

**REPORT NUMBER: NCAP-MGA-2002-003**

**NEW CAR ASSESSMENT PROGRAM  
FRONTAL BARRIER IMPACT TEST**

**2002 LEXUS ES300 4 DOOR  
NHTSA NUMBER: M25100**

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



**Test Date: January 29, 2002**

**Report Date: February 6, 2002**

**FINAL REPORT**

**PREPARED FOR:  
U.S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
OFFICE OF CRASHWORTHINESS STANDARDS  
400 SEVENTH STREET, SW, ROOM 5311  
WASHINGTON, D.C. 20590**

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Prepared by: \_\_\_\_\_ Date: \_\_\_\_\_  
Chris Havens, Project Engineer

Reviewed by: \_\_\_\_\_ Date: \_\_\_\_\_  
David Winkelbauer, Facility Director

FINAL REPORT ACCEPTED BY:

\_\_\_\_\_  
Manager, New Car Assessment Program

\_\_\_\_\_  
Date of Acceptance

\_\_\_\_\_  
COTR, NCAP Frontal Impact Program

\_\_\_\_\_  
Date of Acceptance

### Technical Report Documentation Page

| 1. Report No.<br>NCAP-MGA-2002-003                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2. Government Accession No.                          | 3. Recipient's Catalog No.                                                                                                                                                                                              |                   |                                |              |                  |                   |                  |                            |     |      |     |     |                                 |     |    |    |    |                  |         |       |      |      |                   |         |       |      |      |
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| 4. Title and Subtitle<br>Final Report of New Car Assessment Program Testing of a 2002/Lexus/ES300/4 door<br>NHTSA No.: M25100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                      | 5. Report Date<br>February 6, 2002                                                                                                                                                                                      |                   |                                |              |                  |                   |                  |                            |     |      |     |     |                                 |     |    |    |    |                  |         |       |      |      |                   |         |       |      |      |
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| 9. Performing Organization Name and Address<br>MGA Research Corporation<br>5000 Warren Road<br>Burlington, WI 53105                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                      | 10. Work Unit No.                                                                                                                                                                                                       |                   |                                |              |                  |                   |                  |                            |     |      |     |     |                                 |     |    |    |    |                  |         |       |      |      |                   |         |       |      |      |
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| 15. Supplementary Notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                      |                                                                                                                                                                                                                         |                   |                                |              |                  |                   |                  |                            |     |      |     |     |                                 |     |    |    |    |                  |         |       |      |      |                   |         |       |      |      |
| 16. Abstract<br>A 35 mph (56.3 km/h) frontal barrier impact was conducted on a 2002 Lexus ES300 4 door at MGA Research Corporation on January 29, 2002. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The impact velocity 56.6 was km/h. The ambient temperature at the barrier face at the time of impact was 20.5 degrees Celsius. The vehicle's maximum post test static crush is 656 mm located at the vehicle centerline. The test vehicle is equipped with a 3-point continuous belt system and an airbag in both front outboard seating positions. With respect to FMVSS 208 "Occupant Crash Protection", the occupant injury criteria summary is as follows: <table style="width: 100%; margin-top: 10px;"> <thead> <tr> <th style="text-align: left;"><u>Measurement Description</u></th> <th style="text-align: left;"><u>Units</u></th> <th style="text-align: left;"><u>Threshold</u></th> <th style="text-align: left;"><u>Driver ATD</u></th> <th style="text-align: left;"><u>Pass. ATD</u></th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC)</td> <td>N/A</td> <td>1000</td> <td>491</td> <td>472</td> </tr> <tr> <td>Max. Thorax Accel. (3msec Clip)</td> <td>G's</td> <td>60</td> <td>43</td> <td>42</td> </tr> <tr> <td>Left Femur force</td> <td>Newtons</td> <td>10009</td> <td>1791</td> <td>2218</td> </tr> <tr> <td>Right Femur force</td> <td>Newtons</td> <td>10009</td> <td>3273</td> <td>1095</td> </tr> </tbody> </table> |                                                      |                                                                                                                                                                                                                         |                   | <u>Measurement Description</u> | <u>Units</u> | <u>Threshold</u> | <u>Driver ATD</u> | <u>Pass. ATD</u> | Head Injury Criteria (HIC) | N/A | 1000 | 491 | 472 | Max. Thorax Accel. (3msec Clip) | G's | 60 | 43 | 42 | Left Femur force | Newtons | 10009 | 1791 | 2218 | Right Femur force | Newtons | 10009 | 3273 | 1095 |
| <u>Measurement Description</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <u>Units</u>                                         | <u>Threshold</u>                                                                                                                                                                                                        | <u>Driver ATD</u> | <u>Pass. ATD</u>               |              |                  |                   |                  |                            |     |      |     |     |                                 |     |    |    |    |                  |         |       |      |      |                   |         |       |      |      |
| Head Injury Criteria (HIC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | N/A                                                  | 1000                                                                                                                                                                                                                    | 491               | 472                            |              |                  |                   |                  |                            |     |      |     |     |                                 |     |    |    |    |                  |         |       |      |      |                   |         |       |      |      |
| Max. Thorax Accel. (3msec Clip)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | G's                                                  | 60                                                                                                                                                                                                                      | 43                | 42                             |              |                  |                   |                  |                            |     |      |     |     |                                 |     |    |    |    |                  |         |       |      |      |                   |         |       |      |      |
| Left Femur force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Newtons                                              | 10009                                                                                                                                                                                                                   | 1791              | 2218                           |              |                  |                   |                  |                            |     |      |     |     |                                 |     |    |    |    |                  |         |       |      |      |                   |         |       |      |      |
| Right Femur force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Newtons                                              | 10009                                                                                                                                                                                                                   | 3273              | 1095                           |              |                  |                   |                  |                            |     |      |     |     |                                 |     |    |    |    |                  |         |       |      |      |                   |         |       |      |      |
| 17. Key Words<br><br>56.3 km/h NCAP Frontal Barrier Impact Test<br>New Car Assessment Program (NCAP)<br>2002/Lexus/ES300/4 door<br>NHTSA No: M25100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                      | 18. Distribution Statement<br>Copies of this report are available from:<br>National Highway Traffic Safety Admin., Technical Ref. Division,<br>Room 5108 (NAD-52)<br>400 Seventh Street, S.W.<br>Washington, D.C. 20590 |                   |                                |              |                  |                   |                  |                            |     |      |     |     |                                 |     |    |    |    |                  |         |       |      |      |                   |         |       |      |      |
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## **SECTION 1**

### **PURPOSE AND SUMMARY OF TEST**

#### **PURPOSE**

This 56.6 kph frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under contract number DTNH22-01-D-12005. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact in excess of the current 48.3 kph requirements.

#### **SUMMARY**

A load cell barrier consisting of 30 load cells was impacted by a 2002 Lexus ES300 4 door at a velocity of 56.6 kph. The test was performed at MGA Research Corporation on January 29, 2002. Pre-and post-test photographs of the vehicle and dummies can be found in Appendix A.

One real-time camera and fourteen high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

Two Part 572E, 50<sup>th</sup> percentile male anthropomorphic test devices (ATDs), were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with nine accelerometer array head, chest and pelvis triaxial accelerometers, chest displacement potentiometer, upper neck transducers, right/left femur load cells, left and right knee sliders, and lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 065) and right-front passenger (position 2) ATD (Serial No. 066) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 115 channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

There was 100 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was no Stoddard Solvent leakage after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 656 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's head, chest, and abdomen contacted the airbag. The driver's knees contacted the knee bolster. The passenger's head, chest, and abdomen contacted the airbag. The passenger's knees contacted the glove box.

The occupant data is summarized below:

| ATD position | HIC | Clip(g) | Chest Disp. (mm) | Left Femur (N) | Right Femur (N) | Belt Spoolout (mm) | Belt Stretch (mm/m) |
|--------------|-----|---------|------------------|----------------|-----------------|--------------------|---------------------|
| Driver       | 491 | 43      | 26               | 1791           | 3273            | N/A                | *                   |
| Passenger    | 472 | 42      | 19               | 2218           | 1095            | N/A                | *                   |

\* No valid data collected

**SECTION 2**  
**OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS**

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

NHTSA No.: M25100  
 Test Date: 1/29/02

**CONVERSION FACTORS USED IN THIS REPORT\***

| Quantity           | Typical Application | English Units       | Metric Unit | Multiply By   |
|--------------------|---------------------|---------------------|-------------|---------------|
| Mass               | Vehicle Weight      | lb                  | kg          | 0.4536        |
| Linear Velocity    | Impact Velocity     | mile/h              | km/h        | 1.609         |
| Length or Distance | Measurements        | in                  | mm          | 25.4          |
| Volume             | Fuel Systems        | gal                 | liter       | 3.785         |
| Volume             | Small Fluids        | oz                  | mL          | 29.573        |
| Pressure           | Tire Pressure       | lbf/in <sup>2</sup> | kPa         | 7.0           |
| Volume             | Liquid              | gal                 | liter       | 3.785         |
| Temperature        | General Use         | °F                  | °C          | =(tf -32)/1.8 |
| Force              | Dynamic Forces      | lbf                 | N           | 4.448         |
| Moment             | Torque              | lbf/ft              | Nm          | 1.355         |

\*Based on the Recommended Practice in SAE J916, May 85

**DATA SHEET NO. 1**  
**CRASH TEST SUMMARY**

Test Vehicle: 2002/Lexus/ES300/4 door  
Test Program: NCAP

NHTSA No.: M25100  
Test Date: 1/29/02

**PRIMARY IMPACT DATA**

| Measured Parameter   | Units   | Value  |
|----------------------|---------|--------|
| Velocity at Impact   | km/hr   | 56.6   |
| Test Weight          | kg      | 1802.2 |
| Average Rebound      | mm      | 993    |
| Maximum Static Crush | mm      | 656    |
| Impact Angle         | degrees | 90.2   |

**DOOR OPENING AND SEAT TRACK INFORMATION**

| Description           | Driver               | Passenger            |
|-----------------------|----------------------|----------------------|
| Front Door Opening    | Opened without tools | Opened without tools |
| Rear Door Opening     | Opened without tools | Opened without tools |
| Seat Track Shift (mm) | 0                    | 0                    |
| Seat Back Failure     | None                 | None                 |

**TEST DUMMY INFORMATION**

| Description             | Driver       | Passenger |
|-------------------------|--------------|-----------|
| Dummy Type / Serial No. | HIII / 65    | HIII / 66 |
| Head Contact            | Airbag       | Airbag    |
| Chest Contact           | Airbag       | Airbag    |
| Abdomen Contact         | Airbag       | Airbag    |
| Left Knee Contact       | Knee bolster | Glove box |
| Right Knee Contact      | Knee bolster | Glove box |

**16mm MOVIE COVERAGE**

|            |    |
|------------|----|
| High Speed | 14 |
| Real Time  | 1  |
| Total      | 15 |

|                                  |     |
|----------------------------------|-----|
| Driver ATD Sensors               | 50  |
| Passenger ATD Sensors            | 50  |
| Belt Assessment Sensors          | 6   |
| Vehicle Structure Accelerometers | 9   |
| Rigid Barrier Load Cells         | 6   |
| Total                            | 121 |

## DATA SHEET NO. 2

### GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

NHTSA No.: M25100  
 Test Date: 1/29/02

#### TEST VEHICLE INFORMATION

|                         |                     |
|-------------------------|---------------------|
| Manufacturer            | Lexus               |
| Model                   | ES300               |
| Body Style              | 4 door              |
| NHTSA No.               | M25100              |
| VIN                     | JTHBF30G925018152   |
| Color                   | Grey                |
| Delivery Date           | 1/18/02             |
| Odometer Reading (mile) | 43                  |
| Dealer                  | Lexus of Brookfield |
| Transmission            | Automatic           |
| Final Drive             | Front               |
| Number of Cylinders     | 6                   |
| Engine Displacement (L) | 3.0                 |
| Engine Placement        | Lateral             |

#### TEST VEHICLE OPTIONS

|                    |     |
|--------------------|-----|
| Driver Airbag      | Yes |
| Passenger Airbag   | Yes |
| Power Windows      | Yes |
| Power Steering     | Yes |
| Power Door Locks   | Yes |
| Tilt Wheel         | Yes |
| Air Conditioning   | Yes |
| Power Brakes       | Yes |
| Disc Brakes, Front | Yes |
| Disc Brakes, Rear  | Yes |
| Anti-lock Brakes   | Yes |
| AM/FM/Cassette     | Yes |
| Anti-theft System  | Yes |
| Cruise Control     | Yes |

#### DATA FROM CERTIFICATION LABEL

|                     |                          |                 |      |
|---------------------|--------------------------|-----------------|------|
| Manufactured By     | Toyota Motor Corporation | GVWR (kg)       | 2025 |
| Date of Manufacture | 11-01                    | GAWR Front (kg) | 1211 |
|                     |                          | GAWR Rear (kg)  | 1211 |

#### DATA FROM TIRE PLACARD

| Measured Parameter          | Front       | Rear        |
|-----------------------------|-------------|-------------|
| Maximum Tire Pressure (kPa) | 203         | 203         |
| Cold Pressure (kPa)         | 203         | 203         |
| Recommended Tire Size       | P215/60R16  | P215/60R16  |
| Tire Size on Vehicle        | P215/60R16  | P215/60R16  |
| Tire Manufacturer           | Bridgestone | Bridgestone |

| Measured Parameter      | Front  | Rear    | Third | Total |
|-------------------------|--------|---------|-------|-------|
| Type of Seats           | Bucket | Contour |       |       |
| Number Of Occupants     | 2      | 3       |       | 5     |
| Capacity Wt. (VCW) (kg) |        |         |       | 410.0 |
| Cargo Wt. (RCLW) (kg)   |        |         |       | 69.8  |

## DATA SHEET NO. 2...(continued)

### GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

NHTSA No.: M25100  
 Test Date: 1/29/02

#### TEST VEHICLE WEIGHTS

|        | Units | As Delivered (UVW) (Axle) |       |        | As Tested (ATW) (Axle) |       |        |
|--------|-------|---------------------------|-------|--------|------------------------|-------|--------|
|        |       | Front                     | Rear  | Total  | Front                  | Rear  | Total  |
| Left   | kg    | 482.6                     | 317.1 |        | 525.3                  | 390.1 |        |
| Right  | kg    | 485.8                     | 299.4 |        | 523.5                  | 363.3 |        |
| Ratio  | %     | 61.1                      | 38.9  |        | 58.2                   | 41.8  |        |
| Totals | kg    | 968.4                     | 616.5 | 1584.9 | 1048.8                 | 753.4 | 1802.2 |

#### TARGET TEST WEIGHT CALCULATION

| Measured Parameter                      | Units | Value  |
|-----------------------------------------|-------|--------|
| Total Delivered Weight (UVW)            | kg    | 1584.9 |
| Weight of 2 P572E ATDs                  | kg    | 161.5  |
| Rated Cargo/Luggage Weight (RCLW)       | kg    | 69.8   |
| Calculated Vehicle Target Weight (TVTW) | kg    | 1816.2 |

#### TEST VEHICLE ATTITUDES AND CG

|              | Units | LF  | RF  | LR  | RR  | CG(aft of front axle) |
|--------------|-------|-----|-----|-----|-----|-----------------------|
| As Delivered | mm    | 707 | 711 | 704 | 711 | 1056                  |
| As Tested    | mm    | 690 | 693 | 676 | 684 | 1135                  |
| Post Test    | mm    | 802 | 812 | 674 | 662 |                       |

Vehicle Wheelbase (mm): 2715

Weight of Ballast secured in cargo area (kg): 34.0

Vehicle Components Removed: Rear seat, rear deck, rr taillight, spare tire and jack.

Ballast weight does not include cameras, instrumentation, and brake abort system.

#### FUEL SYSTEM DATA

Fuel System Capacity From Owner's Manual (L): 70.0

Usable Capacity Figure Furnished by COTR (L): 70.0

Actual Test Volume (L): 65.4

Test Fluid Type: Stoddard Solvent ; Specific Gravity: 0.77

Is Vehicle Fuel Pump Electric or Mechanical? Electrical

If electric, does pump operate with ignition switch "ON" & engine "OFF"?: No

**DATA SHEET NO. 3**  
**POST IMPACT DATA**

Test Vehicle: 2002/Lexus/ES300/4 door  
Test Program: NCAP

NHTSA No.: M25100  
Test Date: 1/29/02

| Measured Parameter              | Units | Requirement | Value |
|---------------------------------|-------|-------------|-------|
| Trap No. 1 Velocity (Primary)   | km/h  | 55.5 – 57.1 | 56.6  |
| Trap No. 1 Entry Distance       | mm    | <1524       | 1300  |
| Trap No. 1 Exit Distance        | mm    | <1524       | 300   |
| Trap No. 2 Velocity (Redundant) | km/h  | 55.5 – 57.1 | *     |
| Trap No. 2 Entry Distance       | mm    | <1524       | 1425  |
| Trap No. 2 Exit Distance        | mm    | <1524       | 425   |

\* No valid data collected

**VEHICLE STATIC CRUSH**

| Measured Parameter | Units | Pre-Test | Post-Test | Difference |
|--------------------|-------|----------|-----------|------------|
| Left Side          | mm    | 4714     | 4135      | 579        |
| Center             | mm    | 4828     | 4172      | 656        |
| Right Side         | mm    | 4713     | 4169      | 544        |

**VEHICLE REBOUND FROM BARRIER**

| Measured Parameter | Units | Value |
|--------------------|-------|-------|
| Left Side          | mm    | 967   |
| Center             | mm    | 995   |
| Right Side         | mm    | 1017  |
| Average            | mm    | 993   |

**DATA SHEET NO. 4**  
**TEST VEHICLE INFORMATION**

Test Vehicle: 2002/Lexus/ES300/4 door  
Test Program: NCAP

NHTSA No.: M25100  
Test Date: 1/29/02

**NORMAL DESIGN RIDING POSITION**

The driver and passenger seat back is positioned to the manufacturer's designated angle. The procedure is as follows: Recline 6 degrees rearward from most upright

Driver seat back angle: 6° rearward from upright

Passenger seat back angle: 6° rearward from upright

**SEAT FORE/AFT POSITIONS**

The driver and passenger seats are power operated. The total travel on the driver and passenger seats are 240 mm.

The fore/aft position is set at the middle position for both driver and passenger.

Driver seat fore/aft total travel: 240 mm

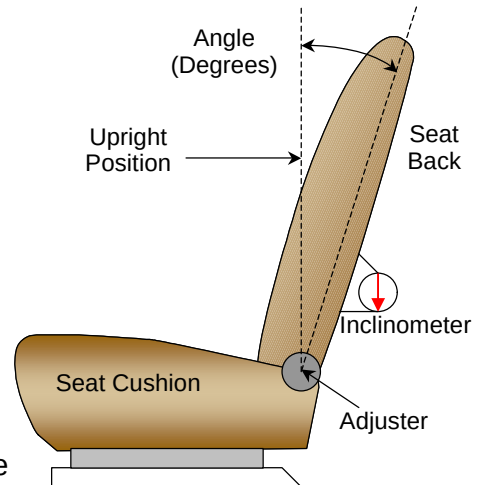
Passenger seat fore/aft total travel: 240 mm

Driver seat fore/aft position: 120 mm

Passenger seat fore/aft position: 120 mm

**SEAT BELT UPPER ANCHORAGE**

Upper anchorage is placed in the 2<sup>nd</sup> position, the uppermost being "1".





## DATA SHEET NO. 4...(continued)

### TEST VEHICLE INFORMATION

Test Vehicle: 2002/Lexus/ES300/4 door  
Test Program: NCAP

NHTSA No.: M25100  
Test Date: 1/29/02

### FUEL TANK CAPACITY DATA

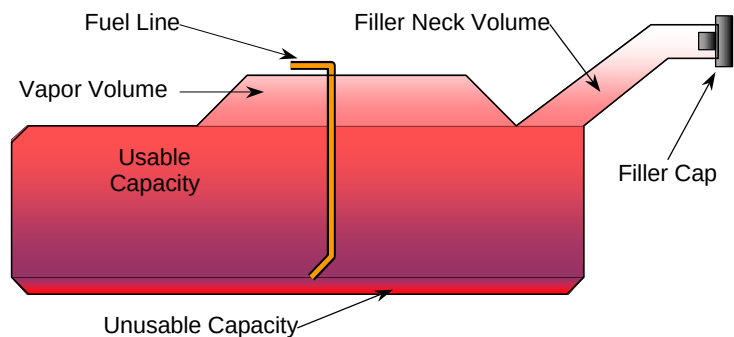
The "Usable Capacity" of the standard equipment fuel tank is: 70.0 liters

The "Usable Capacity" of any optional equipment fuel tank is: N/A liters

The "Usable Capacity" used for certification to FMVSS 301 requirements: 64.3 to 65.9liters

Actual amount of Stoddard solvent added to vehicle for certification test: 65.5 liters

The test vehicle is equipped with an electric fuel pump. The fuel filler door is located on the left rear fender.

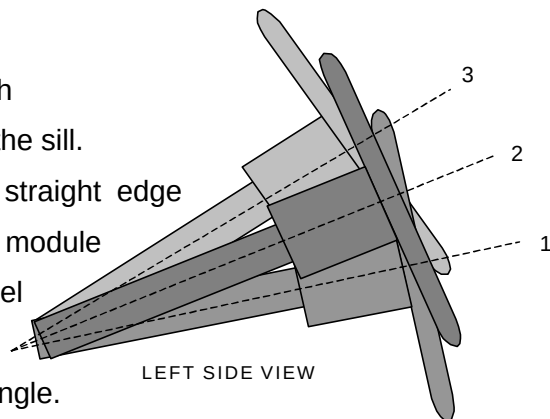


VEHICLE FUEL TANK ASSEMBLY

### STEERING COLUMN ADJUSTMENT

The designated geometric center is the 3<sup>rd</sup> notch from lowermost being "1", or 24° referenced to the sill.

To measure column angle, place a level or straight edge up/down across the center of the driver air bag module resting it on the upper and lower steering wheel rims. Place an inclinometer on the level or straight edge to measure the steering column angle.



STEERING COLUMN ASSEMBLY

Lowermost, position 1: 17.4°

Geometric center, position 2: 24.0°

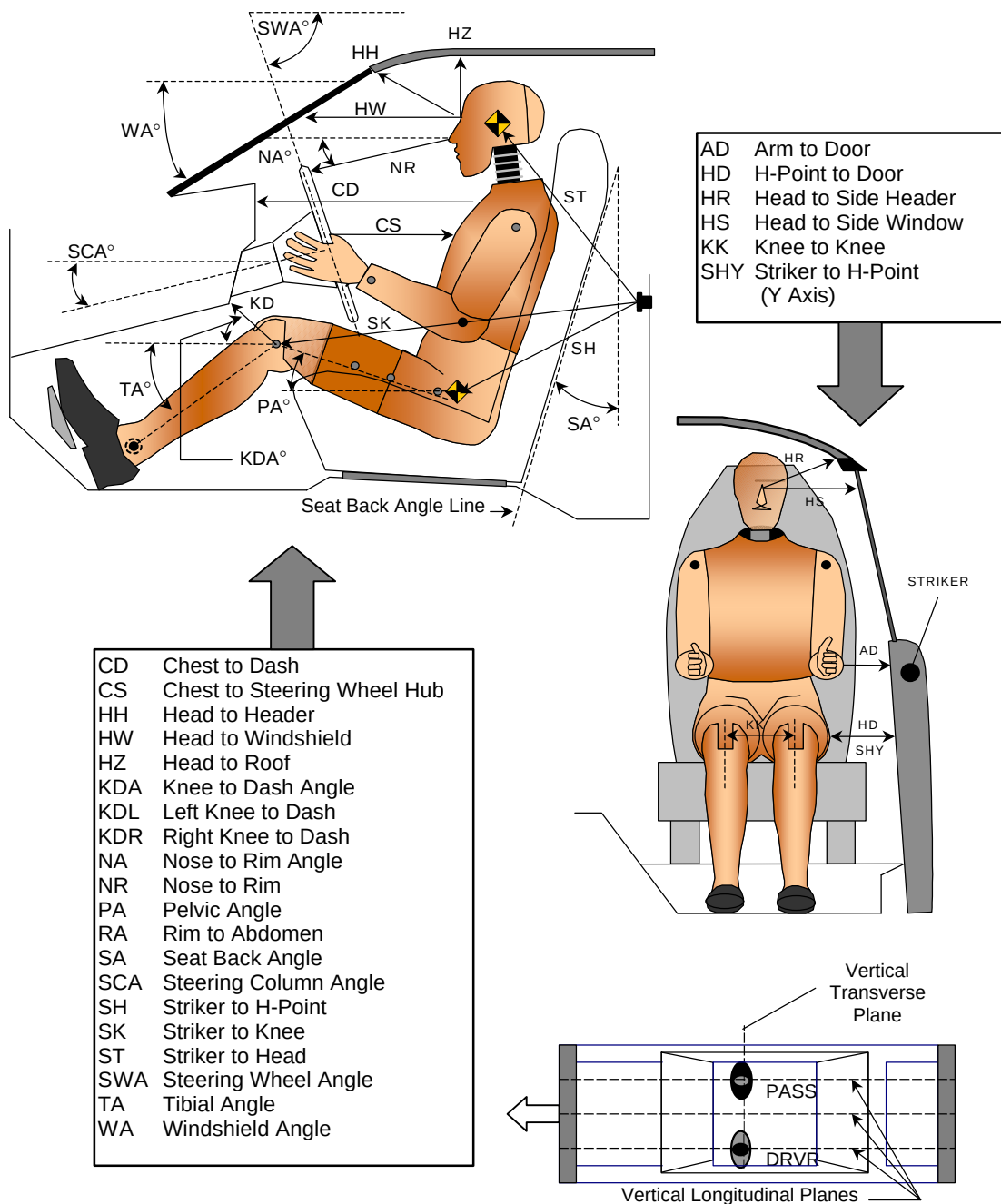
Uppermost, position 3: 33.7°

# **DATA SHEET NO. 5** **DUMMY POSITIONING IN VEHICLE**

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

NHTSA No.: M25100  
 Test Date: 1/29/02

## **DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS**



**DATA SHEET NO. 5...(continued)**  
**DUMMY POSITIONING IN VEHICLE**

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

NHTSA No.: M25100  
 Test Date: 1/29/02

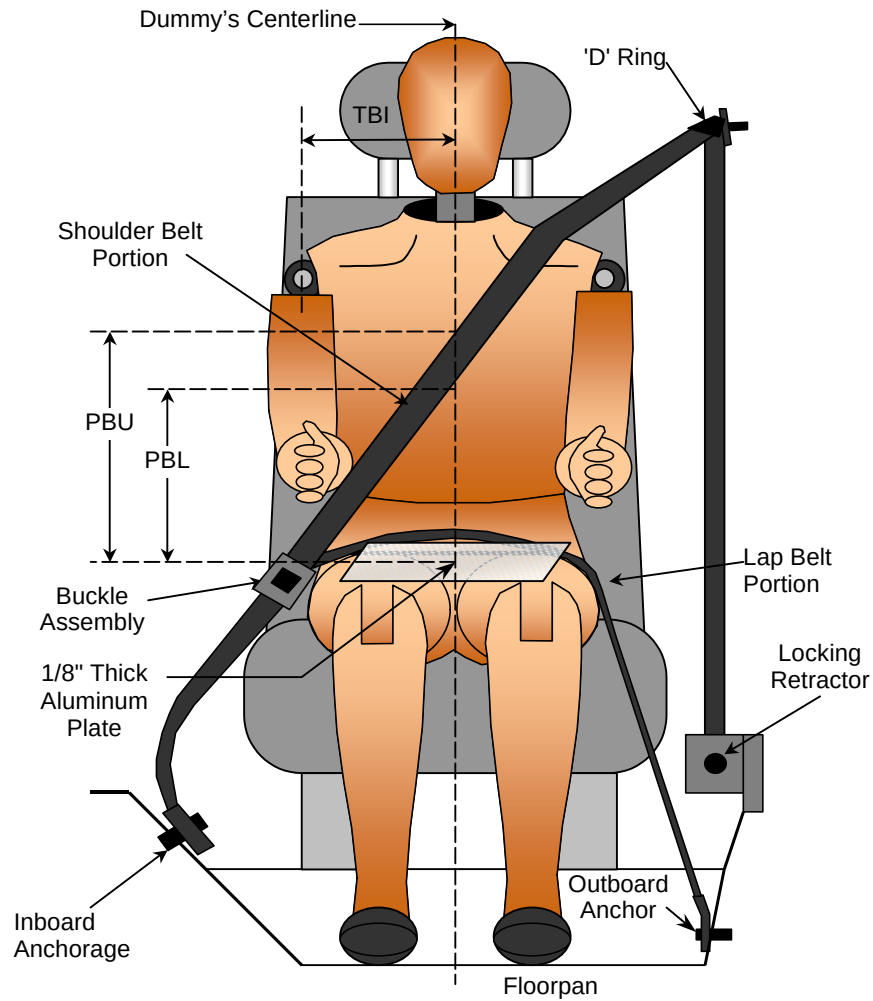
**TEST DUMMY POSITION MEASUREMENTS**

| Code | Measurement Description | Driver      |           | Passenger   |           |
|------|-------------------------|-------------|-----------|-------------|-----------|
|      |                         | Length (mm) | Angle (°) | Length (mm) | Angle (°) |
| WA   | Windshield Angle        |             | 27.5      |             |           |
| SWA  | Steering Wheel Angle    |             | 24.0      |             |           |
| SCA  | Steering Column Angle   |             | 24.5      |             |           |
| SA   | Seat Back Angle         |             | 6.0       |             | 6.0       |
| HZ   | Head to Roof (Z)        | 150         | 90        | 152         | 90        |
| HH   | Head to Header          | 338         | 18.1      | 326         | 23.9      |
| HW   | Head to Windshield      | 622         | 0.0       | 579         | 0.0       |
| HR   | Head to Side Header (Y) | 239         |           | 203         |           |
| NR   | Nose to Rim             | 412         | 10.2      |             |           |
| CD   | Chest to Dash           | 523         |           | 591         |           |
| CS   | Chest to Steering Hub   | 325         | 8.5       |             |           |
| RA   | Rim to Abdomen          | 192         | 0.0       |             |           |
| KDL  | Left Knee to Dash       | 209         | 0.0       | 199         |           |
| KDR  | Right Knee to Dash      | 189         |           | 198         | 0.0       |
| PA   | Pelvic Angle            |             | 23.6      |             | 24.2      |
| TA   | Tibia Angle             |             | 40.8      |             | 44.8      |
| KK   | Knee to Knee (Y)        | 321         |           | 264         |           |
| SK   | Striker to Knee         | 592         | 11.0      | 580         | 11.6      |
| ST   | Striker to Head         | 391         | 9.8       | 408         | 15.1      |
| SH   | Striker to H-Point      | 592         | 49.4      | 292         | 142.2     |
| SHY  | Striker to H-Point (Y)  | 275         |           | 264         |           |
| HS   | Head to Side Window     | 322         |           | 287         |           |
| HD   | H-Point to Door (Y)     | 146         |           | 136         |           |
| AD   | Arm to Door (Y)         | 118         |           | 112         |           |
| AA   | Ankle to Ankle          | 325         |           | 271         |           |

# **DATA SHEET NO. 6** **SEAT BELT POSITIONING DATA**

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

NHTSA No.: M25100  
 Test Date: 1/29/02



## **SEAT BELT POSITIONING MEASUREMENTS**

| Measurement Description                           | Units | Driver | Passenger |
|---------------------------------------------------|-------|--------|-----------|
| TBI - Dummy centerline to shoulder bolt           | mm    | 170    | 170       |
| PBU - Top surface of reference to belt upper edge | mm    | 340    | 339       |
| PBL - To surface of reference to belt lower edge  | mm    | 256    | 258       |

## DATA SHEET NO. 7

### VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

NHTSA No.: M25100  
 Test Date: 1/29/02

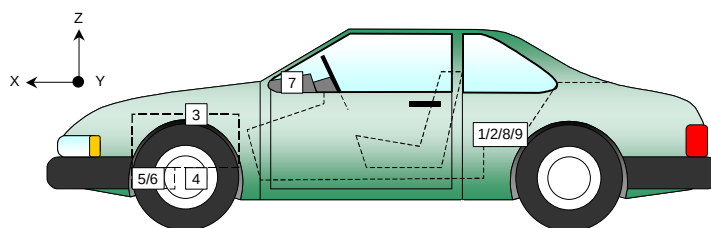
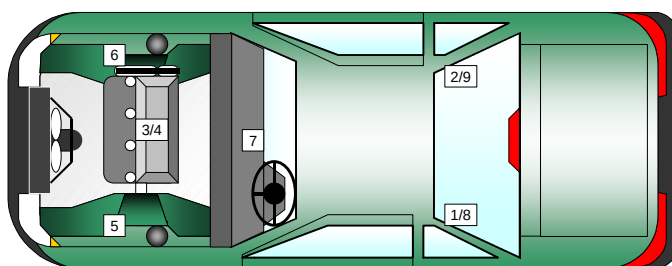
### VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

| No. | Accelerometer Location | Measurements (mm) |      |      | Peak Values |      |      |       |      |
|-----|------------------------|-------------------|------|------|-------------|------|------|-------|------|
|     |                        | X                 | Y    | Z    | Units       | Max  | Time | Min   | Time |
| 1   | Left Rear X-Member X   | 1674              | -342 | 439  | G's         | 2.0  | 124  | 37.4  | 60   |
| 2   | Right Rear X-Member X  | 1674              | 342  | 439  | G's         | 2.0  | 124  | 38.6  | 61   |
| 3   | Engine Top X           | 4042              | -36  | 793  | G's         | 28.9 | 49   | 132.6 | 35   |
| 4   | Engine Bottom X        | 4204              | 185  | 228  | G's         | 48.3 | 45   | 127.8 | 33   |
| 5   | Left Brake Caliper X   | 3964              | -664 | 249  | G's         | 47.2 | 76   | 73.0  | 54   |
| 6   | Right Brake Caliper X  | 3964              | 664  | 249  | G's         | 37.2 | 38   | 83.5  | 61   |
| 7   | Instrument Panel X     | 3276              | 0    | 1014 | G's         | 19.9 | 95   | 66.2  | 40   |
| 8   | Left Rear X-Member Z   | 1674              | -342 | 439  | G's         | 10.5 | 29   | 8.0   | 33   |
| 9   | Right Rear X-Member Z  | 1674              | 342  | 439  | G's         | 6.4  | 28   | 8.2   | 33   |

Reference Points: X - From Rear Surface of Vehicle (+ forward)

Y - Vehicle Centerline (+ to right)

Z - Ground Plane (+ up)



## DATA SHEET NO. 8

### HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

NHTSA No.: M25100  
 Test Date: 1/29/02

#### HEAD PRIMARY PEAK ACCELERATIONS

| Location          | Axis | Units | Driver |      |      |      | Passenger |      |      |      |
|-------------------|------|-------|--------|------|------|------|-----------|------|------|------|
|                   |      |       | Max    | Time | Min  | Time | Max       | Time | Min  | Time |
| Head CG           | X    | G's   | 1.1    | 21   | 63.9 | 80   | 0.2       | 16   | 56.6 | 81   |
| Head CG           | Y    | G's   | 5.9    | 175  | 5.5  | 175  | 6.2       | 108  | 10.2 | 95   |
| Head CG           | Z    | G's   | 19.2   | 53   | 14.1 | 98   | *         | *    | *    | *    |
| Head CG Resultant | N/A  | G's   | 65.3   | 78   |      |      | 57.8      | 81   |      |      |

\* No Valid Data Collected

#### CHEST PRIMARY PEAK ACCELERATIONS

| Location           | Axis | Units | Driver |      |      |      | Passenger |      |      |      |
|--------------------|------|-------|--------|------|------|------|-----------|------|------|------|
|                    |      |       | Max    | Time | Min  | Time | Max       | Time | Min  | Time |
| Chest CG           | X    | G's   | 2.8    | 135  | 45.2 | 88   | 1.8       | 151  | 41.7 | 76   |
| Chest CG           | Y    | G's   | 7.3    | 106  | 4.9  | 48   | 4.8       | 86   | 3.7  | 68   |
| Chest CG           | Z    | G's   | 7.0    | 41   | 11.8 | 99   | 17.0      | 43   | 8.8  | 106  |
| Chest CG Resultant | N/A  | G's   | 45.5   | 88   |      |      | 42.1      | 76   |      |      |

#### FEMUR PEAK FORCES

| Location    | Axis | Units   | Driver |      |      |      | Passenger |      |      |      |
|-------------|------|---------|--------|------|------|------|-----------|------|------|------|
|             |      |         | Max    | Time | Min  | Time | Max       | Time | Min  | Time |
| Left Femur  | Z    | Newtons | 1209   | 55   | 1791 | 66   | 536       | 33   | 2218 | 71   |
| Right Femur | Z    | Newtons | 1238   | 52   | 3273 | 62   | 473       | 32   | 1095 | 43   |

Note: Driver Left Femur- Questionable data from 10 msec. to 50 msec. and 170 msec to end

#### SEAT BELT SENSOR PEAK VALUES

| Location       | Axis | Units   | Driver |      |     |      | Passenger |      |     |      |
|----------------|------|---------|--------|------|-----|------|-----------|------|-----|------|
|                |      |         | Max    | Time | Min | Time | Max       | Time | Min | Time |
| Lap Belt Force | N/A  | Newtons | 8488   | 65   |     |      | 8414      | 72   |     |      |
| Shoulder Belt  | N/A  | Newtons | 4814   | 51   |     |      | 4966      | 49   |     |      |

#### HEAD INJURY CRITERIA (HIC)

| Location        | Driver |         |                |                | Passenger |         |                |                |
|-----------------|--------|---------|----------------|----------------|-----------|---------|----------------|----------------|
|                 | HIC    | Avg G's | T <sup>1</sup> | T <sup>2</sup> | HIC       | Avg G's | T <sup>1</sup> | T <sup>2</sup> |
| Head CG Primary | 491    | 47.5    | 64.6           | 96.1           | 472*      | 45.4    | 65.3           | 99.3           |

\* Passenger Head Z Redundant used for calculations

#### CHEST CLIP (3MSEC)

| Location         | Driver |                |                | Passenger |                |                |
|------------------|--------|----------------|----------------|-----------|----------------|----------------|
|                  | CLIP   | T <sup>1</sup> | T <sup>2</sup> | CLIP      | T <sup>1</sup> | T <sup>2</sup> |
| Chest CG Primary | 43     | 86.6           | 89.6           | 42        | 73.6           | 76.6           |

# DATA SHEET NO. 8...(continued)

## HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2002/Lexus/ES300/4 door  
Test Program: NCAP

NHTSA No.: M25100  
Test Date: 1/29/02

### PELVIC PEAK ACCELERATIONS

| Location | Axis | Units | Driver |      |      |      | Passenger |      |      |      |
|----------|------|-------|--------|------|------|------|-----------|------|------|------|
|          |      |       | Max    | Time | Min  | Time | Max       | Time | Min  | Time |
| Pelvis   | X    | G's   | 8.0    | 91   | 59.6 | 61   | 8.2       | 109  | 50.6 | 70   |
| Pelvis   | Y    | G's   | 11.3   | 79   | 7.1  | 59   | 6.0       | 72   | 7.2  | 87   |
| Pelvis   | Z    | G's   | 2.0    | 164  | 26.3 | 78   | 18.9      | 171  | 28.3 | 80   |

### UPPER NECK PEAK FORCES AND MOMENTS

| Location    | Axis | Units   | Driver |      |      |      | Passenger |      |      |      |
|-------------|------|---------|--------|------|------|------|-----------|------|------|------|
|             |      |         | Max    | Time | Min  | Time | Max       | Time | Min  | Time |
| Neck Force  | X    | Newtons | 542    | 78   | 409  | 145  | 231       | 89   | 329  | 54   |
| Neck Force  | Y    | Newtons | 95     | 121  | 100  | 71   | 70        | 62   | 216  | 84   |
| Neck Force  | Z    | Newtons | 1560   | 79   | 355  | 175  | 1330      | 72   | 318  | 106  |
| Neck Moment | X    | N•m     | 7.8    | 144  | 10.0 | 105  | 23.8      | 96   | 10.3 | 131  |
| Neck Moment | Y    | N•m     | 43.4   | 130  | 17.6 | 101  | 26.6      | 154  | 19.7 | 110  |
| Neck Moment | Z    | N•m     | 5.4    | 123  | 4.5  | 52   | 11.9      | 96   | 6.1  | 139  |

### FOOT PEAK ACCELERATIONS

| Location       | Axis | Units | Driver |      |       |      | Passenger |      |       |      |
|----------------|------|-------|--------|------|-------|------|-----------|------|-------|------|
|                |      |       | Max    | Time | Min   | Time | Max       | Time | Min   | Time |
| Left Foot Aft  | X    | G's   | 13.6   | 93   | 49.4  | 61   | 14.6      | 58   | 95.7  | 53   |
| Left Foot Aft  | Z    | G's   | 2.5    | 127  | 39.6  | 52   | 11.0      | 74   | 47.6  | 36   |
| Left Foot Fore | Z    | G's   | 23.0   | 47   | 51.7  | 28   | 50.0      | 39   | 112.1 | 35   |
| Right Foot Aft | X    | G's   | 14.3   | 88   | 112.1 | 50   | 12.6      | 93   | 45.2  | 42   |
| Right Foot Aft | Z    | G's   | 3.0    | 178  | 88.4  | 49   | 2.5       | 99   | 48.8  | 41   |
| Right Foot     | Z    | G's   | 24.4   | 35   | 184.4 | 49   | 13.2      | 44   | 61.7  | 36   |

### UPPER AND LOWER TIBIA PEAK FORCES AND MOMENTS

| Location           | Axis | Units   | Driver |      |       |      | Passenger |      |       |      |
|--------------------|------|---------|--------|------|-------|------|-----------|------|-------|------|
|                    |      |         | Max    | Time | Min   | Time | Max       | Time | Min   | Time |
| Left Lower Moment  | X    | N•m     | 29.7   | 85   | 2.2   | 140  | 43.5      | 81   | 5.8   | 51   |
| Left Lower Moment  | Y    | N•m     | 37.0   | 91   | 44.7  | 59   | 39.5      | 40   | 35.6  | 51   |
| Left Lower Force   | Z    | Newtons | 123    | 124  | 1682  | 32   | 102       | 189  | 3234  | 40   |
| Left Upper Moment  | X    | N•m     | 35.2   | 58   | 16.4  | 65   | 52.0      | 77   | 13.8  | 154  |
| Left Upper Moment  | Y    | N•m     | 15.2   | 110  | 107.8 | 62   | 26.0      | 163  | 96.4  | 65   |
| Left Upper Force   | Z    | Newtons | 83     | 115  | 1559  | 61   | 95        | 28   | 2415  | 41   |
| Right Lower Moment | X    | N•m     | 11.8   | 81   | 17.8  | 63   | 27.0      | 91   | 21.7  | 42   |
| Right Lower Moment | Y    | N•m     | 35.2   | 92   | 63.8  | 50   | 56.8      | 89   | 34.7  | 61   |
| Right Lower Force  | Z    | Newtons | 92     | 124  | 3659  | 64   | 73        | 137  | 3525  | 42   |
| Right Upper Moment | X    | N•m     | 14.5   | 144  | 27.3  | 92   | 27.7      | 141  | 40.0  | 49   |
| Right Upper Moment | Y    | N•m     | 21.5   | 113  | 135.4 | 67   | 32.4      | 109  | 103.9 | 41   |
| Right Upper Force  | Z    | Newtons | 137    | 129  | 3374  | 64   | 63        | 129  | 2809  | 43   |

# DATA SHEET NO. 8...(continued)

## HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

NHTSA No.: M25100  
 Test Date: 1/29/02

### CHEST PEAK DISPLACEMENTS

| Location | Axis | Units | Driver |      |      |      | Passenger |      |      |      |
|----------|------|-------|--------|------|------|------|-----------|------|------|------|
|          |      |       | Max    | Time | Min  | Time | Max       | Time | Min  | Time |
| Chest CG | X    | mm    |        |      | 26.3 | 89   |           |      | 19.0 | 76   |

### HEAD REDUNDANT PEAK ACCELERATIONS

| Location | Axis | Units | Driver |      |      |      | Passenger |      |      |      |
|----------|------|-------|--------|------|------|------|-----------|------|------|------|
|          |      |       | Max    | Time | Min  | Time | Max       | Time | Min  | Time |
| Head CG  | X    | G's   | 2.1    | 186  | 60.9 | 80   | 0.5       | 191  | 55.9 | 81   |
| Head CG  | Y    | G's   | 5.2    | 146  | 3.9  | 88   | 3.8       | 65   | 11.0 | 95   |
| Head CG  | Z    | G's   | 25.0   | 69   | 14.3 | 97   | 24.4      | 67   | 9.4  | 107  |
| Head CG  | N/A  | G's   | 62.3   | 80   |      |      | 57.1      | 82   |      |      |

### CHEST REDUNDANT PEAK ACCELERATIONS

| Location | Axis | Units | Driver |      |      |      | Passenger |      |      |      |
|----------|------|-------|--------|------|------|------|-----------|------|------|------|
|          |      |       | Max    | Time | Min  | Time | Max       | Time | Min  | Time |
| Chest CG | X    | G's   | 2.8    | 135  | 45.2 | 88   | 1.6       | 151  | 41.9 | 76   |
| Chest CG | Y    | G's   | 6.9    | 90   | 4.4  | 48   | 4.8       | 86   | 3.1  | 68   |
| Chest CG | Z    | G's   | 6.8    | 53   | 12.1 | 99   | 9.3       | 67   | 8.7  | 106  |
| Chest CG | N/A  | G's   | 45.6   | 88   |      |      | 42.2      | 76   |      |      |

### REDUNDANT HEAD INJURY CRITERIA (HIC)

| Location        | Driver |      |                |                | Passenger |         |                |                |
|-----------------|--------|------|----------------|----------------|-----------|---------|----------------|----------------|
|                 | HIC    | Avg  | T <sup>1</sup> | T <sup>2</sup> | HIC       | Avg G's | T <sup>1</sup> | T <sup>2</sup> |
| Head CG Primary | 487    | 47.3 | 64.7           | 96.4           | 463       | 45.1    | 65.3           | 99.2           |

### REDUNDANT CHEST CLIP (3MSEC)

| Location         | Driver |                |                | Passenger |                |                |
|------------------|--------|----------------|----------------|-----------|----------------|----------------|
|                  | CLIP   | T <sup>1</sup> | T <sup>2</sup> | CLIP      | T <sup>1</sup> | T <sup>2</sup> |
| Chest CG Primary | 43     | 86.6           | 89.6           | 42        | 73.8           | 76.8           |



**DATA SHEET NO. 9**  
**SEAT BELT PERFORMANCE ASSESSMENT TEST DATA**

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

NHTSA No.: M25100  
 Test Date: 1/29/02

**SEAT BELT PLACEMENT MEASUREMENTS**

| Measurement Description                           | Units | Driver | Passenger |
|---------------------------------------------------|-------|--------|-----------|
| TBI - Dummy centerline to shoulder bolt           | mm    | 170    | 170       |
| PBU - Top surface of reference to belt upper edge | mm    | 340    | 339       |
| PBL - Top surface of reference to belt lower edge | mm    | 256    | 258       |

**BELT LENGTH DATA**

| Measurement Description                          | Units | Driver | Passenger |
|--------------------------------------------------|-------|--------|-----------|
| Retractor reel to "D" ring                       | mm    | 635    | 635       |
| Shoulder belt length as measured on ATD          | mm    | 875    | 891       |
| Lap belt length as measured on ATD               | mm    | 892    | 836       |
| Remainder of belt on reel                        | mm    | 845    | 885       |
| Total belt length for continuous webbing systems | mm    | 3247   | 3247      |

**SHOULDER BELT SPOOL-OUT DATA**

| Measurement Description        | Units | Driver | Passenger |
|--------------------------------|-------|--------|-----------|
| As determined by film analysis | mm    | *      | *         |

\* Belt spool out not recorded for this test; belts were not visible to camera shots.

**BELT STRETCH DATA**

| Measurement Description      | Units | Driver | Passenger |
|------------------------------|-------|--------|-----------|
| As determined electronically | mm/m  | *      | *         |

\* No valid data collected

**DATA SHEET NO. 10**  
**SUMMARY OF FMVSS 212 DATA**

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

NHTSA No.: M25100  
 Test Date: 1/29/02

**Windshield Mounting Details:**

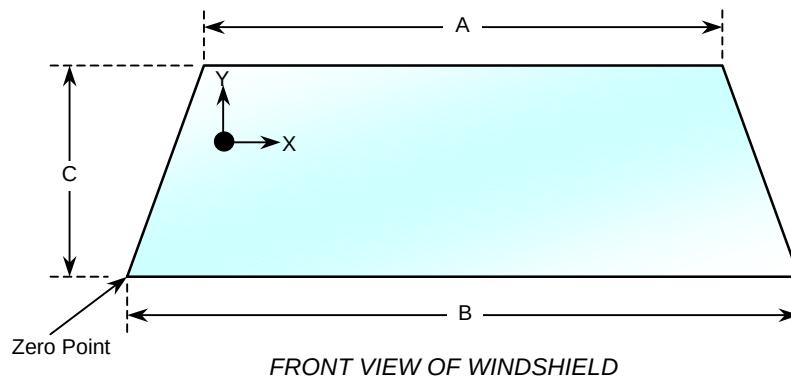
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

The standard requires that the post-test retention measurement be a minimum of 75 percent of the pretest total periphery measurement for vehicles not equipped with occupant passive restraints and 50 percent for each side of the windshield for vehicles, which are equipped with occupant passive restraints.

Temperature of windshield molding during test: 20.5°C

**WINDSHIELD PERIPHERY MEASUREMENTS**

| Measurement | Pre-Test (mm) | Post-Test (mm) | % of Retention |
|-------------|---------------|----------------|----------------|
| Left Side   | 2178          | 2178           | 100            |
| Right Side  | 2179          | 2179           | 100            |
| Total       | 4357          | 4357           | 100            |



**WINDSHIELD DIMENSIONS**

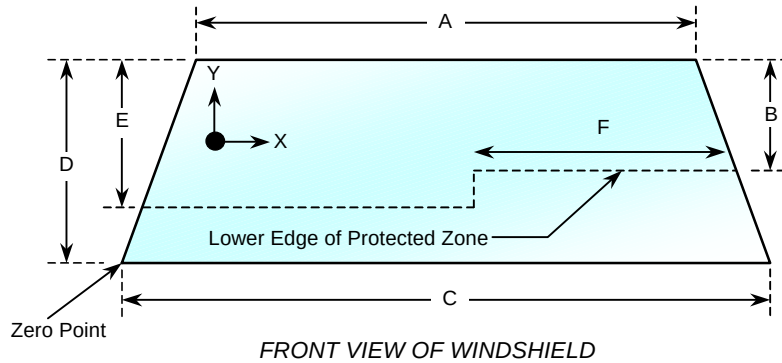
| Item | Units | Segment Length | Molding Width |
|------|-------|----------------|---------------|
| A    | mm    | 1175           | 14            |
| B    | mm    | 1517           | 10            |
| C    | mm    | 833            | 14            |

# DATA SHEET NO. 11

## WINDSHIELD ZONE INTRUSION FMVSS 219 (Partial) DATA

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

NHTSA No.: M25100  
 Test Date: 1/29/02



| Item | Units | Value |
|------|-------|-------|
| A    | mm    | 1175  |
| B    | mm    | 486   |
| C    | mm    | 1517  |
| D    | mm    | 833   |
| E    | mm    | 514   |
| F    | mm    | 572   |

### AREA OF PROTECTED ZONE FAILURES - NONE

- A. Provide coordinates of the area that the protected zone was penetrated more than 0.25 inches by a vehicle component other than one that is normally in contact with the windshield. **None**

| X | Y |
|---|---|
|   |   |
|   |   |
|   |   |
|   |   |

- B. Provide coordinates of the area beneath the protected zone that the inner surface of the windshield was penetrated by a vehicle component. **None**

| X | Y |
|---|---|
|   |   |
|   |   |
|   |   |
|   |   |

**DATA SHEET NO. 12**

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

Test Vehicle: 2002/Lexus/ES300/4 door  
Test Program: NCAP

NHTSA No.: M25100  
Test Date: 1/29/02

Temperature at Time of Impact: 20.5° C

Test Time: 12:30 pm

**Stoddard Solvent Spillage Measurements**

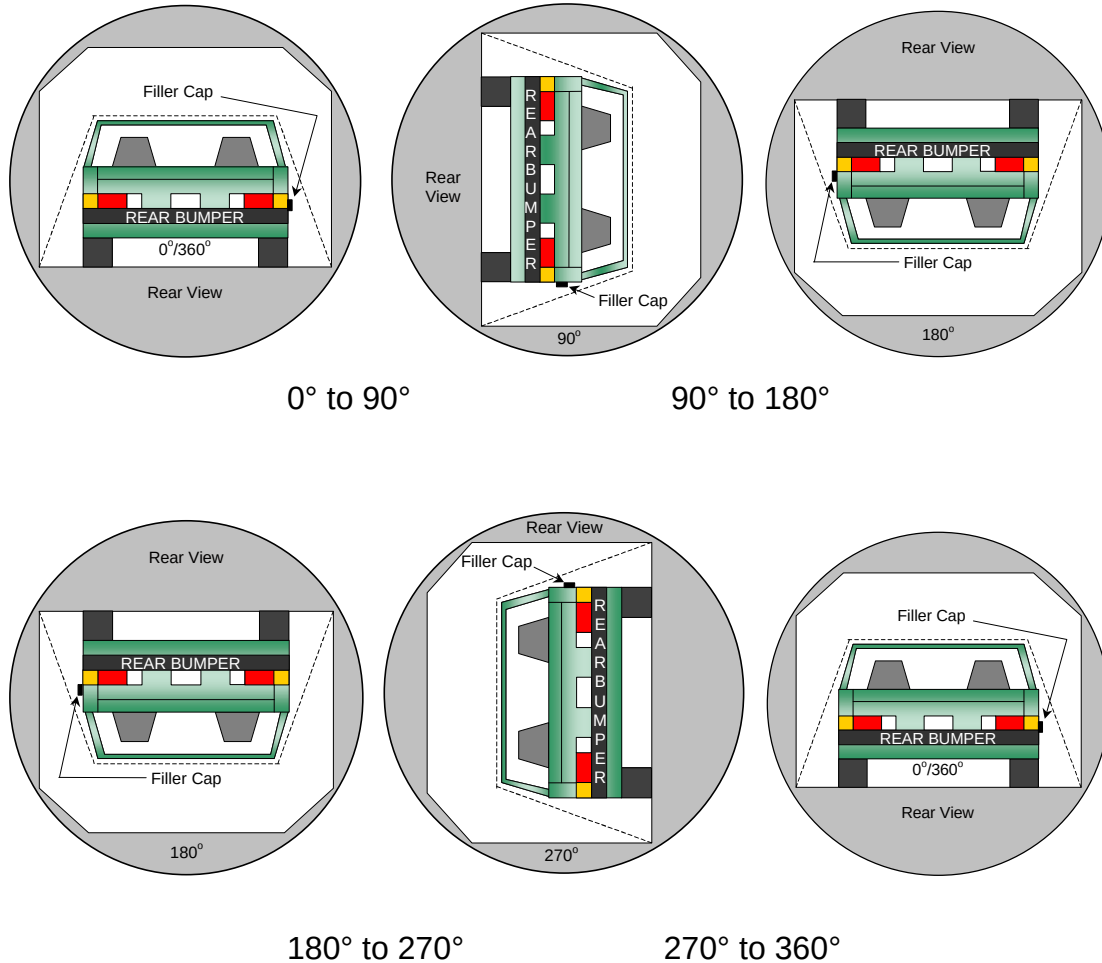
- A. From impact until vehicle motion ceases: 0 oz.  
(Maximum Allowable = 1 ounce)
- B. For the 5 minute period after motion ceases: 0 oz.  
(Maximum Allowable = 5 ounces)
- C. For the following 25 minutes: 0 oz.  
(Maximum Allowable = 1 oz./minute)
- D. Spillage : none

**DATA SHEET NO. 13**  
**FMVSS 301 STATIC ROLLOVER DATA**

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

NHTSA No.: M25100  
 Test Date: 1/29/02

Test Time: 12:30 pm



1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent spillage locations: None

| Test Phase   | Rotation Time (sec.) | Hold Time (sec.) | Spillage (oz.) |
|--------------|----------------------|------------------|----------------|
| 0° to 90°    | 173                  | 300              | 0              |
| 90° to 180°  | 152                  | 300              | 0              |
| 180° to 270° | 131                  | 300              | 0              |
| 270° to 360° | 158                  | 300              | 0              |

**DATA SHEET NO. 14**  
**VEHICLE MEASUREMENTS**

Test Vehicle: 2002/Lexus/ES300/4 door  
Test Program: NCAP

NHTSA No.: M25100  
Test Date: 1/29/02

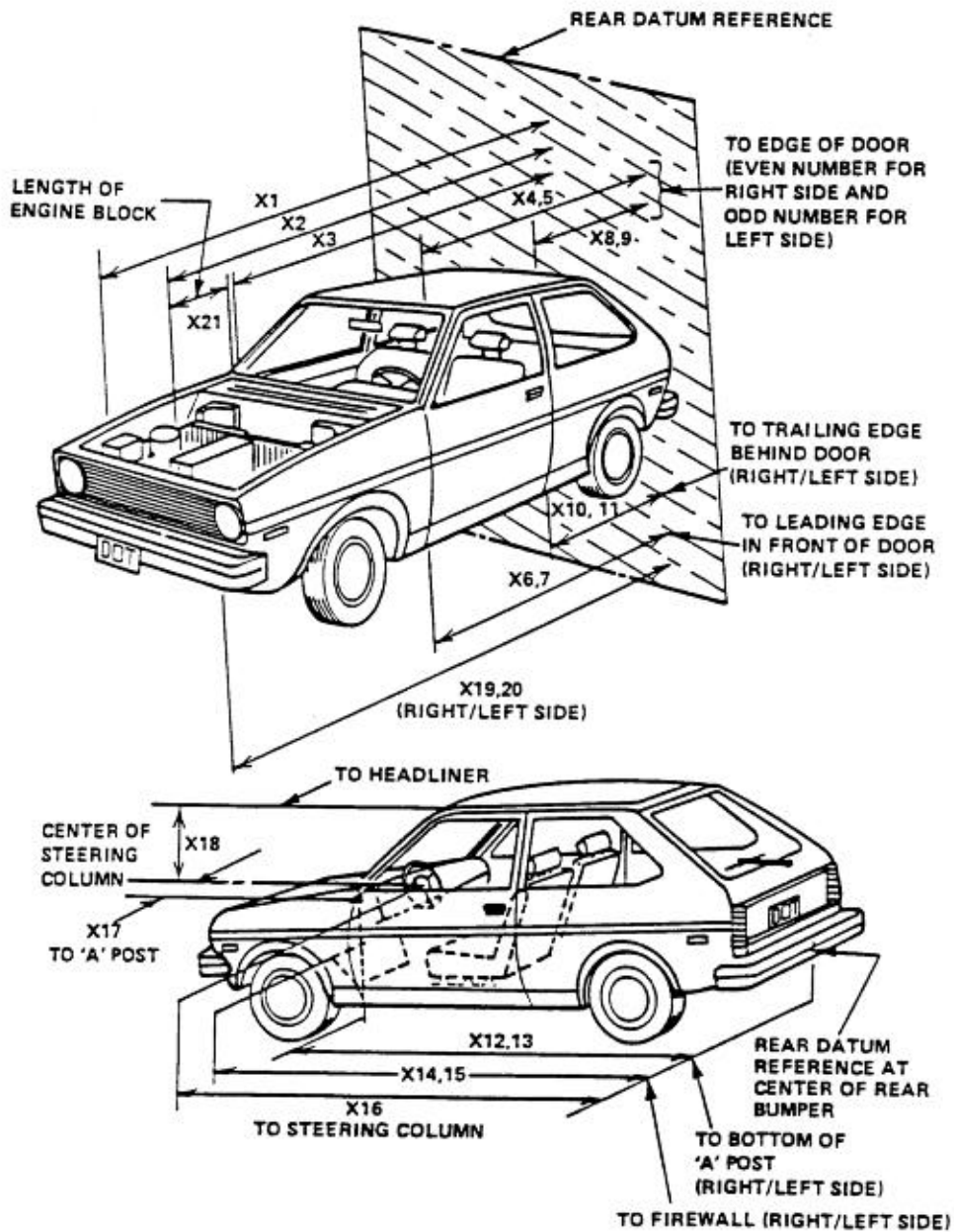
| No. | Measurement Description                      | Units | Pre-Test | Post-Test | Difference |
|-----|----------------------------------------------|-------|----------|-----------|------------|
| 1   | Total length of vehicle at centerline        | mm    | 4828     | 4172      | 656        |
| 2   | RSOV to front of engine                      | mm    | 4216     | 3972      | 244        |
| 3   | RSOV to firewall centerline                  | mm    | 3707     | 3637      | 70         |
| 4   | RSOV to leading edge of right door           | mm    | 3363     | 3361      | 2          |
| 5   | RSOV to leading edge of left door            | mm    | 3362     | 3354      | 8          |
| 6   | RSOV to lower leading edge of right door     | mm    | 3335     | 3334      | 1          |
| 7   | RSOV to lower leading edge of left door      | mm    | 3333     | 3330      | 3          |
| 8   | RSOV to upper leading edge of right door     | mm    | 2243     | 2240      | 3          |
| 9   | RSOV to upper leading edge of left door      | mm    | 2240     | 2228      | 12         |
| 10  | RSOV to lower trailing edge of right door    | mm    | 2225     | 2221      | 4          |
| 11  | RSOV to lower trailing edge of left door     | mm    | 2223     | 2217      | 6          |
| 12  | RSOV to bottom of right 'A' pillar           | mm    | 3190     | 3188      | 2          |
| 13  | RSOV to bottom of left 'A' pillar            | mm    | 3194     | 3193      | 1          |
| 14  | RSOV to firewall on right side               | mm    | 3740     | 3642      | 98         |
| 15  | RSOV to firewall on left side                | mm    | 3742     | 3661      | 81         |
| 16  | RSOV to steering column                      | mm    | 2880     | 2865      | 15         |
| 17  | Center of steering column to left 'A' pillar | mm    | 330      | 312       | 18         |
| 18  | Center of steering column to headlining      | mm    | 380      | 352       | 28         |
| 19  | RSOV to right side of front bumper           | mm    | 4713     | 4169      | 544        |
| 20  | RSOV to left side of front bumper            | mm    | 4714     | 4135      | 579        |
| 21  | Length of engine block                       | mm    | 520      | 520       | 0          |
| RD  | RSOV to right side of dash panel             | mm    | 3111     | 3093      | 18         |
| CD  | RSOV to center of dash panel                 | mm    | 3101     | 3064      | 37         |
| LD  | RSOV to left side of dash panel              | mm    | 3109     | 3090      | 19         |

# DATA SHEET NO. 14...(continued)

## VEHICLE MEASUREMENTS

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

NHTSA No.: M25100  
 Test Date: 1/29/02



**DATA SHEET NO. 15**  
**CAMERA LOCATIONS**

Test Vehicle: 2002/Lexus/ES300/4 door  
Test Program: NCAP

NHTSA No.: M25100  
Test Date: 1/29/02

| No. | Camera View              | Location (mm) * |       |       | Lens (mm) | Speed (fps) |
|-----|--------------------------|-----------------|-------|-------|-----------|-------------|
|     |                          | X               | Y     | Z     |           |             |
| 1   | Real-Time Left Side View |                 |       |       | 18        | 32          |
| 2   | Left Front View          | 1000            | -8000 | 1500  | 25        | 1020        |
| 3   | Steering Column Top      | 2000            | -8000 | 1500  | 25        | 1010        |
| 4   | Steering Column Bottom   | 2000            | -8050 | 1030  | 15        | 746         |
| 5   | Driver Close-up          | 1510            | -8640 | 1360  | 75        | 1026        |
| 6   | Driver Angle             | 4620            | -5000 | 2030  | 50        | 1538        |
| 7   | Onboard Driver           |                 |       |       |           |             |
| 8   | Onboard Passenger        |                 |       |       |           |             |
| 9   | Right Overall            | 1770            | 6450  | 1040  | 13        | 957         |
| 10  | Right Passenger Half     | 800             | 8000  | 1390  | 25        | 877         |
| 11  | Right Close-up           | 1400            | 7190  | 1290  | 75        | 766         |
| 12  | Right Angle              | 4880            | 5590  | 2110  | 50        | 943         |
| 13  | Windshield               | -30             | 0     | 2640  | 13        | 1026        |
| 14  | Top Driver               | 160             | -440  | 1250  | 13        | 1010        |
| 15  | Top Passenger            | 160             | 470   | 1770  | 13        | 1015        |
| 16  | Pit Front                | 1020            | 0     | -3220 | 13        | 1010        |
| 17  | Pit Rear                 | 2600            | 0     | -3220 | 13        | 1005        |

\*COORDINATES:

+X = film plane rearward of barrier

+Y = film plane to right of monorail centerline

+Z = film plane to above ground level

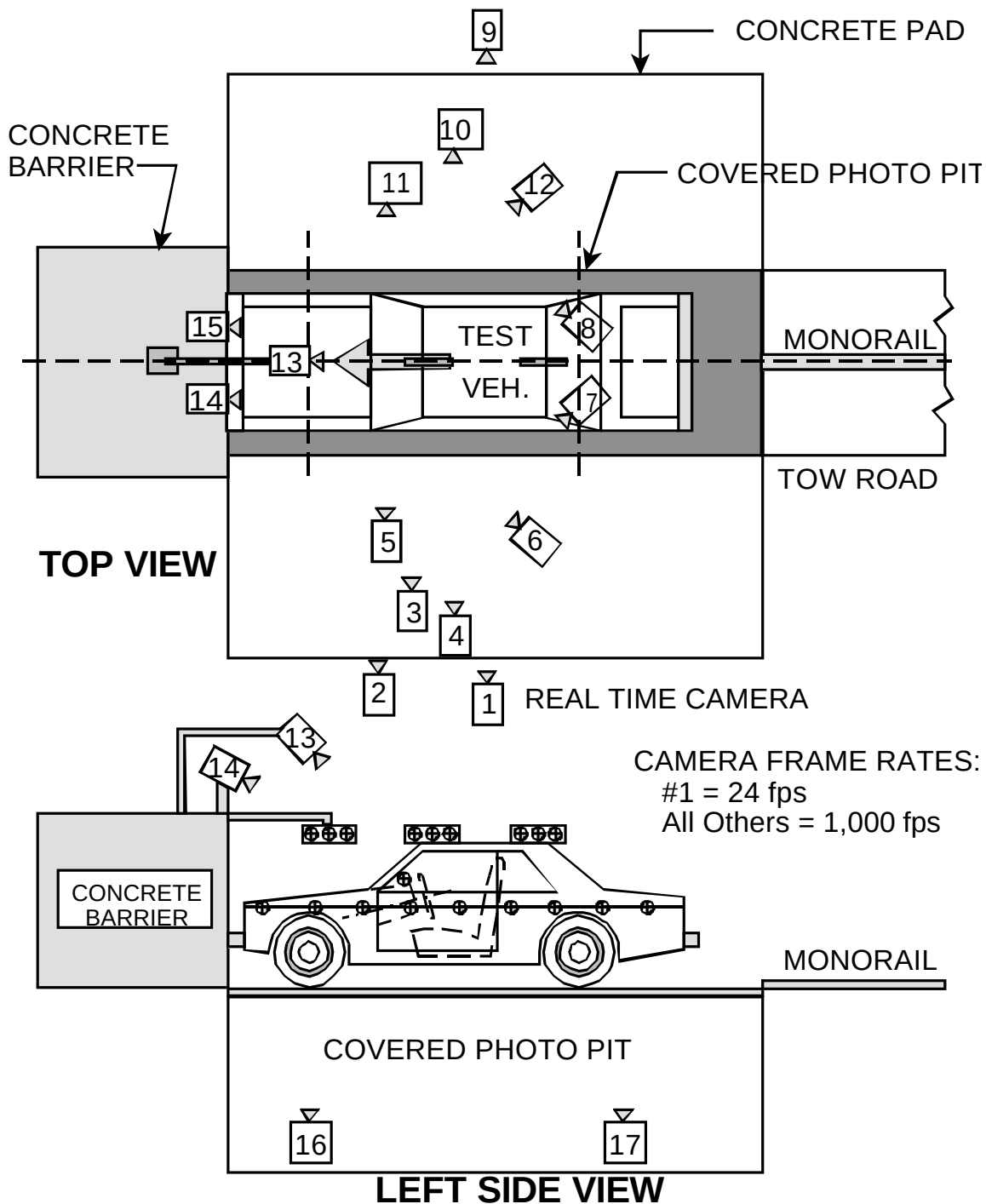


**DATA SHEET NO. 15...(continued)**  
**CAMERA LOCATIONS**

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

NHTSA No.: M25100  
 Test Date: 1/29/02

**CAMERA POSITIONS FOR FRONTAL IMPACTS**

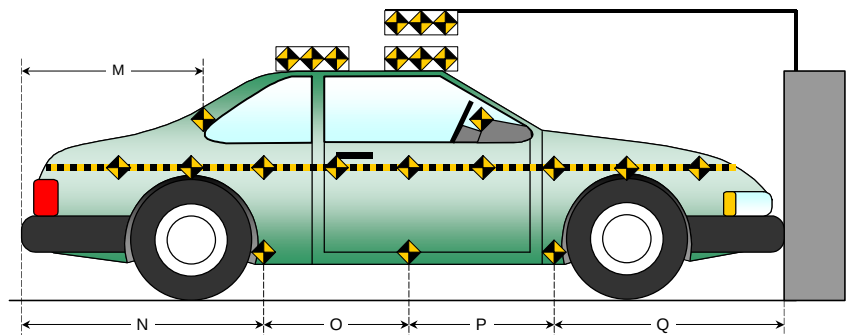
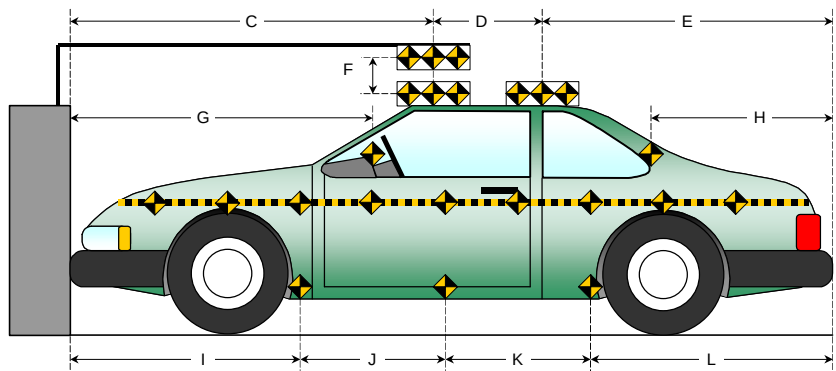
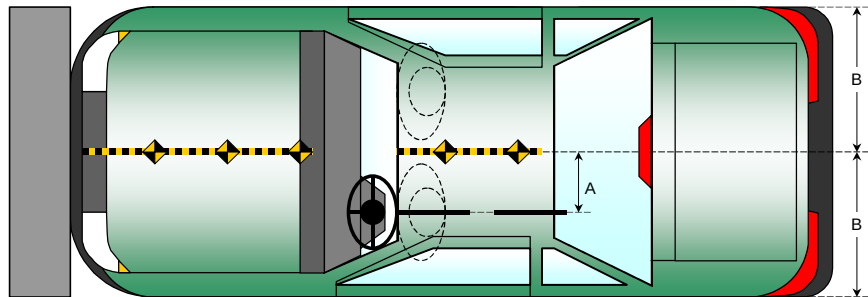


**DATA SHEET NO. 16**  
**PHOTOGRAPHIC REFERENCE TARGET LOCATIONS**

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

NHTSA No.: M25100  
 Test Date: 1/29/02

| Item | Value |
|------|-------|
| A    | 365   |
| B    | 904   |
| C    | 2300  |
| D    | 610   |
| E    | 1945  |
| F    | 205   |
| G    | 1786  |
| H    | 1193  |
| I    | 1434  |
| J    | 938   |
| K    | 940   |
| L    | 1529  |
| M    | 1187  |
| N    | 1524  |
| O    | 936   |
| P    | 943   |
| Q    | 1422  |



**DATA SHEET NO. 17**  
**VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

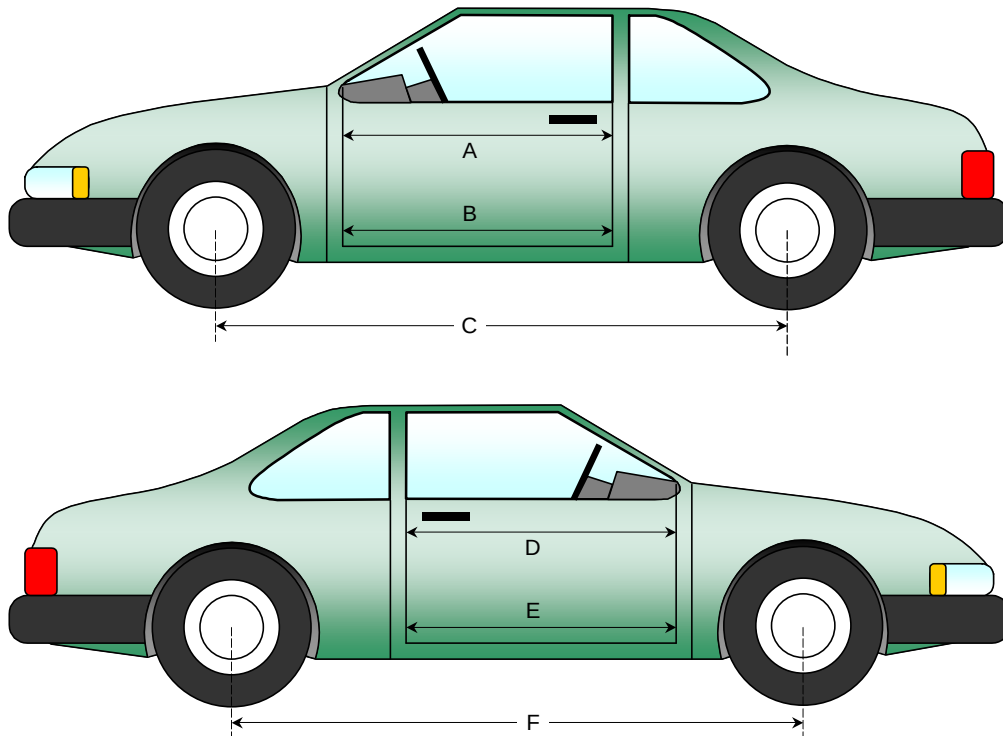
NHTSA No.: M25100  
 Test Date: 1/29/02

**DOOR OPENING WIDTH**

| Item | Description      | Units | Pre-Test | Post-Test | Difference |
|------|------------------|-------|----------|-----------|------------|
| A    | Left Side Upper  | mm    | 1083     | 1079      | 4          |
| B    | Left Side Lower  | mm    | 973      | 973       | 0          |
| D    | Right Side Upper | mm    | 1082     | 1081      | 1          |
| E    | Right Side Lower | mm    | 978      | 978       | 0          |

**WHEELBASE MEASUREMENTS**

| Item | Description          | Units | Pre-Test | Post-Test | Difference |
|------|----------------------|-------|----------|-----------|------------|
| C    | Left Side Wheelbase  | mm    | 2715     | 2664      | 51         |
| F    | Right Side Wheelbase | mm    | 2715     | 2665      | 50         |



**DATA SHEET NO. 17...(continued)**  
**VEHICLE INTRUSION MEASUREMENTS**

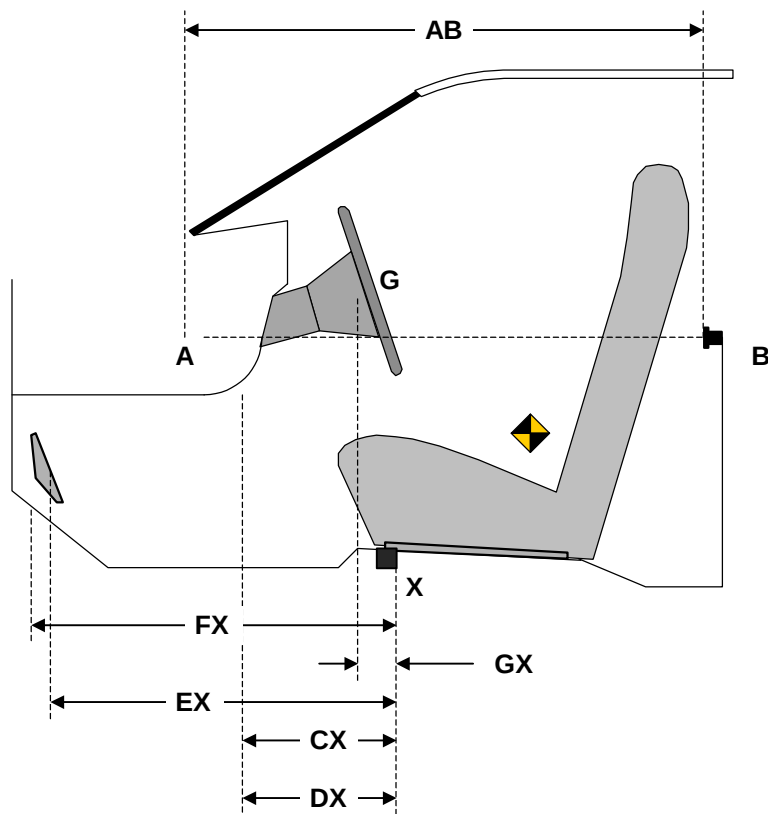
Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

NHTSA No.: M25100  
 Test Date: 1/29/02

**DRIVER COMPARTMENT INTRUSION**

| Item | Description                              | Units | Pre-Test | Post-Test | Difference |
|------|------------------------------------------|-------|----------|-----------|------------|
| AB   | Door Opening (Inside window jam)         | mm    | 925      | 925       | 0          |
| CX   | Left Knee Bolster to X                   | mm    | 274      | 258       | 16         |
| DX   | Right Knee Bolster to X                  | mm    | 275      | 275       | 0          |
| EX   | Brake Pedal to X                         | mm    | 560      | 593       | -33        |
| FX   | Foot Rest to X                           | mm    | 597      | 572       | 25         |
| GX   | Center of Steering Column Wheel Hub to X | mm    | 92       | 106       | -14        |

X = Left Front Seat Front Outboard Anchor Bolt Head



**DRIVER COMPARTMENT**

**DATA SHEET NO. 17...(continued)**  
**VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

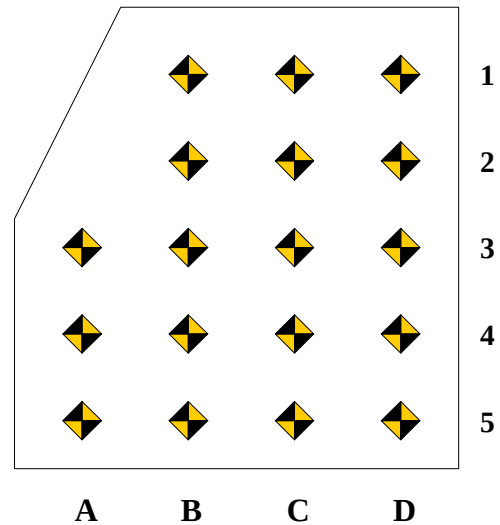
NHTSA No.: M25100  
 Test Date: 1/29/02

Measurement reference point for X and Z axis is the forward outboard seat mounting bolt.

Columns A through D are evenly spaced.

Rows 1 and 2 are on the toe kick portion of the floor pan. Rows 3, 4, and 5 are located on the most level portion of the floor pan.

Row 3 will be at the intersection of the toe kick and the level sections of the floor pan.



**DRIVER FLOOR PAN X-AXIS**

|   | Pre-Test |     |     |     | Post-Test |     |     |     | Difference |    |    |    |
|---|----------|-----|-----|-----|-----------|-----|-----|-----|------------|----|----|----|
|   | A        | B   | C   | D   | A         | B   | C   | D   | A          | B  | C  | D  |
| 1 |          | 656 | 656 | 660 |           | 630 | 625 | 636 |            | 26 | 31 | 24 |
| 2 |          | 596 | 595 | 593 |           | 580 | 574 | 571 |            | 16 | 21 | 22 |
| 3 | 525      | 523 | 520 | 520 | 510       | 517 | 505 | 505 | 15         | 6  | 15 | 15 |
| 4 | 405      | 400 | 395 | 396 | 400       | 394 | 386 | 383 | 5          | 6  | 9  | 13 |
| 5 | 285      | 283 | 283 | 282 | 280       | 260 | 280 | 282 | 5          | 23 | 3  | 0  |

**DRIVER FLOOR PAN Z-AXIS**

|   | Pre-Test |     |     |     | Post-Test |     |     |     | Difference |     |     |     |
|---|----------|-----|-----|-----|-----------|-----|-----|-----|------------|-----|-----|-----|
|   | A        | B   | C   | D   | A         | B   | C   | D   | A          | B   | C   | D   |
| 1 |          | 20  | 25  | 29  |           | 50  | 50  | 39  |            | -30 | -25 | -10 |
| 2 |          | -22 | -25 | -25 |           | 0   | 0   | 0   |            | -25 | -25 | -25 |
| 3 | -60      | -60 | -60 | -60 | -31       | -45 | -45 | -44 | -29        | -15 | -15 | -16 |
| 4 | -75      | -70 | -70 | -65 | -61       | -60 | -52 | -31 | -14        | -10 | -18 | -34 |
| 5 | -85      | -75 | -75 | -85 | -77       | -73 | -71 | -73 | -8         | -2  | -4  | -12 |

**DATA SHEET NO. 17...(continued)**  
**VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

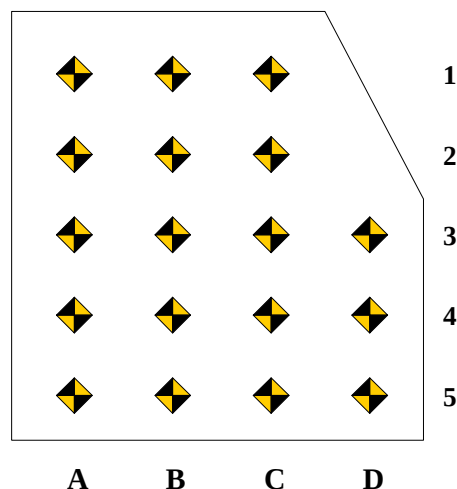
NHTSA No.: M25100  
 Test Date: 1/29/02

Measurement reference point for X and Z axis is the forward outboard seat mounting bolt.

