

**REPORT NUMBER: SNCAP-CAL-10-3**

**NEW CAR ASSESSMENT PROGRAM  
SIDE IMPACT TEST**

**FORD MOTOR COMPANY  
2010 FORD RANGER SUPERCAB 4x2  
2-DOOR PICKUP**

**NHTSA NUMBER: MA0214**

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



**Test Date: October 29, 2009**

**FINAL REPORT**

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

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Prepared by:   
Vincent M. Paolini, Project Engineer

Date: November 24, 2009

Reviewed by:   
David Travale, Program Manager  
Transportation Sciences Center

Date: November 24, 2009

### Technical Report Documentation Page

| <b>1. Report No.</b><br>SNCAP-CAL-10-3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <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>2010 Ford Ranger SuperCab 4x2 2-Door Pickup<br>NHTSA No.: MA0214                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                           | <b>5. Report Date</b><br>October 29, 2009                                                                                                                                                               |                  |  |               |                                |      |                                |      |                                          |      |                             |    |                        |    |     |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                           | <b>6. Performing Organization Code</b><br>CAL                                                                                                                                                           |                  |  |               |                                |      |                                |      |                                          |      |                             |    |                        |    |     |      |
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| <b>9. Performing Organization Name and Address</b><br>Calspan Corporation Transportation Sciences Center<br>P.O. Box 400<br>Buffalo, New York 14225                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                           | <b>10. Work Unit No.</b>                                                                                                                                                                                |                  |  |               |                                |      |                                |      |                                          |      |                             |    |                        |    |     |      |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                           | <b>14. Sponsoring Agency Code</b><br>NVS-111                                                                                                                                                            |                  |  |               |                                |      |                                |      |                                          |      |                             |    |                        |    |     |      |
| <b>15. Supplementary Notes</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                           |                                                                                                                                                                                                         |                  |  |               |                                |      |                                |      |                                          |      |                             |    |                        |    |     |      |
| <b>16. Abstract</b><br>A 55/28 kph 90° Impact Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2010 Ford Ranger SuperCab 4x2 2-Door Pickup in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted at the Calspan Corporation Crash Test Facility in Buffalo, New York, on October 29, 2009. The impact velocity of the Moving Deformable Barrier (MDB) was 62.1 km/h, and the ambient temperature at the struck side (driver side) of the vehicle was 21.7°C. The target vehicle's maximum post test static crush was 246 mm at level 1. The test vehicle's occupant performance is as follows: <table style="margin-left: auto; margin-right: auto; border: none;"> <thead> <tr> <th></th> <th style="text-align: center;"><u>DRIVER</u></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib (LUR) Accel., g</td> <td style="text-align: center;">32.8</td> </tr> <tr> <td>Left Lower Rib (LLR) Accel., g</td> <td style="text-align: center;">48.1</td> </tr> <tr> <td>Lower Spine (T<sub>12</sub>) Accel., g</td> <td style="text-align: center;">50.0</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td style="text-align: center;">49</td> </tr> <tr> <td>Pelvis (PEV) Accel., g</td> <td style="text-align: center;">92</td> </tr> <tr> <td>HIC</td> <td style="text-align: center;">60.7</td> </tr> </tbody> </table> A non-instrumented 50 <sup>th</sup> percentile adult male SID/HIII was placed in the left rear designated seating position for ballast purposes only. The subject vehicle landed on its right side after the impact with the Moving Deformable Barrier. The end position was 90 degrees relative to the initial position. |                                                           |                                                                                                                                                                                                         |                  |  | <u>DRIVER</u> | Left Upper Rib (LUR) Accel., g | 32.8 | Left Lower Rib (LLR) Accel., g | 48.1 | Lower Spine (T <sub>12</sub> ) Accel., g | 50.0 | Thoracic Trauma Index (TTI) | 49 | Pelvis (PEV) Accel., g | 92 | HIC | 60.7 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <u>DRIVER</u>                                             |                                                                                                                                                                                                         |                  |  |               |                                |      |                                |      |                                          |      |                             |    |                        |    |     |      |
| Left Upper Rib (LUR) Accel., g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 32.8                                                      |                                                                                                                                                                                                         |                  |  |               |                                |      |                                |      |                                          |      |                             |    |                        |    |     |      |
| Left Lower Rib (LLR) Accel., g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 48.1                                                      |                                                                                                                                                                                                         |                  |  |               |                                |      |                                |      |                                          |      |                             |    |                        |    |     |      |
| Lower Spine (T <sub>12</sub> ) Accel., g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 50.0                                                      |                                                                                                                                                                                                         |                  |  |               |                                |      |                                |      |                                          |      |                             |    |                        |    |     |      |
| Thoracic Trauma Index (TTI)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 49                                                        |                                                                                                                                                                                                         |                  |  |               |                                |      |                                |      |                                          |      |                             |    |                        |    |     |      |
| Pelvis (PEV) Accel., g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 92                                                        |                                                                                                                                                                                                         |                  |  |               |                                |      |                                |      |                                          |      |                             |    |                        |    |     |      |
| HIC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 60.7                                                      |                                                                                                                                                                                                         |                  |  |               |                                |      |                                |      |                                          |      |                             |    |                        |    |     |      |
| <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 |                  |  |               |                                |      |                                |      |                                          |      |                             |    |                        |    |     |      |
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## **SECTION 1**

### **PURPOSE AND TEST PROCEDURE**

#### **PURPOSE**

This side impact test was conducted as part of the FY' 2010 test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-09-D-00126. The purpose of this test was to evaluate side impact protection in a 2010 Ford Ranger SuperCab 4x2 2-Door Pickup manufactured by Ford Motor Company. The side impact test was conducted in accordance with the Laboratory Test Procedure for New Car Assessment Program Side Impact Testing dated November 2002.

## SECTION 2

### SUMMARY OF NCAP SIDE IMPACT TEST

A model year 2010 Ford Ranger SuperCab 4x2 2-Door Pickup 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 62.1 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 1823.0 kg and the test weight of the MDB was 1362.5 kg. The test was conducted at the Calspan Corporation Transportation Sciences Center on October 29, 2009.

One (1) real-time motion picture camera and nine (9) high-speed motion picture video 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.

One 50th percentile adult male SID/HII was placed in the driver (P1) designated seating position according to instructions specified in the Laboratory Test Procedure for New Car Assessment Program Side Impact Testing dated November 2002. The 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)

A non-instrumented 50<sup>th</sup> percentile adult male SID/HII was placed in the left rear designated seating position for ballast purposes only. The ballast SID was belted using the vehicle's rear seating position lap belt. In addition, a secondary tether belt was placed around the SID and seat back.

The test vehicle was instrumented with twenty-one (21) structural accelerometers and the MDB was instrumented with five (5) accelerometers.

## 2.2 GENERAL COMMENTS

The test vehicle sustained a maximum static crush of 246 mm at level 1, 450 mm rearward of the left vertical impact point. The driver SID/HII, Serial No. 270 was calibrated just prior to this test. The vehicle flipped onto its right side after impact.

Test data and observations are presented in this section of the report. Appendix A contains the still photograph prints. Appendix B contains the driver SID/HII, vehicle, and MDB response data traces. Appendix C contains the SID/HII configuration and performance verification data. Appendix D contains the test equipment information.

The occupant data is summarized below:

| ATD position | HIC(36) | T <sub>1</sub> | T <sub>2</sub> | TTI (G's) | Peak Pelvis (G's) |
|--------------|---------|----------------|----------------|-----------|-------------------|
| Driver       | 60.7    | 49.5           | 85.5           | 49        | 92                |

#### SUPPLEMENTAL RESTRAINT INFORMATION

| Restraint Type                     | Left Front (Driver) |          | Left Rear (Passenger) |          |
|------------------------------------|---------------------|----------|-----------------------|----------|
|                                    | Installed           | Deployed | Installed             | Deployed |
| Front Airbag                       | Yes                 | No       | NA                    | NA       |
| Side Torso Airbag                  | No                  | NA       | No                    | NA       |
| Side Head/Torso Combination Airbag | Yes                 | Yes      | No                    | NA       |
| Curtain Airbag                     | No                  | NA       | No                    | NA       |

A non-instrumented 50<sup>th</sup> percentile adult male SID/HIII was placed in the left rear designated seating position for ballast purposes only.

The test instrumentation data listed in Appendix B can be found on the NHTSA website:  
[www.nhtsa.dot.gov](http://www.nhtsa.dot.gov).

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

|               |                               |            |                  |
|---------------|-------------------------------|------------|------------------|
| Test Vehicle: | 2010 Ford Ranger SuperCab 4x2 | NHTSA No.  | MA0214           |
| Test Program: | NCAP Side Impact              | Test Date: | October 29, 2009 |

**TEST VEHICLE INFORMATION AND VEHICLE OPTIONS**

|                       |                     |                                                          |     |
|-----------------------|---------------------|----------------------------------------------------------|-----|
| Make                  | Ford Motor Company  | Driver Front Airbag                                      | Yes |
| Model                 | Ranger SuperCab 4x2 | Driver Side Curtain Airbag                               | No  |
| Body Style            | 2-Door Pickup       | Driver Side Head/Torso Airbag                            | Yes |
| NHTSA No.             | MA0214              | Driver Pretensioners                                     | Yes |
| VIN                   | 1FTKR1ED9APA01558   | Driver Load Limiters                                     | Yes |
| Color                 | Grey                | Driver Power Seats                                       | No  |
| Engine Disp.(L)       | 2.3                 | Rear Pass. Side Curtain Airbag                           | No  |
| Engine Cylinders      | 4                   | Rear Pass. Side Torso Airbag                             | No  |
| Engine Placement      | Longitudinal        | Rear Pass. Pretensioners                                 | No  |
| Transmission Type     | Manual              | Rear Pass. Load Limiters                                 | No  |
| Transmission Speeds   | 5                   | Rear Pass. Power Seats                                   | No  |
| Final Drive           | Front               | Tilt Wheel                                               | Yes |
| Air Conditioning      | Yes                 | Anti-lock Brakes                                         | Yes |
| Power Steering        | Yes                 | Traction Control                                         | No  |
| Power Brakes          | Yes                 | Power Windows                                            | Yes |
| Delivery Date         | 10/14/09            | Power Door Locks                                         | No  |
| Odometer Reading (km) | 6                   | Automatic Door Locks (ADL)                               | No  |
| Dealer                | Ricart Ford         | Owner's Manual Details<br>Instructions on Disabling ADLs | NA  |

**DATA FROM CERTIFICATION LABEL**

|                     |                    |                 |      |
|---------------------|--------------------|-----------------|------|
| Manufactured By     | Ford Motor Company | GVWR (kg)       | 2159 |
| Date of Manufacture | 09/09              | GAWR Front (kg) | 1089 |
|                     |                    | GAWR Rear (kg)  | 1179 |

**VEHICLE CAPACITY DATA**

| Measured Parameter      | Front  | Rear      | Third | Total   |
|-------------------------|--------|-----------|-------|---------|
| Type of Seats           | Bucket | Jump Seat |       |         |
| Number Of Occupants     | 3      | 2         |       | 5       |
| Capacity Wt. (VCW) (kg) |        |           |       | 596     |
| Cargo Wt. (RCLW) (kg)   |        |           |       | 136 MAX |



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

|               |                               |            |                  |
|---------------|-------------------------------|------------|------------------|
| Test Vehicle: | 2010 Ford Ranger SuperCab 4x2 | NHTSA No.  | MA0214           |
| Test Program: | NCAP Side Impact              | Test Date: | October 29, 2009 |

**TEST VEHICLE WEIGHTS**

|        | Units | As Delivered (UVW) (Axle) |       |        | Fully Loaded (Axle) |       |        | As Tested (ATW) (Axle) |       |        |
|--------|-------|---------------------------|-------|--------|---------------------|-------|--------|------------------------|-------|--------|
|        |       | Front                     | Rear  | Total  | Front               | Rear  | Total  | Front                  | Rear  | Total  |
| Left   | kg    | 448.5                     | 332.5 |        | 524.0               | 454.0 |        | 504.5                  | 456.0 |        |
| Right  | kg    | 424.5                     | 326.5 |        | 426.0               | 426.0 |        | 423.0                  | 439.5 |        |
| Ratio  | %     | 57.0                      | 43.0  |        | 51.9                | 48.1  |        | 50.9                   | 49.1  |        |
| Totals | kg    | 873.0                     | 659.0 | 1532.0 | 950.0               | 880.0 | 1830.0 | 927.5                  | 895.5 | 1823.0 |

**TARGET TEST WEIGHT CALCULATION**

| Measured Parameter                      | Units | Value  |
|-----------------------------------------|-------|--------|
| Total Delivered Weight (UVW)            | kg    | 1532.0 |
| Weight of 2 P572E ATDs (81.2 kg each)   | kg    | 162.4  |
| Rated Cargo/Luggage Weight (RCLW)       | kg    | 136    |
| Calculated Vehicle Target Weight (TVTW) | kg    | 1830.4 |

\* Actual As Tested Weight (ATW) will be TVTW -4.5/-9.1 kg

Weight of Ballast (including instrumentation package and cameras): 128.6 kg

**TEST VEHICLE ATTITUDES**

|              | Units | LF  | RF  | LR  | RR  |
|--------------|-------|-----|-----|-----|-----|
| As Delivered | mm    | 813 | 826 | 858 | 862 |
| Fully Loaded | mm    | 797 | 822 | 806 | 824 |
| As Tested    | mm    | 800 | 825 | 806 | 824 |

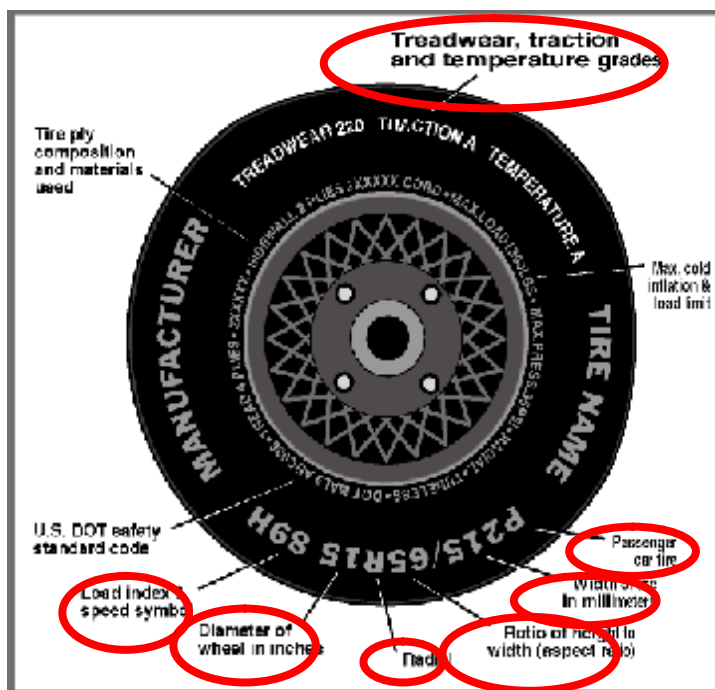
**TEST VEHICLE VERTICAL IMPACT LINE AND CG**

| Measurement Description               | Units | Value |
|---------------------------------------|-------|-------|
| Test Vehicle Wheel Base               | mm    | 3196  |
| Target Impact Point Aft of Front Axle | mm    | 508   |
| Actual Impact Point Aft of Front Axle | mm    | 514   |
| As Tested CG (aft of front axle)      | mm    | 1570  |

## DATA SHEET NO. 2

### TEST VEHICLE TIRE INFORMATION

|               |                               |            |                  |
|---------------|-------------------------------|------------|------------------|
| Test Vehicle: | 2010 Ford Ranger SuperCab 4x2 | NHTSA No.  | MA0214           |
| Test Program: | NCAP Side Impact              | Test Date: | October 29, 2009 |



### DATA FROM TIRE PLACARD

| Measured Parameter                      | Front           | Rear            |
|-----------------------------------------|-----------------|-----------------|
| Maximum Tire Pressure (kPa)             | 300             | 300             |
| Cold / Test Pressure (kPa)              | 205             | 205             |
| Recommended Tire Size                   | P225/70R15      | P225/70R15      |
| Tire Size on Vehicle                    | P225/70R15 100S | P225/70R15 100S |
| Tire Manufacturer                       | Continental     | Continental     |
| Tire Name                               | Contitac        | Contitac        |
| Tire Type                               | Passenger       | Passenger       |
| Tire Width (mm)                         | 225             | 225             |
| Ratio of Height to Width (aspect ratio) | 70              | 70              |
| Radial                                  | Yes             | Yes             |
| Wheel Diameter                          | 15              | 15              |
| Load Index & Speed Symbol               | 100 S           | 100 S           |
| Treadwear                               | 420             | 420             |
| Traction Grade                          | A               | A               |
| Temperature Grade                       | B               | B               |

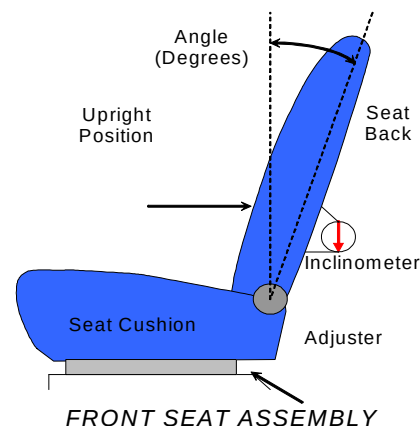
## DATA SHEET NO. 3

### TEST VEHICLE INFORMATION

|               |                               |            |                  |
|---------------|-------------------------------|------------|------------------|
| Test Vehicle: | 2010 Ford Ranger SuperCab 4x2 | NHTSA No.  | MA0214           |
| Test Program: | NCAP Side Impact              | Test Date: | October 29, 2009 |

#### NORMAL DESIGN RIDING POSITION

The driver and passenger seat back is positioned to the manufacturer's designated angle.

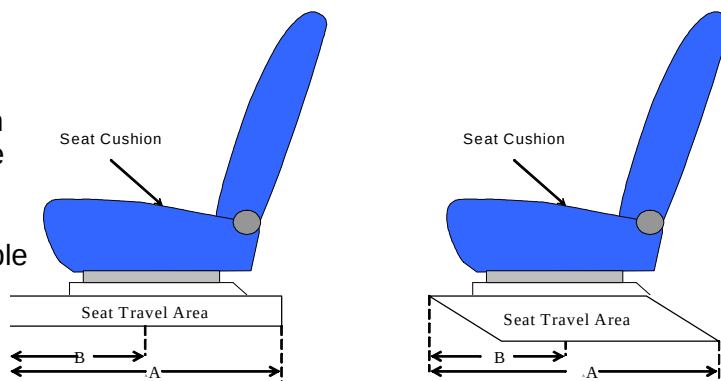


#### SEAT BACK POSITION

|                                                  | Driver Seat                                                                | Rear Seat |
|--------------------------------------------------|----------------------------------------------------------------------------|-----------|
| Test Detent (forward-most detent defined as 0)   | Not measured                                                               | N/A       |
| Angle (deg. from forward-most locking position)  | 11.0                                                                       | N/A       |
| Alternative Measurements to Verify Test Position | 10.6 degrees measured 2" above seat back pivot. Sill angle was 0.4 degrees | N/A       |

#### SEAT FORE/AFT POSITIONS

The total seat travel was measured from forward most position to rearmost position irrespective of vertical seat height in those positions. The seat was set at the longitudinal mid position with vertical adjustment at the lowest position obtainable for both the driver and passenger.



#### SEAT FORE/AFT POSITION

|                                                | Driver Seat | Rear Seat |
|------------------------------------------------|-------------|-----------|
| Total Fore/Aft Travel (A) (mm)                 | 246         | N/A       |
| Test Position (B) (mm)                         | 128         | N/A       |
| Test Detent (forward-most detent defined as 0) | 13          | N/A       |
| Total Number of Detents (including 0)          | 25          | N/A       |

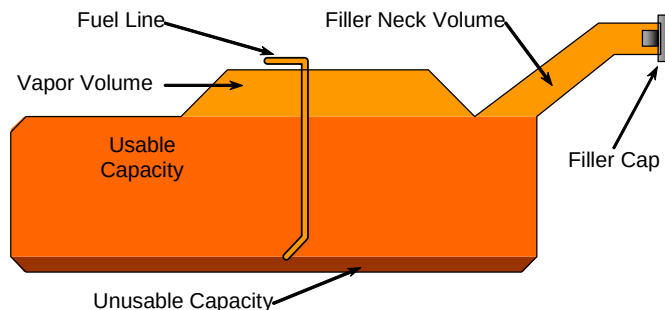
### DATA SHEET NO. 3 (CONTINUED)

#### TEST VEHICLE INFORMATION

|               |                               |            |                  |
|---------------|-------------------------------|------------|------------------|
| Test Vehicle: | 2010 Ford Ranger SuperCab 4x2 | NHTSA No.  | MA0214           |
| Test Program: | NCAP Side Impact              | Test Date: | October 29, 2009 |

#### FUEL SYSTEM INFORMATION

The test vehicle is equipped with an electric fuel pump. The fuel pump operates for approximately two seconds after the ignition is placed in the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the left rear fender. The standard fuel tank occupies the area under the rear seat.



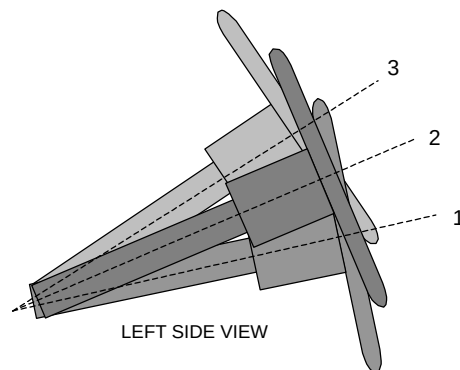
VEHICLE FUEL TANK ASSEMBLY

#### FUEL TANK CAPACITY

|                                                               | Liters |
|---------------------------------------------------------------|--------|
| Usable Capacity of "Standard" Fuel Tank                       | 73.8   |
| Usable Capacity of "Optional" Fuel Tank                       | NA     |
| Stoddard Used For Test (92%-94% of Fuel Tank Usable Capacity) | 68.6   |

#### 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

|                                   | Fore/Aft Position (mm) | Tilt (degrees) | Tilt (detent) |
|-----------------------------------|------------------------|----------------|---------------|
| Lowermost Position No. 1          | N/A                    | Not Measured   | 1             |
| Geometric Center Position No. 2 * | N/A                    | Not Measured   | 3             |
| Uppermost Position No. 3          | N/A                    | Not Measured   | 5             |

\* Test position

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

|               |                               |            |                  |
|---------------|-------------------------------|------------|------------------|
| Test Vehicle: | 2010 Ford Ranger SuperCab 4x2 | NHTSA No.  | MA0214           |
| Test Program: | NCAP Side Impact              | Test Date: | October 29, 2009 |

**MDB SPECIFICATIONS**

| Measurement Description                    | Length (mm) |
|--------------------------------------------|-------------|
| Overall Width of Framework Carriage        | 1250        |
| Overall Length Including Honeycomb Face    | 4120        |
| Wheel base of Framework Carriage           | 2590        |
| Tread of Framework Carriage (front & rear) | 1875        |
| C.G. Location aft of Front Axle            | 1104        |

**MDB WEIGHTS**

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

**MDB SPEED AND IMPACT ANGLE DATA**

| Measured Parameter                    | Units | Requirement    | Value |
|---------------------------------------|-------|----------------|-------|
| Trap No. 1 Velocity (Primary)         | km/h  | 61.1 to 62.7   | 62.1  |
| Trap No. 2 Velocity (Redundant)       | km/h  | 61.1 to 62.7   | 62.1  |
| Impact angle with respect to impactor | °     | 88.5° to 91.5° | 90.8  |

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

| Measured Parameter | Units | Requirement | Value         |
|--------------------|-------|-------------|---------------|
| Horizontal Offset  | mm    | +/- 50      | 6 mm rearward |
| Vertical Offset    | mm    | +/-20       | 6 mm above    |

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

|               |                               |            |                  |
|---------------|-------------------------------|------------|------------------|
| Test Vehicle: | 2010 Ford Ranger SuperCab 4x2 | NHTSA No.  | MA0214           |
| Test Program: | NCAP Side Impact              | Test Date: | October 29, 2009 |

**TEST DUMMY INFORMATION AND CONTACT POINTS**

| Description             | Front Seat SID/HIII               | Rear Seat SID/HIII |
|-------------------------|-----------------------------------|--------------------|
| Dummy Type / Serial No. | SID/HIII / 270                    | Ballast SID/HIII   |
| Head Contact            | Side of Head – Combination Airbag | N/A                |
| Upper Torso Contact     | Airbag; Door Trim                 | N/A                |
| Lower Torso Contact     | Airbag; Door Trim                 | N/A                |
| Left Knee Contact       | No Contact                        | N/A                |
| Right Knee Contact      | No Contact                        | N/A                |

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

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

**POST TEST STRUCTURAL OBSERVATIONS**

| Critical Areas of Performance | Observations and Conclusions                        |
|-------------------------------|-----------------------------------------------------|
| Pillar Performance            | No Separation                                       |
| Sill Separation               | None                                                |
| Windshield Damage             | Minor crack on left side                            |
| Window Damage                 | Left Front window intact                            |
| Other Notable Effects         | The vehicle flipped on its right side after impact. |

