

REPORT NUMBER: SINCAP-MGA-2011-035

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

**HONDA OF CANADA MFG.
2011 Acura MDX AWD SUV
NHTSA No.: MB5316**

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



Test Date: October 27, 2010


Final Report Date: December 28, 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: December 28, 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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| 12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards 1200 New Jersey Ave, SE, Room W43-410 Washington, D.C. 20590 | | 14. Sponsoring Agency Code NVS-111 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 15. Supplementary Notes | | | | | | | | | | | | | | | | | | | | | | | | |
| 16. Abstract A 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2011 Acura MDX AWD SUV 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 October 27, 2010. The impact velocity of the Moving Deformable Barrier (MDB) was 62.3 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 222 mm at level 3. The test vehicle's performance was as follows: | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="text-align: left;">Measurement Description</th> <th colspan="3" style="text-align: center;">Driver ATD (ES-2re)</th> </tr> <tr> <th style="text-align: center;">Units</th> <th style="text-align: center;">Threshold</th> <th style="text-align: center;">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">1000</td> <td style="text-align: center;">50</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;">22</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;">650</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;">1201</td> </tr> </tbody> </table> | | | | Measurement Description | Driver ATD (ES-2re) | | | Units | Threshold | Result | Head Injury Criteria (HIC ₃₆) | N/A | 1000 | 50 | Maximum Thorax Rib Deflection | mm | 44 | 22 | Combined Abdominal Force | N | 2500 | 650 | Pubic Symphysis Force | N | 6000 | 1201 |
| Measurement Description | Driver ATD (ES-2re) | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Units | Threshold | Result | | | | | | | | | | | | | | | | | | | | | | | |
| Head Injury Criteria (HIC ₃₆) | N/A | 1000 | 50 | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Thorax Rib Deflection | mm | 44 | 22 | | | | | | | | | | | | | | | | | | | | | | | |
| Combined Abdominal Force | N | 2500 | 650 | | | | | | | | | | | | | | | | | | | | | | | |
| Pubic Symphysis Force | N | 6000 | 1201 | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="text-align: left;">Measurement Description</th> <th colspan="3" style="text-align: center;">Passenger ATD (SID-IIs)</th> </tr> <tr> <th style="text-align: center;">Units</th> <th style="text-align: center;">Threshold</th> <th style="text-align: center;">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">1000</td> <td style="text-align: center;">154</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;">36</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;">3127</td> </tr> </tbody> </table> | | | | Measurement Description | Passenger ATD (SID-IIs) | | | Units | Threshold | Result | Head Injury Criteria (HIC ₃₆) | N/A | 1000 | 154 | Lower Spine (T12) Resultant Acceleration | G | 82 | 36 | Total Pelvic Force (sum of acetabular and iliac forces) | N | 5525 | 3127 | | | | |
| Measurement Description | Passenger ATD (SID-IIs) | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Units | Threshold | Result | | | | | | | | | | | | | | | | | | | | | | | |
| Head Injury Criteria (HIC ₃₆) | N/A | 1000 | 154 | | | | | | | | | | | | | | | | | | | | | | | |
| Lower Spine (T12) Resultant Acceleration | G | 82 | 36 | | | | | | | | | | | | | | | | | | | | | | | |
| Total Pelvic Force (sum of acetabular and iliac forces) | N | 5525 | 3127 | | | | | | | | | | | | | | | | | | | | | | | |
| The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17. Key Words New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs | | 18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Adm. Technical Reference Division 1200 New Jersey Ave, SE Washington, D.C. 20590 | | | | | | | | | | | | | | | | | | | | | | | | |
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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 Acura MDX AWD SUV. 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 Acura MDX AWD SUV was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.3 km/h (38.7 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 October 27, 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 eleven (11) cameras. Camera locations are included in this report.

The dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)

Head CG Triaxial Accelerometers
Thorax Rib 1 to Rib 3 Displacement Potentiometers
Abdomen Forward, Middle, and Rear Load Cells
Lower Spine Triaxial Accelerometers
Pubic Load Cell

PASSENGER ATD (SID-IIs)

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

DUMMY INJURY VALUES

| Measurement Description | Driver ATD (ES-2re) | | |
|---|---------------------|-----------|--------|
| | Units | Threshold | Result |
| Head Injury Criteria (HIC ₃₆) | N/A | 1000 | 50 |
| Maximum Thorax Rib Deflection | mm | 44 | 22 |
| Combined Abdominal Force | N | 2500 | 650 |
| Pubic Symphysis Force | N | 6000 | 1201 |

| Measurement Description | Passenger ATD (SID-IIs) | | |
|---|-------------------------|-----------|--------|
| | Units | Threshold | Result |
| Head Injury Criteria (HIC ₃₆) | N/A | 1000 | 154 |
| Lower Spine (T12) Resultant Acceleration | G | 82 | 36 |
| Total Pelvic Force (sum of acetabular and iliac forces) | N | 5525 | 3127 |

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

| Restraint Type | Left Front (Driver) P1 | | Left Rear (Passenger) P4 | |
|--------------------------|------------------------|----------|--------------------------|----------|
| | Mounted | Deployed | Mounted | Deployed |
| Frontal Airbag | Yes | No | 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

GENERAL COMMENTS

There was no valid data collected for:

- Left Rear Sill Y
- Left Front Sill Y
- Left Lower B-Post Y after 10 msec.
- Left Mid B-Post Y after 10 msec.
- Left Lower A-Post Y after 40 msec.
- Left Mid A-Post Y after 10 msec.
- Driver Seat Track Y after 10 msec.

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 Acura MDX AWD SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5316
 Test Date: 10/27/2010

TEST VEHICLE INFORMATION AND OPTIONS

| | | | |
|---|-------------------|--------------------------------|-----|
| NHTSA No. | MB5316 | Anti-Lock Brakes | Yes |
| Model Year | 2011 | All Wheel Drive | Yes |
| Make | Acura | Power Steering | Yes |
| Model | MDX | Driver Front Airbag | Yes |
| Body Style | MPV | Driver Curtain Airbag | Yes |
| VIN | 2HNYD2H24BH503757 | Driver Head/Torso Airbag | No |
| Body Color | Grigio M. | Driver Torso Airbag | No |
| Delivery Date | 10/14/2010 | Driver Torso/Pelvis Airbag | Yes |
| Odometer (mi) | 106 | Driver Pelvis Airbag | No |
| Odometer (km) | 171 | Driver Knee Airbag | No |
| Dealer | Continental Acura | Rear Pass. Front Airbag | No |
| Transmission | Automatic | Rear Pass. Curtain Airbag | Yes |
| Final Drive | AWD | Rear Pass. Head/Torso Airbag | No |
| Type/No. Cylinders | 6 | Rear Pass. Torso Airbag | No |
| Engine Displacement (L) | 3.7 | Rear Pass. Torso/Pelvis Airbag | No |
| Engine Placement | Longitudinal | Rear Pass. Pelvis Airbag | No |
| Roof Rack | No | Rear Pass. Knee Airbag | No |
| Sunroof/T-Top | Yes | Pretensioners | Yes |
| Tinted Glass | Yes | Load Limiters | Yes |
| Traction Control | Yes | Automatic Door Locks | Yes |
| Power Brakes | Yes | Bucket Seats | Yes |
| Front Disc | Yes | Tilt Steering | Yes |
| Rear Disc | Yes | Power Seats | Yes |
| Does owner's manual provide instruction to turn off automatic door locks? | | | Yes |

DATA FROM CERTIFICATION LABEL

| | | | |
|---------------------|----------------------|-----------------|------|
| Manufactured By | Honda of Canada Mfg. | GVWR (kg) | 2700 |
| Date of Manufacture | 09/'10 | GAWR Front (kg) | 1310 |
| | | GAWR Rear (kg) | 1440 |

VEHICLE SEATING AND WEIGHT CAPACITY DATA

| Measured Parameter | Front | Rear | Third | Total | |
|-----------------------------------|-------|------|-------|-------|-------|
| Designated Seating Capacity (DSC) | 2 | 3 | 2 | 7 | |
| Capacity Weight (VCW) (kg) | | | | 525 | (A) |
| DSC x 68.04 (kg) | | | | 476 | (B) |
| Cargo Weight (RCLW) (kg) | | | | 49 | (A-B) |

VEHICLE SEAT TYPE

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

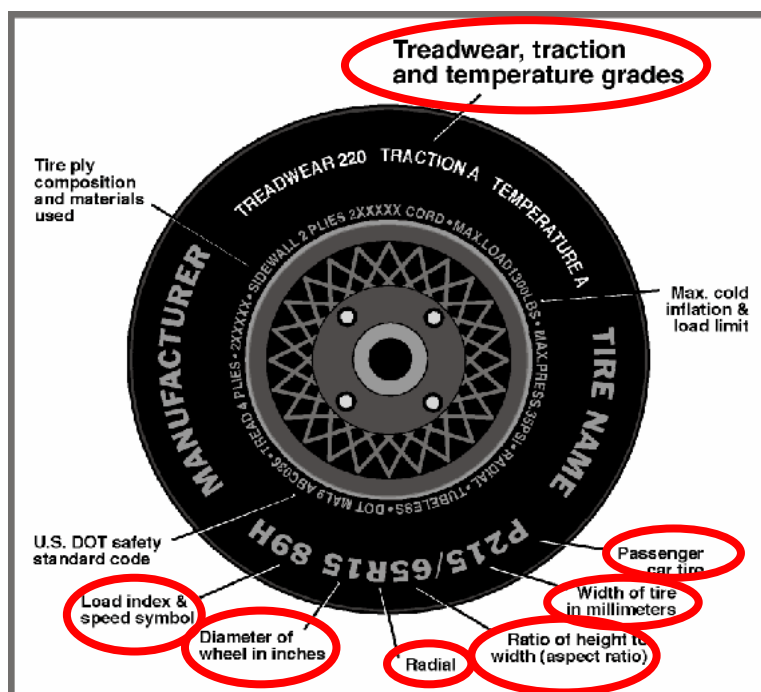
DATA SHEET NO. 1 (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5316
 Test Date: 10/27/2010

VEHICLE TIRE INFORMATION



DATA FROM TIRE PLACARD

| Measured Parameter | Front | Rear |
|-----------------------------|-------------|-------------|
| Maximum Tire Pressure (kPa) | 300 | 300 |
| Cold Pressure (kPa) | 220 | 220 |
| Recommended Tire Size | P255/55R18 | P255/55R18 |
| Tire Size on Vehicle | P255/55R18 | P255/55R18 |
| Tire Manufacturer | Bridgestone | Bridgestone |
| Tire Model | Dueler H/L | Dueler H/L |
| Treadwear | 400 | 400 |
| Traction | B | B |
| Temperature Grades | B | B |
| Tire Plies Sidewall | 2 | 2 |
| Tire Plies Body | 5 | 5 |
| Load Index & Speed Symbol | 104T | 104T |
| Tire Material | Rubber | Rubber |
| DOT Safety Code Right | OB7K 402 | OB7K 402 |
| DOT Safety Code Left | OB7K 402 | OB7K 402 |

DATA SHEET NO. 1 (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5316
 Test Date: 10/27/2010

TEST VEHICLE WEIGHTS

| | Units | As Delivered (UVW) | | | As Tested (ATW) | | | Fully Loaded | | |
|--------|-------|--------------------|-------|--------|-----------------|--------|--------|--------------|--------|--------|
| | | Front | Rear | Total | Front | Rear | Total | Front | Rear | Total |
| Left | kg | 578.3 | 465.4 | | 626.9 | 525.3 | | 620.1 | 543.4 | |
| Right | kg | 569.3 | 454.0 | | 587.8 | 495.3 | | 575.2 | 503.0 | |
| Ratio | % | 55.5 | 45.5 | | 54.3 | 45.7 | | 53.3 | 46.7 | |
| Totals | kg | 1147.6 | 919.4 | 2067.0 | 1214.7 | 1020.6 | 2235.3 | 1195.3 | 1046.4 | 2241.7 |

TARGET TEST WEIGHT CALCULATION

| Measured Parameter | Units | Value | |
|--|-------|--------|---------|
| Total Delivered Weight (UVW) | kg | 2067.0 | (A) |
| Sum of Actual Weight of 2 P572 ATDs Used | kg | 129.3 | (B) |
| Rated Cargo/Luggage Weight (RCLW) | kg | 49 | (C) |
| Calculated Target Vehicle Test Weight (TVTW) | kg | 2245.3 | (A+B+C) |

TEST VEHICLE ATTITUDES AND CG

| | Units | LF | RF | LR | RR | CG (aft of front axle) |
|--|-------|-----|-----|-----|-----|------------------------|
| Fully Loaded | mm | 803 | 808 | 807 | 819 | |
| As Tested (Fully Loaded \pm 10mm at each wheel well) | mm | 802 | 809 | 816 | 820 | 1258 |

GENERAL TEST VEHICLE DATA

| Measurement Description | Units | Value |
|---|-------|-------|
| Total Vehicle Wheel Base | mm | 2756 |
| Total Vehicle Length at Left Side | mm | 3685 |
| Total Vehicle Length at Centerline | mm | 4878 |
| Total Vehicle Length at Right Side | mm | 3685 |
| Weight of Ballast in Cargo Area | kg | 27.2 |
| Weight of Vehicle Components Removed | kg | 47.2 |
| Amount of Stoddard Solvent in Fuel Tank | L | 73.9 |

Vehicle components removed to meet target vehicle test weight: Third row seats, rear floor mats, right tail light, passenger window trim, radiator plastic cover, splash guards, passenger mirror, trunk compartment, jack & tools.

TEST VEHICLE VERTICAL IMPACT POINT DATA

| Measurement Description | Units | Value |
|---------------------------------------|-------|-------|
| Target Impact Point Aft of Front Axle | mm | 438 |
| Actual Impact Point Aft of Front Axle | mm | 447 |

DATA SHEET NO. 2

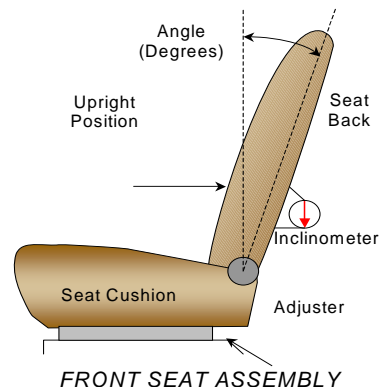
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5316
 Test Date: 10/27/2010

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, set seat back at 12.7° on the outboard headrest post guide. The left rear passenger seat back was fixed.



SEAT BACK ANGLES

| | Degrees |
|-----------------------------|---------------------------------------|
| Driver with Seated Dummy | 12.9° on outboard headrest post guide |
| Passenger with Seated Dummy | 1.4° on outboard headrest post guide |

SEAT FORE/AFT POSITIONS

| | Total Fore/Aft Travel | Placed in Position # |
|-------------|-----------------------|----------------------------|
| Driver Seat | 240 mm | 120 mm (forward-most as 0) |
| Rear Seat | Fixed | Fixed |

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. The left rear passenger seat track was fixed.

SEAT BELT UPPER ANCHORAGES

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

Describe method: The driver seat anchorage was set in the uppermost position. The left rear passenger seat anchorage was fixed.

DATA SHEET NO. 2 (CONTINUED)

SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5316
 Test Date: 10/27/2010

FUEL TANK CAPACITY DATA

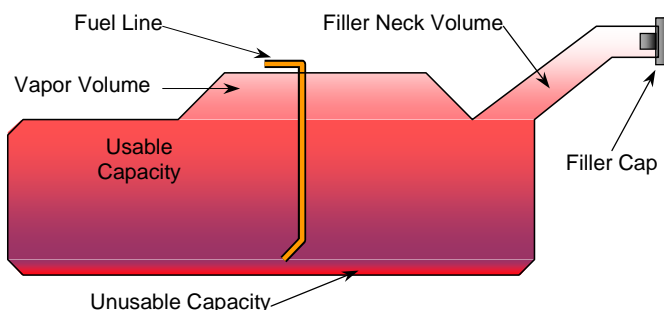
| | Liters |
|------------------------------------|--------------|
| Usable Capacity of "Standard Tank" | 79.5 |
| Usable Capacity of "Optional" Tank | |
| Usable Capacity Used for FMVSS 301 | 73.1 to 74.7 |
| Actual Amount of Solvent used | 73.9 |

FUEL PUMP

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. 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.

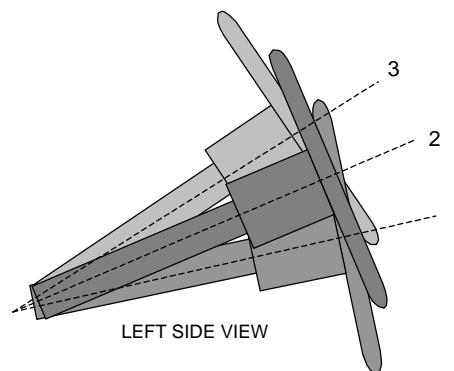
The fuel pipe is on the left side.



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.



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITION

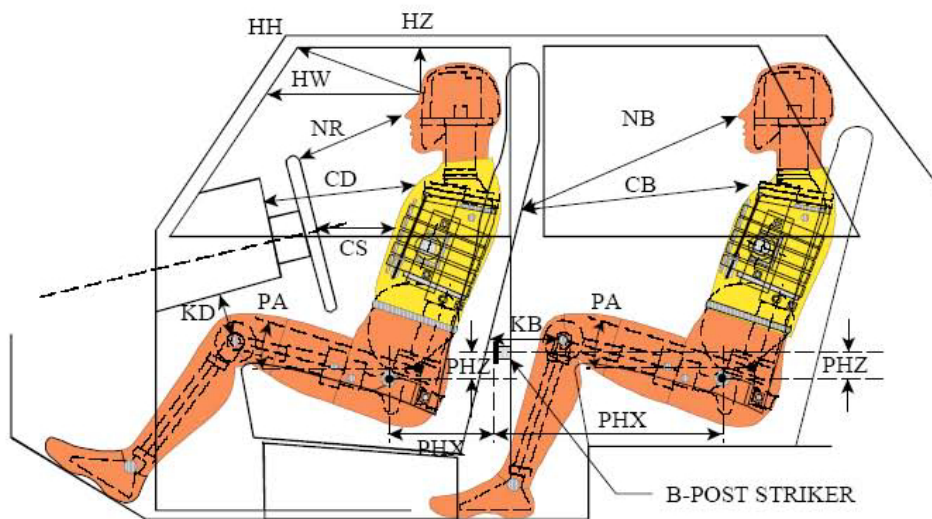
| | Detent | Fore/Aft Position (mm) |
|-----------------------------------|--------|------------------------|
| Lowermost - Position 1 | 69.6 | 212 |
| Geometric Center – Position 2 | 67.1 | 192 |
| Uppermost – Position 3 | 64.6 | 172 |
| Telescoping Steering Wheel Travel | | 40 |
| Test Position | 67.1 | 192 |

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5316
 Test Date: 10/27/2010



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

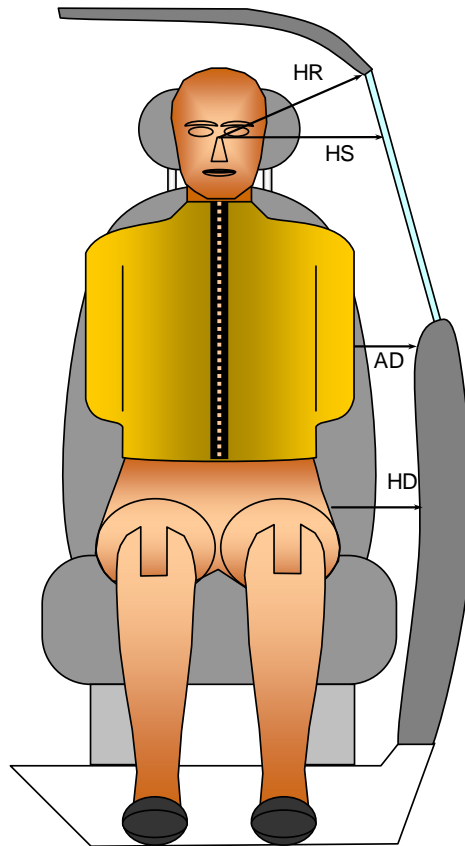
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

| Driver Code | Pass. Code | Measurement Description | Driver S/N 032 | | Passenger S/N 306 | |
|-------------|------------|------------------------------|----------------|----------|-------------------|----------|
| | | | Length (mm) | Angle(°) | Length (mm) | Angle(°) |
| HH | | Head to Header | 431 | 21.0 | | |
| HW | | Head to Windshield | 710 | 0 | | |
| HZ | HZ | Head to Roof | 212 | 90 | 262 | 90 |
| NR | NB | Nose to Rim/Seat Back | 465 | 12.3 | 511 | 19.7 |
| CD | CB | Chest to Dash/Seat Back | 586 | 8.7 | 491 | 10.1 |
| CS | | Chest to Steering Wheel | 365 | 2.6 | | |
| KDL | KBL | Left Knee to Dash/Seat Back | 164 | 35.1 | 284 | 11.6 |
| KDR | KBR | Right Knee to Dash/Seat Back | 148 | 29.7 | 289 | 6.7 |
| PA | PA | Pelvic Angle | | 28.5 | | 18.3 |
| PHX | PHX | H-Point to Striker (X-Axis) | 210 | 0 | 334 | 0 |
| PHZ | PHZ | H-Point to Striker (Z-Axis) | 140 | 90 | 196 | 90 |
| SA | SA | Seat Back Angle | | 13.1 | | Fixed |

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5316
 Test Date: 10/27/2010



FRONT VIEW OF DUMMY

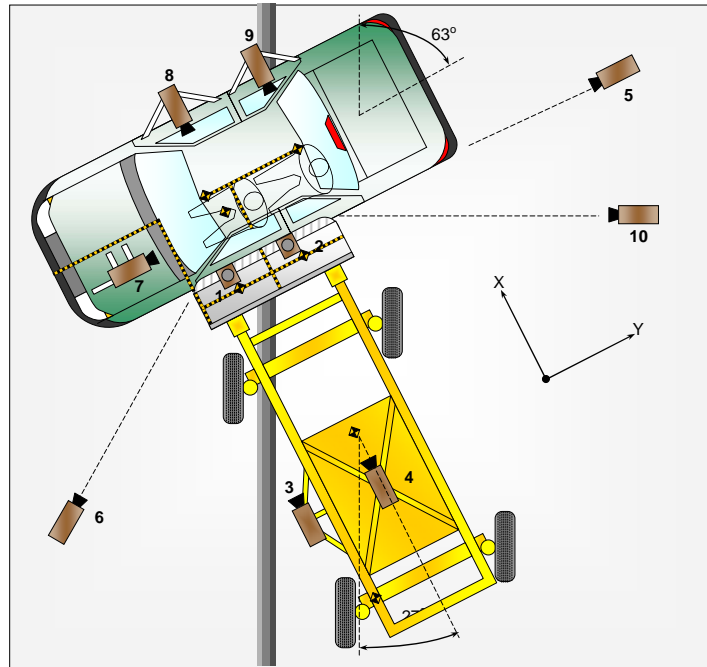
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

| Code | Measurement Description | Units | Driver S/N 032 | Passenger S/N 306 |
|------|-------------------------|-------|----------------|-------------------|
| HR | Head to Side Header | mm | 221 | 255 |
| HS | Head to Side Window | mm | 351 | 356 |
| AD | Arm to Door | mm | 116 | 182 |
| HD | H-Point to Door | mm | 149 | 174 |

DATA SHEET NO. 5
CAMERA LOCATIONS AND DATA

Test Vehicle: 2011 Acura MDX AWD SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5316
Test Date: 10/27/2010



CAMERA LOCATIONS AND DATA

| No. | Camera View | Coordinates (mm) | | | Angle | Lens (mm) | Film Speed (fps) |
|-----|-------------------------|------------------|-------|-------|-------|-----------|------------------|
| | | X* | Y* | Z* | | | |
| 1 | Overhead Overall | -870 | 0 | -5050 | 87.8 | 14 | 1000 |
| 2 | Overhead Close-up | 640 | 1160 | -5050 | 81.6 | 50 | 1000 |
| 3 | Left Impact Point (MDB) | | | | | 50 | 1000 |
| 4 | Side Overall (MDB) | | | | | 16 | 1000 |
| 5 | Rear | -3020 | 5230 | -1250 | 6.0 | 24 | 1000 |
| 6 | Left Front | 3450 | -4210 | -1290 | 6.2 | 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 |

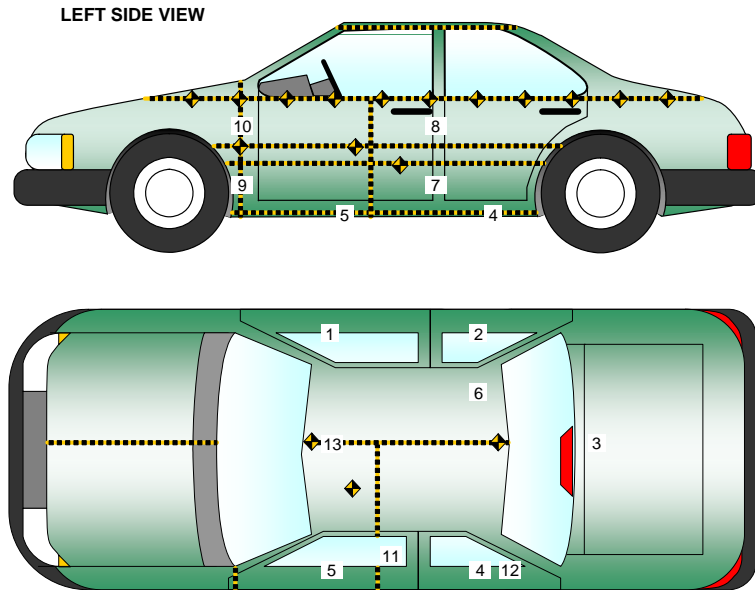
Reference: Impact Point projected to Ground
+X = To Front of MDB, +Y = To Right of MDB, +Z = Down

* All measurements accurate to ± 6 mm

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

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5316
 Test Date: 10/27/2010



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

| Accelerometer Location | | | | |
|------------------------|------------------------------|------------------|------|-----|
| No. | ID | Coordinates (mm) | | |
| | | X | Y | Z |
| 1 | Right Sill at Front Seat | 2895 | 795 | 340 |
| 2 | Right Sill at Rear Seat | 1799 | 790 | 355 |
| 3 | Rear Floorpan Above Axle | 1019 | 0 | 540 |
| 4 | Left Sill at Rear Door | 1844 | -790 | 360 |
| 5 | Left Sill at Front Door | 2756 | -790 | 345 |
| 6 | Rt. Rear Occ. Compartment | 2045 | -464 | 480 |
| 7 | Left Lower B-Post | 2217 | -763 | 748 |
| 8 | Left Middle B-Post | 2225 | -765 | 950 |
| 9 | Left Lower A-Post | 3275 | -778 | 725 |
| 10 | Left Middle A-Post | 3336 | -870 | 905 |
| 11 | Front Seat Track | 2387 | -605 | 705 |
| 12 | Rear Seat Track or Structure | | | |
| 13 | Vehicle CG | 2534 | 0 | 365 |

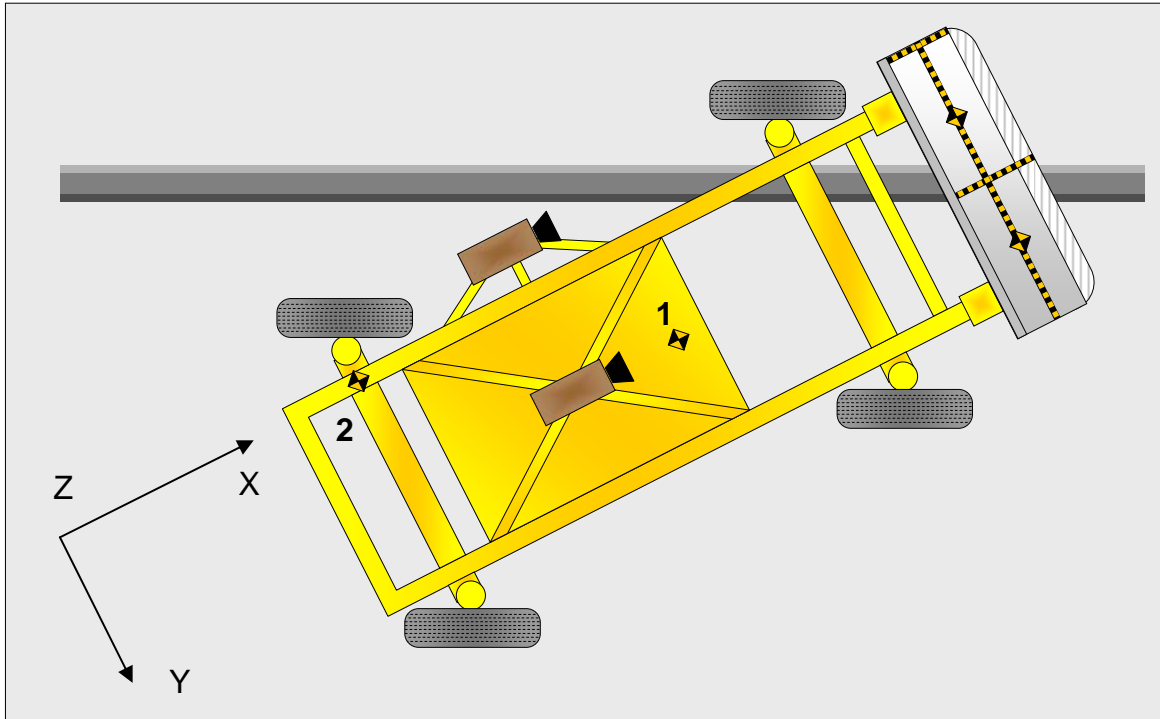
Reference: X – Rear Surface of Vehicle (+ forward)
 Y - Vehicle Centerline (+ to right)
 Z - Ground Plane (+ up)

DATA SHEET NO. 7

MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5316
 Test Date: 10/27/2010



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 (+ down)

DATA SHEET NO. 8

TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2011 Acura MDX AWD SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5316
Test Date: 10/27/2010

MAXIMUM EXTERIOR STATIC CRUSH

| Level | Measurement Description | Units | Maximum Crush | Above Ground |
|-------|-------------------------|-------|---------------|--------------|
| 1 | Sill Top Height | mm | 141 | 370 |
| 2 | Occupant H-Point | mm | 220 | 720 |
| 3 | Mid Door | mm | 222 | 750 |
| 4 | Window Sill | mm | 114 | 1090 |
| 5 | Window Top | mm | 16 | 1615 |
| | Maximum Penetration | mm | 222 | |

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 |
| 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 Acura MDX AWD SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5316
 Test Date: 10/27/2010

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 | 62.3 |
| Trap No. 2 Velocity (Redundant) | km/h | 61.1 to 62.7 | 62.4 |
| 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 | 233 |
| B | Top of Bumper | 533 | 800 | Right | 198 |
| C | Mid-Level | 686 | 800 | Left | 153 |
| D | Top of Stack | 813 | 800 | Left | 187 |

MDB INSTRUMENTATION AND CAMERAS

| | |
|--------------------|---|
| Accelerometers | 5 |
| Contact Switches | 2 |
| High-Speed Cameras | 2 |

DATA SHEET NO. 10

POST-TEST OBSERVATIONS

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5316
 Test Date: 10/27/2010

TEST DUMMY INFORMATION AND CONTACT

| Description | Driver (ES-2re) | Passenger (SID-IIs) |
|-------------------------|--------------------------|--------------------------|
| Dummy Type / Serial No. | ES-2re / 032 | SID-IIs / 306 |
| Head Contact | Curtain Airbag, Headrest | Curtain Airbag, Headrest |
| Upper Torso Contact | Torso Airbag | Door Panel |
| Lower Torso Contact | Torso 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 | Left Rear Broke |
| 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 | No | 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

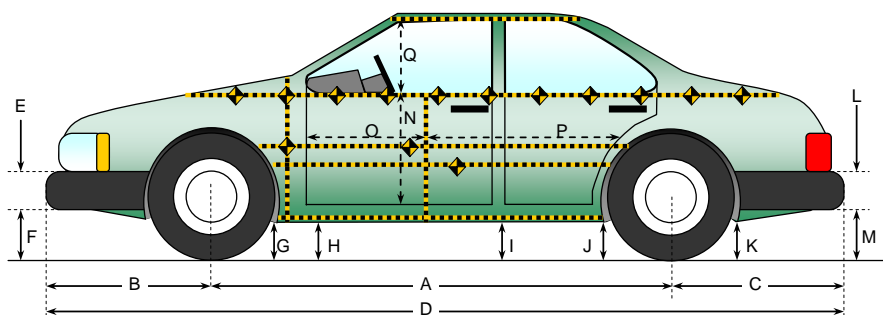
| Measured Parameter | Units | Requirement | Value |
|--------------------|-------|-------------|------------|
| Horizontal Offset | mm | +/- 50 | 9 rearward |
| Vertical Offset | mm | +/-20 | 13 down |

DATA SHEET NO. 11

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5316
 Test Date: 10/27/2010



All measurements in (mm) with tolerance of ± 3 mm

LEFT SIDE VIEW

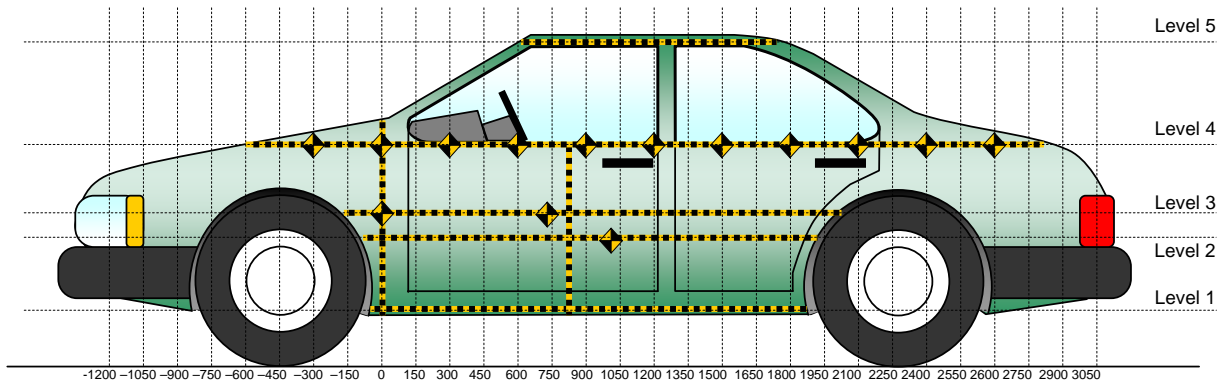
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

| Code | Measurement Description | Pre-Test | Post-Test | Difference |
|------|--|----------|-----------|------------|
| A | Wheelbase | 2756 | 2730 | 26 |
| B | Front Axle to FSOV | 1016 | 1010 | 6 |
| C | Rear Axle to RSOV | 1106 | 1112 | -6 |
| D | Total Length at Centerline | 4878 | 4852 | 26 |
| E | Front Bumper Thickness | 105 | 105 | 0 |
| F | Front Bumper Bottom to Ground | 311 | 319 | -8 |
| G | Sill Height at Front Wheel Well | 309 | 299 | 10 |
| H | Sill Height at Front Door Leading Edge | 309 | 296 | 13 |
| I | Sill Height at B Pillar | 307 | 288 | 19 |
| J1 | Sill Height at Rear Wheel Well | 313 | 334 | -21 |
| J2 | Pinch Weld Height at Rear Wheel Well | 311 | 325 | -14 |
| K | Sill Height Aft of Rear Wheel Well | 290 | 310 | -20 |
| L | Rear Bumper Thickness | 125 | 125 | 0 |
| M | Rear Bumper Bottom to Ground | 399 | 400 | -1 |
| N | Sill Height to Window Bottom Sill | 823 | 776 | 47 |
| O | Front Door Leading Edge to Impact CL | 810 | 770 | 40 |
| P | Rear Door Trailing Edge to Impact CL | 1185 | 1113 | 72 |
| Q | Front Window Opening | 475 | 468 | 7 |
| R | Right Side Length | 3685 | 3688 | -3 |
| S | Left Side Length | 3685 | 3660 | 25 |
| T | Vehicle Width at B Post | 1973 | 1817 | 156 |

DATA SHEET NO. 12
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5316
 Test Date: 10/27/2010



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 | 370 |
| 2 | Occupant H-Point | 720 |
| 3 | Mid-Door | 750 |
| 4 | Window Sill | 1090 |
| 5 | Window Top | 1615 |

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

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5316
 Test Date: 10/27/2010

| | Pre-Test | | | | | Post-Test | | | | | Difference | | | | |
|------|----------|-----|-----|-----|-----|-----------|-----|-----|-----|-----|------------|-----|-----|-----|----|
| | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| -900 | | | | 343 | | | | | 342 | | | | | -1 | |
| -750 | | | | 313 | | | | | 316 | | | | | 3 | |
| -600 | | | | 284 | | | | | 297 | | | | | 13 | |
| -450 | | | | 271 | | | | | 278 | | | | | 7 | |
| -300 | | | | 253 | | | | | 263 | | | | | 10 | |
| -150 | | 109 | 112 | 237 | | | 122 | 128 | 249 | | | 13 | 16 | 12 | |
| 0 | | 122 | 126 | 225 | | | 133 | 140 | 238 | | | 11 | 14 | 13 | |
| 150 | 180 | 127 | 127 | 214 | | 260 | 268 | 263 | 222 | | 80 | 141 | 136 | 8 | |
| 300 | 194 | 125 | 124 | 204 | | 262 | 319 | 317 | 216 | | 68 | 194 | 193 | 12 | |
| 450 | 196 | 122 | 120 | 197 | | 298 | 333 | 332 | 218 | | 102 | 211 | 212 | 21 | |
| 600 | 195 | 120 | 118 | 189 | 430 | 302 | 340 | 340 | 229 | 434 | 107 | 220 | 222 | 45 | 4 |
| 750 | 195 | 119 | 118 | 185 | 418 | 302 | 339 | 340 | 224 | 423 | 107 | 220 | 222 | 39 | 5 |
| 900 | 197 | 118 | 116 | 181 | 420 | 304 | 330 | 333 | 222 | 425 | 107 | 212 | 217 | 41 | 5 |
| 1050 | 197 | 118 | 117 | 176 | 420 | 304 | 312 | 308 | 228 | 433 | 107 | 194 | 191 | 52 | 13 |
| 1200 | 199 | 121 | 119 | 175 | 424 | 340 | 324 | 328 | 253 | 440 | 141 | 203 | 209 | 78 | 16 |
| 1350 | 200 | 123 | 121 | 175 | 425 | 337 | 332 | 340 | 270 | 438 | 137 | 209 | 219 | 95 | 13 |
| 1500 | 199 | 125 | 123 | 175 | 427 | 328 | 323 | 334 | 289 | 440 | 129 | 198 | 211 | 114 | 13 |
| 1650 | 199 | 127 | 126 | 176 | 427 | 334 | 303 | 319 | 260 | 438 | 135 | 176 | 193 | 84 | 11 |
| 1800 | 183 | 128 | 127 | 179 | 431 | 300 | 276 | 283 | 219 | 435 | 117 | 148 | 156 | 40 | 4 |
| 1950 | | 111 | 113 | 188 | 437 | | 183 | 182 | 203 | 441 | | 72 | 69 | 15 | 4 |
| 2100 | | | | 185 | 446 | | | | 198 | 450 | | | | 13 | 4 |
| 2250 | | | | 190 | 455 | | | | 220 | 462 | | | | 30 | 7 |
| 2400 | | | | 195 | 464 | | | | 212 | 468 | | | | 17 | 4 |
| 2550 | | | | 205 | 478 | | | | 219 | 480 | | | | 14 | 2 |
| 2700 | | | | 215 | 494 | | | | 226 | 494 | | | | 10 | 0 |
| 2850 | | | | 230 | | | | | 235 | | | | | 5 | |

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

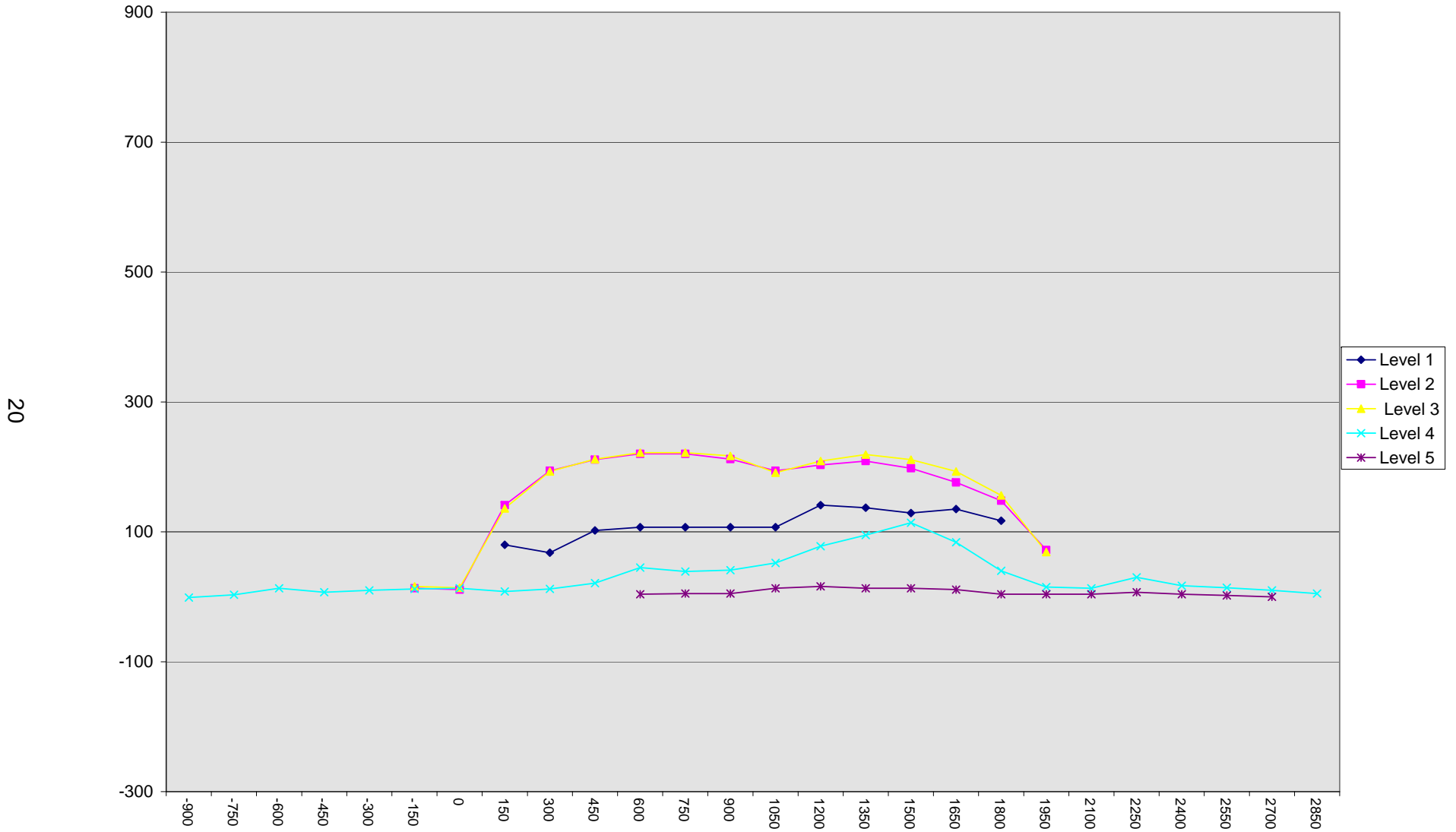
| | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---------------------------|---------|---------|---------|---------|---------|
| Maximum Crush (mm) | 141 | 220 | 222 | 114 | 16 |
| Distance From Impact (mm) | 1200 | 750 | 750 | 1500 | 1200 |

DATA SHEET NO. 12 (continued)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Acura MDX AWD SUV
Test Program: NCAP Side MDB Impact Test

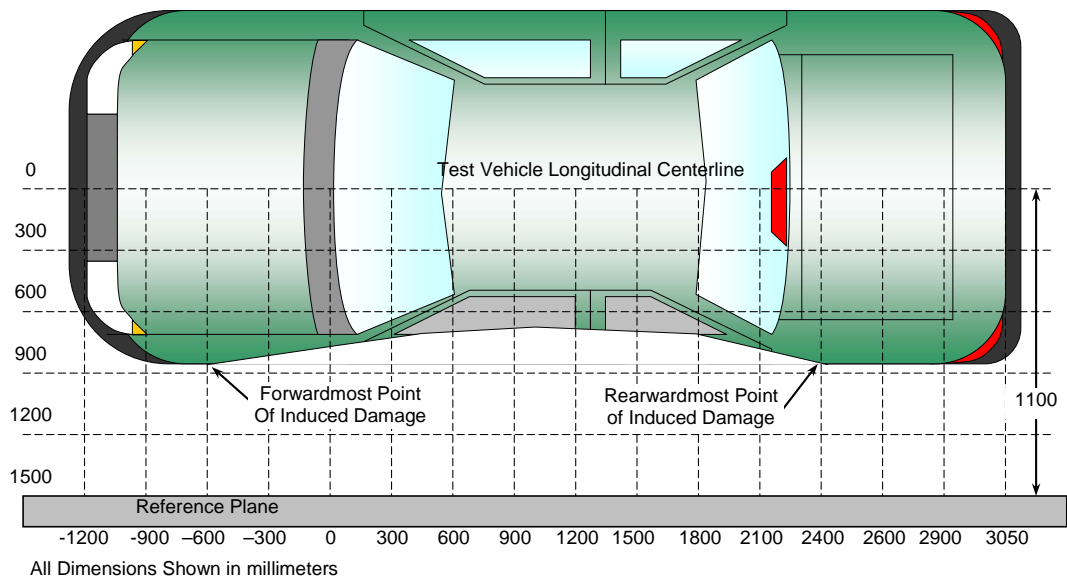
NHTSA No. MB5316
Test Date: 10/27/2010



DATA SHEET NO. 13
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5316
 Test Date: 10/27/2010



TOP VIEW

DAMAGE PROFILE DISTANCES

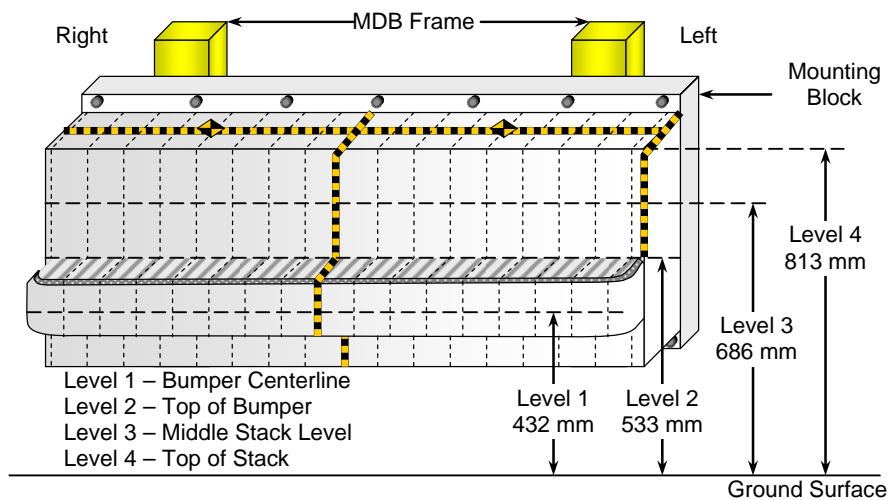
| DPD | Distance from Impact Point (mm) | Level | Pre-Test (mm) | Post-Test (mm) | Max. Static Crush (mm) |
|-----|---------------------------------|-------|---------------|----------------|------------------------|
| 1 | 2850 | 4 | 230 | 235 | 5 |
| 2 | 2095 | 4 | 185 | 198 | 13 |
| 3 | 1340 | 2 | 122 | 331 | 209 |
| 4 | 570 | 3 | 118 | 340 | 222 |
| 5 | -158 | 4 | 239 | 255 | 16 |
| 6 | -900 | 4 | 343 | 342 | -1 |

DATA SHEET NO. 14

EXTERIOR STATIC CRUSH FOR IMPACTOR FACE

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5316
 Test Date: 10/27/2010



FRONT VIEW

DEFORMABLE BARRIER STATIC CRUSH

| Stack Level | Distance Right of Center (mm) | | | | | | | | C _L | Distance Left of Center (mm) | | | | | | | |
|-------------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|----------------|------------------------------|-----|-----|-----|-----|-----|-----|-----|
| | 800 | 700 | 600 | 500 | 400 | 300 | 200 | 100 | | 0 | 100 | 200 | 300 | 400 | 500 | 600 | 700 |
| 4 | 137 | 117 | 93 | 83 | 87 | 92 | 126 | 124 | 119 | 97 | 100 | 119 | 117 | 121 | 130 | 149 | 187 |
| 3 | 147 | 129 | 127 | 113 | 107 | 105 | 126 | 137 | 124 | 112 | 105 | 110 | 100 | 105 | 111 | 126 | 153 |
| 2 | 198 | 194 | 180 | 164 | 142 | 130 | 125 | 128 | 119 | 129 | 139 | 143 | 149 | 151 | 157 | 164 | 175 |
| 1 | 230 | 229 | 223 | 217 | 202 | 195 | 194 | 195 | 195 | 197 | 199 | 200 | 202 | 208 | 217 | 227 | 233 |

DATA SHEET NO. 15

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

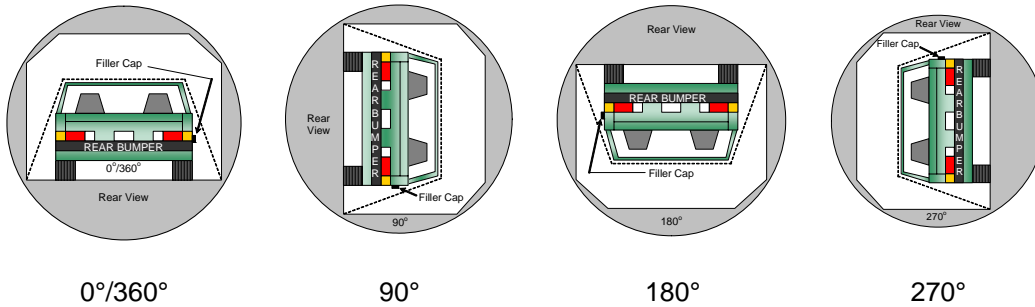
Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5316
 Test Date: 10/27/2010

Test Time: 11:05 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° | 109 | 300 | 409 |
| 90° to 180° | Incomplete | | |
| 180° to 270° | | | |
| 270° to 360° | | | |

FMVSS 301 ROLLOVER SPILLAGE TABLE (units in ounces)

| Test Phase | First 5 Minutes | Sixth Minute | Seventh Minute | Eight Minute |
|--------------|-----------------|--------------|----------------|--------------|
| 0° to 90° | 4.48 | 1.60 | 1.44 | 1.28 |
| 90° to 180° | 10.88 | | | |
| 180° to 270° | | | | |
| 270° to 360° | | | | |

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

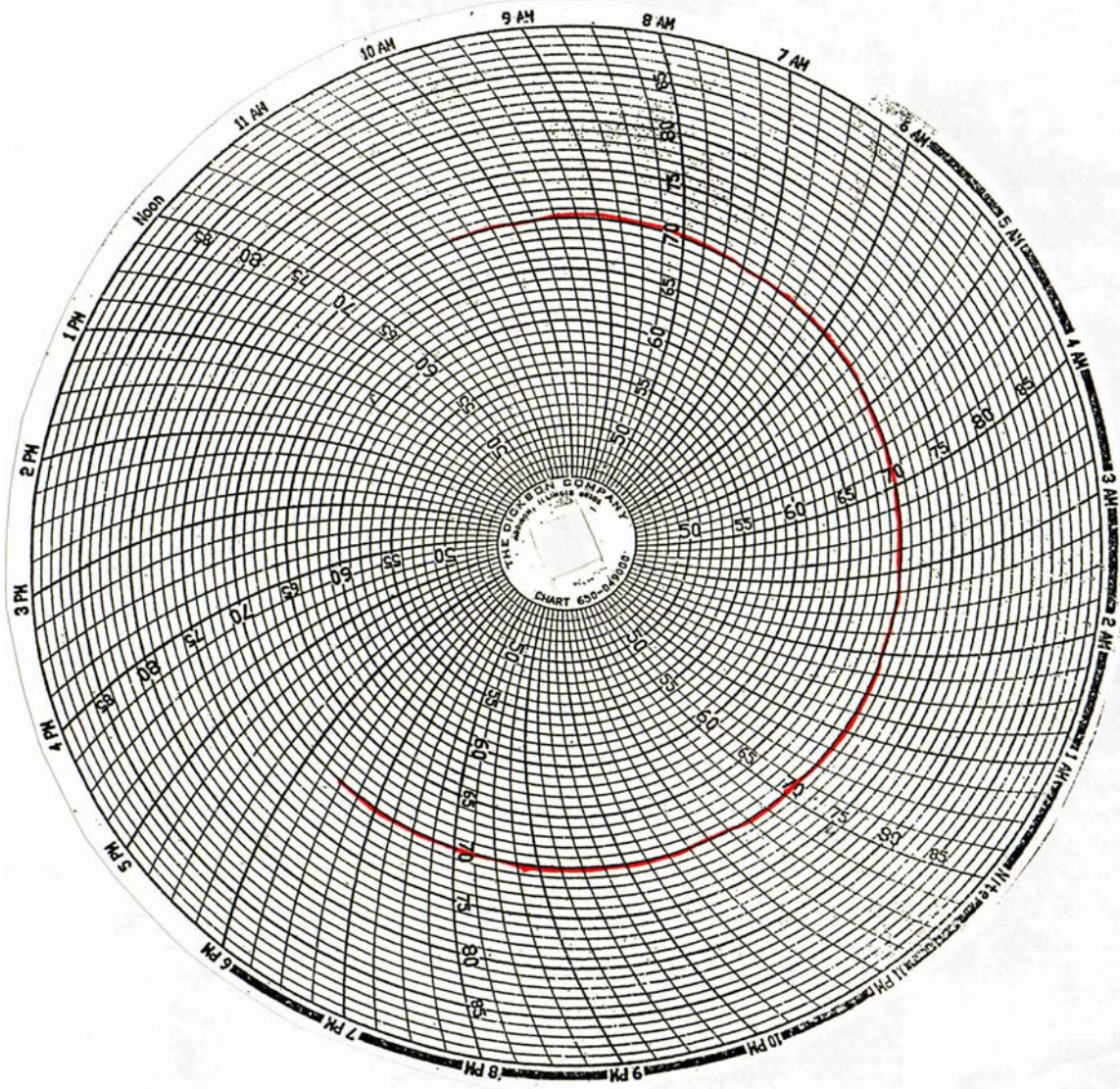
| Test Phase | Spillage Location |
|--------------|-------------------|
| 0° to 90° | Fuel Filler Cap |
| 90° to 180° | Fuel Filler Cap |
| 180° to 270° | |
| 270° to 360° | |

DATA SHEET NO. 16

DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2011 Acura MDX AWD SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. MB5316
Test Date: 10/27/2010



APPENDIX A
PHOTOGRAPHS

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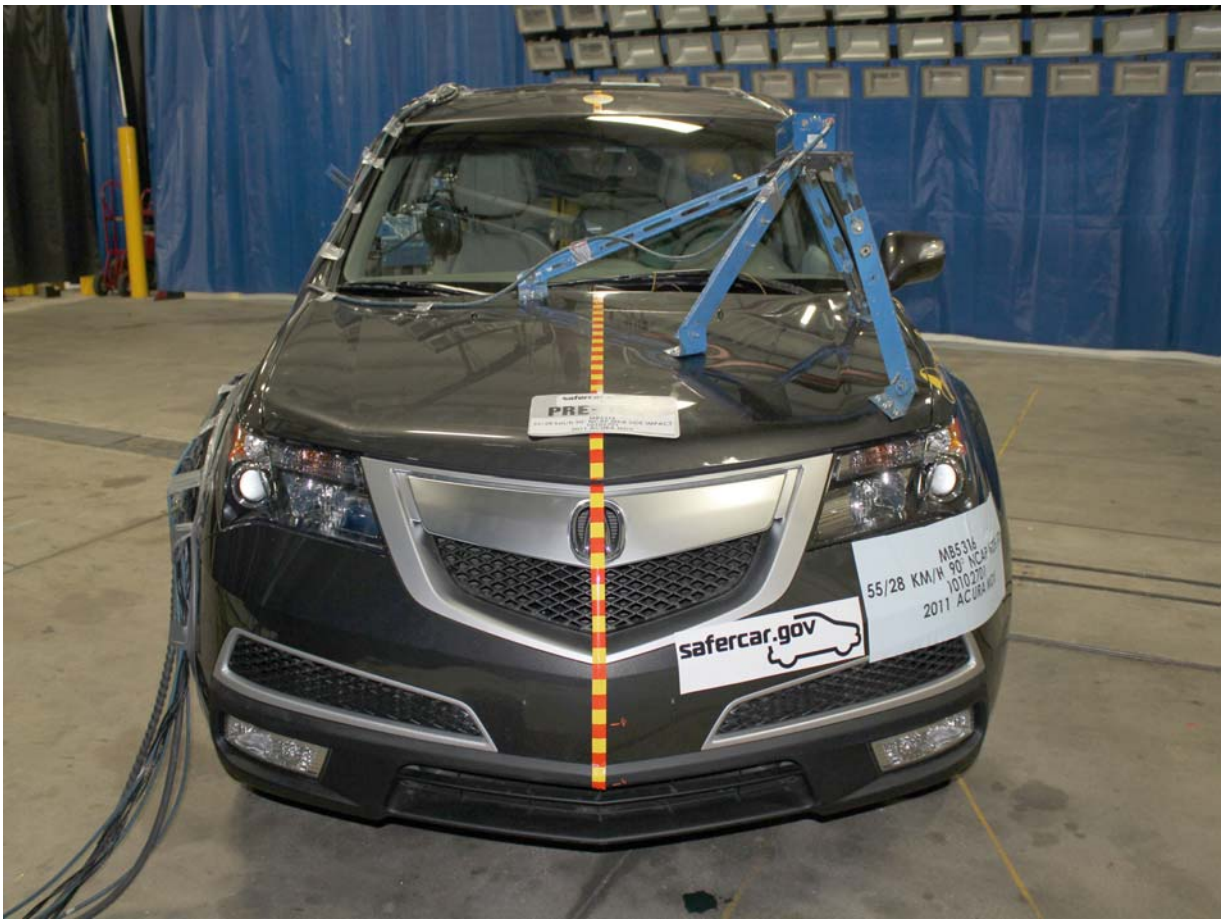
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As Delivered Right Front Three-Quarter View of Test Vehicle



As Delivered Left Rear Three-Quarter View of Test Vehicle



Pre-Test Frontal View of Test Vehicle



Post-Test Frontal View of Test Vehicle



Pre-Test Left Three-Quarter Front View of Test Vehicle



Post-Test Left Three-Quarter Front View of Test Vehicle



Pre-Test Left Side View of Test Vehicle



Post-Test Left Side View of Test Vehicle



Pre-Test Left Three-Quarter Rear View of Test Vehicle



Post-Test Left Three-Quarter Rear View of Test Vehicle



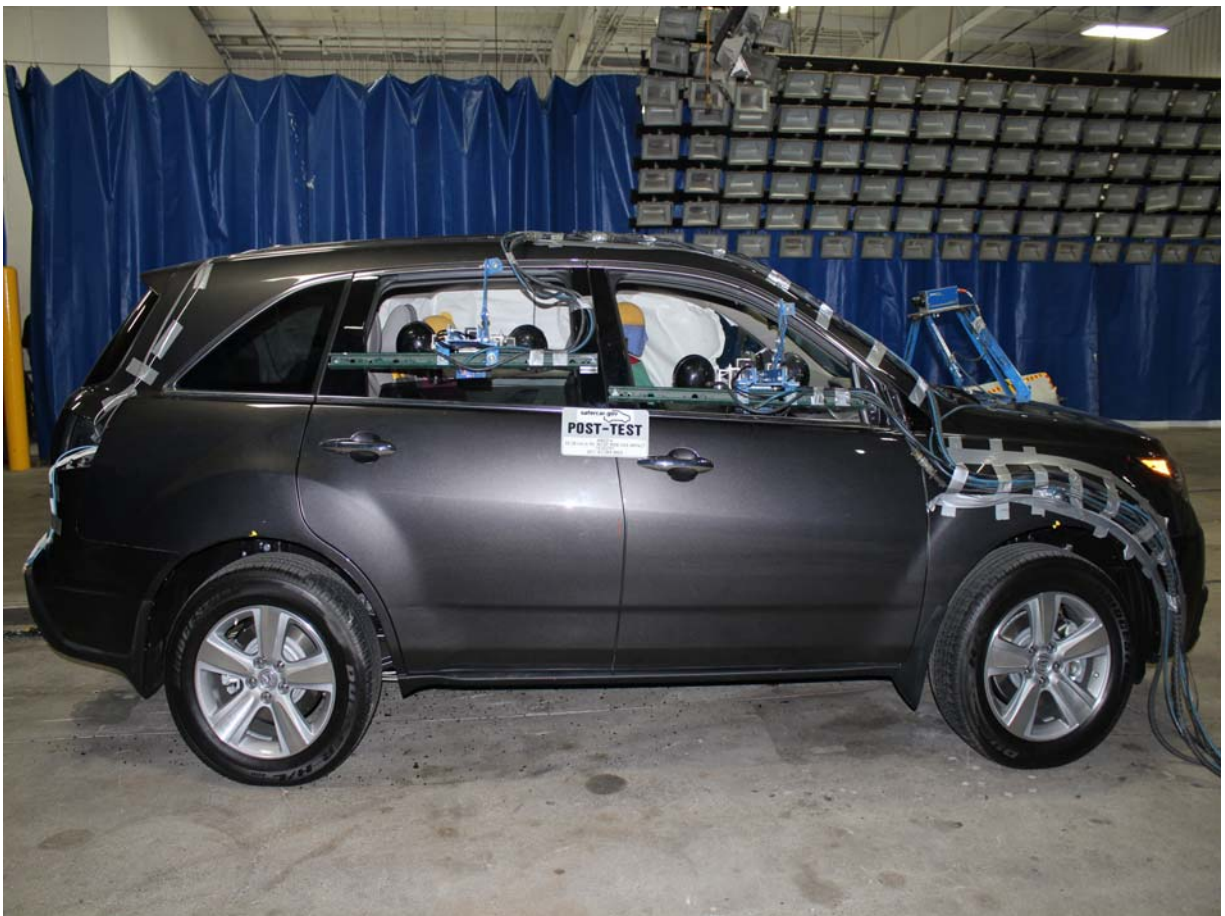
Pre-Test Rear View of Test Vehicle



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 Test Vehicle



Post-Test Overhead View of Test Vehicle and MDB



Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle



Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle



Pre-Test Close-Up View of Impact Point Target



Post-Test Close-Up View of Impact Point Target



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



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



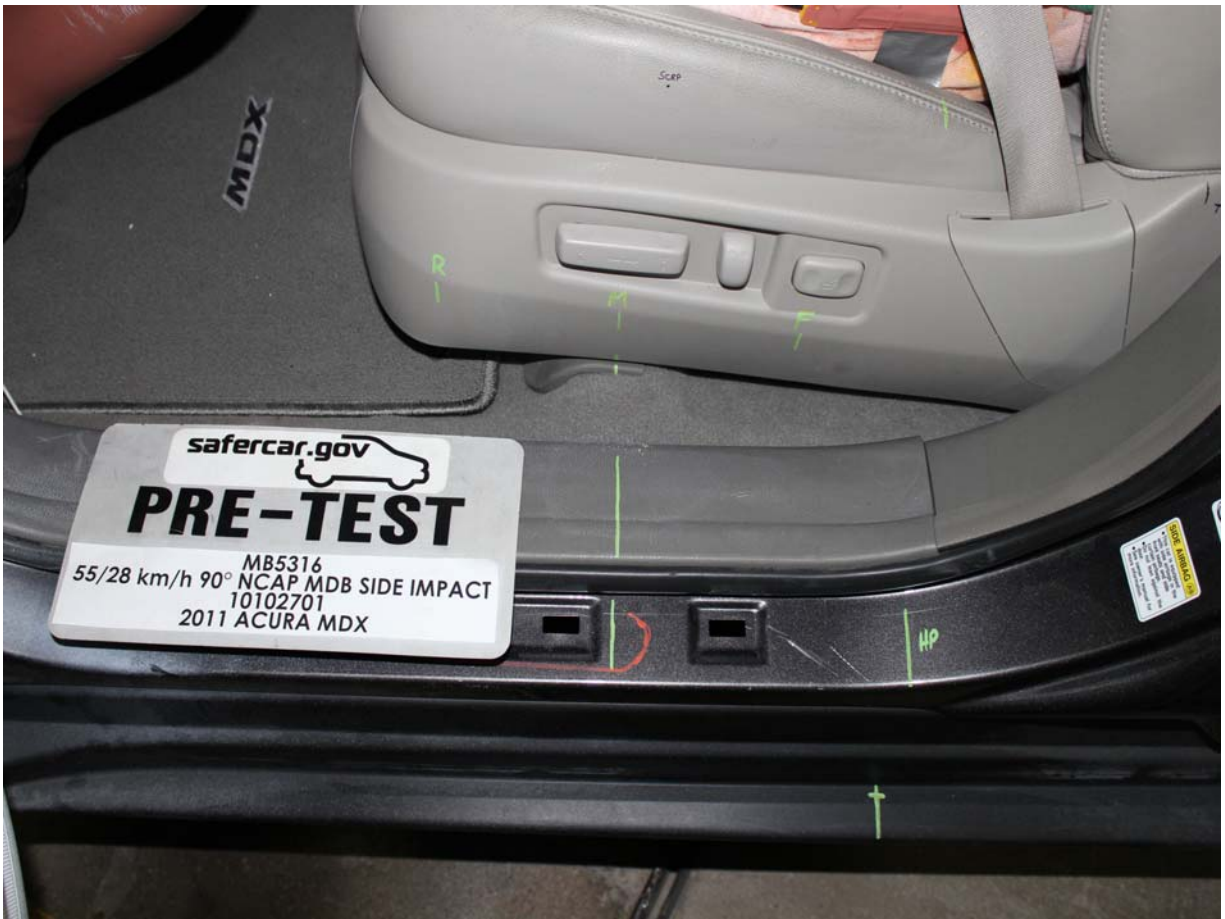
Pre-Test View of Belt Anchorage for Driver Dummy



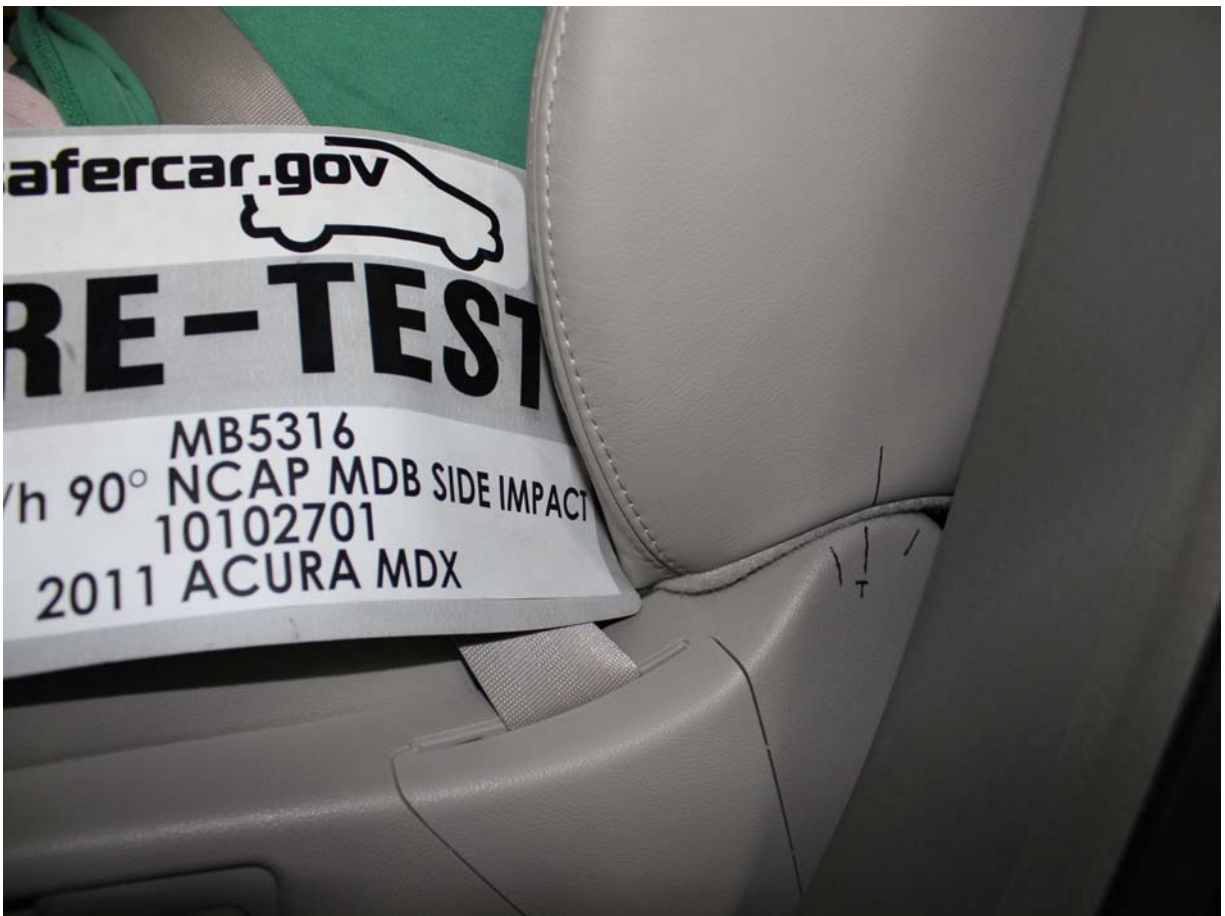
Pre-Test Left Side View of Steering Wheel



