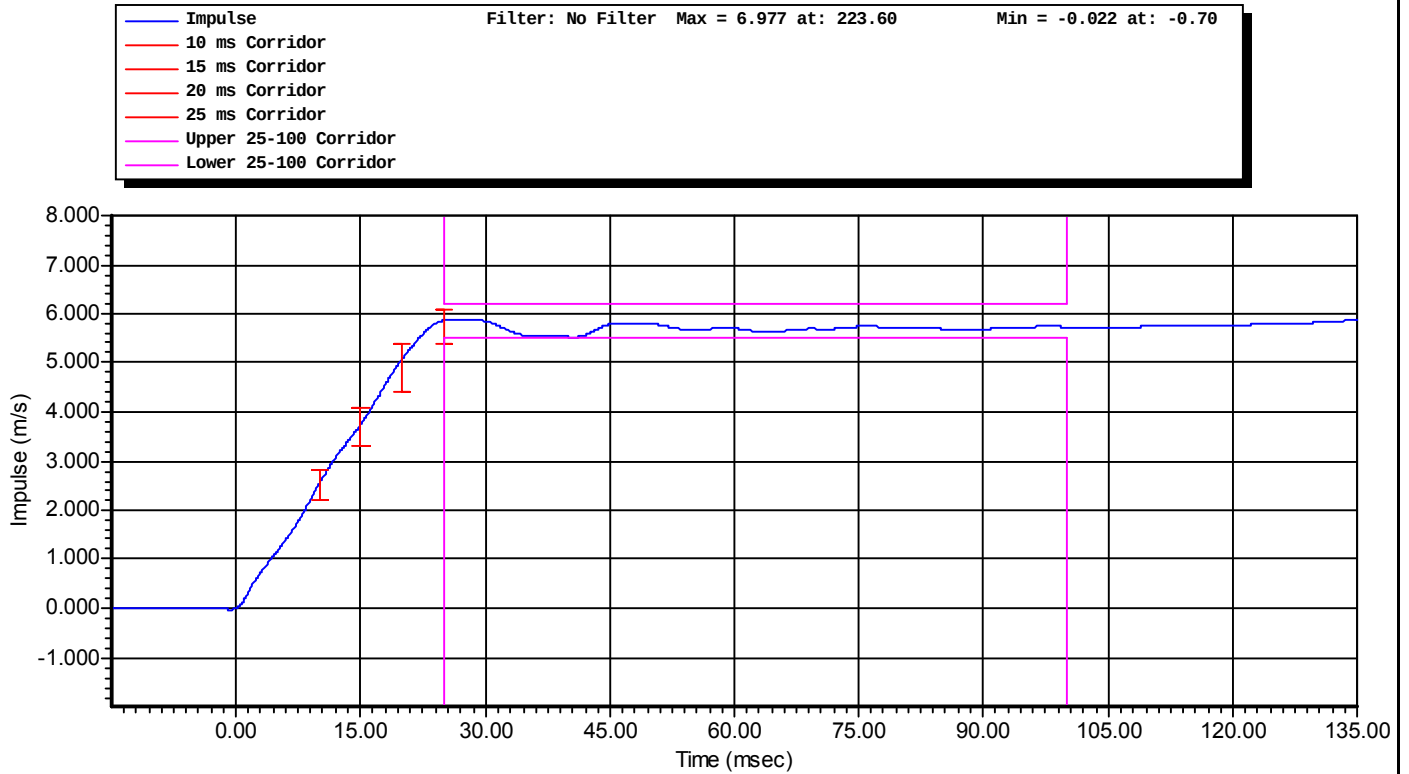


Test ID: Neck Flexion

Test Time: 1:05:51 PM

Test Date: 6/9/2010

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 300		
Test ID:	Shoulder	Test Date:	6/10/2010
Test Number:	1	Test Time:	2:21:39 PM

Component Part Number	Component Serial Number
-----------------------	-------------------------

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.70 deg C P
Humidity	10.0 -- 70.0	51.0 %RH P
Velocity	4.20 -- 4.40	4.38 m/s P
Probe Acceleration	13.0 -- 18.0	17.0 g P
Shoulder Deflection	28.0 -- 37.0	32.1 mm P
T1 Acceleration	17.0 -- 22.0	20.6 g P

All test parameters are within specifications

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

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

Test ID: **Shoulder**

Test Time: **2:21:39 PM**

Test Date: **6/10/2010**



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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	P16576	4/6/2010
Servo	180-3885	DS-1063	4/7/2010
Endevco	7264-2000	P21516	5/26/2010

Test ID: **Shoulder**

Test Time: **2:21:39 PM**

Test Date: **6/10/2010**



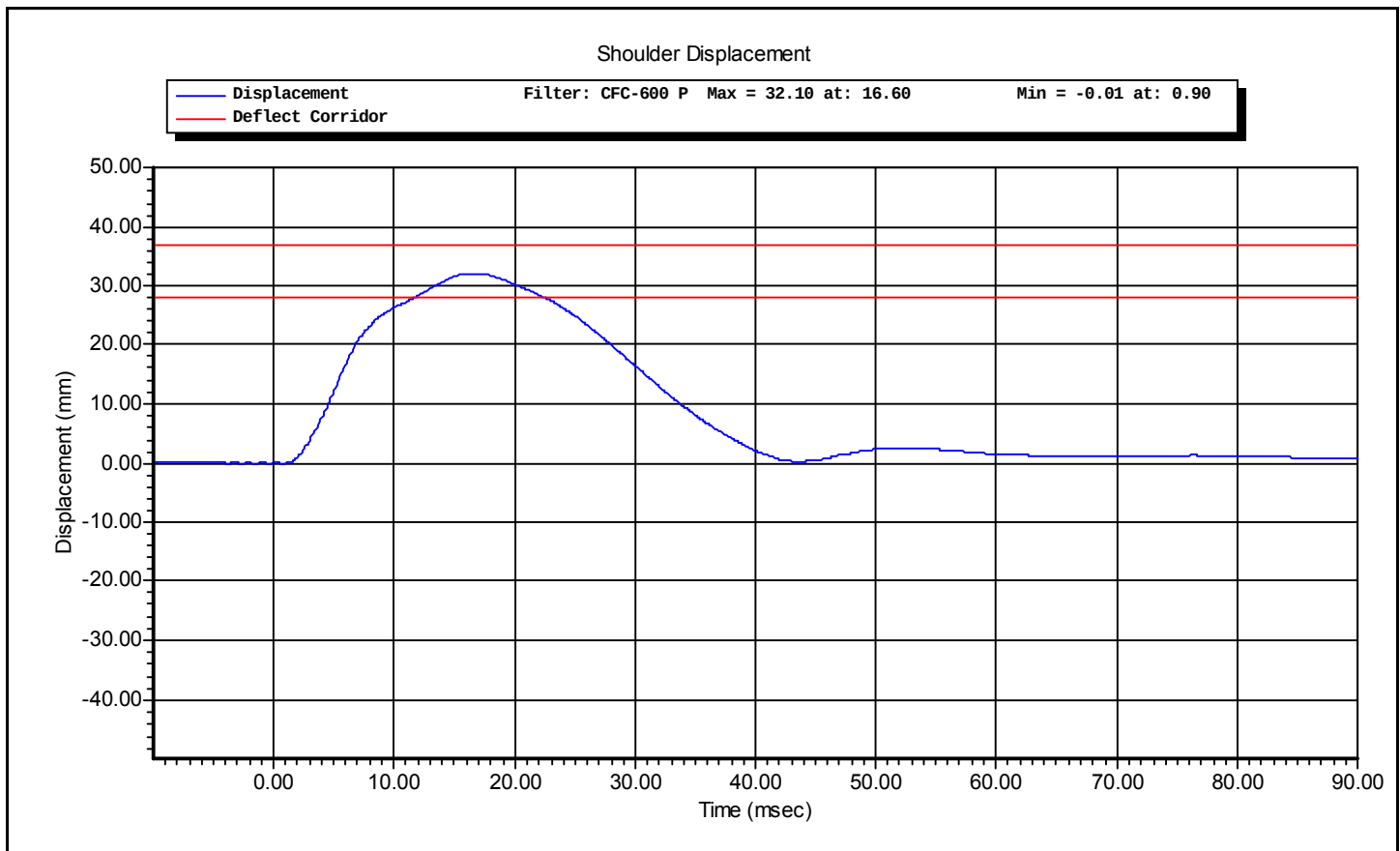
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Test Name:	Shoulder Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 300		
Test ID:	Shoulder	Test Date:	6/10/2010
Test Number:	1	Test Time:	2:21:39 PM

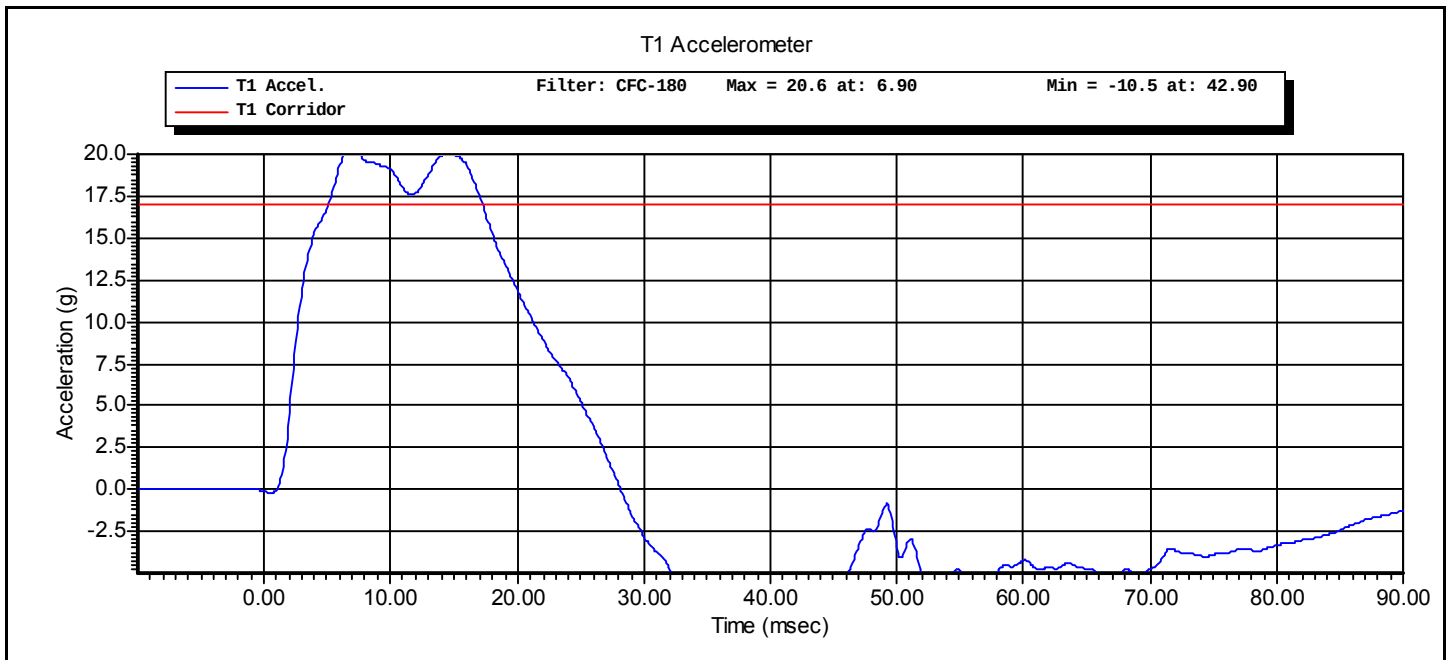
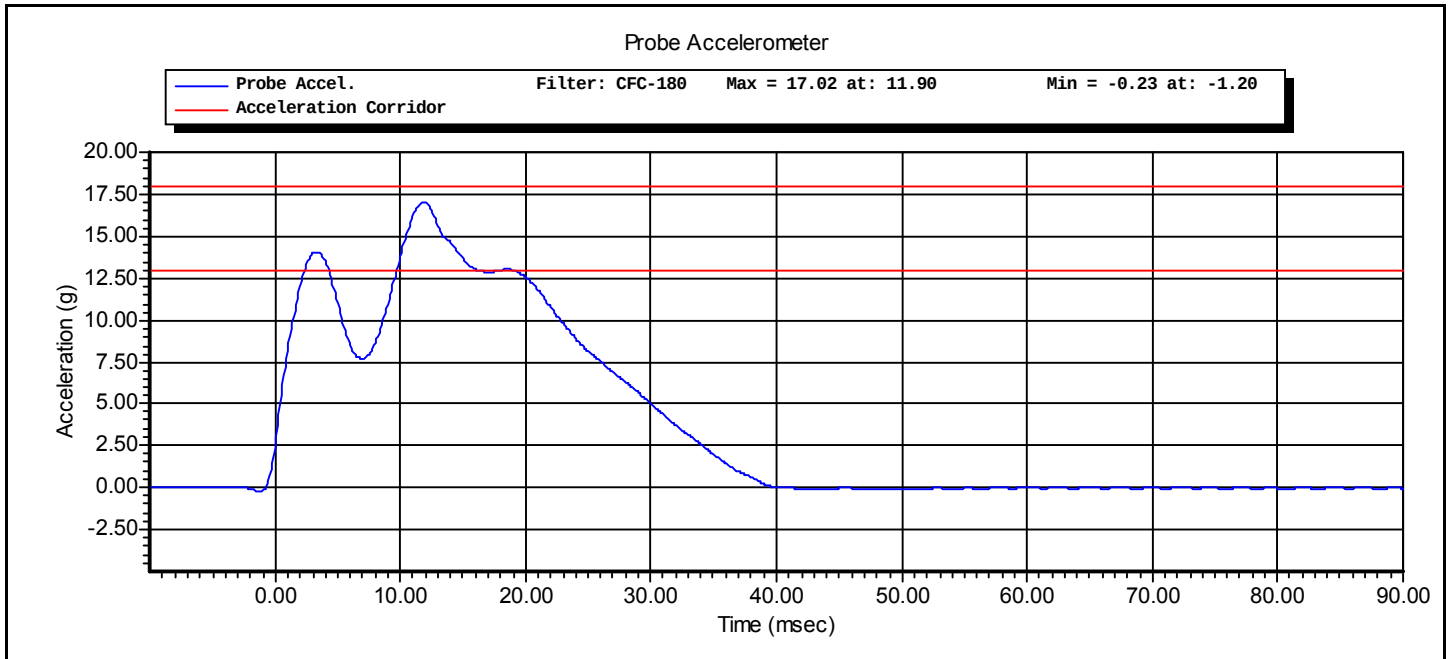
Component Part Number	Component Serial Number
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Test ID: **Shoulder**

Test Time: **2:21:39 PM**

Test Date: **6/10/2010**





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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 300		
Test ID:	Thorax With Arm	Test Date:	6/11/2010
Test Number:	3	Test Time:	12:47:46 PM

Component Part Number	Component Serial Number
-----------------------	-------------------------

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	50 %RH P
Velocity	6.60 -- 6.80	6.67 m/s P
Probe Acceleration after 5ms	30.0 -- 36.0	34.8 g P
Upper Thorax Rib Deflection	25.0 -- 32.0	26.4 mm P
Mid Thorax Rib Deflection	30.0 -- 36.0	31.0 mm P
Lower Thorax Rib Deflection	32.0 -- 38.0	33.3 mm P
Upper Spine Acceleration ("y")	34.0 -- 43.0	38.2 g P
Lower Spine Acceleration ("y")	29.0 -- 37.0	36.7 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: **12:47:46 PM**

Test Date: **6/11/2010**



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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	P16576	4/6/2010
Servo	180-3885	DS-1121	4/7/2010
Servo	180-3885	DS-1151	4/7/2010
Servo	180-3885	DS-1156	4/7/2010
Endevco	7264-2000	P23904	3/15/2010
Endevco	7264-2000	02I02I05-F22	4/7/2010
Servo	180-3885	DS-1063	4/7/2010

Test ID: **Thorax With Arm** Test Time: **12:47:46 PM**

Test Date: **6/11/2010**



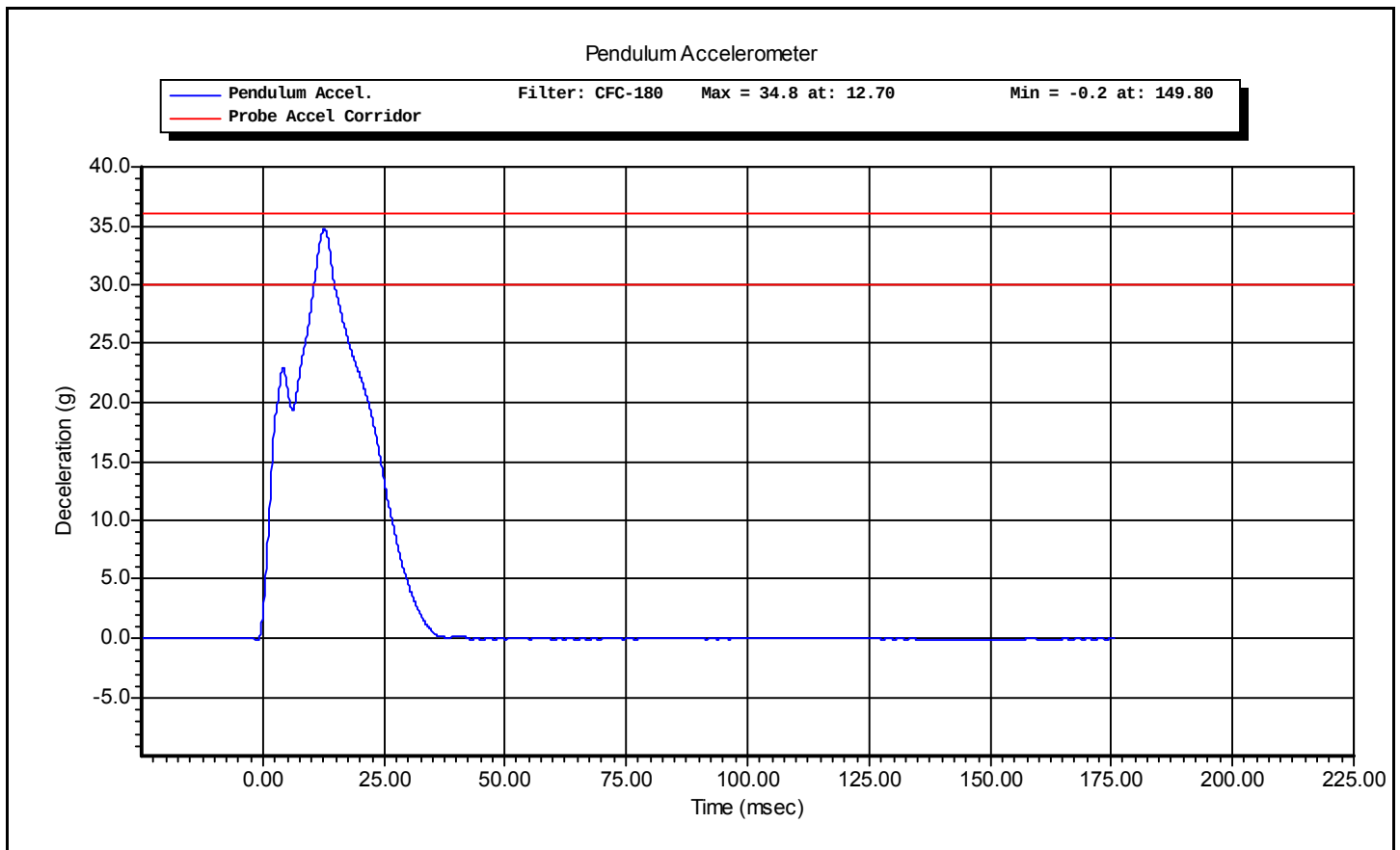
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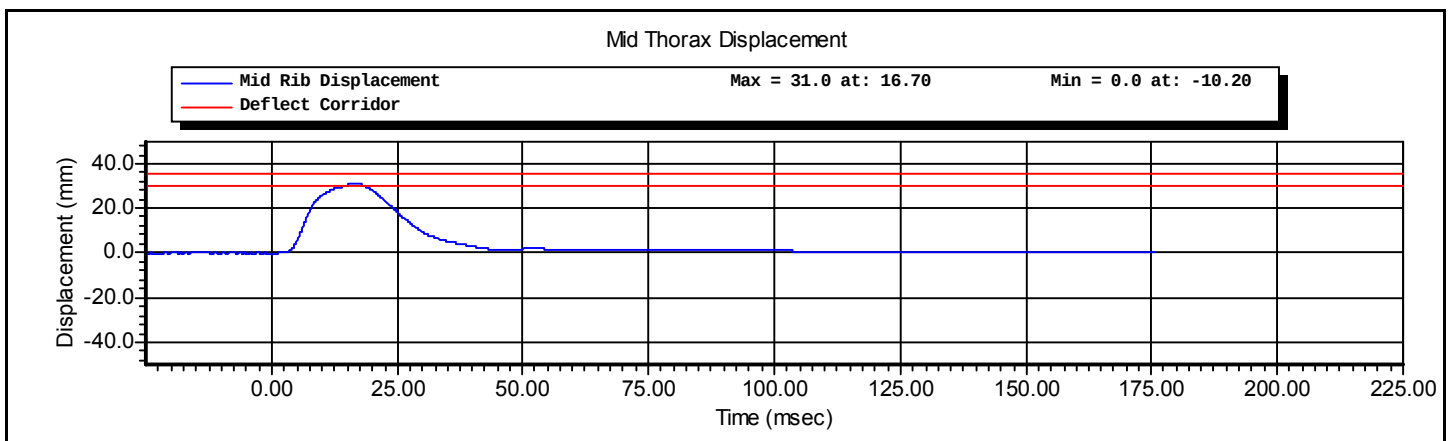
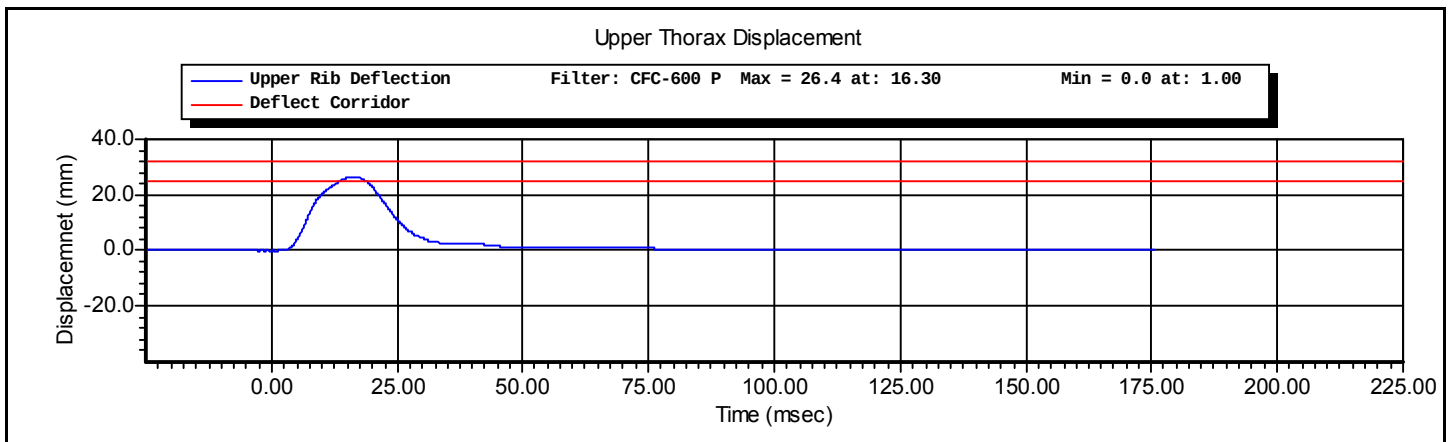
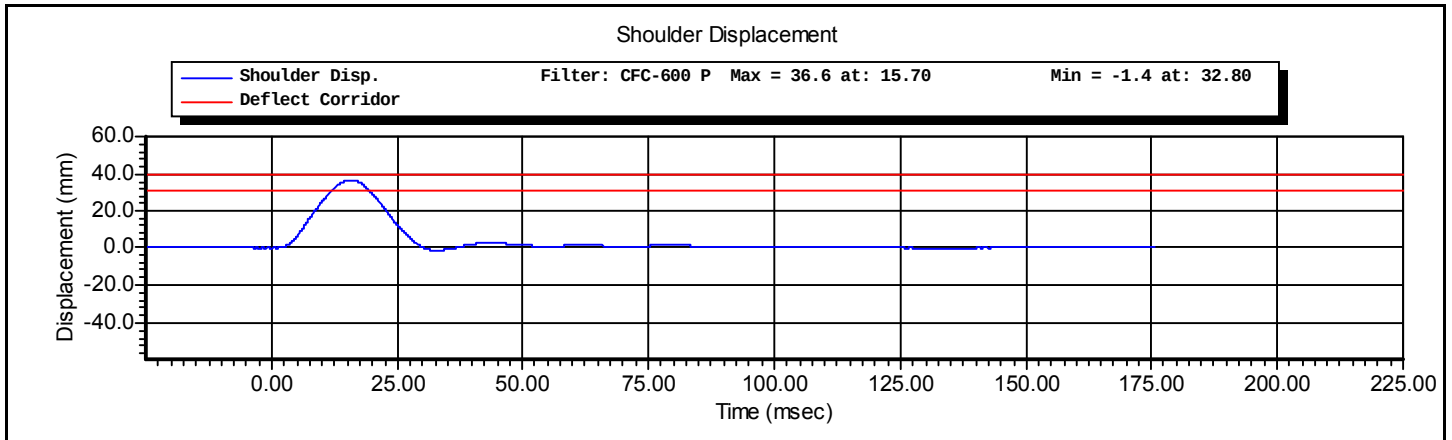
Test Name:	Thorax Impact with Arm	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 300		
Test ID:	Thorax With Arm	Test Date:	6/11/2010
Test Number:	3	Test Time:	12:47:46 PM

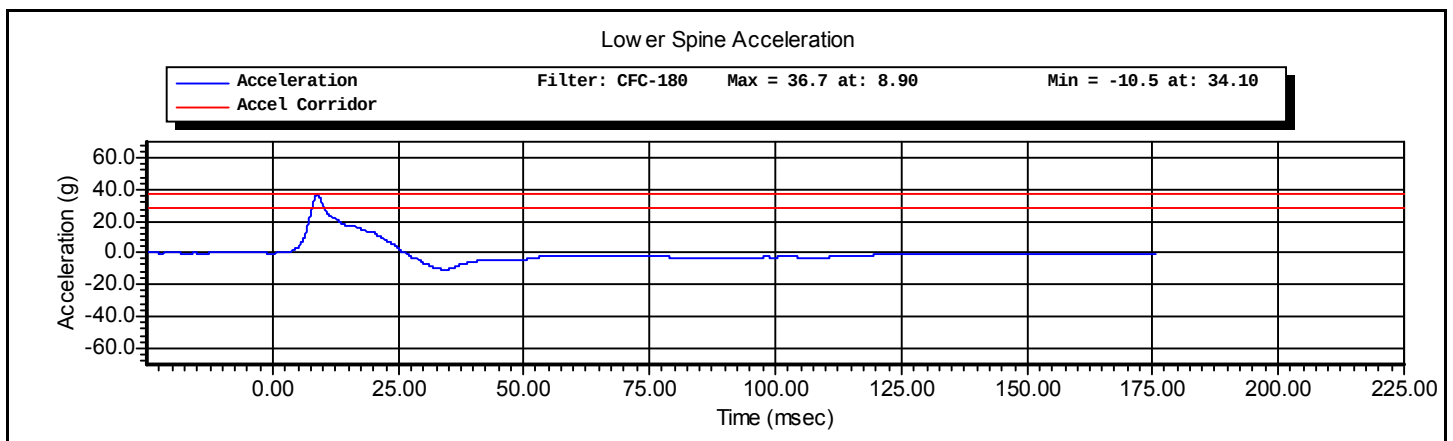
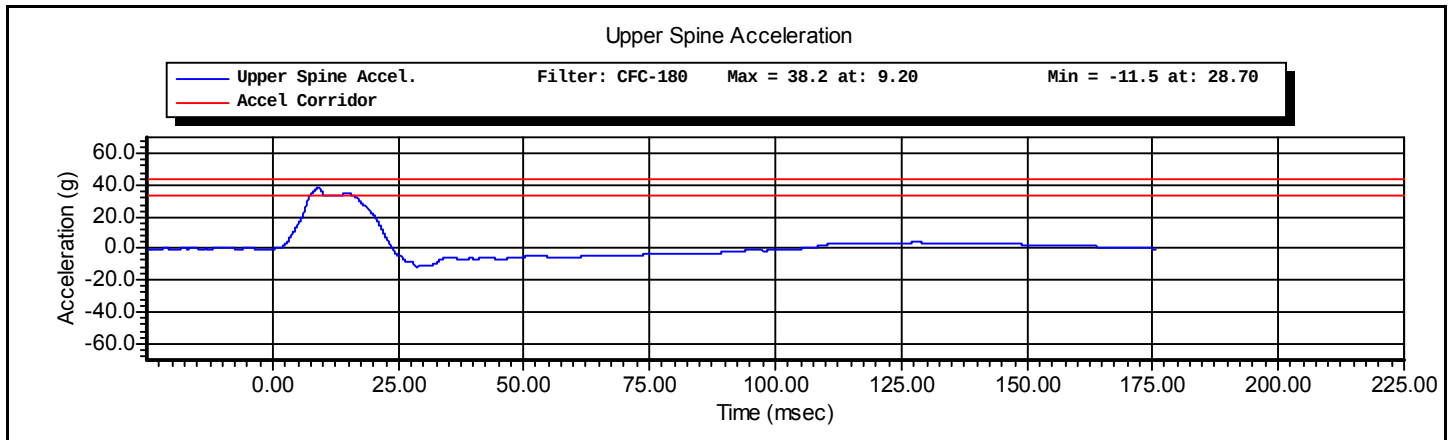
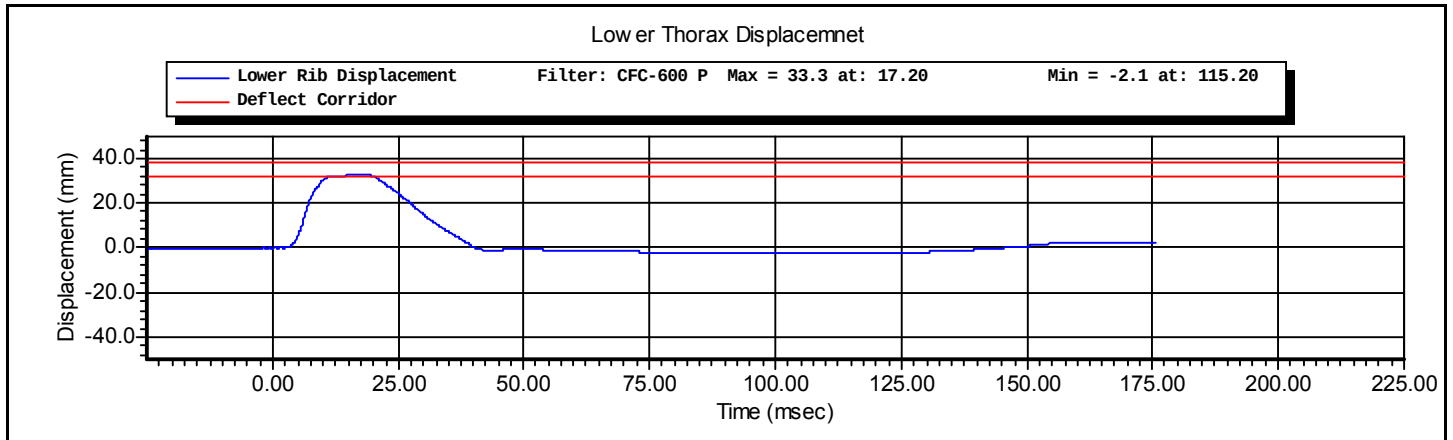
Component Part Number	Component Serial Number
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Test ID: Thorax With Arm Test Time: 12:47:46 PM

Test Date: 6/11/2010







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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 300		
Test ID:	Thorax w/o Arm	Test Date:	6/11/2010
Test Number:	1	Test Time:	9:31:52 AM

Component Part Number	Component Serial Number
-----------------------	-------------------------

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.1 deg C P
Humidity	10 -- 70	59 %RH P
Velocity	4.20 -- 4.40	4.36 m/s P
Probe Acceleration	14.0 -- 18.0	16.5 g P
Upper Thorax Rib Deflection	32.0 -- 40.0	35.0 mm P
Mid Thorax Rib Deflection	39.0 -- 45.0	40.1 mm P
Lower Thorax Rib Deflection	35.0 -- 43.0	38.1 mm P
Upper Spine Acceleration T1	13.0 -- 17.0	16.9 g P
Lower Spine Acceleration T12	7.0 -- 11.0	10.8 g P

All test parameters are within specifications

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

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

Test ID: **Thorax w/o Arm**

Test Time: **9:31:52 AM**

Test Date: **6/11/2010**



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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	P16576	4/6/2010
Servo	180-3885	DS-1121	4/7/2010
Servo	180-3885	DS-1151	4/7/2010
Servo	180-3885	DS-1156	4/7/2010
Endevco	7264-2000	P21516	5/26/2010
Endevco	7264-2000	02I02I05-F22	4/7/2010