Columns A through D are evenly spaced.

Rows 1 and 2 are on the toe kick portion of the floor pan. Rows 3, 4, and 5 are located on the most level portion of the floor pan.

Row 3 will be at the intersection of the toe kick and the level sections of the floor pan.



**PASSENGER FLOOR PAN X-AXIS**

|   | Pre-Test |     |     |     | Post-Test |     |     |     | Difference |    |    |   |
|---|----------|-----|-----|-----|-----------|-----|-----|-----|------------|----|----|---|
|   | A        | B   | C   | D   | A         | B   | C   | D   | A          | B  | C  | D |
| 1 | 666      | 664 | 665 |     | 645       | 635 | 632 |     | 21         | 29 | 33 |   |
| 2 | 599      | 602 | 605 |     | 575       | 582 | 585 |     | 24         | 20 | 20 |   |
| 3 | 515      | 512 | 515 | 514 | 496       | 500 | 510 | 509 | 19         | 12 | 5  | 5 |
| 4 | 396      | 398 | 400 | 404 | 383       | 390 | 395 | 402 | 13         | 8  | 5  | 2 |
| 5 | 290      | 288 | 286 | 285 | 290       | 287 | 284 | 283 | 0          | 1  | 2  | 2 |

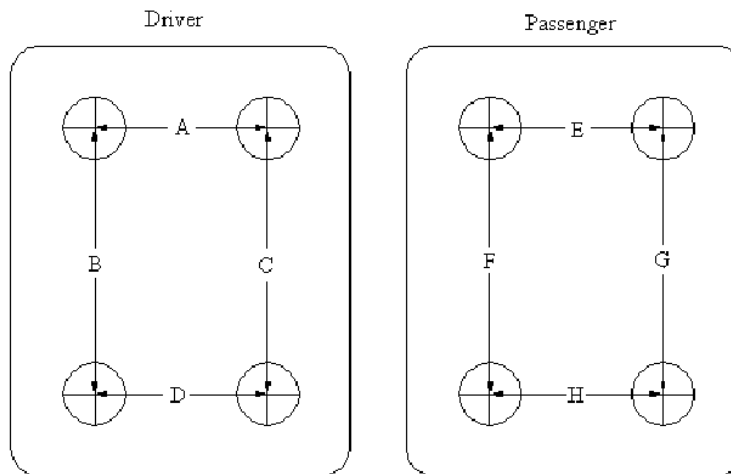
**PASSENGER FLOOR PAN Z-AXIS**

|   | Pre-Test |     |     |     | Post-Test |     |     |     | Difference |     |     |     |
|---|----------|-----|-----|-----|-----------|-----|-----|-----|------------|-----|-----|-----|
|   | A        | B   | C   | D   | A         | B   | C   | D   | A          | B   | C   | D   |
| 1 | 34       | 28  | 28  |     | 32        | 52  | 60  |     | 2          | -24 | -32 |     |
| 2 | -30      | -25 | -25 |     | -16       | 0   | 3   |     | -14        | -25 | -28 |     |
| 3 | -66      | -66 | -66 | -68 | -57       | -60 | -49 | -43 | -9         | -6  | -17 | -25 |
| 4 | -68      | -69 | -69 | -75 | -45       | -58 | -58 | -55 | -23        | -11 | -11 | -20 |
| 5 | -92      | -69 | -69 | -87 | -85       | -73 | -63 | -76 | -7         | 4   | -6  | -11 |

**DATA SHEET NO. 17...(continued)**  
**VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

NHTSA No.: M25100  
 Test Date: 1/29/02



**UNDERBODY FLOORBOARD DEFORMATION**

| Measurement | Pre-Test | Post-Test | Difference |
|-------------|----------|-----------|------------|
| A           | 363      | 350       | 13         |
| B           | 347      | 344       | 3          |
| C           | 301      | 303       | -2         |
| D           | 327      | 314       | 13         |
| E           | 318      | 315       | 3          |
| F           | 391      | 389       | 2          |
| G           | 377      | 378       | -1         |
| H           | 277      | 270       | 7          |

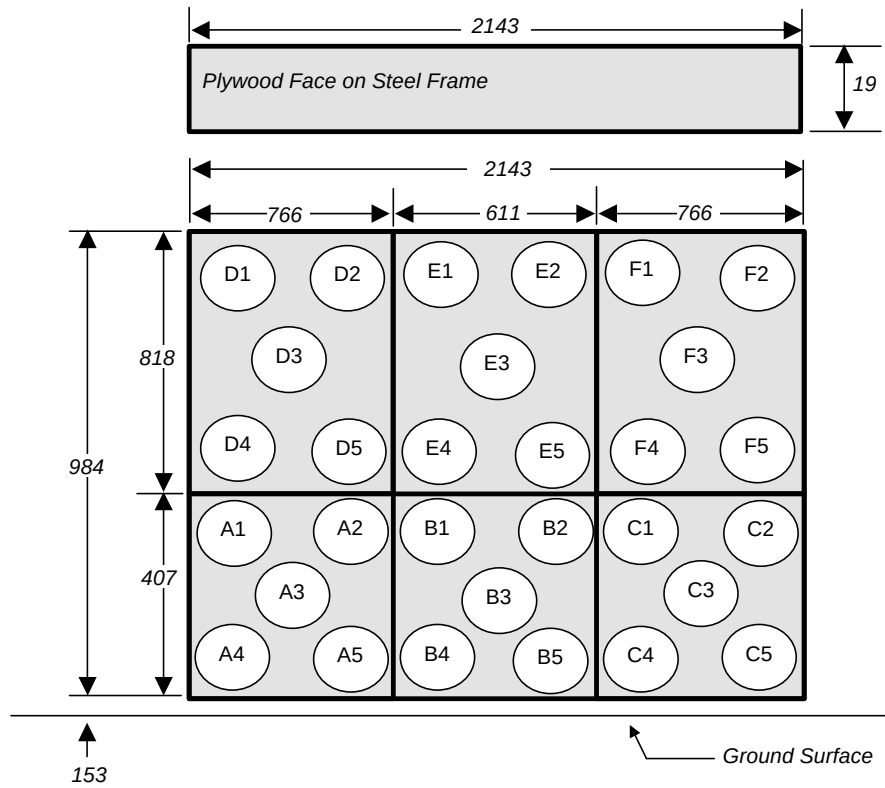
## DATA SHEET NO. 18

### LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2002/Lexus/ES300/4 door  
 Test Program: NCAP

NHTSA No.: M25100  
 Test Date: 1/29/02

#### 30 Load Cell Rigid Barrier Load Cell Locations on Fixed Barrier



The Data is presented in Appendix B with the following requirements:

1. Sum data from 6 groupings shown above (5 cells/group)
2. Sum of left 2 groupings, center 2 groupings and right 2 groupings.
3. Total or sum of all 30 individual load cells.
4. Total versus average rear seat crossmember displacement



**DATA SHEET NO. 19****ACCIDENT INVESTIGATION DIVISION DATA**

Test Vehicle: 2002/Lexus/ES300/4 door  
Test Program: NCAP

NHTSA No.: M25100  
Test Date: 1/29/02

**VEHICLE INFORMATION**

VIN: JTHBF30G925018152 Wheelbase (mm) : 2715  
Vehicle Size Category: 4 door Sedan Test Weight (kg) : 1802.2

**ACCELEROMETER DATA**

Accelerometer Locations: As per measurements on Page 13  
Cal. Procedure/Interval: MGA procedure / 6 month  
Integration Algorithm: Trapezoidal Linearity: > 99%  
Impact Velocity (km/h): 56.6  
Velocity Change (km/h): 64.0 Time of Separation (msec): 165

**CRUSH PROFILE**

Collision Deformation Classification: Frontal Midpoint of Damage: C/L  
Damage Region Length (mm): 1360 Impact Mode: Frontal

| No. | Measurement Description    | Units | Pre-Test | Post-Test | Difference |
|-----|----------------------------|-------|----------|-----------|------------|
| C1  | Crush zone 1 at left side  | mm    | 4714     | 4135      | 579        |
| C2  | Crush zone 2 at left side  | mm    | 4779     | 4170      | 609        |
| C3  | Crush zone 3 at left side  | mm    | 4819     | 4168      | 651        |
| C4  | Crush zone 4 at right side | mm    | 4817     | 4176      | 641        |
| C5  | Crush zone 5 at right side | mm    | 4778     | 4170      | 608        |
| C6  | Crush zone 6 at right side | mm    | 4713     | 4169      | 544        |

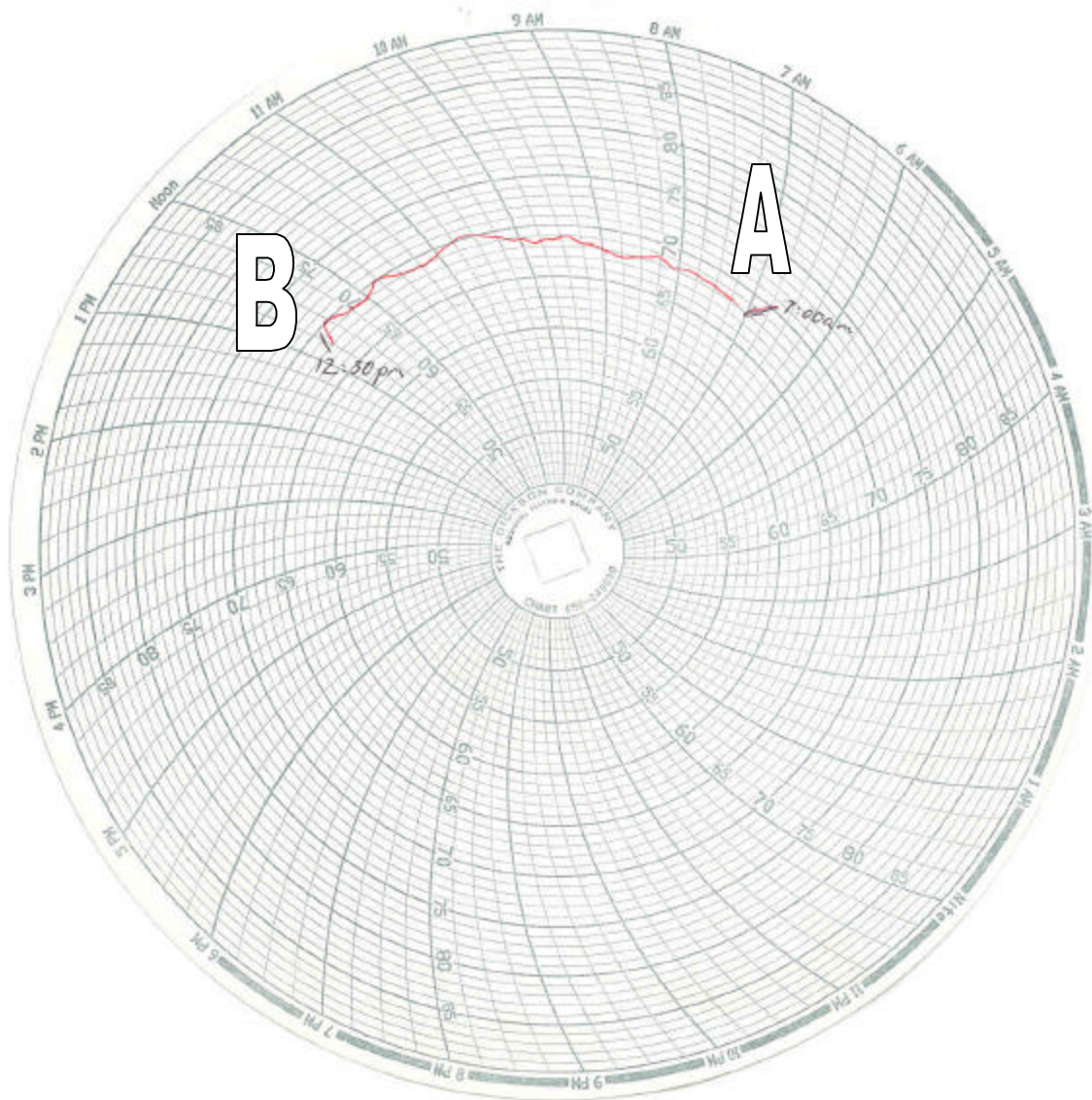
Note: Bumper cover separated from chassis due to impact.

## DATA SHEET NO. 20

### DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2002/Lexus/ES300/4 door  
Test Program: NCAP

NHTSA No.: M25100  
Test Date: 1/29/02



A = Dummies installed in vehicle at 7:00 a.m.

B = Test conducted at 12:30 p.m.

**APPENDIX A**  
**PHOTOGRAPHS**

## TABLE OF PHOTOGRAPHS

|              |                                                            |      |
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| Photo No. 3  | Pre-Test Rear View of Test Vehicle                         | A-3  |
| Photo No. 4  | Post-Test Rear View of Test Vehicle                        | A-4  |
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| Photo No. 6  | Post-Test Left Side View of Test Vehicle                   | A-6  |
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| Photo No. 9  | Pre-Test Right Side View of Test Vehicle                   | A-9  |
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| Photo No. 11 | Pre-Test Right Front Three-Quarter View of Test Vehicle    | A-11 |
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| Photo No. 24 | Pre-Test Driver Dummy Position Left Side View              | A-24 |
| Photo No. 25 | Post-Test Driver Dummy Position Left Side View             | A-25 |
| Photo No. 26 | Pre-Test Driver Dummy Position Left Side View (Door Open)  | A-26 |
| Photo No. 27 | Post-Test Driver Dummy Position Left Side View (Door Open) | A-27 |
| Photo No. 28 | Pre-Test Driver Seat Position View                         | A-28 |
| Photo No. 29 | Post-Test Driver Seat Position View                        | A-29 |
| Photo No. 30 | Pre-Test Driver Dummy Knee Position                        | A-30 |

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| Photo No. 31 | Post-Test Driver Dummy Knee Position                       | A-31 |
| Photo No. 32 | Post-Test Driver Airbag Contact                            | A-32 |
| Photo No. 33 | Post-Test Driver Knee Contact View                         | A-33 |
| Photo No. 34 | Pre-Test Driver Windshield View                            | A-34 |
| Photo No. 35 | Post-Test Driver Windshield View                           | A-35 |
| Photo No. 36 | Pre-Test Passenger Dummy Position Right Side View          | A-36 |
| Photo No. 37 | Post-Test Passenger Dummy Position Right Side View         | A-37 |
| Photo No. 38 | Pre-Test Pass. Dummy Position Right Side View (Door Open)  | A-38 |
| Photo No. 39 | Post-Test Pass. Dummy Position Right Side View (Door Open) | A-39 |
| Photo No. 40 | Pre-Test Passenger Seat Position View                      | A-40 |
| Photo No. 41 | Post-Test Passenger Seat Position View                     | A-41 |
| Photo No. 42 | Pre-Test Passenger Dummy Knee Position                     | A-42 |
| Photo No. 43 | Post-Test Passenger Dummy Knee Position                    | A-43 |
| Photo No. 44 | Post-Test Passenger Knee Contact View                      | A-44 |
| Photo No. 45 | Pre-Test Passenger Windshield View                         | A-45 |
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| Photo No. 49 | Vehicle Impact                                             | A-49 |
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| Photo No. 51 | Rollover 180 Degrees                                       | A-51 |
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| Photo No. 54 | Pre-Test Left Front Door Latched                           | A-54 |
| Photo No. 55 | Pre-Test Left Rear Door Latched                            | A-55 |
| Photo No. 56 | Pre-Test Right Front Door Latched                          | A-56 |
| Photo No. 57 | Pre-Test Right Rear Door Latched                           | A-57 |





Pre-Test Front View of Test Vehicle





Post-Test Front View of Test Vehicle





Pre-Test Rear View of Test Vehicle





Post-Test Rear View of Test Vehicle



A-5.



Pre-Test Left Side View of Test Vehicle





Post-Test Left Side View of Test Vehicle





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





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





Pre-Test Right Side View of Test Vehicle





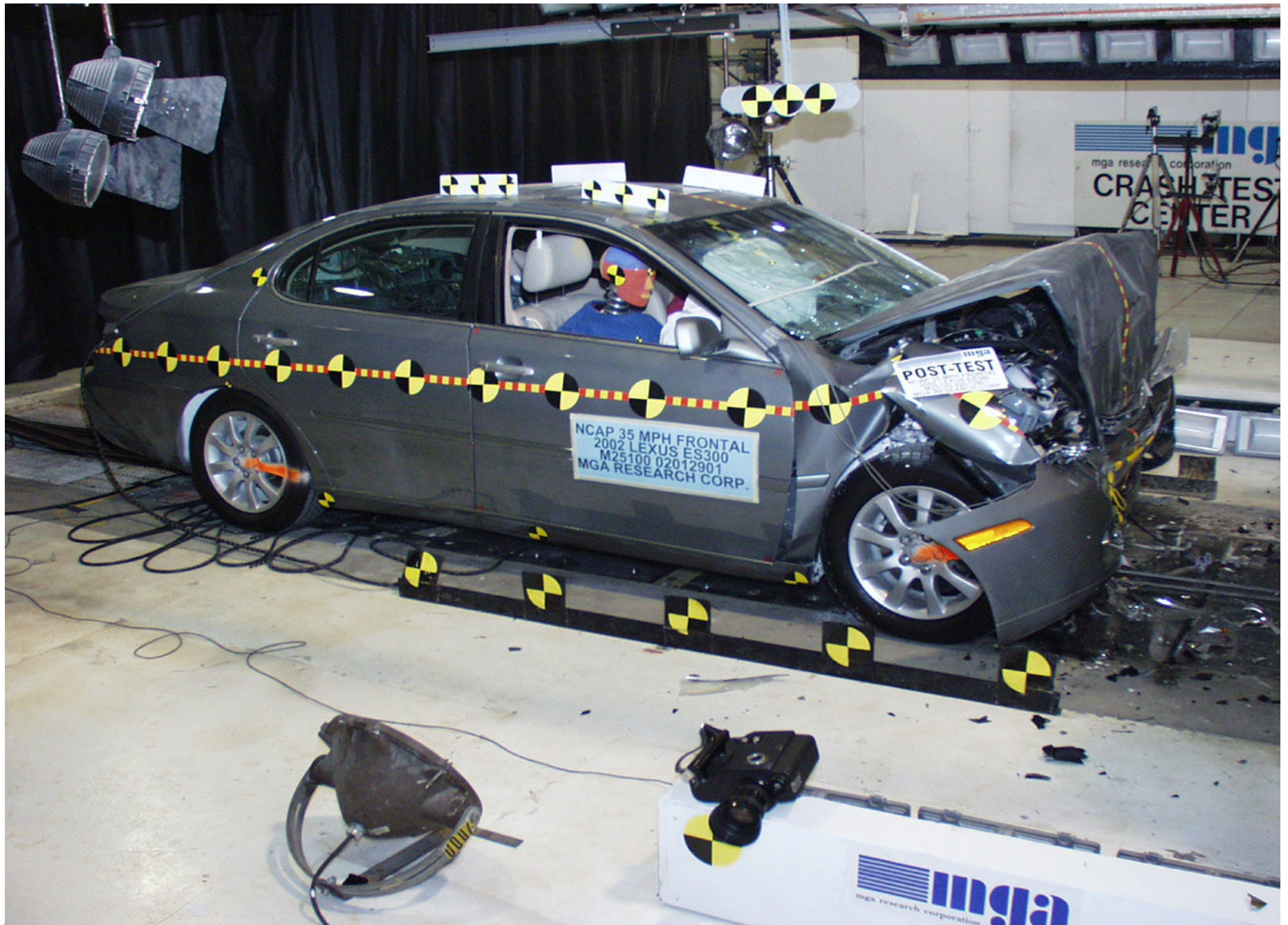
Post-Test Right Side View of Test Vehicle





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





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





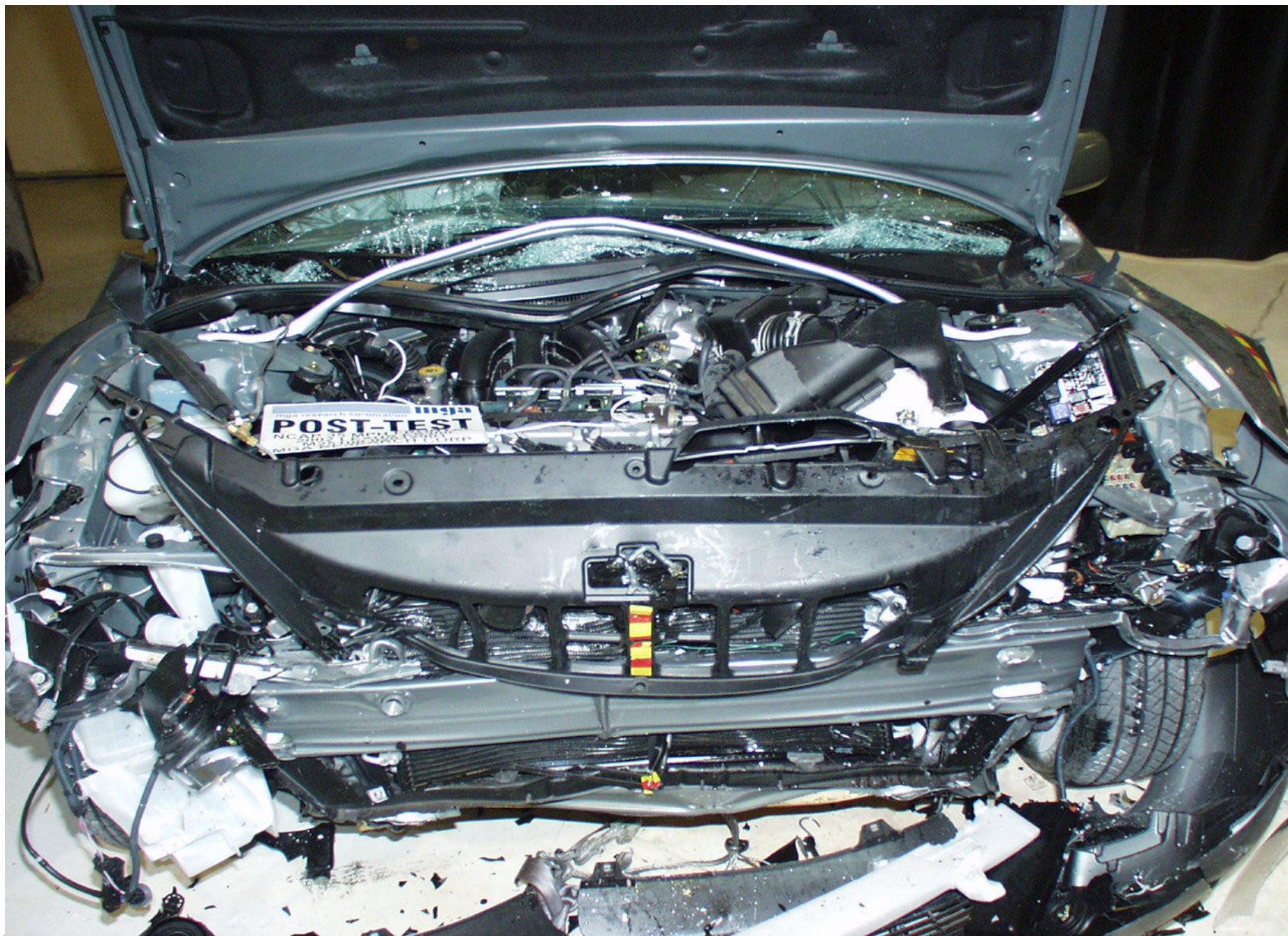
Pre-Test Fuel Filler Cap View





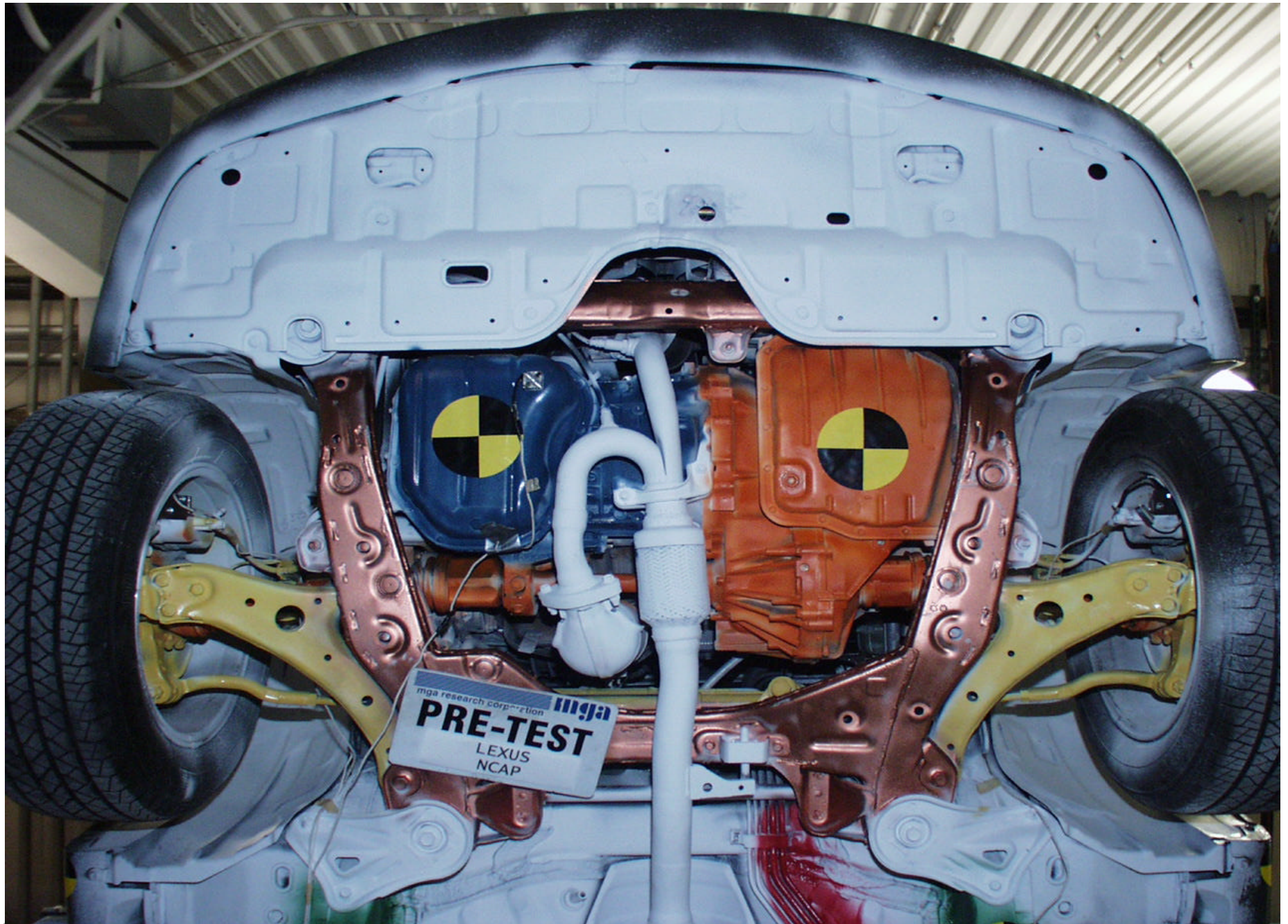
Pre-Test Engine Compartment View





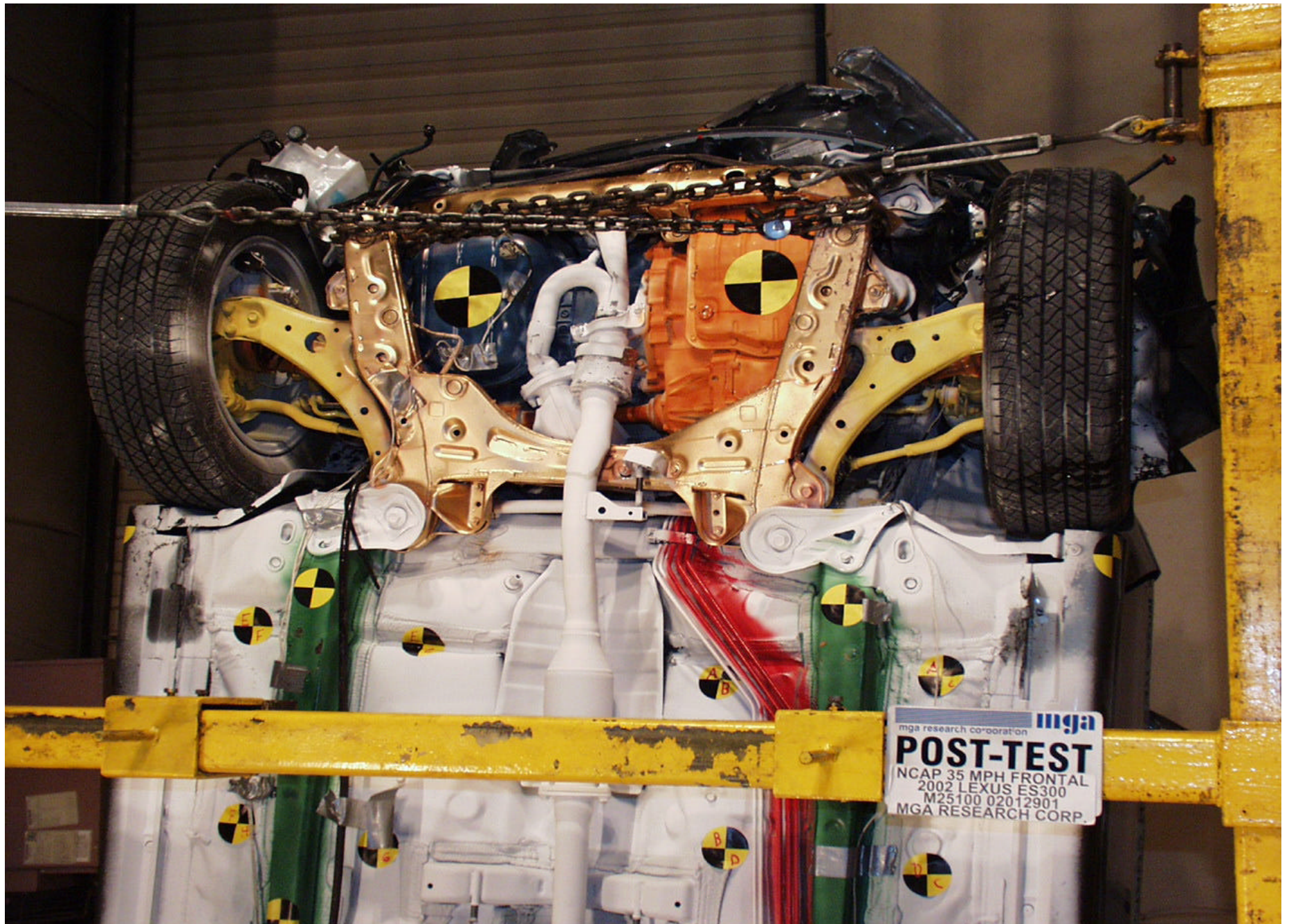
Post-Test Engine Compartment View





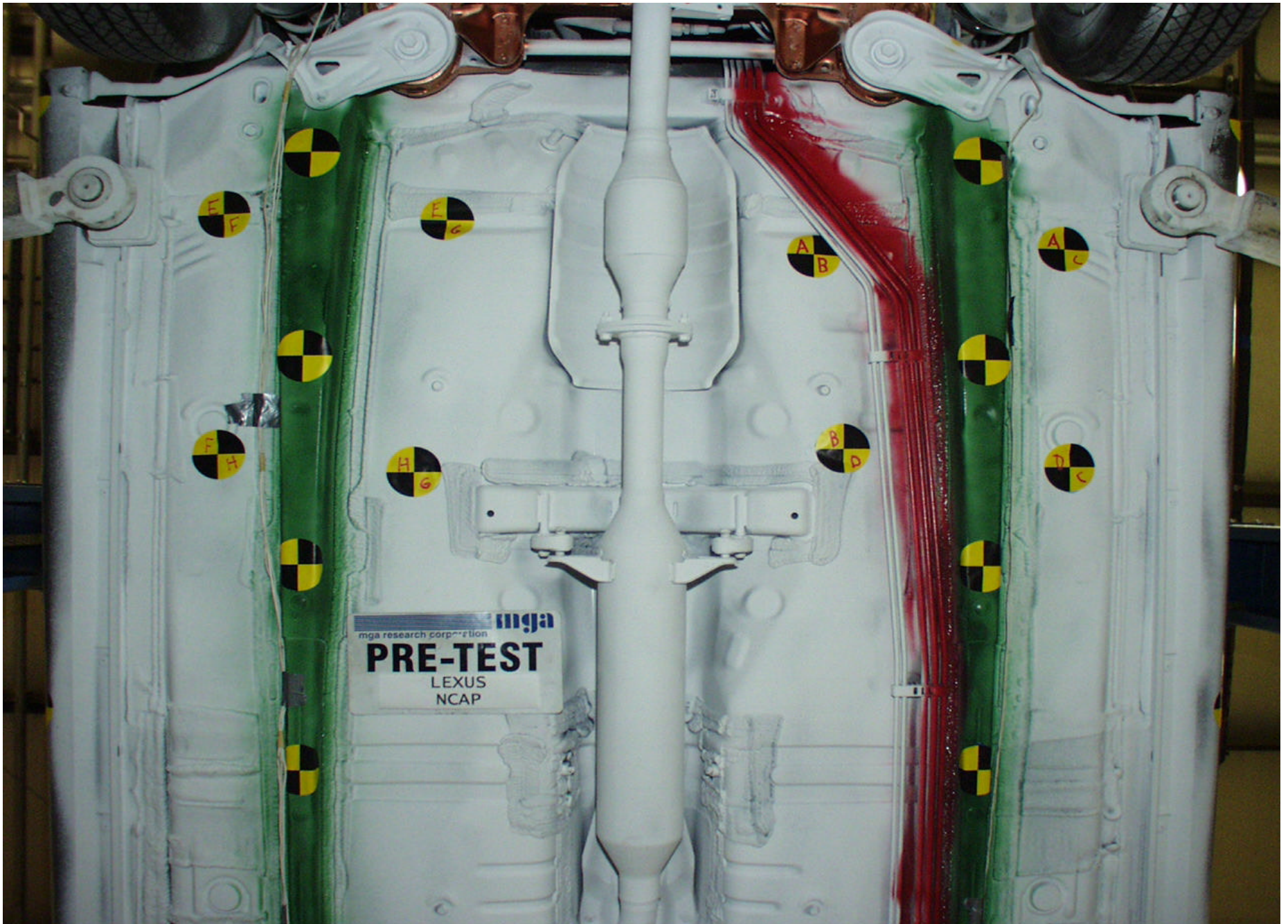
Pre-Test Front Underbody View





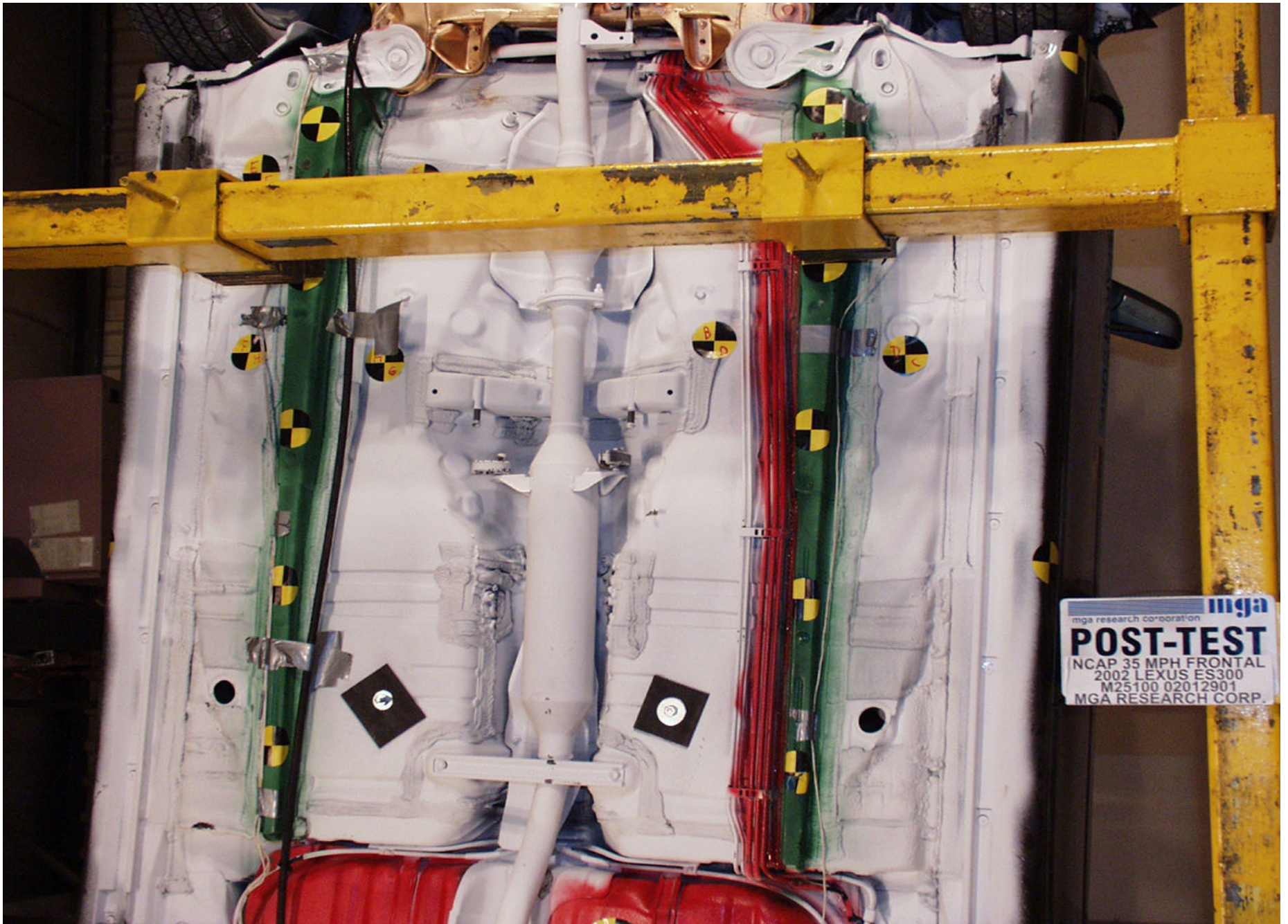
Post-Test Front Underbody View





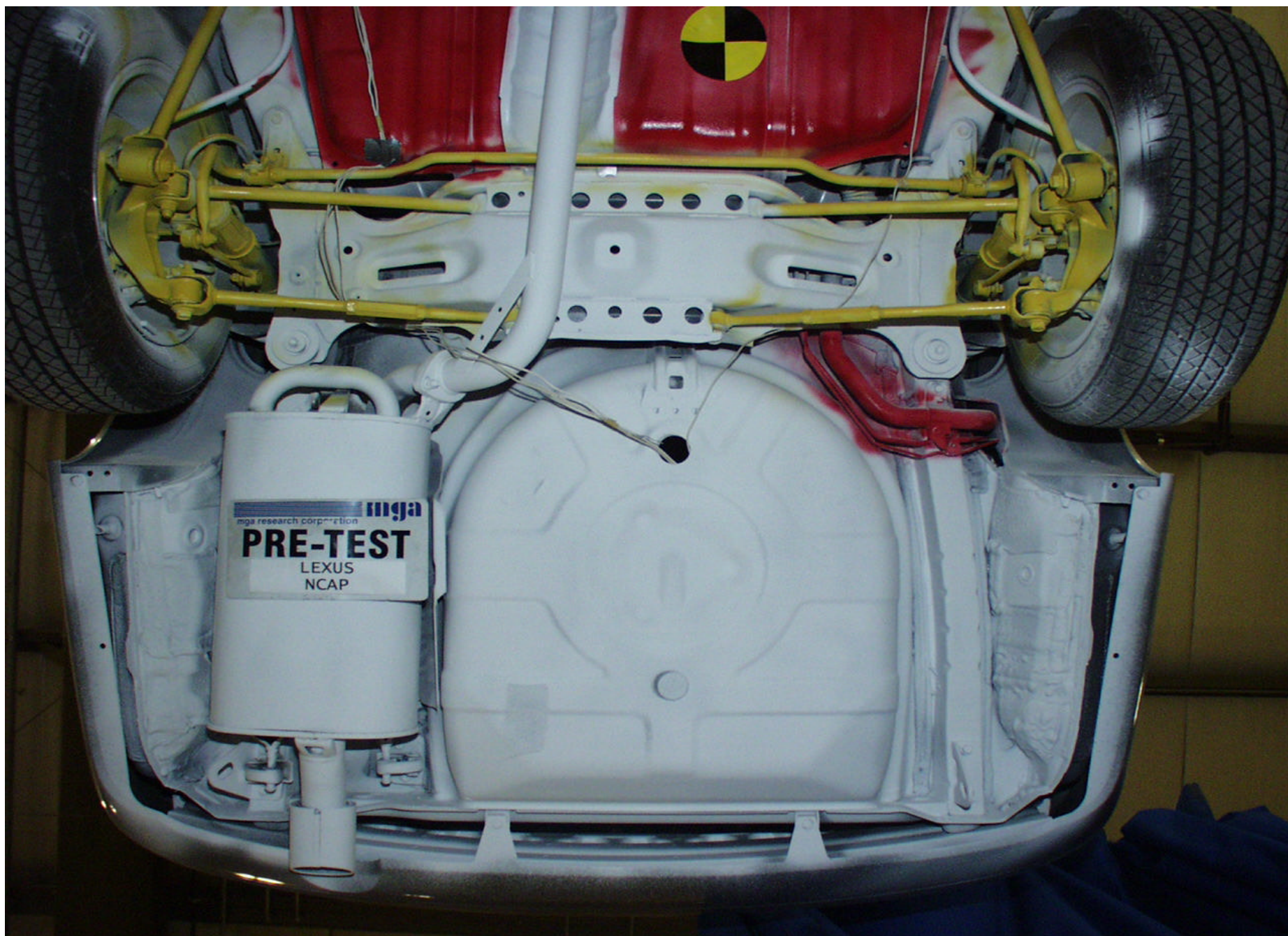
Pre-Test Mid Underbody





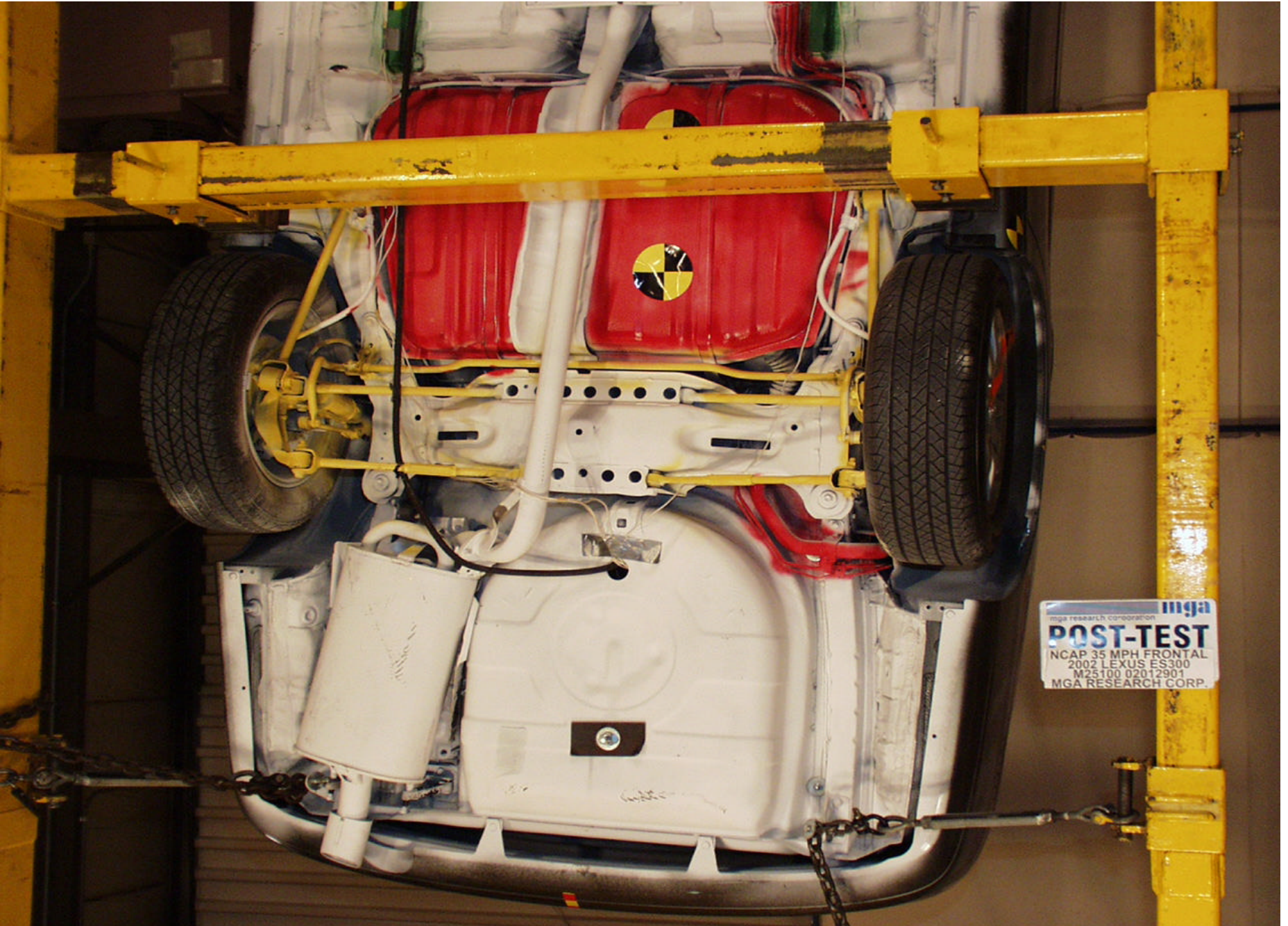
Post-Test Mid Underbody





Pre-Test Rear Underbody View





Post-Test Rear Underbody View





Pre-Test Windshield View





Post-Test Windshield View





Pre-Test Driver Dummy Position Left Side View





Post-Test Driver Dummy Position Left Side View





Pre-Test Driver Dummy Position Left Side View (Door Open)





Post-Test Driver Dummy Position Left Side View (Door Open)





Pre-Test Driver Seat Position View





Post-Test Driver Seat Position View





Pre-Test Driver Dummy Knee Position





Post-Test Driver Dummy Knee Position





Post-Test Driver Airbag Contact





Post-Test Driver Knee Contact View





Pre-Test Driver Windshield View





Post-Test Driver Windshield View





Pre-Test Passenger Dummy Position Right Side View





Post-Test Passenger Dummy Position Right Side View





Pre-Test Pass. Dummy Position Right Side View (Door Open)





Post-Test Pass. Dummy Position Right Side View (Door Open)





Pre-Test Passenger Seat Position View





Post-Test Passenger Seat Position View





Pre-Test Passenger Dummy Knee Position





Post-Test Passenger Dummy Knee Position



A-44.



Post-Test Passenger Knee Contact View





Pre-Test Passenger Windshield View





Post-Test Passenger Windshield View



\* MFD. BY: TOYOTA MOTOR CORPORATION 11/01  
GVWR 4465LB GAWR FR 2670LB RR 2670LB  
THIS VEHICLE CONFORMS TO ALL APPLICABLE  
FEDERAL MOTOR VEHICLE SAFETY, BUMPER, AND  
THEFT PREVENTION STANDARDS IN EFFECT ON  
THE DATE OF MANUFACTURE SHOWN ABOVE.  
JTHBF30G925018152 PASS. CAR



C/TR: 6S5/LA07 MODEL: MCV30L-BEAGKA  
A/TM: -01A/U150E MADE IN JAPAN  
\* NO. 895 \*

Vehicle Certification Label



### TIRE-LOADING INFORMATION

VEHICLE CAPACITY WEIGHT : 410kg (900lbs)  
OCCUPANTS : FRT. 2 RR. 3 TOTAL 5  
COLD TIRE PRESSURE : kPa (psi)  
UP TO VEHICLE CAPACITY WEIGHT : FRT. 200 (29), RR. 200 (29)  
TIRE SIZE : P215/60R16 94V  
SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION

---

CHARGE MAXIMALE DU VEHICULE : 410kg (900 LIVRES)  
PERSONNES : AVANT 2, ARRIERE 3 TOTAL 5  
PRESSION DE PNEUS : kPa (LB/PO<sup>2</sup>)  
AU POIDS MAXIMAL DU VEHICULE CHARGE :  
AVANT 200 (29), ARRIERE 200 (29)  
DIMENSION DES PNEUS : P215/60R16 94V  
POUR DE PLUS AMPLES DETAILS, VOIR LE MANUEL DU PROPRIETAIRE

33570

A 1

**SRS SIDE AIRBAG**  
DO NOT INSTALL IN  
OBSERVE THE SAFETY  
SEE THE OWNER'S  
**COUSSIN GONFLABLE**  
NE PAS INSTALLER  
OBSERVER LES PRECAUTIONS  
PROXIMITE DU PASSENGER  
POUR DE PLUS AMPLES  
**SRS-SEITEN-AIRBAG**  
VOM HERSTELLER NUR FÜR DEN VORDEREN SITZ  
DIE GLEICHEN VORSICHTSMASSNAHMEN  
BESCHRIEBEN SIND  
SIEHE DAS BENUTZUNGS-

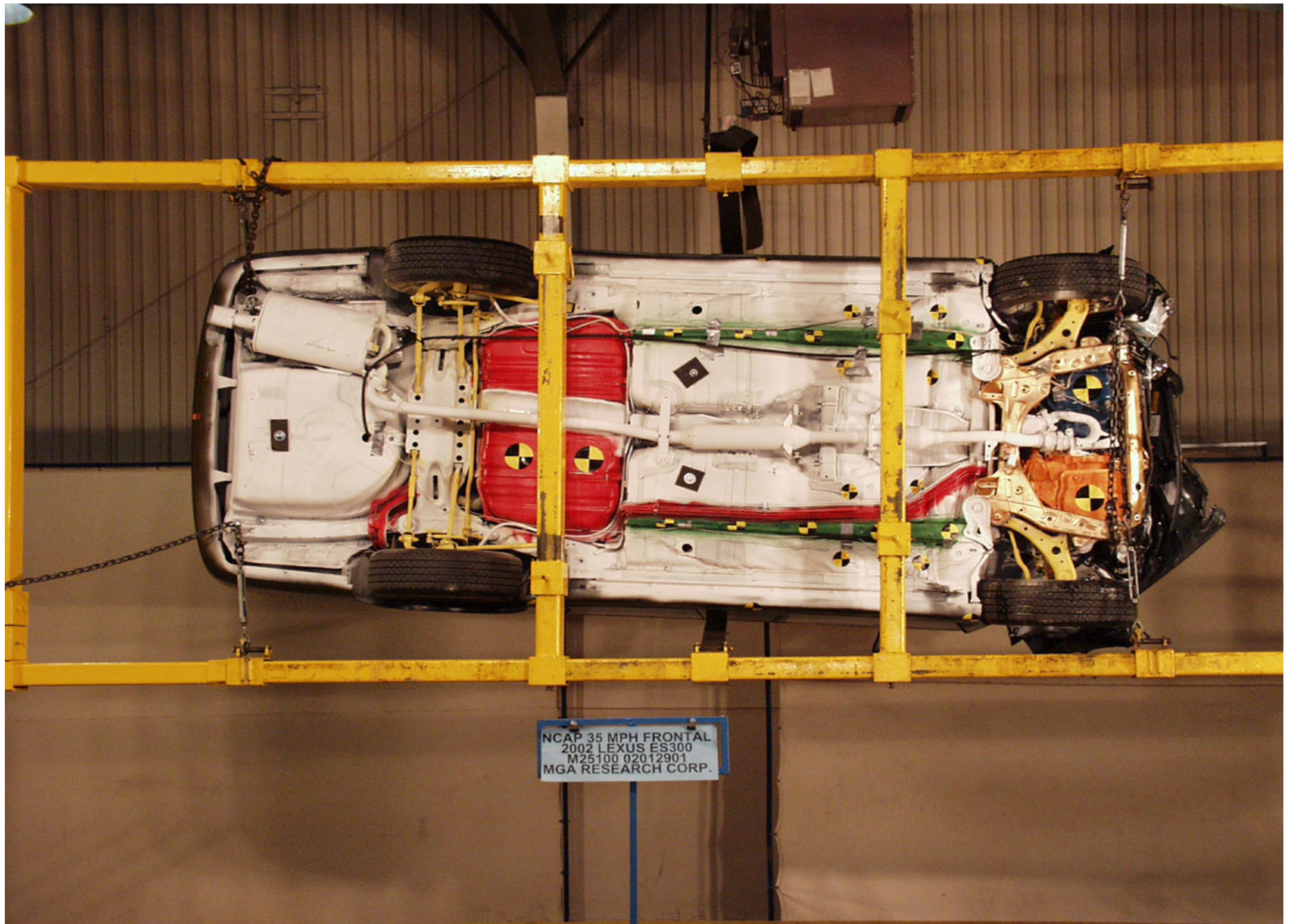




Vehicle Impact



A-50.



Rollover 90 Degrees





Rollover 180 Degrees





Rollover 270 Degrees





Rollover 360 Degrees





Pre-Test Left Front Door Latched





Pre-Test Left Rear Door Latched





Pre-Test Right Front Door Latched





Pre-Test Right Rear Door Latched



## **APPENDIX B**

### **DUMMY AND VEHICLE RESPONSE DATA TRACES**

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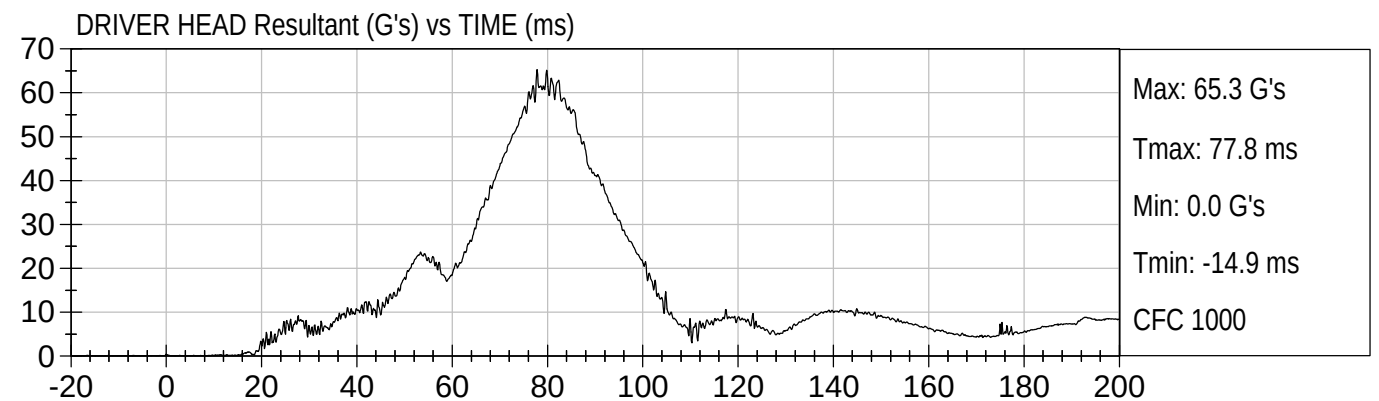
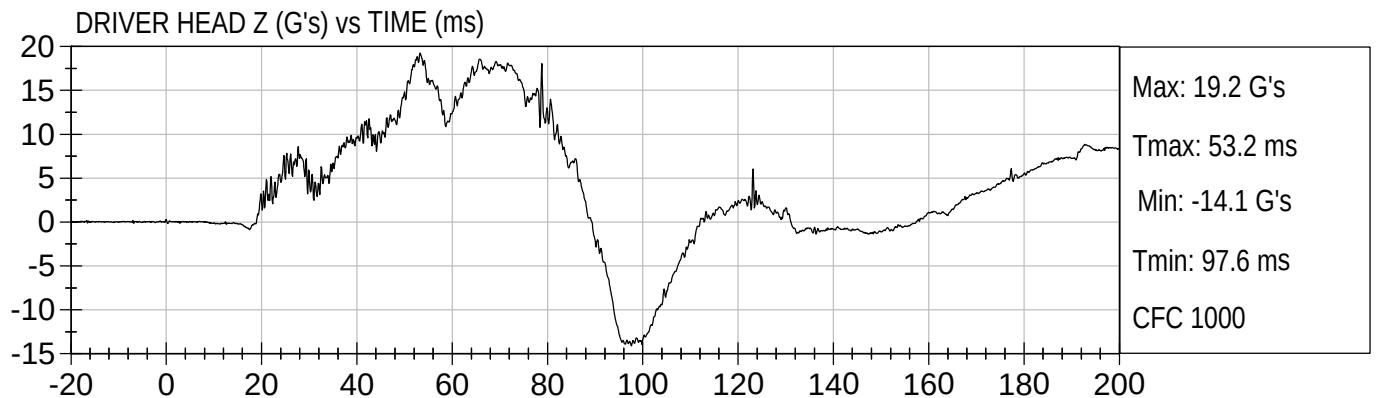
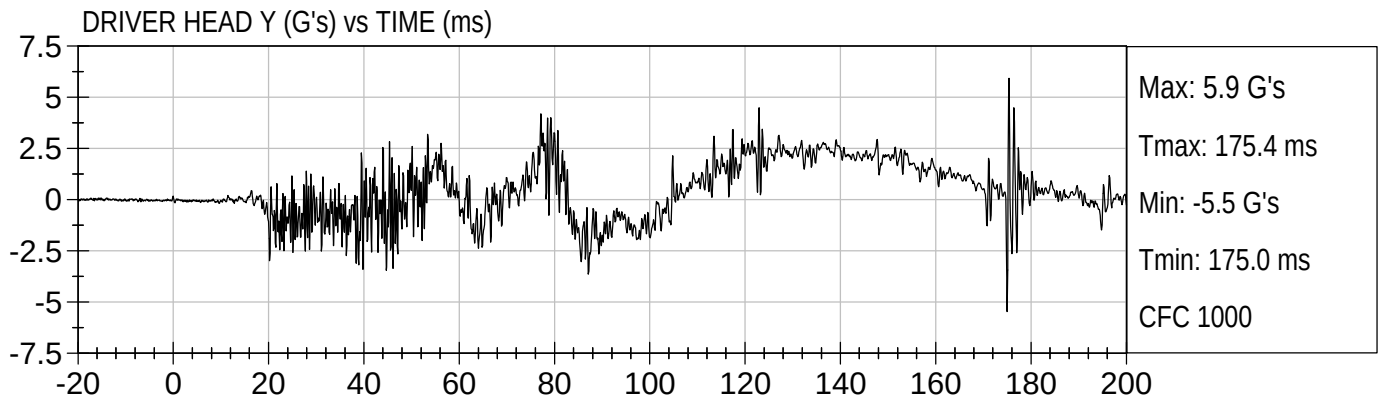
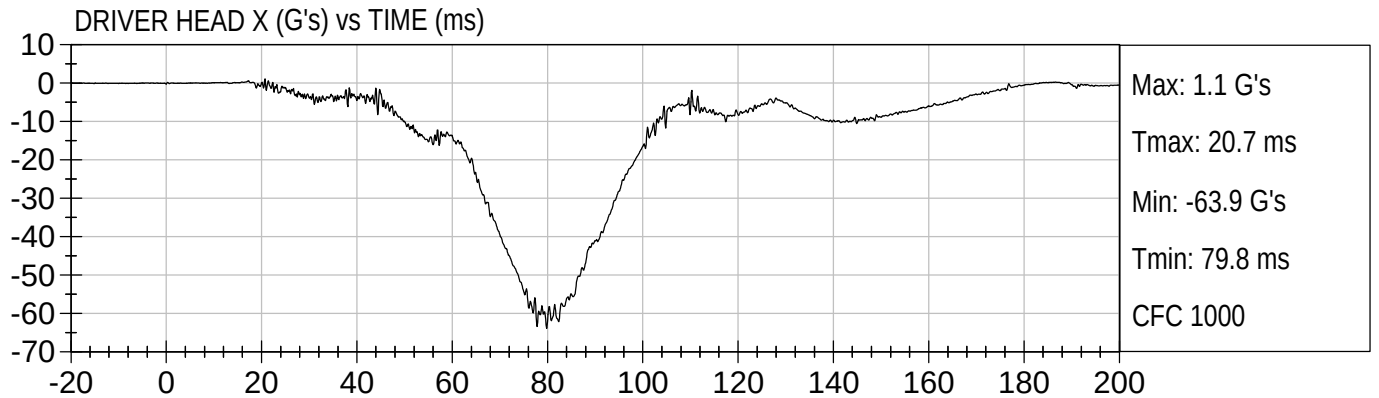
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35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

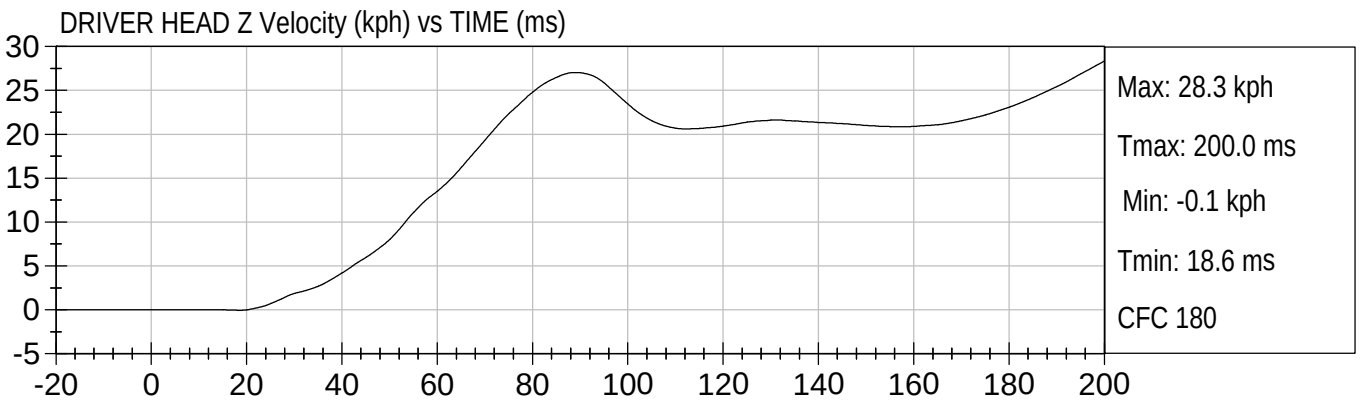
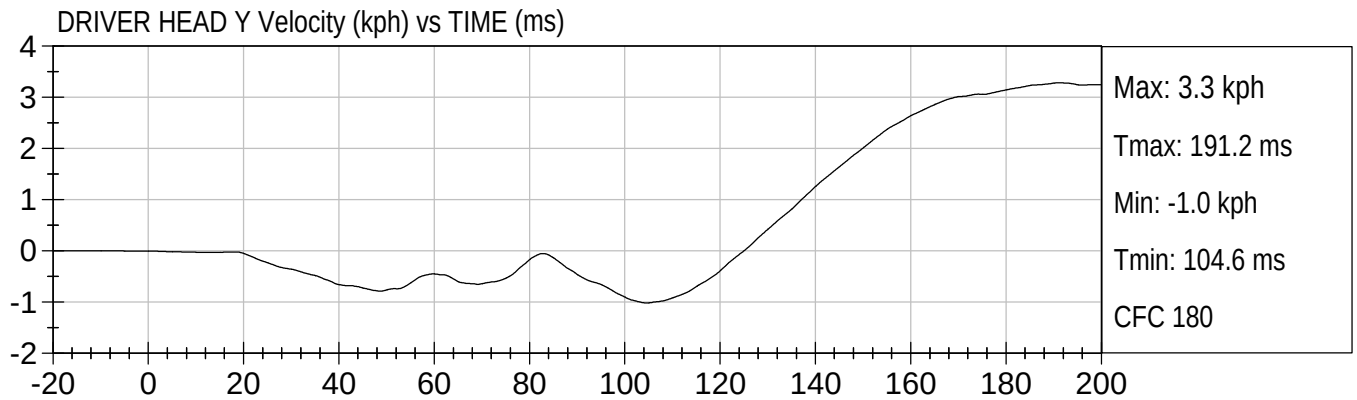
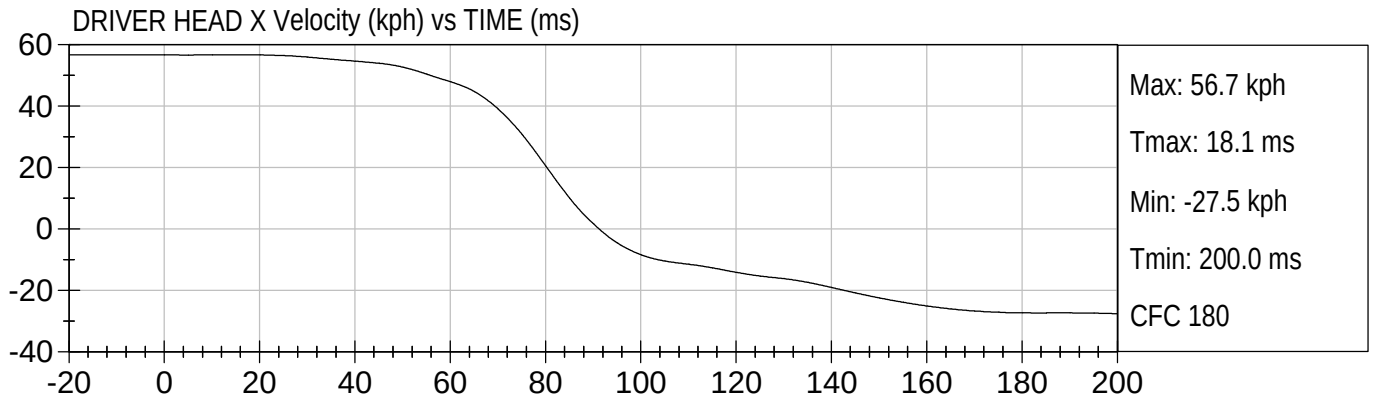
Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

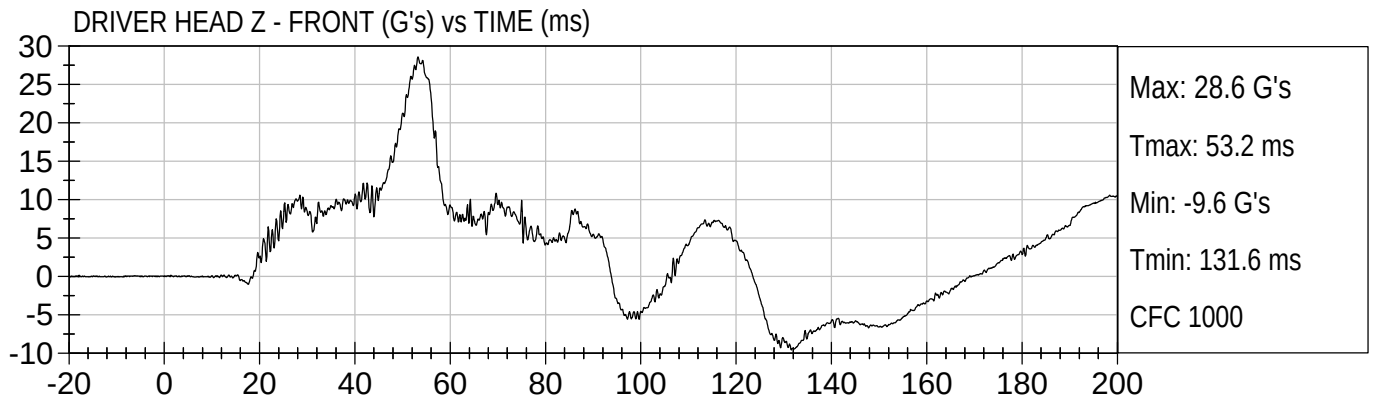
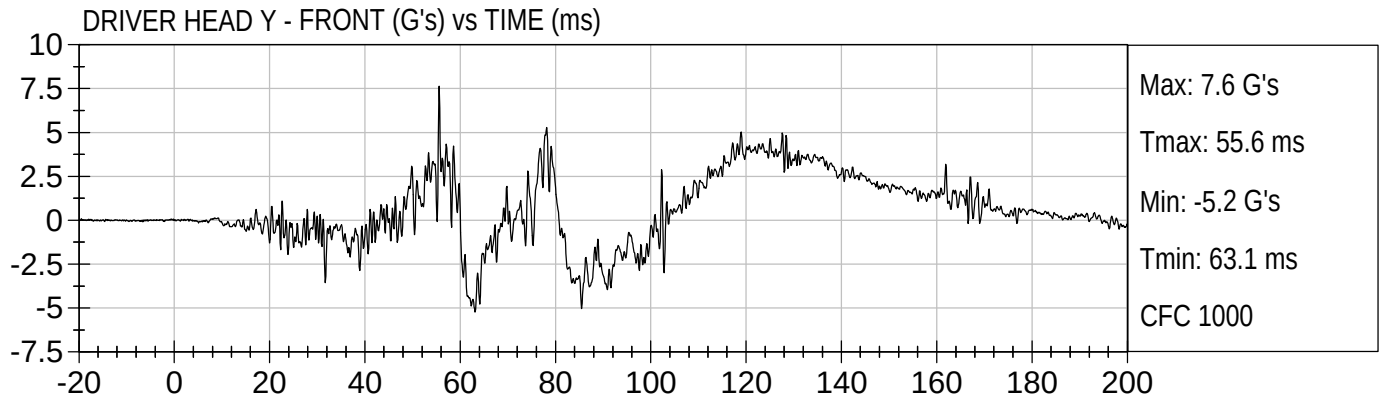






35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

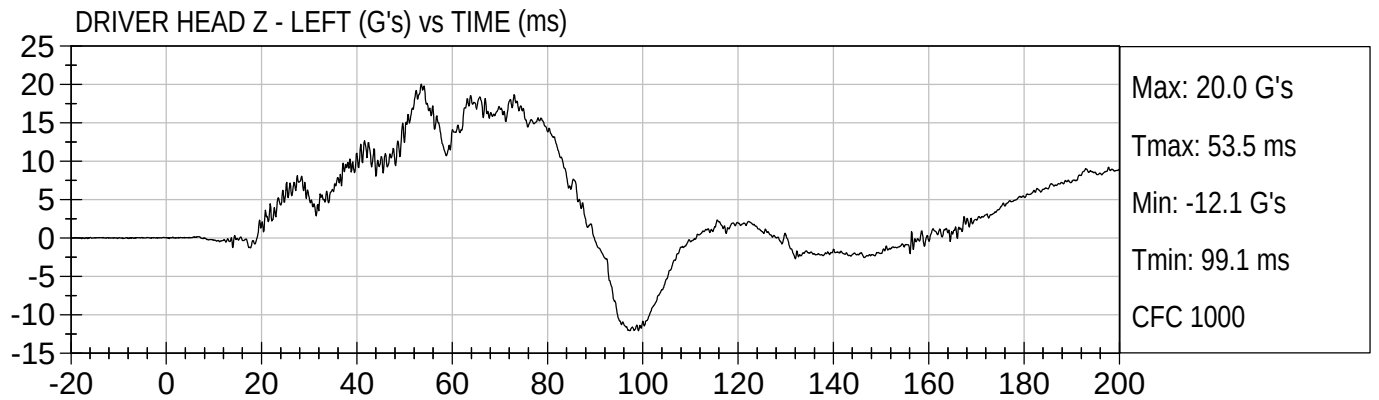
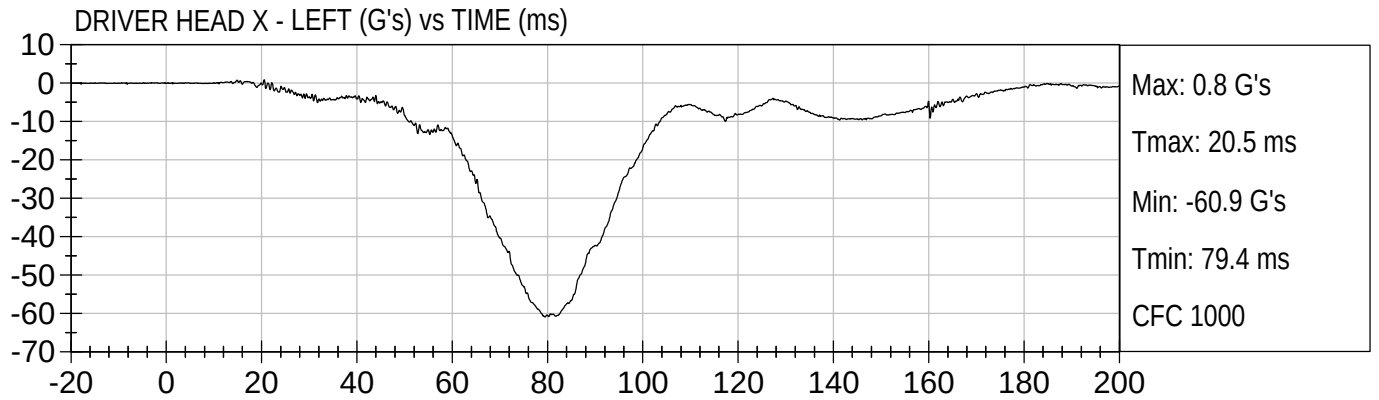
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Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

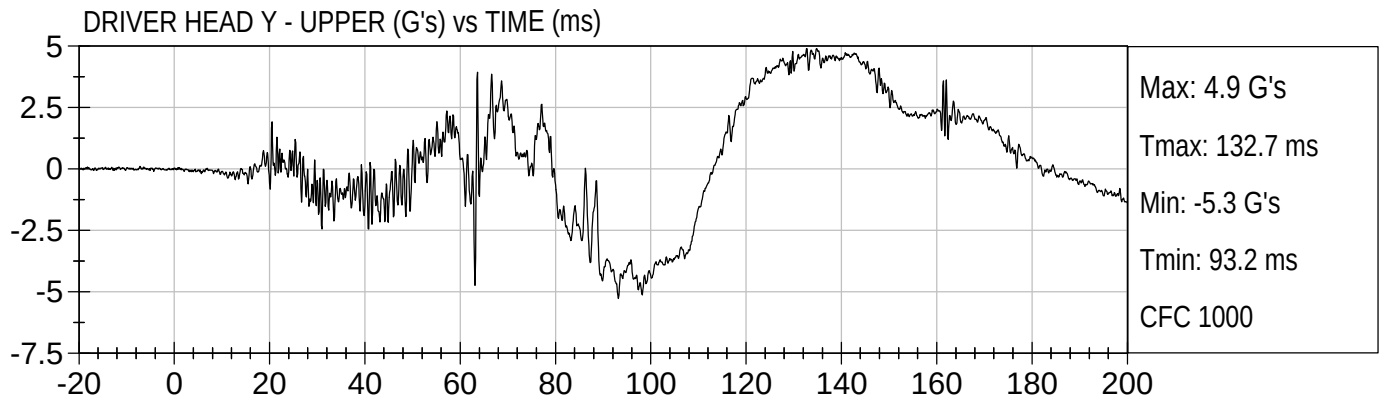
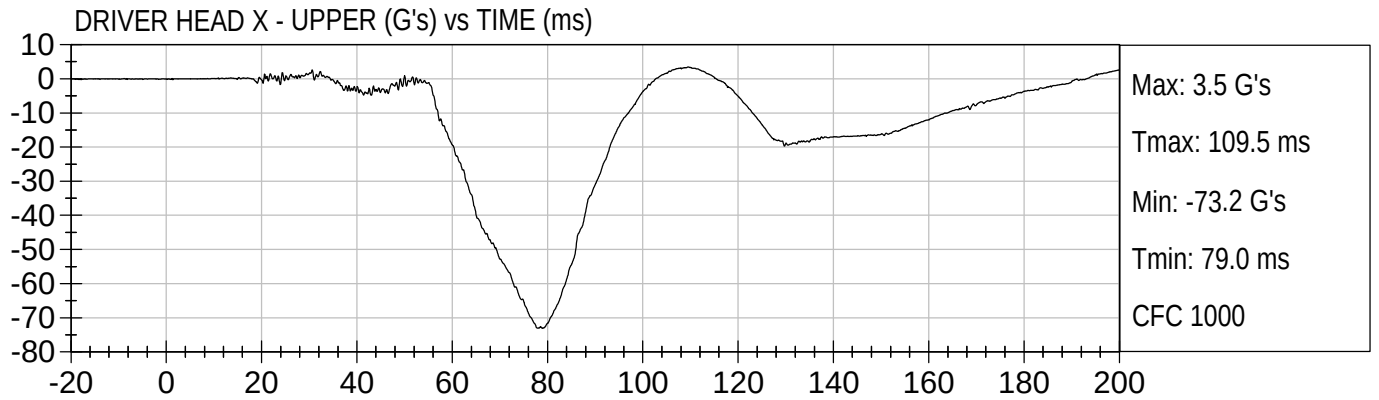






35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

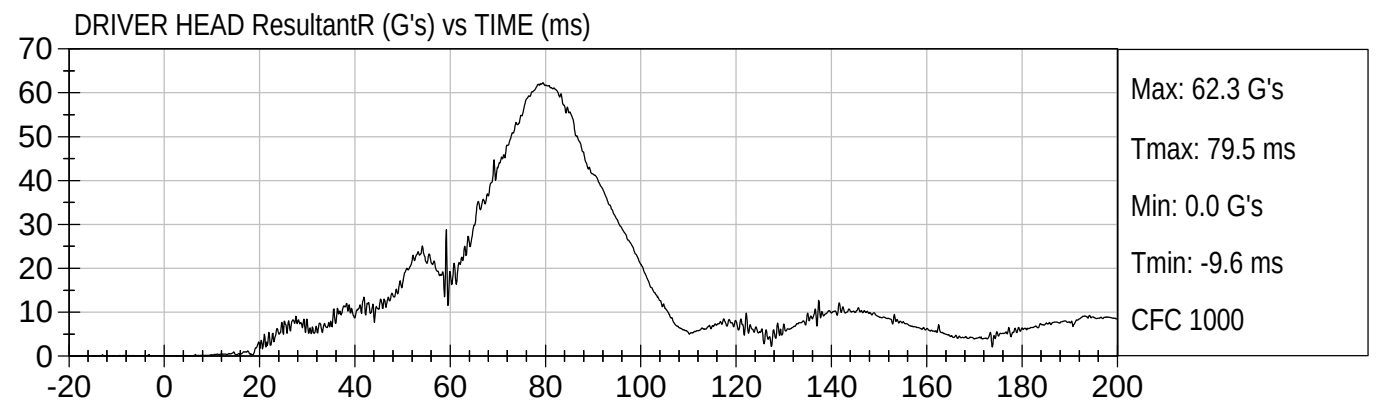
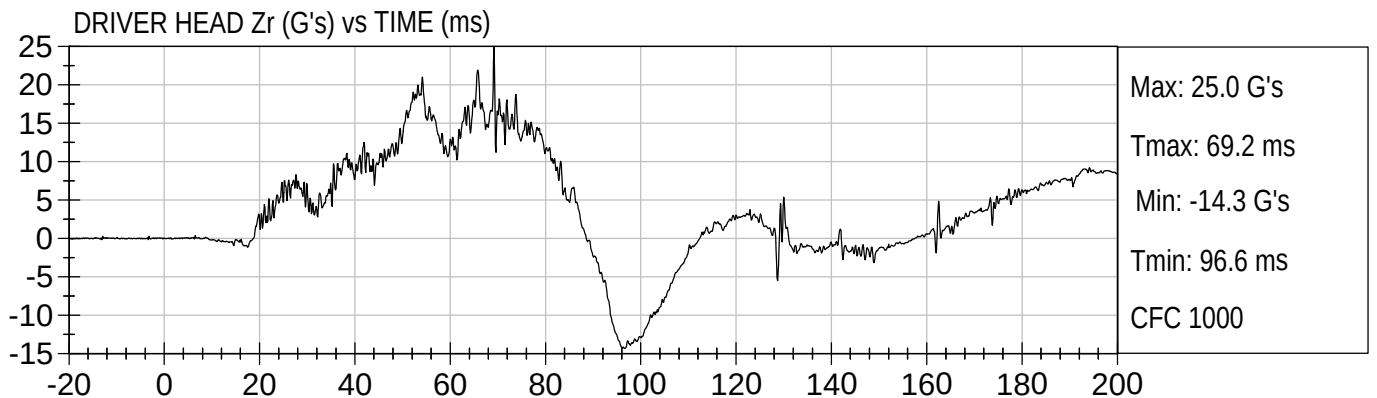
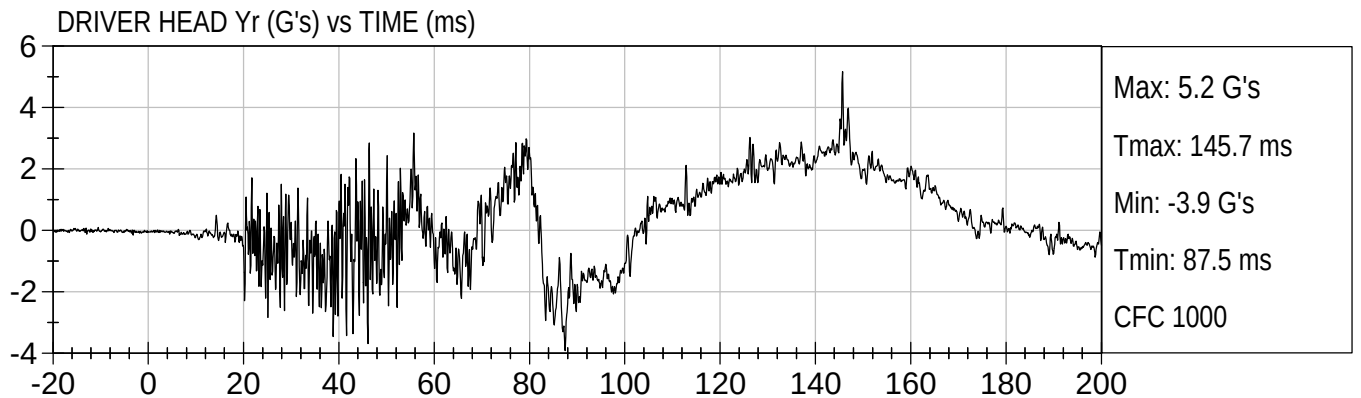
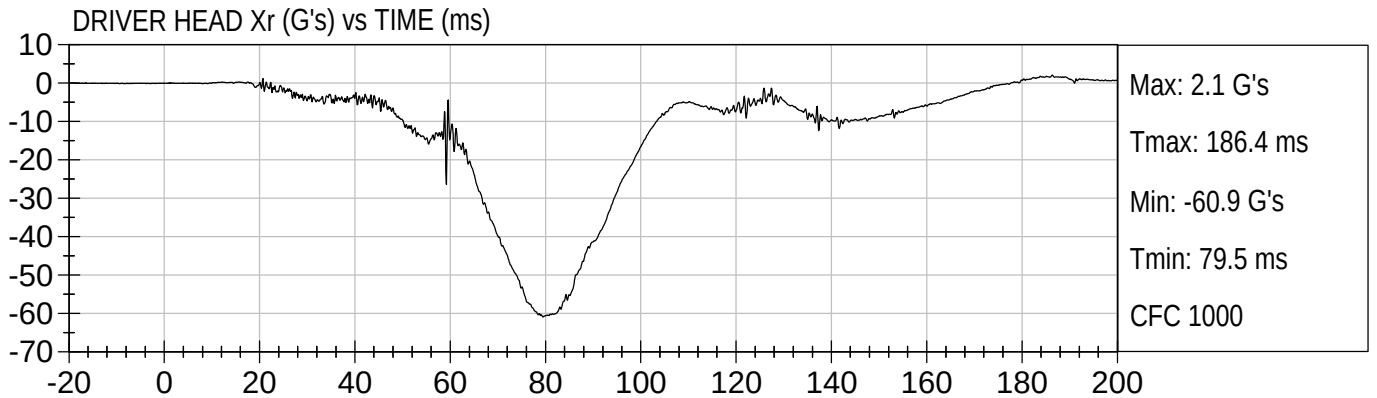
Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

