**REPORT NUMBER: SPNCAP-MGA-2014-041**

# NEW CAR ASSESSMENT PROGRAM (NCAP)
## Side Impact Pole Test

**CHRYSLER GROUP LLC**
**2014 Ram 2500 Crew Cab**
**NHTSA No.: M20140313**

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

**Test Date: December 17, 2013**

**Final Report Date: January 28, 2014**

**FINAL REPORT**

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

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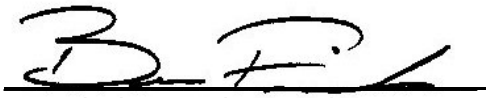
Prepared by: 
Donna Janovicz, Project Manager

Approved by: 
Ben Fischer, Project Engineer

Approval Date: January 28, 2014

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

**Technical Report Documentation Page**

| | | |
|---|---|---|
| *1. Report No.*<br>SPNCAP-MGA-2014-041 | *2. Government Accession No.* | *3. Recipient's Catalog No.* |
| *4. Title and Subtitle*<br>Final Report of New Car Assessment Program<br>Side Impact Pole Testing of a 2014 Ram 2500 Crew Cab,<br>NHTSA No.: M20140313 | | *5. Report Date*<br>January 28, 2014<br>*6. Performing Organization Code*<br>MGA |
| *7. Author(s)*<br>Donna Janovicz, Project Manager<br>Ben Fischer, Project Engineer | | *8. Performing Organization Report No.*<br>SPNCAP-MGA-2014-041 |
| *9. Performing Organization Name and Address*<br>MGA Research Corporation<br>5000 Warren Road<br>Burlington, WI 53105 | | *10. Work Unit No.*<br>*11. Contract or Grant No.*<br>DTNH22-09-D-00124 |
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| *15. Supplementary Notes* | | |

*16. Abstract*

A 32.20 km/h, 75° oblique impact Side NCAP Test was conducted on the subject 2014 Ram 2500 Crew Cab in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. The test was conducted at MGA Research Corporation, in Burlington, Wisconsin, on December 17, 2013.

The impact velocity was 32.0 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21.0°C. The test vehicle post-test maximum crush was 473 mm at level 2. The test vehicle's performance was as follows:

| | Driver ATD (SID-IIs) | | |
|---|---|---|---|
| **Measurement Description** | **Units** | **Threshold** | **Result** |
| Head Injury Criteria ($HIC_{36}$) | N/A | 1000 | 315 |
| Resultant Lower Spine Acceleration | Gs | 82 | 48 |
| Total Pelvic Force<br>(sum of acetabular and iliac forces) | N | 5525 | 3901 |
| Maximum Thoracic Rib Deflection | mm | 38* | 30 |
| Maximum Abdomen Rib Deflection | mm | 45* | 36 |

*Proposed IARV

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*<br>New Car Assessment Program (NCAP)<br>Side Impact<br>Pole<br>Part 572V<br>SID-IIs | | *18. Distribution Statement*<br>Copies of this report are available from:<br>National Highway Traffic Safety Administration<br>Technical Information Services Division, NPO-411<br>1200 New Jersey Ave, SE<br>Washington, DC 20590<br>e-mail: tis@nhtsa.dot.gov<br>FAX: 202-493-2833 | |
| *19. Security Classification of Report*<br>Unclassified | *20. Security Classification of Page*<br>Unclassified | *21. No. of Pages*<br>135 | 22. Price |

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## SECTION 1
## TEST PURPOSE AND PROCEDURE

This side impact test is part of the MY 2014 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 2014 Ram 2500 Crew Cab. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated September 2013.

## SECTION 2
## SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2014 Ram 2500 Crew Cab. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.0 km/h. The test was conducted by MGA Research Corporation in Burlington, Wisconsin, on December 17, 2013. Pre-test and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure dated September 2013. Camera locations and other pertinent camera information are included in this report.

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

Primary and Redundant Head CG Triaxial Accelerometers
9 Axis Head CG Accelerometers
Thorax Upper, Middle, and Lower Rib Displacement Potentiometers
Abdomen Upper Rib and Lower Rib Displacement Potentiometers
Lower Spine (T12) Triaxial Accelerometers
Iliac Load Cell
Acetabulum Load Cell

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

Injury readings for the SID-IIs dummy were recorded as follows:

| Measurement Description | Driver ATD (SID-IIs) | | |
|---|---|---|---|
| | Units | Threshold | Result |
| Head Injury Criteria ($HIC_{36}$) | N/A | 1000 | 315 |
| Resultant Lower Spine Acceleration | Gs | 82 | 48 |
| Total Pelvic Force (sum of acetabular and iliac forces) | N | 5525 | 3901 |
| Maximum Thoracic Rib Deflection | mm | 38* | 30 |
| Maximum Abdominal Rib Deflection | mm | 45* | 36 |

*Proposed IARV

Supplemental restraint information is given below:

| Restraint Type | Struck Side Driver | | Struck Side Rear Passenger | |
|---|---|---|---|---|
| | Mounted | Deployed | Mounted | Deployed |
| Frontal Airbag | Yes | Yes | | |
| Knee Airbag | No | | | |
| Side Curtain Airbag | Yes | Yes | Yes | Yes |
| Side Torso Airbag | Yes | Yes | No | |
| Seat Belt Pretensioner | Yes | Yes | No | |
| Seat Belt Load Limiter | Yes | | No | |
| Other | | | | |

The test data can be found on the NHTSA website at www.nhtsa.dot.gov

## GENERAL COMMENTS

None

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

## SECTION 3
## OCCUPANT AND VEHICLE INFORMATION

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

Test Vehicle: 2014 Ram 2500 Crew Cab
Test Program: NCAP Side Pole Impact Test
NHTSA No. M20140313
Test Date: 12/17/2013

### TEST VEHICLE INFORMATION AND OPTIONS

| | |
|---|---|
| NHTSA No. | M20140313 |
| Model Year | 2014 |
| Make | Ram |
| Model | 2500 |
| Body Style | Crew Cab Truck, Short Box |
| VIN | 3C6TR4CT3EG109787 |
| Body Color | Granite Crystal Metallic |
| Odometer Reading (km/mi) | 27 / 17 |
| Engine Displacement (L) | 5.7 |
| Type/No. Cylinders | 8 |
| Engine Placement | Longitudinal |
| Transmission Type | Automatic |
| Transmission Speeds | 6 |
| Overdrive | Yes |
| Final Drive | Rear |
| Roof Rack | No |
| Sunroof/T-Top | No |
| Running Boards | No |
| Tilt Steering Wheel | Yes |
| Power Seats | No |
| Anti-Lock Brakes (ABS) | Yes |

| | |
|---|---|
| Traction Control System (TCS) | Yes |
| Auto-Leveling System | No |
| Automatic Door Locks (ADL) | Yes |
| Power Window Auto-Reverse | Yes |
| Other Optional Feature | N/A |
| Driver Front Airbag | Yes |
| Driver Curtain Airbag | Yes |
| Driver Head/Torso Airbag | No |
| Driver Torso Airbag | Yes |
| Driver Torso/Pelvis Airbag | No |
| Driver Pelvis Airbag | No |
| Driver Knee Airbag | No |
| Rear Pass. Curtain Airbag | Yes |
| Rear Pass. Head/Torso Airbag | No |
| Rear Pass. Torso Airbag | No |
| Rear Pass. Torso/Pelvis Airbag | No |
| Rear Pass. Pelvis Airbag | No |
| Driver Seat Belt Pretensioner | Yes |
| Rear Pass. Seat Belt Pretensioner | No |
| Driver Load Limiter | Yes |
| Rear Pass. Load Limiter | No |
| Other Safety Restraint | N/A |

| | |
|---|---|
| Does owner's manual provide instructions to turn off automatic door locks? | No |

### DATA FROM CERTIFICATION LABEL

| | |
|---|---|
| Manufactured By | Chrysler Group LLC |
| Date of Manufacture | 10/13 |
| Vehicle Type | Truck |

| | |
|---|---|
| GVWR (kg) | 4083 |
| GAWR Front (kg) | 2268 |
| GAWR Rear (kg) | 2722 |

### VEHICLE SEATING AND WEIGHT CAPACITY DATA

| Measured Parameter | Front | Rear | Third | Total | |
|---|---|---|---|---|---|
| Designated Seating Capacity (DSC) | 3 | 3 | | 6 | |
| Capacity Weight (VCW) (kg) | | | | 1162 | (A) |
| DSC x 68.04 kg | | | | 408 | (B) |
| Rated Cargo and Luggage Weight (RCLW) (kg) | | | | 754 | (A-B) |

### VEHICLE SEAT TYPE

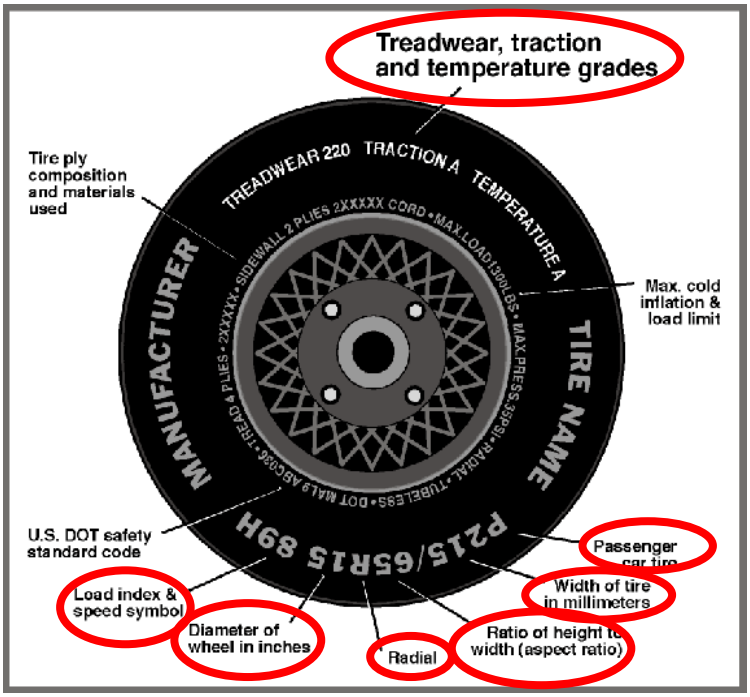
| Seating Location | Type of Seat Pan | | | | Type of Seat Back | | |
|---|---|---|---|---|---|---|---|
| | Bucket | Bench | Split Bench | Contoured | Fixed | Adjustable | |
| | | | | | | Manual | Power |
| Front Seat | | | X | | | w/lever | |
| Rear or Second Row | | X | | | X | | |
| Third Row Seat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

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

Test Vehicle: 2014 Ram 2500 Crew Cab
Test Program: NCAP Side Pole Impact Test

NHTSA No. M20140313
Test Date: 12/17/2013

## VEHICLE TIRE INFORMATION




| Measured Parameter | Front | Rear |
|---|---|---|
| Max. Tire Pressure (kPa) | 550 | 550 |
| Cold Pressure (kPa) | 415 | 550 |
| Recommended Tire Size | LT275/70R18 | LT275/70R18 |
| Tire Size on Vehicle | LT275/70R18 | LT275/70R18 |
| Tire Manufacturer | Firestone | Firestone |
| Tire Model | Transforce HT | Transforce HT |
| Treadwear | | |
| Traction | | |
| Temperature Grade | | |
| Tire Plies Sidewall | 2 Polyester | 2 Polyester |
| Tire Plies Body | 2 Polyester, 2 Steel, 1 Nylon | 2 Polyester, 2 Steel, 1 Nylon |
| Load Index/Speed Symbol | 125/122S | 125/122S |
| Tire Material | Rubber | Rubber |
| DOT Safety Code Left | VN15 TH1 3813 | VN15 TH1 3813 |
| DOT Safety Code Right | VN15 TH1 3813 | VN15 TH1 3813 |

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

Test Vehicle: 2014 Ram 2500 Crew Cab NHTSA No. M20140313
Test Program: NCAP Side Pole Impact Test Test Date: 12/17/2013

### TEST PRESSURES

| | Units | LF | RF | LR | RR |
|---|---|---|---|---|---|
| As Delivered | kpa | 415 | 415 | 550 | 550 |
| Tire Placard | kpa | 415 | 415 | 550 | 550 |
| Owner's Manual | kpa | | | | |
| As Tested | kpa | 415 | 415 | 550 | 550 |

### TEST VEHICLE WEIGHTS

| | | As Delivered (UVW) | | | As Tested (ATW) | | | Fully Loaded | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Units | Front | Rear | Total | Front | Rear | Total | Front | Rear | Total |
| Left | kg | 809.7 | 677.2 | | 817.8 | 762.5 | | 826.4 | 771.6 | |
| Right | kg | 806.5 | 621.4 | | 807.0 | 708.5 | | 797.9 | 706.7 | |
| Ratio | % | 55.4 | 44.6 | | 52.5 | 47.5 | | 52.4 | 47.6 | |
| Totals | kg | 1616.2 | 1298.6 | 2914.8 | 1624.8 | 1471.0 | 3095.8 | 1624.3 | 1478.3 | 3102.6 |

### TARGET TEST WEIGHT CALCULATION

| Measured Parameter | Units | Value | |
|---|---|---|---|
| Total Delivered Weight (UVW) | kg | 2914.8 | (A) |
| Actual Weight of 1 P572V ATD (SID-IIs) ATD Used | kg | 52.2 | (B) |
| Rated Cargo/Luggage Weight (RCLW) | kg | 136 | (C) |
| Calculated Vehicle Target Weight (TVTW) | kg | 3103.0 | (A+B+C) |

Does the measured As Tested Vehicle Weight lie within the required weight range (i.e. Calculated Test Vehicle Target Weight – 4.5 kg to 9 kg)? **YES**

### TEST VEHICLE ATTITUDES AND CG

| | Units | As Delivered | As Tested | Fully Loaded | Meets Requirement*** |
|---|---|---|---|---|---|
| Driver Door Sill Angle (front-to-rear)* | deg | -1.2 | -1.2 | -0.9 | Yes |
| Front Pass. Sill Angle (front-to-rear)* | deg | -1.6 | -1.3 | -1.3 | Yes |
| Front Bumper Angle (left-to-right)** | deg | -0.2 | -0.3 | -0.3 | Yes |
| Rear Bumper Angle (left-to-right)** | deg | -0.3 | -0.4 | -0.5 | Yes |
| Vehicle CG (Aft of Front Axle) | mm | 1686 | 1798 | 1803 | |
| Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline) | mm | 17 | 17 | 25 | |

*ND=Nose Down (-), NU=Nose Up (+) ** LD=Left Down (-), LU=Left Up (+)
*** The "As Tested" vehicle attitude measurements must be equal to or between the "As Delivered" and "Fully Loaded" vehicle attitude measurements.

### WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

| Component Description | Weight (kg) |
|---|---|
| Ballast (if any) | 58.5 |
| None | 0.0 |

| | |
|---|---|
| Test height adjustable suspension setting, if applicable: | Not Applicable |

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

Test Vehicle: 2014 Ram 2500 Crew Cab NHTSA No. M20140313
Test Program: NCAP Side Pole Impact Test Test Date: 12/17/2013

## SEAT POSITIONING

The driver's seat, front center seat (if applicable), and right front passenger's seat should be set to the forward-most, mid-height, mid-angle position. The struck-side rear passenger's seat, rear center seat, and non-struck side rear passenger's seats should be set to the rear-most, lowest, mid-angle position.

### SCRL ANGLE RANGE

| Seat | SCRL (°) | | |
|---|---|---|---|
| | Max | Min | Mid |
| Driver Seat | Fixed | Fixed | Fixed |
| Front Passenger Seat | Fixed | Fixed | Fixed |
| Front Center Seat | Fixed | Fixed | Fixed |
| Struck Side Rear Seat | Fixed | Fixed | Fixed |
| Non-Struck Side Rear Seat | Fixed | Fixed | Fixed |
| Rear Center Seat | Fixed | Fixed | Fixed |

### SEAT HEIGHT AND ANGLE

| Seat | As Tested SCRL Angle (Mid) (°) | As Tested SCRP Height (mm) | SCRP Height Position | SCRP Height (mm) | | |
|---|---|---|---|---|---|---|
| | | | | Rear-most | Mid-Fore/Aft | Forward-Most |
| Driver Seat | Fixed | Fixed | Max | Fixed | Fixed | Fixed |
| | Fixed | Fixed | Mid | Fixed | Fixed | Fixed |
| | Fixed | Fixed | Min | Fixed | Fixed | Fixed |
| Front Passenger Seat | Fixed | Fixed | Max | Fixed | Fixed | Fixed |
| | Fixed | Fixed | Mid | Fixed | Fixed | Fixed |
| | Fixed | Fixed | Min | Fixed | Fixed | Fixed |
| Front Center Seat | Fixed | Fixed | Max | Fixed | Fixed | Fixed |
| | Fixed | Fixed | Mid | Fixed | Fixed | Fixed |
| | Fixed | Fixed | Min | Fixed | Fixed | Fixed |
| Struck Side Rear Seat | Fixed | Fixed | Max | Fixed | Fixed | Fixed |
| | Fixed | Fixed | Mid | Fixed | Fixed | Fixed |
| | Fixed | Fixed | Min | Fixed | Fixed | Fixed |
| Non-Struck Side Rear Seat | Fixed | Fixed | Max | Fixed | Fixed | Fixed |
| | Fixed | Fixed | Mid | Fixed | Fixed | Fixed |
| | Fixed | Fixed | Min | Fixed | Fixed | Fixed |
| Rear Center Seat | Fixed | Fixed | Max | Fixed | Fixed | Fixed |
| | Fixed | Fixed | Mid | Fixed | Fixed | Fixed |
| | Fixed | Fixed | Min | Fixed | Fixed | Fixed |

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

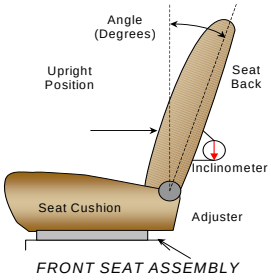
Test Vehicle: 2014 Ram 2500 Crew Cab NHTSA No. M20140313
Test Program: NCAP Side Pole Impact Test Test Date: 12/17/2013

**SEAT FORE/AFT POSITIONS**

| Seat | Total Fore/Aft Travel | | Test Position from Forward-most Position | |
|---|---|---|---|---|
| | mm | Detents | mm | Detent |
| Driver Seat | 230 | 24 (1st as 1) | 0 | 0 (1st as 0) |
| Front Passenger Seat | 230 | 24 (1st as 1) | 0 | 0 (1st as 0) |
| Front Center Seat | Fixed | Fixed | Fixed | Fixed |
| Struck Side Rear Seat | Fixed | Fixed | Fixed | Fixed |
| Non-Struck Side Rear Seat | Fixed | Fixed | Fixed | Fixed |
| Rear Center Seat | Fixed | Fixed | Fixed | Fixed |

**SEAT BACK ANGLE ADJUSTMENT**

The driver's seat back is positioned such that the dummy's head is level. The front center and front passenger's seat backs are positioned in a similar manner as the driver's seat back. The struck-side rear passenger seat back is positioned in accordance with the information provided by the manufacturer on Form No. 1 for the 5th percentile female dummy in a Side NCAP MDB test. The rear center and non-struck side rear passenger's seat back is set to match the struck-side rear seat back.




| Seat | Total Seat Back Angle Range | | Test Position from Vertical | |
|---|---|---|---|---|
| | Degrees | Detents | Degree | Detent |
| Driver Seat w/Seated Dummy | 56.0 | 29 (1st as 1) | -5.9 | 3rd (1st as 0) |
| Front Passenger Seat | 55.9 | 29 (1st as 1) | -6.2 | 3rd (1st as 0) |
| Front Center Seat | Fixed | Fixed | Fixed | Fixed |
| Struck Side Rear Seat | Fixed | Fixed | Fixed | Fixed |
| Non-Struck Side Rear Seat | Fixed | Fixed | Fixed | Fixed |
| Rear Center Seat | Fixed | Fixed | Fixed | Fixed |

Seat back angles measured on headrest post.

**SEAT BELT ANCHORAGE ADJUSTMENT**

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1.

| | **Total # of Positions** | **Placed in Position #** |
|---|---|---|
| Driver Seat | 5 detents (1st as 1) | 0 (uppermost as 0) |

**HEAD RESTRAINT ADJUSTMENT**

Head restraints are adjusted to the lowest and most full forward in-use position.

| | **Total # of Positions** | **Placed in Position #** |
|---|---|---|
| Driver Seat | 4 | Lowest |

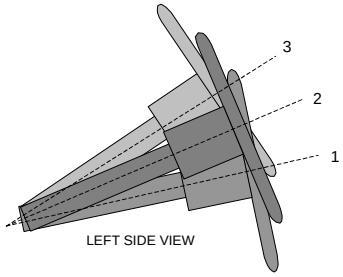
## DATA SHEET NO. 2 (CONTINUED)
## SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA

Test Vehicle: 2014 Ram 2500 Crew Cab NHTSA No. M20140313
Test Program: NCAP Side Pole Impact Test Test Date: 12/17/2013

### STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel geometric locus is described when it moves through its full range of motion.

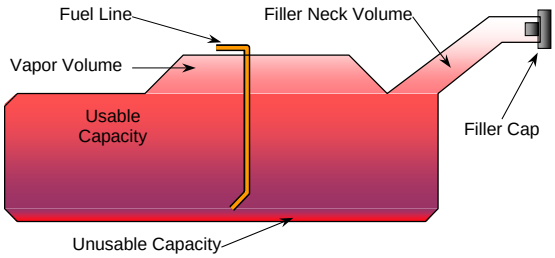
| | Degrees | Fore/Aft Position (mm) |
|---|---|---|
| Lowermost, Position 1 | 76.0 | |
| Geometric Center, Position 2 | 67.5 | |
| Uppermost, Position 3 | 59.0 | |
| Telescoping Steering Wheel Travel | | |
| Test Position | 68.4 | |




*STEERING COLUMN ASSEMBLY*

### FUEL PUMP

Describe the fuel pump type, details about how it operates and the location of the fuel filler pipe.
The vehicle is equipped with an electric fuel pump. The fuel pump will pump fuel when the ignition key is in and turned to the run position. The fuel pipe is on the left side.




*VEHICLE FUEL TANK ASSEMBLY*

### FUEL TANK CAPACITY DATA

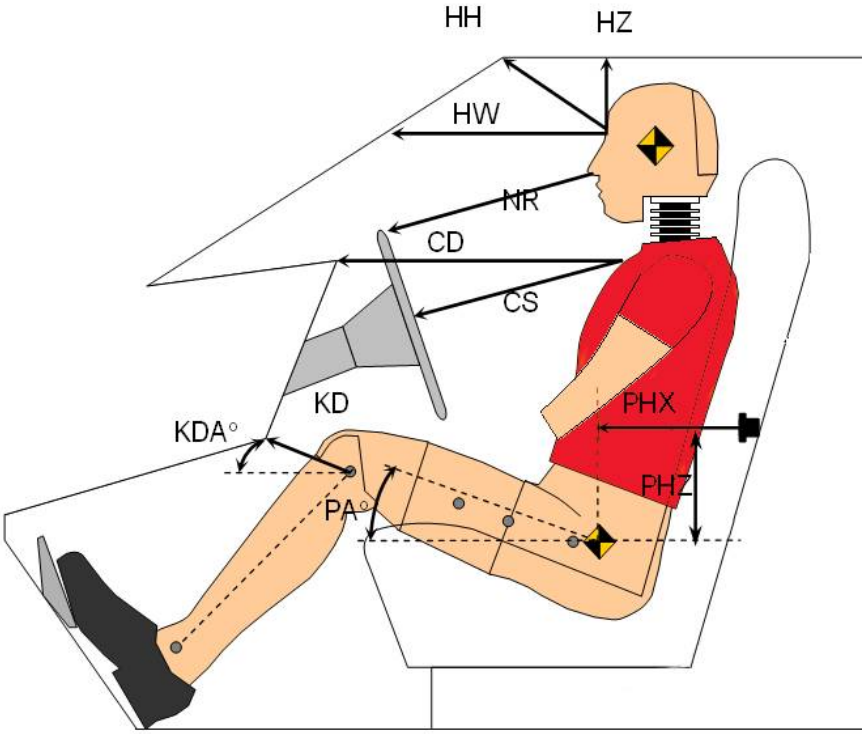
| | Liters |
|---|---|
| Usable Capacity of "Standard Tank" (see Form No. 1) | 117.3 |
| Usable Capacity of "Optional Tank" (see Form No. 1) | |
| Usable Capacity of Standard Tank as Specified in Owner's Manual | 129.0 |
| Usable Capacity of Optional Tank as Specified in Owner's Manual | |
| 93% of Usable Capacity | 109.1 |
| Actual Amount of Solvent Used | 109.0 |
| 1/3 of Usable Capacity | 39.1 |

Is the actual amount of solvent used in the test equal to 93% ± 1% of the Usable Capacity stated in Form No. 1? **YES**

## .DATA SHEET NO. 3
## DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Ram 2500 Crew Cab
Test Program: NCAP Side Pole Impact Test

NHTSA No. M20140313
Test Date: 12/17/2013



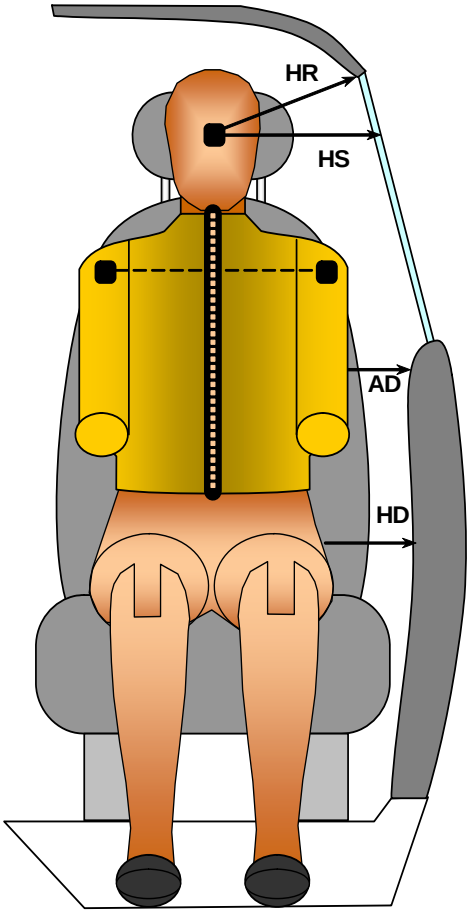

**LEFT SIDE VIEW**

| Code | Measurement Description | Driver | |
|---|---|---|---|
| | | Length (mm) | Angle (°) |
| HH | Head to Header | 317 | |
| HW | Head to Windshield | 605 | |
| HZ | Head to Roof Liner | 204 | |
| NR | Nose to Rim | 232 | |
| CD | Chest to Dashboard | 436 | |
| CS | Chest to Steering Wheel | 182 | |
| KDL/KDAL° | Left Knee to Dash | 76 | 27.3 |
| KDR/KDAR° | Right Knee to Dash | 71 | 33.4 |
| PAX° | Pelvic Tilt Angle (X-Axis) | | 20.7 |
| PAY° | Pelvic Tilt Angle (Y-Axis) | | 0.0 |
| PHX | Hip Point to Striker (X-Axis) | 337 | |
| PHZ | Hip Point to Striker (Z-Axis) | 41 | |

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

Test Vehicle: 2014 Ram 2500 Crew Cab
Test Program: NCAP Side Pole Impact Test

NHTSA No. M20140313
Test Date: 12/17/2013

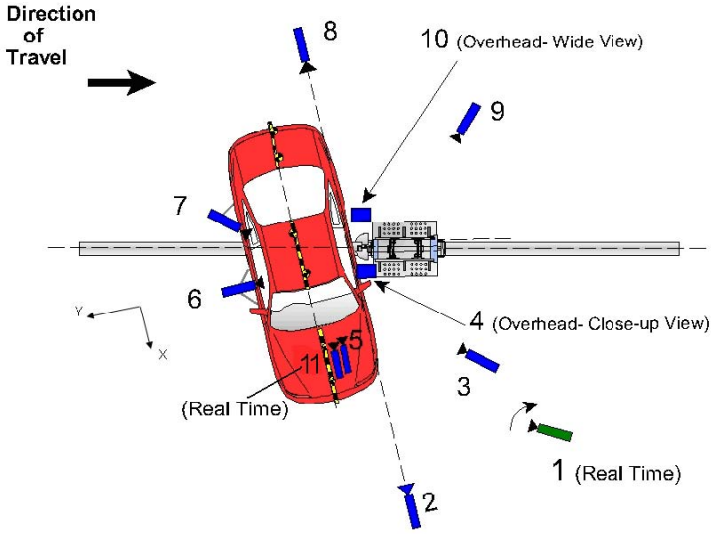



*FRONT VIEW OF DUMMY*

| Code | Measurement Description | Driver Length (mm) |
|---|---|---|
| HR | Head to Side Header | 238 |
| HS | Head to Side Window | 354 |
| AD | Arm to Door | 168 |
| HD | Hip Point to Door | 161 |

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

Test Vehicle: 2014 Ram 2500 Crew Cab NHTSA No. M20140313
Test Program: NCAP Side Pole Impact Test Test Date: 12/17/2013




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

| Camera No. | View | Coordinates (mm) | | | Lens (mm) | Film Speed (fps) |
|---|---|---|---|---|---|---|
| | | X* | Y* | Z* | | |
| 1 | Real-Time Pan View | | | | `````` | 30 |
| 2 | Front Ground Level | -70 | 6350 | -1800 | 24 | 1000 |
| 3 | Impact Side 45° Forward | -2330 | 5360 | -1930 | 20 | 1000 |
| 4 | Overhead Closeup | 100 | 0 | -4420 | 50 | 1000 |
| 5 | Onboard – Driver Front | | | | 16 | 1000 |
| 6 | Onboard – Driver Side | | | | 8 | 1000 |
| 7 | Onboard – Driver Rear | | | | 8 | 1000 |
| 8 | Rear Ground Level | -60 | -7100 | -1830 | 24 | 1000 |
| 9 | Impact Side 45° Rearward | -4160 | -4550 | -1900 | 20 | 1000 |
| 10 | Overhead Wide View | 390 | 0 | -4610 | 14 | 1000 |
| 11 | Real-Time Dummy Front View | | | | | 30 |

* All measurements accurate to ± 6 mm
Note: Vehicle was at a 75° angle to the rigid pole.

Explain why camera(s) did not operate as intended: None

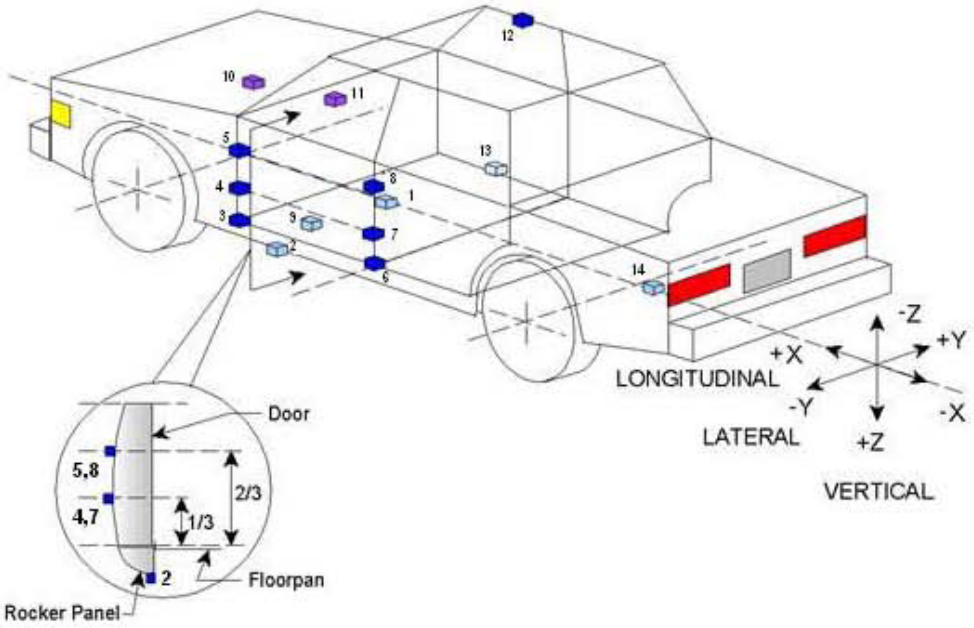
**INSTRUMENTATION**

| | Number of Channels |
|---|---|
| Driver Dummy | 22 |
| Vehicle Structure | 18 |
| Pole Load Cells | 8 |
| TOTAL | 48 |

**DATA SHEET NO. 6**

**VEHICLE ACCELEROMETER DATA**

Test Vehicle: 2014 Ram 2500 Crew Cab NHTSA No. M20140313
Test Program: NCAP Side Pole Impact Test Test Date: 12/17/2013




| | Accelerometer Location | | | |
|---|---|---|---|---|
| | ID | Coordinates (mm) | | |
| | | X | Y | Z |
| 1 | Vehicle CG | 3447 | 74 | -712 |
| 2 | Left Floor Sill | 4129 | -815 | -468 |
| 3 | A Pillar Sill | 4398 | -815 | -465 |
| 4 | A Pillar Low | 4440 | -945 | -885 |
| 5 | A Pillar Mid | 4440 | -950 | -1116 |
| 6 | B Pillar Sill | 3346 | -815 | -485 |
| 7 | B Pillar Low | 3341 | -820 | -1005 |
| 8 | B Pillar Mid | 3341 | -820 | -1223 |
| 9 | Driver Seat Track | 3461 | -563 | -664 |
| 10 | Engine Top | 5083 | 0 | -1155 |
| 11 | Firewall | 4911 | 0 | -1365 |
| 12 | Right Roof | 3284 | 670 | -2035 |
| 13 | Right Floor Sill | 4114 | 815 | -465 |
| 14 | Rear Floorpan | 287 | 0 | -940 |

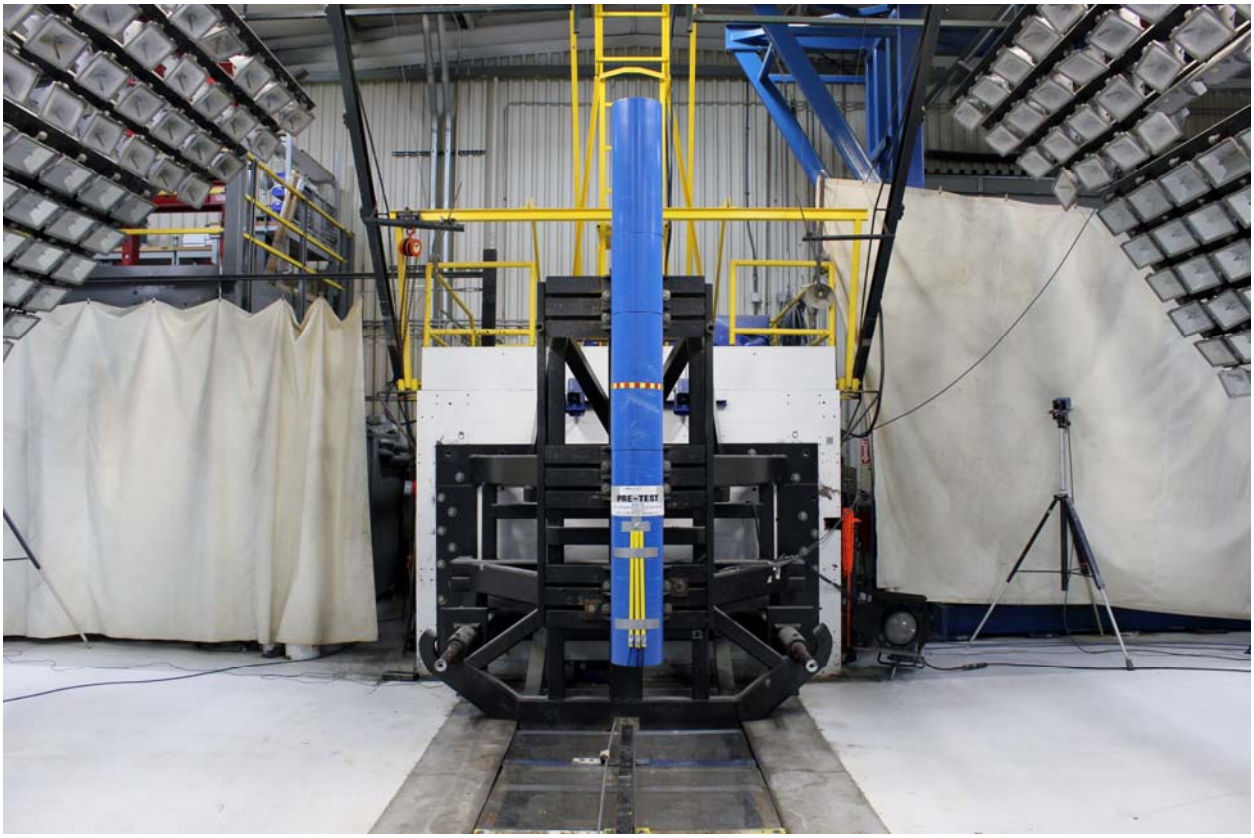
Reference:

X – Test Vehicle Rear Bumper (+forward)
Y – Test Vehicle Centerline (+ to right)
Z – Ground Plane (+ down)

**DATA SHEET NO. 7**
**RIGID POLE LOAD CELL DATA**

Test Vehicle: 2014 Ram 2500 Crew Cab
Test Program: NCAP Side Pole Impact Test

NHTSA No. M20140313
Test Date: 12/17/2013




254 mm Diameter Rigid Pole

| Load Cell Locations | |
|---|---|
| ID | Height From Impact Surface (mm) |
| 1 | 182 |
| 2 | 470 |
| 3 | 698 |
| 4 | 986 |
| 5 | 1212 |
| 6 | 1641 |
| 7 | 1854 |
| 8 | 2053 |

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

Test Vehicle: 2014 Ram 2500 Crew Cab
Test Program: NCAP Side Pole Impact Test
NHTSA No. M20140313
Test Date: 12/17/2013

**TEST DUMMY INFORMATION AND CONTACT POINTS**

| Description | Driver SID-IIs Dummy |
|---|---|
| Face | Curtain Airbag, Headrest |
| Top of Head | Curtain Airbag, Headrest |
| Left Side of Head | Curtain Airbag |
| Back of Head | Curtain Airbag, Headrest |
| Left Shoulder | Side Airbag, Seatback |
| Upper Torso | Side Airbag, Seatback |
| Lower Torso | Side Airbag, Seatback |
| Left Hip | Side Airbag, Seatpan |
| Left Knee | None |

**POST-TEST DOOR PERFORMANCE**

| Description | Struck Side | | Non-Struck Side | | Rear Hatch/ Other Door |
|---|---|---|---|---|---|
| | Front | Rear | Front | Rear | |
| Remained Closed and Operational | No | No | Yes | Yes | Yes |
| Total Separation from Vehicle at Hinges or Latches | No | No | No | No | No |
| Latch or Hinge Systems Pulled Out of Their Anchorages | No | No | No | No | No |
| Disengaged from Latched Position | No | No | No | No | No |
| Latch Separated from Striker | No | No | No | No | No |
| Jammed Shut | Yes | Yes | No | No | No |
| If Door Opened at Striker, Record Width of Opening at Striker (mm) | N/A | N/A | N/A | N/A | N/A |

**POST-TEST SEAT PERFORMANCE**

| | Struck Side | | Non-Struck Side | |
|---|---|---|---|---|
| Description | Front | Rear | Front | Rear |
| Seat Movement Along Seat Track | No | No | No | No |
| Seat Disengagement from Floor Pan | No | No | No | No |
| Seat Back Movement from Initial Position | No | No | No | No |
| Seat Back Collapse | No | No | No | No |

**POST-TEST STRUCTURAL OBSERVATIONS**

| Critical Areas of Performance | Observations and Conclusions |
|---|---|
| Pillar Performance | No Separation |
| Sill Separation | None |
| Windshield Damage | Cracked |
| Side Window Damage | Left Front Window Broken |
| Other Notable Effects | None |

**DATA SHEET NO. 8 (CONTINUED)**
**POST-TEST OBSERVATIONS**

Test Vehicle: 2014 Ram 2500 Crew Cab NHTSA No. M20140313
Test Program: NCAP Side Pole Impact Test Test Date: 12/17/2013

**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

| Restraint Type | Struck Side Driver | | Struck Side Rear Passenger | |
|---|---|---|---|---|
| | Mounted | Deployed | Mounted | Deployed |
| Frontal Airbag | Yes | Yes | | |
| Knee Airbag | No | | | |
| Side Curtain Airbag | Yes | Yes | Yes | Yes |
| Side Torso Airbag | Yes | Yes | No | |
| Seat Belt Pretensioner | Yes | Yes | No | |
| Seat Belt Load Limiter | Yes | | No | |
| Other | | | | |

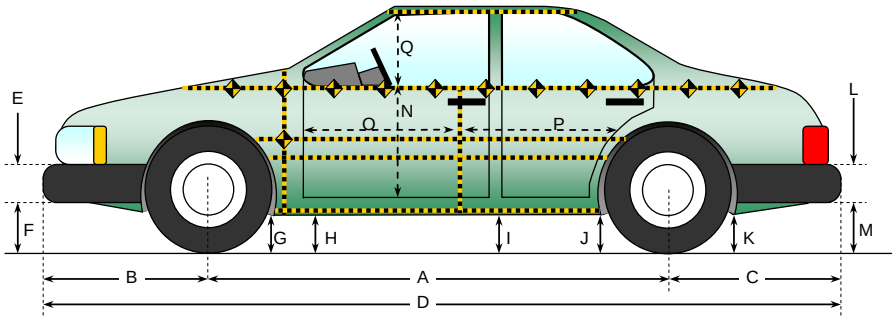
**VEHICLE SPEED, VEHICLE ANGLE AT IMPACT, AND IMPACT POINT LOCATION DATA**

| Measured Parameter | Units | Tolerance | Value |
|---|---|---|---|
| Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point) | mm | | 1184 |
| Actual Impact Point (Aft of Front Axle) | mm | | 1185 |
| Horizontal Offset (+forward / -rearward) | mm | +/- 38 of Intended Impact Point | -1 |
| Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion | deg | 75 +/- 3 | 75 |
| Trap No. 1 Velocity (Primary) | km/h | 31.4 to 33.0 | 32.0 |
| Trap No. 2 Velocity (Redundant) | km/h | 31.4 to 33.0 | 32.1 |

**DATA SHEET NO. 9**
**VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2014 Ram 2500 Crew Cab
Test Program: NCAP Side Pole Impact Test

NHTSA No. M20140313
Test Date: 12/17/2013




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

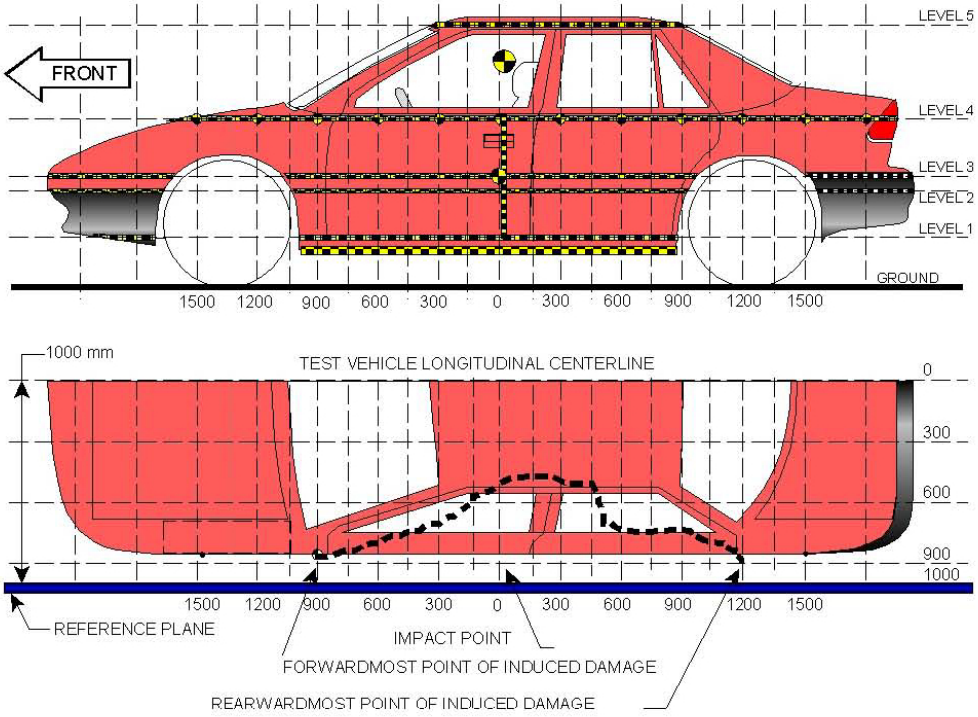
**LEFT SIDE VIEW**

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

| Code | Measurement Description | Pre-Test | Post-Test | Difference |
|---|---|---|---|---|
| A | Wheelbase | 3785 | 3697 | 88 |
| B | Front Axle to FSOV | 1029 | 1066 | -37 |
| C | Rear Axle to RSOV | 1218 | 1208 | 10 |
| D | Total Vehicle Length at Centerline | 6032 | 5971 | 61 |
| E | Front Bumper Thickness | 250 | 250 | 0 |
| F | Front Bumper Bottom to Ground | 287 | 316 | -29 |
| G | Sill Height at Front Wheel Well | 403 | 395 | 8 |
| H | Sill Height at Front Door Leading Edge | 410 | 387 | 23 |
| I | Sill Height at B-Pillar | 415 | 395 | 20 |
| J1 | Sill Height at Rear Wheel Well | 427 | 432 | -5 |
| J2 | Pinch Weld Height at Rear Wheel Well | 424 | 420 | 4 |
| K | Sill Height Aft of Rear Wheel Well | 505 | 553 | -48 |
| L | Rear Bumper Thickness | 205 | 205 | 0 |
| M | Rear Bumper Bottom to Ground | 500 | 515 | -15 |
| N | Sill Height to Bottom of Front Window Sill | 872 | 865 | 7 |
| O | Front Door Leading Edge to Impact CL | 782 | 573 | 209 |
| P | Rear Door Trailing Edge to Impact CL | 1364 | 1194 | 170 |
| Q | Front Window Opening | 508 | 483 | 25 |
| R | Right Side Length | 5297 | 5313 | -16 |
| S | Left Side Length | 5297 | 5032 | 265 |
| T | Vehicle Width at B-Pillars | 2020 | 1838 | 182 |

**DATA SHEET NO. 10**
**VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2014 Ram 2500 Crew Cab NHTSA No. M20140313
Test Program: NCAP Side Pole Impact Test Test Date: 12/17/2013




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

**MAXIMUM EXTERIOR CRUSH MEAUREMENTS**

| Level | Measurement Description | Height Above Ground (mm) | Maximum Exterior Static Crush | Distance from Impact |
|---|---|---|---|---|
| 1 | Sill Top | 484 | 396 | -75 |
| 2 | Mid Door | 938 | 473 | -75 |
| 3 | Occupant Hip Point | 1014 | 470 | -75 |
| 4 | Window Sill | 1325 | 405 | -75 |
| 5 | Window Top | 1910 | 247 | -150 |

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

Test Vehicle: 2014 Ram 2500 Crew Cab NHTSA No. M20140313
Test Program: NCAP Side Pole Impact Test Test Date: 12/17/2013