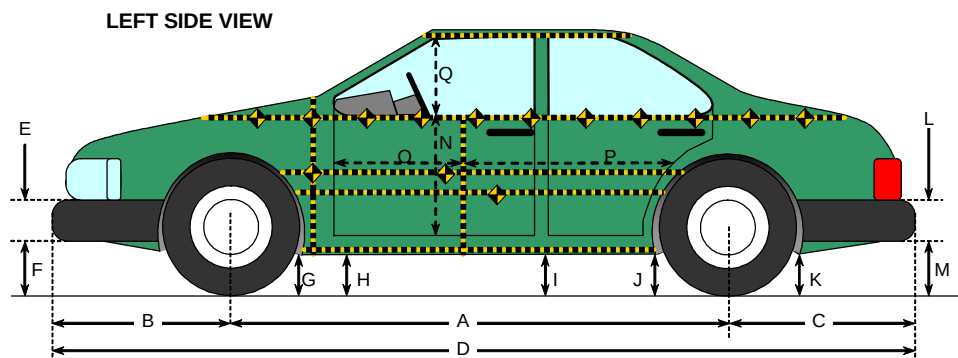
**SUPPLEMENTAL RESTRAINT INFORMATION**

| Restraint Type                     | Left Front (Driver) |          | Left Rear (Passenger) |          |
|------------------------------------|---------------------|----------|-----------------------|----------|
|                                    | Installed           | Deployed | Installed             | Deployed |
| Front Airbag                       | Yes                 | No       | N/A                   | N/A      |
| Side Torso Airbag                  | No                  | N/A      | No                    | N/A      |
| Side Head/Torso Combination Airbag | Yes                 | Yes      | No                    | NA       |
| Curtain Airbag                     | No                  | N/A      | No                    | N/A      |

## DATA SHEET NO. 6

### VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

|               |                               |            |                  |
|---------------|-------------------------------|------------|------------------|
| Test Vehicle: | 2010 Ford Ranger SuperCab 4x2 | NHTSA No.  | MA0214           |
| Test Program: | NCAP Side Impact              | Test Date: | October 29, 2009 |



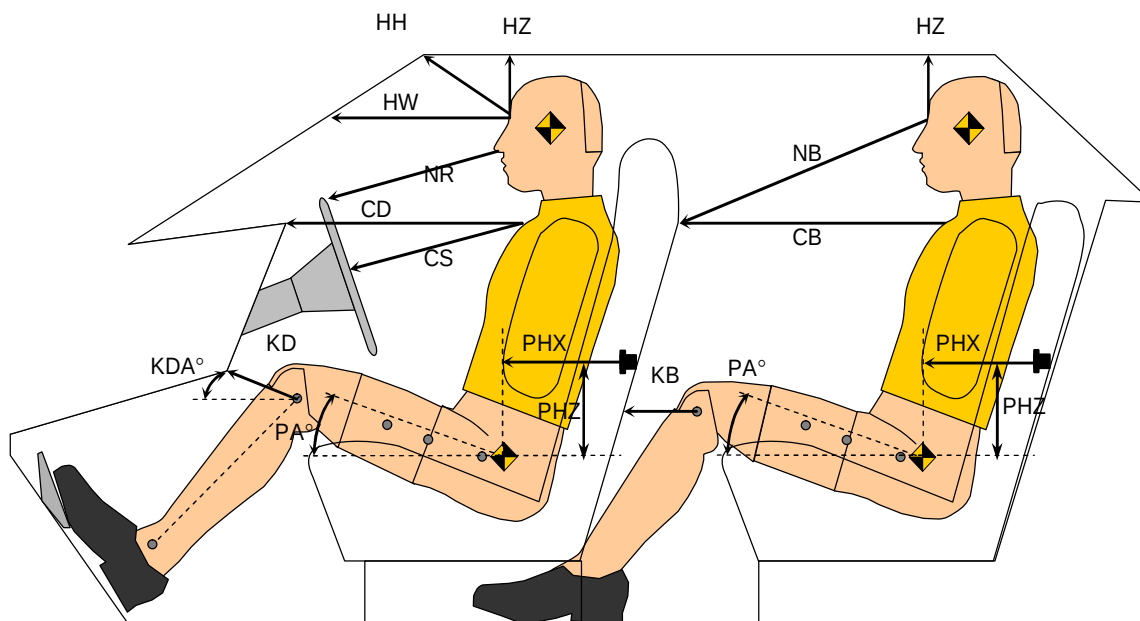
All Measurements in mm

| Code | Measurement Description                | Pre-Test<br>(delivered) | Pre-Test<br>(as tested) | Post-Test<br>(as tested) | Difference |
|------|----------------------------------------|-------------------------|-------------------------|--------------------------|------------|
| A    | Wheelbase                              | 3196                    | 3196                    | 3146                     | 50         |
| B    | Front Axle to FSOV                     | 849                     | 849                     | 833                      | 16         |
| C    | Rear Axle to RSOV                      | 1128                    | 1128                    | 1197                     | -69        |
| D    | Total Length at Centerline             | 5173                    | 5173                    | 5170                     | 3          |
| E    | Front Bumper Thickness                 | 75                      | 75                      | 75                       | 0          |
| F    | Front Bumper Bottom to Ground          | 537                     | 536                     | 553                      | -17        |
| G    | Sill Height at Front Wheel Well        | 368                     | 347                     | 382                      | -35        |
| H    | Sill Height at Front Door Leading Edge | 376                     | 353                     | 397                      | -44        |
| I    | Sill Height at "B" Pillar              | 390                     | 359                     | 346                      | 13         |
| J1   | Sill Height at Rear Wheel Well         | 443                     | 408                     | 412                      | -4         |
| J2   | Pinch Weld Height at Rear Wheel Well   | 395                     | 353                     | 413                      | -60        |
| K    | Sill Height Aft of Rear Wheel Well     | 451                     | 397                     | 459                      | -62        |
| L    | Rear Bumper Thickness                  | 165                     | 165                     | 165                      | 0          |
| M    | Rear Bumper Bottom to Ground           | 457                     | 405                     | 370                      | 35         |
| N    | Sill Height to Window Bottom Sill      | 676                     | 676                     | 656                      | 20         |
| O    | Front Door Leading Edge to Impact CL   | 751                     | 751                     | 727                      | 24         |
| P    | Rear Door Trailing Edge to Impact CL   | 386                     | 386                     | 381                      | 5          |
| Q    | Front Window Opening                   | 492                     | 492                     | 491                      | 1          |
| R    | Right Side Length                      | 5068                    | 5068                    | 5055                     | 13         |
| S    | Left Side Length                       | 5073                    | 5073                    | 4991                     | 82         |
| T    | Vehicle Width at "B" Post              | 1724                    | 1724                    | 1526                     | 198        |

## DATA SHEET NO. 7

### SID/HIII LONGITUDINAL CLEARANCE DIMENSIONS

|               |                               |            |                  |
|---------------|-------------------------------|------------|------------------|
| Test Vehicle: | 2010 Ford Ranger SuperCab 4x2 | NHTSA No.  | MA0214           |
| Test Program: | NCAP Side Impact              | Test Date: | October 29, 2009 |



| Driver Code | Pass. Code | Measurement Description        | Driver S/N 270 |          | Passenger S/N |          |
|-------------|------------|--------------------------------|----------------|----------|---------------|----------|
|             |            |                                | Length(mm)     | Angle(°) | Length(mm)    | Angle(°) |
| HH          |            | Head to Header                 | 481            |          |               |          |
| HW          |            | Head to Windshield             | 618            |          |               |          |
| HZ          | HZ         | Head to Roof                   | 175            |          | N/A           |          |
| NR          | NB         | Nose to Rim/Nose to Seatback   | 402            |          | N/A           |          |
| CD          | CB         | Chest to Dash or Seatback      | 518            |          | N/A           |          |
| CS          |            | Chest to Steering Wheel        | 248            |          |               |          |
| KDL         | KBL        | Left Knee to Dash or Seatback  | 151            | 30       | N/A           | N/A      |
| KDR         | KBR        | Right Knee to Dash or Seatback | 152            | 25       | N/A           | N/A      |
| PA          | PA         | Pelvic Angle                   |                | 24.5     |               | N/A      |
| PHX         | PHX        | H-Point to Striker (X-Axis)    | 315            |          | N/A           |          |
| PHZ         | PHZ        | H-Point to Striker (Z-Axis)    | 112            |          | N/A           |          |

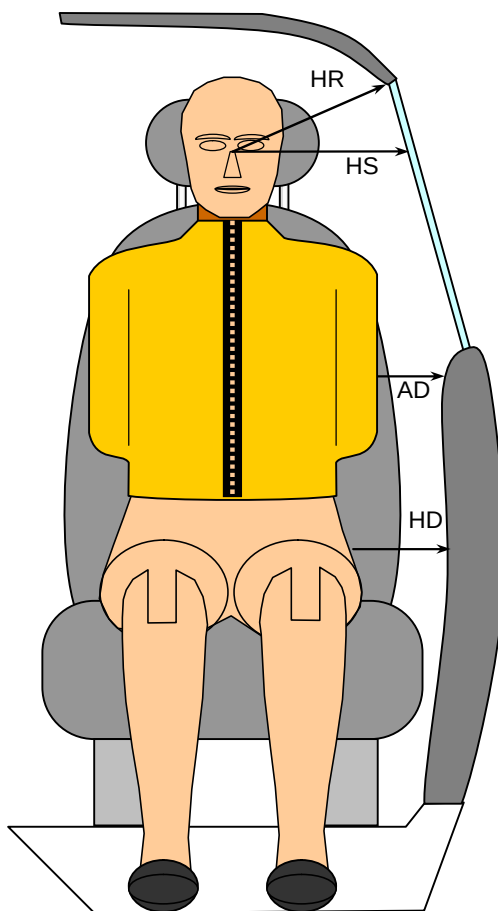
A non-instrumented 50<sup>th</sup> percentile adult male SID/HIII was placed in the left rear designated seating position for ballast purposes only.



## DATA SHEET NO. 8

### SID/HIII LATERAL CLEARANCE DIMENSIONS

|               |                               |            |                  |
|---------------|-------------------------------|------------|------------------|
| Test Vehicle: | 2010 Ford Ranger SuperCab 4x2 | NHTSA No.  | MA0214           |
| Test Program: | NCAP Side Impact              | Test Date: | October 29, 2009 |



*FRONT VIEW OF DUMMY*

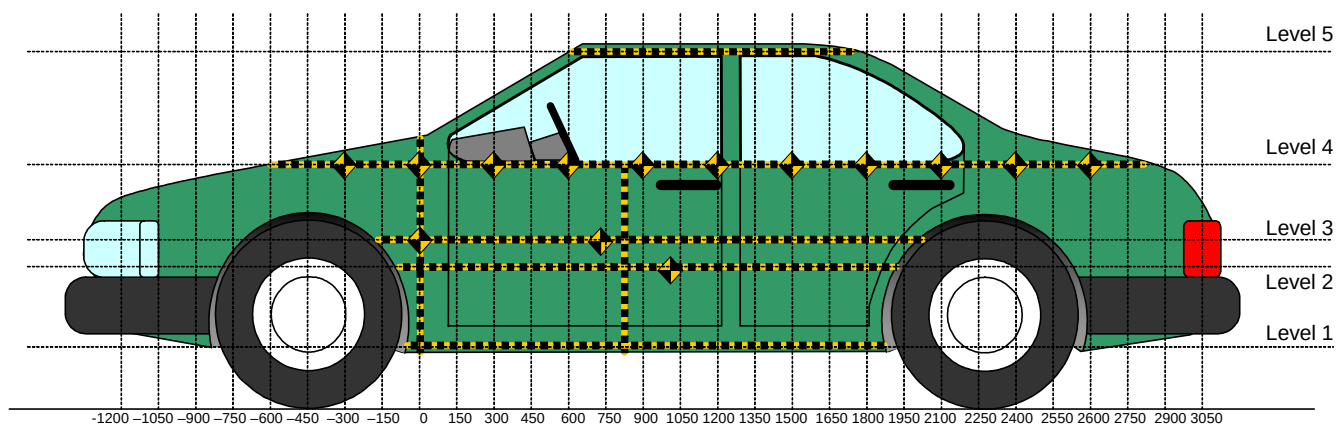
| Code            | Measurement Description          | Units | Driver<br>S/N 270 | Passenger<br>S/N |
|-----------------|----------------------------------|-------|-------------------|------------------|
| HR              | Head to Side Header              | mm    | 211               | N/A              |
| HS              | Head to Side Window              | mm    | 313               | N/A              |
| AD <sub>1</sub> | Arm to Door (at upper rib level) | mm    | 79                | N/A              |
| AD <sub>2</sub> | Arm to Door (at lower rib level) | mm    | 72                | N/A              |
| HD              | H-Point to Door                  | mm    | 146               | N/A              |

A non-instrumented 50<sup>th</sup> percentile adult male SID/HIII was placed in the left rear designated seating position for ballast purposes only.

## DATA SHEET NO. 9

### VEHICLE SIDE MEASUREMENTS

|               |                               |            |                  |
|---------------|-------------------------------|------------|------------------|
| Test Vehicle: | 2010 Ford Ranger SuperCab 4x2 | NHTSA No.  | MA0214           |
| Test Program: | NCAP Side Impact              | Test Date: | October 29, 2009 |



All Measurements Shown in mm

### LEFT SIDE VIEW

Measurements are taken with vehicle in the as tested condition.  
 Measurements along the vertical 750 mm.  
 All measurements below in mm.

| Level | Measurement Description | Maximum Exterior Static Crush | Height Above Ground | Distance From Impact |
|-------|-------------------------|-------------------------------|---------------------|----------------------|
| 1     | Sill Top                | 246                           | 406                 | 450                  |
| 2     | Occupant H-Point        | 228                           | 628                 | 1650                 |
| 3     | Mid Door                | 232                           | 734                 | 1350                 |
| 4     | Window Sill             | 108                           | 997                 | 1350                 |
| 5     | Window                  | 3                             | 1548                | 1200                 |
|       | Maximum Penetration     | 246                           |                     |                      |

# DATA SHEET NO. 10

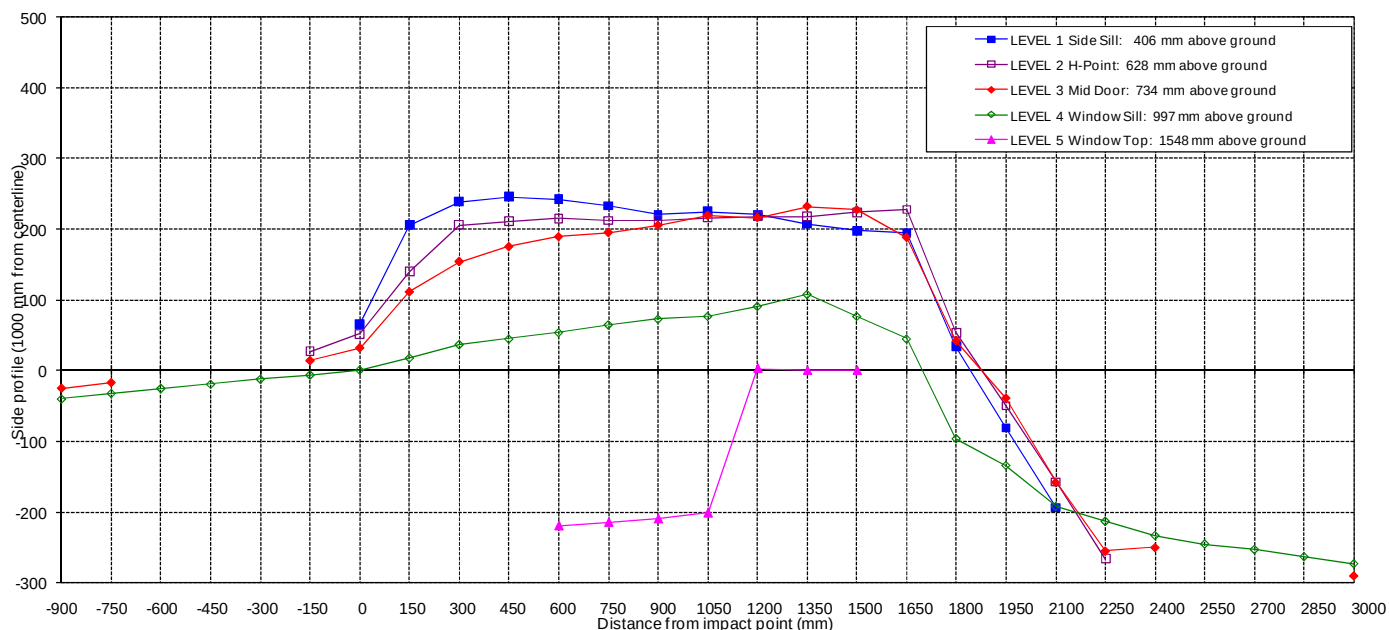
## VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2010 Ford Ranger SuperCab 4x2

NHTSA No. MA0214

Test Program: NCAP Side Impact

Test Date: October 29, 2009

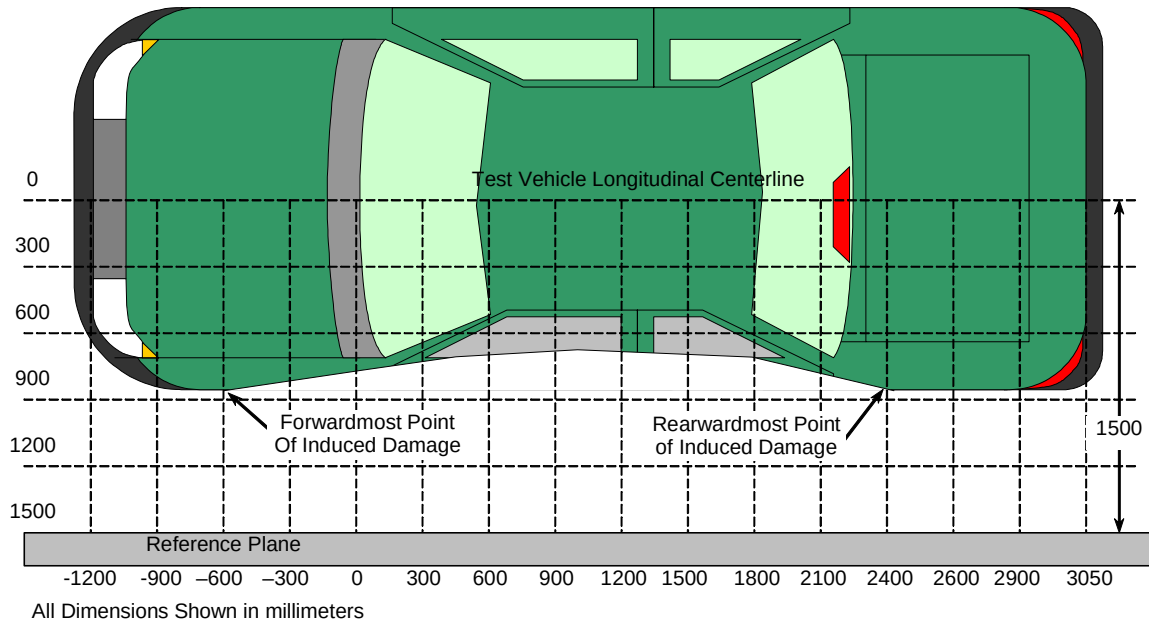


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|  |  |  | NOTE: All dimensions are in millimeters with a tolerance of ±3mm |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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## DATA SHEET NO. 11

### VEHICLE DAMAGE PROFILE DISTANCES

|               |                               |            |                  |
|---------------|-------------------------------|------------|------------------|
| Test Vehicle: | 2010 Ford Ranger SuperCab 4x2 | NHTSA No.  | MA0214           |
| Test Program: | NCAP Side Impact              | Test Date: | October 29, 2009 |



**TOP VIEW**

### DAMAGE PROFILE DISTANCES

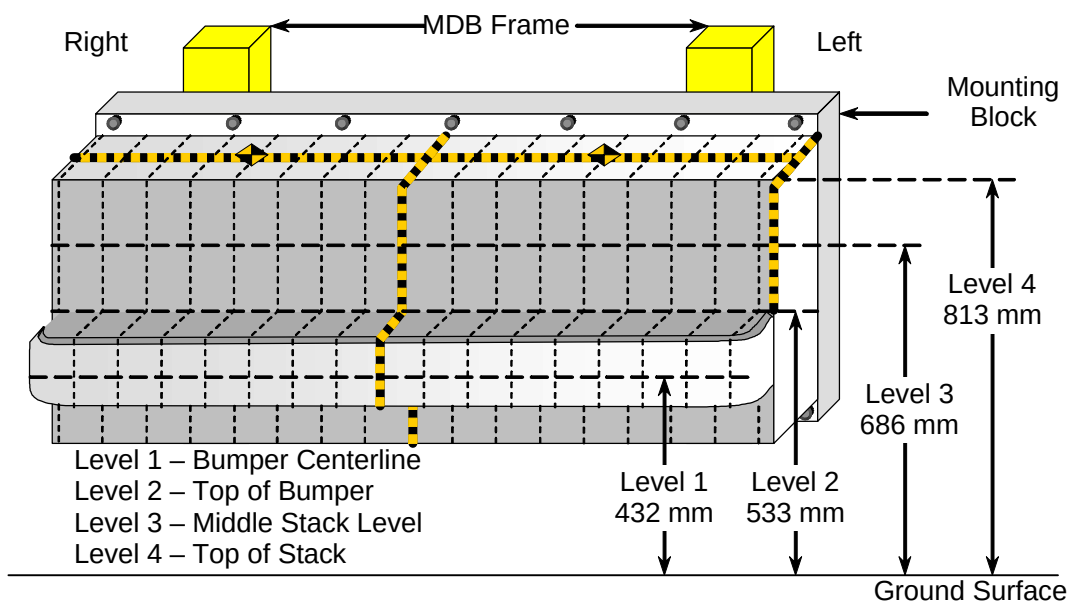
| DPD    | Distance from Impact Point in mm | Level | Pre-Test (mm) | Post-Test (mm) | Max Static Crush (mm) |
|--------|----------------------------------|-------|---------------|----------------|-----------------------|
| 1 (LR) | 1900                             | 3     | 129           | 117            | -12                   |
| 2      | 1480                             | 3     | 126           | 354            | 228                   |
| 3      | 1060                             | 1     | 191           | 416            | 225                   |
| 4      | 640                              | 1     | 191           | 430            | 239                   |
| 5      | 220                              | 1     | 191           | 412            | 221                   |
| 6 (LF) | -200                             | 4     | 160           | 152            | -8                    |

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

## DATA SHEET NO. 12

### DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

|               |                               |            |                  |
|---------------|-------------------------------|------------|------------------|
| Test Vehicle: | 2010 Ford Ranger SuperCab 4x2 | NHTSA No.  | MA0214           |
| Test Program: | NCAP Side Impact              | Test Date: | October 29, 2009 |



|         |                          |       | NOTE: All dimensions are in millimeters with a tolerance of ±3 mm |      |      |      |      |      |      |      |     |                              |     |     |     |     |     |     |     |  |
|---------|--------------------------|-------|-------------------------------------------------------------------|------|------|------|------|------|------|------|-----|------------------------------|-----|-----|-----|-----|-----|-----|-----|--|
|         |                          |       | DISTANCE RIGHT OF CENTER (mm)                                     |      |      |      |      |      |      |      |     | DISTANCE LEFT OF CENTER (mm) |     |     |     |     |     |     |     |  |
| LEVEL   | HEIGHT<br>AT CL<br>(mm)* |       | -800                                                              | -700 | -600 | -500 | -400 | -300 | -200 | -100 | 0   | 100                          | 200 | 300 | 400 | 500 | 600 | 700 | 800 |  |
| LEVEL 4 |                          | PRE   | 411                                                               | 412  | 412  | 412  | 412  | 412  | 413  | 413  | 413 | 413                          | 413 | 413 | 413 | 413 | 413 | 413 | 412 |  |
| TOP     | 811                      | POST  | 262                                                               | 310  | 345  | 388  | 407  | 399  | 388  | 399  | 402 | 399                          | 396 | 391 | 378 | 366 | 347 | 322 | 287 |  |
| STACK   |                          | CRUSH | 149                                                               | 102  | 67   | 24   | 5    | 13   | 25   | 14   | 11  | 14                           | 17  | 22  | 35  | 47  | 66  | 91  | 125 |  |
| LEVEL 3 |                          | PRE   | 411                                                               | 411  | 412  | 412  | 412  | 412  | 412  | 412  | 413 | 412                          | 412 | 412 | 412 | 412 | 412 | 412 | 412 |  |
| MID     | 682                      | POST  | 323                                                               | 367  | 407  | 410  | 409  | 406  | 402  | 410  | 411 | 412                          | 412 | 412 | 412 | 411 | 398 | 382 | 340 |  |
| LEVEL   |                          | CRUSH | 88                                                                | 44   | 5    | 2    | 3    | 6    | 10   | 2    | 2   | 0                            | 0   | 0   | 0   | 1   | 14  | 30  | 72  |  |
| LEVEL 2 |                          | PRE   | 411                                                               | 412  | 412  | 412  | 412  | 412  | 412  | 412  | 413 | 412                          | 412 | 412 | 412 | 412 | 412 | 412 | 412 |  |
| TOP     | 542                      | POST  | 346                                                               | 353  | 356  | 361  | 365  | 367  | 373  | 373  | 375 | 377                          | 379 | 380 | 383 | 382 | 383 | 384 | 380 |  |
| BUMPER  |                          | CRUSH | 65                                                                | 59   | 56   | 51   | 47   | 45   | 39   | 39   | 38  | 35                           | 33  | 32  | 29  | 30  | 29  | 28  | 32  |  |
| LEVEL 1 |                          | PRE   | 501                                                               | 513  | 513  | 513  | 513  | 513  | 513  | 514  | 514 | 514                          | 514 | 514 | 514 | 514 | 514 | 514 | 505 |  |
| MID     | 430                      | POST  | 442                                                               | 459  | 463  | 466  | 470  | 474  | 477  | 479  | 479 | 476                          | 483 | 488 | 489 | 490 | 491 | 485 | 461 |  |
| BUMPER  |                          | CRUSH | 59                                                                | 54   | 50   | 47   | 43   | 39   | 36   | 35   | 35  | 38                           | 31  | 26  | 25  | 24  | 23  | 29  | 44  |  |

\*Heights measured above ground level.