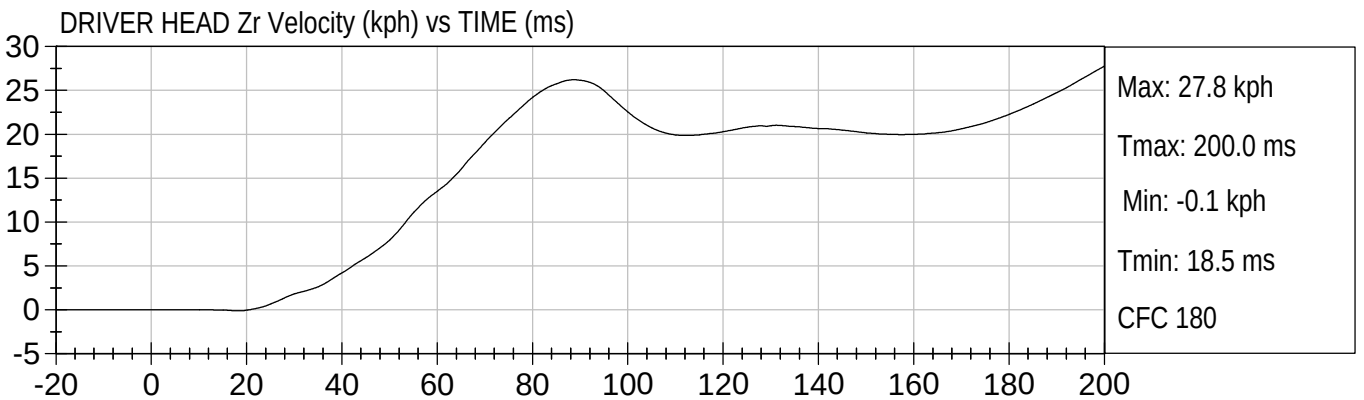
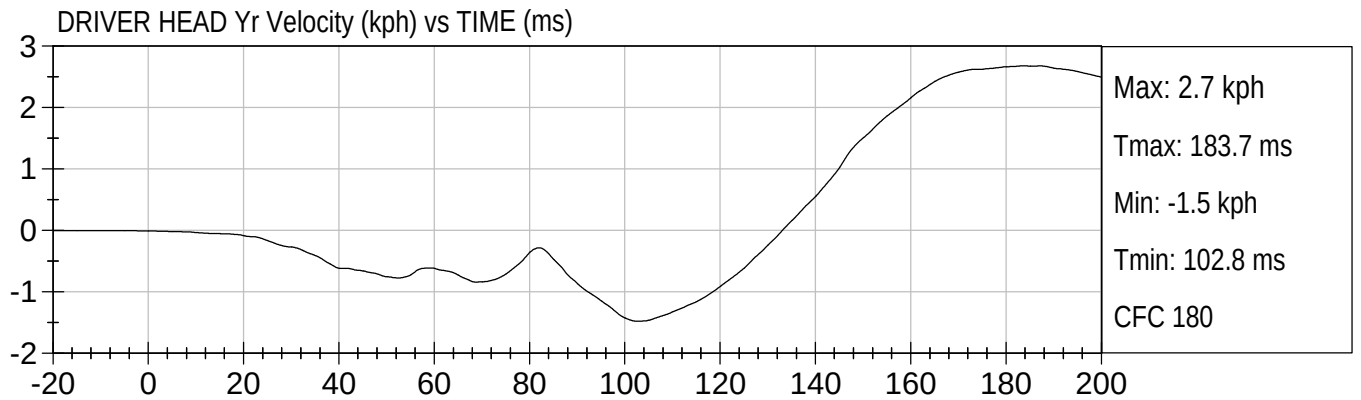
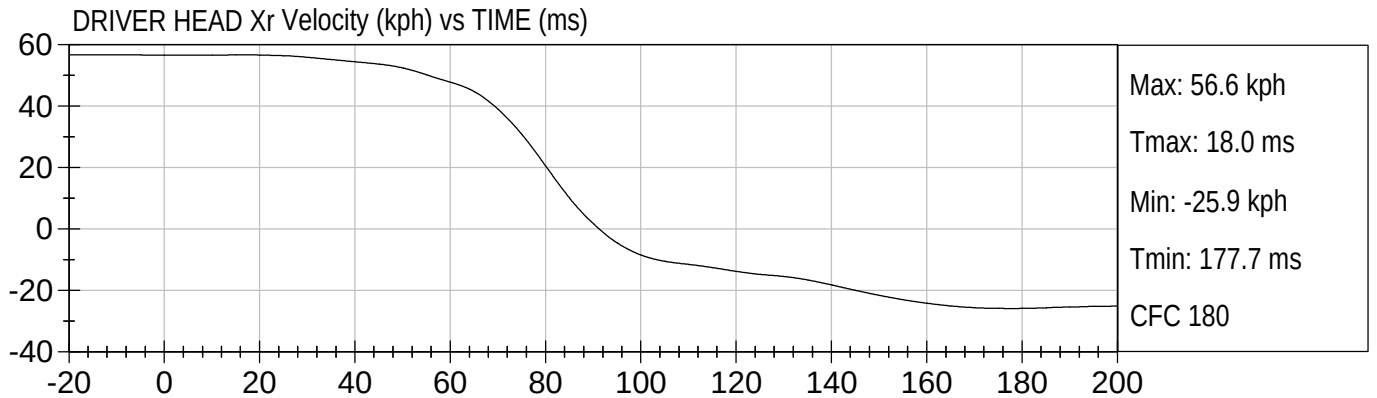






35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

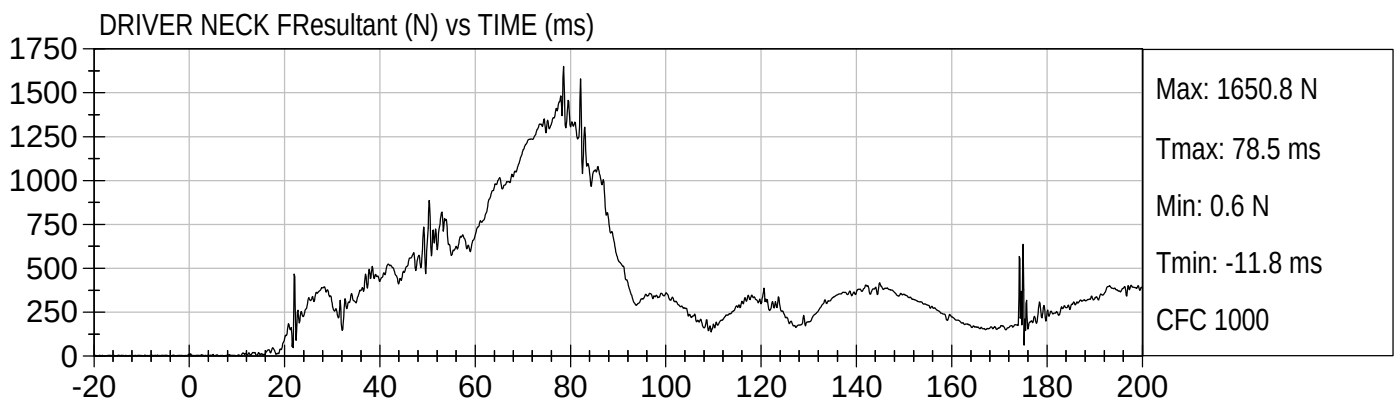
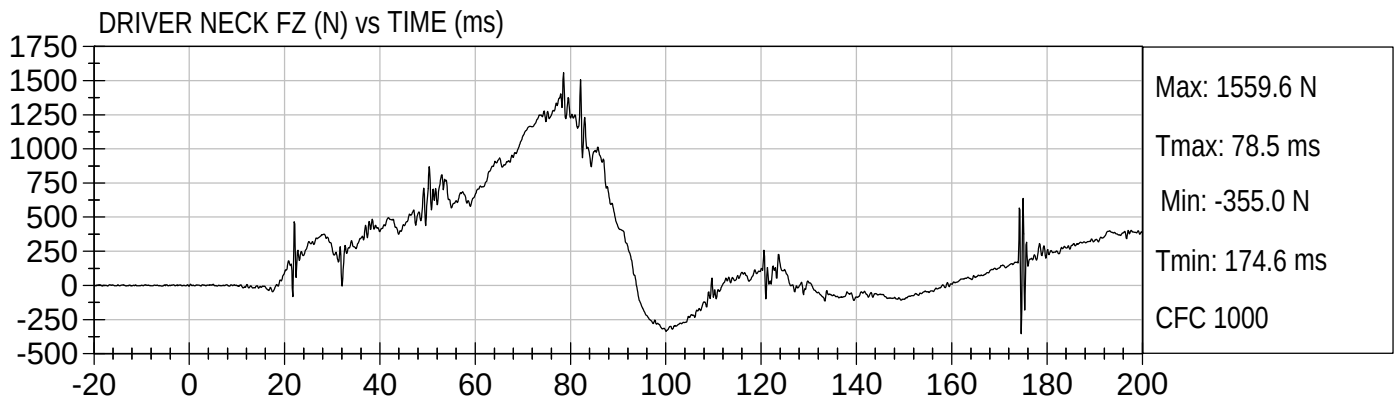
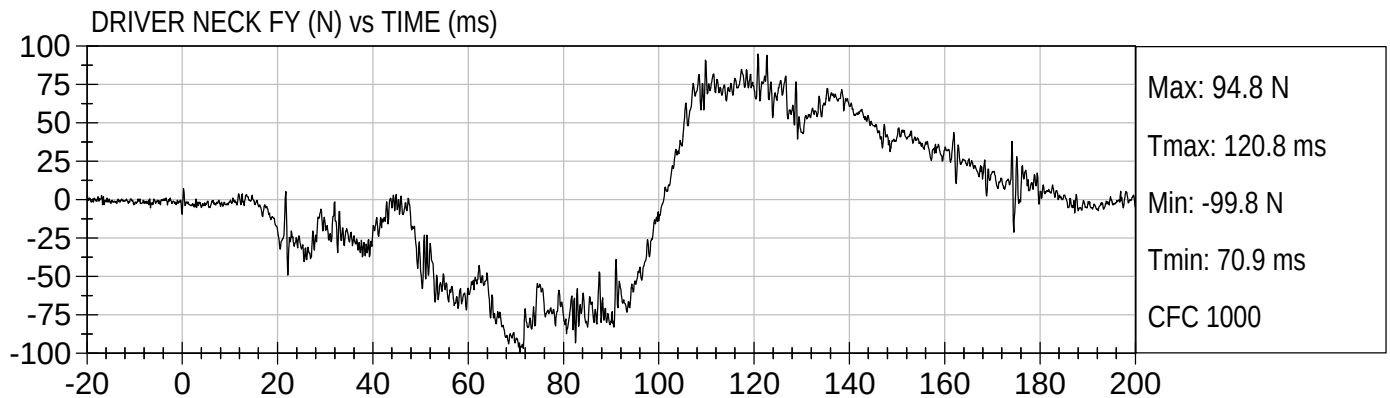
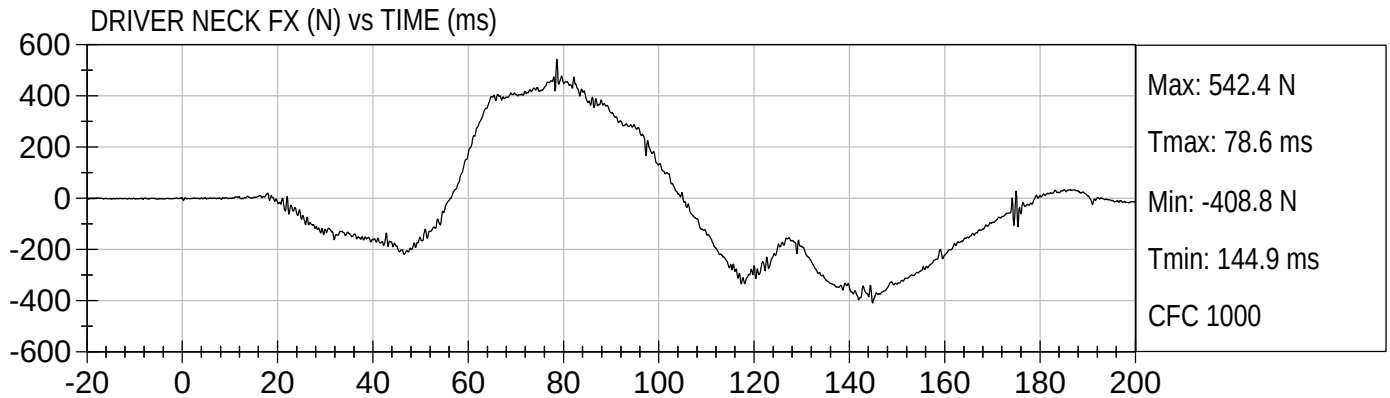
Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

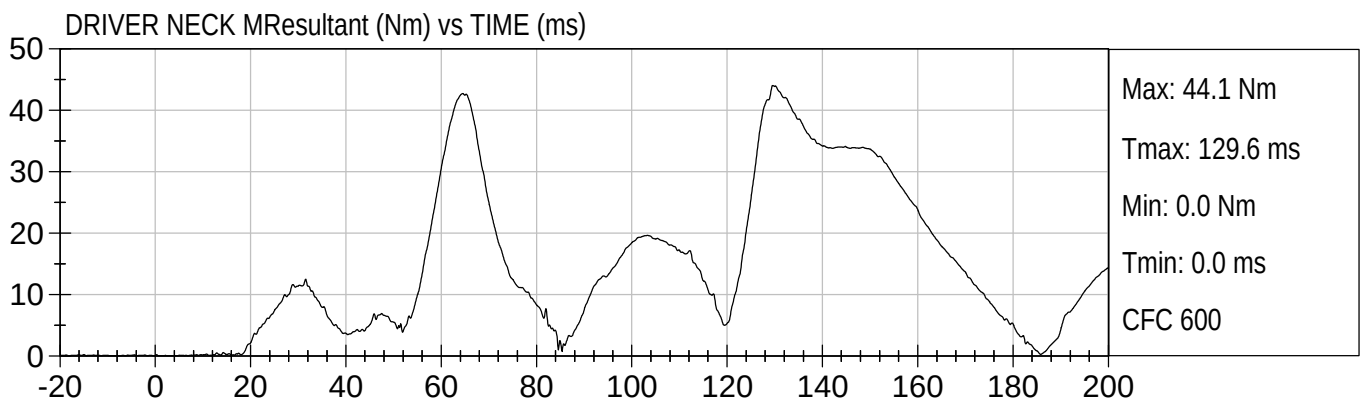
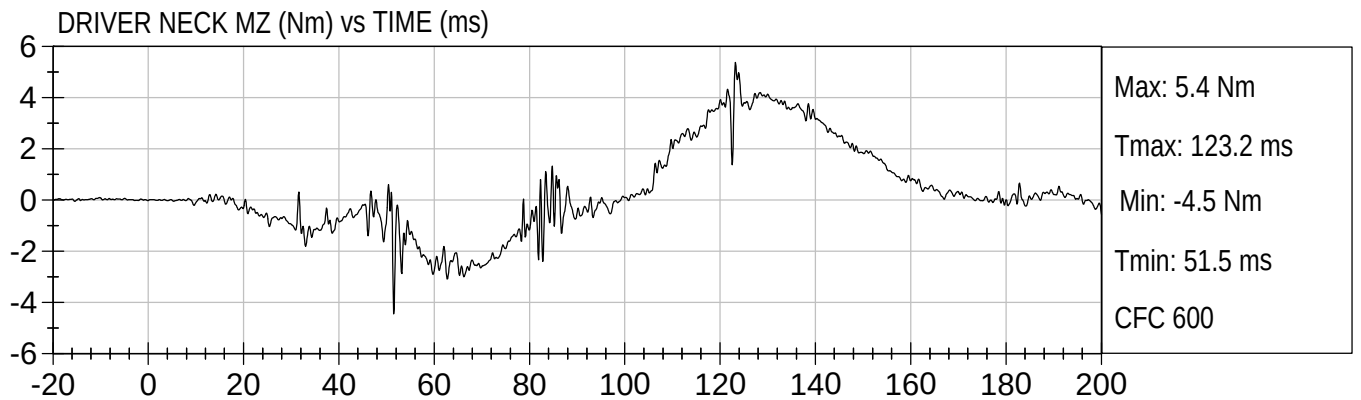
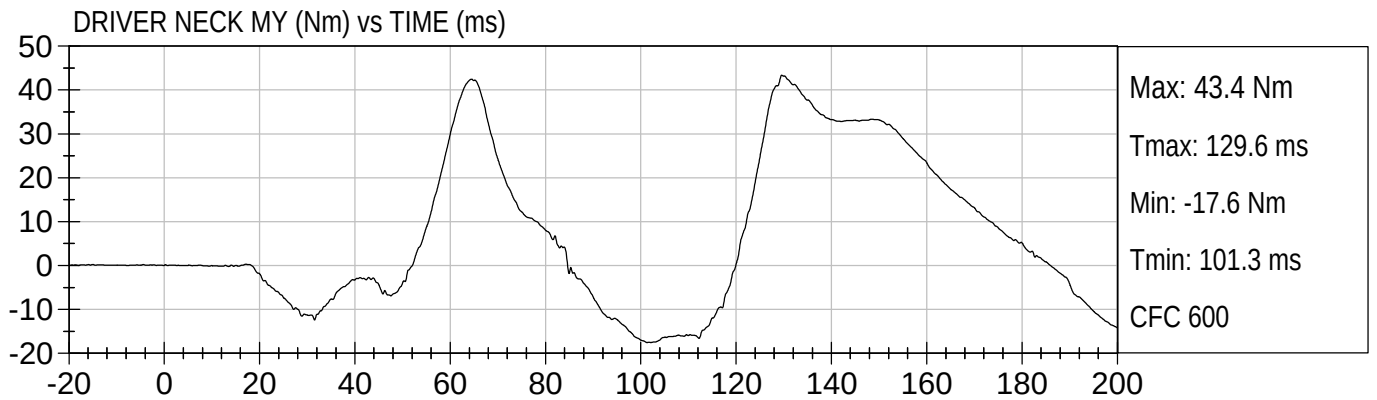
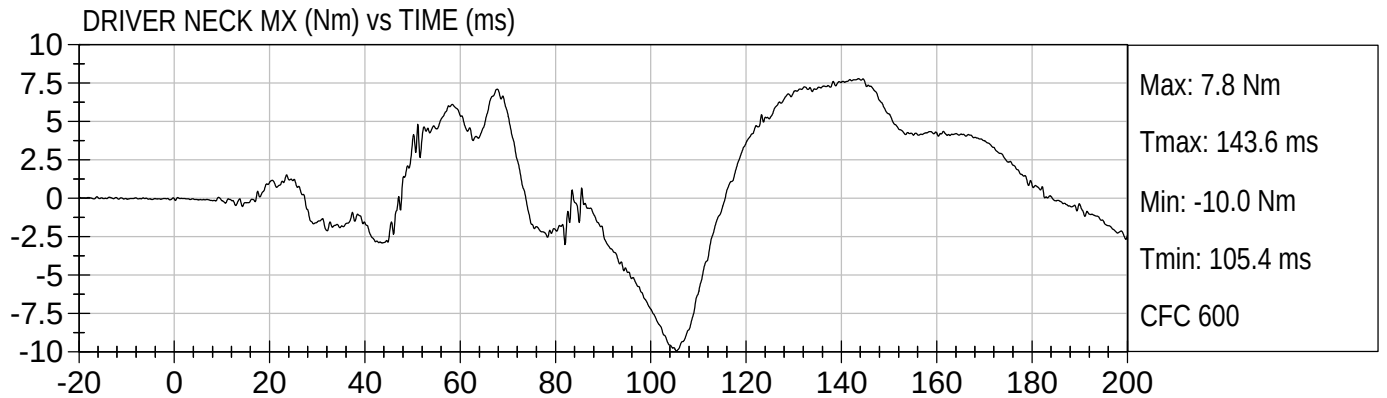






35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

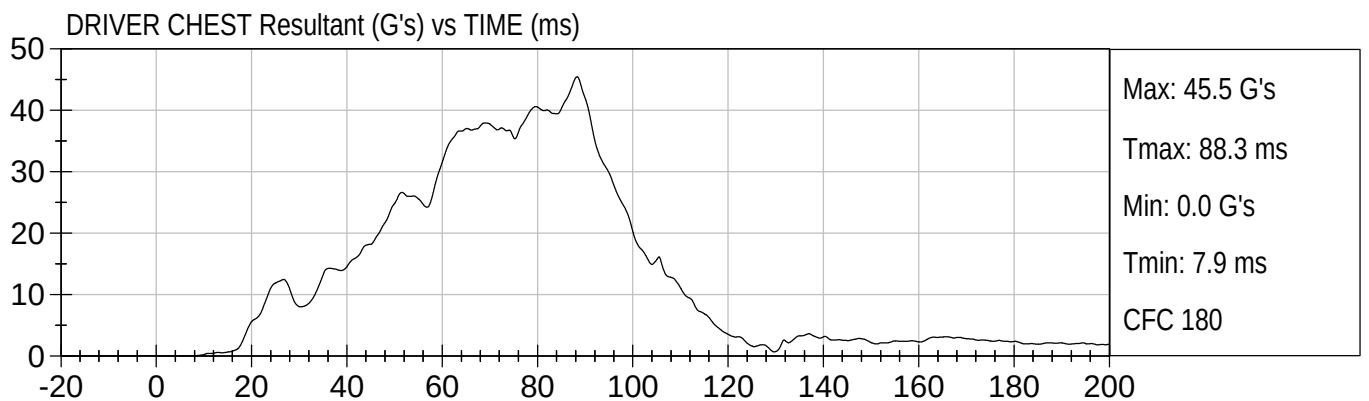
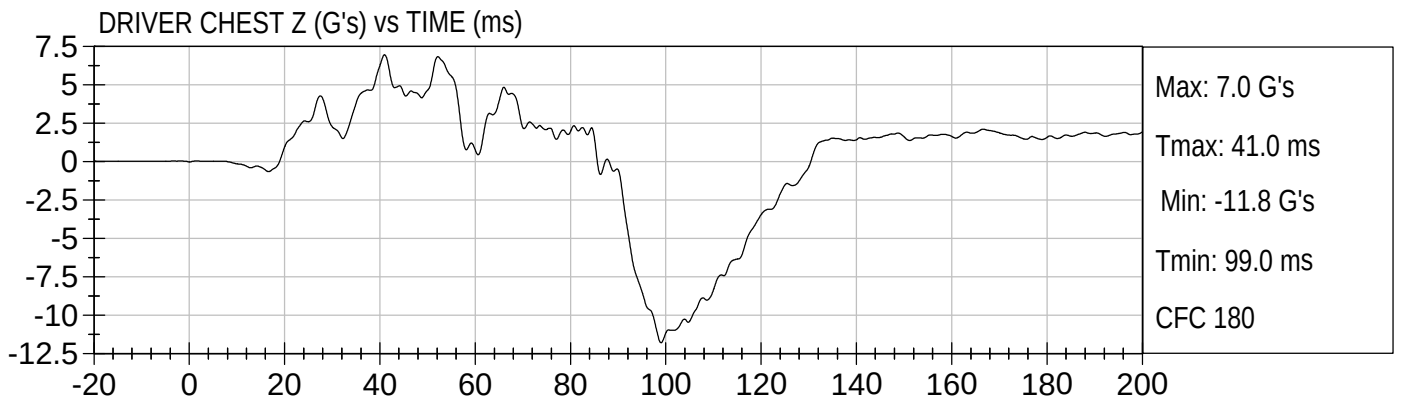
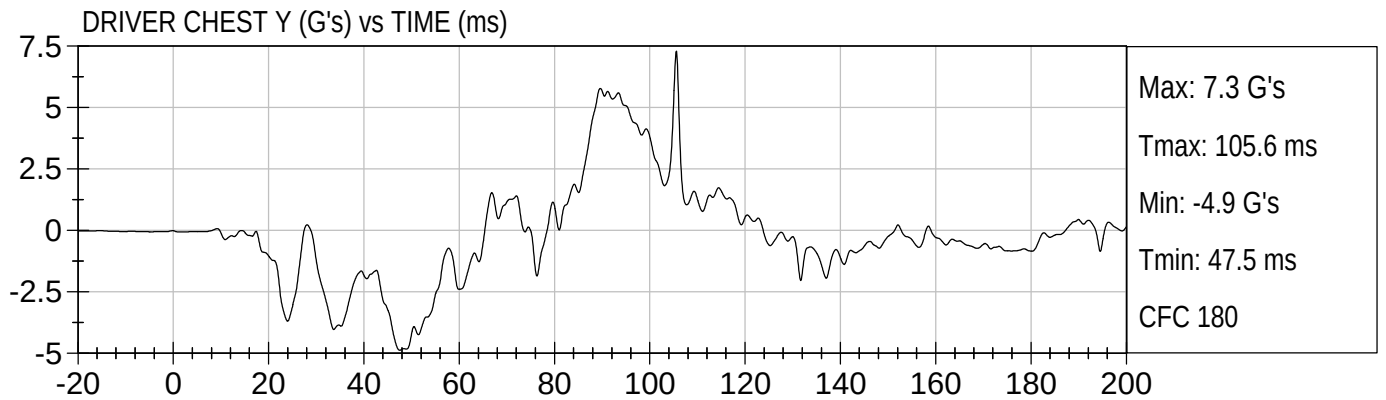
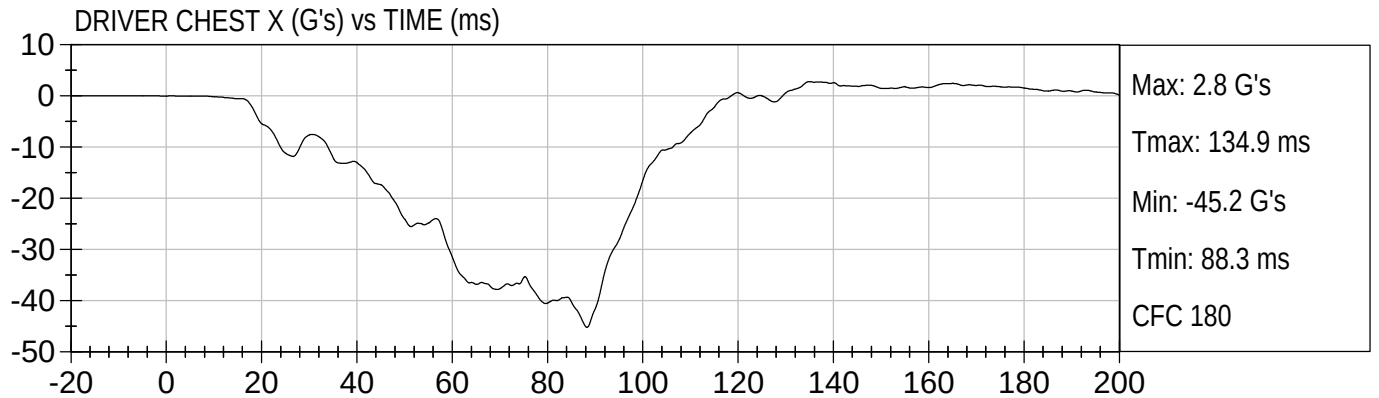
Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

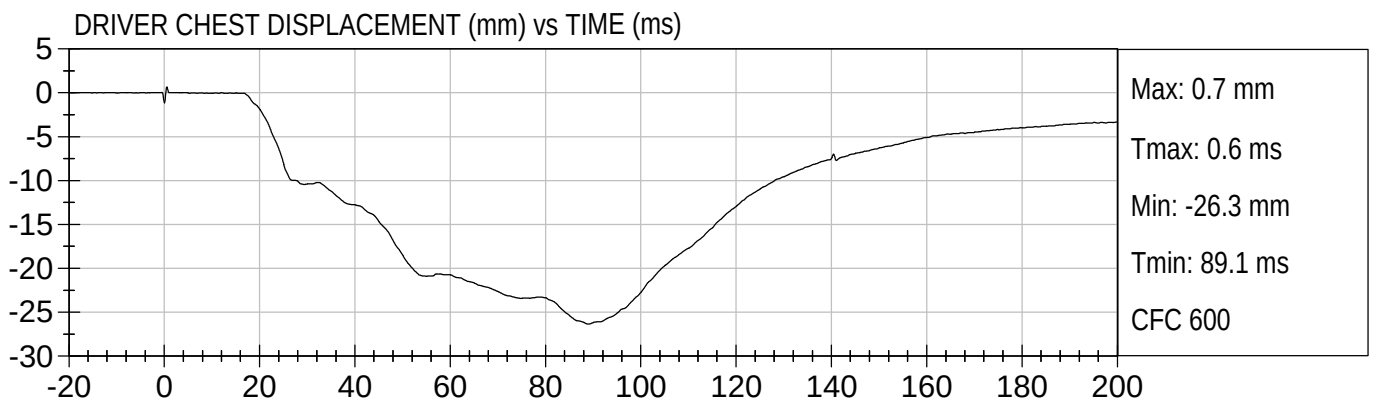
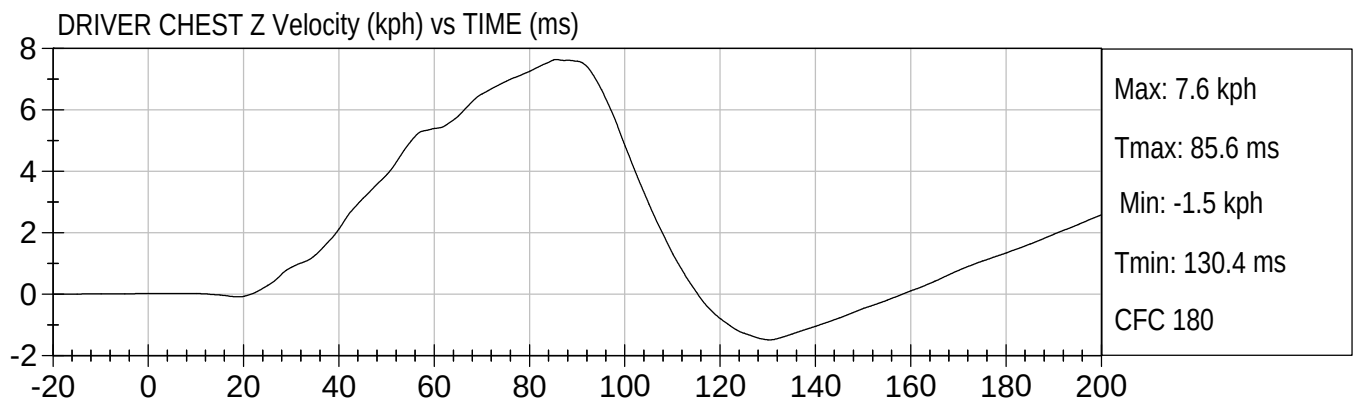
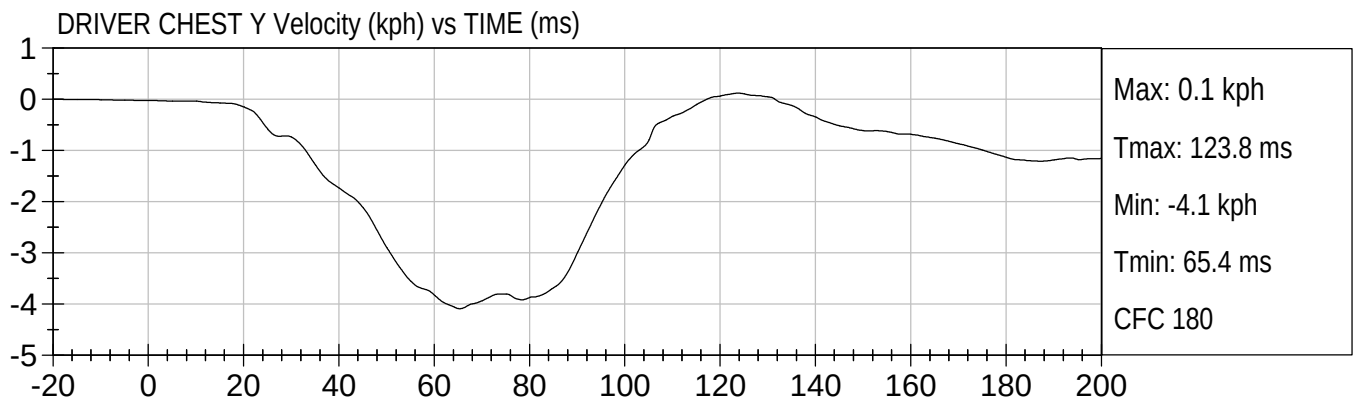
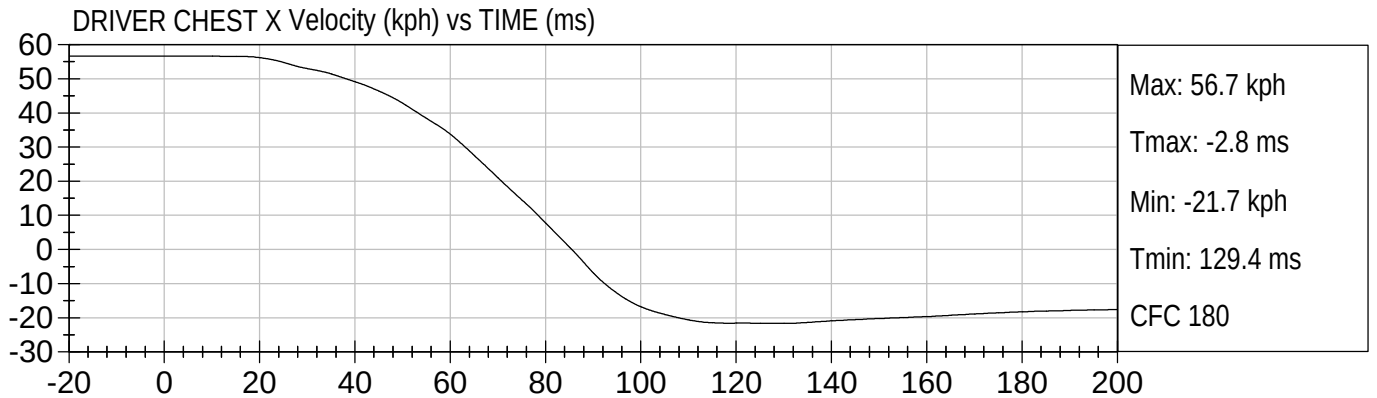






35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

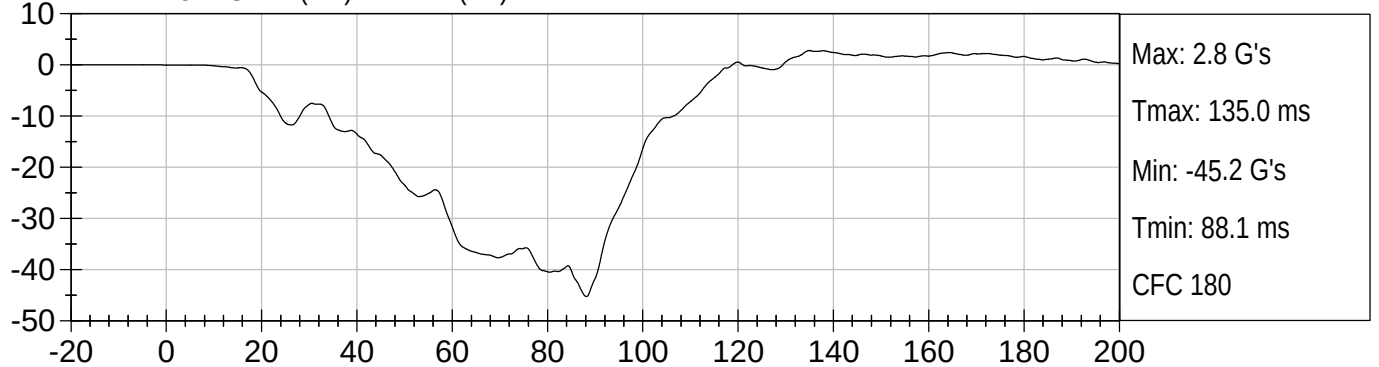




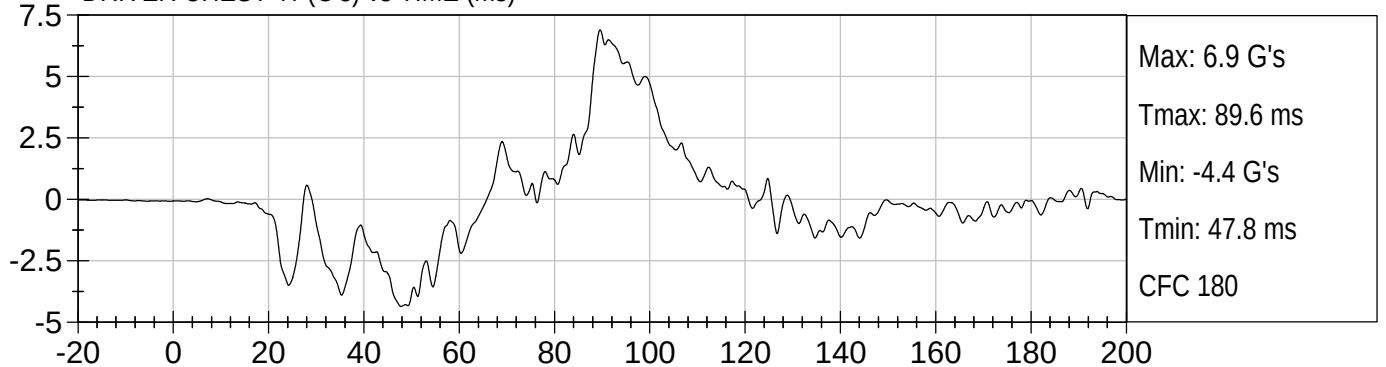
35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

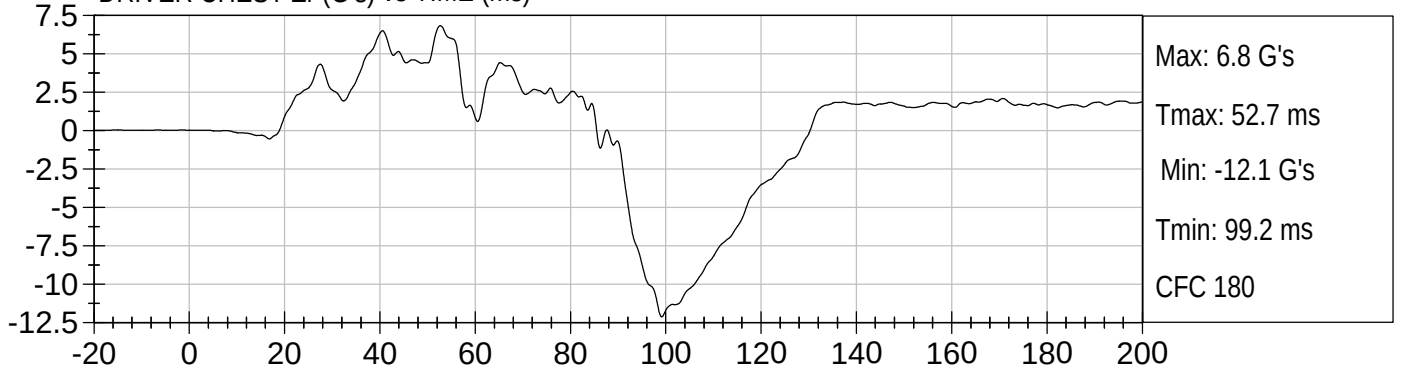
DRIVER CHEST Xr (G's) vs TIME (ms)



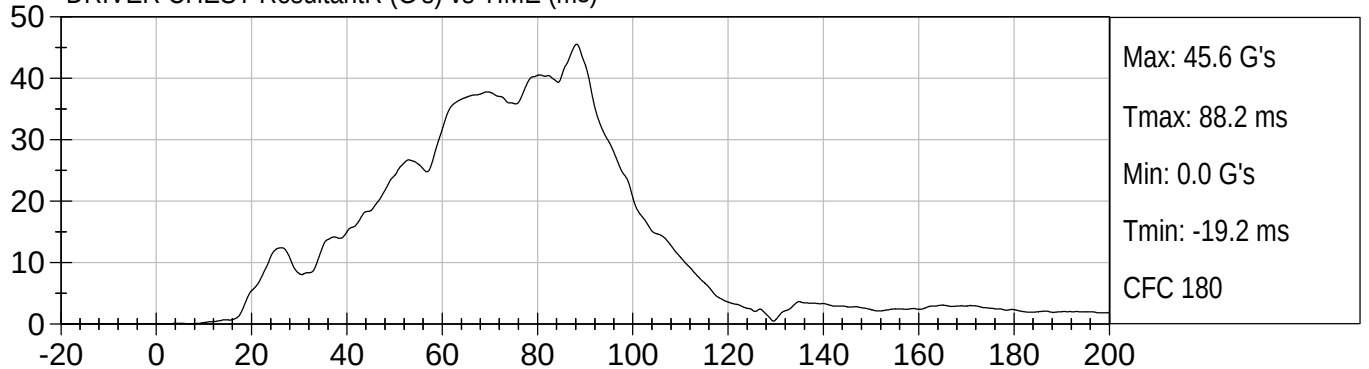
DRIVER CHEST Yr (G's) vs TIME (ms)



DRIVER CHEST Zr (G's) vs TIME (ms)



DRIVER CHEST ResultantR (G's) vs TIME (ms)

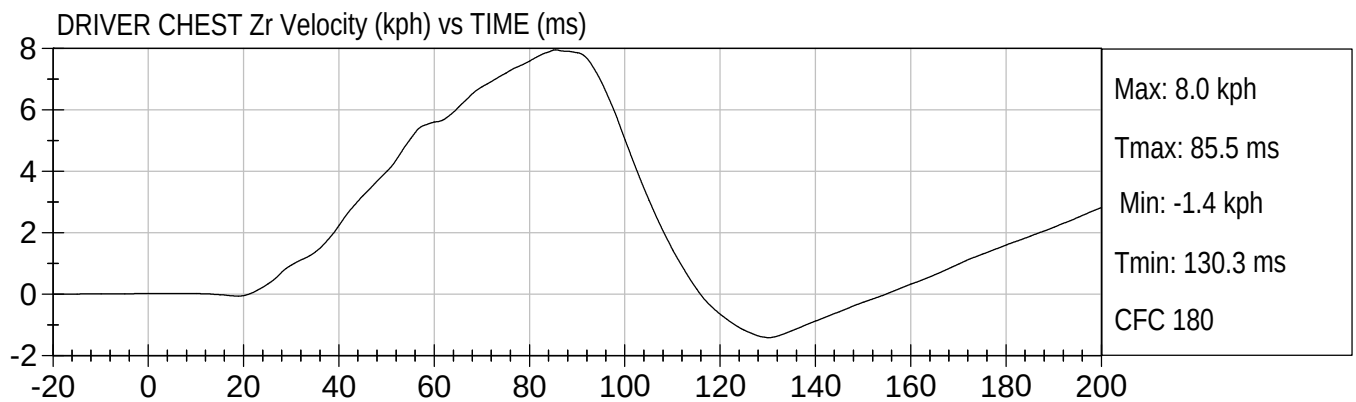
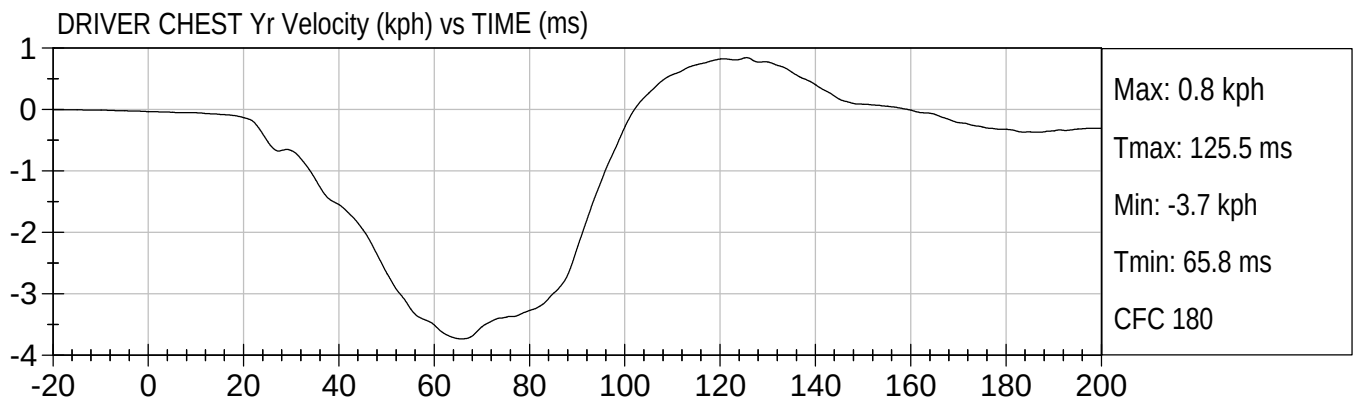
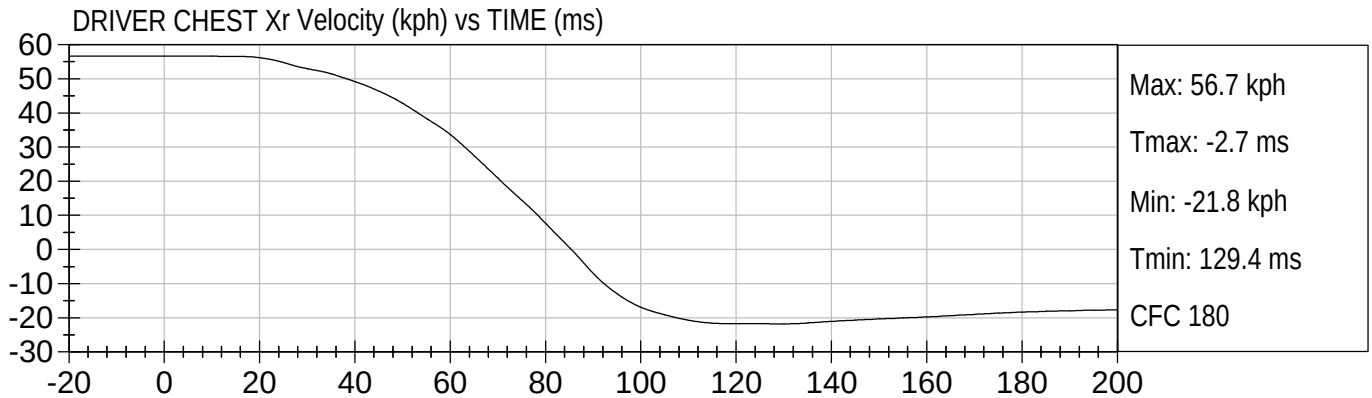






35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

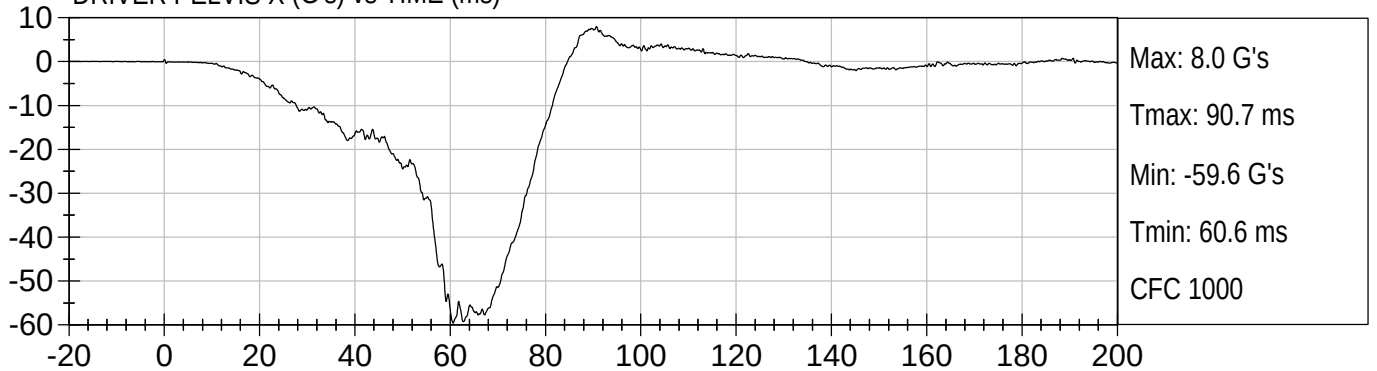




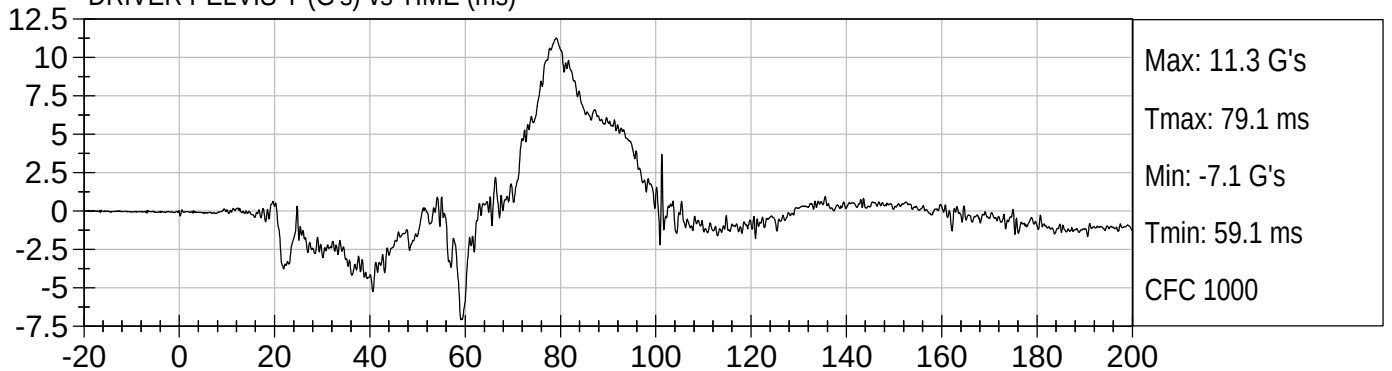
35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

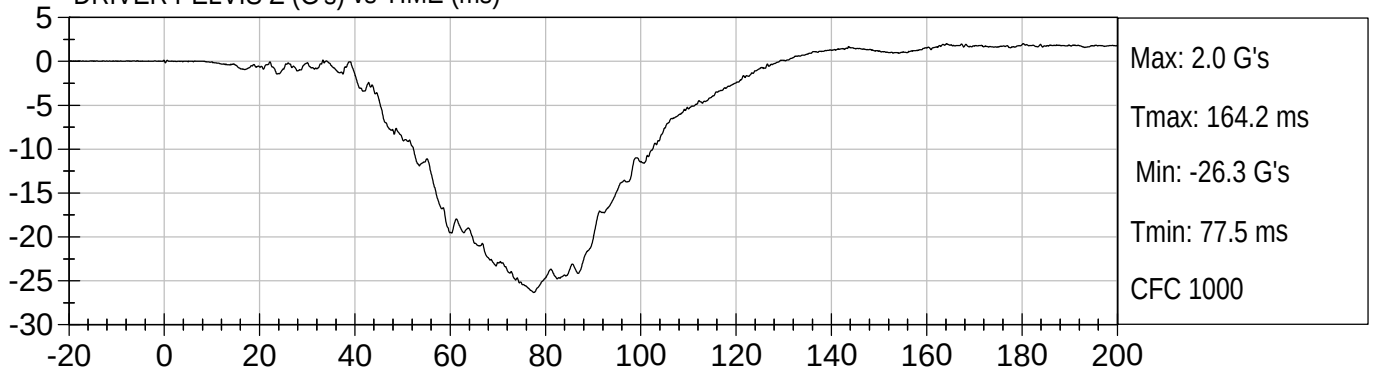
DRIVER PELVIS X (G's) vs TIME (ms)



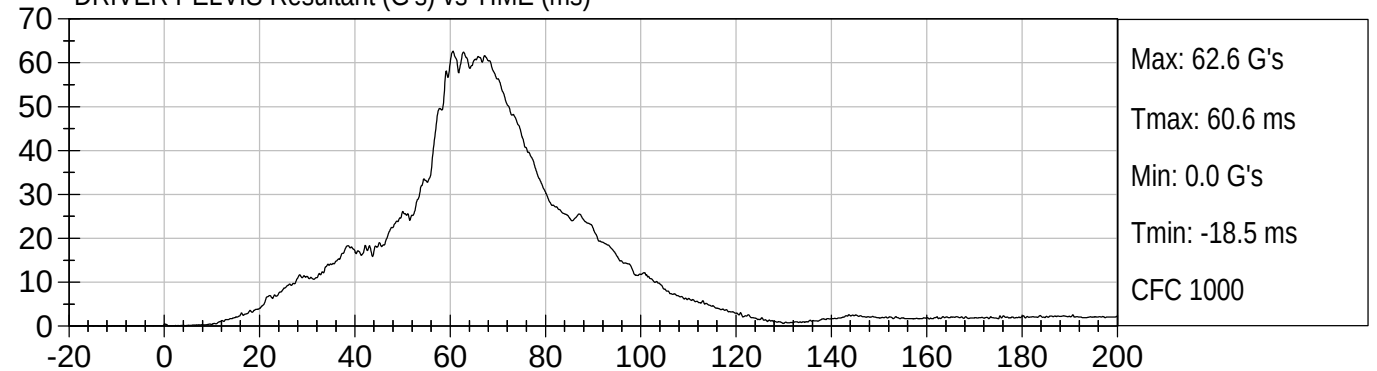
DRIVER PELVIS Y (G's) vs TIME (ms)



DRIVER PELVIS Z (G's) vs TIME (ms)



DRIVER PELVIS Resultant (G's) vs TIME (ms)

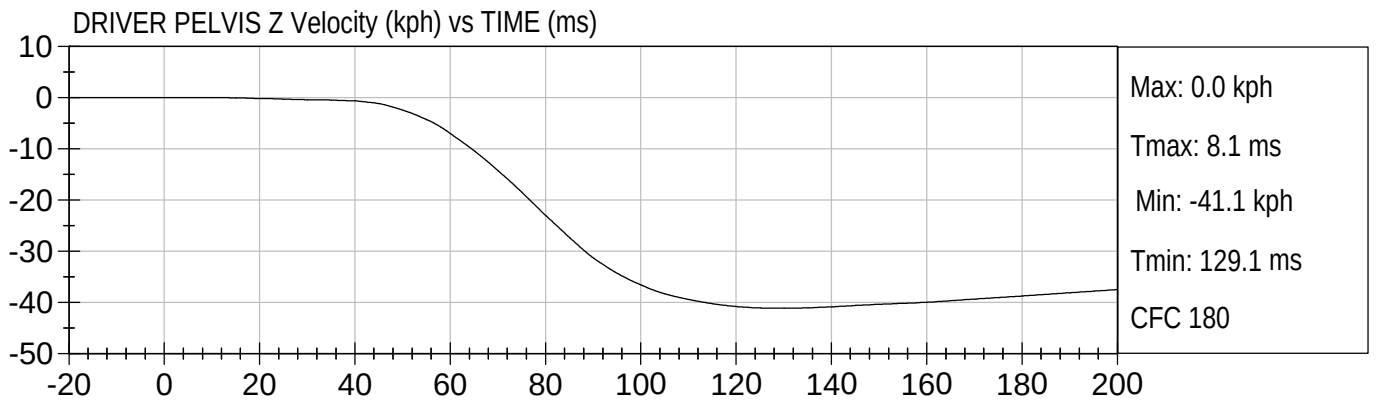
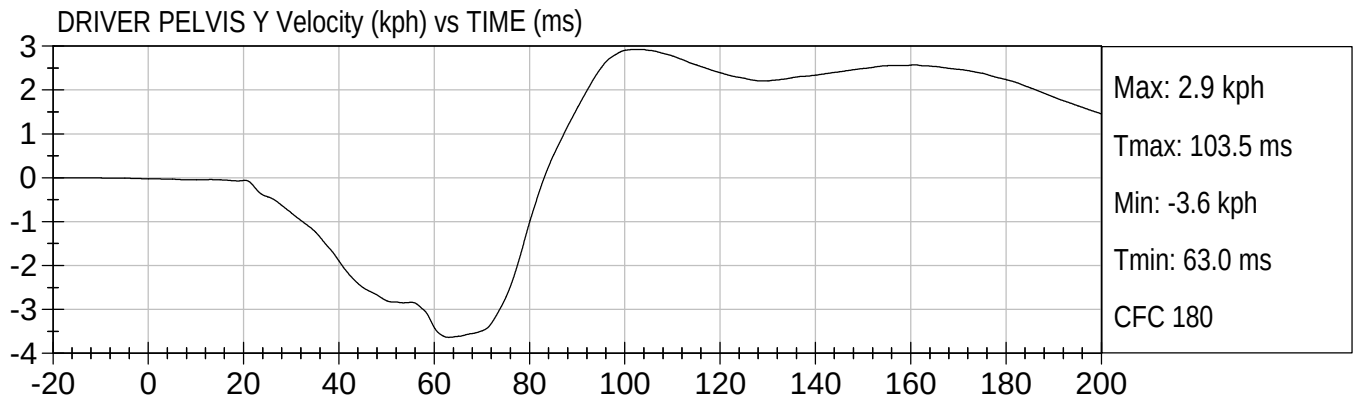
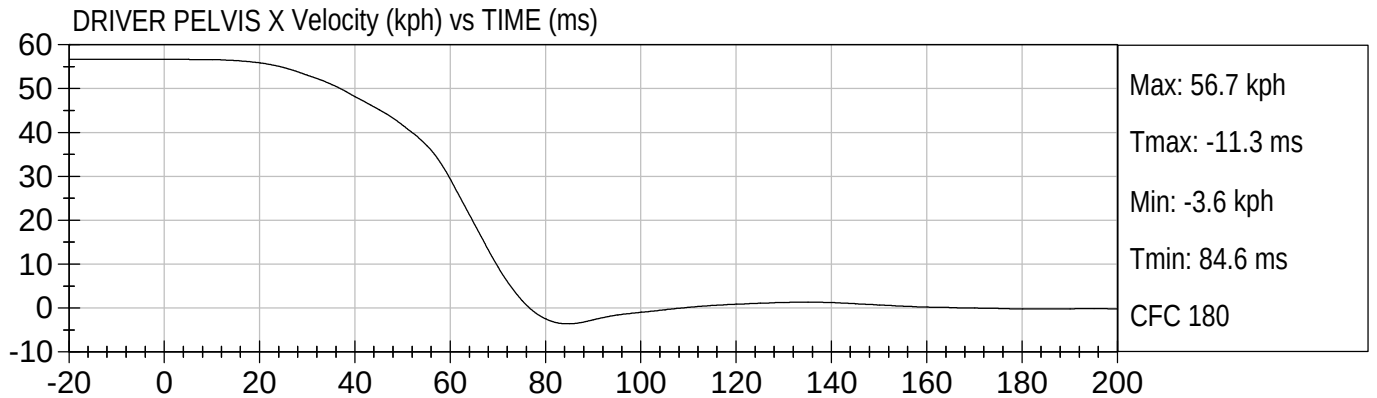






35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

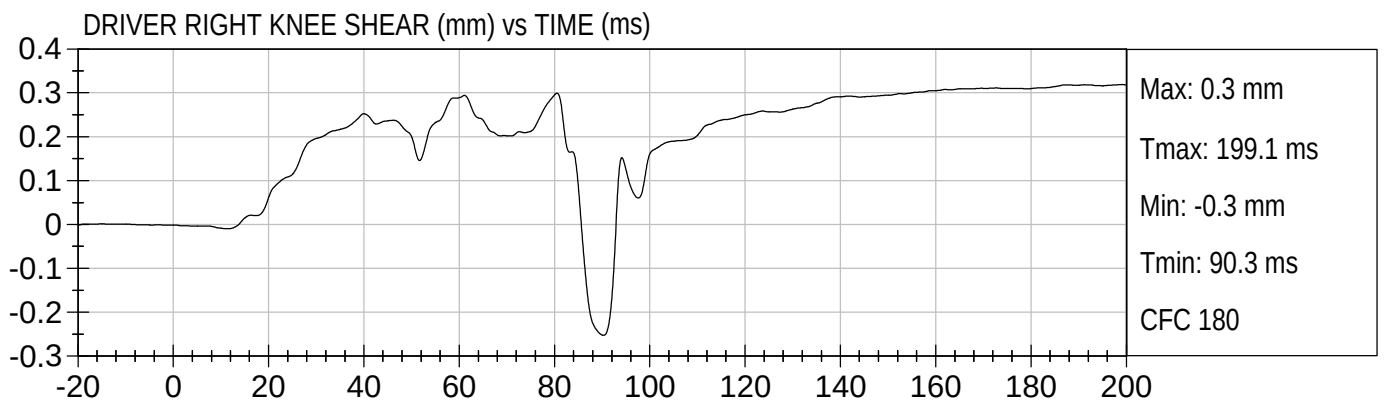
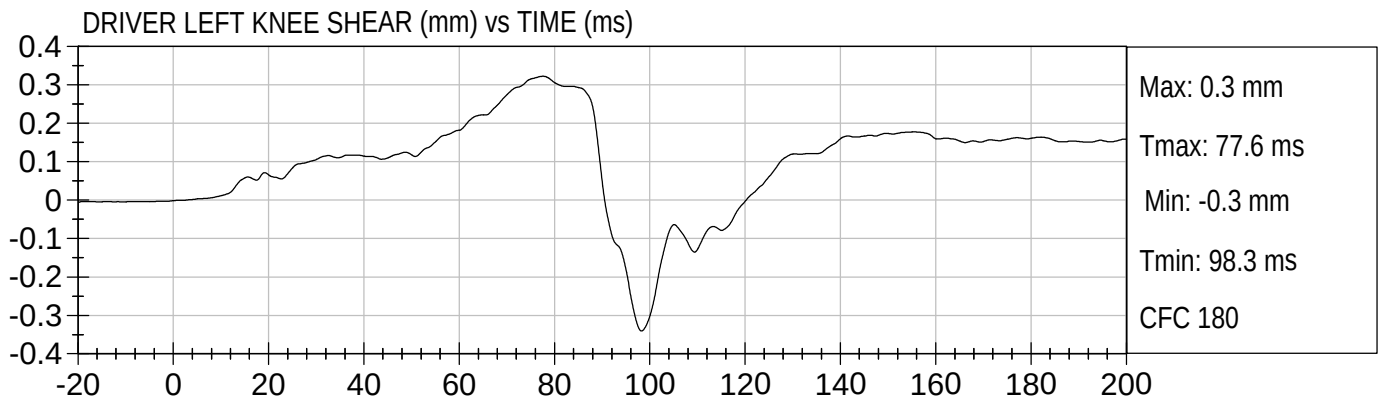
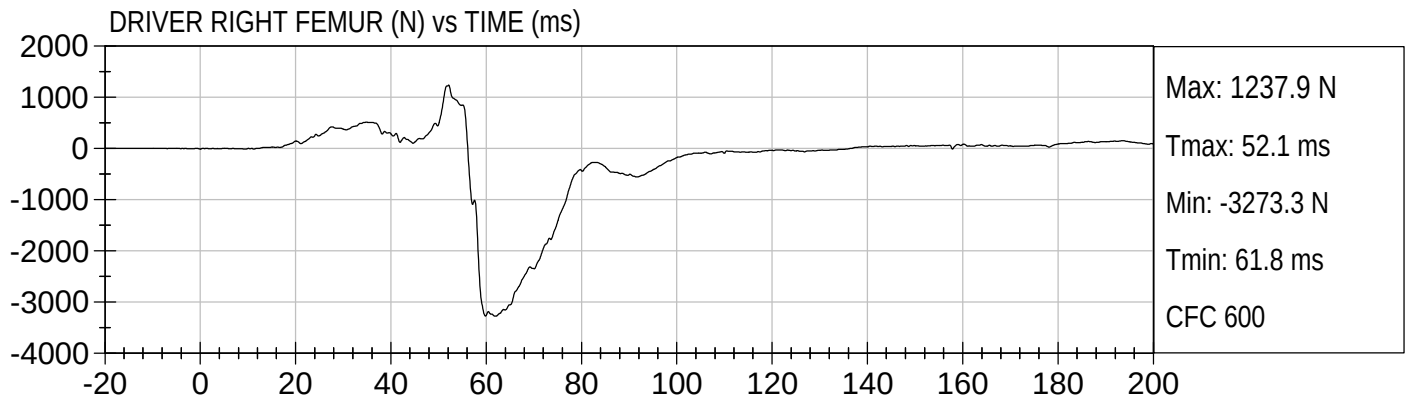
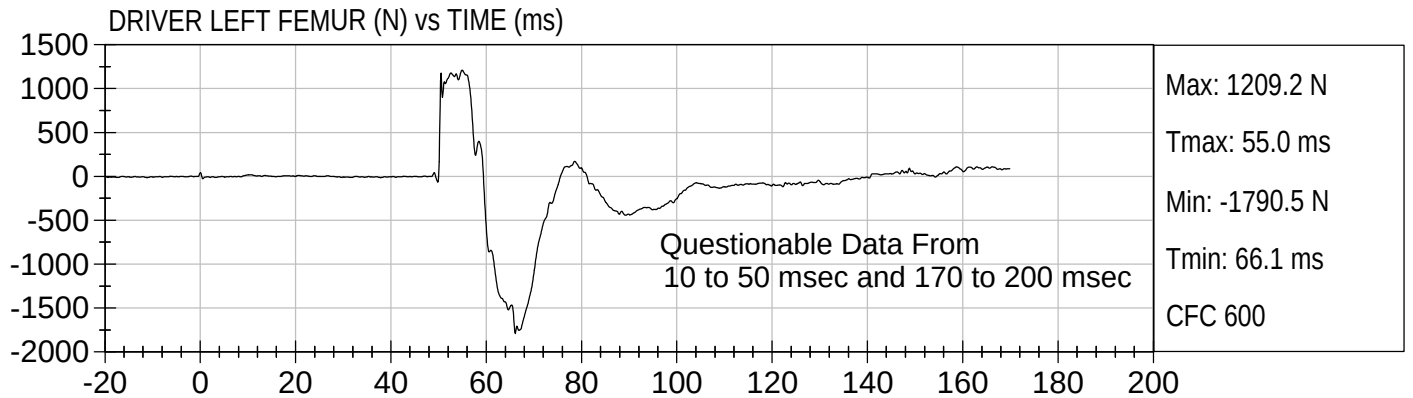
Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

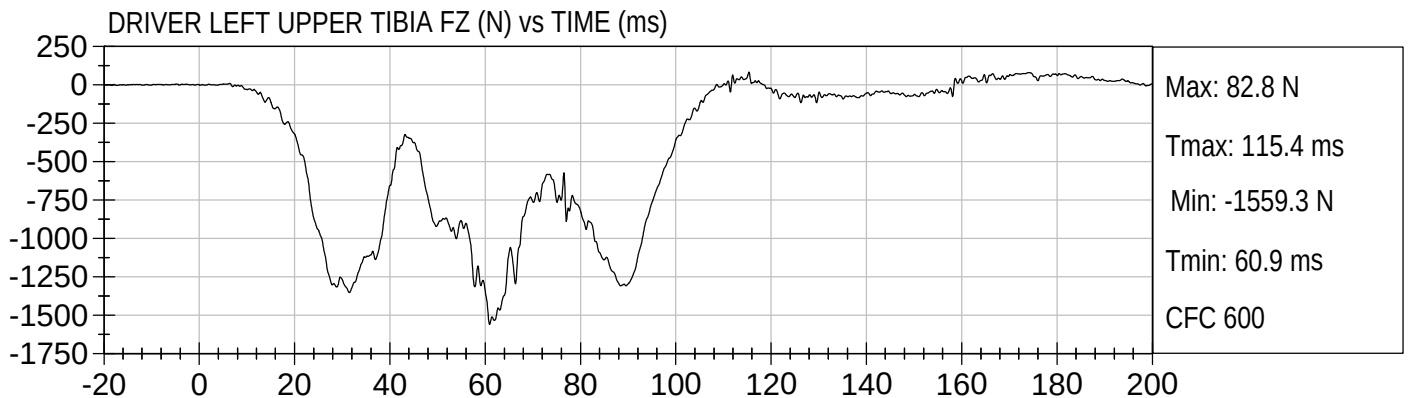
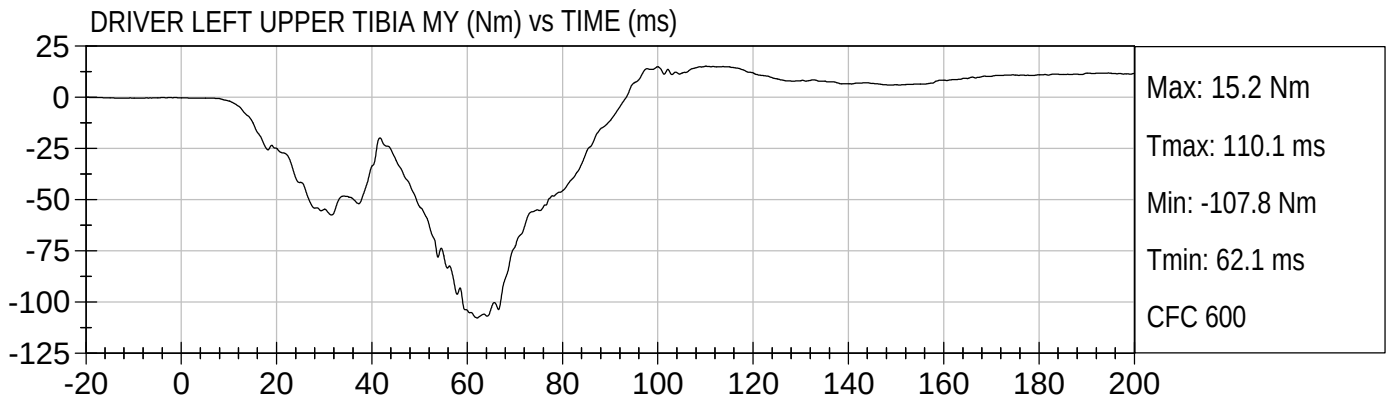
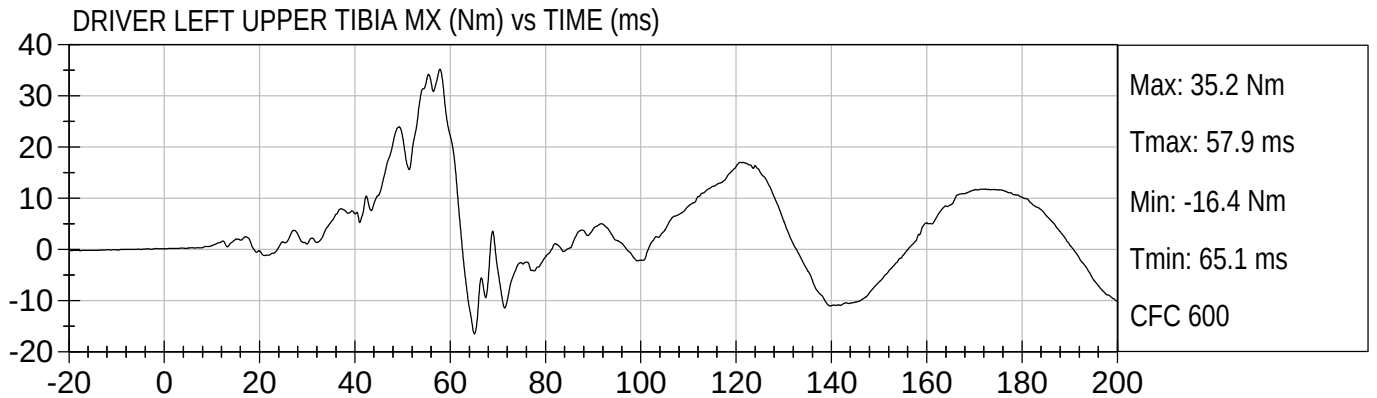






35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

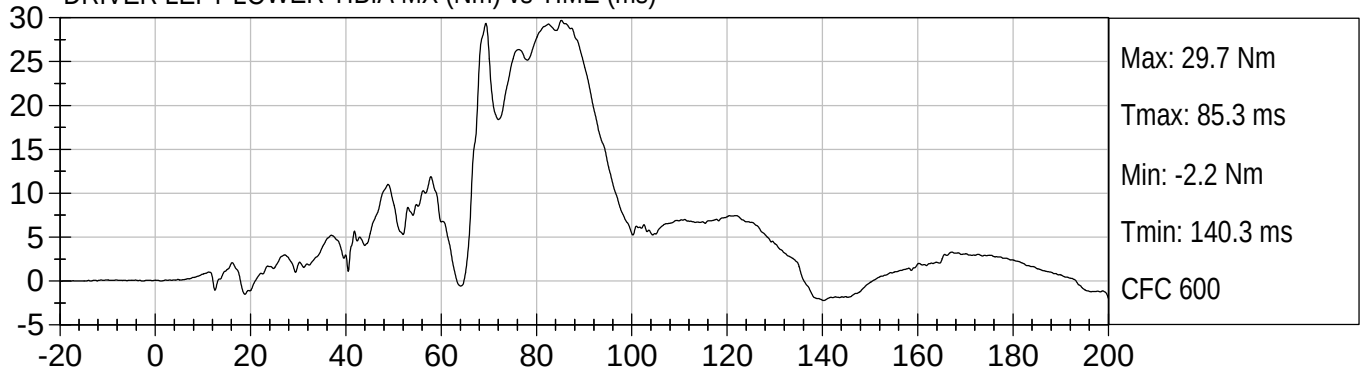




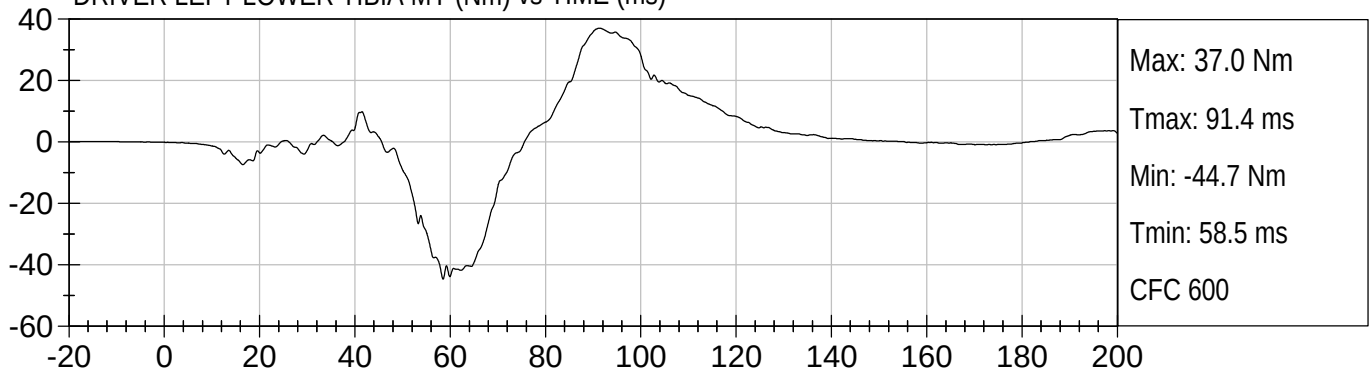
35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

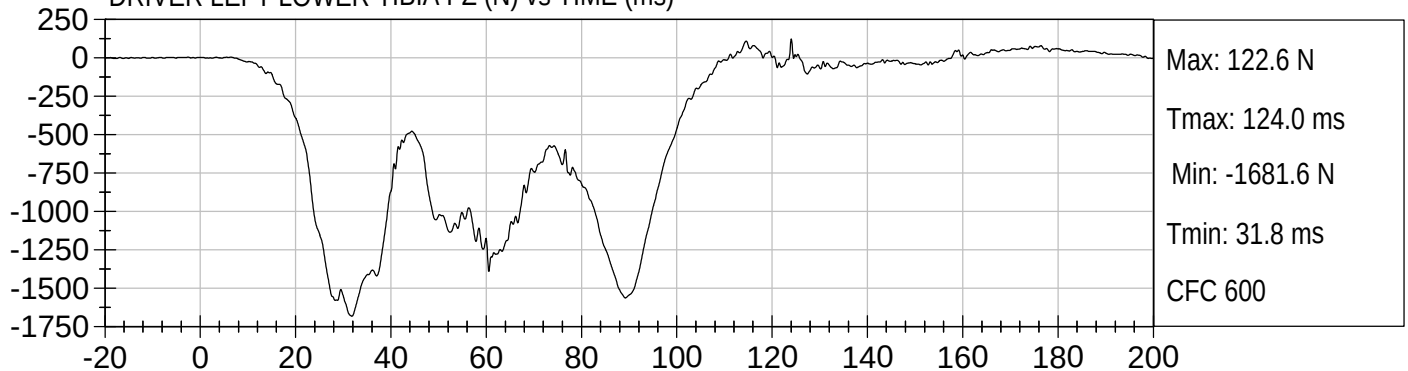
DRIVER LEFT LOWER TIBIA MX (Nm) vs TIME (ms)



DRIVER LEFT LOWER TIBIA MY (Nm) vs TIME (ms)



DRIVER LEFT LOWER TIBIA FZ (N) vs TIME (ms)



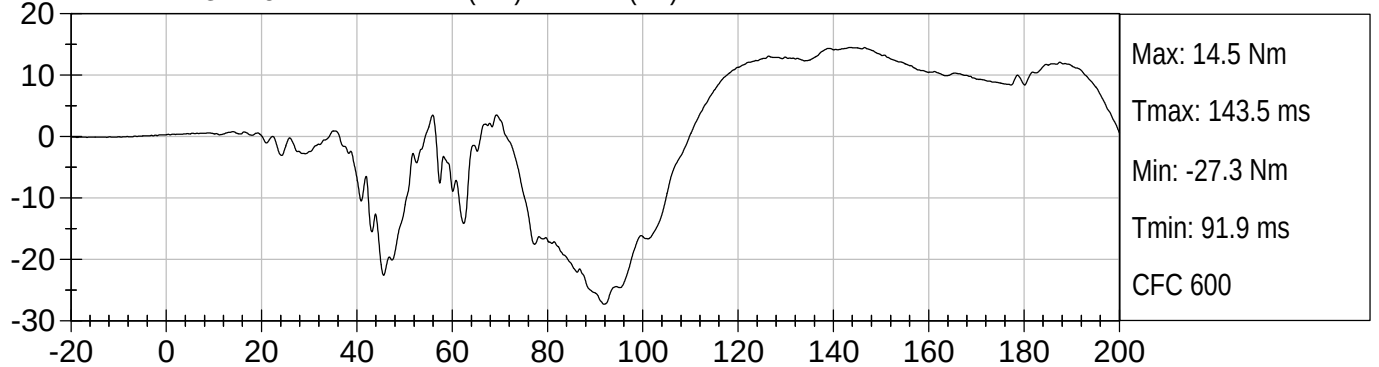




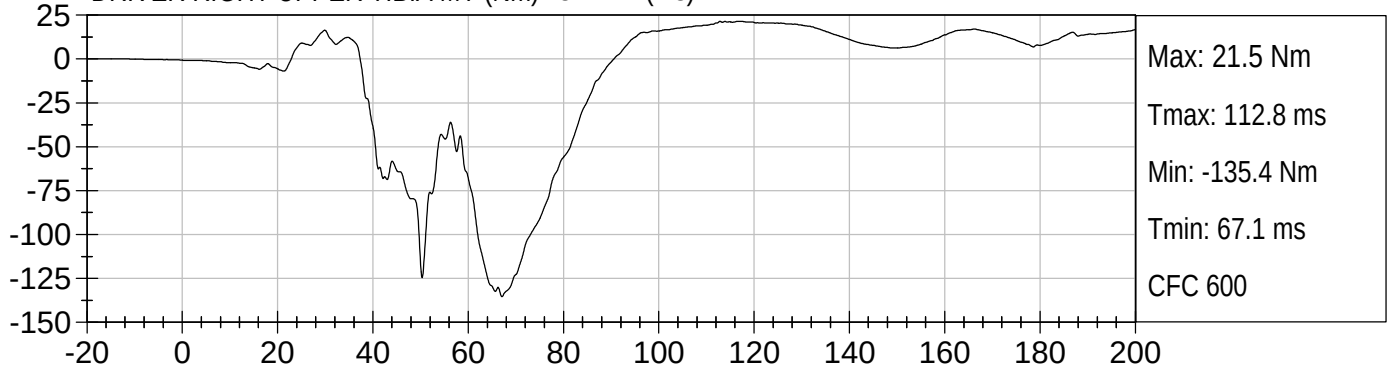
35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

