

**REPORT NUMBER: NCAPSIDE-MGA-2008-006**

**NEW CAR ASSESSMENT PROGRAM  
SIDE IMPACT TEST**

**TOYOTA MOTOR CORPORATION  
2008 TOYOTA 4RUNNER 4X4  
NHTSA NUMBER: M85106**

**PREPARED BY:  
MGA RESEARCH CORPORATION  
5000 WARREN ROAD  
BURLINGTON, WI 53105**



**Test Date: September 20, 2007**

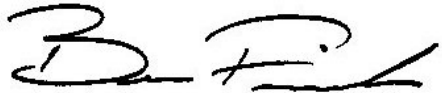
**Report Date: October 19, 2007**

**FINAL REPORT**

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

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-03-D-12005.

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Prepared by:   
Ben Fischer, Project Engineer

Date: 10/19/07

Reviewed by:   
David Winkelbauer, Facility Director

Date: 10/19/07

### Technical Report Documentation Page

| <b>1. Report No.</b><br>NCAPSIDE-MGA-2008-006                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>2. Government Accession No.</b>                          | <b>3. Recipient's Catalog No.</b>                                                                                                                                                                       |                  |  |               |              |                                |      |      |                                |      |      |                                          |      |      |                             |    |    |                        |      |      |     |    |     |
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| <b>4. Title and Subtitle</b><br>Final Report of New Car Assessment Program<br>Side Impact Testing of 2008 Toyota 4Runner 4x4<br>NHTSA No.: M85106                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                             | <b>5. Report Date</b><br>October 19, 2007                                                                                                                                                               |                  |  |               |              |                                |      |      |                                |      |      |                                          |      |      |                             |    |    |                        |      |      |     |    |     |
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| <b>7. Author(s)</b><br>Ben Fischer, Project Engineer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                             | <b>8. Performing Organization Report No.</b><br>NCAPSIDE-MGA-2008-006                                                                                                                                   |                  |  |               |              |                                |      |      |                                |      |      |                                          |      |      |                             |    |    |                        |      |      |     |    |     |
| <b>9. Performing Organization Name and Address</b><br>MGA Research Corporation<br>5000 Warren Road<br>Burlington, WI 53105                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                             | <b>10. Work Unit No.</b>                                                                                                                                                                                |                  |  |               |              |                                |      |      |                                |      |      |                                          |      |      |                             |    |    |                        |      |      |     |    |     |
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| <b>12. Sponsoring Agency Name and Address</b><br>U.S. Department of Transportation<br>National Highway Traffic Safety Administration<br>Rulemaking, Office of Crashworthiness Standards<br>1200 New Jersey Ave, SE, Room W43-410, NVS-111<br>Washington, D.C. 20590                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                             | <b>13. Type of Report and Period Covered:</b><br><i>Final Report</i><br>9/20/2007 to 10/19/2007                                                                                                         |                  |  |               |              |                                |      |      |                                |      |      |                                          |      |      |                             |    |    |                        |      |      |     |    |     |
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| <b>15. Supplementary Notes</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                             |                                                                                                                                                                                                         |                  |  |               |              |                                |      |      |                                |      |      |                                          |      |      |                             |    |    |                        |      |      |     |    |     |
| <b>16. Abstract</b><br>A 55/28 km/h 90° Moving Deformable Barrier NCAP side impact was conducted on the subject 2008 Toyota 4Runner 4x4 to obtain new car assessment and research data indicant of FMVSS No. 214D performance. The test was conducted at MGA Research Corporation, in Burlington, Wisconsin, on September 20, 2007. The impact velocity of the Moving Deformable Barrier (MDB) was 62.4 km/h, and the ambient temperature at the struck side (drivers) of the vehicle was 21°C. The target vehicle's maximum post test static crush was 208 mm at level 2. The test vehicle's occupant performance is as follows: <table style="margin-left: auto; margin-right: auto; border: none; width: 80%;"> <thead> <tr> <th></th> <th style="text-align: center;"><u>DRIVER</u></th> <th style="text-align: center;"><u>PASS.</u></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib (LUR) Accel., g</td> <td style="text-align: center;">23.9</td> <td style="text-align: center;">36.9</td> </tr> <tr> <td>Left Lower Rib (LLR) Accel., g</td> <td style="text-align: center;">23.6</td> <td style="text-align: center;">32.1</td> </tr> <tr> <td>Lower Spine (T<sub>12</sub>) Accel., g</td> <td style="text-align: center;">35.9</td> <td style="text-align: center;">25.7</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td style="text-align: center;">30</td> <td style="text-align: center;">31</td> </tr> <tr> <td>Pelvis (PEV) Accel., g</td> <td style="text-align: center;">40.3</td> <td style="text-align: center;">18.7</td> </tr> <tr> <td>HIC</td> <td style="text-align: center;">42</td> <td style="text-align: center;">143</td> </tr> </tbody> </table> <p>The 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.</p> |                                                             |                                                                                                                                                                                                         |                  |  | <u>DRIVER</u> | <u>PASS.</u> | Left Upper Rib (LUR) Accel., g | 23.9 | 36.9 | Left Lower Rib (LLR) Accel., g | 23.6 | 32.1 | Lower Spine (T <sub>12</sub> ) Accel., g | 35.9 | 25.7 | Thoracic Trauma Index (TTI) | 30 | 31 | Pelvis (PEV) Accel., g | 40.3 | 18.7 | HIC | 42 | 143 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <u>DRIVER</u>                                               | <u>PASS.</u>                                                                                                                                                                                            |                  |  |               |              |                                |      |      |                                |      |      |                                          |      |      |                             |    |    |                        |      |      |     |    |     |
| Left Upper Rib (LUR) Accel., g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 23.9                                                        | 36.9                                                                                                                                                                                                    |                  |  |               |              |                                |      |      |                                |      |      |                                          |      |      |                             |    |    |                        |      |      |     |    |     |
| Left Lower Rib (LLR) Accel., g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 23.6                                                        | 32.1                                                                                                                                                                                                    |                  |  |               |              |                                |      |      |                                |      |      |                                          |      |      |                             |    |    |                        |      |      |     |    |     |
| Lower Spine (T <sub>12</sub> ) Accel., g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 35.9                                                        | 25.7                                                                                                                                                                                                    |                  |  |               |              |                                |      |      |                                |      |      |                                          |      |      |                             |    |    |                        |      |      |     |    |     |
| Thoracic Trauma Index (TTI)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 30                                                          | 31                                                                                                                                                                                                      |                  |  |               |              |                                |      |      |                                |      |      |                                          |      |      |                             |    |    |                        |      |      |     |    |     |
| Pelvis (PEV) Accel., g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 40.3                                                        | 18.7                                                                                                                                                                                                    |                  |  |               |              |                                |      |      |                                |      |      |                                          |      |      |                             |    |    |                        |      |      |     |    |     |
| HIC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 42                                                          | 143                                                                                                                                                                                                     |                  |  |               |              |                                |      |      |                                |      |      |                                          |      |      |                             |    |    |                        |      |      |     |    |     |
| <b>17. Key Words</b><br>New Car Assessment Program (NCAP)<br>Side Impact<br>Side Impact Hybrid III Dummy (SID/HIII)<br>Occupant Side Impact Protection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                             | <b>18. Distribution Statement</b><br>Copies of this report are available from:<br>National Highway Traffic Safety Adm.<br>Technical Ref. Division,<br>1200 New Jersey Ave, SE<br>Washington, D.C. 20590 |                  |  |               |              |                                |      |      |                                |      |      |                                          |      |      |                             |    |    |                        |      |      |     |    |     |
| <b>19. Security Classif. (of this report)</b><br>Unclassified                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>20. Security Classif. (of this page)</b><br>Unclassified | <b>21. No. of Pages</b><br>167                                                                                                                                                                          | <b>22. Price</b> |  |               |              |                                |      |      |                                |      |      |                                          |      |      |                             |    |    |                        |      |      |     |    |     |

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## **SECTION 1**

### **PURPOSE AND TEST PROCEDURE**

#### **PURPOSE**

This side impact test was conducted as part of the FY' 2008 test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-03-D-12005. The purpose of this test was to evaluate side impact protection in a 2008 Toyota 4Runner 4x4 manufactured by Toyota Motor Corporation.

#### **TEST PROCEDURE**

The side impact test was conducted in accordance with the Laboratory Test Procedure for New Car Assessment Program Side Impact Testing dated November 2002 and the corresponding MGA Research Corporation Test Procedure MGA-NHTSA5. The procedures for receiving, inspection, testing, and reporting of test results are described in the test procedures and are not repeated in this report.

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

## **SECTION 2**

### **SUMMARY OF NCAP SIDE IMPACT TEST**

A model year 2008 Toyota 4Runner 4x4 was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.4 km/h. The specified impact velocity range is from 61.1 to 62.7 km/h. The test (target) vehicle was stationary and positioned 63° to the line of forward motion. The weight of the vehicle as tested was 2166.8 kg and the test weight of the MDB was 1360.8 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on September 20, 2007.

One (1) real-time motion picture camera and ten (10) high-speed motion picture cameras were used to document the impact event. The pre-test and post-test conditions were recorded by one (1) real-time motion picture camera. Camera locations and pertinent camera information are documented in the data sheets. Pre- and post-test photographs of the vehicle and Side Impact Dummies (SID/HIIs) can be found in Appendix A. Two 50th percentile adult male SID/HIIs were placed in the driver and left rear passenger designated seating positions according to instructions specified in the Laboratory Test Procedure for New Car Assessment Program Side Impact Testing dated November 2002. Each SID/HII was instrumented in the following locations:

- Left Upper Rib (LUR) uni-axial accelerometer (Y-axis primary and redundant)
- Left Lower Rib (LLR) uni-axial accelerometer (Y-axis primary and redundant)
- Lower Thoracic Spine (T12) uni-axial accelerometer (Y-axis primary and redundant)
- Pelvic (PEV) section uni-axial accelerometer (Y-axis primary and redundant)
- Head Center of Gravity (CG) tri-axial accelerometers (X, Y and Z axes primary and redundant)
- Upper Neck load cell (Fx, Fy, Fz, Mx, My, Mz)

The test vehicle was instrumented with twenty (20) structural accelerometers and the MDB was instrumented with five (5) accelerometers and two (2) contact switches on the bumper to compare left side to right side bumper impact timing. All data channels were recorded with a fully self contained on-board DTS TDAS Pro Data Acquisition System. The data was digitally sampled at 10,000 samples per second and processed per Appendix V of the Test Procedure.

## **2.2 GENERAL COMMENTS**

The test vehicle sustained a maximum static crush of 208 mm at level 2, 1350 mm rearward of the vertical impact point. The driver and passenger SID/HIIs, Serial Nos. 904 and 271 respectively, were calibrated just prior to this test.

Appendix A contains the still photograph prints. Appendix B contains the SID/HII response data traces. Appendix C contains the dummy calibration data. Appendix D contains the child dummy data.

The occupant data is summarized below:

| ATD position | HIC | T <sup>1</sup> | T <sup>2</sup> | TTI (G's) | Peak Pelvis (G's) |
|--------------|-----|----------------|----------------|-----------|-------------------|
| Driver       | 42  | 48.3           | 83.6           | 30        | 40.3              |
| Passenger    | 143 | 50.8           | 72.6           | 31        | 18.7              |

#### SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

| Restraint Information | Left Front (Driver) |          | Left Rear (Passenger) |          |
|-----------------------|---------------------|----------|-----------------------|----------|
|                       | Installed           | Deployed | Installed             | Deployed |
| Front Airbag          | Yes                 | No       | No                    |          |
| Side Torso Airbag     | Yes                 | Yes      | No                    |          |
| Curtain Airbag        | Yes                 | Yes      | Yes                   | Yes      |

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

#### TEST NOTES

There was no valid data collected for:

Left Rear Sill Y

Left Front Sill Y

Driver Seat Track Y after 20 msec.

**DATA SHEET NO. 1****GENERAL TEST AND VEHICLE PARAMETER DATA**Test Vehicle: 2008 Toyota 4Runner 4x4NHTSA No. M85106Test Program: NCAP Side ImpactTest Date: 9/20/2007**TEST VEHICLE INFORMATION**

|                                                          |                   |
|----------------------------------------------------------|-------------------|
| Make                                                     | Toyota            |
| Model                                                    | 4Runner           |
| Body Style                                               | MPV               |
| NHTSA No.                                                | M85106            |
| VIN                                                      | JTEBU14R180128928 |
| Color                                                    | Shadow Mica       |
| Delivery Date                                            | 9/14/2007         |
| Odometer Reading (mile)                                  | 34                |
| Dealer                                                   | Wilde Toyota      |
| Transmission                                             | Automatic         |
| Final Drive                                              | 4 Wheel           |
| Number of Cylinders                                      | 6                 |
| Engine Displacement (L)                                  | 4.0               |
| Engine Placement                                         | Longitudinal      |
| Automatic Door Locks (ADL)                               | No                |
| Owner's Manual Details<br>Instructions on Disabling ADLs | N/A               |

**TEST VEHICLE OPTIONS**

|                                    |     |
|------------------------------------|-----|
| Driver Front Airbag                | Yes |
| Driver Side Curtain Airbag         | Yes |
| Driver Side Torso Airbag           | Yes |
| Rear Passenger Side Curtain Airbag | Yes |
| Rear Passenger Side Torso Airbag   | No  |
| Power Steering                     | Yes |
| Power Door Locks                   | Yes |
| Tilt Wheel                         | Yes |
| Anti-lock Brakes                   | Yes |
| Traction Control                   | Yes |
| All Wheel Drive                    | Yes |
| Power Seats                        | No  |
| Pretensioners                      | Yes |
| Load Limiters                      | Yes |
| Bucket Seats                       | Yes |

**DATA FROM CERTIFICATION LABEL**

|                     |                          |
|---------------------|--------------------------|
| Manufactured By     | Toyota Motor Corporation |
| Date of Manufacture | 07/07                    |

|                 |      |
|-----------------|------|
| GVWR (kg)       | 2535 |
| GAWR Front (kg) | 1160 |
| GAWR Rear (kg)  | 1390 |

| Measured Parameter      | Front  | Rear   | Third | Total |
|-------------------------|--------|--------|-------|-------|
| Type of Seats           | Bucket | Bucket | Bench |       |
| Number Of Occupants     | 2      | 3      | 2     | 7     |
| Capacity Wt. (VCW) (kg) |        |        |       | 477   |
| Cargo Wt. (RCLW) (kg)   |        |        |       | 0     |

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

Test Vehicle: 2008 Toyota 4Runner 4x4  
 Test Program: NCAP Side Impact

NHTSA No. M85106  
 Test Date: 9/20/2007

**TEST VEHICLE WEIGHTS**

|        | Units | As Delivered (UVW) (Axle) |       |        | As Tested (ATW) (Axle) |        |        |
|--------|-------|---------------------------|-------|--------|------------------------|--------|--------|
|        |       | Front                     | Rear  | Total  | Front                  | Rear   | Total  |
| Left   | kg    | 553.4                     | 489.0 |        | 618.7                  | 545.7  |        |
| Right  | kg    | 496.2                     | 474.0 |        | 492.6                  | 509.8  |        |
| Ratio  | %     | 52.2                      | 47.8  |        | 51.3                   | 48.7   |        |
| Totals | kg    | 1049.6                    | 963.0 | 2012.6 | 1111.3                 | 1055.5 | 2166.8 |

**TARGET TEST WEIGHT CALCULATION**

| Measured Parameter                      | Units | Value  |
|-----------------------------------------|-------|--------|
| Total Delivered Weight (UVW)            | kg    | 2012.6 |
| Weight of 2 P572M ATDs                  | kg    | 161.5  |
| Rated Cargo/Luggage Weight (RCLW)       | kg    | 0      |
| Calculated Vehicle Target Weight (TVTW) | kg    | 2174.1 |

\* Actual As Tested Weight (ATW) will be TVTW -5/-10 kg

Weight of Ballast in Cargo Area: None

**TEST VEHICLE ATTITUDES AND CG**

|              | Units | LF  | RF  | LR  | RR  | CG (aft of front axle) |
|--------------|-------|-----|-----|-----|-----|------------------------|
| As Delivered | mm    | 851 | 853 | 902 | 910 | 1335                   |
| As Tested    | mm    | 839 | 851 | 888 | 899 | 1360                   |
| Fully Loaded | mm    | 835 | 851 | 877 | 899 |                        |

**TEST VEHICLE VERTICAL IMPACT LINE DATA**

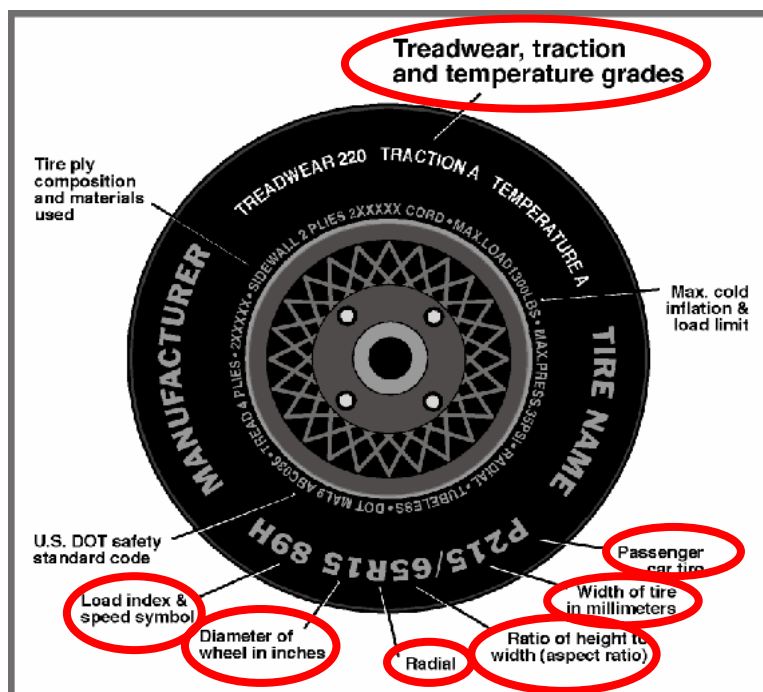
| Measurement Description               | Units | Value |
|---------------------------------------|-------|-------|
| Test Vehicle Wheel Base               | mm    | 2791  |
| Target Impact Point Aft of Front Axle | mm    | 456   |
| Actual Impact Point Aft of Front Axle | mm    | 463   |

## DATA SHEET NO. 2

### TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2008 Toyota 4Runner 4x4  
 Test Program: NCAP Side Impact

NHTSA No. M85106  
 Test Date: 9/20/2007



### DATA FROM TIRE PLACARD

| Measured Parameter                      | Front       | Rear        |
|-----------------------------------------|-------------|-------------|
| Maximum Tire Pressure (kPa)             | 300         | 300         |
| Cold / Test Pressure (kPa)              | 220         | 220         |
| Recommended Tire Size                   | P265/65R17  | P265/65R17  |
| Tire Size on Vehicle                    | P265/65R17  | P265/65R17  |
| Tire Manufacturer                       | Bridgestone | Bridgestone |
| Tire Name                               | Dueler H/L  | Dueler H/L  |
| Tire Type                               | Passenger   | Passenger   |
| Tire Width (mm)                         | 265         | 265         |
| Ratio of Height to Width (aspect ratio) | 65          | 65          |
| Radial                                  | R           | R           |
| Wheel Diameter                          | 17          | 17          |
| Load Index & Speed Symbol               | 840         | 840         |
| Treadwear                               |             |             |
| Traction Grade                          |             |             |
| Temperature Grade                       |             |             |

# **DATA SHEET NO. 3** **TEST VEHICLE INFORMATION**

Test Vehicle: 2008 Toyota 4Runner 4x4  
 Test Program: NCAP Side Impact

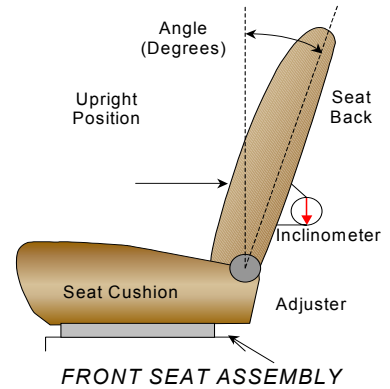
NHTSA No. M85106  
 Test Date: 9/20/2007

## **NORMAL DESIGN RIDING POSITION**

The driver and passenger seat back is positioned to the manufacturer's designated angle. The procedure is as follows:  
 4<sup>th</sup> detent with for forward-most detent defined as 0.

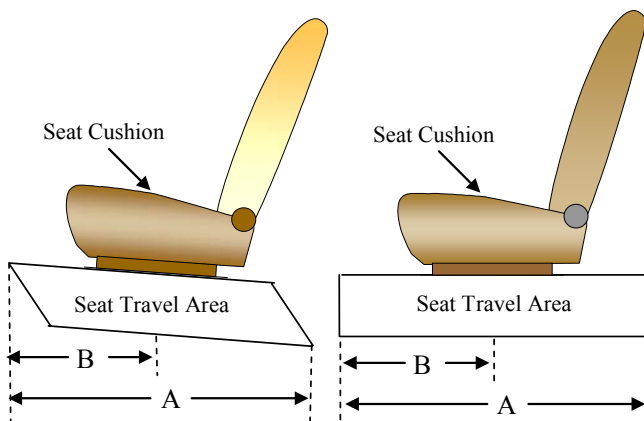
Driver seat back angle: 4<sup>th</sup> detent (forward-most as 0)

Passenger seat back angle: 4<sup>th</sup> detent (forward-most as 0)



## **SEAT FORE/AFT POSITIONS**

|             | Total Fore/Aft Travel | Placed in position #                          |
|-------------|-----------------------|-----------------------------------------------|
| Driver Seat | 17 detents            | 8 <sup>th</sup> detent (1 <sup>st</sup> as 0) |
| Rear Seat   | Fixed                 | Fixed                                         |



## DATA SHEET NO. 3 (CONTINUED)

### TEST VEHICLE INFORMATION

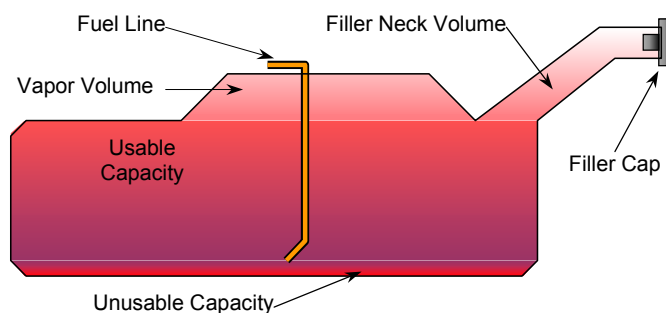
Test Vehicle: 2008 Toyota 4Runner 4x4  
Test Program: NCAP Side Impact

NHTSA No. M85106  
Test Date: 9/20/2007

### FUEL TANK CAPACITY

|                                    | Liters      |
|------------------------------------|-------------|
| Usable Capacity of "Standard Tank" | 87.1        |
| Usable Capacity of "Optional" Tank |             |
| 92-94% of Usable Capacity          | 80.1 – 81.8 |
| Actual Amount of Solvent used      | 80.2        |
| 1/3 of Usable Capacity             | 29.0        |

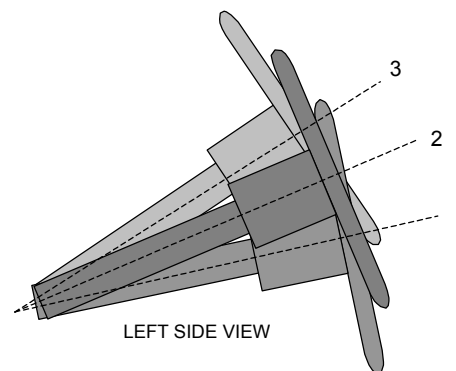
The test vehicle is equipped with an electric fuel pump. The fuel pump is activated when the ignition is turned on.



VEHICLE FUEL TANK ASSEMBLY

### STEERING COLUMN ADJUSTMENT

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



STEERING COLUMN ASSEMBLY

### STEERING COLUMN POSITION

Placed in the 3<sup>rd</sup> notch down; uppermost notch as 0; total of 6.

**DATA SHEET NO. 4**  
**MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS**

Test Vehicle: 2008 Toyota 4Runner 4x4  
 Test Program: NCAP Side Impact

NHTSA No. M85106  
 Test Date: 9/20/2007

**MDB SPECIFICATIONS**

| Measurement Description                 | Length (mm) |
|-----------------------------------------|-------------|
| Overall Width of Framework Carriage     | 1252        |
| Overall Length Including Honeycomb Face | 4115        |
| Wheel base of Framework Carriage        | 2588        |
| C.G. Location aft of Front Axle         | 1101        |

**MDB WEIGHTS**

|        | Units | Front Axle | Rear Axle | Total  |
|--------|-------|------------|-----------|--------|
| Left   | kg    | 473.5      | 219.5     |        |
| Right  | kg    | 308.3      | 359.5     |        |
| Ratio  | %     | 57.5       | 42.5      |        |
| Totals | kg    | 781.8      | 579.0     | 1360.8 |

**SPEED AND IMPACT ANGLE DATA**

| Measured Parameter              | Units   | Requirement  | Value |
|---------------------------------|---------|--------------|-------|
| Trap No. 1 Velocity (Primary)   | km/h    | 61.1 to 62.7 | 62.4  |
| Trap No. 2 Velocity (Redundant) | km/h    | 61.1 to 62.7 | 62.4  |
| MDB CL to Target Vehicle CL     | degrees | 88.5 to 91.5 | 89.9  |

**POST TEST OBSERVATIONS**  
**MDB LEFT EDGE IMPACT POINT DATA**

| Measured Parameter | Units | Requirement | Value      |
|--------------------|-------|-------------|------------|
| Horizontal Offset  | mm    | +/- 50      | 7 rearward |
| Vertical Offset    | mm    | +/-20       | 4 up       |

**DATA SHEET NO. 5****POST TEST OBSERVATIONS**

Test Vehicle: 2008 Toyota 4Runner 4x4  
 Test Program: NCAP Side Impact

NHTSA No. M85106  
 Test Date: 9/20/2007

**TEST DUMMY INFORMATION AND CONTACT POINTS**

| Description             | Front Seat SID/HIII                   | Rear Seat SID/HIII                    |
|-------------------------|---------------------------------------|---------------------------------------|
| Dummy Type / Serial No. | SID HIII / 904                        | SID HIII / 271                        |
| Head Contact            | Curtain Airbag, Side Header, Headrest | Side Header, Curtain Airbag, Headrest |
| Upper Torso Contact     | Side Airbag                           | Door Panel                            |
| Lower Torso Contact     | Door Panel                            | Door Panel                            |
| Left Knee Contact       | Door Panel                            | Door Panel                            |
| Right Knee Contact      | Left Knee                             | Left Knee                             |

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

| Description             | Front                                                          | Rear                                                           |
|-------------------------|----------------------------------------------------------------|----------------------------------------------------------------|
| Locked/Unlocked Doors   | Doors were unlocked                                            | Doors were unlocked                                            |
| Left Side Door Opening  | Door remained closed and latched                               | Door remained closed and latched                               |
| Right Side Door Opening | Door remained closed and latched;<br>Door opened without tools | Door remained closed and latched;<br>Door opened without tools |
| Seat Movement           | 0                                                              | 0                                                              |
| Seat Back Failure       | None                                                           | None                                                           |

**POST TEST STRUCTURAL OBSERVATIONS**

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

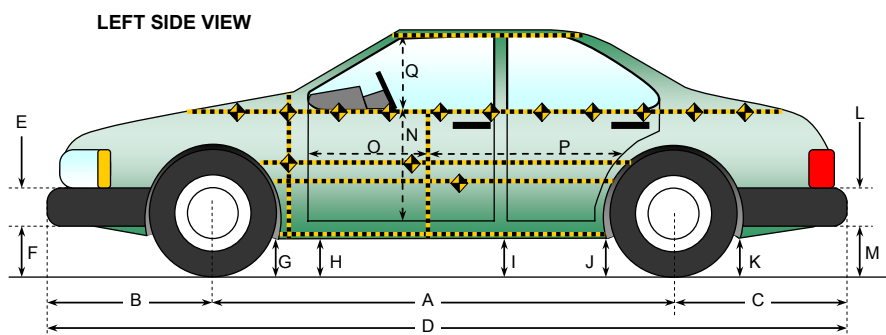
**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

| Restraint Type    | Occupant Location 01 |           | Occupant Location 04 |           |
|-------------------|----------------------|-----------|----------------------|-----------|
|                   | Installed            | Operation | Installed            | Operation |
| Front Airbag      | Yes                  | No        | No                   |           |
| Side Torso Airbag | Yes                  | Yes       | No                   |           |
| Curtain Airbag    | Yes                  | Yes       | Yes                  | Yes       |

**DATA SHEET NO. 6**  
**VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS**

Test Vehicle: 2008 Toyota 4Runner 4x4  
 Test Program: NCAP Side Impact

NHTSA No. M85106  
 Test Date: 9/20/2007



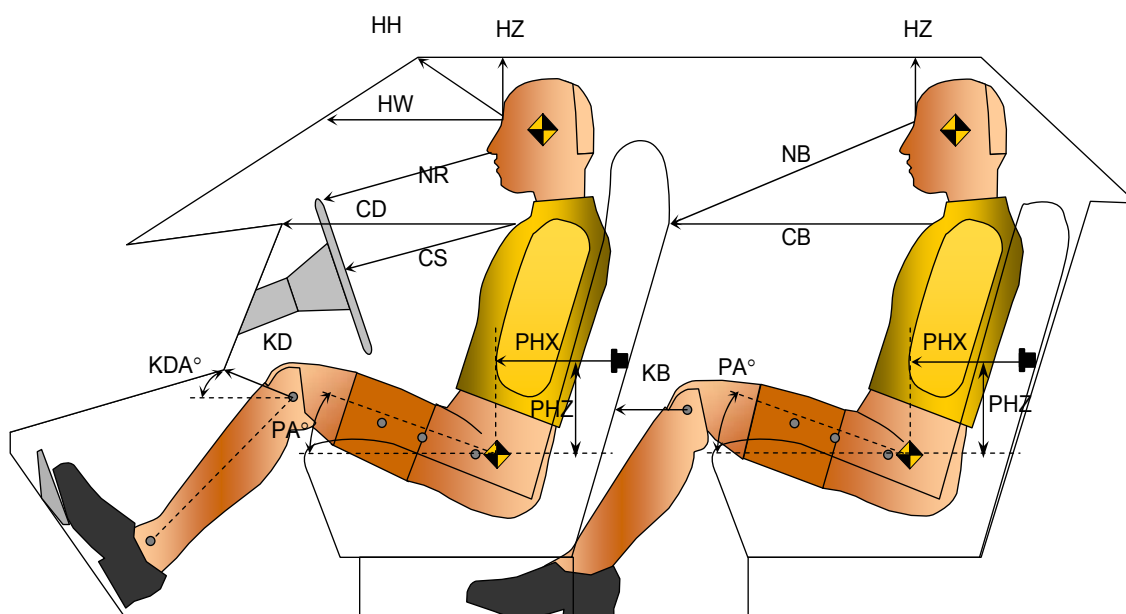
All Measurements in mm

| Code | Measurement Description                | Pre-Test | Post-Test | Difference |
|------|----------------------------------------|----------|-----------|------------|
| A    | Wheelbase                              | 2791     | 2795      | -4         |
| B    | Front Axle to FSOV                     | 909      | 895       | 14         |
| C    | Rear Axle to RSOV                      | 1084     | 1062      | 22         |
| D    | Total Length at Centerline             | 4784     | 4752      | 32         |
| E    | Front Bumper Thickness                 | 289      | 289       | 0          |
| F    | Front Bumper Bottom to Ground          | 386      | 393       | -7         |
| G    | Sill Height at Front Wheel Well        | 358      | 343       | 15         |
| H    | Sill Height at Front Door Leading Edge | 421      | 408       | 13         |
| I    | Sill Height at "B" Pillar              | 424      | 409       | 15         |
| J1   | Sill Height at Rear Wheel Well         | 419      | 370       | 49         |
| J2   | Pinch Weld Height at Rear Wheel Well   | 422      | 397       | 25         |
| K    | Sill Height Aft of Rear Wheel Well     | 402      | 377       | 25         |
| L    | Rear Bumper Thickness                  | 182      | 182       | 0          |
| M    | Rear Bumper Bottom to Ground           | 392      | 393       | -1         |
| N    | Sill Height to Window Bottom Sill      | 780      | 692       | 88         |
| O    | Front Door Leading Edge to Impact CL   |          |           |            |
| P    | Rear Door Trailing Edge to Impact CL   |          |           |            |
| Q    | Front Window Opening                   | 444      | 442       | 2          |
| R    | Right Side Length                      | 4050     | 4050      | 0          |
| S    | Left Side Length                       | 4050     | 4005      | 45         |
| T    | Vehicle Width at "B" Post              | 1857     | 1659      | 198        |

**DATA SHEET NO. 7**  
**SID/HII LONGITUDINAL CLEARANCE DIMENSIONS**

Test Vehicle: 2008 Toyota 4Runner 4x4  
 Test Program: NCAP Side Impact

NHTSA No. M85106  
 Test Date: 9/20/2007

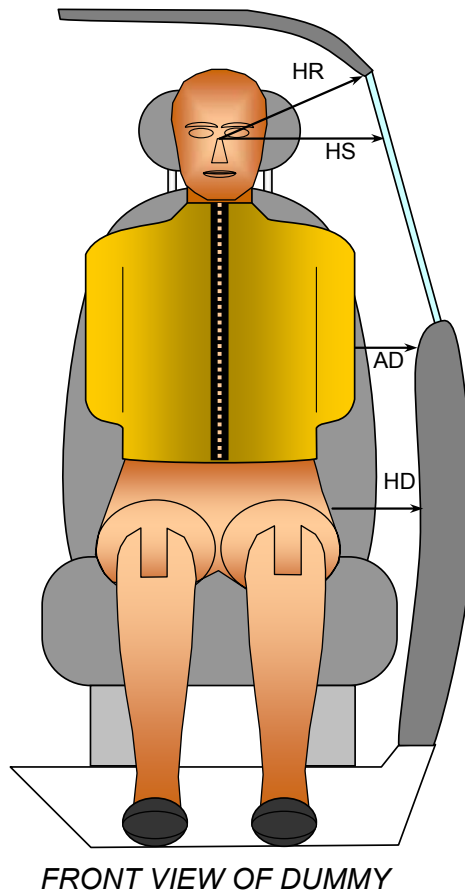


| Driver Code | Pass. Code | Measurement Description        | Driver S/N 904 |          | Passenger S/N 271 |          |
|-------------|------------|--------------------------------|----------------|----------|-------------------|----------|
|             |            |                                | Length(mm)     | Angle(°) | Length(mm)        | Angle(°) |
| HH          |            | Head to Header                 | 408            |          |                   |          |
| HW          |            | Head to Windshield             | 604            |          |                   |          |
| HZ          | HZ         | Head to Roof                   | 166            |          | 156               |          |
| NR          | NB         | Nose to Rim/Nose to Seatback   | 452            |          | 601               |          |
| CD          | CB         | Chest to Dash or Seatback      | 562            |          | 516               |          |
| CS          |            | Chest to Steering Wheel        | 341            |          |                   |          |
| KDL         | KBL        | Left Knee to Dash or Seatback  | 196            | 21.3     | 208               | 21.9     |
| KDR         | KBR        | Right Knee to Dash or Seatback | 183            | 21.9     | 192               | 25.3     |
| PA          | PA         | Pelvic Angle                   |                | 23.5     |                   | 23.4     |
| PHX         | PHX        | H-Point to Striker (X-Axis)    | 234            |          | 259               |          |
| PHZ         | PHZ        | H-Point to Striker (Z-Axis)    | 206            |          | 239               |          |

**DATA SHEET NO. 8**  
**SID/HIII LATERAL CLEARANCE DIMENSIONS**

Test Vehicle: 2008 Toyota 4Runner 4x4  
Test Program: NCAP Side Impact

NHTSA No. M85106  
Test Date: 9/20/2007

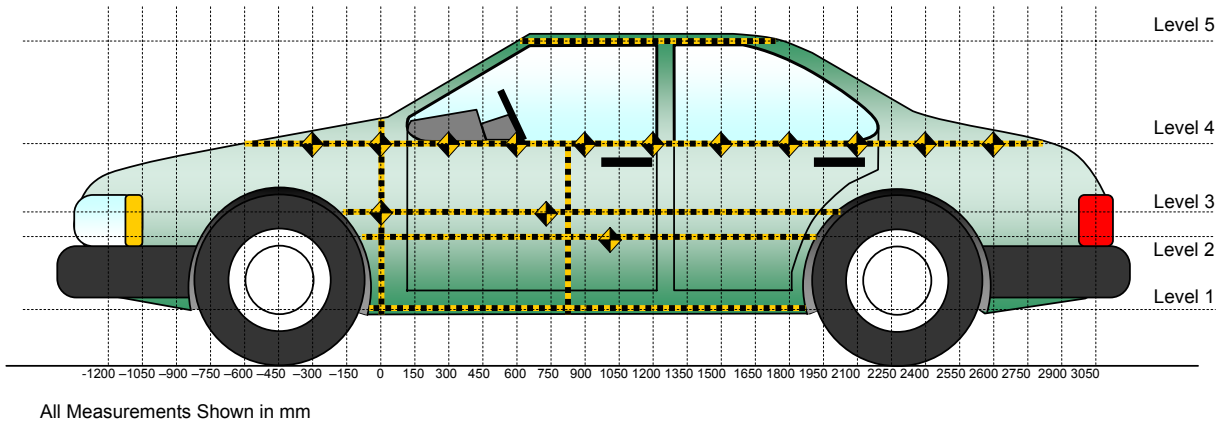


| Code | Measurement Description | Units | Driver<br>S/N 904 | Passenger<br>S/N 271 |
|------|-------------------------|-------|-------------------|----------------------|
| HR   | Head to Side Header     | mm    | 207               | 164                  |
| HS   | Head to Side Window     | mm    | 317               | 285                  |
| AD   | Arm to Door             | mm    | 96                | 153                  |
| HD   | H-Point to Door         | mm    | 219               | 223                  |

# **DATA SHEET NO. 9** **VEHICLE SIDE MEASUREMENTS**

Test Vehicle: 2008 Toyota 4Runner 4x4  
 Test Program: NCAP Side Impact

NHTSA No. M85106  
 Test Date: 9/20/2007



**LEFT SIDE VIEW**

Measurements are taken with vehicle in the as tested condition.  
 Measurements along the vertical 800 mm.  
 All measurements below in mm.

| Level | Measurement Description | Maximum Exterior Static Crush | Distance From Impact | Height Above Ground |
|-------|-------------------------|-------------------------------|----------------------|---------------------|
| 5     | Window                  | -48                           | 1200                 | 1626                |
| 4     | Window Sill             | 48                            | 1350                 | 1146                |
| 3     | Mid Door                | 196                           | 1350                 | 797                 |
| 2     | Occupant H-Point        | 208                           | 1350                 | 743                 |
| 1     | Sill Top                | 196                           | 600                  | 430                 |
|       | Maximum Penetration     | 284                           |                      |                     |

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

Test Vehicle: 2008 Toyota 4Runner 4x4  
 Test Program: NCAP Side Impact

NHTSA No. M85106  
 Test Date: 9/20/2007

|      | Pre-Test |     |     |     |     | Post-Test |     |     |     |     | Difference |     |     |     |     |
|------|----------|-----|-----|-----|-----|-----------|-----|-----|-----|-----|------------|-----|-----|-----|-----|
|      | 1        | 2   | 3   | 4   | 5   | 1         | 2   | 3   | 4   | 5   | 1          | 2   | 3   | 4   | 5   |
| -150 |          |     |     | 271 |     |           |     |     | 264 |     |            |     |     | -7  |     |
| 0    |          | 156 | 160 | 266 |     |           | 211 | 210 | 255 |     |            | 55  | 50  | -11 |     |
| 150  | 242      | 202 | 202 | 262 |     | 294       | 283 | 280 | 238 |     | 52         | 81  | 78  | -24 |     |
| 300  | 240      | 212 | 205 | 262 |     | 372       | 364 | 352 | 240 |     | 132        | 152 | 147 | -22 |     |
| 450  | 245      | 212 | 205 | 259 |     | 418       | 398 | 383 | 247 |     | 173        | 186 | 178 | -12 |     |
| 600  | 246      | 212 | 204 | 256 | 469 | 442       | 408 | 392 | 253 | 414 | 196        | 196 | 188 | -3  | -55 |
| 750  | 249      | 212 | 204 | 255 | 456 | 434       | 413 | 393 | 262 | 403 | 185        | 201 | 189 | 7   | -53 |
| 900  | 248      | 213 | 204 | 255 | 453 | 430       | 414 | 394 | 272 | 401 | 182        | 201 | 190 | 17  | -52 |
| 1050 | 249      | 214 | 204 | 255 | 450 | 421       | 409 | 393 | 281 | 400 | 172        | 195 | 189 | 26  | -50 |
| 1200 | 251      | 215 | 205 | 255 | 450 | 417       | 416 | 398 | 290 | 402 | 166        | 201 | 193 | 35  | -48 |
| 1350 | 249      | 216 | 206 | 255 | 451 | 409       | 424 | 402 | 303 | 403 | 160        | 208 | 196 | 48  | -48 |
| 1500 | 248      | 217 | 207 | 256 | 449 | 389       | 410 | 398 | 292 | 398 | 141        | 193 | 191 | 36  | -51 |
| 1650 | 249      | 214 | 207 | 257 | 448 | 374       | 387 | 379 | 281 | 395 | 125        | 173 | 172 | 24  | -53 |
| 1800 | 230      | 183 | 186 | 259 | 448 | 350       | 336 | 345 | 258 | 390 | 120        | 153 | 159 | -1  | -58 |
| 1950 |          | 145 | 147 | 263 | 445 |           | 257 | 249 | 235 | 386 |            | 112 | 102 | -28 | -59 |
| 2100 |          |     |     | 265 | 444 |           |     |     | 229 | 382 |            |     |     | -36 | -62 |
| 2250 |          |     |     | 267 | 444 |           |     |     | 239 | 378 |            |     |     | -28 | -66 |

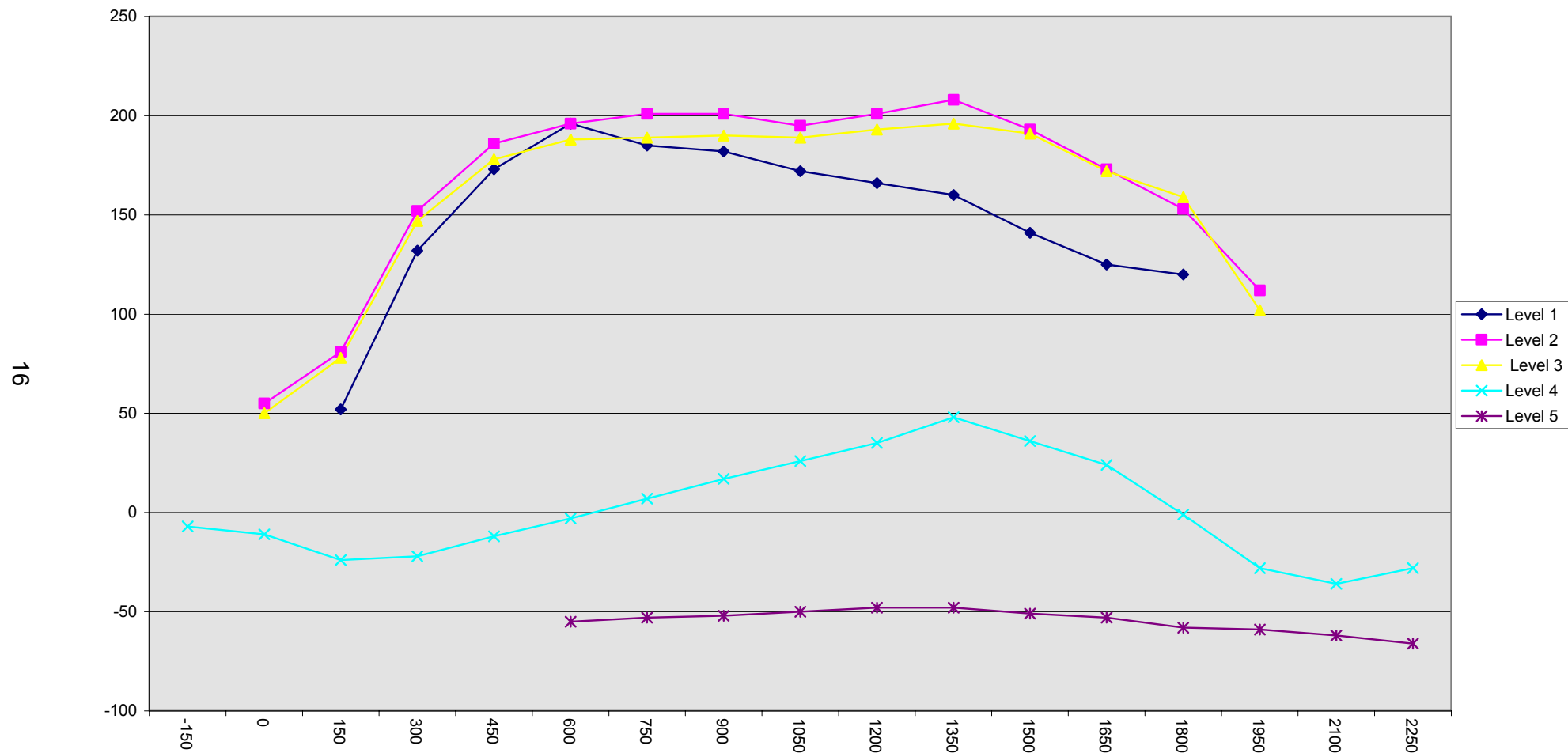
Reference plane is parallel to test vehicle longitudinal centerline.

Given dimensions = Reference plane to car body

**DATA SHEET NO. 10... (continued)**  
**VEHICLE EXTERIOR CRUSH PROFILES**

Test Vehicle: 2008 Toyota 4Runner 4x4  
Test Program: NCAP Side Impact

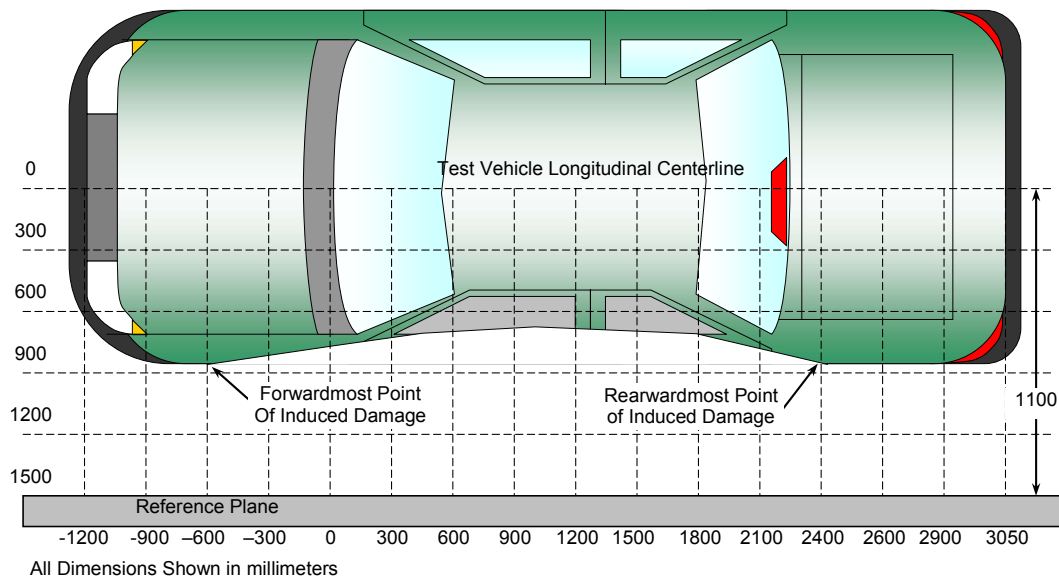
NHTSA No. M85106  
Test Date: 9/20/2007



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

Test Vehicle: 2008 Toyota 4Runner 4x4  
 Test Program: NCAP Side Impact

NHTSA No. M85106  
 Test Date: 9/20/2007



**TOP VIEW**

## **DAMAGE PROFILE DISTANCES**

| DPD | Distance from Impact Point in mm | Level | Pre-Test (mm) | Post-Test (mm) | Max Static Crush (mm) |
|-----|----------------------------------|-------|---------------|----------------|-----------------------|
| 1   | 2250                             | 4     | 267           | 239            | -28                   |
| 2   | 1760                             | 1     | 238           | 367            | 129                   |
| 3   | 1262                             | 2     | 215           | 422            | 207                   |
| 4   | 790                              | 1     | 249           | 406            | 157                   |
| 5   | 320                              | 1     | 241           | 395            | 154                   |
| 6   | -150                             | 4     | 271           | 264            | -7                    |

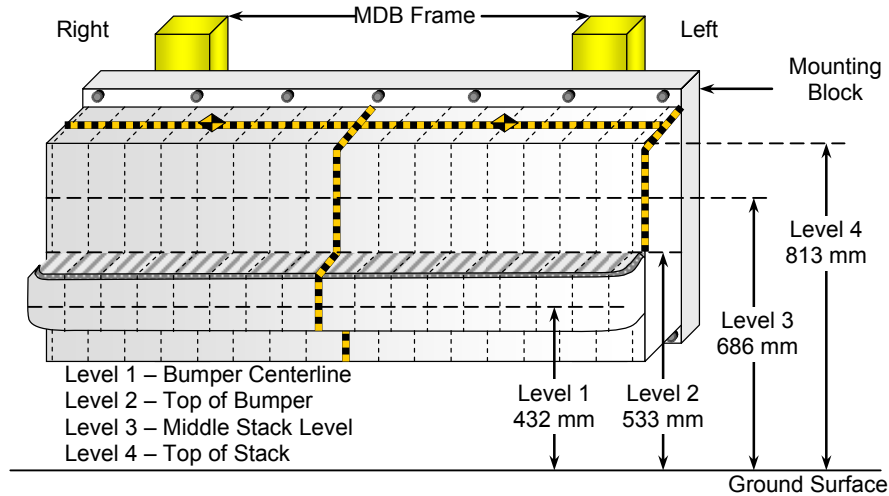
Reference plane is parallel to test vehicle longitudinal centerline.  
 Given dimensions = Reference plane to car body.