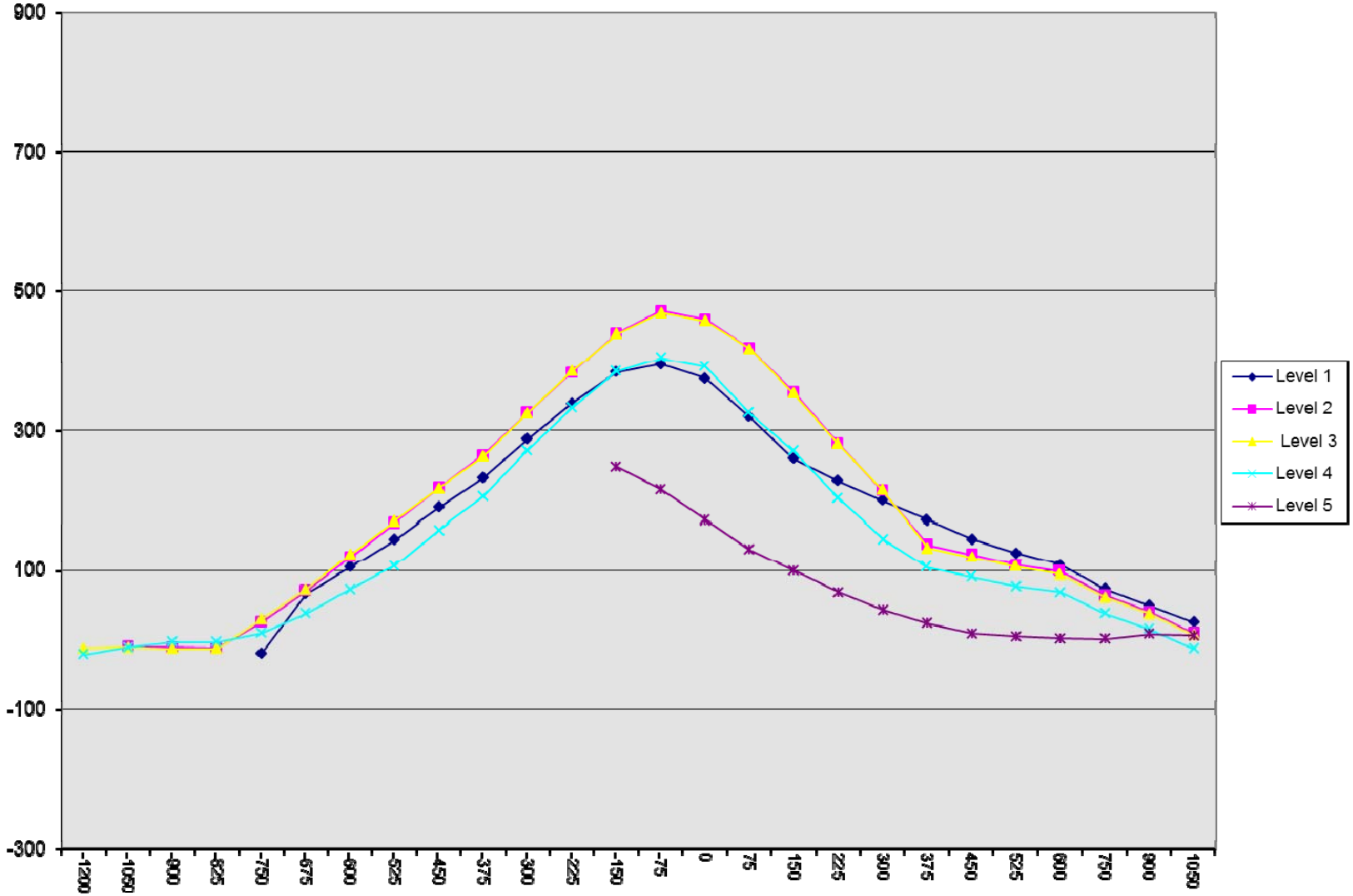
| | Pre-Test | | | | | Post-Test | | | | | Difference | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| -1200 | | | 100 | 223 | | | | 89 | 203 | | | | -11 | -20 | |
| -1050 | | 100 | 95 | 207 | | | 91 | 85 | 197 | | | -9 | -10 | -10 | |
| -900 | | 97 | 95 | 196 | | | 87 | 83 | 194 | | | -10 | -12 | -2 | |
| -825 | | 97 | 95 | 191 | | | 86 | 83 | 189 | | | -11 | -12 | -2 | |
| -750 | 177 | 98 | 90 | 187 | | 158 | 124 | 120 | 198 | | -19 | 26 | 30 | 11 | |
| -675 | 177 | 98 | 90 | 184 | | 244 | 169 | 163 | 223 | | 67 | 71 | 73 | 39 | |
| -600 | 177 | 99 | 91 | 179 | | 282 | 218 | 214 | 252 | | 105 | 119 | 123 | 73 | |
| -525 | 176 | 99 | 92 | 177 | | 320 | 266 | 262 | 284 | | 144 | 167 | 170 | 107 | |
| -450 | 175 | 99 | 99 | 175 | | 364 | 316 | 315 | 332 | | 189 | 217 | 216 | 157 | |
| -375 | 176 | 100 | 100 | 173 | | 407 | 364 | 362 | 377 | | 231 | 264 | 262 | 204 | |
| -300 | 175 | 100 | 100 | 171 | | 462 | 425 | 424 | 442 | | 287 | 325 | 324 | 271 | |
| -225 | 174 | 100 | 100 | 169 | | 512 | 483 | 485 | 501 | | 338 | 383 | 385 | 332 | |
| -150 | 173 | 100 | 100 | 167 | 403 | 557 | 541 | 540 | 552 | 650 | 384 | 441 | 440 | 385 | 247 |
| -75 | 173 | 100 | 100 | 165 | 401 | 569 | 573 | 570 | 570 | 616 | 396 | 473 | 470 | 405 | 215 |
| 0 | 173 | 99 | 100 | 163 | 400 | 548 | 559 | 558 | 555 | 571 | 375 | 460 | 458 | 392 | 171 |
| 75 | 173 | 98 | 99 | 160 | 395 | 492 | 517 | 517 | 485 | 525 | 319 | 419 | 418 | 325 | 130 |
| 150 | 172 | 97 | 98 | 157 | 393 | 431 | 452 | 451 | 427 | 493 | 259 | 355 | 353 | 270 | 100 |
| 225 | 172 | 95 | 97 | 154 | 390 | 399 | 376 | 377 | 356 | 459 | 227 | 281 | 280 | 202 | 69 |
| 300 | 172 | 94 | 95 | 152 | 389 | 371 | 307 | 309 | 297 | 433 | 199 | 213 | 214 | 145 | 44 |
| 375 | 172 | 94 | 95 | 152 | 388 | 343 | 231 | 227 | 257 | 413 | 171 | 137 | 132 | 105 | 25 |
| 450 | 173 | 94 | 94 | 151 | 386 | 318 | 217 | 213 | 242 | 396 | 145 | 123 | 119 | 91 | 10 |
| 525 | 173 | 93 | 94 | 150 | 385 | 298 | 201 | 200 | 227 | 391 | 125 | 108 | 106 | 77 | 6 |
| 600 | 173 | 93 | 94 | 149 | 385 | 281 | 192 | 188 | 218 | 388 | 108 | 99 | 94 | 69 | 3 |
| 750 | 173 | 93 | 93 | 147 | 382 | 247 | 158 | 155 | 186 | 384 | 74 | 65 | 62 | 39 | 2 |
| 900 | 174 | 93 | 93 | 145 | 379 | 224 | 134 | 131 | 161 | 388 | 50 | 41 | 38 | 16 | 9 |
| 1050 | 175 | 94 | 94 | 145 | 379 | 204 | 105 | 102 | 133 | 386 | 26 | 11 | 8 | -12 | 7 |

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

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

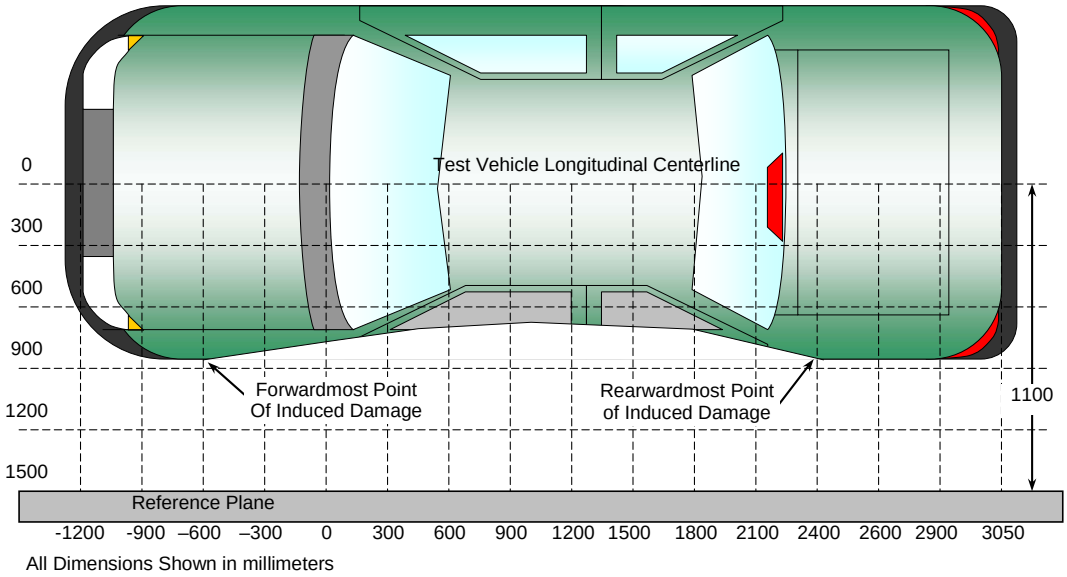
Test Vehicle: 2014 Ram 2500 Crew Cab
Test Program: NCAP Side Pole Impact Test

NHTSA No. M20140313
Test Date: 12/17/2013



**DATA SHEET NO. 11**
**VEHICLE DAMAGE PROFILE DISTANCES**

Test Vehicle: 2014 Ram 2500 Crew Cab NHTSA No. M20140313
Test Program: NCAP Side Pole Impact Test Test Date: 12/17/2013




**TOP VIEW**

**DAMAGE PROFILE DISTANCES**

| DPD | Distance from Impact Point (mm) | Level | Pre-Test (mm) | Post-Test (mm) | Crush (mm) |
|---|---|---|---|---|---|
| 1 | 900 | 3 | 93 | 295 | 202 |
| 2 | 555 | 3 | 94 | 377 | 283 |
| 3 | 210 | 3 | 97 | 589 | 492 |
| 4 | -135 | 3 | 100 | 756 | 656 |
| 5 | -480 | 3 | 98 | 503 | 405 |
| 6 | -825 | 3 | 95 | 269 | 174 |

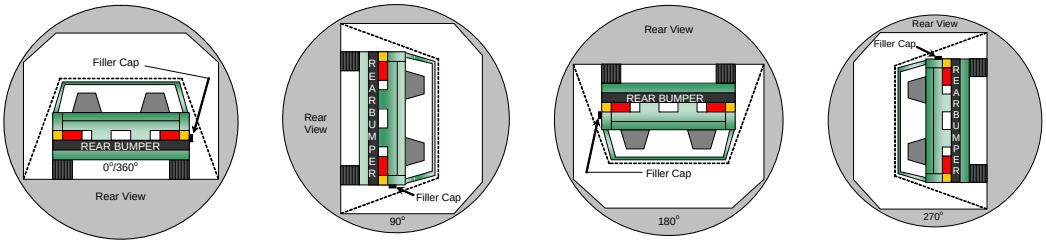
**DATA SHEET NO. 12**
**FMVSS NO. 301 STATIC ROLLOVER RESULTS**

Test Vehicle: 2014 Ram 2500 Crew Cab NHTSA No. M20140313
Test Program: NCAP Side Pole Impact Test Test Date: 12/17/2013

Test Time: 10:04 am Temperature: 21.0°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**




0°/360° 90° 180° 270°

**ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS**

| Test Phase | Rotation Time | Hold Time | Total Time |
|---|---|---|---|
| 0° to 90° | 165 | 300 | 465 |
| 90° to 180° | 119 | 300 | 419 |
| 180° to 270° | 140 | 300 | 440 |
| 270° to 360° | 161 | 300 | 461 |

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

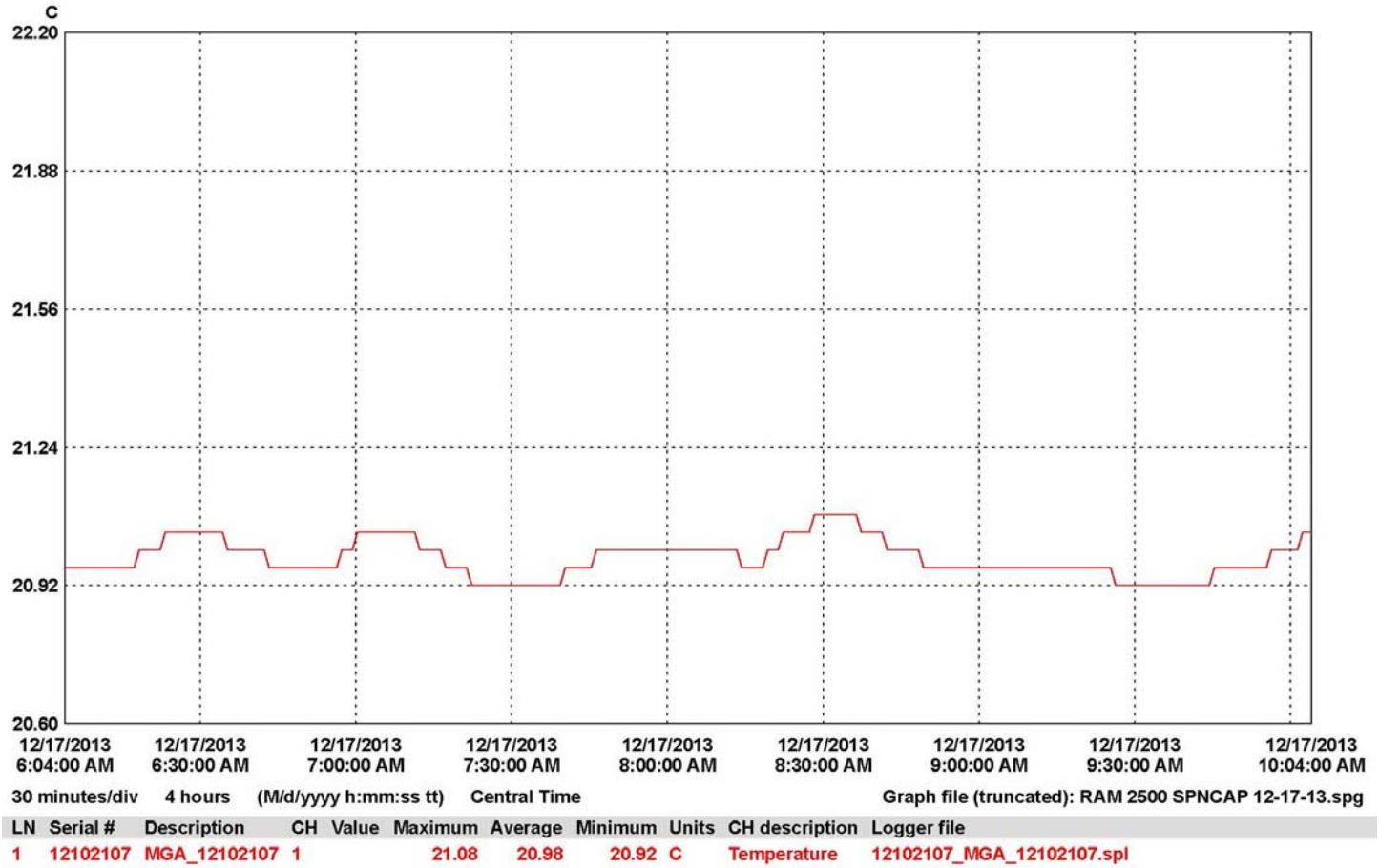
| Test Phase | First 5 Minutes | Sixth Minute | Seventh Minute | Eight Minute |
|---|---|---|---|---|
| 0° to 90° | 0 | 0 | 0 | 0 |
| 90° to 180° | 0 | 0 | 0 | 0 |
| 180° to 270° | 0 | 0 | 0 | 0 |
| 270° to 360° | 0 | 0 | 0 | 0 |

**ROLLOVER SOLVENT SPILLAGE LOCATION TABLE**

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

**DATA SHEET NO. 13**
**DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA**

Test Vehicle: 2014 Ram 2500 Crew Cab NHTSA No. M20140313
Test Program: NCAP Side Pole Impact Test Test Date: 12/17/2013




| LN | Serial # | Description | CH | Value | Maximum | Average | Minimum | Units | CH description | Logger file |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 12102107 | MGA_12102107 | 1 | | 21.08 | 20.98 | 20.92 | C | Temperature | 12102107_MGA_12102107.spl |

# APPENDIX A
# PHOTOGRAPHS

TABLE OF PHOTOGRAPHS


As Delivered Right Front ¾ View of Test Vehicle


As Delivered Left Rear ¾ View of Test Vehicle


Pre-Test Frontal View of Test Vehicle


Post-Test Frontal View of Test Vehicle


Pre-Test Left Front ¾ View of Test Vehicle


Post-Test Left Front ¾ View of Test Vehicle


Pre-Test Left Side View of Test Vehicle


Post-Test Left Side View of Test Vehicle

Pre-Test Left Rear ¾ View of Test Vehicle

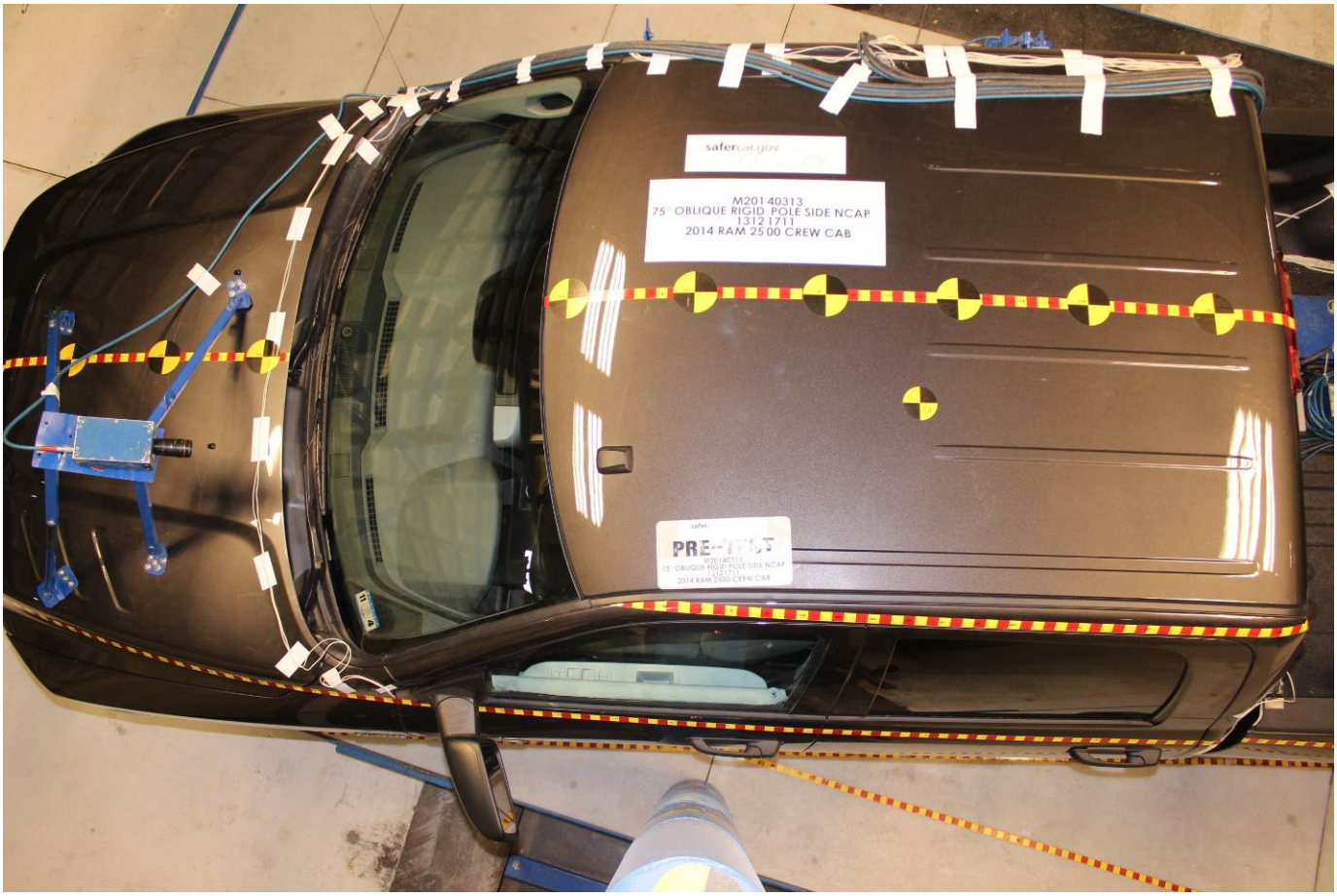
Post-Test Left Rear ¾ View of Test Vehicle


Pre-Test Rear View of Test Vehicle

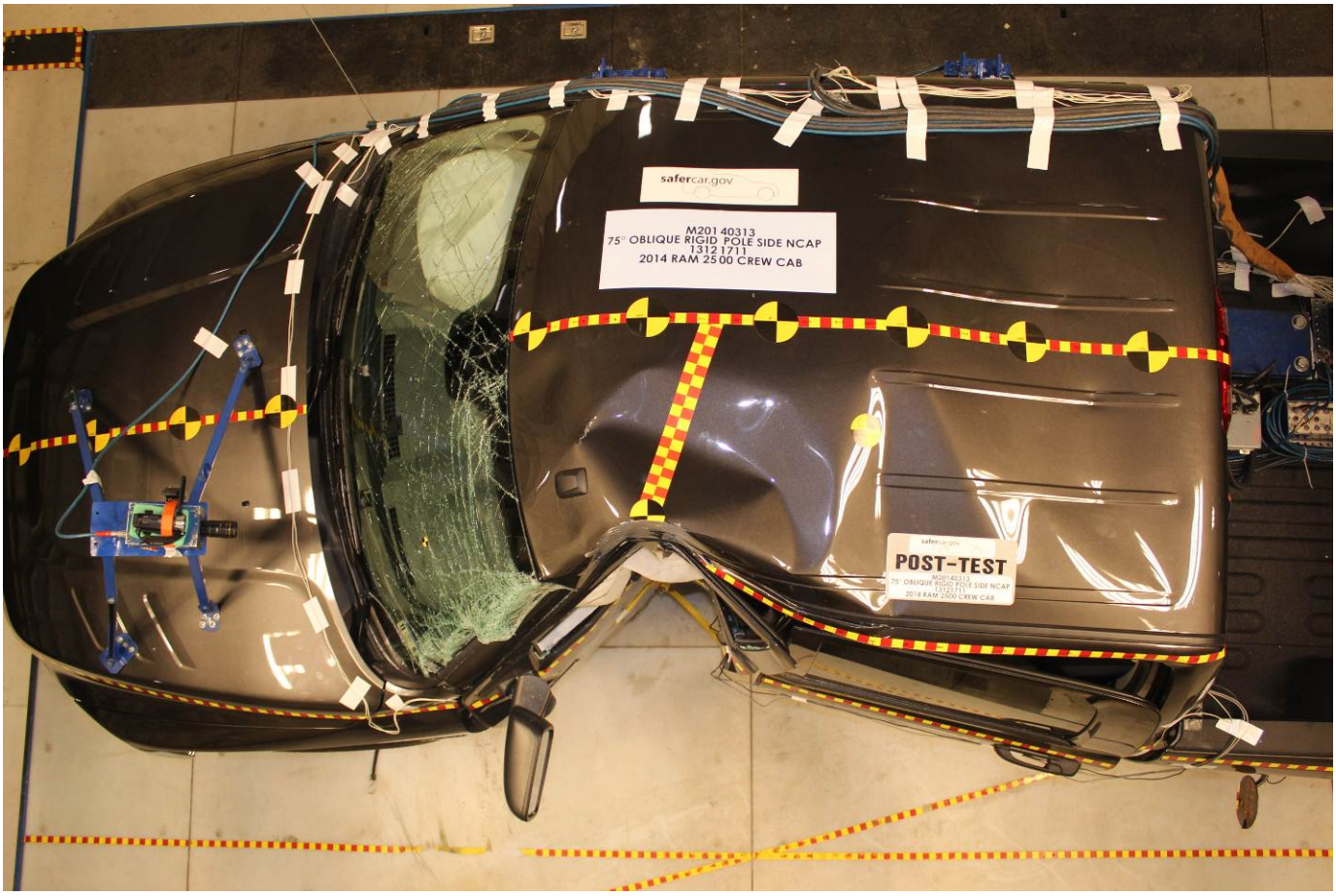

Post-Test Rear View of Test Vehicle


Pre-Test Right Side View of Test Vehicle


Post-Test Right Side View of Test Vehicle




Pre-Test Overhead View of Test Area




Post-Test Overhead View of Test Area

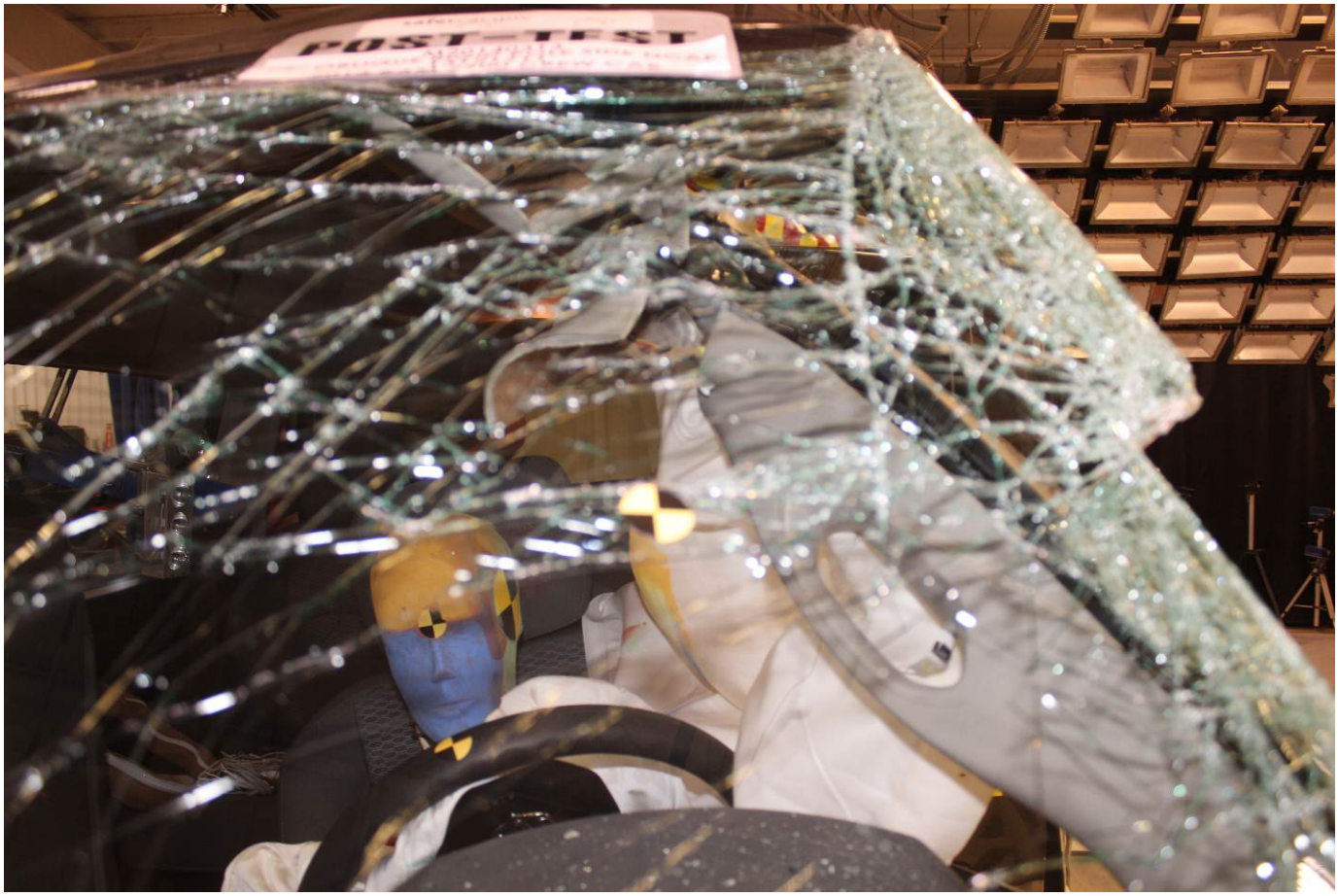
Pre-Test Left Side View of Pole Positioned Against Side of Vehicle

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

Pre-Test Close-Up View of Impact Point Target

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


Pre-Test Front Close-Up View of Dummy Head and Chest




Post-Test Front Close-Up View of Dummy

Pre-Test Left Side View of Dummy Showing Belt and Chalking

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

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

Pre-Test Front View of Seat Back Prior to Dummy Positioning

Pre-Test Front Close-Up View of Dummy Head and Shoulders in Relation to Head Restraint

Pre-Test Front View of Seat Pan Prior to Dummy Positioning

Pre-Test Overhead View of Dummy Thighs on Seat Pan

PHOTOGRAPH NOT AVAILABLE

Pre-Test Left Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket

Pre-Test Left Side View of Dummy's Head Showing Dummy's Head is Level

Pre-Test Placement of Dummy's Feet

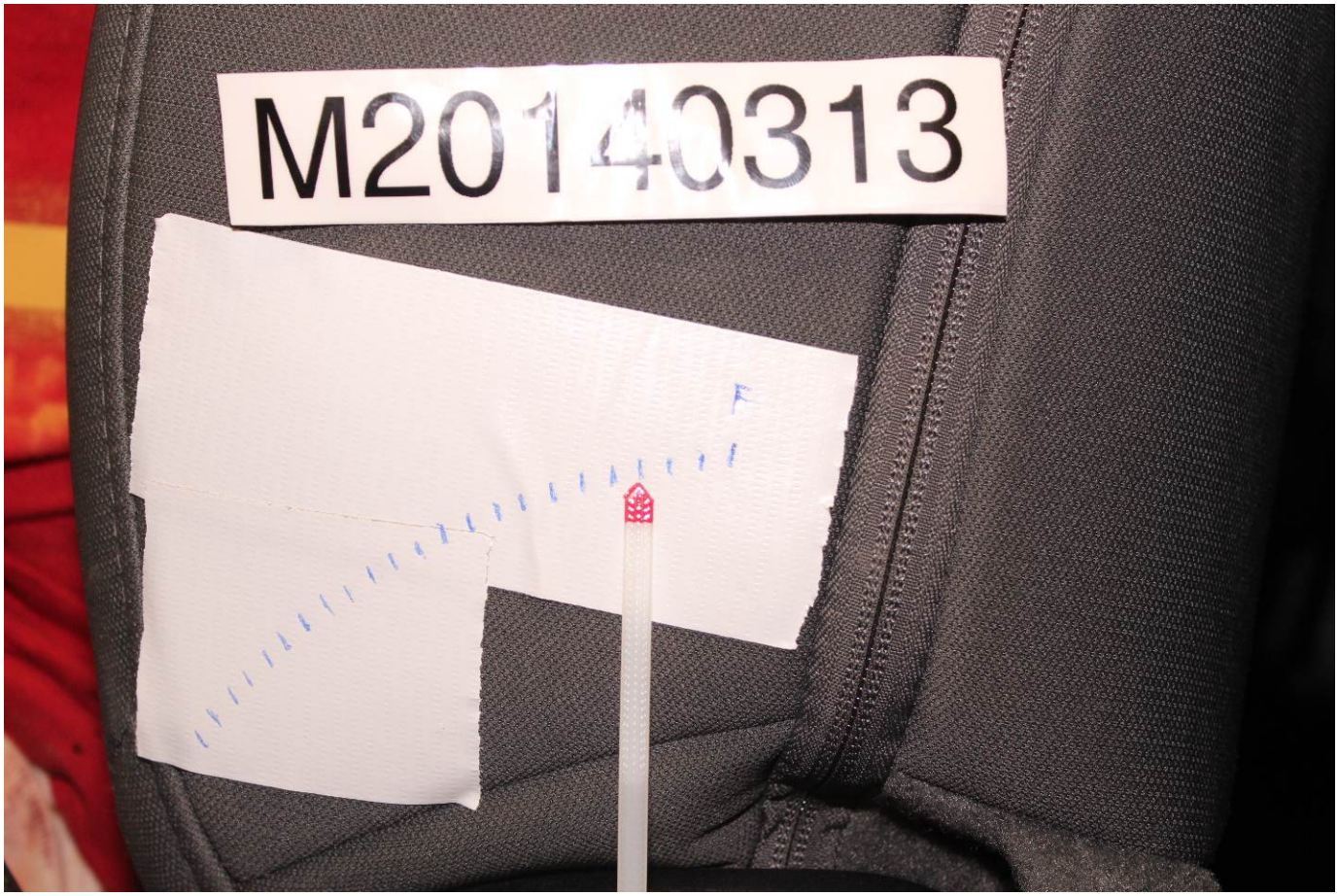
Pre-Test View of Belt Anchorage for Dummy

Pre-Test Left Side View of Steering Wheel


Pre-Test View of Disengaged Parking Brake


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 Dummy and Door Clearance View

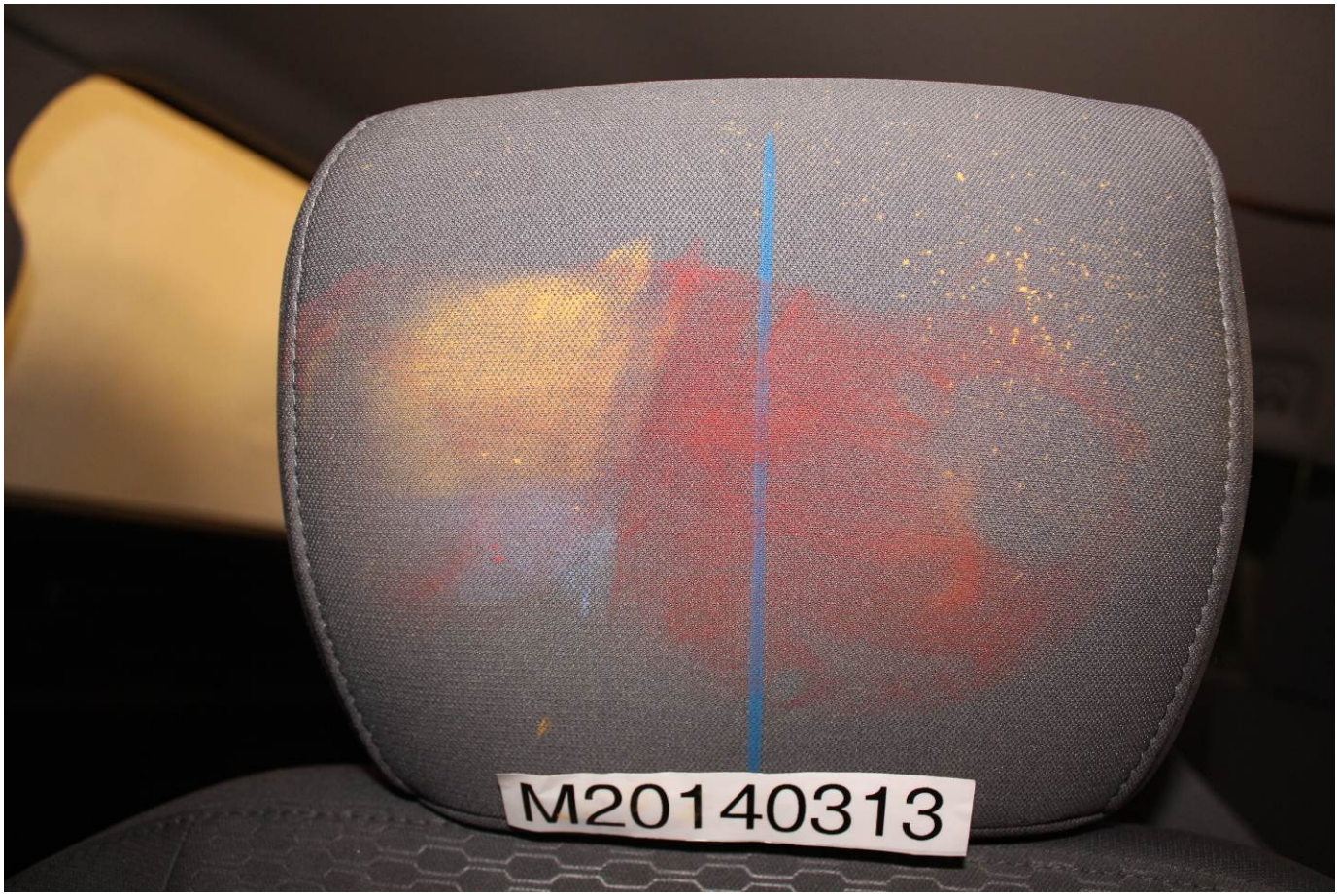

Post-Test Dummy and Door Clearance View


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

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

Pre-Test Inner Door Panel View

Post-Test Inner Door Panel View Showing Dummy Contact Location



Post-Test Dummy Close-Up Head Contact with Vehicle Interior View


Post-Test Dummy Close-Up Head Contact with Side Air Bag View


Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View

Post-Test Dummy Close-Up Torso Contact with Side Air Bag View

Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View


Post-Test Dummy Close-Up Pelvis Contact with Side Air Bag View

PHOTOGRAPH NOT APPLICABLE

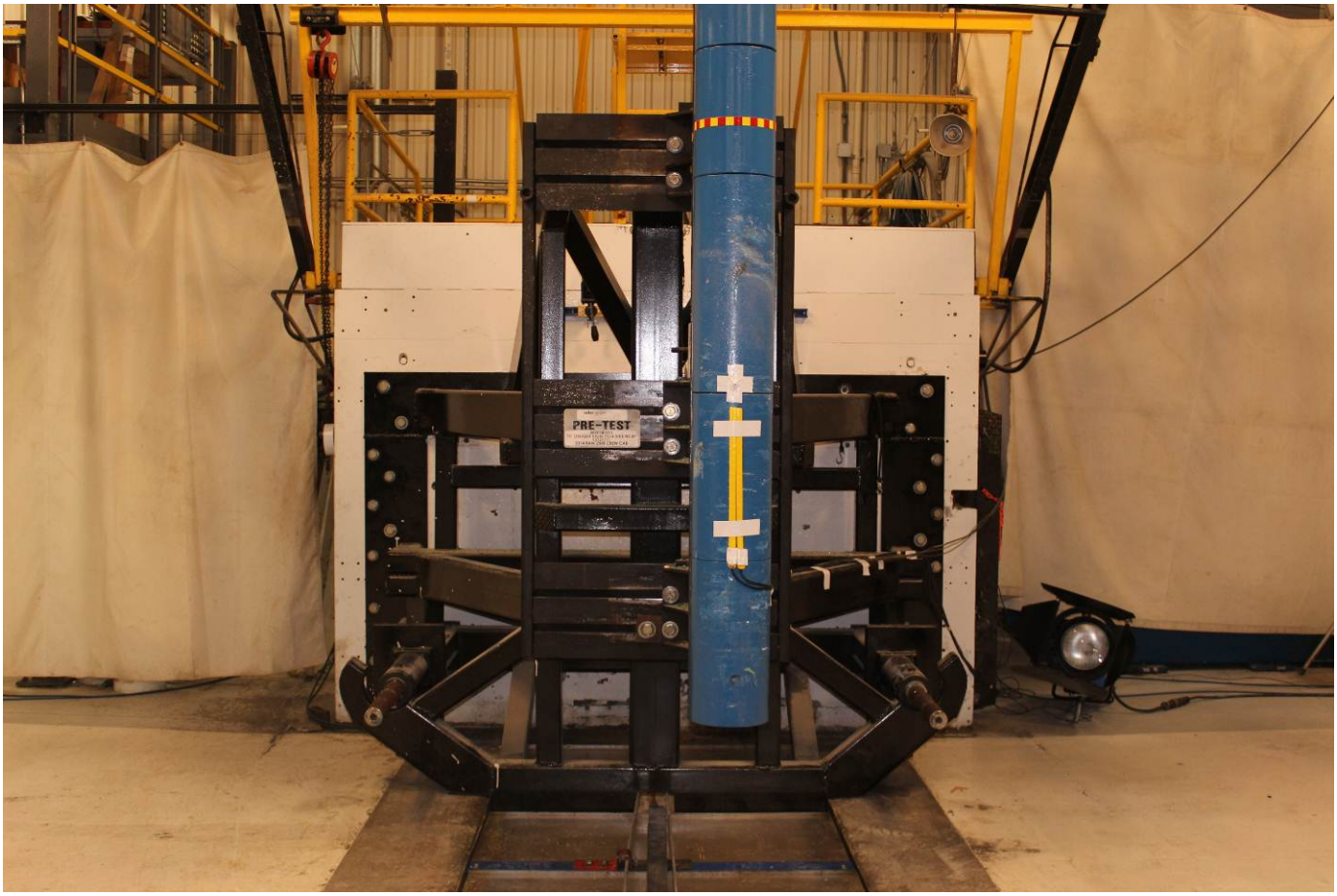
Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View


