

638622

**REPORT NUMBER: 214-CAL-07-03**

**SAFETY COMPLIANCE TESTING FOR FMVSS 214  
SIDE IMPACT PROTECTION  
INDICANT**

**GENERAL MOTORS CORPORATION  
2007 PONTIAC SOLSTICE  
2-DOOR CONVERTIBLE**

**NHTSA NUMBER: C70101**

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



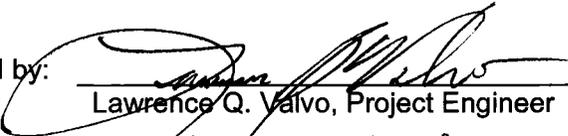
**Test Date: October 17, 2006**

**FINAL REPORT**

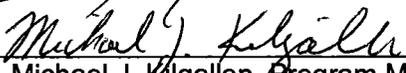
**PREPARED FOR:  
U.S. DEPARTMENT OF TRANSPORTATION  
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OFFICE OF VEHICLE SAFETY COMPLIANCE  
MAIL CODE: NVS-220  
400 SEVENTH STREET, SW, ROOM 6111  
WASHINGTON, D.C. 20590**

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Prepared by:   
Lawrence Q. Valvo, Project Engineer

Date: 11/13/06

Reviewed by:   
Michael J. Kilgallon, Program Manager  
Transportation Sciences Center

Date: 11/13/06

### Technical Report Documentation Page

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| <b>4. Title and Subtitle</b><br>Final Report of FMVSS 214 Compliance Side Impact Testing of a 2007 Pontiac Solstice 2-Door Convertible<br>NHTSA No.: C70101  |   | <b>5. Report Date</b><br>October 17, 2006   |                  |  |               |                   |                                |      |   |                                |      |   |  |      |   |                             |    |   |                        |    |   |     |       |   |
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| <b>15. Supplementary Notes</b>   |   |   |                  |  |               |                   |                                |      |   |                                |      |   |  |      |   |                             |    |   |                        |    |   |     |       |   |
| <b>16. Abstract</b><br><p>A 55/28 km/h 90° Moving Deformable Barrier FMVSS 214 Indicant side impact was conducted on the subject 2007 Pontiac Solstice 2-Door Convertible to obtain new car assessment and research data indicant of FMVSS No. 214D performance. The test was conducted at the Calspan Corporation Transportation Sciences Center in Buffalo, New York, on October 17, 2006. The impact velocity of the Moving Deformable Barrier (MDB) was 62.28 km/h, and the ambient temperature at the struck side (driver side) of the vehicle was 21.1°C. The target vehicle's maximum post test static crush was 194 mm at level 3. The test vehicle's occupant performance is as follows:</p> <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"></th> <th style="text-align: center;"><u>DRIVER</u></th> <th style="text-align: center;"><u>PASSENGER*</u></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib (LUR) Accel., g</td> <td style="text-align: center;">54.4</td> <td style="text-align: center;">-</td> </tr> <tr> <td>Left Lower Rib (LLR) Accel., g</td> <td style="text-align: center;">52.3</td> <td style="text-align: center;">-</td> </tr> <tr> <td>Lower Spine (T<sub>12</sub>) Accel., g</td> <td style="text-align: center;">64.0</td> <td style="text-align: center;">-</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td style="text-align: center;">59</td> <td style="text-align: center;">-</td> </tr> <tr> <td>Pelvis (PEV) Accel., g</td> <td style="text-align: center;">71</td> <td style="text-align: center;">-</td> </tr> <tr> <td>HIC</td> <td style="text-align: center;">304.6</td> <td style="text-align: center;">-</td> </tr> </tbody> </table> <p>* This two-seat vehicle does not have rear seating positions.</p> <p>The door on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite door did not open during the side impact event.</p> |   |   |                  |  | <u>DRIVER</u> | <u>PASSENGER*</u> | Left Upper Rib (LUR) Accel., g | 54.4 | - | Left Lower Rib (LLR) Accel., g | 52.3 | - | Lower Spine (T <sub>12</sub> ) Accel., g | 64.0 | - | Thoracic Trauma Index (TTI) | 59 | - | Pelvis (PEV) Accel., g | 71 | - | HIC | 304.6 | - |
|  | <u>DRIVER</u>   | <u>PASSENGER*</u>   |                  |  |               |                   |                                |      |   |                                |      |   |  |      |   |                             |    |   |                        |    |   |     |       |   |
| Left Upper Rib (LUR) Accel., g   | 54.4  | -   |                  |  |               |                   |                                |      |   |                                |      |   |  |      |   |                             |    |   |                        |    |   |     |       |   |
| Left Lower Rib (LLR) Accel., g   | 52.3  | -   |                  |  |               |                   |                                |      |   |                                |      |   |  |      |   |                             |    |   |                        |    |   |     |       |   |
| Lower Spine (T <sub>12</sub> ) Accel., g   | 64.0  | -   |                  |  |               |                   |                                |      |   |                                |      |   |  |      |   |                             |    |   |                        |    |   |     |       |   |
| Thoracic Trauma Index (TTI)  | 59  | -   |                  |  |               |                   |                                |      |   |                                |      |   |  |      |   |                             |    |   |                        |    |   |     |       |   |
| Pelvis (PEV) Accel., g   | 71  | -   |                  |  |               |                   |                                |      |   |                                |      |   |  |      |   |                             |    |   |                        |    |   |     |       |   |
| HIC  | 304.6   | -   |                  |  |               |                   |                                |      |   |                                |      |   |  |      |   |                             |    |   |                        |    |   |     |       |   |
| <b>17. Key Words</b><br>Compliance Testing<br>Side Impact Protection<br>FMVSS 214<br>Side Impact Dummy (SID)   |   | <b>18. Distribution Statement</b><br><u>Copies of this report are available from:</u><br>National Highway Traffic Safety Administration<br>Technical Reference Division (TIS)<br>Room 5108 (NPO-230)<br>400 Seventh St., S.W.<br>Washington, D.C. 20590<br>Telephone No. (202) 366-4946 |                  |  |               |                   |                                |      |   |                                |      |   |  |      |   |                             |    |   |                        |    |   |     |       |   |
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## TABLE OF CONTENTS

| <u>Section</u> |  | <u>Page No.</u> |
|----------------|--|-----------------|
| 1              | Purpose and Test Procedure                     | 1-1             |
| 2              | Summary of FMVSS 214 Indicant Side Impact Test | 2-1             |

| <u>Data Sheet No.</u> |  | <u>Page No.</u> |
|-----------------------|--|-----------------|
| 1                     | General Test and Vehicle Parameter Data            | 2-3             |
| 2                     | Test Vehicle Tire Information                      | 2-5             |
| 3                     | Test Vehicle Information                           | 2-6             |
| 4                     | Moving Deformable Barrier (MDB) Summary of Results | 2-8             |
| 5                     | Post Test Observations                             | 2-9             |
| 6                     | Vehicle Pre-Test and Post Test Measurements        | 2-10            |
| 7                     | SID/HIII Longitudinal Clearance Dimensions         | 2-11            |
| 8                     | SID/HIII Lateral Clearance Dimensions              | 2-12            |
| 9                     | Vehicle Side Measurements                          | 2-13            |
| 10                    | Vehicle Exterior Crush Profiles                    | 2-14            |
| 11                    | Vehicle Damage Profile Distances                   | 2-15            |
| 12                    | Deformable Barrier Honeycomb Face Static Crush     | 2-16            |
| 13                    | Vehicle Accelerometer Locations                    | 2-17            |
| 14                    | MDB Accelerometer Locations                        | 2-18            |
| 15                    | Vehicle Structural Measurements                    | 2-19            |
| 16                    | High Speed Camera Locations and Data               | 2-20            |
| 17                    | Summary of FMVSS 301 Data                          | 2-21            |

| <u>Appendix</u> |  | <u>Page No</u> |
|-----------------|--|----------------|
| A               | Photographs  | A-1            |
| B               | SID/HIII, Vehicle and MDB Response Data                  | B-1            |
| C               | SID/HIII Configuration and Performance Verification Data | C-1            |
| D               | Test Equipment and Calibration Information               | D-1            |

**SECTION 1**  
**PURPOSE AND TEST PROCEDURE**

**PURPOSE**

This side impact test is part of the FMVSS 214 Side Impact Protection Compliance Test Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-02-D-01114. The purpose of this indicant test was to evaluate side impact protection in a 2007 Pontiac Solstice 2-Door Convertible when tested at the New Car Assessment Program (NCAP) target test velocity of 62.0 kph, which is 8 kph faster than the target velocity required by the Office of Vehicle Safety Compliance's Laboratory Test Procedure (TP-214D-06, dated July 26, 2001).

## **SECTION 2**

### **SUMMARY OF FMVSS 214 INDICANT SIDE IMPACT TEST**

This Side Impact Protection Indicant Test was performed at the New Car Assessment Program (NCAP) target test velocity of 62.0 kph, which is 8 kph faster than the target velocity required by the Office of Vehicle Safety Compliance's Laboratory Test Procedure (TP-214D-06, dated July 26, 2001).

A model year 2007 Pontiac Solstice 2-Door Convertible 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 62.28 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 1423.0 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 17, 2006.

One (1) real-time motion picture camera and eight (8) high-speed motion picture cameras were used to document the impact event. The pre-test and post-test conditions were recorded by one (1) real-time motion picture camera. Camera locations and pertinent camera information are documented in the data sheets. Pre- and post-test photographs of the vehicle and Side Impact Dummy (SID/HIII) can be found in Appendix A.

One 50th percentile adult male SID/HIII 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 July 1997. The SID/HIII was instrumented in the following locations:

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

The test vehicle was instrumented with twenty (20) structural accelerometers and the MDB was instrumented with five (5) accelerometers.

#### **2.2 GENERAL COMMENTS**

The test vehicle sustained a maximum static crush of 194 mm at level 3, 1350 mm rearward of the left vertical impact point. The driver SID/HIII, Serial No. 906, was calibrated just prior to this test.

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/HIII, vehicle, and MDB response data traces. Appendix C contains the SID/HIII 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       | 304.6   | 32.5           | 34.1           | 59        | 71                |
| Passenger *  | -       | -              | -              | -         | -                 |

**SUPPLEMENTAL RESTRAINT INFORMATION**

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

\* This two-seat vehicle does not have rear seating positions.

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: | <u>2007 Pontiac Solstice</u>          | NHTSA No.: | <u>C70101</u>           |
| Test Program: | <u>FMVSS 214 Indicant Side Impact</u> | Test Date: | <u>October 17, 2006</u> |

**TEST VEHICLE INFORMATION AND VEHICLE OPTIONS**

|                       |  |   |     |
|-----------------------|--|---|-----|
| Make                  | General Motors Corporation                               | Driver Front Airbag                                   | Yes |
| Model                 | Solstice   | Driver Side Curtain Airbag                            | No  |
| Body Style            | 2-Door Convertible                                       | Driver Side Torso Airbag                              | No  |
| NHTSA No.             | C70101   | Driver Pretensioners                                  | Yes |
| VIN                   | 1G2MB35B57Y106547  | Driver Load Limiters                                  | Yes |
| Color                 | Yellow   | Driver Power Seats                                    | No  |
| Engine Disp.(L)       | 2.4  | Rear Pass. Side Curtain Airbag                        | -   |
| Engine Cylinders      | 4  | Rear Pass. Side Torso Airbag                          | -   |
| Engine Placement      | Longitudinal   | Rear Pass. Pretensioners                              | -   |
| Transmission Type     | Manual   | Rear Pass. Load Limiters                              | -   |
| Transmission Speeds   | 5  | Rear Pass. Power Seats                                | -   |
| Final Drive           | Rear   | Tilt Wheel  | Yes |
| Air Conditioning      | Yes  | Anti-lock Brakes                                      | No  |
| Power Steering        | Yes  | Traction Control                                      | Yes |
| Power Brakes          | Yes  | Power Windows   | Yes |
| Delivery Date         | 09/15/2006   | Power Door Locks                                      | Yes |
| Odometer Reading (km) | 802  | Automatic Door Locks (ADL)                            | Yes |
| Dealer                | Jim Murphy Pontiac Buick GMC, Inc., Depew, NY 14043-2608 | Owner's Manual Details Instructions on Disabling ADLs | No  |

**DATA FROM CERTIFICATION LABEL**

|                     |                            |                 |      |
|---------------------|----------------------------|-----------------|------|
| Manufactured By     | General Motors Corporation | GVWR (kg)       | 1543 |
| Date of Manufacture | 07/06                      | GAWR Front (kg) | 774  |
|                     |                            | GAWR Rear (kg)  | 769  |

**VEHICLE CAPACITY DATA**

| Measured Parameter      | Front  | Rear | Third | Total |
|-------------------------|--------|------|-------|-------|
| Type of Seats           | Bucket |      |       |       |
| Number Of Occupants     | 2      |      |       | 2     |
| Capacity Wt. (VCW) (kg) |        |      |       | 164   |
| Cargo Wt. (RCLW) (kg)   |        |      |       | 27.9  |

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

**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2007 Pontiac Solstice NHTSA No. C70101  
 Test Program: FMVSS 214 Indicant Side Impact Test Date: October 17, 2006

**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    | 339.5                     | 316.5 |        | 364.5               | 367.5 |        | 351.5                  | 363.5 |        |
| Right  | kg    | 350.5                     | 314.0 |        | 354.0               | 346.0 |        | 355.5                  | 352.5 |        |
| Ratio  | %     | 52.3                      | 47.7  |        | 50.2                | 49.8  |        | 49.7                   | 50.3  |        |
| Totals | kg    | 690.0                     | 630.5 | 1320.5 | 718.5               | 713.5 | 1432.0 | 707.0                  | 716.0 | 1423.0 |

**TARGET TEST WEIGHT CALCULATION**

| Measured Parameter                      | Units | Value  |
|---|-------|--------|
| Total Delivered Weight (UVW)            | kg    | 1320.5 |
| Weight of 2 P572E ATDs (81.2 kg each)   | kg    | 81.2   |
| Rated Cargo/Luggage Weight (RCLW)       | kg    | 27.9   |
| Calculated Vehicle Target Weight (TVTW) | kg    | 1429.6 |

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

Weight of Ballast (including instrumentation package and cameras): 21.3 kg

**TEST VEHICLE ATTITUDES**

|              | Units | LF  | RF  | LR  | RR  |
|--------------|-------|-----|-----|-----|-----|
| As Delivered | mm    | 732 | 727 | 742 | 748 |
| Fully Loaded | mm    | 725 | 723 | 724 | 734 |
| As Tested    | mm    | 727 | 727 | 730 | 734 |

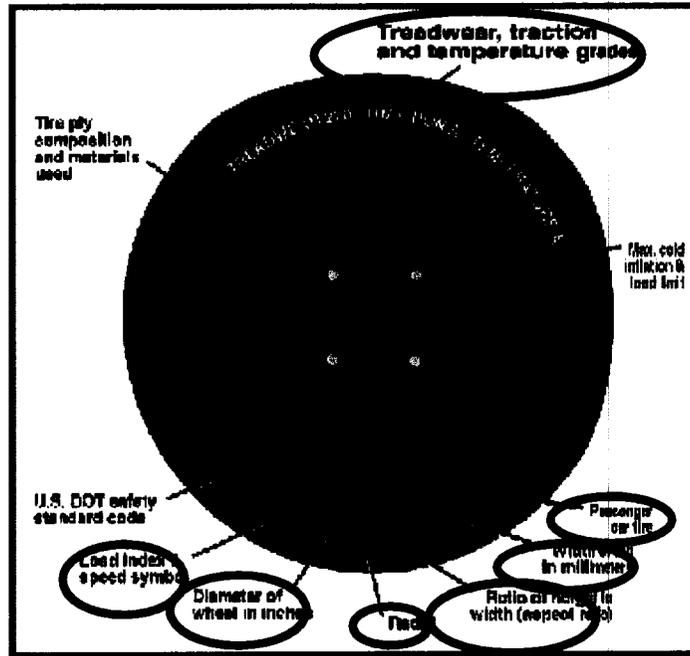
**TEST VEHICLE VERTICAL IMPACT LINE AND CG**

| Measurement Description               | Units | Value |
|---------------------------------------|-------|-------|
| Test Vehicle Wheel Base               | mm    | 2420  |
| Target Impact Point Aft of Front Axle | mm    | 270   |
| Actual Impact Point Aft of Front Axle | mm    | 264   |
| As Tested CG (aft of front axle)      | mm    | 1218  |

**DATA SHEET NO. 2**

**TEST VEHICLE TIRE INFORMATION**

Test Vehicle: 2007 Pontiac Solstice NHTSA No. C70101  
 Test Program: FMVSS 214 Indicant Side Impact Test Date: October 17, 2006



**DATA FROM TIRE PLACARD**

| Measured Parameter                      | Front      | Rear       |
|---|------------|------------|
| Maximum Tire Pressure (kPa)             | 300        | 300        |
| Cold / Test Pressure (kPa)              | 200        | 200        |
| Recommended Tire Size                   | P245/45R18 | P245/45R18 |
| Tire Size on Vehicle                    | P245/45R18 | P245/45R18 |
| Tire Manufacturer                       | Goodyear   | Goodyear   |
| Tire Name                               | Eagle RS-A | Eagle RS-A |
| Tire Type                               | P          | P          |
| Tire Width (mm)                         | 245        | 245        |
| Ratio of Height to Width (aspect ratio) | 45         | 45         |
| Radial                                  | R          | R          |
| Wheel Diameter                          | 18         | 18         |
| Load Index & Speed Symbol               | 96V        | 96V        |
| Treadwear                               | 260        | 260        |
| Traction Grade                          | A          | A          |
| Temperature Grade                       | A          | A          |

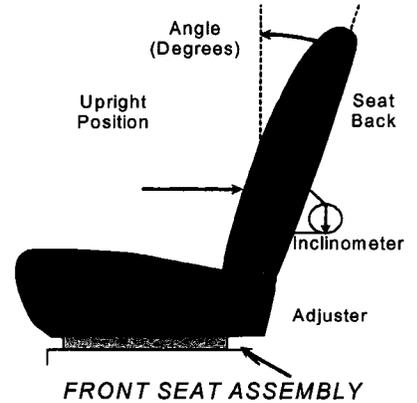
**DATA SHEET NO. 3**

**TEST VEHICLE INFORMATION**

Test Vehicle: 2007 Pontiac Solstice NHTSA No. C70101  
 Test Program: FMVSS 214 Indicant Side Impact Test Date: October 17, 2006

**NORMAL DESIGN RIDING POSITION**

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

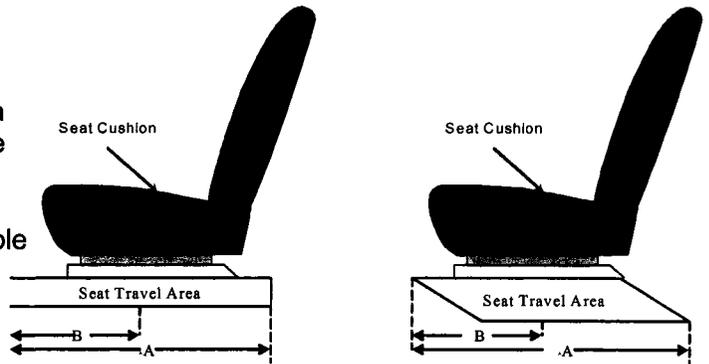


**SEAT BACK POSITION**

|  | Driver Seat  | Rear Seat* |
|--|--|------------|
| Test Detent (forward-most detent defined as 0)   | NA   | -          |
| Angle (deg. from forward-most locking position)  | NA   | -          |
| Alternative Measurements to Verify Test Position | Set outboard seatback recliner bracket to 10.6° back from vertical | -          |

**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)                 | 210         | -          |
| Test Position (B) (mm)                         | 110         | -          |
| Test Detent (forward-most detent defined as 0) | Detent 11   | -          |
| Total Number of Detents (including 0)          | 22          | -          |

\* This two-seat vehicle does not have rear seating positions.

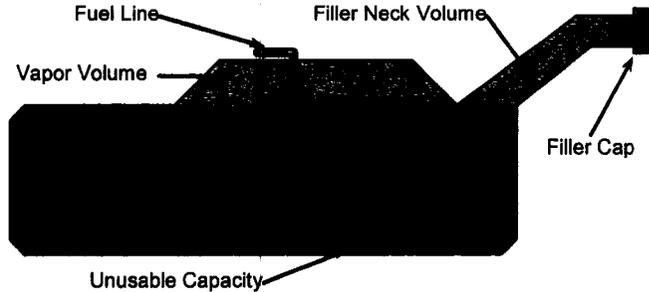
**DATA SHEET NO. 3 (CONTINUED)**

**TEST VEHICLE INFORMATION**

|               |                                       |            |                         |
|---------------|---------------------------------------|------------|-------------------------|
| Test Vehicle: | <u>2007 Pontiac Solstice</u>          | NHTSA No.: | <u>C70101</u>           |
| Test Program: | <u>FMVSS 214 Indicant Side Impact</u> | Test Date: | <u>October 17, 2006</u> |

**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.



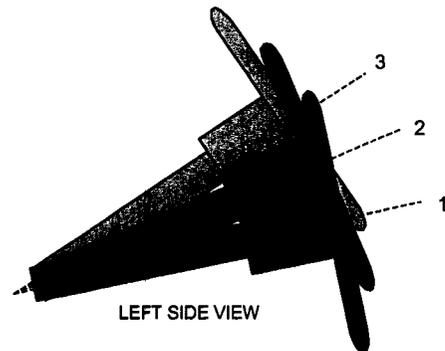
VEHICLE FUEL TANK ASSEMBLY

**FUEL TANK CAPACITY**

|   | Liters |
|---|--------|
| Usable Capacity of "Standard" Fuel Tank                       | 51.48  |
| Usable Capacity of "Optional" Fuel Tank                       | -      |
| Stoddard Used For Test (92%-94% of Fuel Tank Usable Capacity) | 47.70  |

**STEERING COLUMN ADJUSTMENT**

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



LEFT SIDE VIEW

STEERING COLUMN ASSEMBLY

**STEERING COLUMN POSITION**

|                                   | Fore/Aft Position (mm) | Tilt (degrees) | Tilt (detent) |
|-----------------------------------|------------------------|----------------|---------------|
| Lowermost Position No. 1          | NA                     | 16.00          | NA            |
| Geometric Center Position No. 2 * | NA                     | 18.25          | NA            |
| Uppermost Position No. 3          | NA                     | 20.50          | NA            |

\* Test position.

### DATA SHEET NO. 4

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

Test Vehicle: 2007 Pontiac Solstice NHTSA No. C70101  
Test Program: FMVSS 214 Indicant Side Impact Test Date: October 17, 2006

#### 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 | 62.28 |
| Trap No. 2 Velocity (Redundant) | km/h  | 61.1 to 62.7 | 62.28 |

#### POST TEST OBSERVATIONS

##### MDB LEFT EDGE IMPACT POINT DATA

| Measured Parameter | Units | Requirement | Value        |
|--------------------|-------|-------------|--------------|
| Horizontal Offset  | mm    | +/- 50      | 6 mm forward |
| Vertical Offset    | mm    | +/-20       | 5 mm below   |

**DATA SHEET NO. 5**

**POST TEST OBSERVATIONS**

Test Vehicle: 2007 Pontiac Solstice NHTSA No. C70101  
 Test Program: FMVSS 214 Indicant Side Impact Test Date: October 17, 2006

**TEST DUMMY INFORMATION AND CONTACT POINTS**

| Description             | Front Seat SID/HIII                  | Rear Seat SID/HIII* |
|-------------------------|--------------------------------------|---------------------|
| Dummy Type / Serial No. | SID/HIII / 906                       | SID/HIII / -        |
| Head Contact            | Top of head to side header           | -                   |
| Upper Torso Contact     | Left arm to door trim above arm rest | -                   |
| Lower Torso Contact     | Pelvis to door trim below arm rest   | -                   |
| Left Knee Contact       | Left knee to door trim               | -                   |
| Right Knee Contact      | Right knee to left knee              | -                   |

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

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

**POST TEST STRUCTURAL OBSERVATIONS**

| Critical Areas of Performance | Observations and Conclusions            |
|-------------------------------|---|
| Pillar Performance            | No Separation                           |
| Sill Separation               | None                                    |
| Windshield Damage             | Windshield cracked along the left edge  |
| Window Damage                 | Left window shattered during the impact |
| Other Notable Effects         | None                                    |

**SUPPLEMENTAL RESTRAINT INFORMATION**

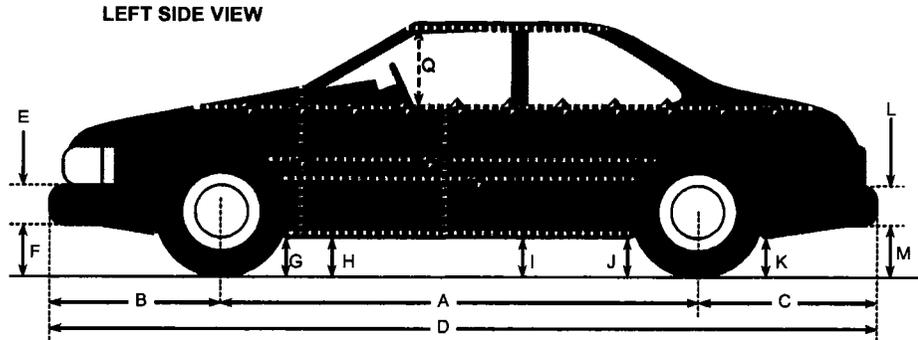
| Restraint Type                     | Left Front (Driver) |          | Left Rear (Passenger)* |          |
|------------------------------------|---------------------|----------|------------------------|----------|
|                                    | Installed           | Deployed | Installed   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

\* This two-seat vehicle does not have rear seating positions.

**DATA SHEET NO. 6**

**VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS**

Test Vehicle: 2007 Pontiac Solstice NHTSA No. C70101  
 Test Program: FMVSS 214 Indicant Side Impact Test Date: October 17, 2006



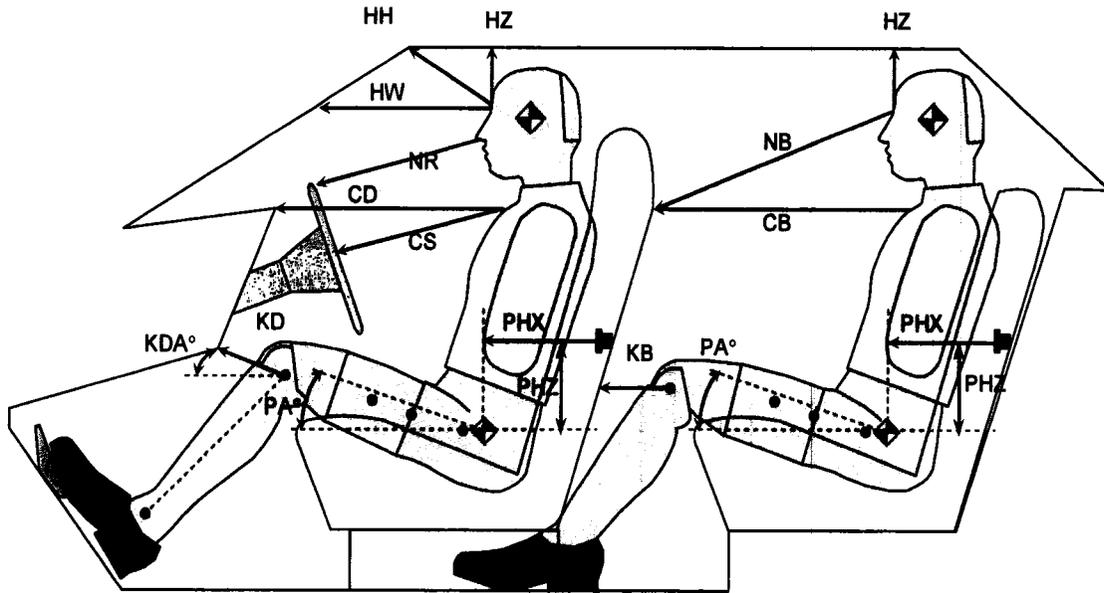
All Measurements in mm

| Code | Measurement Description                | Pre-Test (delivered) | Pre-Test (as tested) | Post-Test (as tested) | Difference |
|------|--|----------------------|----------------------|-----------------------|------------|
| A    | Wheelbase                              | 2415                 | 2420                 | 2412                  | 8          |
| B    | Front Axle to FSOV                     | 767                  | 765                  | 784                   | -19        |
| C    | Rear Axle to RSOV                      | 808                  | 805                  | 785                   | 20         |
| D    | Total Length at Centerline             | 3990                 | 3990                 | 3981                  | 9          |
| E    | Front Bumper Thickness                 | 477                  | 477                  | 477                   | 0          |
| F    | Front Bumper Bottom to Ground          | 142                  | 137                  | 158                   | -21        |
| G    | Sill Height at Front Wheel Well        | 123                  | 113                  | 167                   | -54        |
| H    | Sill Height at Front Door Leading Edge | 136                  | 125                  | 148                   | -23        |
| I    | Sill Height at "B" Pillar              | 152                  | 137                  | 142                   | -5         |
| J1   | Sill Height at Rear Wheel Well         | 165                  | 149                  | 151                   | -2         |
| J2   | Pinch Weld Height at Rear Wheel Well   | 152                  | 136                  | 136                   | 0          |
| K    | Sill Height Aft of Rear Wheel Well     | 237                  | 218                  | 234                   | -16        |
| L    | Rear Bumper Thickness                  | 245                  | 245                  | 245                   | 0          |
| M    | Rear Bumper Bottom to Ground           | 248                  | 229                  | 245                   | -16        |
| N    | Sill Height to Window Bottom Sill      | 574                  | 574                  | 568                   | 6          |
| O    | Front Door Leading Edge to Impact CL   | 783                  | 783                  | 749                   | 34         |
| P    | Front Door Trailing Edge to Impact CL  | 993                  | 993                  | 823                   | 170        |
| Q    | Front Window Opening                   | 291                  | 291                  | 279                   | 12         |
| R    | Right Side Length                      | 3822                 | 3822                 | 3826                  | -4         |
| S    | Left Side Length                       | 3822                 | 3822                 | 3820                  | 2          |
| T    | Vehicle Width at "B" Post              | 1796                 | 1796                 | 1730                  | 66         |

**DATA SHEET NO. 7**

**SID/HIII LONGITUDINAL CLEARANCE DIMENSIONS**

Test Vehicle: 2007 Pontiac Solstice NHTSA No. C70101  
 Test Program: FMVSS 214 Indicant Side Impact Test Date: October 17, 2006



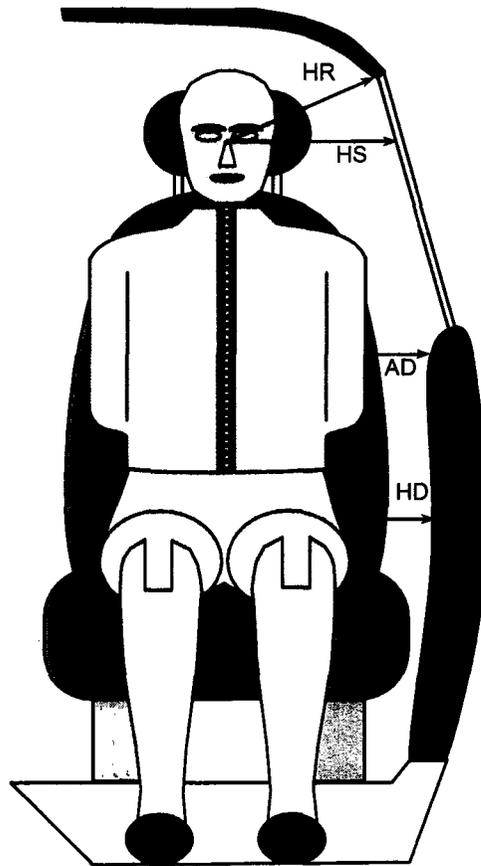
| Driver Code | Pass. Code | Measurement Description        | Driver S/N 906 |          | Passenger * |          |
|-------------|------------|--------------------------------|----------------|----------|-------------|----------|
|             |            |                                | Length(mm)     | Angle(°) | Length(mm)  | Angle(°) |
| HH          |            | Head to Header                 | 356            |          |             |          |
| HW          |            | Head to Windshield             | 660            |          |             |          |
| HZ          | HZ         | Head to Roof                   | 178            |          | -           |          |
| NR          | NB         | Nose to Rim/Nose to Seatback   | 427            |          | -           |          |
| CD          | CB         | Chest to Dash or Seatback      | 628            |          | -           |          |
| CS          |            | Chest to Steering Wheel        | 328            |          |             |          |
| KDL         | KBL        | Left Knee to Dash or Seatback  | 164            | 35       | -           | -        |
| KDR         | KBR        | Right Knee to Dash or Seatback | 162            | 35       | -           | -        |
| PA          | PA         | Pelvic Angle                   |                | 23.2     |             | -        |
| PHX         | PHX        | H-Point to Striker (X-Axis)    | 316            |          | -           |          |
| PHZ         | PHZ        | H-Point to Striker (Z-Axis)    | 273            |          | -           |          |

\* This two-seat vehicle does not have rear seating positions.

**DATA SHEET NO. 8**

**SID/HIII LATERAL CLEARANCE DIMENSIONS**

Test Vehicle: 2007 Pontiac Solstice NHTSA No. C70101  
 Test Program: FMVSS 214 Indicant Side Impact Test Date: October 17, 2006



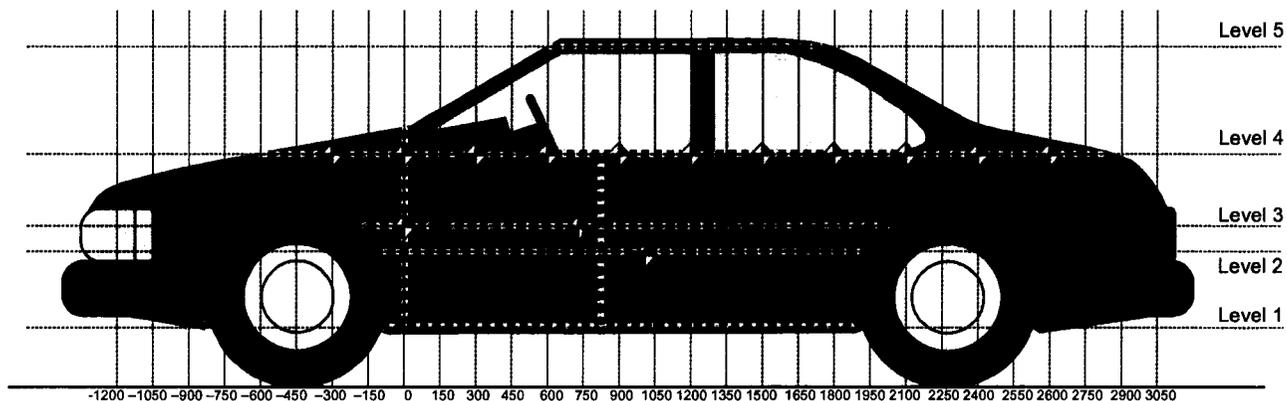
*FRONT VIEW OF DUMMY*

| Code            | Measurement Description          | Units | Driver<br>S/N 906 | Passenger * |
|-----------------|----------------------------------|-------|-------------------|-------------|
| HR              | Head to Side Header              | mm    | 185               | -           |
| HS              | Head to Side Window              | mm    | 265               | -           |
| AD <sub>1</sub> | Arm to Door (at upper rib level) | mm    | 50                | -           |
| AD <sub>2</sub> | Arm to Door (at lower rib level) | mm    | 76                | -           |
| HD              | H-Point to Door                  | mm    | 102               | -           |

\* This two-seat vehicle does not have rear seating positions.