Test ID: **Thorax w/o Arm**

Test Time: **9:31:52 AM**

Test Date: **6/11/2010**



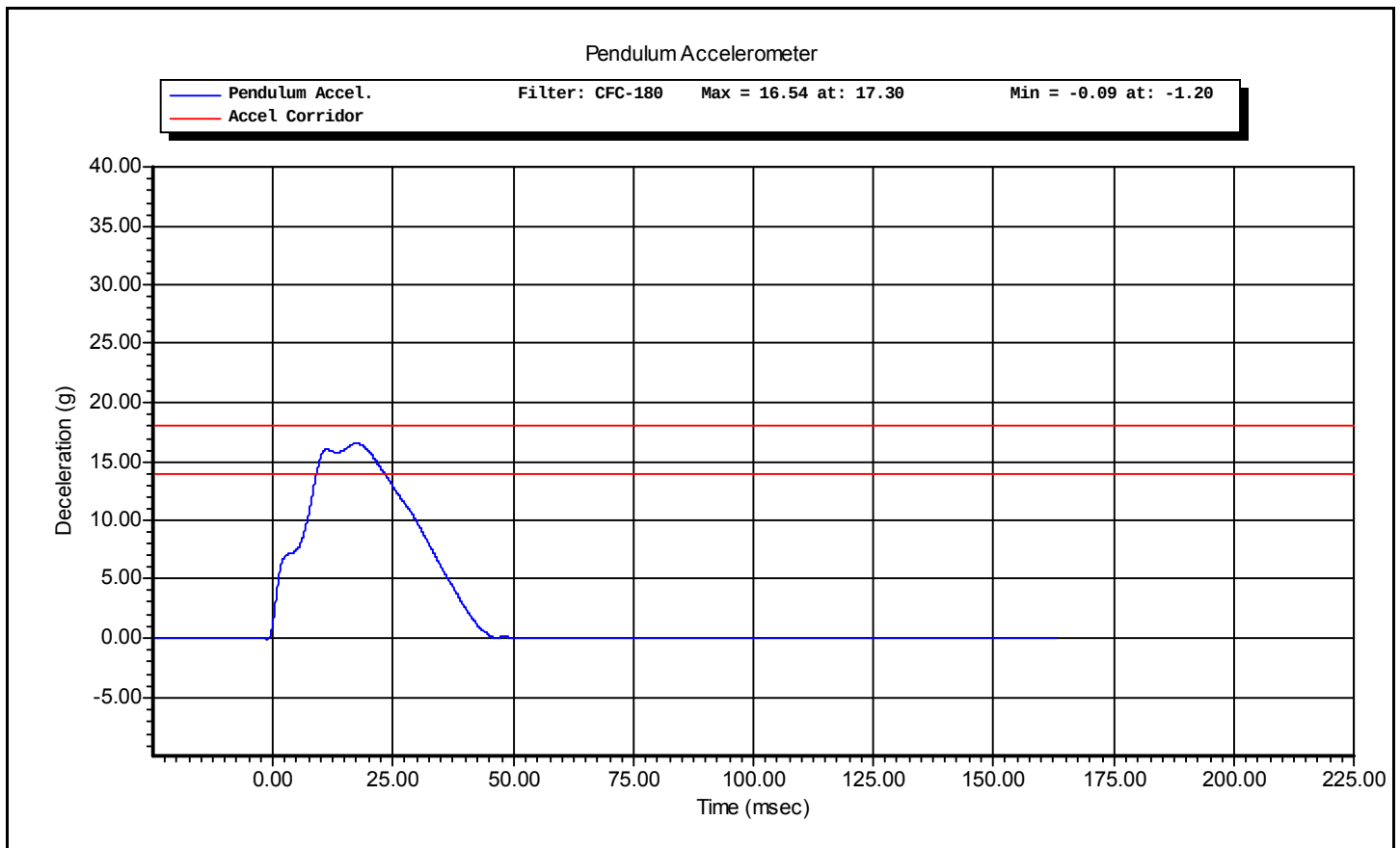
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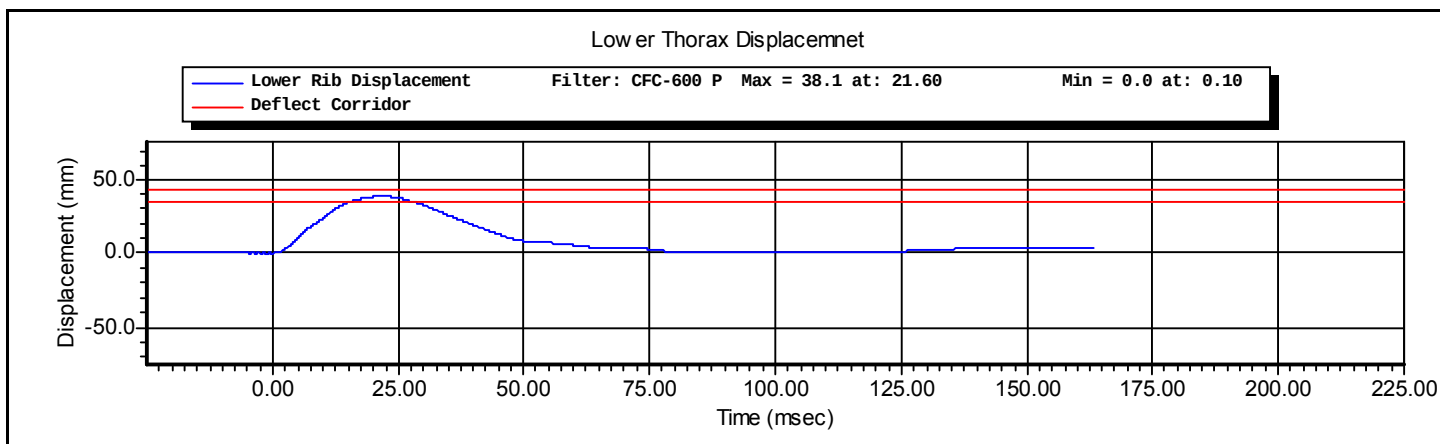
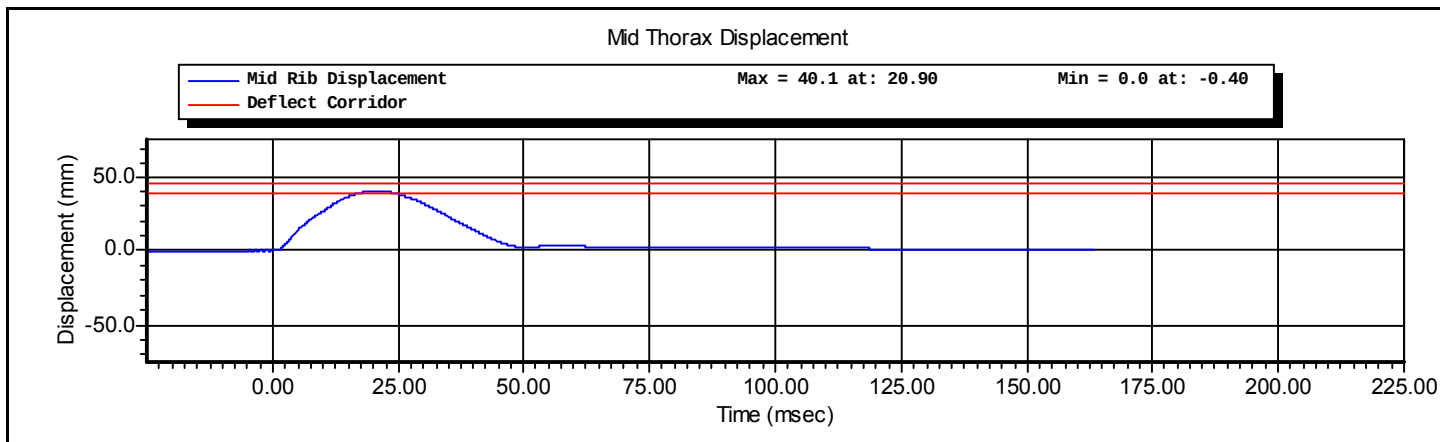
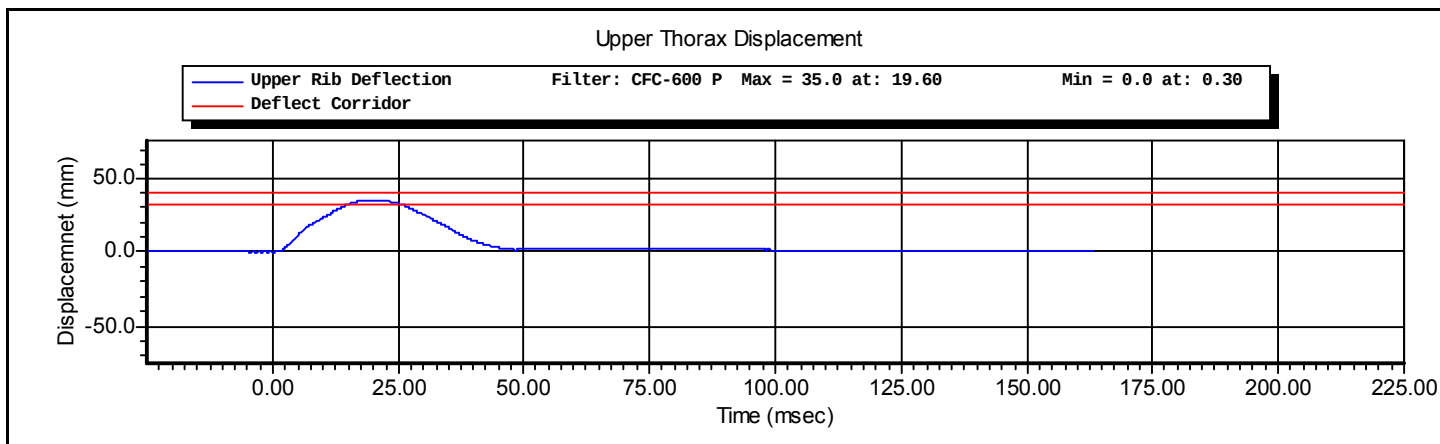
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 300		
Test ID:	Thorax w/o Arm	Test Date:	6/11/2010
Test Number:	1	Test Time:	9:31:52 AM

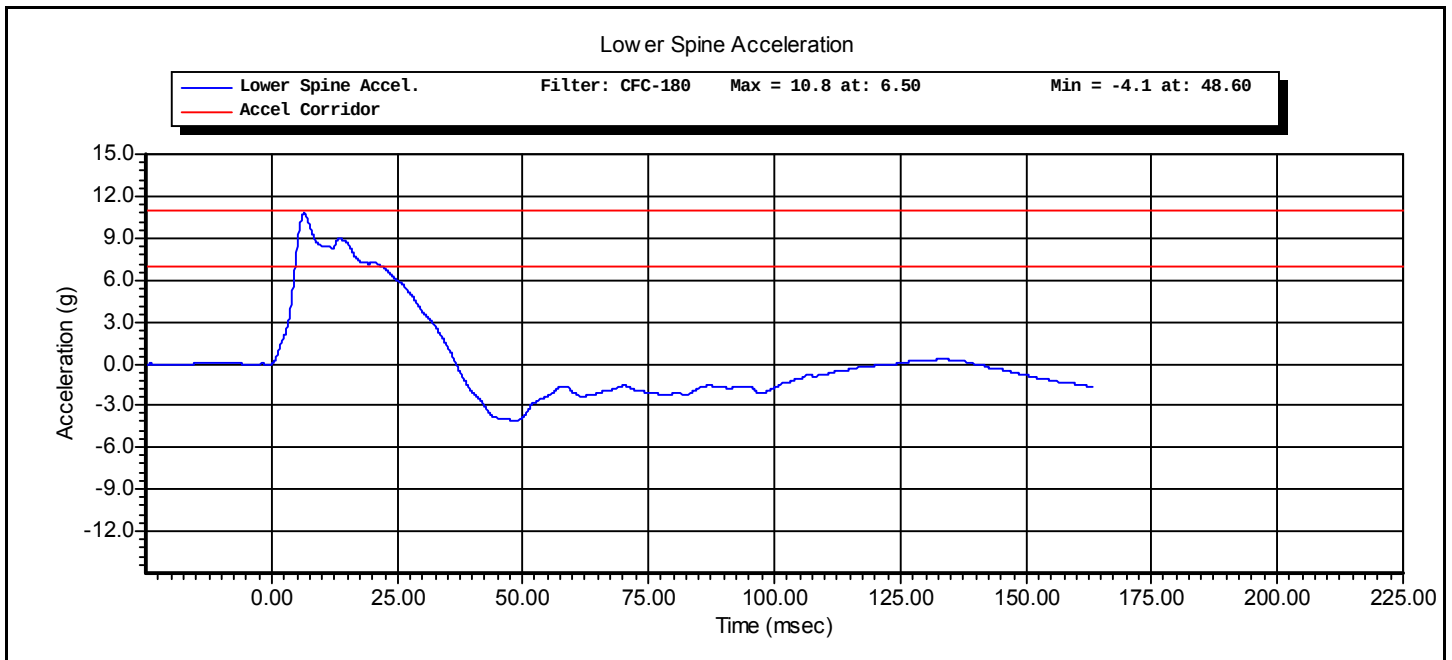
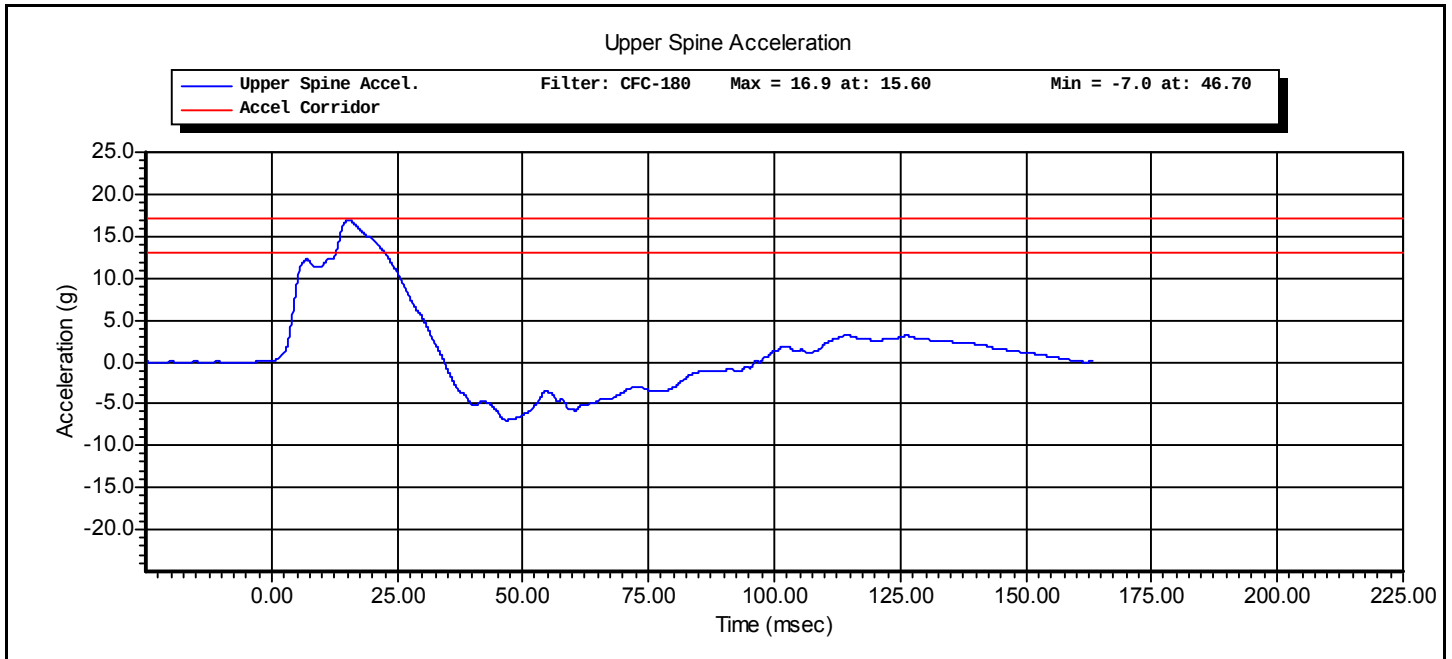
Component Part Number	Component Serial Number
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Test ID: Thorax w/o Arm Test Time: 9:31:52 AM

Test Date: 6/11/2010







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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 300		
Test ID:	Abdominal Impact	Test Date:	6/10/2010
Test Number:	1	Test Time:	4:30:14 PM

Component Part Number	Component Serial Number
-----------------------	-------------------------

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	52 %RH P
Velocity	4.20 -- 4.40	4.37 m/s P
Probe Acceleration	12.0 -- 16.0	15.6 g P
Upper Abdominal Rib Deflection	36.0 -- 47.0	38.8 mm P
Lower Abdominal Rib Deflection	33.0 -- 44.0	35.8 mm P
Lower Spine Acceleration - T12	9.0 -- 14.0	12.7 g P

All test parameters are within specifications

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

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

Test ID: **Abdominal Impact** Test Time: **4:30:14 PM**

Test Date: **6/10/2010**



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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	P16576	4/6/2010
Servo	180-3885	DS-1162	4/7/2010
Servo	180-3885	DS-1232	4/7/2010
Endevco	7264-2000	02I02I05-F22	4/7/2010

Test ID: **Abdominal Impact** Test Time: **4:30:14 PM**

Test Date: **6/10/2010**



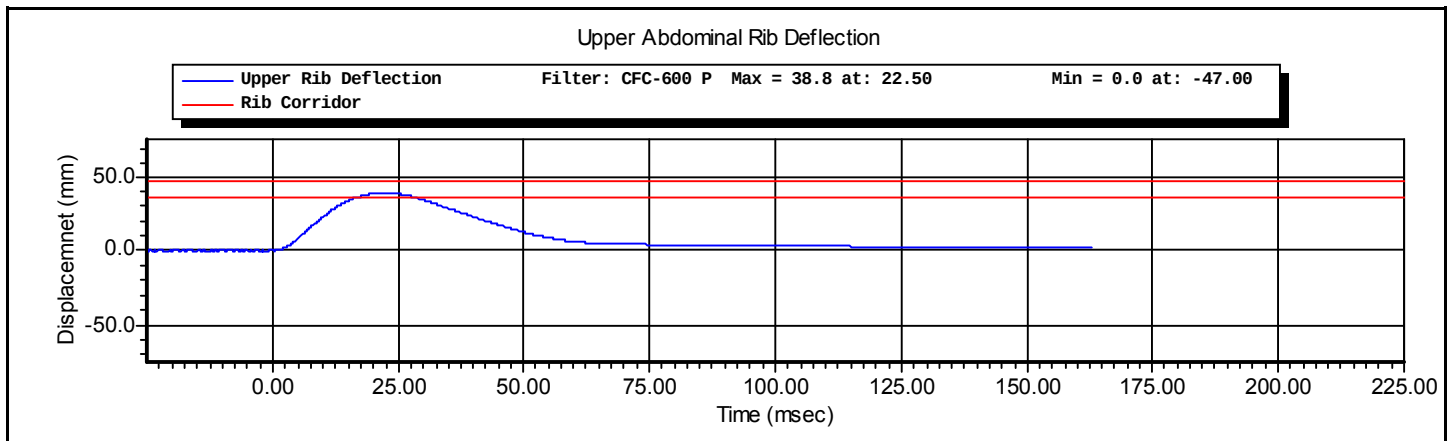
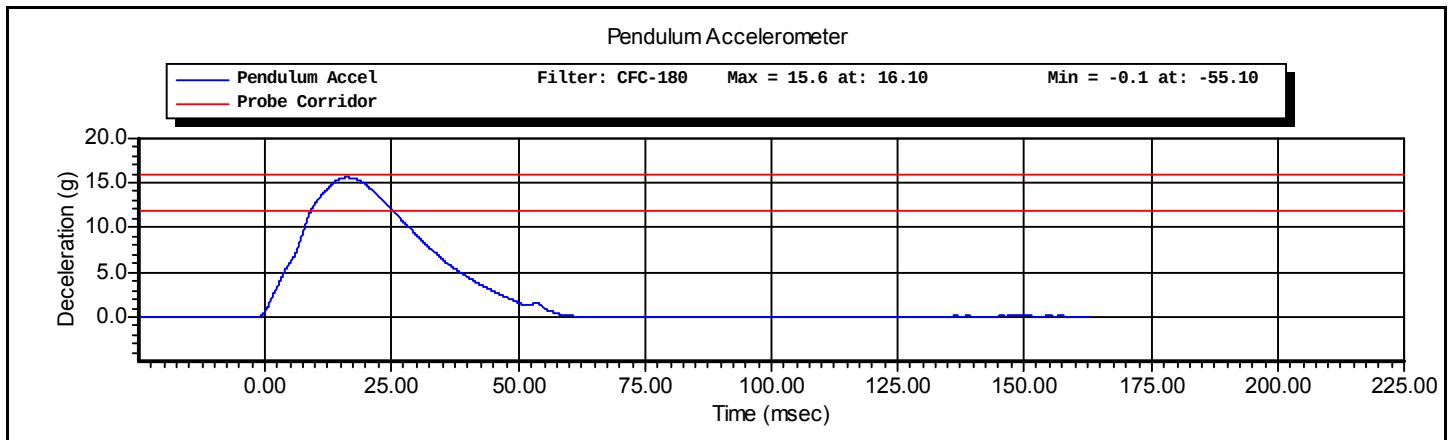
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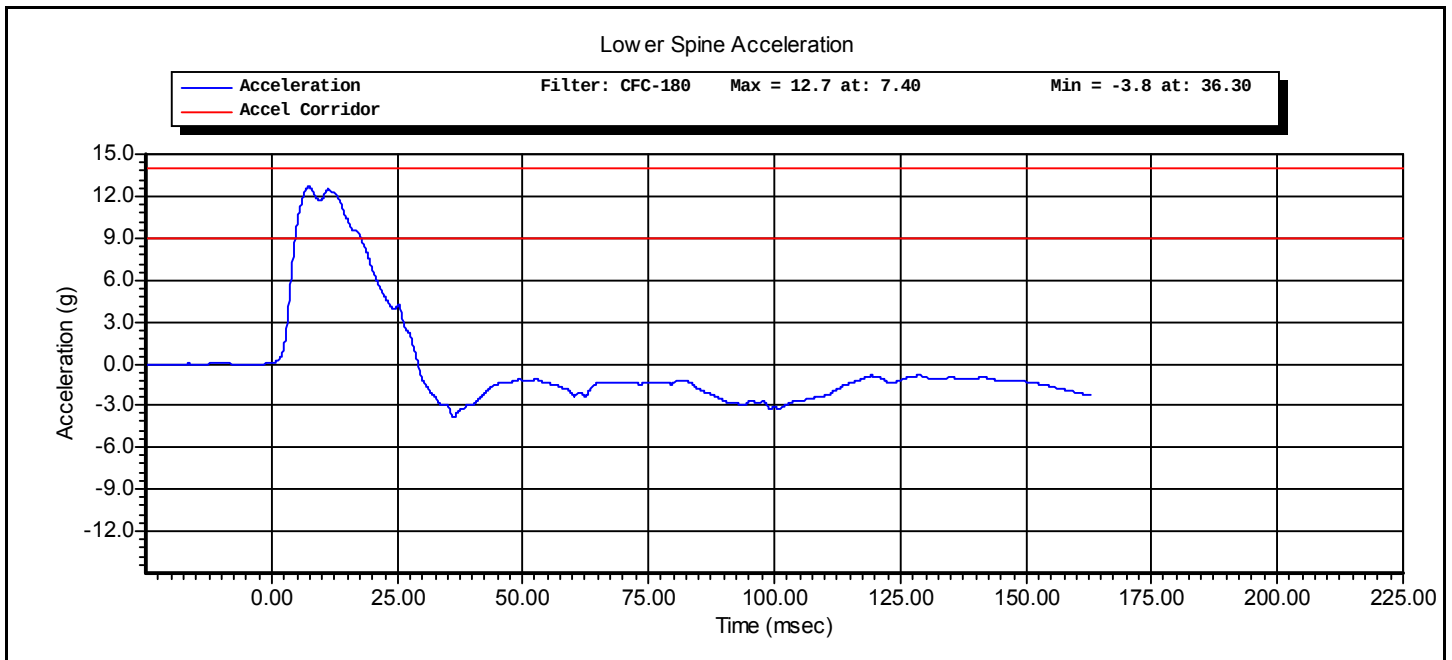
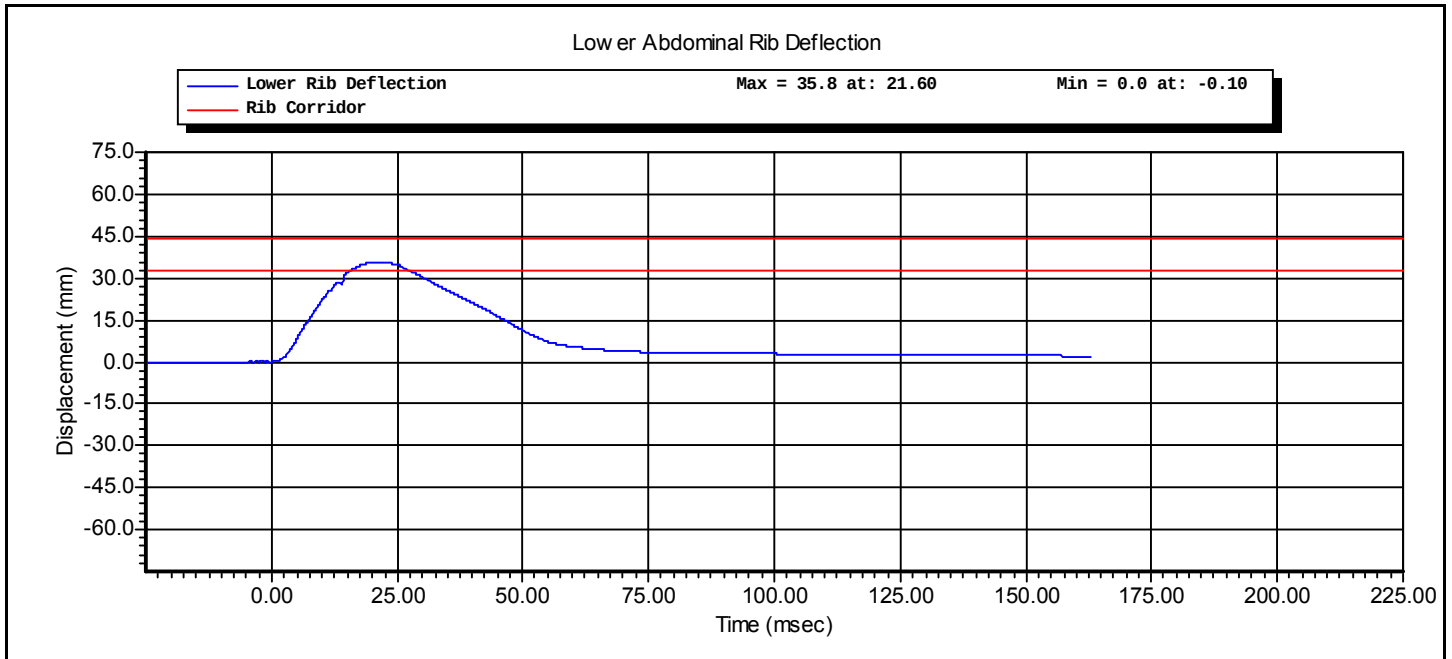
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 300		
Test ID:	Abdominal Impact	Test Date:	6/10/2010
Test Number:	1	Test Time:	4:30:14 PM

Component Part Number	Component Serial Number
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Test ID: Abdominal Impact Test Time: 4:30:14 PM

Test Date: 6/10/2010





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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 300		
Test ID:	Acetabulum	Test Date:	6/10/2010
Test Number:	2	Test Time:	11:59:20 AM

Component Part Number	Component Serial Number
-----------------------	-------------------------

Comments:

Pelvis Plug Used for Certification:
FTSS S/N 9816
Force @ 3mm = 1505N

Pelvis Plug Used for Full Scale Test:
FTSS S/N 9817
Force @ 3mm = 1506N

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	21.1 deg C	P
Humidity	10	--	70	53 %RH	P
Velocity	6.60	--	6.80	6.61 m/s	P
Peak Probe Acceleration	38.0	--	47.0	44.6 g	P
Peak Pelvis Acceleration	34.0	--	42.0	41.3 g	P
Peak Acetabulum Force	3.60	--	4.30	3.95 kN	P

All test parameters are within specifications

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

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

Test ID: **Acetabulum**

Test Time: **11:59:20 AM**

Test Date: **6/10/2010**



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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	P16576	4/6/2010
Endevco	7264-2000	P51671	4/12/2010
DentonATD	3249J	LC-275a	4/12/2010

Test ID: **Acetabulum**

Test Time: **11:59:20 AM**

Test Date: **6/10/2010**



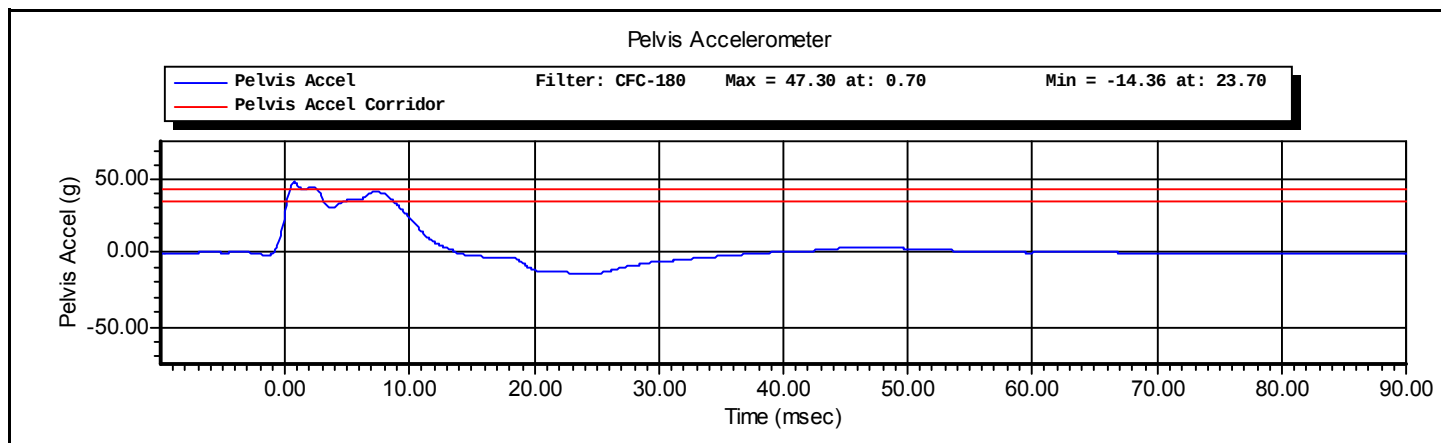
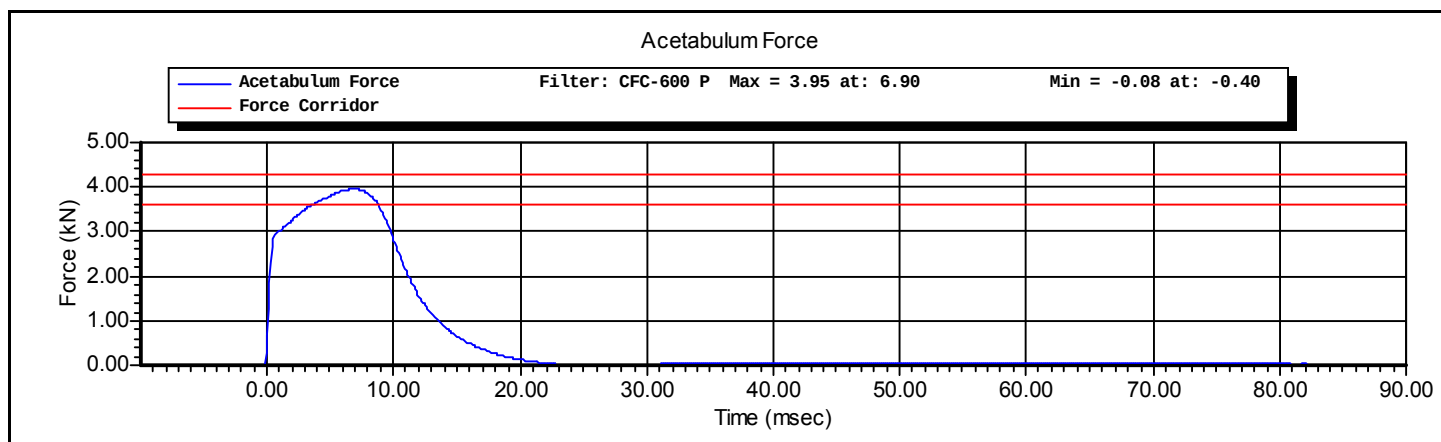
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Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Acetabulum Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 300		
Test ID:	Acetabulum	Test Date:	6/10/2010
Test Number:	2	Test Time:	11:59:20 AM

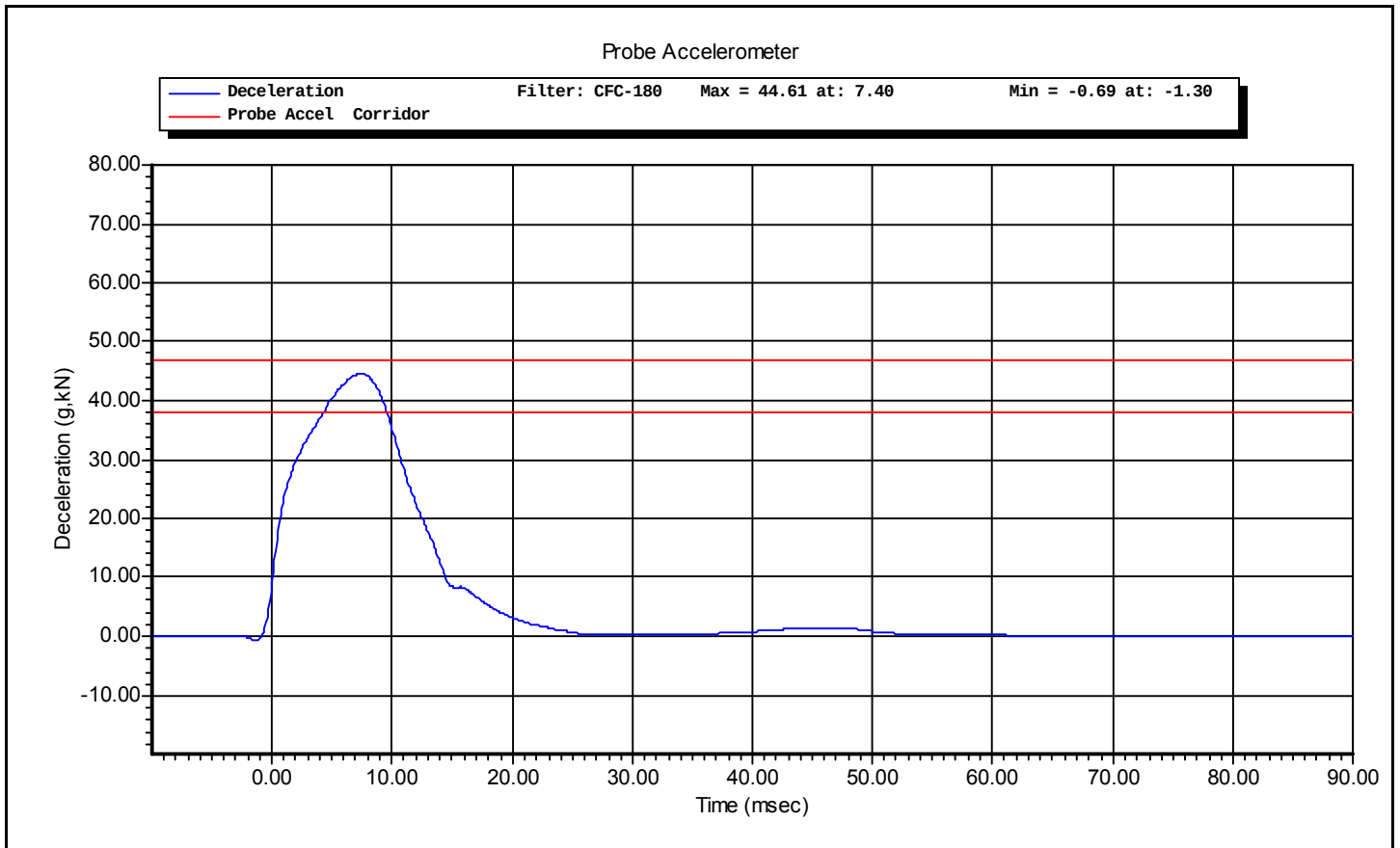
Component Part Number	Component Serial Number
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Test ID: **Acetabulum**