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

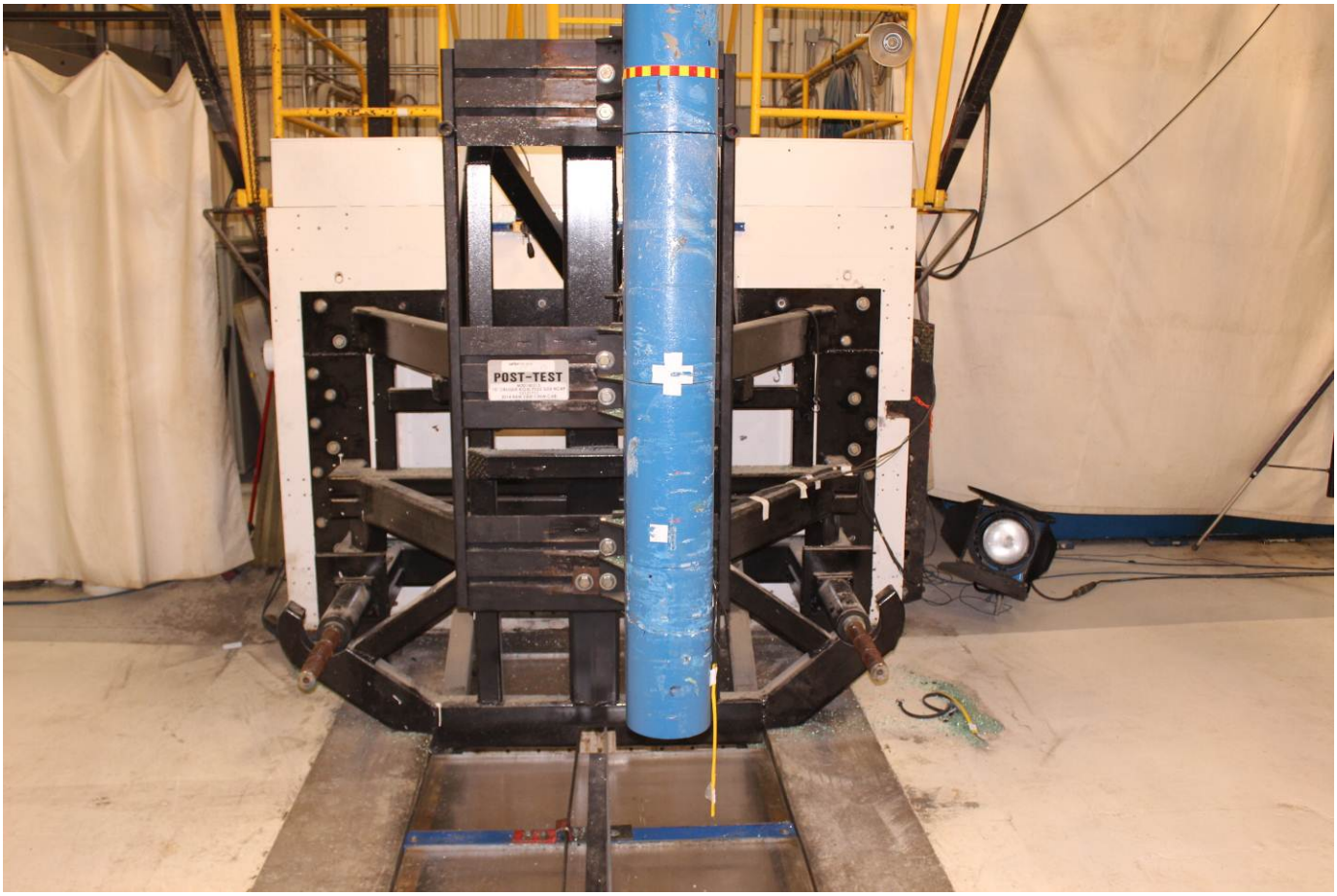

Post-Test View of Fuel Filler Cap or Fuel Filler Neck


Close-Up View of Vehicle's Certification Label

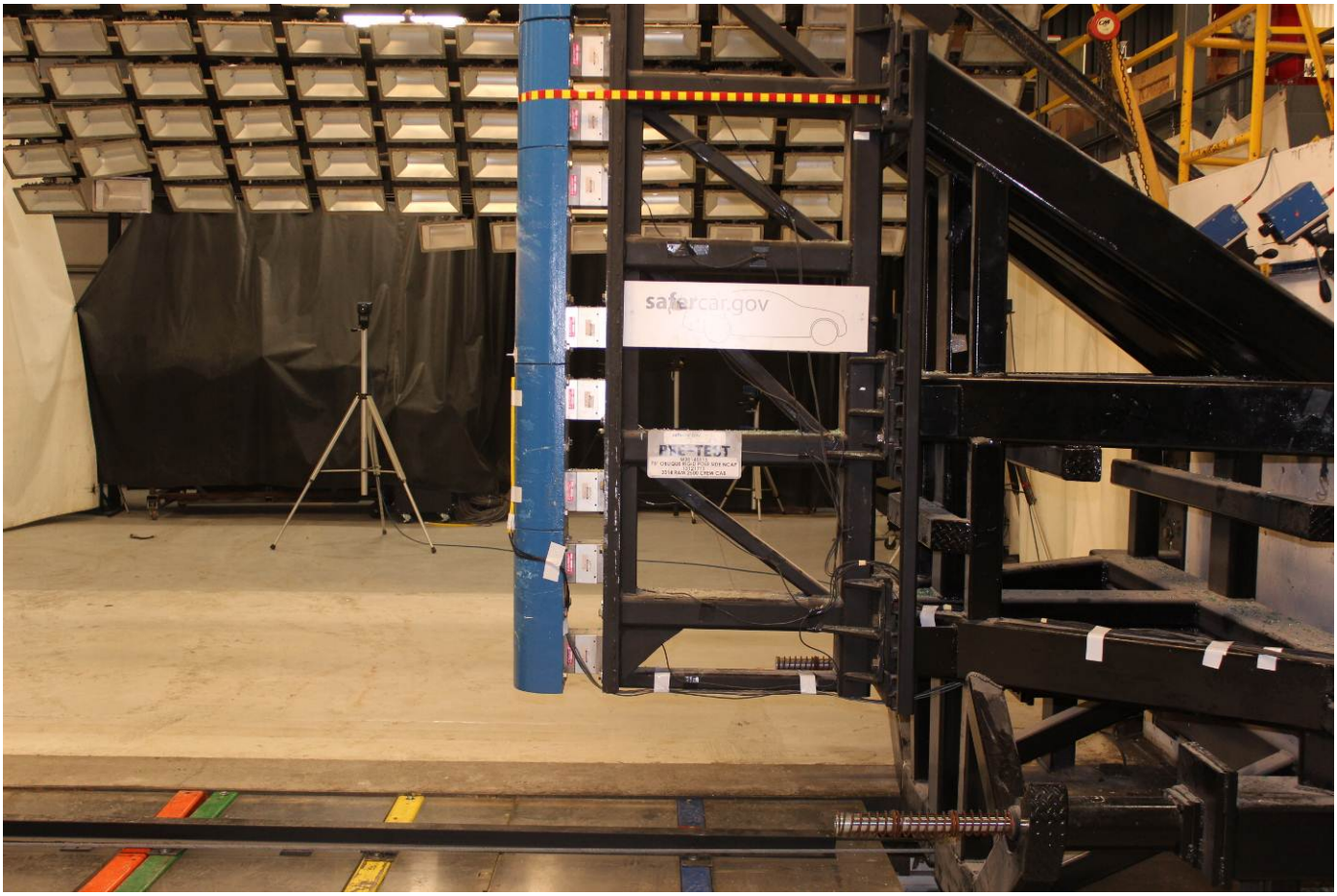

Close-Up View of Vehicle's Tire Information Placard or Label



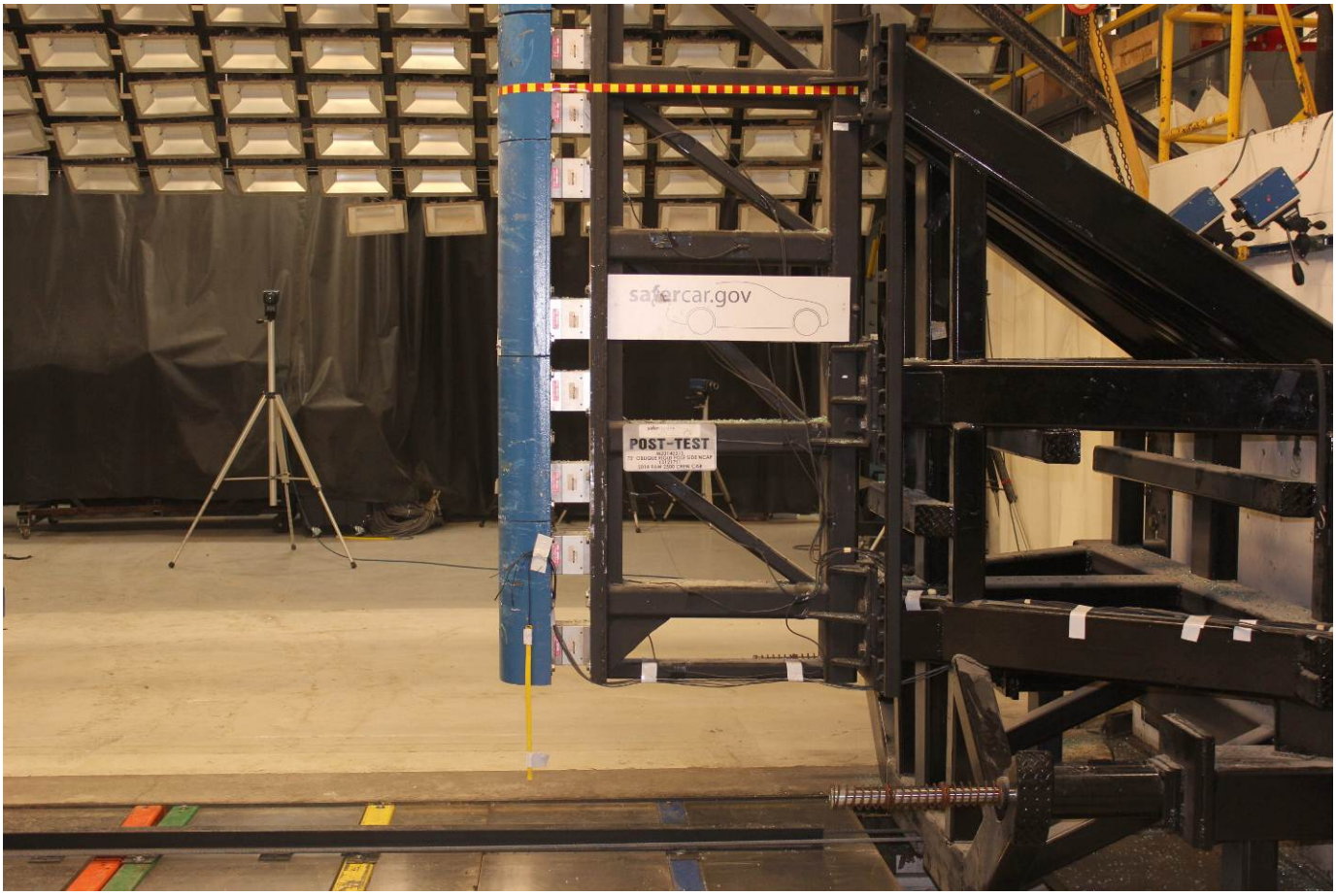

Pre-Test Pole Barrier Front View



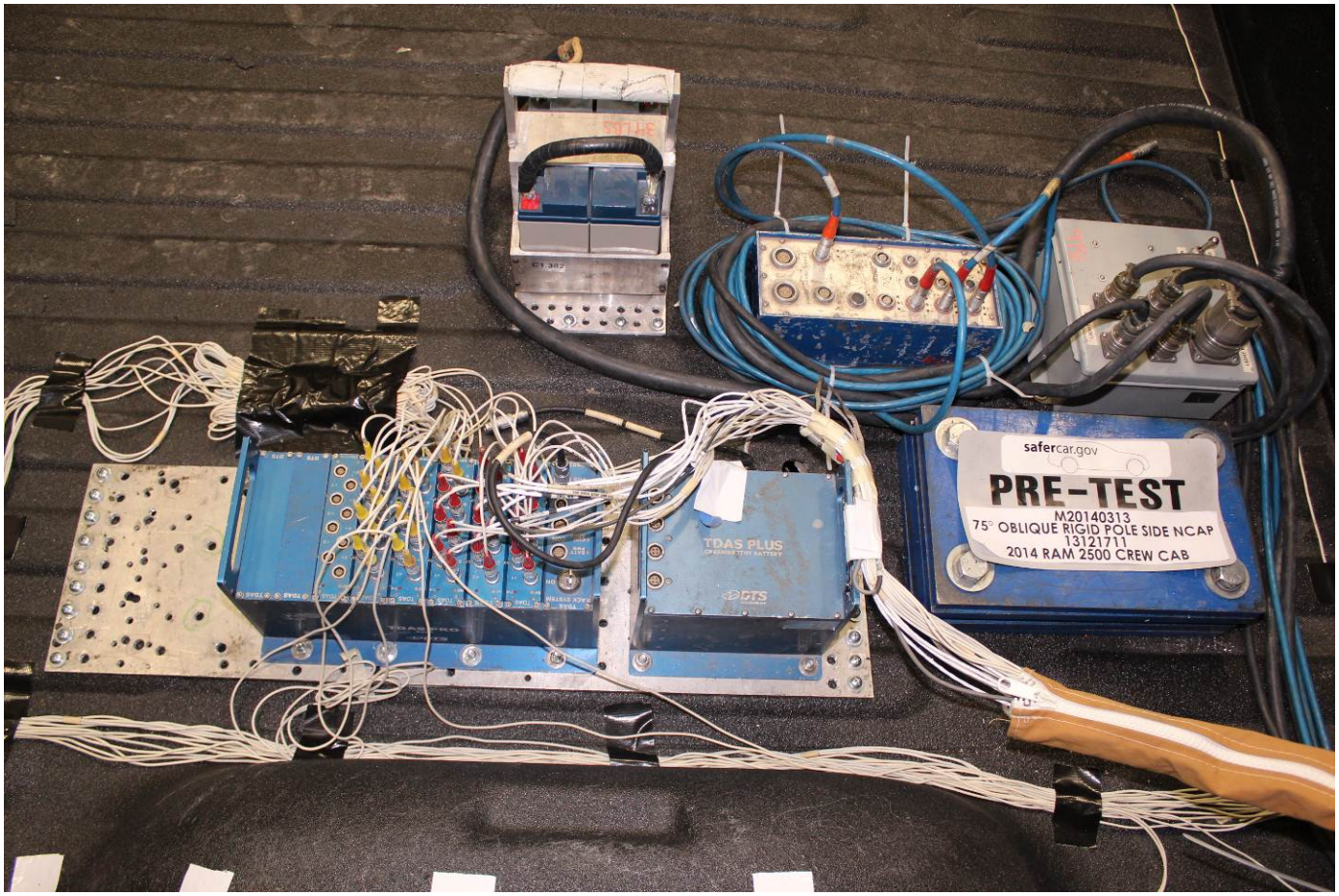

Post-Test Pole Barrier Front View




Pre-Test Pole Barrier Side View



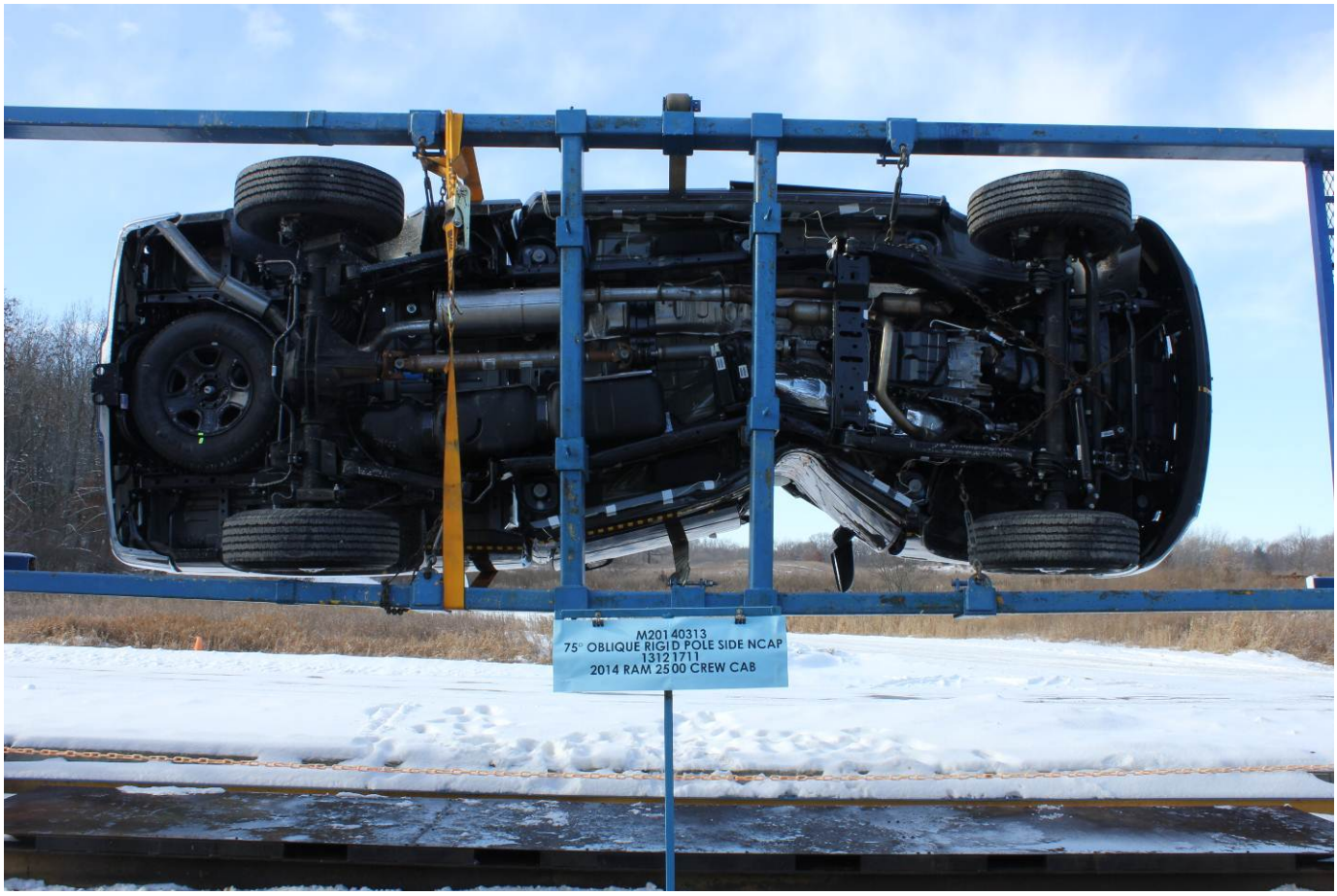

Post-Test Pole Barrier Side View



Pre-Test Ballast View

Post-Test Primary and Redundant Speed Trap Read-Out


FMVSS No. 301 Static Rollover 0 Degrees

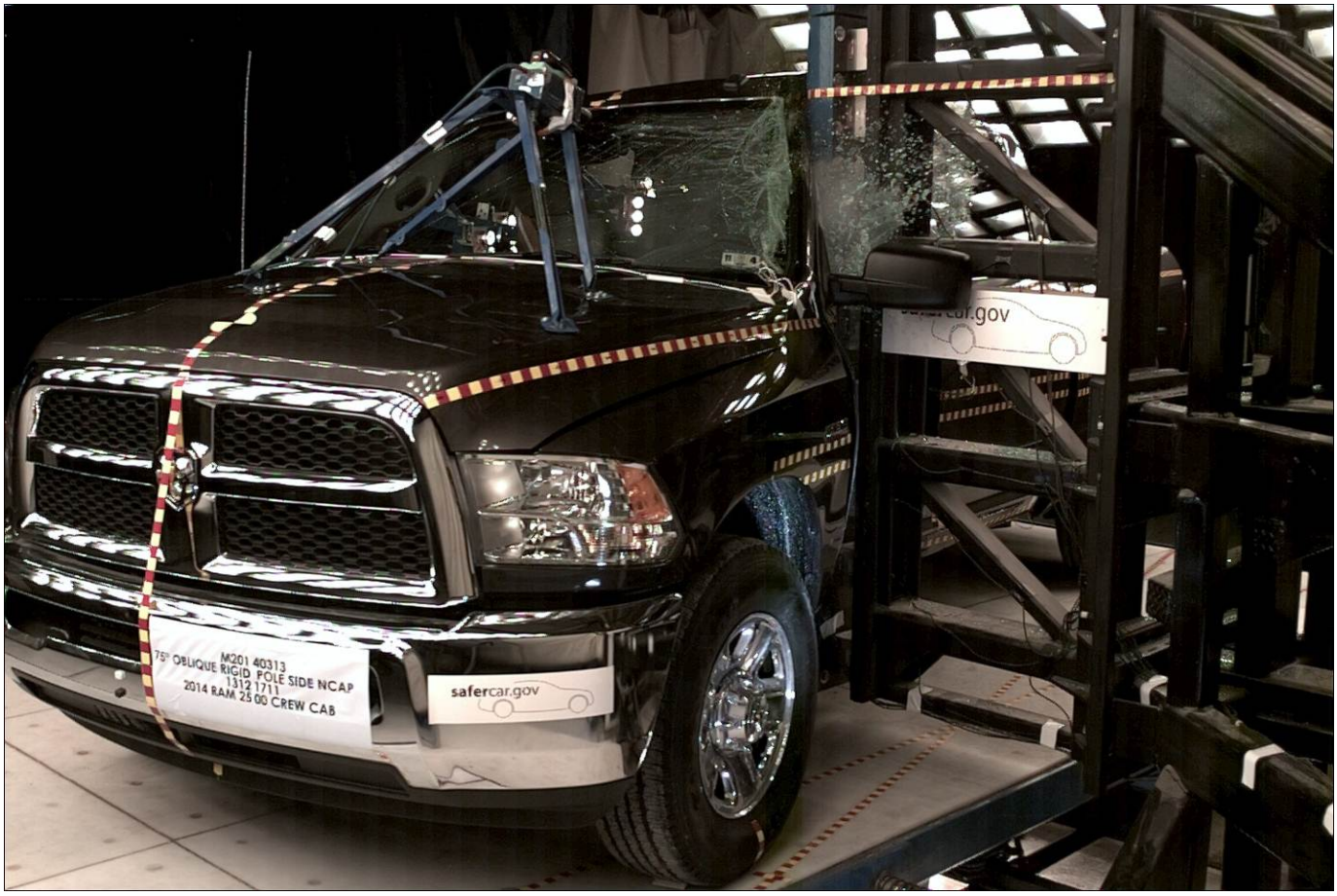



FMVSS No. 301 Static Rollover 90 Degrees


FMVSS No. 301 Static Rollover 180 Degrees


FMVSS No. 301 Static Rollover 270 Degrees

FMVSS No. 301 Static Rollover 360 Degrees



Impact Event

2014 MODEL YEAR

**RAM 2500 TRADESMAN CREW CAB 4X2**

For more information visit: www.ramtrucks.com
or call 1-866-RAMINFO

Chrysler Group LLC

THIS VEHICLE IS MANUFACTURED TO MEET SPECIFIC UNITED STATES REQUIREMENTS. THIS VEHICLE IS NOT MANUFACTURED FOR SALE OR REGISTRATION OUTSIDE OF THE UNITED STATES.

**MANUFACTURER'S SUGGESTED RETAIL PRICE OF THIS MODEL INCLUDING DEALER PREPARATION**

**Base Price: $33,355**

**RAM 2500 ST CREW CAB 4X2**
**Exterior Color:** Granite Crystal Metallic Clear Coat Exterior Paint
**Interior Color:** Black / Diesel Gray Interior Colors
**Interior:** Cloth 40 / 20 / 40 Bench Seat
**Engine:** 5.7-Liter V8 HEMI® VVT Engine
**Transmission:** 6-Speed Automatic Transmission

**STANDARD EQUIPMENT** (UNLESS REPLACED BY OPTIONAL EQUIPMENT)

FUNCTIONAL/SAFETY FEATURES
Advanced Multistage Front Airbags
Supplemental Side-Curtain Front and Rear Airbags
Supplemental Front Seat-Mounted Side Airbags
Tire Pressure Monitoring Display
Electronic Stability Control
3.73 Rear Axle Ratio
Transmission Oil Cooler
Anti-Lock 4-Wheel Disc Brakes
730-Amp Maintenance Free Battery
160-Amp Alternator
Sentry Key® Theft Deterrent System
Speed Control
Power Door Locks
Power Front Windows w/ 1-Touch Up and Down Feature
Automatic Headlamps
Halogen Quad Headlamps
Incandescent Tail Lamps
Tip Start

INTERIOR FEATURES
Air Conditioning
6 Speakers
Uconnect® 3.0 AM/FM
Media Hub (USB, Aux)
Remote USB Port
Instrument Cluster with Display Screen
40 / 20 / 40 Split Bench Seat
Front Armrest with Cup Holders
Rear Folding Seat
Second-Row In-Floor Storage Bins
Rear Under Seat Storage Compartment
12-Volt Auxiliary Power Outlet
Tilt Steering Column
Power Accessory Delay
Driver / Passenger Assist Handles
Rearview Day / Night Mirror

EXTERIOR FEATURES
17-Inch x 7.5-Inch Steel Styled Wheels
LT245/70R17E BSW All Season Tires
31-Gallon Fuel Tank
Locking Tailgate
Class V Receiver Hitch
7-Pin Trailer Wiring Harness
Trailer Tow with 4-Pin Connector Wiring
Tinted Windshield Glass
Tinted Glass Windows
Variable Intermittent Windshield Wipers
Power Heated Mirrors with Manual Fold-Away
Cargo Lamp
17-Inch Steel Spare Wheel

**OPTIONAL EQUIPMENT**
**Customer Preferred Package 26A** $795
Chrome Appearance Group
18-Inch Steel Spare Wheel
18-Inch x 8-Inch Steel Chrome Clad Wheels
LT275/70R18E BSW All Season Tires
Bright Front Bumper
Bright Grille
Bright Rear Bumper
Popular Equipment Group $650
Cloth 40 / 20 / 40 Bench Seat
Floor Covering Carpet
Front and Rear Floor Mats
Remote Keyless Entry with All-Secure
Anti-Spin Differential Rear Axle $325
Uconnect® 5.0 AM/FM/BT $660
5.0-Inch Touch Screen Display
SiriusXM Satellite Radio w/ 1-Yr Radio Subscription
For More Information, Call 800-643-2112
Integrated Voice Command with Bluetooth®
Overhead Console
Rearview Mirror with Microphone
ParkSense® Rear Park Assist System $250
Spray-In Bedliner $475

**DESTINATION CHARGE** $1,195

**TOTAL PRICE: * $37,705**

**WARRANTY COVERAGE**
5-year or 100,000-mile Powertrain Limited Warranty.
3-year or 36,000-mile Basic Limited Warranty.
5-year or 100,000-mile Roadside Assistance; certain restrictions apply.
Ask Dealer for a copy of the limited warranties or see your owner's manual for details.

**5 YEAR / 100,000 MILE POWERTRAIN WARRANTY**

Assembly Point/Port of Entry: SALTILLO, MEXICO

VIN: 3C6-TR4CT3EG-109787 L4-VON: 5942 1017

SHIPTO: 45462 44
NYLE MAXWELL CHRYSLER DODGE JEEP
14150 STATE HIGHWAY 79
TAYLOR TX 76574-4606

SOLDTO: 63 45462
NYLE MAXWELL CHRYSLER DODGE JEEP
14150 STATE HIGHWAY 79
TAYLOR TX 76574-4606

THIS LABEL IS ADDED TO THIS VEHICLE TO COMPLY WITH FEDERAL LAW. THE LABEL CANNOT BE REMOVED OR ALTERED PRIOR TO DELIVERY TO THE ULTIMATE PURCHASER.

* STATE AND/OR LOCAL TAXES IF ANY, LICENSE AND TITLE FEES AND DEALER SUPPLIED AND INSTALLED OPTIONS AND ACCESSORIES ARE NOT INCLUDED IN THIS PRICE. DISCOUNT, IF ANY, IS BASED ON PRICE OF OPTIONS IF PURCHASED SEPARATELY.

**EPA DOT Fuel Economy and Environment**

**Fuel Economy**
**N/A** combined city/hwy city highway
**N/A** gallons per 100 miles

**Heavy duty vehicle, no label required.**

**You save N/A** in fuel costs over 5 years compared to the average new vehicle.

**Annual fuel cost N/A**

**Fuel Economy & Greenhouse Gas Rating** (tailpipe only) 1 10 Best

**Smog Rating** (tailpipe only) 1 10 Best

**fueleconomy.gov**
Calculate personalized estimates and compare vehicles

**GOVERNMENT 5-STAR SAFETY RATINGS**

**Overall Vehicle Score** Not Rated
Based on the combined ratings of frontal, side, and rollover.
Should ONLY be compared to other vehicles of similar size and weight.

| | | |
|---|---|---|
| **Frontal** | Driver | Not Rated |
| **Crash** | Passenger | Not Rated |

Based on the risk of injury in a frontal impact.
Should ONLY be compared to other vehicles of similar size and weight.

| | | |
|---|---|---|
| **Side** | Front seat | Not Rated |
| **Crash** | Rear seat | Not Rated |

Based on the risk of injury in a side impact.

**Rollover** ★★★★
Based on the risk of rollover in a single-vehicle crash.

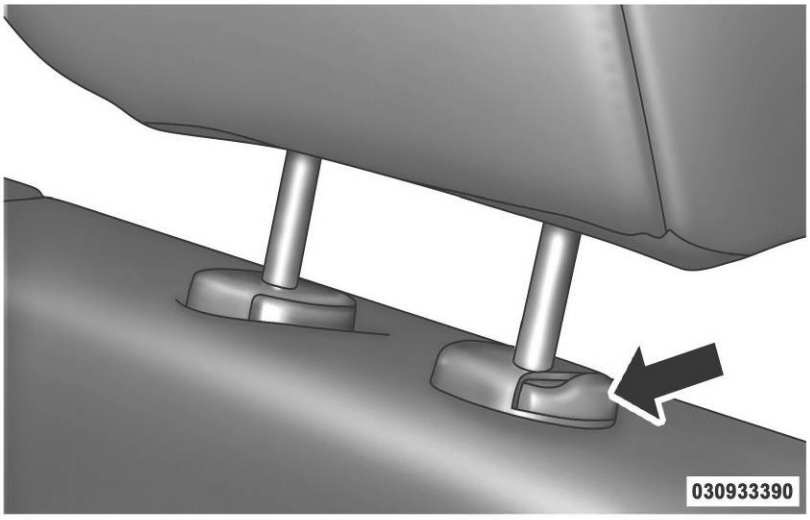
Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest.
Source: National Highway Traffic Safety Administration (NHTSA)
www.safercar.gov or 1-888-327-4236

The safety ratings above are based on Federal Government tests of particular vehicles equipped with certain features and options. The performance of this vehicle may differ.

Monroney Label

## Front Head Restraints

To raise the head restraint, pull upward on the head restraint. To lower the head restraint, press the adjustment button, located on the base of the head restraint, and push downward on the head restraint.




Adjustment Button

**Parent topic:** Head Restraints

**Related information** +/-

Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

Post-Test View of Shattered Vehicle Inner Door Panel

# APPENDIX B
# DUMMY RESPONSE DATA PLOTS

**TABLE OF DATA PLOTS**
**Driver Dummy Instrumentation Plots**



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

**Additional Driver Dummy Instrumentation Data**

Driver Head CG Redundant Acceleration (X) vs. Time

Driver Head CG Redundant Acceleration (Y) vs. Time

Driver Head CG Redundant Acceleration (Z) vs. Time

Driver 9 Axis Head X Arm Y

Driver 9 Axis Head X Arm Z

Driver 9 Axis Head Y Arm X

Driver 9 Axis Head Y Arm Z

Driver 9 Axis Head Z Arm X

Driver 9 Axis Head Z Arm Y

Driver Upper Thorax Rib Deflection (Y)

Driver Middle Thorax Rib Deflection (Y)

Driver Lower Thorax Rib Deflection (Y)

Driver Upper Abdomen Rib Deflection (Y)

Driver Lower Abdomen Rib Deflection (Y)

**Vehicle Instrumentation Data**

Vehicle Center of Gravity Acceleration (X)

Vehicle Center of Gravity Acceleration (Y)

Vehicle Center of Gravity Acceleration (Z)

Left Floor Sill Acceleration (Y)

Left A-Pillar Sill Acceleration (Y)

Left Lower A-Pillar Acceleration (Y)

Left Mid A-Pillar Acceleration (Y)

Left B-Pillar Sill Acceleration (Y)

Left Lower B-Pillar Acceleration (Y)

Left Mid B-Pillar Acceleration (Y)

Driver Seat Track at Dummy Hip Point Acceleration (Y)

Engine Top Acceleration (X)

Engine Top Acceleration (Y)

Firewall Center Acceleration (Y)

Right Roof at Vertical Impact Reference Line Acceleration (Y)

Right Sill at Vertical Impact Reference Line Acceleration (Y)

Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)

Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)

**Pole Instrumentation Data**

Load Cell Pole Barrier #1 Force (Y)

Load Cell Pole Barrier #2 Force (Y)

Load Cell Pole Barrier #3 Force (Y)

Load Cell Pole Barrier #4 Force (Y)

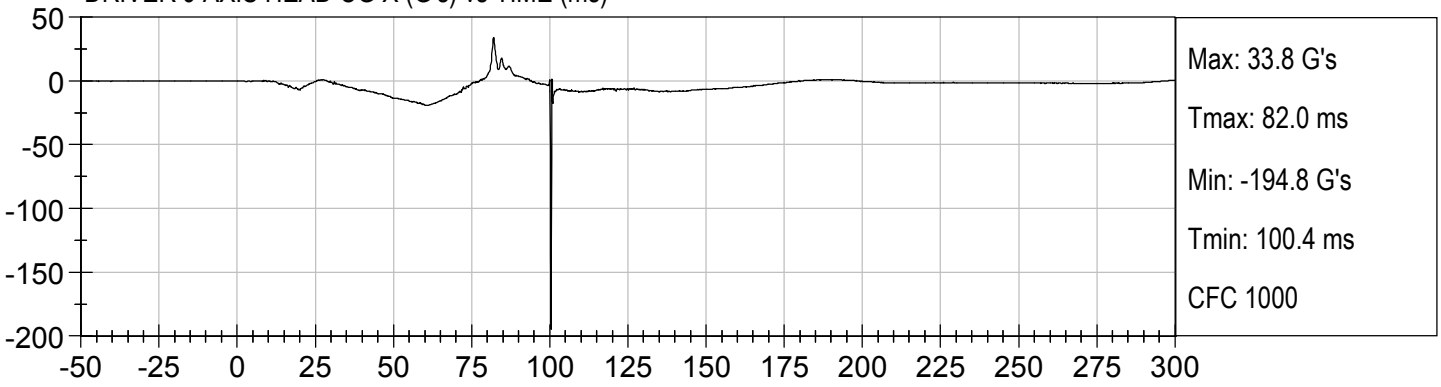
Load Cell Pole Barrier #5 Force (Y)

Load Cell Pole Barrier #6 Force (Y)

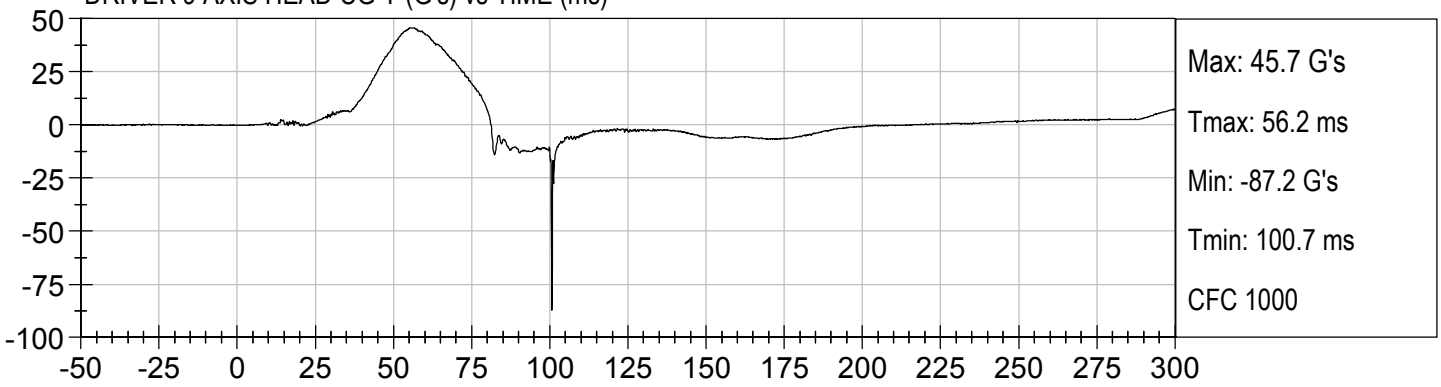
Load Cell Pole Barrier #7 Force (Y)

Load Cell Pole Barrier #8 Force (Y)

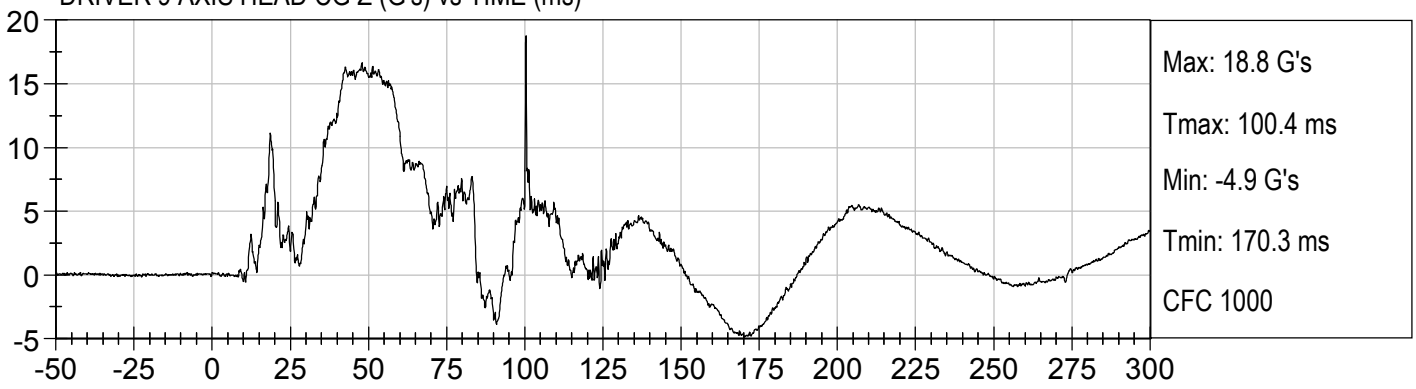
DRIVER 9 AXIS HEAD CG X (G's) vs TIME (ms)



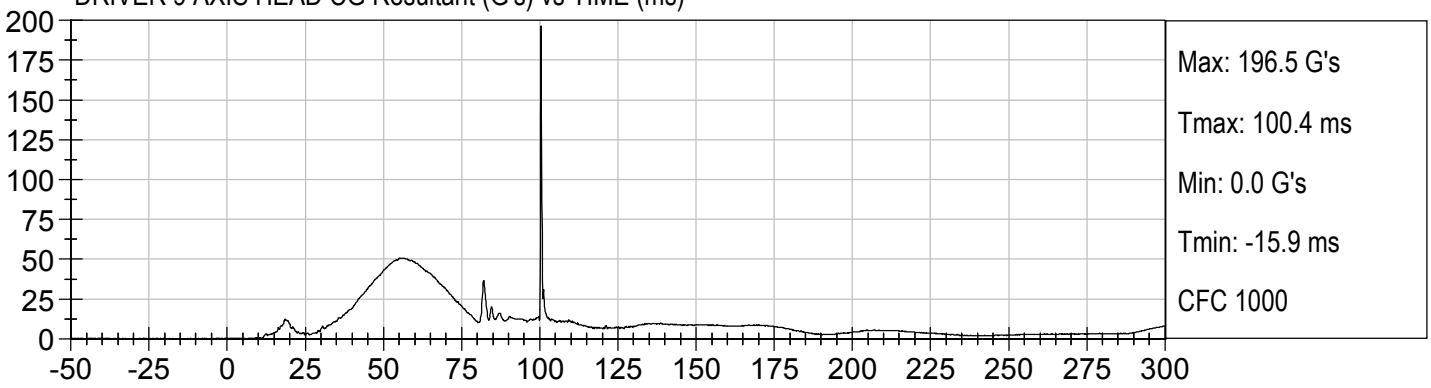

DRIVER 9 AXIS HEAD CG Y (G's) vs TIME (ms)



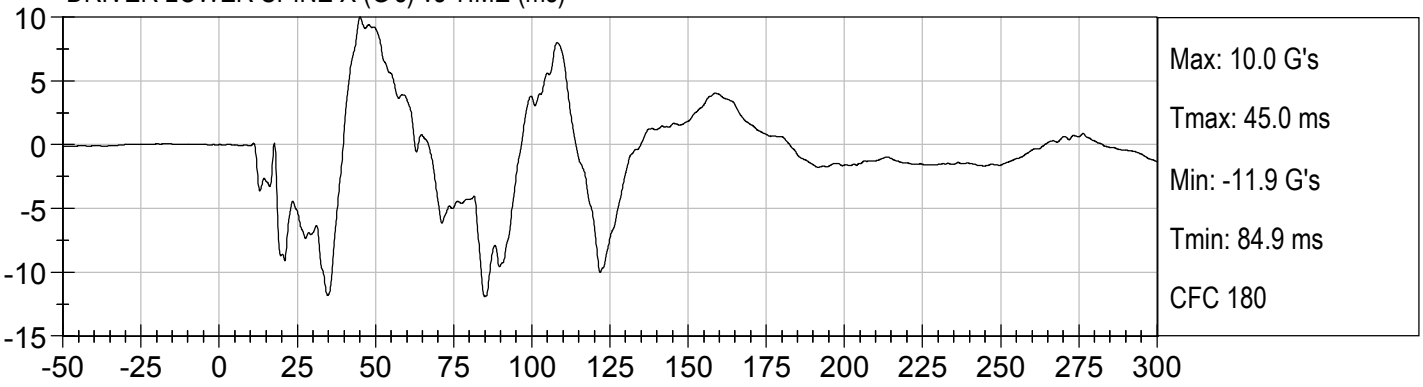

DRIVER 9 AXIS HEAD CG Z (G's) vs TIME (ms)



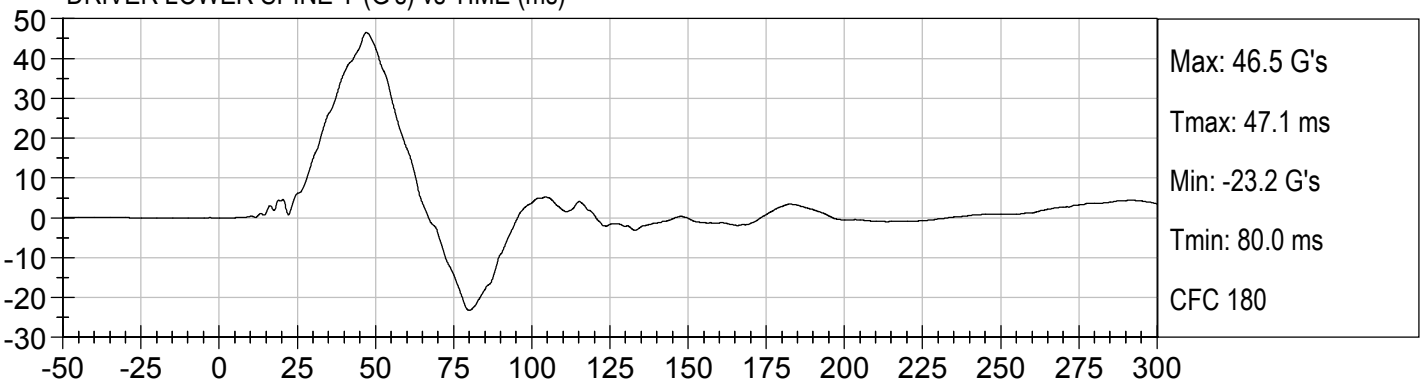

DRIVER 9 AXIS HEAD CG Resultant (G's) vs TIME (ms)



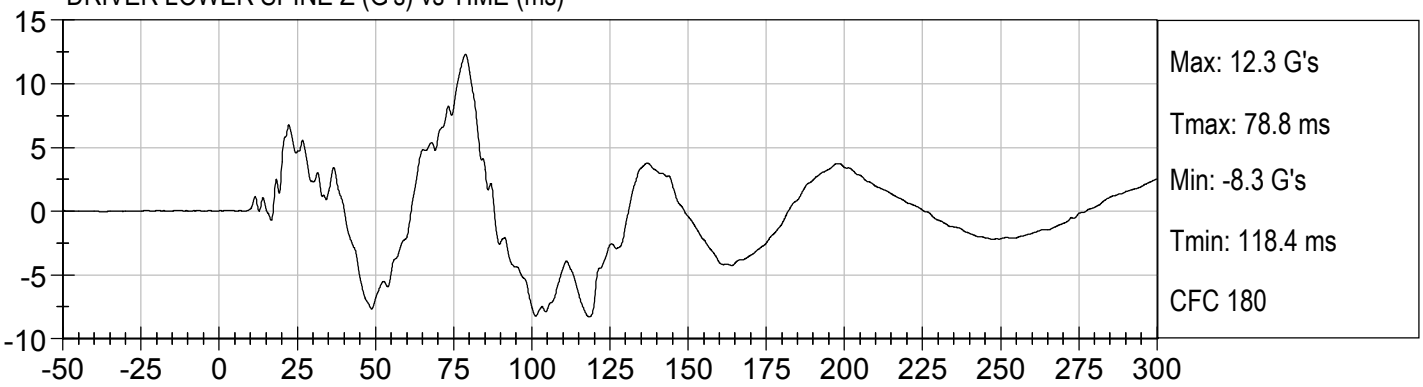
DRIVER LOWER SPINE X (G's) vs TIME (ms)



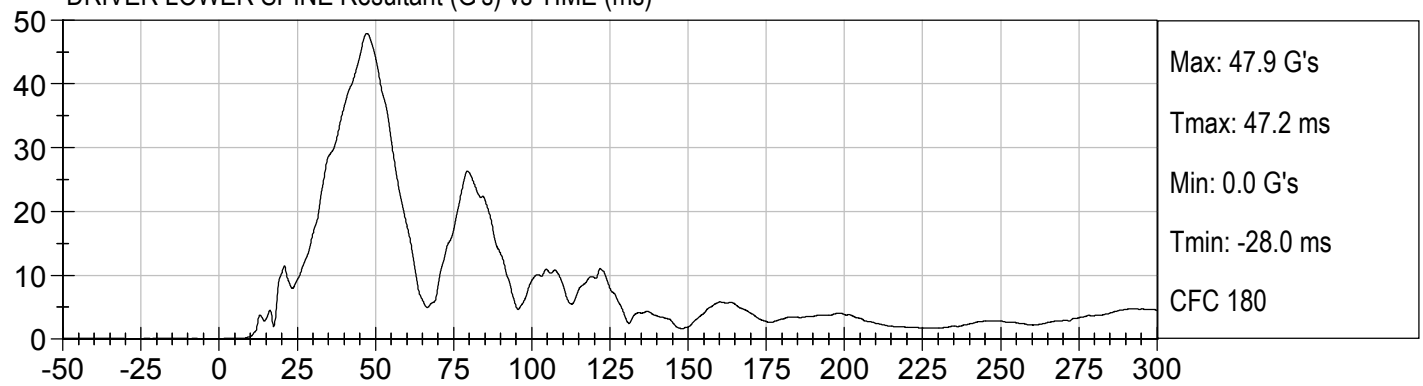

DRIVER LOWER SPINE Y (G's) vs TIME (ms)



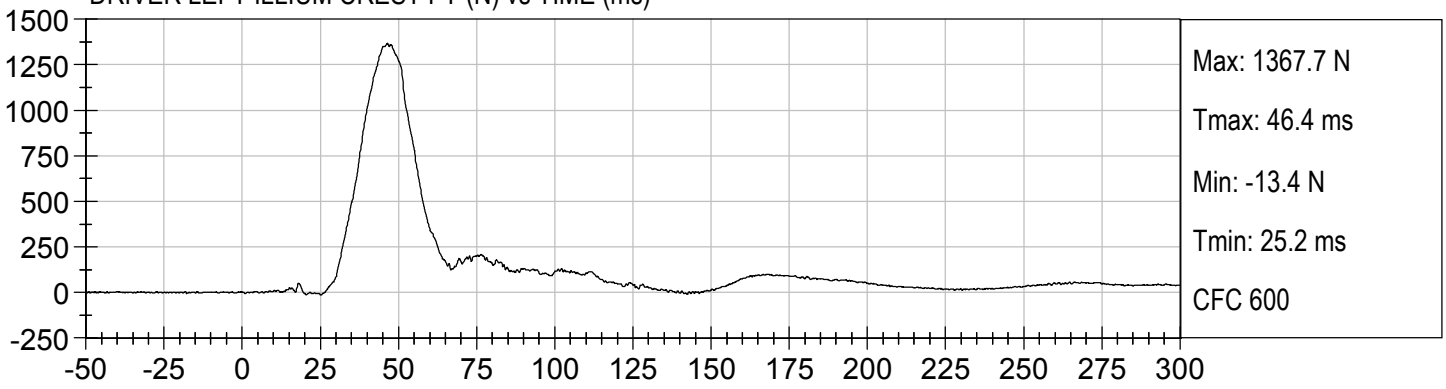

DRIVER LOWER SPINE Z (G's) vs TIME (ms)



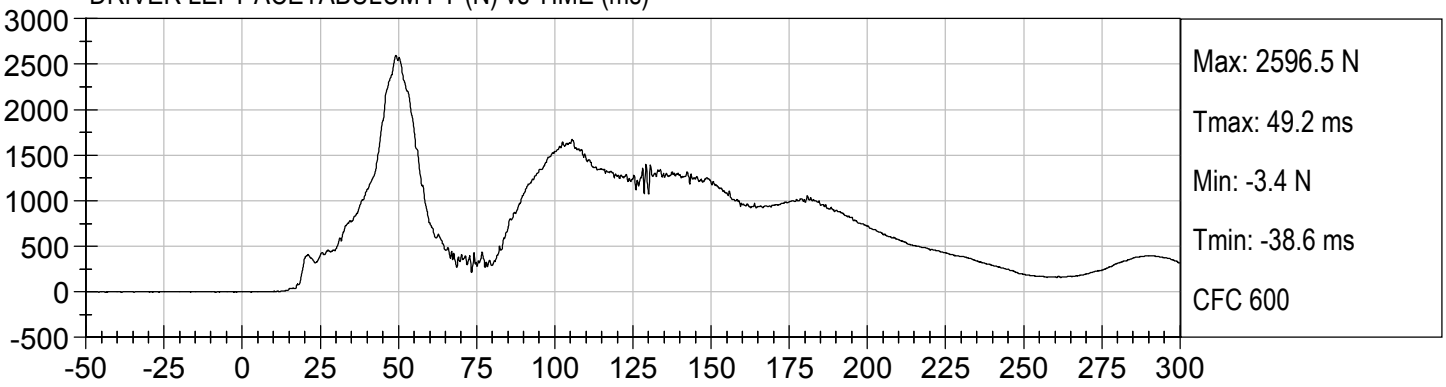

DRIVER LOWER SPINE Resultant (G's) vs TIME (ms)



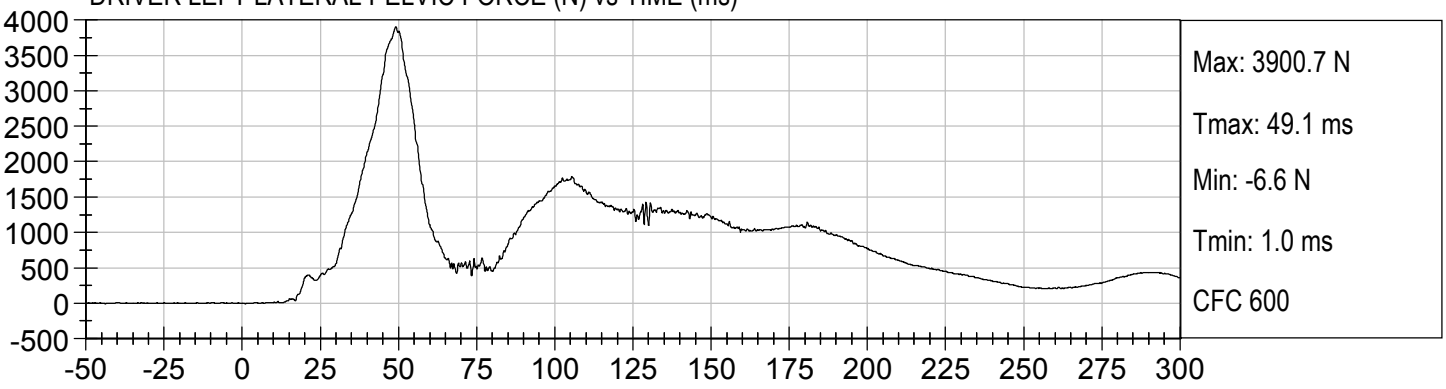
DRIVER LEFT ILLIUM CREST FY (N) vs TIME (ms)




DRIVER LEFT ACETABULUM FY (N) vs TIME (ms)




DRIVER LEFT LATERAL PELVIC FORCE (N) vs TIME (ms)



# APPENDIX C
# DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

**SID-IIsD External Measurements**
**SN: 306**

| No. | Name | Spec. (mm) | Result | Pass/Fail |
|---|---|---|---|---|
| **A** | Sitting Height | 772 - 788 | 785 | Pass |
| **B** | Shoulder Pivot Height | 437 - 453 | 449 | Pass |
| **C** | H-point Height | 79 - 89 | 86 | Pass |
| **D** | H-point from Seatback | 141 - 151 | 147 | Pass |
| **E** | Shoulder Pivot from Backline | 97 - 107 | 99 | Pass |
| **F** | Thigh Clearance | 119 -135 | 120 | Pass |
| **G** | Head Breadth | 140 - 148 | 141 | Pass |
| **H** | Head Back from Backline | 40 - 46 | 45 | Pass |
| **I** | Head Depth | 178 - 188 | 182 | Pass |
| **J** | Head Circumference | 541 - 551 | 550 | Pass |
| **K** | Buttock to Knee Length | 514 - 540 | 538 | Pass |
| **L** | Popliteal Height | 343 - 369 | 349 | Pass |
| **M** | Knee Pivot to Floor Height | 392 - 409 | 394 | Pass |
| **N** | Buttock Popliteal Length | 416 - 442 | 435 | Pass |
| **O** | Chest Depth w/o Jacket | 195 - 211 | 198 | Pass |
| **P** | Foot Length | 216 - 232 | 222 | Pass |
| **Q** | Hip Breadth (w/ pelvic plugs) | 313 - 323 | 317 | Pass |
| **R** | Arm Length | 249 - 259 | 250 | Pass |
| **S** | Knee Joint to Seatback | 477 - 493 | 483 | Pass |
| **V** | Shoulder Width | 341 - 357 | 351 | Pass |
| **W** | Foot Width | 78 - 94 | 82 | Pass |
| **Y** | Chest Circumference w/ jacket | 851 - 881 | 863 | Pass |
| **Z** | Waist Circumference | 761 - 791 | 782 | Pass |

**MGA RESEARCH CORPORATION**

**HEAD DROP TEST**

**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 306 **Test ID:** D134251

| 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 | 15 | Pass |
| Peak Resultant Acceleration | G's | 115 to 137 | 117 | Pass |
| Peak Longitudinal Acceleration | G's | +/- 15 | -5.0 | Pass |
| Unimodal | N/A | Yes | Yes | Pass |
| Oscillations | N/A | <15% | Yes | Pass |
| | | Overall Test Results | | Pass |

Jessica Gall
Laboratory Technician

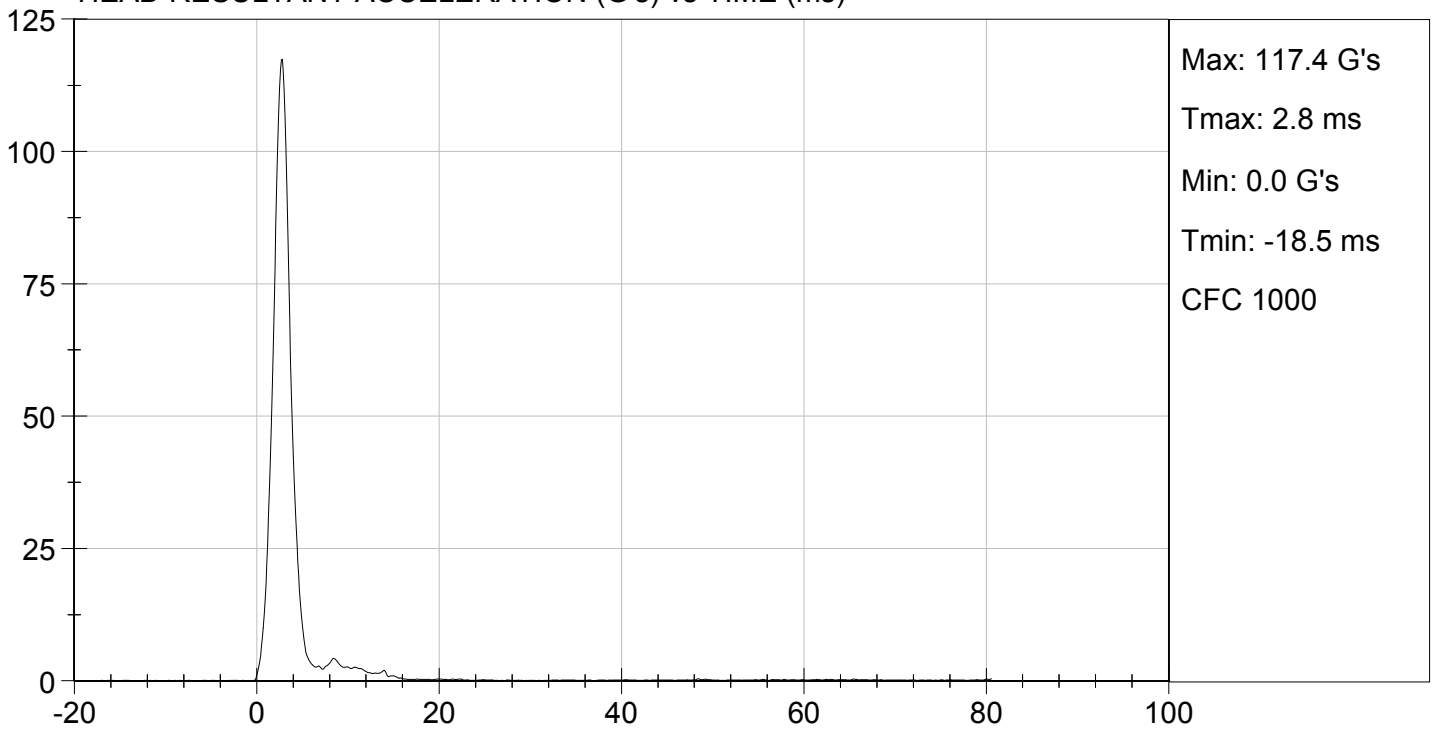
12/13/2013
Test Date

David Winkelbauer
Approved By

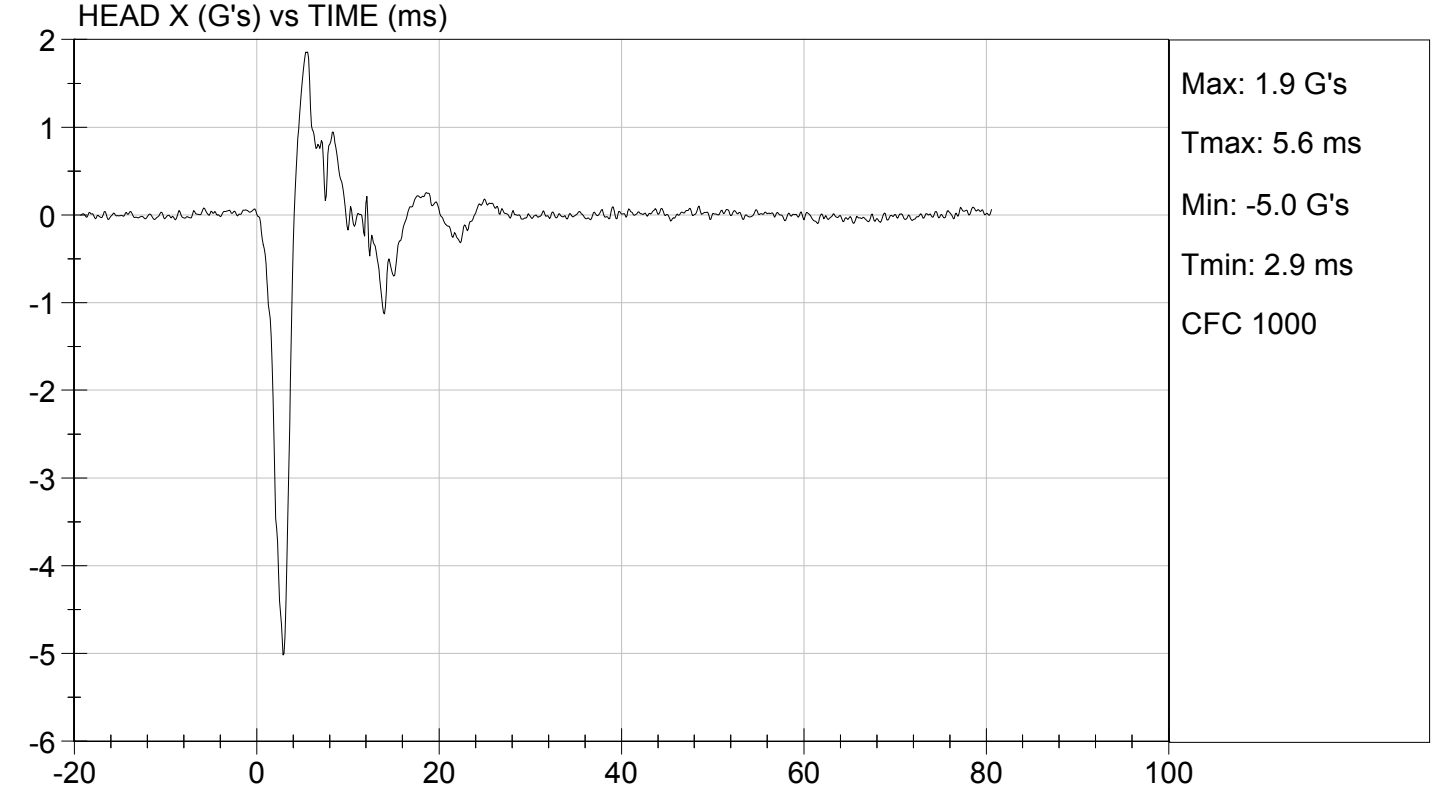
TEST DESC: HEAD DROP

TEST DATE: 12/13/2013
TEST #: D134251

HEAD RESULTANT ACCELERATION (G's) vs TIME (ms)