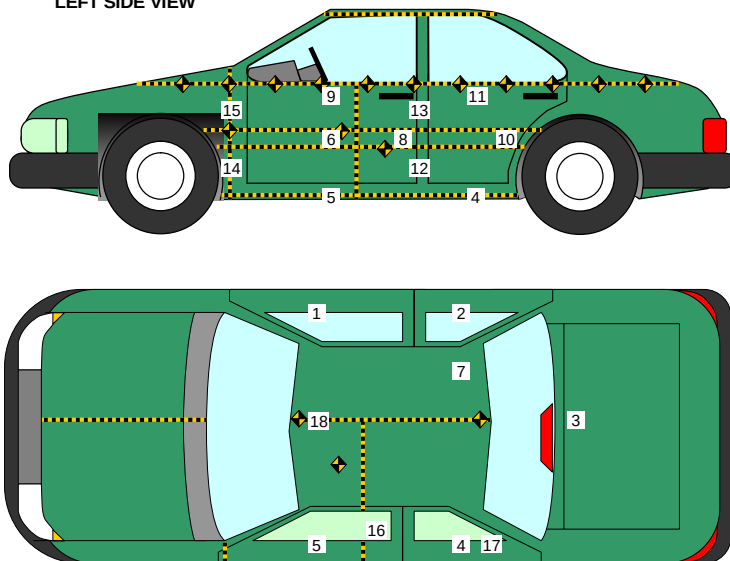
\*Heights measured above ground level.

# DATA SHEET NO. 13

## VEHICLE ACCELEROMETER LOCATIONS

|               |                               |            |                  |
|---------------|-------------------------------|------------|------------------|
| Test Vehicle: | 2010 Ford Ranger SuperCab 4x2 | NHTSA No.  | MA0214           |
| Test Program: | NCAP Side Impact              | Test Date: | October 29, 2009 |

LEFT SIDE VIEW



| Loc. No. | Accelerometer Location       | Measurements (mm) |      |      |
|----------|------------------------------|-------------------|------|------|
|          |                              | X                 | Y    | Z    |
| 1        | Right Sill at Front Seat     | 3221              | 521  | 562  |
| 2        | Right Sill at Rear Seat      | 2737              | 659  | 498  |
| 3        | Rear Floorpan Above Axle     | 1252              | -6   | 680  |
| 4        | Left Sill at Rear Door       | 2741              | -668 | 496  |
| 5        | Left Sill at Front Door      | -                 | -    | -    |
| 6        | Left Front Door C/L**        | -                 | -    | -    |
| 7        | Rear Occupant Compartment    | 2631              | 309  | 490  |
| 8        | Left Front Door Mid-Rear**   | -                 | -    | -    |
| 9        | Left Front Door Upper C/L**  | -                 | -    | -    |
| 10       | Left Rear Door Mid-Rear**    | -                 | -    | -    |
| 11       | Left Rear Door Upper C/L**   | -                 | -    | -    |
| 12       | Left Lower B-Post            | 2669              | -676 | 614  |
| 13       | Left Middle B-Post           | 2657              | -693 | 1040 |
| 14       | Left Lower A-Post            | 3709              | -667 | 573  |
| 15       | Left Middle A-Post           | 3599              | -663 | 1198 |
| 16       | Front Seat Track             | 2900              | -535 | 509  |
| 17       | Rear Seat Track or Structure | 2035              | -697 | 733  |
| 18       | Vehicle CG                   | 3351              | -40  | 589  |

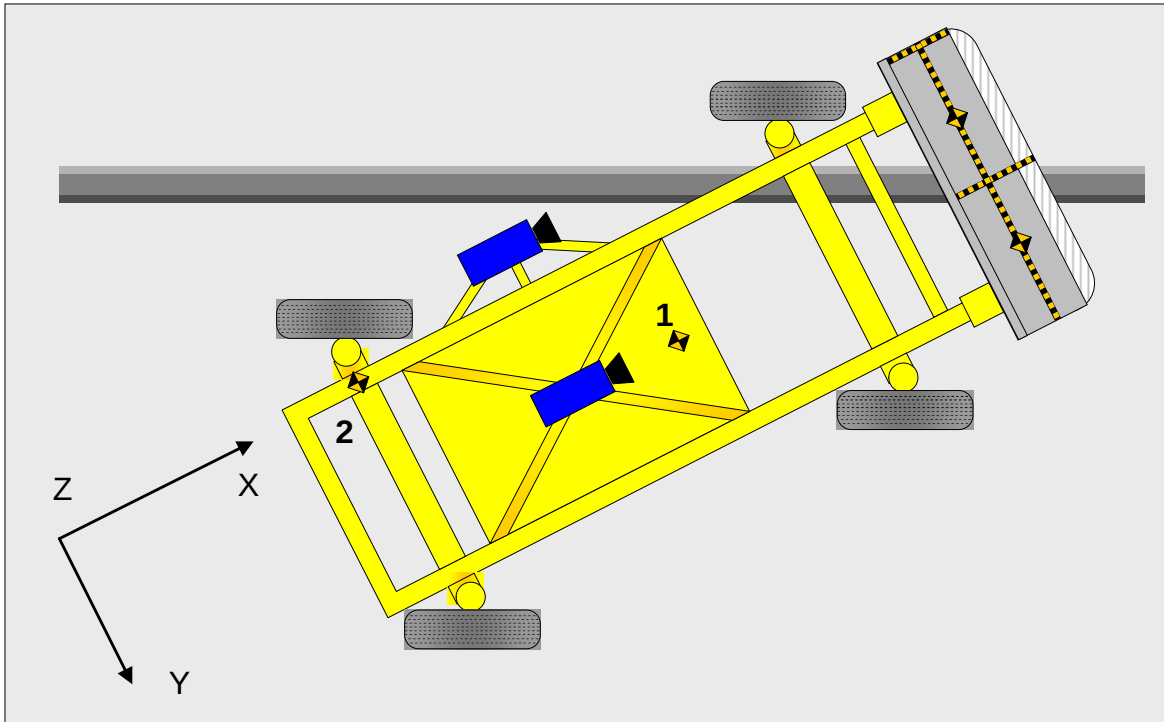
Reference Points    X - Test Vehicle Rear Bumper (+ forward)  
                              Y - Test Vehicle Centerline (+ to right)  
                              Z - Ground Plane (+ down)

\*\* Accelerometer was not requested by the COTR.

## DATA SHEET NO. 14

### MDB ACCELEROMETER LOCATIONS

|               |                               |            |                  |
|---------------|-------------------------------|------------|------------------|
| Test Vehicle: | 2010 Ford Ranger SuperCab 4x2 | NHTSA No.  | MA0214           |
| Test Program: | NCAP Side Impact              | Test Date: | October 29, 2009 |



| Loc. No. | Accelerometer Location | Measurements (mm) |      |      |
|----------|------------------------|-------------------|------|------|
|          |                        | X                 | Y    | Z    |
| 1        | MDB CG                 | 1859              | 0    | -330 |
| 2        | MDB Rear               | 386               | -660 | -660 |

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

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

|               |                               |            |                  |
|---------------|-------------------------------|------------|------------------|
| Test Vehicle: | 2010 Ford Ranger SuperCab 4x2 | NHTSA No.  | MA0214           |
| Test Program: | NCAP Side Impact              | Test Date: | October 29, 2009 |

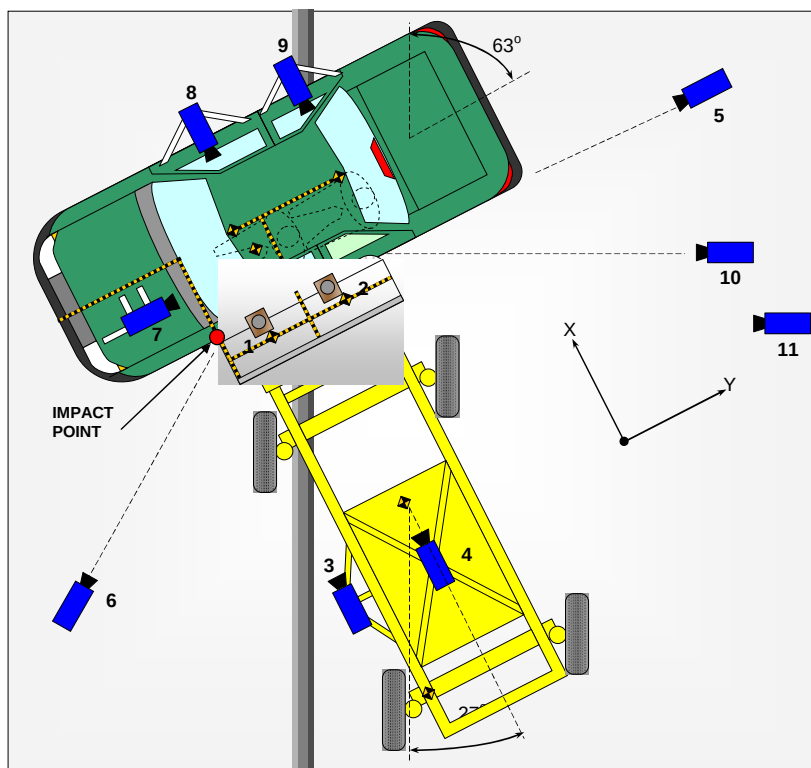
|    | Elements                              | Pre-Test (mm) |
|----|---------------------------------------|---------------|
| 1  | Total Length                          | 5173          |
| 2  | Total Width                           | 1724          |
| 3  | Bumper Top Height                     | 609           |
| 4  | Bumper Bottom Height                  | 536           |
| 5  | Longitudinal Member Top Height        | 321           |
| 6  | Distance between Longitudinal Members | 818           |
| 7  | Longitudinal Member Width             | 75            |
| 8  | Engine Top Height                     | 1077          |
| 9  | Engine Bottom Height                  | 295           |
| 10 | Engine and gearbox width              | 546           |
| 11 | Front bumper-engine distance          | 5173          |
| 12 | Front shock absorber fixing height    | 641           |
| 13 | Bonnet leading edge height            | 987           |
| 14 | Front shock absorber fixing width     | 765           |
| 15 | Front bumper – front axle distance    | 849           |
| 16 | Front axle – a pillar distance        | 568           |
| 17 | A-pillar – B-pillar distance          | 1152          |
| 18 | B-Pillar – rear axle distance         | 1476          |
| 19 | B-pillar – C-pillar distance          | 1479          |
| 20 | Roof sill bottom height               | 1526          |
| 21 | Roof sill top height                  | 1613          |
| 22 | Floor sill bottom height              | 471           |
| 23 | Floor sill top height                 | 490           |



## DATA SHEET NO. 16

### HIGH SPEED CAMERA LOCATIONS AND DATA

|               |                               |            |                  |
|---------------|-------------------------------|------------|------------------|
| Test Vehicle: | 2010 Ford Ranger SuperCab 4x2 | NHTSA No.  | MA0214           |
| Test Program: | NCAP Side Impact              | Test Date: | October 29, 2009 |



| No. | Camera View                           | Location (mm) |       |       | Angle (deg) | Lens (mm) | Film Speed (fps) |
|-----|---------------------------------------|---------------|-------|-------|-------------|-----------|------------------|
|     |                                       | X             | Y     | Z     |             |           |                  |
| 1   | Overhead Overall                      | 72            | 812   | -4880 | -90         | 8         | 500              |
| 2   | Overhead Close-up                     | 195           | 855   | -4880 | -90         | 28        | 1000             |
| 3   | MDB Onboard, Impact Point Close-up    | -1470         | 0     | -847  | 0           | 13        | 500              |
| 4   | MDB Onboard, Centerline of Impact     | -1140         | 838   | -1587 | -17         | 7.5       | 500              |
| 5   | Right Side, Ground Level, Overall     | 160           | 11050 | 975   | -3          | 50        | 1000             |
| 6   | Left Side, Ground Level, Overall      | -1970         | -1540 | 915   | -3          | 24        | 1000             |
| 7   | Vehicle Onboard Front SID/HIII, Front | 530           | -310  | 1470  | -11         | 25        | 500              |
| 8   | Vehicle Onboard Front SID/HIII, Side  | 1603          | 768   | 1195  | -6          | 12.5      | 500              |
| 9   | Vehicle Onboard Rear SID/HIII, Side * | None          | None  | None  | None        | -         | -                |
| 10  | Secondary Impact Point                | -4860         | 2110  | 1035  | 0           | 50        | 1000             |
| 11  | Real Time Coverage                    |               |       |       |             |           | 30               |

\* Video location not used in this test

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

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

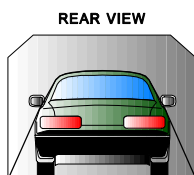
|               |                               |            |                  |
|---------------|-------------------------------|------------|------------------|
| Test Vehicle: | 2010 Ford Ranger SuperCab 4x2 | NHTSA No.  | MA0214           |
| Test Program: | NCAP Side Impact              | Test Date: | October 29, 2009 |

**FUEL SYSTEM INTEGRITY POST IMPACT DATA**

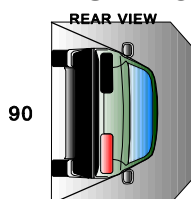
| Time Interval                       | FMVSS 301 Maximum Allowable Spillage | Spillage (g) |
|-------------------------------------|--------------------------------------|--------------|
| Impact Until Motion Ceases          | 28 g                                 | 0            |
| First Five Minutes Following Impact | 142 g                                | 0            |
| Next 25 Minutes                     | 28 g / 1 minute                      | 0            |

|                      |      |
|----------------------|------|
| Spillage Location(s) | None |
|----------------------|------|

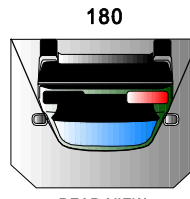
**STATIC ROLLOVER DATA**



0/360

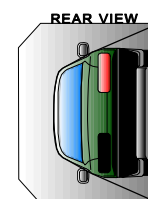


90



180

REAR VIEW



270

| Rollover Stage | Rotation Time (spec. 1 -3 min) |         |    |         | FMVSS 301 Hold Time |         | Total Time |         |    |         | Next Whole Minute Interval |         |
|----------------|--------------------------------|---------|----|---------|---------------------|---------|------------|---------|----|---------|----------------------------|---------|
| 0° - 90°       | 1                              | minutes | 10 | seconds | 5                   | minutes | 6          | minutes | 10 | seconds | 7                          | minutes |
| 90° - 180°     | 1                              | minutes | 06 | seconds | 5                   | minutes | 6          | minutes | 6  | seconds | 7                          | minutes |
| 180°-270°      | 0                              | minutes | 58 | seconds | 5                   | minutes | 5          | minutes | 58 | seconds | 6                          | minutes |
| 270°-360°      | 1                              | minutes | 11 | seconds | 5                   | minutes | 6          | minutes | 11 | seconds | 7                          | minutes |

| Rollover Stage                                   | Spillage (g)                        |                      |                      |                                    |
|--------------------------------------------------|-------------------------------------|----------------------|----------------------|------------------------------------|
|                                                  | First 5 min. from onset of rotation | 6 <sup>th</sup> min. | 7 <sup>th</sup> min. | 8 <sup>th</sup> min. (if required) |
| 0° - 90°                                         | 0                                   | 0                    | 0                    | 0                                  |
| 90° - 180°                                       | 0                                   | 0                    | 0                    | 0                                  |
| 180°-270°                                        | 0                                   | 0                    | 0                    | 0                                  |
| 270°-360°                                        | 0                                   | 0                    | 0                    | 0                                  |
| FMVSS 301 Maximum Allowable (for each 90° stage) | 142                                 | 28                   | 28                   | 28                                 |

| Rollover Stage | Spillage Location(s) |
|----------------|----------------------|
| 0° - 90°       | None                 |
| 90° - 180°     | None                 |
| 180°-270°      | None                 |
| 270°-360°      | None                 |

## **APPENDIX A**

### **PHOTOGRAPHS**

**(The vehicle flipped onto its right side after impact. The post-test photographs shown were taken after the vehicle was rolled back to its normal driving position).**

## TABLE OF PHOTOGRAPHS

| FIGURE | TITLE                                               | PAGE |
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| A-2    | As Received Right Rear $\frac{3}{4}$ View           | A-4  |
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| A-5    | Pre-Test Front View                                 | A-6  |
| A-6    | Post-Test Front View                                | A-6  |
| A-7    | Pre-Test Left Front $\frac{3}{4}$ View              | A-7  |
| A-8    | Post-Test Left Front $\frac{3}{4}$ View             | A-7  |
| A-9    | Pre-Test Left Side View                             | A-8  |
| A-10   | Post-Test Left Side View                            | A-8  |
| A-11   | Pre-Test Left Rear $\frac{3}{4}$ View               | A-9  |
| A-12   | Post-Test Left Rear $\frac{3}{4}$ View              | A-9  |
| A-13   | Pre-Test Rear View                                  | A-10 |
| A-14   | Post-Test Rear View                                 | A-10 |
| A-15   | Pre-Test Right Rear $\frac{3}{4}$ View              | A-11 |
| A-16   | Post-Test Right Rear $\frac{3}{4}$ View             | A-11 |
| A-17   | Pre-Test Right Side View                            | A-12 |
| A-18   | Post-Test Right Side View                           | A-12 |
| A-19   | Pre-Test Right Front $\frac{3}{4}$ View             | A-13 |
| A-20   | Post-Test Right Front $\frac{3}{4}$ View            | A-13 |
| A-21   | Pre-Test Frontal View of MDB Impactor Face          | A-14 |
| A-22   | Post-Test Frontal View of MDB Impactor Face         | A-14 |
| A-23   | Pre-Test Left Side View of MDB Impactor Face        | A-15 |
| A-24   | Post-Test Left Side View of MDB Impactor Face       | A-15 |
| A-25   | Pre-Test Right Side View of MDB Impactor Face       | A-16 |
| A-26   | Post-Test Right Side View of MDB Impactor Face      | A-16 |
| A-27   | Pre-Test Top View of MDB Impactor Face              | A-17 |
| A-28   | Post-Test Top View of MDB Impactor Face             | A-17 |
| A-29   | Pre-Test Left Side View of Aligned MDB and Vehicle  | A-18 |
| A-30   | Pre-Test Right Side View of Aligned MDB and Vehicle | A-18 |
| A-31   | Pre-Test Overhead View of Aligned MDB and Vehicle   | A-19 |
| A-32   | Post-Test Overhead View of MDB and Vehicle          | A-19 |
| A-33   | Pre-Test Close-Up View of Impact Point Target       | A-20 |
| A-34   | Post-Test Close-Up View of Impact Point Target      | A-20 |

**TABLE OF PHOTOGRAPHS (continued)**

| FIGURE | TITLE                                                      | PAGE |
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| A-38   | Post-Test Right Occupant Compartment View of Passenger     | A-22 |
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| A-40   | Post-Test Left Occupant Compartment View of Driver         | A-23 |
| A-41   | Pre-Test Left Front Interior Trim                          | A-24 |
| A-42   | Post-Test Left Front Interior Trim                         | A-24 |
| A-43   | Pre-Test Left Front $\frac{3}{4}$ View of Left Side Doors  | A-25 |
| A-44   | Post-Test Left Front $\frac{3}{4}$ View of Left Side Doors | A-25 |
| A-45   | Pre-Test Left Rear $\frac{3}{4}$ View of Left Side Doors   | A-26 |
| A-46   | Post-Test Left Rear $\frac{3}{4}$ View of Left Side Doors  | A-26 |
| A-47   | Rollover 90 Degrees                                        | A-27 |
| A-48   | Rollover 180 Degrees                                       | A-27 |
| A-49   | Rollover 270 Degrees                                       | A-28 |
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| A-52   | Post-Test Vehicle Frontal View (Tipped)                    | A-30 |
| A-53   | Post-Test Vehicle Top View (Tipped)                        | A-30 |