Test Time: **11:59:20 AM**

Test Date: **6/10/2010**





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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 300		
Test ID:	Illiic Pelvis	Test Date:	6/9/2010
Test Number:	1	Test Time:	4:09:11 PM

Component Part Number	Component Serial Number
-----------------------	-------------------------

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	20.6 deg C P
Humidity	10 -- 70	60 %RH P
Velocity	4.20 -- 4.40	4.32 m/s P
Peak Probe Acceleration	36.0 -- 45.0	43.4 g P
Peak Pelvis Acceleration	28.0 -- 39.0	36.7 g P
Peak Iliac Force	4.10 -- 5.10	4.81 kN P

All test parameters are within specifications

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

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

Test ID: **Illiic Pelvis**

Test Time: **4:09:11 PM**

Test Date: **6/9/2010**



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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	P16576	4/6/2010
Endevco	7264-2000	P51671	4/12/2010
DentonATD	3228J	LC-279 Fy	4/12/2010

Test ID: **Illiac Pelvis**

Test Time: **4:09:11 PM**

Test Date: **6/9/2010**



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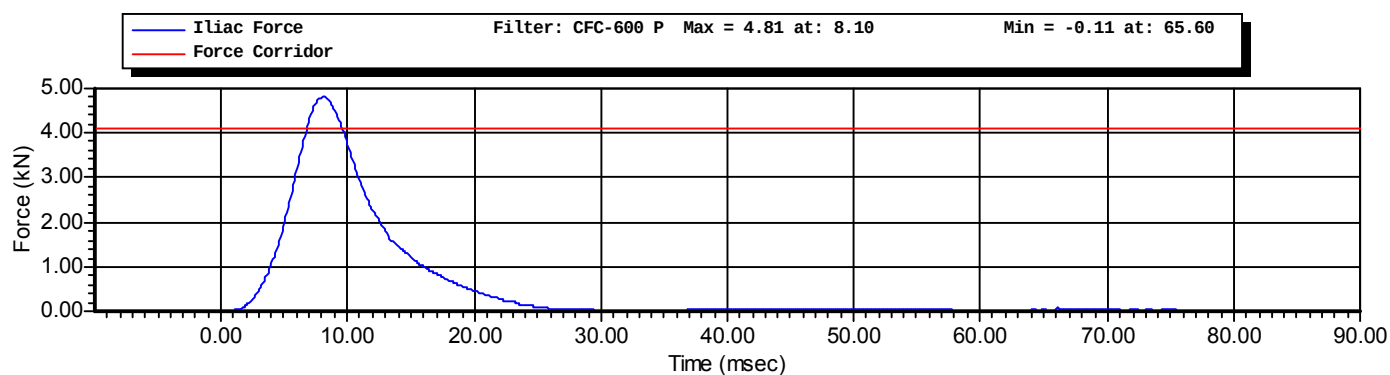
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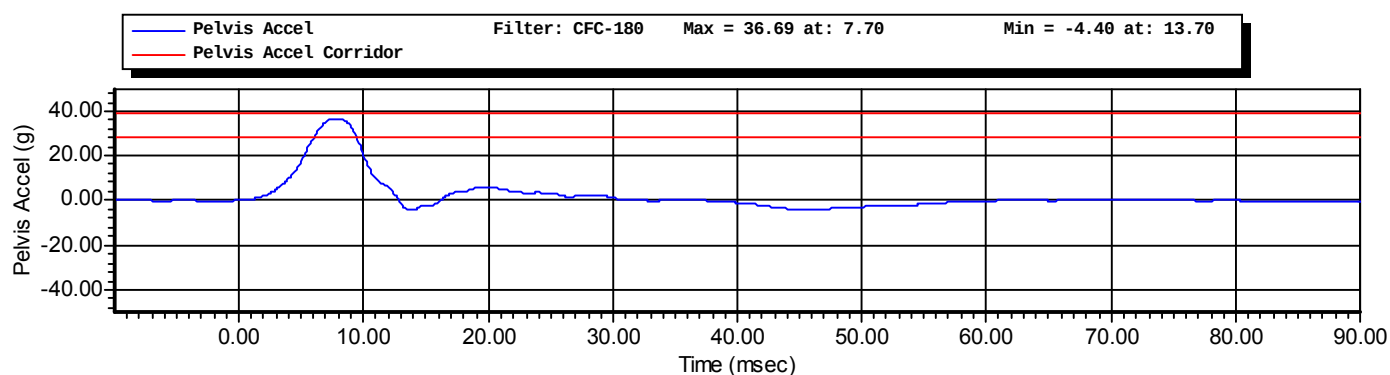
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Sub Test Name:	Iliac Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 300		
Test ID:	Illiic Pelvis	Test Date:	6/9/2010
Test Number:	1	Test Time:	4:09:11 PM

Component Part Number	Component Serial Number
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Iliac Force



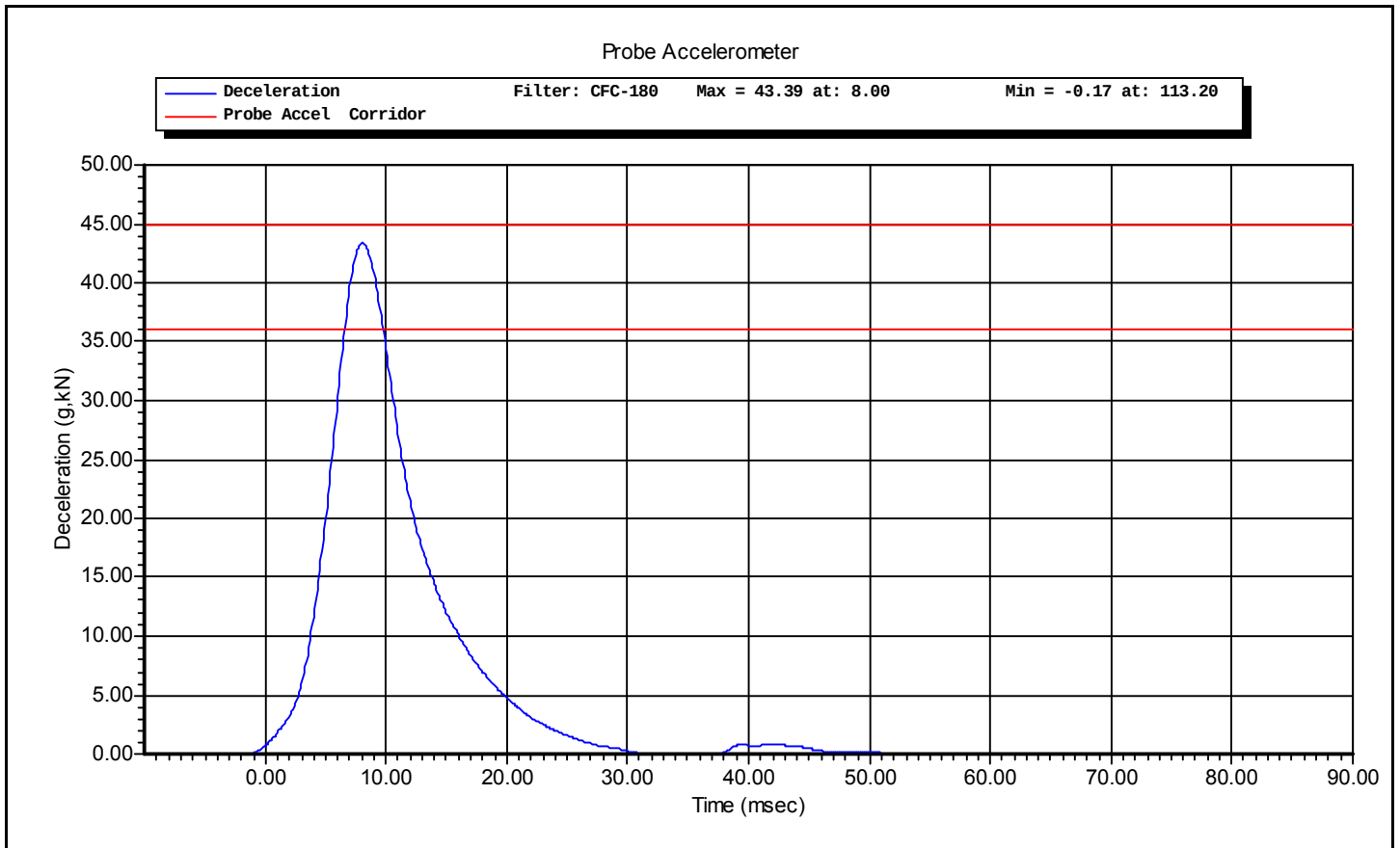
Pelvis Accelerometer



Test ID: **Illiic Pelvis**

Test Time: **4:09:11 PM**

Test Date: **6/9/2010**



CALIBRATION TEST RESULTS

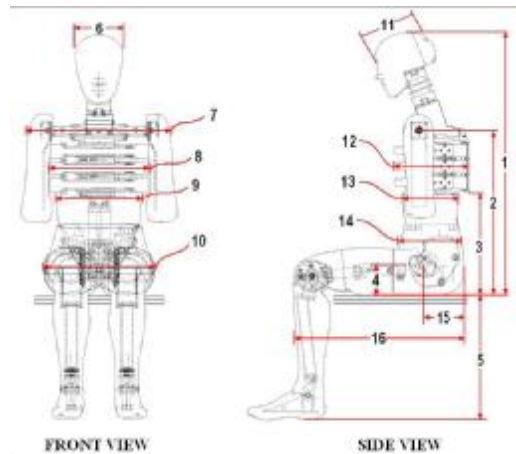
POST-TEST

ES2-re No: F033

CONFIGURED FOR LEFT SIDE IMPACT

ES-2re External Measurements

S/N F033



Dim. No.	Description	Specification (mm)	Result	Pass/Fail
1	Sitting Height	900-918	906	Pass
2	Seat to Shoulder Joint	558-572	570	Pass
3	Seat to Lower Face of Thoracic Spine Box	346-356	354	Pass
4	Seat to Hip Joint (center of bolt)	97-103	101	Pass
5	Sole to Seat, Sitting	333-451	436	Pass
6	Head Width	152-158	153	Pass
7	Shoulder/Arm Width	461-479	466	Pass
8	Thorax Width	322-332	324	Pass
9	Abdomen Width	273-287	284	Pass
10	Pelvis Lap Width	359-373	368	Pass
11	Head Depth	196-206	202	Pass
12	Thorax Depth	262-272	267	Pass
13	Abdomen Depth	194-204	201	Pass
14	Pelvis Depth	235-245	236	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150-160	158	Pass
16	Back of Buttocks to Front Knee	597-615	603	Pass

Technician : A. Rudniski

Date: 06/30/2010



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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Head Drop	Test Date:	6/29/2010
Test Number:	1	Test Time:	3:55:39 PM

Component Part Number	Component Serial Number
455-1007	8473

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10 -- 70	48 %RH P
Resultant Acceleration	125 -- 155	137 g P
Oscillation	0.0 -- 15.0	12.2 % P
Fore-Aft Acceleration	-15.00 -- 15.00	-6.96 g P

All test parameters are within specifications

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

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

Test ID: **Head Drop**

Test Time: **3:55:39 PM**

Test Date: **6/29/2010**



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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	P15526	1/22/2010
Endevco	7264-2000	P51949	5/26/2010
Endevco	7264-2000	P26269	4/6/2010

Test ID: **Head Drop**

Test Time: **3:55:39 PM**

Test Date: **6/29/2010**



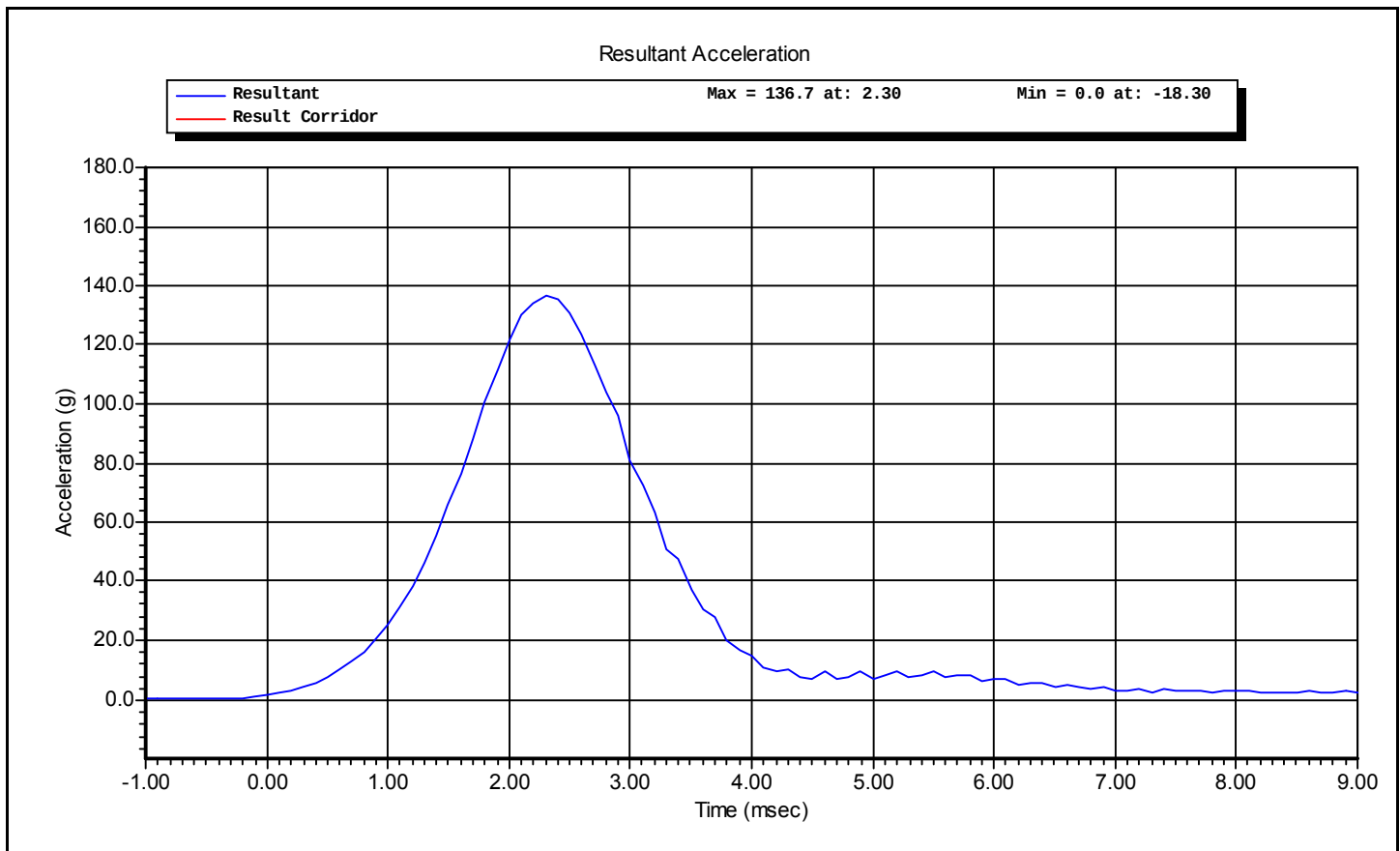
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Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Head Drop	Test Date:	6/29/2010
Test Number:	1	Test Time:	3:55:39 PM

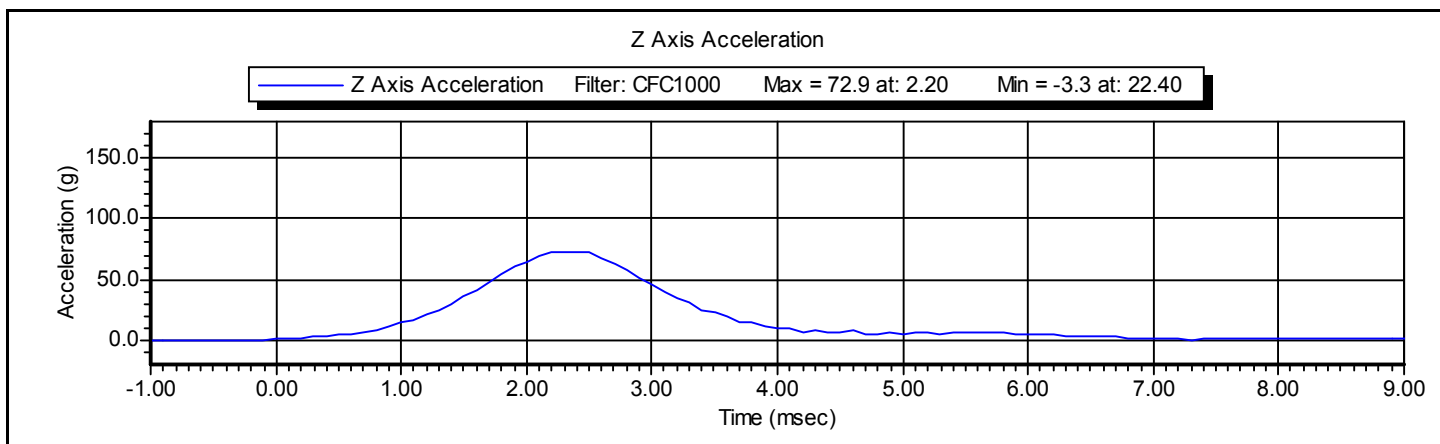
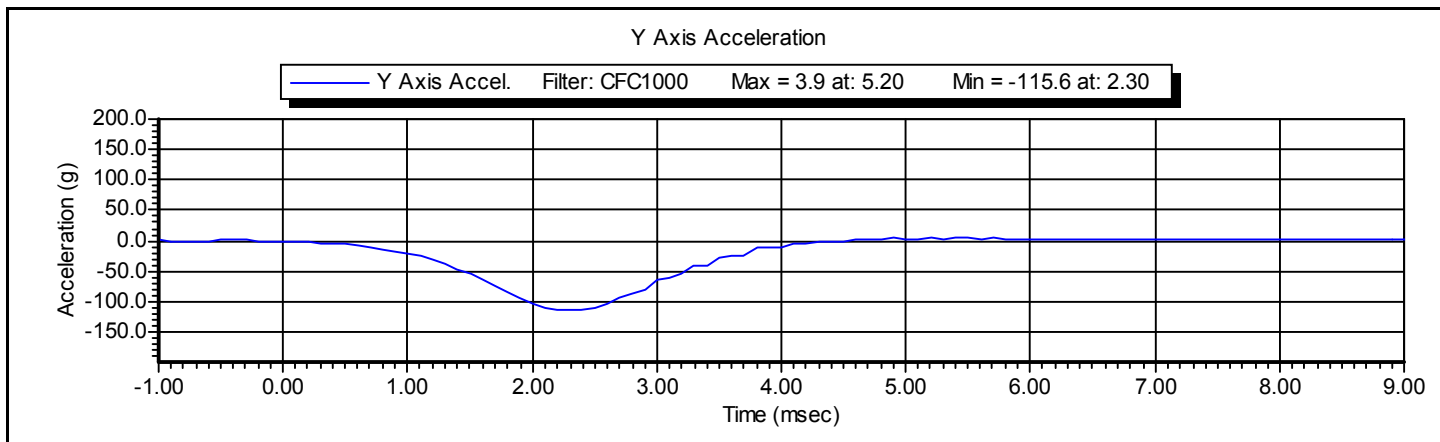
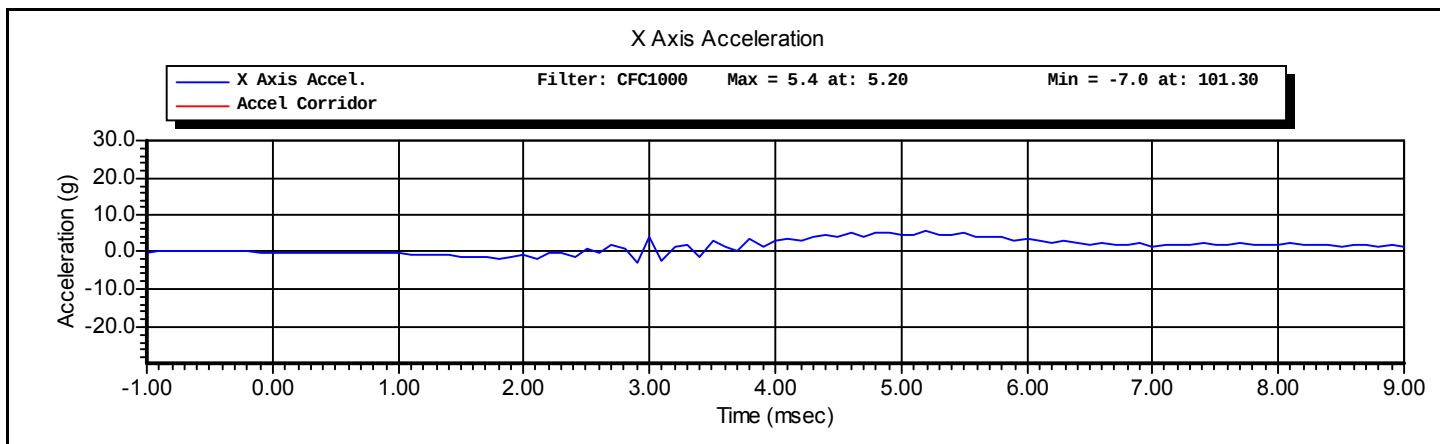
Component Part Number	Component Serial Number
455-1007	8473



Test ID: Head Drop

Test Time: 3:55:39 PM

Test Date: 6/29/2010





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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Neck Flexion	Test Date:	6/29/2010
Test Number:	1	Test Time:	4:45:14 PM

Component Part Number	Component Serial Number
455-2002	07085

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10 -- 70	43 %RH P
Velocity	3.30 -- 3.50	3.42 m/s P
Maximum Neck Flexion Angle	49.0 -- 59.0	52.0 degrees P
Time At Maximum Neck Flexion	54.0 -- 66.0	60.1 ms P
Decay to Zero Degrees	53.0 -- 88.0	57.5 ms P
Velocity Corridor	--	P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **4:45:14 PM**

Test Date: **6/29/2010**



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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
DentonATD	7000428	094	4/27/2010
DentonATD	7000428	095	4/27/2010
DentonATD	7000428	093	4/27/2010

Test ID: **Neck Flexion**

Test Time: **4:45:14 PM**

Test Date: **6/29/2010**



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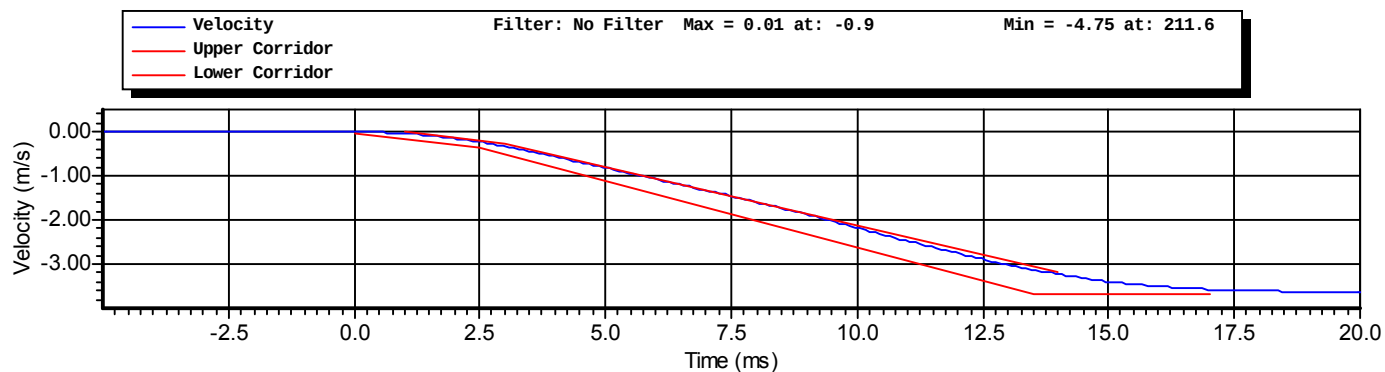
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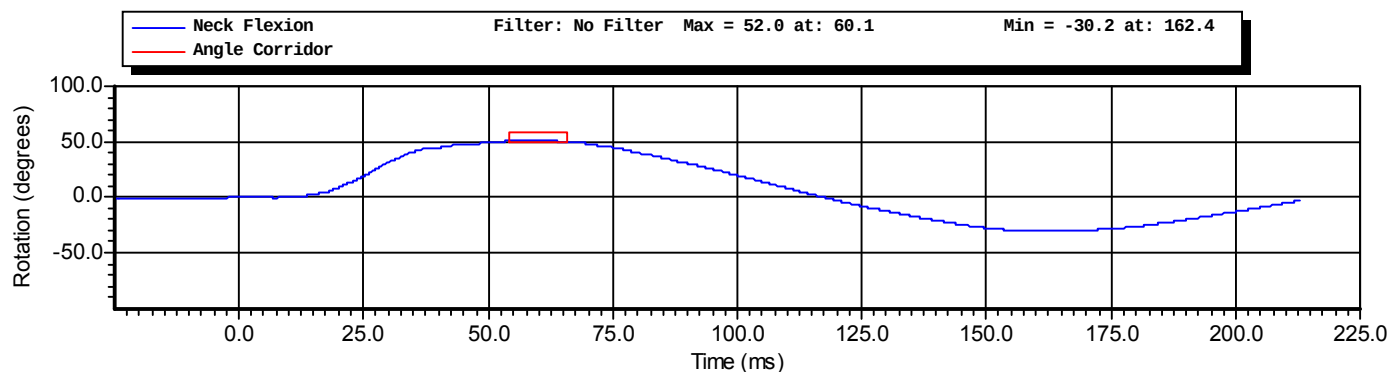
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Neck Flexion	Test Date:	6/29/2010
Test Number:	1	Test Time:	4:45:14 PM

Component Part Number	Component Serial Number
455-2002	07085

Pendulum Velocity



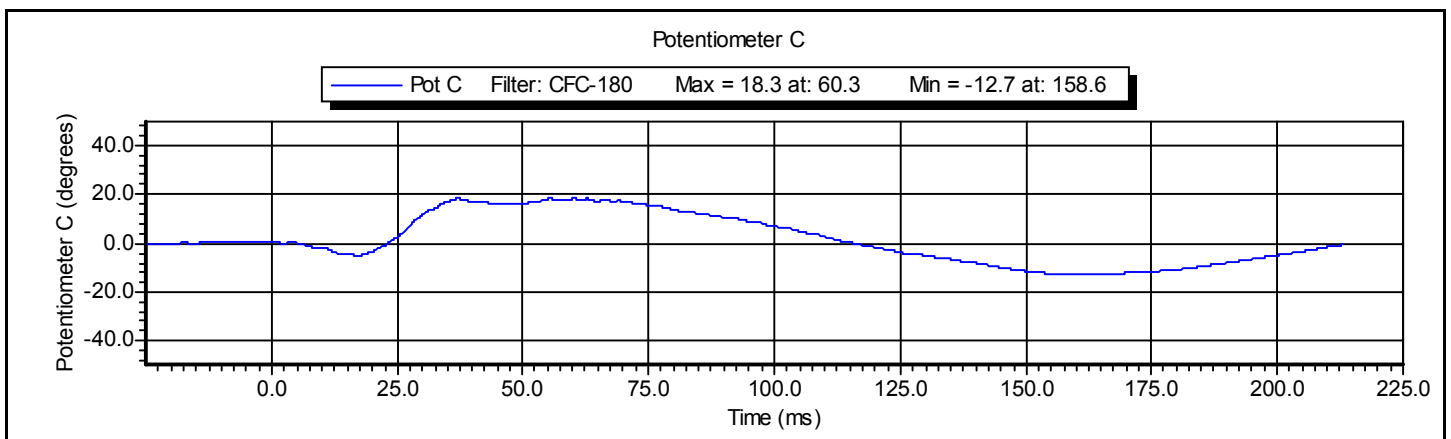
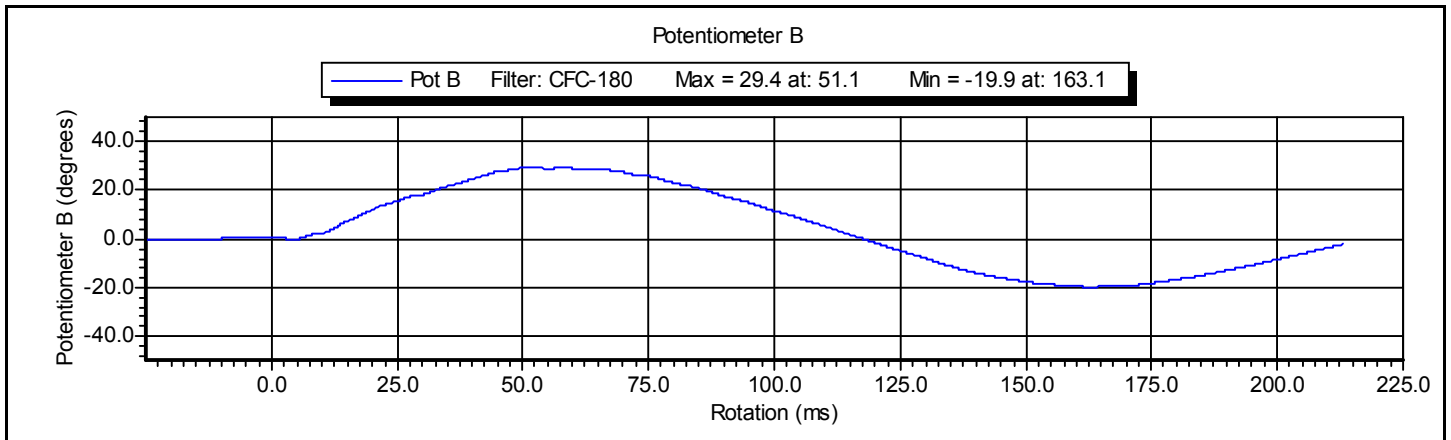
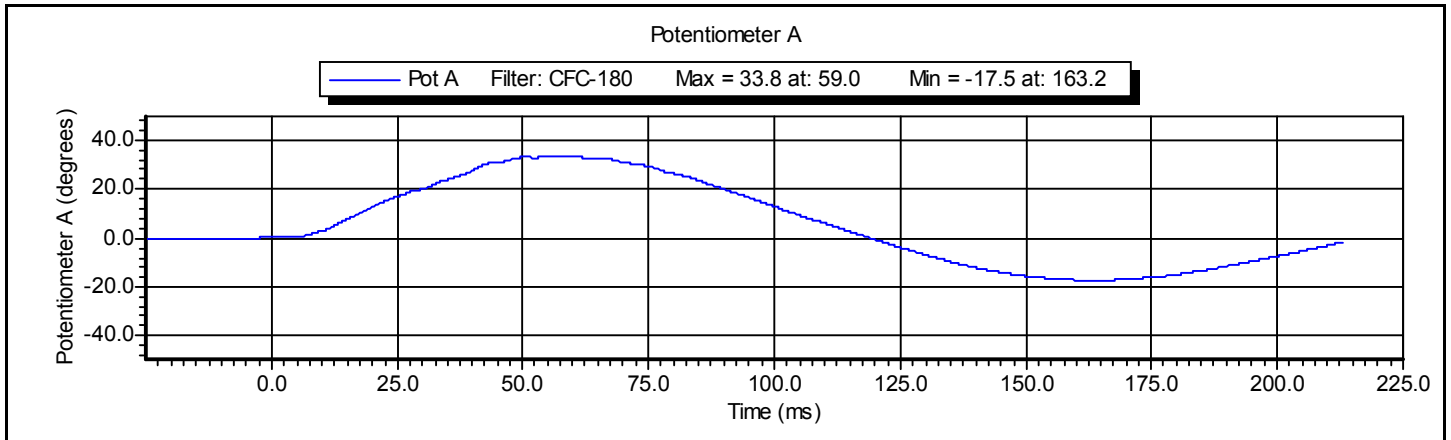
Neck Flexion Angle



Test ID: Neck Flexion

Test Time: 4:45:14 PM

Test Date: 6/29/2010





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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Lower Rib 4 m/s	Test Date:	6/29/2010
Test Number:	1	Test Time:	11:23:09 AM

Component Part Number	Component Serial Number
455-3100	LOWER

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10.0 -- 70.0	56.0 %RH P
Velocity	3.90 -- 4.10	3.99 m/s P
Rib Displacement	-51.00 -- -46.00	-47.57 mm P
Drop Height	807.0 -- 823.0	815.0 mm P

All test parameters are within specifications

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

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

Test ID: **Lower Rib 4 m/s**

Test Time: **11:23:09 AM**

Test Date: **6/29/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-178	4/23/2010
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P23137	1/22/2010