## DATA SHEET NO. 12

### DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2008 Toyota 4Runner 4x4  
 Test Program: NCAP Side Impact

NHTSA No. M85106  
 Test Date: 9/20/2007



### DEFORMABLE BARRIER STATIC CRUSH

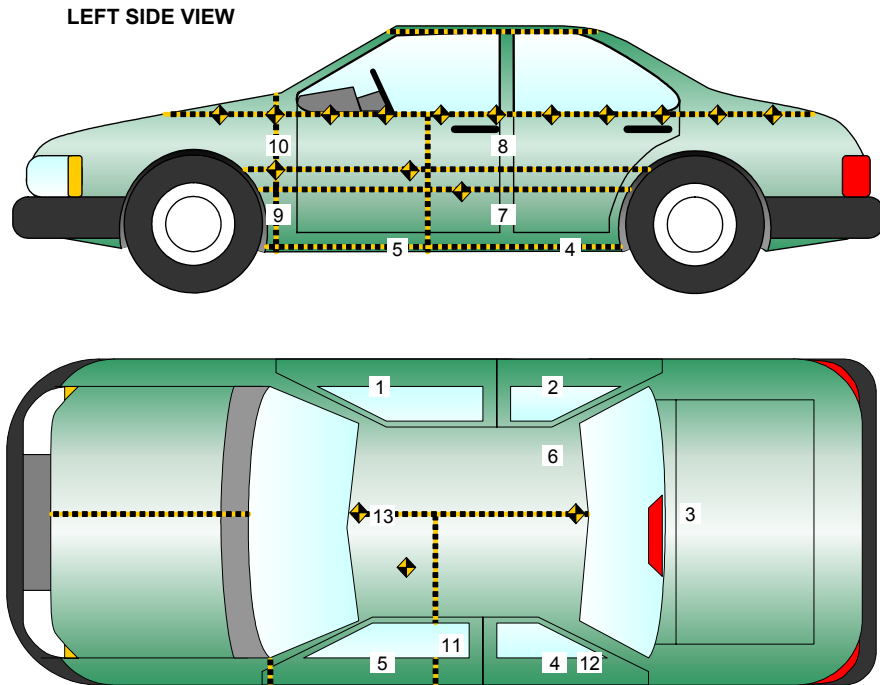
| Stack Level | Distance Right of Center |     |     |     |     |     |     |     | C <sub>L</sub> | Distance Left of Center |     |     |     |     |     |     |     |
|-------------|--------------------------|-----|-----|-----|-----|-----|-----|-----|----------------|-------------------------|-----|-----|-----|-----|-----|-----|-----|
|             | 800                      | 700 | 600 | 500 | 400 | 300 | 200 | 100 |                | 100                     | 200 | 300 | 400 | 500 | 600 | 700 | 800 |
| 1           | 208                      | 179 | 158 | 137 | 120 | 112 | 107 | 103 | 99             | 95                      | 90  | 87  | 87  | 99  | 112 | 127 | 134 |
| 2           | 177                      | 171 | 153 | 139 | 123 | 113 | 106 | 103 | 94             | 94                      | 92  | 89  | 85  | 88  | 108 | 125 | 130 |
| 3           | 156                      | 128 | 100 | 76  | 53  | 48  | 60  | 54  | 44             | 40                      | 43  | 45  | 44  | 48  | 56  | 70  | 132 |
| 4           | 101                      | 67  | 44  | 31  | 30  | 30  | 44  | 50  | 39             | 35                      | 35  | 38  | 46  | 54  | 63  | 97  | 146 |

All Dimensions in mm

**DATA SHEET NO. 13**  
**VEHICLE ACCELEROMETER LOCATIONS**

Test Vehicle: 2008 Toyota 4Runner 4x4  
 Test Program: NCAP Side Impact

NHTSA No. M85106  
 Test Date: 9/20/2007



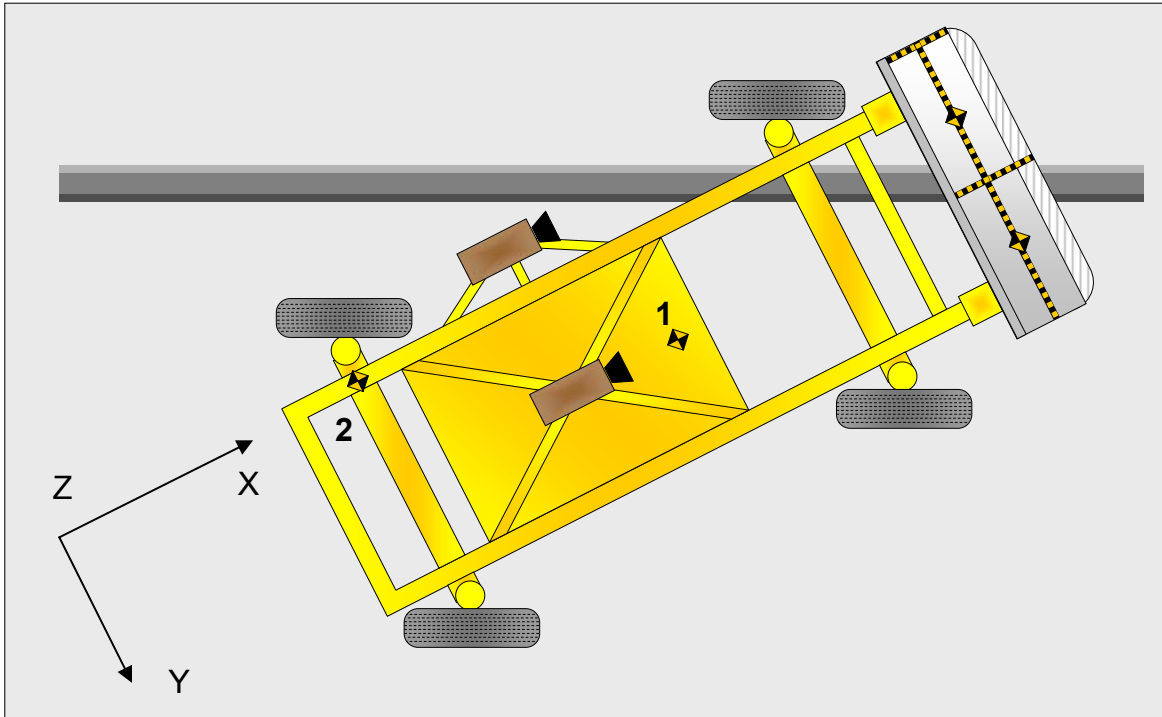
| Loc. No. | Accelerometer Location       | Measurements (mm) |      |      |
|----------|------------------------------|-------------------|------|------|
|          |                              | X                 | Y    | Z    |
| 1        | Right Sill at Front Seat     | 2652              | 752  | 426  |
| 2        | Right Sill at Rear Seat      | 1702              | 748  | 433  |
| 3        | Rear Floorpan Above Axle     | 1086              | 0    | 741  |
| 4        | Left Sill at Rear Door       | 1697              | -748 | 440  |
| 5        | Left Sill at Front Door      | 2674              | -752 | 429  |
| 6        | Rear Occupant Compartment    | 1918              | 354  | 639  |
| 7        | Left Lower B-Post            | 2240              | -747 | 765  |
| 8        | Left Middle B-Post           | 2226              | -753 | 1017 |
| 9        | Left Lower A-Post            | 3184              | -766 | 781  |
| 10       | Left Middle A-Post           | 3239              | -828 | 1008 |
| 11       | Front Seat Track             | 2372              | -580 | 608  |
| 12       | Rear Seat Track or Structure |                   |      |      |
| 13       | Vehicle CG                   | 2571              | 0    | 658  |

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

**DATA SHEET NO. 14**  
**MDB ACCELEROMETER LOCATIONS**

Test Vehicle: 2008 Toyota 4Runner 4x4  
 Test Program: NCAP Side Impact

NHTSA No. M85106  
 Test Date: 9/20/2007



| Loc. No. | Accelerometer Location | Measurements (mm) |      |      |
|----------|------------------------|-------------------|------|------|
|          |                        | X                 | Y    | Z    |
| 1        | MDB CG                 | -1092             | 0    | -483 |
| 2        | MDB Rear               | -2591             | -625 | -622 |

Reference Points    X - MDB Front Axle (+ forward)  
                              Y - MDB Centerline (+ to right)  
                              Z - Ground Plane (+ down)

**DATA SHEET NO. 15**  
**VEHICLE STRUCTURAL MEASUREMENTS**

Test Vehicle: 2008 Toyota 4Runner 4x4  
Test Program: NCAP Side Impact

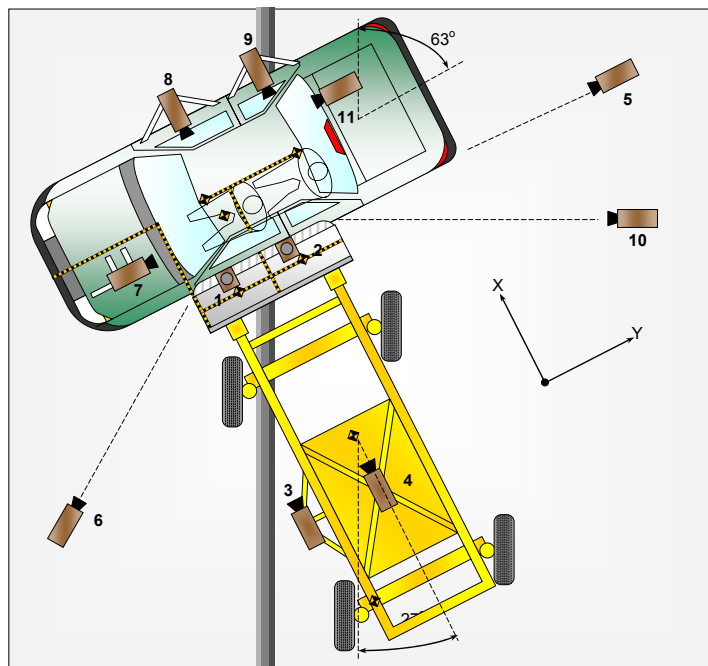
NHTSA No. M85106  
Test Date: 9/20/2007

|    | Elements                              | Pre-Test (mm) |
|----|---------------------------------------|---------------|
| 1  | Total Length                          | 4784          |
| 2  | Total Width                           | 1857          |
| 3  | Bumper Top Height                     | 765           |
| 4  | Bumper Bottom Height                  | 476           |
| 5  | Longitudinal Member Top Height        | 566           |
| 6  | Distance between Longitudinal Members | 868           |
| 7  | Longitudinal Member Width             | 60            |
| 8  | Engine Top Height                     | 1158          |
| 9  | Engine Bottom Height                  | 354           |
| 10 | Engine and gearbox width              | 609           |
| 11 | Front bumper-engine distance          | 564           |
| 12 | Front shock absorber fixing height    | 843           |
| 13 | Bonnet leading edge height            | 1045          |
| 14 | Front shock absorber fixing width     | 943           |
| 15 | Front bumper – front axle distance    | 909           |
| 16 | Front axle – a pillar distance        | 566           |
| 17 | A-pillar – B-pillar distance          | 1088          |
| 18 | B-Pillar – rear axle distance         | 1133          |
| 19 | B-pillar – C-pillar distance          | 982           |
| 20 | Roof sill bottom height               | 1594          |
| 21 | Roof sill top height                  | 1697          |
| 22 | Floor sill bottom height              | 442           |
| 23 | Floor sill top height                 | 527           |

**DATA SHEET NO. 16**  
**HIGH SPEED CAMERA LOCATIONS AND DATA**

Test Vehicle: 2008 Toyota 4Runner 4x4  
 Test Program: NCAP Side Impact

NHTSA No. M85106  
 Test Date: 9/20/2007



| No. | Camera View                           | Location (mm) |       |      | Lens (mm) | Film Speed (fps) |
|-----|---------------------------------------|---------------|-------|------|-----------|------------------|
|     |                                       | X             | Y     | Z    |           |                  |
| 1   | Overhead Close-up                     | 100           | 0     | 5050 | 50        | 1000             |
| 2   | Overhead Overall                      | -340          | 0     | 5050 | 14        | 1000             |
| 3   | MDB Onboard, Impact Point Close-up    |               |       |      | 50        | 1000             |
| 4   | MDB Onboard, Centerline of Impact     |               |       |      | 16        | 1000             |
| 5   | Right Side, Ground Level, Overall     | -1210         | 5150  | 1325 | 24        | 1000             |
| 6   | Left Side, Ground Level, Overall      | 1150          | -5200 | 1310 | 24        | 1000             |
| 7   | Vehicle Onboard Front SID/HIII, Front |               |       |      | 12.5      | 1000             |
| 8   | Vehicle Onboard Front SID/HIII, Side  |               |       |      | 8         | 1000             |
| 9   | Vehicle Onboard Rear SID/HIII, Side   |               |       |      | 8         | 1000             |
| 10  | Real Time Coverage                    |               |       |      | 13        | 24               |
| 11  | Onboard Child Seat                    |               |       |      | 12.5      | 1000             |

Reference Points X - Impact Line  
 Y - MDB Left Edge Impact Point  
 Z - Ground Plane

**DATA SHEET NO. 17**  
**SUMMARY OF FMVSS 301 DATA**

Test Vehicle: 2008 Toyota 4Runner 4x4  
 Test Program: NCAP Side Impact

NHTSA No. M85106  
 Test Date: 9/20/2007

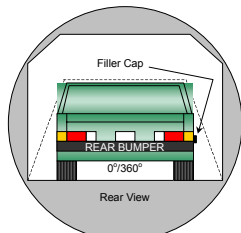
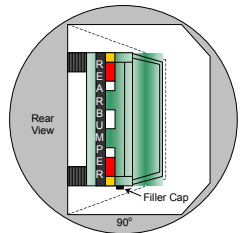
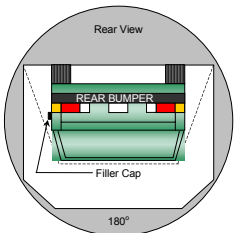
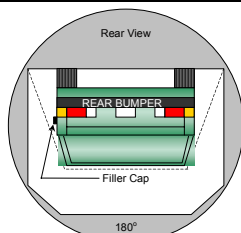
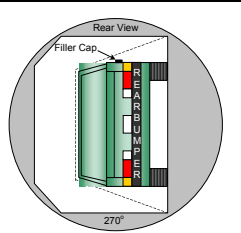
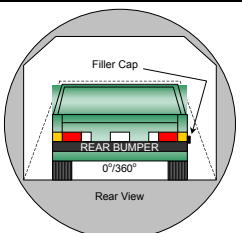
**FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA**

Temperature at Time of Impact: 21° C      Test Time: 11:00 am

**Stoddard Solvent Spillage Measurements**

- 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**

|                                                                                     |                                                                                     |                                                                                      |                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |  |  | <p>1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.</p> <p>2. The position hold time at each position is 300 seconds (minimum).</p> <p>3. Details of Stoddard Solvent spillage locations:<br/><b>None</b></p> |
| 0° to 90°      90° to 180°                                                          |                                                                                     |                                                                                      |                                                                                                                                                                                                                                                    |
|  |  |  |                                                                                                                                                                                                                                                    |
| 180° to 270°      270° to 360°                                                      |                                                                                     |                                                                                      |                                                                                                                                                                                                                                                    |

| Test Phase   | Rotation Time (sec.) | Hold Time (sec.) | Spillage Collection Time (min) | Spillage (oz.) |
|--------------|----------------------|------------------|--------------------------------|----------------|
| 0° to 90°    | 118                  | 300              | First 5                        | 0              |
| 90° to 180°  | 115                  | 300              | First 5                        | 0              |
| 180° to 270° | 109                  | 300              | First 5                        | 0              |
| 270° to 360° | 118                  | 300              | First 5                        | 0              |

**APPENDIX A**  
**PHOTOGRAPHS**

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Left Front  $\frac{3}{4}$  View, As Received



Right Rear  $\frac{3}{4}$  View, As Received



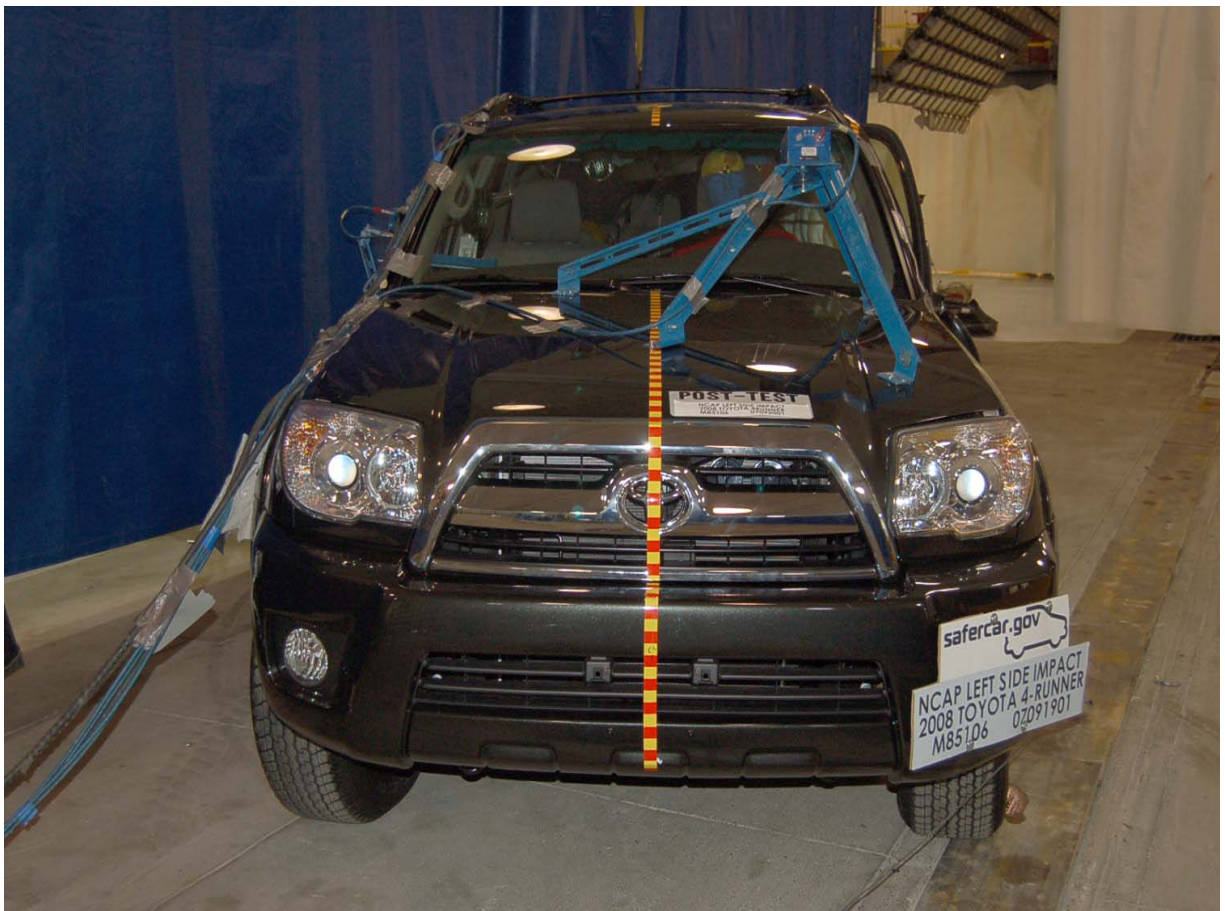
Manufacturer's Label



Tire Placard



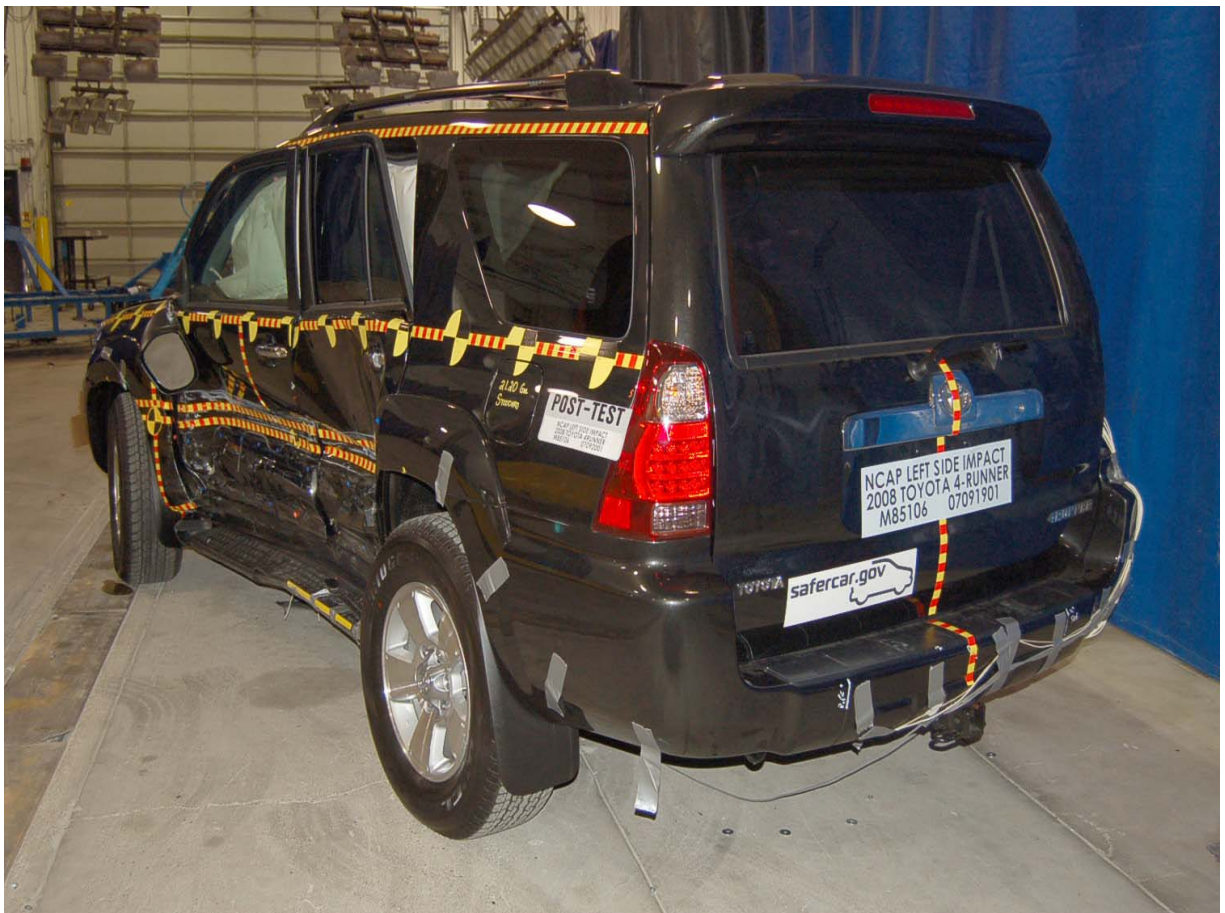
Pre-Test Front View



Post-Test Front View



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



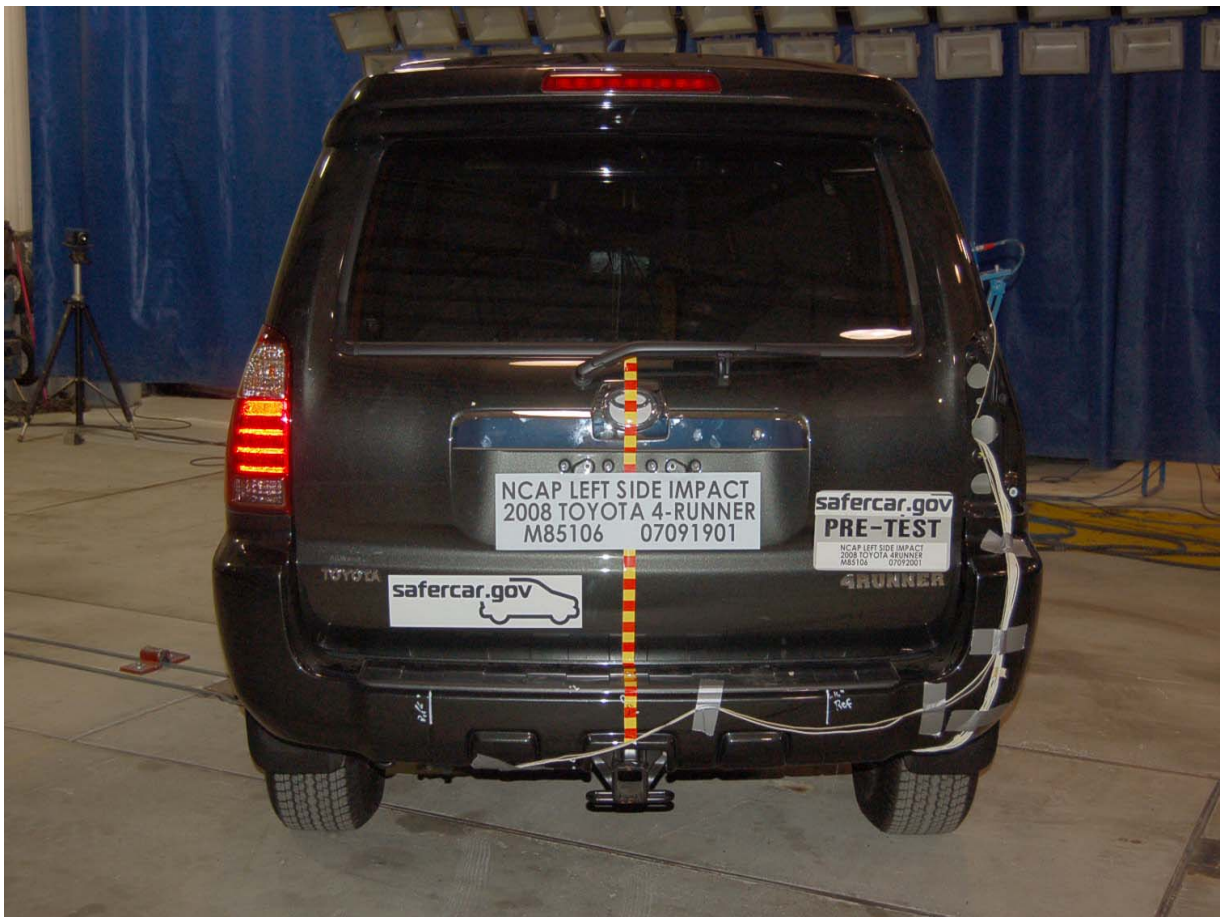
Post-Test Left Rear  $\frac{3}{4}$  View



Pre-Test Left Side View



Post-Test Left Side View



Pre-Test Rear View



Post-Test Rear View



Pre-Test Right Rear  $\frac{3}{4}$  View



Post-Test Right Rear  $\frac{3}{4}$  View



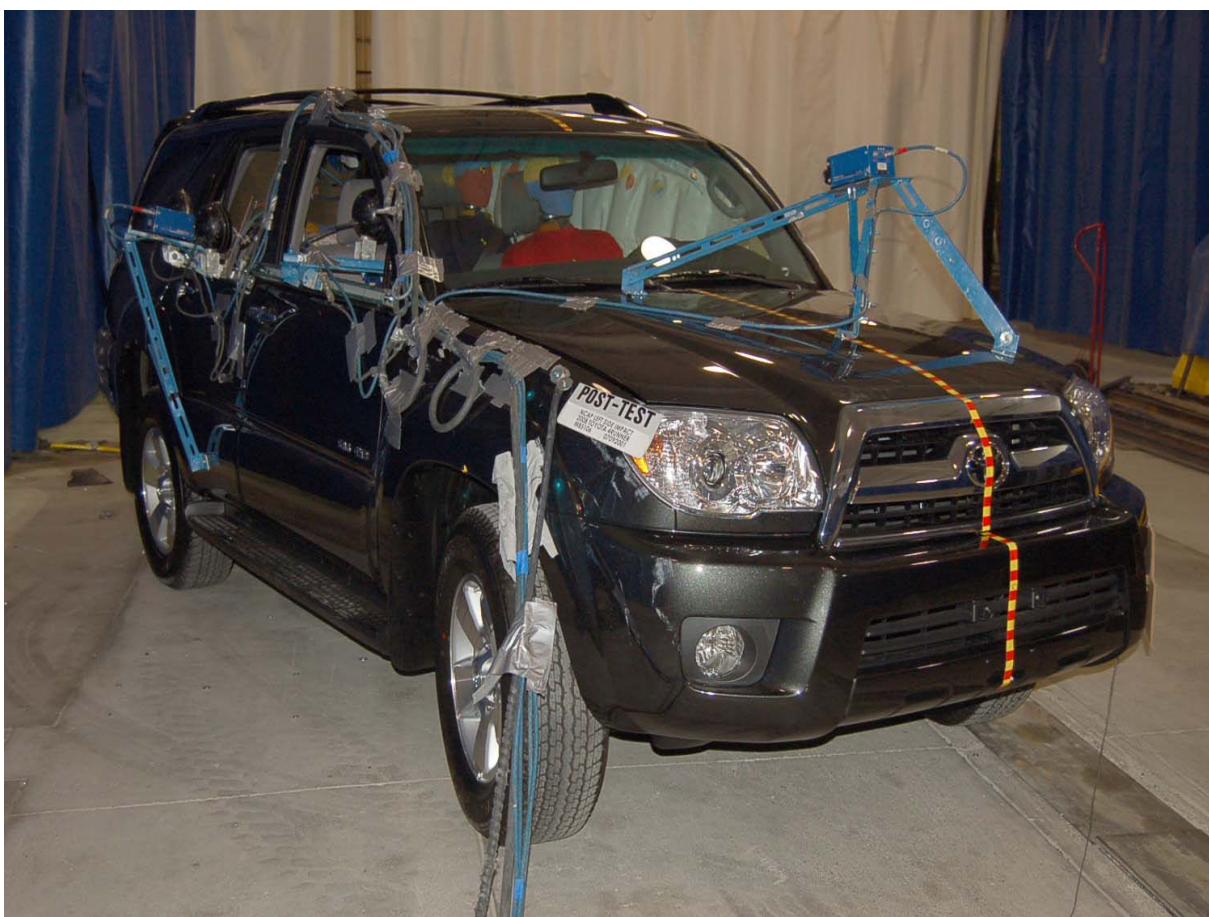
Pre-Test Right Side View



Post-Test Right Side View



Pre-Test Right Front  $\frac{3}{4}$  View



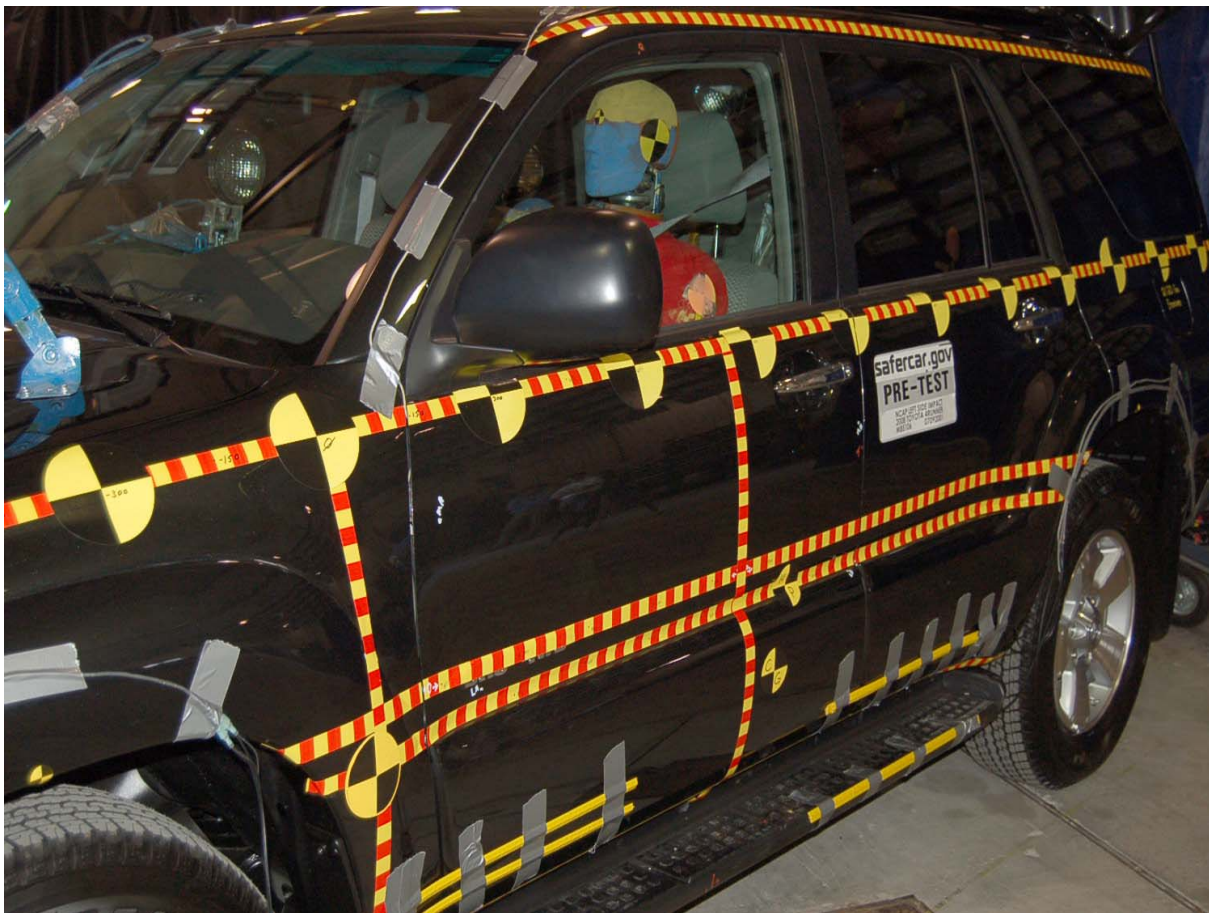
Post-Test Right Front  $\frac{3}{4}$  View



Pre-Test Left Impact Point



Post-Test Left Impact Point



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



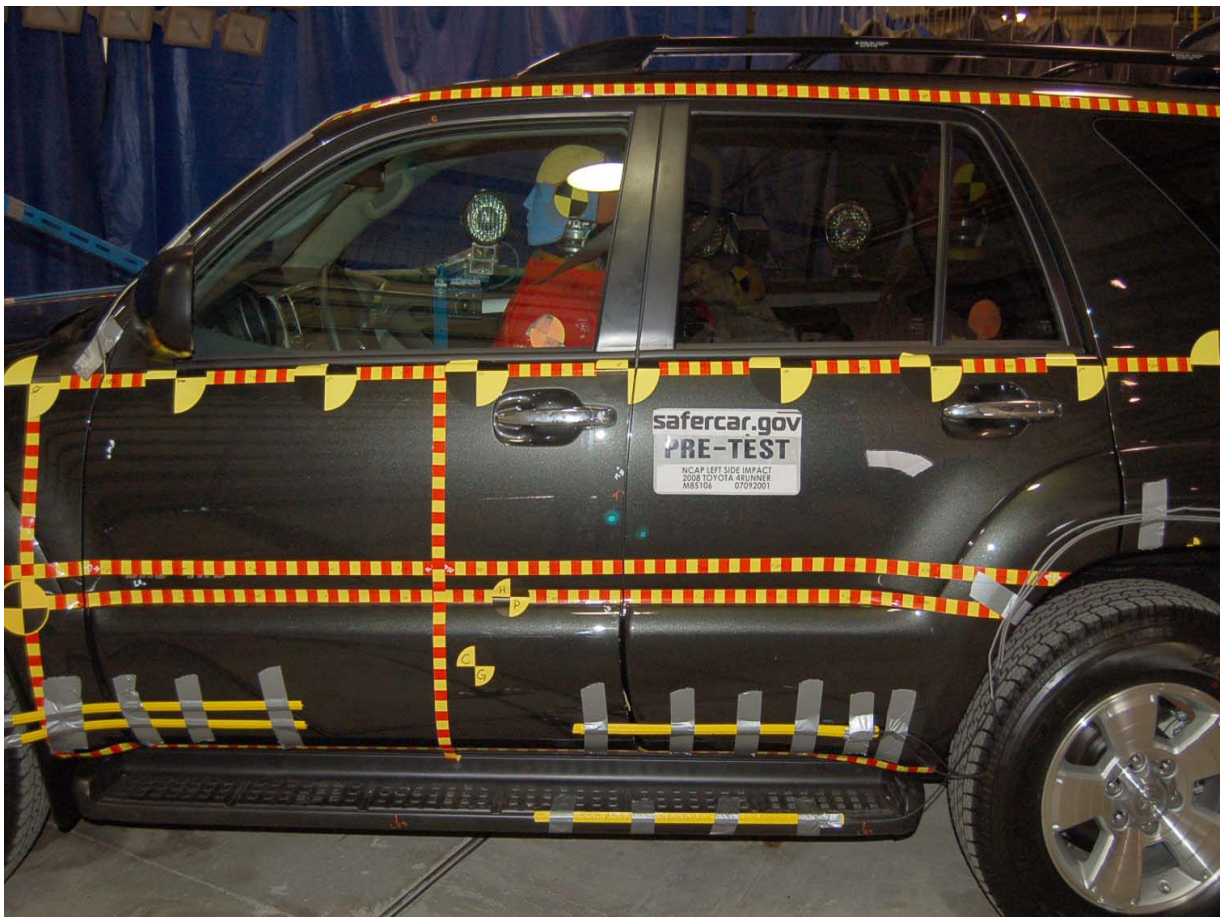
Post-Test Front  $\frac{3}{4}$  View of Left Side Doors



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



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



Pre-Test Left Side Impact Close-up



Post-Test Left Side Impact Close-up



Pre-Test Driver Dummy (Door Open)



Pre-Test Driver Dummy Clearance From Door



Post-Test Driver Dummy Clearance From Door



Pre-Test Driver Dummy (Through Window)



Post-Test Driver Dummy (Through Window)



Pre-Test Driver Dummy Right Side View



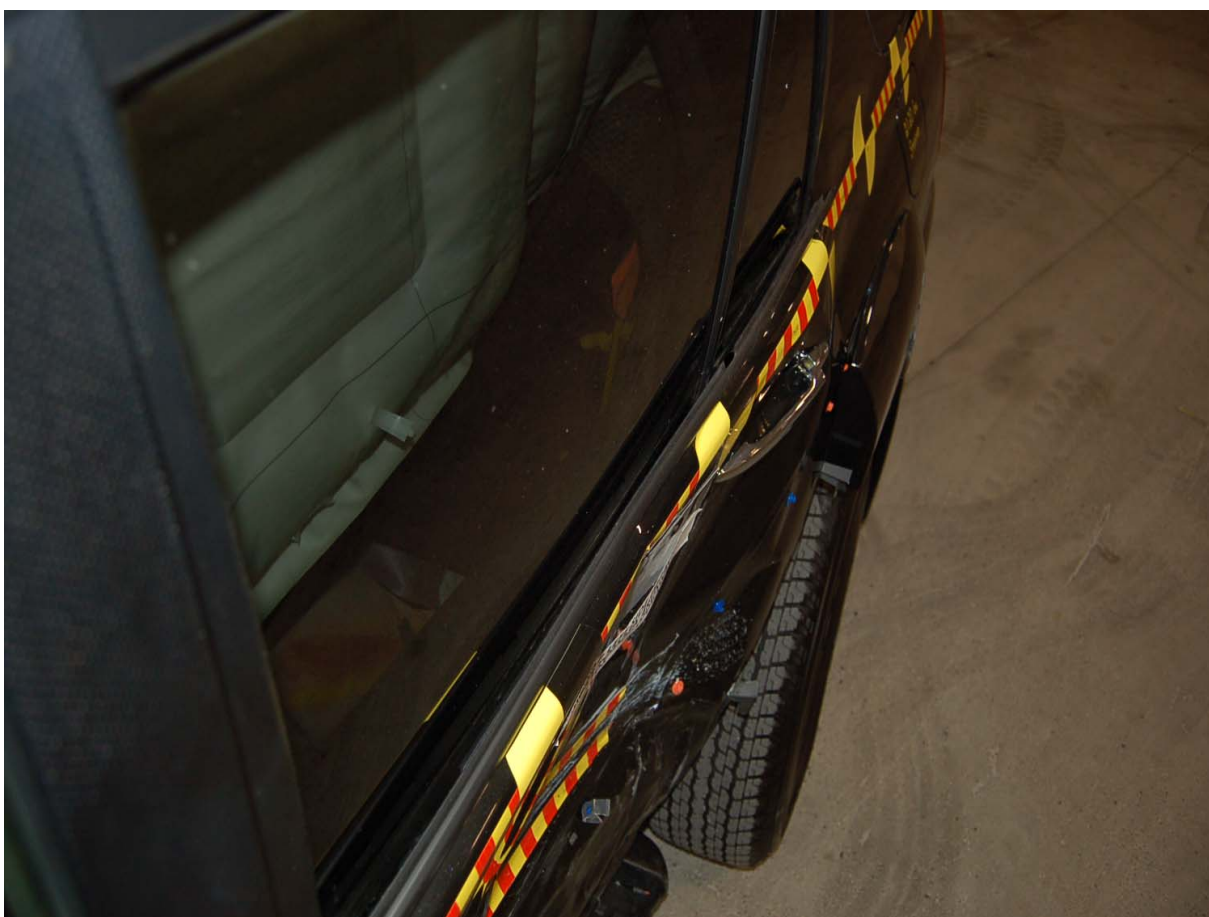
Post-Test Driver Dummy Right Side View



Pre-Test Passenger Dummy (Door Open)



Pre-Test Passenger Dummy Clearance From Door



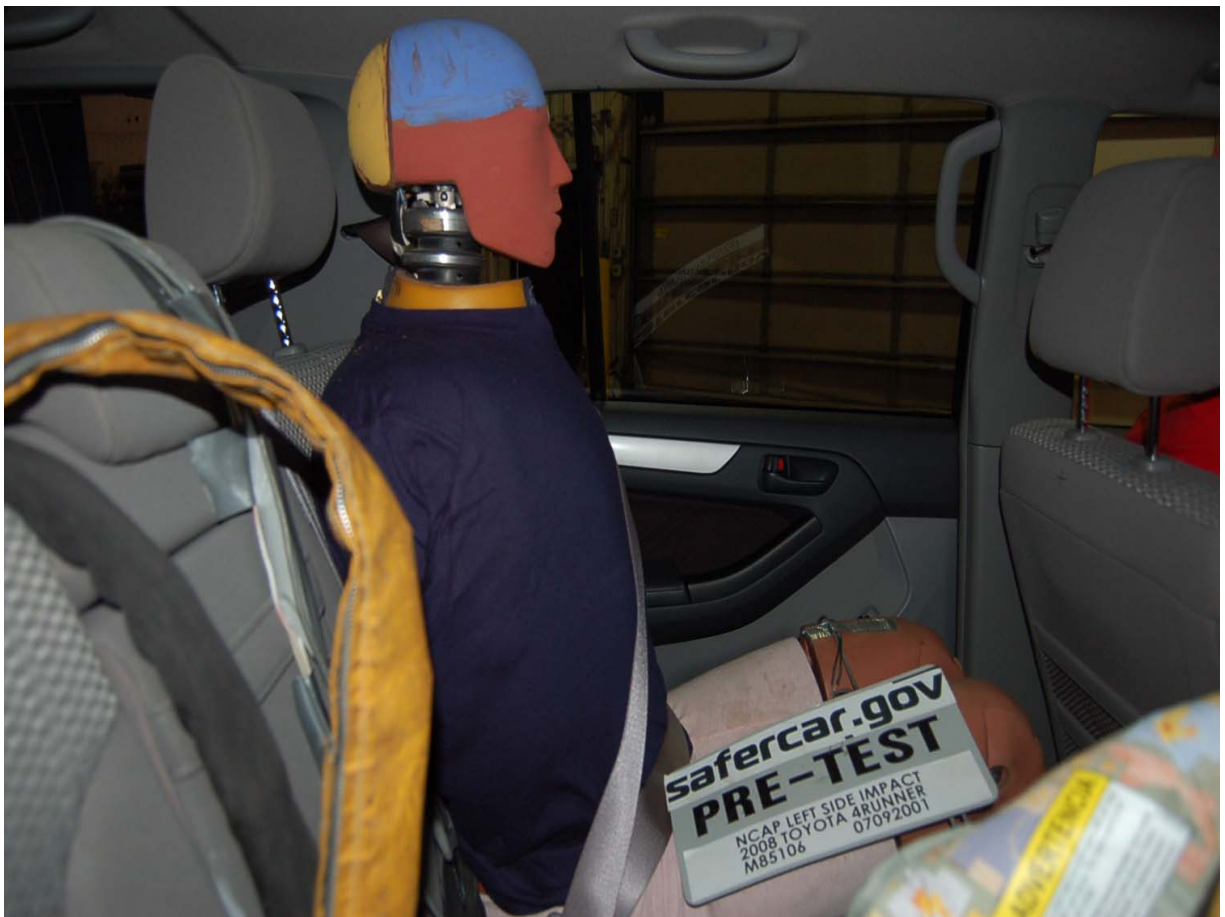
Post-Test Passenger Dummy Clearance From Door



Pre-Test Passenger Dummy (Through Window)



Post-Test Passenger Dummy (Through Window)



Pre-Test Passenger Dummy Right Side View



Pre-Test Front View of Deformable Barrier



Post-Test Front View of Deformable Barrier



Pre-Test Top View of Deformable Barrier



Post-Test Top View of Deformable Barrier



Pre-Test Right Side View of Deformable Barrier



Post-Test Right Side View of Deformable Barrier



Pre-Test Left Side View of Deformable Barrier



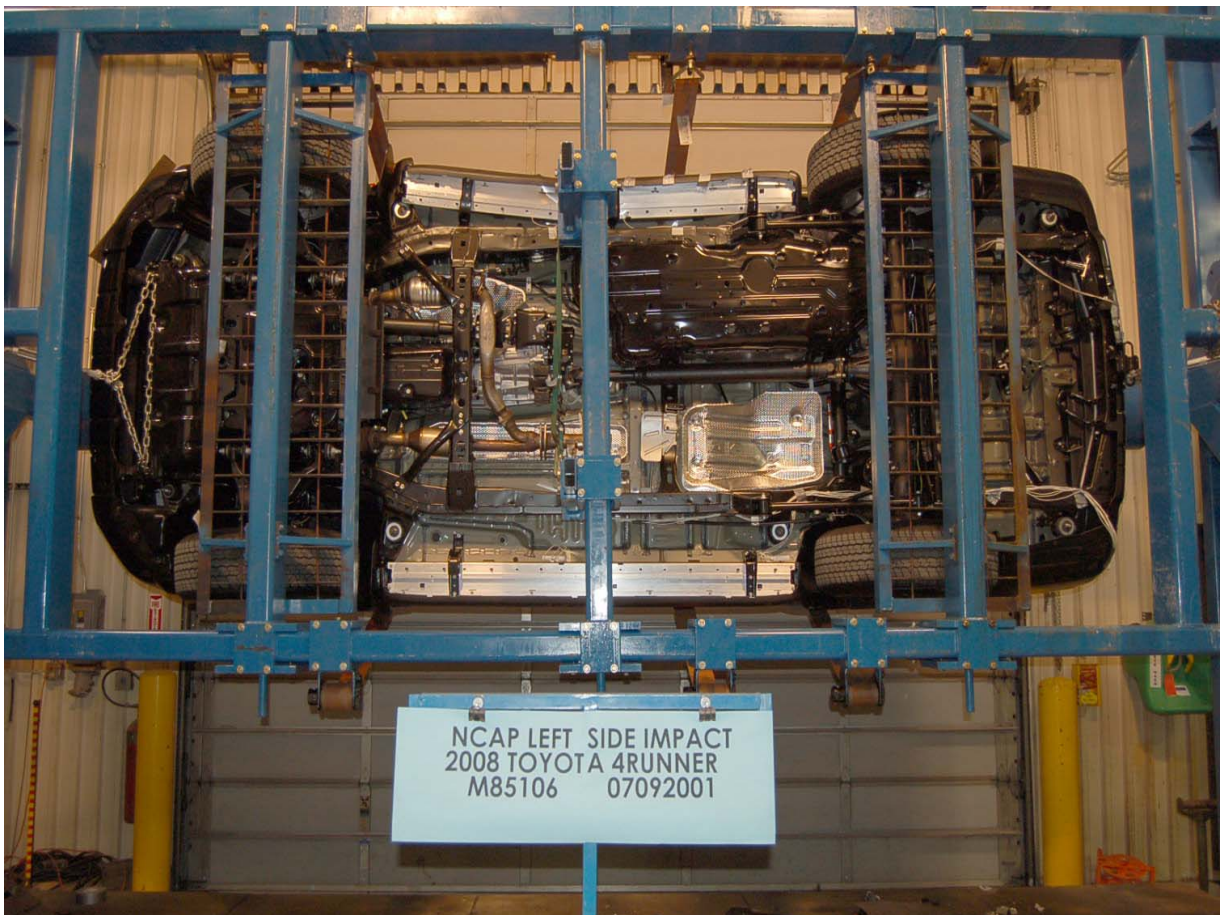
Post-Test Left Side View of Deformable Barrier