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

Test Vehicle: 2007 Pontiac Solstice NHTSA No. C70101  
 Test Program: FMVSS 214 Indicant Side Impact Test Date: October 17, 2006



All Measurements Shown in mm

**LEFT SIDE VIEW**

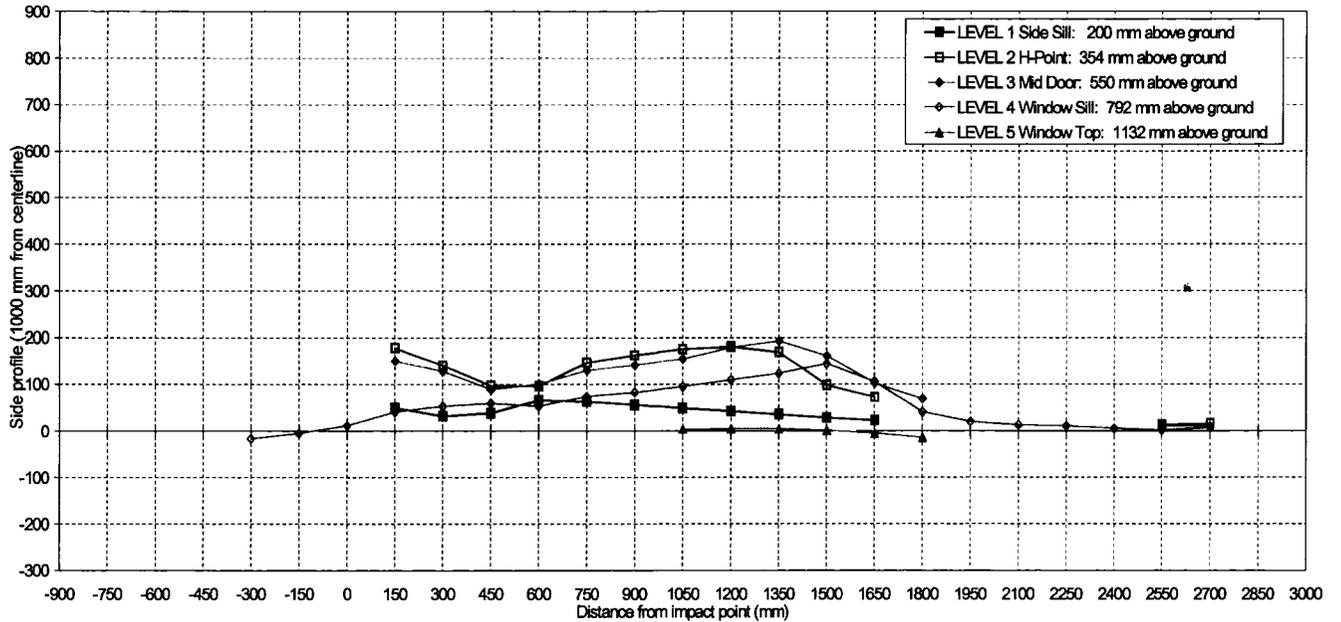
Measurements are taken with vehicle in the as tested condition.  
 Measurements along the vertical 750 mm.  
 All measurements below in mm.

| Level | Measurement Description | Maximum Exterior Static Crush | Height Above Ground | Distance From Impact |
|-------|-------------------------|-------------------------------|---------------------|----------------------|
| 1     | Sill Top                | 66                            | 200                 | 600                  |
| 2     | Occupant H-Point        | 182                           | 354                 | 1200                 |
| 3     | Mid Door                | 194                           | 550                 | 1350                 |
| 4     | Window Sill             | 144                           | 792                 | 1500                 |
| 5     | Window                  | 6                             | 1132                | 1200                 |
|       | Maximum Penetration     | 194                           |                     |                      |

# DATA SHEET NO. 10

## VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2007 Pontiac Solstice NHTSA No. C70101  
 Test Program: FMVSS 214 Indicant Side Impact Test Date: October 17, 2006



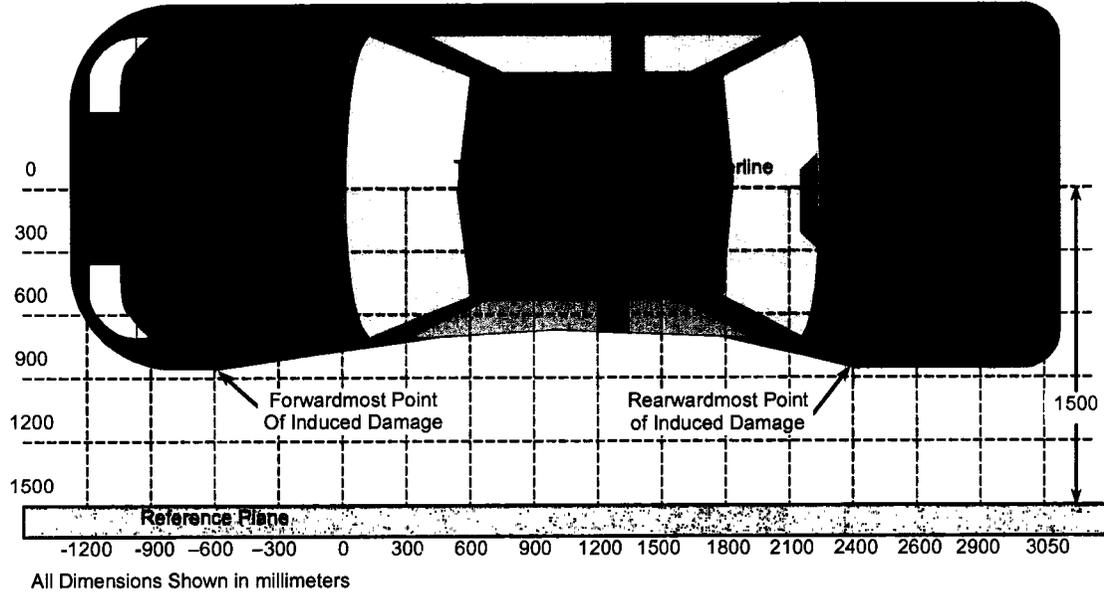
NOTE: All dimensions are in millimeters with a tolerance of ±3 mm

|                           |             | DISTANCE IN MILLIMETERS (mm) FROM IMPACT POINT |      |      |      |      |      |      |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
|---------------------------|-------------|--|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|
| LEVEL                     | HEIGHT (mm) |  | -900 | -750 | -600 | -450 | -300 | -150 | 0   | 150 | 300 | 450 | 600 | 750 | 900 | 1050 | 1200 | 1350 | 1500 | 1650 | 1800 | 1950 | 2100 | 2250 | 2400 | 2550 | 2700 | 2850 | 3000 |     |
| LEVEL 1<br>SIDE<br>SILL   | 200         | PRE  | -    | -    | -    | -    | -    | -    |     | 166 | 189 | 202 | 206 | 208 | 211 | 214  | 215  | 216  | 210  | 193  | -    | -    | -    | -    | -    | -    | -    | -    | -    | -   |
|                           |             | POST   | -    | -    | -    | -    | -    | -    |     | 216 | 222 | 241 | 272 | 271 | 267 | 263  | 258  | 252  | 239  | 217  | -    | -    | -    | -    | -    | -    | -    | -    | -    | -   |
|                           |             | CRUSH  | N/A  | N/A  | N/A  | N/A  | N/A  | N/A  | N/A | 50  | 33  | 39  | 66  | 63  | 56  | 49   | 43   | 36   | 29   | 24   | N/A  | N/A |
| LEVEL 2<br>H<br>POINT     | 354         | PRE  | -    | -    | -    | -    | -    | -    |     | 127 | 144 | 152 | 157 | 161 | 163 | 165  | 166  | 165  | 161  | 142  | -    | -    | -    | -    | -    | 174  | 313  | -    | -    |     |
|                           |             | POST   | -    | -    | -    | -    | -    | -    |     | 307 | 285 | 250 | 254 | 309 | 327 | 342  | 348  | 335  | 260  | 215  | -    | -    | -    | -    | -    | 189  | 330  | -    | -    |     |
|                           |             | CRUSH  | N/A  | N/A  | N/A  | N/A  | N/A  | N/A  | N/A | 180 | 141 | 98  | 97  | 148 | 164 | 177  | 182  | 170  | 99   | 73   | N/A  | N/A  | N/A  | N/A  | N/A  | 15   | 17   | N/A  | N/A  |     |
| LEVEL 3<br>MID<br>DOOR    | 550         | PRE  | -    | -    | -    | -    | -    | -    |     | 116 | 142 | 134 | 140 | 143 | 145 | 146  | 146  | 144  | 140  | 127  | 98   | -    | -    | -    | -    | 159  | 269  | -    | -    |     |
|                           |             | POST   | -    | -    | -    | -    | -    | -    |     | 268 | 271 | 225 | 242 | 274 | 288 | 302  | 327  | 338  | 302  | 230  | 168  | -    | -    | -    | -    | 172  | 281  | -    | -    |     |
|                           |             | CRUSH  | N/A  | N/A  | N/A  | N/A  | N/A  | N/A  | N/A | 152 | 129 | 91  | 102 | 131 | 143 | 156  | 181  | 194  | 162  | 103  | 70   | N/A  | N/A  | N/A  | N/A  | 13   | 12   | N/A  | N/A  |     |
| LEVEL 4<br>WINDOW<br>SILL | 792         | PRE  | -    | -    | -    | -    | 209  | 181  | 160 | 186 | 188 | 188 | 187 | 187 | 185 | 183  | 180  | 176  | 184  | 163  | 146  | 130  | 117  | 120  | 149  | 205  | 289  | -    | -    |     |
|                           |             | POST   | -    | -    | -    | -    | 193  | 176  | 192 | 227 | 241 | 247 | 240 | 261 | 268 | 278  | 289  | 299  | 328  | 269  | 187  | 151  | 131  | 131  | 155  | 207  | 296  | -    | -    |     |
|                           |             | CRUSH  | N/A  | N/A  | N/A  | N/A  | -16  | -5   | 12  | 41  | 53  | 59  | 53  | 74  | 83  | 95   | 109  | 123  | 144  | 106  | 41   | 21   | 14   | 11   | 6    | 2    | 7    | N/A  | N/A  |     |
| LEVEL 5<br>WINDOW<br>TOP  | 1132        | PRE  | -    | -    | -    | -    | -    | -    |     | -   | -   | -   | -   | -   | -   | 415  | 400  | 394  | 390  | 429  | 479  | -    | -    | -    | -    | -    | -    | -    |      |     |
|                           |             | POST   | -    | -    | -    | -    | -    | -    |     | -   | -   | -   | -   | -   | -   | 420  | 406  | 400  | 392  | 425  | 466  | -    | -    | -    | -    | -    | -    | -    | -    |     |
|                           |             | CRUSH  | N/A  | N/A  | N/A  | N/A  | N/A  | N/A  | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 5    | 6    | 6    | 2    | -4   | -13  | N/A  |     |

**DATA SHEET NO. 11**

**VEHICLE DAMAGE PROFILE DISTANCES**

Test Vehicle: 2007 Pontiac Solstice NHTSA No. C70101  
 Test Program: FMVSS 214 Indicant Side Impact Test Date: October 17, 2006



**TOP VIEW**

**DAMAGE PROFILE DISTANCES**

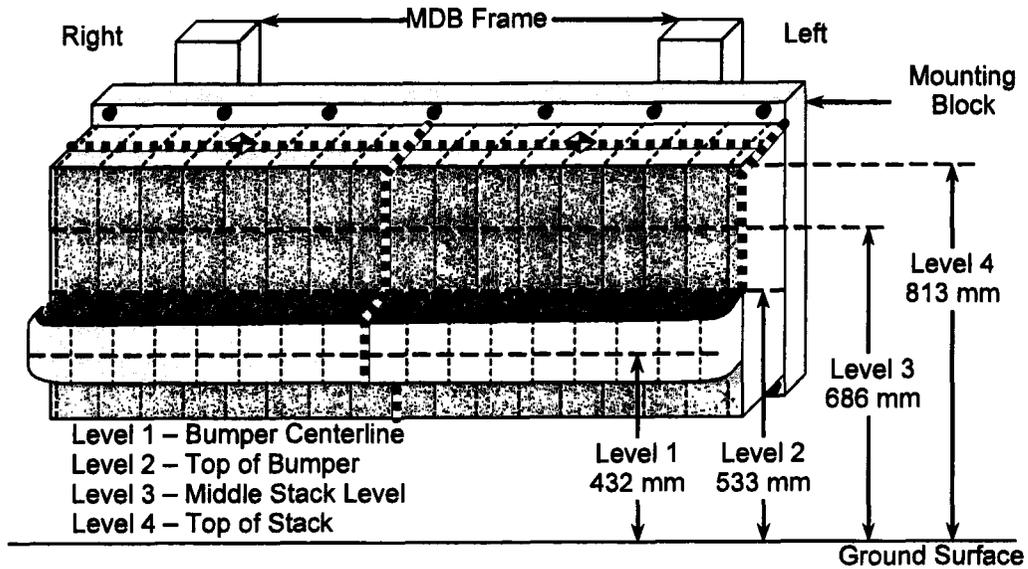
| DPD    | Distance from Impact Point in mm | Level | Pre-Test (mm) | Post-Test (mm) | Max Static Crush (mm) |
|--------|----------------------------------|-------|---------------|----------------|-----------------------|
| 1 (LR) | 2450                             | 792   | 168           | 172            | 4                     |
| 2      | 1944                             | 792   | 131           | 152            | 21                    |
| 3      | 1438                             | 550   | 142           | 317            | 175                   |
| 4      | 932                              | 354   | 163           | 330            | 167                   |
| 5      | 426                              | 354   | 151           | 256            | 105                   |
| 6 (LF) | -80                              | 792   | 181           | 183            | 2                     |

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: 2007 Pontiac Solstice NHTSA No. C70101  
 Test Program: FMVSS 214 Indicant Side Impact Test Date: October 17, 2006



NOTE: All dimensions are in millimeters with a tolerance of  $\pm 3$  mm

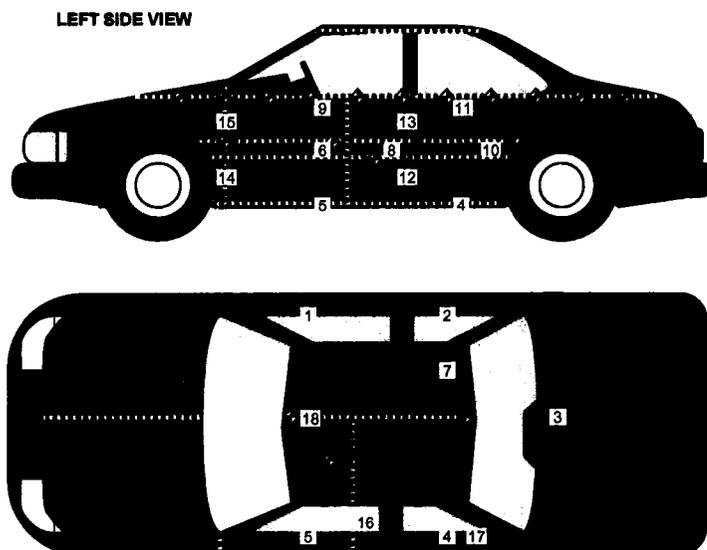
| LEVEL                    | HEIGHT AT CL (mm)* |       | DISTANCE RIGHT OF CENTER (mm) |     |     |     |     |     |     |     |     | 0   | DISTANCE LEFT OF CENTER (mm) |     |     |     |     |     |     |     |  |
|--------------------------|--------------------|-------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------------------------|-----|-----|-----|-----|-----|-----|-----|--|
|                          |                    |       | 800                           | 700 | 600 | 500 | 400 | 300 | 200 | 100 | 100 |     | 200                          | 300 | 400 | 500 | 600 | 700 | 800 |     |  |
| LEVEL 4<br>TOP<br>STACK  | 813                | PRE   | 619                           | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619                          | 619 | 619 | 619 | 619 | 619 | 619 |     |  |
|                          |                    | POST  | 764                           | 686 | 627 | 622 | 620 | 618 | 620 | 627 | 627 | 627 | 644                          | 653 | 680 | 689 | 681 | 681 | 681 | 697 |  |
|                          |                    | CRUSH | 145                           | 67  | 8   | 3   | 1   | -1  | 1   | 8   | 8   | 8   | 25                           | 34  | 61  | 70  | 62  | 62  | 62  | 78  |  |
| LEVEL 3<br>MID<br>LEVEL  | 686                | PRE   | 619                           | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619                          | 619 | 619 | 619 | 619 | 619 | 619 |     |  |
|                          |                    | POST  | 800                           | 716 | 655 | 643 | 644 | 641 | 637 | 635 | 635 | 635 | 647                          | 673 | 709 | 717 | 699 | 673 | 664 | 671 |  |
|                          |                    | CRUSH | 181                           | 97  | 36  | 24  | 25  | 22  | 18  | 16  | 16  | 16  | 28                           | 54  | 90  | 98  | 80  | 54  | 45  | 52  |  |
| LEVEL 2<br>TOP<br>BUMPER | 533                | PRE   | 619                           | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619 | 619                          | 619 | 619 | 619 | 619 | 619 | 619 |     |  |
|                          |                    | POST  | 842                           | 770 | 698 | 679 | 689 | 688 | 691 | 691 | 691 | 691 | 705                          | 718 | 739 | 754 | 736 | 711 | 692 | 678 |  |
|                          |                    | CRUSH | 223                           | 151 | 79  | 60  | 70  | 69  | 72  | 72  | 72  | 72  | 86                           | 99  | 120 | 135 | 117 | 92  | 73  | 59  |  |
| LEVEL 1<br>MID<br>BUMPER | 432                | PRE   | 535                           | 519 | 518 | 518 | 518 | 518 | 518 | 518 | 518 | 518 | 518                          | 518 | 518 | 518 | 518 | 519 | 535 |     |  |
|                          |                    | POST  | 804                           | 771 | 719 | 662 | 626 | 612 | 612 | 614 | 614 | 614 | 623                          | 642 | 682 | 696 | 669 | 636 | 617 | 614 |  |
|                          |                    | CRUSH | 269                           | 252 | 201 | 144 | 108 | 94  | 94  | 96  | 96  | 96  | 105                          | 124 | 164 | 178 | 151 | 118 | 98  | 79  |  |

\*Heights measured above ground level.

**DATA SHEET NO. 13**

**VEHICLE ACCELEROMETER LOCATIONS**

Test Vehicle: 2007 Pontiac Solstice NHTSA No. C70101  
 Test Program: FMVSS 214 Indicant Side Impact Test Date: October 17, 2006



| Loc. No. | Accelerometer Location       | Measurements (mm) |      |     |
|----------|------------------------------|-------------------|------|-----|
|          |                              | X                 | Y    | Z   |
| 1        | Right Sill at Front Seat     | 2070              | 653  | 225 |
| 2        | Right Sill at Rear Seat      | 1362              | 670  | 354 |
| 3        | Rear Floorpan Above Axle     | 966               | 10   | 713 |
| 4        | Left Sill at Rear Door       | 1412              | -629 | 248 |
| 5        | Left Sill at Front Door      | 2087              | -611 | 239 |
| 6        | Left Front Door C/L**        | -                 | -    | -   |
| 7        | Rear Occupant Compartment    | 1911              | 601  | 171 |
| 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            | 1322              | -663 | 406 |
| 13       | Left Middle B-Post           | 1027              | -687 | 893 |
| 14       | Left Lower A-Post            | 2355              | -643 | 425 |
| 15       | Left Middle A-Post           | 2215              | -654 | 834 |
| 16       | Front Seat Track             | 1519              | -586 | 209 |
| 17       | Rear Seat Track or Structure | -                 | -    | -   |
| 18       | Vehicle CG                   | 1706              | 25   | 485 |

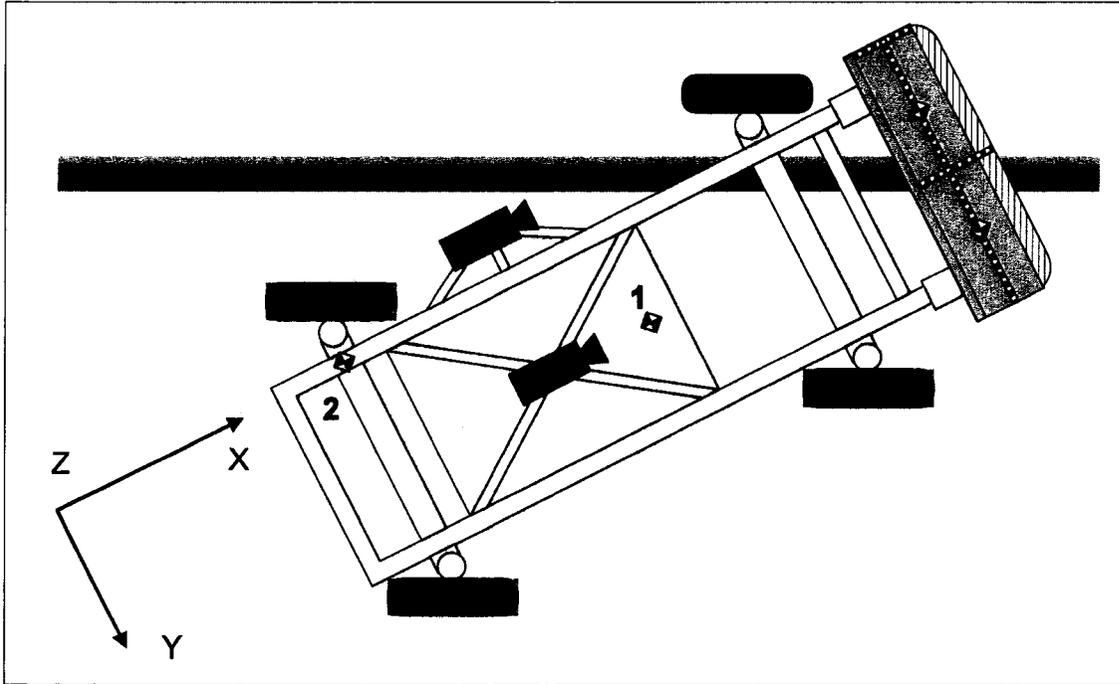
Reference Points X - Test Vehicle Rear Bumper (+ forward)  
 Y - Test Vehicle Centerline (+ to right)  
 Z - Ground Plane (+ down)

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

**DATA SHEET NO. 14**

**MDB ACCELEROMETER LOCATIONS**

Test Vehicle: 2007 Pontiac Solstice NHTSA No. C70101  
 Test Program: FMVSS 214 Indicant Side Impact Test Date: October 17, 2006



| 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**

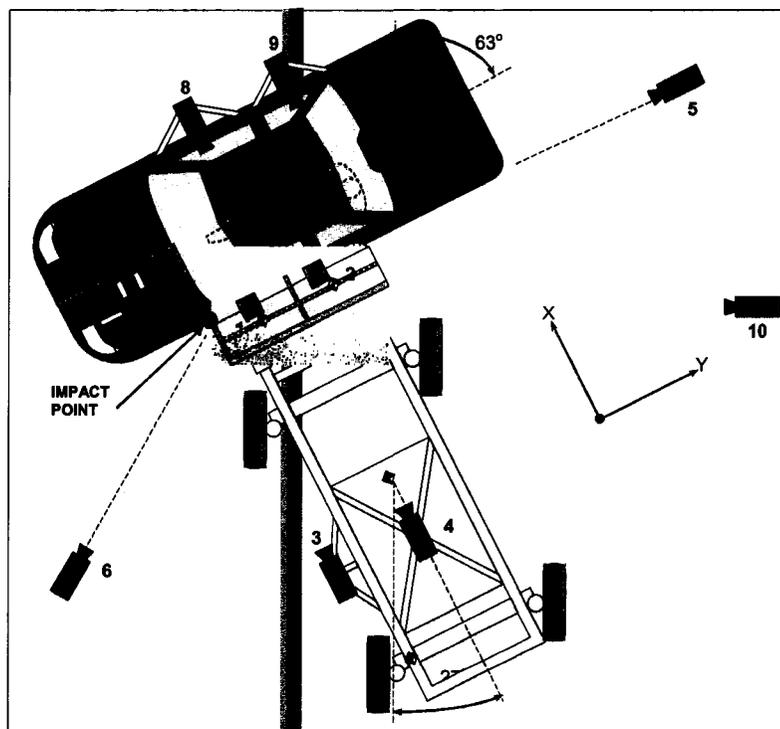
Test Vehicle: 2007 Pontiac Solstice NHTSA No. C70101  
 Test Program: FMVSS 214 Indicant Side Impact Test Date: October 17, 2006

|    | Elements                              | Pre-Test (mm) |
|----|---------------------------------------|---------------|
| 1  | Total Length                          | 3990          |
| 2  | Total Width                           | 1796          |
| 3  | Bumper Top Height                     | 490           |
| 4  | Bumper Bottom Height                  | 380           |
| 5  | Longitudinal Member Top Height        | 490           |
| 6  | Distance between Longitudinal Members | 872           |
| 7  | Longitudinal Member Width             | 90            |
| 8  | Engine Top Height                     | 803           |
| 9  | Engine Bottom Height                  | 380           |
| 10 | Engine and gearbox width              | 559           |
| 11 | Front bumper-engine distance          | 721           |
| 12 | Front shock absorber fixing height    | 566           |
| 13 | Bonnet leading edge height            | 613           |
| 14 | Front shock absorber fixing width     | 920           |
| 15 | Front bumper – front axle distance    | 769           |
| 16 | Front axle – a pillar distance        | 913           |
| 17 | A-pillar – B-pillar distance          | 1104          |
| 18 | B-Pillar – rear axle distance         | 402           |
| 19 | B-pillar – C-pillar distance          | 0             |
| 20 | Roof sill bottom height               | 1085          |
| 21 | Roof sill top height                  | 1140          |
| 22 | Floor sill bottom height              | 171           |
| 23 | Floor sill top height                 | 319           |

**DATA SHEET NO. 16**

**HIGH SPEED CAMERA LOCATIONS AND DATA**

Test Vehicle: 2007 Pontiac Solstice NHTSA No. C70101  
 Test Program: FMVSS 214 Indicant Side Impact Test Date: October 17, 2006



| No. | Camera View                           | Location (mm) |       |       | Angle (deg) | Lens (mm) | Film Speed (fps) |
|-----|---------------------------------------|---------------|-------|-------|-------------|-----------|------------------|
|     |                                       | X             | Y     | Z     |             |           |                  |
| 1   | Overhead Close-up                     | 72            | 812   | -4880 | -90         | 20        | 1000             |
| 2   | Overhead Overall                      | 195           | 855   | -4880 | -90         | 28        | 1000             |
| 3   | MDB Onboard, Impact Point Close-up    | -1470         | 0     | -847  | 0           | 13        | 1000             |
| 4   | MDB Onboard, Centerline of Impact     | -1140         | 838   | -1587 | -17         | 7.5       | 1000             |
| 5   | Right Side, Ground Level, Overall     | 0             | 9891  | -1100 | -5          | 50        | 1000             |
| 6   | Left Side, Ground Level, Overall      | -1952         | -2176 | -938  | -6          | 28        | 1000             |
| 7   | Vehicle Onboard Front SID/HIII, Front | 565           | -299  | -1182 | -3          | 25        | 1000             |
| 8   | Vehicle Onboard Front SID/HIII, Side  | 1537          | 1346  | -961  | -14         | 12.5      | 1000             |
| 9   | Vehicle Onboard Rear SID/HIII, Side   | -             | -     | -     | -           | -         | -                |
| 10  | Real Time Coverage                    |               |       |       |             |           | 30               |

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

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

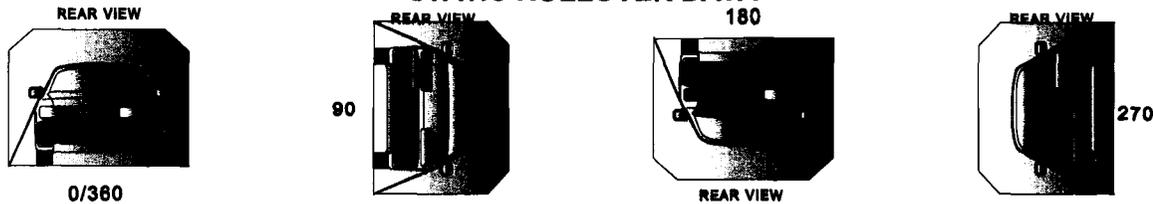
Test Vehicle: 2007 Pontiac Solstice NHTSA No. C70101  
 Test Program: FMVSS 214 Indicant Side Impact Test Date: October 17, 2006

**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**



| Rollover Stage | Rotation Time (spec. 1 -3 min) |         |   |         | FMVSS 301 Hold Time |         | Total Time |         |   |         | Next Whole Minute Interval |         |
|----------------|--------------------------------|---------|---|---------|---------------------|---------|------------|---------|---|---------|----------------------------|---------|
|                | 1                              | minutes | 7 | seconds | 5                   | minutes | 6          | minutes | 7 | seconds | 7                          | minutes |
| 0° - 90°       | 1                              | minutes | 7 | seconds | 5                   | minutes | 6          | minutes | 7 | seconds | 7                          | minutes |
| 90° - 180°     | 1                              | minutes | 7 | seconds | 5                   | minutes | 6          | minutes | 7 | seconds | 7                          | minutes |
| 180°-270°      | 1                              | minutes | 8 | seconds | 5                   | minutes | 6          | minutes | 8 | seconds | 7                          | minutes |
| 270°-360°      | 1                              | minutes | 8 | seconds | 5                   | minutes | 6          | minutes | 8 | 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                    | -                                  |
| 90° - 180°                                       | 0                                   | 0                    | 0                    | -                                  |
| 180°-270°  | 0                                   | 0                    | 0                    | -                                  |
| 270°-360°  | 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**

## TABLE OF PHOTOGRAPHS

| FIGURE | TITLE   | PAGE |
|--------|---|------|
| A-1    | As Received Left Front $\frac{3}{4}$ View           | A-4  |
| A-2    | As Received Right Rear $\frac{3}{4}$ View           | A-4  |
| A-3    | Vehicle Certification Label                         | A-5  |
| A-4    | Vehicle Tire Placard Label                          | A-5  |
| 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)**

| <b>FIGURE</b> | <b>TITLE</b>  | <b>PAGE</b> |
|---------------|---|-------------|
| A-35          | Pre-Test Right Occupant Compartment View of Driver  | A-21        |
| A-36          | Post-Test Right Occupant Compartment View of Driver | A-21        |
| A-37          | Pre-Test Left Occupant Compartment View of Driver   | A-22        |
| A-38          | Post-Test Left Occupant Compartment View of Driver  | A-22        |
| A-39          | Pre-Test Left Front Interior Trim                   | A-23        |
| A-40          | Post-Test Left Front Interior Trim                  | A-23        |
| A-41          | Pre-Test Left Front ¾ View of Left Side Doors       | A-24        |
| A-42          | Post-Test Left Front ¾ View of Left Side Doors      | A-24        |
| A-43          | Pre-Test Left Rear ¾ View of Left Side Doors        | A-25        |
| A-44          | Post-Test Left Rear ¾ View of Left Side Doors       | A-25        |
| A-45          | Rollover 90 Degrees                                 | A-26        |
| A-46          | Rollover 180 Degrees                                | A-26        |
| A-47          | Rollover 270 Degrees                                | A-27        |
| A-48          | Rollover 360 Degrees                                | A-27        |
| A-49          | Impact Photo  | A-28        |