Pre-Test View of Parking Brake



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



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



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



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



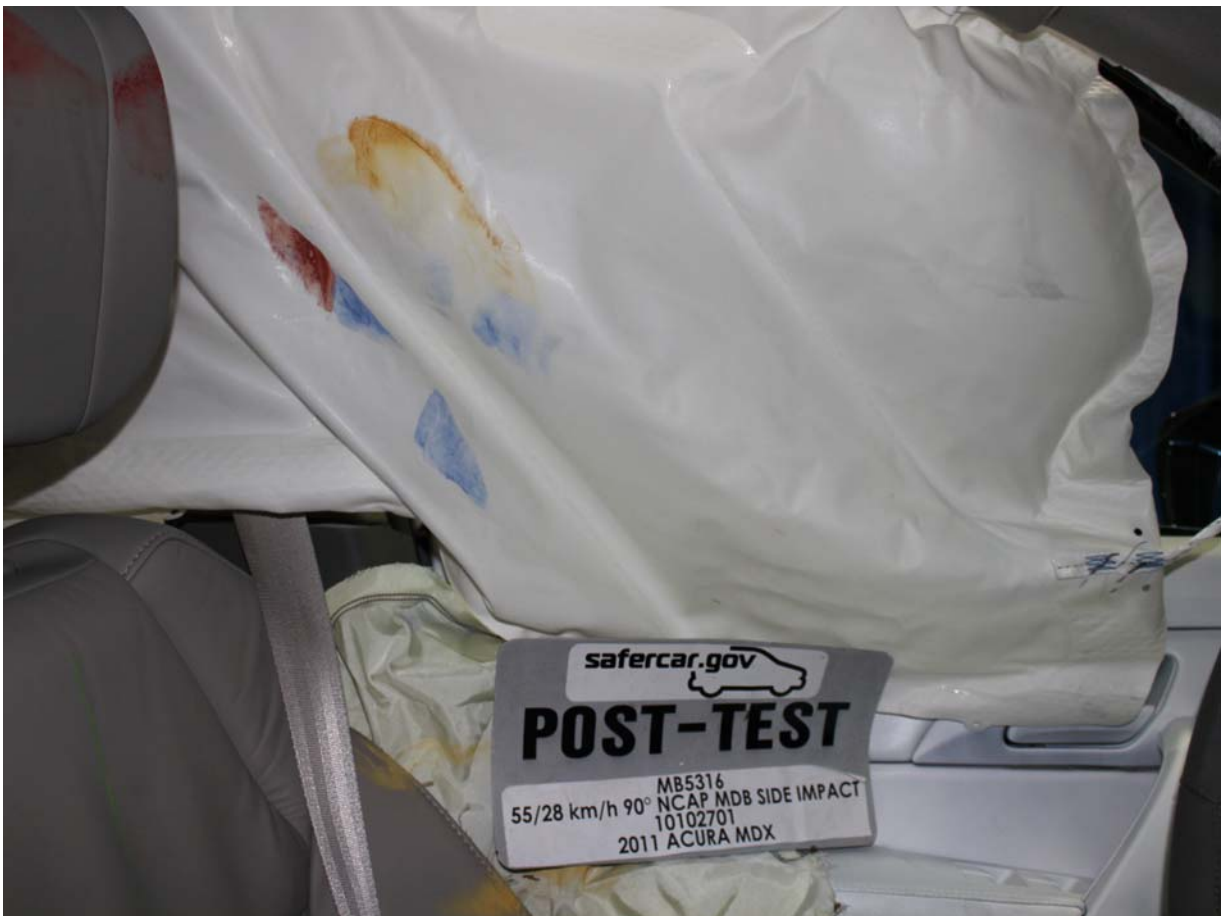
Pre-Test Driver Inner Door Panel View



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 Interior View



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



Post-Test Driver Dummy Close-up Pelvis Contact with Vehicle Interior 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



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



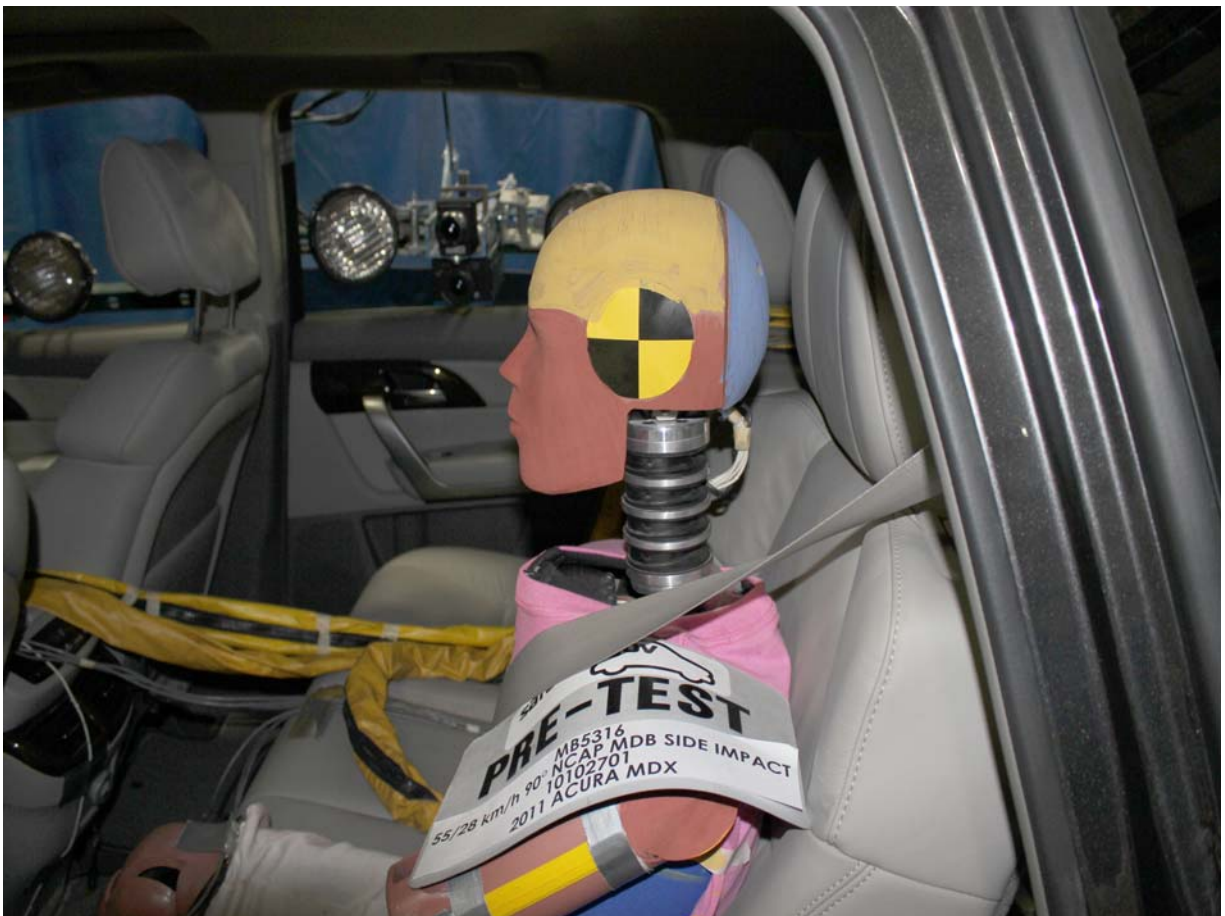
Pre-Test Placement of Rear Passenger Dummy's Feet



Pre-Test View of Belt Anchorage for Rear Passenger Dummy



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



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



Pre-Test Close-Up Left Side View of Rear Passenger Seat Back or Head Restraint



Pre-Test Close-Up View of Rear Passenger Seat Back with Inclinator



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 Dummy Contact Locations



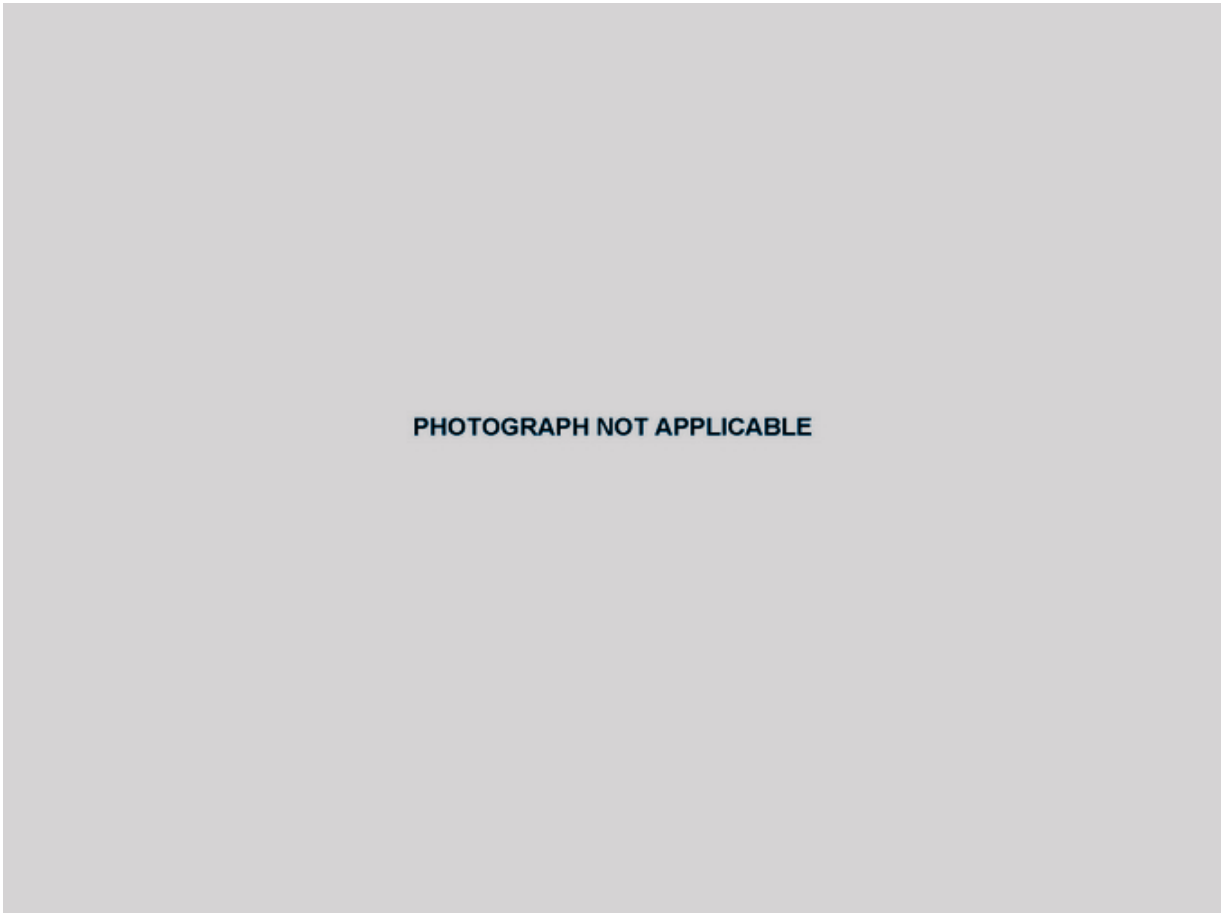
Post-Test Rear Passenger Dummy Close-up Head Contact with Vehicle View



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



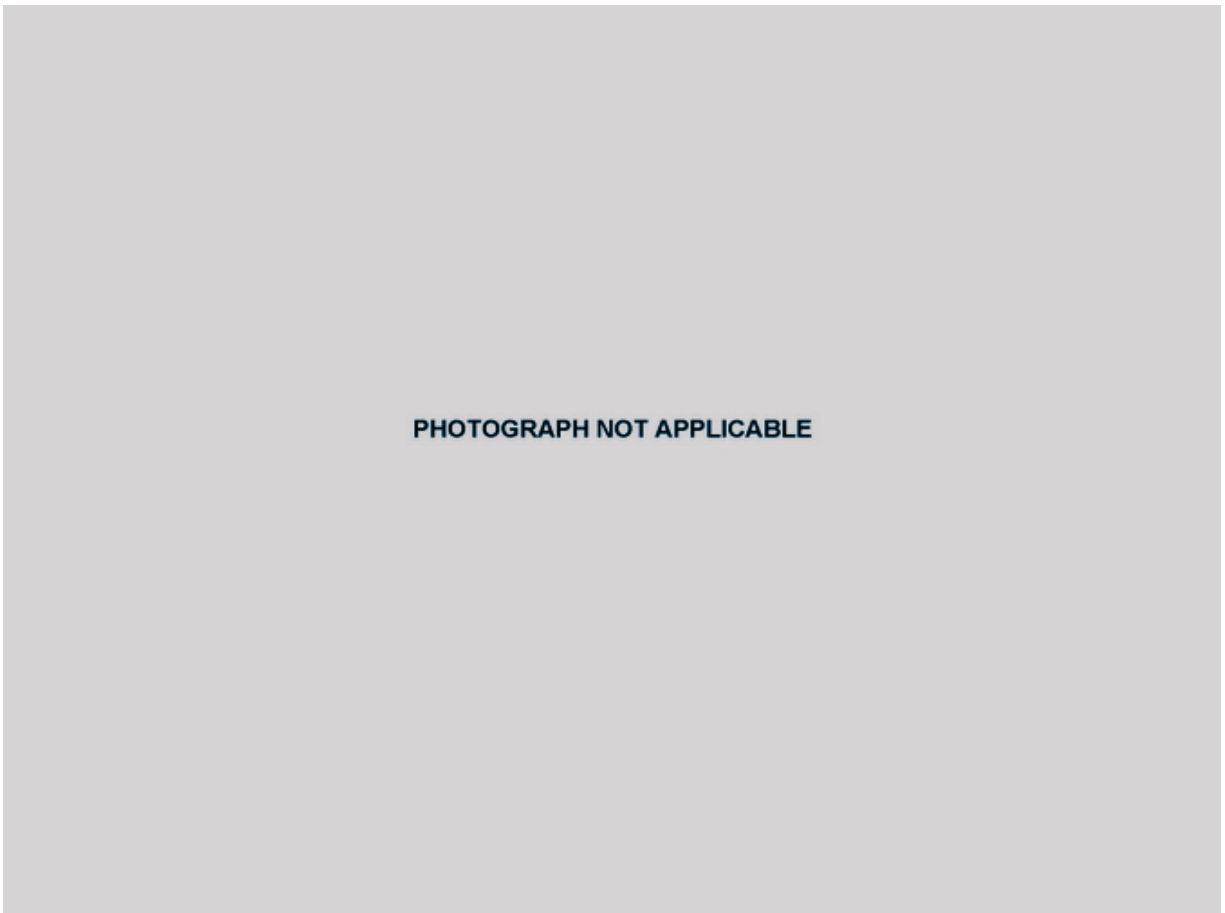
Post-Test Rear Passenger Dummy Close-up Torso Contact with Vehicle Interior View



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



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



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



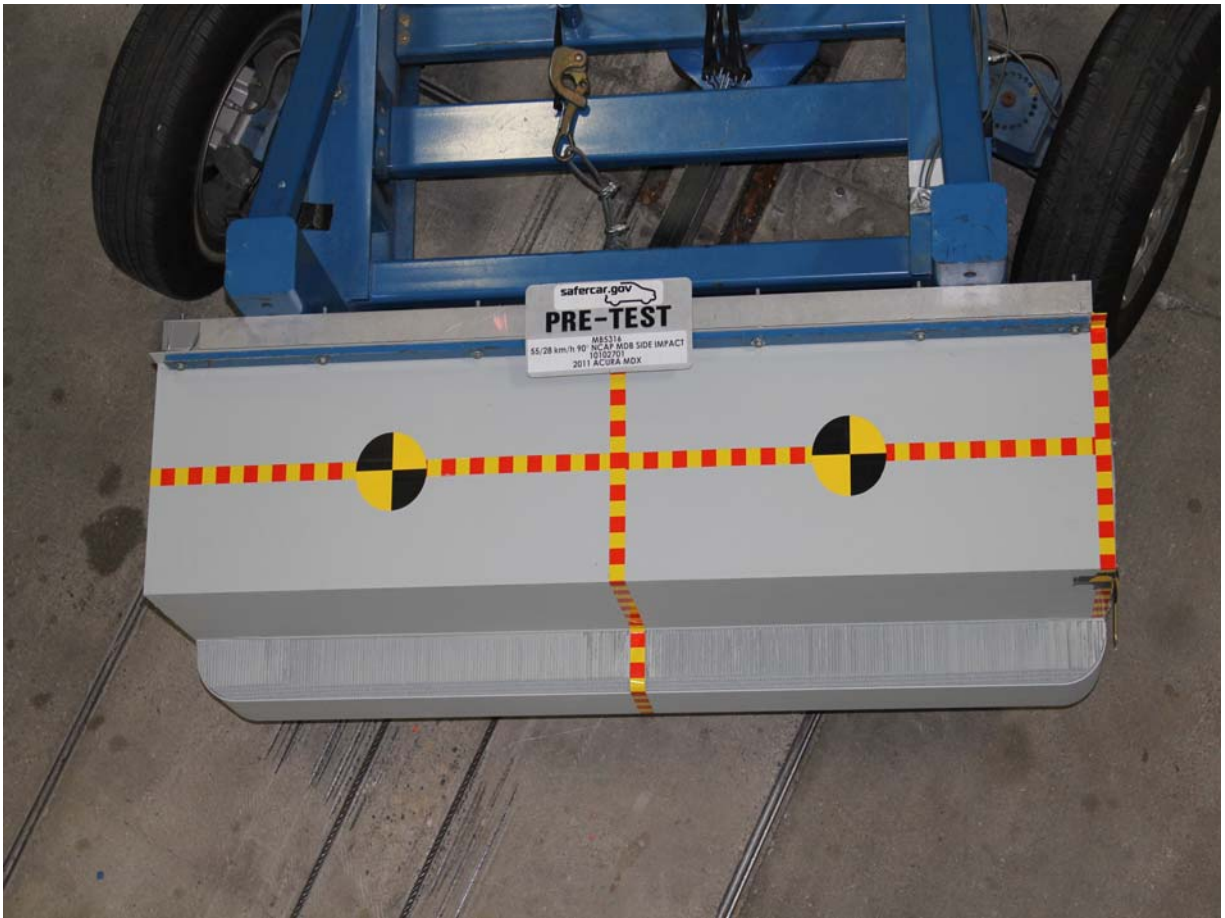
Post-Test View of Fuel Filler Cap or Fuel Filler Neck



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



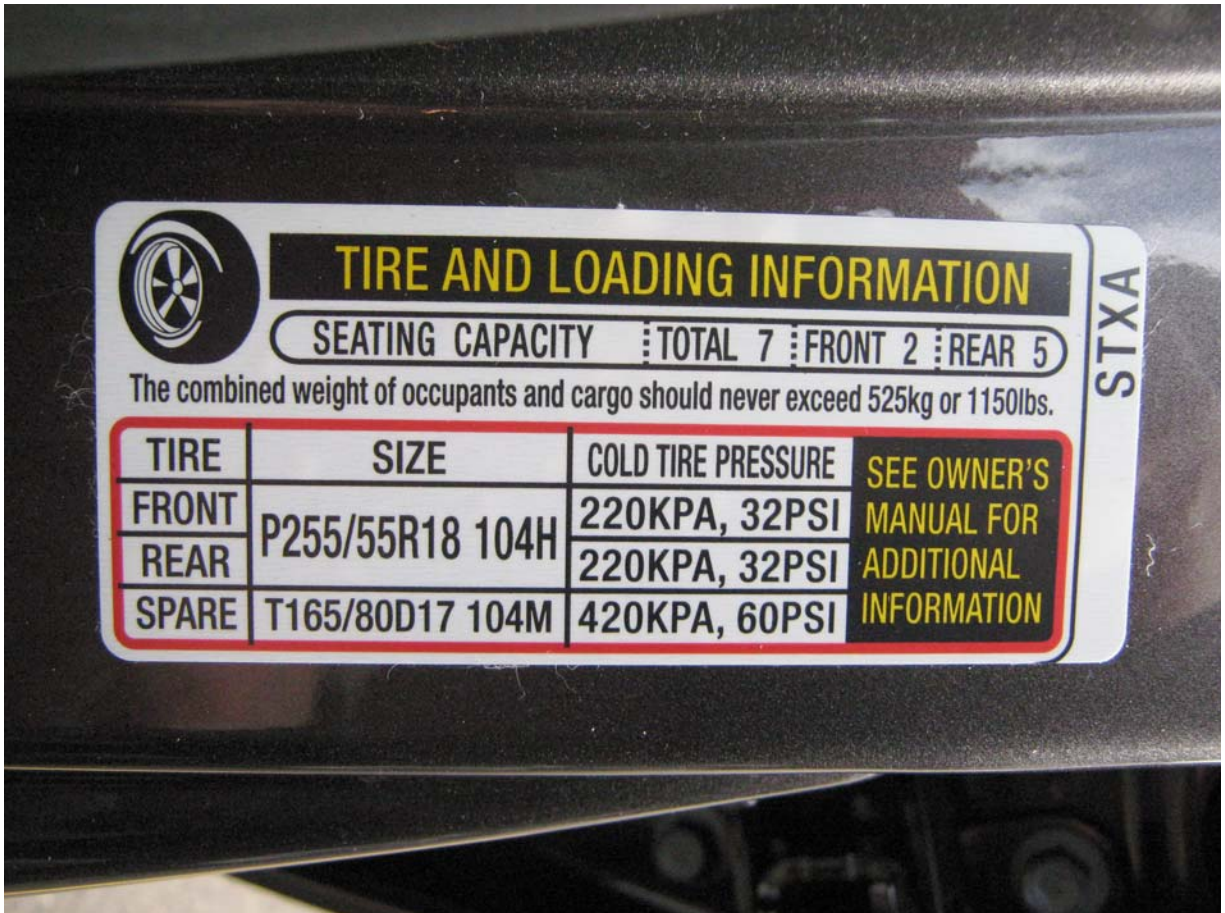
Pre-Test Right Side View of MDB Impactor Face



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



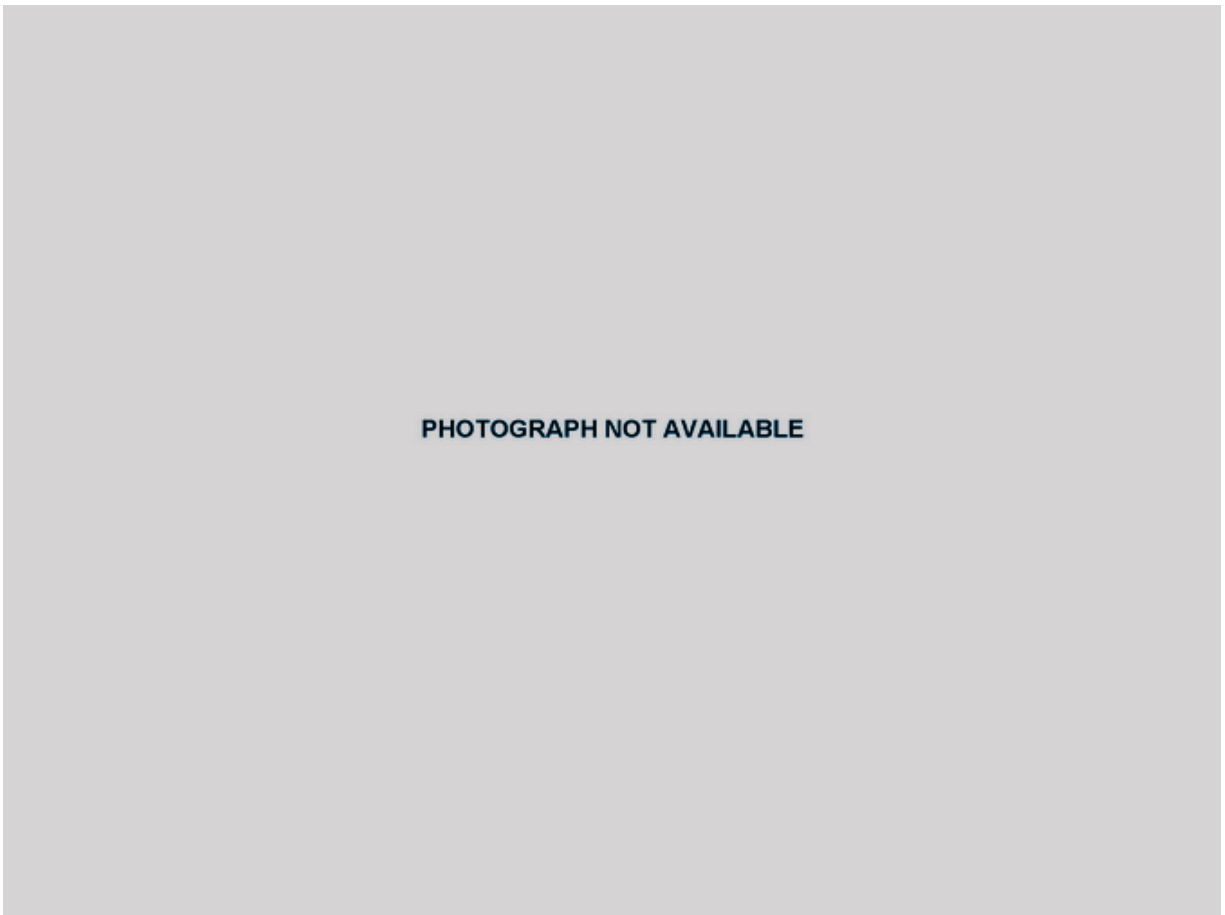
Pre-Test Ballast View



Post-Test Primary and Redundant Speed Trap Read-Out



FMVSS No. 301/305 Rollover 0 Degrees



FMVSS No. 301/305 Rollover 90 Degrees

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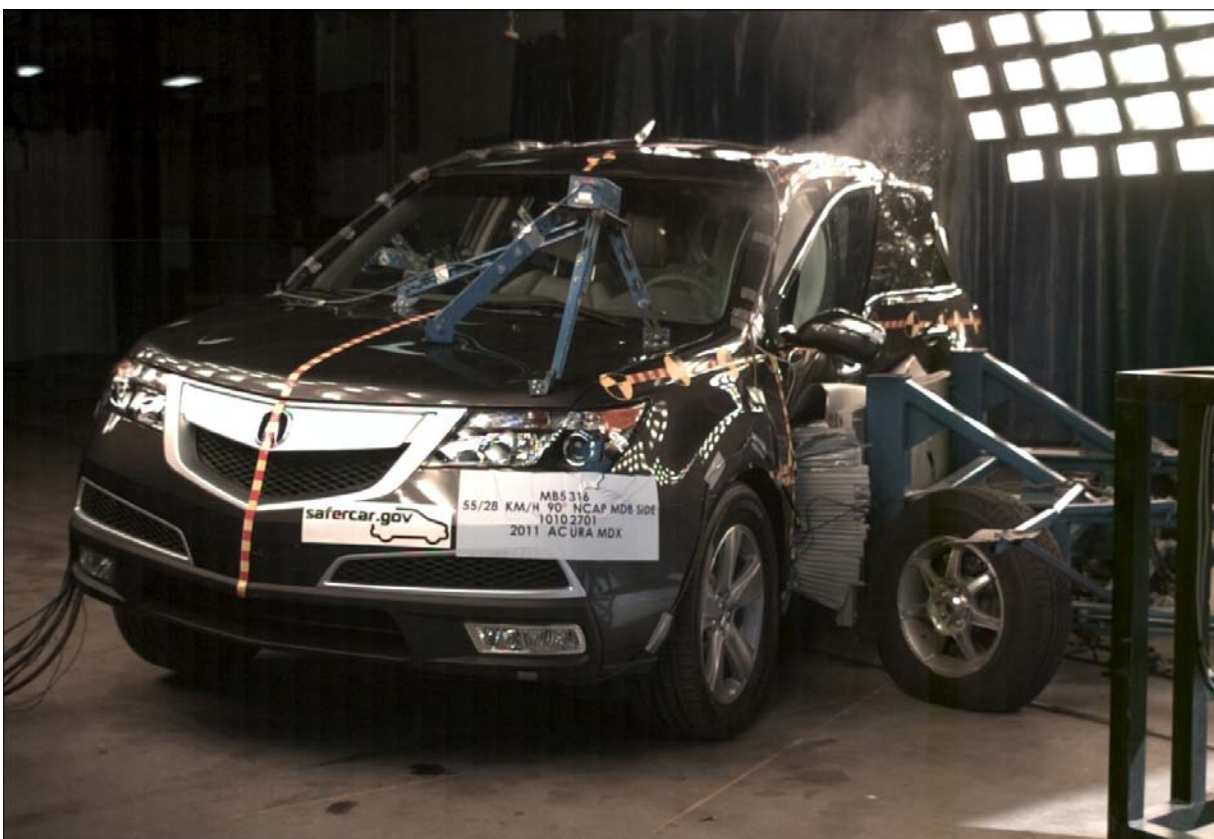
FMVSS No. 301/305 Rollover 180 Degrees

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FMVSS No. 301/305 Rollover 270 Degrees

PHOTOGRAPH NOT AVAILABLE

FMVSS No. 301/305 Rollover 360 Degrees



Impact Event



2011 MDX

VEHICLE NUMBER: 2HNYD2H4BH503757
EXCISE NUMBER: 137AL7004820 EXT: GRIGIO M.
CONTROL NUMBER: 643944 INT: TAUPE

STANDARD EQUIPMENT AT NO EXTRA COST

- TECHNICAL FEATURES ***
 - 300hp 3.7-Liter SOHC 24-Valve VTEC V6 Engine
 - 6-Speed Automatic Transmission with Sequential SportShift
 - Saddle Sillers
 - 4-Wheel Disc Brakes
 - MacPherson Strut Front Suspension
 - Rear Multi-Link Suspension
 - Variable-Assist Rack-and-Pinion Power Steering
 - Inmoblizer Theft-Deterrent System
- SAFETY FEATURES ***
 - Driver's and Front Passenger's Dual-Stage Airbags (SRS)
 - Driver's and Front Passenger's Side Airbags
 - Side Curtain Airbags with Rollover Sensor
 - Vehicle Stability Assist (VSA)
 - Brake Assist
 - Electronic Brake Distribution (EBD)
 - 3-Point Seat Belts
 - Front Seat Belts with Automatic Tensioning System
 - Active Front Head Restraints
 - Tire Pressure Monitoring System
 - ACE Body Structure
 - Side Impact Door Beams
 - Door Pinch Lights (DPL)
 - LATCH System for Child Seats
- EXTERIOR FEATURES ***
 - Power Tailgate
 - Power Moonroof with Tilt Feature
 - 18" Alloy Wheels
 - PASSLOCK 3® Anti-Theft System
 - Xenon HID Headlights
 - Fog Lights
 - Heated Power Door Mirrors with Turn Indicators
 - Remote Entry with Security System
- INTERIOR FEATURES ***
 - Sport Seats with Leather Trim
 - Acura Premium Sound System with 8 Speakers
 - AM/FM/6-Disc In-Dash CD and Satellite Radio
 - MP3 Satellite Input Jack
 - Driver's Memory System
 - Drivers 10-Way Power Seat
 - Front Passenger's 8-Way Power Seat
 - Heated Front Seats
 - HomeLink System
 - Bluetooth HandsFreeLink with Air Mirrors System
 - Acura Performance Steering
 - Auto Dimming Rearview Mirror with Rearview Camera Display

Manufacturer's Suggested Retail Price **\$42,580.00**

MSRP includes:
-4YR/70K Mile Powertrain Warranty
-4YR/50K Mile Lid Vehicle Warranty
-Full Tank of Fuel
-3 Months Free XM Radio Service
-XM Radio is available in the 49 contiguous states

Destination and Handling **860.00**

TOTAL VEHICLE PRICE
(includes Pre-Delivery Service)

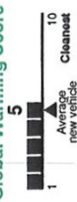
\$43,440.00

Licenses 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



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 for more information. AIR RESOURCES BOARD

CONTINENTAL ACURA OF NAPE
2275 AURORA AVENUE
NAPERVILLE, IL 60540

PORT OF ENTRY: BUFFALO
DELIVERY POINT: CHICAGO
SHIP#: 256-004

ROW/SPACE: 256-004
TRANS.METHOD: N50 ELWOOD

VIN: 2HNYD2H4BH503757

ORIG. DLR: 251144
REF. NO.: 40281
HN CODE: AL-4912
EMISSION: 50 STATE

DEALER: 251144



EPA Fuel Economy Estimates

CITY MPG

16

Expected range for most drivers 13 to 19 MPG

HIGHWAY MPG

21

Expected range for most drivers 17 to 23 MPG

Estimated Annual Fuel Cost **\$2,669**

based on 15,000 miles at \$3.20 per gallon

Combined Fuel Economy This Vehicle **18**

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

10 32

All SUVs

See the FREE Fuel Economy Guide at dealers or www.fueleconomy.gov



PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE
U.S./Canadian Parts Content: **65 %**
Major Sources of Foreign Parts Content:
JAPAN 25 %

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

GOVERNMENT SAFETY RATINGS

Frontal Crash Driver Not Rated
Passenger 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.

Side Crash Front seat Not Rated
Rear seat Not Rated

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

Rollover **★★★**

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 or 1-888-327-4236

FOR THIS VEHICLE
Final Assembly Point:
**ALLISTON, ONTARIO
CANADA**

Country of Origin: Engine:

U.S.A.

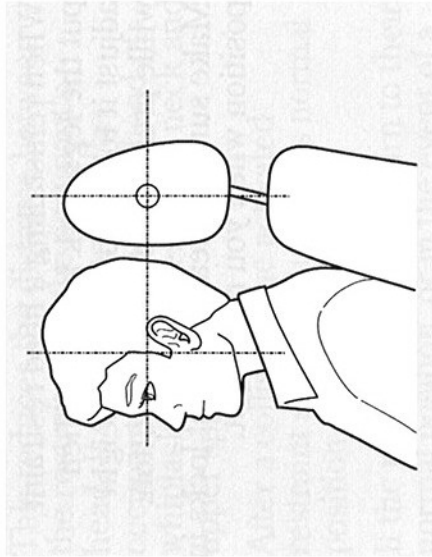
Transmission:

JAPAN

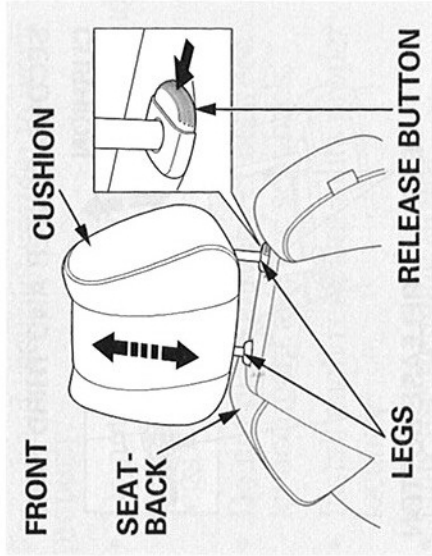
Head Restraints

See page 15 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.

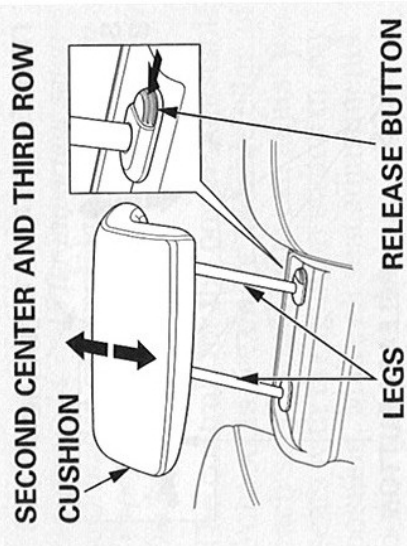


Adjusting the Head Restraint

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.

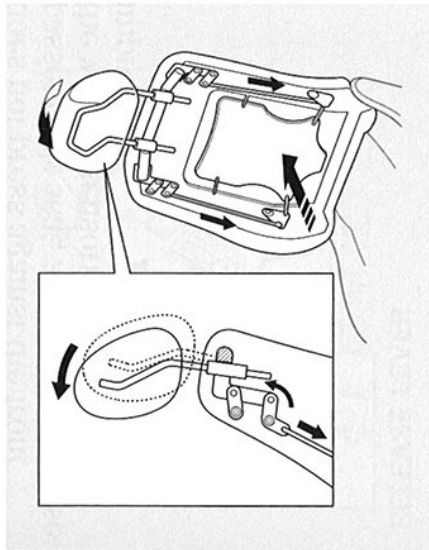
When reinstalling a head restraint, put the legs back in place. Then adjust it to the appropriate height while pressing the release button. Make sure the head restraint locks in position when you reinstall it.

⚠ WARNING

Failure to reinstall the head restraints can result in severe injury during a crash.

Always replace the head restraints before driving.

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 an Acura 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 Acura replacement head restraints.

CONTINUED

APPENDIX B
DUMMY RESPONSE DATA

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

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| 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 |
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| Figure No. 18. | Passenger Lower Spine T12 Acceleration (X) vs. Time | B-6 |
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| 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

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)

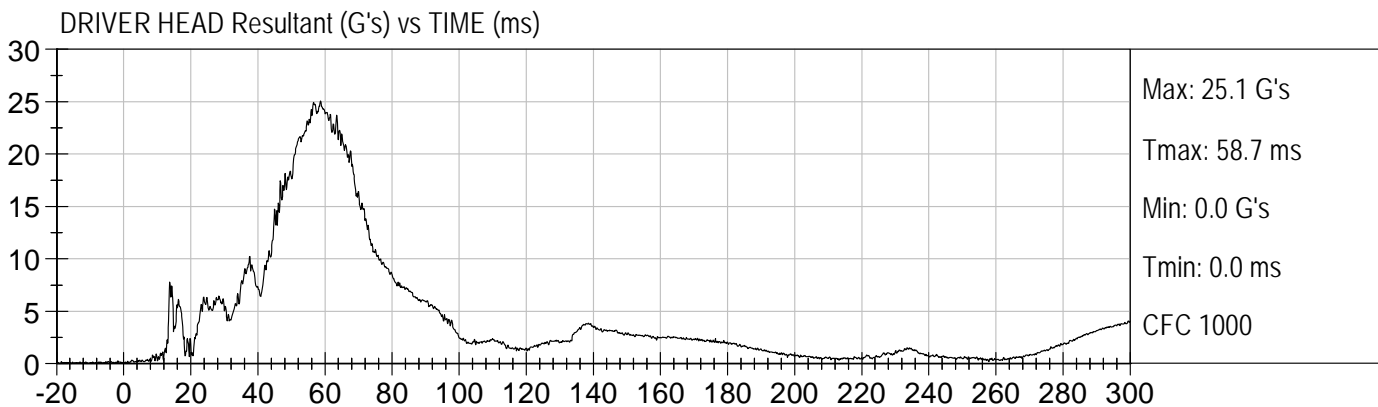
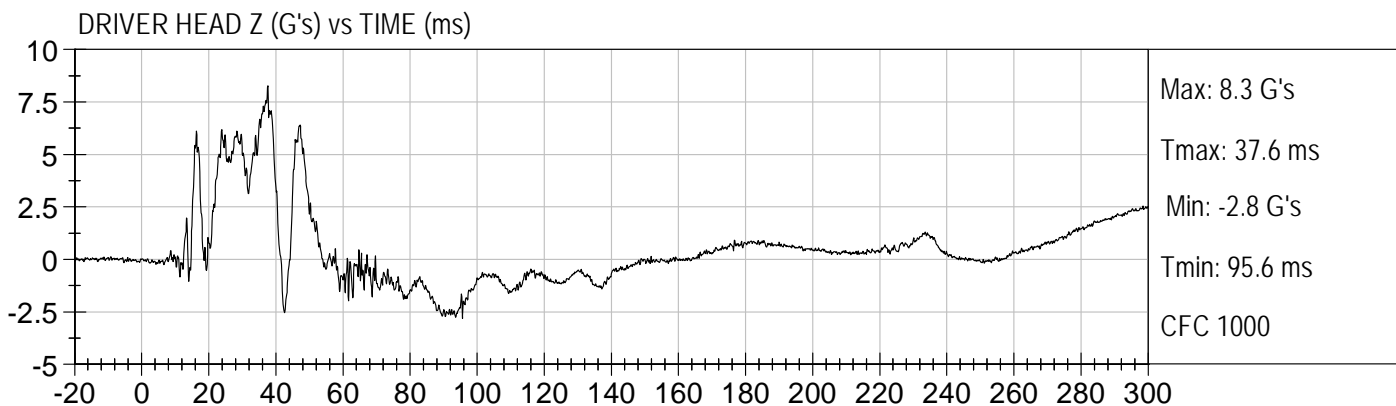
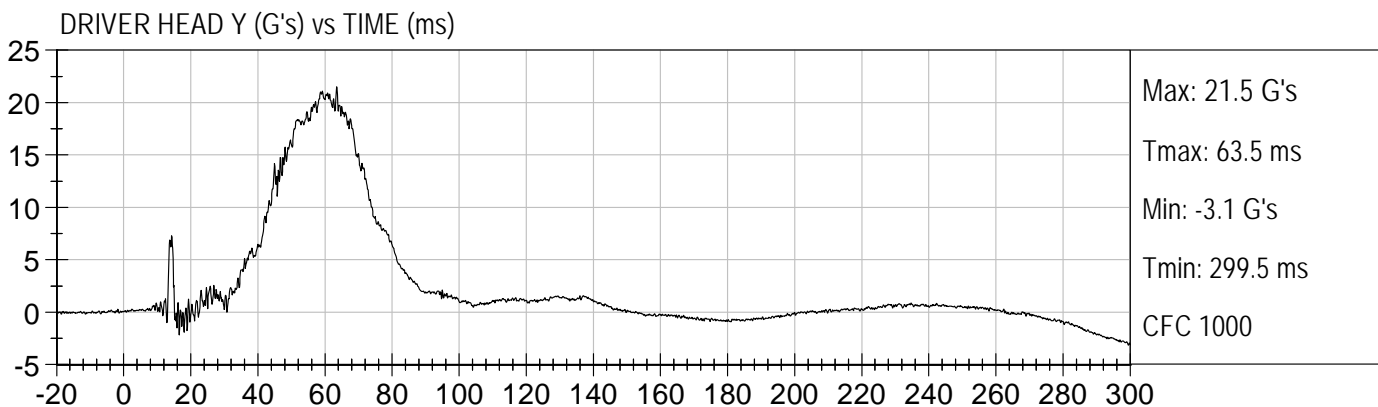
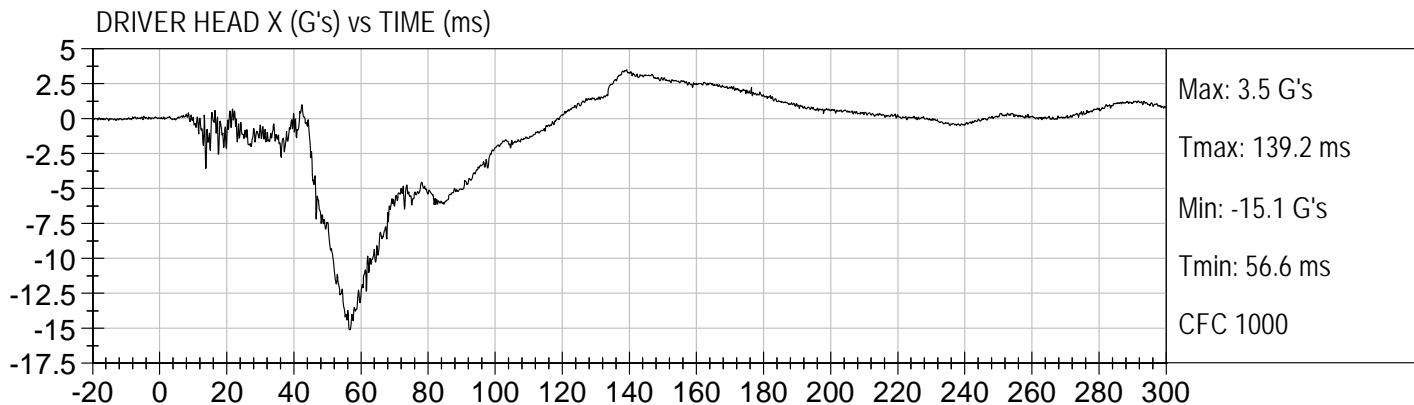
Passenger Side Curtain Airbag Timing (not installed)

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)

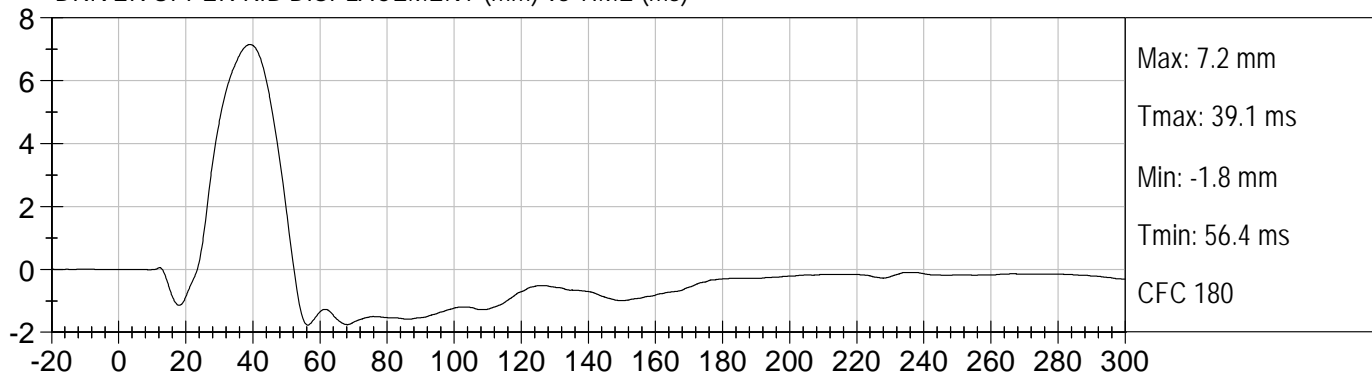
MDB Instrumentation Data

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

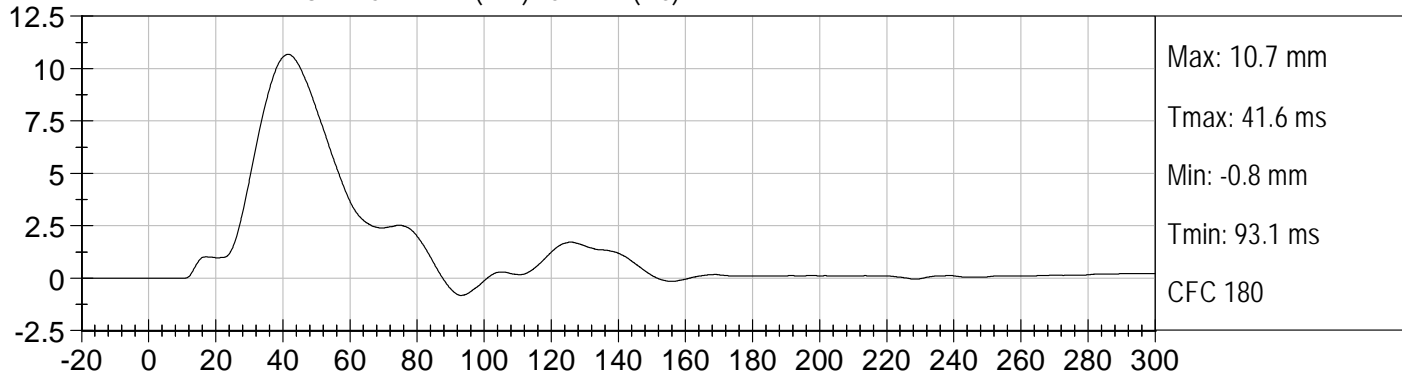




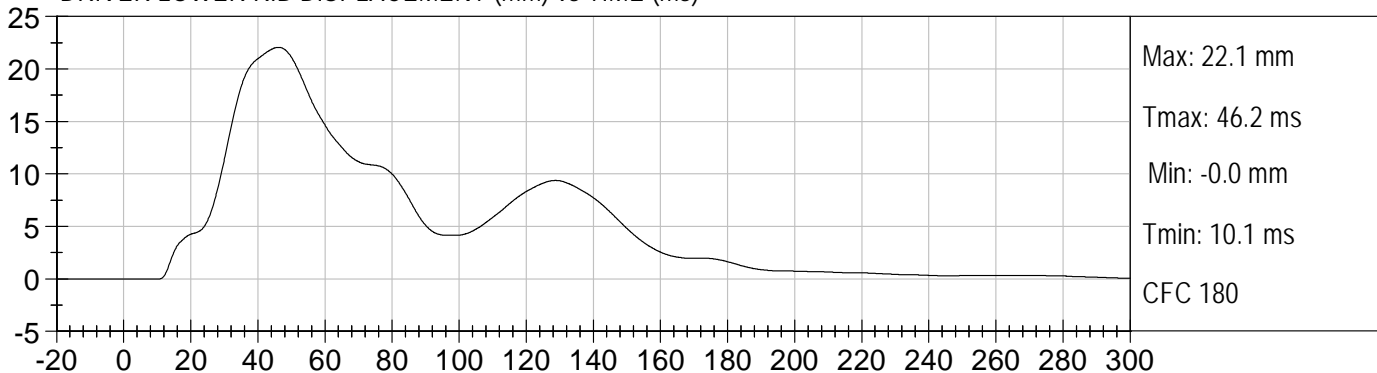
DRIVER UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



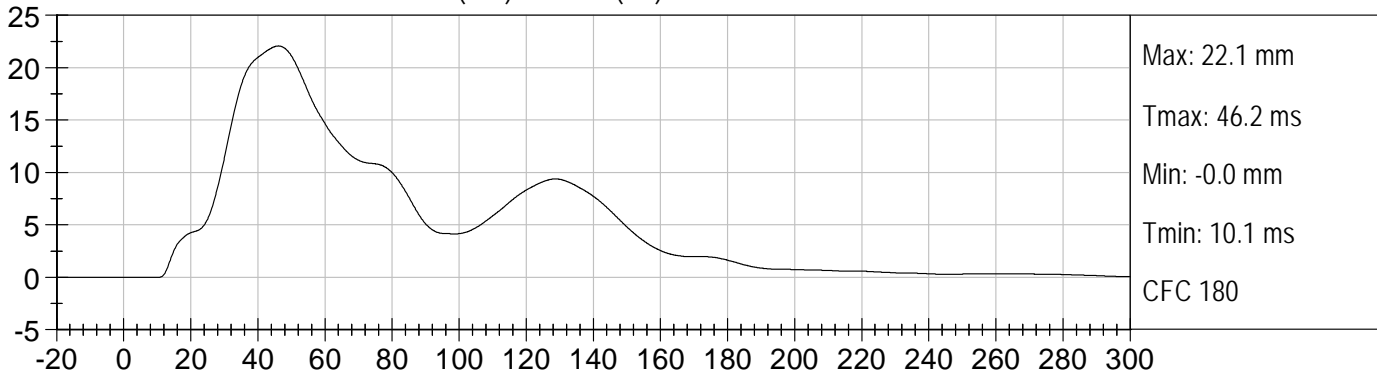
DRIVER MID RIB DISPLACEMENT (mm) vs TIME (ms)

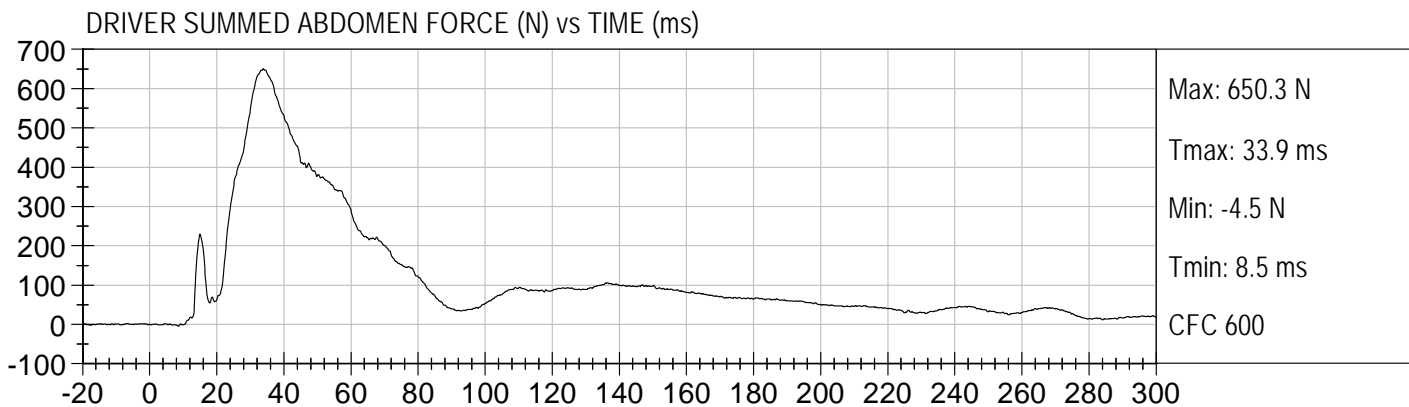
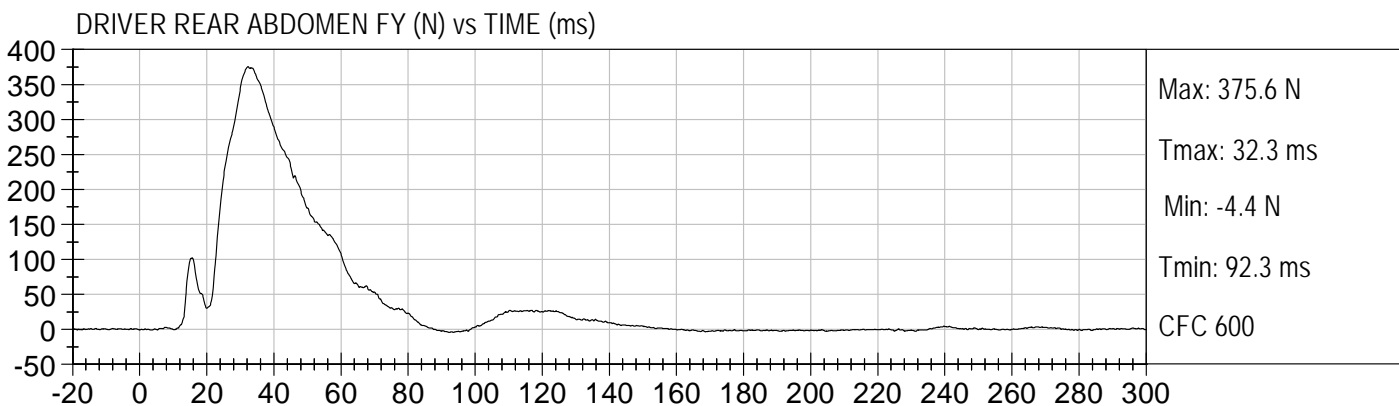
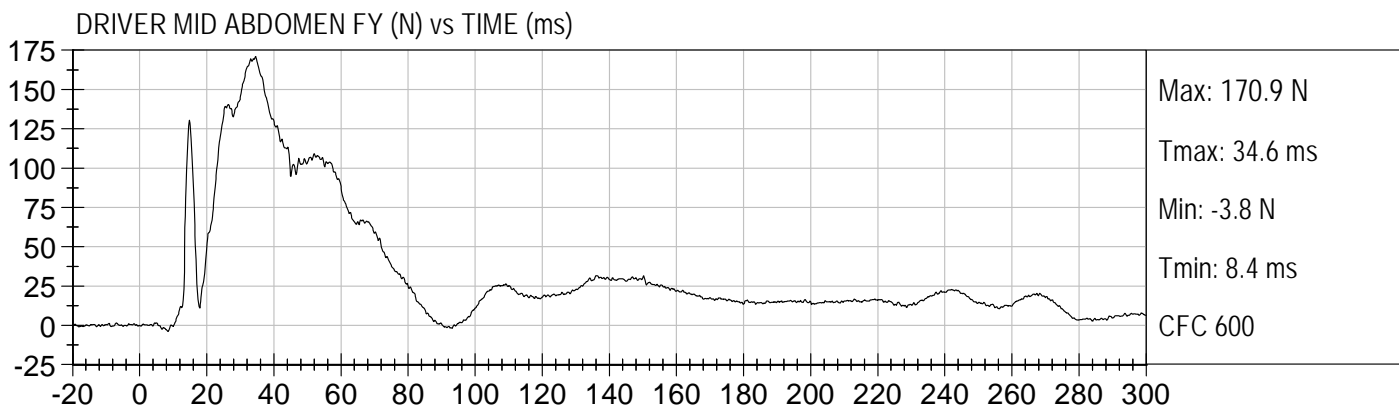
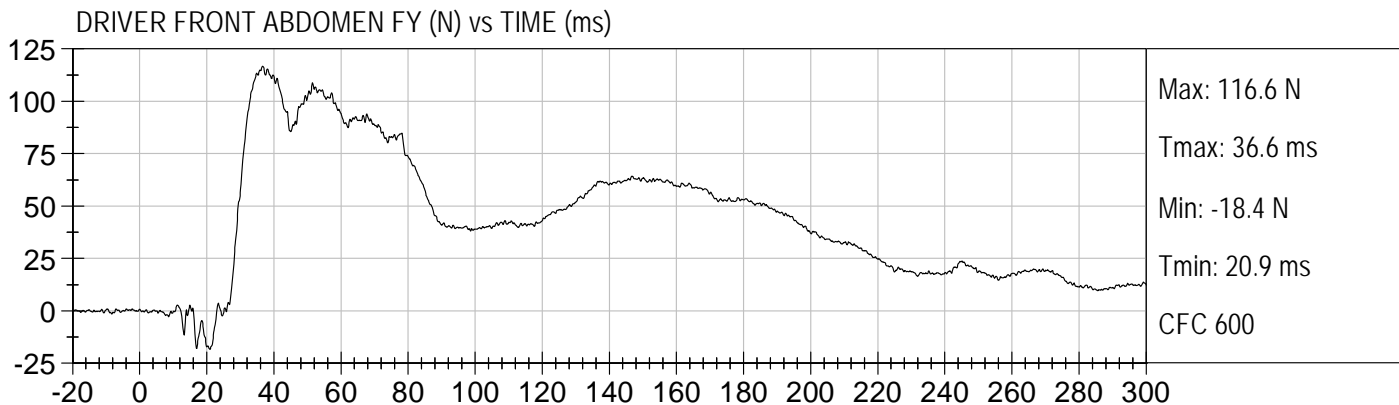


DRIVER LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



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

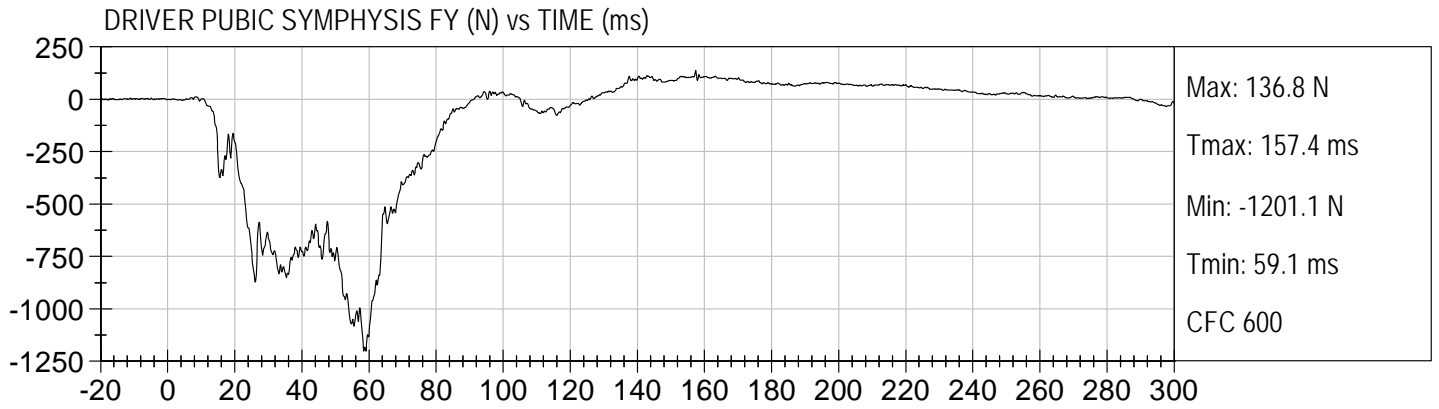


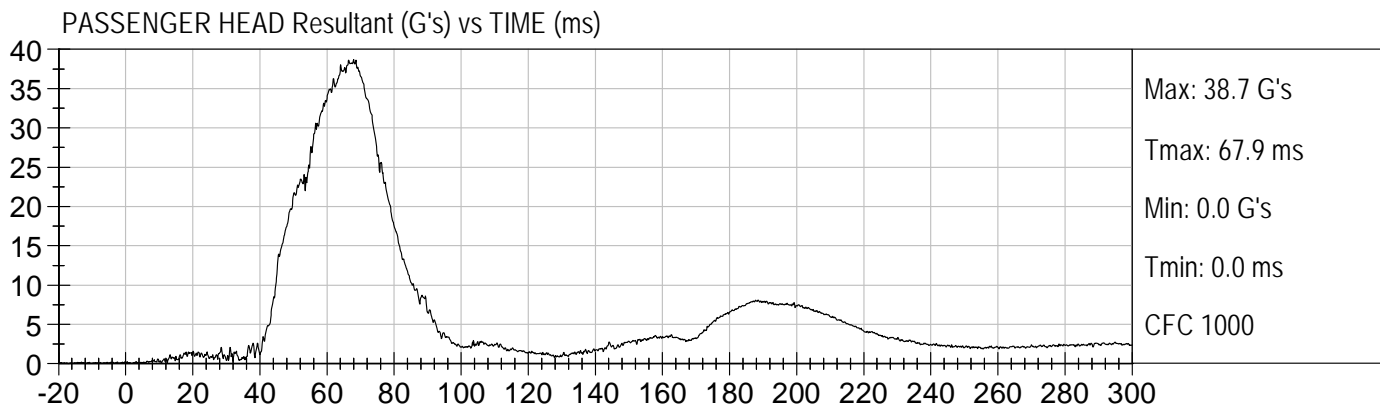
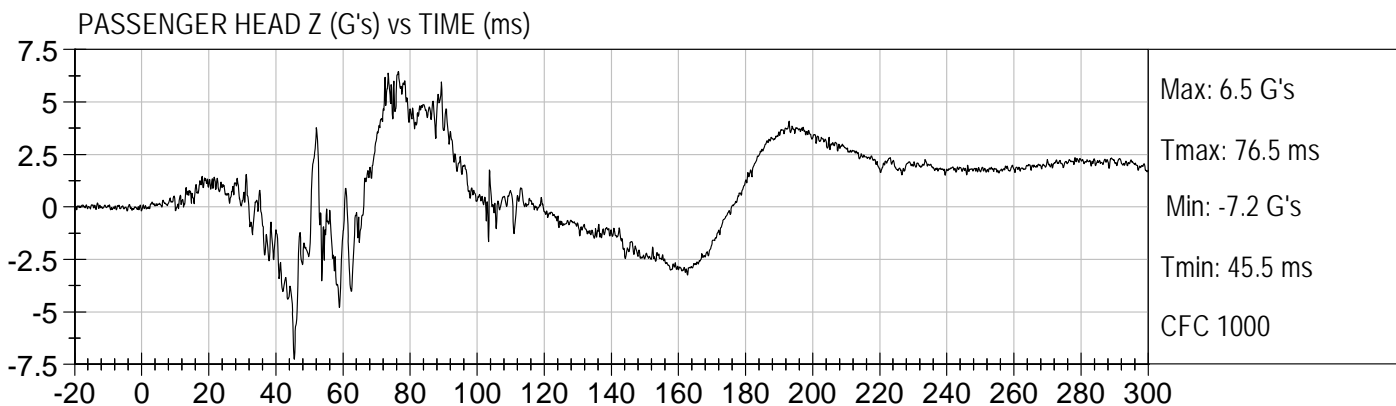
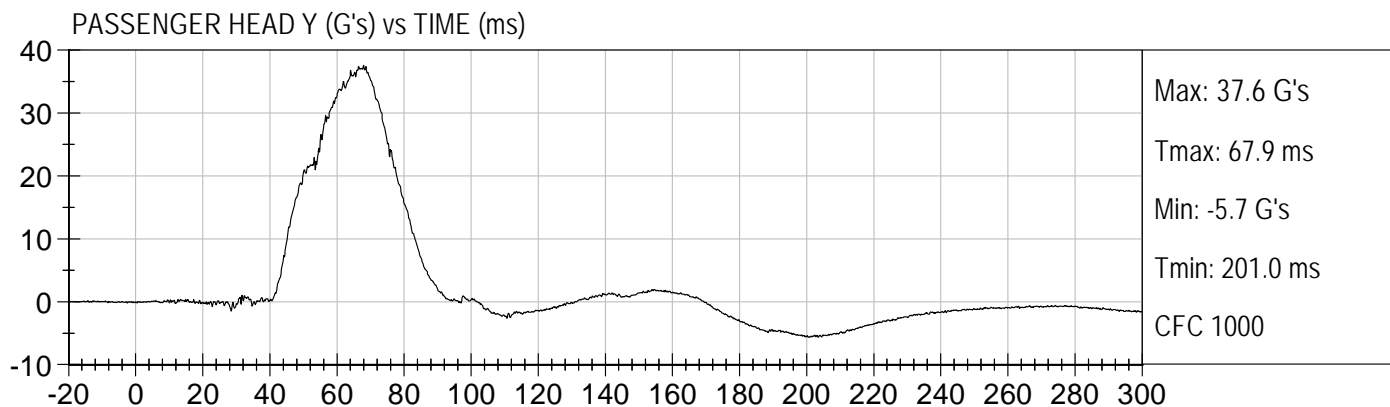
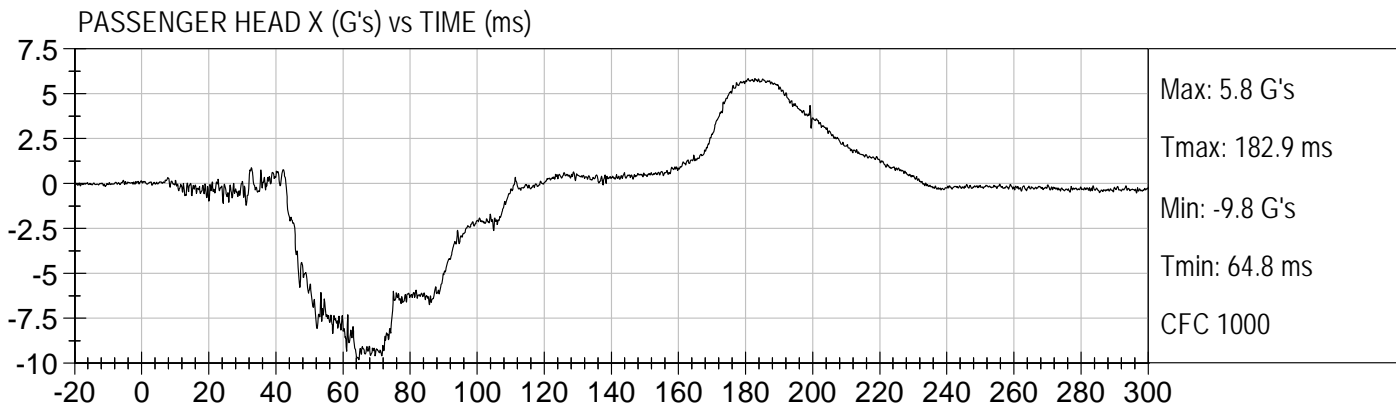