**Figure A-1: As Received Left Front  $\frac{3}{4}$  View**



**Figure A-2: As Received Right Rear  $\frac{3}{4}$  View**



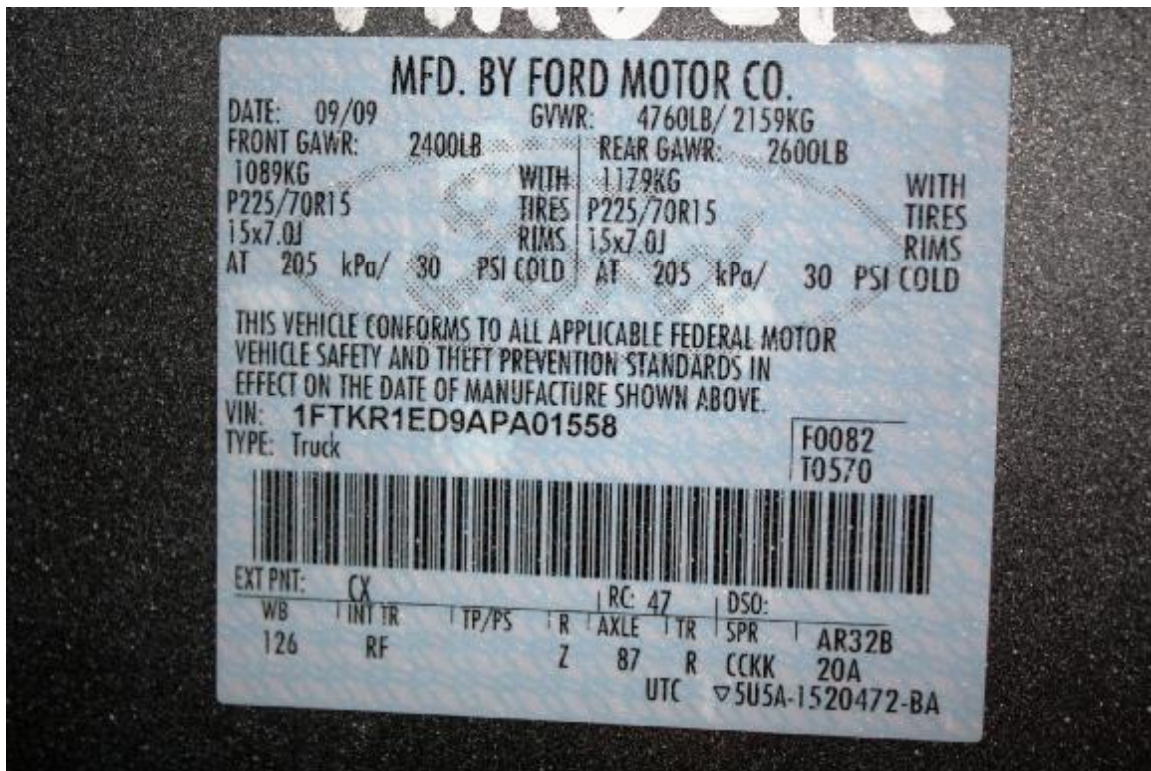


Figure A-3: Vehicle Certification Label

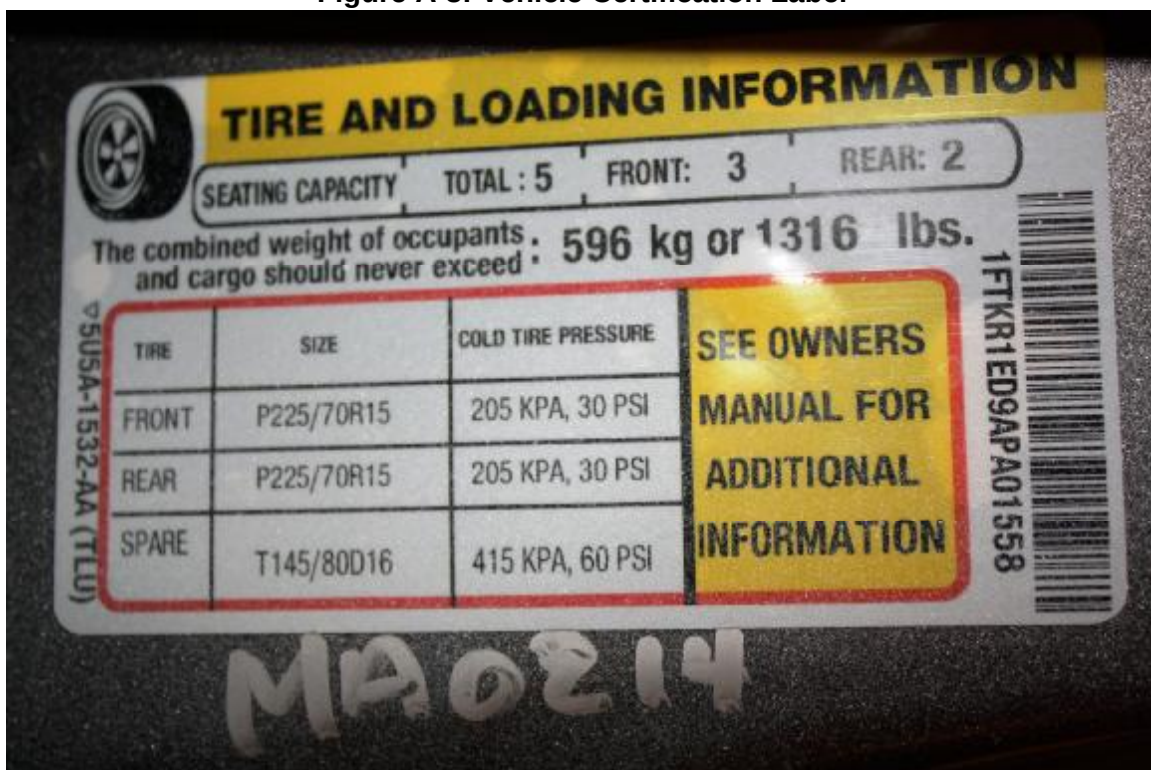


Figure A-4: Vehicle Tire Placard Label



**Figure A-5: Pre-Test Front View**



**Figure A-6: Post-Test Front View**





**Figure A-7: Pre-Test Left Front  $\frac{3}{4}$  View**



**Figure A-8: Post-Test Left Front  $\frac{3}{4}$  View**



**Figure A-9: Pre-Test Left Side View**



**Figure A-10: Post-Test Left Side View**





**Figure A-11: Pre-Test Left Rear  $\frac{3}{4}$  View**



**Figure A-12: Post-Test Left Rear  $\frac{3}{4}$  View**



**Figure A-13: Pre-Test Rear View**

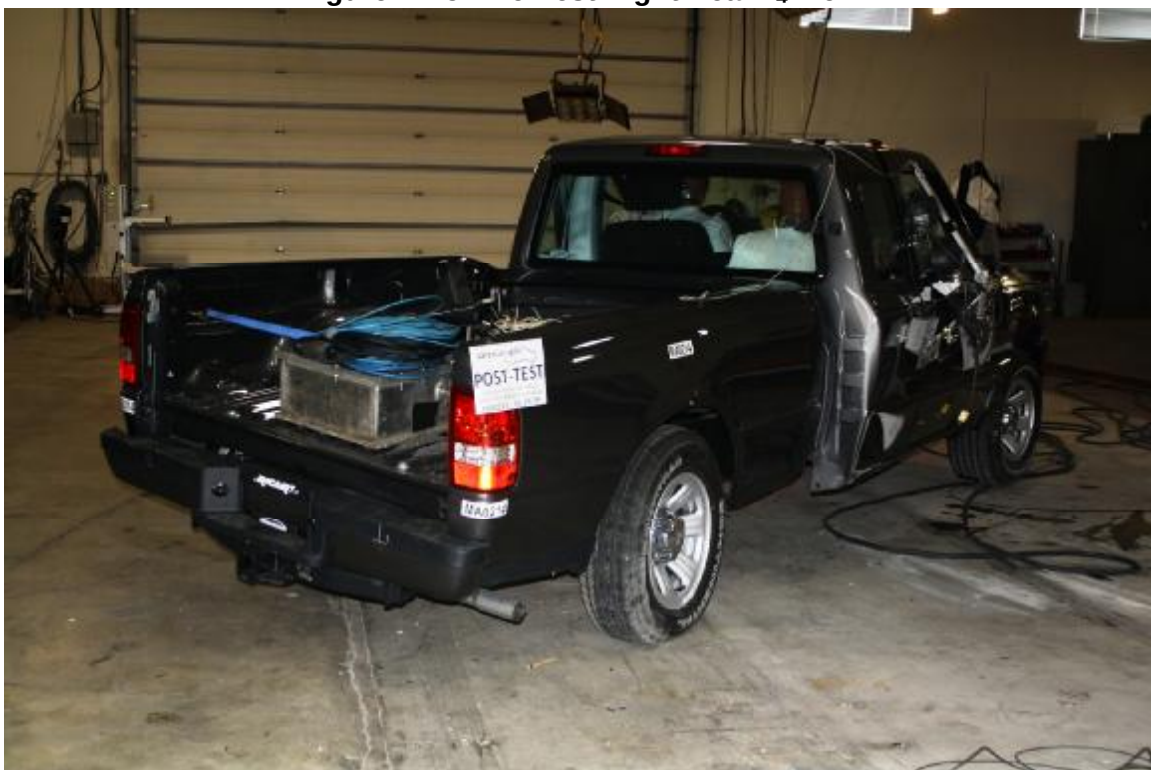


**Figure A-14: Post-Test Rear View**





**Figure A-15: Pre-Test Right Rear  $\frac{3}{4}$  View**



**Figure A-16: Post-Test Right Rear  $\frac{3}{4}$  View**



**Figure A-17: Pre-Test Right Side View**



**Figure A-18: Post-Test Right Side View**





**Figure A-19: Pre-Test Right Front  $\frac{3}{4}$  View**



**Figure A-20: Post-Test Right Front  $\frac{3}{4}$  View**



Figure A-21: Pre-Test Frontal View of MDB Impactor Face



Figure A-22: Post-Test Frontal View of MDB Impactor Face





Figure A-23: Pre-Test Left Side View of MDB Impactor Face



Figure A-24: Post-Test Left Side View of MDB Impactor Face



Figure A-25: Pre-Test Right Side View of MDB Impactor Face



Figure A-26: Post-Test Right Side View of MDB Impactor Face





Figure A-27: Pre-Test Top View of MDB Impactor Face



Figure A-28: Post-Test Top View of MDB Impactor Face

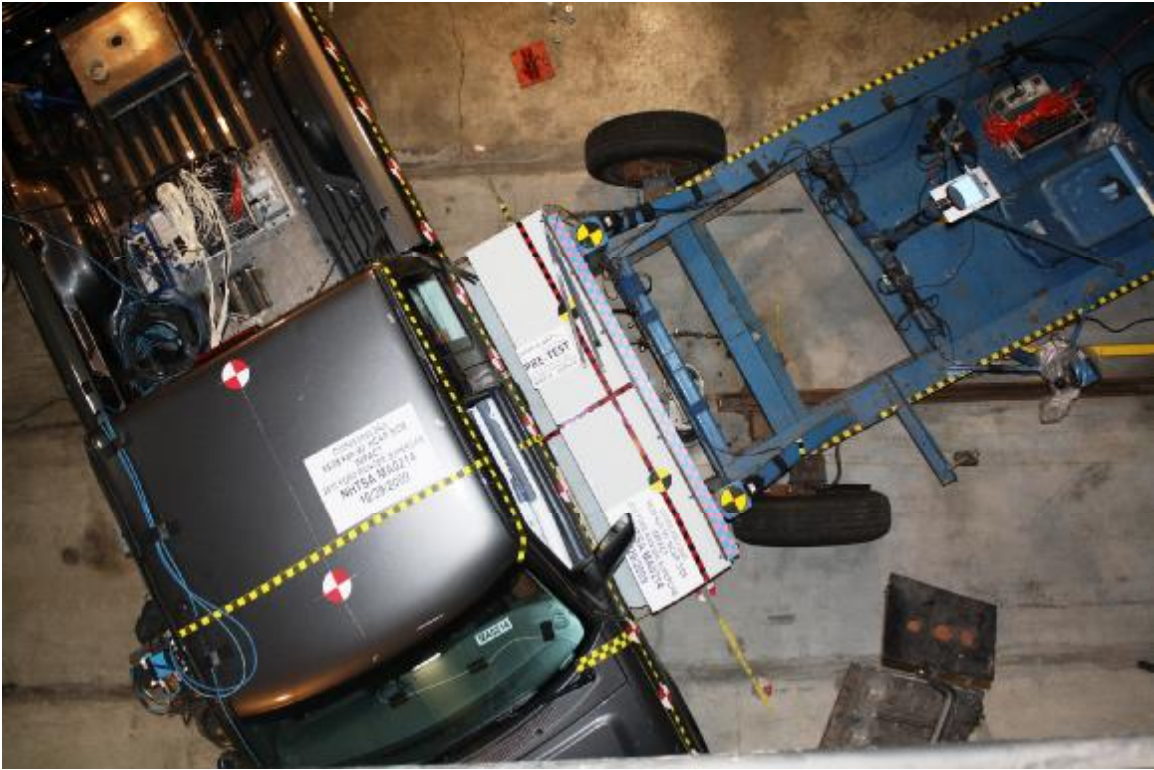


Figure A-29: Pre-Test Left Side View of Aligned MDB and Vehicle



Figure A-30: Pre-Test Right Side View of Aligned MDB and Vehicle





**Figure A-31: Pre-Test Overhead View of Aligned MDB and Vehicle**



**Figure A-32: Post-Test Overhead View of MDB and Vehicle**



Figure A-33: Pre-Test Close-Up View of Impact Point Target



Figure A-34: Post-Test Close-Up View of Impact Point Target





Figure A-35: Pre-Test Right Occupant Compartment View of Driver



Figure A-36: Post-Test Right Occupant Compartment View of Driver



**Figure A-37: Pre-Test Left Occupant Compartment View of Passenger**



**Figure A-38: Post-Test Left Occupant Compartment View of Passenger**



**Figure A-39: Pre-Test Left Occupant Compartment View of Driver**



**Figure A-40: Post-Test Left Occupant Compartment View of Driver**





**Figure A-41: Pre-Test Left Front Interior Trim**



**Figure A-42: Post-Test Left Front Interior Trim**

Photograph Not Available

**Figure A-43: Pre-Test Left Front  $\frac{3}{4}$  View of Left Side Doors**



**Figure A-44: Post-Test Left Front  $\frac{3}{4}$  View of Left Side Doors**



Photograph Not Available

**Figure A-45: Pre-Test Left Rear  $\frac{3}{4}$  View of Left Side Doors**



**Figure A-46: Post-Test Left Rear  $\frac{3}{4}$  View of Left Side Doors**



**Figure A-47: Rollover 90 Degrees**



**Figure A-48: Rollover 180 Degrees**



**Figure A-49: Rollover 270 Degrees**



**Figure A-50: Rollover 360 Degrees**





**Figure A-51: Impact Photo**





**Figure A-52: Post-Test Vehicle Frontal View (Tipped)**



**Figure A-53: Post-Test Vehicle Top View (Tipped)**

**APPENDIX B**  
**SID/HIII, VEHICLE AND MDB RESPONSE DATA**  
**(SAE sign convention)**

### DATA CHANNEL FILTER CLASS SUMMARY

| Data Type                | SAE Filter Class |
|--------------------------|------------------|
| Dummy Head Accelerations | CFC 1000         |
| Rib Accelerations        | FIR 100          |
| Spine Accelerations      | FIR 100          |
| Pelvis Accelerations     | FIR 100          |

### DATA CHANNEL TITLE KEY

| Prefix                                            | Suffix                         |
|---------------------------------------------------|--------------------------------|
| V1 = Vehicle 1 (Moving Barrier)                   | Ax = Acceleration, X-direction |
| V2 = Vehicle 2 (Test Vehicle)                     | Ay = Acceleration, Y-direction |
| P1 = Left Front Seating Position (Driver)         | Az = Acceleration, Z-direction |
| P4 = Left Second Row Seating Position (Passenger) | Fx = Force, X-direction        |
| A1-A18 = Accelerometer Location Number            | Fy = Force, Y-direction        |
|                                                   | Fz = Force, Z-direction        |
|                                                   | Mx = Moment about X            |
|                                                   | My = Moment about Y            |
|                                                   | Mz = Moment about Z            |

### TABLE OF DATA PLOTS

| PLOT | PLOT NAME[UNITS, CHANNEL FILTER CLASS] | PAGE |
|------|----------------------------------------|------|
| 1    | V2P1 Head Ax [g, CFC_1000]             | B-5  |
| 2    | V2P1 Head Ay [g, CFC_1000]             | B-5  |
| 3    | V2P1 Head Az [g, CFC_1000]             | B-5  |
| 4    | V2P1 Head Ar [g, CFC_1000]             | B-5  |
| 5    | V1P1 Upper Rib Ay [g, FIR_100]         | B-6  |
| 6    | V1P1 Lower Rib Ay [g, FIR_100]         | B-6  |
| 7    | V1P1 Lower Spine Ay [g, FIR_100]       | B-6  |
| 8    | V1P1 Pelvic Ay [g, FIR_100]            | B-6  |



The following dummy, vehicle and load cell response data can be found in the research and development section of the NHTSA website at: [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov)

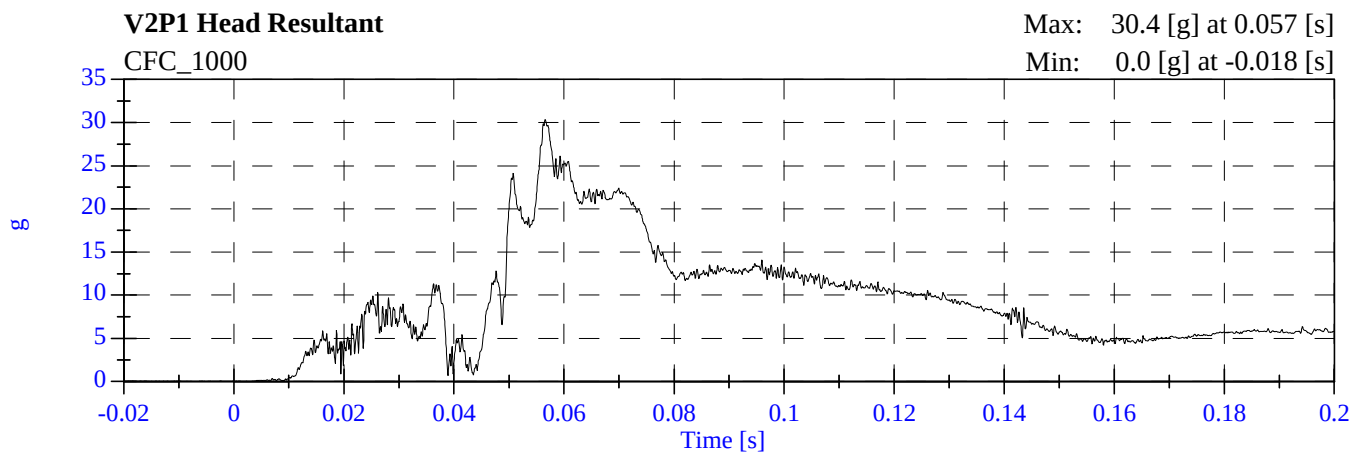
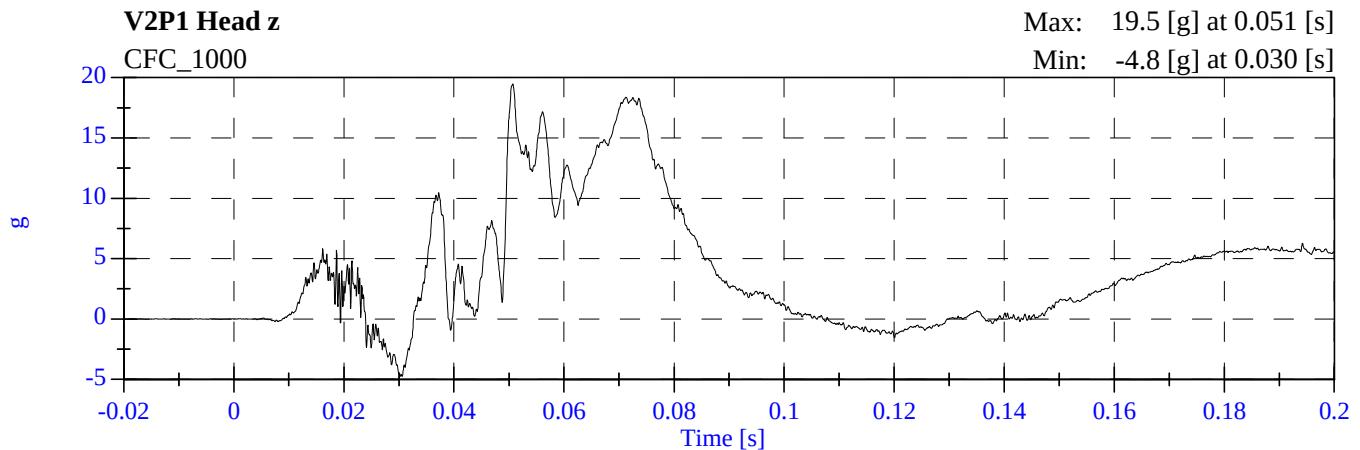
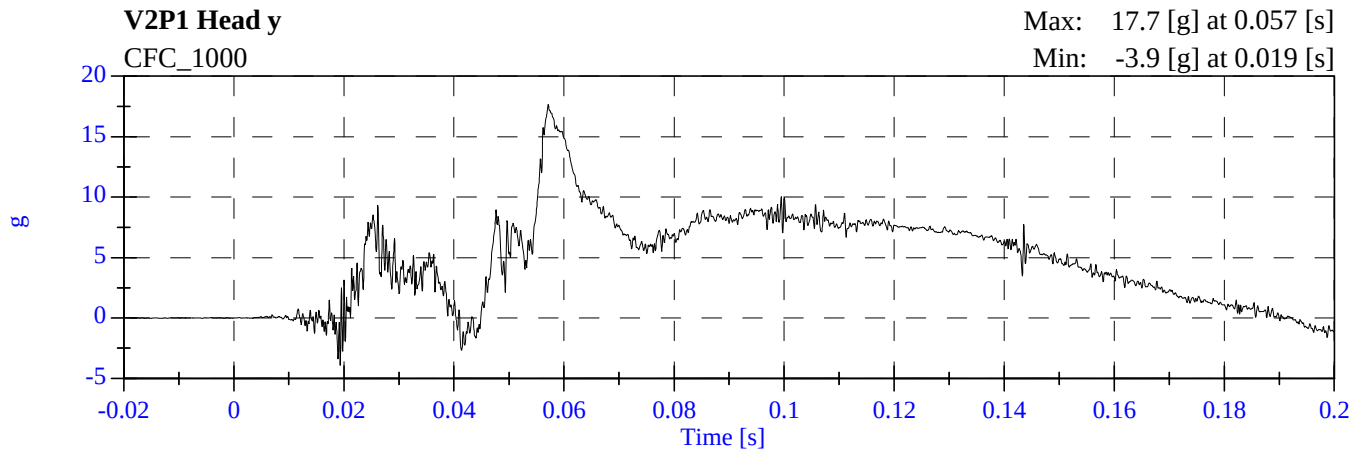
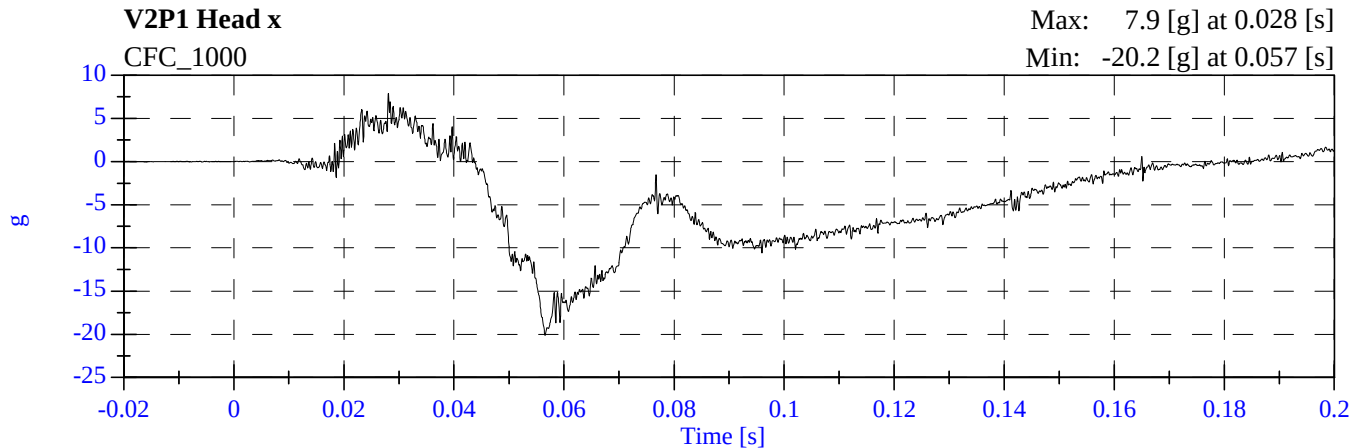
|                               |                                |
|-------------------------------|--------------------------------|
| V2P1 Head Ax                  | V2A1 Right Front Sill Ax       |
| V2P1 Head Ay                  | V2A1 Right Front Sill Ay       |
| V2P1 Head Az                  | V2A1 Right Front Sill Az       |
| V2P1 Upper Neck Fx            | V2A2 Right Rear Sill Ax        |
| V2P1 Upper Neck Fy            | V2A2 Right Rear Sill Ay        |
| V2P1 Upper Neck Fz            | V2A2 Right Rear Sill Az        |
| V2P1 Upper Neck Mx            | V2A3 Rear Floorpan Ax          |
| V2P1 Upper Neck My            | V2A3 Rear Floorpan Ay          |
| V2P1 Upper Neck Mz            | V2A3 Rear Floorpan Az          |
| V2P1 Upper Rib Ay             | V2A4 Left Rear Sill Ay         |
| V2P1 Upper Rib Redundant Ay   | V2A5 Left Front Sill Ay        |
| V2P1 Lower Rib Ay             | V2A7 Right Rear Compartment Ay |
| V2P1 Lower Rib Redundant Ay   | V2A12 Left Lower B Post Ay     |
| V2P1 Lower Spine Ay           | V2A13 Left Mid B Post Ay       |
| V2P1 Lower Spine Redundant Ay | V2A14 Left Lower A Post Ay     |
| V2P1 Pelvic Ay                | V2A15 Left Mid A Post Ay       |
| V2P1 Pelvic Redundant Ay      | V2A16 Front Seat Track Ay      |
|                               | V2A17 Rear Seat Track Ay       |
|                               | V2A18 Target CG Ax             |
|                               | V2A18 Target CG Ay             |
|                               | V2A18 Target CG Az             |
|                               | V1 Moving Barrier CG Ax        |
|                               | V1 Moving Barrier CG Ay        |
|                               | V1 Moving Barrier CG Az        |
|                               | V1 Moving Barrier Left Rail Ax |
|                               | V1 Moving Barrier Left Rail Ay |