Vehicle on Rollover Device (90 Degrees)



Vehicle on Rollover Device (180 Degrees)



Vehicle on Rollover Device (270 Degrees)



Vehicle on Rollover Device (360 Degrees)



Vehicle Impact



Post-Test Driver Dummy Head Contact



Post-Test Driver Dummy Torso Contact



Post-Test Passenger Dummy Head Contact



Post-Test Passenger Dummy Torso Contact

**APPENDIX B**  
**SID/HIII RESPONSE DATA TRACES**

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**The following dummy and vehicle response data can be found in the R&D section of the NHTSA website at [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov)**

Driver Head X Primary

Driver Head Y Primary

Driver Head Z Primary

Driver Head X Redundant

Driver Head Y Redundant

Driver Head Z Redundant

Driver Upper Neck Force X

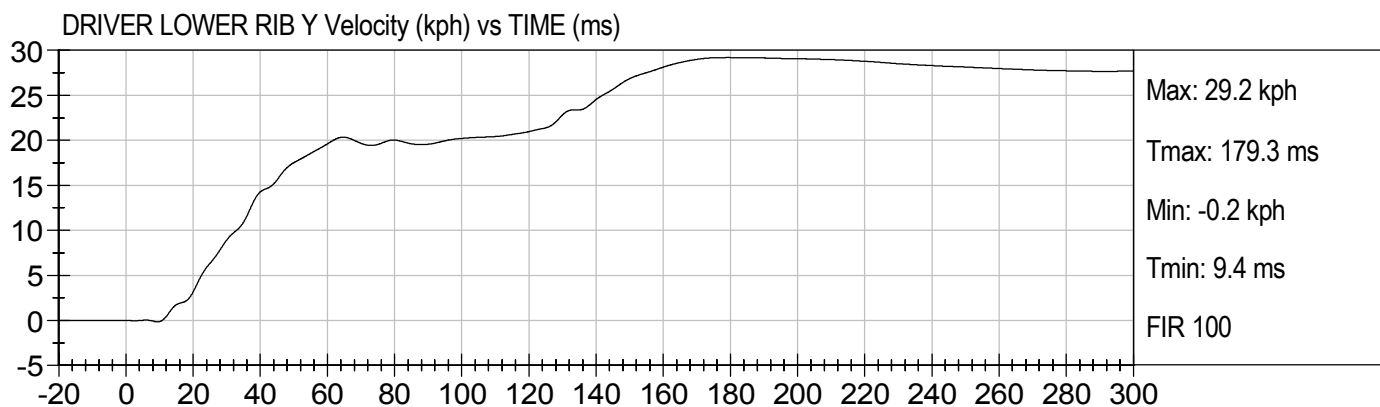
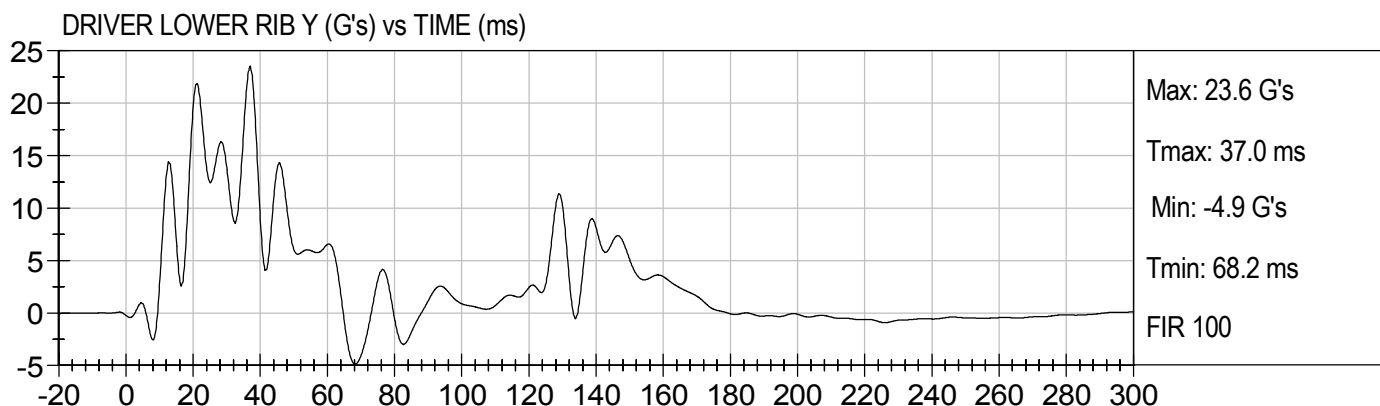
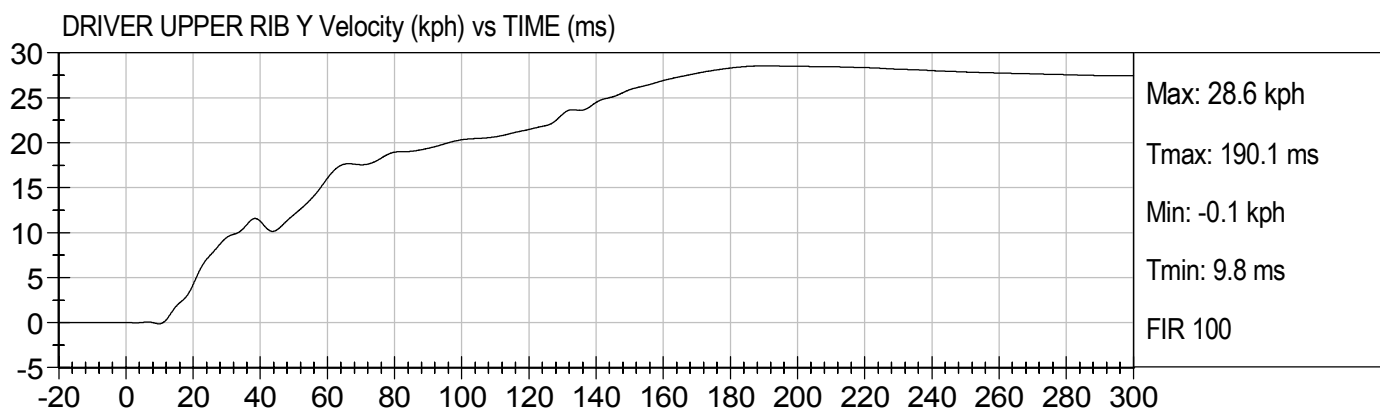
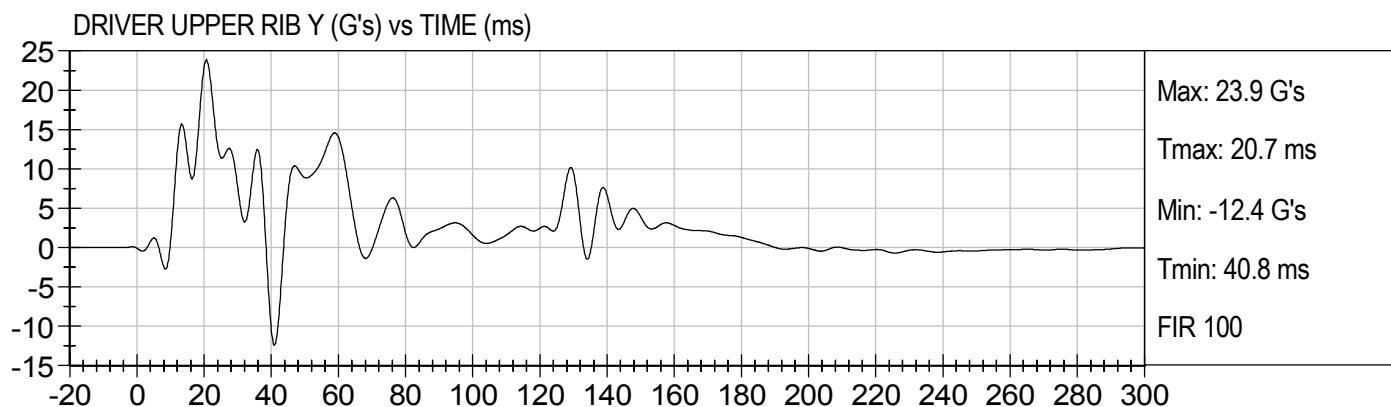
Driver Upper Neck Force Y

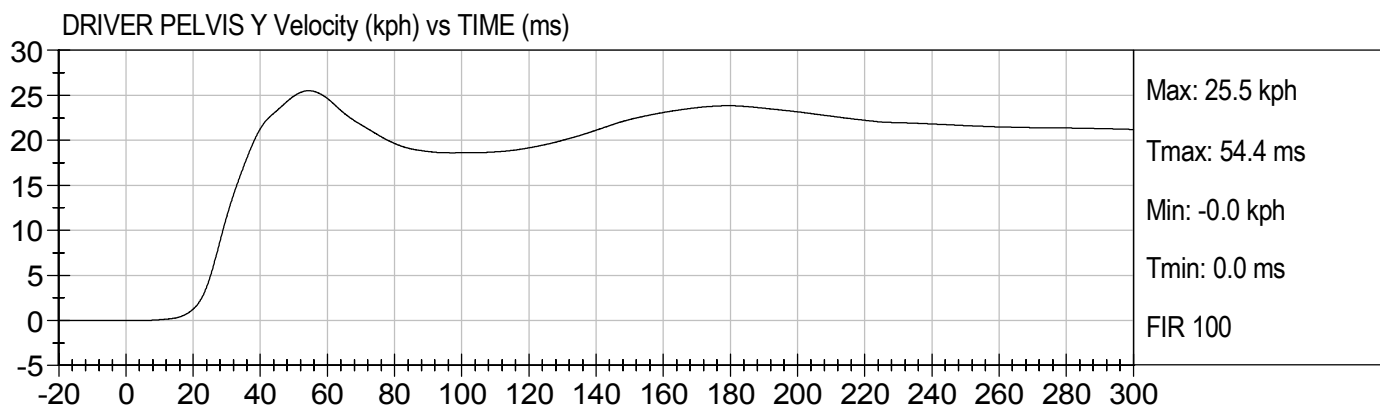
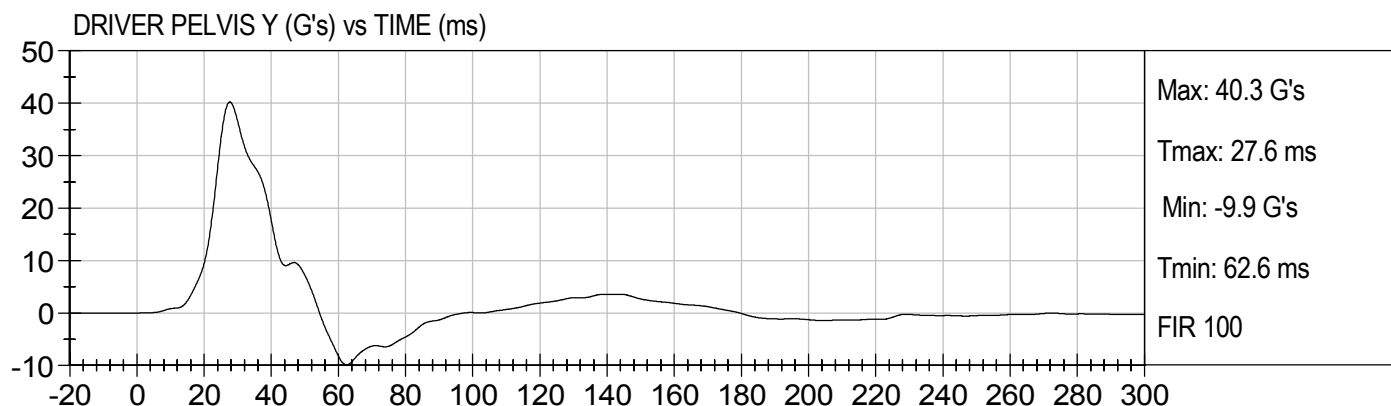
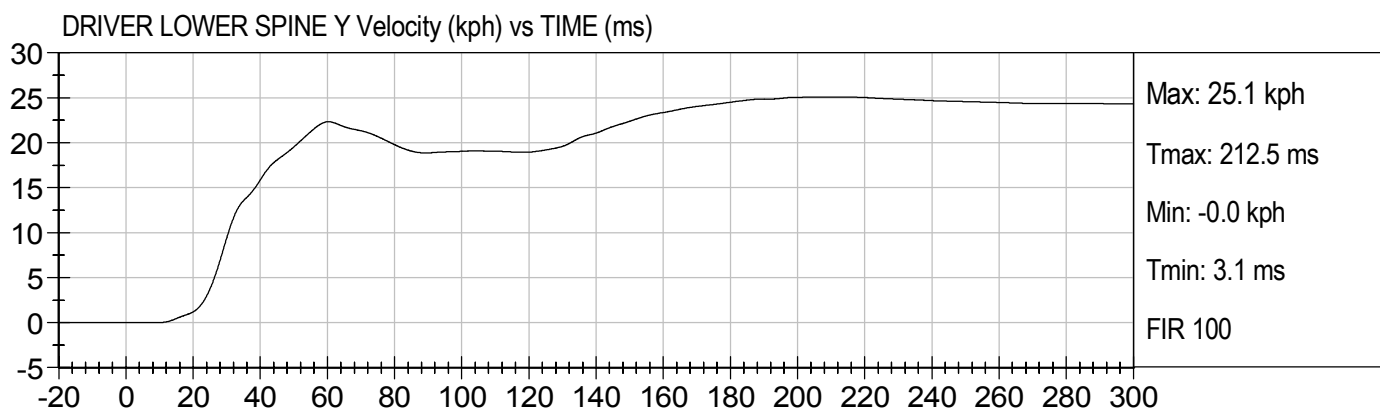
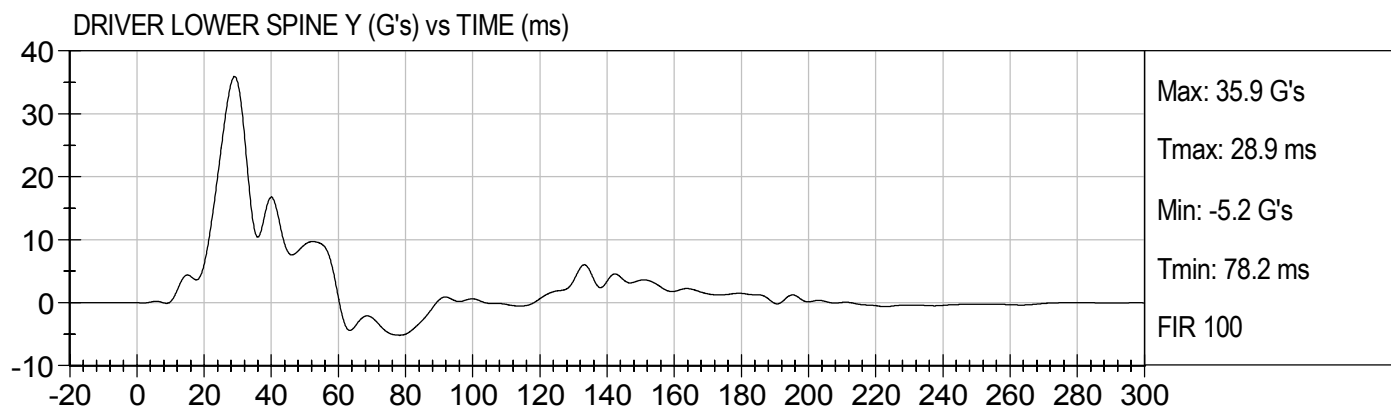
Driver Upper Neck Force Z

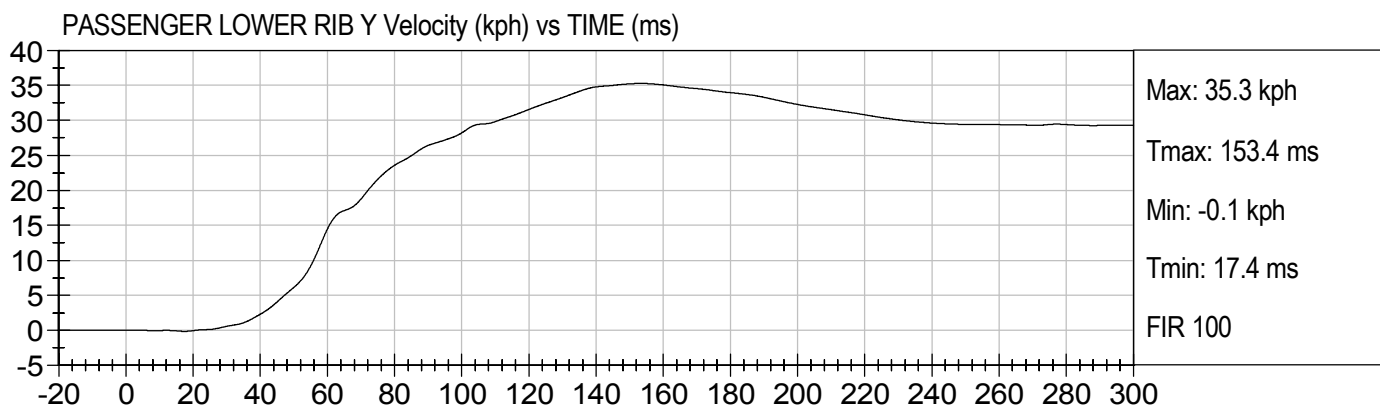
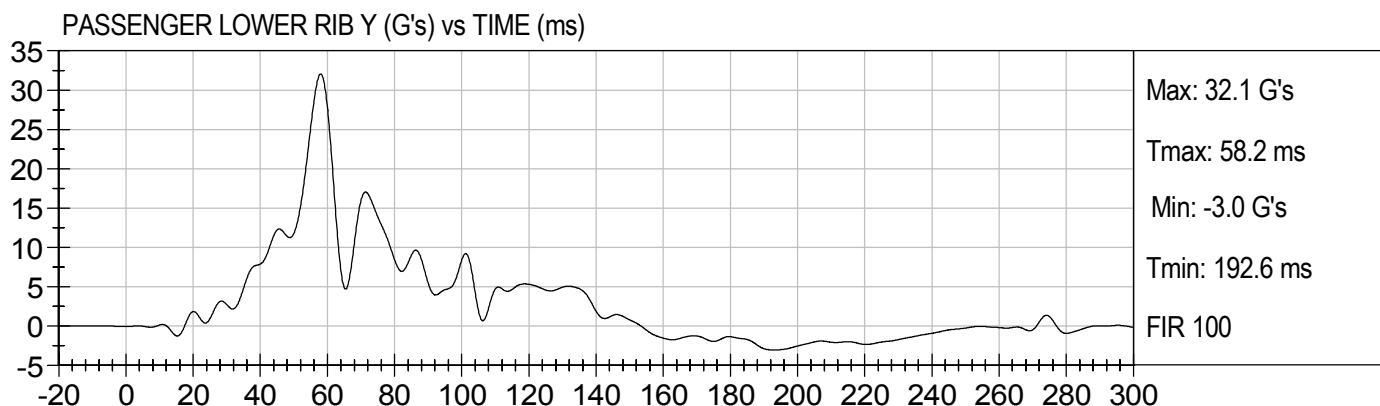
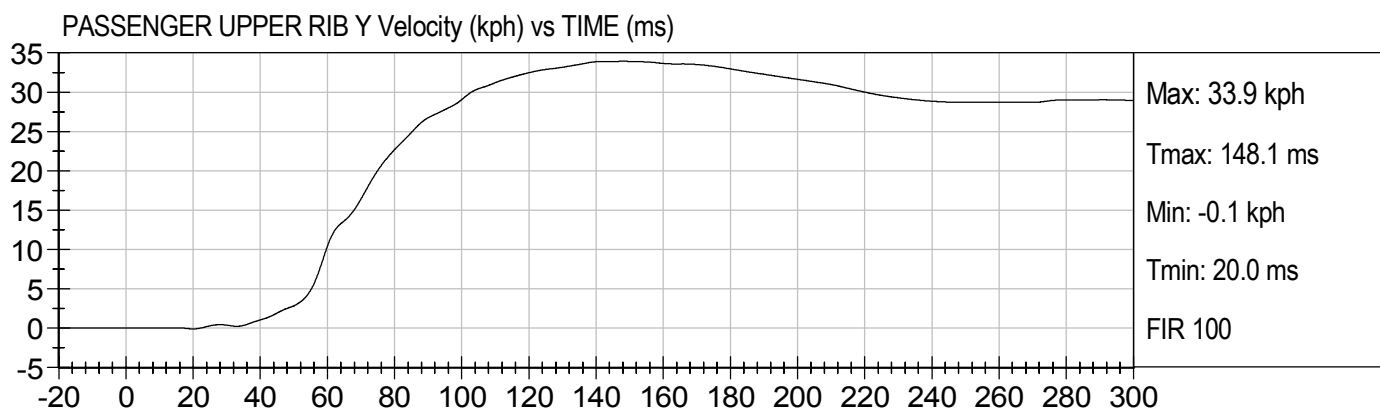
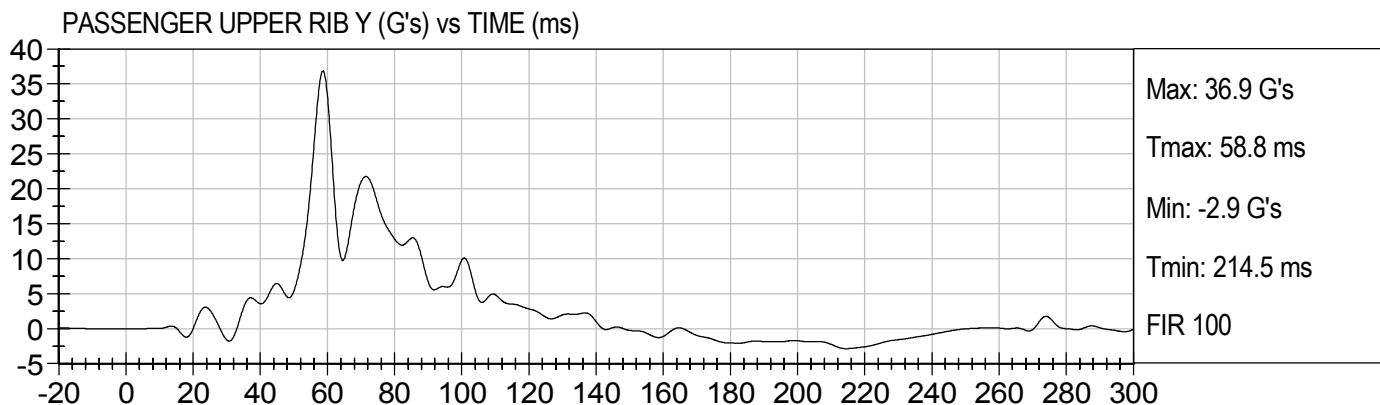
Driver Upper Neck Moment X

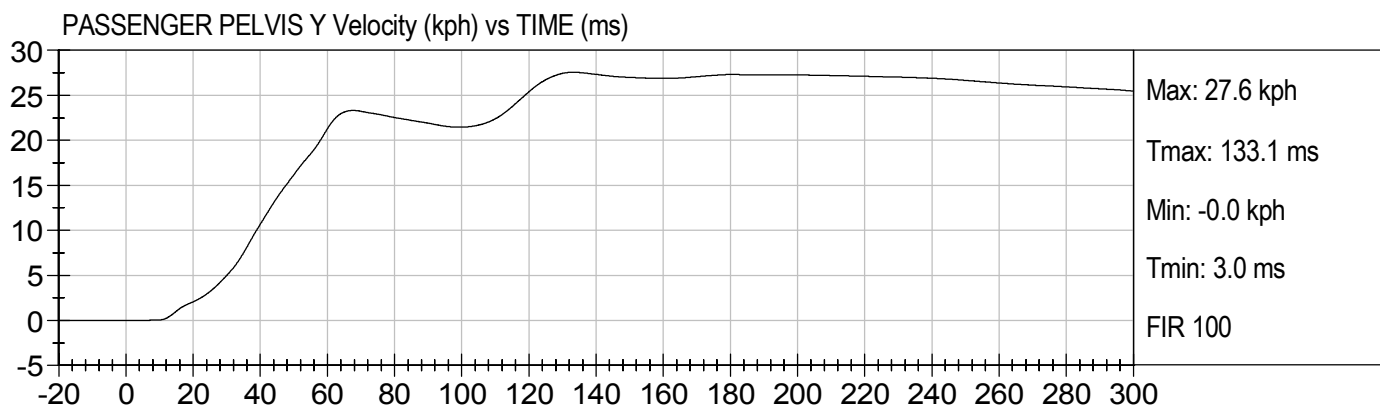
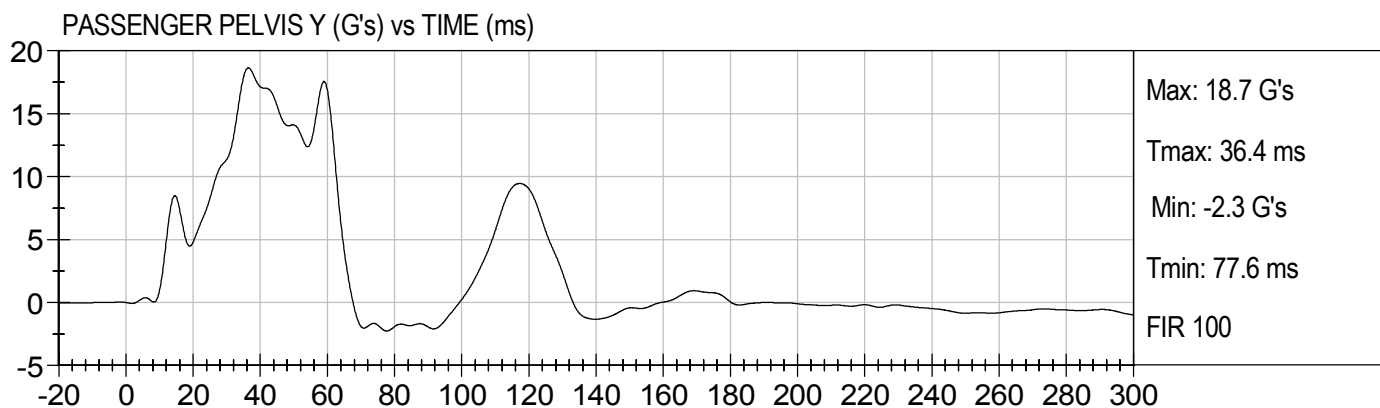
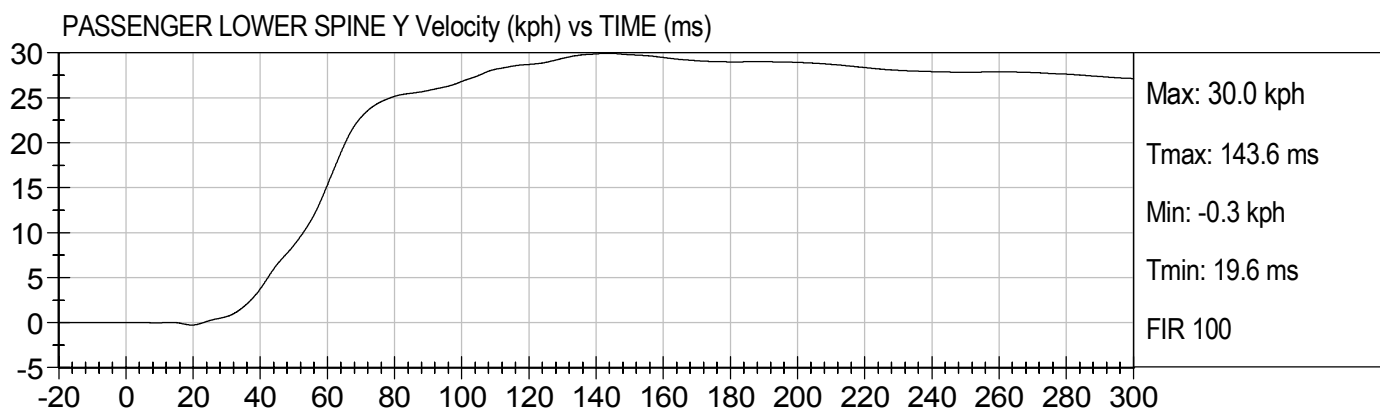
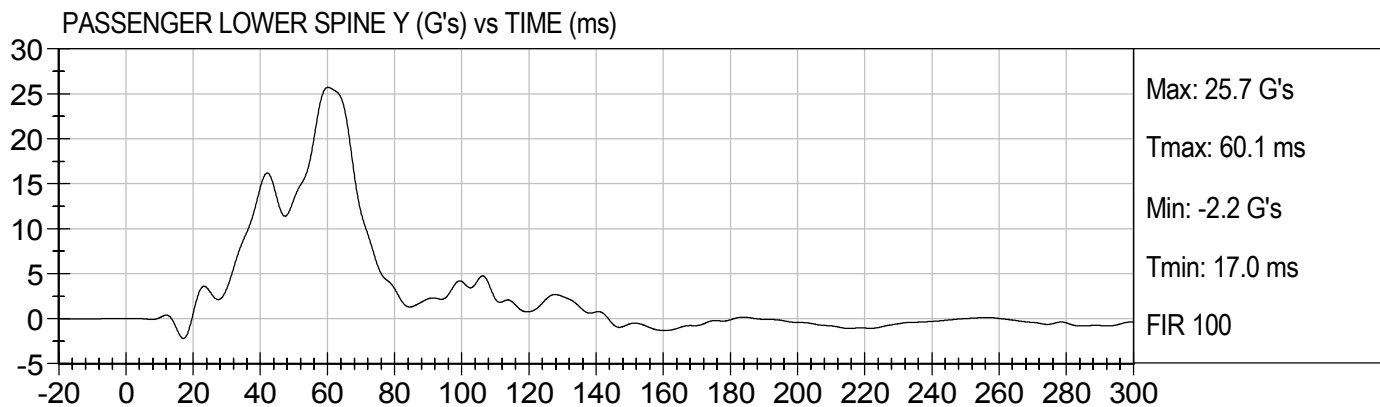
Driver Upper Neck Moment Y  
Driver Upper Neck Moment Z  
Driver Upper Rib Redundant Y  
Driver Lower Rib Redundant Y  
Driver Lower Spine Redundant Y  
Driver Pelvis Redundant Y  
Driver Thorax Contact  
Driver Pelvis Contact  
Passenger Head X Primary  
Passenger Head Y Primary  
Passenger Head Z Primary  
Passenger Head X Redundant  
Passenger Head Y Redundant  
Passenger Head Z Redundant  
Passenger Upper Neck Force X  
Passenger Upper Neck Force Y  
Passenger Upper Neck Force Z  
Passenger Upper Neck Moment X  
Passenger Upper Neck Moment Y  
Passenger Upper Neck Moment Z  
Passenger Upper Rib Redundant Y  
Passenger Lower Rib Redundant Y  
Passenger Lower Spine Redundant Y  
Passenger Pelvis Redundant Y  
Passenger Thorax Contact  
Passenger Pelvis Contact  
Vehicle Right Sill at Front Seat X  
Vehicle Right Sill at Front Seat Y  
Vehicle Right Sill at Front Seat Z  
Vehicle Right Sill at Rear Seat X  
Vehicle Right Sill at Rear Seat Y  
Vehicle Right Sill at Rear Seat Z

Vehicle Rear Floor Above Axle X  
Vehicle Rear Floor Above Axle Y  
Vehicle Rear Floor Above Axle Z  
Vehicle Left Sill at Rear Door Y  
Vehicle Left Sill at Front Door Y  
Vehicle Right Rear Occupant Compartment  
Vehicle B-Post Lower Y  
Vehicle B-Post Middle Y  
Vehicle A-Post Lower Y  
Vehicle A-Post Middle Y  
Vehicle Left Front Seat Track  
Vehicle CG X  
Vehicle CG Y  
Vehicle CG Z  
MDB CG X  
MDB CG Y  
MDB CG Z  
MDB Rear X  
MDB Rear Y  
MDB Left Bumper Contact  
MDB Right Bumper Contact









**APPENDIX C**  
**DUMMY CALIBRATION DATA**

CERTIFICATION DATA

Dummy Serial Number: 904

## Calibration Test Results Summary

Dummy Serial Number: 904

### Pre-Test Calibration

|                             |                                                       |
|-----------------------------|-------------------------------------------------------|
| External Dimensions:        | The dummy passed all external dimension requirements. |
| Head Drop Test:             | The head passed all drop test requirements.           |
| Neck Pendulum Test:         | The neck passed all pendulum test requirements.       |
| Thorax Impact Test:         | The thorax passed all impact test requirements.       |
| Pelvic Impact Test:         | The pelvis passed all impact test requirements.       |
| Abdominal Compression Test: | The abdomen passed all compression test requirements. |
| Lumbar Flexion Test:        | The lumbar passed all flexion test requirements.      |

**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**External Measurements**

**ATD Serial No:** 904

**Test I.D:** D07264

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| SH - Seated Height           | mm    | 889 - 909     | 906    | Pass      |
| RH - Rib Height              | mm    | 501 - 521     | 508    | Pass      |
| HP - Hip Pivot Height        | mm    | 99 ref.       | 99     | Pass      |
| RD - Rib from Back Line      | mm    | 229 - 241     | 240    | Pass      |
| KV - Knee Pivot to Back Line | mm    | 511 - 526     | 523    | Pass      |
| SW - Knee Pivot to Floor     | mm    | 490 - 505     | 496    | Pass      |
| HW - Hip Width               | mm    | 356 - 391     | 360    | Pass      |
| Overall Test Results         |       |               | Pass   |           |

Jessica Hall  
Laboratory Technician

David Winkelbauer  
Approved By

8/29/2007

Test Date

**SID/HIII Calibration Data Sheet**  
**Side Impact Dummy**  
**Head Drop Calibration (Lateral)**

**ATD Serial No:** 904

**Test I.D:** D072641

| Tested Parameter              | Units  | Specification | Result               | Pass/Fail |
|-------------------------------|--------|---------------|----------------------|-----------|
| Laboratory Temperature        | deg C  | 18.9 to 25.5  | 21.0                 | Pass      |
| Laboratory Relative Humidity  | %      | 10 to 70      | 45                   | Pass      |
| Peak Resultant Acceleration   | G's    | 120 to 150    | 136                  | Pass      |
| Is Resultant Curve Unimodal?  | Yes/No | 15% of peak   | Yes                  | Pass      |
| Peak Longitudnal Acceleration | G's    | +/- 15        | -8.2                 | Pass      |
|                               |        |               | Overall Test Results | Pass      |

Jessica Hall  
Laboratory Technician

8/29/07  
Test Date

David Winkelbauer  
Approved By



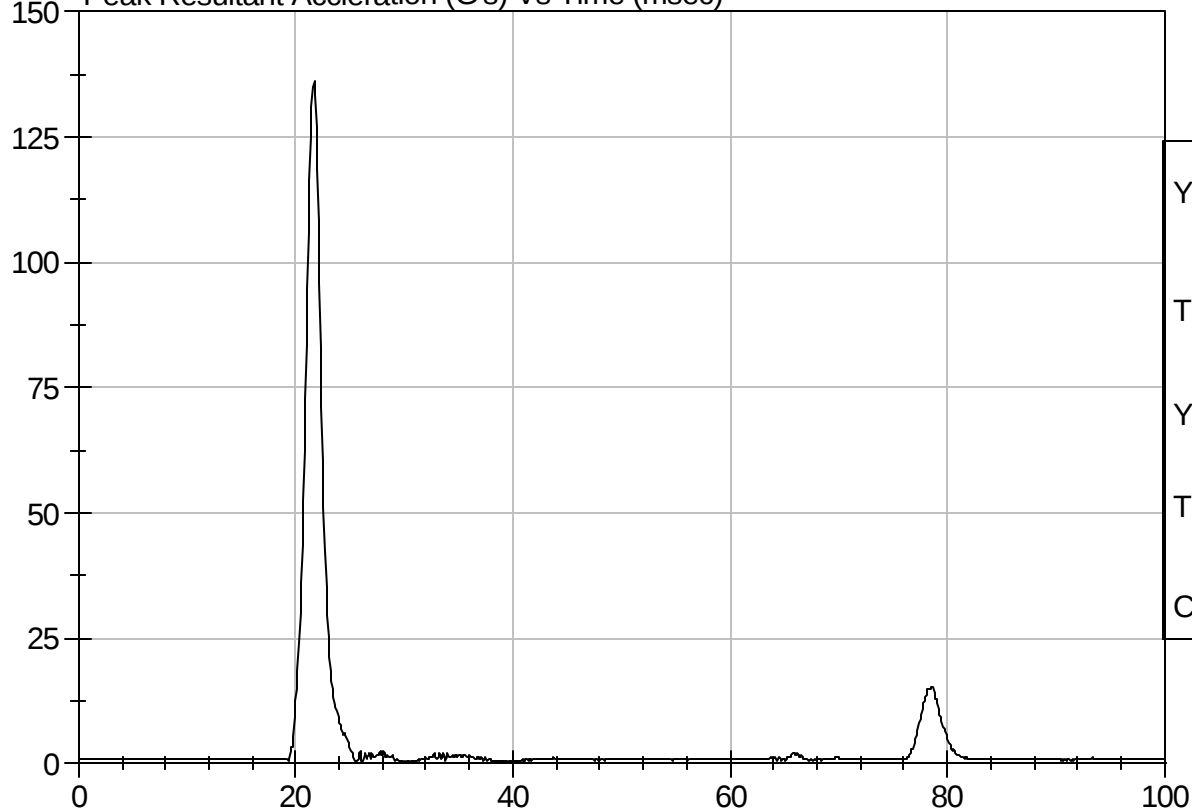
Test Description: Head Drop

Test Date: 8/29/07

Component: D072641

Speed: 0 ft/s, 0 m/s

Peak Resultant Acceleration (G's) Vs Time (msec)



YMax: 136.2 G

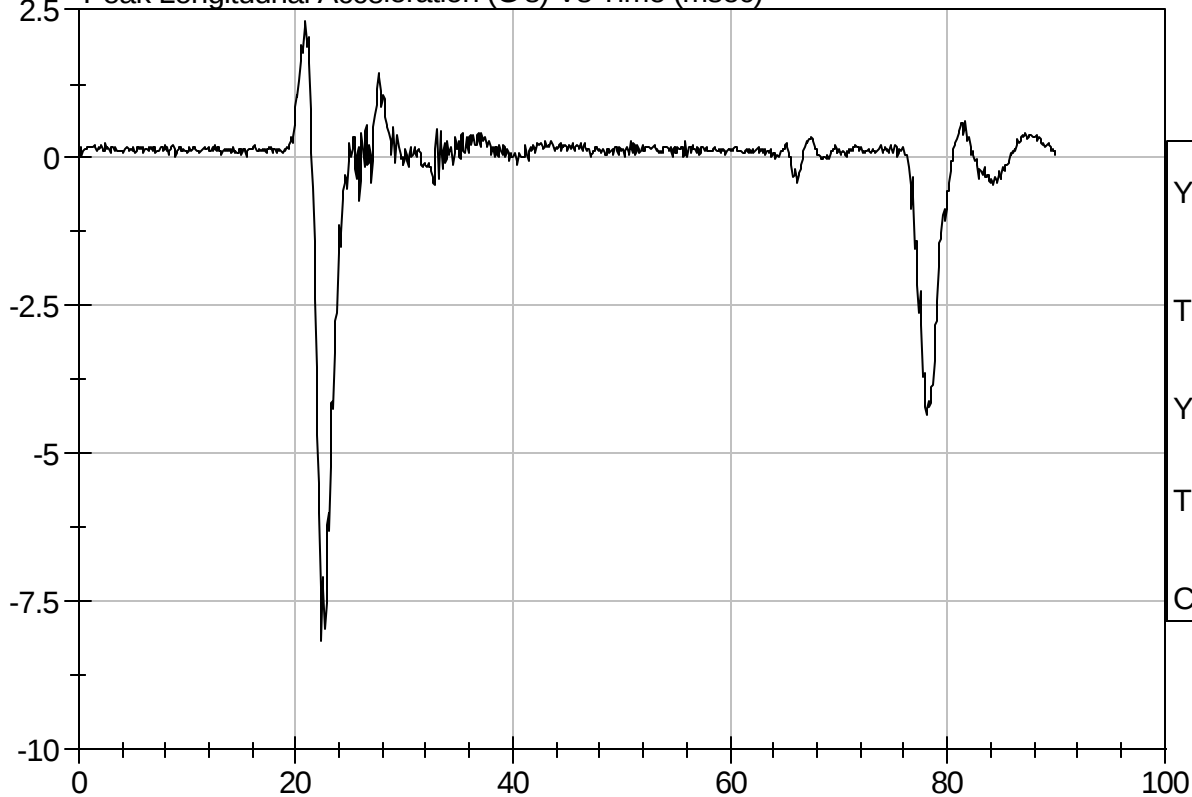
Tmax: 21.7 ms

YMin: 0.2 G

Tmin: 29.9 ms

CFC 1000

Peak Longitudnal Acceleration (G's) Vs Time (msec)



YMax: 2.3 G

Tmax: 20.9 ms

YMin: -8.2 G

Tmin: 22.4 ms

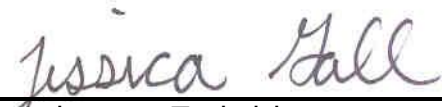
CFC 1000

**SID/HIII Calibration Data Sheet**  
**Side Impact Dummy**  
**Thorax Impact Test**

**ATD Serial No:** 904

**Test I.D:** D072642

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 - 25.5   | 21.1   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 46     | Pass      |
| Probe Velocity               | m/s   | 4.22 - 4.31   | 4.23   | Pass      |
| Upper Rib                    | G's   | 37 - 46       | 39     | Pass      |
| Lower Rib                    | G's   | 37 - 46       | 37     | Pass      |
| Lower Spine                  | G's   | 15 - 22       | 22     | Pass      |
| Overall Test Results         |       |               |        | Pass      |

  
Laboratory Technician

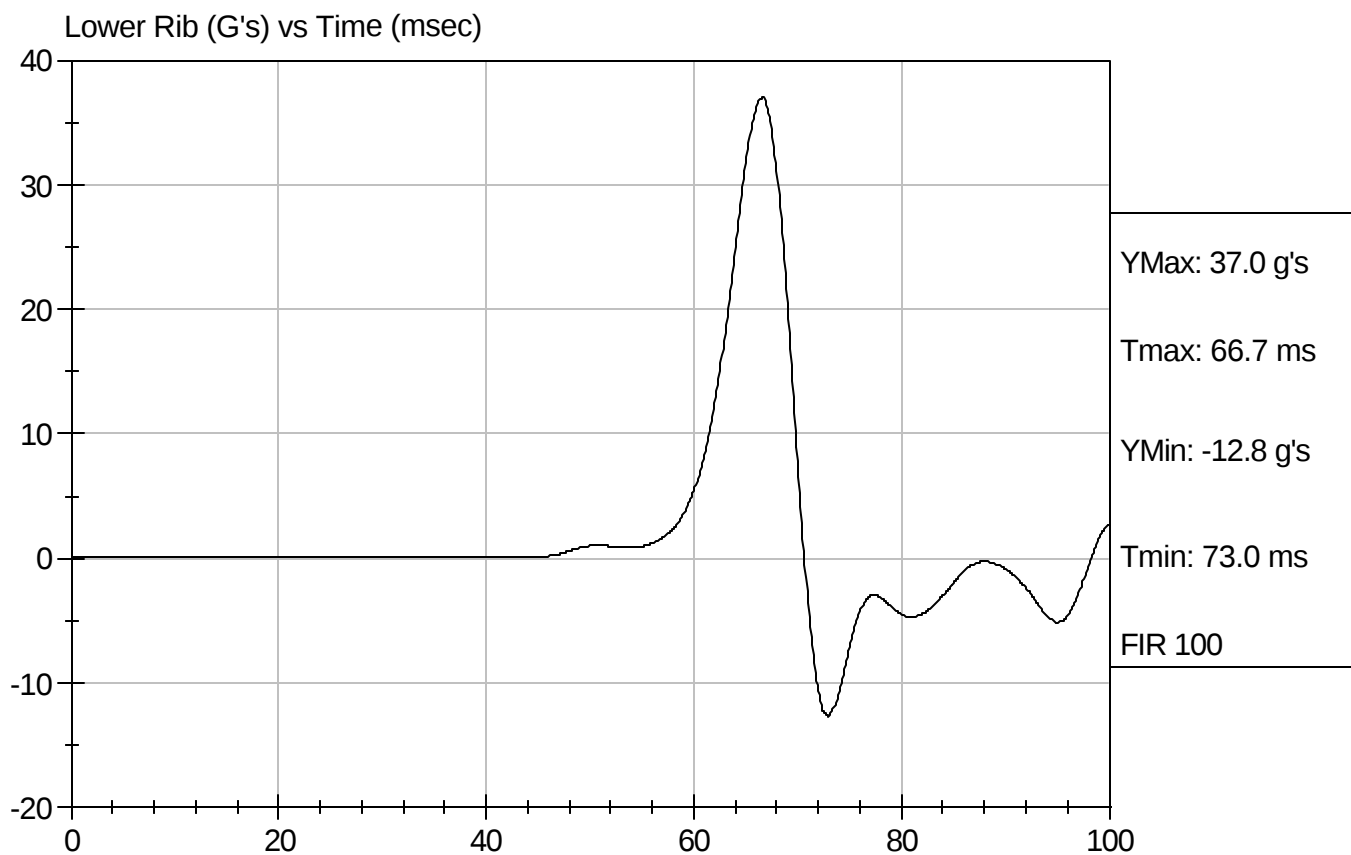
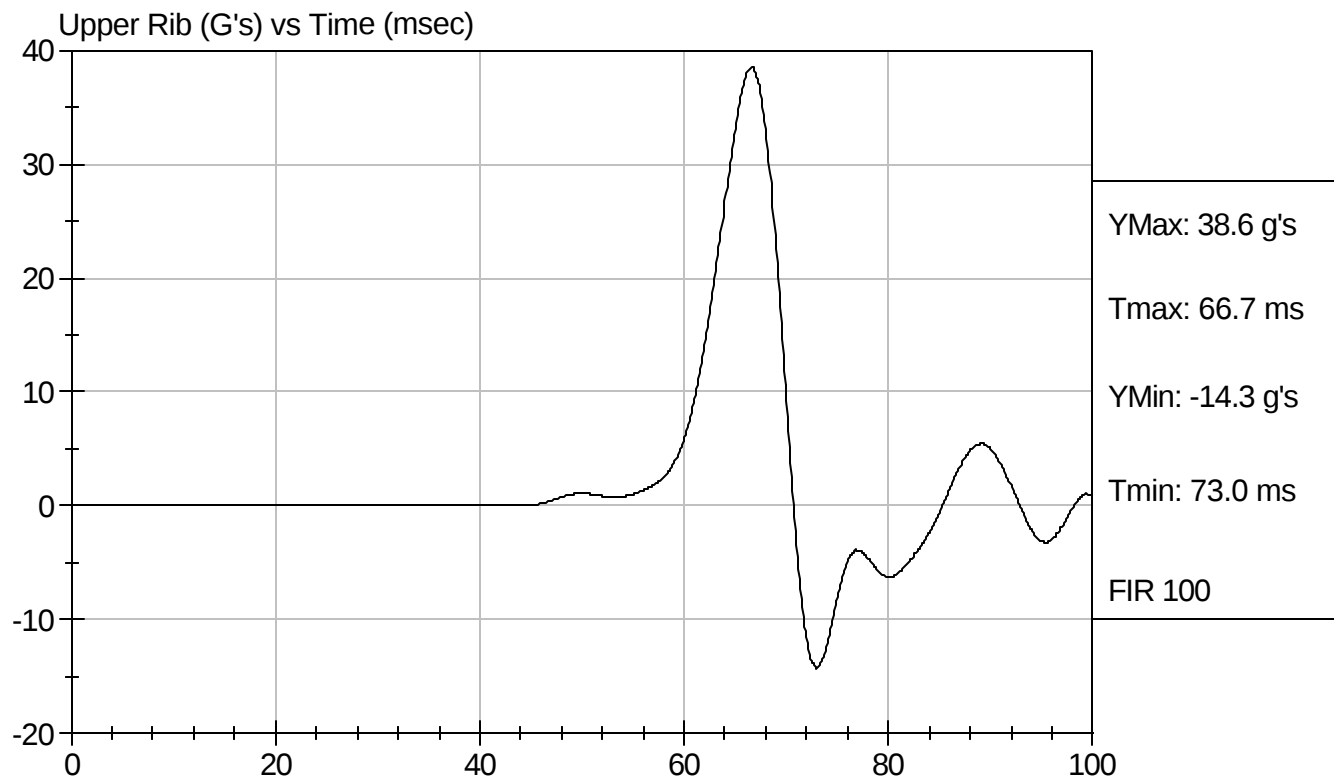
8/29/07  
Test Date