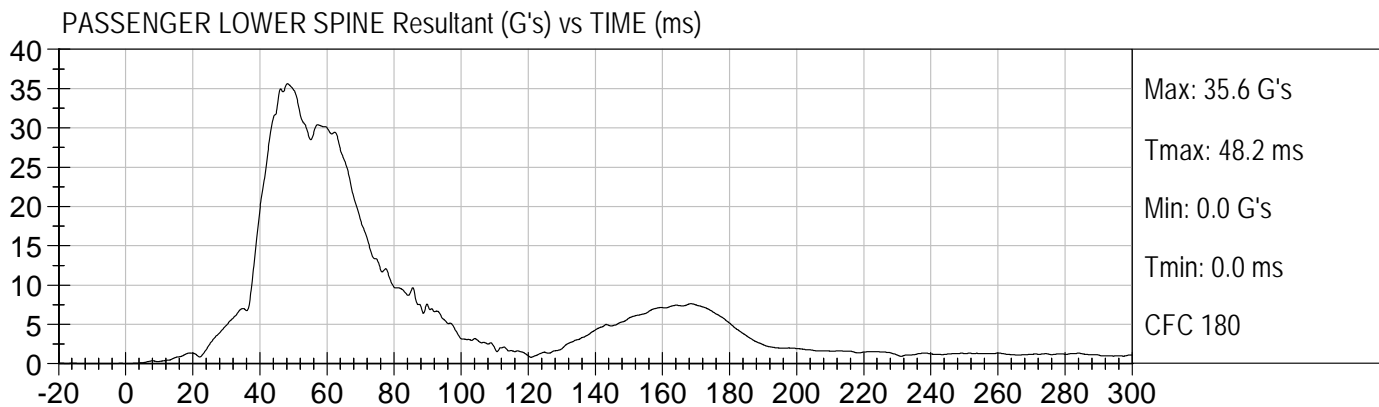
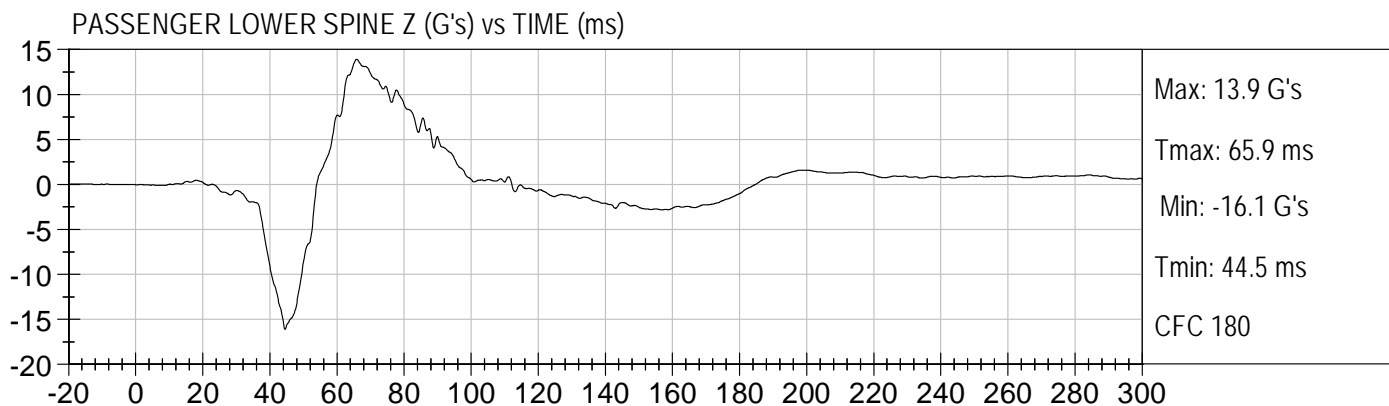
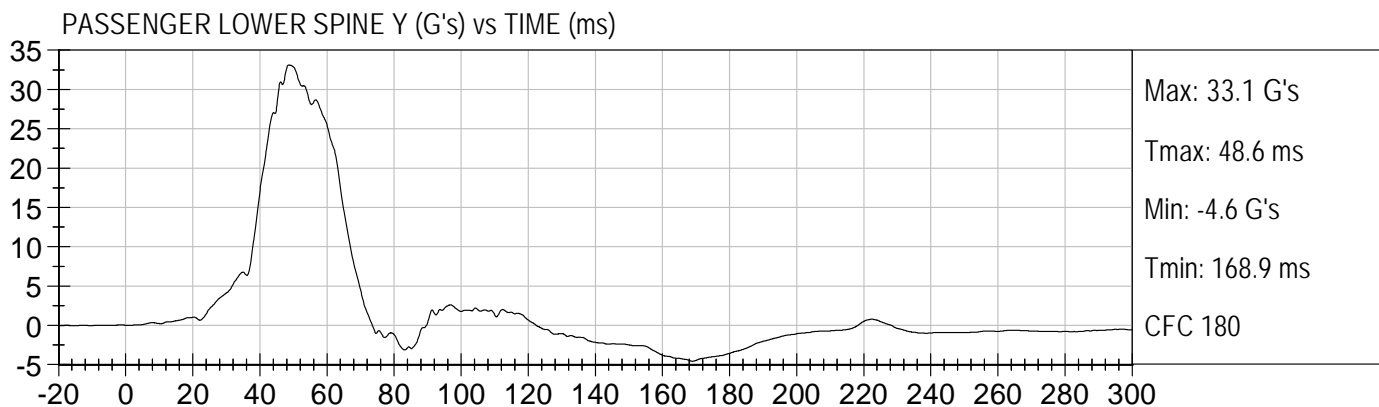
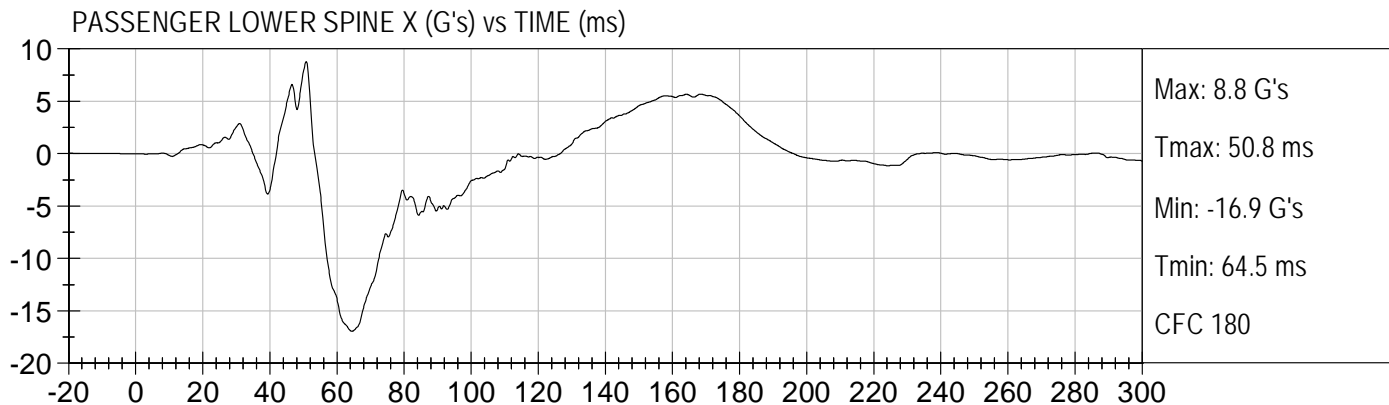


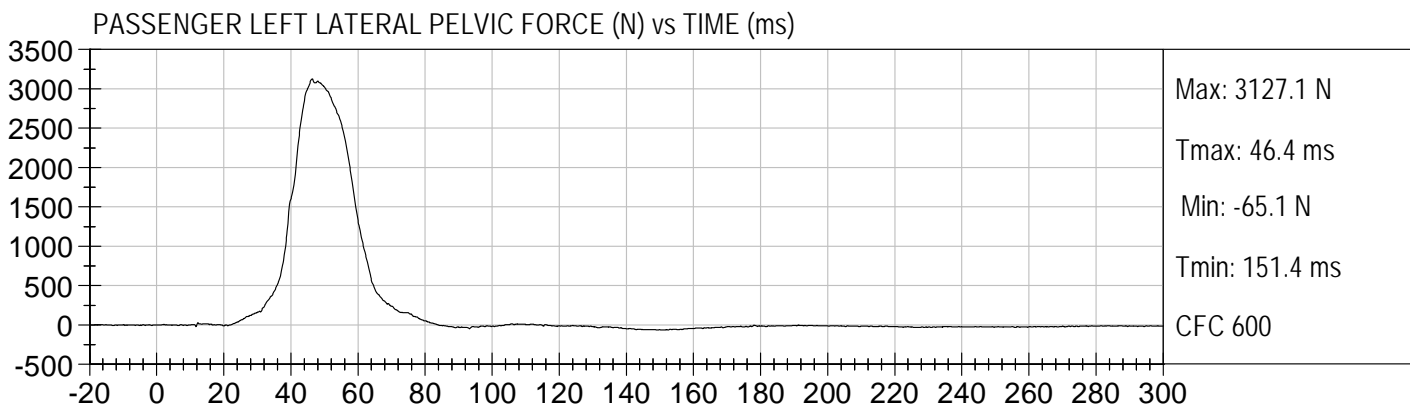
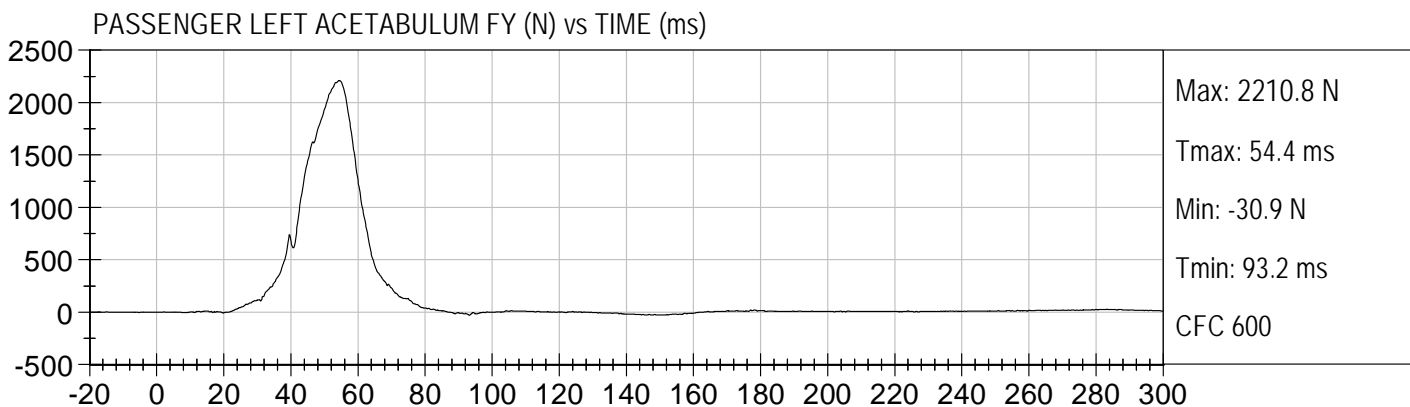
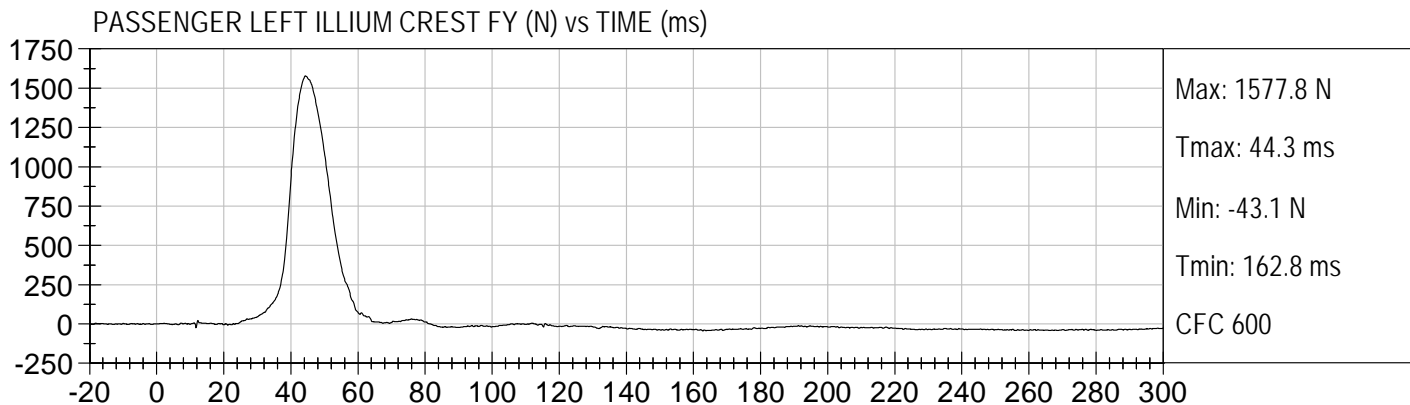
55/28 km/h 90° NCAP MDB Side Impact
2011 Acura MDX - MB5316

Test Date: 10/27/2010
Speed: 38.7 mph (62.3 km/h)









APPENDIX C

DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

MGA RESEARCH CORPORATION
HEAD DROP TEST
ES-2re DUMMY

ATD Serial No: 032

Test ID: D103581

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|--------------------|--------|-----------|
| Laboratory Temperature | deg C | 18.9 to 25.6 | 21.7 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 34 | Pass |
| Peak Resultant Acceleration | G's | 125 to 155 | 147 | Pass |
| Peak Lateral Acceleration | G's | +/- 15 | 10.1 | Pass |
| Unimodal | N/A | Yes | Yes | Pass |
| Oscillations | N/A | within 15% of peak | Yes | Pass |
| Overall Test Results | | | | Pass |

Jessica Hall
Laboratory Technician

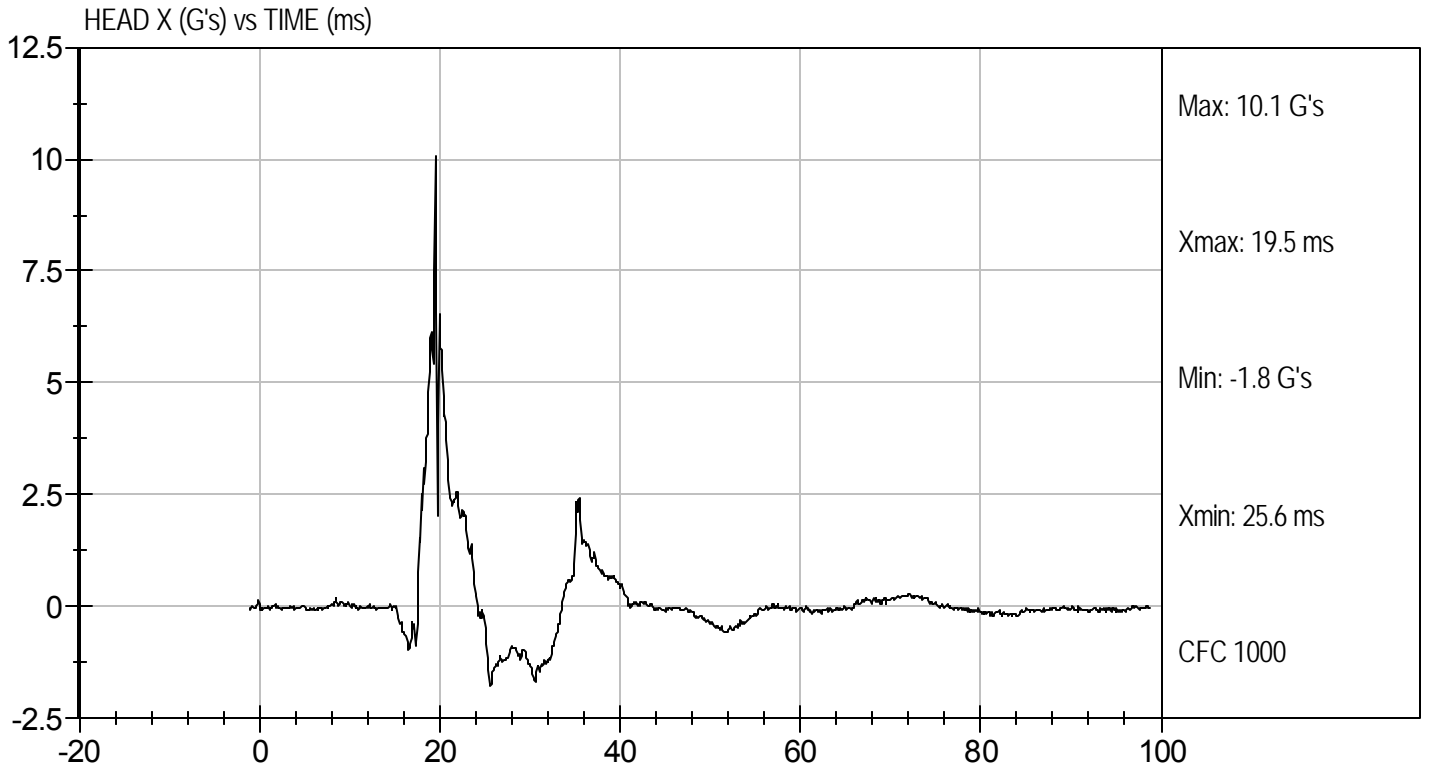
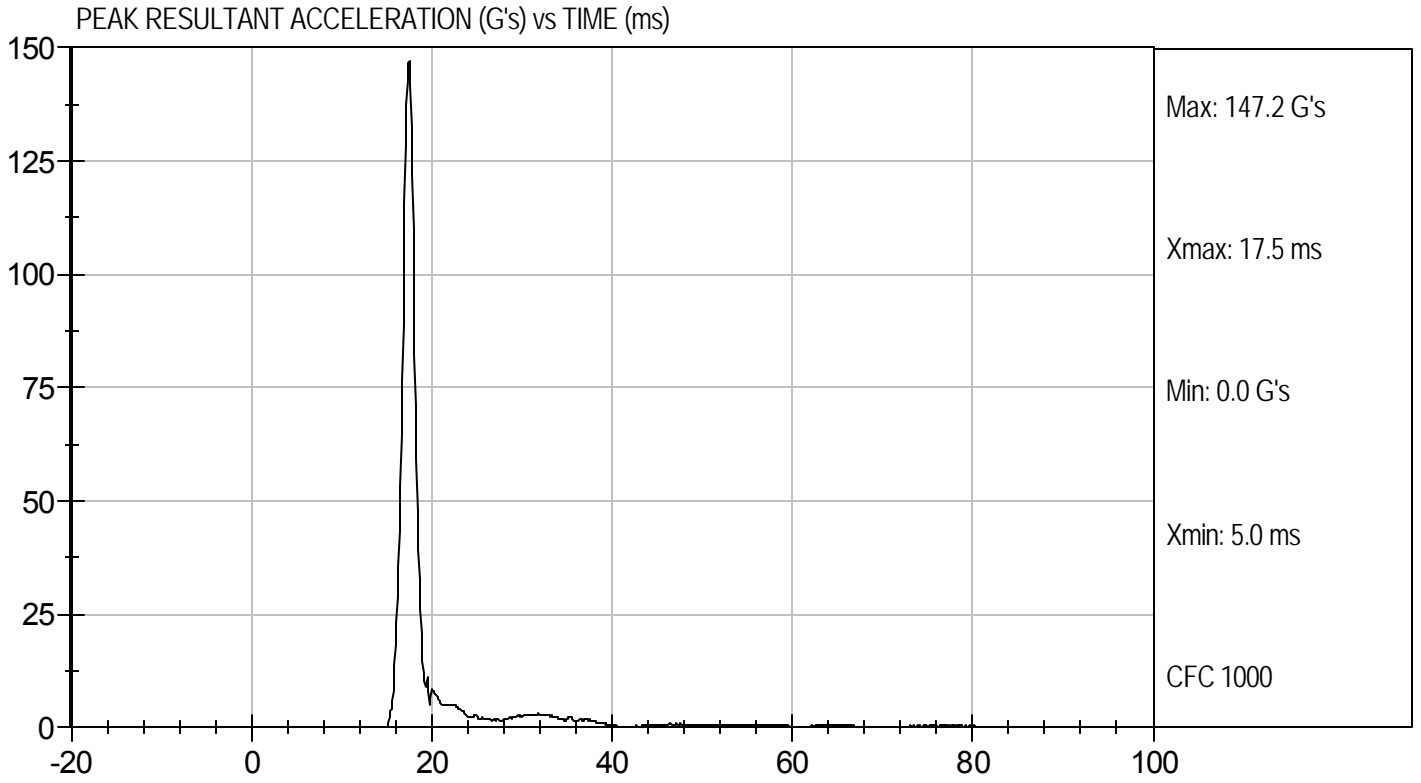
10/20/10
Test Date

David Winkelbauer
Approved By



Test Desc: Head Drop
Component ID: D103581

Test Date: 10/20/10
Velocity: 0 ft/s, 0.00 m/s



MGA RESEARCH CORPORATION
NECK PENDULUM TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D.: D103582

| Tested Parameter | | Units | Specification | Result | Pass/Fail |
|--------------------------------------|-------|-------|-----------------|--------|-----------|
| Laboratory Temperature | | deg C | 18.0 to 22.0 | 21.7 | Pass |
| Laboratory Relative Humidity | | % | 10 to 70 | 33 | 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 | -0.334 | Pass |
| | 14 ms | m/s | -3.20 to -3.70 | -3.26 | Pass |
| Maximum Flexion Angle | | deg | 49.0 to 59.0 | 54.0 | Pass |
| Time of Maximum Flexion Angle | | ms | 54.0 to 66.0 | 63.4 | Pass |
| Head Rotation Decay Time to 0 degree | | ms | 53.0 to 88.0 | 60.9 | Pass |
| Overall Test Results | | | | | Pass |

Jessica Hall
 Laboratory Technician

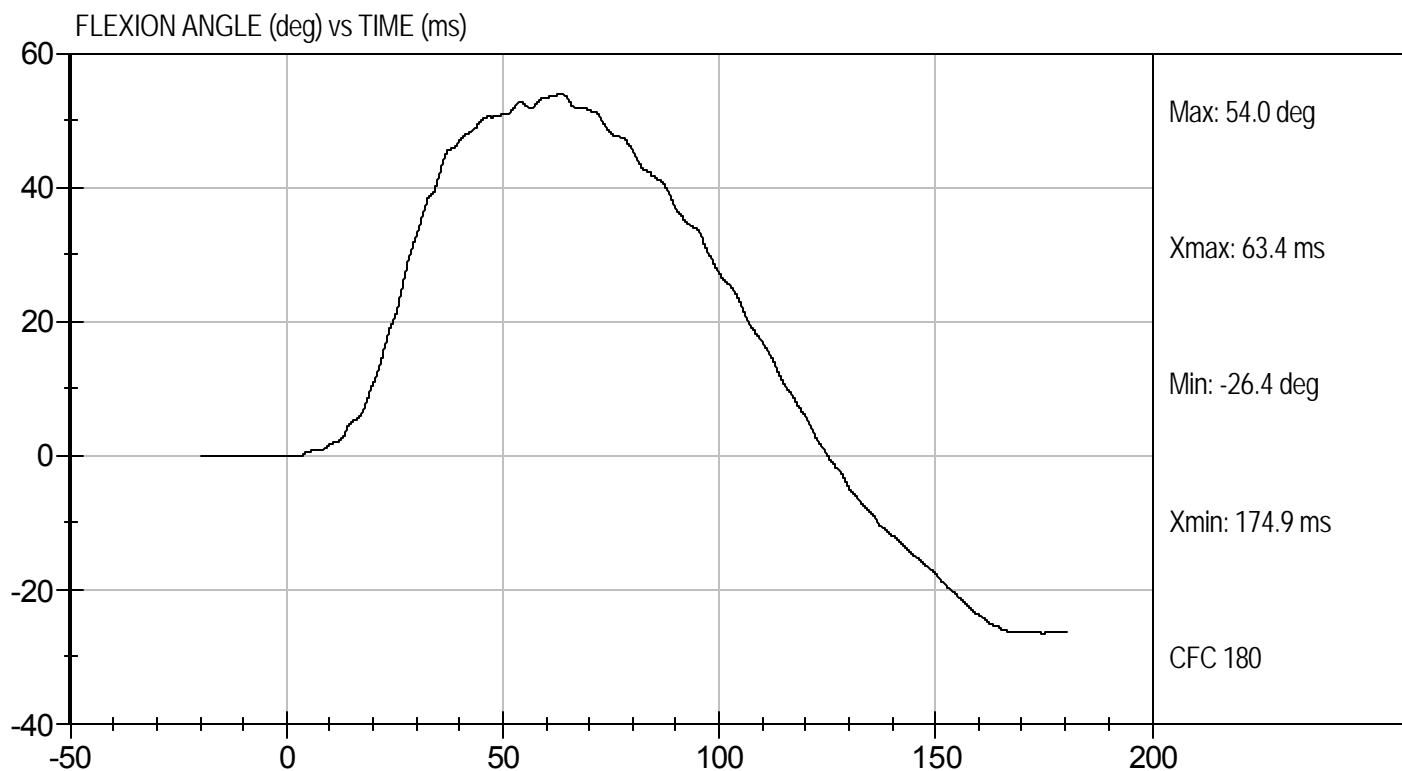
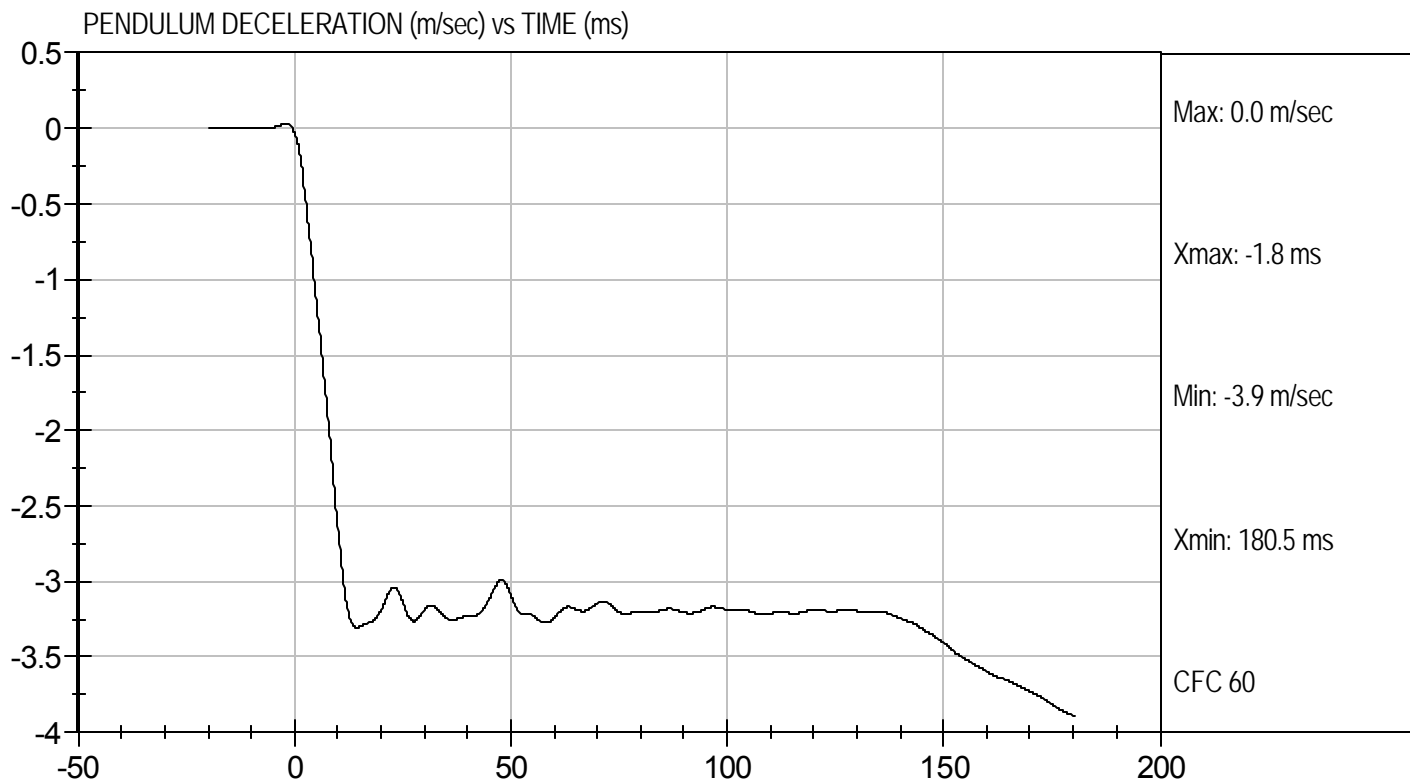
10/20/10
 Test Date

David Winkelbauer
 Approved By



Test Desc: Neck Bending
Component ID: D103582

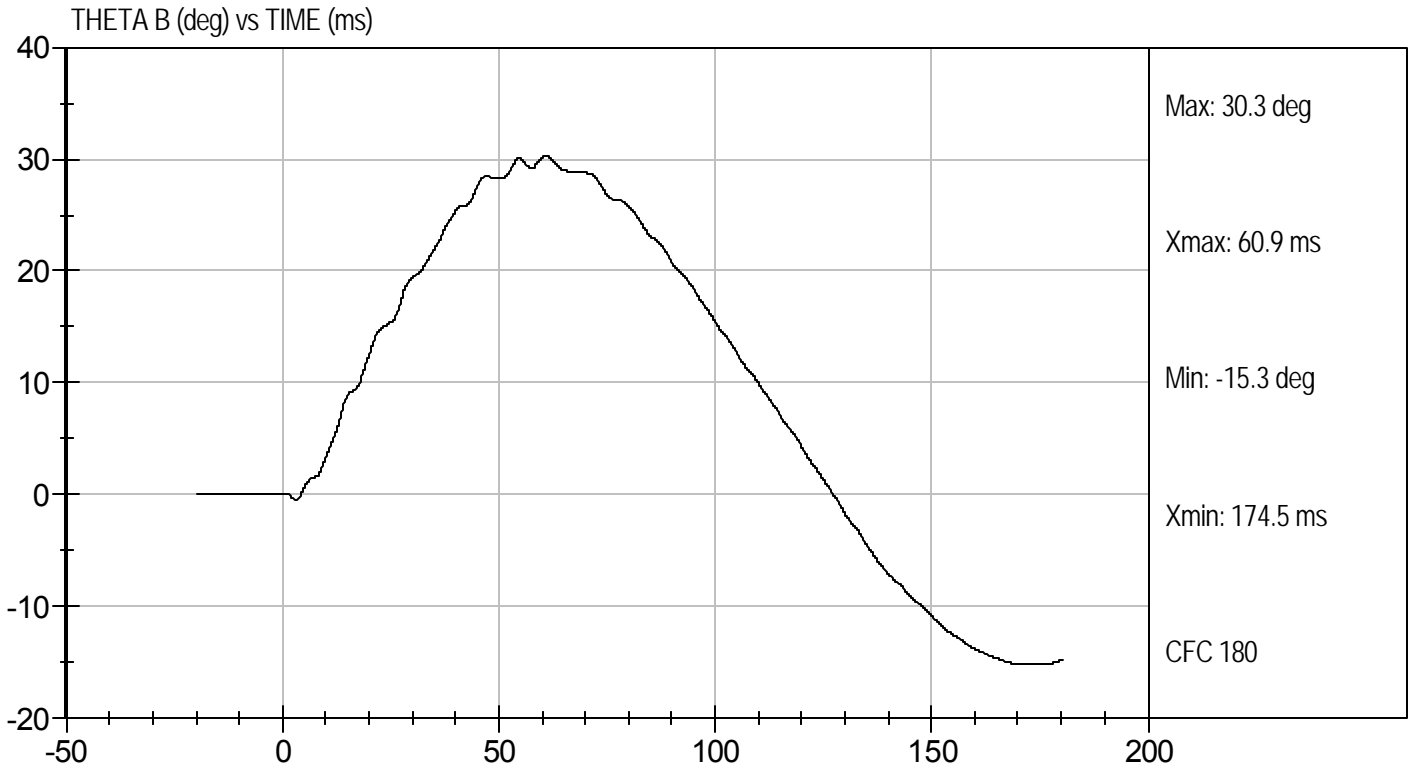
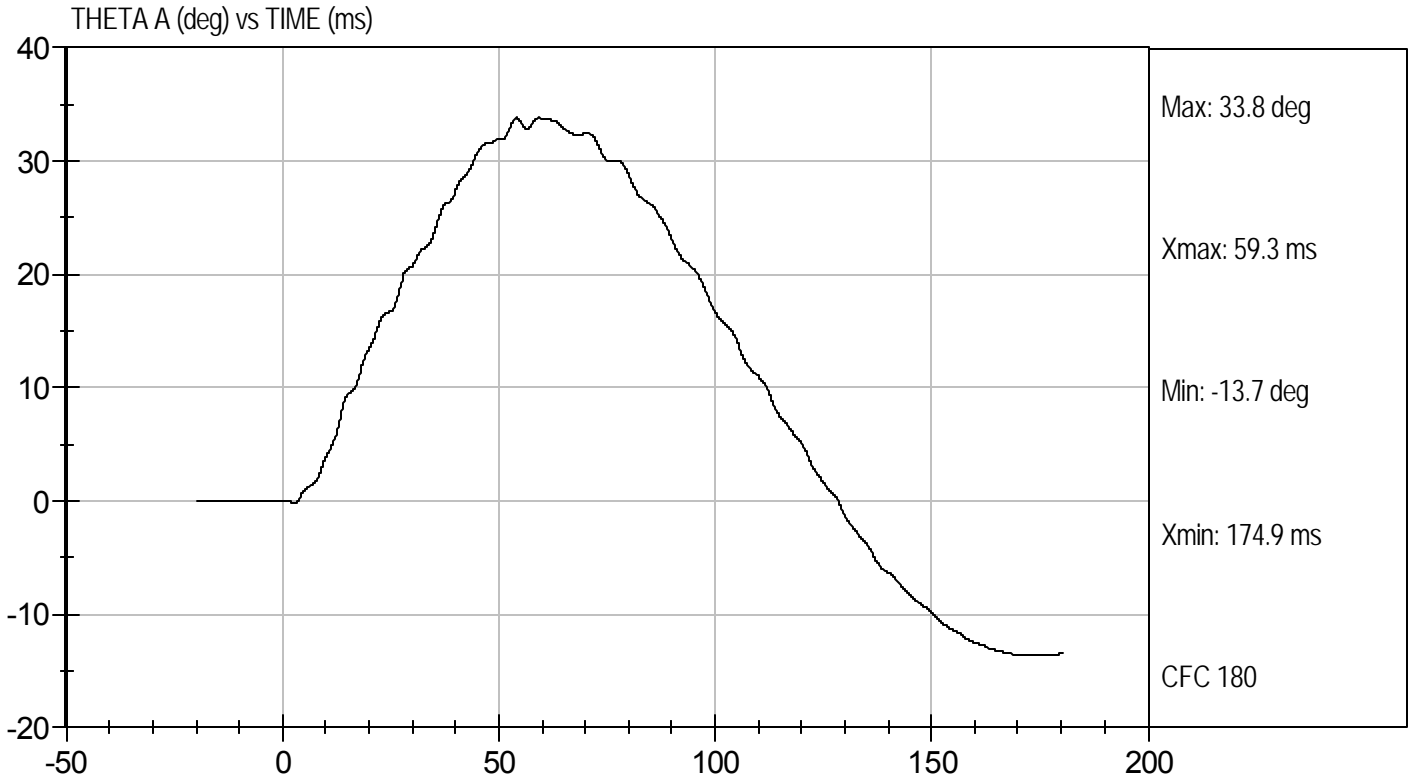
Test Date: 10/20/10
Velocity: 11.04 ft/s, 3.4 m/s





Test Desc: Neck Bending
Component ID: D103582

Test Date: 10/20/10
Velocity: 11.04 ft/s, 3.4 m/s



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D103583

| 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 | 35 | Pass |
| Pendulum Speed | m/s | 4.2 to 4.4 | 4.2 | Pass |
| Peak Shoulder Acceleration | G's | 7.5 to 10.5 | 9.6 | Pass |
| Time of Peak Shoulder Acceleration | ms | NA | 13.5 | Pass |
| Overall Test Results | | | | Pass |

Jessica Gall
 Laboratory Technician

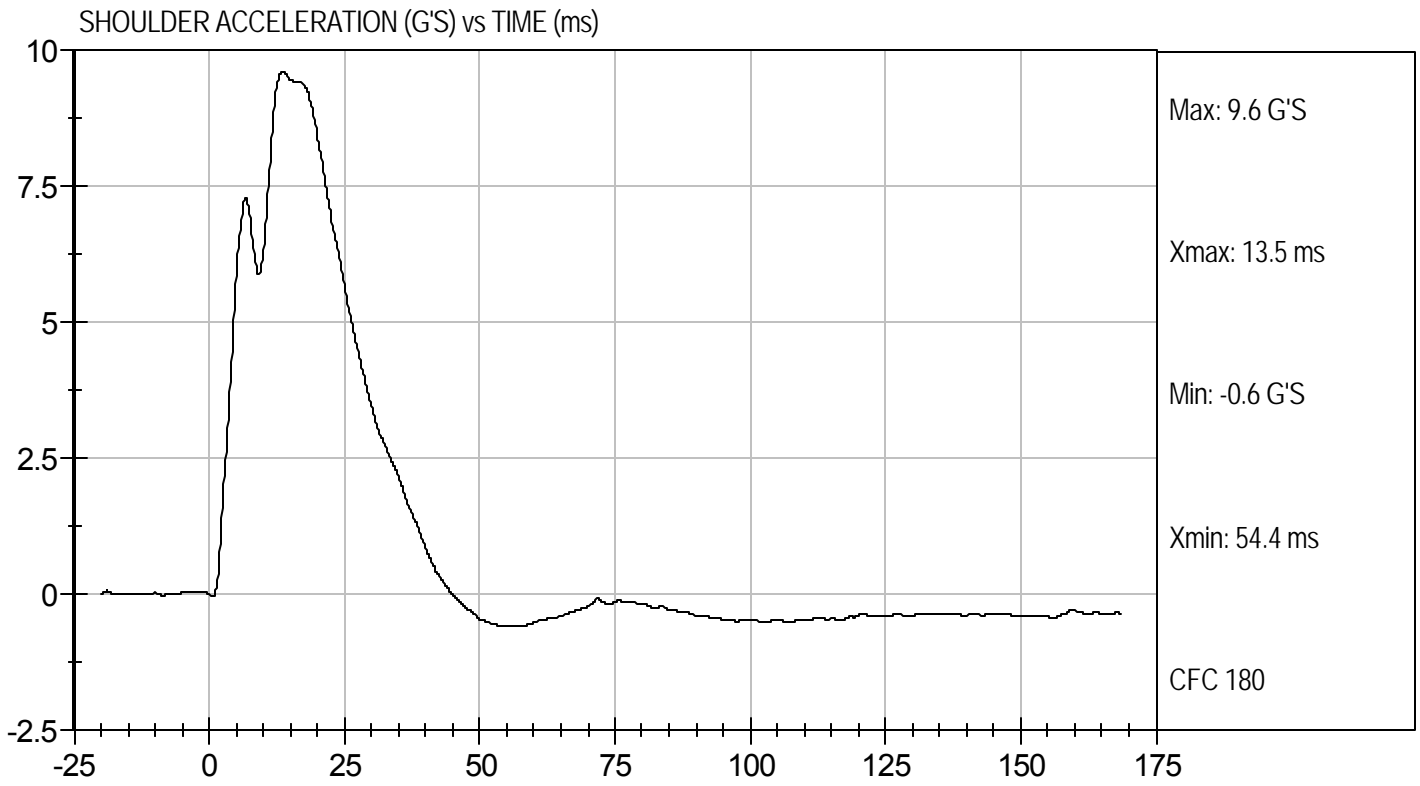
10/20/10
 Test Date

David Winkelbauer
 Approved By



Test Desc: Shoulder Impact
Component ID: D103583

Test Date: 10/20/10
Velocity: 13.88 ft/s, 4.2 m/s



MGA RESEARCH CORPORATION

UPPER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D103584

| 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 | 32 | Pass |
| Displacement at 3 m/s | mm | 36.0 to 40.0 | 36.8 | Pass |
| Displacement at 4 m/s | mm | 46.0 to 51.0 | 47.4 | Pass |
| Overall Test Results | | | | Pass |

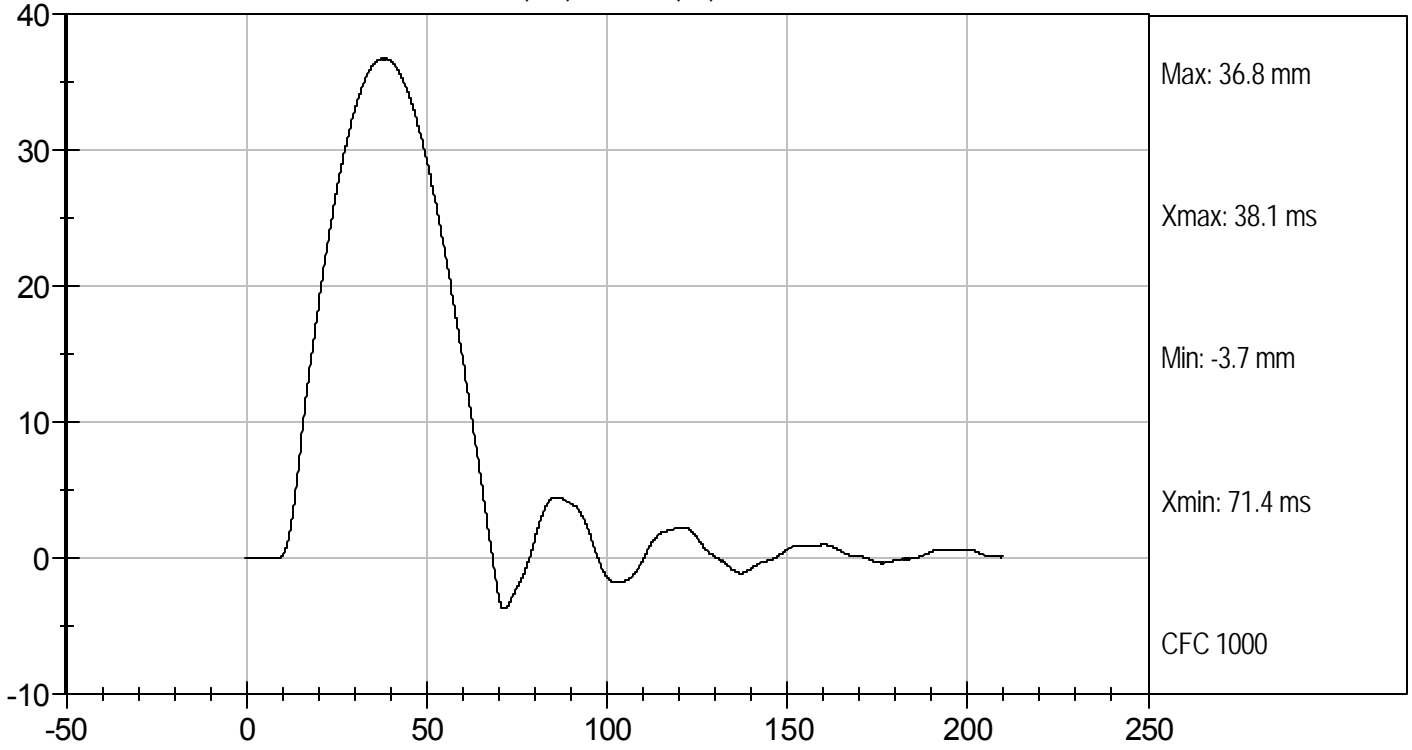
Jessica Gall
Laboratory Technician

10/20/10
Test Date

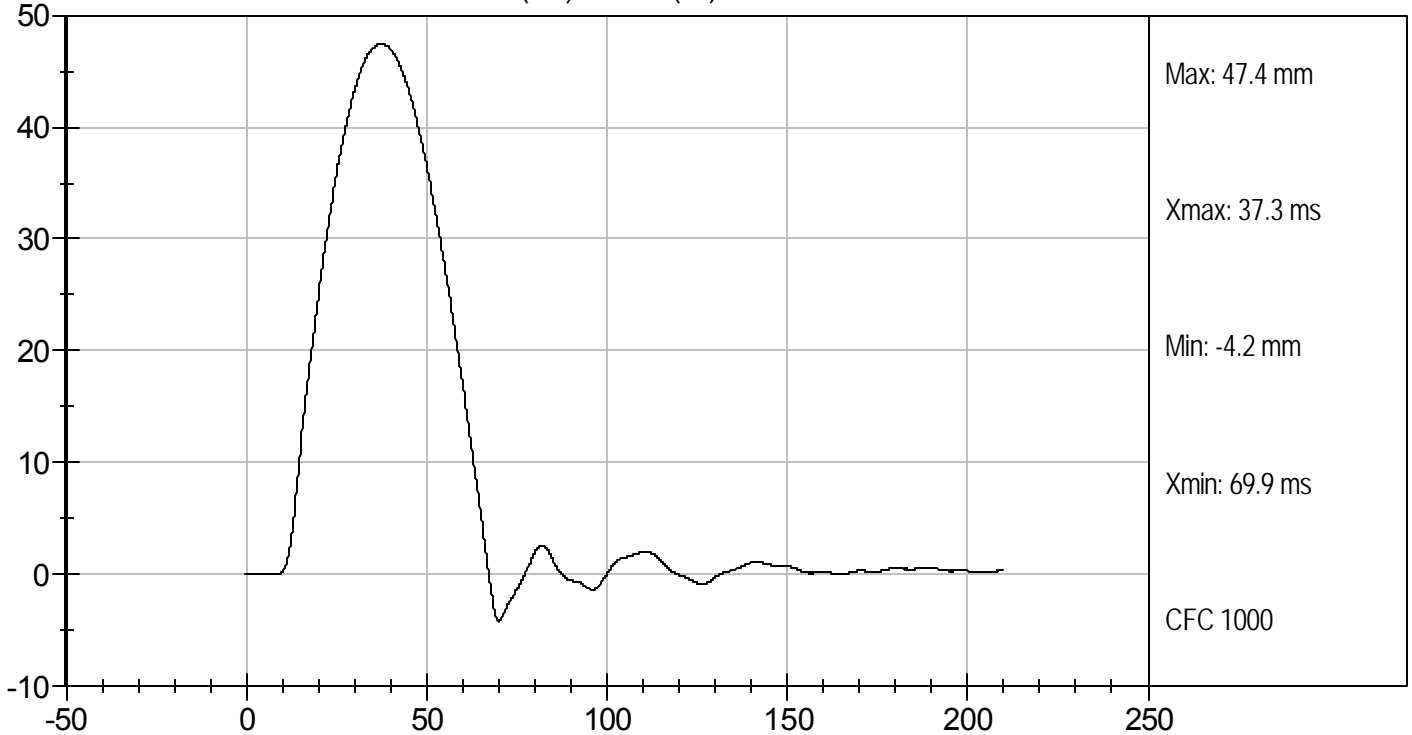
David Winkelbauer
Approved By



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: D103585

| 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 | 32 | Pass |
| Displacement at 3 m/s | mm | 36.0 to 40.0 | 36.9 | Pass |
| Displacement at 4 m/s | mm | 46.0 to 51.0 | 47.7 | Pass |
| Overall Test Results | | | | Pass |

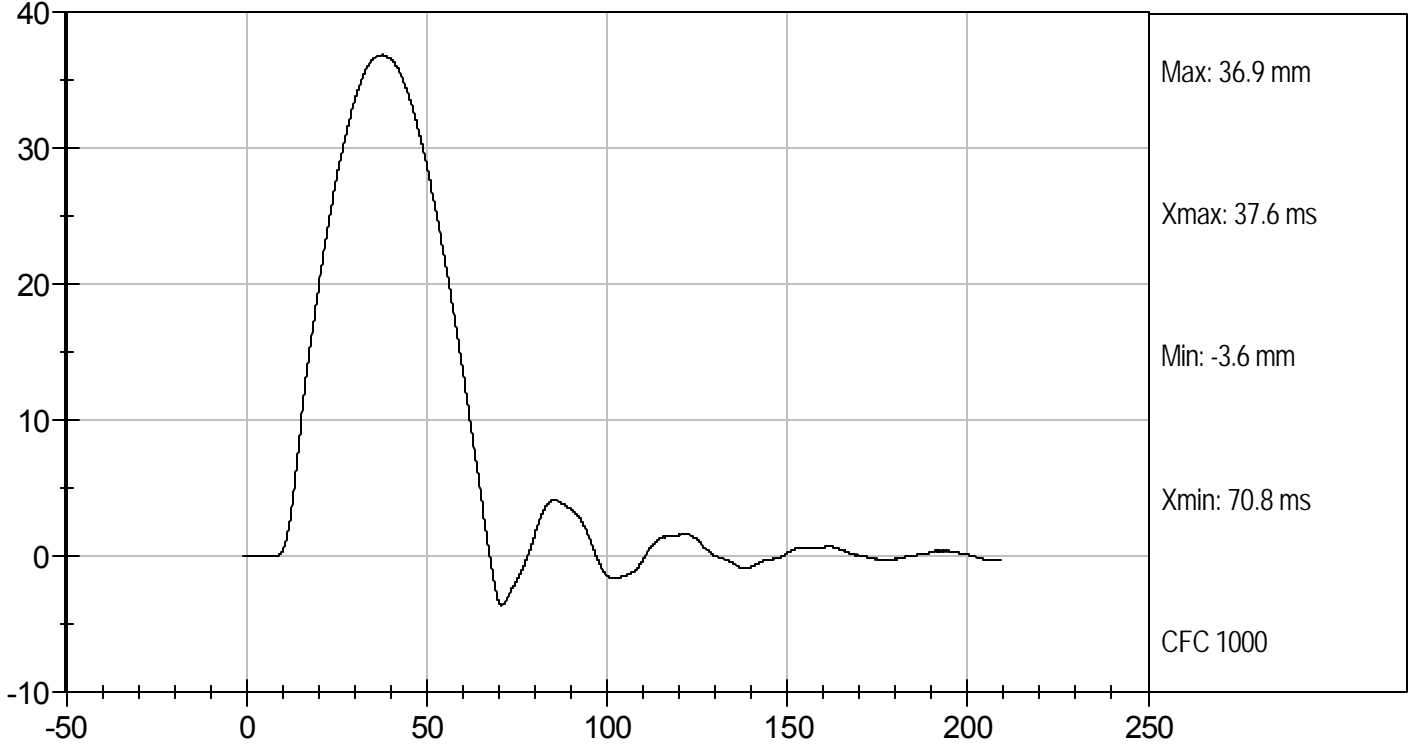
Jessica Hall
Laboratory Technician

10/20/10
Test Date

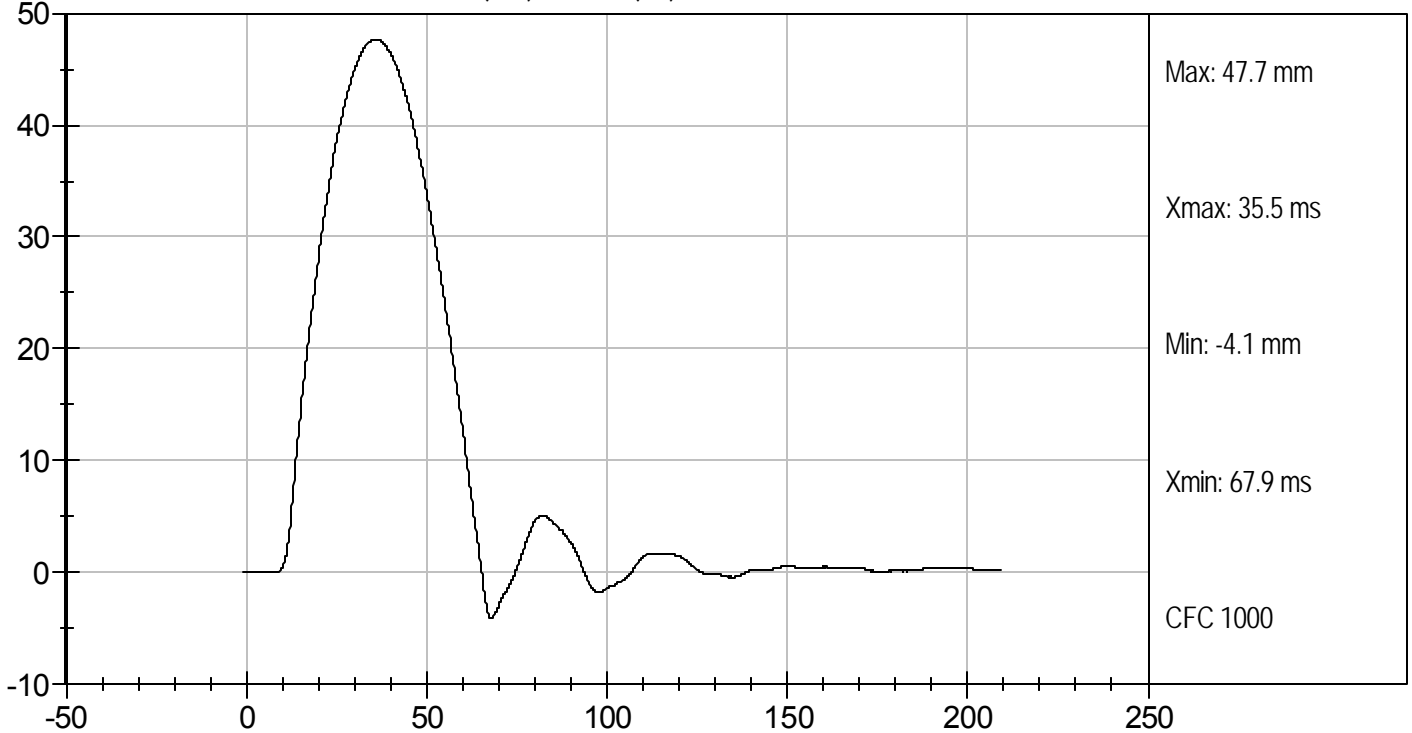
David Winkelbauer
Approved By



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



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



MGA RESEARCH CORPORATION

LOWER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D103586

| 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 | 32 | Pass |
| Displacement at 3 m/s | mm | 36.0 to 40.0 | 37.8 | Pass |
| Displacement at 4 m/s | mm | 46.0 to 51.0 | 48.0 | Pass |
| Overall Test Results | | | | Pass |

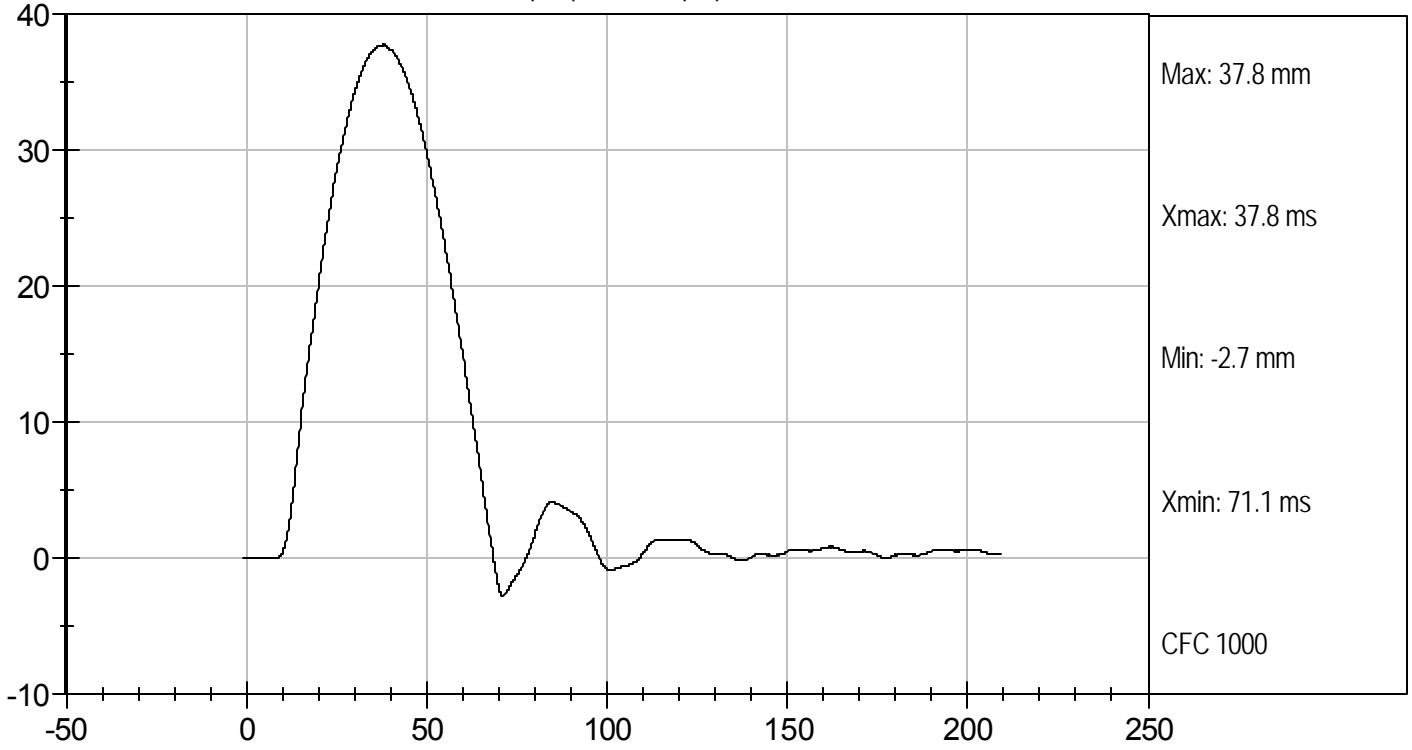
Jessica Gall
Laboratory Technician

10/20/10
Test Date

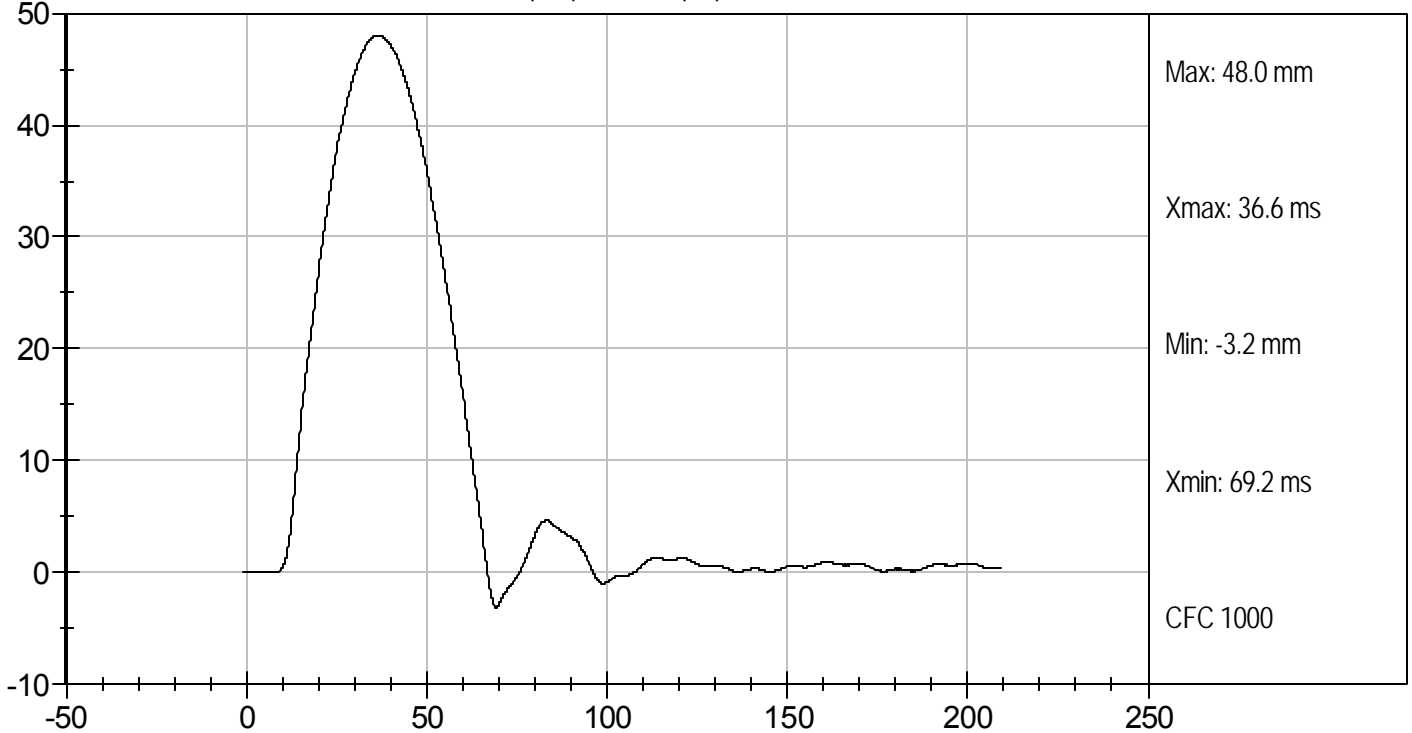
David Winkelbauer
Approved By



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: D103587

| 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 | 32 | Pass |
| Probe Speed | m/s | 3.90 to 4.10 | 4.1 | Pass |
| Maximum Impact Force | kN | 4.00 to 4.80 | 4.25 | Pass |
| Time of Maximum Impact Force | ms | 10.60 to 13.00 | 11.00 | Pass |
| Maximum Total Abdomen Force | kN | 2.20 to 2.70 | 2.50 | Pass |
| Time of Maximum Abdomen Force | ms | 10.00 to 12.30 | 10.70 | Pass |
| Overall Test Results | | | | Pass |

Jessica Hall
Laboratory Technician

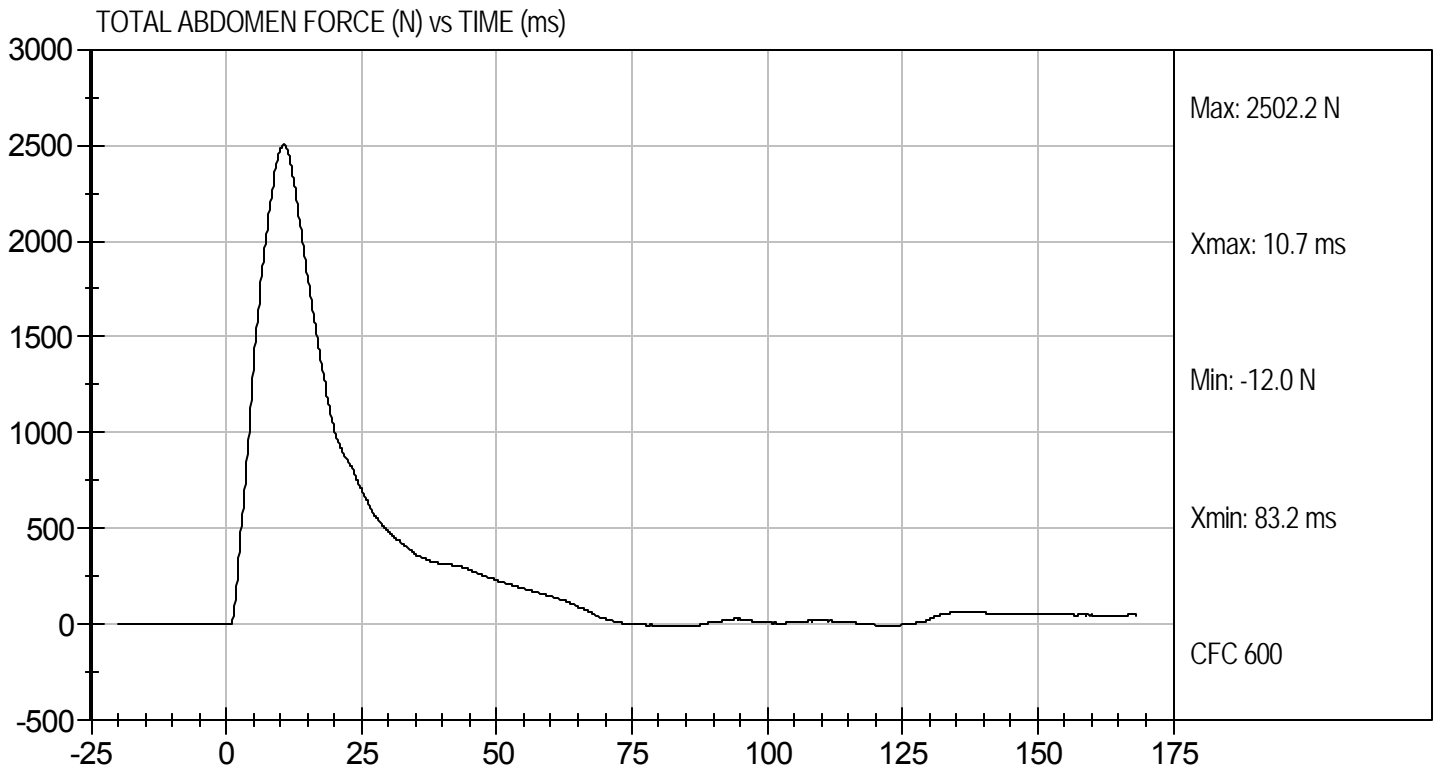
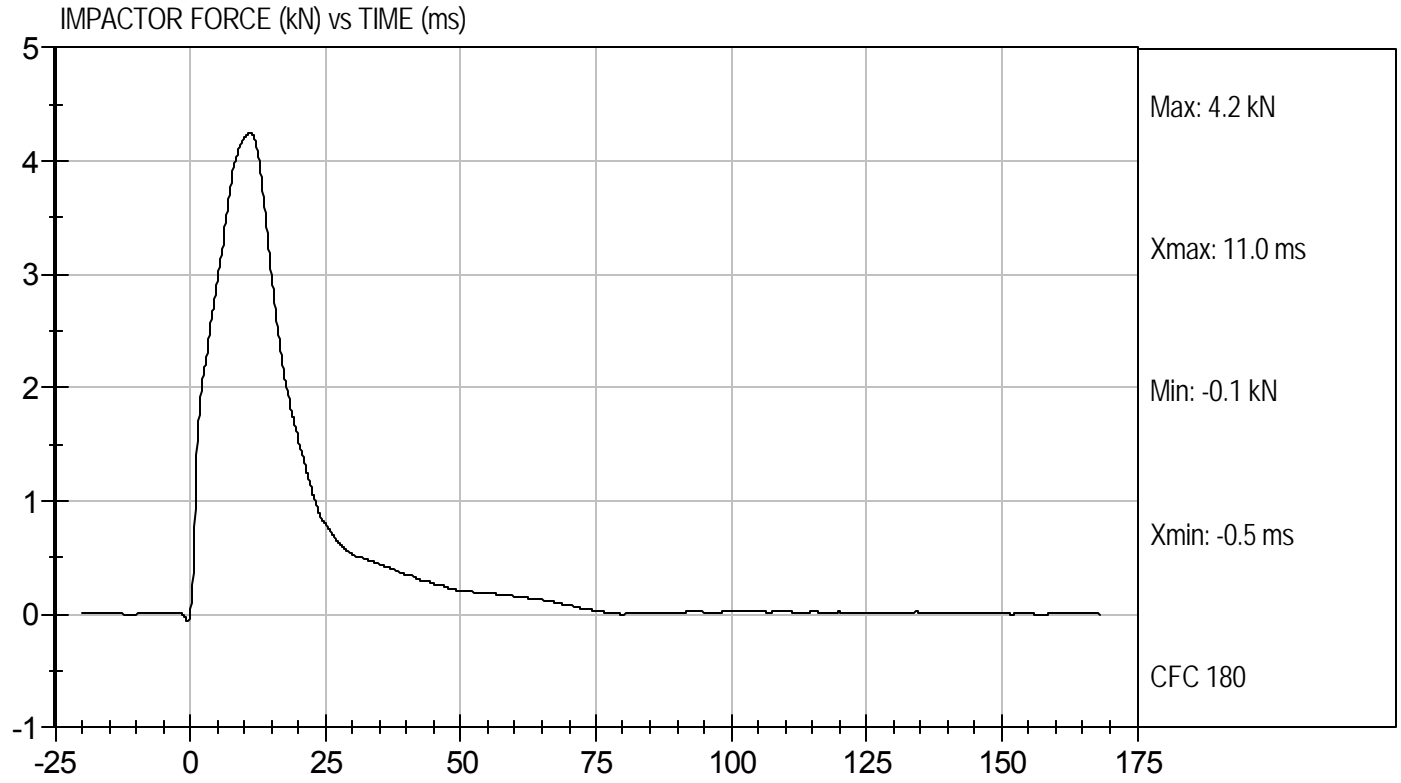
10/20/10
Test Date

David Winkelbauer
Approved By



Test Desc: Abdomen Impact
Component ID: D103587

Test Date: 10/20/10
Velocity: 13.44 ft/s, 4.1 m/s



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D.: D103588

| Tested Parameter | | Units | Specification | Result | Pass/Fail |
|---|--------|-------|-----------------|--------|-----------|
| Laboratory Temperature | | deg C | 20.6 to 22.2 | 22.1 | Pass |
| Laboratory Relative Humidity | | % | 10 to 70 | 27 | Pass |
| Pendulum Speed | | m/s | 5.95 to 6.15 | 6.12 | Pass |
| Pendulum Deceleration | 1 ms | m/s | -0.05 to 0.00 | -0.01 | Pass |
| | 3.7 ms | m/s | -0.425 to -0.24 | -0.42 | Pass |
| | 27 ms | m/s | -6.50 to -5.80 | -5.98 | Pass |
| | 30 ms | m/s | >= -6.5 | -5.93 | Pass |
| Maximum Flexion Angle | | deg | 45.0 to 55.0 | 47.7 | Pass |
| Time of Maximum Flexion Angle | | ms | 39.0 to 53.0 | 44.5 | Pass |
| Headform Rotation Decay to Initial Position | | ms | 37 to 57 | 42 | Pass |
| Overall Results | | | | | Pass |