## TEST NOTES

The following data anomalies occurred: None

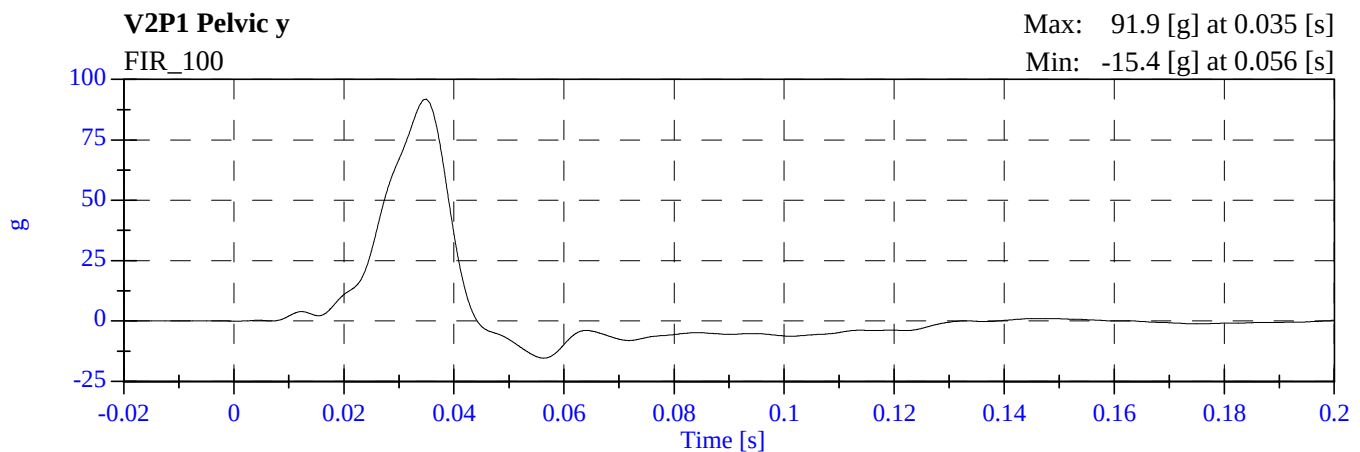
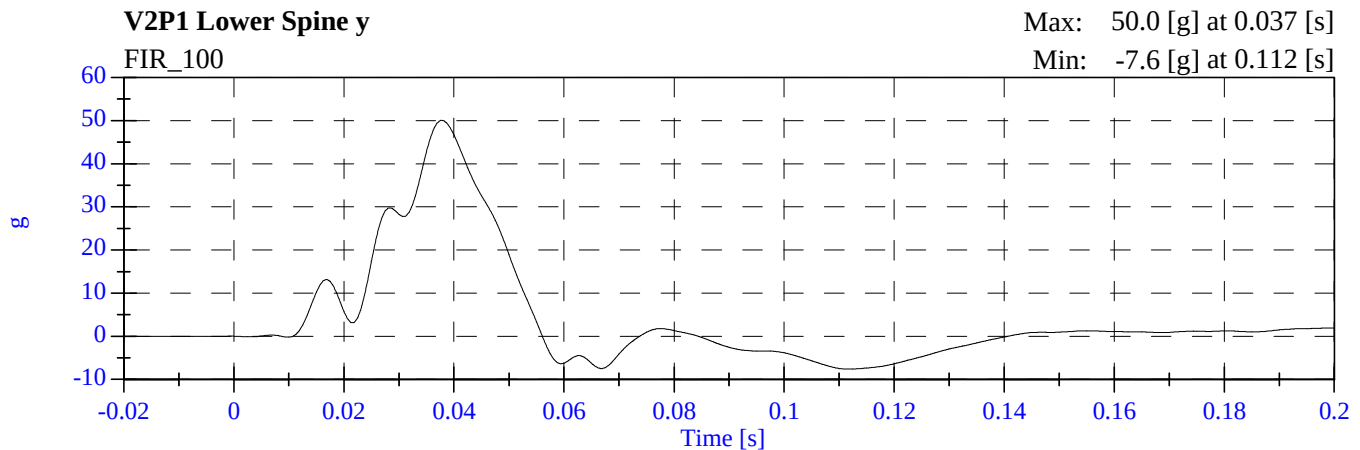
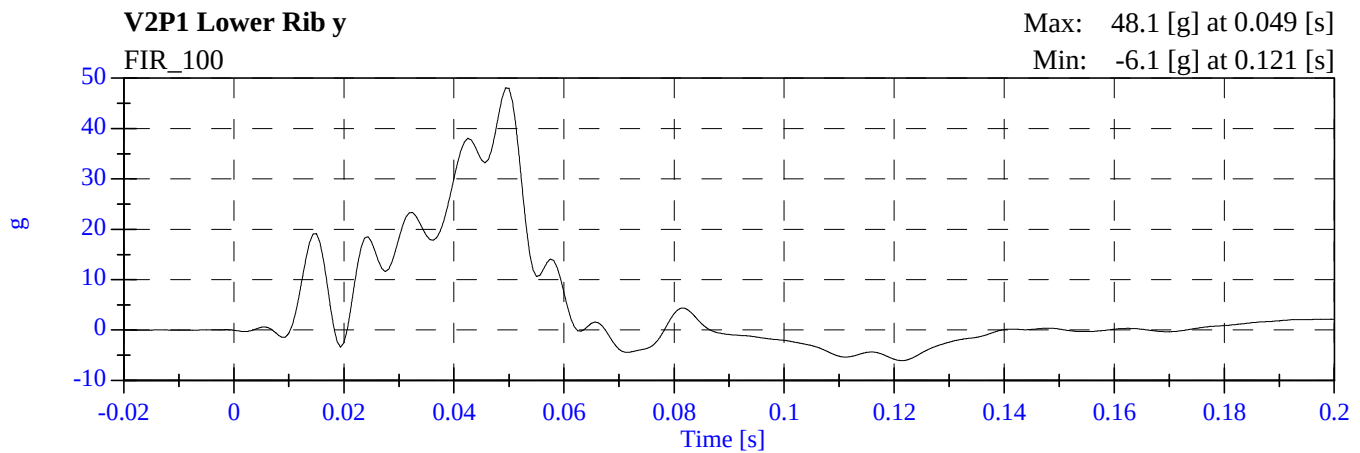
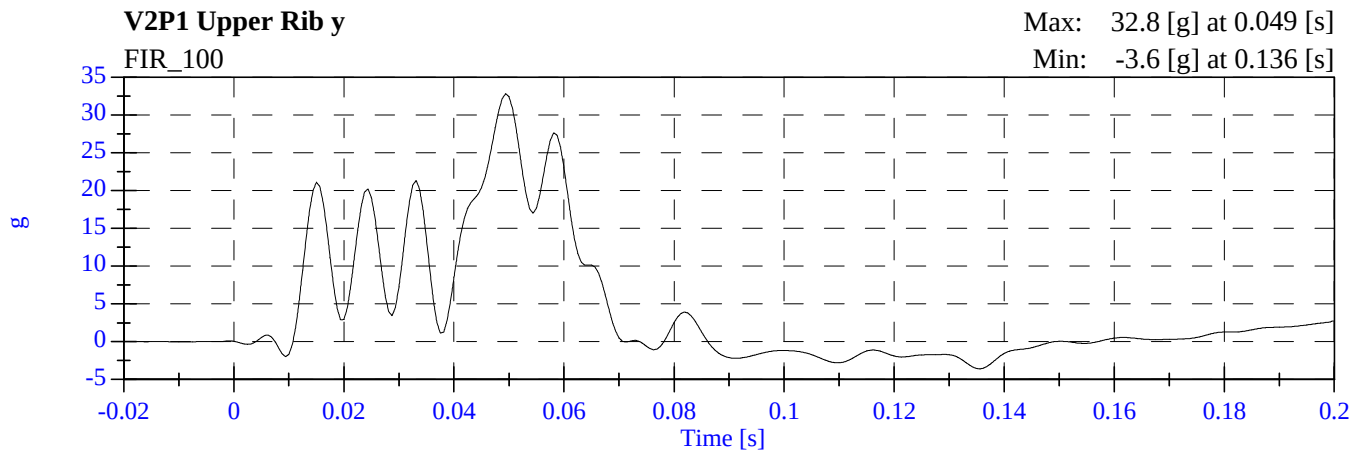
# Side NCAP - 2010 Ford Ranger SuperCab

## MA0214 - October 29, 2009



# Side NCAP - 2010 Ford Ranger SuperCab

## MA0214 - October 29, 2009



**APPENDIX C**

**DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA**



**SUMMARY**  
**SID H3 PRE & POST TEST CALIBRATION**

**CONFIGURED FOR LEFT SIDE IMPACT**

Date: 10/24/09; 11/17/09 Sequential Test Number: 1  
Laboratory Technician: A.Rudniski

| TEST PARAMETER                     | SPECIFICATION | SID H3 NO.:270 |           |
|------------------------------------|---------------|----------------|-----------|
|                                    |               | PRE-TEST       | POST-TEST |
| SH- Seated Height (mm)             | 889 - 909     | 899            | 899       |
| RH- Rib Height (mm)                | 501 - 521     | 505            | 504       |
| HP- Hip Pivot Height (mm)          | 99 ref.       | 99             | 99        |
| RD- Rib from Back Line (mm)        | 229 - 241     | 234            | 233       |
| KV- Knee Pivot from Back Line (mm) | 511 - 526     | 518            | 518       |
| SW- Knee Pivot to Floor (mm)       | 490 - 505     | 495            | 494       |
| HW- Hip Width (mm)                 | 356 - 391     | 384            | 386       |
| <b>THORAX IMPACTS</b>              |               |                |           |
| TEMPERATURE (• C)                  | 18.9 - 25.5   | 21.1           | 21.7      |
| RELATIVE HUMIDITY (%)              | 10 - 70       | 38             | 26        |
| PROBE SPEED (m/s)                  | 4.27 - 4.33   | 4.31           | 4.29      |
| UPPER RIB (g's)                    | 37 - 46       | 39.32          | 38.92     |
| LOWER RIB (g's)                    | 37 - 46       | 38.66          | 38.45     |
| LOWER SPINE (g's)                  | 15 - 22       | 21.22          | 20.37     |
| <b>PELVIS IMPACT</b>               |               |                |           |
| TEMPERATURE (• C)                  | 18.9 - 25.5   | 21.1           | 21.7      |
| RELATIVE HUMIDITY (%)              | 10 - 70       | 40             | 27        |
| PROBE SPEED (m/s)                  | 4.27 - 4.33   | 4.31           | 4.29      |
| PELVIS (g's)                       | 40 - 60       | 51.83          | 43.14     |

**REMARKS:** None

## **CALIBRATION TEST RESULTS**

### **PRE-TEST**

**SID H3 NO.:** 270

**CONFIGURED FOR** LEFT SIDE IMPACT

**CALIBRATION TEST RESULTS SUMMARY  
PRE-TEST**

**CONFIGURED FOR LEFT SIDE IMPACT**

|                        |                                   |
|------------------------|-----------------------------------|
| SID H3 Serial No.: 270 | Sequential Test Number: 1         |
| Date: 10/24/09         | Laboratory Technician: A.Rudniski |

| TEST                         | COMMENTS                 |
|------------------------------|--------------------------|
| EXTERNAL DIMENSIONS          | Passed all requirements. |
| THORACIC SHOCK ABSORBER TEST | Passed all requirements. |
| LATERAL THORAX IMPACT TEST   | Passed all requirements. |
| LATERAL PELVIS IMPACT TEST   | Passed all requirements. |
| HEAD DROP TEST*              | Passed all requirements. |
| LATERAL NECK BEND TEST*      | Passed all requirements. |
| ABDOMINAL COMPRESSION TEST*  | Passed all requirements. |
| LUMBAR FLEXION TEST*         | Passed all requirements. |

\* Test not required for SID certification.

**REMARKS:** None

**EXTERNAL DIMENSIONS  
PRE-TEST**

**CONFIGURED FOR LEFT SIDE IMPACT**

SID H3 Serial No.: 270 Sequential Test Number: 1  
Date: 10/22/09 Laboratory Technician: A.Rudniski

| TEST PARAMETER                     | SPECIFICATION | TEST RESULTS |
|------------------------------------|---------------|--------------|
| SH- Seated Height (mm)             | 889 – 909     | 899          |
| RH- Rib Height (mm)                | 502 – 520     | 505          |
| HP- Hip Pivot Height (mm)          | 99 ref.       | 99           |
| RD- Rib from Back Line (mm)        | 229 – 241     | 234          |
| KH- Knee Pivot from Back Line (mm) | 511 – 526     | 518          |
| KV- Knee Pivot to Floor (mm)       | 490 – 505     | 495          |
| HW- Hip Width (mm)                 | 356 - 391     | 384          |

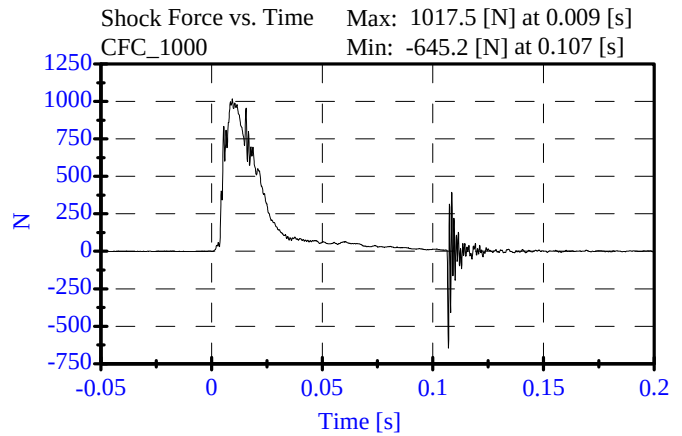
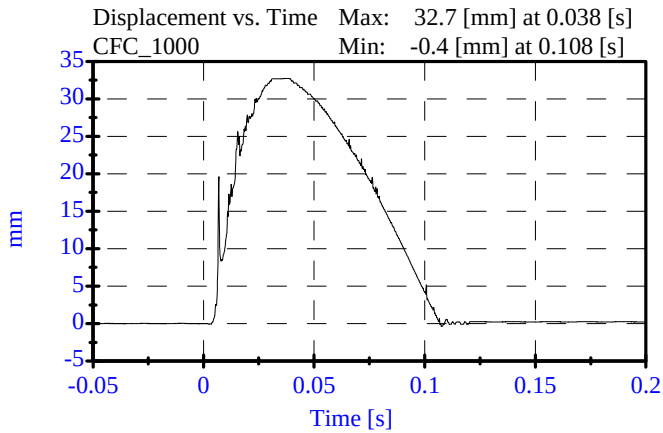
**REMARKS:** None

**Shock Test Low ( 3.05 m/s )**  
**PRE TEST**  
**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270  
Date: 04-06-09

Sequential Test Number: 1 File: 270SL 04-06-09  
Laboratory Technician: A. Rudniski

| <u>TEST PARAMETER</u>  | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|------------------------|----------------------|---------------------|---------------|
| Lab Temperature:       | 18.9-25.5 C          | 22.2 C              | Passed        |
| Lab Humidity:          | 10-70 %              | 28.00 %             | Passed        |
| Displacement:          | 30.00-35.00 mm       | 32.73 mm            | Passed        |
| Maximum Force:         | 836.00-1125.00 N     | 1017.49 N           | Passed        |
| Impact Test Velocity:  | 3.05 m/s             |                     |               |
| Damper Identification: | 270                  |                     |               |
| Damper Setting:        | 5                    |                     |               |





# Shock Test Medium ( 4.27 m/s )

## PRE TEST

### CONFIGURED FOR LEFT SIDE IMPACT

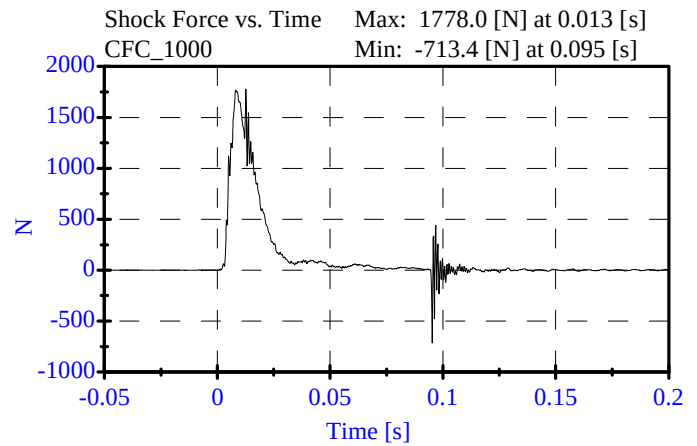
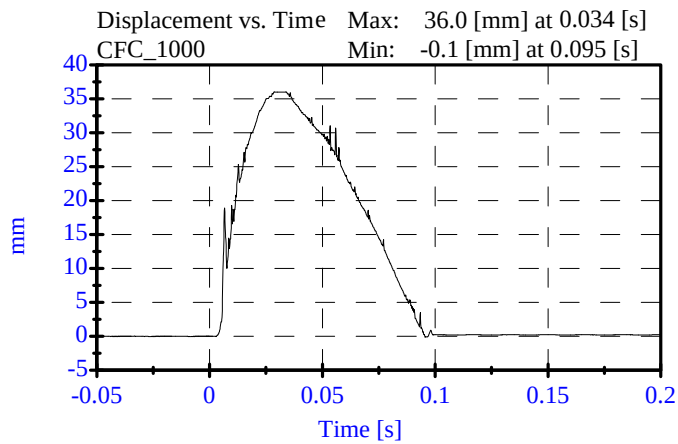
ATD Serial No: 270

Date: 04-06-09

Sequential Test Number: 1 File: 270SM 04-06-09

Laboratory Technician: A. Rudniski

| TEST PARAMETER         | SPECIFICATION     | TEST RESULTS | STATUS |
|------------------------|-------------------|--------------|--------|
| Lab Temperature:       | 18.9-25.5 C       | 22.2 C       | Passed |
| Lab Humidity:          | 10-70 %           | 28.00 %      | Passed |
| Displacement:          | 32.00-37.00 mm    | 36.02 mm     | Passed |
| Maximum Force:         | 1730.00-2099.00 N | 1778.00 N    | Passed |
| Impact Test Velocity:  | 4.27 m/s          |              |        |
| Damper Identification: | 270               |              |        |
| Damper Setting:        | 5                 |              |        |

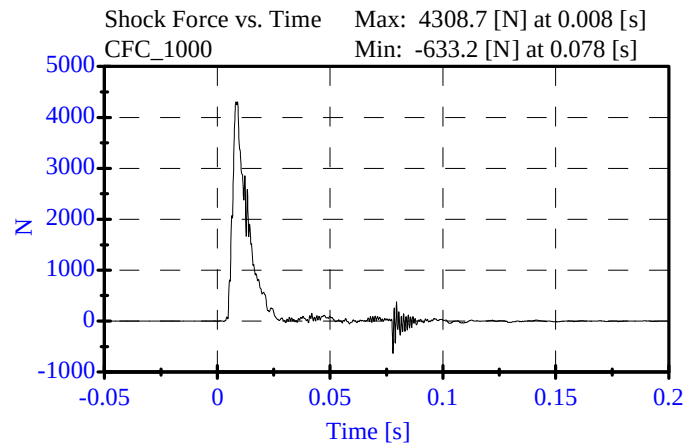
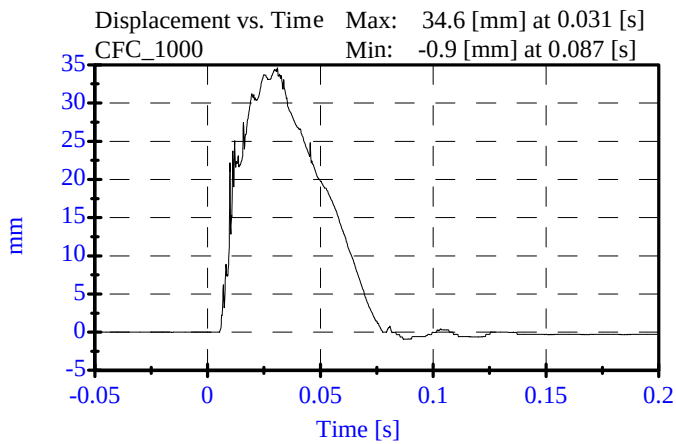


**Shock Test High ( 6.10 m/s )**  
**PRE TEST**  
**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270  
Date: 04-06-09

Sequential Test Number: 1 File: 270SH2 04-06-09  
Laboratory Technician: A. Rudniski

| TEST PARAMETER         | SPECIFICATION     | TEST RESULTS | STATUS |
|------------------------|-------------------|--------------|--------|
| Lab Temperature:       | 18.9-25.5 C       | 22.2 C       | Passed |
| Lab Humidity:          | 10-70 %           | 28.00 %      | Passed |
| Displacement:          | 33.00-40.00 mm    | 34.65 mm     | Passed |
| Maximum Force:         | 3741.00-4448.00 N | 4308.68 N    | Passed |
| Impact Test Velocity:  | 6.10 m/s          |              |        |
| Damper Identification: | 270               |              |        |
| Damper Setting:        | 5                 |              |        |

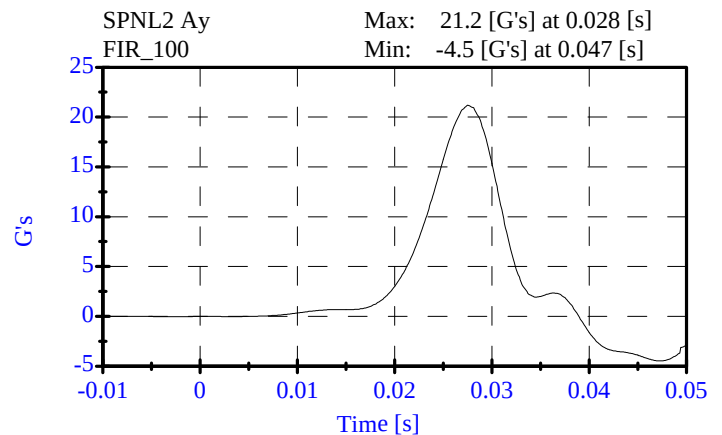
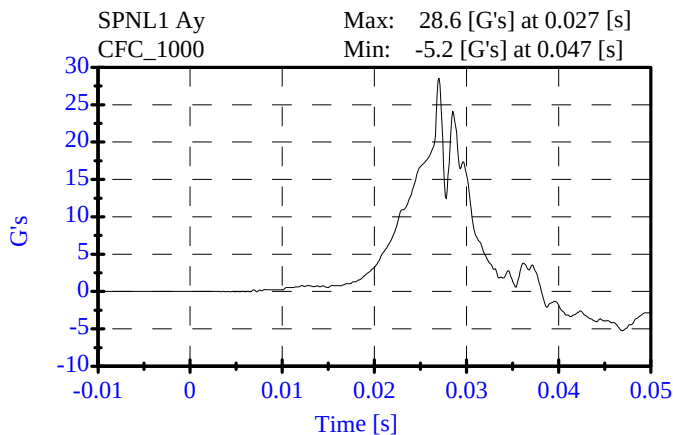
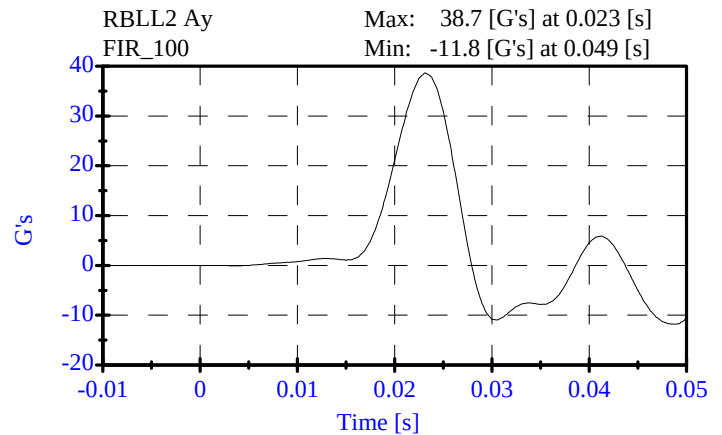
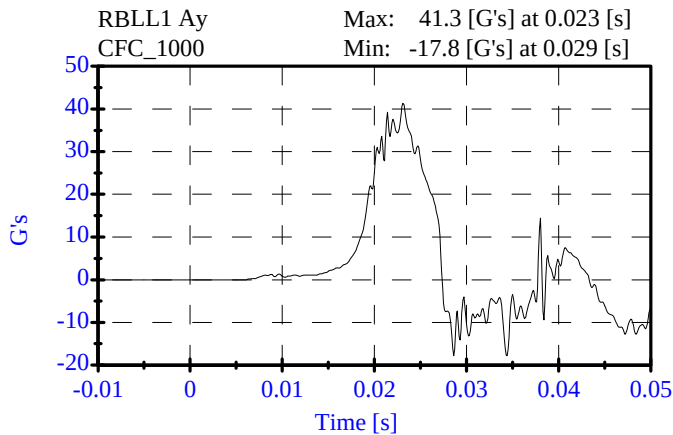
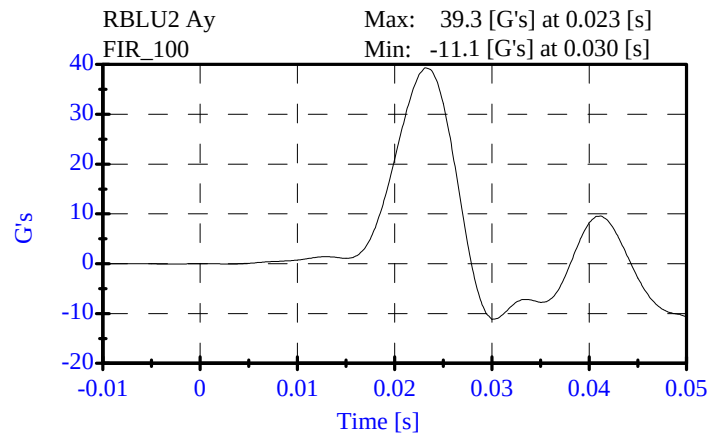
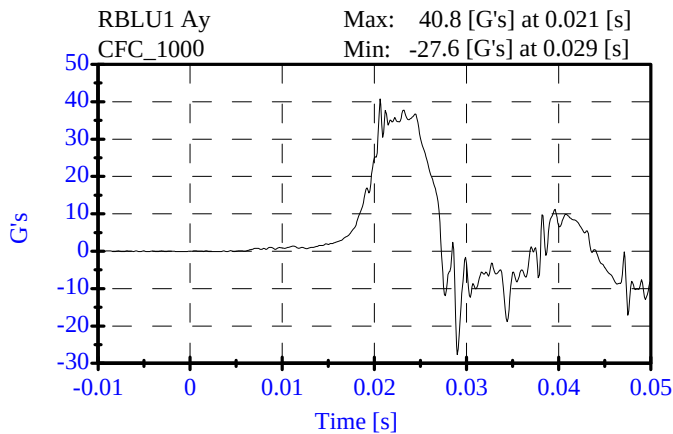


**Thorax Impact Test**  
**Pre-Test**  
**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270  
Date: 10-23-09

Sequential Test Number: 1 File: 270T 10-23-09  
Laboratory Technician: A. Rudniski

| TEST PARAMETER            | SPECIFICATION   | TEST RESULTS | STATUS |
|---------------------------|-----------------|--------------|--------|
| Lab Temperature:          | 18.9-25.5 C     | 21.1 C       | Passed |
| Lab Humidity:             | 10-70 %         | 38.00 %      | Passed |
| Probe Velocity:           | 4.27- 4.33 m/s  | 4.31 m/s     | Passed |
| Upper Rib Acceleration:   | 37.00-46.00 G's | 39.32 G's    | Passed |
| Lower Rib Acceleration:   | 37.00-46.00 G's | 38.66 G's    | Passed |
| Lower Spine Acceleration: | 15.00-22.00 G's | 21.22 G's    | Passed |