Test ID: **Lower Rib 4 m/s**

Test Time: **11:23:09 AM**

Test Date: **6/29/2010**



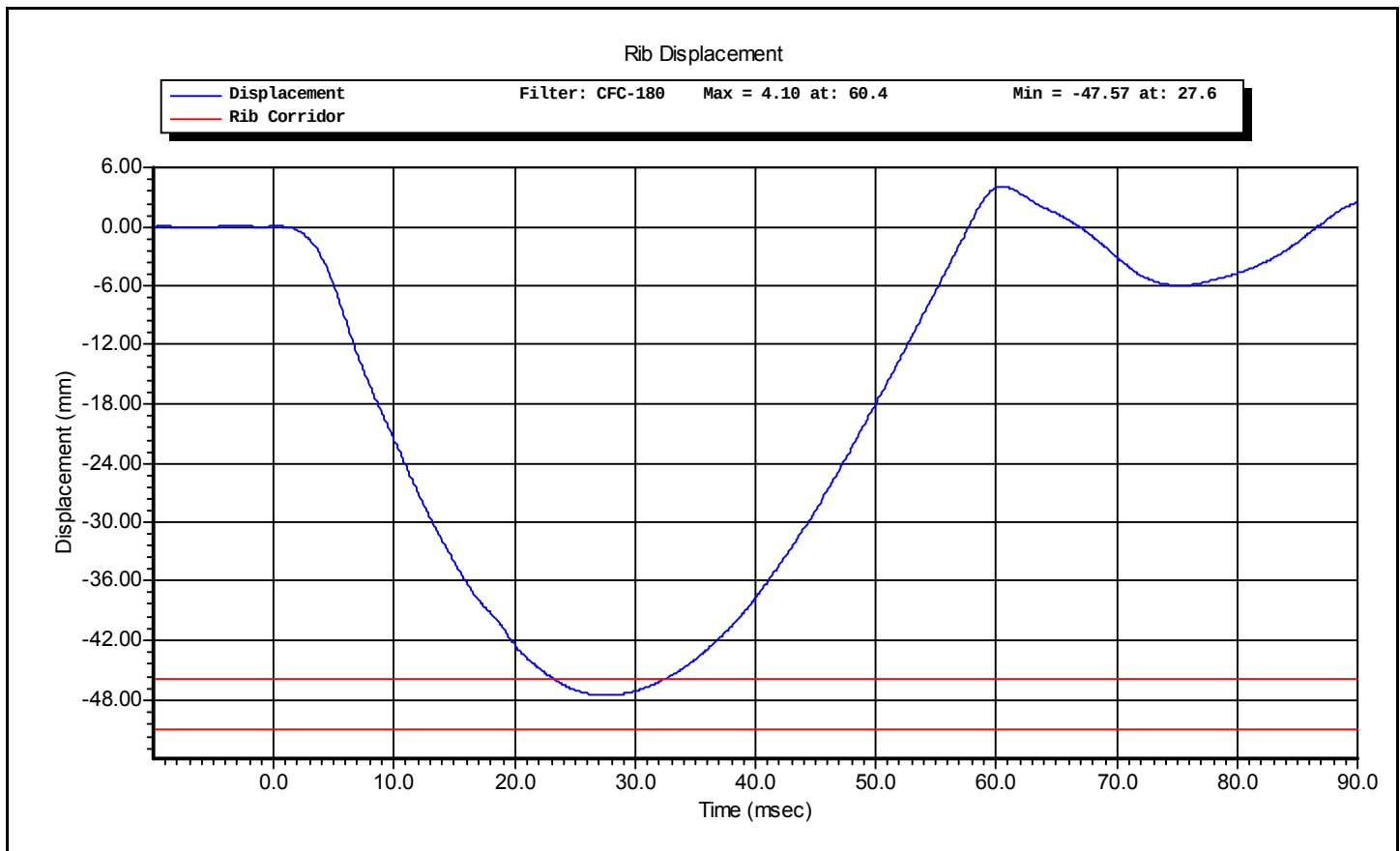
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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Lower Rib 4 m/s	Test Date:	6/29/2010
Test Number:	1	Test Time:	11:23:09 AM

Component Part Number	Component Serial Number
455-3100	LOWER



Test ID: Lower Rib 4 m/s Test Time: 11:23:09 AM

Test Date: 6/29/2010



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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Lower Rib 3 m/s	Test Date:	6/29/2010
Test Number:	1	Test Time:	11:32:25 AM

Component Part Number	Component Serial Number
455-3100	LOWER

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10.0 -- 70.0	56.0 %RH P
Velocity	2.90 -- 3.10	2.98 m/s P
Rib Displacement	-40.00 -- -36.00	-36.95 mm P
Drop Height	454 -- 464	459 mm P

All test parameters are within specifications

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

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

Test ID: **Lower Rib 3 m/s**

Test Time: **11:32:25 AM**

Test Date: **6/29/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-178	4/23/2010
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P23137	1/22/2010

Test ID: **Lower Rib 3 m/s**

Test Time: **11:32:25 AM**

Test Date: **6/29/2010**



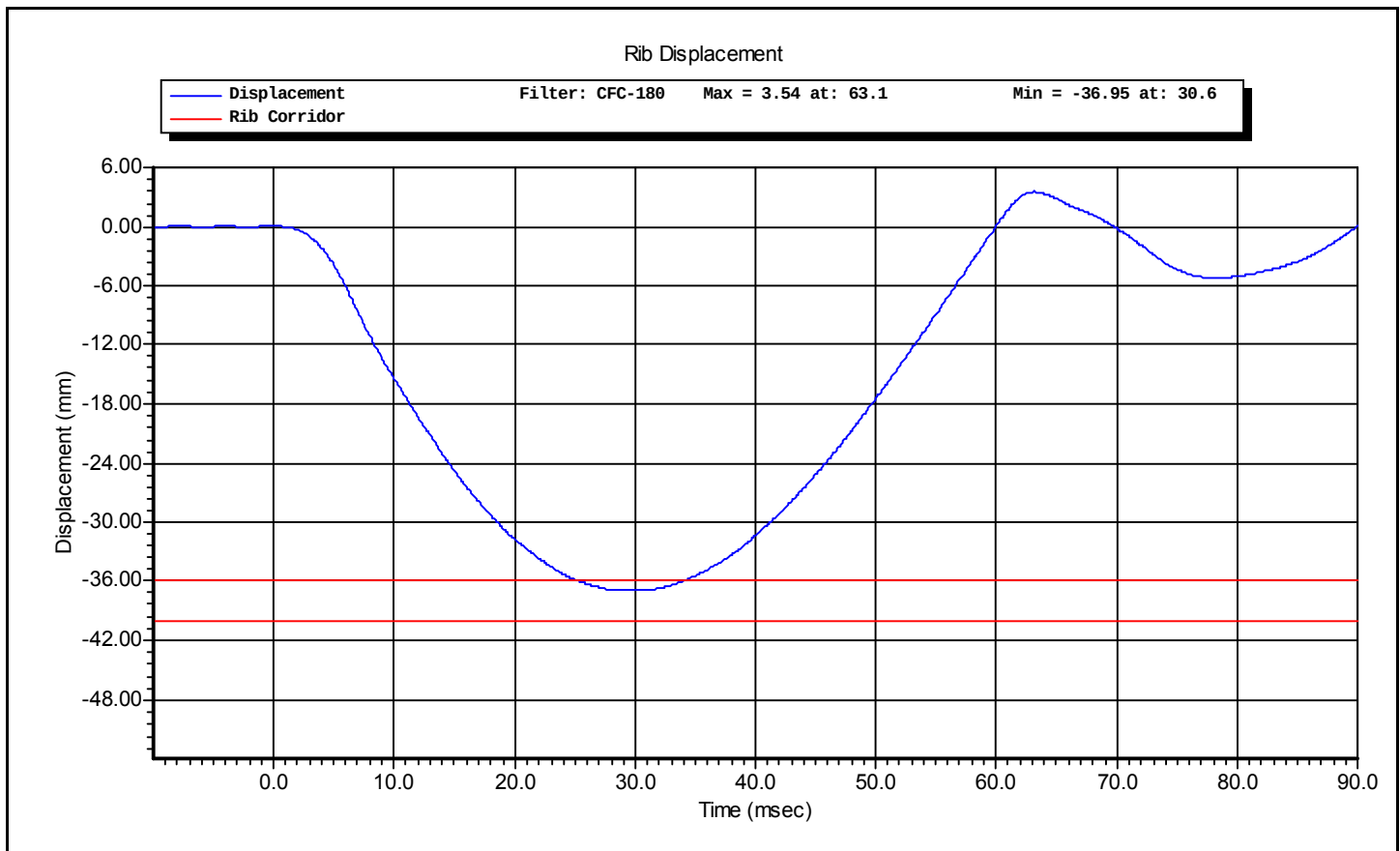
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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Lower Rib 3 m/s	Test Date:	6/29/2010
Test Number:	1	Test Time:	11:32:25 AM

Component Part Number	Component Serial Number
455-3100	LOWER



Test ID: Lower Rib 3 m/s Test Time: 11:32:25 AM

Test Date: 6/29/2010



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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Middle Rib 4 m/s	Test Date:	6/29/2010
Test Number:	1	Test Time:	11:06:01 AM

Component Part Number	Component Serial Number
455-3100	MIDDLE

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10.0 -- 70.0	56.0 %RH P
Velocity	3.90 -- 4.10	3.99 m/s P
Rib Displacement	-51.00 -- -46.00	-47.54 mm P
Drop Height	807.0 -- 823.0	815.0 mm P

All test parameters are within specifications

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

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

Test ID: **Middle Rib 4 m/s** Test Time: **11:06:01 AM**

Test Date: **6/29/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-185	4/23/2010
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P23137	1/22/2010

Test ID: **Middle Rib 4 m/s**

Test Time: **11:06:01 AM**

Test Date: **6/29/2010**



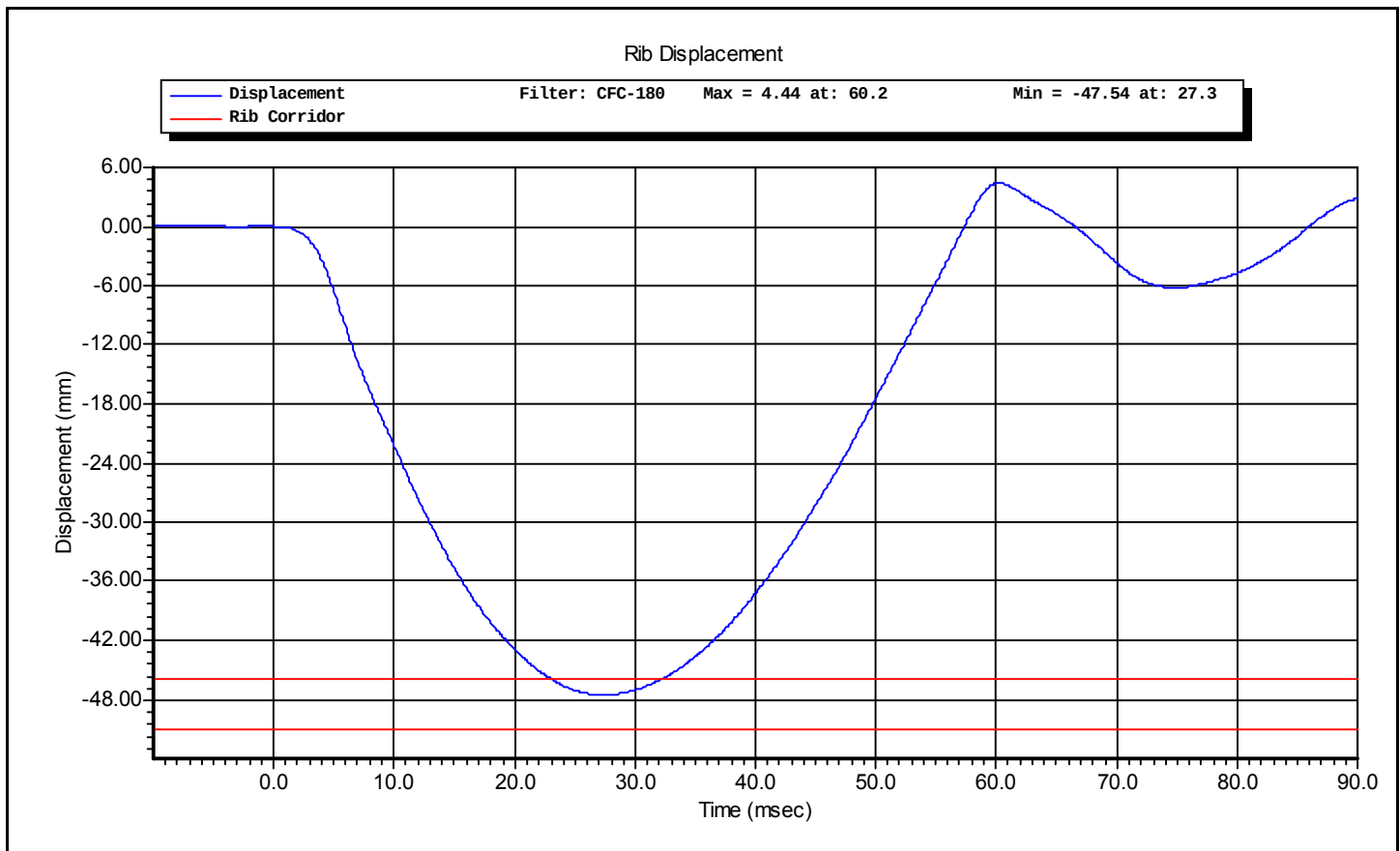
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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Middle Rib 4 m/s	Test Date:	6/29/2010
Test Number:	1	Test Time:	11:06:01 AM

Component Part Number	Component Serial Number
455-3100	MIDDLE



Test ID: Middle Rib 4 m/s Test Time: 11:06:01 AM

Test Date: 6/29/2010



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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Middle Rib 3 m/s	Test Date:	6/29/2010
Test Number:	1	Test Time:	11:17:04 AM

Component Part Number	Component Serial Number
455-3100	MIDDLE

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10.0 -- 70.0	56.0 %RH P
Velocity	2.90 -- 3.10	2.98 m/s P
Rib Displacement	-40.00 -- -36.00	-36.81 mm P
Drop Height	454 -- 464	459 mm P

All test parameters are within specifications

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

Test ID: **Middle Rib 3 m/s** Test Time: **11:17:04 AM**

Test Date: **6/29/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-185	4/23/2010
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P23137	1/22/2010

Test ID: **Middle Rib 3 m/s**

Test Time: **11:17:04 AM**

Test Date: **6/29/2010**



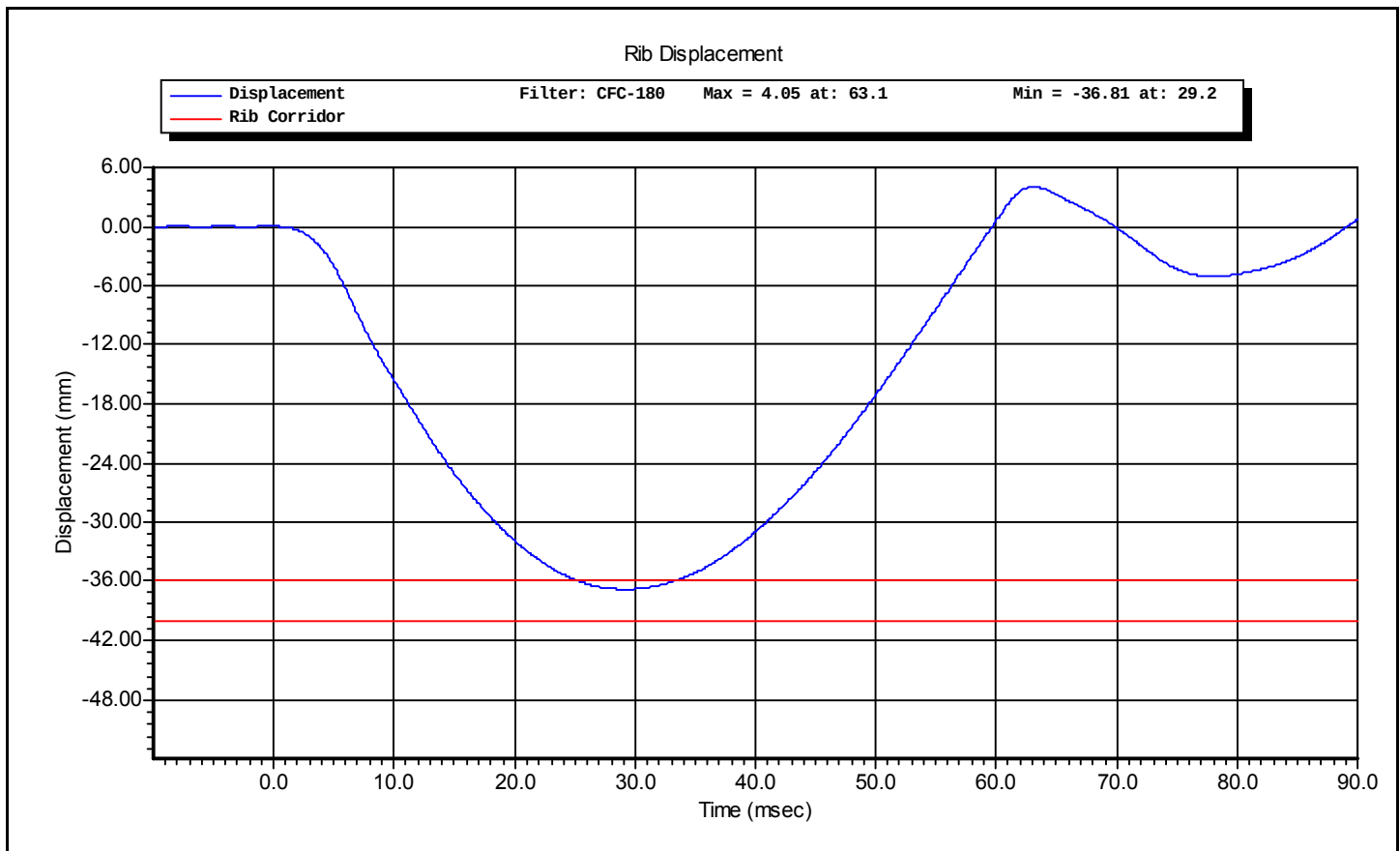
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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Middle Rib 3 m/s	Test Date:	6/29/2010
Test Number:	1	Test Time:	11:17:04 AM

Component Part Number	Component Serial Number
455-3100	MIDDLE



Test ID: Middle Rib 3 m/s Test Time: 11:17:04 AM

Test Date: 6/29/2010



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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Upper Rib 4 m/s	Test Date:	6/29/2010
Test Number:	1	Test Time:	10:45:55 AM

Component Part Number	Component Serial Number
455-3100	UPPER

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10.0 -- 70.0	56.0 %RH P
Velocity	3.90 -- 4.10	3.97 m/s P
Rib Displacement	-51.00 -- -46.00	-47.33 mm P
Drop Height	807.0 -- 823.0	815.0 mm P

All test parameters are within specifications

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

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

Test ID: **Upper Rib 4 m/s**

Test Time: **10:45:55 AM**

Test Date: **6/29/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-179	4/23/2010
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P23137	1/22/2010

Test ID: **Upper Rib 4 m/s**

Test Time: **10:45:55 AM**

Test Date: **6/29/2010**



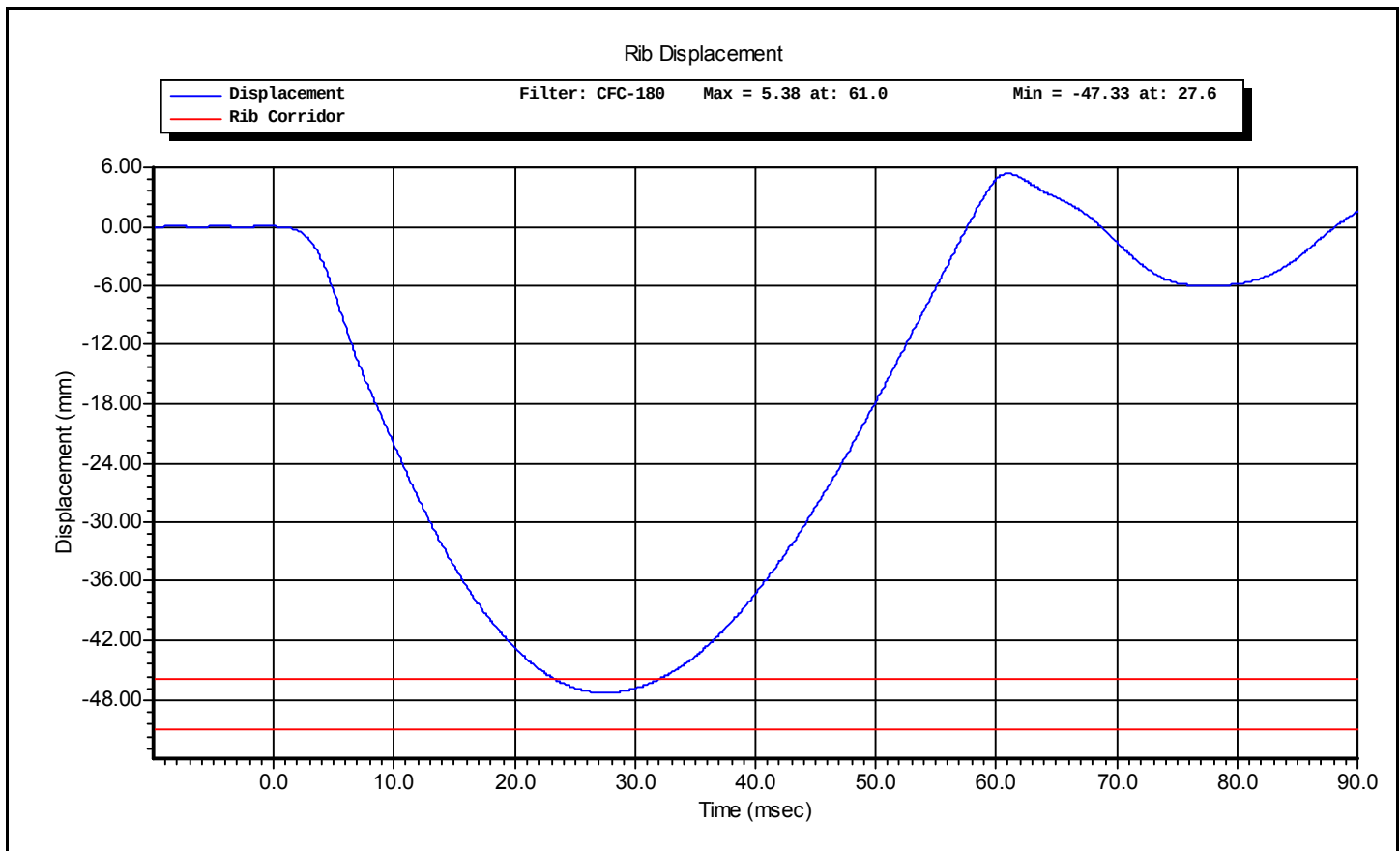
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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	4.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Upper Rib 4 m/s	Test Date:	6/29/2010
Test Number:	1	Test Time:	10:45:55 AM

Component Part Number	Component Serial Number
455-3100	UPPER



Test ID: Upper Rib 4 m/s Test Time: 10:45:55 AM

Test Date: 6/29/2010



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VERIFICATION REPORT

Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Upper Rib 3 m/s	Test Date:	6/29/2010
Test Number:	1	Test Time:	10:54:20 AM

Component Part Number	Component Serial Number
455-3100	UPPER

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10.0 -- 70.0	56.0 %RH P
Velocity	2.90 -- 3.10	2.96 m/s P
Rib Displacement	-40.00 -- -36.00	-36.39 mm P
Drop Height	454 -- 464	459 mm P

All test parameters are within specifications

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

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

Test ID: **Upper Rib 3 m/s**

Test Time: **10:54:20 AM**

Test Date: **6/29/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Honeywell	MLT-38000	DS-179	4/23/2010
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P23137	1/22/2010

Test ID: **Upper Rib 3 m/s**

Test Time: **10:54:20 AM**

Test Date: **6/29/2010**



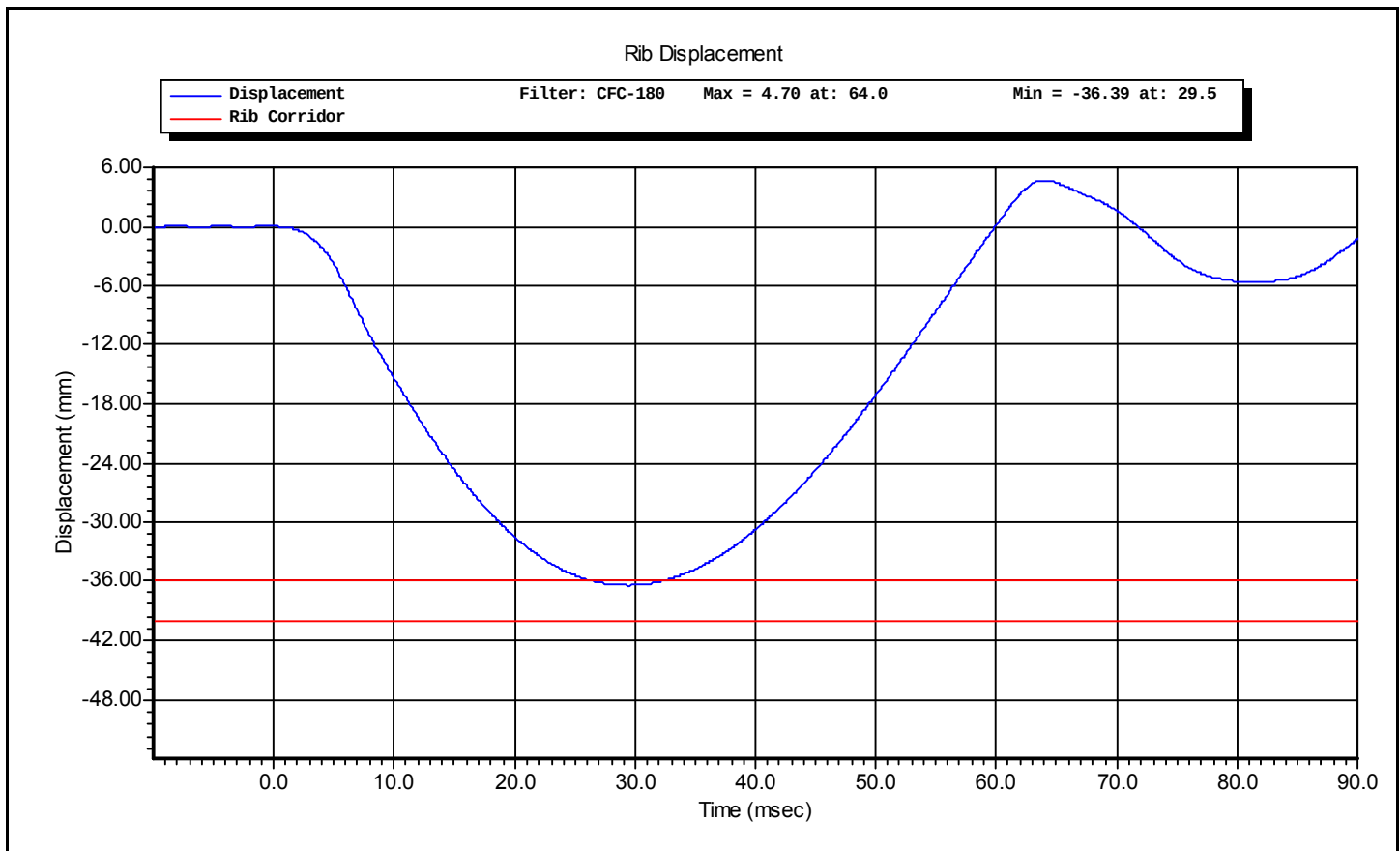
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Test Name:	Full Rib Module Impact	Revision:	12/14/2006
Sub Test Name:	3.0 Meters/Second	Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Upper Rib 3 m/s	Test Date:	6/29/2010
Test Number:	1	Test Time:	10:54:20 AM

Component Part Number	Component Serial Number
455-3100	UPPER



Test ID: Upper Rib 3 m/s Test Time: 10:54:20 AM

Test Date: 6/29/2010



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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	8/15/2008
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Thorax	Test Date:	6/29/2010
Test Number:	1	Test Time:	1:25:34 PM

Component Part Number	Component Serial Number
Upper Rib - 175-4002	UPPER
Middle Rib - 175-4002	MIDDLE
Lower Rib - 175-4002	LOWER

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10.0 -- 70.0	53.0 %RH P
Velocity	5.40 -- 5.60	5.50 m/s P
Upper Rib Displacement	34.0 -- 41.0	37.2 mm P
Middle Rib Displacement	37.0 -- 45.0	40.7 mm P
Lower Rib Displacement	37.0 -- 44.0	40.1 mm P
Impactor Force	5100 -- 6200	5547 N P

All test parameters are within specifications

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

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

Test ID: **Thorax**

Test Time: **1:25:34 PM**

Test Date: **6/29/2010**



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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	P16576	4/6/2010
Honeywell	MLT-38000	DS-179	4/23/2010
Honeywell	MLT-38000	DS-185	4/23/2010
Honeywell	MLT-38000	DS-178	4/23/2010

Test ID: **Thorax**

Test Time: **1:25:34 PM**

Test Date: **6/29/2010**



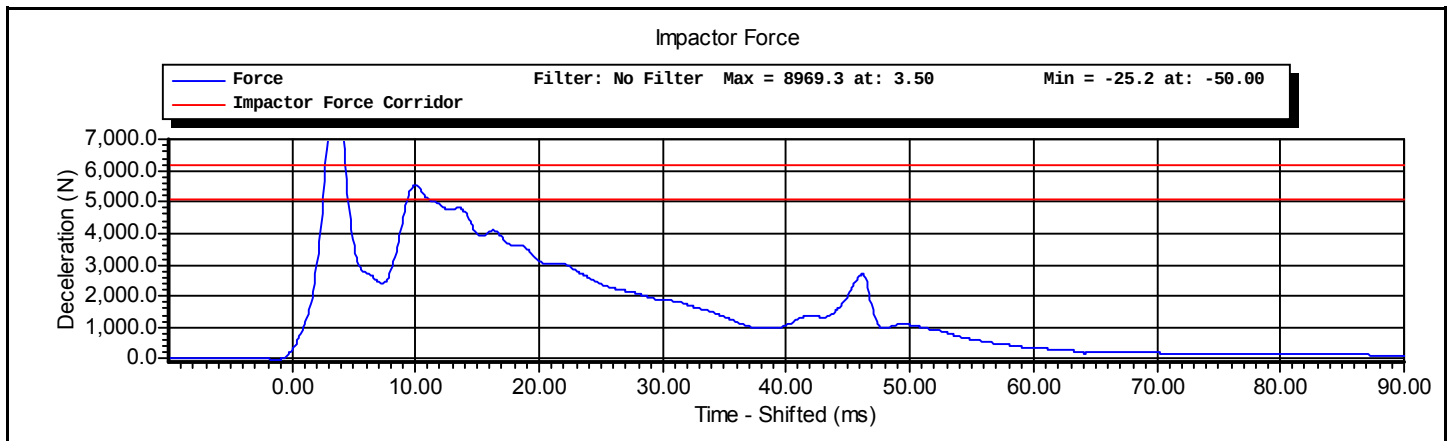
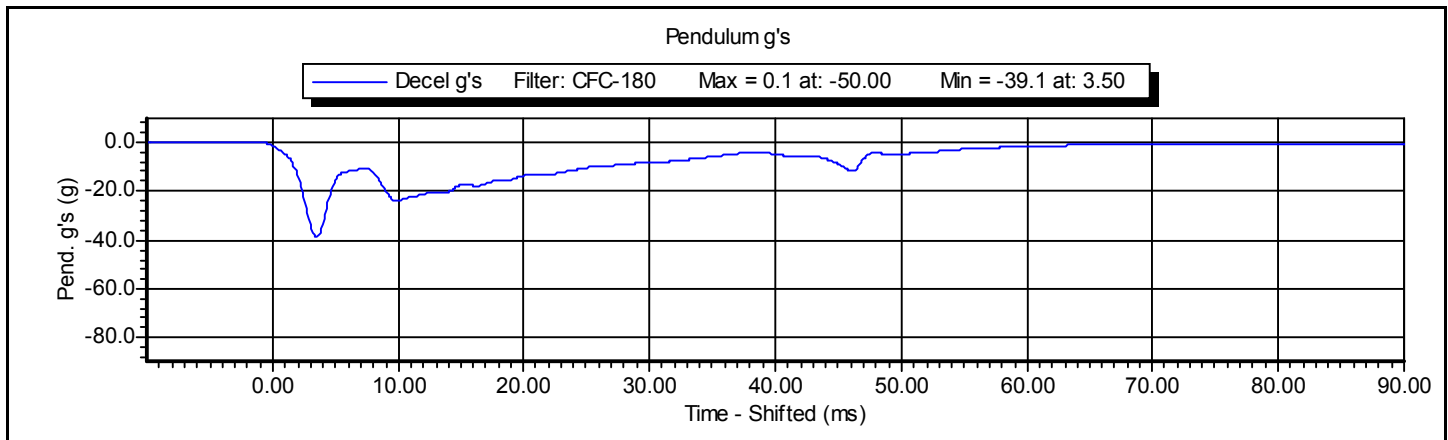
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Test Name:	Thorax Impact	Revision:	8/15/2008
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Thorax	Test Date:	6/29/2010
Test Number:	1	Test Time:	1:25:34 PM

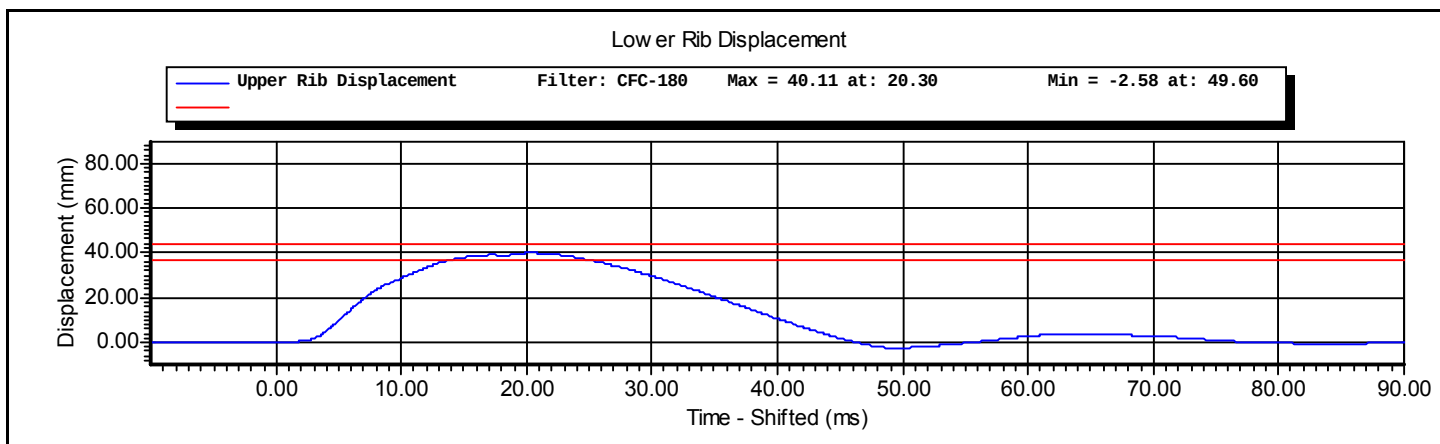
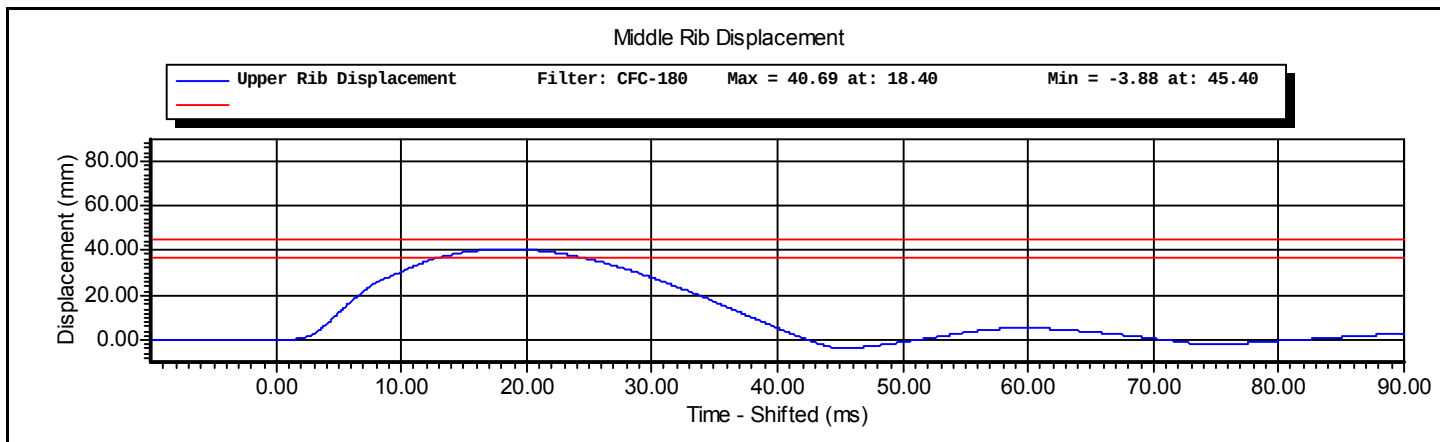
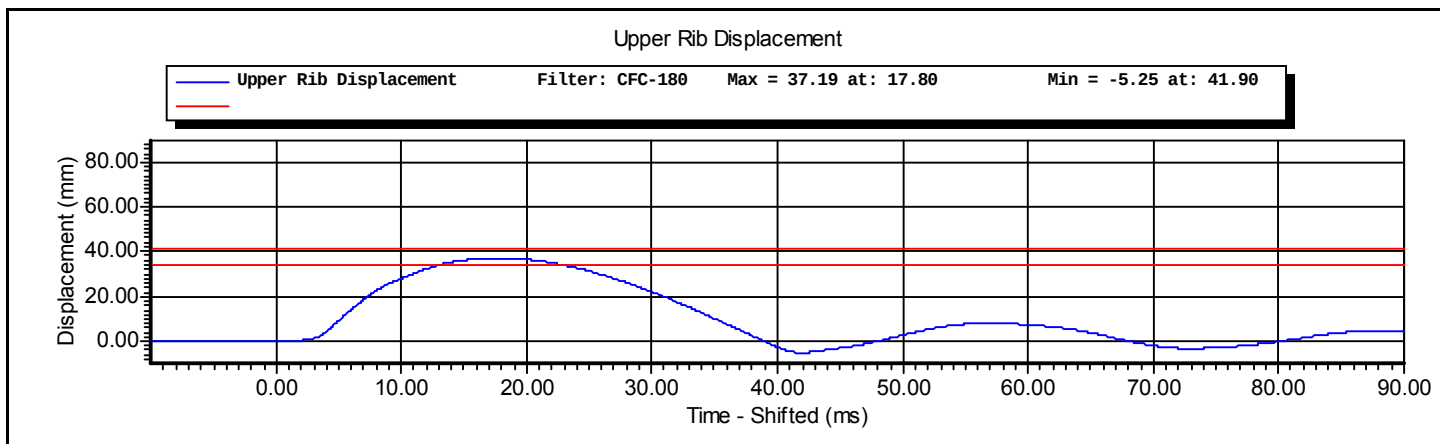
Component Part Number	Component Serial Number
Upper Rib - 175-4002	UPPER



Test ID: Thorax

Test Time: 1:25:34 PM

Test Date: 6/29/2010





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VERIFICATION REPORT

Test Name:	Abdominal Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Abdomen	Test Date:	6/29/2010
Test Number:	3	Test Time:	8:51:10 AM

Component Part Number	Component Serial Number
455-4001	07/136

Comments:

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10 -- 70	58 %RH P
Velocity	3.90 -- 4.10	3.93 m/s P
Peak Abdominal Force	-2.70 -- -2.20	-2.41 kN P
Time At Peak Abdominal Force	10.0 -- 12.3	12.3 ms P
Maximum Pendulum Force	-4.80 -- -4.00	-4.21 kN P
Time at Peak Pendulum Force	10.6 -- 13.0	12.6 ms P

All test parameters are within specifications

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

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

Test ID: **Abdomen**

Test Time: **8:51:10 AM**

Test Date: **6/29/2010**



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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	P16576	4/6/2010
Denton	2631	LC-1524	4/22/2010
Denton	2631	LC-1523	4/22/2010
Denton	2631	LC-1530	4/22/2010

Test ID: **Abdomen**

Test Time: **8:51:10 AM**

Test Date: **6/29/2010**



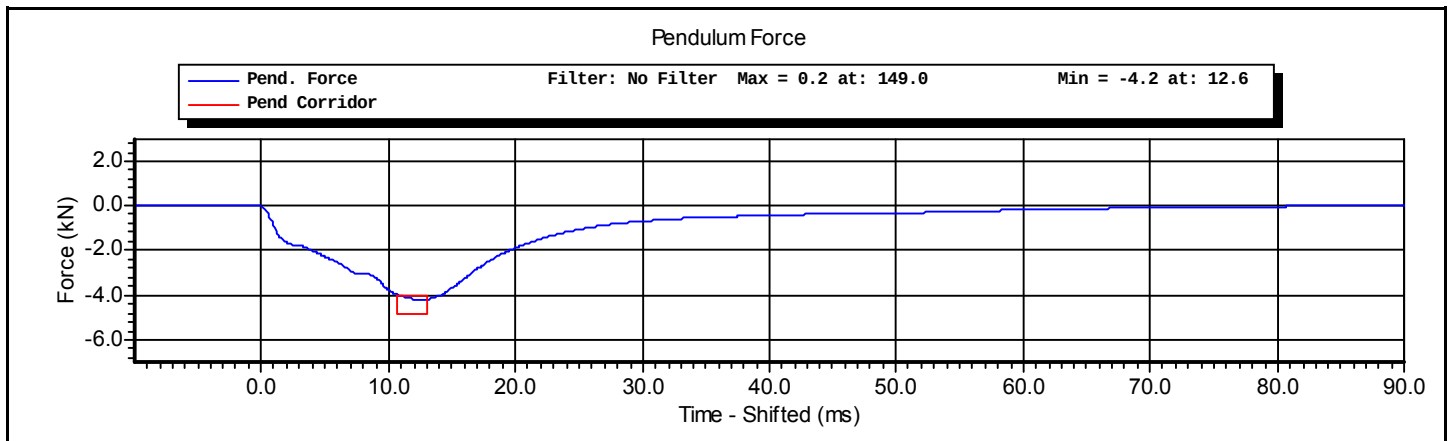
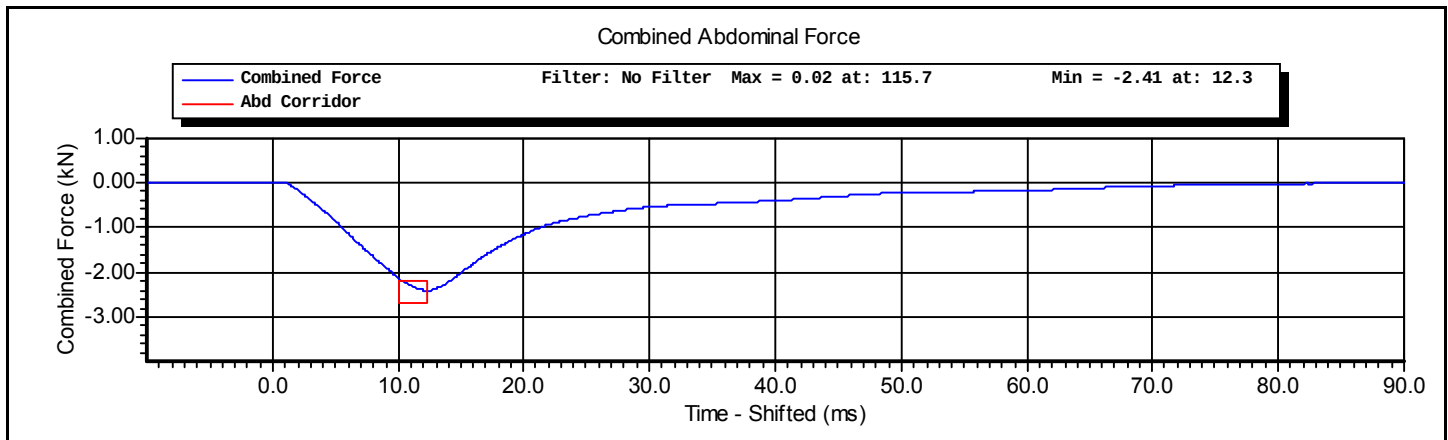
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Test Name:	Abdominal Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Abdomen	Test Date:	6/29/2010
Test Number:	3	Test Time:	8:51:10 AM

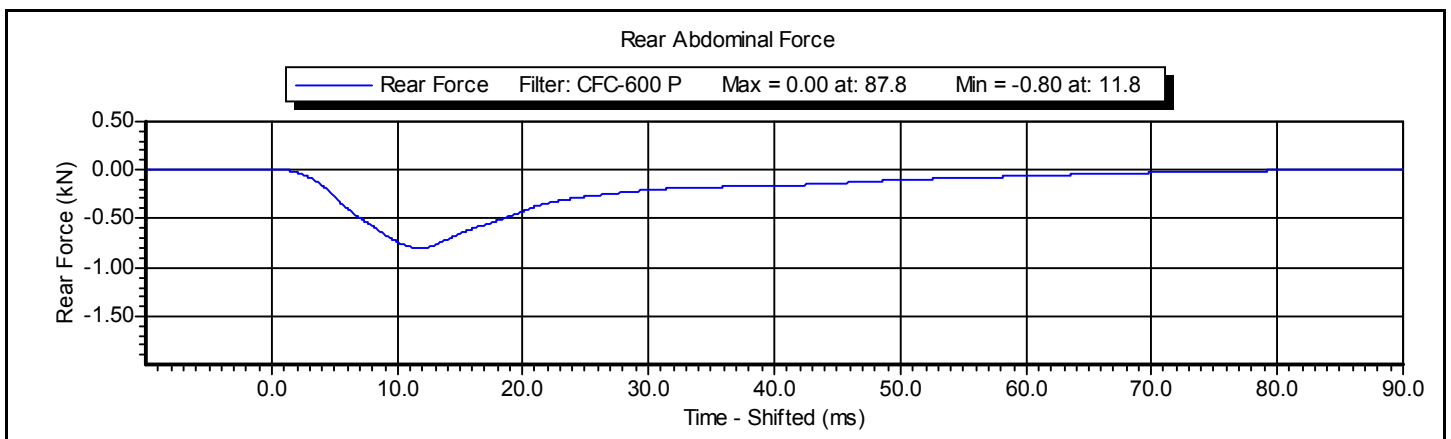
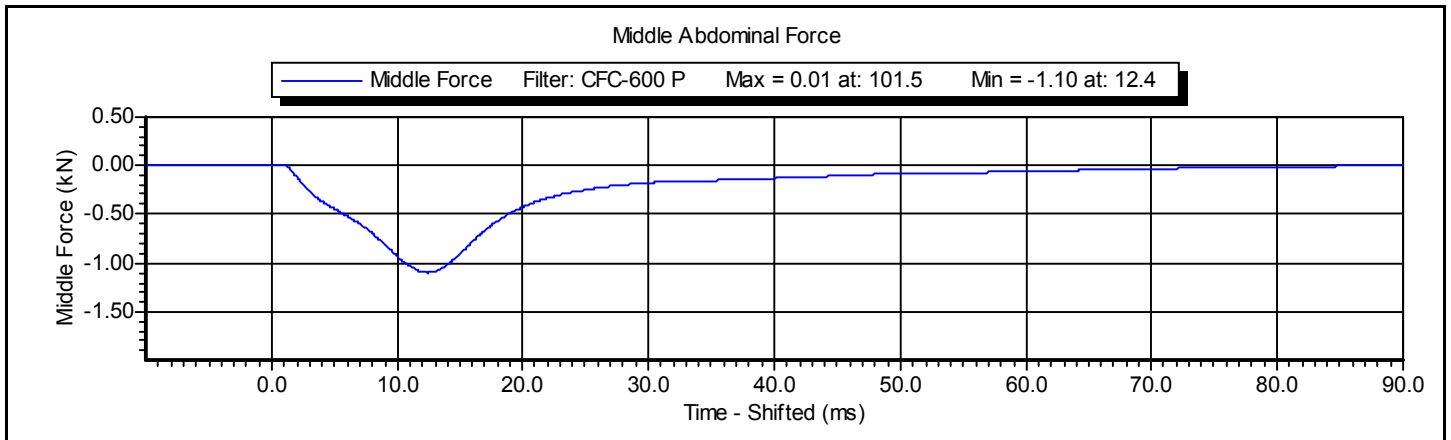
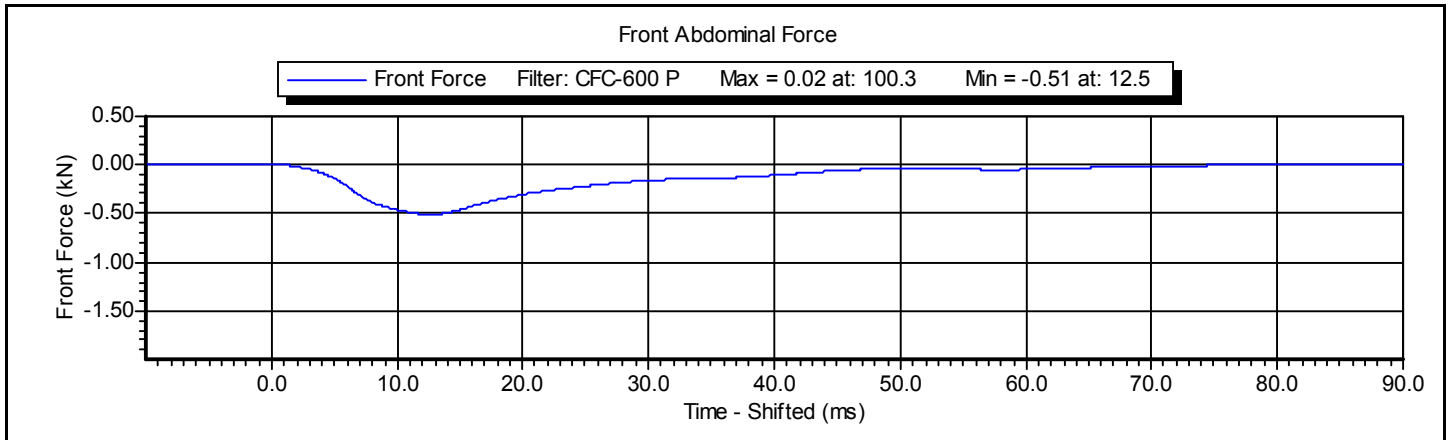
Component Part Number	Component Serial Number
455-4001	07/136



Test ID: **Abdomen**

Test Time: **8:51:10 AM**

Test Date: **6/29/2010**





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VERIFICATION REPORT

Test Name:	Lumbar Spine	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Lumbar Spine	Test Date:	6/30/2010
Test Number:	1	Test Time:	9:00:50 AM

Component Part Number	Component Serial Number
175-5501	19-0545

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.1 deg C P
Humidity	10 -- 70	45 %RH P
Velocity	5.95 -- 6.15	6.14 m/s P
Maximum Headform Flexion Angle	45.0 -- 55.0	48.9 degrees P
Time at Maximum Headform Flexion Angle	39.0 -- 53.0	41.6 ms P
Decay to Zero Degrees	37.0 -- 57.0	40.6 ms P
Velocity Corridor	--	P

All test parameters are within specifications

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

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

Test ID: **Lumbar Spine**

Test Time: **9:00:50 AM**

Test Date: **6/30/2010**



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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
DentonATD	7000428	094	4/27/2010
DentonATD	7000428	095	4/27/2010
DentonATD	7000428	093	4/27/2010

Test ID: **Lumbar Spine**

Test Time: **9:00:50 AM**

Test Date: **6/30/2010**



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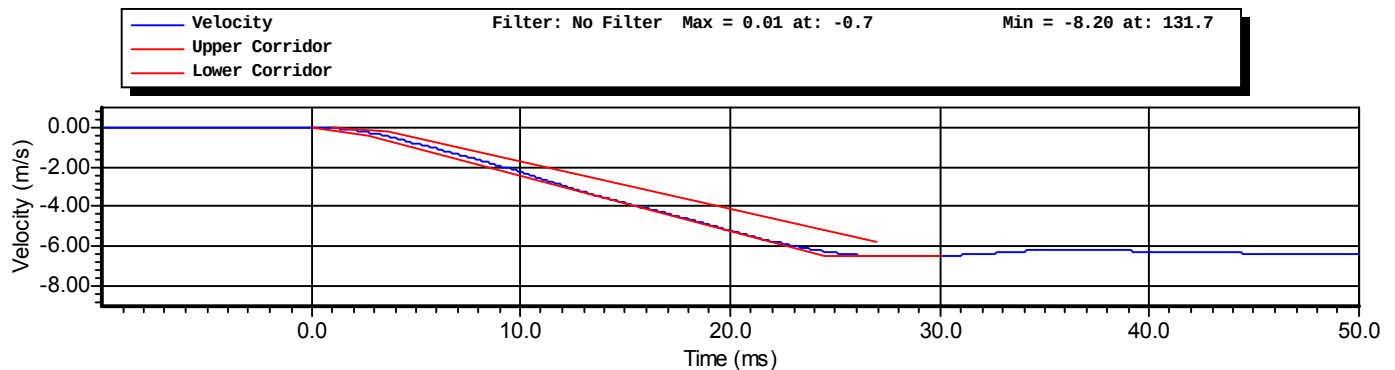
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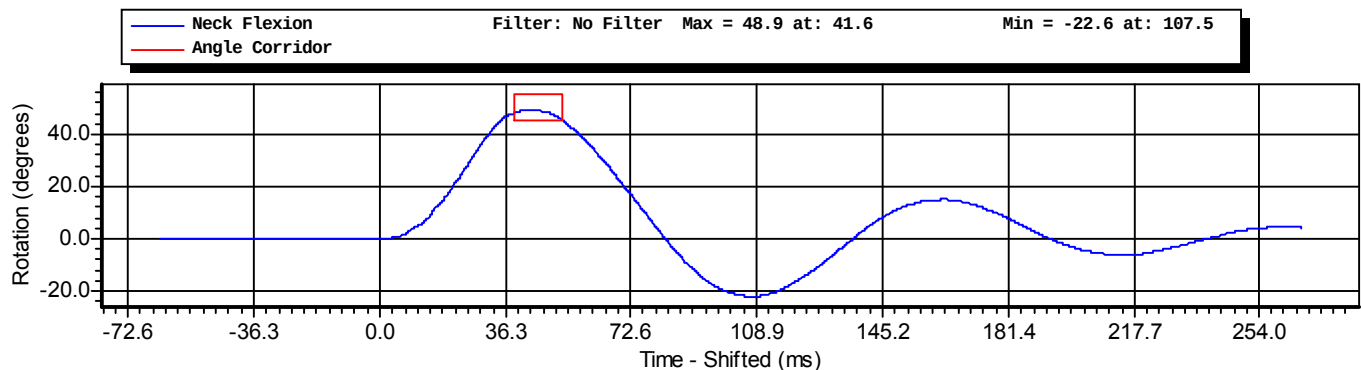
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Lumbar Spine	Test Date:	6/30/2010
Test Number:	1	Test Time:	9:00:50 AM

Component Part Number	Component Serial Number
175-5501	19-0545

Pendulum Velocity

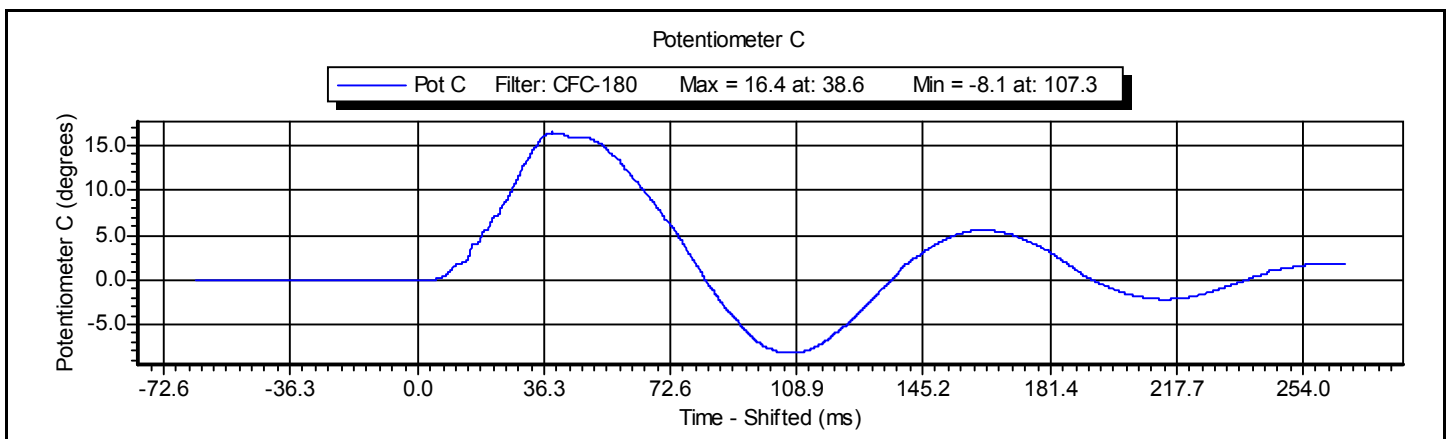
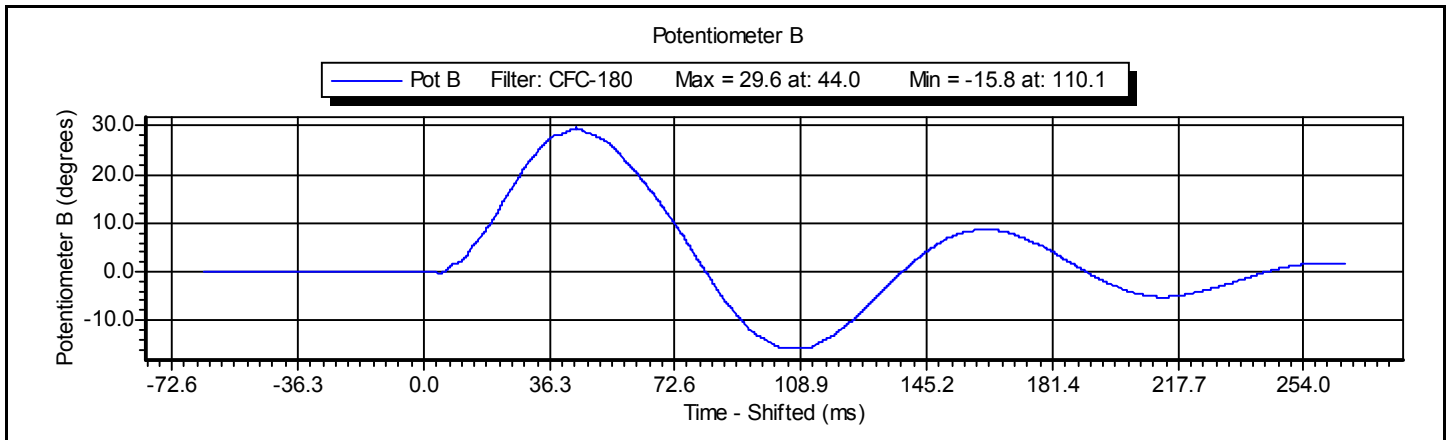
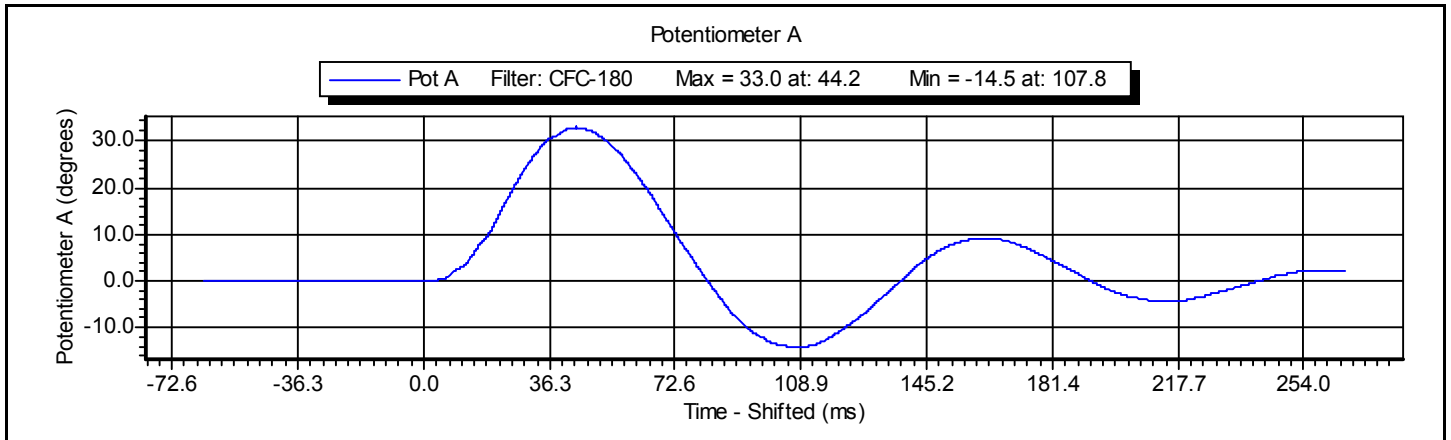


Neck Flexion Angle



Test ID: **Lumbar Spine** Test Time: **9:00:50 AM**

Test Date: **6/30/2010**





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VERIFICATION REPORT

Test Name:	Pelvis Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Pelvis	Test Date:	6/29/2010
Test Number:	1	Test Time:	9:25:36 AM

Component Part Number	Component Serial Number
455-4003	

Comments:

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	4.31 m/s P
Peak Pendulum Force	-5.40 -- -4.70	-4.94 kN P
Time at Peak Pendulum Force	11.80 -- 16.10	14.28 ms P
Peak Pubic Symphysis Force	-1.59 -- -1.23	-1.45 kN P
Time at Peak Pubic Symphysis Force	12.20 -- 17.00	15.68 ms P

All test parameters are within specifications

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

Test ID: **Pelvis**

Test Time: **9:25:36 AM**

Test Date: **6/29/2010**



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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	P16576	4/6/2010
Denton	3096	LC-456Fy	4/22/2010

Test ID: **Pelvis**

Test Time: **9:25:36 AM**

Test Date: **6/29/2010**



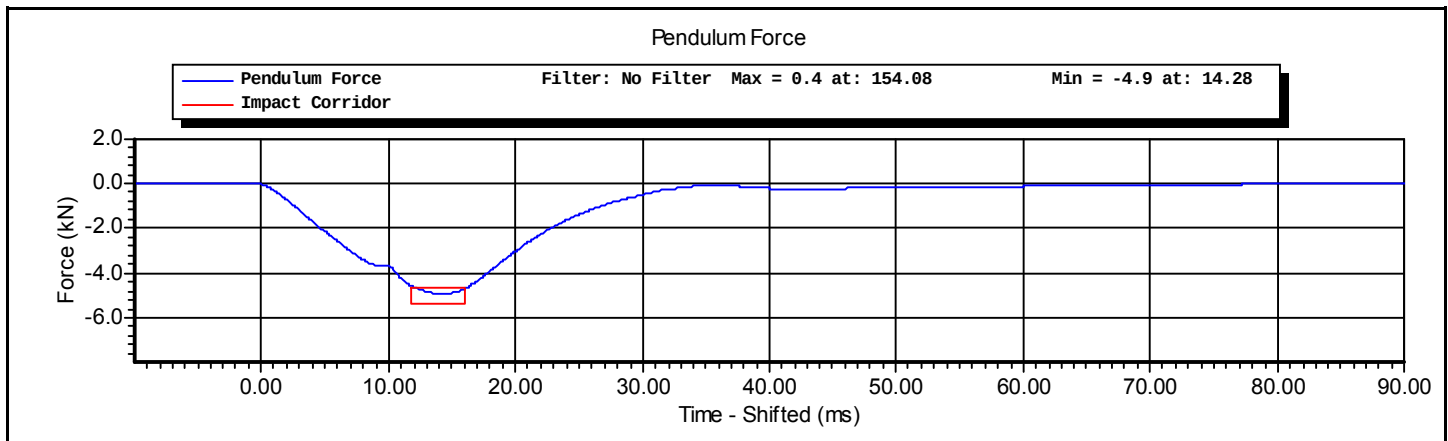
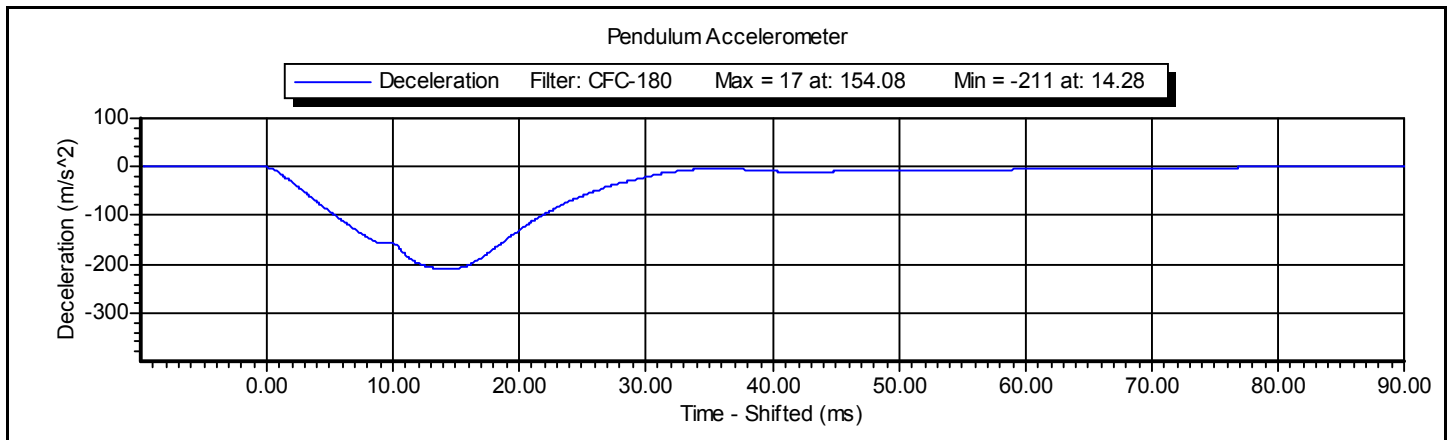
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Test Name:	Pelvis Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	ES-2re		
ATD Serial Number:	F033		
Test ID:	Pelvis	Test Date:	6/29/2010
Test Number:	1	Test Time:	9:25:36 AM

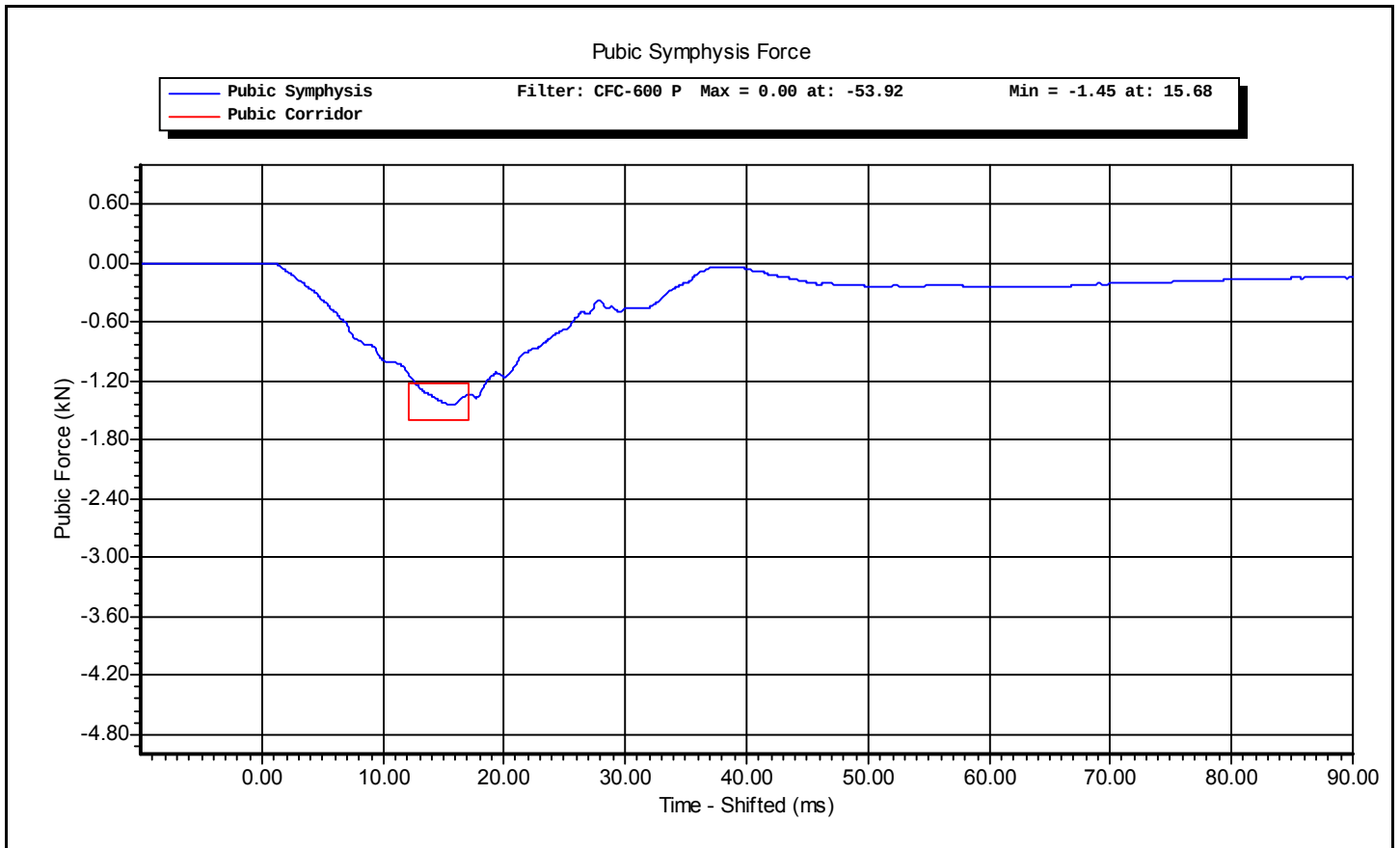
Component Part Number	Component Serial Number
455-4003	



Test ID: **Pelvis**

Test Time: **9:25:36 AM**

Test Date: **6/29/2010**



CALIBRATION TEST RESULTS

POST-TEST

SID-IIs No: 300

CONFIGURED FOR LEFT SIDE IMPACT

SID-IIsD External Measurements

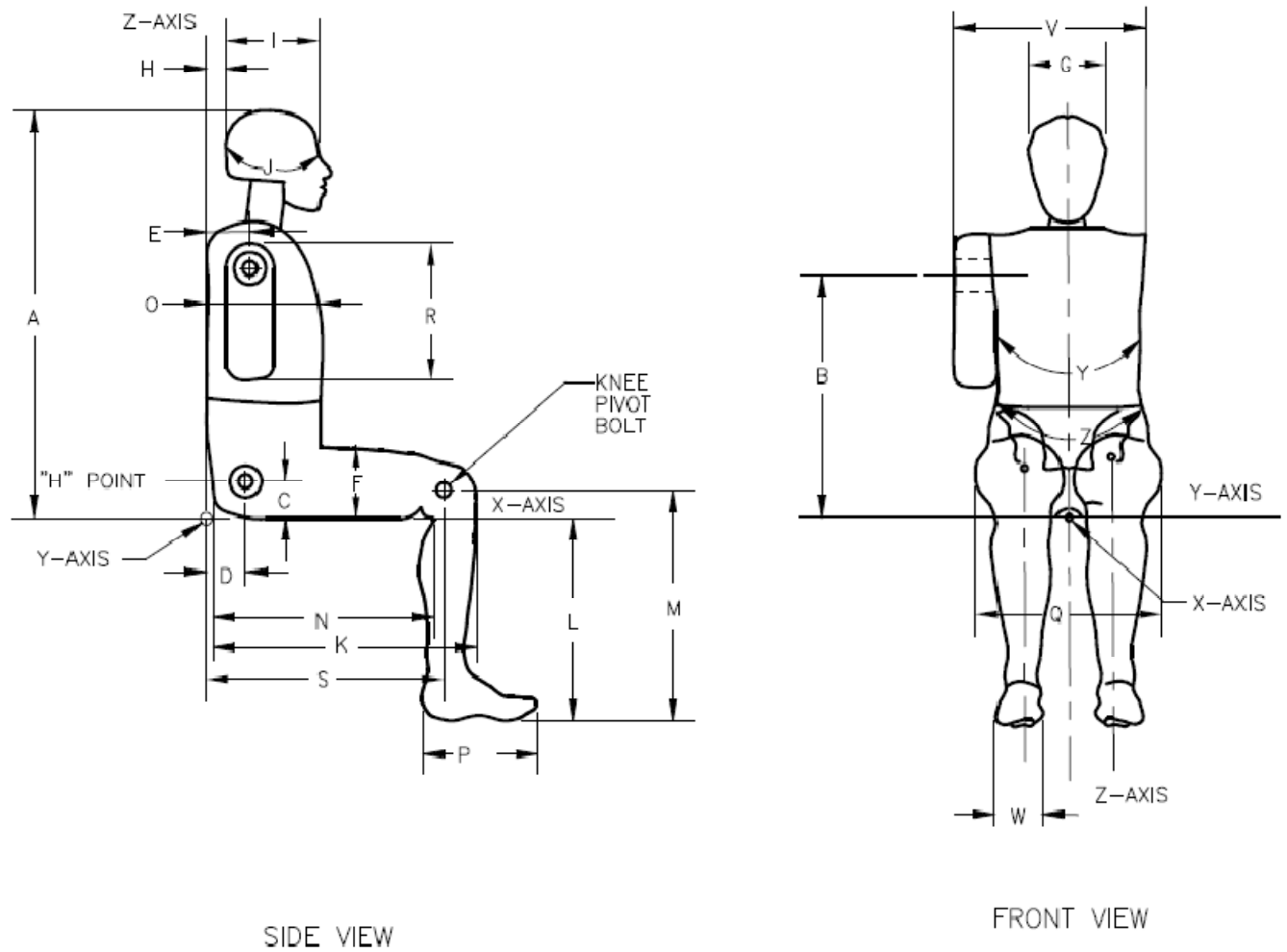
NHTSA ATD S/N 300

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	785	Yes
B	Shoulder Pivot Height	437.0 - 453.0	450	Yes
C	H-Point Height	79.0 - 89.0	87	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	98	Yes
F	Thigh Clearance	119.0 - 135.0	125	Yes
G	Head Breadth	140.0 - 148.0	143	Yes
H	Head Back from Backline	40.0 - 46.0	42	Yes
I	Head Depth	178.0 - 188.0	181	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	365	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	395	Yes
N	Buttock Popliteal Length	416.0 - 442.0	430	Yes
O	Chest Depth without Jacket	195.0 - 211.0	205	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	315	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to Seat back	478.0 - 493.0	475	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	353	Yes
W	Foot Width (right)	78.0 - 94.0	85	Yes
W	Foot Width (left)	78.0 - 94.0	85	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	870	Yes
Z	Waist Circumference	761.0 - 791.0	773	Yes

Technician: A. Rudniski

Date: 7/9/2010

SID-IIIsD External Dimension Reference Diagram



Technician: A. Rudniski

Date: 7/9/2010



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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 300		
Test ID:	Head Drop	Test Date:	7/9/2010
Test Number:	1	Test Time:	1:46:25 PM

Component Part Number	Component Serial Number
Head Skin - 180-1002	1355

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	62 %RH P
Resultant Acceleration	115.0 -- 137.0	130.1 g P
Oscillation	0.0 -- 15.0	2.0 % P
Fore-Aft Acceleration	-15.0 -- 15.0	5.9 g P

All test parameters are within specifications

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

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

Test ID: **Head Drop**

Test Time: **1:46:25 PM**

Test Date: **7/9/2010**



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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	P51685	4/7/2010
Endevco	7264-2000	P51682	4/7/2010
Endevco	7264-2000	P51699	4/7/2010

Test ID: **Head Drop**

Test Time: **1:46:25 PM**

Test Date: **7/9/2010**



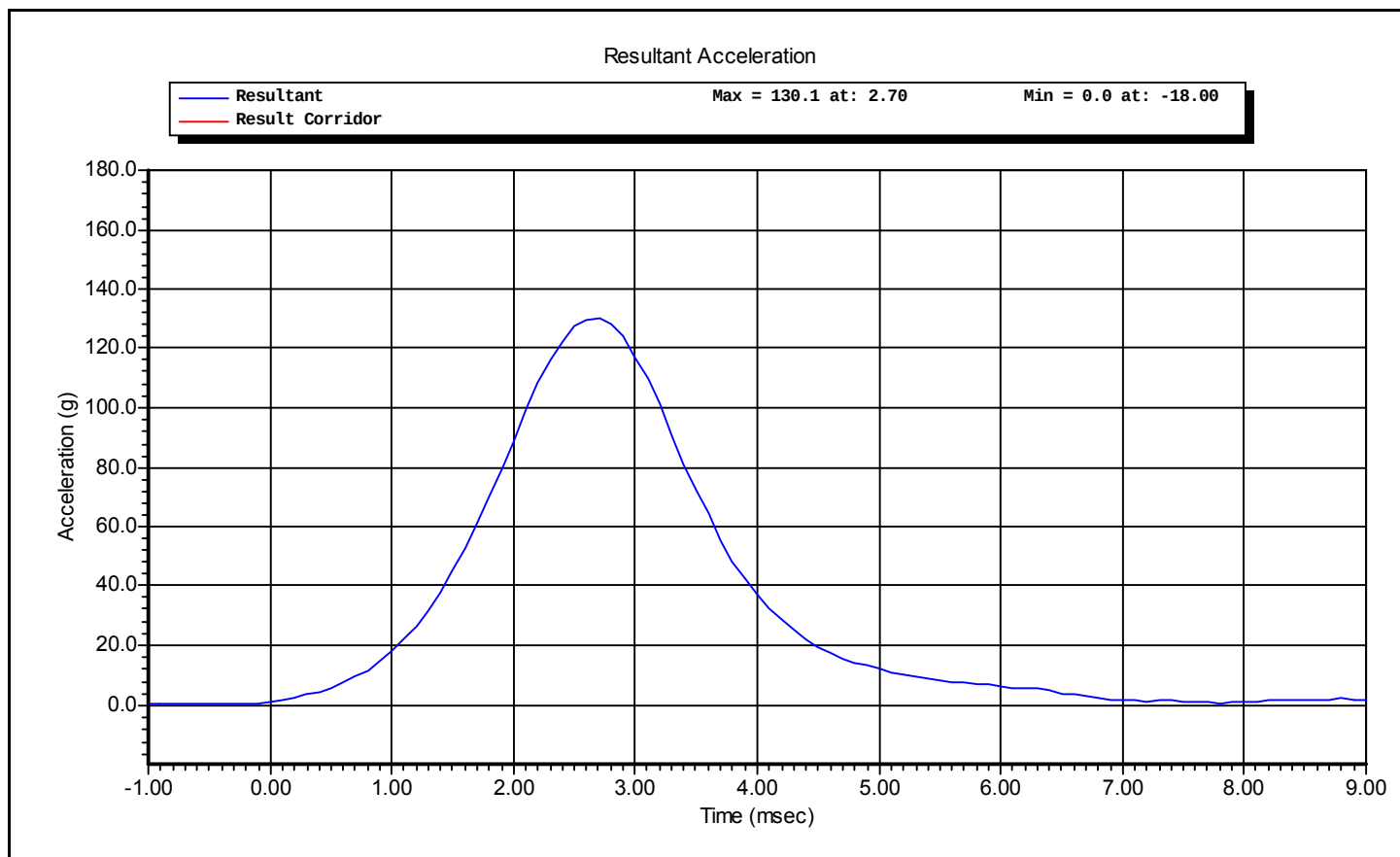
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Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 300		
Test ID:	Head Drop	Test Date:	7/9/2010
Test Number:	1	Test Time:	1:46:25 PM

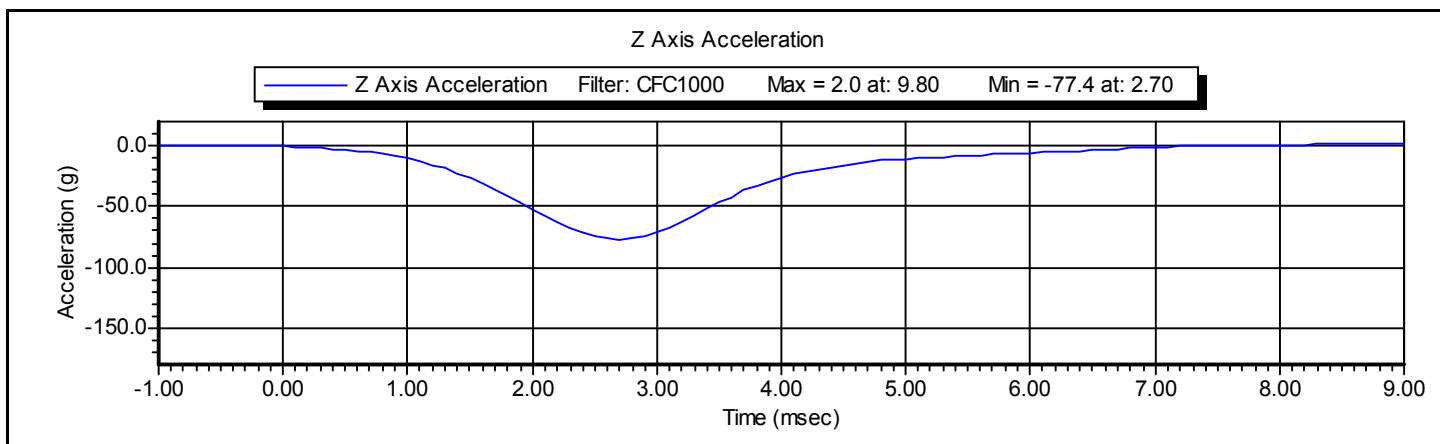
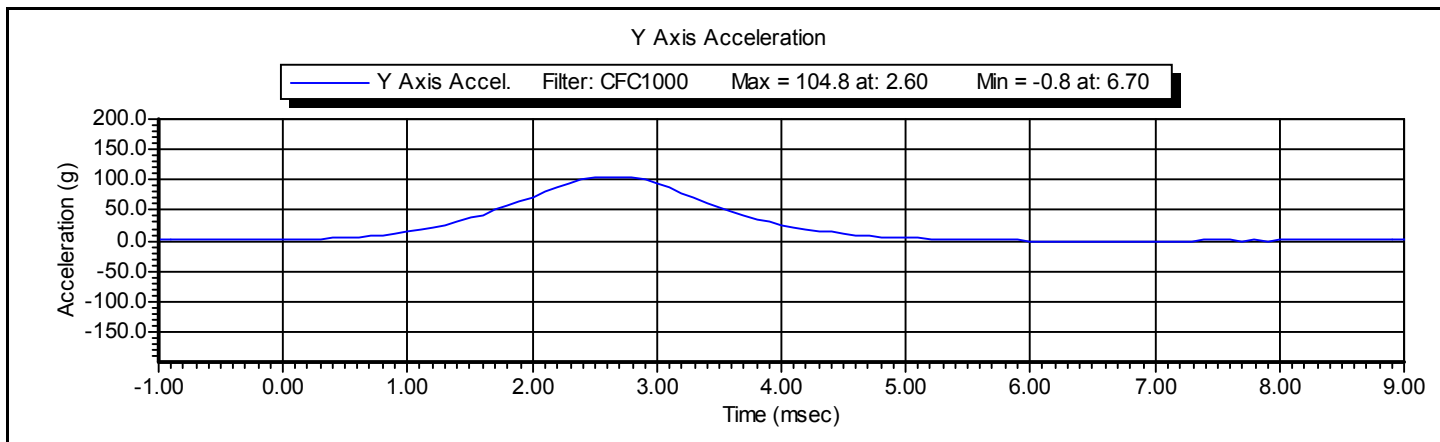
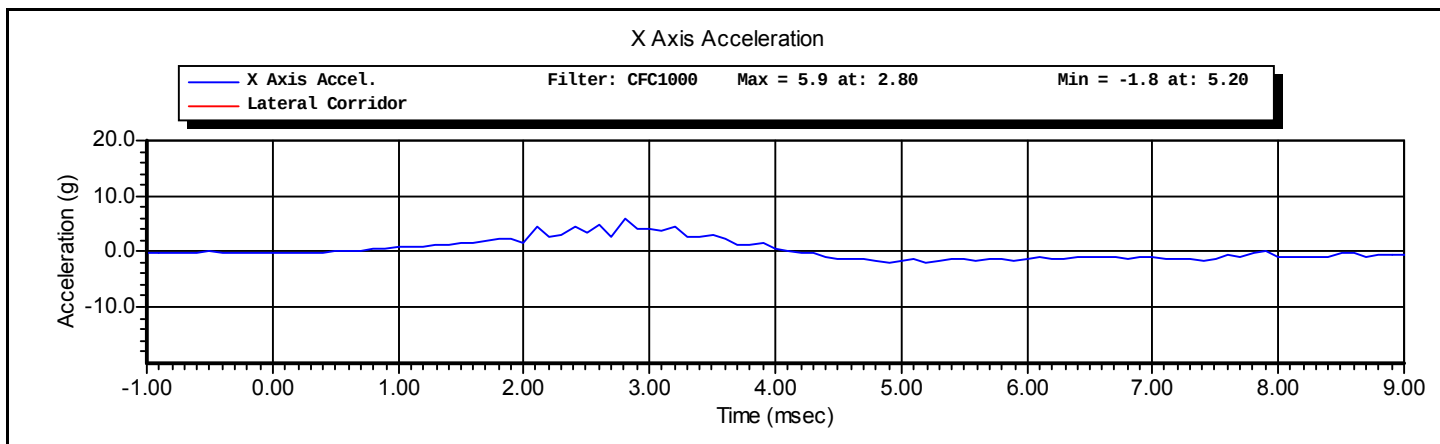
Component Part Number	Component Serial Number
Head Skin - 180-1002	1355



Test ID: Head Drop

Test Time: 1:46:25 PM

Test Date: 7/9/2010





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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 300		
Test ID:	Neck Flexion	Test Date:	7/9/2010
Test Number:	1	Test Time:	3:07:35 PM

Component Part Number	Component Serial Number
Neck - 180-2001	787

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	61 %RH P
Velocity	5.51 -- 5.63	5.57 m/s P
Pendulum Impulse at 10 ms	2.20 -- 2.80	2.57 m/s P
Pendulum Impulse at 15 ms	3.30 -- 4.10	3.82 m/s P
Pendulum Impulse at 20 ms	4.40 -- 5.40	5.17 m/s P
Pendulum Impulse at 25 ms	5.40 -- 6.10	5.87 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	76.1 degrees P
Time at Max Rotation	50.0 -- 70.0	61.5 ms P
Moment about OC	-44.0 -- -36.0	-43.0 Nm P
Moment Decay to Zero	102.0 -- 126.0	116.4 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **3:07:35 PM**

Test Date: **7/9/2010**



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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	1/12/2010
Denton	1716A	LC-576 Mx	1/12/2010
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: **3:07:35 PM**

Test Date: **7/9/2010**



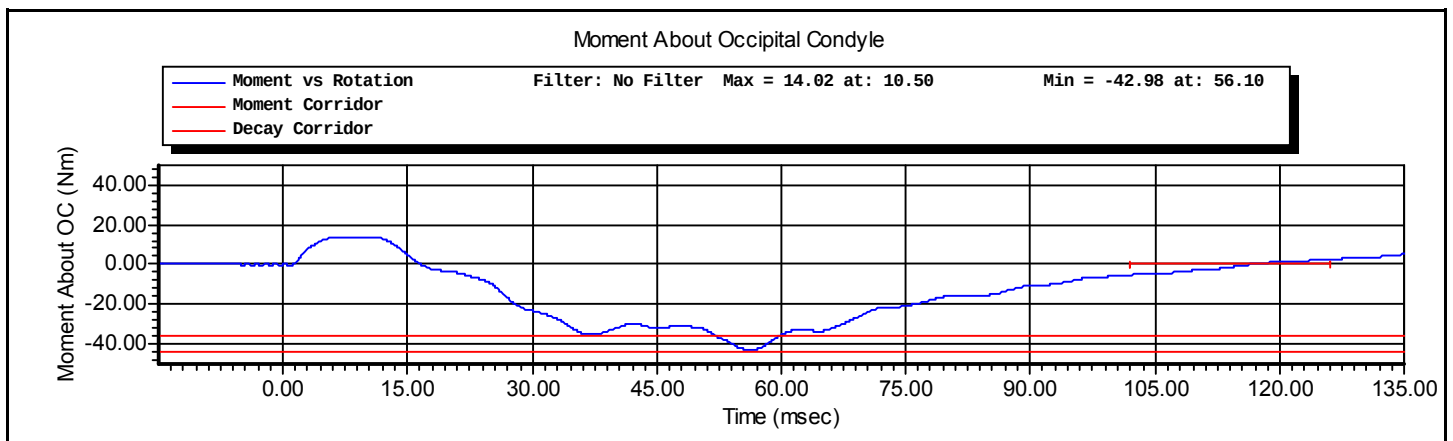
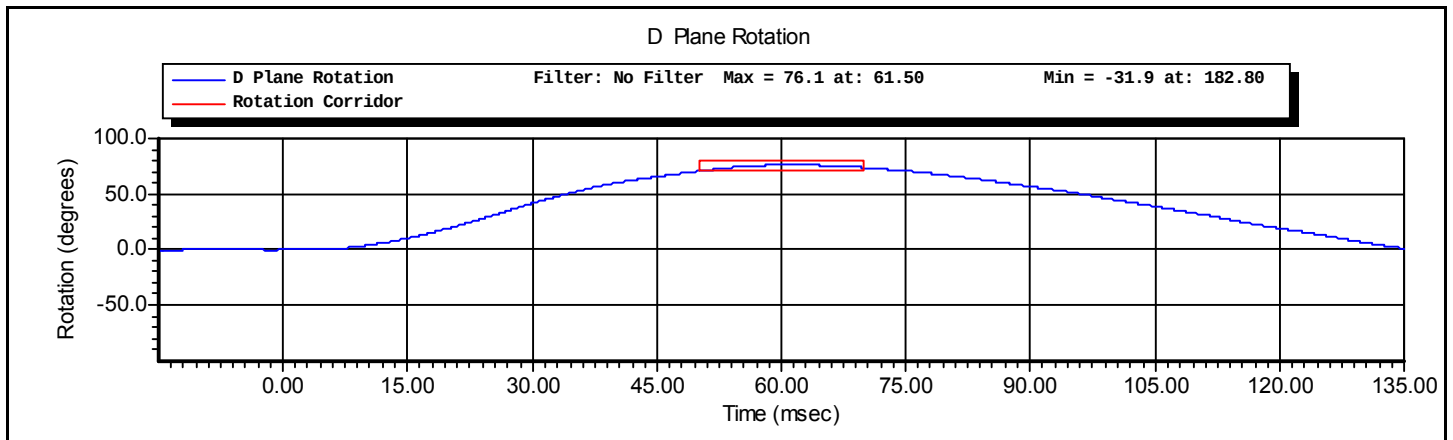
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Test Name:	Neck Pendulum	Revision:	8/24/2009
Sub Test Name:	Left Side	Spec Type:	NHTSA
ATD Type:	SID-IIIs		
ATD Serial Number:	SID 300		
Test ID:	Neck Flexion	Test Date:	7/9/2010
Test Number:	1	Test Time:	3:07:35 PM

Component Part Number	Component Serial Number
Neck - 180-2001	787

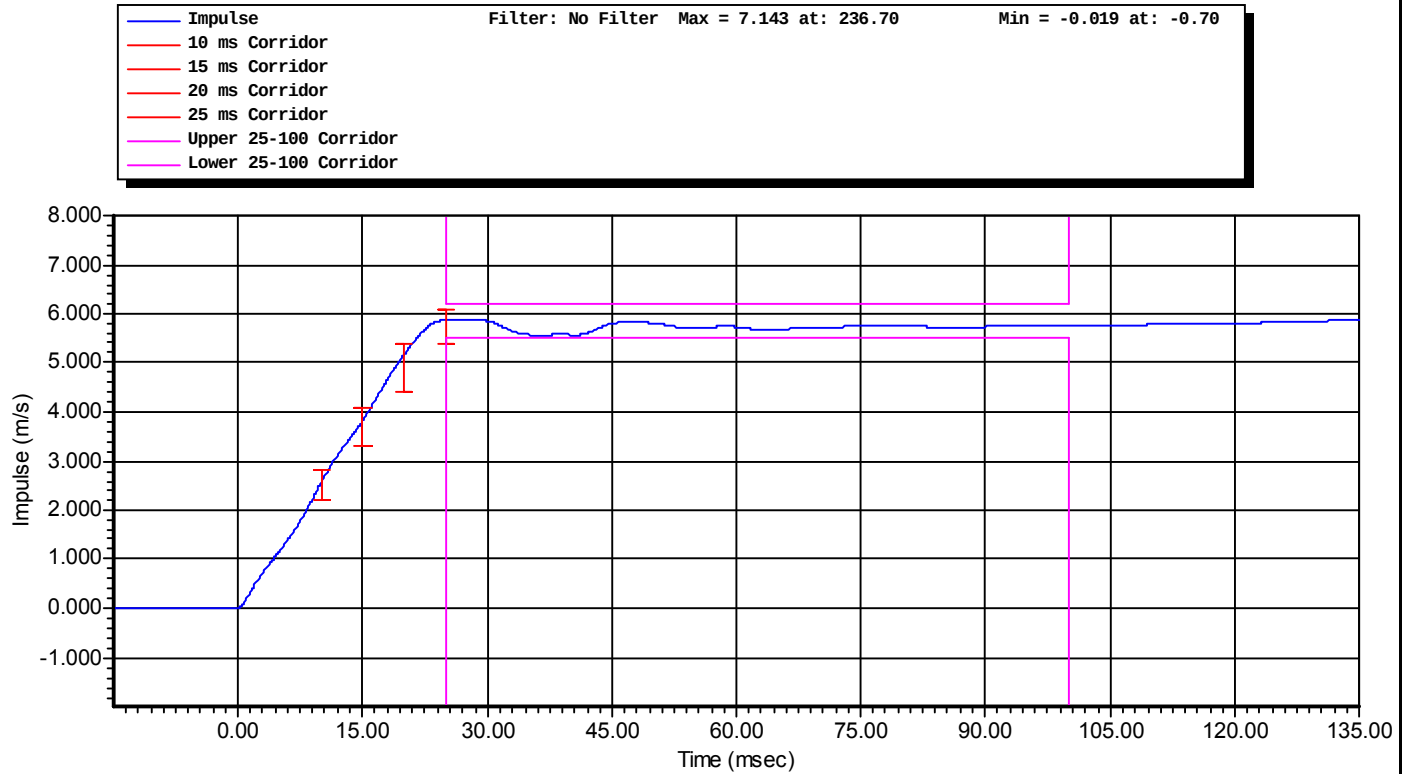


Test ID: Neck Flexion

Test Time: 3:07:35 PM

Test Date: 7/9/2010

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 300		
Test ID:	Shoulder	Test Date:	7/10/2010
Test Number:	1	Test Time:	1:57:52 PM

Component Part Number	Component Serial Number
-----------------------	-------------------------

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.20 deg C P
Humidity	10.0 -- 70.0	51.0 %RH P
Velocity	4.20 -- 4.40	4.38 m/s P
Probe Acceleration	13.0 -- 18.0	15.9 g P
Shoulder Deflection	28.0 -- 37.0	33.40 mm P
T1 Acceleration	17.0 -- 22.0	19.8 g P

All test parameters are within specifications

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

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

Test ID: **Shoulder**

Test Time: **1:57:52 PM**

Test Date: **7/10/2010**



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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	P38216	6/22/2010
Servo	180-3885	DS-1063	4/7/2010
Endevco	7264-2000	P23904	3/15/2010

Test ID: **Shoulder**

Test Time: **1:57:52 PM**

Test Date: **7/10/2010**



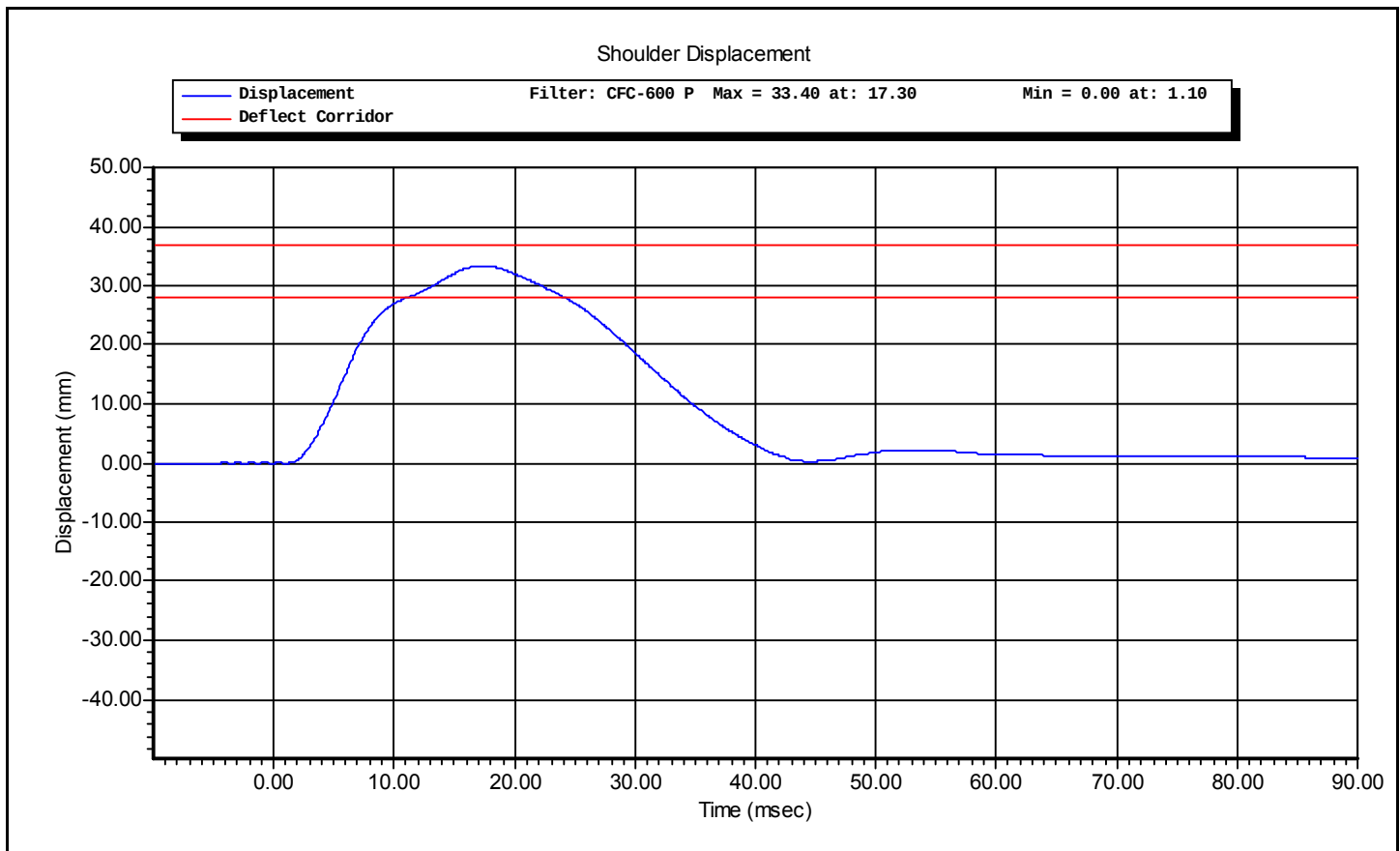
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Test Name:	Shoulder Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 300		
Test ID:	Shoulder	Test Date:	7/10/2010
Test Number:	1	Test Time:	1:57:52 PM

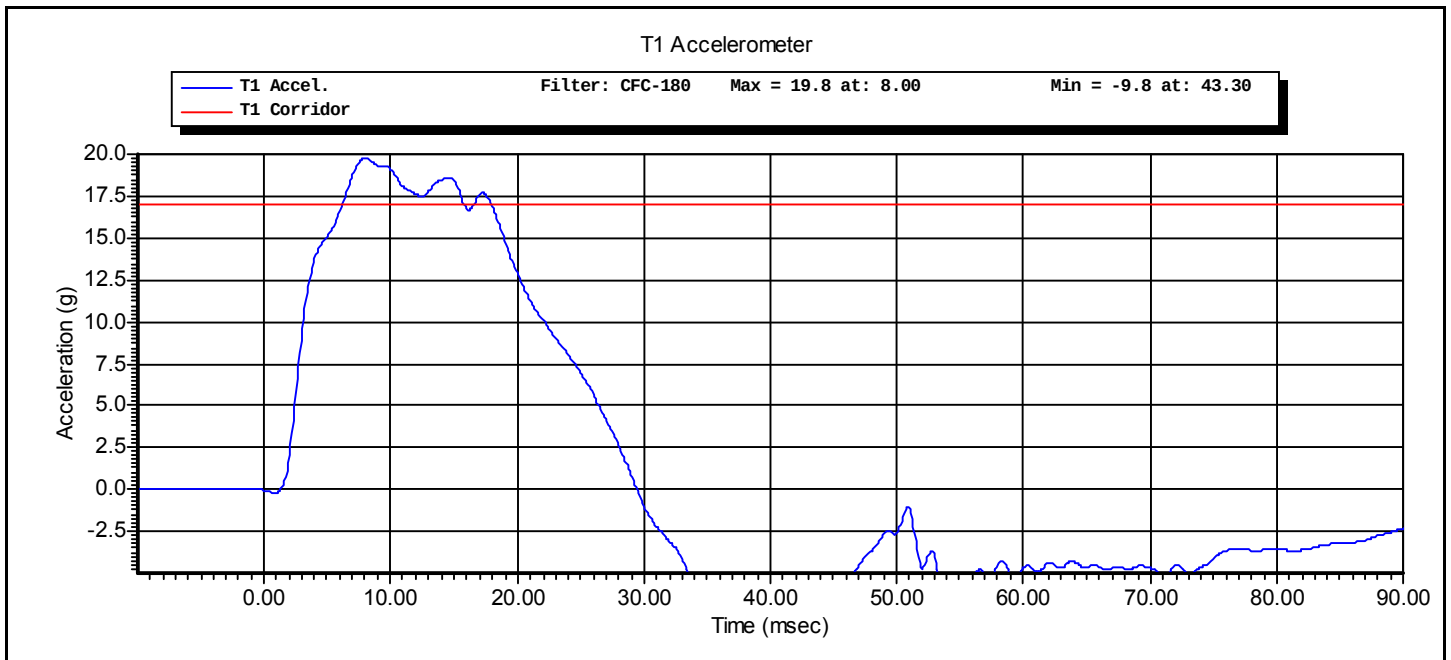
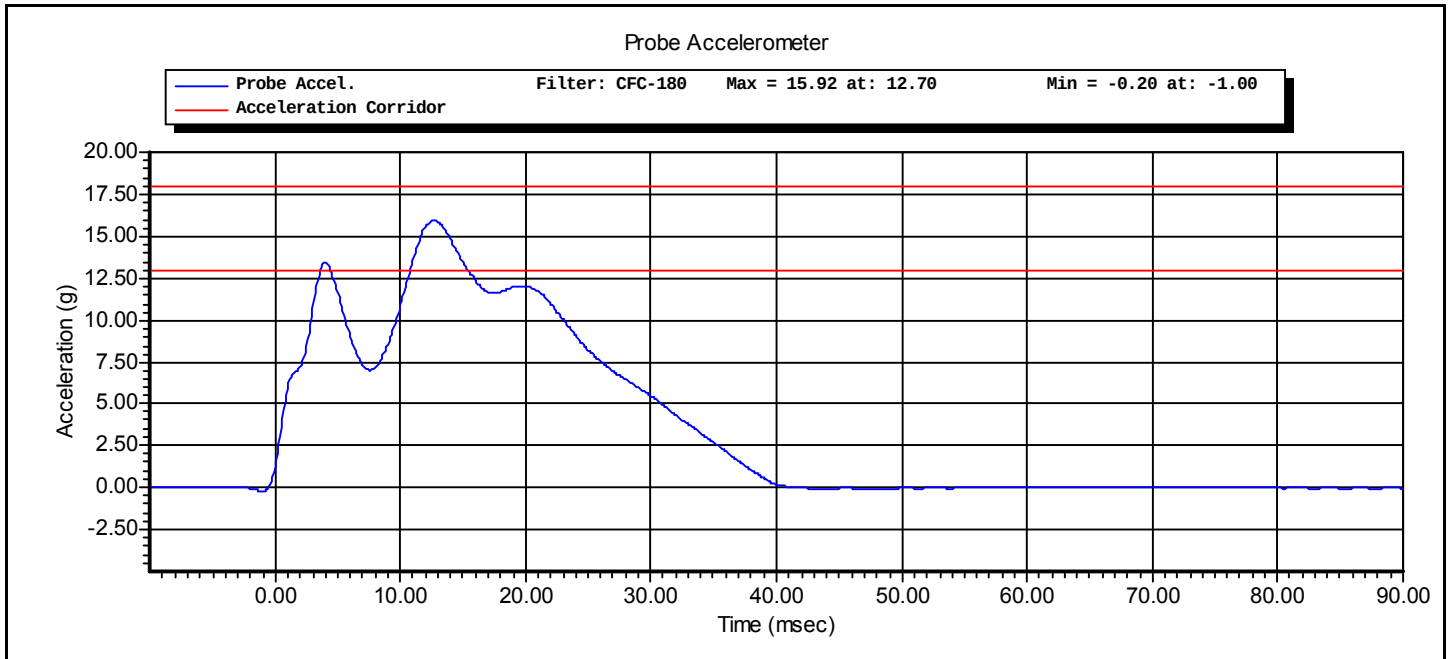
Component Part Number	Component Serial Number
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Test ID: **Shoulder**

Test Time: **1:57:52 PM**

Test Date: **7/10/2010**





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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 300		
Test ID:	Thorax With Arm	Test Date:	7/10/2010
Test Number:	1	Test Time:	1:48:08 PM

Component Part Number	Component Serial Number
-----------------------	-------------------------

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	6.67 m/s P
Probe Acceleration after 5ms	30.0 -- 36.0	32.2 g P
Upper Thorax Rib Deflection	25.0 -- 32.0	26.8 mm P
Mid Thorax Rib Deflection	30.0 -- 36.0	31.7 mm P
Lower Thorax Rib Deflection	32.0 -- 38.0	33.3 mm P
Upper Spine Acceleration ("y")	34.0 -- 43.0	39.3 g P
Lower Spine Acceleration ("y")	29.0 -- 37.0	33.2 g P
Shoulder Deflection	31.0 -- 40.0	37.6 mm P

All test parameters are within specifications

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

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

Test ID: **Thorax With Arm** Test Time: **1:48:08 PM**

Test Date: **7/10/2010**



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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	P38216	6/22/2010
Servo	180-3885	DS-1121	4/7/2010
Servo	180-3885	DS-1151	4/7/2010
Servo	180-3885	DS-1156	4/7/2010
Endevco	7264-2000	P23904	3/15/2010
Endevco	7264-2000	P50078	7/2/2010
Servo	180-3885	DS-1063	4/7/2010

Test ID: **Thorax With Arm** Test Time: **1:48:08 PM**

Test Date: **7/10/2010**



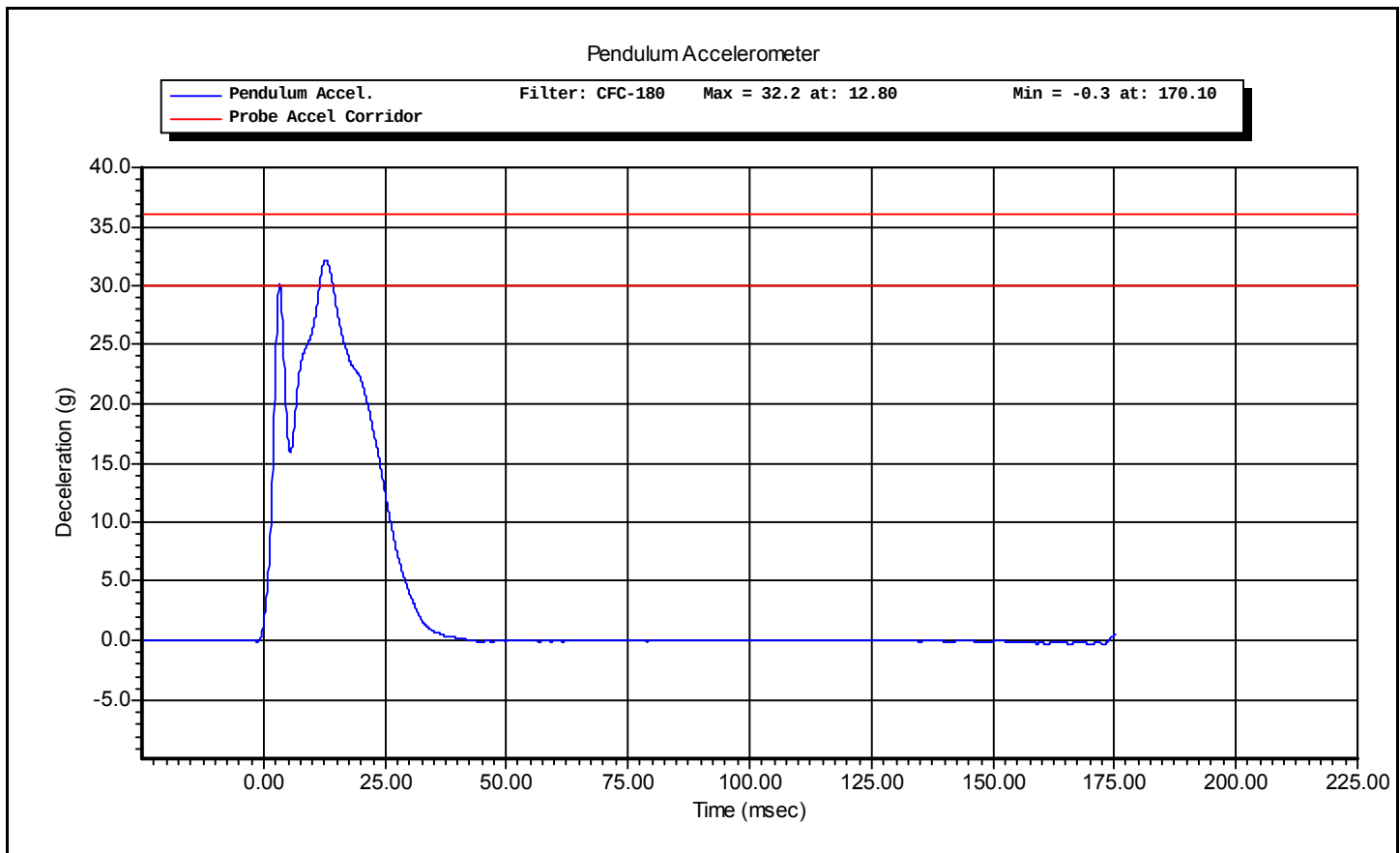
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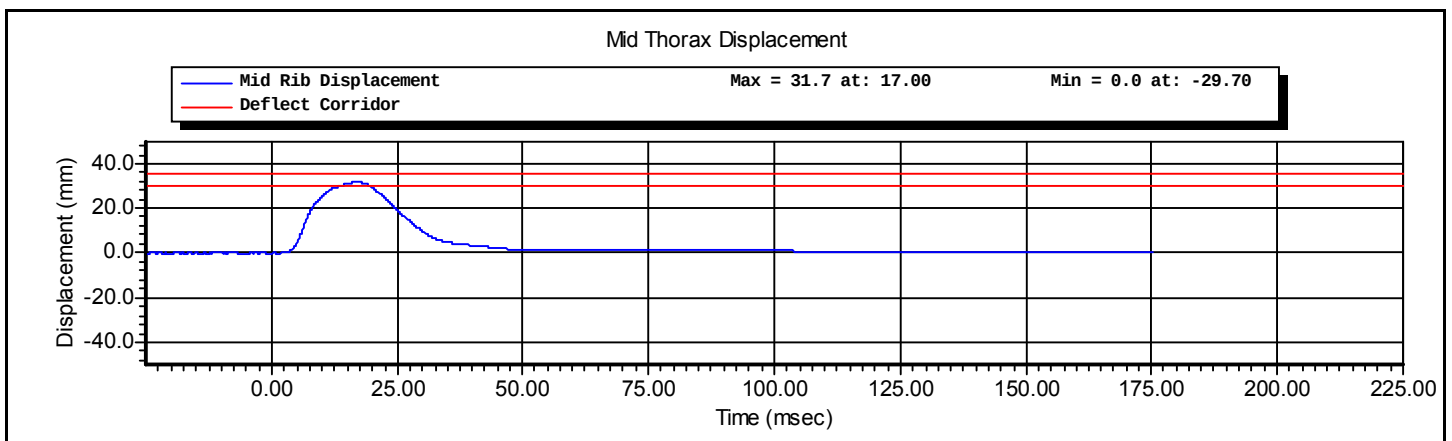
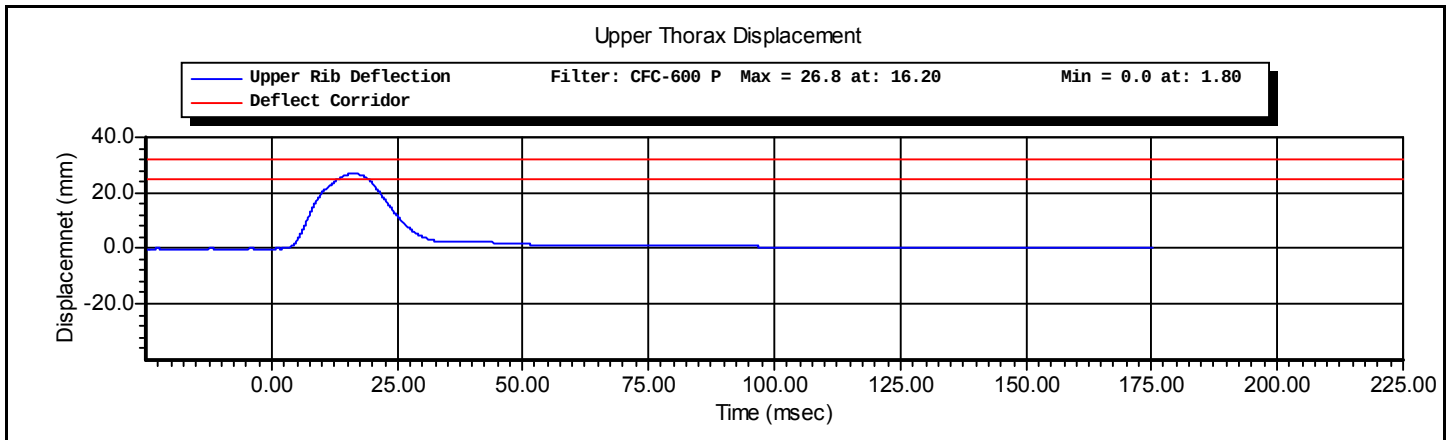
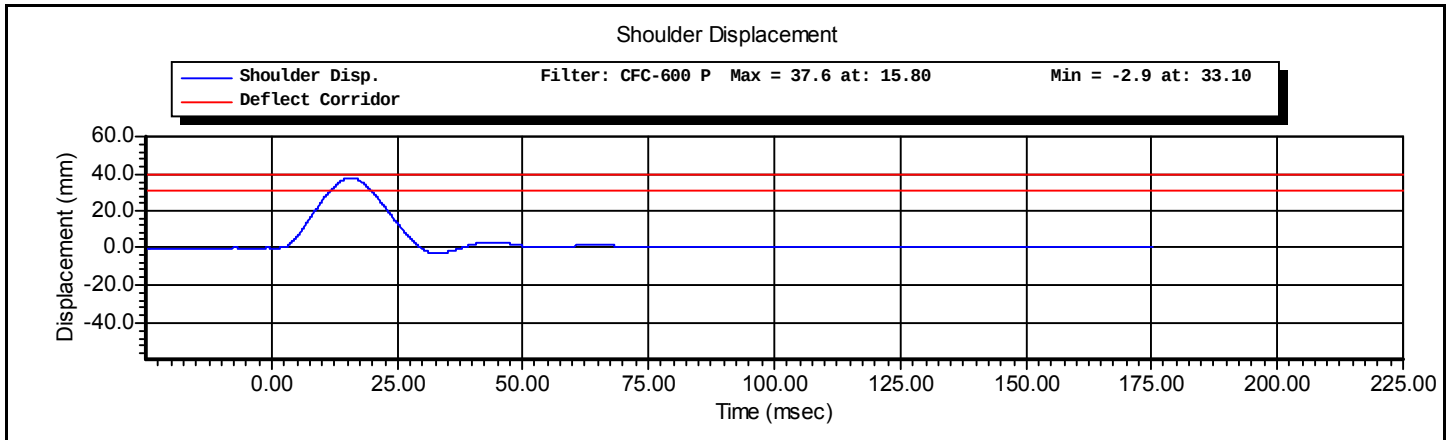
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 300		
Test ID:	Thorax With Arm	Test Date:	7/10/2010
Test Number:	1	Test Time:	1:48:08 PM

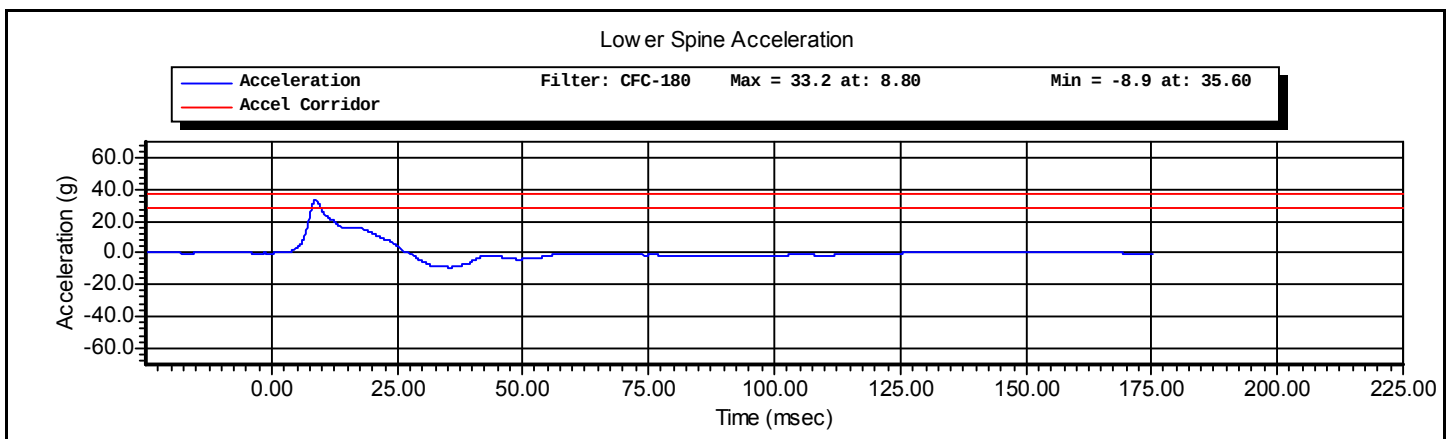
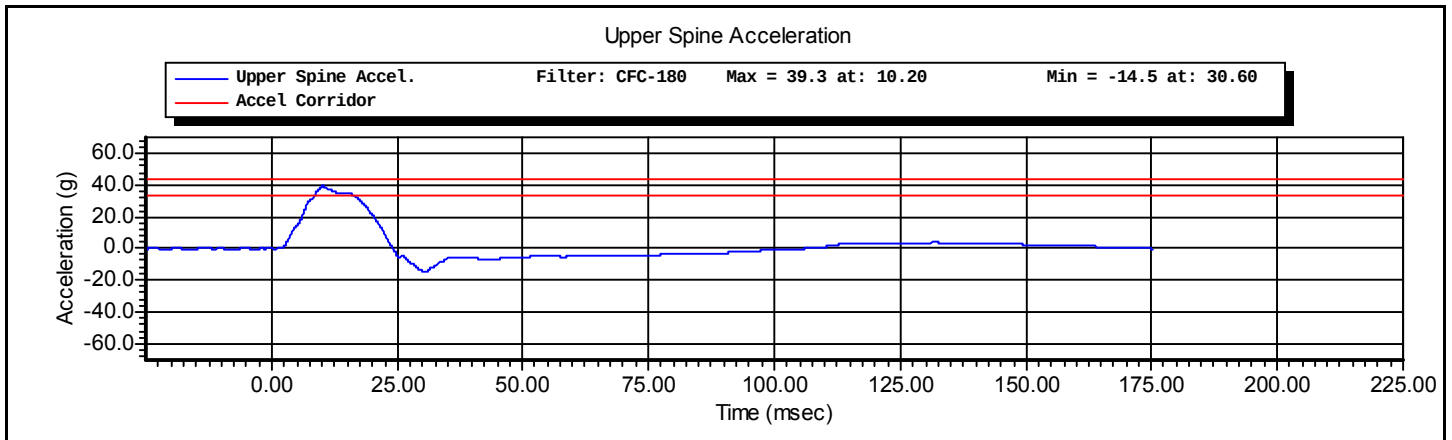
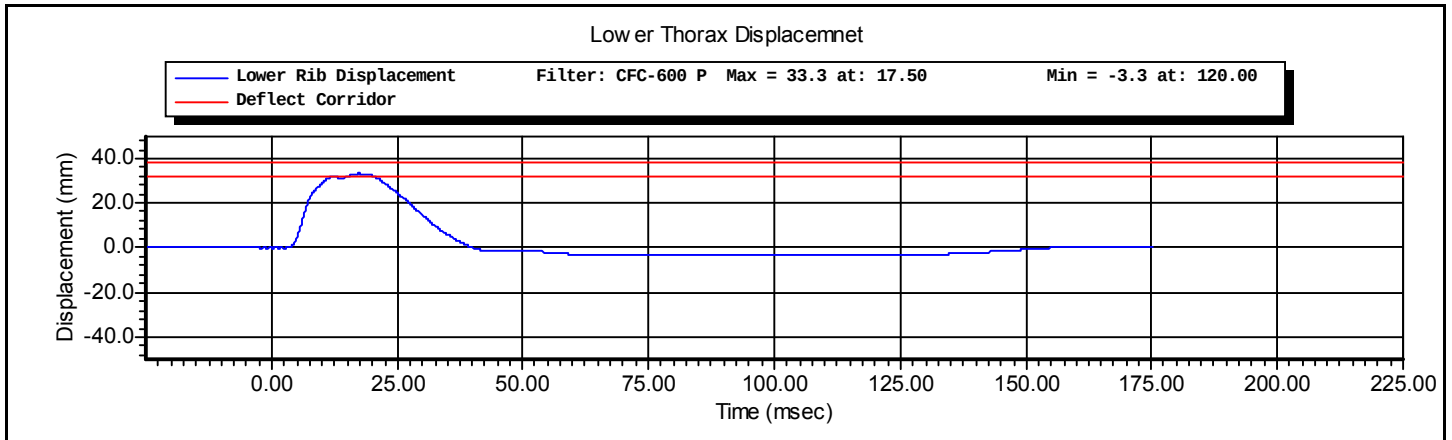
Component Part Number	Component Serial Number
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Test ID: Thorax With Arm Test Time: 1:48:08 PM

Test Date: 7/10/2010







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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 300		
Test ID:	Thorax Without Arm	Test Date:	7/10/2010
Test Number:	3	Test Time:	1:14:01 PM

Component Part Number	Component Serial Number
-----------------------	-------------------------

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	52 %RH P
Velocity	4.20 -- 4.40	4.36 m/s P
Probe Acceleration	14.0 -- 18.0	15.7 g P
Upper Thorax Rib Deflection	32.0 -- 40.0	35.4 mm P
Mid Thorax Rib Deflection	39.0 -- 45.0	41.7 mm P
Lower Thorax Rib Deflection	35.0 -- 43.0	38.5 mm P
Upper Spine Acceleration T1	13.0 -- 17.0	16.4 g P
Lower Spine Acceleration T12	7.0 -- 11.0	9.5 g P

All test parameters are within specifications

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

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

Test ID: **Thorax Without Arm** Test Time: **1:14:01 PM**

Test Date: **7/10/2010**



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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	P38216	6/22/2010
Servo	180-3885	DS-1121	4/7/2010
Servo	180-3885	DS-1151	4/7/2010
Servo	180-3885	DS-1156	4/7/2010
Endevco	7264-2000	P23904	3/15/2010
Endevco	7264-2000	P50078	7/2/2010

Test ID: **Thorax Without Arm** Test Time: **1:14:01 PM**

Test Date: **7/10/2010**



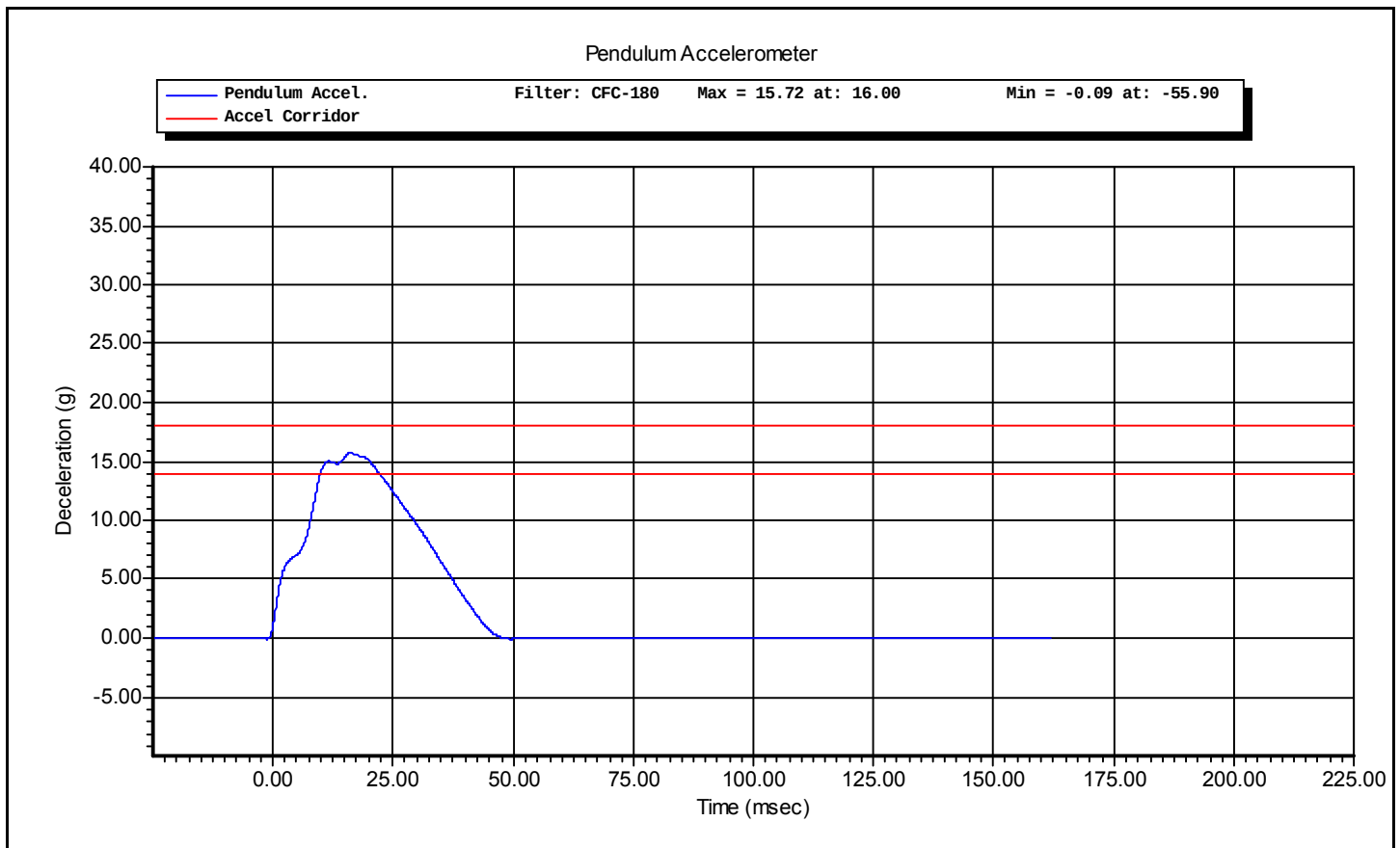
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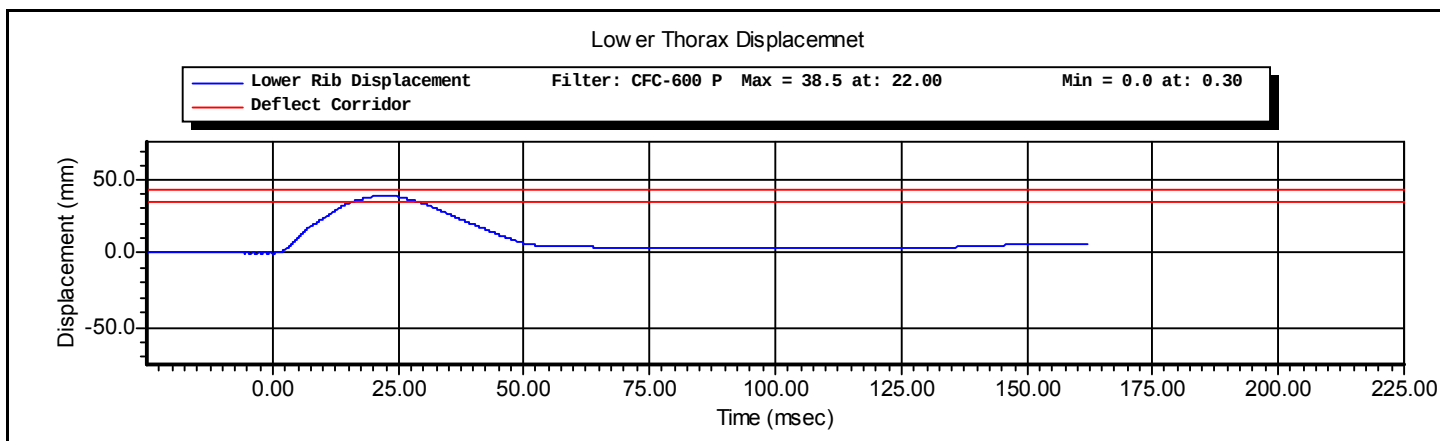
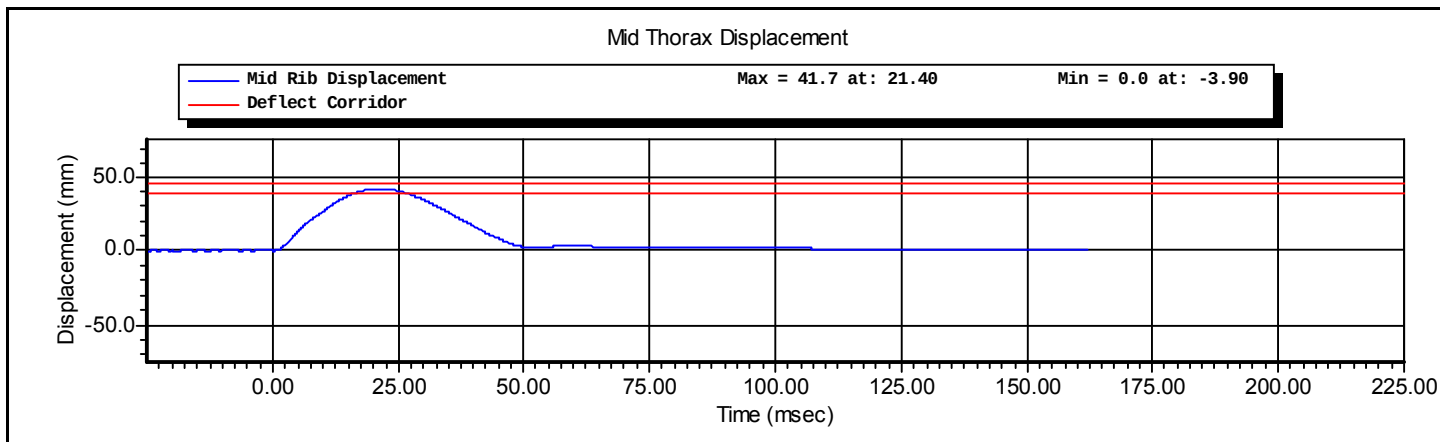
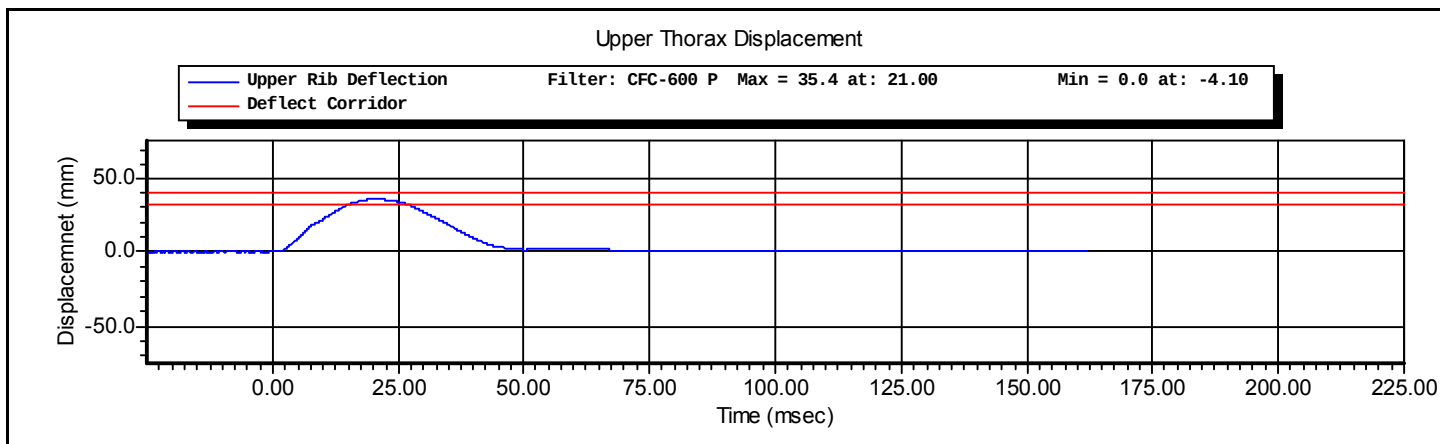
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 300		
Test ID:	Thorax Without Arm	Test Date:	7/10/2010
Test Number:	3	Test Time:	1:14:01 PM

Component Part Number	Component Serial Number
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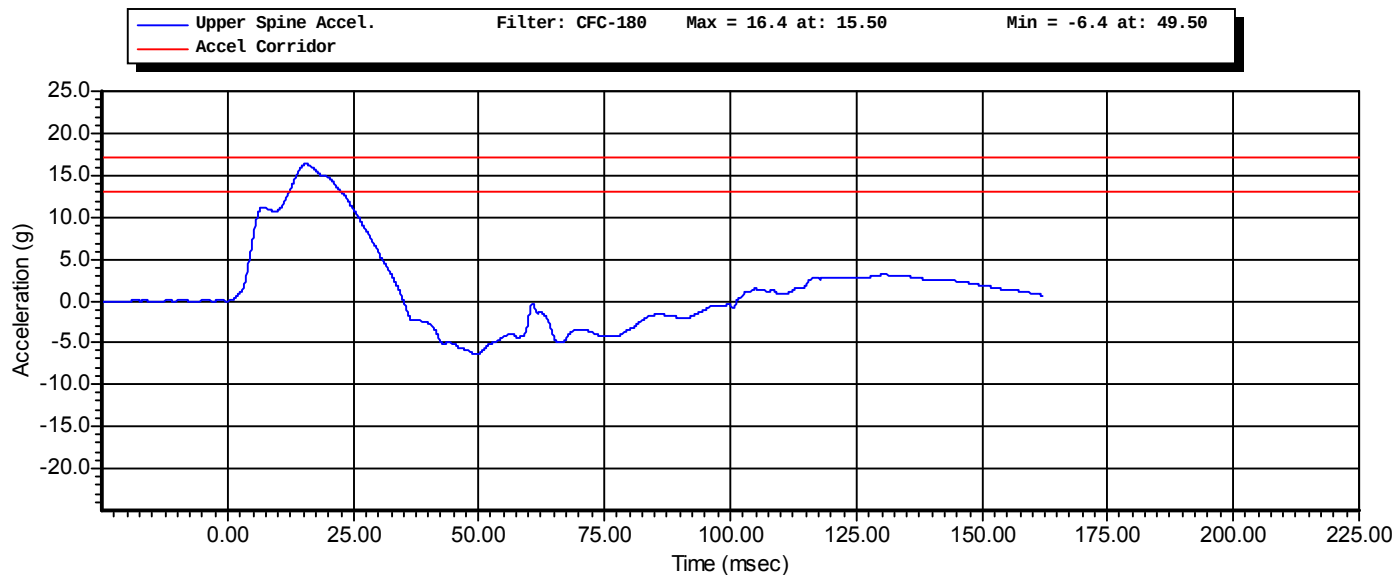


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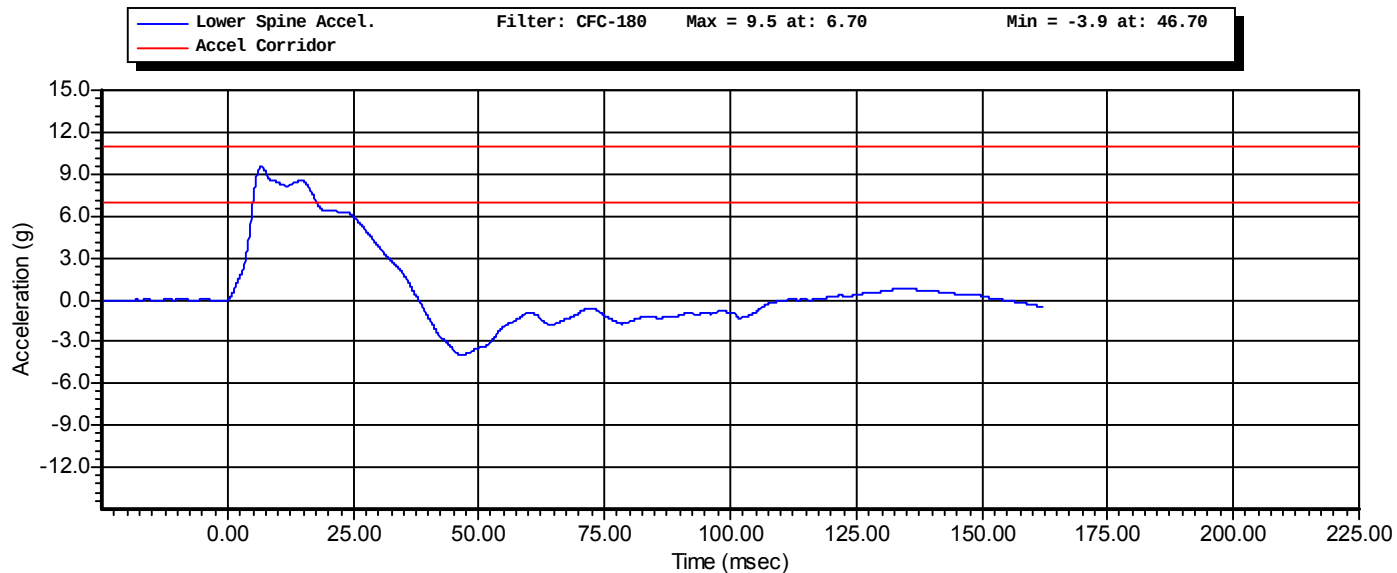
Test Date: 7/10/2010



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 300		
Test ID:	Abdomen	Test Date:	7/10/2010
Test Number:	1	Test Time:	11:41:56 AM

Component Part Number	Component Serial Number
-----------------------	-------------------------

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10 -- 70	55 %RH P
Velocity	4.20 -- 4.40	4.39 m/s P
Probe Acceleration	12.0 -- 16.0	14.0 g P
Upper Abdominal Rib Deflection	36.0 -- 47.0	39.8 mm P
Lower Abdominal Rib Deflection	33.0 -- 44.0	37.6 mm P
Lower Spine Acceleration - T12	9.0 -- 14.0	12.9 g P

All test parameters are within specifications

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

Test ID: **Abdomen**

Test Time: **11:41:56 AM**

Test Date: **7/10/2010**



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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	P16576	4/6/2010
Servo	180-3885	DS-1162	4/7/2010
Servo	180-3885	DS-1232	4/7/2010
Endevco	7264-2000	02I02I05-F22	4/7/2010

Test ID: **Abdomen**

Test Time: **11:41:56 AM**

Test Date: **7/10/2010**



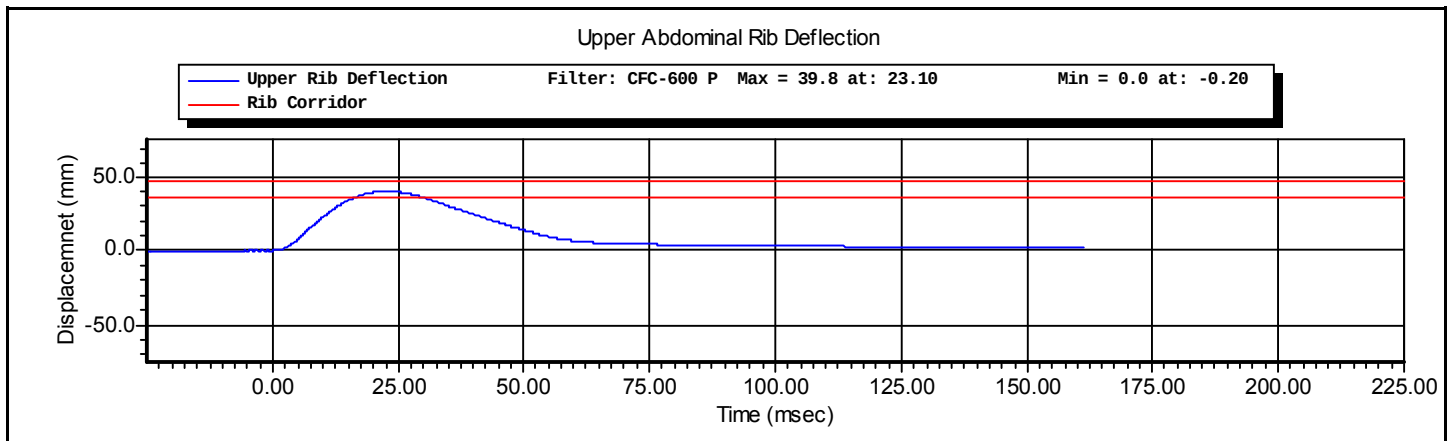
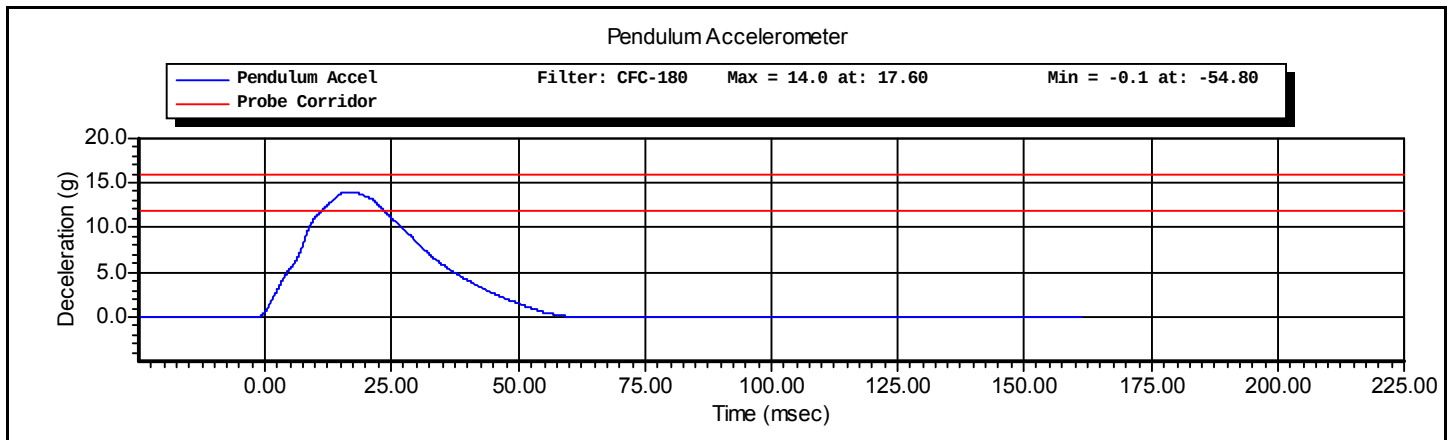
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Test Name:	Abdominal Impact	Revision:	8/24/2009
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 300		
Test ID:	Abdomen	Test Date:	7/10/2010
Test Number:	1	Test Time:	11:41:56 AM

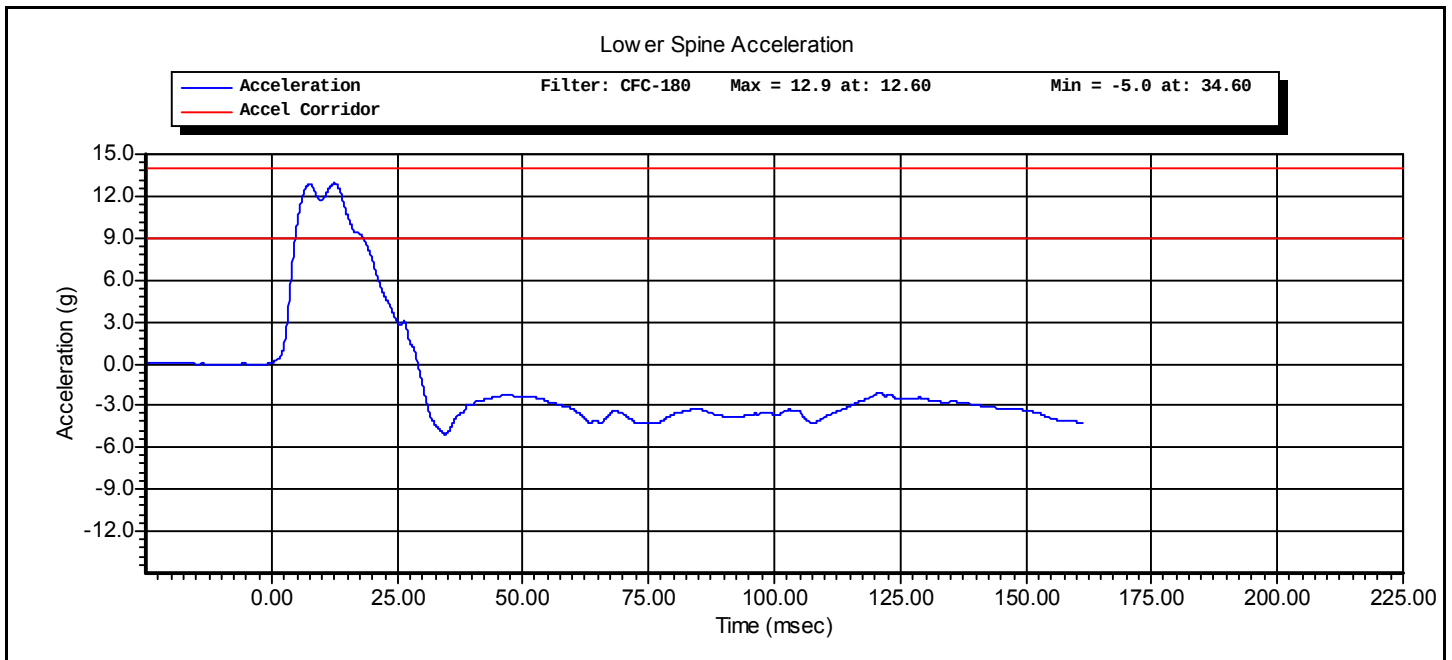
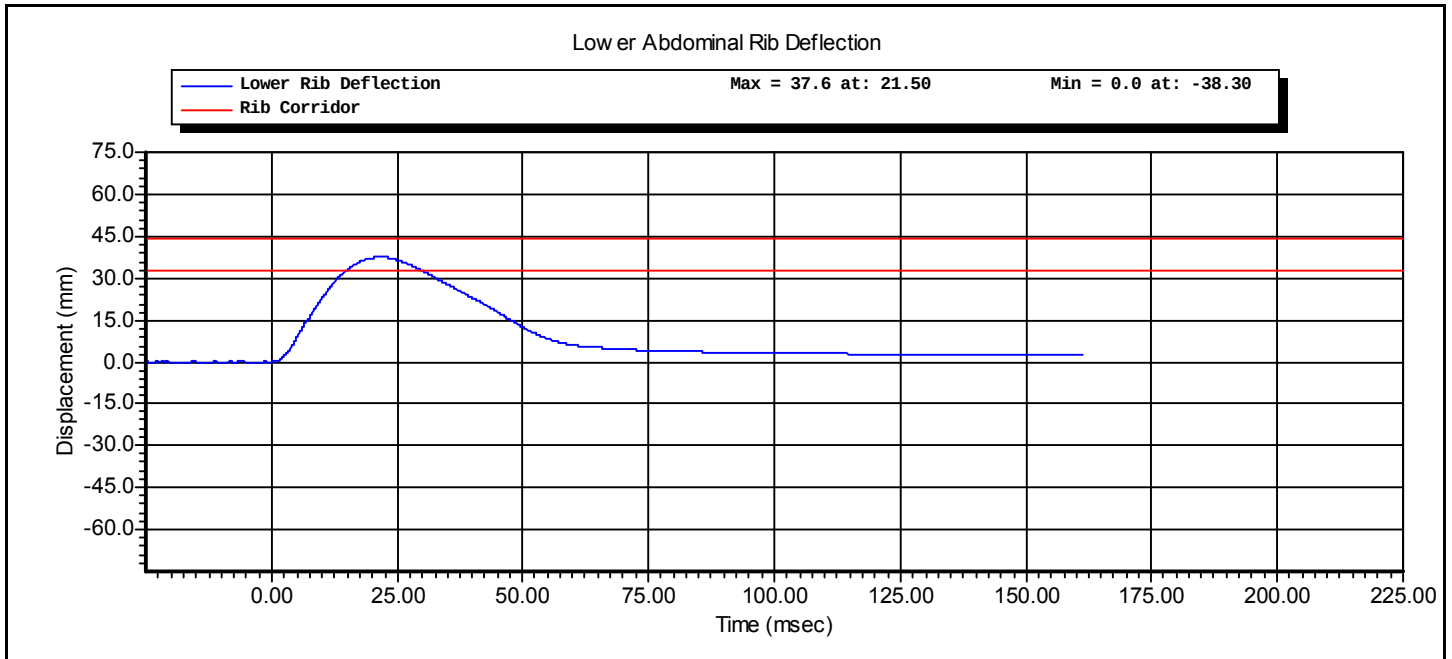
Component Part Number	Component Serial Number
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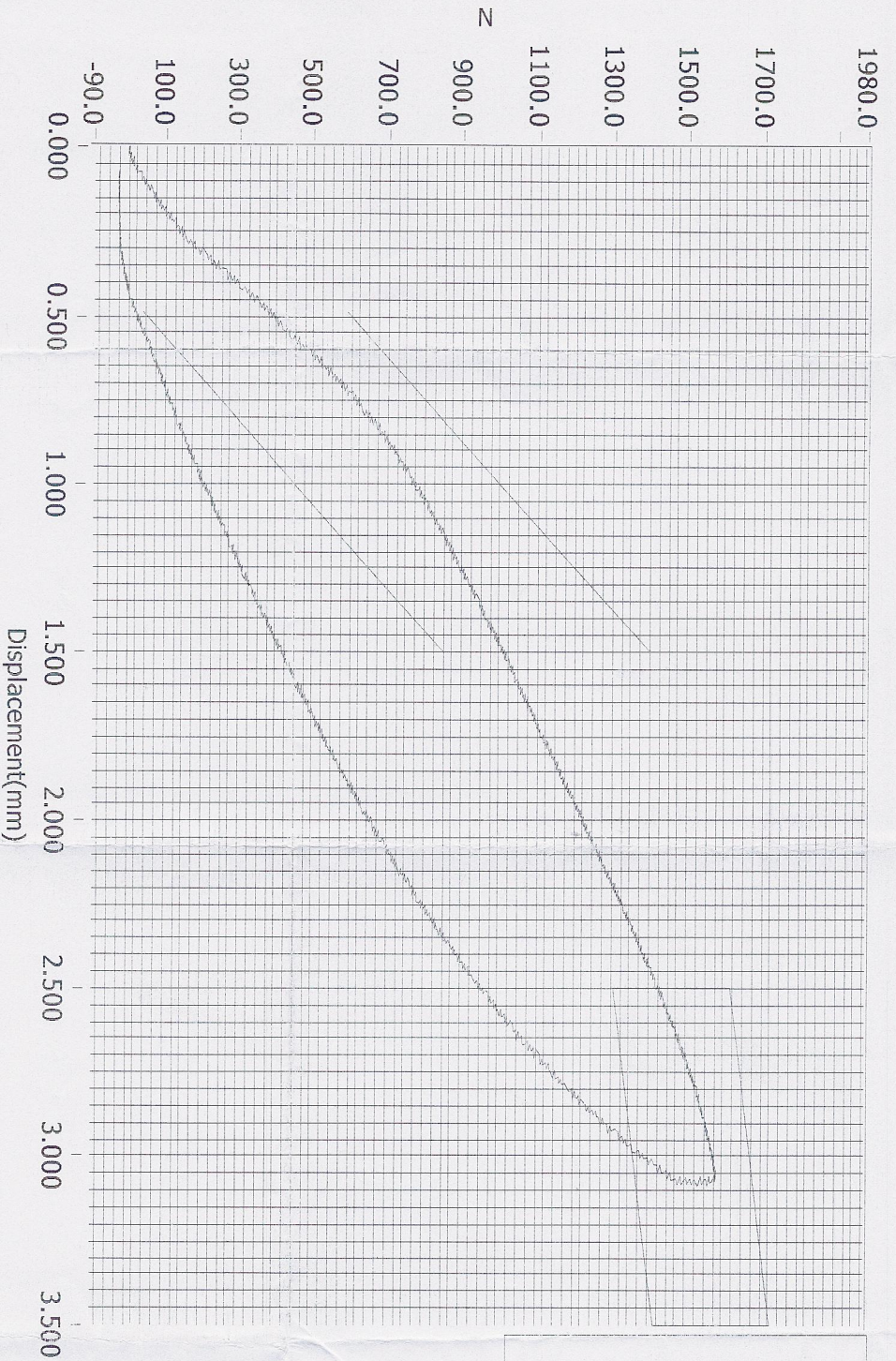
Test ID: **Abdomen**

Test Time: **11:41:56 AM**

Test Date: **7/10/2010**



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

Full Scale Test

Test ID

Part Serial Number

Test Date

Test Time

Cert ID

ATD Serial Number

ATD Type

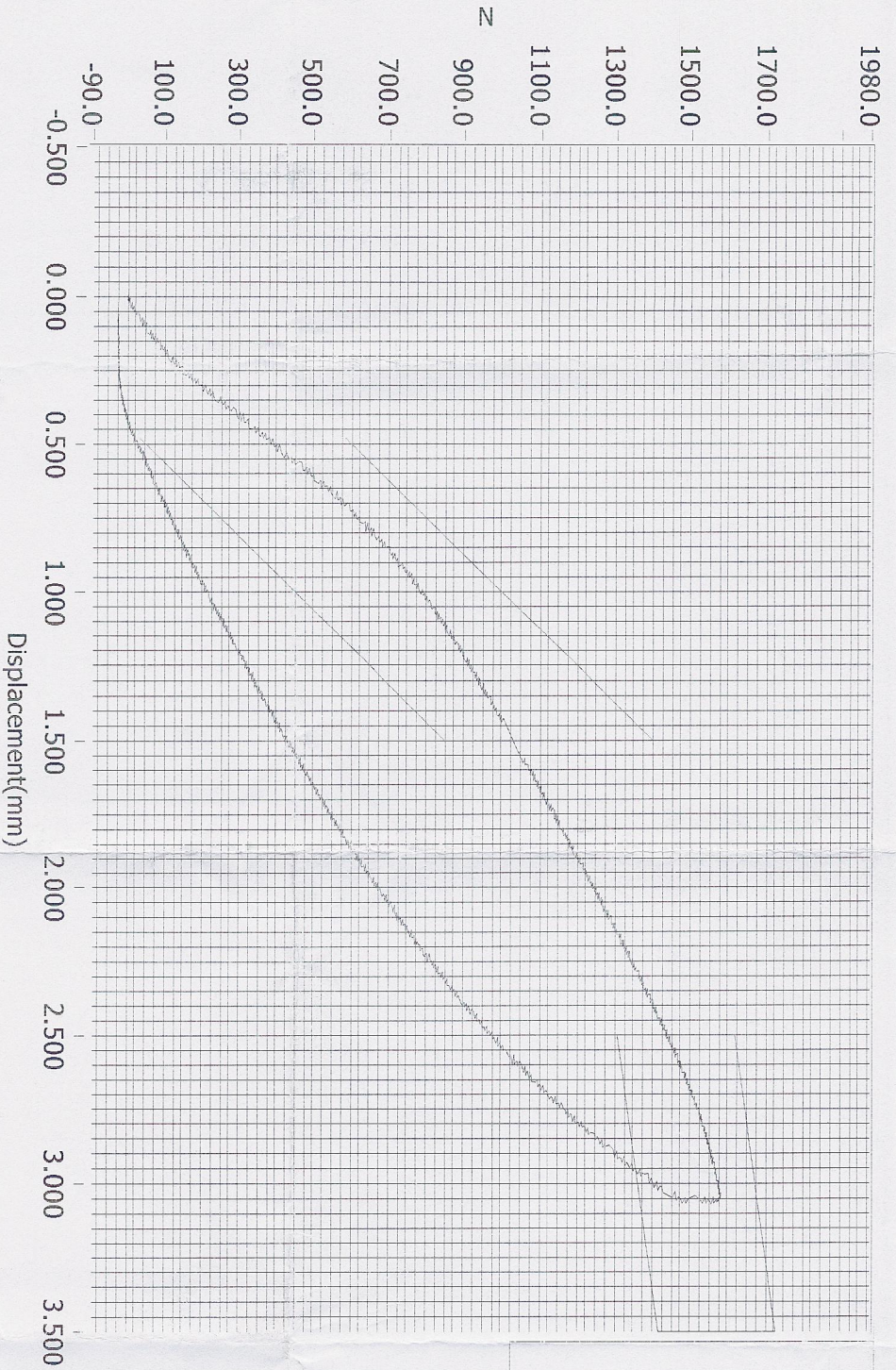
12694

SIDIIs

Current Date : 7/16/2007

Current Time : 12:10:05

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

Certification Test

Test ID

Part Serial Number

Test Date

Test Time

Cert ID

ATD Serial Number

ATD Type

12704

SIDIIs

Current Date : 7/16/2007

Current Time : 12:25:57



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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 300		
Test ID:	Pelvis Acetabulum	Test Date:	7/10/2010
Test Number:	3	Test Time:	3:02:26 PM

Component Part Number	Component Serial Number
-----------------------	-------------------------

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	50 %RH P
Velocity	6.60 -- 6.80	6.69 m/s P
Peak Probe Acceleration	38.0 -- 47.0	42.7 g P
Peak Pelvis Acceleration	34.0 -- 42.0	39.9 g P
Peak Acetabulum Force	3.60 -- 4.30	4.01 kN P

All test parameters are within specifications

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

Test ID: **Pelvis Acetabulum** Test Time: **3:02:26 PM**

Test Date: **7/10/2010**



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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	P38216	6/22/2010
Endevco	7264-2000	P51671	4/12/2010
DentonATD	3249J	LC-275a	4/12/2010

Test ID: **Pelvis Acetabulum** Test Time: **3:02:26 PM**

Test Date: **7/10/2010**



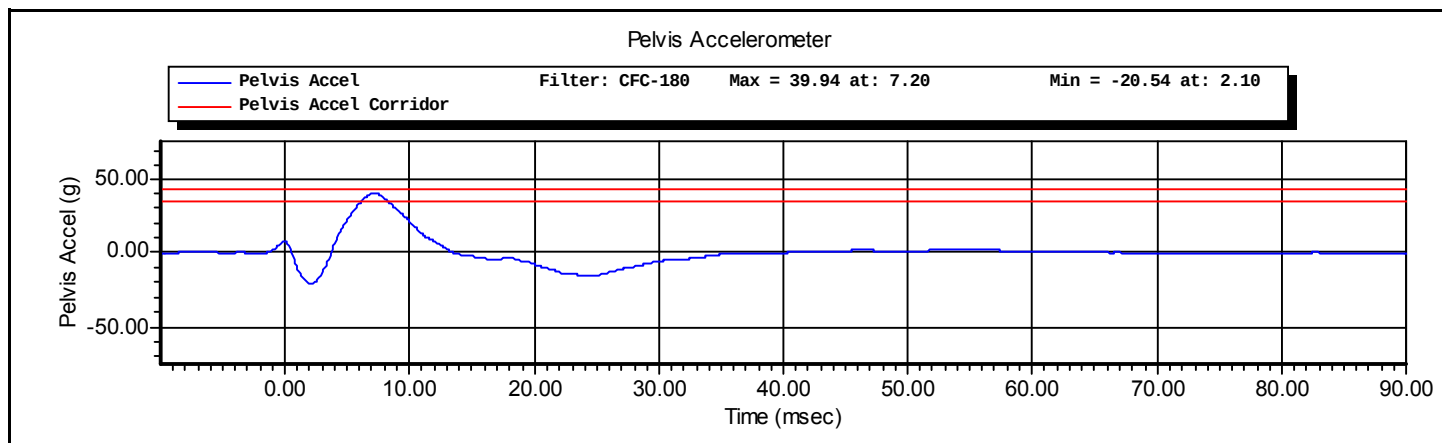
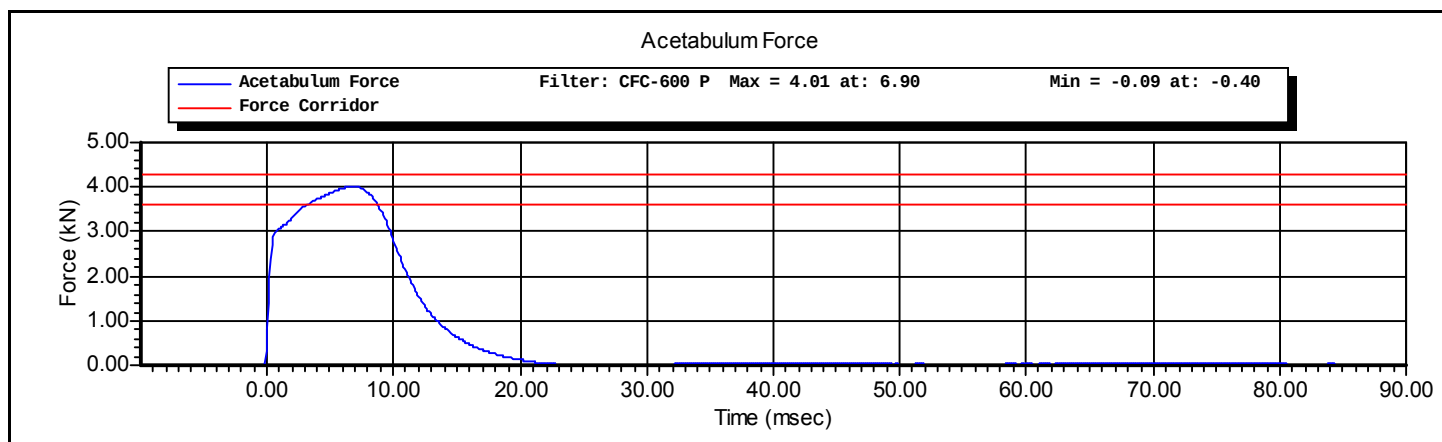
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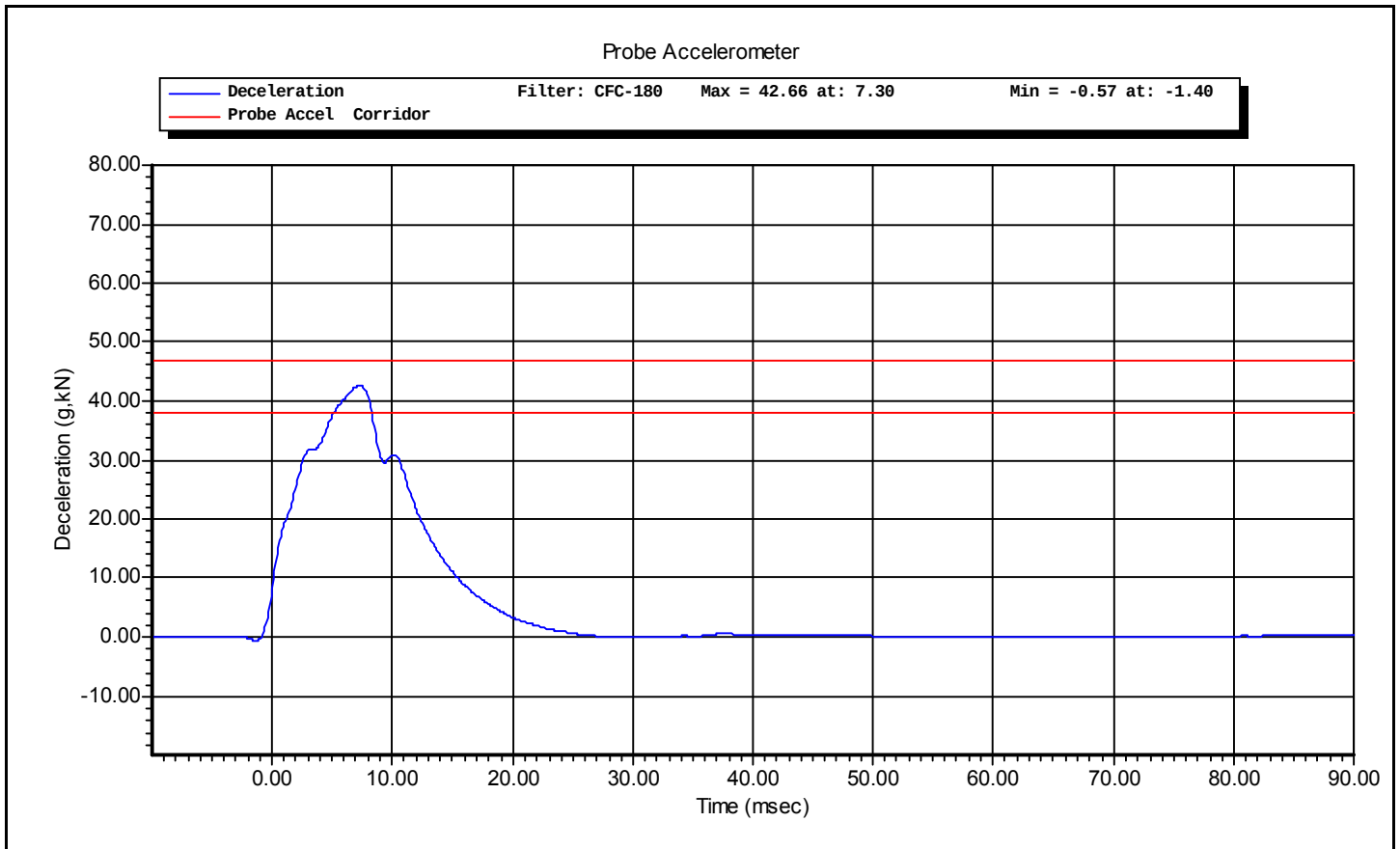
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Sub Test Name:	Acetabulum Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 300		
Test ID:	Pelvis Acetabulum	Test Date:	7/10/2010
Test Number:	3	Test Time:	3:02:26 PM

Component Part Number	Component Serial Number
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Test ID: **Pelvis Acetabulum** Test Time: **3:02:26 PM**

Test Date: **7/10/2010**





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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 300		
Test ID:	Pelvis Iliac	Test Date:	7/10/2010
Test Number:	1	Test Time:	9:14:22 AM

Component Part Number	Component Serial Number
-----------------------	-------------------------

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10 -- 70	62 %RH P
Velocity	4.20 -- 4.40	4.29 m/s P
Peak Probe Acceleration	36.0 -- 45.0	39.1 g P
Peak Pelvis Acceleration	28.0 -- 39.0	33.6 g P
Peak Iliac Force	4.10 -- 5.10	4.43 kN P

All test parameters are within specifications

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

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

Test ID: **Pelvis Iliac**

Test Time: **9:14:22 AM**

Test Date: **7/10/2010**



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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	P38216	6/22/2010
Endevco	7264-2000	P51671	4/12/2010
DentonATD	3228J	LC-279 Fy	4/12/2010

Test ID: **Pelvis Iliac**

Test Time: **9:14:22 AM**

Test Date: **7/10/2010**



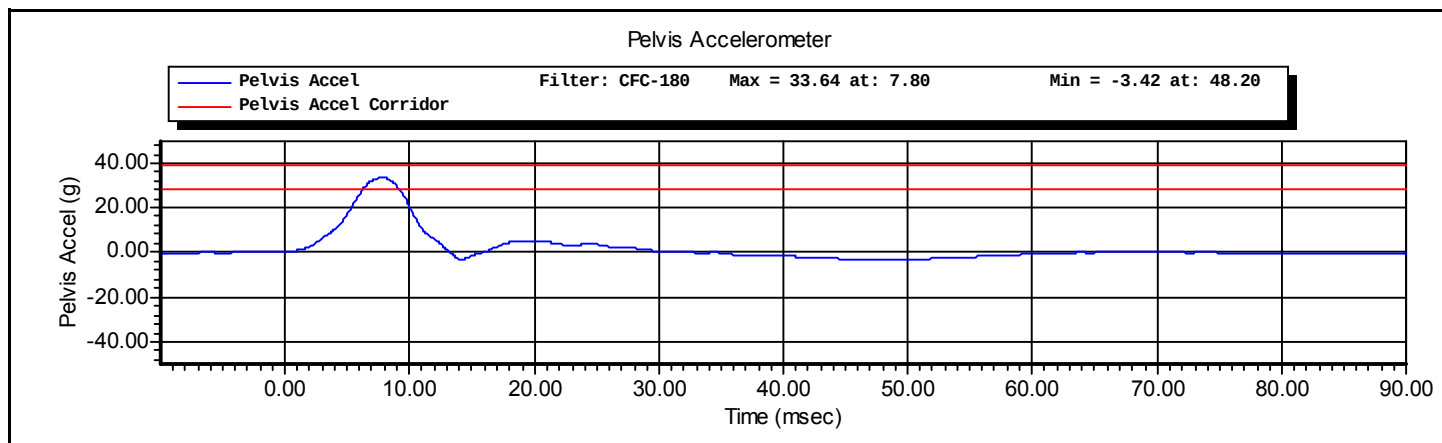
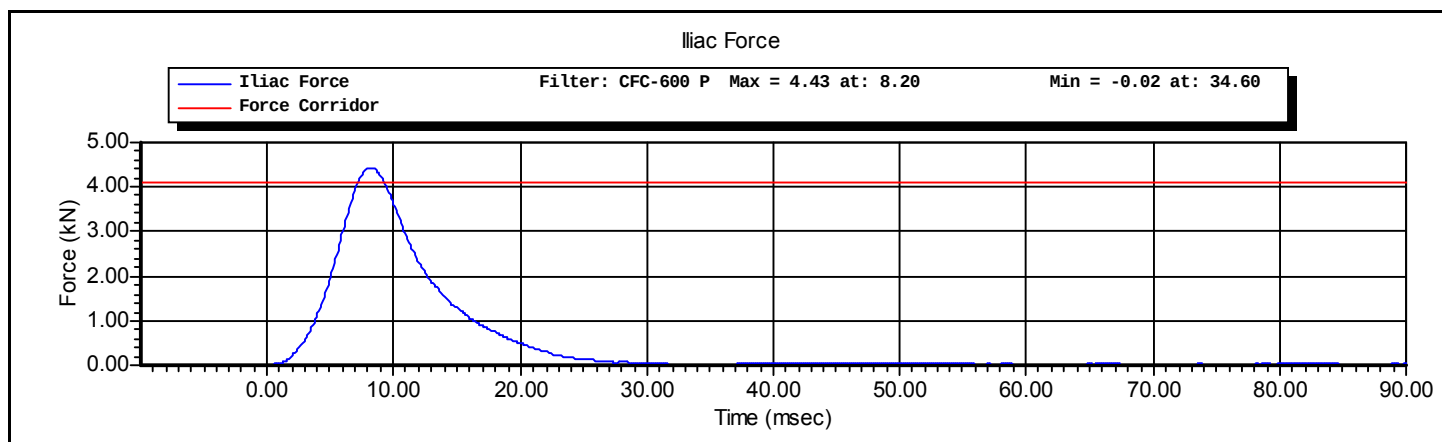
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Test Name:	Pelvis	Revision:	8/24/2009
Sub Test Name:	Iliac Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs		
ATD Serial Number:	SID 300		
Test ID:	Pelvis Iliac	Test Date:	7/10/2010
Test Number:	1	Test Time:	9:14:22 AM

Component Part Number	Component Serial Number
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Test ID: **Pelvis Iliac**

Test Time: **9:14:22 AM**

Test Date: **7/10/2010**