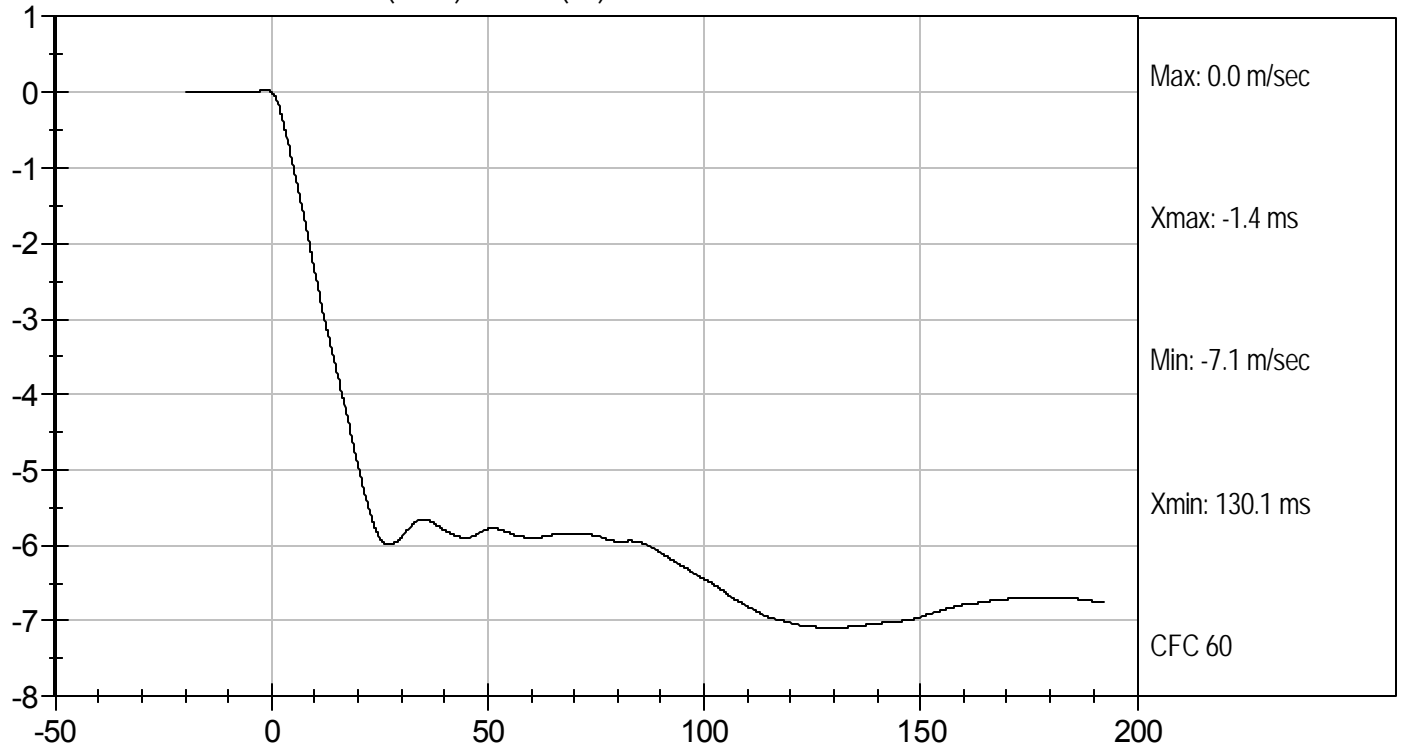

 Laboratory Technician

10/20/10
 Test Date

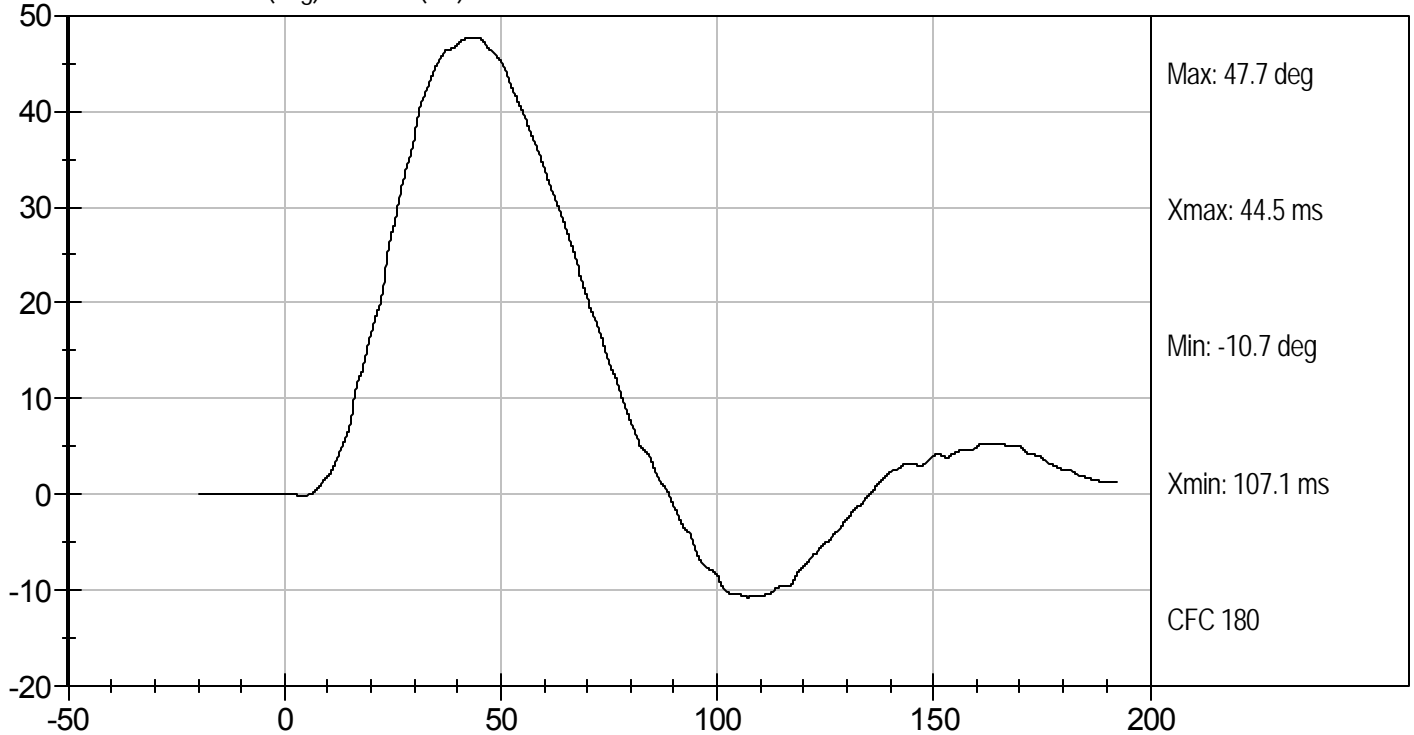

 Approved By

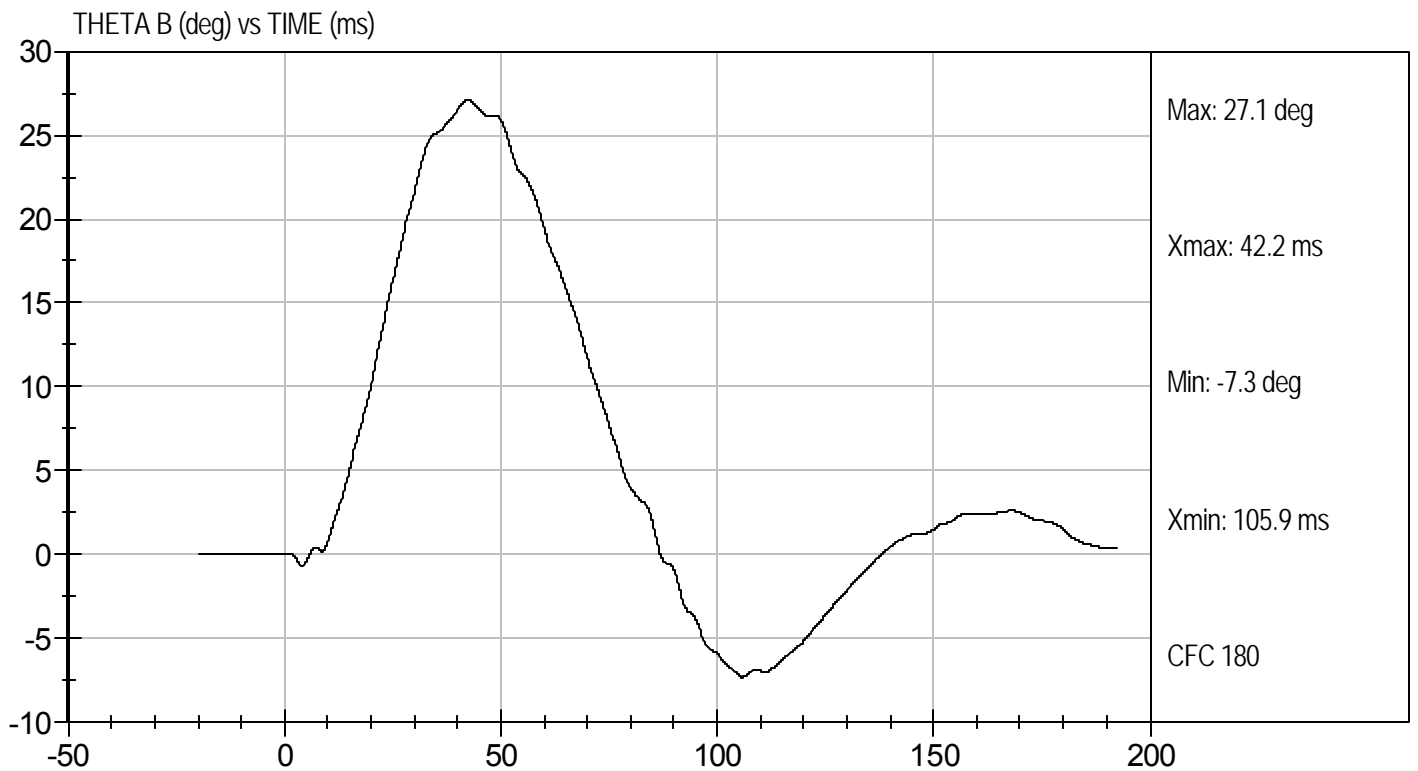
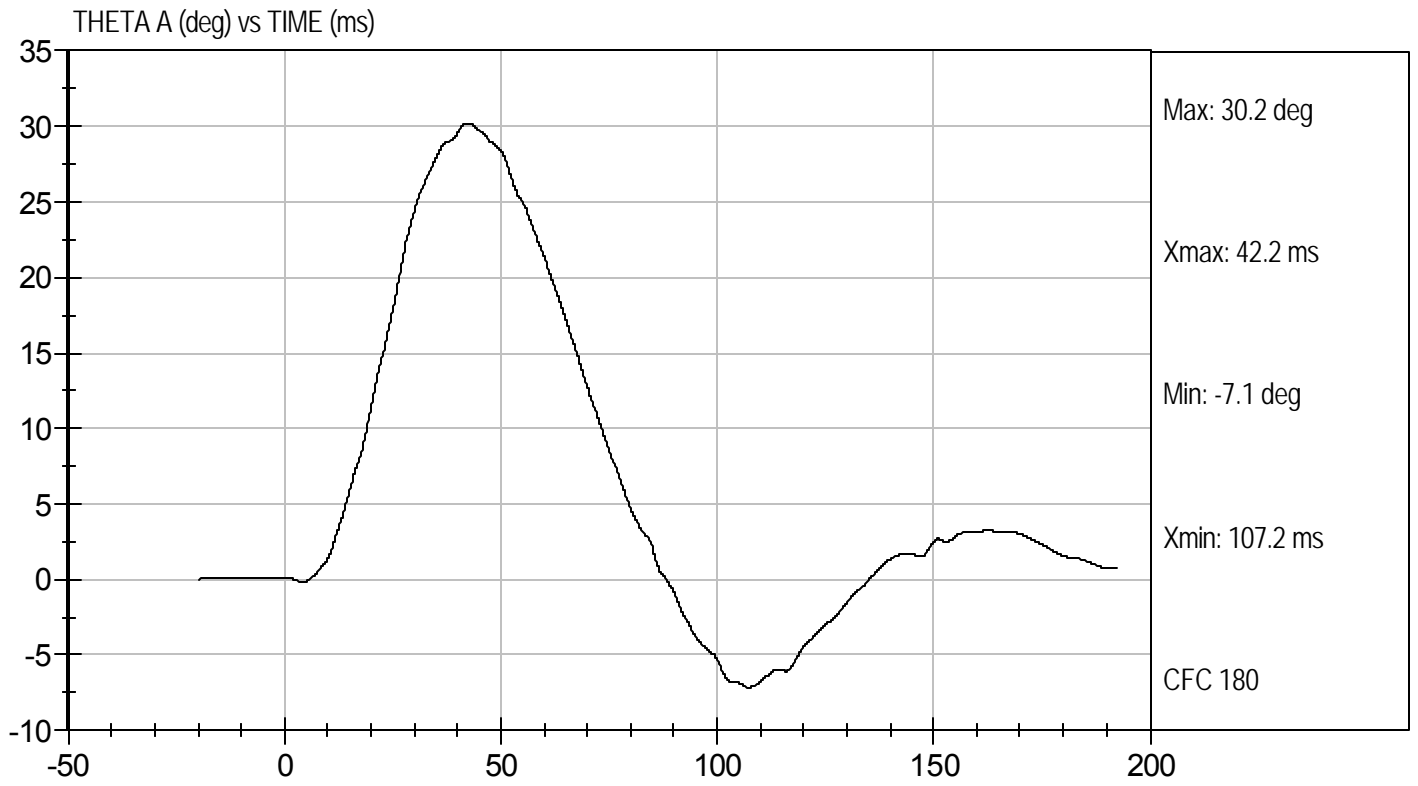


PENDULUM DECELERATION (m/sec) vs TIME (ms)



FLEXION ANGLE (deg) vs TIME (ms)





MGA RESEARCH CORPORATION

**PELVIS TEST
ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D103589

| 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 | 32 | Pass |
| Probe Speed | m/s | 4.20 to 4.40 | 4.38 | Pass |
| Maximum Impactor Force | kN | 4.70 to 5.40 | 4.82 | Pass |
| Time of Maximum Impactor Force | ms | 11.80 to 16.10 | 13.30 | Pass |
| Maximum Pubic Force | kN | 1.23 to 1.59 | 1.47 | Pass |
| Time of Maximum Pubic Force | ms | 12.20 to 17.00 | 15.40 | Pass |
| Overall Test Results | | | | Pass |

Jessica Hall
Laboratory Technician

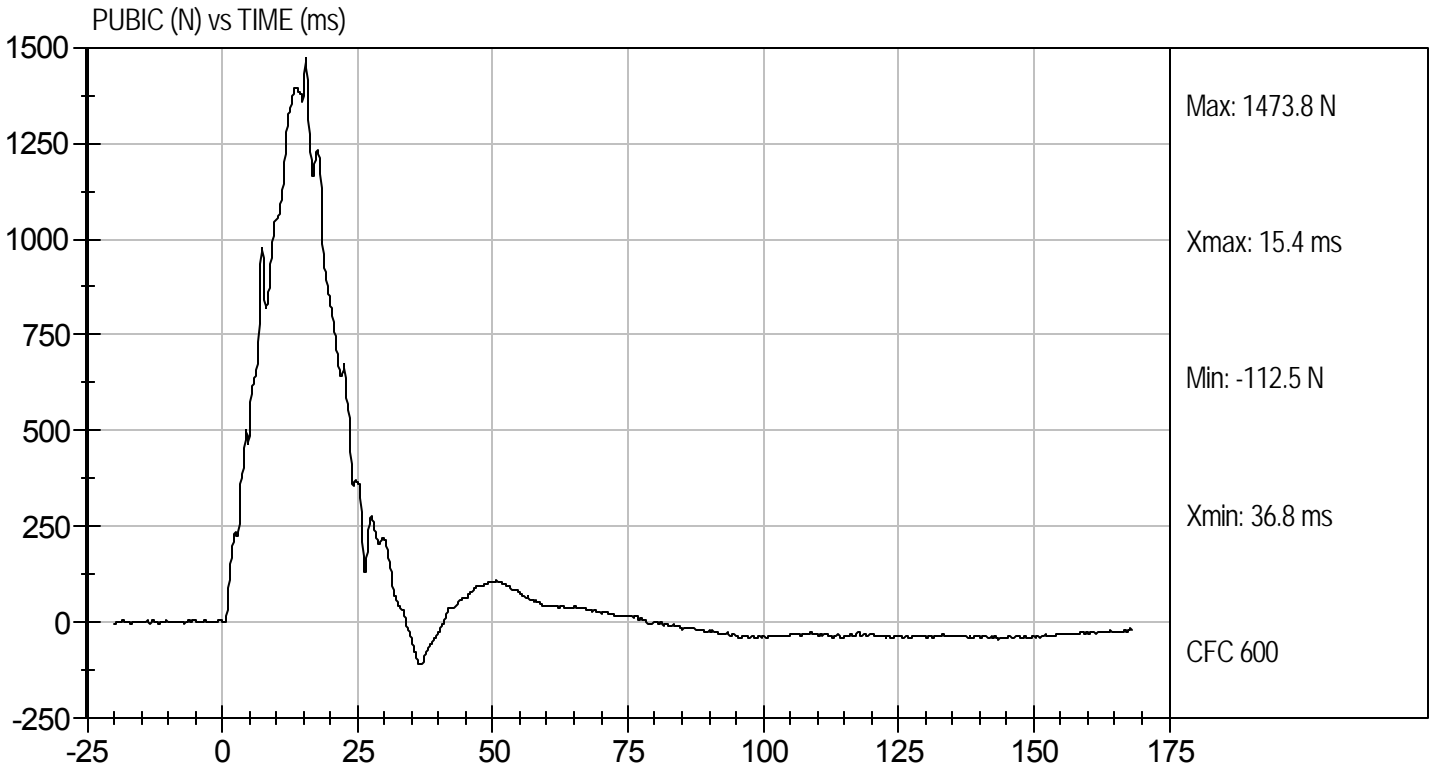
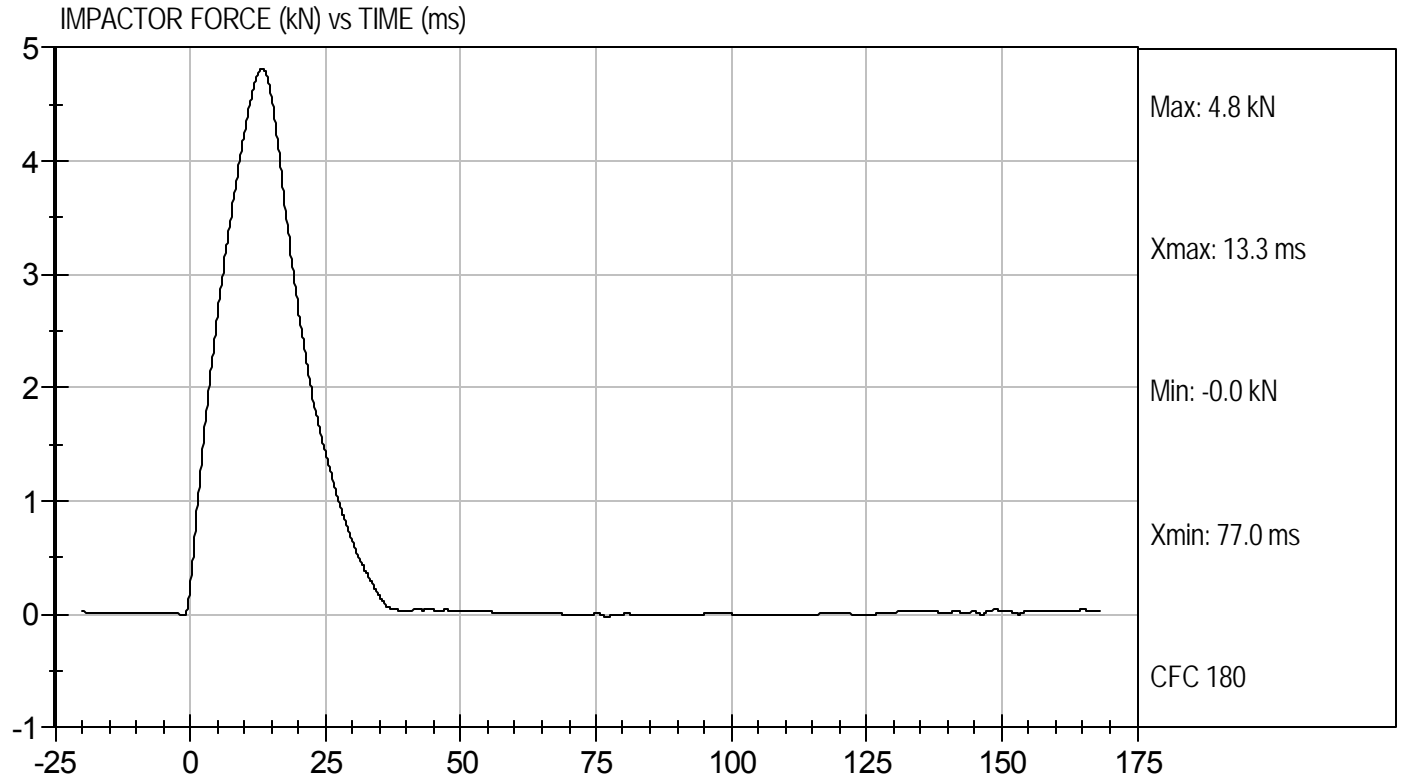
10/20/10
Test Date

David Winkelbauer
Approved By



Test Desc: Pelvis Impact
Component ID: D103589

Test Date: 10/20/10
Velocity: 14.36 ft/s, 4.38 m/s



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

ATD Serial No: 032

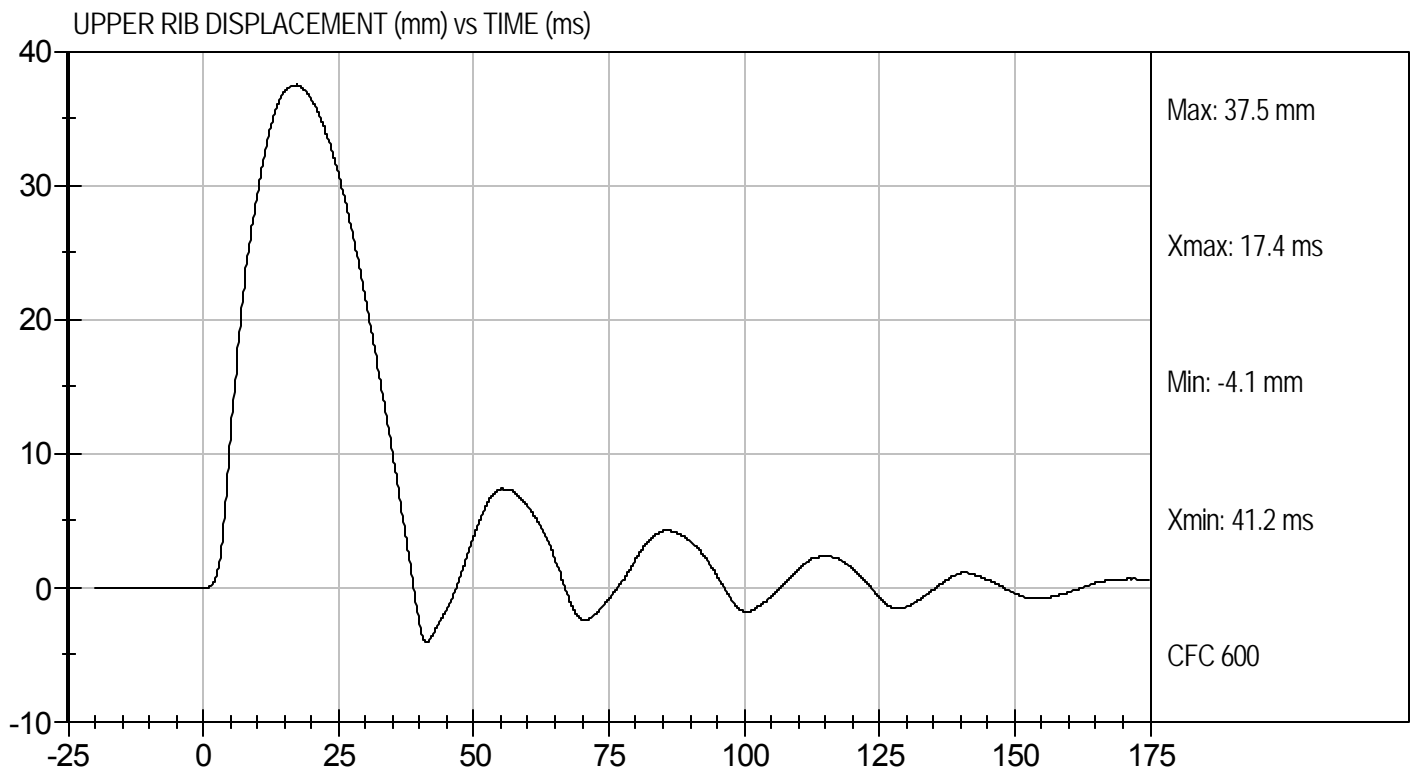
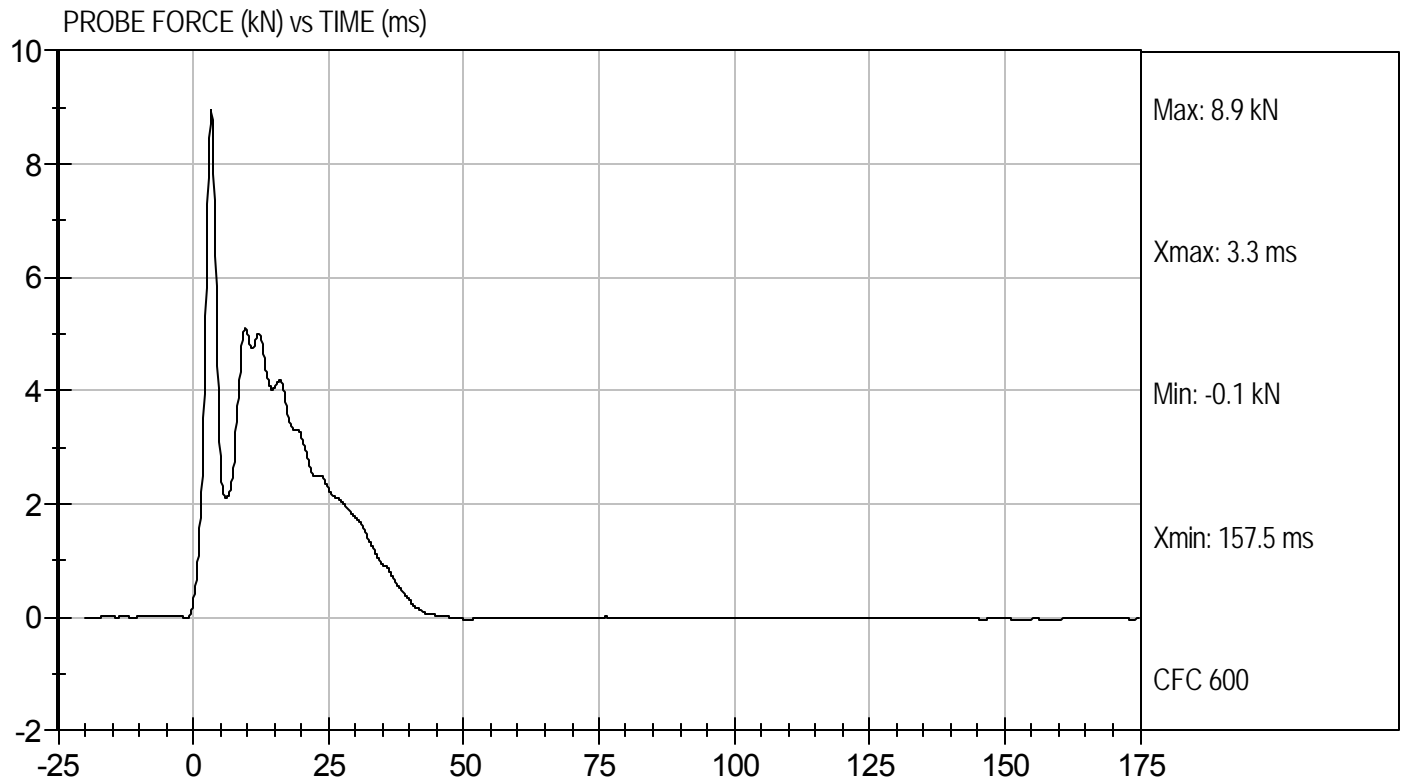
Test I.D: D103580

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|-------------------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 21.4 | Pass |
| Humidity | % | 10 to 70 | 32 | 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 | 5.10 | Pass |
| Upper Rib Displacement | mm | 34.0 to 41.0 | 37.5 | Pass |
| Middle Rib Displacement | mm | 37.0 to 45.0 | 40.1 | Pass |
| Lower Rib Displacement | mm | 37.0 to 44.0 | 39.6 | Pass |
| Overall Test Results | | | | Pass |

Jessica Gall
 Laboratory Technician

10/20/10
 Test Date

David Winkelbauer
 Approved By

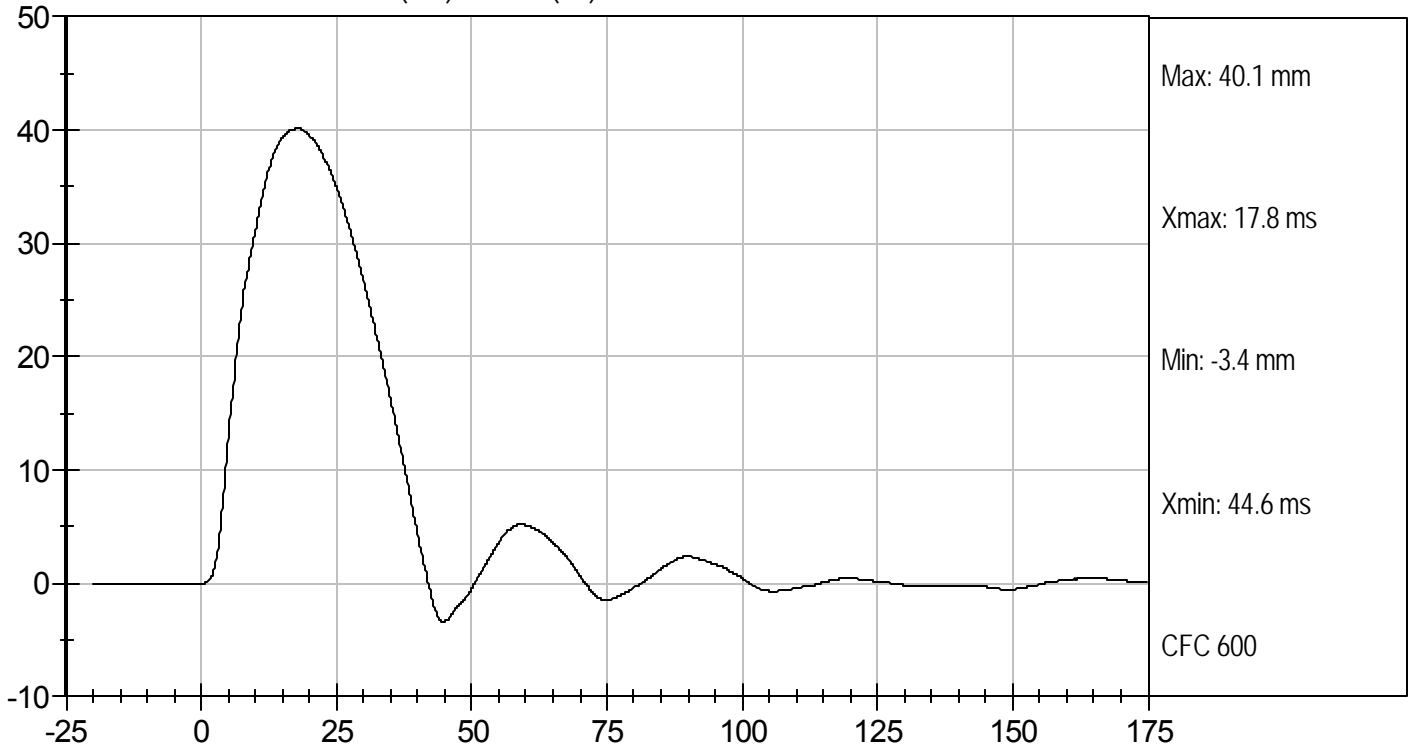




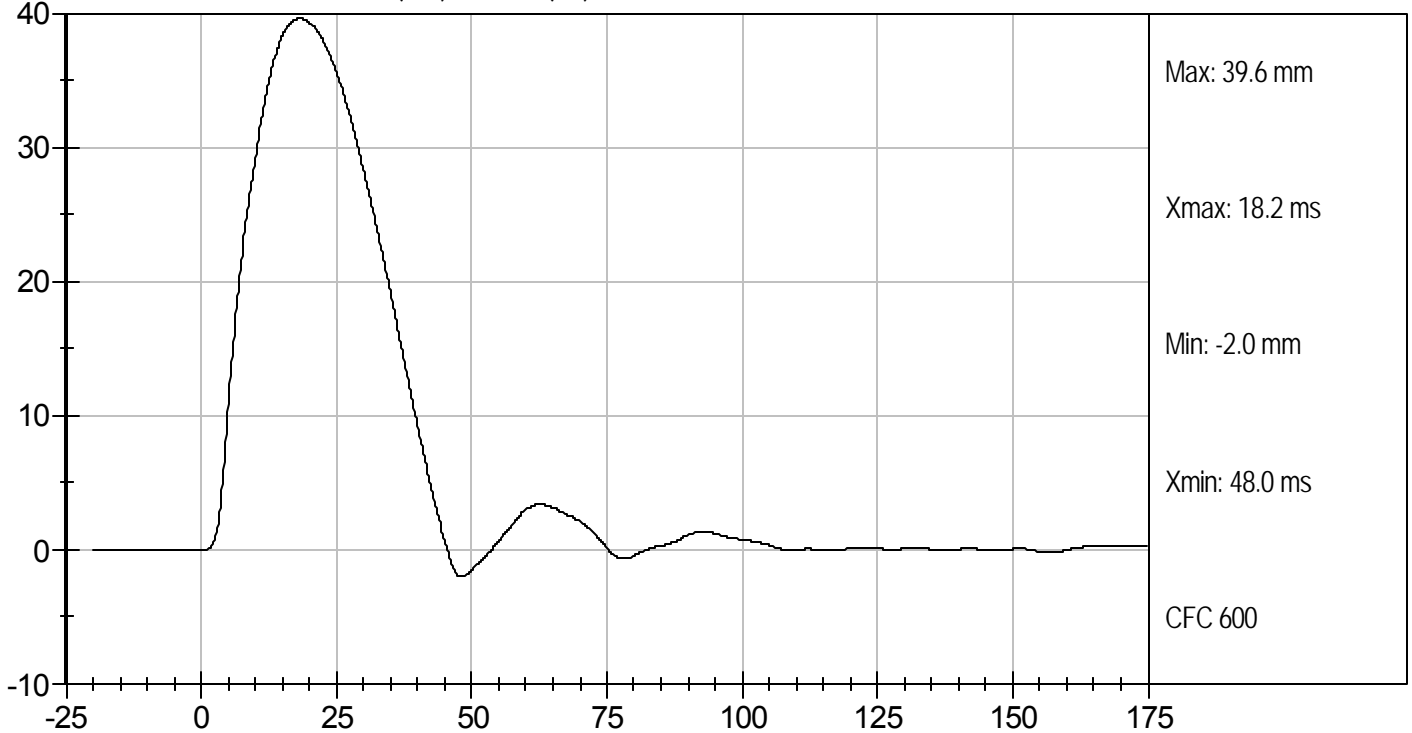
Test Desc: Thorax Impact
Component ID: D103580

Test Date: 10/20/10
Velocity: 17.92 ft/s, 5.46 m/s

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



MGA RESEARCH CORPORATION
HEAD DROP TEST
ES-2re DUMMY

ATD Serial No: 032

Test ID: D103691

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|--------------------|--------|-----------|
| Laboratory Temperature | deg C | 18.9 to 25.6 | 22.0 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 32 | Pass |
| Peak Resultant Acceleration | G's | 125 to 155 | 154 | Pass |
| Peak Lateral Acceleration | G's | +/- 15 | -9.6 | Pass |
| Unimodal | N/A | Yes | Yes | Pass |
| Oscillations | N/A | within 15% of peak | Yes | Pass |
| Overall Test Results | | | | Pass |

Jessica Gall
Laboratory Technician

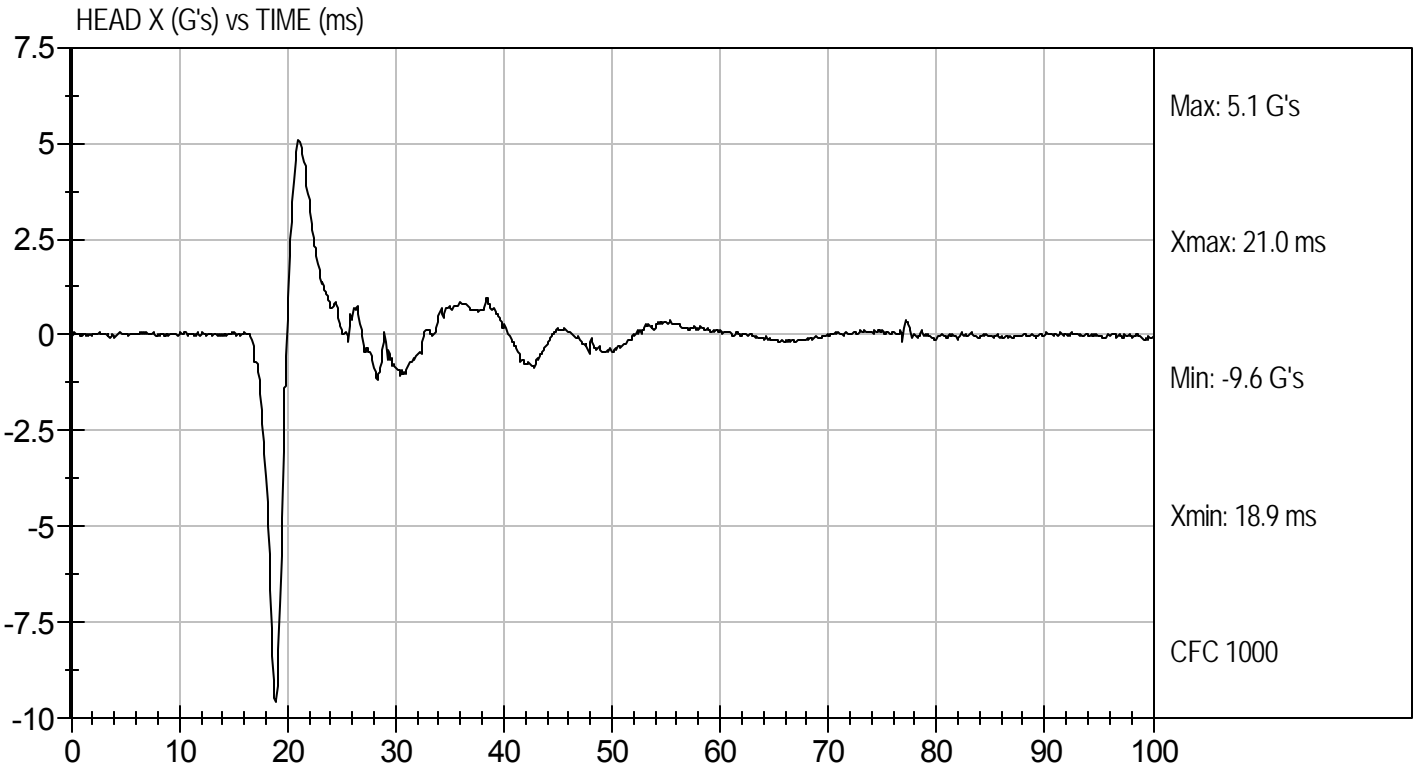
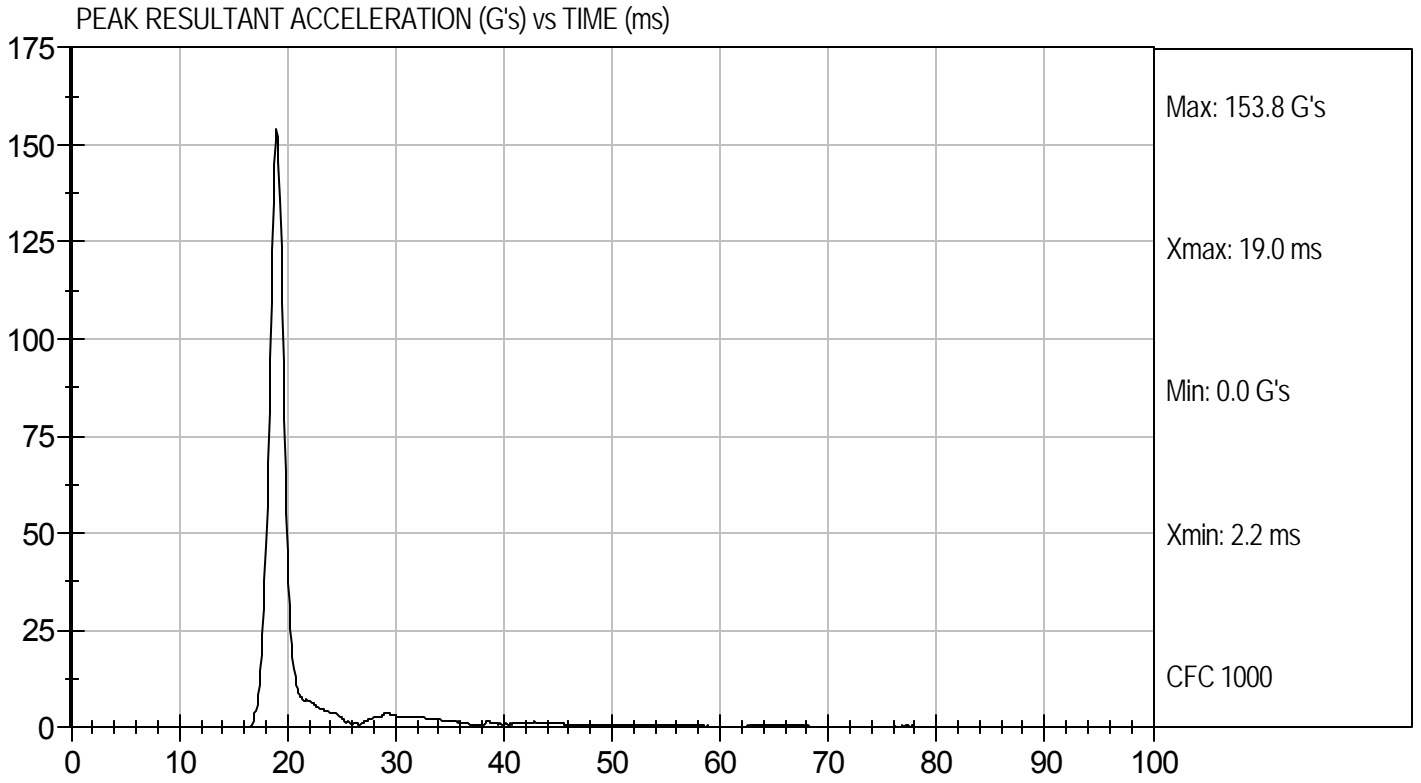
10/28/10
Test Date

David Winkelbauer
Approved By



Test Desc: Head Drop
Component ID: D103691

Test Date: 10/28/10
Velocity: 0 ft/s, 0 m/s



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

ATD Serial No: 032

Test I.D.: D103692

| Tested Parameter | | Units | Specification | Result | Pass/Fail |
|--------------------------------------|-------|-------|-----------------|--------|-----------|
| Laboratory Temperature | | deg C | 18.0 to 22.0 | 22.0 | Pass |
| Laboratory Relative Humidity | | % | 10 to 70 | 32 | Pass |
| Pendulum Speed | | m/s | 3.3 to 3.5 | 3.3 | Pass |
| Pendulum Deceleration | 1 ms | m/s | 0.00 to -0.05 | -0.02 | Pass |
| | 3 ms | m/s | -0.25 to -0.375 | -0.33 | Pass |
| | 14 ms | m/s | -3.20 to -3.70 | -3.34 | Pass |
| Maximum Flexion Angle | | deg | 49.0 to 59.0 | 53.6 | Pass |
| Time of Maximum Flexion Angle | | ms | 54.0 to 66.0 | 60.1 | Pass |
| Head Rotation Decay Time to 0 degree | | ms | 53.0 to 88.0 | 60.9 | Pass |
| Overall Test Results | | | | | Pass |

Jessica Hall
Laboratory Technician

10/28/10
Test Date

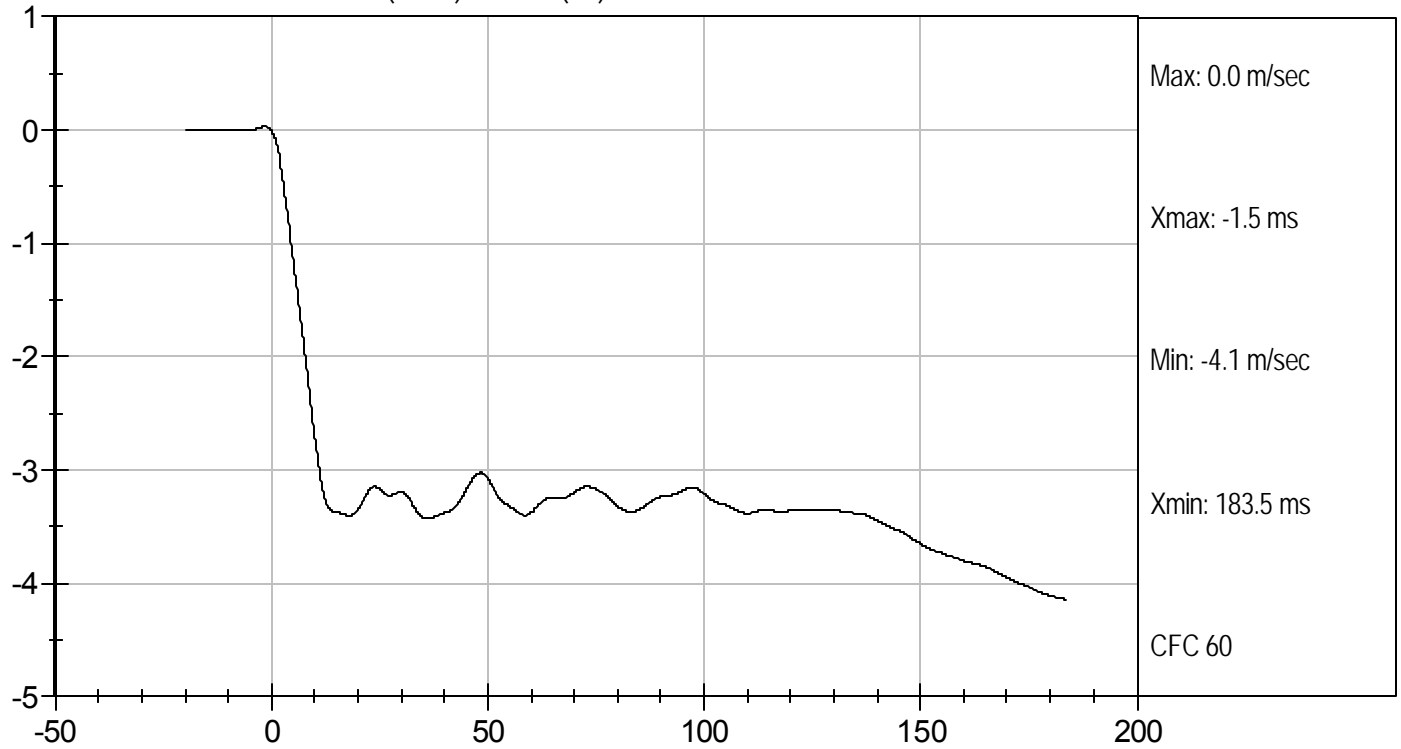
David Winkelbauer
Approved By



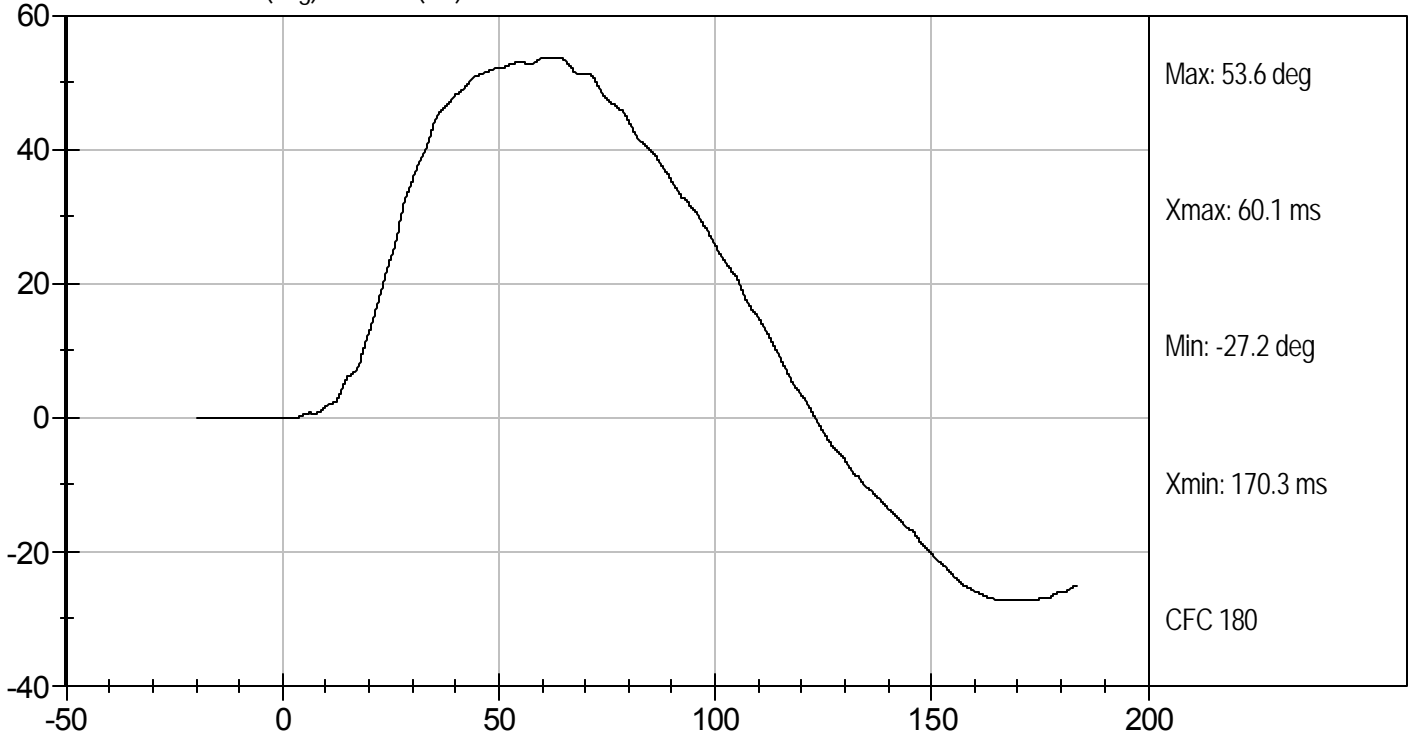
Test Desc: Neck Bending
Component ID: D103692

Test Date: 10/28/10
Velocity: 10.96 ft/s, 3.3 m/s

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



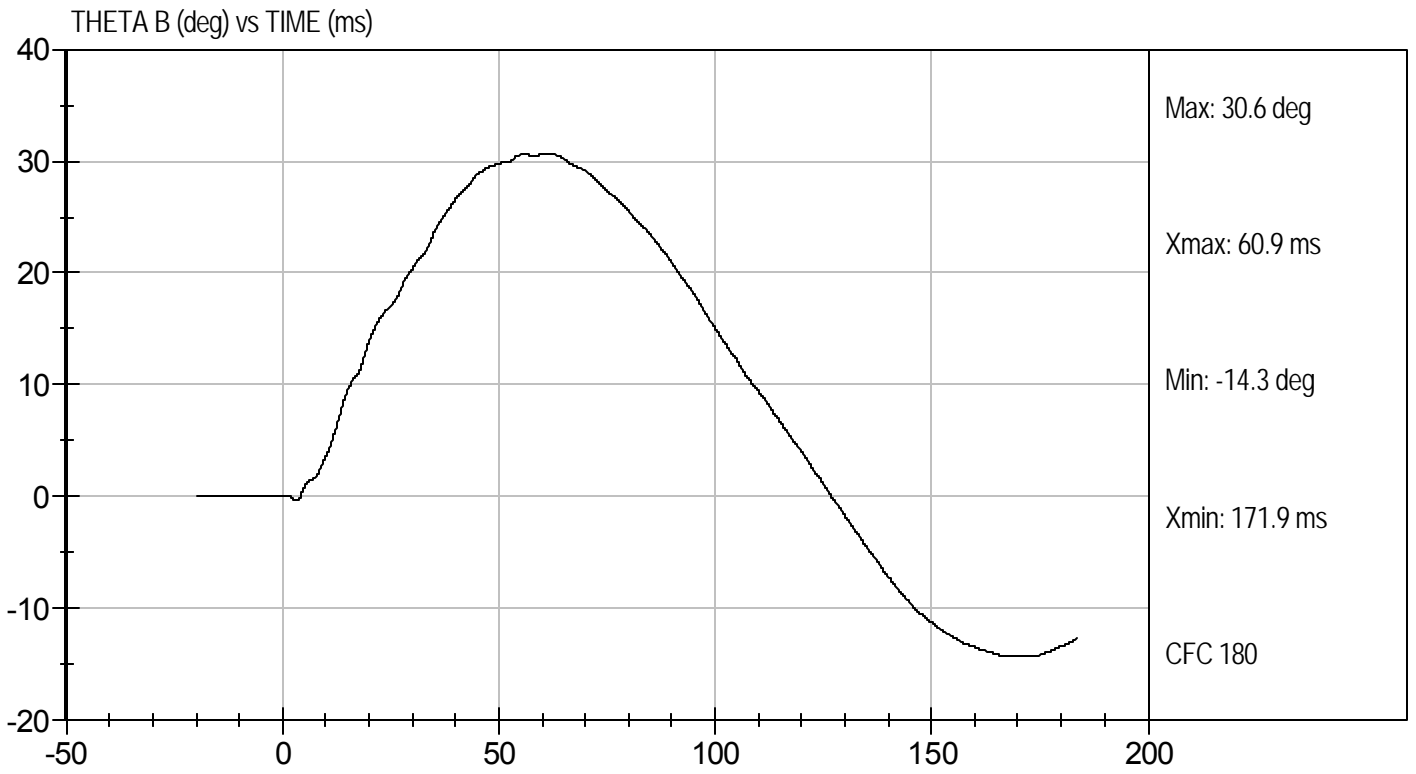
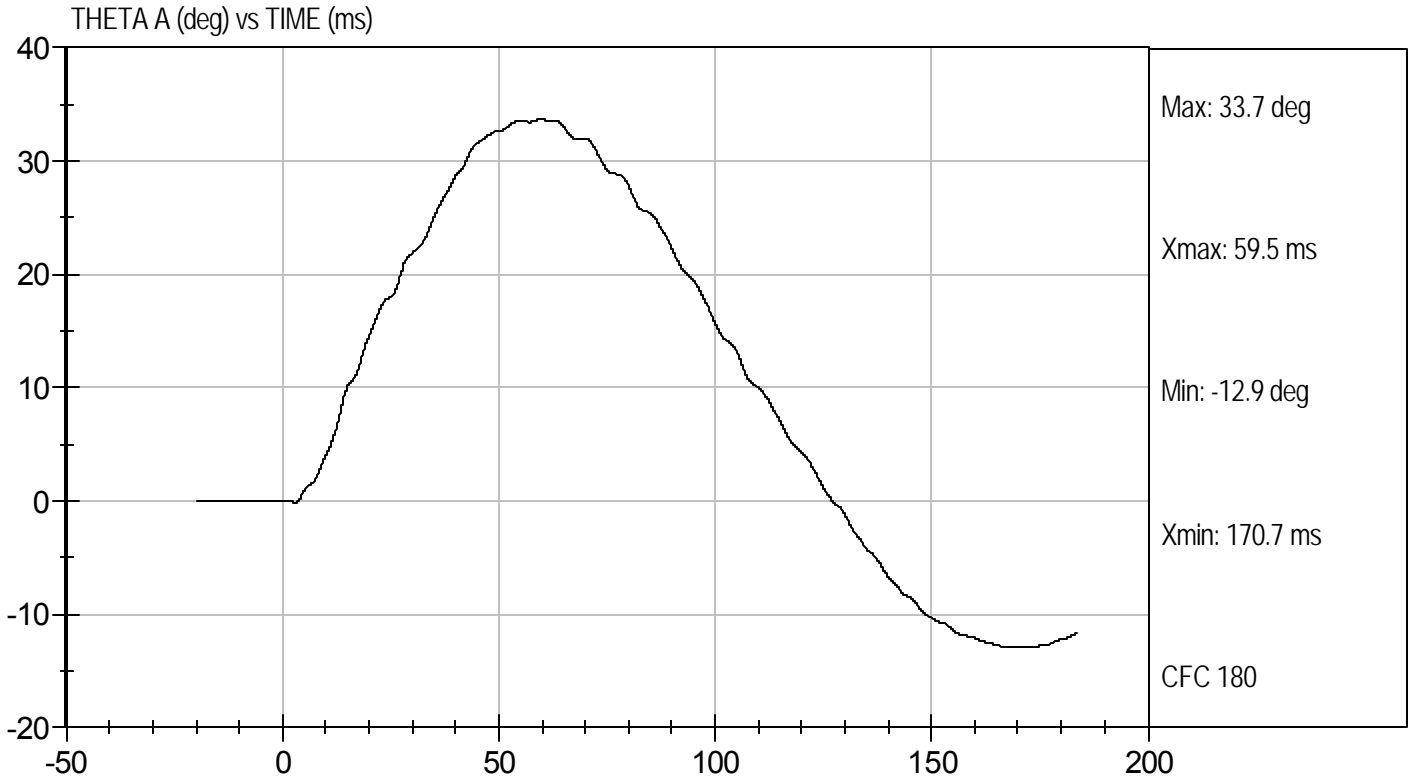
FLEXION ANGLE (deg) vs TIME (ms)





Test Desc: Neck Bending
Component ID: D103692

Test Date: 10/28/10
Velocity: 10.96 ft/s, 3.3 m/s



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D103693

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 21.8 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 29 | Pass |
| Pendulum Speed | m/s | 4.2 to 4.4 | 4.3 | Pass |
| Peak Shoulder Acceleration | G's | 7.5 to 10.5 | 9.8 | Pass |
| Time of Peak Shoulder Acceleration | ms | NA | 13.3 | Pass |
| Overall Test Results | | | | Pass |

Jessica Gall
 Laboratory Technician

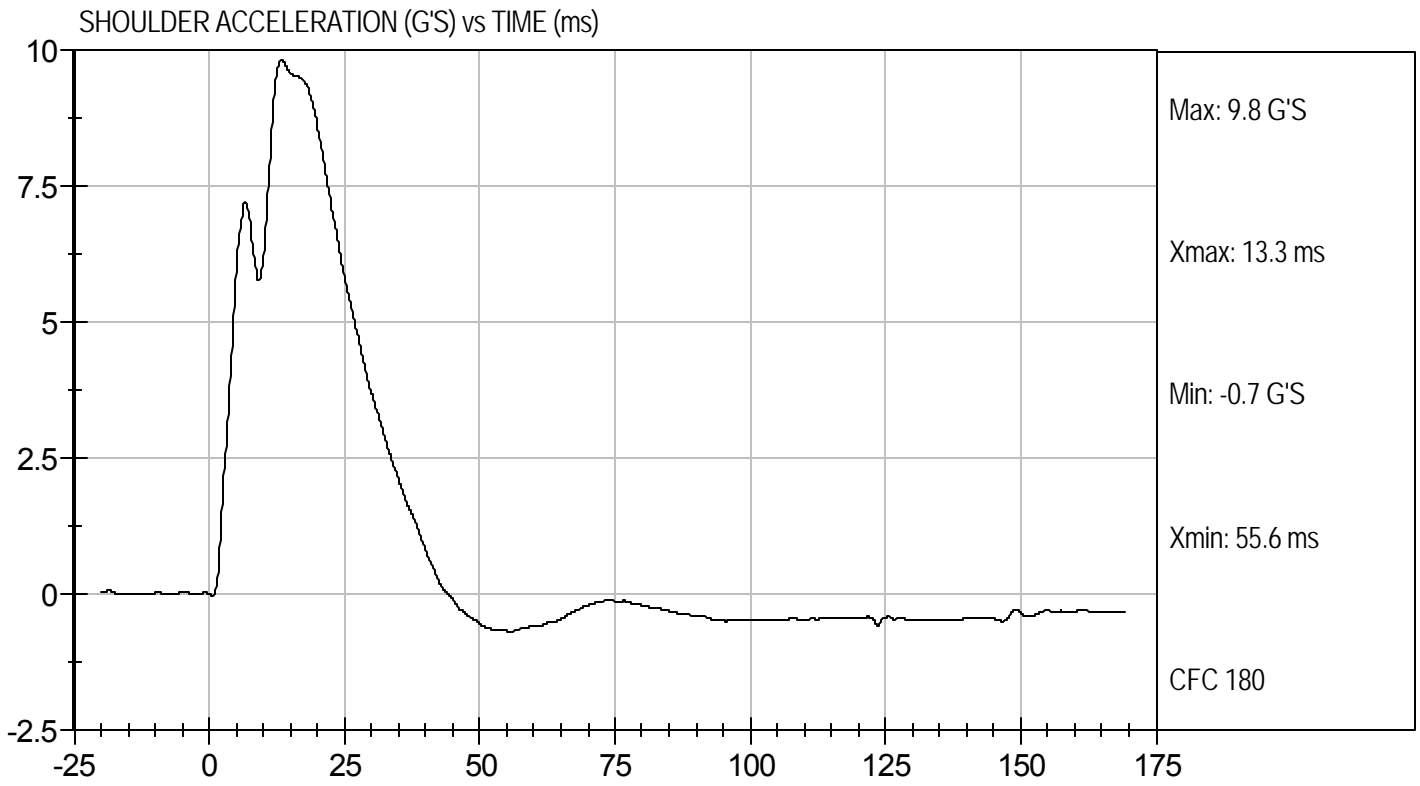
10/27/10
 Test Date

David Winkelbauer
 Approved By



Test Desc: Shoulder Impact
Component ID: D103693

Test Date: 10/27/10
Velocity: 14.00 ft/s, 4.3 m/s



MGA RESEARCH CORPORATION

UPPER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D103694

| 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 | 32 | Pass |
| Displacement at 3 m/s | mm | 36.0 to 40.0 | 37.3 | Pass |
| Displacement at 4 m/s | mm | 46.0 to 51.0 | 48.1 | Pass |
| Overall Test Results | | | | Pass |

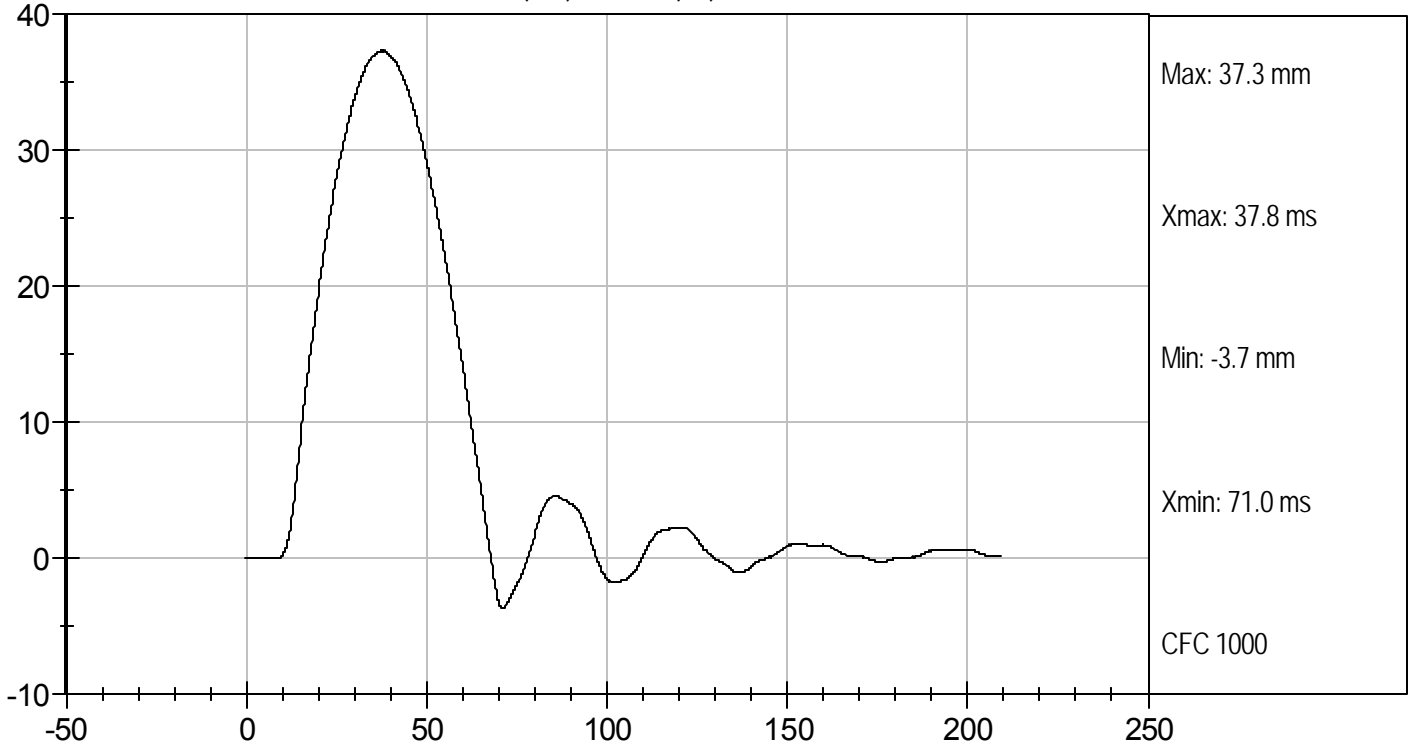
Jessica Hall
Laboratory Technician

10/28/10
Test Date

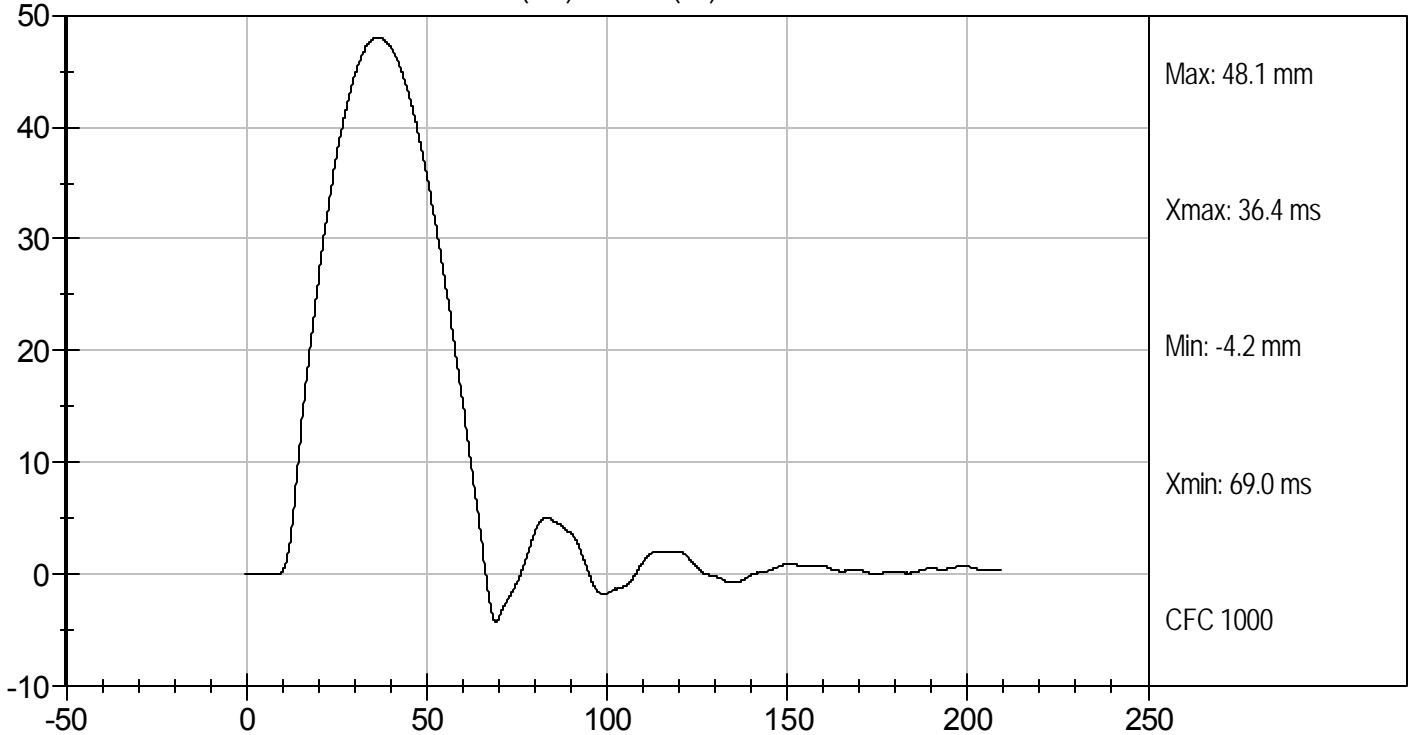
David Winkelbauer
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UPPER RIB DISPLACEMENT @ 3 M/SEC (mm) vs TIME (ms)



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: D103695

| 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 | 32 | Pass |
| Displacement at 3 m/s | mm | 36.0 to 40.0 | 37.7 | Pass |
| Displacement at 4 m/s | mm | 46.0 to 51.0 | 48.1 | Pass |
| Overall Test Results | | | | Pass |