  
Approved By



Test Desc: Thorax Impact  
Component ID: D072642

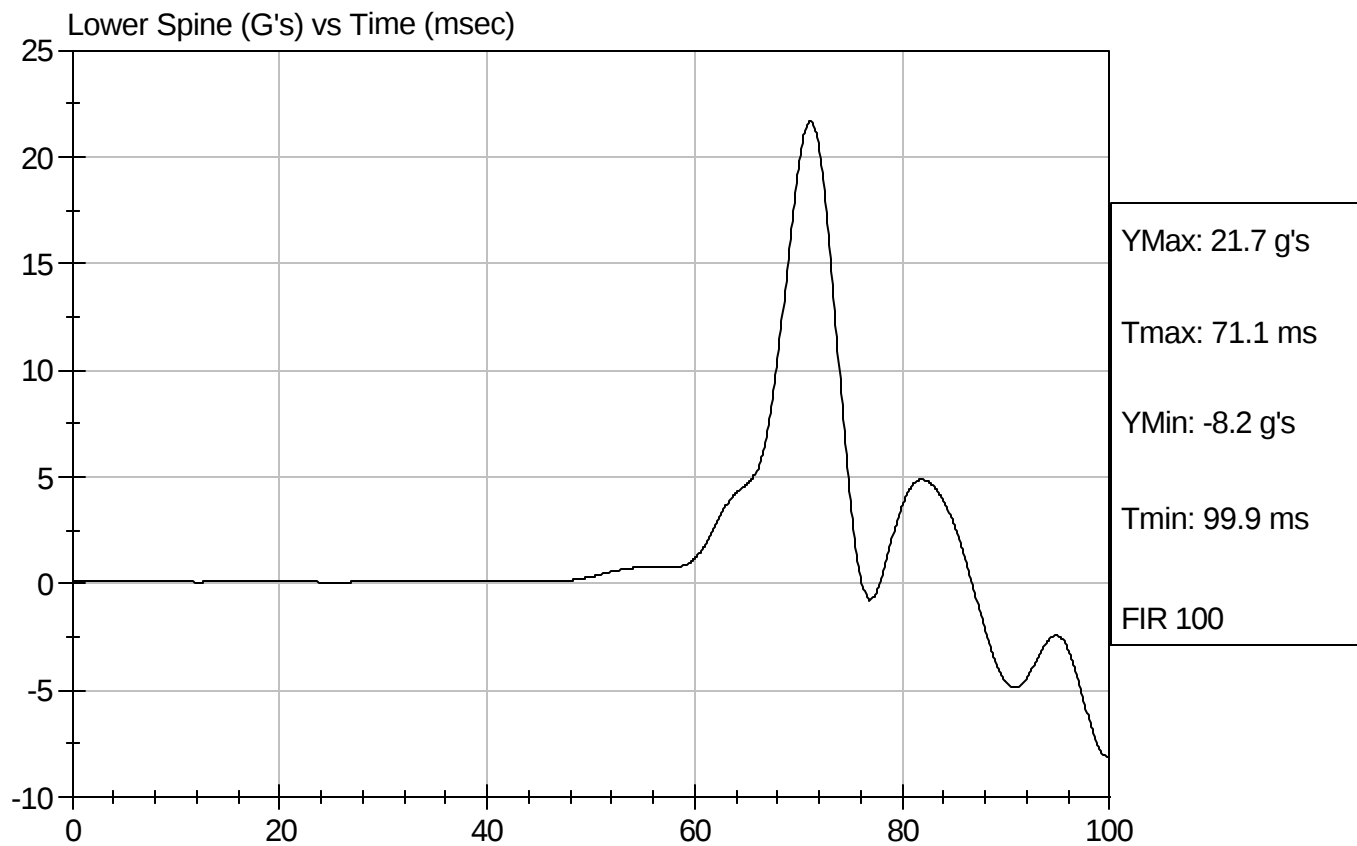
Test Date: 8/29/07  
Speed: 13.88 ft/sec, 4.23 m/sec





Test Desc: Thorax Impact  
Component ID: D072642

Test Date: 8/29/07  
Speed: 13.88 ft/sec, 4.23 m/sec



**SID/HIII Calibration Data Sheet**  
**Side Impact Dummy**  
**Pelvis Impact Test**

**ATD Serial No:** 904

**Test I.D:** D072643

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 to 25.5  | 21.1   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 46     | Pass      |
| Probe Velocity               | m/s   | 4.27 - 4.33   | 4.30   | Pass      |
| Pelvis Acceleration          | G's   | 40 - 60       | 43     | Pass      |
| Overall Test Results         |       |               |        | Pass      |

Jessica Hall  
Laboratory Technician

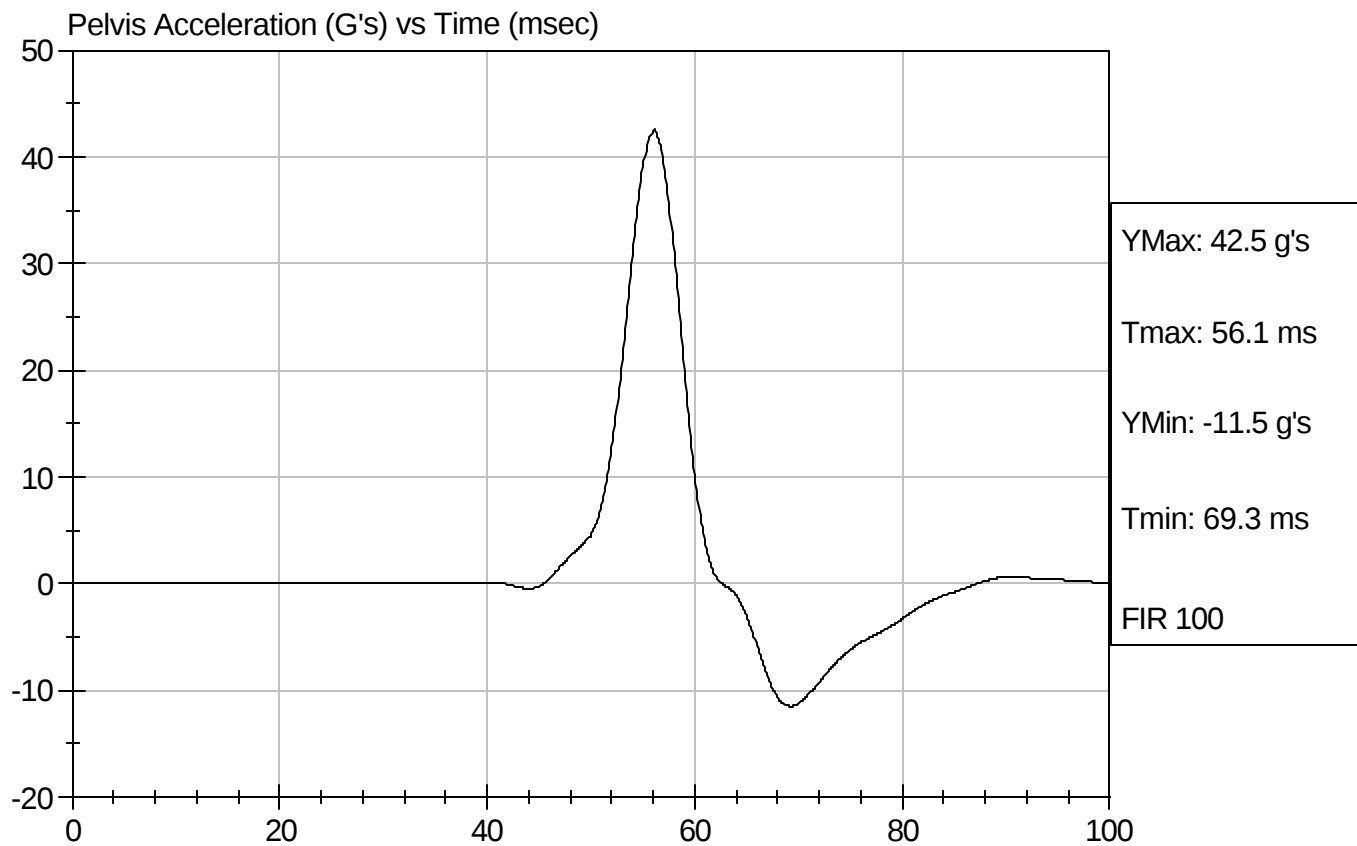
8/29/07  
Test Date

David Winkelbauer  
Approved By



Test Desc: Pelvis Impact  
Component ID: D072643

Test Date: 8/29/07  
Speed: 14.12 ft/sec, 4.30 m/sec



**SID/HIII Calibration Data Sheet**  
**Side Impact Dummy**  
**Abdominal Compression Calibration (Pre-Load = 10 lbs)**

ATD Serial No: 904

Test I.D: D072644

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 - 25.5   | 20.6   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 37     | Pass      |
| Force At 12.7 mm             | N     | 104 -162      | 135    | Pass      |
| Force At 19 mm               | N     | 163 - 222     | 186    | Pass      |
| Force At 25.4 mm             | N     | 222 - 280     | 250    | Pass      |
| Force At 33 mm               | N     | 325 - 391     | 333    | Pass      |
| Overall Test Results         |       |               |        | Pass      |

Jessica Hall  
Laboratory Technician

8/29/07  
Test Date

David Winkelbauer  
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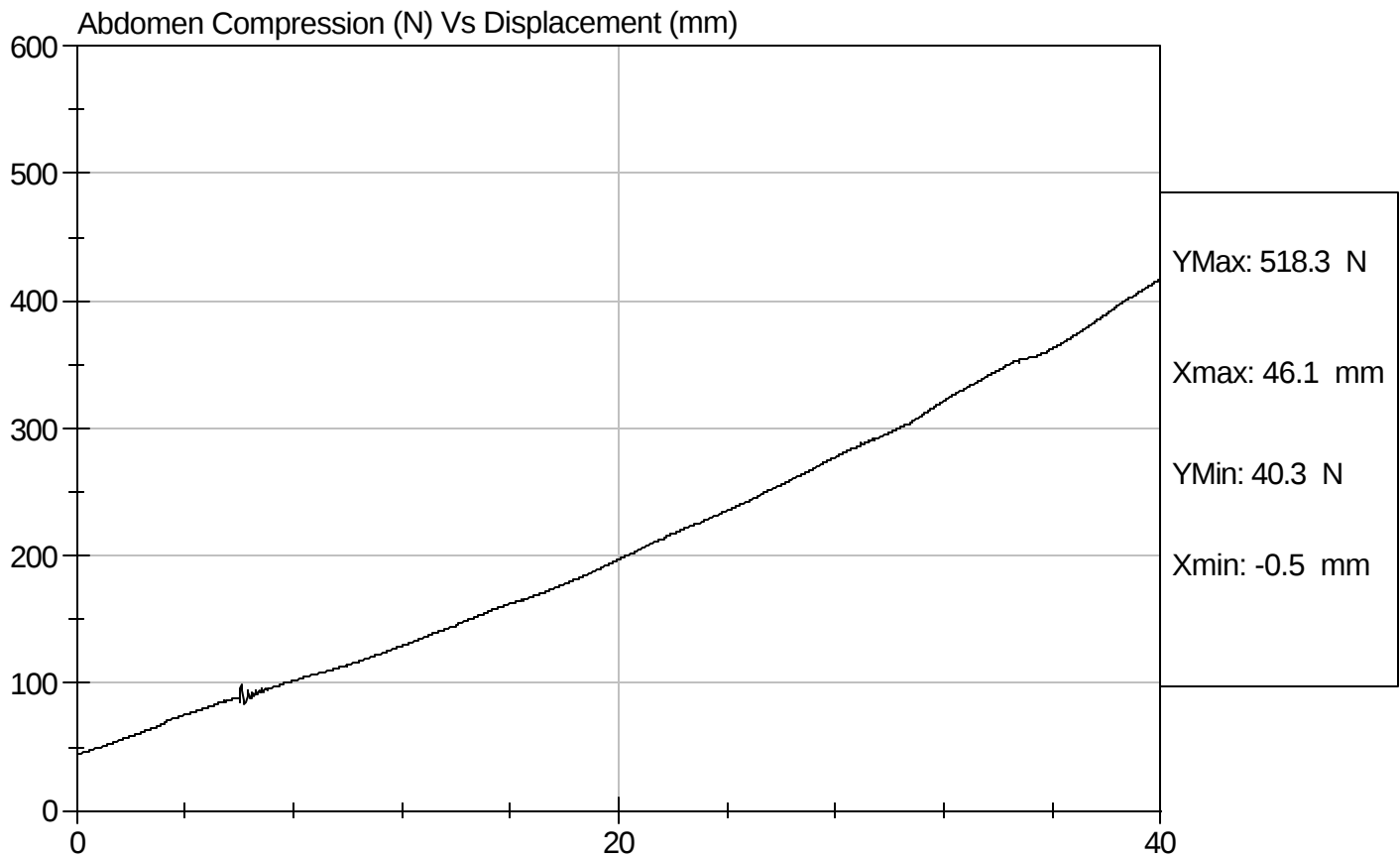


Test Description: Abdomen Compression

Test Date: 8/29/07

Component: D072644

Speed: 0 ft/sec, 0 m/sec



**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Lumbar Flexion Calibration**

**ATD Serial No:** 904

**Test I.D:** D072645

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 - 25.5   | 21.1   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 46     | Pass      |
| Force At 0 deg               | N     | 0 - 26.7      | 0      | Pass      |
| Force At 20 deg              | N     | 97.9 - 151.2  | 132.5  | Pass      |
| Force At 30 deg              | N     | 151.2 - 204.6 | 198.3  | Pass      |
| Force At 40 deg              | N     | 204.6 - 258.0 | 256.6  | Pass      |
| Return Angle                 | Deg   | 12 Maximum    | 7      | Pass      |
| Overall Test Results         |       |               | Pass   |           |

Jessica Hall  
Laboratory Technician

8/29/07  
Test Date

David Winkelbauer  
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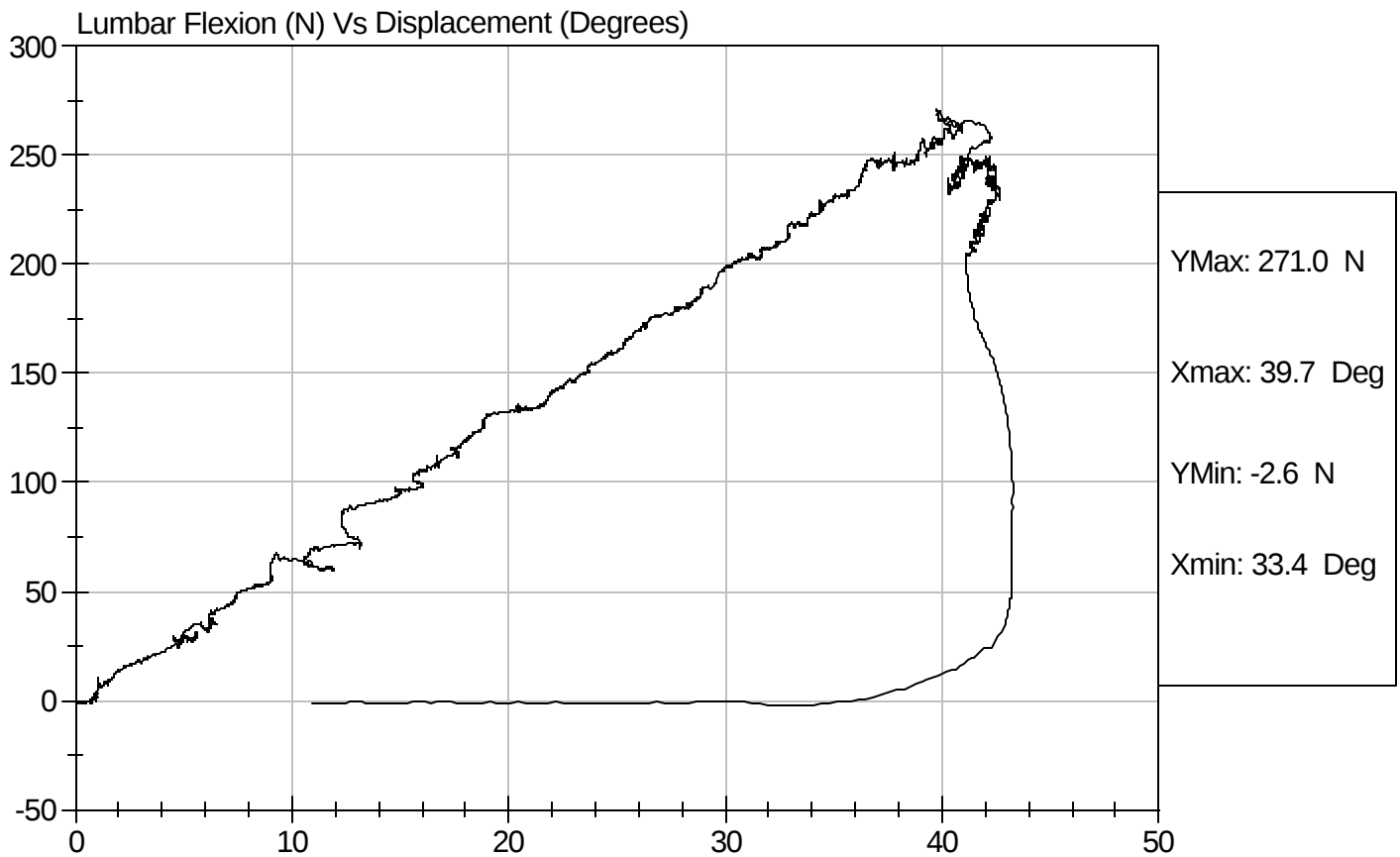


Test Description: Lumbar Flexion

Test Date: 8/29/07

Component: D072645

Speed: 0 ft/sec, 0 m/sec

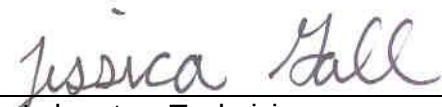


**SID/HIII Calibration Data Sheet**  
**Side Impact Dummy (SID)**  
**Neck Pendulum Test**

**ATD Serial No:** 904

**Test I.D:** D072649

| Tested Parameter                        |               | Units | Specification | Result | Pass/Fail |
|-----------------------------------------|---------------|-------|---------------|--------|-----------|
| Laboratory Temperature                  |               | deg C | 20.6 to 22.2  | 21.0   | Pass      |
| Laboratory Relative Humidity            |               | %     | 10 to 70      | 44     | Pass      |
| Impact Velocity                         |               | m/s   | 6.89 to 7.13  | 7.05   | Pass      |
| Pendulum Deceleration                   | 10 msec       | m/s   | 1.96 to 2.55  | 2.19   | Pass      |
|                                         | 20 msec       | m/s   | 4.12 to 5.10  | 4.42   | Pass      |
|                                         | 30 msec       | m/s   | 5.73 to 7.01  | 6.14   | Pass      |
|                                         | 40 to 70 msec | m/s   | 6.27 to 7.64  | 6.80   | Pass      |
| Midsagittal Plane Max Rotation          |               | deg   | 66 to 82      | 72     | Pass      |
| Head Rotation Peak to Zero - Decay Time |               | msec  | 58 to 67      | 58     | Pass      |
| Max. Mx at Occipital Condyles           |               | Nm    | 73 to 88      | 76     | Pass      |
| Mx Peak To Zero - Decay Time            |               | msec  | 49 to 64      | 61     | Pass      |
| Mx Peak to Max. Head Rotation           |               | msec  | 2 to 16       | 13     | Pass      |

  
 Laboratory Technician

8/29/07

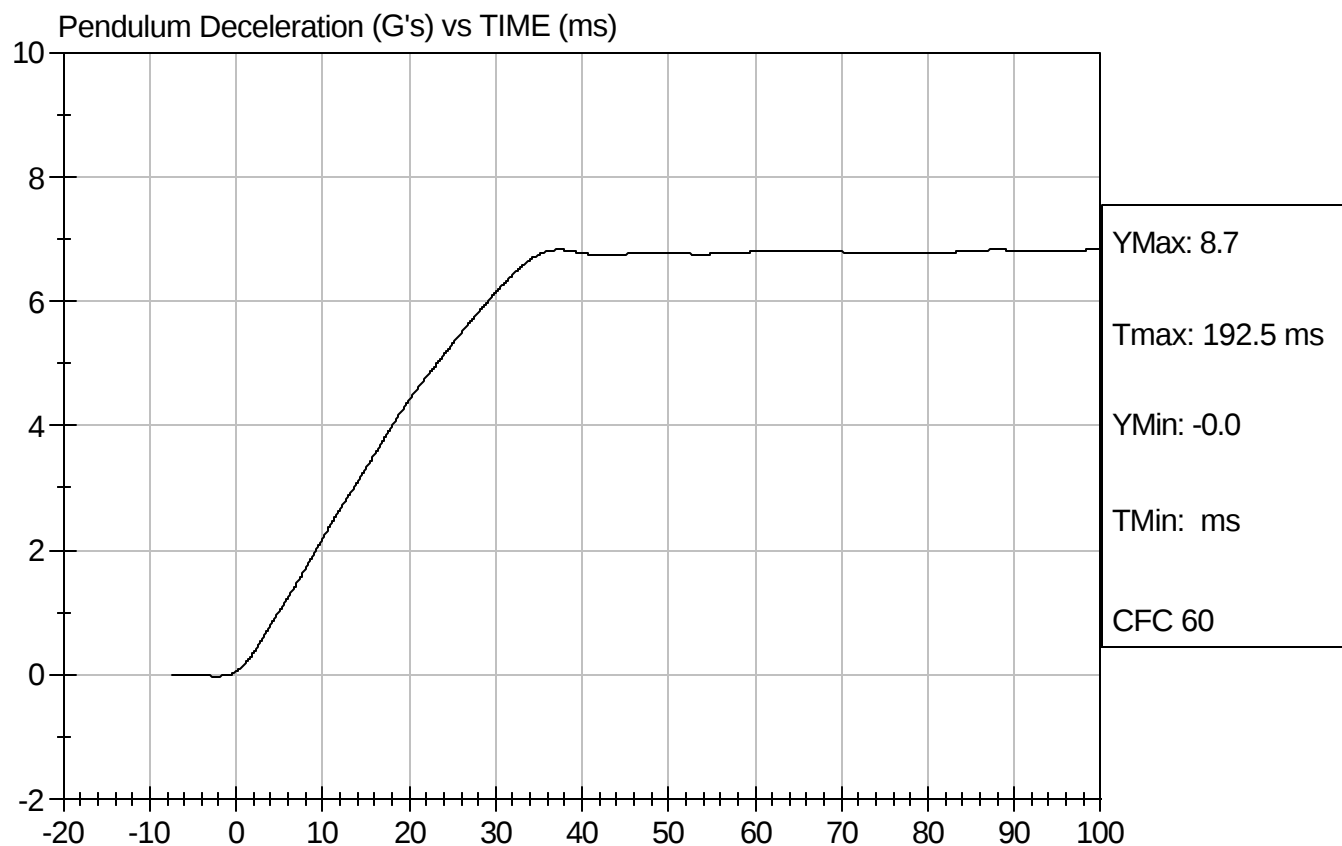
Test Date

  
 Approved By



Test Desc: Neck Bending  
Component ID: D072649

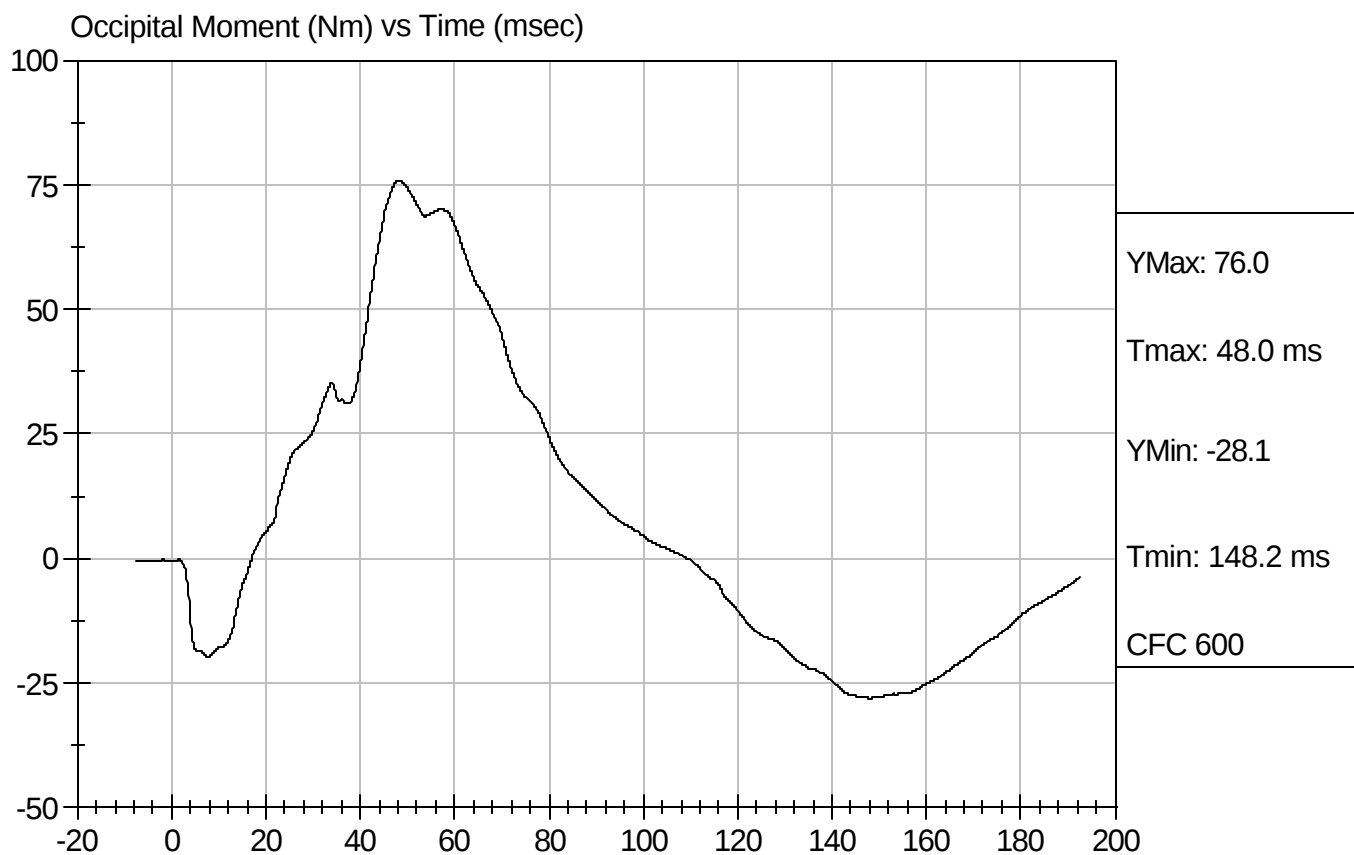
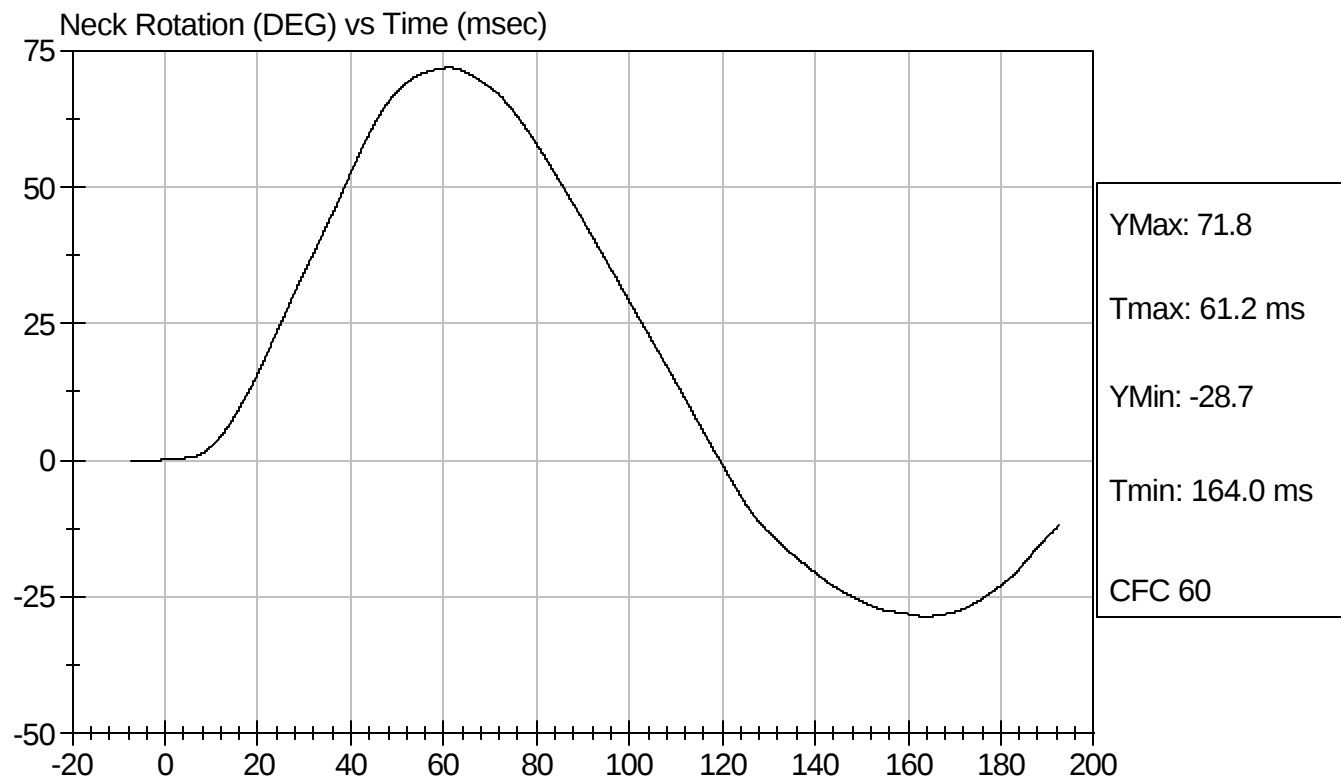
Test Date: 8/29/07  
Speed: 23.14 ft/sec, 7.05 m/sec





Test Desc: Neck Bending  
Component ID: D072649

Test Date: 8/29/07  
Speed: 23.14 ft/sec, 7.05 m/sec



## Calibration Test Results Summary

Dummy Serial Number: 904

### Post-Test Calibration

|                             |                                                       |
|-----------------------------|-------------------------------------------------------|
| External Dimensions:        | The dummy passed all external dimension requirements. |
| Head Drop Test:             | The head passed all drop test requirements.           |
| Neck Pendulum Test:         | The neck passed all pendulum test requirements.       |
| Thorax Impact Test:         | The thorax passed all impact test requirements.       |
| Pelvic Impact Test:         | The pelvis passed all impact test requirements.       |
| Abdominal Compression Test: | The abdomen passed all compression test requirements. |
| Lumbar Flexion Test:        | The lumbar passed all flexion test requirements.      |

**SID/HIII Calibration Data Sheet**  
**Side Impact Dummy**  
**Head Drop Calibration (Lateral)**

**ATD Serial No:** 904

**Test I.D:** D072971

| Tested Parameter              | Units  | Specification | Result | Pass/Fail |
|-------------------------------|--------|---------------|--------|-----------|
| Laboratory Temperature        | deg C  | 18.9 to 25.5  | 21.0   | Pass      |
| Laboratory Relative Humidity  | %      | 10 to 70      | 38     | Pass      |
| Peak Resultant Acceleration   | G's    | 120 to 150    | 148    | Pass      |
| Is Resultant Curve Unimodal?  | Yes/No | 15% of peak   | Yes    | Pass      |
| Peak Longitudnal Acceleration | G's    | +/- 15        | -8.0   | Pass      |
| Overall Test Results          |        |               |        | Pass      |

Jessica Hall  
Laboratory Technician

9/21/07  
Test Date

David Winkelbauer  
Approved By



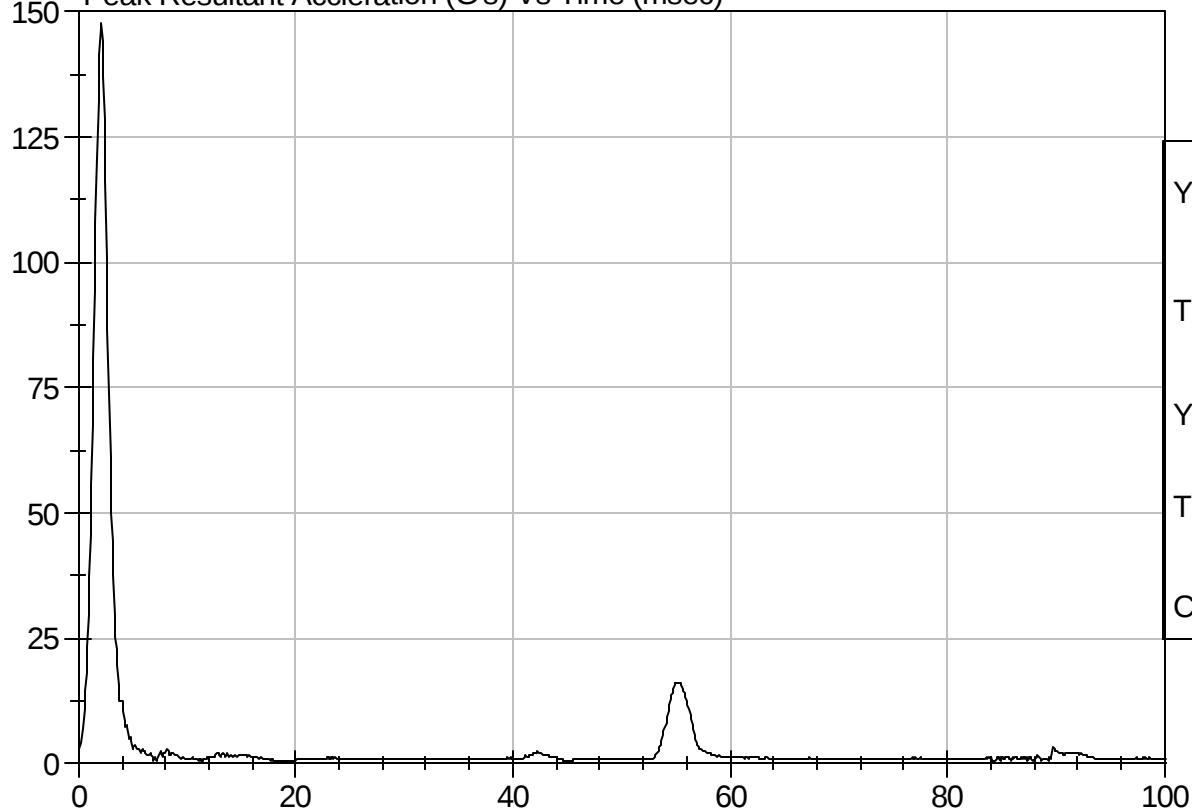
Test Description: Head Drop

Test Date: 9/21/07

Component: D072971

Speed: 0 ft/s, 0.00 m/s

Peak Resultant Acceleration (G's) Vs Time (msec)



YMax: 147.7 G

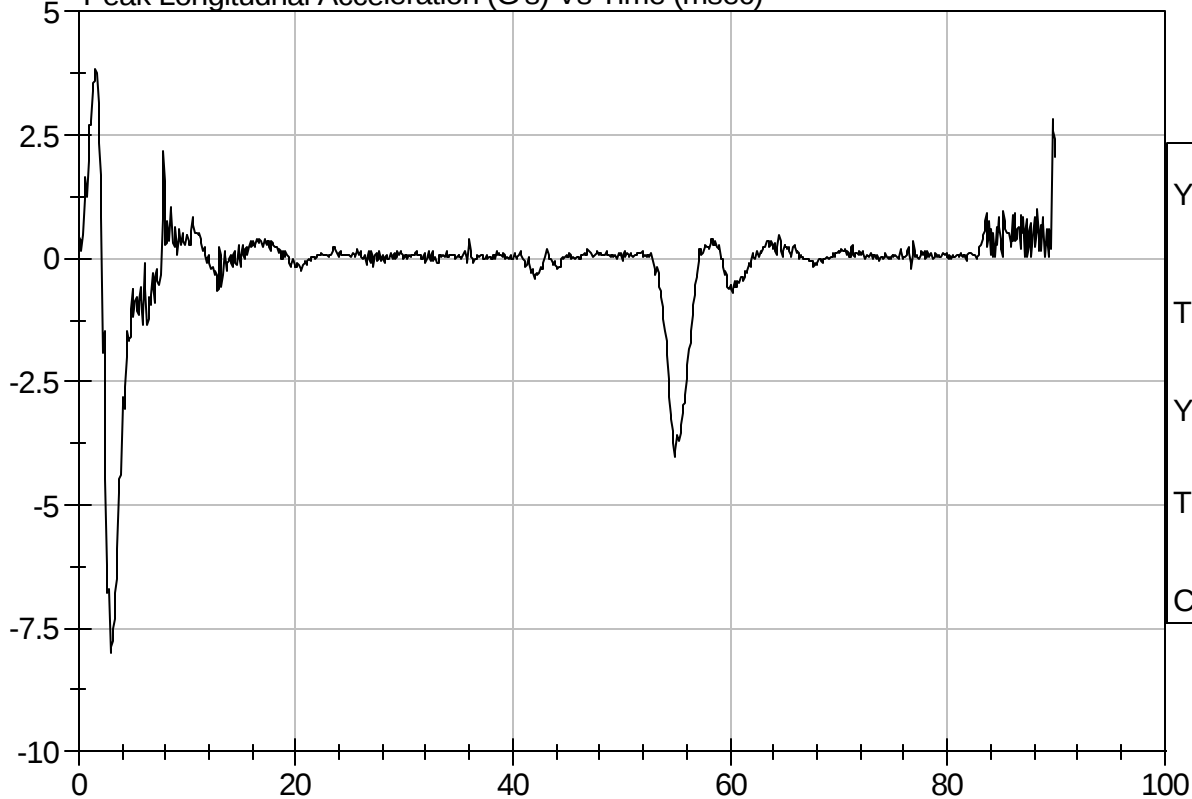
Tmax: 2.1 ms

YMin: 0.2 G

Tmin: 84.2 ms

CFC 1000

Peak Longitudinal Acceleration (G's) Vs Time (msec)



YMax: 3.8 G

Tmax: 1.6 ms

YMin: -8.0 G

Tmin: 2.9 ms

CFC 1000

**SID/HIII Calibration Data Sheet**  
**Side Impact Dummy**  
**Thorax Impact Test**

**ATD Serial No:** 904

**Test I.D:** D072972

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 - 25.5   | 21.1   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 42     | Pass      |
| Probe Velocity               | m/s   | 4.22 - 4.31   | 4.27   | Pass      |
| Upper Rib                    | G's   | 37 - 46       | 41     | Pass      |
| Lower Rib                    | G's   | 37 - 46       | 40     | Pass      |
| Lower Spine                  | G's   | 15 - 22       | 21     | Pass      |
| Overall Test Results         |       |               |        | Pass      |

Jessica Hall  
Laboratory Technician

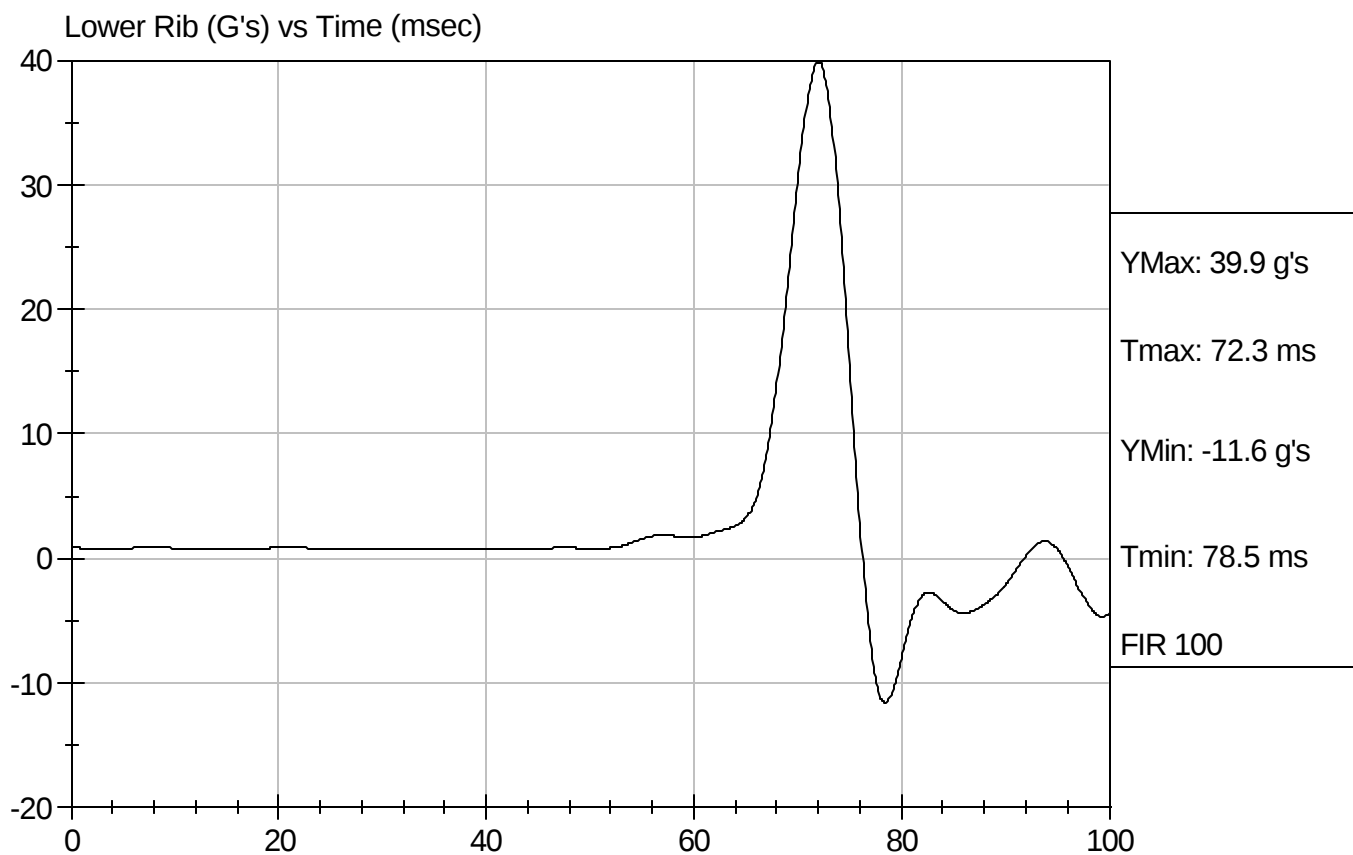
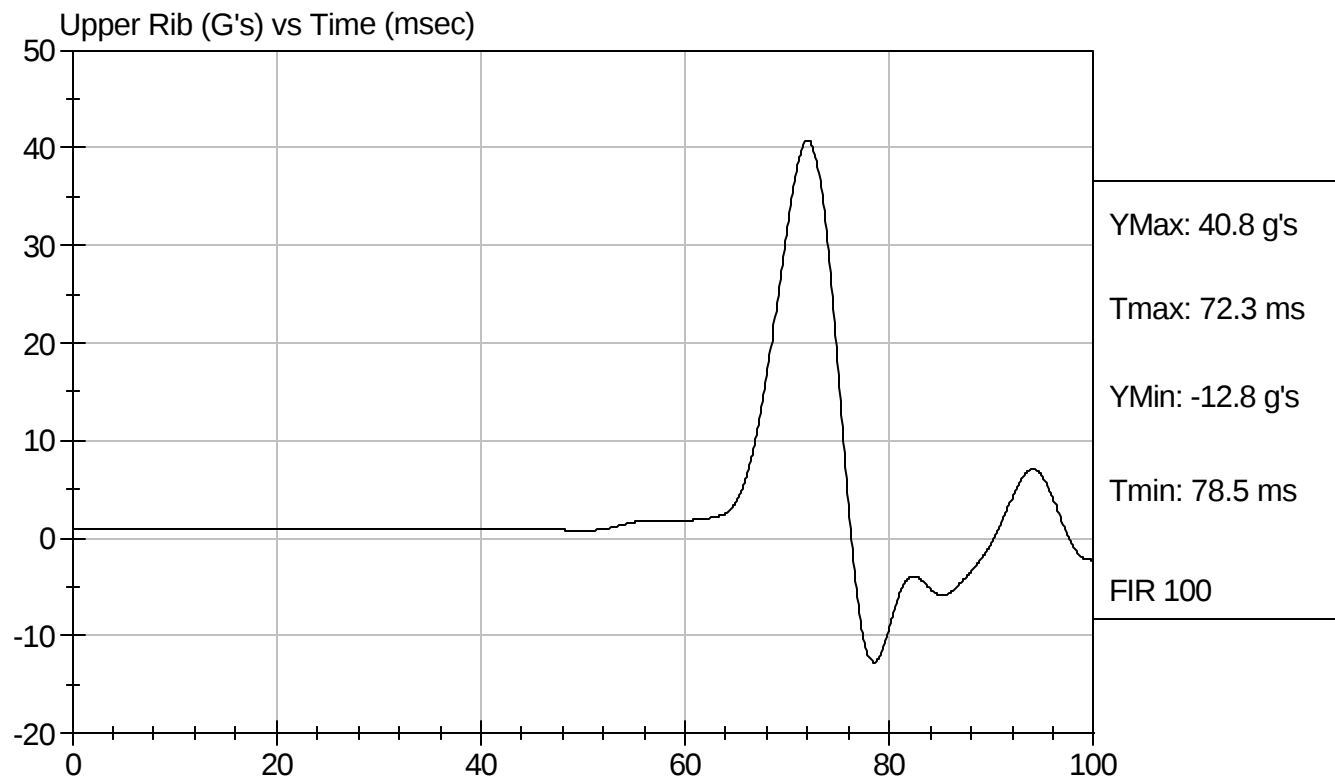
9/21/07  
Test Date

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Test Desc: Thorax Impact  
Component ID: D072972

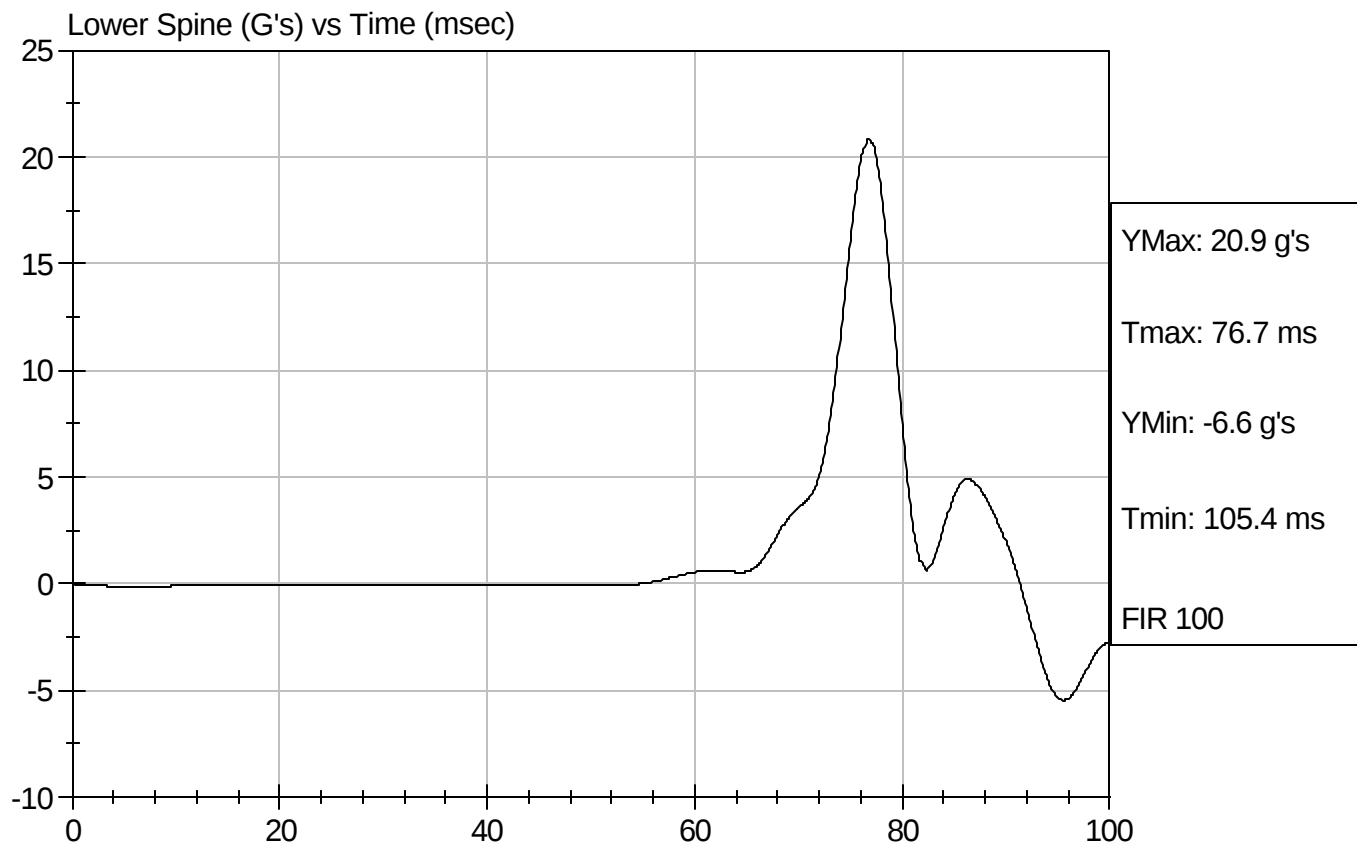
Test Date: 9/21/07  
Speed: 14.00 ft/sec, 4.27 m/sec





Test Desc: Thorax Impact  
Component ID: D072972

Test Date: 9/21/07  
Speed: 14.00 ft/sec, 4.27 m/sec



**SID/HIII Calibration Data Sheet**  
**Side Impact Dummy**  
**Pelvis Impact Test**

**ATD Serial No:** 904

**Test I.D:** D072973

| Tested Parameter             | Units | Specification | Result               | Pass/Fail |
|------------------------------|-------|---------------|----------------------|-----------|
| Laboratory Temperature       | deg C | 18.9 to 25.5  | 21.1                 | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 42                   | Pass      |
| Probe Velocity               | m/s   | 4.27 - 4.33   | 4.30                 | Pass      |
| Pelvis Acceleration          | G's   | 40 - 60       | 43                   | Pass      |
|                              |       |               | Overall Test Results | Pass      |