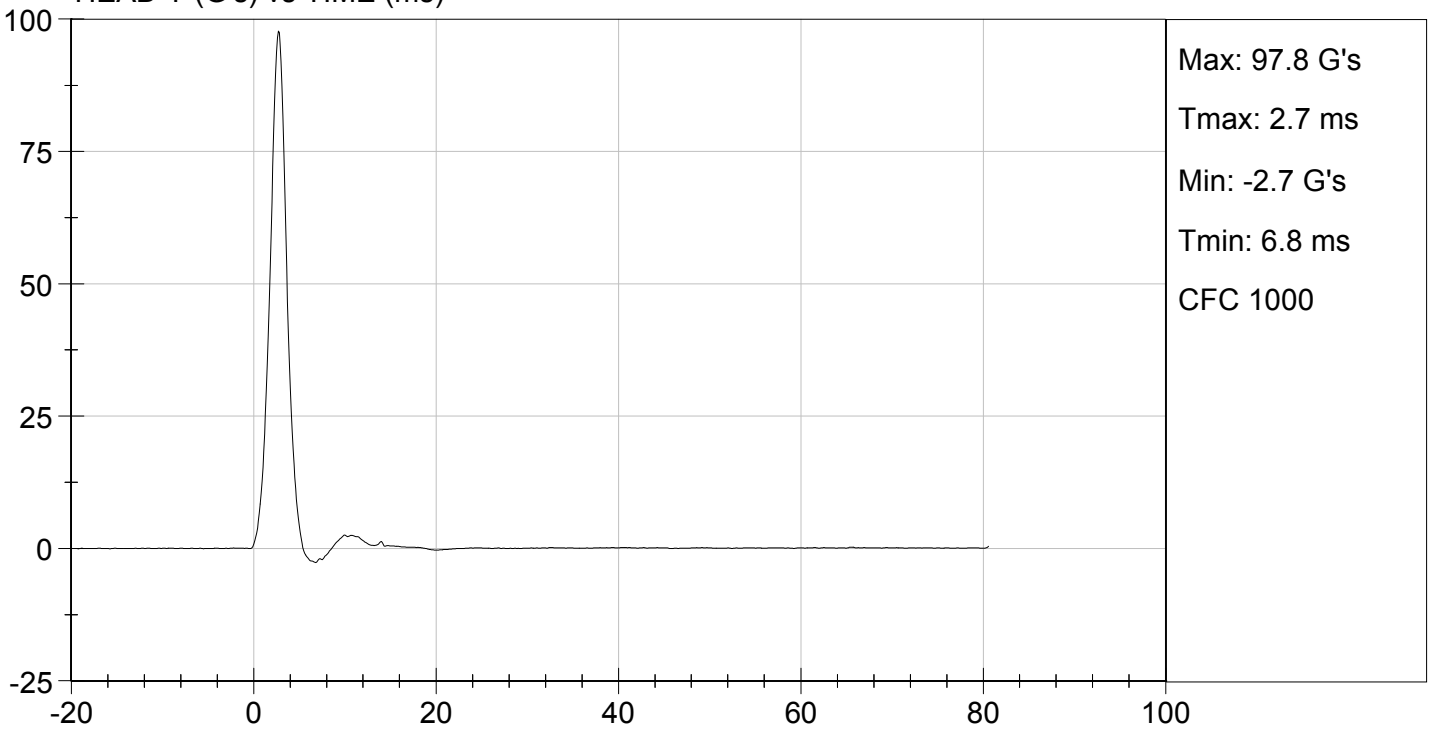

HEAD X (G's) vs TIME (ms)



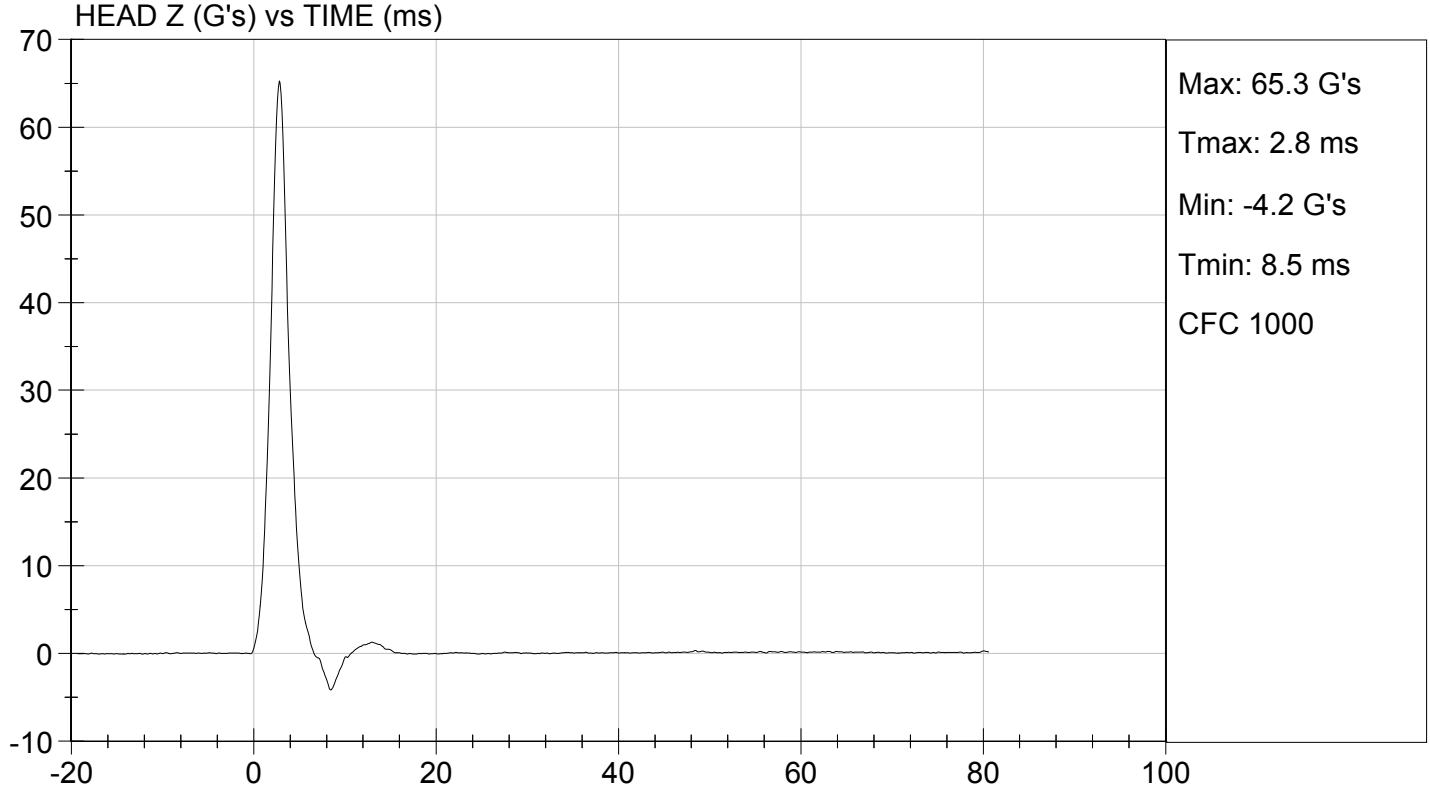
TEST DESC: HEAD DROP

TEST DATE: 12/13/2013
TEST #: D134251

HEAD Y (G's) vs TIME (ms)




HEAD Z (G's) vs TIME (ms)



**MGA RESEARCH CORPORATION**

**LATERAL NECK PENDULUM TEST**

**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 306 **Test I.D:** D134252

| Tested Parameter | | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|---|
| Temperature | | deg C | 20.6 to 22.2 | 20.7 | Pass |
| Humidity | | % | 10 to 70 | 17 | Pass |
| Impact Velocity | | m/s | 5.51 to 5.63 | 5.58 | Pass |
| Pendulum Velocity | 10 ms | m/s | 2.20 to 2.80 | 2.45 | Pass |
| | 15 ms | m/s | 3.30 to 4.10 | 3.45 | Pass |
| | 20 ms | m/s | 4.40 to 5.40 | 4.53 | Pass |
| | 25 ms | m/s | 5.40 to 6.10 | 5.44 | Pass |
| | 25-100 ms | m/s | 5.50 to 6.20 | 5.92 | 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 | | Nm | -44 to -36 | -40 | Pass |
| Time of Moment Decay to 0 Nm | | ms | 102 to 126 | 115 | Pass |
| | | | Overall Test Results | | Pass |

Jessica Hall
Laboratory Technician

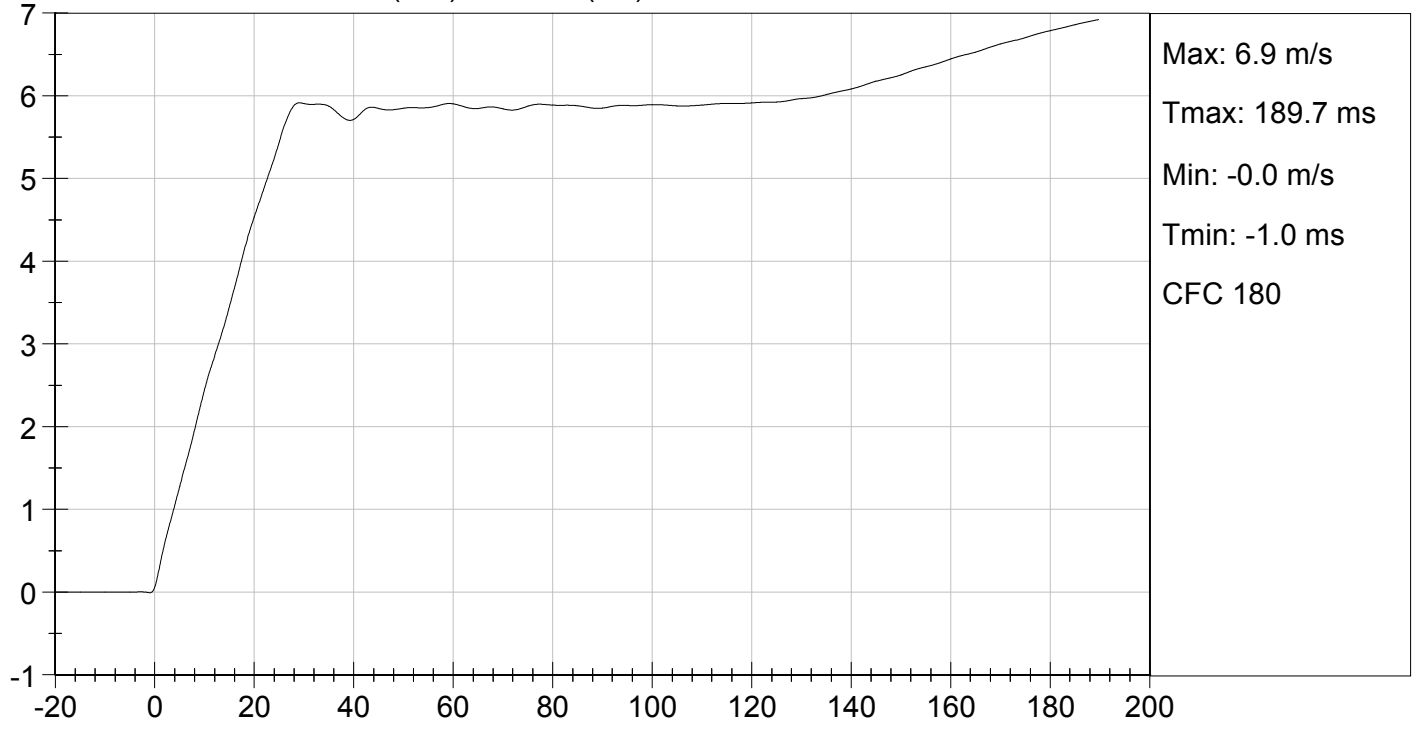
12/13/2013
Test Date

David Winkelbauer
Approved By

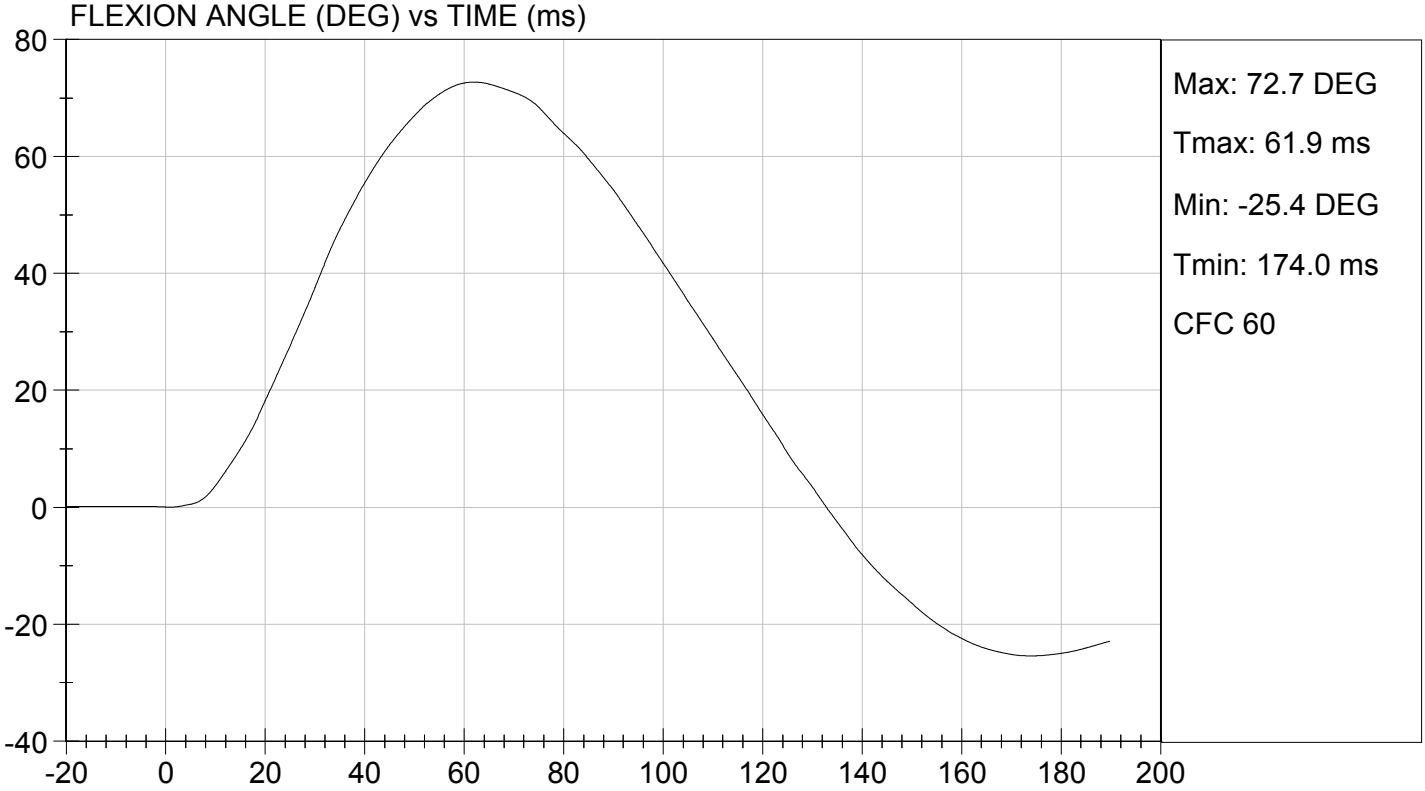
TEST DESC: NECK BENDING
VELOCITY: 18.31 ft/s, 5.58 m/s

TEST DATE: 12/13/2013
TEST #: D134252

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



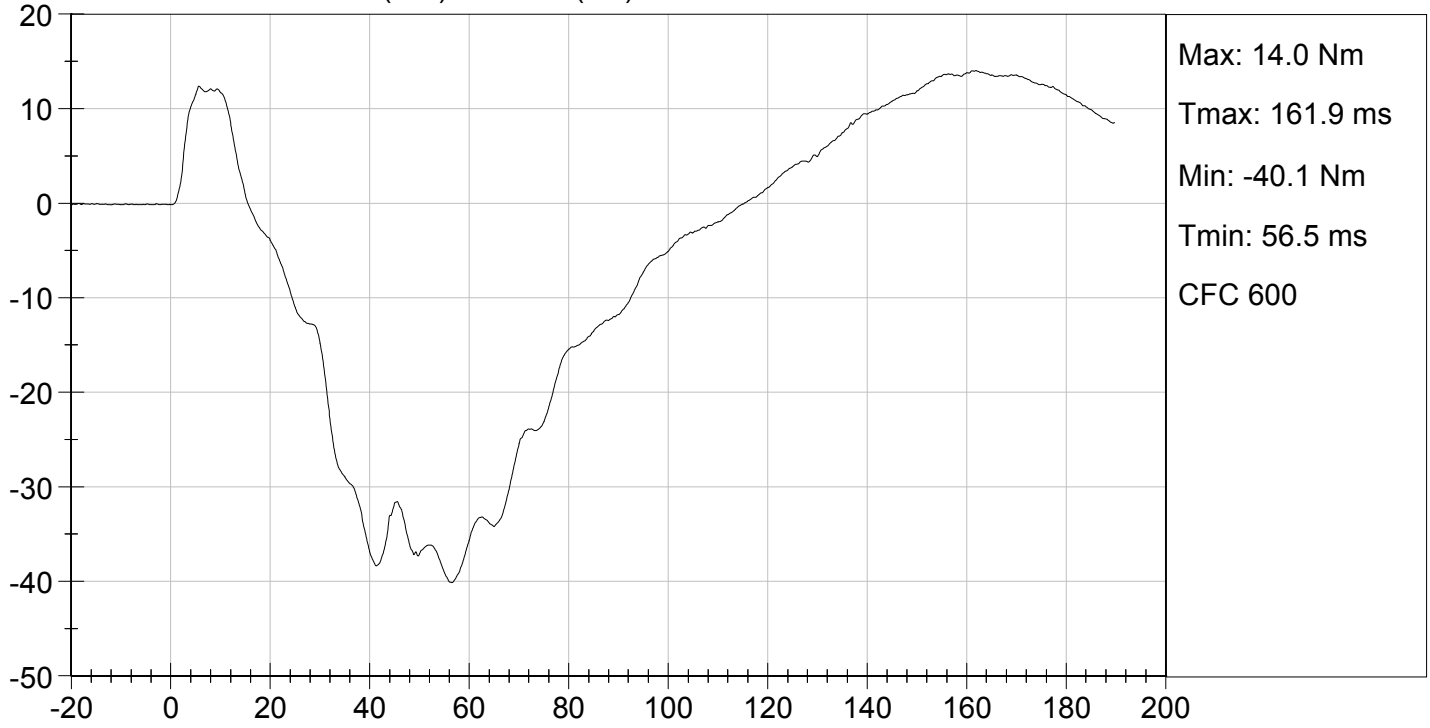

FLEXION ANGLE (DEG) vs TIME (ms)



TEST DESC: NECK BENDING
VELOCITY: 18.31 ft/s, 5.58 m/s

TEST DATE: 12/13/2013
TEST #: D134252

OCCIPITAL MOMENT (Nm) vs TIME (ms)



**MGA RESEARCH CORPORATION**

**SHOULDER IMPACT TEST**

**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 306 **Test ID:** D134253

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 20.8 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 18 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.34 | Pass |
| Maximum Probe Acceleration | G's | 13 to 18 | 15 | Pass |
| Shoulder Displacement | mm | 28 to 37 | 29 | Pass |
| Upper Spine (T1) Y Acceleration | G's | 17 to 22 | 19 | Pass |
| | | Overall Test Results | | Pass |

Jessica Hall
Laboratory Technician

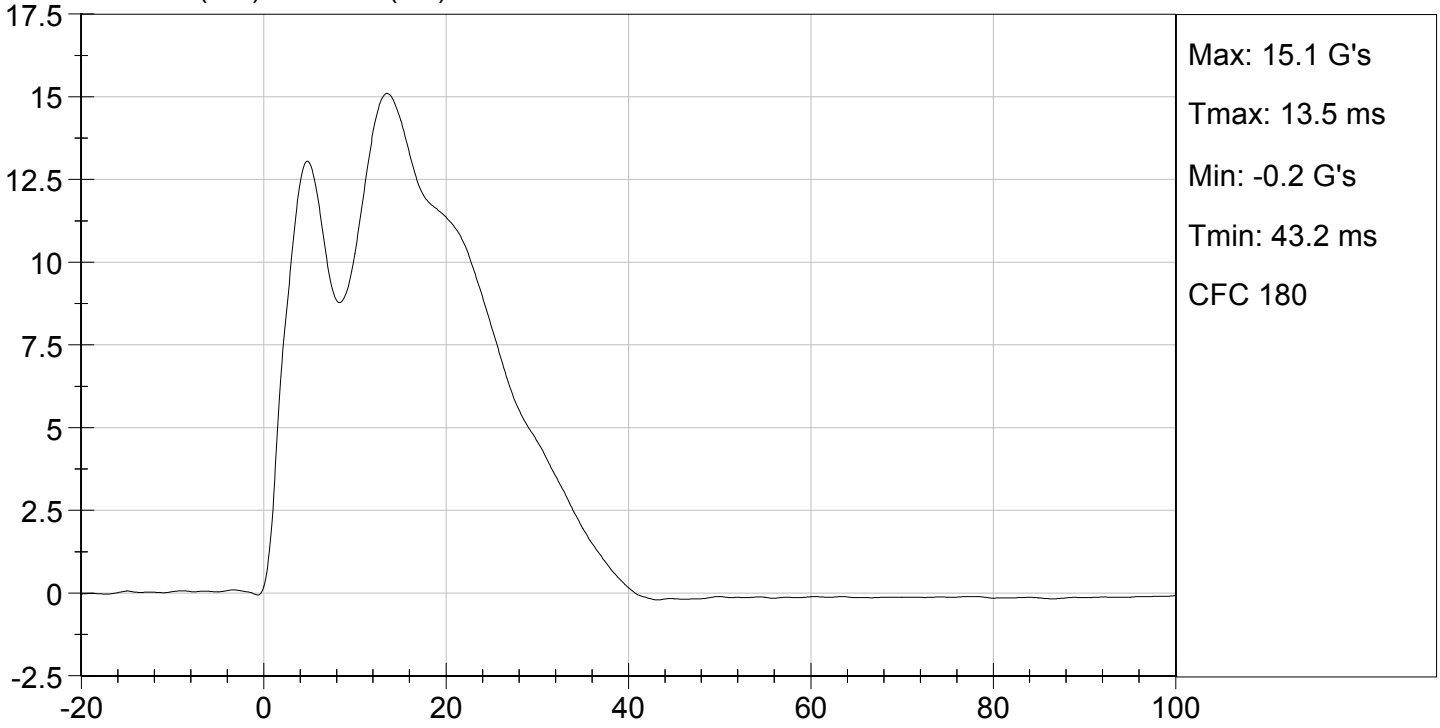
12/13/2013
Test Date

David Winkelbauer
Approved By

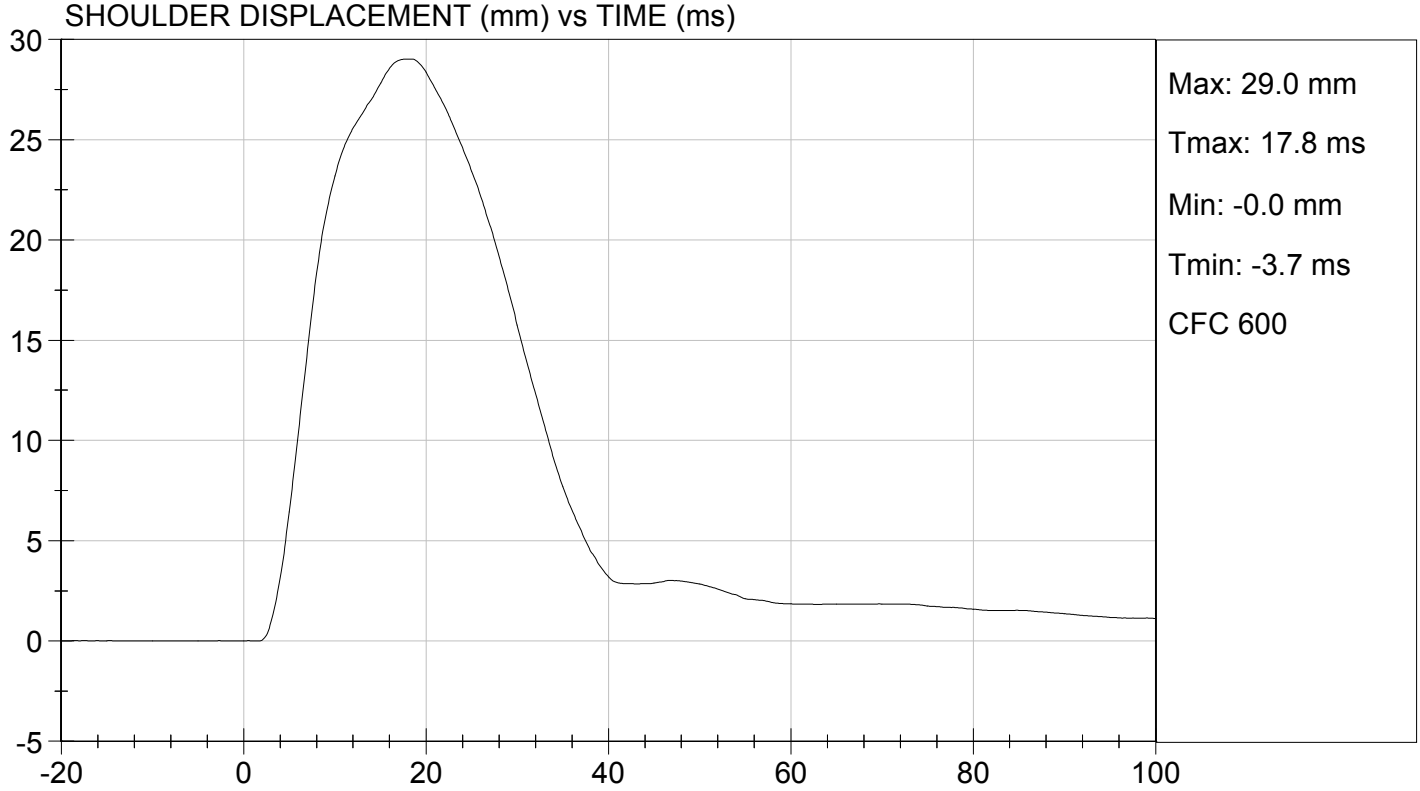
TEST DESC: SHOULDER IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 12/13/2013
TEST #: D134253

PROBE (G's) vs TIME (ms)



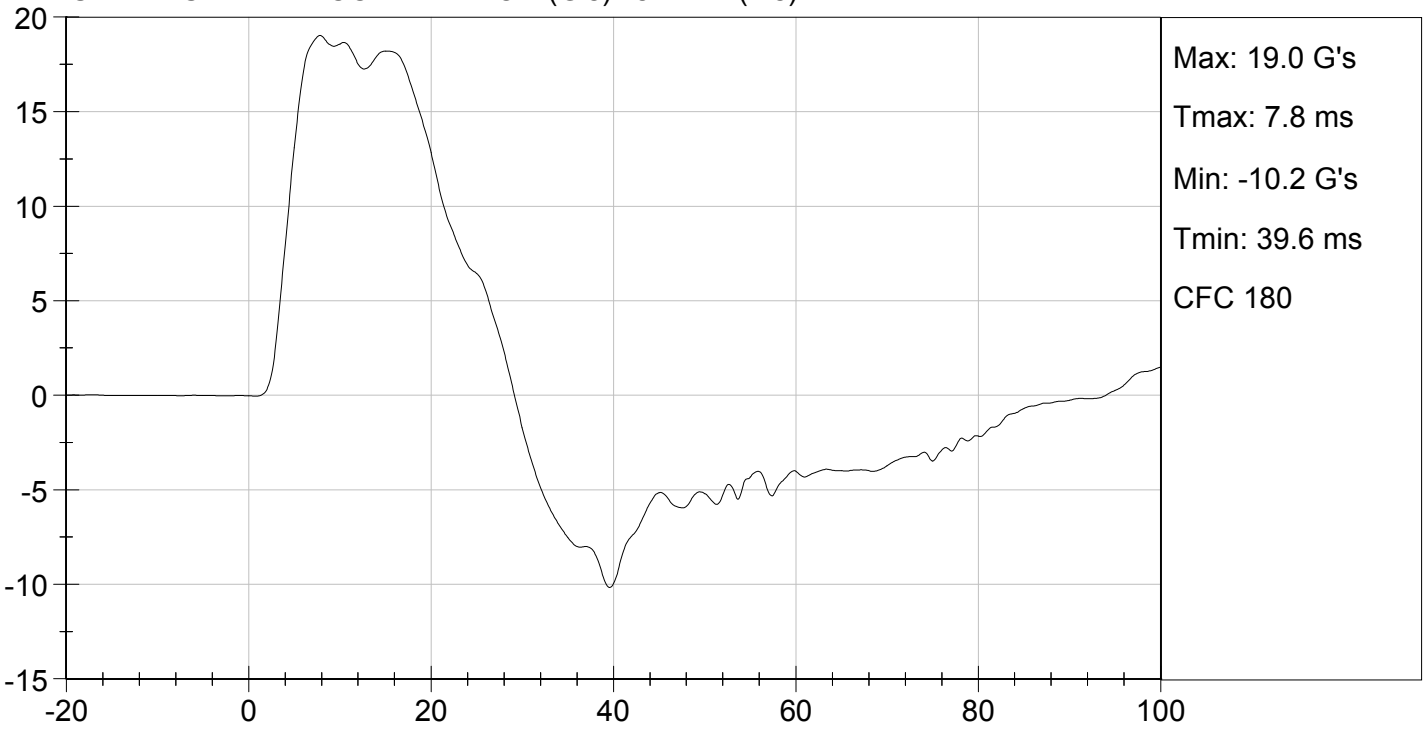

SHOULDER DISPLACEMENT (mm) vs TIME (ms)



TEST DESC: SHOULDER IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 12/13/2013
TEST #: D134253

UPPER SPINE Y ACCELERATION (G's) vs TIME (ms)



**MGA RESEARCH CORPORATION**

**THORAX (WITH ARM) IMPACT TEST**

**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 306 **Test I.D:** D134254

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Temperature | deg C | 20.6 to 22.2 | 20.8 | Pass |
| Humidity | % | 10 to 70 | 18 | Pass |
| Impact Velocity | m/s | 6.60 to 6.80 | 6.77 | Pass |
| Maximum Probe Acceleration | G's | 30 to 36 | 33 | Pass |
| Shoulder Displacement | mm | 31 to 40 | 31 | Pass |
| Upper Rib Displacement | mm | 25 to 32 | 25 | Pass |
| Middle Rib Displacement | mm | 30 to 36 | 31 | Pass |
| Lower Rib Displacement | mm | 32 to 38 | 35 | Pass |
| Upper Spine (T1) Y Acceleration | G's | 34 to 43 | 42 | Pass |
| Lower Spine (T12) Y Acceleration | G's | 29 to 37 | 31 | Pass |
| | | Overall Test Results | | Pass |

Jessica Hall
Laboratory Technician

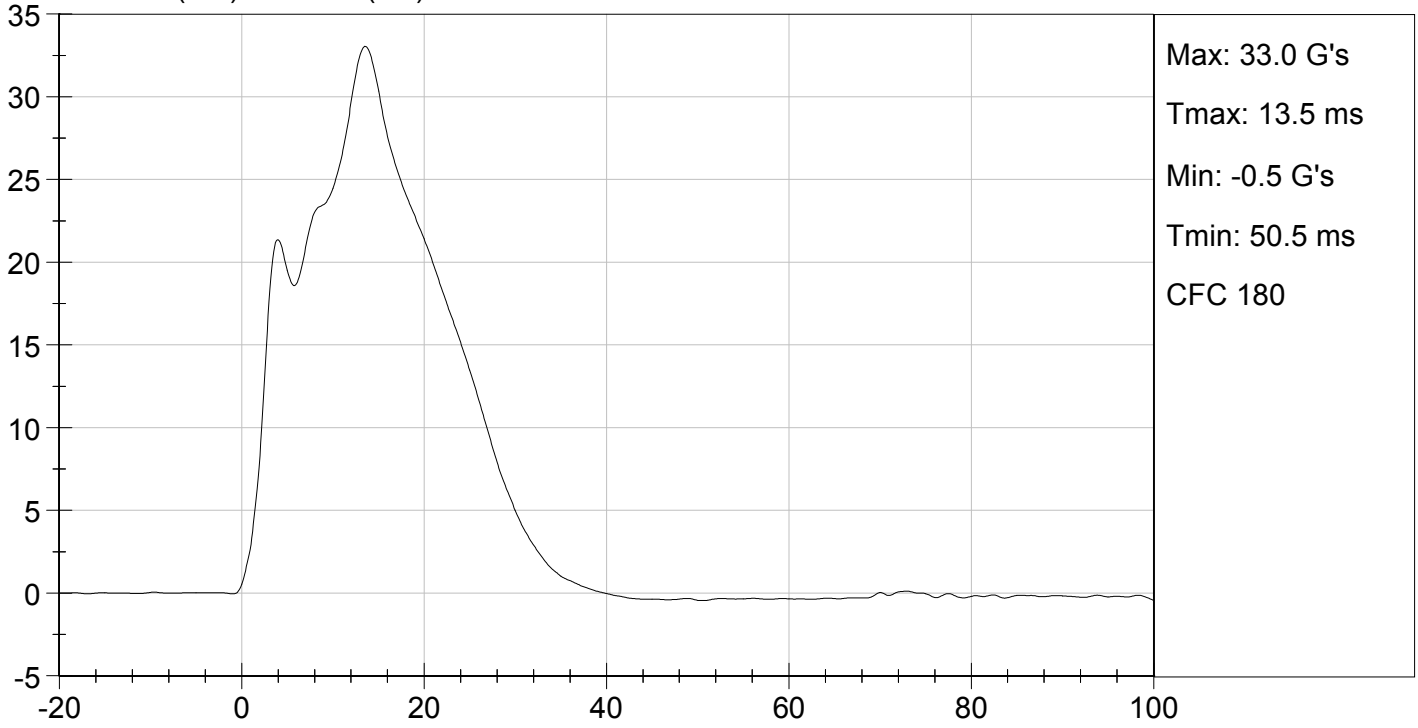
12/13/2013
Test Date

David Winkelbauer
Approved By

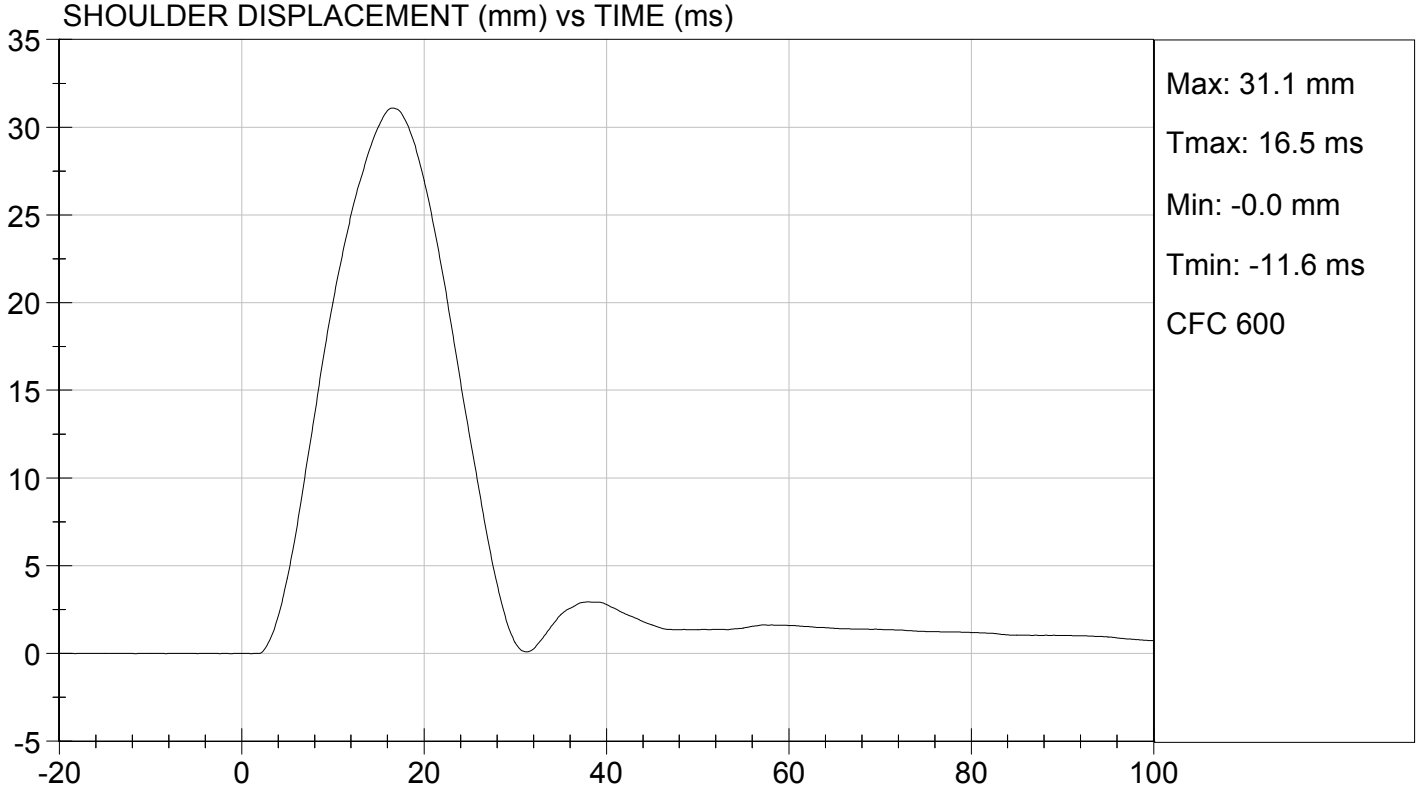
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 12/13/2013
TEST #: D134254

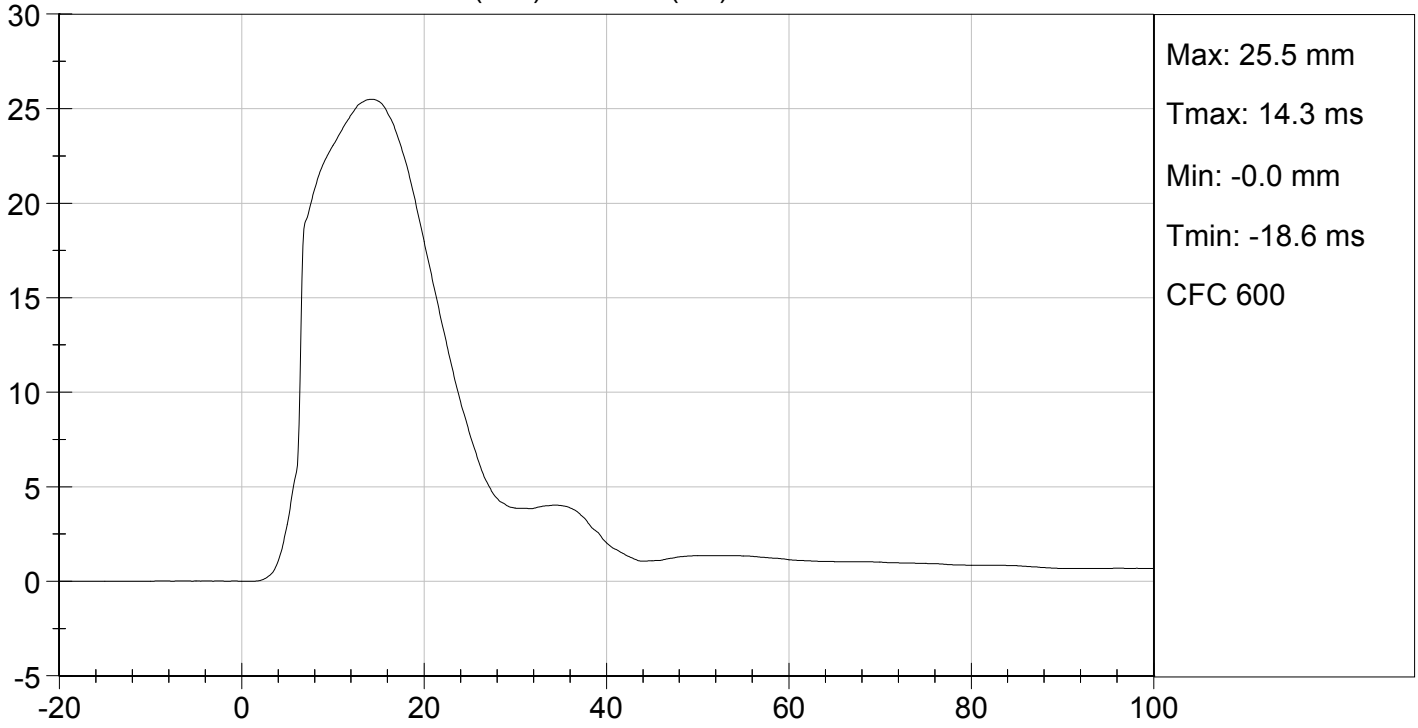
PROBE (G's) vs TIME (ms)



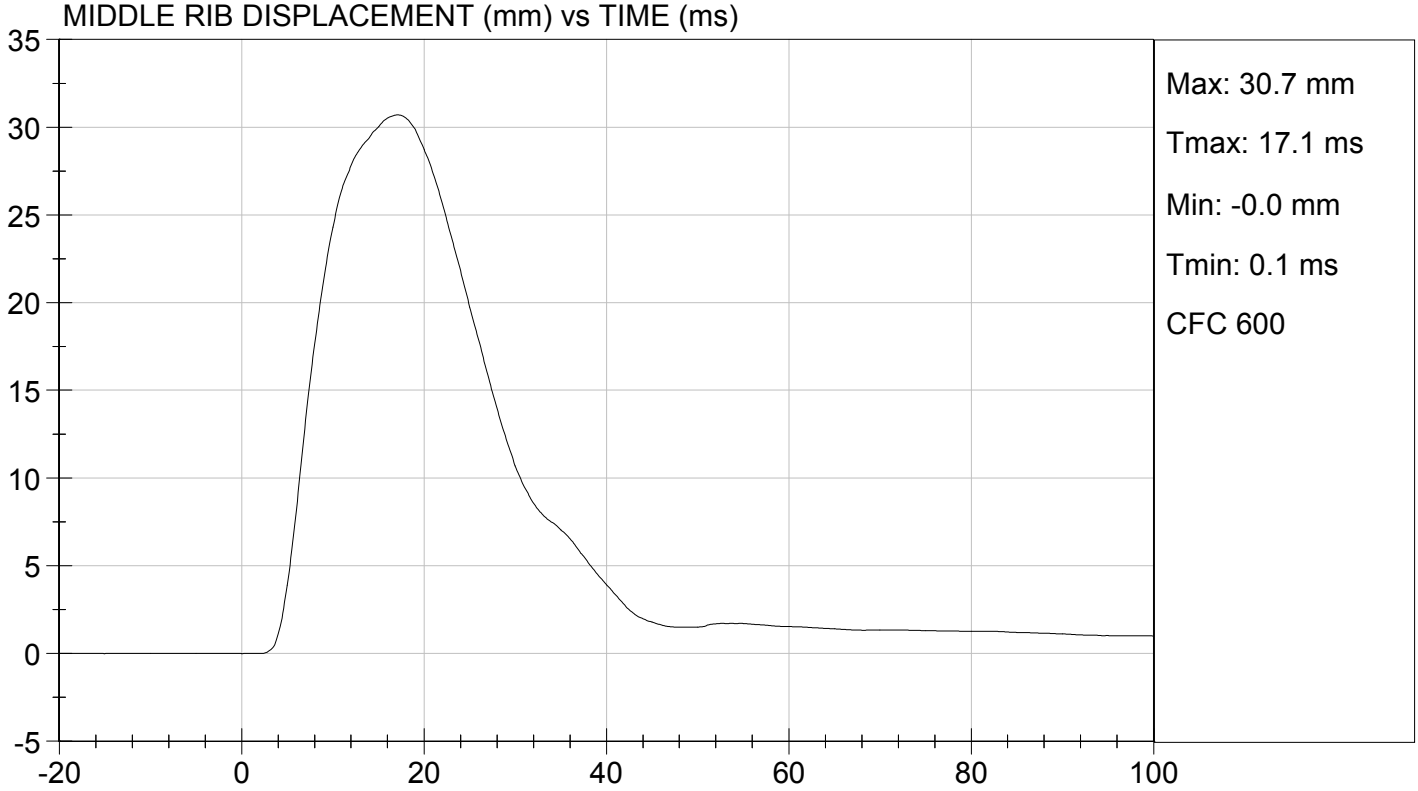

SHOULDER DISPLACEMENT (mm) vs TIME (ms)



UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



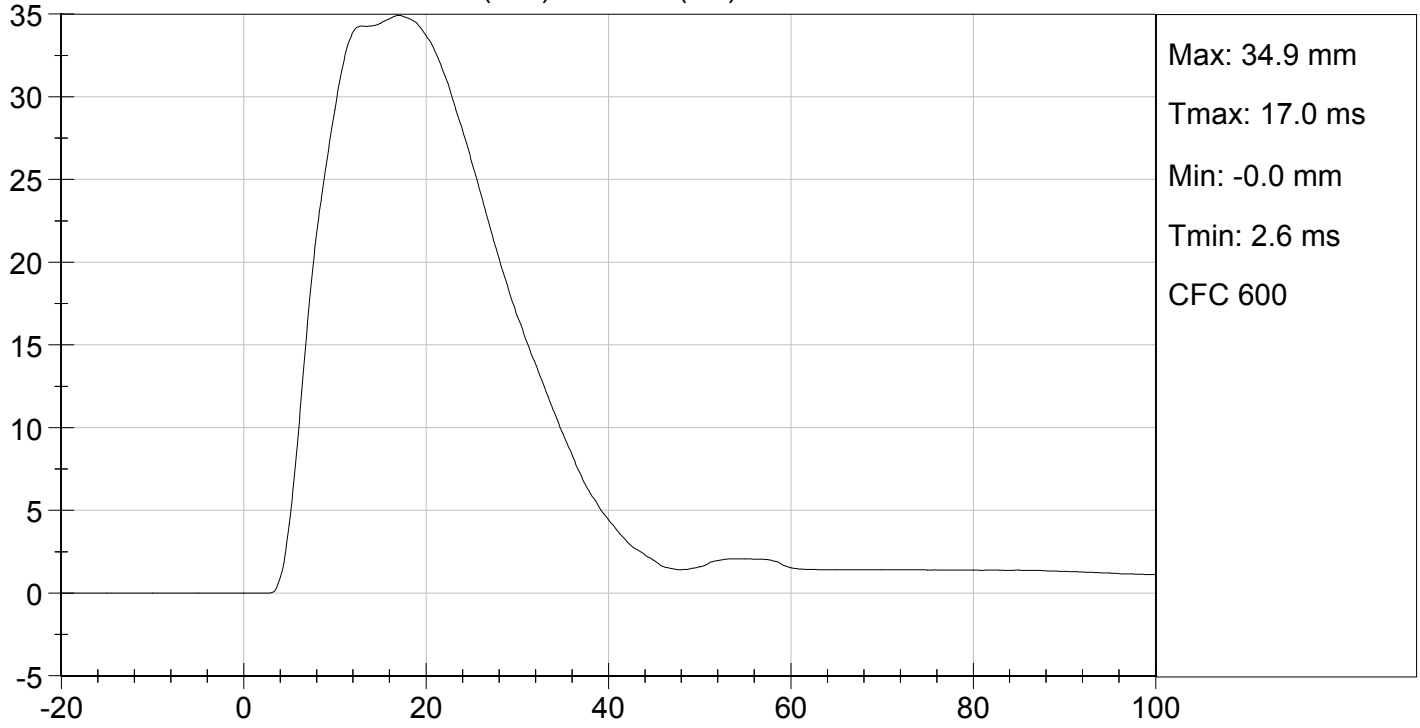

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



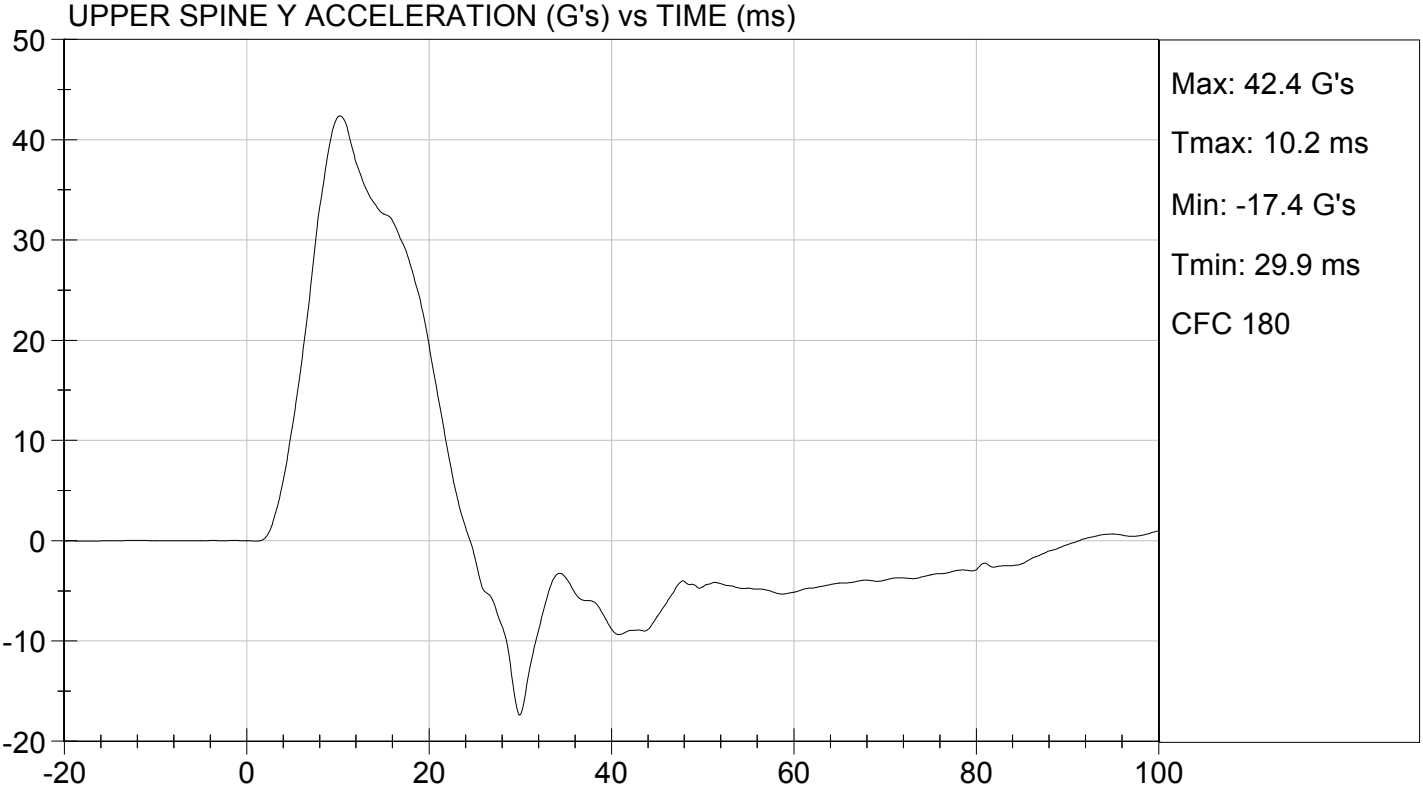
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 12/13/2013
TEST #: D134254

LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



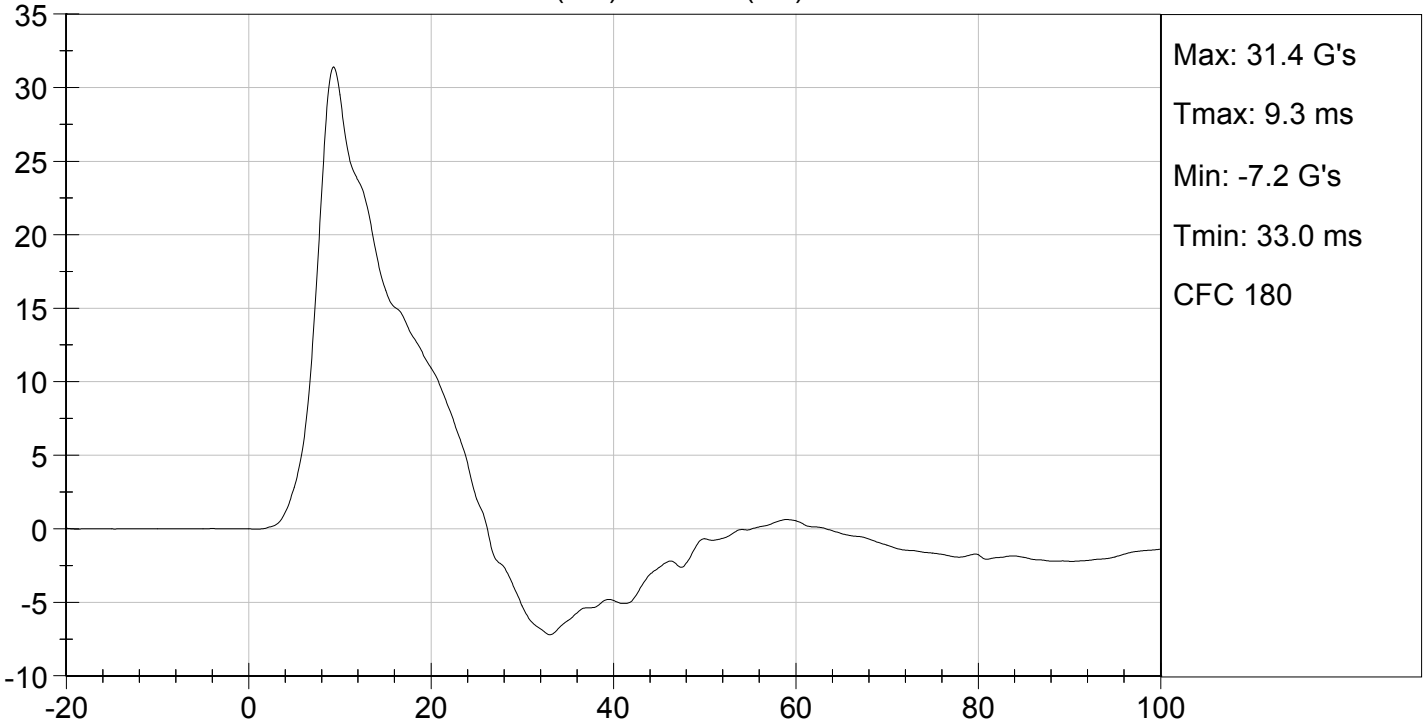

UPPER SPINE Y ACCELERATION (G's) vs TIME (ms)



TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 12/13/2013
TEST #: D134254

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



**MGA RESEARCH CORPORATION**

**THORAX (WITHOUT ARM) IMPACT TEST**

**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 306 **Test I.D:** D134255

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Temperature | deg C | 20.6 to 22.2 | 20.8 | Pass |
| Humidity | % | 10 to 70 | 18 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.38 | Pass |
| Maximum Probe Acceleration | G's | 14 to 18 | 16 | Pass |
| Upper Rib Displacement | mm | 32 to 40 | 36 | Pass |
| Middle Rib Displacement | mm | 39 to 45 | 42 | Pass |
| Lower Rib Displacement | mm | 35 to 43 | 41 | Pass |
| Upper Spine (T1) Y Acceleration | G's | 13 to 17 | 15 | Pass |
| Lower Spine (T12) Y Acceleration | G's | 7 to 11 | 9 | Pass |
| | | Overall Test Results | | Pass |

Jessica Gall
Laboratory Technician

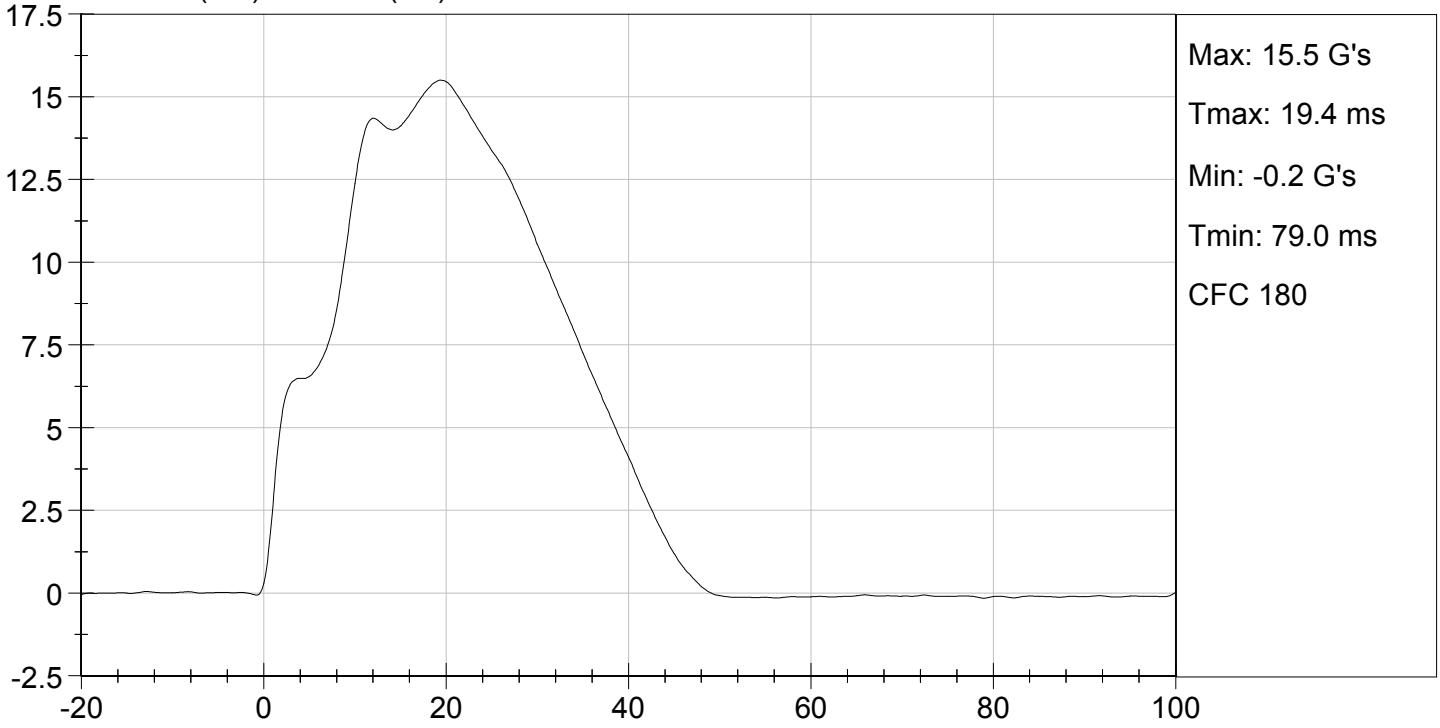
12/13/2013
Test Date

David Winkelbauer
Approved By

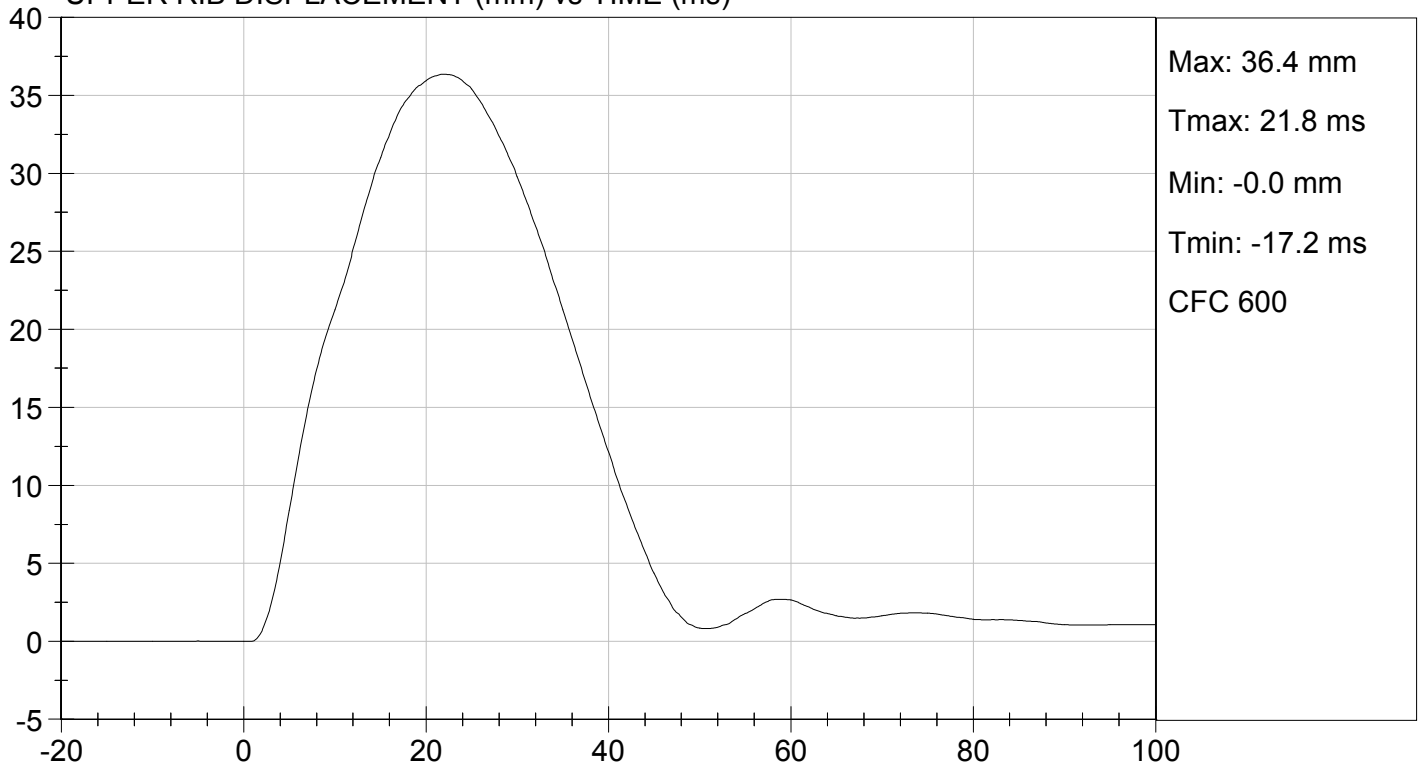
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 12/13/2013
TEST #: D134255

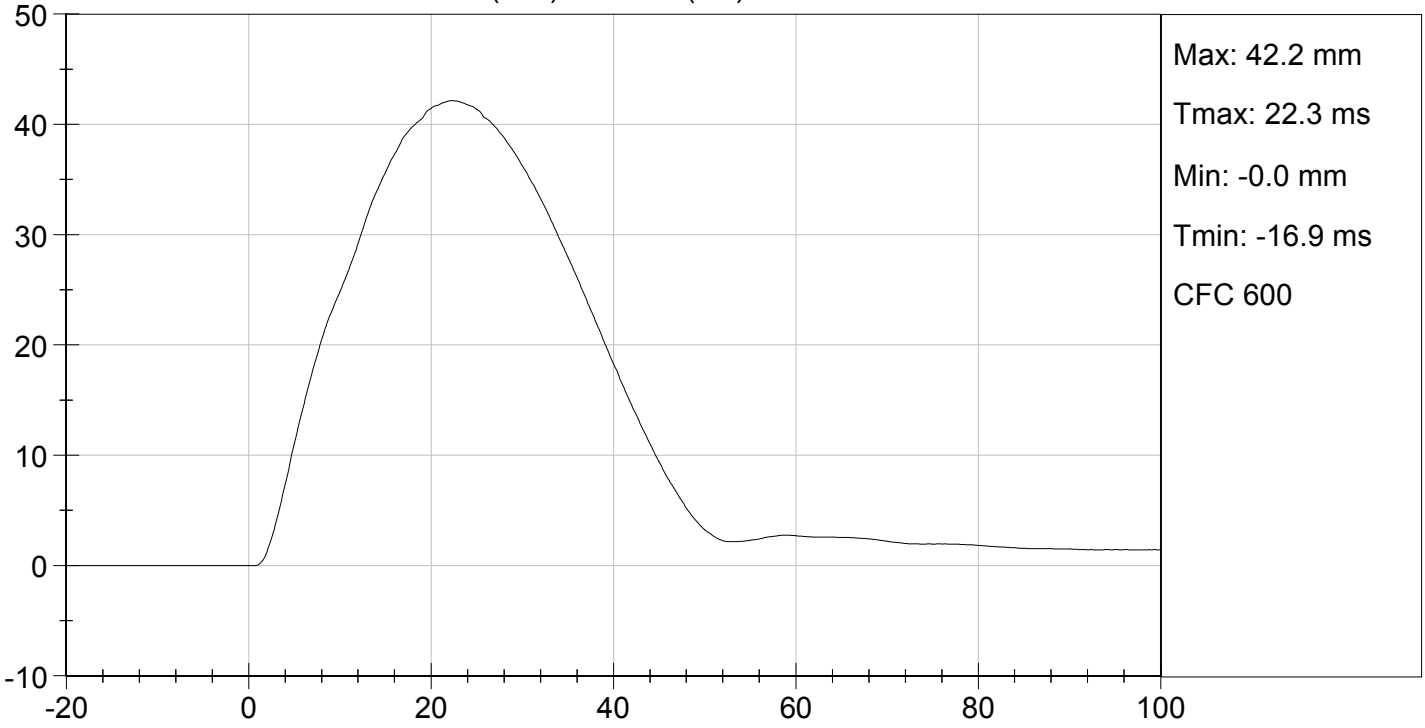
PROBE (G's) vs TIME (ms)



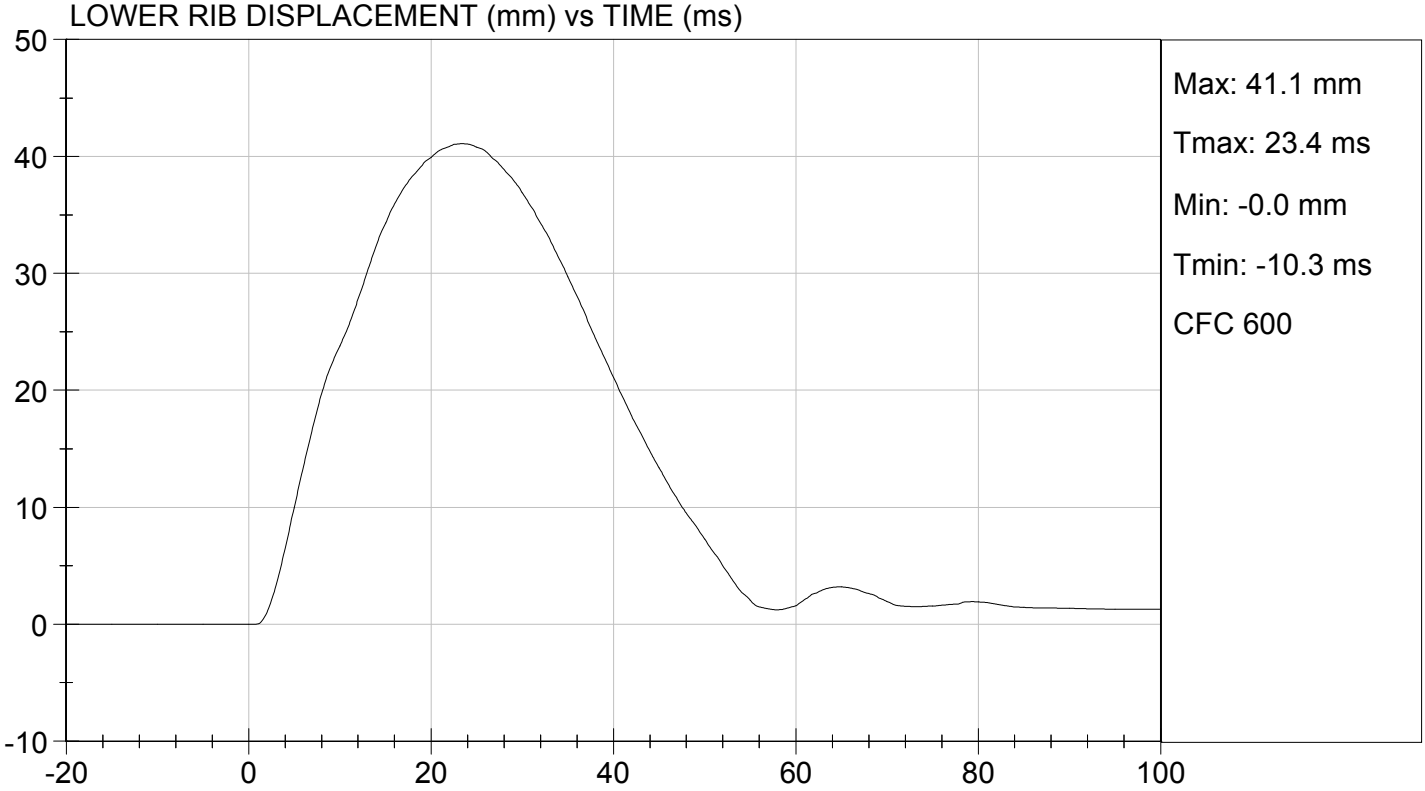

UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



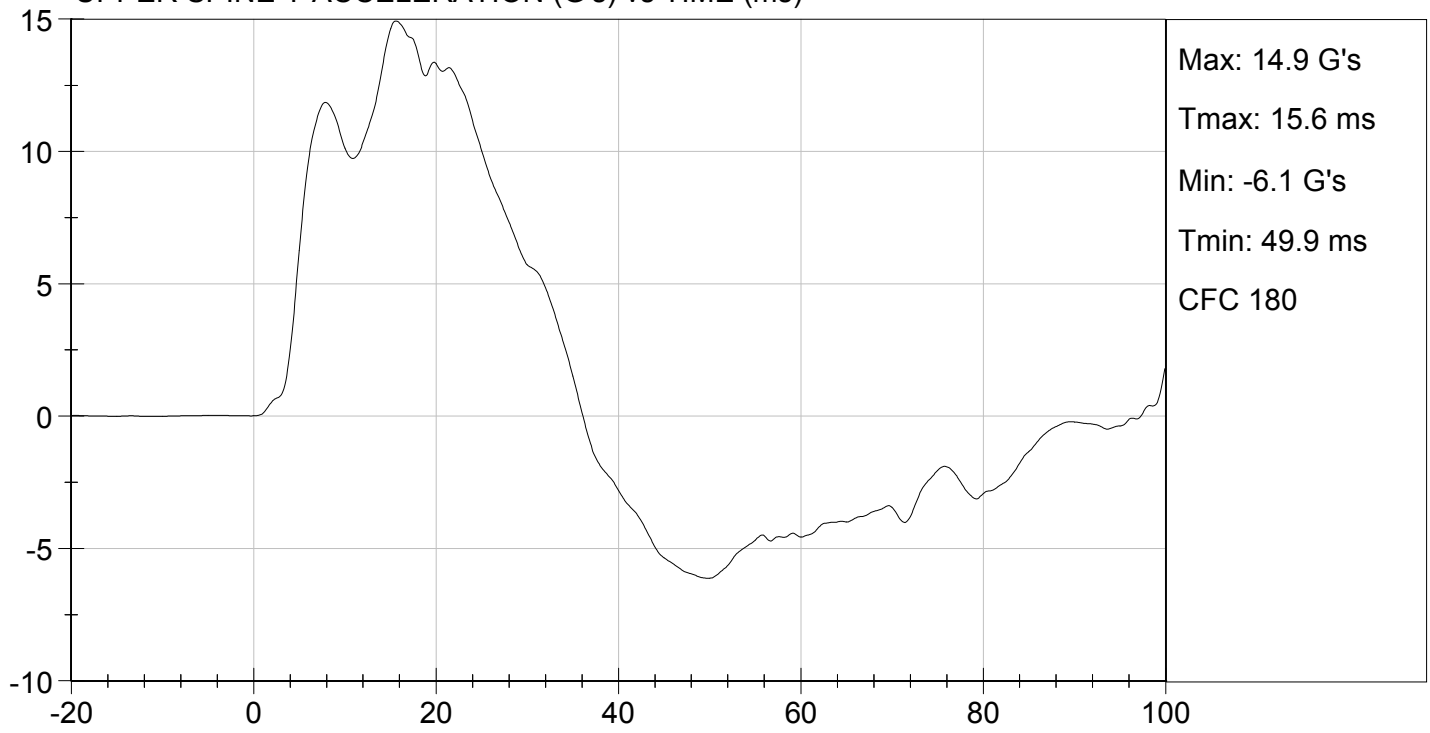

LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



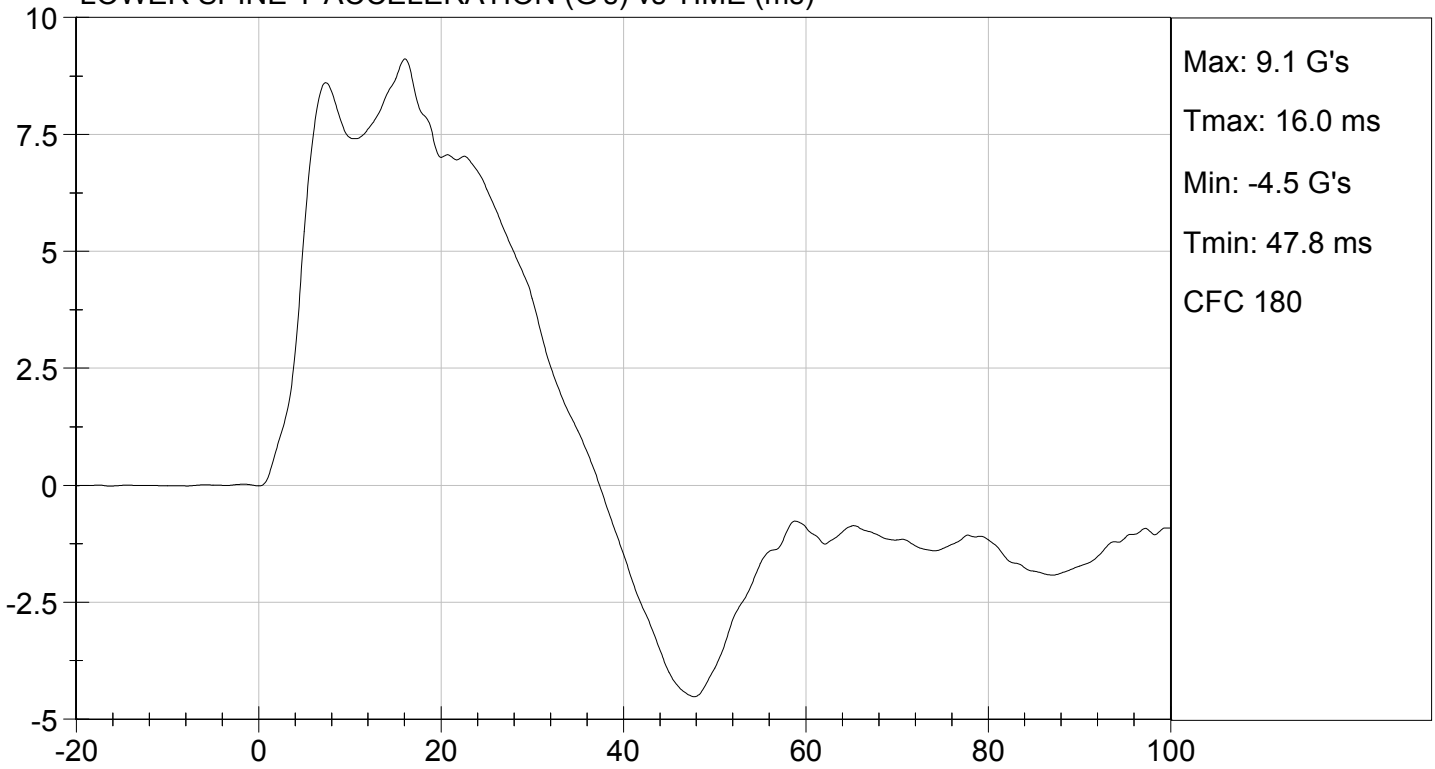
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 12/13/2013
TEST #: D134255

UPPER SPINE Y ACCELERATION (G's) vs TIME (ms)




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



**MGA RESEARCH CORPORATION**

**ABDOMINAL IMPACT TEST**

**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 306 **Test I.D:** D134256

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Temperature | deg C | 20.6 to 22.2 | 20.8 | Pass |
| Humidity | % | 10 to 70 | 18 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.34 | Pass |
| Maximum Probe Acceleration | G's | 12 to 16 | 13 | Pass |
| Upper Abdomen Rib Displacement | mm | 36 to 47 | 43 | Pass |
| Lower Abdomen Rib Displacement | mm | 33 to 44 | 42 | Pass |
| Lower Spine (T12) Y Acceleration | G's | 9 to 14 | 10 | Pass |
| | | Overall Test Results | | Pass |

Jessica Hall
Laboratory Technician

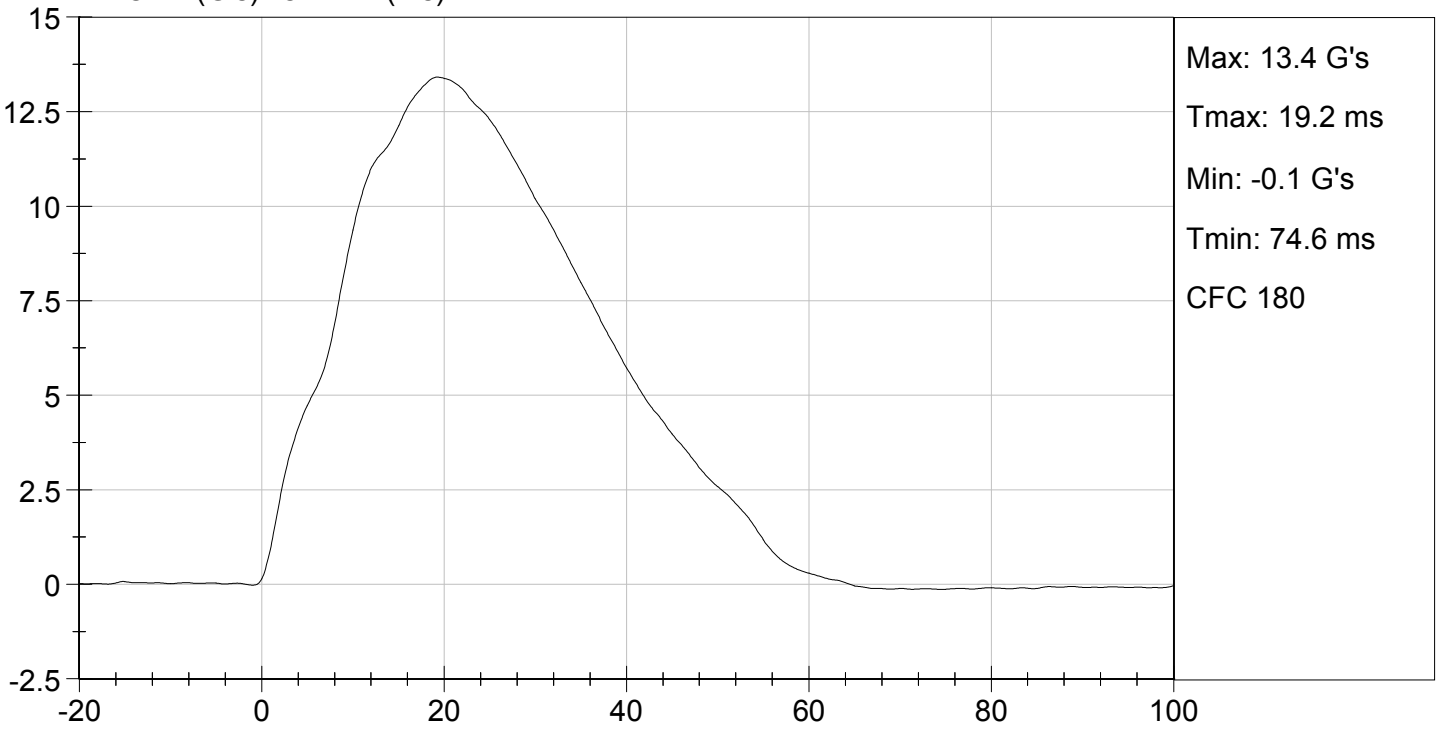
12/13/2013
Test Date

David Winkelbauer
Approved By

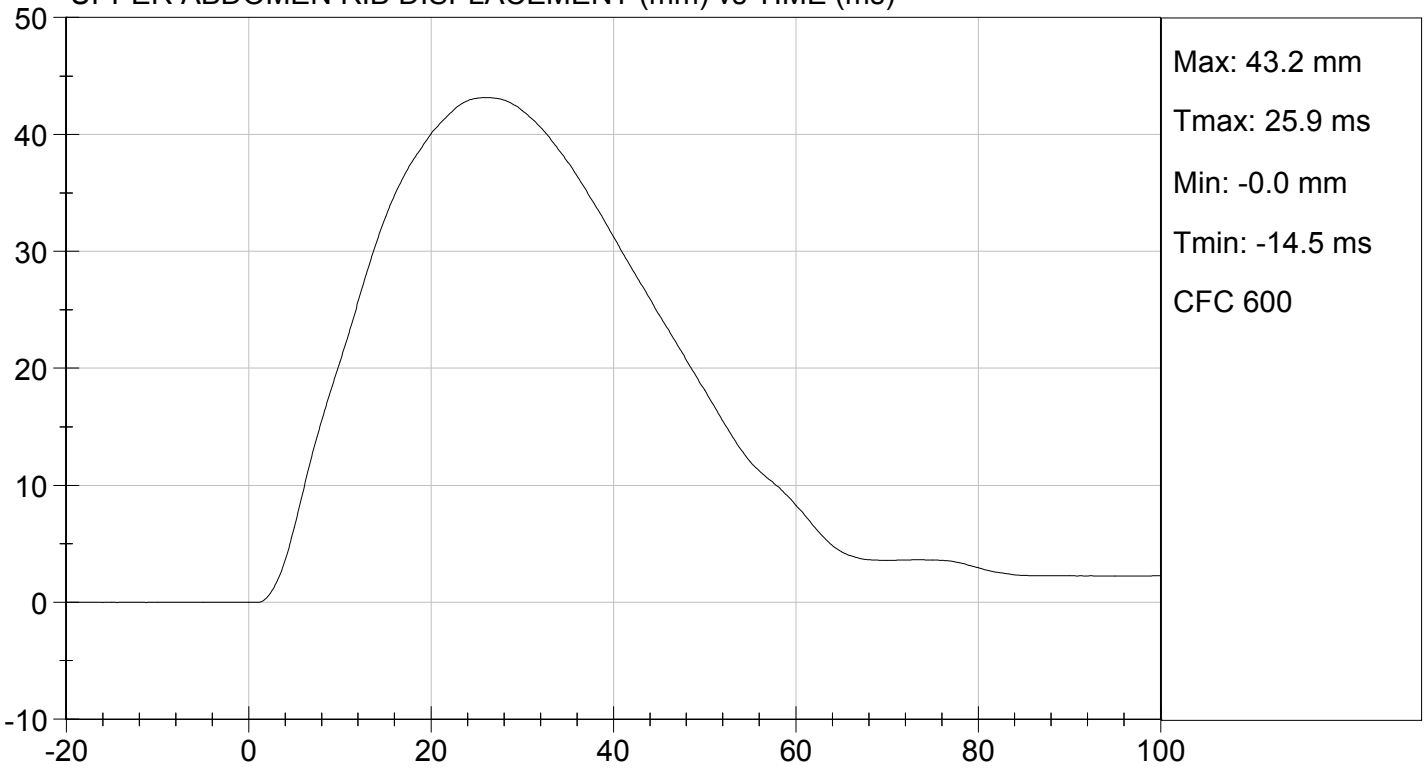
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 12/13/2013
TEST #: D134256

PROBE (G's) vs TIME (ms)



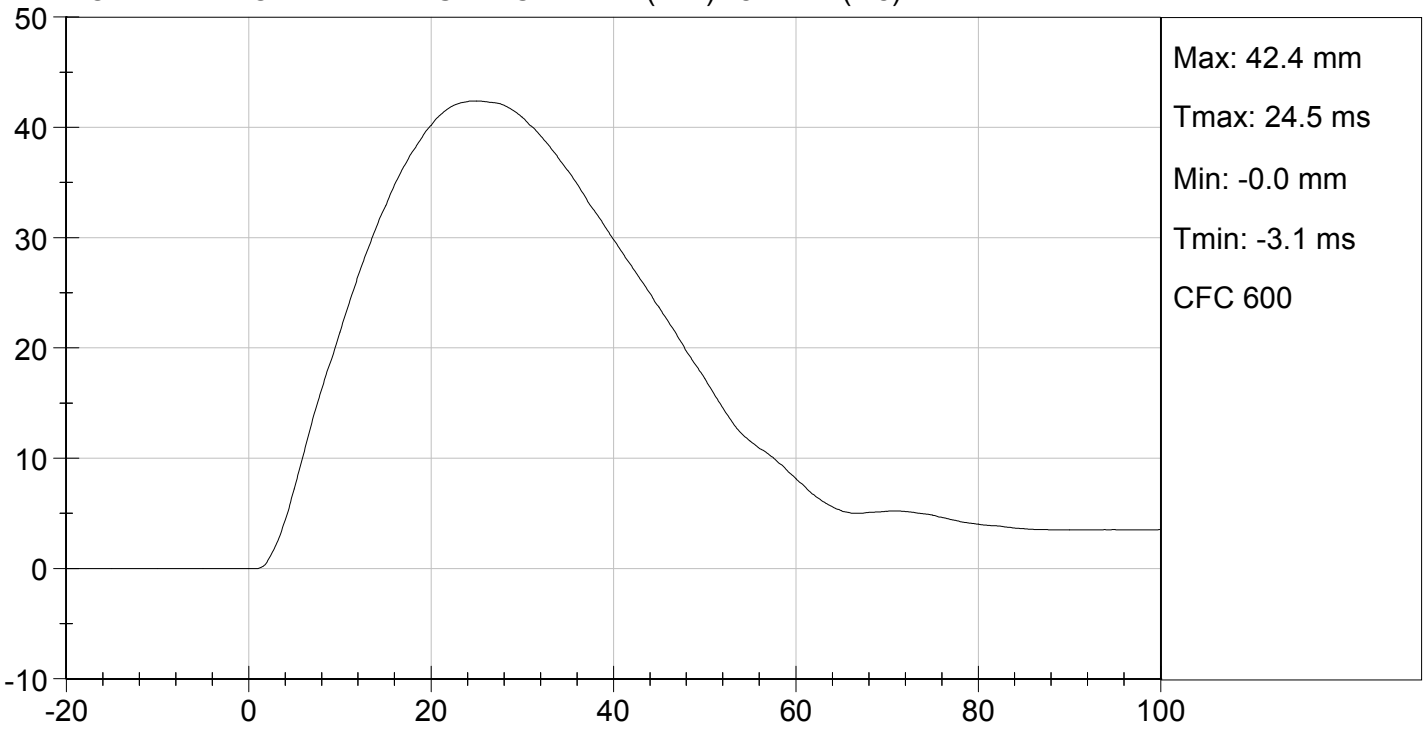

UPPER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



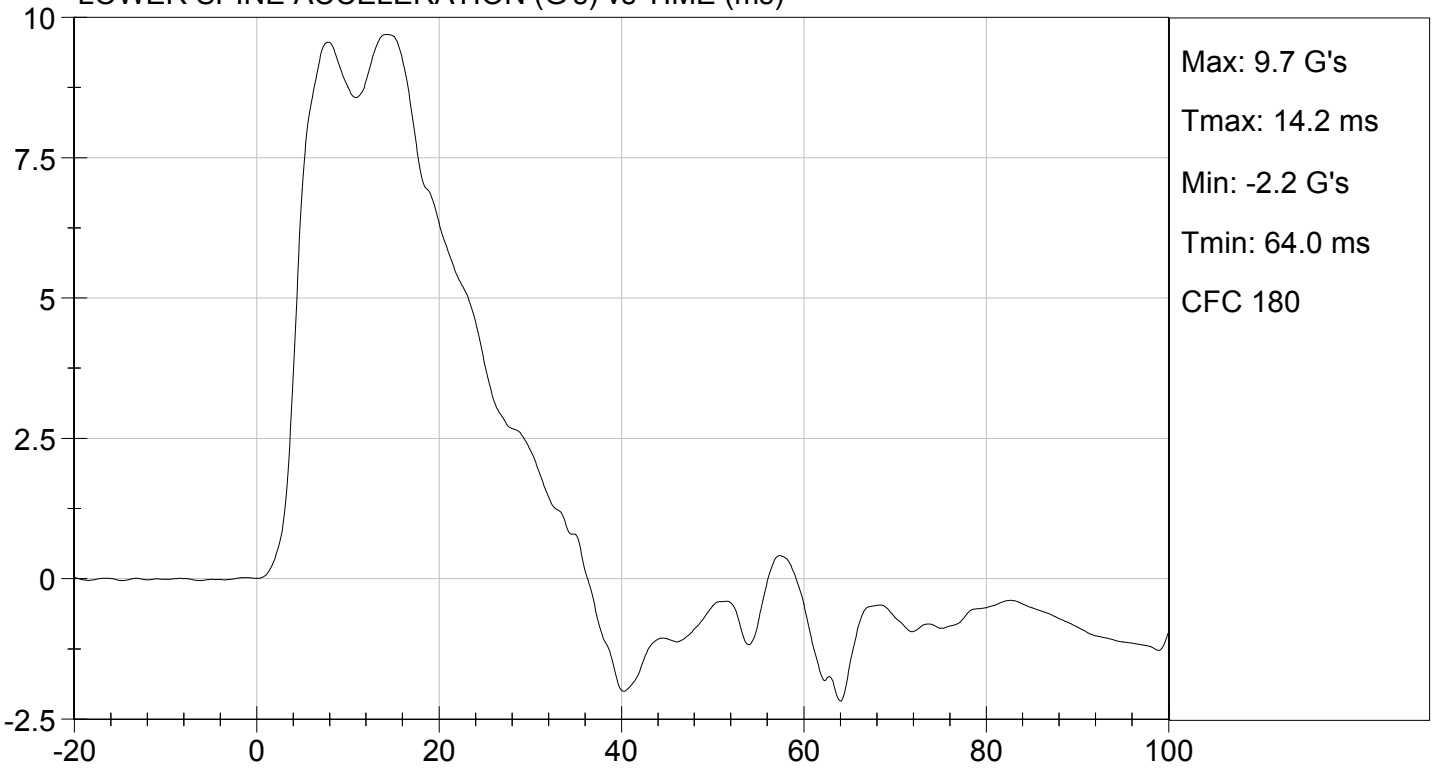
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 12/13/2013
TEST #: D134256

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




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



**MGA RESEARCH CORPORATION**

**PELVIS IMPACT TEST**

**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 306 **Test I.D:** D134257

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Temperature | deg C | 20.6 to 22.2 | 20.8 | Pass |
| Humidity | % | 10 to 70 | 18 | Pass |
| Impact Velocity | m/s | 6.60 to 6.80 | 6.60 | Pass |
| Maximum Probe Acceleration | G's | 38 to 47 | 42 | Pass |
| Pelvis Y Acceleration After 6 ms | G's | 34 to 42 | 40 | Pass |
| Peak Acetabulum Force | N | 3600 to 4300 | 3,978 | Pass |
| | | Overall Test Results | | Pass |

Jessica Hall
Laboratory Technician

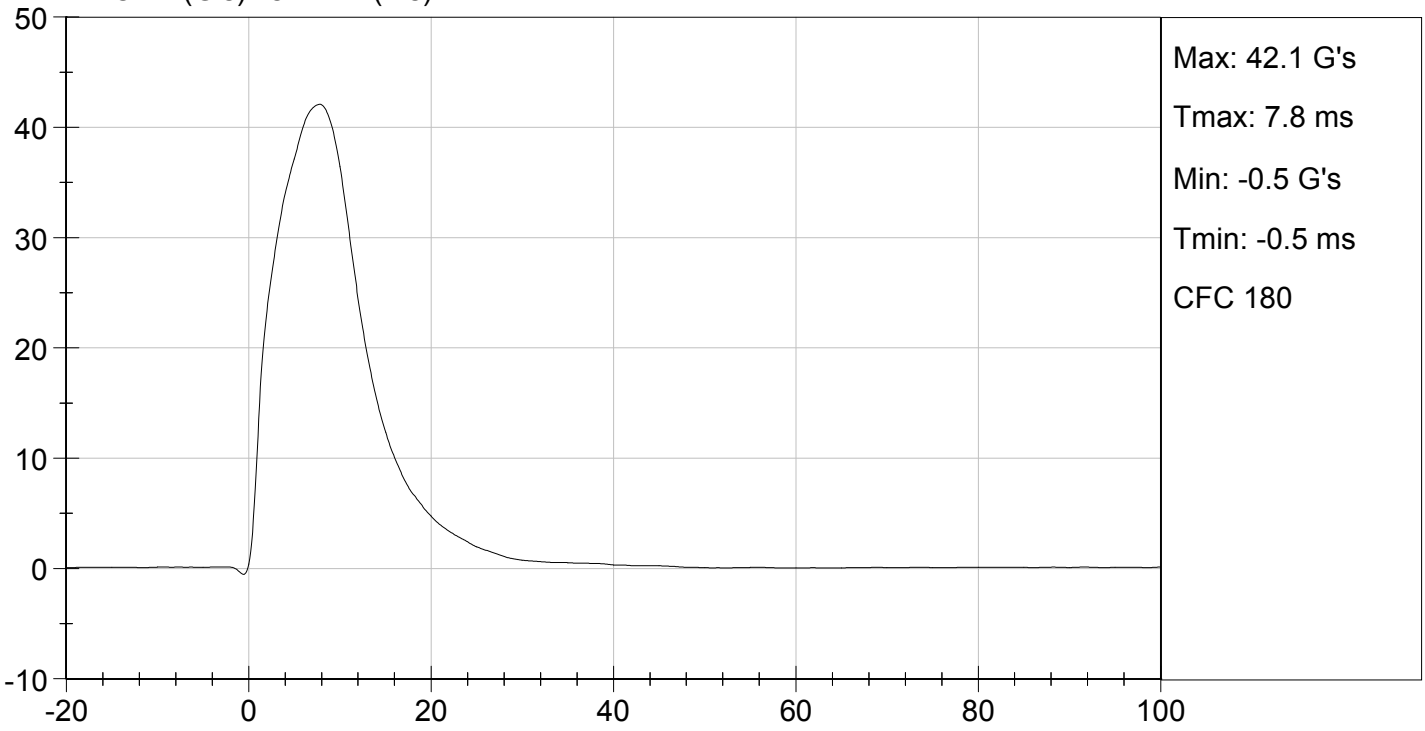
12/13/2013
Test Date

David Winkelbauer
Approved By

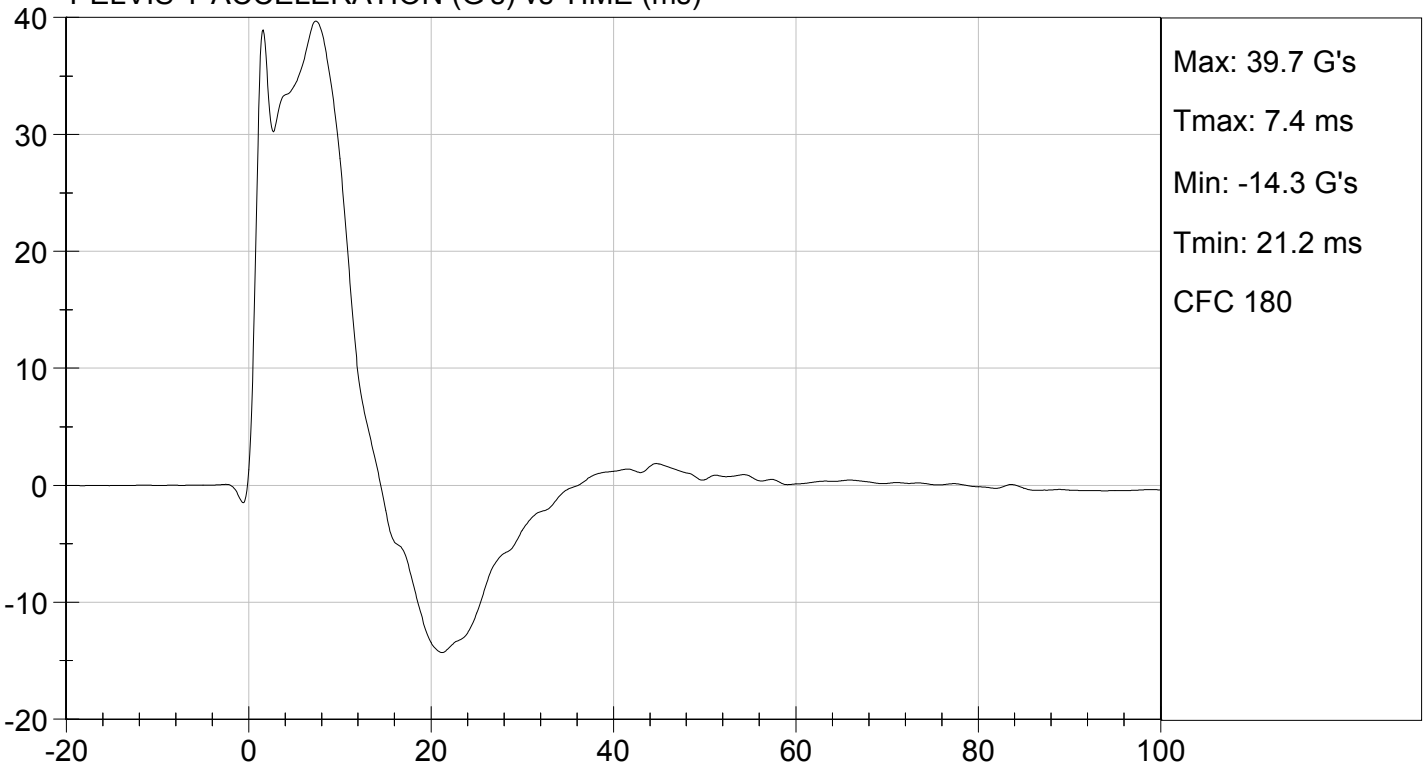
TEST DESC: PELVIS IMPACT
VELOCITY: 21.65 ft/s, 6.60 m/s