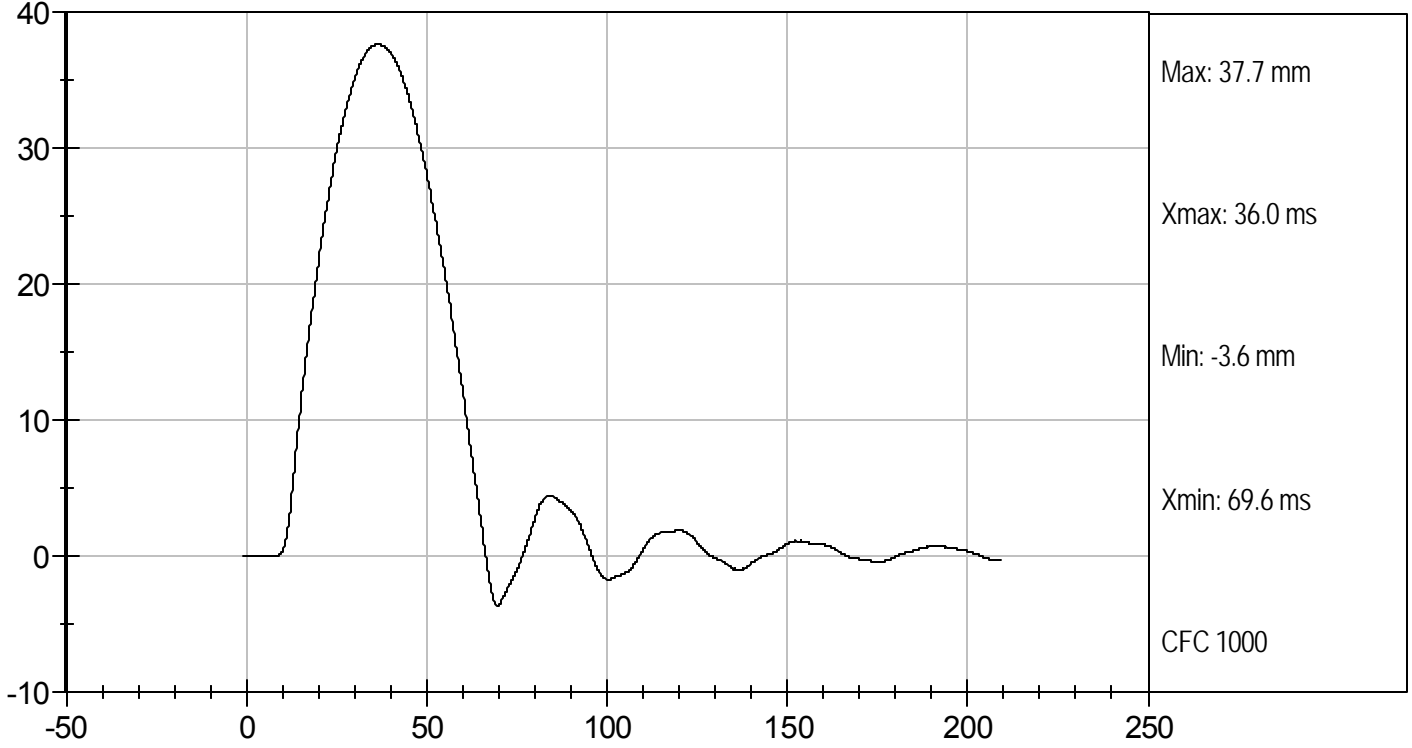
Jessica Hall
Laboratory Technician

10/28/10
Test Date

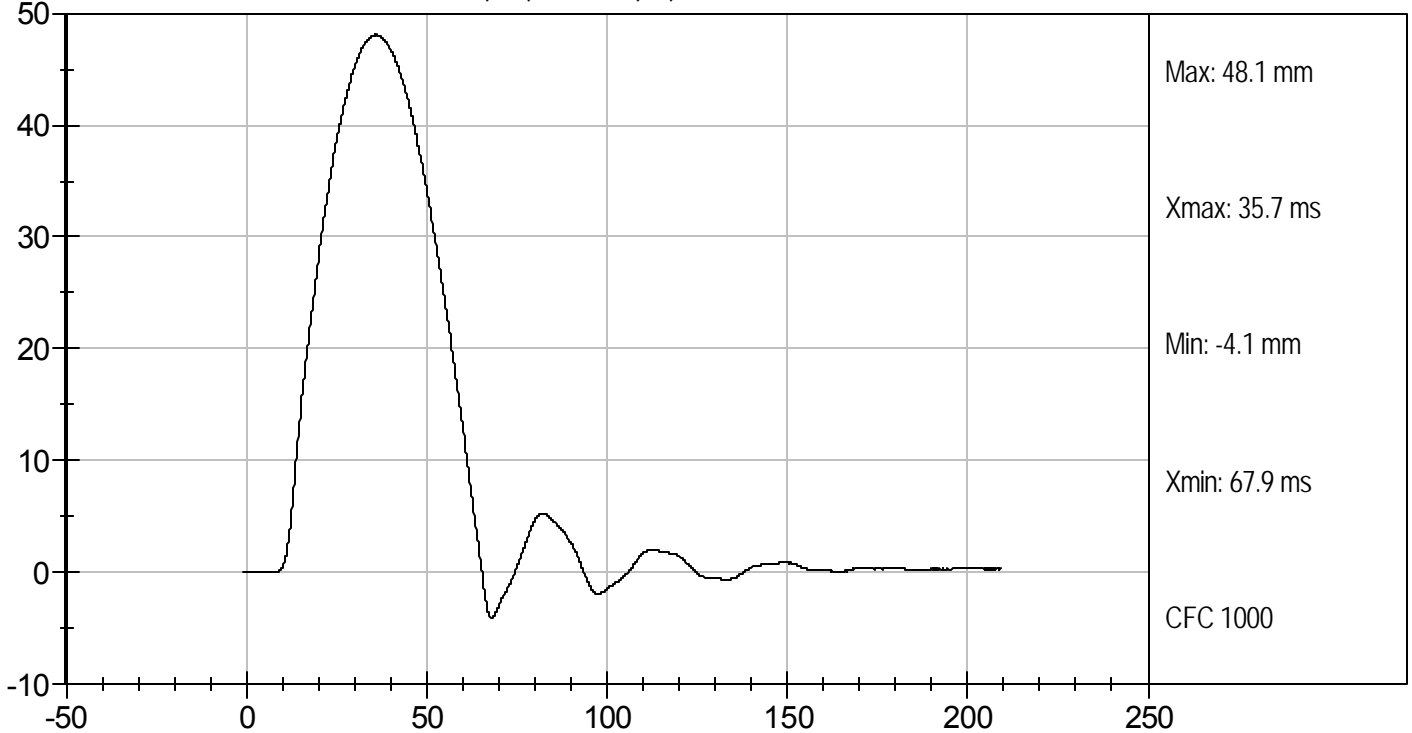
David Winkelbauer
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MID RIB DISPLACEMENT @ 3 M/SEC (mm) vs TIME (ms)



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



MGA RESEARCH CORPORATION

LOWER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D103696

| 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 | 32 | Pass |
| Displacement at 3 m/s | mm | 36.0 to 40.0 | 38.6 | Pass |
| Displacement at 4 m/s | mm | 46.0 to 51.0 | 48.3 | Pass |
| Overall Test Results | | | | Pass |

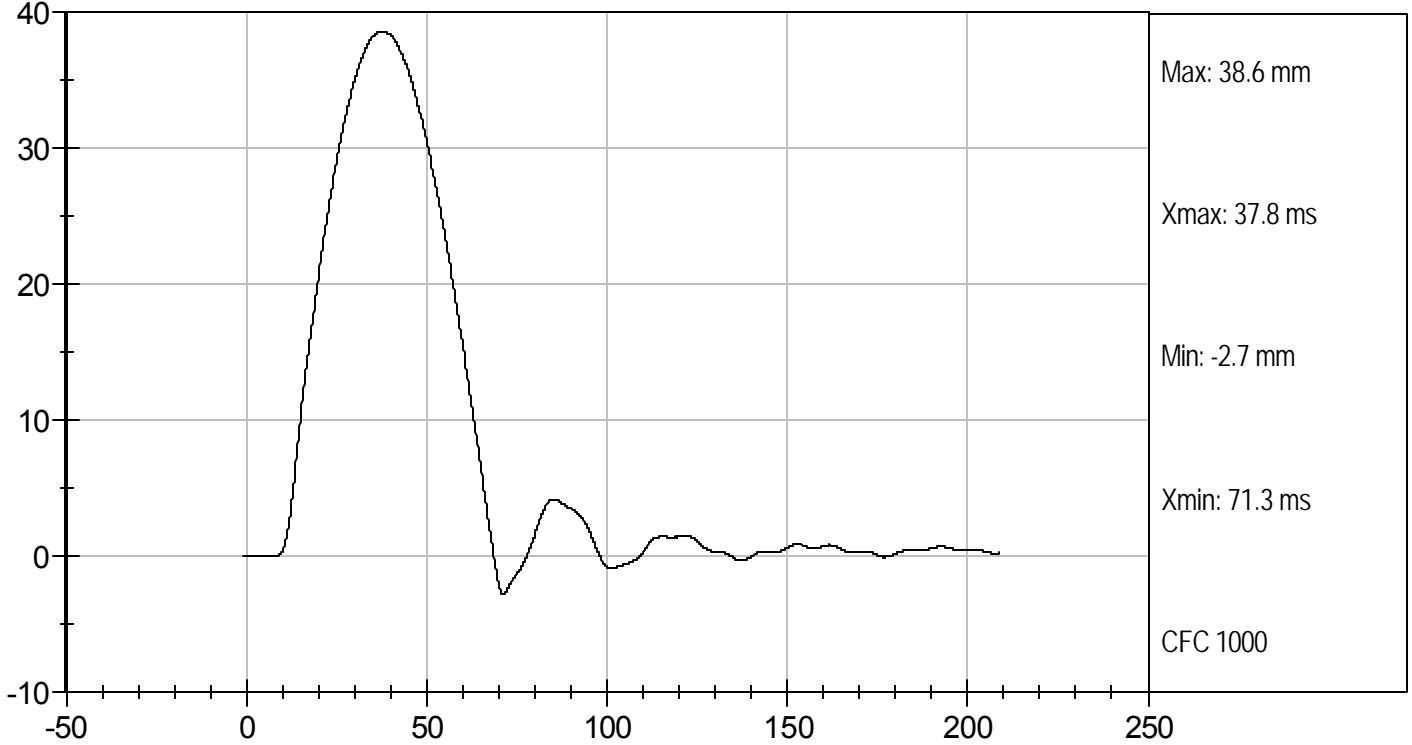
Jessica Hall
Laboratory Technician

10/28/10
Test Date

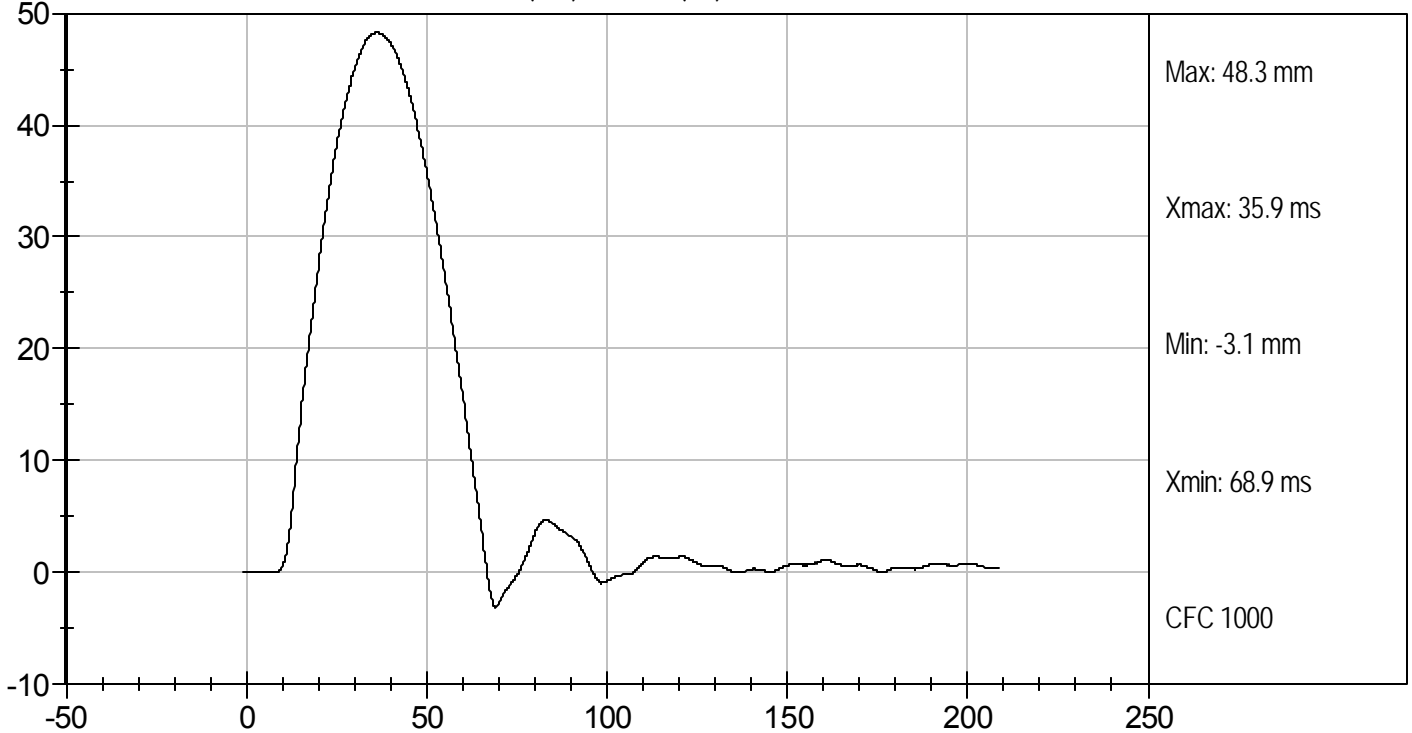
David Winkelbauer
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LOWER RIB DISPLACEMENT @ 3 M/SEC (mm) vs TIME (ms)



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: D103697

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|-------------------------------|-------|----------------|--------|-----------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 21.8 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 29 | Pass |
| Probe Speed | m/s | 3.90 to 4.10 | 4.06 | Pass |
| Maximum Impact Force | kN | 4.00 to 4.80 | 4.39 | Pass |
| Time of Maximum Impact Force | ms | 10.60 to 13.00 | 11.50 | Pass |
| Maximum Total Abdomen Force | kN | 2.20 to 2.70 | 2.50 | Pass |
| Time of Maximum Abdomen Force | ms | 10.00 to 12.30 | 11.00 | Pass |
| Overall Test Results | | | | Pass |

Jessica Hall
Laboratory Technician

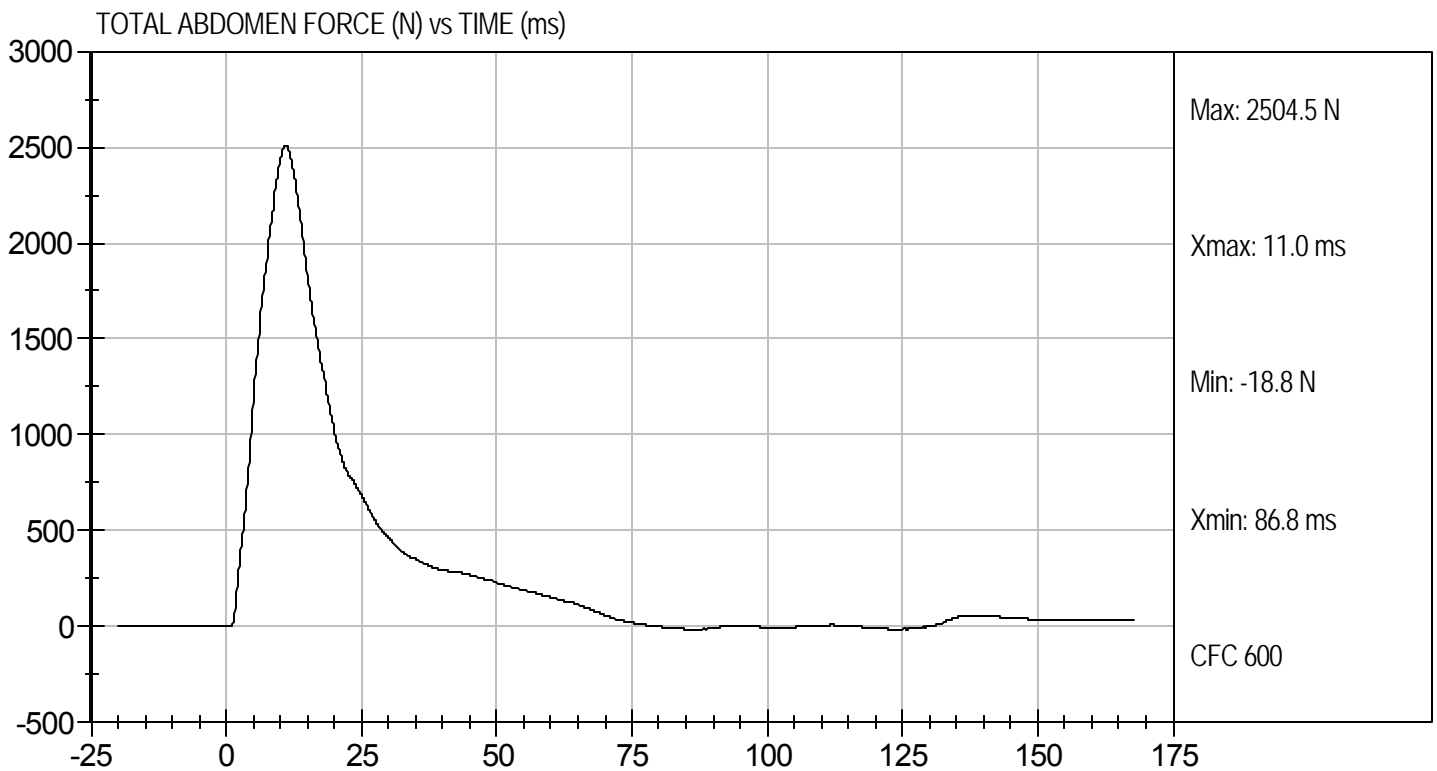
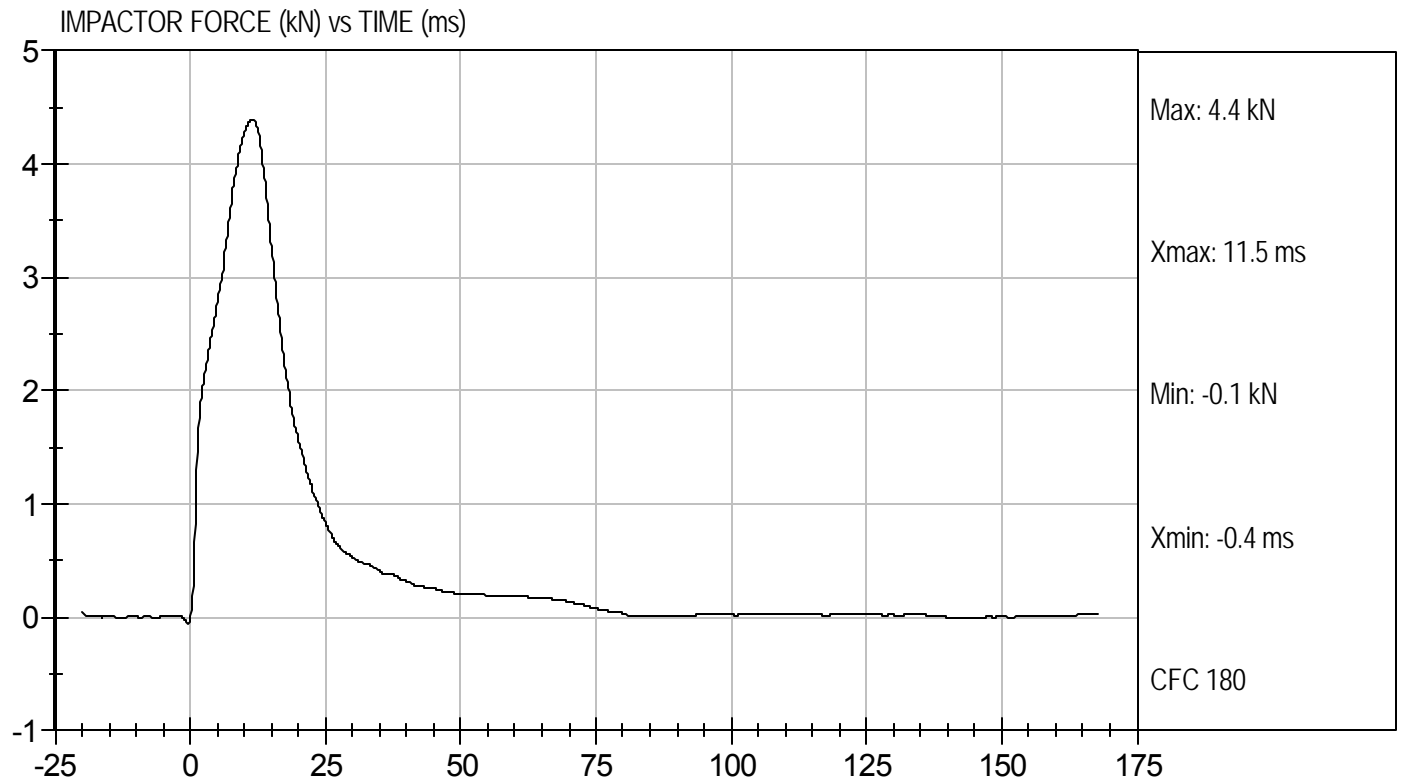
10/27/10
Test Date

David Winkelbauer
Approved By



Test Desc: Abdomen Impact
Component ID: D103697

Test Date: 10/27/10
Velocity: 13.33 ft/s, 4.06 m/s



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D.: D103698

| 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 | 32 | 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 | -0.41 | Pass |
| | 27 ms | m/s | -6.50 to -5.80 | -5.95 | Pass |
| | 30 ms | m/s | >= -6.5 | -5.99 | Pass |
| Maximum Flexion Angle | | deg | 45.0 to 55.0 | 47.4 | Pass |
| Time of Maximum Flexion Angle | | ms | 39.0 to 53.0 | 43.2 | Pass |
| Headform Rotation Decay to Initial Position | | ms | 37 to 57 | 44 | Pass |
| Overall Results | | | | | Pass |

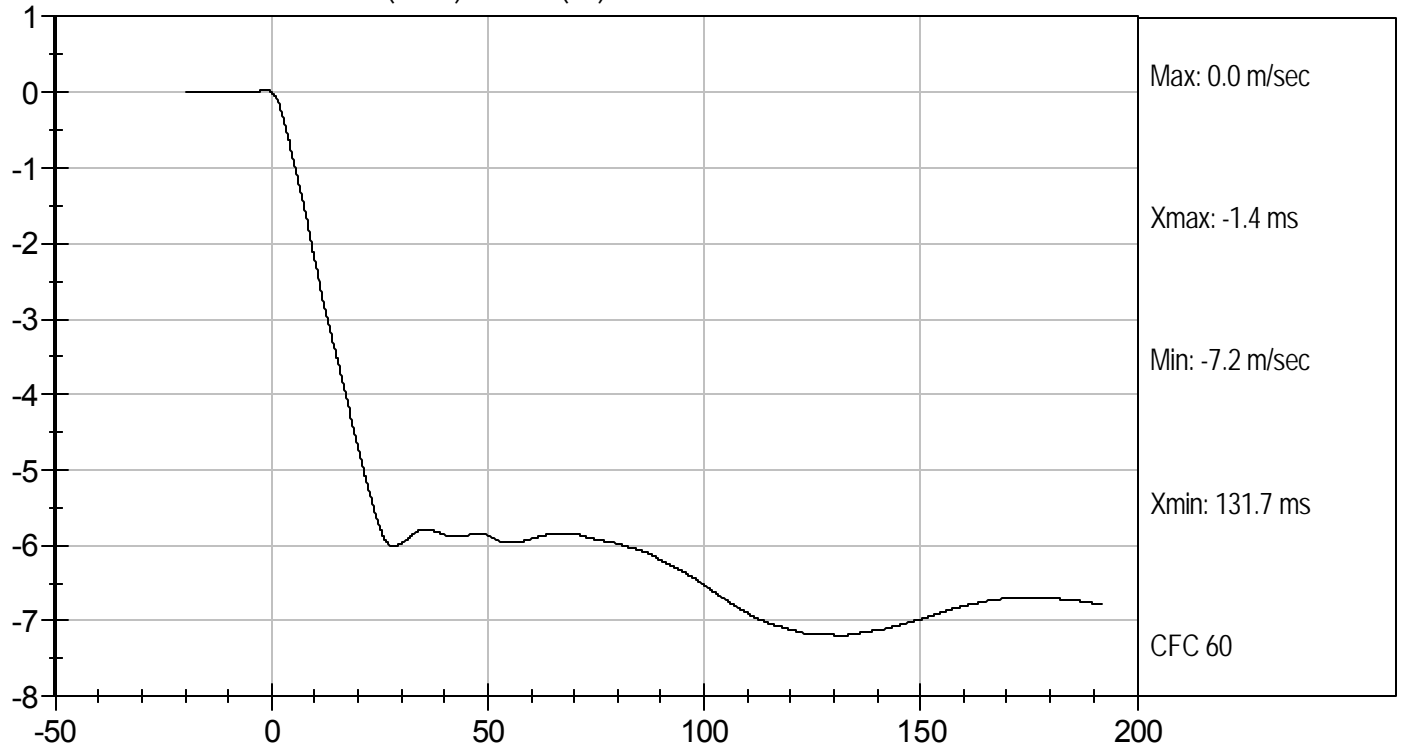
Jessica Hall
 Laboratory Technician

10/28/10
 Test Date

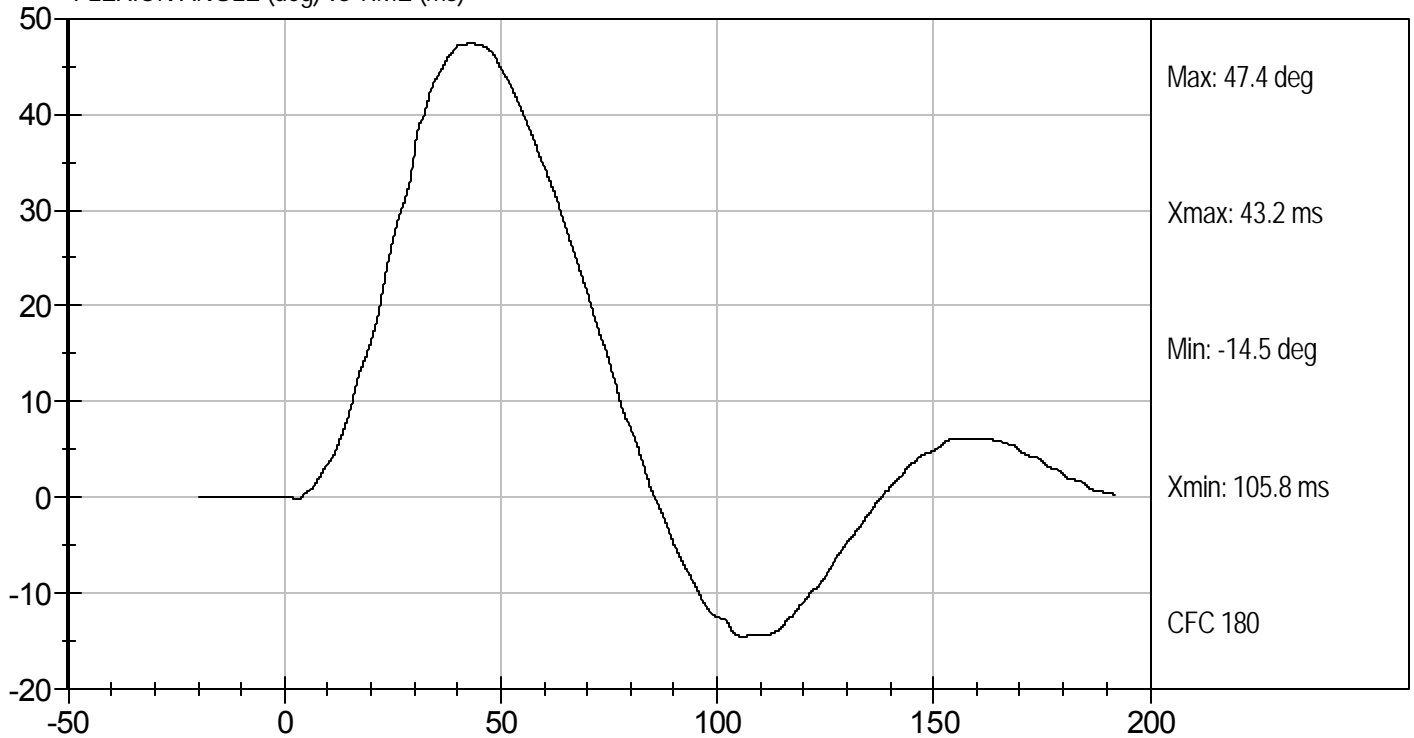
David Winkelbauer
 Approved By

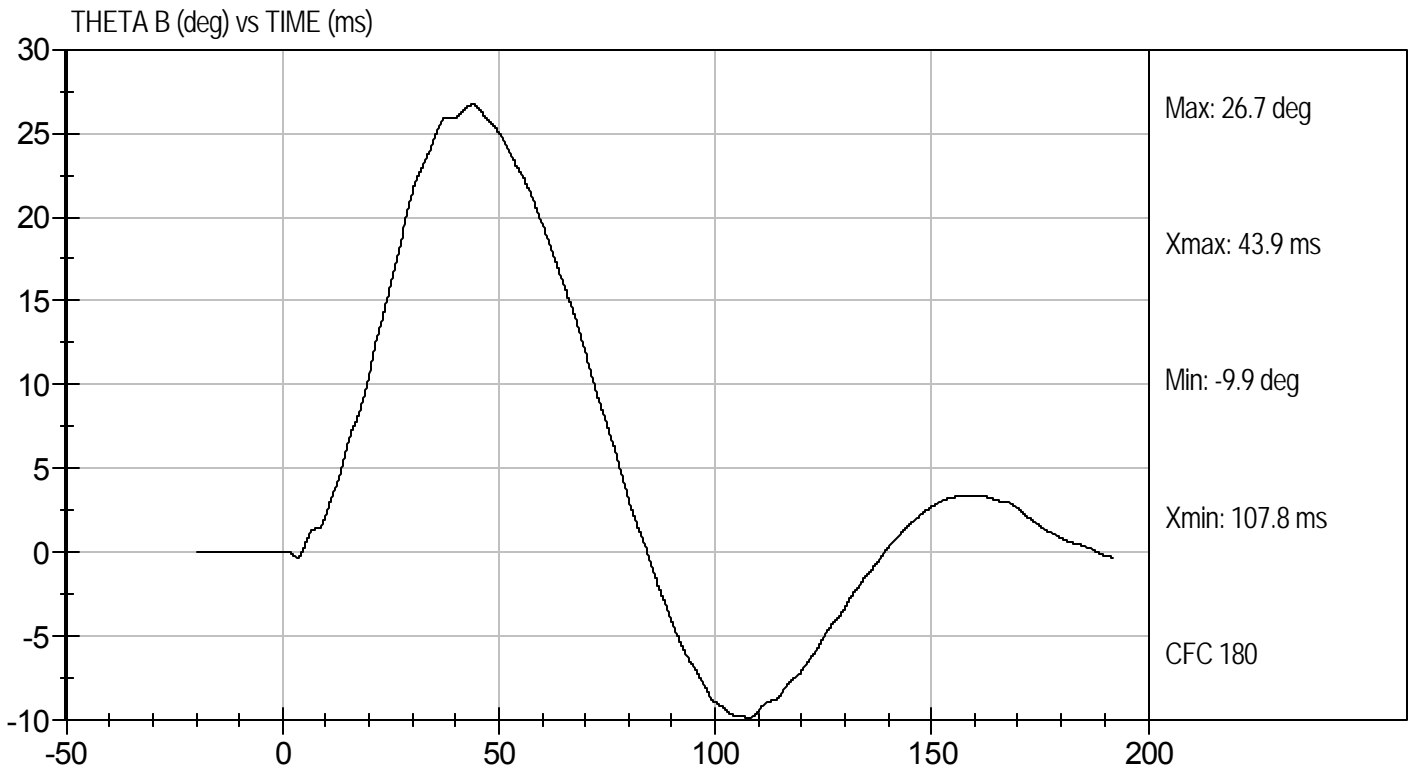
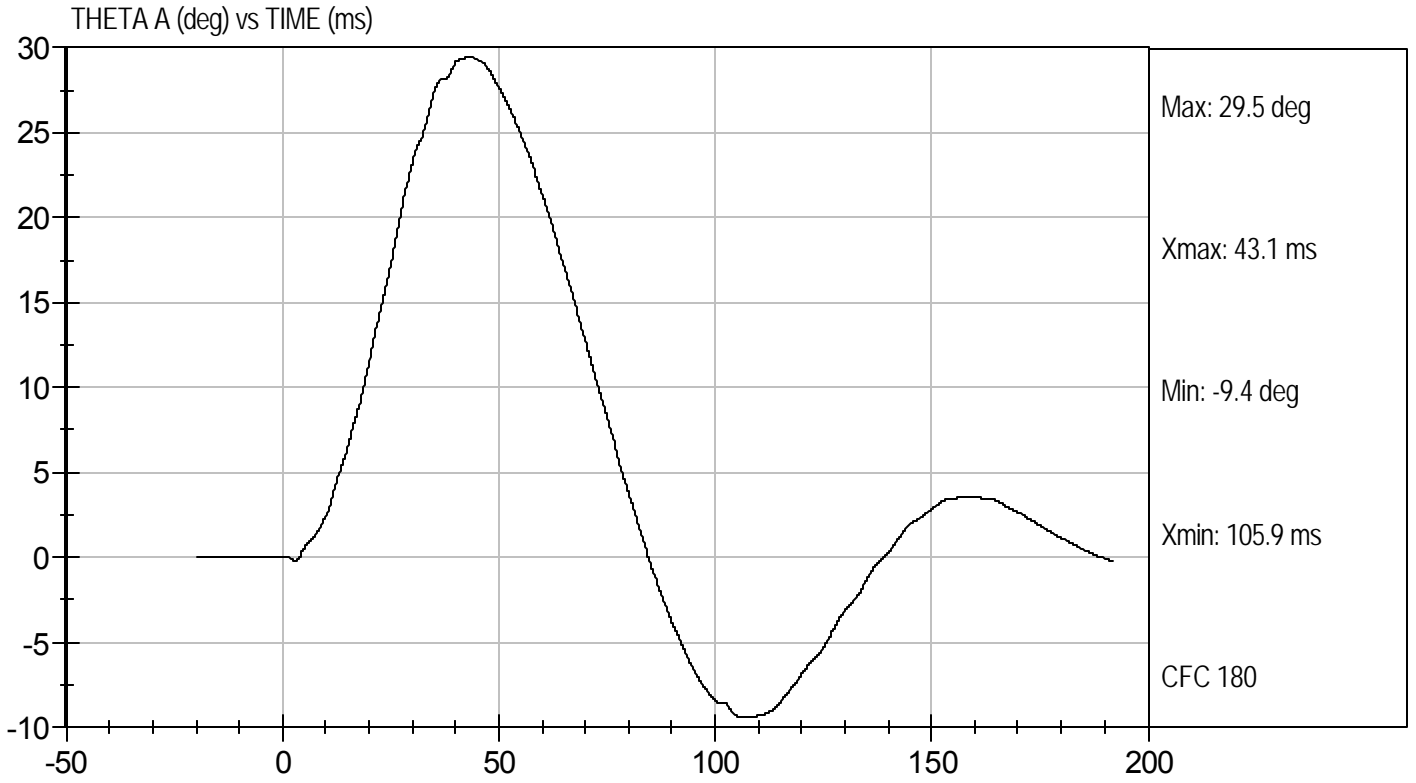


PENDULUM DECELERATION (m/sec) vs TIME (ms)



FLEXION ANGLE (deg) vs TIME (ms)





MGA RESEARCH CORPORATION

PELVIS TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D103699

| 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 | 30 | Pass |
| Probe Speed | m/s | 4.20 to 4.40 | 4.34 | Pass |
| Maximum Impactor Force | kN | 4.70 to 5.40 | 4.72 | Pass |
| Time of Maximum Impactor Force | ms | 11.80 to 16.10 | 12.80 | Pass |
| Maximum Pubic Force | kN | 1.23 to 1.59 | 1.49 | Pass |
| Time of Maximum Pubic Force | ms | 12.20 to 17.00 | 13.60 | Pass |
| Overall Test Results | | | | Pass |

Jessica Hall
Laboratory Technician

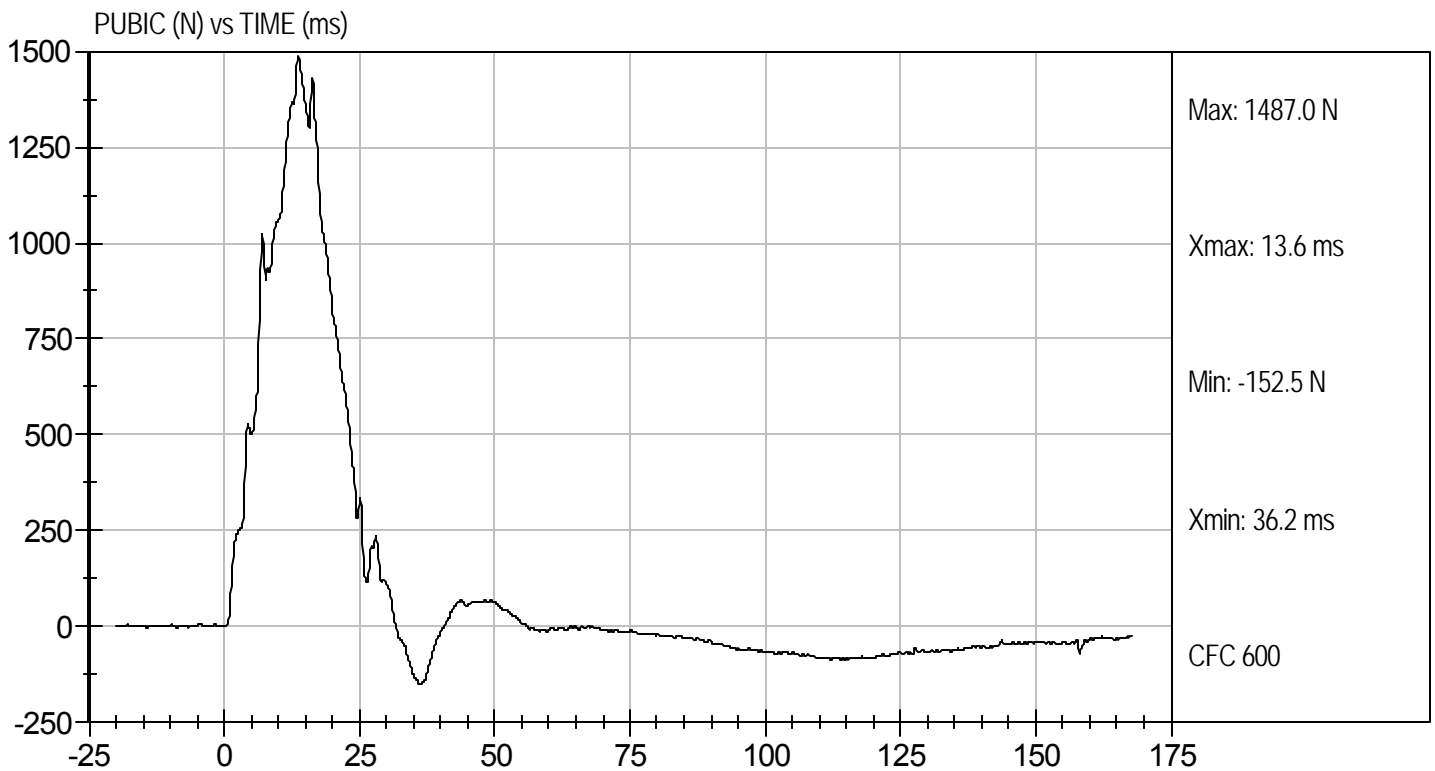
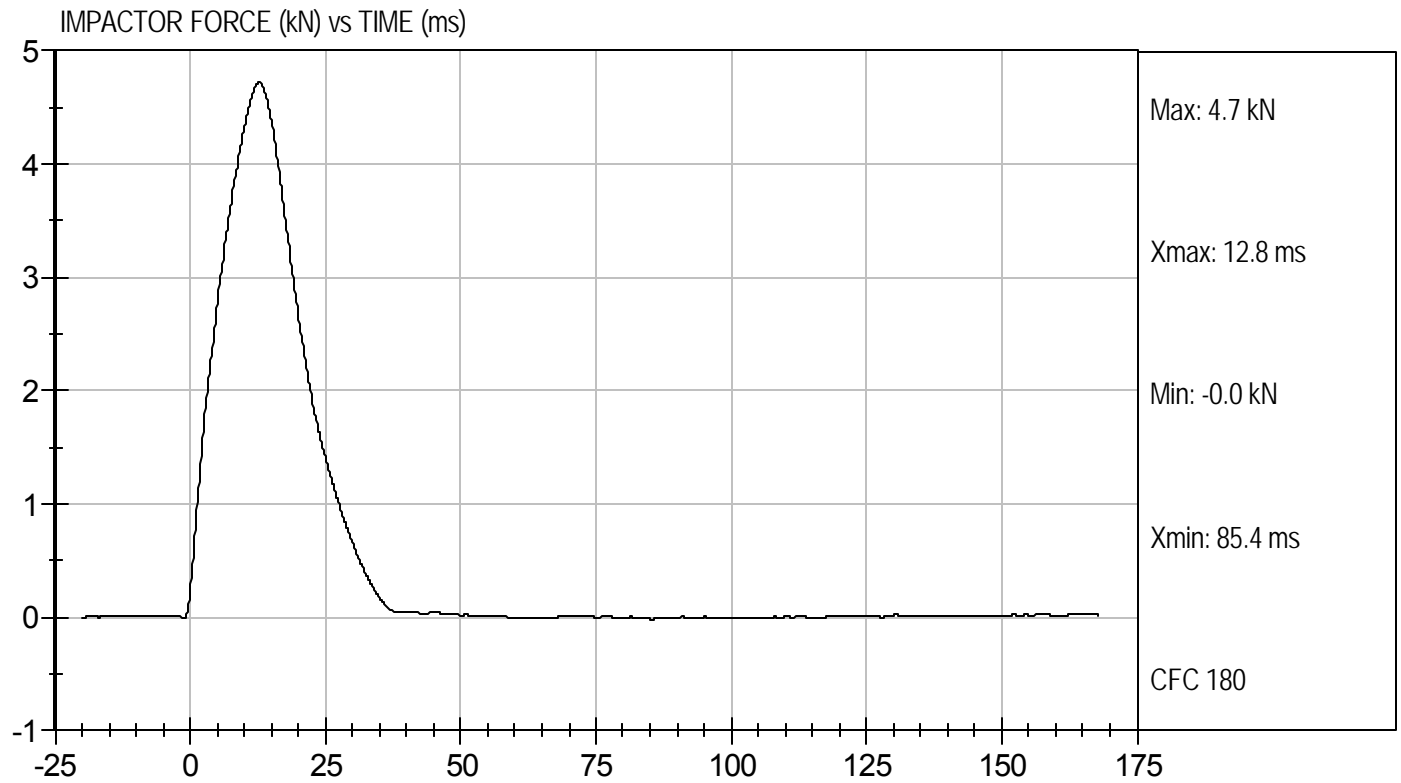
10/27/10
Test Date

David Winkelbauer
Approved By



Test Desc: Pelvis Impact
Component ID: D103699

Test Date: 10/27/10
Velocity: 14.24 ft/s, 4.34 m/s



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

ATD Serial No: 032

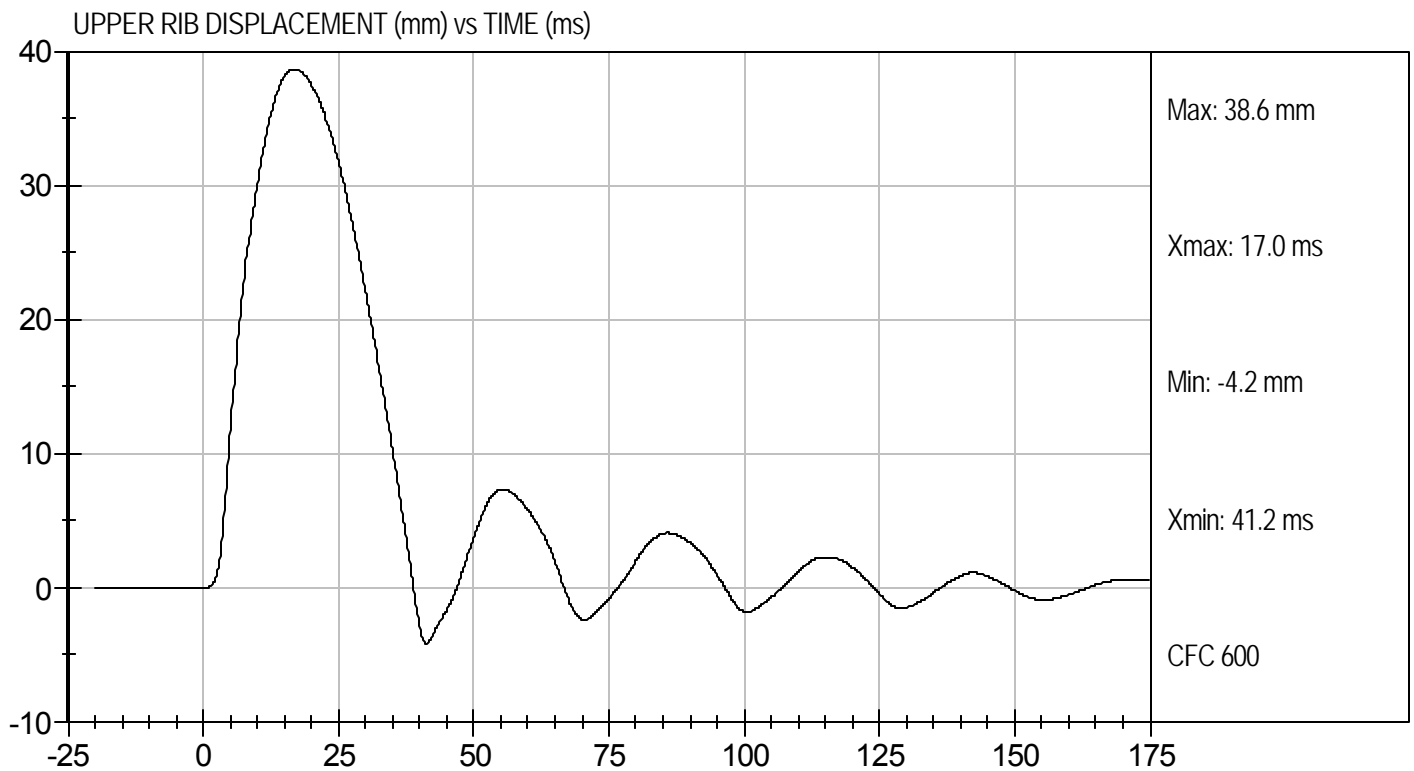
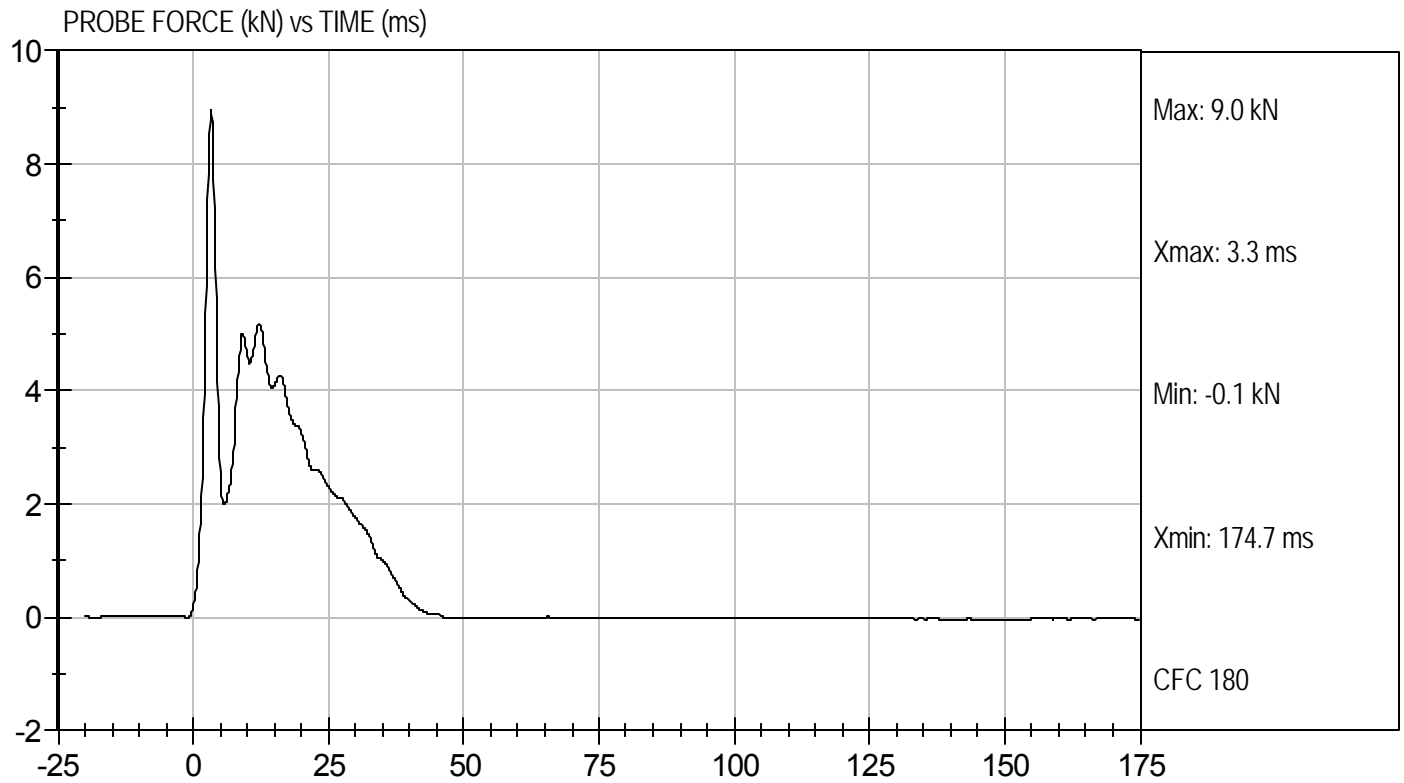
Test I.D: D103690

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|-------------------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 21.6 | Pass |
| Humidity | % | 10 to 70 | 30 | Pass |
| Probe Speed | m/s | 5.40 to 5.60 | 5.58 | Pass |
| Maximum Impactor Force (after 6 ms) | kN | 5.10 to 6.20 | 5.18 | Pass |
| Upper Rib Displacement | mm | 34.0 to 41.0 | 38.6 | Pass |
| Middle Rib Displacement | mm | 37.0 to 45.0 | 40.8 | Pass |
| Lower Rib Displacement | mm | 37.0 to 44.0 | 40.0 | Pass |
| Overall Test Results | | | | Pass |

Jessica Gall
Laboratory Technician

10/27/10
Test Date

David Winkelbauer
Approved By

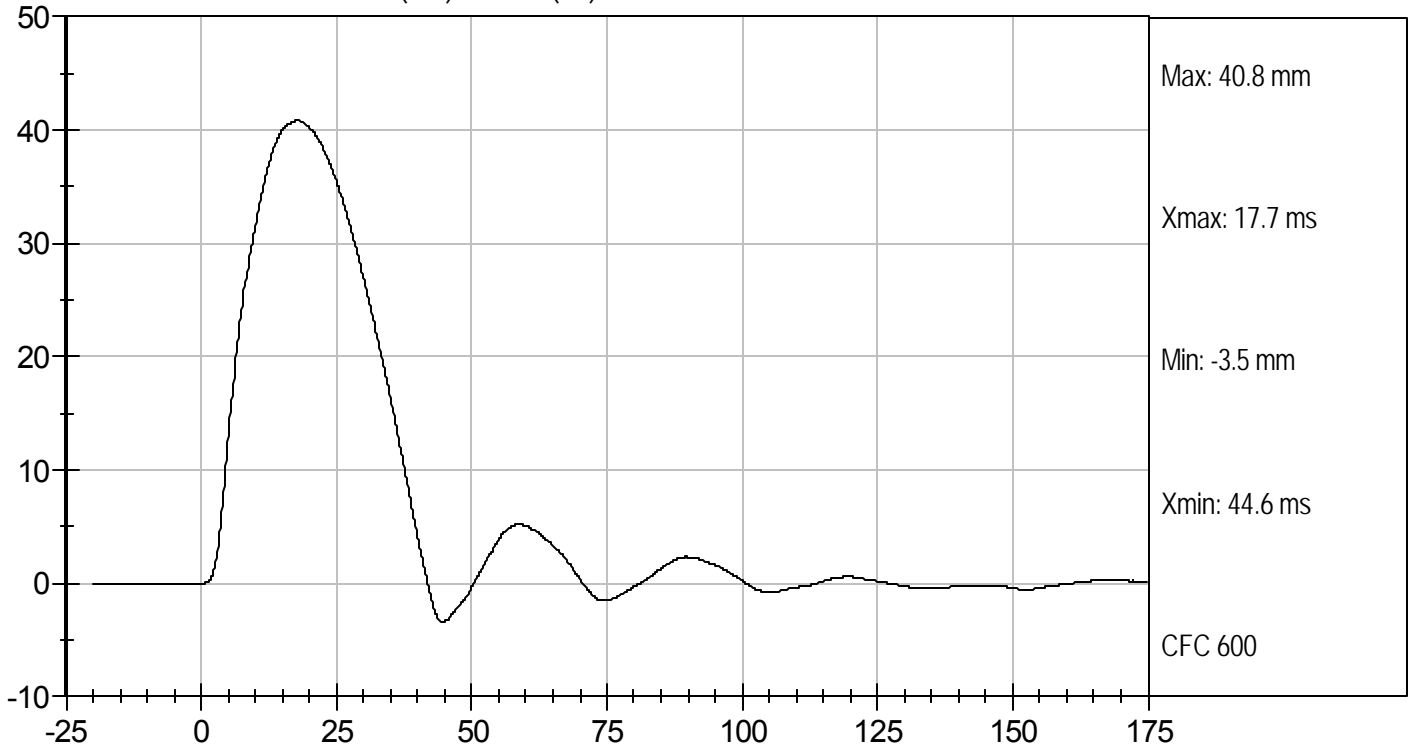




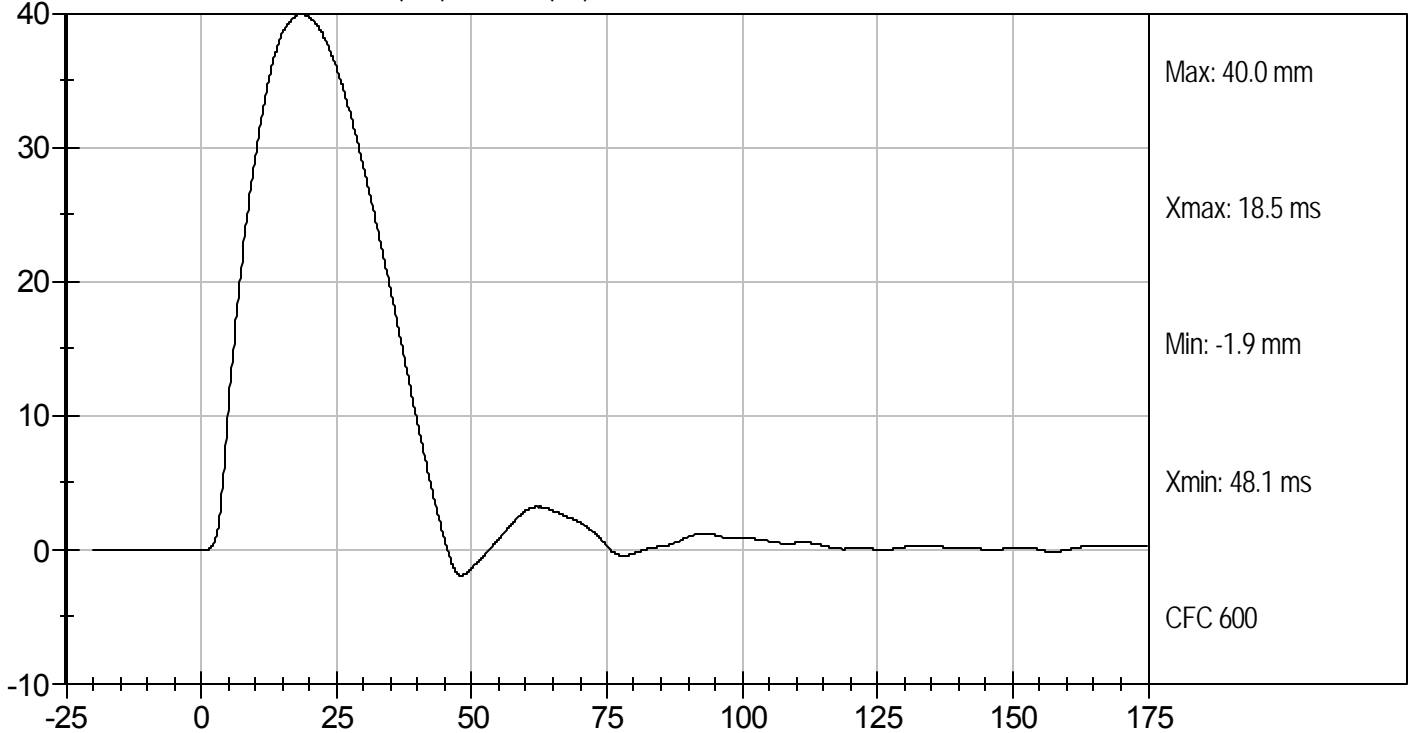
Test Desc: Thorax Impact
Component ID: D103690

Test Date: 10/27/10
Velocity: 18.31 ft/s, 5.58 m/s

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



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

ATD Serial No: 306

Test ID: D103571

| 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 | 30 | Pass |
| Peak Resultant Acceleration | G's | 115 to 137 | 119 | Pass |
| Peak Lateral Acceleration | G's | +/- 15 | -6.5 | Pass |
| Unimodal | N/A | <15% | Yes | Pass |
| Overall Test Results | | | | Pass |

Jessica Hall
Laboratory Technician

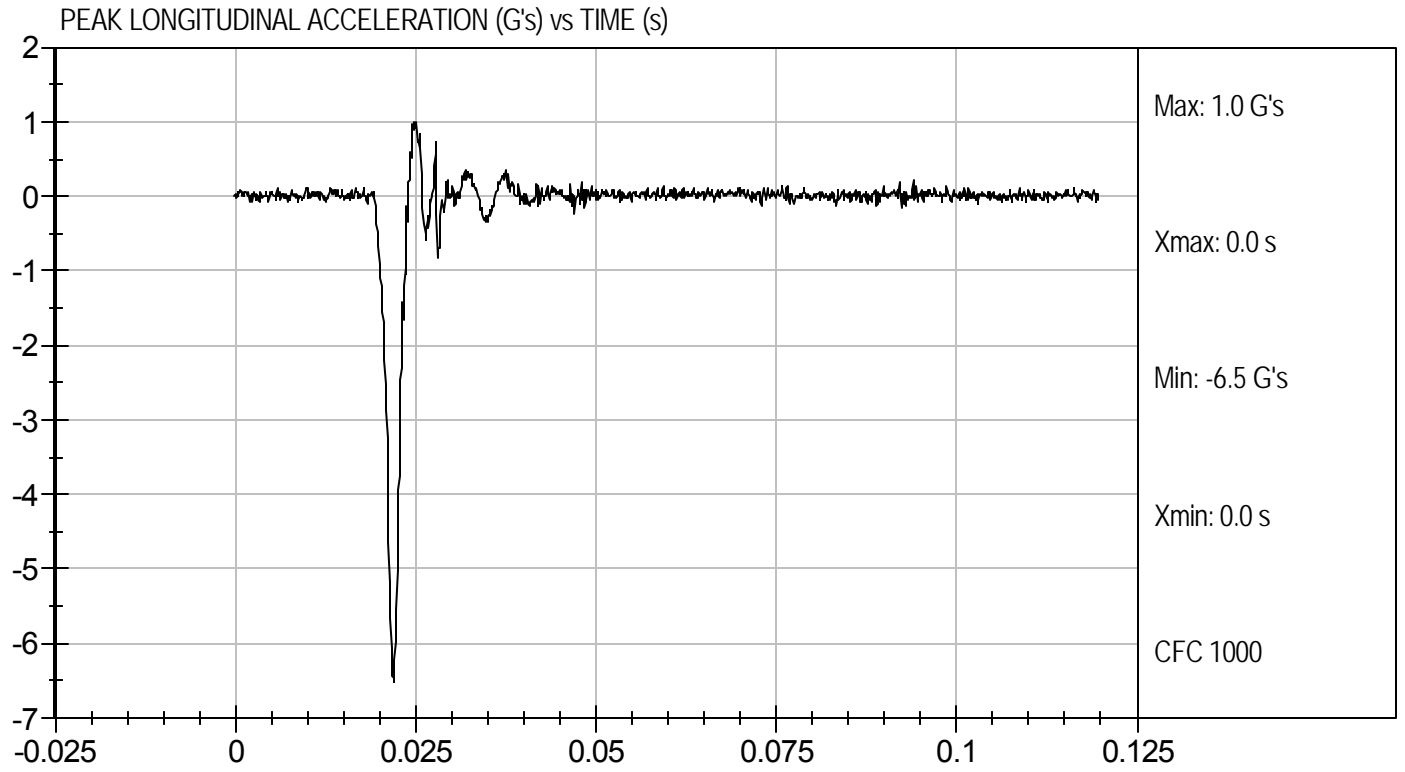
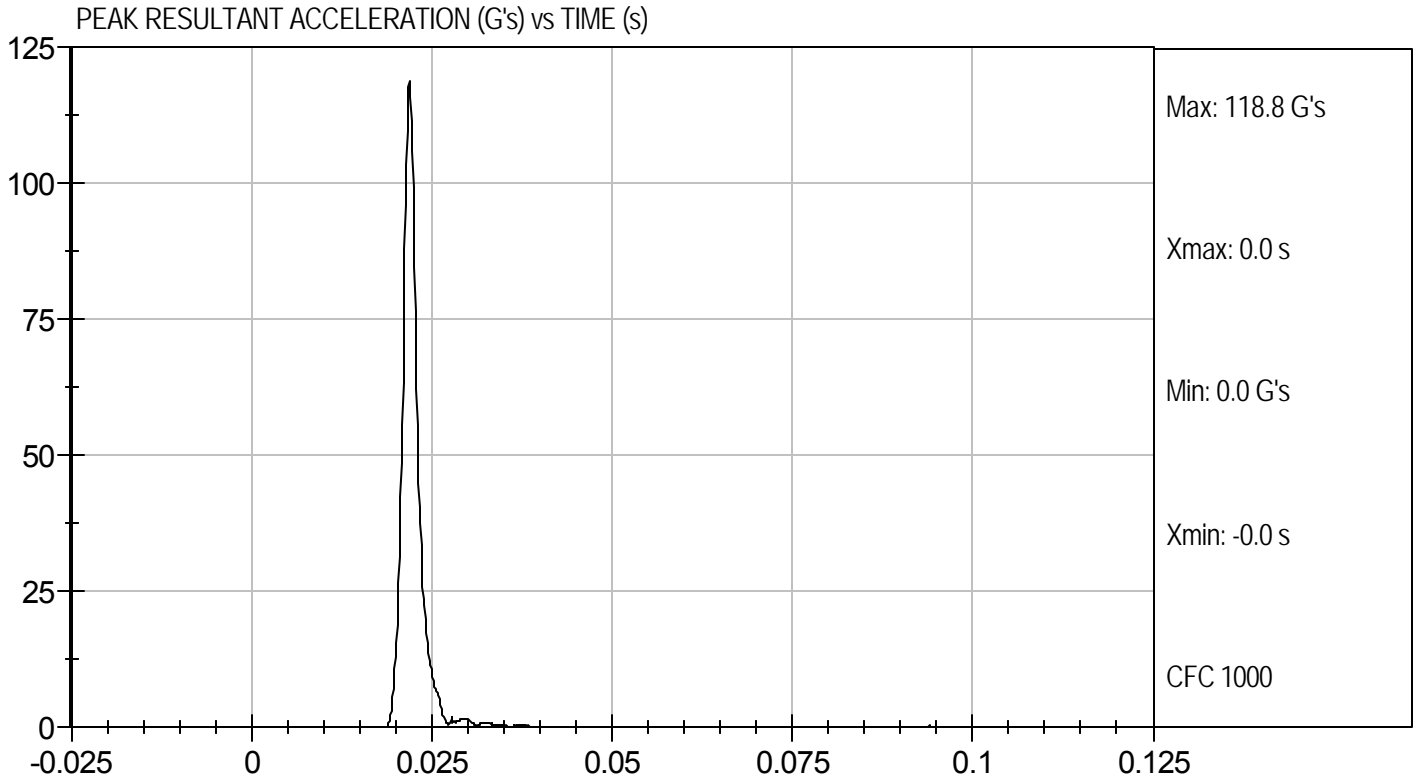
10/19/10
Test Date

David Winkelbauer
Approved By



Test Desc: Head Drop
Component ID: D103571

Test Date: 10/19/10
Velocity: 0 ft/s, 0 m/s



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


ATD Serial No: 306

Test I.D.: D103572

| Tested Parameter | | Units | Specification | Result | Pass/Fail |
|--|-----------|-------|---------------|--------|-----------|
| Temperature | | deg C | 20.6 to 22.2 | 21.2 | Pass |
| Humidity | | % | 10 to 70 | 31 | Pass |
| Impact Velocity | | m/s | 5.51 to 5.63 | 5.52 | Pass |
| Delta Velocity | 10 ms | m/s | 2.20 to 2.80 | 2.50 | Pass |
| | 15 ms | m/s | 3.30 to 4.10 | 3.54 | Pass |
| | 20 ms | m/s | 4.40 to 5.40 | 4.76 | Pass |
| | 25 ms | m/s | 5.40 to 6.10 | 5.52 | Pass |
| | 25-100 ms | m/s | 5.50 to 6.20 | 5.53 | Pass |
| Maximum D-Plane Rotation | | deg | 71 to 81 | 72 | Pass |
| Time of Maximum D-Plane Rotation | | ms | 50 to 70 | 59 | 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 | 115 | Pass |
| Overall Test Results | | | | | Pass |


Laboratory Technician

10/19/10
Test Date

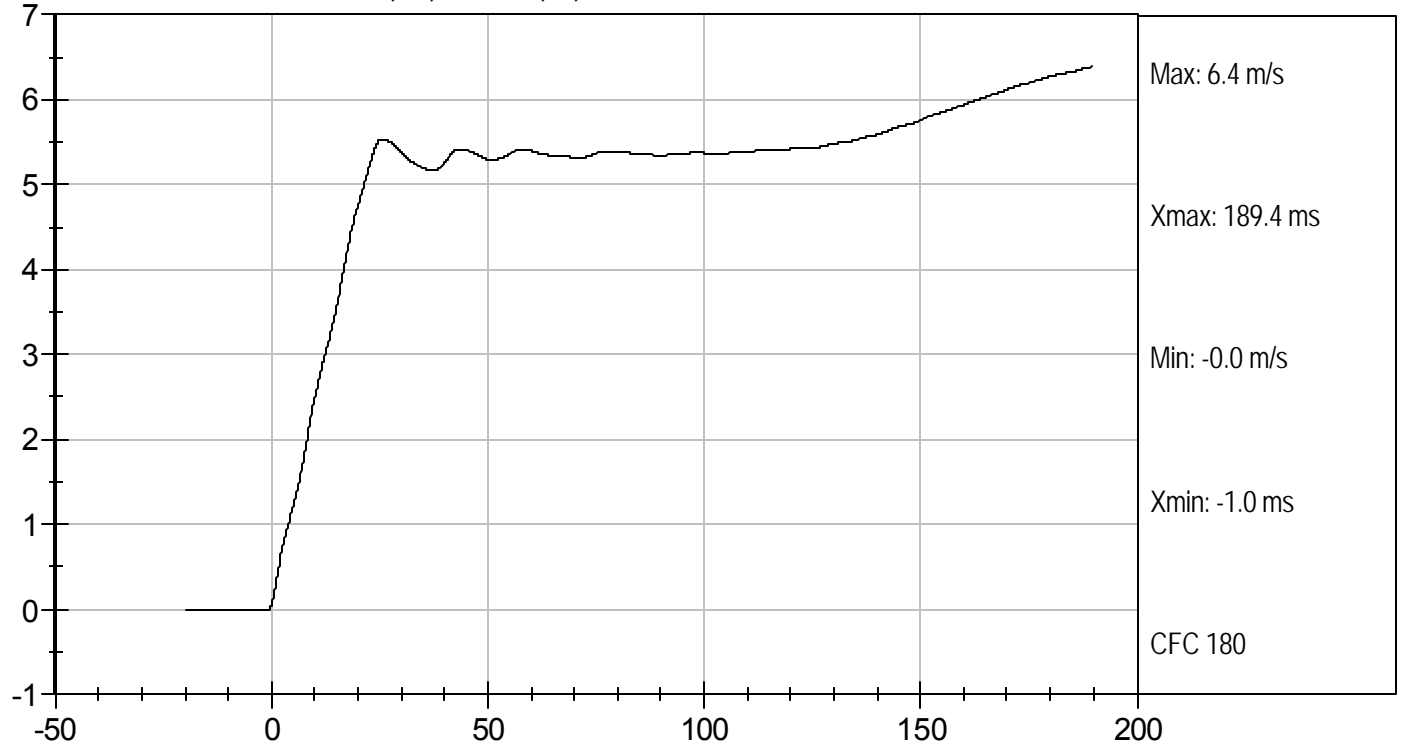

Approved By



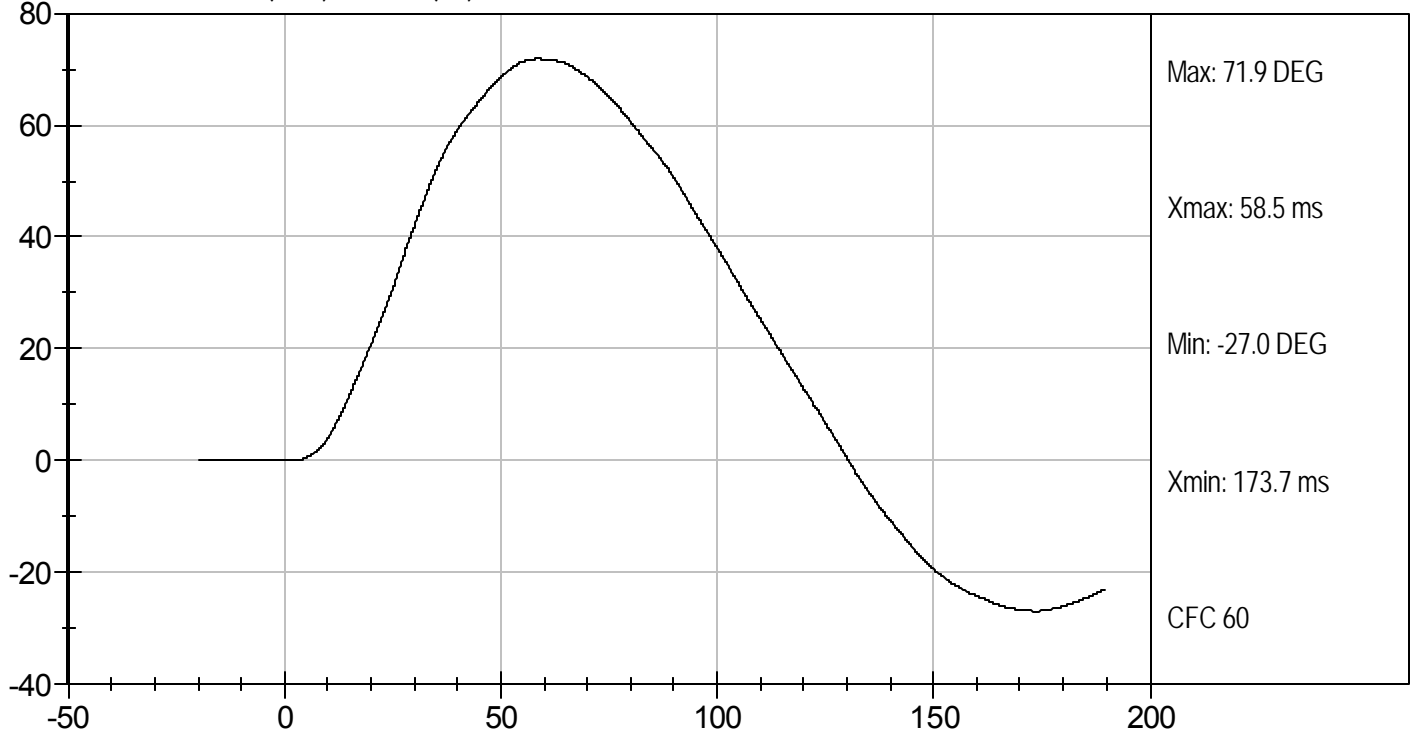
Test Desc: Neck Bending
Component ID: D103572