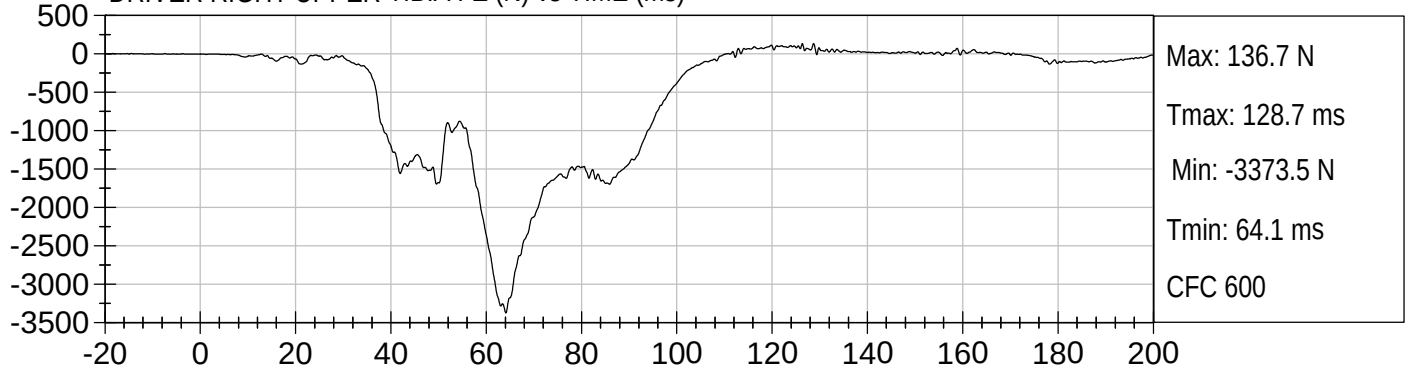
DRIVER RIGHT UPPER TIBIA MX (Nm) vs TIME (ms)



DRIVER RIGHT UPPER TIBIA MY (Nm) vs TIME (ms)



DRIVER RIGHT UPPER TIBIA FZ (N) vs TIME (ms)

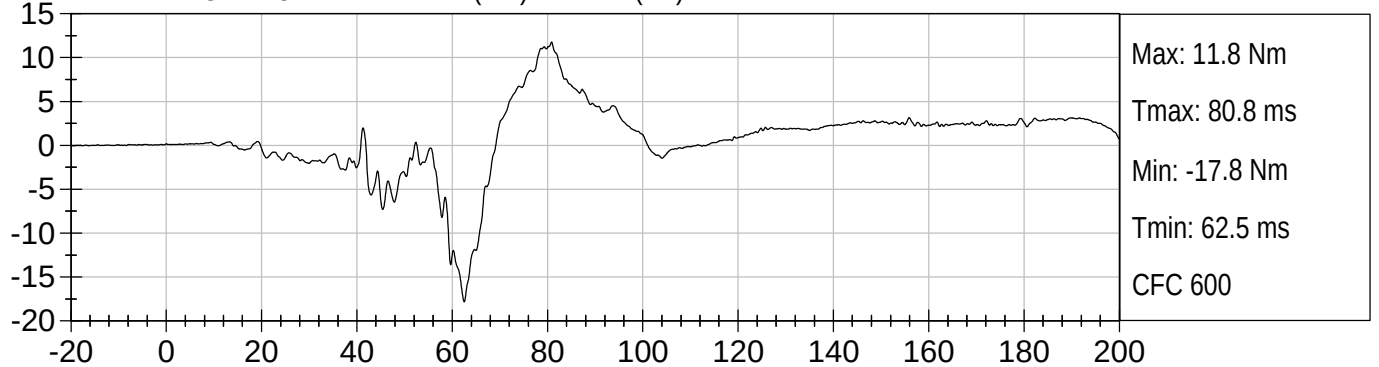




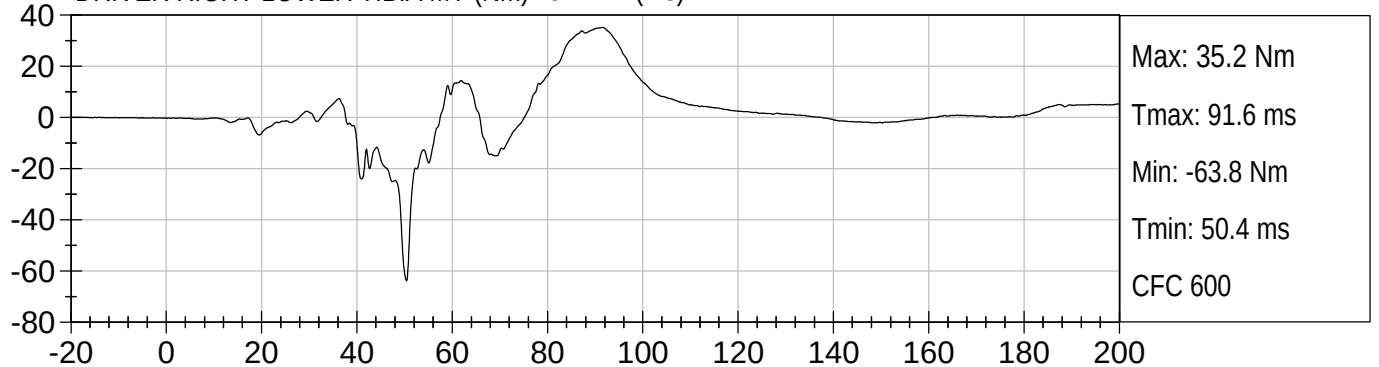
35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

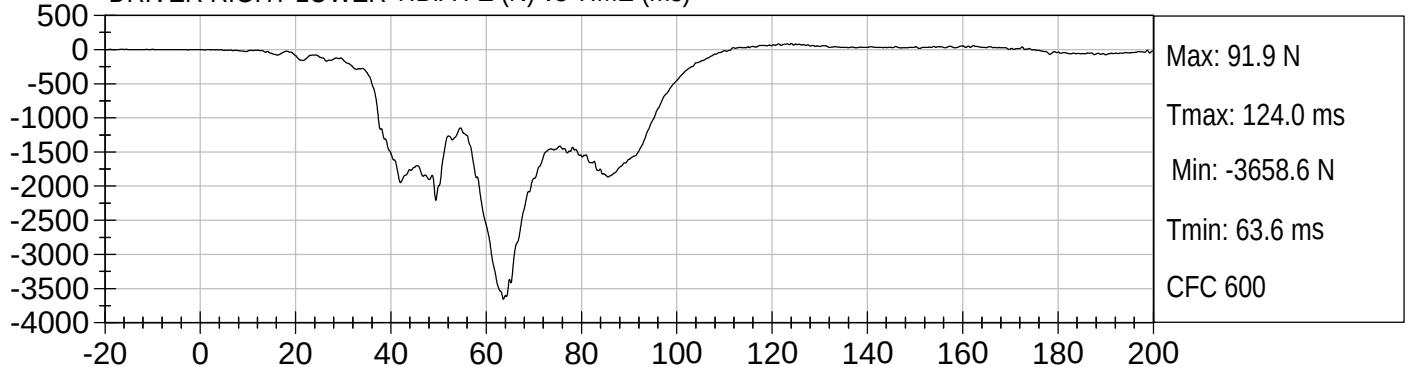
DRIVER RIGHT LOWER TIBIA MX (Nm) vs TIME (ms)



DRIVER RIGHT LOWER TIBIA MY (Nm) vs TIME (ms)



DRIVER RIGHT LOWER TIBIA FZ (N) vs TIME (ms)

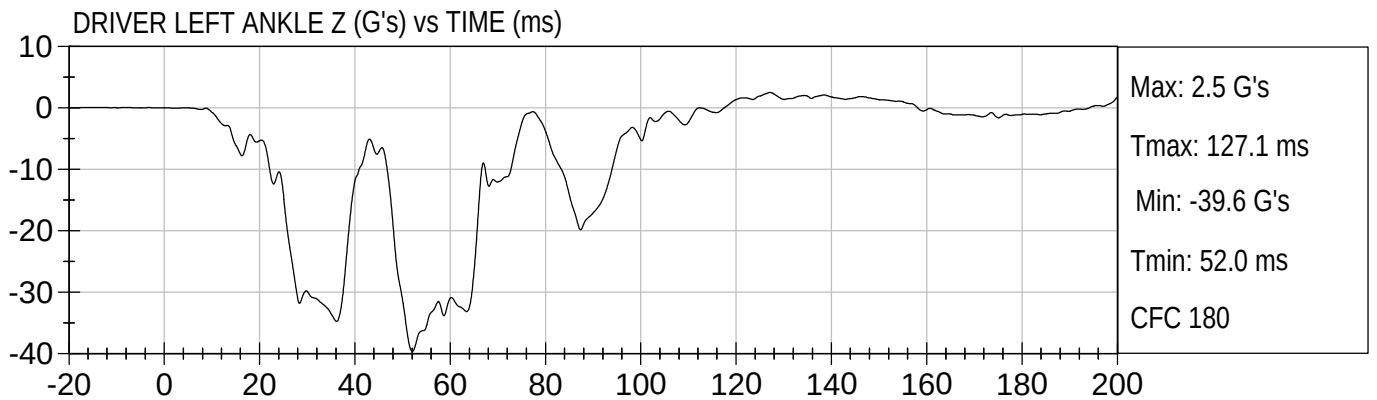
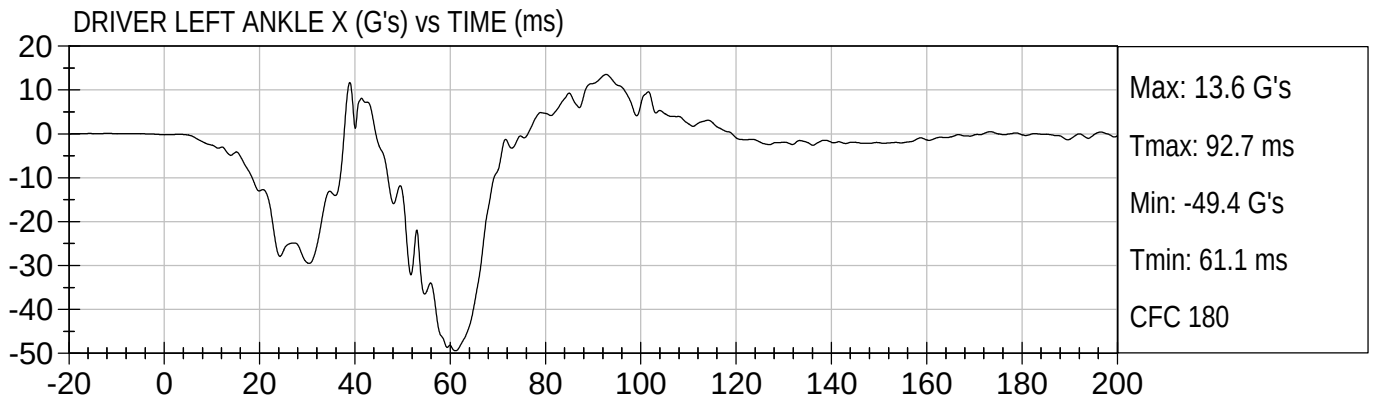
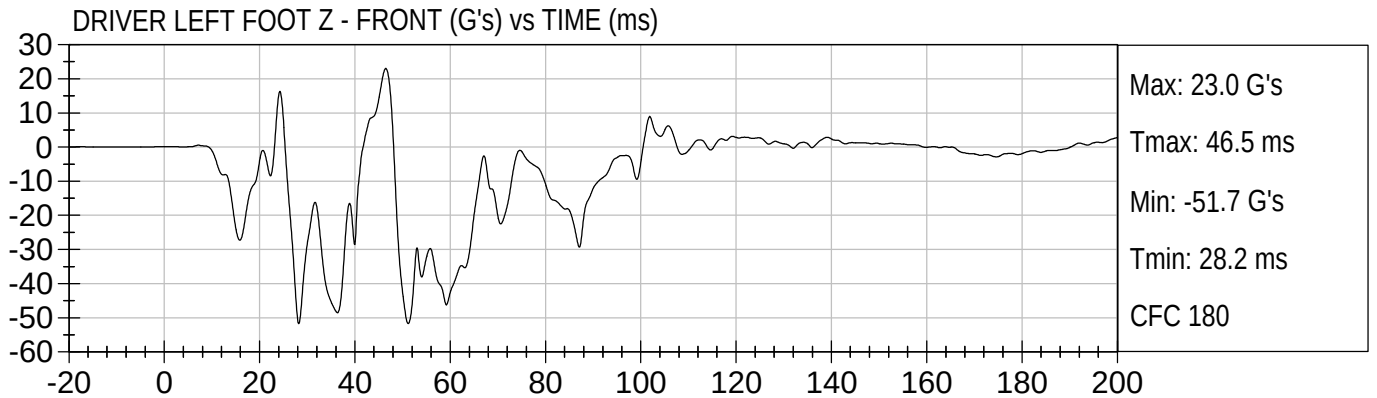






35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

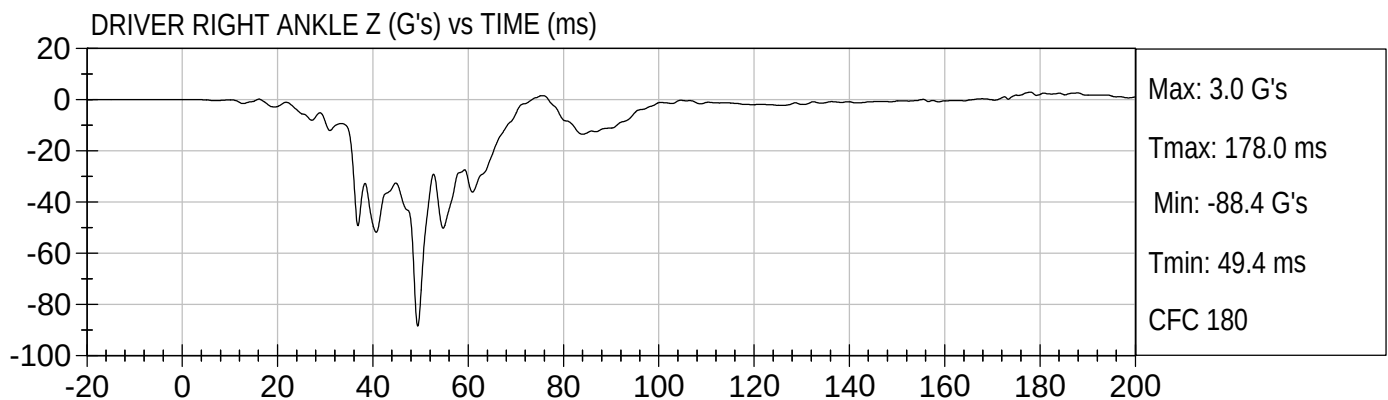
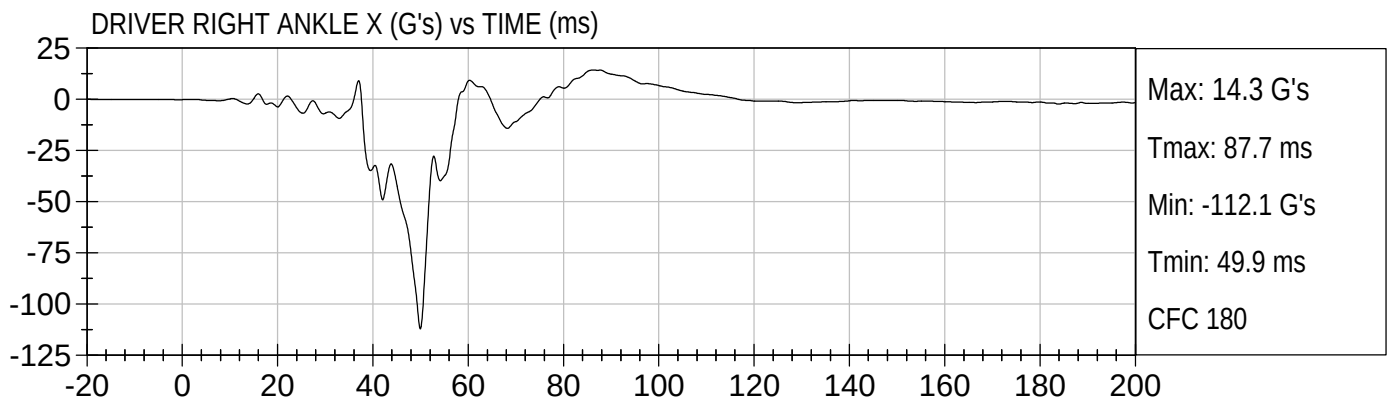
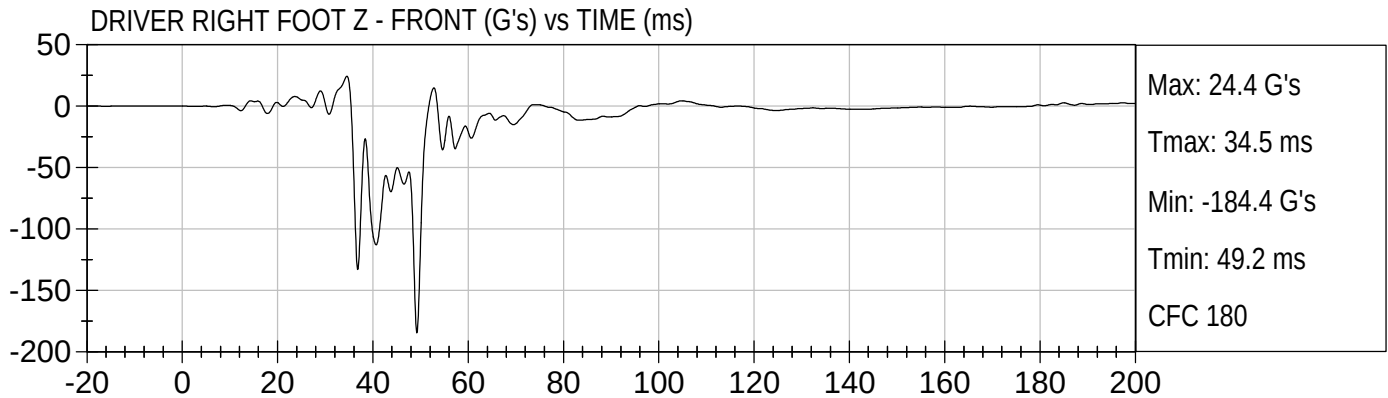
Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

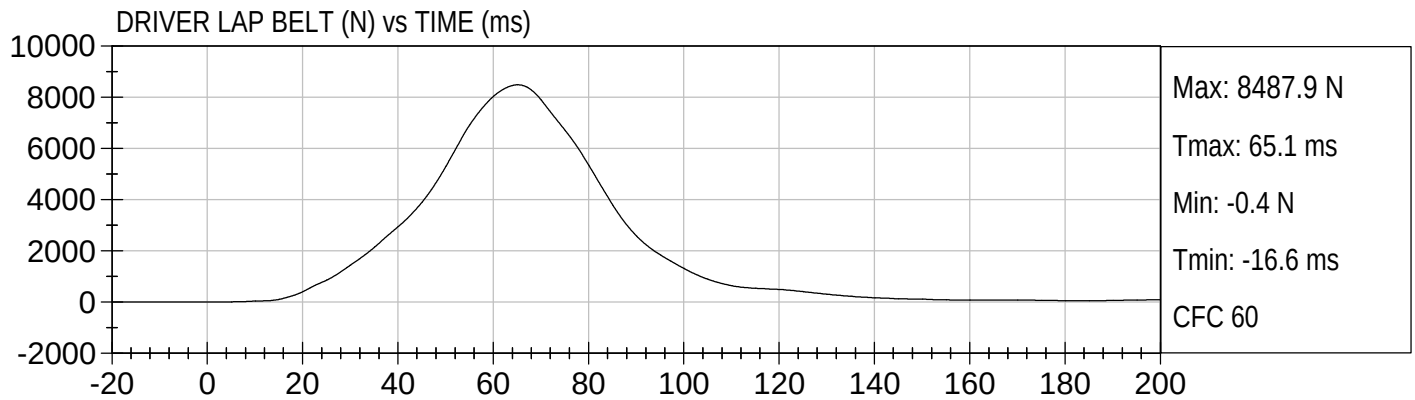
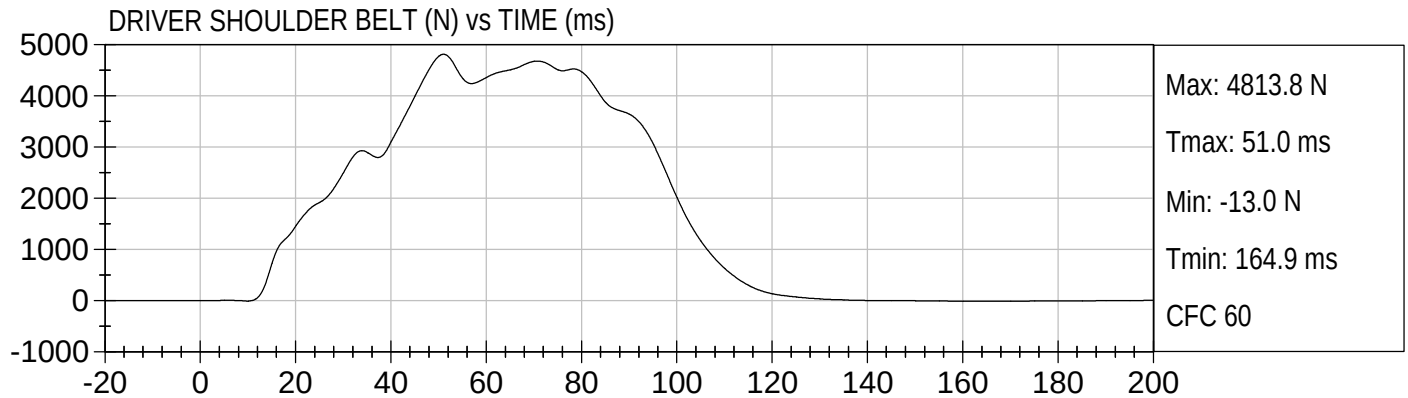






35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)



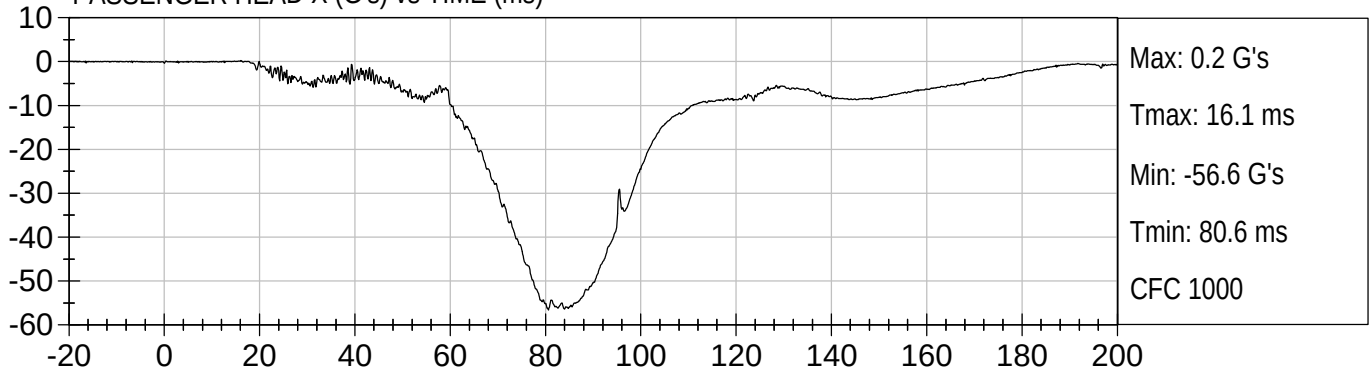
DRIVER BELT STRETCH (mm/M) vs TIME (ms)  
NO VALID DATA COLLECTED



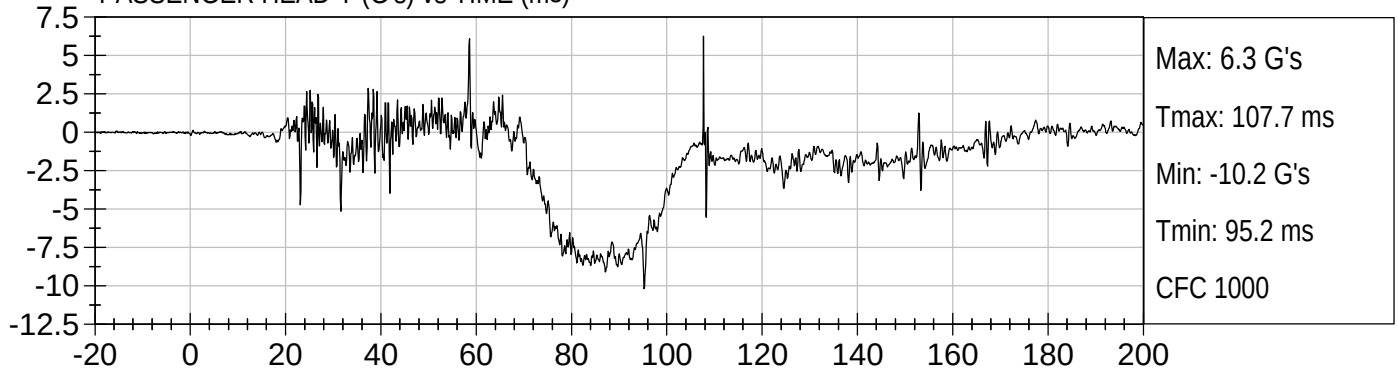
35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/01  
Speed: 35.2 mph (56.6 km/h)

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



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



PASSENGER HEAD Z (G's) vs TIME (ms)  
NO VALID DATA COLLECTED

PASSENGER HEAD Resultant (G's) vs TIME (ms)  
NO VALID DATA COLLECTED

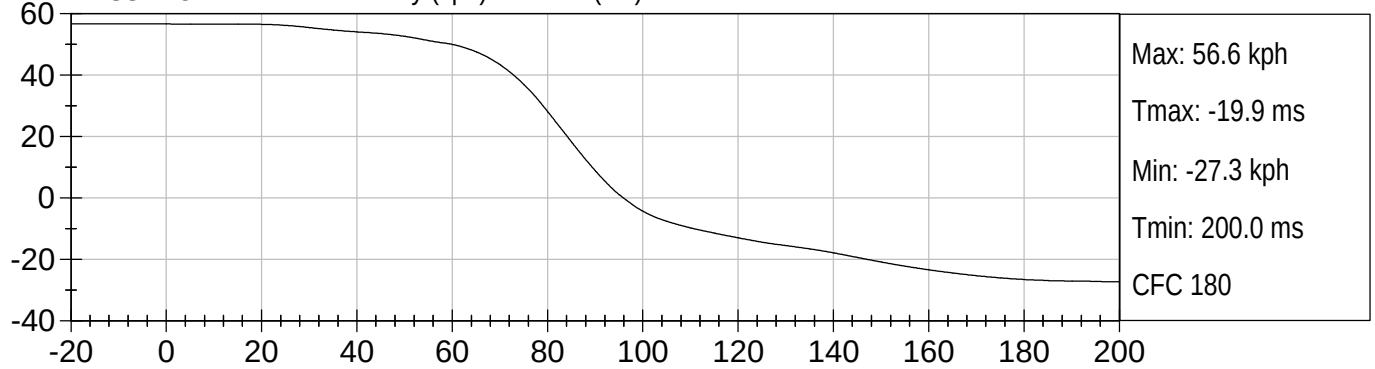




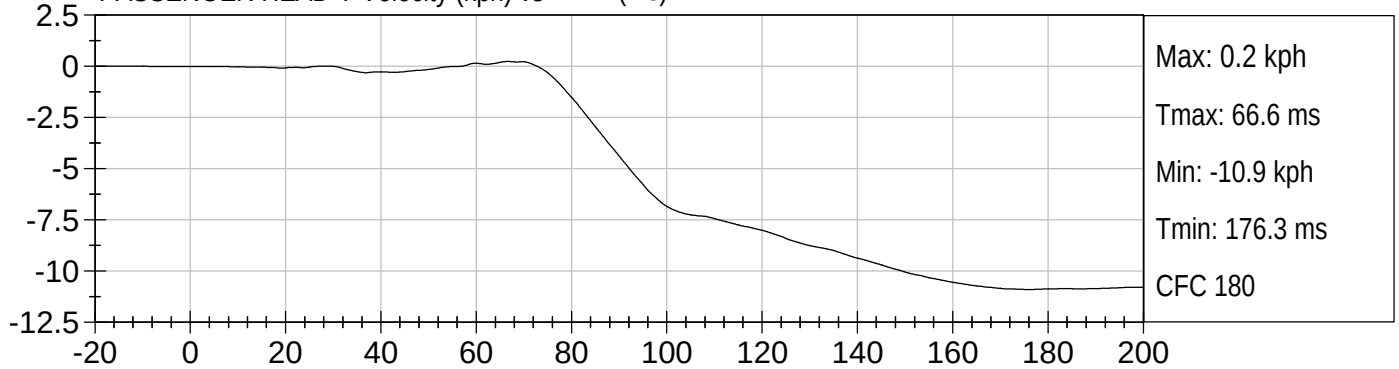
35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/01  
Speed: 35.2 mph (56.6 km/h)

PASSENGER HEAD X Velocity (kph) vs TIME (ms)



PASSENGER HEAD Y Velocity (kph) vs TIME (ms)

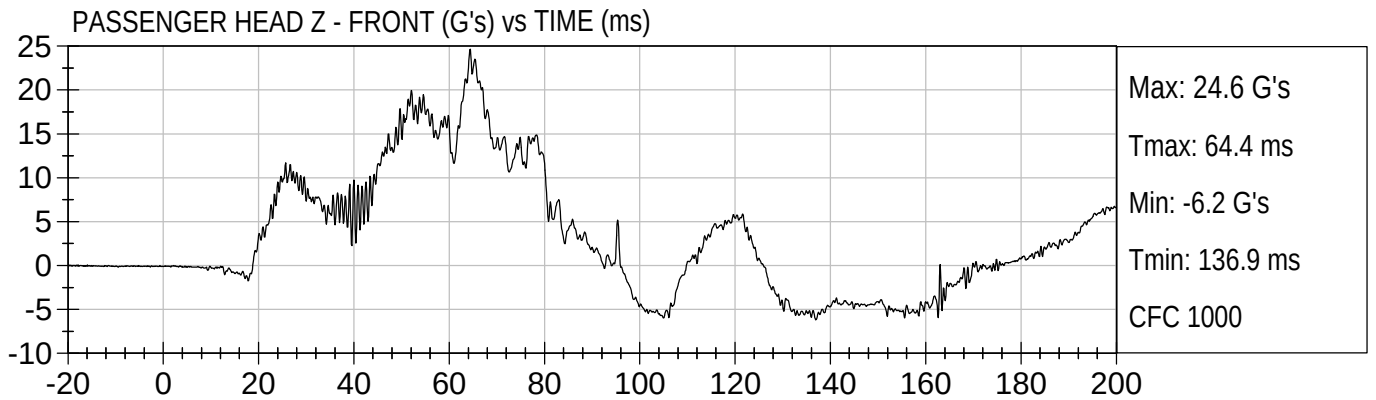
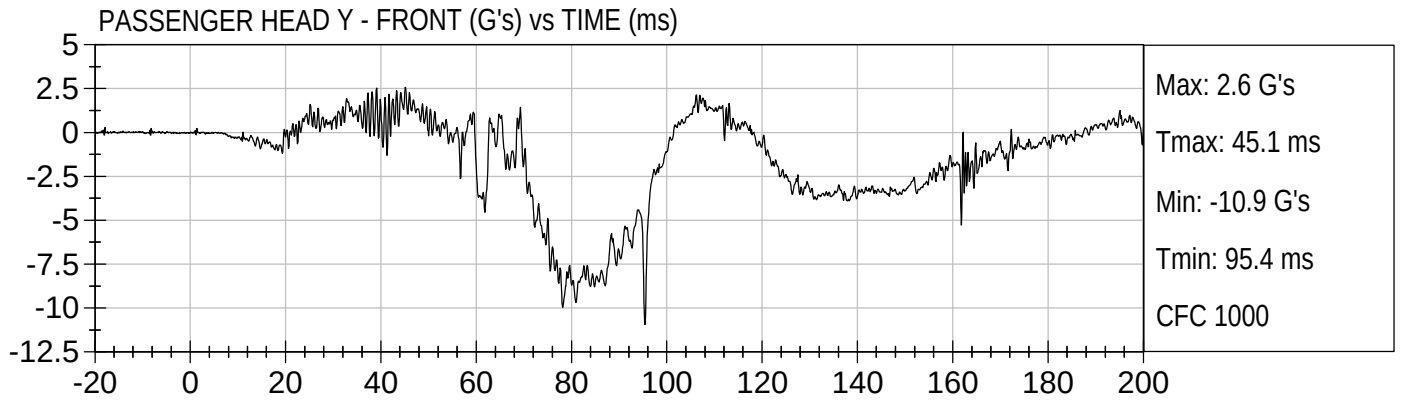


PASSENGER HEAD Z Velocity (kph) vs TIME (ms)  
NO VALID DATA COLLECTED



35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

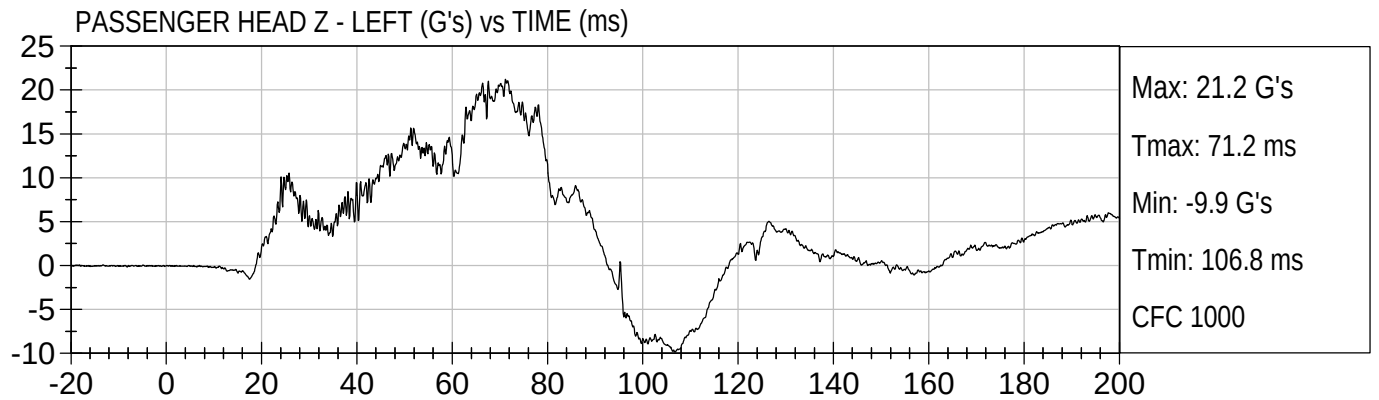
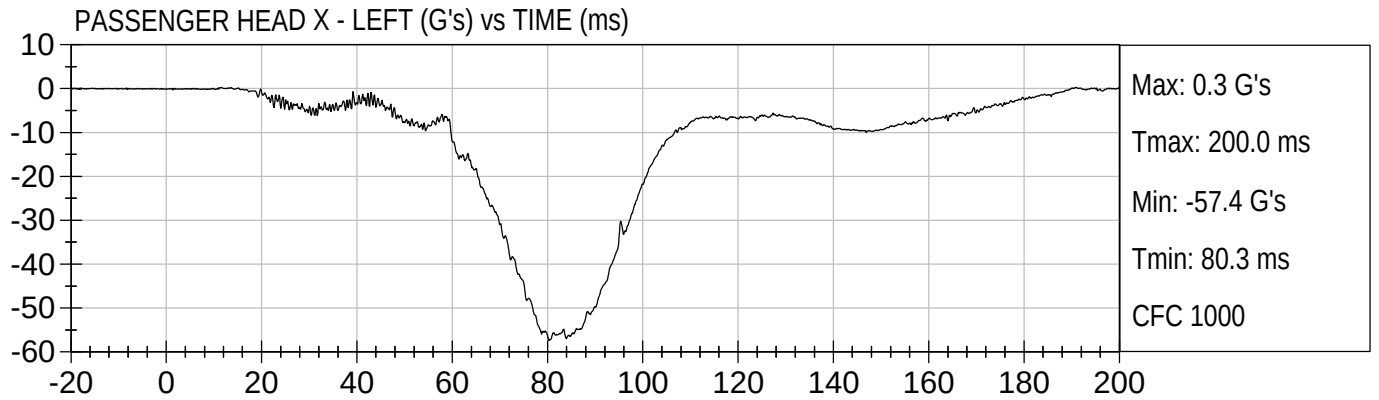






35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

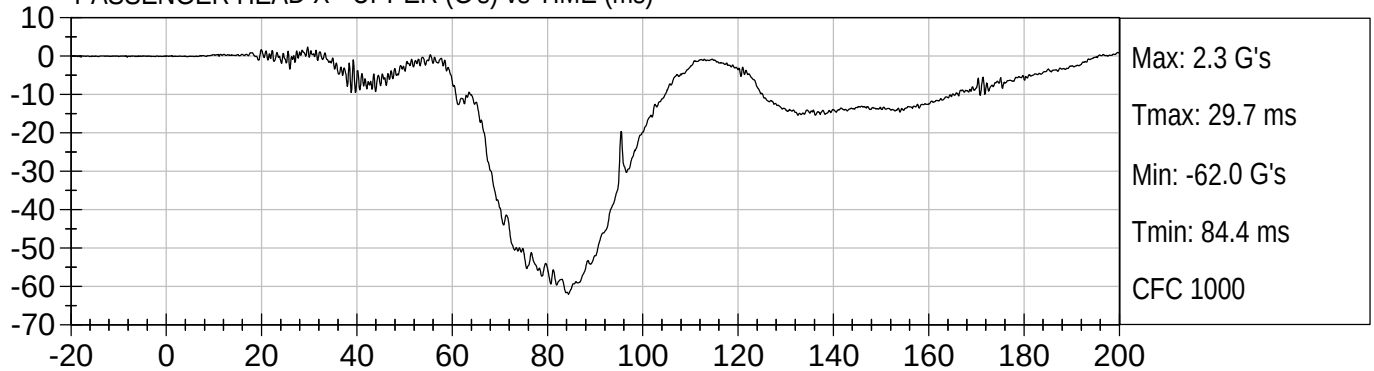




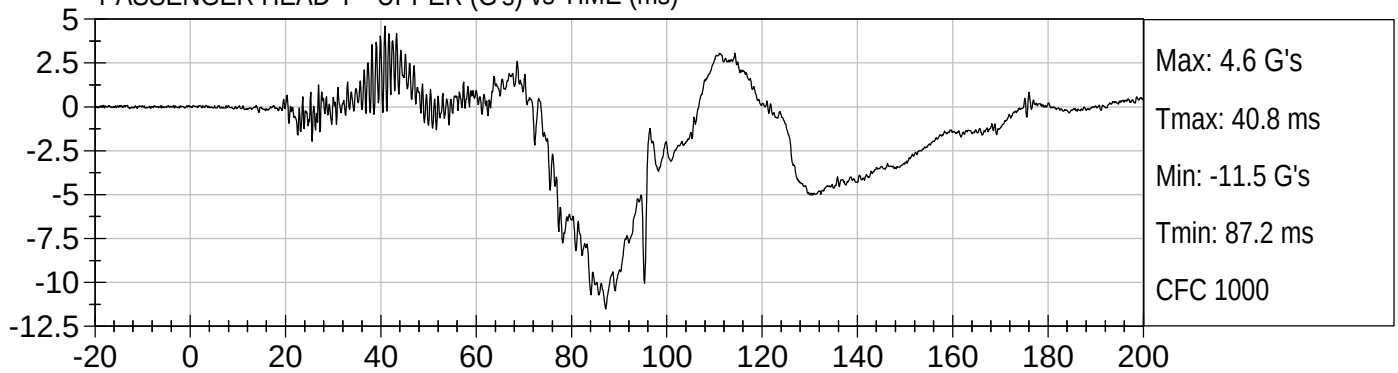
35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

PASSENGER HEAD X - UPPER (G's) vs TIME (ms)



PASSENGER HEAD Y - UPPER (G's) vs TIME (ms)



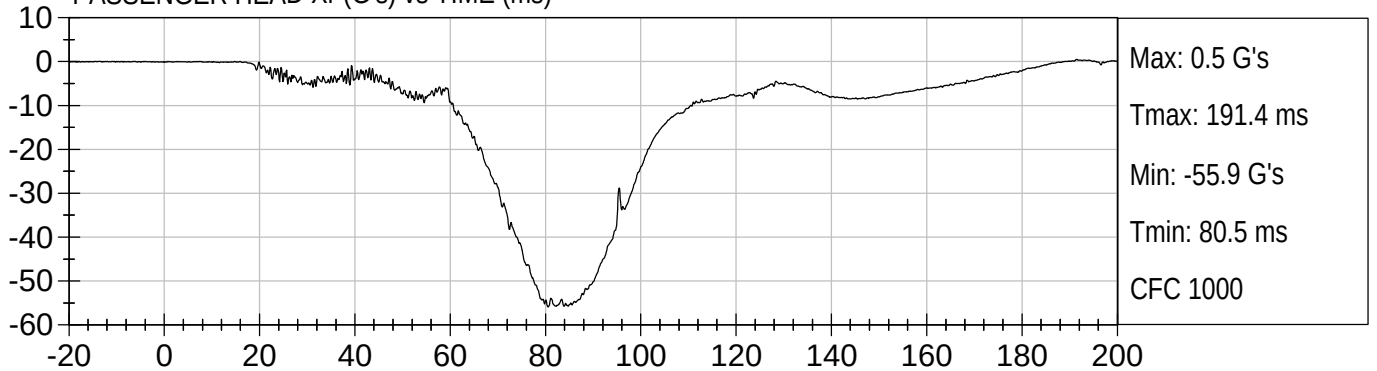




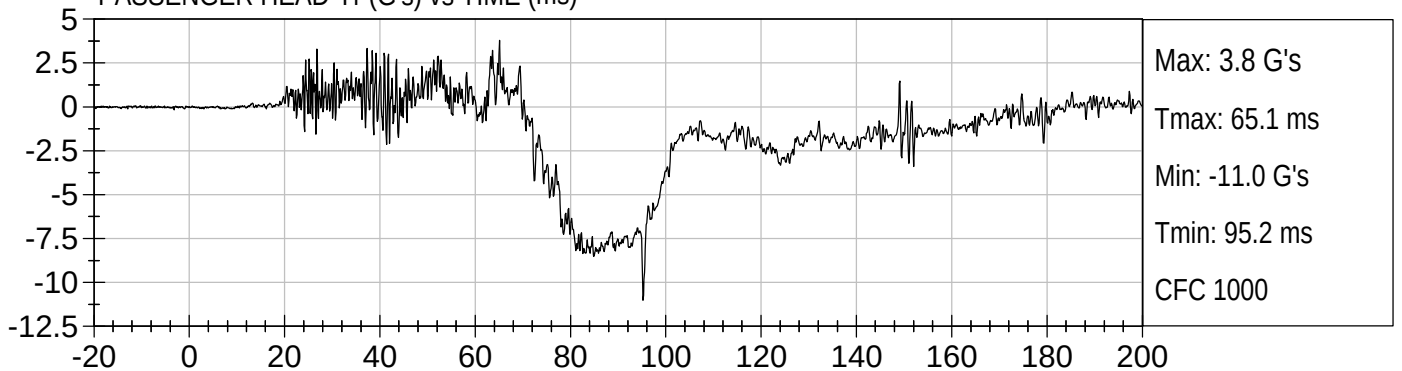
35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

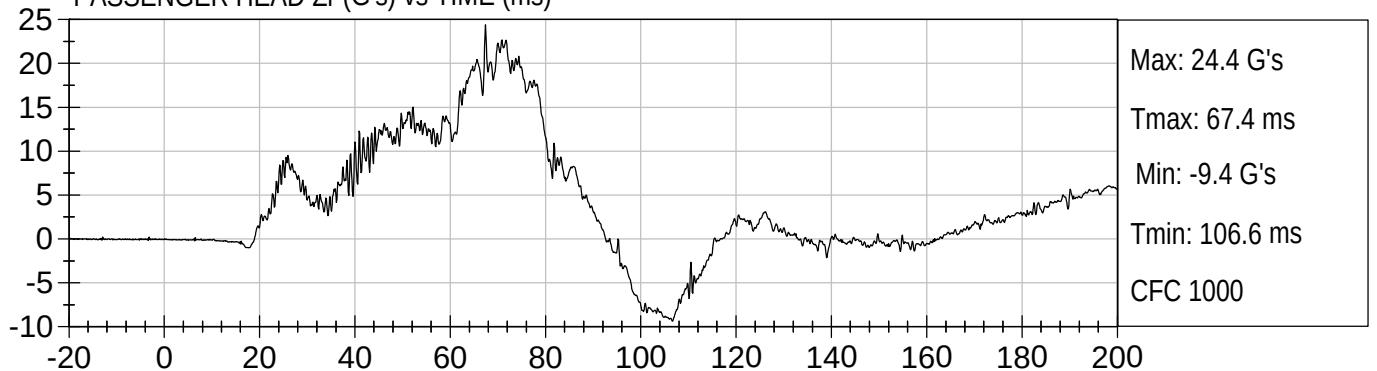
PASSENGER HEAD Xr (G's) vs TIME (ms)



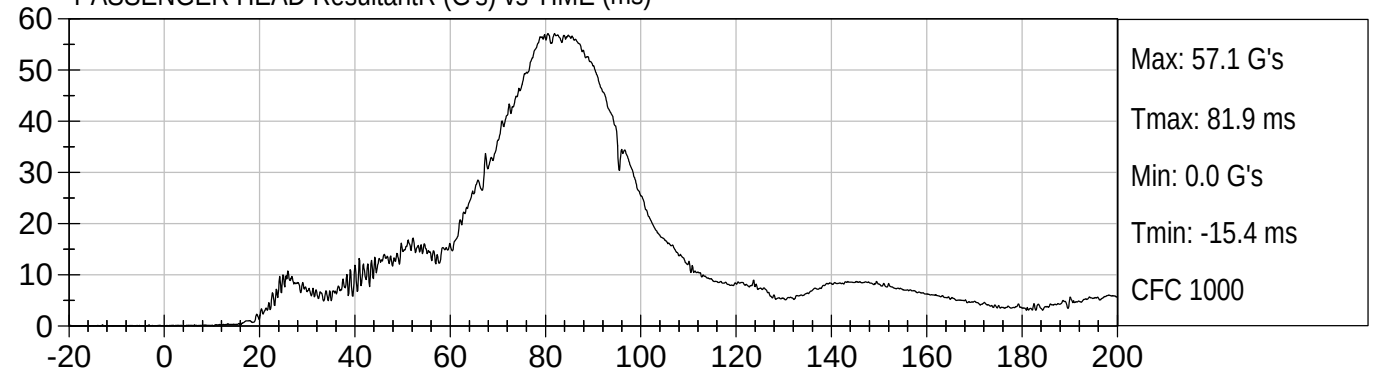
PASSENGER HEAD Yr (G's) vs TIME (ms)



PASSENGER HEAD Zr (G's) vs TIME (ms)



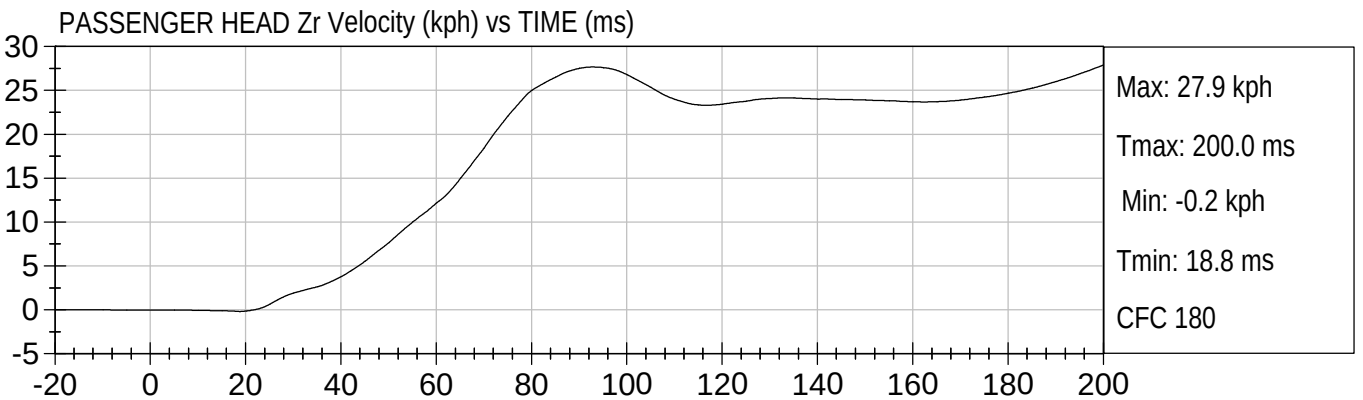
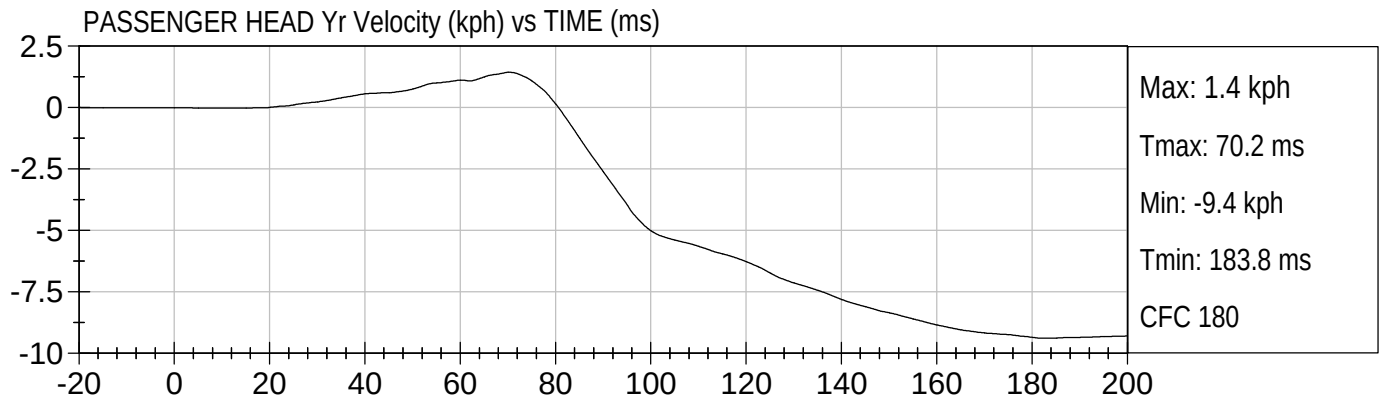
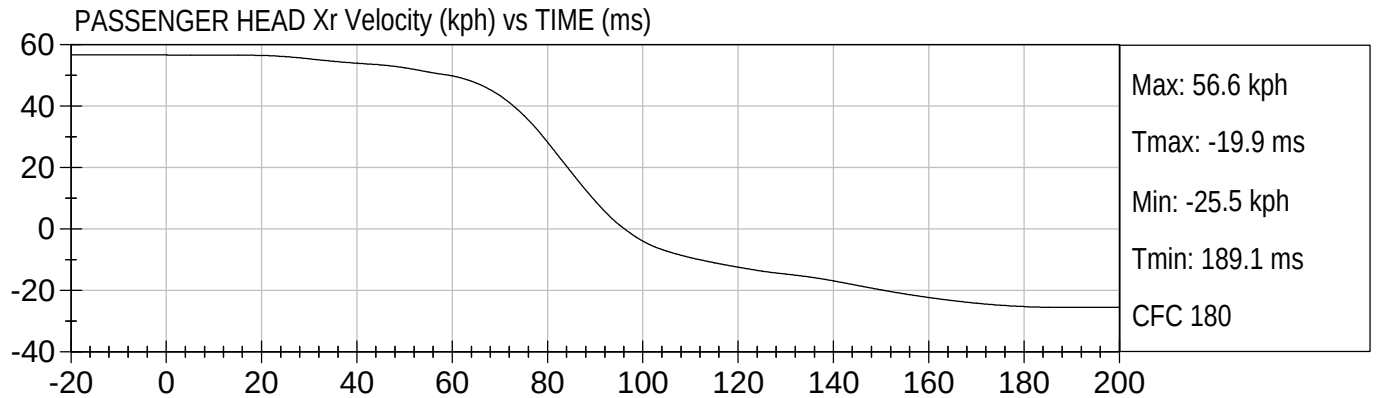
PASSENGER HEAD ResultantR (G's) vs TIME (ms)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

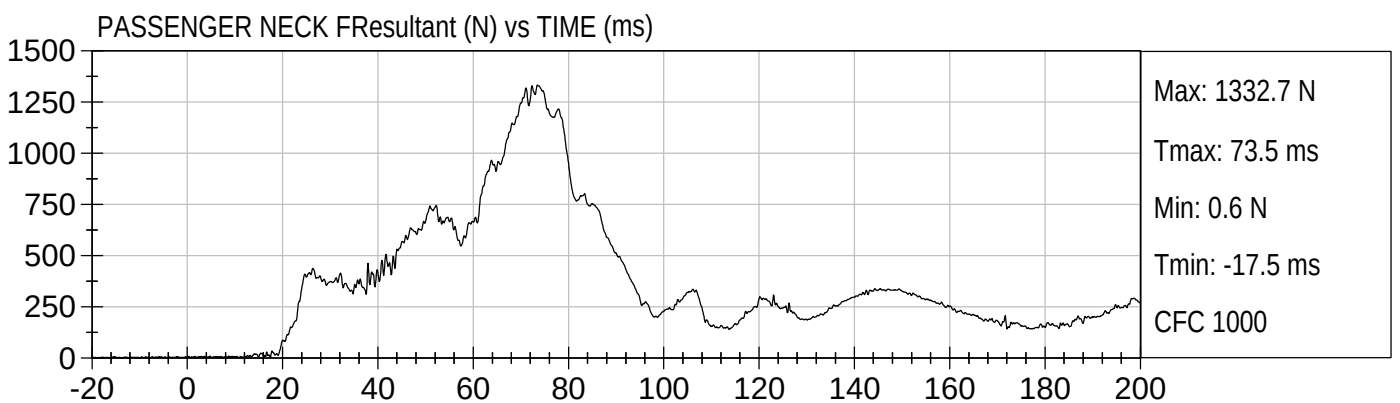
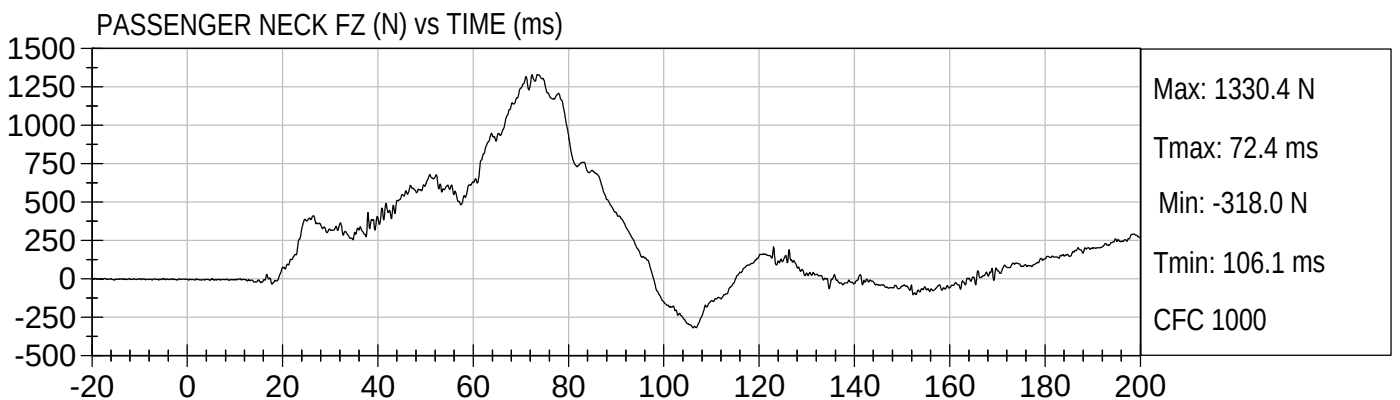
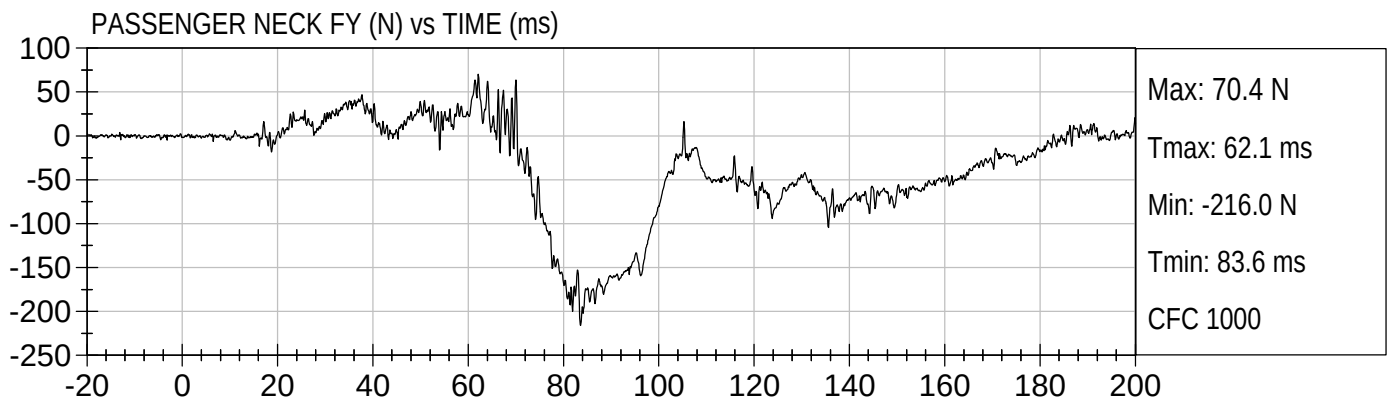
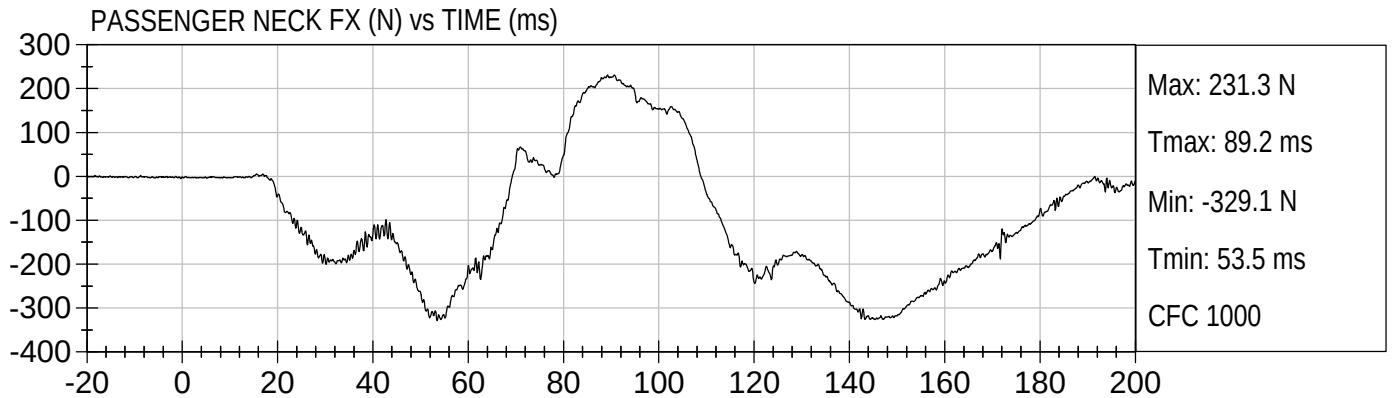
Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

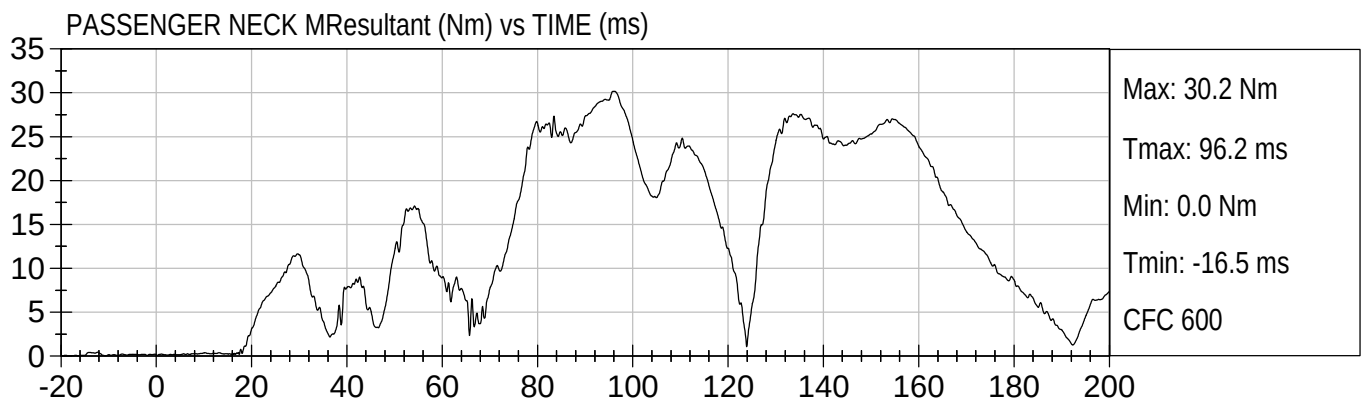
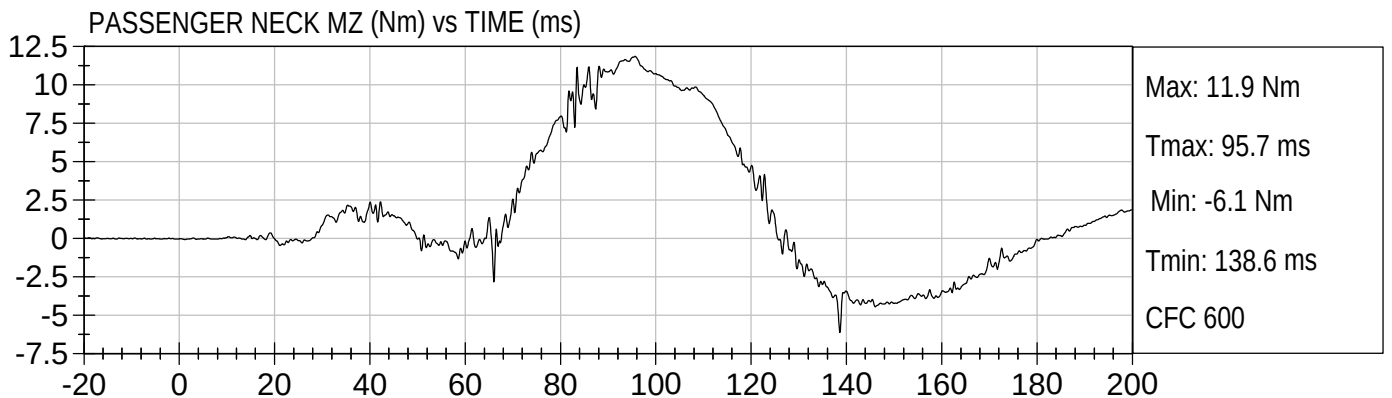
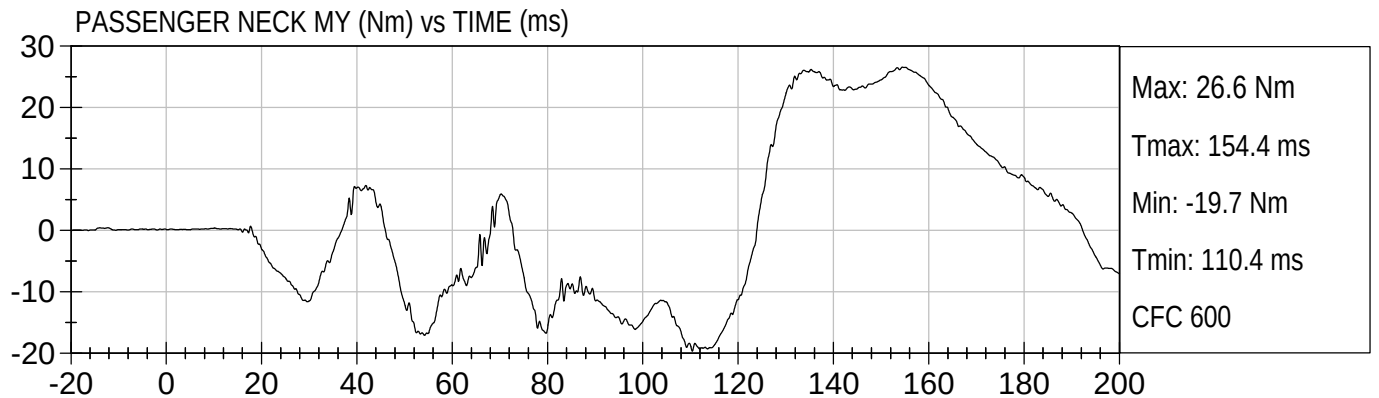
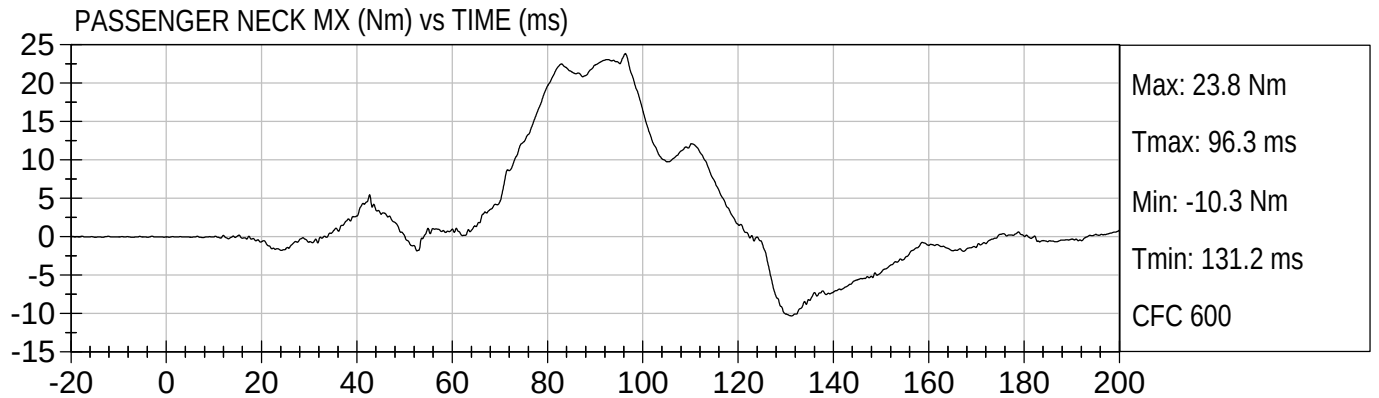






35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

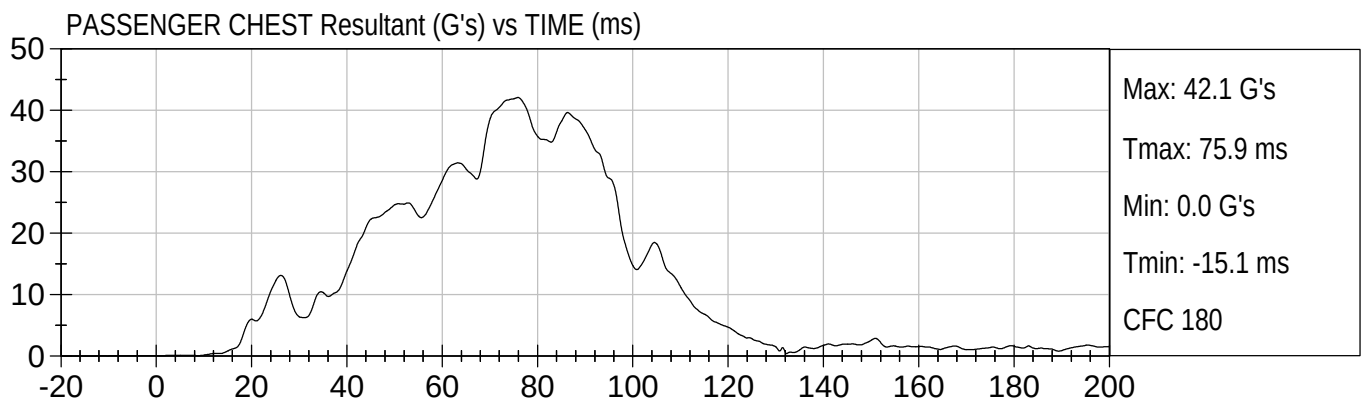
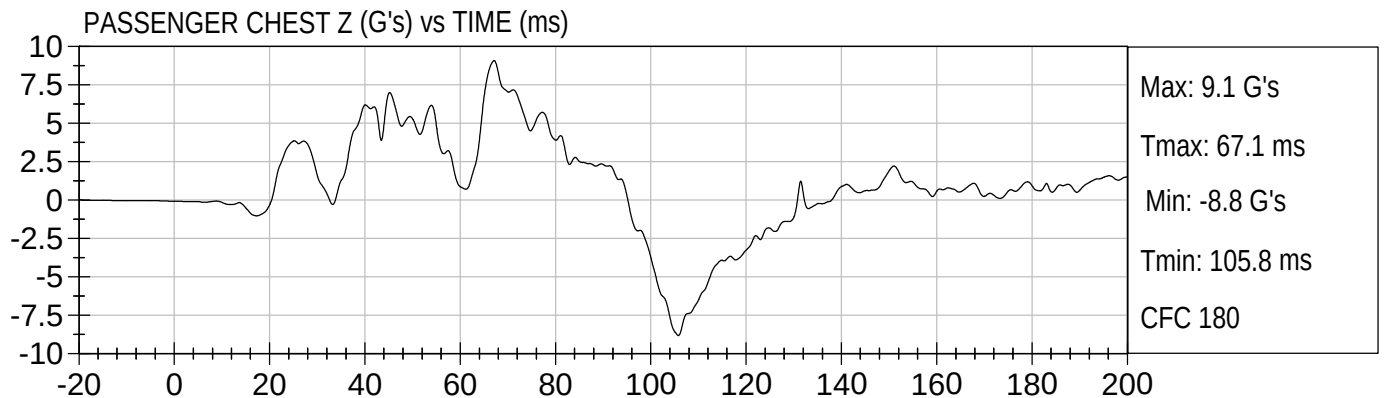
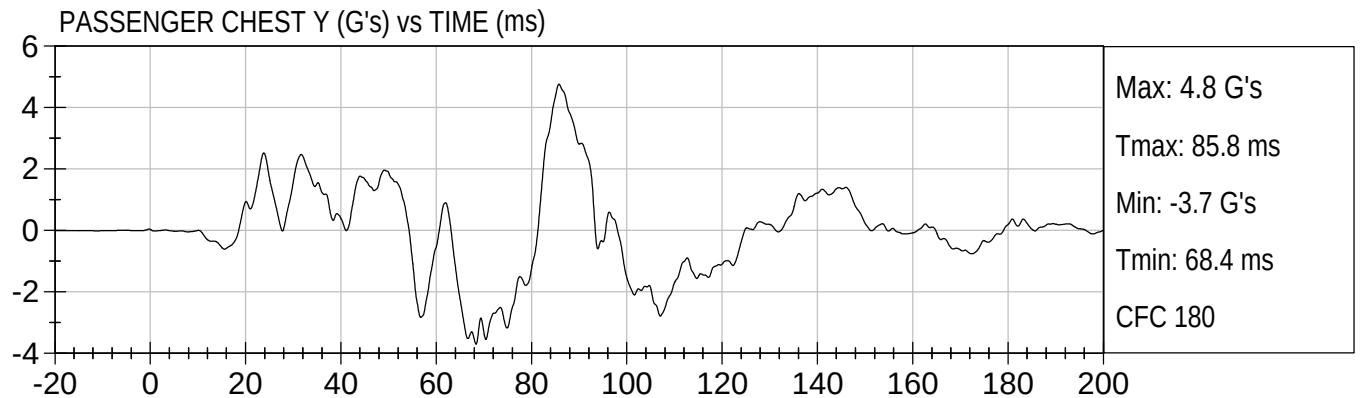
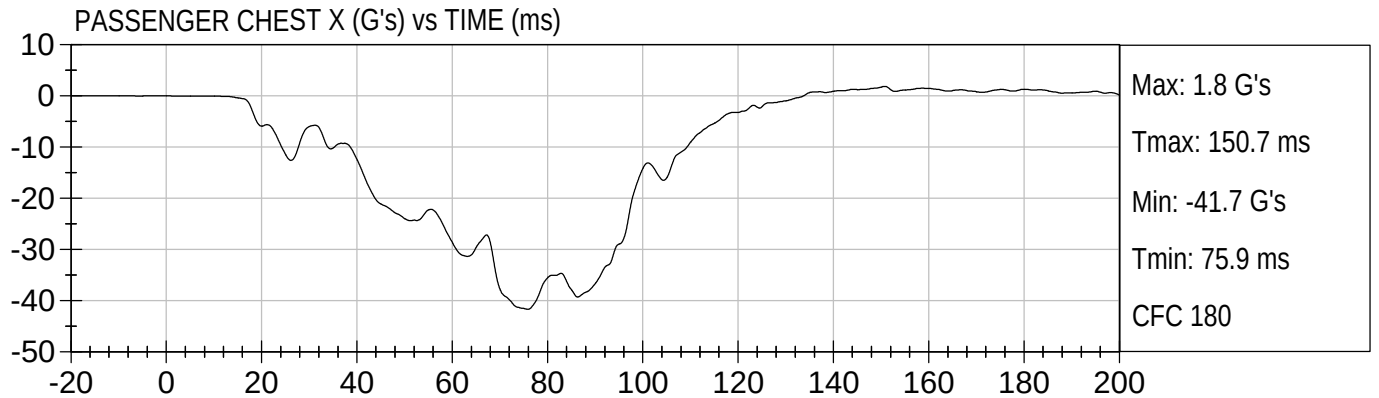
Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/01  
Speed: 35.2 mph (56.6 km/h)

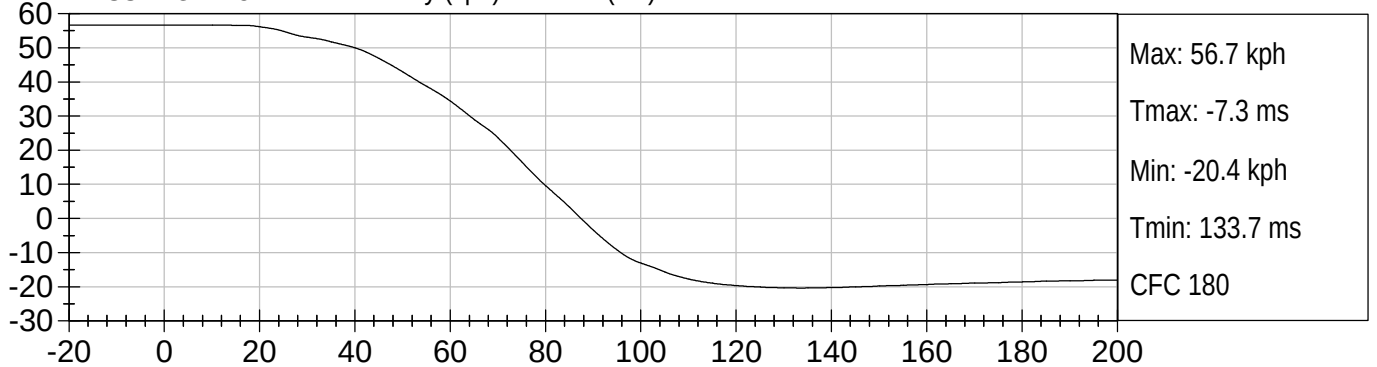




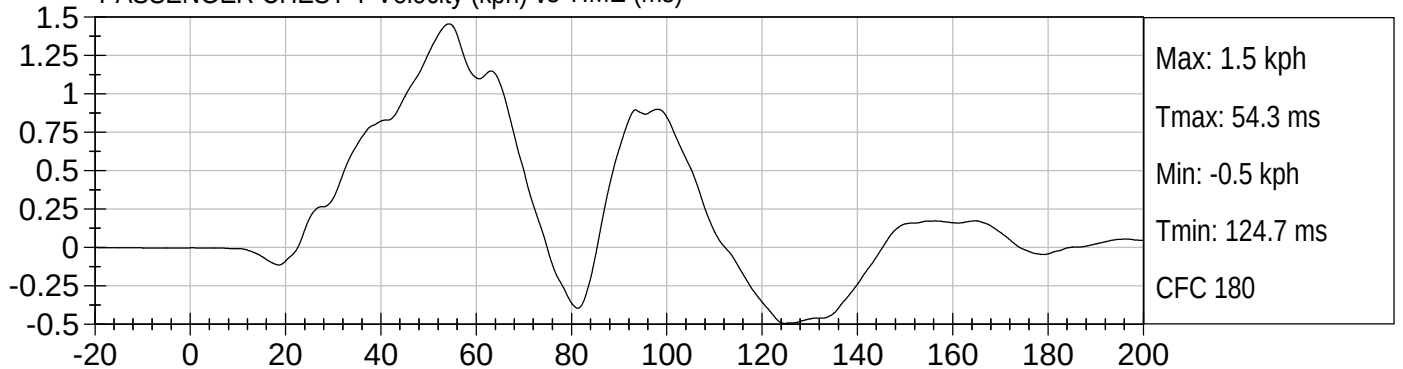
35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

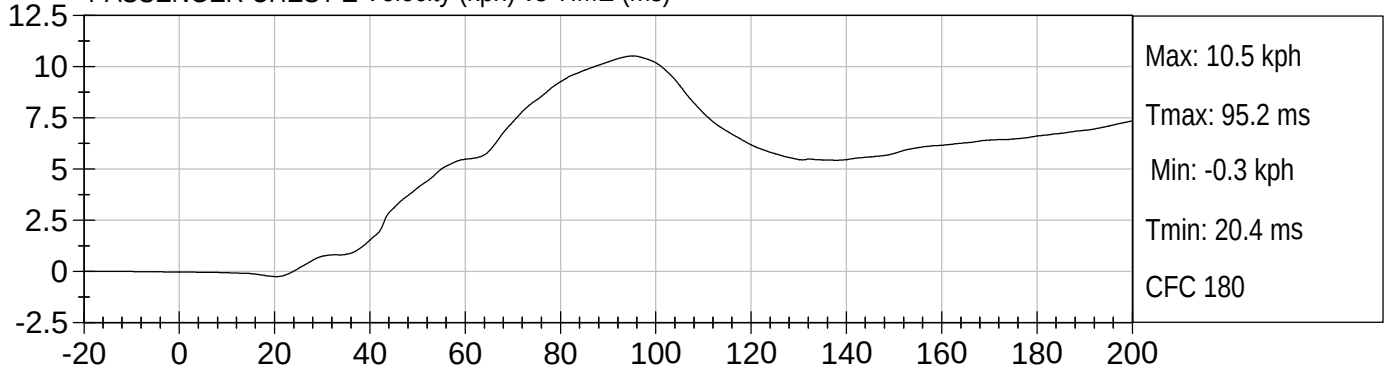
PASSENGER CHEST X Velocity (kph) vs TIME (ms)