TEST DATE: 12/13/2013
TEST #: D134257

PROBE (G's) vs TIME (ms)

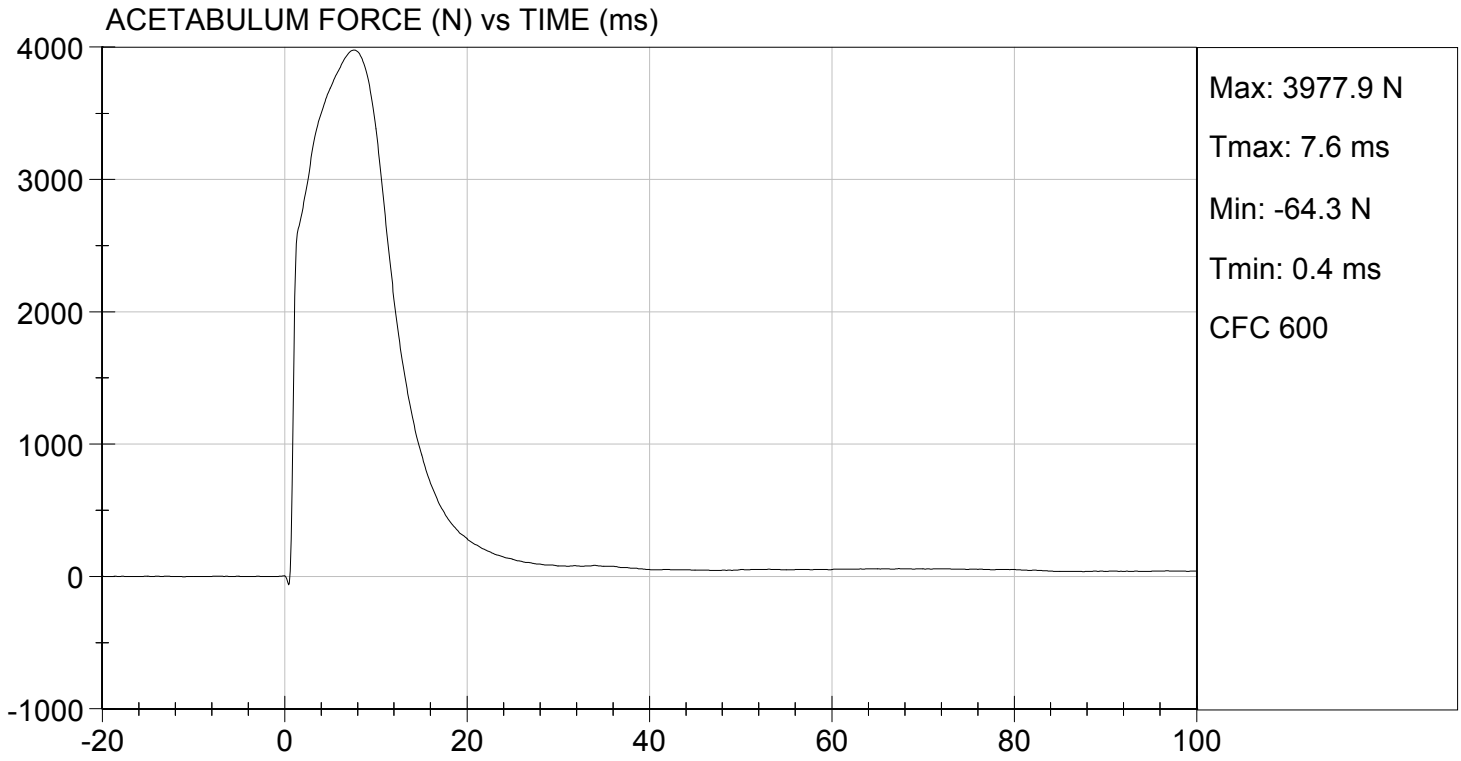



PELVIS Y ACCELERATION (G's) vs TIME (ms)



TEST DESC: PELVIS IMPACT
VELOCITY: 21.65 ft/s, 6.60 m/s

TEST DATE: 12/13/2013
TEST #: D134257



**MGA RESEARCH CORPORATION**

**ILIAC IMPACT TEST**

**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 306 **Test I.D:** D134258

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Temperature | deg C | 20.6 to 22.2 | 20.8 | Pass |
| Humidity | % | 10 to 70 | 18 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.27 | Pass |
| Maximum Probe Acceleration | G's | 36 to 45 | 41 | Pass |
| Pelvis Y Acceleration | G's | 28 to 39 | 36 | Pass |
| Peak Pelvis Iliac Force | N | 4100 to 5100 | 5,050 | Pass |
| | | Overall Test Results | | Pass |

Jessica Gall
Laboratory Technician

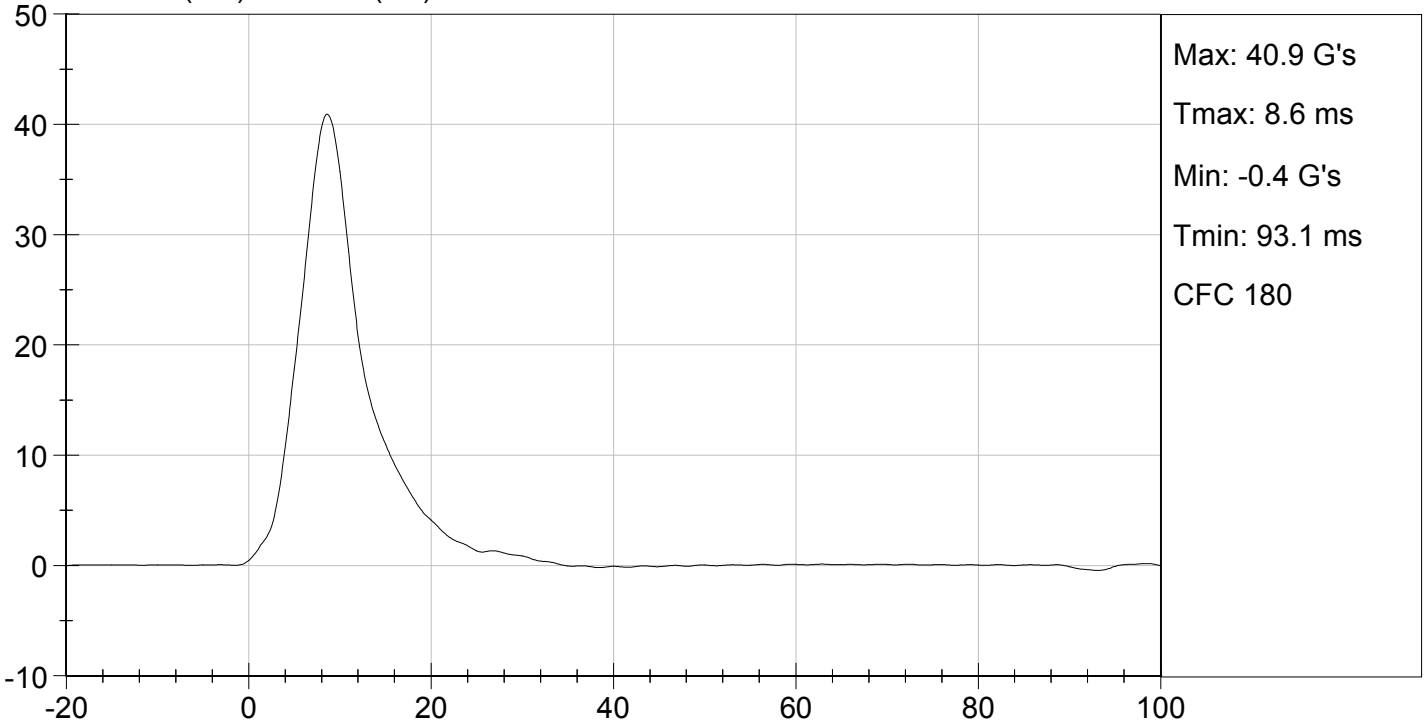
12/13/2013
Test Date

David Winkelbauer
Approved By

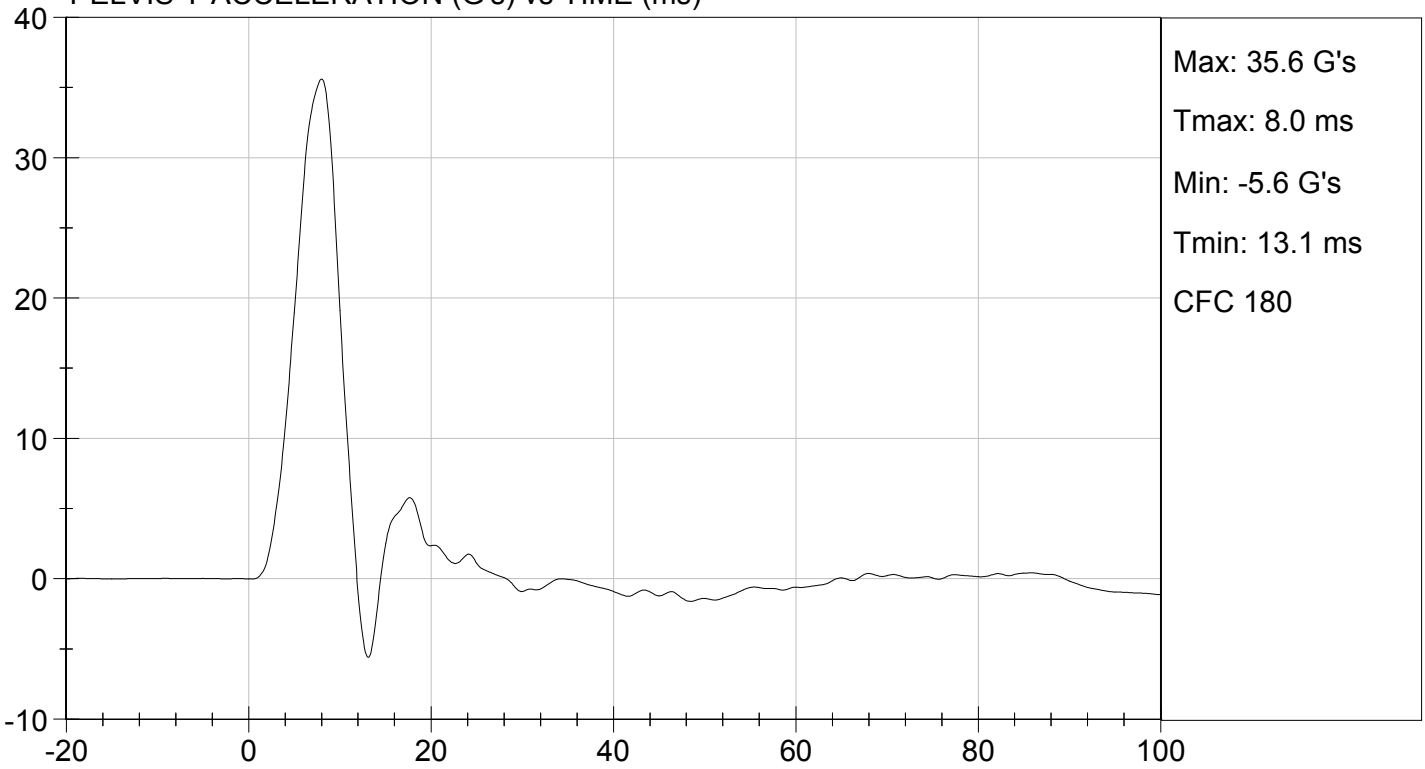
TEST DESC: ILLIAC
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 12/13/2013
TEST #: D134258

PROBE (G's) vs TIME (ms)

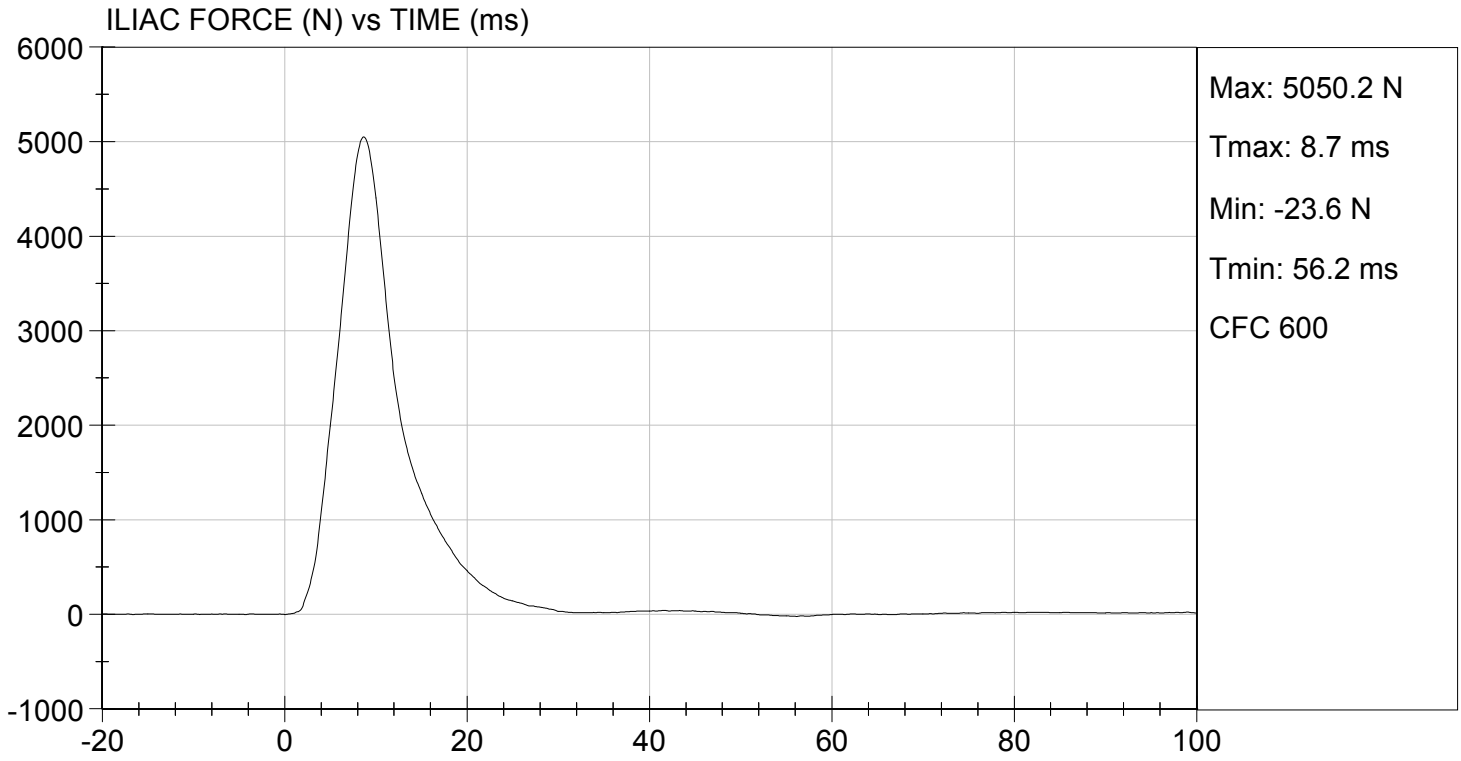



PELVIS Y ACCELERATION (G's) vs TIME (ms)



TEST DESC: ILLIAC
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 12/13/2013
TEST #: D134258



**MGA RESEARCH CORPORATION**

**HEAD DROP TEST**

**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 306 **Test ID:** D134311

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 21.9 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 21 | Pass |
| Peak Resultant Acceleration | G's | 115 to 137 | 124 | Pass |
| Peak Longitudinal Acceleration | G's | +/- 15 | -4.5 | Pass |
| Unimodal | N/A | Yes | Yes | Pass |
| Oscillations | N/A | <15% | Yes | Pass |
| | | Overall Test Results | | Pass |

Jessica Gall
Laboratory Technician

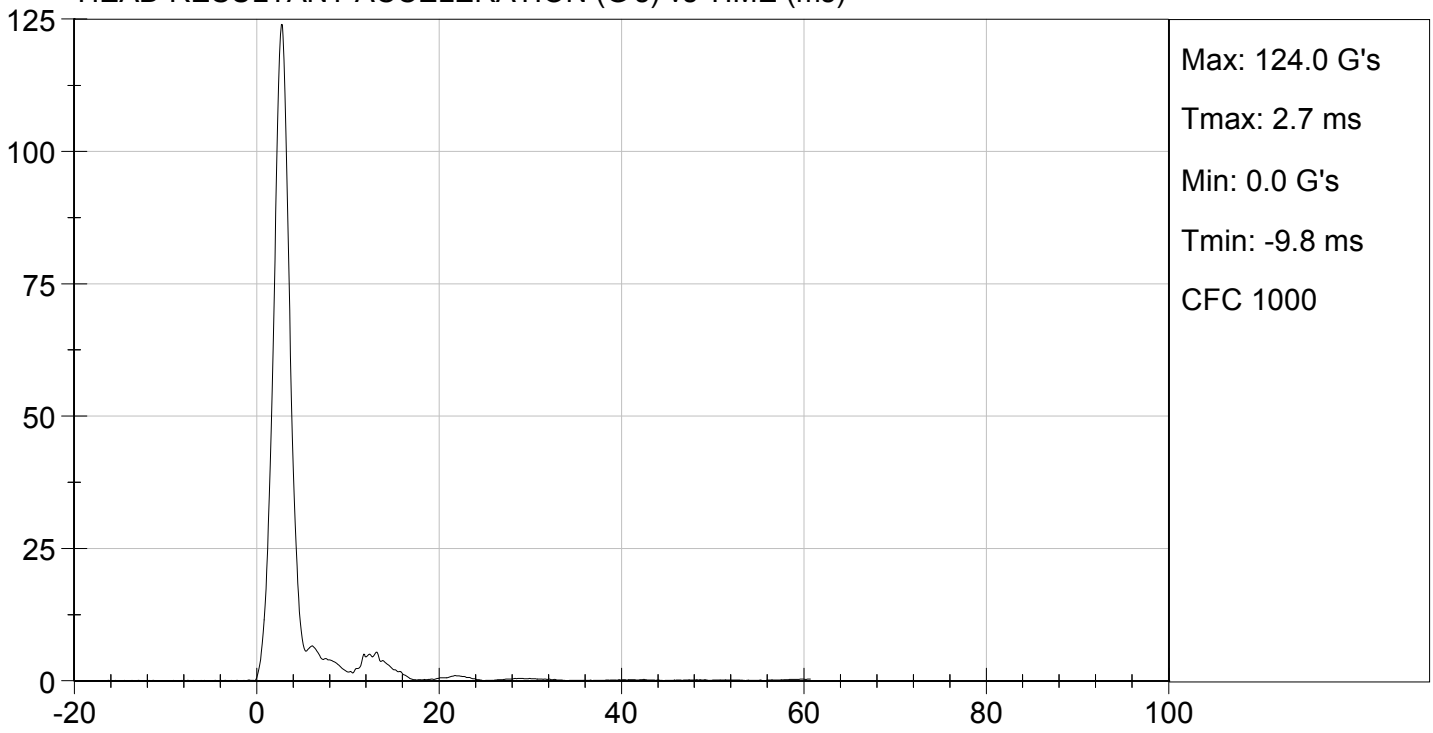
12/17/2013
Test Date

David Winkelbauer
Approved By

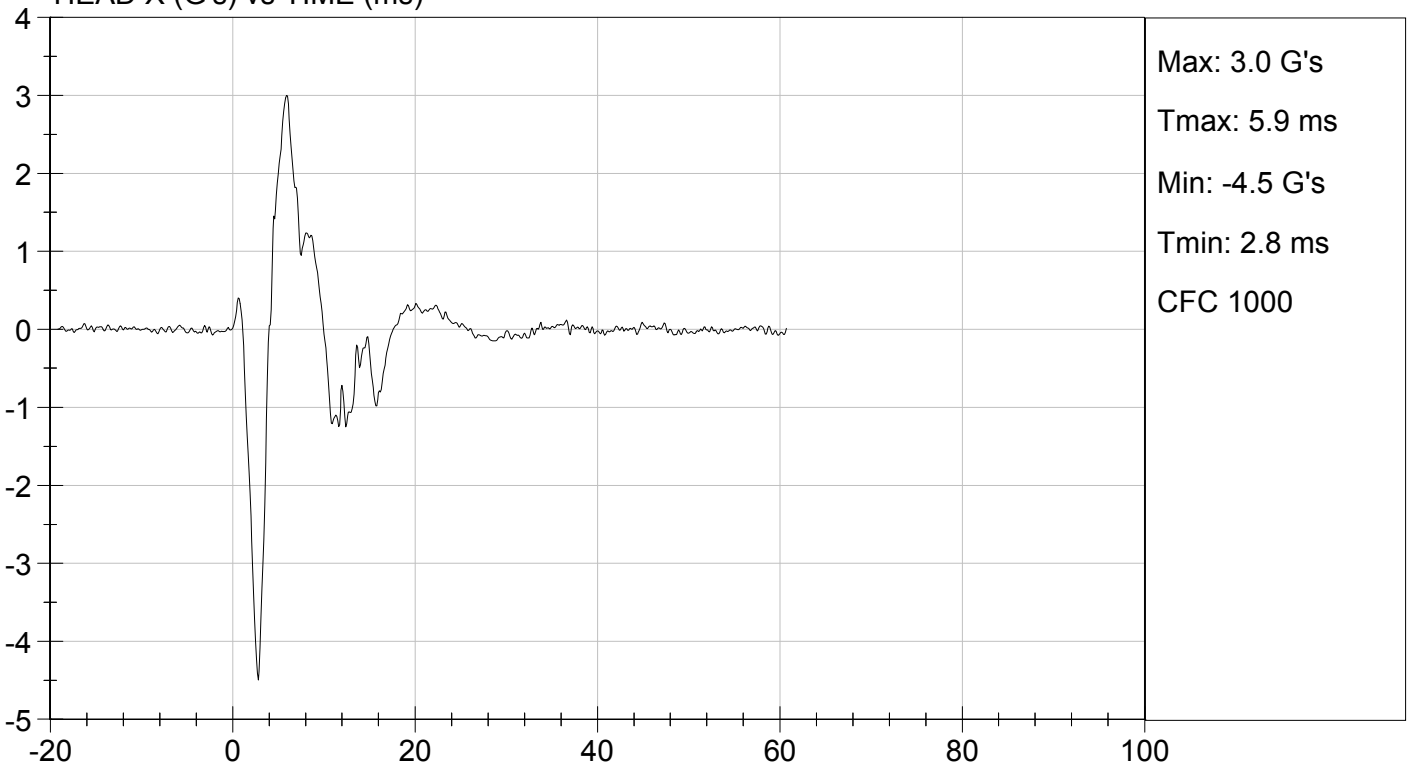
TEST DESC: HEAD DROP

TEST DATE: 12/17/2013
TEST #: D134311

HEAD RESULTANT ACCELERATION (G's) vs TIME (ms)



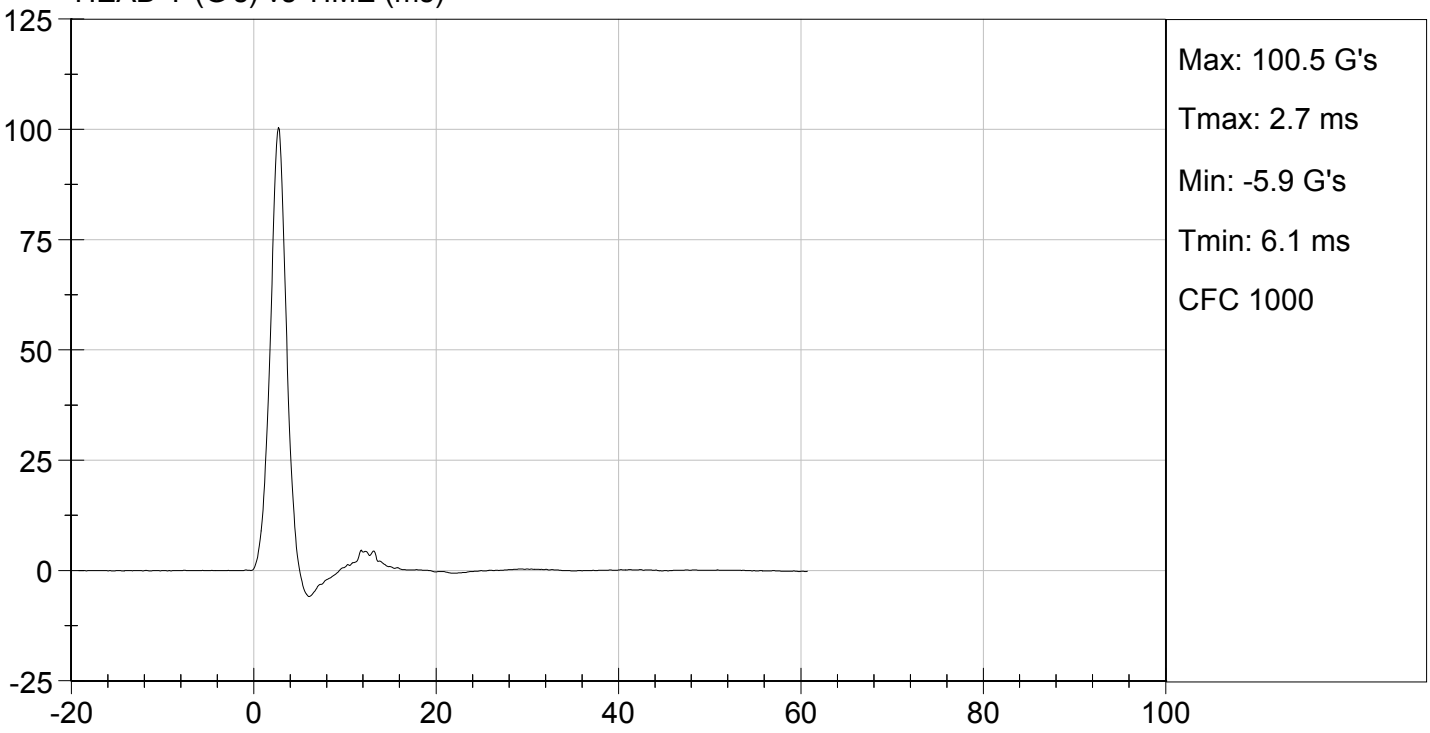

HEAD X (G's) vs TIME (ms)



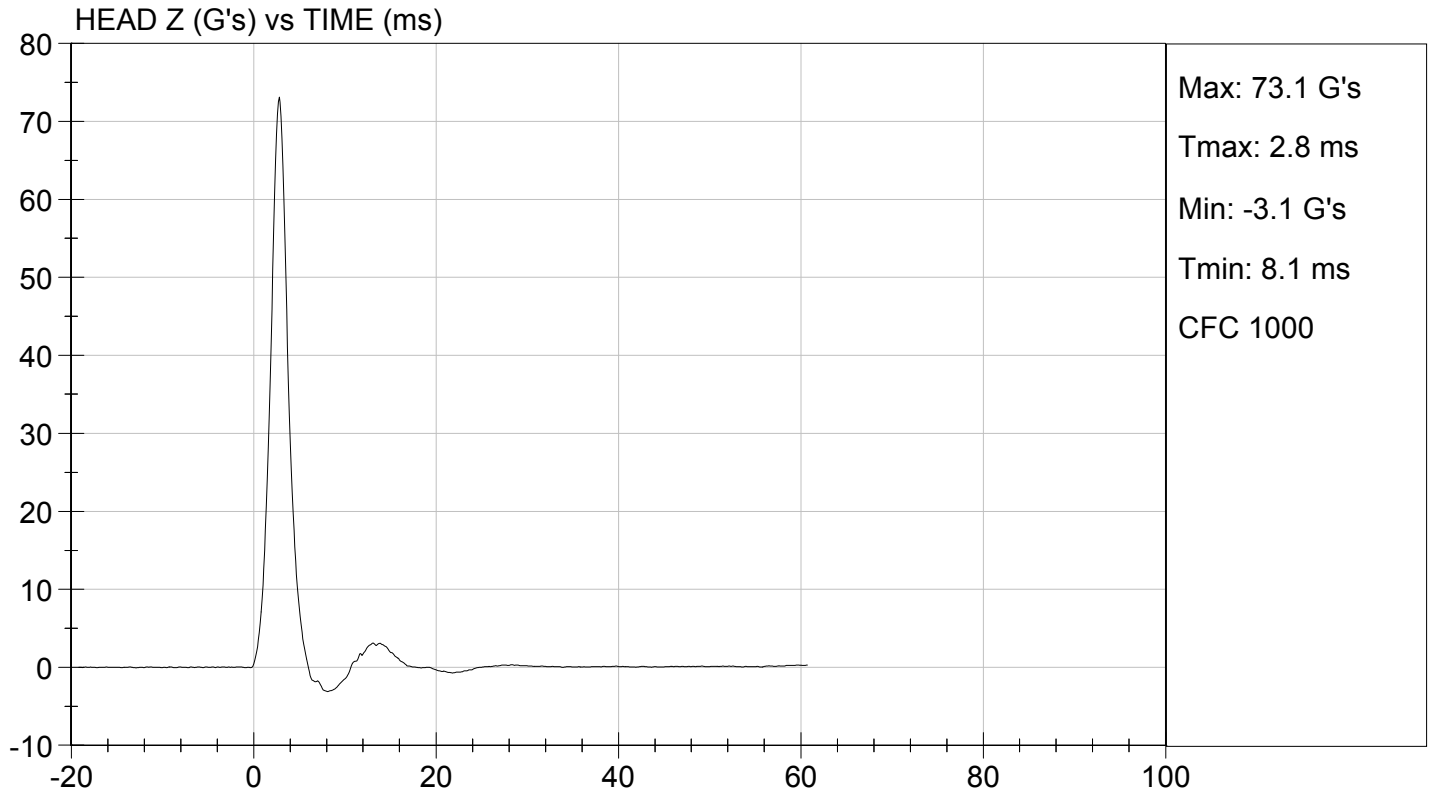
TEST DESC: HEAD DROP

TEST DATE: 12/17/2013
TEST #: D134311

HEAD Y (G's) vs TIME (ms)




HEAD Z (G's) vs TIME (ms)



**MGA RESEARCH CORPORATION**

**LATERAL NECK PENDULUM TEST**

**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 306 **Test I.D:** D134312

| Tested Parameter | | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|---|
| Temperature | | deg C | 20.6 to 22.2 | 21.7 | Pass |
| Humidity | | % | 10 to 70 | 27 | Pass |
| Impact Velocity | | m/s | 5.51 to 5.63 | 5.63 | Pass |
| Pendulum Velocity | 10 ms | m/s | 2.20 to 2.80 | 2.52 | Pass |
| | 15 ms | m/s | 3.30 to 4.10 | 3.60 | Pass |
| | 20 ms | m/s | 4.40 to 5.40 | 4.77 | Pass |
| | 25 ms | m/s | 5.40 to 6.10 | 5.56 | Pass |
| | 25-100 ms | m/s | 5.50 to 6.20 | 5.57 | Pass |
| Maximum D-Plane Rotation | | deg | 71 to 81 | 74 | Pass |
| Time of Maximum D-Plane Rotation | | ms | 50 to 70 | 60 | Pass |
| Maximum Occipital Condyle Moment | | Nm | -44 to -36 | -43 | Pass |
| Time of Moment Decay to 0 Nm | | ms | 102 to 126 | 114 | Pass |
| | | | Overall Test Results | | Pass |

Jessica Hall
Laboratory Technician

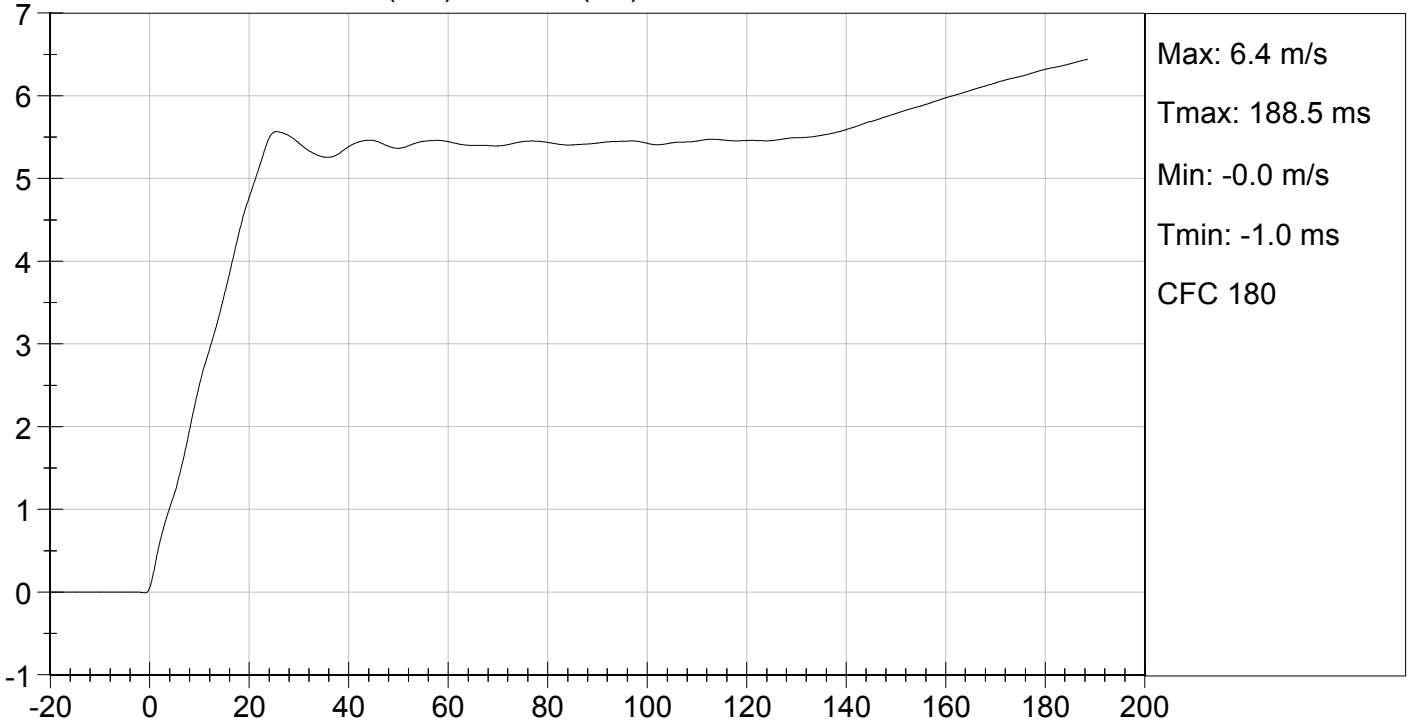
12/17/2013
Test Date

David Winkelbauer
Approved By

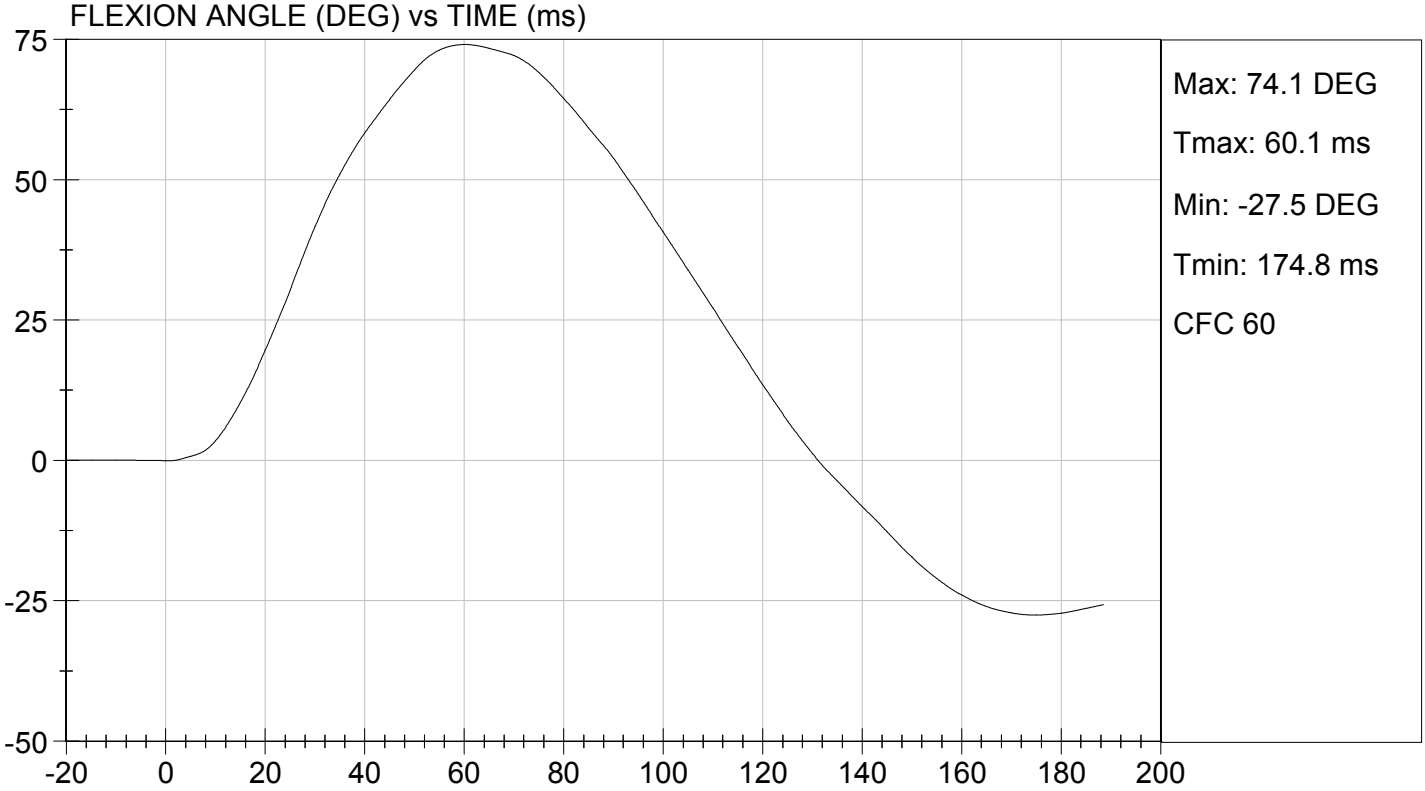
TEST DESC: NECK BENDING
VELOCITY: 18.47 ft/s, 5.63 m/s

TEST DATE: 12/17/2013
TEST #: D134312

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

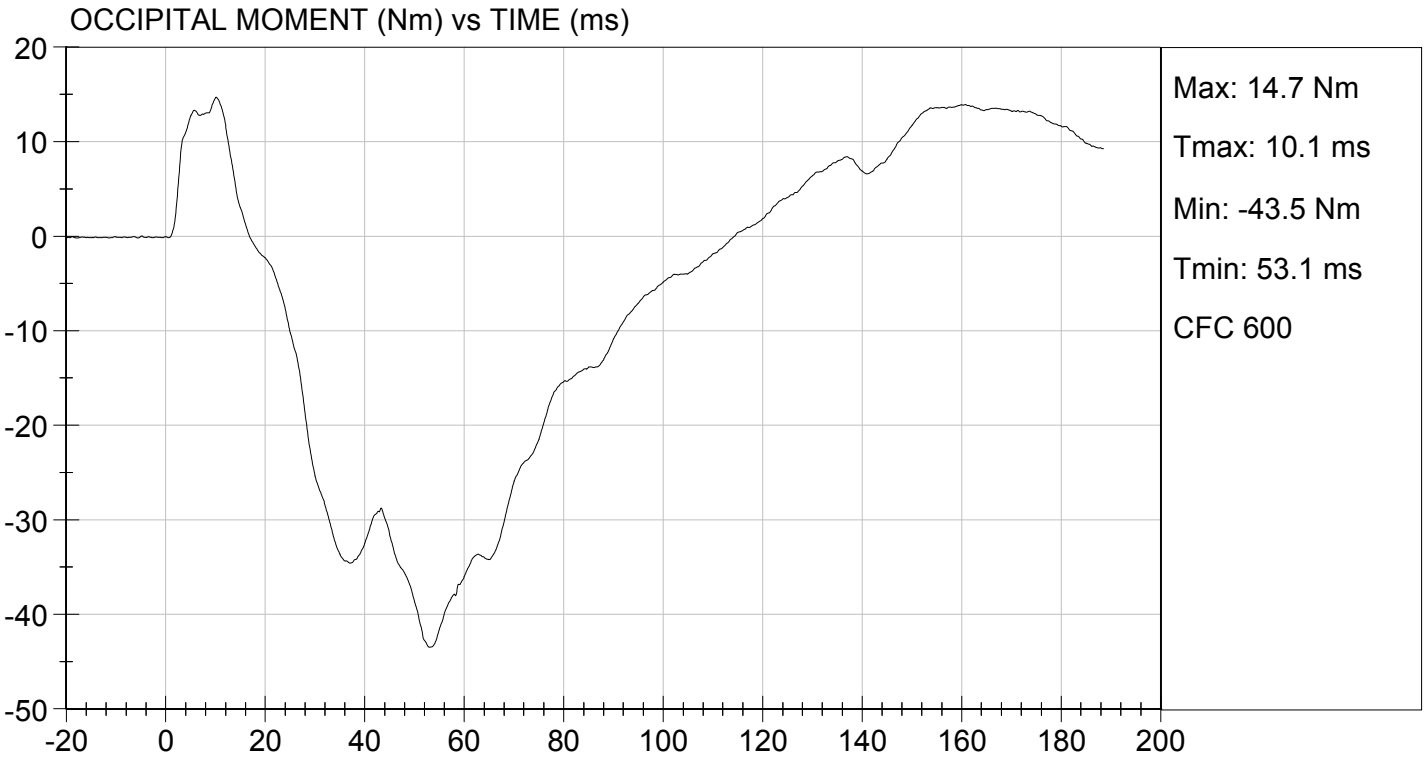



FLEXION ANGLE (DEG) vs TIME (ms)



TEST DESC: NECK BENDING
VELOCITY: 18.47 ft/s, 5.63 m/s

TEST DATE: 12/17/2013
TEST #: D134312



**MGA RESEARCH CORPORATION**

**SHOULDER IMPACT TEST**

**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 306 **Test ID:** D134313

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 21.7 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 27 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.34 | Pass |
| Maximum Probe Acceleration | G's | 13 to 18 | 15 | 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

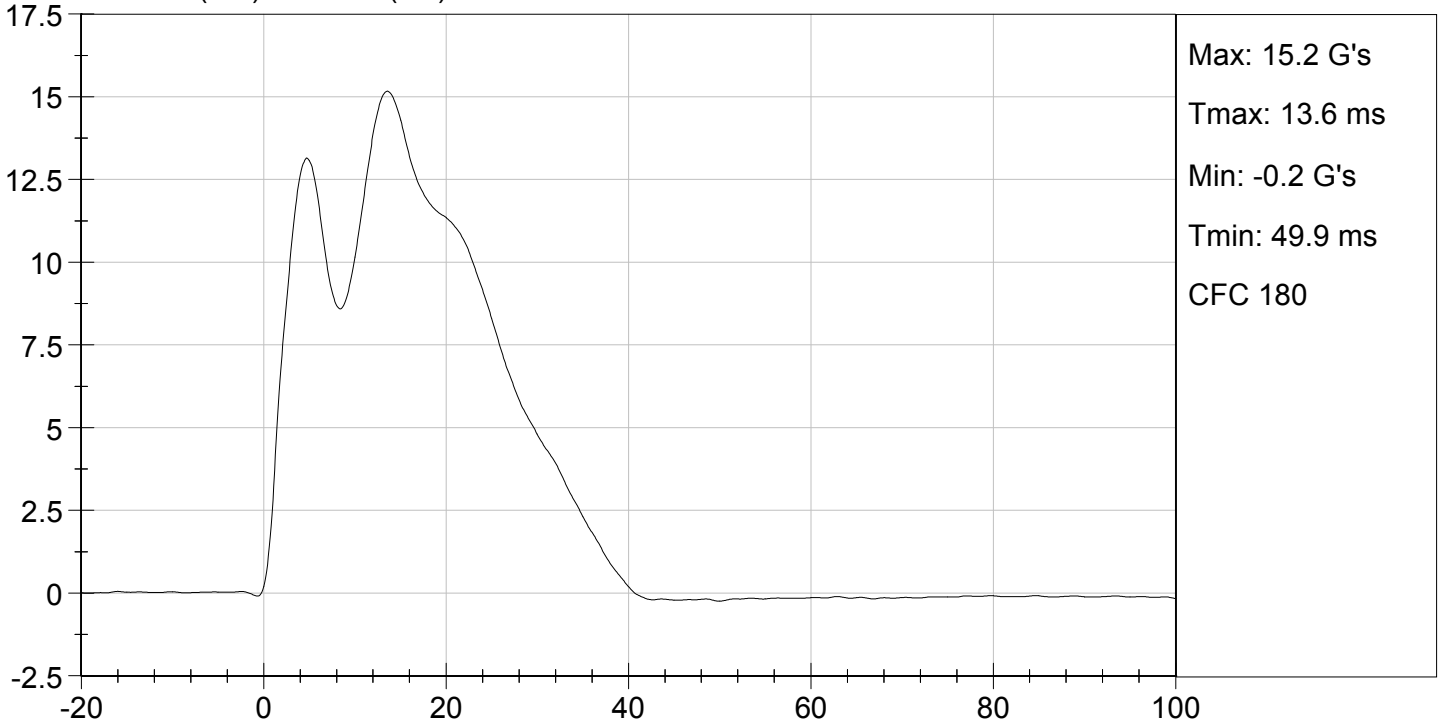
12/17/2013
Test Date

David Winkelbauer
Approved By

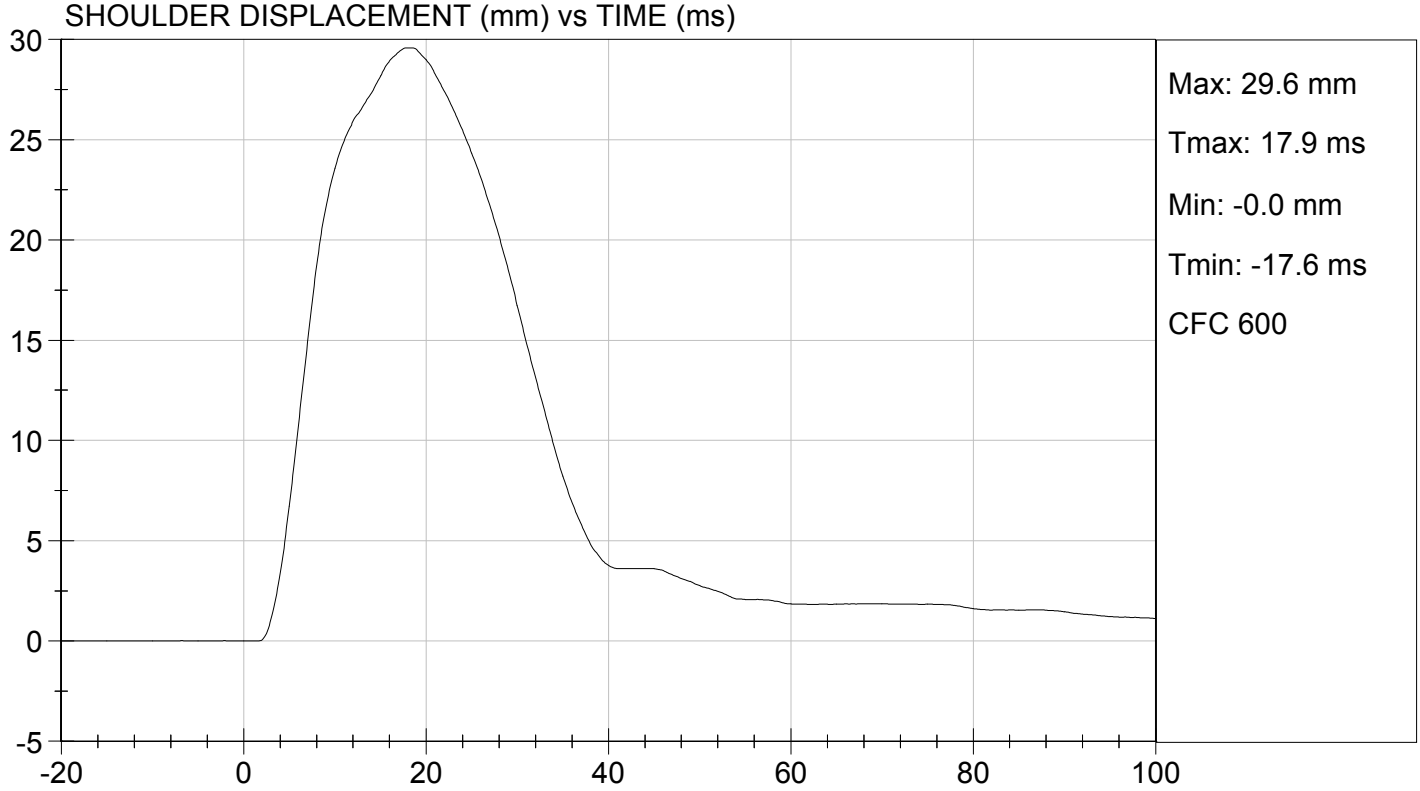
TEST DESC: SHOULDER IMPACT
VELOCITY: 14.24 ft/s, 4.34 m/s

TEST DATE: 12/17/2013
TEST #: D134313

PROBE (G's) vs TIME (ms)