Test Date: 10/19/10
Velocity: 18.12 ft/s, 5.52 m/s

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



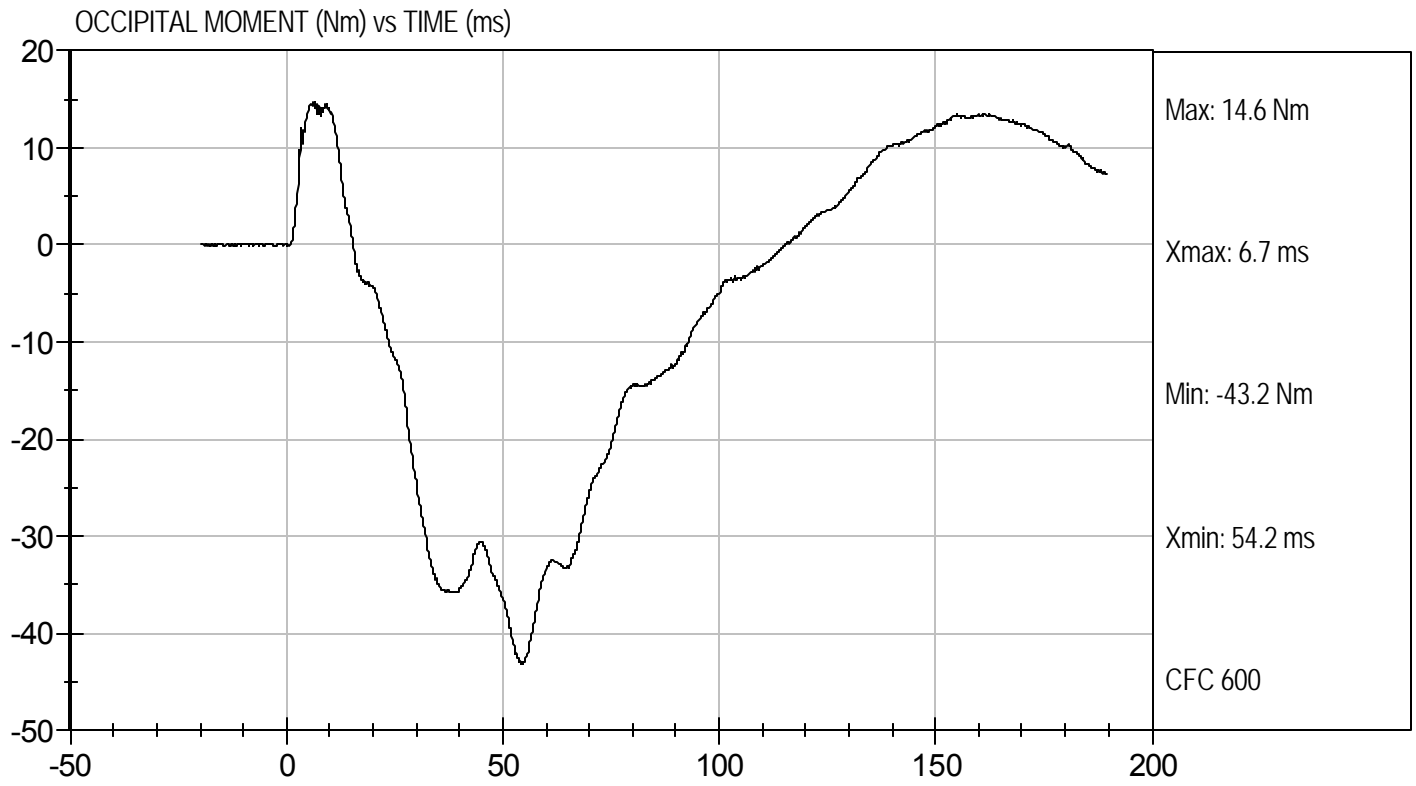
FLEXION ANGLE (DEG) vs TIME (ms)





Test Desc: Neck Bending
Component ID: D103572

Test Date: 10/19/10
Velocity: 18.12 ft/s, 5.52 m/s



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

ATD Serial No: 306

Test ID: D103573

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.34 | Pass |
| Maximum Probe Acceleration | G's | 13 to 18 | 16 | Pass |
| Shoulder Displacement | mm | 28 to 37 | 33 | Pass |
| Upper Spine (T1) Y Acceleration | G's | 17 to 22 | 18 | Pass |
| Overall Test Results | | | | Pass |

Jessica Hall
Laboratory Technician

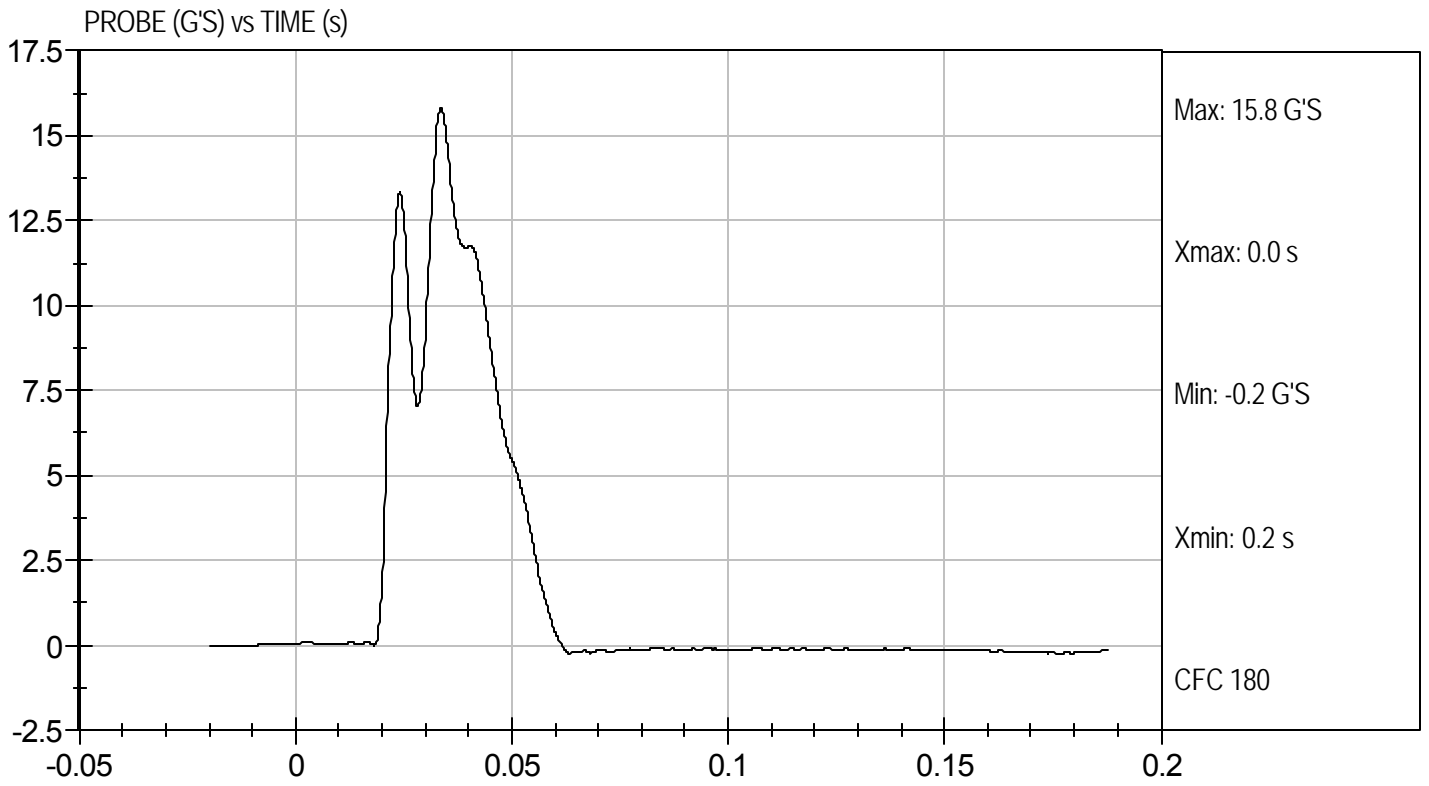
10/19/10
Test Date

David Winkelbauer
Approved By



Test Desc: Shoulder Impact
Component ID: D103573

Test Date: 10/19/10
Velocity: 14.25 ft/s, 4.34 m/s

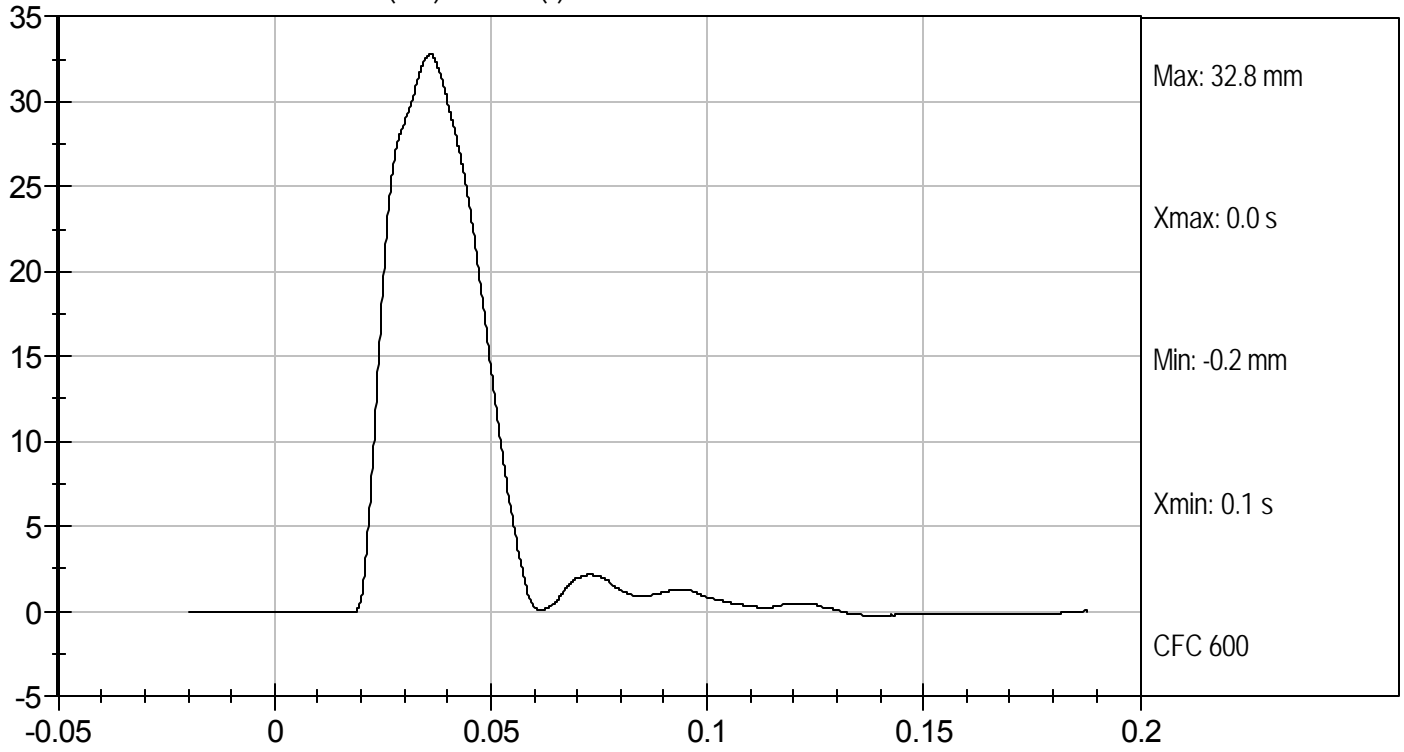




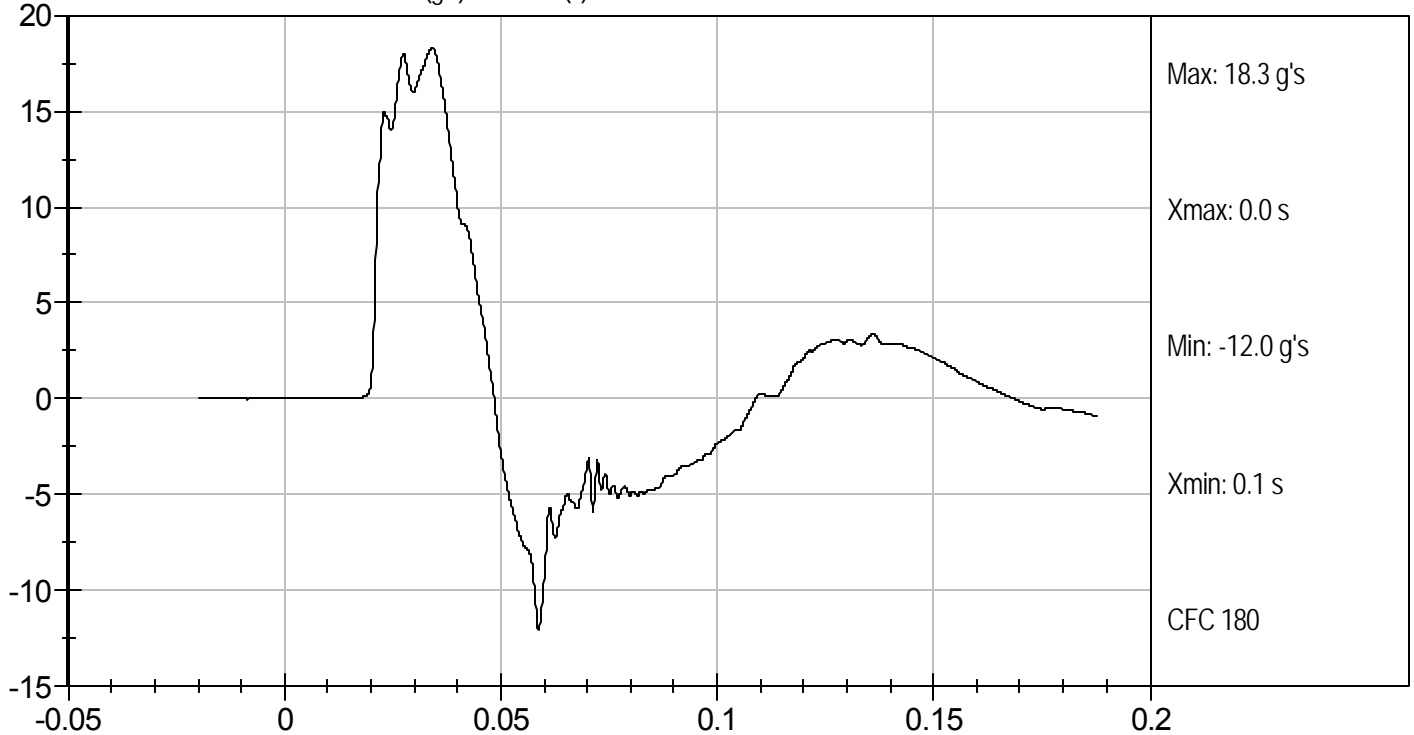
Test Desc: Shoulder Impact
Component ID: D103573

Test Date: 10/19/10
Velocity: 14.25 ft/s, 4.34 m/s

SHOULDER DISPLACEMENT (mm) vs TIME (s)



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



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

ATD Serial No: 306

Test I.D: D103574

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 21.2 | Pass |
| Humidity | % | 10 to 70 | 30 | Pass |
| Impact Velocity | m/s | 6.60 to 6.80 | 6.77 | Pass |
| Peak Impactor Acceleration | G's | 30 to 36 | 33 | Pass |
| Shoulder Displacement | mm | 31 to 40 | 39 | Pass |
| Upper Rib Displacement | mm | 25 to 32 | 29 | 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 | 33 | Pass |
| Overall Test Results | | | | Pass |

Jessica Hall
Laboratory Technician

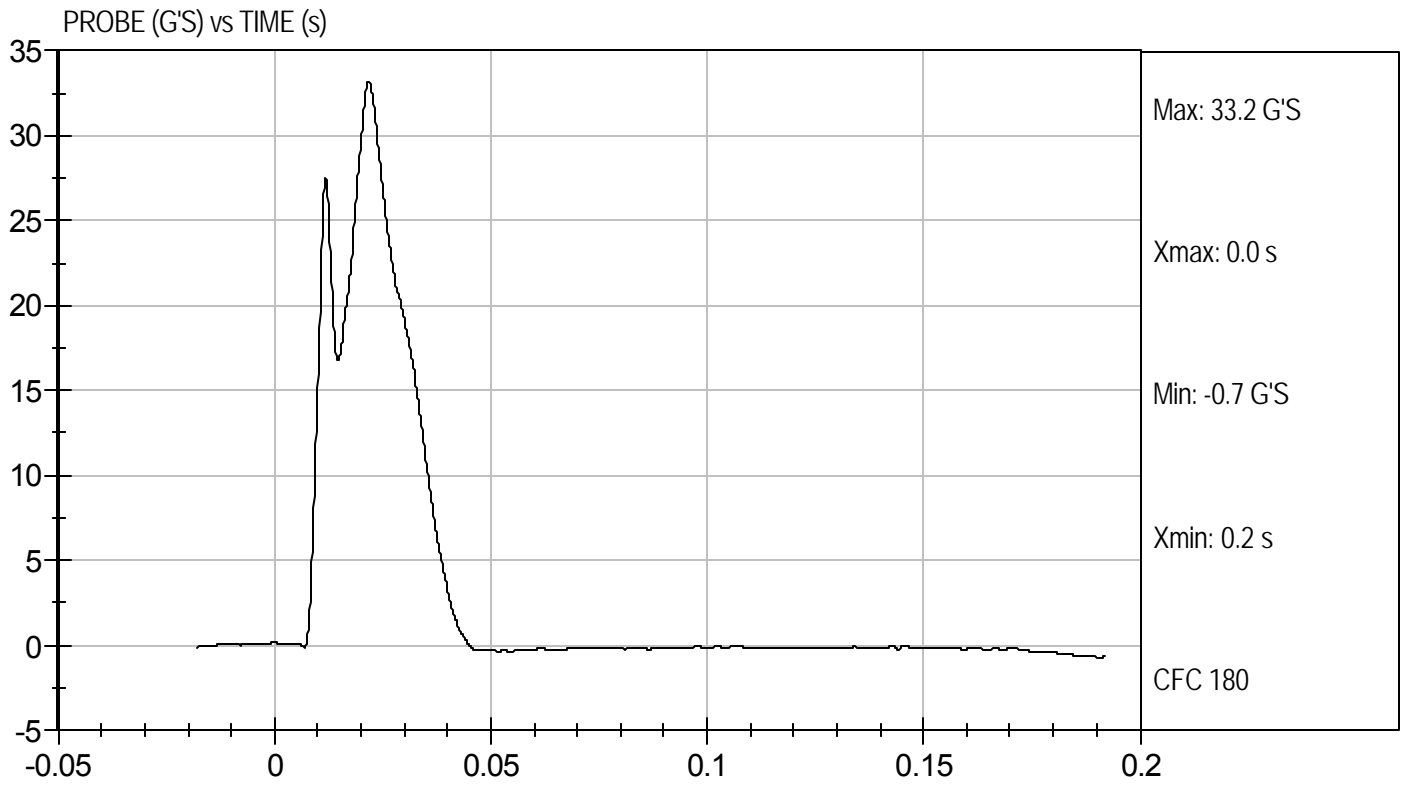
10/19/10
Test Date

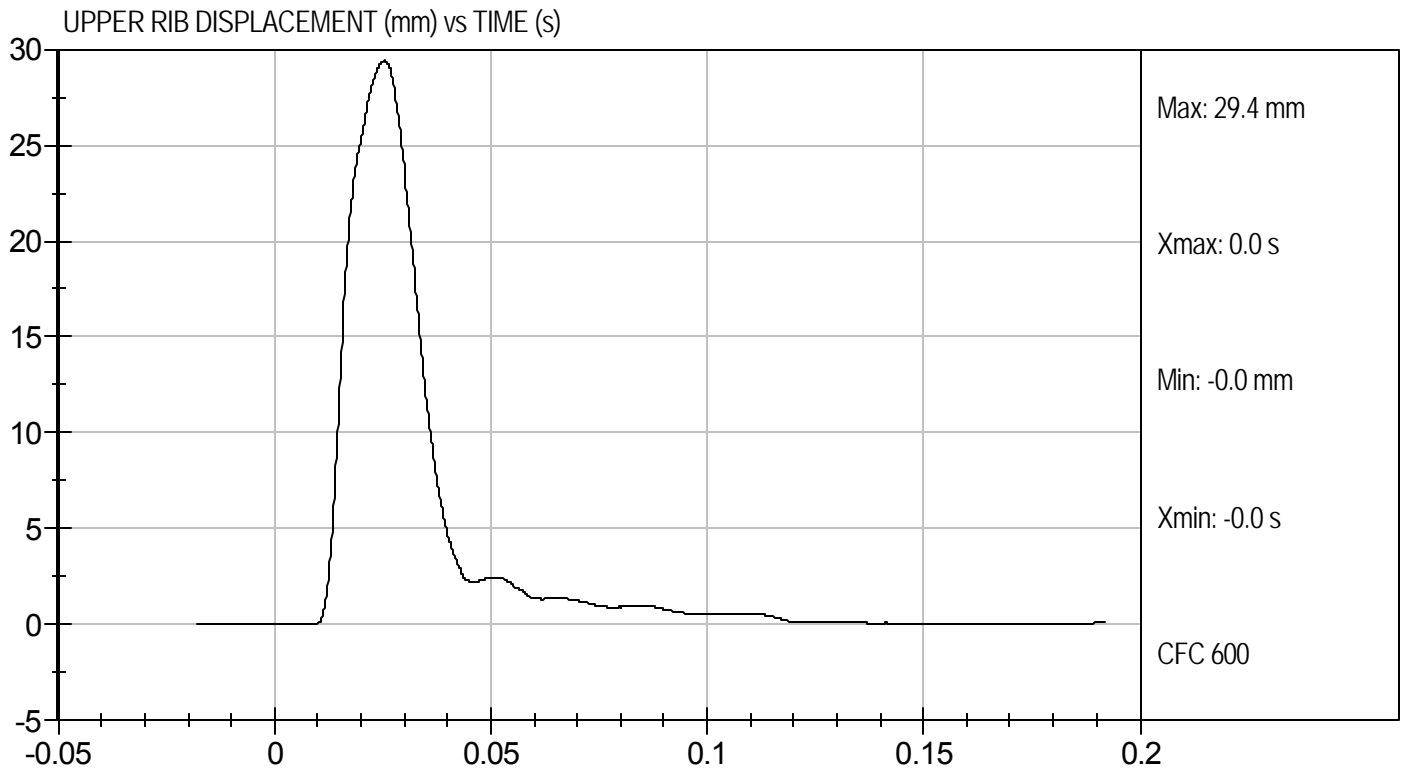
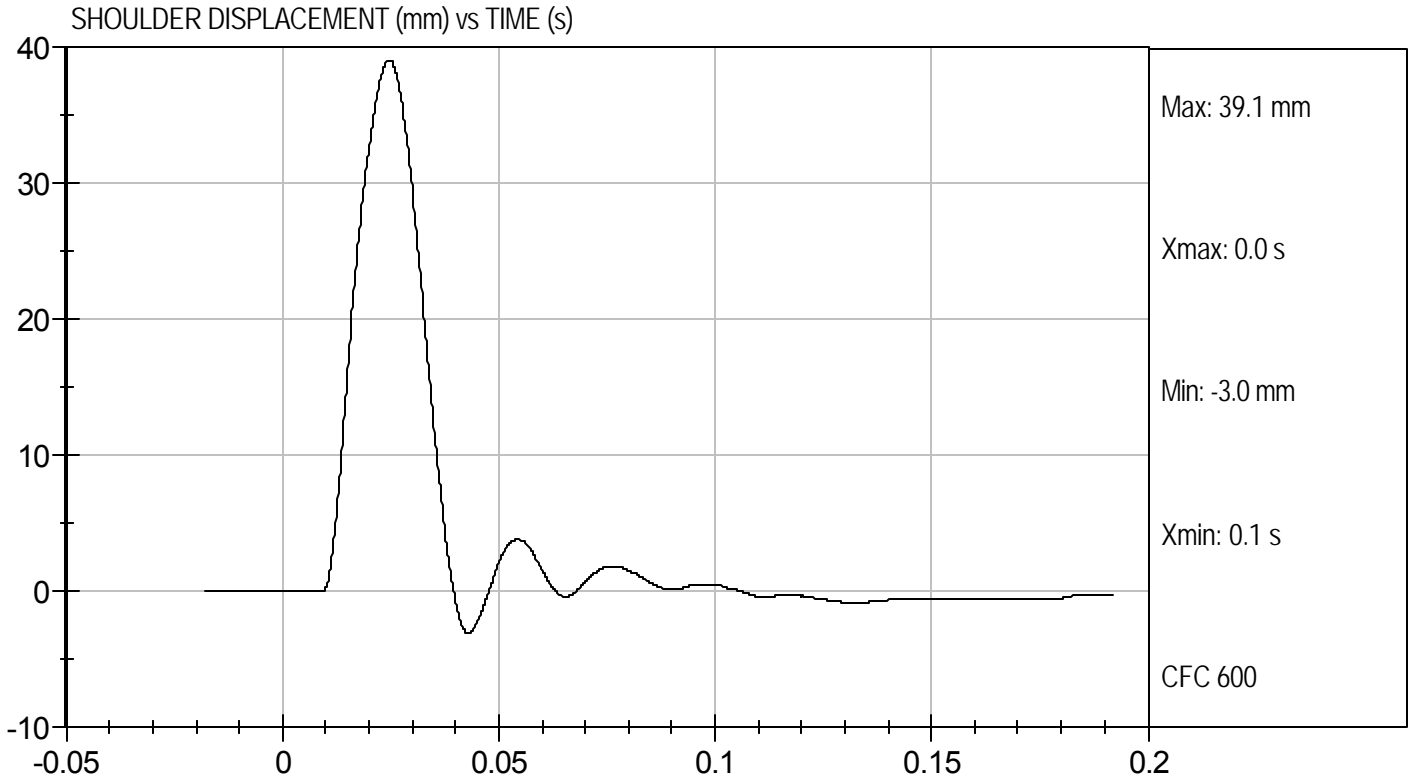
David Winkelbauer
Approved By

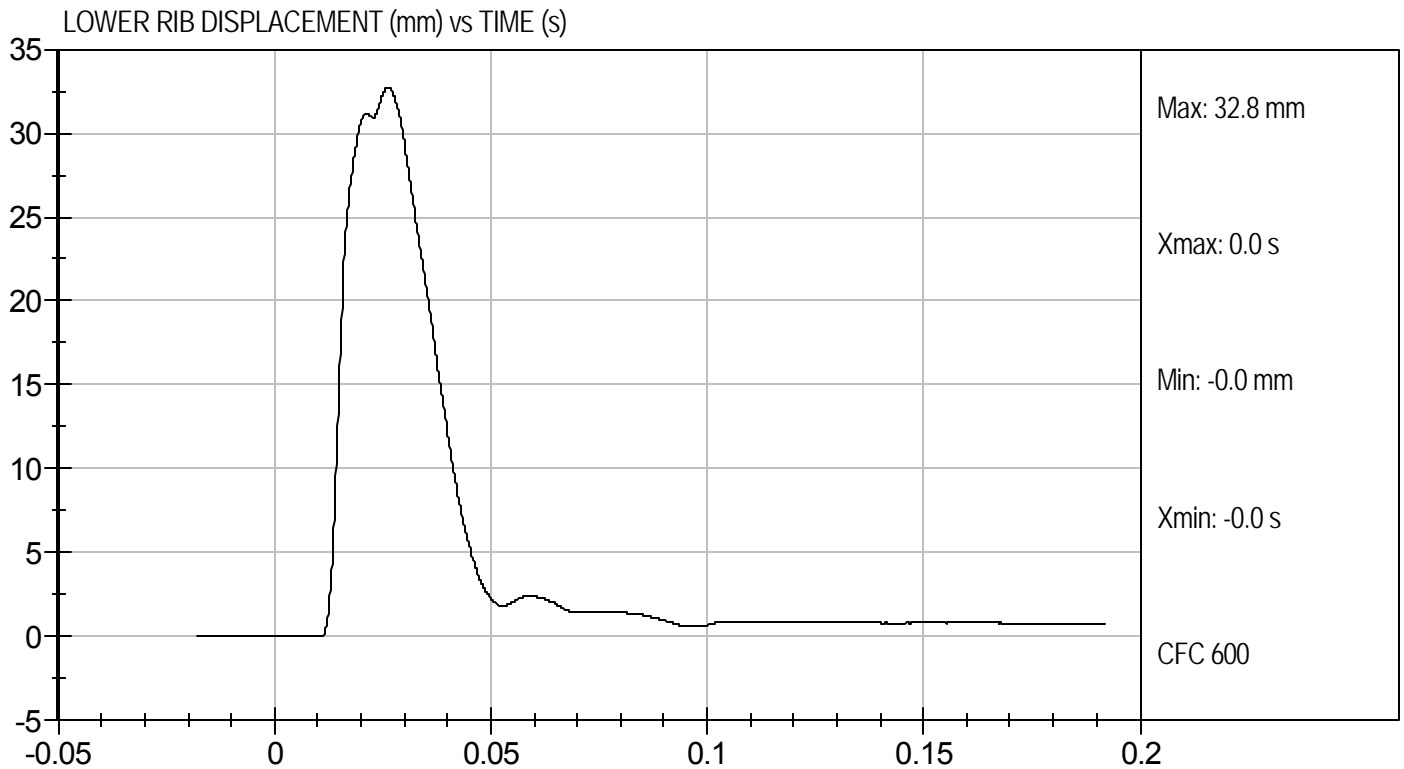
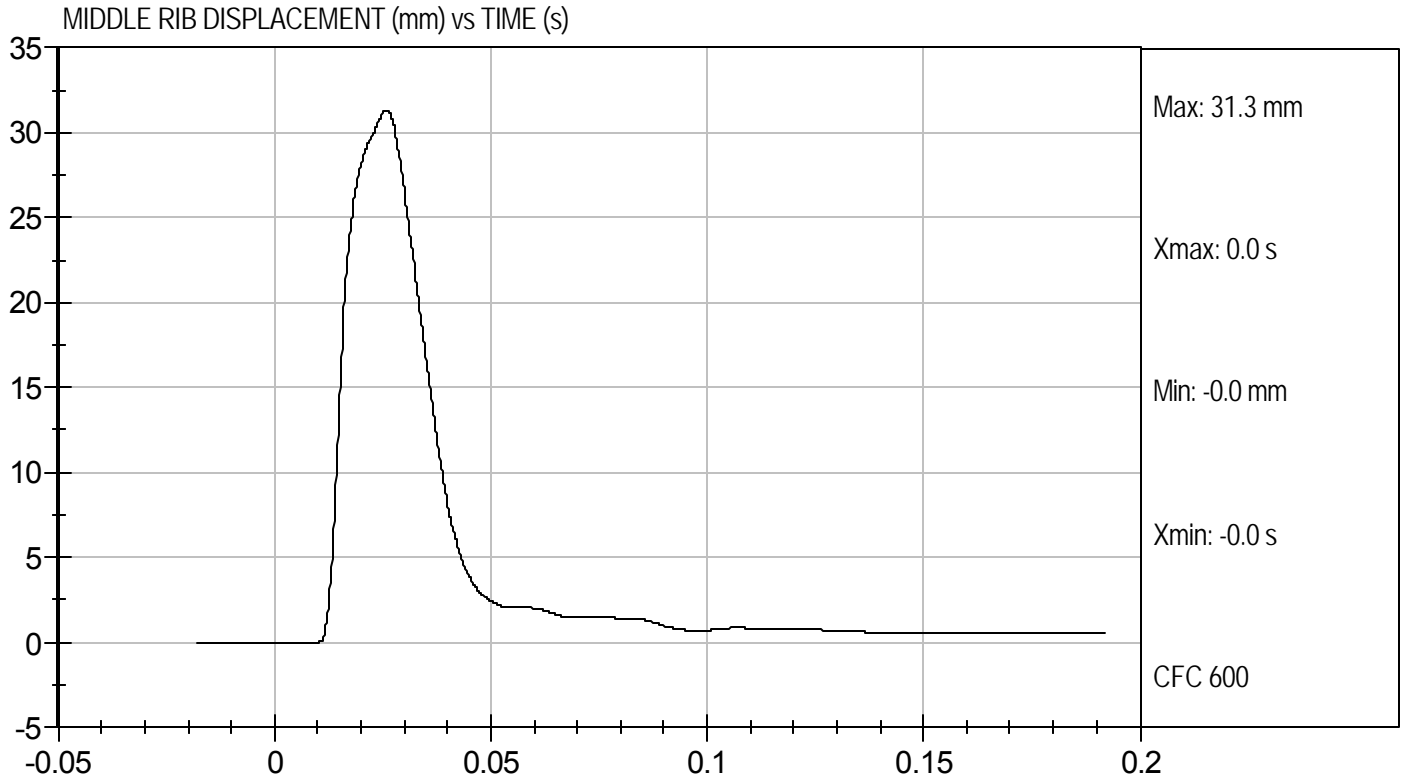


Test Desc: Thorax With Arm
Component ID: D103574

Test Date: 10/19/10
Velocity: 22.22 ft/s, 6.77 m/s





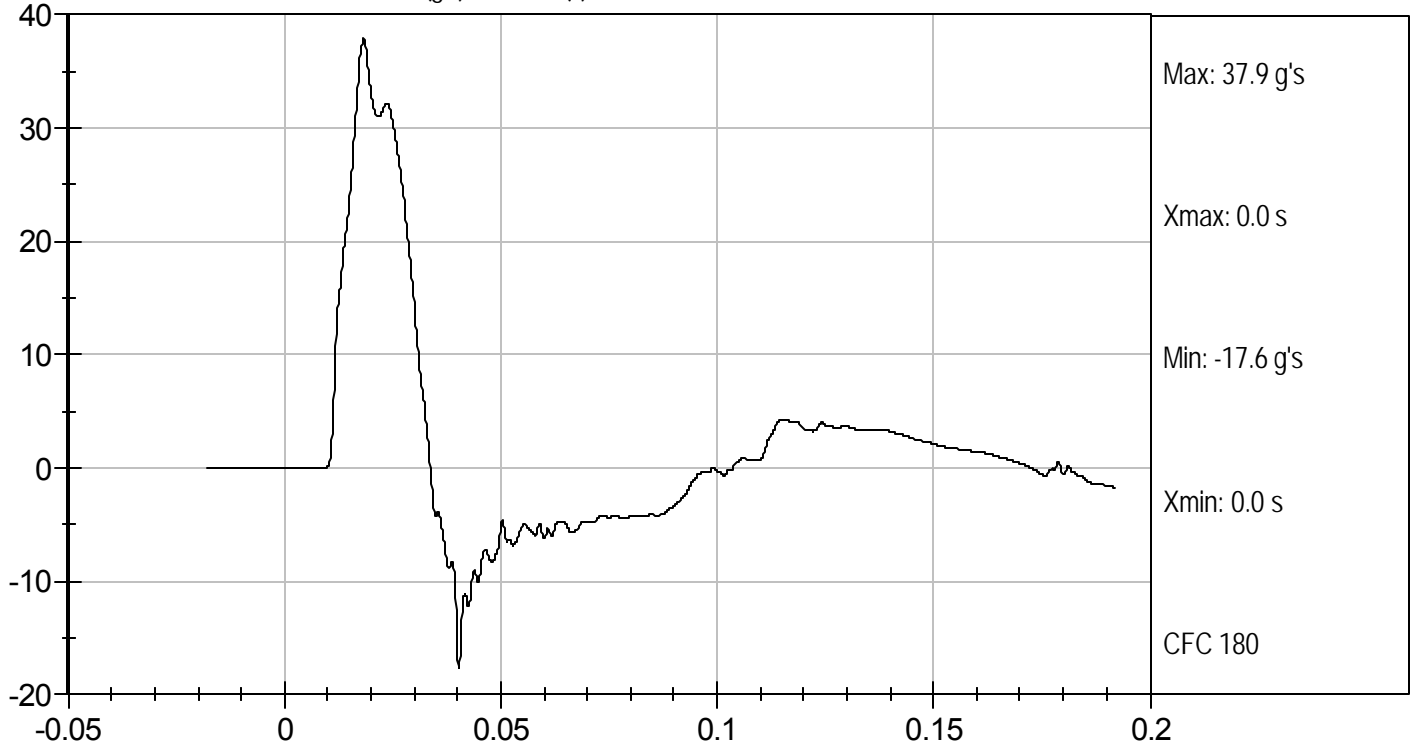




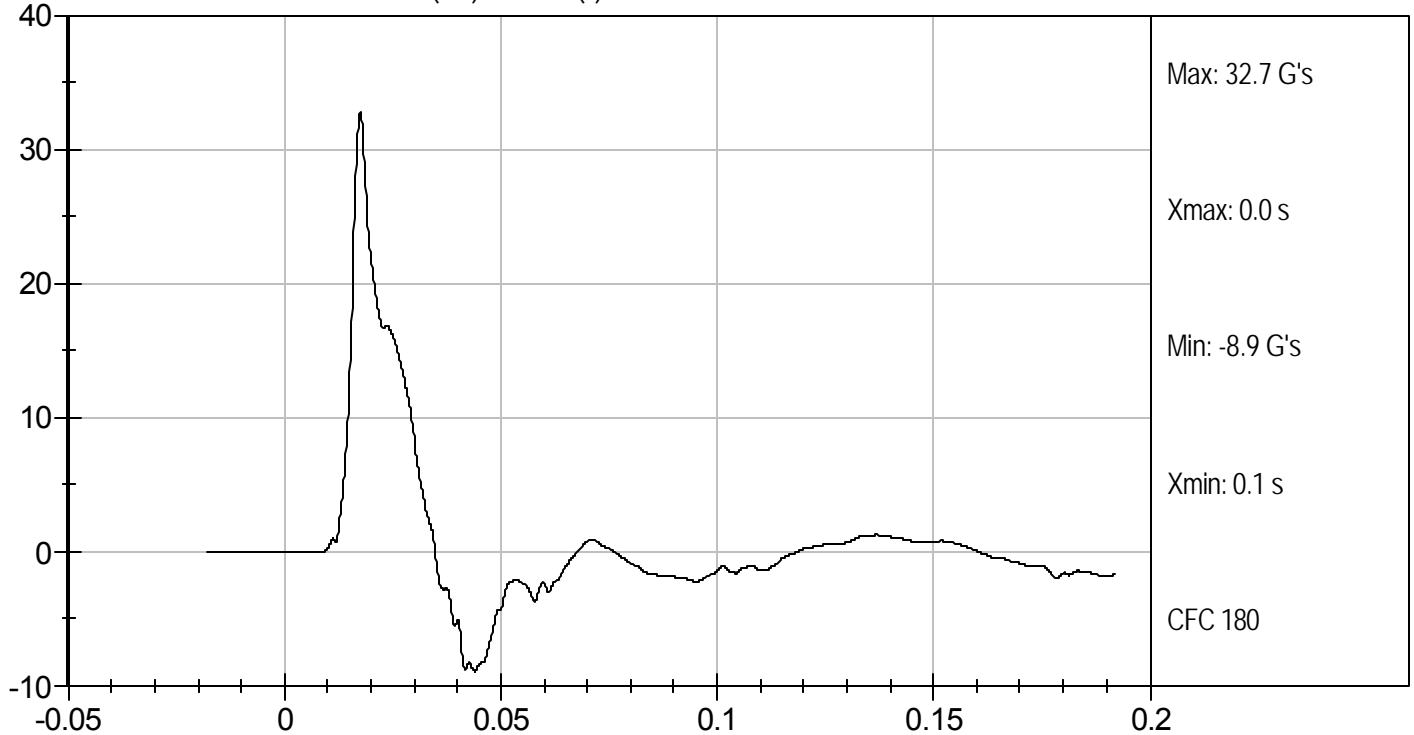
Test Desc: Thorax With Arm
Component ID: D103574

Test Date: 10/19/10
Velocity: 22.22 ft/s, 6.77 m/s

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



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



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

ATD Serial No: 306

Test I.D: D103575

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 21.2 | Pass |
| Humidity | % | 10 to 70 | 30 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.38 | Pass |
| Peak Impactor Force | G's | 14 to 18 | 15 | Pass |
| Upper Rib Displacement | mm | 32 to 40 | 39 | Pass |
| Middle Rib Displacement | mm | 39 to 45 | 42 | Pass |
| Lower Rib Displacement | mm | 35 to 43 | 37 | Pass |
| Upper Spine (T1) Y Acceleration | G's | 13 to 17 | 15 | Pass |
| Lower Spine (T12) Y Acceleration | G's | 7 to 11 | 8 | Pass |
| Overall Test Results | | | | Pass |


 Laboratory Technician

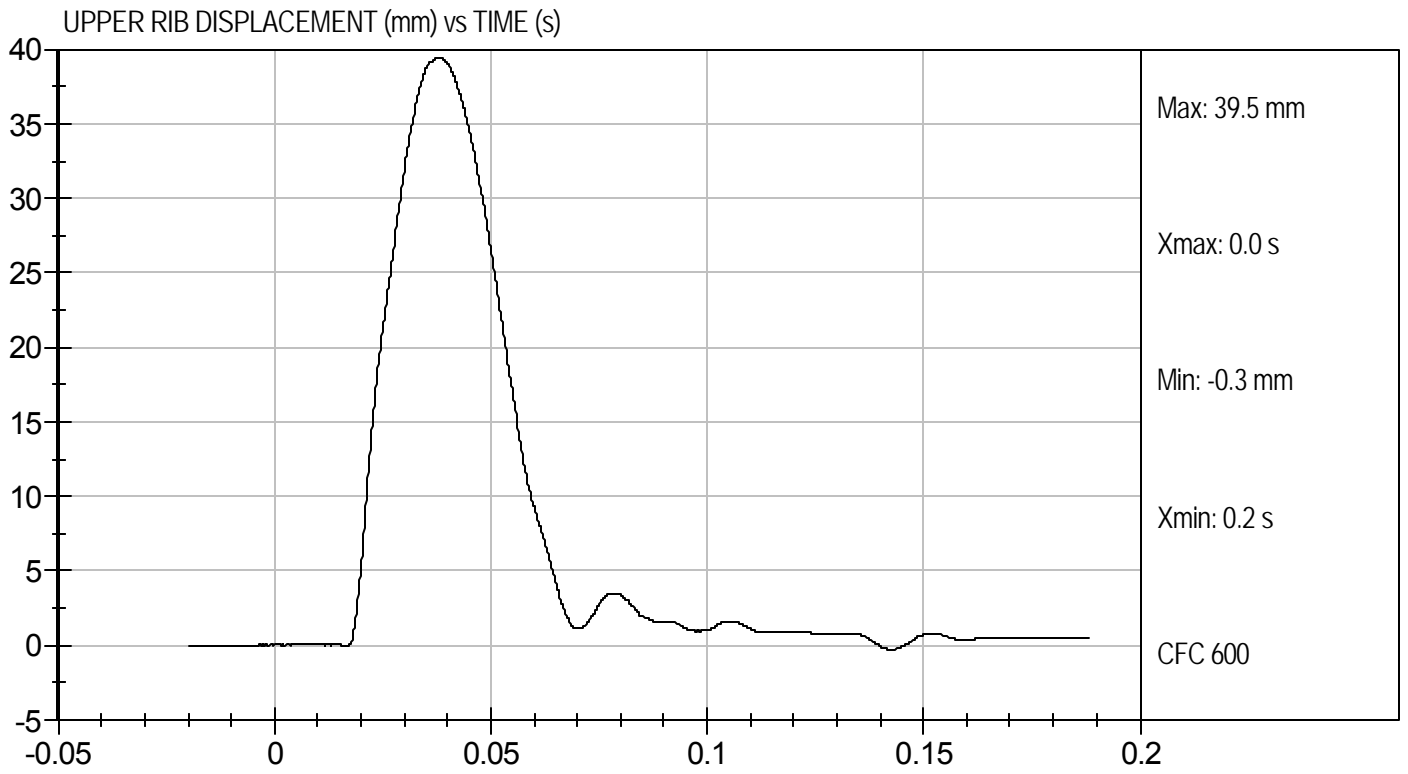
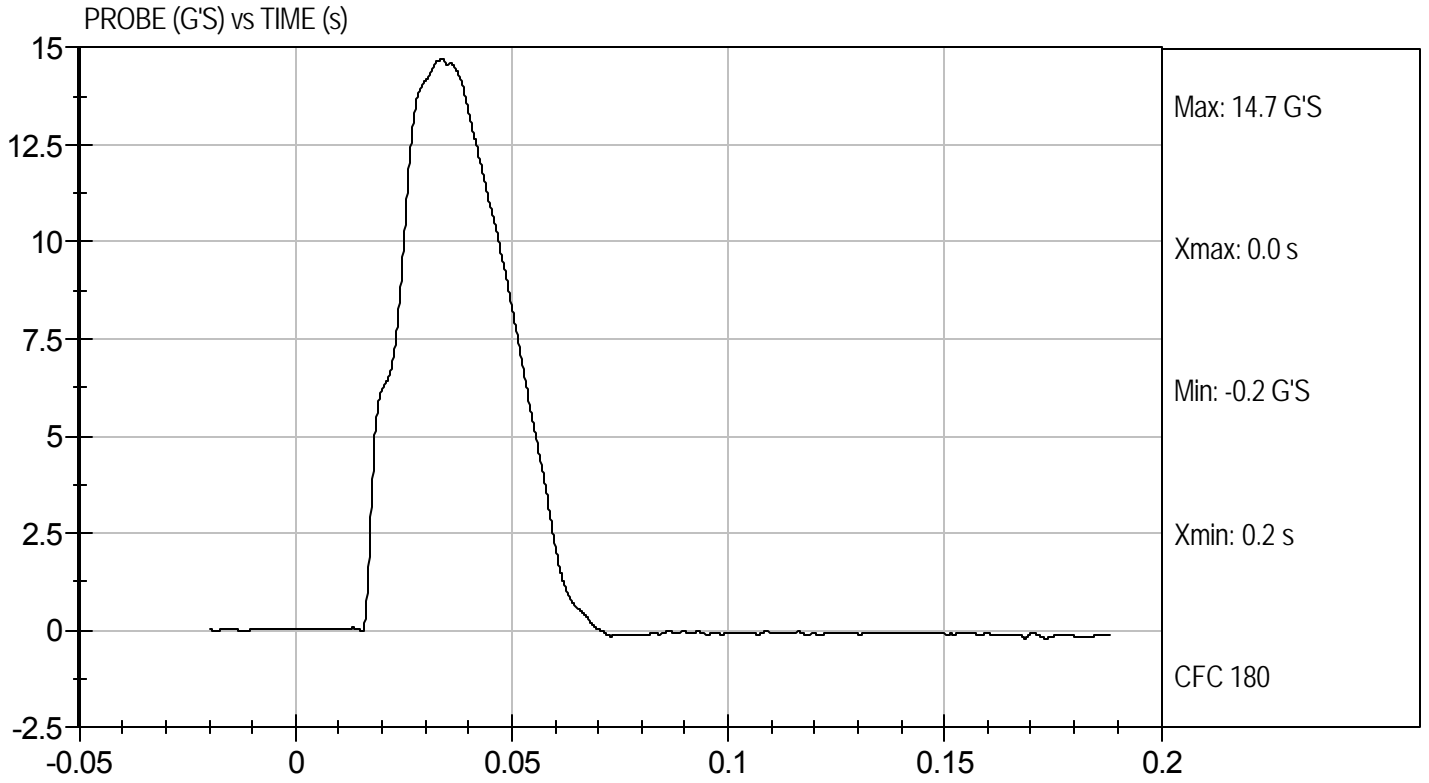
10/19/10
 Test Date


 Approved By



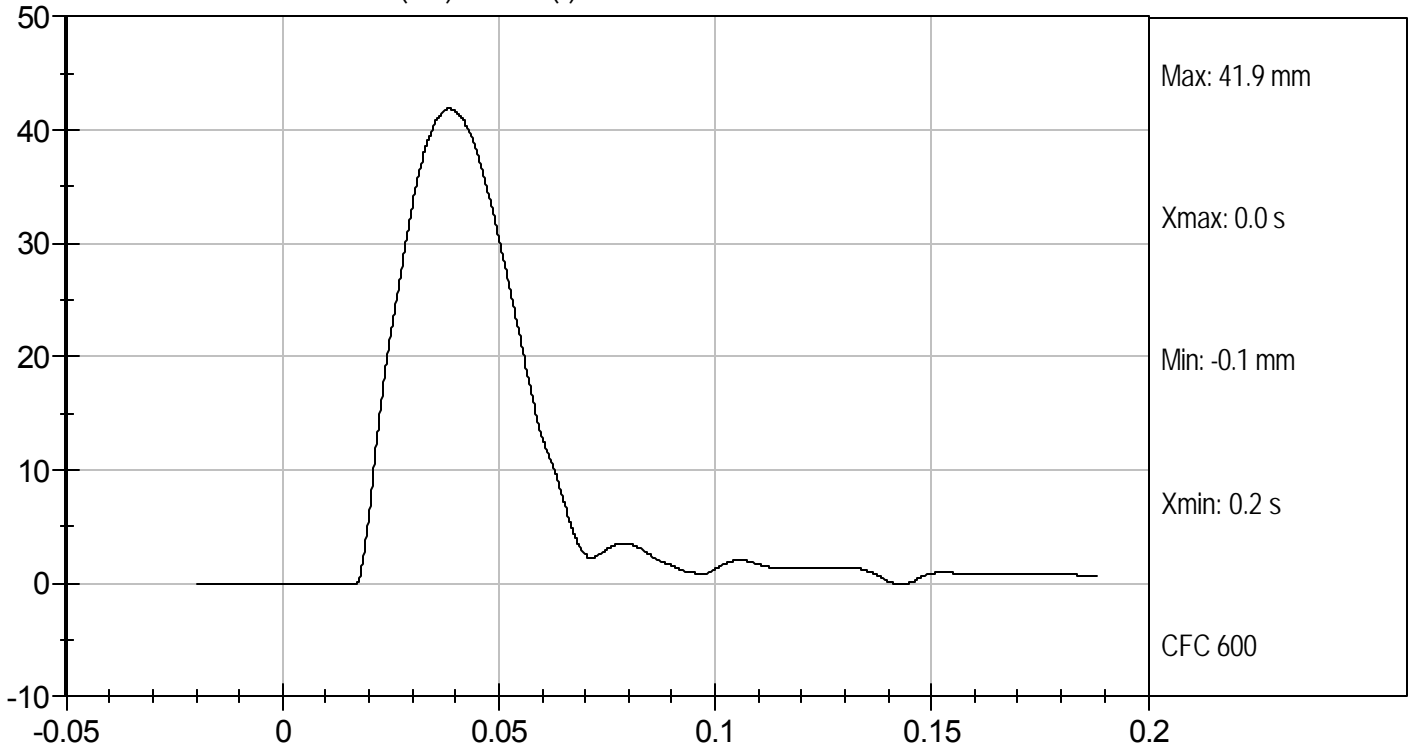
Test Desc: Thorax Without Arm
Component ID: D103575

Test Date: 10/19/10
Velocity: 14.37 ft/s, 4.38 m/s

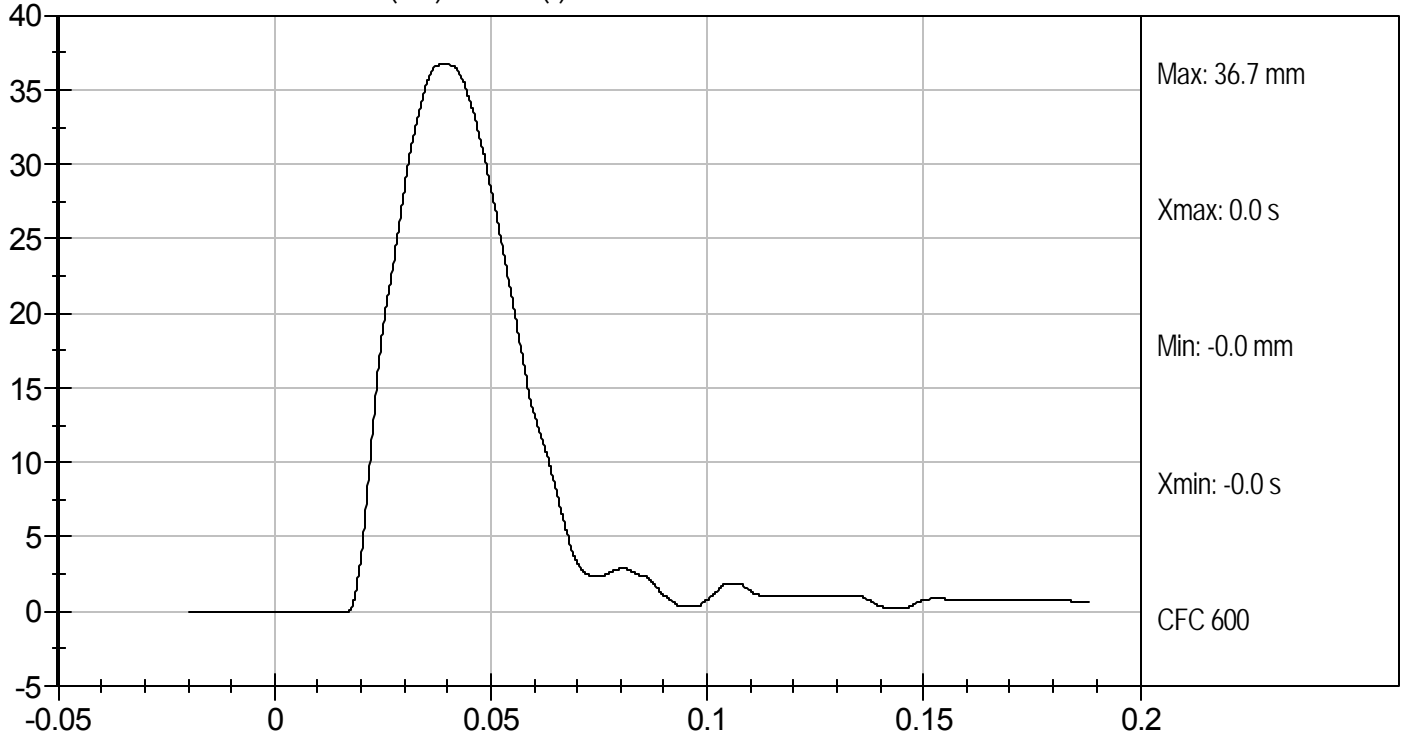




MIDDLE RIB DISPLACEMENT (mm) vs TIME (s)



LOWER RIB DISPLACEMENT (mm) vs TIME (s)

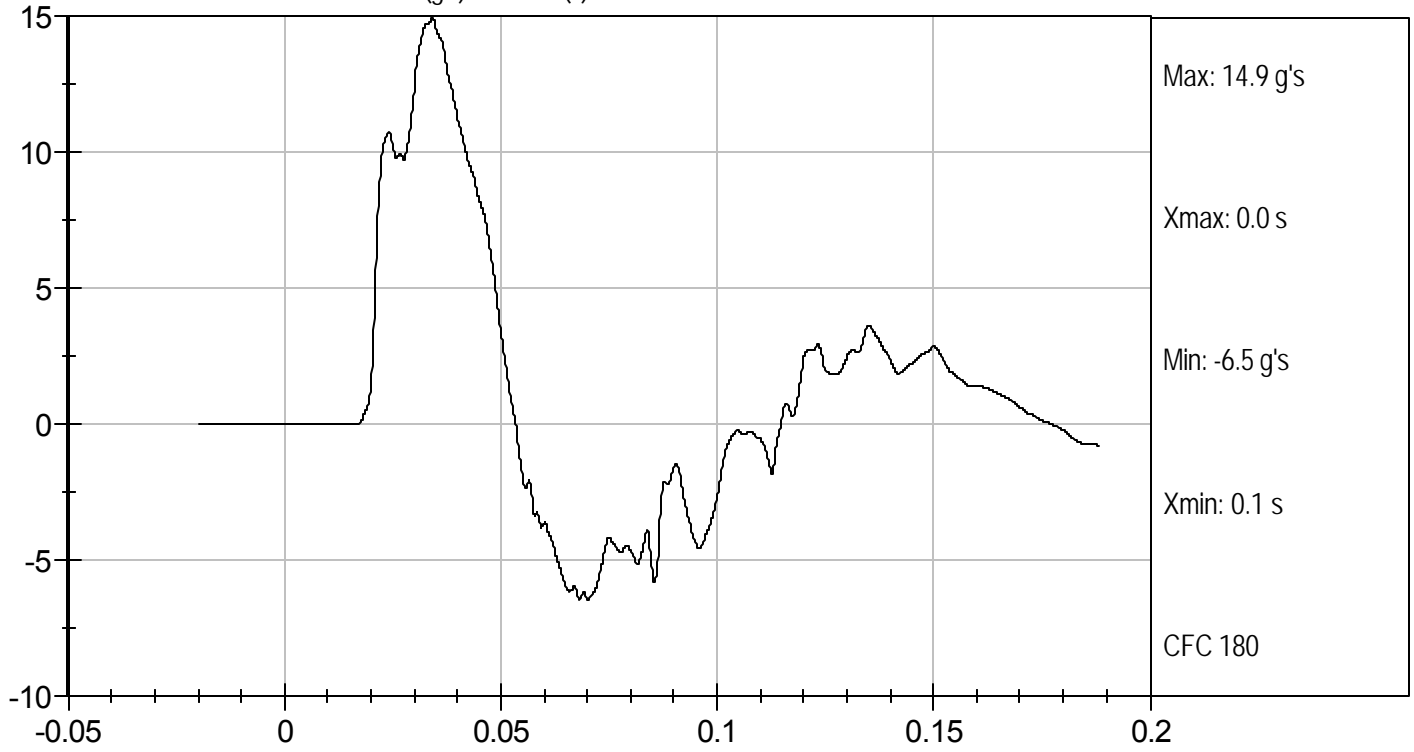




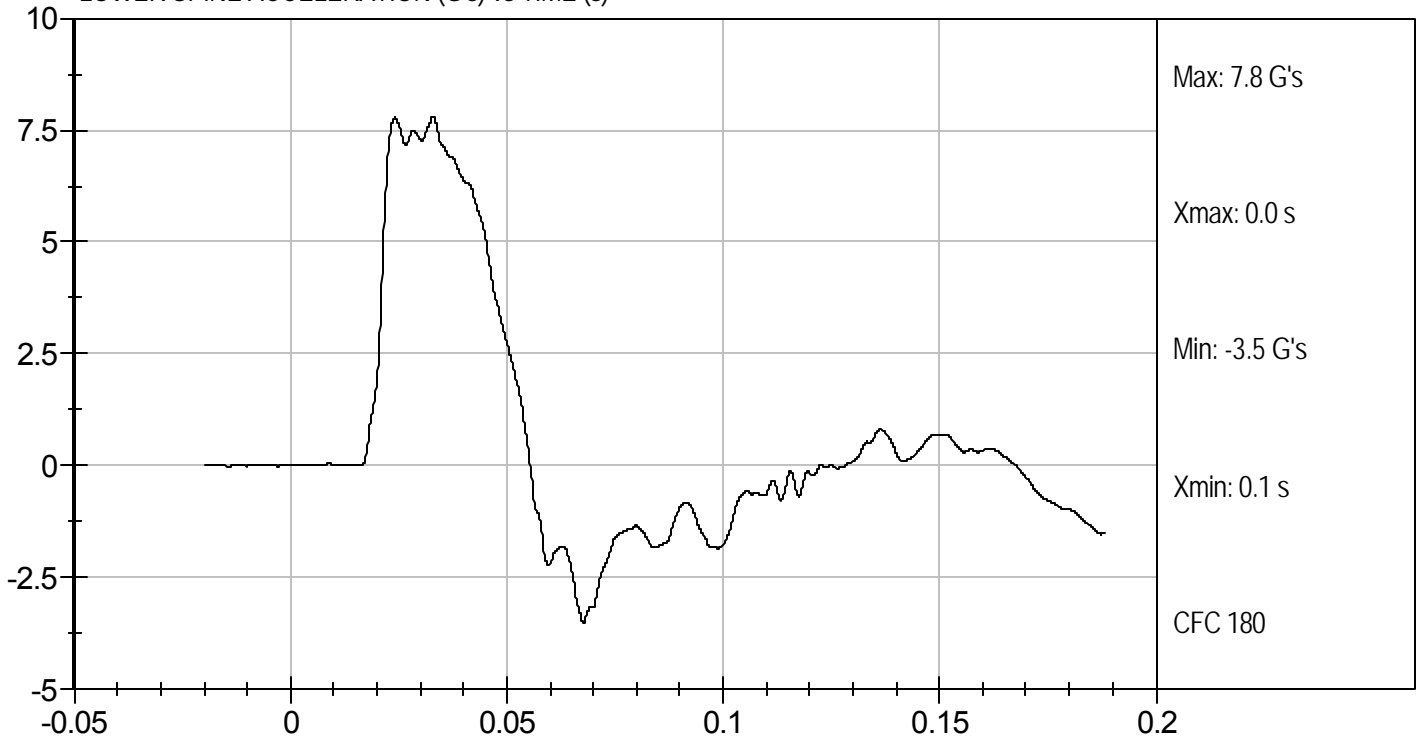
Test Desc: Thorax Without Arm
Component ID: D103575

Test Date: 10/19/10
Velocity: 14.37 ft/s, 4.38 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: 306

Test I.D: D103576

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 21.4 | Pass |
| Humidity | % | 10 to 70 | 31 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.38 | Pass |
| Peak Impactor Acceleration | G's | 12 to 16 | 14 | Pass |
| Upper Rib Displacement | mm | 36 to 47 | 42 | 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

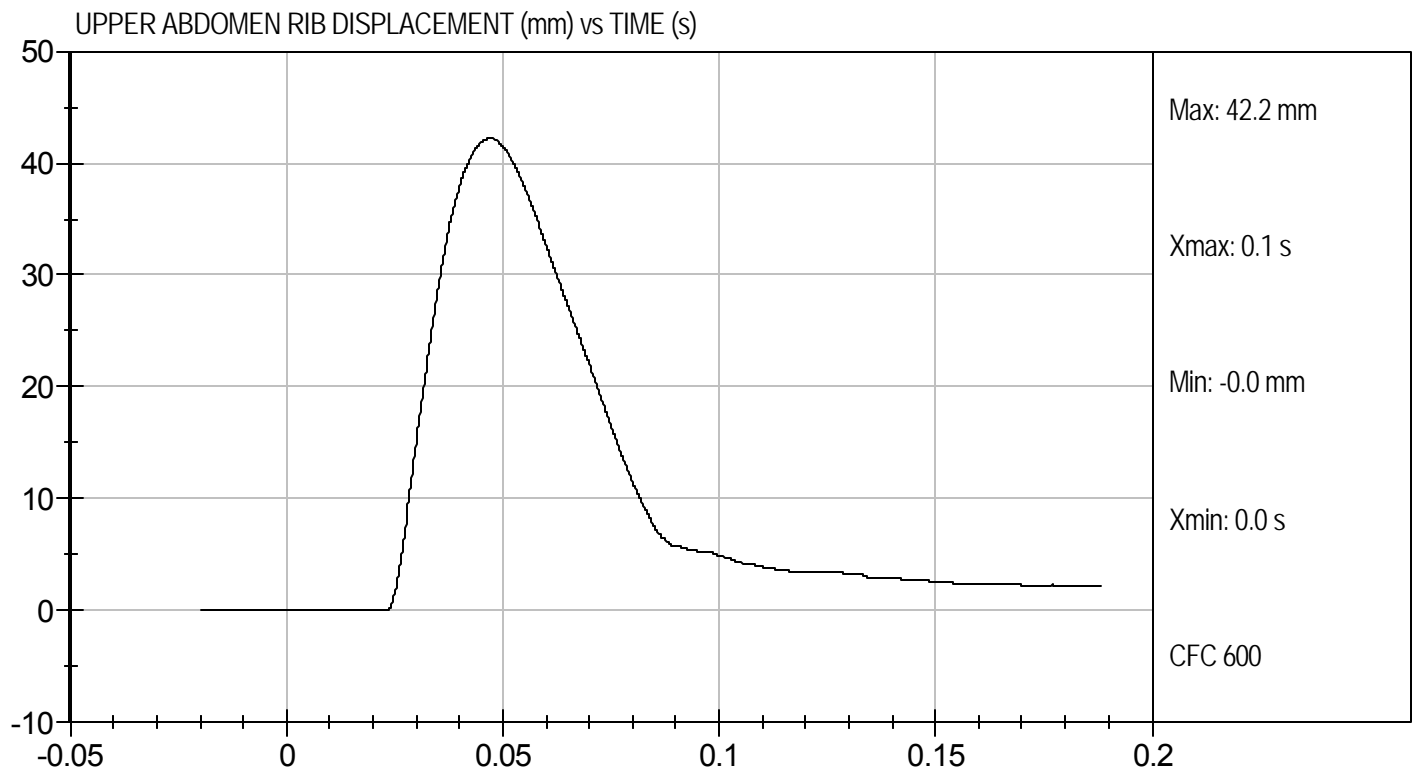
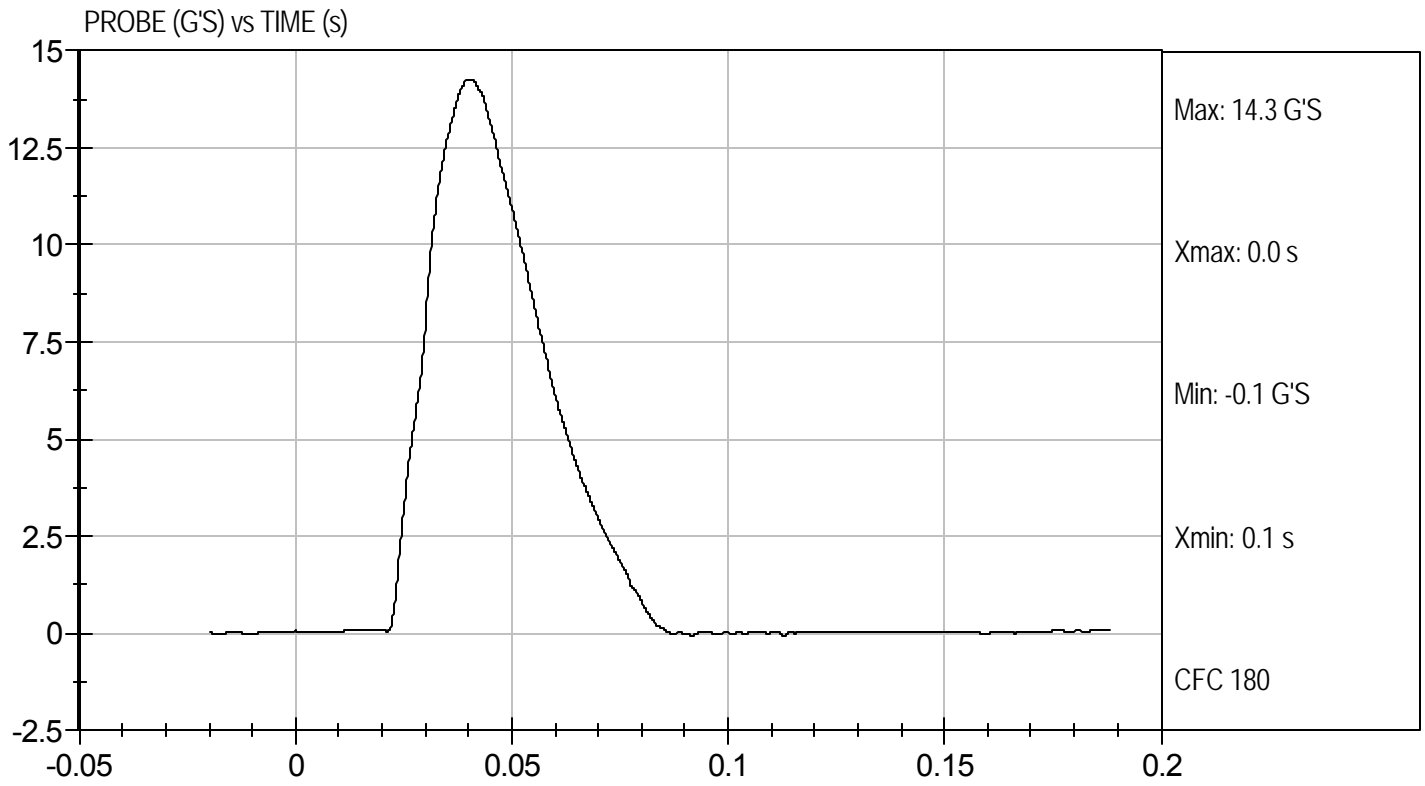
10/19/10
Test Date