Jessica Hall  
Laboratory Technician

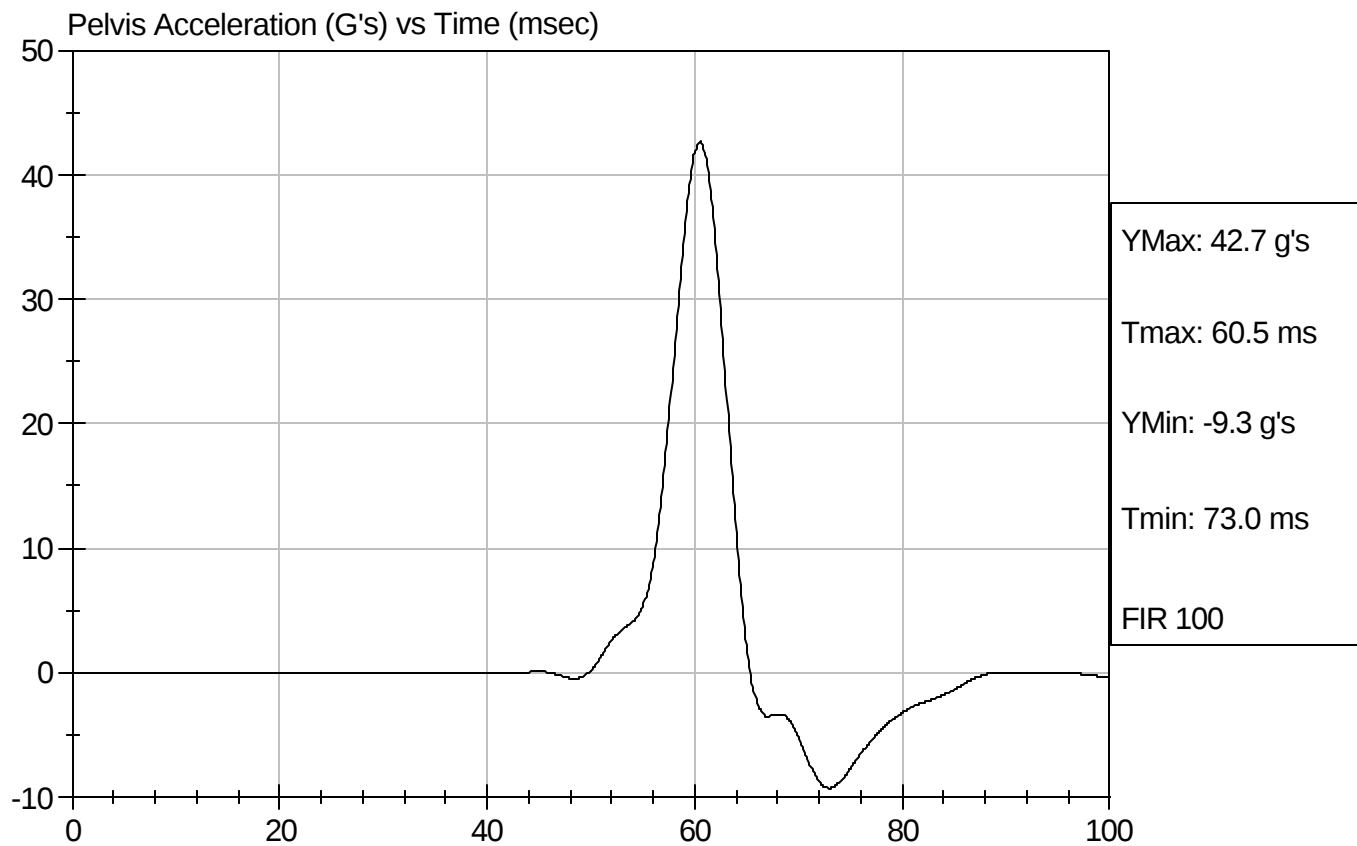
9/21/07  
Test Date

David Winkelbauer  
Approved By



Test Desc: Pelvis Impact  
Component ID: D072973

Test Date: 9/21/07  
Speed: 14.12 ft/sec, 4.30 m/sec



**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Abdominal Compression Calibration (Pre-Load = 10 lbs)**

ATD Serial No: 904

Test I.D: D072974

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 - 25.5   | 21.1   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 42     | Pass      |
| Force At 12.7 mm             | N     | 104 -162      | 129    | Pass      |
| Force At 19 mm               | N     | 163 - 222     | 177    | Pass      |
| Force At 25.4 mm             | N     | 222 - 280     | 232    | Pass      |
| Force At 33 mm               | N     | 325 - 391     | 308    | Pass      |
| Overall Test Results         |       |               |        | Pass      |

Jessica Hall  
Laboratory Technician

9/21/07  
Test Date

David Winkelbauer  
Approved By

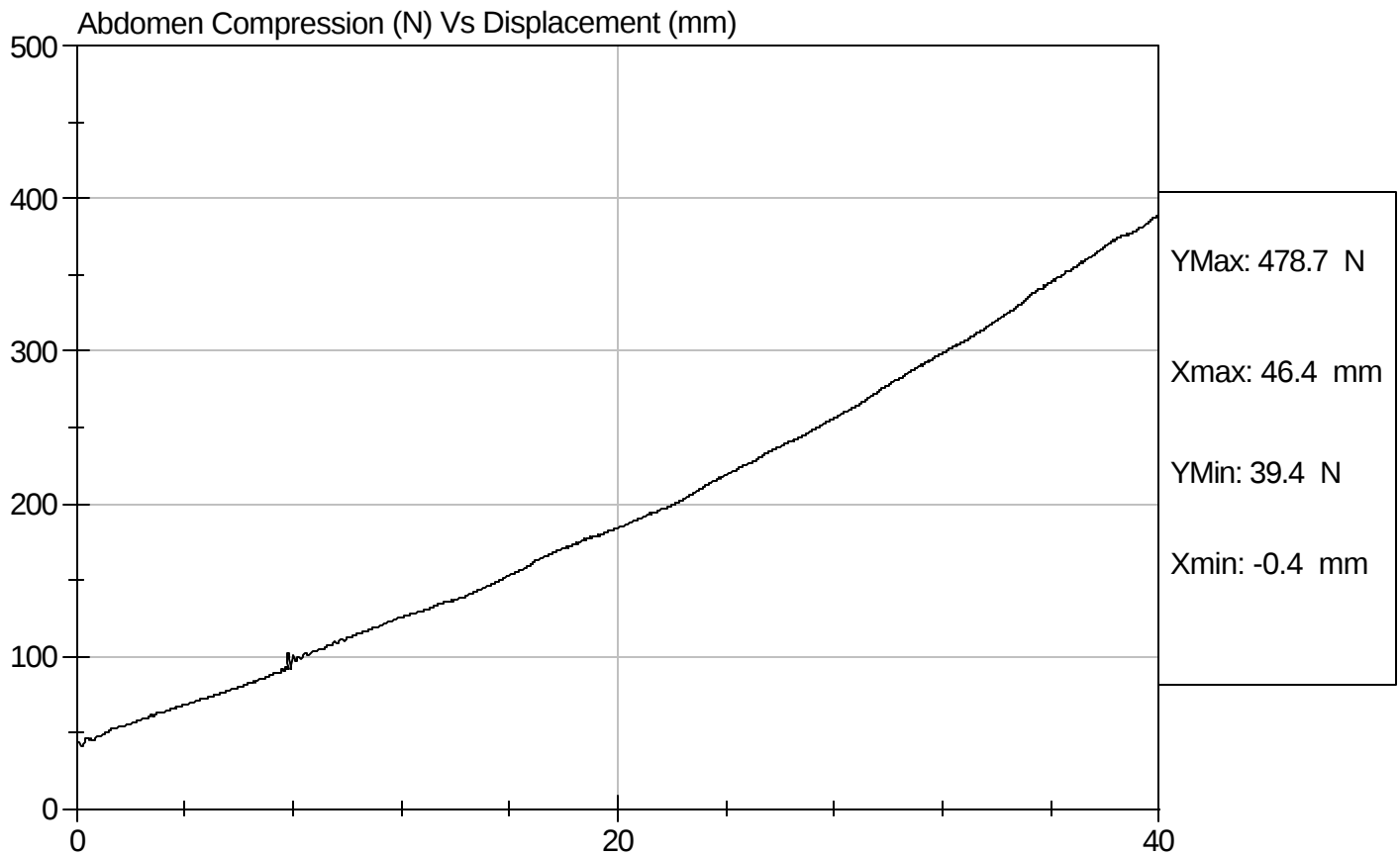


Test Description: Abdomen Compression

Test Date: 9/21/07

Component: D072974

Speed: 0 ft/sec, 0 m/sec

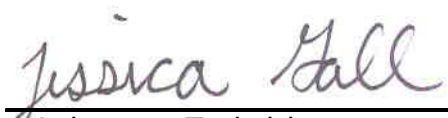


**SID/HIII Calibration Data Sheet**  
**Side Impact Dummy**  
**Lumbar Flexion Calibration**

**ATD Serial No:** 904

**Test I.D:** D072975

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 - 25.5   | 20.6   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 38     | Pass      |
| Force At 0 deg               | N     | 0 - 26.7      | 0      | Pass      |
| Force At 20 deg              | N     | 97.9 - 151.2  | 129.5  | Pass      |
| Force At 30 deg              | N     | 151.2 - 204.6 | 180.4  | Pass      |
| Force At 40 deg              | N     | 204.6 - 258.0 | 224.1  | Pass      |
| Return Angle                 | Deg   | 12 Maximum    | 6      | Pass      |
| Overall Test Results         |       |               | Pass   |           |

  
Laboratory Technician

9/21/07  
Test Date

  
Approved By

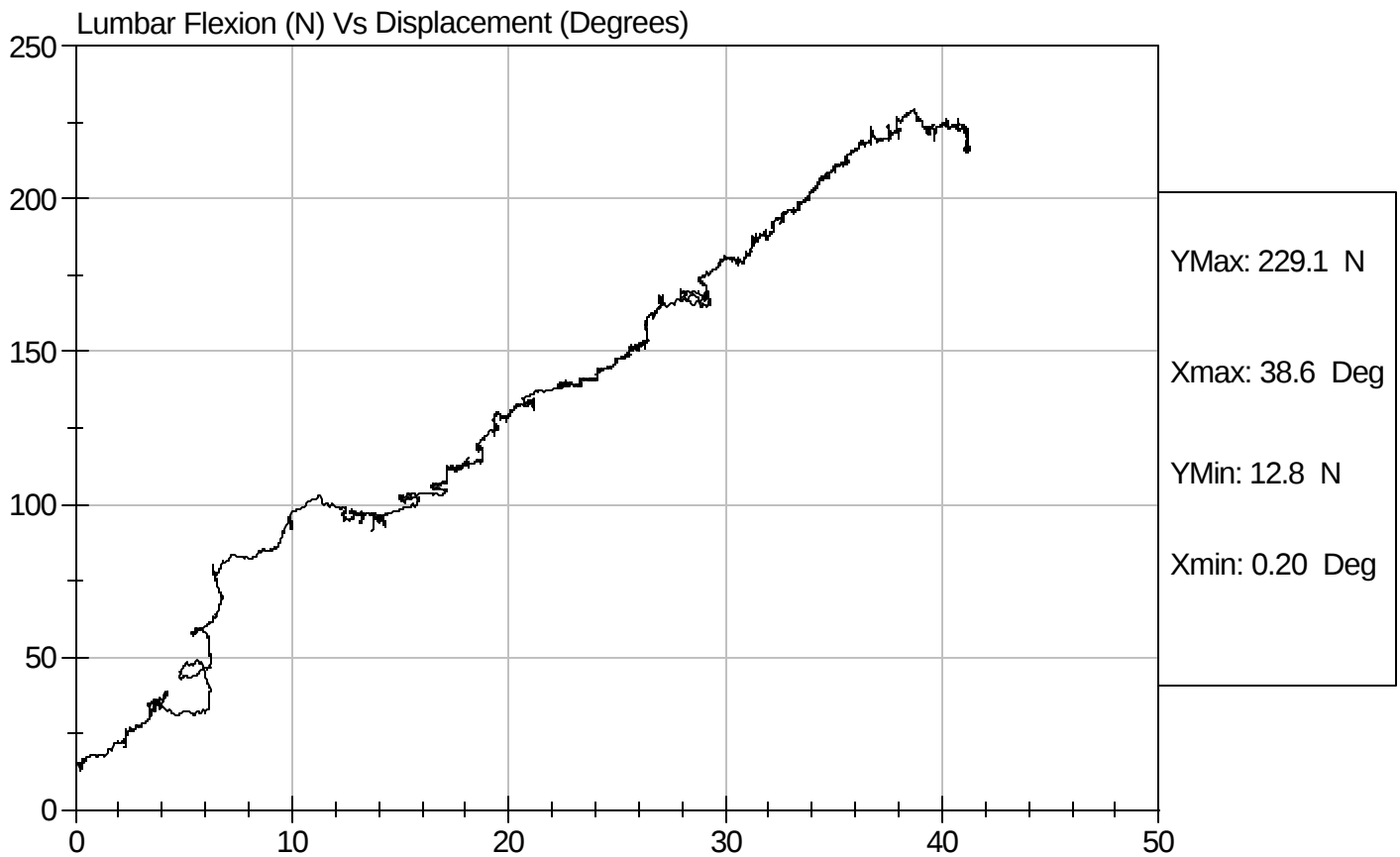


Test Description: Lumbar Flexion

Test Date: 9/21/07

Component: D072975

Speed: 0 ft/sec, 0 m/sec

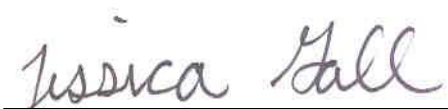


**SID/HIII Calibration Data Sheet**  
**Side Impact Dummy (SID)**  
**Neck Pendulum Test**

**ATD Serial No:** 904

**Test I.D:** D072979

| Tested Parameter                        |               | Units | Specification | Result | Pass/Fail |
|-----------------------------------------|---------------|-------|---------------|--------|-----------|
| Laboratory Temperature                  |               | deg C | 20.6 to 22.2  | 20.6   | Pass      |
| Laboratory Relative Humidity            |               | %     | 10 to 70      | 38     | Pass      |
| Impact Velocity                         |               | m/s   | 6.89 to 7.13  | 7.06   | Pass      |
| Pendulum Deceleration                   | 10 msec       | m/s   | 1.96 to 2.55  | 2.24   | Pass      |
|                                         | 20 msec       | m/s   | 4.12 to 5.10  | 4.54   | Pass      |
|                                         | 30 msec       | m/s   | 5.73 to 7.01  | 6.46   | Pass      |
|                                         | 40 to 70 msec | m/s   | 6.27 to 7.64  | 6.77   | Pass      |
| Midsagittal Plane Max Rotation          |               | deg   | 66 to 82      | 71     | Pass      |
| Head Rotation Peak to Zero - Decay Time |               | msec  | 58 to 67      | 58     | Pass      |
| Max. Mx at Occipital Condyles           |               | Nm    | 73 to 88      | 73     | Pass      |
| Mx Peak To Zero - Decay Time            |               | msec  | 49 to 64      | 63     | Pass      |
| Mx Peak to Max. Head Rotation           |               | msec  | 2 to 16       | 14     | Pass      |

  
 Laboratory Technician

9/21/07

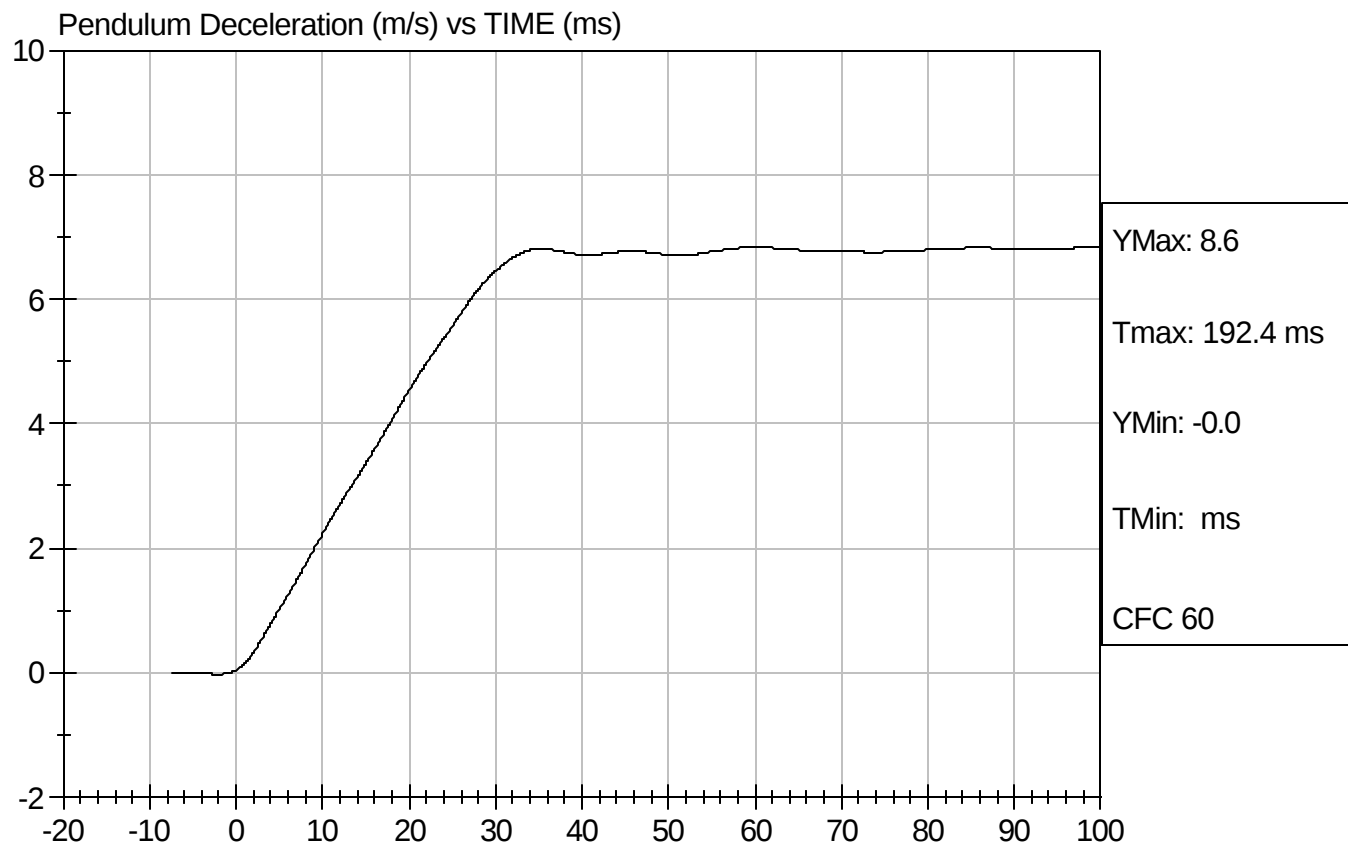
Test Date

  
 Approved By



Test Desc: Neck Bending  
Component ID: D072979

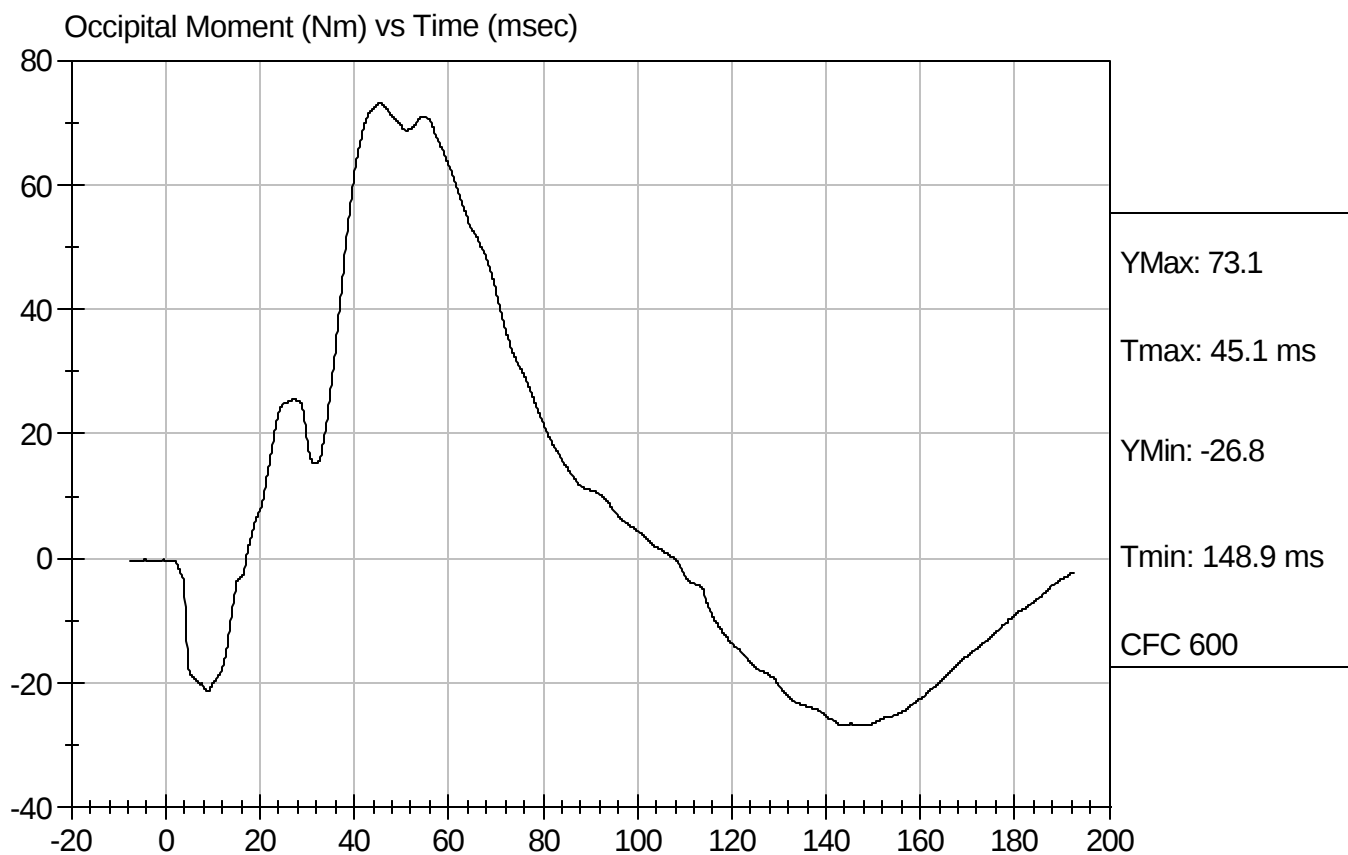
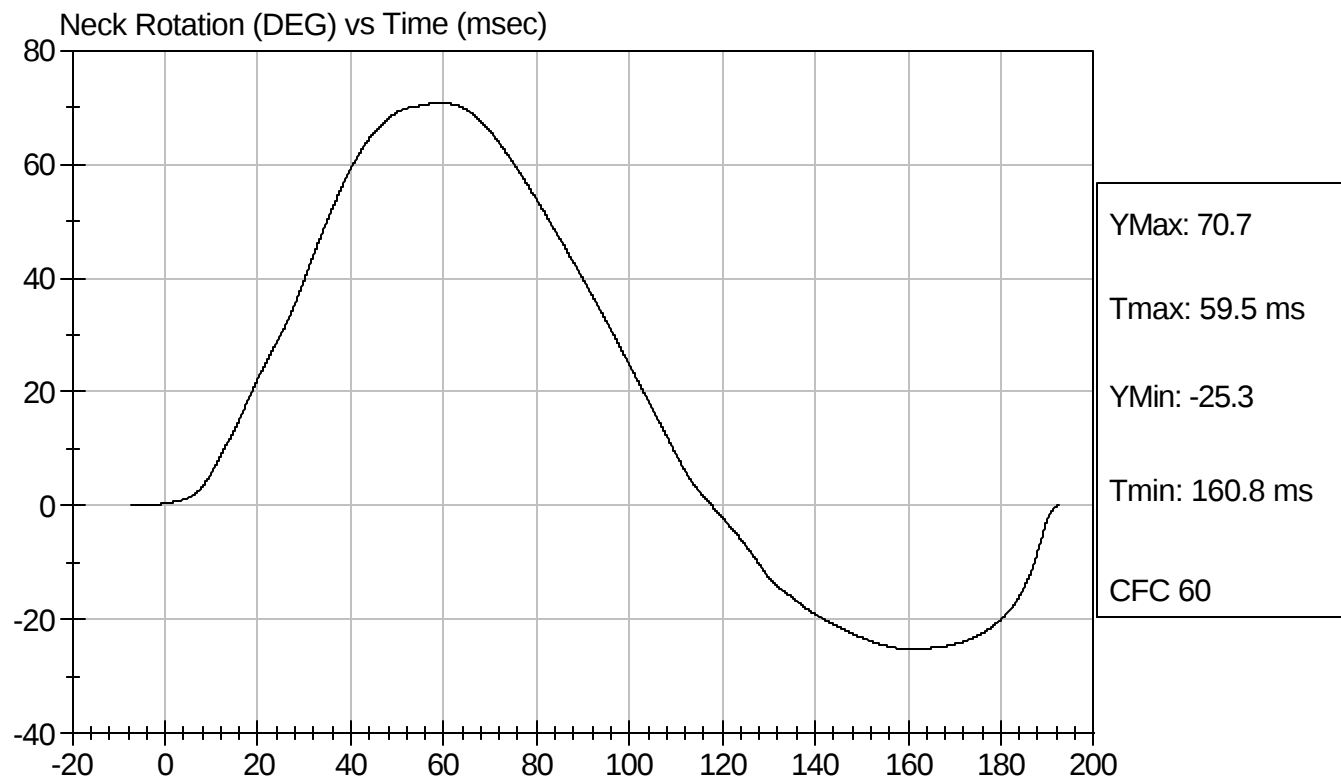
Test Date: 9/21/07  
Speed: 23.148 ft/sec, 7.06 m/sec





Test Desc: Neck Bending  
Component ID: D072979

Test Date: 9/21/07  
Speed: 23.148 ft/sec, 7.06 m/sec



**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Inspection Checklist**

**ATD Serial No:** 904

| Test Part    | Items Checked                        | Result |
|--------------|--------------------------------------|--------|
| Skin         | Visual inspection                    | Pass   |
| Head         | Visual, ballast, accelerometer mount | Pass   |
| Neck         | Visual                               | Pass   |
| Spine Box    | Visual, ballast, accelerometer mount | Pass   |
| Rib Cage     | Visual, measure                      | Pass   |
| Sternum      | Visual                               | Pass   |
| Lumbar Spine | Visual                               | Pass   |
| Abdomen      | Visual                               | Pass   |
| Pelvis       | Visual, palpate, accelerometer mount | Pass   |
| Upper Legs   | Visual                               | Pass   |
| Knees        | Visual                               | Pass   |
| Lower Legs   | Visual, range of motion              | Pass   |
| Ankles       | Visual, range of motion              | Pass   |
| Feet         | Visual, range of motion              | Pass   |
| Joints       | 1 to 2 g range                       | Pass   |
| Other        |                                      | Pass   |

Jessica Hall  
Laboratory Technician  
David Winkelbauer  
Approved By

9/21/2007  
Test Date

CERTIFICATION DATA

Dummy Serial Number: 271

## Calibration Test Results Summary

Dummy Serial Number: 271

### Pre-Test Calibration

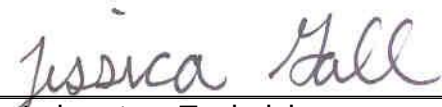
|                             |                                                       |
|-----------------------------|-------------------------------------------------------|
| External Dimensions:        | The dummy passed all external dimension requirements. |
| Head Drop Test:             | The head passed all drop test requirements.           |
| Neck Pendulum Test:         | The neck passed all pendulum test requirements.       |
| Thorax Impact Test:         | The thorax passed all impact test requirements.       |
| Pelvic Impact Test:         | The pelvis passed all impact test requirements.       |
| Abdominal Compression Test: | The abdomen passed all compression test requirements. |
| Lumbar Flexion Test:        | The lumbar passed all flexion test requirements.      |

**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**External Measurements**

**ATD Serial No:** 271

**Test I.D:** D07294

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| SH - Seated Height           | mm    | 889 - 909     | 905    | Pass      |
| RH - Rib Height              | mm    | 501 - 521     | 502    | Pass      |
| HP - Hip Pivot Height        | mm    | 99 ref.       | 99     | Pass      |
| RD - Rib from Back Line      | mm    | 229 - 241     | 239    | Pass      |
| KV - Knee Pivot to Back Line | mm    | 511 - 526     | 526    | Pass      |
| SW - Knee Pivot to Floor     | mm    | 490 - 505     | 497    | Pass      |
| HW - Hip Width               | mm    | 356 - 391     | 371    | Pass      |
| Overall Test Results         |       |               | Pass   |           |

  
Laboratory Technician

  
Approved By

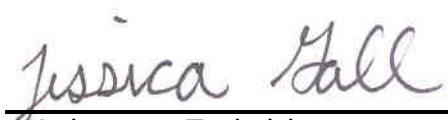
9/19/2007  
Test Date

**SID/HIII Calibration Data Sheet**  
**Side Impact Dummy**  
**Head Drop Calibration (Lateral)**

**ATD Serial No:** 271

**Test I.D:** D072941

| Tested Parameter              | Units  | Specification | Result               | Pass/Fail |
|-------------------------------|--------|---------------|----------------------|-----------|
| Laboratory Temperature        | deg C  | 18.9 to 25.5  | 21.0                 | Pass      |
| Laboratory Relative Humidity  | %      | 10 to 70      | 39                   | Pass      |
| Peak Resultant Acceleration   | G's    | 120 to 150    | 138                  | Pass      |
| Is Resultant Curve Unimodal?  | Yes/No | 15% of peak   | Yes                  | Pass      |
| Peak Longitudnal Acceleration | G's    | +/- 15        | -10.0                | Pass      |
|                               |        |               | Overall Test Results | Pass      |

  
Laboratory Technician

9/19/07  
Test Date

  
Approved By



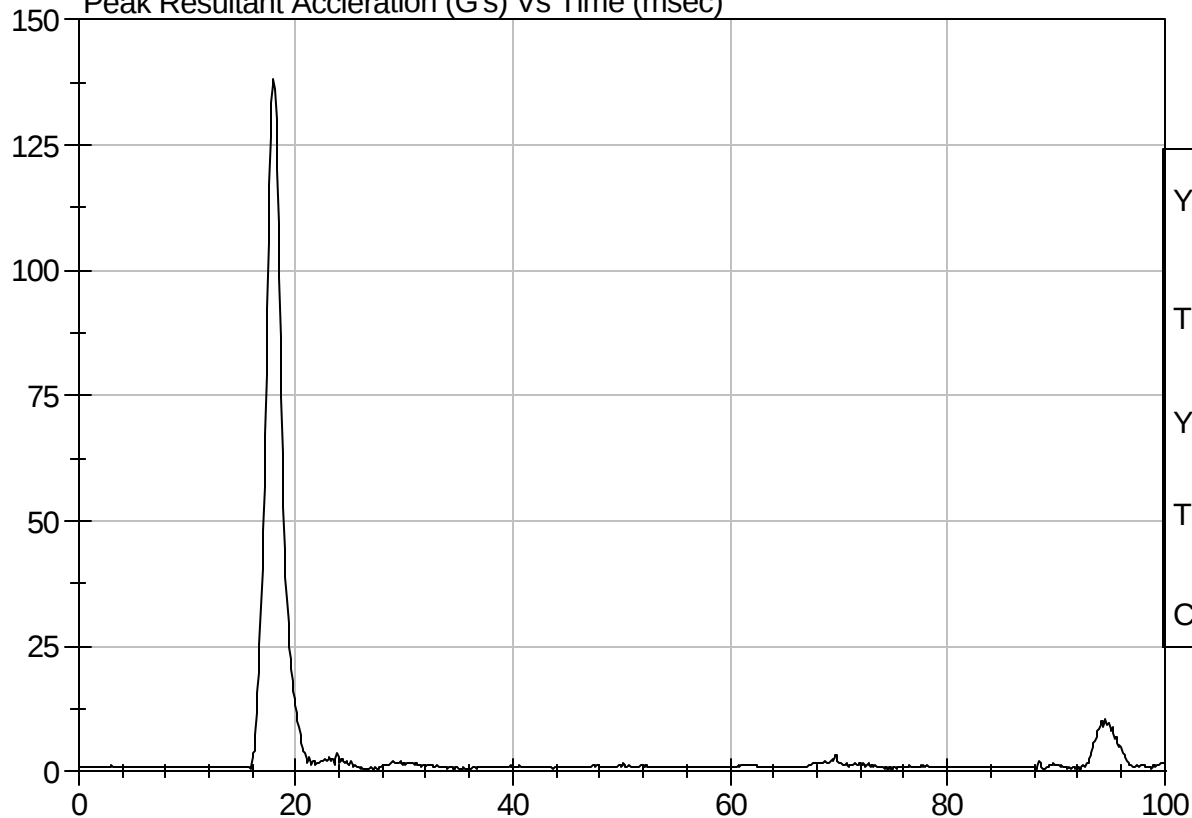
Test Description: Head Drop

Test Date: 9/19/07

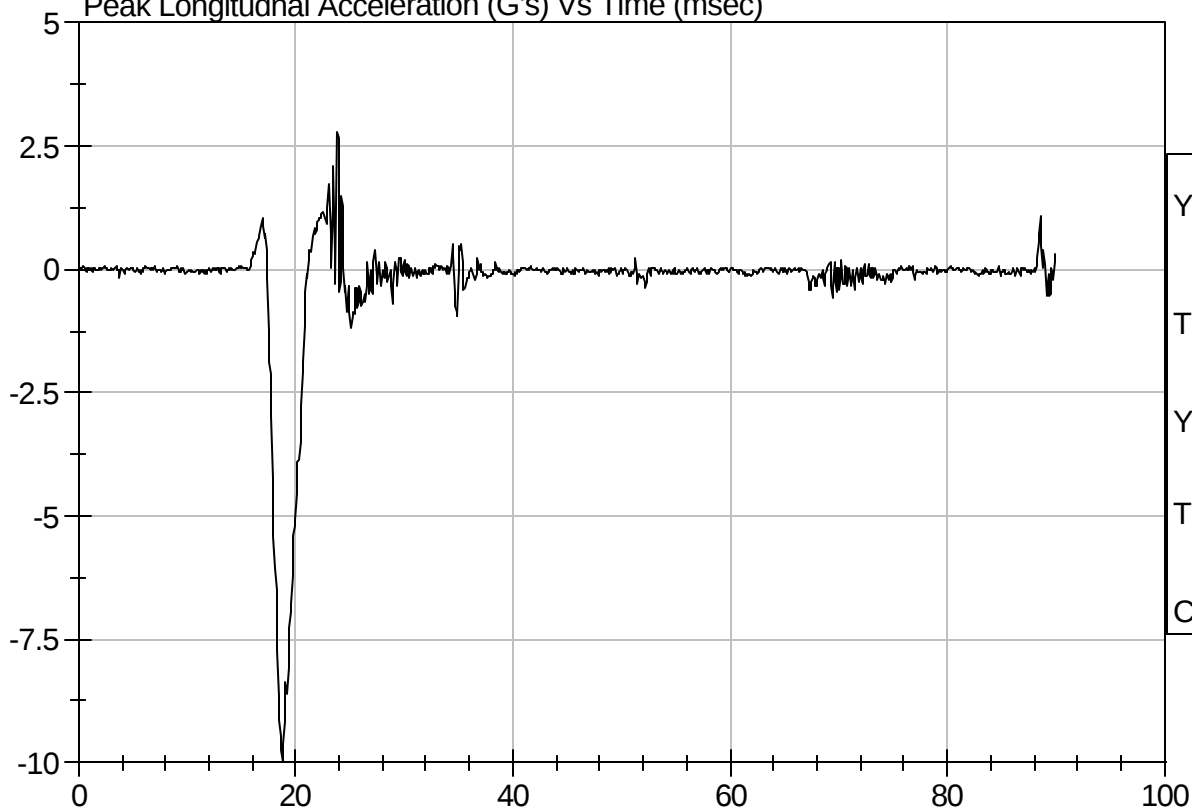
Component: D072941

Speed: 0 ft/s, 0 m/s

Peak Resultant Acceleration (G's) Vs Time (msec)



Peak Longitudinal Acceleration (G's) Vs Time (msec)

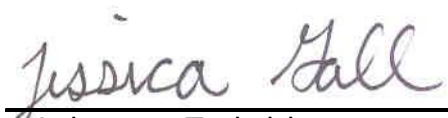


**SID/HIII Calibration Data Sheet**  
**Side Impact Dummy**  
**Thorax Impact Test**

**ATD Serial No:** 271

**Test I.D:** D072942

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 - 25.5   | 20.9   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 39     | Pass      |
| Probe Velocity               | m/s   | 4.22 - 4.31   | 4.23   | Pass      |
| Upper Rib                    | G's   | 37 - 46       | 45     | Pass      |
| Lower Rib                    | G's   | 37 - 46       | 43     | Pass      |
| Lower Spine                  | G's   | 15 - 22       | 19     | Pass      |
| Overall Test Results         |       |               |        | Pass      |

  
Laboratory Technician

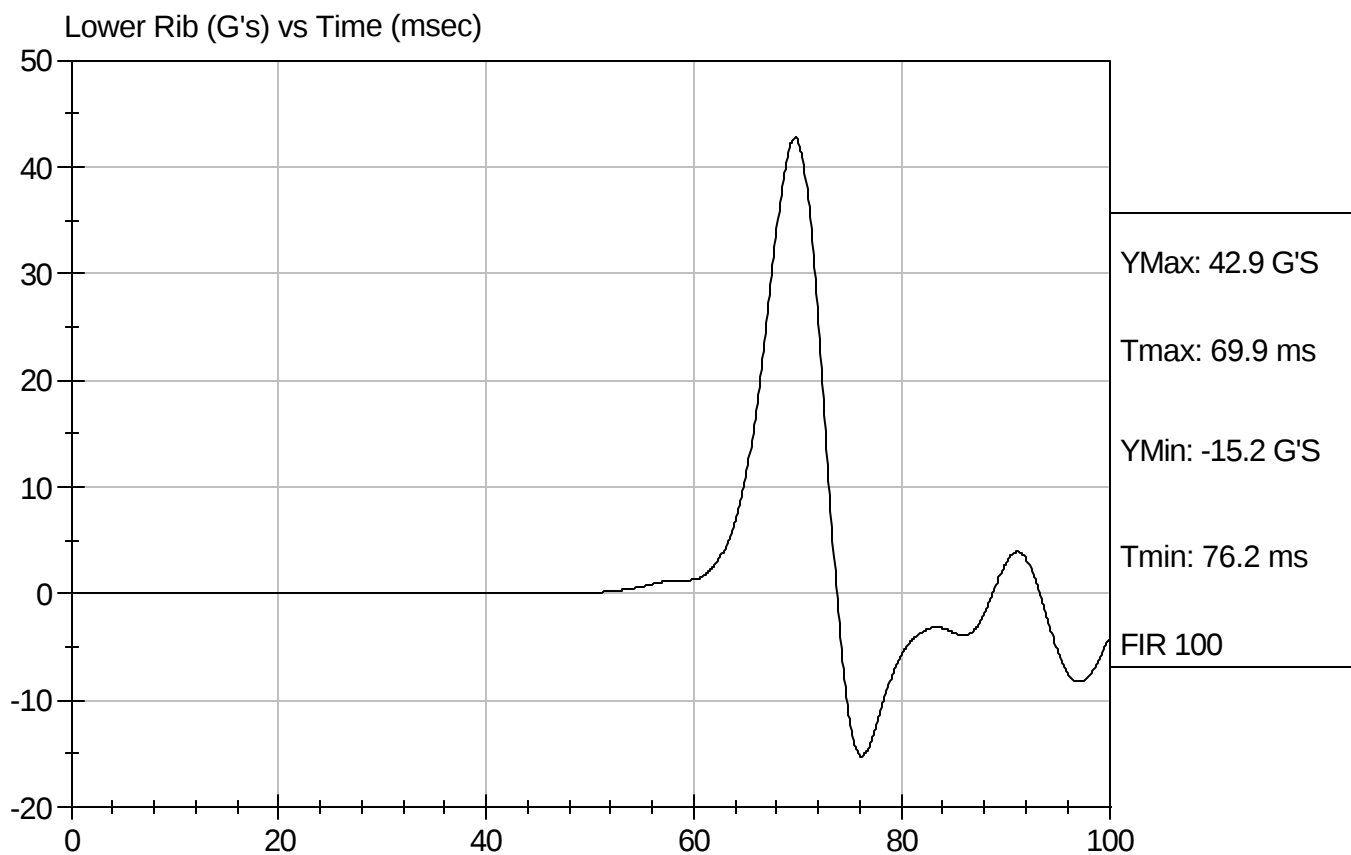
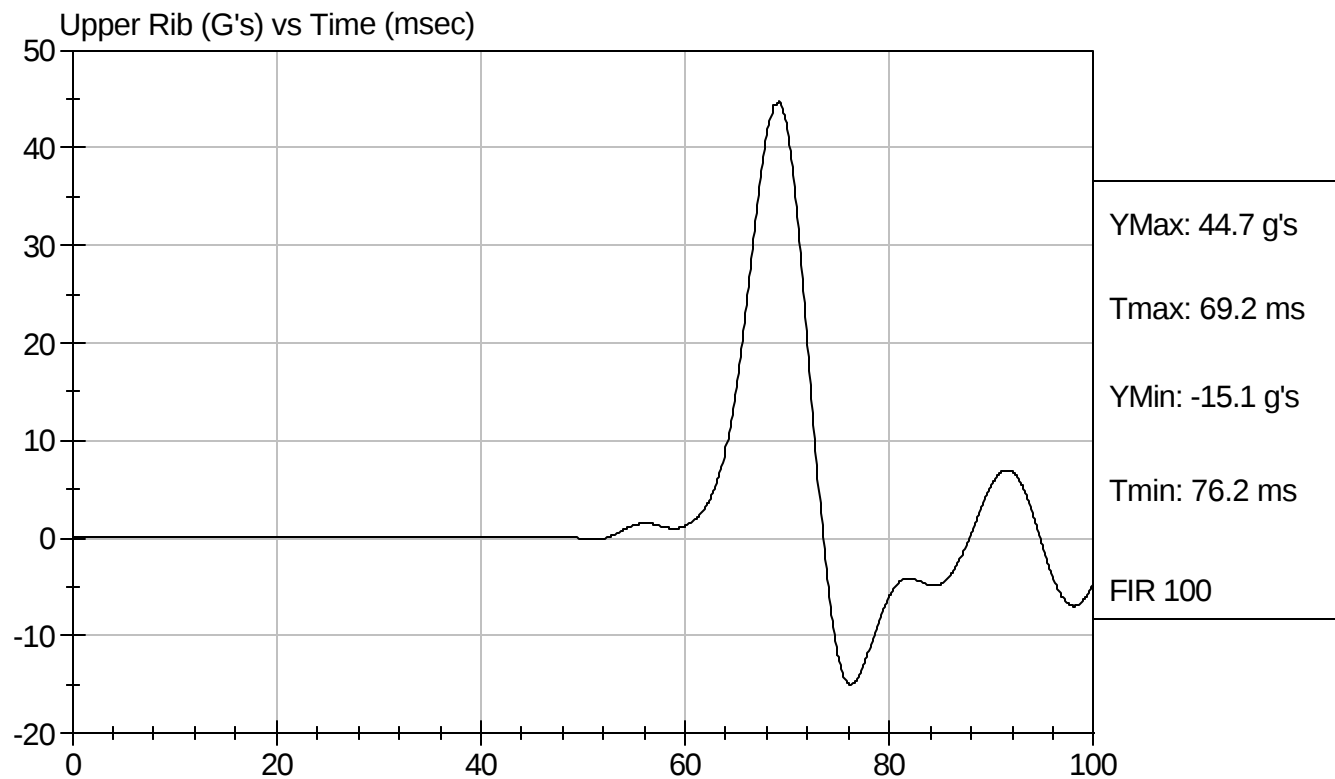
9/19/07  
Test Date

  
Approved By



Test Desc: Thorax Impact  
Component ID: D072942

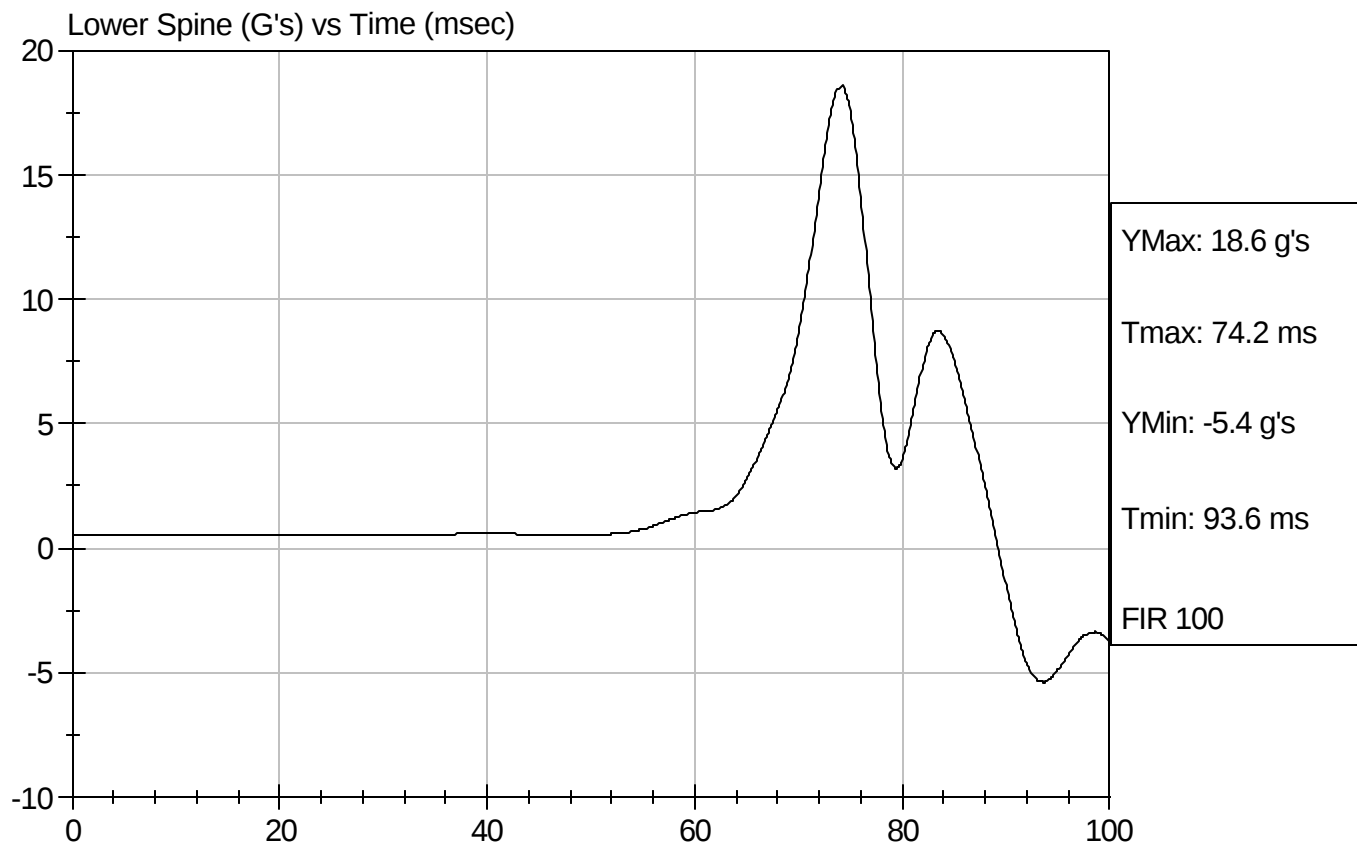
Test Date: 9/19/07  
Speed: 13.89 ft/sec, 4.23 m/sec





Test Desc: Thorax Impact  
Component ID: D072942

Test Date: 9/19/07  
Speed: 13.89 ft/sec, 4.23 m/sec



**SID/HIII Calibration Data Sheet**  
**Side Impact Dummy**  
**Pelvis Impact Test**

**ATD Serial No:** 271

**Test I.D:** D072943

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 to 25.5  | 20.9   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 39     | Pass      |
| Probe Velocity               | m/s   | 4.27 - 4.33   | 4.31   | Pass      |
| Pelvis Acceleration          | G's   | 40 - 60       | 41     | Pass      |
| Overall Test Results         |       |               | Pass   |           |