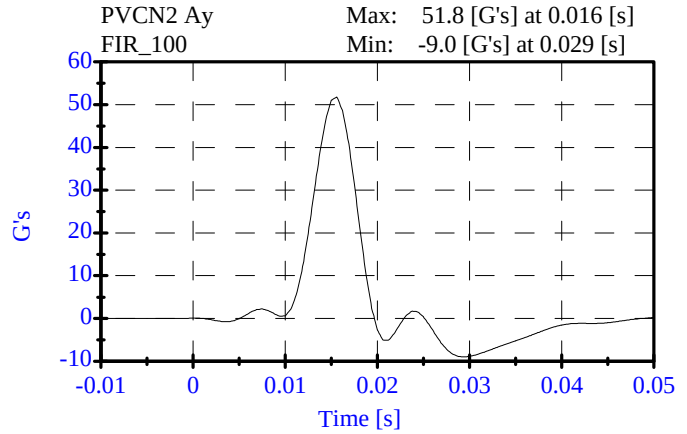
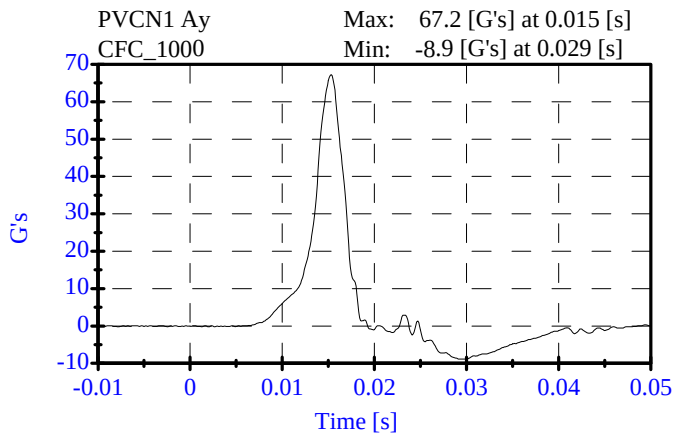


**Pelvis Impact Test**  
**Pre-Test**  
**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270  
Date: 10-23-09

Sequential Test Number: 1 File: 270P3 10-23-09  
Laboratory Technician: A. Rudniski

| <u>TEST PARAMETER</u>  | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|------------------------|----------------------|---------------------|---------------|
| Lab Temperature:       | 18.9-25.5 C          | 21.1 C              | Passed        |
| Lab Humidity:          | 10-70 %              | 40.00 %             | Passed        |
| Probe Velocity:        | 4.27- 4.33 m/s       | 4.31 m/s            | Passed        |
| Pelvis Y Acceleration: | 40.00-60.00 G's      | 51.83 G's           | Passed        |
| Time Above 20 Gs       | 3.0-7.0 ms           | 5.7 ms              | Passed        |

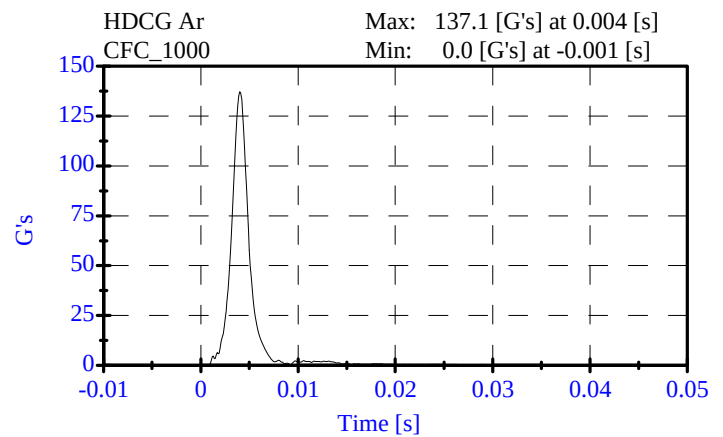
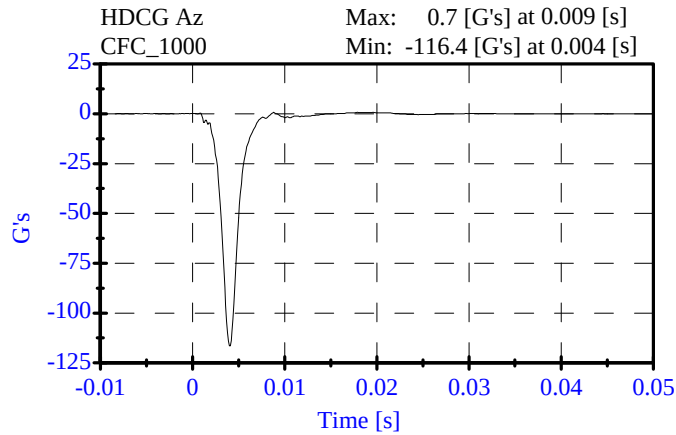
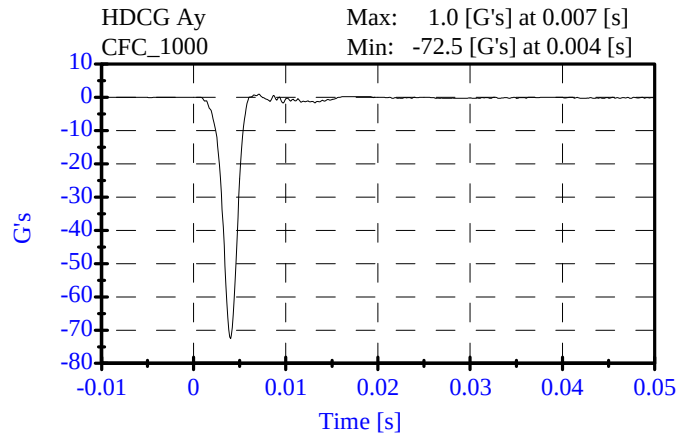
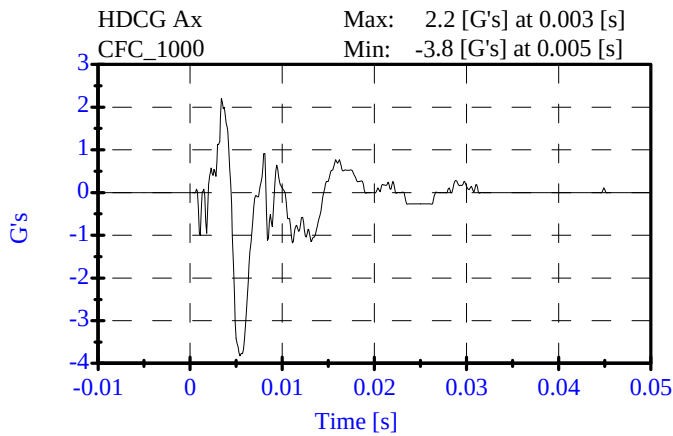


# **Head Drop Test** **Pre-Test** **CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270  
Date: 10-22-09

Sequential Test Number: 1 File: 270H 10-22-09  
Laboratory Technician: A.Rudniski

| TEST PARAMETER          | SPECIFICATION | TEST RESULTS | STATUS |
|-------------------------|---------------|--------------|--------|
| Lab Temperature:        | 18.9-25.6 C   | 21.1 C       | Passed |
| Lab Humidity:           | 10-70 %       | 39.00 %      | Passed |
| Peak Resultant Accel.:  | 120-150 Gs    | 137.12 Gs    | Passed |
| Peak Lateral Accel.:    | 15 Gs Max     | 2.20 Gs      | Passed |
| Curve PerCent NonModal: | < 15%         | 1.86 %       | Passed |





**Neck Flexion Test**  
**Pre-Test**  
**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270  
Date: 10-22-09

Sequential Test Number: 1 File: 270N 10-22-09  
Laboratory Technician: A. Rudnski

| <u>TEST PARAMETER</u>                                           | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|-----------------------------------------------------------------|----------------------|---------------------|---------------|
| Lab Temperature:                                                | 20.6-22.2 C          | 21.1 C              | Passed        |
| Lab Humidity:                                                   | 10-70 %              | 39.00 %             | Passed        |
| Impact Velocity:                                                | 6.89- 7.13 m/s       | 6.99 m/s            | Passed        |
| PENDULUM DELTA V                                                |                      |                     |               |
| Delta V at 10 ms:                                               | 1.96- 2.55 m/s       | 2.23 m/s            | Passed        |
| Delta V at 20 ms:                                               | 4.12- 5.10 m/s       | 4.48 m/s            | Passed        |
| Delta V at 30 ms:                                               | 5.73- 7.01 m/s       | 6.23 m/s            | Passed        |
| Delta V between 40-70 ms:                                       | 6.27- 7.64 m/s       | 7.58 m/s            | Passed        |
| D PLANE ROTATION                                                |                      |                     |               |
| Maximum Rotation:                                               | 66.0-82.0 Deg        | 70.28 Deg           | Passed        |
| Rotation Angle Decay:                                           | 58.0-67.0 ms         | 60.70 ms            | Passed        |
| MOMENT ABOUT THE OCCIPITAL CONDYLE                              |                      |                     |               |
| Max Occipital Moment:                                           | 73.00- 88.00 N-m     | 80.71 N-m           | Passed        |
| Occipital Moment Decay:                                         | 49.0-64.0 ms         | 53.60 ms            | Passed        |
| HEAD ROTATION TIME WITH RESPECT TO THE OCCIPITAL CONDYLE MOMENT |                      |                     |               |
| Moment to Rotation Peak:                                        | 2.0-16.0 ms          | 9.80 ms             | Passed        |

**Neck Flexion Test**  
**Pre-Test**  
**CONFIGURED FOR LEFT SIDE IMPACT**

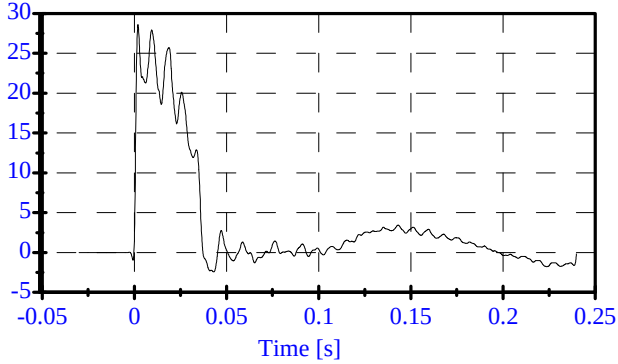
ATD Serial No: 270

Date: 10-22-09

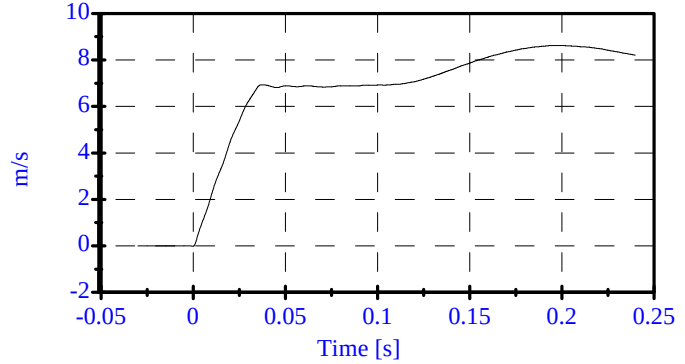
Sequential Test Number: 1 File: 270N 10-22-09

Laboratory Technician: A. Rudniski

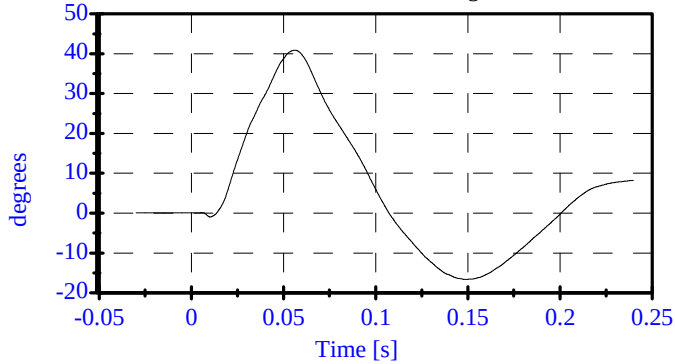
Pend Ax  
CFC\_180  
Max: 28.6 [ ] at 0.002 [s]  
Min: -2.4 [ ] at 0.043 [s]



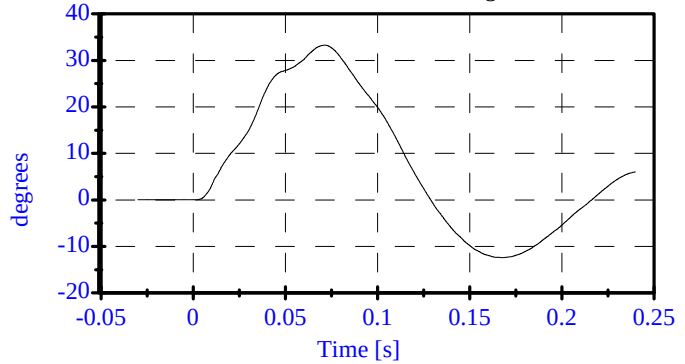
Pend Vx  
CFC\_180  
Max: 8.6 [m/s] at 0.198 [s]  
Min: -0.0 [m/s] at -0.000 [s]



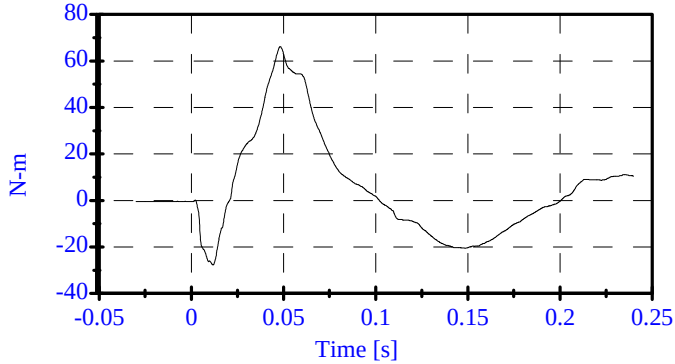
Head Rot  
CFC\_180  
Max: 40.9 [degrees] at 0.056 [s]  
Min: -16.6 [degrees] at 0.149 [s]



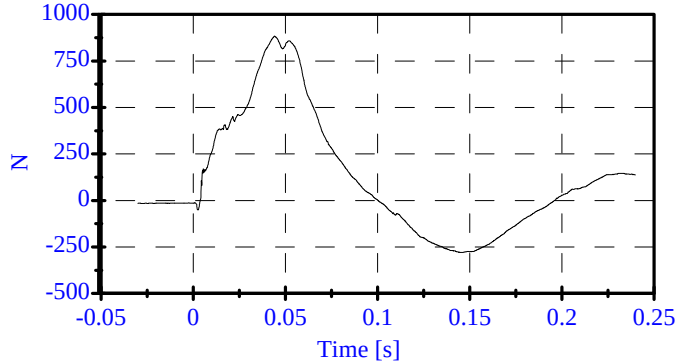
Arm Rot  
CFC\_180  
Max: 33.3 [degrees] at 0.071 [s]  
Min: -12.4 [degrees] at 0.168 [s]



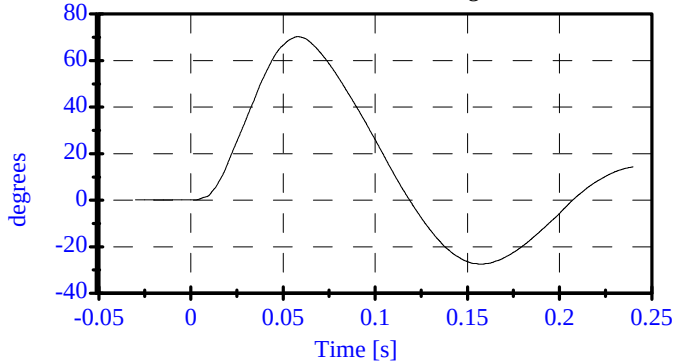
Neck Mx  
CFC\_600  
Max: 66.2 [N-m] at 0.048 [s]  
Min: -27.8 [N-m] at 0.012 [s]



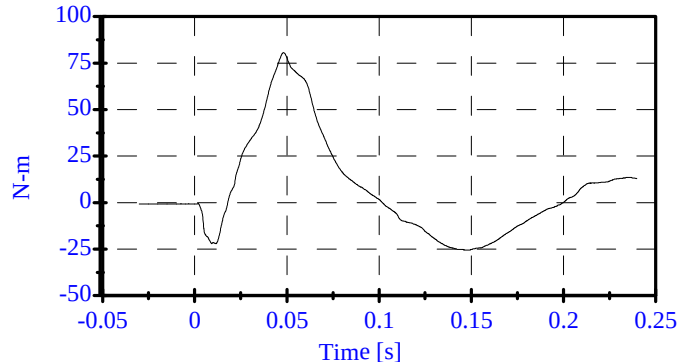
Neck Fy  
CFC\_1000  
Max: 882.8 [N] at 0.044 [s]  
Min: -280.2 [N] at 0.146 [s]



Tot Rot  
CFC\_180  
Max: 70.3 [degrees] at 0.058 [s]  
Min: -27.5 [degrees] at 0.157 [s]



MOCX  
Max: 80.7 [N-m] at 0.048 [s]  
Min: -25.5 [N-m] at 0.148 [s]



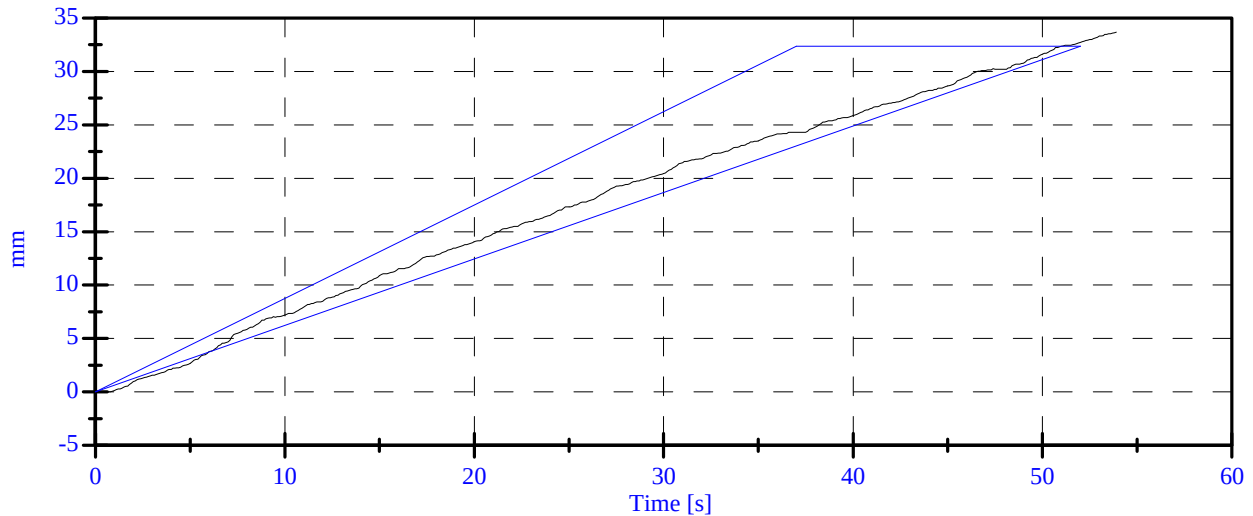
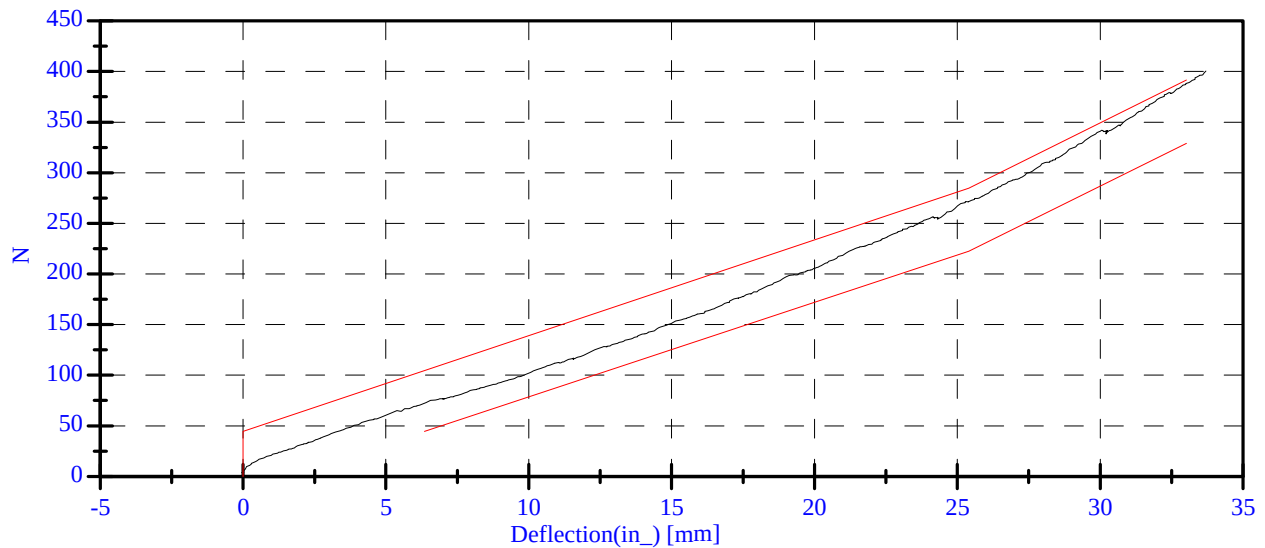
**Abdominal Compression Test**  
**Pre-Test**  
**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270  
Date: 10-23-09

Sequential Test Number: 1 File: 270Ab 10-23-09  
Laboratory Technician: A. Rudniski

| TEST PARAMETER      | SPECIFICATION   | TEST RESULTS | STATUS |
|---------------------|-----------------|--------------|--------|
| Lab Temperature:    | 18.9-25.5 C     | 20.6 C       | Passed |
| Lab Humidity:       | 10-70 %         | 36.00 %      | Passed |
| Force at 12.95 mm : | 104.00-162.00 N | 130.48 N     | Passed |
| Force at 19.05 mm : | 162.98-220.99 N | 197.29 N     | Passed |
| Force at 25.40 mm : | 221.97-280.02 N | 271.02 N     | Passed |
| Force at 33.02 mm : | 324.99-391.00 N | 387.11 N     | Passed |

**ABDOMINAL COMPRESSION TEST**



## Lumbar Spine Test

### Pre-Test

#### CONFIGURED FOR LEFT SIDE IMPACT

ATD Serial No: 270

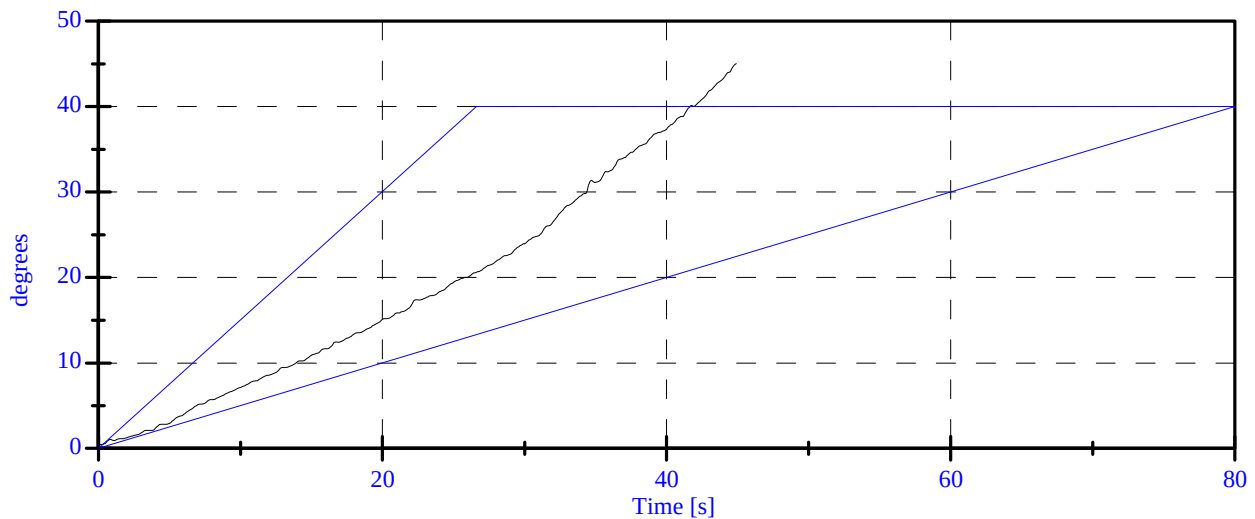
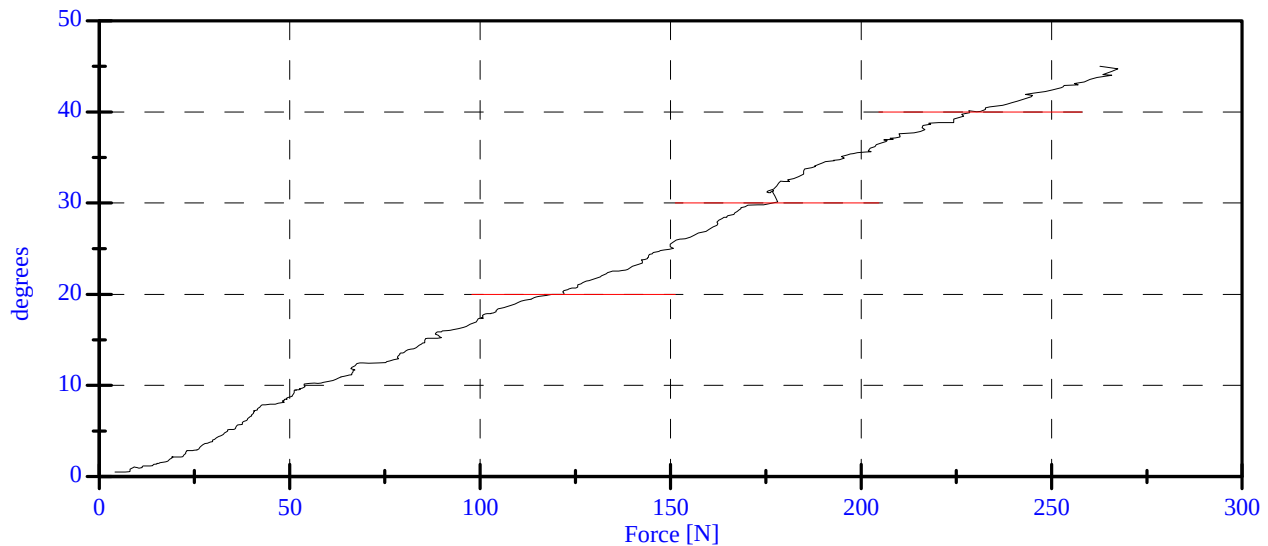
Date: 10-27-09