David Winkelbauer
Approved By



Test Desc: Abdomen Impact
Component ID: D103576

Test Date: 10/19/10
Velocity: 14.37 ft/s, 4.38 m/s

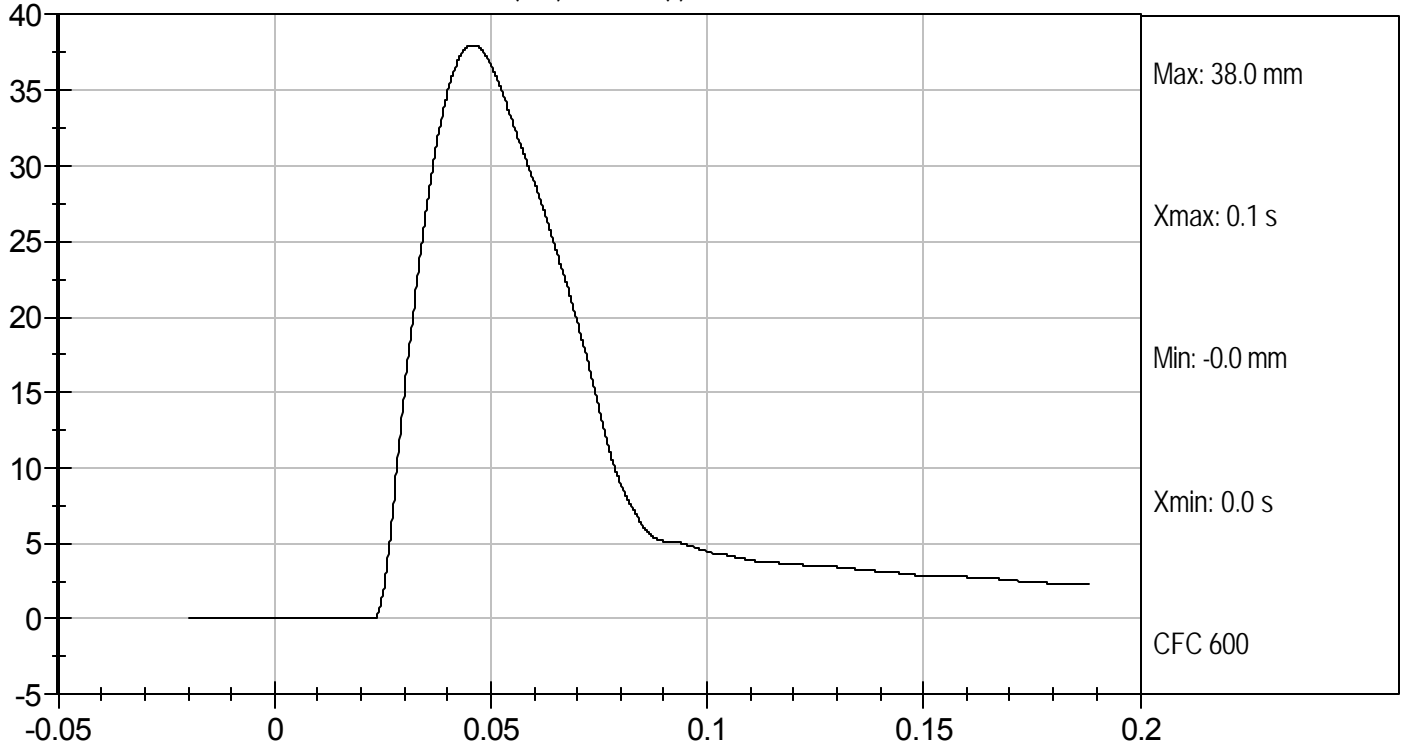




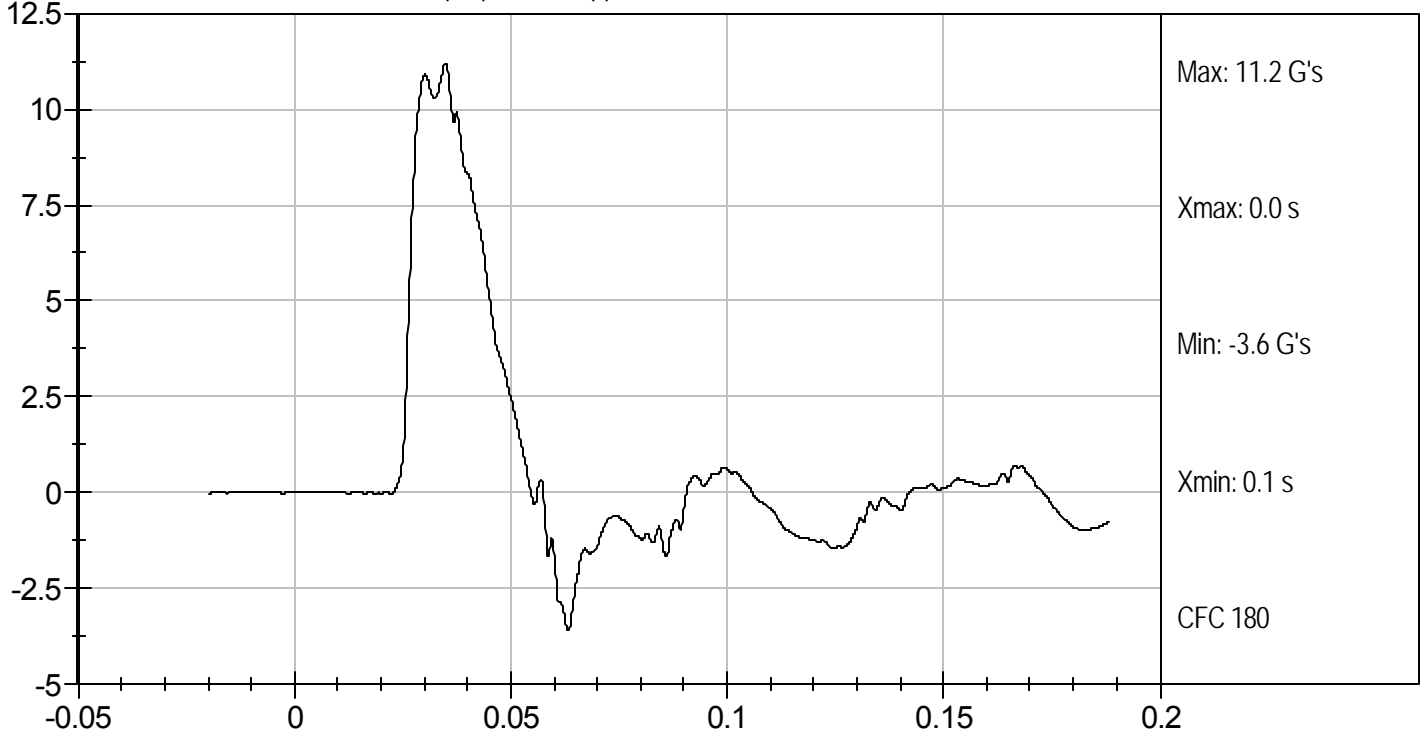
Test Desc: Abdomen Impact
Component ID: D103576

Test Date: 10/19/10
Velocity: 14.37 ft/s, 4.38 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: 306

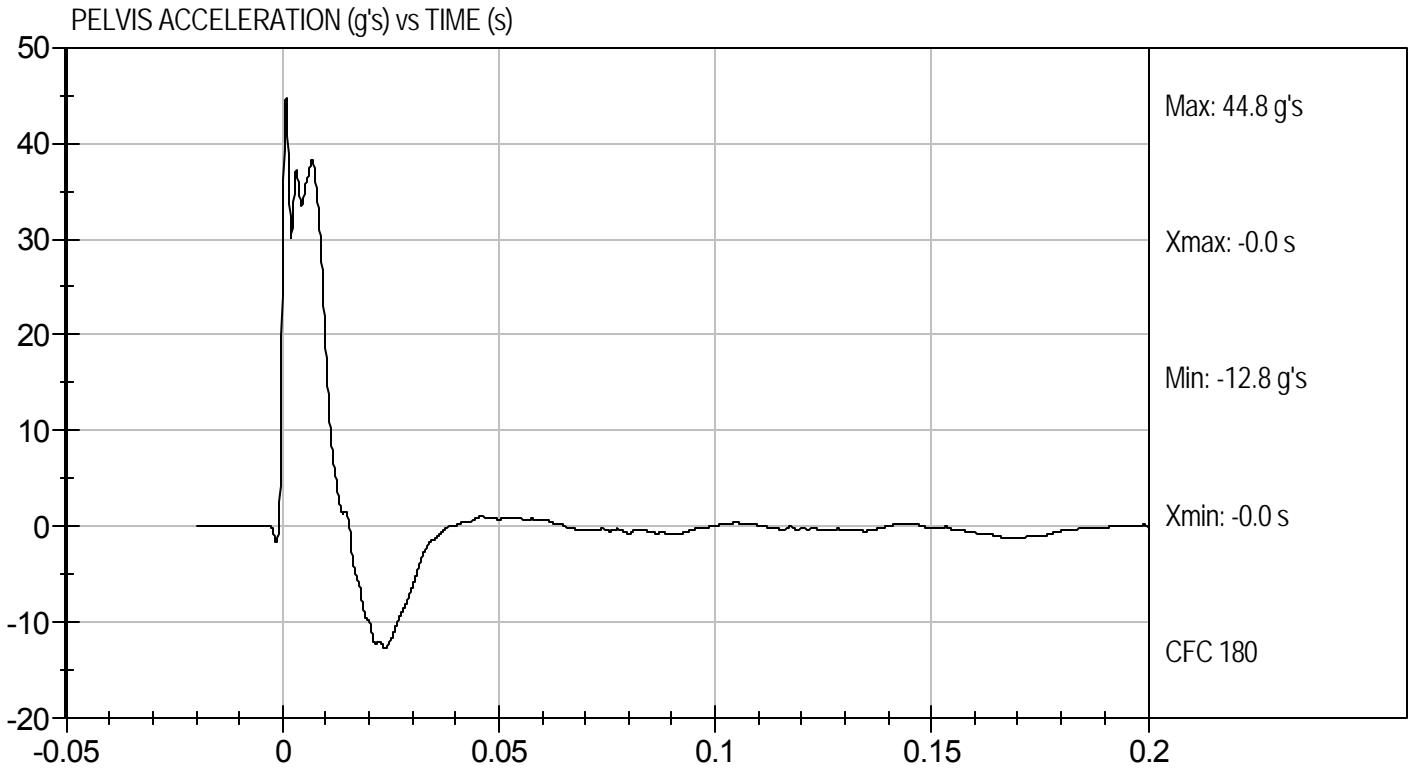
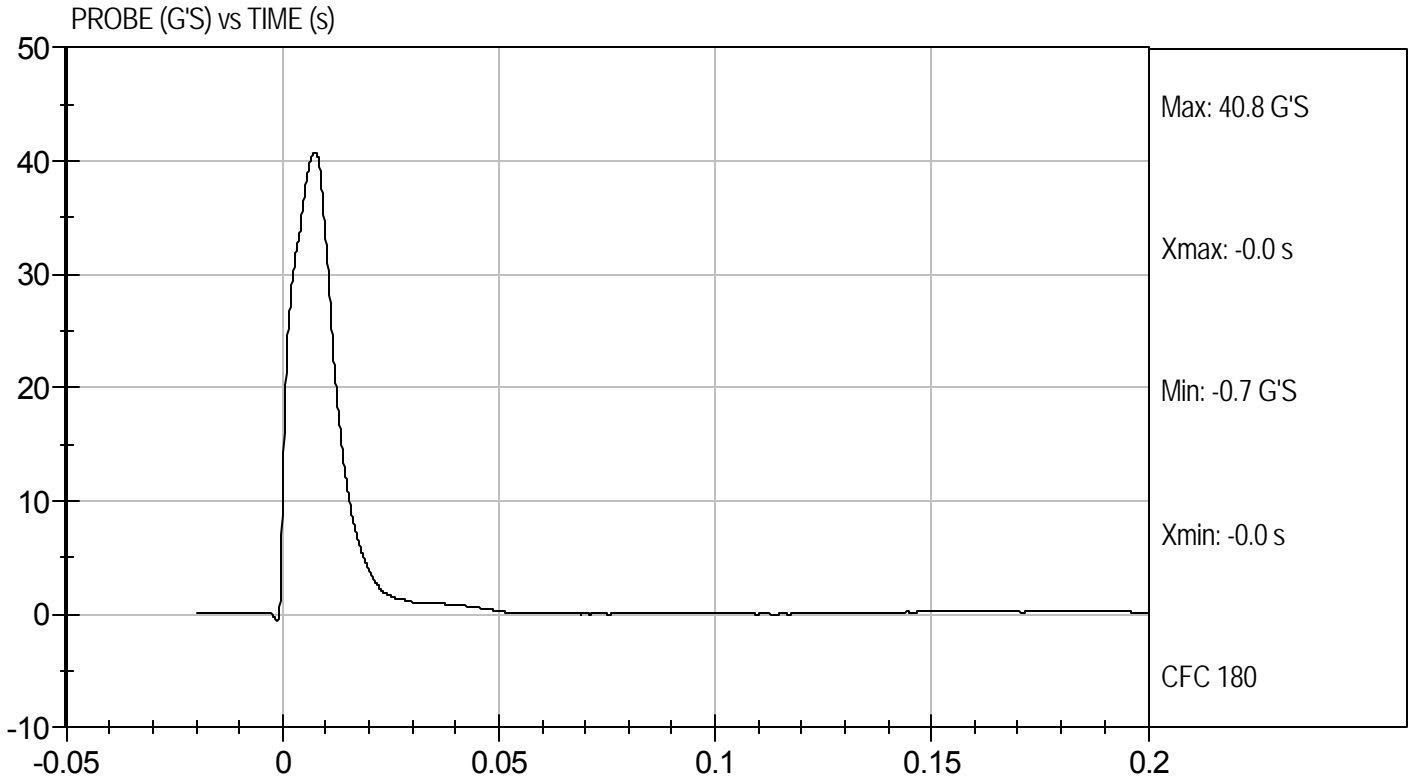
Test I.D: D103577

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 21.0 | Pass |
| Humidity | % | 10 to 70 | 30 | Pass |
| Impact Velocity | m/s | 6.60 to 6.80 | 6.71 | Pass |
| Peak Impactor Acceleration | G's | 38 to 47 | 41 | Pass |
| Pelvis Y Acceleration after 6 ms | G's | 34 to 42 | 38 | Pass |
| Peak Acetabulum Force | N | 3600 to 4300 | 4035 | Pass |
| Overall Test Results | | | | Pass |

Jessica Hall
 Laboratory Technician

10/19/10
 Test Date

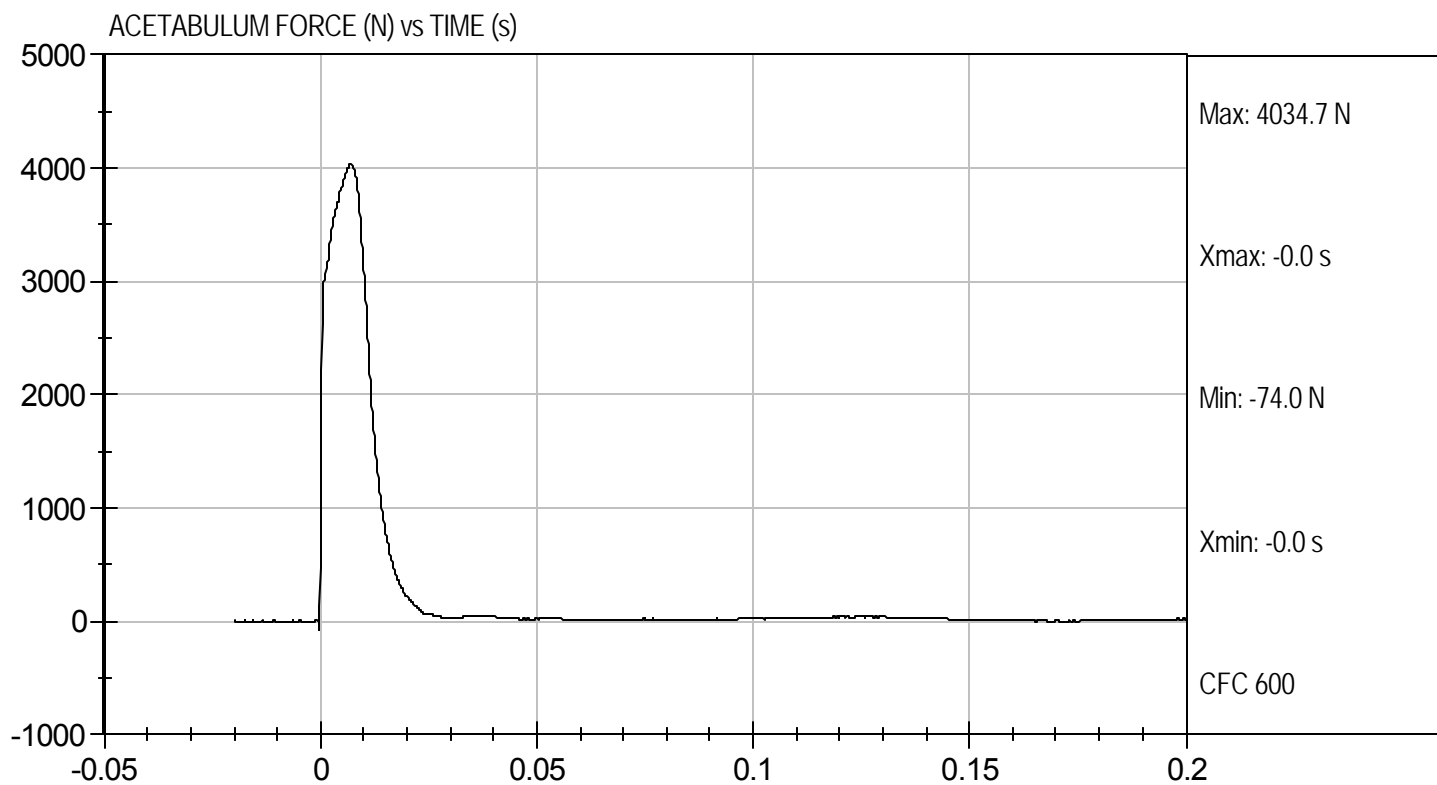
David Winkelbauer
 Approved By





Test Desc: Pelvis Impact
Component ID: D103577

Test Date: 10/19/10
Velocity: 22.00 ft/s, 6.71 m/s



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

ATD Serial No: 306

Test I.D: D103578

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|----------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 21.1 | Pass |
| Humidity | % | 10 to 70 | 30 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.38 | Pass |
| Peak Impactor Acceleration | G's | 36 to 45 | 39 | Pass |
| Pelvis Y Acceleration | G's | 28 to 39 | 31 | Pass |
| Peak Pelvis Iliac Force | N | 4100 to 5100 | 4813 | Pass |
| Overall Test Results | | | | Pass |


 Laboratory Technician

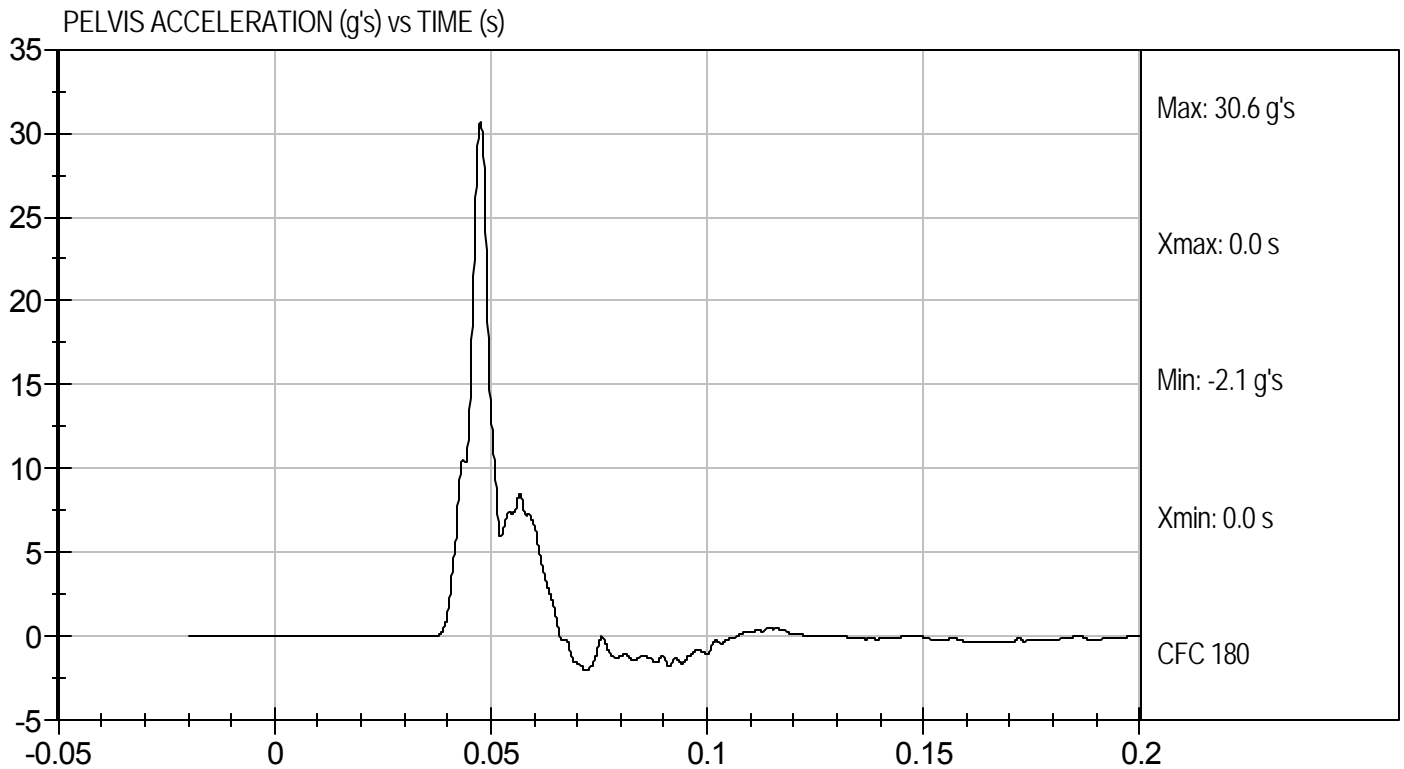
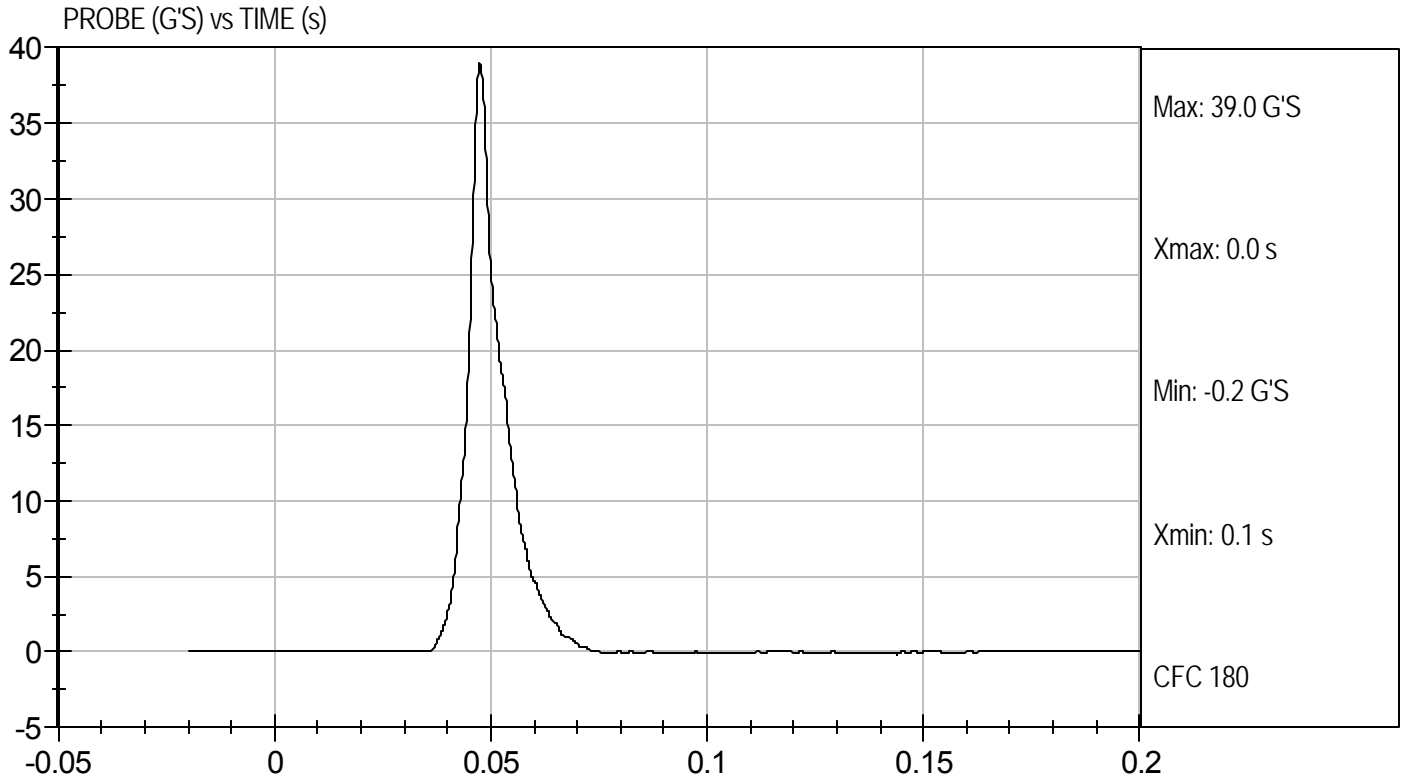
10/19/10
 Test Date


 Approved By



Test Desc: Iliac Impact
Component ID: D103578

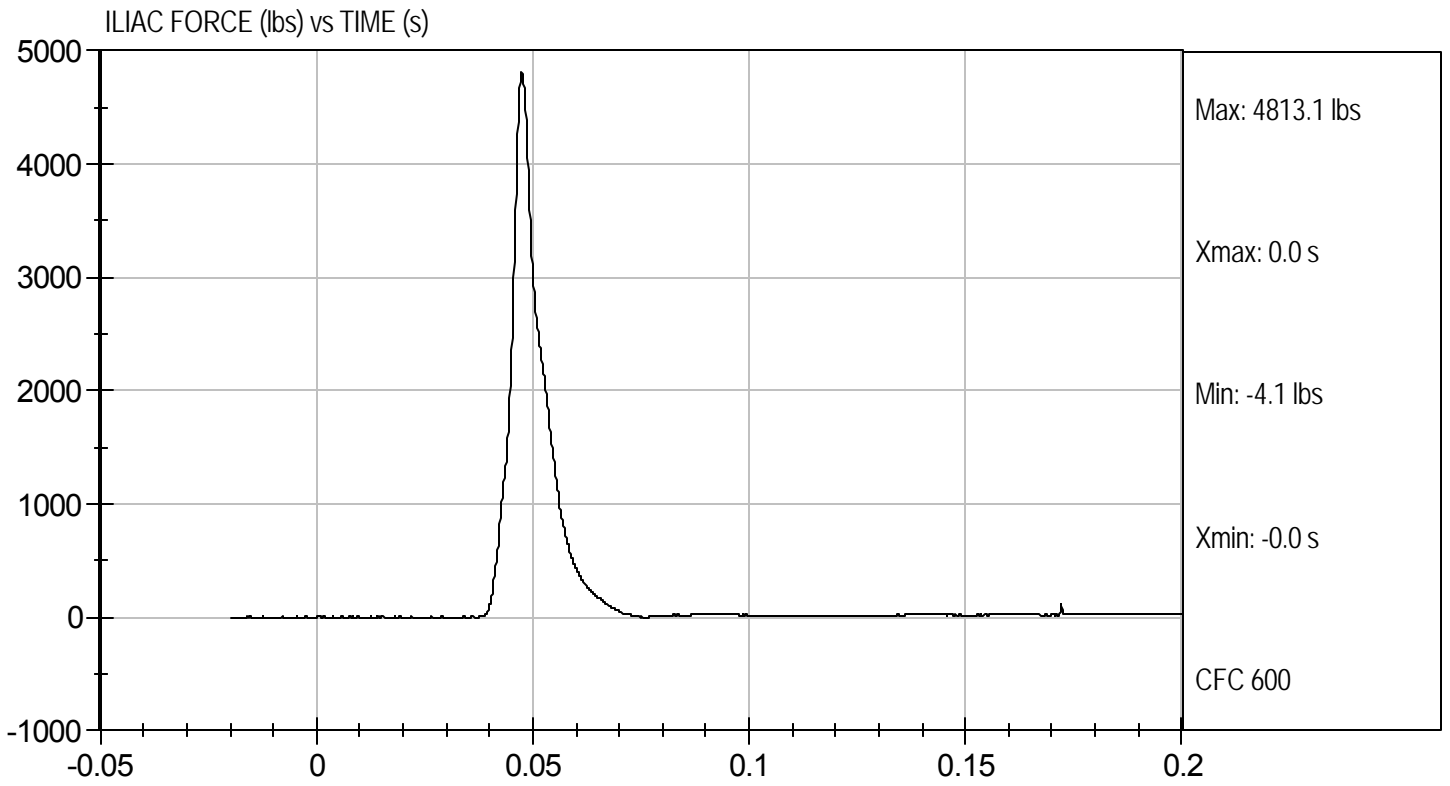
Test Date: 10/19/10
Velocity: 14.37 ft/s, 4.38 m/s





Test Desc: Iliac Impact
Component ID: D103578

Test Date: 10/19/10
Velocity: 14.37 ft/s, 4.38 m/s



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

ATD Serial No: 306

Test ID: D103681

| 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 | 30 | Pass |
| Peak Resultant Acceleration | G's | 115 to 137 | 118 | Pass |
| Peak Lateral Acceleration | G's | +/- 15 | -5.6 | Pass |
| Unimodal | N/A | <15% | Yes | Pass |
| Overall Test Results | | | | Pass |

Jessica Hall
Laboratory Technician

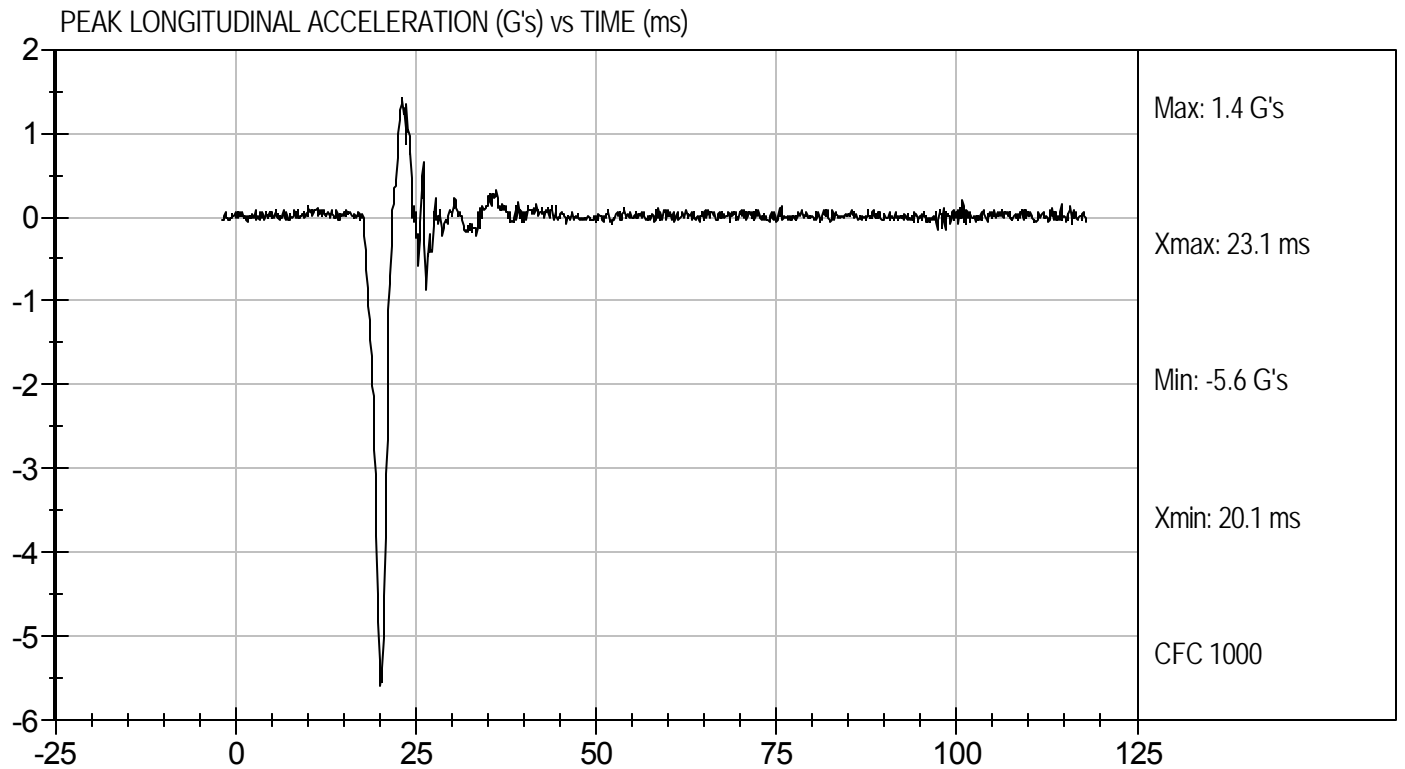
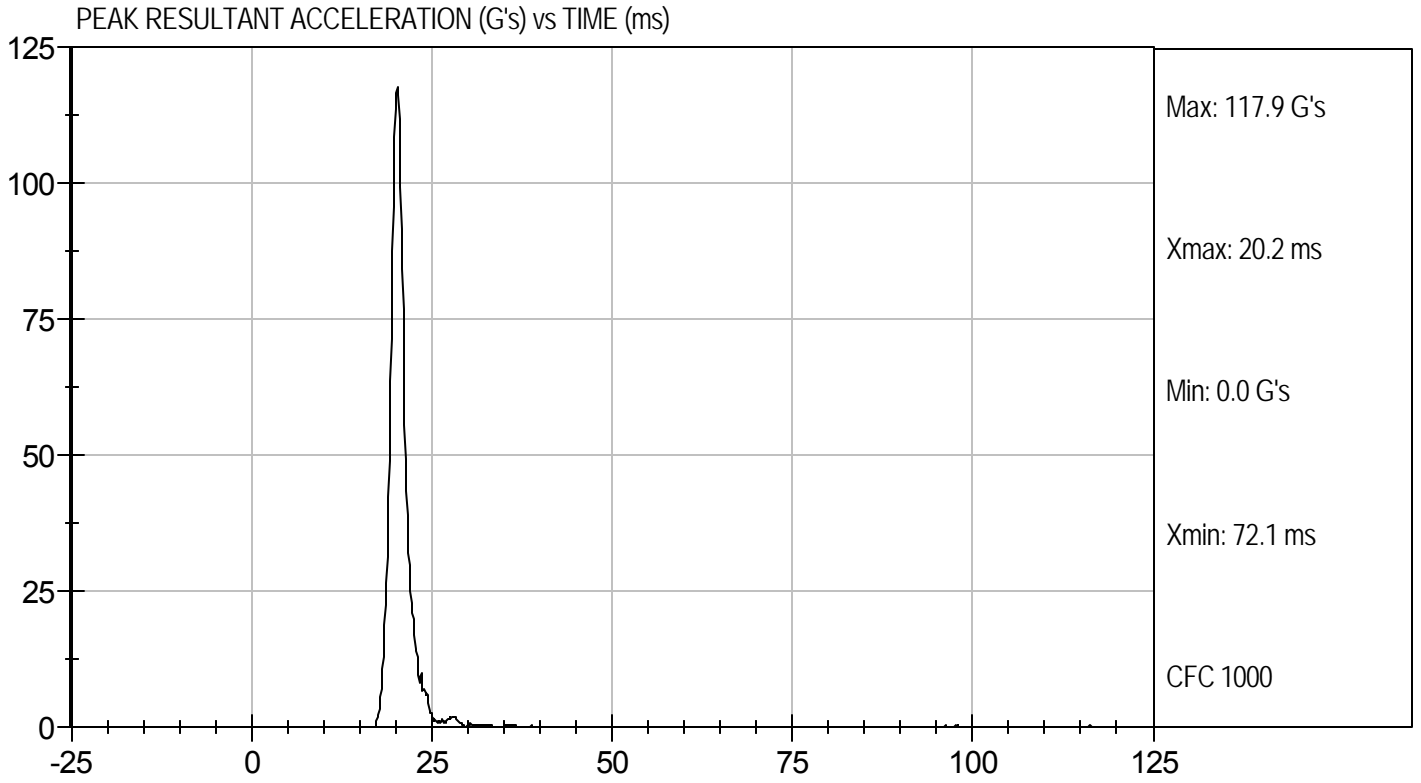
10/27/10
Test Date

David Winkelbauer
Approved By



Test Desc: Head Drop
Component ID: D103681

Test Date: 10/27/10
Velocity: 0 ft/s, 0 m/s



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

ATD Serial No: 306

Test I.D.: D103682

| Tested Parameter | | Units | Specification | Result | Pass/Fail |
|--|-----------|-------|---------------|--------|-----------|
| Temperature | | deg C | 20.6 to 22.2 | 22.0 | Pass |
| Humidity | | % | 10 to 70 | 30 | Pass |
| Impact Velocity | | m/s | 5.51 to 5.63 | 5.58 | Pass |
| Delta Velocity | 10 ms | m/s | 2.20 to 2.80 | 2.53 | Pass |
| | 15 ms | m/s | 3.30 to 4.10 | 3.55 | Pass |
| | 20 ms | m/s | 4.40 to 5.40 | 4.65 | Pass |
| | 25 ms | m/s | 5.40 to 6.10 | 5.51 | Pass |
| | 25-100 ms | m/s | 5.50 to 6.20 | 5.54 | Pass |
| Maximum D-Plane Rotation | | deg | 71 to 81 | 73 | Pass |
| Time of Maximum D-Plane Rotation | | ms | 50 to 70 | 62 | Pass |
| Maximum Occipital Condyle Moment during Rotation Interval Nm | | | -44 to -36 | -42 | Pass |
| Time of Moment Decay to 0 Nm | | ms | 102 to 126 | 120 | Pass |
| Overall Test Results | | | | | Pass |

Jessica Hall
Laboratory Technician

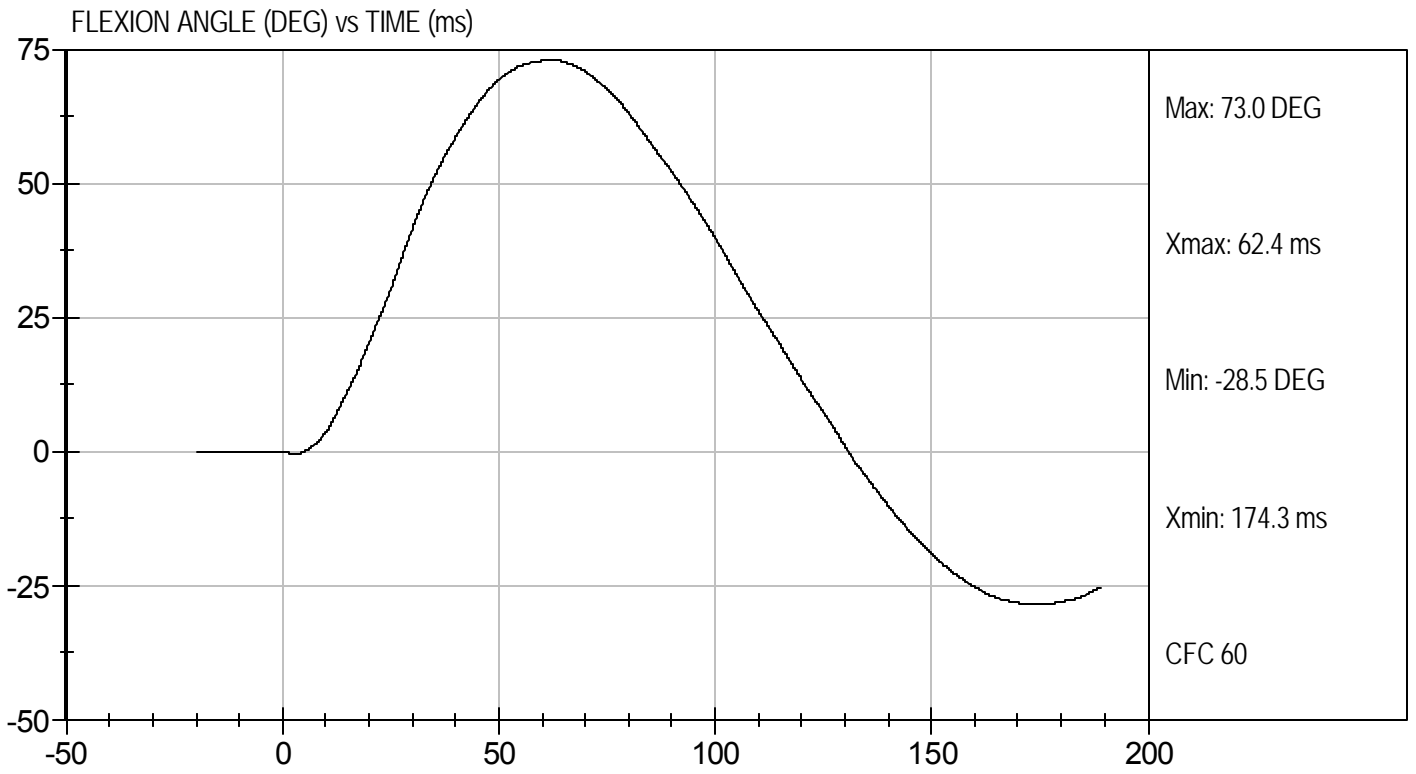
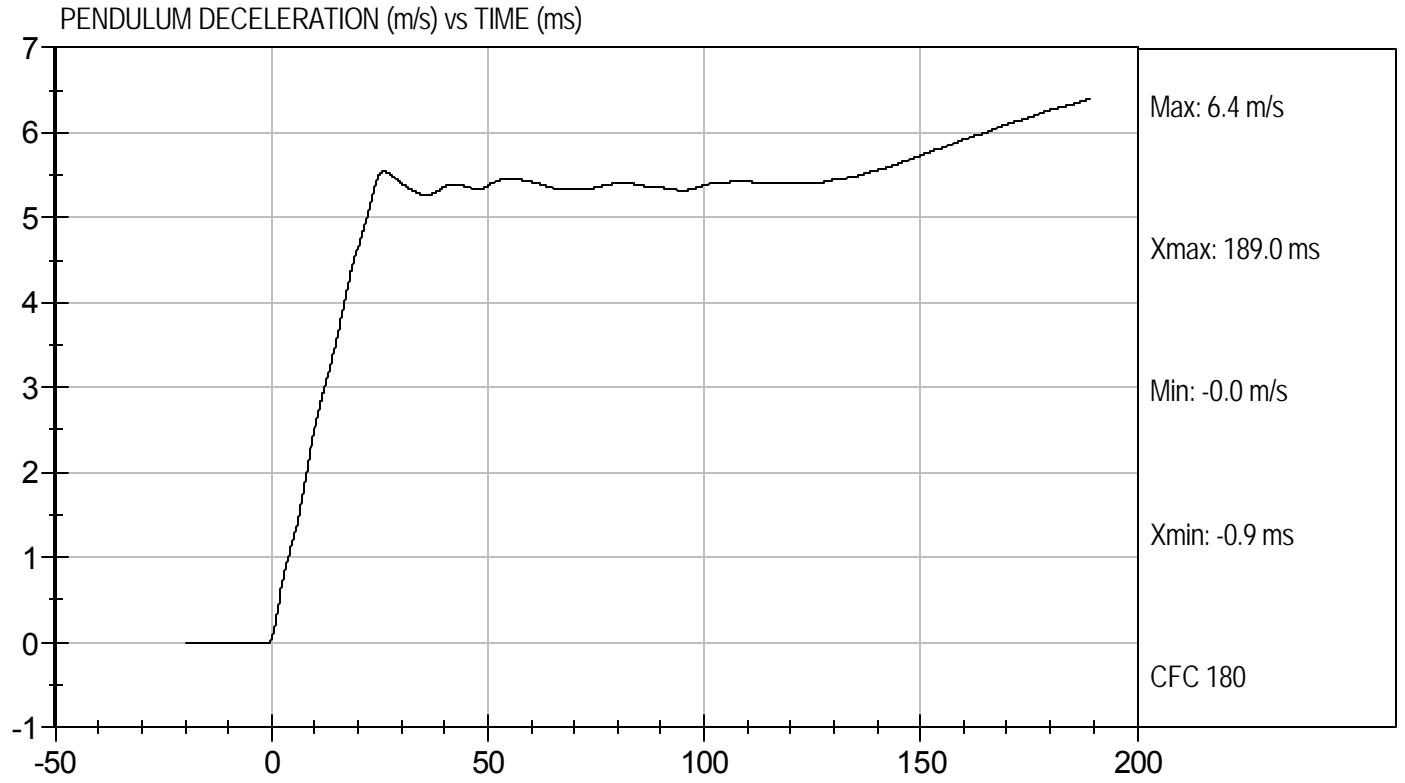
10/27/10
Test Date

David Winkelbauer
Approved By



Test Desc: Neck Bending
Component ID: D103682

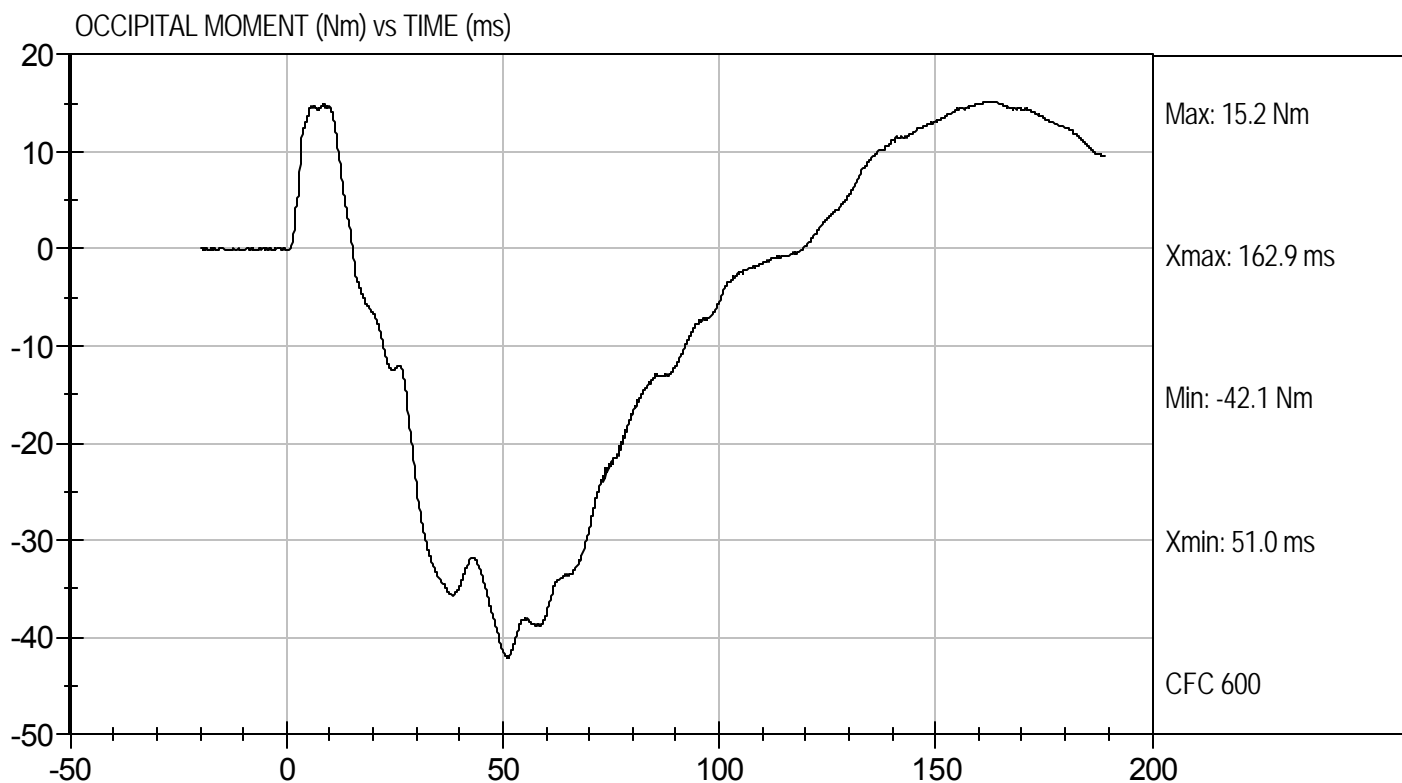
Test Date: 10/27/10
Velocity: 18.32 ft/s, 5.58 m/s





Test Desc: Neck Bending
Component ID: D103682

Test Date: 10/27/10
Velocity: 18.32 ft/s, 5.58 m/s



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

ATD Serial No: 306

Test ID: D103683

| 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 | 31 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.34 | Pass |
| Maximum Probe Acceleration | G's | 13 to 18 | 16 | Pass |
| Shoulder Displacement | mm | 28 to 37 | 30 | Pass |
| Upper Spine (T1) Y Acceleration | G's | 17 to 22 | 19 | Pass |
| Overall Test Results | | | | Pass |

Jessica Hall
Laboratory Technician

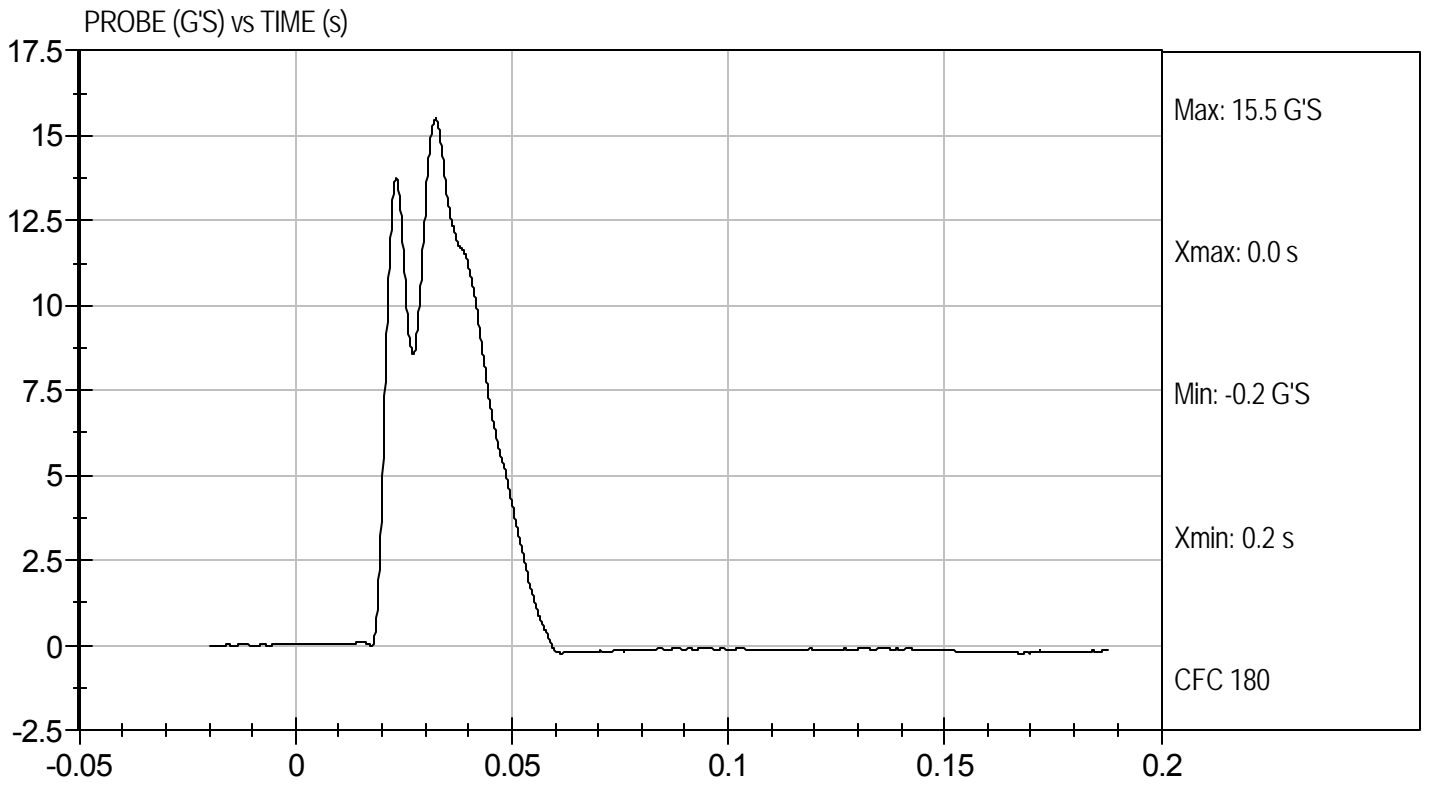
10/28/10
Test Date

David Winkelbauer
Approved By



Test Desc: Shoulder Impact
Component ID: D103683

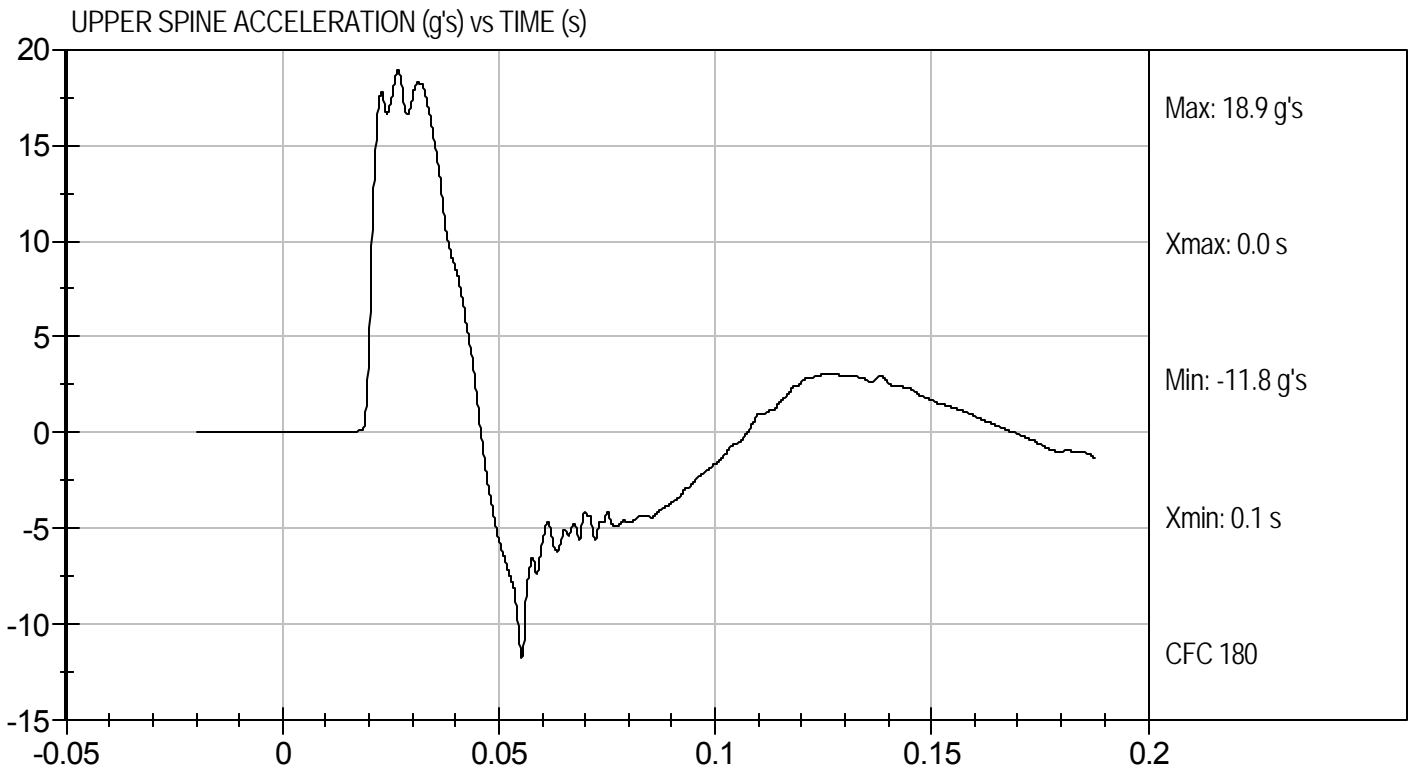
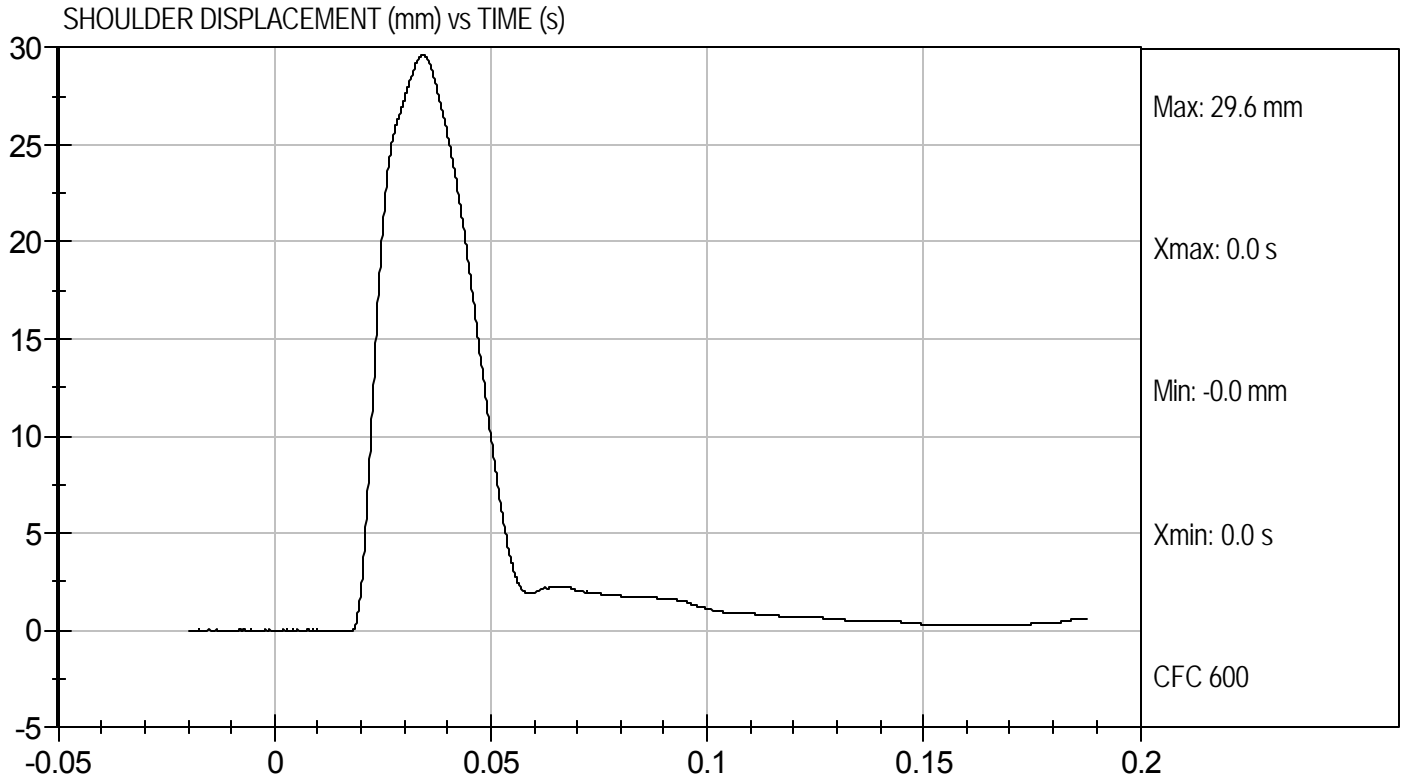
Test Date: 10/28/10
Velocity: 14.25 ft/s, 4.34 m/s





Test Desc: Shoulder Impact
Component ID: D103683

Test Date: 10/28/10
Velocity: 14.25 ft/s, 4.34 m/s



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

ATD Serial No: 306

Test I.D: D103684

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 22.1 | Pass |
| Humidity | % | 10 to 70 | 31 | Pass |
| Impact Velocity | m/s | 6.60 to 6.80 | 6.77 | Pass |
| Peak Impactor Acceleration | G's | 30 to 36 | 33 | Pass |
| Shoulder Displacement | mm | 31 to 40 | 38 | Pass |
| Upper Rib Displacement | mm | 25 to 32 | 29 | Pass |
| Middle Rib Displacement | mm | 30 to 36 | 32 | Pass |
| Lower Rib Displacement | mm | 32 to 38 | 34 | 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 Hall
Laboratory Technician

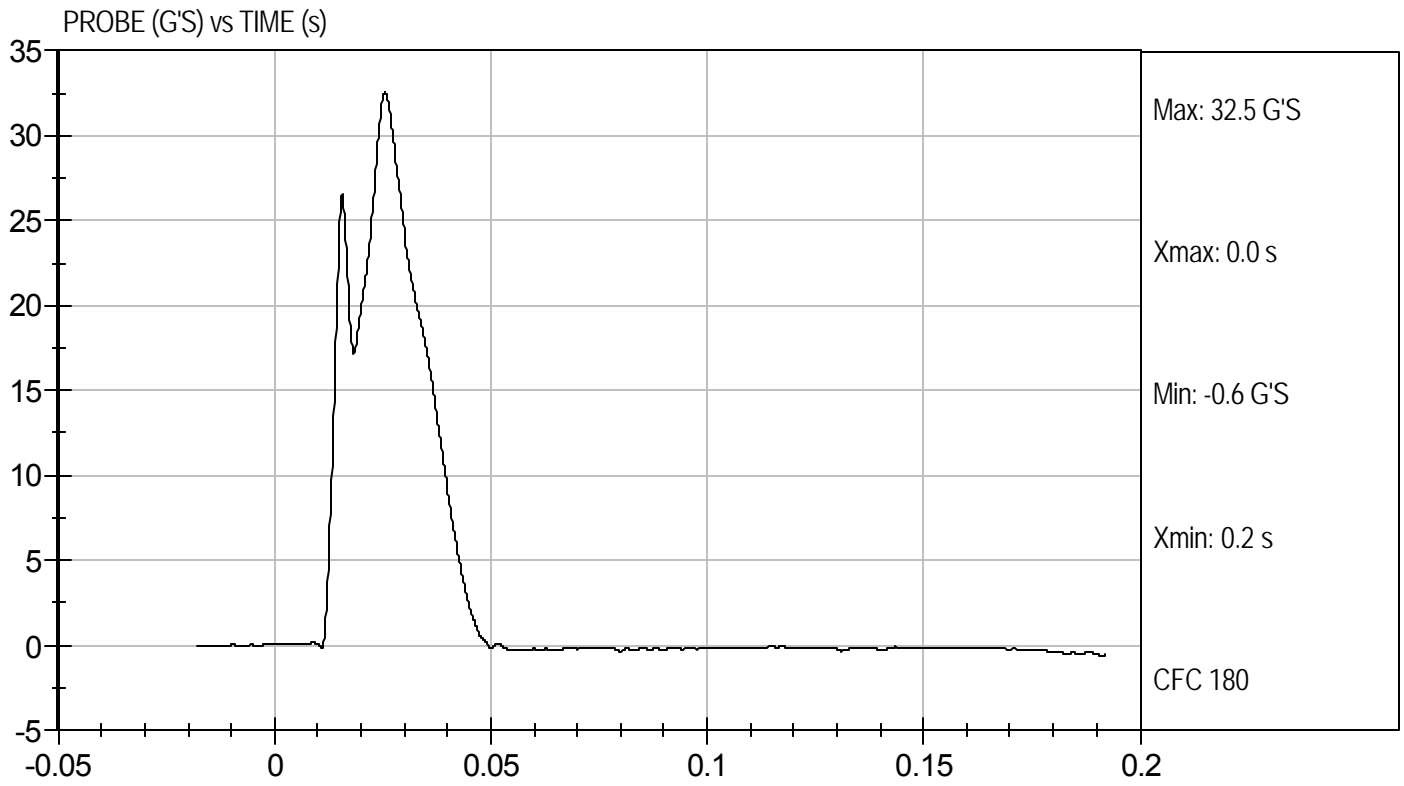
10/28/10
Test Date

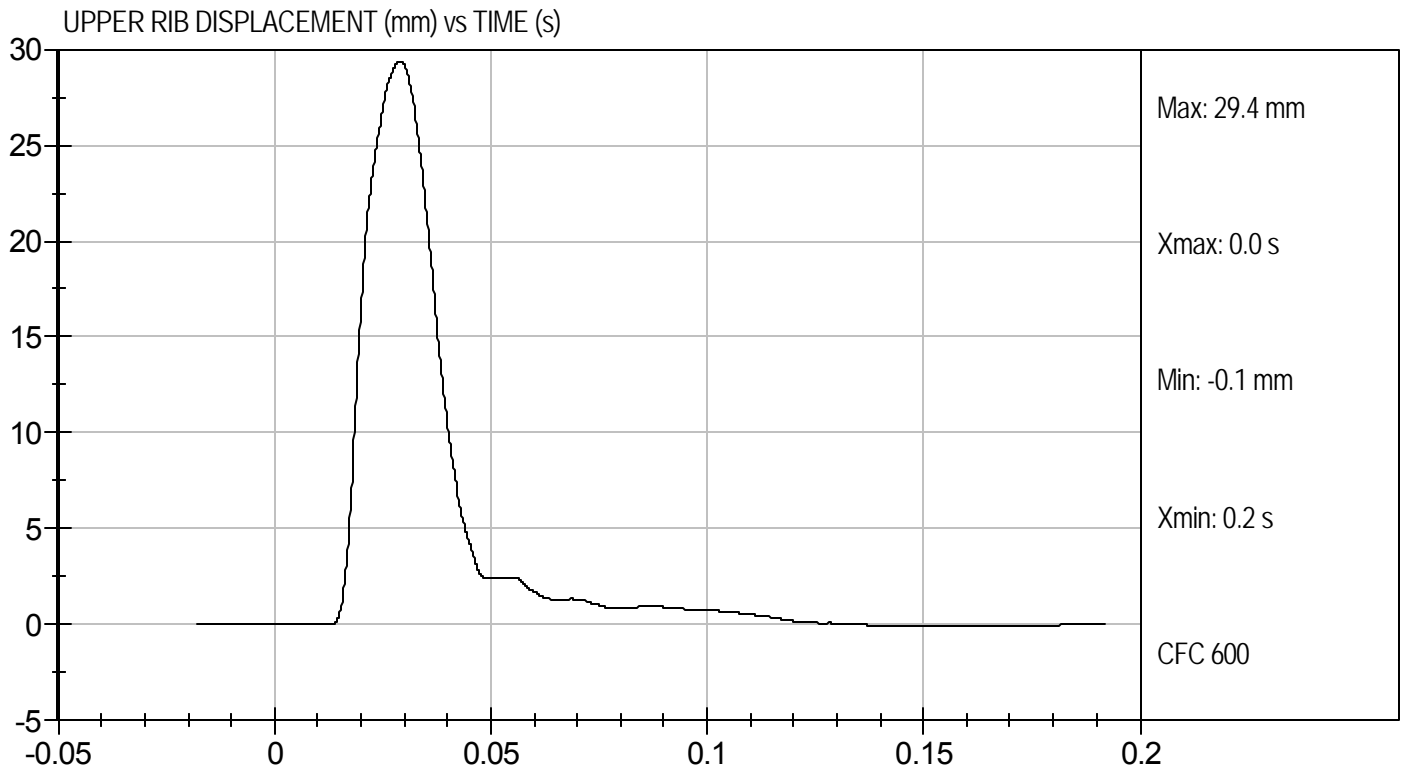
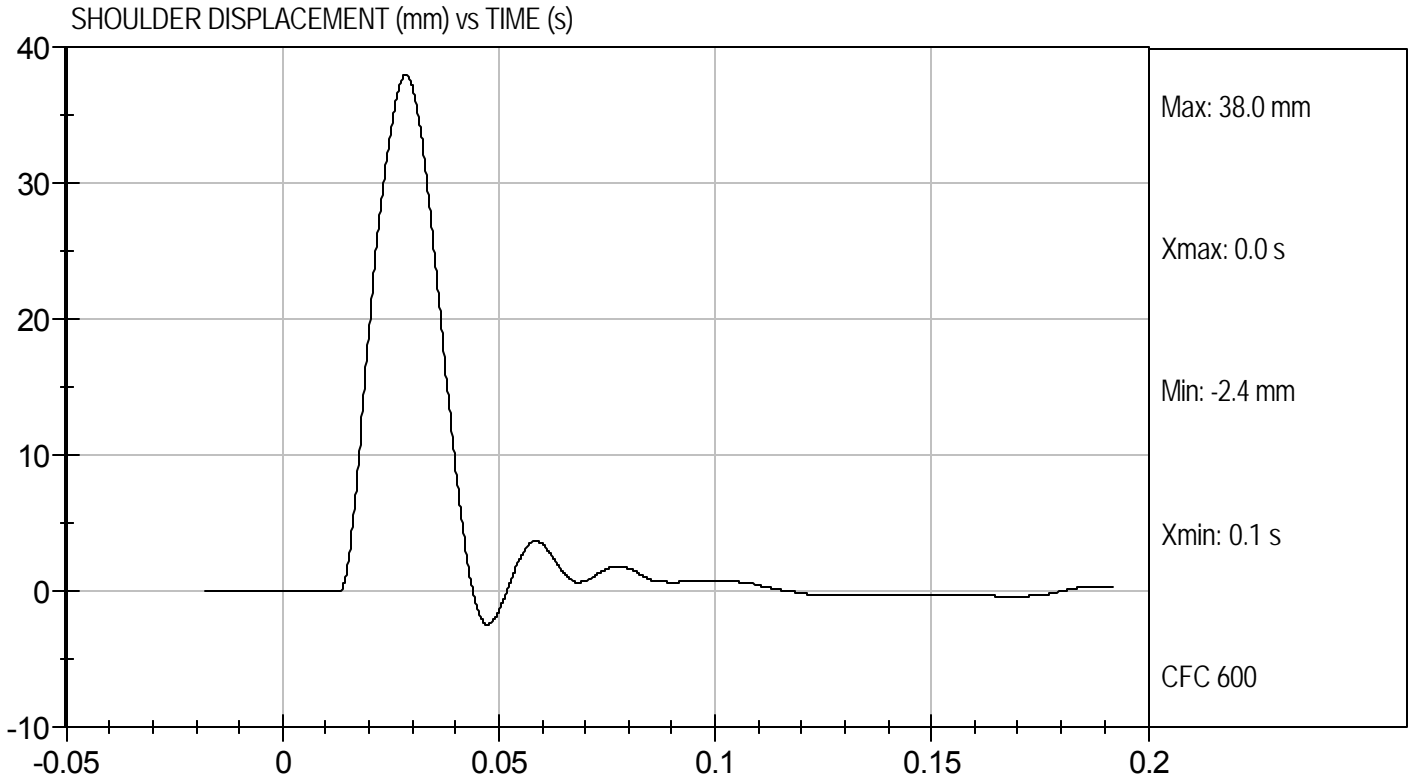
David Winkelbauer
Approved By