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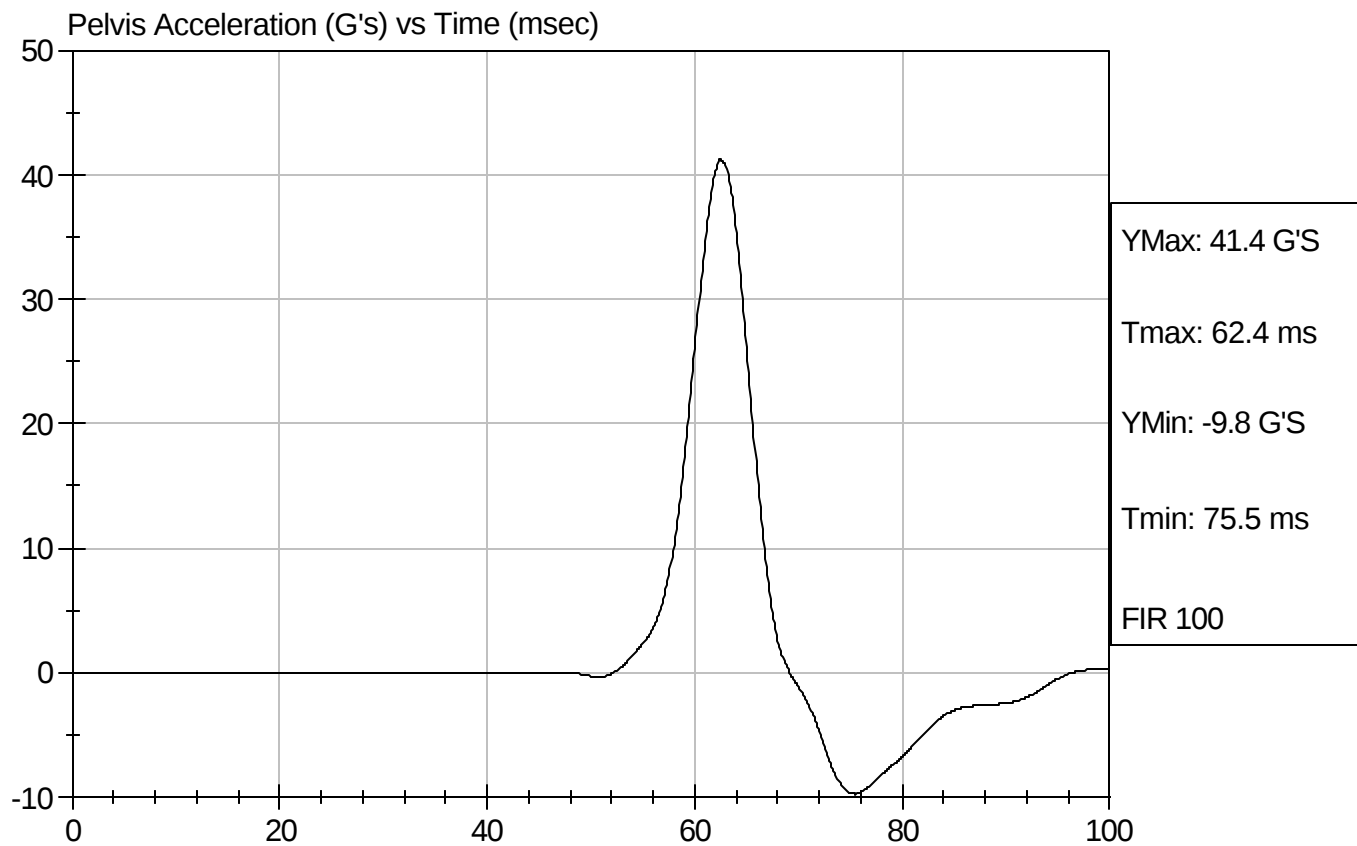
9/19/07  
Test Date

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Approved By



Test Desc: Pelvis Impact  
Component ID: D072943

Test Date: 9/19/07  
Speed: 14.14 ft/sec, 4.31 m/sec



**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Abdominal Compression Calibration (Pre-Load = 10 lbs)**

ATD Serial No: 271

Test I.D: D072944

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 - 25.5   | 20.9   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 39     | Pass      |
| Force At 12.7 mm             | N     | 104 -162      | 132    | Pass      |
| Force At 19 mm               | N     | 163 - 222     | 185    | Pass      |
| Force At 25.4 mm             | N     | 222 - 280     | 245    | Pass      |
| Force At 33 mm               | N     | 325 - 391     | 338    | Pass      |
| Overall Test Results         |       |               |        | Pass      |

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9/19/07  
Test Date

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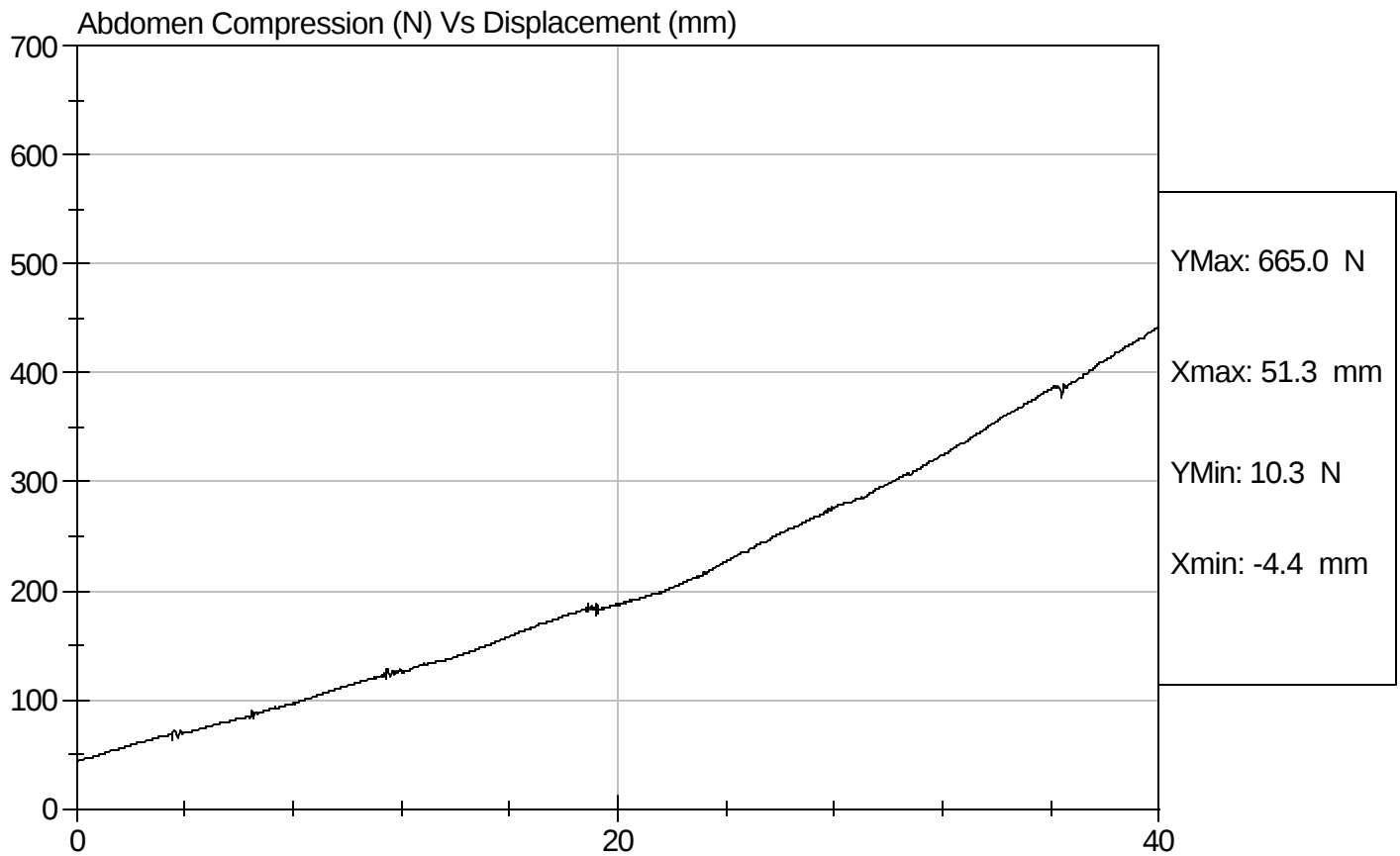


Test Description: Abdomen Compression

Test Date: 9/19/07

Component: D072944

Speed: 0 ft/sec, 0 m/sec



**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Lumbar Flexion Calibration**

ATD Serial No: 271

Test I.D.: D072945

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 - 25.5   | 20.9   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 39     | Pass      |
| Force At 0 deg               | N     | 0 - 26.7      | 0      | Pass      |
| Force At 20 deg              | N     | 97.9 - 151.2  | 136.5  | Pass      |
| Force At 30 deg              | N     | 151.2 - 204.6 | 180.4  | Pass      |
| Force At 40 deg              | N     | 204.6 - 258.0 | 249.2  | Pass      |
| Return Angle                 | Deg   | 12 Maximum    | 5      | Pass      |
| Overall Test Results         |       |               | Pass   |           |

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Laboratory Technician

9/19/07  
Test Date

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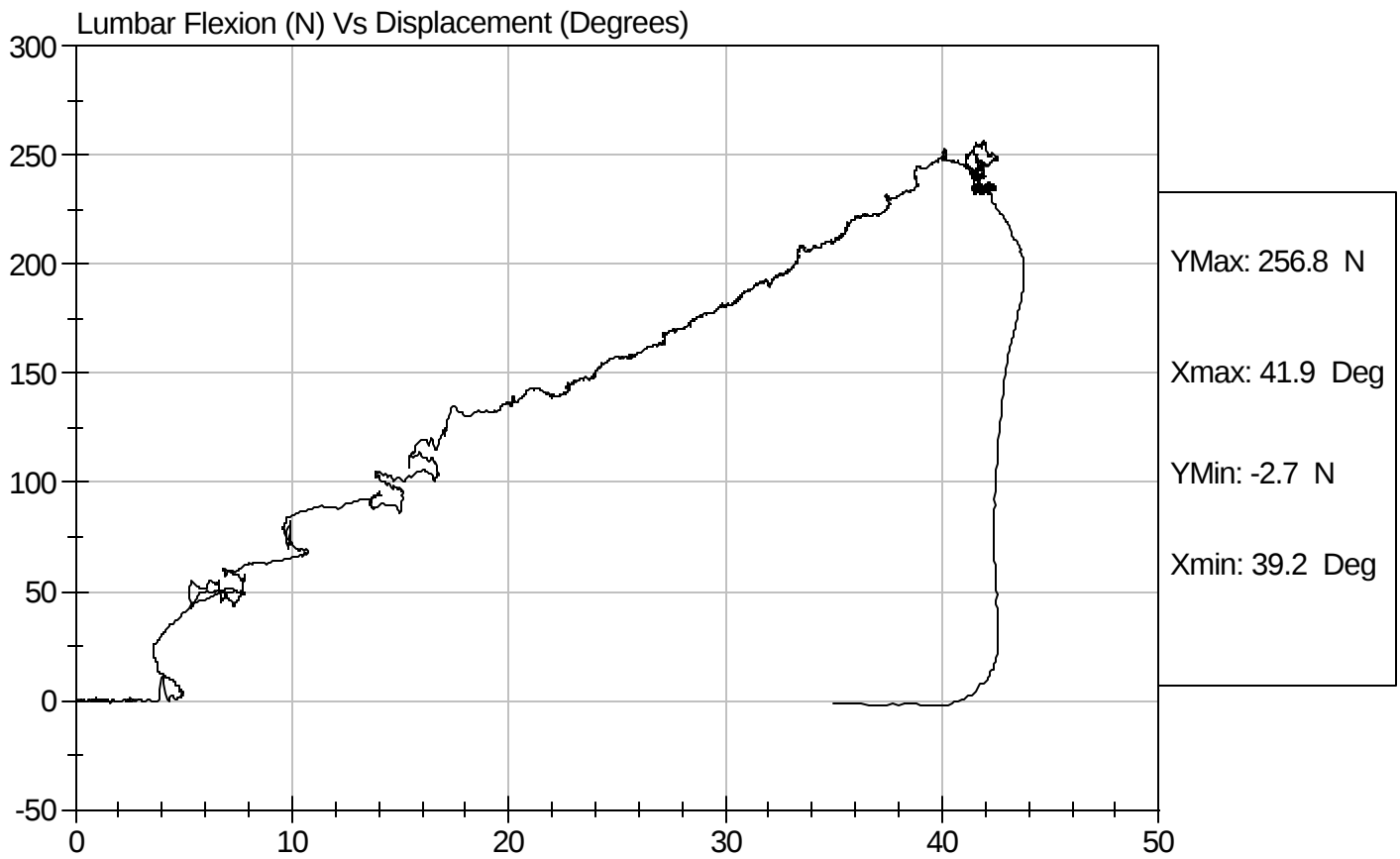


Test Description: Lumbar Flexion

Test Date: 9/19/07

Component: D072945

Speed: 0 ft/sec, 0 m/sec

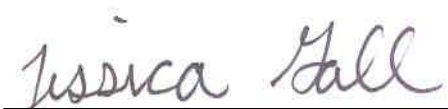


**SID/HIII Calibration Data Sheet**  
**Side Impact Dummy (SID)**  
**Neck Pendulum Test**

**ATD Serial No:** 271

**Test I.D:** D072949

| Tested Parameter                        |               | Units | Specification | Result | Pass/Fail |
|-----------------------------------------|---------------|-------|---------------|--------|-----------|
| Laboratory Temperature                  |               | deg C | 20.6 to 22.2  | 21.0   | Pass      |
| Laboratory Relative Humidity            |               | %     | 10 to 70      | 39     | Pass      |
| Impact Velocity                         |               | m/s   | 6.89 to 7.13  | 7.06   | Pass      |
| Pendulum Deceleration                   | 10 msec       | m/s   | 1.96 to 2.55  | 2.46   | Pass      |
|                                         | 20 msec       | m/s   | 4.12 to 5.10  | 4.86   | Pass      |
|                                         | 30 msec       | m/s   | 5.73 to 7.01  | 6.66   | Pass      |
|                                         | 40 to 70 msec | m/s   | 6.27 to 7.64  | 6.71   | Pass      |
| Midsagittal Plane Max Rotation          |               | deg   | 66 to 82      | 75     | Pass      |
| Head Rotation Peak to Zero - Decay Time |               | msec  | 58 to 67      | 62     | Pass      |
| Max. Mx at Occipital Condyles           |               | Nm    | 73 to 88      | 76     | Pass      |
| Mx Peak To Zero - Decay Time            |               | msec  | 49 to 64      | 54     | Pass      |
| Mx Peak to Max. Head Rotation           |               | msec  | 2 to 16       | 5      | Pass      |

  
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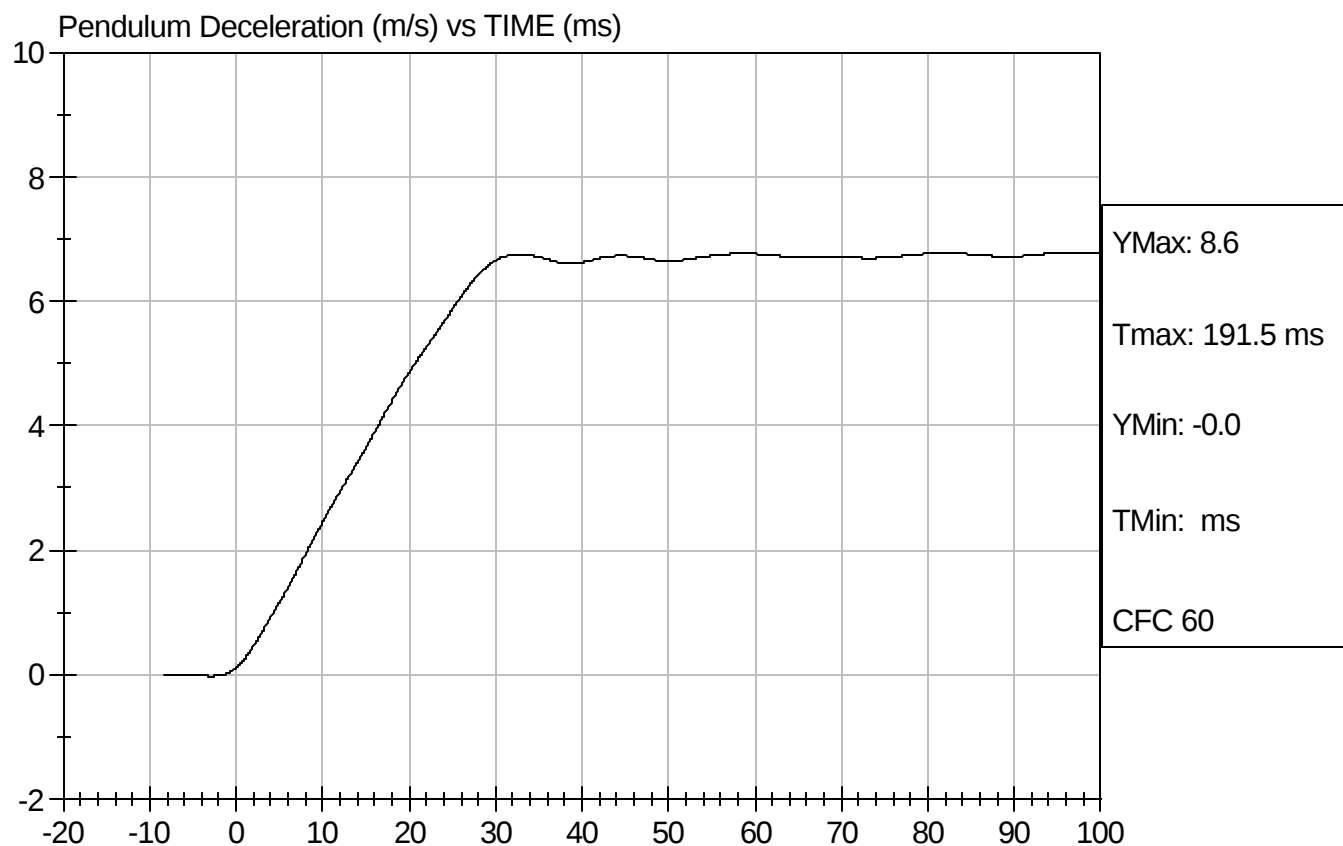
Test Date

  
 Approved By



Test Desc: Neck Bending  
Component ID: D072949

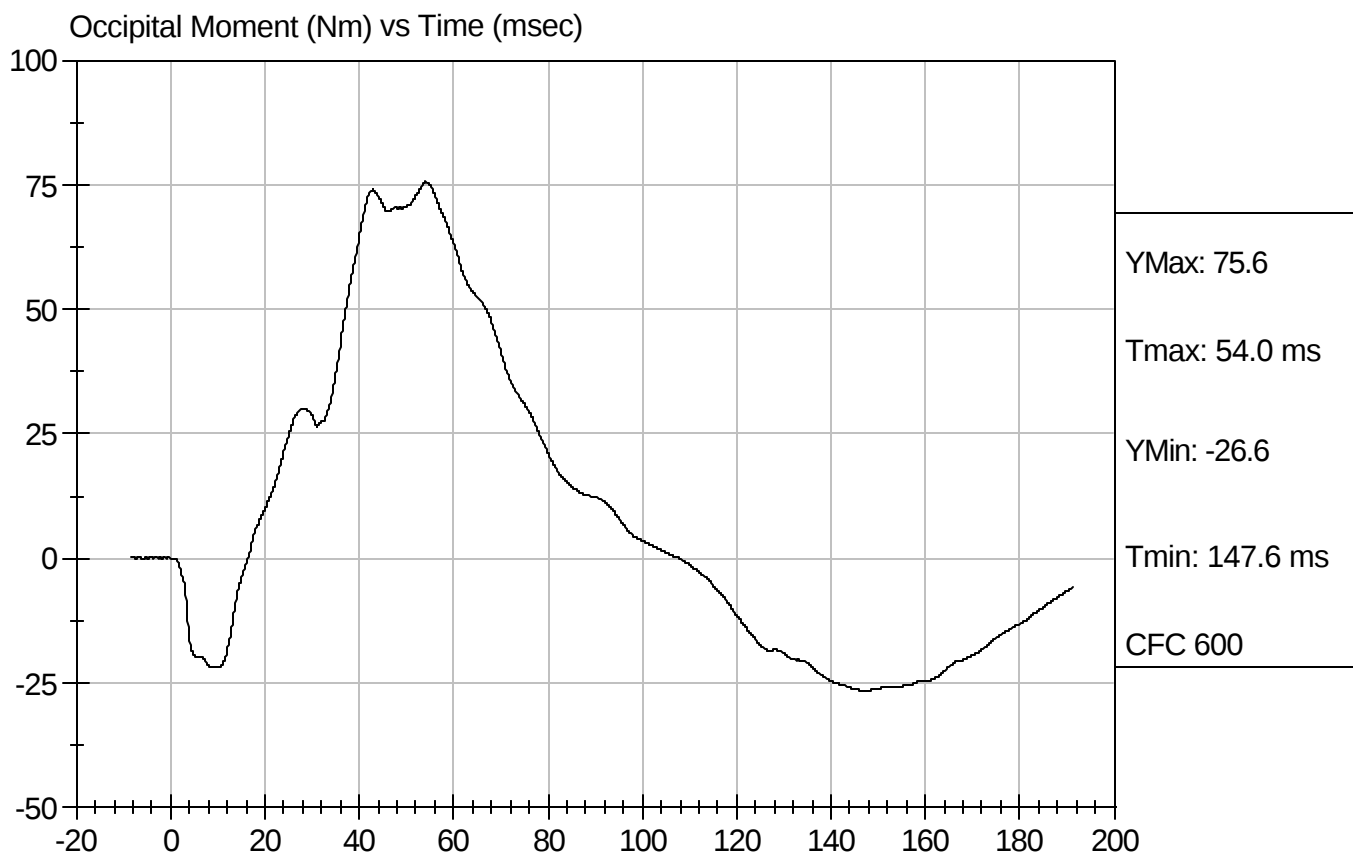
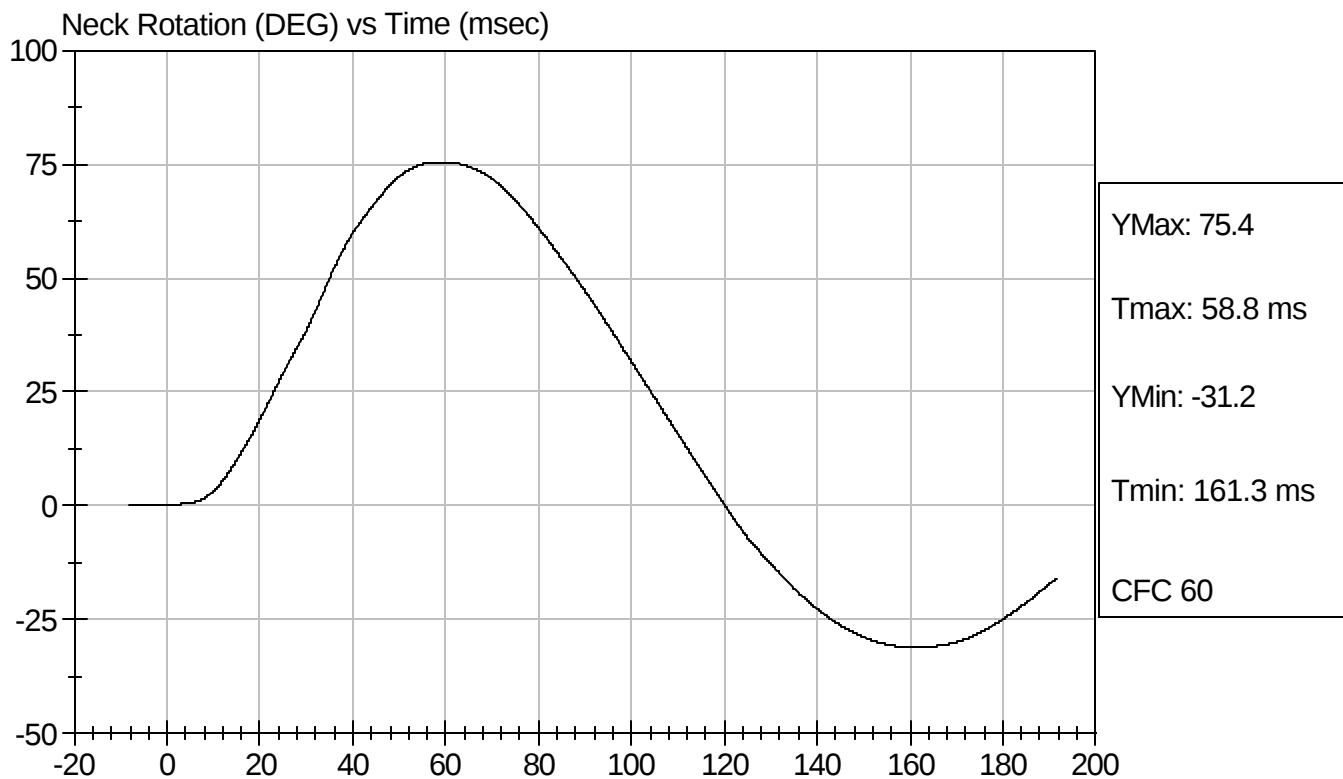
Test Date: 9/19/07  
Speed: 23.15 ft/sec, 7.06 m/sec





Test Desc: Neck Bending  
Component ID: D072949

Test Date: 9/19/07  
Speed: 23.15 ft/sec, 7.06 m/sec



## Calibration Test Results Summary

Dummy Serial Number: 271

### Post-Test Calibration

|                             |                                                       |
|-----------------------------|-------------------------------------------------------|
| External Dimensions:        | The dummy passed all external dimension requirements. |
| Head Drop Test:             | The head passed all drop test requirements.           |
| Neck Pendulum Test:         | The neck passed all pendulum test requirements.       |
| Thorax Impact Test:         | The thorax passed all impact test requirements.       |
| Pelvic Impact Test:         | The pelvis passed all impact test requirements.       |
| Abdominal Compression Test: | The abdomen passed all compression test requirements. |
| Lumbar Flexion Test:        | The lumbar passed all flexion test requirements.      |

**SID/HIII Calibration Data Sheet**  
**Side Impact Dummy**  
**Head Drop Calibration (Lateral)**

**ATD Serial No:** 271

**Test I.D:** D072961

| Tested Parameter              | Units  | Specification | Result | Pass/Fail |
|-------------------------------|--------|---------------|--------|-----------|
| Laboratory Temperature        | deg C  | 18.9 to 25.5  | 21.1   | Pass      |
| Laboratory Relative Humidity  | %      | 10 to 70      | 42     | Pass      |
| Peak Resultant Acceleration   | G's    | 120 to 150    | 130    | Pass      |
| Is Resultant Curve Unimodal?  | Yes/No | 15% of peak   | Yes    | Pass      |
| Peak Longitudnal Acceleration | G's    | +/- 15        | -10.6  | Pass      |
| Overall Test Results          |        |               |        | Pass      |

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9/21/07  
Test Date

David Winkelbauer  
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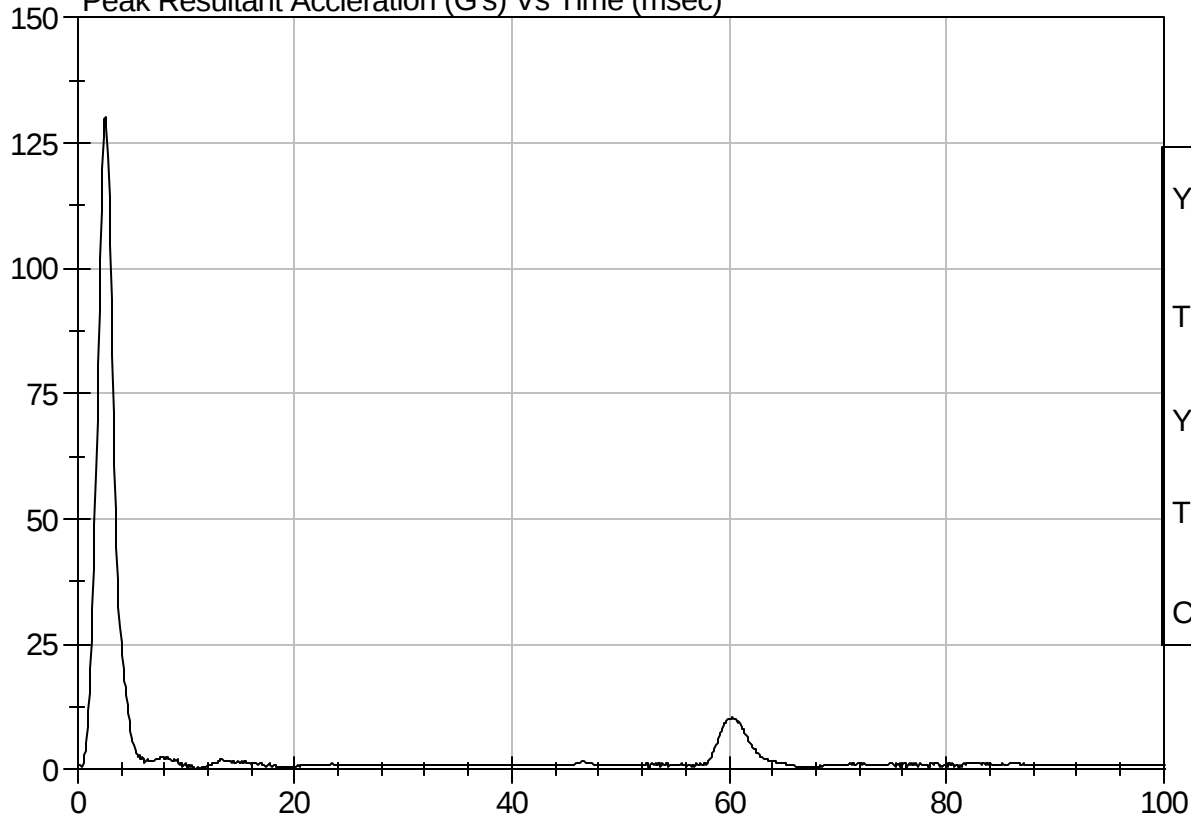
Test Description: Head Drop

Test Date: 9/21/07

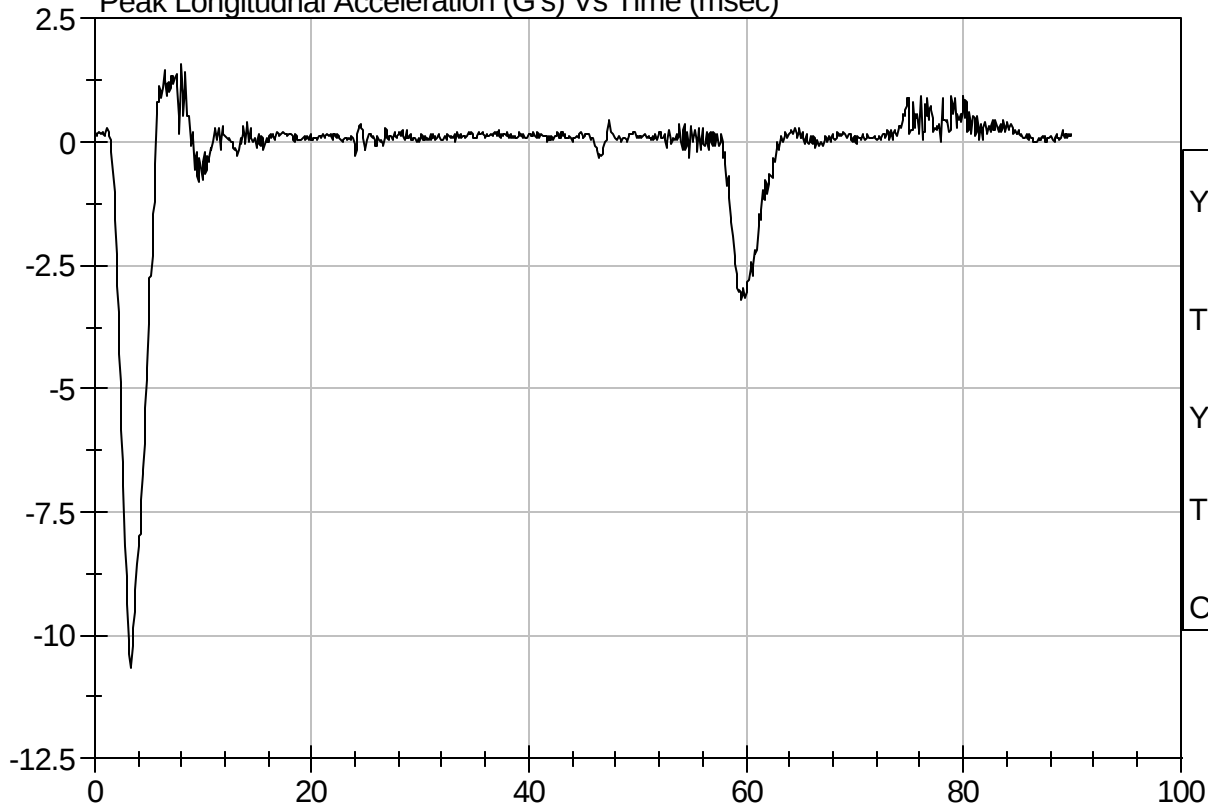
Component: D072961

Speed: 0 ft/s, 0.00 m/s

Peak Resultant Acceleration (G's) Vs Time (msec)



Peak Longitudinal Acceleration (G's) Vs Time (msec)



**SID/HIII Calibration Data Sheet**  
**Side Impact Dummy**  
**Thorax Impact Test**

**ATD Serial No:** 271

**Test I.D:** D072962

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 - 25.5   | 21.1   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 42     | Pass      |
| Probe Velocity               | m/s   | 4.22 - 4.31   | 4.30   | Pass      |
| Upper Rib                    | G's   | 37 - 46       | 42     | Pass      |
| Lower Rib                    | G's   | 37 - 46       | 41     | Pass      |
| Lower Spine                  | G's   | 15 - 22       | 17     | Pass      |
| Overall Test Results         |       |               |        | Pass      |

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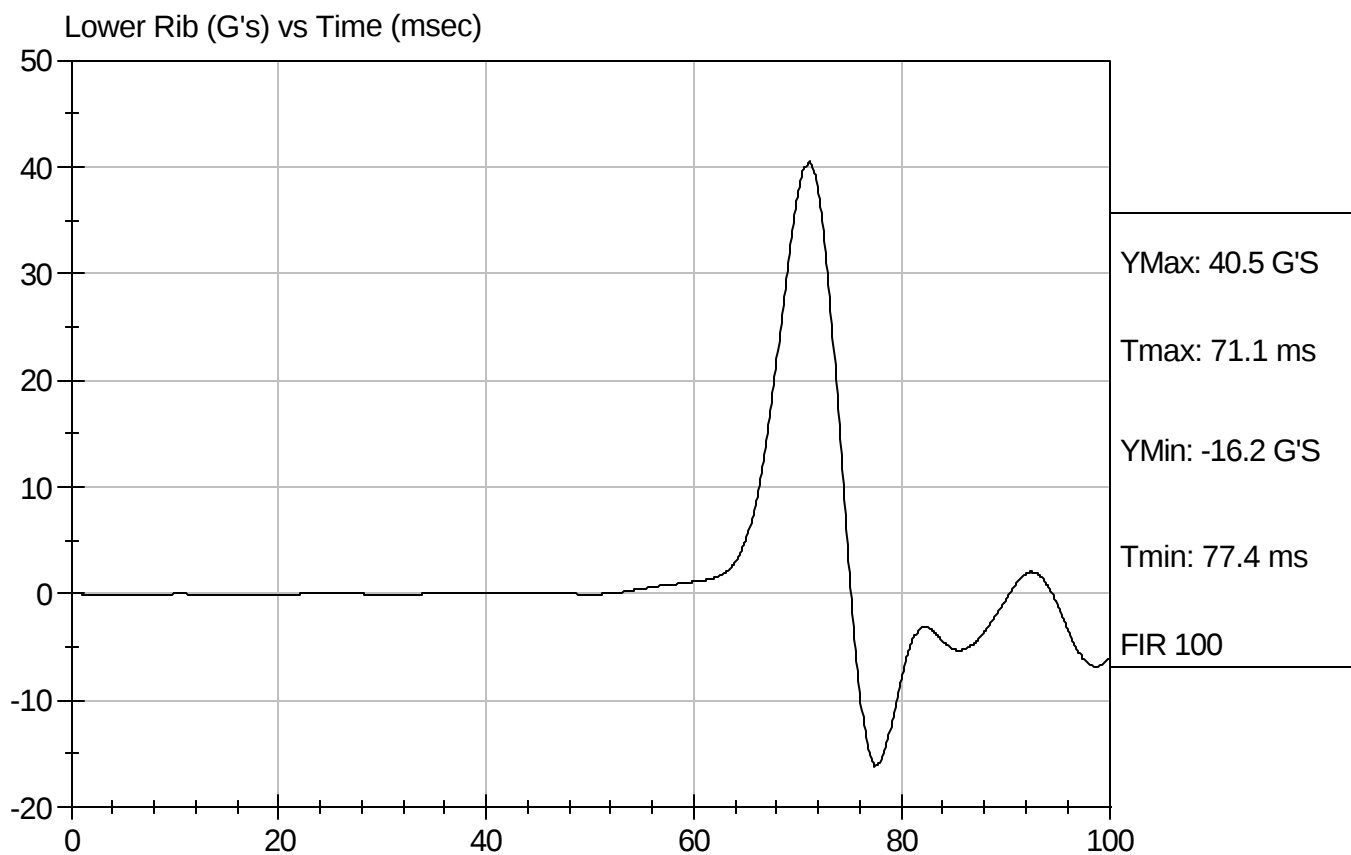
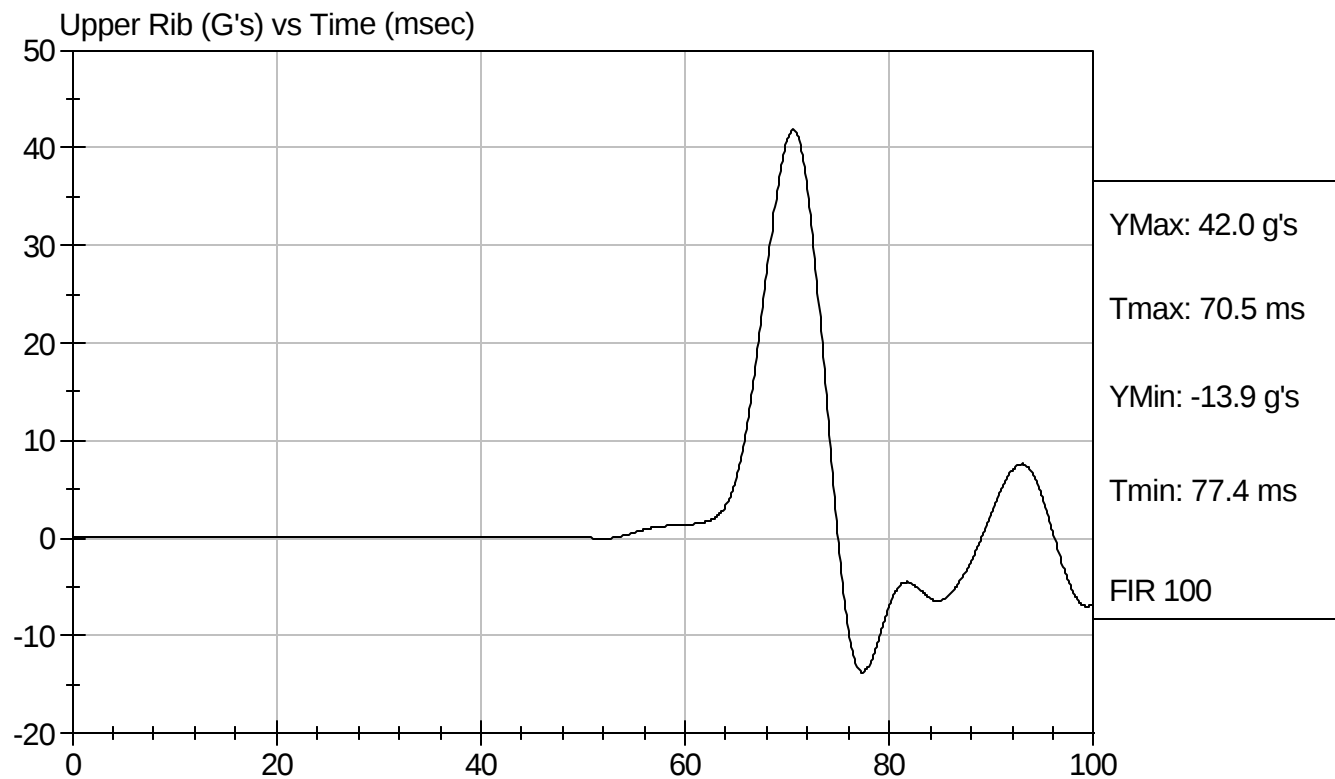
9/21/07  
Test Date

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Test Desc: Thorax Impact  
Component ID: D072962

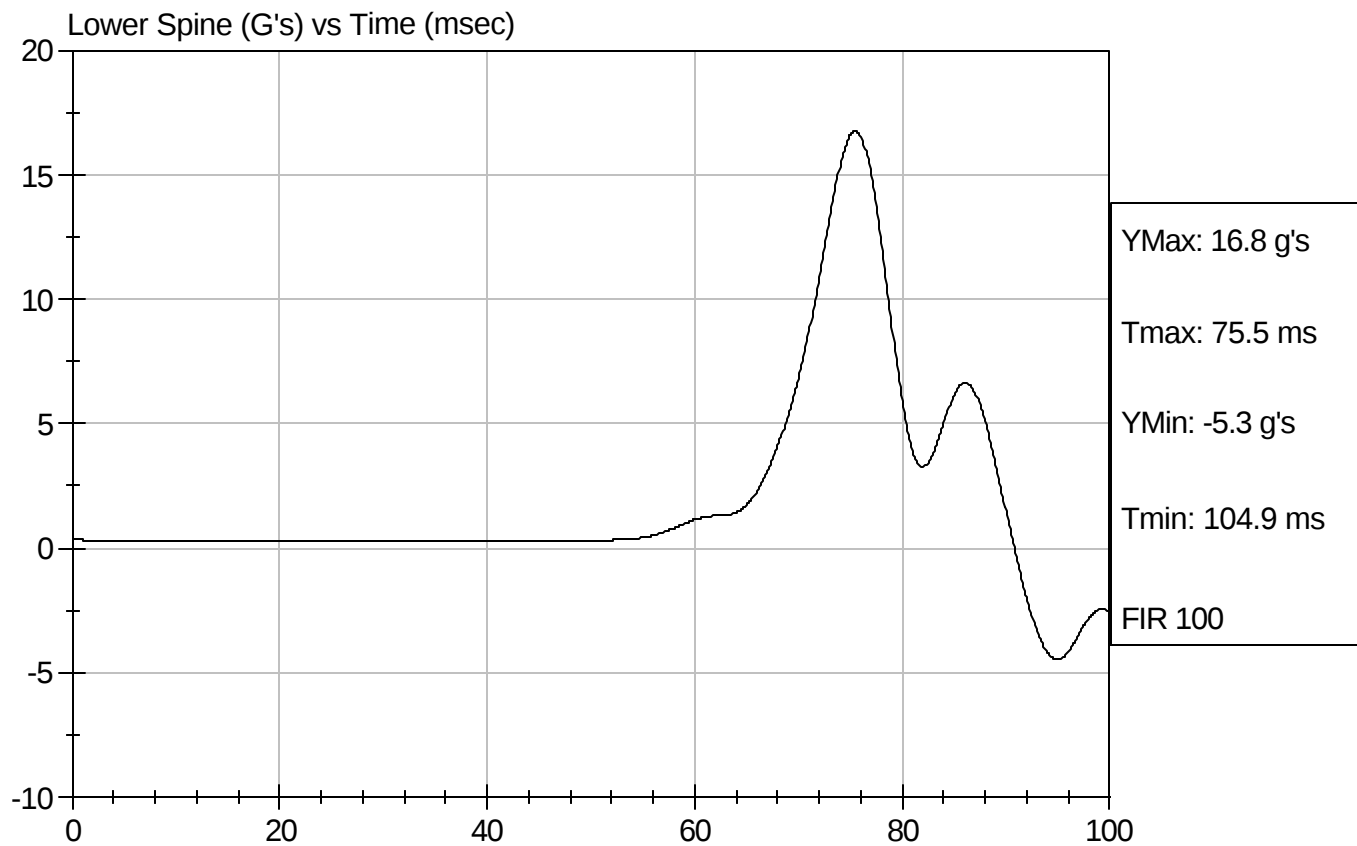
Test Date: 9/21/07  
Speed: 14.12 ft/sec, 4.30 m/sec





Test Desc: Thorax Impact  
Component ID: D072962

Test Date: 9/21/07  
Speed: 14.12 ft/sec, 4.30 m/sec



**SID/HIII Calibration Data Sheet**  
**Side Impact Dummy**  
**Pelvis Impact Test**

**ATD Serial No:** 271

**Test I.D:** D072963

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 to 25.5  | 21.1   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 42     | Pass      |
| Probe Velocity               | m/s   | 4.27 - 4.33   | 4.32   | Pass      |
| Pelvis Acceleration          | G's   | 40 - 60       | 44     | Pass      |
| Overall Test Results         |       |               |        | Pass      |

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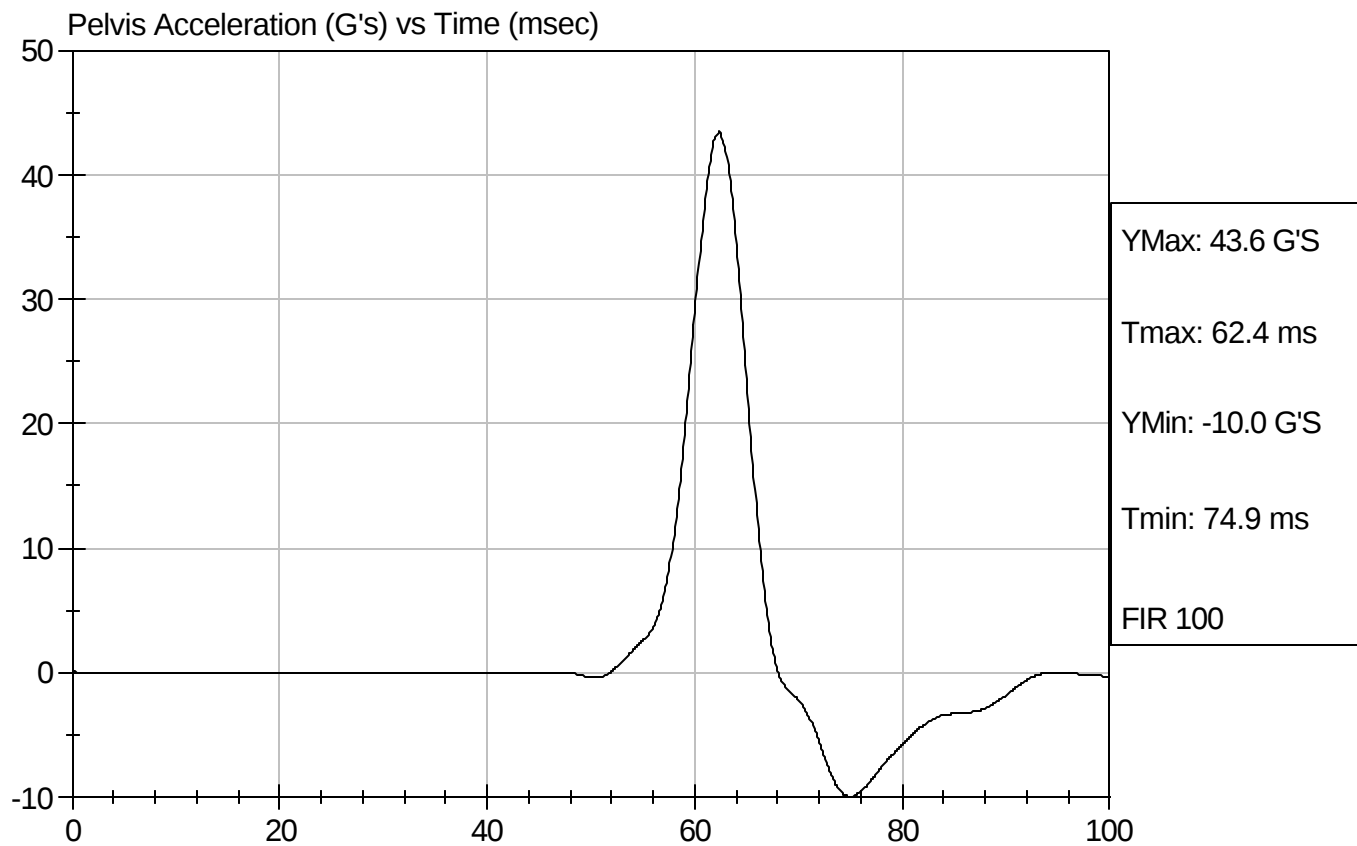
9/21/07  
Test Date

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Test Desc: Pelvis Impact  
Component ID: D072963

Test Date: 9/21/07  
Speed: 14.18 ft/sec, 4.32 m/sec



**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Abdominal Compression Calibration (Pre-Load = 10 lbs)**

ATD Serial No: 271

Test I.D.: D072964

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 - 25.5   | 21.1   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 42     | Pass      |
| Force At 12.7 mm             | N     | 104 -162      | 147    | Pass      |
| Force At 19 mm               | N     | 163 - 222     | 207    | Pass      |
| Force At 25.4 mm             | N     | 222 - 280     | 274    | Pass      |
| Force At 33 mm               | N     | 325 - 391     | 371    | Pass      |
| Overall Test Results         |       |               |        | Pass      |

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Laboratory Technician

9/21/07  
Test Date

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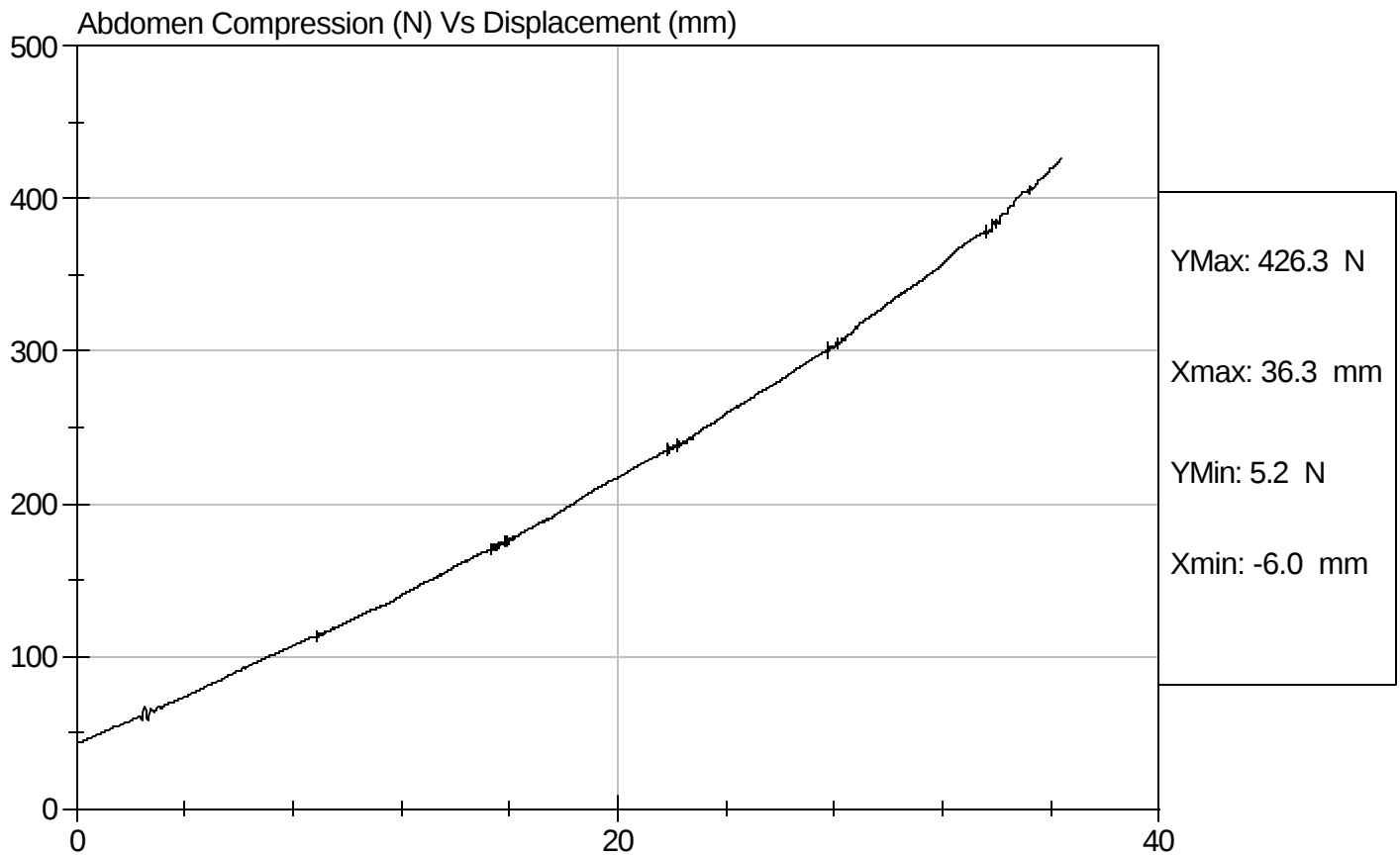


Test Description: Abdomen Compression

Test Date: 9/21/07

Component: D072964

Speed: 0 ft/sec, 0 m/sec

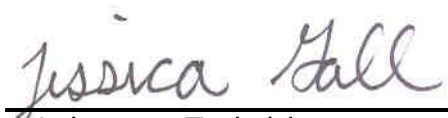


**SID/HIII Calibration Data Sheet**  
**Side Impact Dummy**  
**Lumbar Flexion Calibration**

**ATD Serial No:** 271

**Test I.D:** D072965

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 - 25.5   | 20.7   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 38     | Pass      |
| Force At 0 deg               | N     | 0 - 26.7      | 0      | Pass      |
| Force At 20 deg              | N     | 97.9 - 151.2  | 120.3  | Pass      |
| Force At 30 deg              | N     | 151.2 - 204.6 | 189.8  | Pass      |
| Force At 40 deg              | N     | 204.6 - 258.0 | 243.2  | Pass      |
| Return Angle                 | Deg   | 12 Maximum    | 7      | Pass      |
| Overall Test Results         |       |               | Pass   |           |

  
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9/21/07  
Test Date

  
Approved By

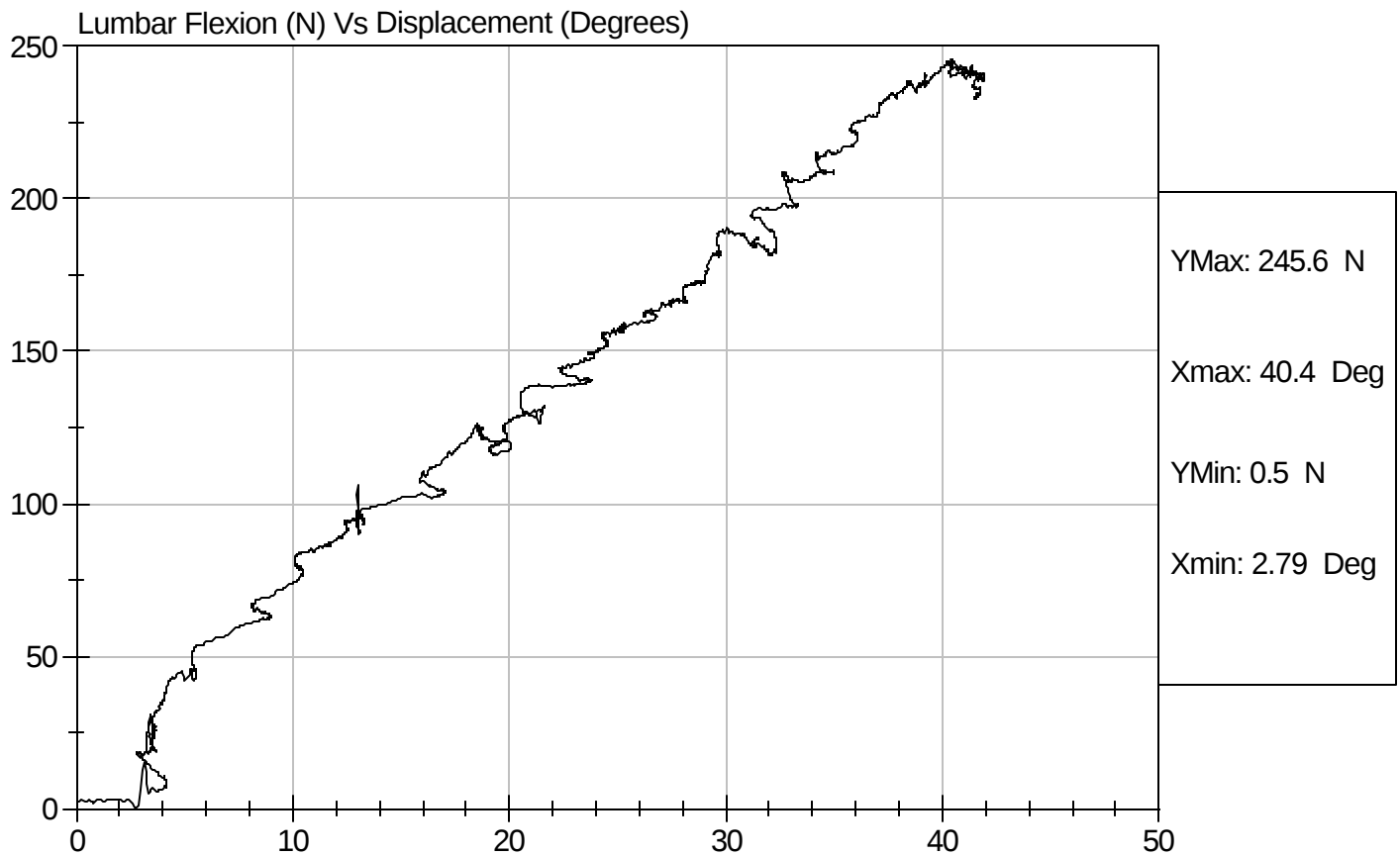


Test Description: Lumbar Flexion

Test Date: 9/21/07

Component: D072965

Speed: 0 ft/sec, 0 m/sec

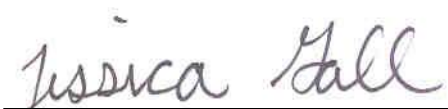


**SID/HIII Calibration Data Sheet**  
**Side Impact Dummy (SID)**  
**Neck Pendulum Test**

**ATD Serial No:** 271

**Test I.D:** D072969

| Tested Parameter                        |               | Units | Specification | Result | Pass/Fail |
|-----------------------------------------|---------------|-------|---------------|--------|-----------|
| Laboratory Temperature                  |               | deg C | 20.6 to 22.2  | 20.6   | Pass      |
| Laboratory Relative Humidity            |               | %     | 10 to 70      | 38     | Pass      |
| Impact Velocity                         |               | m/s   | 6.89 to 7.13  | 6.96   | Pass      |
| Pendulum Deceleration                   | 10 msec       | m/s   | 1.96 to 2.55  | 2.21   | Pass      |
|                                         | 20 msec       | m/s   | 4.12 to 5.10  | 4.41   | Pass      |
|                                         | 30 msec       | m/s   | 5.73 to 7.01  | 6.09   | Pass      |
|                                         | 40 to 70 msec | m/s   | 6.27 to 7.64  | 6.84   | Pass      |
| Midsagittal Plane Max Rotation          |               | deg   | 66 to 82      | 73     | Pass      |
| Head Rotation Peak to Zero - Decay Time |               | msec  | 58 to 67      | 61     | Pass      |
| Max. Mx at Occipital Condyles           |               | Nm    | 73 to 88      | 75     | Pass      |
| Mx Peak To Zero - Decay Time            |               | msec  | 49 to 64      | 60     | Pass      |
| Mx Peak to Max. Head Rotation           |               | msec  | 2 to 16       | 12     | Pass      |

  
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9/21/07

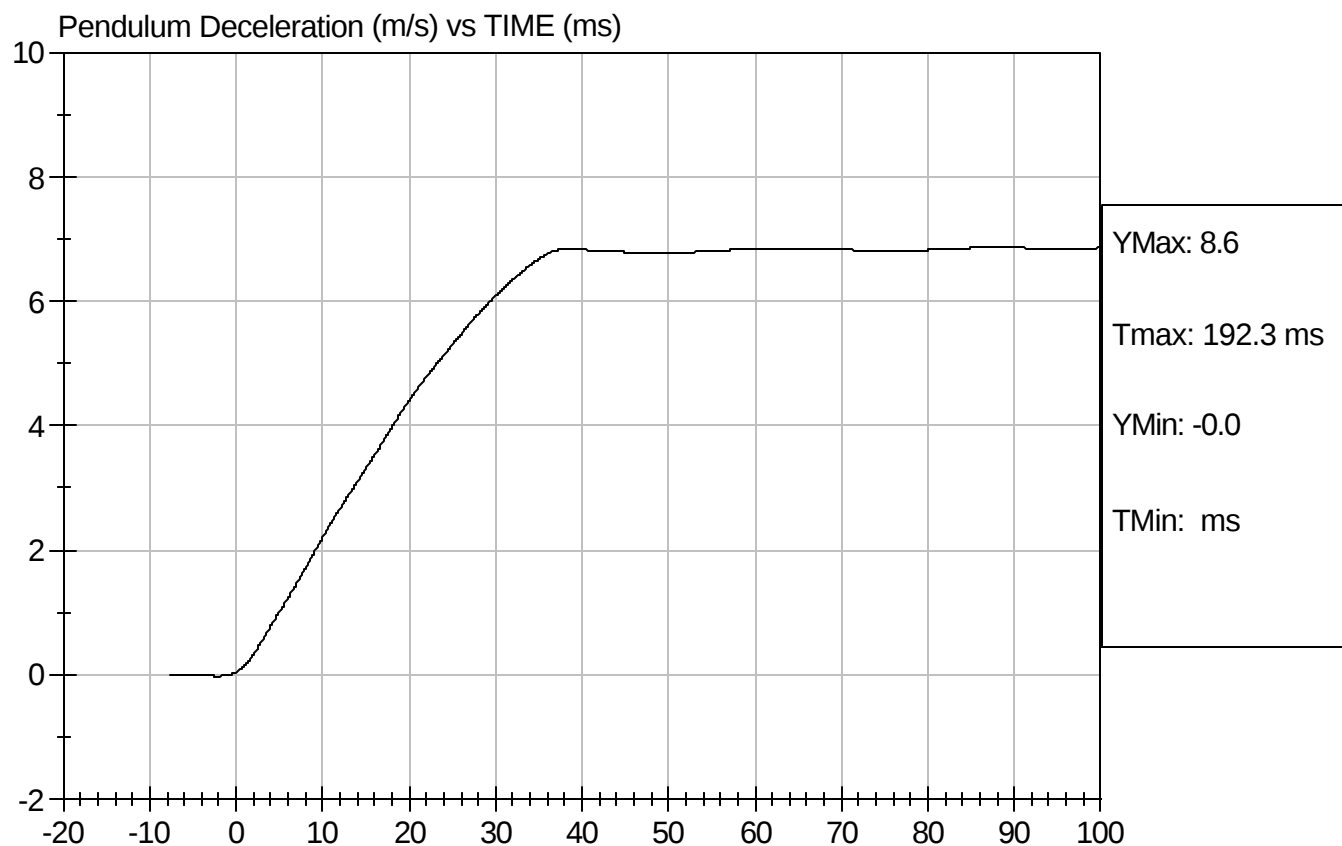
Test Date

  
 Approved By



Test Desc: Neck Bending  
Component ID: D072969

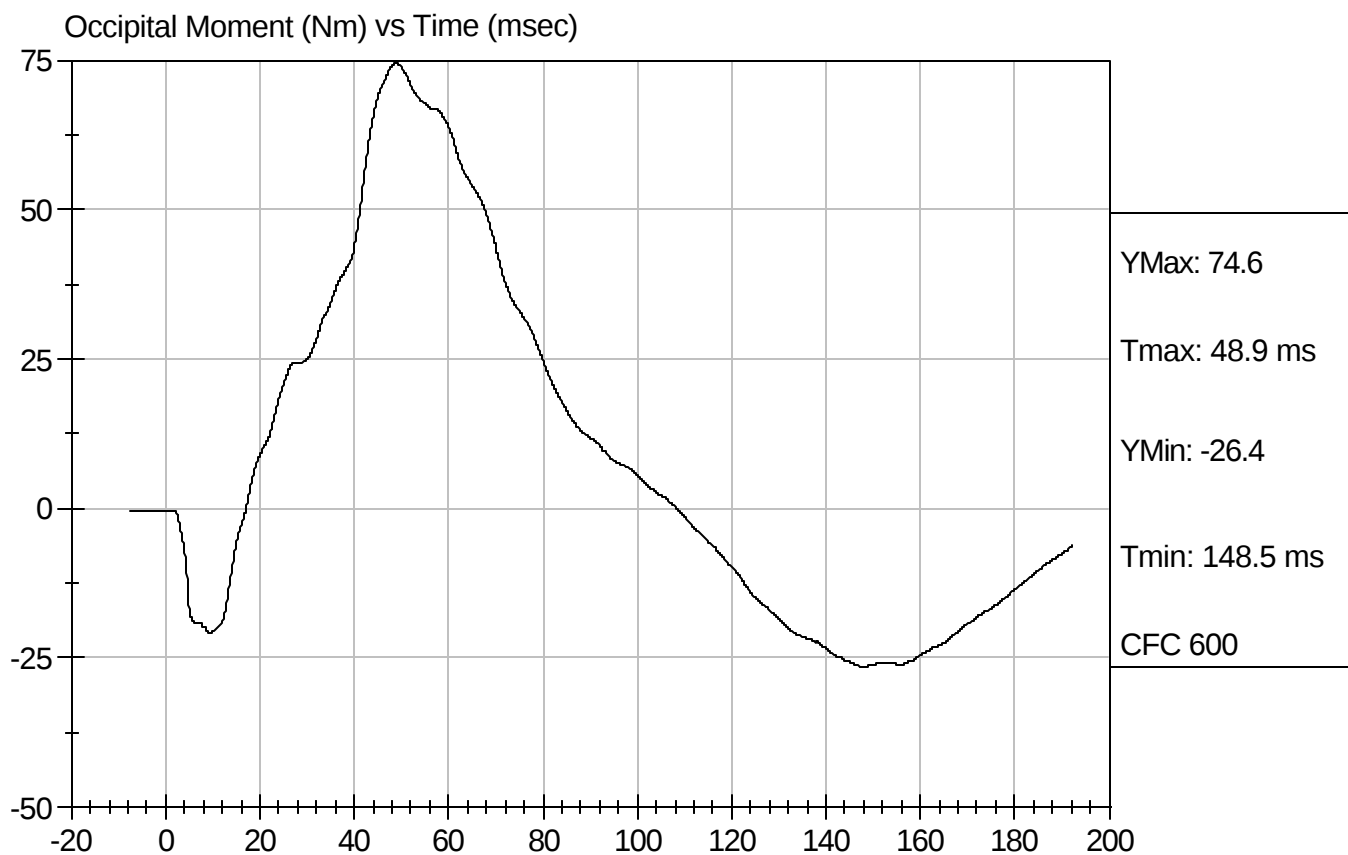
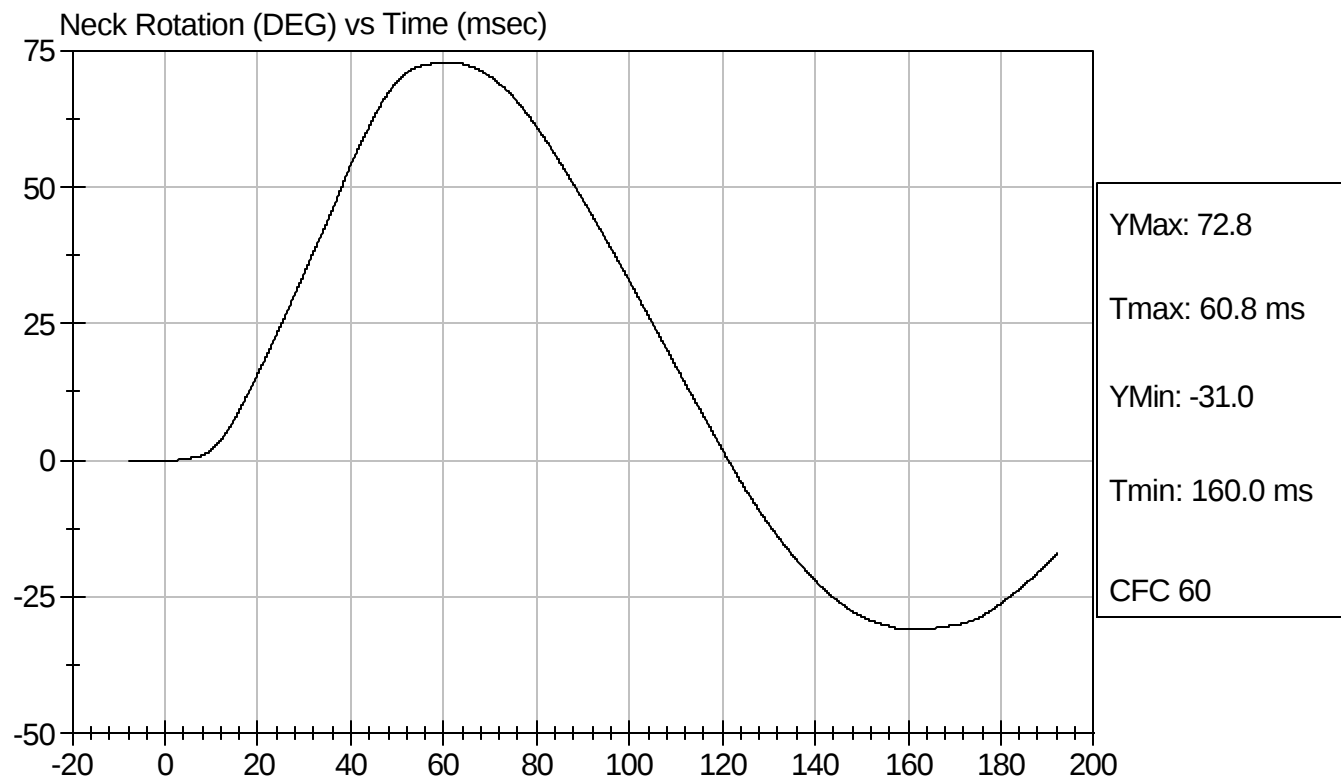
Test Date: 9/21/07  
Speed: 22.831 ft/sec, 6.96 m/sec





Test Desc: Neck Bending  
Component ID: D072969

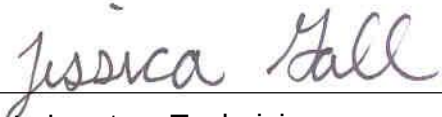
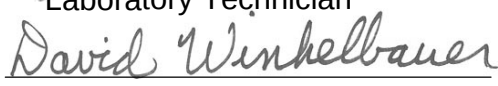
Test Date: 9/21/07  
Speed: 22.831 ft/sec, 6.96 m/sec



**SID Calibration Data Sheet**  
**Side Impact Dummy**  
**Inspection Checklist**

**ATD Serial No:** 271

| Test Part    | Items Checked                        | Result |
|--------------|--------------------------------------|--------|
| Skin         | Visual inspection                    | Pass   |
| Head         | Visual, ballast, accelerometer mount | Pass   |
| Neck         | Visual                               | Pass   |
| Spine Box    | Visual, ballast, accelerometer mount | Pass   |
| Rib Cage     | Visual, measure                      | Pass   |
| Sternum      | Visual                               | Pass   |
| Lumbar Spine | Visual                               | Pass   |
| Abdomen      | Visual                               | Pass   |
| Pelvis       | Visual, palpate, accelerometer mount | Pass   |
| Upper Legs   | Visual                               | Pass   |
| Knees        | Visual                               | Pass   |
| Lower Legs   | Visual, range of motion              | Pass   |
| Ankles       | Visual, range of motion              | Pass   |
| Feet         | Visual, range of motion              | Pass   |
| Joints       | 1 to 2 g range                       | Pass   |
| Other        |                                      | Pass   |

  
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Approved By

9/21/2007  
Test Date

**APPENDIX D**  
**CHILD DUMMY DATA**

## SUMMARY OF TEST

| Measurement Description         | Units | Threshold | P3 ATD |
|---------------------------------|-------|-----------|--------|
| Head Injury Criteria (HIC36)    | N/A   | N/A       | 44     |
| Head Injury Criteria (HIC15)    | N/A   | 390       | 25     |
| Max. Thorax Accel. (3msec Clip) | G's   | 50        | 20     |

The child dummy was instrumented with head, chest, and upper six axial neck force and moment sensors.

The right rear (Position 3) child dummy (S/N 093) was calibrated previous to this test. Child dummy certification information can be found in this Appendix.

Position 3 was rear facing and used the vehicle LATCH attachment.

## TEST VEHICLE WEIGHTS

|        | Units | As Tested (ATW) (Axle) |        |        |
|--------|-------|------------------------|--------|--------|
|        |       | Front                  | Rear   | Total  |
| Left   | kg    | 618.7                  | 545.7  |        |
| Right  | kg    | 492.6                  | 509.8  |        |
| Ratio  | %     | 51.3                   | 48.7   |        |
| Totals | kg    | 1111.3                 | 1055.5 | 2166.8 |

As tested weight of vehicle includes two ATDs, one CRABI with CRS, cargo, equipment and instrumentation.

## TEST NOTES

None

**TEST DUMMY INFORMATION**

|                         |                                 |
|-------------------------|---------------------------------|
| Description             | Position 3 CRS                  |
| Dummy Type / Serial No. | 12 month old CRABI / 093        |
| Number of Data Channels | 12                              |
| Restraint System        | Graco Snugride<br>(Rear Facing) |

**POST TEST SEAT DATA**

| Location         | Seat Movement (mm) | Seat Back Failure |
|------------------|--------------------|-------------------|
| P1 (Left Front)  | 0                  | None              |
| P2 (Right Front) | 0                  | None              |
| P3 (Right Rear)  | 0                  | None              |
| P4 (Left Rear)   | 0                  | None              |

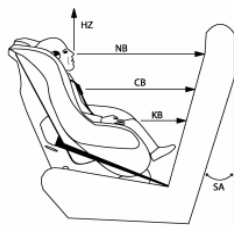
**VISIBLE DUMMY CONTACT POINTS**

|                     |                     |
|---------------------|---------------------|
| Description         | Position 3 CRS      |
| Head Contact        | Back of Head to CRS |
| Upper Torso Contact | None                |
| Lower Torso Contact | None                |
| Left Foot Contact   | None                |
| Right Foot Contact  | None                |

## CHILD DUMMY POSITIONING IN VEHICLE

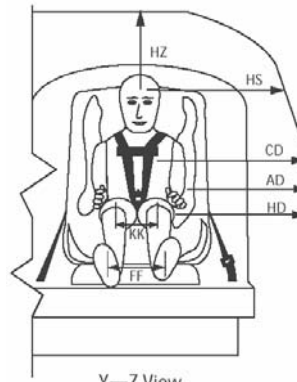
|                                     |                             |
|-------------------------------------|-----------------------------|
| Child Restraint System (Position 3) | Graco Snuggly (Rear Facing) |
| NHTSA No.                           | M85106                      |

Dummy Measurements for Rear-facing CRS Passengers



X—Z View

|    |   |                             |
|----|---|-----------------------------|
| HZ | - | Head to Roof                |
| NB | - | Nose to Front of Back Seat  |
| CB | - | Chest to Front of Back Seat |
| KB | - | Knee to Front of Back Seat  |
| SA | - | Seat Back Angle             |



Y—Z View

X—Z View

|    |   |                          |
|----|---|--------------------------|
| HZ | - | Head to Roof             |
| HS | - | Head to Side Window      |
| CD | - | Chest to Door            |
| AD | - | Arm to Door              |
| HD | - | H-Point to Door          |
| KK | - | Knee to Knee             |
| FF | - | Foot to Foot             |
| NB | - | Nose to Front Seat Back  |
| CB | - | Chest to Front Seat Back |
| KB | - | Knee to Front Seat Back  |
| TB | - | Toe to Front Seat Back   |
| SA | - | Seat Back Angle          |

| Measurement | Pre-Test (mm) | Post-Test (mm) |
|-------------|---------------|----------------|
|             | P3 CRS (093)  | P3 CRS (093)   |
| SA (deg)    | 14.1          |                |
| HS          | 440           | 354            |
| CD          | 360           | 308            |
| AD          | 250           | 174            |
| HD          | 330           | 241            |
| HZ          | 400           | 397            |
| NB          | 518           | 493            |
| CB          | 438           | 412            |
| KK          | 105           | 97             |
| FF          | 107           | 62             |
| KB - LEFT   | 185           | 149            |
| KB - RIGHT  | 185           | 196            |
| TB - LEFT   | 50            | 50             |
| TB - RIGHT  | 50            | 67             |

All dimensions in mm (unless noted)  
P3 – Right Rear Passenger (Rear Facing)

### CRS PERFORMANCE DATA

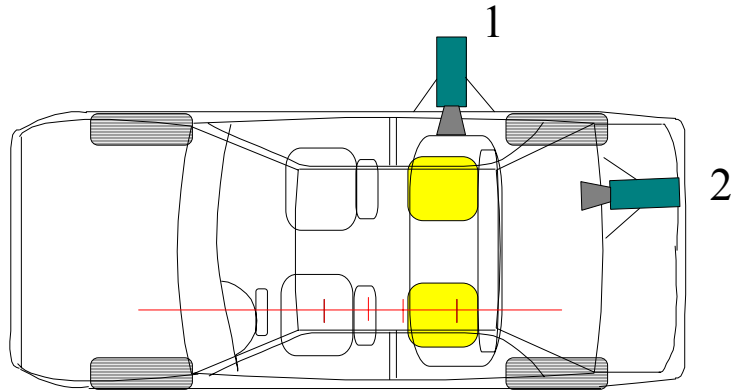
|                                     |                              |
|-------------------------------------|------------------------------|
| Child Restraint System (Position 3) | Graco Snugride (Rear Facing) |
| NHTSA No.                           | M85106                       |

### POSITION 3 CRS POST-TEST INSPECTION

| Location                    | Damage | Remarks            |
|-----------------------------|--------|--------------------|
| Upper Tether Strap          |        |                    |
| Upper Tether Buckle         |        |                    |
| Upper Tether Hook           |        |                    |
| Vehicle Upper Tether Anchor |        |                    |
| Lower Anchor Strap          | None   |                    |
| Lower Anchor Buckle         |        |                    |
| Lower Anchor Hooks          | None   |                    |
| Vehicle Lower CRS Anchors   | None   |                    |
| Harness Connections         | None   |                    |
| Cracks on CRS               | None   |                    |
| Fabric Tears on CRS         | None   |                    |
| Vehicle Seat Structure      | None   |                    |
| Vehicle Seat Fabric Tears   | None   |                    |
| Child Dummy                 | None   | CRABI 12 Month Old |

## CRS CAMERA DATA

|                                     |                              |
|-------------------------------------|------------------------------|
| Child Restraint System (Position 3) | Graco Snugride (Rear Facing) |
| NHTSA No.                           | M85106                       |



| No. | Camera View                         | Location (mm) * |   |   | Angle (deg) | Lens (mm) | Speed (fps) |
|-----|-------------------------------------|-----------------|---|---|-------------|-----------|-------------|
|     |                                     | X               | Y | Z |             |           |             |
| 1   | Vehicle Onboard Rear SID/HIII, Side |                 |   |   |             | 8         | 1000        |
| 2   | Onboard Child Seat                  |                 |   |   |             | 12.5      | 1000        |

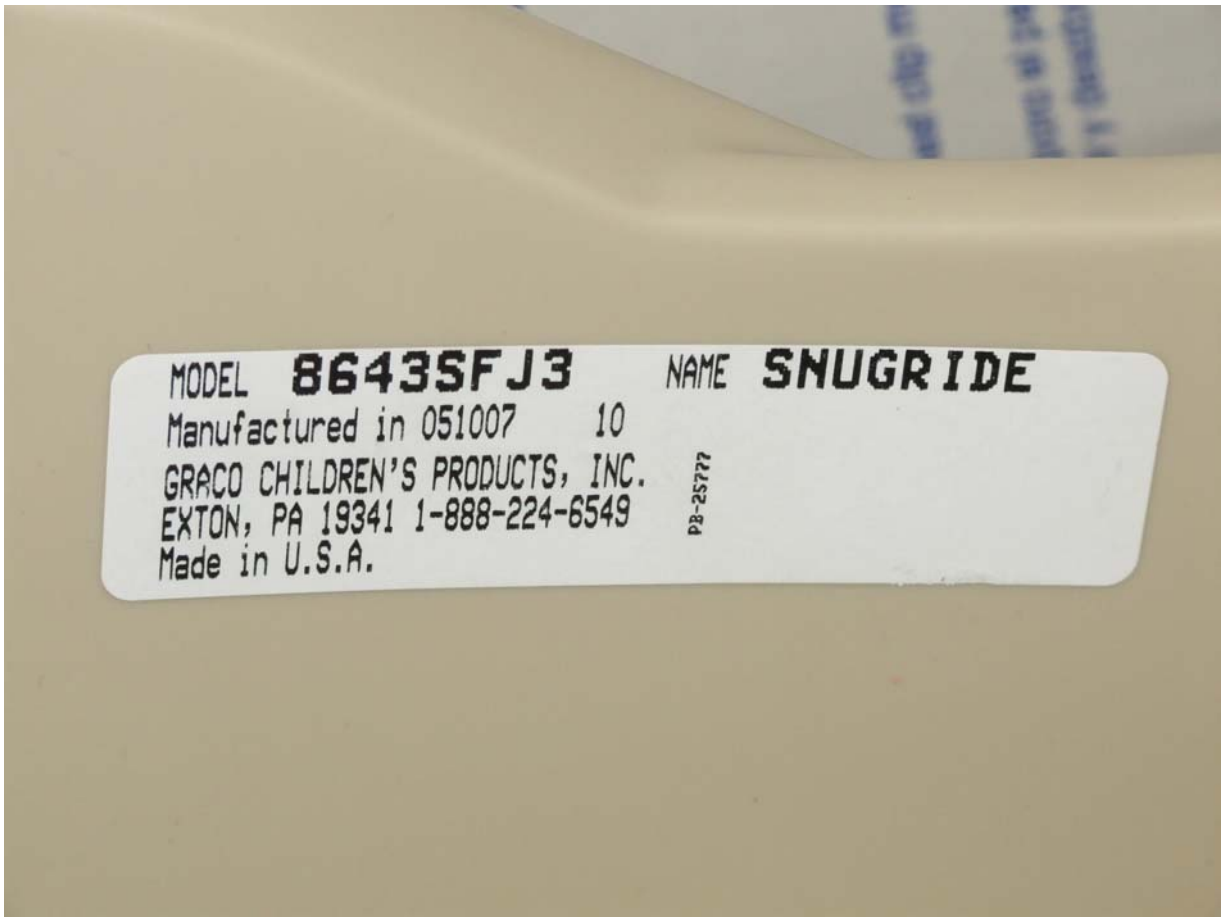
**\*COORDINATES:**

- +X = film plane rearward of barrier
- +Y = film plane to right of monorail centerline
- +Z = film plane above ground level

## PHOTOGRAPHS

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Close-up View of Position 3 CRS Label



Pre-Test Front View of Position 3 CRS



Post-Test Front View of Position 3 CRS



Pre-Test Rear View of Position 3 CRS



Post-Test Rear View of Position 3 CRS



Pre-Test Left Side View of Position 3 CRS



Post-Test Left Side View of Position 3 CRS



Pre-Test Right Side View of Position 3 CRS



Post-Test Right Side View of Position 3 CRS



Pre-Test Position 3 Left Side View



Pre-Test Position 3 Right Side View



Post-Test Position 3 Right Side View

## CHILD DUMMY RESPONSE DATA TRACES

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| Figure No. 14. | RRP Child Head Y Acceleration vs. Time             | D-15            |
| Figure No. 15. | RRP Child Head Z Acceleration vs. Time             | D-15            |
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**The following response data can be found in the R&D section of the NHTSA website at [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov)**

RRP Child Seat X Acceleration vs. Time

RRP Child Seat Y Acceleration vs. Time

RRP Child Seat Z Acceleration vs. Time

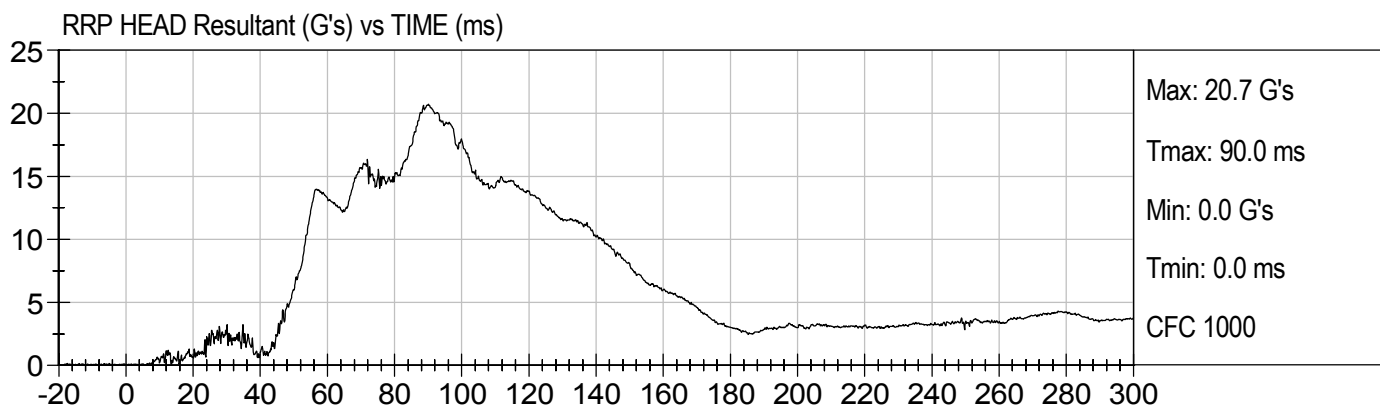
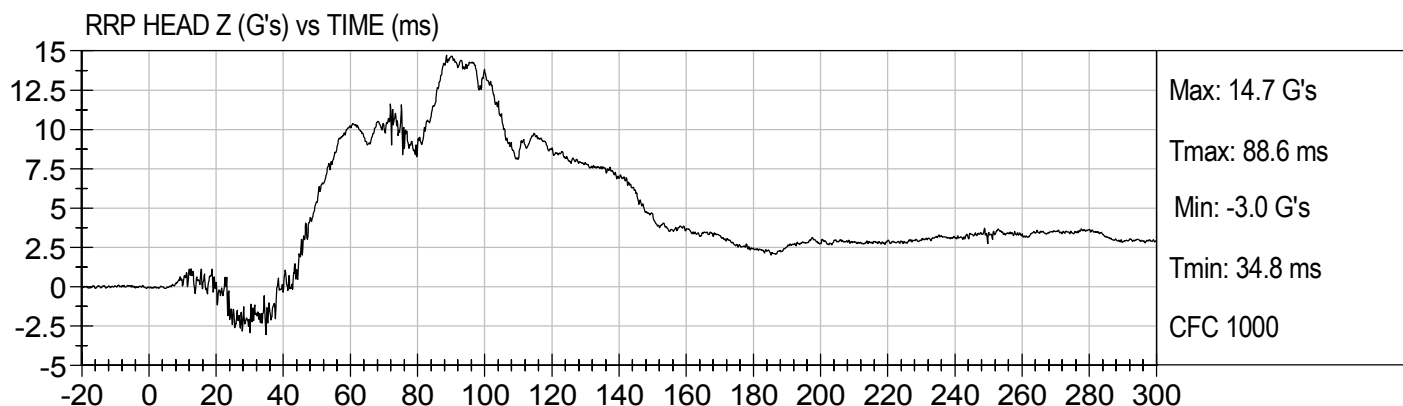
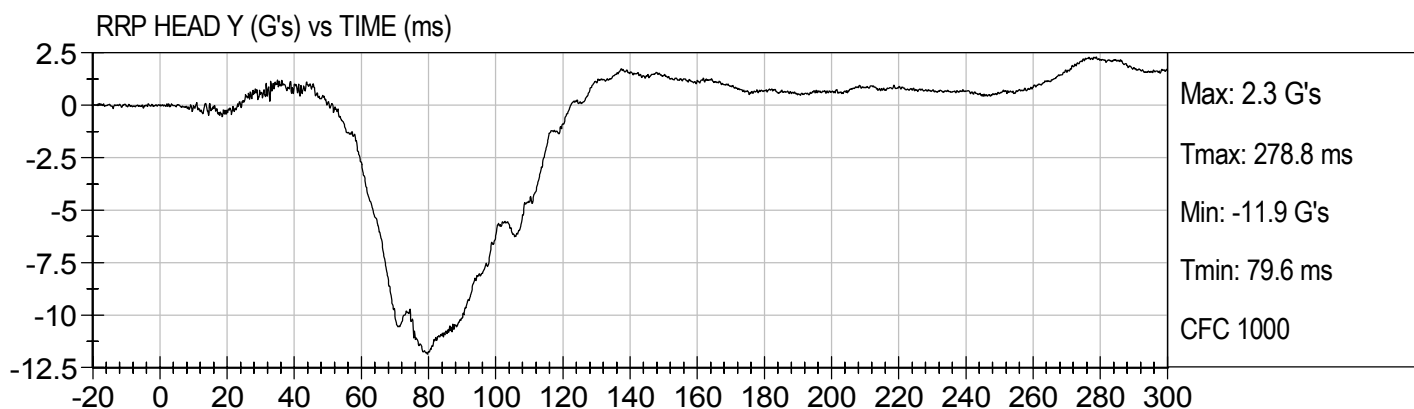
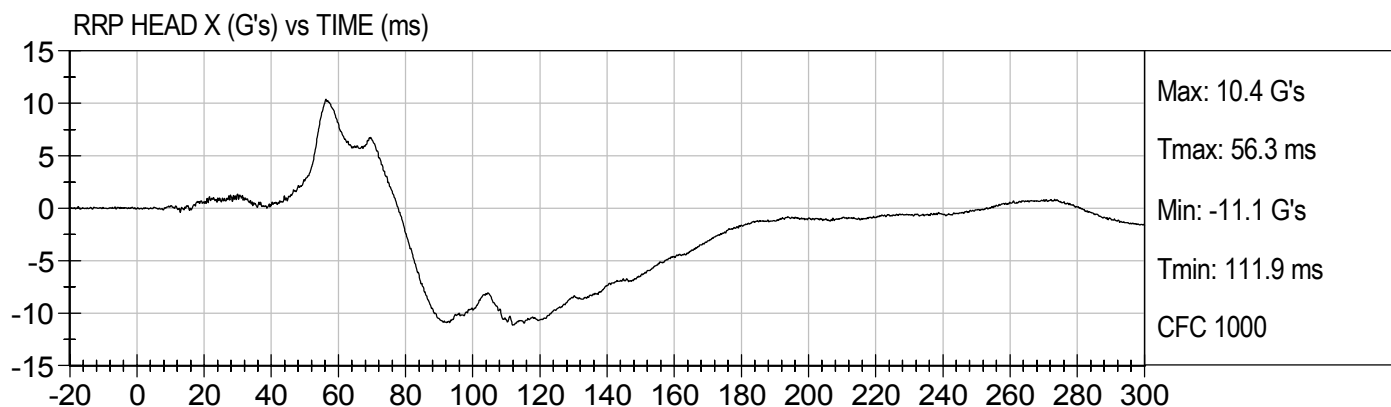
RRP Child Seat Resultant Acceleration vs. Time



LEFT SIDE NCAP  
2008 TOYOTA 4RUNNER

M85106

Test Date: 09/20/2007  
Speed: 38.8 mph (62.4 km/h)

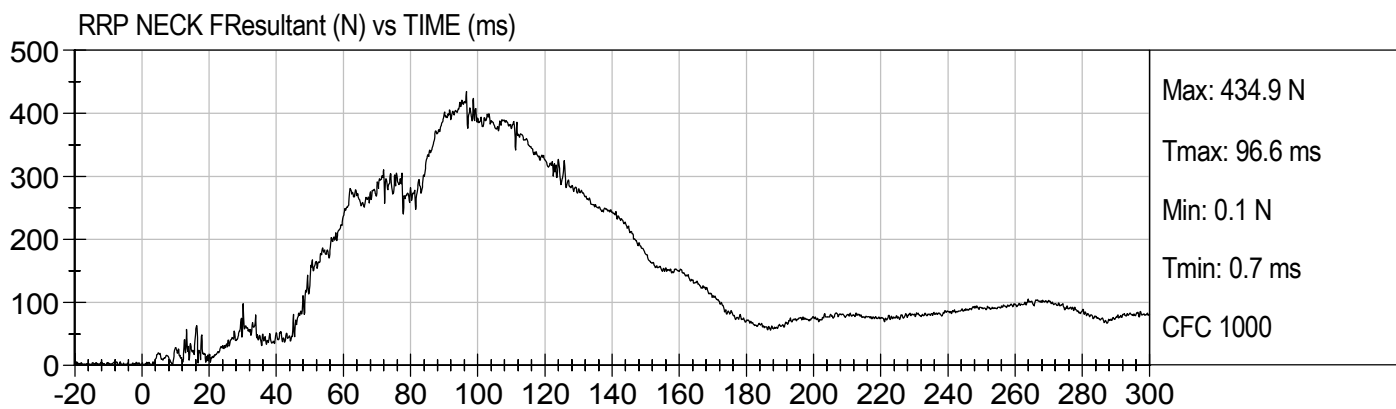
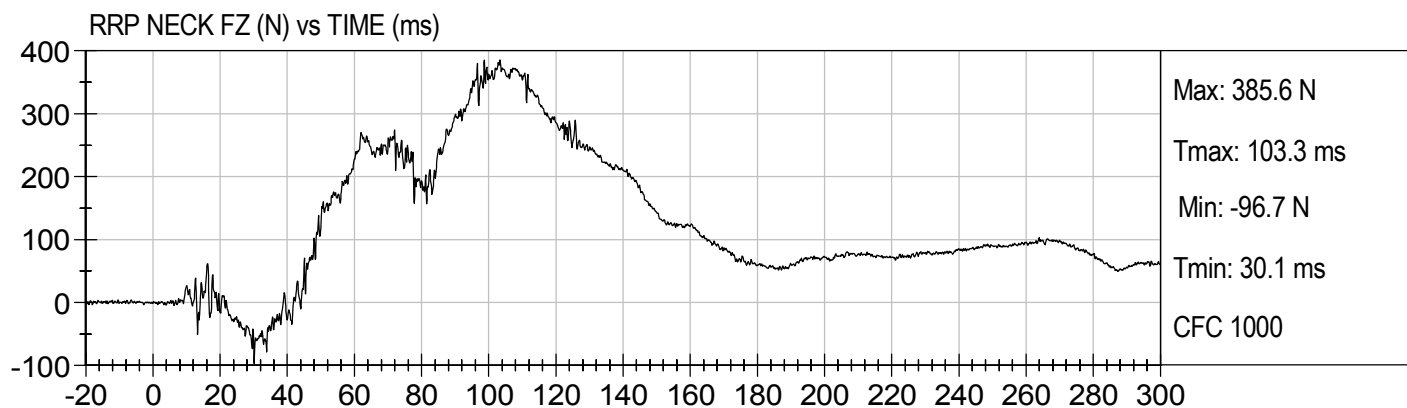
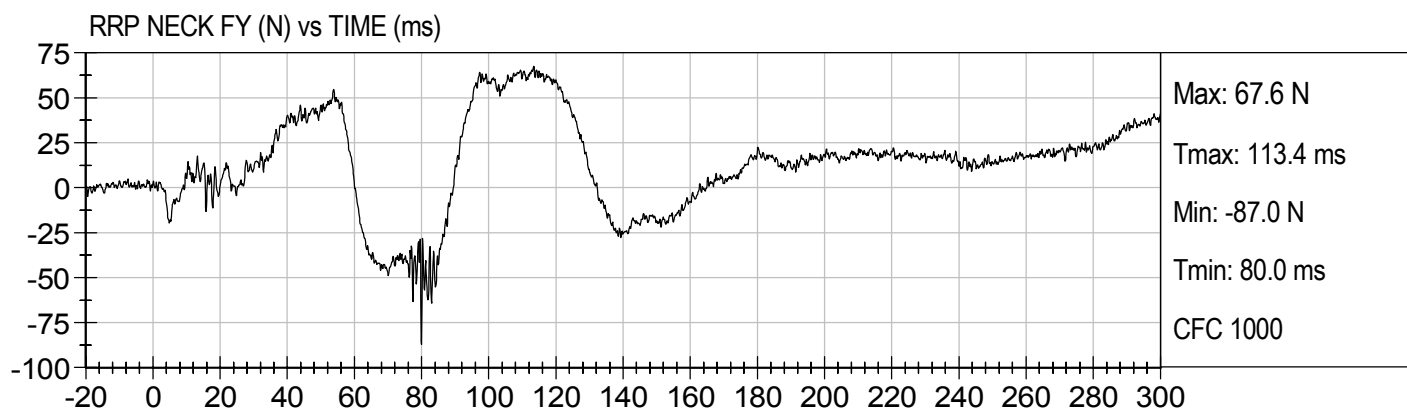
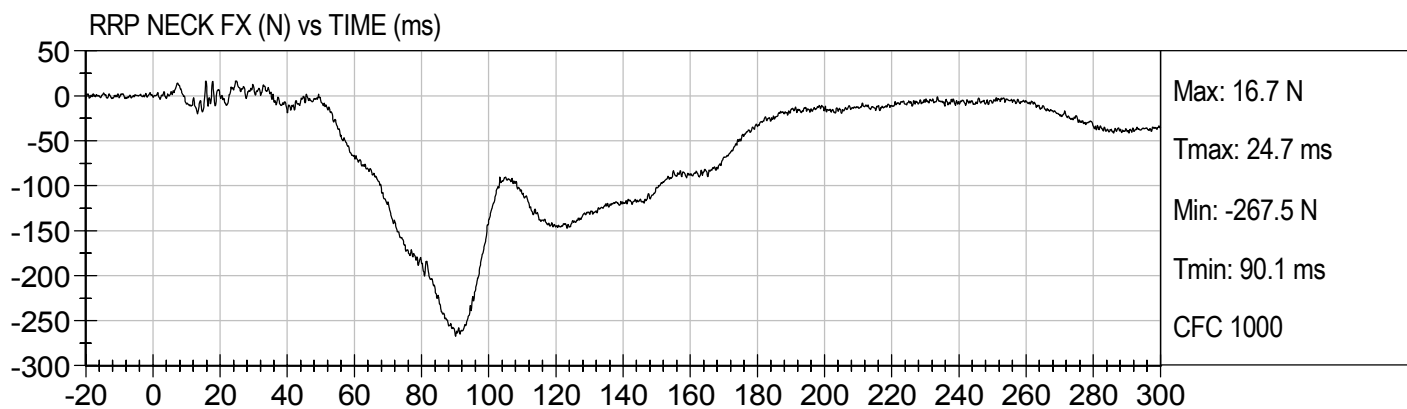


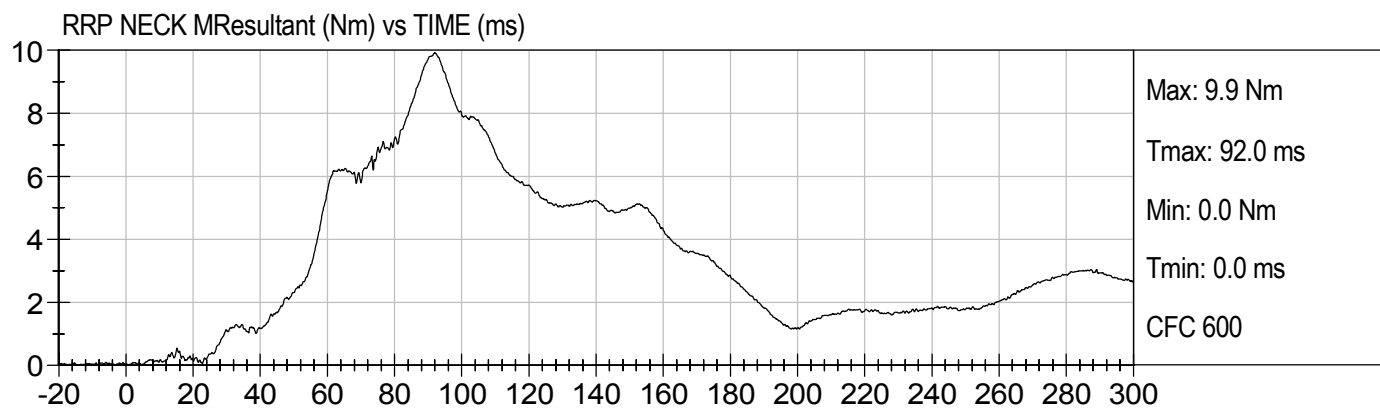
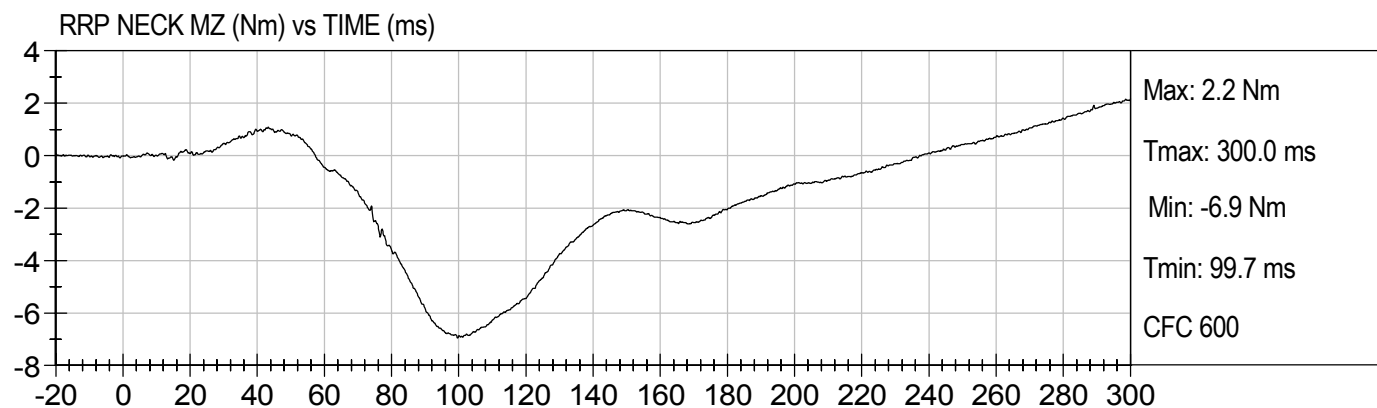
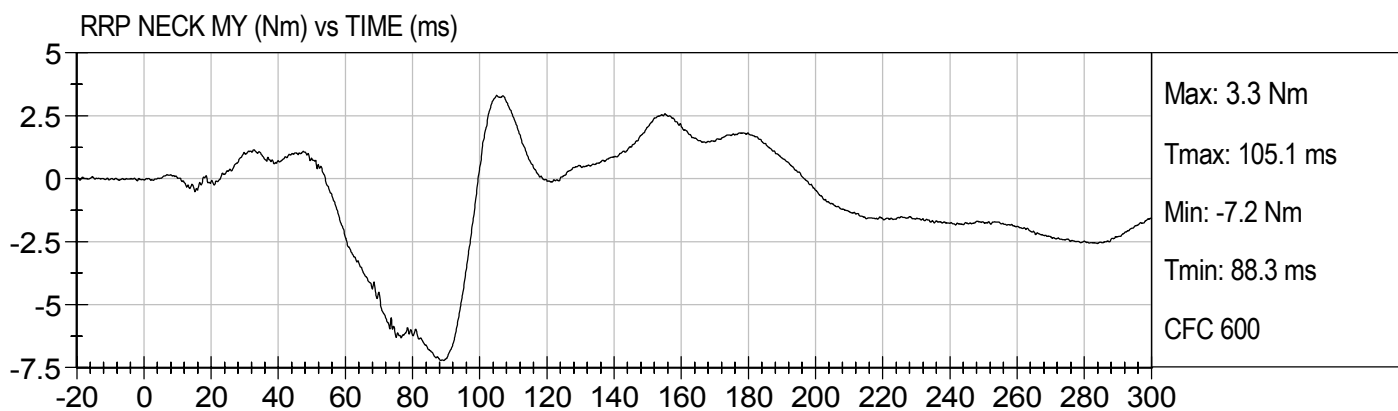
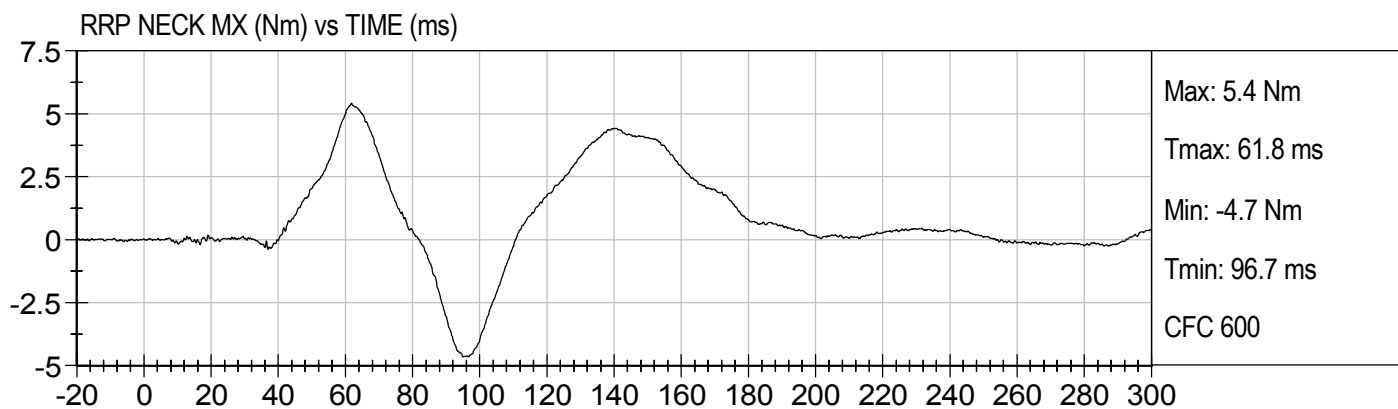


LEFT SIDE NCAP  
2008 TOYOTA 4RUNNER

M85106

Test Date: 09/20/2007  
Speed: 38.8 mph (62.4 km/h)



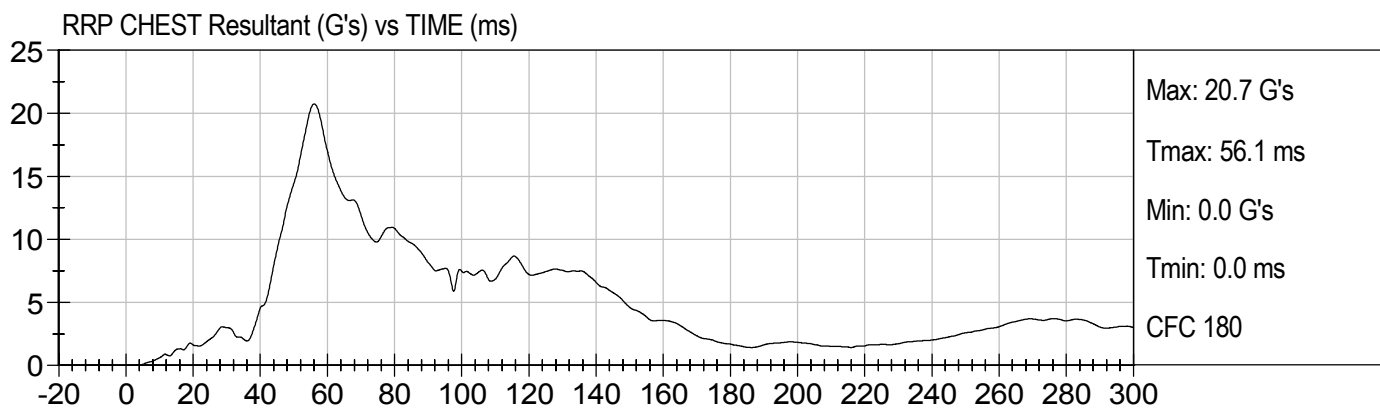
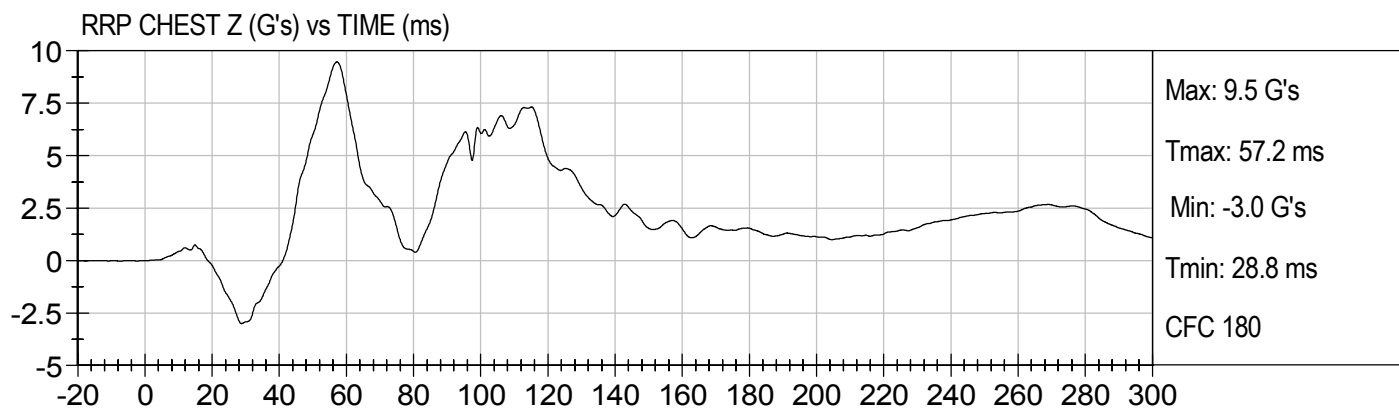
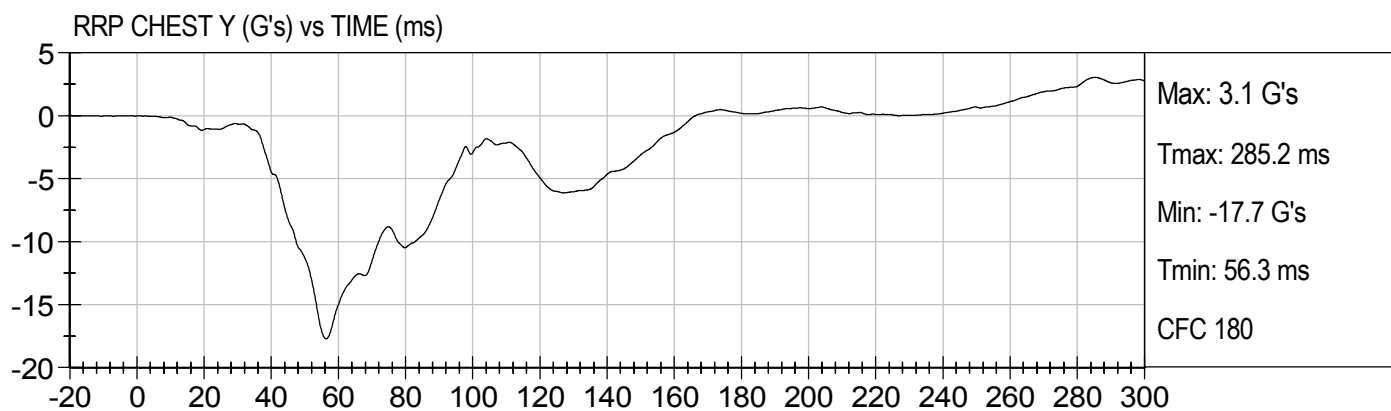
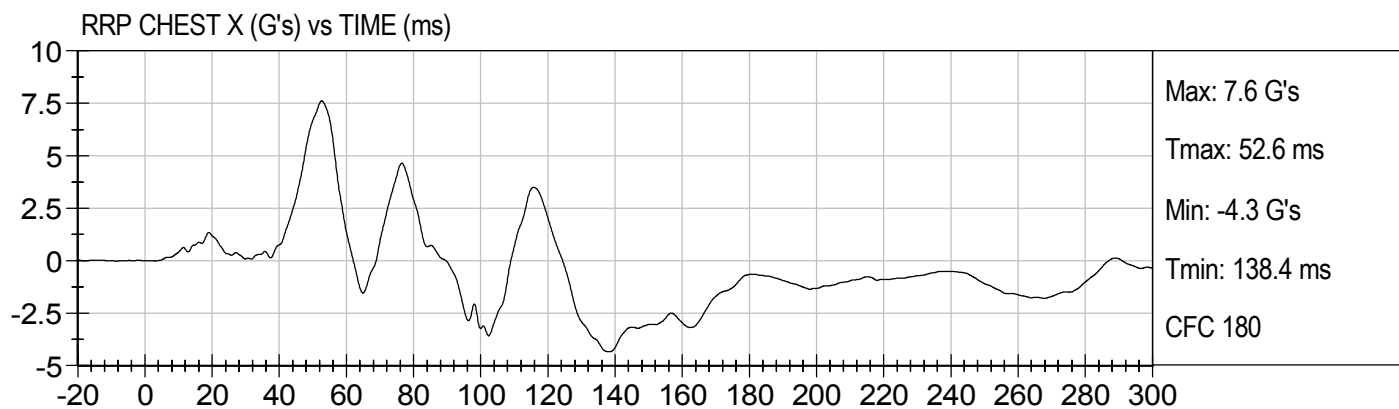




LEFT SIDE NCAP  
2008 TOYOTA 4RUNNER

M85106

Test Date: 09/20/2007  
Speed: 38.8 mph (62.4 km/h)



## CHILD DUMMY CALIBRATION INFORMATION

**MGA RESEARCH CORPORATION**  
**FRONT HEAD DROP TEST**  
**CRABI 12 MONTH**

**ATD Serial No:** 093

**Test ID:** D072541

| Tested Parameter             | Units | Specification      | Result | Pass/Fail |
|------------------------------|-------|--------------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 to 25.6       | 20.8   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70           | 47     | Pass      |
| Peak Resultant Acceleration  | G's   | 100 to 120         | 110    | Pass      |
| Peak Lateral Acceleration    | G's   | +/- 15             | -3     | Pass      |
| Unimodal                     | N/A   | within 17% of peak | Yes    | Pass      |
| Overall Test Results         |       |                    |        | Pass      |

  
Laboratory Technician

8/23/07

Test Date

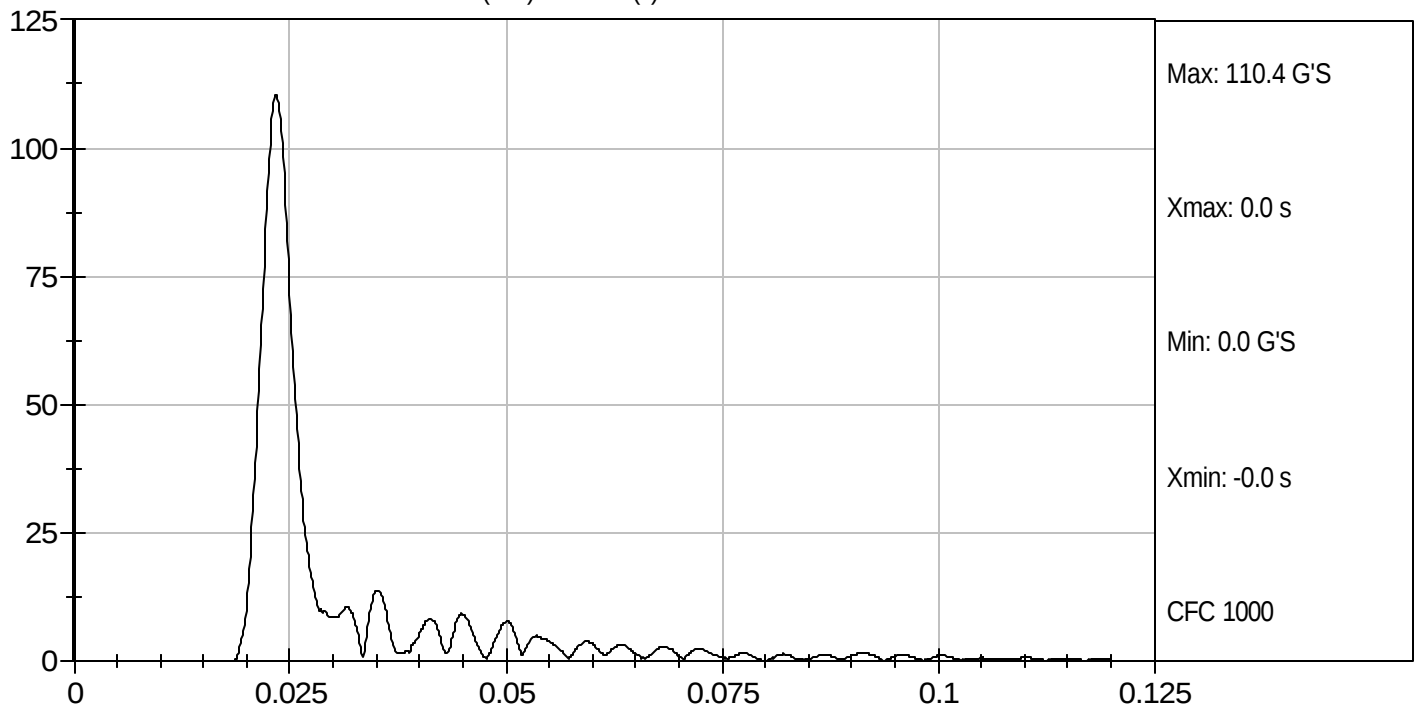
  
Approved By



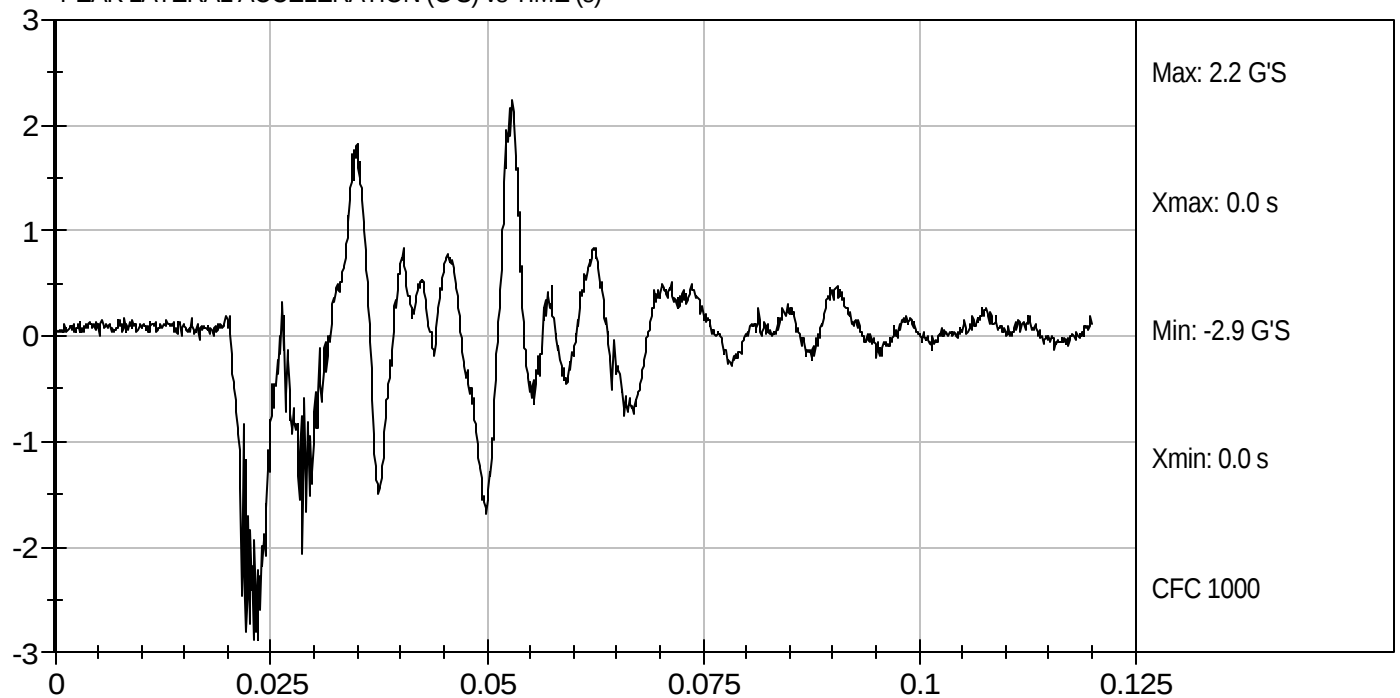
Test Desc: Head Drop  
Component ID: D072541

Test Date: 8/23/07  
Velocity: 0 ft/s, 0 m/s

PEAK RESULTANT ACCELERATION (G'S) vs TIME (s)



PEAK LATERAL ACCELERATION (G'S) vs TIME (s)



**MGA RESEARCH CORPORATION**  
**NECK FLEXION TEST**  
**CRABI 12 MONTH**

**ATD Serial No:** 093

**Test I.D:** D072542

| Tested Parameter                           |         | Units | Specification | Result | Pass/Fail |
|--------------------------------------------|---------|-------|---------------|--------|-----------|
| Temperature                                |         | deg C | 20.6 to 22.2  | 20.8   | Pass      |
| Humidity                                   |         | %     | 10 to 70      | 46     | Pass      |
| Impact Velocity                            |         | m/s   | 5.1 to 5.3    | 5.2    | Pass      |
| Pendulum Deceleration                      | 10 msec | m/s   | 1.6 to 2.3    | 1.9    | Pass      |
|                                            | 20 msec | m/s   | 3.4 to 4.2    | 3.6    | Pass      |
|                                            | 25 msec | m/s   | 4.3 to 5.2    | 4.4    | Pass      |
| D Plane Rotation                           |         | deg   | 75.0 to 86.0  | 83.1   | Pass      |
| Moment About Occipital Condyle             |         | Nm    | 36.0 to 45.0  | 40.2   | Pass      |
| Positive Moment - Time Curve Decay to 5 Nm |         | msec  | 60 to 80      | 74     | Pass      |
| Overall Test Results                       |         |       |               | Pass   |           |



Laboratory Technician

8/23/07

Test Date



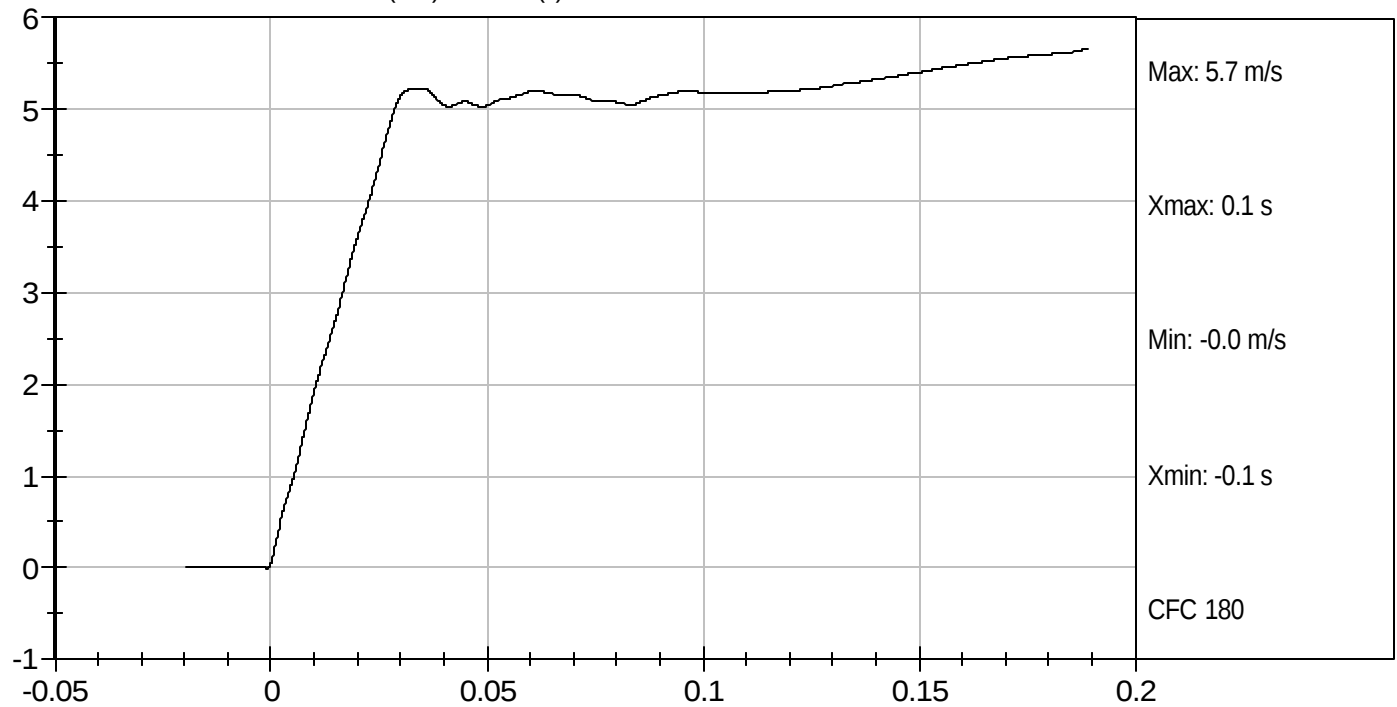
Approved By



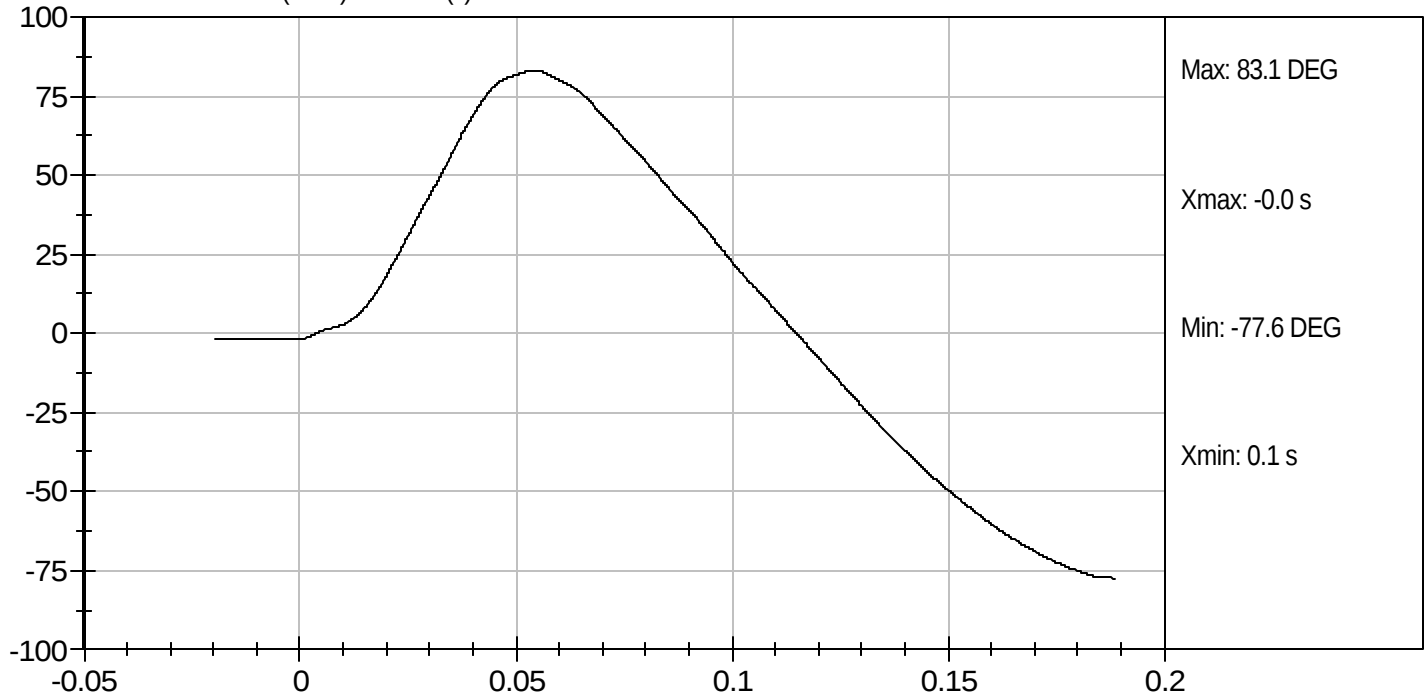
Test Desc: Neck Flexion  
Component ID: D072542

Test Date: 8/23/07  
Velocity: 17.006 ft/s, 5.2 m/s

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



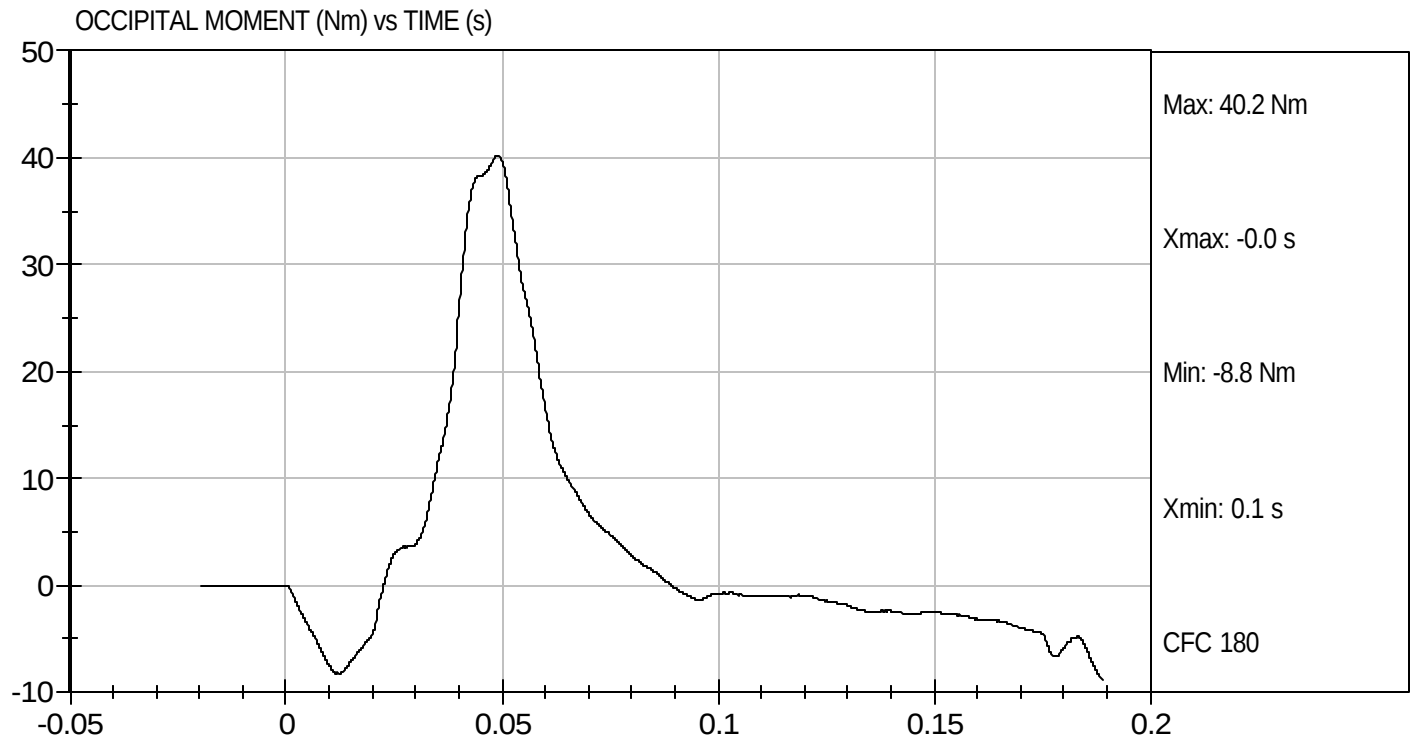
FLEXION ANGLE (DEG) vs TIME (s)





Test Desc: Neck Flexion  
Component ID: D072542

Test Date: 8/23/07  
Velocity: 17.006 ft/s, 5.2 m/s



**MGA RESEARCH CORPORATION**  
**NECK EXTENSION TEST**  
**CRABI 12 MONTH**

**ATD Serial No:** 093

**Test I.D:** D072543

| Tested Parameter                            |         | Units | Specification  | Result | Pass/Fail |
|---------------------------------------------|---------|-------|----------------|--------|-----------|
| Temperature                                 |         | deg C | 20.6 to 22.2   | 20.8   | Pass      |
| Humidity                                    |         | %     | 10 to 70       | 46     | Pass      |
| Pendulum Speed                              |         | m/s   | 2.4 to 2.6     | 2.5    | Pass      |
| Pendulum Deceleration                       | 6 msec  | m/s   | 0.8 to 1.2     | 1.0    | Pass      |
|                                             | 10 msec | m/s   | 1.5 to 2.1     | 2.0    | Pass      |
|                                             | 14 msec | m/s   | 2.2 to 2.9     | 2.3    | Pass      |
| D Plane Rotation                            |         | deg   | 80.0 to 92.0   | 80.3   | Pass      |
| Moment About Occipital Condyle              |         | Nm    | -23.0 to -12.0 | -19.1  | Pass      |
| Negative Moment - Time Curve Decay to -5 Nm |         | msec  | 76 to 90       | 77     | Pass      |
| Overall Test Results                        |         |       |                | Pass   |           |

  
 Laboratory Technician

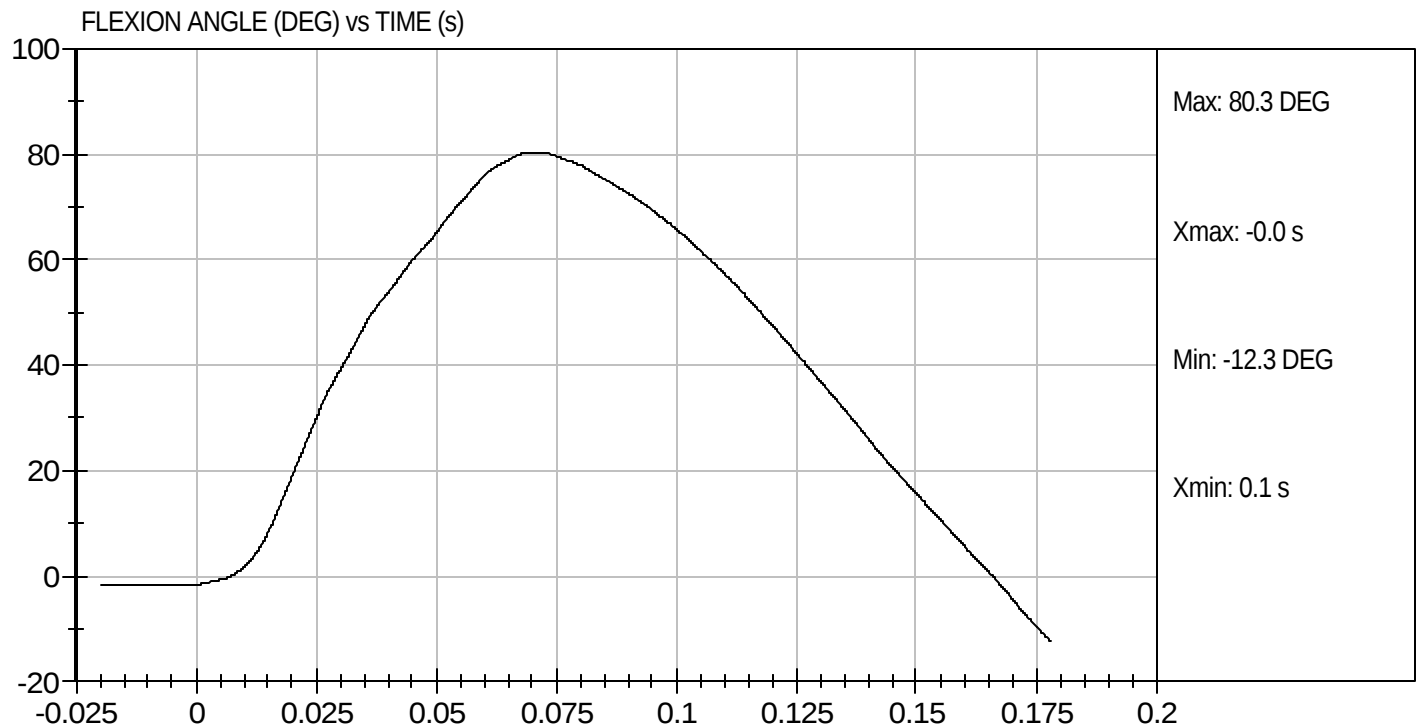
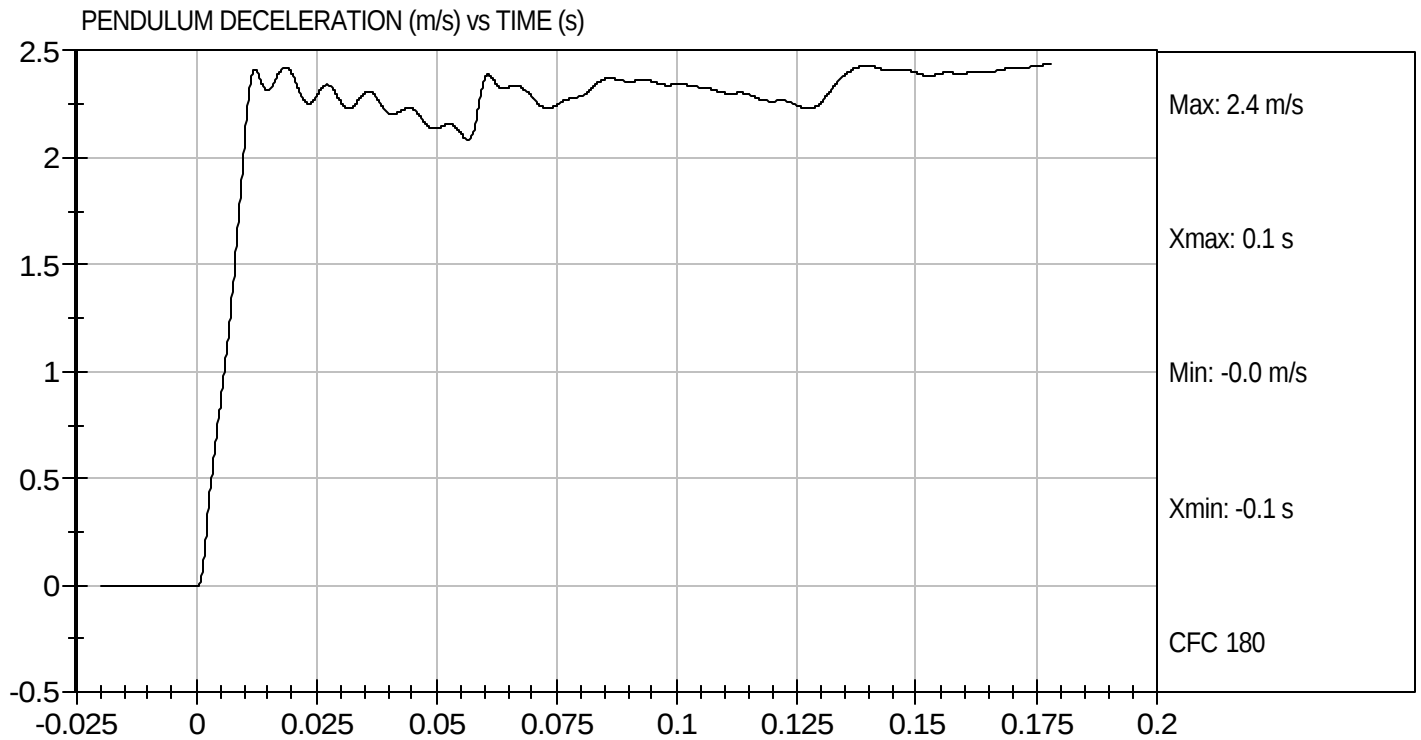
8/23/07  
 Test Date

  
 Approved By



Test Desc: Neck Extension  
Component ID: D072543

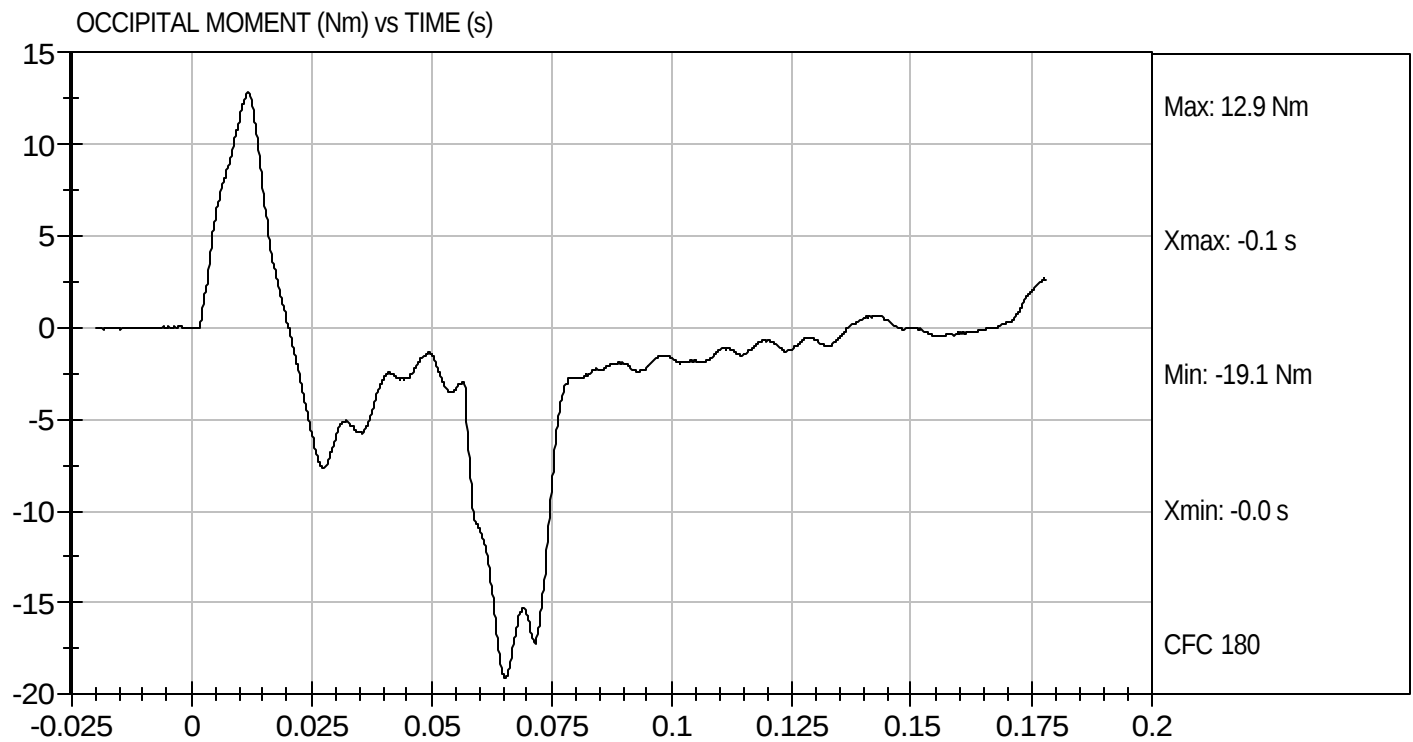
Test Date: 8/23/07  
Velocity: 8.33 ft/s, 2.5 m/s





Test Desc: Neck Extension  
Component ID: D072543

Test Date: 8/23/07  
Velocity: 8.33 ft/s, 2.5 m/s



**MGA RESEARCH CORPORATION**  
**THORAX IMPACT TEST**  
**CRABI 12 MONTH**

**ATD Serial No:** 093

**Test I.D:** D072544

| Tested Parameter             | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature       | deg C | 20.6 to 22.2  | 20.6   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70      | 43     | Pass      |
| Probe Speed                  | m/sec | 4.9 to 5.1    | 5.03   | Pass      |
| Probe Force                  | kN    | 1.51 to 1.80  | 1.55   | Pass      |
| Overall Test Results         |       |               |        | Pass      |

  
Laboratory Technician

8/23/07

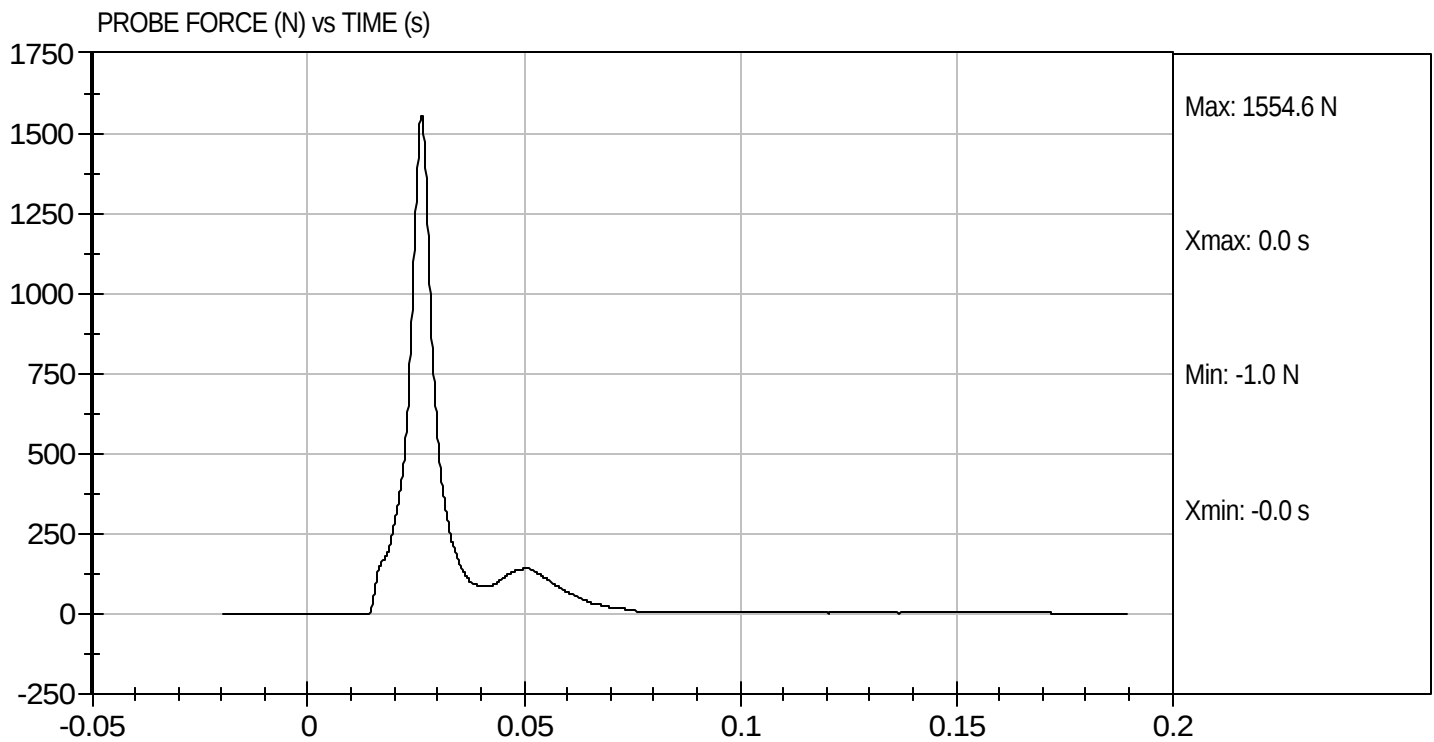
Test Date

  
Approved By



Test Desc: Thorax Impact  
Component ID: D072544

Test Date: 8/23/07  
Velocity: 16.5 ft/s, 5.03 m/s

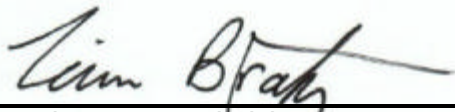


**MGA RESEARCH CORPORATION**  
**REAR HEAD DROP TEST**  
**CRABI 12 MONTH**

**ATD Serial No:** 093

**Test ID:** D072545

| Tested Parameter             | Units | Specification      | Result | Pass/Fail |
|------------------------------|-------|--------------------|--------|-----------|
| Laboratory Temperature       | deg C | 18.9 to 25.6       | 20.8   | Pass      |
| Laboratory Relative Humidity | %     | 10 to 70           | 47     | Pass      |
| Peak Resultant Acceleration  | G's   | 55 to 71           | 69     | Pass      |
| Peak Lateral Acceleration    | G's   | +/- 15             | 3      | Pass      |
| Unimodal                     | N/A   | within 17% of peak | Yes    | Pass      |
| Overall Test Results         |       |                    |        | Pass      |

  
Laboratory Technician

  
Approved By

8/23/07  
Test Date



Test Desc: Head Drop  
Component ID: D072545

Test Date: 8/23/07  
Velocity: 0 ft/s, 0 m/s