Sequential Test Number: 1 File: 270 Spine 10-27-09

Laboratory Technician: A. Rudniski

| TEST PARAMETER   | SPECIFICATION   | TEST RESULTS | STATUS |
|------------------|-----------------|--------------|--------|
| Lab Temperature: | 18.9-25.5 C     | 21.1 C       | Passed |
| Lab Humidity:    | 10-70 %         | 34.00 %      | Passed |
| Force at 0 Deg:  | 0.00-26.69 N    | 4.18 N       | Passed |
| Force at 20 Deg: | 97.86-151.24 N  | 118.82 N     | Passed |
| Force at 30 Deg: | 151.24-204.62 N | 178.11 N     | Passed |
| Force at 40 Deg: | 204.62-258.00 N | 230.34 N     | Passed |
| Return Angle     | 12 Deg Max      | 6.59 deg     | Passed |

### LUMBAR SPINE FLEXION TEST



**PRE-TEST DUMMY INSPECTION LIST**  
**CONFIGURED FOR LEFT SIDE IMPACT**

SID H3 Serial No.: 270 Sequential Test Number: 1  
Date: 10/22/09 Laboratory Technician: A.Rudniski

| PART         | ITEMS CHECKED                                     | COMMENTS |
|--------------|---------------------------------------------------|----------|
| SKIN         | VISUAL INSPECTION                                 | OK       |
| HEAD         | VISUAL, BALLAST,<br>ACCELEROMETER MOUNT           | OK       |
| NECK         | VISUAL, CABLE TORQUE                              | OK       |
| SPINE BOX    | VISUAL, BALLAST, WELDMENT,<br>ACCELEROMETER MOUNT | OK       |
| RIB CAGE     | VISUAL, MEASURE, STIFFENERS                       | OK       |
| STERNUM      | VISUAL                                            | OK       |
| LUMBAR SPINE | VISUAL                                            | OK       |
| ABDOMEN      | VISUAL                                            | OK       |
| PELVIS       | VISUAL, PALPATE,<br>ACCELEROMETER MOUNT           | OK       |
| UPPER LEGS   | VISUAL                                            | OK       |
| KNEES        | VISUAL, STOPS, INSERTS                            | OK       |
| LOWER LEGS   | VISUAL, RANGE OF MOTION                           | OK       |
| ANKLES       | VISUAL, RANGE OF MOTION                           | OK       |
| FEET         | VISUAL, RANGE OF MOTION                           | OK       |
| JOINTS       | 1 TO 2 g RANGE                                    | OK       |
| OTHER        | NONE                                              | -        |

**REMARKS:** None



**CALIBRATION TEST RESULTS**

**POST TEST**

**SID H3 NO.:** 270

**CONFIGURED FOR LEFT SIDE IMPACT**

**CALIBRATION TEST RESULTS SUMMARY  
POST TEST**

**CONFIGURED FOR LEFT SIDE IMPACT**

|                        |                                   |
|------------------------|-----------------------------------|
| SID H3 Serial No.: 270 | Sequential Test Number: 1         |
| Date: 11/17/09         | Laboratory Technician: A.Rudniski |

| TEST                        | COMMENTS                 |
|-----------------------------|--------------------------|
| EXTERNAL DIMENSIONS         | Passed all requirements. |
| LATERAL THORAX IMPACT TEST  | Passed all requirements. |
| LATERAL PELVIS IMPACT TEST  | Passed all requirements. |
| HEAD DROP TEST*             | Passed all requirements. |
| LATERAL NECK BEND TEST*     | Passed all requirements. |
| ABDOMINAL COMPRESSION TEST* | Passed all requirements. |
| LUMBAR FLEXION TEST*        | Passed all requirements. |

\* Test not required for SID certification.

**REMARKS:** None

**EXTERNAL DIMENSIONS  
POST TEST**

**CONFIGURED FOR LEFT SIDE IMPACT**

SID H3 Serial No.: 270 Sequential Test Number: 1  
Date: 11/16/09 Laboratory Technician: A.Rudniski

| TEST PARAMETER                     | SPECIFICATION | TEST RESULTS |
|------------------------------------|---------------|--------------|
| SH- Seated Height (mm)             | 889 - 909     | 899          |
| RH- Rib Height (mm)                | 502 - 520     | 504          |
| HP- Hip Pivot Height (mm)          | 99 ref.       | 99           |
| RD- Rib from Back Line (mm)        | 229 - 241     | 233          |
| KH- Knee Pivot from Back Line (mm) | 511 - 526     | 518          |
| KV- Knee Pivot to Floor (mm)       | 490 - 505     | 494          |
| HW- Hip Width (mm)                 | 356 - 391     | 386          |

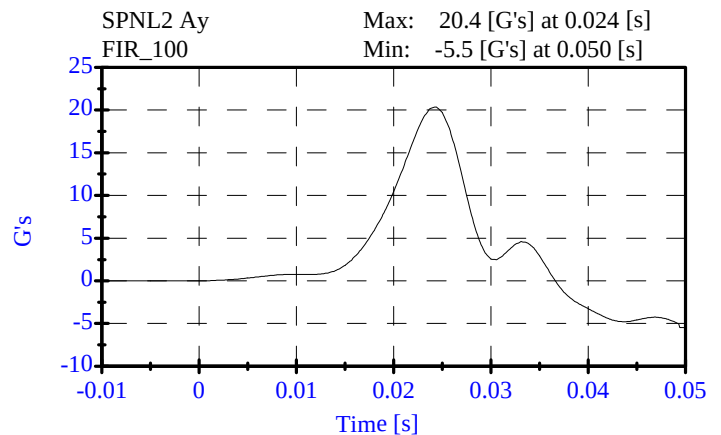
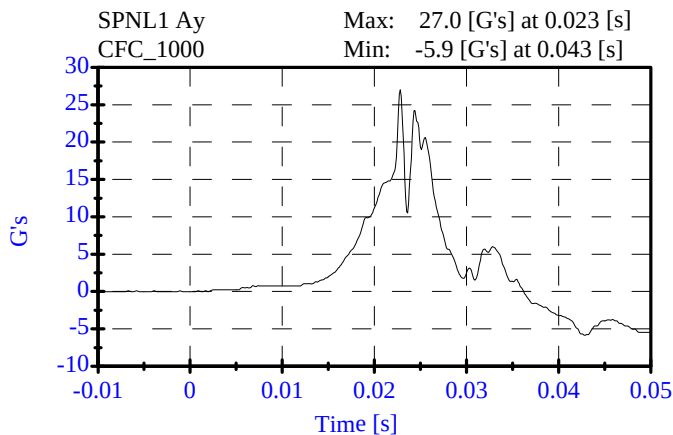
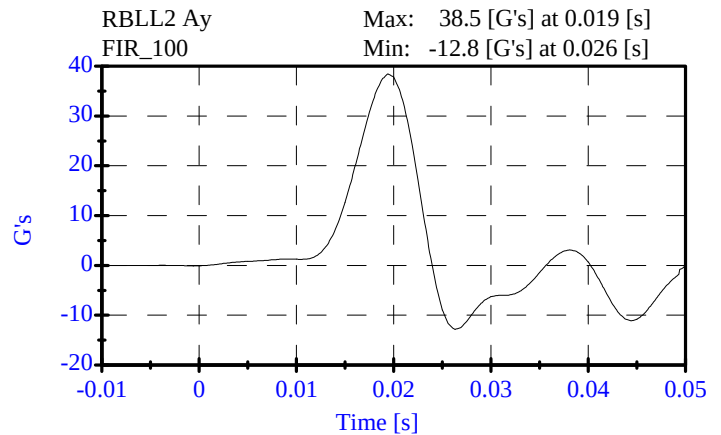
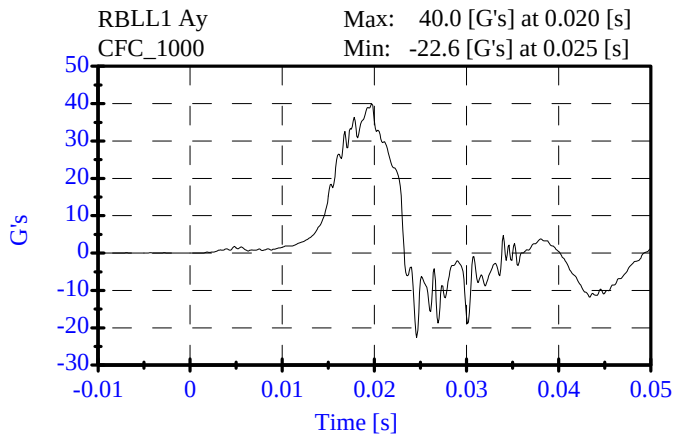
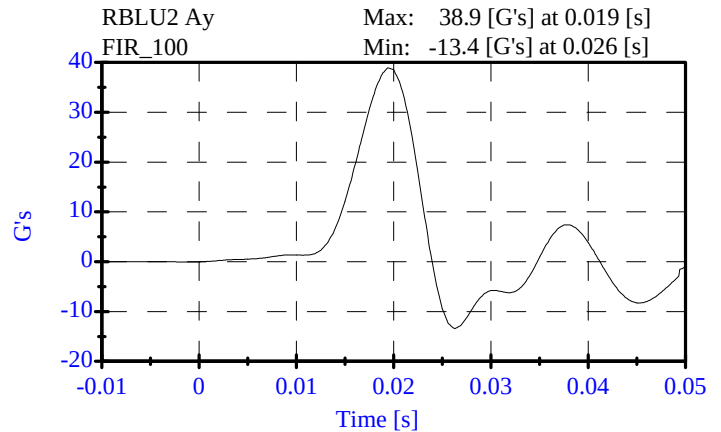
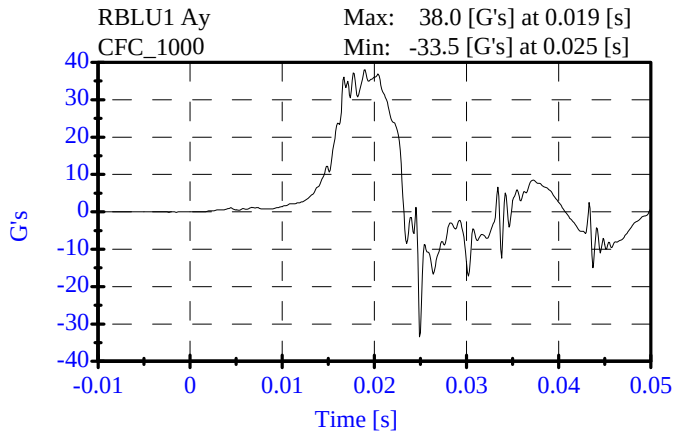
**REMARKS:** None

**Thorax Impact Test**  
**Post-Test**  
**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270  
Date: 11-16-09

Sequential Test Number: 1 File: 270T 11-16-09  
Laboratory Technician: A. Rudniski

| TEST PARAMETER            | SPECIFICATION   | TEST RESULTS | STATUS |
|---------------------------|-----------------|--------------|--------|
| Lab Temperature:          | 18.9-25.5 C     | 21.7 C       | Passed |
| Lab Humidity:             | 10-70 %         | 26.00 %      | Passed |
| Probe Velocity:           | 4.27- 4.33 m/s  | 4.29 m/s     | Passed |
| Upper Rib Acceleration:   | 37.00-46.00 G's | 38.92 G's    | Passed |
| Lower Rib Acceleration:   | 37.00-46.00 G's | 38.45 G's    | Passed |
| Lower Spine Acceleration: | 15.00-22.00 G's | 20.37 G's    | Passed |



## Pelvic Impact Test

### Post-Test

#### CONFIGURED FOR LEFT SIDE IMPACT

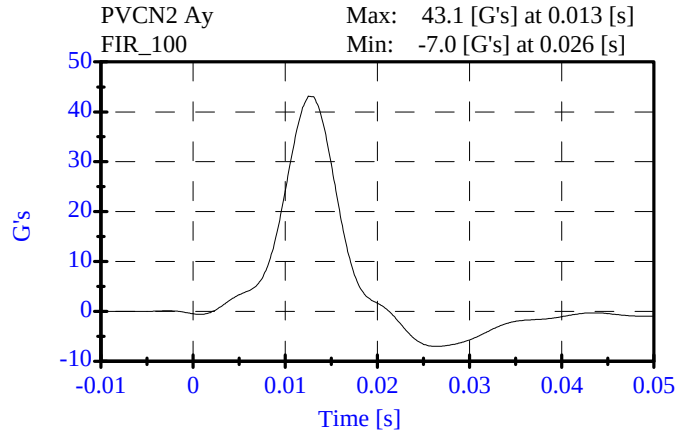
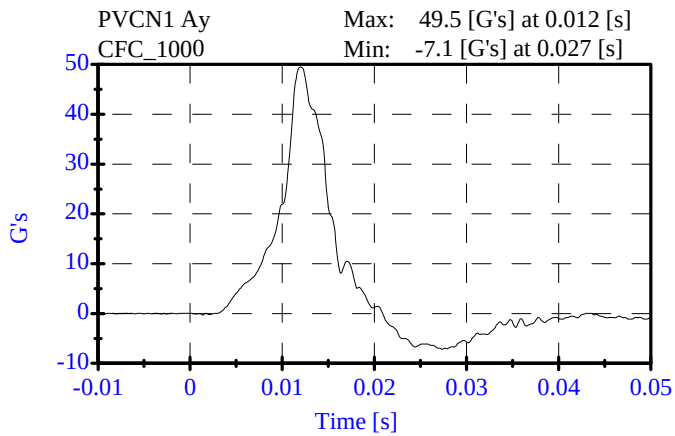
ATD Serial No: 270

Date: 11-16-09

Sequential Test Number: 1 File: 270P2 11-16-09

Laboratory Technician: A. Rudniski

| TEST PARAMETER         | SPECIFICATION   | TEST RESULTS | STATUS |
|------------------------|-----------------|--------------|--------|
| Lab Temperature:       | 18.9-25.5 C     | 21.7 C       | Passed |
| Lab Humidity:          | 10-70 %         | 27.00 %      | Passed |
| Probe Velocity:        | 4.27- 4.33 m/s  | 4.29 m/s     | Passed |
| Pelvis Y Acceleration: | 40.00-60.00 G's | 43.14 G's    | Passed |
| Time Above 20 Gs       | 3.0-7.0 ms      | 6.3 ms       | Passed |

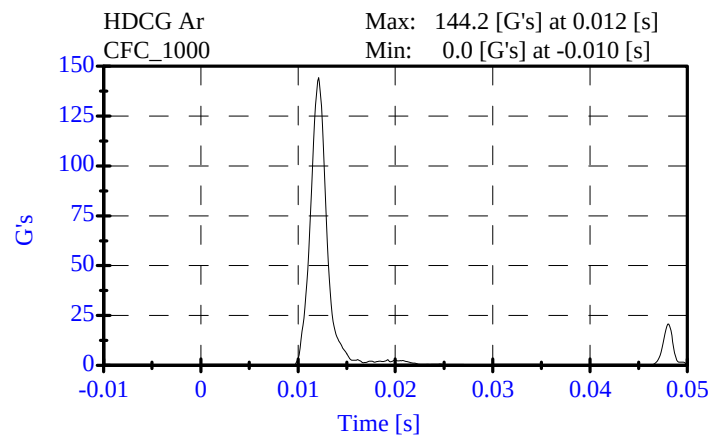
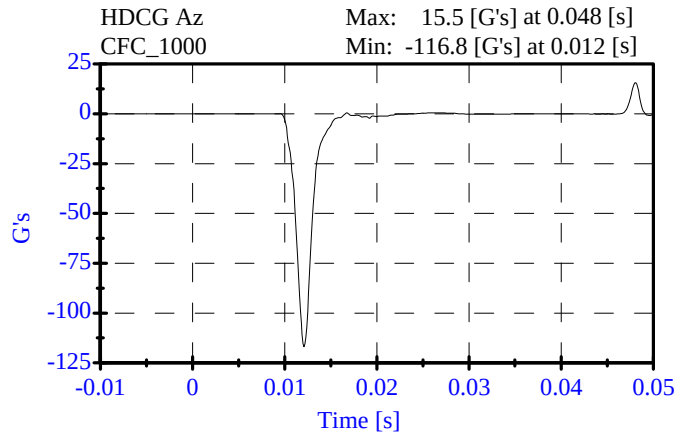
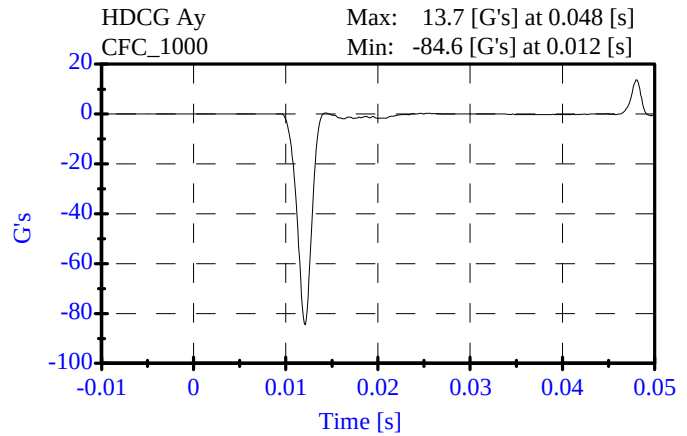
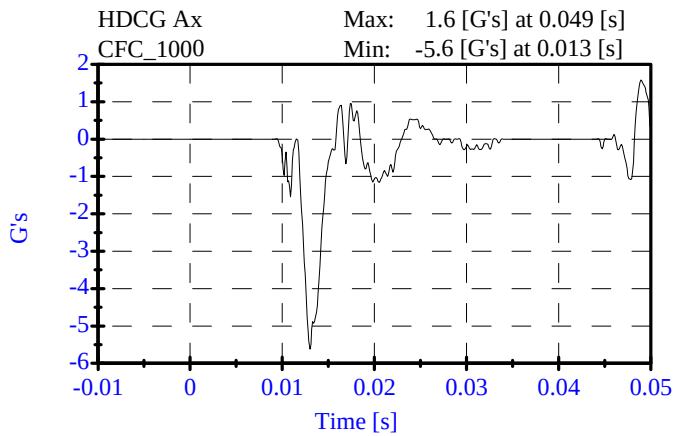


# **Head Drop Test** **Post-Test** **CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270  
Date: 11-16-09

Sequential Test Number: 1 File: 270H 11-16-09  
Laboratory Technician: A.Rudniski

| TEST PARAMETER          | SPECIFICATION | TEST RESULTS | STATUS |
|-------------------------|---------------|--------------|--------|
| Lab Temperature:        | 18.9-25.6 C   | 21.7 C       | Passed |
| Lab Humidity:           | 10-70 %       | 27.00 %      | Passed |
| Peak Resultant Accel.:  | 120-150 Gs    | 144.22 Gs    | Passed |
| Peak Lateral Accel.:    | 15 Gs Max     | 1.58 Gs      | Passed |
| Curve PerCent NonModal: | < 15%         | 14.36 %      | Passed |





**Neck Flexion Test****Post-Test****CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270

Date: 11-16-09

Sequential Test Number: 1 File: 270N 11-16-09

Laboratory Technician: A. Rudnski

| <u>TEST PARAMETER</u>                                           | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|-----------------------------------------------------------------|----------------------|---------------------|---------------|
| Lab Temperature:                                                | 20.6-22.2 C          | 21.7 C              | Passed        |
| Lab Humidity:                                                   | 10-70 %              | 27.00 %             | Passed        |
| Impact Velocity:                                                | 6.89- 7.13 m/s       | 7.00 m/s            | Passed        |
| PENDULUM DELTA V                                                |                      |                     |               |
| Delta V at 10 ms:                                               | 1.96- 2.55 m/s       | 2.27 m/s            | Passed        |
| Delta V at 20 ms:                                               | 4.12- 5.10 m/s       | 4.56 m/s            | Passed        |
| Delta V at 30 ms:                                               | 5.73- 7.01 m/s       | 6.34 m/s            | Passed        |
| Delta V between 40-70 ms:                                       | 6.27- 7.64 m/s       | 7.56 m/s            | Passed        |
| D PLANE ROTATION                                                |                      |                     |               |
| Maximum Rotation:                                               | 66.0-82.0 Deg        | 68.34 Deg           | Passed        |
| Rotation Angle Decay:                                           | 58.0-67.0 ms         | 59.70 ms            | Passed        |
| MOMENT ABOUT THE OCCIPITAL CONDYLE                              |                      |                     |               |
| Max Occipital Moment:                                           | 73.00- 88.00 N-m     | 78.54 N-m           | Passed        |
| Occipital Moment Decay:                                         | 49.0-64.0 ms         | 54.80 ms            | Passed        |
| HEAD ROTATION TIME WITH RESPECT TO THE OCCIPITAL CONDYLE MOMENT |                      |                     |               |
| Moment to Rotation Peak:                                        | 2.0-16.0 ms          | 10.60 ms            | Passed        |

**Neck Flexion Test**  
**Post-Test**  
**CONFIGURED FOR LEFT SIDE IMPACT**

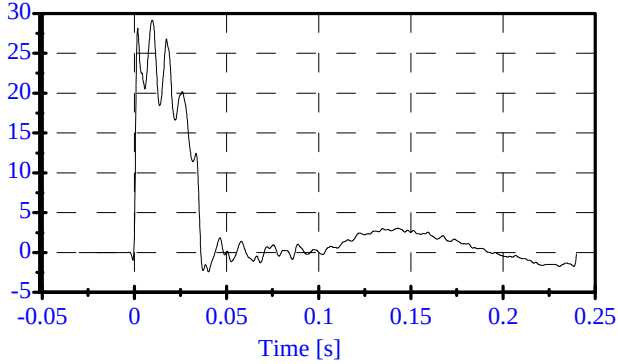
ATD Serial No: 270

Date: 11-16-09

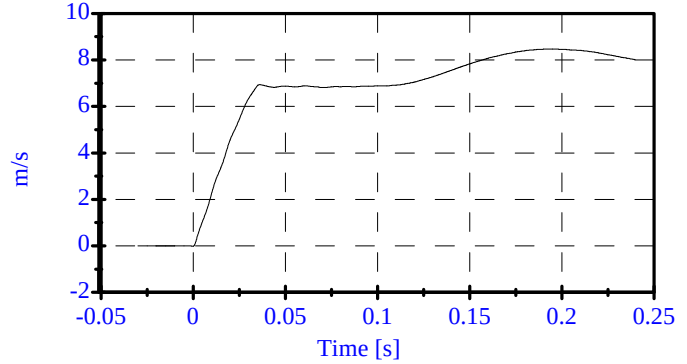
Sequential Test Number: 1 File: 270N 11-16-09

Laboratory Technician: A. Rudniski

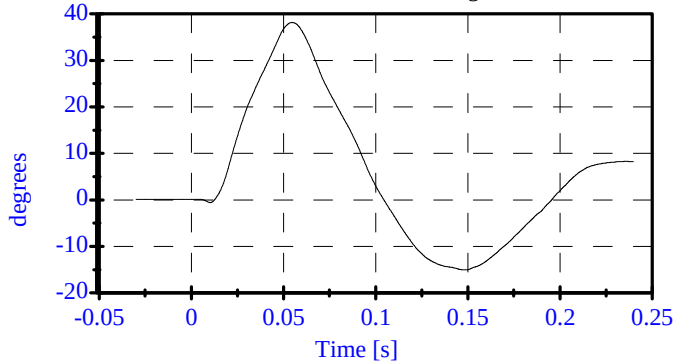
Pend Ax  
CFC\_180  
Max: 29.2 [ ] at 0.010 [s]  
Min: -2.4 [ ] at 0.040 [s]



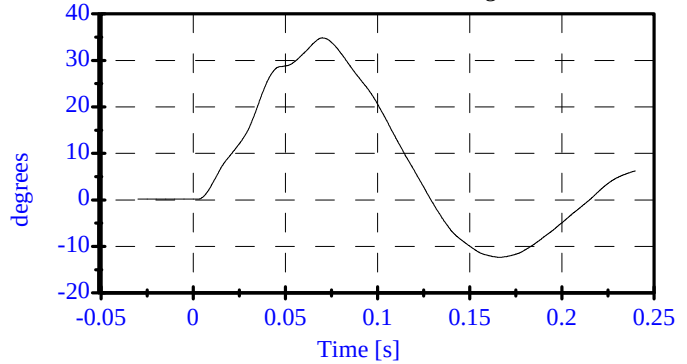
Pend Vx  
CFC\_180  
Max: 8.5 [m/s] at 0.193 [s]  
Min: -0.0 [m/s] at -0.000 [s]