Test Desc: Thorax With Arm
Component ID: D103684

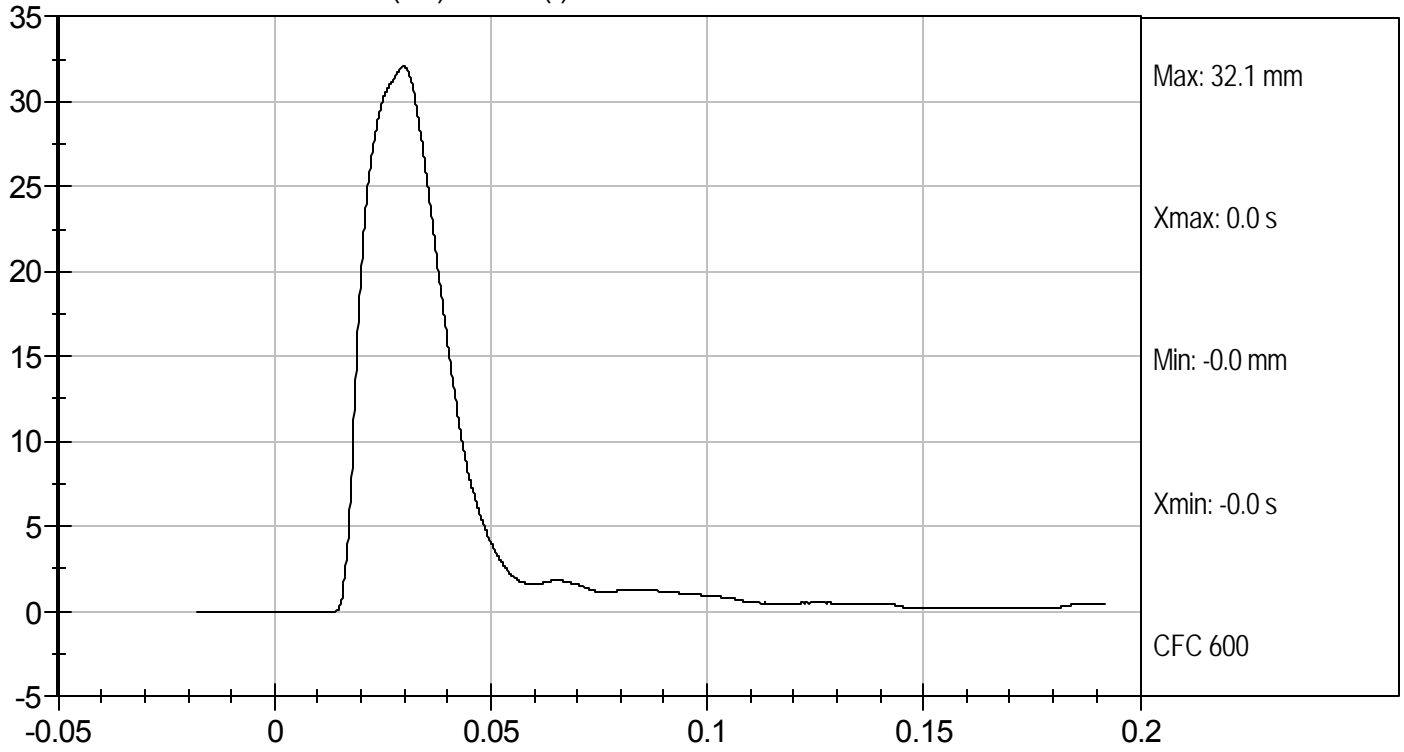
Test Date: 10/28/10
Velocity: 22.22 ft/s, 6.77 m/s



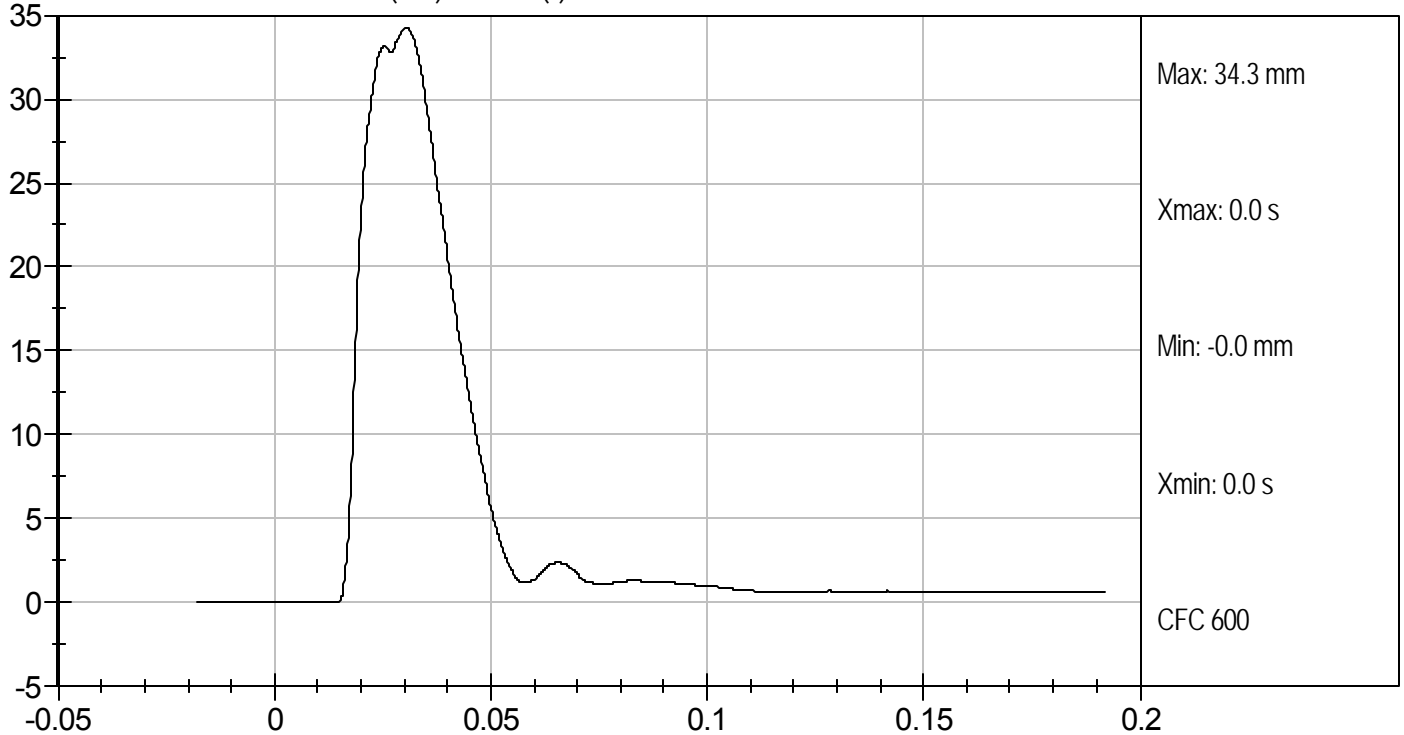




MIDDLE RIB DISPLACEMENT (mm) vs TIME (s)



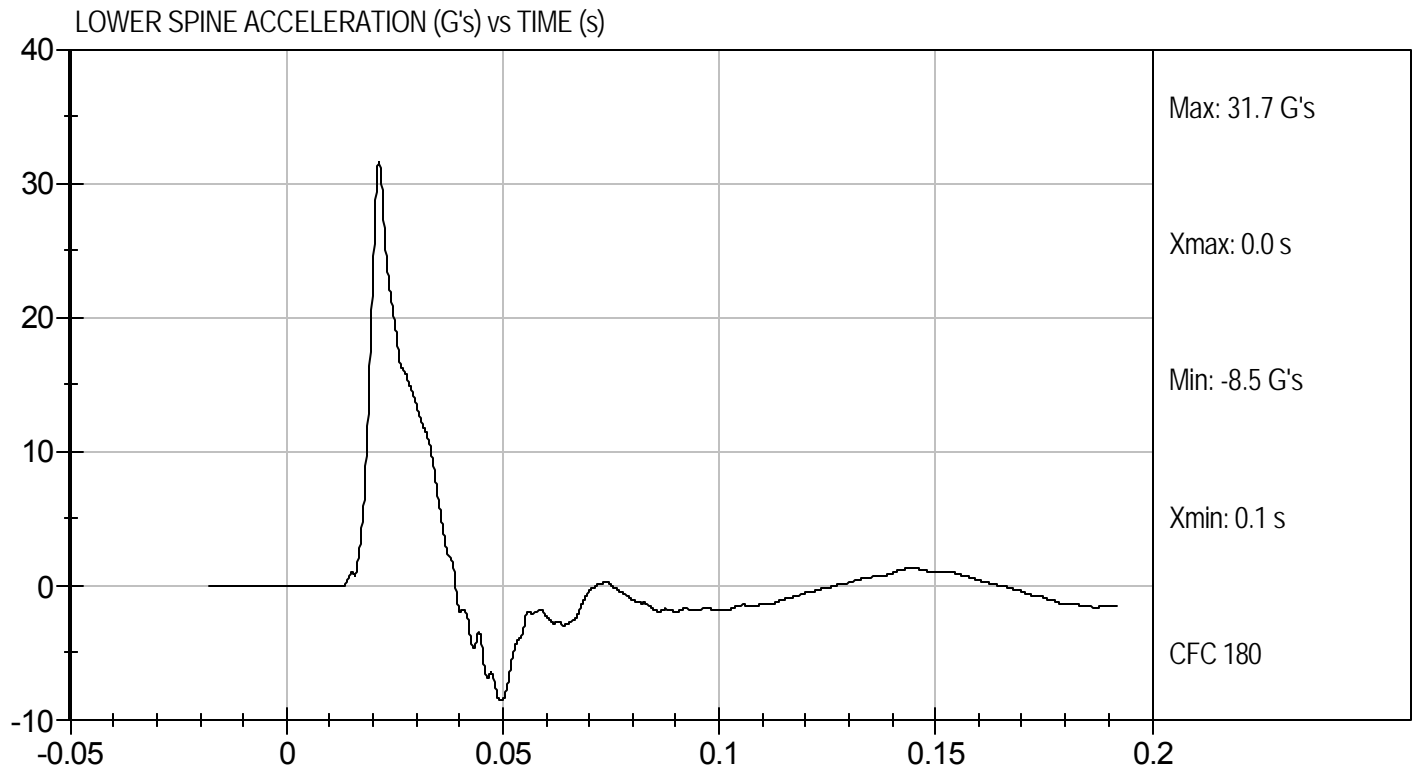
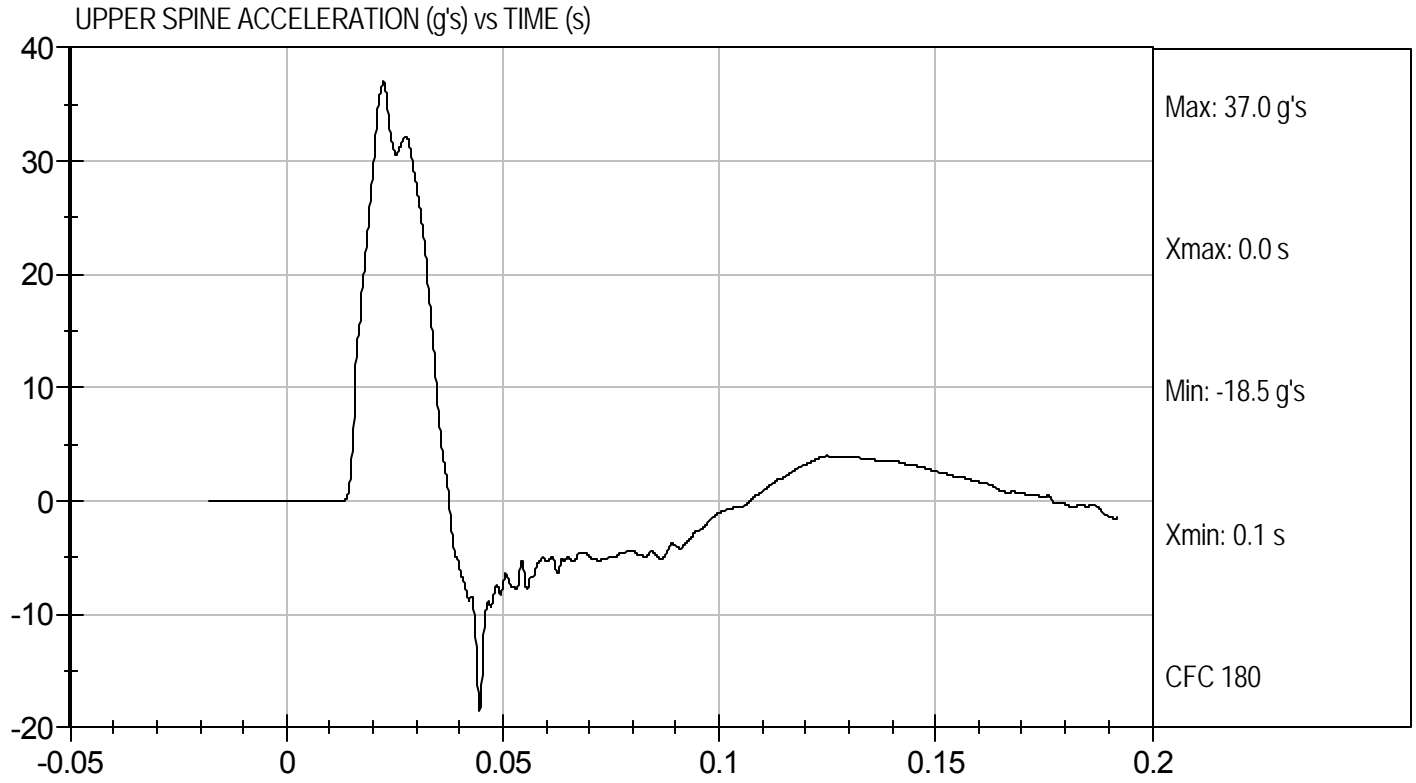
LOWER RIB DISPLACEMENT (mm) vs TIME (s)





Test Desc: Thorax With Arm
Component ID: D103684

Test Date: 10/28/10
Velocity: 22.22 ft/s, 6.77 m/s



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

ATD Serial No: 306

Test I.D: D103685

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 21.9 | Pass |
| Humidity | % | 10 to 70 | 32 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.34 | Pass |
| Peak Impactor Force | G's | 14 to 18 | 16 | Pass |
| Upper Rib Displacement | mm | 32 to 40 | 35 | 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 | 16 | Pass |
| Lower Spine (T12) Y Acceleration | G's | 7 to 11 | 9 | Pass |
| Overall Test Results | | | | Pass |

Jessica Hall
Laboratory Technician

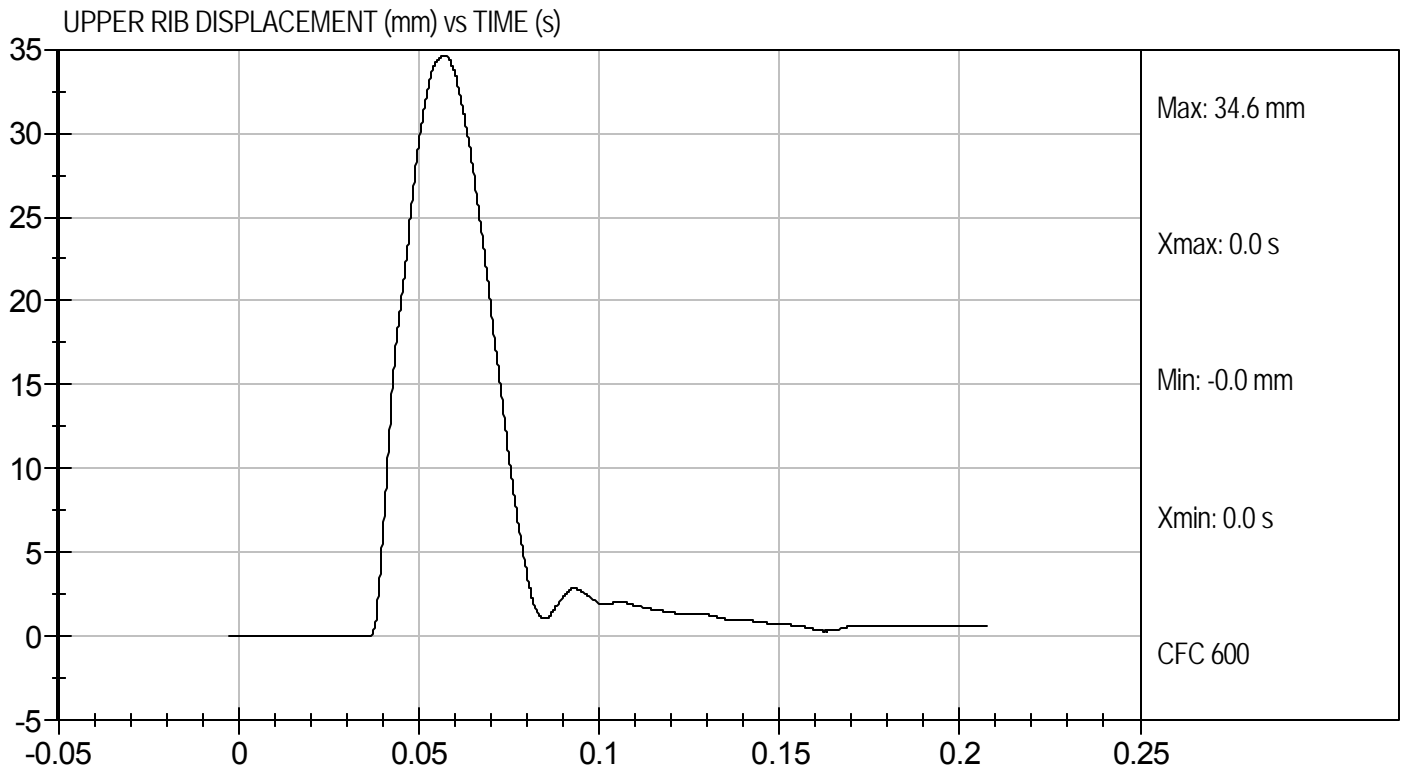
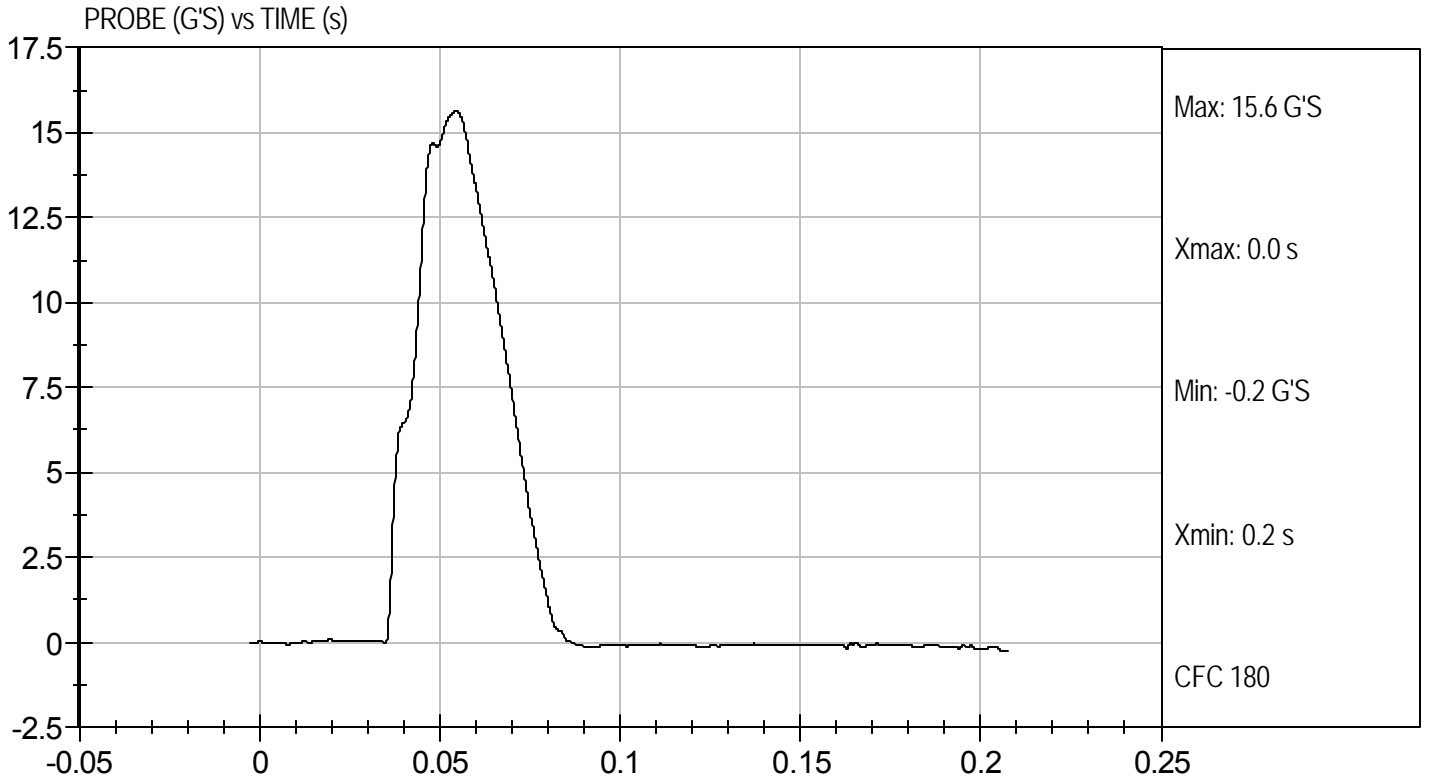
10/28/10
Test Date

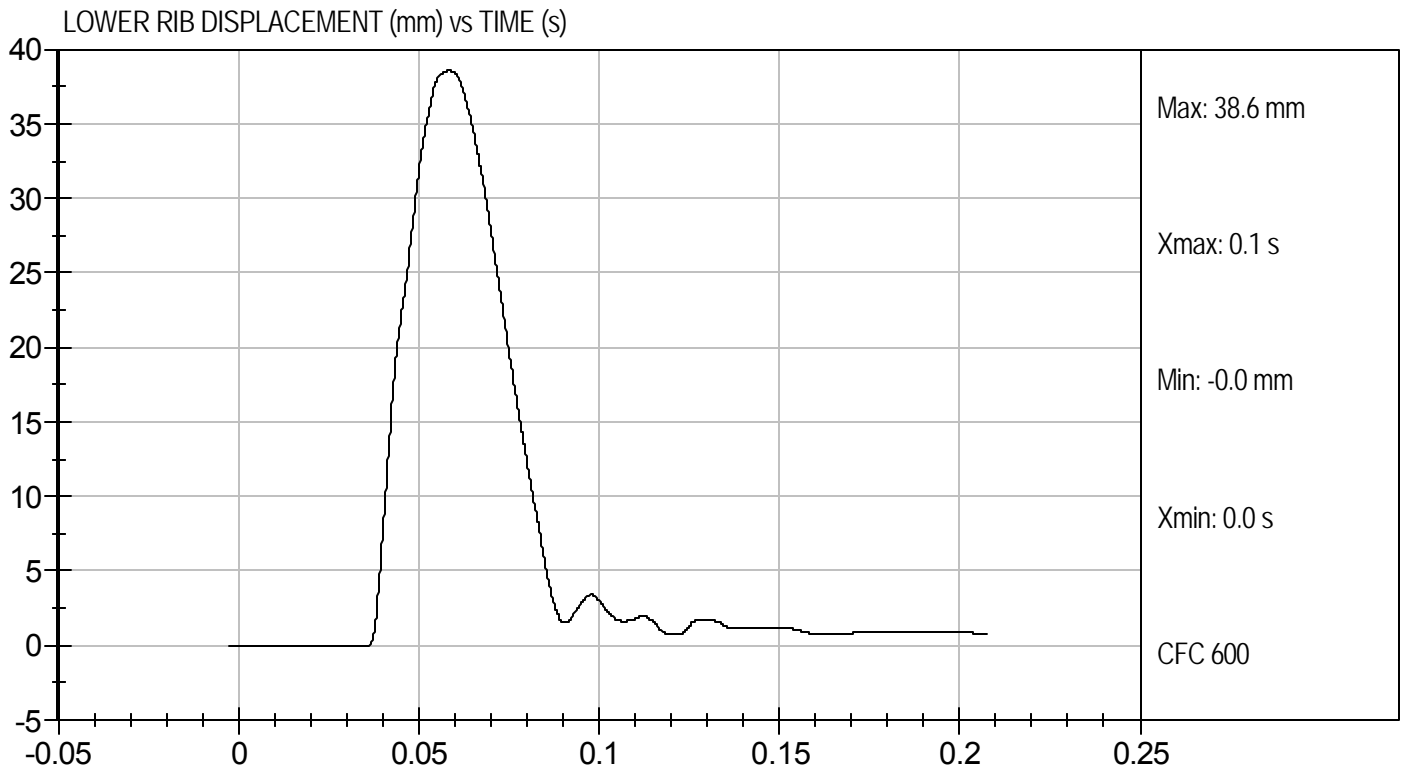
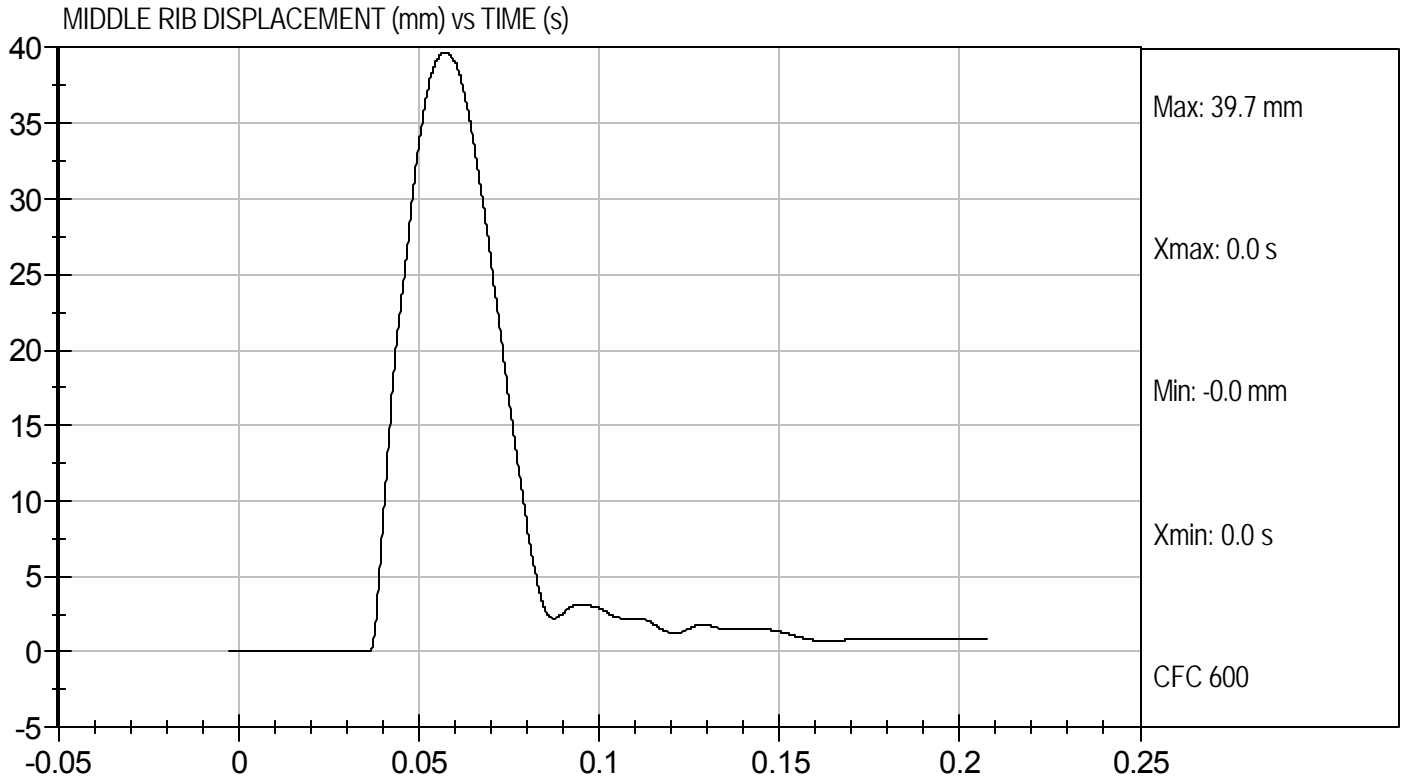
David Winkelbauer
Approved By



Test Desc: Thorax Without Arm
Component ID: D103685

Test Date: 10/28/10
Velocity: 14.25 ft/s, 4.34 m/s



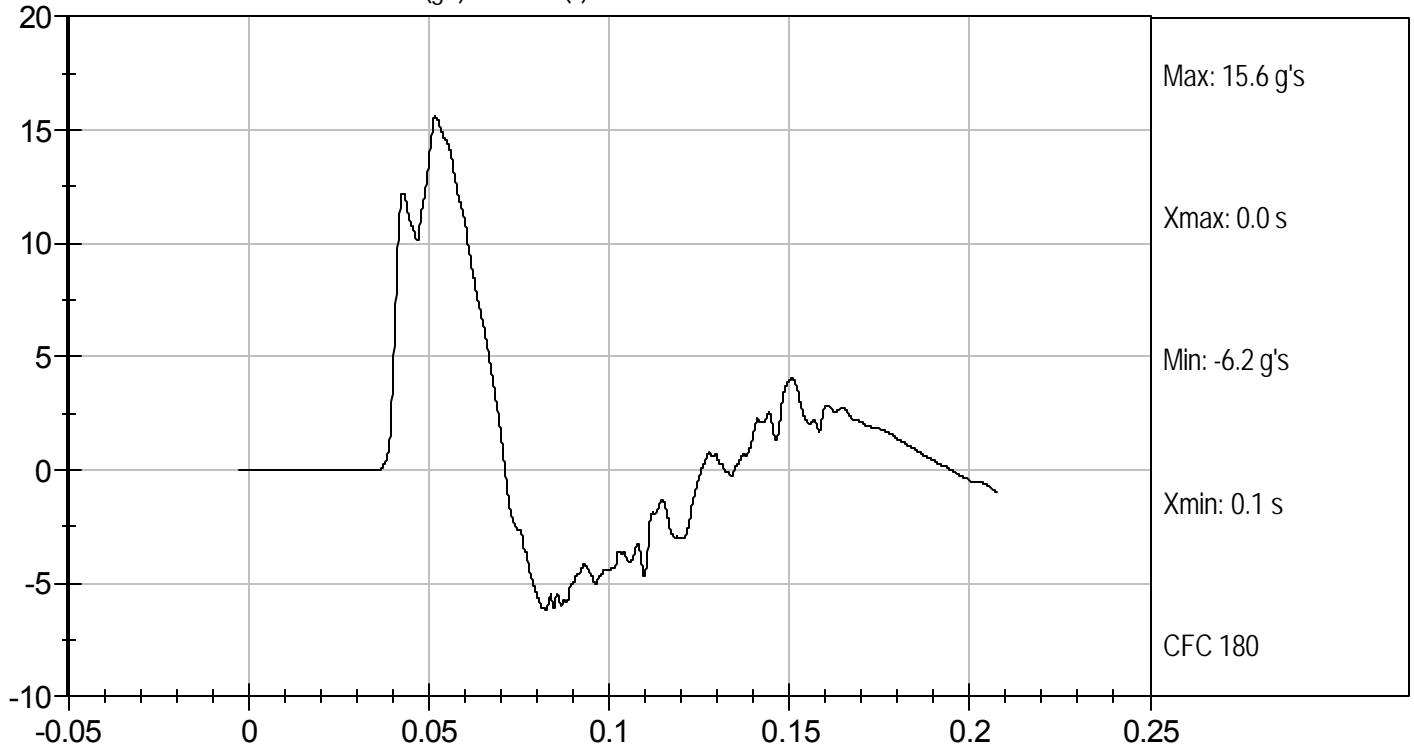




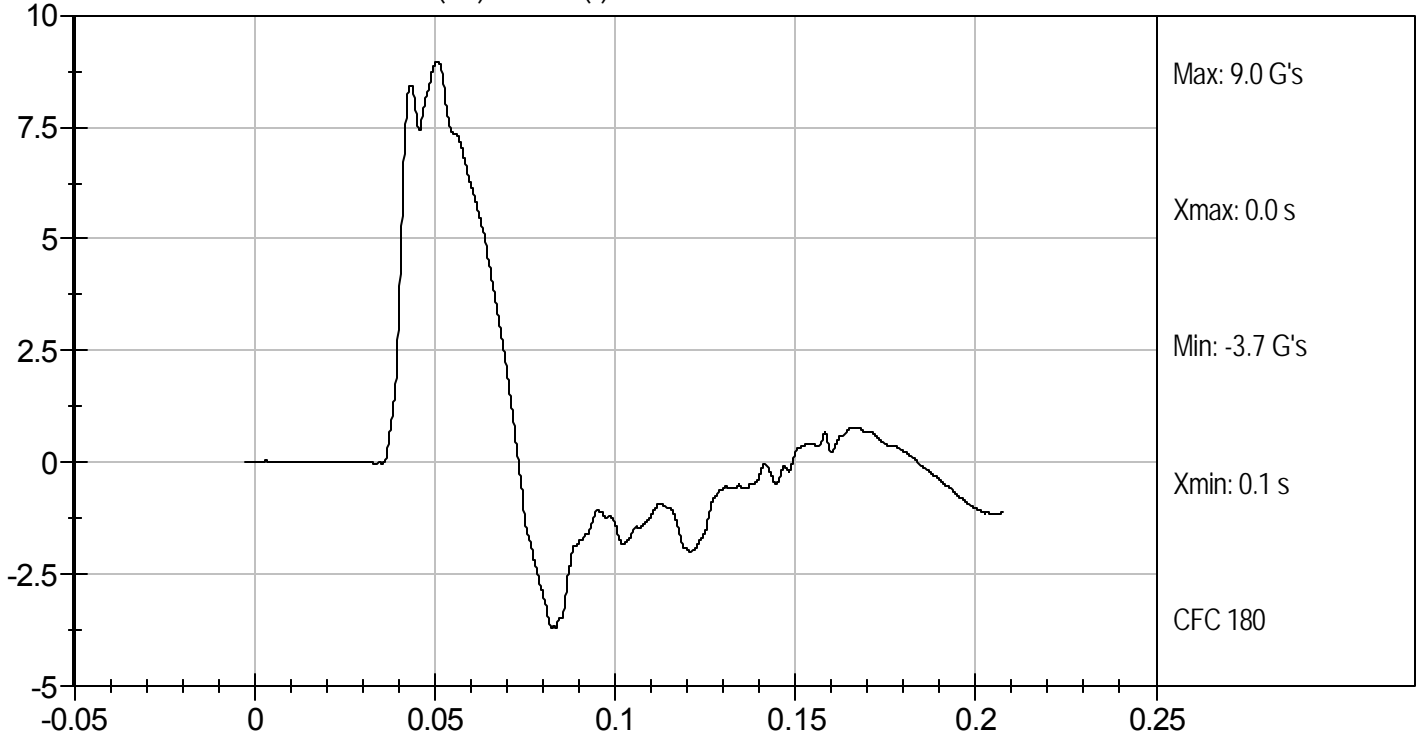
Test Desc: Thorax Without Arm
Component ID: D103685

Test Date: 10/28/10
Velocity: 14.25 ft/s, 4.34 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: 306

Test I.D: D103686

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 22.0 | Pass |
| Humidity | % | 10 to 70 | 33 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.38 | Pass |
| Peak Impactor Acceleration | G's | 12 to 16 | 15 | Pass |
| Upper Rib Displacement | mm | 36 to 47 | 43 | Pass |
| Lower Rib Displacement | mm | 33 to 44 | 36 | Pass |
| Lower Spine (T12) Y Acceleration | G's | 9 to 14 | 11 | Pass |
| Overall Test Results | | | | Pass |

Jessica Hall
 Laboratory Technician

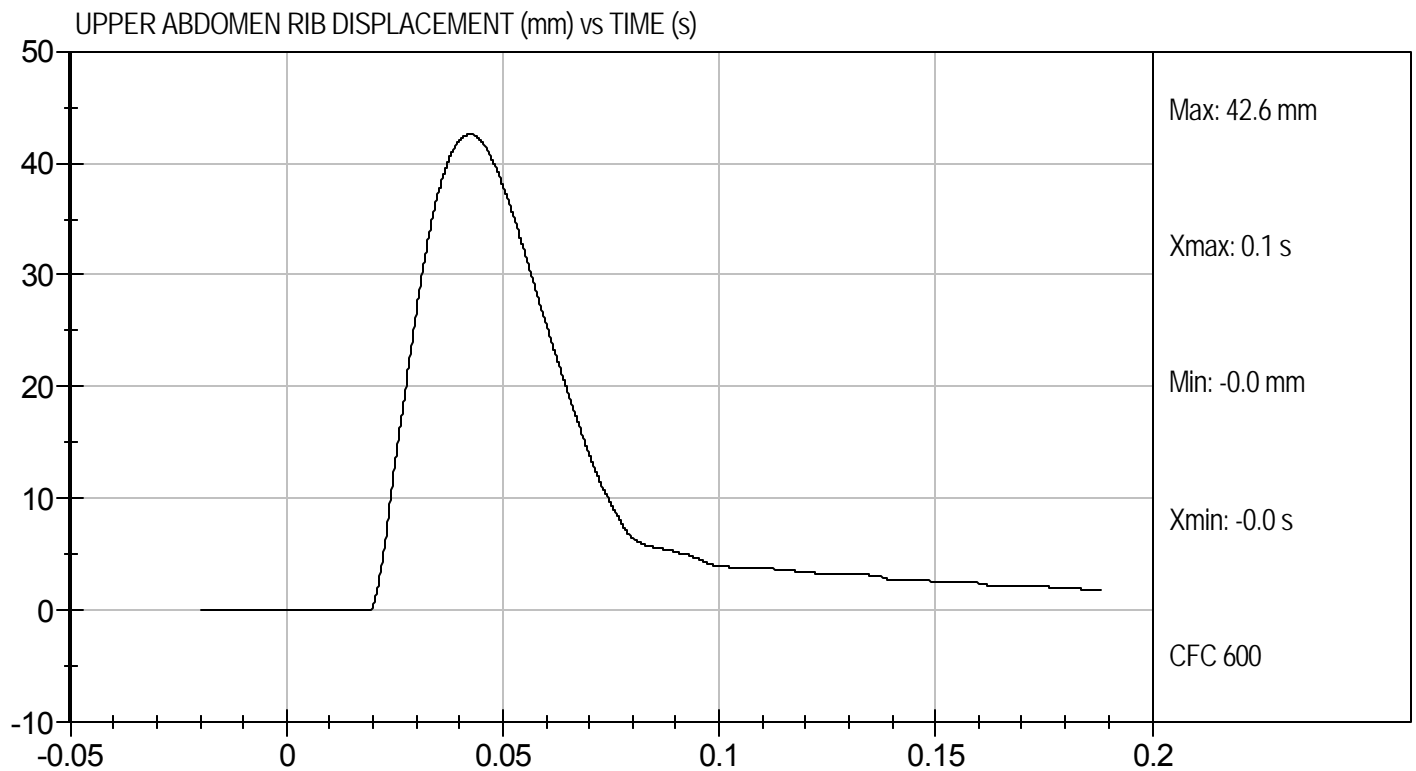
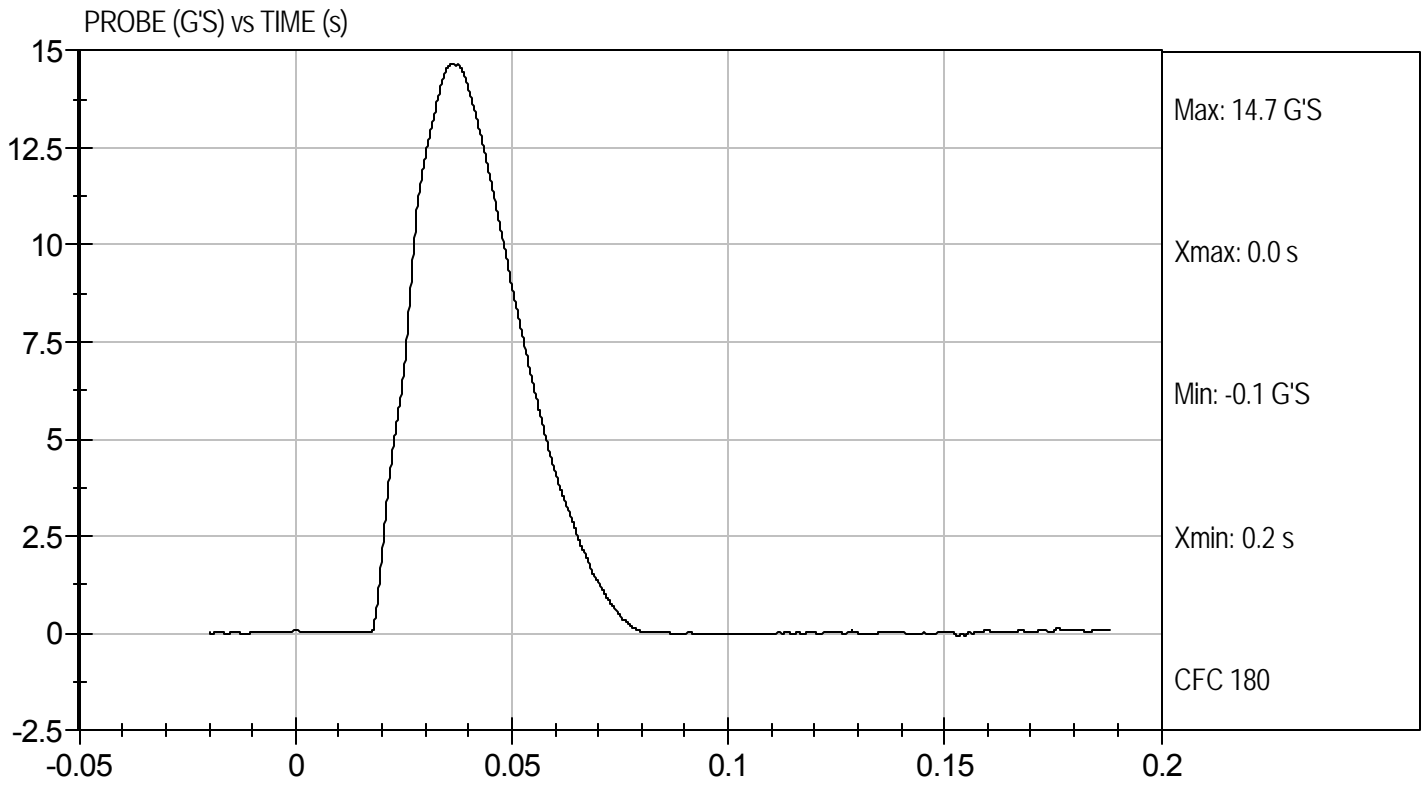
10/28/10
 Test Date

David Winkelbauer
 Approved By



Test Desc: Abdomen Impact
Component ID: D103686

Test Date: 10/28/10
Velocity: 14.37 ft/s, 4.38 m/s

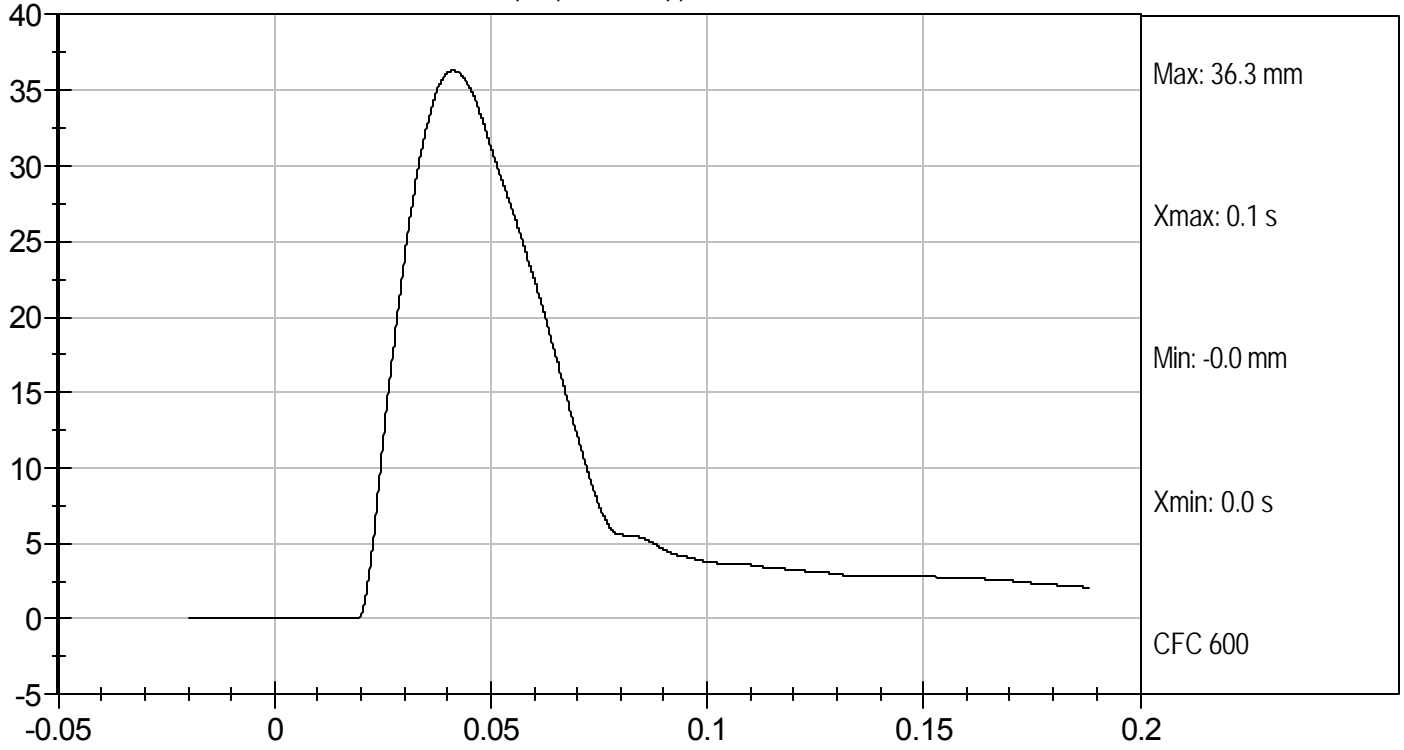




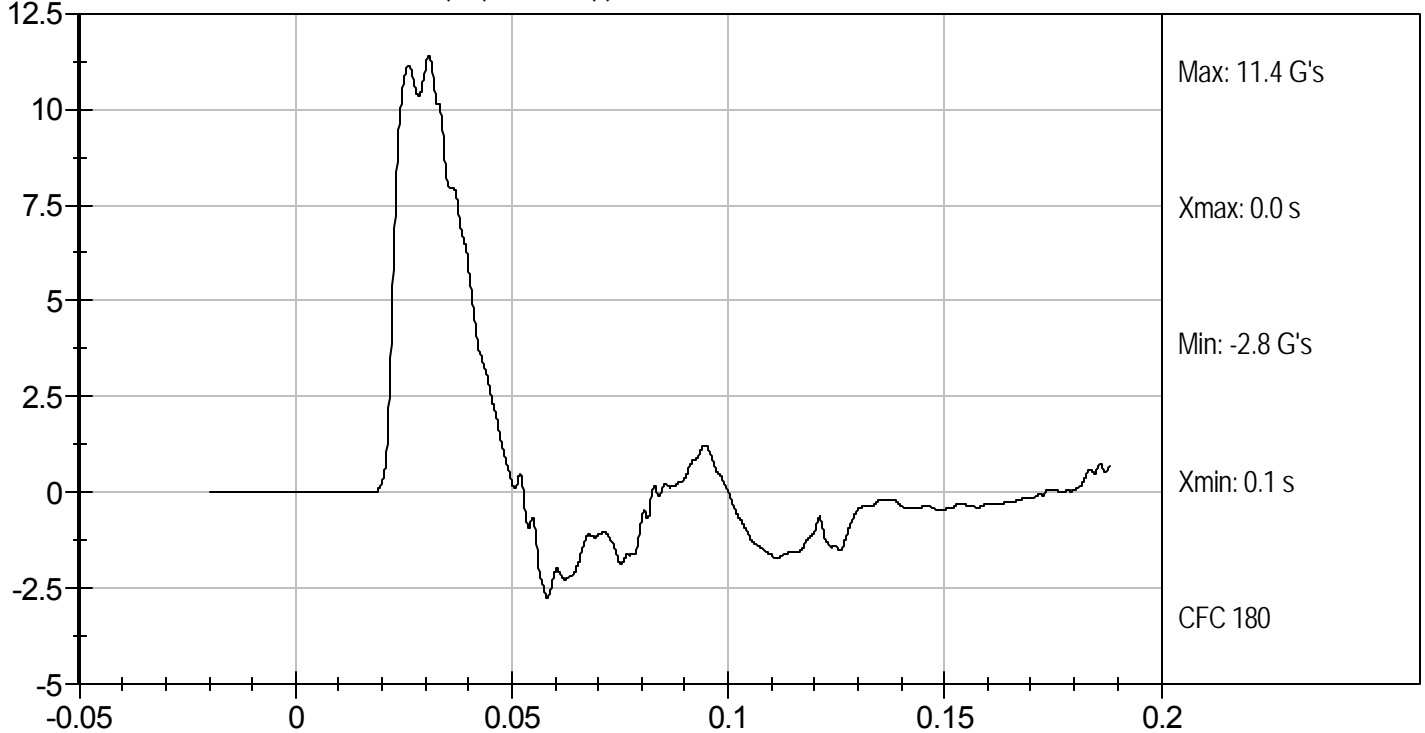
Test Desc: Abdomen Impact
Component ID: D103686

Test Date: 10/28/10
Velocity: 14.37 ft/s, 4.38 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: 306

Test I.D: D103687

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 21.8 | Pass |
| Humidity | % | 10 to 70 | 33 | Pass |
| Impact Velocity | m/s | 6.60 to 6.80 | 6.77 | Pass |
| Peak Impactor Acceleration | G's | 38 to 47 | 41 | Pass |
| Pelvis Y Acceleration after 6 ms | G's | 34 to 42 | 38 | Pass |
| Peak Acetabulum Force | N | 3600 to 4300 | 4034 | Pass |
| Overall Test Results | | | | Pass |

Jessica Gall
 Laboratory Technician

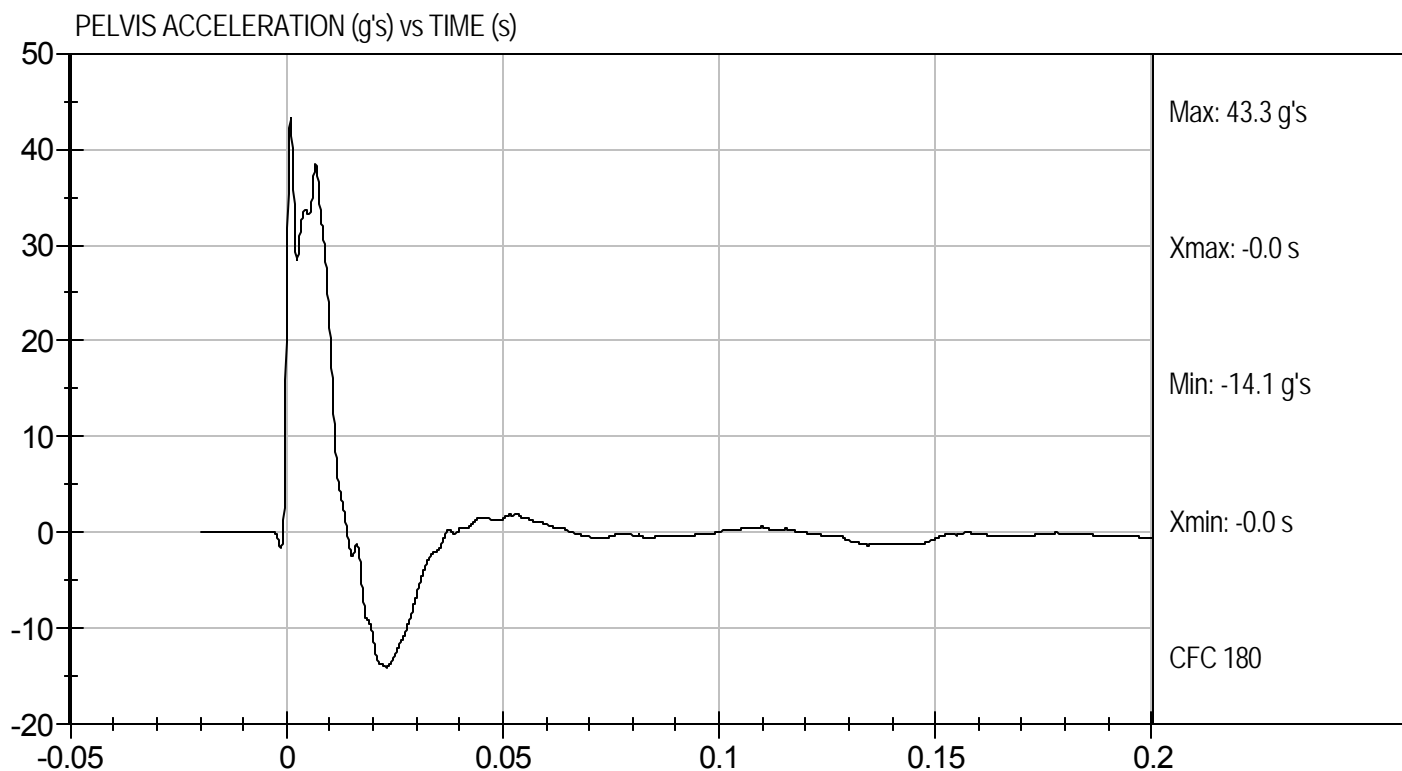
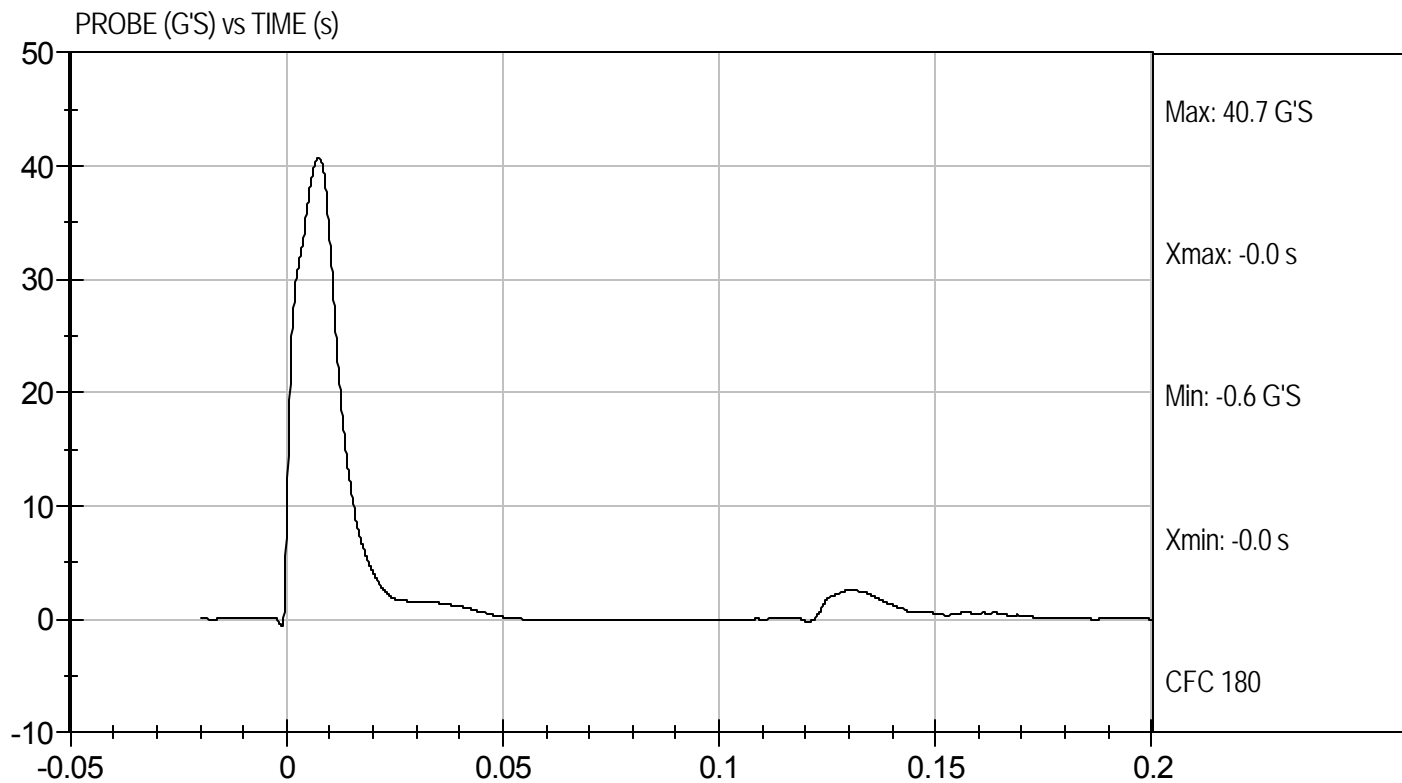
10/28/10
 Test Date

David Winkelbauer
 Approved By



Test Desc: Pelvis Impact
Component ID: D103687

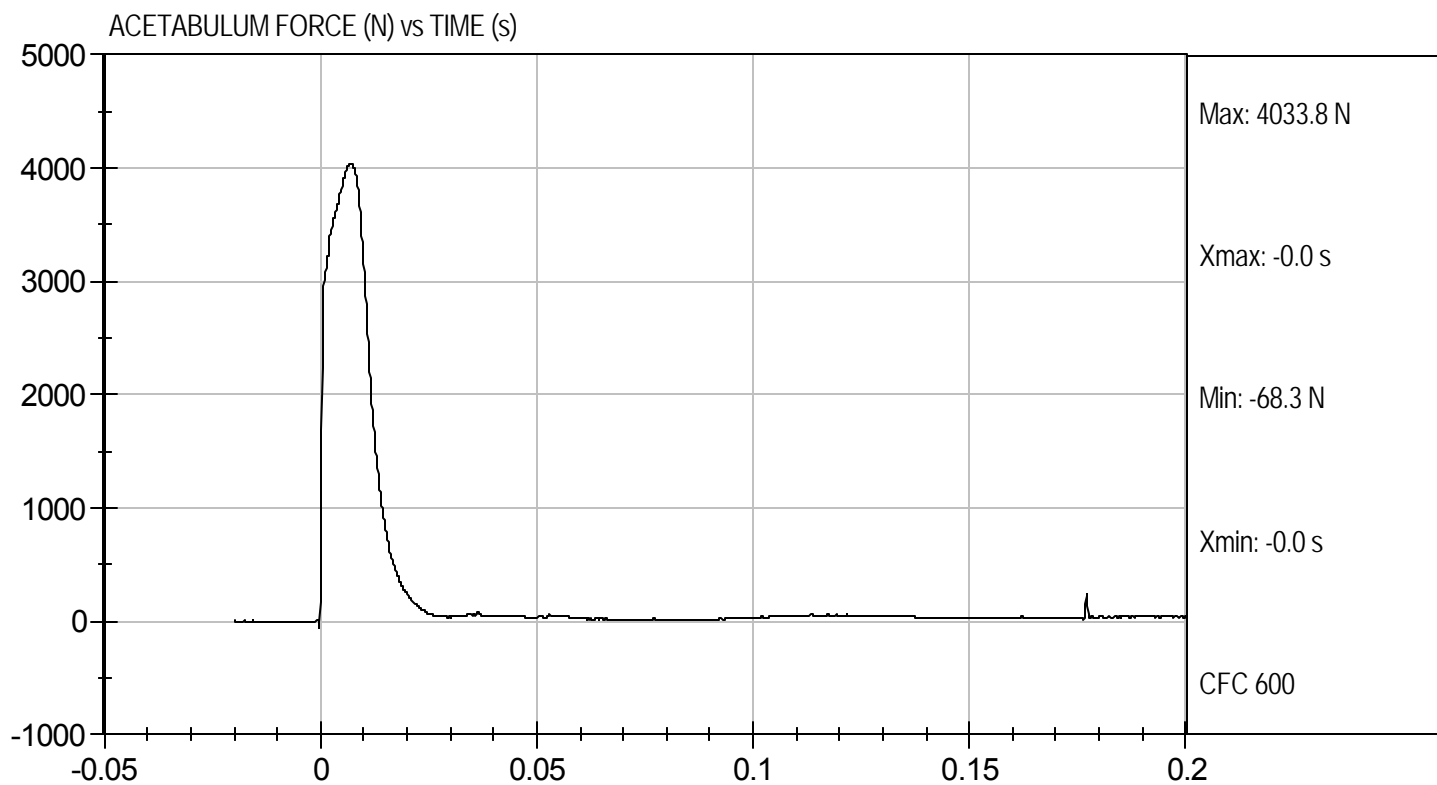
Test Date: 10/28/10
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Pelvis Impact
Component ID: D103687

Test Date: 10/28/10
Velocity: 22.22 ft/s, 6.77 m/s



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

ATD Serial No: 306

Test I.D: D103688

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|----------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 21.9 | Pass |
| Humidity | % | 10 to 70 | 33 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.38 | Pass |
| Peak Impactor Acceleration | G's | 36 to 45 | 38 | Pass |
| Pelvis Y Acceleration | G's | 28 to 39 | 29 | Pass |
| Peak Pelvis Iliac Force | N | 4100 to 5100 | 4856 | Pass |
| Overall Test Results | | | | Pass |

Jessica Hall
 Laboratory Technician

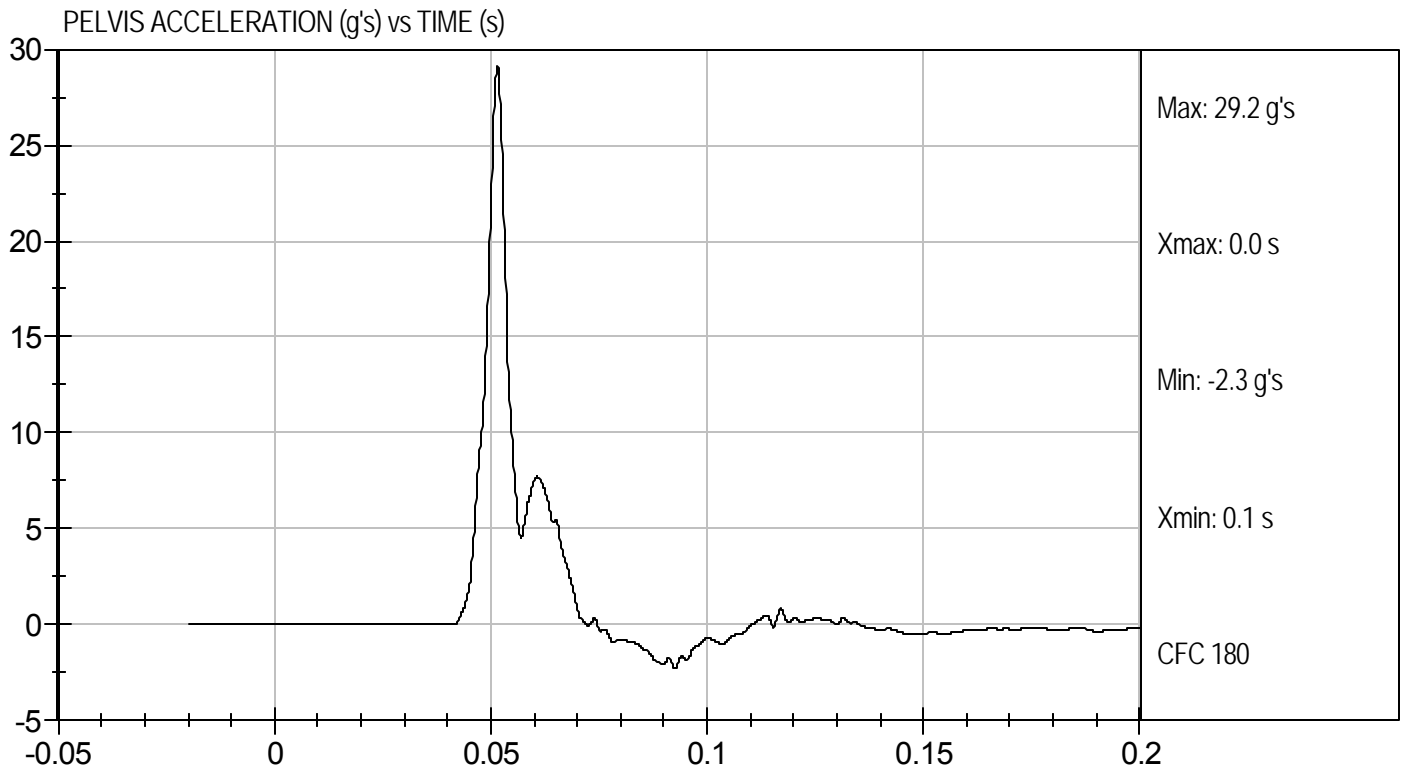
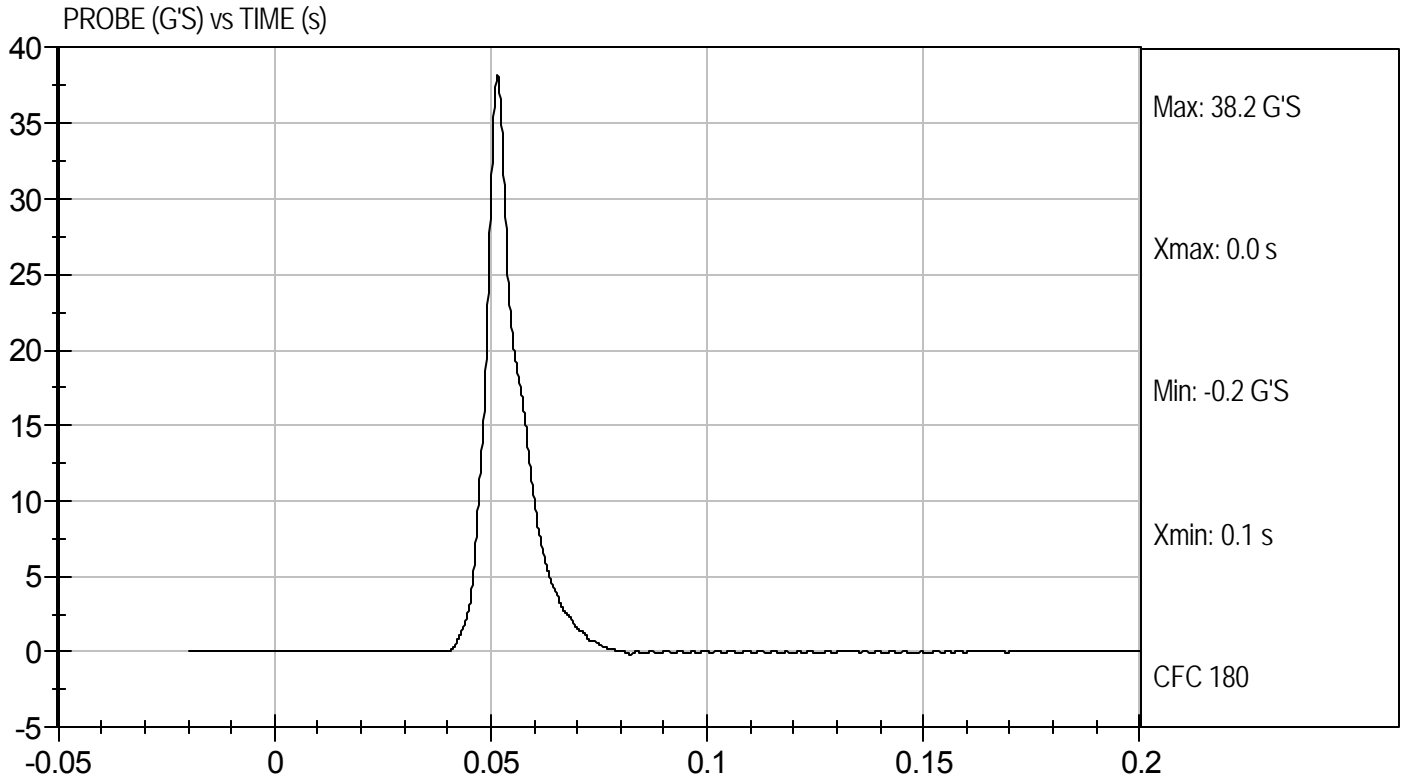
10/28/10
 Test Date

David Winkelbauer
 Approved By



Test Desc: Iliac Impact
Component ID: D103688

Test Date: 10/28/10
Velocity: 14.37 ft/s, 4.38 m/s





Test Desc: Iliac Impact
Component ID: D103688

Test Date: 10/28/10
Velocity: 14.37 ft/s, 4.38 m/s