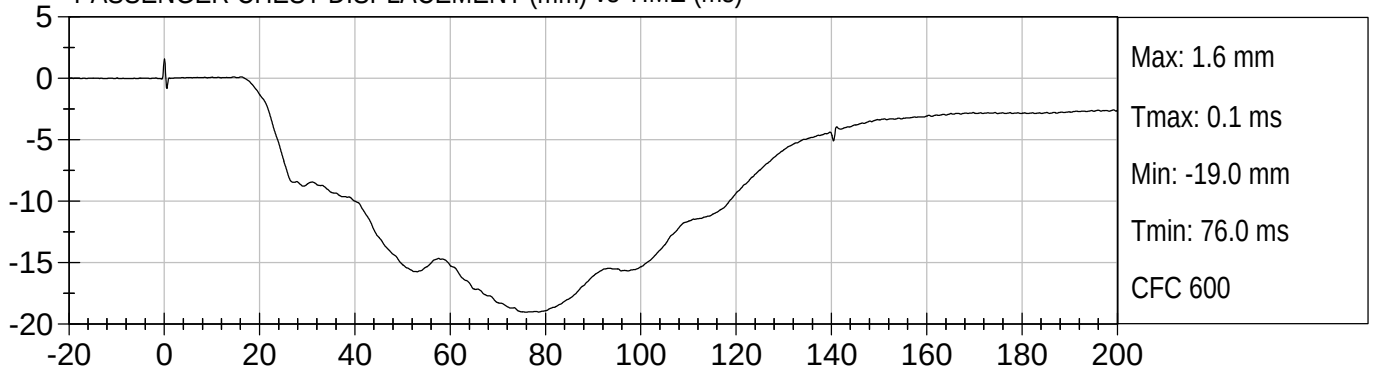
PASSENGER CHEST Y Velocity (kph) vs TIME (ms)



PASSENGER CHEST Z Velocity (kph) vs TIME (ms)



PASSENGER CHEST DISPLACEMENT (mm) vs TIME (ms)

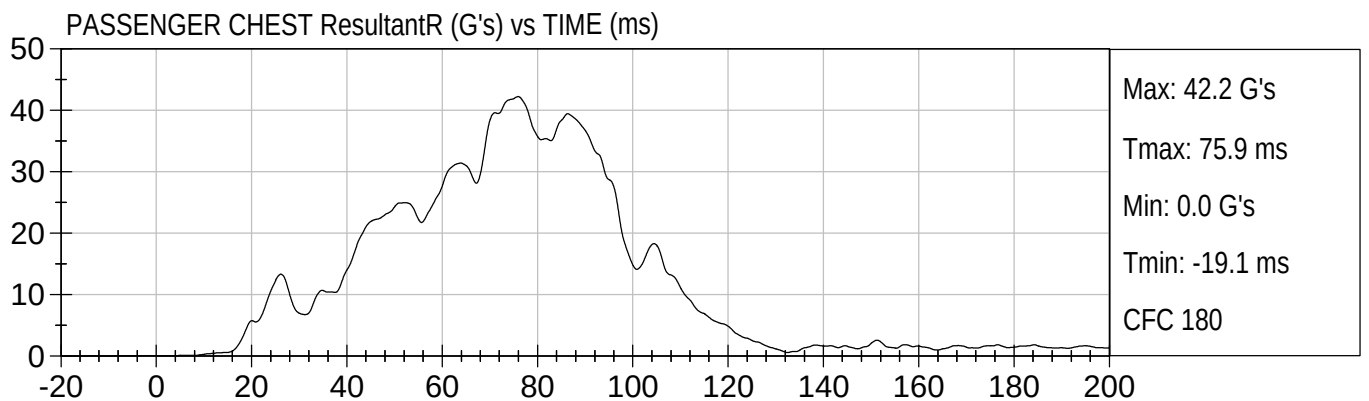
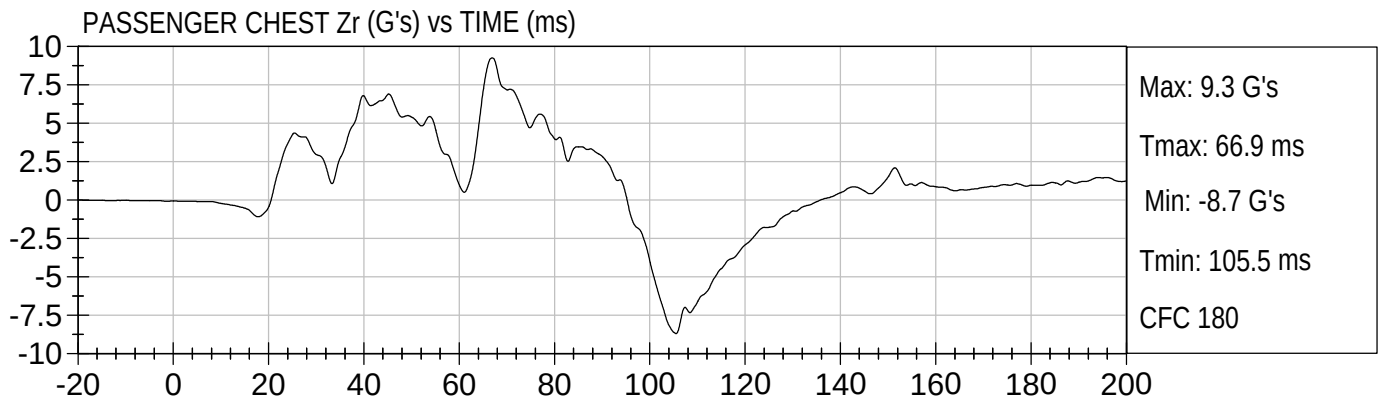
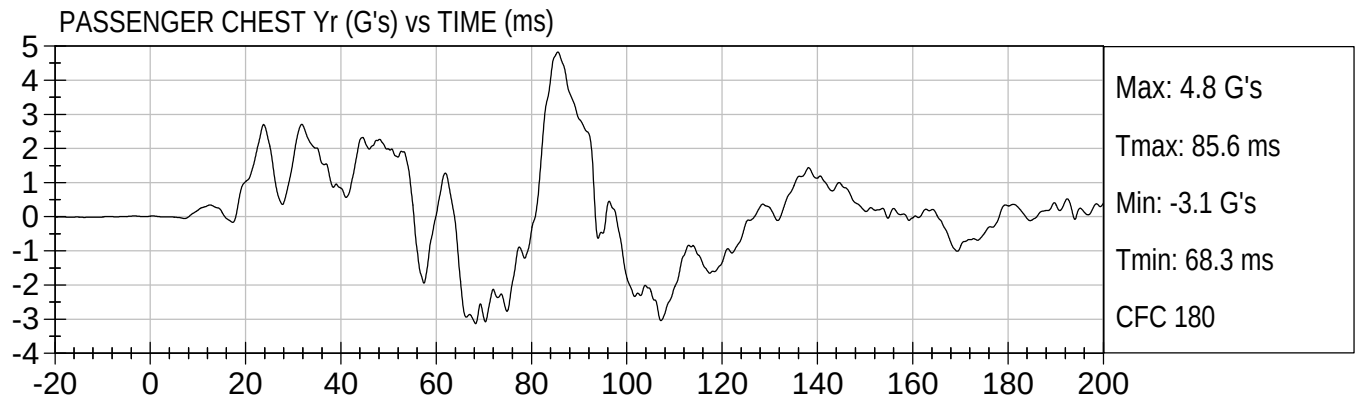
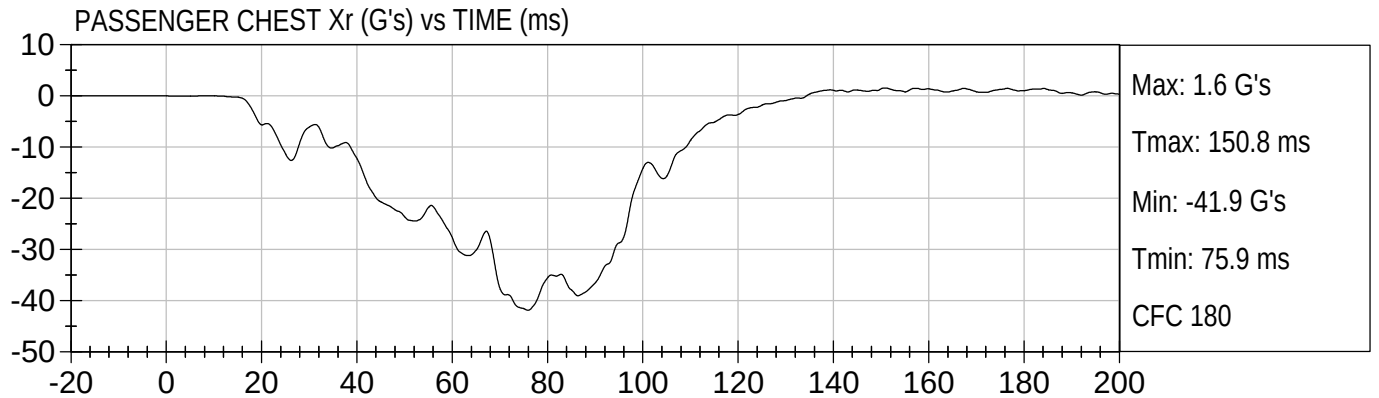






35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

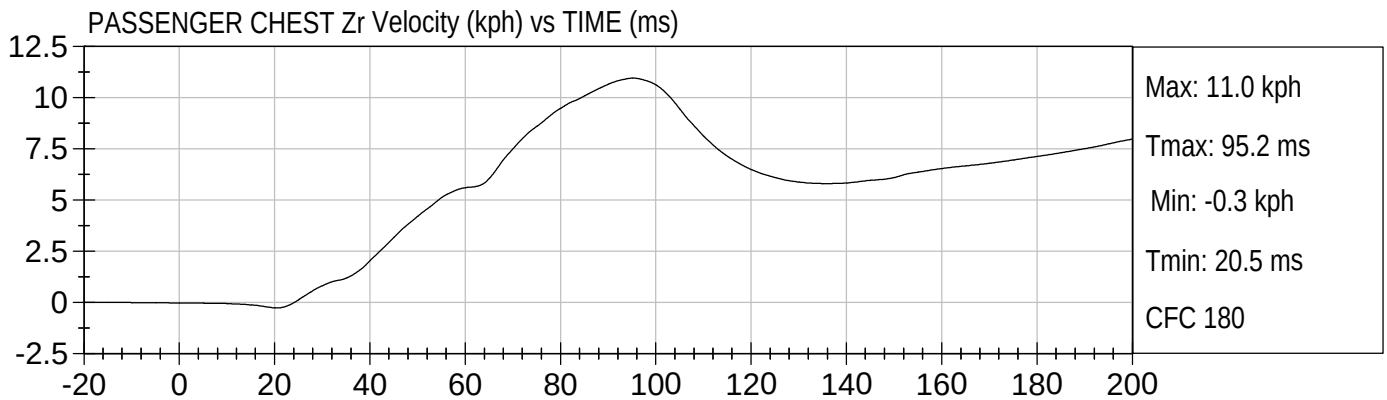
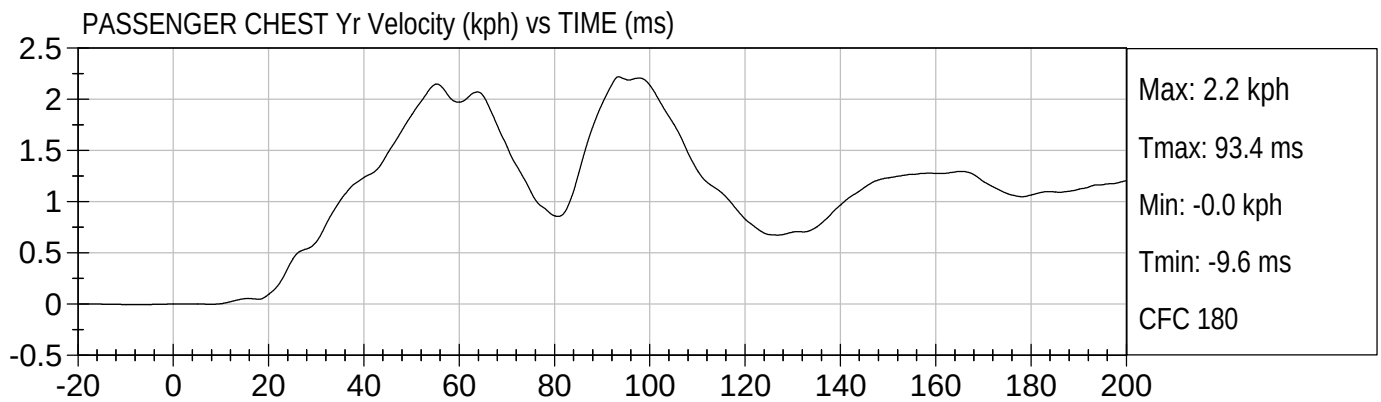
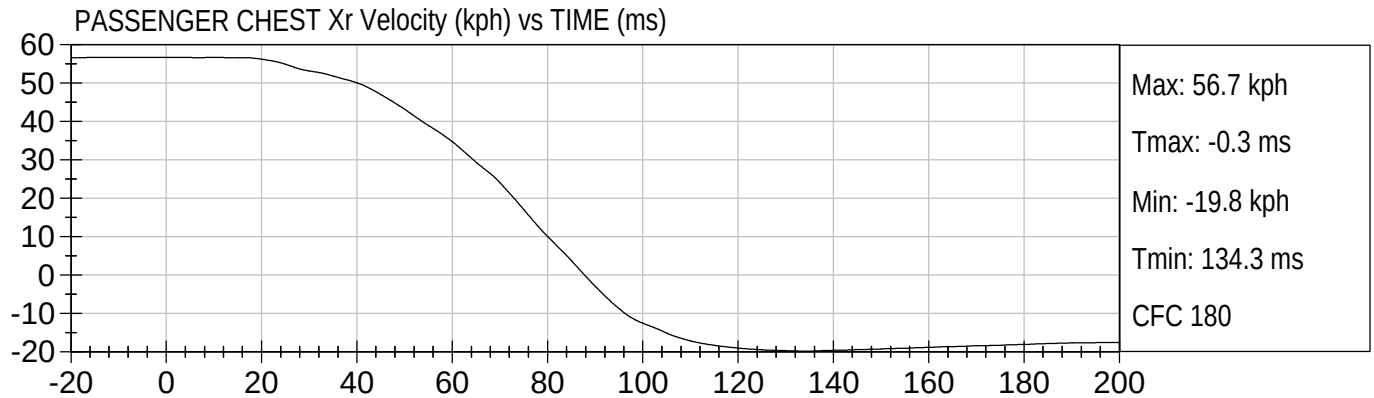
Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

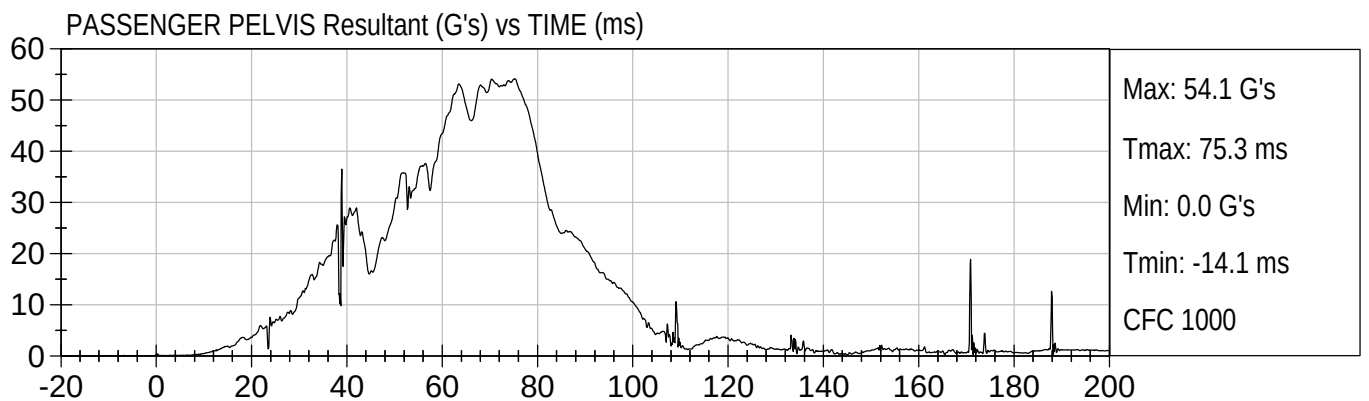
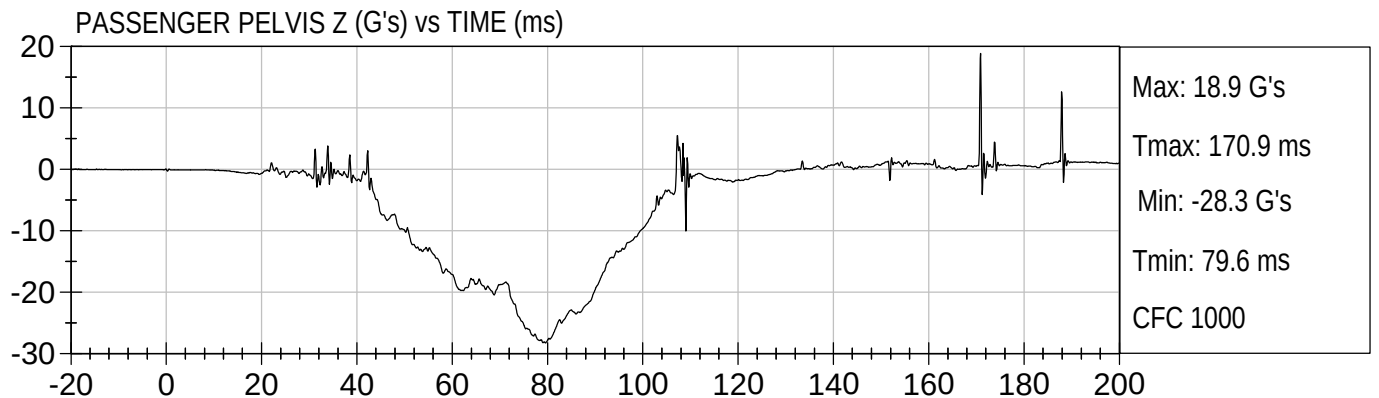
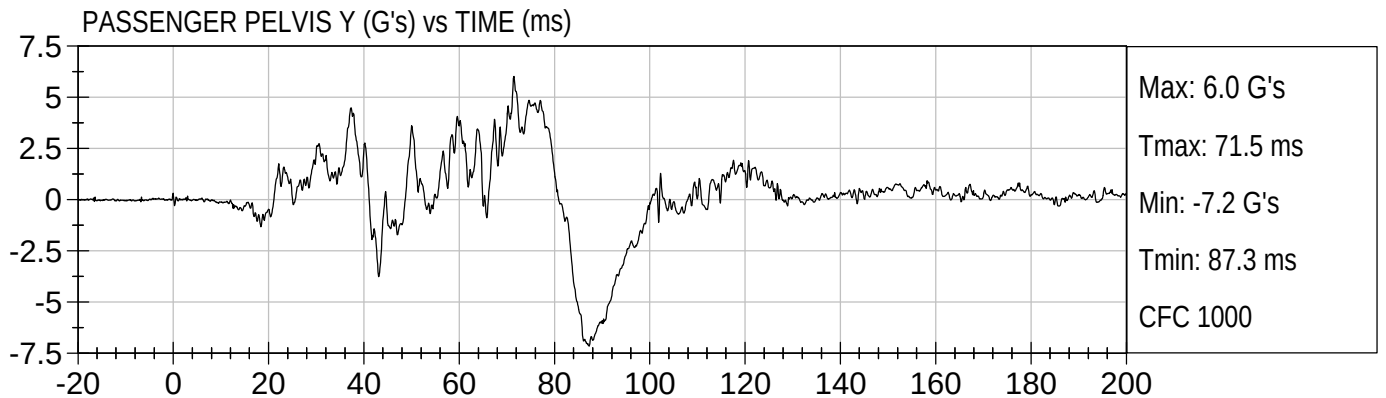
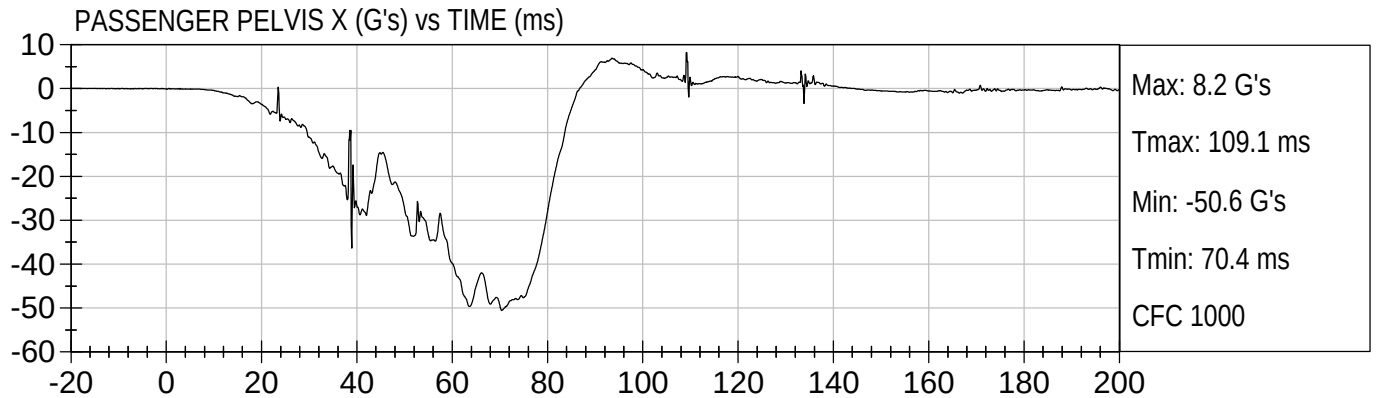
Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

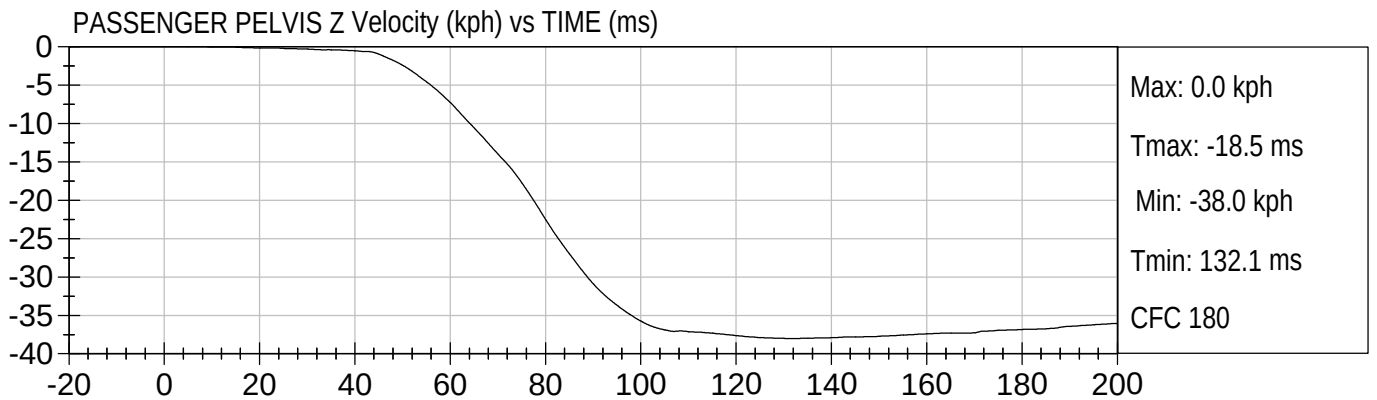
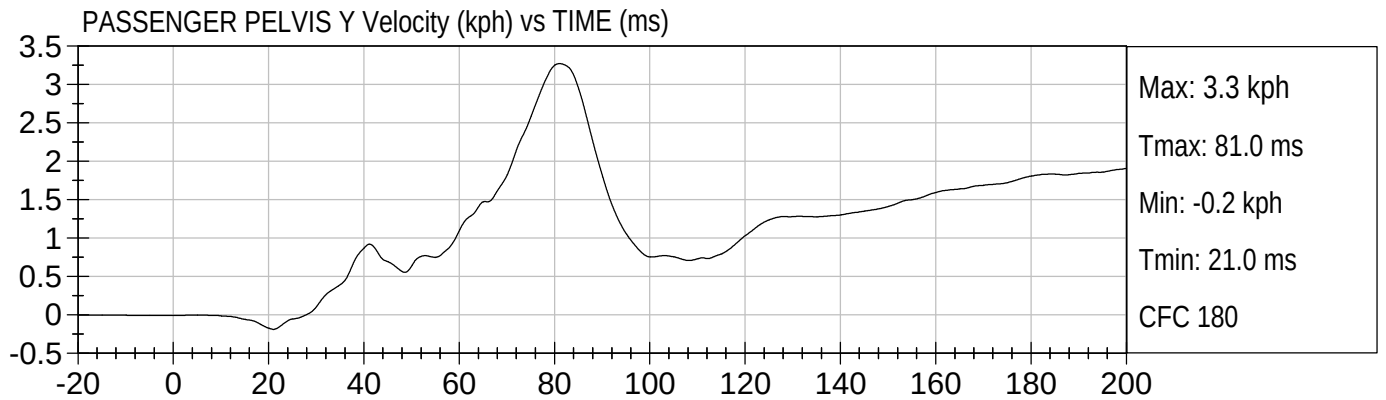
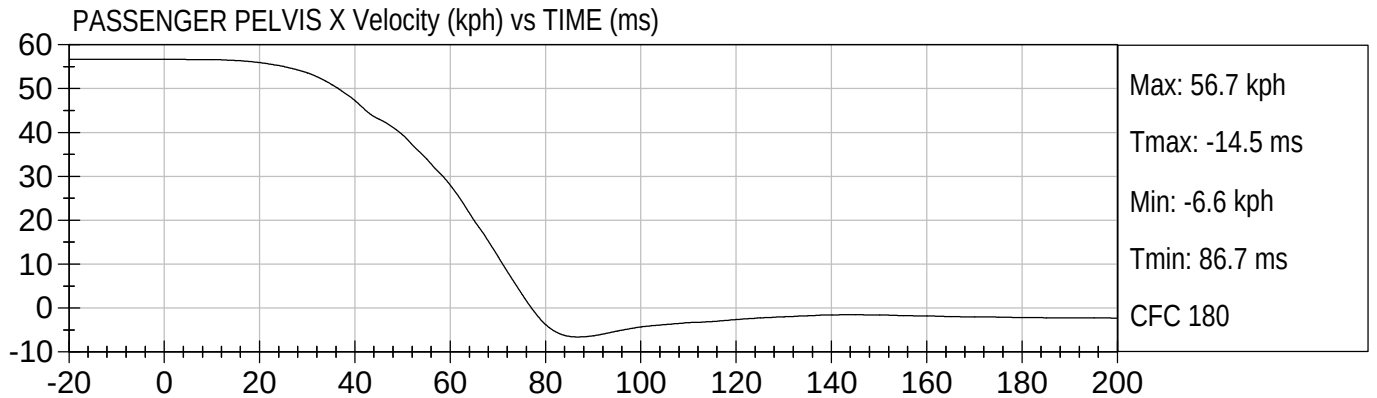






35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

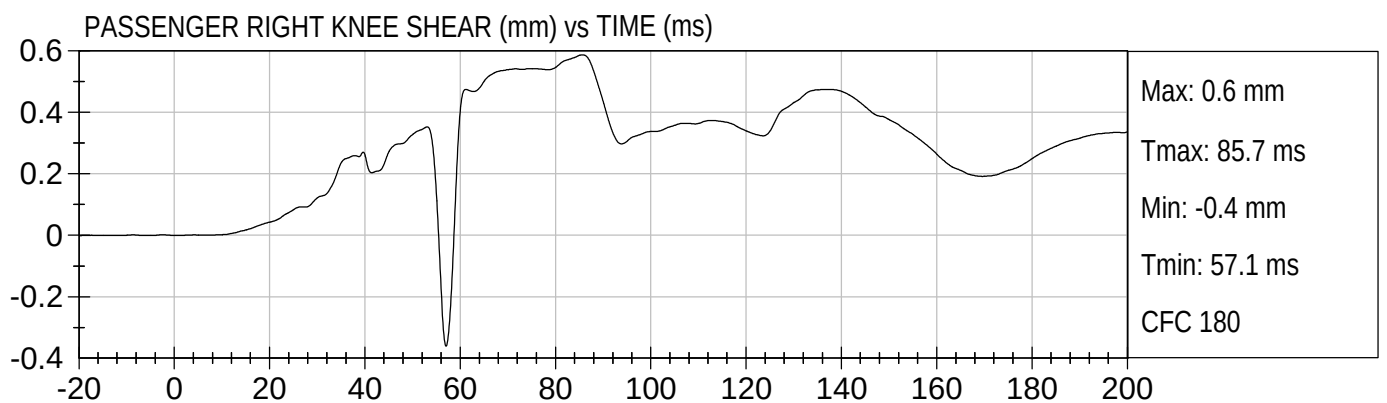
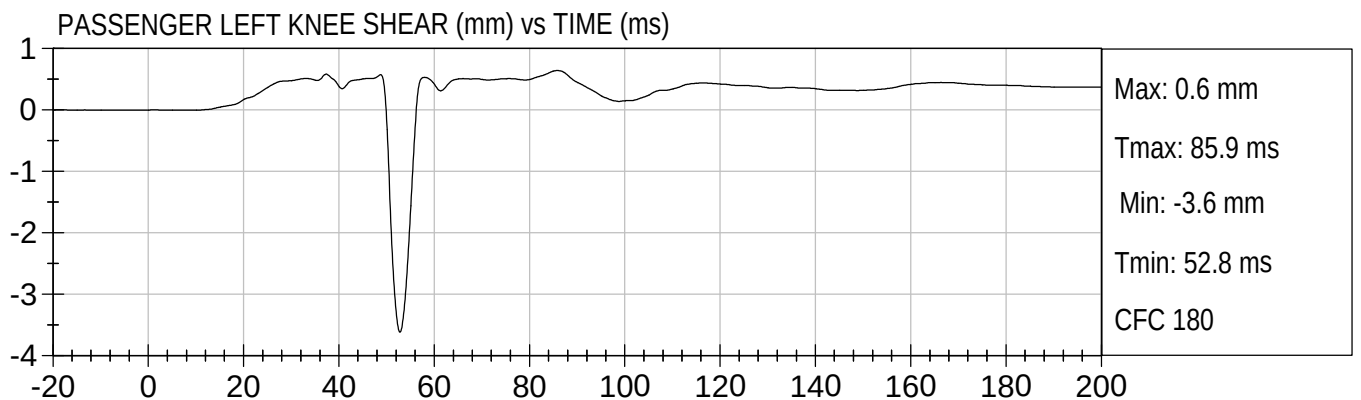
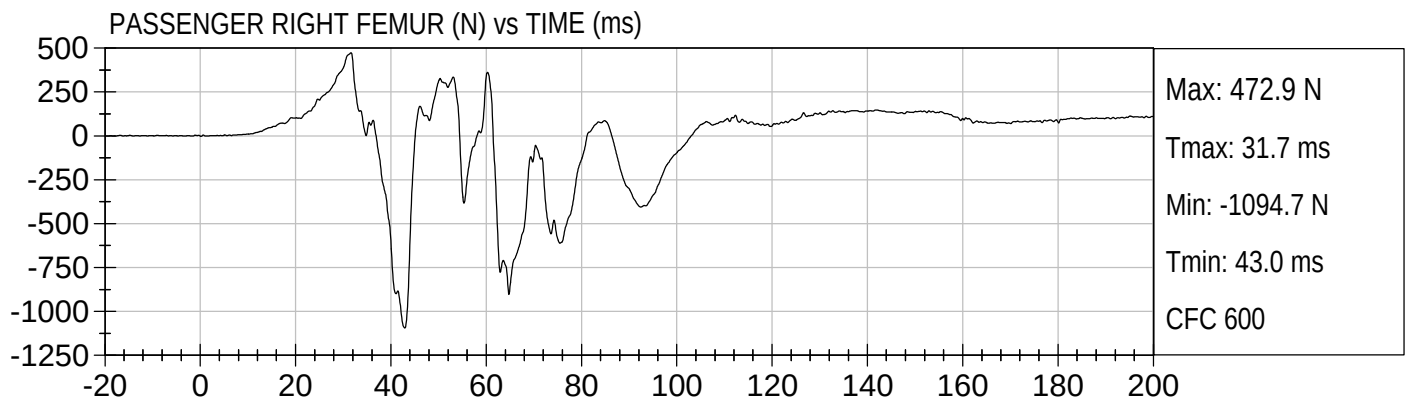
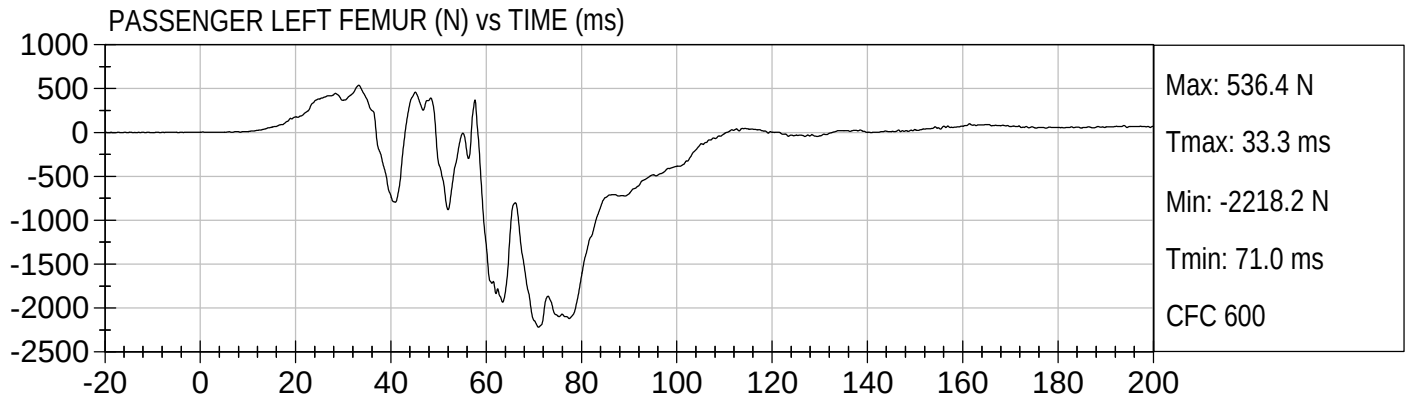
Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

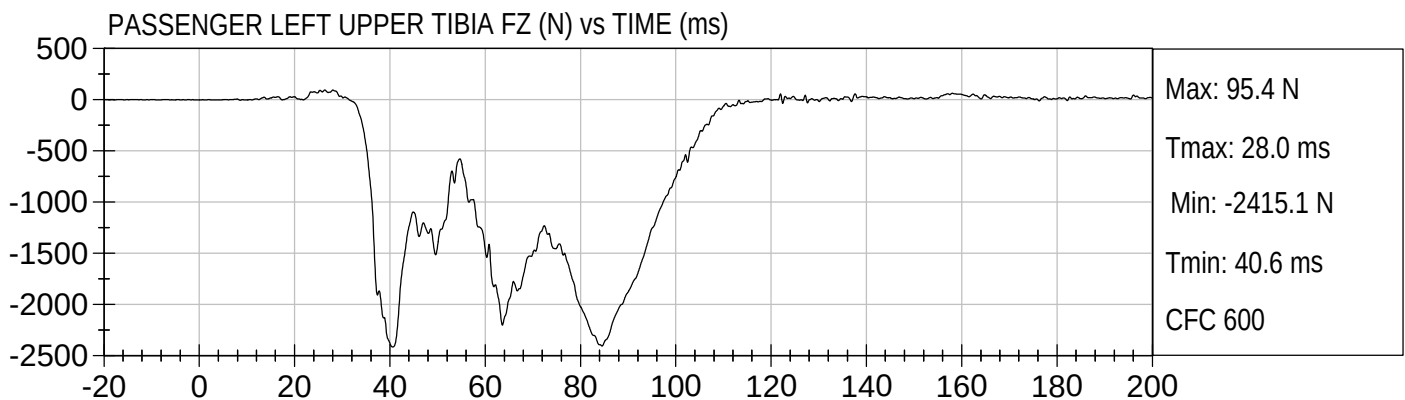
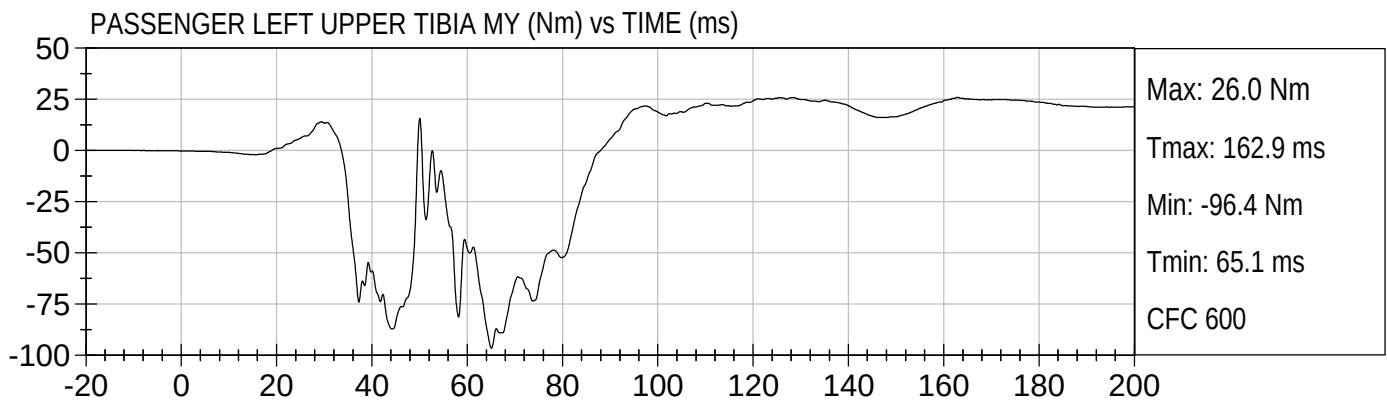
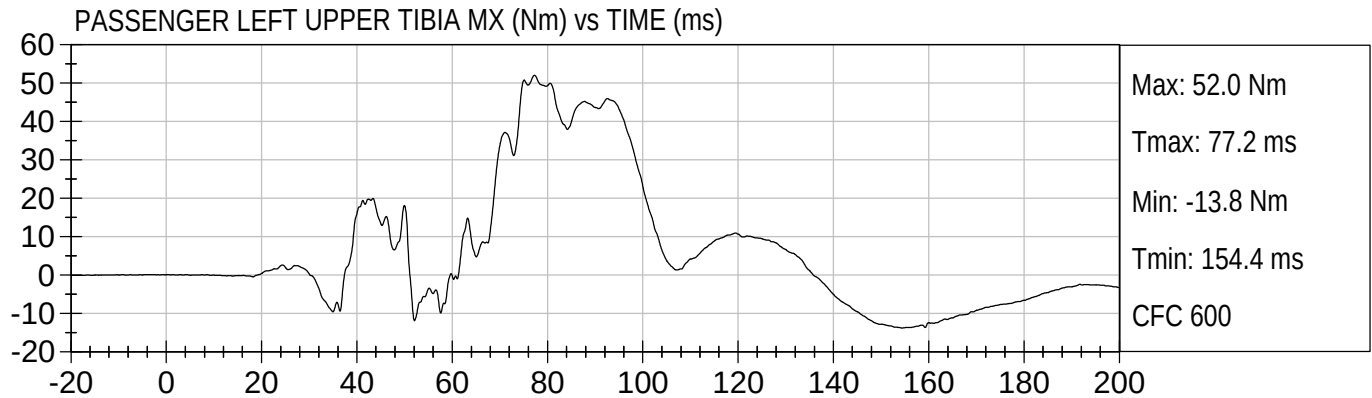
Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)



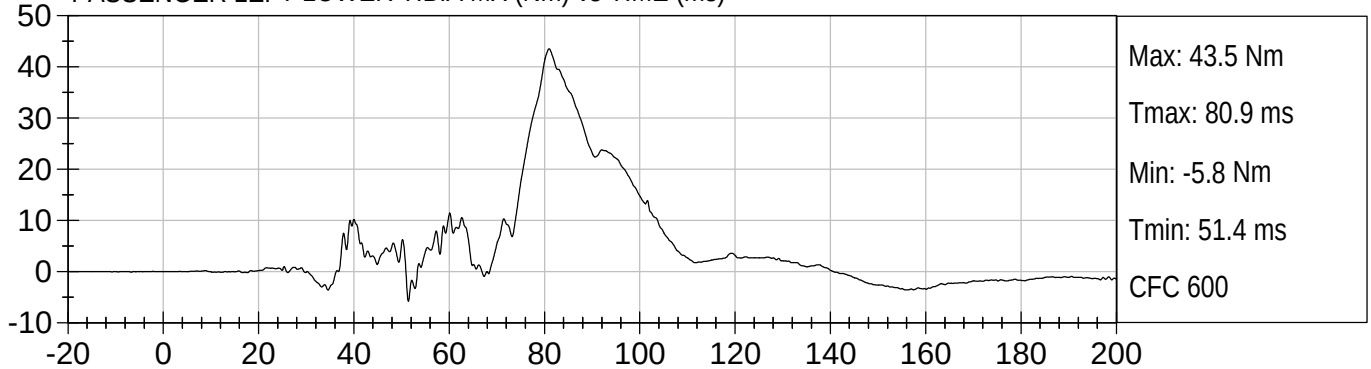




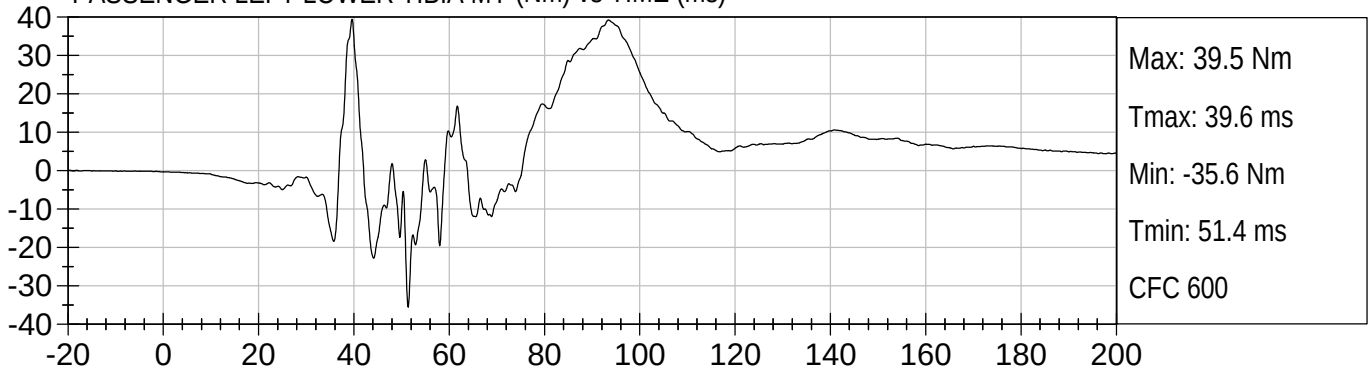
35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

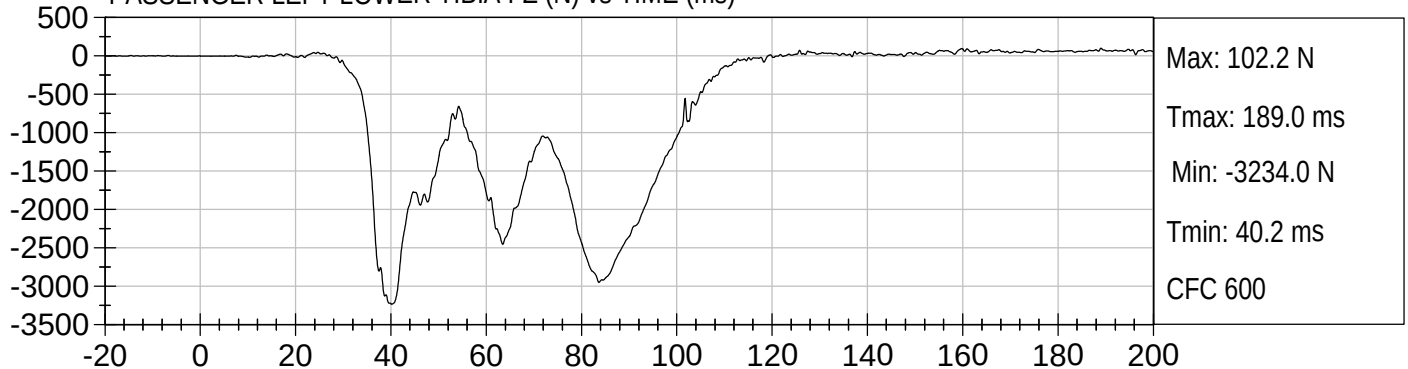
PASSENGER LEFT LOWER TIBIA MX (Nm) vs TIME (ms)



PASSENGER LEFT LOWER TIBIA MY (Nm) vs TIME (ms)



PASSENGER LEFT LOWER TIBIA FZ (N) vs TIME (ms)

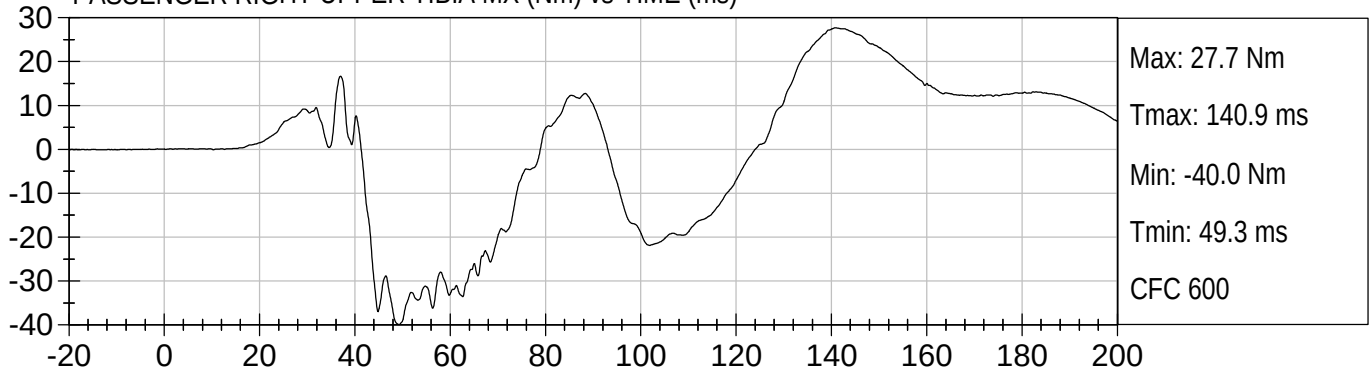




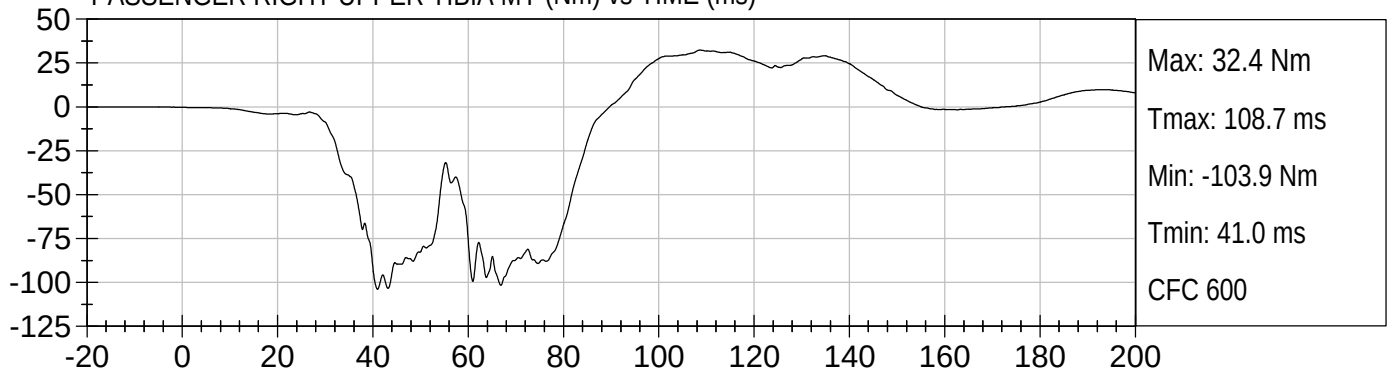
35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

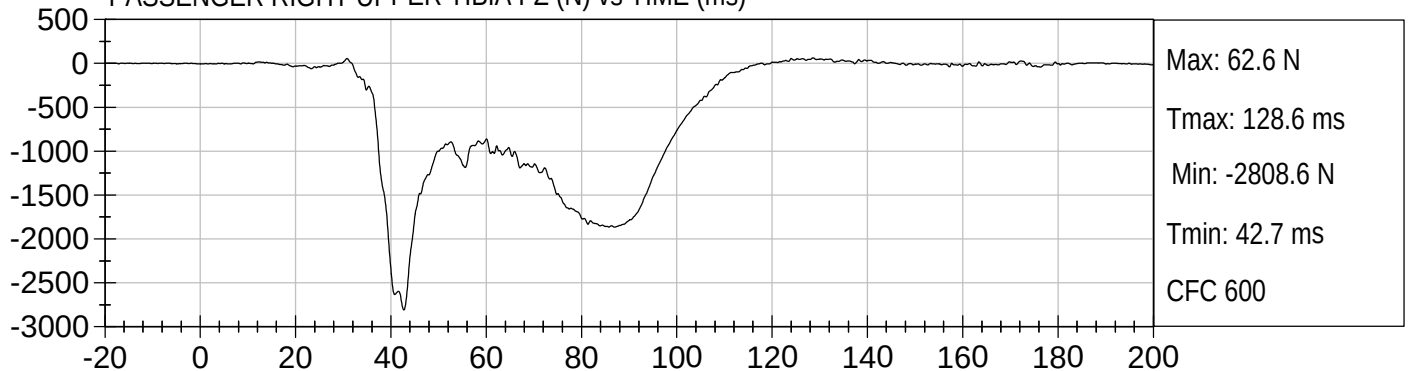
PASSENGER RIGHT UPPER TIBIA MX (Nm) vs TIME (ms)



PASSENGER RIGHT UPPER TIBIA MY (Nm) vs TIME (ms)



PASSENGER RIGHT UPPER TIBIA FZ (N) vs TIME (ms)

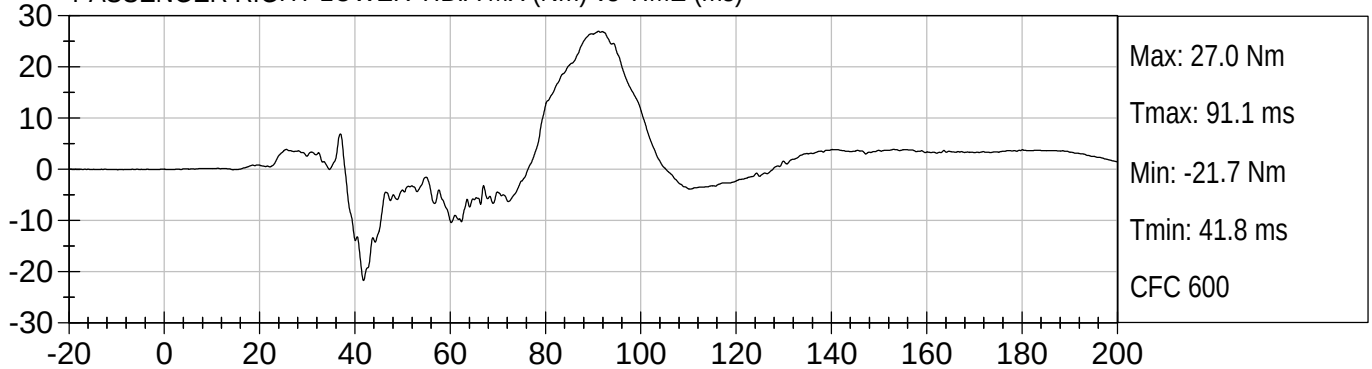




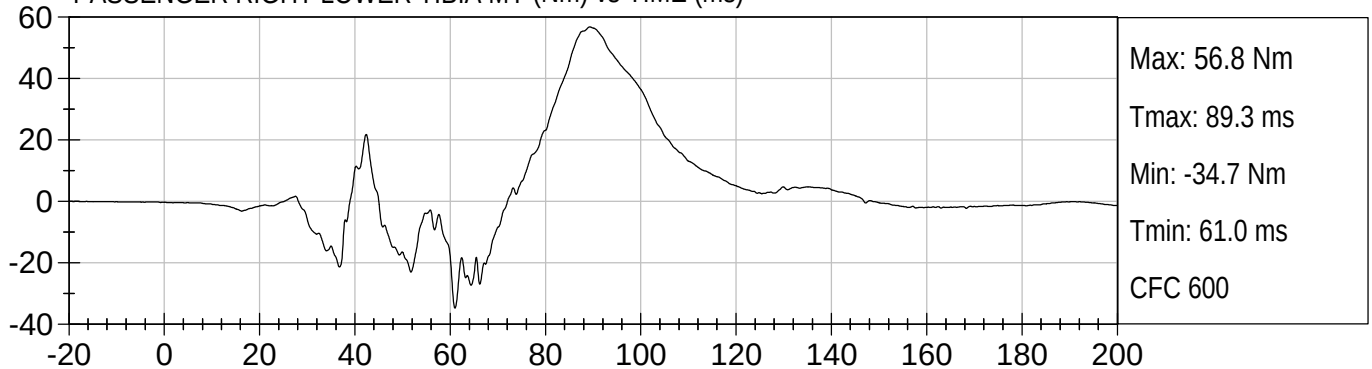
35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

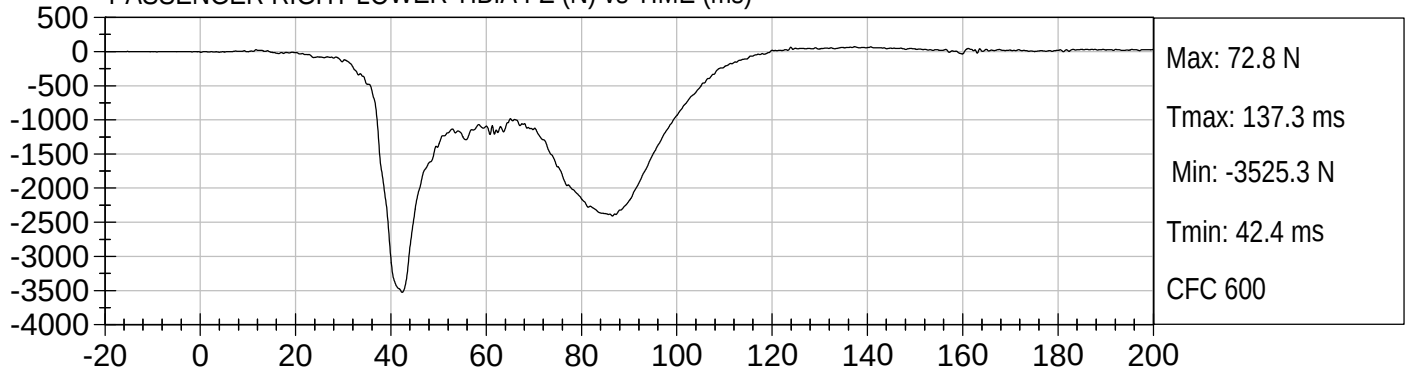
PASSENGER RIGHT LOWER TIBIA MX (Nm) vs TIME (ms)



PASSENGER RIGHT LOWER TIBIA MY (Nm) vs TIME (ms)



PASSENGER RIGHT LOWER TIBIA FZ (N) vs TIME (ms)

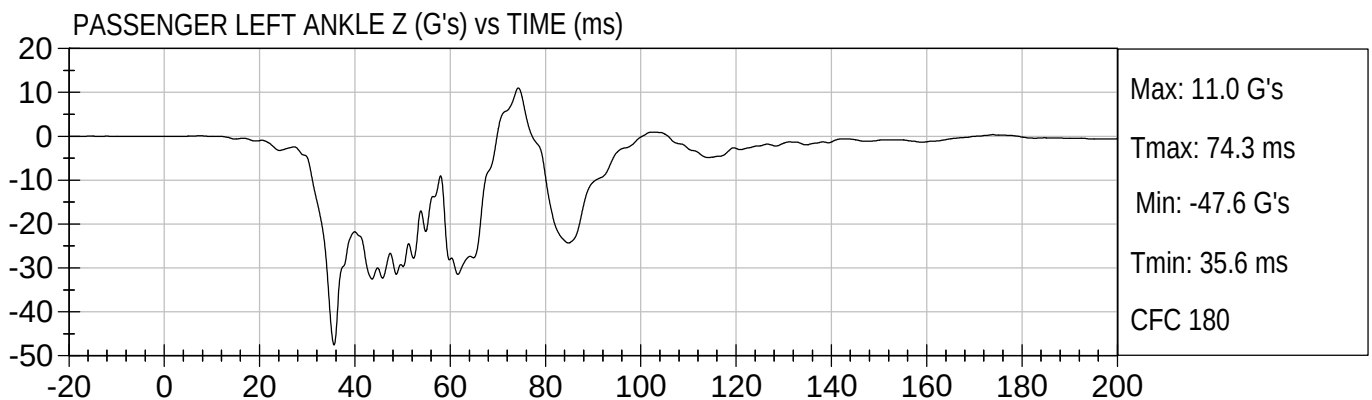
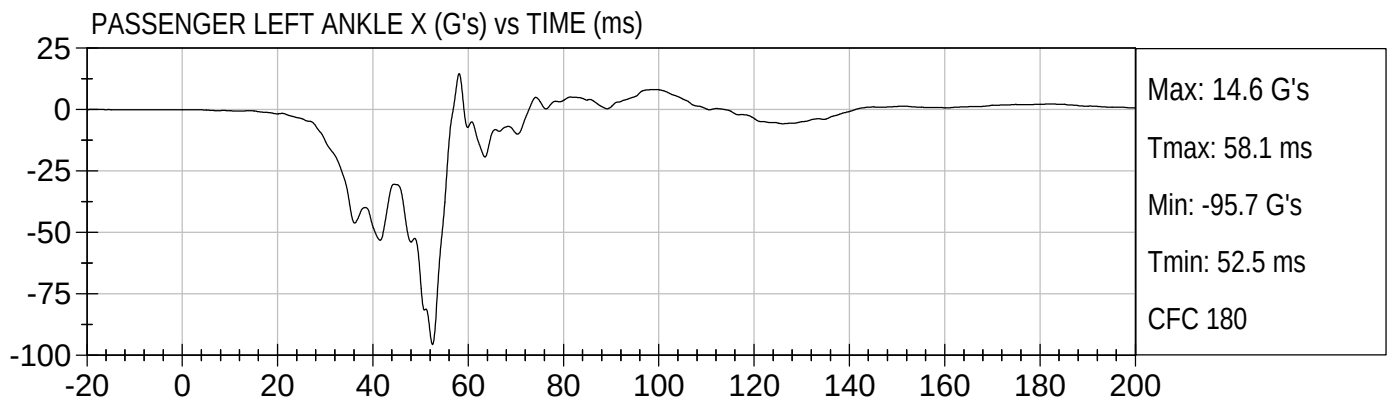
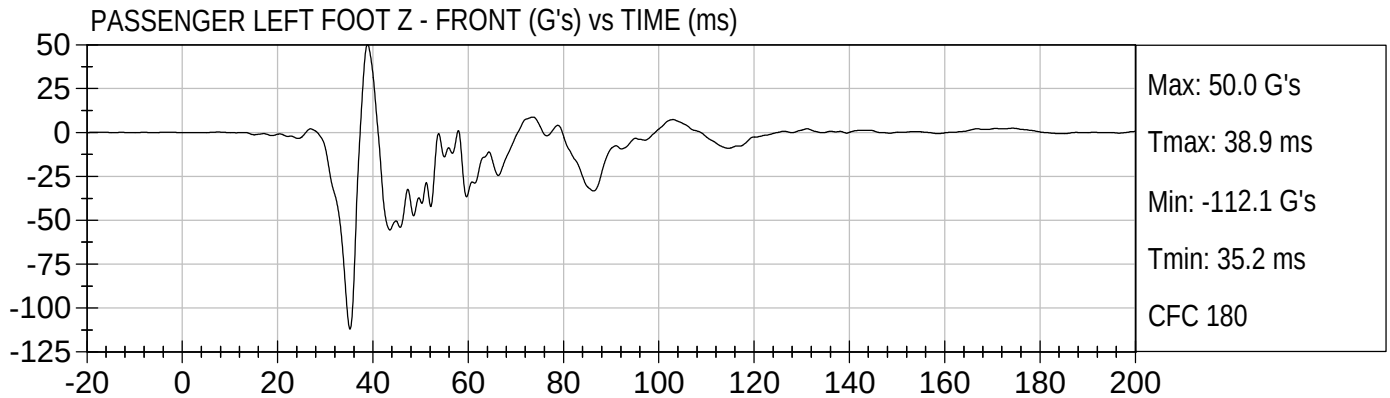






35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

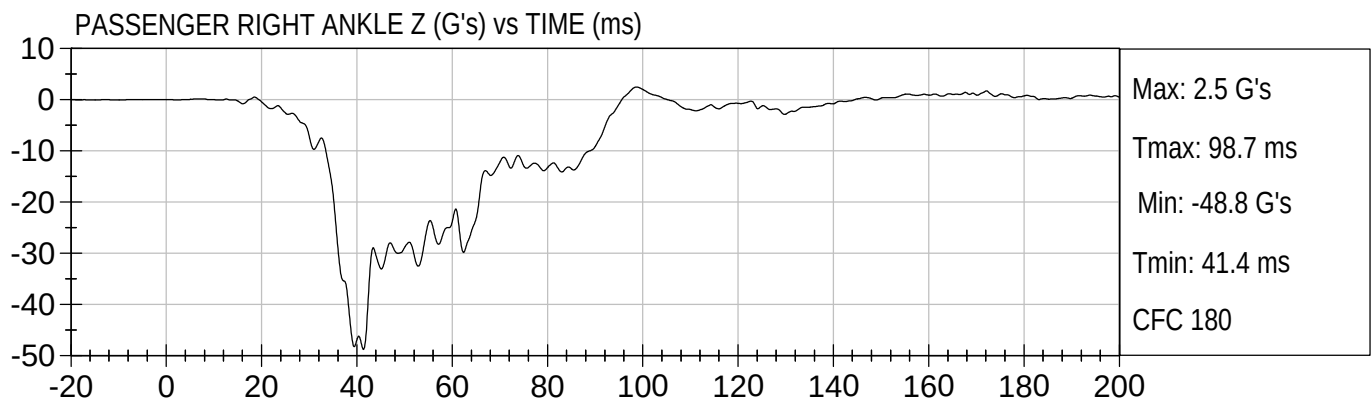
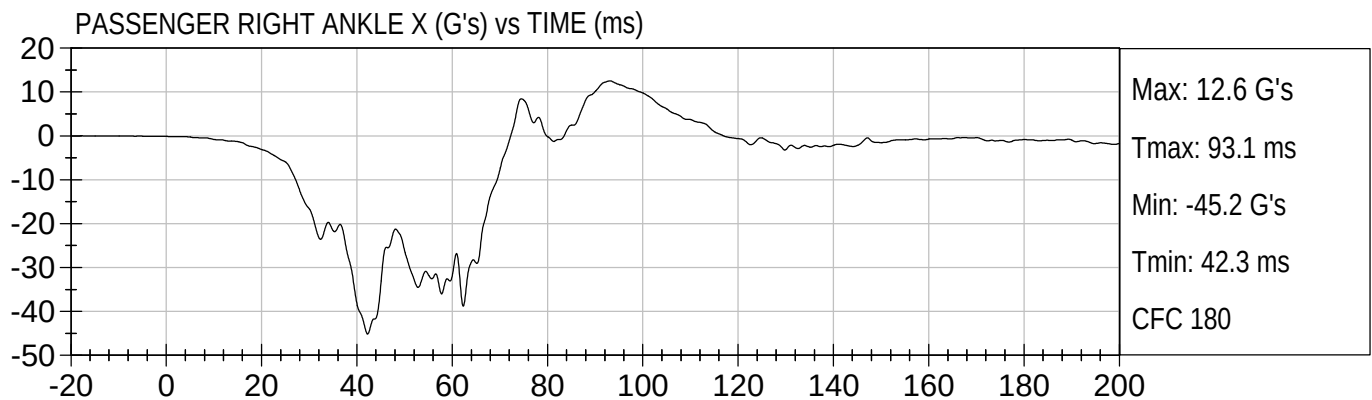
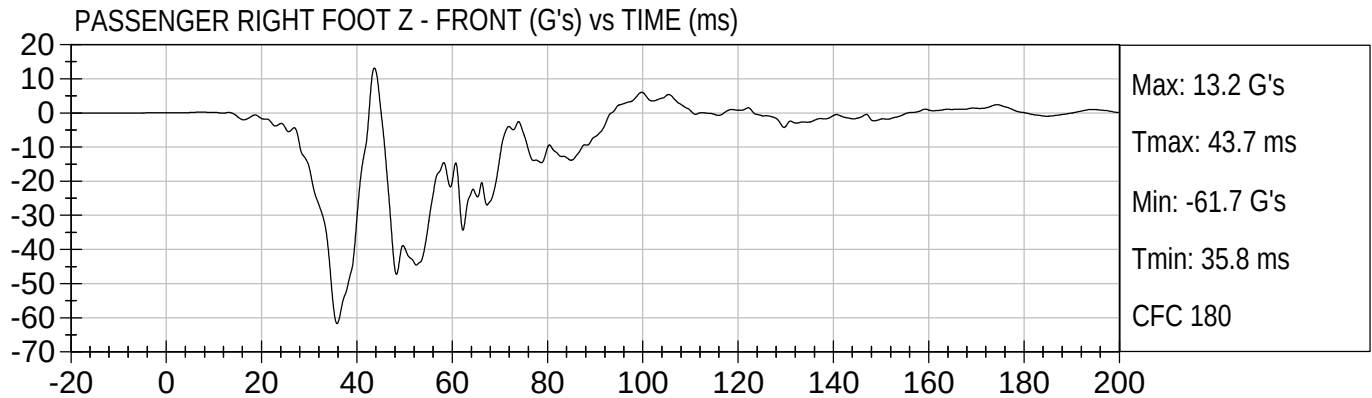
Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

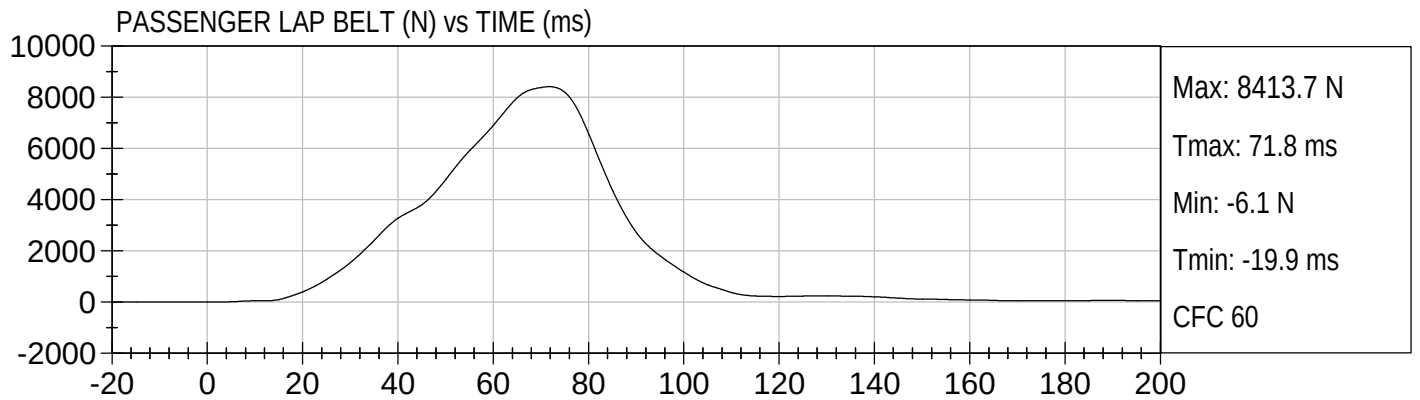
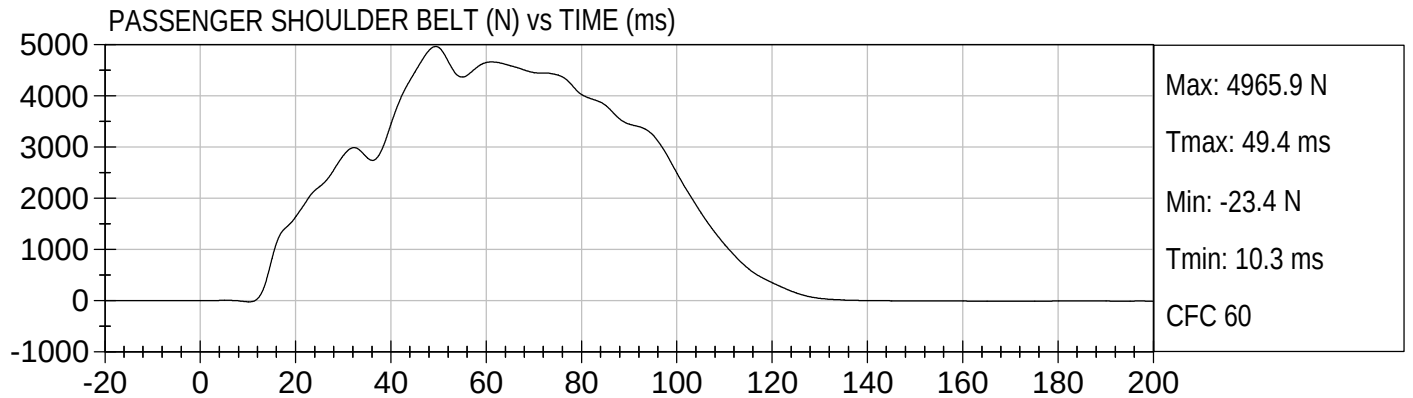
Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)



PASSENGER BELT STRETCH (mm/M) vs TIME (ms)  
NO VALID DATA COLLECTED

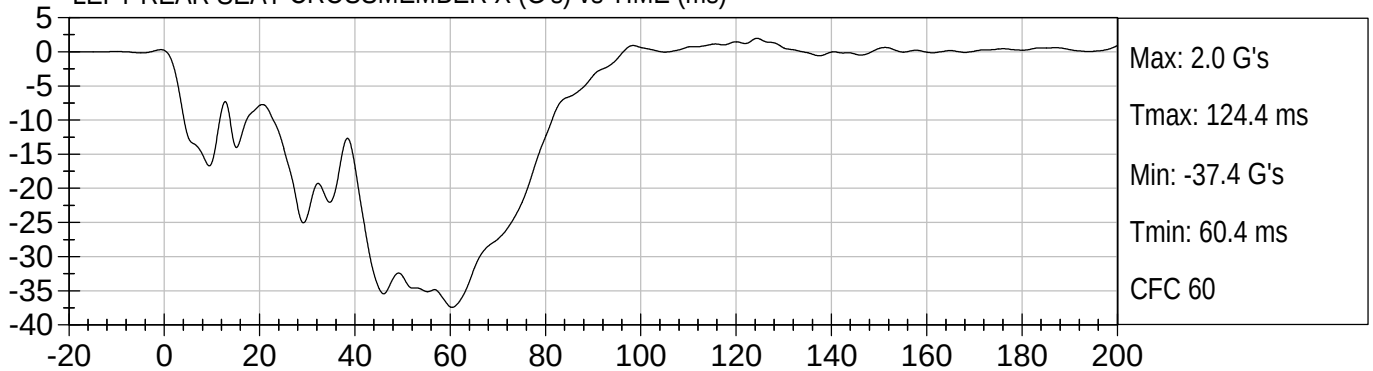




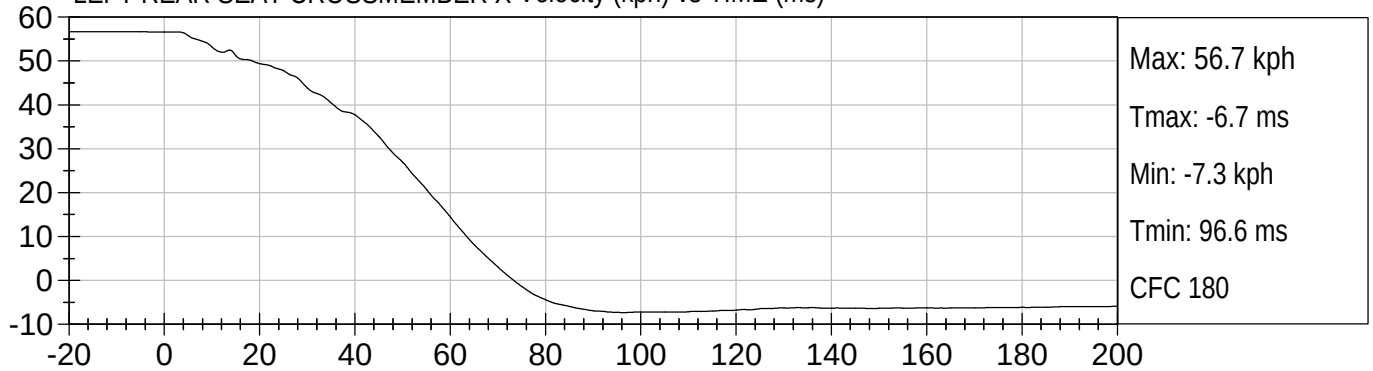
35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

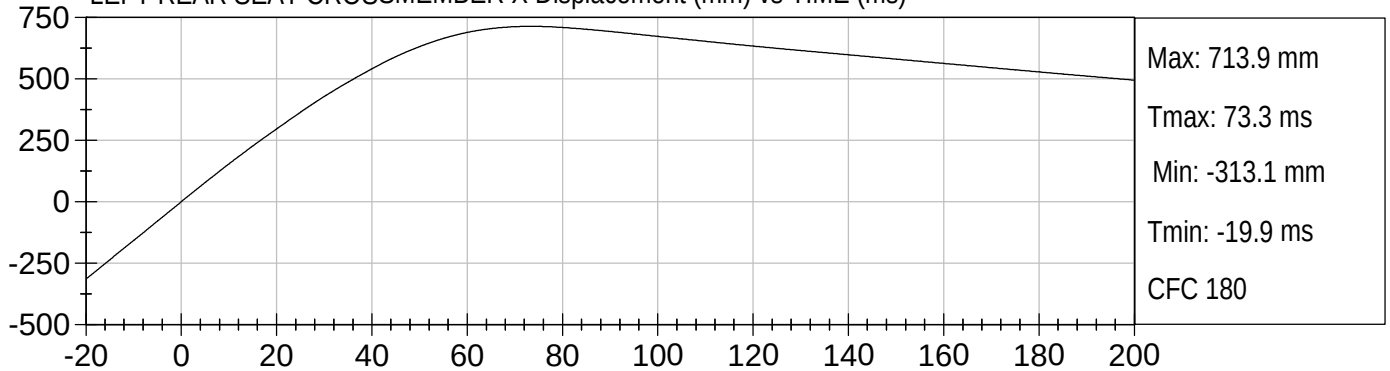
LEFT REAR SEAT CROSSMEMBER X (G's) vs TIME (ms)



LEFT REAR SEAT CROSSMEMBER X Velocity (kph) vs TIME (ms)



LEFT REAR SEAT CROSSMEMBER X Displacement (mm) vs TIME (ms)

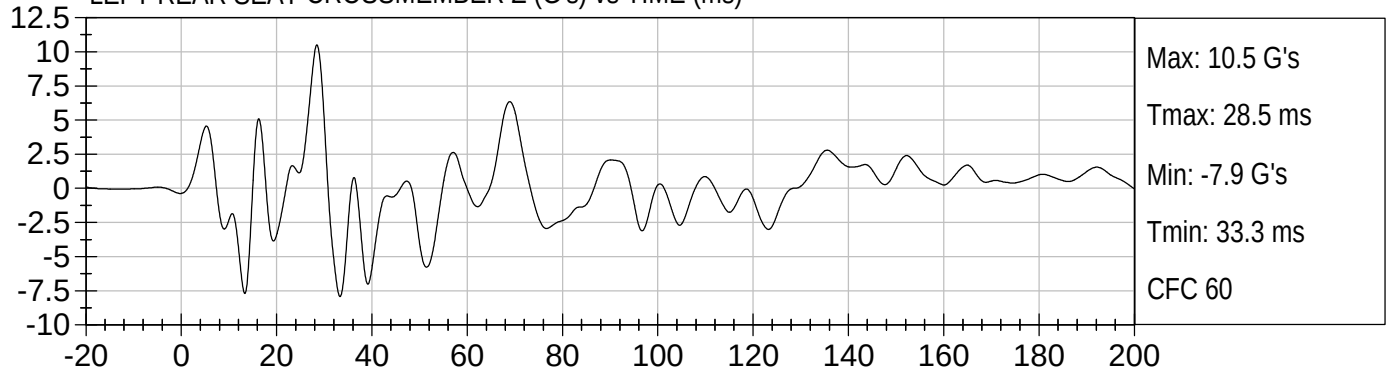




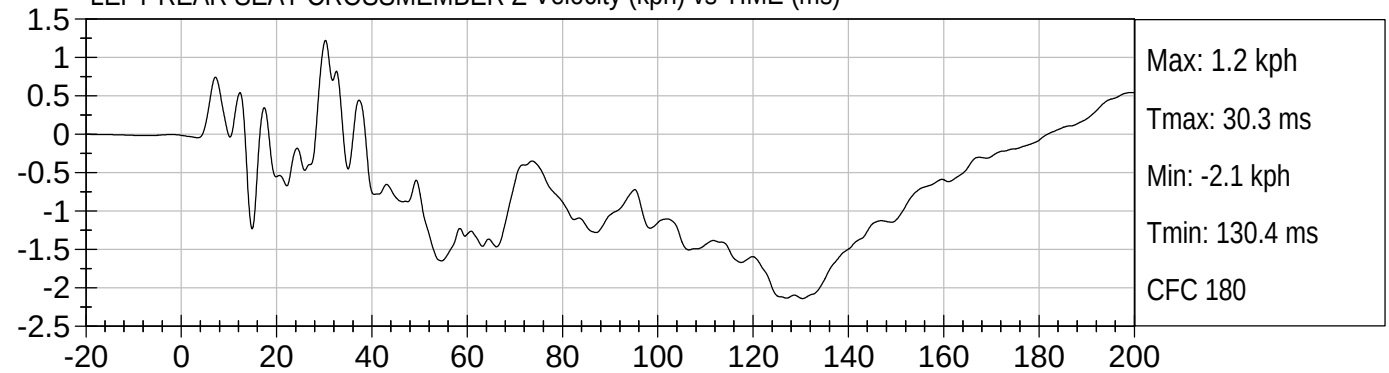
35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

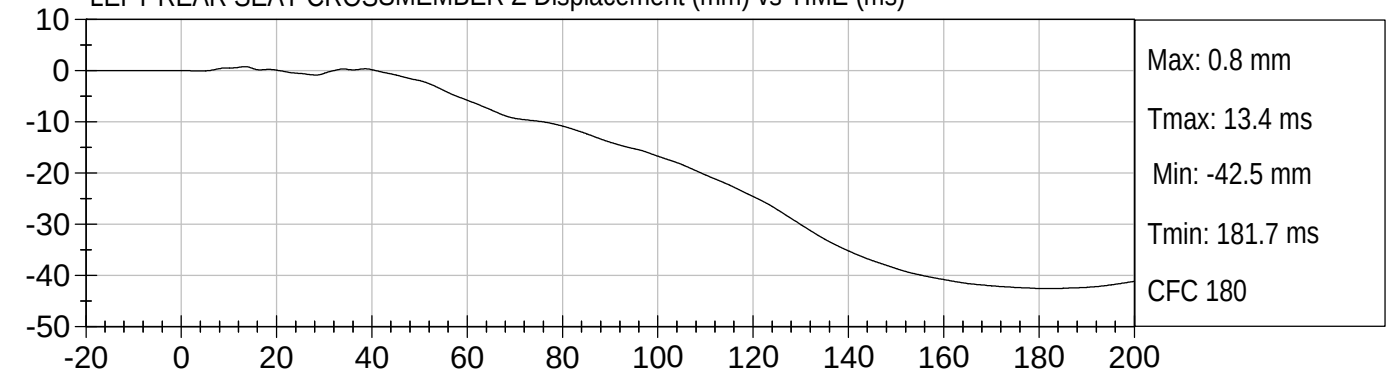
LEFT REAR SEAT CROSSMEMBER Z (G's) vs TIME (ms)



LEFT REAR SEAT CROSSMEMBER Z Velocity (kph) vs TIME (ms)



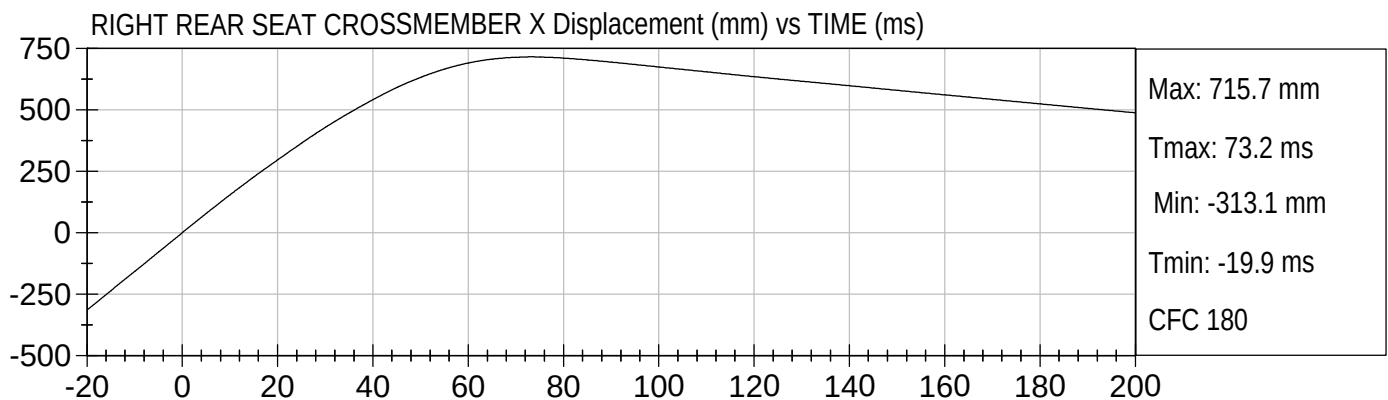
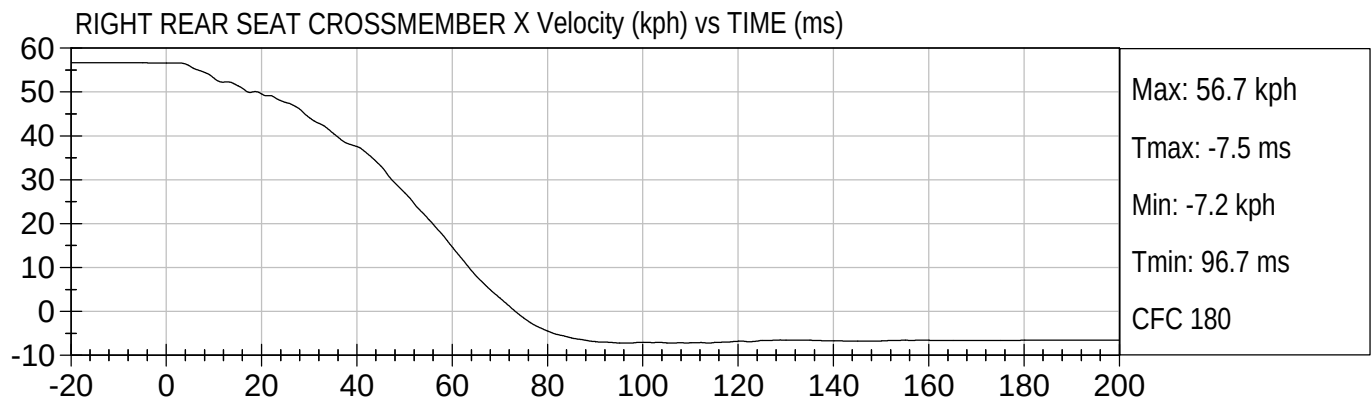
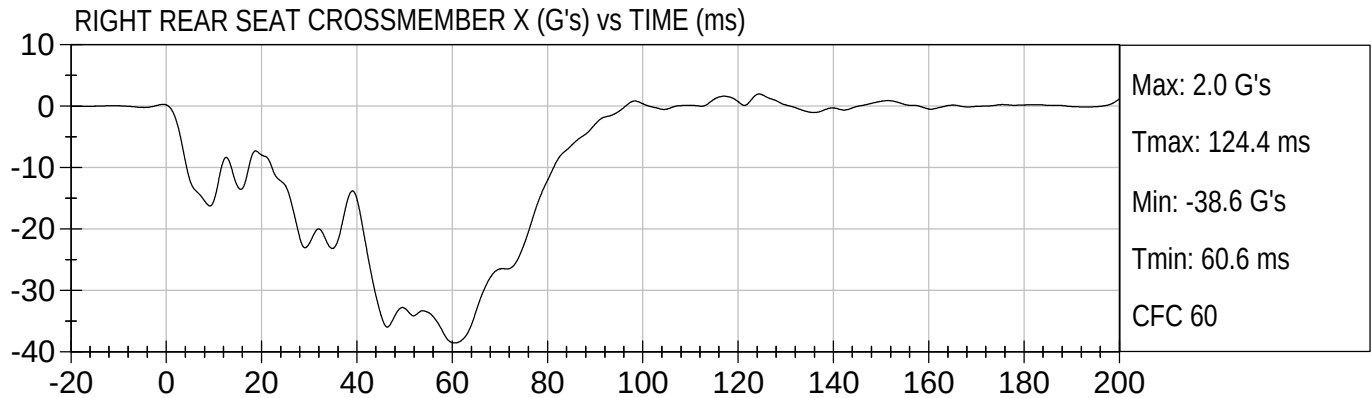
LEFT REAR SEAT CROSSMEMBER Z Displacement (mm) vs TIME (ms)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)



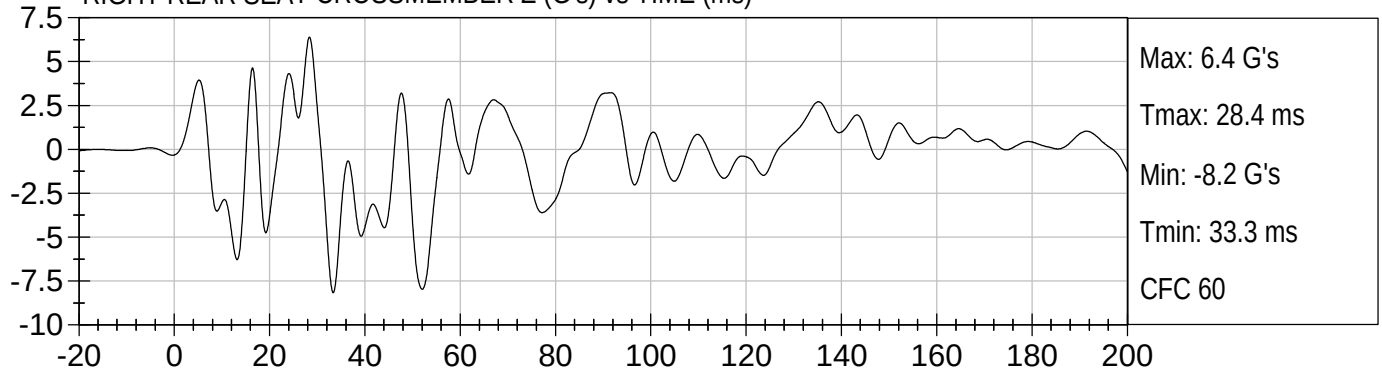




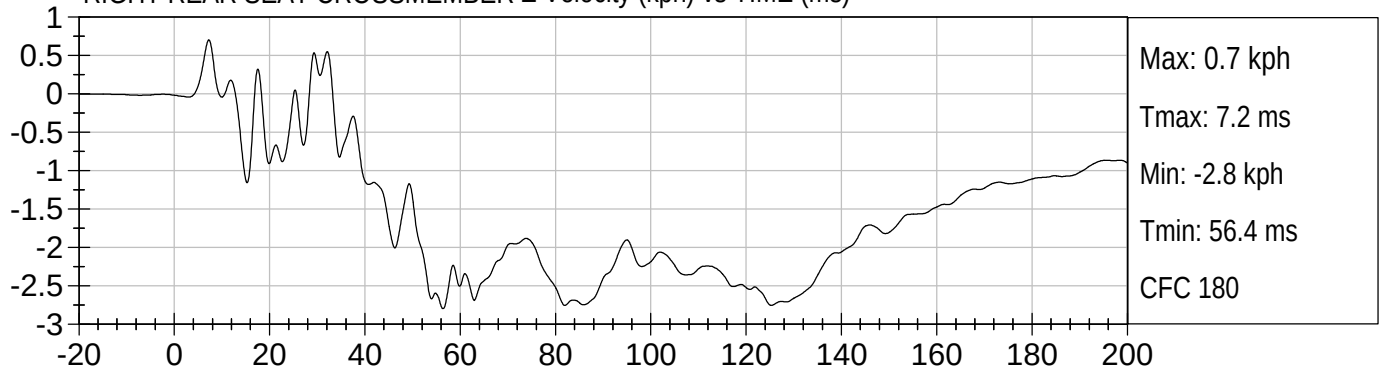
35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

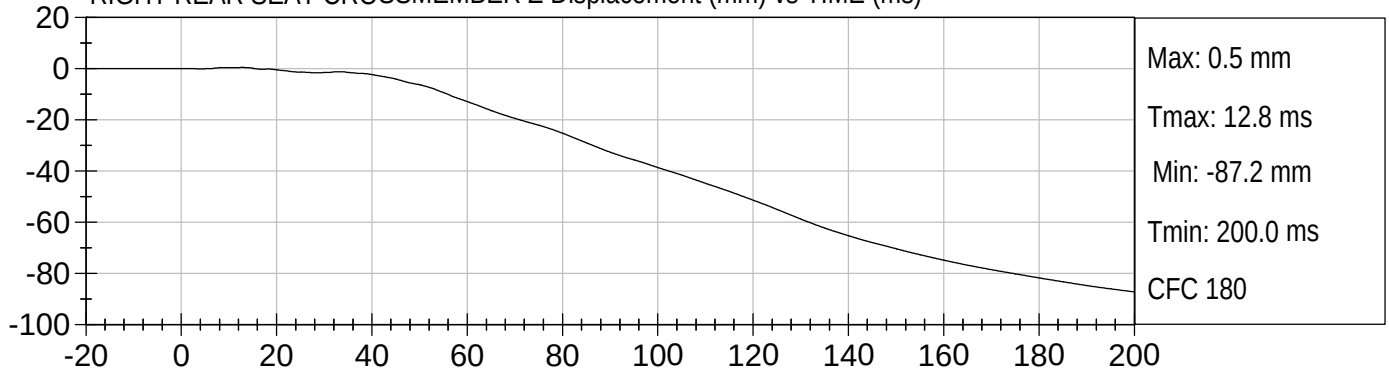
RIGHT REAR SEAT CROSSMEMBER Z (G's) vs TIME (ms)



RIGHT REAR SEAT CROSSMEMBER Z Velocity (kph) vs TIME (ms)



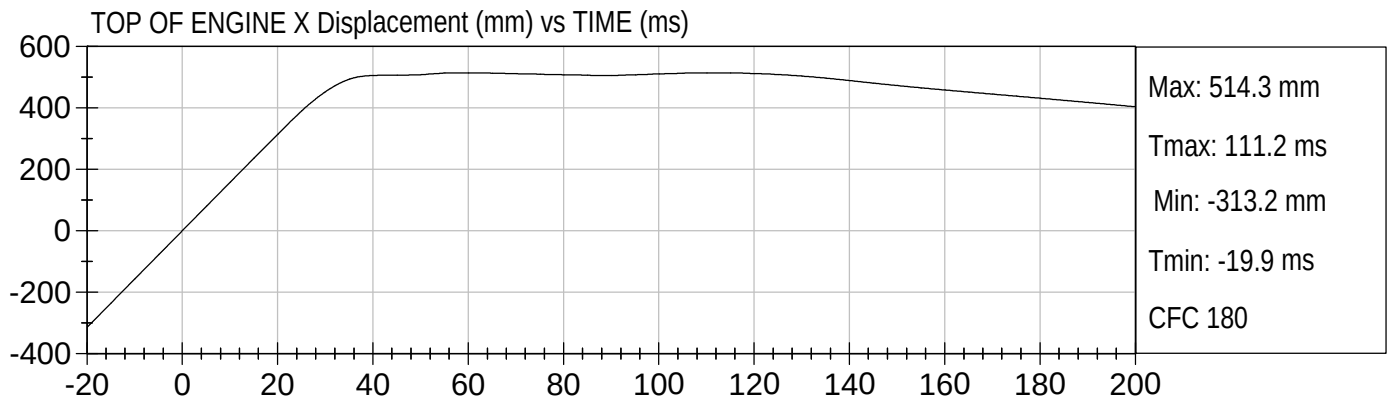
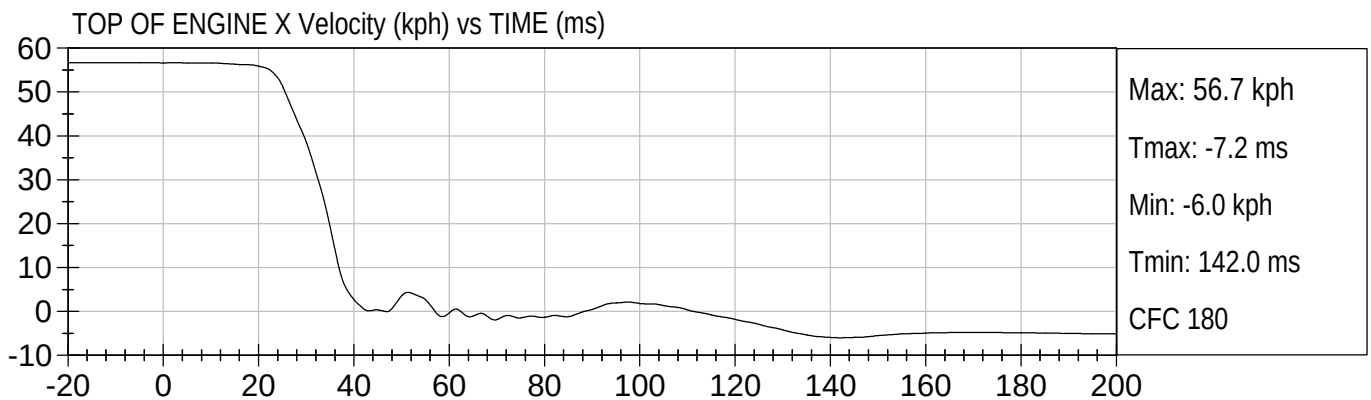
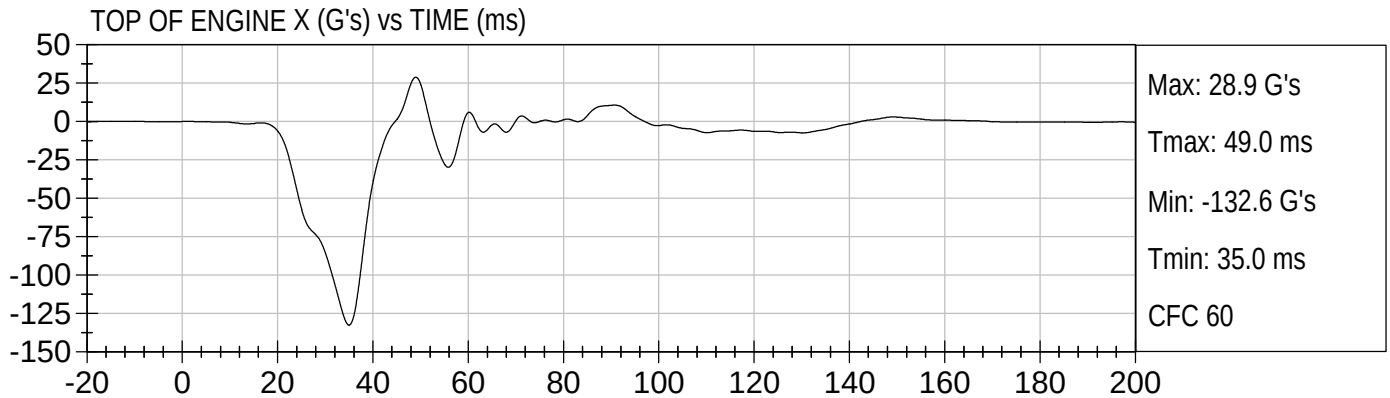
RIGHT REAR SEAT CROSSMEMBER Z Displacement (mm) vs TIME (ms)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

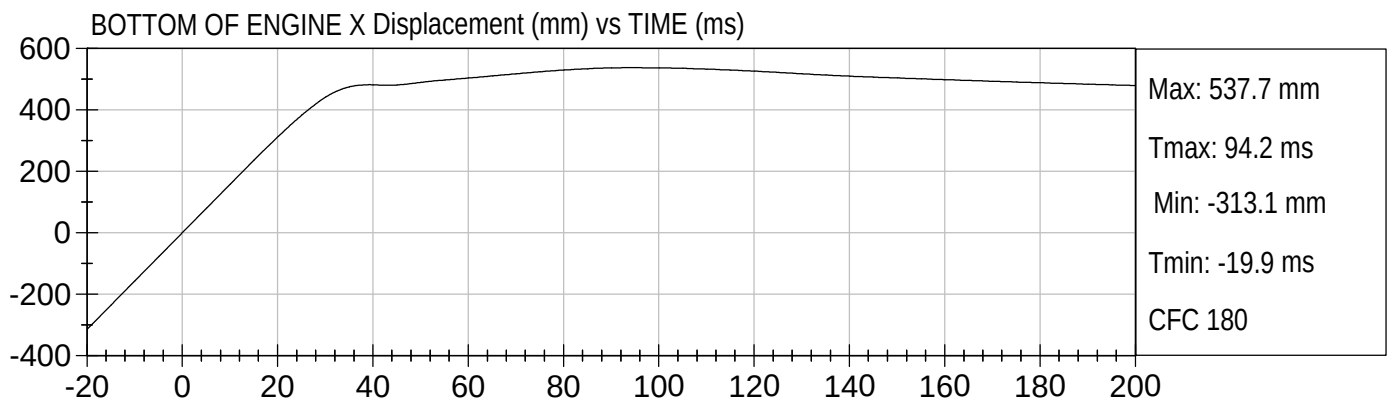
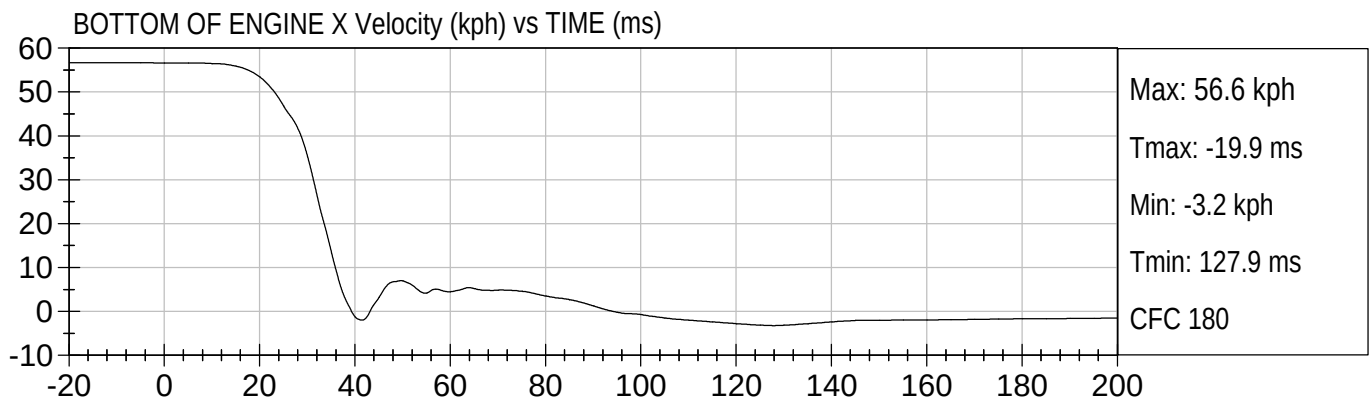
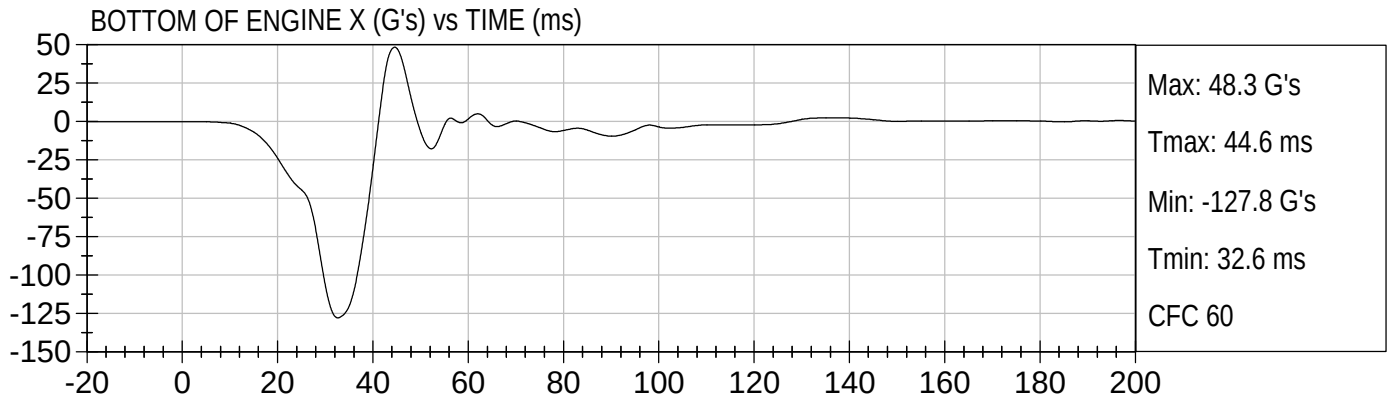
Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

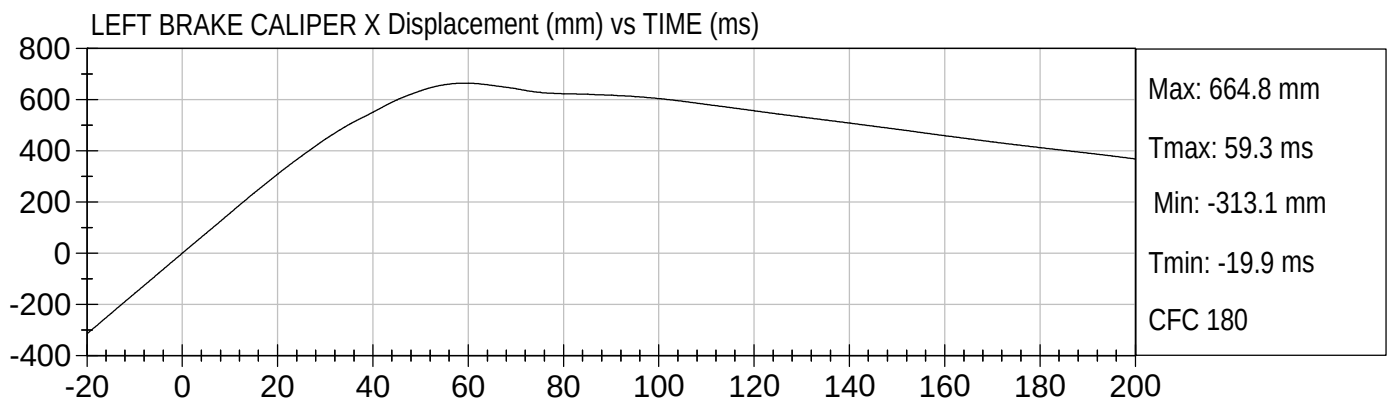
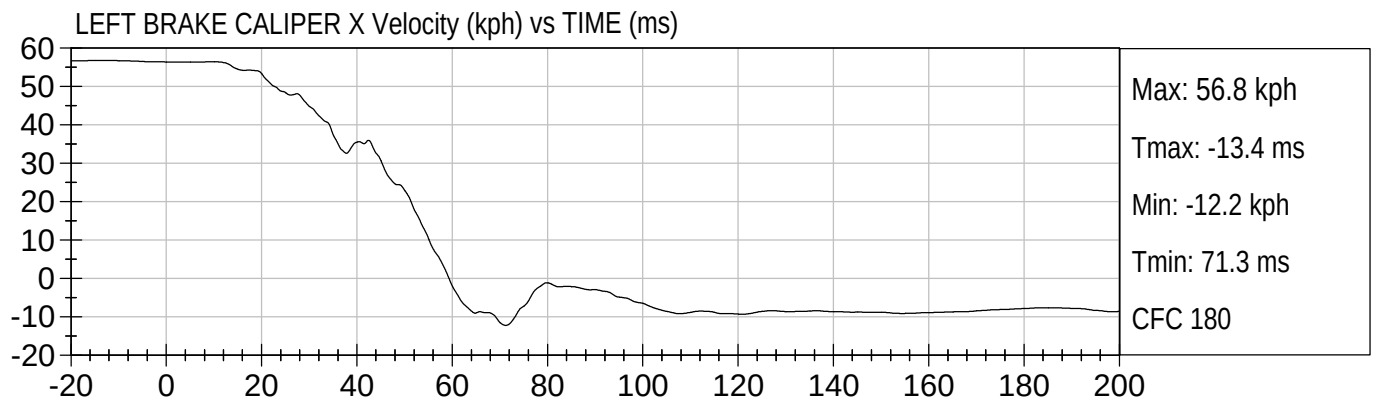
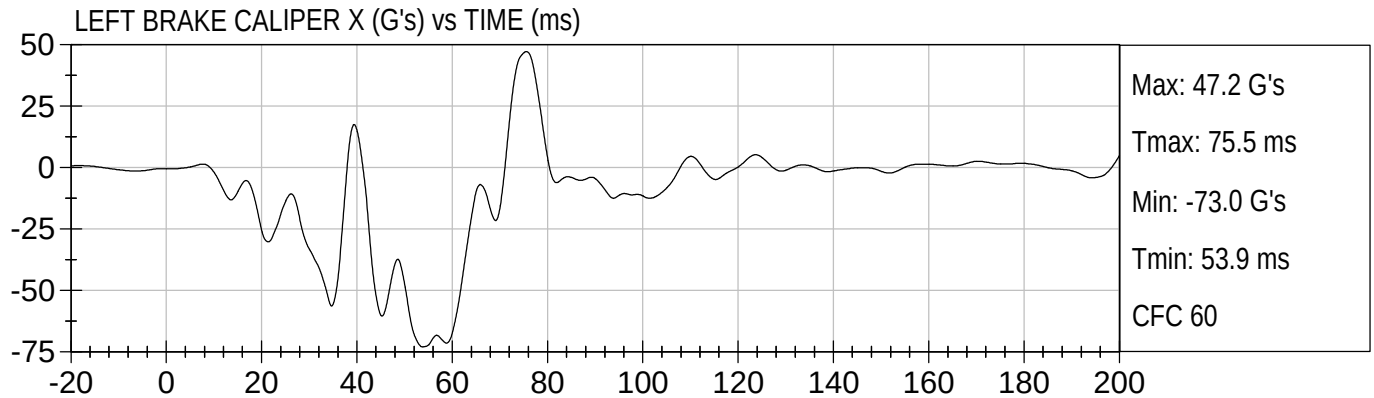






35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

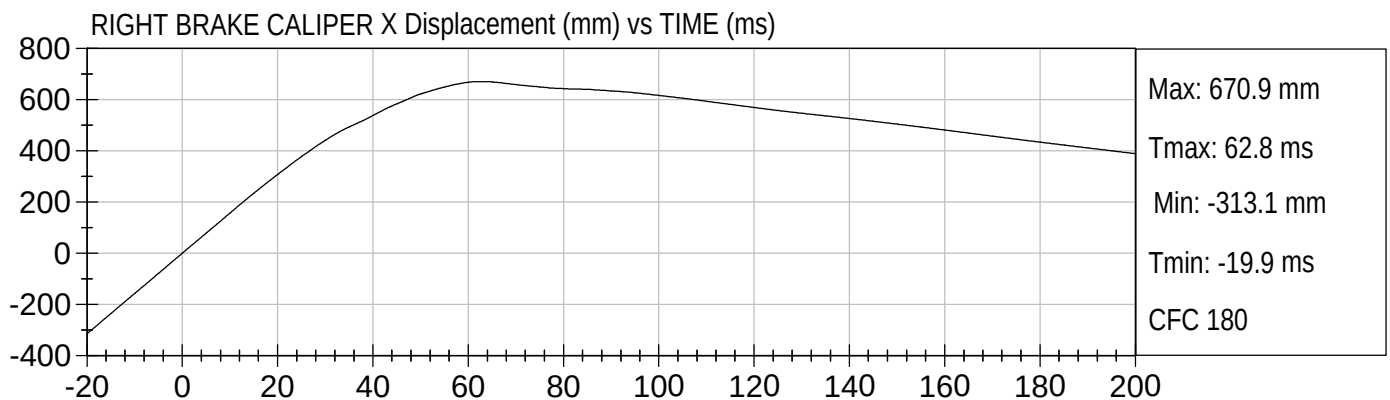
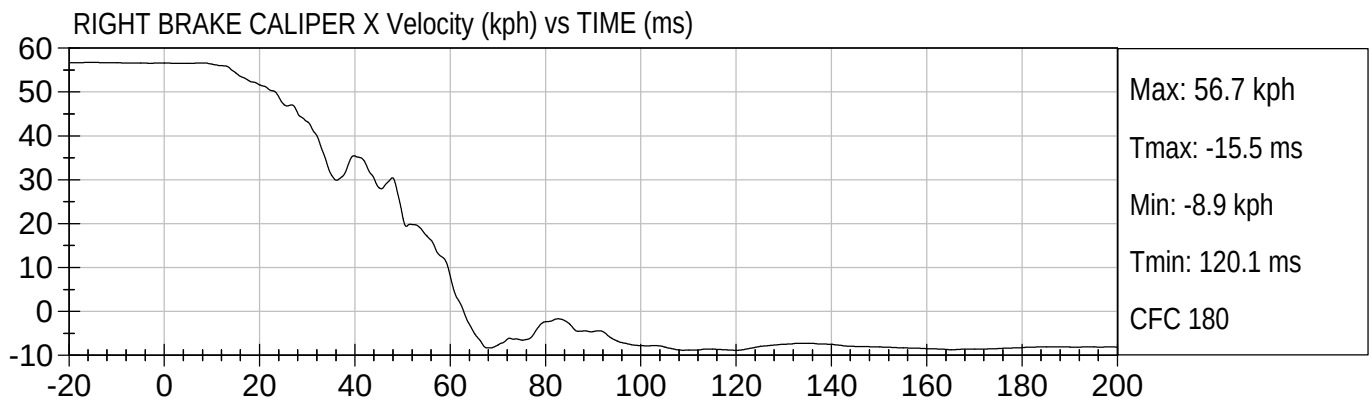
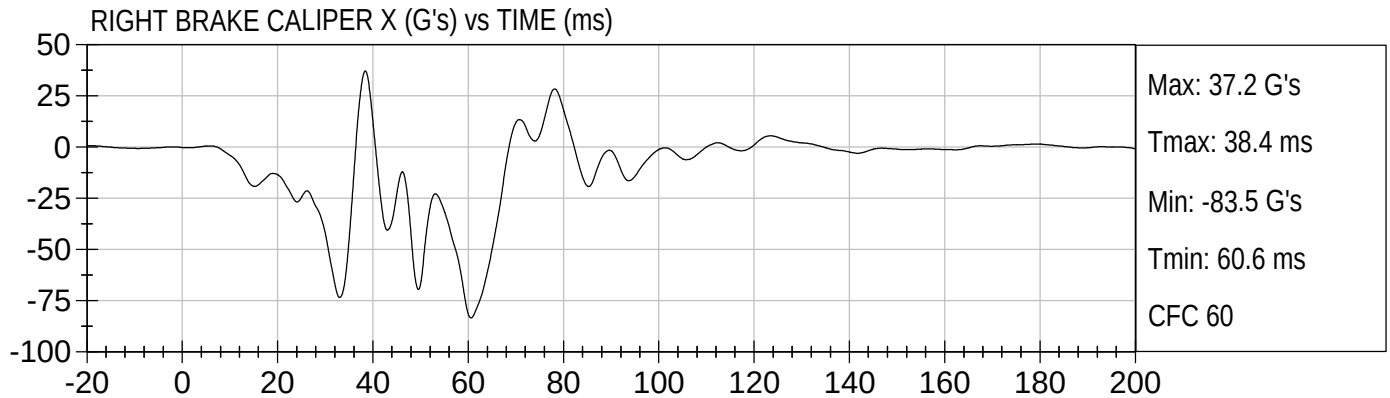
Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

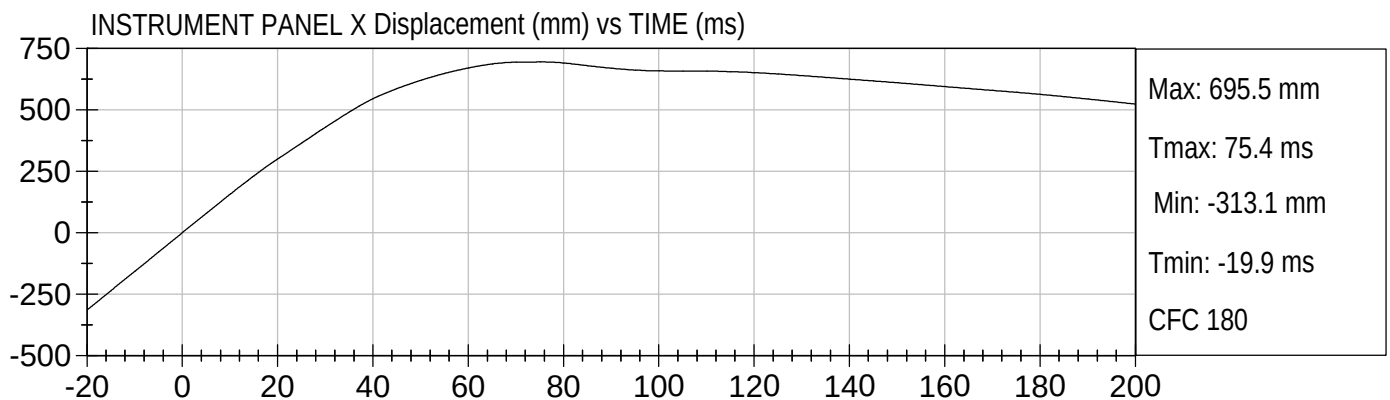
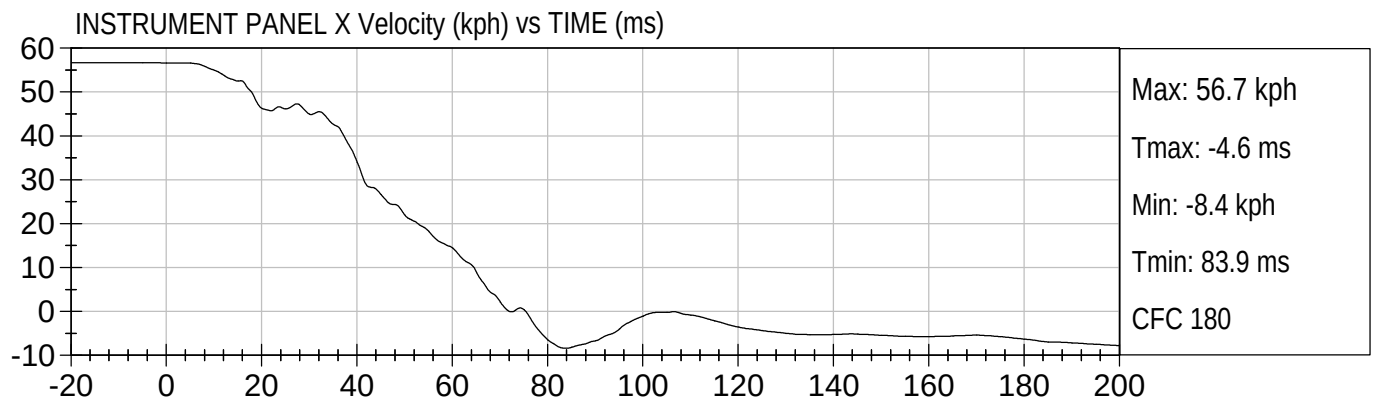
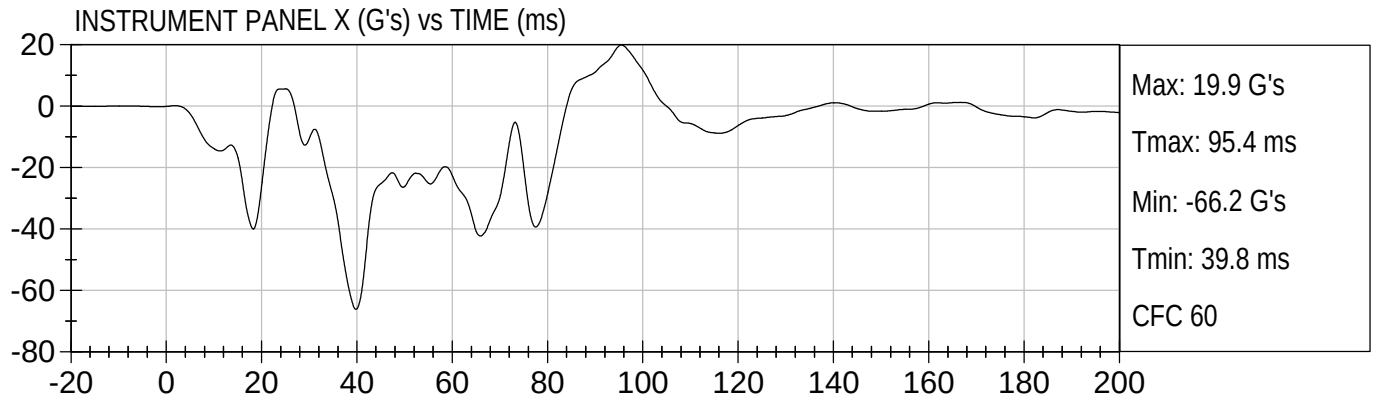
Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

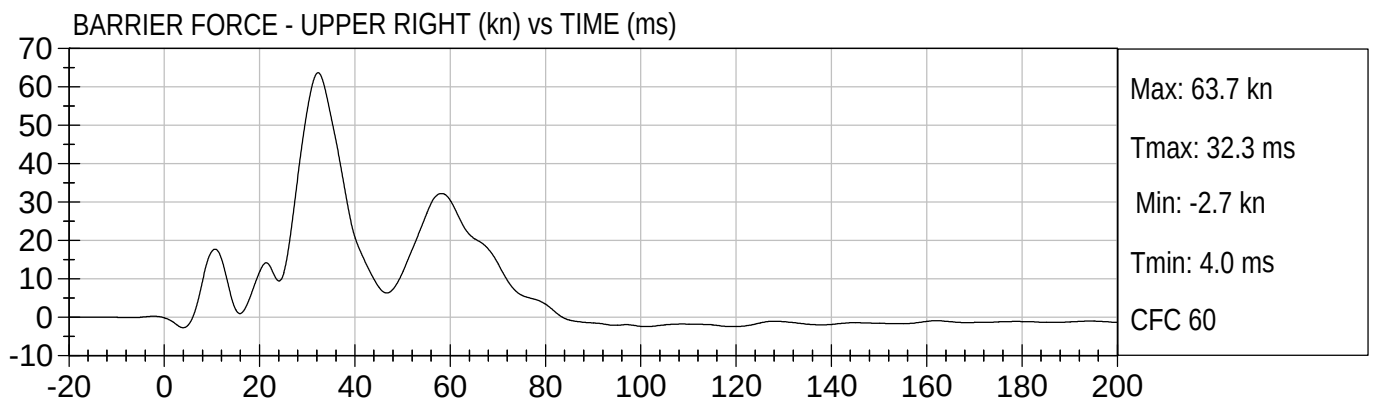
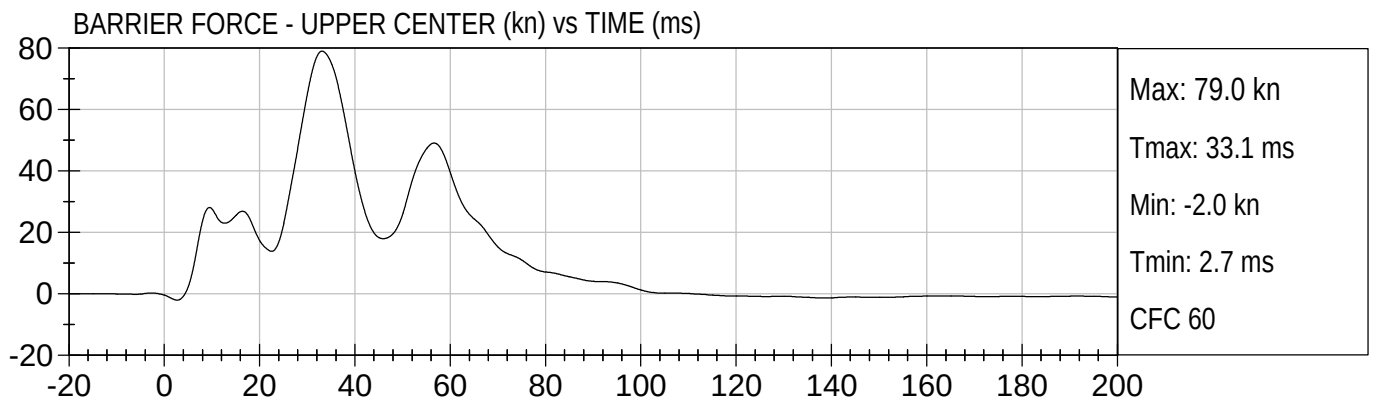
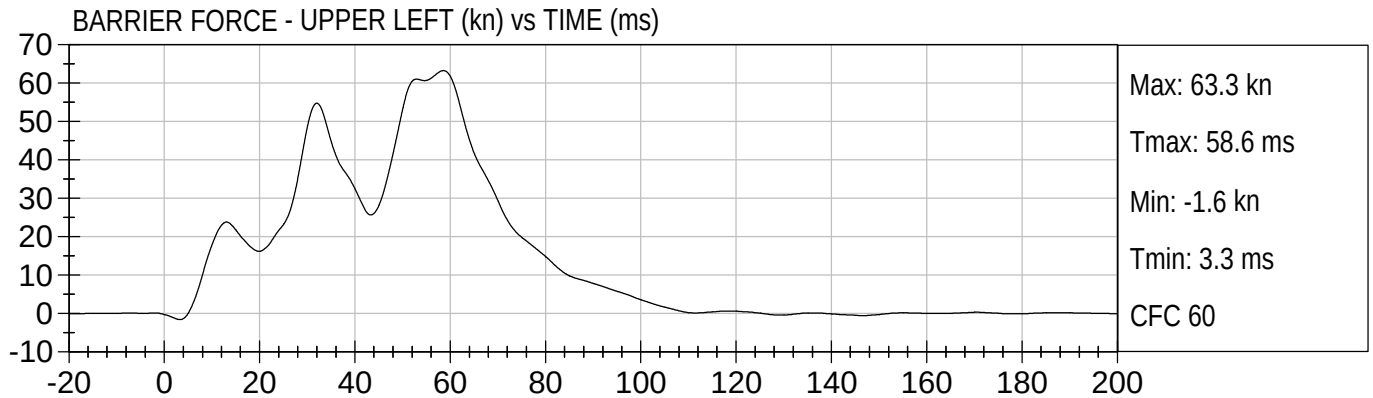






35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

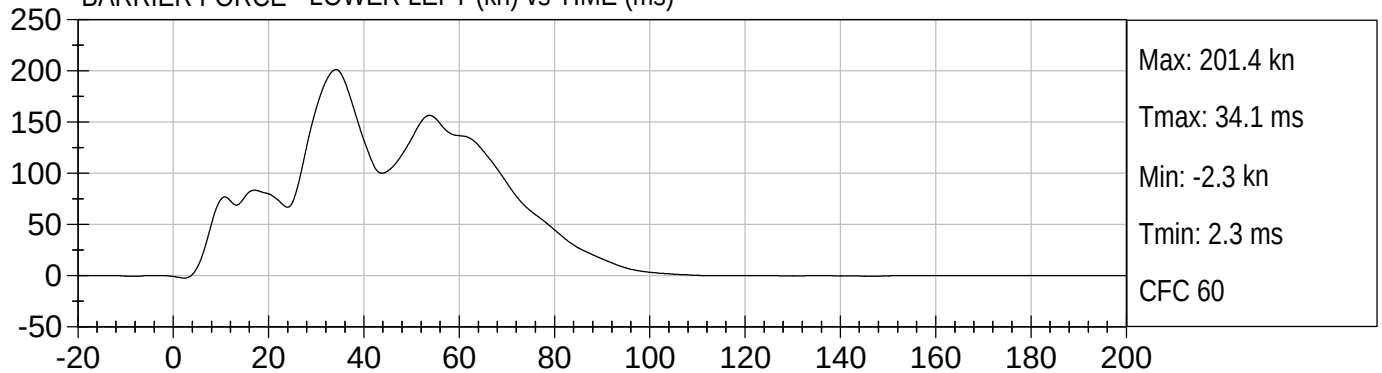




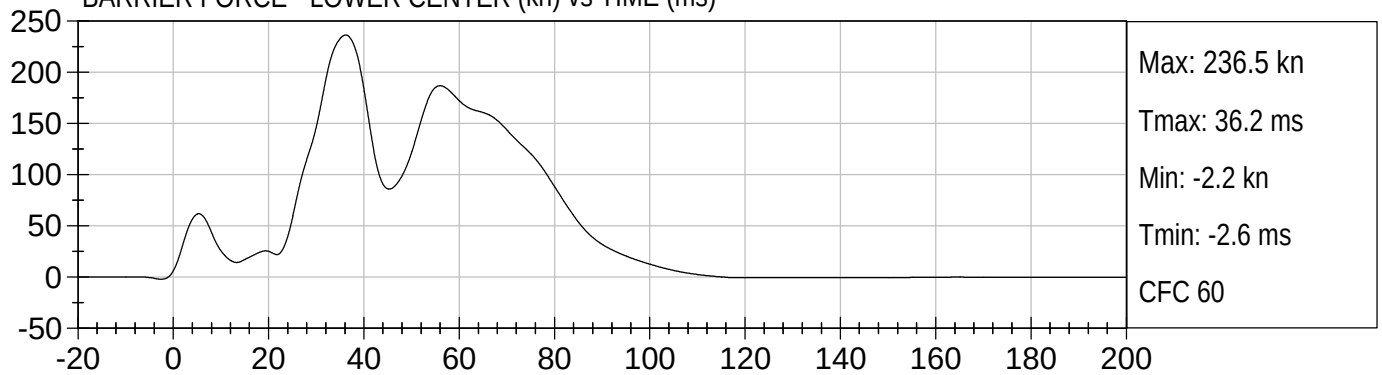
35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

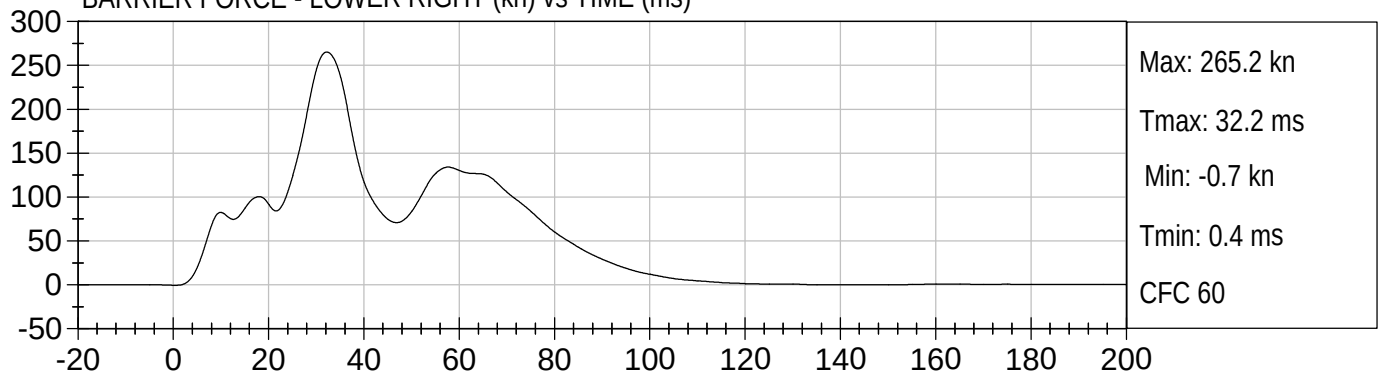
BARRIER FORCE - LOWER LEFT (kn) vs TIME (ms)



BARRIER FORCE - LOWER CENTER (kn) vs TIME (ms)



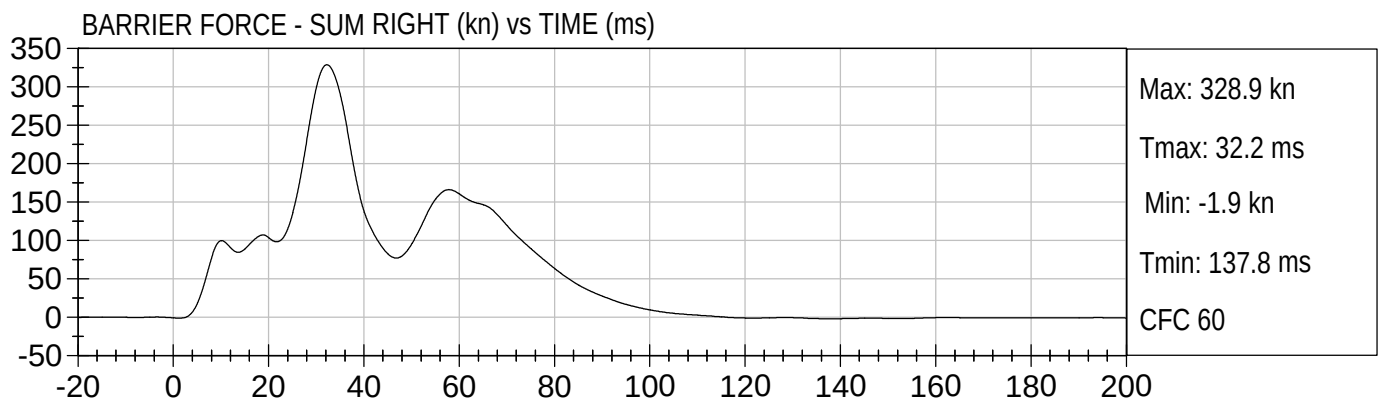
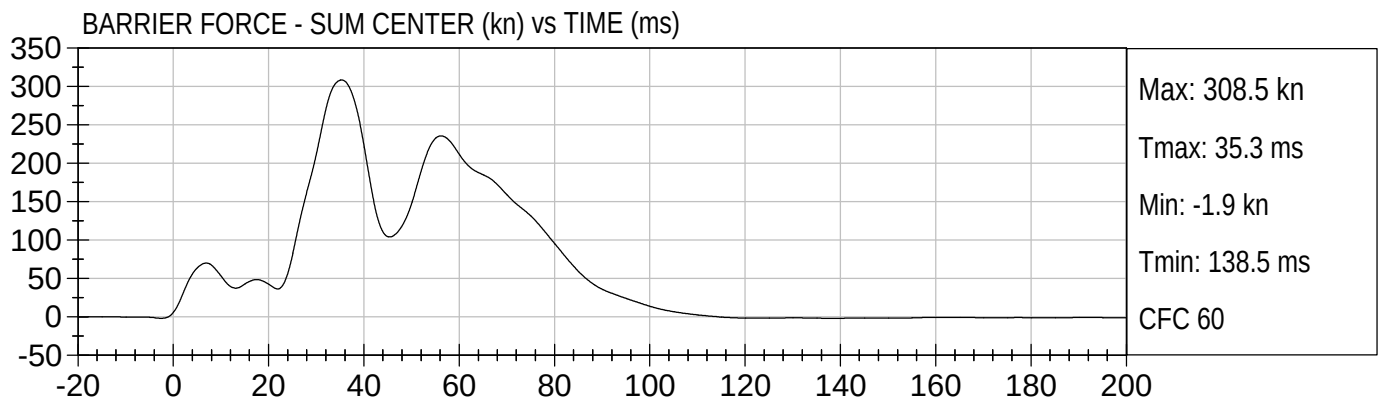
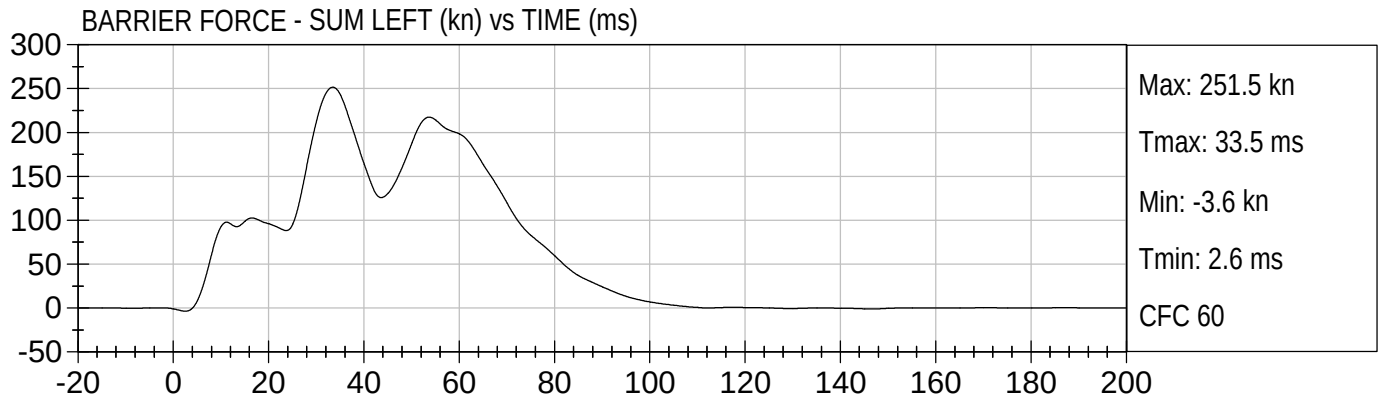
BARRIER FORCE - LOWER RIGHT (kn) vs TIME (ms)





35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)

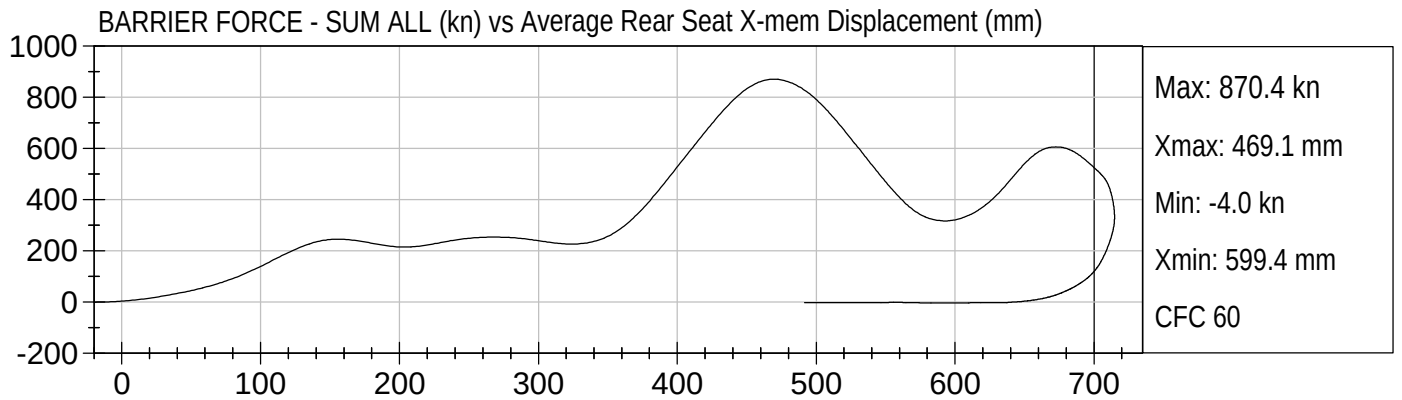
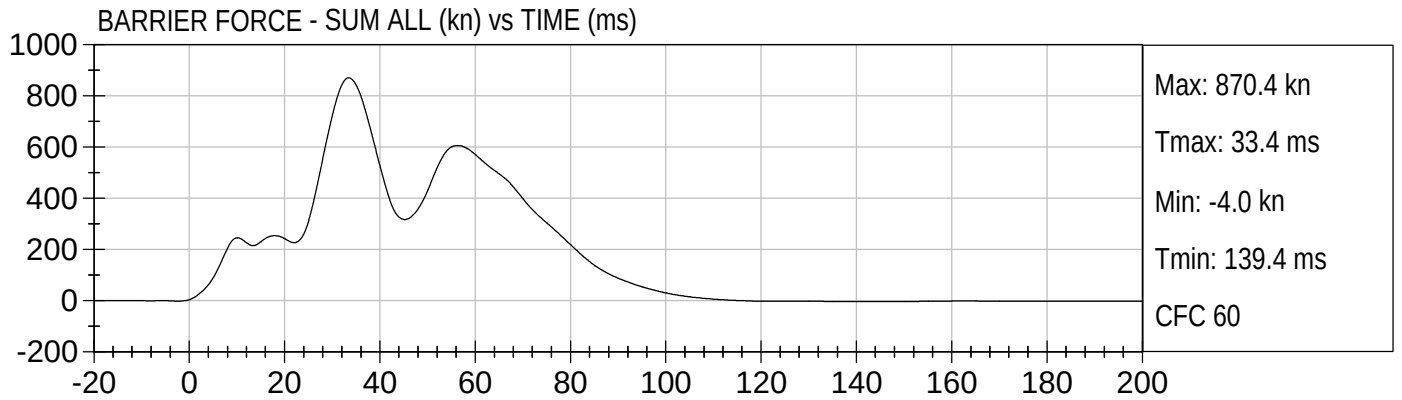






35 MPH FRONTAL IMPACT  
2002 LEXUS ES300 (M25100)

Test Date: 1/29/02  
Speed: 35.2 mph (56.6 km/h)



## **APPENDIX C**

### **DUMMY CALIBRATION DATA TRACES AND TABLES**

**Hybrid III Calibration Data Sheet**  
**50<sup>th</sup> Percentile Male**  
**Left Knee Impact Test**

ATD Serial No.: 065

Test I.D.: D011766

| Tested Parameter             | Units   | Specification | Result | Pass/Fail |
|------------------------------|---------|---------------|--------|-----------|
| Laboratory Temperature       | °C      | 18.9 to 25.5  | 21.8   | Pass      |
| Laboratory Relative Humidity | %       | 10 to 70      | 32     | Pass      |
| Probe Velocity               | m/s     | 2.07 to 2.13  | 2.11   | Pass      |
| Peak Probe Force             | Newtons | 4715 to 5782  | 5414   | Pass      |
| Overall Test Results         |         |               |        | Pass      |

\_\_\_\_\_  
Laboratory Technician

11/28/01

Test Date

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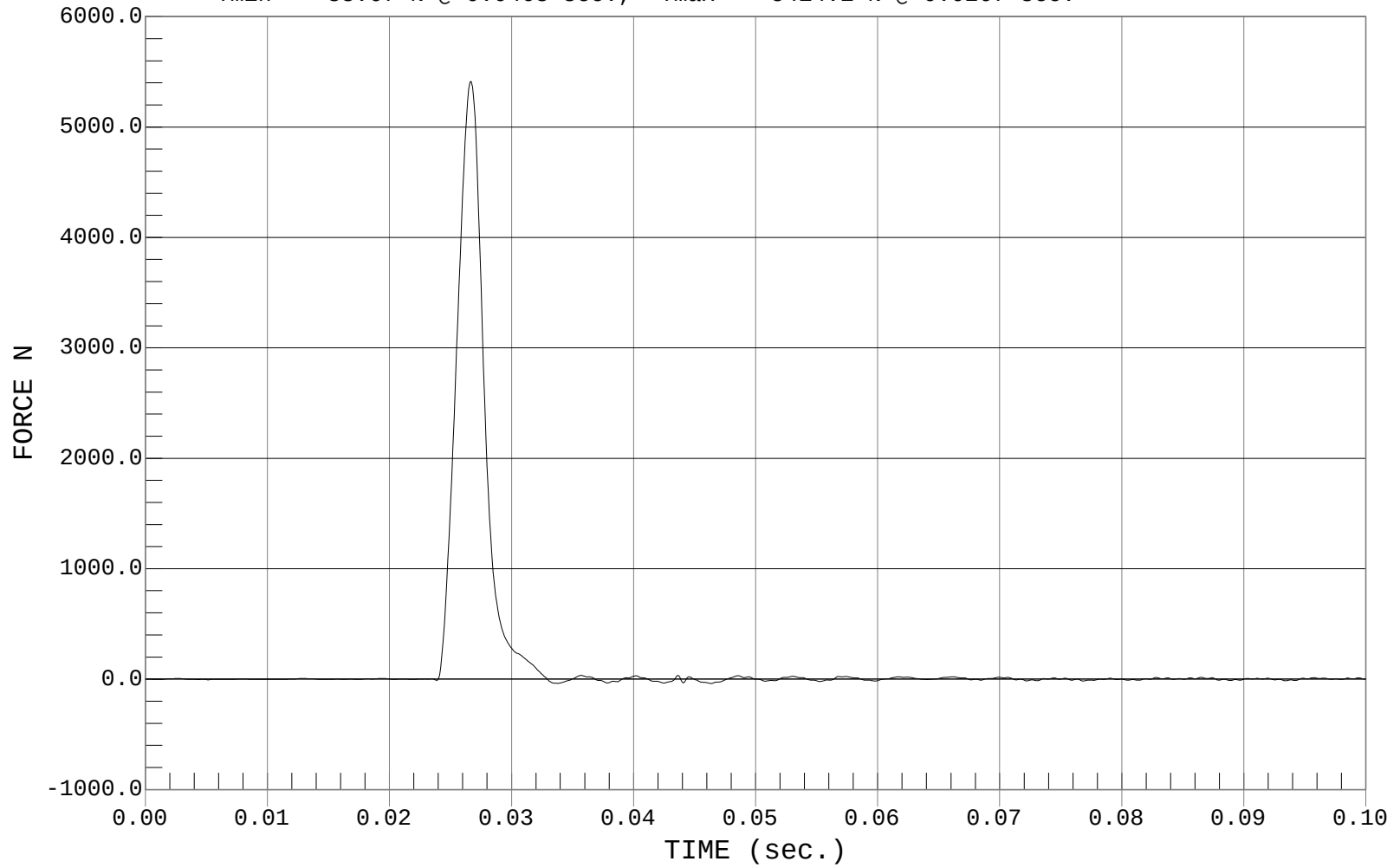
# LEFT KNEE IMPACT

Test Desc.: Dummy Calibration - Left Knee Impact  
Component: Dummy #065

Test Date: 11-28-01  
Speed: 6.93 FT/SEC, 2.11 M/SEC

1 FORCE, D01766FF.F09

Ymin = -38.67 N @ 0.0463 sec., Ymax = 5414.1 N @ 0.0267 sec.



**Hybrid III Calibration Data Sheet**  
**50<sup>th</sup> Percentile Male**  
**Right Knee Impact Test**

ATD Serial No.: 065

Test I.D.: D011765

| Tested Parameter             | Units   | Specification | Result | Pass/Fail |
|------------------------------|---------|---------------|--------|-----------|
| Laboratory Temperature       | °C      | 18.9 to 25.5  | 21.8   | Pass      |
| Laboratory Relative Humidity | %       | 10 to 70      | 32     | Pass      |
| Probe Velocity               | m/s     | 2.07 to 2.13  | 2.11   | Pass      |
| Peak Probe Force             | Newtons | 4715 to 5782  | 5585   | Pass      |
| Overall Test Results         |         |               |        | Pass      |

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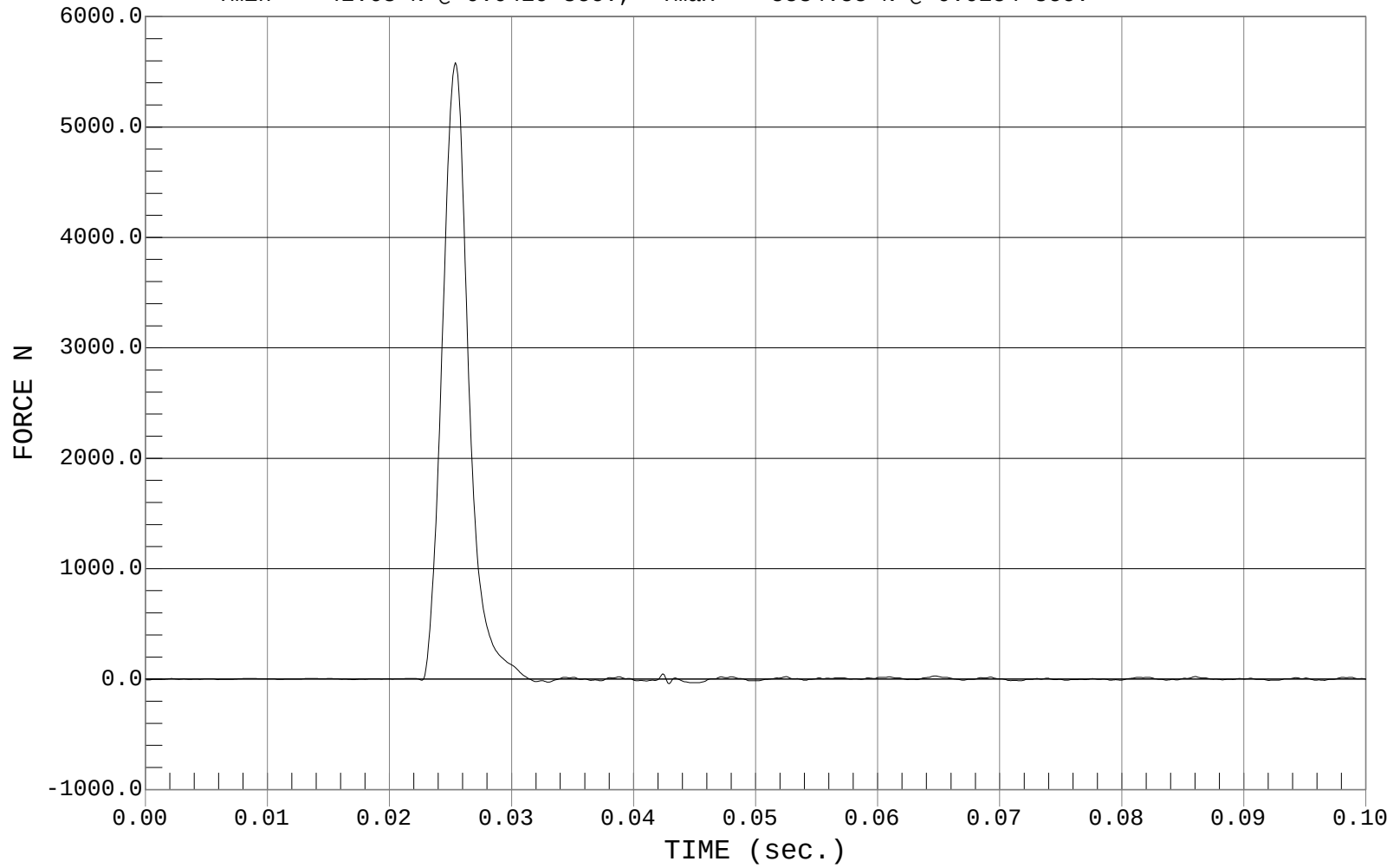
## RIGHT KNEE IMPACT

Test Desc.: Dummy Calibration - Right Knee Impact  
Component: Dummy #065

Test Date: 11-28-01  
Speed: 6.93 FT/SEC, 2.11 M/SEC

— 1 FORCE, D01765FF.F09

Ymin = -42.63 N @ 0.0429 sec., Ymax = 5584.55 N @ 0.0254 sec.





**Hybrid III Calibration Data Sheet**  
**50<sup>th</sup> Percentile Male**  
**Head Drop Calibration**

ATD Serial No.: 065

Test I.D.: D011761

| Tested Parameter             | Units  | Specification   | Result | Pass/Fail |
|------------------------------|--------|-----------------|--------|-----------|
| Laboratory Temperature       | °C     | 18.9 to 25.5    | 22.0   | Pass      |
| Laboratory Relative Humidity | %      | 10 to 70        | 33     | Pass      |
| Peak Resultant Acceleration  | G's    | 225.0 to 275.0  | 243.8  | Pass      |
| Peak Lateral Acceleration    | G's    | $\leq \pm 15.0$ | -6.8   | Pass      |
| Is Acceleration Unimodal?    | Yes/No | < 10% Peak      | Yes    | Pass      |
| Overall Test Results         |        |                 |        | Pass      |

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Test Date

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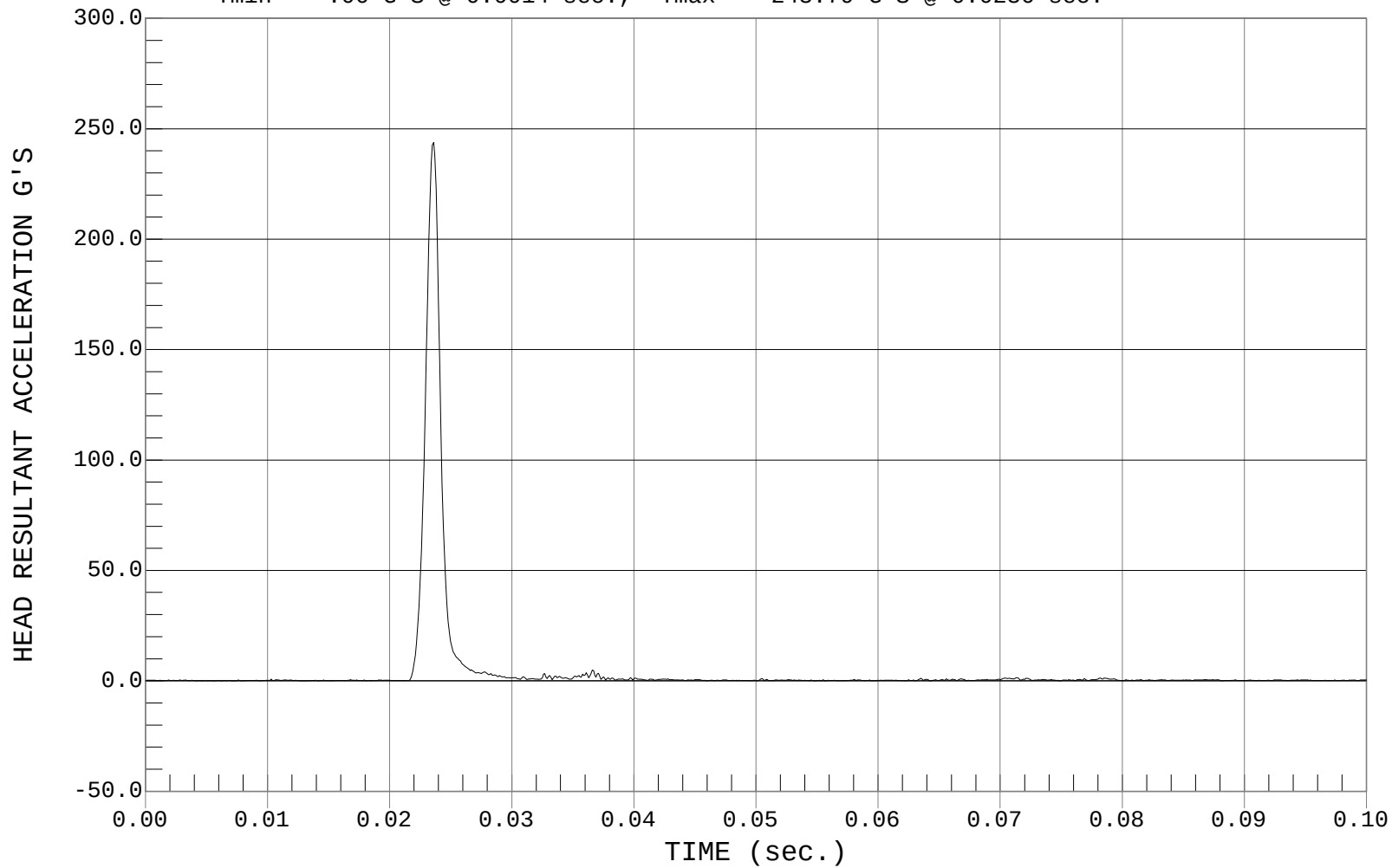


## PEAK RESULTANT ACCELERATION

Test Desc.: Dummy Calibration - Head Drop  
Component: Dummy #065

Test Date: 11-26-01  
Speed: 0.00 FT/SEC, 0.00 M/SEC

Ymin = .06 G'S @ 0.0014 sec., Ymax = 243.79 G'S @ 0.0236 sec.





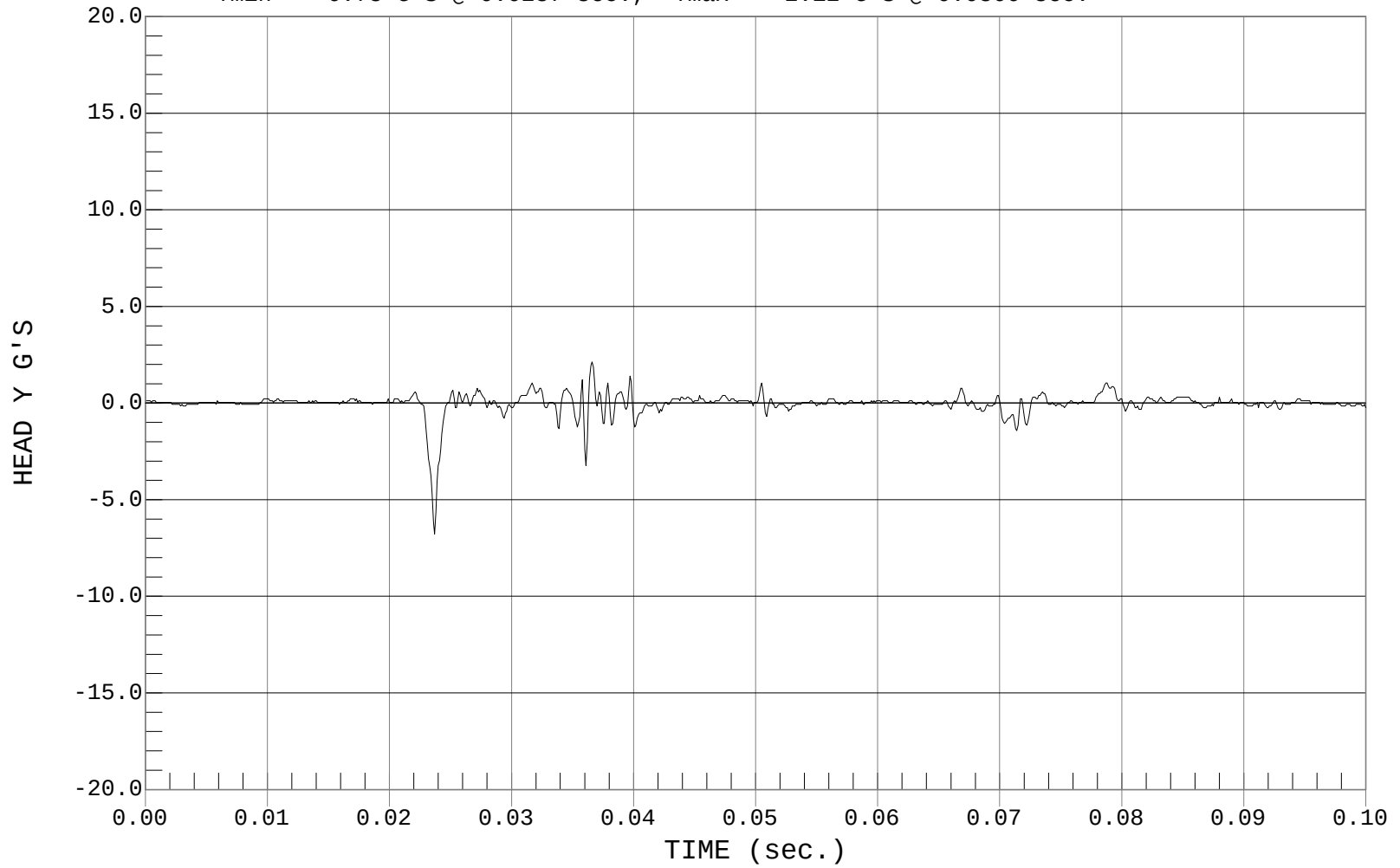
# PEAK LATERAL ACCELARATION

Test Desc.: Dummy Calibration - Head Drop  
Component: Dummy #065

Test Date: 11-26-01  
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 HEAD Y, D01761AR.A02

Ymin = -6.78 G'S @ 0.0237 sec., Ymax = 2.12 G'S @ 0.0366 sec.





**Hybrid III Calibration Data Sheet**  
**50<sup>th</sup> Percentile Male**  
**Thorax Impact Test**

ATD Serial No.: 065

Test I.D.: D011764

| Tested Parameter             | Units   | Specification | Result | Pass/Fail |
|------------------------------|---------|---------------|--------|-----------|
| Laboratory Temperature       | °C      | 20.6 to 22.2  | 21.4   | Pass      |
| Laboratory Relative Humidity | %       | 10 to 70      | 36     | Pass      |
| Probe Velocity               | m/s     | 6.58 to 6.82  | 6.71   | Pass      |
| Peak Probe Force             | Newtons | 5159 to 5893  | 5792   | Pass      |
| Peak Sternum Displacement    | cm      | 6.35 to 7.26  | 6.95   | Pass      |
| Internal Hysteresis          | %       | 69 to 85      | 70     | Pass      |
| Overall Test Results         |         |               |        | Pass      |

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12/3/01  
Test Date

\_\_\_\_\_  
Approved By



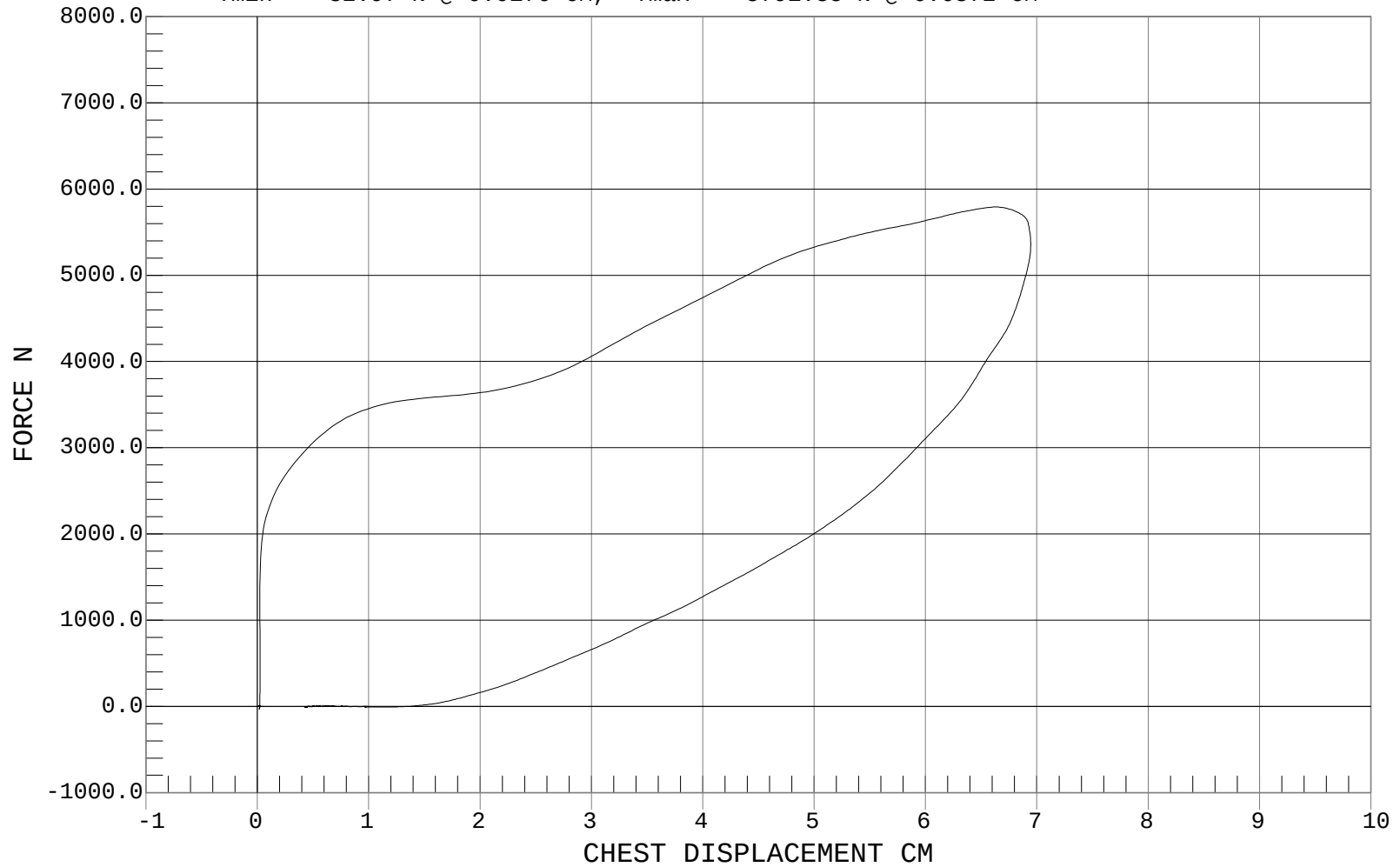
# THORAX IMPACT

Test Desc.: Dummy Calibration - Chest Impact  
Component: Dummy #065

Test Date: 12-03-01  
Speed: 22.01 FT/SEC, 6.71 M/SEC

— 1 FORCE, D01764CH.FVD

Ymin = -32.97 N @ 0.0176 CM, Ymax = 5791.85 N @ 6.6372 CM



**Hybrid III Calibration Data Sheet**  
**50<sup>th</sup> Percentile Male**  
**Neck Flexion Test**

ATD Serial No.: 065

Test I.D.: D011762

| Tested Parameter                               |          | Units   | Specification  | Result | Pass/Fail |
|------------------------------------------------|----------|---------|----------------|--------|-----------|
| Laboratory Temperature                         |          | °C      | 20.6 to 22.2   | 20.8   | Pass      |
| Laboratory Relative Humidity                   |          | %       | 10 to 70       | 32     | Pass      |
| Pendulum Velocity                              |          | m/s     | 6.89 to 7.13   | 7.01   | Pass      |
| Pendulum Deceleration                          | 10 msec. | G's     | 22.50 to 27.50 | 22.91  | Pass      |
|                                                | 20 msec. | G's     | 17.60 to 22.60 | 19.36  | Pass      |
|                                                | 30 msec. | G's     | 12.50 to 18.50 | 15.95  | Pass      |
| Peak Pendulum Deceleration After 30 msec.      |          | G's     | ≤29.0          | 16.0   | Pass      |
| Deceleration Decay Time to Cross 5 G's         |          | msec.   | 34.0 to 42.0   | 37.2   | Pass      |
| Maximum "D" Plane Rotation                     | Maximum  | Degrees | 64.0 to 78.0   | 73.0   | Pass      |
|                                                | Time     | msec.   | 57.0 to 64.0   | 58.7   | Pass      |
| "D" Plane Rotation Decay Time To Zero Crossing |          | msec.   | 113.0 to 128.0 | 115.9  | Pass      |
| Moment About Occipital Condyle                 | Maximum  | N· m    | 84.1 to 108.5  | 92.7   | Pass      |
|                                                | Time     | msec.   | 47.0 to 58.0   | 50.6   | Pass      |
| Positive Moment Decay Time To Zero Crossing    |          | msec.   | 97.0 to 107.0  | 104.1  | Pass      |
| Overall Test Results                           |          |         |                | Pass   |           |

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Laboratory Technician

11/28/01

Test Date

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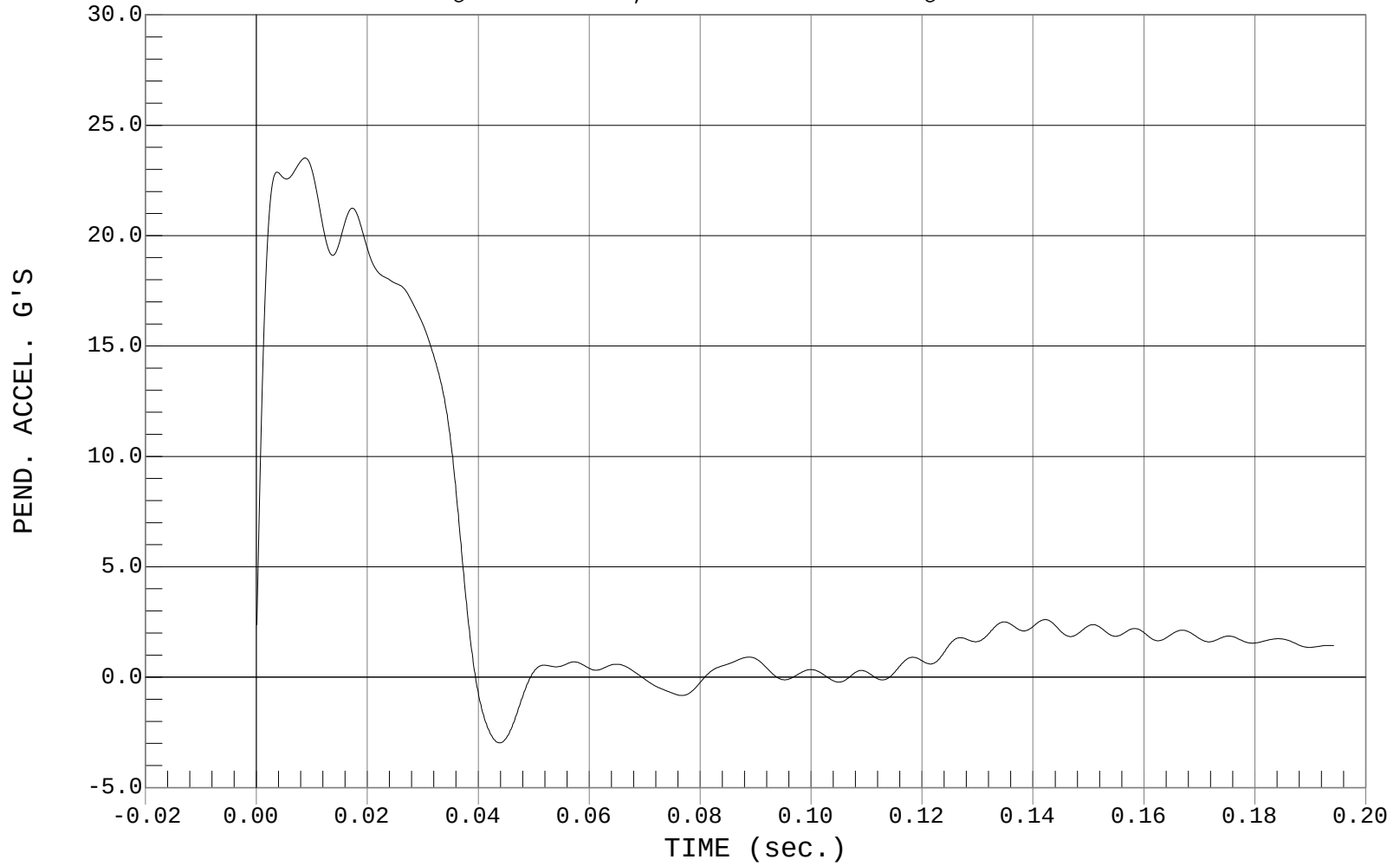
# PENDULUM DECELERATION

Test Desc.: Dummy Calibration - Neck Flexion  
Component: Dummy #065

Test Date: 11-28-01  
Speed: 23.01 FT/SEC, 7.01 M/SEC

— 1 PEND. ACCEL., D01762AF.A04

Ymin = -2.98 G'S @ 0.0439 sec., Ymax = 23.52 G'S @ 0.0088 sec.