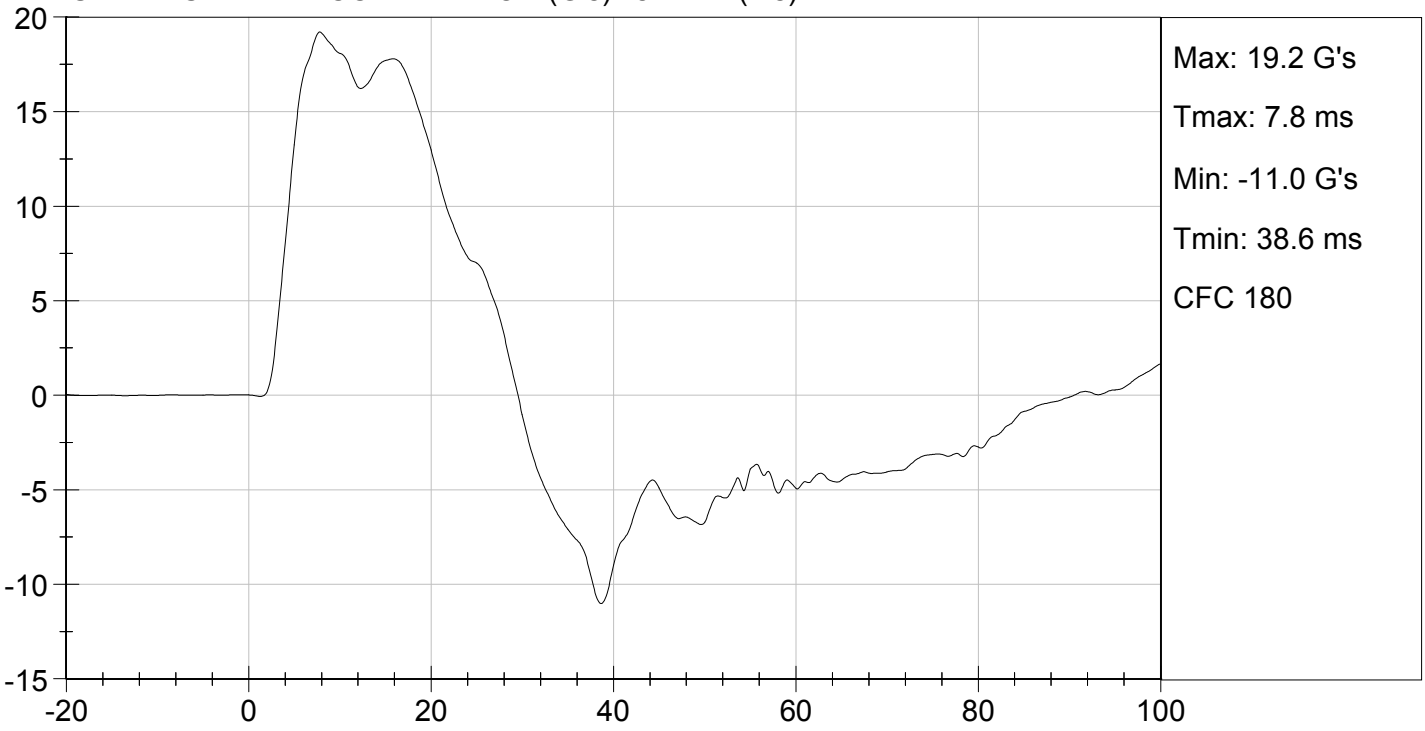

SHOULDER DISPLACEMENT (mm) vs TIME (ms)



TEST DESC: SHOULDER IMPACT
VELOCITY: 14.24 ft/s, 4.34 m/s

TEST DATE: 12/17/2013
TEST #: D134313

UPPER SPINE Y ACCELERATION (G's) vs TIME (ms)



**MGA RESEARCH CORPORATION**

**THORAX (WITH ARM) IMPACT TEST**

**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 306 **Test I.D:** D134314

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Temperature | deg C | 20.6 to 22.2 | 21.7 | Pass |
| Humidity | % | 10 to 70 | 27 | Pass |
| Impact Velocity | m/s | 6.60 to 6.80 | 6.77 | Pass |
| Maximum Probe Acceleration | G's | 30 to 36 | 33 | Pass |
| Shoulder Displacement | mm | 31 to 40 | 32 | Pass |
| Upper Rib Displacement | mm | 25 to 32 | 26 | Pass |
| Middle Rib Displacement | mm | 30 to 36 | 30 | Pass |
| Lower Rib Displacement | mm | 32 to 38 | 34 | Pass |
| Upper Spine (T1) Y Acceleration | G's | 34 to 43 | 39 | Pass |
| Lower Spine (T12) Y Acceleration | G's | 29 to 37 | 32 | Pass |
| | | Overall Test Results | | Pass |

Jessica Hall
Laboratory Technician

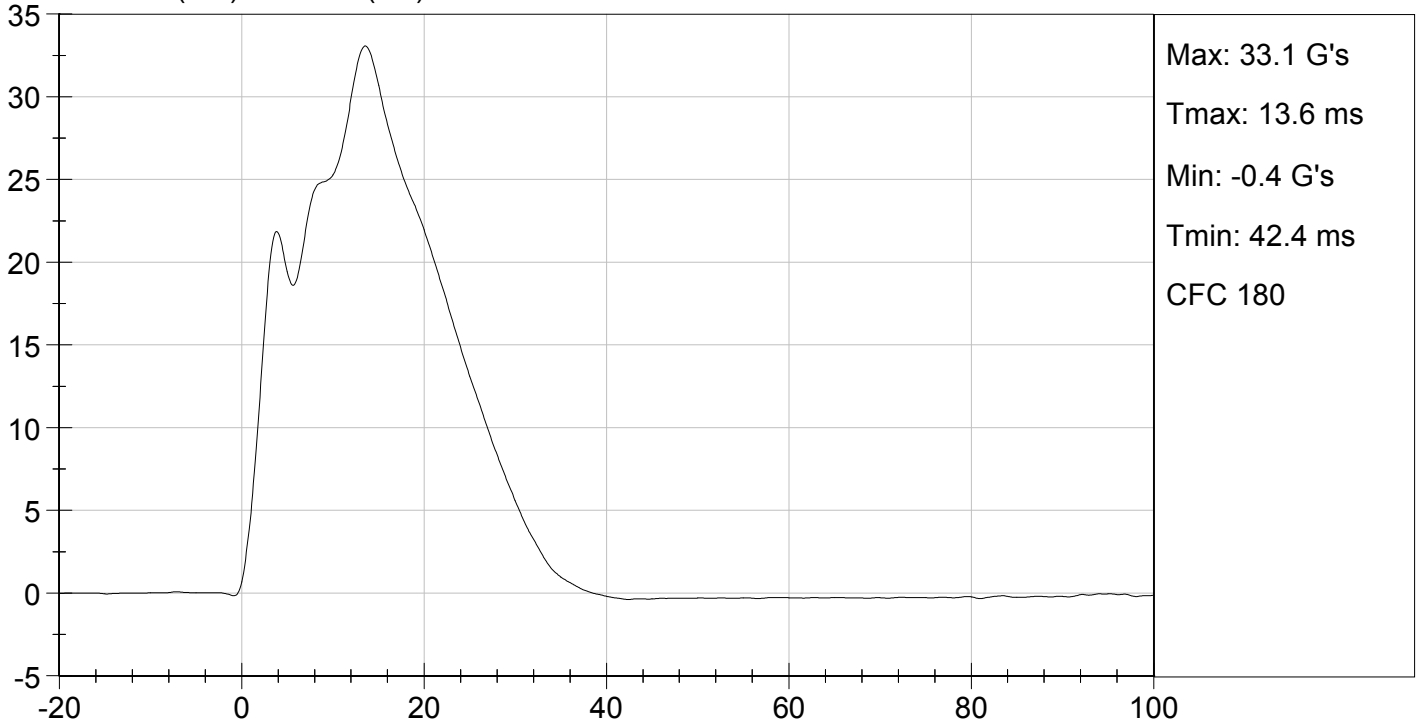
12/17/2013
Test Date

David Winkelbauer
Approved By

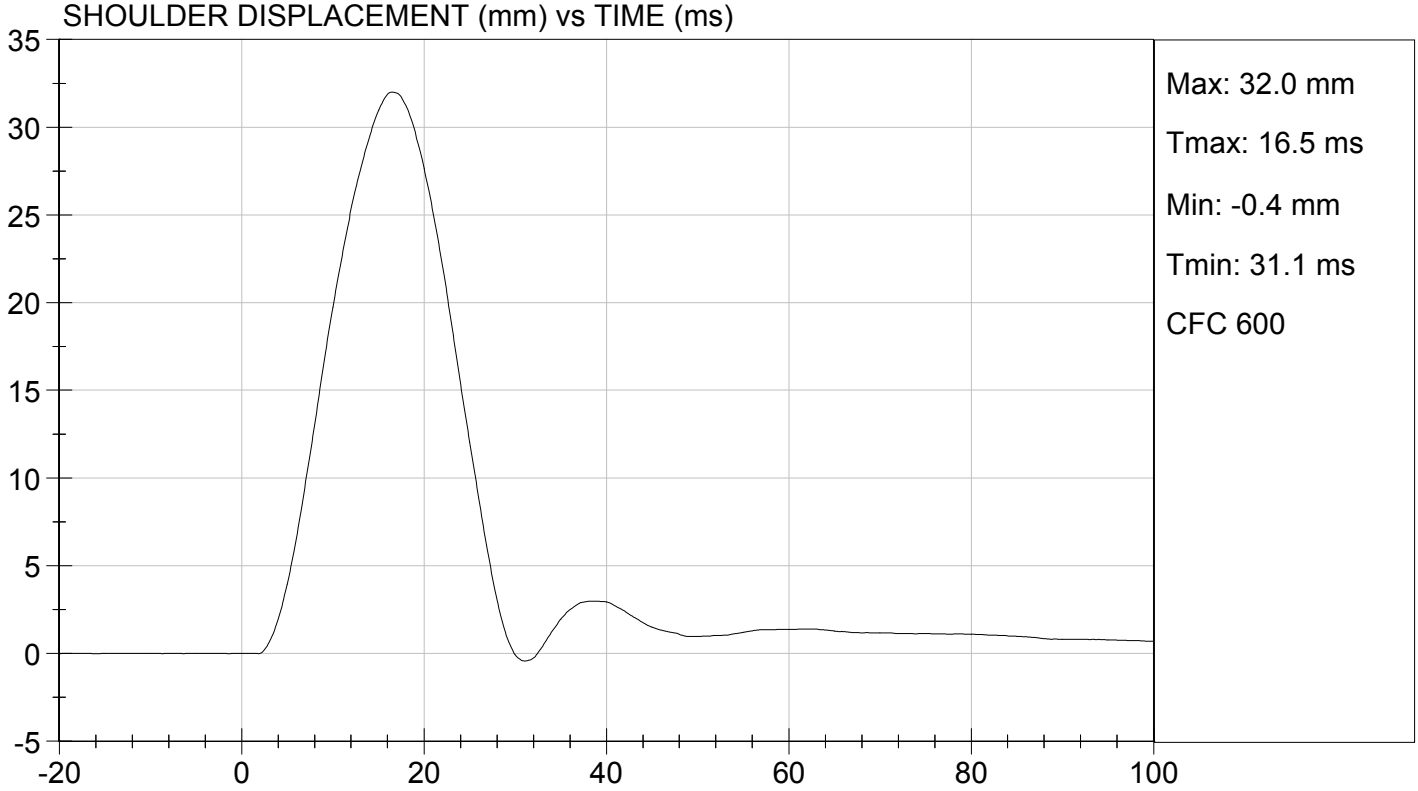
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 12/17/2013
TEST #: D134314

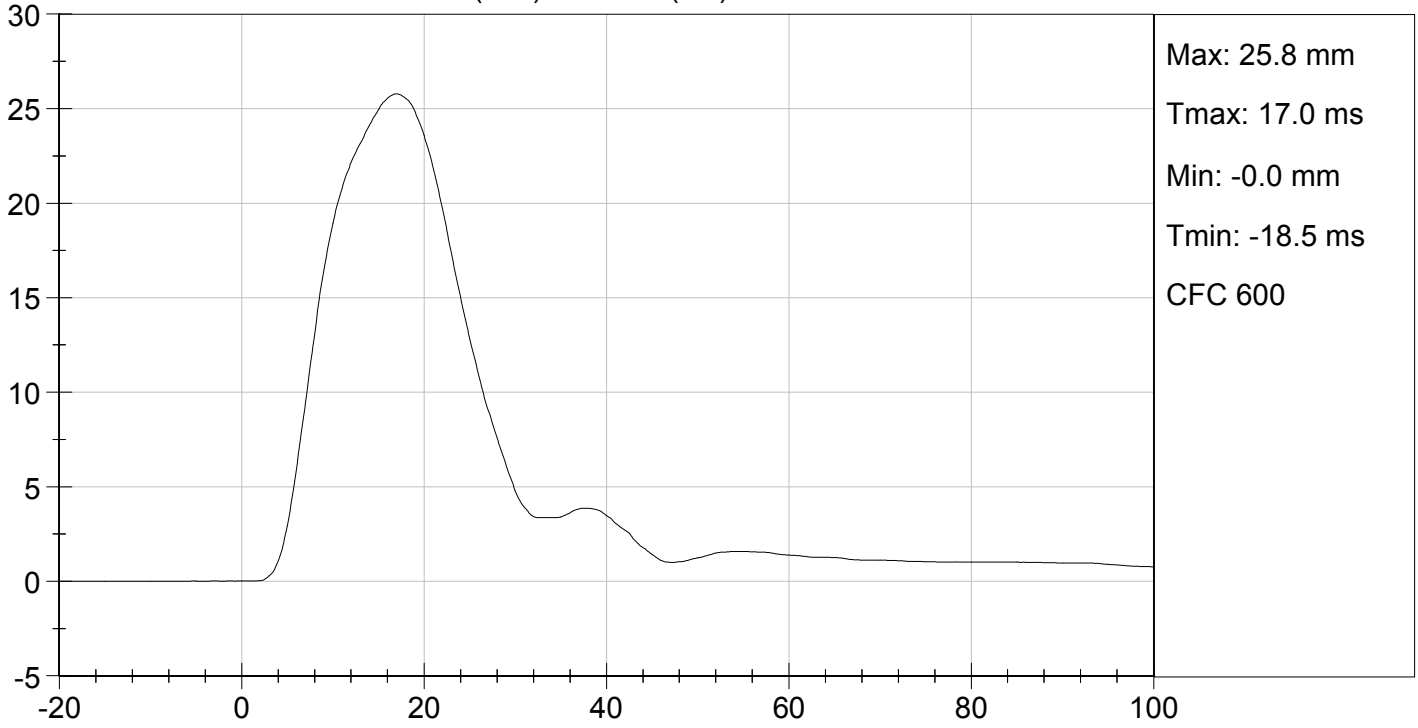
PROBE (G's) vs TIME (ms)



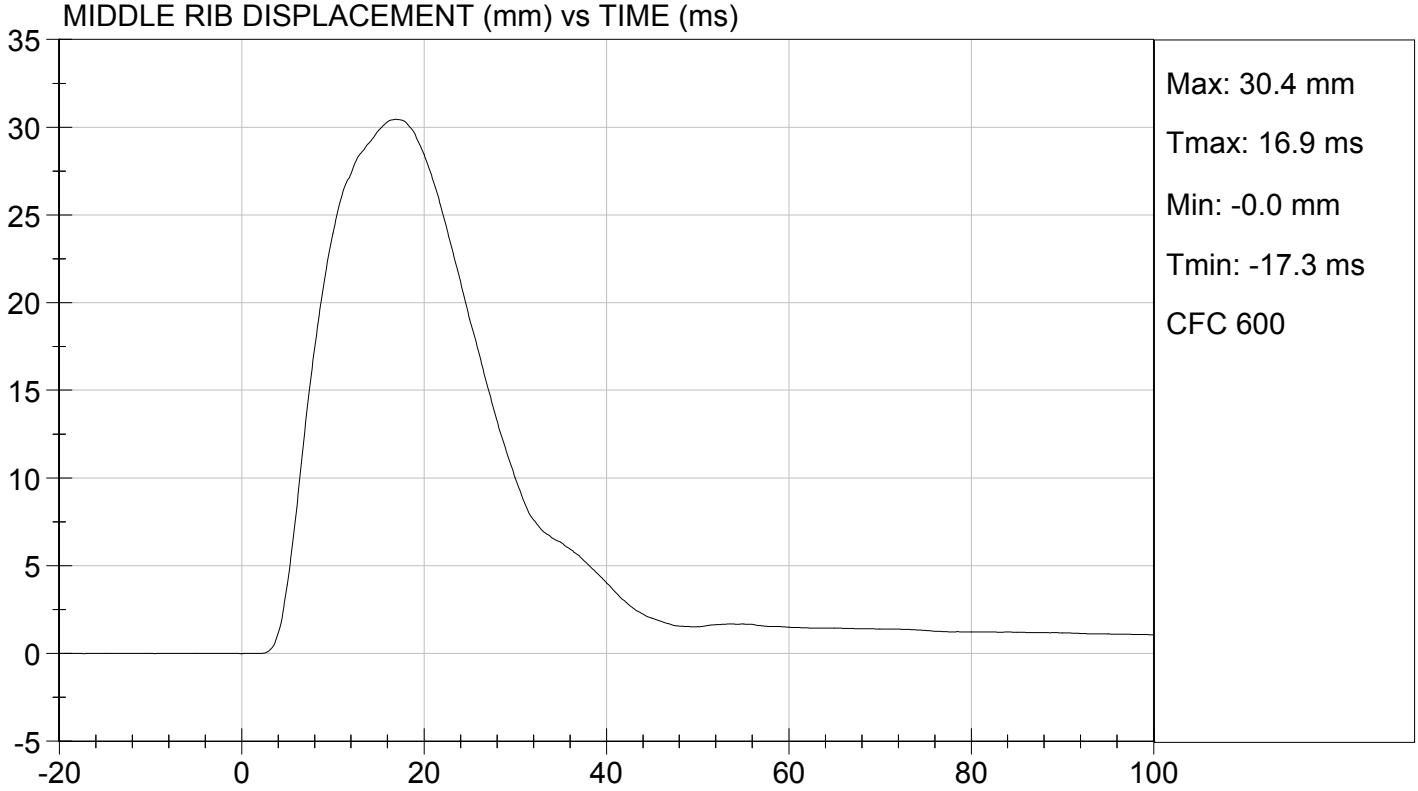

SHOULDER DISPLACEMENT (mm) vs TIME (ms)



UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



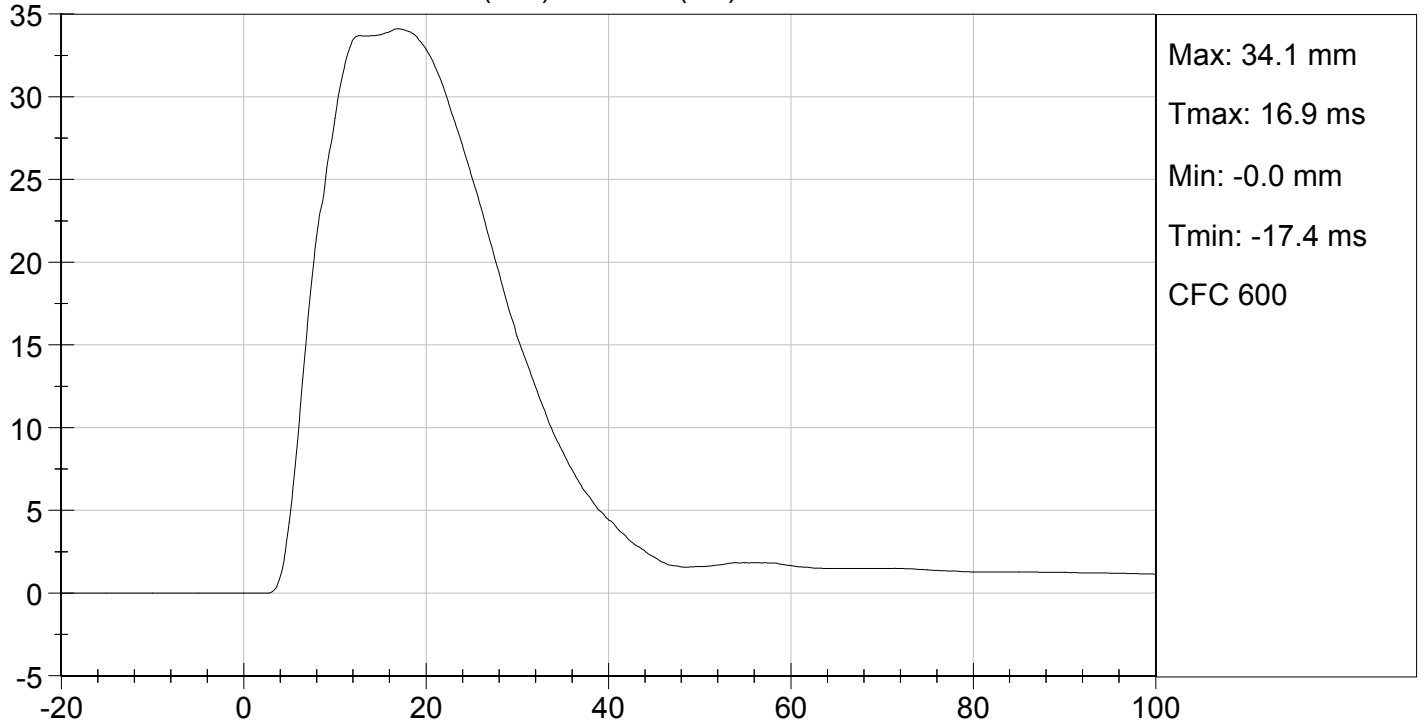

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



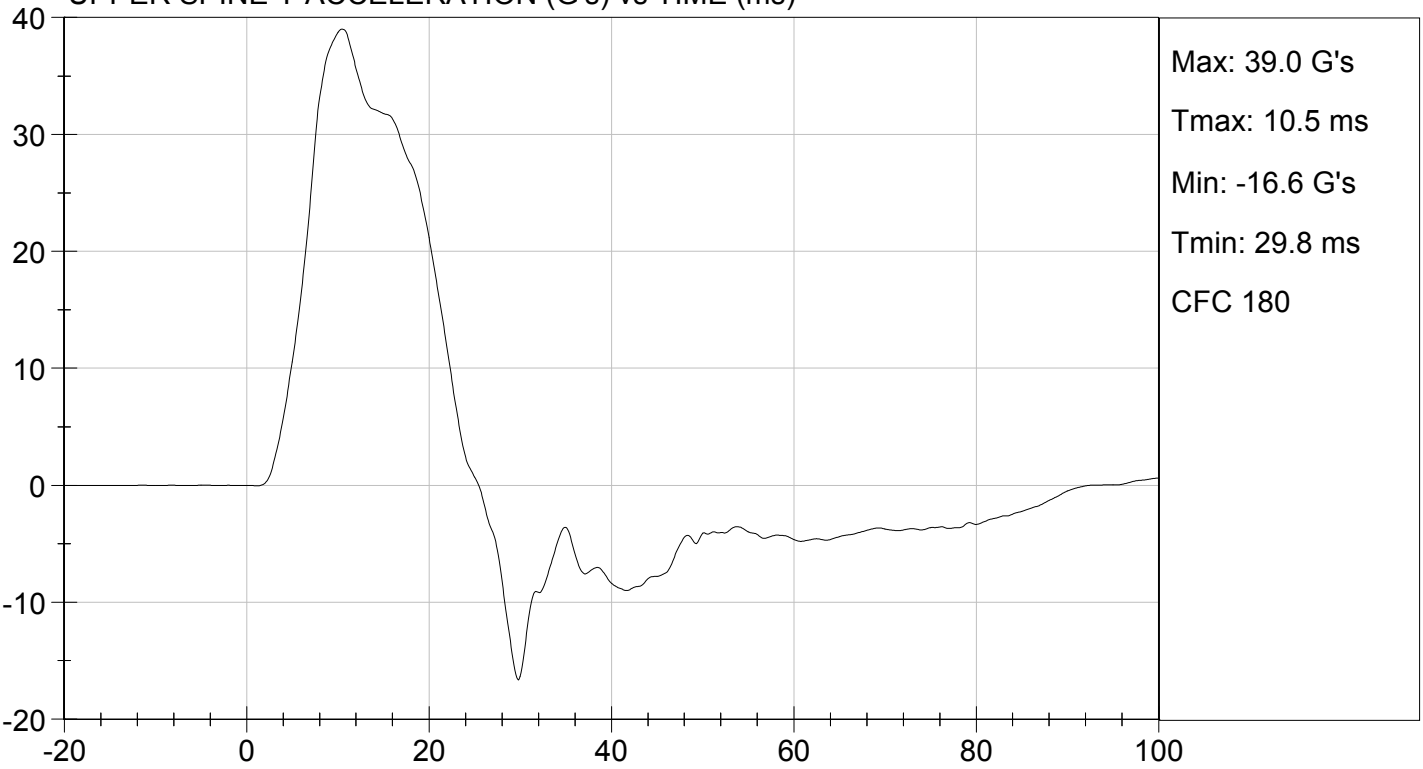
TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 12/17/2013
TEST #: D134314

LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



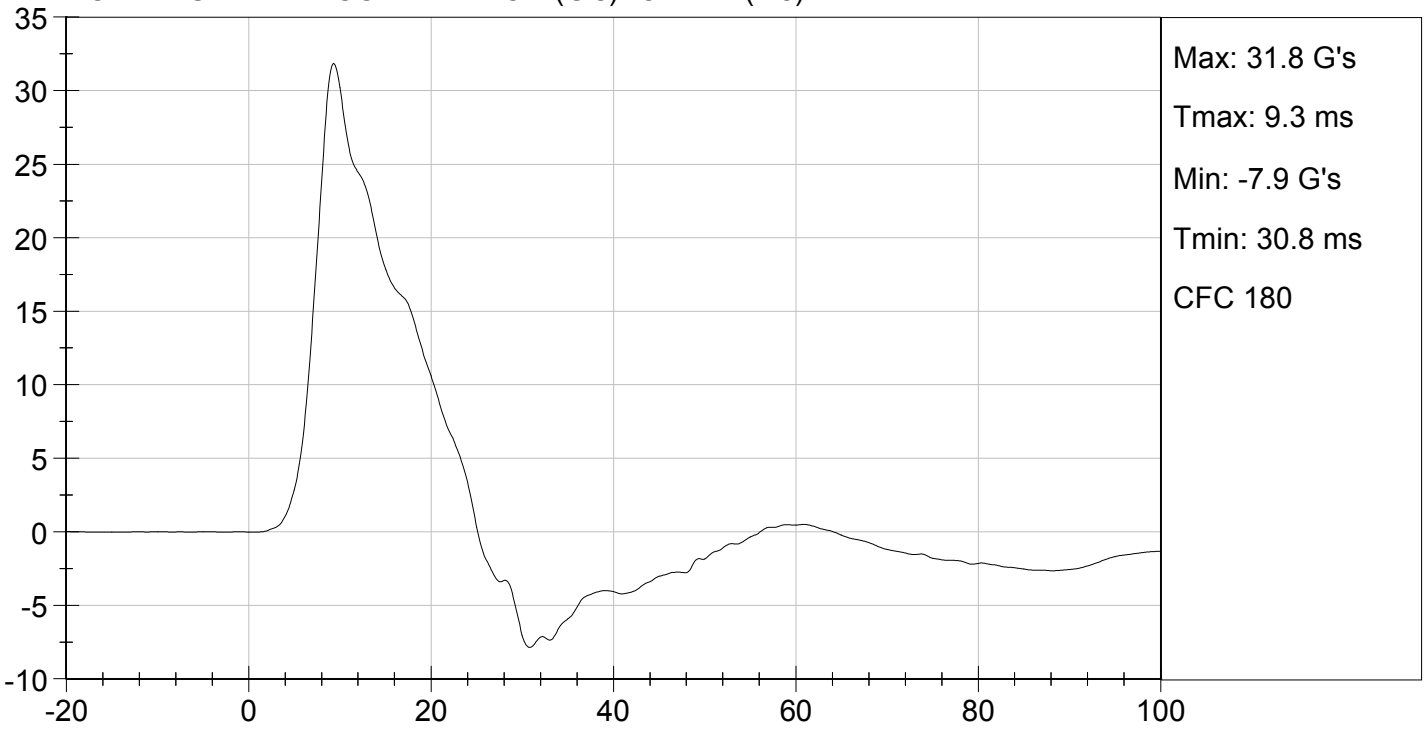

UPPER SPINE Y ACCELERATION (G's) vs TIME (ms)



TEST DESC: THORAX IMPACT WITH ARM
VELOCITY: 22.22 ft/s, 6.77 m/s

TEST DATE: 12/17/2013
TEST #: D134314

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



**MGA RESEARCH CORPORATION**

**THORAX (WITHOUT ARM) IMPACT TEST**

**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 306 **Test I.D:** D134315

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Temperature | deg C | 20.6 to 22.2 | 21.7 | Pass |
| Humidity | % | 10 to 70 | 27 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.27 | Pass |
| Maximum Probe Acceleration | G's | 14 to 18 | 15 | Pass |
| Upper Rib Displacement | mm | 32 to 40 | 38 | Pass |
| Middle Rib Displacement | mm | 39 to 45 | 42 | Pass |
| Lower Rib Displacement | mm | 35 to 43 | 40 | Pass |
| Upper Spine (T1) Y Acceleration | G's | 13 to 17 | 15 | Pass |
| Lower Spine (T12) Y Acceleration | G's | 7 to 11 | 9 | Pass |
| | | Overall Test Results | | Pass |

Jessica Hall
Laboratory Technician

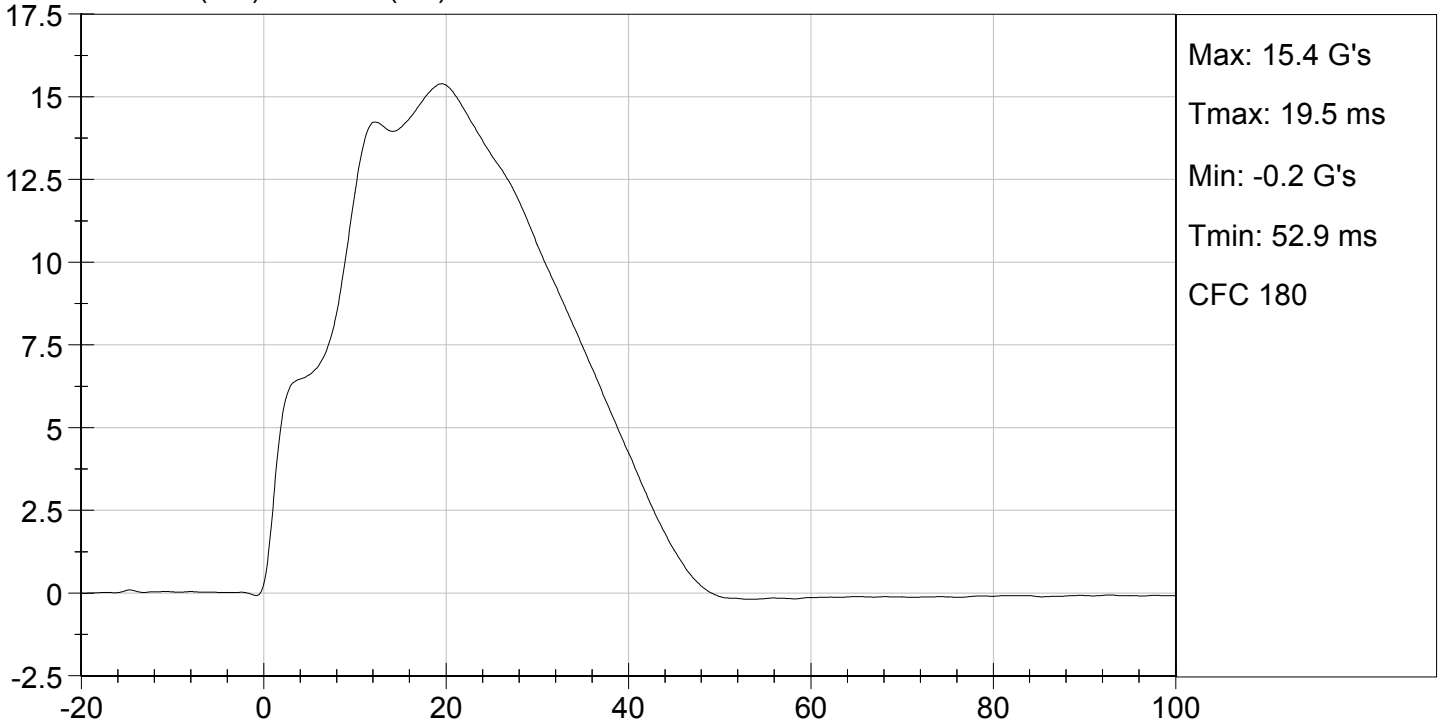
12/17/2013
Test Date

David Winkelbauer
Approved By

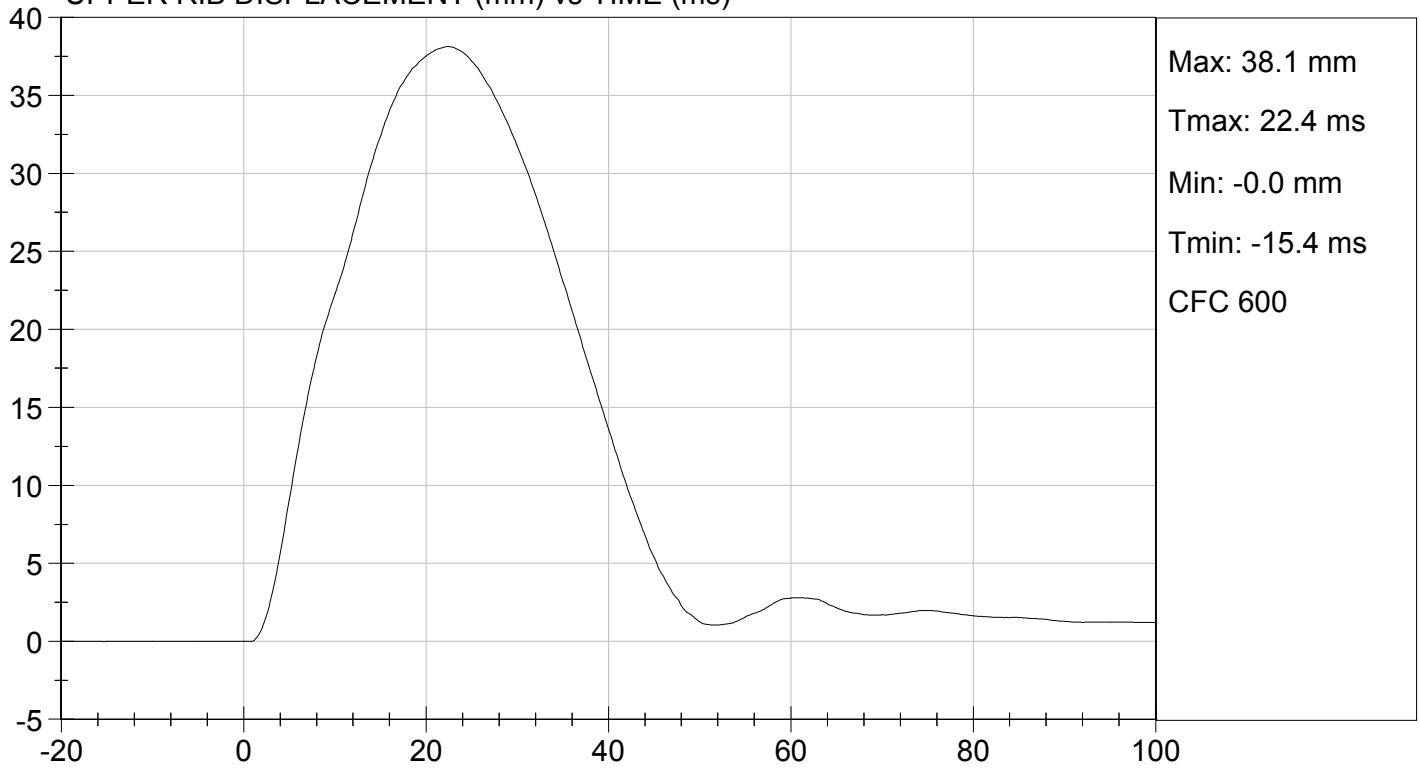
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 12/17/2013
TEST #: D134315

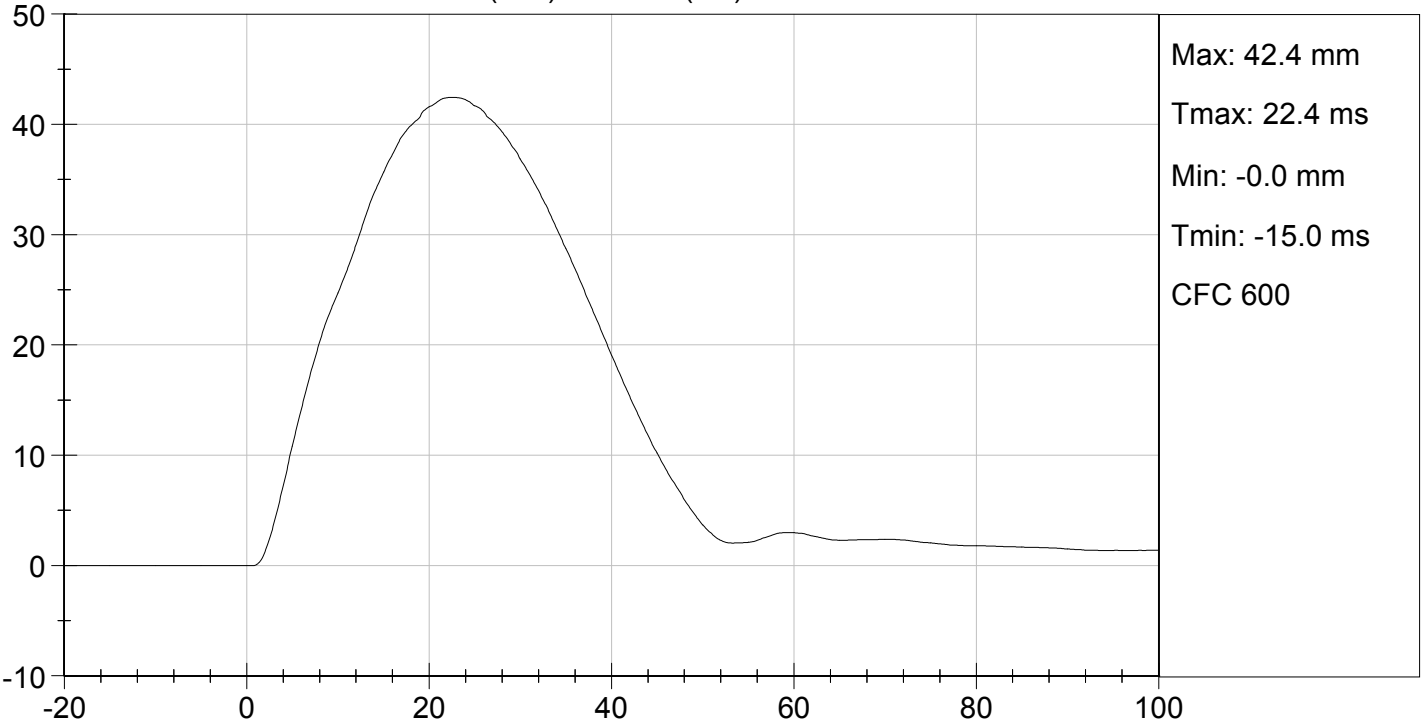
PROBE (G's) vs TIME (ms)



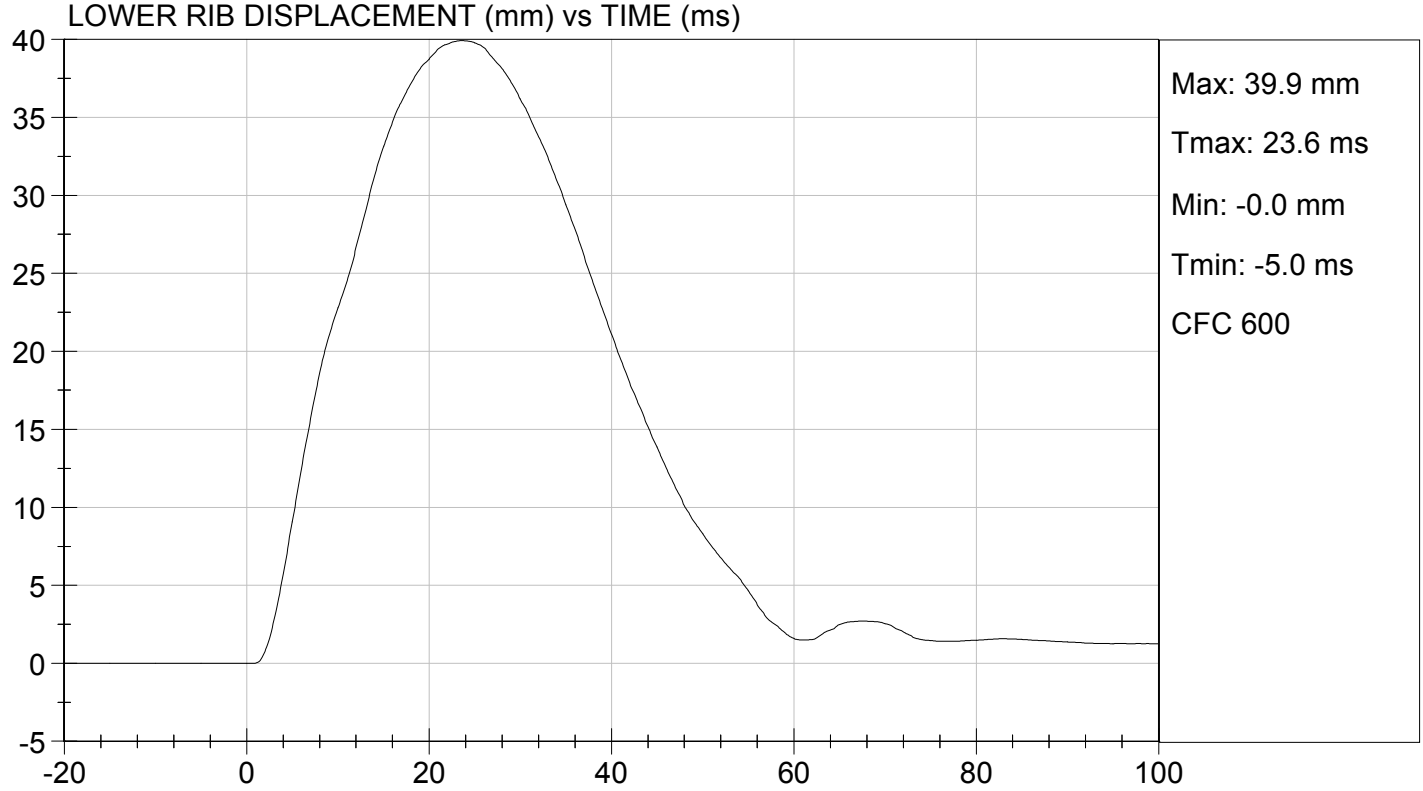

UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



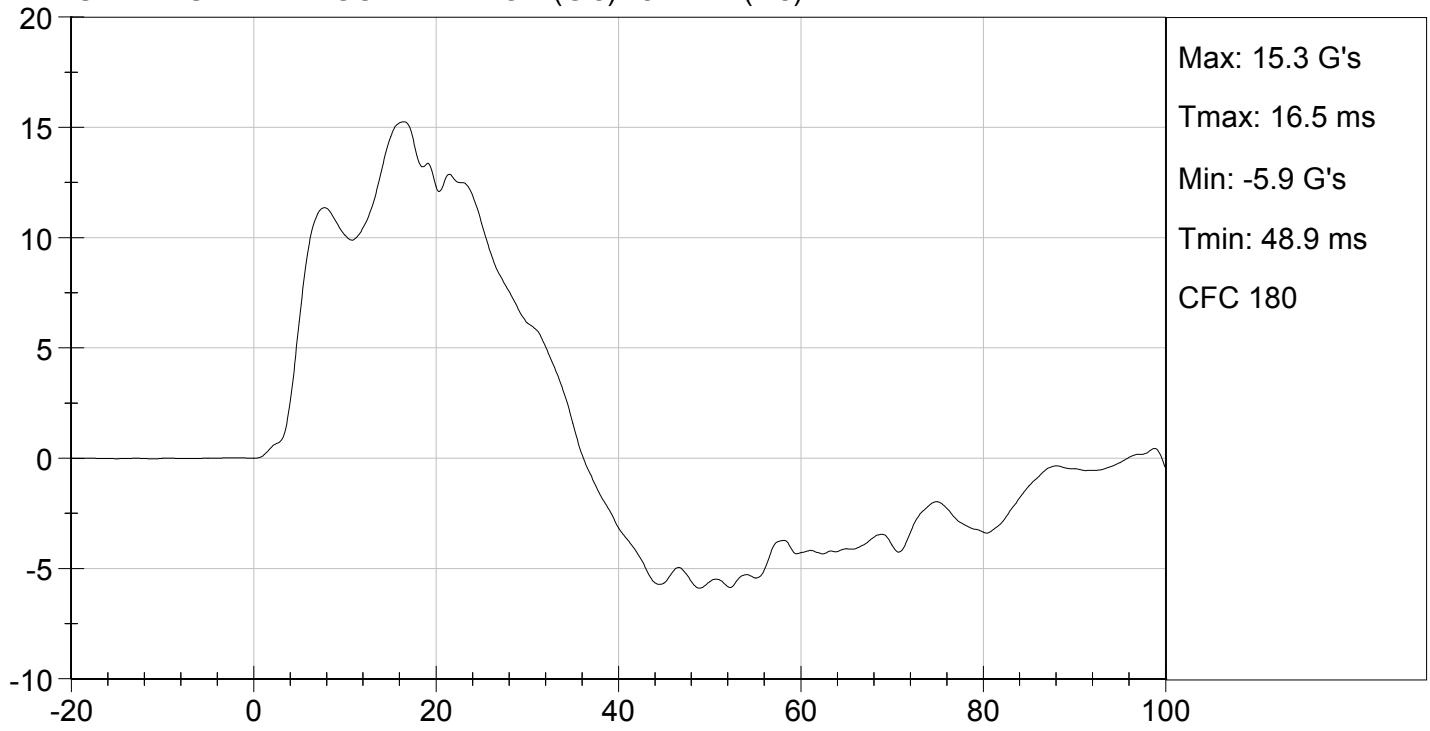

LOWER RIB DISPLACEMENT (mm) vs TIME (ms)



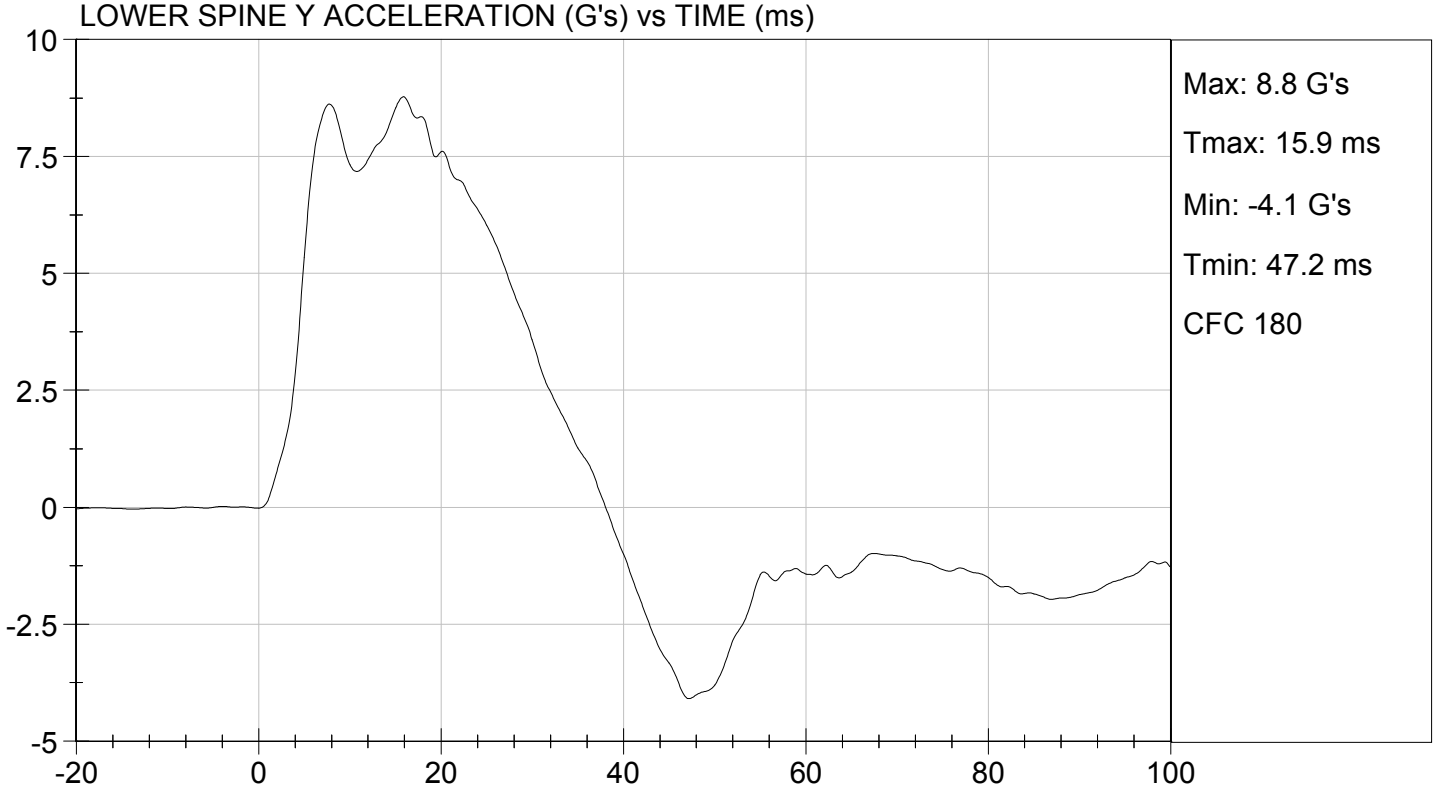
TEST DESC: THORAX IMPACT WITHOUT ARM
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 12/17/2013
TEST #: D134315

UPPER SPINE Y ACCELERATION (G's) vs TIME (ms)