Figure A-1: As Received Left Front 3/4 View

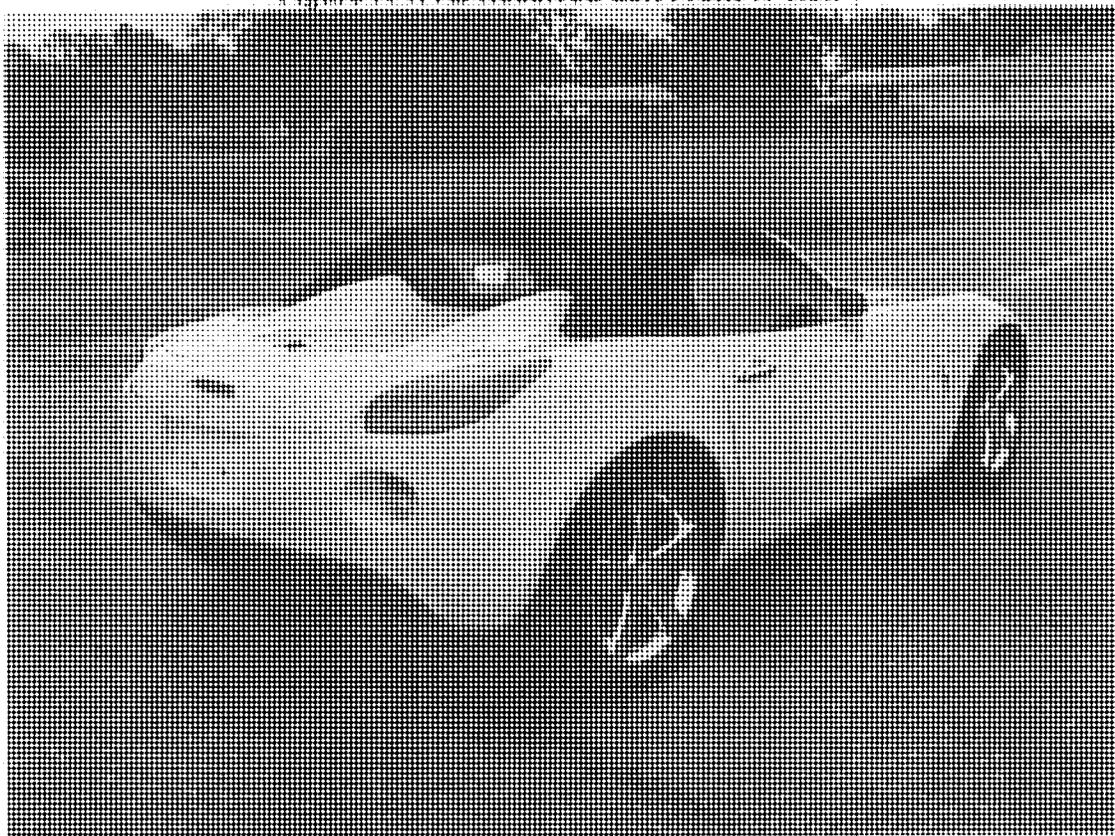


Figure A-2: As Received Right Rear 3/4 View

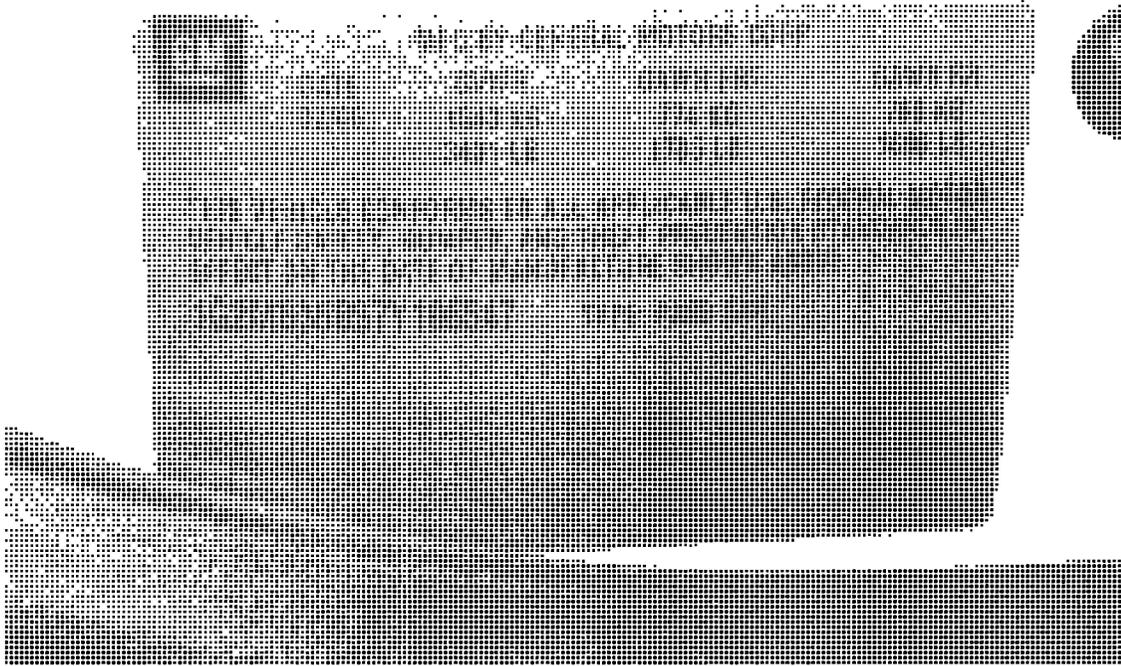


Figure 4-3: Vehicle Certification on Label

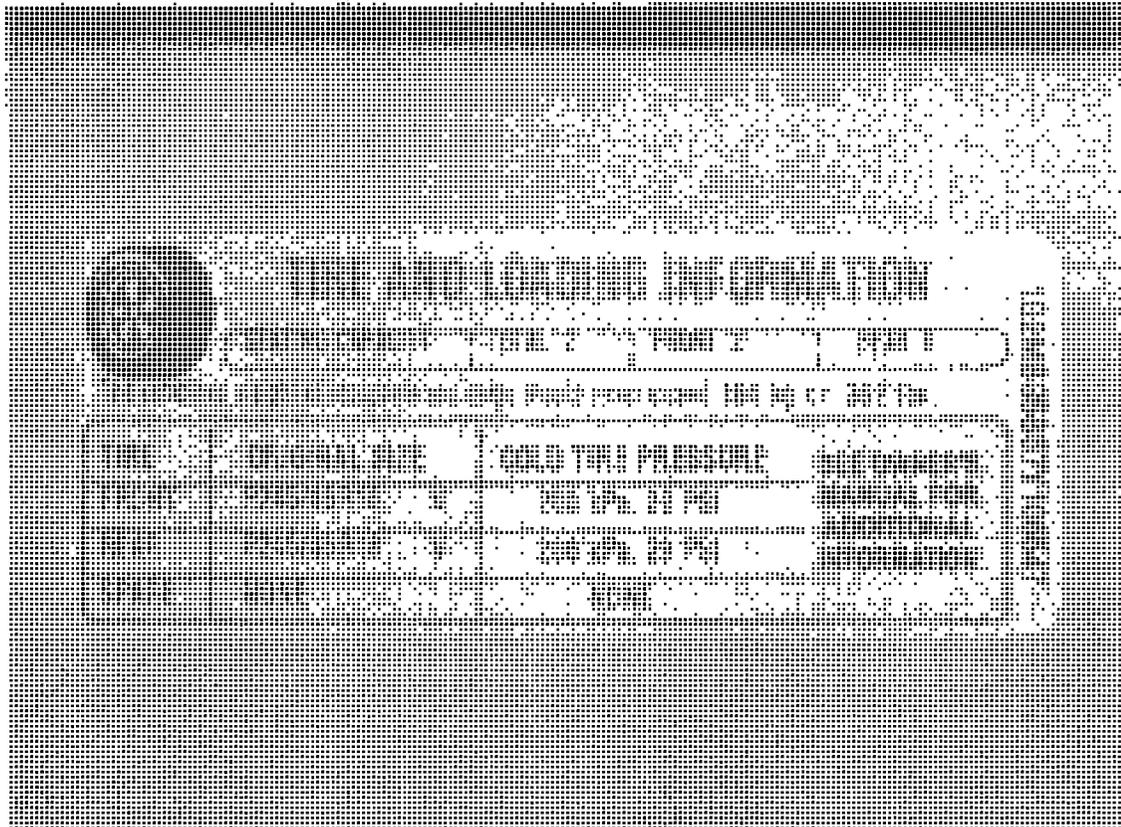


Figure A-4: Vehicle Tire Placard Label

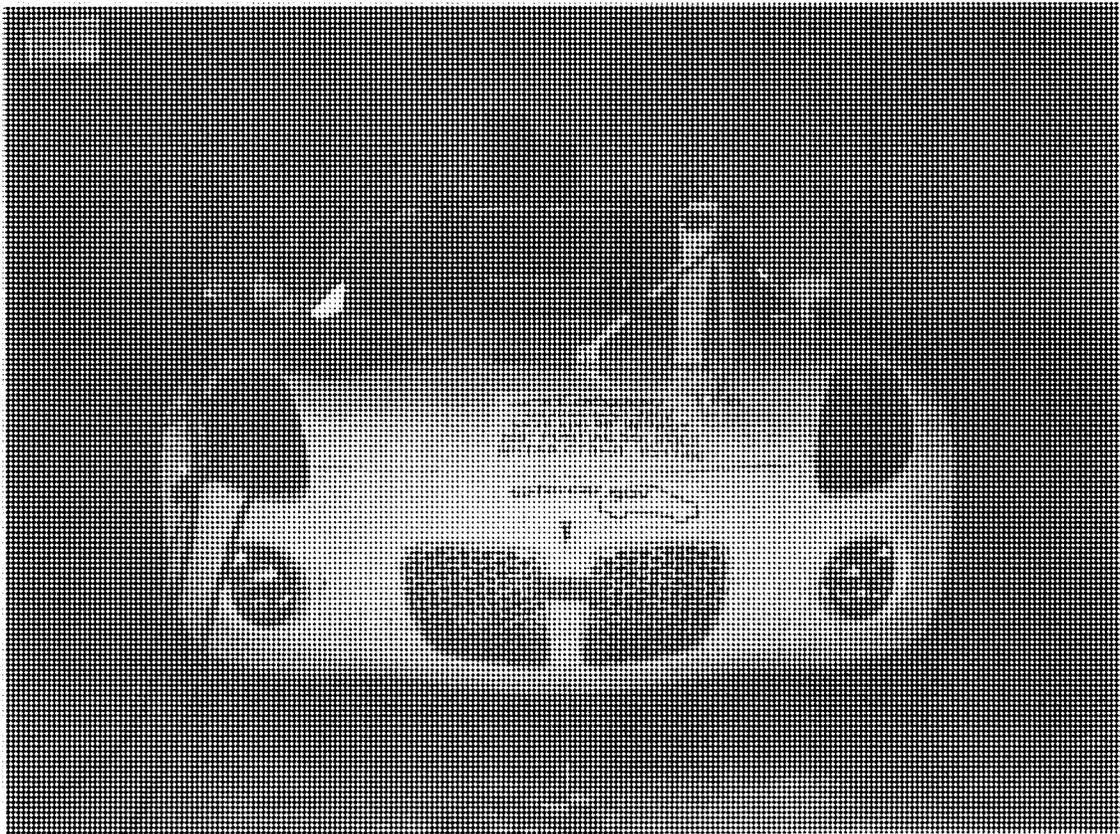


Figure A-5: Pre-Test Front View



Figure A-6: Post-Test Front View

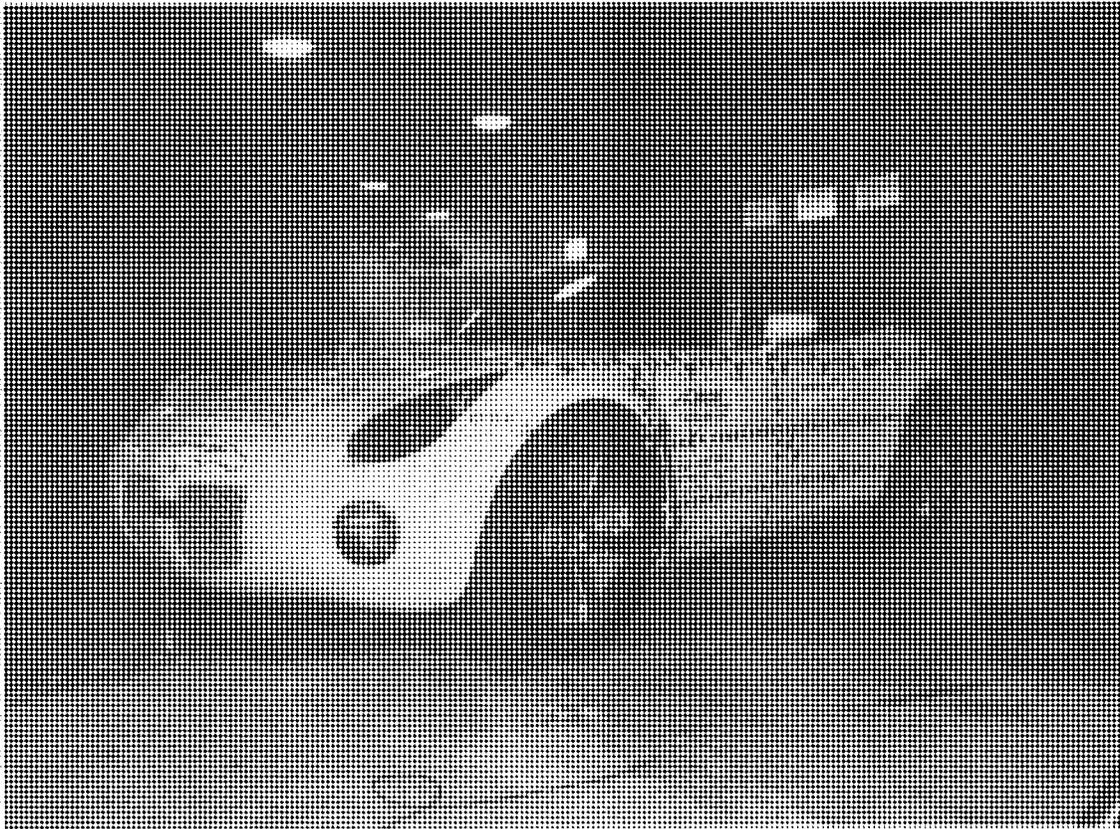


Figure A-7: Pre-Test Left Front 1/4 View

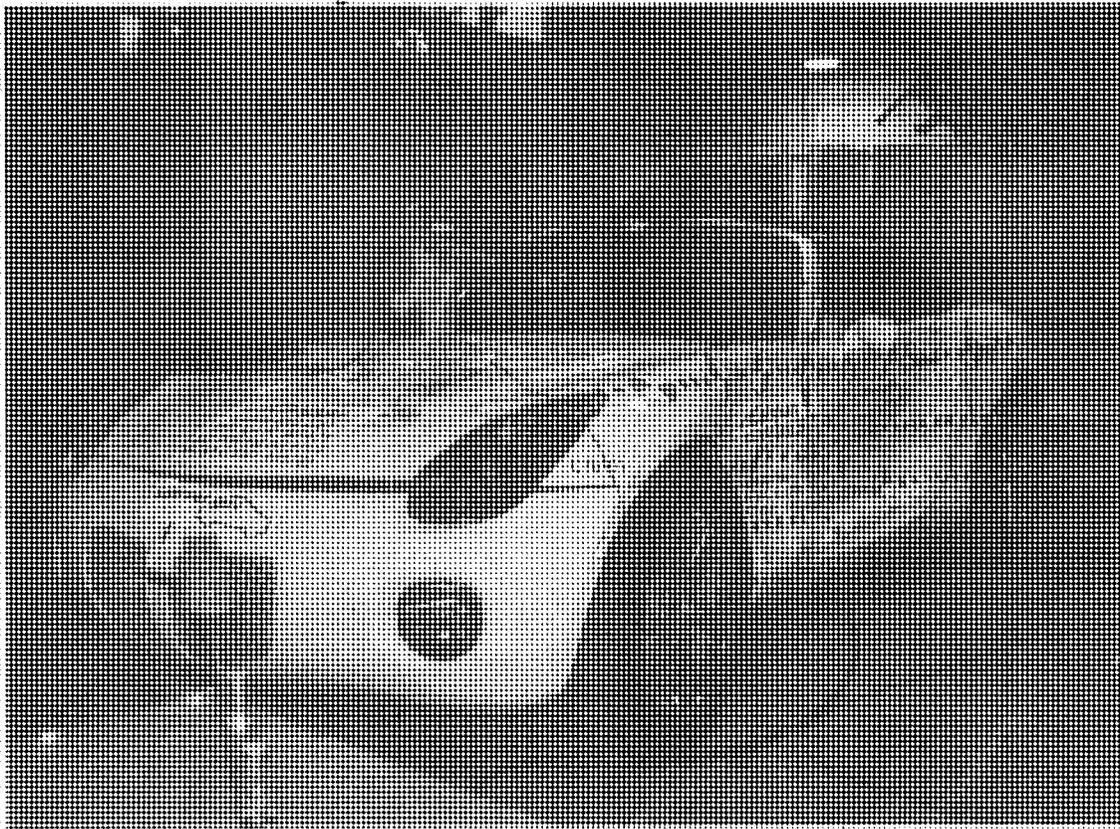


Figure A-8: Post-Test Left Front 1/4 View

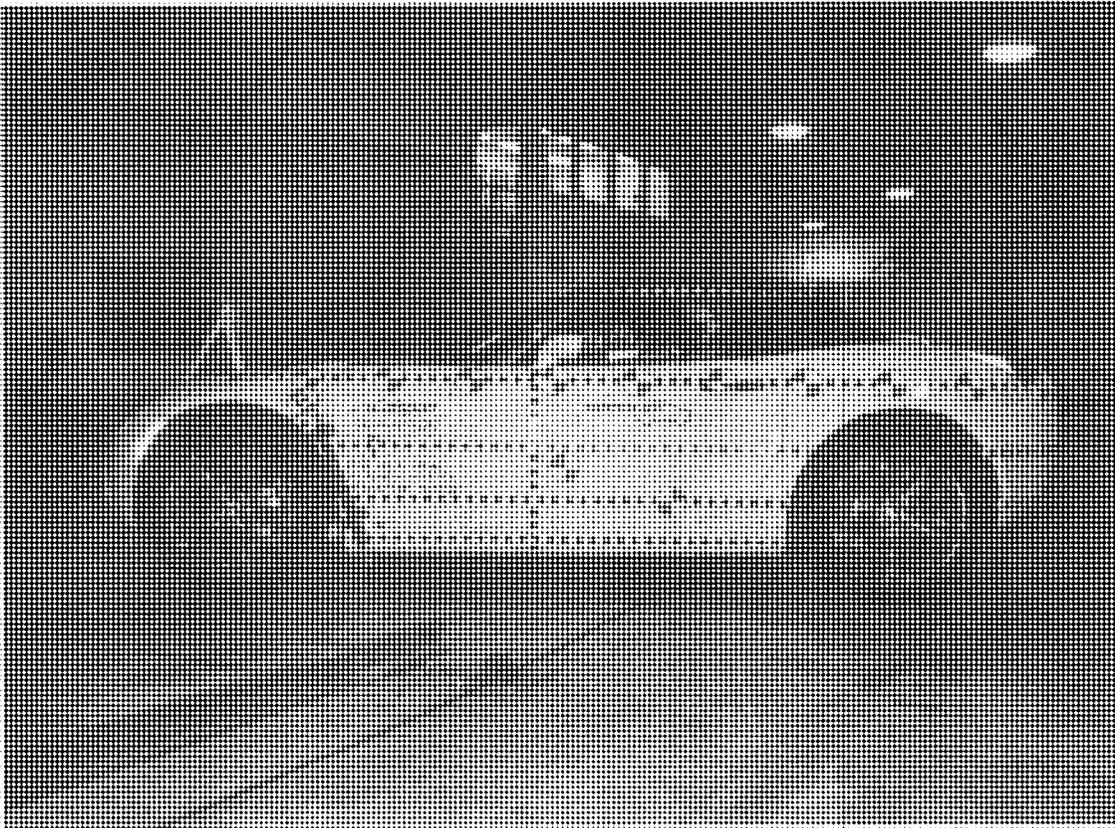


Figure A-9: Pre-Test Left Side View

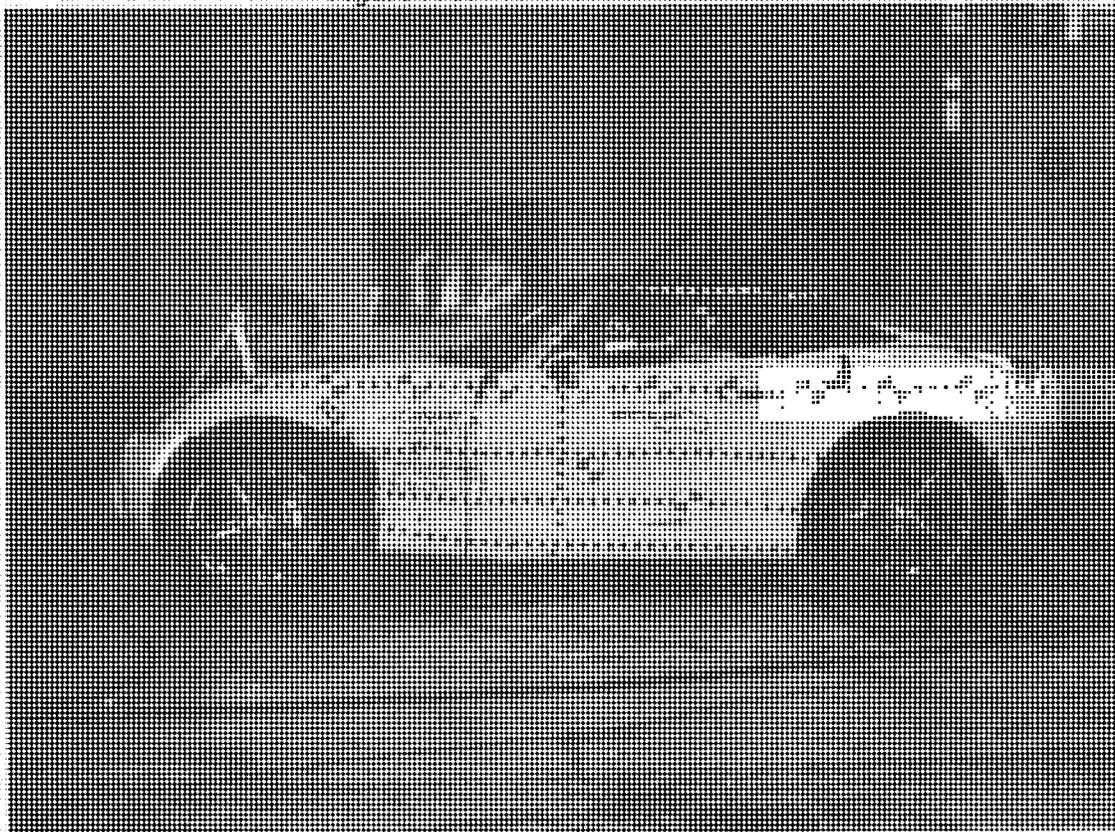


Figure A-10: Post-Test Left Side View



Figure A-11: Pre-Test Left Rear 3/4 View

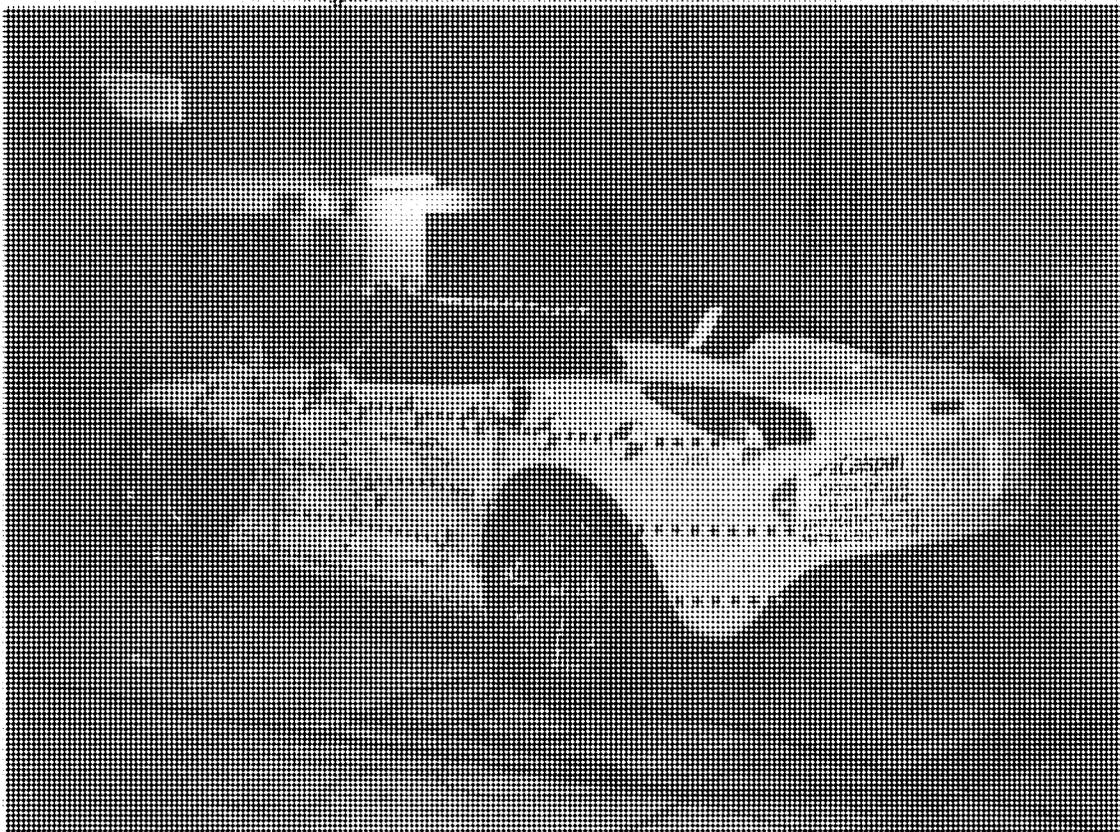


Figure A-12: Post-Test Left Rear 3/4 View

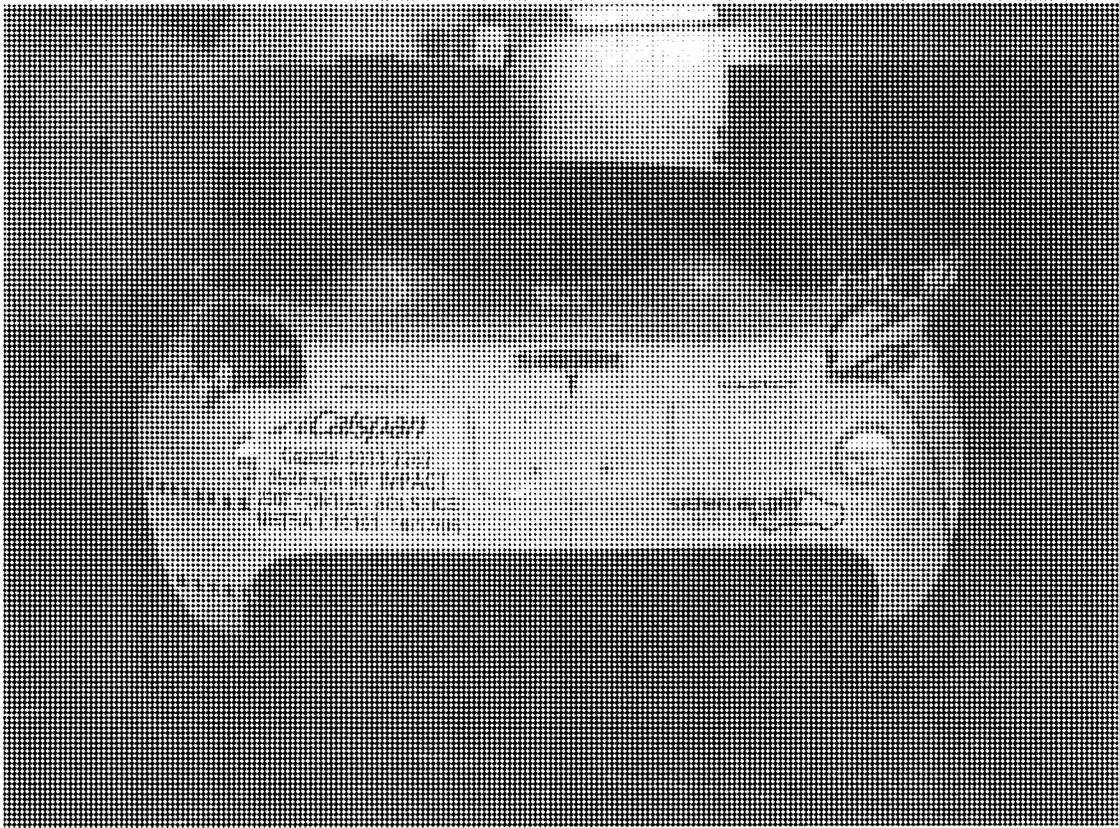


Figure A-13: Pre-Test Rear View

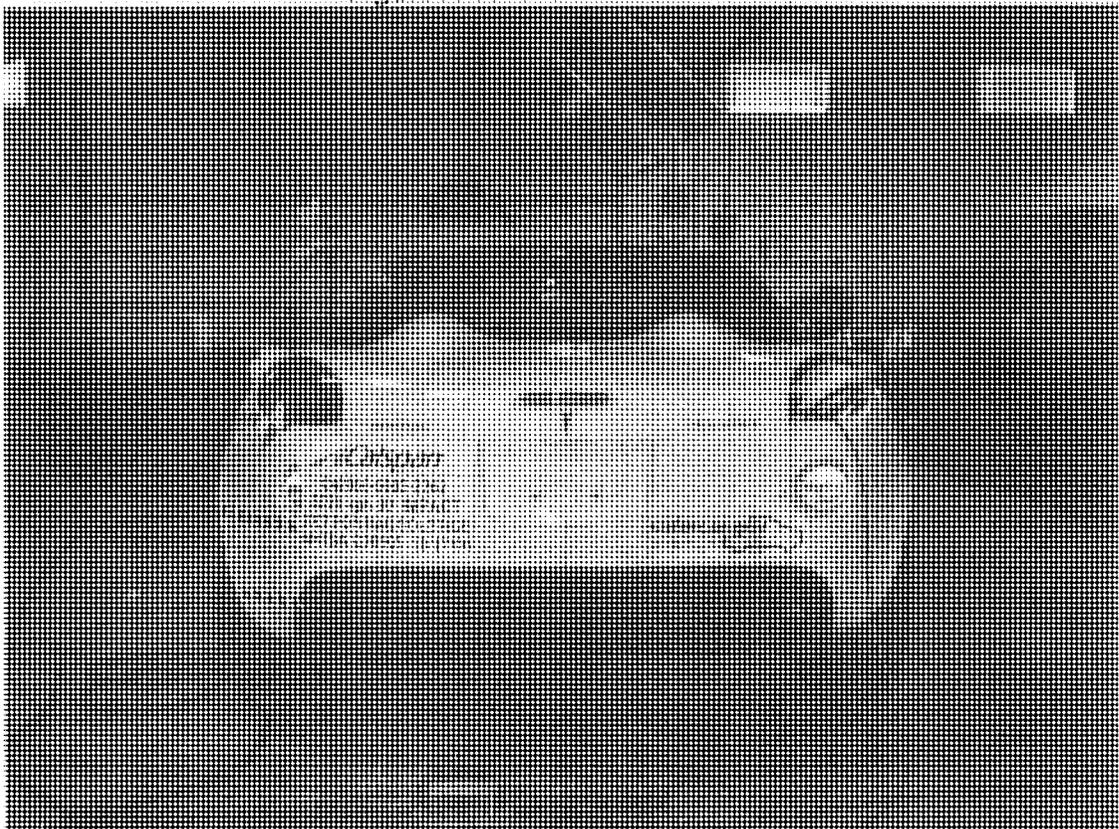


Figure A-14: Post-Test Rear View

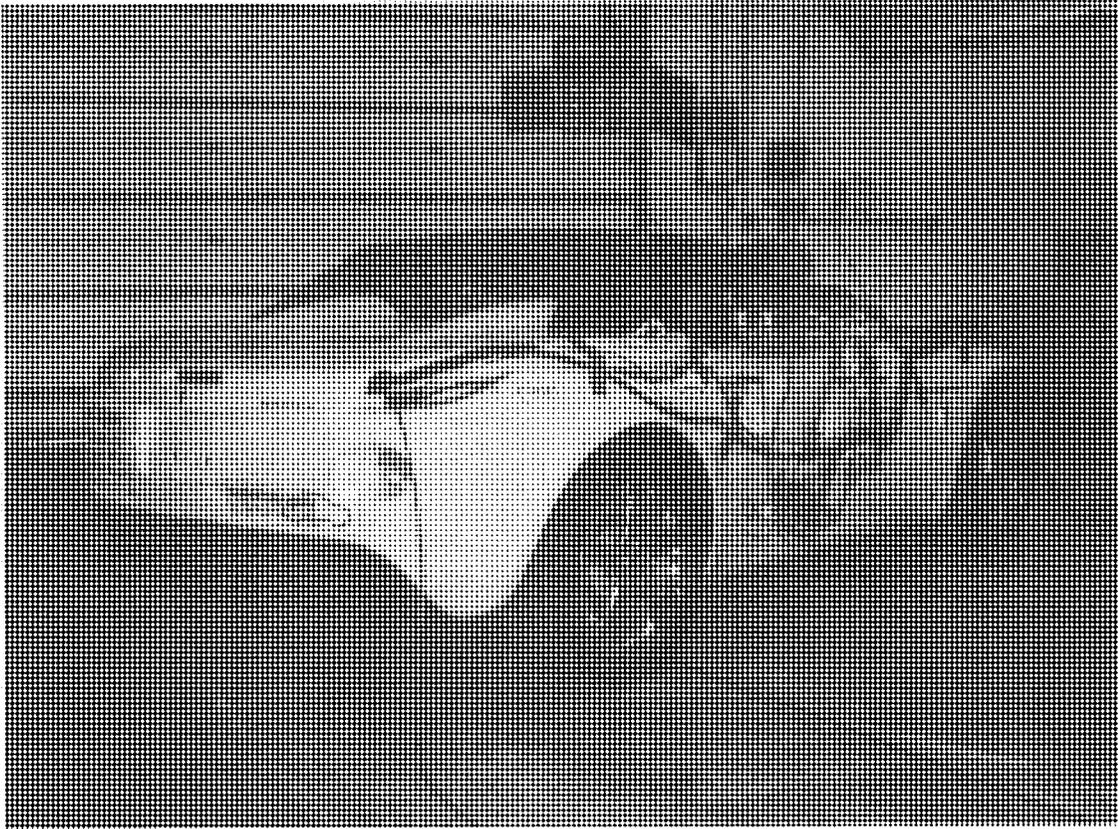


Figure A-15: Pre-Test Right Rear 3/4 View

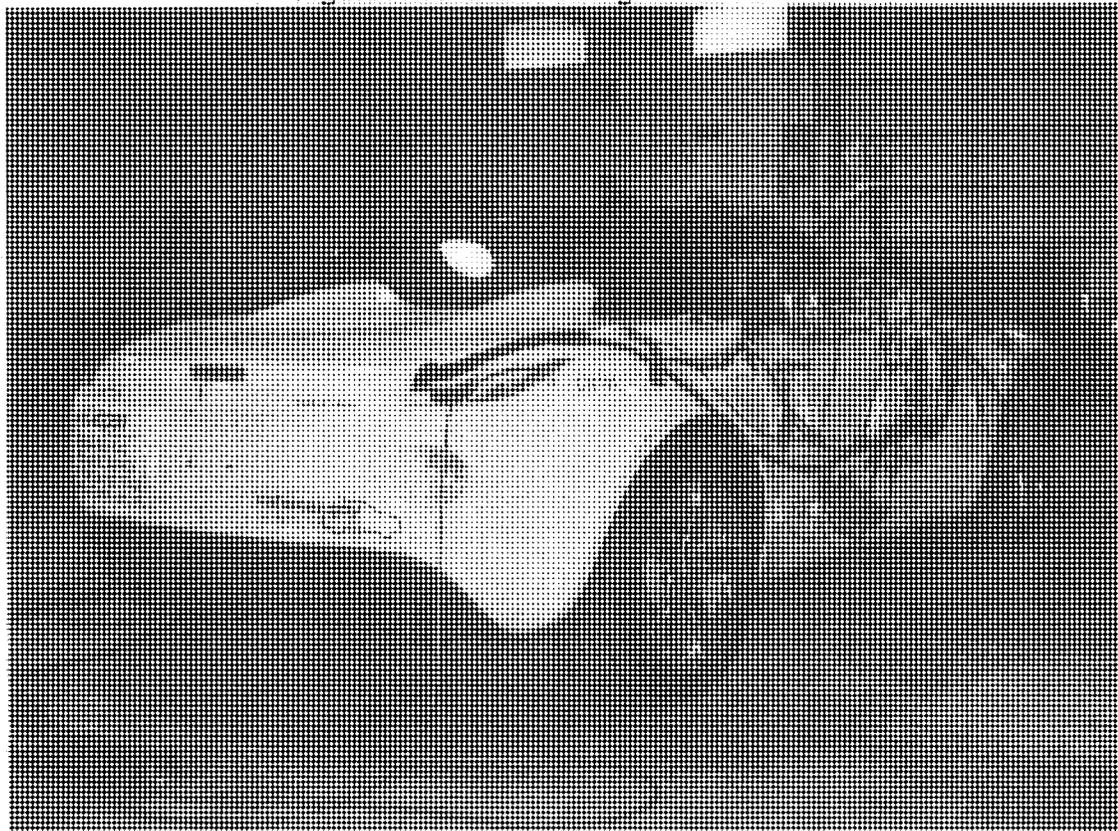


Figure A-15: Post-Test Right Rear 3/4 View

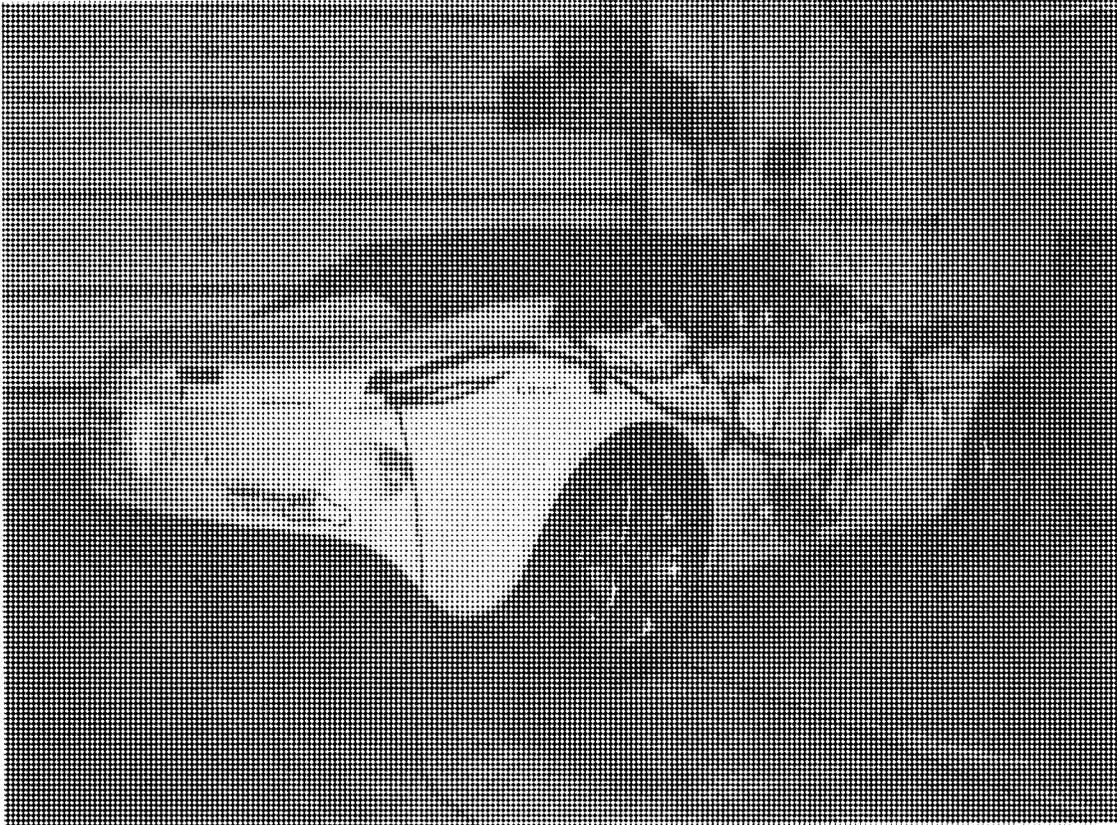


Figure A-15: Pre-Test Right Rear 3/4 View

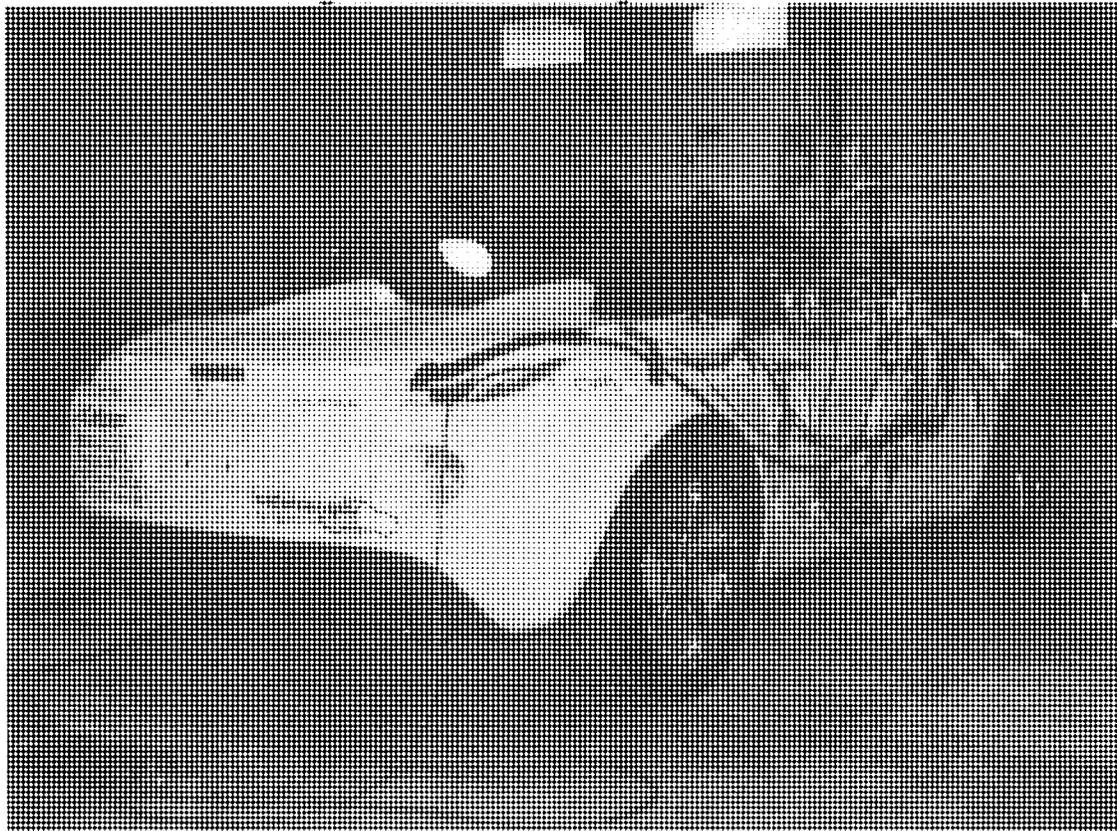


Figure A-16: Post-Test Right Rear 3/4 View

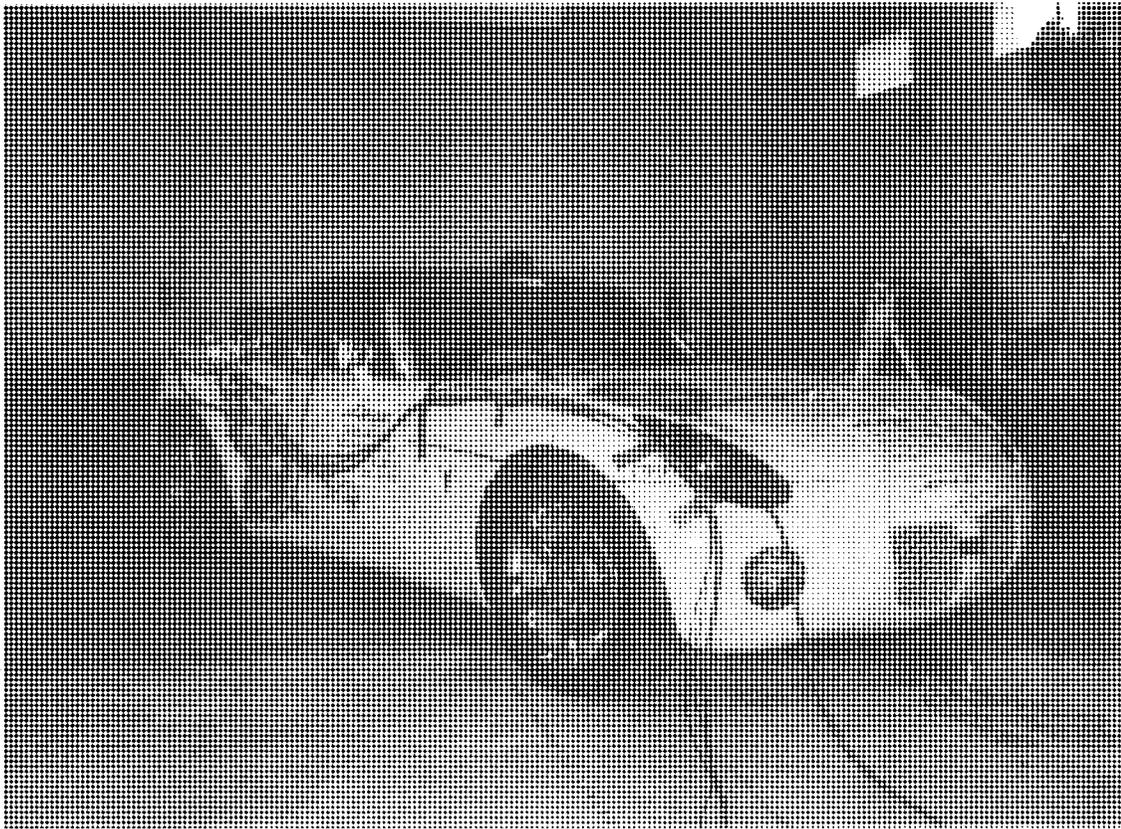