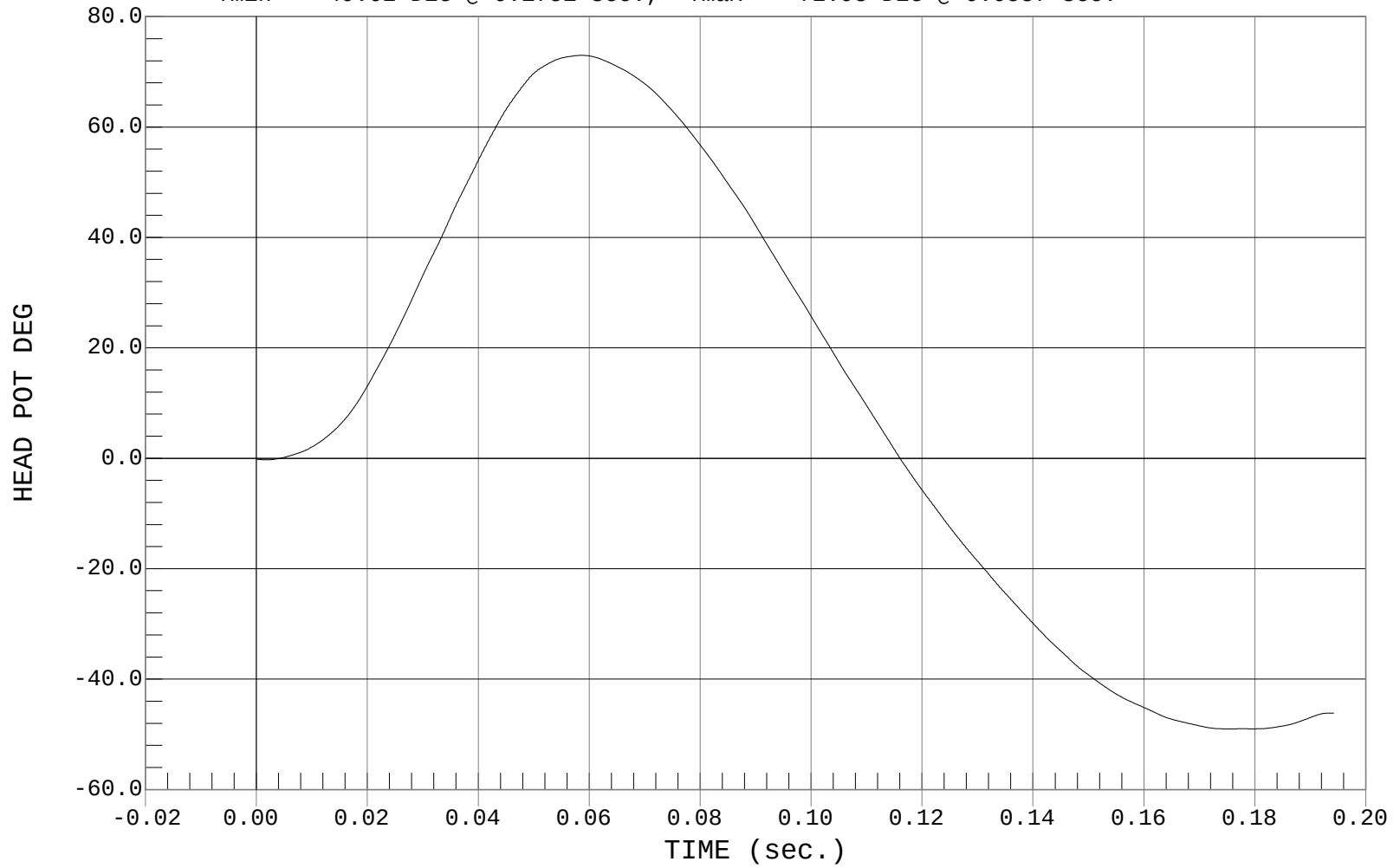
## NECK ROTATION

Test Desc.: Dummy Calibration - Neck Flexion  
Component: Dummy #065

Test Date: 11-28-01  
Speed: 23.01 FT/SEC, 7.01 M/SEC

— 1 HEAD POT, D01762DU.D05

Ymin = -49.02 DEG @ 0.1751 sec., Ymax = 72.98 DEG @ 0.0587 sec.





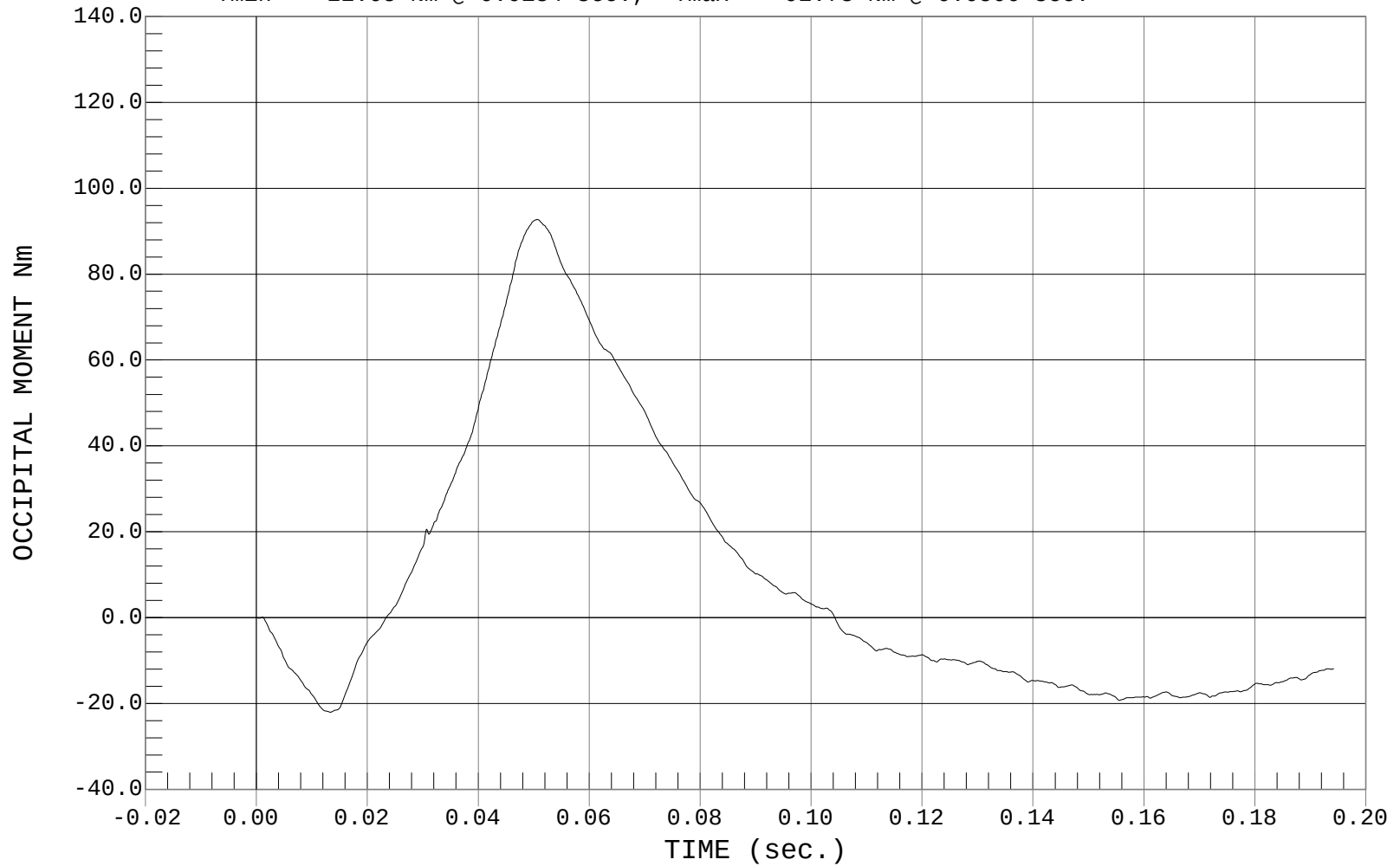
## OCCIPITAL MOMENT

Test Desc.: Dummy Calibration - Neck Flexion  
Component: Dummy #065

Test Date: 11-28-01  
Speed: 23.01 FT/SEC, 7.01 M/SEC

— 1 OCCIPITAL MOMENT, D01762NK.MNT

Ymin = -22.05 Nm @ 0.0134 sec., Ymax = 92.73 Nm @ 0.0506 sec.





# Hybrid III Calibration Data Sheet

50<sup>th</sup> Percentile Male

Neck Extension Test

ATD Serial No.: 065

Test I.D.: D011763

| Tested Parameter                               |          | Units   | Specification  | Result | Pass/Fail |
|------------------------------------------------|----------|---------|----------------|--------|-----------|
| Laboratory Temperature                         |          | °C      | 20.6 to 22.2   | 20.9   | Pass      |
| Laboratory Relative Humidity                   |          | %       | 10 to 70       | 31     | Pass      |
| Pendulum Velocity                              |          | m/s     | 5.95 to 6.19   | 6.09   | Pass      |
| Pendulum Deceleration                          | 10 msec. | G's     | 17.20 to 21.20 | 18.91  | Pass      |
|                                                | 20 msec. | G's     | 14.00 to 19.00 | 17.32  | Pass      |
|                                                | 30 msec. | G's     | 11.00 to 16.00 | 12.06  | Pass      |
| Peak Pendulum Deceleration After 30 msec.      |          | G's     | ≤22.0          | 12.7   | Pass      |
| Deceleration Decay Time to Cross 5 G's         |          | msec.   | 38.0 to 46.0   | 38.3   | Pass      |
| Maximum "D" Plane Rotation                     | Maximum  | Degrees | 81.0 to 106.0  | 99.1   | Pass      |
|                                                | Time     | msec.   | 72.0 to 82.0   | 78.9   | Pass      |
| "D" Plane Rotation Decay Time To Zero Crossing |          | msec.   | 147.0 to 174.0 | 158.6  | Pass      |
| Moment About Occipital Condyle                 | Minimum  | N·m     | -52.9 to -79.9 | -63.4  | Pass      |
|                                                | Time     | msec.   | 65.0 to 79.0   | 72.6   | Pass      |
| Negative Moment Decay Time To Zero Crossing    |          | msec.   | 120.0 to 148.0 | 143.7  | Pass      |
| Overall Test Results                           |          |         |                | Pass   |           |

\_\_\_\_\_  
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11/28/01

Test Date

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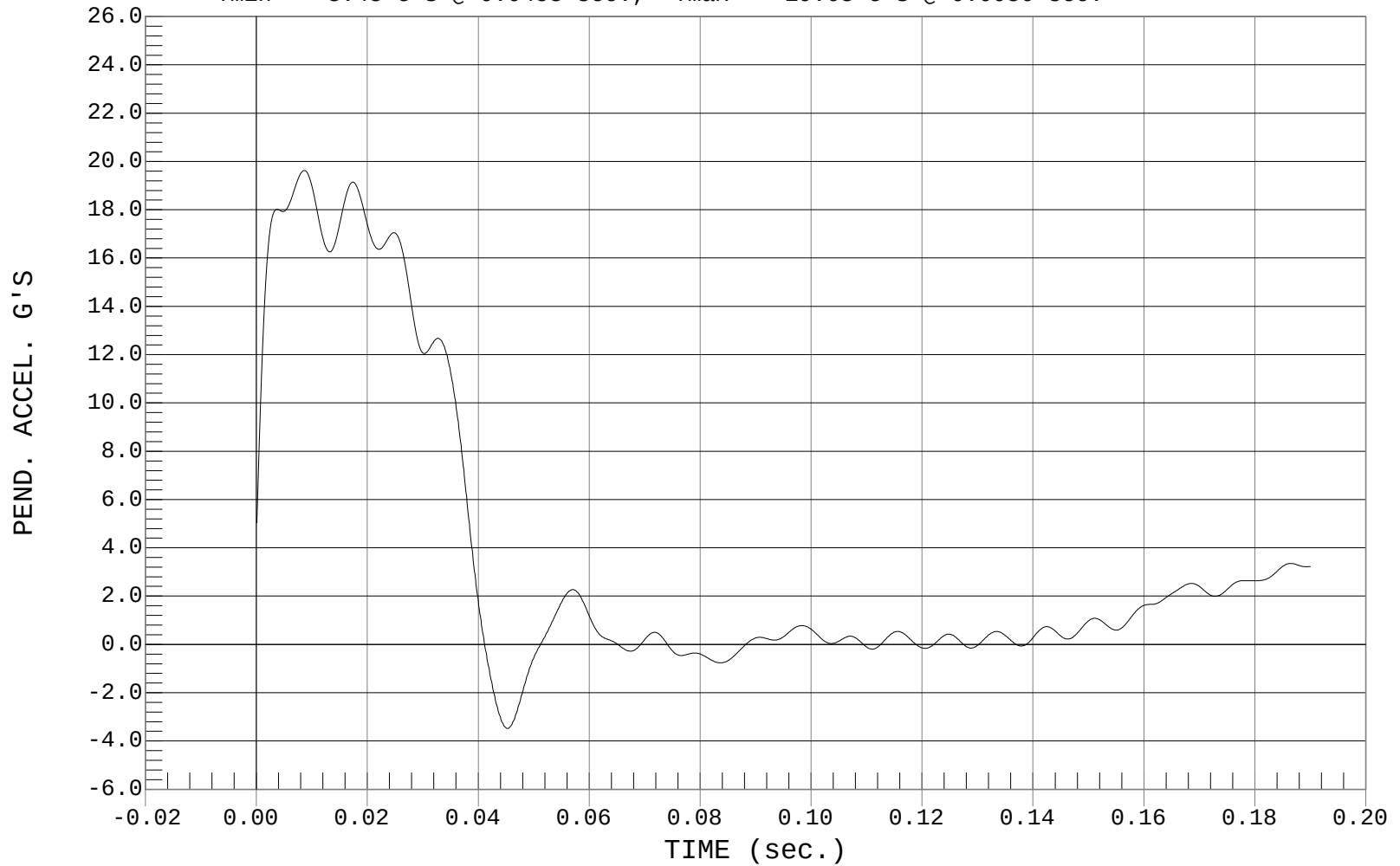
# PENDULUM DECELERATION

Test Desc.: Dummy Calibration - Neck Extension  
Component: Dummy #065

Test Date: 11-28-01  
Speed: 19.98 FT/SEC, 6.09 M/SEC

— 1 PEND. ACCEL., D01763AF.A04

Ymin = -3.48 G'S @ 0.0453 sec., Ymax = 19.63 G'S @ 0.0086 sec.





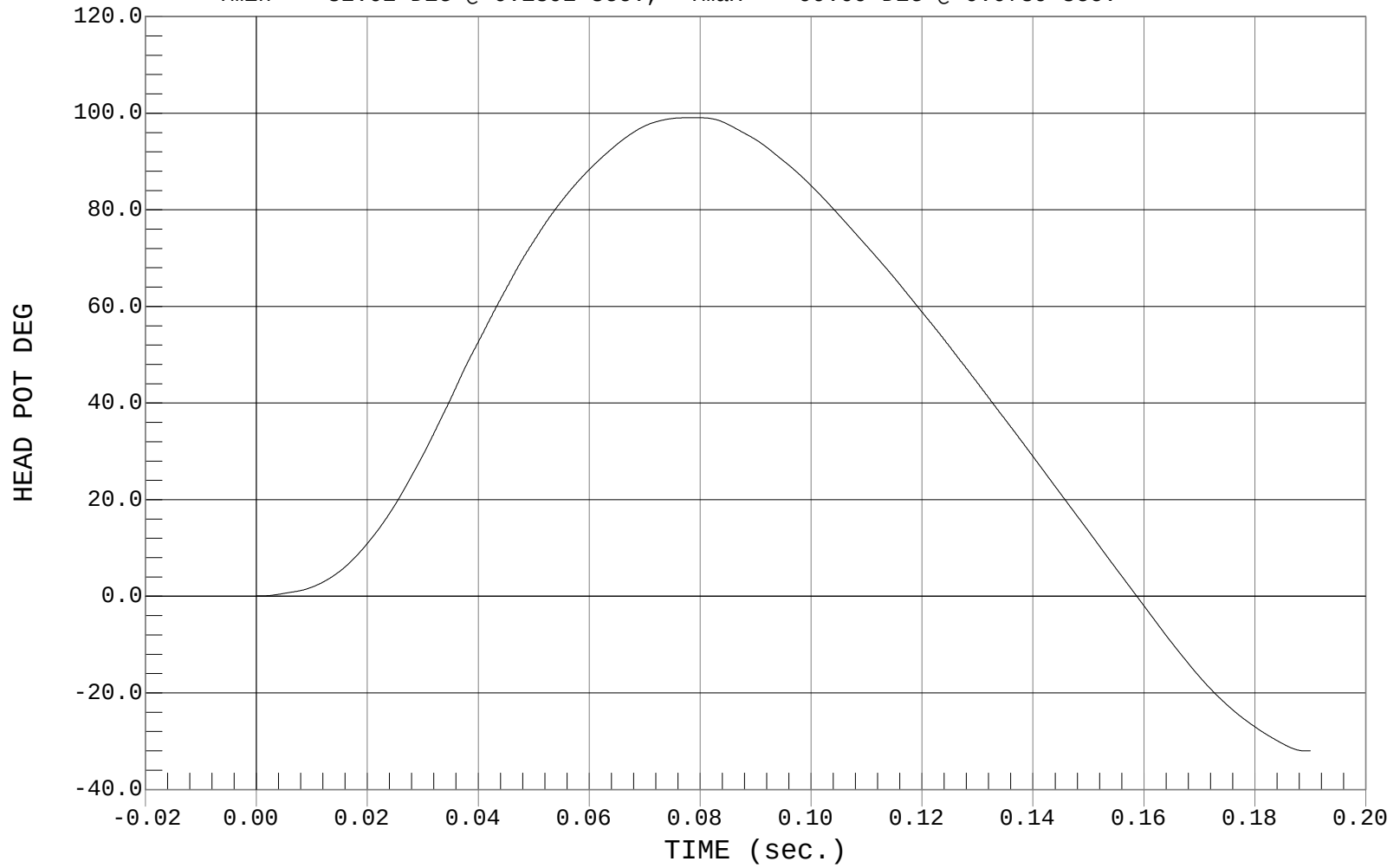
## NECK ROTATION

Test Desc.: Dummy Calibration - Neck Extension  
Component: Dummy #065

Test Date: 11-28-01  
Speed: 19.98 FT/SEC, 6.09 M/SEC

— 1 HEAD POT, D01763DU.D05

Ymin = -32.02 DEG @ 0.1892 sec., Ymax = 99.09 DEG @ 0.0789 sec.







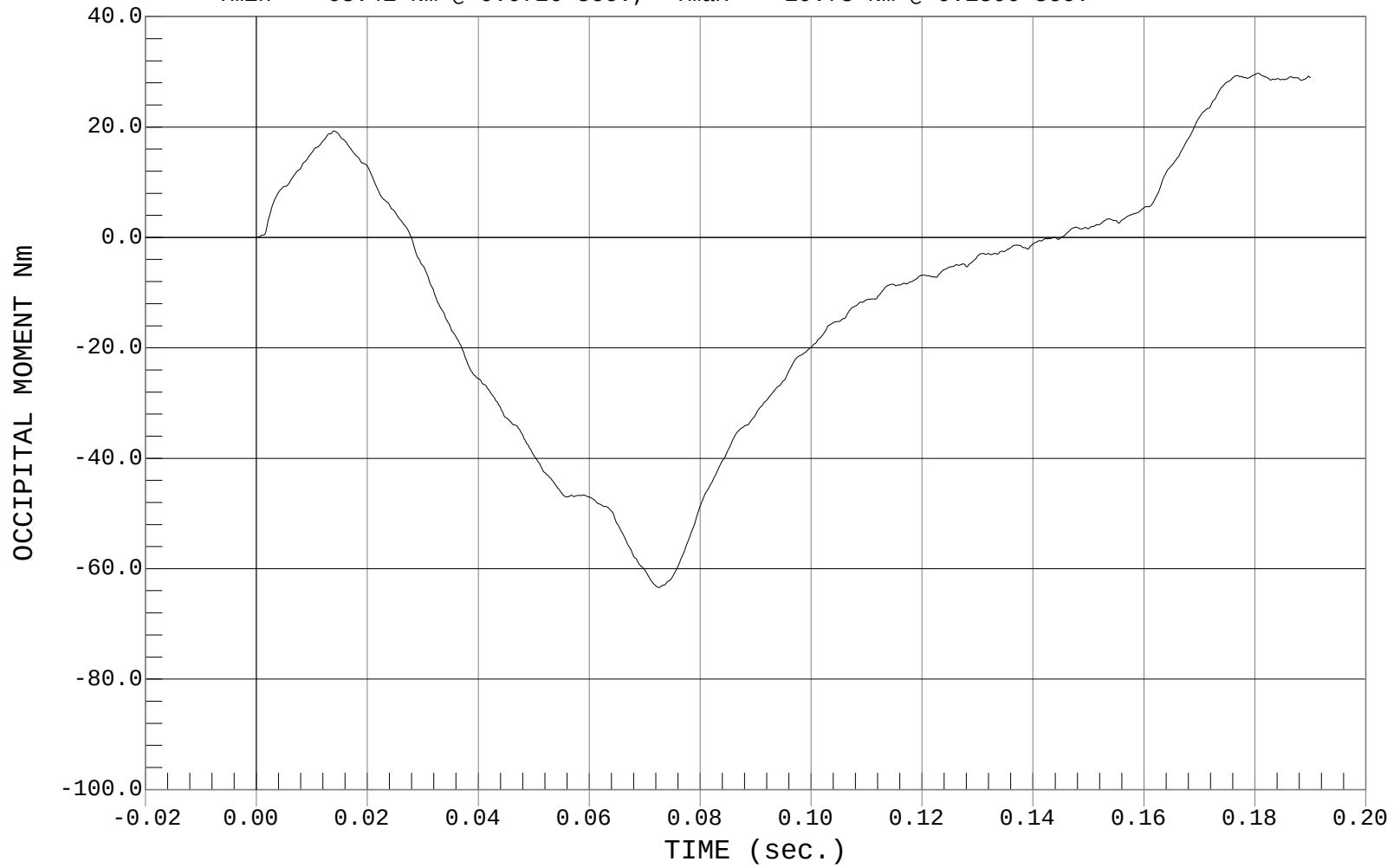
## OCCIPITAL MOMENT

Test Desc.: Dummy Calibration - Neck Extension  
Component: Dummy #065

Test Date: 11-28-01  
Speed: 19.98 FT/SEC, 6.09 M/SEC

— 1 OCCIPITAL MOMENT, D01763NK.MNT

Ymin = -63.41 Nm @ 0.0726 sec., Ymax = 29.73 Nm @ 0.1806 sec.



**Hybrid III Calibration Data Sheet**  
**50<sup>th</sup> Percentile Male**  
**Hip-Femur Flexion Test**

ATD Serial No.: 065

Test I.D.: D011769/0

| Tested Parameter      | Units   | Specification                   | Result |      | Pass/Fail |
|-----------------------|---------|---------------------------------|--------|------|-----------|
|                       |         |                                 | Right  | Left |           |
| Temperature           | °C      | 18.9 to 25.6                    | 21.1   | 21.1 | Pass      |
| Relative Humidity     | %       | 10 to 70                        | 33     | 33   | Pass      |
| Rotation Rate         | deg/sec | 5 – 10                          | Yes    | Yes  | Pass      |
| 30 Degrees            | Nm      | 94.9 Nm Max.                    | 63.5   | 65.5 | Pass      |
| 150 ft-lbf / 203.4 Nm | Deg     | 40 – 50 Degree<br>Max. rotation | 47     | 45   | Pass      |
| Overall Test Results  |         |                                 |        |      | Pass      |

\_\_\_\_\_  
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11/29/01

Test Date

\_\_\_\_\_  
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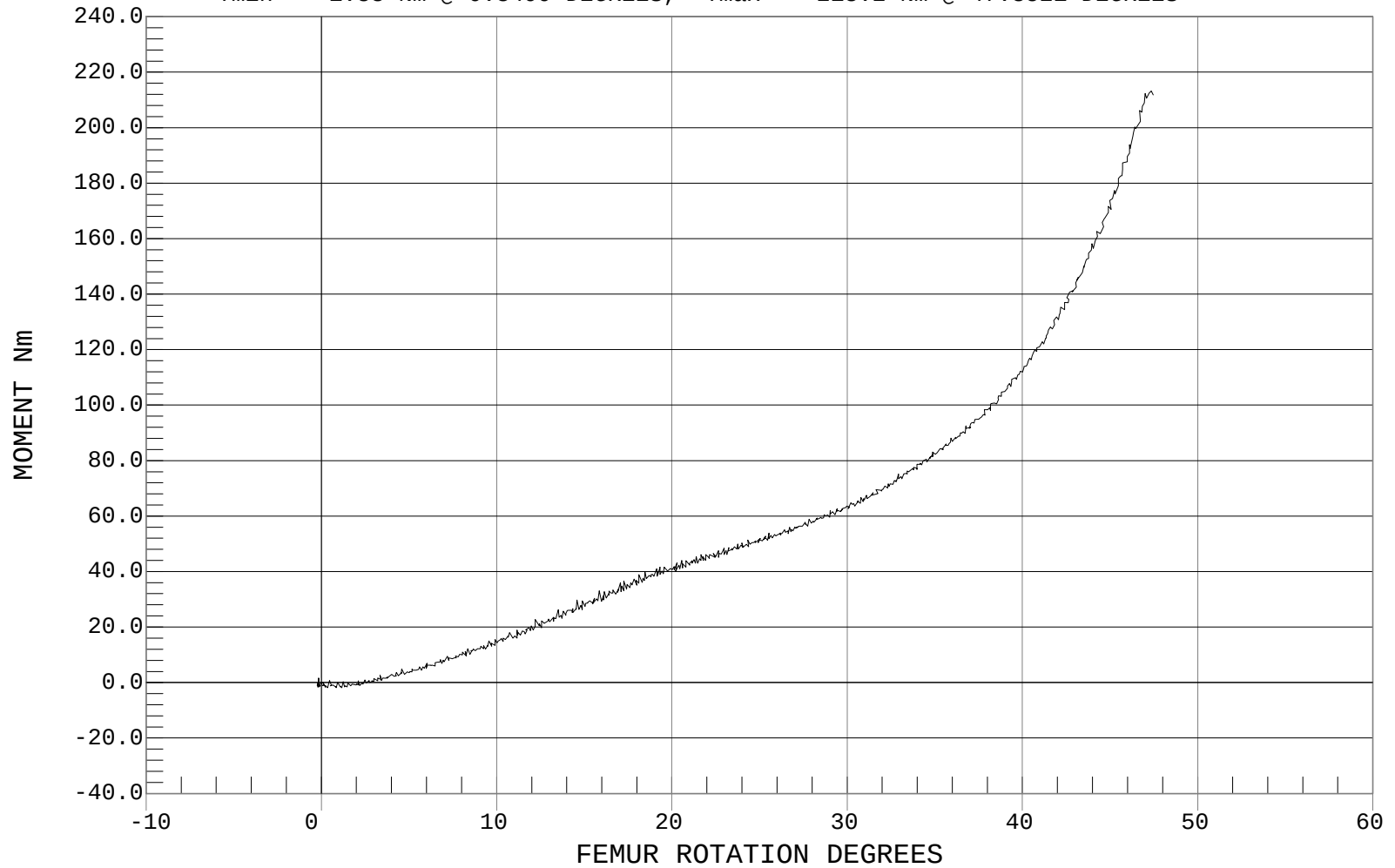
# HIP-FEMUR FLEXION

Test Desc.: DUMMY CALIBRATION - HIP-FEMUR FLEXION  
Component: DUMMY # 065 RIGHT FEMUR

Test Date: 11-29-01  
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 MOMENT, D01769FC.F14

Ymin = -1.83 Nm @ 0.3499 DEGREES, Ymax = 213.2 Nm @ 47.3521 DEGREES







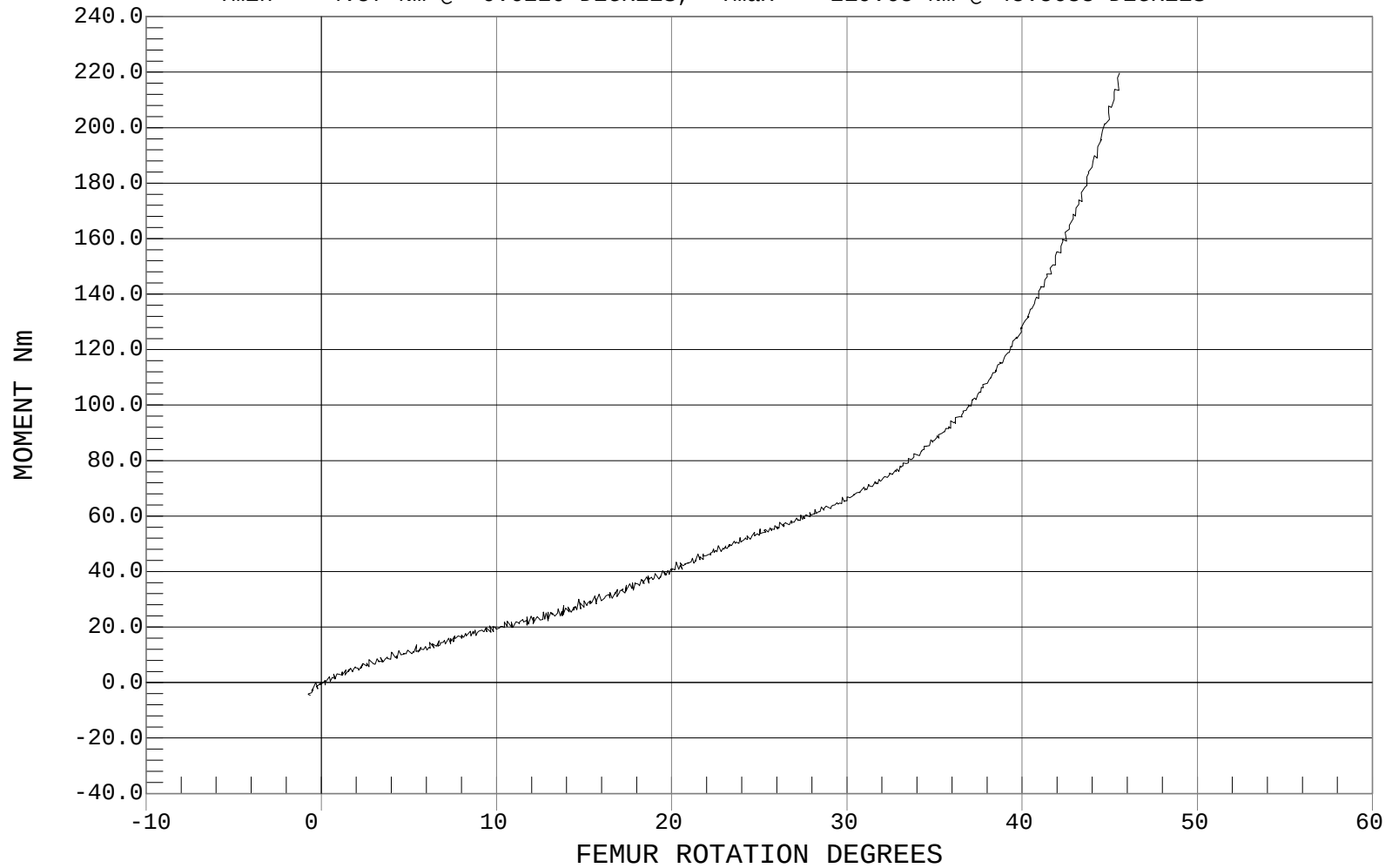
# HIP-FEMUR FLEXION

Test Desc.: DUMMY CALIBRATION - HIP-FEMUR FLEXION  
Component: DUMMY # 065 LEFT FEMUR

Test Date: 11-29-01  
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 MOMENT, D01760FC.F14

Ymin = -4.57 Nm @ -0.6220 DEGREES, Ymax = 219.65 Nm @ 45.5638 DEGREES



**Hybrid III Calibration Data Sheet**  
**50<sup>th</sup> Percentile Male**  
**Right Knee Slider**

ATD Serial No.: 065

Test I.D.: D011767

| Tested Parameter     | Units | Specification  | Result | Pass/Fail |
|----------------------|-------|----------------|--------|-----------|
| Temperature          | °C    | 18.9 to 25.6   | 21.1   | Pass      |
| Relative Humidity    | %     | 10 to 70       | 30     | Pass      |
| Velocity             | m/s   | 2.7 – 2.8      | 2.7    | Pass      |
| Impact Force @ 10 mm | kN    | -1.72 to -1.26 | -1.66  | Pass      |
| Impact Force @ 18 mm | KN    | -3.10 to -2.27 | -2.62  | Pass      |
| Overall Test Results |       |                |        | Pass      |

\_\_\_\_\_  
Laboratory Technician

12/01/01

Test Date

\_\_\_\_\_  
Approved By



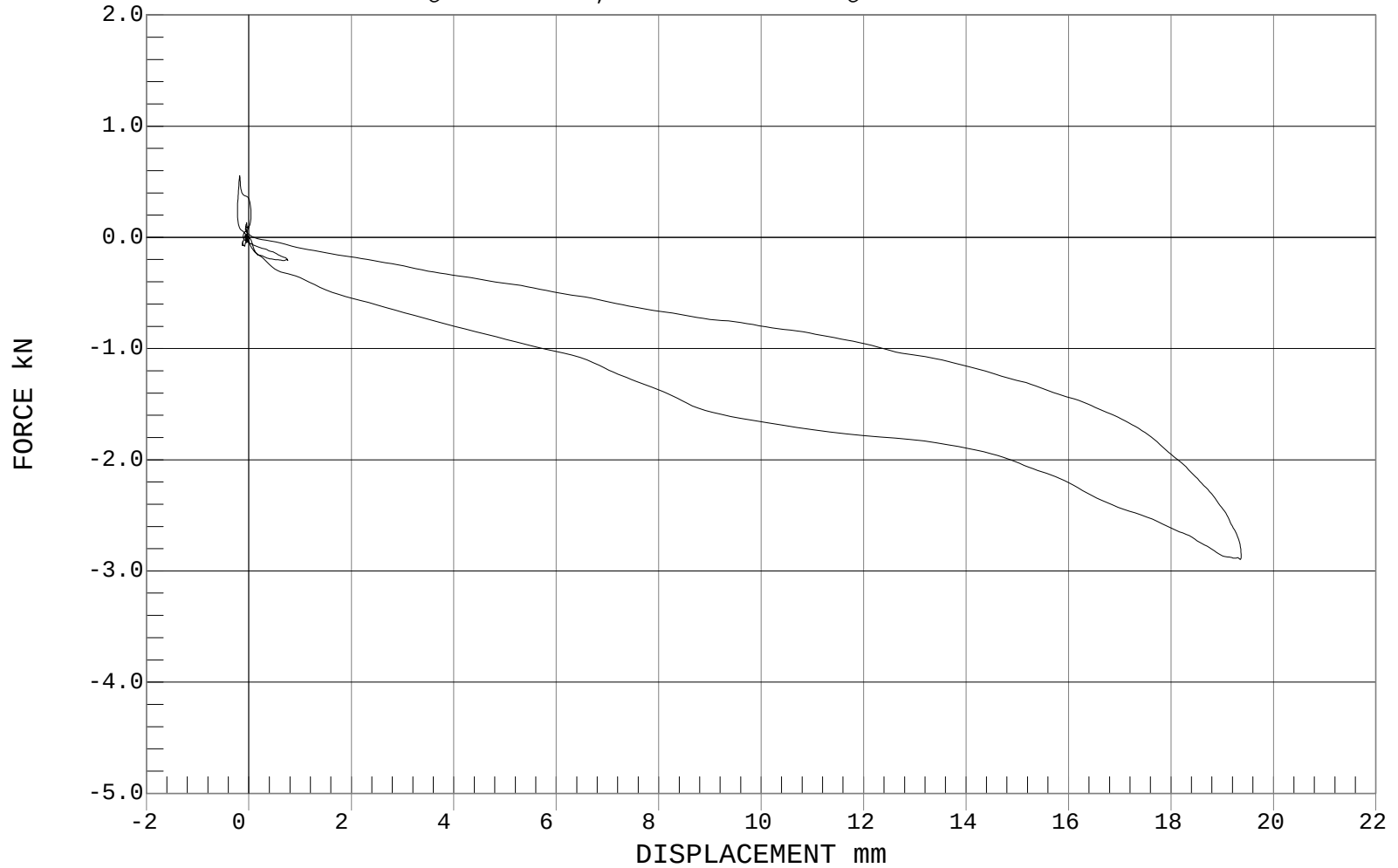
## RIGHT KNEE SLIDER

Test Desc.: Dummy Calibration - Right Knee Slider  
Component: Dummy #065

Test Date: 12-01-01  
Speed: 8.99 FT/SEC, 2.74 M/SEC

— 1 FORCE, D01767FC.F05

Ymin = -2.9 kN @ 19.3520 mm, Ymax = .55 kN @ -0.1796 mm





**Hybrid III Calibration Data Sheet**  
**50<sup>th</sup> Percentile Male**  
**Left Knee Slider**

ATD Serial No.: 065

Test I.D.: D011768

| Tested Parameter     | Units | Specification  | Result | Pass/Fail |
|----------------------|-------|----------------|--------|-----------|
| Temperature          | °C    | 18.9 to 25.6   | 21.1   | Pass      |
| Relative Humidity    | %     | 10 to 70       | 30     | Pass      |
| Velocity             | m/s   | 2.7 – 2.8      | 2.7    | Pass      |
| Impact Force @ 10 mm | kN    | -1.72 to -1.26 | -1.36  | Pass      |
| Impact Force @ 18 mm | kN    | -3.10 to -2.27 | -2.39  | Pass      |
| Overall Test Results |       |                |        | Pass      |

\_\_\_\_\_  
Laboratory Technician

12/01/01

Test Date

\_\_\_\_\_  
Approved By



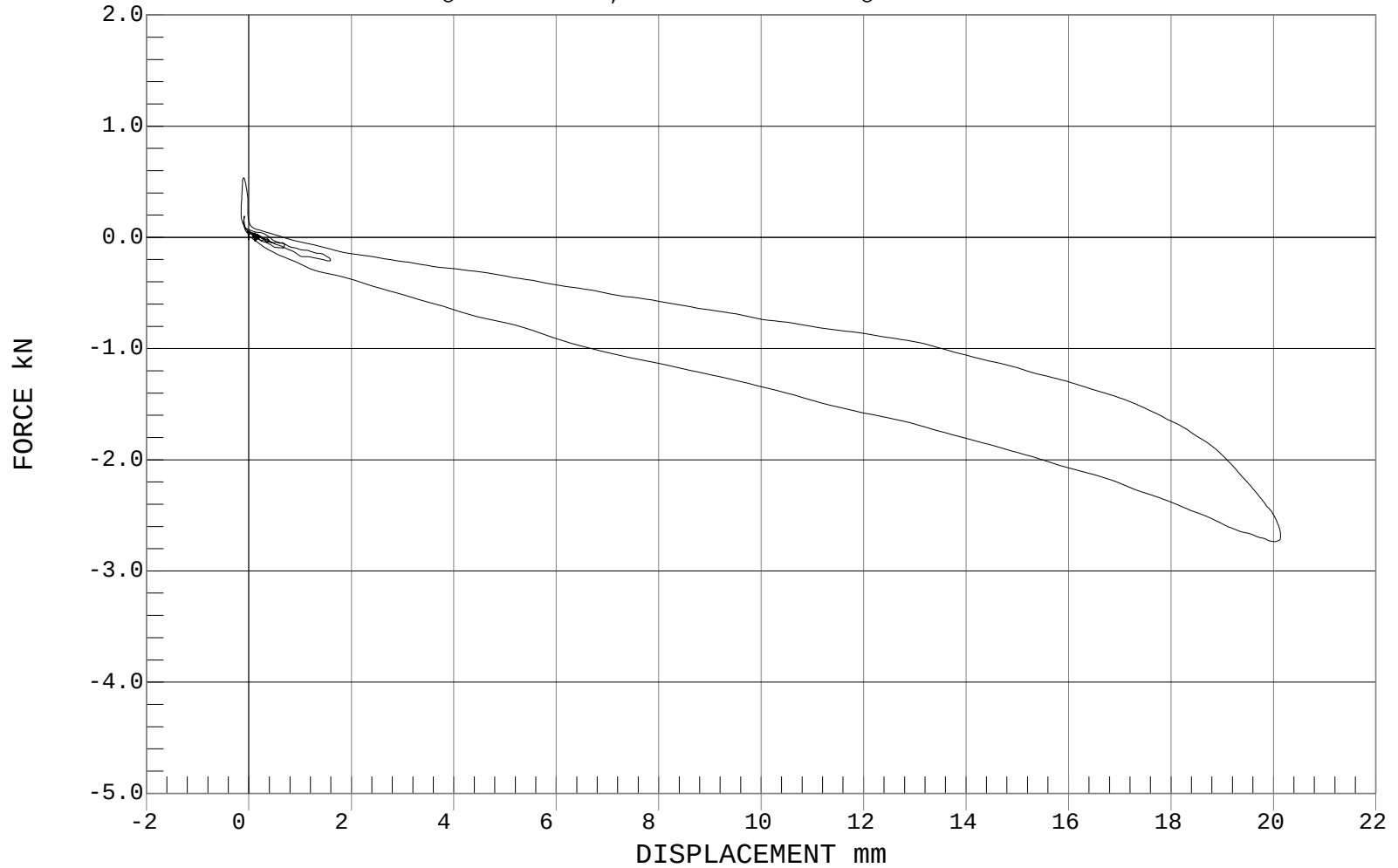
# LEFT KNEE SLIDER

Test Desc.: Dummy Calibration - Left Knee Slider  
Component: Dummy #065

Test Date: 12-01-01  
Speed: 8.89 FT/SEC, 2.71 M/SEC

— 1 FORCE, D01768FC.F05

Ymin = -2.74 kN @ 20.0198 mm, Ymax = .53 kN @ -0.0967 mm



# Hybrid III Calibration Data Sheet

## 50<sup>th</sup> Percentile Male

### External Measurements

ATD Serial No.: 065

Test I.D.: D01176

| External Measurement Data             |       |               |        |           |
|---------------------------------------|-------|---------------|--------|-----------|
| Tested Parameter                      | Units | Specification | Result | Pass/Fail |
| Laboratory Temperature                | °C    | 20.4 to 22.1  | 21.4   | Pass      |
| Laboratory Relative Humidity          | %     | 10 to 70      | 36     | Pass      |
| A – Total sitting height              | mm    | 879 to 889    | 884    | Pass      |
| B – Shoulder pivot height             | mm    | 506 to 521    | 511    | Pass      |
| C – “H” point height                  | mm    | 84 to 89      | 86     | Pass      |
| D – “H” point from seat back          | mm    | 135 to 140    | 137    | Pass      |
| E – Shoulder pivot from back          | mm    | 84 to 94      | 89     | Pass      |
| F – Thigh clearance                   | mm    | 140 to 155    | 145    | Pass      |
| G – Elbow back to wrist pivot         | mm    | 290 to 305    | 292    | Pass      |
| H – Skull cap to back line            | mm    | 41 to 46      | 43     | Pass      |
| I – Shoulder to elbow length          | mm    | 330 to 345    | 335    | Pass      |
| J – Elbow rest height                 | mm    | 191 to 211    | 196    | Pass      |
| K – Buttock to knee length            | mm    | 579 to 605    | 589    | Pass      |
| L – Popliteal length                  | mm    | 429 to 455    | 442    | Pass      |
| M – Knee pivot height                 | mm    | 485 to 500    | 495    | Pass      |
| N – Buttock popliteal length          | mm    | 452 to 478    | 467    | Pass      |
| O – Chest depth                       | mm    | 213 to 229    | 221    | Pass      |
| P – Foot breadth                      | mm    | 252 to 267    | 262    | Pass      |
| V – Shoulder breadth                  | mm    | 422 to 437    | 424    | Pass      |
| W – Foot length                       | mm    | 91 to 107     | 99     | Pass      |
| Y – Chest circumference               | mm    | 970 to 1001   | 985    | Pass      |
| Z – Waist circumference               | mm    | 836 to 866    | 856    | Pass      |
| AA – Location for chest circumference | mm    | 429 to 434    | 432    | Pass      |
| BB – Location for waist circumference | mm    | 226 to 231    | 229    | Pass      |
| Overall Test Results                  |       |               |        | Pass      |

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**Hybrid III Calibration Data Sheet**  
**50<sup>th</sup> Percentile Male**  
**Left Knee Impact Test**

ATD Serial No.: 066

Test I.D.: D011776

| Tested Parameter             | Units   | Specification | Result | Pass/Fail |
|------------------------------|---------|---------------|--------|-----------|
| Laboratory Temperature       | °C      | 18.9 to 25.5  | 22.0   | Pass      |
| Laboratory Relative Humidity | %       | 10 to 70      | 32     | Pass      |
| Probe Velocity               | m/s     | 2.07 to 2.13  | 2.11   | Pass      |
| Peak Probe Force             | Newtons | 4715 to 5782  | 5145   | Pass      |
| Overall Test Results         |         |               |        | Pass      |

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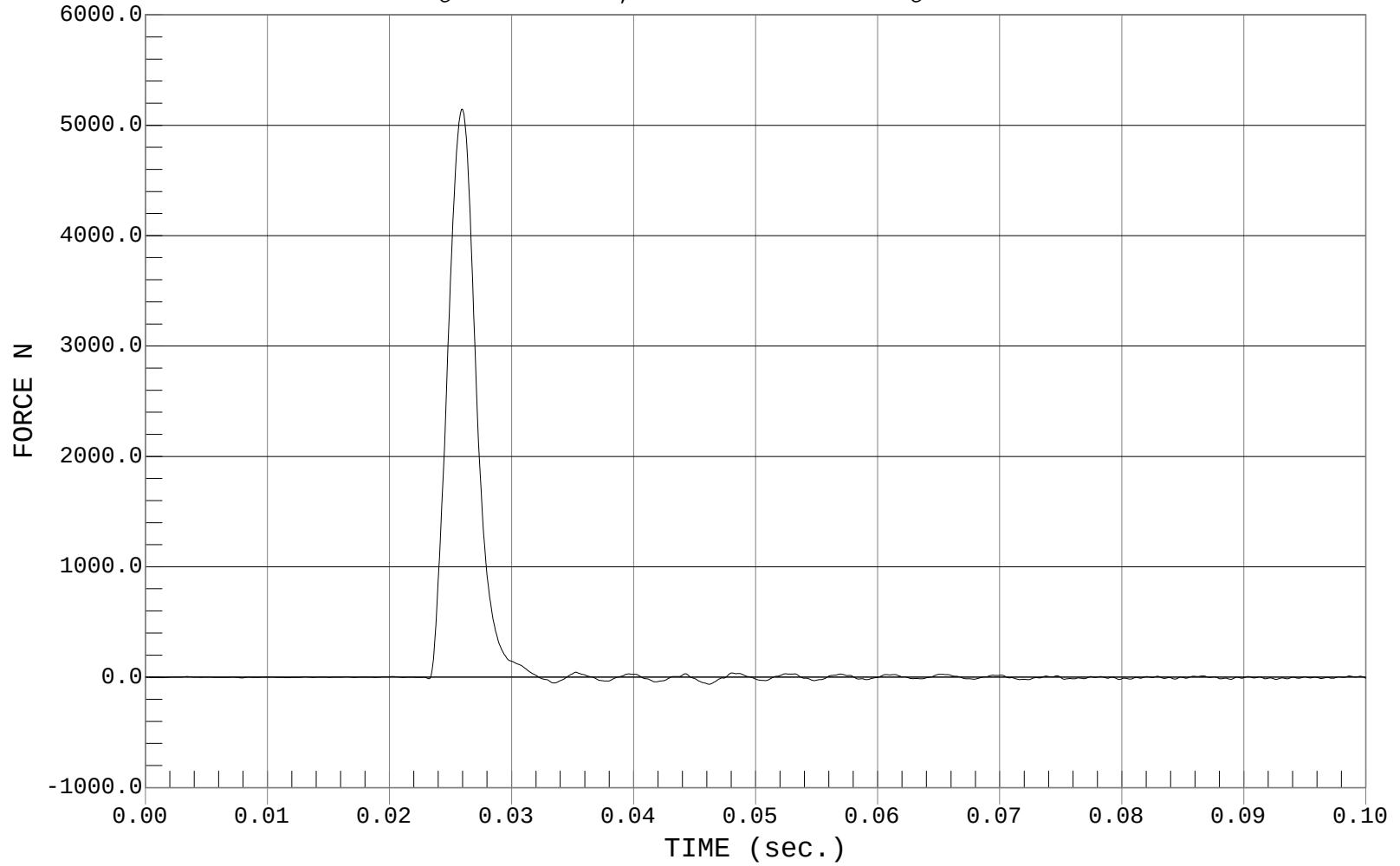
# LEFT KNEE IMPACT

Test Desc.: Dummy Calibration - Left Knee Impact  
Component: Dummy #066

Test Date: 11-28-01  
Speed: 6.92 FT/SEC, 2.11 M/SEC

— 1 FORCE, D01776FF.F09

Ymin = -63.27 N @ 0.0462 sec., Ymax = 5145.04 N @ 0.0259 sec.



# Hybrid III Calibration Data Sheet

50<sup>th</sup> Percentile Male

Right Knee Impact Test

ATD Serial No.: 066

Test I.D.: D011775

| Tested Parameter             | Units   | Specification | Result | Pass/Fail |
|------------------------------|---------|---------------|--------|-----------|
| Laboratory Temperature       | °C      | 18.9 to 25.5  | 22.0   | Pass      |
| Laboratory Relative Humidity | %       | 10 to 70      | 32     | Pass      |
| Probe Velocity               | m/s     | 2.07 to 2.13  | 2.11   | Pass      |
| Peak Probe Force             | Newtons | 4715 to 5782  | 5193   | Pass      |
| Overall Test Results         |         |               |        | Pass      |

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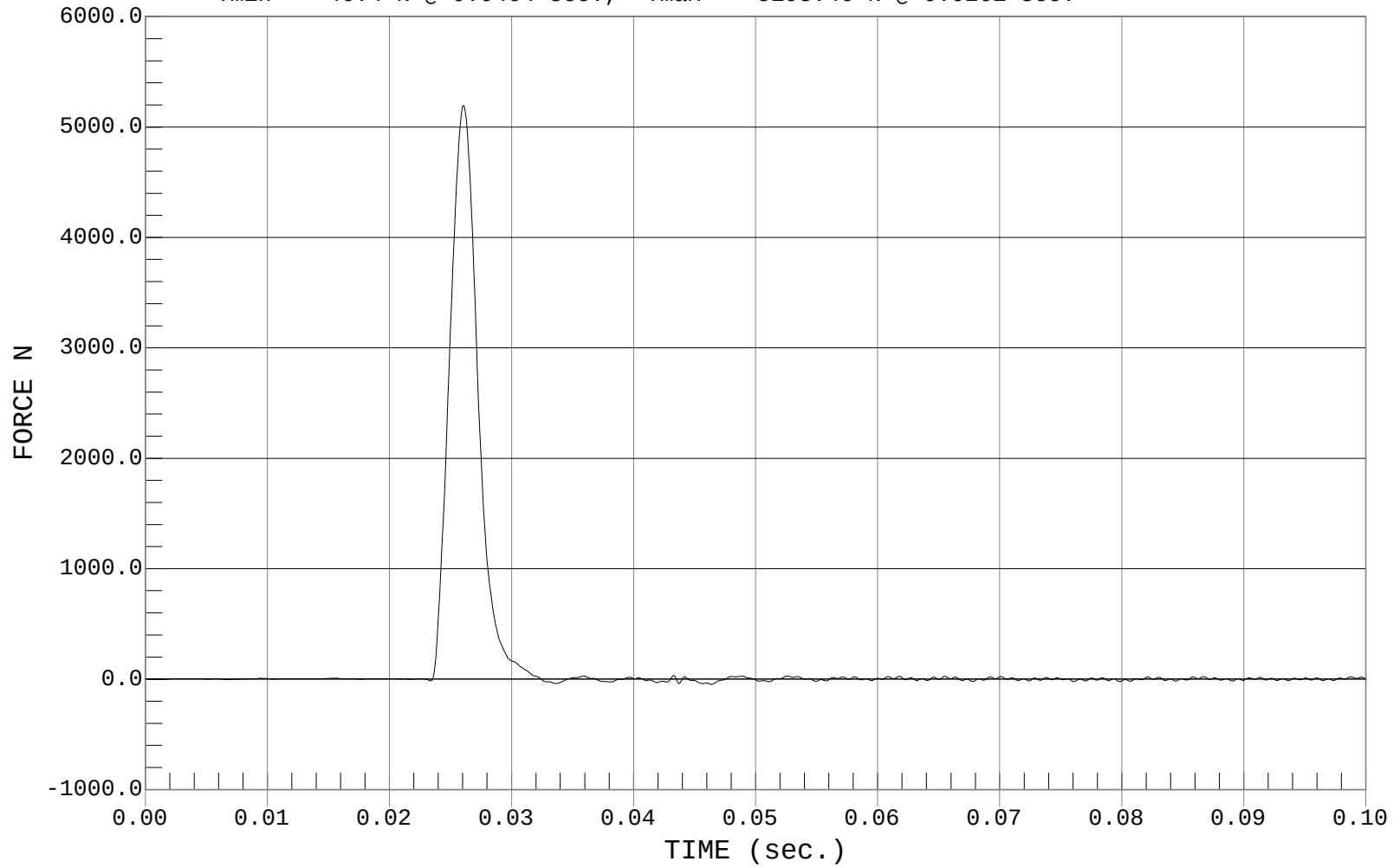
## RIGHT KNEE IMPACT

Test Desc.: Dummy Calibration - Right Knee Impact  
Component: Dummy #066

Test Date: 11-28-01  
Speed: 6.93 FT/SEC, 2.11 M/SEC

— 1 FORCE, D01775FF.F09

Ymin = -46.4 N @ 0.0464 sec., Ymax = 5193.46 N @ 0.0261 sec.



**Hybrid III Calibration Data Sheet**  
**50<sup>th</sup> Percentile Male**  
**Head Drop Calibration**

ATD Serial No.: 066

Test I.D.: D011771

| Tested Parameter             | Units  | Specification   | Result | Pass/Fail |
|------------------------------|--------|-----------------|--------|-----------|
| Laboratory Temperature       | °C     | 18.9 to 25.5    | 22.0   | Pass      |
| Laboratory Relative Humidity | %      | 10 to 70        | 33     | Pass      |
| Peak Resultant Acceleration  | G's    | 225.0 to 275.0  | 243.8  | Pass      |
| Peak Probe Force             | G's    | $\leq \pm 15.0$ | 4.0    | Pass      |
| Is Acceleration Unimodal?    | Yes/No | < 10% Peak      | Yes    | Pass      |
| Overall Test Results         |        |                 |        | Pass      |

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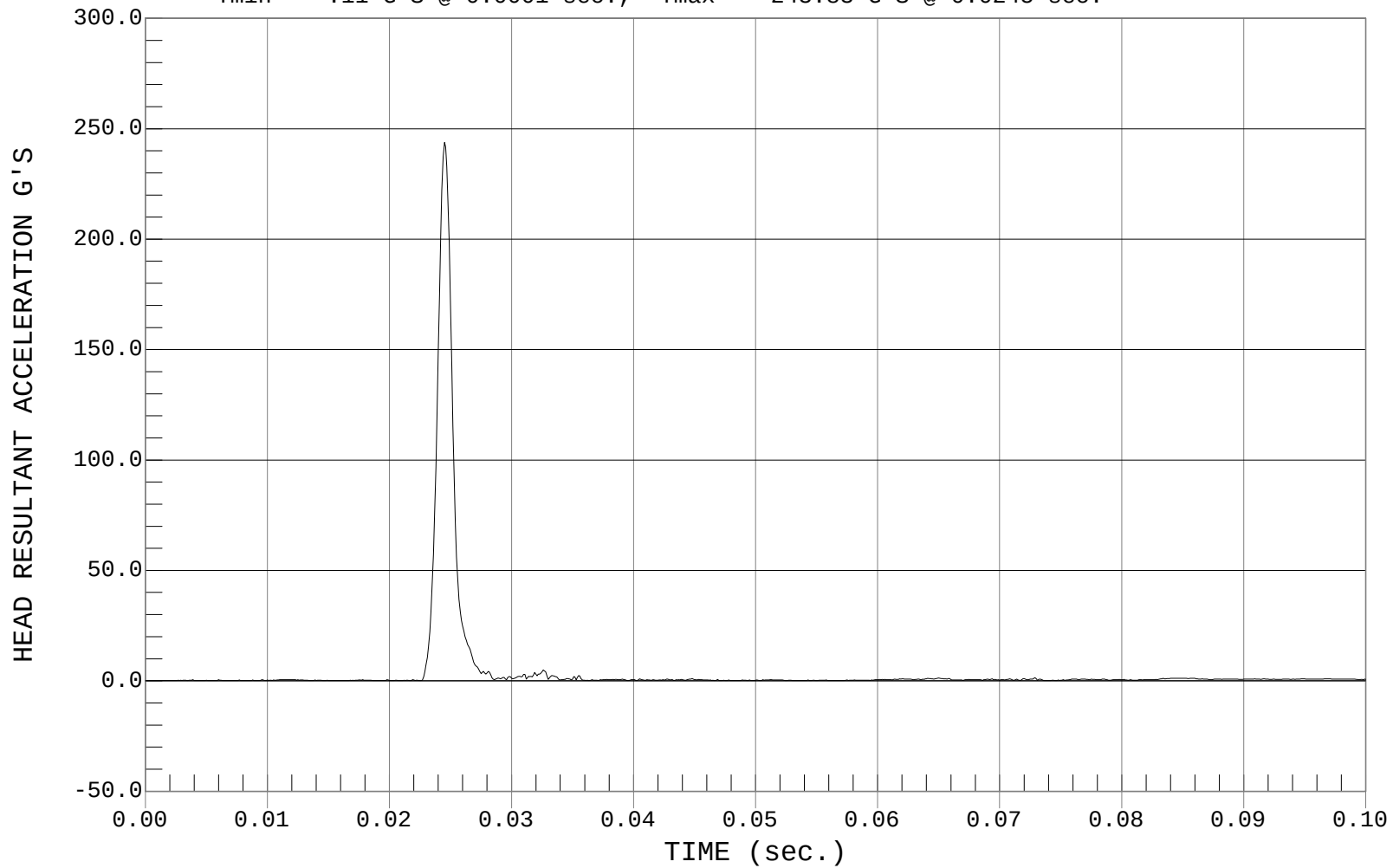
## PEAK RESULTANT ACCELERATION

Test Desc.: Dummy Calibration - Head Drop  
Component: Dummy #066

Test Date: 11-26-01  
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 HEAD RESULTANT ACCELERATION, D01771AV.A01

Ymin = .11 G'S @ 0.0001 sec., Ymax = 243.83 G'S @ 0.0245 sec.





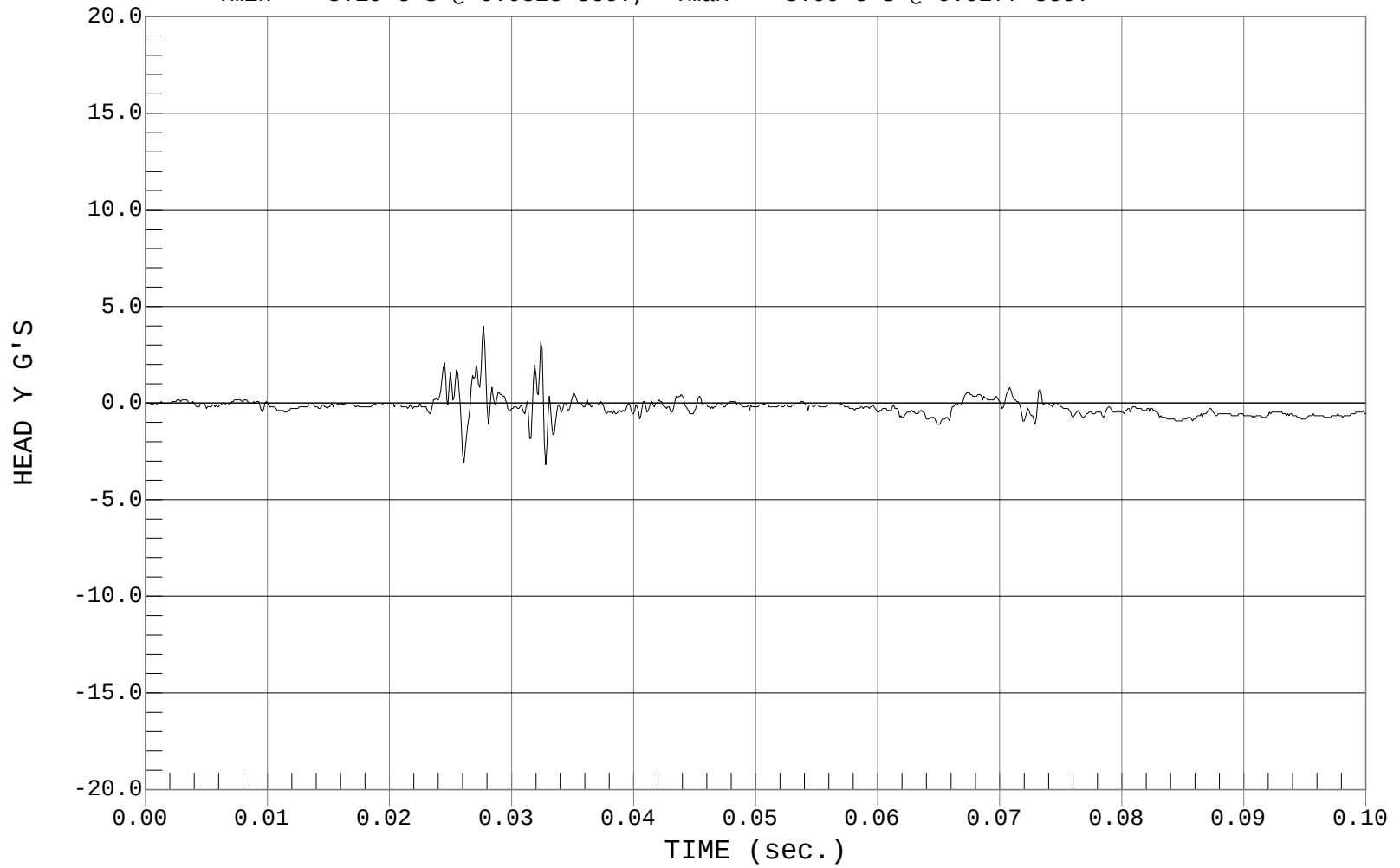
# PEAK LATERAL ACCELARATION

Test Desc.: Dummy Calibration - Head Drop  
Component: Dummy #066

Test Date: 11-26-01  
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 HEAD Y, D01771AR.A02

Ymin = -3.19 G'S @ 0.0328 sec., Ymax = 3.99 G'S @ 0.0277 sec.





**Hybrid III Calibration Data Sheet**  
**50<sup>th</sup> Percentile Male**  
**Thorax Impact Test**

ATD Serial No.: 066

Test I.D.: D011774

| Tested Parameter             | Units   | Specification | Result | Pass/Fail |
|------------------------------|---------|---------------|--------|-----------|
| Laboratory Temperature       | °C      | 20.6 to 22.2  | 21.4   | Pass      |
| Laboratory Relative Humidity | %       | 10 to 70      | 36     | Pass      |
| Probe Velocity               | m/s     | 6.58 to 6.82  | 6.68   | Pass      |
| Peak Probe Force             | Newtons | 5159 to 5893  | 5606   | Pass      |
| Peak Sternum Displacement    | cm      | 6.35 to 7.26  | 6.58   | Pass      |
| Internal Hysteresis          | %       | 69 to 85      | 74     | Pass      |
| Overall Test Results         |         |               |        | Pass      |

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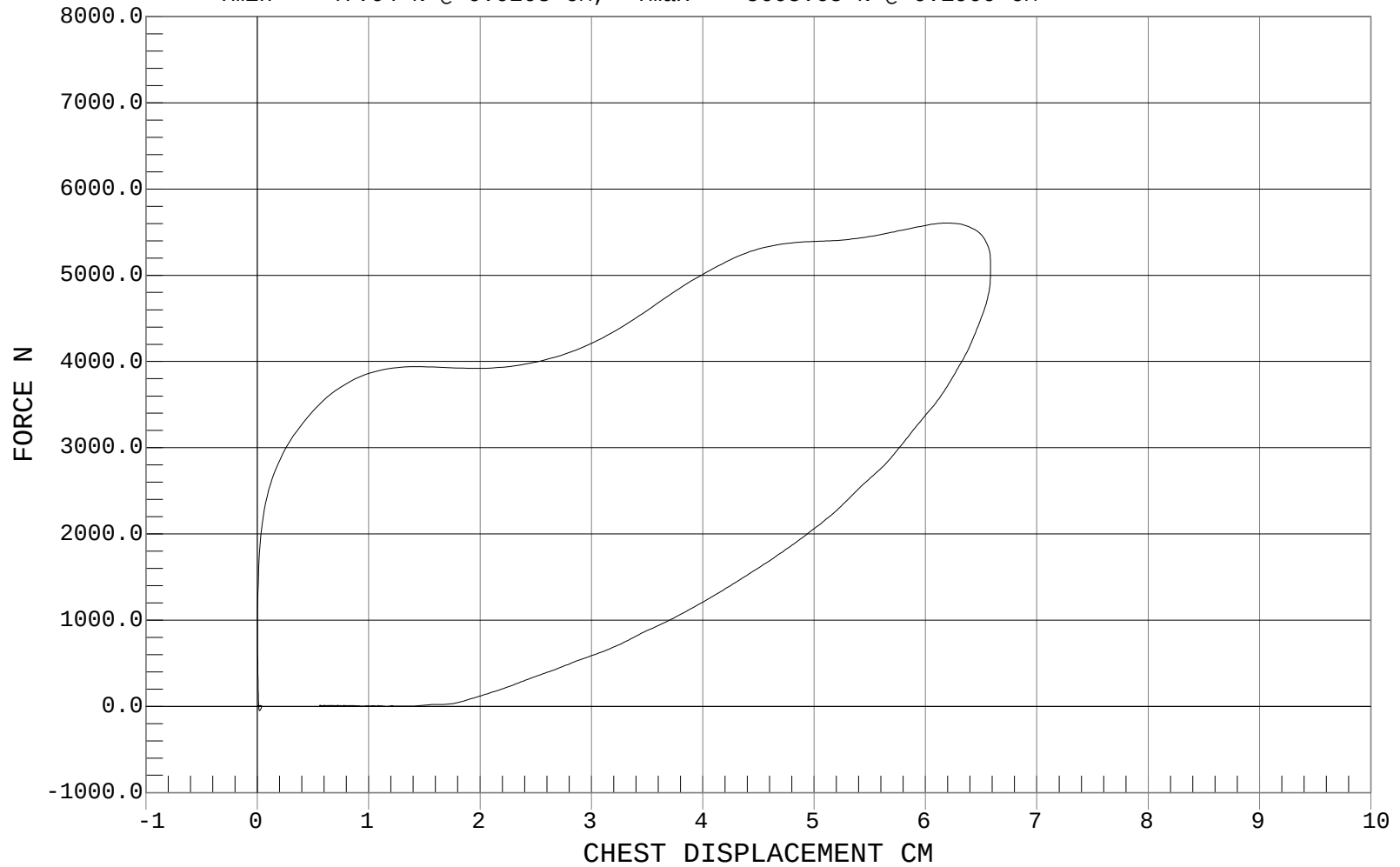
# THORAX IMPACT

Test Desc.: Dummy Calibration - Chest Impact  
Component: Dummy #066

Test Date: 12-03-01  
Speed: 21.93 FT/SEC, 6.68 M/SEC

— 1 FORCE, D01774CH.FVD

Ymin = -47.64 N @ 0.0203 CM, Ymax = 5605.65 N @ 6.1900 CM



**Hybrid III Calibration Data Sheet**  
**50<sup>th</sup> Percentile Male**  
**Neck Flexion Test**

ATD Serial No.: 066

Test I.D.: D011772

| Tested Parameter                               |          | Units   | Specification  | Result | Pass/Fail |
|------------------------------------------------|----------|---------|----------------|--------|-----------|
| Laboratory Temperature                         |          | °C      | 20.6 to 22.2   | 21.4   | Pass      |
| Laboratory Relative Humidity                   |          | %       | 10 to 70       | 32     | Pass      |
| Pendulum Velocity                              |          | m/s     | 6.89 to 7.13   | 7.03   | Pass      |
| Pendulum Deceleration                          | 10 msec. | G's     | 22.50 to 27.50 | 22.87  | Pass      |
|                                                | 20 msec. | G's     | 17.60 to 22.60 | 20.27  | Pass      |
|                                                | 30 msec. | G's     | 12.50 to 18.50 | 17.01  | Pass      |
| Peak Pendulum Decel. After 30 msec.            |          | G's     | ≤29.0          | 17.0   | Pass      |
| Deceleration Decay, Time to Cross 5 G's        |          | msec.   | 34.0 to 42.0   | 36.5   | Pass      |
| Maximum "D" Plane Rotation                     | Maximum  | Degrees | 64.0 to 78.0   | 71.4   | Pass      |
|                                                | Time     | msec.   | 57.0 to 64.0   | 57.2   | Pass      |
| "D" Plane Rotation Decay Time To Zero Crossing |          | msec.   | 113.0 to 128.0 | 115.2  | Pass      |
| Moment About Occipital Condyle                 | Maximum  | N·m     | 84.1 to 108.5  | 97.3   | Pass      |
|                                                | Time     | msec.   | 47.0 to 58.0   | 49.6   | Pass      |
| Positive Moment Decay Time To Zero Crossing    |          | msec.   | 97.0 to 107.0  | 99.8   | Pass      |
| Overall Test Results                           |          |         |                | Pass   |           |

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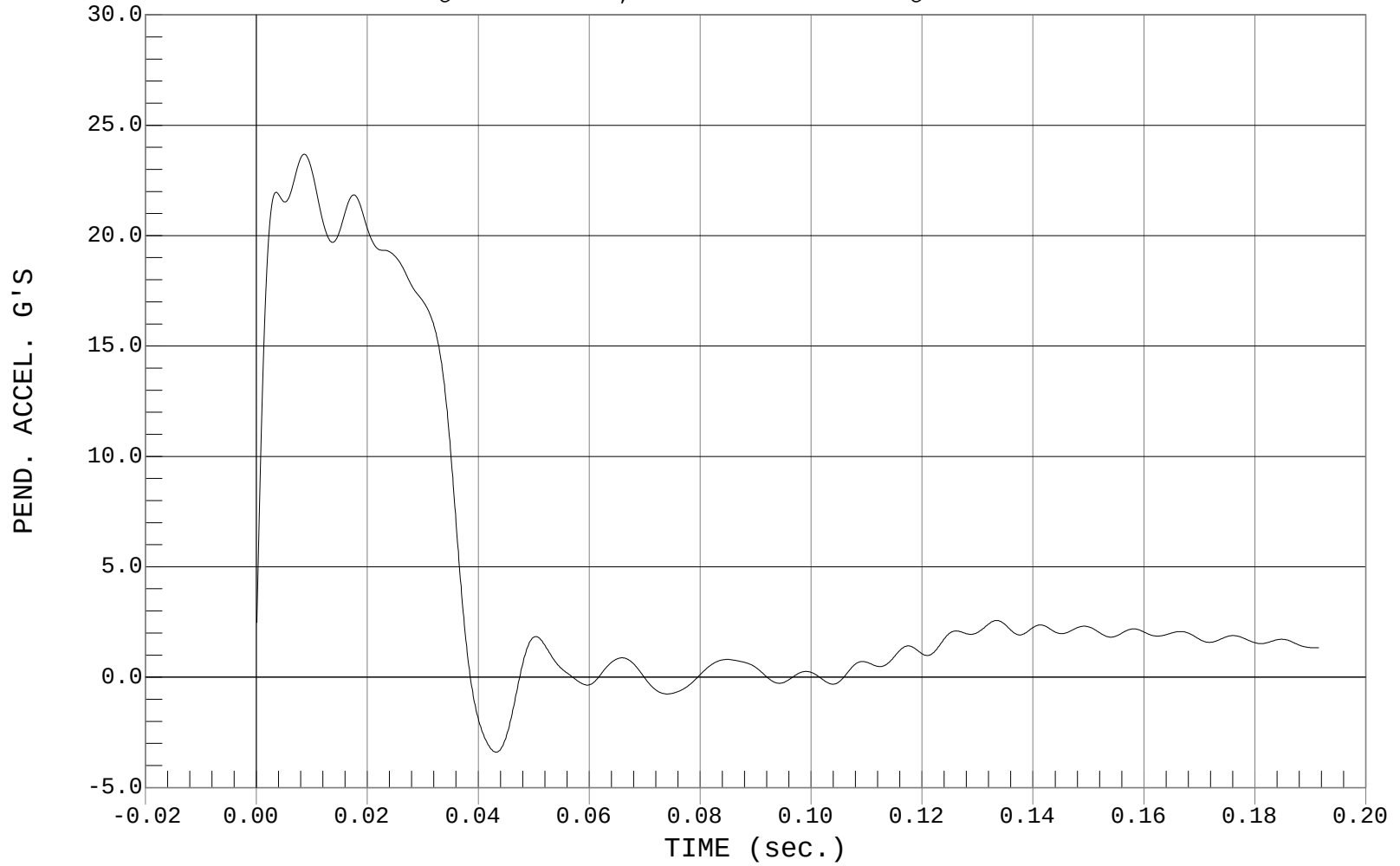
# PENDULUM DECELERATION

Test Desc.: Dummy Calibration - Neck Flexion  
Component: Dummy #066

Test Date: 11-28-01  
Speed: 23.06 FT/SEC, 7.03 M/SEC

— 1 PEND. ACCEL., D01772AF.A04

Ymin = -3.4 G'S @ 0.0432 sec., Ymax = 23.69 G'S @ 0.0086 sec.







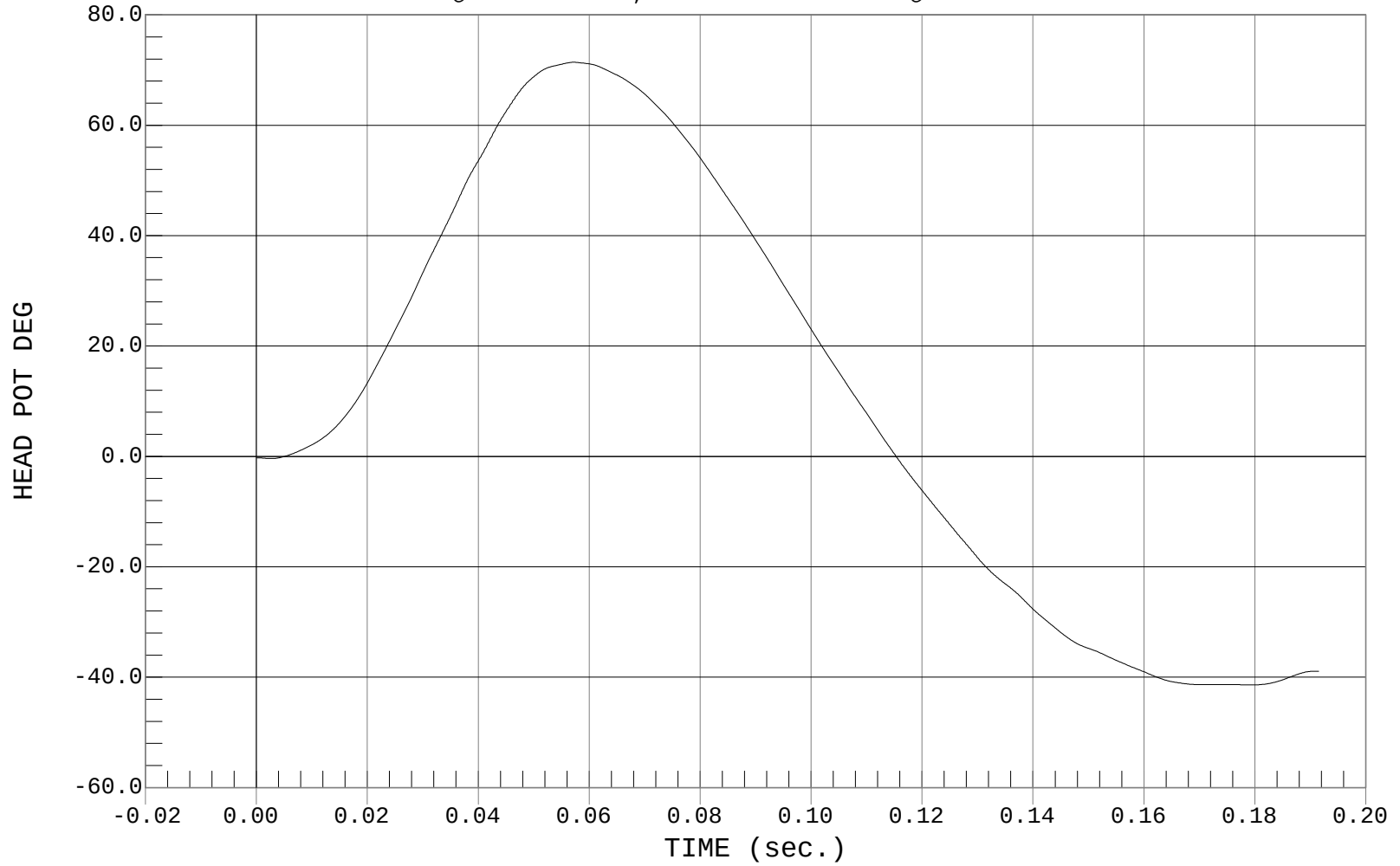
## NECK ROTATION

Test Desc.: Dummy Calibration - Neck Flexion  
Component: Dummy #066

Test Date: 11-28-01  
Speed: 23.06 FT/SEC, 7.03 M/SEC

— 1 HEAD POT, D01772DU.D05

Ymin = -41.4 DEG @ 0.1793 sec., Ymax = 71.4 DEG @ 0.0572 sec.