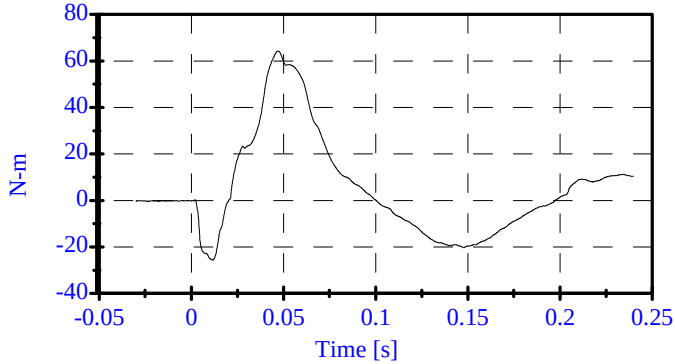
Head Rot  
CFC\_180  
Max: 38.2 [degrees] at 0.055 [s]  
Min: -15.0 [degrees] at 0.149 [s]



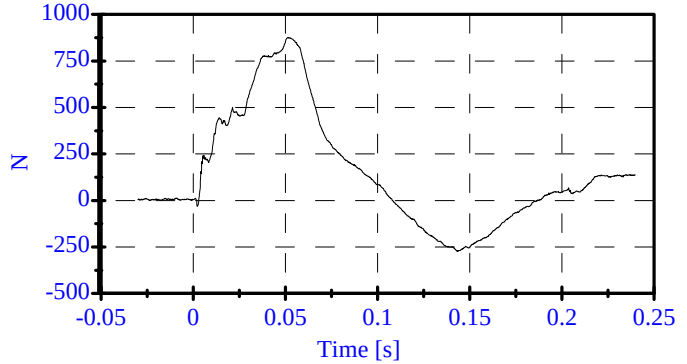
Arm Rot  
CFC\_180  
Max: 34.9 [degrees] at 0.070 [s]  
Min: -12.3 [degrees] at 0.166 [s]



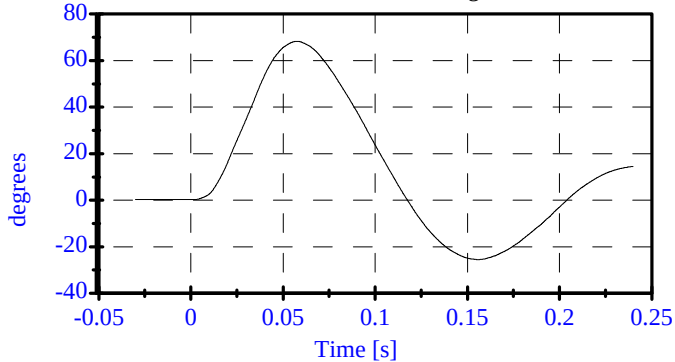
Neck Mx  
CFC\_600  
Max: 64.3 [N-m] at 0.047 [s]  
Min: -25.7 [N-m] at 0.012 [s]



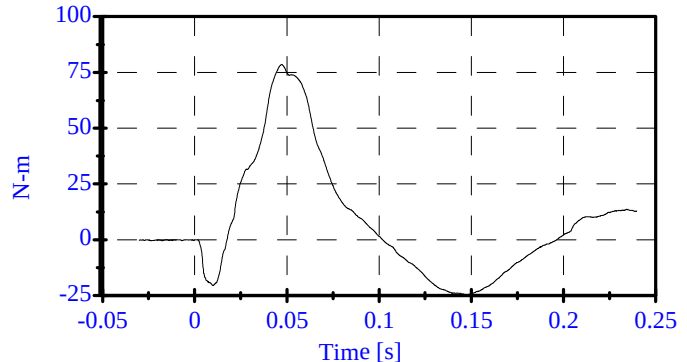
Neck Fy  
CFC\_1000  
Max: 877.1 [N] at 0.052 [s]  
Min: -274.0 [N] at 0.143 [s]



Tot Rot  
CFC\_180  
Max: 68.3 [degrees] at 0.058 [s]  
Min: -25.6 [degrees] at 0.156 [s]



MOCX  
Max: 78.5 [N-m] at 0.047 [s]  
Min: -24.7 [N-m] at 0.147 [s]



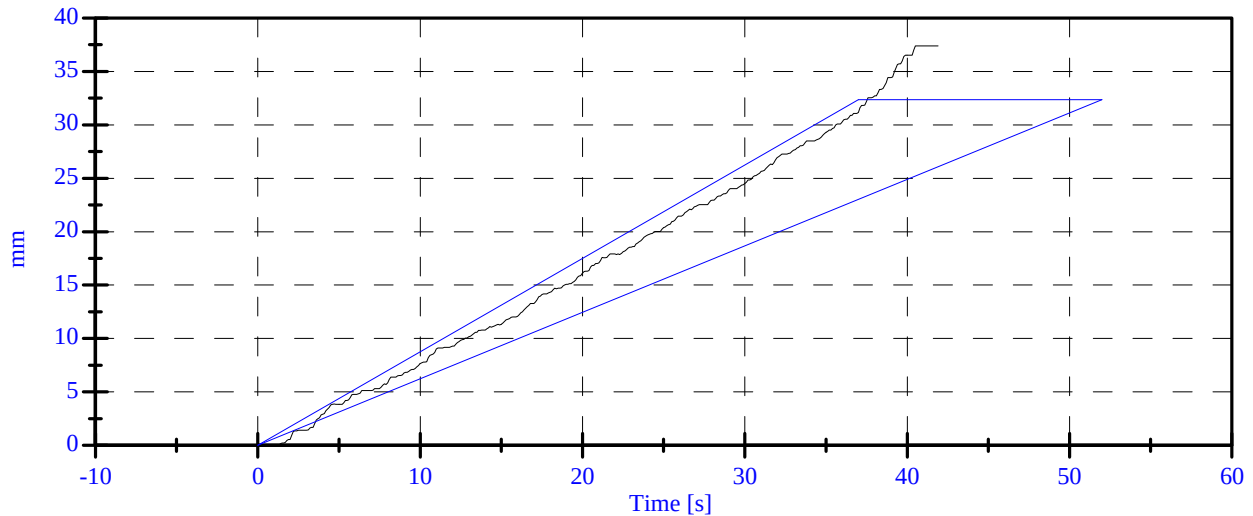
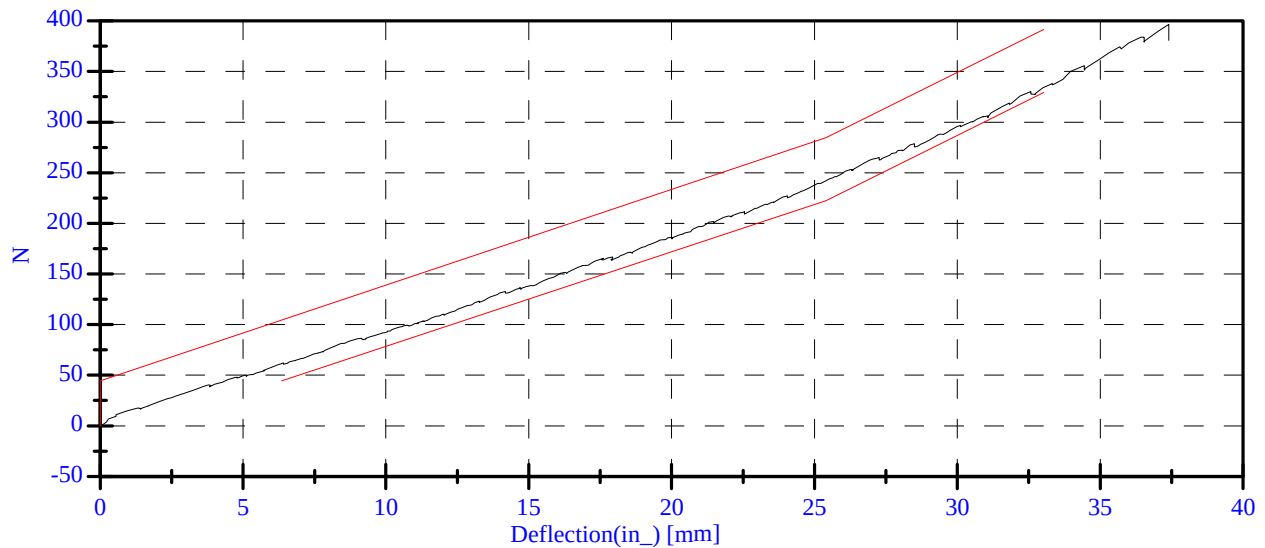
**Abdominal Compression Test**  
**Post-Test**  
**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270  
Date: 11-16-09

Sequential Test Number: 1 File: 270AB 11-16-09  
Laboratory Technician: A. Rudniski

| TEST PARAMETER      | SPECIFICATION   | TEST RESULTS | STATUS |
|---------------------|-----------------|--------------|--------|
| Lab Temperature:    | 18.9-25.5 C     | 21.7 C       | Passed |
| Lab Humidity:       | 10-70 %         | 27.00 %      | Passed |
| Force at 12.95 mm : | 104.00-162.00 N | 119.53 N     | Passed |
| Force at 19.05 mm : | 162.98-220.99 N | 176.84 N     | Passed |
| Force at 25.40 mm : | 221.97-280.02 N | 241.82 N     | Passed |
| Force at 33.02 mm : | 324.99-391.00 N | 333.81 N     | Passed |

**ABDOMINAL COMPRESSION TEST**



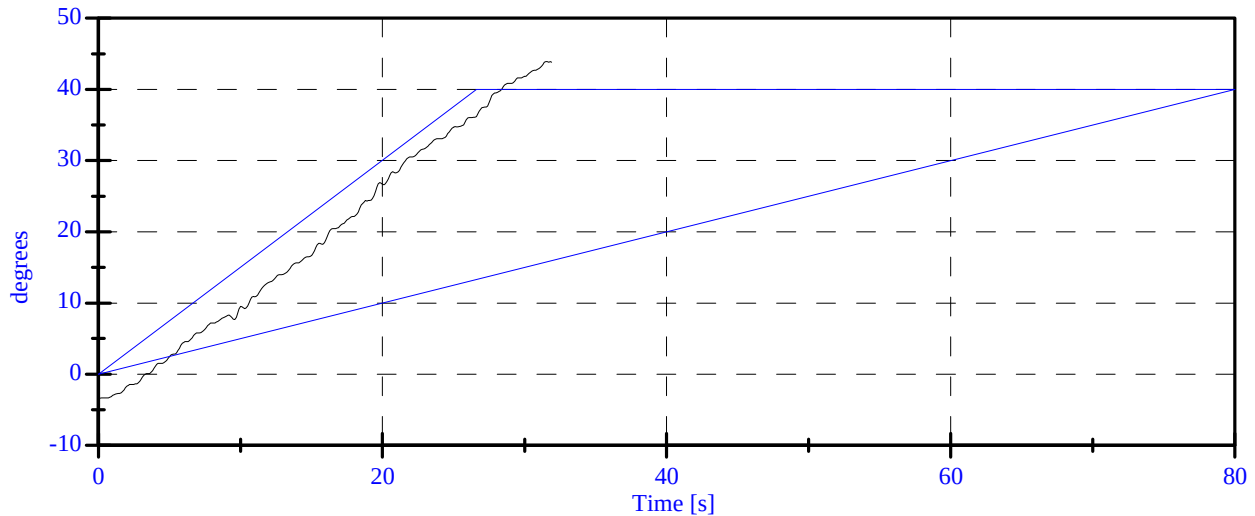
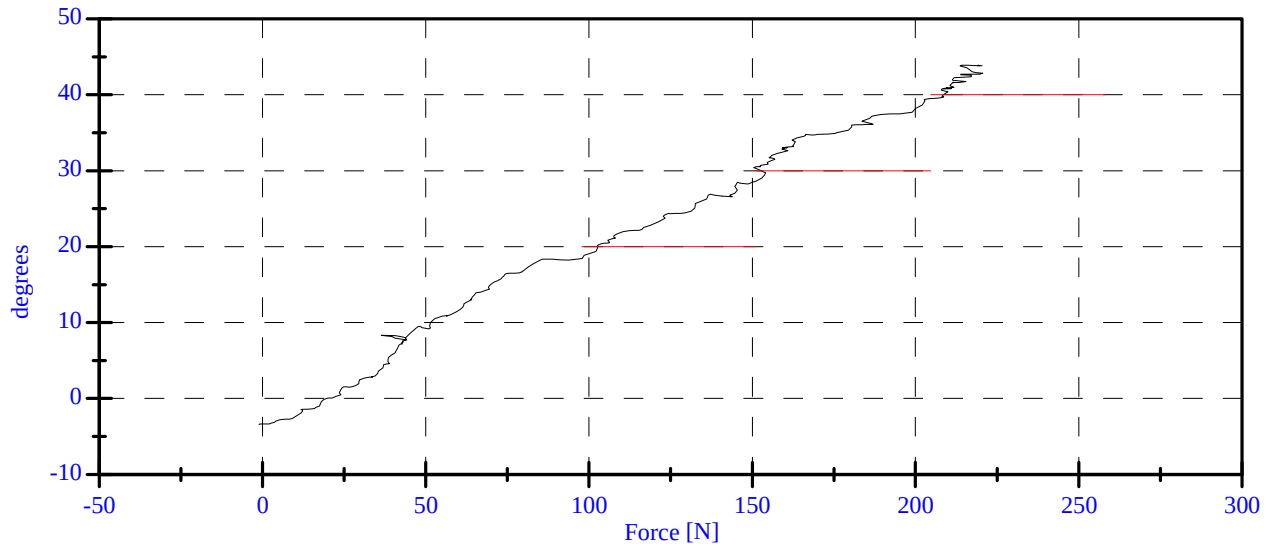
**Lumbar Flexion Test**  
**Post-Test**  
**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 270  
Date: 11-16-09

Sequential Test Number: 1 File: 270SP 11-16-09  
Laboratory Technician: A. Rudniski

| TEST PARAMETER   | SPECIFICATION   | TEST RESULTS | STATUS |
|------------------|-----------------|--------------|--------|
| Lab Temperature: | 18.9-25.5 C     | 21.7 C       | Passed |
| Lab Humidity:    | 10-70 %         | 27.00 %      | Passed |
| Force at 0 Deg:  | 0.00-26.69 N    | 19.58 N      | Passed |
| Force at 20 Deg: | 97.86-151.24 N  | 102.63 N     | Passed |
| Force at 30 Deg: | 151.24-204.62 N | 152.77 N     | Passed |
| Force at 40 Deg: | 204.62-258.00 N | 208.66 N     | Passed |
| Return Angle     | 12 Deg Max      | 9.73 deg     | Passed |

**LUMBAR SPINE FLEXION TEST**



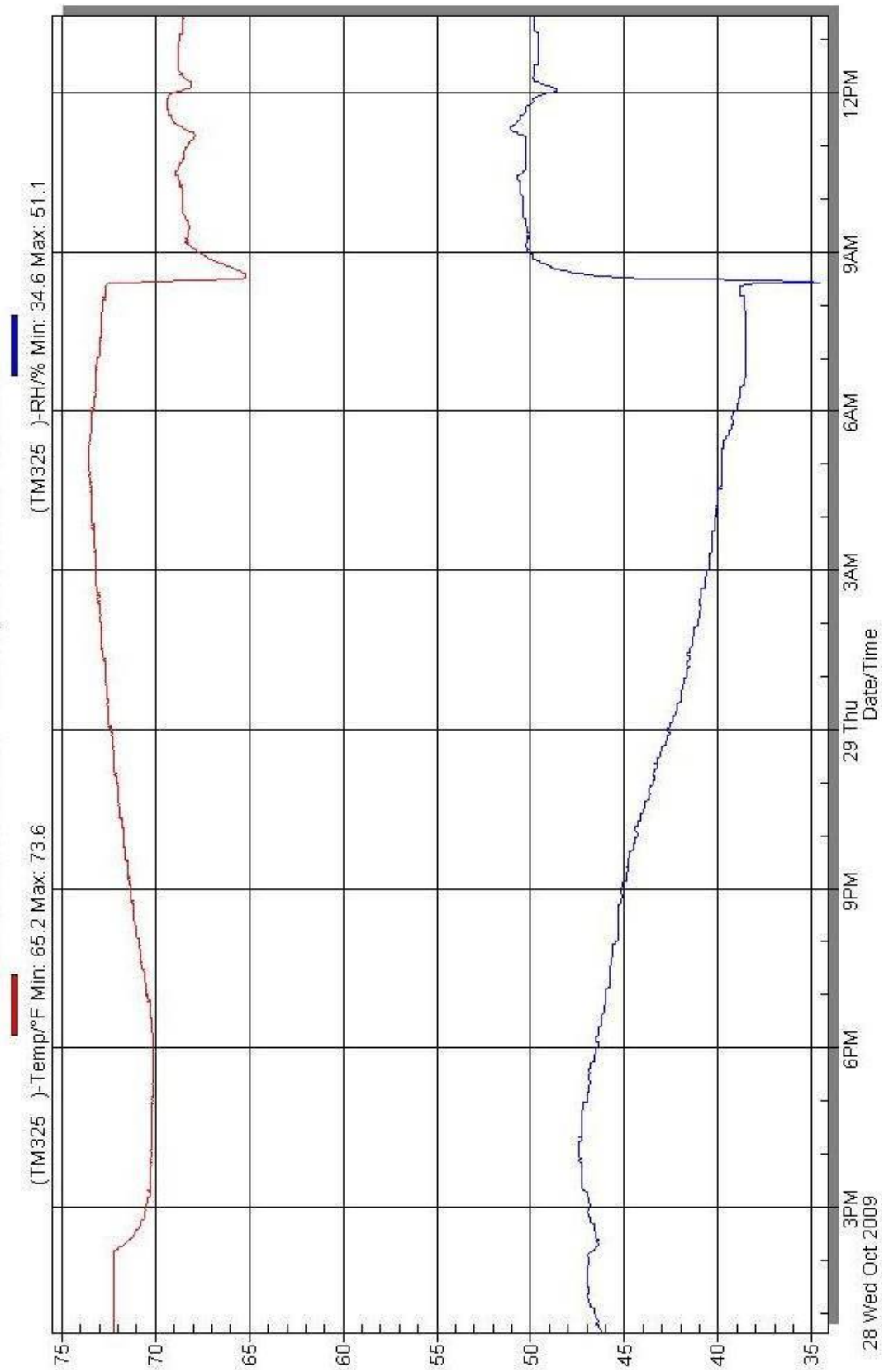
**POST TEST DUMMY INSPECTION LIST**  
**CONFIGURED FOR LEFT SIDE IMPACT**

SID H3 Serial No.: 270 Sequential Test Number: 1  
 Date: 11/16/09 Laboratory Technician: A.Rudniski

| PART         | ITEMS CHECKED                                     | COMMENTS |
|--------------|---------------------------------------------------|----------|
| SKIN         | VISUAL INSPECTION                                 | OK       |
| HEAD         | VISUAL, BALLAST,<br>ACCELEROMETER MOUNT           | OK       |
| NECK         | VISUAL, CABLE TORQUE                              | OK       |
| SPINE BOX    | VISUAL, BALLAST, WELDMENT,<br>ACCELEROMETER MOUNT | OK       |
| RIB CAGE     | VISUAL, MEASURE, STIFFENERS                       | OK       |
| STERNUM      | VISUAL                                            | OK       |
| LUMBAR SPINE | VISUAL                                            | OK       |
| ABDOMEN      | VISUAL                                            | OK       |
| PELVIS       | VISUAL, PALPATE,<br>ACCELEROMETER MOUNT           | OK       |
| UPPER LEGS   | VISUAL                                            | OK       |
| KNEES        | VISUAL, STOPS, INSERTS                            | OK       |
| LOWER LEGS   | VISUAL, RANGE OF MOTION                           | OK       |
| ANKLES       | VISUAL, RANGE OF MOTION                           | OK       |
| FEET         | VISUAL, RANGE OF MOTION                           | OK       |
| JOINTS       | 1 TO 2 g RANGE                                    | OK       |
| OTHER        | NONE                                              | -        |

**REMARKS:** None

# TEMPERATURE TRACE





**APPENDIX D**

**TEST EQUIPMENT AND CALIBRATION INFORMATION**

# TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

## SID/HIII INSTRUMENTATION

|                       | FRONT SID/HIII NO.: 270 |              |                  |
|-----------------------|-------------------------|--------------|------------------|
|                       | SERIAL NUMBER           | MANUFACTURER | CALIBRATION DATE |
| HEAD AX               | AC-P58998               | ENDEVCO      | 7/24/2009        |
| HEAD AY               | AC-P58909               | ENDEVCO      | 7/24/2009        |
| HEAD AZ               | AC-P51279               | ENDEVCO      | 7/24/2009        |
| HEAD AX (REDUNDANT)   | AC-P58780               | ENDEVCO      | 7/24/2009        |
| HEAD AY (REDUNDANT)   | AC-P58997               | ENDEVCO      | 7/24/2009        |
| HEAD AZ (REDUNDANT)   | AC-P58912               | ENDEVCO      | 7/24/2009        |
| UPPER NECK FX         | LC-498Fx                | DENTON       | 4/20/2009        |
| UPPER NECK FY         | LC-498Fy                | DENTON       | 4/20/2009        |
| UPPER NECK FZ         | LC-498Fz                | DENTON       | 4/20/2009        |
| UPPER NECK MX         | LC-498Mx                | DENTON       | 4/20/2009        |
| UPPER NECK MY         | LC-498My                | DENTON       | 4/20/2009        |
| UPPER NECK MZ         | LC-498Mz                | DENTON       | 4/20/2009        |
| UPPER RIB             | AC-P51969               | ENDEVCO      | 7/24/2009        |
| LOWER RIB             | AC-P51950               | ENDEVCO      | 7/24/2009        |
| LOWER SPINE           | AC-P51970               | ENDEVCO      | 7/24/2009        |
| PELVIS                | AC-P51946               | ENDEVCO      | 7/24/2009        |
| UPPER RIB REDUNDANT   | AC-P51948               | ENDEVCO      | 7/24/2009        |
| LOWER RIB REDUNDANT   | AC-P51974               | ENDEVCO      | 7/24/2009        |
| LOWER SPINE REDUNDANT | AC-P51965               | ENDEVCO      | 7/24/2009        |
| PELVIS REDUNDANT      | AC-P51945               | ENDEVCO      | 7/24/2009        |

**REMARKS:** None

# TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

## VEHICLE AND MDB INSTRUMENTATION

|                                    | VEHICLE AND MDB INSTRUMENTS |              |                  |
|------------------------------------|-----------------------------|--------------|------------------|
|                                    | SERIAL NUMBER               | MANUFACTURER | CALIBRATION DATE |
| RIGHT FRONT SILL (X)               | AC-P38132                   | ENDEVCO      | 9/25/2009        |
| RIGHT FRONT SILL (Y)               | AC-P23993                   | ENDEVCO      | 9/25/2009        |
| RIGHT FRONT SILL (Z)               | AC-P23939                   | ENDEVCO      | 9/25/2009        |
| RIGHT REAR SILL (X)                | AC-P23885                   | ENDEVCO      | 10/2/2009        |
| RIGHT REAR SILL (Y)                | AC-P32288                   | ENDEVCO      | 9/25/2009        |
| RIGHT REAR SILL (Z)                | AC-P16671                   | ENDEVCO      | 9/25/2009        |
| REAR FLOORPAN ABOVE AXLE (X)       | AC-P35803                   | ENDEVCO      | 9/25/2009        |
| REAR FLOORPAN ABOVE AXLE (Y)       | AC-P35811                   | ENDEVCO      | 9/25/2009        |
| REAR FLOORPAN ABOVE AXLE (Z)       | AC-P35789                   | ENDEVCO      | 9/25/2009        |
| LEFT REAR SILL (Y)                 | AC-P35788                   | ENDEVCO      | 9/25/2009        |
| LEFT FRONT SILL (Y)                | AC-P26269                   | ENDEVCO      | 9/25/2009        |
| RIGHT REAR SEAT OCCUPANT COMP. (Y) | AC-P16862                   | ENDEVCO      | 9/25/2009        |
| LOWER LEFT B- PILLAR (Y)           | AC-P17283                   | ENDEVCO      | 9/25/2009        |
| MIDDLE LEFT B-PILLAR (Y)           | AC-P23873                   | ENDEVCO      | 9/25/2009        |
| LOWER LEFT A-PILLAR (Y)            | AC-P23788                   | ENDEVCO      | 9/25/2009        |
| UPPER LEFT A-PILLAR (Y)            | AC-P19222                   | ENDEVCO      | 9/25/2009        |
| FRONT SEAT TRACK (Y)               | AC-P23960                   | ENDEVCO      | 9/25/2009        |
| REAR SEAT TRACK (Y)                | AC-P13329                   | ENDEVCO      | 7/29/2009        |
| VEHICLE CG (X)                     | AC-P35757                   | ENDEVCO      | 9/25/2009        |
| VEHICLE CG (Y)                     | AC-P21399                   | ENDEVCO      | 9/25/2009        |
| VEHICLE CG (Z)                     | AC-P23899                   | ENDEVCO      | 9/25/2009        |
| MDB CG (X)                         | AC-C16680                   | ENDEVCO      | 6/9/2009         |
| MDB CG (Y)                         | AC-C14948                   | ENDEVCO      | 6/9/2009         |
| MDB CG (Z)                         | AC-CP30                     | ENDEVCO      | 6/9/2009         |
| MDB REAR FRAME MEMBER (X)          | AC-C15007                   | ENDEVCO      | 6/9/2009         |
| MDB REAR FRAME MEMBER (Y)          | AC-C16499                   | ENDEVCO      | 6/9/2009         |

**REMARKS:** None