Figure A-19: Pre-Test Right Front 3/4 View

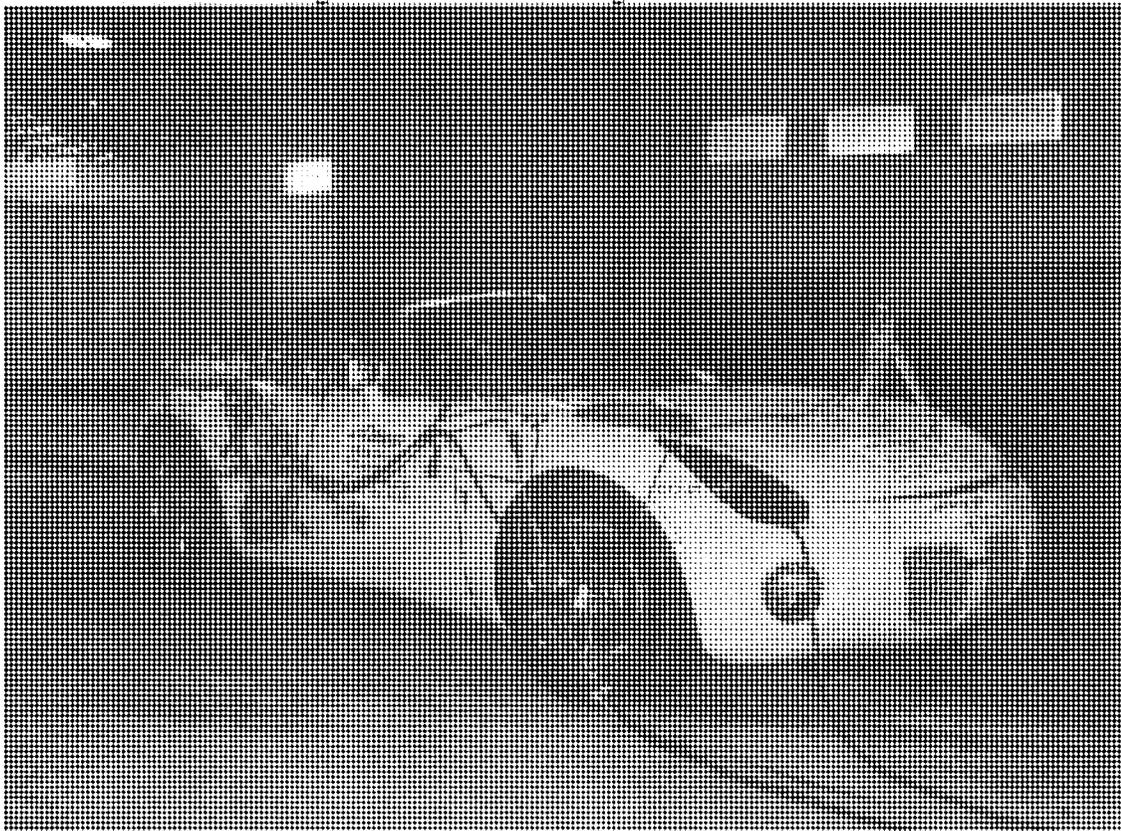


Figure A-20: Post-Test Right Front 3/4 View

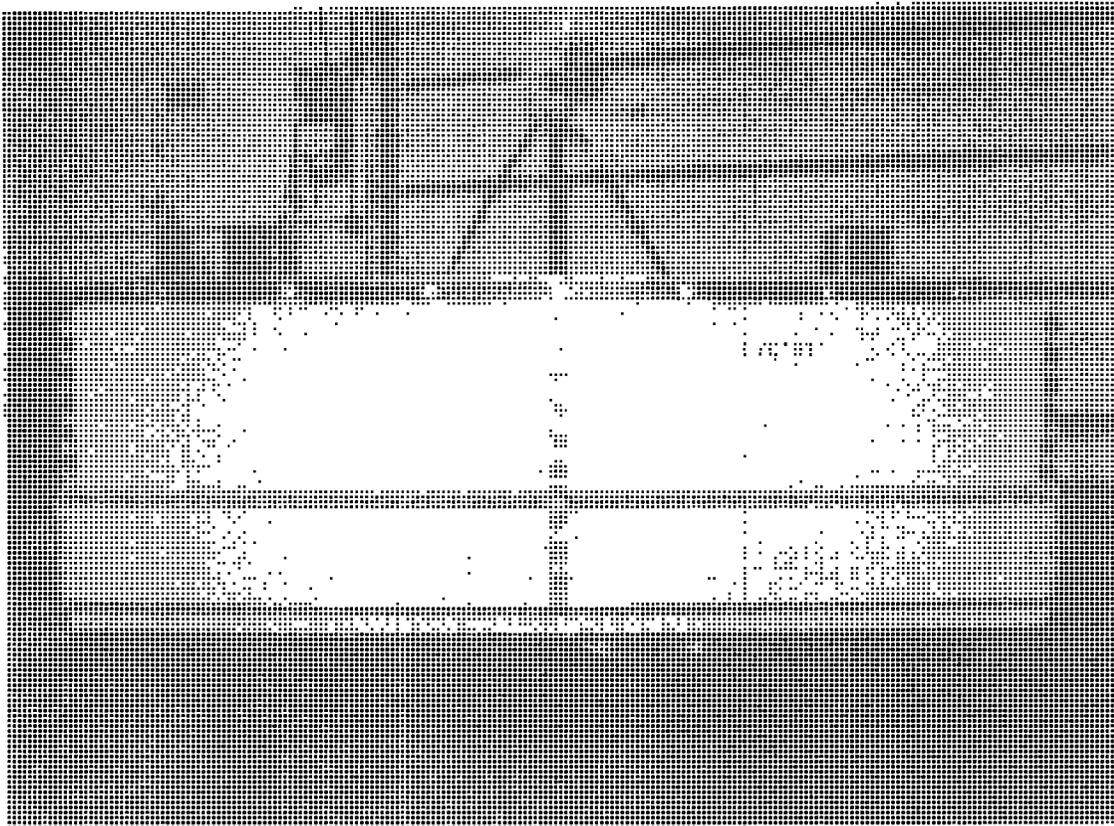


Figure A-27. Frontal View of YPR Inceptor Face

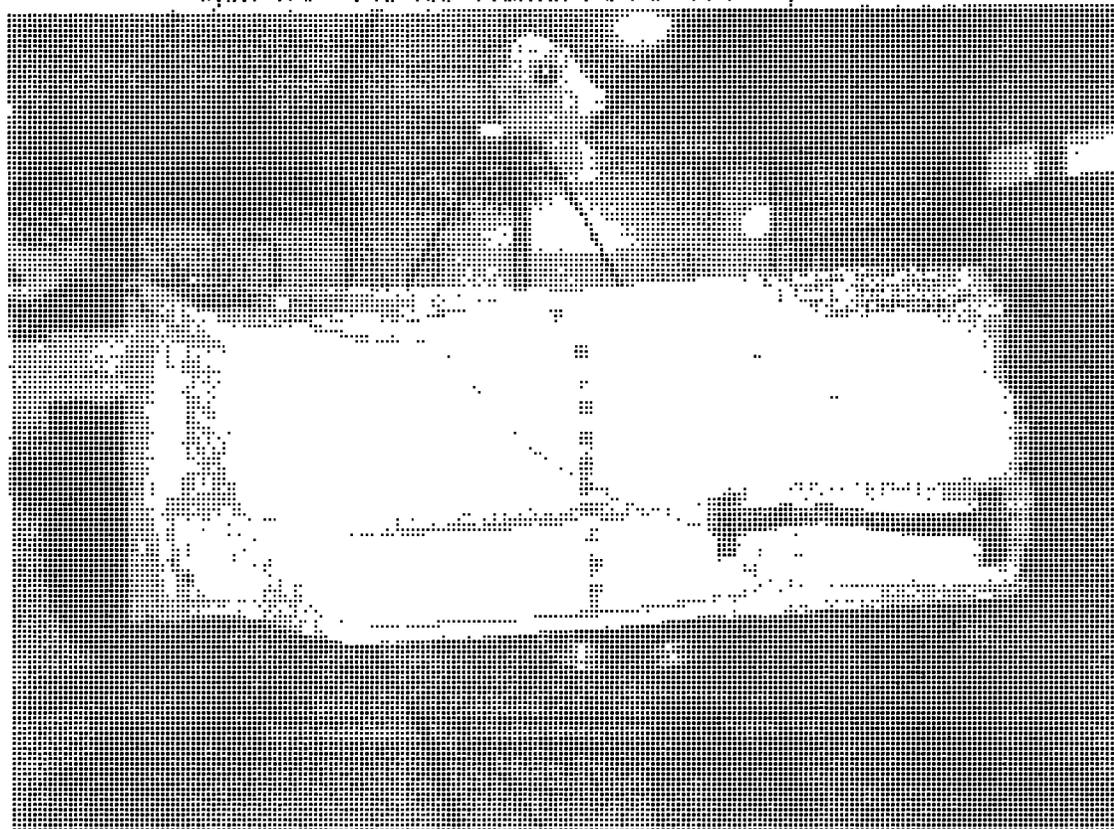


Figure A-28. Top-Down Frontal View of MDR Inceptor Face

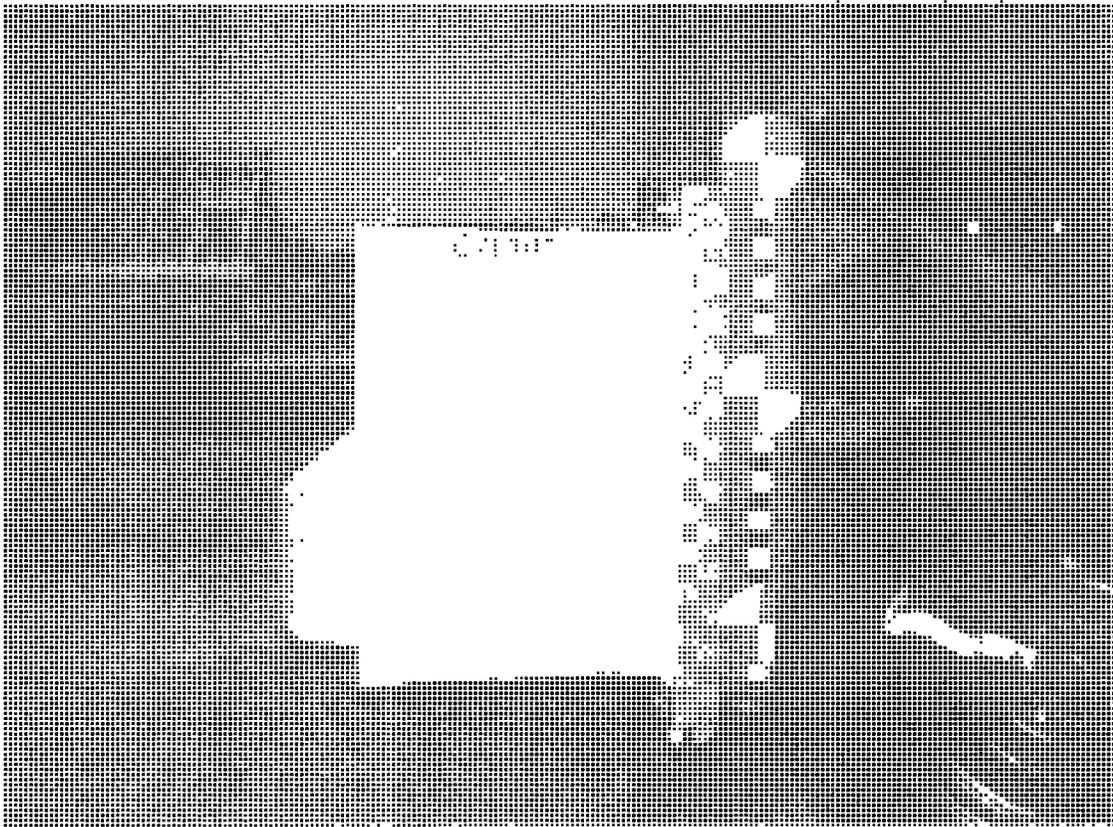


Figure A-23: Top View of the Side of MCH Impulse Panel

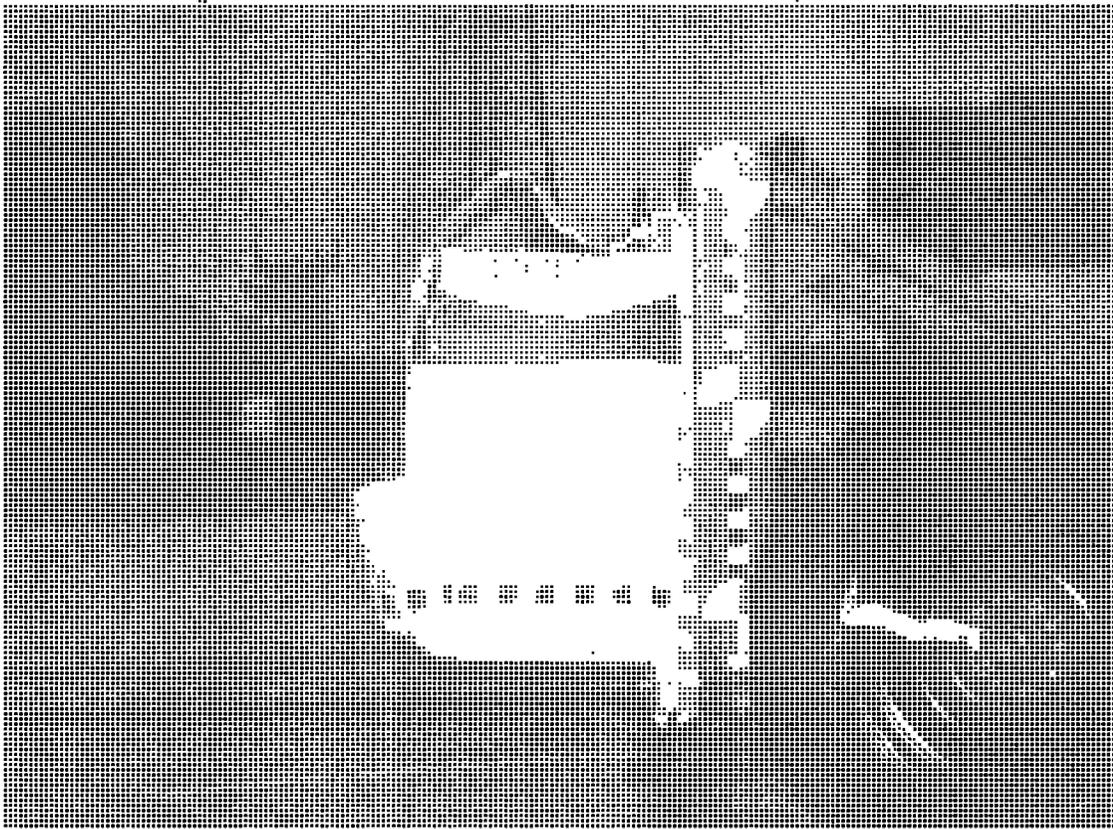


Figure A-24: Top View of the Side Face of MCH Impulse Panel

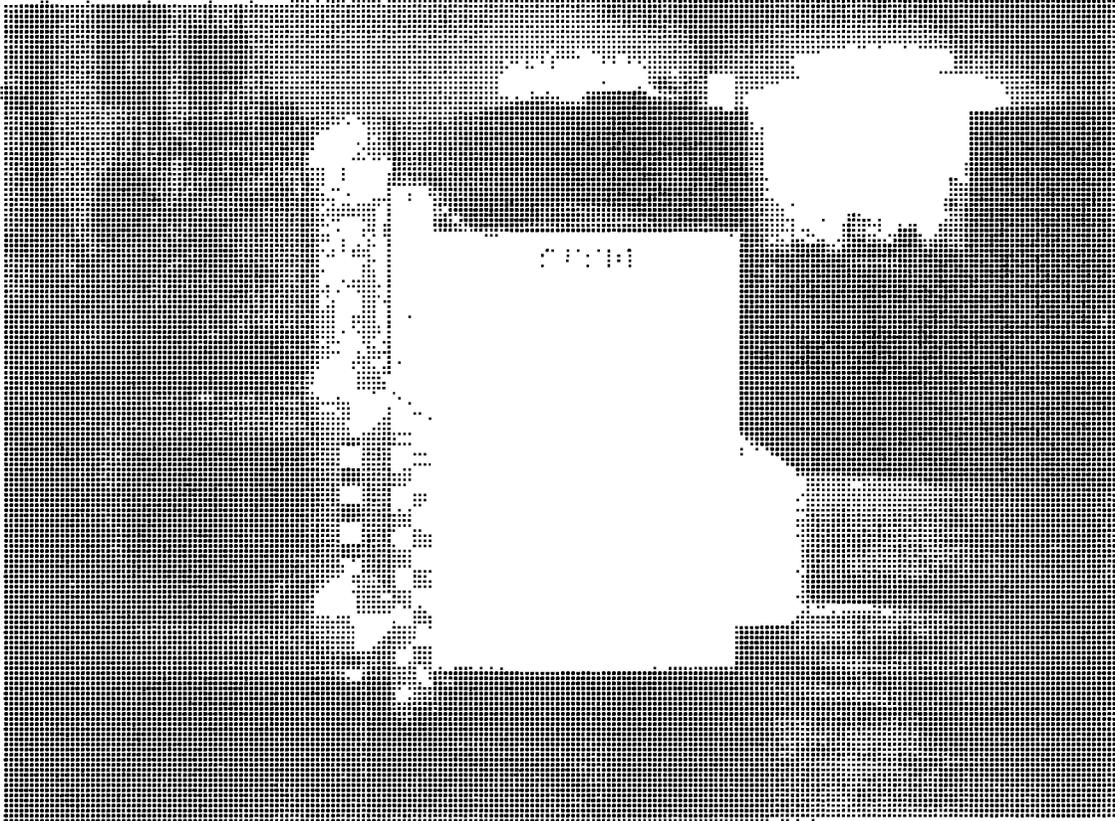


Figure A-27: Pre-Test Right Side View of AOS from the Case

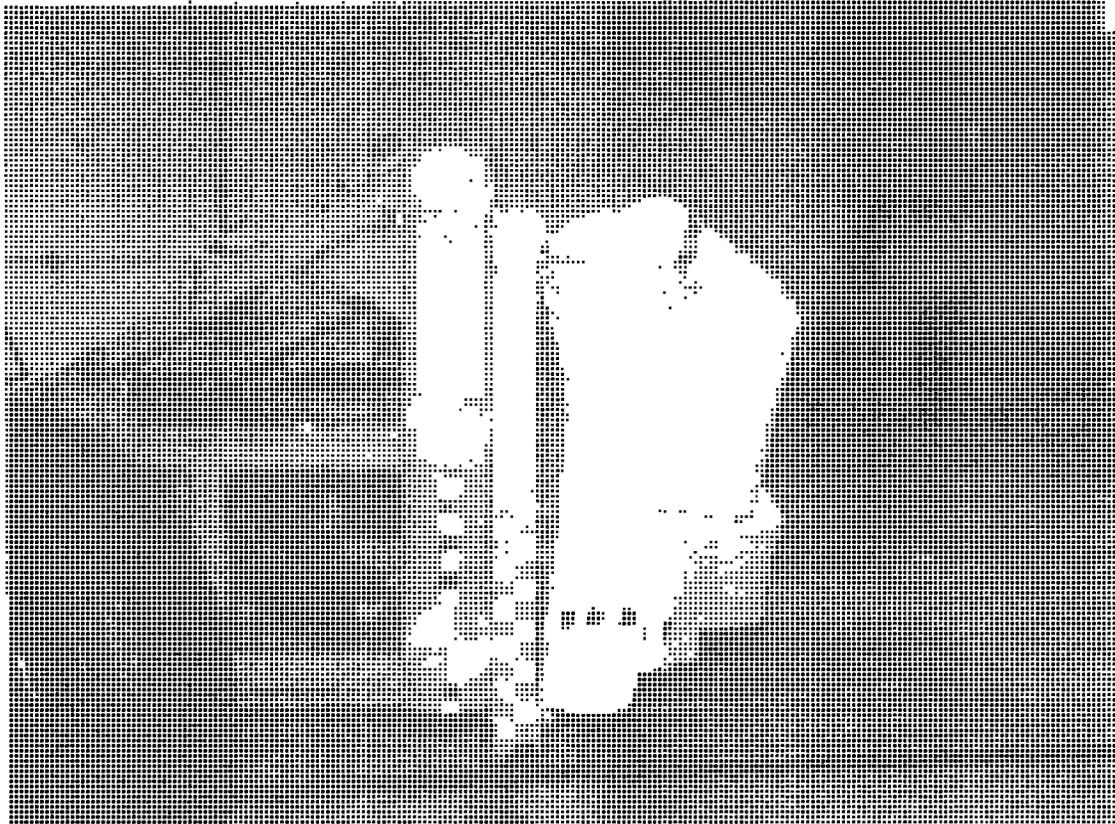


Figure A-28: Post-Test Right Side View of MBB Inspector Face

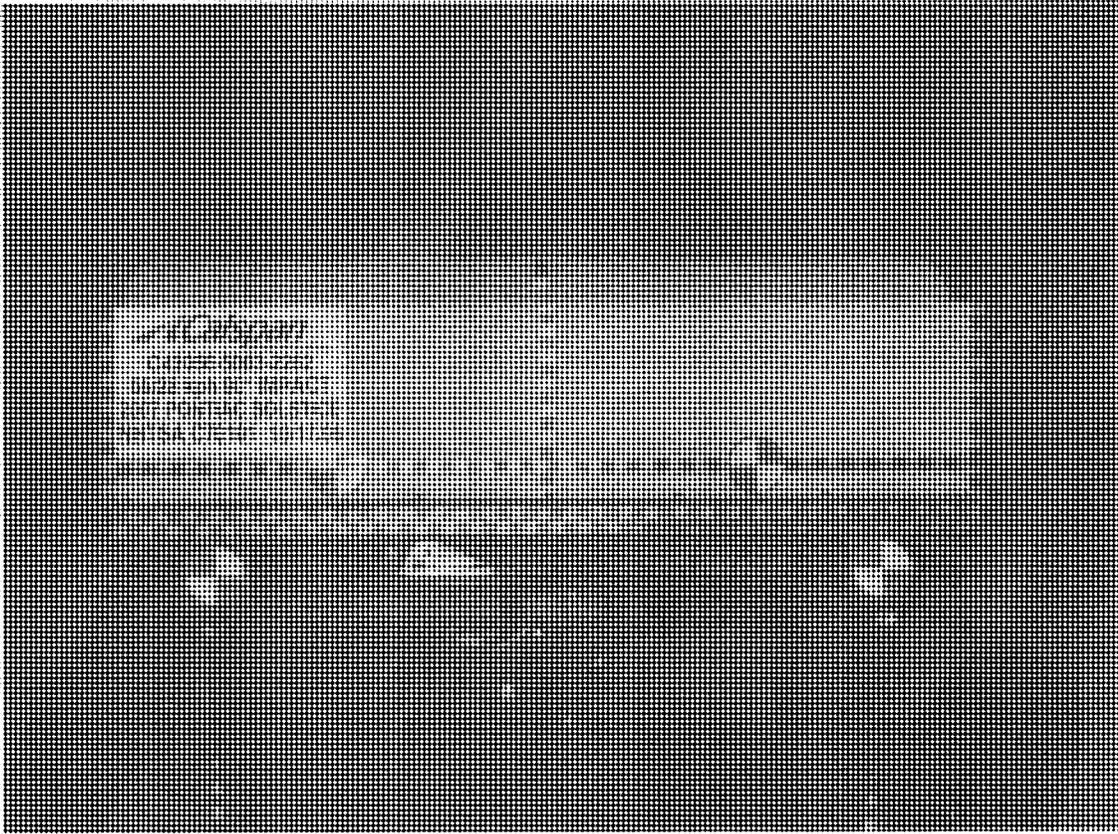


Figure A-37: Pre-Test Top View of MDB Impactor Face

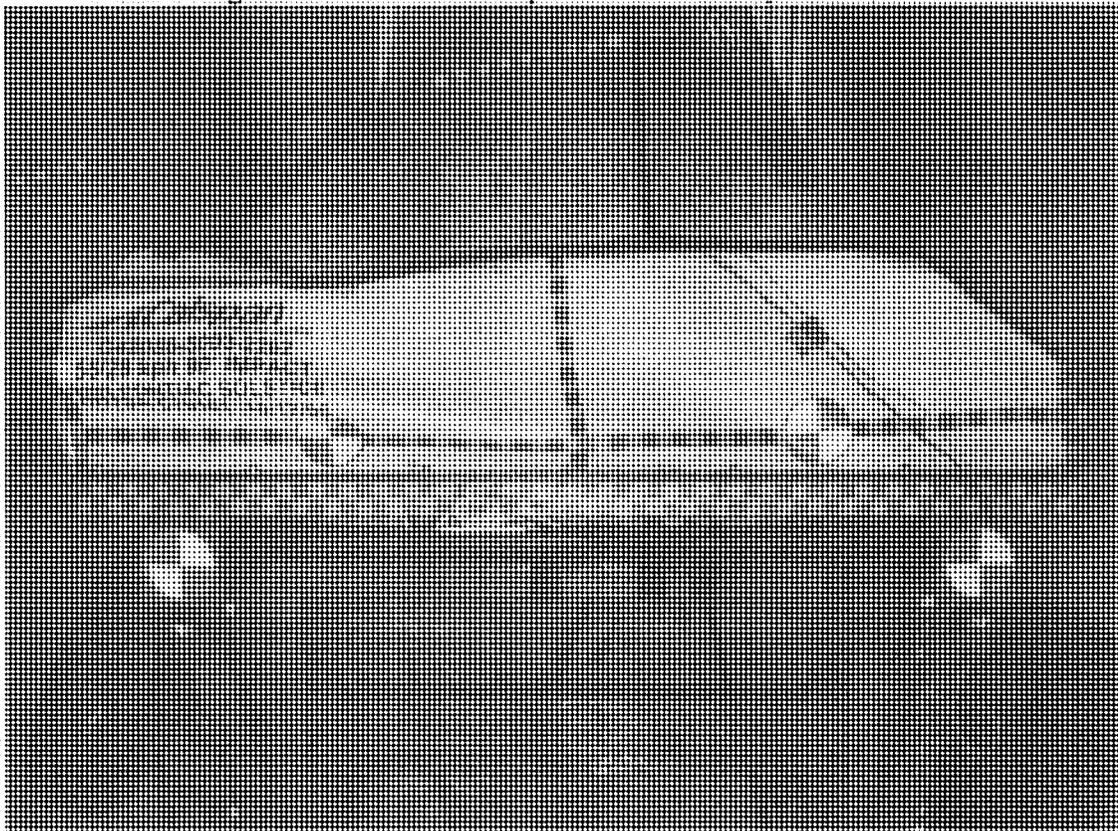


Figure A-28: Post-Test Top View of MDB Impactor Face

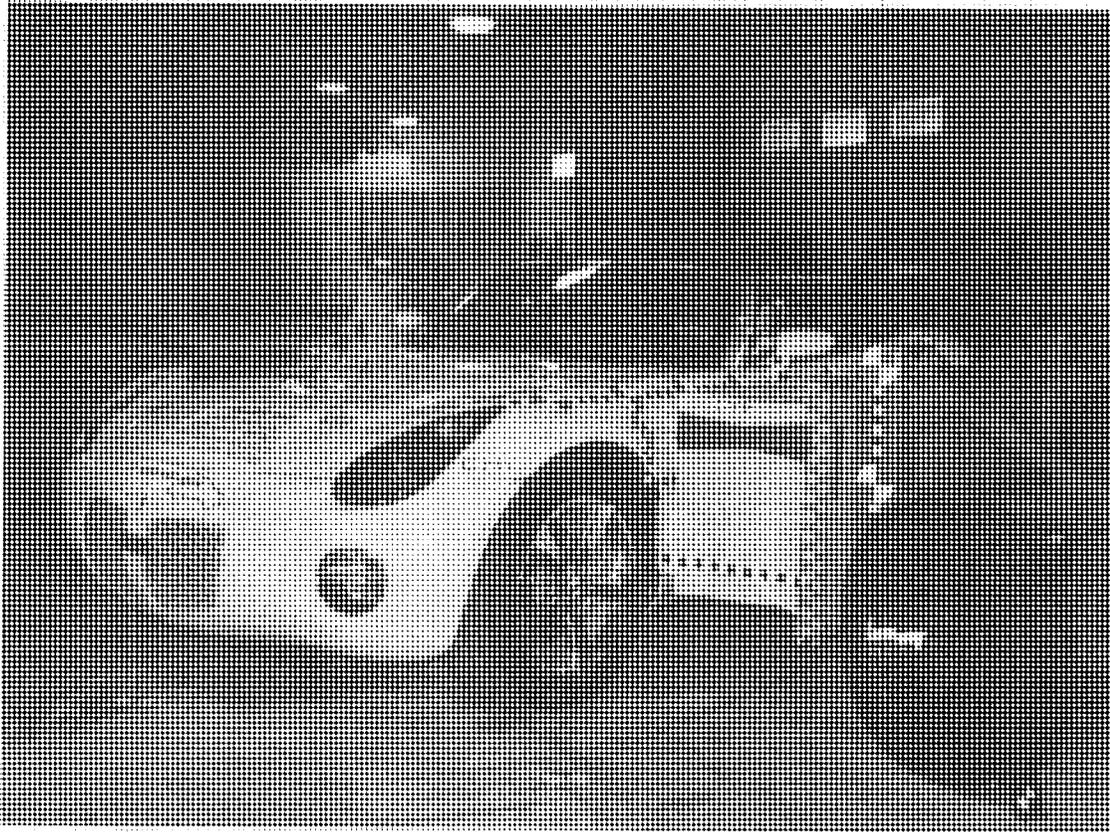


Figure A-29: Pre-Test Left Side View of Aligned MDB and Vehicle

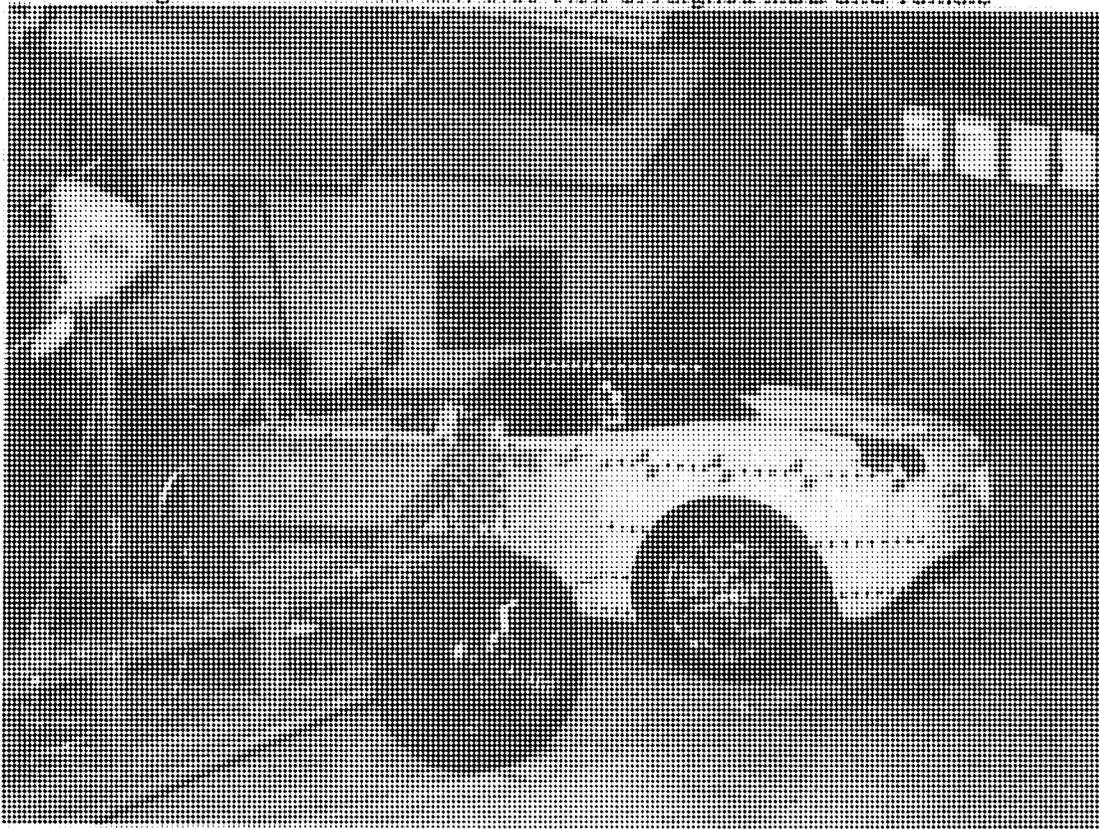


Figure A-30: Pre-Test Right Side View of Aligned MDB and Vehicle

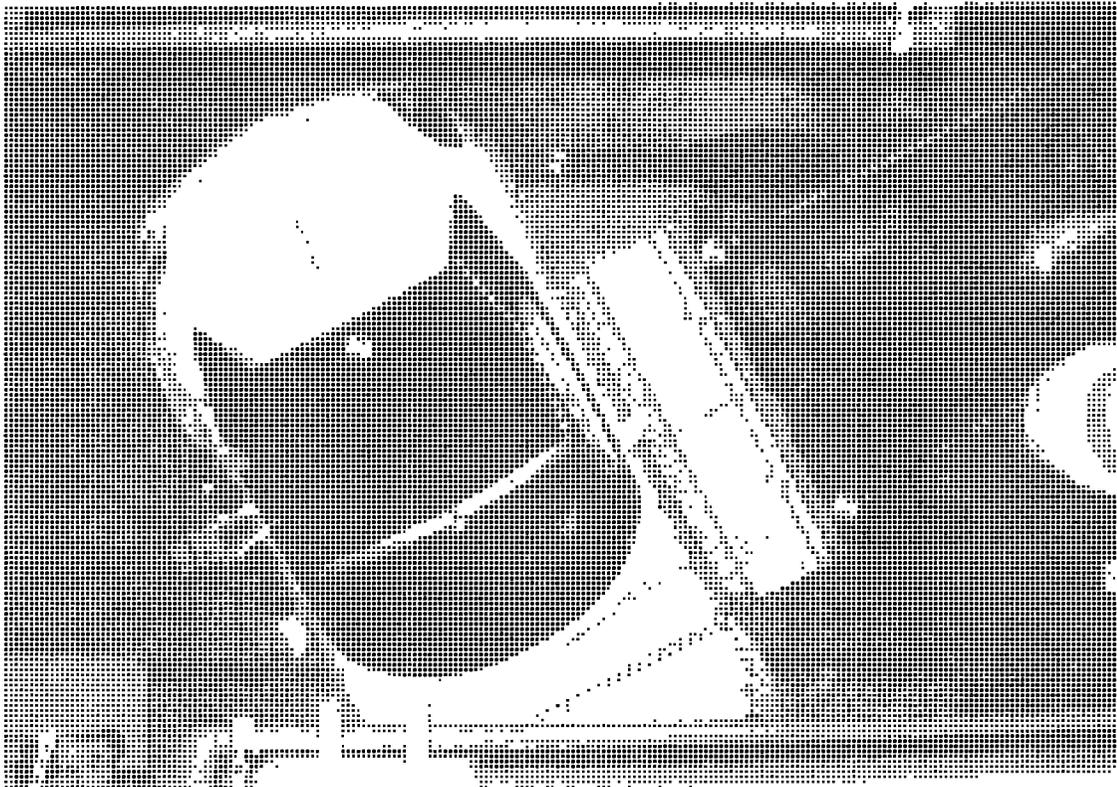


Figure A-31: Pre-Test Overhead View of Aligned MDB and Vehicle

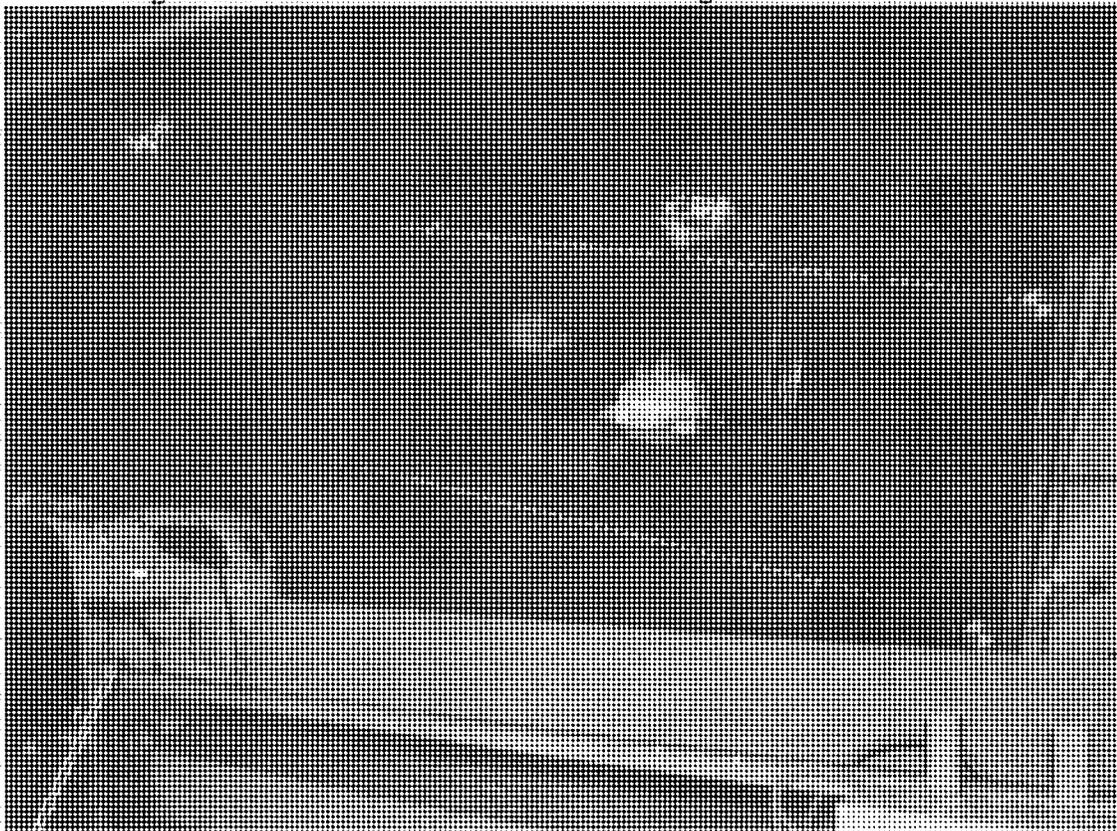


Figure A-32: Post-Test Overhead View of MDB and Vehicle

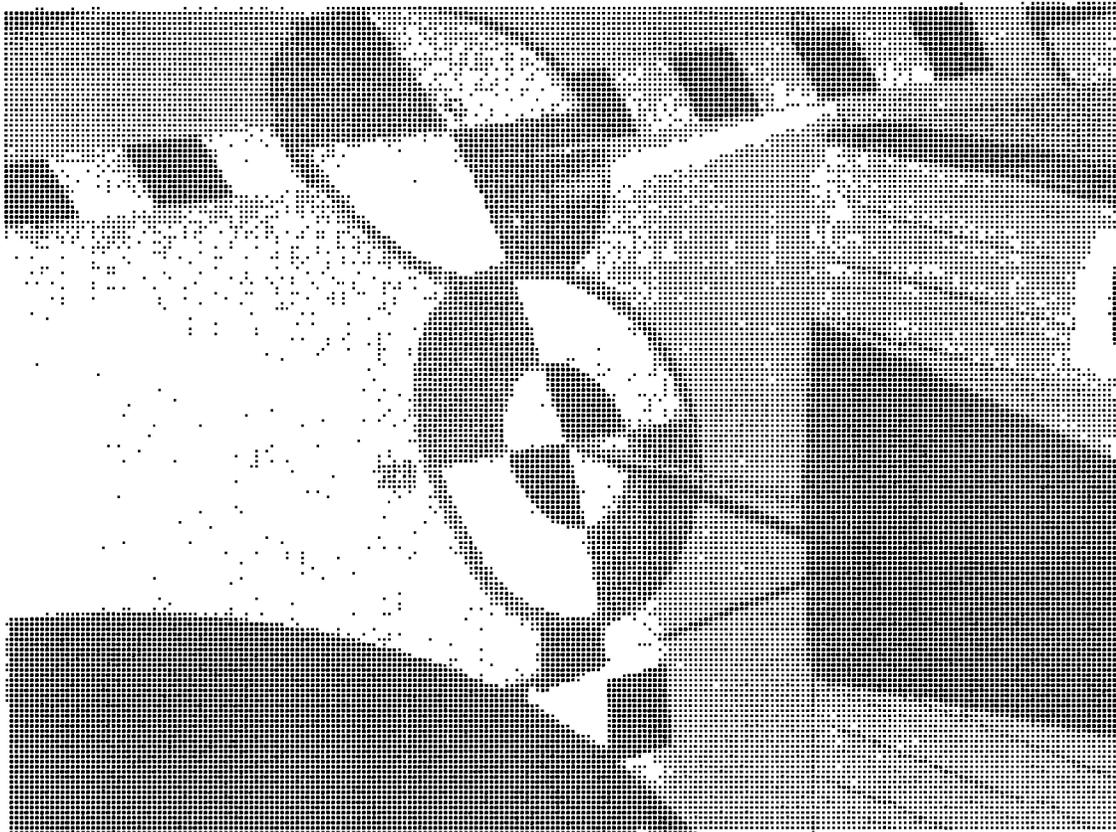


Figure A-33 Pre-Test Close-Up View of Impact Point (right)

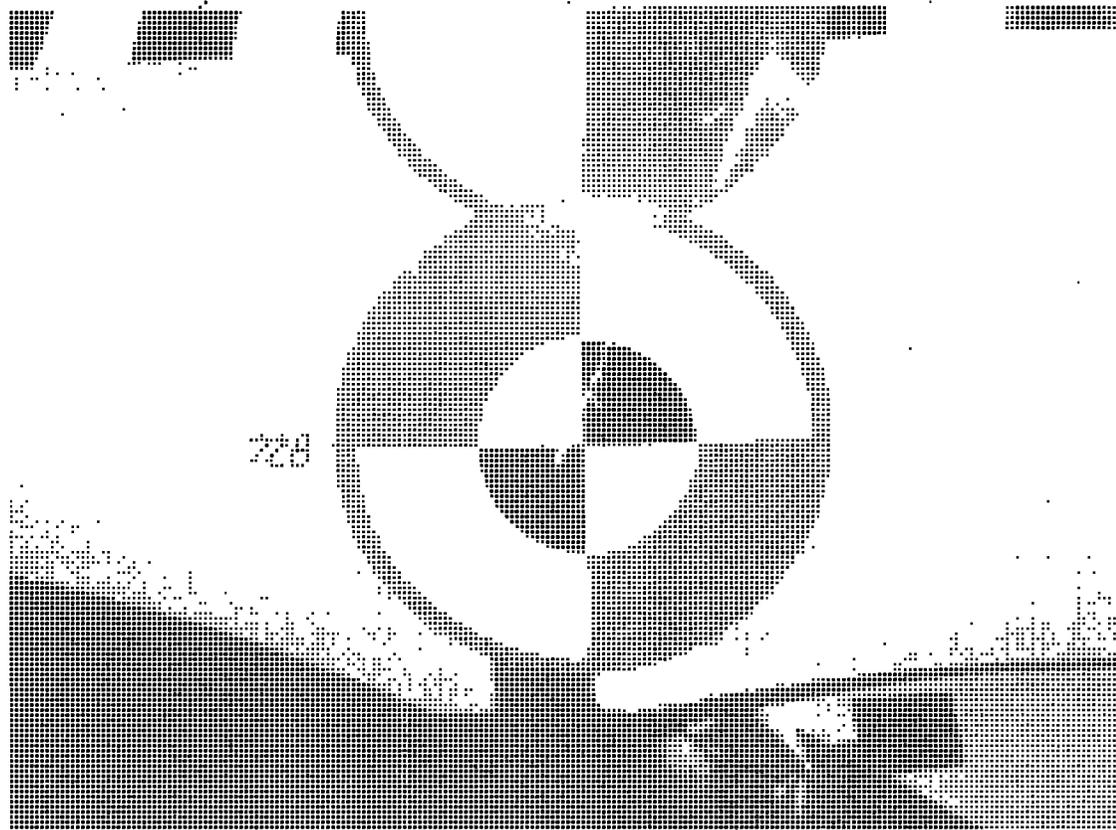


Figure A-34 Pre-Test Close-Up View of Impact Point (left)

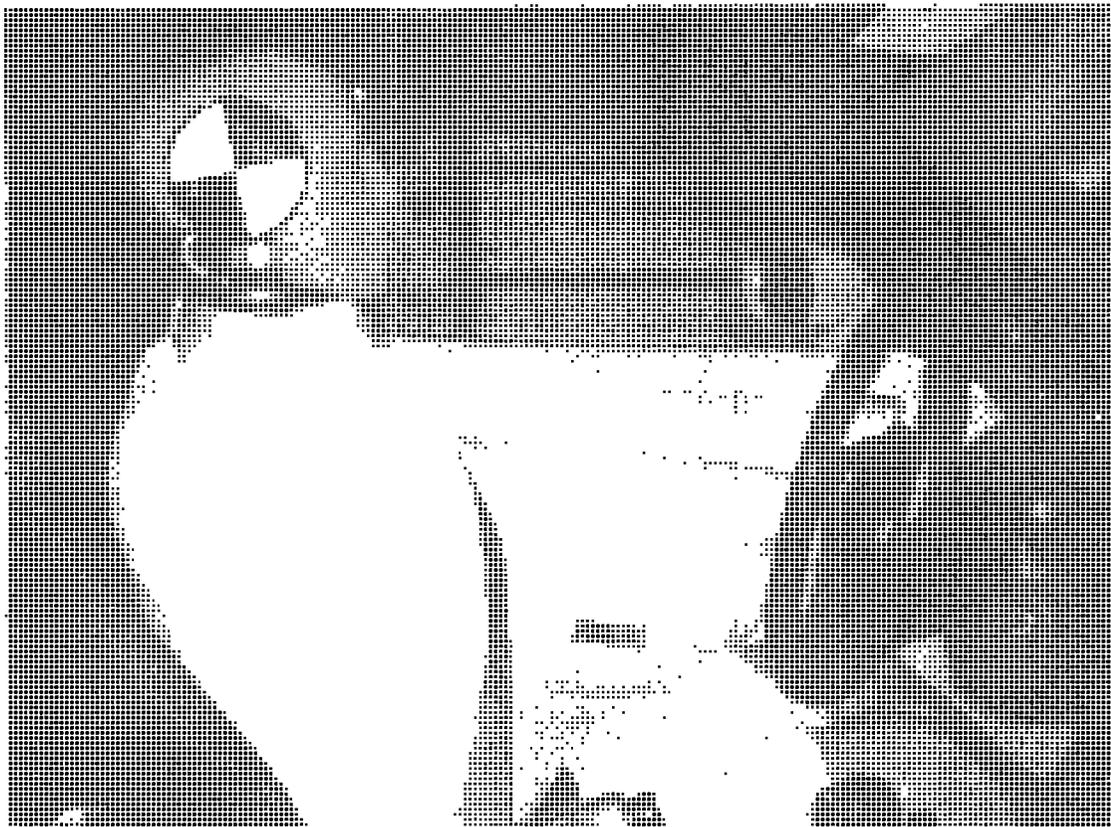


Figure 4-35: Photo of EpiO Respirator Comparison View of O<sub>2</sub> Use

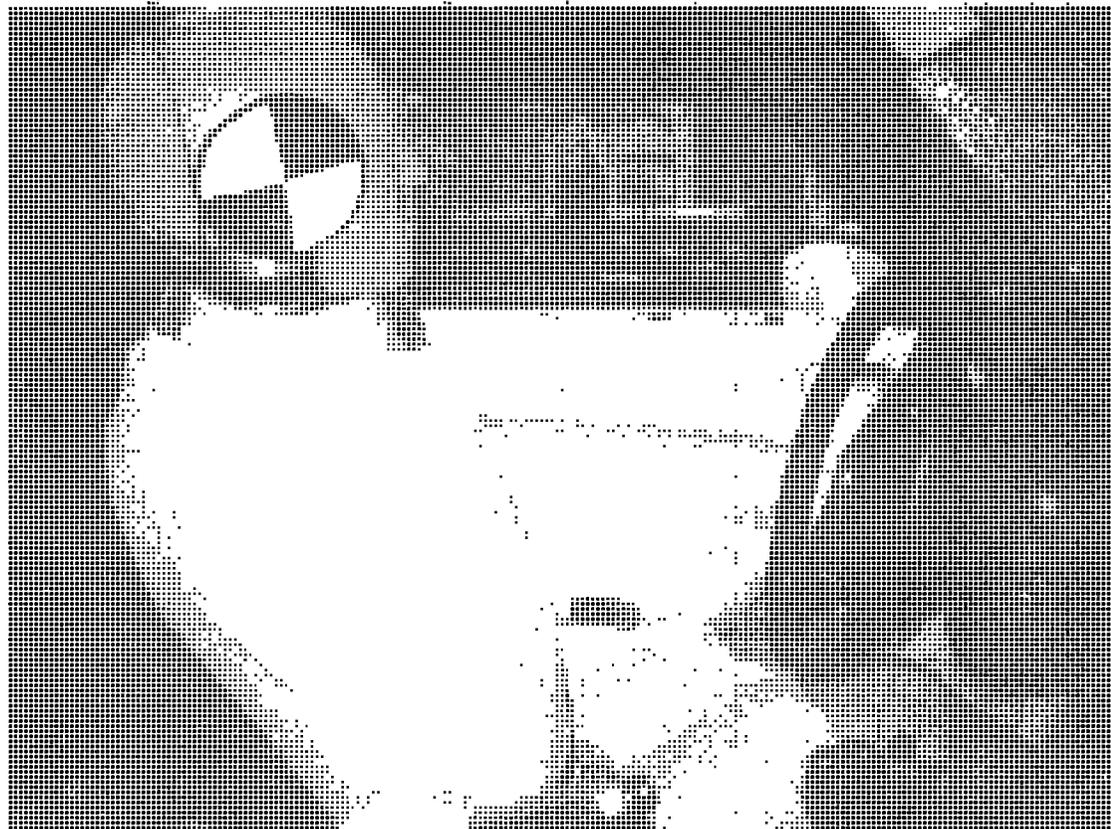


Figure 4-36: Photo of EpiO Respirator Comparison View of O<sub>2</sub> Use

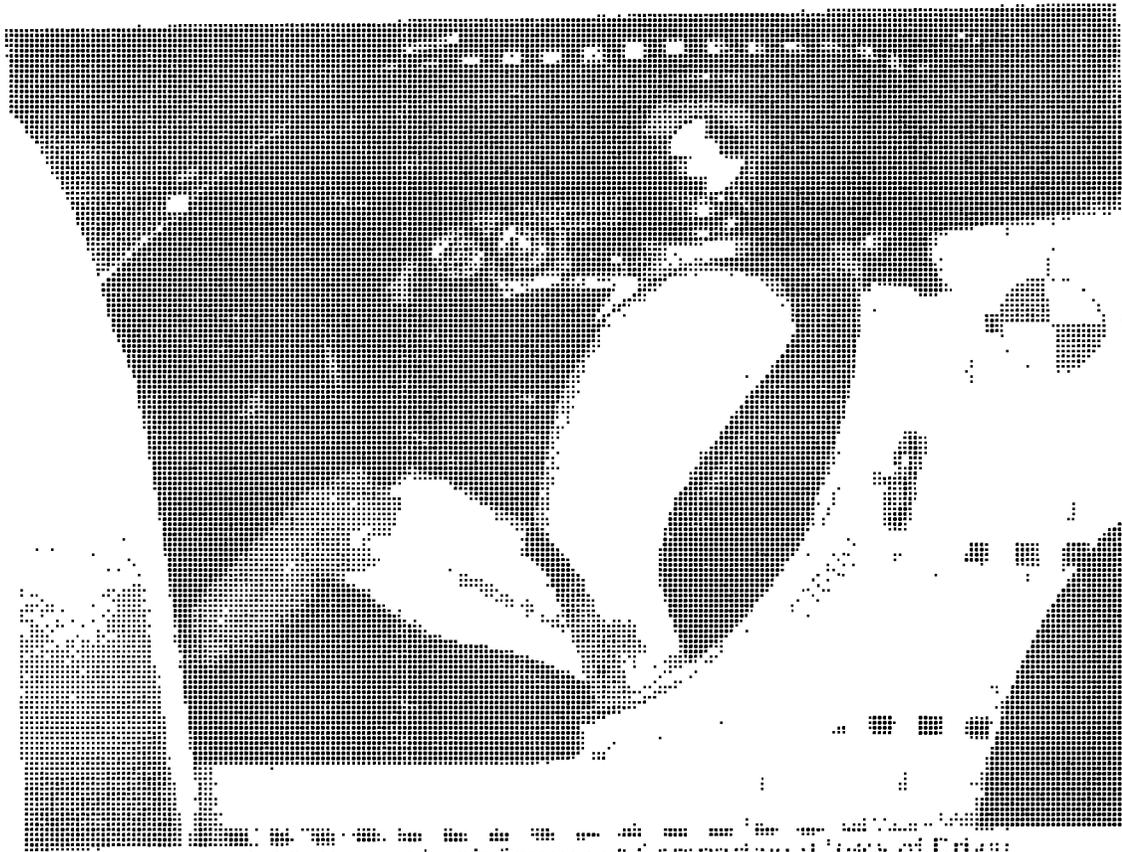


Figure A-37. Point Left Occupant Comparison View of Driver

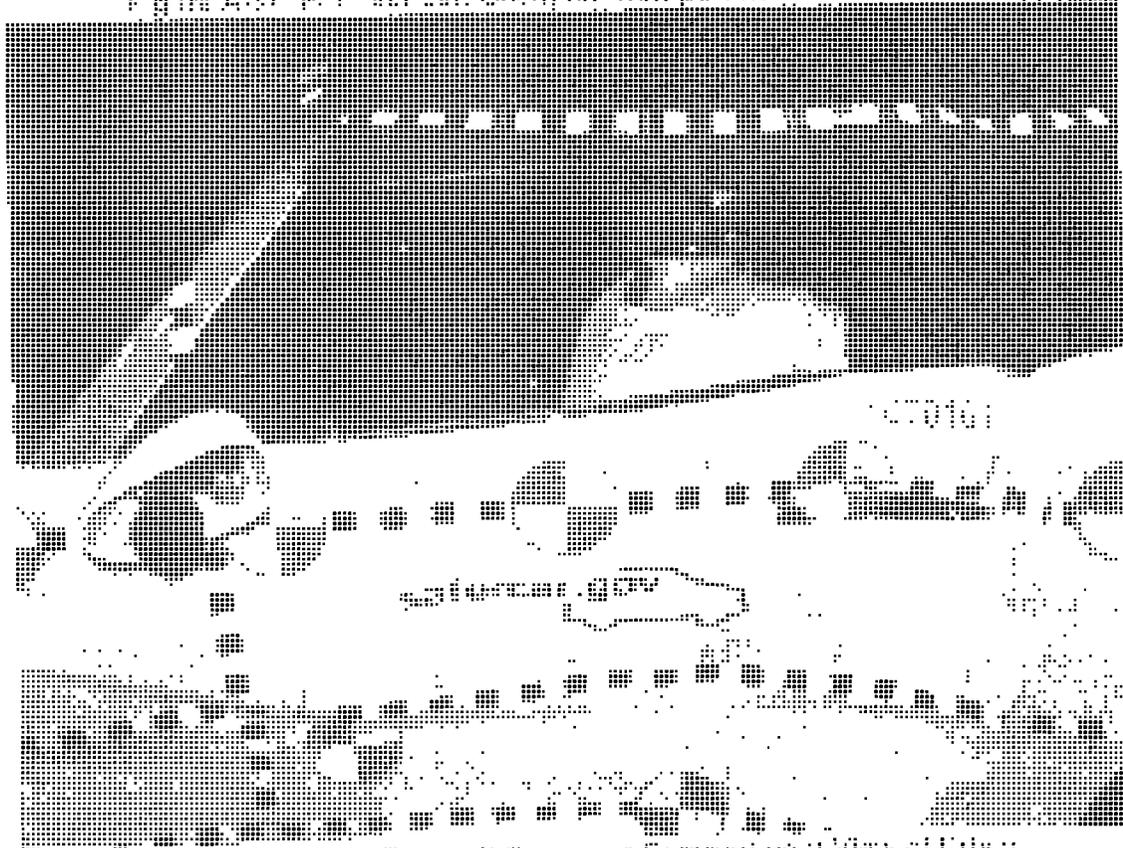


Figure A-38. Point Front Left Occupant Comparison View of Driver

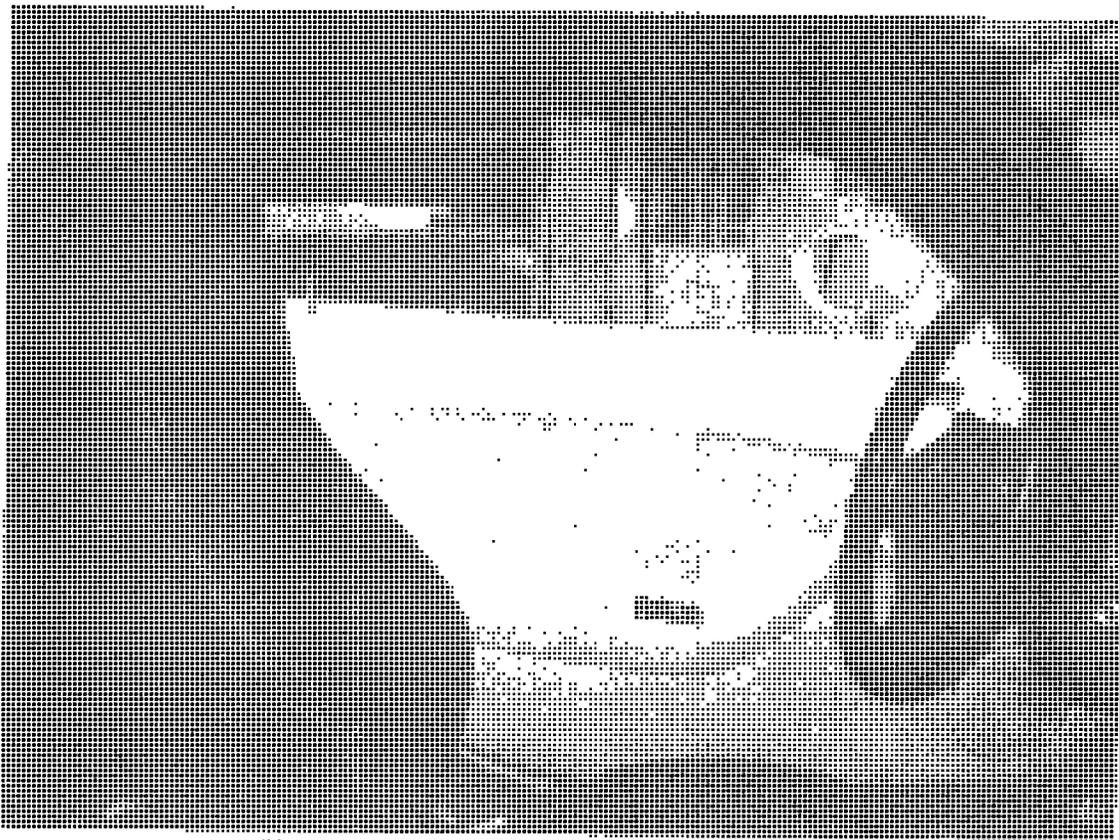


Figure A-35: Front View of Fuel Inlet Tank

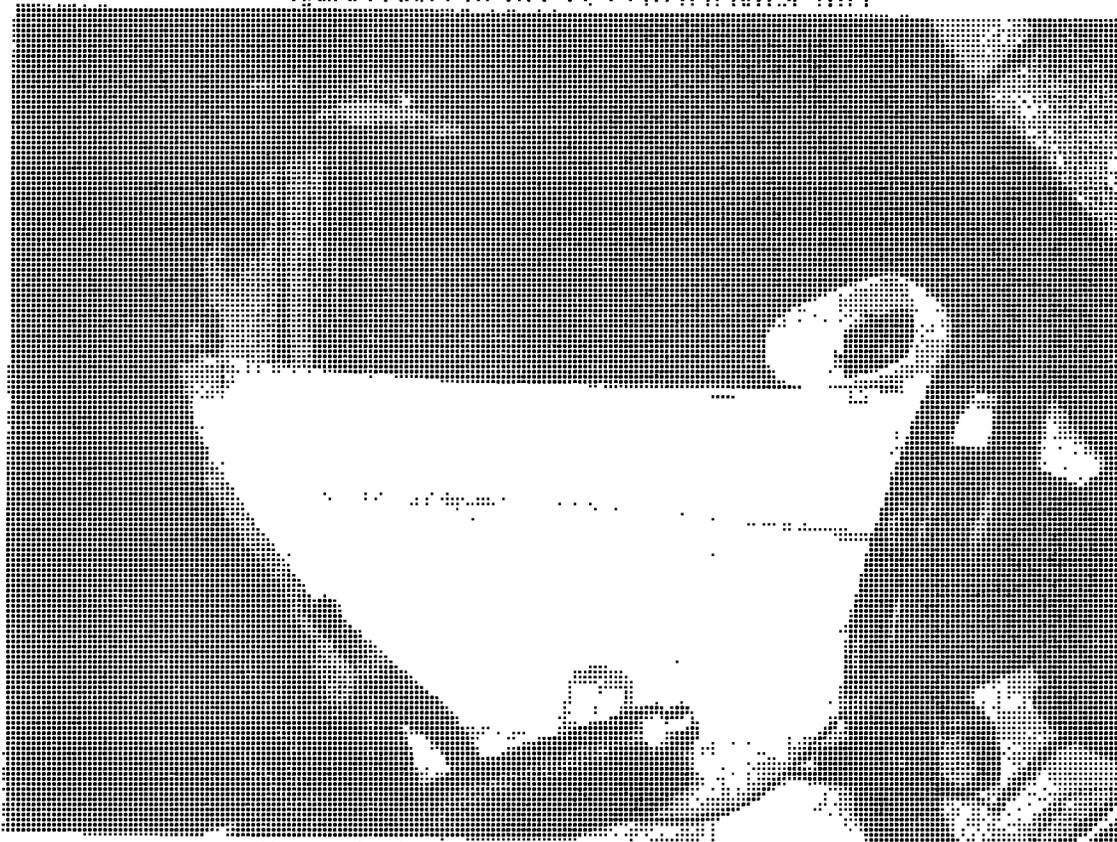


Figure A-36: Front View with Front Cover of Tank

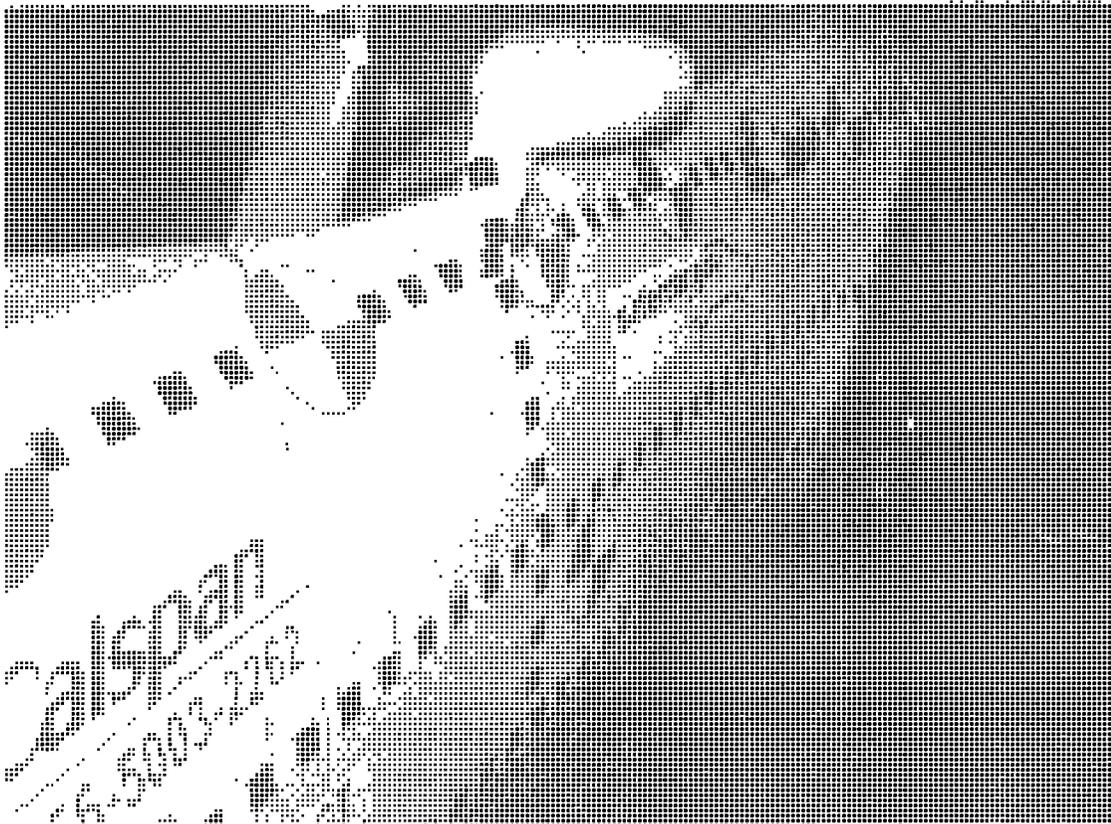


Figure A-41: Plot Test Left From a View of Left Side Up.

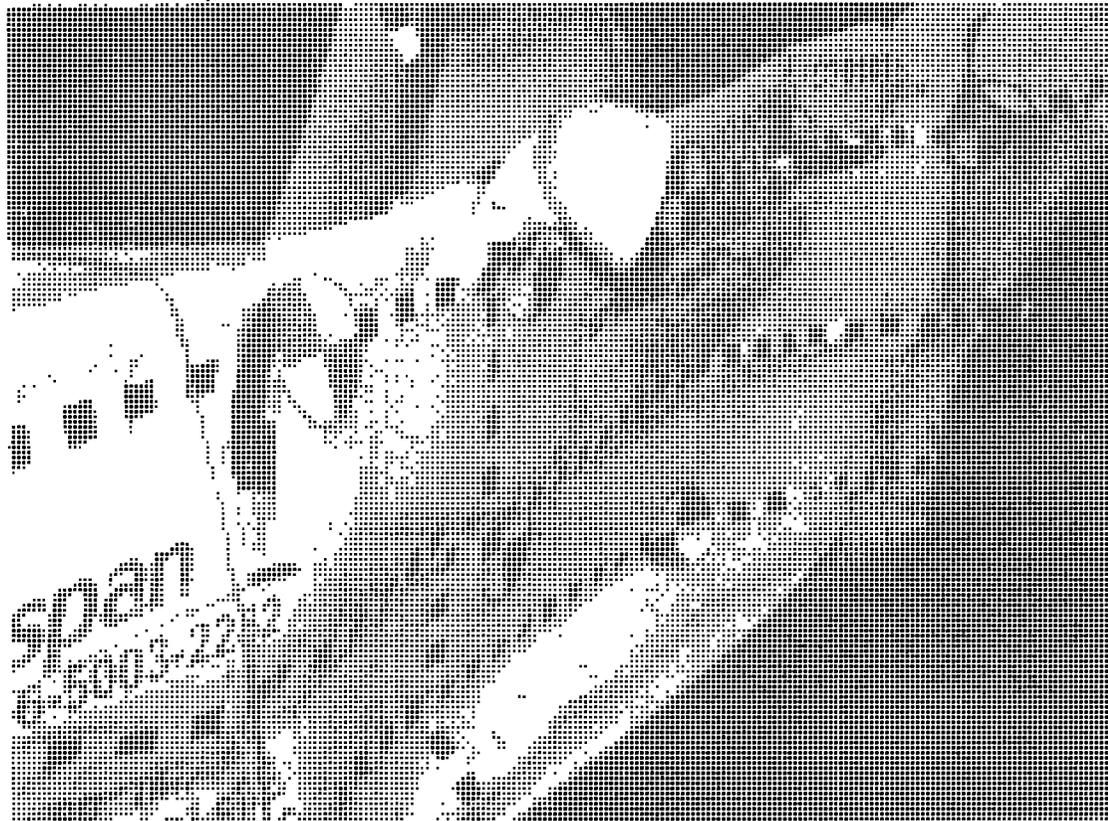


Figure A-42: Plot Test Left From a View of Left Side Down.

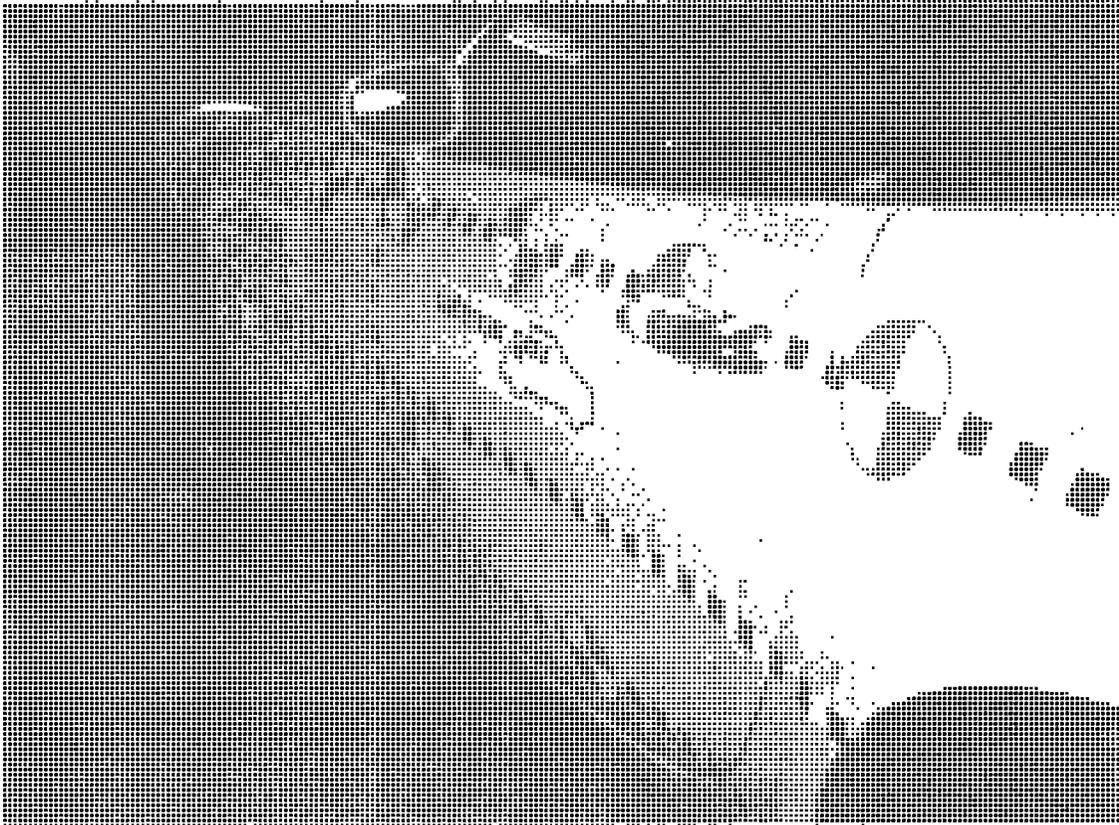


Figure A-41. Post Test Cell Bear 1 - View of Left Sub Engine.

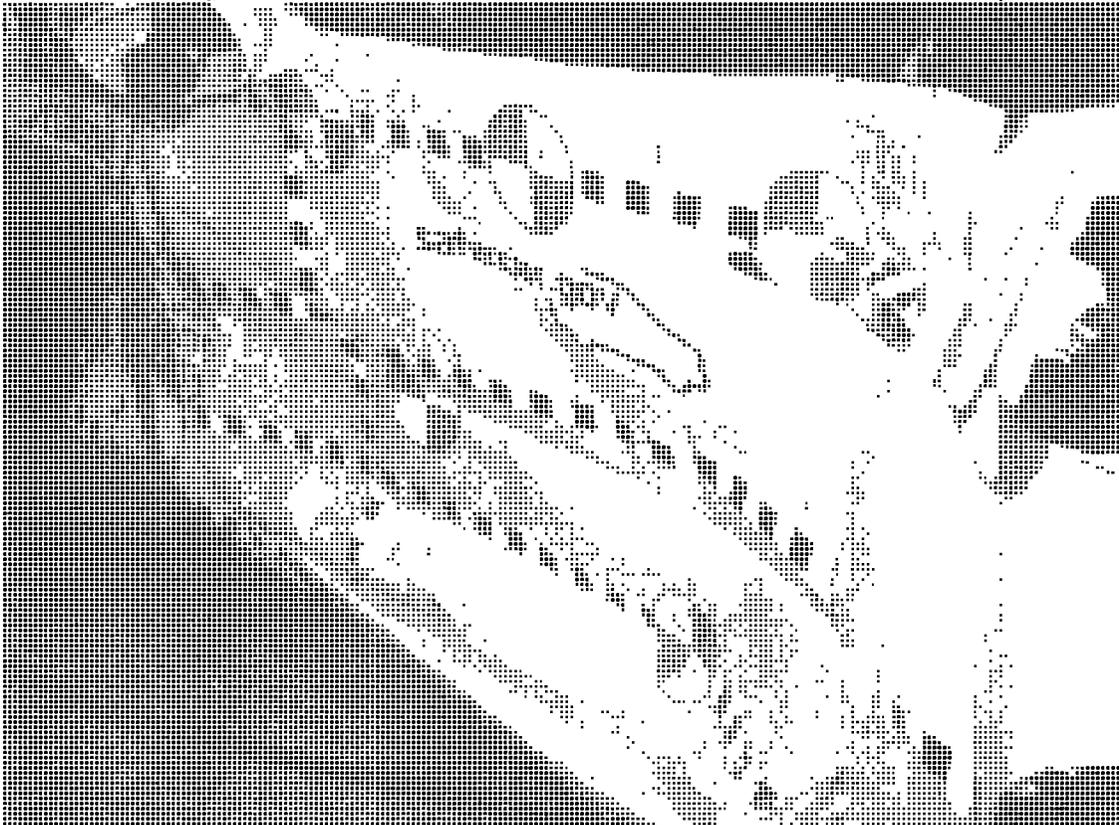


Figure A-42. Post Test Cell Bear 2 - View of Left Sub Engine.

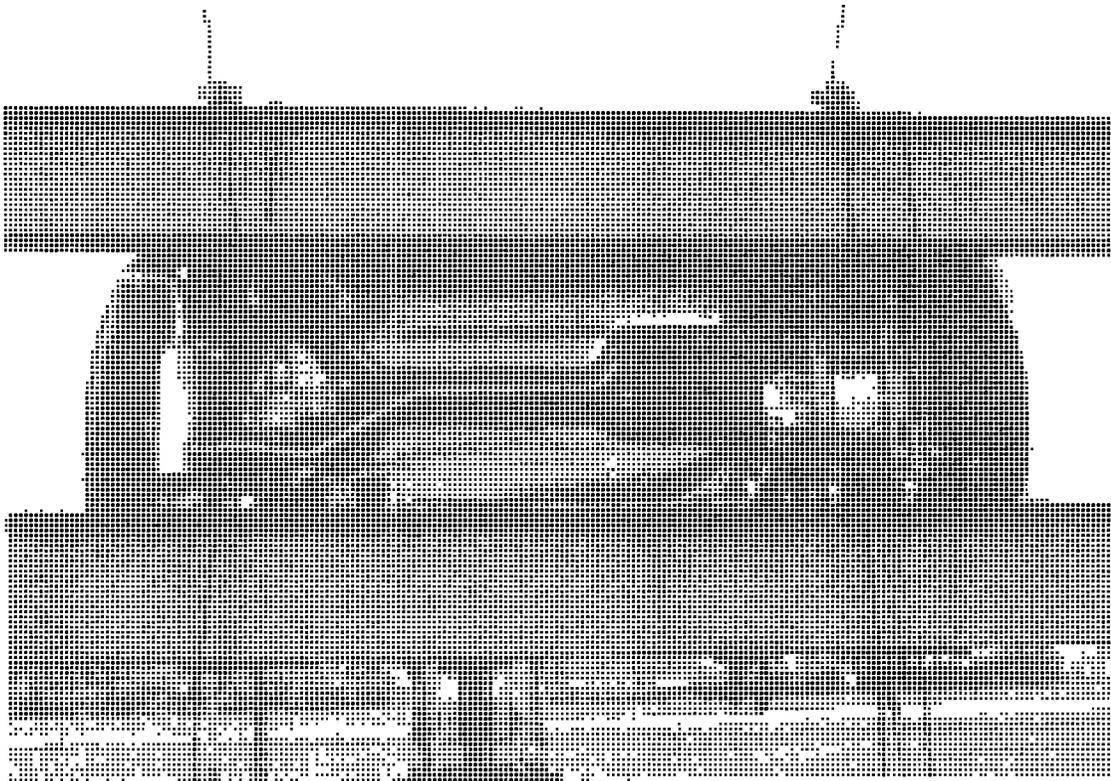


Figure A-45: Roll over 90 Degree.

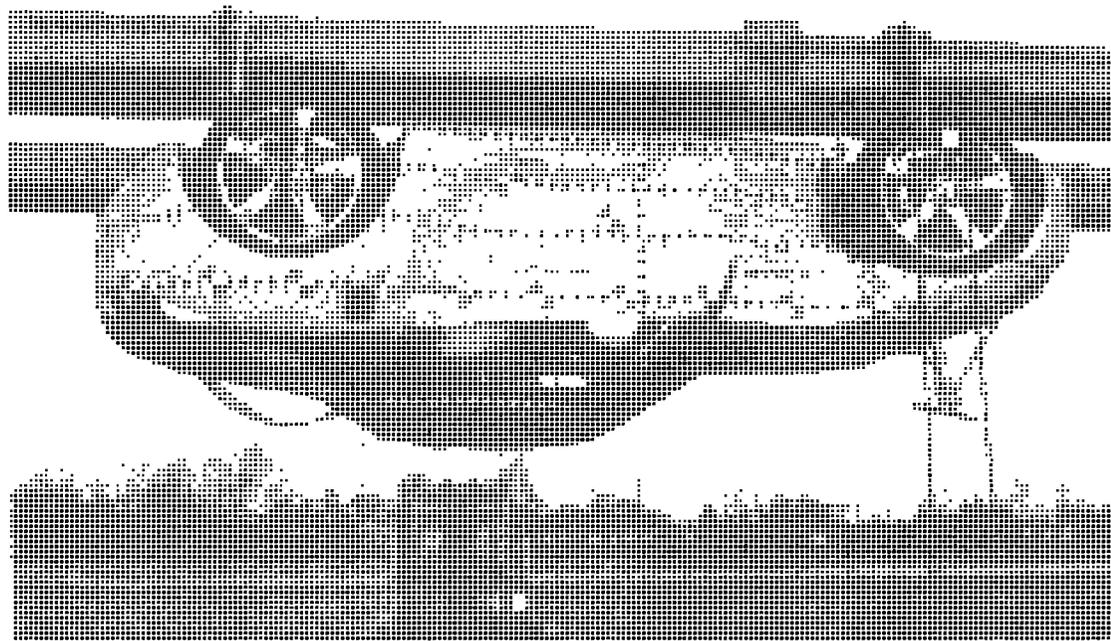


Figure A-46: Roll over 180 Degree.

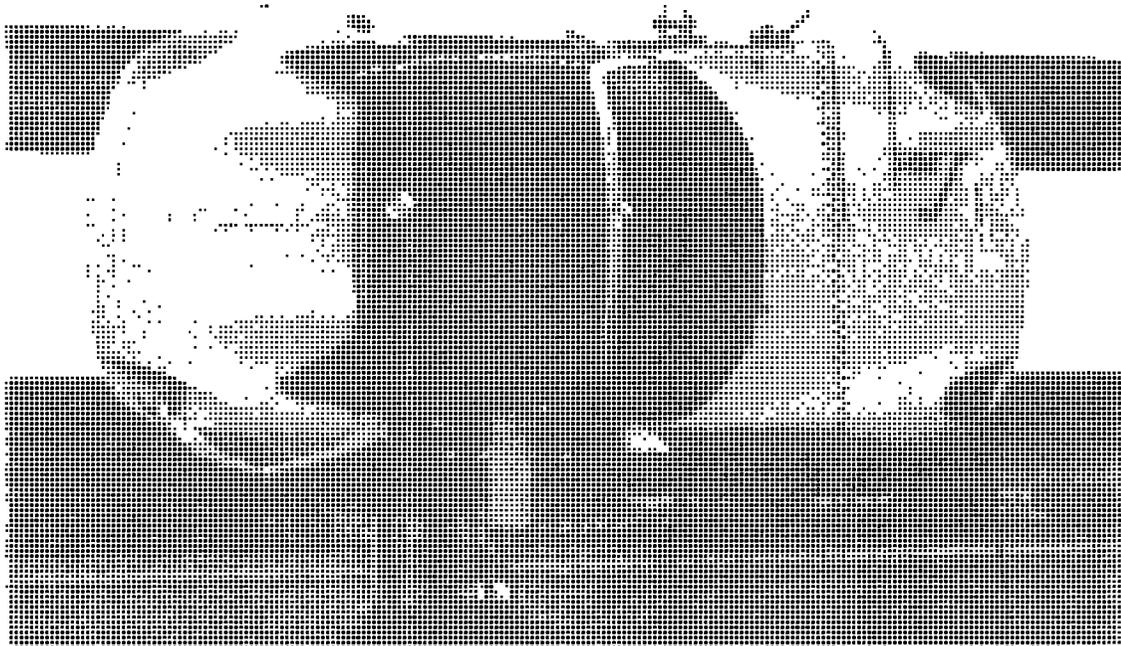


Figure 4.47 Halftone: 75 Degrees

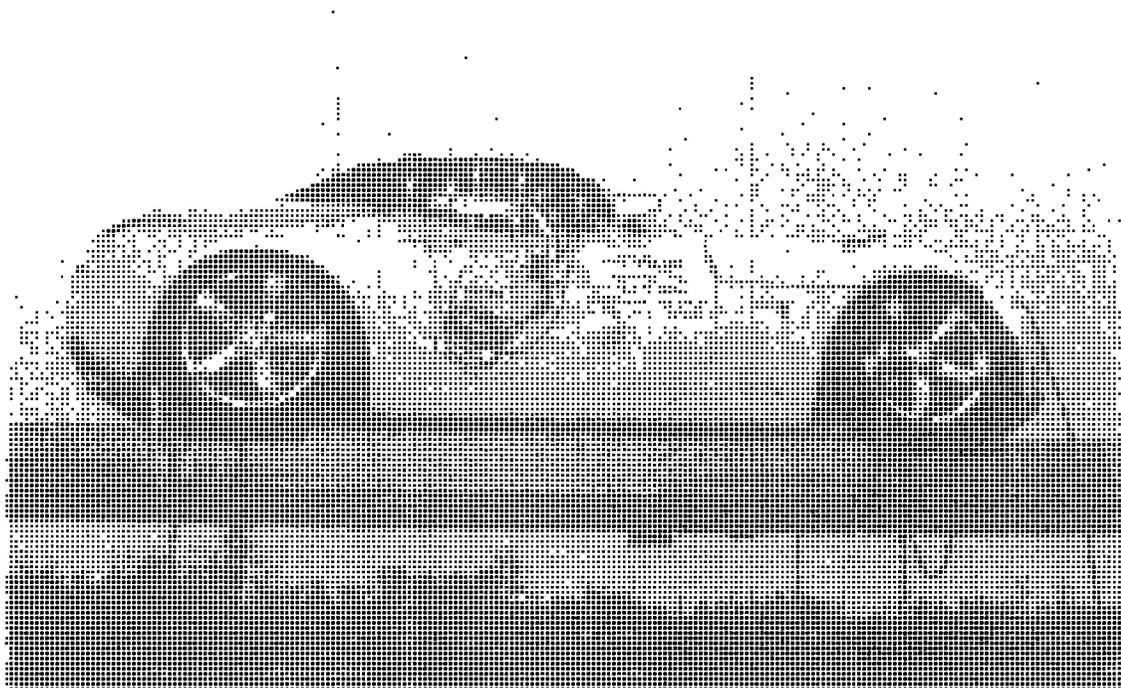


Figure 4.48 Halftone: 60 Degrees

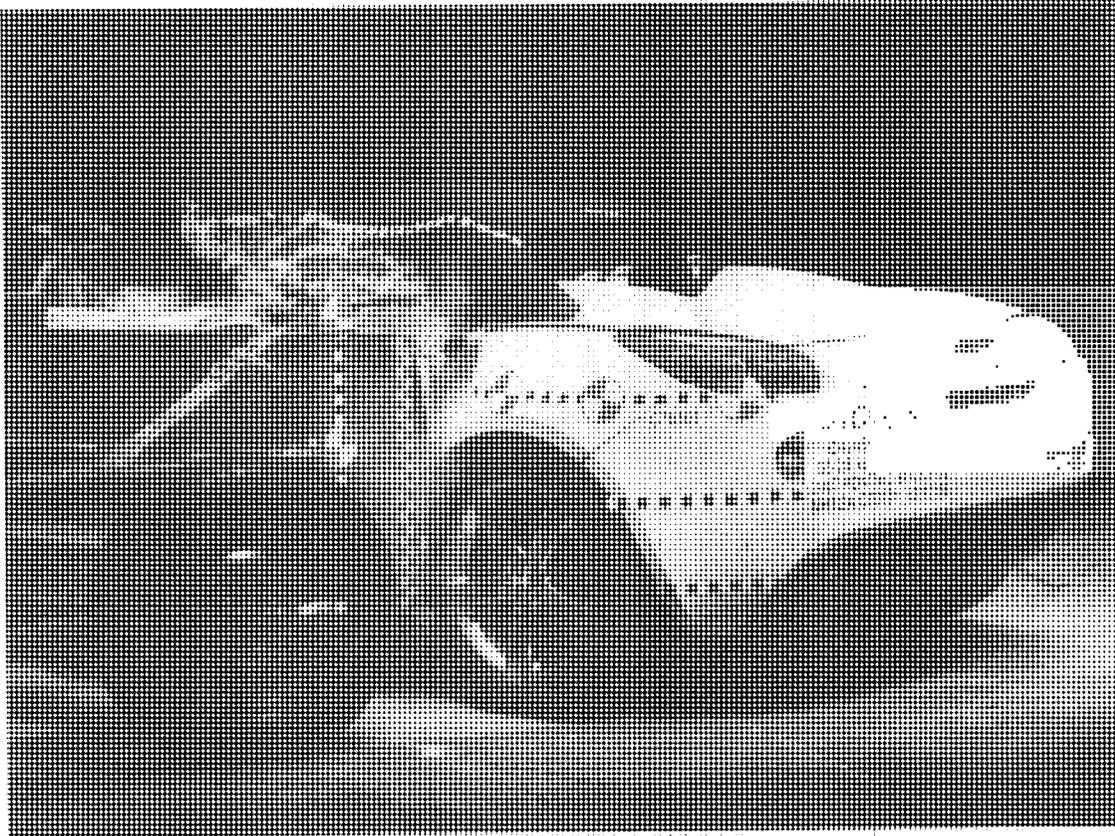


Figure A-69: Impact Photo

**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  |

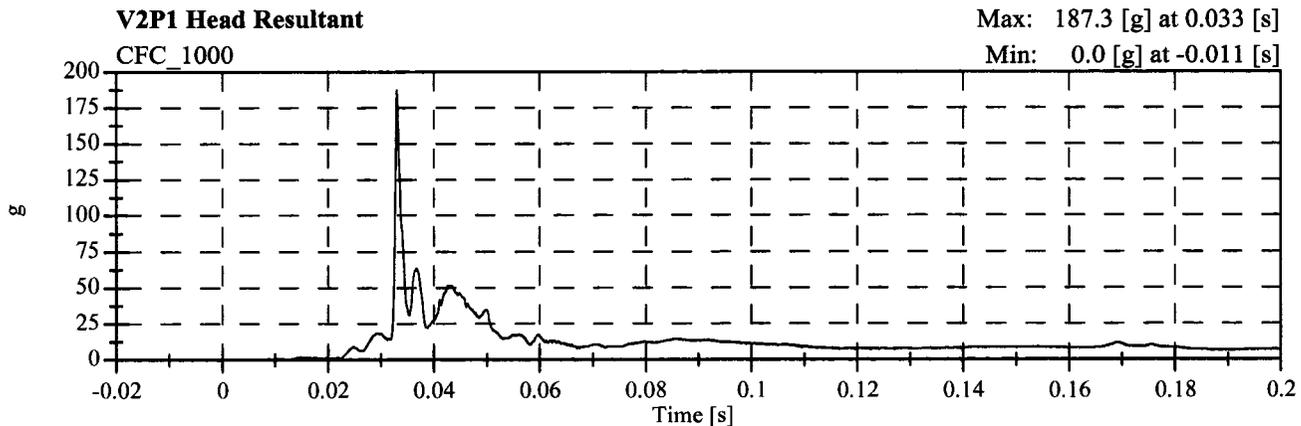
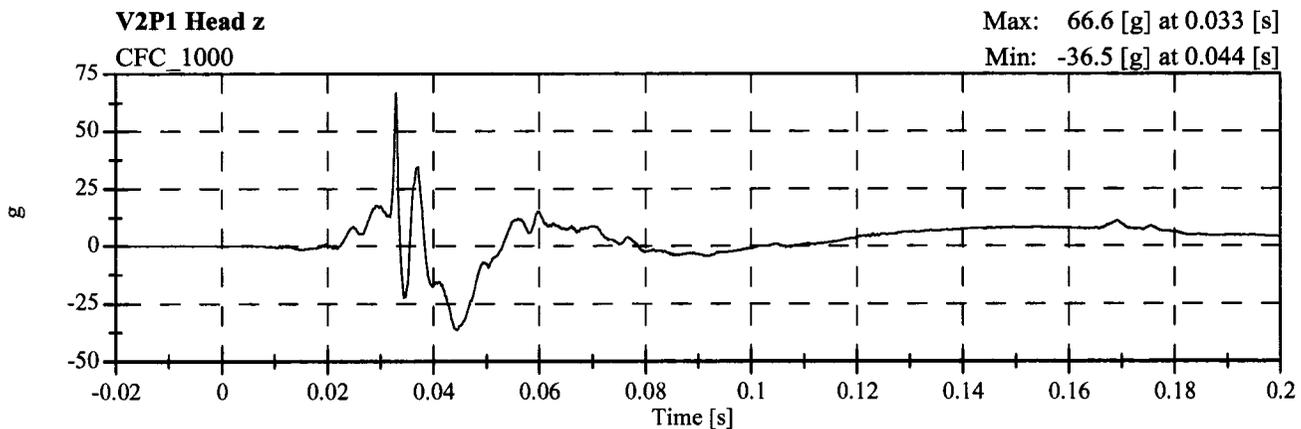
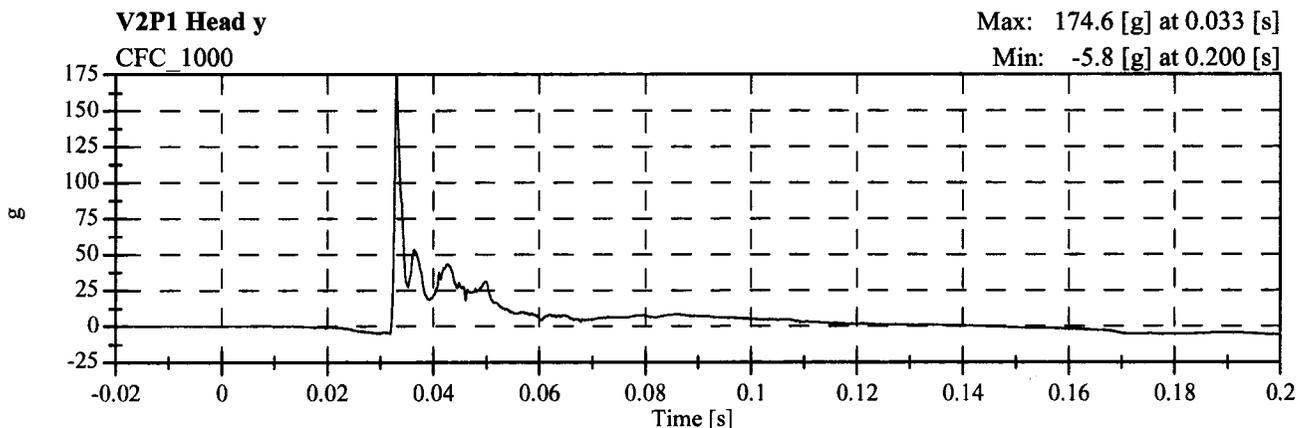
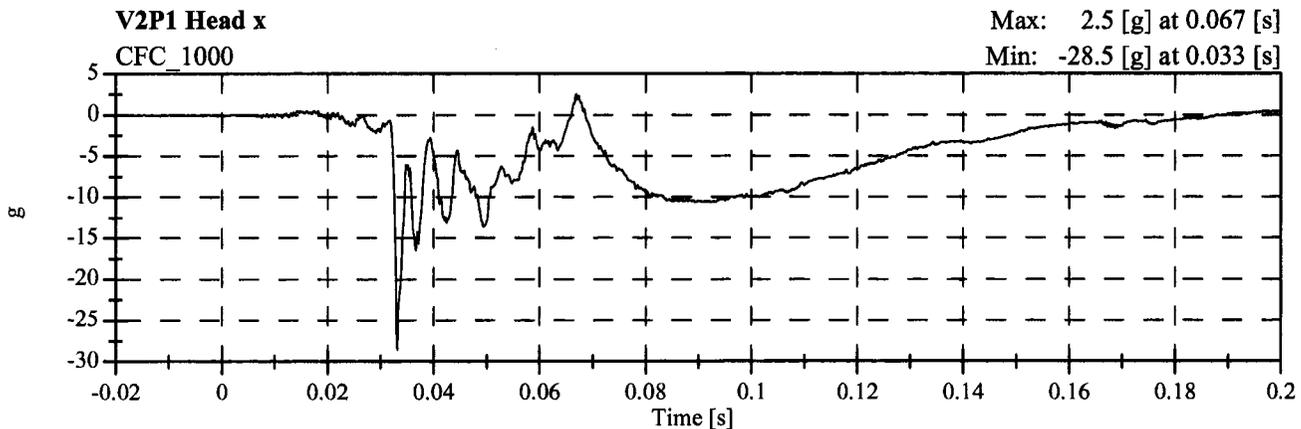
The following dummy, vehicle and load cell response data can be found in the research and development section of the NHTSA website at: [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov)

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

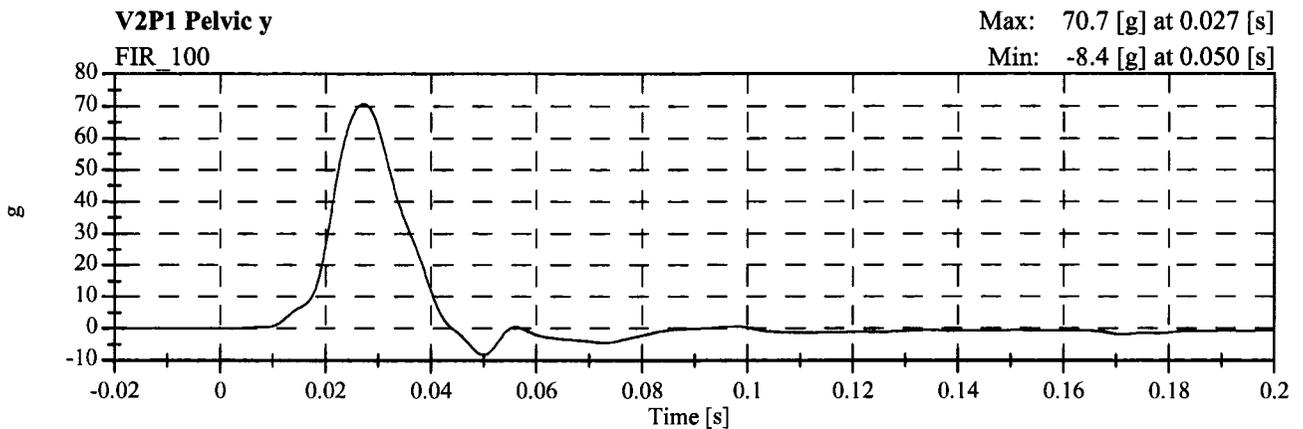
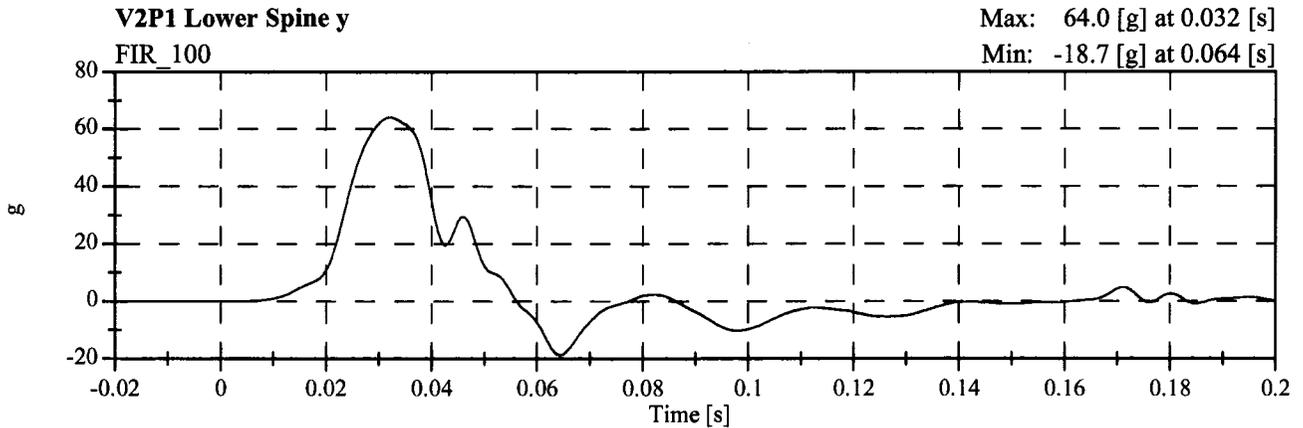
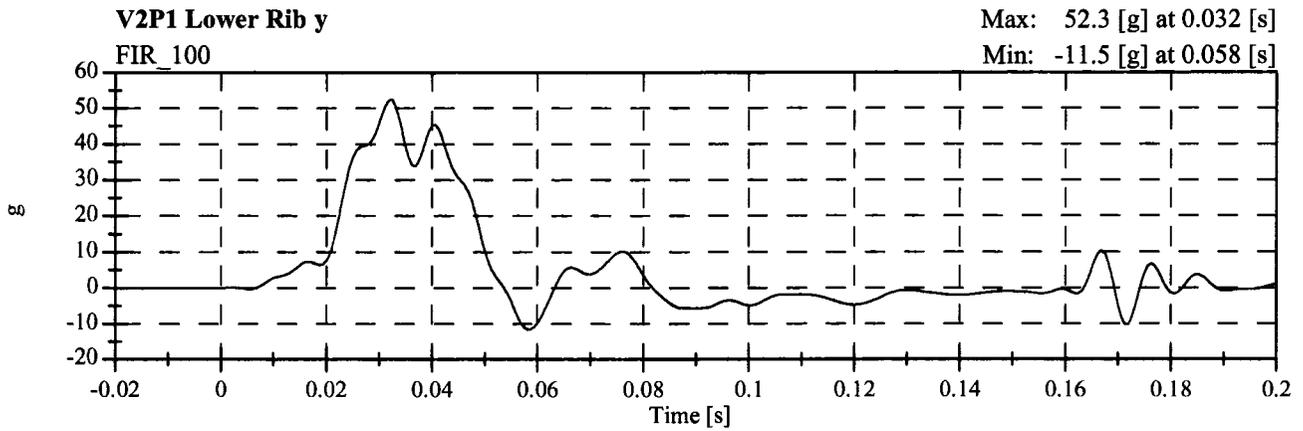
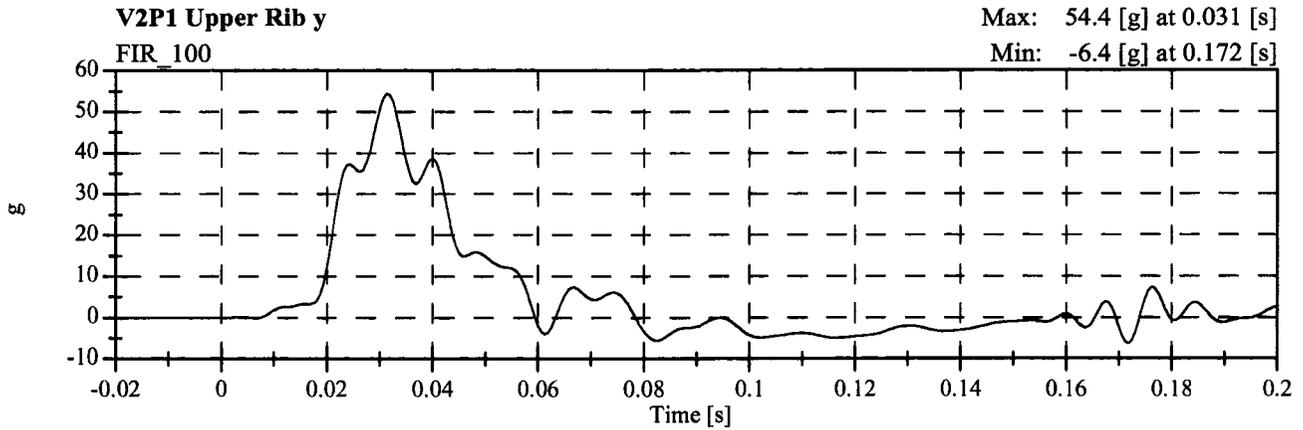
#### **TEST NOTES**

The following channel anomalies occurred:  
None

# 2007 NHTSA FMVSS 214D Indicant - 2007 Pontiac Solstice C70101 - October 17, 2006



# 2007 NHTSA FMVSS 214D Indicant - 2007 Pontiac Solstice C70101 - October 17, 2006



**APPENDIX C**  
**DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA**

**SUMMARY**  
**SID H3 PRE & POST TEST CALIBRATION**  
**CONFIGURED FOR LEFT SIDE IMPACT**

Date: 09/13/2006

Sequential Test Number:

1.1

Laboratory Technician:

B. Swiecicki

| TEST PARAMETER                     | SPECIFICATION | SID H3 NO.: 906 |           | SID H3 NO.: - |           |
|------------------------------------|---------------|-----------------|-----------|---------------|-----------|
|                                    |               | PRE TEST        | POST TEST | PRE TEST      | POST TEST |
| SH- Seated Height (mm)             | 889 - 909     | 907             | 907       | -             | -         |
| RH- Rib Height (mm)                | 501 - 521     | 516             | 514       | -             | -         |
| HP- Hip Pivot Height (mm)          | 99 ref.       | 99              | 99        | -             | -         |
| RD- Rib from Back Line (mm)        | 229 - 241     | 241             | 240       | -             | -         |
| KV- Knee Pivot from Back Line (mm) | 511 - 526     | 518             | 517       | -             | -         |
| SW- Knee Pivot to Floor (mm)       | 490 - 505     | 493             | 494       | -             | -         |
| HW- Hip Width (mm)                 | 356 - 391     | 381             | 381       | -             | -         |
| <b>THORAX IMPACTS</b>              |               |                 |           |               |           |
| TEMPERATURE (° C)                  | 18.9 - 25.5   | 21.1            | 21.1      | -             | -         |
| RELATIVE HUMIDITY (%)              | 10 - 70       | 50.0            | 37.0      | -             | -         |
| PROBE SPEED (m/s)                  | 4.27 - 4.33   | 4.30            | 4.33      | -             | -         |
| UPPER RIB (g's)                    | 37 - 46       | 40.53           | 44.97     | -             | -         |
| LOWER RIB (g's)                    | 37 - 46       | 42.27           | 44.57     | -             | -         |
| LOWER SPINE (g's)                  | 15 - 22       | 20.55           | 21.82     | -             | -         |
| <b>PELVIS IMPACT</b>               |               |                 |           |               |           |
| TEMPERATURE (° C)                  | 18.9 - 25.5   | 21.1            | 21.1      | -             | -         |
| RELATIVE HUMIDITY (%)              | 10 - 70       | 50.0            | 37.0      | -             | -         |
| PROBE SPEED (m/s)                  | 4.27 - 4.33   | 4.30            | 4.32      | -             | -         |
| PELVIS (g's)                       | 40 - 60       | 47.93           | 49.13     | -             | -         |

REMARKS: None

**CALIBRATION TEST RESULTS**

**PRE-TEST**

**SID H3 NO.: 906**

**CONFIGURED FOR LEFT SIDE IMPACT**

**CALIBRATION TEST RESULTS SUMMARY  
PRE-TEST**

**CONFIGURED FOR LEFT SIDE IMPACT**

SID H3 Serial No.: 906 Sequential Test Number: 1  
Date: September 13, 2006 Laboratory Technician: B. Swiecicki

| 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.: 906 Sequential Test Number: 1  
Date: September 13, 2006 Laboratory Technician: B. Swiecicki

| TEST PARAMETER                     | SPECIFICATION | TEST RESULTS |
|------------------------------------|---------------|--------------|
| SH- Seated Height (mm)             | 889 – 909     | 907          |
| RH- Rib Height (mm)                | 502 – 520     | 516          |
| HP- Hip Pivot Height (mm)          | 99 ref.       | 99           |
| RD- Rib from Back Line (mm)        | 229 – 241     | 241          |
| KH- Knee Pivot from Back Line (mm) | 511 – 526     | 518          |
| KV- Knee Pivot to Floor (mm)       | 490 – 505     | 493          |
| HW- Hip Width (mm)                 | 356 - 391     | 381          |

**REMARKS:** None

**SID Shock Test S/N:906 ( 3.05 m/s )**

**PRE TEST**

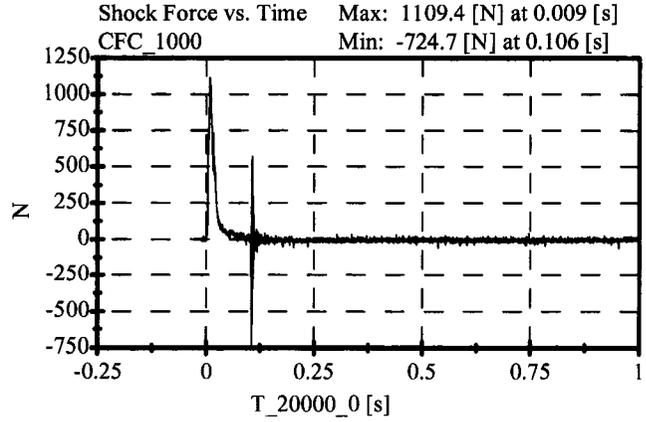
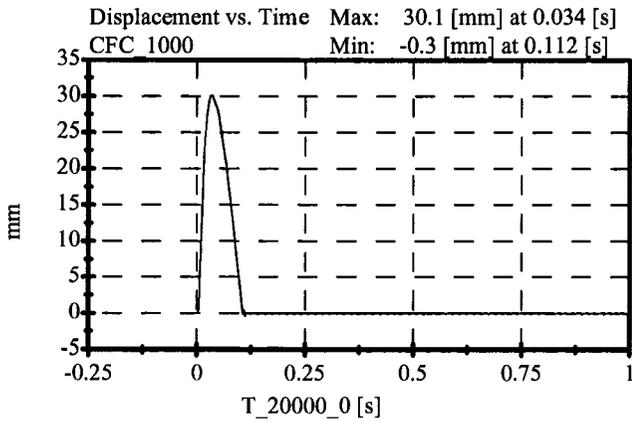
**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 906  
Date: September 11, 2006

Sequential Test Number: 1 File: 905SH  
Laboratory Technician: B. Swiecicki

| <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 %              | 50.00 %             | Passed        |
| Displacement:         | 30.00-35.00 mm       | 30.05 mm            | Passed        |
| Maximum Force:        | 836.00-1125.00 N     | 1109.43 N           | Passed        |

Impact Test Velocity: 3.05 m/s  
Damper Identification: 906  
Damper Setting: 5



**SID Mid Speed Shock Test S/N:906 ( 4.27 m/s )**

**PRE TEST**

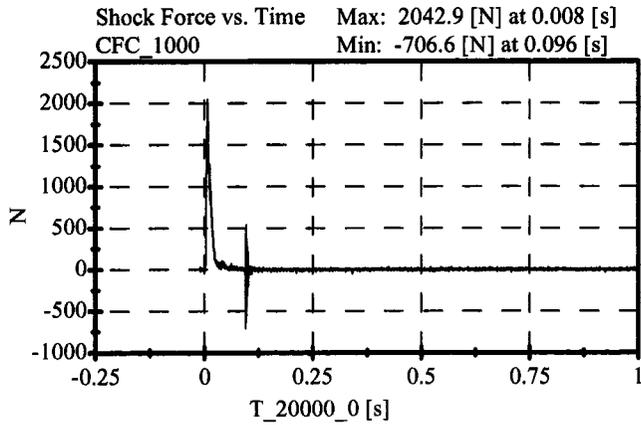
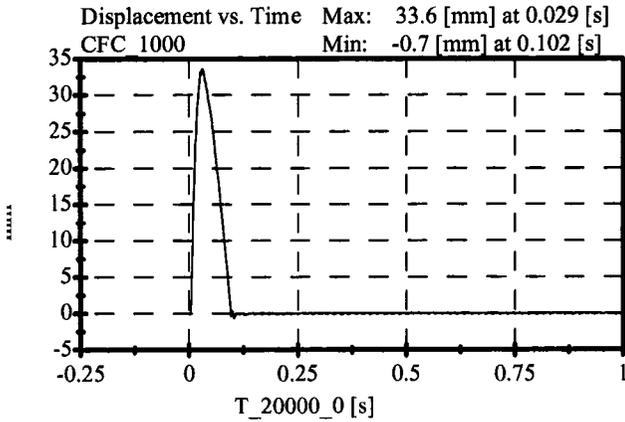
**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 906  
Date: September 11, 2006

Sequential Test Number: 1 File: 906SH  
Laboratory Technician: B. Swiecicki

| <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 %              | 50.00 %             | Passed        |
| Displacement:         | 32.00-37.00 mm       | 33.58 mm            | Passed        |
| Maximum Force:        | 1730.00-2099.00 N    | 2042.90 N           | Passed        |

Impact Test Velocity: 4.27 m/s  
Damper Identification: 906  
Damper Setting: 5



# SID High Speed Shock Test S/N:906 ( 6.10 m/s )

## PRE TEST

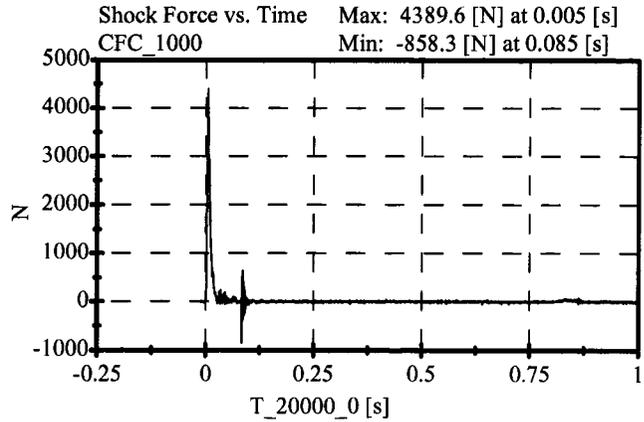
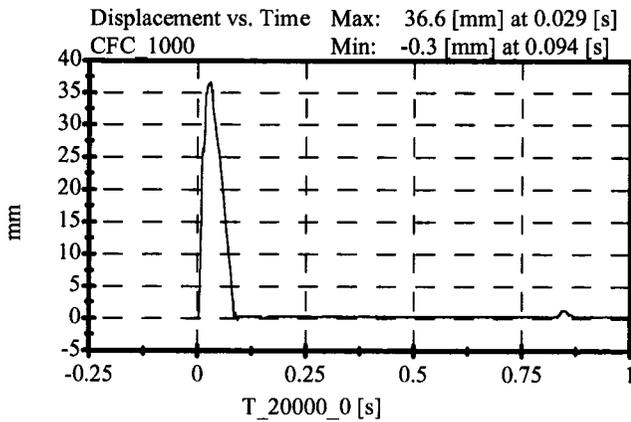
### CONFIGURED FOR LEFT SIDE IMPACT

ATD Serial No: 906  
Date: September 11, 2006

Sequential Test Number: 1 File: 906SH  
Laboratory Technician: B. Swiecicki

| <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 %              | 50.00 %             | Passed        |
| Displacement:         | 33.00-40.00 mm       | 36.58 mm            | Passed        |
| Maximum Force:        | 3741.00-4448.00 N    | 4389.60 N           | Passed        |

Impact Test Velocity: 6.10 m/s  
Damper Identification: 906  
Damper Setting: 5



SID Thorax Test S/N:906

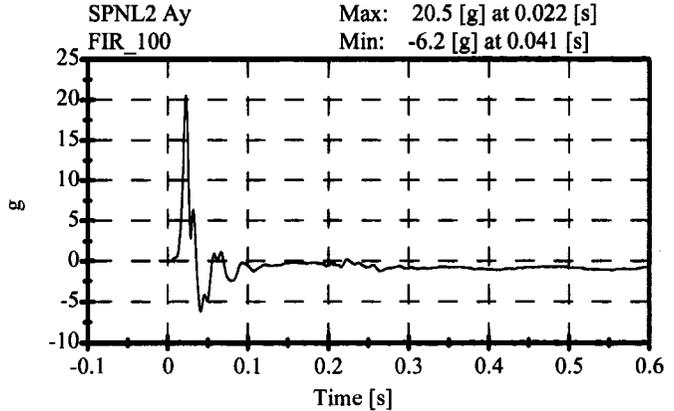
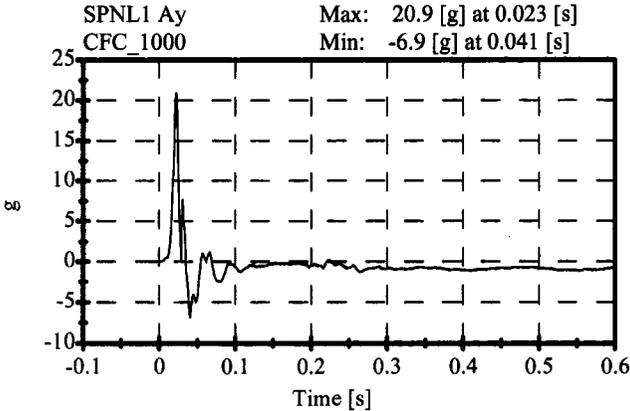
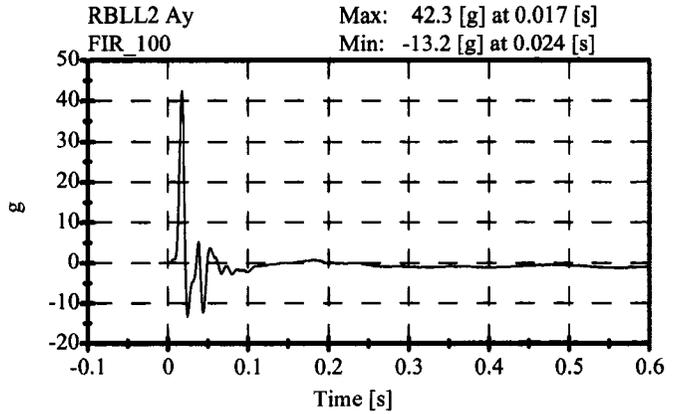
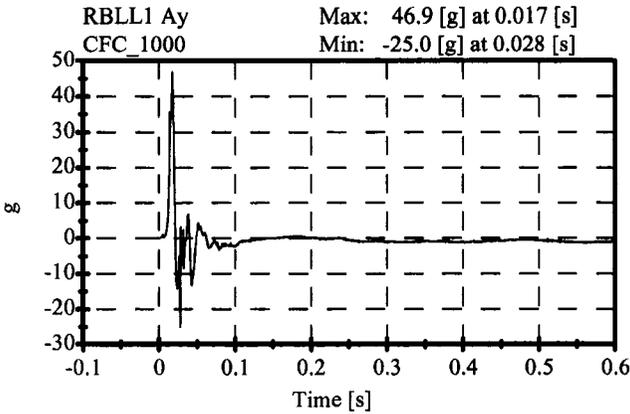
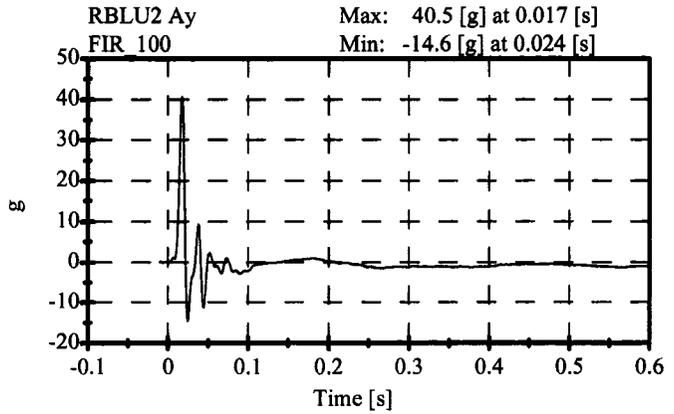
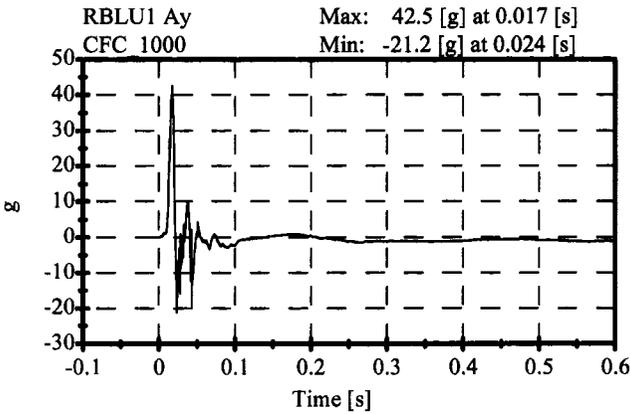
Pre-Test

CONFIGURED FOR LEFT SIDE IMPACT

ATD Serial No: 906  
Date: September 13, 2006

Sequential Test Number: 1 File: test1  
Laboratory Technician: B. Swiecicki

| TEST PARAMETER            | SPECIFICATION  | TEST RESULTS | STATUS |
|---------------------------|----------------|--------------|--------|
| Lab Temperature:          | 18.9-25.5 C    | 21.7 C       | Passed |
| Lab Humidity:             | 10-70 %        | 50.00 %      | Passed |
| Probe Velocity:           | 4.27- 4.33 m/s | 4.30 m/s     | Passed |
| Upper Rib Acceleration:   | 37.00-46.00 g  | 40.53 g      | Passed |
| Lower Rib Acceleration:   | 37.00-46.00 g  | 42.27 g      | Passed |
| Lower Spine Acceleration: | 15.00-22.00 g  | 20.55 g      | Passed |



SID Pelvis Test S/N:906

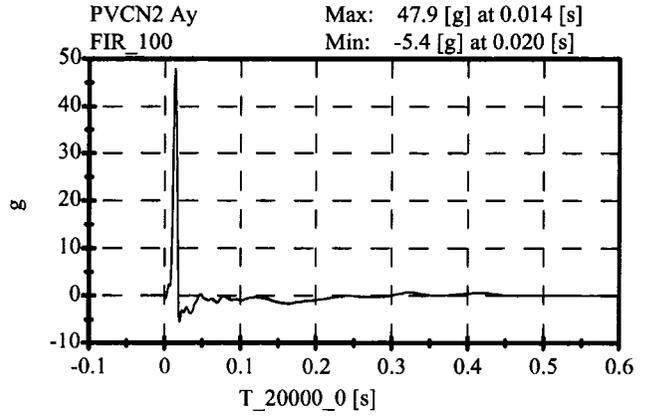
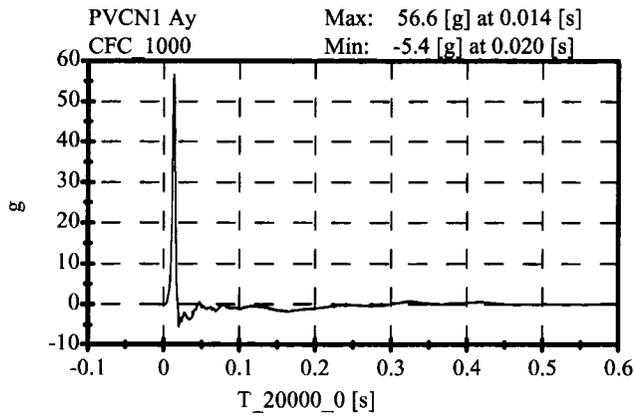
Pre-Test

CONFIGURED FOR LEFT SIDE IMPACT

ATD Serial No: 906  
Date: September 13, 2006

Sequential Test Number: 1 File: 905T  
Laboratory Technician: B. Swiecicki

| TEST PARAMETER         | SPECIFICATION  | TEST RESULTS | STATUS |
|------------------------|----------------|--------------|--------|
| Lab Temperature:       | 18.9-25.5 C    | 21.1 C       | Passed |
| Lab Humidity:          | 10-70 %        | 50.00 %      | Passed |
| Probe Velocity:        | 4.27- 4.33 m/s | 4.30 m/s     | Passed |
| Pelvis Y Acceleration: | 40.00-60.00 g  | 47.93 g      | Passed |
| Time Above 20 Gs       | 3.0-7.0 ms     | 5.9 ms       | Passed |



**SID HYIII Head Drop Test S/N:906**

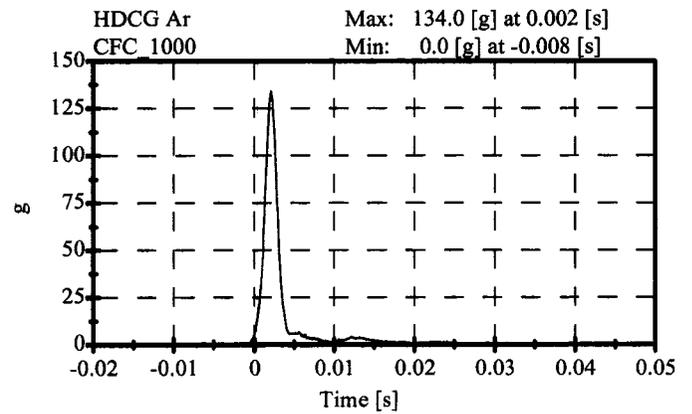
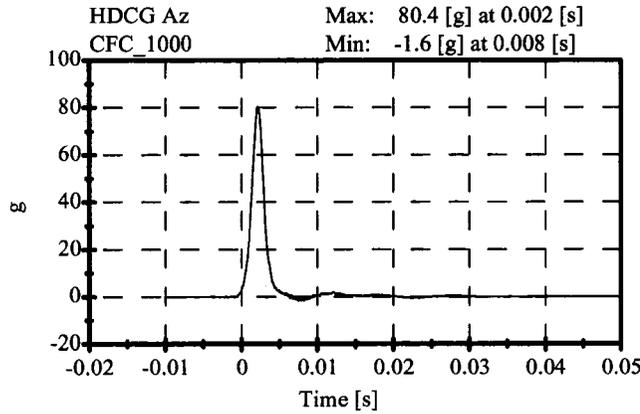
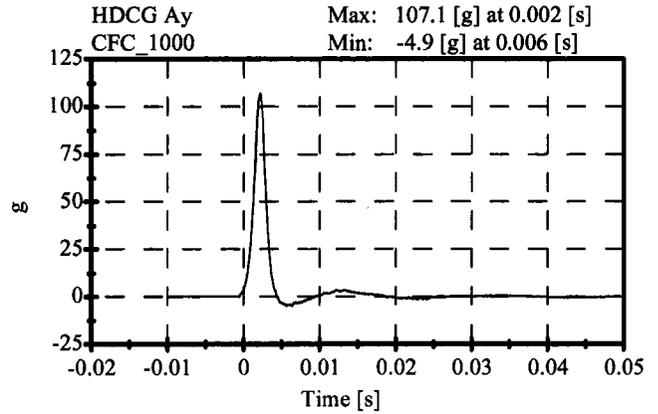
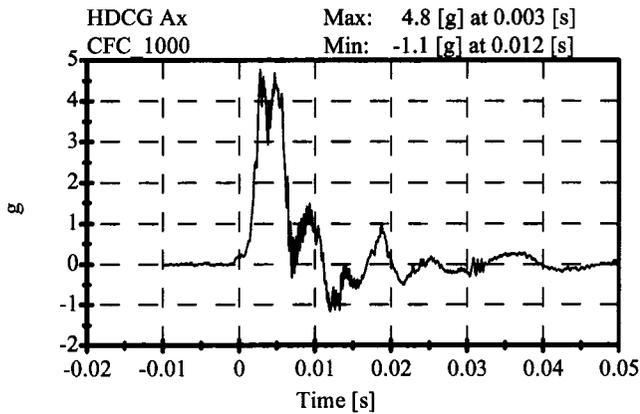
**Pre-Test**

**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 906  
Date: September 11, 2006

Sequential Test Number: 1 File: 906H  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>   | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|-------------------------|----------------------|---------------------|---------------|
| Lab Temperature:        | 18.9-25.6 C          | 21.1 C              | Passed        |
| Lab Humidity:           | 10-70 %              | 50.00 %             | Passed        |
| Peak Resultant Accel.:  | 120-150 Gs           | 133.95 Gs           | Passed        |
| Peak Lateral Accel.:    | 15 Gs Max            | 4.77 Gs             | Passed        |
| Curve PerCent NonModal: | < 15%                | 4.82 %              | Passed        |



**SID Head Neck Test S/N:906**

**Pre-Test**

**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 906  
Date: September 11, 2006

Sequential Test Number: 1 File: 905N  
Laboratory Technician: B. Swiecicki

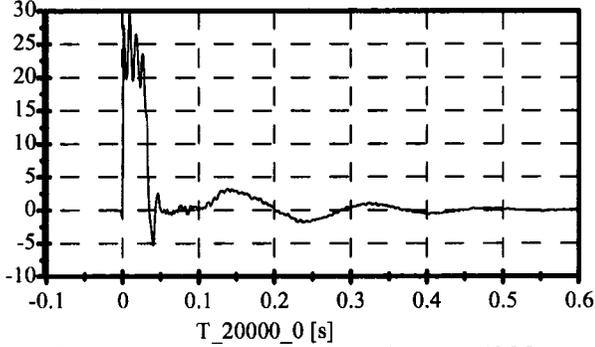
| <u>TEST PARAMETER</u>  | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|--|----------------------|---------------------|---------------|
| Lab Temperature:   | 20.6-22.2 C          | 21.1 C              | Passed        |
| Lab Humidity:  | 10-70 %              | 50.00 %             | Passed        |
| Impact Velocity:   | 6.89- 7.13 m/s       | 6.92 m/s            | Passed        |
| <b>PENDULUM DELTA V</b>  |                      |                     |               |
| Delta V at 10 ms:  | 1.96- 2.55 m/s       | 2.25 m/s            | Passed        |
| Delta V at 20 ms:  | 4.12- 5.10 m/s       | 4.59 m/s            | Passed        |
| Delta V at 30 ms:  | 5.73- 7.01 m/s       | 6.62 m/s            | Passed        |
| Delta V between 40-70 ms:  | 6.27- 7.64 m/s       | 7.18 m/s            | Passed        |
| <b>D PLANE ROTATION</b>  |                      |                     |               |
| Maximum Rotation:  | 66.0-82.0 Deg        | 71.76 Deg           | Passed        |
| Rotation Angle Decay:  | 58.0-67.0 ms         | 61.40 ms            | Passed        |
| <b>MOMENT ABOUT THE OCCIPITAL CONDYLE</b>                              |                      |                     |               |
| Max Occipital Moment:  | 73.00- 88.00 N-m     | 81.21 N-m           | Passed        |
| Occipital Moment Decay:  | 49.0-64.0 ms         | 60.75 ms            | Passed        |
| <b>HEAD ROTATION TIME WITH RESPECT TO THE OCCIPITAL CONDYLE MOMENT</b> |                      |                     |               |
| Moment to Rotation Peak:   | 2.0-16.0 ms          | 11.05 ms            | Passed        |

**SID Head Neck Test S/N:906**  
**Pre-Test**  
**CONFIGURED FOR LEFT SIDE IMPACT**

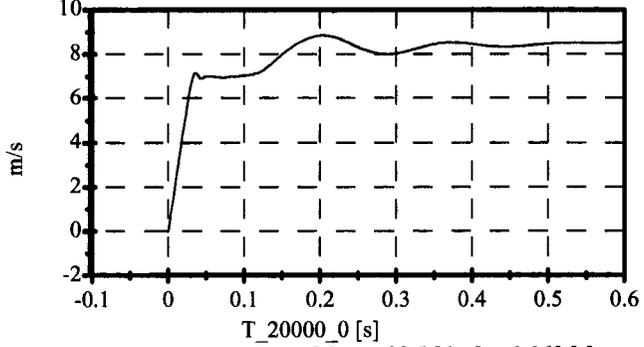
ATD Serial No: 906  
 Date: September 11, 2006

Sequential Test Number: 1 File: 905N  
 Laboratory Technician: B. Swiecicki

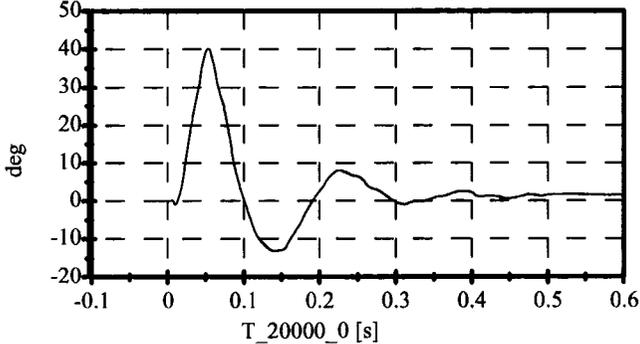
Pend Ax  
 CFC\_180  
 Max: 29.5 [ ] at 0.009 [s]  
 Min: -5.2 [ ] at 0.041 [s]



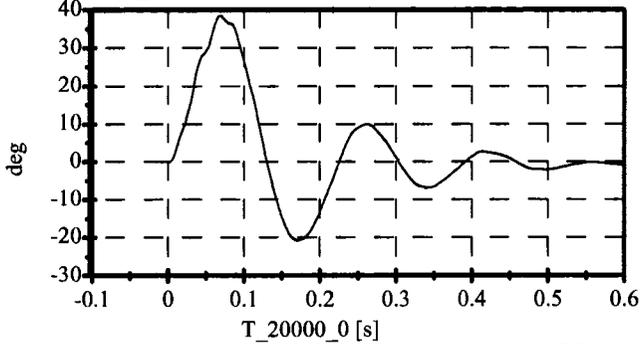
Pend Vx  
 CFC\_180  
 Max: 8.8 [m/s] at 0.201 [s]  
 Min: -0.0 [m/s] at -0.000 [s]



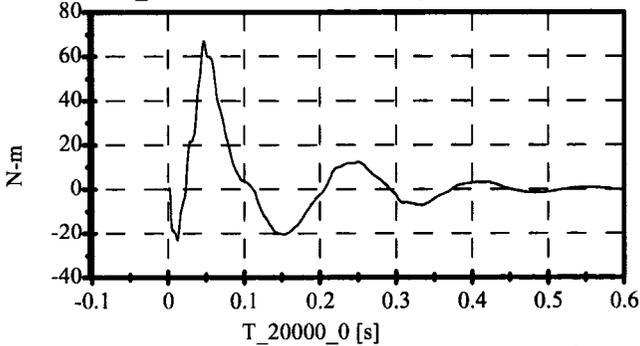
Head Rot  
 CFC\_180  
 Max: 40.2 [deg] at 0.053 [s]  
 Min: -13.1 [deg] at 0.141 [s]



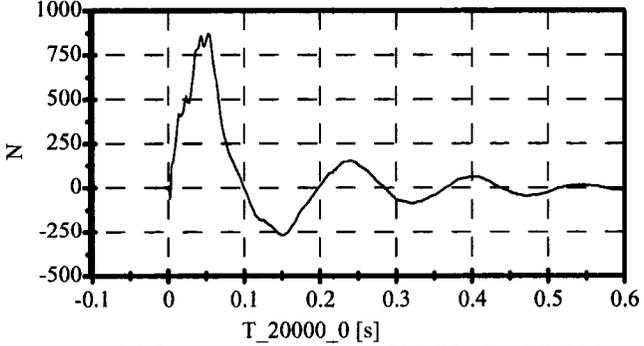
Arm Rot  
 CFC\_180  
 Max: 38.5 [deg] at 0.069 [s]  
 Min: -20.7 [deg] at 0.171 [s]



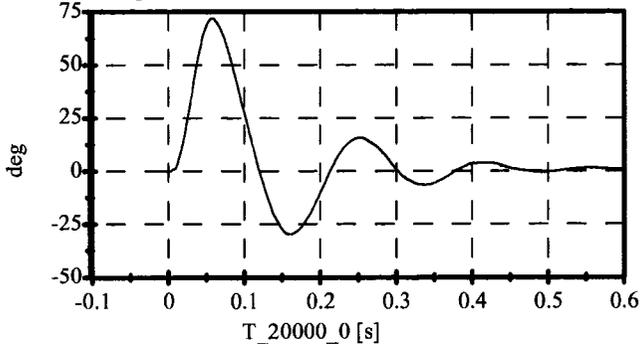
Neck Mx  
 CFC\_600  
 Max: 67.0 [N-m] at 0.047 [s]  
 Min: -23.1 [N-m] at 0.012 [s]



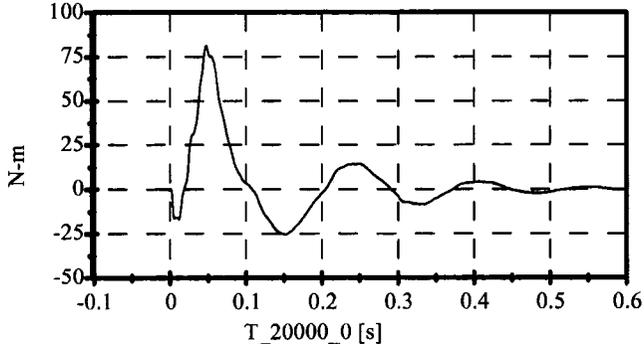
Neck Fy  
 CFC\_1000  
 Max: 870.5 [N] at 0.053 [s]  
 Min: -270.9 [N] at 0.151 [s]



Tot Rot  
 CFC\_180  
 Max: 71.8 [deg] at 0.059 [s]  
 Min: -29.7 [deg] at 0.159 [s]



MOCX  
 Max: 81.2 [N-m] at 0.048 [s]  
 Min: -25.4 [N-m] at 0.152 [s]



**SID Abdominal Test  
Pre-Test**

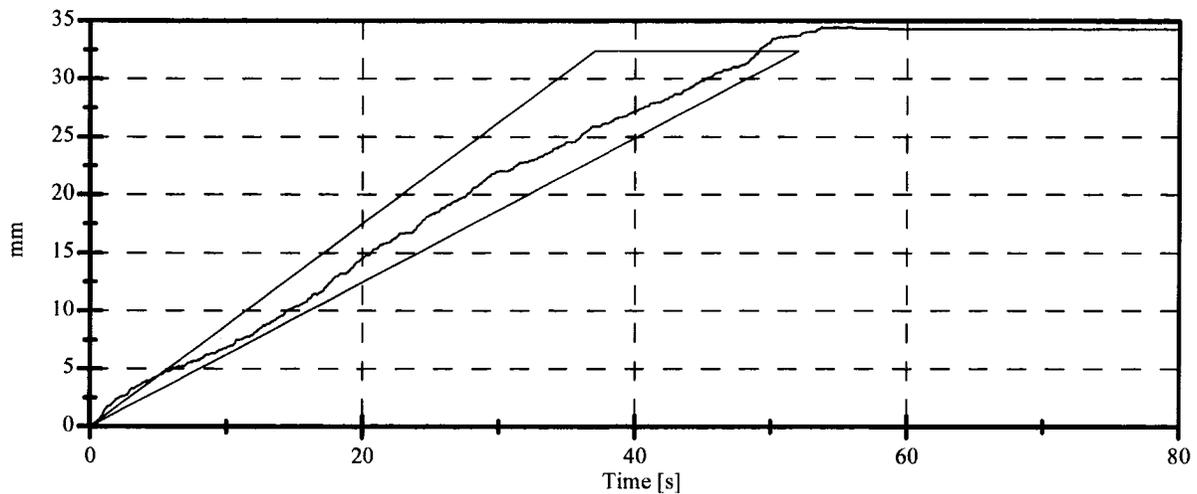
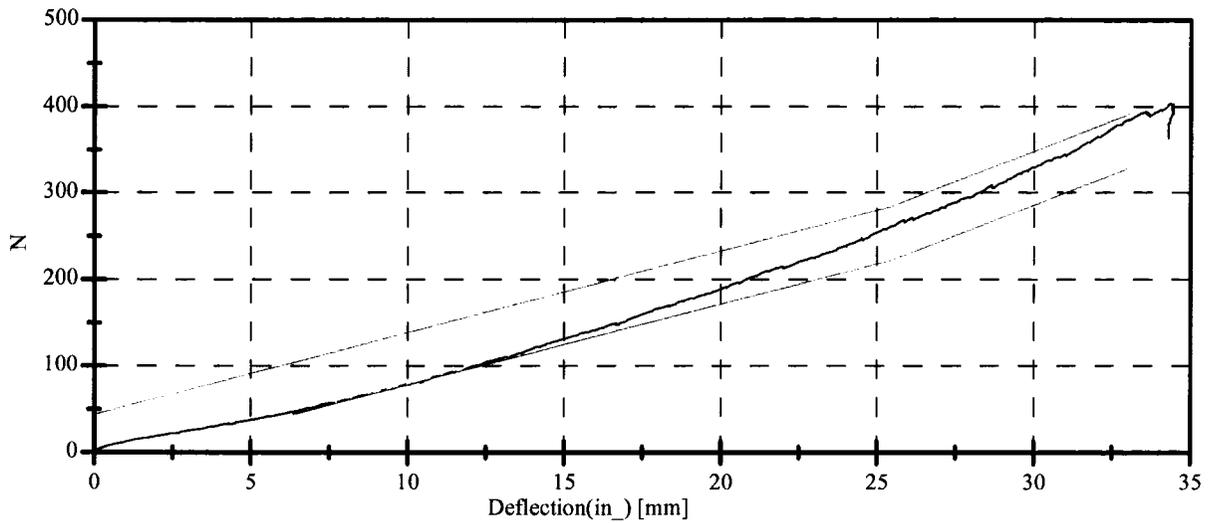
**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 906  
Date: 9-13-2006

Sequential Test Number: 1 File: 906 abdominal 09-06-test  
Laboratory Technician: B. Swiecicki

| <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 %              | 50.00 %             | Passed        |
| Force at 12.95 mm :   | 104.00-162.00 N      | 109.24 N            | Passed        |
| Force at 19.05 mm :   | 162.98-220.99 N      | 178.38 N            | Passed        |
| Force at 25.40 mm :   | 221.97-280.02 N      | 261.20 N            | Passed        |
| Force at 33.02 mm :   | 324.99-391.00 N      | 385.06 N            | Passed        |

**ABDOMINAL COMPRESSION TEST**



# Lumbar Spine Test

## Pre-Test

### CONFIGURED FOR LEFT SIDE IMPACT

ATD Serial No: 906

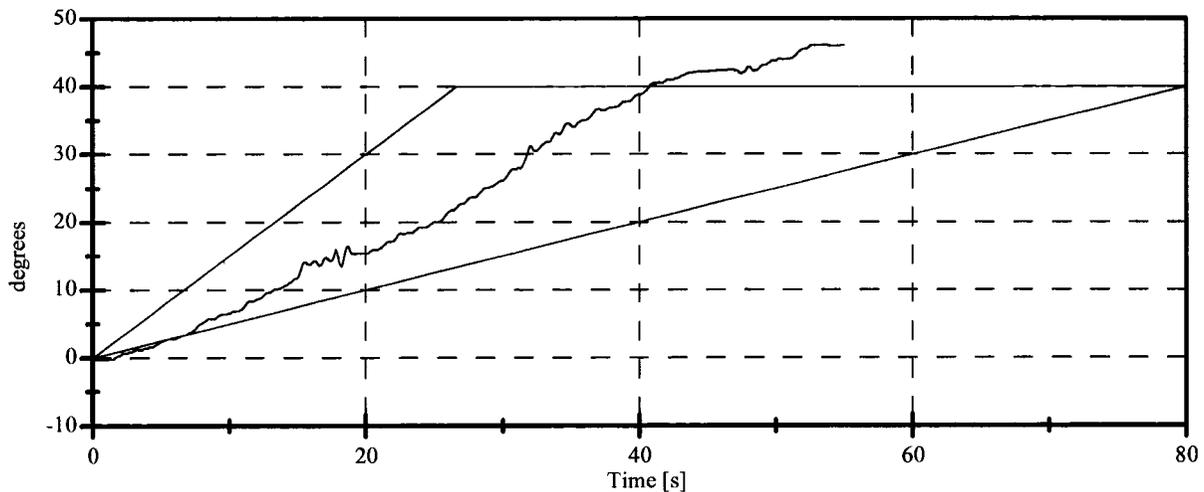
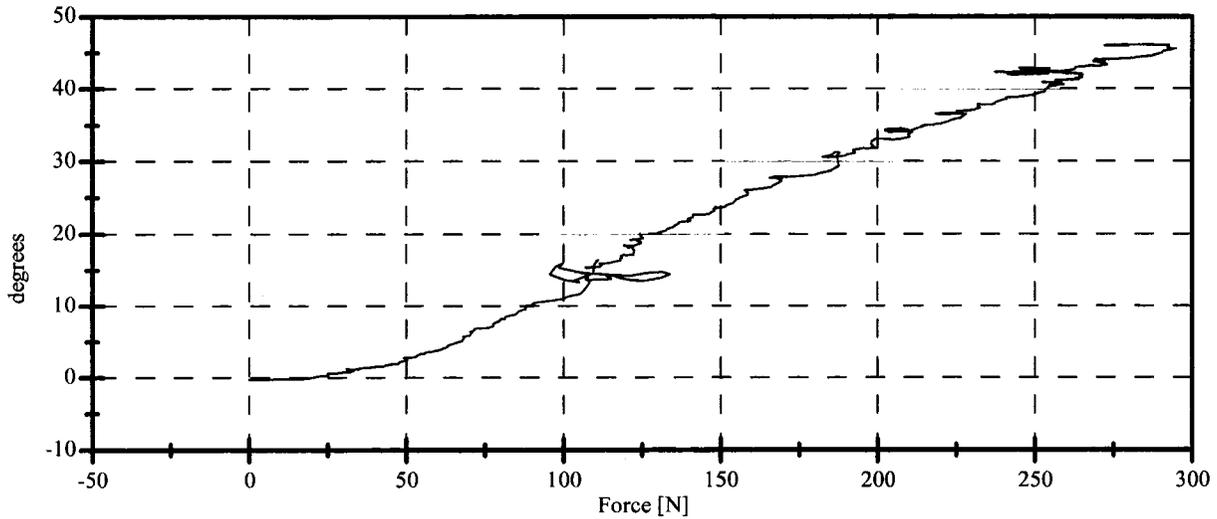
Date: 9-12-2006

Sequential Test Number: 1 File: 906 spine 09-09-test1

Laboratory Technician: B. Swiecicki

| <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 %              | 50.00 %             | Passed        |
| Force at 0 Deg:       | 0.00-26.69 N         | 20.69 N             | Passed        |
| Force at 20 Deg:      | 97.86-151.24 N       | 123.73 N            | Passed        |
| Force at 30 Deg:      | 151.24-204.62 N      | 187.41 N            | Passed        |
| Force at 40 Deg:      | 204.62-258.00 N      | 254.10 N            | Passed        |
| Return Angle          | 12 Deg Max           | 8.62 deg            | Passed        |

### LUMBAR SPINE FLEXION TEST



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

SID H3 Serial No.: 906 Sequential Test Number: 1  
 Date: September 13, 2006 Laboratory Technician: B. Swiecicki

| PART         | ITEMS CHECKED                                  | COMMENTS |
|--------------|--|----------|
| SKIN         | VISUAL INSPECTION                              | OK       |
| HEAD         | VISUAL, BALLAST, ACCELEROMETER MOUNT           | OK       |
| NECK         | VISUAL, CABLE TORQUE                           | OK       |
| SPINE BOX    | VISUAL, BALLAST, WELDMENT, ACCELEROMETER MOUNT | OK       |
| RIB CAGE     | VISUAL, MEASURE, STIFFENERS                    | OK       |
| STERNUM      | VISUAL   | OK       |
| LUMBAR SPINE | VISUAL   | OK       |
| ABDOMEN      | VISUAL   | OK       |
| PELVIS       | VISUAL, PALPATE, 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.: 906**

**CONFIGURED FOR LEFT SIDE IMPACT**

**CALIBRATION TEST RESULTS SUMMARY  
POST TEST**

**CONFIGURED FOR LEFT SIDE IMPACT**

SID H3 Serial No.: 906 Sequential Test Number: 1  
Date: October 19, 2006 Laboratory Technician: B. Swiecicki

| 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.: 906 Sequential Test Number: 1  
Date: October 19, 2006 Laboratory Technician: B. Swiecicki

| TEST PARAMETER                     | SPECIFICATION | TEST RESULTS |
|------------------------------------|---------------|--------------|
| SH- Seated Height (mm)             | 889 - 909     | 907          |
| RH- Rib Height (mm)                | 502 - 520     | 514          |
| HP- Hip Pivot Height (mm)          | 99 ref.       | 99           |
| RD- Rib from Back Line (mm)        | 229 - 241     | 240          |
| KH- Knee Pivot from Back Line (mm) | 511 - 526     | 517          |
| KV- Knee Pivot to Floor (mm)       | 490 - 505     | 494          |
| HW- Hip Width (mm)                 | 356 - 391     | 381          |

**REMARKS:** None

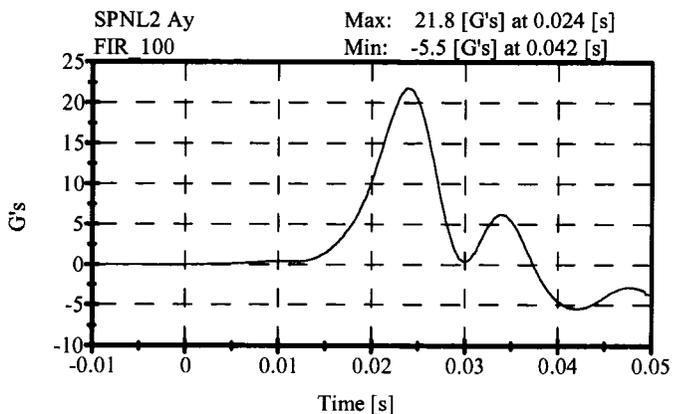
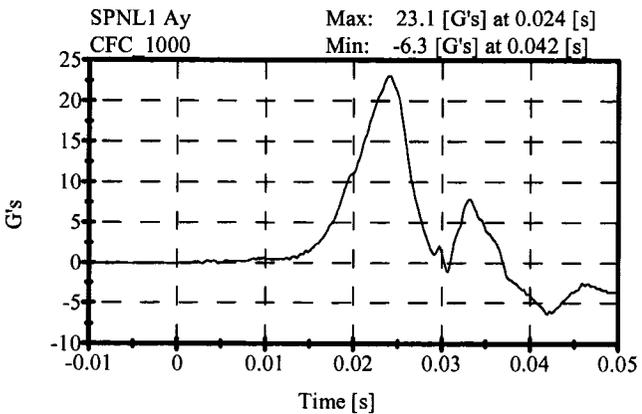
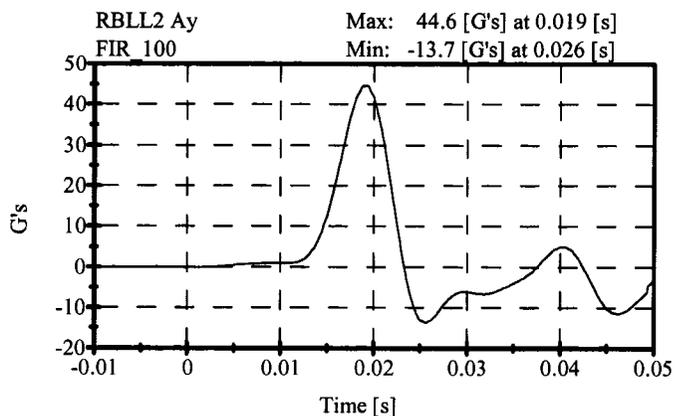
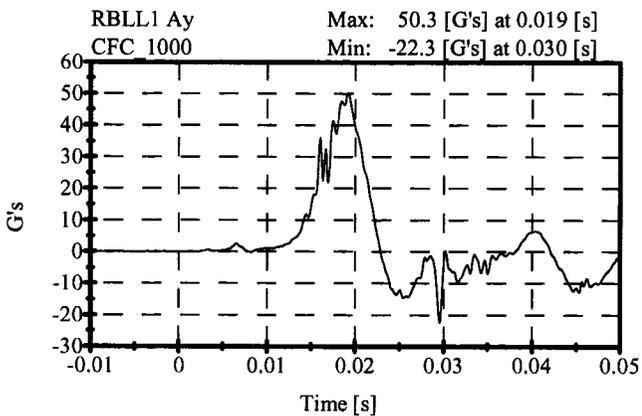
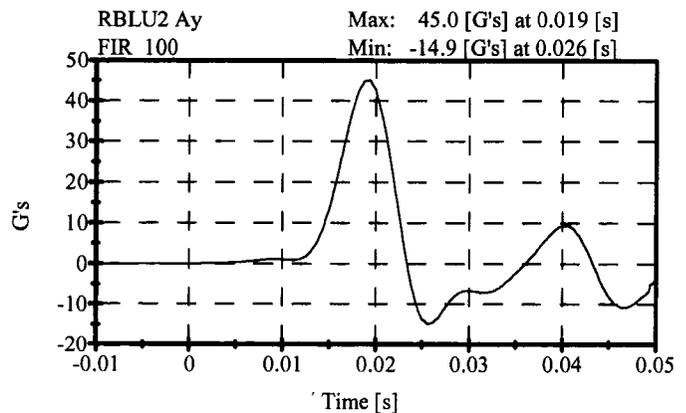
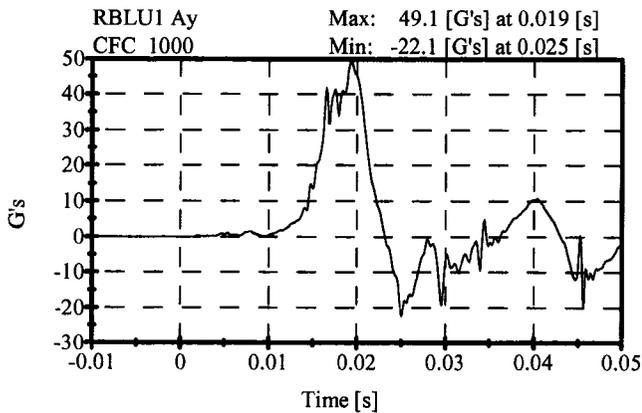
**Thorax Impact  
Post-Test**

**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 906  
Date: 10-18-06

Sequential Test Number: 1 File: 906T2 10-18-06  
Laboratory Technician: B. Swiecicki

| <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 %              | 37.00 %             | Passed        |
| Probe Velocity:           | 4.27- 4.33 m/s       | 4.33 m/s            | Passed        |
| Upper Rib Acceleration:   | 37.00-46.00 G's      | 44.97 G's           | Passed        |
| Lower Rib Acceleration:   | 37.00-46.00 G's      | 44.57 G's           | Passed        |
| Lower Spine Acceleration: | 15.00-22.00 G's      | 21.82 G's           | Passed        |



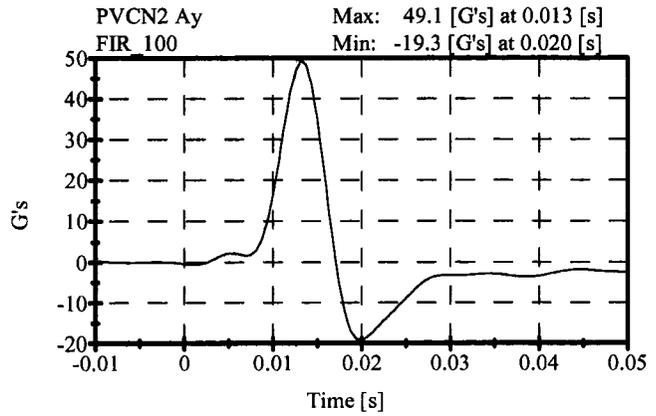
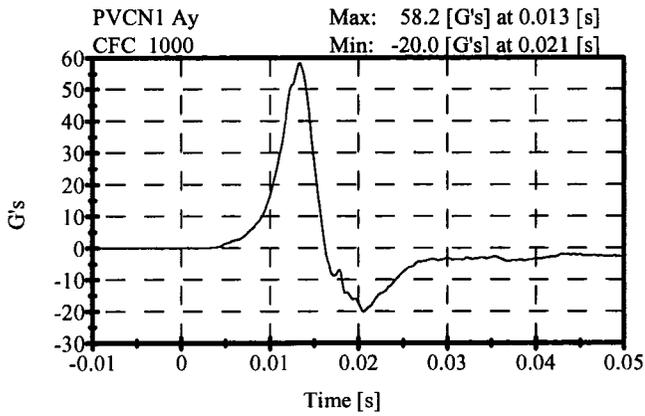
**Pelvis Test  
POST TEST**

**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 906  
Date: 10-18-06

Sequential Test Number: 1 File: 906P 10-18-06  
Laboratory Technician: B. Swiecicki

| <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 %              | 37.00 %             | Passed        |
| Probe Velocity:        | 4.27- 4.33 m/s       | 4.32 m/s            | Passed        |
| Pelvis Y Acceleration: | 40.00-60.00 G's      | 49.13 G's           | Passed        |
| Time Above 20 Gs       | 3.0-7.0 ms           | 5.6 ms              | Passed        |



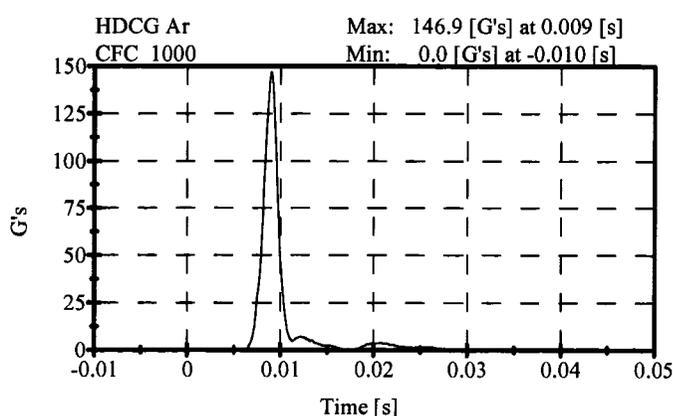
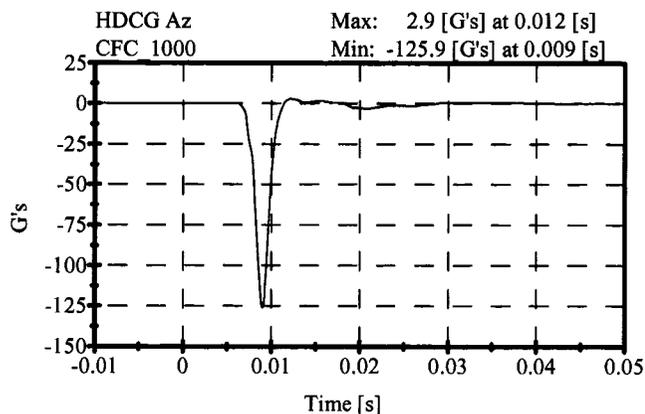
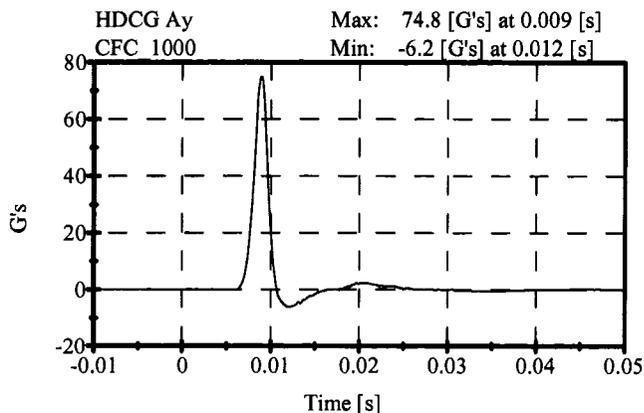
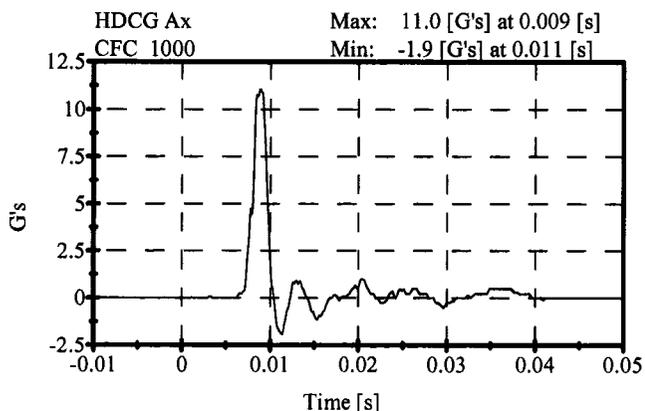
## Head Drop POST TEST

### CONFIGURED FOR LEFT SIDE IMPACT

ATD Serial No: 906  
Date: 10-18-06

Sequential Test Number: 1 File: 906H 10-18-06  
Laboratory Technician: B. Swiecicki

| <u>TEST PARAMETER</u>   | <u>SPECIFICATION</u> | <u>TEST RESULTS</u> | <u>STATUS</u> |
|-------------------------|----------------------|---------------------|---------------|
| Lab Temperature:        | 66.0-78.0 F          | 70.0 F              | Passed        |
| Lab Humidity:           | 10-70 %              | 37.00 %             | Passed        |
| Peak Resultant Accel.:  | 120-150 Gs           | 146.87 Gs           | Passed        |
| Peak Lateral Accel.:    | 15 Gs Max            | 11.04 Gs            | Passed        |
| Curve PerCent NonModal: | < 15%                | 4.66 %              | Passed        |



**Neck test  
POST TEST**

**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 906  
Date: 10-18-06

Sequential Test Number: 1 File: 906N\_new 10-18-06  
Laboratory Technician: B. Swiecicki

| <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 %              | 37.00 %             | Passed        |
| Impact Velocity:   | 6.89- 7.13 m/s       | 6.99 m/s            | Passed        |
| <b>PENDULUM DELTA V</b>  |                      |                     |               |
| Delta V at 10 ms:  | 1.96- 2.55 m/s       | 2.14 m/s            | Passed        |
| Delta V at 20 ms:  | 4.12- 5.10 m/s       | 4.36 m/s            | Passed        |
| Delta V at 30 ms:  | 5.73- 7.01 m/s       | 6.25 m/s            | Passed        |
| Delta V between 40-70 ms:  | 6.27- 7.64 m/s       | 6.98 m/s            | Passed        |
| <b>D PLANE ROTATION</b>  |                      |                     |               |
| Maximum Rotation:  | 66.0-82.0 Deg        | 71.39 Deg           | Passed        |
| Rotation Angle Decay:  | 58.0-67.0 ms         | 61.90 ms            | Passed        |
| <b>MOMENT ABOUT THE OCCIPITAL CONDYLE</b>                              |                      |                     |               |
| Max Occipital Moment:  | 73.00- 88.00 N-m     | 81.57 N-m           | Passed        |
| Occipital Moment Decay:  | 49.0-64.0 ms         | 58.20 ms            | Passed        |
| <b>HEAD ROTATION TIME WITH RESPECT TO THE OCCIPITAL CONDYLE MOMENT</b> |                      |                     |               |
| Moment to Rotation Peak:   | 2.0-16.0 ms          | 8.90 ms             | Passed        |

Neck test  
POST TEST

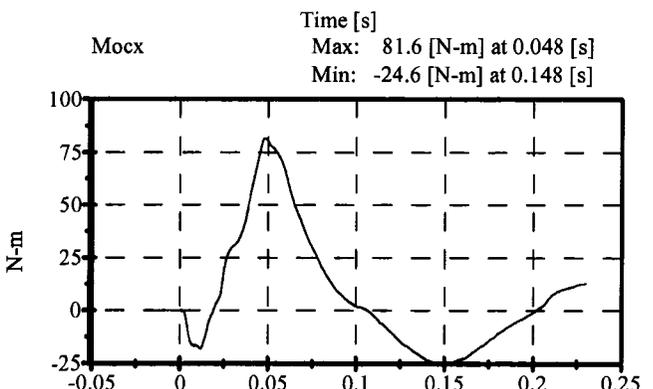
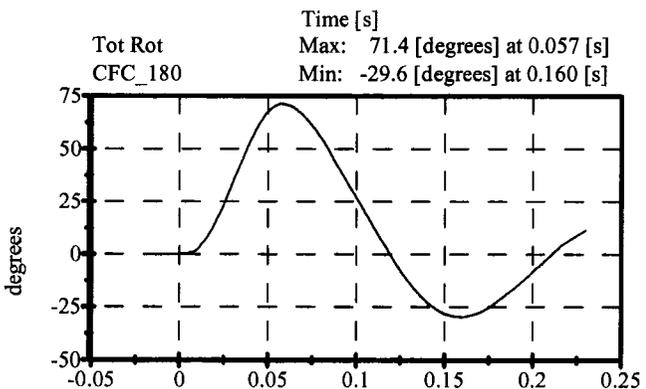
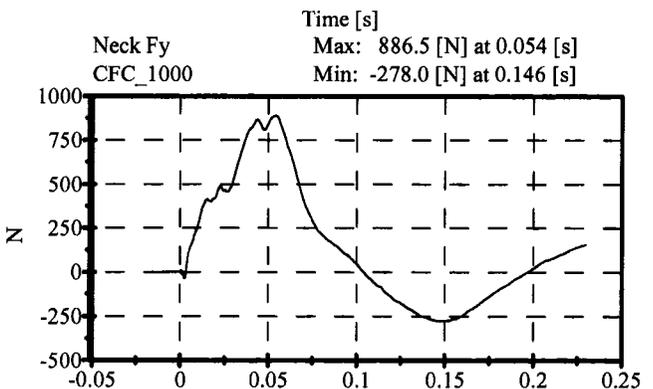
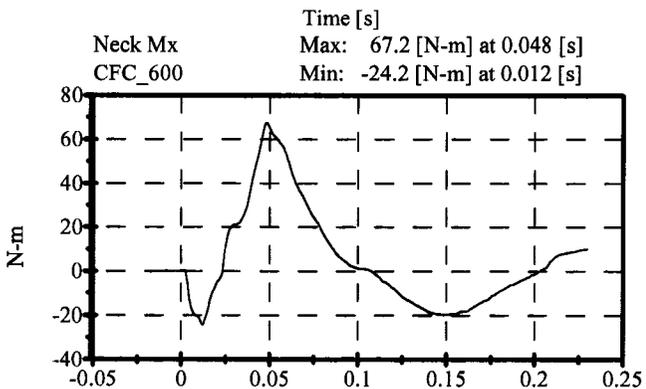
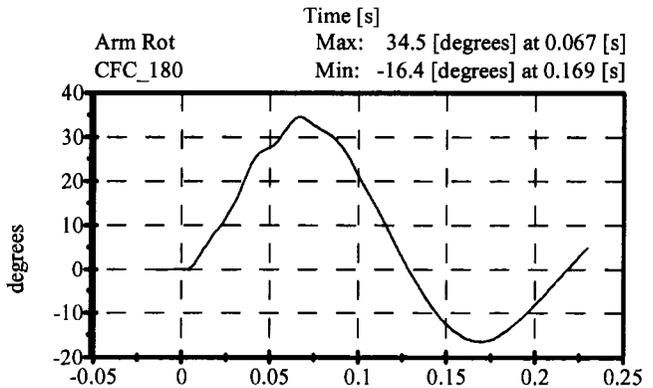
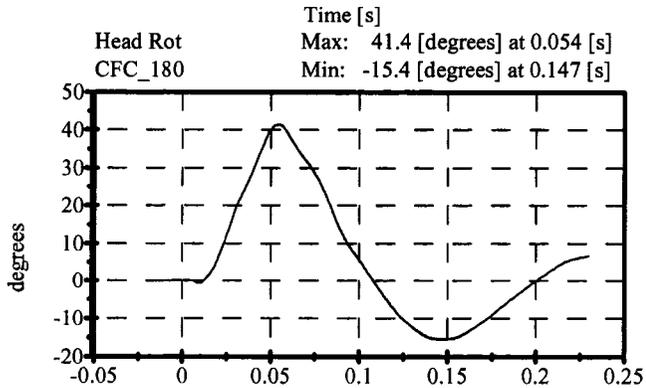
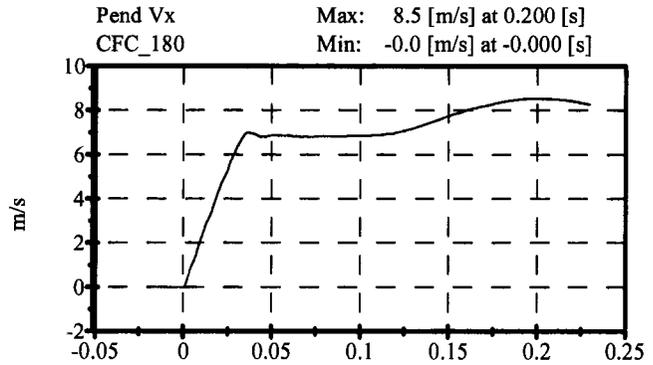
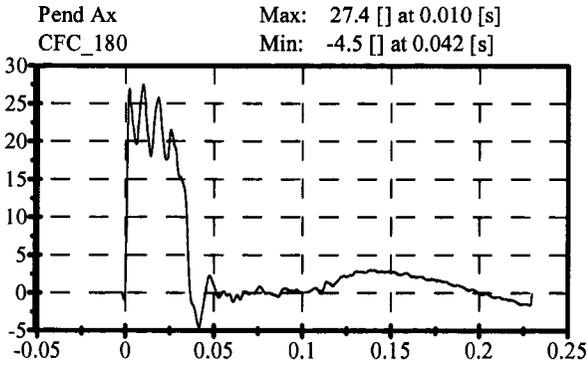
CONFIGURED FOR LEFT SIDE IMPACT

ATD Serial No: 906

Date: 10-18-06

Sequential Test Number: 1 File: 906N\_new 10-18-06

Laboratory Technician: B. Swiecicki



### Abdomen Test

### Post-Test

### CONFIGURED FOR LEFT SIDE IMPACT

ATD Serial No: 906

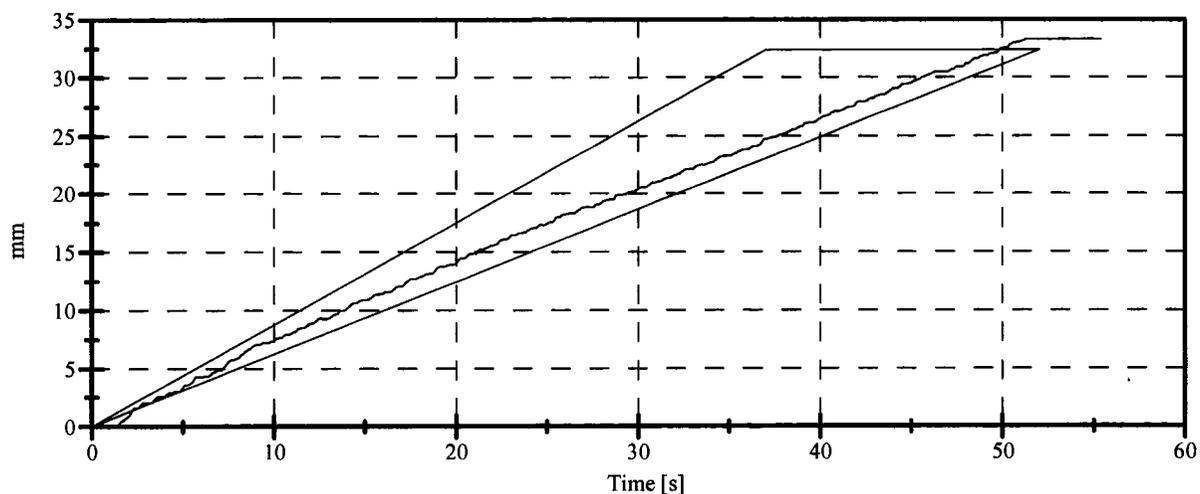
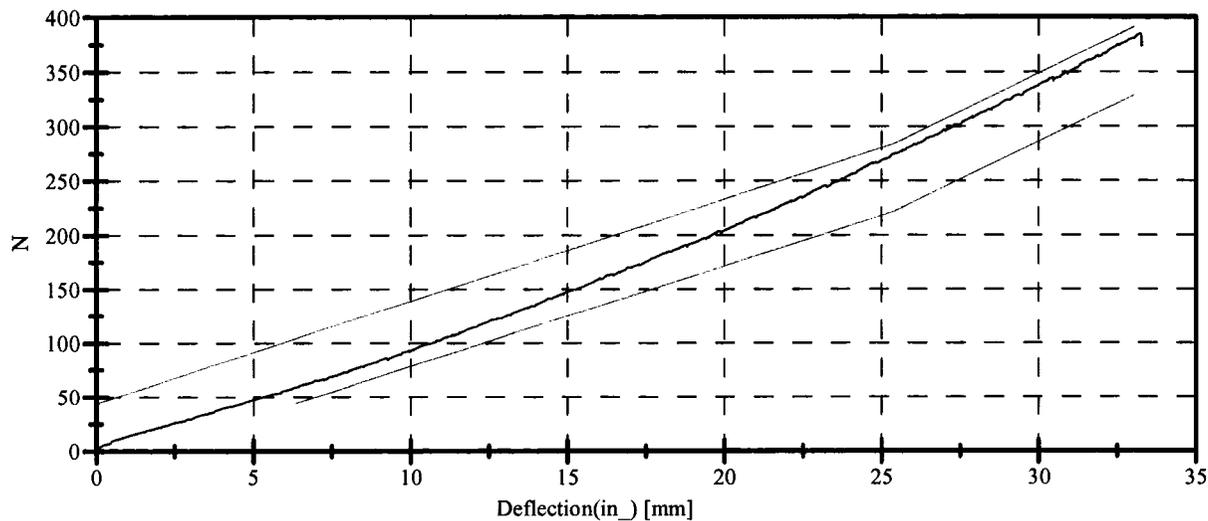
Date: 10-19-06

Sequential Test Number: 1 File: 906ab 10-19-06

Laboratory Technician: B. Swiecicki

| <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 %              | 33.00 %             | Passed        |
| Force at 12.95 mm :   | 104.00-162.00 N      | 124.04 N            | Passed        |
| Force at 19.05 mm :   | 162.98-220.99 N      | 192.91 N            | Passed        |
| Force at 25.40 mm :   | 221.97-280.02 N      | 274.83 N            | Passed        |
| Force at 33.02 mm :   | 324.99-391.00 N      | 380.32 N            | Passed        |

### ABDOMINAL COMPRESSION TEST



**Lumbar Spine  
POST TEST**

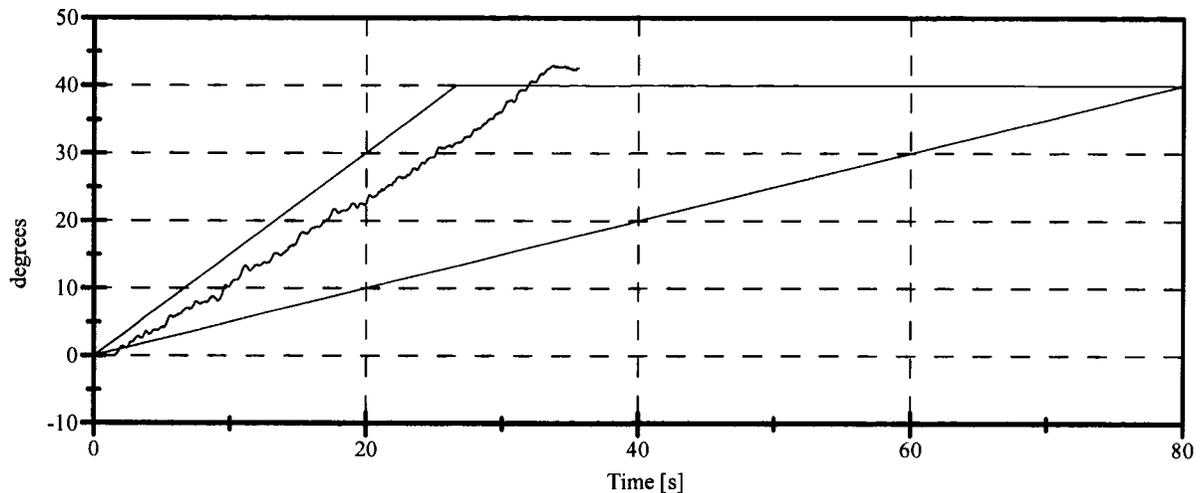
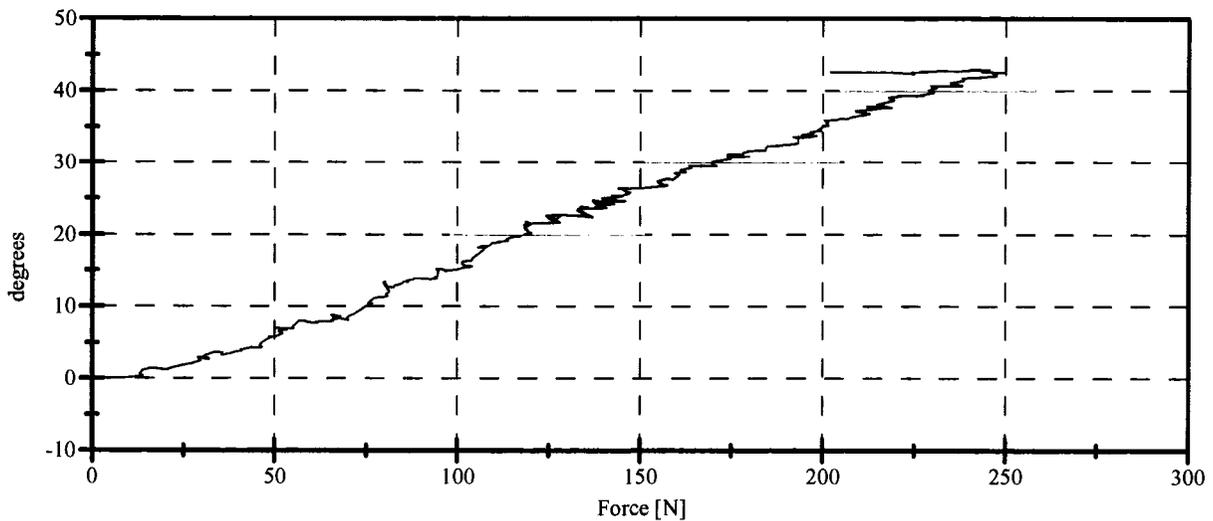
**CONFIGURED FOR LEFT SIDE IMPACT**

ATD Serial No: 906  
Date: 10-19-06

Sequential Test Number: 1 File: 906spine 10-19-06  
Laboratory Technician: B. Swiecicki

| <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 %              | 33.00 %             | Passed        |
| Force at 0 Deg:       | 0.00-26.69 N         | 0.40 N              | Passed        |
| Force at 20 Deg:      | 97.86-151.24 N       | 120.00 N            | Passed        |
| Force at 30 Deg:      | 151.24-204.62 N      | 169.62 N            | Passed        |
| Force at 40 Deg:      | 204.62-258.00 N      | 228.64 N            | Passed        |
| Return Angle          | 12 Deg Max           | 7.15 deg            | Passed        |

**LUMBAR SPINE FLEXION TEST**



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

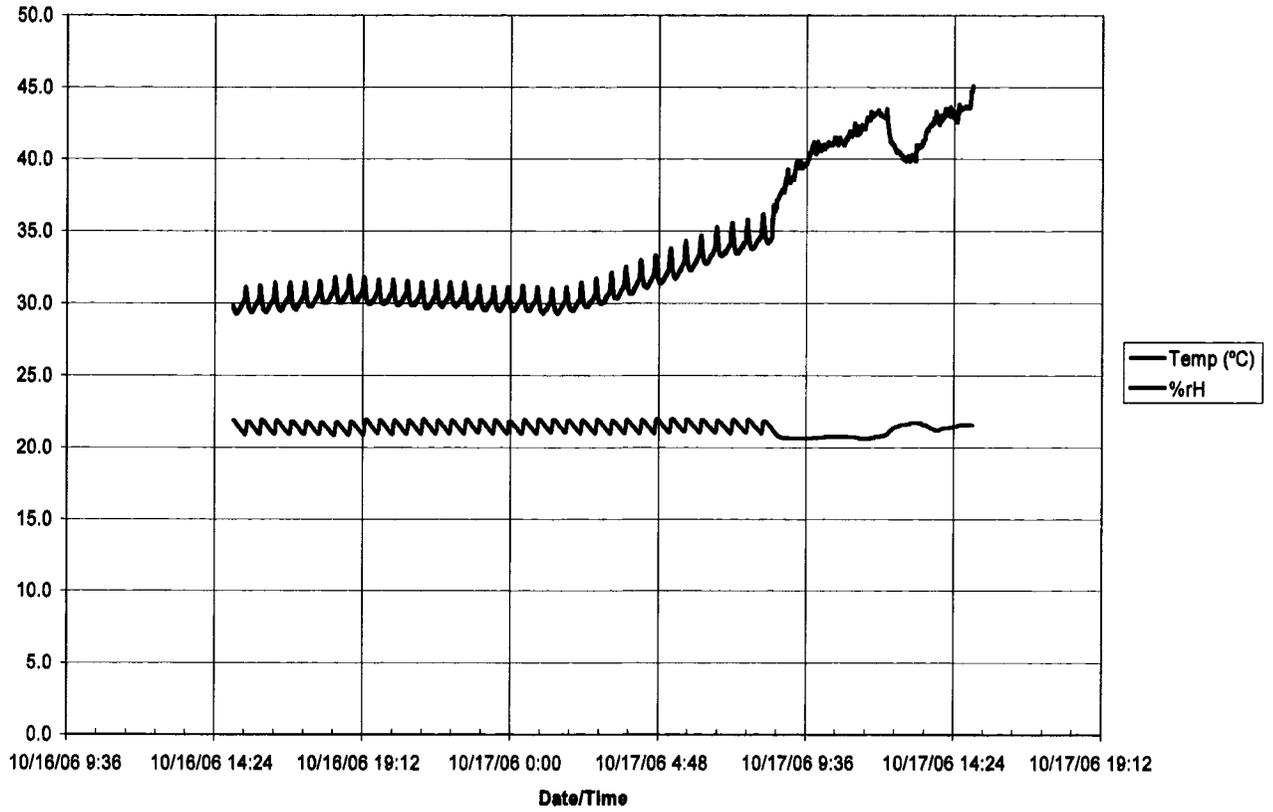
SID H3 Serial No.: 906                      Sequential Test Number: 1  
 Date: October 19, 2006                      Laboratory Technician: B. Swiecicki

| 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

## 2007 Pontiac Soletice C70101 Environmental Conditions



**APPENDIX D**  
**TEST EQUIPMENT AND CALIBRATION INFORMATION**

**TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

**SID/HIII INSTRUMENTATION**

| FRONT SID/HIII NO.: 906 |               |              |                  |
|-------------------------|---------------|--------------|------------------|
|                         | SERIAL NUMBER | MANUFACTURER | CALIBRATION DATE |
| HEAD AX                 | AC-P23788     | ENDEVCO      | 6-Jul-06         |
| HEAD AY                 | AC-P21393     | ENDEVCO      | 6-Jul-06         |
| HEAD AZ                 | AC-P16845     | ENDEVCO      | 6-Jul-06         |
| UPPER NECK FX           | LC-798FX      | DENTON       | 6-Jul-06         |
| UPPER NECK FY           | LC-798FY      | DENTON       | 6-Jul-06         |
| UPPER NECK FZ           | LC-798FZ      | DENTON       | 6-Jul-06         |
| UPPER NECK MX           | LC-798MX      | DENTON       | 6-Jul-06         |
| UPPER NECK MY           | LC-798MY      | DENTON       | 6-Jul-06         |
| UPPER NECK MZ           | LC-798MZ      | DENTON       | 6-Jul-06         |
| UPPER RIB               | AC-P16862     | ENDEVCO      | 6-Jul-06         |
| LOWER RIB               | AC-P16866     | ENDEVCO      | 6-Jul-06         |
| LOWER SPINE             | AC-P16645     | ENDEVCO      | 6-Jul-06         |
| PELVIS                  | AC-P23139     | ENDEVCO      | 6-Jul-06         |
| UPPER RIB REDUNDANT     | AC-P23156     | ENDEVCO      | 6-Jul-06         |
| LOWER RIB REDUNDANT     | AC-P16656     | ENDEVCO      | 6-Jul-06         |
| LOWER SPINE REDUNDANT   | AC-P19343     | ENDEVCO      | 6-Jul-06         |
| PELVIS REDUNDANT        | AC-P17539     | ENDEVCO      | 6-Jul-06         |

**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-P17237                   | ENDEVCO      | 5-Jul-06         |
| RIGHT FRONT SILL (Y)               | AC-J32838                   | ENDEVCO      | 7-Jul-06         |
| RIGHT FRONT SILL (Z)               | AC-P16625                   | ENDEVCO      | 18-Jul-06        |
| RIGHT REAR SILL (X)                | AC-P23993                   | ENDEVCO      | 19-Jul-06        |
| RIGHT REAR SILL (Y)                | AC-P23999                   | ENDEVCO      | 19-Jul-06        |
| RIGHT REAR SILL (Z)                | AC-P23939                   | ENDEVCO      | 19-Jul-06        |
| REAR FLOORPAN ABOVE AXLE (X)       | AC-P18628                   | ENDEVCO      | 6-Jul-06         |
| REAR FLOORPAN ABOVE AXLE (Y)       | AC-P23976                   | ENDEVCO      | 6-Jul-06         |
| REAR FLOORPAN ABOVE AXLE (Z)       | AC-P18718                   | ENDEVCO      | 5-Jul-06         |
| LEFT REAR SILL (Y)                 | AC-P35789                   | ENDEVCO      | 18-Jul-06        |
| LEFT FRONT SILL (Y)                | AC-P26266                   | ENDEVCO      | 7-Aug-06         |
| LEFT FRONT DOOR CENTERLINE (Y)     | -                           | -            | -                |
| RIGHT REAR SEAT OCCUPANT COMP. (Y) | AC-P17242                   | ENDEVCO      | 18-Jul-06        |
| MID REAR OF LEFT FRONT DOOR (Y)    | -                           | -            | -                |
| LEFT FRONT DOOR UPPER C/L (Y)      | -                           | -            | -                |
| MID REAR OF LEFT REAR DOOR (Y)     | -                           | -            | -                |
| LEFT REAR DOOR UPPER C/L (Y)       | -                           | -            | -                |
| LOWER LEFT B-PILLAR (Y)            | AC-P18728                   | ENDEVCO      | 28-Jun-06        |
| MIDDLE LEFT B-PILLAR (Y)           | AC-P17141                   | ENDEVCO      | 18-Jul-06        |
| LOWER LEFT A-PILLAR (Y)            | AC-P35803                   | ENDEVCO      | 18-Jul-06        |
| UPPER LEFT A-PILLAR (Y)            | AC-P39743                   | ENDEVCO      | 18-Jul-06        |
| FRONT SEAT TRACK (Y)               | AC-P16616                   | ENDEVCO      | 5-Jul-06         |
| REAR SEAT TRACK (Y)                | -                           | -            | -                |
| VEHICLE CG (X)                     | AC-P23161                   | ENDEVCO      | 19-Jul-06        |
| VEHICLE CG (Y)                     | AC-P15534                   | ENDEVCO      | 14-Jun-06        |
| VEHICLE CG (Z)                     | AC-P24011                   | ENDEVCO      | 7-Jul-06         |
| MDB CG (X)                         | AC-C16433                   | ENDEVCO      | 27-Jun-06        |
| MDB CG (Y)                         | AC-C16416                   | ENDEVCO      | 27-Jun-06        |
| MDB CG (Z)                         | AC-C16499                   | ENDEVCO      | 27-Jun-06        |
| MDB REAR FRAME MEMBER (X)          | AC-C14948                   | ENDEVCO      | 27-Jun-06        |
| MDB REAR FRAME MEMBER (Y)          | AC-C16680                   | ENDEVCO      | 27-Jun-06        |

**REMARKS:** None