

**REPORT NUMBER: 208-MGA-2011-006**

**VEHICLE SAFETY COMPLIANCE TESTING  
FOR  
FMVSS 208, OCCUPANT CRASH PROTECTION  
FMVSS 212, WINDSHIELD MOUNTING  
FMVSS 219, WINDSHIELD INTRUSION (PARTIAL)  
FMVSS 301, FUEL SYSTEM INTEGRITY  
FMVSS 305, ELECTROLYTE SPILLAGE & ELECTRICAL SHOCK PROTECTION**

**HYUNDAI MOTOR COMPANY  
2011 HYUNDAI SONATA HYBRID PASSENGER CAR  
NHTSA NO.: CB0502**

**PREPARED BY:  
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**TEST DATES: JANUARY 18, 2012 – FEBRUARY 24, 2012**

**FINAL REPORT DATE: JULY 2, 2012**

**FINAL REPORT**

**PREPARED FOR:  
U.S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
OFFICE OF ENFORCEMENT  
OFFICE OF VEHICLE SAFETY COMPLIANCE  
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WASHINGTON, D.C. 20590**

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July 2, 2012



### Technical Report Documentation Page

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                             |                                                                                                                                                                                                                                                                                                                   |                  |
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| <b>16. Abstract</b><br>Compliance tests were conducted on the subject 2011 Hyundai Sonata Hybrid in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP208-14 for the determination of FMVSS 208 compliance. Test failures identified were as follows:<br><br><b>TEST FAILURES:</b><br>The 2011 Hyundai Sonata Hybrid (CB0502) center rear belt is detachable. Per FMVSS 208 S4.1.5.5.2, the detachable belt system is not permitted in the rear of passenger cars that do not have a fold down seat. |                                                             |                                                                                                                                                                                                                                                                                                                   |                  |
| <b>17. Key Words</b><br><br>Frontal Impact<br>40 kmph Vehicle Safety Compliance Testing<br>FMVSS 208, "Occupant Crash Protection"<br>FMVSS 212, "Windshield Mounting"<br>FMVSS 219, (partial), "Windshield Zone Intrusion"<br>FMVSS 301, "Fuel System Integrity"<br>FMVSS 305, "Electrolyte Spillage & Electrical Shock Protection"                                                                                                                                                                                                                   |                                                             | <b>18. Distribution Statement</b><br>Copies of this report are available from the following:<br>U.S. Department of Transportation<br>National Highway Traffic Safety Administration<br>Technical Information Services (TIS),<br>NPO-411<br>1200 New Jersey Avenue, S.E.<br>(Room E12-100)<br>Washington, DC 20590 |                  |
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**SECTION 1**  
**PURPOSE OF COMPLIANCE TESTS**

This Federal Motor Vehicle Safety Standard 208 compliance test is part of a program conducted for the National Highway Traffic Safety Administration (NHTSA) by MGA Research Corporation (MGA) under Contract No.: DTNH22-08-D-00086. The purpose of this test was to determine whether the subject vehicle, a 2011 Hyundai Sonata Hybrid , NHTSA No.: CB0502, meets certain performance requirements of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Mounting"; FMVSS 219, "Windshield Zone Intrusion"; FMVSS 301, "Fuel System Integrity", and FMVSS 305, "Electric Powered Vehicles: Electrolyte Spillage and Electrical Shock Protection." The compliance test was conducted in accordance with OVSC Laboratory Test Procedure No.: TP208-14 dated April 16, 2008.

## SECTION 2

### TESTS PERFORMED

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance

NHTSA No.: CB0502  
 Test Dates: 1/18/12 - 2/24/12

The following checked items indicate the tests that were performed:

- |                                     |     |                                                                                                                |
|-------------------------------------|-----|----------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | 1.  | Rear seating position seat belts                                                                               |
| <input checked="" type="checkbox"/> | 2.  | Air bag labels (S4.5.1)                                                                                        |
| <input checked="" type="checkbox"/> | 3.  | Readiness indicator (S4.5.2)                                                                                   |
| <input checked="" type="checkbox"/> | 4.  | Passenger air bag manual cut-off device (S4.5.4)                                                               |
| <input checked="" type="checkbox"/> | 5.  | Lap belt lockability (S7.1.1.5)                                                                                |
| <input checked="" type="checkbox"/> | 6.  | Seat belt warning system (S7.3)                                                                                |
| <input checked="" type="checkbox"/> | 7.  | Seat belt contact force (S7.4.3)                                                                               |
| <input checked="" type="checkbox"/> | 8.  | Seat belt latch plate access (S7.4.4)                                                                          |
| <input checked="" type="checkbox"/> | 9.  | Seat belt retraction (S7.4.5)                                                                                  |
| <input checked="" type="checkbox"/> | 10. | Seat belt guides and hardware (S7.4.6)                                                                         |
| <input checked="" type="checkbox"/> | 11. | Air bag suppression telltale (S19.2.2)                                                                         |
| <input checked="" type="checkbox"/> | 12. | Suppression tests with 12-month-old CRABI dummy (Part 572, Subpart R)                                          |
| <input checked="" type="checkbox"/> | 13. | Suppression tests with Newborn infant (Part 572, Subpart K)                                                    |
| <input type="checkbox"/>            | 14. | Suppression tests with 3-year-old dummy (Part 572, Subpart P)                                                  |
| <input type="checkbox"/>            | 15. | Suppression tests with 6-year-old dummy (Part 572, Subpart N)                                                  |
| <input checked="" type="checkbox"/> | 16. | Test of Reactivation of the passenger air bag system with an unbelted 5 <sup>th</sup> percentile female dummy. |
| <input type="checkbox"/>            | 17. | Low risk deployment test with 12-month-old dummy (Part 572, Subpart R)                                         |
| <input checked="" type="checkbox"/> | 18. | Low risk deployment test with 3-year-old dummy (Part 572, Subpart P)                                           |
| <input checked="" type="checkbox"/> | 19. | Low risk deployment test with 6-year-old dummy (Part 572, Subpart N)                                           |
| <input checked="" type="checkbox"/> | 20. | Low risk deployment test with 5 <sup>th</sup> female dummy (Part 572, Subpart O)                               |
| <input checked="" type="checkbox"/> | 21. | Impact Tests                                                                                                   |
| <input type="checkbox"/>            |     | Frontal Oblique                                                                                                |
| <input type="checkbox"/>            |     | Belted 50 <sup>th</sup> male dummy driver and passenger (0 to 48 kmph) (S5.1.1(a))                             |
| <input type="checkbox"/>            |     | Unbelted 50 <sup>th</sup> male dummy driver and passenger (0 to 48 kmph) (S5.1.2(a)(1))                        |
| <input type="checkbox"/>            |     | Unbelted 50 <sup>th</sup> male dummy driver and passenger (32 to 40 kmph) (S5.1.2(a)(1) or S5.1.2(b))          |
| <input checked="" type="checkbox"/> |     | