

**REPORT NUMBER: SINCAP-MGA-2011-007**

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

**HONDA MFG. OF ALABAMA, LLC  
2011 Honda Pilot LX 2WD  
NHTSA No.: MB5301**

**MGA RESEARCH CORPORATION  
5000 Warren Road  
Burlington, WI 53105**



**Test Date: July 29, 2010**


**Final Report Date: August 19, 2010**

**FINAL REPORT**

**U.S. DEPARTMENT OF TRANSPORTATION  
National Highway Traffic Safety Administration  
Office of Crashworthiness Standards  
1200 New Jersey Ave, SE  
Mail Code: NVS 111, Room W43-410  
Washington, DC 20590**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-09-D-00124.

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Approval Date: August 19, 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

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<b>4. Title and Subtitle</b> Final Report of New Car Assessment Program Side Impact Testing of a 2011 Honda Pilot LX 2WD NHTSA No.: MB5301		<b>5. Report Date</b> August 19, 2010																																													
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<b>7. Author(s)</b> Donna Janovicz, Project Manager Ben Fischer, Project Engineer		<b>8. Performing Organization Report No.</b> SINCAP-MGA-2011-007																																													
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<b>15. Supplementary Notes</b>																																															
<b>16. Abstract</b> <p>A 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2011 Honda Pilot LX 2WD in accordance with the specifications of the Office of Crashworthiness Standards NCAP Side Laboratory Test Procedure for the generation of consumer information on vehicle side crash protection. The test was conducted at MGA Research Corporation, in Burlington, Wisconsin, on July 29, 2010.</p> <p>The impact velocity of the Moving Deformable Barrier (MDB) was 61.8 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21°C. The target vehicle post-test maximum crush was 238 mm at level 2. The test vehicle's performance was as follows:</p> <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th colspan="4" 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 (HIC<sub>36</sub>)</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">1000</td> <td style="text-align: center;">56</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;">36</td> </tr> <tr> <td>Combined Abdominal Force</td> <td style="text-align: center;">N</td> <td style="text-align: center;">2500</td> <td style="text-align: center;">698</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;">1356</td> </tr> </tbody> </table> <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th colspan="4" 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 (HIC<sub>36</sub>)</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">1000</td> <td style="text-align: center;">115</td> </tr> <tr> <td>Lower Spine (T12) Resultant Acceleration</td> <td style="text-align: center;">G</td> <td style="text-align: center;">82</td> <td style="text-align: center;">41</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;">3330</td> </tr> </tbody> </table>				Driver ATD (ES-2re)				Measurement Description	Units	Threshold	Result	Head Injury Criteria (HIC <sub>36</sub> )	N/A	1000	56	Maximum Thorax Rib Deflection	mm	44	36	Combined Abdominal Force	N	2500	698	Pubic Symphysis Force	N	6000	1356	Passenger ATD (SID-IIs)				Measurement Description	Units	Threshold	Result	Head Injury Criteria (HIC <sub>36</sub> )	N/A	1000	115	Lower Spine (T12) Resultant Acceleration	G	82	41	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3330
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<b>17. Key Words</b> New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs		<b>18. Distribution Statement</b> Copies of this report are available from: National Highway Traffic Safety Adm. Technical Reference Division 1200 New Jersey Ave, SE Washington, D.C. 20590																																													
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## TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	Purpose and Summary of Test	1
2	Occupant and Vehicle Information / Data Sheets	3

<u>Data Sheet No.</u>		<u>Page No.</u>
1	General Test and Vehicle Parameter Data	4
2	Seat Adjustment, Fuel System, and Steering Wheel Data	7
3	Dummy Longitudinal Clearance Dimensions	9
4	Dummy Lateral Clearance Dimensions	10
5	Camera Locations and Data	11
6	Vehicle Accelerometer Locations	12
7	Moving Deformable Barrier Accelerometer Locations	13
8	Test Vehicle Summary of Results	14
9	Moving Deformable Barrier Summary of Results	15
10	Post-Test Observations	16
11	Vehicle Profile Measurements	17
12	Vehicle Exterior Crush Measurements	18
13	Vehicle Damage Profile Distances	21
14	Exterior Static Crush for Impactor Face	22
15	FMVSS 301 Fuel System Integrity Post-Impact Data	23
16	Dummy/Vehicle Temperature Stabilization Data	24

<u>Appendix</u>		
A	Photographs	A
B	Dummy Response Data	B
C	Dummy Calibration and Performance Verification Data	C

**SECTION 1**  
**PURPOSE AND SUMMARY OF TEST**

**PURPOSE**

This moving deformable barrier side impact test is part of the MY 2011 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-09-D-00124. The purpose of this test is to generate comparative side impact performance in a 2011 Honda Pilot LX 2WD. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Laboratory Test Procedure dated January 2010.

**SUMMARY**

A 2011 Honda Pilot LX 2WD 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 (38.4 mph). 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 MGA Research Corporation in Burlington, Wisconsin, on July 29, 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 NCAP Side Laboratory Test Procedure dated January 2010. The side impact event was documented by ten (10) cameras. Camera locations are included in this report.

The dummies were instrumented in the following manner:

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

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

### DUMMY INJURY VALUES

Measurement Description	Driver ATD (ES-2re)		
	Units	Threshold	Result
Head Injury Criteria (HIC <sub>36</sub> )	N/A	1000	56
Maximum Thorax Rib Deflection	mm	44	36
Combined Abdominal Force	N	2500	698
Pubic Symphysis Force	N	6000	1356

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC <sub>36</sub> )	N/A	1000	115
Lower Spine (T12) Resultant Acceleration	G	82	41
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3330

### SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) P1		Left Rear (Passenger) P4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	Yes	No	
Knee Airbag	No		No	
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes		No	

The test data can be found on the NHTSA website at [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov)

### GENERAL COMMENTS

There was no valid data collected for:  
Left Mid B-Post Y after 10 msec.

Note: Overhead Close-up video image was lost.

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes.

**SECTION 2**  
**OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS**

**DATA SHEET NO. 1**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2011 Honda Pilot LX 2WD  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5301  
 Test Date: 7/29/2010

**TEST VEHICLE INFORMATION AND OPTIONS**

NHTSA No.	MB5301	Anti-Lock Brakes	Yes
Model Year	2011	All Wheel Drive	No
Make	Honda	Power Steering	Yes
Model	Pilot	Driver Front Airbag	Yes
Body Style	MPV	Driver Curtain Airbag	Yes
VIN	5FNYP3H20BB013814	Driver Head/Torso Airbag	No
Body Color	Alabaster Silver M	Driver Torso Airbag	No
Delivery Date	7/13/2010	Driver Torso/Pelvis Airbag	Yes
Odometer (mi)	73	Driver Pelvis Airbag	No
Odometer (km)	117	Driver Knee Airbag	No
Dealer	Boyland Honda	Rear Pass. Front Airbag	No
Transmission	Automatic	Rear Pass. Curtain Airbag	Yes
Final Drive	Front	Rear Pass. Head/Torso Airbag	No
Type/No. Cylinders	6	Rear Pass. Torso Airbag	No
Engine Displacement (L)	3.5	Rear Pass. Torso/Pelvis Airbag	No
Engine Placement	Lateral	Rear Pass. Pelvis Airbag	No
Roof Rack	No	Rear Pass. Knee Airbag	No
Sunroof/T-Top	No	Pretensioners	Yes
Tinted Glass	Yes	Load Limiters	Yes
Traction Control	No	Automatic Door Locks	Yes
Power Brakes	Yes	Bucket Seats	Yes
Front Disc	Yes	Tilt Steering	Yes
Rear Disc	Yes	Power Seats	No
Does owner's manual provide instruction to turn off automatic door locks?			Yes

**DATA FROM CERTIFICATION LABEL**

Manufactured By	Honda Mfg. of Alabama, LLC	GVWR (kg)	2700
Date of Manufacture	06/'10	GAWR Front (kg)	1325
		GAWR Rear (kg)	1450

**VEHICLE SEATING AND WEIGHT CAPACITY DATA**

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	3	8	
Capacity Weight (VCW) (kg)				600	(A)
DSC x 68.04 (kg)				544	(B)
Cargo Weight (RCLW) (kg)				56	(A-B)

**VEHICLE SEAT TYPE**

Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	60/40 Fold-Down	Contoured	Fixed	Adjustable	
						Manual	Power
Front Seat	X					w/Lever	
Rear or Second Row			X			w/Lever	
Third Row Seat			X		X		

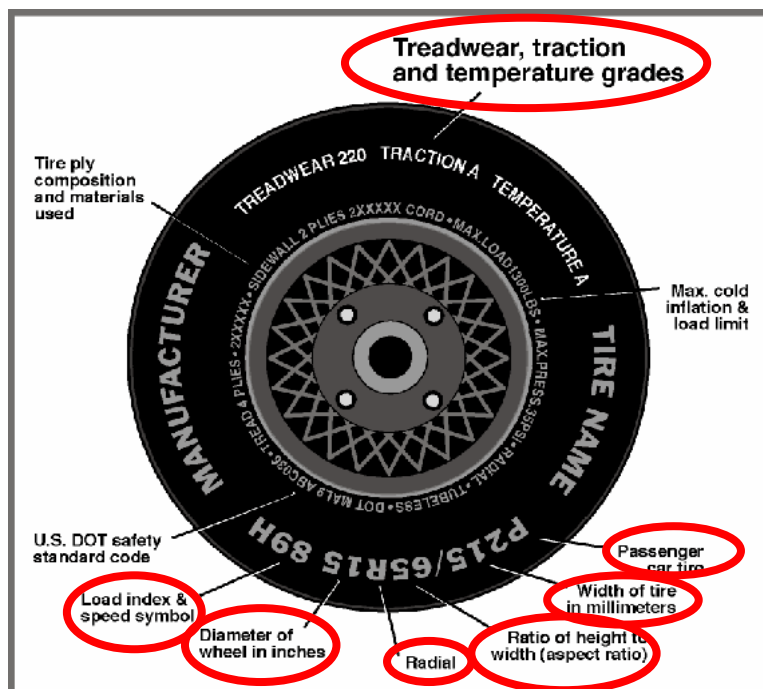
## DATA SHEET NO. 1 (continued)

### GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Honda Pilot LX 2WD  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5301  
 Test Date: 7/29/2010

### VEHICLE TIRE INFORMATION



### DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	220	220
Recommended Tire Size	P245/65R17	P245/65R17
Tire Size on Vehicle	P245/65R17	P245/65R17
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Fortera	Fortera
Treadwear	540	540
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	2 steel / 2 poly / 1 nylon	2 steel / 2 poly / 1 nylon
Tire Plies Body	5	5
Load Index & Speed Symbol	105T	105T
Tire Material	Rubber	Rubber
DOT Safety Code Right	DOT4B8T 011R 2010	DOT4B8T 011R 2010
DOT Safety Code Left	DOT4B8T 011R 2010	DOT4B8T 011R 2010

**DATA SHEET NO. 1 (continued)**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle:	<u>2011 Honda Pilot LX 2WD</u>	NHTSA No.	<u>MB5301</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>7/29/2010</u>

**TEST VEHICLE WEIGHTS**

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	548.8	435.5		585.6	511.2		591.0	521.2	
Right	kg	540.7	432.7		564.3	473.6		545.2	484.0	
Ratio	%	55.7	44.3		53.9	46.1		53.1	46.9	
Totals	kg	1089.5	868.2	1957.7	1149.9	984.8	2134.7	1136.2	1005.2	2141.4

**TARGET TEST WEIGHT CALCULATION**

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1957.7	(A)
Sum of Actual Weight of 2 P572 ATDs Used	kg	129.3	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	56	(C)
Calculated Target Vehicle Test Weight (TVT <sub>W</sub> )	kg	2143.0	(A+B+C)

**TEST VEHICLE ATTITUDES AND CG**

	Units	LF	RF	LR	RR	CG (aft of front axle)
Fully Loaded	mm	805	814	803	813	
As Tested (Fully Loaded $\pm$ 10mm at each wheel well)	mm	805	815	809	815	1282

**GENERAL TEST VEHICLE DATA**

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2778
Total Vehicle Length at Left Side	mm	4015
Total Vehicle Length at Centerline	mm	4847
Total Vehicle Length at Right Side	mm	4015
Weight of Ballast in Cargo Area	kg	14.1
Weight of Vehicle Components Removed	kg	16.6
Amount of Stoddard Solvent in Fuel Tank	L	73.8

Vehicle components removed to meet target vehicle test weight: RF mirror, jack kit, rear cargo compartment, license plate bracket, and RR taillight.

**TEST VEHICLE VERTICAL IMPACT POINT DATA**

Measurement Description	Units	Value
Target Impact Point Aft of Front Axle	mm	449
Actual Impact Point Aft of Front Axle	mm	447

## DATA SHEET NO. 2

### SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

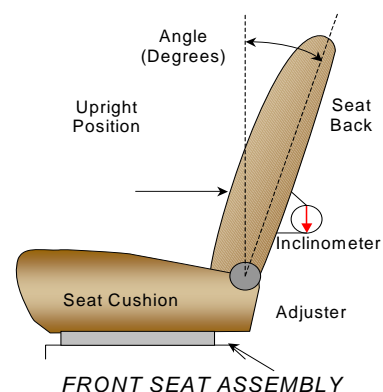
Test Vehicle: 2011 Honda Pilot LX 2WD  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5301  
 Test Date: 7/29/2010

#### NOMINAL DESIGN RIDING POSITION

The driver and passenger seat backs are positioned to the manufacturer's designated angle. The procedure is as follows:

For the driver and left rear passenger seat backs, set at 12.7° referenced to the sill and measured at the outboard headrest post guide.



#### SEAT BACK ANGLES

	Degrees
Driver with Seated Dummy	13.1° at headrest post guide
Passenger with Seated Dummy	Full forward position

#### SEAT FORE/AFT POSITIONS

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	24 detents	12 <sup>th</sup> detent (forwardmost as 0)
Rear Seat	10 detents	10 <sup>th</sup> detent (forwardmost as 0)

Describe method: For the driver seat track, using only the controls that primarily move the seat in the fore-aft direction, the seat was moved to the full rear position and marked. The seat was then moved to the foremost position and marked. The seat was then placed in the mid point of travel and marked. For the left rear passenger seat track, using only the controls that primarily move the seat in the fore-aft direction, the seat was moved to the full rear position and marked. The seat was then moved to the foremost position and marked.

#### SEAT BELT UPPER ANCHORAGES

	Total # of Positions	Placed in Position #
Driver Seat	4 detents	0 (uppermost as 0)
Rear Seat	4 detents	0 (uppermost as 0)

Describe method: The driver and left rear passenger seat anchorages were set in the uppermost position.

## DATA SHEET NO. 2 (CONTINUED)

### SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2011 Honda Pilot LX 2WD  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5301  
 Test Date: 7/29/2010

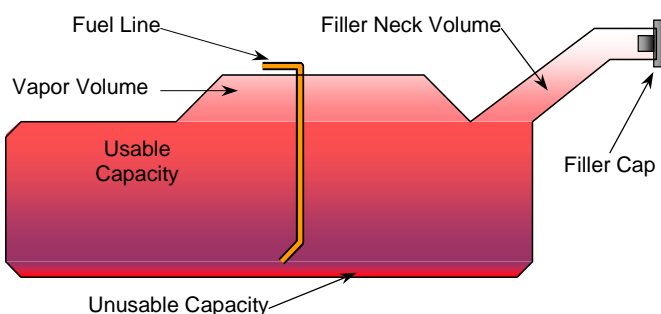
#### FUEL TANK CAPACITY DATA

	Liters
Usable Capacity of "Standard Tank"	79.5
Usable Capacity of "Optional" Tank	
Usable Capacity Used for FMVSS 301	73.1 to 74.7
Actual Amount of Solvent used	73.8

Describe the fuel pump type, its behavior, and the location of the fuel filler pipe.

The test vehicle is equipped with an electric fuel pump. The fuel pump will pump fuel after the ignition key is turned from LOCK (0) to ON (II) position, the pump will be filled up for two seconds, and then the pressure is maintained.

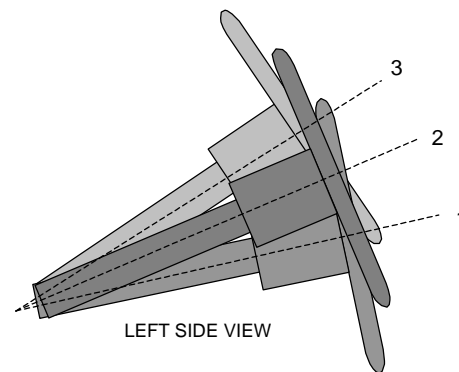
The fuel pipe is on the left side.



VEHICLE FUEL TANK ASSEMBLY

#### STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed on the plate and the angle is measured.



LEFT SIDE VIEW

STEERING COLUMN ASSEMBLY

#### STEERING COLUMN POSITION

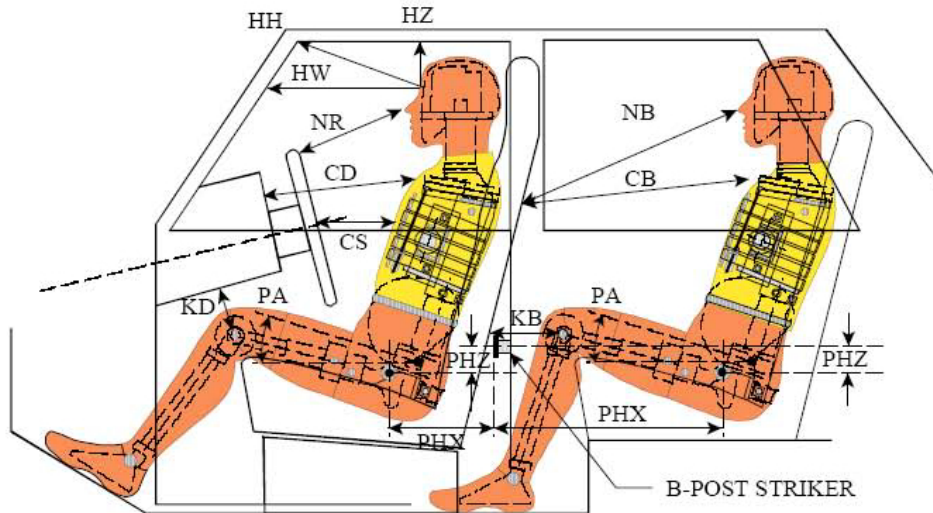
	Degrees	Fore/Aft Position (mm)
Lowermost - Position 1	68.5	210
Geometric Center – Position 2	65.5	190
Uppermost – Position 3	62.5	170
Telescoping Steering Wheel Travel		40
Test Position	65.5	190

### DATA SHEET NO. 3

### DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Honda Pilot LX 2WD  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5301  
 Test Date: 7/29/2010



**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

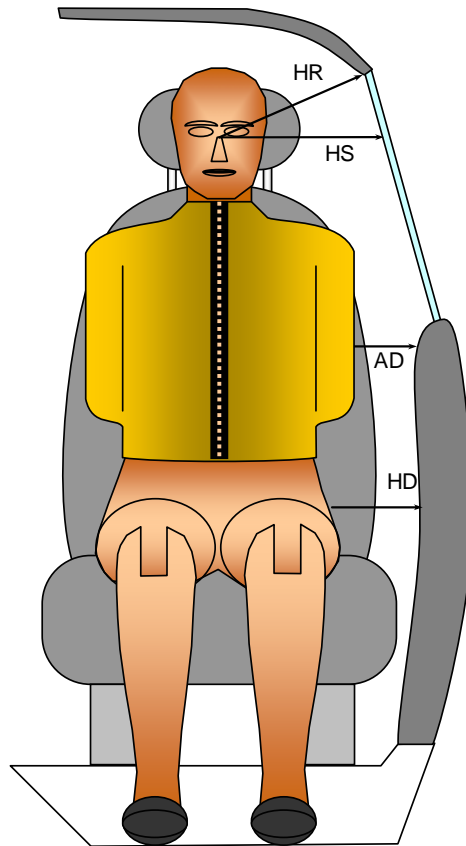
#### DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver S/N 032		Passenger S/N 296	
			Length (mm)	Angle(°)	Length (mm)	Angle(°)
HH		Head to Header	468	18.5		
HW		Head to Windshield	672	0		
HZ	HZ	Head to Roof	215	90	304	90
NR	NB	Nose to Rim/Seat Back	439	14.8	541	15.6
CD	CB	Chest to Dash/Seat Back	557	8.1	542	12.0
CS		Chest to Steering Wheel	345	7.3		
KDL	KBL	Left Knee to Dash/Seat Back	149	20.2	334	9.8
KDR	KBR	Right Knee to Dash/Seat Back	118	15.6	343	7.6
PA	PA	Pelvic Angle		24.8		18.8
PHX	PHX	H-Point to Striker (X-Axis)	226	0	284	0
PHZ	PHZ	H-Point to Striker (Z-Axis)	89	90	122	90
SA	SA	Seat Back Angle		13.1		

**DATA SHEET NO. 4**  
**DUMMY LATERAL CLEARANCE DIMENSIONS**

Test Vehicle: 2011 Honda Pilot LX 2WD  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5301  
 Test Date: 7/29/2010



*FRONT VIEW OF DUMMY*

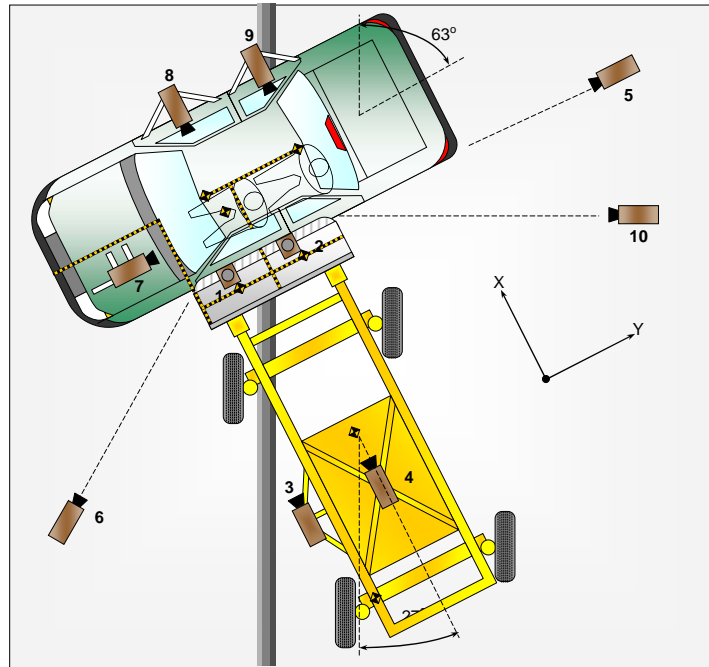
**DUMMY LATERAL CLEARANCE DIMENSION INFORMATION**

Code	Measurement Description	Units	Driver S/N 032	Passenger S/N 296
HR	Head to Side Header	mm	225	294
HS	Head to Side Window	mm	358	389
AD	Arm to Door	mm	97	70
HD	H-Point to Door	mm	164	134

**DATA SHEET NO. 5**  
**CAMERA LOCATIONS AND DATA**

Test Vehicle: 2011 Honda Pilot LX 2WD  
Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5301  
Test Date: 7/29/2010



**CAMERA LOCATIONS AND DATA**

No.	Camera View	Coordinates (mm)			Angle	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
1	Overhead Overall	-890	0	-5050	79.9	14	1000
2	Overhead Close-up	**	**	**	**	50	1000
3	Left Impact Point (MDB)					50	1000
4	Side Overall (MDB)					16	1000
5	Rear	-3370	5290	-1270	6.6	24	1000
6	Left Front	3395	-4230	-1260	6.9	24	1000
7	Driver Front (OB)					12.5	1000
8	Driver Side (OB)					8	1000
9	Passenger Side (OB)					8	1000
10	Real Time Left Rear						30
11	Real Time Inrun						30

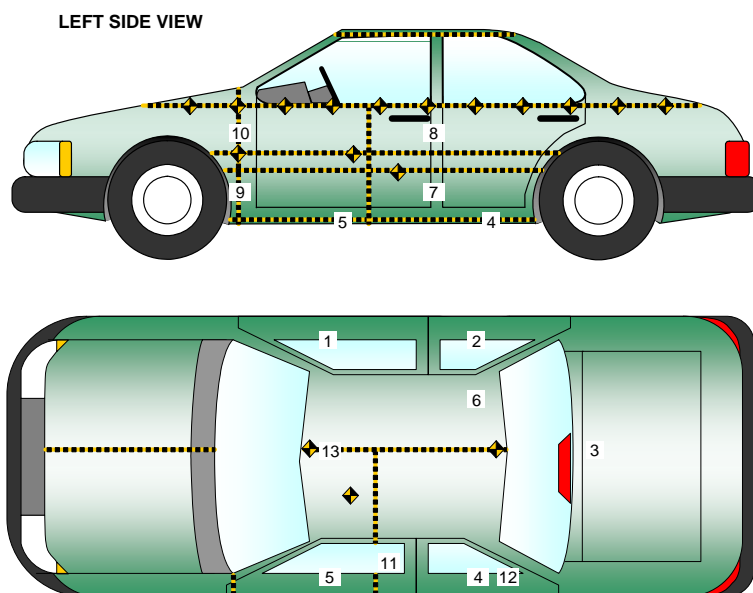
Reference: Impact Point projected to Ground  
+X = To Front of MDB, +Y = To Right of MDB, +Z = Down

\* All measurements accurate to  $\pm 6$  mm  
\*\* See Test Notes

**DATA SHEET NO. 6  
VEHICLE ACCELEROMETER LOCATIONS**

Test Vehicle: 2011 Honda Pilot LX 2WD  
Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5301  
Test Date: 7/29/2010



**VEHICLE ACCELEROMETER PRE-TEST LOCATIONS**

Accelerometer Location				
No.	ID	Coordinates (mm)		
		X	Y	Z
1	Right Sill at Front Seat	2784	783	350
2	Right Sill at Rear Seat	1890	783	340
3	Rear Floorpan Above Axle	748	0	638
4	Left Sill at Rear Door	1900	-783	335
5	Left Sill at Front Door	2800	-783	345
6	Rt. Rear Occ. Compartment	2105	440	446
7	Left Lower B-Post	2325	-780	685
8	Left Middle B-Post	2315	-770	957
9	Left Lower A-Post	3320	-780	680
10	Left Middle A-Post	3391	-810	900
11	Front Seat Track	2522	-630	626
12	Rear Seat Track or Structure	2311	-600	576
13	Vehicle CG	2506	-65	355

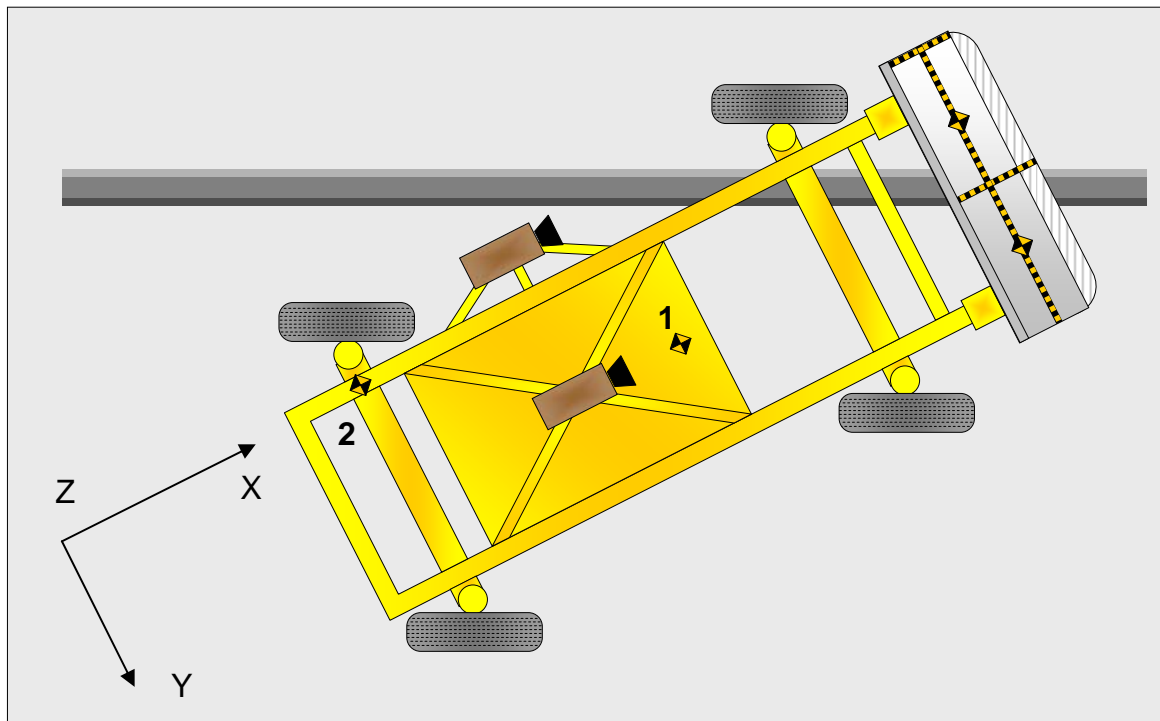
Reference: X – Rear Surface of Vehicle (+ forward)  
Y - Vehicle Centerline (+ to right)  
Z - Ground Plane (+ up)

## DATA SHEET NO. 7

### MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS

Test Vehicle: 2011 Honda Pilot LX 2WD  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5301  
 Test Date: 7/29/2010



#### MDB ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	MDB CG	-1105	0	330
2	MDB Rear	-2580	-650	625

Reference: X - MDB Face (+ forward)  
 Y - MDB Centerline (+ to right)  
 Z - Ground Plane (+ up)

**DATA SHEET NO. 8****TEST VEHICLE SUMMARY OF RESULTS**

Test Vehicle: 2011 Honda Pilot LX 2WD  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5301  
 Test Date: 7/29/2010

**MAXIMUM EXTERIOR STATIC CRUSH**

Level	Measurement Description	Units	Maximum Crush	Above Ground
1	Sill Top Height	mm	116	356
2	Occupant H-Point	mm	238	765
3	Mid Door	mm	234	798
4	Window Sill	mm	58	1167
5	Window Top	mm	-22	1685
	Maximum Penetration	mm	238	

**INSTRUMENTATION**

Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	21
MDB Accelerometers	5
Total No. of Contact Switches	8
Monitoring Channels	4
Total	70

**CAMERA COVERAGE**

High-Speed Vehicle Onboard	3
High-Speed Offboard	4 (see Test Notes)
High-Speed MDB Onboard	2
Real-Time Stationary	1
Real-Time Panning	1
Total	11

## DATA SHEET NO. 9

### MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS

Test Vehicle: 2011 Honda Pilot LX 2WD  
Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5301  
Test Date: 7/29/2010

#### MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheelbase of Framework Carriage	2592
CG Location aft of Front Axle	1129

#### MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	411.8	281.6	
Right	kg	356.8	311.3	
Ratio	%	56.5	43.5	
Totals	kg	768.6	592.9	1361.5

#### 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	89.8

#### MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Row	Vertical Location		From Centerline		Maximum Crush
	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Left	202
B	Top of Bumper	533	800	Right	156
C	Mid-Level	686	800	Left	130
D	Top of Stack	813	800	Left	167

#### MDB INSTRUMENTATION AND CAMERAS

Accelerometers	5
Contact Switches	2
High-Speed Cameras	2

**DATA SHEET NO. 10**

**POST-TEST OBSERVATIONS**

Test Vehicle: 2011 Honda Pilot LX 2WD  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5301  
 Test Date: 7/29/2010

**TEST DUMMY INFORMATION AND CONTACT**

Description	Driver (ES-2re)	Passenger (SID-IIs)
Dummy Type / Serial No.	ES-2re / 032	SID-IIs / 296
Head Contact	Curtain Airbag, Side Header, Headrest	Curtain Airbag, Headrest
Upper Torso Contact	Side Airbag	Door Panel
Lower Torso Contact	Side Airbag	Door Panel
Left Knee Contact	Door Panel	Door Panel
Right Knee Contact	Left Knee	Left Knee

**POST TEST DOOR OPENING AND SEAT TRACK INFORMATION**

Description	Front	Rear
Left Side Doors	Remained closed and jammed shut	Remained closed and jammed shut
Right Side Doors	Remained closed and operational	Remained closed and operational
Hatch and Other Doors	Remained closed and operational	Remained closed and operational
Seat Movement	0	0
Seat Back Failure	None	None

**POST TEST STRUCTURAL OBSERVATIONS**

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No Separation
Sill Separation	None
Windshield Damage	None
Window Damage	None
Other Notable Effects	None

**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

Restraint Type	Left Front (Driver) P1		Left Rear (Passenger) P4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	Yes	No	
Knee Airbag	No		No	
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes		No	

**MDB LEFT EDGE IMPACT POINT DATA**

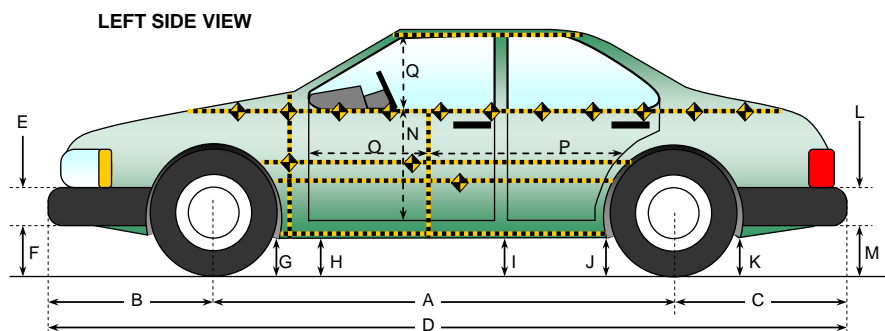
Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	2 forward
Vertical Offset	mm	+/-20	2 down

## DATA SHEET NO. 11

### VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Honda Pilot LX 2WD  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5301  
 Test Date: 7/29/2010



All measurements in (mm) with tolerance of  $\pm 3$  mm

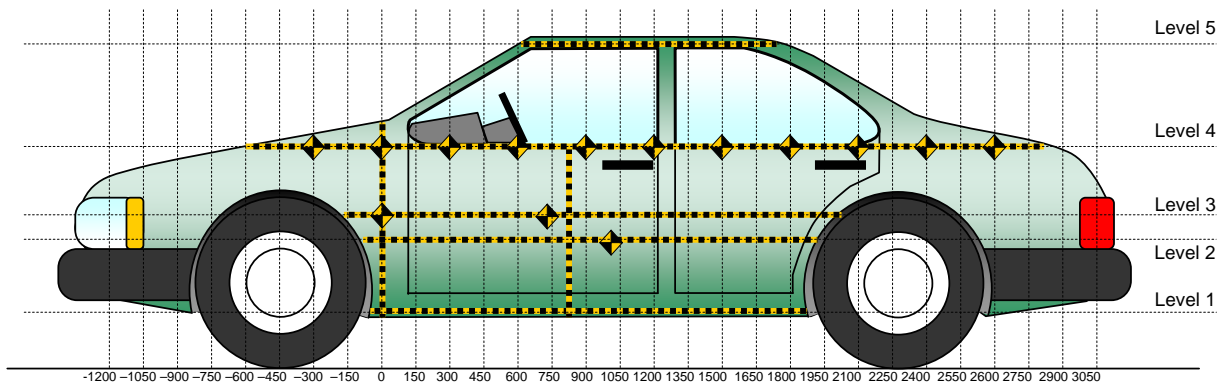
#### VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2778	2733	45
B	Front Axle to FSOV	946	966	-20
C	Rear Axle to RSOV	1123	1131	-8
D	Total Length at Centerline	4847	4830	17
E	Front Bumper Thickness	190	190	0
F	Front Bumper Bottom to Ground	474	405	69
G	Sill Height at Front Wheel Well	228	238	-10
H	Sill Height at Front Door Leading Edge	311	235	76
I	Sill Height at B Pillar	328	240	88
J1	Sill Height at Rear Wheel Well	265	284	-19
J2	Pinch Weld Height at Rear Wheel Well	317	268	49
K	Sill Height Aft of Rear Wheel Well	264	259	5
L	Rear Bumper Thickness	106	106	0
M	Rear Bumper Bottom to Ground	456	477	-21
N	Sill Height to Window Bottom Sill	845	784	61
O	Front Door Leading Edge to Impact CL	812	789	23
P	Rear Door Trailing Edge to Impact CL	1266	1242	24
Q	Front Window Opening	480	475	5
R	Right Side Length	4015	4015	0
S	Left Side Length	4015	3977	38
T	Vehicle Width at B Post	1965	1836	129

**DATA SHEET NO. 12**  
**VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2011 Honda Pilot LX 2WD  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5301  
 Test Date: 7/29/2010



All Measurements Shown in mm

**LEFT SIDE VIEW**

Note: The measurements are taken along the vertical impact reference line.  
 Vehicle measurements forward of the vertical impact reference line are negative.

Level	Measurement Description	Height Above Ground (mm)
1	Sill Top	356
2	Occupant H-Point	765
3	Mid-Door	798
4	Window Sill	1167
5	Window Top	1685

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

Test Vehicle: 2011 Honda Pilot LX 2WD  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5301  
 Test Date: 7/29/2010

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-150		103	106	220			99	97	218			-4	-9	-2	
0		120	122	210			116	116	206			-4	-6	-4	
150	194	121	120	203		256	255	249	195		62	134	129	-8	
300	216	119	118	197		290	308	301	186		74	189	183	-11	
450	215	117	116	193		299	326	320	190		84	209	204	-3	
600	215	116	116	186	380	307	339	330	191	349	92	223	214	5	-31
750	215	115	116	183	379	311	347	341	197	348	96	232	225	14	-31
900	215	112	116	179	375	316	343	341	203	349	101	231	225	24	-26
1050	215	110	117	178	373	322	327	332	211	348	107	217	215	33	-25
1200	216	110	118	173	372	327	335	348	231	347	111	225	230	58	-25
1350	217	110	118	173	369	328	348	352	216	347	111	238	234	43	-22
1500	220	112	120	171	368	331	332	339	209	345	111	220	219	38	-23
1650	217	115	123	174	368	332	307	317	201	344	115	192	194	27	-24
1800	202	124	125	172	369	318	278	283	179	342	116	154	158	7	-27
1950		106	109	174	369		195	209	174	341		89	100	0	-28

Note: The measurements are taken along the vertical impact reference line.  
 Vehicle measurements forward of the vertical impact reference line are negative.

**MAXIMUM CRUSH DATA**

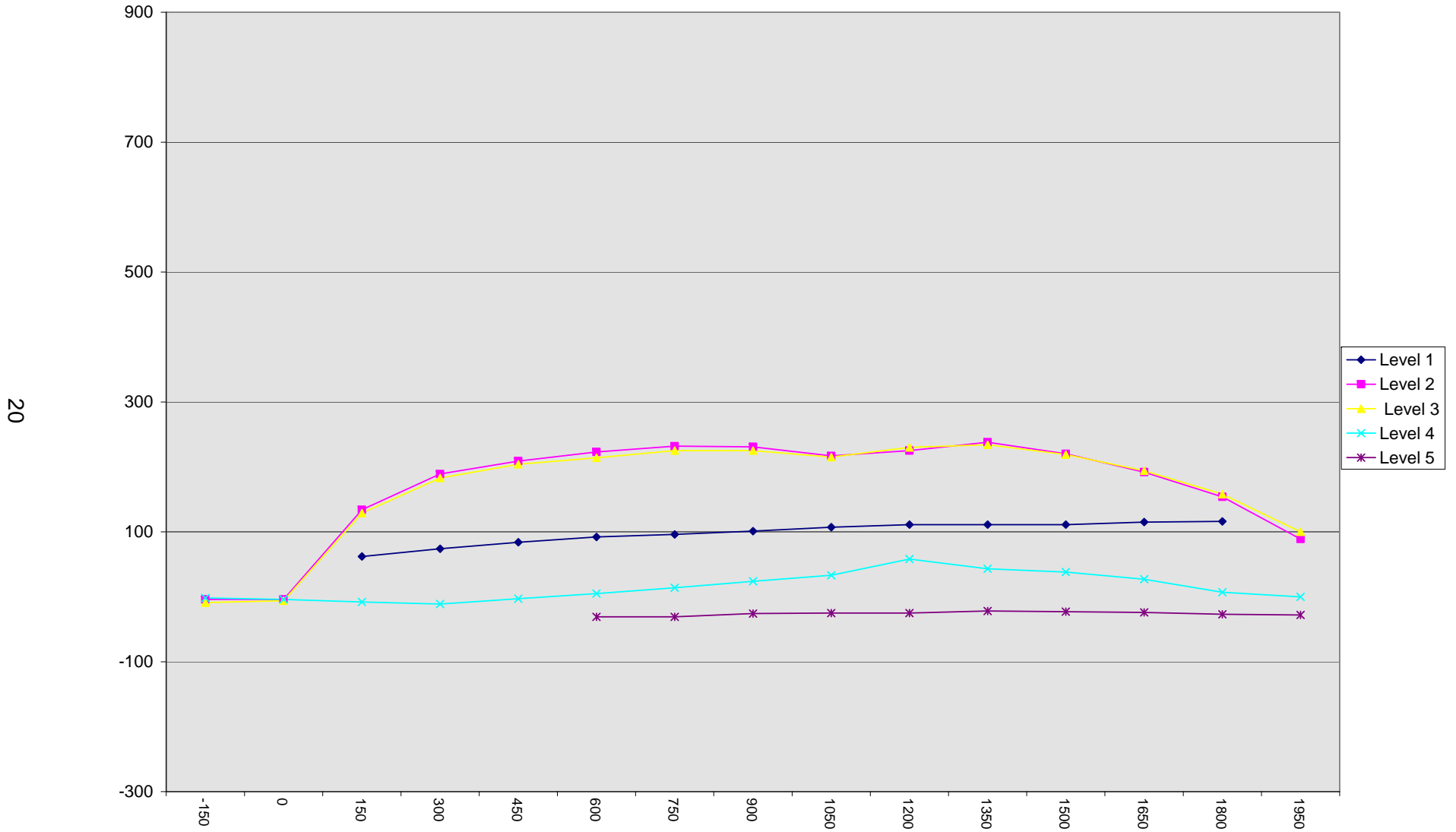
	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush (mm)	116	238	234	58	-22
Distance From Impact (mm)	1800	1350	1350	1200	1350

DATA SHEET NO. 12 (continued)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Honda Pilot LX 2WD  
Test Program: NCAP Side MDB Impact Test

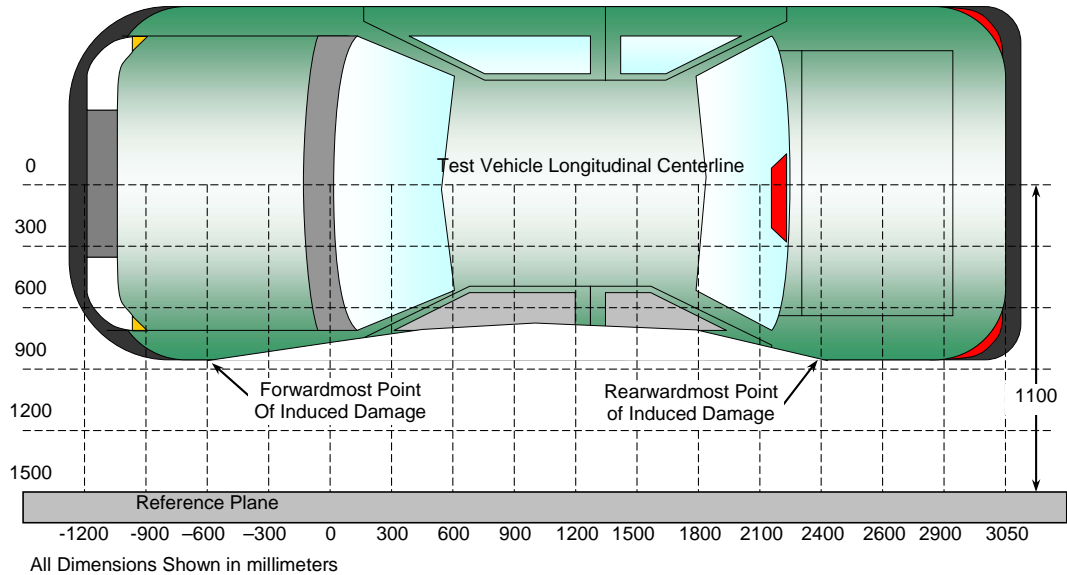
NHTSA No. MB5301  
Test Date: 7/29/2010



**DATA SHEET NO. 13**  
**VEHICLE DAMAGE PROFILE DISTANCES**

Test Vehicle: 2011 Honda Pilot LX 2WD  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5301  
 Test Date: 7/29/2010



**TOP VIEW**

**DAMAGE PROFILE DISTANCES**

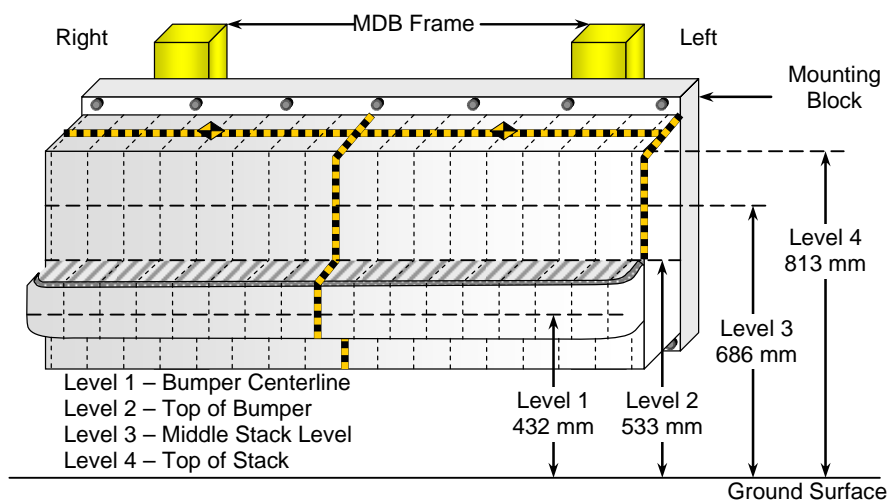
DPD	Distance from Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Max. Static Crush (mm)
1	1950	4	174	174	0
2	1530	2	113	329	216
3	1110	2	110	331	221
4	690	2	115	342	227
5	270	2	120	305	185
6	-150	4	220	218	-2

## DATA SHEET NO. 14

### EXTERIOR STATIC CRUSH FOR IMPACTOR FACE

Test Vehicle: 2011 Honda Pilot LX 2WD  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5301  
 Test Date: 7/29/2010



### DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center (mm)								C <sub>L</sub>	Distance Left of Center (mm)							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
4	127	99	76	59	49	45	68	78	73	68	74	75	84	96	109	128	167
3	106	84	75	60	57	60	69	90	74	58	51	55	64	75	87	108	130
2	156	152	150	144	133	135	129	131	126	129	127	124	124	124	126	129	135
1	187	186	186	182	180	178	178	178	177	179	180	182	183	188	193	202	202

**DATA SHEET NO. 15**

**FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA**

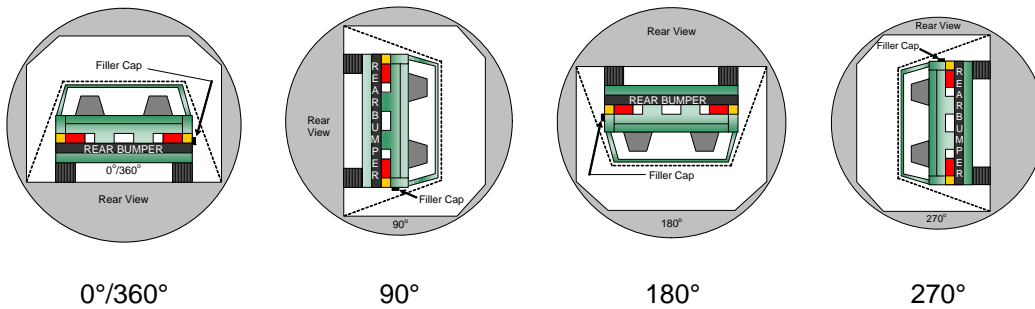
Test Vehicle: 2011 Honda Pilot LX 2WD  
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5301  
 Test Date: 7/29/2010

Test Time: 11:13 am      Temperature: 21° C

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

**FMVSS 301 STATIC ROLLOVER DATA**



**ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS**

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	117	300	417
90° to 180°	116	300	416
180° to 270°	111	300	411
270° to 360°	119	300	419

**FMVSS 301 ROLLOVER SPILLAGE TABLE (units in ounces)**

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eight 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**

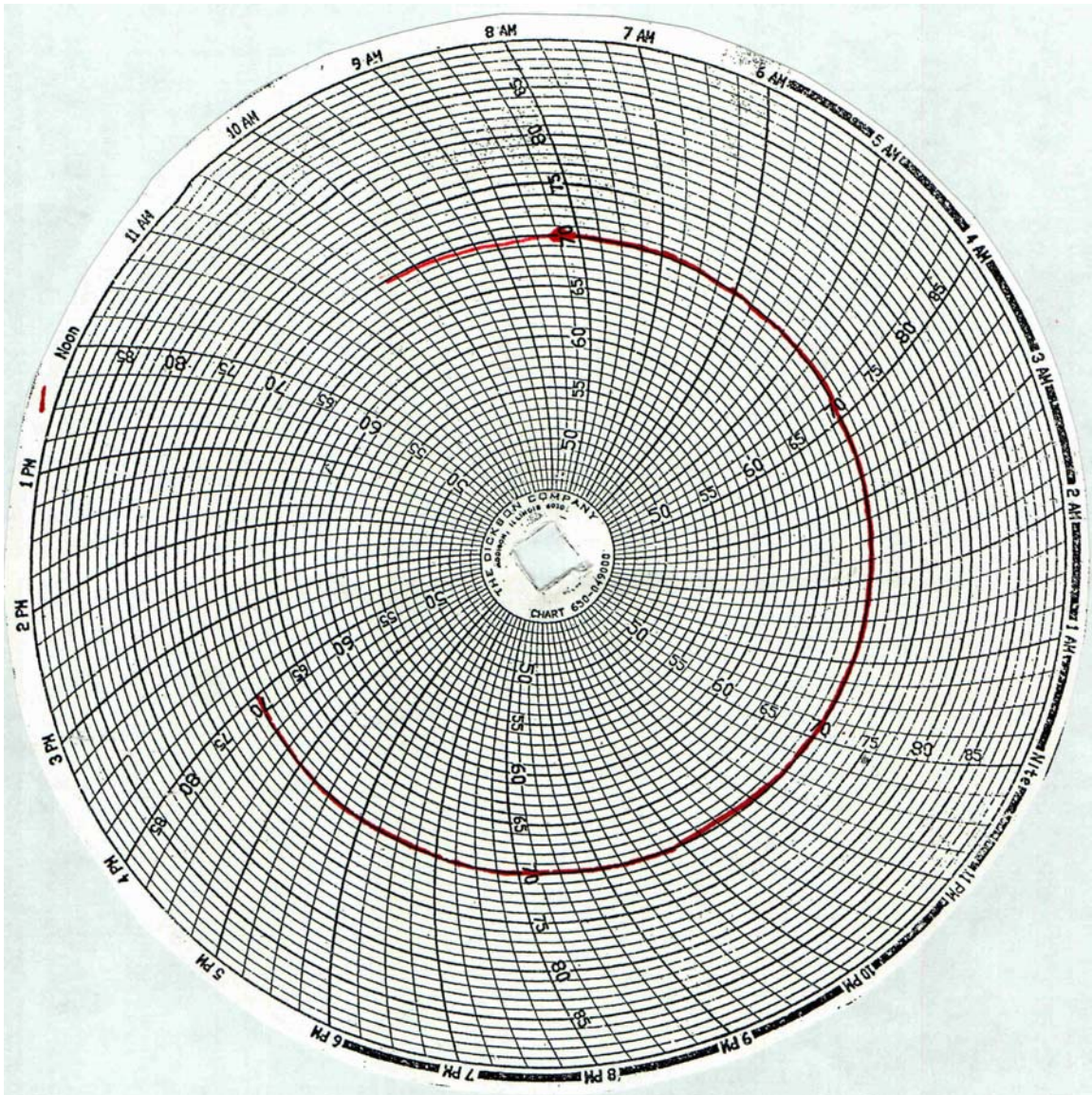
Test Phase	Spillage Location
0° to 90°	
90° to 180°	
180° to 270°	
270° to 360°	

# DATA SHEET NO. 16

## DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2011 Honda Pilot LX 2WD  
Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5301  
Test Date: 7/29/2010



**APPENDIX A**  
**PHOTOGRAPHS**

## TABLE OF PHOTOGRAPHS

		<u>Page No.</u>
Photo No. 1.	As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle	A-1
Photo No. 2.	As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle	A-1
Photo No. 3.	Pre-Test Frontal View of Test Vehicle	A-2
Photo No. 4.	Post-Test Frontal View of Test Vehicle	A-2
Photo No. 5.	Pre-Test Left $\frac{3}{4}$ Front View of Test Vehicle	A-3
Photo No. 6.	Post-Test Left $\frac{3}{4}$ Front View of Test Vehicle	A-3
Photo No. 7.	Pre-Test Left Side View of Test Vehicle	A-4
Photo No. 8.	Post-Test Left Side View of Test Vehicle	A-4
Photo No. 9.	Pre-Test Left $\frac{3}{4}$ Rear View of Test Vehicle	A-5
Photo No. 10.	Post-Test Left $\frac{3}{4}$ Rear View of Test Vehicle	A-5
Photo No. 11.	Pre-Test Rear View of Test Vehicle	A-6
Photo No. 12.	Post-Test Rear View of Test Vehicle	A-6
Photo No. 13.	Pre-Test Right Side View of Test Vehicle	A-7
Photo No. 14.	Post-Test Right Side View of Test Vehicle	A-7
Photo No. 15.	Pre-Test Overhead View of Test Vehicle with MDB Positioned Against Side of Target Vehicle at Ideal Impact Point	A-8
Photo No. 16.	Post-Test Overhead View of Test Vehicle and MDB	A-8
Photo No. 17.	Pre-Test Left Side View of MDB Positioned Against Side of Target Vehicle at Ideal Impact Point	A-9
Photo No. 18.	Pre-Test Right Side View of MDB Positioned Against Side of Target Vehicle at Ideal Impact Point	A-9
Photo No. 19.	Pre-Test Close-Up View of Impact Point Target	A-10
Photo No. 20.	Post-Test Close-Up View of Impact Point Target Showing Impact Point Location	A-10
Photo No. 21.	Pre-Test Left Front Door Latch Close-Up	A-11
Photo No. 22.	Post-Test Left Front Door Latch Close-Up	A-11
Photo No. 23.	Pre-Test Left Rear Door Latch Close-Up	A-12

		<u>Page No.</u>
Photo No. 24.	Post-Test Left Rear Door Latch Close-Up	A-12
Photo No. 25.	Pre-Test Front Close-Up View of Driver Dummy	A-13
Photo No. 26.	Post-Test Front Close-Up View of Driver Dummy	A-13
Photo No. 27.	Pre-Test Left Side View of Driver Dummy Showing Belt, Chalking, and Contact Switches (Door Open)	A-14
Photo No. 28.	Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View	A-15
Photo No. 29.	Post-Test Left Side View of Driver Dummy Shoulder and Door Top View	A-15
Photo No. 30.	Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning	A-16
Photo No. 31.	Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint	A-16
Photo No. 32.	Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning	A-17
Photo No. 33.	Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan	A-17
Photo No. 34.	Pre-Test Placement of Driver Dummy's Feet	A-18
Photo No. 35.	Pre-Test View of Belt Anchorage for Driver Dummy to Show Position	A-18
Photo No. 36.	Pre-Test Left Side View of Steering Wheel to Show Position	A-19
Photo No. 37.	Pre-Test View of Parking Brake	A-19
Photo No. 38.	Pre-Test Close-Up Left Side View of Driver Seat Track Showing Test Position	A-20
Photo No. 39.	Pre-Test Close-Up Left Side View of Driver Seat Back Showing Test Position	A-20
Photo No. 40.	Pre-Test Close-Up View of Driver Seat Back or Head Restraint Showing Seat Back Test Position	A-21
Photo No. 41.	Pre-Test Driver Dummy and Door Clearance View	A-22
Photo No. 42.	Post-Test Driver Dummy and Door Clearance View	A-22
Photo No. 43.	Pre-Test Right Side View of Front Seat of Occupant Compartment	A-23
Photo No. 44.	Post-Test Right Side View of Front Seat of Occupant Compartment	A-23
Photo No. 45.	Pre-Test Driver Inner Door Panel View	A-24
Photo No. 46.	Post-Test Driver Inner Door Panel View Showing Driver Dummy Contact Locations	A-24
Photo No. 47.	Post-Test Driver Dummy Close-up Head Contact with Vehicle View	A-25

		<u>Page No.</u>
Photo No. 48.	Post-Test Driver Dummy Close-up Head Contact with Side Airbag View	A-25
Photo No. 49.	Post-Test Driver Dummy Close-up Torso Contact with Vehicle View	A-26
Photo No. 50.	Post-Test Driver Dummy Close-up Torso Contact with Side Airbag View	A-26
Photo No. 51.	Post-Test Driver Dummy Close-up Pelvis Contact View	A-27
Photo No. 52.	Post-Test Driver Dummy Close-up Pelvis Contact with Side Airbag View	A-27
Photo No. 53.	Pre-Test Left Side View of Passenger Dummy Showing Belt, Chalking, and Contact Switches (Door Open)	A-28
Photo No. 54.	Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View	A-29
Photo No. 55.	Post-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View	A-29
Photo No. 56.	Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning	A-30
Photo No. 57.	Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint	A-30
Photo No. 58.	Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning	A-31
Photo No. 59.	Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan	A-31
Photo No. 60.	Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket	A-32
Photo No. 61.	Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level	A-32
Photo No. 62.	Pre-Test Placement of Rear Passenger Dummy's Feet	A-33
Photo No. 63.	Pre-Test View of Belt Anchorage for Rear Passenger Dummy to Show Position	A-33
Photo No. 64.	Pre-Test Close-Up Left Side View of Rear Passenger Seat Track Showing Test Position	A-34
Photo No. 65.	Pre-Test Close-Up Left Side View of Rear Passenger Seat Back Showing Test Position	A-34
Photo No. 66.	Pre-Test Close-up View of Rear Passenger Seat Back or Head Restraint Showing Seat Back Test Position	A-35
Photo No. 67.	Pre-Test Rear Passenger Dummy and Door Clearance View	A-36
Photo No. 68.	Post-Test Rear Passenger Dummy and Door Clearance View	A-36
Photo No. 69.	Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment	A-37
Photo No. 70.	Post-Test Right Side View of Rear Passenger Dummy Seat and Rear Seat Occupant Compartment	A-37
Photo No. 71.	Pre-Test Passenger Inner Door Panel View	A-38

		<u>Page No.</u>
Photo No. 72.	Post-Test Rear Passenger Inner Door Panel View Showing Rear Passenger Dummy Contact Locations	A-38
Photo No. 73.	Post-Test Rear Passenger Dummy Close-up Head Contact with Vehicle View	A-39
Photo No. 74.	Post-Test Rear Passenger Dummy Close-up Head Contact with Side Airbag View	A-39
Photo No. 75.	Post-Test Rear Passenger Dummy Close-up Torso Contact with Vehicle View	A-40
Photo No. 76.	Post-Test Rear Passenger Dummy Close-up Torso Contact with Side Airbag View	A-40
Photo No. 77.	Post-Test Rear Passenger Dummy Close-up Pelvis Contact with Vehicle Interior View	A-41
Photo No. 78.	Post-Test Rear Passenger Dummy Close-up Pelvis Contact with Side Airbag View	A-41
Photo No. 79.	Pre-Test View of Fuel Filler Cap or Fuel Filler Neck	A-42
Photo No. 80.	Post-Test View of Fuel Filler Cap or Fuel Filler Neck	A-42
Photo No. 81.	Pre-Test Front View of MDB Impactor Face	A-43
Photo No. 82.	Post-Test Front View of MDB Impactor Face	A-43
Photo No. 83.	Pre-Test Top View of MDB Impactor Face	A-44
Photo No. 84.	Post-Test Top View of MDB Impactor Face	A-44
Photo No. 85.	Pre-Test Left Side View of MDB Impactor Face	A-45
Photo No. 86.	Post-Test Left Side View of MDB Impactor Face	A-45
Photo No. 87.	Pre-Test Right Side View of MDB Impactor Face	A-46
Photo No. 88.	Post-Test Right Side View of MDB Impactor Face	A-46
Photo No. 89.	Close-Up View of Vehicle's Certification Label	A-47
Photo No. 90.	Close-Up View of Vehicle's Tire Information Placard or Label	A-47
Photo No. 91.	Pre-Test Ballast View	A-48
Photo No. 92.	Post-Test Primary and Redundant Speed Trap Read-Out	A-48
Photo No. 93.	FMVSS No. 301/305 Rollover 0 Degrees	A-49
Photo No. 94.	FMVSS No. 301/305 Rollover 90 Degrees	A-49
Photo No. 95.	FMVSS No. 301/305 Rollover 180 Degrees	A-50

		<u>Page No.</u>
Photo No. 96.	FMVSS No. 301/305 Rollover 270 Degrees	A-50
Photo No. 97.	FMVSS No. 301/305 Rollover 360 Degrees	A-51
Photo No. 98.	Impact Event (Impact Side)	A-51
Photo No. 99.	Monroney Label	A-52
Photo No. 100.	Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-53
Photo No. 101.	Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-54



As Delivered Right Front ¾ View of Test Vehicle



As Delivered Left Rear ¾ View of Test Vehicle



Pre-Test Frontal View of Test Vehicle



Post-Test Frontal View of Test Vehicle



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



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



Pre-Test Left Side View of Test Vehicle



Post-Test Left Side View of Test Vehicle



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



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



Pre-Test Rear View of Test Vehicle



Post-Test Rear View of Test Vehicle



Pre-Test Right Side View of Test Vehicle



Post-Test Right Side View of Test Vehicle



Pre-Test Overhead View of Test Vehicle with MDB Positioned Against Side of Target Vehicle at Ideal Impact Point



Post-Test Overhead View of Test Vehicle and MDB



Pre-Test Left Side View of MDB Positioned Against Side of Target Vehicle at Ideal Impact Point



Pre-Test Right Side View of MDB Positioned Against Side of Target Vehicle at Ideal Impact Point



Pre-Test Close-Up View of Impact Point Target



Post-Test Close-Up View of Impact Point Target Showing Impact Point Location



Pre-Test Left Front Door Latch Close-Up



Post-Test Left Front Door Latch Close-Up



Pre-Test Left Rear Door Latch Close-Up



Post-Test Left Rear Door Latch Close-Up



Pre-Test Front Close-Up View of Driver Dummy



Post-Test Front Close-Up View of Driver Dummy



Pre-Test Left Side View of Driver Dummy Showing Belt, Chalking, and Contact Switches (Door Open)



Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View



Post-Test Left Side View of Driver Dummy Shoulder and Door Top View



Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning



Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint



Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning



Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan



Pre-Test Placement of Driver Dummy's Feet



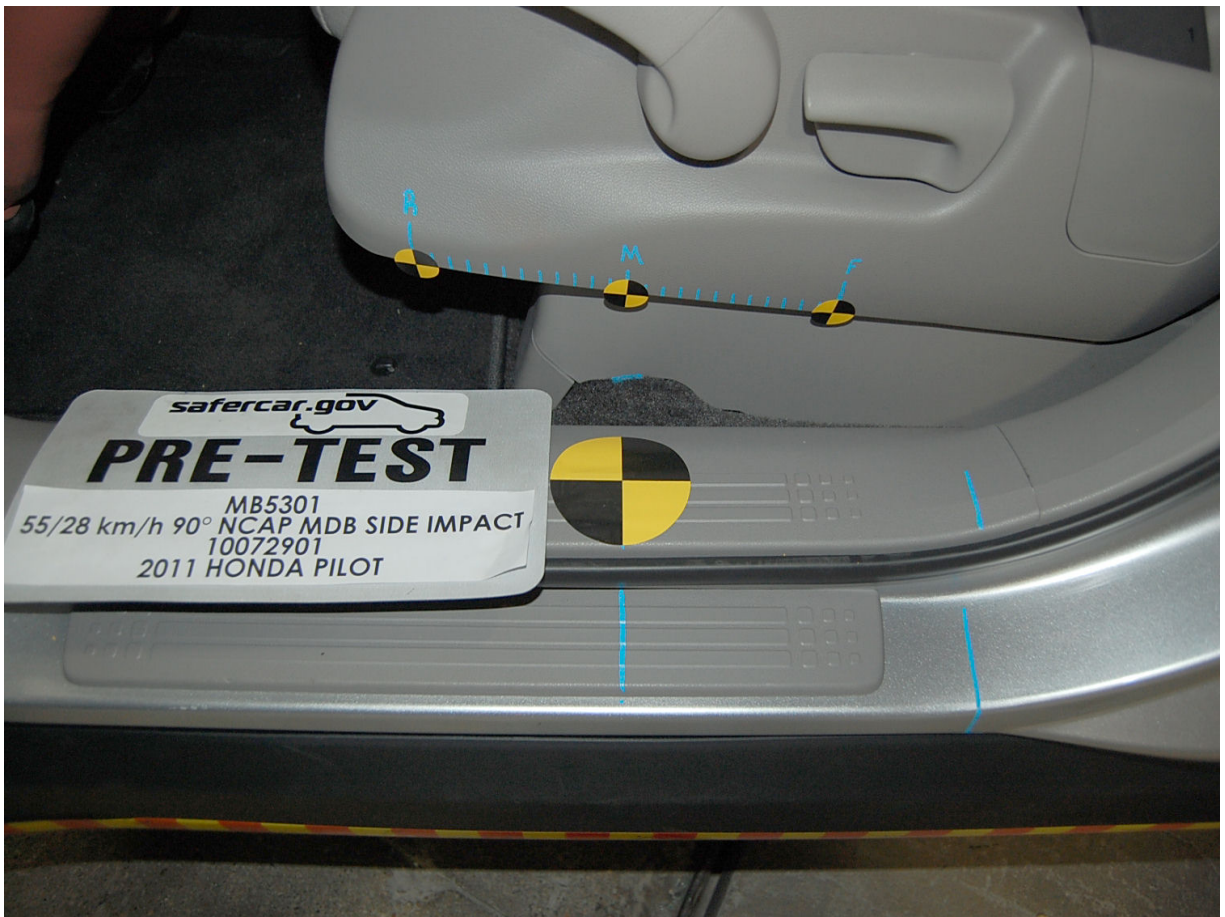
Pre-Test View of Belt Anchorage for Driver Dummy to Show Position



Pre-Test Left Side View of Steering Wheel to Show Position



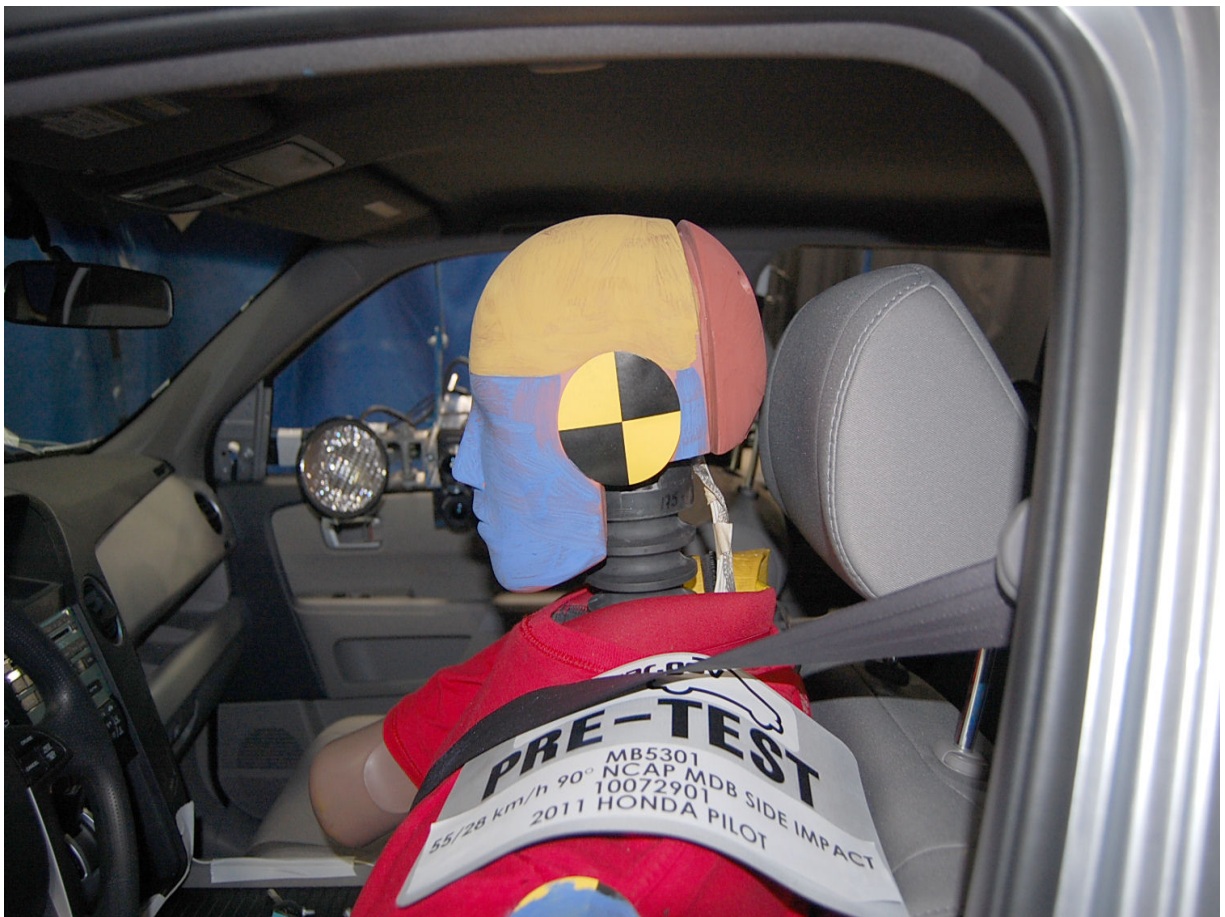
Pre-Test View of Parking Brake



Pre-Test Close-Up Left Side View of Driver Seat Track Showing Test Position



Pre-Test Close-Up Left Side View of Driver Seat Back Showing Test Position



Pre-Test Close-Up View of Driver Seat Back or Head Restraint Showing Seat Back Test Position



Pre-Test Driver Dummy and Door Clearance View



Post-Test Driver Dummy and Door Clearance View



Pre-Test Right Side View of Front Seat of Occupant Compartment



Post-Test Right Side View of Front Seat of Occupant Compartment



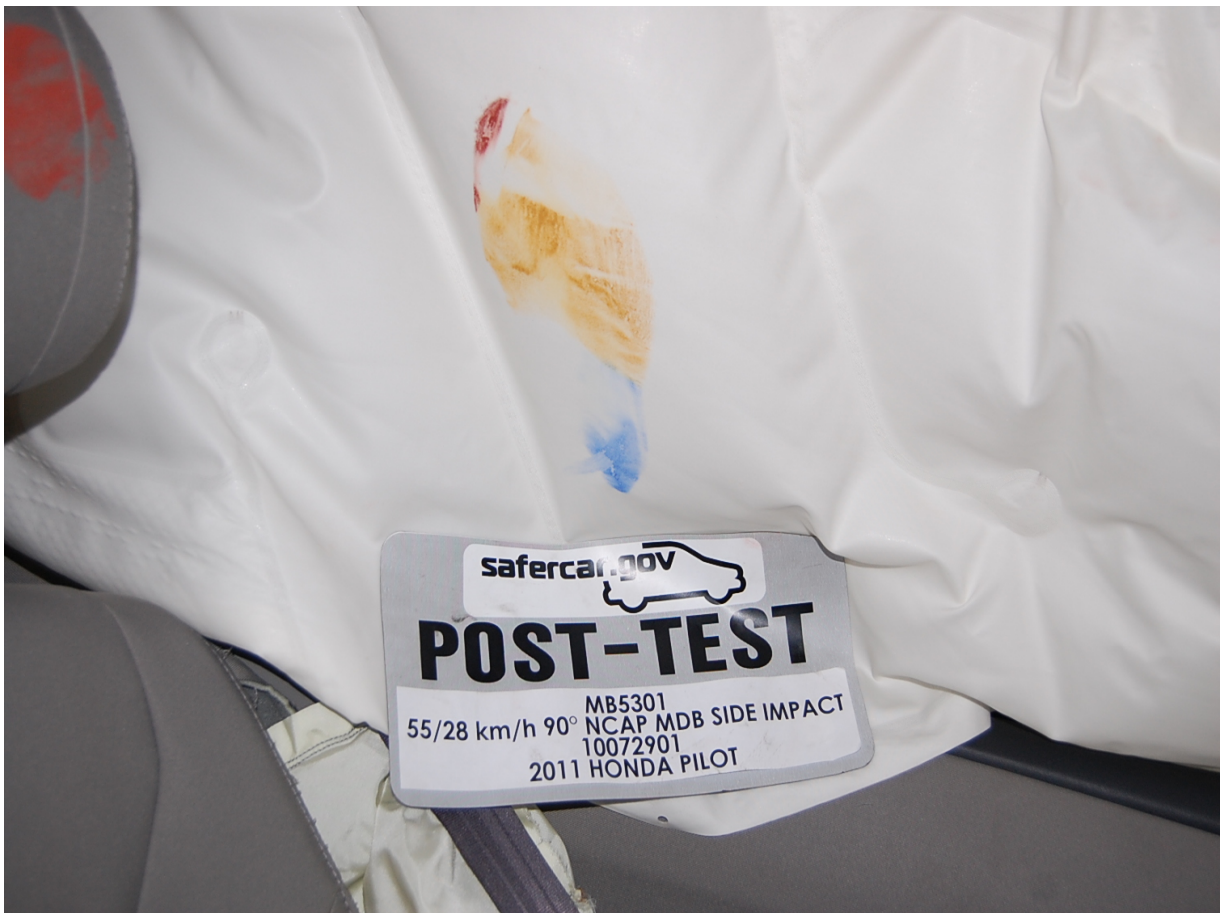
Pre-Test Driver Inner Door Panel View



Post-Test Driver Inner Door Panel View Showing Driver Dummy Contact Locations



Post-Test Driver Dummy Close-up Head Contact with Vehicle View



Post-Test Driver Dummy Close-up Head Contact with Side Airbag View



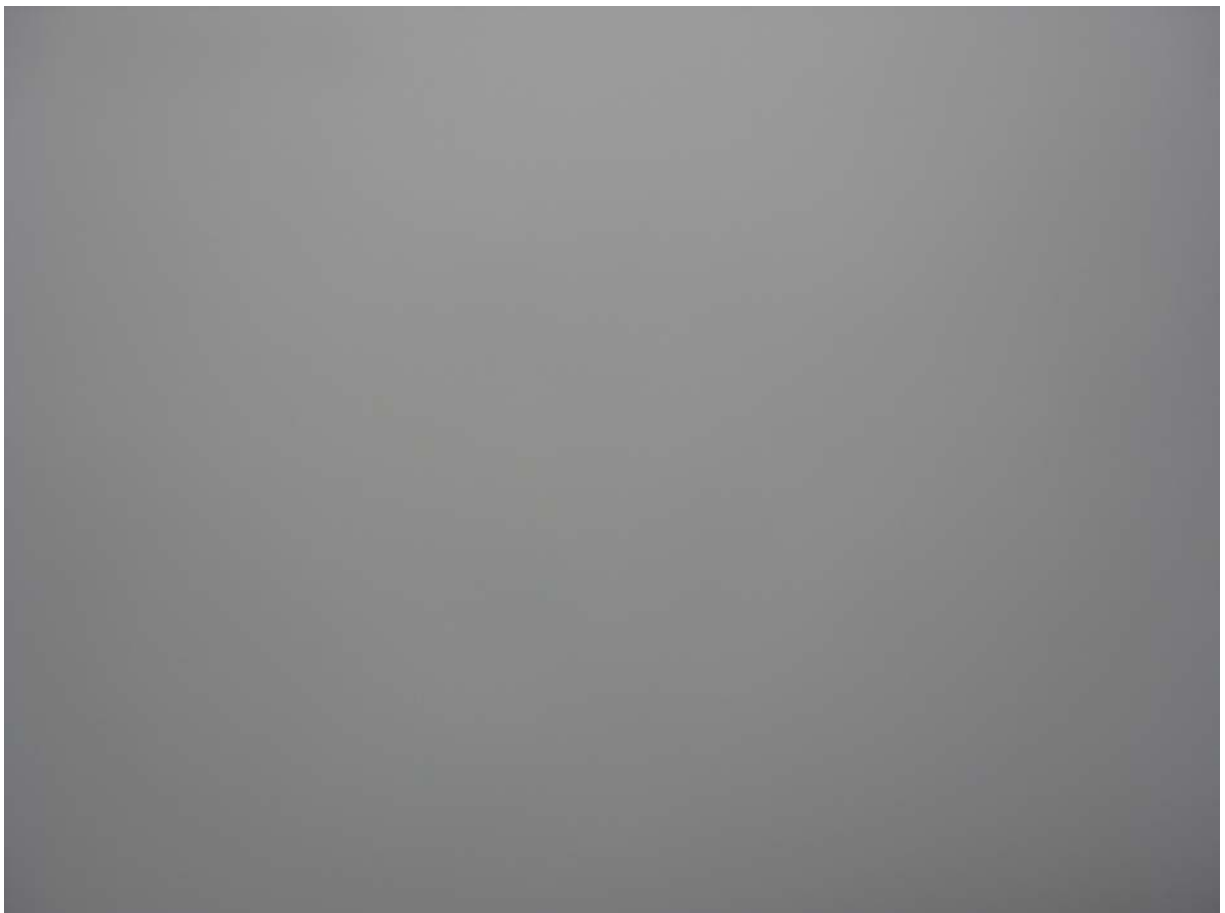
Post-Test Driver Dummy Close-up Torso Contact with Vehicle View



Post-Test Driver Dummy Close-up Torso Contact with Side Airbag View



Post-Test Driver Dummy Close-up Pelvis Contact View



Post-Test Driver Dummy Close-up Pelvis Contact with Side Airbag View



Pre-Test Left Side View of Passenger Dummy Showing Belt, Chalking, and Contact Switches (Door Open)



Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View



Post-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View



Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning



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



Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning



Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan



Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket



Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level



Pre-Test Placement of Rear Passenger Dummy's Feet



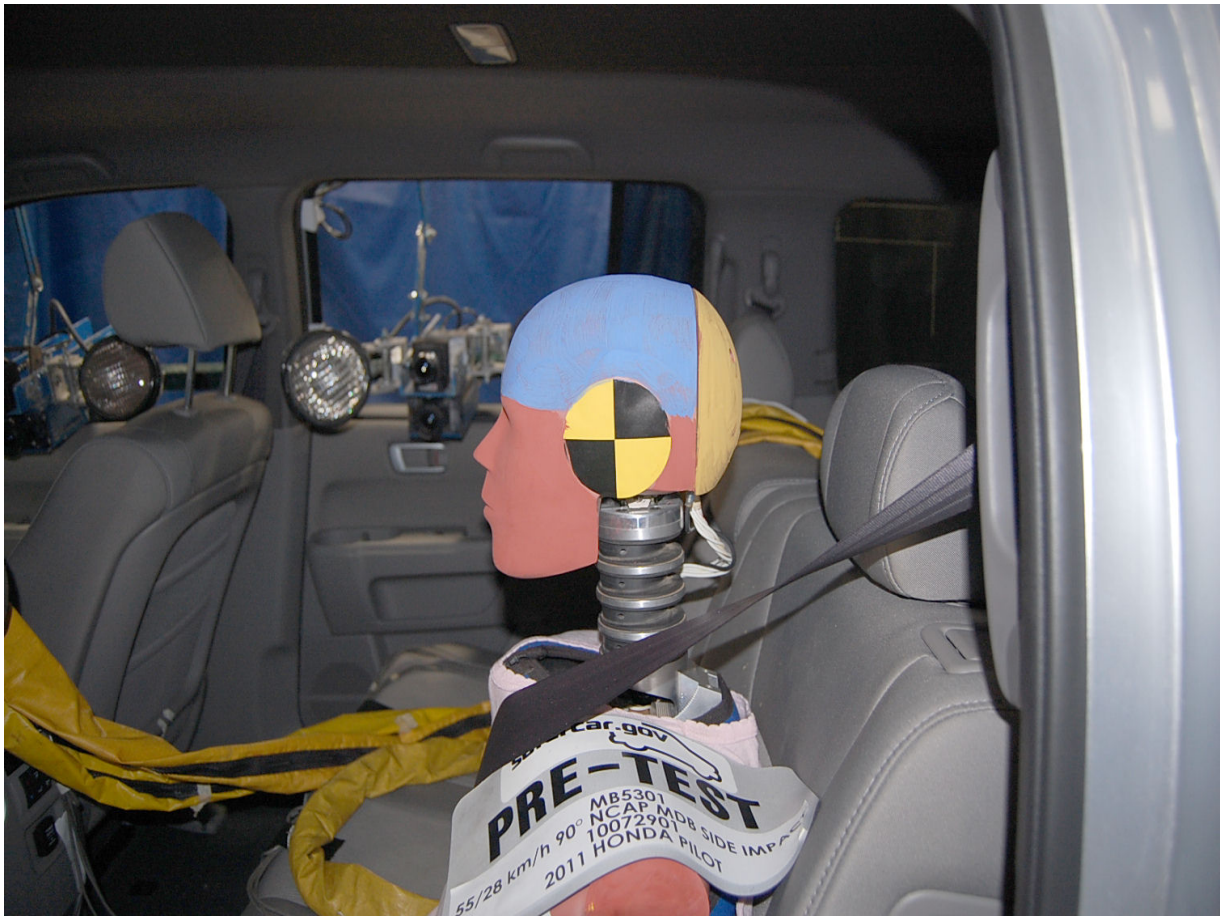
Pre-Test View of Belt Anchorage for Rear Passenger Dummy to Show Position



Pre-Test Close-Up Left Side View of Rear Passenger Seat Track Showing Test Position



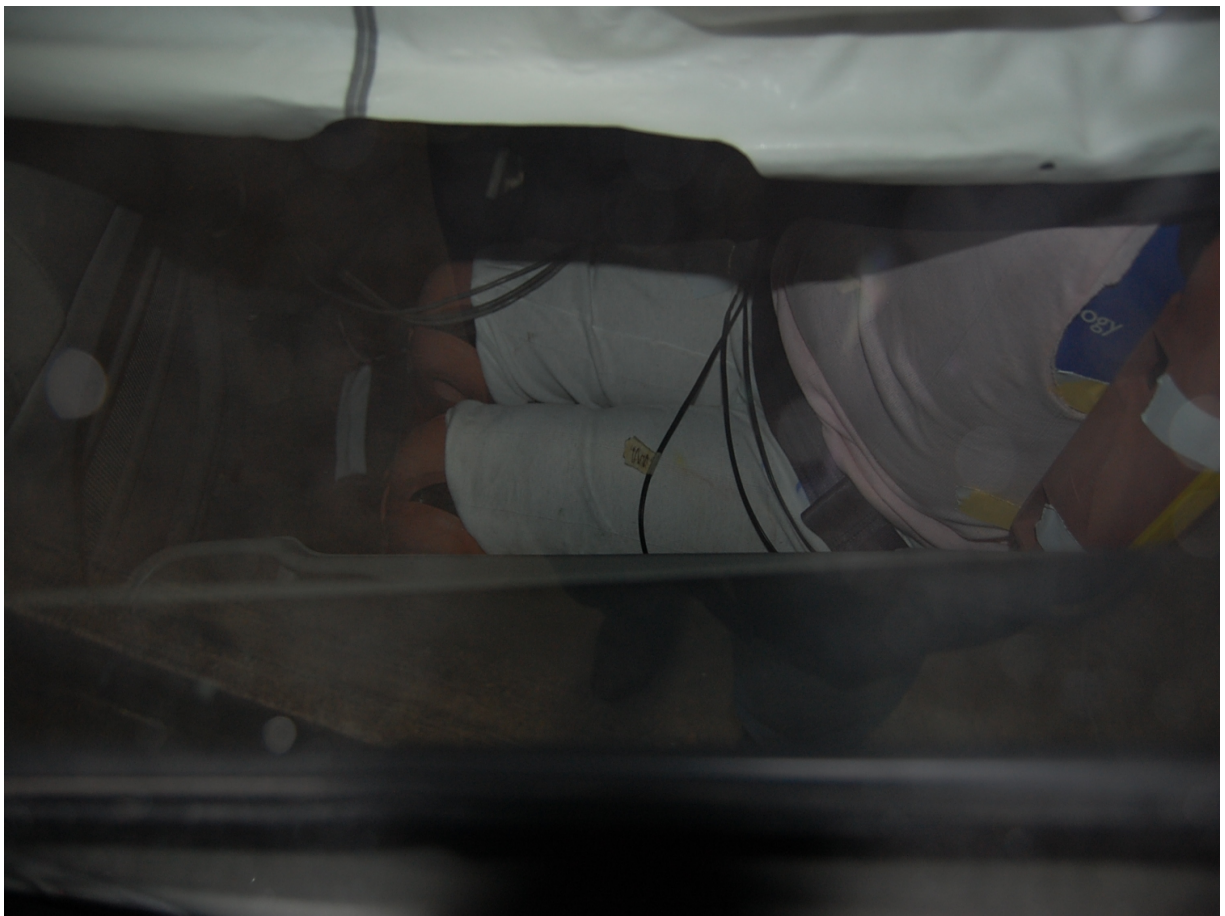
Pre-Test Close-Up Left Side View of Rear Passenger Seat Back Showing Test Position



Pre-Test Close-up View of Rear Passenger Seat Back or Head Restraint Showing Seat Back Test Position



Pre-Test Rear Passenger Dummy and Door Clearance View



Post-Test Rear Passenger Dummy and Door Clearance View



Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



Post-Test Right Side View of Rear Passenger Dummy Seat and Rear Seat Occupant Compartment



Pre-Test Passenger Inner Door Panel View



Post-Test Rear Passenger Inner Door Panel View Showing Rear Passenger Dummy Contact Locations



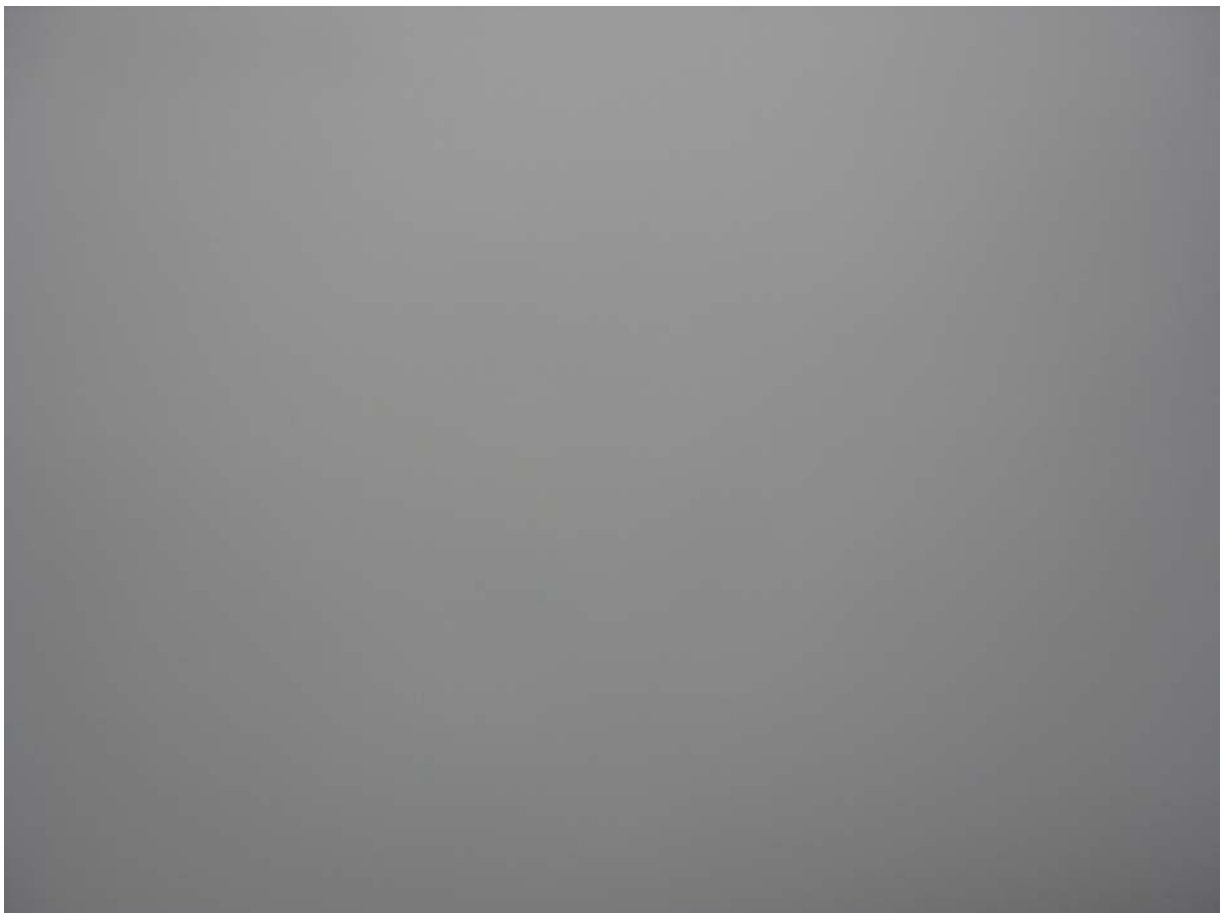
Post-Test Rear Passenger Dummy Close-up Head Contact with Vehicle View



Post-Test Rear Passenger Dummy Close-up Head Contact with Side Airbag View



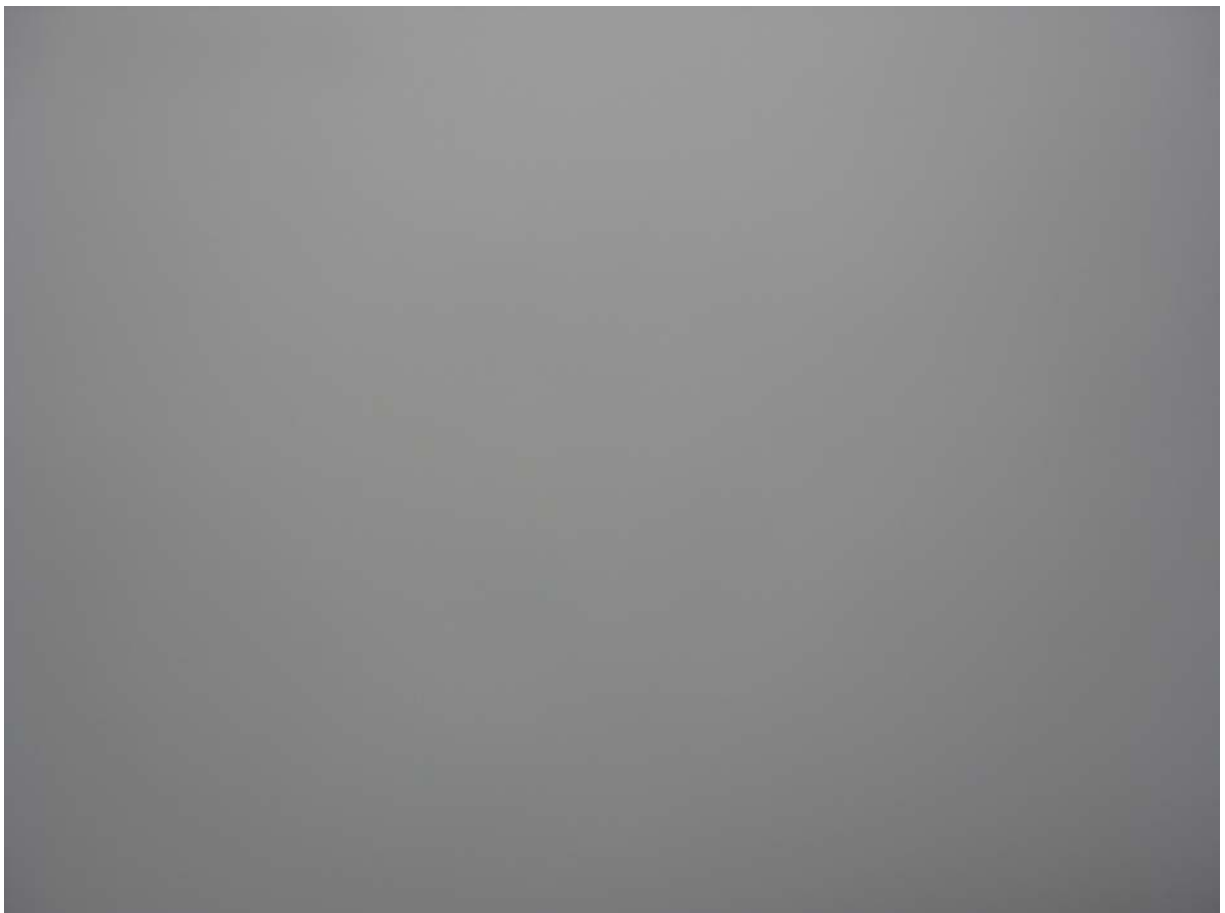
Post-Test Rear Passenger Dummy Close-up Torso Contact with Vehicle View



Post-Test Rear Passenger Dummy Close-up Torso Contact with Side Airbag View



Post-Test Rear Passenger Dummy Close-up Pelvis Contact with Vehicle Interior View



Post-Test Rear Passenger Dummy Close-up Pelvis Contact with Side Airbag View



Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



Post-Test View of Fuel Filler Cap or Fuel Filler Neck



Pre-Test Front View of MDB Impactor Face



Post-Test Front View of MDB Impactor Face



Pre-Test Top View of MDB Impactor Face



Post-Test Top View of MDB Impactor Face



Pre-Test Left Side View of MDB Impactor Face



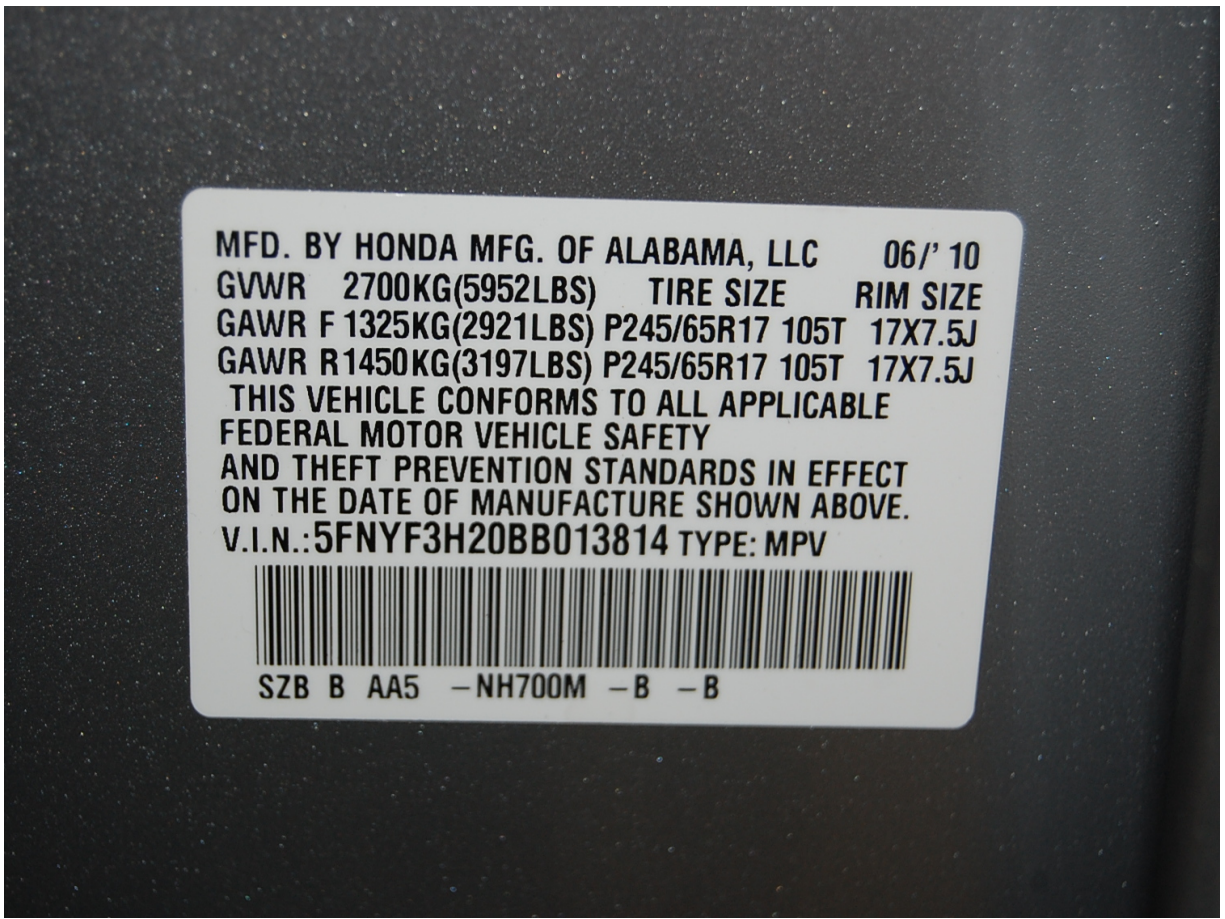
Post-Test Left Side View of MDB Impactor Face



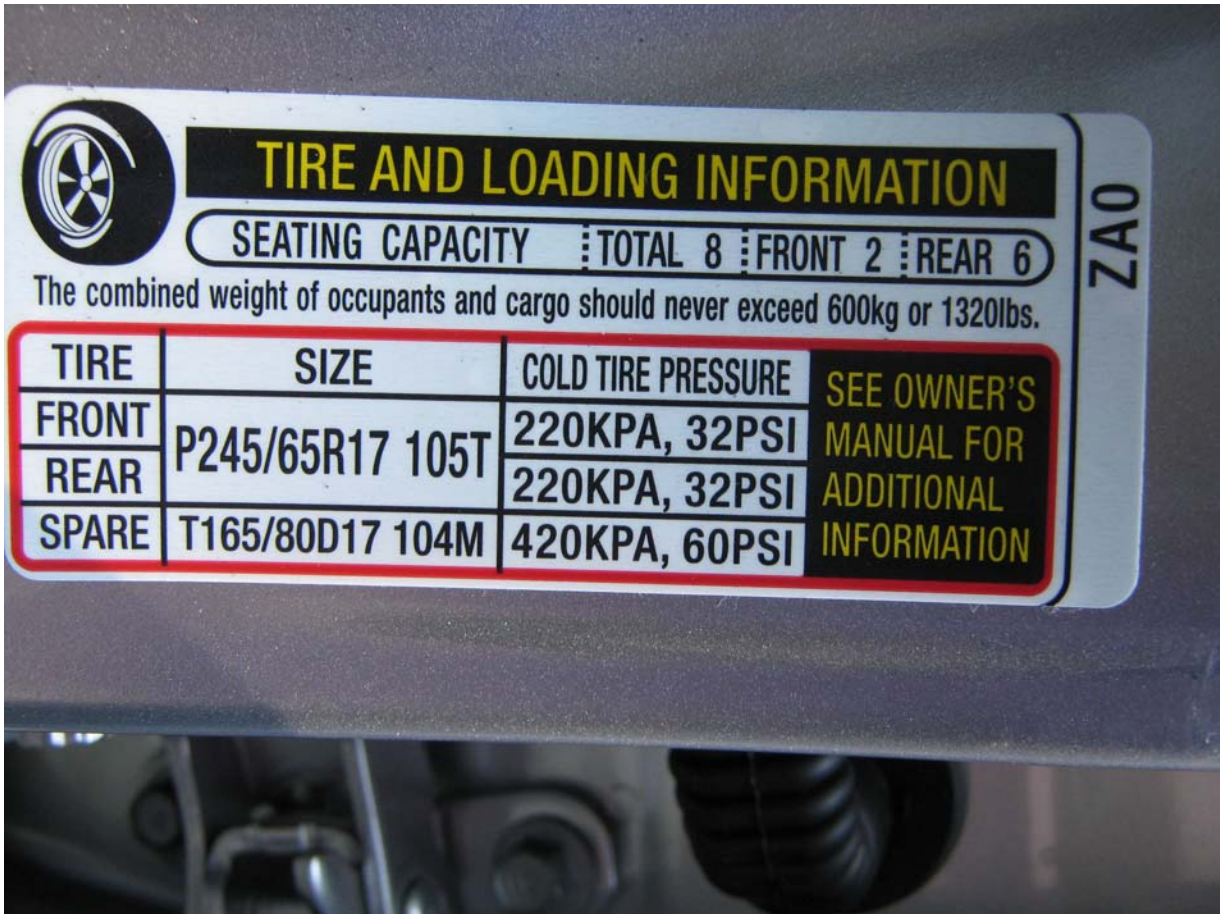
Pre-Test Right Side View of MDB Impactor Face



Post-Test Right Side View of MDB Impactor Face



Close-Up View of Vehicle's Certification Label



Close-Up View of Vehicle's Tire Information Placard or Label



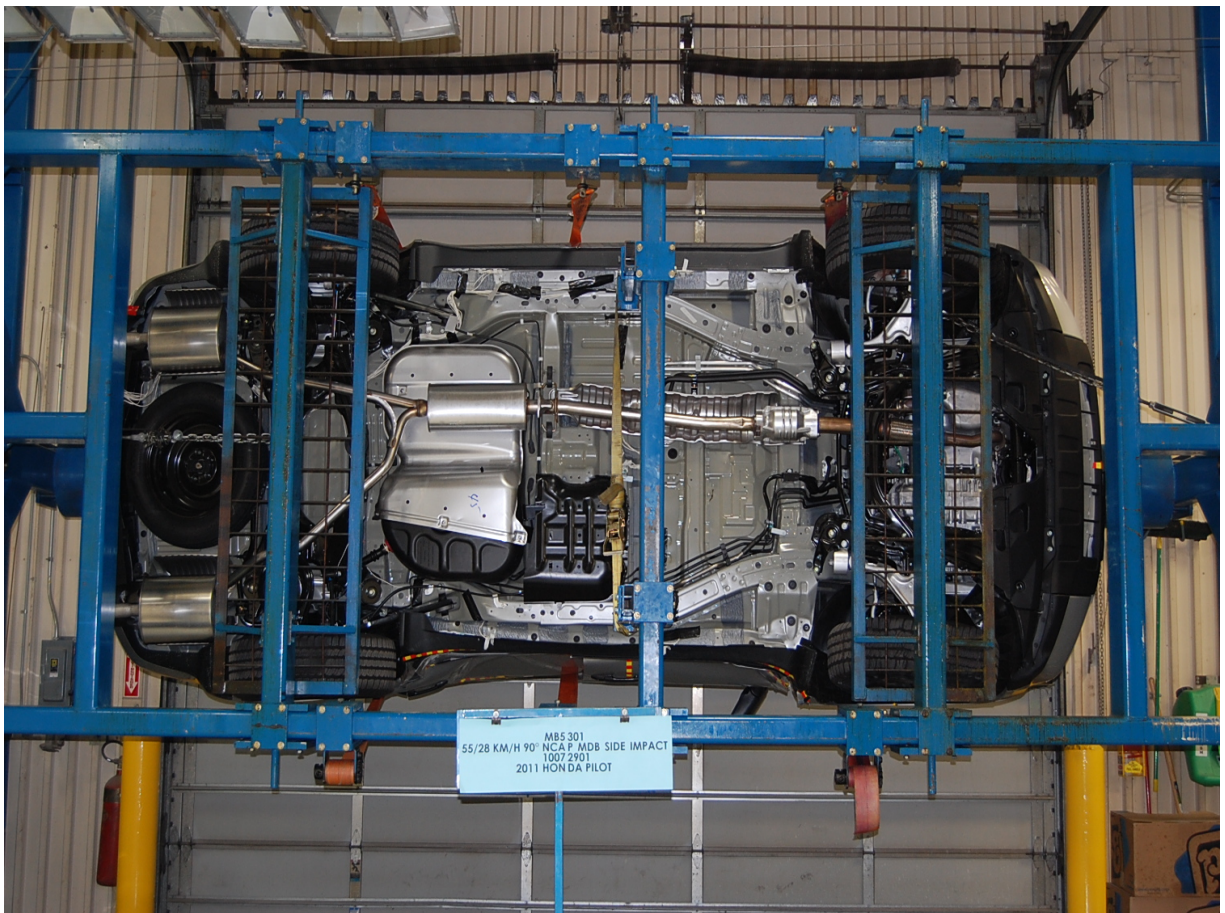
Pre-Test Ballast View



Post-Test Primary and Redundant Speed Trap Read-Out



FMVSS No. 301/305 Rollover 0 Degrees



FMVSS No. 301/305 Rollover 90 Degrees



FMVSS No. 301/305 Rollover 180 Degrees



FMVSS No. 301/305 Rollover 270 Degrees



FMVSS No. 301/305 Rollover 360 Degrees



Impact Event (Impact Side)



**2011 PILOT 5DR 2WD LX**  
 VEHICLE NUMBER: 9FNYF3H20BB013814  
 ENGINE NUMBER: J35Z4-3039894 EXT: ALABASTER SILVER M  
 CONTROL NUMBER: 942193 INT: GRAY

**STANDARD EQUIPMENT AT NO EXTRA COST**

- TECHNICAL FEATURES \***
  - 250hp 3.5-Liter SOHC 24-Valve I-VTEC V6 Engine with Variable Cylinder Management (VCM)
  - Active Noise Cancellation System with Grade Logic Control
  - 4-Wheel Disc Brakes
  - Hill Start Assist
  - Front Suspension with Strut Suspension
  - Rear Multi-Link Suspension
  - Front and Rear Stabilizer Bars
  - Variable-Assist Rack-and-Pinion Power Steering
  - Immobilizer/Theft-Deterrent System
- INTERIOR FEATURES \***
  - AM/FM/CD Audio System with 7 Speakers including Subwoofer
  - MP3/Auxiliary Input Jack
  - Front and Rear Air Conditioning
  - Driver's Seat Height Adjustment
  - Tilt & Telescopic Steering Column
  - 1148 Fold-Down 2nd and 3rd Rows
  - Power Windows, Auto Door Locks
  - Programmable Auto Door Locks
  - Front Air Up/Down Windows
  - Trip Computer and Compass
  - Cruise Control
  - Maintenance Minder System
  - 1st and 2nd Row Floor Mats
- EXTERIOR FEATURES \***
  - 17" x 7.5" Styled Steel Wheels
  - P245/65 R17 All-Season Tires
  - Remote Entry System
  - Auto-On/Off Headlights
  - Power Door Mirrors
  - Rear Side Moldings
  - Rear Privacy Glass
  - Roof Rack with Crossbar
  - Tailgate w/ Class III Trailer Hitch
  - Pre-Wired for Trailer Harness
- SAFETY FEATURES \***
  - Driver's and Front Passenger's Dual-Stage Airbags (SRS)
  - Driver's and Front Passenger's Side Airbags
  - Three Row Side Curtain Airbags
  - Active Front Head Restraints
  - Vehicle Stability Assist (VSA)
  - Anti-Lock Braking System (ABS)
  - Electronic Brake Distribution (EBD)
  - ACE Body Structure
  - 3-Point Seat Belts
  - Front Seat Belts with Automatic Tensioning System
  - Tire Pressure Monitoring System
  - Side-Impact Door Beams
  - Daytime Running Lights (DRL)
  - LATCH System for Child Seats

Manufacturer's Suggested Retail Price **\$28,045.00**  
 Full Tank of Fuel No Charge

Destination and Handling 780.00  
**TOTAL VEHICLE PRICE**  
 (Includes Pre-Delivery Service) **\$28,825.00**

License and title fees, state and local taxes and dealer options and accessories are not included in the manufacturer's suggested retail price.

**Environmental Performance**

Protect the environment, choose vehicles with higher scores:  
**Global Warming Score**



Smog Score

Bar chart showing Smog Score from 1 to 10. The score is 5. The chart is labeled 'Average new vehicle' and 'Cleanest'.

Vehicle emissions are a primary contributor to global warming and smog. Scores are determined by the California Air Resources Board based on this vehicle's measured emissions. Please visit [www.DriveClean.ca.gov](http://www.DriveClean.ca.gov) for more information. **AIR RESOURCES BOARD**

BOYLAND HONDA  
 6141 S. 27TH STREET  
 GREENFIELD, WI 53221

PORT OF ENTRY: ALABAMA  
 DELIVERY POINT: SCHAUMBURG  
 SHIP#: 740-002  
 ROW/SPACE: 107-011  
 TRANS.METHOD: NEO ELWOOD

VIN: 9FNYF3H20BB013814  
 DEALER: 208276

ORIG. DLR: 208276  
 REF. NO: 40219  
 HN CODE: HN-8284  
 EMISSION: 50 STATE



**EPA Fuel Economy Estimates**

18962

**CITY MPG**  
**17**  
 Expected range for most drivers 14 to 20 MPG

**HIGHWAY MPG**  
**23**  
 Expected range for most drivers 19 to 27 MPG

Estimated Annual Fuel Cost **\$2,051**  
 based on 15,000 miles at \$2.60 per gallon

Combined Fuel Economy **19**  
 This Vehicle  
 10 ——— 32  
 All SUVs

Your actual mileage will vary depending on how you drive and maintain your vehicle



See the FREE Fuel Economy Guide at dealers or [www.fueleconomy.gov](http://www.fueleconomy.gov)

**PARTS CONTENT INFORMATION**

FOR VEHICLES IN THIS CARLINE  
 U.S./Canadian Parts Content: **70 %**

NOTE: Parts content does not include final assembly, distribution or other non-parts costs.

**GOVERNMENT SAFETY RATINGS**

<b>Frontal Crash</b>	Driver Passenger	Not Rated Not Rated
<b>Side Crash</b>	Front seat Rear seat	Not Rated Not Rated
<b>Rollover</b>		Not Rated

Star ratings based on the risk of injury in a frontal impact. Frontal ratings should ONLY be compared to other vehicles of similar size and weight.

Star ratings based on the risk of injury in a side impact.

Star ratings based on the risk of rollover in a single vehicle crash.

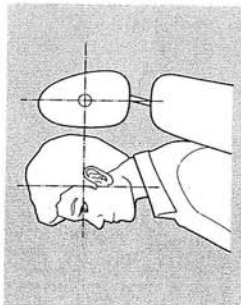
Star ratings range from 1 to 5 stars (★ ★ ★ ★ ★) with 5 being the highest.  
 Source: National Highway Traffic Safety Administration (NHTSA).

[www.safercar.gov](http://www.safercar.gov) or 1-888-327-4236

FOR THIS VEHICLE  
 Final Assembly Point:  
**USA**  
**LINCOLN, ALABAMA**

Country of Origin: Engine:  
**U.S.A.**  
 Transmission:  
**U.S.A.**

4. Adjust the Head Restraints



Adjust the driver's head restraint so the center of the back of your head rests against the center of the restraint.

Have passengers adjust their head restraints properly as well. Taller persons should adjust their restraint as high as possible.

**▲ WARNING**

Improperly positioning head restraints reduces their effectiveness and you can be seriously injured in a crash.

Make sure head restraints are in place and positioned properly before driving.

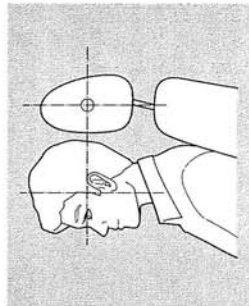
Properly adjusted head restraints will help protect occupants from whiplash and other crash injuries.

See page 157 for how to adjust the head restraints and how the driver's and front passenger's active head restraints work.

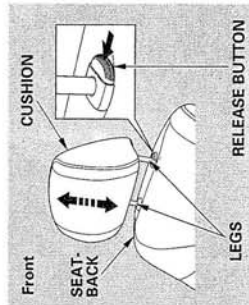
**Head Restraints**

See page 16 for important safety information and a warning about improperly positioning head restraints.

Your vehicle is equipped with head restraints in all seating positions to help protect you and your passengers from the likelihood of whiplash and other injuries.



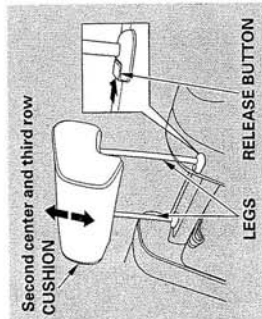
They are most effective when you adjust them so the center of the back of the occupant's head rests against the center of the restraint.



**Adjusting the Head Restraint**  
The head restraints adjust for height. You need both hands to adjust the restraint. Do not attempt to adjust it while driving. To raise it, pull upward. To lower the restraint, push the release button sideways, and push the restraint down.

CONTINUED

## Seats



**Removing the Head Restraint**  
To remove a head restraint for cleaning or repair, pull it up as far as it will go. Push the release button, then pull the restraint out of the seat-back.

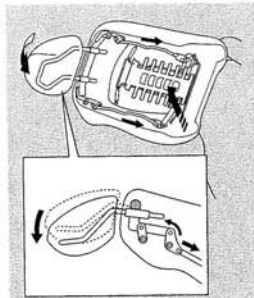
### ⚠ WARNING

Failure to reinstall the head restraints can result in severe injury during a crash.  
Always replace the head restraints before driving.

When reinstalling a head restraint, put the legs back in place. Then adjust it to the appropriate height while pressing the release button.

Make sure the head restraint locks in position when you reinstall it.

### Active Head Restraints



The driver's and front passenger's seats have active head restraints. If the vehicle is struck severely from the rear, the occupant properly secured with the seat belt will be pushed against the seat-back and the head restraint will automatically move forward.

This reduces the distance between the restraint and the occupant's head. It also helps protect the occupants against the likelihood of whiplash and injuries to the neck and upper spine.

After a collision, the activated restraint should return to its normal position.

If the restraints do not return to their normal position, or in the event of a severe collision, have the vehicle inspected by a Honda dealer.

For a head restraint system to work properly:

- Do not hang any items on the head restraints, or from the restraint legs.
- Do not place any object between an occupant and the seat-back.
- Install each restraint in its proper location.
- Only use genuine Honda replacement head restraints.

**APPENDIX B**  
**DUMMY RESPONSE DATA**

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

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

**The following additional data for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at [www.nhtsa.dot.gov](http://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 (not installed)

Passenger Side Airbag Timing (not installed)

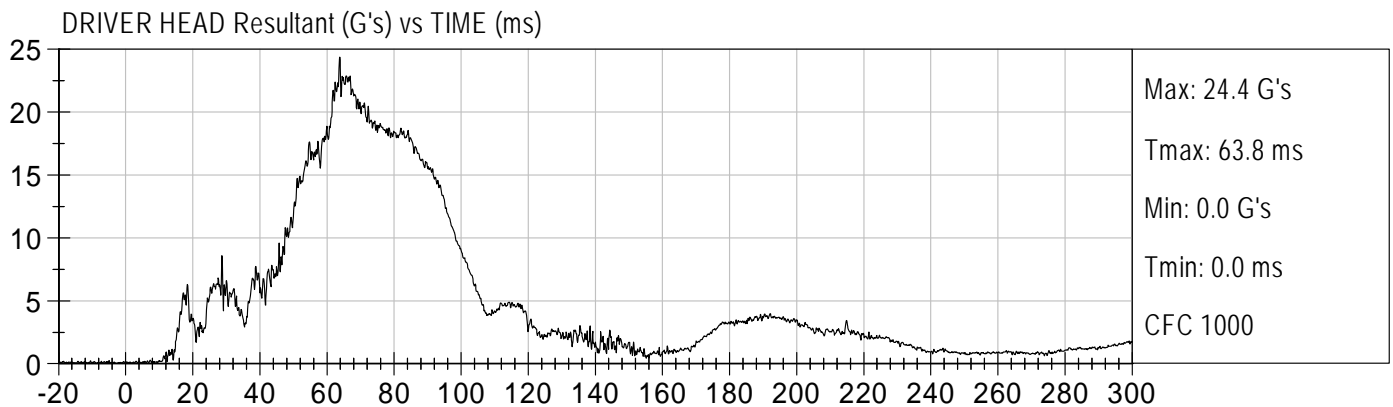
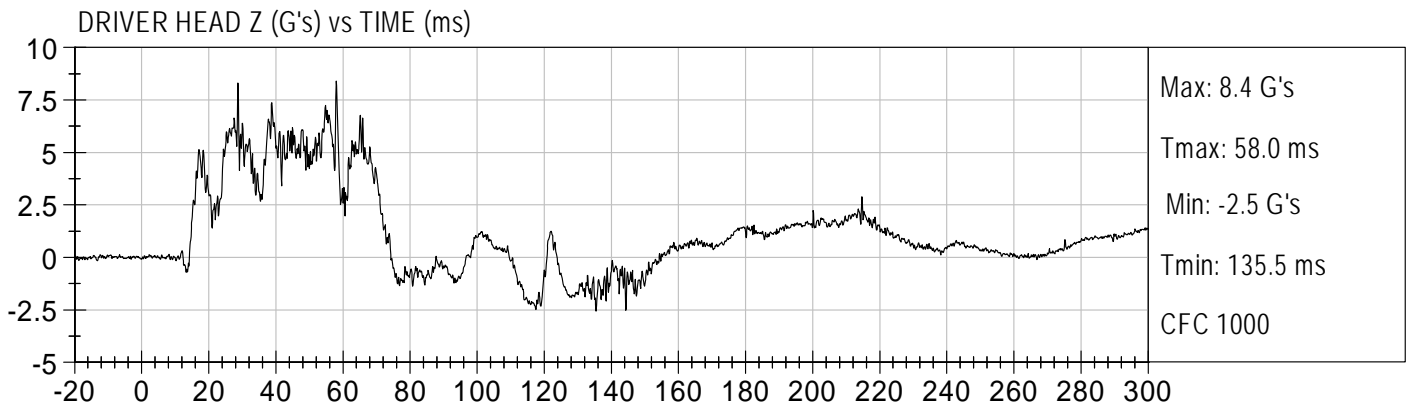
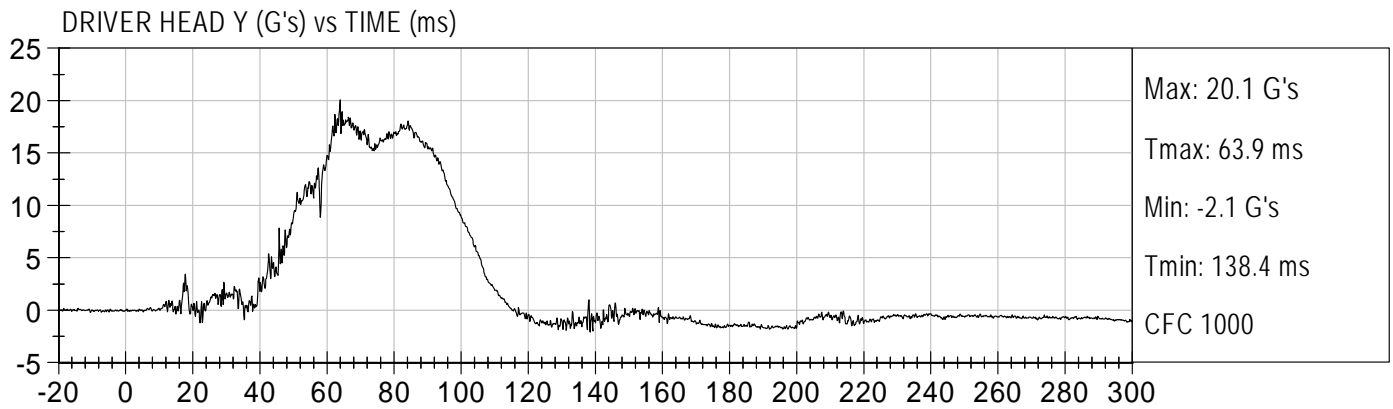
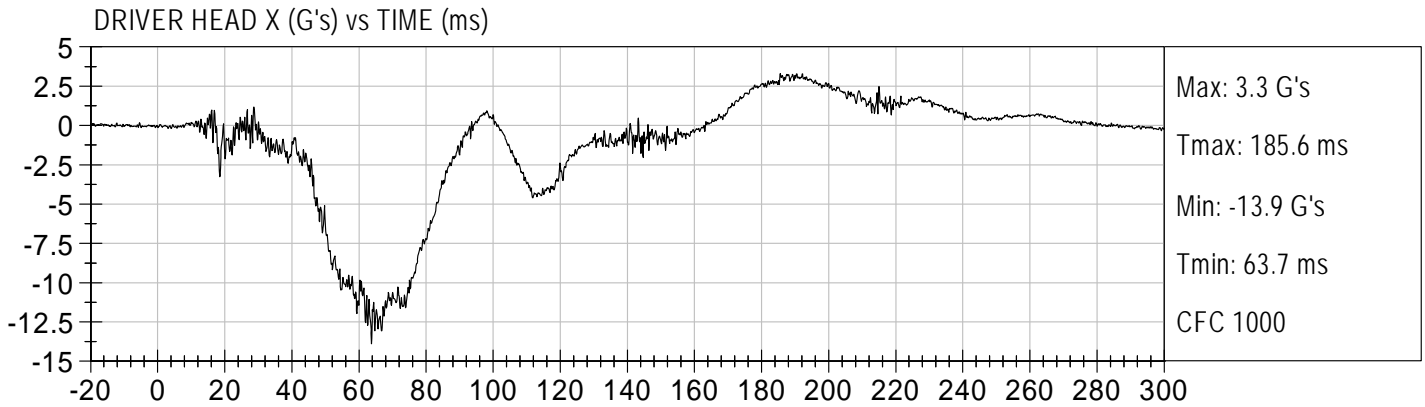
Passenger Side Curtain Airbag Timing (not installed)

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)  
Middle A-Post Acceleration (Y)  
Lower B-Post Acceleration (Y)  
Middle 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)

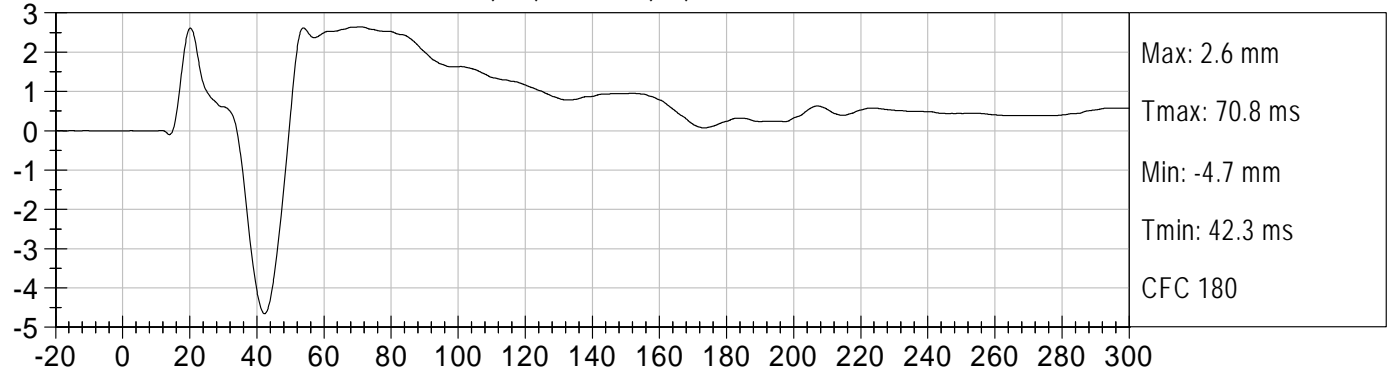
#### **MDB Instrumentation Data**

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

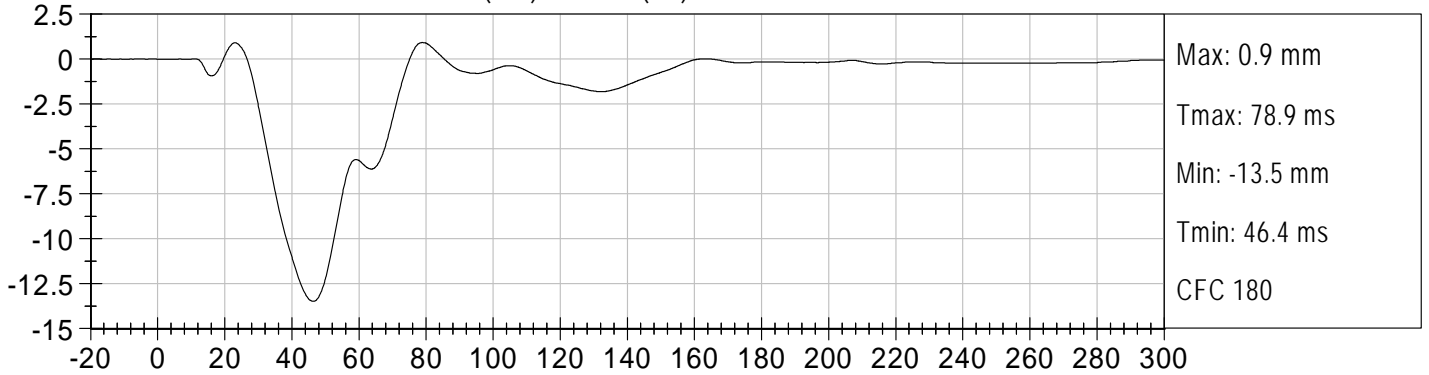




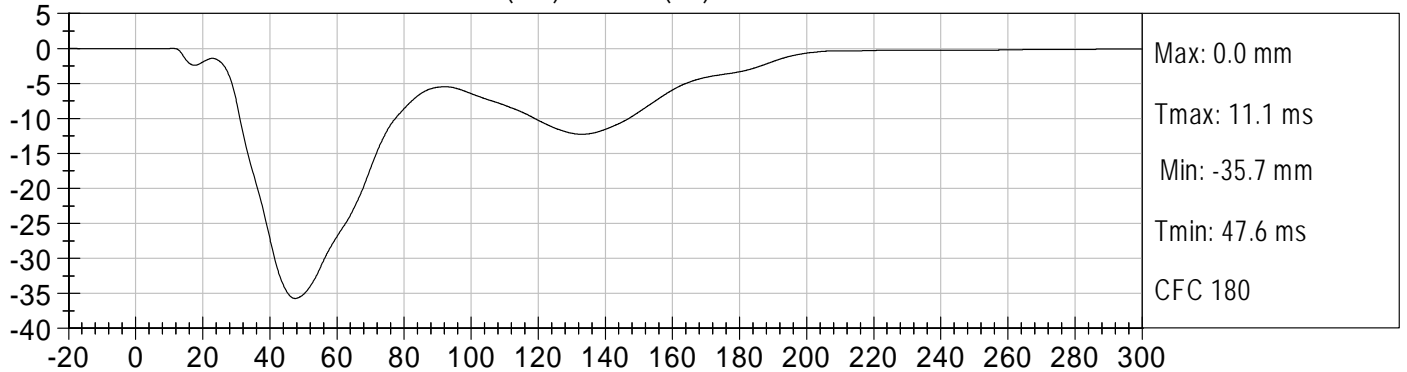
DRIVER UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



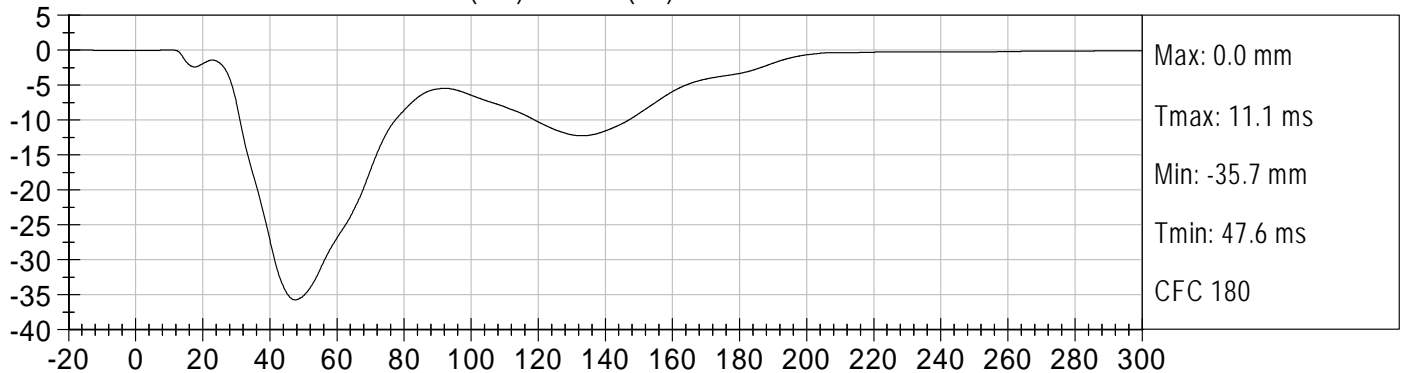
DRIVER MID RIB DISPLACEMENT (mm) vs TIME (ms)



DRIVER LOWER RIB DISPLACEMENT (mm) vs TIME (ms)

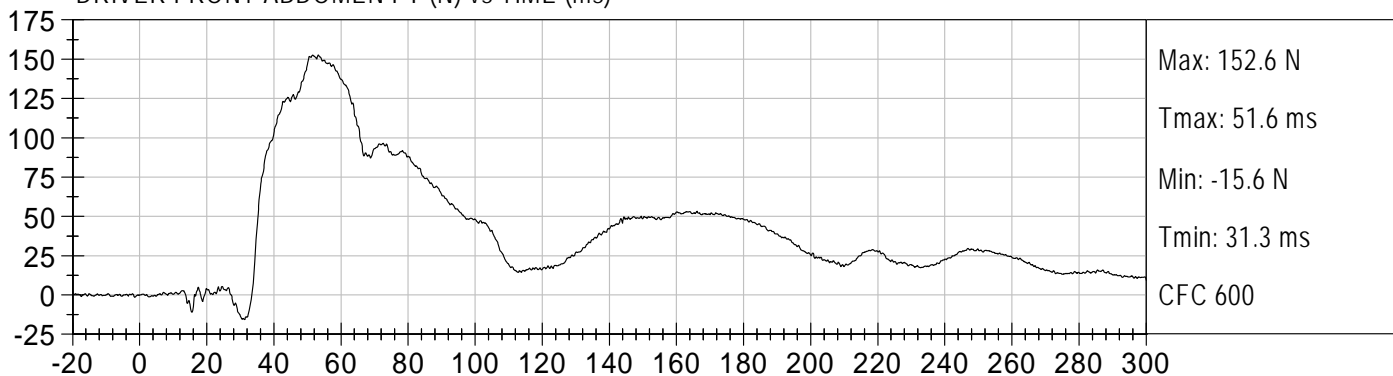


DRIVER MAX RIB DISPLACEMENT (mm) vs TIME (ms)

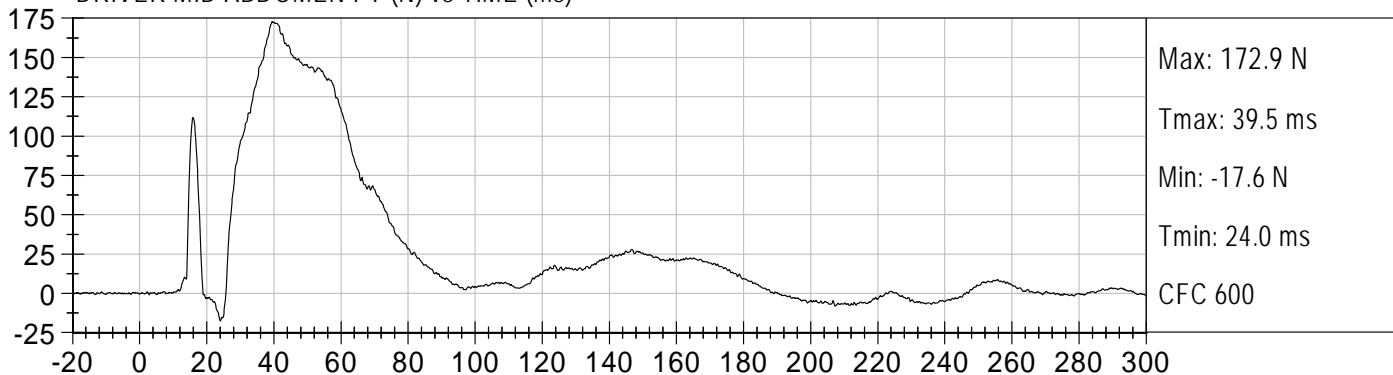




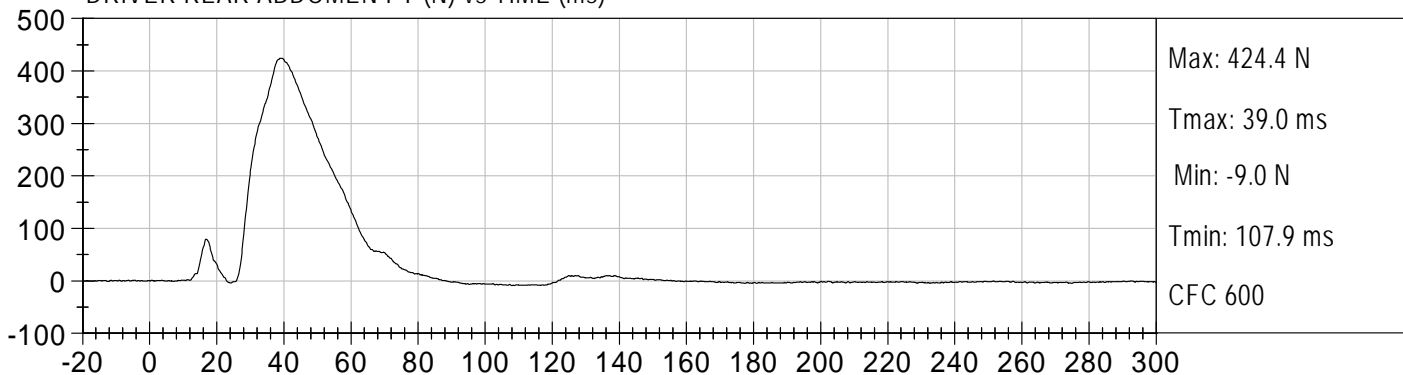
DRIVER FRONT ABDOMEN FY (N) vs TIME (ms)



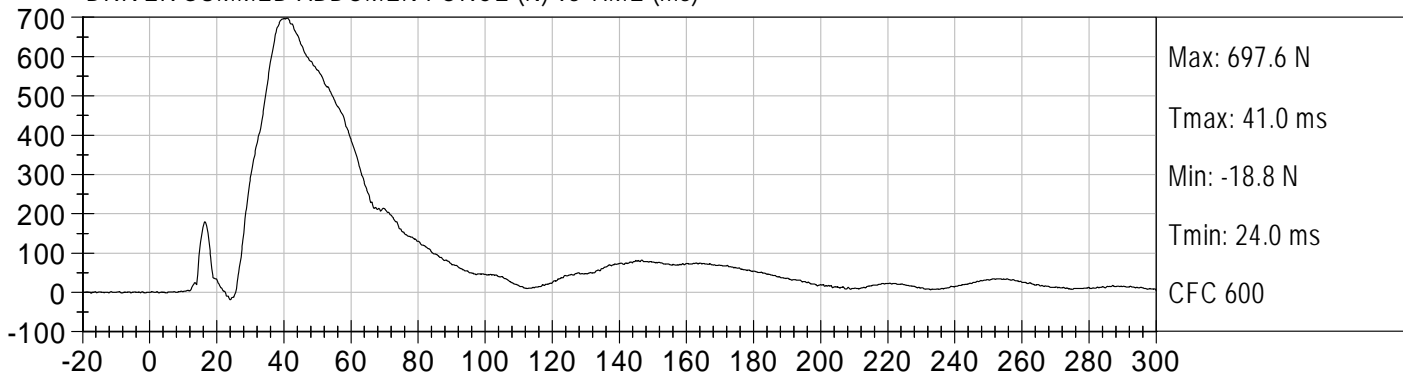
DRIVER MID ABDOMEN FY (N) vs TIME (ms)

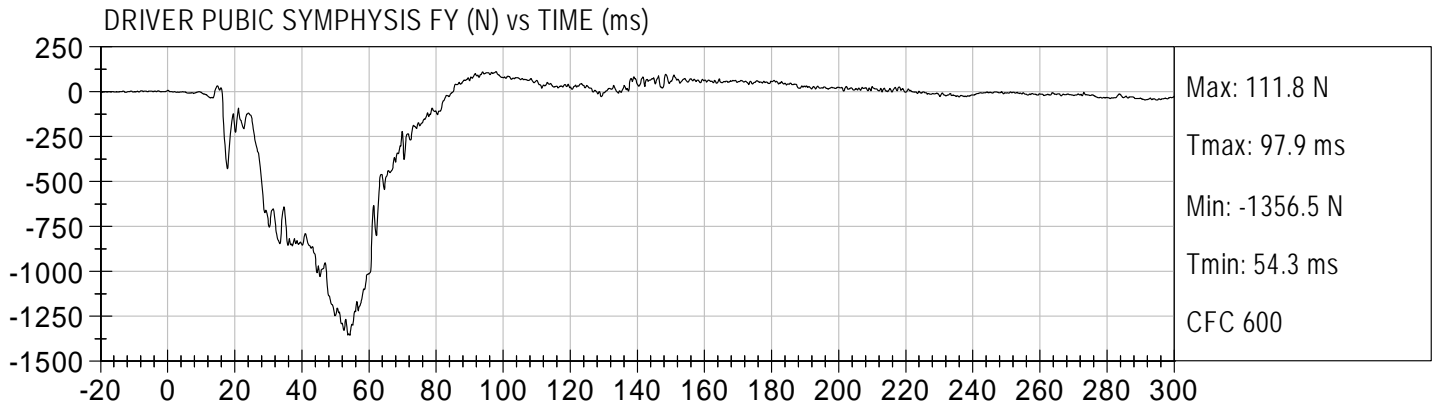


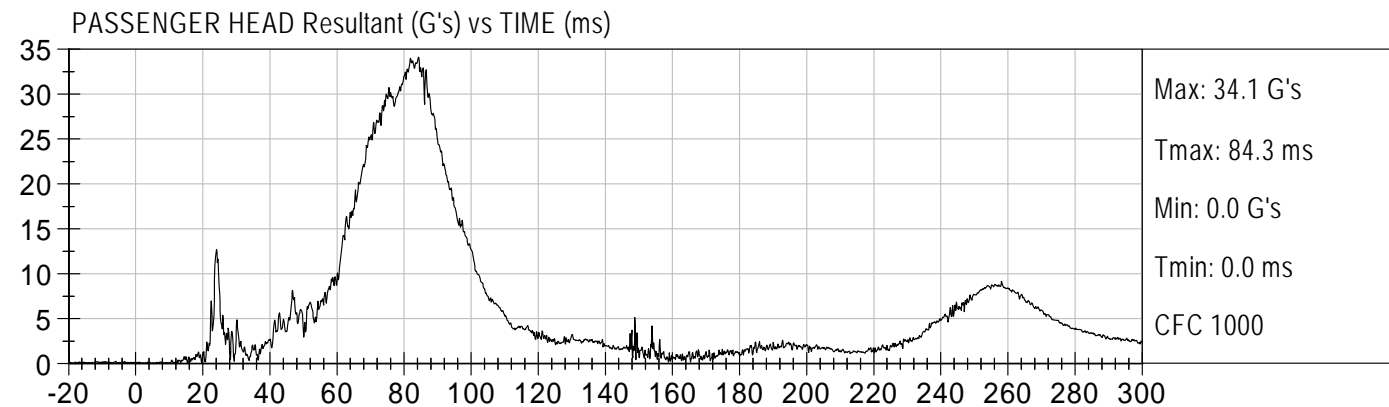
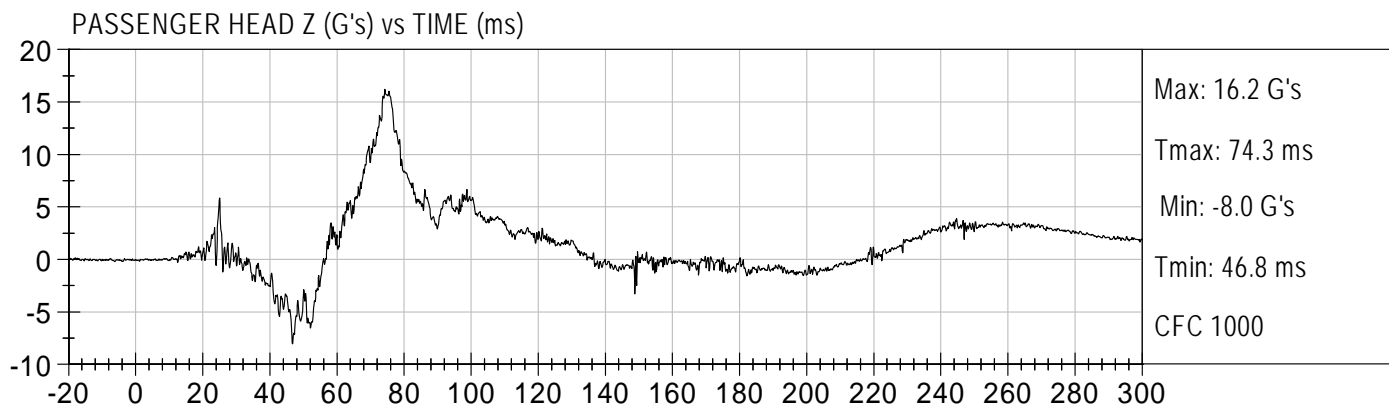
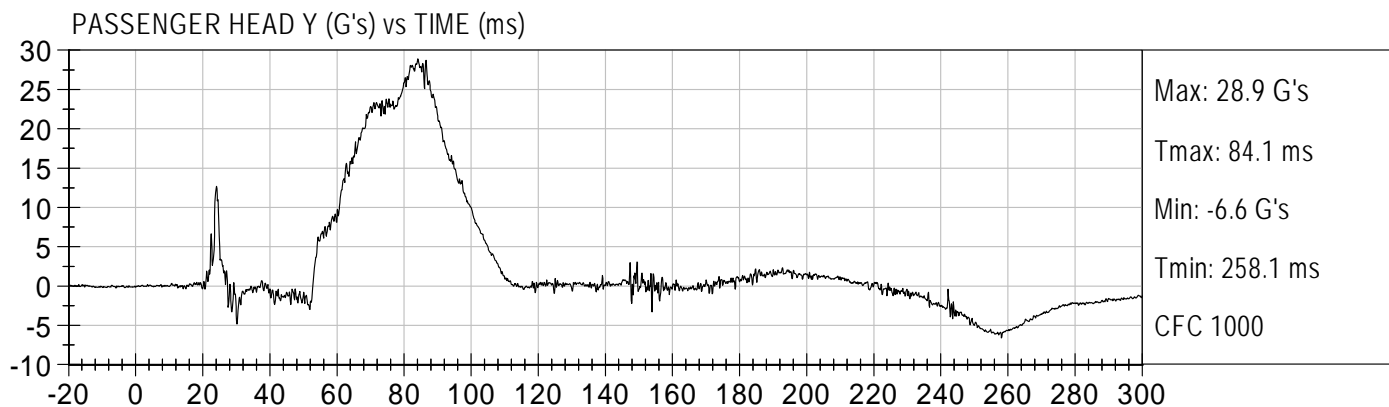
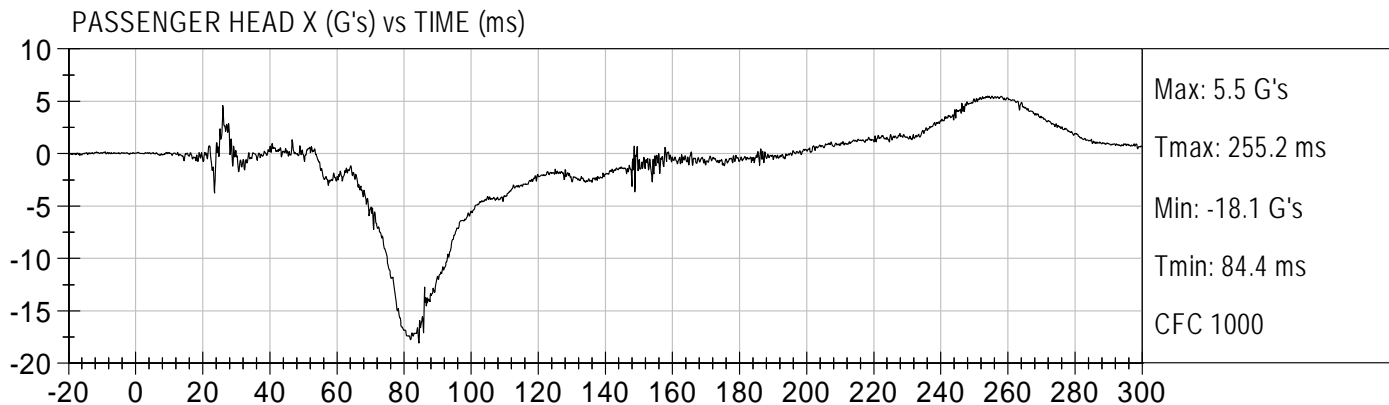
DRIVER REAR ABDOMEN FY (N) vs TIME (ms)

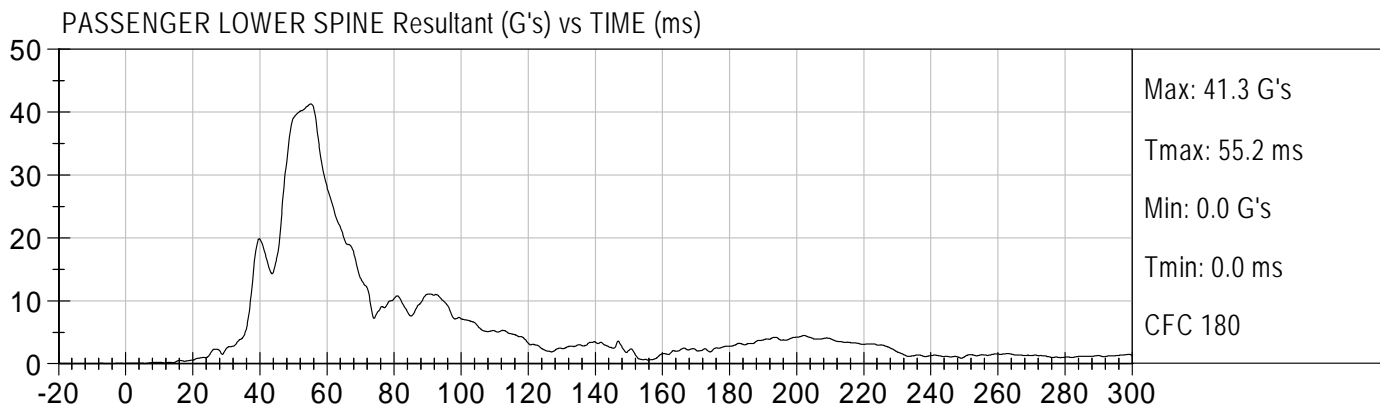
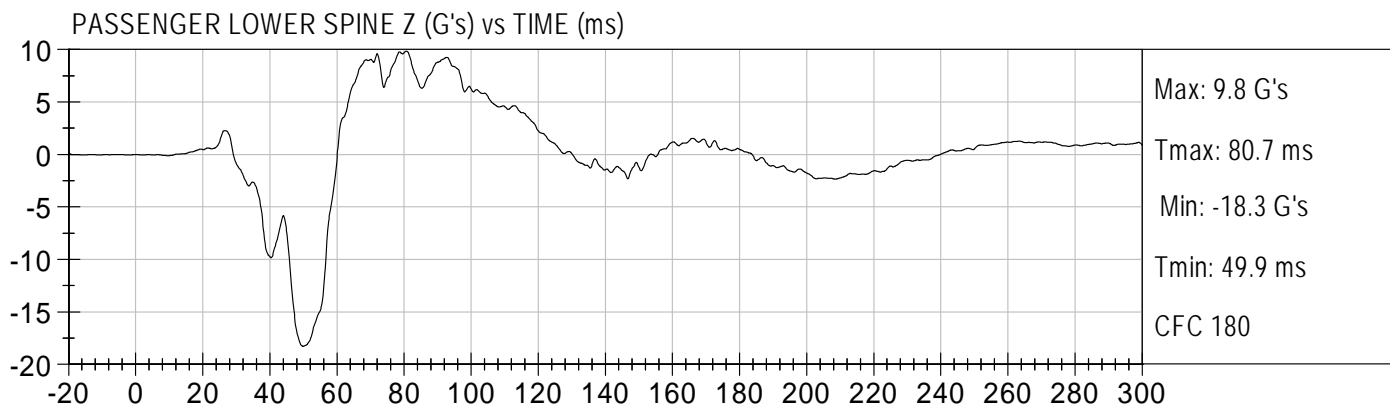
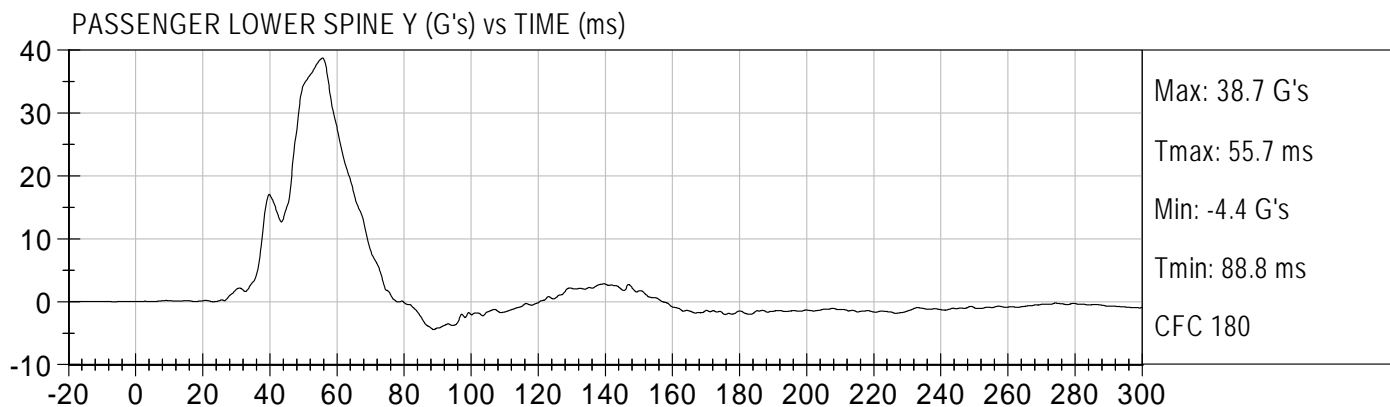
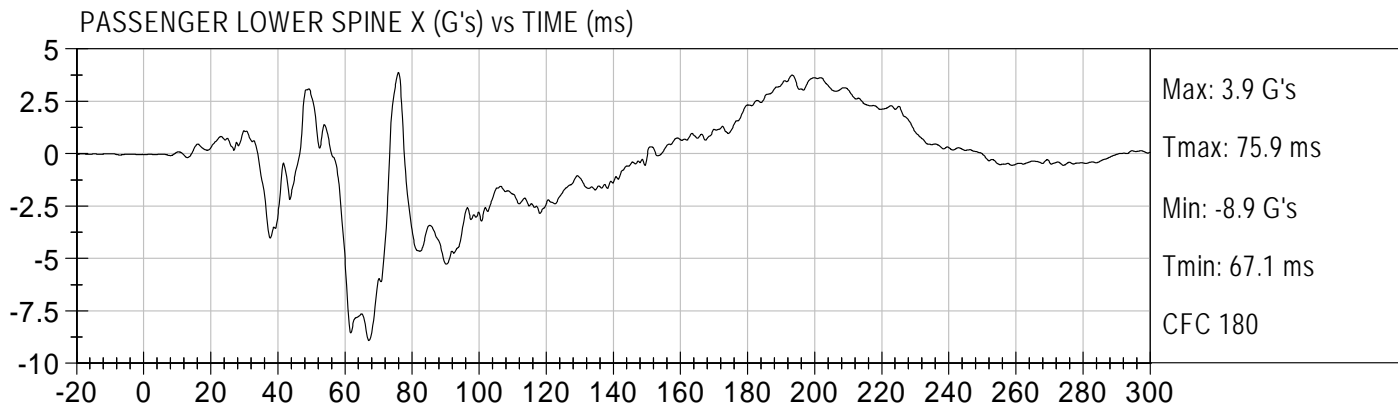


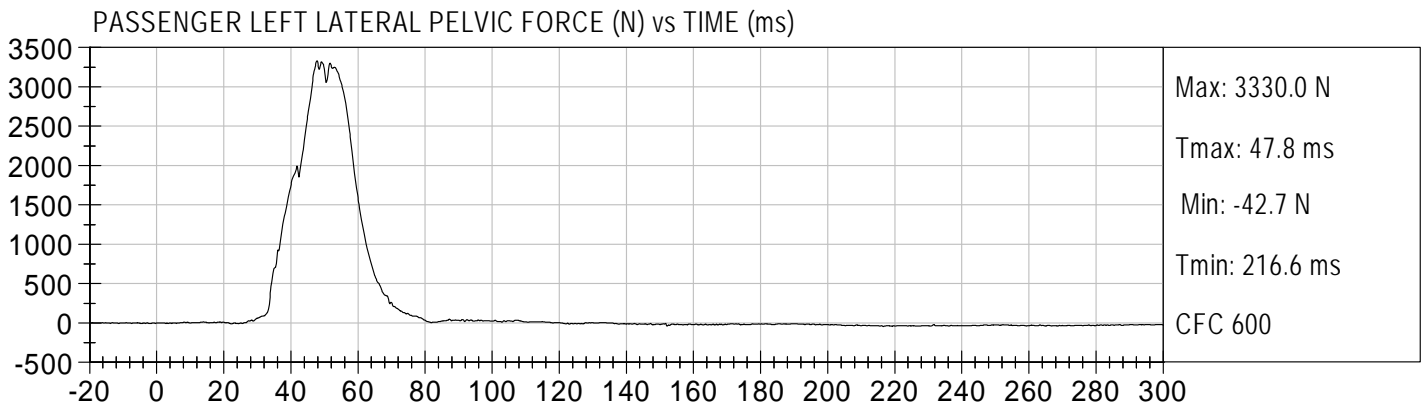
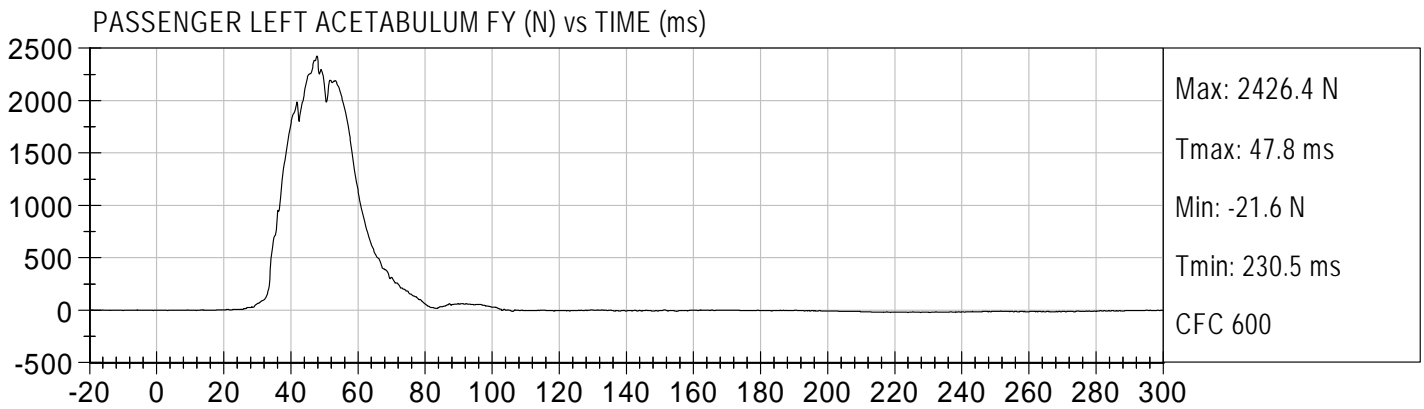
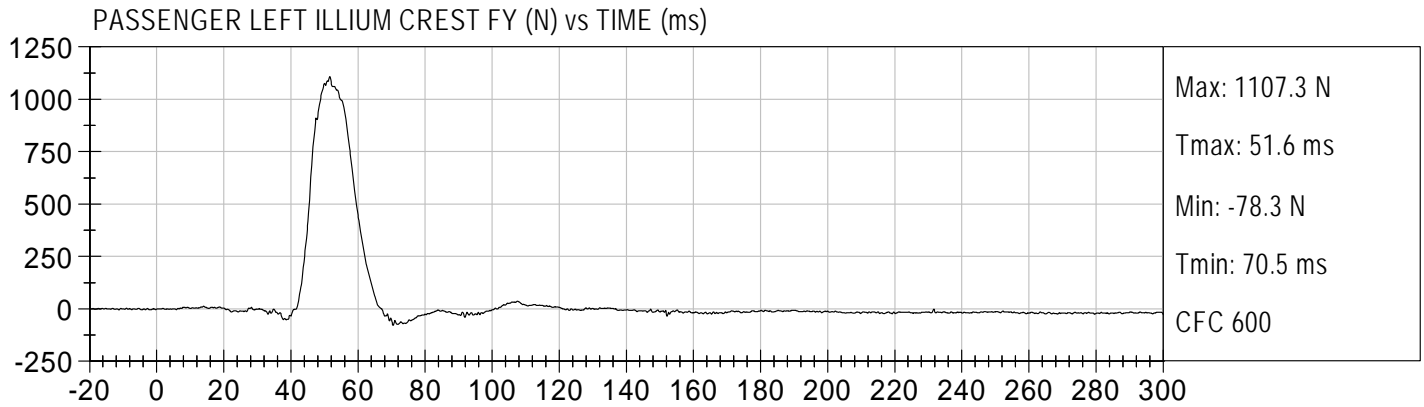
DRIVER SUMMED ABDOMEN FORCE (N) vs TIME (ms)











## **APPENDIX C**

### **DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA**

**MGA RESEARCH CORPORATION**  
**HEAD DROP TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

Test ID: D102361

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	53	Pass
Peak Resultant Acceleration	G's	125 to 155	149	Pass
Peak Lateral Acceleration	G's	+/- 15	-5.5	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
Overall Test Results				Pass

Jessica Hall  
Laboratory Technician

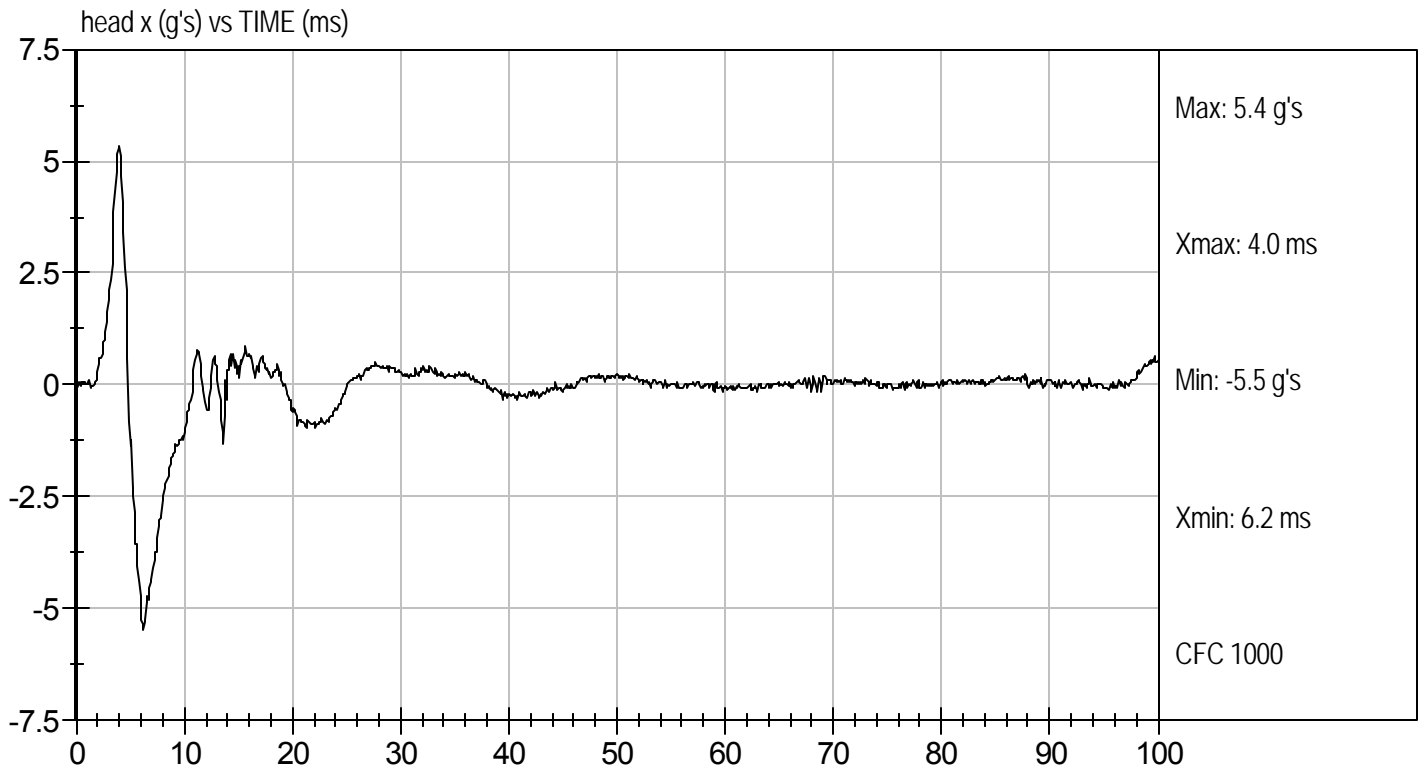
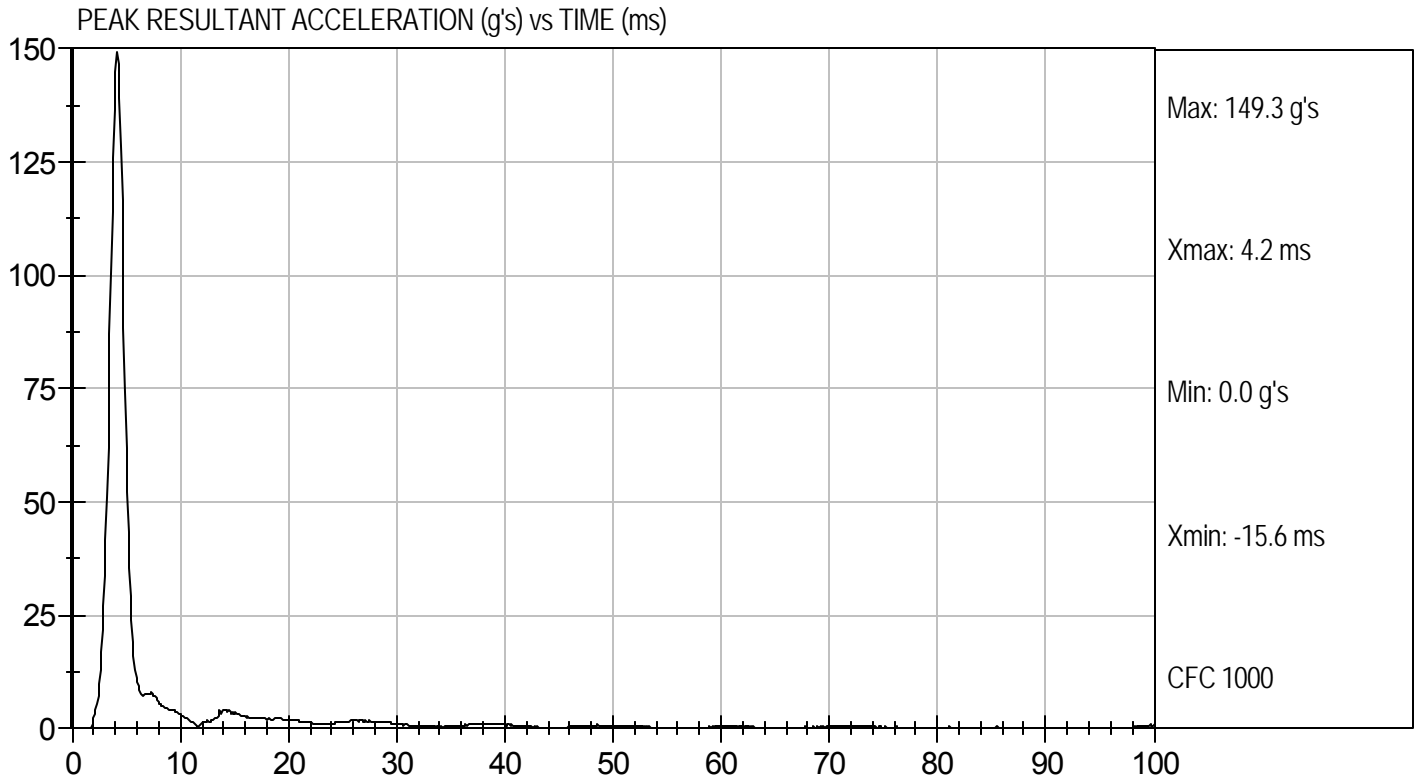
7/26/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Head Drop  
Component ID: D102361

Test Date: 7/26/10  
Velocity: 0 ft/s, 0 m/s



**MGA RESEARCH CORPORATION**  
**NECK PENDULUM TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D102362

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	18.0 to 22.0	21.9	Pass
Laboratory Relative Humidity		%	10 to 70	47	Pass
Pendulum Speed		m/s	3.3 to 3.5	3.5	Pass
Pendulum Deceleration	1 ms	m/s	0.00 to -0.05	-0.02	Pass
	3 ms	m/s	-0.25 to -0.375	-0.34	Pass
	14 ms	m/s	-3.20 to -3.70	-3.34	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	52.5	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	63.1	Pass
Head Rotation Decay Time to 0 degree		ms	53.0 to 88.0	57.5	Pass
Overall Test Results					Pass

*Jessica Gall*  
 \_\_\_\_\_  
 Laboratory Technician

7/26/10  
 \_\_\_\_\_  
 Test Date

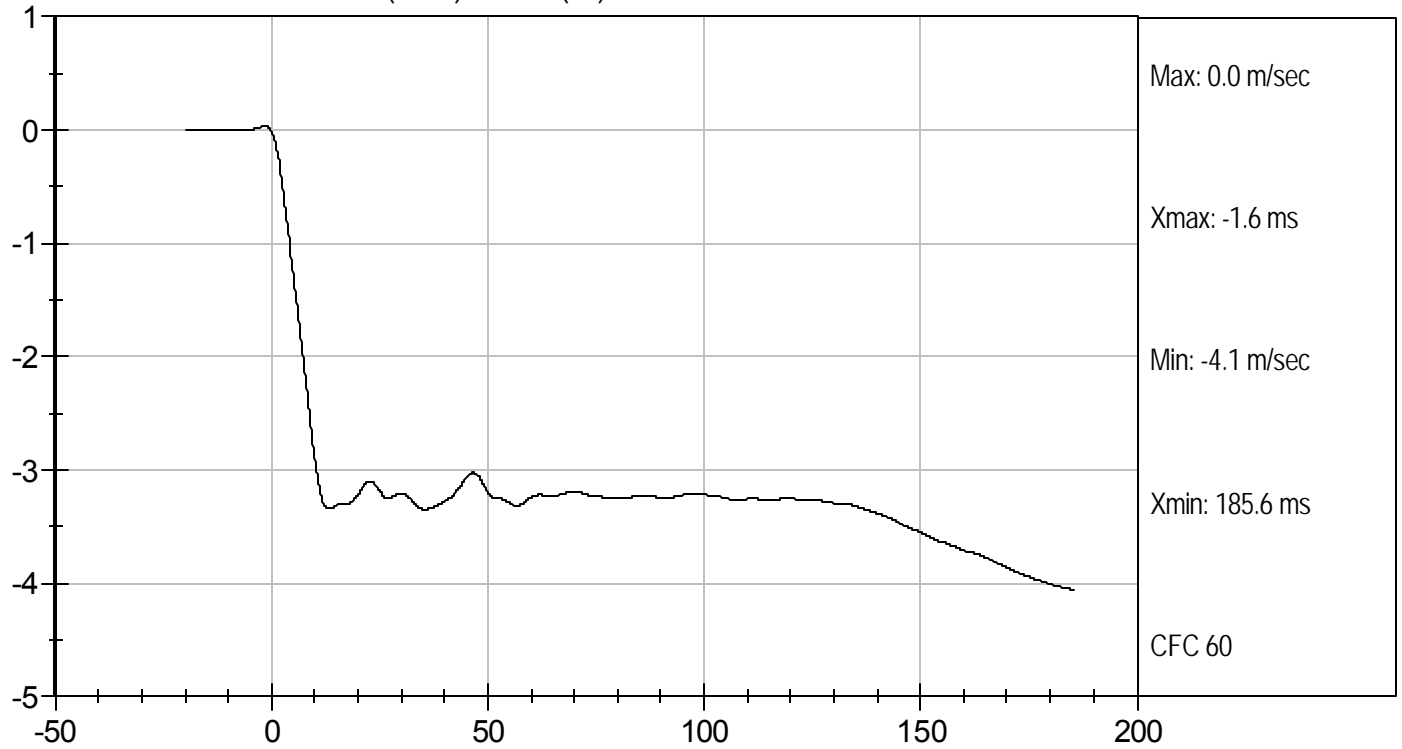
*David Winkelbauer*  
 \_\_\_\_\_  
 Approved By



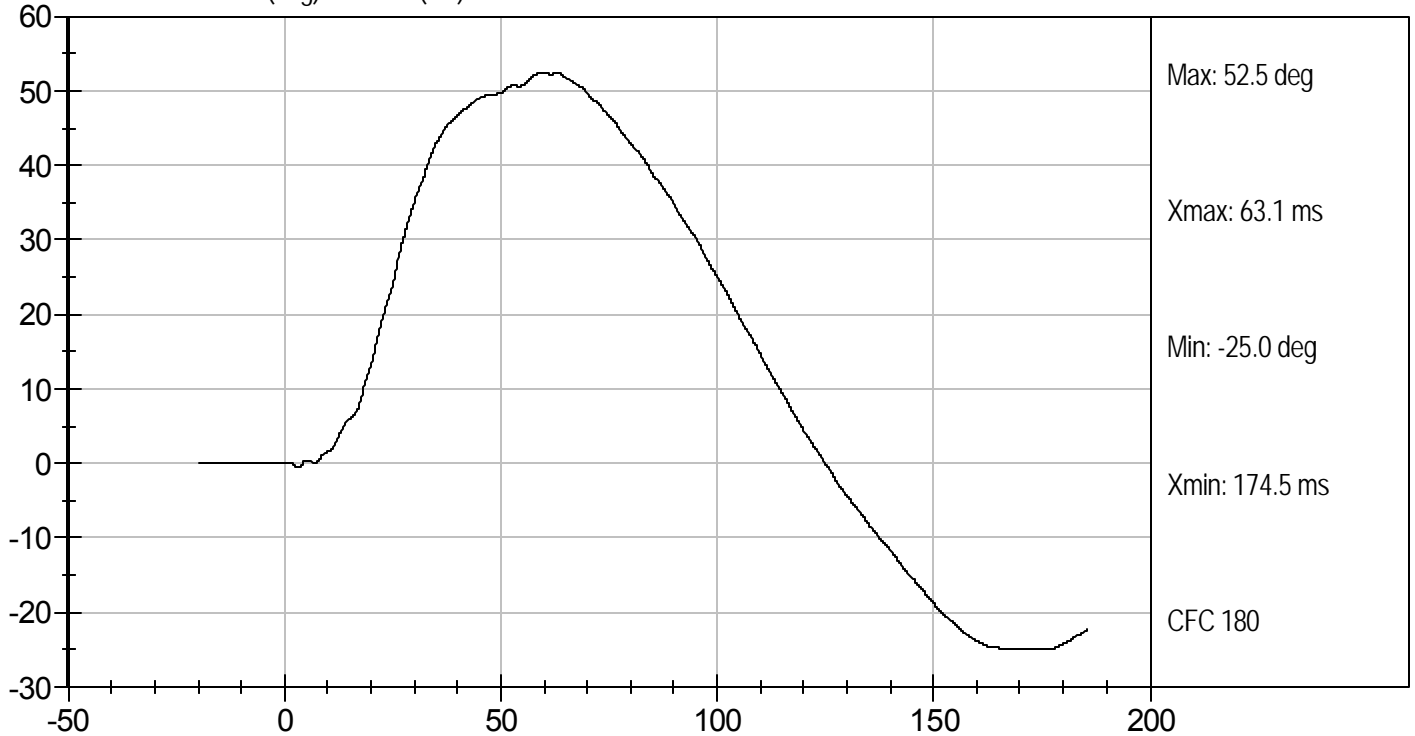
Test Desc: Neck Bending  
Component ID: D102362

Test Date: 7/26/10  
Velocity: 11.34 ft/s, 3.5 m/s

PENDULUM DECELERATION (m/sec) vs TIME (ms)



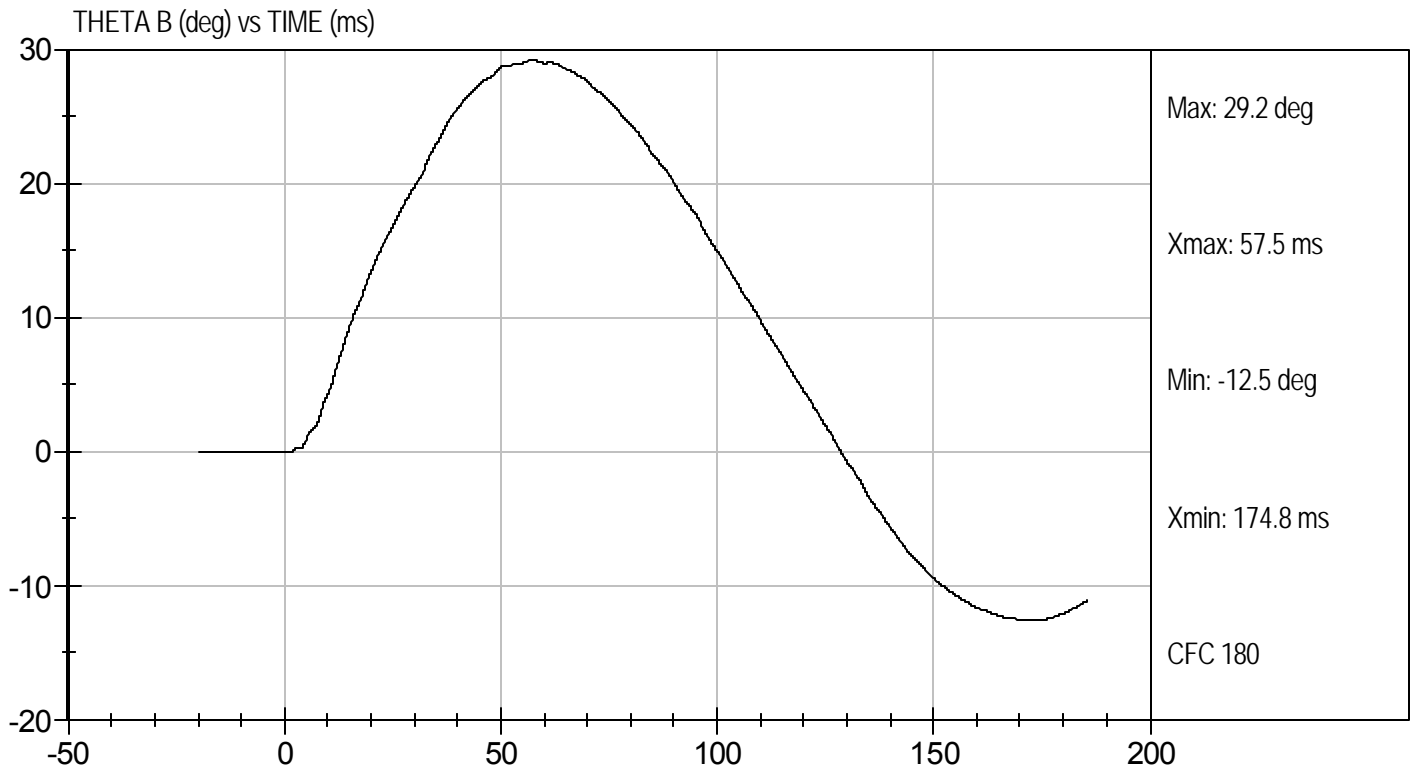
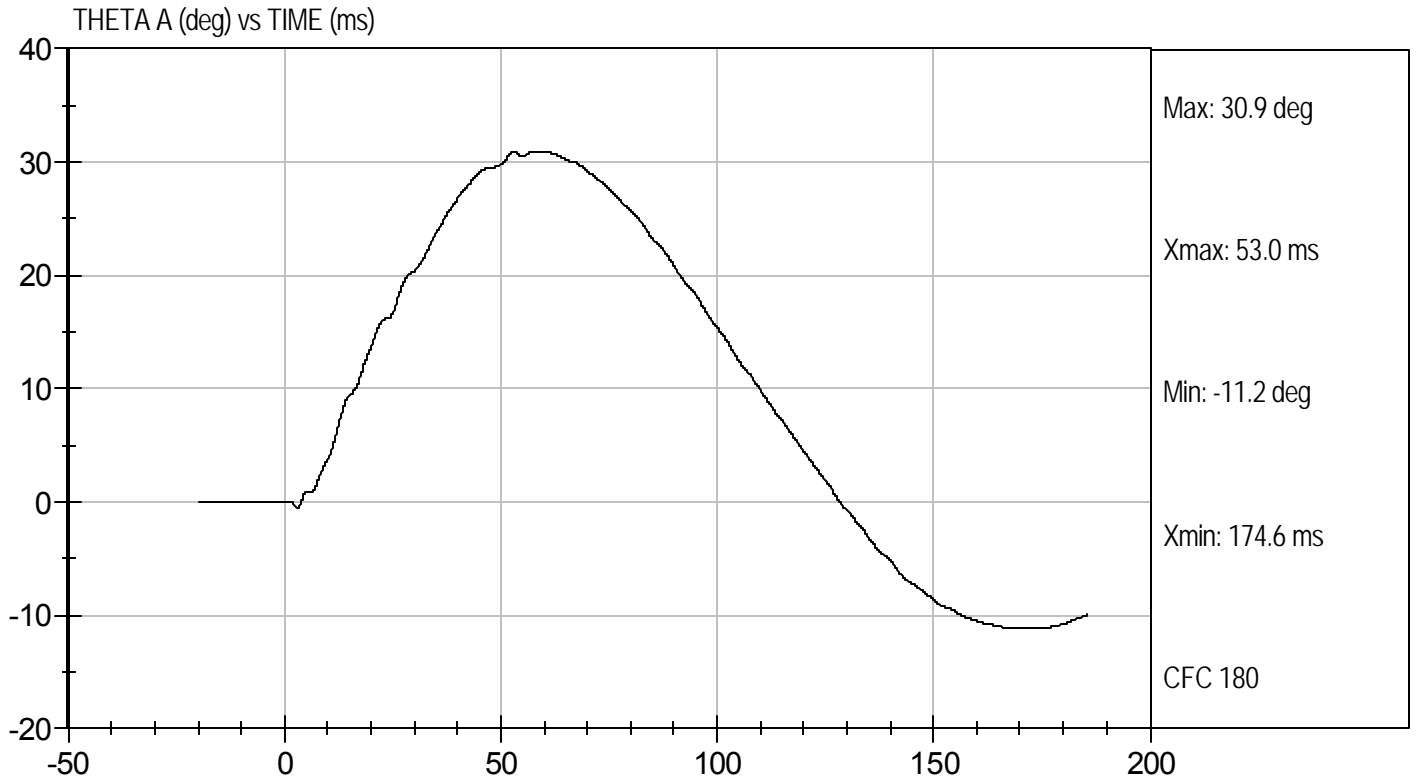
FLEXION ANGLE (deg) vs TIME (ms)





Test Desc: Neck Bending  
Component ID: D102362

Test Date: 7/26/10  
Velocity: 11.34 ft/s, 3.5 m/s



**MGA RESEARCH CORPORATION**  
**SHOULDER IMPACT TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D102363

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	54	Pass
Pendulum Speed	m/s	4.2 to 4.4	4.3	Pass
Peak Shoulder Acceleration	G's	7.5 to 10.5	9.2	Pass
Time of Peak Shoulder Acceleration	ms	NA	13.4	Pass
Overall Test Results				Pass

Jessica Hall  
 Laboratory Technician

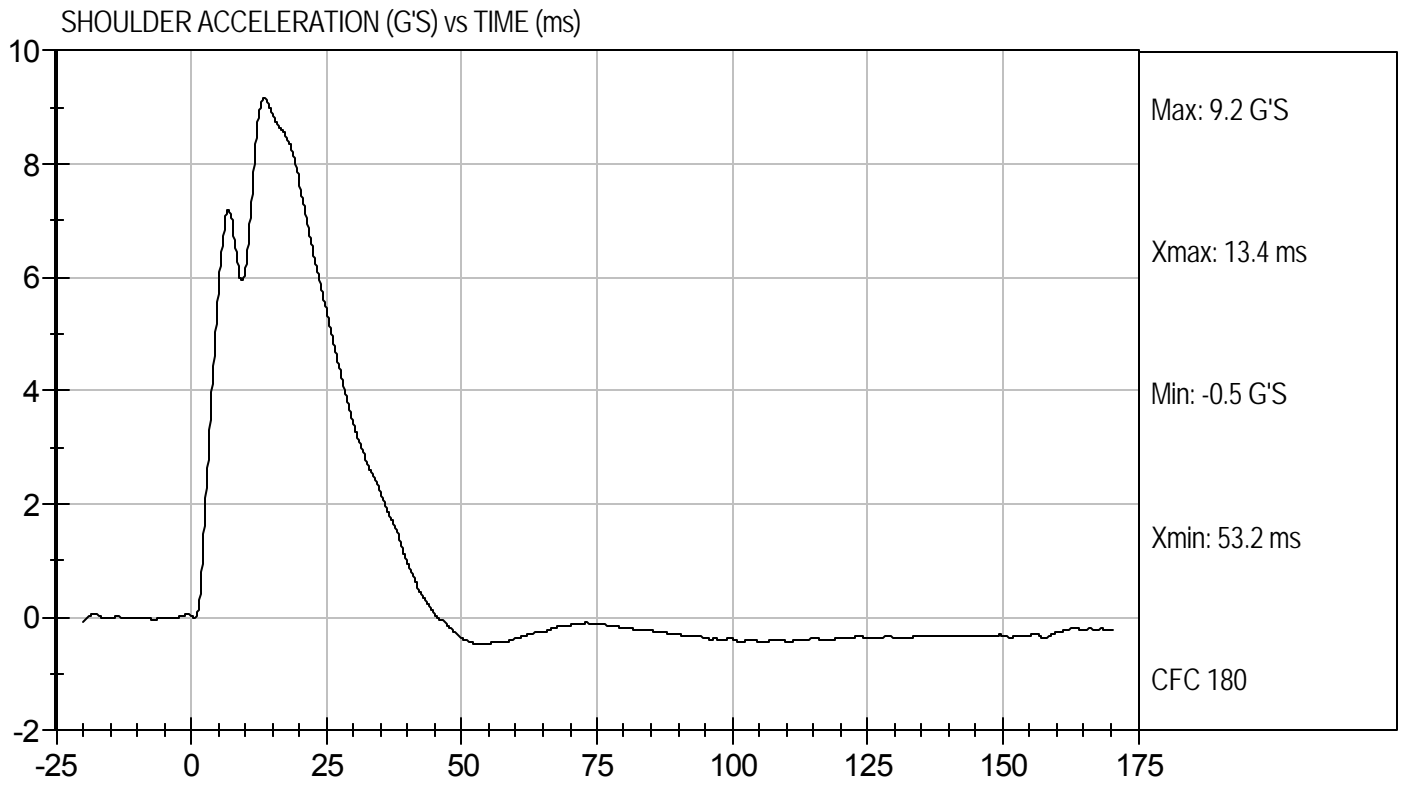
7/27/10  
 Test Date

David Winkelbauer  
 Approved By



Test Desc: Shoulder Impact  
Component ID: D102363

Test Date: 7/27/10  
Velocity: 14.0 ft/s, 4.3 m/s



**MGA RESEARCH CORPORATION**  
**UPPER RIB TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D102364

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	47	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	37.4	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	47.5	Pass
Overall Test Results				Pass

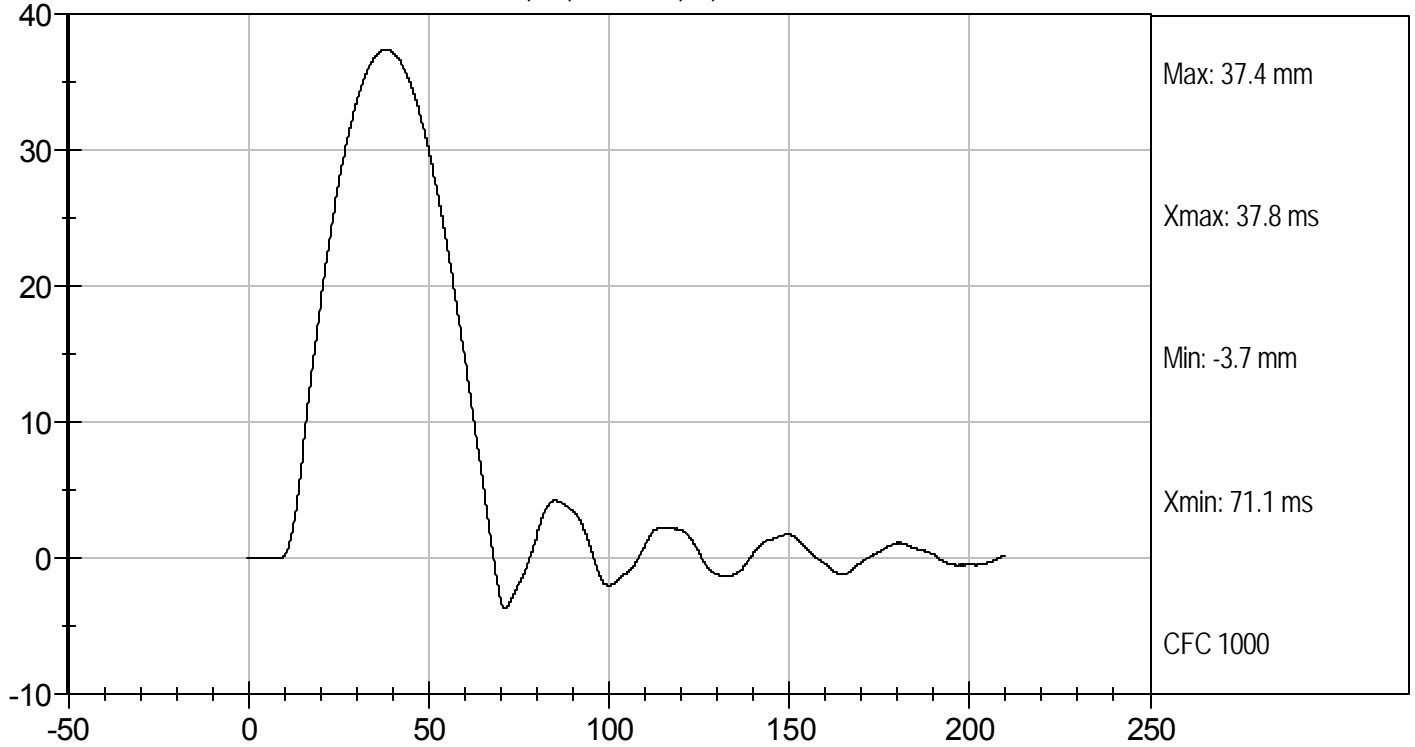
*Jessica Hall*  
 \_\_\_\_\_  
 Laboratory Technician

7/26/10  
 \_\_\_\_\_  
 Test Date

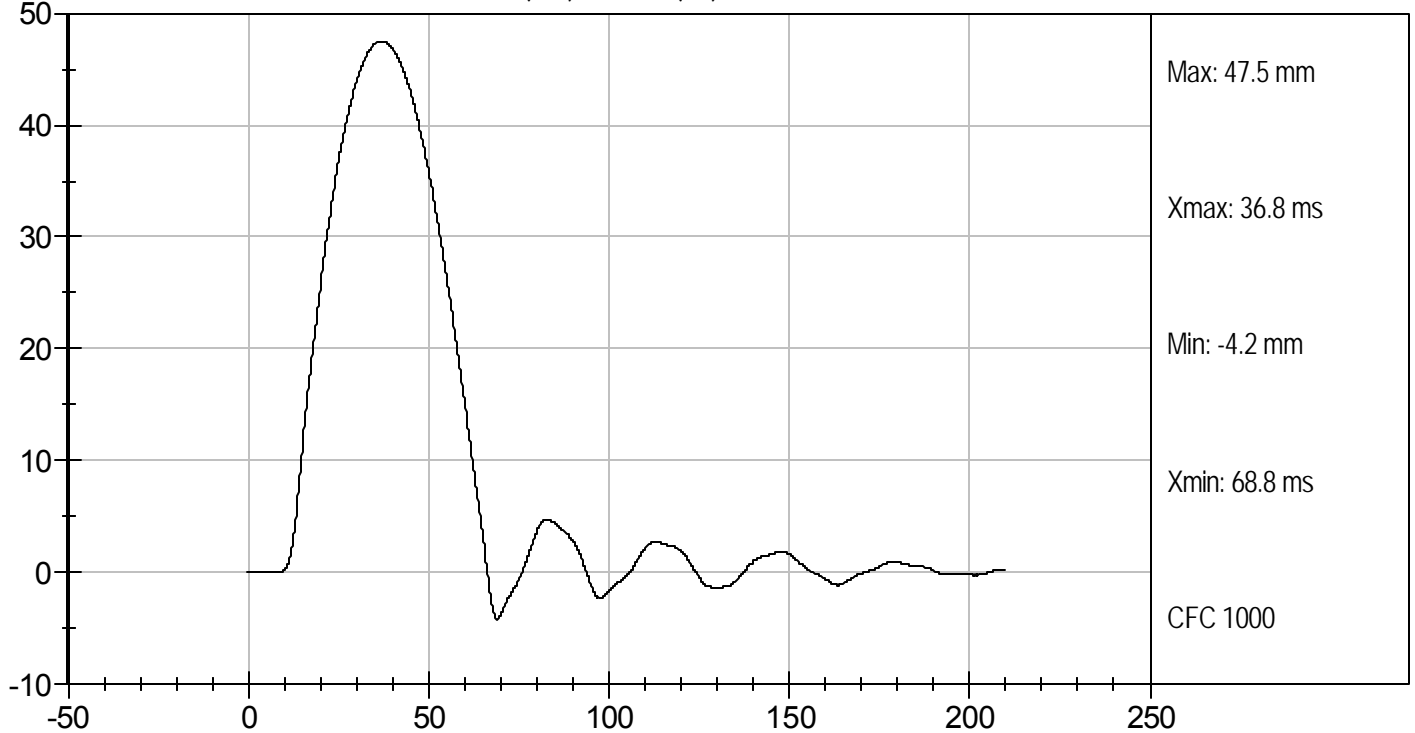
*David Winkelbauer*  
 \_\_\_\_\_  
 Approved By



UPPER RIB DISPLACEMENT @ 3 M/SEC (mm) vs TIME (ms)



UPPER RIB DISPLACEMENT @ 4 M/SEC (mm) vs TIME (ms)



MGA RESEARCH CORPORATION

MID RIB TEST

ES-2re DUMMY

ATD Serial No: 032

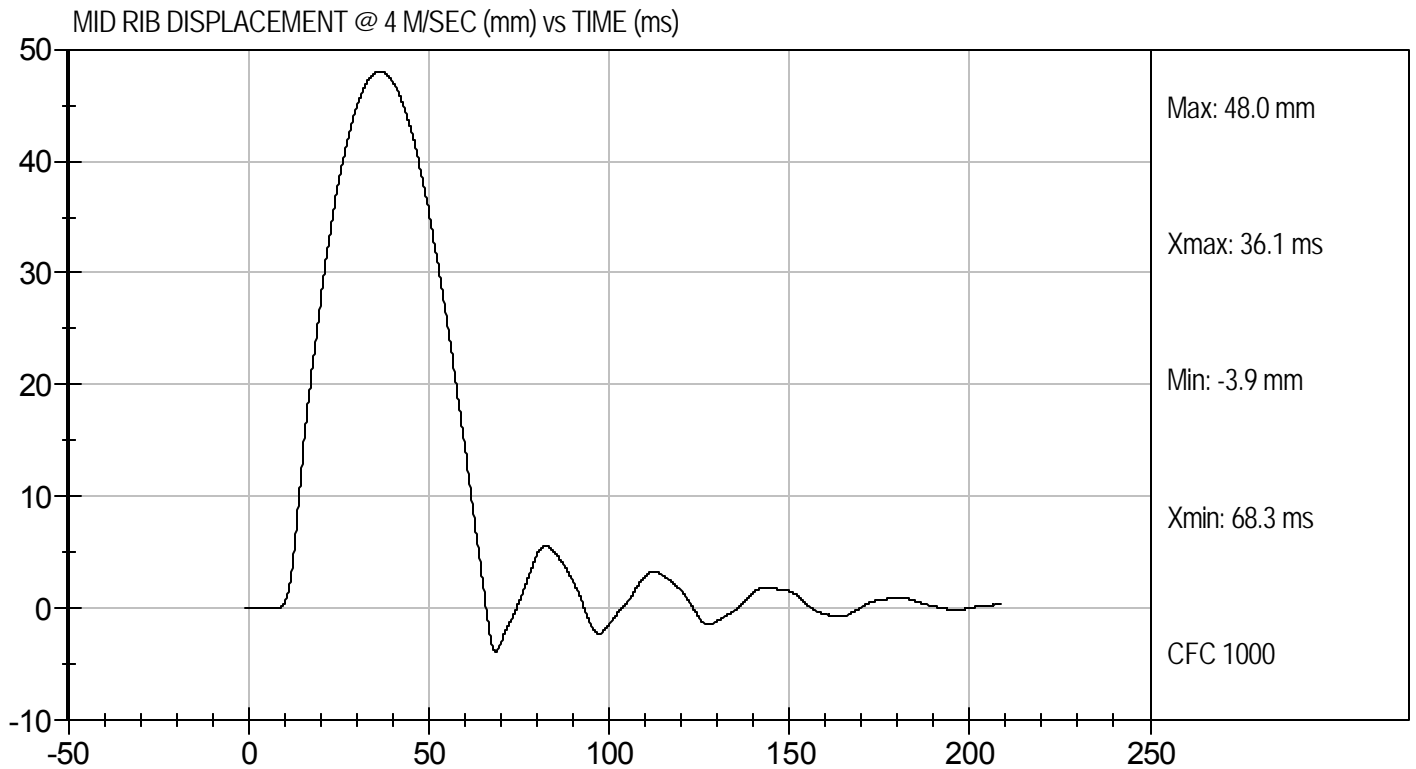
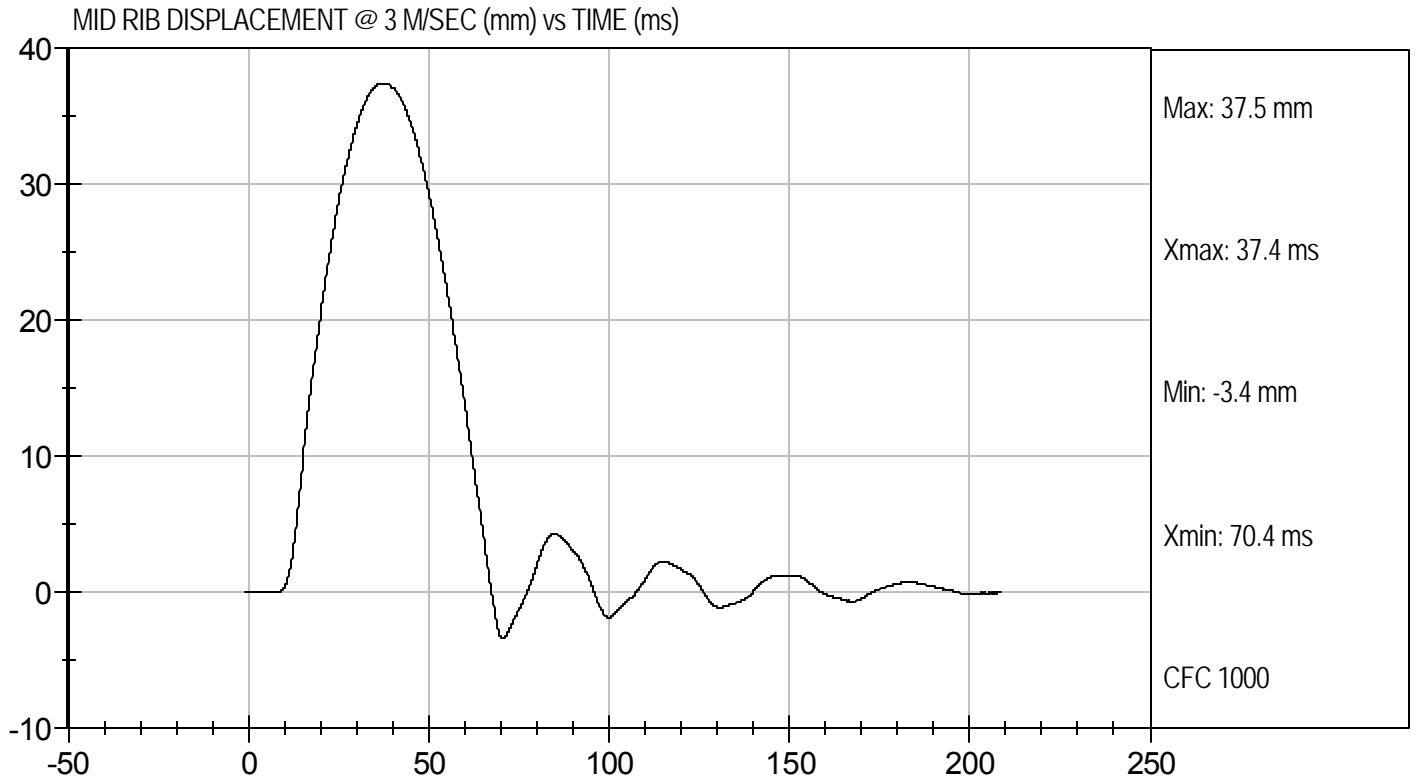
Test I.D: D102365

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	47	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	37.5	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	48.0	Pass
Overall Test Results				Pass

Jessica Hall  
Laboratory Technician

7/26/10  
Test Date

David Winkelbauer  
Approved By



MGA RESEARCH CORPORATION

LOWER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D102366

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	47	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	36.7	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	47.5	Pass
Overall Test Results				Pass

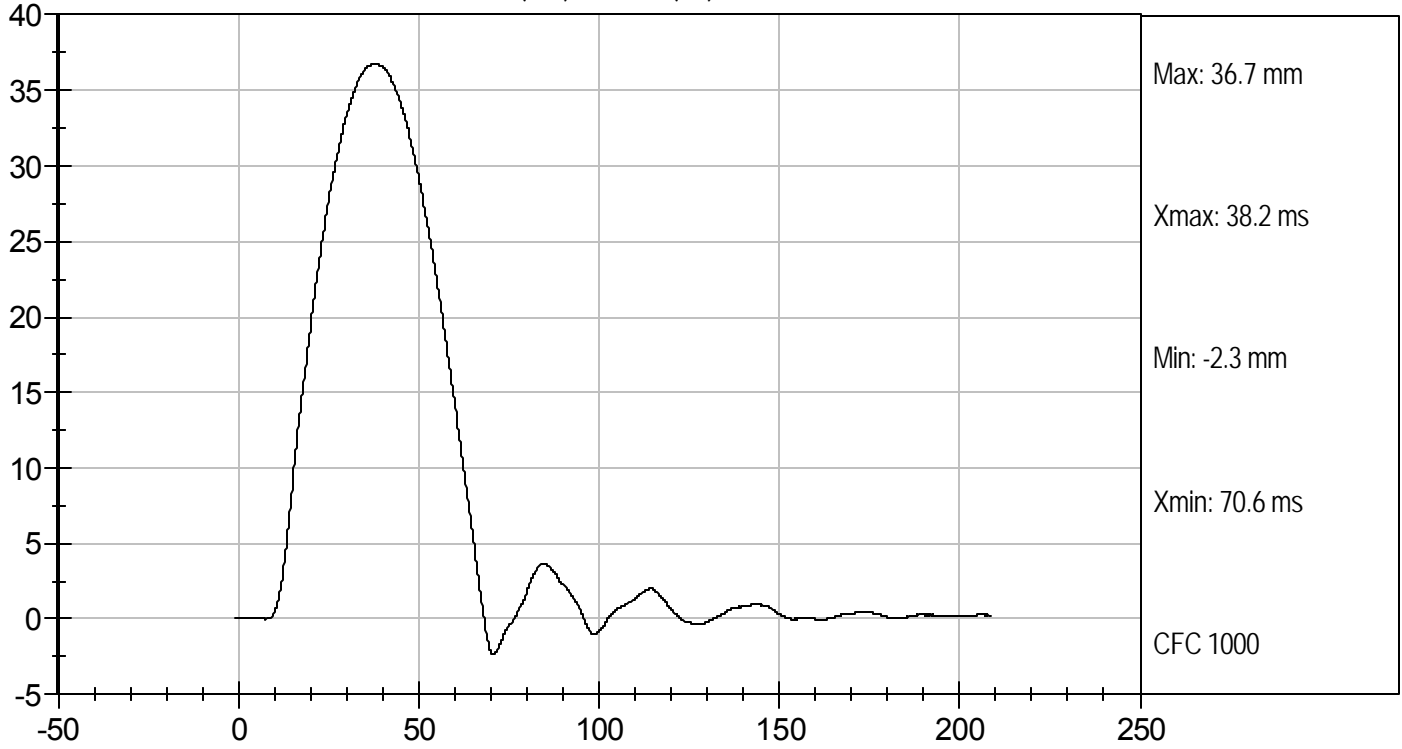
Jessica Hall  
Laboratory Technician

7/26/10  
Test Date

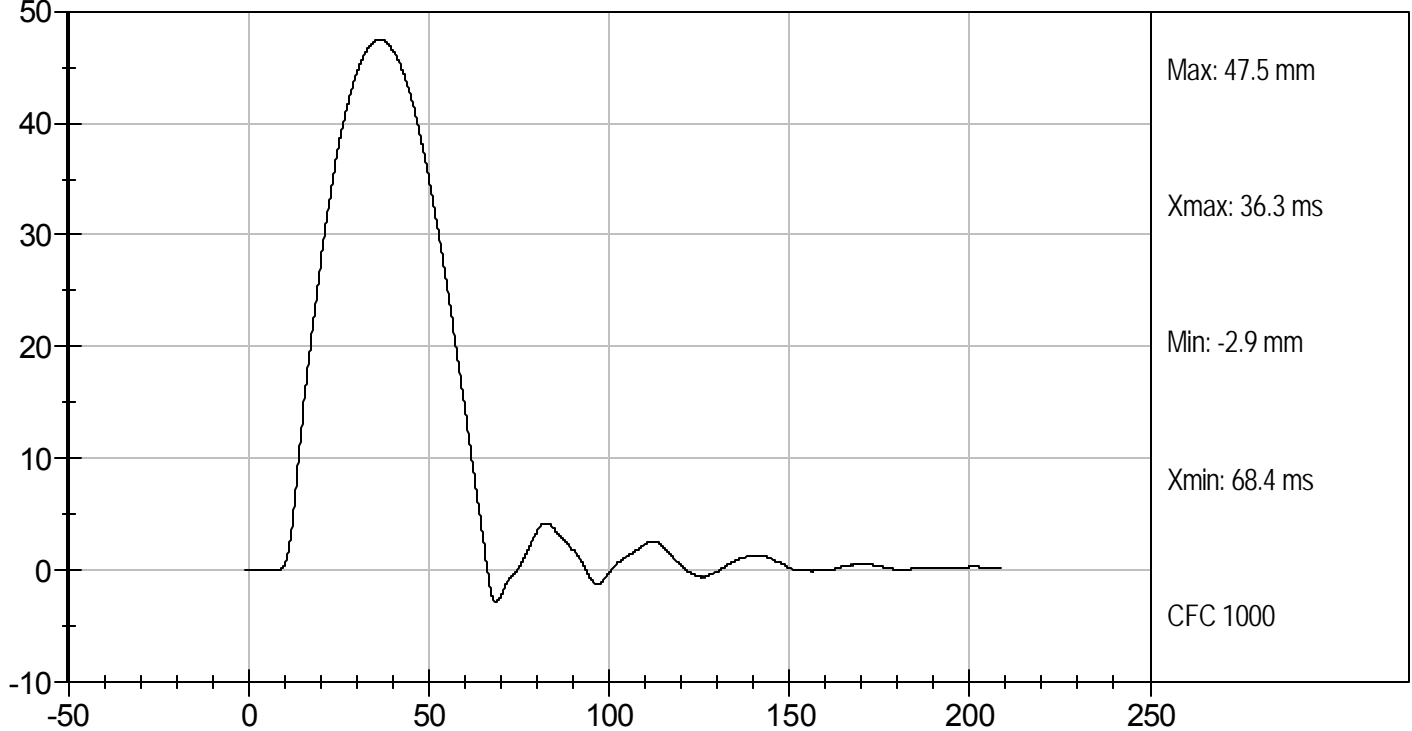
David Winkelbauer  
Approved By



LOWER RIB DISPLACEMENT @ 3 M/SEC (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT @ 4 M/SEC (mm) vs TIME (ms)



**MGA RESEARCH CORPORATION**  
**ABDOMEN TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

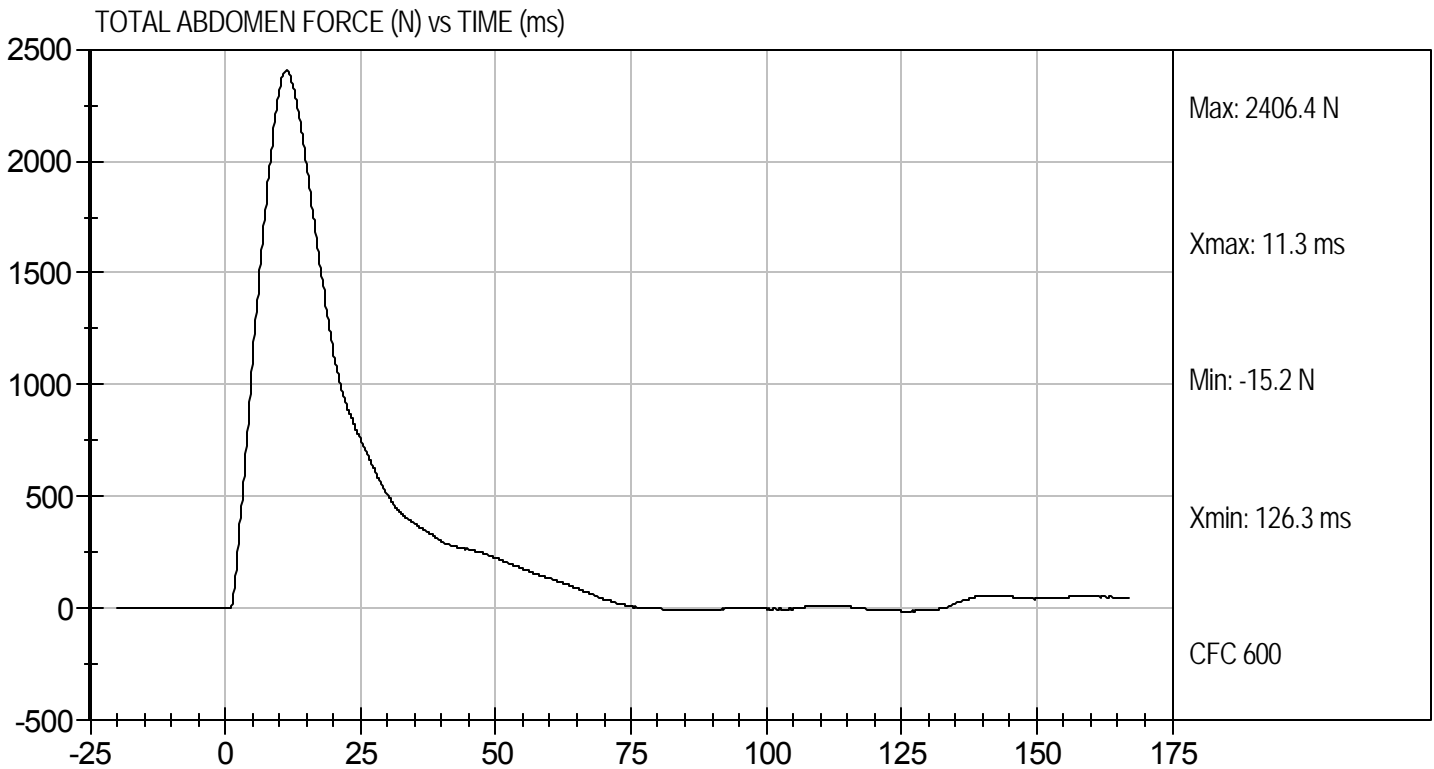
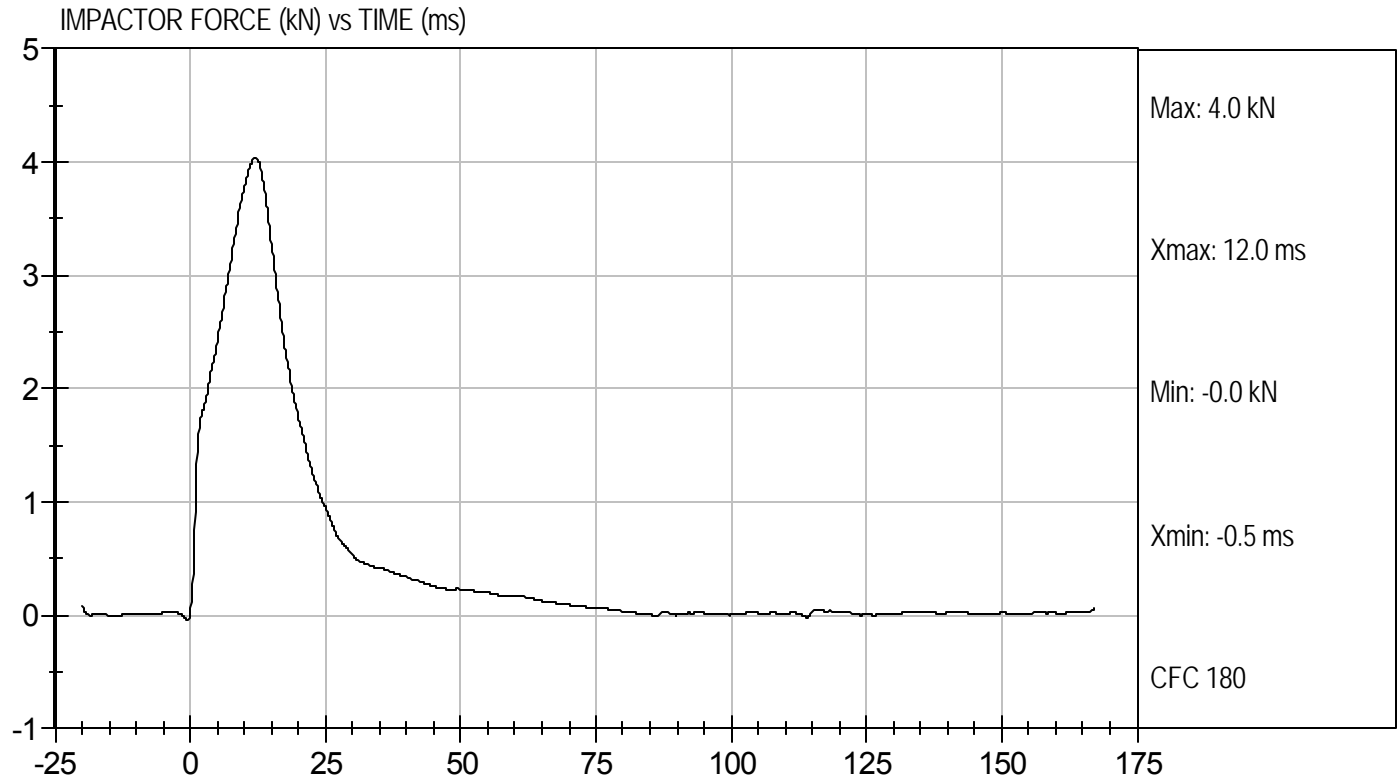
Test I.D: D102367

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	54	Pass
Probe Speed	m/s	3.90 to 4.10	4.05	Pass
Maximum Impact Force	kN	4.00 to 4.80	4.04	Pass
Time of Maximum Impactor Force	ms	10.60 to 13.00	12.00	Pass
Maximum Total Abdomen Force	kN	2.20 to 2.70	2.41	Pass
Time of Maximum Abdomen Force	ms	10.00 to 12.30	11.30	Pass
Overall Test Results				Pass

Jessica Hall  
Laboratory Technician

7/27/10  
Test Date

David Winkelbauer  
Approved By



**MGA RESEARCH CORPORATION**  
**LUMBAR SPINE TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D102368

Tested Parameter	Units	Specification	Result	Pass/Fail	
Laboratory Temperature	deg C	20.6 to 22.2	21.5	Pass	
Laboratory Relative Humidity	%	10 to 70	49	Pass	
Pendulum Speed	m/s	5.95 to 6.15	6.05	Pass	
Pendulum Deceleration	1 ms	m/s	-0.05 to 0.00	-0.02	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.41	Pass
	27 ms	m/s	-6.50 to -5.80	-5.81	Pass
	30 ms	m/s	>= -6.5	-6.02	Pass
Maximum Flexion Angle	deg	45.0 to 55.0	45.7	Pass	
Time of Maximum Flexion Angle	ms	39.0 to 53.0	43.1	Pass	
Headform Rotation Decay to Initial Position	ms	37 to 57	43	Pass	
Overall Results				Pass	

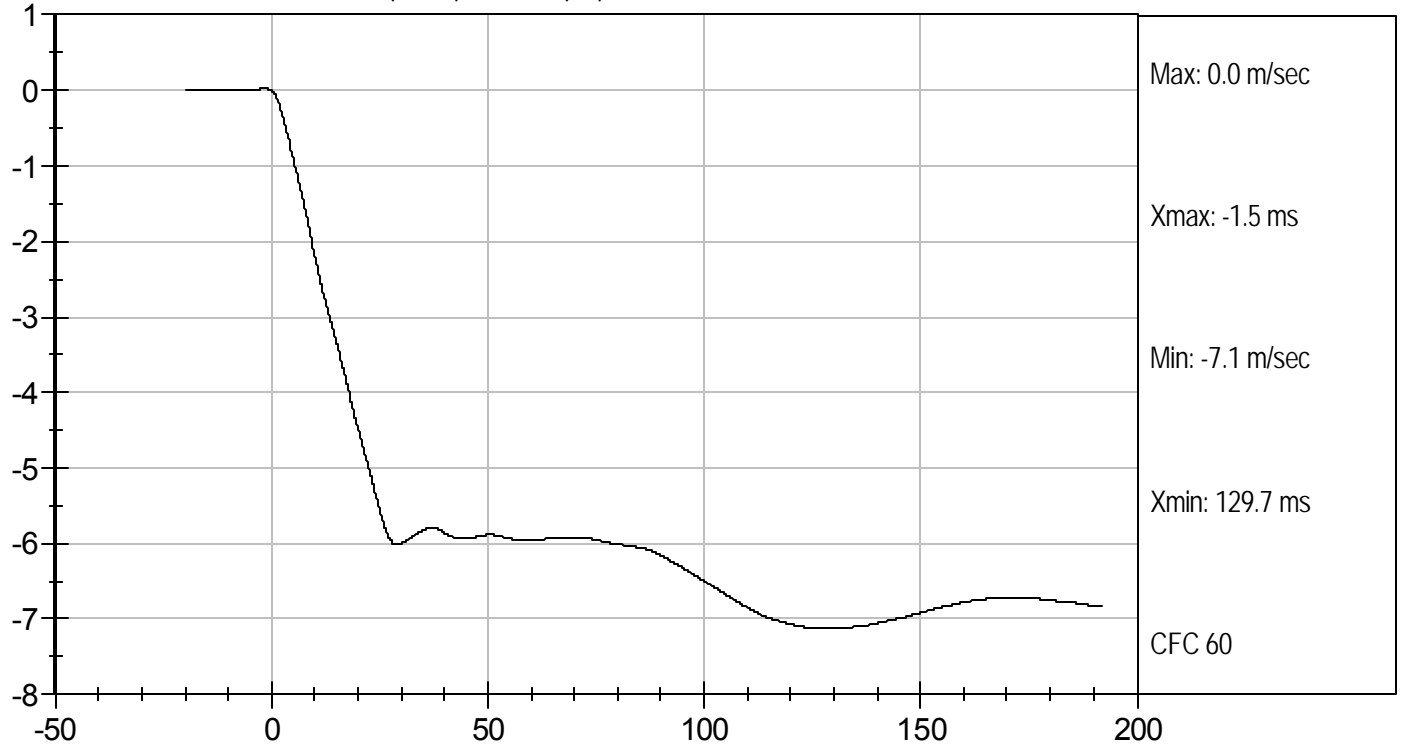
Jessica Hall  
Laboratory Technician

7/26/10  
Test Date

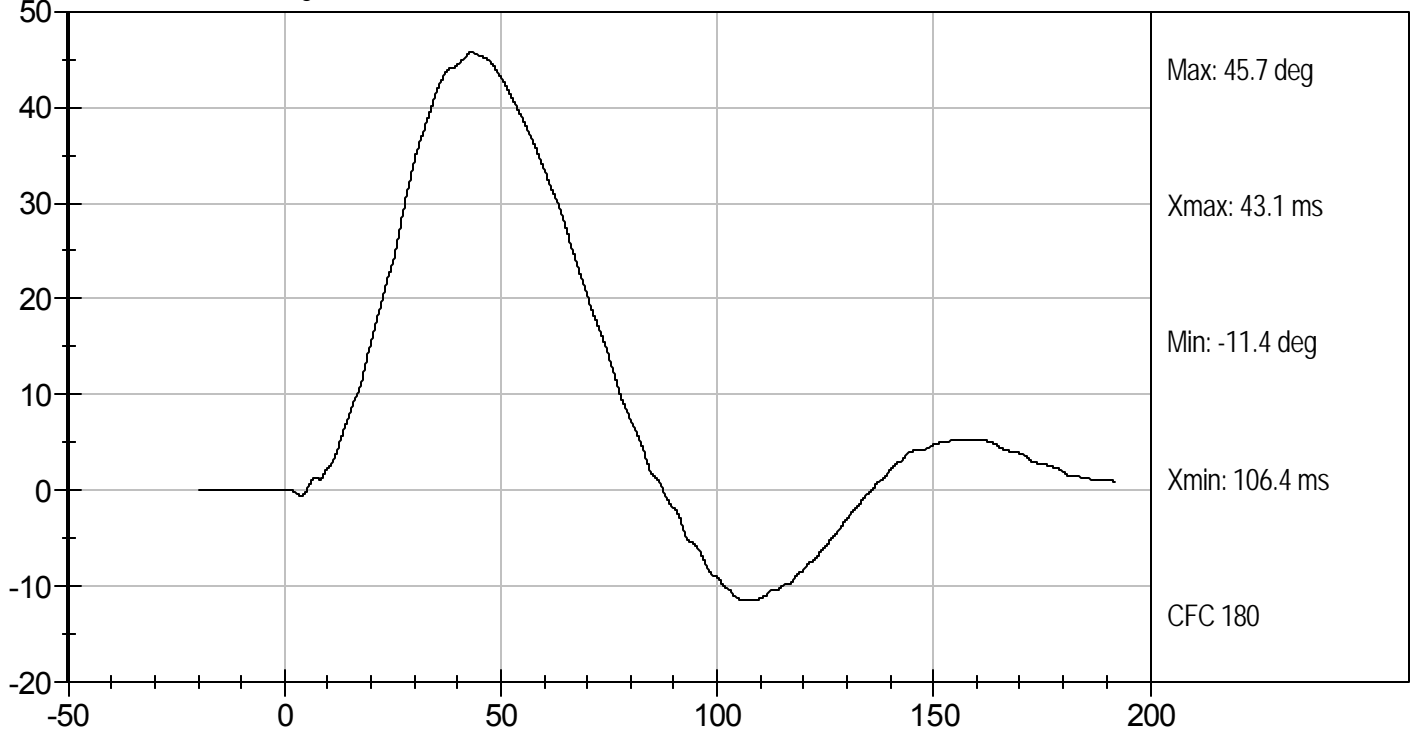
David Winkelbauer  
Approved By



PENDULUM DECELERATION (m/sec) vs TIME (ms)



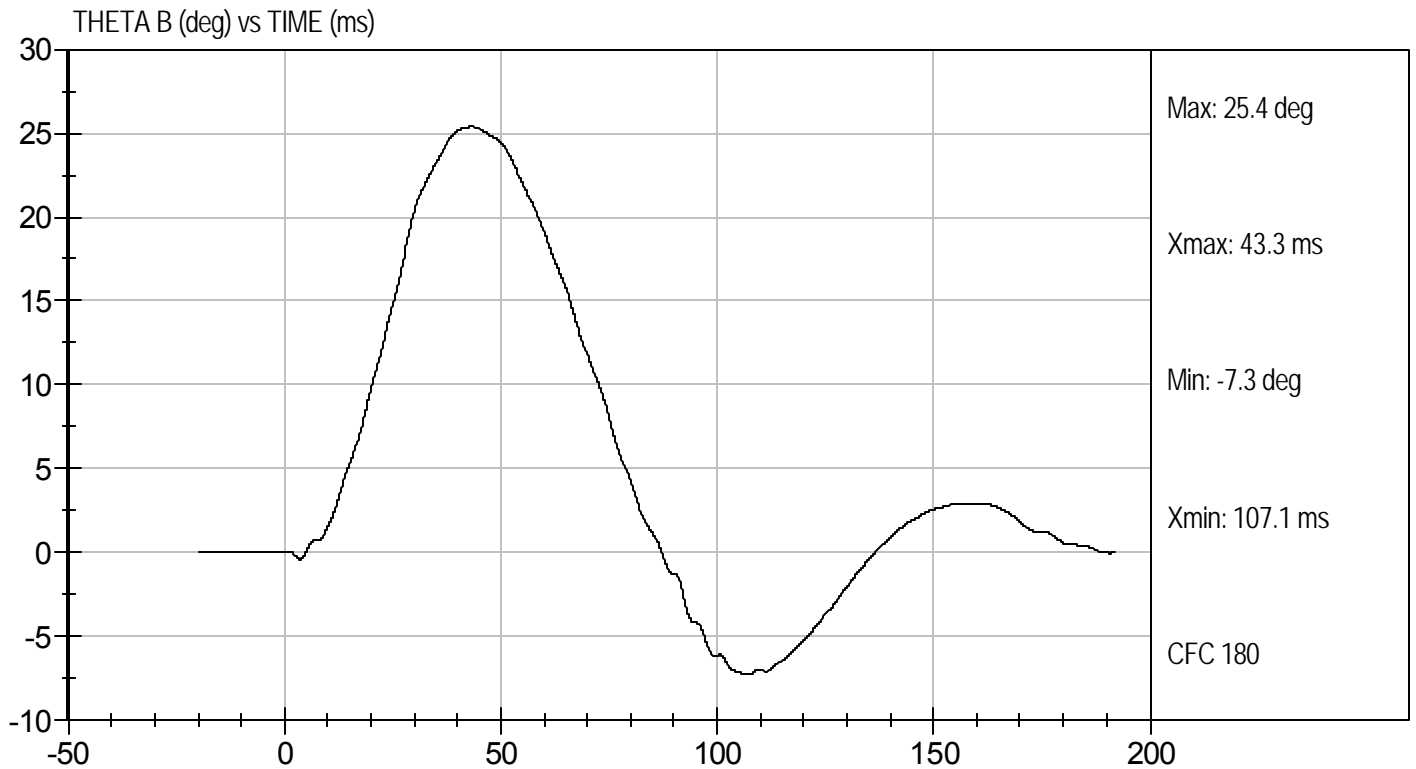
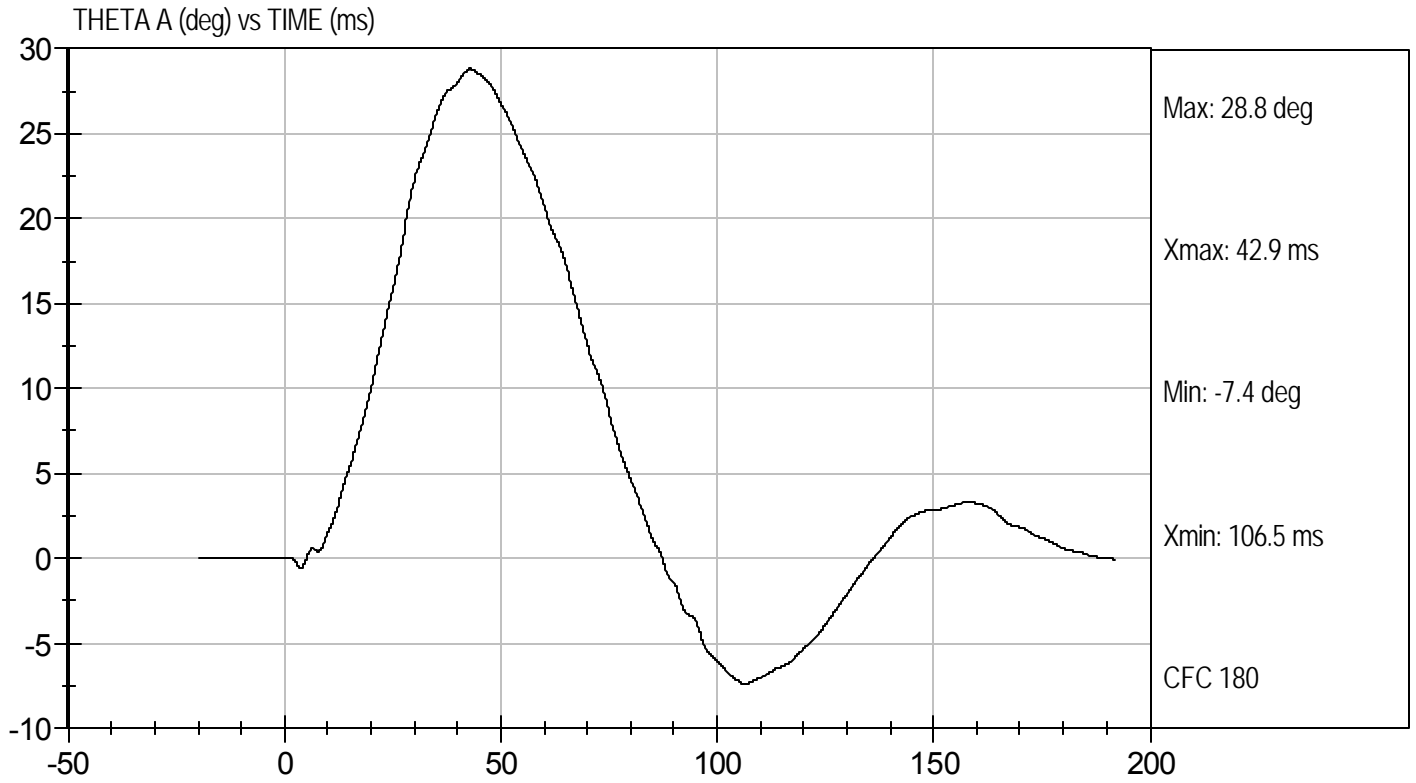
FLEXION ANGLE (deg) vs TIME (ms)





Test Desc: Lumbar Bending  
Component ID: D102368

Test Date: 7/26/10  
Velocity: 19.84 ft/s, 6.05 m/s



MGA RESEARCH CORPORATION

PELVIS TEST  
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D102369

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	54	Pass
Probe Speed	m/s	4.20 to 4.40	4.36	Pass
Maximum Impactor Force	kN	4.70 to 5.40	4.75	Pass
Time of Maximum Impactor Force	ms	11.80 to 16.10	14.20	Pass
Maximum Pubic Force	kN	1.23 to 1.59	1.50	Pass
Time of Maximum Pubic Force	ms	12.20 to 17.00	15.20	Pass
Overall Test Results				Pass

Jessica Gall  
Laboratory Technician

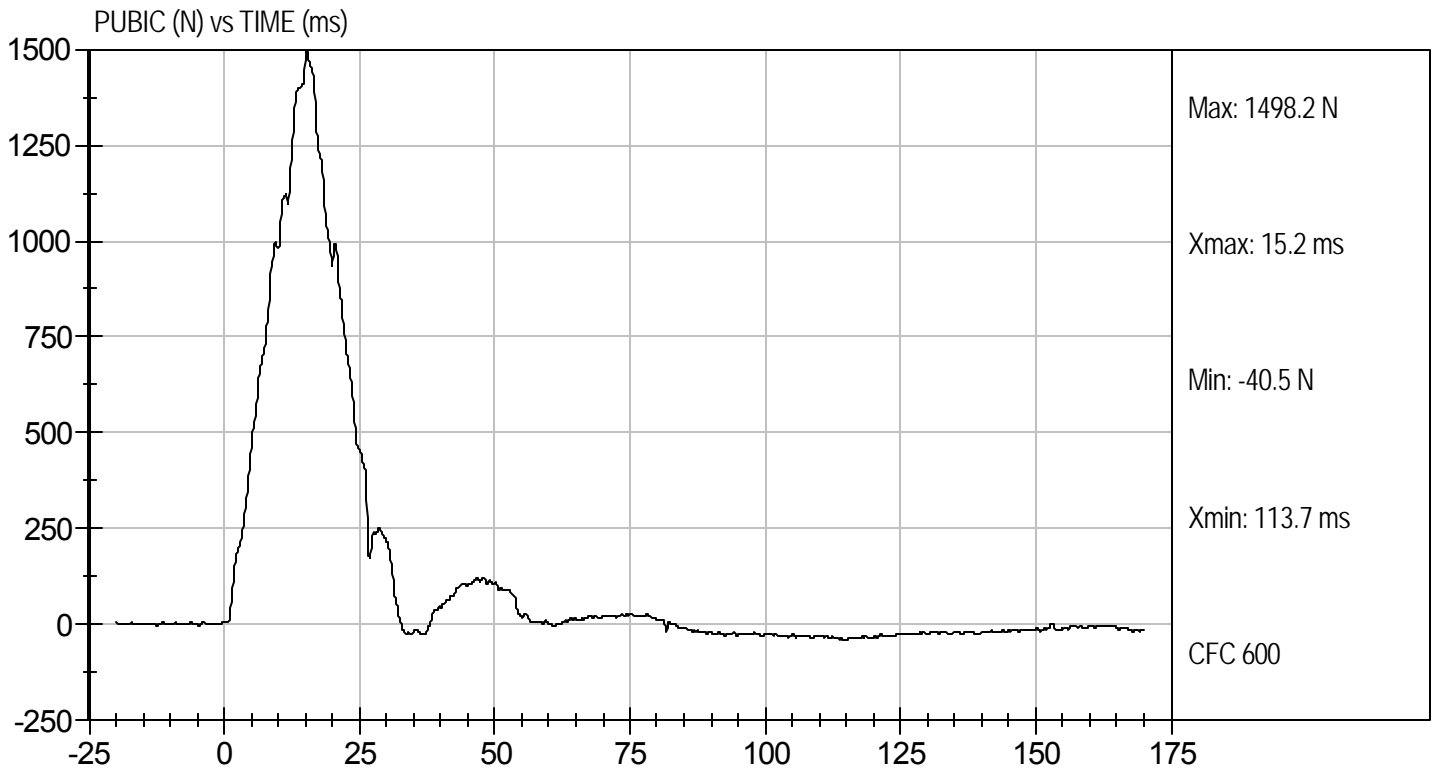
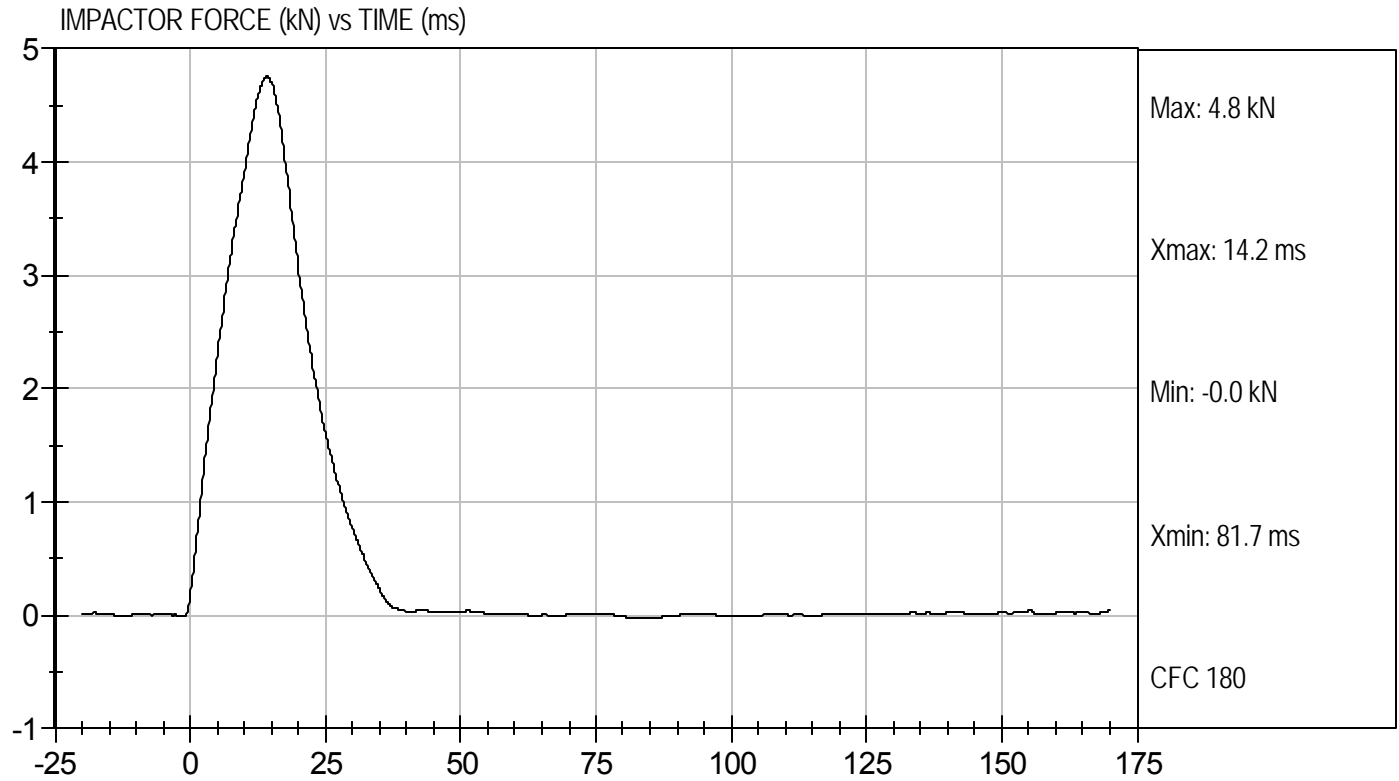
7/27/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Pelvis Impact  
Component ID: D102369

Test Date: 7/27/10  
Velocity: 14.3 ft/s, 5.52 m/s



**MGA RESEARCH CORPORATION**  
**FULL BODY THORAX IMPACT TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D102360

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.7	Pass
Humidity	%	10 to 70	54	Pass
Probe Speed	m/s	5.40 to 5.60	5.52	Pass
Maximum Impactor Force (after 6 ms)	kN	5.10 to 6.20	5.20	Pass
Upper Rib Displacement	mm	34.0 to 41.0	37.6	Pass
Middle Rib Displacement	mm	37.0 to 45.0	39.8	Pass
Lower Rib Displacement	mm	37.0 to 44.0	39.2	Pass
Overall Test Results				Pass

Jessica Hall  
Laboratory Technician

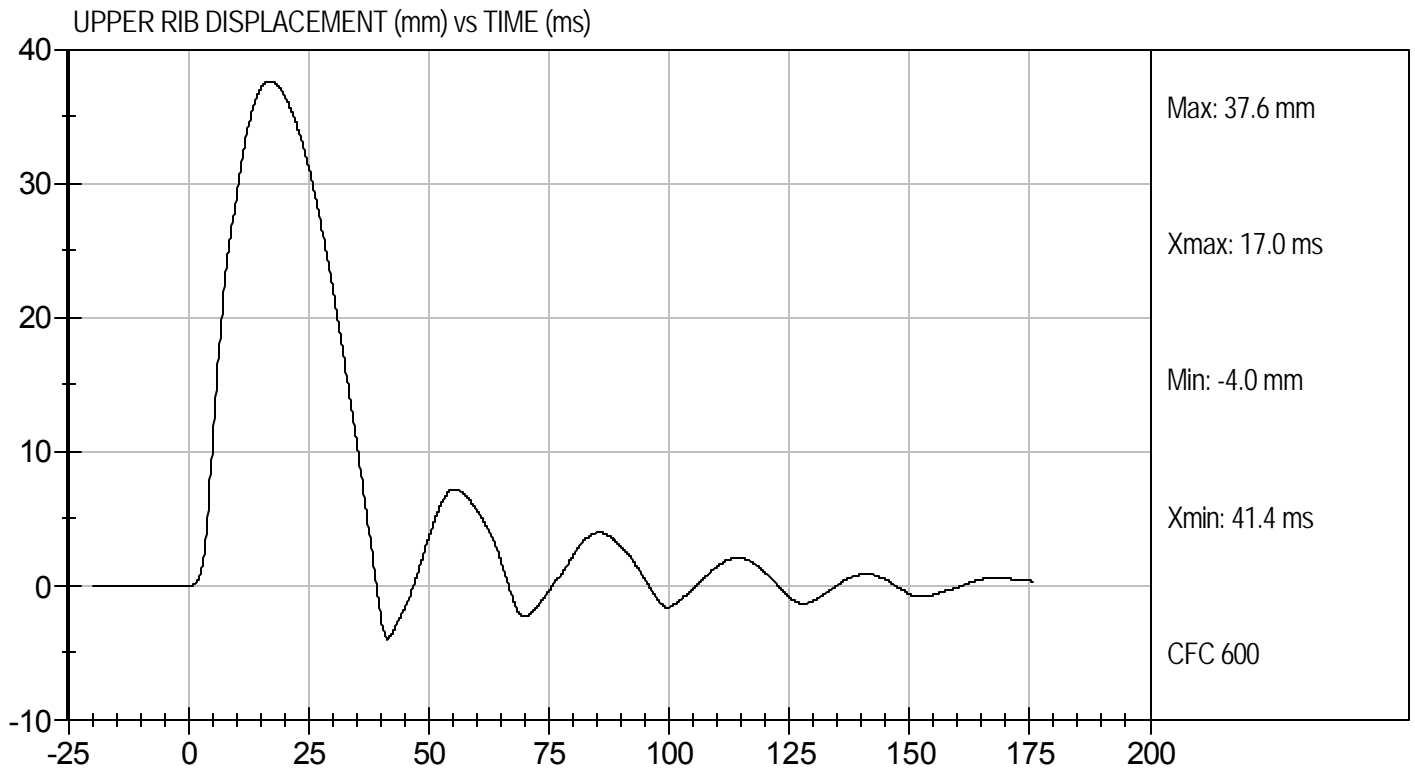
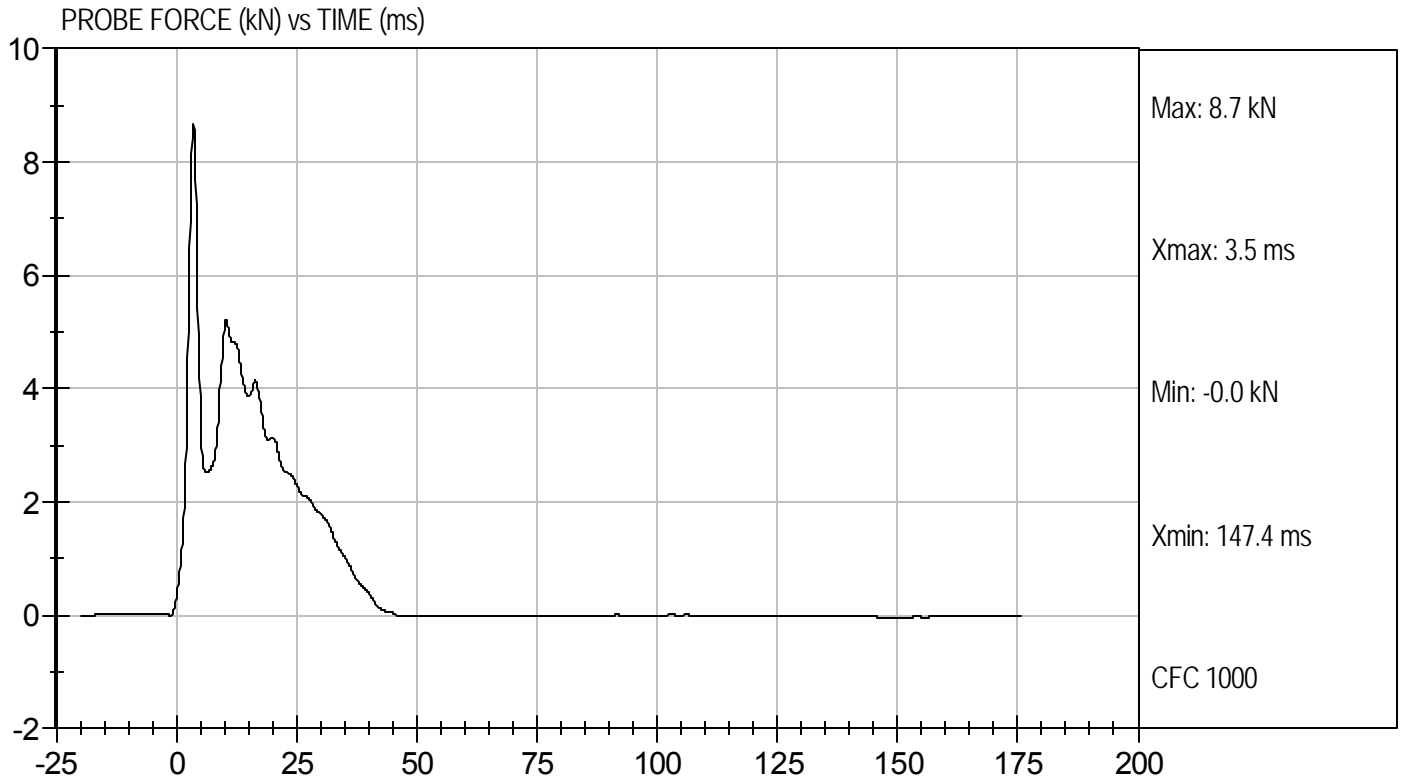
7/27/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Thorax Impact  
Component ID: D102360

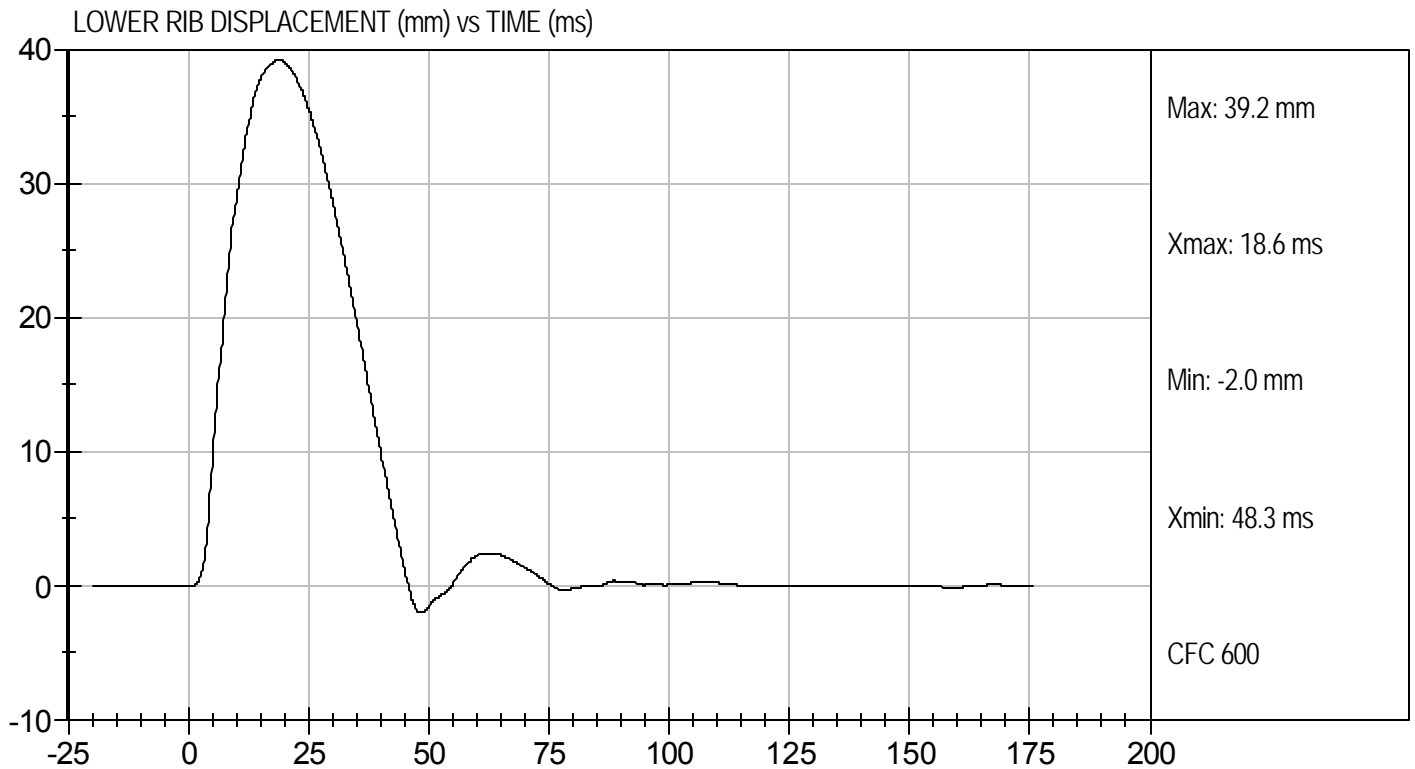
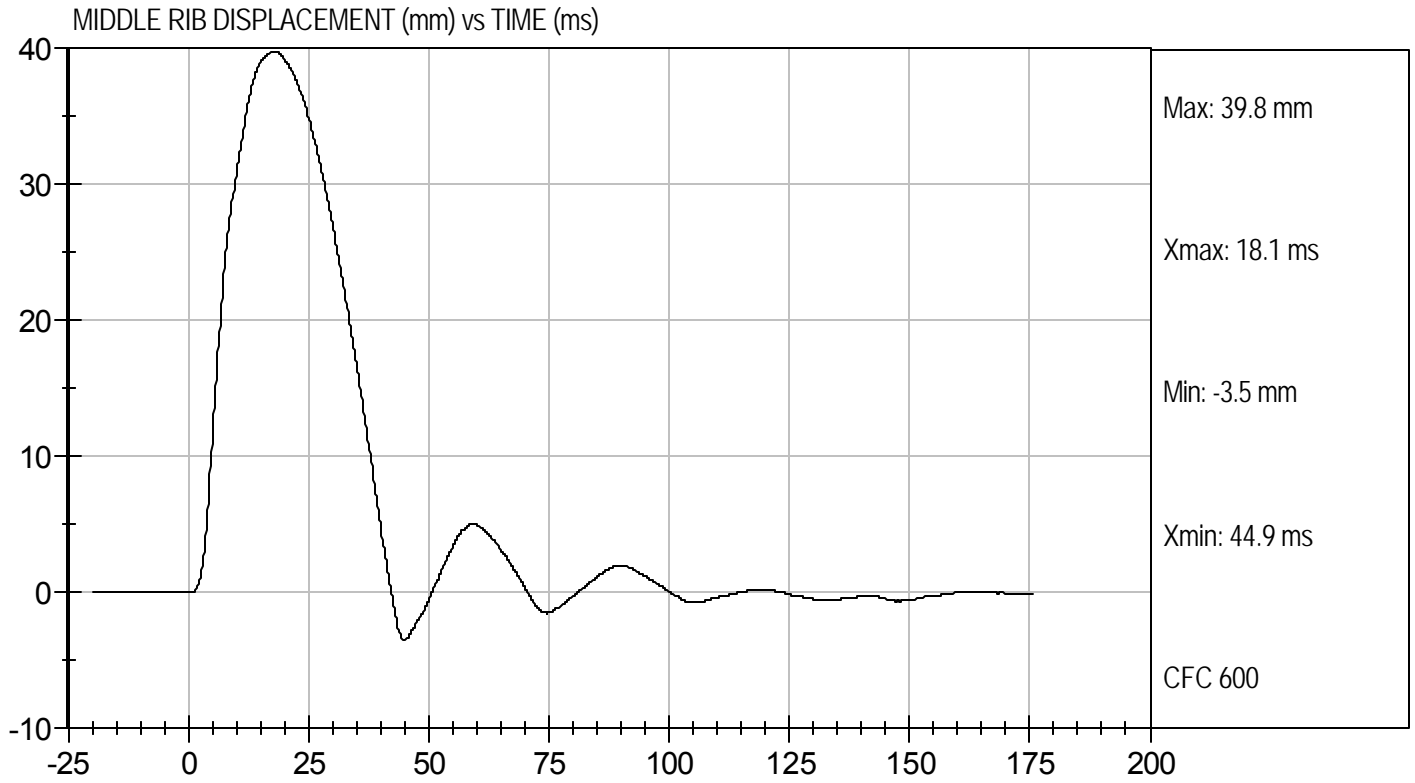
Test Date: 7/27/10  
Velocity: 18.1 ft/s, 5.52 m/s





Test Desc: Thorax Impact  
Component ID: D102360

Test Date: 7/27/10  
Velocity: 18.1 ft/s, 5.52 m/s



**MGA RESEARCH CORPORATION**  
**HEAD DROP TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

Test ID: D102451

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	48	Pass
Peak Resultant Acceleration	G's	125 to 155	150	Pass
Peak Lateral Acceleration	G's	+/- 15	-6.8	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
Overall Test Results				Pass

Jessica Hall  
Laboratory Technician

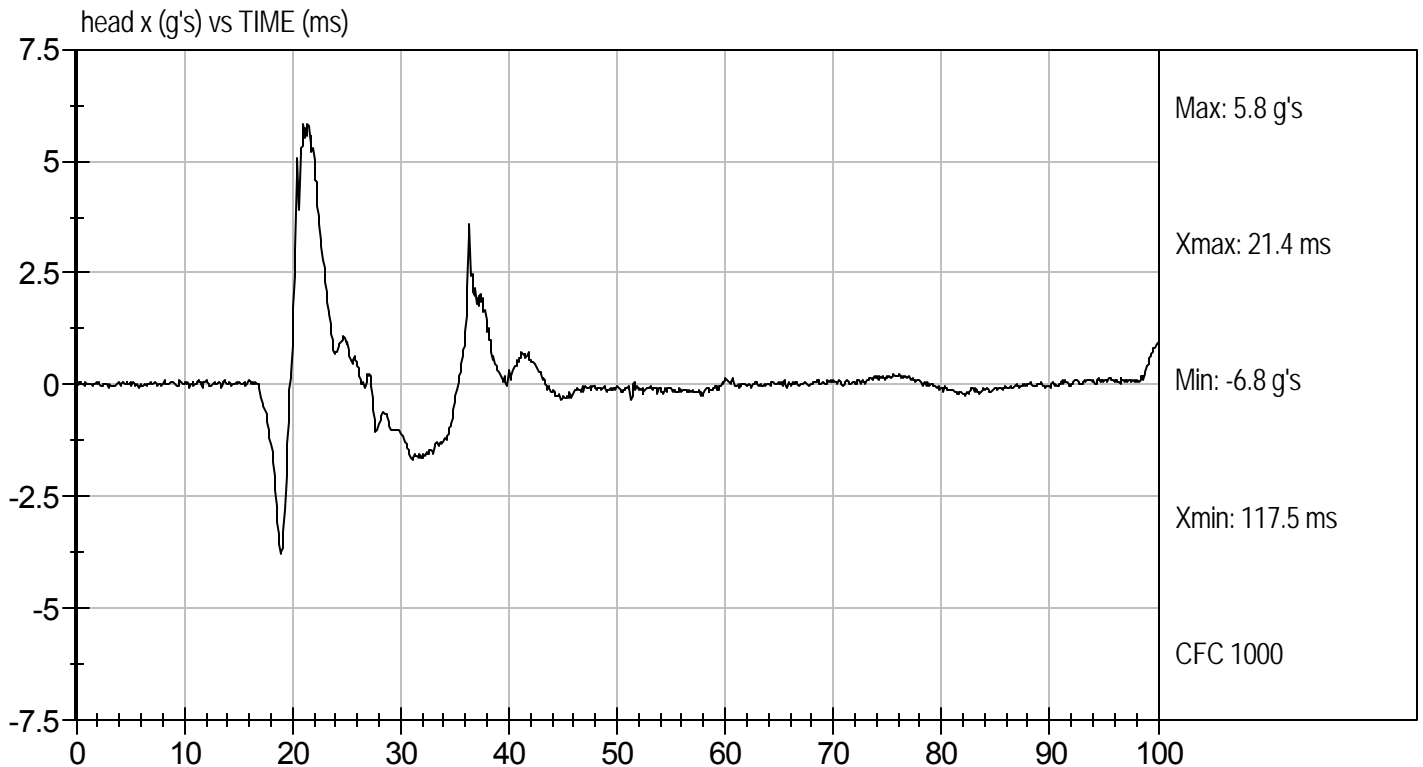
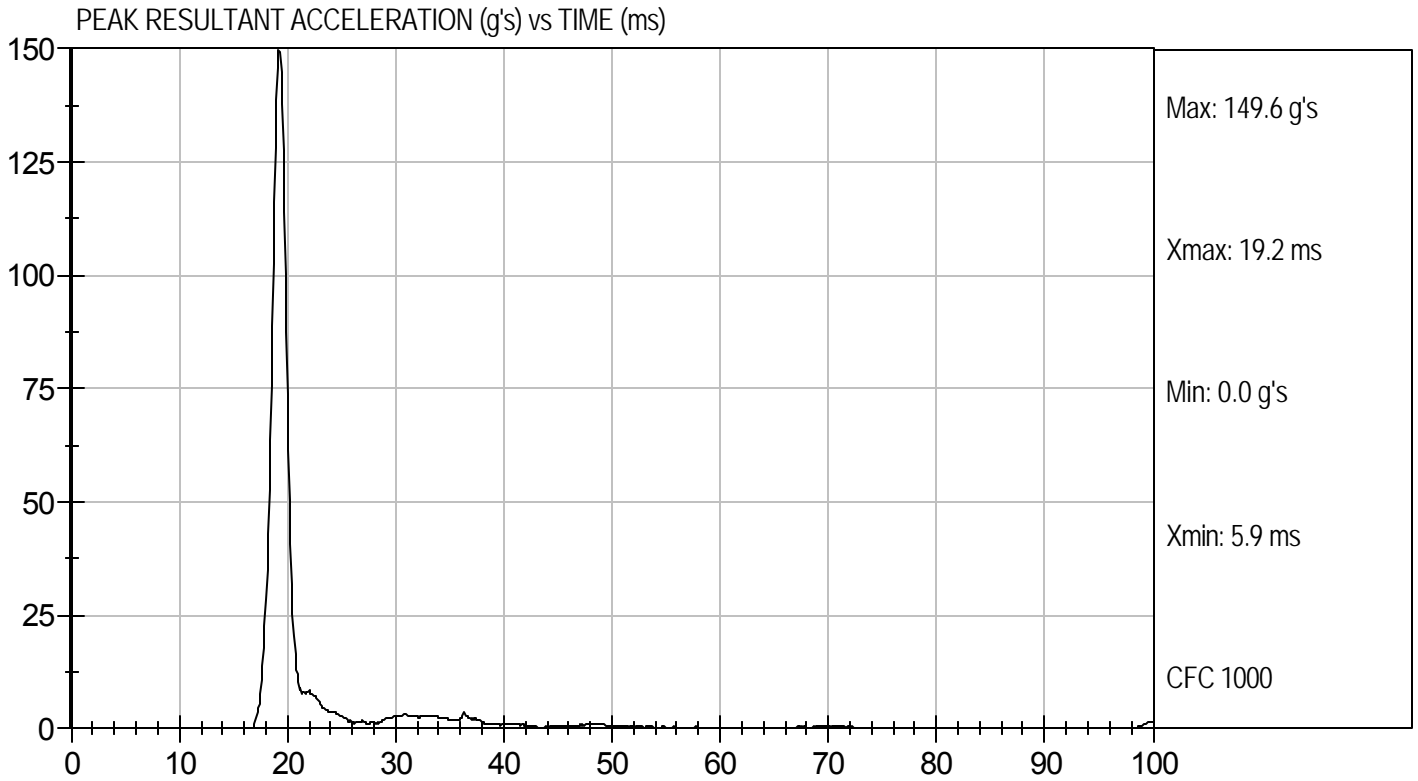
7/29/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Head Drop  
Component ID: D102451

Test Date: 7/29/10  
Velocity: 0 ft/s, 0 m/s



**MGA RESEARCH CORPORATION  
NECK PENDULUM TEST  
ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D102452

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	18.0 to 22.0	21.0	Pass
Laboratory Relative Humidity		%	10 to 70	48	Pass
Pendulum Speed		m/s	3.3 to 3.5	3.4	Pass
Pendulum Deceleration	1 ms	m/s	0.00 to -0.05	-0.03	Pass
	3 ms	m/s	-0.25 to -0.375	-0.33	Pass
	14 ms	m/s	-3.20 to -3.70	-3.22	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	53.0	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	61.2	Pass
Head Rotation Decay Time to 0 degree		ms	53.0 to 88.0	59.9	Pass
Overall Test Results					Pass

*Jessica Hall*  
Laboratory Technician

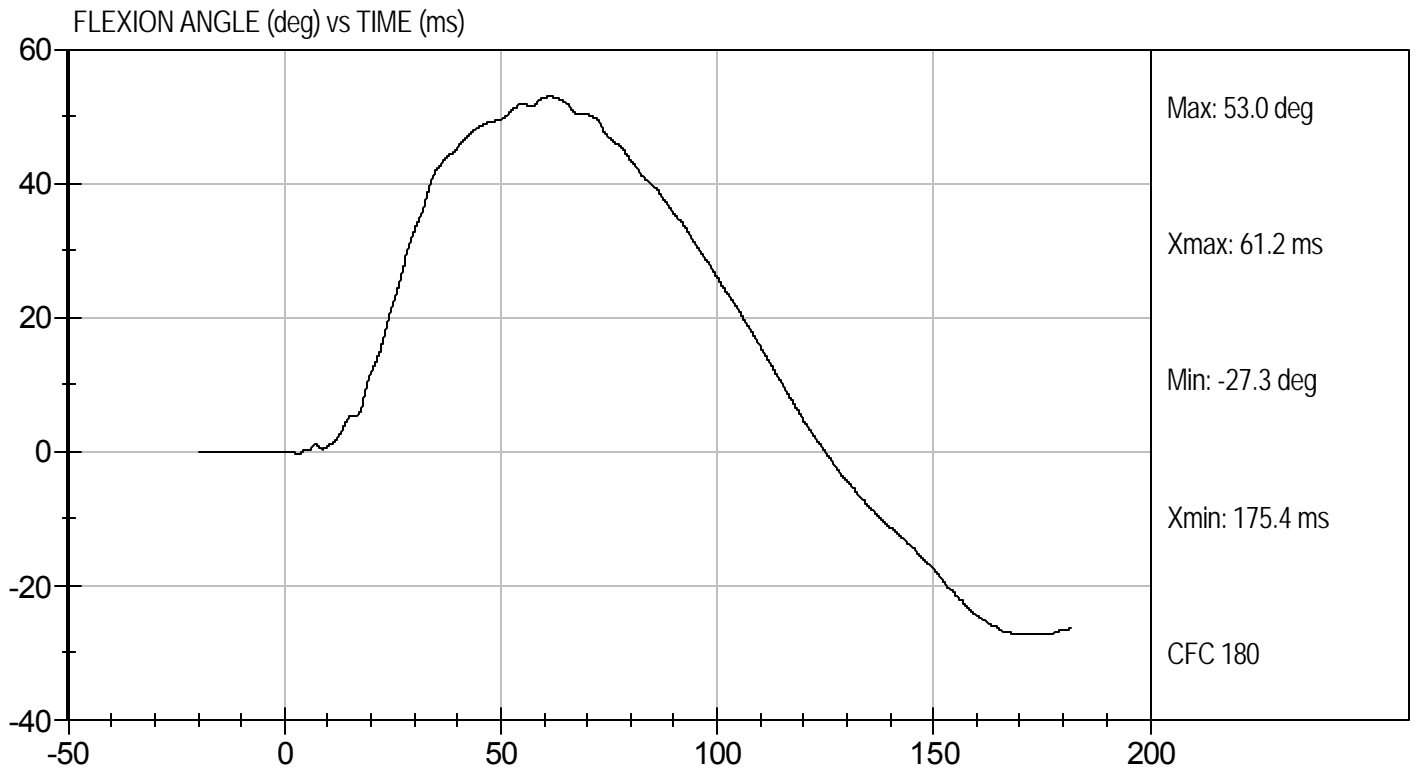
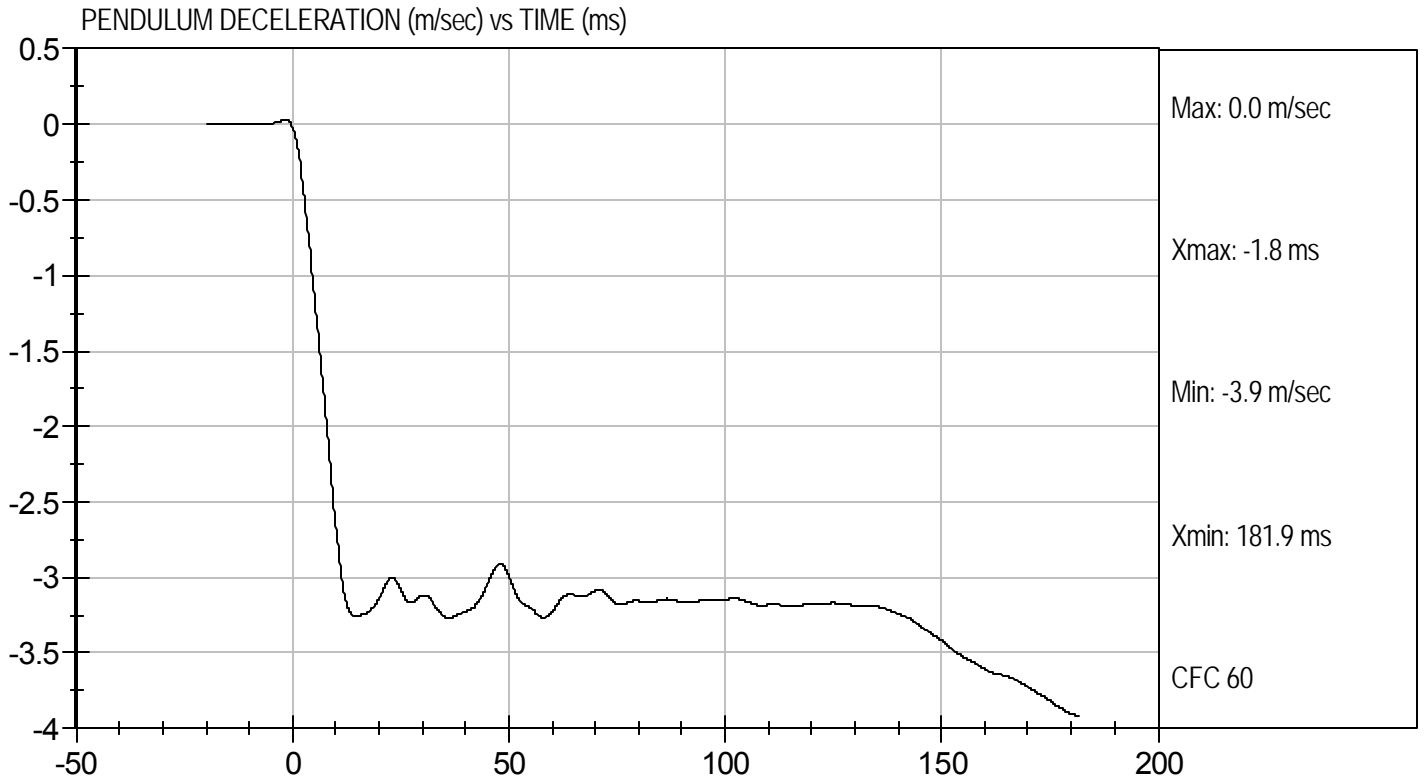
7/29/10  
Test Date

*David Winkelbauer*  
Approved By



Test Desc: Neck Bending  
Component ID: D102452

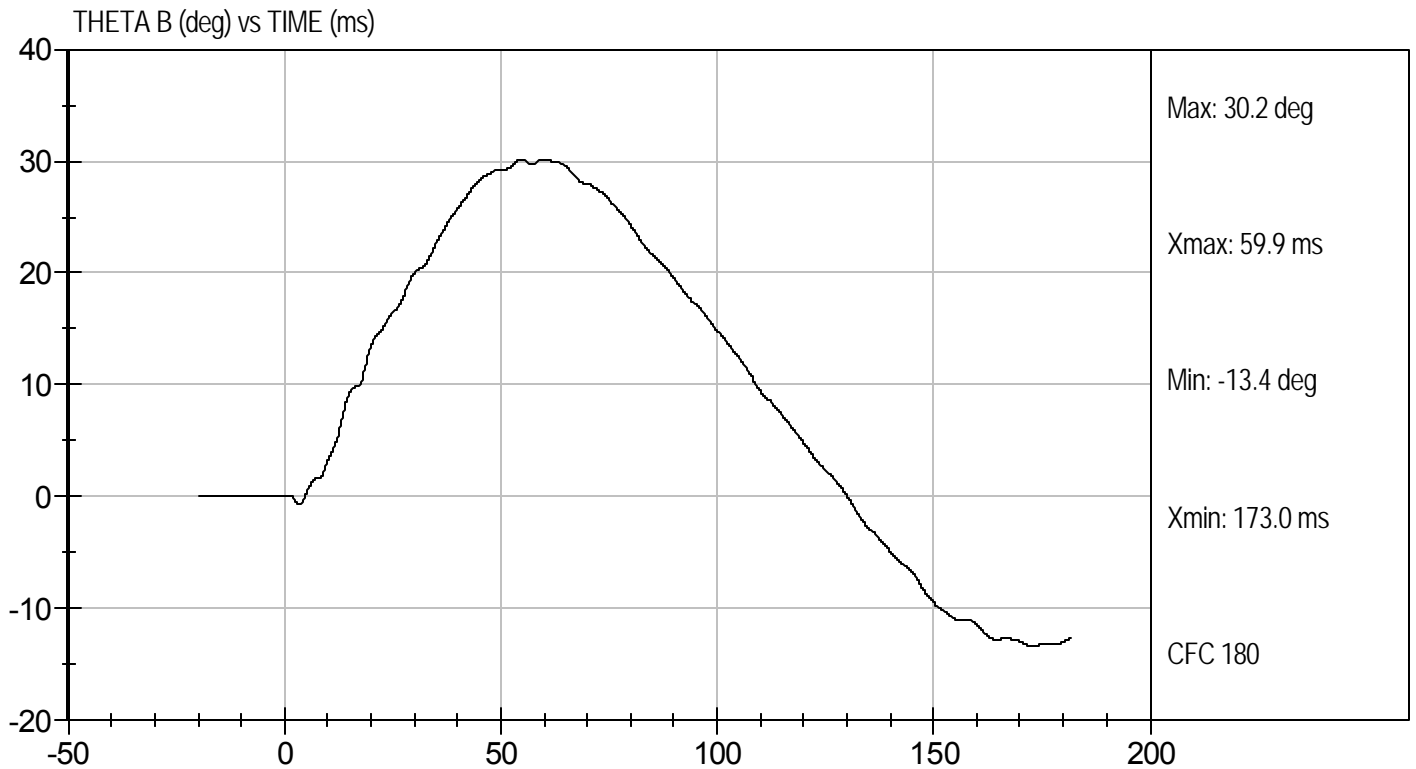
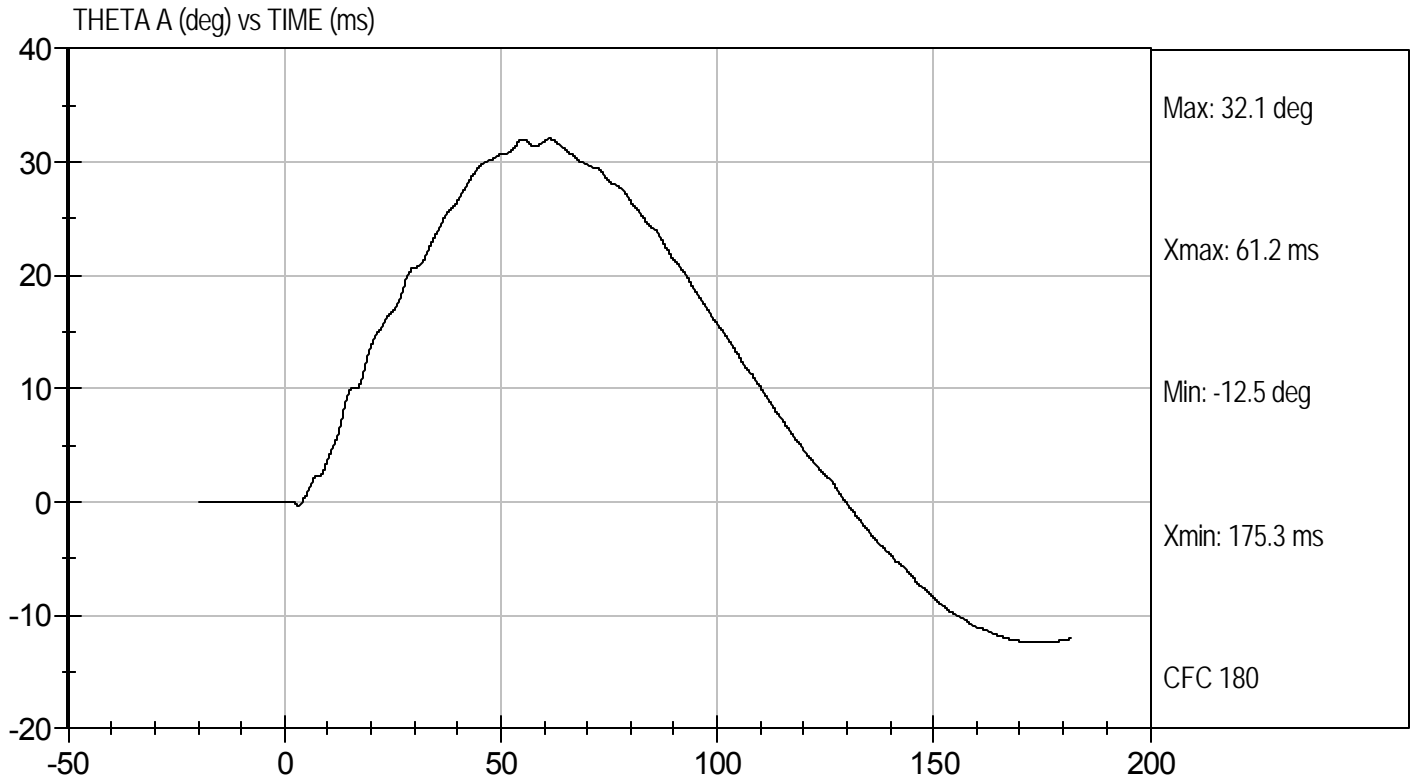
Test Date: 7/29/10  
Velocity: 11.19 ft/s, 3.4 m/s





Test Desc: Neck Bending  
Component ID: D102452

Test Date: 7/29/10  
Velocity: 11.19 ft/s, 3.4 m/s



**MGA RESEARCH CORPORATION**  
**SHOULDER IMPACT TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D102453

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	47	Pass
Pendulum Speed	m/s	4.2 to 4.4	4.3	Pass
Peak Shoulder Acceleration	G's	7.5 to 10.5	9.7	Pass
Time of Peak Shoulder Acceleration	ms	NA	13.7	Pass
Overall Test Results				Pass

*Jessica Gall*  
 Laboratory Technician

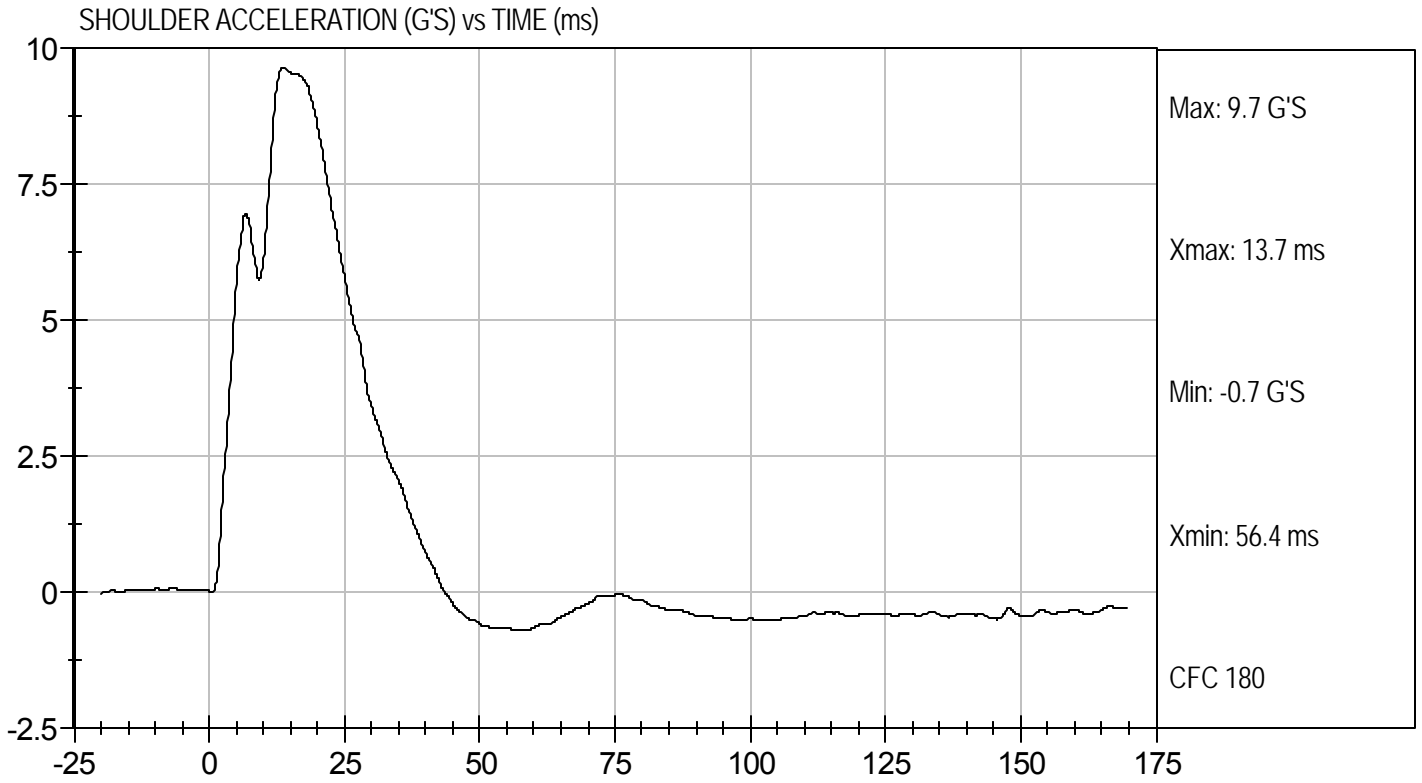
7/30/10  
 Test Date

*David Winkelbauer*  
 Approved By



Test Desc: Shoulder Impact  
Component ID: D102453

Test Date: 7/30/10  
Velocity: 14.0 ft/s, 4.3 m/s



MGA RESEARCH CORPORATION

UPPER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D102454

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	36.2	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	47.4	Pass
Overall Test Results				Pass

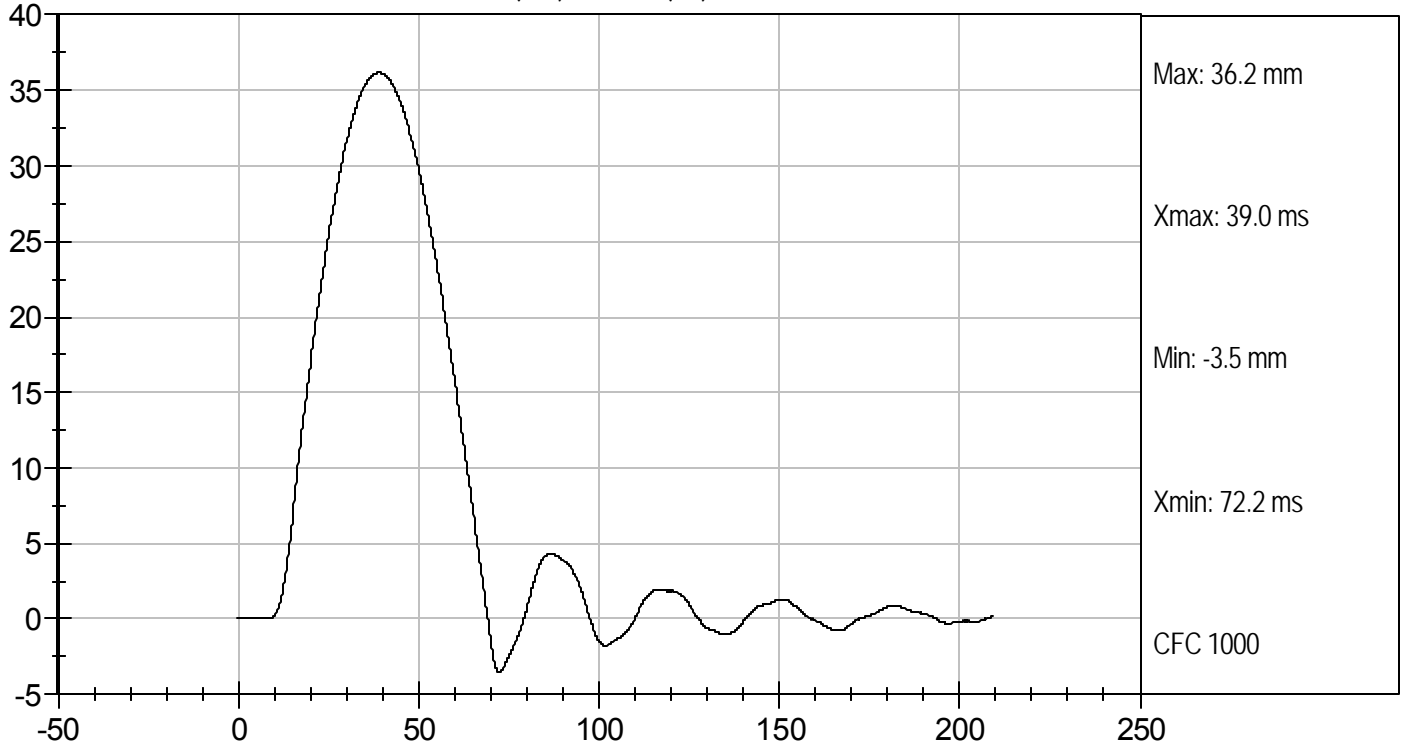
Jessica Hall  
Laboratory Technician

7/30/10  
Test Date

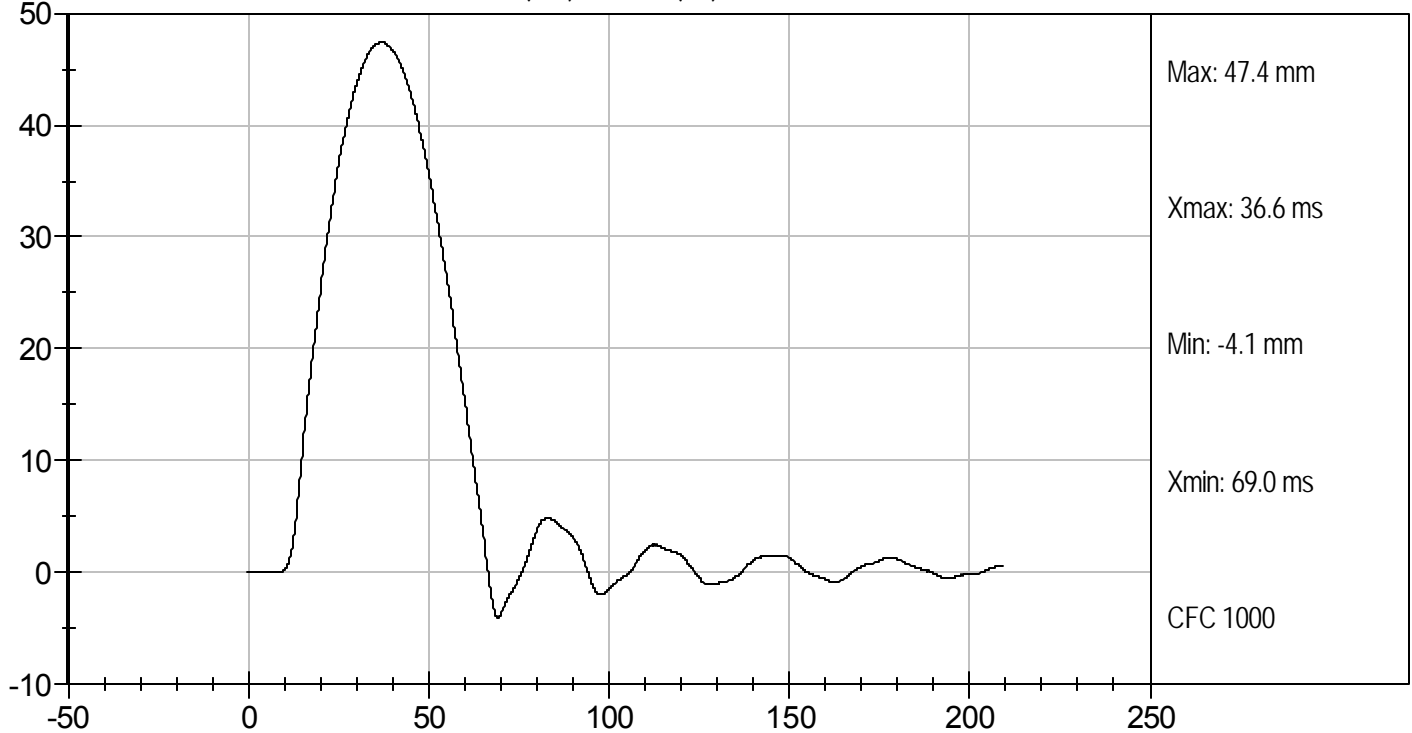
David Winkelbauer  
Approved By



UPPER RIB DISPLACEMENT @ 3 M/SEC (mm) vs TIME (ms)



UPPER RIB DISPLACEMENT @ 4 M/SEC (mm) vs TIME (ms)



MGA RESEARCH CORPORATION

MID RIB TEST  
ES-2re DUMMY

ATD Serial No: 032

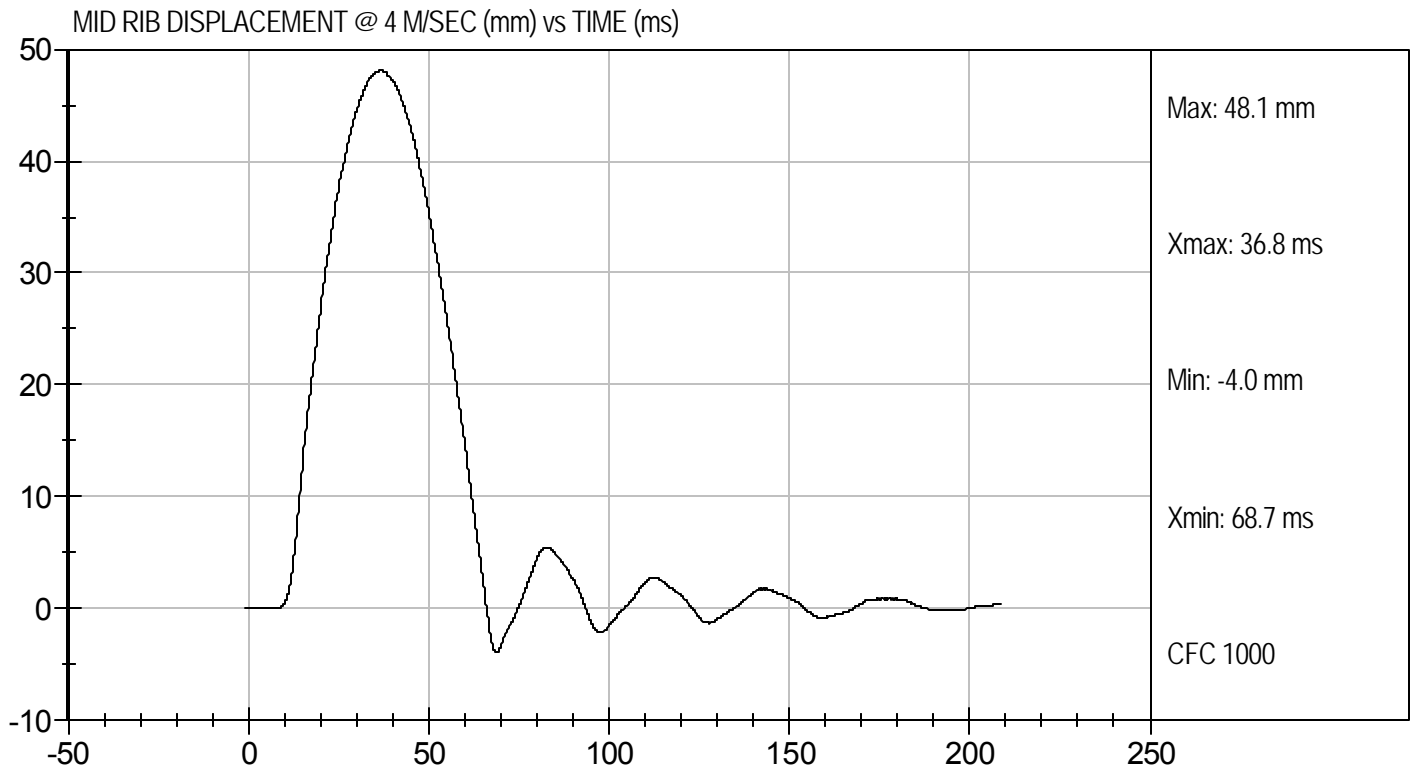
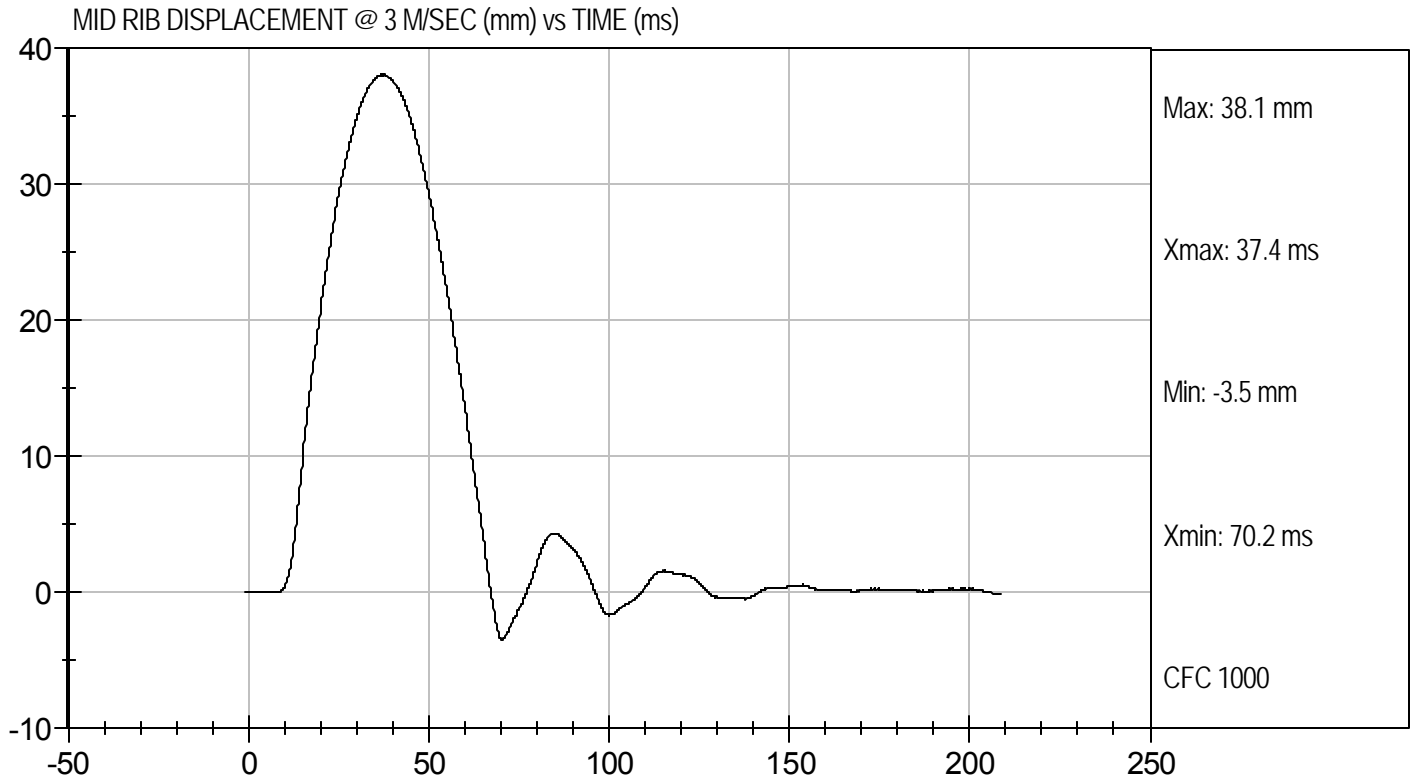
Test I.D: D102455

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	38.1	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	48.1	Pass
Overall Test Results				Pass

Jessica Hall  
Laboratory Technician

7/30/10  
Test Date

David Winkelbauer  
Approved By



MGA RESEARCH CORPORATION

LOWER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D102456

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	37.6	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	47.1	Pass
Overall Test Results				Pass

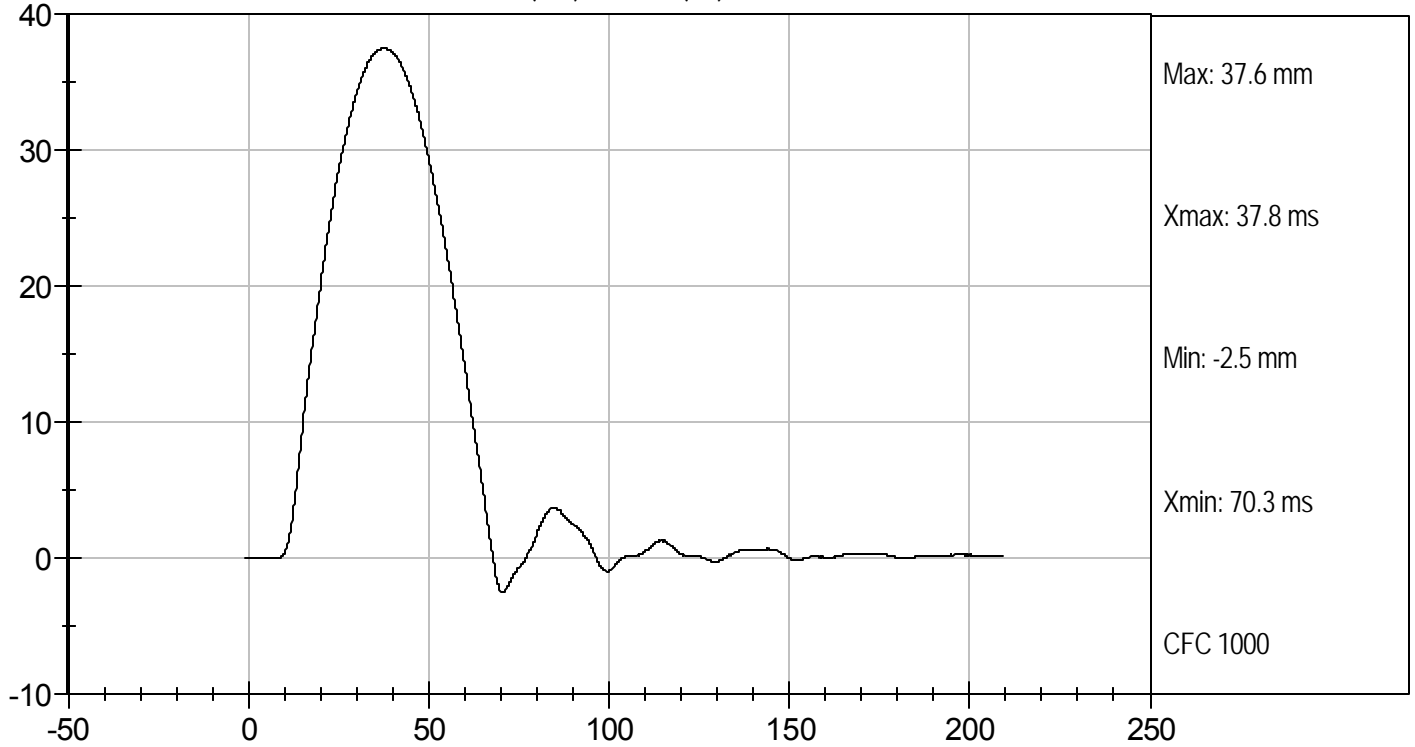
Jessica Gall  
Laboratory Technician

7/30/10  
Test Date

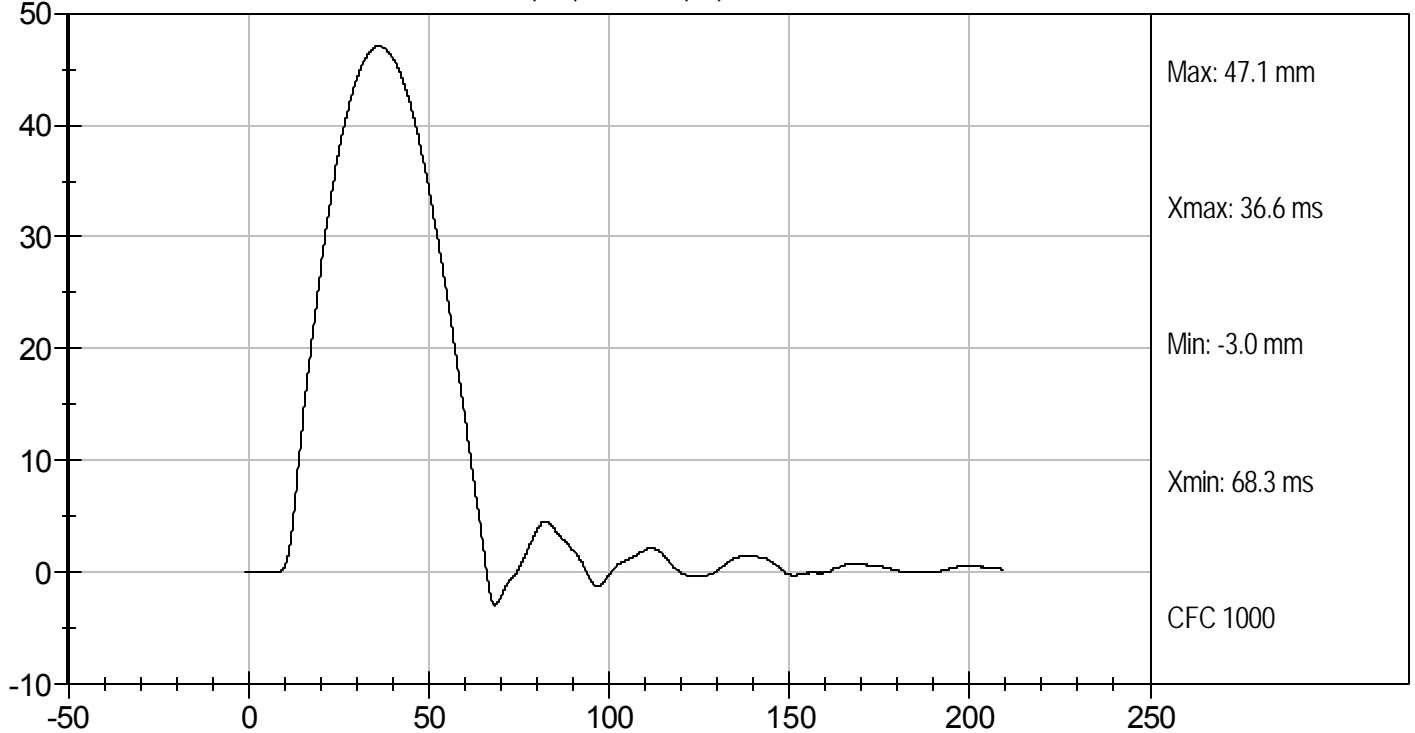
David Winkelbauer  
Approved By



LOWER RIB DISPLACEMENT @ 3 M/SEC (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT @ 4 M/SEC (mm) vs TIME (ms)



**MGA RESEARCH CORPORATION**  
**ABDOMEN TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D102457

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Probe Speed	m/s	3.90 to 4.10	4.08	Pass
Maximum Impact Force	kN	4.00 to 4.80	4.11	Pass
Time of Maximum Impact Force	ms	10.60 to 13.00	12.00	Pass
Maximum Total Abdomen Force	kN	2.20 to 2.70	2.46	Pass
Time of Maximum Abdomen Force	ms	10.00 to 12.30	11.30	Pass
Overall Test Results				Pass

Jessica Hall  
 Laboratory Technician

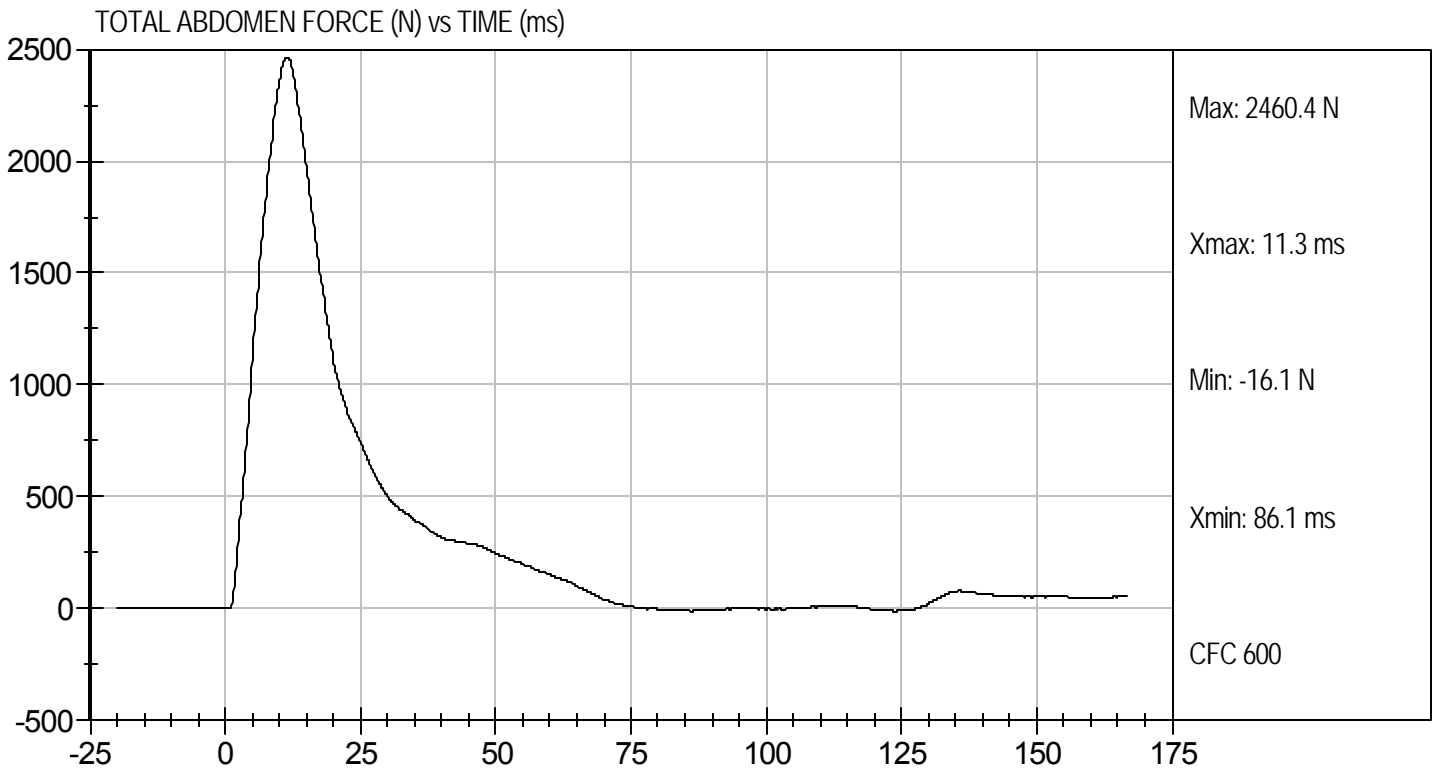
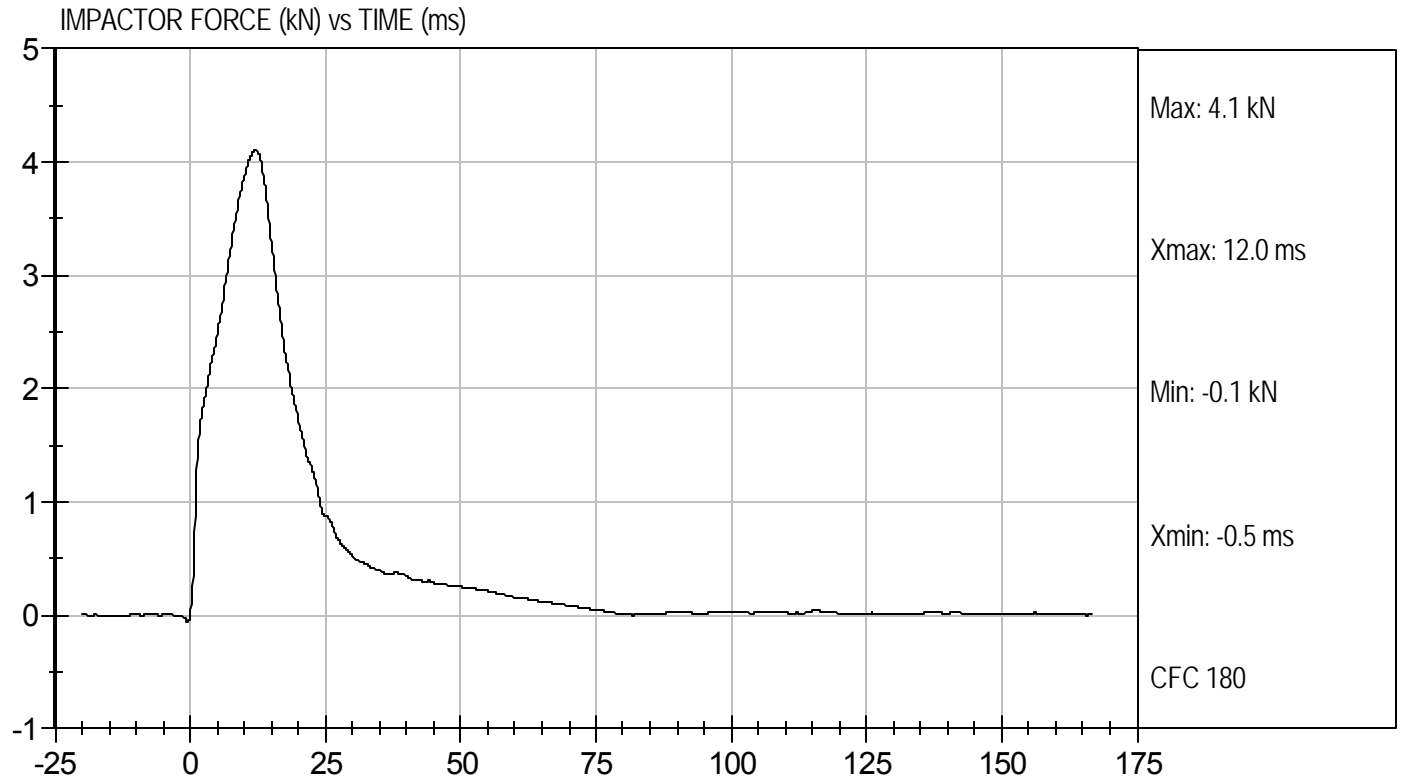
7/30/10  
 Test Date

David Winkelbauer  
 Approved By



Test Desc: Abdomen Impact  
Component ID: D102457

Test Date: 7/30/10  
Velocity: 13.4 ft/s, 4.08 m/s



**MGA RESEARCH CORPORATION**  
**LUMBAR SPINE TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D102458

Tested Parameter	Units	Specification	Result	Pass/Fail	
Laboratory Temperature	deg C	20.6 to 22.2	21.0	Pass	
Laboratory Relative Humidity	%	10 to 70	48	Pass	
Pendulum Speed	m/s	5.95 to 6.15	6.12	Pass	
Pendulum Deceleration	1 ms	m/s	-0.05 to 0.00	-0.02	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.42	Pass
	27 ms	m/s	-6.50 to -5.80	-5.84	Pass
	30 ms	m/s	>= -6.5	-6.02	Pass
Maximum Flexion Angle	deg	45.0 to 55.0	45.5	Pass	
Time of Maximum Flexion Angle	ms	39.0 to 53.0	42.9	Pass	
Headform Rotation Decay to Initial Position	ms	37 to 57	42	Pass	
Overall Results				Pass	

Jessica Hall  
Laboratory Technician

7/29/10  
Test Date

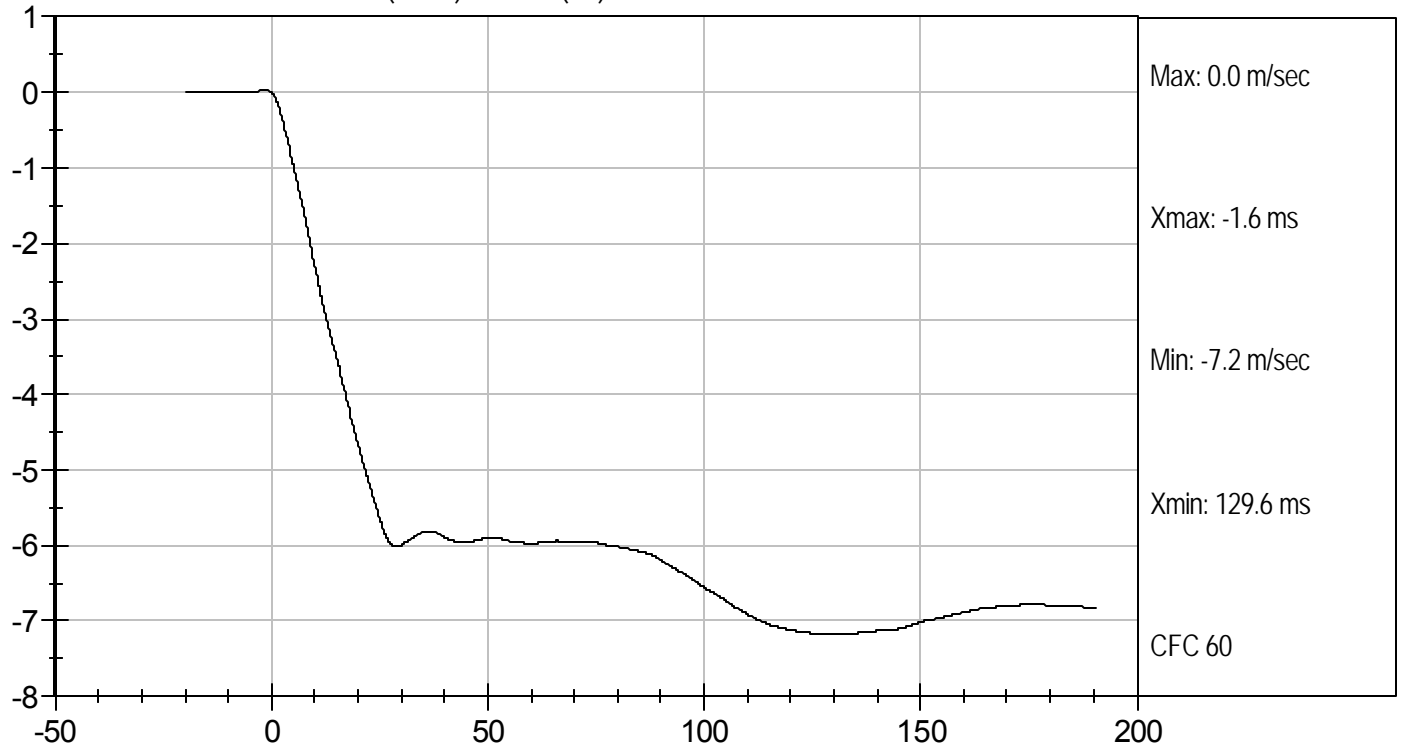
David Winkelbauer  
Approved By



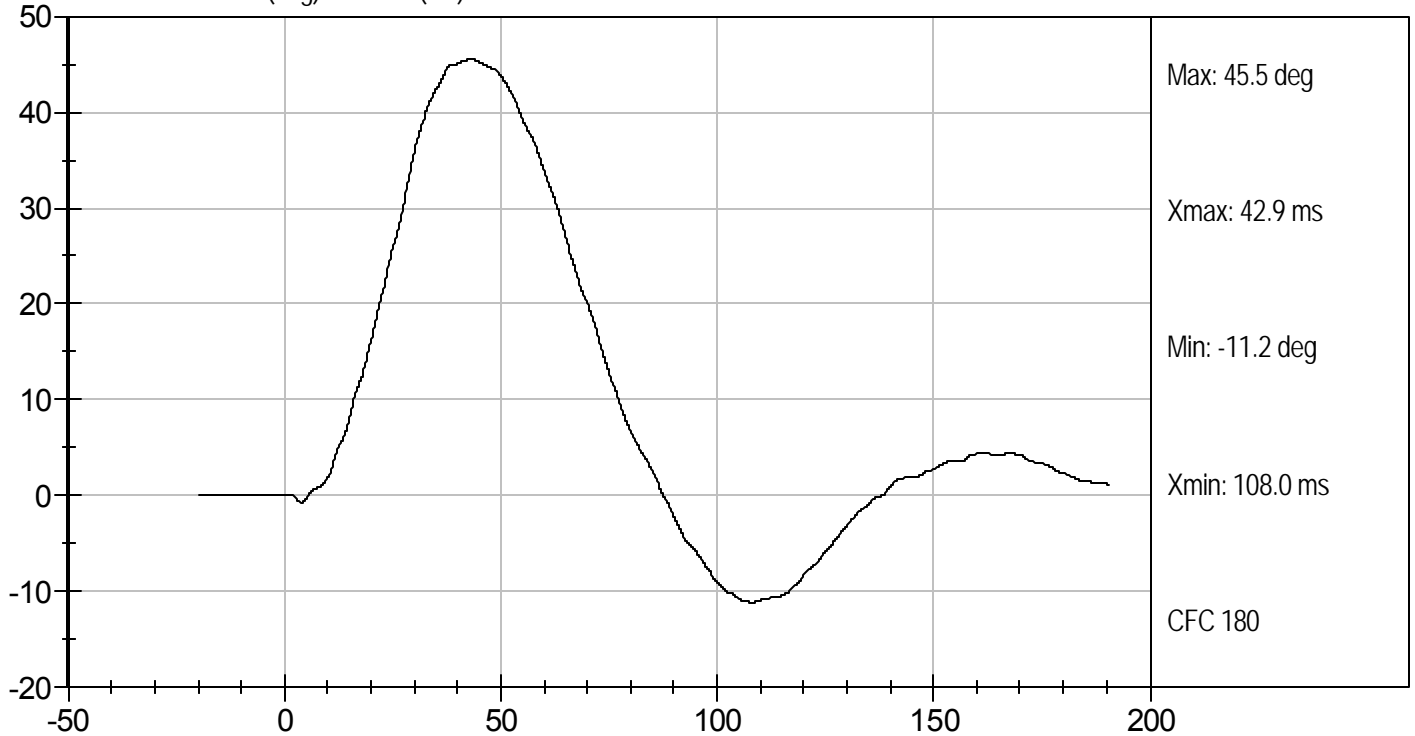
Test Desc: Lumbar Bending  
Component ID: D102458

Test Date: 7/29/10  
Velocity: 20.08 ft/s, 6.12 m/s

PENDULUM DECELERATION (m/sec) vs TIME (ms)



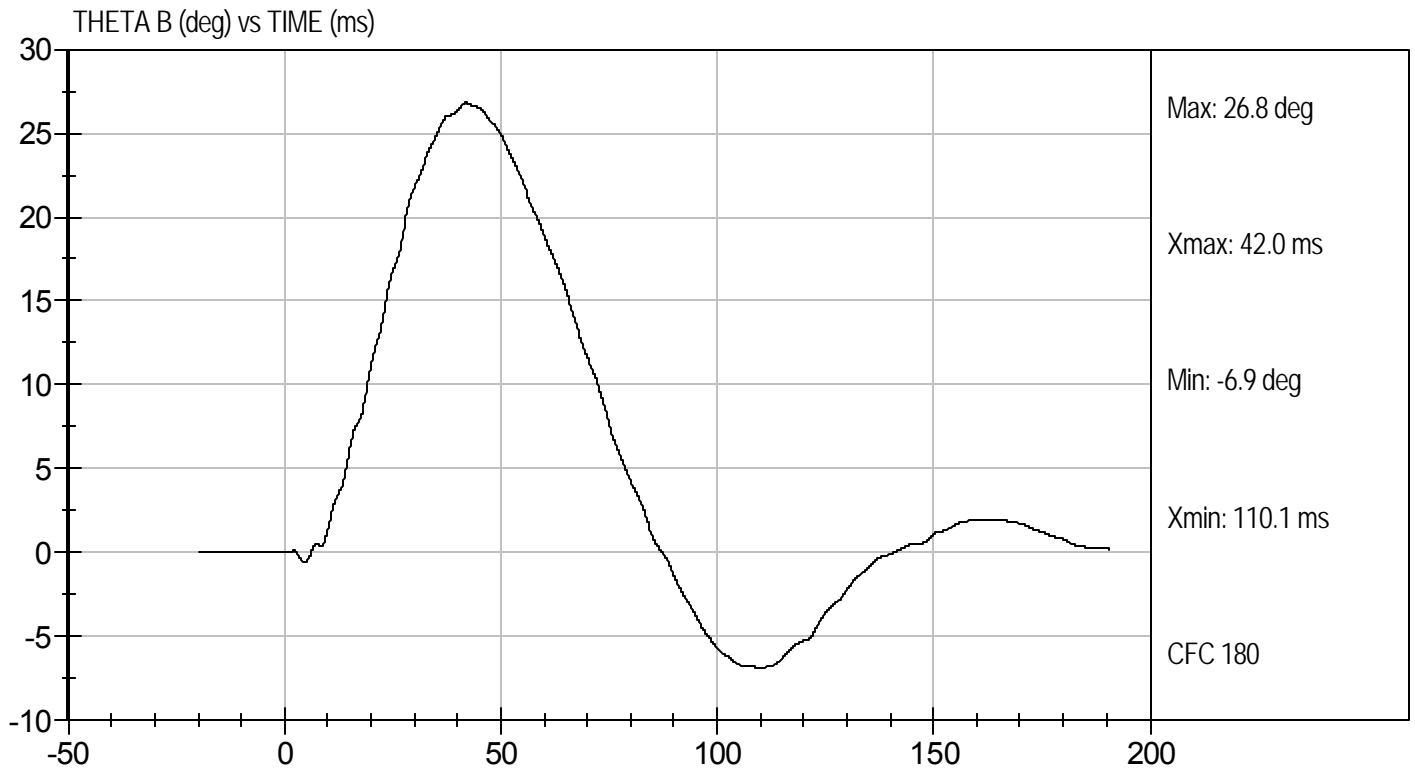
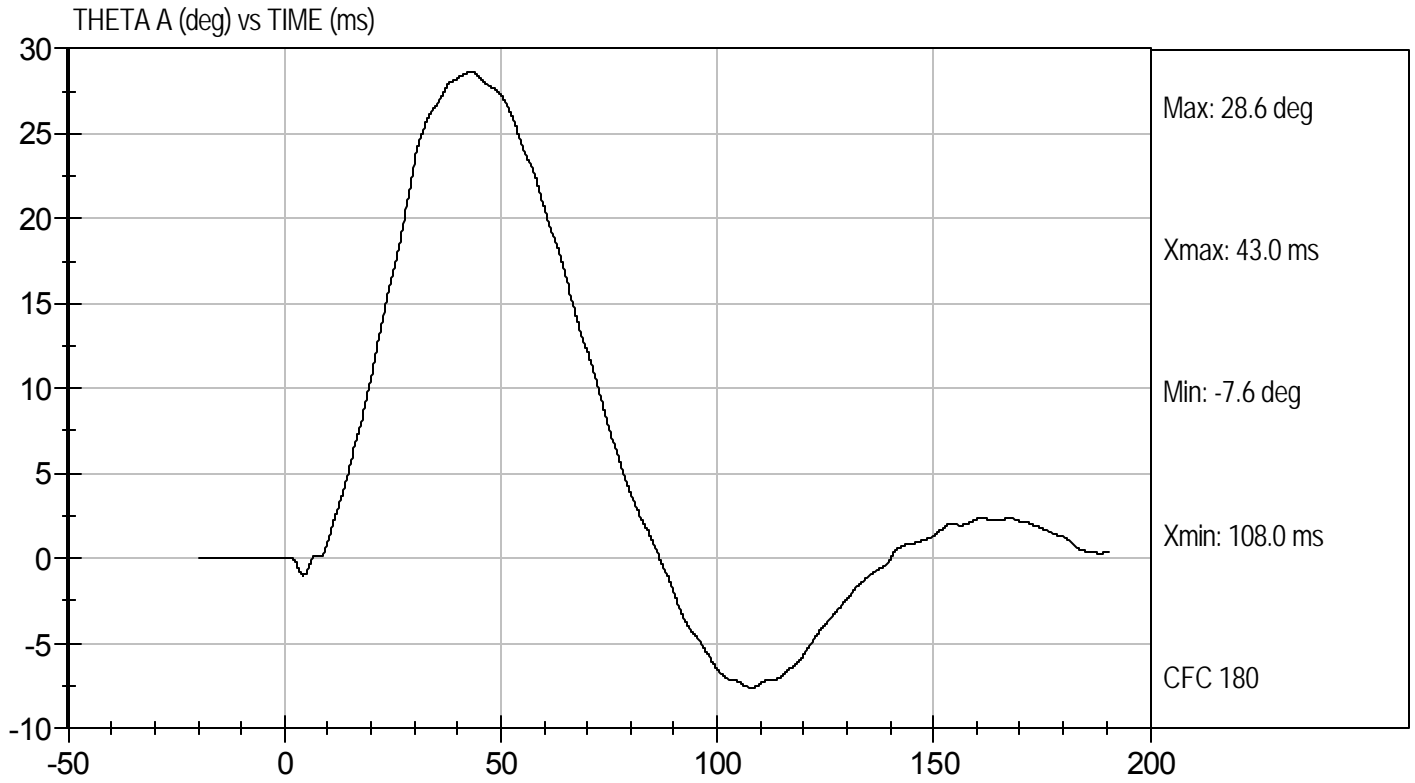
FLEXION ANGLE (deg) vs TIME (ms)





Test Desc: Lumbar Bending  
Component ID: D102458

Test Date: 7/29/10  
Velocity: 20.08 ft/s, 6.12 m/s



**MGA RESEARCH CORPORATION**  
**PELVIS TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D102459

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Probe Speed	m/s	4.20 to 4.40	4.33	Pass
Maximum Impactor Force	kN	4.70 to 5.40	4.73	Pass
Time of Maximum Impactor Force	ms	11.80 to 16.10	14.10	Pass
Maximum Pubic Force	kN	1.23 to 1.59	1.55	Pass
Time of Maximum Pubic Force	ms	12.20 to 17.00	16.00	Pass
Overall Test Results				Pass

Jessica Hall  
 Laboratory Technician

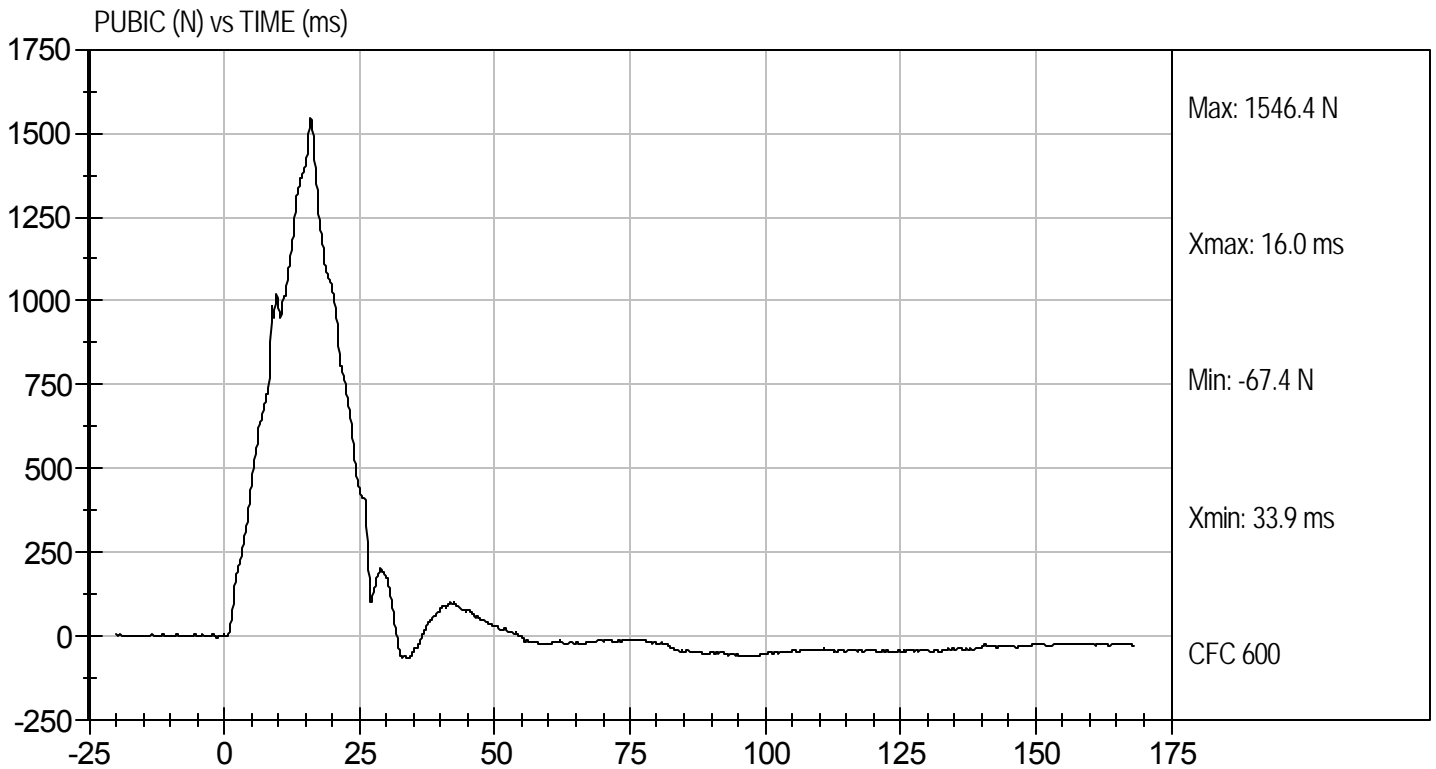
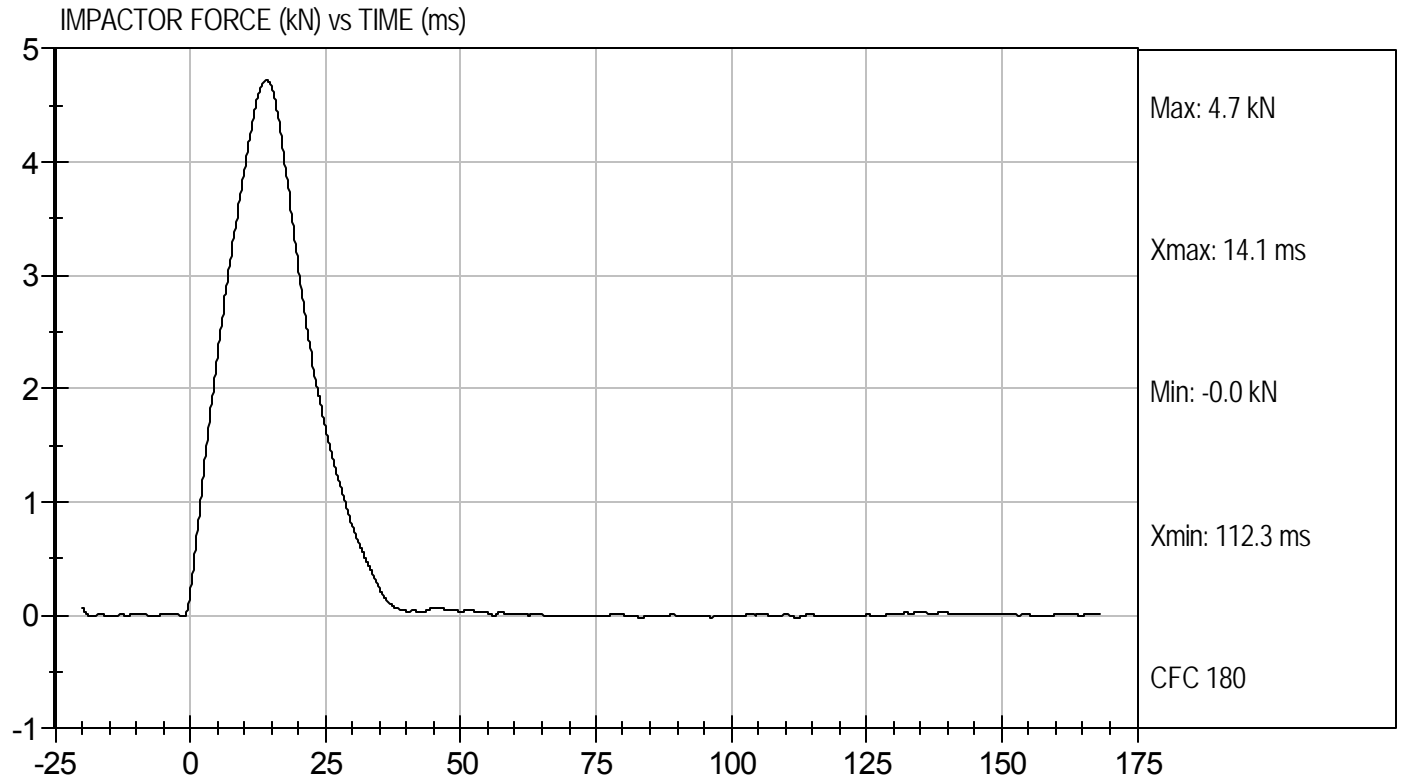
7/30/10  
 Test Date

David Winkelbauer  
 Approved By



Test Desc: Pelvis Impact  
Component ID: D102459

Test Date: 7/30/10  
Velocity: 14.2 ft/s, 4.33 m/s



**MGA RESEARCH CORPORATION**  
**FULL BODY THORAX IMPACT TEST**  
**ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D102450

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.7	Pass
Humidity	%	10 to 70	47	Pass
Probe Speed	m/s	5.40 to 5.60	5.46	Pass
Maximum Impactor Force (after 6 ms)	kN	5.10 to 6.20	5.14	Pass
Upper Rib Displacement	mm	34.0 to 41.0	38.6	Pass
Middle Rib Displacement	mm	37.0 to 45.0	41.2	Pass
Lower Rib Displacement	mm	37.0 to 44.0	40.8	Pass
Overall Test Results				Pass

*Jessica Hall*  
 \_\_\_\_\_  
 Laboratory Technician

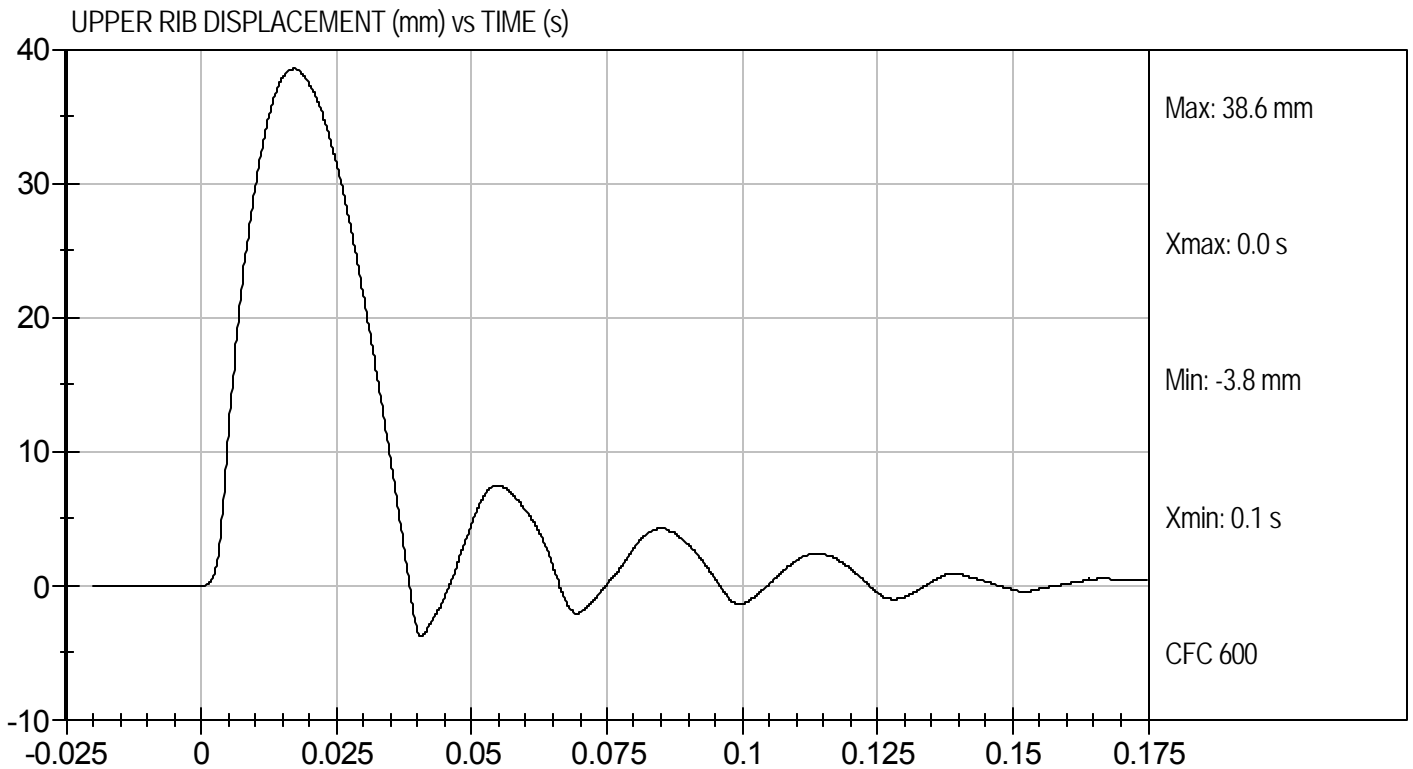
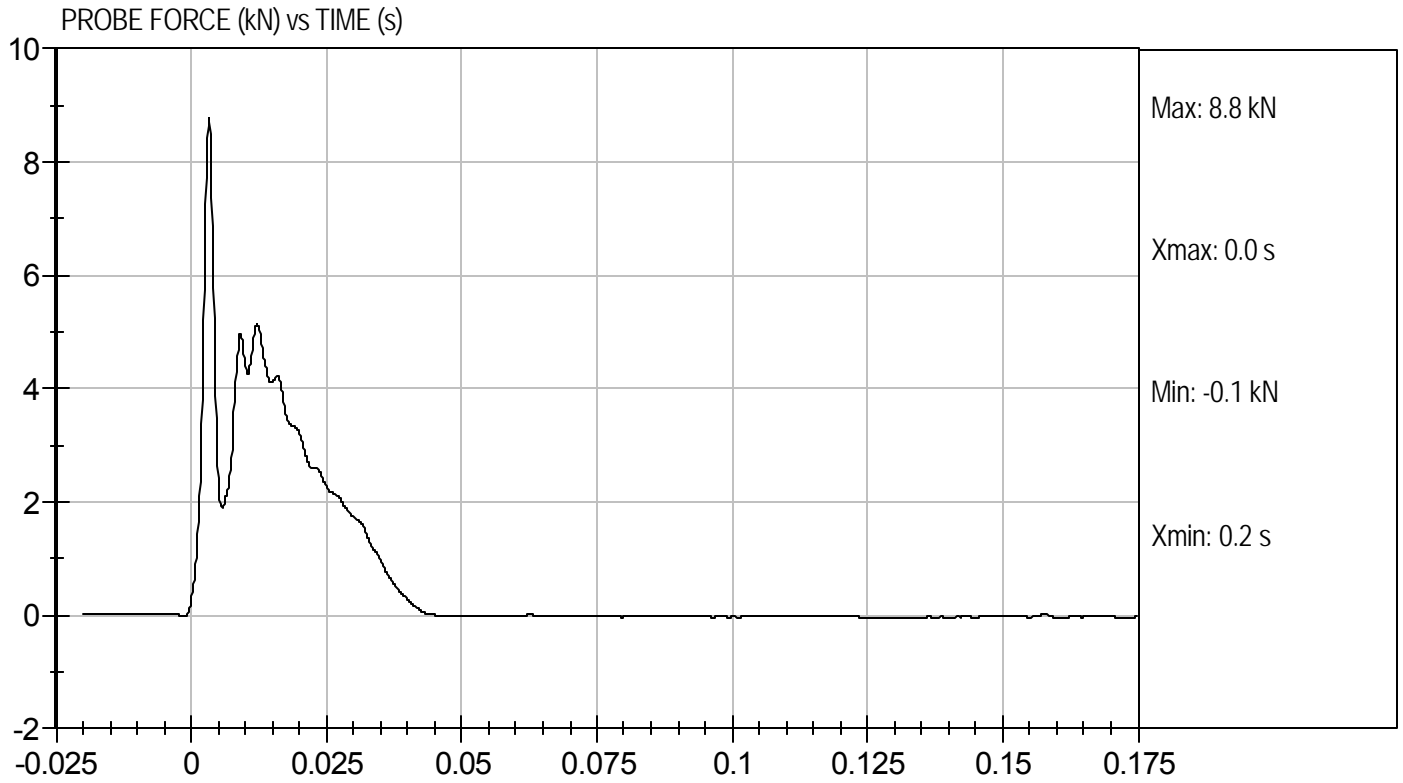
7/30/10  
 \_\_\_\_\_  
 Test Date

*David Winkelbauer*  
 \_\_\_\_\_  
 Approved By



Test Desc: Thorax Impact  
Component ID: D102450

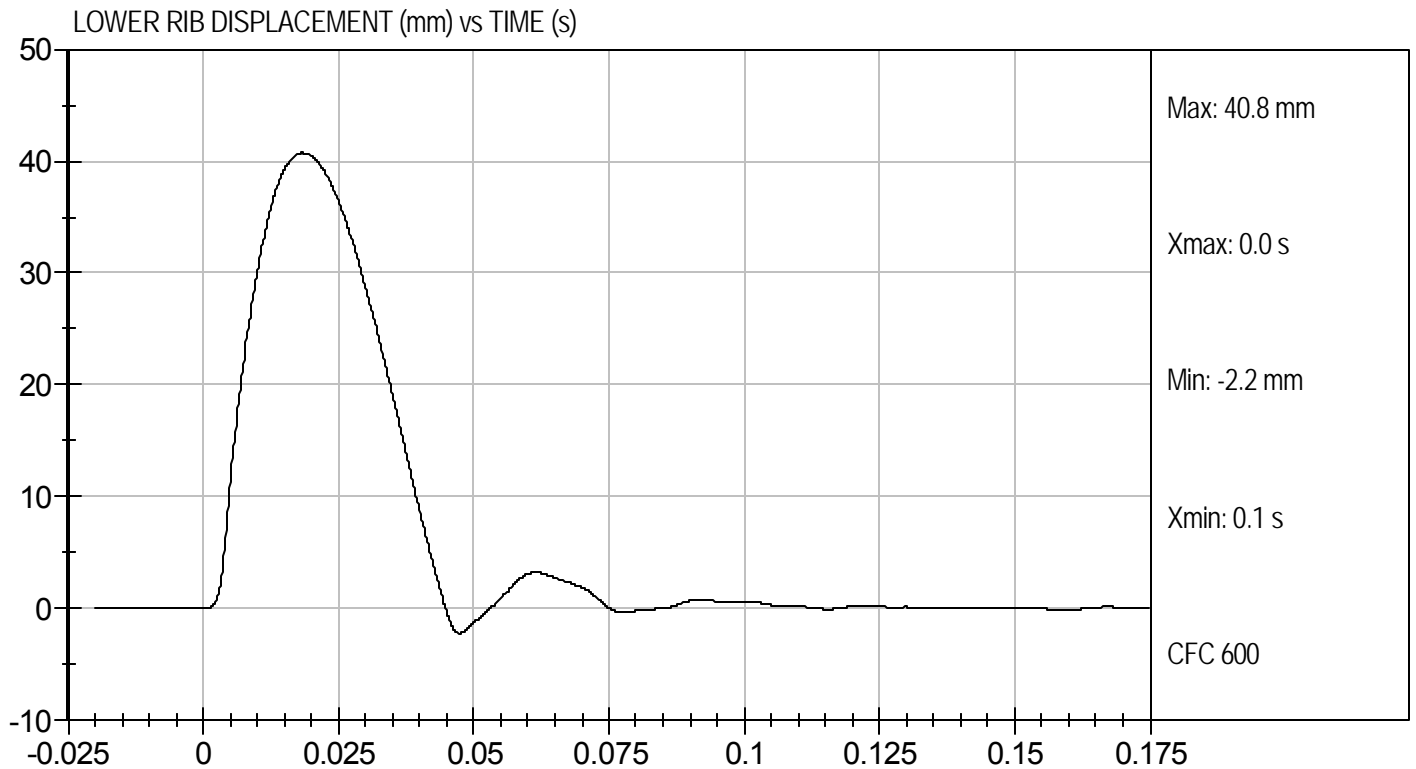
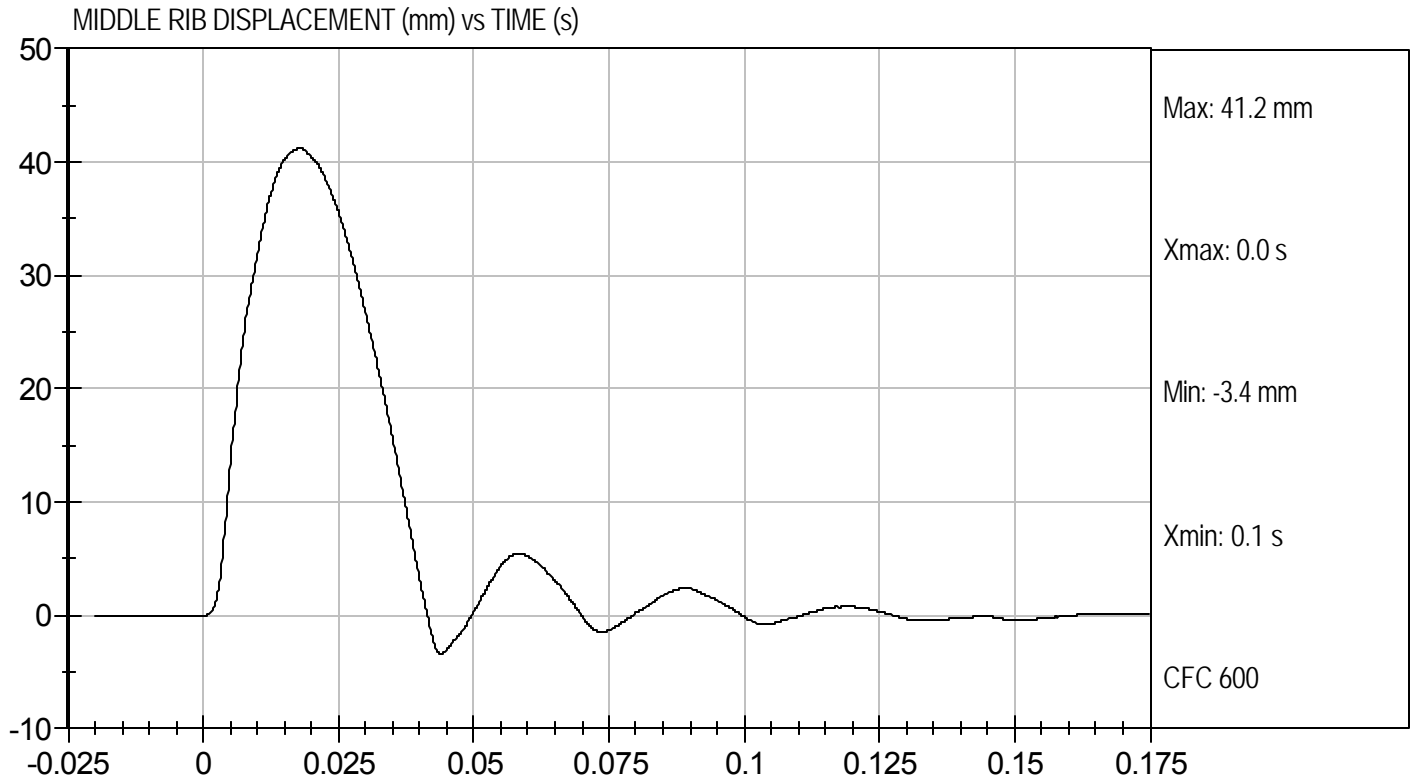
Test Date: 7/30/10  
Velocity: 17.9 ft/s, 5.46 m/s





Test Desc: Thorax Impact  
Component ID: D102450

Test Date: 7/30/10  
Velocity: 17.9 ft/s, 5.46 m/s



**MGA RESEARCH CORPORATION**  
**HEAD DROP TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

ATD Serial No: 296

Test ID: D102371

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	53	Pass
Peak Resultant Acceleration	G's	115 to 137	116	Pass
Peak Lateral Acceleration	G's	+/- 15	5.3	Pass
Unimodal	N/A	<15%	Yes	Pass
Overall Test Results				Pass

*Jessica Hall*  
 \_\_\_\_\_  
 Laboratory Technician

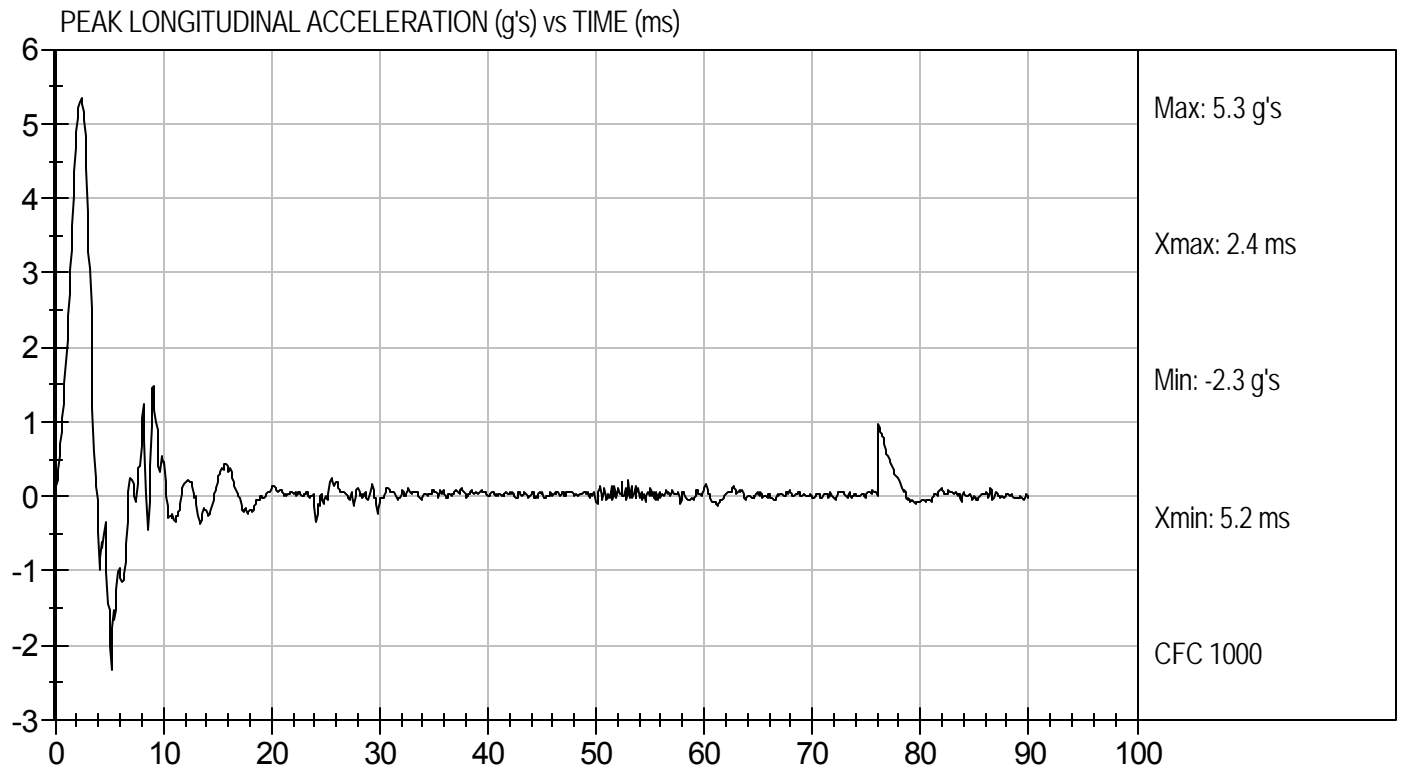
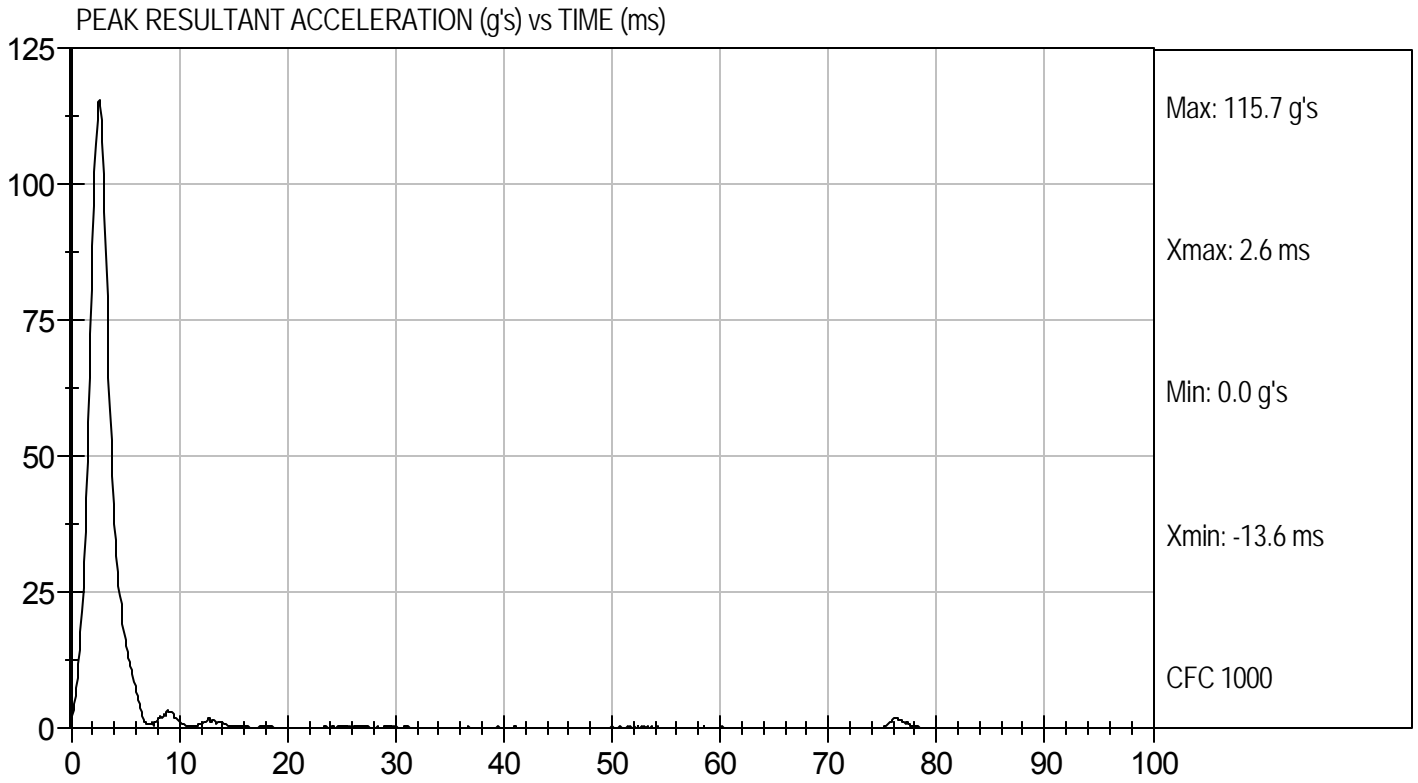
7/26/10  
 \_\_\_\_\_  
 Test Date

*David Winkelbauer*  
 \_\_\_\_\_  
 Approved By



Test Desc: Head Drop  
Component ID: D102371

Test Date: 7/26/10  
Velocity: 0 ft/s, 0 m/s



**MGA RESEARCH CORPORATION  
LATERAL NECK PENDULUM TEST  
SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 296

**Test I.D.:** D102372

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.9	Pass
Humidity		%	10 to 70	47	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Delta Velocity	10 ms	m/s	2.20 to 2.80	2.73	Pass
	15 ms	m/s	3.30 to 4.10	3.86	Pass
	20 ms	m/s	4.40 to 5.40	5.10	Pass
	25 ms	m/s	5.40 to 6.10	5.55	Pass
	25-100 ms	m/s	5.50 to 6.20	5.56	Pass
Maximum D-Plane Rotation		deg	71 to 81	76	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	60	Pass
Maximum Occipital Condyle Moment during Rotation Interval		Nm	-44 to -36	-43	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	114	Pass
<b>Overall Test Results</b>					<b>Pass</b>

*Jessica Hall*  
\_\_\_\_\_  
Laboratory Technician

7/26/10  
\_\_\_\_\_  
Test Date

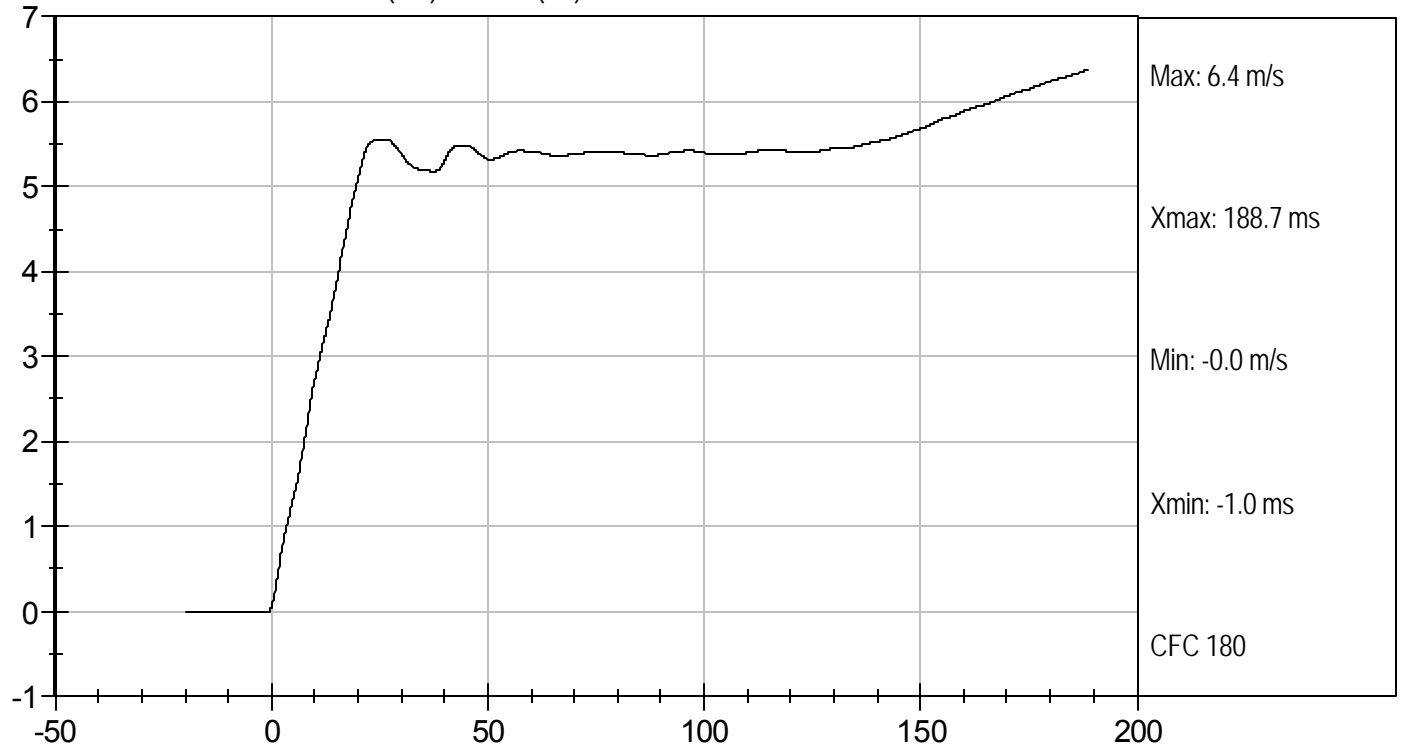
*David Winkelbauer*  
\_\_\_\_\_  
Approved By



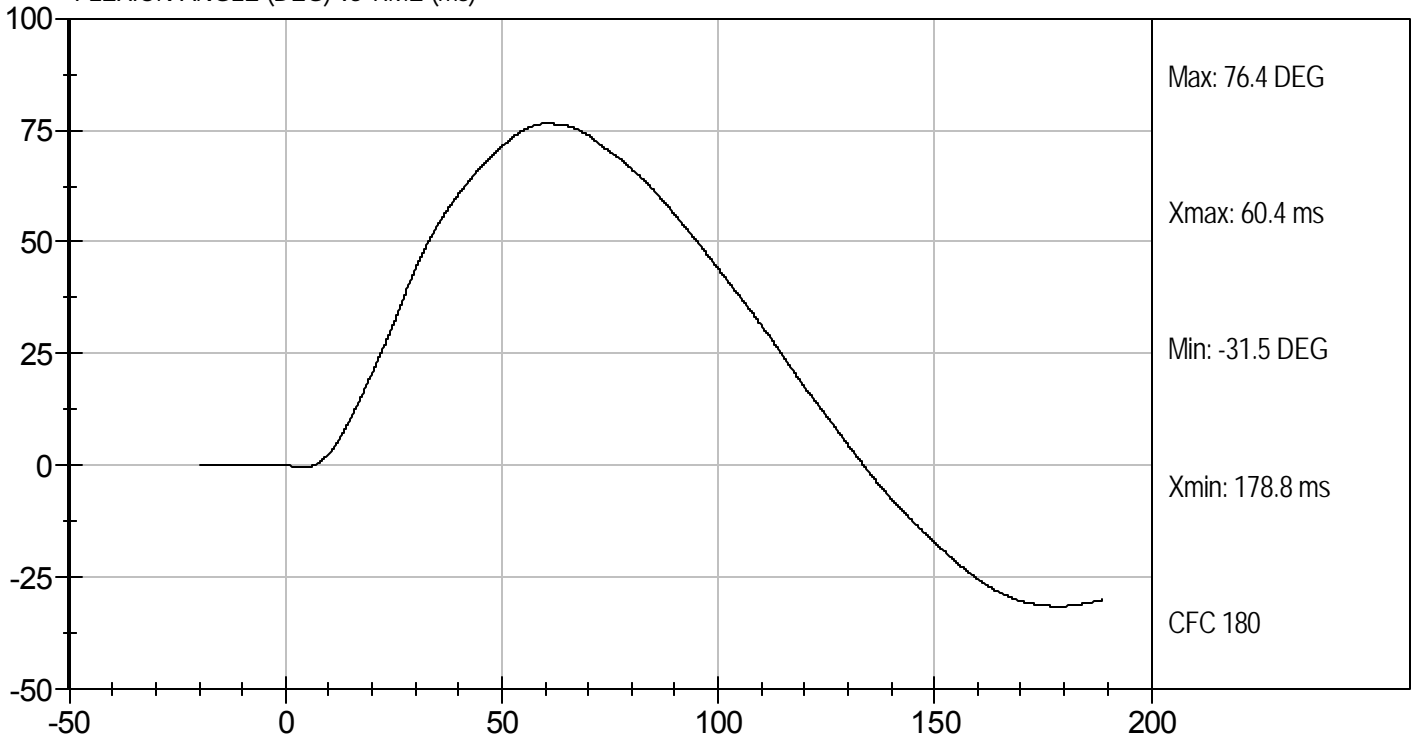
Test Desc: Neck Bending  
Component ID: D102372

Test Date: 7/26/10  
Velocity: 18.32 ft/s, 5.58 m/s

PENDULUM DECELERATION (m/s) vs TIME (ms)



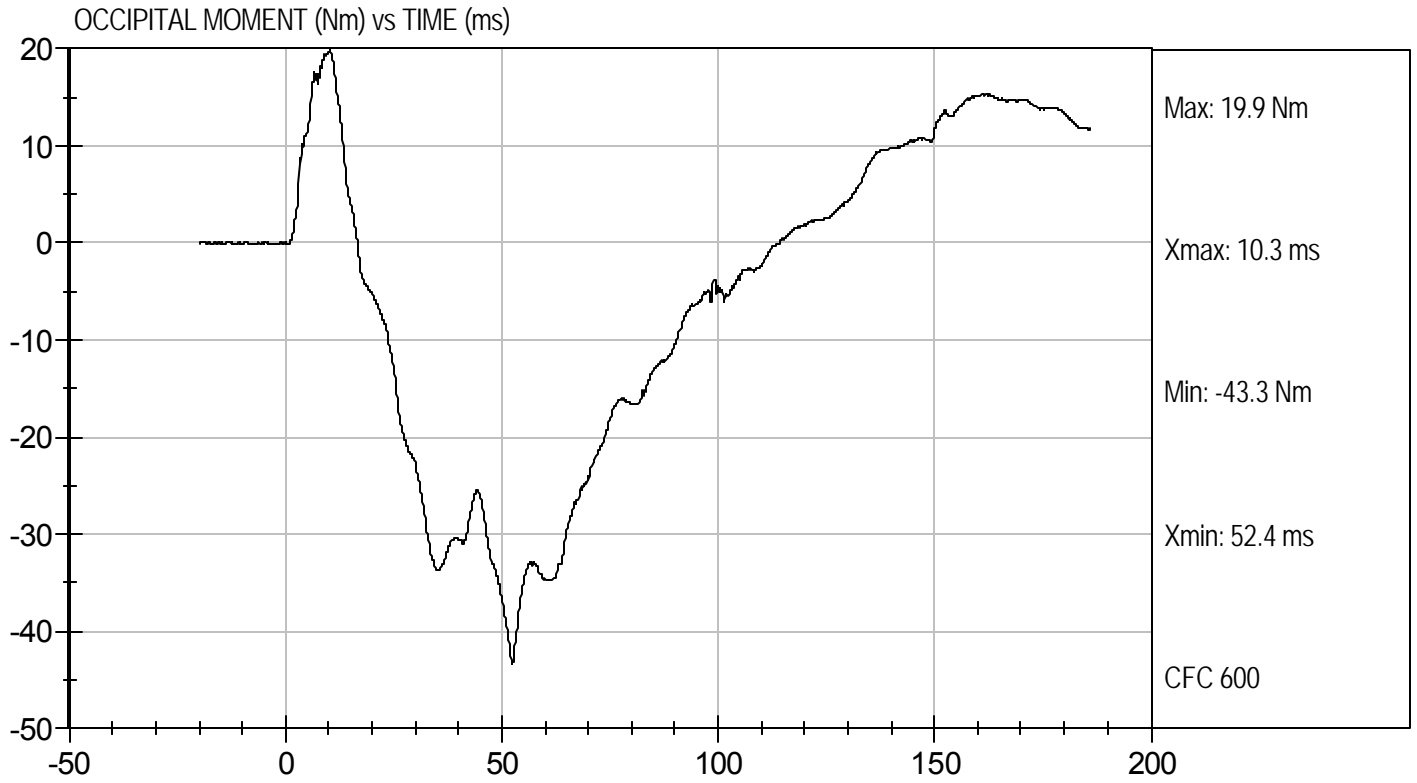
FLEXION ANGLE (DEG) vs TIME (ms)





Test Desc: Neck Bending  
Component ID: D102372

Test Date: 7/26/10  
Velocity: 18.32 ft/s, 5.58 m/s



**MGA RESEARCH CORPORATION  
SHOULDER IMPACT TEST  
SID-IIs BUILD LEVEL D DUMMY**

ATD Serial No: 296

Test ID: D102373

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	53	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	32	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	19	Pass
Overall Test Results				Pass

*Jessica Hall*  
Laboratory Technician

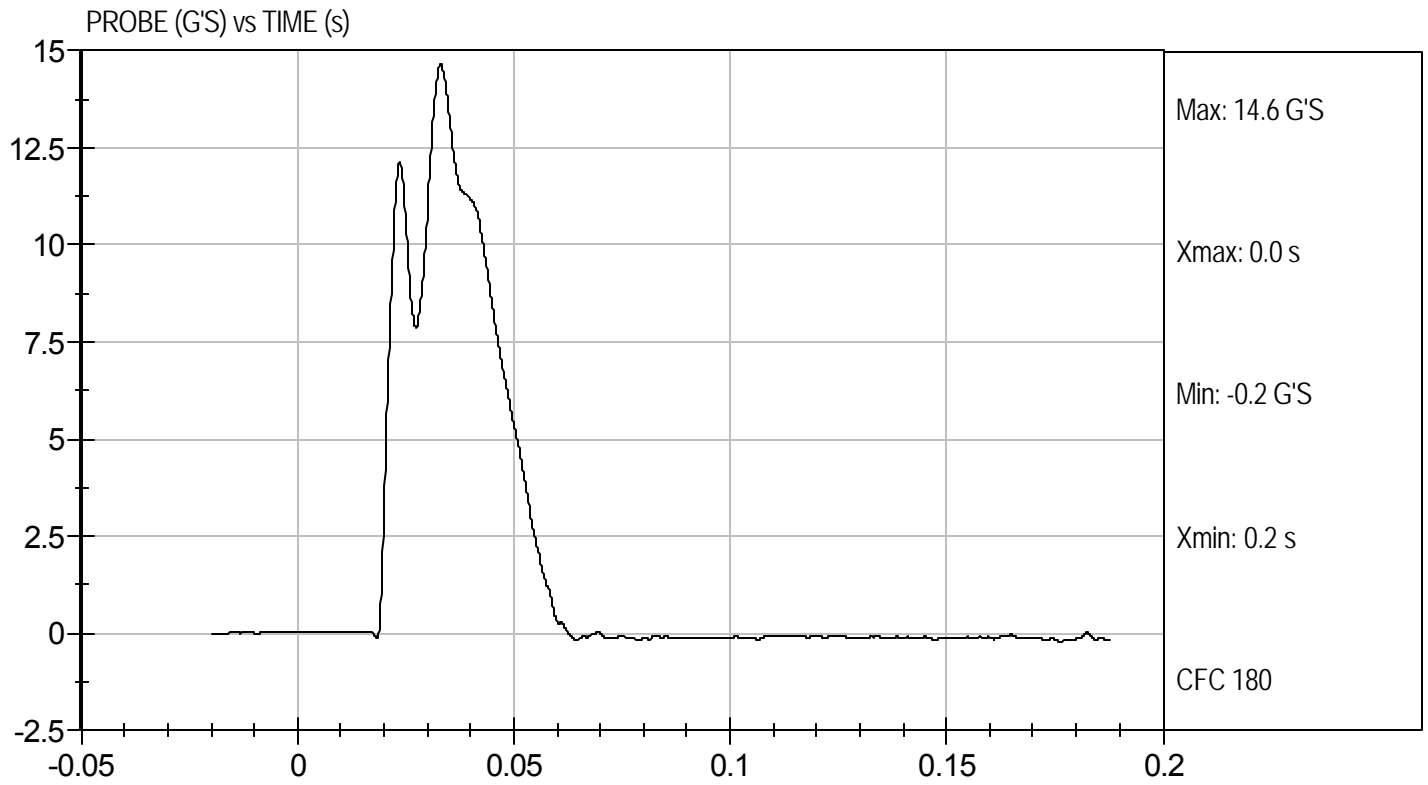
7/26/10  
Test Date

*David Winkelbauer*  
Approved By



Test Desc: Shoulder Impact  
Component ID: D102373

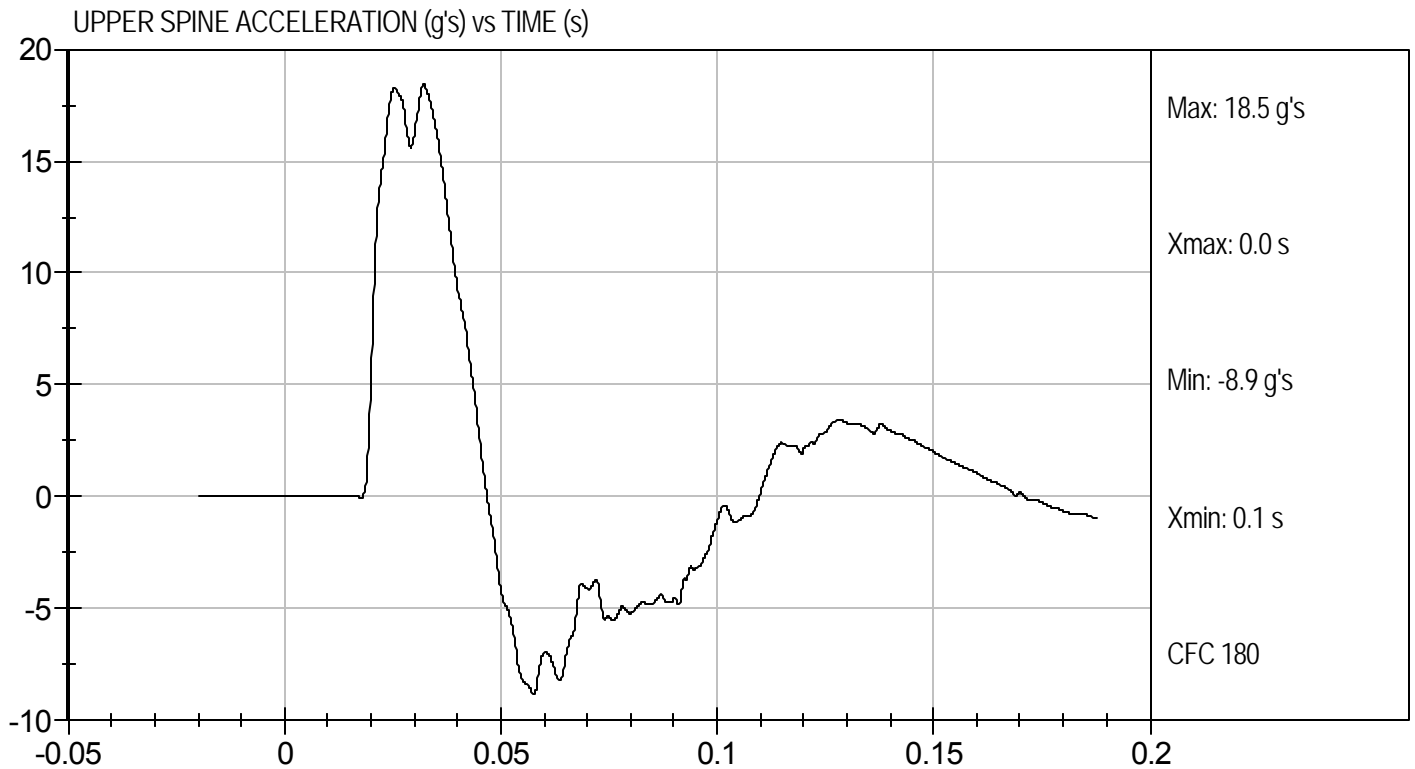
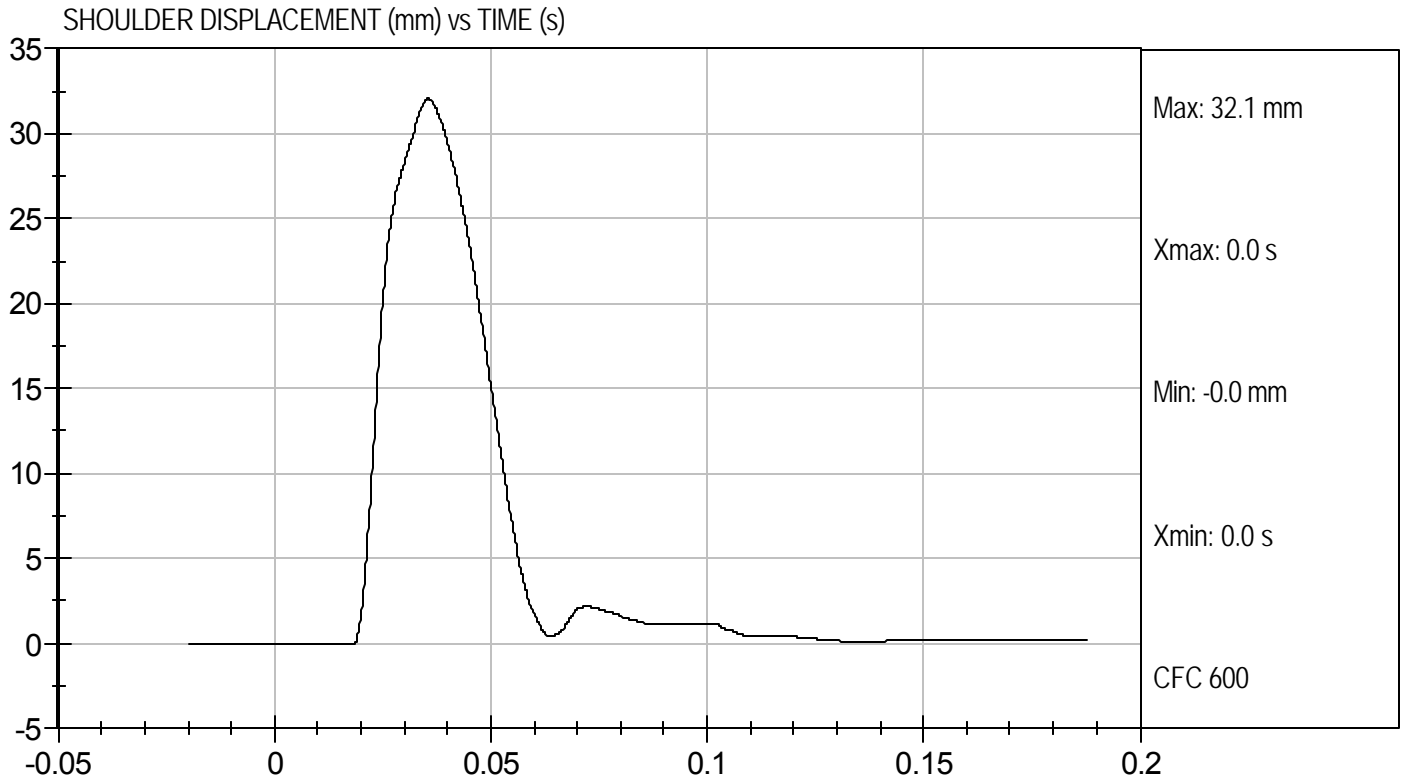
Test Date: 7/26/10  
Velocity: 14.0 ft/s, 4.27 m/s





Test Desc: Shoulder Impact  
Component ID: D102373

Test Date: 7/26/10  
Velocity: 14.0 ft/s, 4.34 m/s



**MGA RESEARCH CORPORATION**  
**THORAX (WITH ARM) IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

ATD Serial No: 296

Test I.D: D102374

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	53	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Peak Impactor Acceleration	G's	30 to 36	32	Pass
Shoulder Displacement	mm	31 to 40	36	Pass
Upper Rib Displacement	mm	25 to 32	27	Pass
Middle Rib Displacement	mm	30 to 36	31	Pass
Lower Rib Displacement	mm	32 to 38	33	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	38	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	32	Pass
Overall Test Results				Pass

Jessica Hall  
 Laboratory Technician

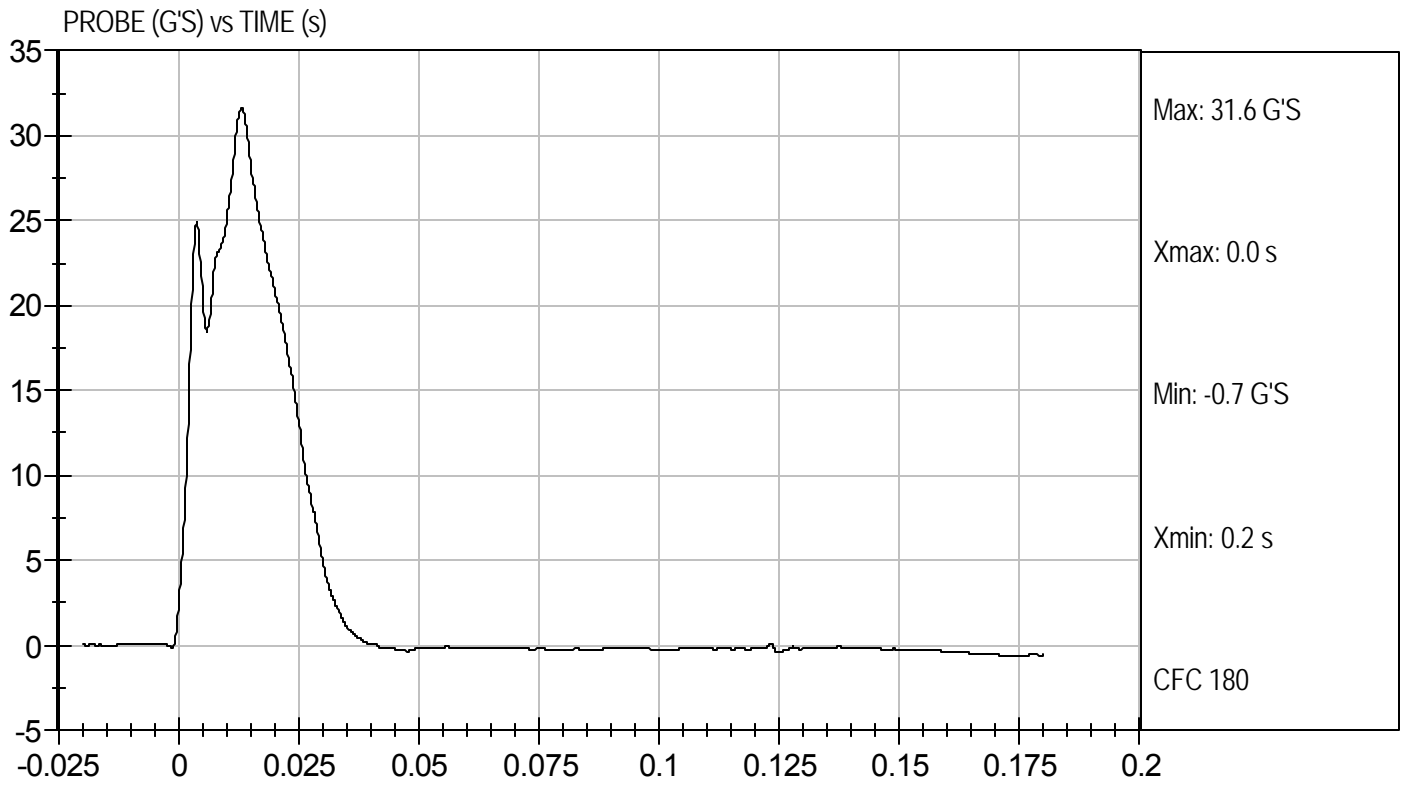
7/26/10  
 Test Date

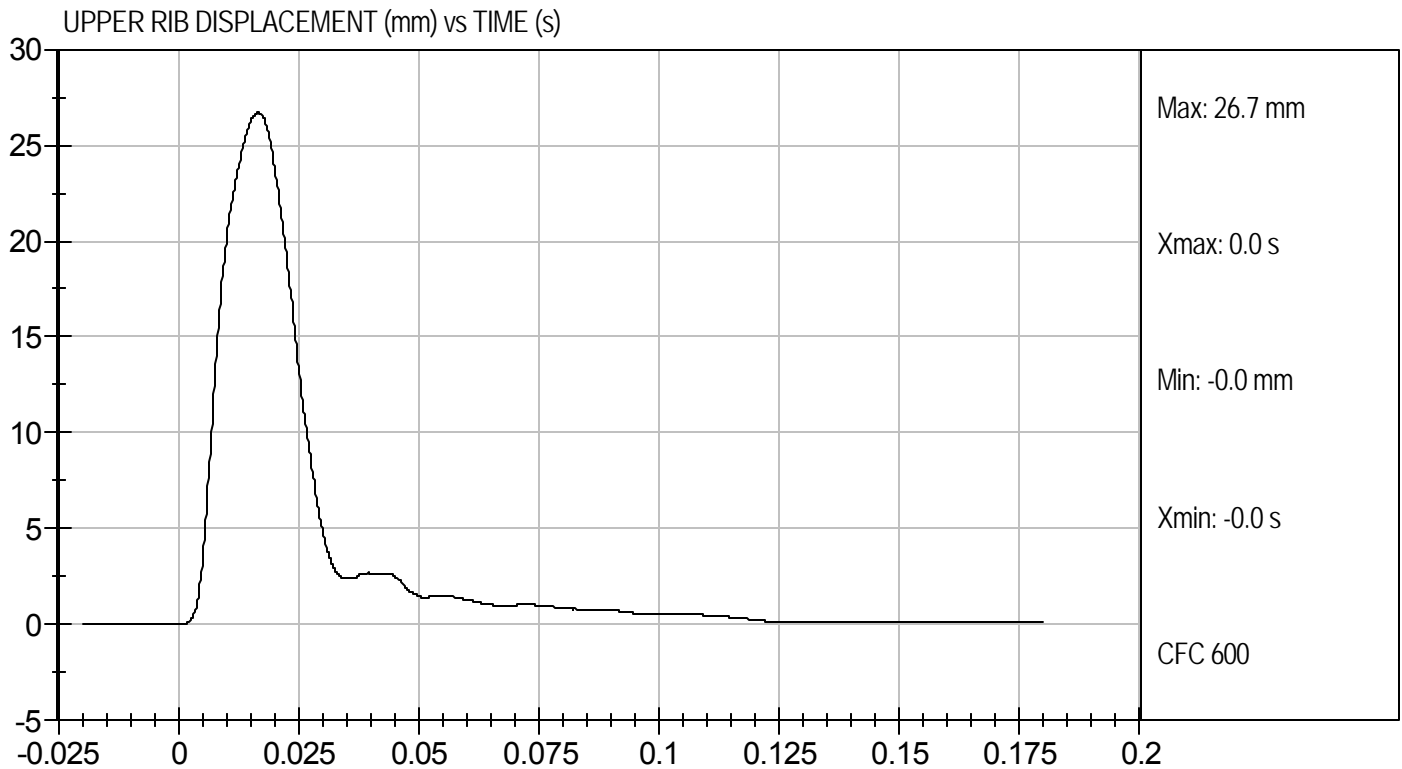
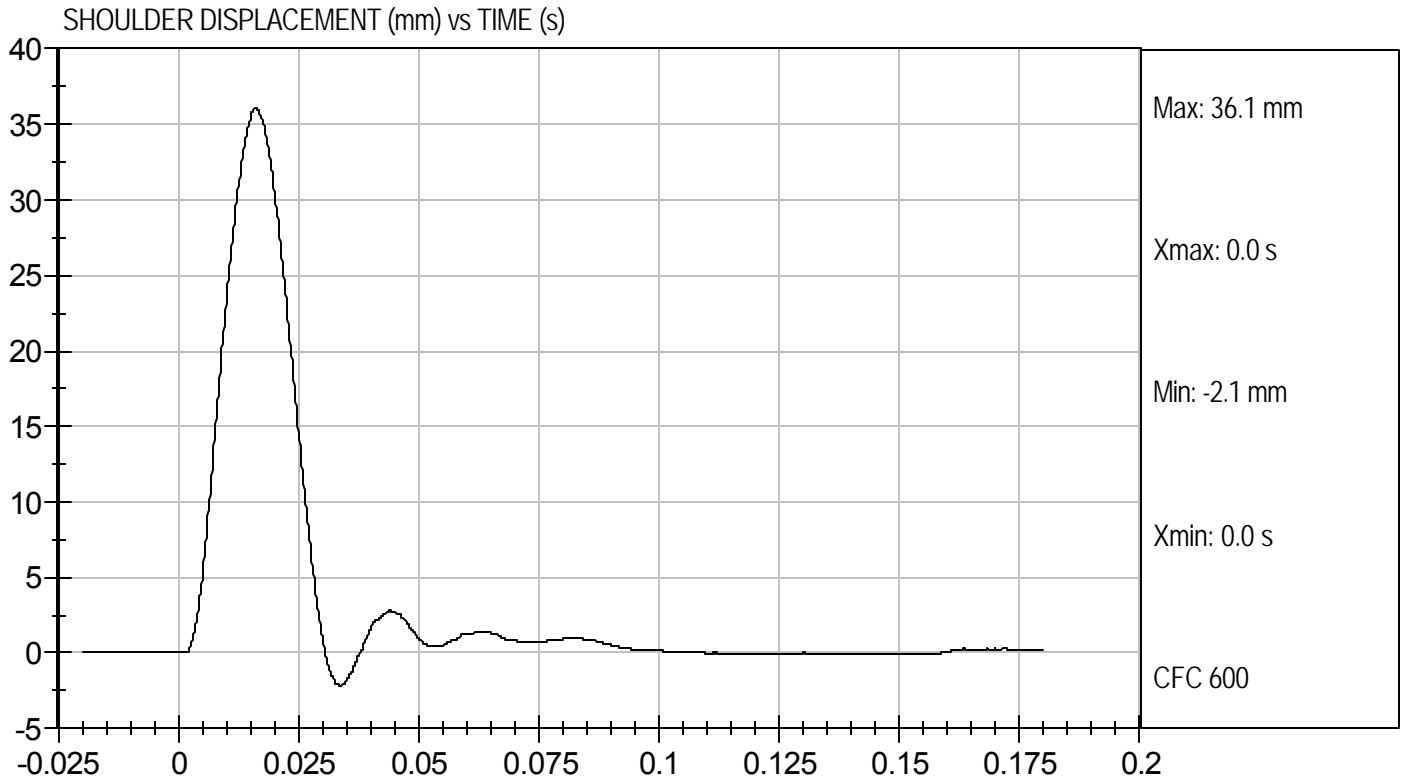
David Winkelbauer  
 Approved By

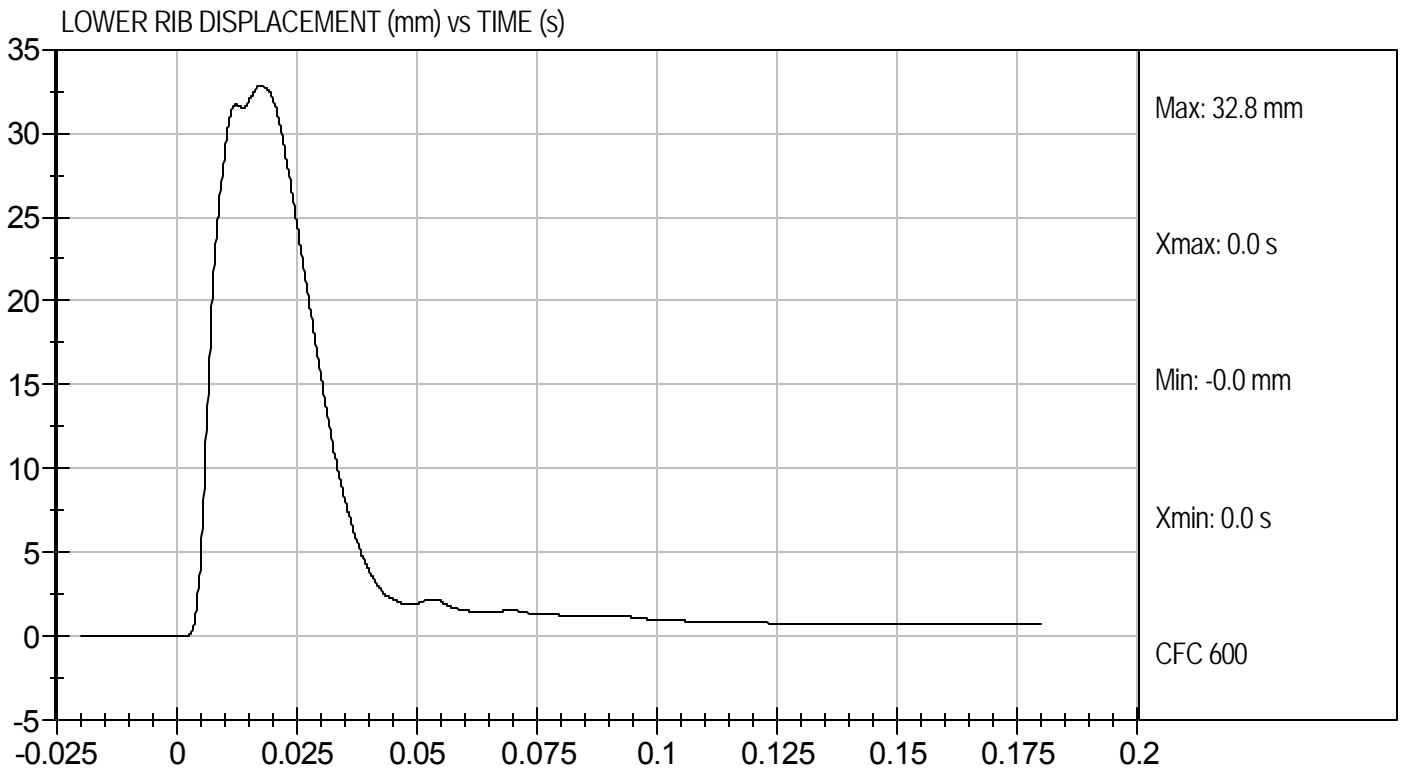
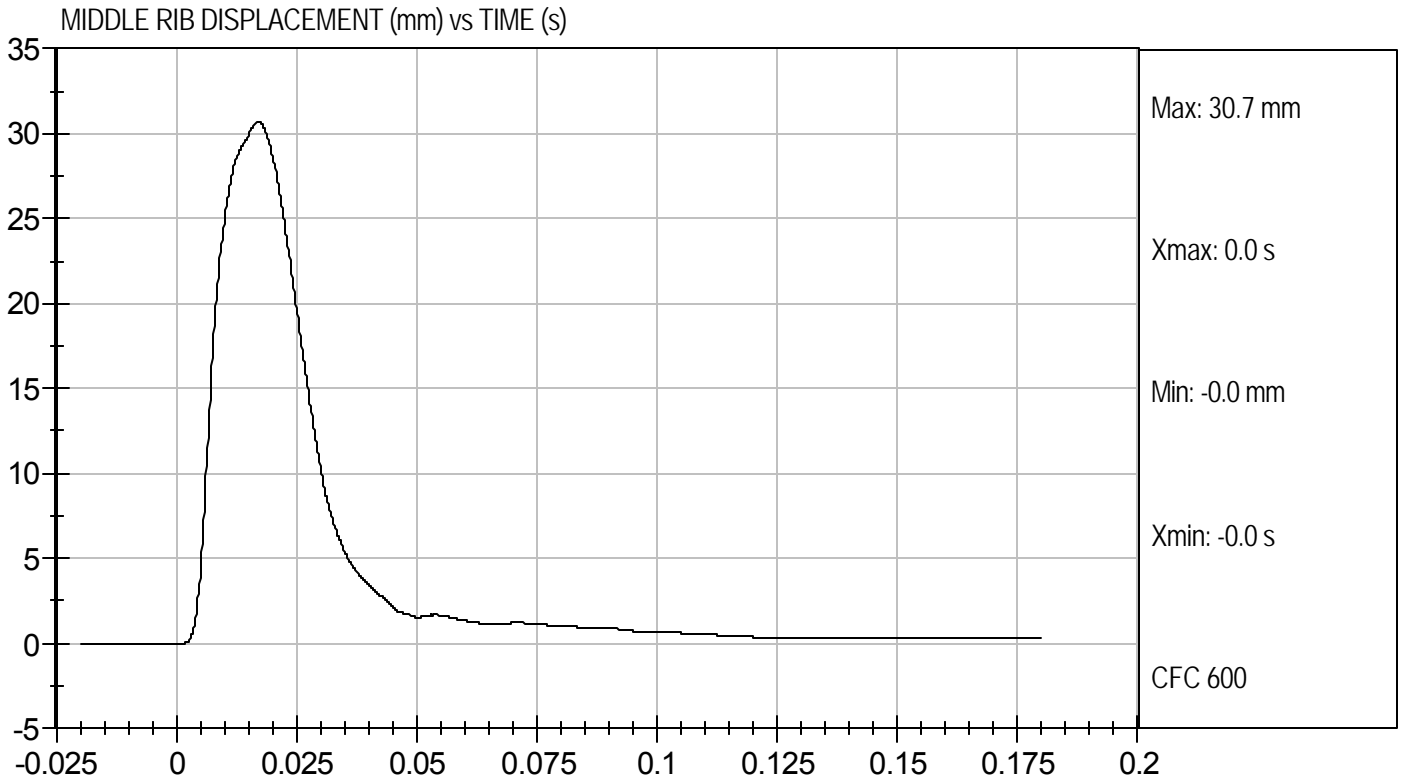


Test Desc: Thorax With Arm  
Component ID: D102374

Test Date: 7/26/10  
Velocity: 21.9 ft/s, 6.68 m/s



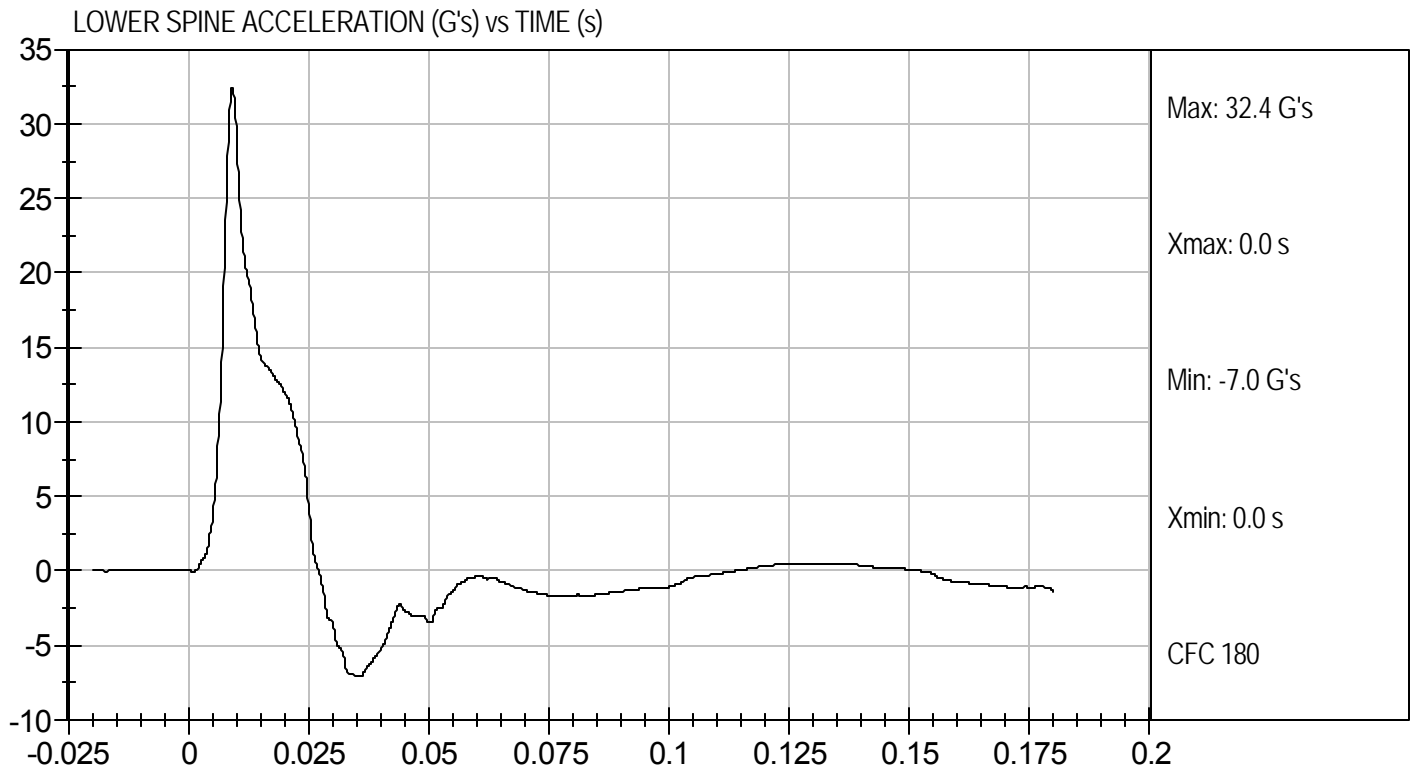
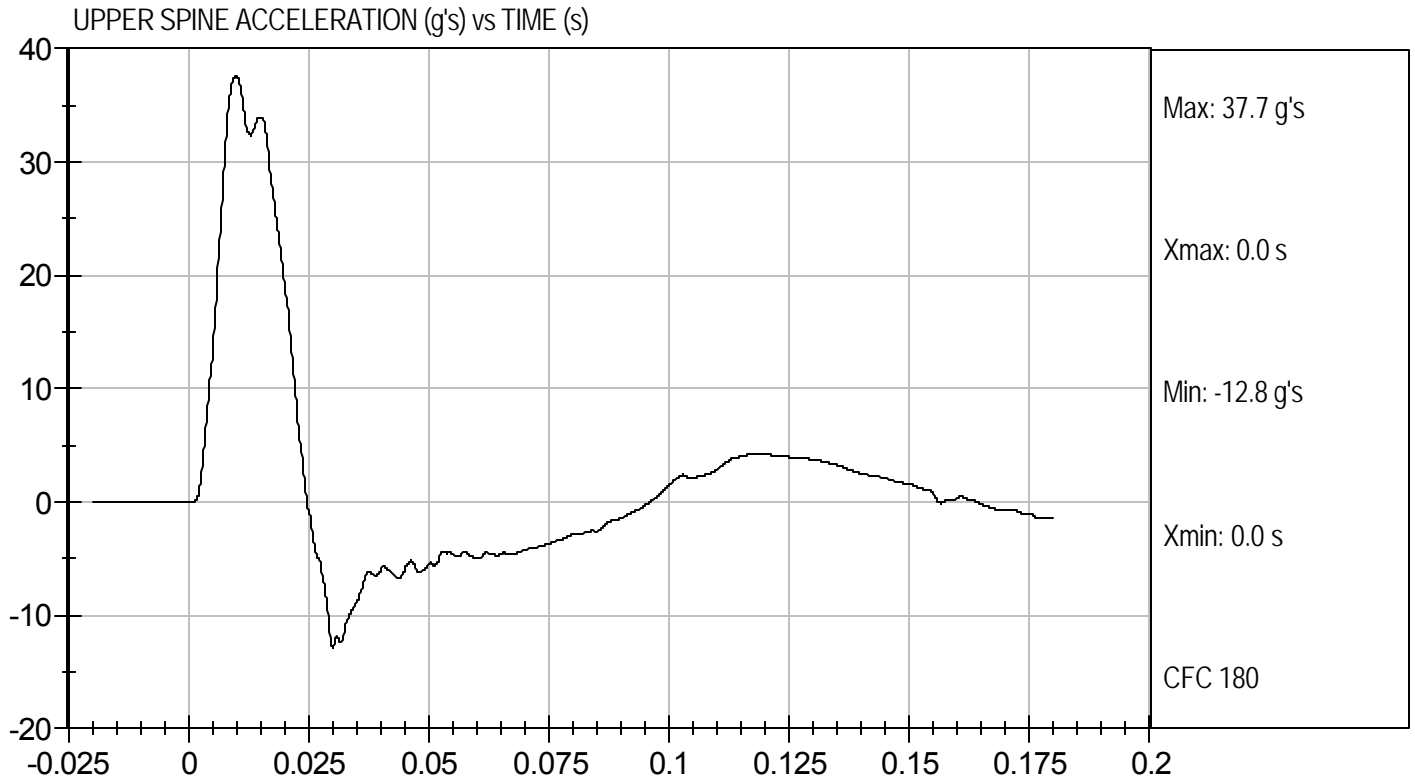






Test Desc: Thorax With Arm  
Component ID: D102374

Test Date: 7/26/10  
Velocity: 21.9 ft/s, 6.68 m/s



**MGA RESEARCH CORPORATION  
 THORAX (WITHOUT ARM) IMPACT TEST  
 SID-IIs BUILD LEVEL D DUMMY**

ATD Serial No: 296

Test I.D: D102375

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	53	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Peak Impactor Force	G's	14 to 18	14	Pass
Upper Rib Displacement	mm	32 to 40	35	Pass
Middle Rib Displacement	mm	39 to 45	39	Pass
Lower Rib Displacement	mm	35 to 43	36	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	13	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	8	Pass
Overall Test Results				Pass

Jessica Hall  
 Laboratory Technician

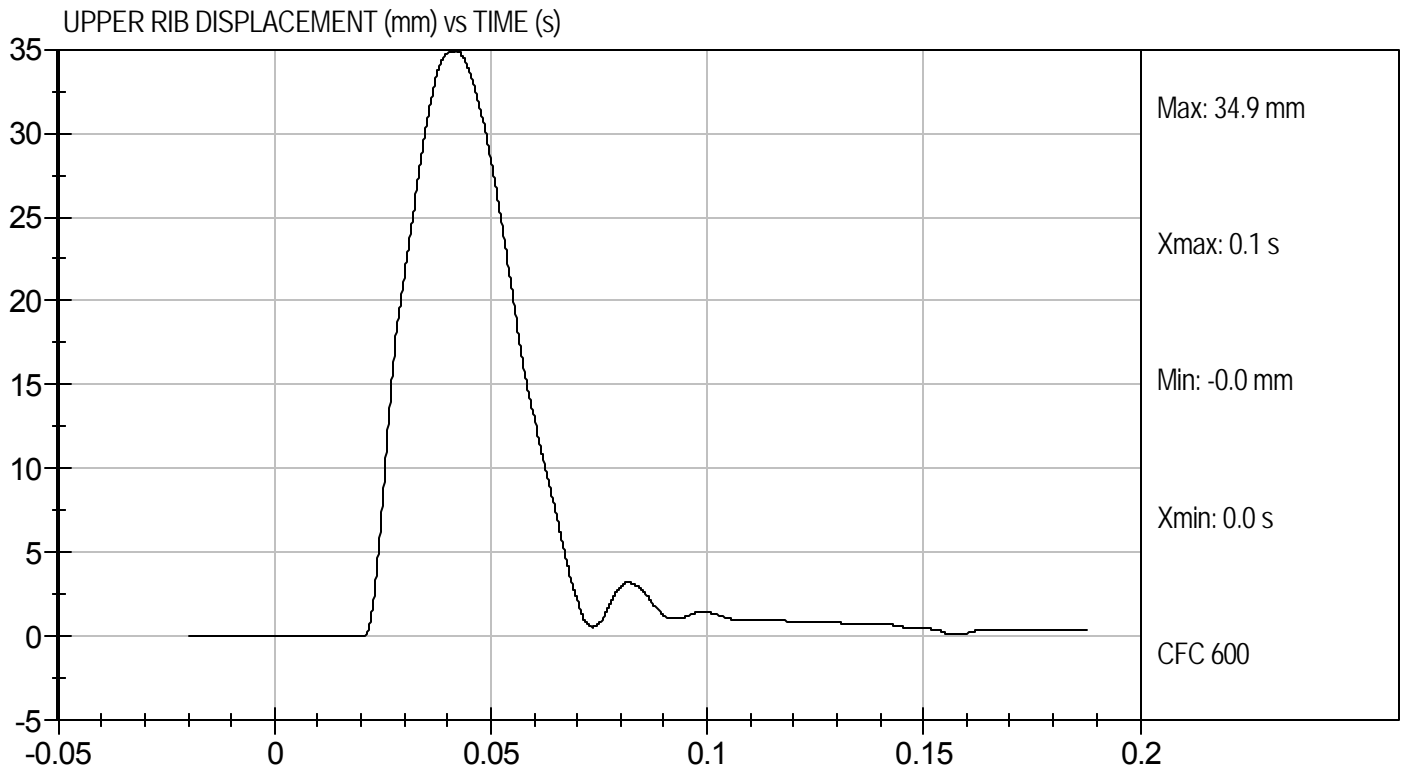
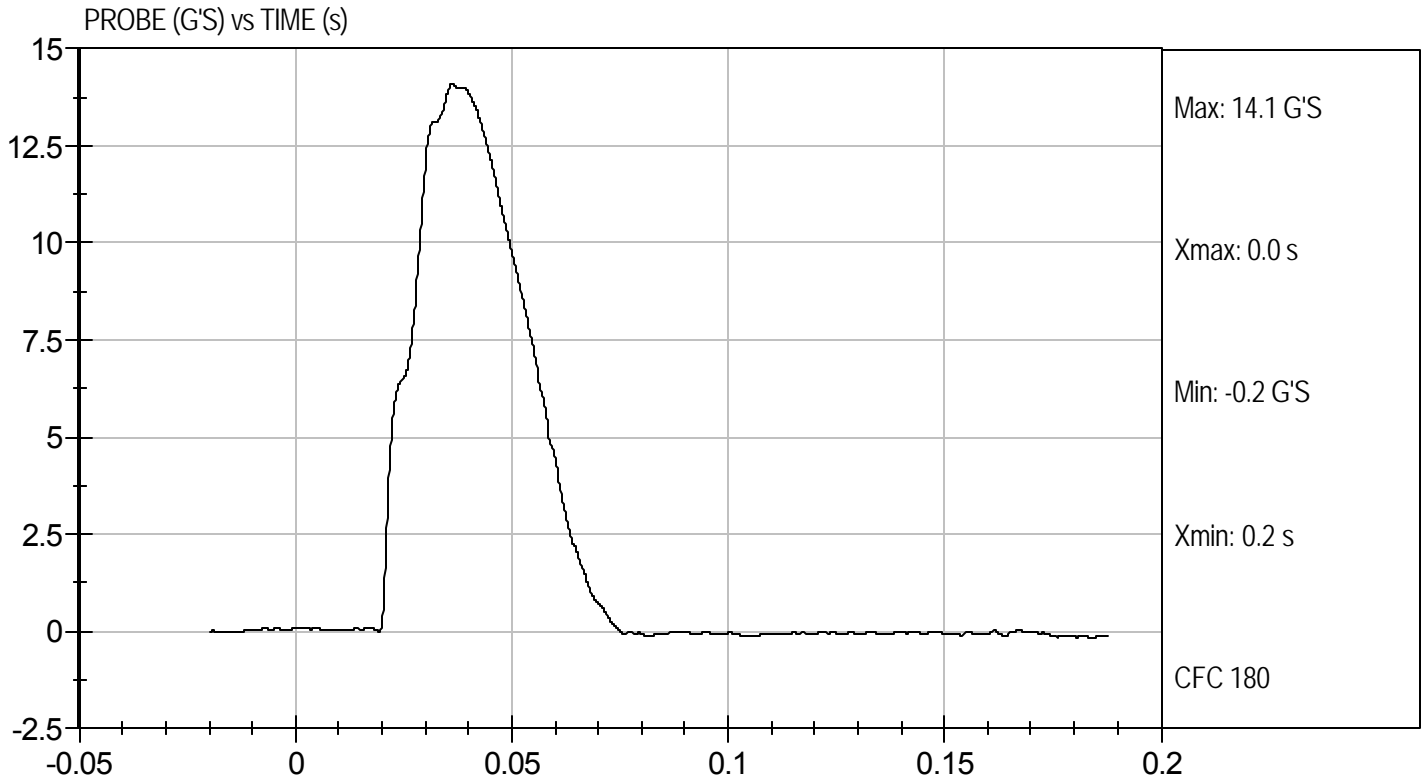
7/26/10  
 Test Date

David Winkelbauer  
 Approved By



Test Desc: Thorax Without Arm  
Component ID: D102375

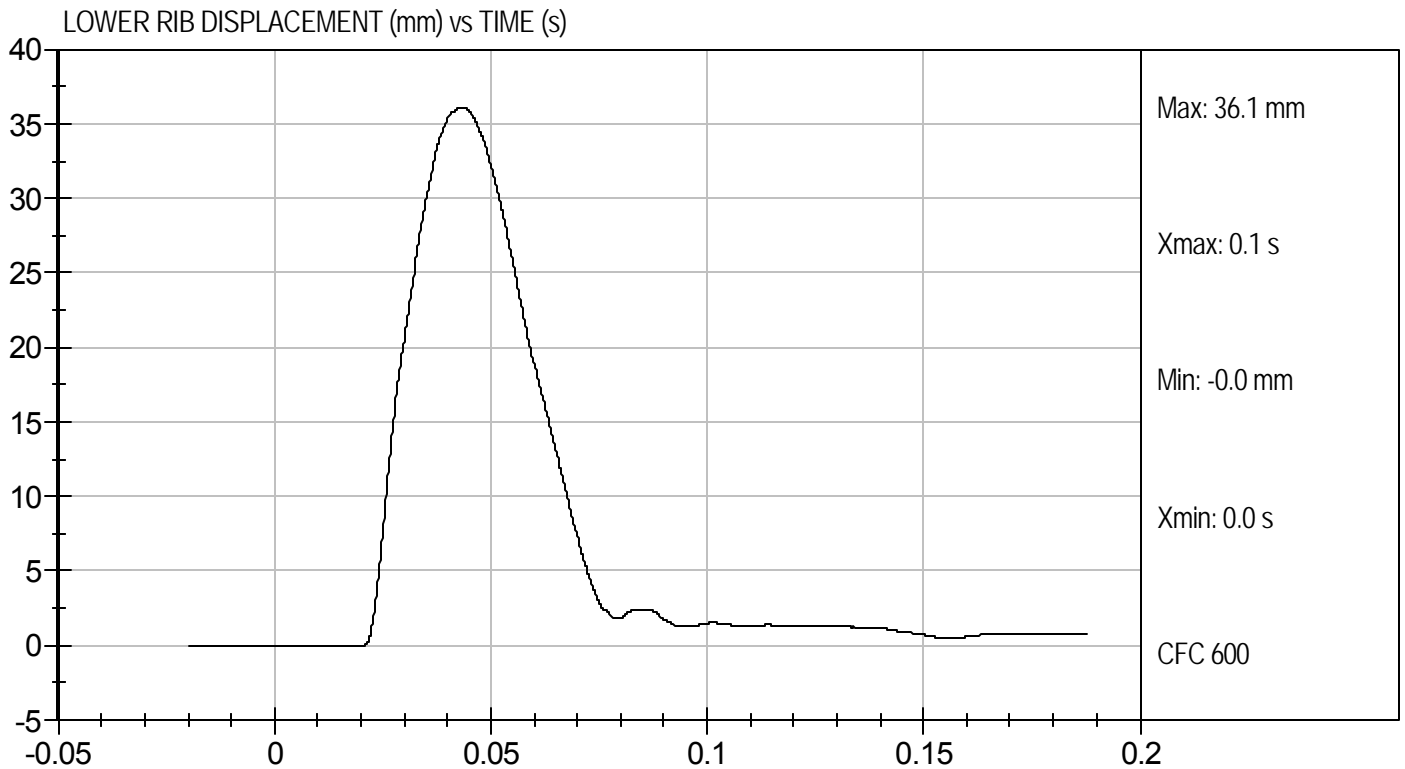
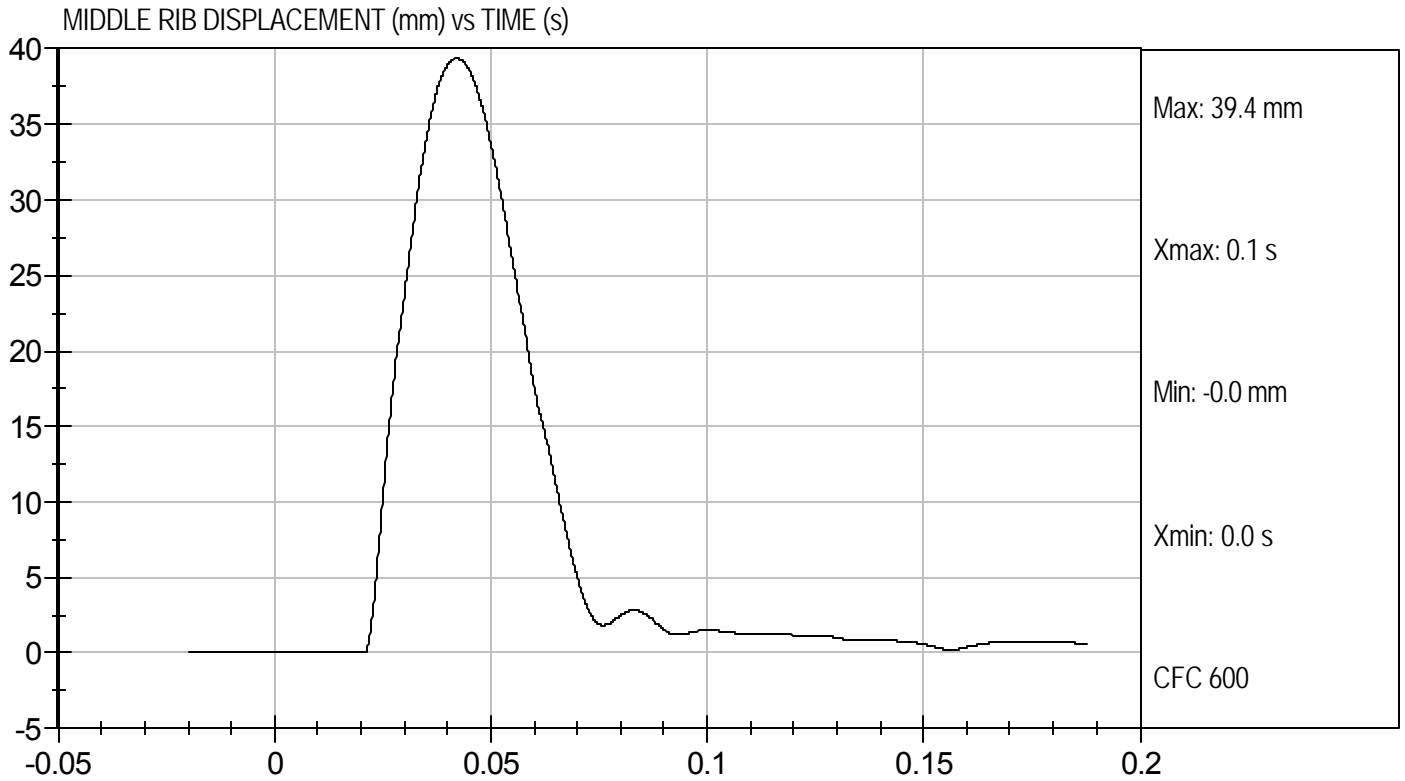
Test Date: 7/26/10  
Velocity: 14.1 ft/s, 4.30 m/s





Test Desc: Thorax Without Arm  
Component ID: D102375

Test Date: 7/26/10  
Velocity: 14.1 ft/s, 4.30 m/s

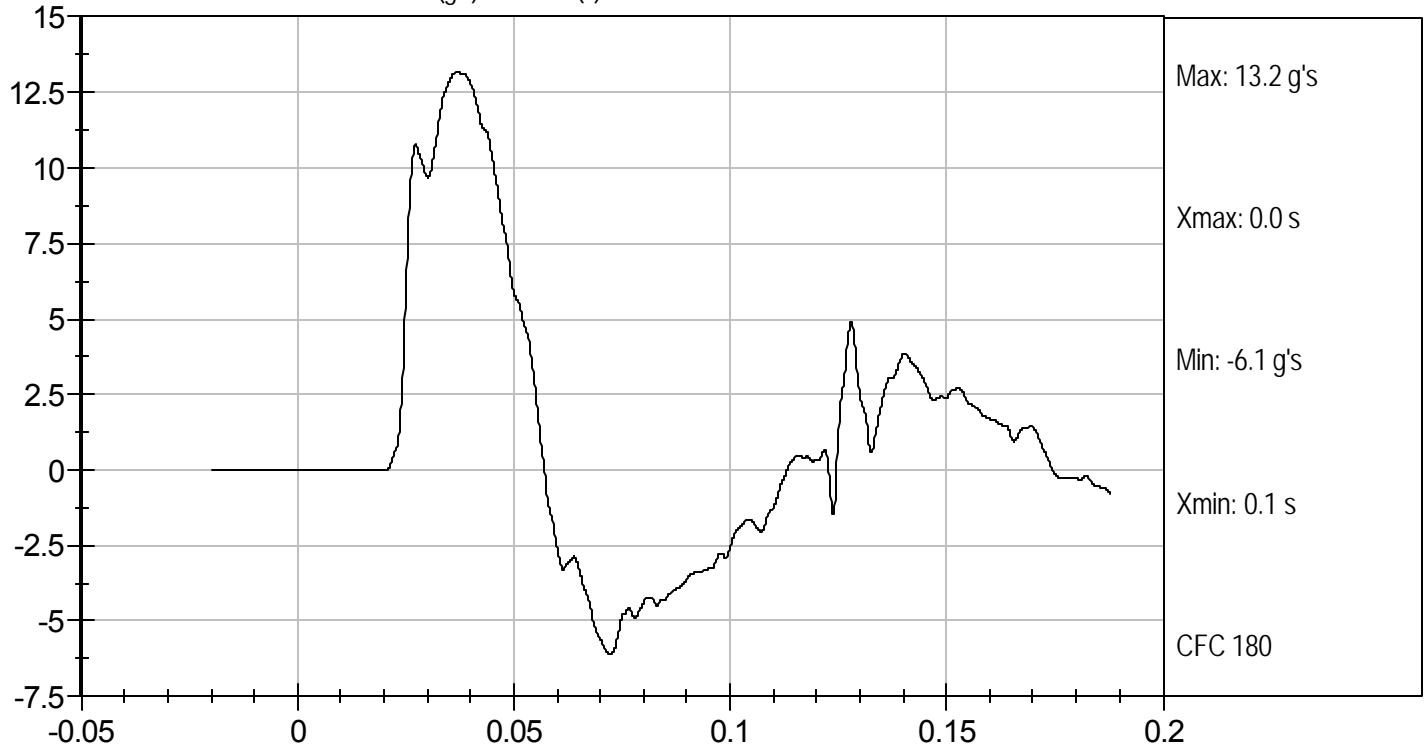




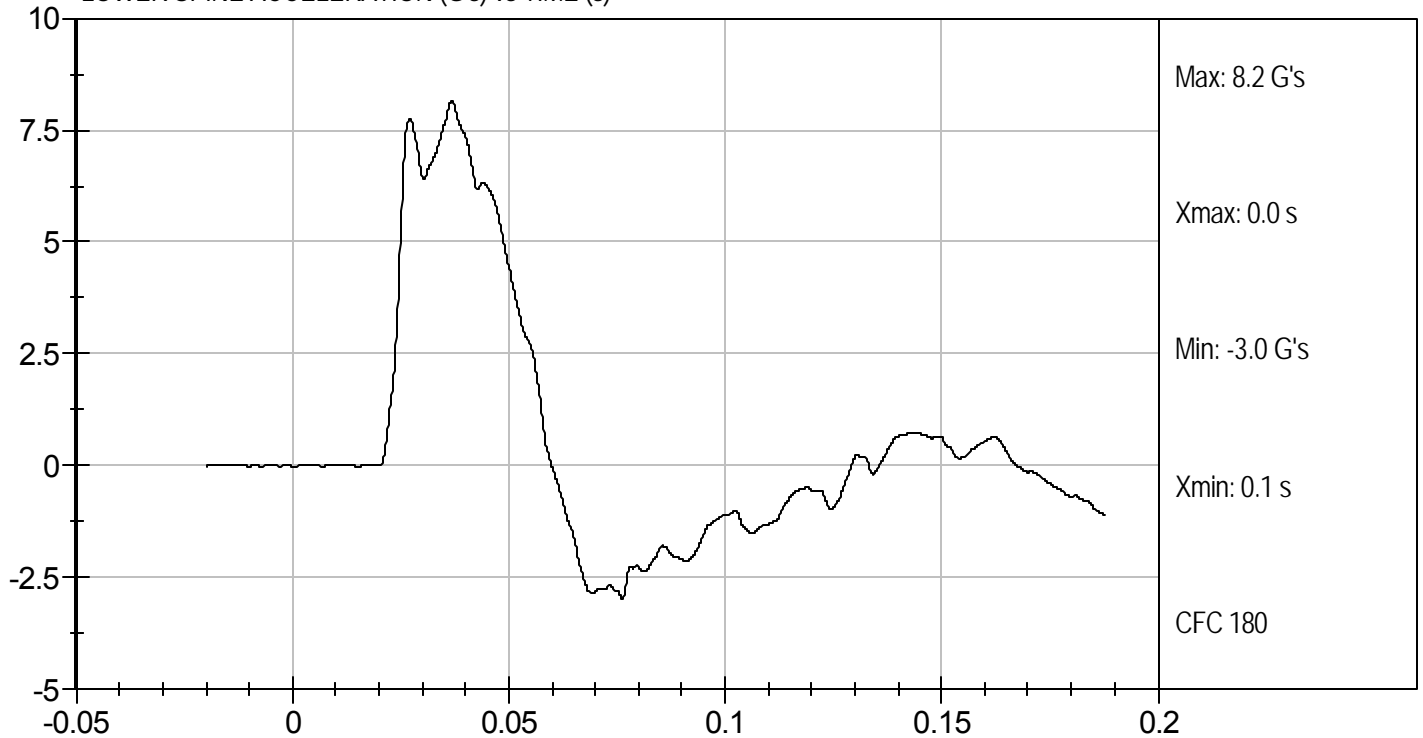
Test Desc: Thorax Without Arm  
Component ID: D102375

Test Date: 7/26/10  
Velocity: 14.1 ft/s, 4.30 m/s

UPPER SPINE ACCELERATION (g's) vs TIME (s)



LOWER SPINE ACCELERATION (G's) vs TIME (s)



**MGA RESEARCH CORPORATION**  
**ABDOMINAL IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

ATD Serial No: 296

Test I.D: D102376

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	53	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Peak Impactor Acceleration	G's	12 to 16	14	Pass
Upper Rib Displacement	mm	36 to 47	40	Pass
Lower Rib Displacement	mm	33 to 44	39	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	10	Pass
Overall Test Results				Pass

Jessica Gall  
Laboratory Technician

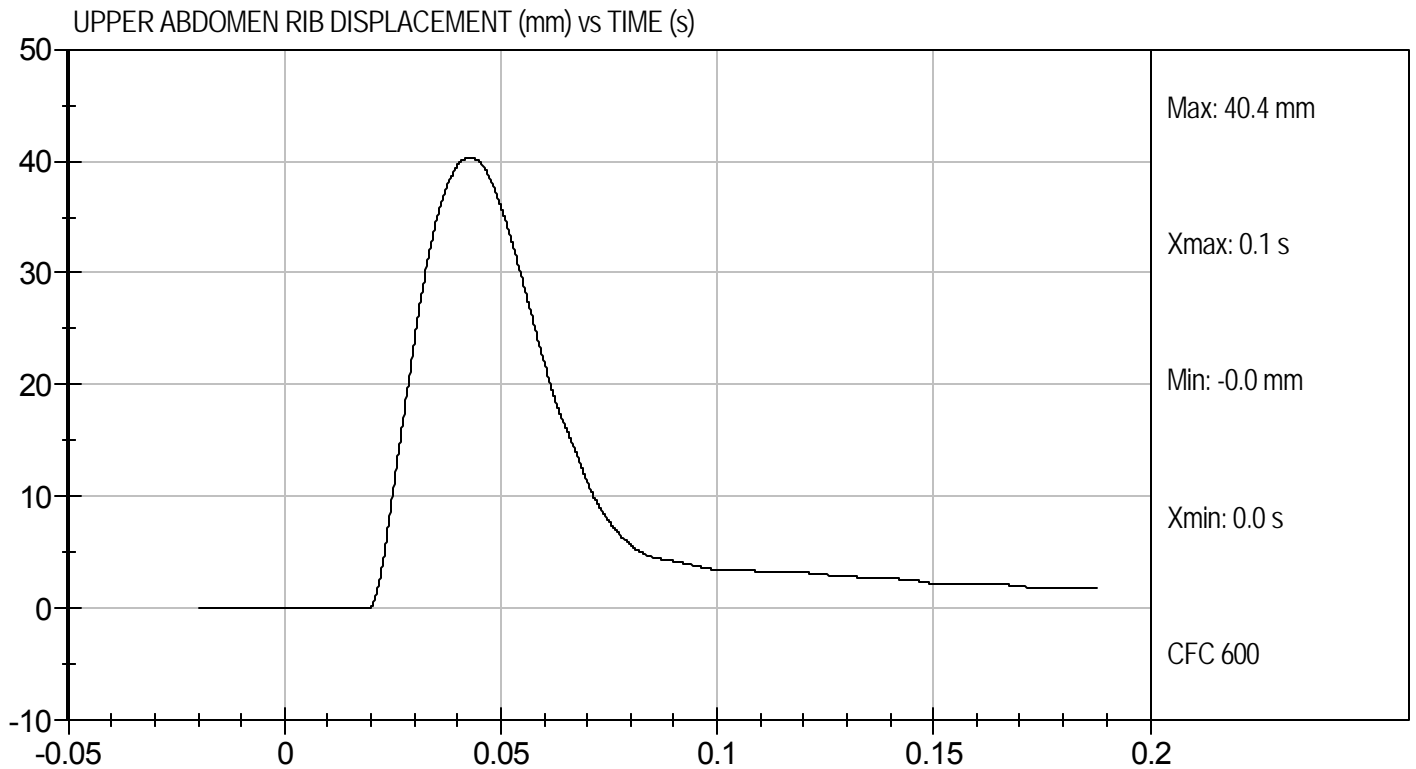
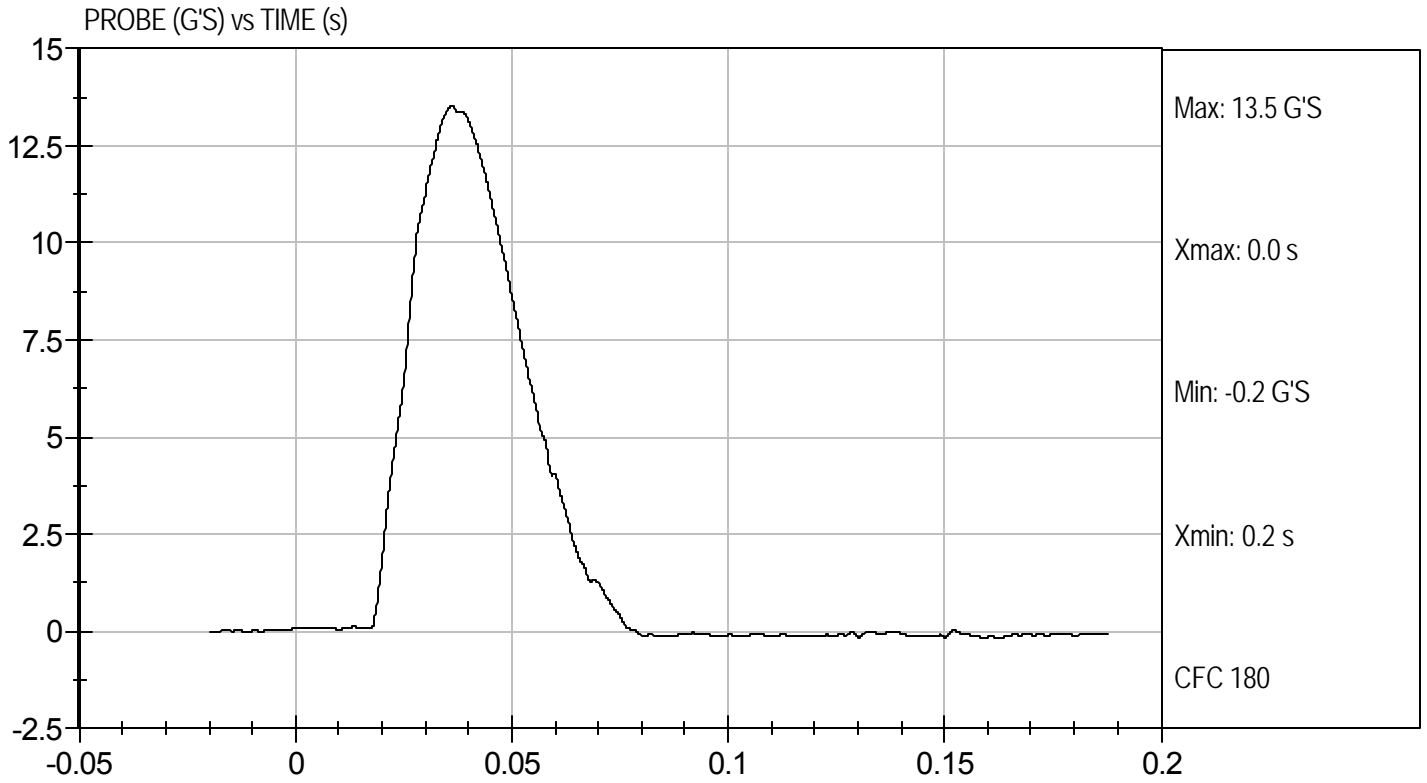
7/26/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Abdomen Impact  
Component ID: D102376

Test Date: 7/26/10  
Velocity: 14.1 ft/s, 4.30 m/s

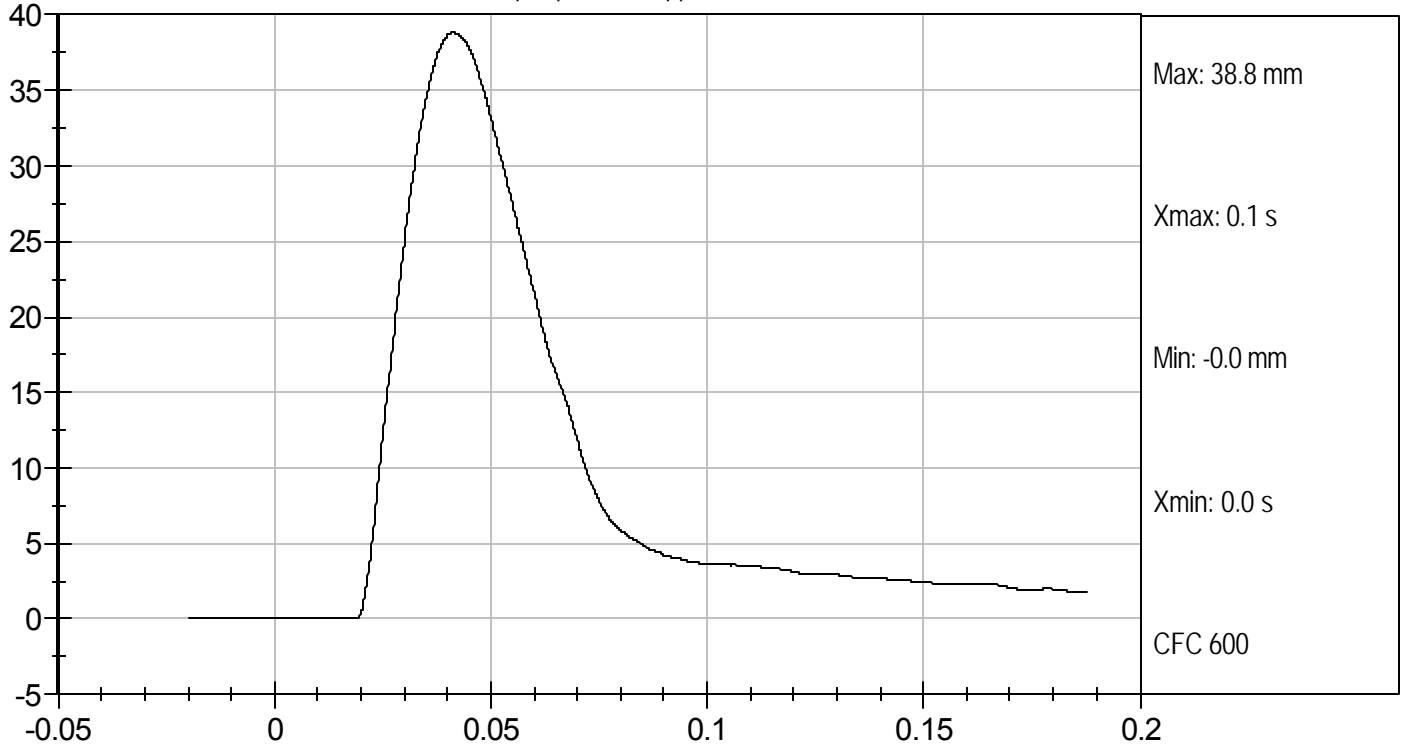




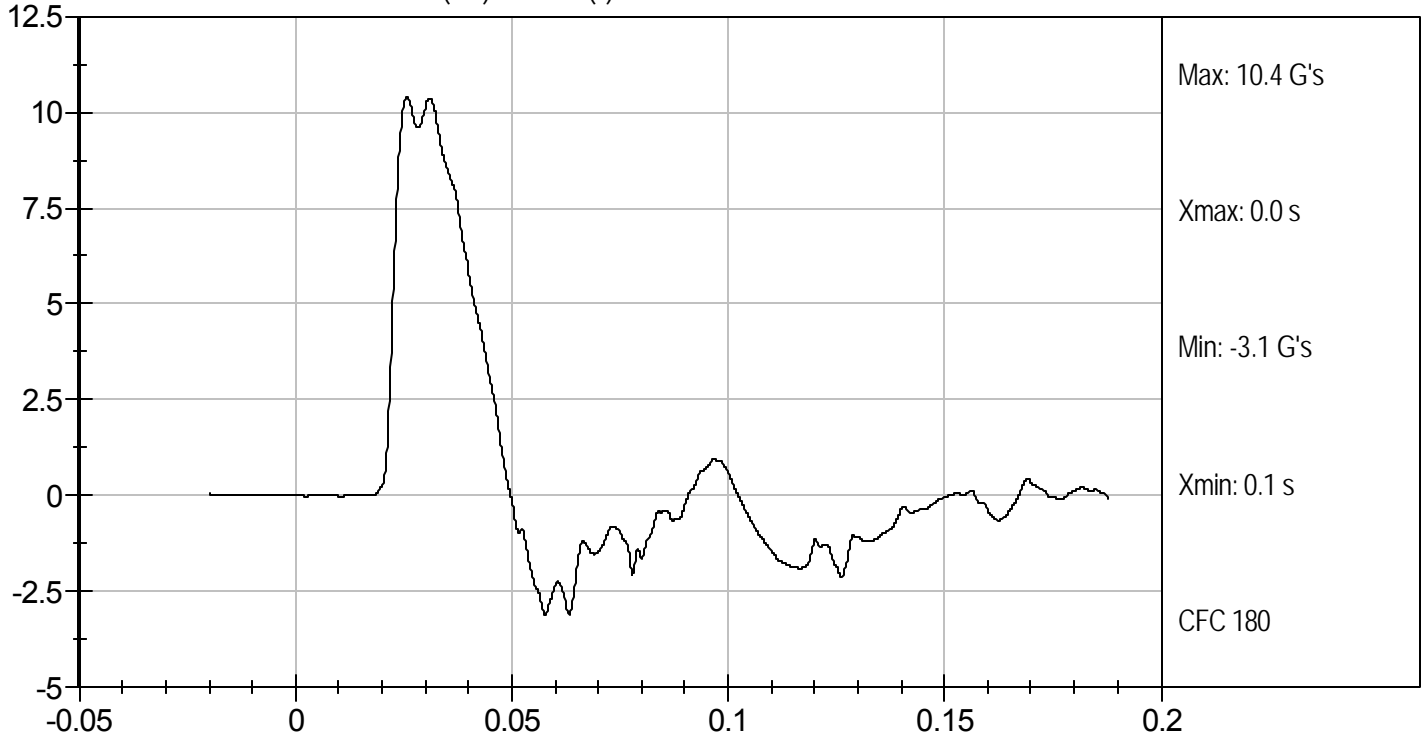
Test Desc: Abdomen Impact  
Component ID: D102376

Test Date: 7/26/10  
Velocity: 14.1 ft/s, 4.30 m/s

LOWER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (s)



LOWER SPINE ACCELERATION (G's) vs TIME (s)



**MGA RESEARCH CORPORATION**  
**PELVIS IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

ATD Serial No: 296

Test I.D: D102377

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	53	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Peak Impactor Acceleration	G's	38 to 47	42	Pass
Pelvis Y Acceleration after 6 ms	G's	34 to 42	40	Pass
Peak Acetabulum Force	N	3600 to 4300	4032	Pass
Overall Test Results				Pass

*Jessica Hall*  
Laboratory Technician

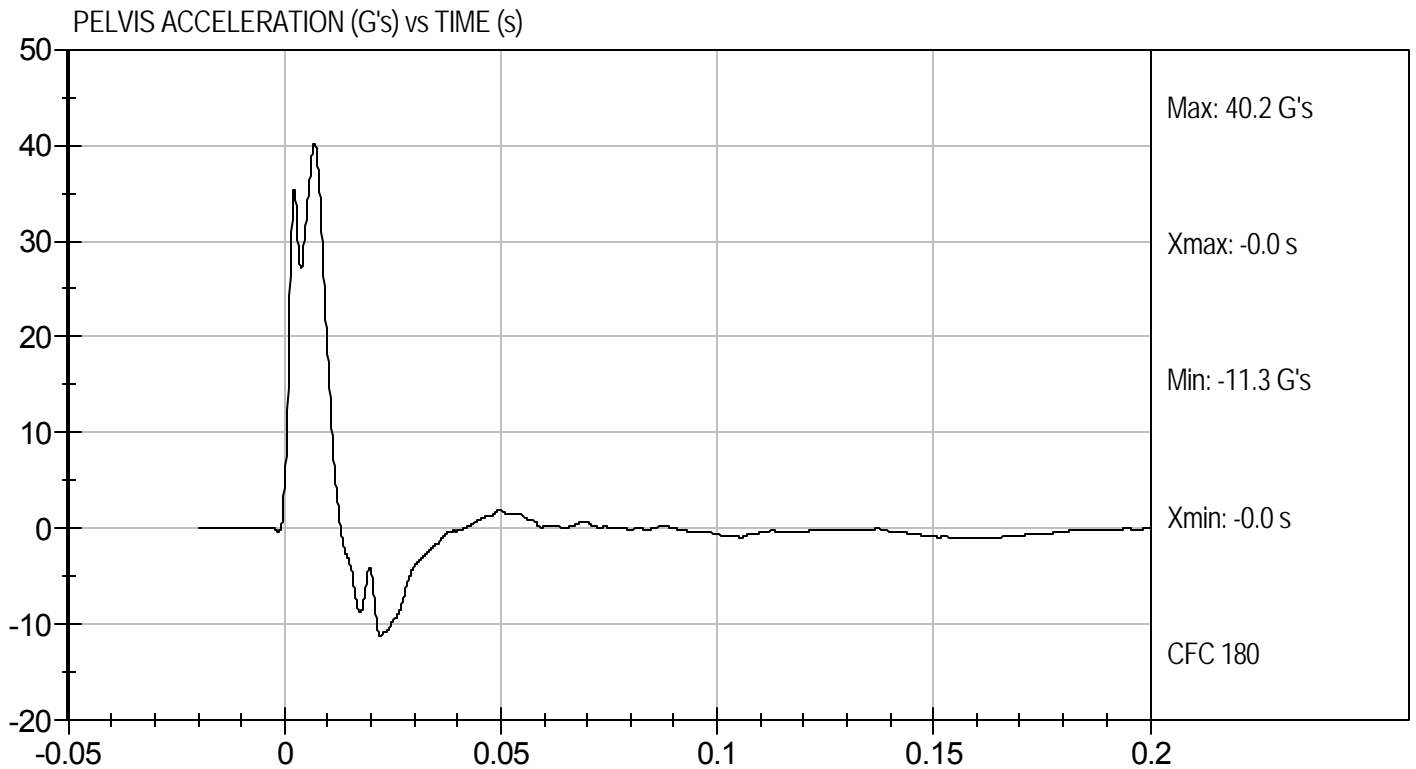
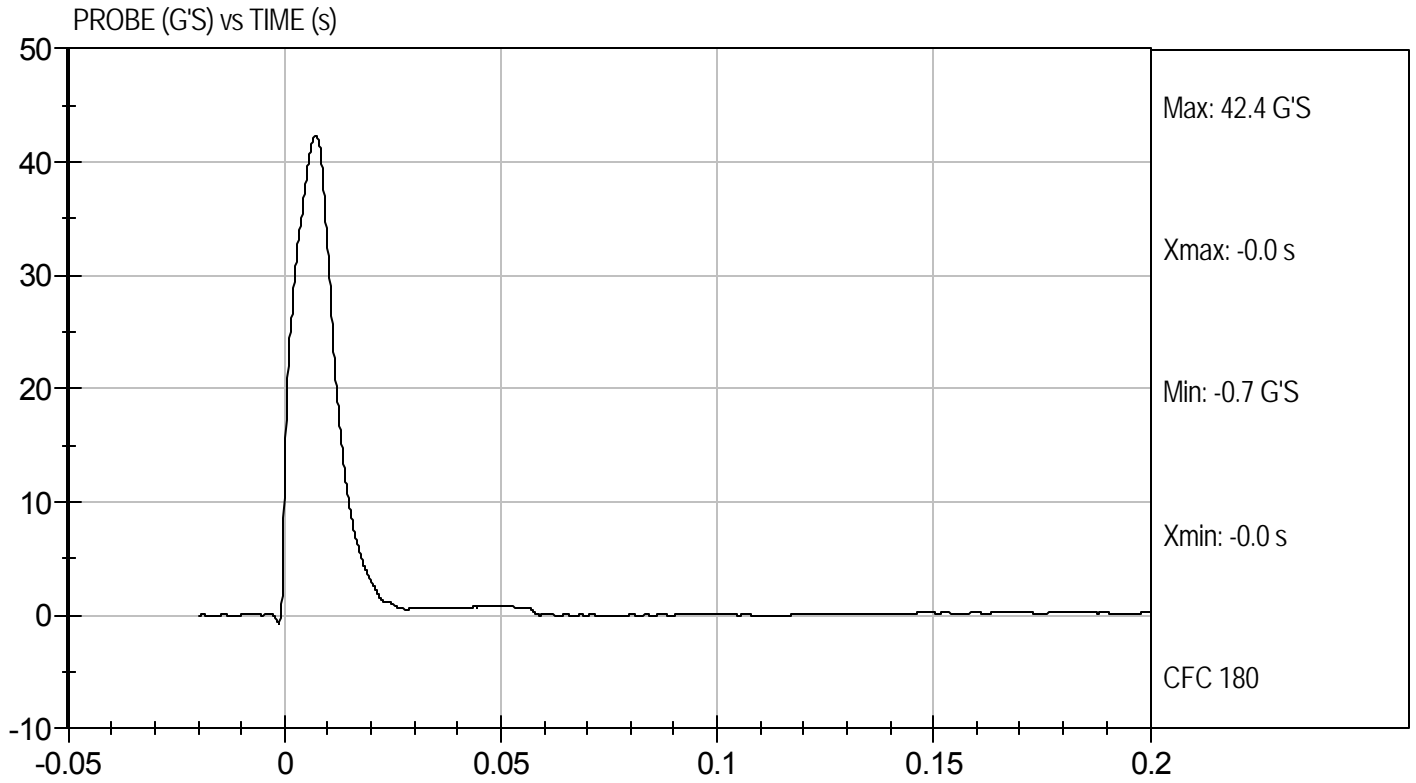
7/26/10  
Test Date

*David Winkelbauer*  
Approved By



Test Desc: Pelvis Impact  
Component ID: D102377

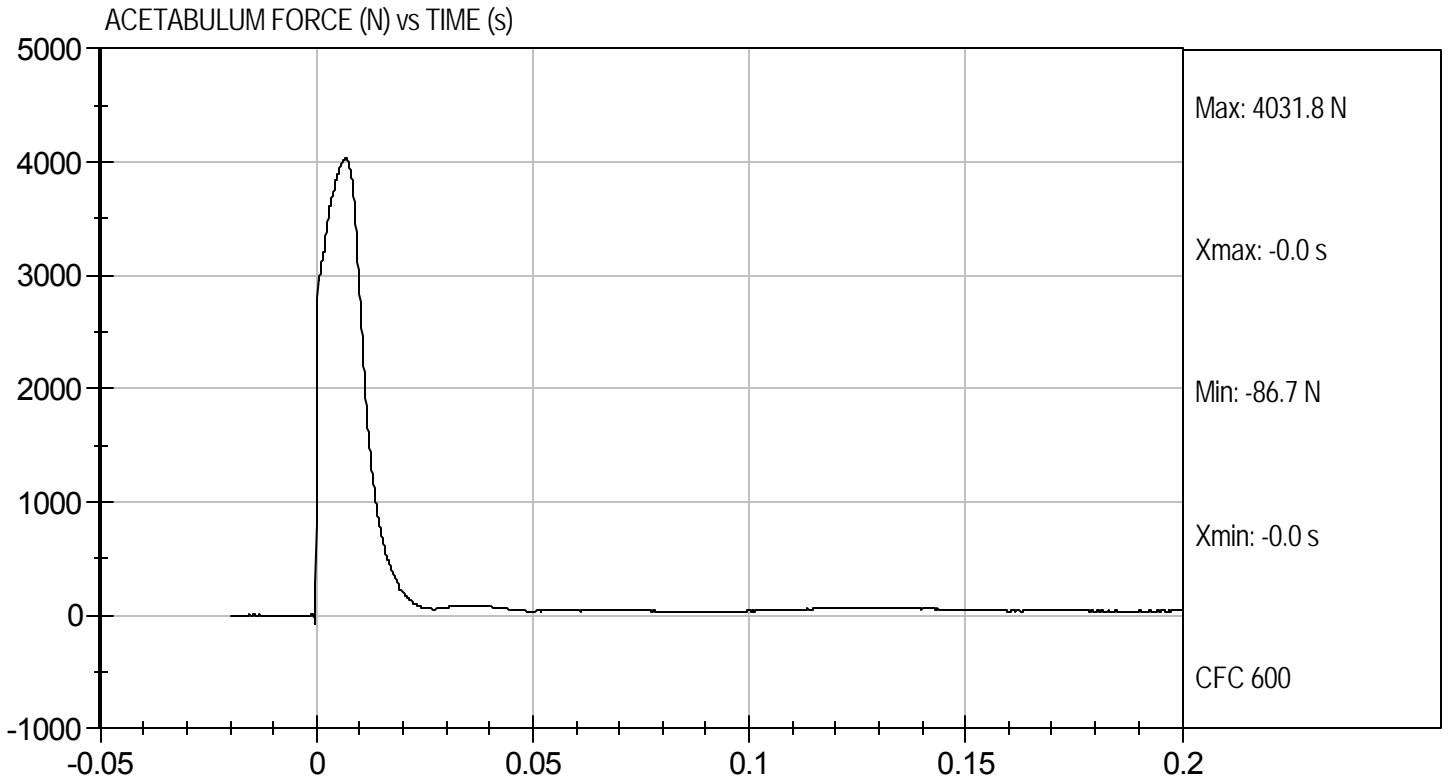
Test Date: 7/26/10  
Velocity: 21.9 ft/s, 6.68 m/s





Test Desc: Pelvis Impact  
Component ID: D102377

Test Date: 7/26/10  
Velocity: 21.9 ft/s, 6.68 m/s



**MGA RESEARCH CORPORATION**  
**ILIAC IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

ATD Serial No: 296

Test I.D: D102378

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	53	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Peak Impactor Acceleration	G's	36 to 45	36	Pass
Pelvis Y Acceleration	G's	28 to 39	35	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4525	Pass
			Overall Test Results	Pass

Jessica Hall  
Laboratory Technician

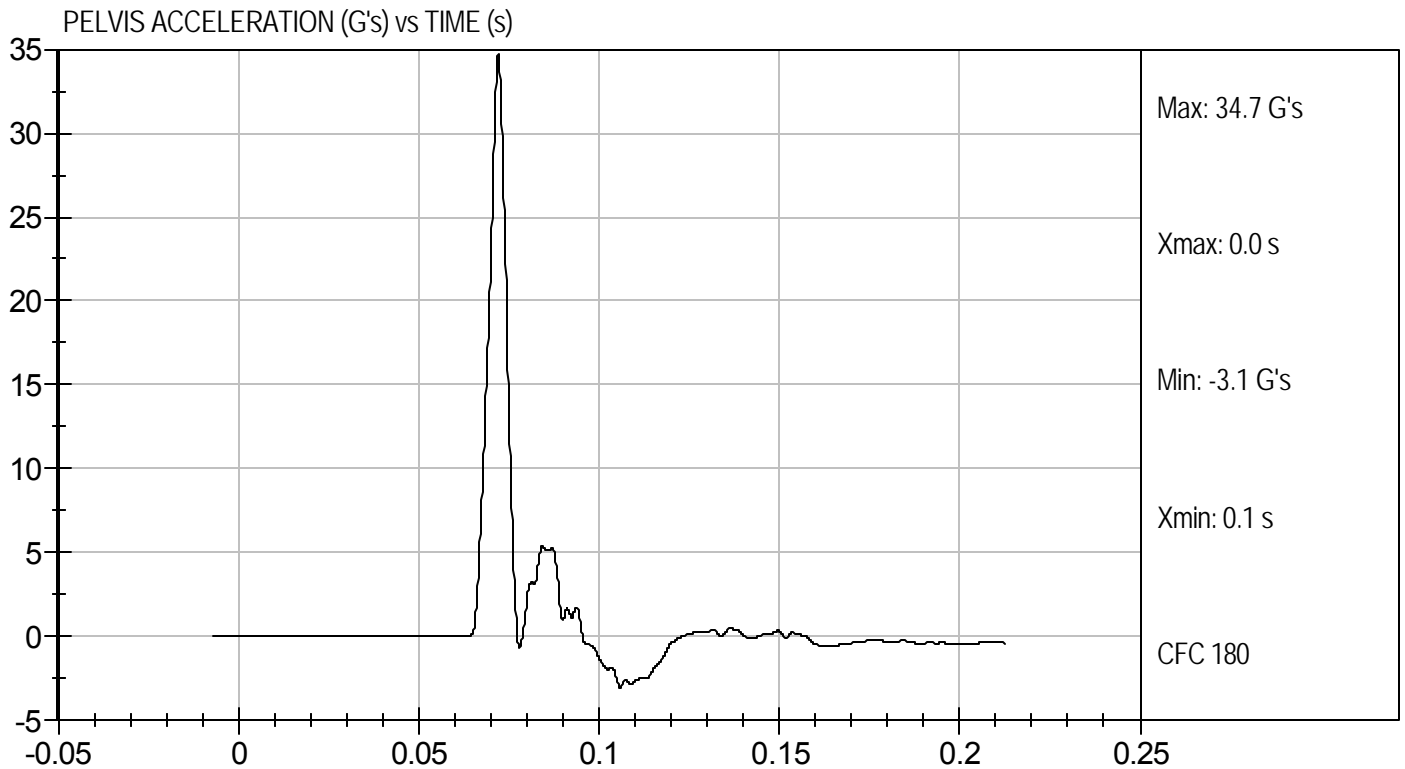
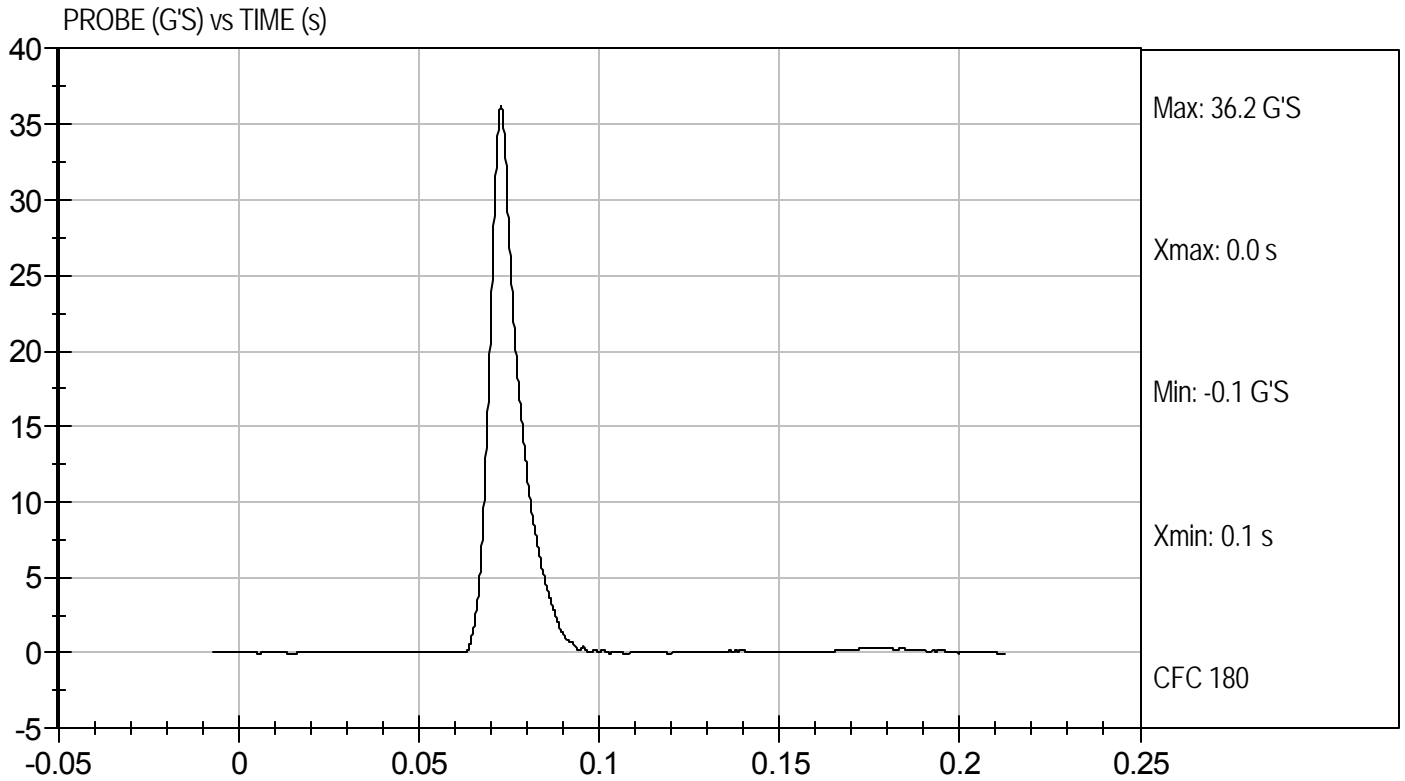
7/26/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Iliac Impact  
Component ID: D102378

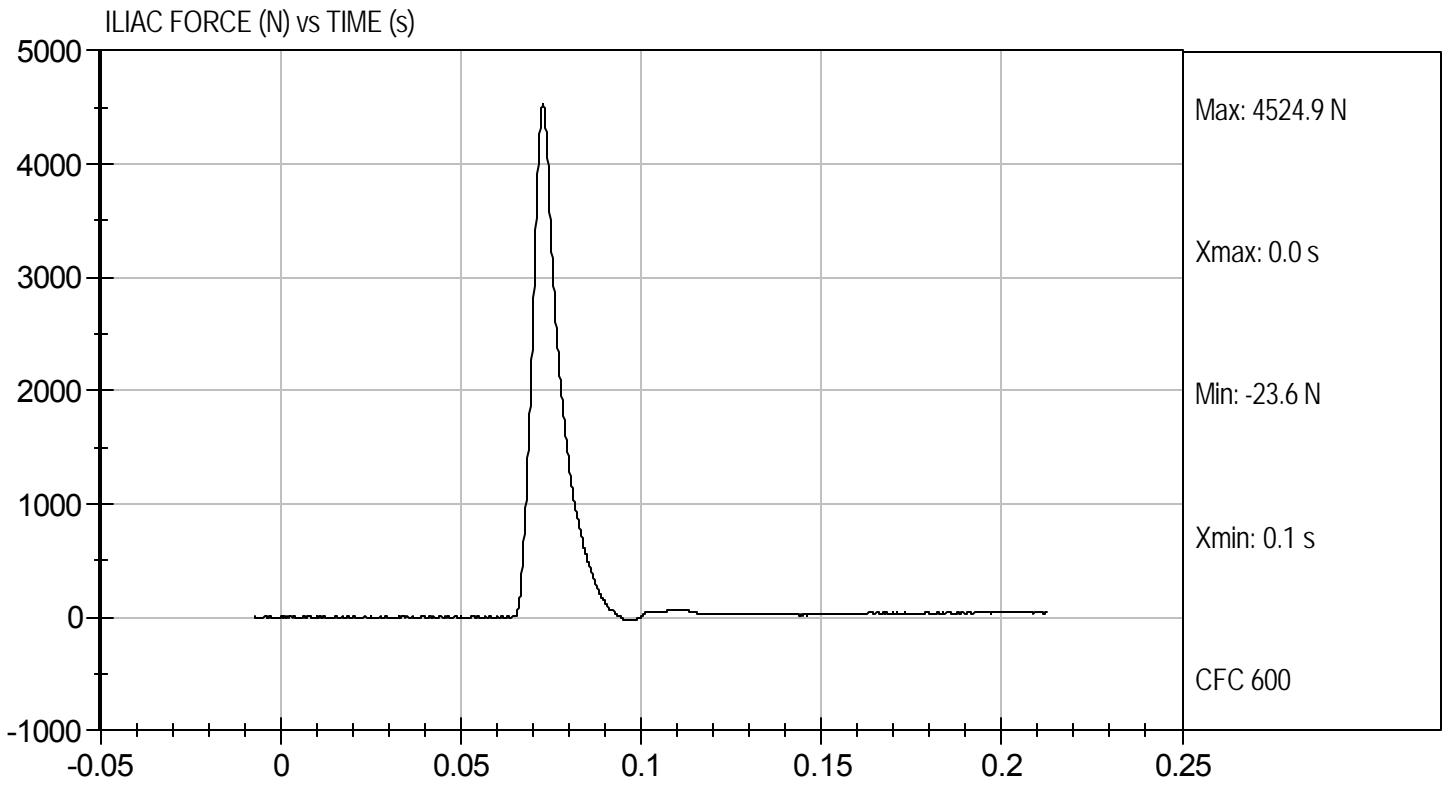
Test Date: 7/26/10  
Velocity: 14.24 ft/s, 4.34 m/s





Test Desc: Iliac Impact  
Component ID: D102378

Test Date: 7/26/10  
Velocity: 14.24 ft/s, 4.34 m/s



**MGA RESEARCH CORPORATION**  
**HEAD DROP TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

ATD Serial No: 296

Test ID: D102461

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Peak Resultant Acceleration	G's	115 to 137	123	Pass
Peak Lateral Acceleration	G's	+/- 15	-6.1	Pass
Unimodal	N/A	<15%	Yes	Pass
Overall Test Results				Pass

*Jessica Gall*  
 Laboratory Technician

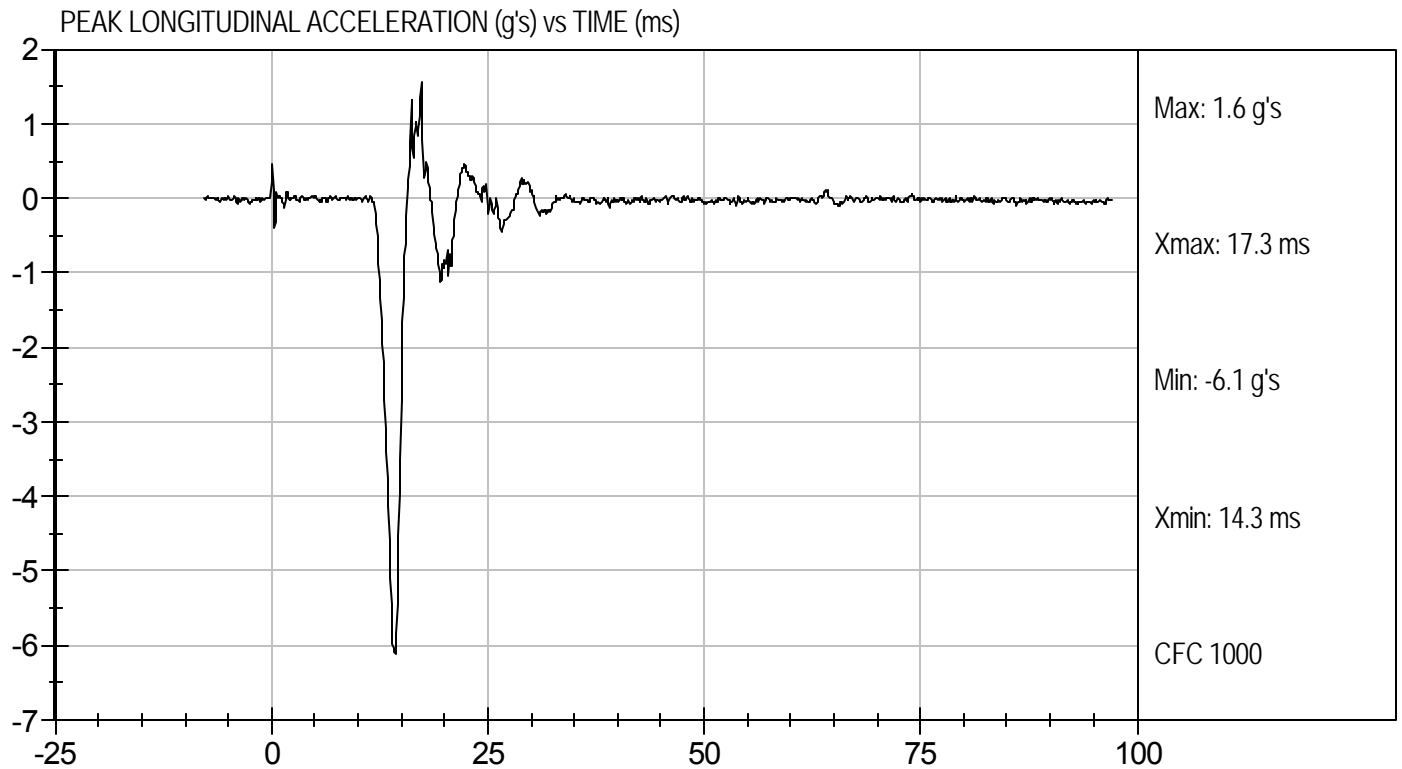
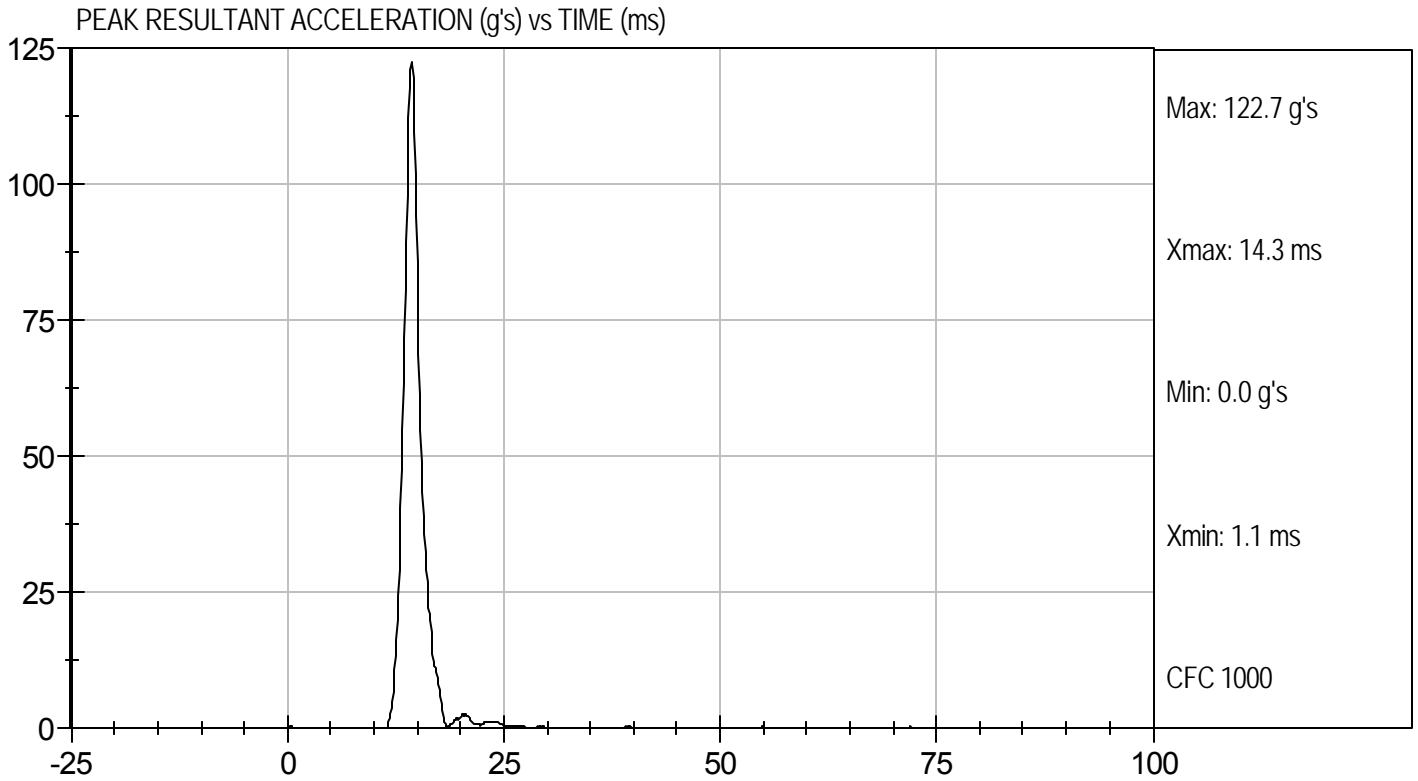
7/30/10  
 Test Date

*David Winkelbauer*  
 Approved By



Test Desc: Head Drop  
Component ID: D102461

Test Date: 7/30/10  
Velocity: 0 ft/s, 0 m/s



**MGA RESEARCH CORPORATION  
LATERAL NECK PENDULUM TEST  
SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 296

**Test I.D.:** D102462

Tested Parameter	Units	Specification	Result	Pass/Fail	
Temperature	deg C	20.6 to 22.2	21.9	Pass	
Humidity	%	10 to 70	49	Pass	
Impact Velocity	m/s	5.51 to 5.63	5.58	Pass	
Delta Velocity	10 ms	m/s	2.20 to 2.80	2.50	Pass
	15 ms	m/s	3.30 to 4.10	3.58	Pass
	20 ms	m/s	4.40 to 5.40	4.73	Pass
	25 ms	m/s	5.40 to 6.10	5.56	Pass
	25-100 ms	m/s	5.50 to 6.20	5.59	Pass
Maximum D-Plane Rotation	deg	71 to 81	74	Pass	
Time of Maximum D-Plane Rotation	ms	50 to 70	61	Pass	
Maximum Occipital Condyle Moment during Rotation Interval	Nm	-44 to -36	-39	Pass	
Time of Moment Decay to 0 Nm	ms	102 to 126	114	Pass	
Overall Test Results				Pass	

*Jessica Gall*  
Laboratory Technician

7/30/10  
Test Date

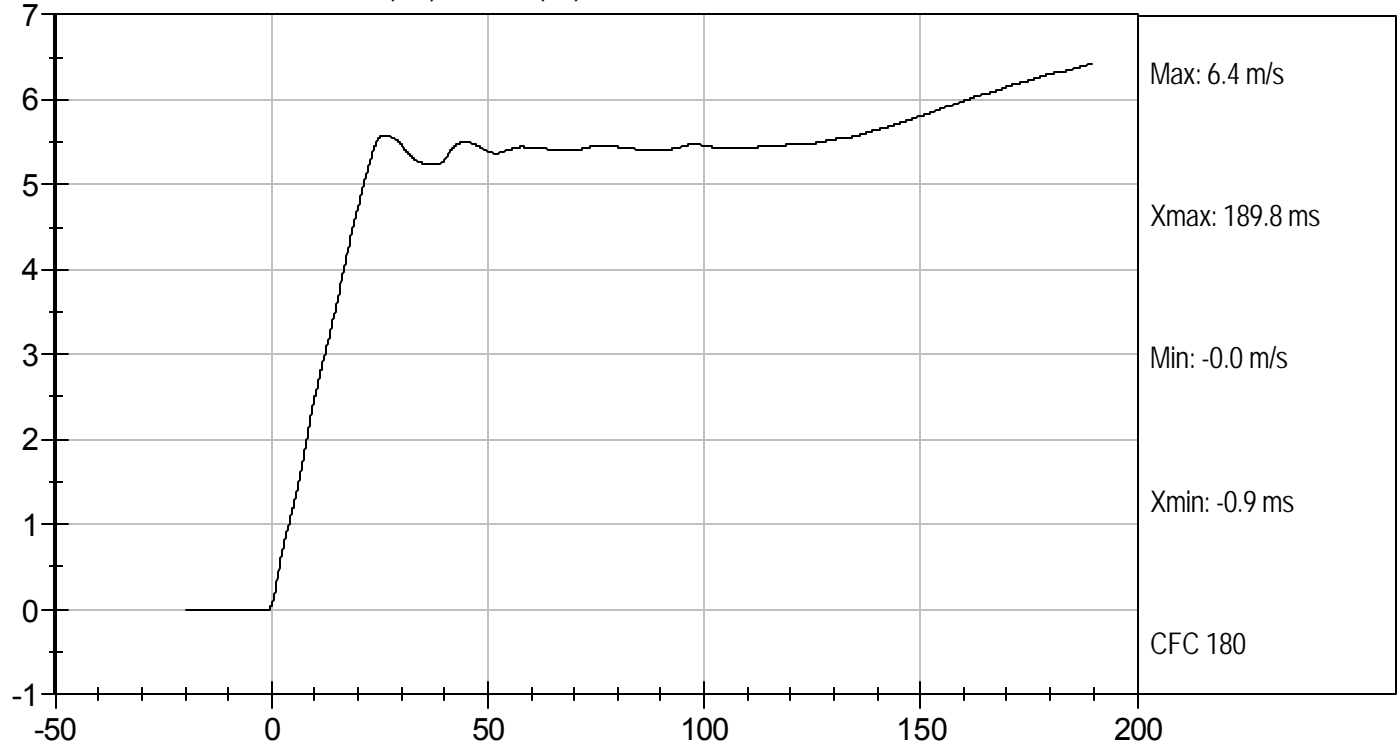
*David Winkelbauer*  
Approved By



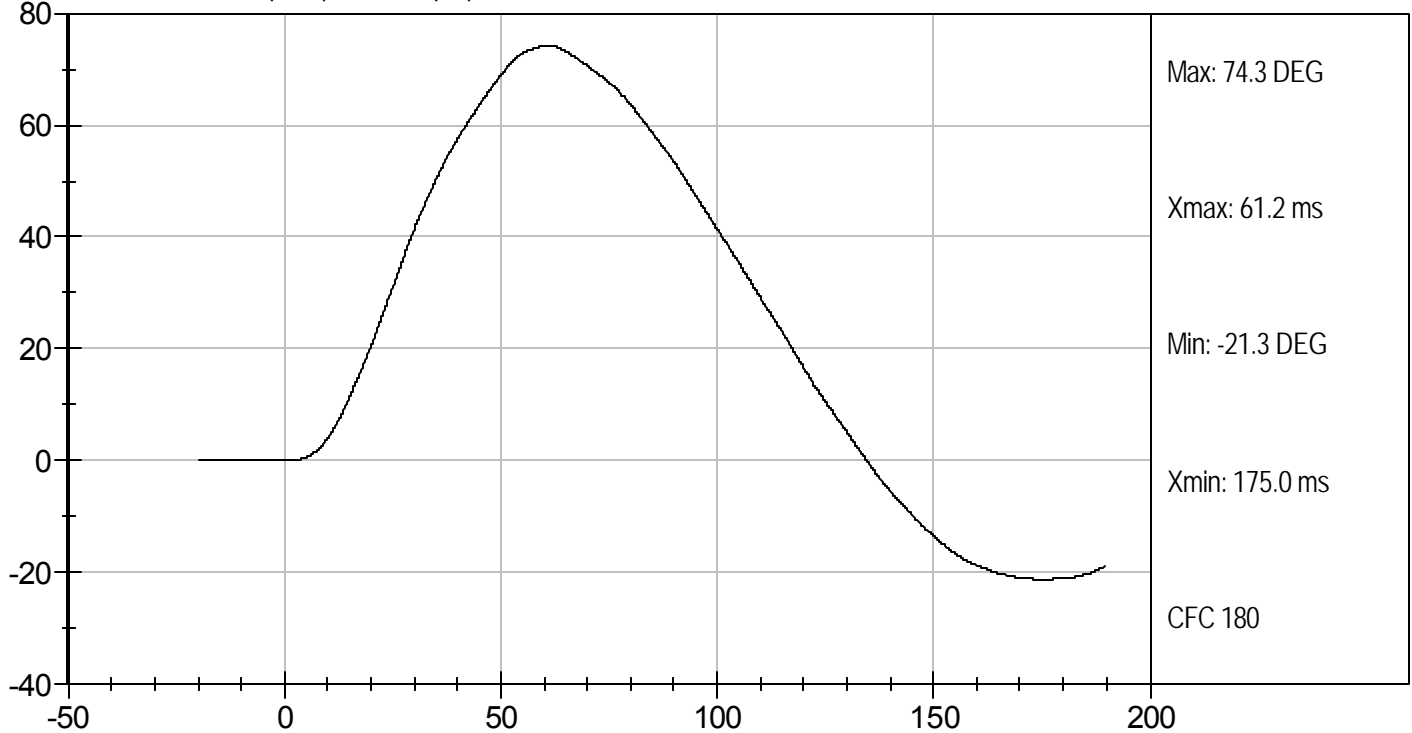
Test Desc: Neck Bending  
Component ID: D102462

Test Date: 7/30/10  
Velocity: 18.32 ft/s, 5.58 m/s

PENDULUM DECELERATION (m/s) vs TIME (ms)



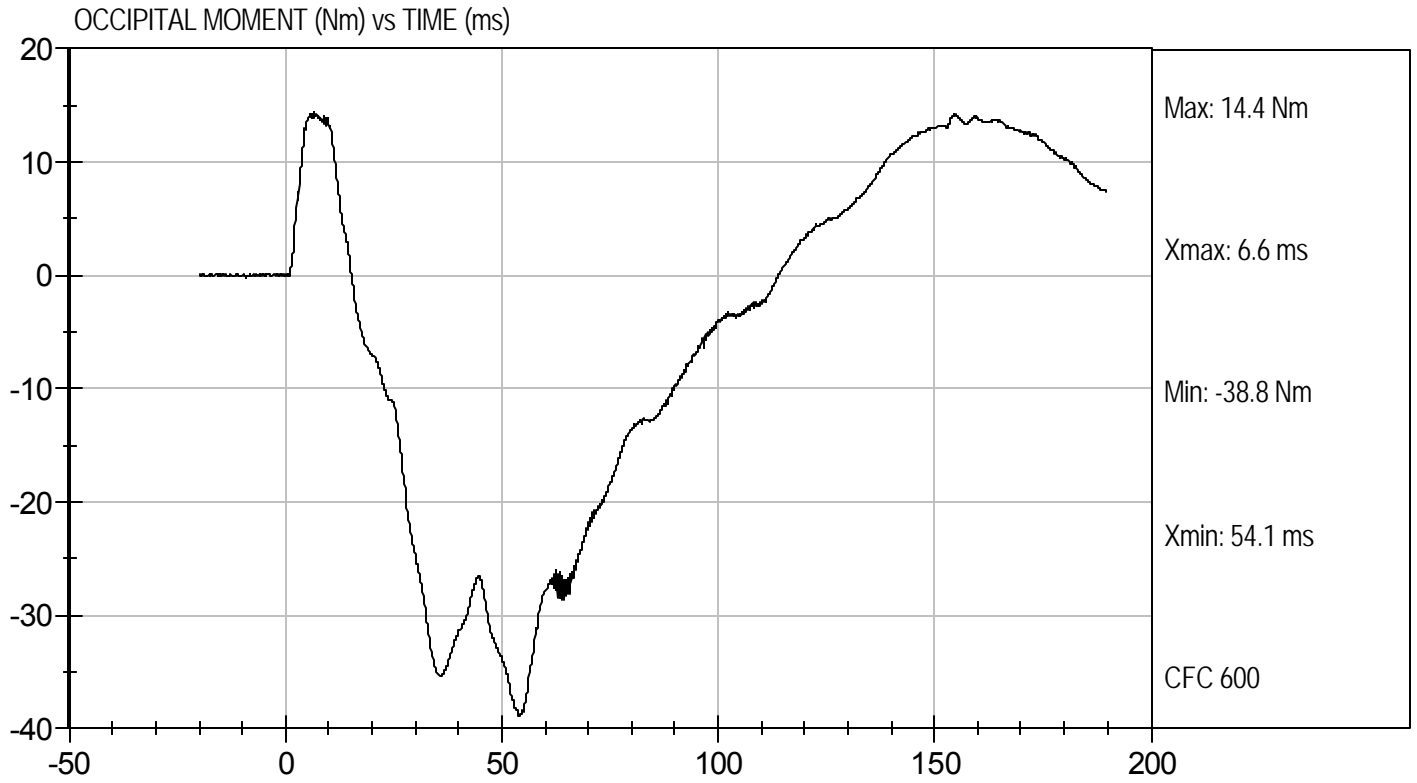
FLEXION ANGLE (DEG) vs TIME (ms)





Test Desc: Neck Bending  
Component ID: D102462

Test Date: 7/30/10  
Velocity: 18.32 ft/s, 5.58 m/s



**MGA RESEARCH CORPORATION  
SHOULDER IMPACT TEST  
SID-IIs BUILD LEVEL D DUMMY**

ATD Serial No: 296

Test ID: D102463

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	47	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	32	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	19	Pass
Overall Test Results				Pass

Jessica Hall  
Laboratory Technician

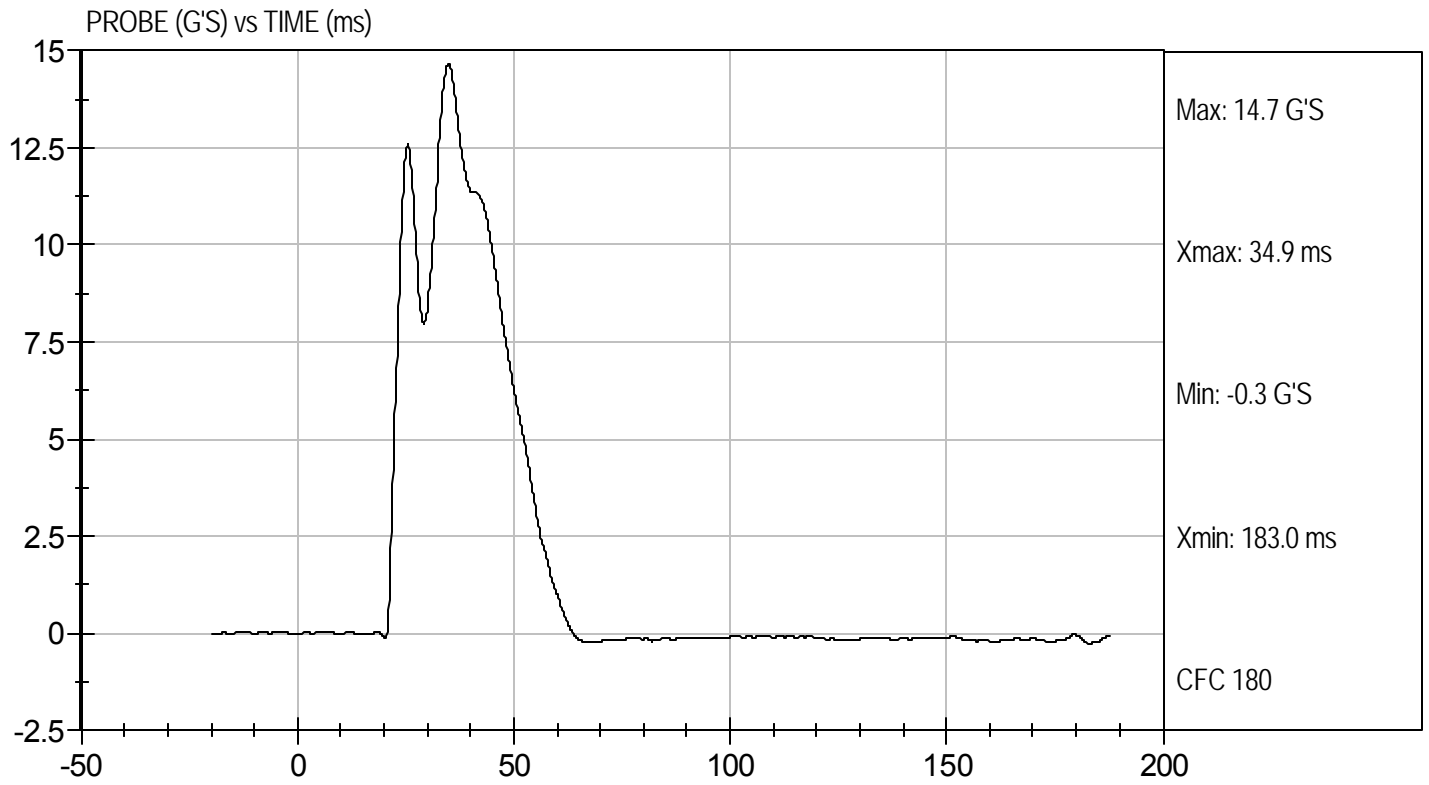
7/29/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Shoulder Impact  
Component ID: D102463

Test Date: 7/29/10  
Velocity: 14.0 ft/s, 4.27 m/s

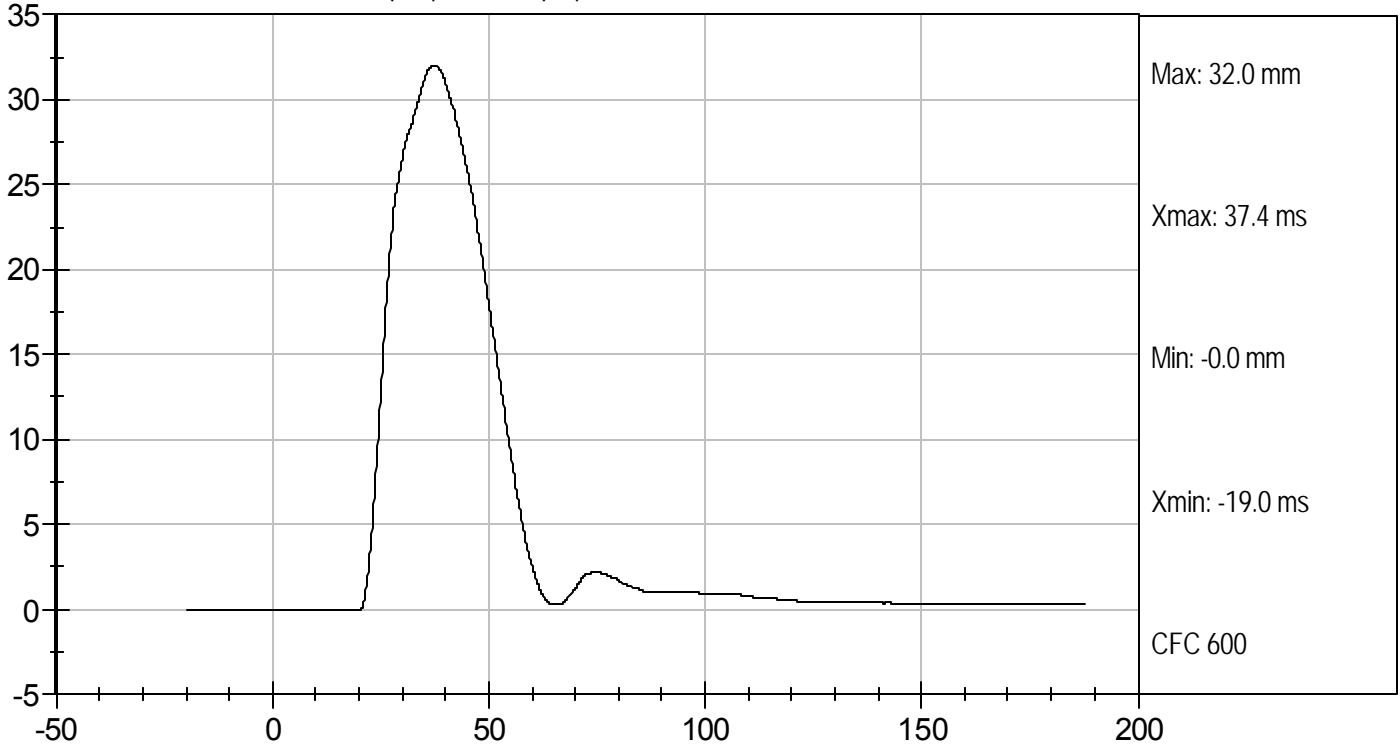




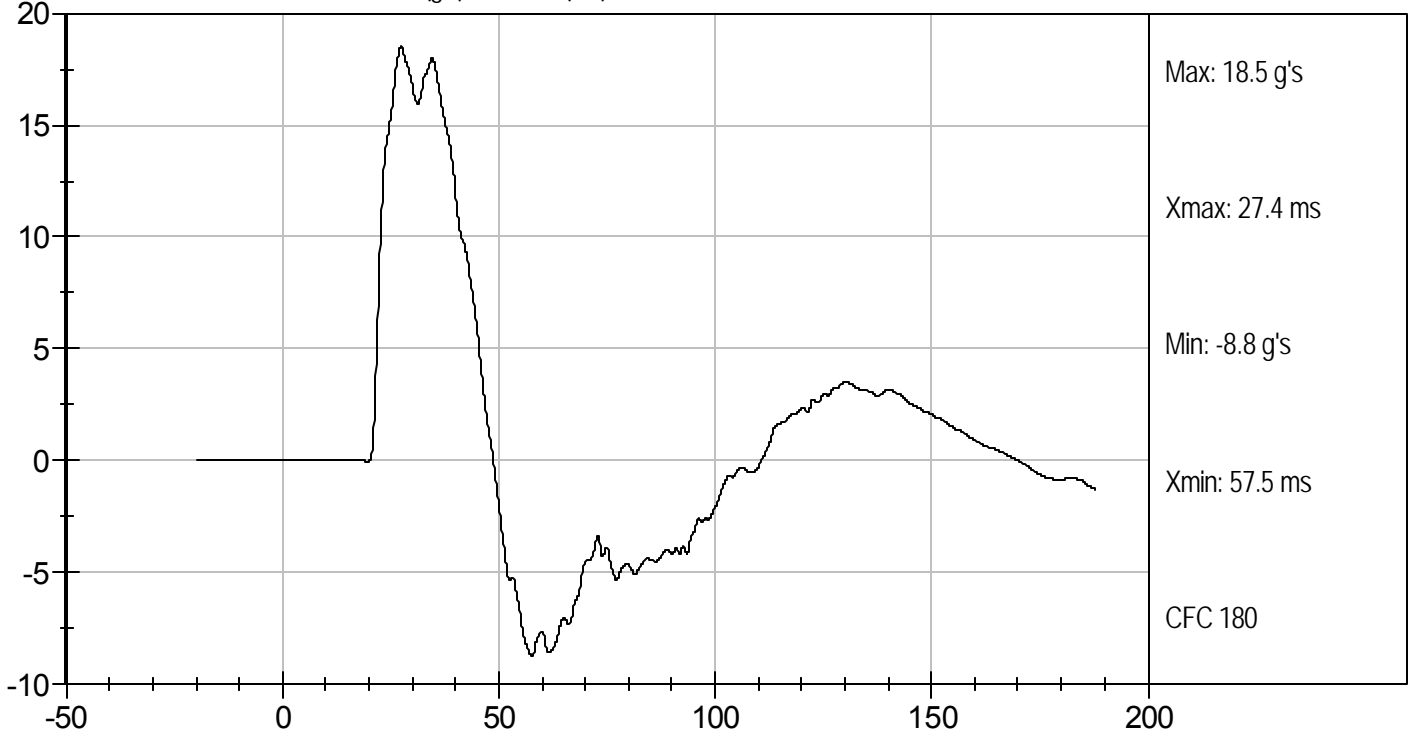
Test Desc: Shoulder Impact  
Component ID: D102463

Test Date: 7/29/10  
Velocity: 14.0 ft/s, 4.27 m/s

SHOULDER DISPLACEMENT (mm) vs TIME (ms)



UPPER SPINE ACCELERATION (g's) vs TIME (ms)



**MGA RESEARCH CORPORATION**  
**THORAX (WITH ARM) IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

ATD Serial No: 296

Test I.D: D102464

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.2	Pass
Humidity	%	10 to 70	48	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Peak Impactor Acceleration	G's	30 to 36	32	Pass
Shoulder Displacement	mm	31 to 40	35	Pass
Upper Rib Displacement	mm	25 to 32	26	Pass
Middle Rib Displacement	mm	30 to 36	31	Pass
Lower Rib Displacement	mm	32 to 38	33	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	37	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	32	Pass
Overall Test Results				Pass

Jessica Gall  
Laboratory Technician

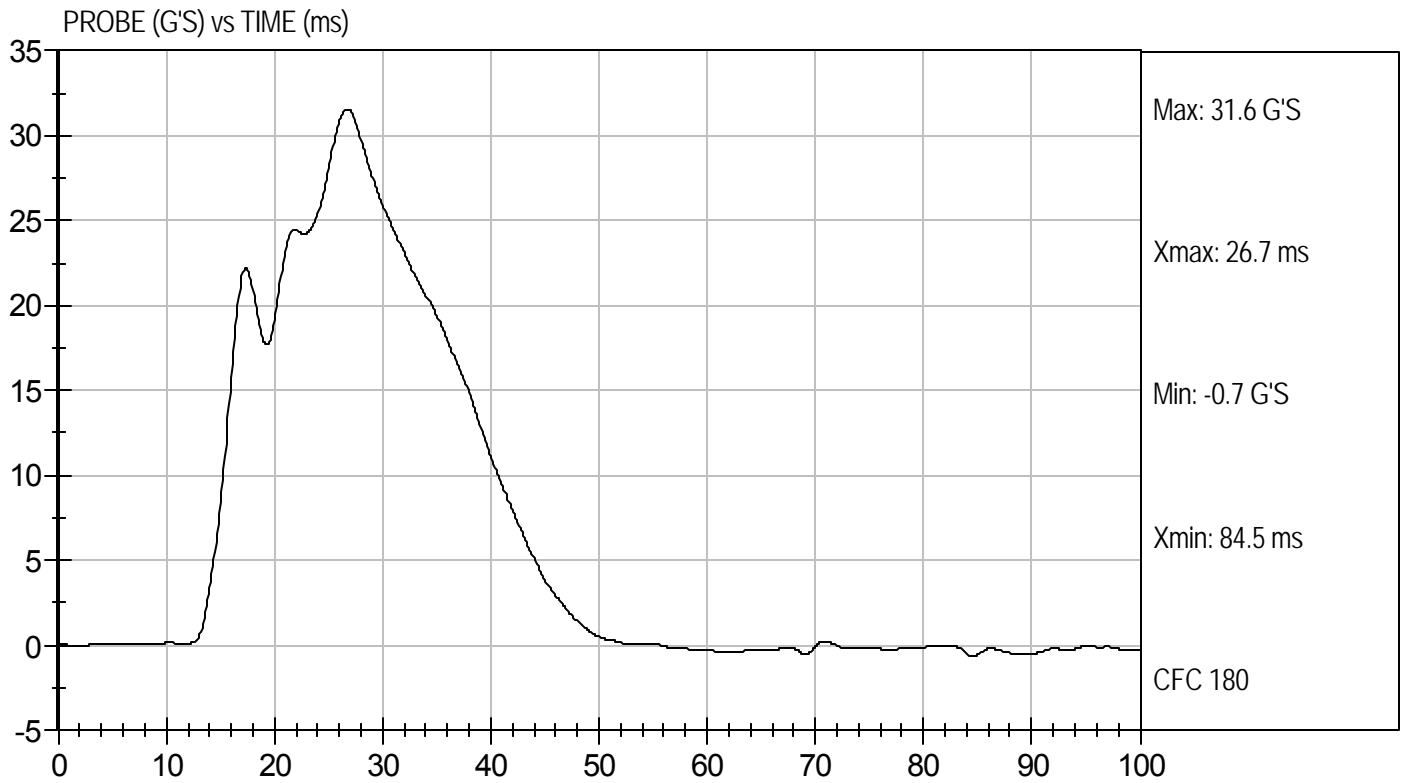
7/29/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Thorax With Arm  
Component ID: D102464

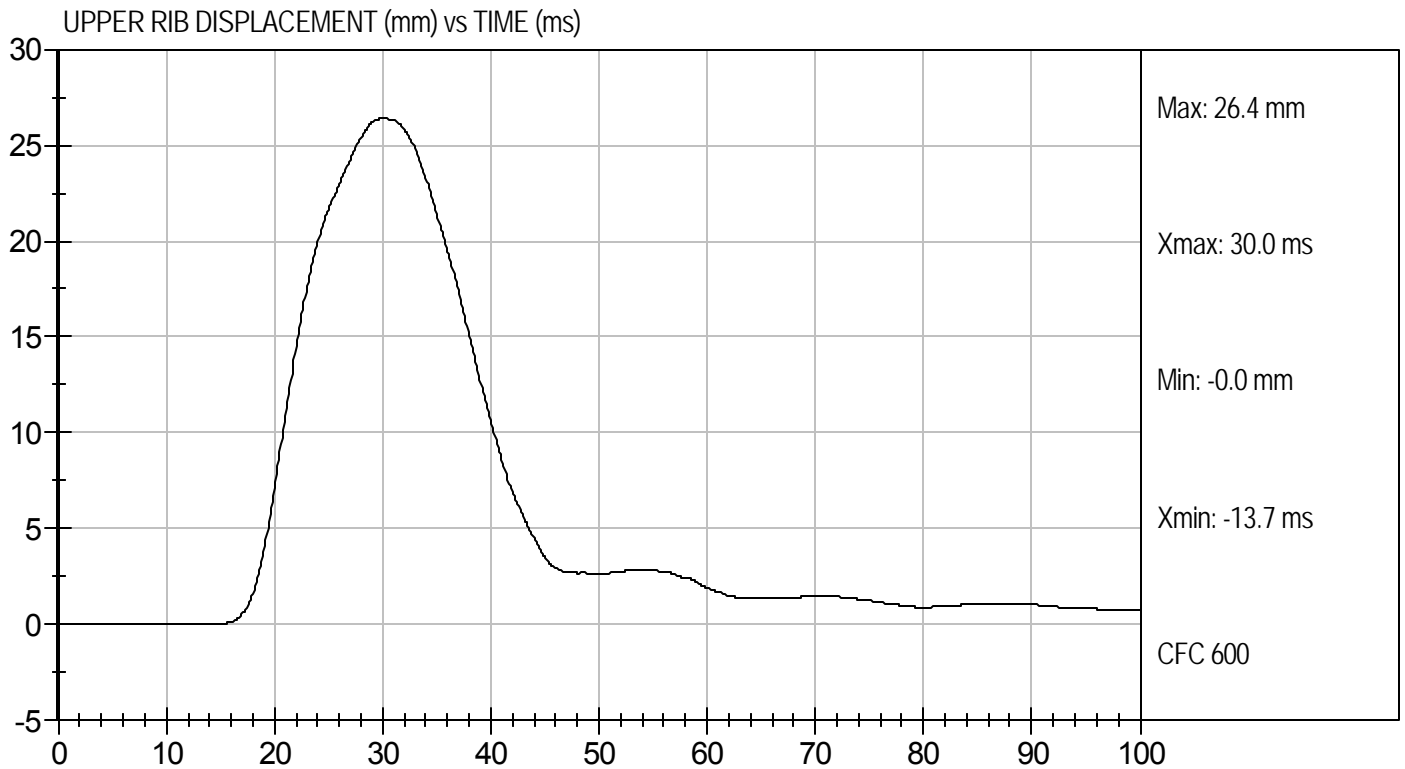
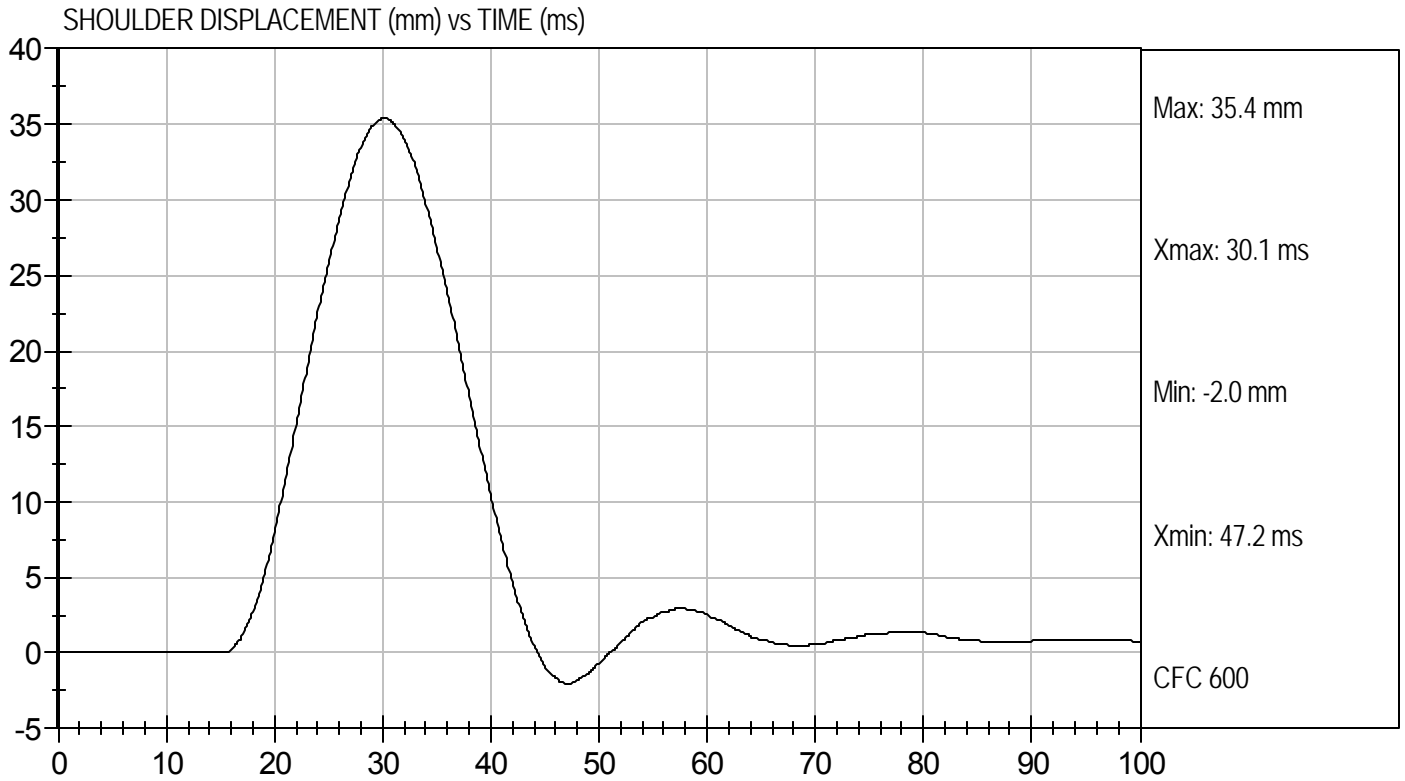
Test Date: 7/29/10  
Velocity: 21.9 ft/s, 6.68 m/s





Test Desc: Thorax With Arm  
Component ID: D102464

Test Date: 7/29/10  
Velocity: 21.9 ft/s, 6.68 m/s

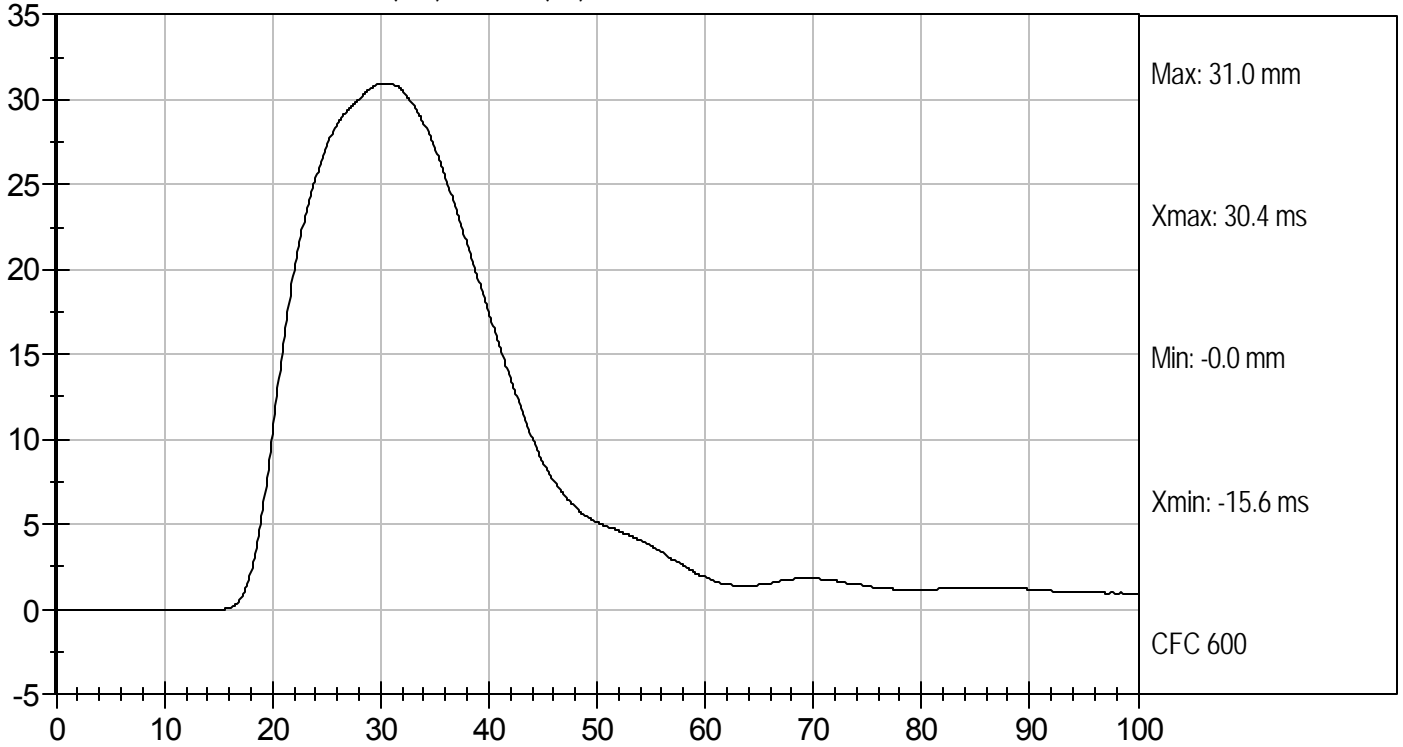




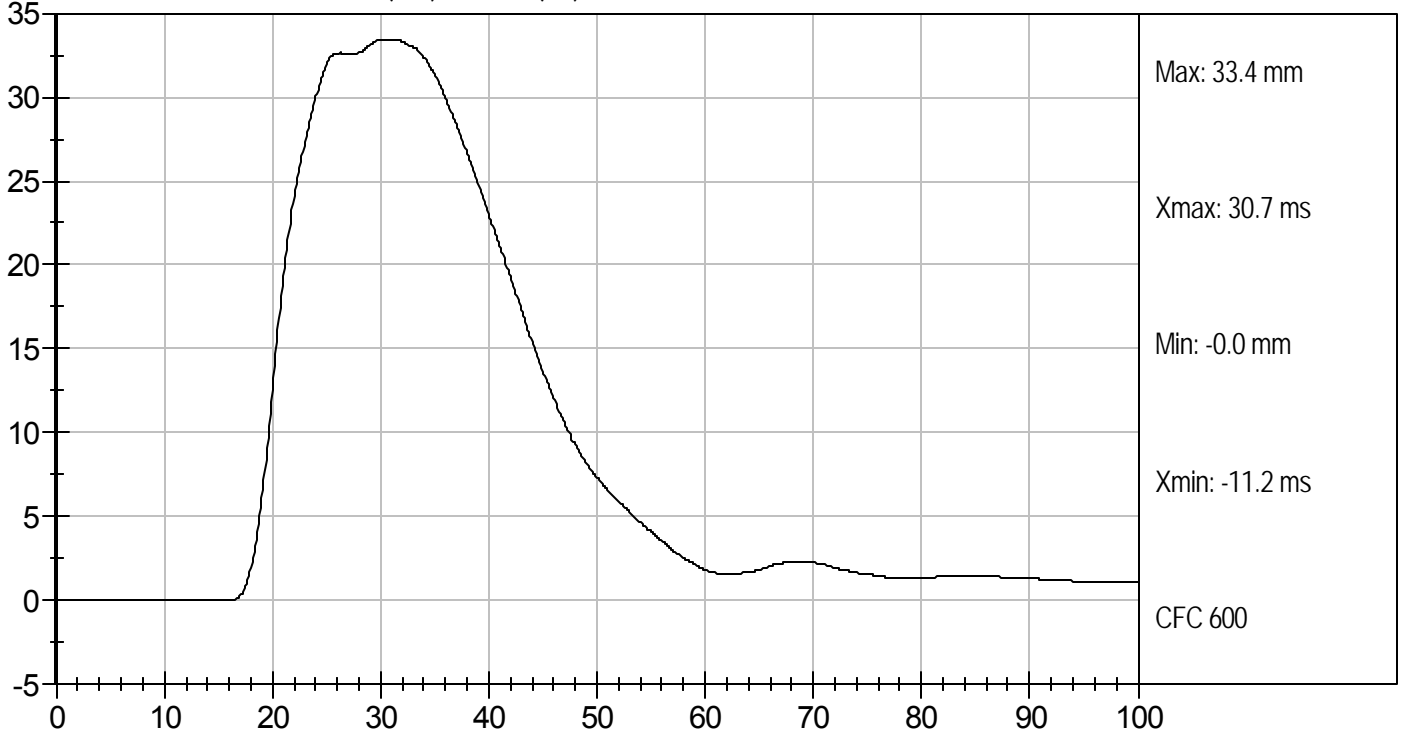
Test Desc: Thorax With Arm  
Component ID: D102464

Test Date: 7/29/10  
Velocity: 21.9 ft/s, 6.68 m/s

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



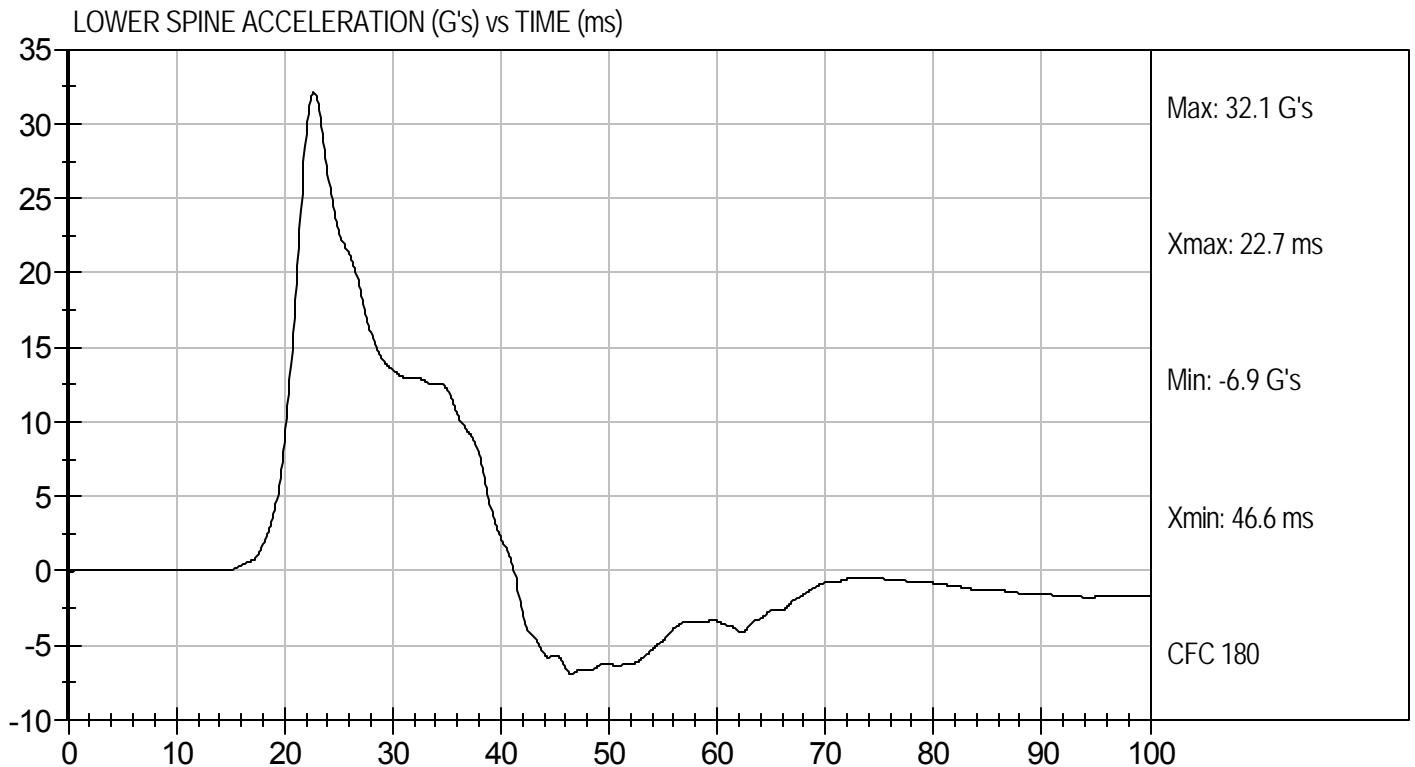
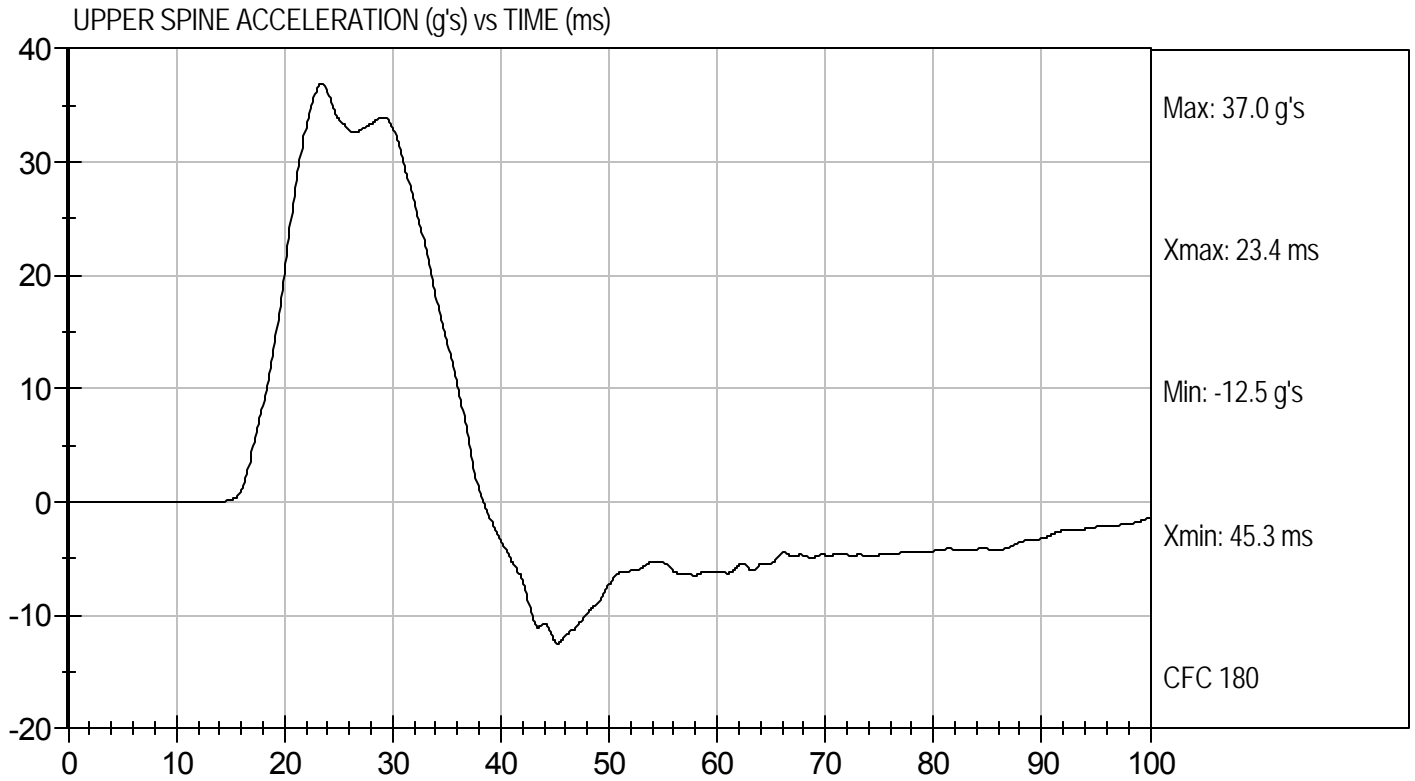
LOWER RIB DISPLACEMENT (mm) vs TIME (ms)





Test Desc: Thorax With Arm  
Component ID: D102464

Test Date: 7/29/10  
Velocity: 21.9 ft/s, 6.68 m/s



**MGA RESEARCH CORPORATION**  
**THORAX (WITHOUT ARM) IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

ATD Serial No: 296

Test I.D: D102465

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.2	Pass
Humidity	%	10 to 70	48	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Peak Impactor Force	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	32	Pass
Middle Rib Displacement	mm	39 to 45	40	Pass
Lower Rib Displacement	mm	35 to 43	39	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	13	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	10	Pass
Overall Test Results				Pass

Jessica Hall  
 Laboratory Technician

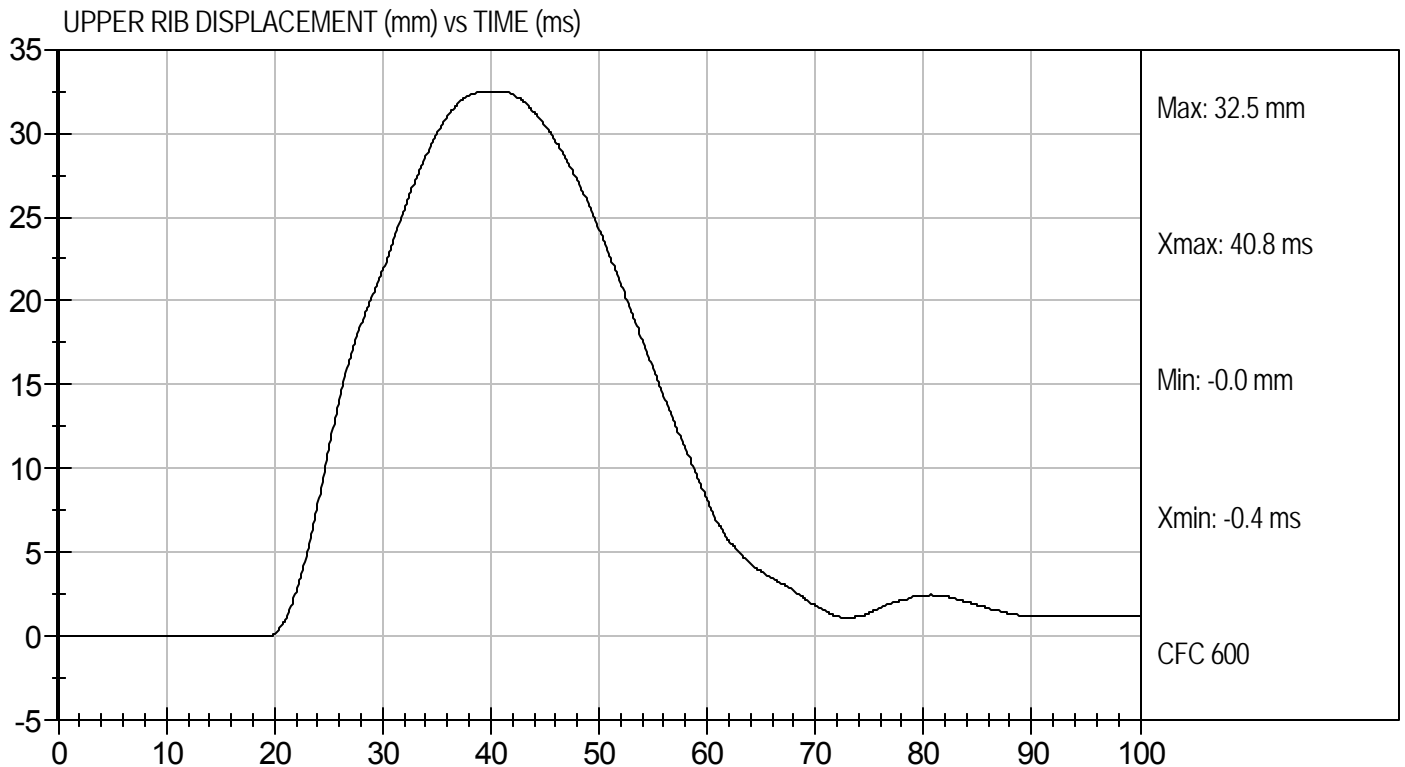
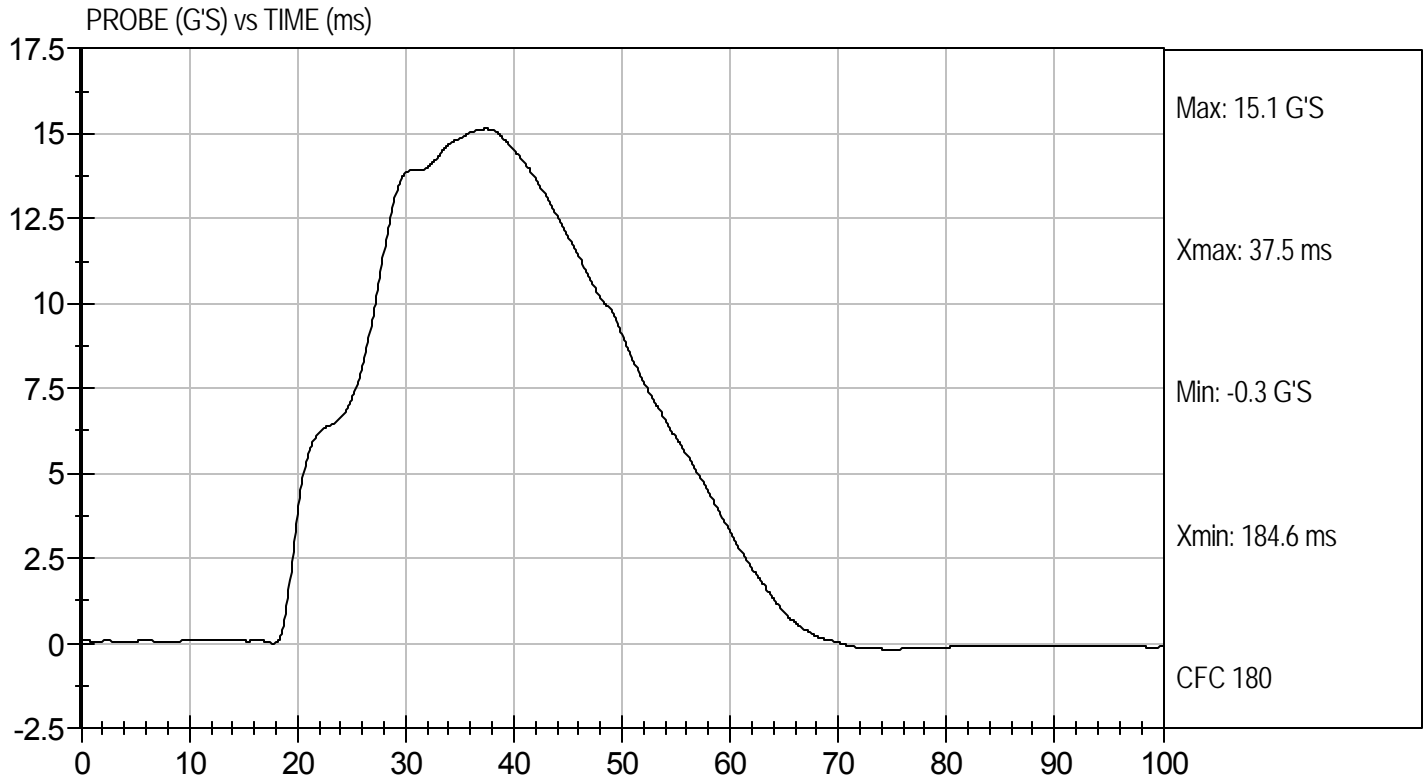
7/29/10  
 Test Date

David Winkelbauer  
 Approved By



Test Desc: Thorax Without Arm  
Component ID: D102465

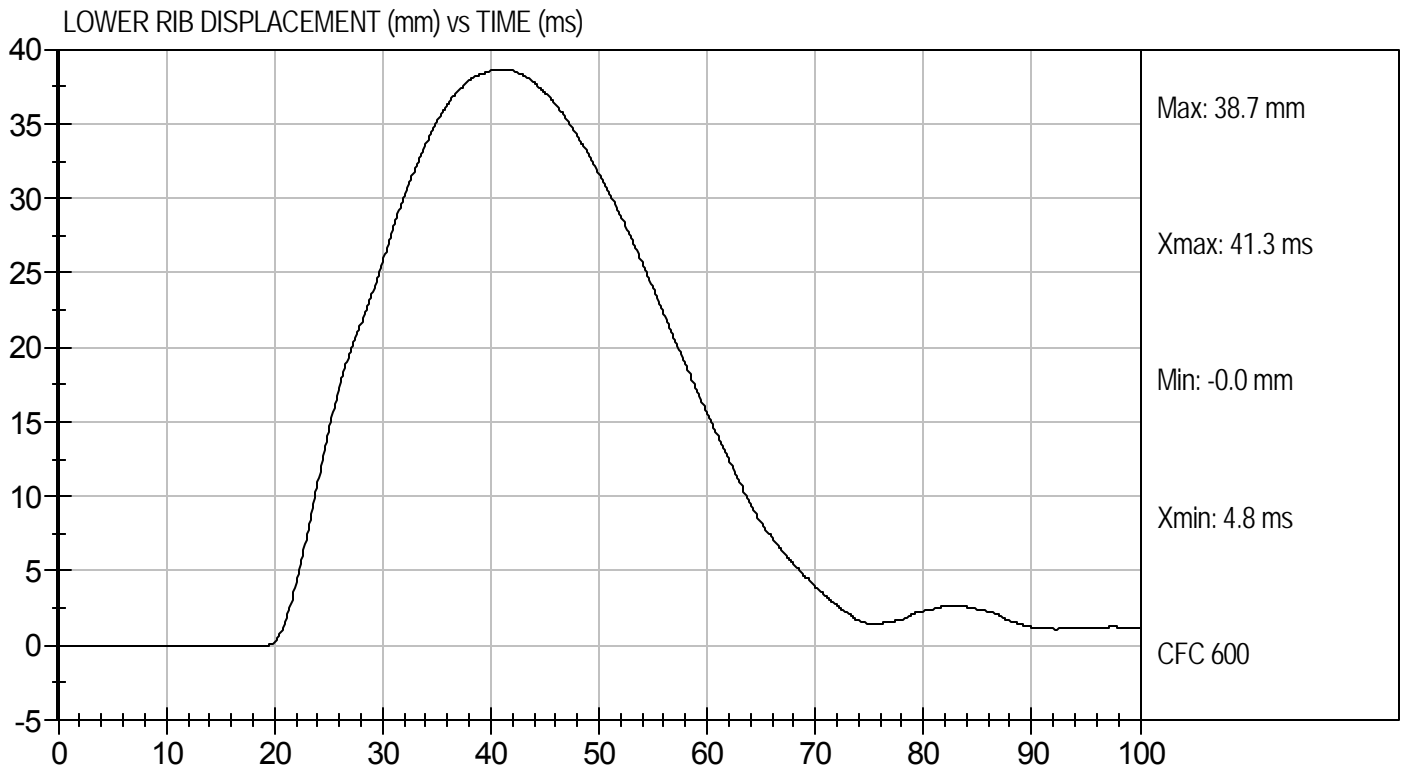
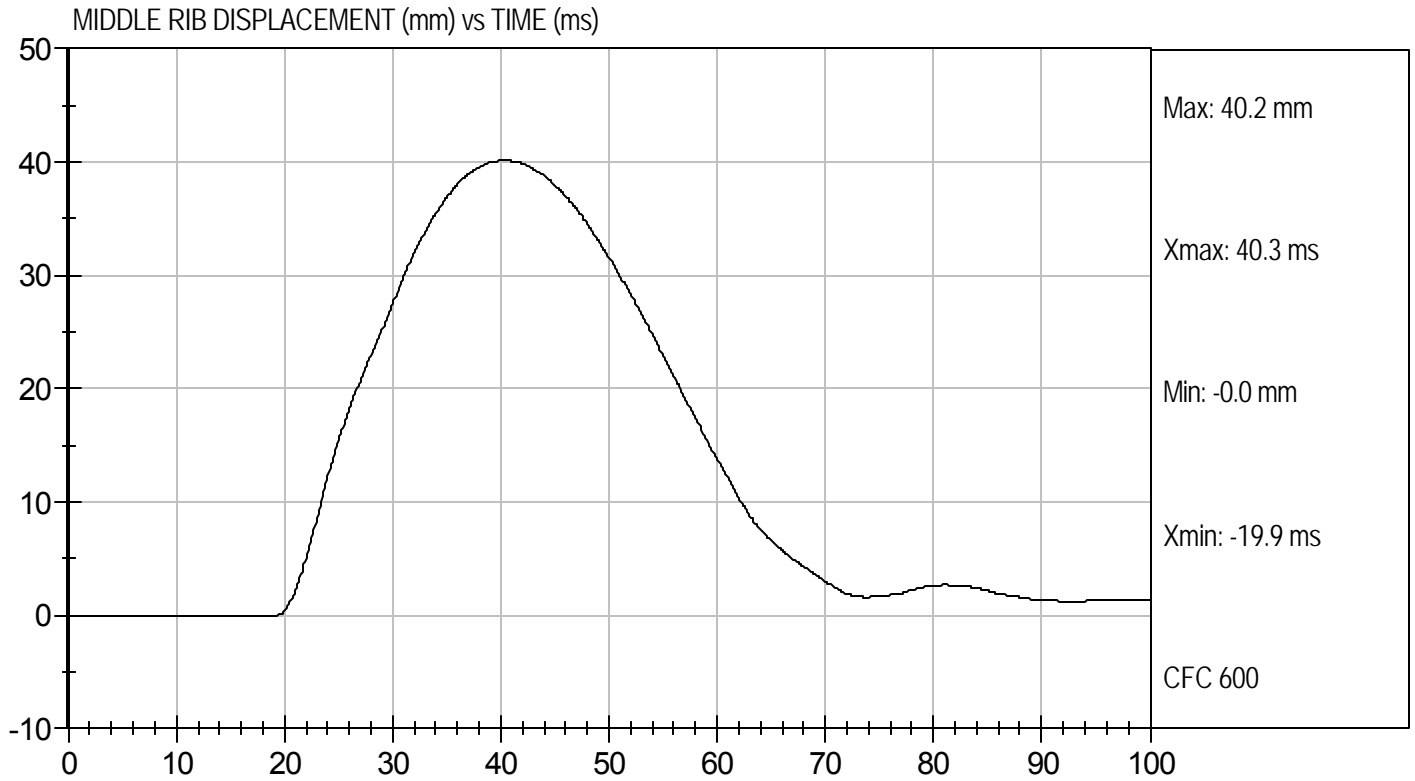
Test Date: 7/29/10  
Velocity: 14.0 ft/s, 4.27 m/s





Test Desc: Thorax Without Arm  
Component ID: D102465

Test Date: 7/29/10  
Velocity: 14.0 ft/s, 4.27 m/s

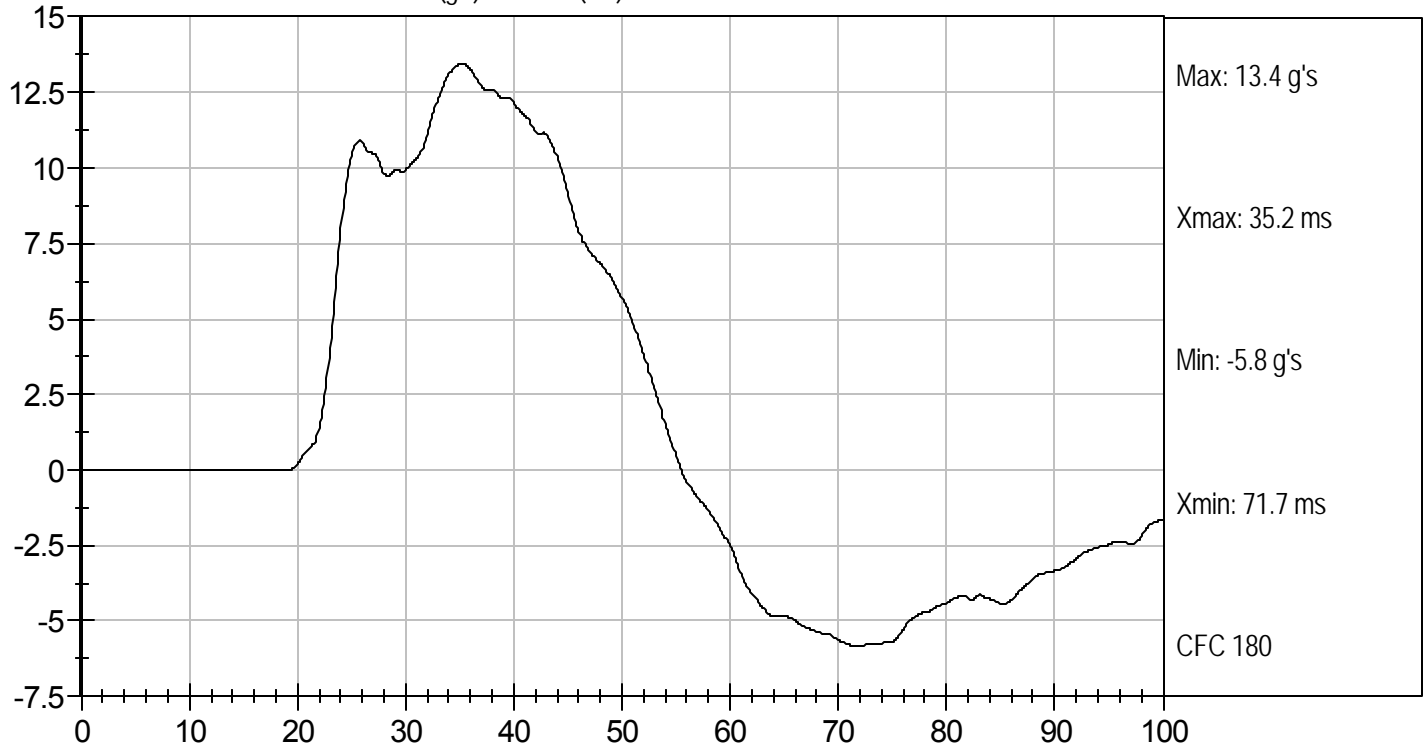




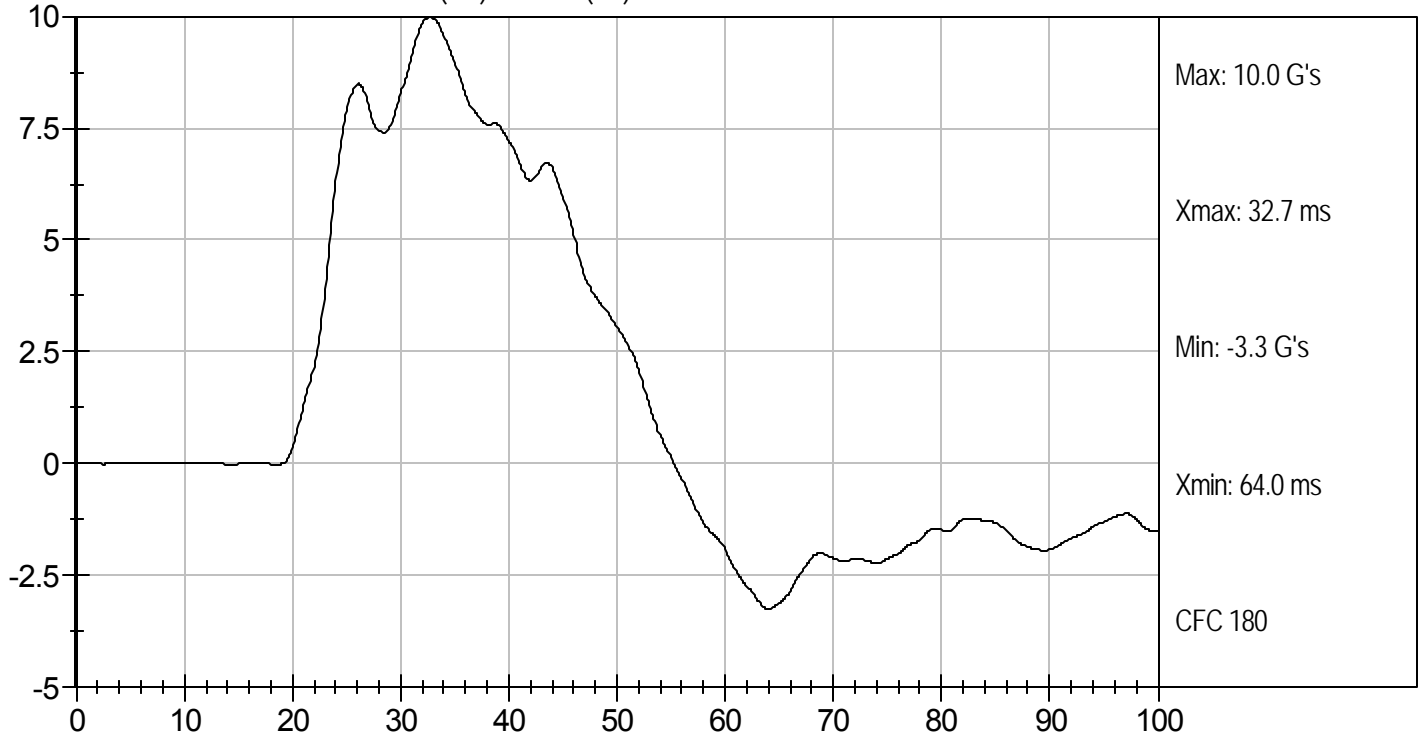
Test Desc: Thorax Without Arm  
Component ID: D102465

Test Date: 7/29/10  
Velocity: 14.0 ft/s, 4.27 m/s

UPPER SPINE ACCELERATION (g's) vs TIME (ms)



LOWER SPINE ACCELERATION (G's) vs TIME (ms)



**MGA RESEARCH CORPORATION**  
**ABDOMINAL IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

ATD Serial No: 296

Test I.D: D102466

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.2	Pass
Humidity	%	10 to 70	48	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Peak Impactor Acceleration	G's	12 to 16	14	Pass
Upper Rib Displacement	mm	36 to 47	38	Pass
Lower Rib Displacement	mm	33 to 44	38	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
Overall Test Results				Pass

Jessica Hall  
Laboratory Technician

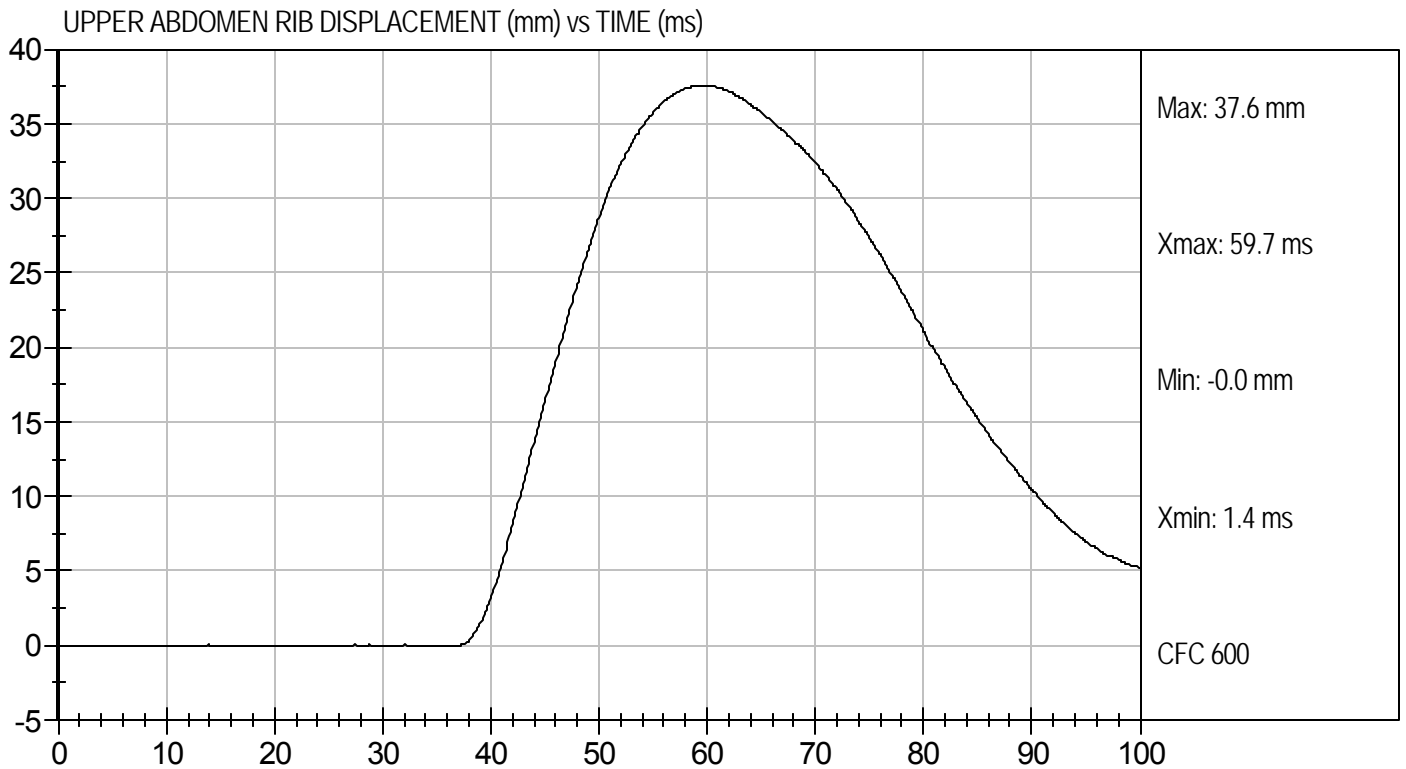
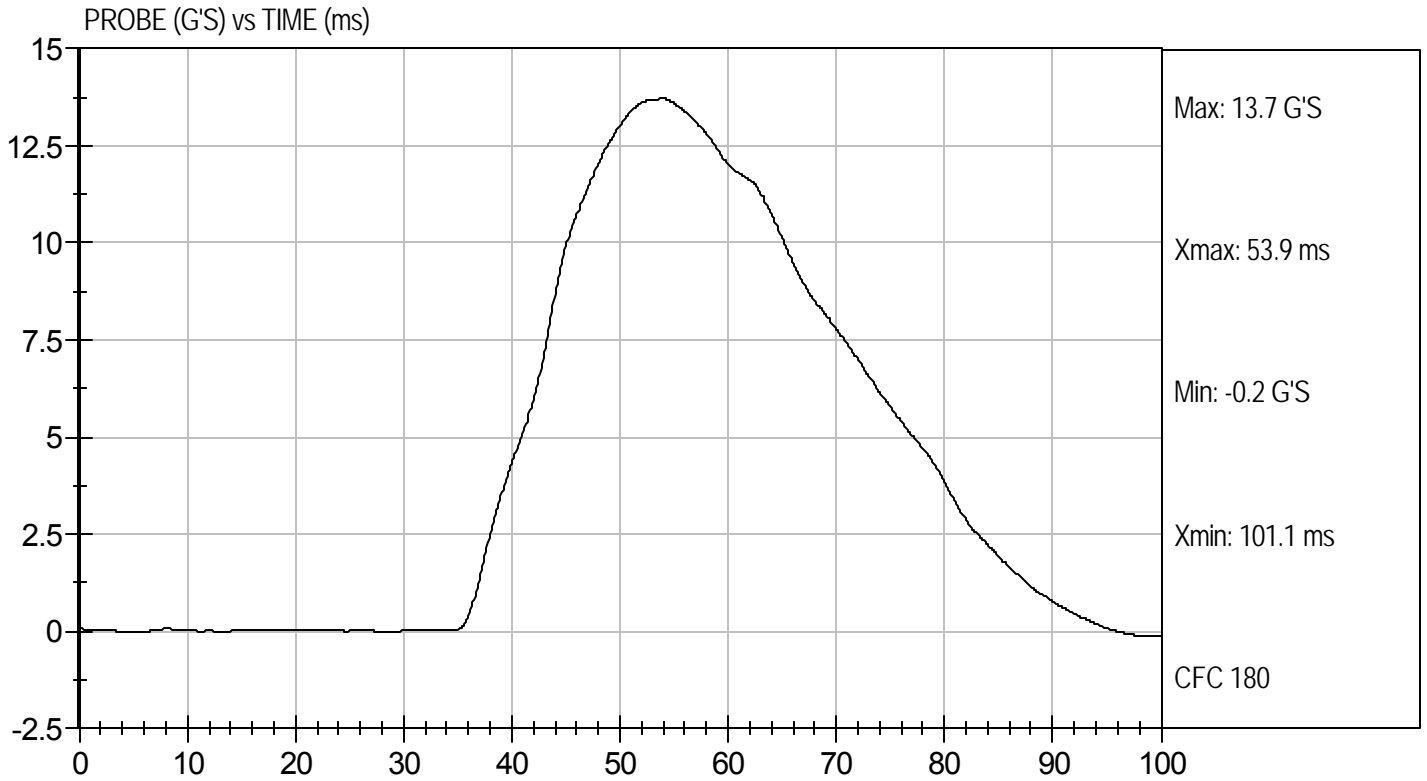
7/29/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Abdomen Impact  
Component ID: D102466

Test Date: 7/29/10  
Velocity: 14.1 ft/s, 4.30 m/s

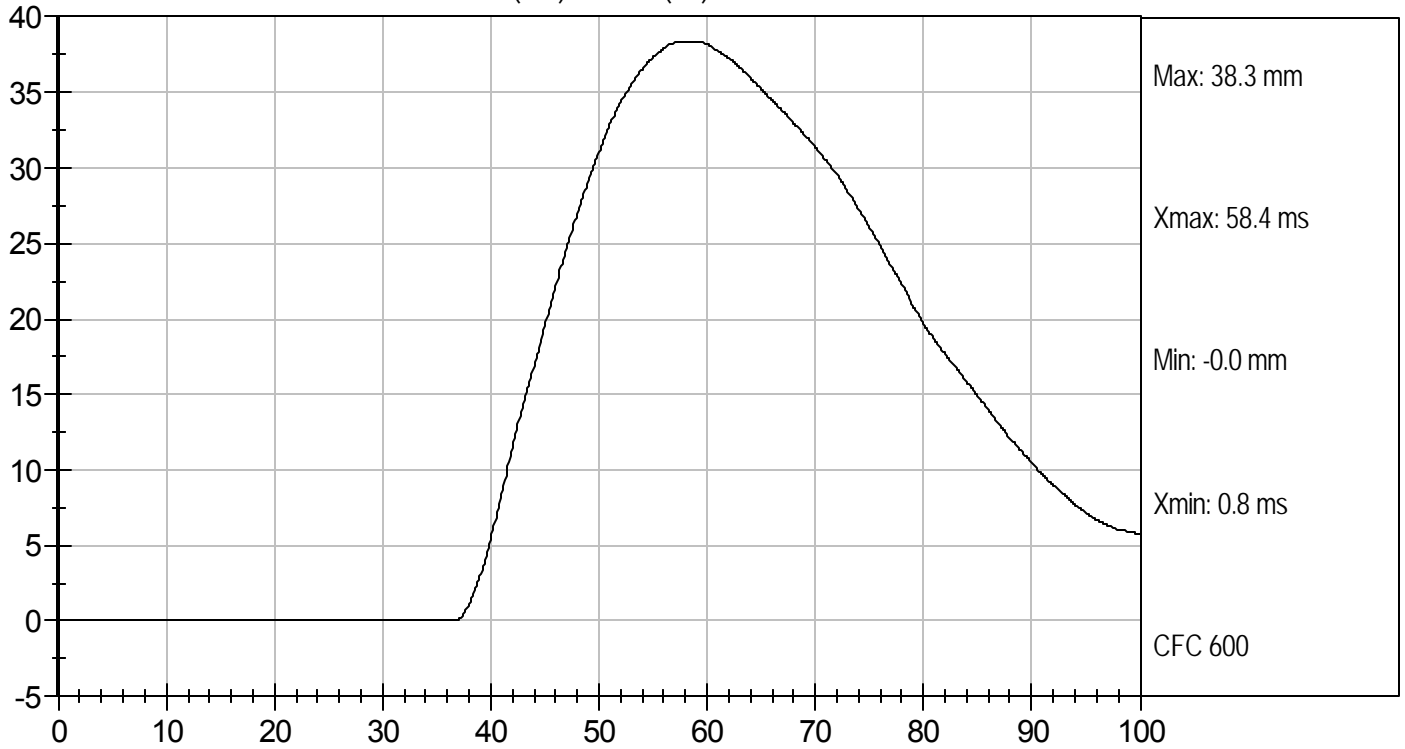




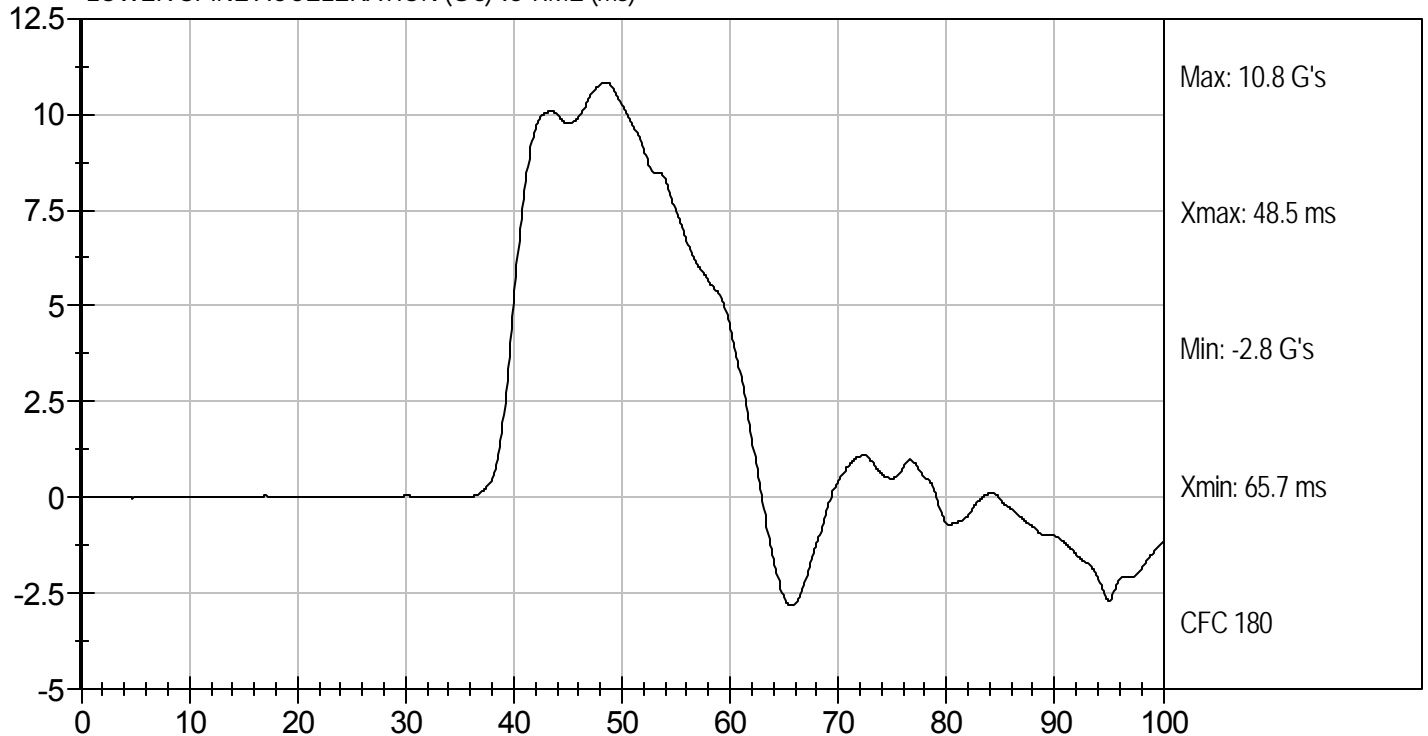
Test Desc: Abdomen Impact  
Component ID: D102466

Test Date: 7/29/10  
Velocity: 14.1 ft/s, 4.30 m/s

LOWER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER SPINE ACCELERATION (G's) vs TIME (ms)



**MGA RESEARCH CORPORATION**  
**PELVIS IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

ATD Serial No: 296

Test I.D: D102467

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	48	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Peak Impactor Acceleration	G's	38 to 47	42	Pass
Pelvis Y Acceleration after 6 ms	G's	34 to 42	39	Pass
Peak Acetabulum Force	N	3600 to 4300	4050	Pass
Overall Test Results				Pass

Jessica Gall  
Laboratory Technician

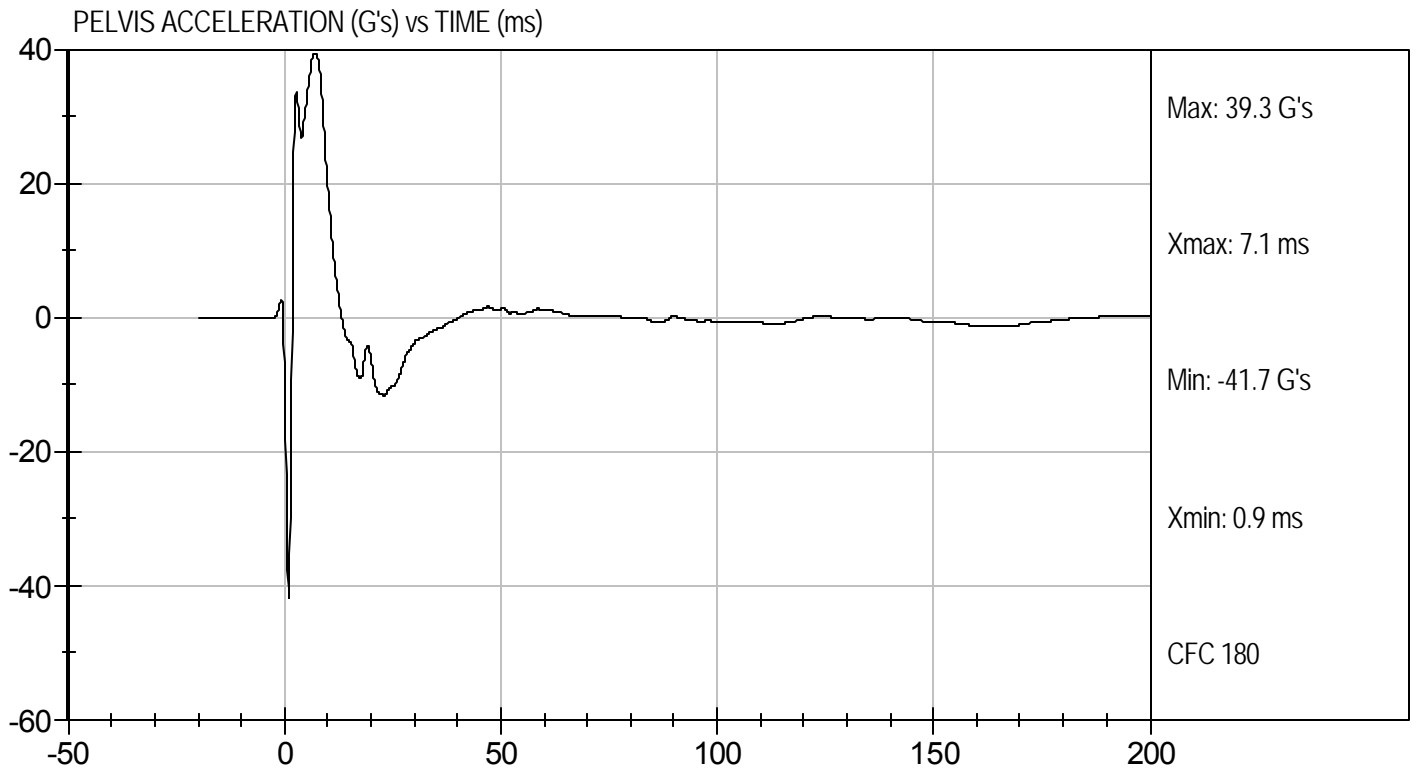
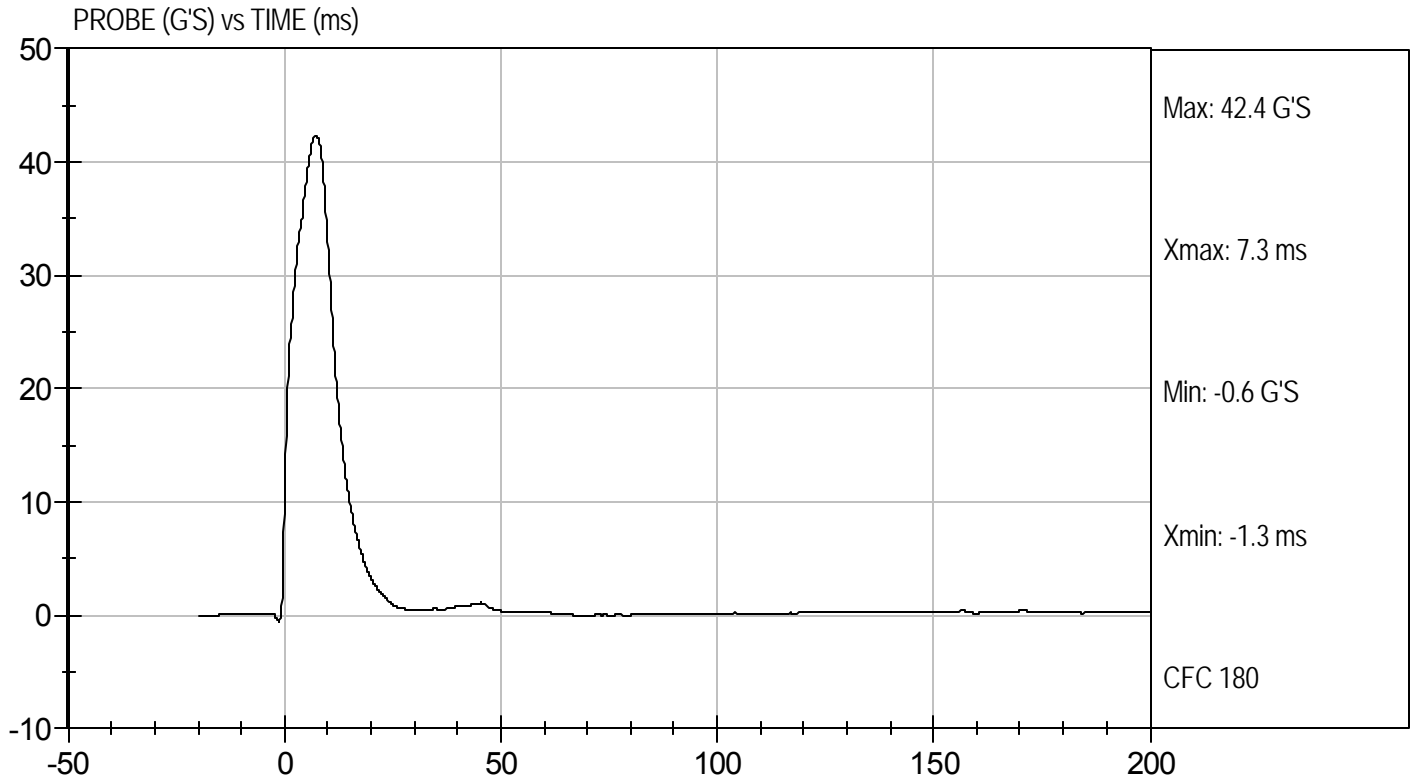
7/29/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Pelvis Impact  
Component ID: D102467

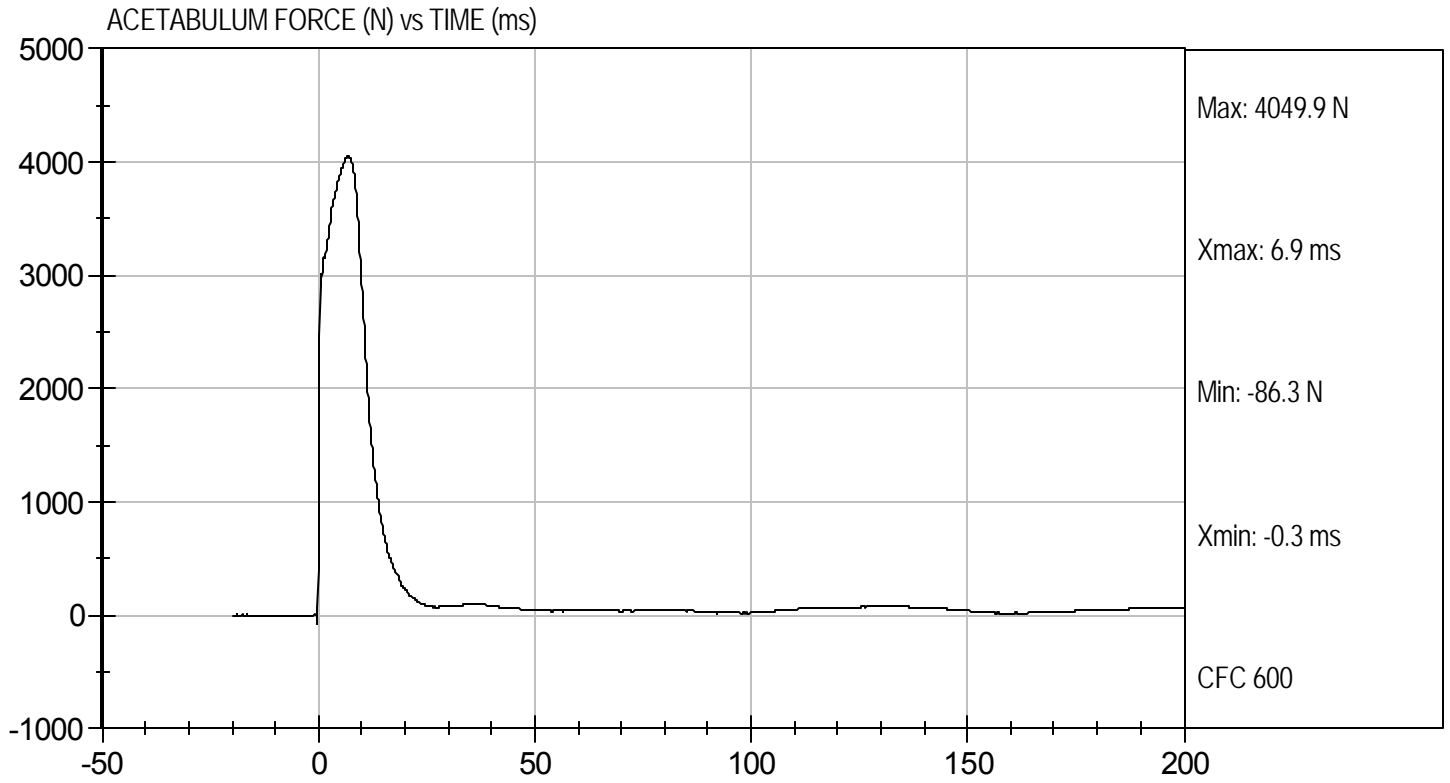
Test Date: 7/29/10  
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Pelvis Impact  
Component ID: D102467

Test Date: 7/29/10  
Velocity: 22.22 ft/s, 6.77 m/s



**MGA RESEARCH CORPORATION**  
**ILIAC IMPACT TEST**  
**SID-IIs BUILD LEVEL D DUMMY**

ATD Serial No: 296

Test I.D: D102468

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.9	Pass
Humidity	%	10 to 70	47	Pass
Impact Velocity	m/s	4.20 to 4.40	4.33	Pass
Peak Impactor Acceleration	G's	36 to 45	37	Pass
Pelvis Y Acceleration	G's	28 to 39	33	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4388	Pass
			Overall Test Results	Pass

Jessica Hall  
Laboratory Technician

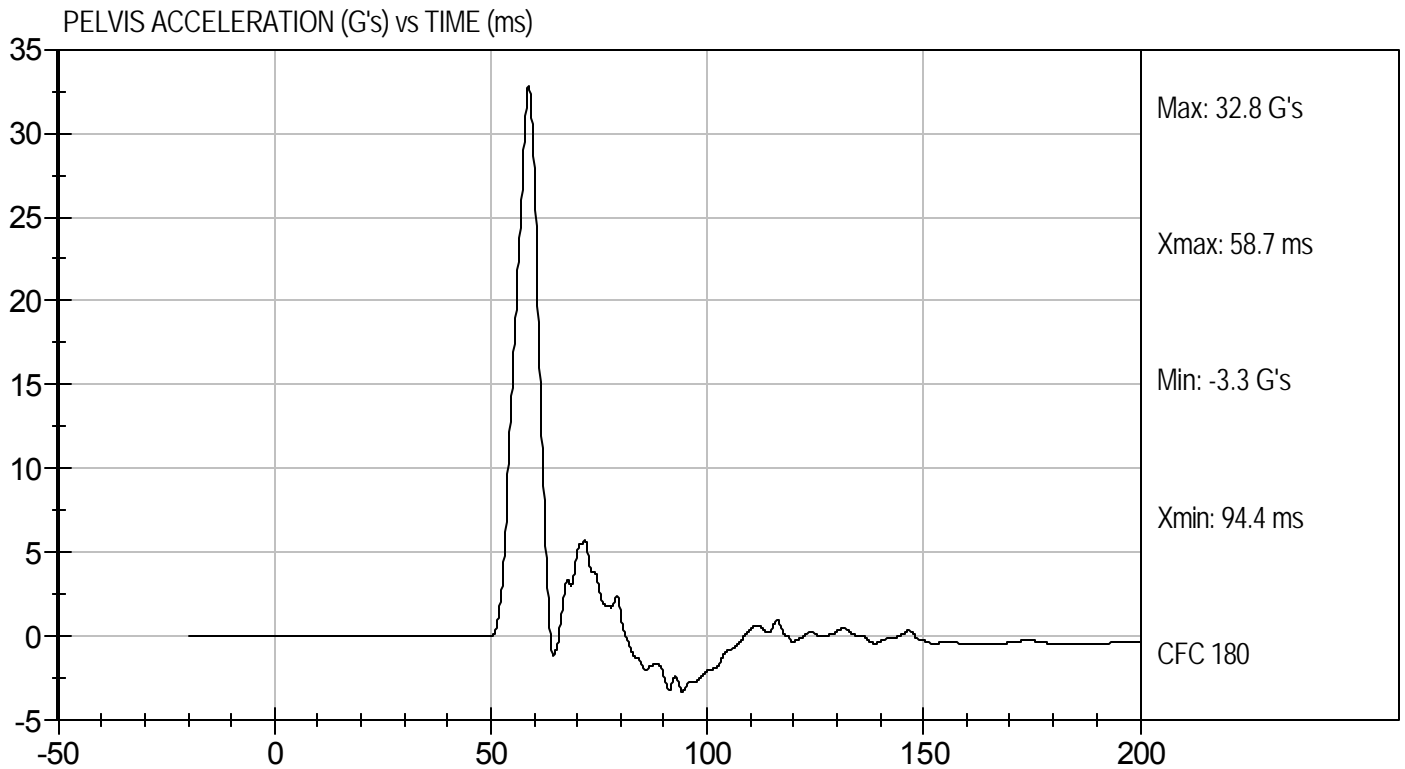
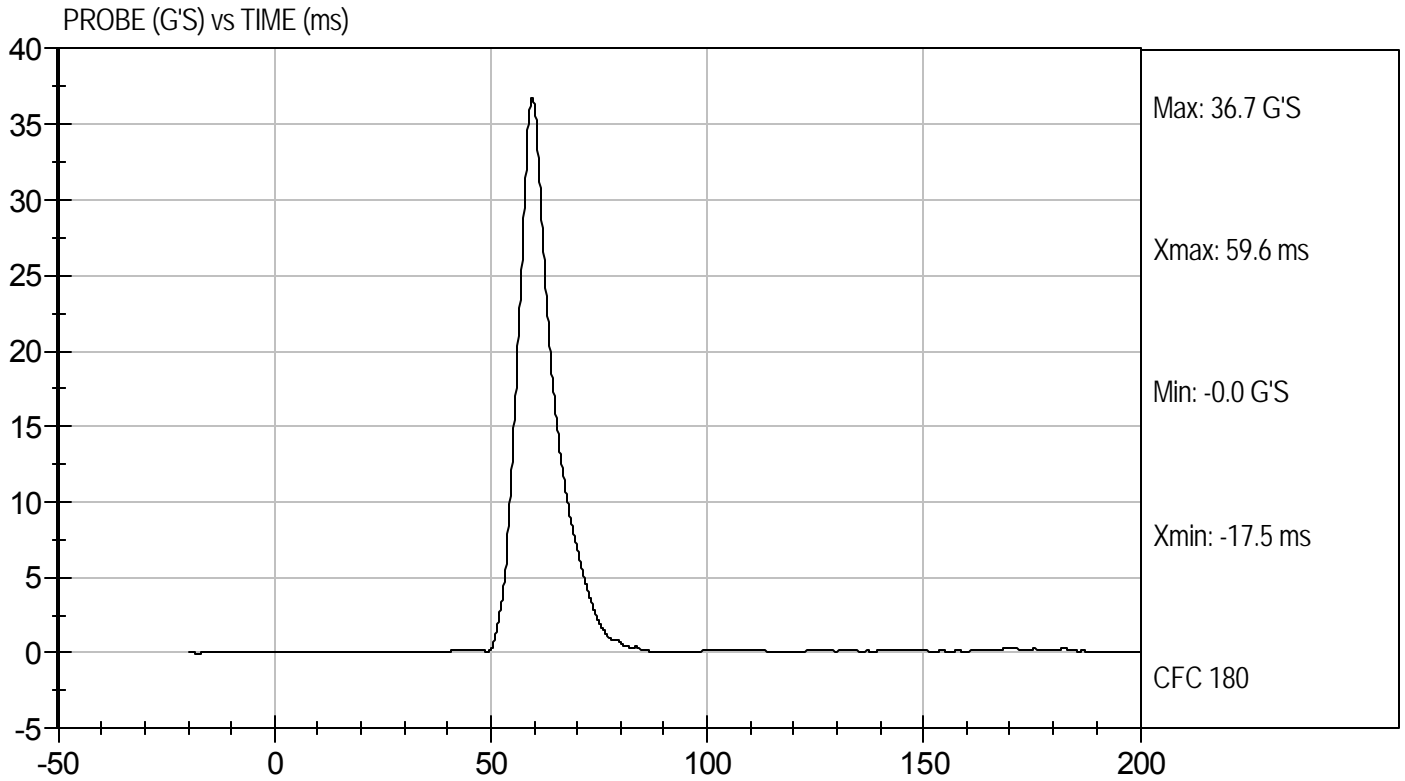
7/29/10  
Test Date

David Winkelbauer  
Approved By



Test Desc: Iliac Impact  
Component ID: D102468

Test Date: 7/29/10  
Velocity: 14.2 ft/s, 4.33 m/s





Test Desc: Iliac Impact  
Component ID: D102468

Test Date: 7/29/10  
Velocity: 14.2 ft/s, 4.33 m/s