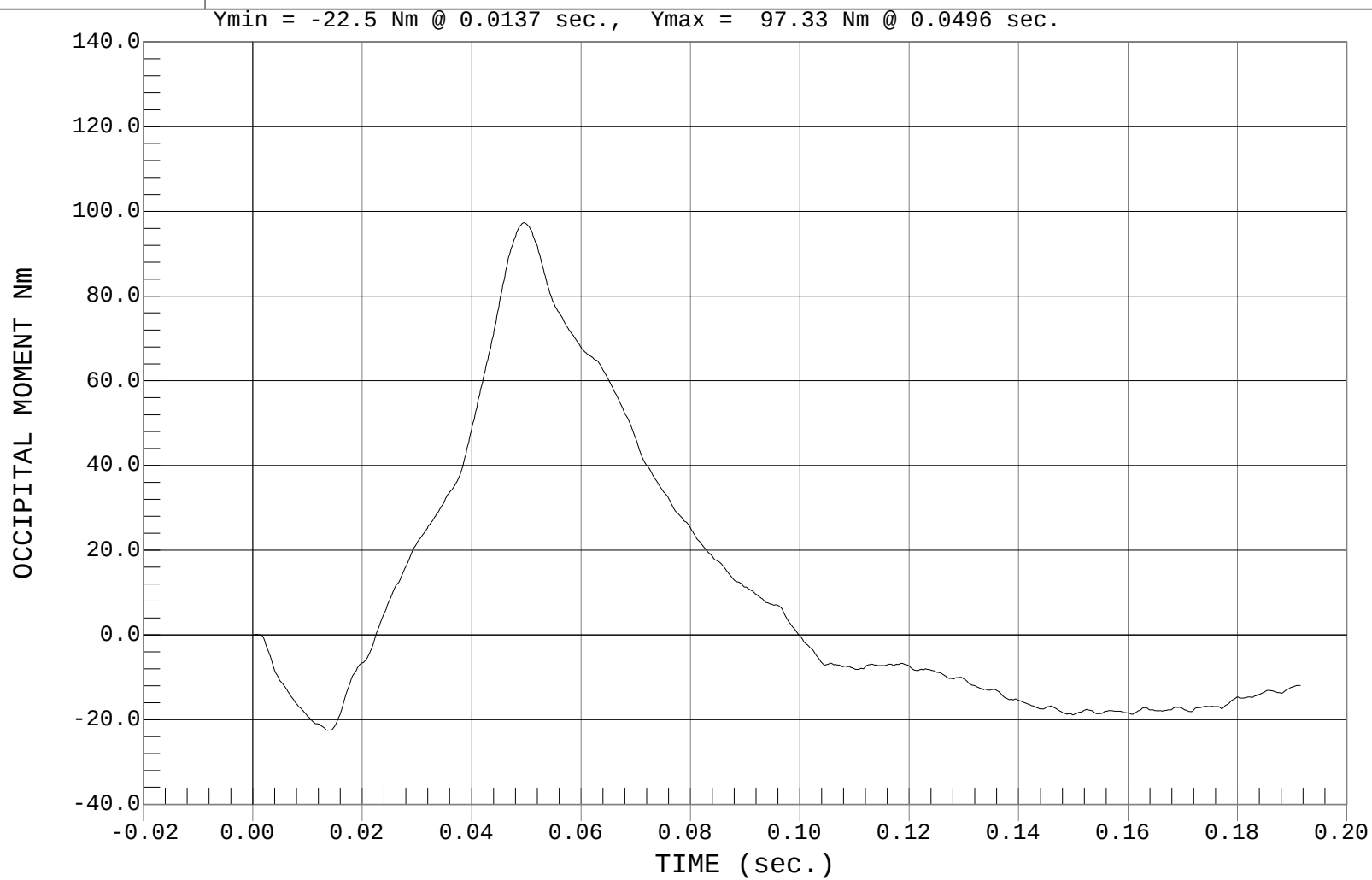


## OCCIPITAL MOMENT

Test Desc.: Dummy Calibration - Neck Flexion  
Component: Dummy #066

Test Date: 11-28-01  
Speed: 23.06 FT/SEC, 7.03 M/SEC

— 1 OCCIPITAL MOMENT, D01772NK.MNT



# Hybrid III Calibration Data Sheet

50<sup>th</sup> Percentile Male

Neck Extension Test

ATD Serial No.: 066

Test I.D.: D011773

| Tested Parameter                               |          | Units   | Specification  | Result | Pass/Fail |
|------------------------------------------------|----------|---------|----------------|--------|-----------|
| Laboratory Temperature                         |          | °C      | 20.6 to 22.2   | 21.4   | Pass      |
| Laboratory Relative Humidity                   |          | %       | 10 to 70       | 32     | Pass      |
| Pendulum Velocity                              |          | m/s     | 5.95 to 6.19   | 6.07   | Pass      |
| Pendulum Deceleration                          | 10 msec. | G's     | 17.20 to 21.20 | 17.29  | Pass      |
|                                                | 20 msec. | G's     | 14.00 to 19.00 | 15.45  | Pass      |
|                                                | 30 msec. | G's     | 11.00 to 16.00 | 13.45  | Pass      |
| Peak Pendulum Deceleration After 30 msec.      |          | G's     | ≤22.0          | 13.5   | Pass      |
| Deceleration Decay Time to Cross 5 G's         |          | msec.   | 38.0 to 46.0   | 41.9   | Pass      |
| Maximum "D" Plane Rotation                     | Maximum  | Degrees | 81.0 to 106.0  | 94.4   | Pass      |
|                                                | Time     | msec.   | 72.0 to 82.0   | 79.0   | Pass      |
| "D" Plane Rotation Decay Time To Zero Crossing |          | msec.   | 147.0 to 174.0 | 159.5  | Pass      |
| Moment About Occipital Condyle                 | Minimum  | N·m     | -52.9 to -79.9 | -57.1  | Pass      |
|                                                | Time     | msec.   | 65.0 to 79.0   | 75.0   | Pass      |
| Negative Moment Decay Time To Zero Crossing    |          | msec.   | 120.0 to 148.0 | 141.2  | Pass      |
| Overall Test Results                           |          |         |                | Pass   |           |

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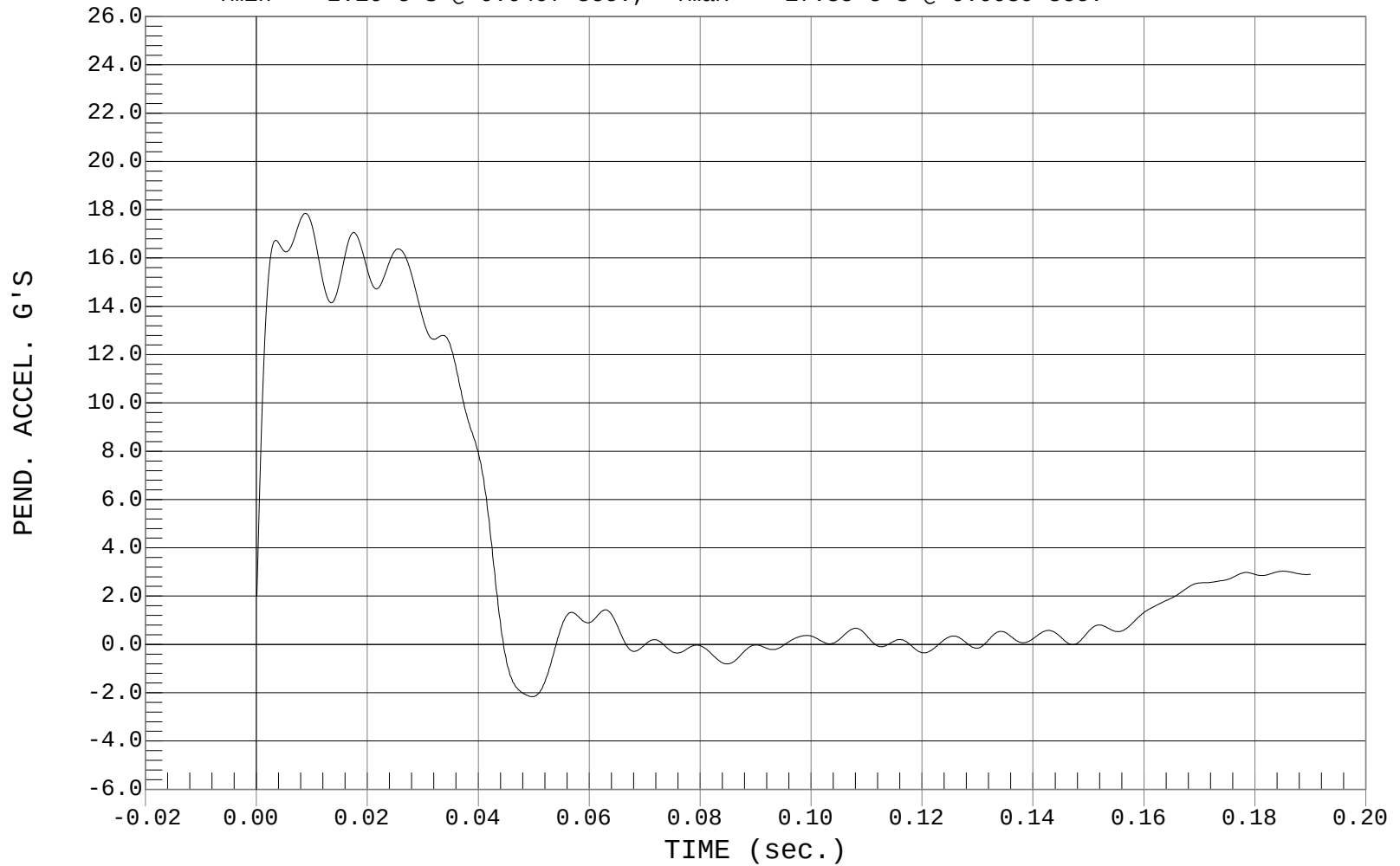
# PENDULUM DECELERATION

Test Desc.: Dummy Calibration - Neck Extension  
Component: Dummy #066

Test Date: 11-28-01  
Speed: 19.91 FT/SEC, 6.07 M/SEC

— 1 PEND. ACCEL., D01773AF.A04

Ymin = -2.16 G'S @ 0.0497 sec., Ymax = 17.85 G'S @ 0.0089 sec.







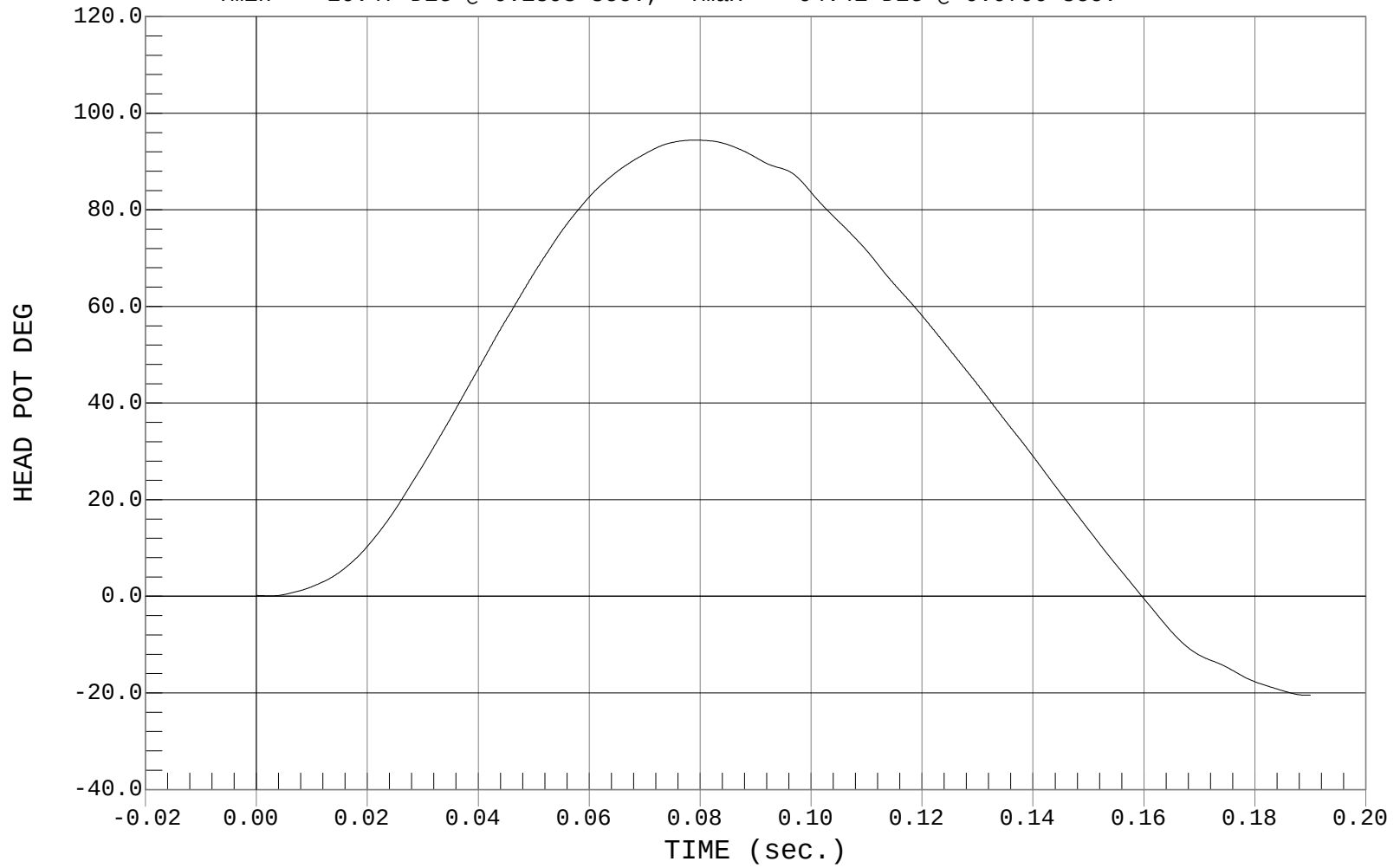
## NECK ROTATION

Test Desc.: Dummy Calibration - Neck Extension  
Component: Dummy #066

Test Date: 11-28-01  
Speed: 19.91 FT/SEC, 6.07 M/SEC

— 1 HEAD POT, D01773DU.D05

Ymin = -20.47 DEG @ 0.1893 sec., Ymax = 94.41 DEG @ 0.0790 sec.





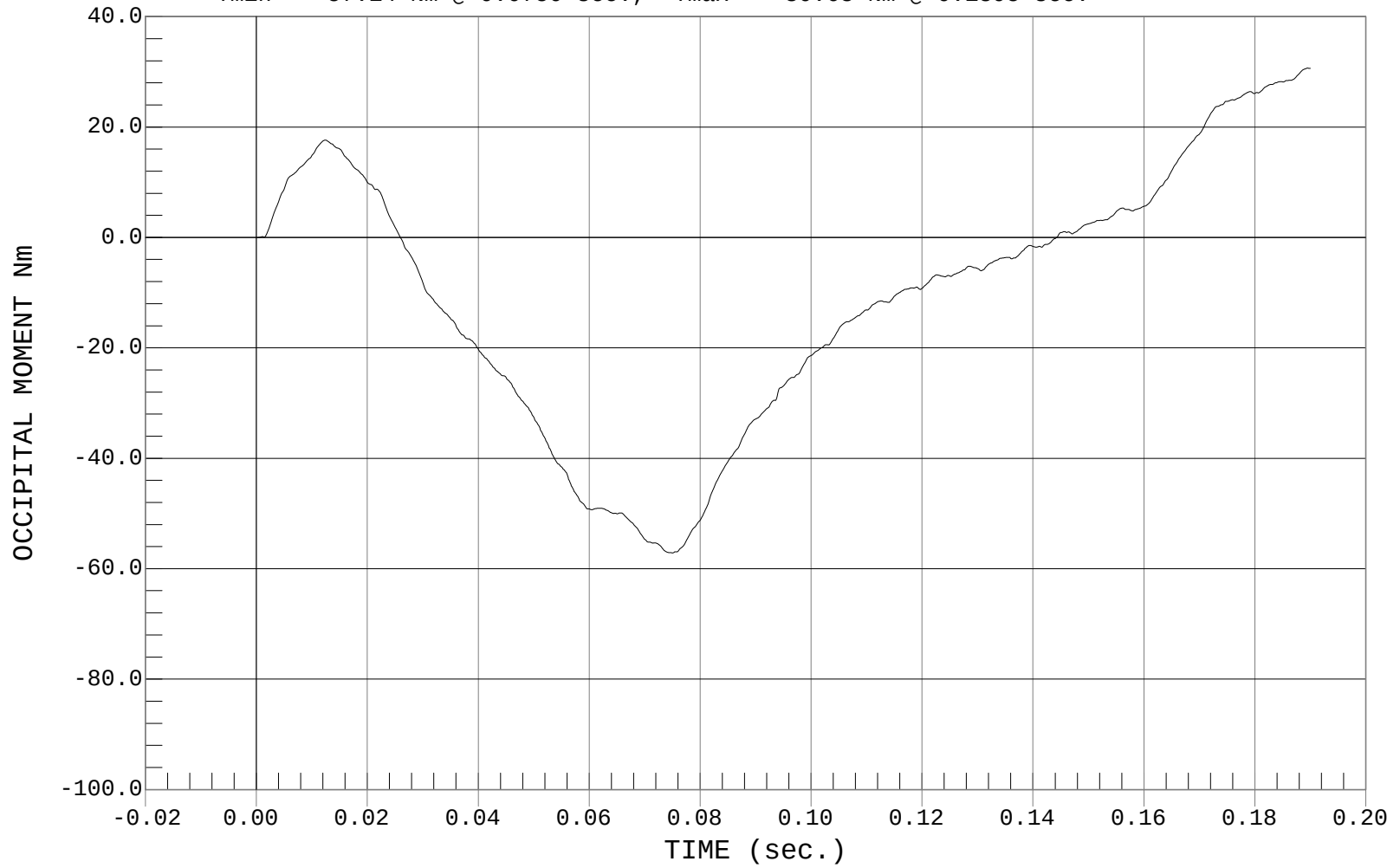
## OCCIPITAL MOMENT

Test Desc.: Dummy Calibration - Neck Extension  
Component: Dummy #066

Test Date: 11-28-01  
Speed: 19.91 FT/SEC, 6.07 M/SEC

— 1 OCCIPITAL MOMENT, D01773NK.MNT

Ymin = -57.14 Nm @ 0.0750 sec., Ymax = 30.68 Nm @ 0.1895 sec.



**Hybrid III Calibration Data Sheet**  
**50<sup>th</sup> Percentile Male**  
**Hip-Femur Flexion Test**

ATD Serial No.: 066

Test I.D.: D011779/0

| Tested Parameter      | Units   | Specification                   | Result |      | Pass/Fail |
|-----------------------|---------|---------------------------------|--------|------|-----------|
|                       |         |                                 | Right  | Left |           |
| Temperature           | °C      | 18.9 to 25.6                    | 21.1   | 21.1 | Pass      |
| Relative Humidity     | %       | 10 to 70                        | 33     | 33   | Pass      |
| Rotation Rate         | deg/sec | 5 – 10                          | Yes    | Yes  | Pass      |
| 30 Degrees            | Nm      | 94.9 Nm Max.                    | 75.8   | 65.7 | Pass      |
| 150 ft-lbf / 203.4 Nm | Deg     | 40 – 50 Degree<br>Max. rotation | 45     | 45   | Pass      |
| Overall Test Results  |         |                                 |        |      | Pass      |

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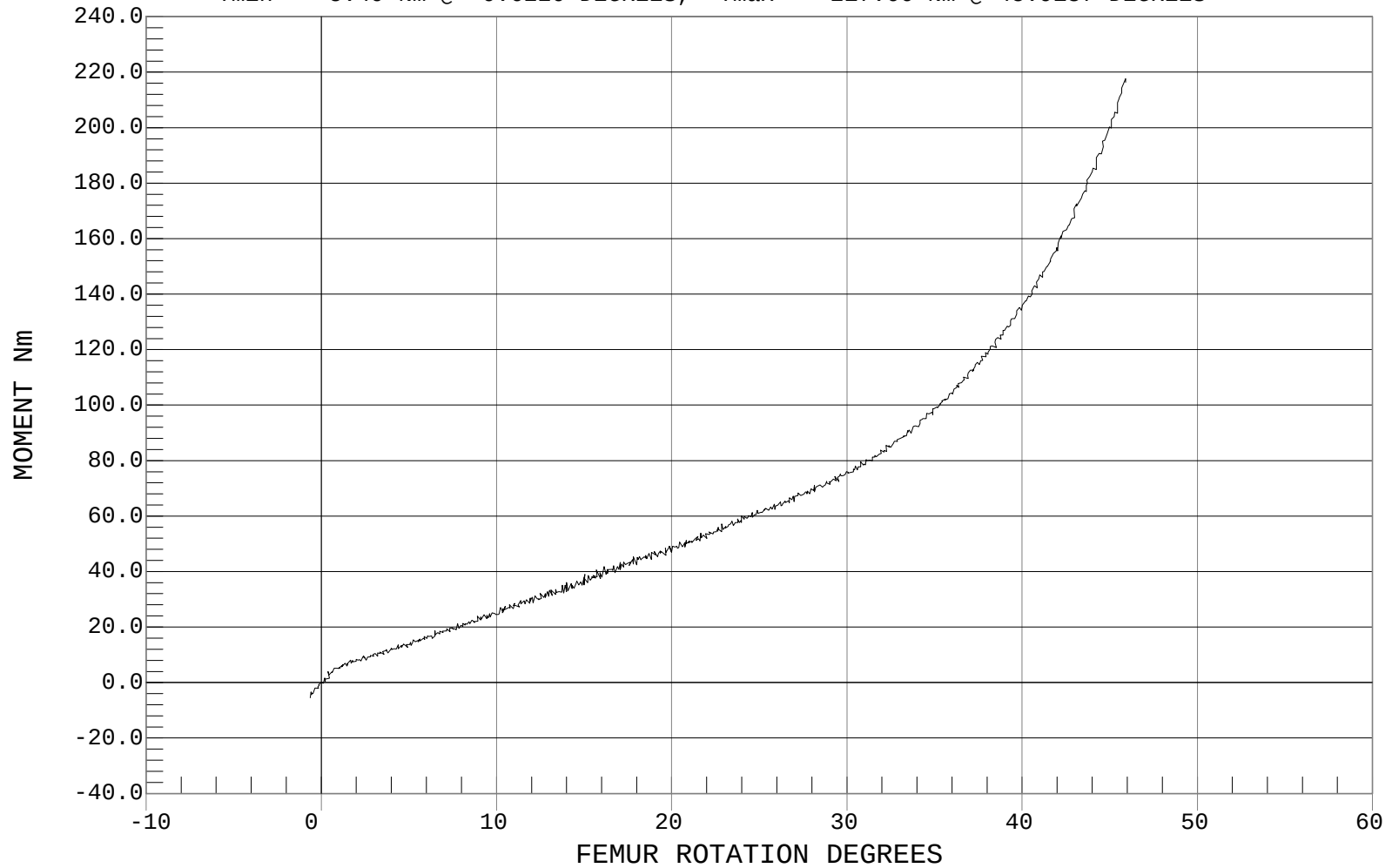
# HIP-FEMUR FLEXION

Test Desc.: DUMMY CALIBRATION - HIP-FEMUR FLEXION  
Component: DUMMY # 066 RIGHT FEMUR

Test Date: 11-29-01  
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 MOMENT, D01779FC.F14

Ymin = -5.49 Nm @ -0.6220 DEGREES, Ymax = 217.66 Nm @ 45.9137 DEGREES







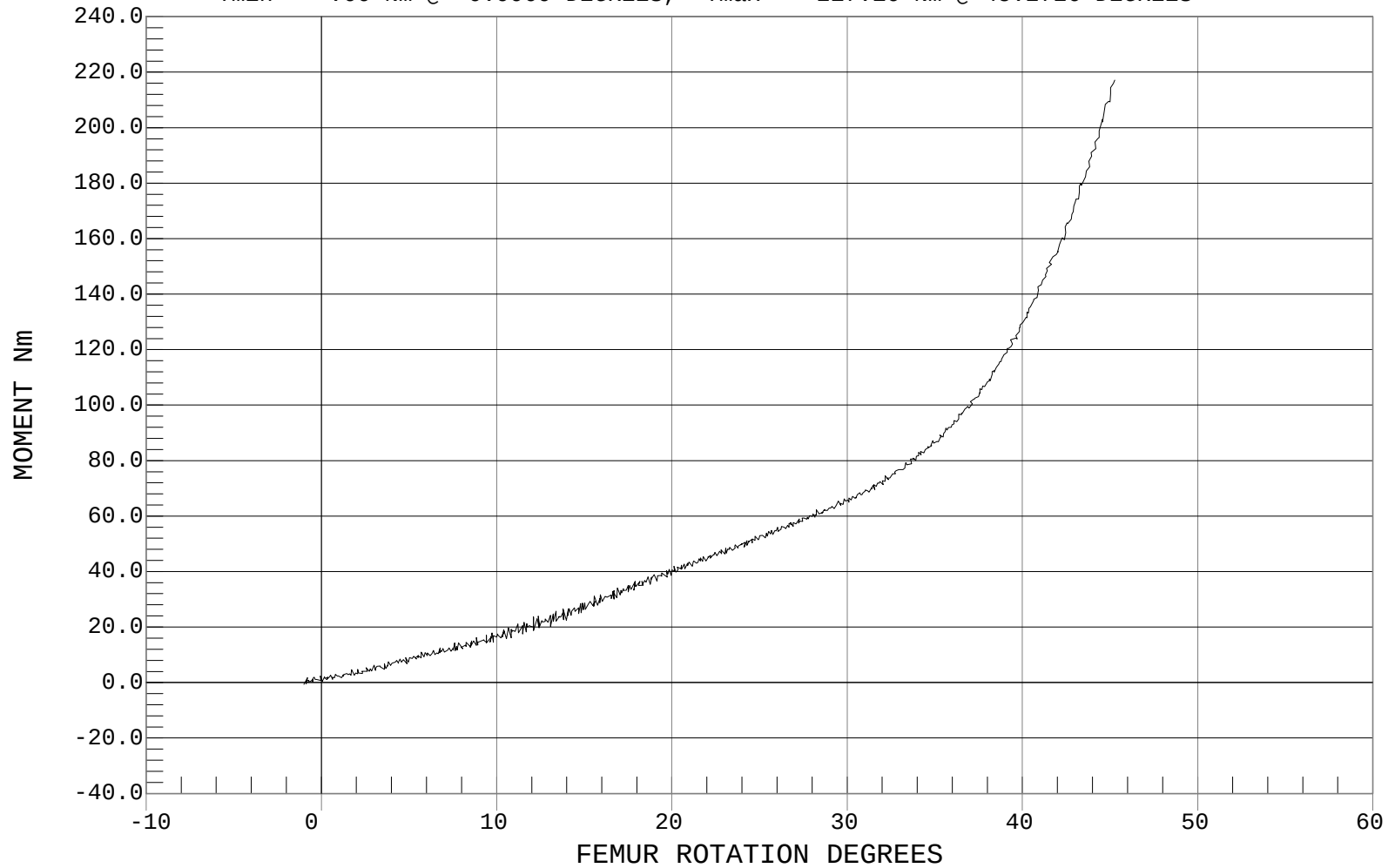
# HIP-FEMUR FLEXION

Test Desc.: DUMMY CALIBRATION - HIP-FEMUR FLEXION  
Component: DUMMY # 066 LEFT FEMUR

Test Date: 11-29-01  
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 MOMENT, D01770FC.F14

Ymin = -.66 Nm @ -0.9909 DEGREES, Ymax = 217.16 Nm @ 45.2726 DEGREES



**Hybrid III Calibration Data Sheet**  
**50<sup>th</sup> Percentile Male**  
**Right Knee Slider**

ATD Serial No.: 066

Test I.D.: D011777

| Tested Parameter     | Units | Specification  | Result | Pass/Fail |
|----------------------|-------|----------------|--------|-----------|
| Temperature          | °C    | 18.9 to 25.6   | 21.1   | Pass      |
| Relative Humidity    | %     | 10 to 70       | 31     | Pass      |
| Velocity             | m/s   | 2.7 – 2.8      | 2.7    | Pass      |
| Impact Force @ 10 mm | kN    | -1.72 to -1.26 | -1.39  | Pass      |
| Impact Force @ 18 mm | kN    | -3.10 to -2.27 | -2.51  | Pass      |
| Overall Test Results |       |                |        | Pass      |

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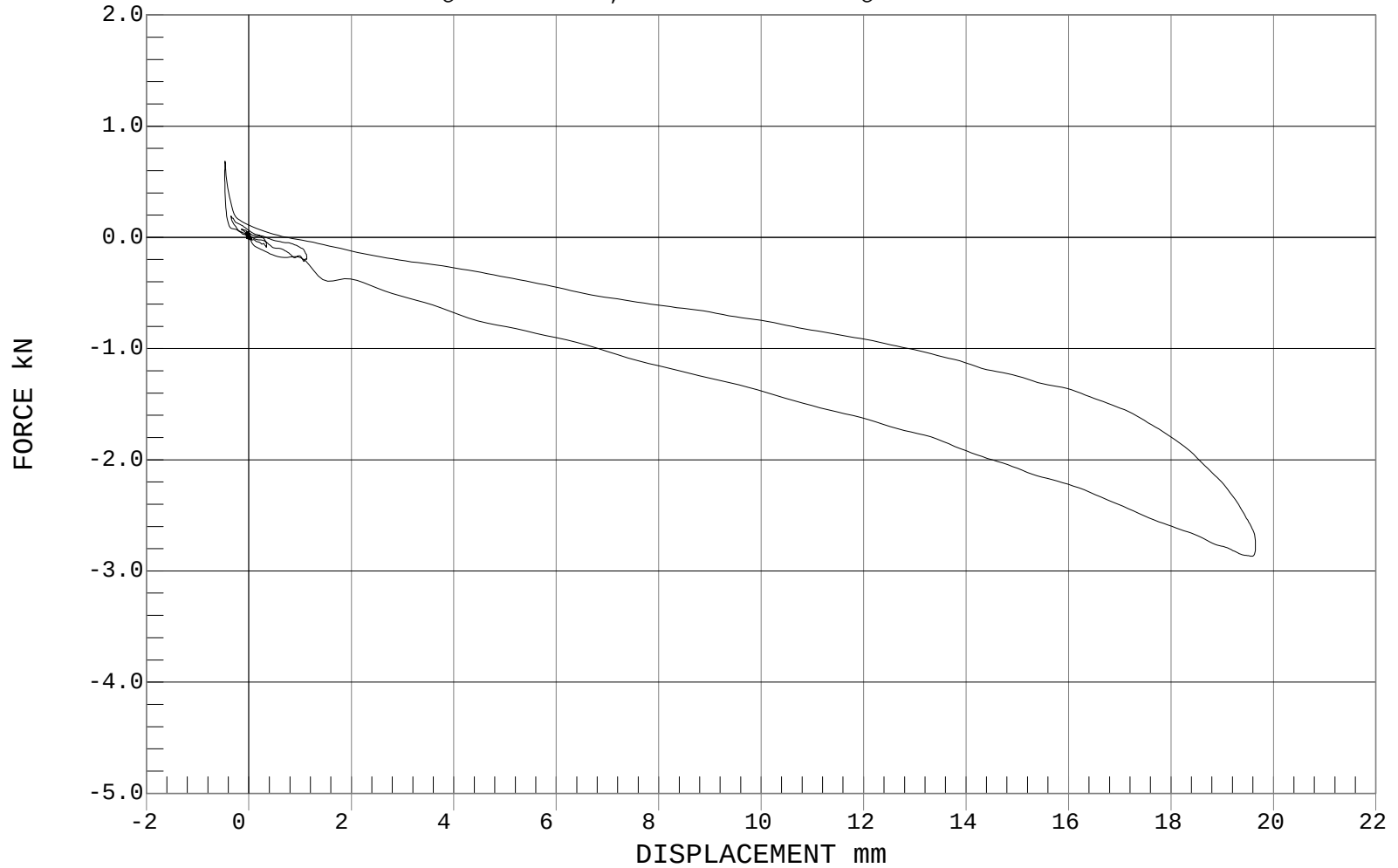
# RIGHT KNEE SLIDER

Test Desc.: Dummy Calibration - Right Knee Slider  
Component: Dummy #066

Test Date: 12-01-01  
Speed: 8.94 FT/SEC, 2.73 M/SEC

— 1 FORCE, D01777FC.F05

Ymin = -2.87 kN @ 19.5847 mm, Ymax = .68 kN @ -0.4638 mm



**Hybrid III Calibration Data Sheet**  
**50<sup>th</sup> Percentile Male**  
**Left Knee Slider**

ATD Serial No.: 066

Test I.D.: D011778

| Tested Parameter     | Units | Specification  | Result | Pass/Fail |
|----------------------|-------|----------------|--------|-----------|
| Temperature          | °C    | 18.9 to 25.6   | 21.1   | Pass      |
| Relative Humidity    | %     | 10 to 70       | 31     | Pass      |
| Velocity             | m/s   | 2.7 – 2.8      | 2.7    | Pass      |
| Impact Force @ 10 mm | kN    | -1.72 to -1.26 | -1.51  | Pass      |
| Impact Force @ 18 mm | kN    | -3.10 to -2.27 | -2.78  | Pass      |
| Overall Test Results |       |                |        | Pass      |

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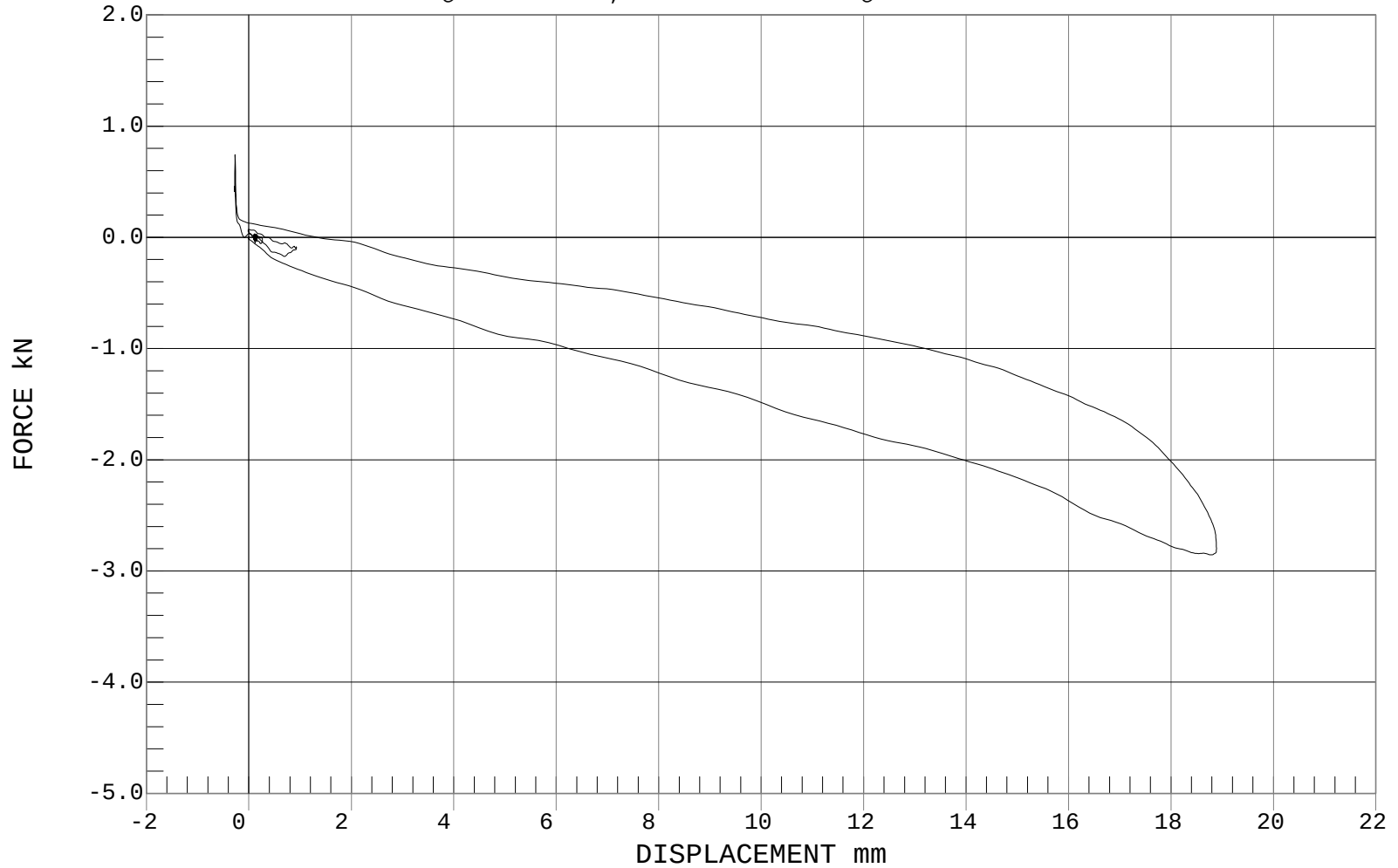
# LEFT KNEE SLIDER

Test Desc.: Dummy Calibration - Left Knee Slider  
Component: Dummy #066

Test Date: 12-01-01  
Speed: 8.99 FT/SEC, 2.74 M/SEC

— 1 FORCE, D01778FC.F05

Ymin = -2.86 kN @ 18.7938 mm, Ymax = .74 kN @ -0.2680 mm



## Hybrid III Calibration Data Sheet

### 50<sup>th</sup> Percentile Male

#### External Measurements

ATD Serial No.: 066

Test I.D.: D01177

| External Measurement Data             |       |               |        |           |
|---------------------------------------|-------|---------------|--------|-----------|
| Tested Parameter                      | Units | Specification | Result | Pass/Fail |
| Laboratory Temperature                | °C    | 20.4 to 22.1  | 21.4   | Pass      |
| Laboratory Relative Humidity          | %     | 10 to 70      | 36     | Pass      |
| A – Total sitting height              | mm    | 879 to 889    | 881    | Pass      |
| B – Shoulder pivot height             | mm    | 506 to 521    | 513    | Pass      |
| C – “H” point height                  | mm    | 84 to 89      | 86     | Pass      |
| D – “H” point from seat back          | mm    | 135 to 140    | 137    | Pass      |
| E – Shoulder pivot from back          | mm    | 84 to 94      | 91     | Pass      |
| F – Thigh clearance                   | mm    | 140 to 156    | 145    | Pass      |
| G – Elbow back to wrist pivot         | mm    | 290 to 305    | 292    | Pass      |
| H – Skull cap to back line            | mm    | 41 to 46      | 43     | Pass      |
| I – Shoulder to elbow length          | mm    | 330 to 345    | 335    | Pass      |
| J – Elbow rest height                 | mm    | 191 to 211    | 196    | Pass      |
| K – Buttock to knee length            | mm    | 579 to 605    | 592    | Pass      |
| L – Popliteal length                  | mm    | 429 to 455    | 445    | Pass      |
| M – Knee pivot height                 | mm    | 485 to 500    | 493    | Pass      |
| N – Buttock popliteal length          | mm    | 452 to 478    | 457    | Pass      |
| O – Chest depth                       | mm    | 213 to 229    | 218    | Pass      |
| P – Foot breadth                      | mm    | 252 to 267    | 264    | Pass      |
| V – Shoulder breadth                  | mm    | 422 to 437    | 427    | Pass      |
| W – Foot length                       | mm    | 91 to 107     | 99     | Pass      |
| Y – Chest circumference               | mm    | 970 to 1001   | 988    | Pass      |
| Z – Waist circumference               | mm    | 836 to 866    | 859    | Pass      |
| AA – Location for chest circumference | mm    | 429 to 434    | 432    | Pass      |
| BB – Location for waist circumference | mm    | 226 to 231    | 229    | Pass      |
| Overall Test Results                  |       |               |        | Pass      |

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## **APPENDIX D**

### **TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION**

# INSTRUMENTS FOR DRIVER DUMMY NO. 065

|                            | SERIAL NO. | MANUFACTURER | CALIBRATION DATE |
|----------------------------|------------|--------------|------------------|
| Head X                     | ACCY6      | Endevco      | 11/14/01         |
| Head Y                     | J13941     | Endevco      | 10/2/01          |
| Head Z                     | AAMW5      | Endevco      | 11/14/01         |
| Head Y – Front             | J20165     | Endevco      | 11/15/01         |
| Head Z – Front             | J28708     | Endevco      | 11/15/01         |
| Head X – Left              | J27513     | Endevco      | 11/15/01         |
| Head Z – Left              | J23946     | Endevco      | 11/15/01         |
| Head X – Upper             | J20580     | Endevco      | 11/15/01         |
| Head Y - Upper             | J23914     | Endevco      | 11/15/01         |
| Head X Redundant           | J18724     | Endevco      | 11/15/01         |
| Head Y Redundant           | J14235     | Endevco      | 11/15/01         |
| Head Z Redundant           | AJ5R0      | Endevco      | 11/15/01         |
| Neck Load Cell             | 442        | Denton       | 9/7/01           |
| Chest X                    | ACC78      | Endevco      | 11/14/01         |
| Chest Y                    | ACCE6      | Endevco      | 11/14/01         |
| Chest Z                    | ACCY3      | Endevco      | 11/14/01         |
| Chest Deflection Gauge     | 065        | Servo        | 11/28/01         |
| Chest X Redundant          | J19927     | Endevco      | 11/15/01         |
| Chest Y Redundant          | J14674     | Endevco      | 11/15/01         |
| Chest Z Redundant          | J18736     | Endevco      | 11/15/01         |
| Pelvis X                   | AJ9N4      | Endevco      | 11/16/01         |
| Pelvis Y                   | ALFL9      | Endevco      | 11/16/01         |
| Pelvis Z                   | AJ808      | Endevco      | 11/16/01         |
| Left Femur Load Cell       | 260        | Denton       | 11/30/01         |
| Right Femur Load Cell      | 259        | Denton       | 11/30/01         |
| Left Knee Shear            | 14690      | Denton       | 12/1/01          |
| Right Knee Shear           | 14682      | Denton       | 12/1/01          |
| Left Upper Tibia Load Cell | 105        | Denton       | 11/19/01         |



|                             | SERIAL NO. | MANUFACTURER | CALIBRATION DATE |
|-----------------------------|------------|--------------|------------------|
| Left Lower Tibia Load Cell  | 133        | Denton       | 11/16/01         |
| Right Upper Tibia Load Cell | 103        | Denton       | 11/19/01         |
| Right Lower Tibia Load Cell | 134        | Denton       | 11/16/01         |
| Left Foot Z – Front         | AJ9F3      | Endevco      | 9/10/01          |
| Left Ankle X                | AJ9D9      | Endevco      | 9/10/01          |
| Left Ankle Z                | AJ9D4      | Endevco      | 9/10/01          |
| Right Foot Z – Front        | AJ9J7      | Endevco      | 11/16/01         |
| Right Ankle X               | AJ819      | Endevco      | 11/16/01         |
| Right Ankle Z               | AJ7A2      | Endevco      | 11/16/01         |
| Shoulder Belt Load Cell     | 195        | Denton       | 11/7/01          |
| Lap Belt Load Cell          | 199        | Denton       | 11/7/01          |
| Belt Stretch Potentiometer  | 01         | Servo        | 12/4/01          |

# INSTRUMENTS FOR PASSENGER DUMMY NO. 066

|                            | SERIAL NO. | MANUFACTURER | CALIBRATION DATE |
|----------------------------|------------|--------------|------------------|
| Head X                     | AAMN8      | Endevco      | 11/14/01         |
| Head Y                     | ACC61      | Endevco      | 11/14/01         |
| Head Z                     | ACCW9      | Endevco      | 11/14/01         |
| Head Y – Front             | APYY3      | Endevco      | 10/2/01          |
| Head Z – Front             | J23774     | Endevco      | 11/15/01         |
| Head X – Left              | J20382     | Endevco      | 11/15/01         |
| Head Z – Left              | J28988     | Endevco      | 11/15/01         |
| Head X – Upper             | J22036     | Endevco      | 11/15/01         |
| Head Y - Upper             | J20569     | Endevco      | 11/15/01         |
| Head X Redundant           | J19884     | Endevco      | 11/15/01         |
| Head Y Redundant           | J21988     | Endevco      | 11/15/01         |
| Head Z Redundant           | J28986     | Endevco      | 11/15/01         |
| Neck Load Cell             | 606        | Denton       | 9/7/01           |
| Chest X                    | ACCY1      | Endevco      | 11/14/01         |
| Chest Y                    | ACCC8      | Endevco      | 11/14/01         |
| Chest Z                    | ACCT7      | Endevco      | 11/14/01         |
| Chest Deflection Gauge     | 066        | Servo        | 11/28/01         |
| Chest X Redundant          | J13541     | Endevco      | 10/2/01          |
| Chest Y Redundant          | J20093     | Endevco      | 11/15/01         |
| Chest Z Redundant          | J19440     | Endevco      | 11/15/01         |
| Pelvis X                   | AJ820      | Endevco      | 8/29/01          |
| Pelvis Y                   | AGTG8      | Endevco      | 8/29/01          |
| Pelvis Z                   | AJ8Y6      | Endevco      | 8/29/01          |
| Left Femur Load Cell       | 262        | Denton       | 11/30/01         |
| Right Femur Load Cell      | 261        | Denton       | 11/30/01         |
| Left Knee Shear            | 13462      | Denton       | 12/1/01          |
| Right Knee Shear           | 18921      | Denton       | 12/1/01          |
| Left Upper Tibia Load Cell | 109        | Denton       | 11/19/01         |

|                             | SERIAL NO. | MANUFACTURER | CALIBRATION DATE |
|-----------------------------|------------|--------------|------------------|
| Left Lower Tibia Load Cell  | 138        | Denton       | 11/16/01         |
| Right Upper Tibia Load Cell | 106        | Denton       | 11/19/01         |
| Right Lower Tibia Load Cell | 135        | Denton       | 11/16/01         |
| Left Foot Z – Front         | AHWK8      | Endevco      | 11/16/01         |
| Left Ankle X                | AH0D1      | Endevco      | 11/16/01         |
| Left Ankle Z                | AH0M0      | Endevco      | 11/16/01         |
| Right Foot Z – Front        | J21612     | Endevco      | 11/16/01         |
| Right Ankle X               | J22034     | Endevco      | 11/16/01         |
| Right Ankle Z               | J21724     | Endevco      | 11/16/01         |
| Shoulder Belt Load Cell     | 197        | Denton       | 11/7/01          |
| Lap Belt Load Cell          | 190        | Denton       | 11/6/01          |
| Belt Stretch Potentiometer  | 02         | Servo        | 12/4/01          |

## INSTRUMENTS FOR VEHICLE AND LABORATORY

|                               | SERIAL NO. | MANUFACTURER | CALIBRATION DATE |
|-------------------------------|------------|--------------|------------------|
| Left Rear Seat Crossmember X  | I12-F12    | Entran       | 10/10/01         |
| Left Rear Seat Crossmember Z  | J10-E12    | Entran       | 9/27/01          |
| Right Rear Seat Crossmember X | E03-H04    | Entran       | 1/16/02          |
| Right Rear Seat Crossmember Z | G1-B07     | Entran       | 1/16/02          |
| Top of Engine X               | K21-N27    | Entran       | 1/17/02          |
| Bottom of Engine X            | K11-J08    | Entran       | 8/8/01           |
| Left Brake Caliper X          | I25-J09    | Entran       | 1/16/02          |
| Right Brake Caliper X         | F04-N05    | Entran       | 1/16/02          |
| Instrument Panel X            | I18-E18    | Entran       | 11/2/01          |

Note: All Endevco accelerometers are Model No. 7264-2000  
All Entran accelerometers are Model No. EGE-72



## **APPENDIX E**

### **VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT INSTRUCTIONS**

## SEAT BELTS

### Seat belt precautions

Lexus strongly urges that the driver and passengers in the vehicle be properly restrained at all times with the seat belts provided. Failure to do so could increase the chance of injury and/or the severity of injury in accidents.

**Child.** Use a child restraint system appropriate for the child until the child becomes large enough to properly wear the vehicle's seat belts. See "Child restraint" on page 129 for details.

If a child is too large for a child restraint system, the child should sit in the rear seat and must be restrained using the vehicle's seat belt. According to accident statistics, the child is safer when properly restrained in the rear seat than in the front seat.

If a child must sit in the front seat, the seat belts should be worn properly. Do not let the child sit on your lap. It does not provide sufficient restraint. If an accident occurs and the seat belts are not worn properly, the force of the rapid inflation of the airbag may cause death or serious injury to the child.

Do not allow the child to stand up or kneel on either rear or front seats. An unrestrained child could suffer serious injury or death during emergency braking or a collision.

**Pregnant woman.** Lexus recommends the use of a seat belt. Ask your doctor for specific recommendations. The lap belt should be worn securely and as low as possible over the hips and not on the waist.

### COMFORT ADJUSTMENT

**Injured person.** Lexus recommends the use of a seat belt. Depending on the injury, first check with your doctor for specific recommendations.

#### CAUTION

Persons should ride in their seats properly wearing their seat belts whenever the vehicle is moving. Otherwise, they are much more likely to suffer serious bodily injury or death in the event of sudden braking or a collision.

When using the seat belts, observe the following:

- Use the belt for only one person at a time. Do not use a single belt for two or more people – even children.
- Avoid reclining the seatbacks too much. The seat belts provide maximum protection when the seatbacks are in the upright position. (See "Adjusting seatback angle" on page 94.)
- Be careful not to damage the belt webbing or hardware. Take care that they do not get caught or pinched in the seat or doors.
- Inspect the belt system periodically. Check for cuts, fraying, and loose parts. Damaged parts should be replaced. Do not disassemble or modify the system.
- Keep the belts clean and dry. If they need cleaning, use a mild soap solution or lukewarm water. Never use bleach, dye, or abrasive cleaners – they may severely weaken the belts. (See "Cleaning the interior" on page 342 for instructions.)

- Replace the belt assembly (including bolts) if it has been used in a severe impact. The entire assembly should be replaced even if damage is not obvious.

#### Fastening front and rear seat belts



Adjust the seat as needed and sit up straight and well back in the seat. To fasten your belt, pull it out of the retractor and insert the tab into the buckle.

You will hear a click when the tab locks into the buckle.

The seat belt length automatically adjusts to your size and the seat position.

The retractor will lock the belt during a sudden stop or on impact. It also may lock if you lean forward too quickly. A slow, easy motion will allow the belt to extend, and you can move around freely.

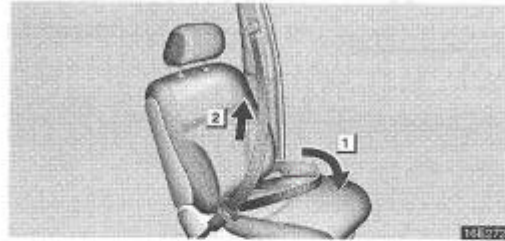
## COMFORT ADJUSTMENT

When a passenger's shoulder belt is completely extended and is then retracted even slightly, the belt is locked in that position and cannot be extended. This feature is used to hold the child restraint system securely. (For details, see "Child restraint" on page 129.) To free the belt again, fully retract the belt and then pull the belt out once more.

If the seat belt cannot be pulled out of the retractor, firmly pull the belt and release it. You will then be able to smoothly pull the belt out of the retractor.

### ⚠ CAUTION

- After inserting the tab, make sure the tab and buckle are locked and that the belt is not twisted.
- Do not insert coins, clips, etc. in the buckle as this may prevent you from properly latching the tab and buckle.
- If the seat belt does not function normally, immediately contact your Lexus dealer. Do not use the seat until the seat belt is fixed. It cannot protect an adult occupant or your child from injury.



Adjust the position of the lap and shoulder belts.

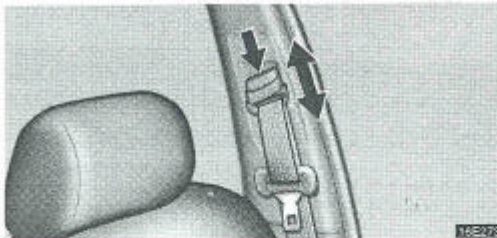
- 1 Position the lap belt as low as possible on your hips – not on your waist.
- 2 Adjust it to a snug fit by pulling the shoulder portion upward through the latch plate.

### ⚠ CAUTION

- Both high-positioned lap belts and loose-fitting belts could cause serious injuries due to sliding under the lap belt during a collision or other unintended result. Keep the lap belt positioned as low on hip as possible.
- For your safety, do not place the shoulder belt under your arm.

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## COMFORT ADJUSTMENT



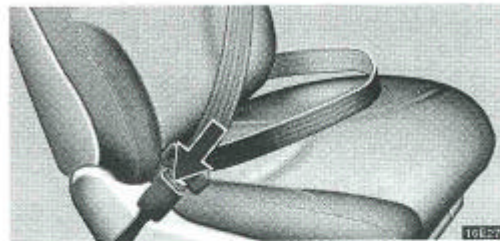
►Front seat belts only

Adjust the shoulder anchor position to your size.

To raise the anchor position, push the anchor up. To lower the anchor position, support the anchor while you push the lock release button then slide the anchor down. After the adjustment, make sure the anchor is locked in position.

### ⚠ CAUTION

Always make sure the shoulder belt is positioned across the center of your shoulder. The belt should be kept away from your neck, but not falling off your shoulder. Failure to do so could reduce the amount of protection in an accident and cause severe injuries in a collision.



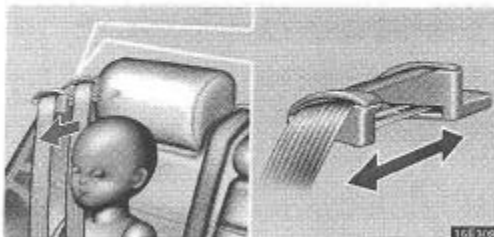
To release the belt, press the buckle release button and allow the belt to retract.

If the belt does not retract smoothly, pull it out and check for kinks or twists. Then make sure it remains untwisted as it retracts.

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## Seat belt comfort guides



The seat belt comfort guides are installed on the outside rear seats to relieve uncomfortableness from the shoulder belt when it is applied closer to a child's neck (at the age of 10 or so), by pulling the shoulder belt a little forward.

Slide the seat belt comfort guide forward to adjust the shoulder belt.

The seat belt comfort guide should not be in the forward position for other purposes.



## CAUTION

Always make sure the shoulder belt is positioned across the center of the child's shoulder. The belt should be kept away from the child's neck, and should not fall off the child's shoulder. Failure to observe these precautions could reduce the effectiveness of the seat belt in an accident, causing death or serious injury.

## Seat belt extender

If your seat belts cannot be fastened securely because it is not long enough, a personalized seat belt extender is available from your Lexus dealer free of charge.

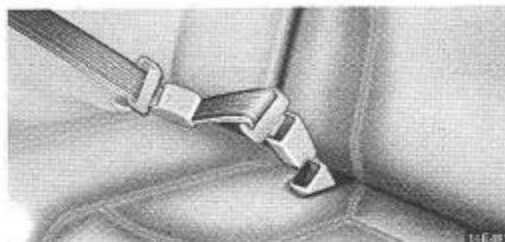
Please contact your local Lexus dealer so that the dealer can order the proper required length for the extender. Bring the heaviest coat you expect to wear for proper measurement and selection of length. Additional ordering information is available at your Lexus dealer.



## CAUTION

When using the seat belt extender, observe the following precautions. Failure to follow these instructions could result in less effectiveness of the seat belt restraint system in case of vehicle accident, increasing the chance of personal injury.

- Never use the seat belt extender if you can fasten the seat belt without it.
- Remember that the extender provided for you may not be safe when used on a different vehicle, or for another person or at a different seating position than the one originally intended for.



To connect the extender to the seat belt, insert the tab into the seat belt buckle so that the "PRESS" signs on the buckle release buttons of the extender and the seat belt are both facing outward as shown.

You will hear a click when the tab locks into the buckle.

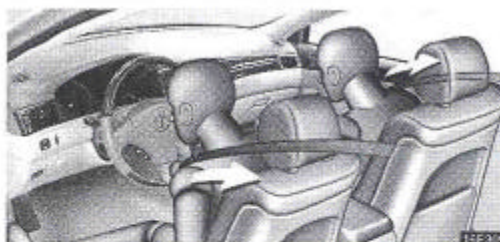
When releasing the seat belt, press on the buckle release button on the extender, not on the seat belt. This helps prevent damage to the vehicle interior and extender itself.

When not in use, remove the extender and store in the vehicle for future use.



 **CAUTION**

- After inserting the tab, make sure the tab and buckle are locked and that the belt is not twisted.
- Do not insert coins, clips, etc. in the buckle as this may prevent you from properly latching the tab and buckle.
- If the seat belt does not function normally, immediately contact your Lexus dealer. Do not use the seat until the seat belt is fixed. It cannot protect an adult occupant or your child from injury.

**Front seat belt pretensioners**

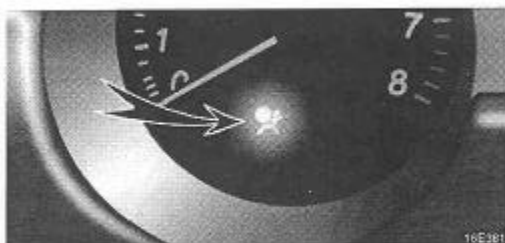
The driver and front passenger's seat belt pretensioners are designed to be activated in response to a severe frontal impact.

When the airbag sensor detects the shock of a severe frontal impact, the front seat belts are quickly drawn back in by the retractors so that the belts snugly restrain the front seat occupants.

The front seat belt pretensioners are activated even with no passenger in the front seat.

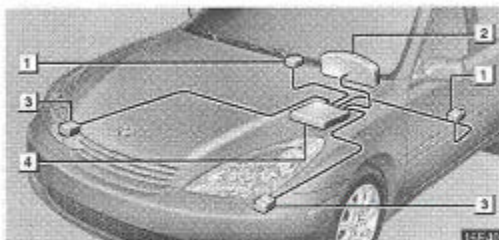
110

## COMFORT ADJUSTMENT



This indicator comes on when the ignition key is turned to the "ON" position. It goes off after about 6 seconds. This means the front seat belt pretensioners are operating properly.

This warning light system monitors the airbag sensor assembly, front airbag sensors, side and curtain shield airbag sensor assemblies, curtain shield airbag sensor assemblies, driver's seat position sensor, driver's seat belt buckle switch, front seat belt pretensioner assemblies, inflators, warning light, interconnecting wiring and power sources. (For details, see "Service reminder indicators and warning buzzers" on page 48 for instructions.)



- ▶ 1 Front seat belt pretensioner assemblies
- 2 SRS warning light
- 3 Front airbag sensors
- 4 Airbag sensor assembly

The front seat belt pretensioner system mainly consists of the above components, and their locations are shown in the illustration.

The front seat belt pretensioners are controlled by the airbag sensor assembly. The airbag sensor assembly consists of a safing sensor and airbag sensor.

When the front seat belt pretensioners are activated, an operating noise may be heard and a small amount of smoke-like gas may be released. This gas is harmless and does not indicate that a fire is occurring.

Once the front seat belt pretensioners have been activated, the seat belt retractors remain locked.

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**CAUTION**

Do not modify, remove, strike or open the front seat belt pretensioner assemblies, airbag sensor or surrounding area or wiring. Doing so may cause sudden operation of the front seat belt pretensioners or disable the system, which could result in death or serious injury.

Failure to follow these instructions can result in death or serious injuries.

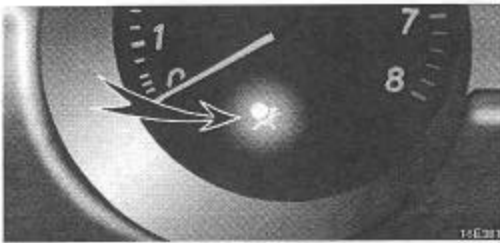
- Attachment of a grille guard (bull bar, kangaroo bar, etc.), snowplow, winches or any other equipment to the front end
- Repair made on or near the front fenders, front end structure or console

**NOTICE**

Do not perform any of the following changes without consulting your Lexus dealer. Such changes can interfere with proper operation of the front seat belt pretensioners in some cases.

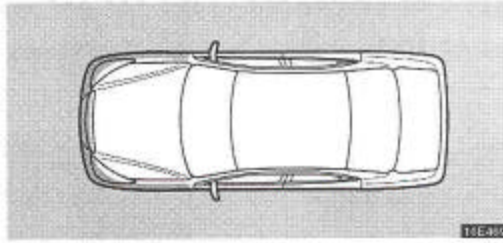
- Installation of electronic devices such as a mobile two-way radio, cassette tape player or compact disc player
- Repairs on or near the front seat belt retractor assemblies
- Modification of the suspension system
- Modification of the front end structure

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This front seat belt pretensioner system has a service reminder indicator to inform the driver of operating problems. If any of the following conditions occurs, this indicates a malfunction of the airbags or pretensioners. Contact your Lexus dealer as soon as possible to service the vehicle.

- The light does not come on when the ignition key is turned to the "ON" position, or the light remains on.
- The light comes on or flashes while driving.
- If either front seat belt does not retract or cannot be pulled out due to a malfunction or activation of the relevant front seat belt pretensioner.



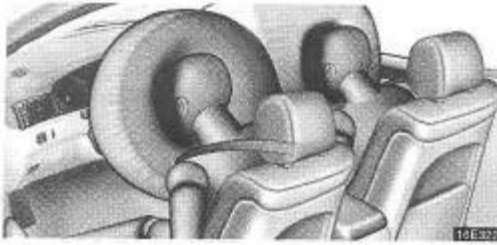
In the following cases, contact your Lexus dealer as soon as possible:

- The front of the vehicle (shaded in the illustration) was involved in an accident that was not severe enough to cause the front seat belt pretensioners to operate.
- Either front seat belt pretensioner assembly or surrounding area is scratched, cracked, or otherwise damaged.

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## SRS AIRBAGS

The SRS (Supplemental Restraint System) airbags are designed to provide further protection for the driver, front passenger and rear outside passengers in addition to the primary safety protection provided by the seat belts.



### ► SRS front airbags

In response to a severe frontal impact, the SRS front airbags work together with the seat belts to help reduce injury by inflating. The SRS front airbags help to reduce injuries mainly to the driver's or front passenger's head or chest caused by directly hitting the steering wheel or dashboard.

The front passenger airbag is activated even with no passenger in the front seat.

Your vehicle is equipped with a crash sensing and diagnostic module, which will record the use of the seat belt restraint system by the driver and front passenger when the SRS front airbags are inflated.

Be sure to wear your seat belt properly.

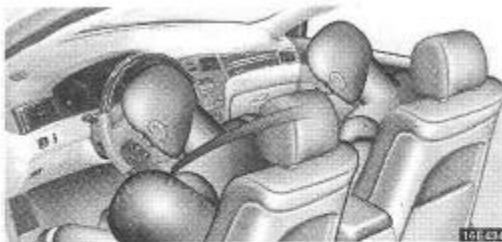


### CAUTION

The driver or front passenger who is too close to the steering wheel or dashboard during airbag deployment can be killed or seriously injured. Lexus strongly recommends that:

- The driver sit as far back as possible from the steering wheel while still maintaining control of the vehicle.
- The front passenger sit as far back as possible from the dashboard.
- All vehicle occupants be properly restrained using the available seat belts.

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### ► SRS side airbags

In response to a severe side impact, the SRS side airbags for the driver or front passenger work together with the seat belts to help reduce injury by inflating. The SRS side airbags help to reduce injuries mainly to the driver's or front passenger's chest.

The SRS side airbag on the passenger seat is activated even with no passenger in the front seat.

Your vehicle is equipped with a crash sensing and diagnostic module, which will record the use of the seat belt restraint system by the driver and front passenger when the SRS side airbags are inflated.

Be sure to wear your seat belt properly.



### CAUTION

SRS side airbags inflate with considerable force. To avoid potential death or serious injury when they inflate, the driver and front passenger must:

- Wear their seat belts properly.
- Remain properly seated with their back upright and against the seat at all times.

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► SRS curtain shield airbags for front and rear outside occupants

In response to a severe side impact, the SRS curtain shield airbag on either side works together with the seat belts by inflating. The SRS curtain shield airbags help to reduce injuries mainly to the driver's head, front passenger's head and rear outside passenger's head.

The SRS curtain shield airbag is activated even with no passenger in the front seat or rear seat.

Your vehicle is equipped with a crash sensing and diagnostic module, which will record the use of the seat belt restraint system by the driver and front passenger when the SRS curtain shield airbags are inflated.

Be sure to wear your seat belt properly.

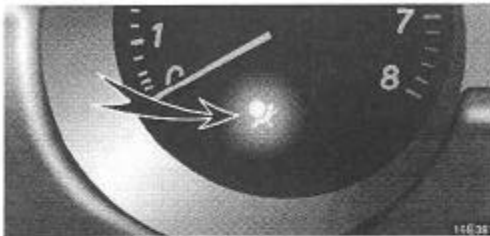


### CAUTION

The SRS curtain shield airbags inflate with considerable force. To avoid potential death or serious injury when they inflate, the driver, front passenger and rear outside passenger must:

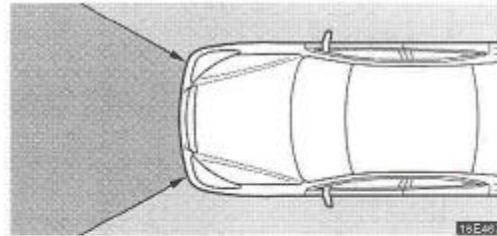
- Wear their seat belts properly.
- Remain properly seated with their back upright and against the seat at all times.

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The indicator comes on when the ignition key is turned to the "ON" position. It goes off after about 6 seconds. This means the SRS airbags are operating properly.

This warning light system monitors the airbag sensor assembly, front airbag sensors, side and curtain shield airbag sensor assemblies, curtain shield airbag sensor assemblies, driver's seat position sensor, driver's seat belt buckle switch, front seat belt pretensioner assemblies, inflators, warning light, interconnecting wiring and power sources. (For details, see "Service reminder indicators and warning buzzers" on page 48 for instructions.)



The SRS front airbag system is designed to activate in response to a severe frontal impact within the shaded area between the arrows in the illustration.

The SRS front airbags will deploy if the severity of the impact is above the designed threshold level, comparable to an approximate 25 km/h (15 mph) collision when impacting straight into a fixed barrier that does not move or deform.

If the severity of the impact is below the above threshold level, the SRS front airbags may not deploy.

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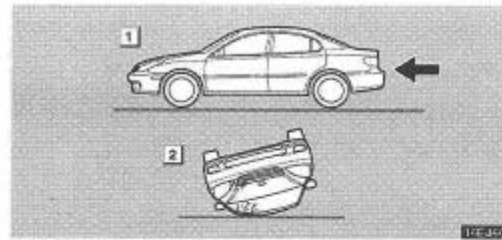


## COMFORT ADJUSTMENT

However, this threshold velocity will be considerably higher if the vehicle strikes an object, such as a parked vehicle or sign pole, which can move or deform on impact, or if it is involved in an underride collision (e.g. a collision in which the nose of the vehicle "underrides", or goes under, the bed of a truck, etc.).

It is possible that in some collisions at the lower zone of airbag sensor detection and activation the SRS airbags and seat belt pretensioners will not operate all together.

For the safety of all occupants, always wear your seat belts properly.



- 1 Collision from the rear
- 2 Vehicle rollover

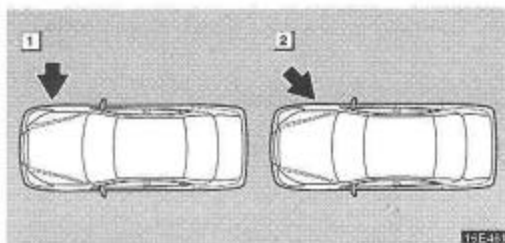
The SRS front airbags are not designed to inflate if the vehicle is involved in a rear collision, if it rolls over, or if it is involved in a low-speed frontal collision.

The SRS side and curtain shield airbags are designed to inflate when the passenger compartment gets a severe collision from the side.

The SRS side and curtain shield airbags may rather not to activate in the impact in which the occupant wearing the seat belt correctly would not get serious injury.

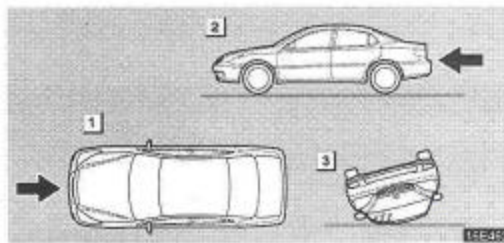
118

## COMFORT ADJUSTMENT



- 1 Collision from the side to the vehicle body other than the passenger compartment
- 2 Collision from the side at an angle

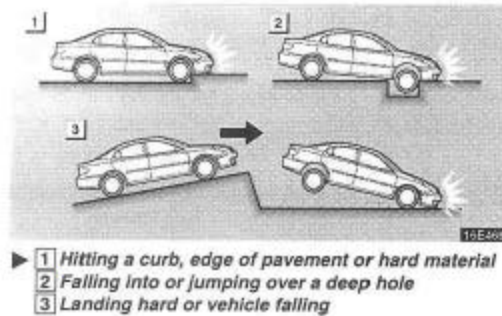
The SRS side and curtain shield airbag system may not activate if the vehicle is subjected to a collision from the side at certain angles, or a collision to the side of the vehicle body other than the passenger compartment as shown in the illustration.



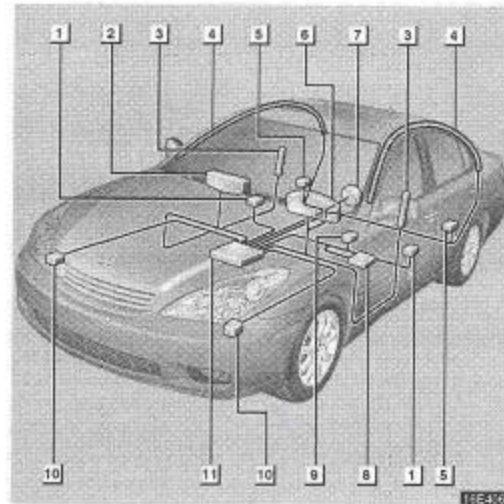
- 1 Collision from the front
- 2 Collision from the rear
- 3 Vehicle rollover

The SRS side and curtain shield airbags are not designed to inflate if the vehicle is involved in a front or rear collision, if it rolls over, or if it is involved in a low-speed side collision.

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The SRS airbags may deploy if a serious impact occurs to the underside of your vehicle. Some examples are shown in the illustration.



- 1 Side and curtain shield airbag sensor assemblies
- 2 Airbag module for front passenger (airbag and inflator)
- 3 Side airbag modules (airbag and inflator)
- 4 Curtain shield airbag modules (airbag and inflator)
- 5 Curtain shield airbag sensor assemblies
- 6 SRS warning light
- 7 Airbag module for driver (airbag and inflator)
- 8 Driver's seat position sensor
- 9 Driver's seat belt buckle switch
- 10 Front airbag sensors
- 11 Airbag sensor assembly

The SRS airbag system consists mainly of the above components, and their locations are shown in the illustration.

The airbag sensor assembly consists of a safing sensor and airbag sensor.

In a severe frontal impact, the front airbag sensors detect deceleration and the system triggers the front airbag inflators. In a severe side impact, the side and curtain shield airbag sensor and/or the curtain shield airbag sensor trigger(s) the side and curtain shield airbag inflators and/or the curtain shield airbag inflator. At this time, a chemical reaction in the inflators quickly fills the airbags with non-toxic gas to help restrain the forward or lateral motion of the occupants.

When the SRS airbag operates, it produces a fairly loud noise and release some smoke and residue along with non-toxic gas. This does not indicate a fire. This gas is normally harmless; however, for those who have delicate skin, it may cause a minor skin irritation. Be sure to wash off any residue as soon as possible to prevent any potential skin irritation.

Deployment of the airbags happens in a fraction of a second, so the airbags must inflate with considerable force. While the system is designed to reduce serious injuries, it may also cause minor burns or abrasions and swelling.

Parts of the airbag module (steering wheel hub, dashboard, front seats, parts of the front and rear pillars and roof side) may be hot for several minutes, but the airbags themselves will not be hot. The airbags are designed to inflate only once.

A crash severe enough to inflate the driver and front passenger airbags may break the windshield as the vehicle buckles. In vehicles with a front passenger airbag, the windshield may also be damaged by absorbing some of the force of the inflating airbag.

**CAUTION**

- The SRS airbag system is designed only as a supplement to the primary protection of the driver side and front and rear outside passenger side seat belt systems. The front and rear outside seat occupants can be killed or seriously injured by the inflating airbags if they do not wear the available seat belts properly. During sudden braking just before a collision, an unrestrained driver, front passenger or rear outside passenger can move forward or sideways into direct contact with or close proximity to the airbag which may then deploy during the collision. To ensure maximum protection in an accident, the driver and all passengers in the vehicle must wear their seat belts properly. Wearing a seat belt properly during an accident reduces the chances of death or serious injury or being thrown out of the vehicle. For instructions and precautions concerning the seat belt system, see "Seat belts" on page 104.
- Improperly seated and/or restrained infants and children can be killed or seriously injured by the deploying airbags. An infant or child who is too small to use a seat belt should be properly secured using a child restraint system. Lexus strongly recommends that all infants and children be placed in the rear seat of the vehicle and properly restrained. The rear seat is the safest for infants and children. For instructions concerning the installation of a child restraint system, see "Child restraint" on page 129.



- Never install a rear-facing child restraint system on the front passenger seat because the force of the rapid inflation of the front passenger airbag can cause death or serious injury to the child.

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► Move seat fully back

- A forward-facing child restraint system should be allowed to be installed on the front passenger seat only when it is unavoidable. Always move the seat as far back as possible, because the force of the deploying front passenger airbag could cause death or serious injury to the child.
- Do not allow the child to lean against the front door or around the front door even if the child is seated in a child restraint system. It is dangerous if the side airbag and curtain shield airbag inflate, because the impact could cause death or serious injury to the child.
- For instructions concerning the installation of a child restraint system, see "Child restraint" on page 129.



- Do not sit on the edge of the seat or lean over the dashboard when the vehicle is in use. The front airbags inflate with considerable speed and force; you may be killed or seriously injured. Sit up straight and well back in the seat, and always use your seat belt properly.

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## COMFORT ADJUSTMENT



- Do not lean against the door when the vehicle is in use. The side airbag and curtain shield airbag inflate with considerable speed and force; you may be killed or seriously injured. Special care should be taken especially when you have a small child in the vehicle.
- Sit up straight and well back in the seat, distributing your weight evenly in the seat. Do not apply excessive weight to the outer side of the front seats on vehicles with side airbags.



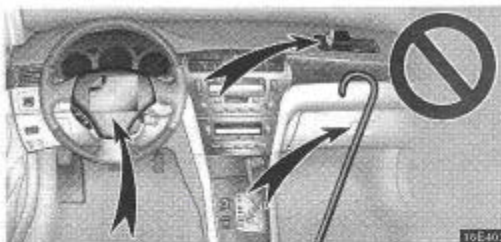
- Do not get your head closer to the area where the side airbag and curtain shield airbag inflate. These airbags inflate with considerable speed and force; you may be killed or seriously injured. Special care should be taken especially when you have a small child in the vehicle.
- Do not allow a child to kneel on the passenger seat facing the passenger's side door. The side airbag and curtain shield airbag inflate with considerable speed and force; the child may be killed or seriously injured.

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## COMFORT ADJUSTMENT



- Do not allow a child to stand up, or to kneel on the front passenger seat. The front airbag inflates with considerable speed and force; the child may be killed or seriously injured.
- Do not hold a child on your lap or in your arms. Use a child restraint system in the rear seat. For instructions concerning the installation of a child restraint system, see "Child restraint" on page 129.

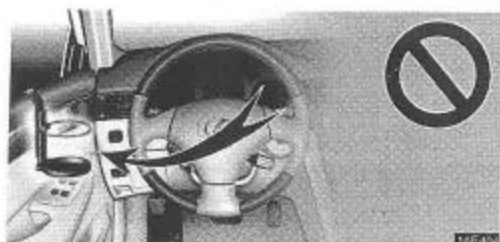


- Do not put objects or your pets on or in front of the dashboard or steering wheel pad that houses the front airbag system. They might restrict inflation or cause death or serious injury as they are projected rearward by the force of the deploying airbags. Likewise, the driver and front passenger should not hold things in their arms or on their knees.

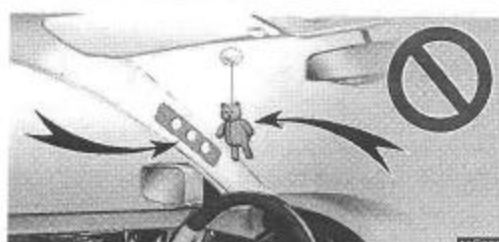
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## COMFORT ADJUSTMENT



- Do not attach a cup holder or any other device or object on or around the door. When the side airbag inflates, the cup holder or any other device or object will be thrown with great force, or the side airbag may not activate correctly, resulting in death or serious injury. Likewise, the driver and front passenger should not hold things in their arms or on their knees.



- Do not attach a microphone or any other device or object around the part where the curtain shield airbag activates such as on the windshield glass, side door glass, front and rear pillars and roof side or assist grips. When the curtain shield airbag inflates, the microphone or other device or object will be hurled with great force or the curtain shield airbag may not activate correctly, resulting in death or serious injury.
- Do not hook a hanger, heavy or sharp pointed objects on the coat hook. If the curtain shield airbag inflates, those items will be hurled away with great force or the curtain shield airbag may not activate correctly. When you hang clothes, hang them on the coat hook directly.

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## COMFORT ADJUSTMENT

- Do not use seat accessories which cover the parts where the side airbags inflate. Such accessories may prevent the side airbags from activating correctly, causing death or serious injury.
- Do not modify or remove any wiring. Do not modify, remove, strike or open any components, such as the steering wheel pad, steering wheel, column cover, front passenger airbag cover or airbag sensor assembly. Doing so may cause sudden front airbags inflation or disable the system, which could result in death or serious injury.
- Do not modify or replace the seats or upholstery of front seats with side airbags. Such changes may disable the system or cause the side airbags to inflate accidentally, resulting in death or serious injury.
- Do not disassemble or repair the front and rear pillars and roof side rail containing the curtain shield airbags. Such changes may disable the system or cause the curtain shield airbags to inflate accidentally, resulting in death or serious injury.

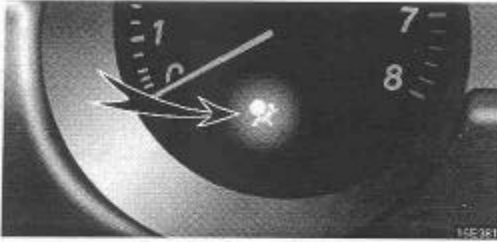
Failure to follow these instructions can result in death or serious injury. Consult your Lexus dealer about any repairs and modifications.

### NOTICE

Do not perform any of the following changes without consulting your Lexus dealer. Such changes can interfere with proper operation of the SRS in some cases.

- Installation of electronic devices such as a mobile two-way radio, cassette tape player or compact disc player
- Modification of the suspension system
- Modification of the front end structure and side structure of the passenger compartment
- Attachment of a grille guard (bull bar, kangaroo bar, etc.), snowplow, winches or any other equipment to the front end
- Repairs made on or near the front fenders, front end structure, console, steering column, steering wheel, dashboard near the front passenger airbag or front seats

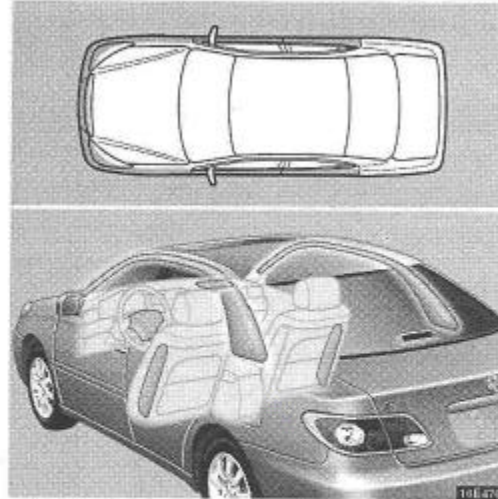
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This SRS airbag system has an indicator to inform the driver of operating problems. If either of the following conditions occurs, this indicates a malfunction of the airbags. Contact your Lexus dealer as soon as possible to service the vehicle.

- When the ignition key is turned to the "ON" position, the light does not come on, stays on or flashes.
- The light comes on or starts flashing while driving.

If the light stays on, it indicates that the SRS front airbags have a problem. If the light flashes, the SRS side and curtain shield airbags have a problem.



In the following cases, contact your Lexus dealer as soon as possible:

- Any of the SRS airbags have been inflated.
- The front of the vehicle and portion of the doors (shaded in the illustration) were involved in an accident that was not severe enough to cause the SRS airbags to inflate.

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- The surface of the seats with the side airbags or the pad section of the steering wheel or front passenger airbag cover (shaded in the illustration) is scratched, cracked, or otherwise damaged.
- The portion of the front and rear pillars and roof side rail garnish (padding) containing the curtain shield airbags inside (shaded in the illustration) is scratched, cracked, or otherwise damaged.

#### NOTICE

***Do not disconnect the battery cables before contacting your Lexus dealer.***