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



**MGA RESEARCH CORPORATION**

**ABDOMINAL IMPACT TEST**

**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 306 **Test I.D:** D134316

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Temperature | deg C | 20.6 to 22.2 | 21.7 | Pass |
| Humidity | % | 10 to 70 | 27 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.38 | Pass |
| Maximum Probe Acceleration | G's | 12 to 16 | 14 | Pass |
| Upper Abdomen Rib Displacement | mm | 36 to 47 | 41 | Pass |
| Lower Abdomen Rib Displacement | mm | 33 to 44 | 40 | Pass |
| Lower Spine (T12) Y Acceleration | G's | 9 to 14 | 10 | Pass |
| | | Overall Test Results | | Pass |

Jessica Gall
Laboratory Technician

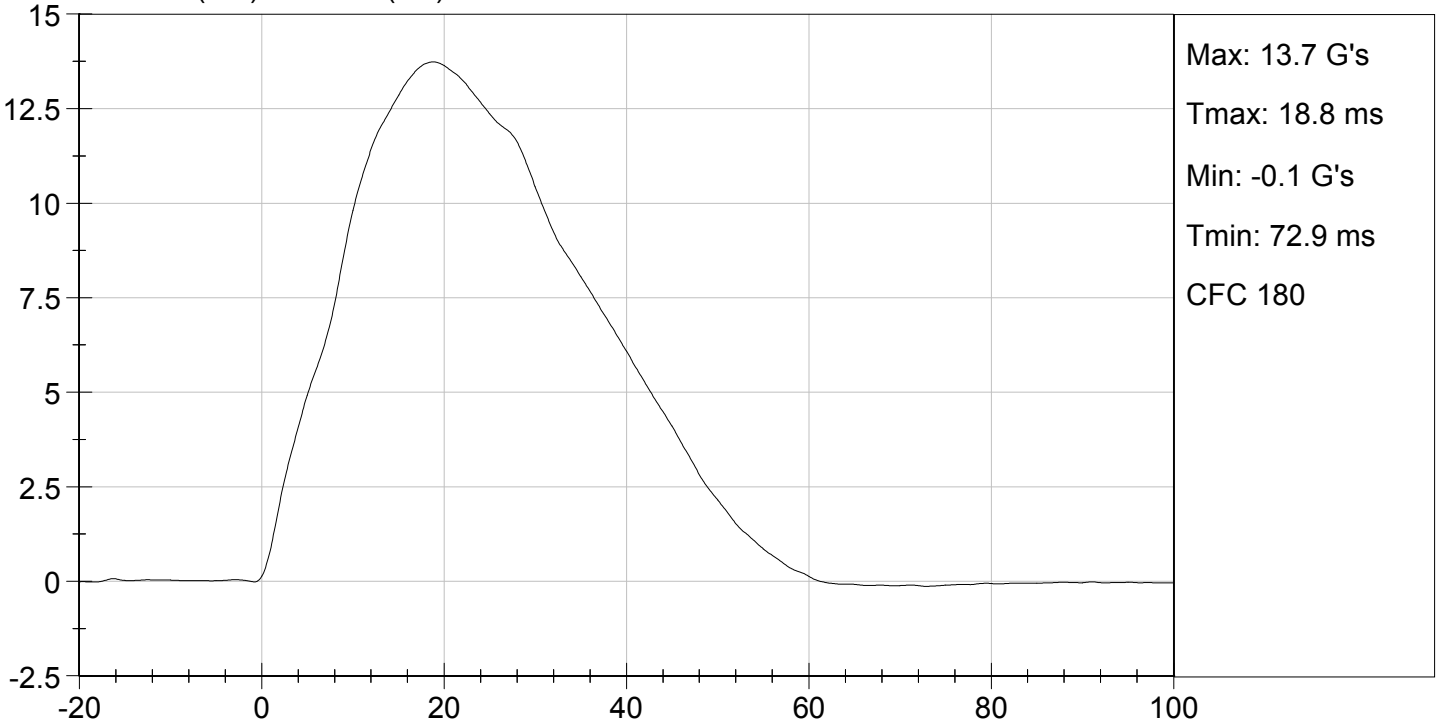
12/17/2013
Test Date

David Winkelbauer
Approved By

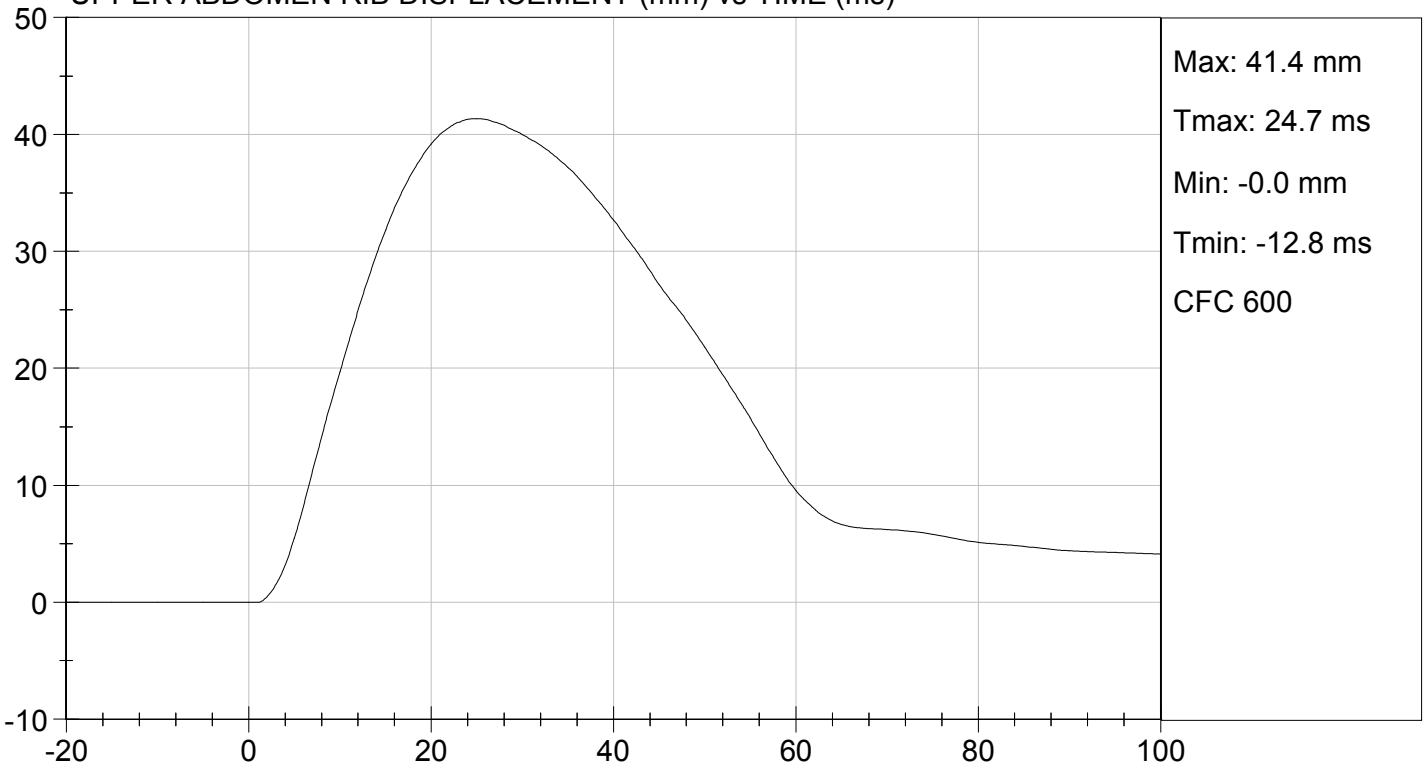
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 12/17/2013
TEST #: D134316

PROBE (G's) vs TIME (ms)



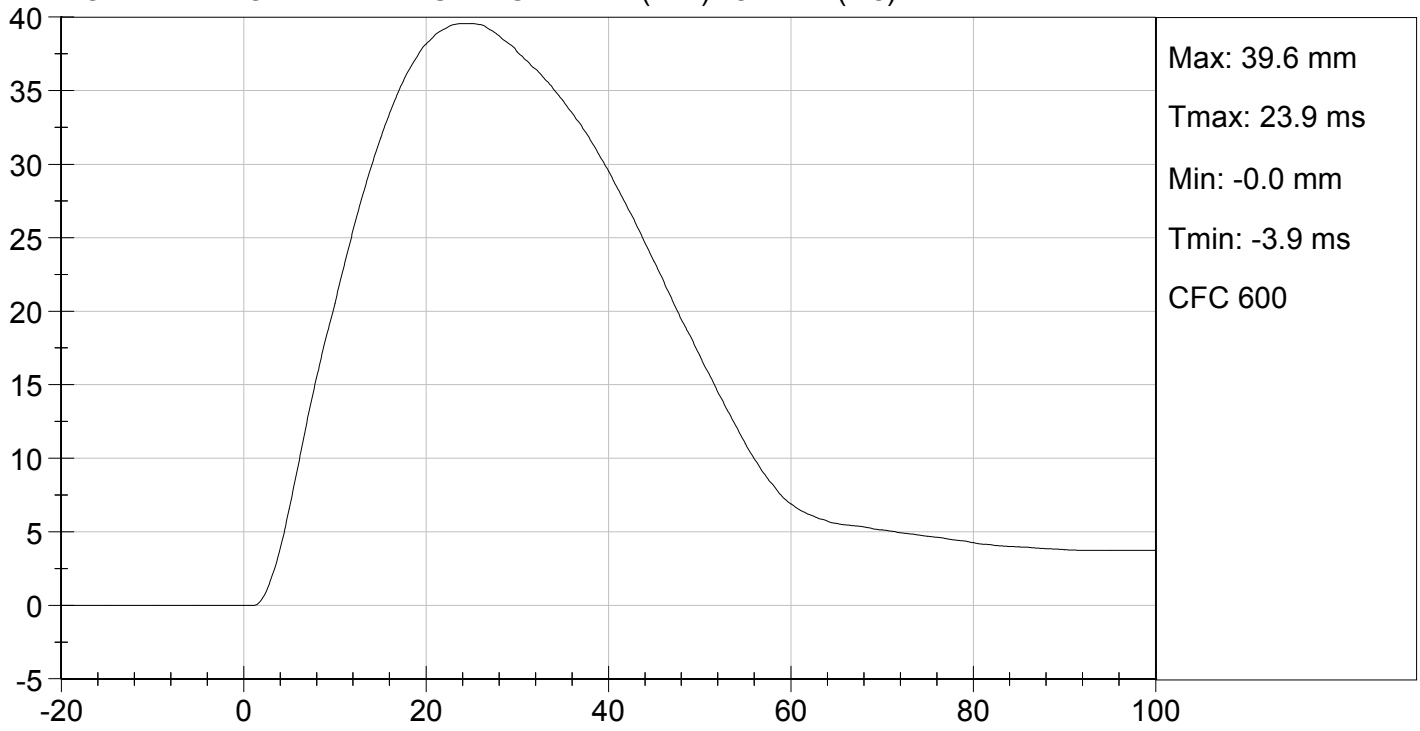

UPPER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



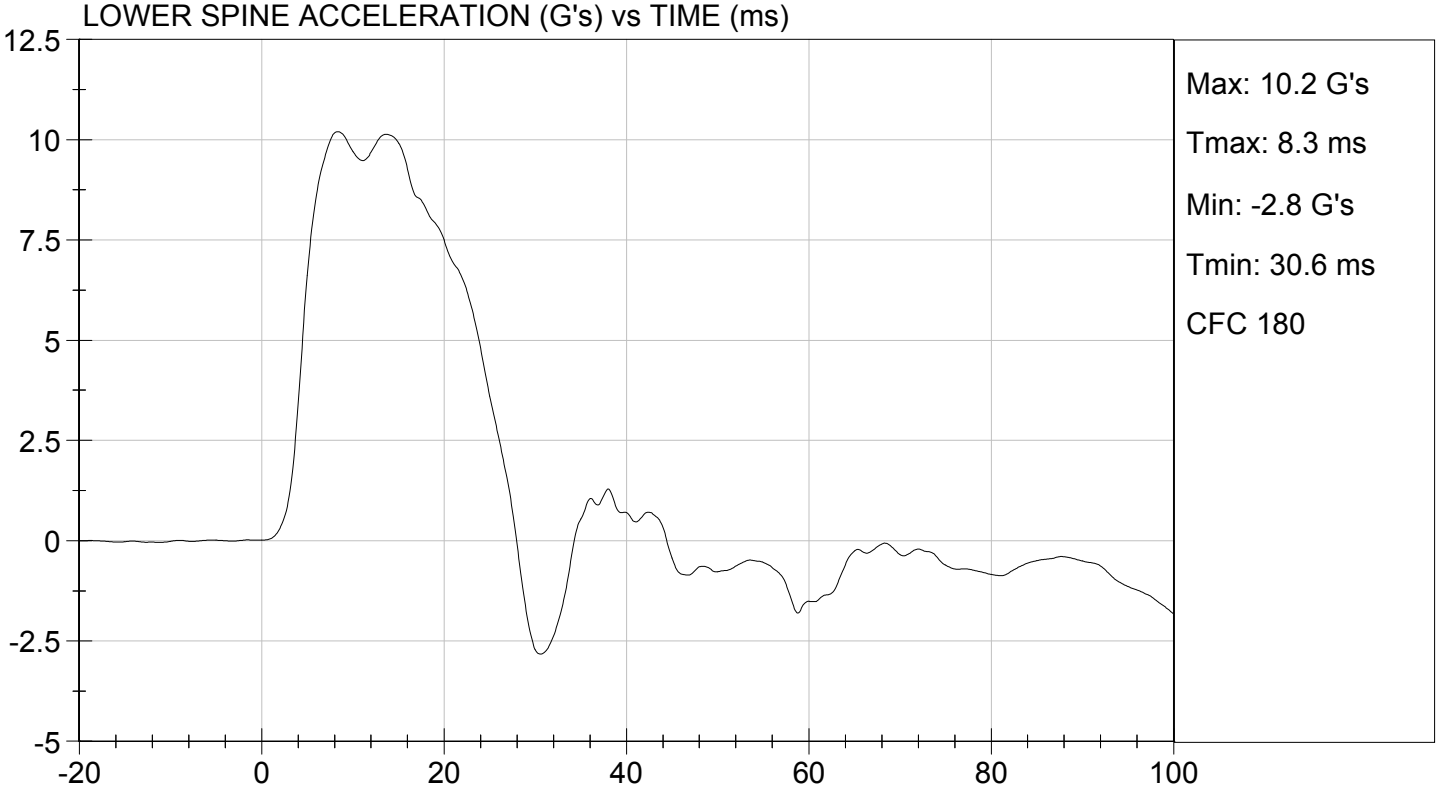
TEST DESC: ABDOMEN IMPACT
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 12/17/2013
TEST #: D134316

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




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



**MGA RESEARCH CORPORATION**

**PELVIS IMPACT TEST**

**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 306 **Test I.D:** D134317

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Temperature | deg C | 20.6 to 22.2 | 21.7 | Pass |
| Humidity | % | 10 to 70 | 27 | Pass |
| Impact Velocity | m/s | 6.60 to 6.80 | 6.60 | Pass |
| Maximum Probe Acceleration | G's | 38 to 47 | 43 | Pass |
| Pelvis Y Acceleration After 6 ms | G's | 34 to 42 | 41 | Pass |
| Peak Acetabulum Force | N | 3600 to 4300 | 4,234 | Pass |
| | | Overall Test Results | | Pass |

Jessica Hall
Laboratory Technician

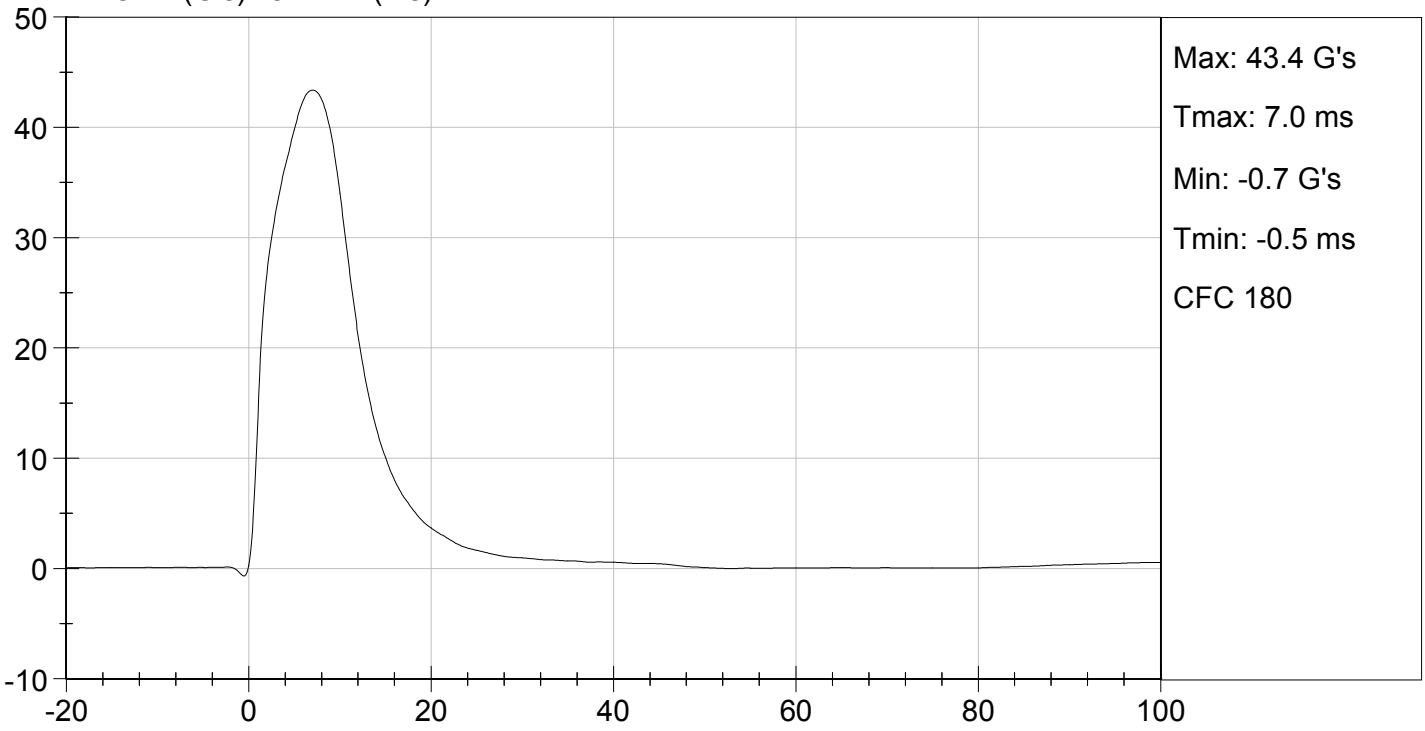
12/17/2013
Test Date

David Winkelbauer
Approved By

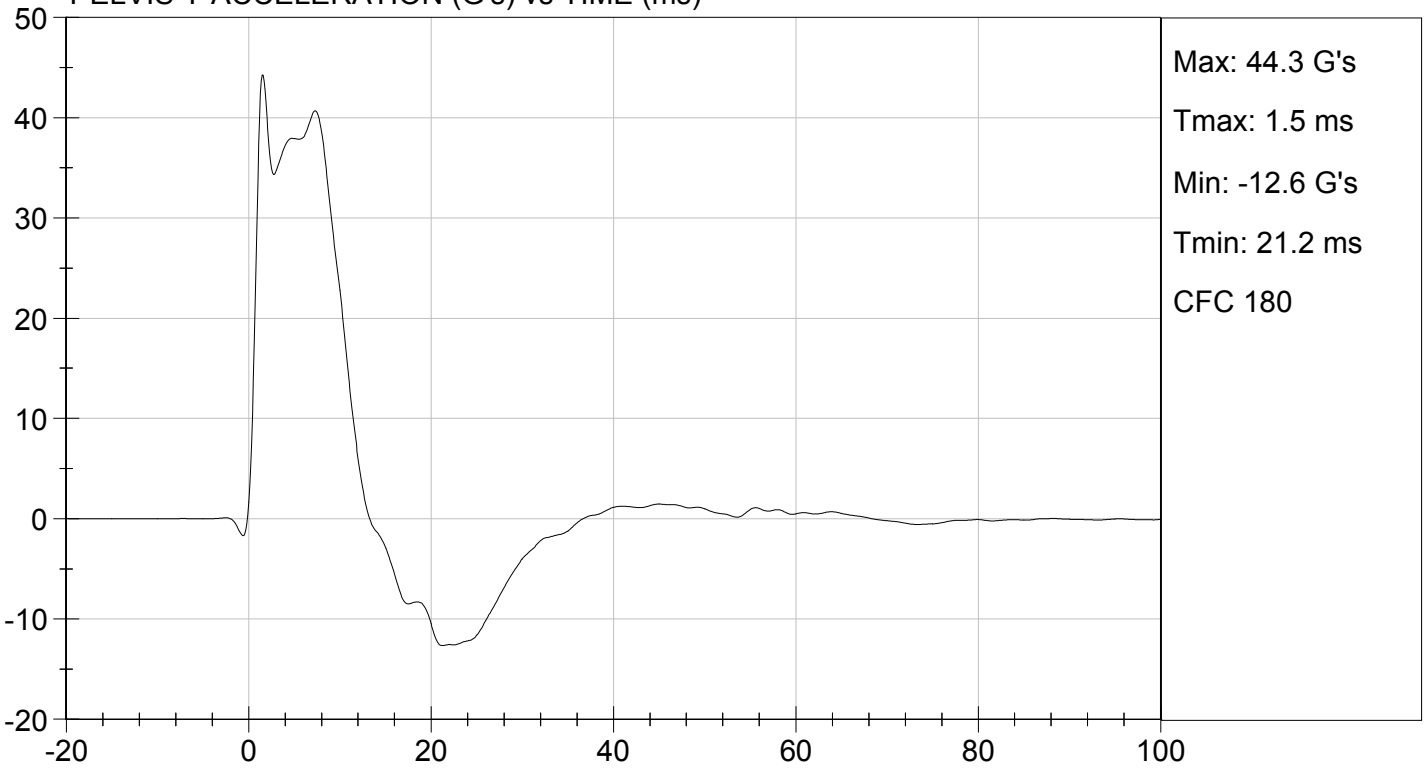
TEST DESC: PELVIS IMPACT
VELOCITY: 21.65 ft/s, 6.60 m/s

TEST DATE: 12/17/2013
TEST #: D134317

PROBE (G's) vs TIME (ms)

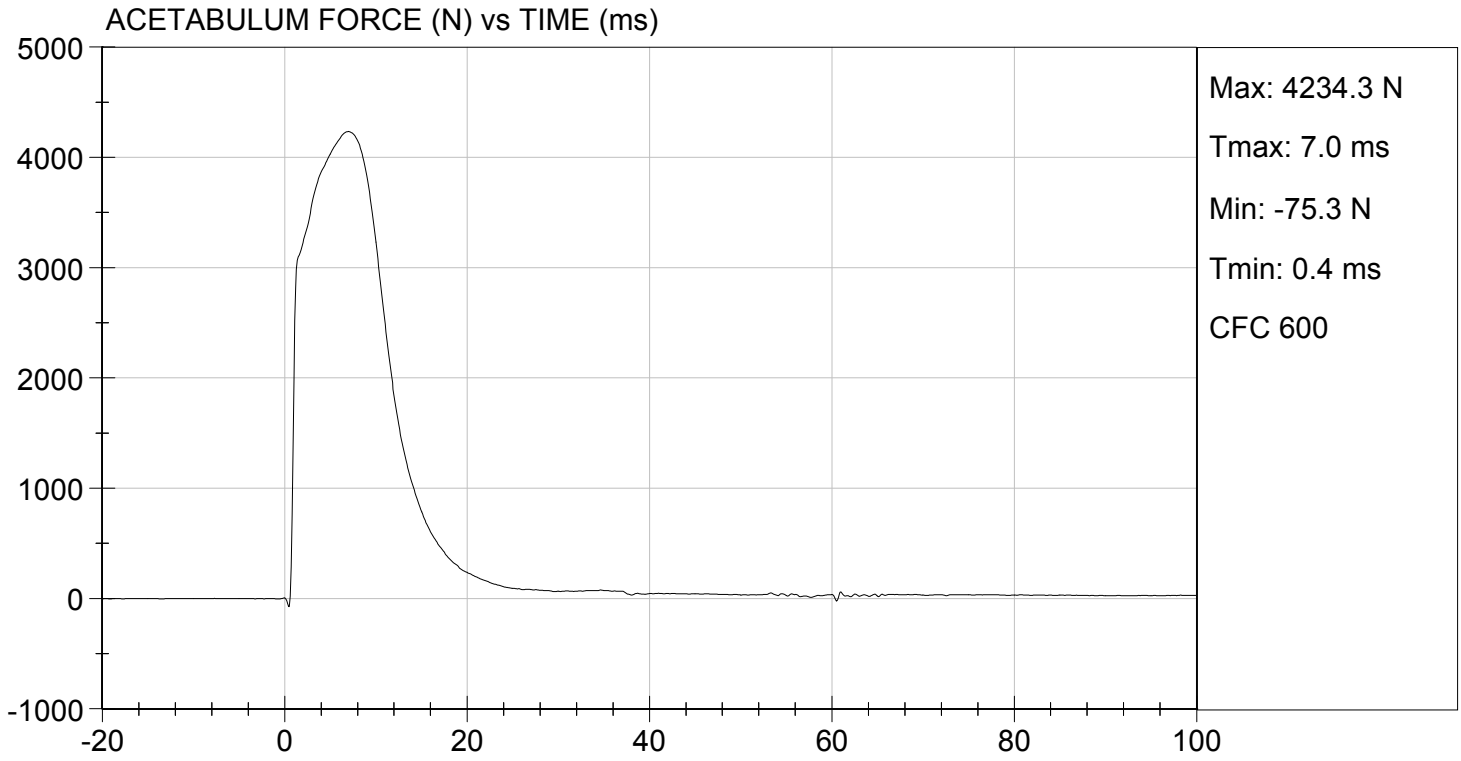



PELVIS Y ACCELERATION (G's) vs TIME (ms)



TEST DESC: PELVIS IMPACT
VELOCITY: 21.65 ft/s, 6.60 m/s

TEST DATE: 12/17/2013
TEST #: D134317



**MGA RESEARCH CORPORATION**

**ILIAC IMPACT TEST**

**SID-IIs BUILD LEVEL D DUMMY**

**ATD Serial No:** 306 **Test I.D:** D134318

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---|---|---|---|---|
| Temperature | deg C | 20.6 to 22.2 | 21.7 | Pass |
| Humidity | % | 10 to 70 | 27 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.27 | Pass |
| Maximum Probe Acceleration | G's | 36 to 45 | 41 | Pass |
| Pelvis Y Acceleration | G's | 28 to 39 | 36 | Pass |
| Peak Pelvis Iliac Force | N | 4100 to 5100 | 4,993 | Pass |
| | | Overall Test Results | | Pass |

Jessica Gall
Laboratory Technician

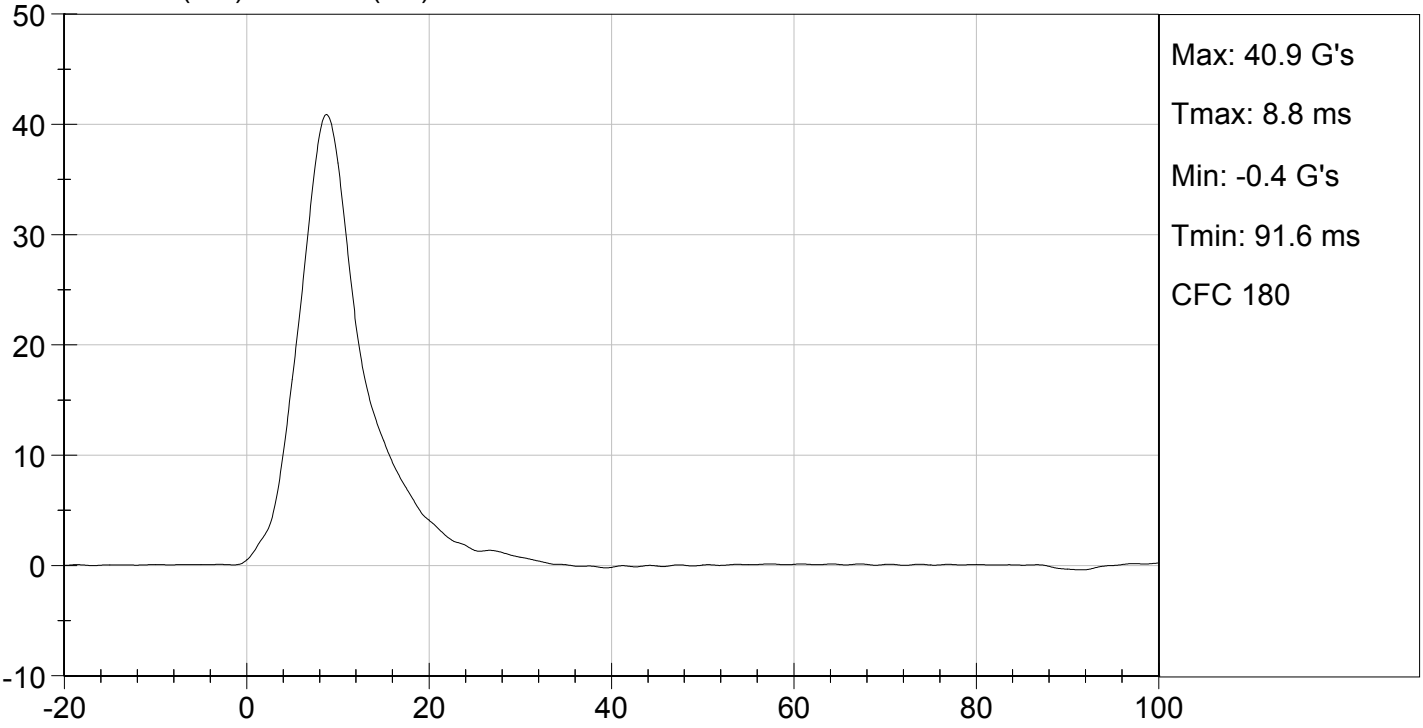
12/17/2013
Test Date

David Winkelbauer
Approved By

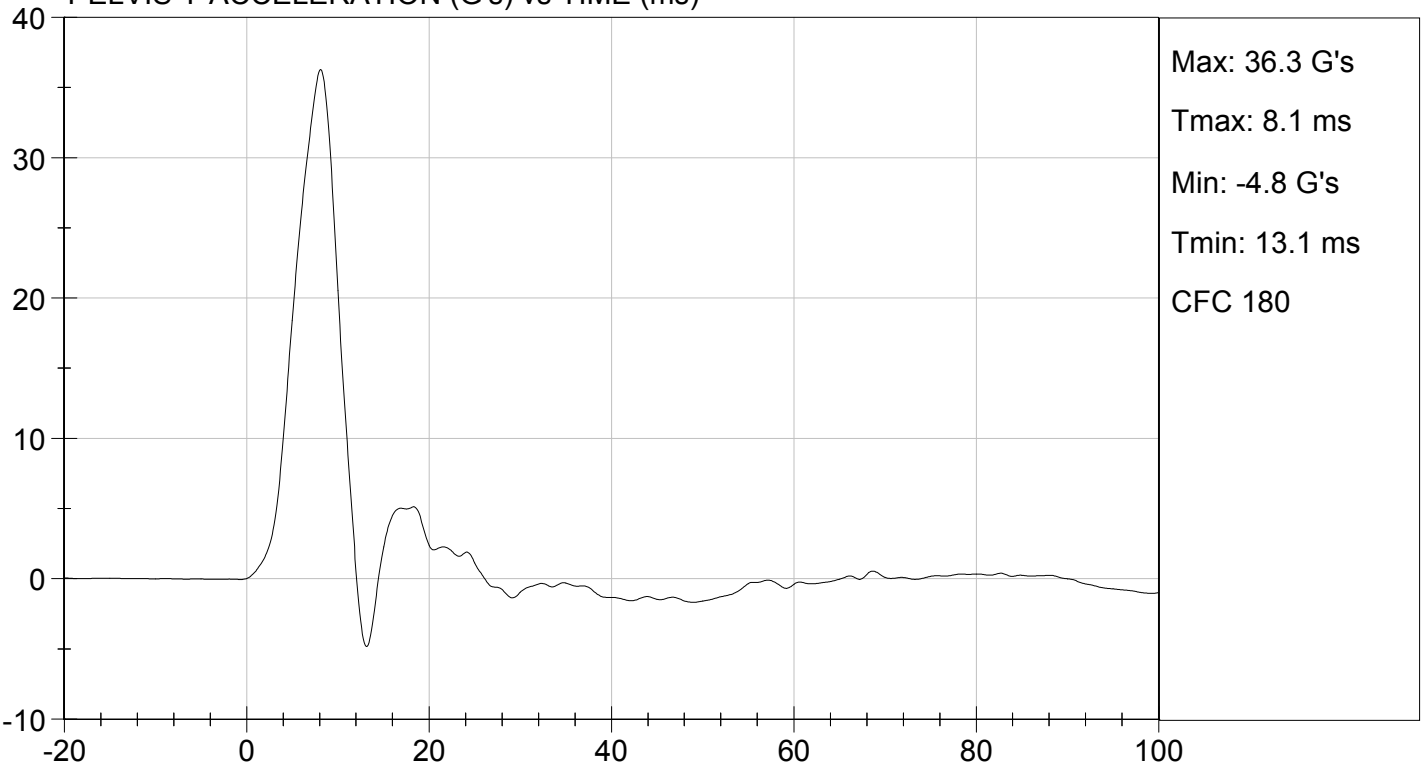
TEST DESC: ILLIAC
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 12/17/2013
TEST #: D134318

PROBE (G's) vs TIME (ms)

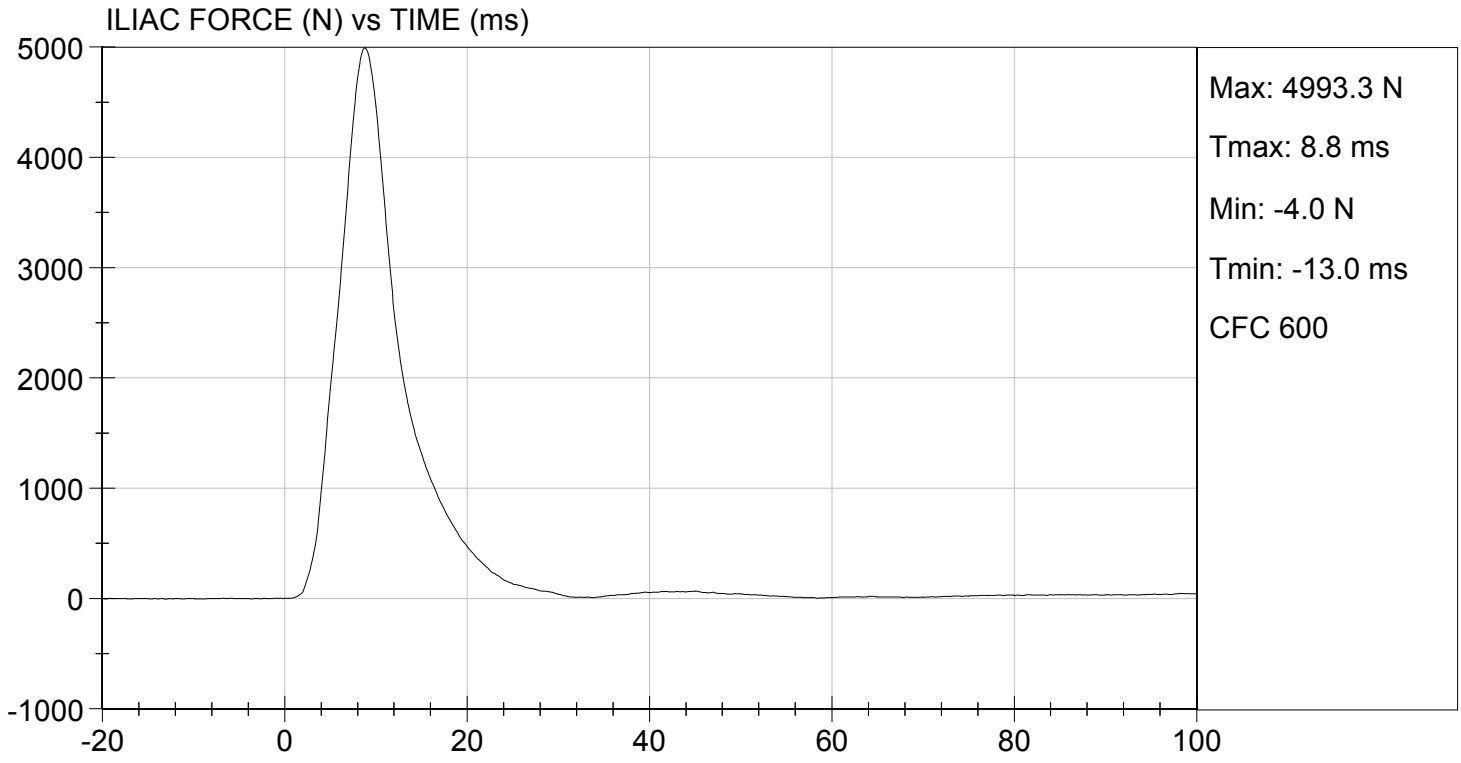



PELVIS Y ACCELERATION (G's) vs TIME (ms)

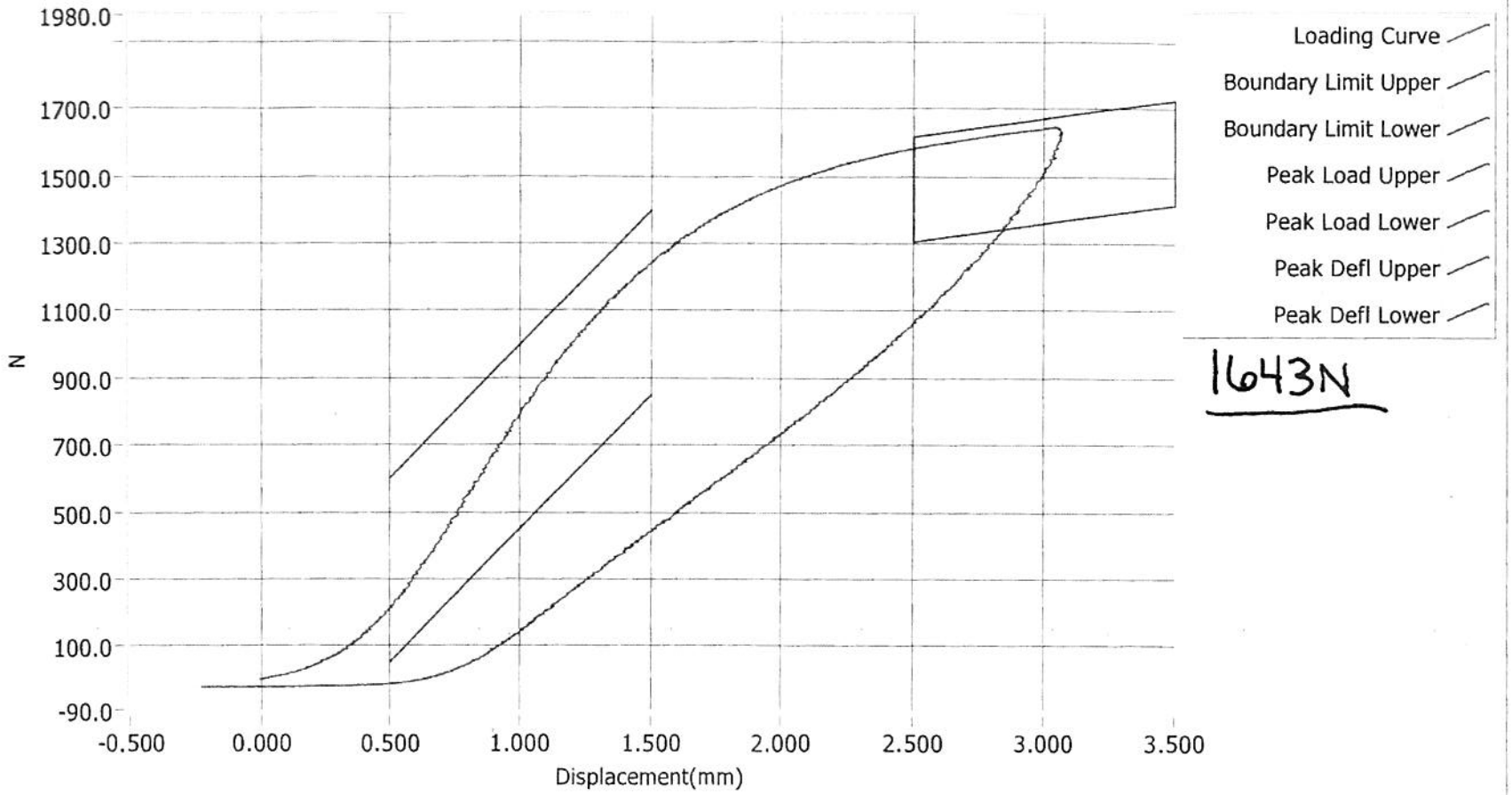


TEST DESC: ILLIAC
VELOCITY: 14.01 ft/s, 4.27 m/s

TEST DATE: 12/17/2013
TEST #: D134318



## Resultant Data - SIDIIs Plug Compression



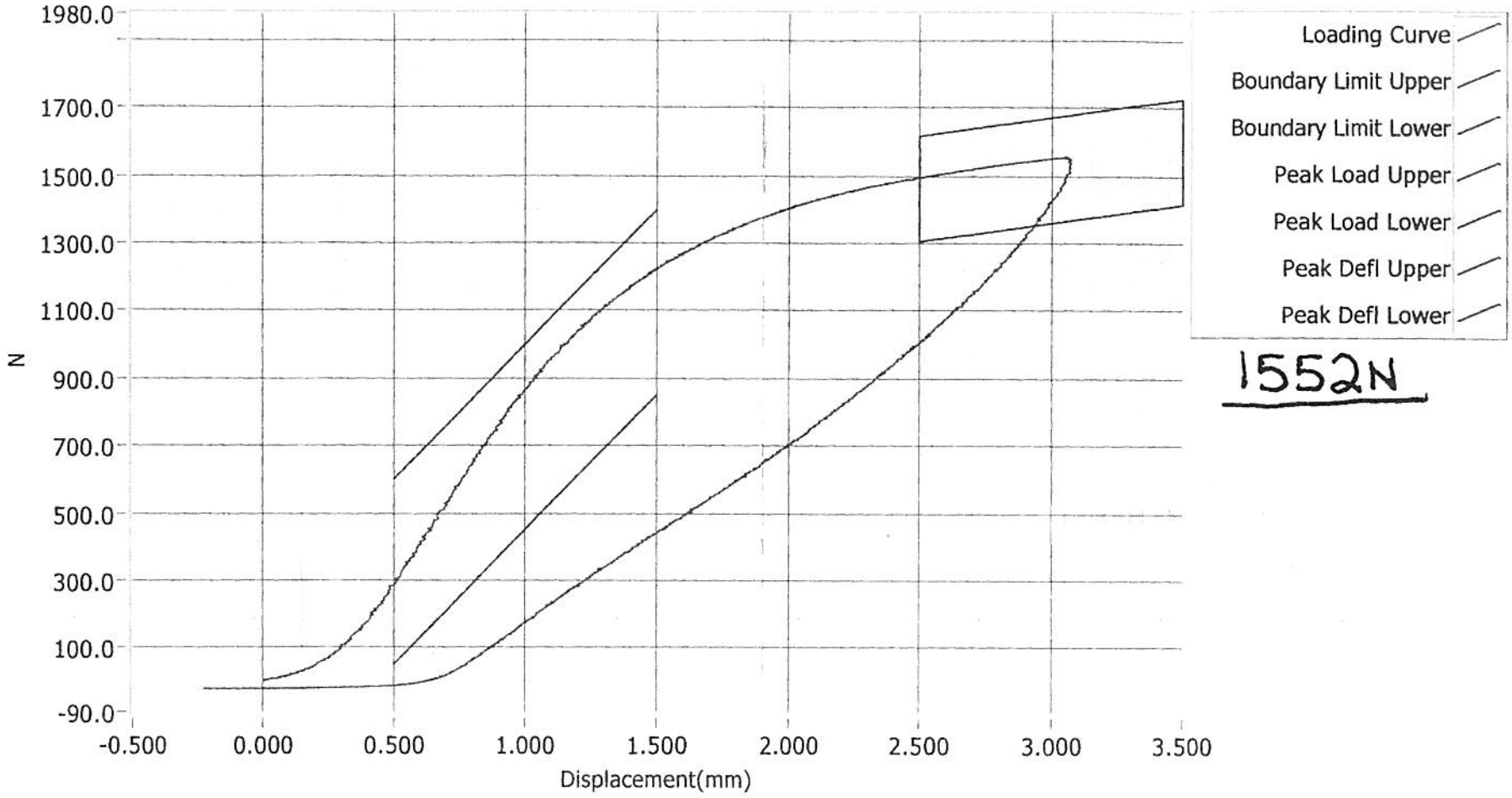

1643N

ATD Calibration Lab

| Test ID | Part Serial Number | Test Date | Test Time |
|---|---|---|---|
| | 63194 | 1/23/2013 | 8:13 PM |
| Cert ID | ATD Serial Number | ATD Type | |
| | N/A | SIDIIs | |

Current Date : 1/23/2013 Current Time : 20:14:23

## Resultant Data - SIDIIs Plug Compression




ATD Calibration Lab

| Test ID | Part Serial Number | Test Date | Test Time |
|---|---|---|---|
| | 63038 | 1/19/2013 | 12:28 AM |
| Cert ID | ATD Serial Number | ATD Type | |
| | N/A | SIDIIs | |

Current Date : 1/19/2013 Current Time : 00:29:21

# APPENDIX D
# TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

**Table 1 – Dummy Instrumentation**

| | | | | SID-IIs S/N 306 | | |
|---|---|---|---|---|---|---|
| | | | | Serial Number | Manufacturer | Calibration Date |
| 9 Axis Head CG (Primary) | | | X | P79727 | Endevco | 07/08/13 |
| | | | Y | P79728 | Endevco | 07/08/13 |
| | | | Z | P79730 | Endevco | 07/08/13 |
| 9 Axis Head CG (Redundant) | | | Xr | P79733 | Endevco | 07/08/13 |
| | | | Yr | P79734 | Endevco | 07/08/13 |
| | | | Zr | P79735 | Endevco | 07/08/13 |
| 9 Axis Head X | | | Y | P79715 | Endevco | 07/08/13 |
| | | | Z | P79716 | Endevco | 07/08/13 |
| 9 Axis Head Y | | | X | P79717 | Endevco | 07/08/13 |
| | | | Z | P79718 | Endevco | 07/08/13 |
| 9 Axis Head Z | | | X | P79720 | Endevco | 07/08/13 |
| | | | Y | P79726 | Endevco | 07/08/13 |
| Displacement Potentiometers | Thoracic Rib | Upper | Y | G1187 | FTSS | 10/17/13 |
| | | Middle | Y | G1261 | FTSS | 10/17/13 |
| | | Lower | Y | G1270 | FTSS | 10/17/13 |
| | Abdominal Rib | Upper | Y | G032 | FTSS | 10/17/13 |
| | | Lower | Y | G1304 | FTSS | 10/17/13 |
| Lower Spine Accelerometers (T12) | | | X | P78279 | Endevco | 10/10/13 |
| | | | Y | P78280 | Endevco | 10/10/13 |
| | | | Z | P78281 | Endevco | 10/10/13 |
| Acetabulum Load Cell | | | Y | ACG111 | FTSS | 04/26/13 |
| Iliac Wing Load Cell | | | Y | IWG226 | FTSS | 04/26/13 |
| Pelvis Plug (struck side) | | | | 63226 | FTSS | 01/23/13 |
| Pelvis Plug (non-struck side) | | | | 63133 | FTSS | 01/21/13 |

**Table 2 – Vehicle Instrumentation**

| | | Serial Number | Manufacturer | Calibration Date |
|---|---|---|---|---|
| Vehicle Center of Gravity | X | P66825 | Endevco | 10/30/13 |
| Vehicle Center of Gravity | Y | P66826 | Endevco | 10/30/13 |
| Vehicle Center of Gravity | Z | P66824 | Endevco | 10/30/13 |
| Left Floor Sill | Y | P66600 | Endevco | 10/16/13 |
| A-Pillar Sill | Y | P63891 | Endevco | 10/23/13 |
| A-Pillar Low | Y | P72749 | Endevco | 11/06/13 |
| A-Pillar Mid | Y | P77763 | Endevco | 08/15/13 |
| B-Pillar Sill | Y | P63546 | Endevco | 12/11/13 |
| B-Pillar Low | Y | P68872 | Endevco | 08/15/13 |
| B-Pillar Mid | V | P73984 | Endevco | 08/15/13 |
| Driver Seat | Y | P67878 | Endevco | 07/23/13 |
| Engine Top | X | P66842 | Endevco | 11/20/13 |
| Engine Top | Y | P66849 | Endevco | 07/10/13 |
| Firewall | Y | P78855 | Endevco | 11/06/13 |
| Right Roof | Y | P78706 | Endevco | 07/24/13 |
| Right Floor Sill | Y | P73120 | Endevco | 11/20/13 |
| Rear Floorpan | X | P67891 | Endevco | 07/10/13 |
| Rear Floorpan | Y | P67892 | Endevco | 07/10/13 |

**Table 3 – Pole Instrumentation**

| | Serial Number | Manufacturer | Calibration Date |
|---|---|---|---|
| Load Cell 1 | DG6277 | FTSS | 08/16/13 |
| Load Cell 2 | DG6278 | FTSS | 08/16/13 |
| Load Cell 3 | DG6279 | FTSS | 08/19/13 |
| Load Cell 4 | DG6280 | FTSS | 08/19/13 |
| Load Cell 5 | DG6281 | FTSS | 08/19/13 |
| Load Cell 6 | DG6283 | FTSS | 08/19/13 |
| Load Cell 7 | DG6284 | FTSS | 08/19/13 |
| Load Cell 8 | DG6582 | FTSS | 08/19/13 |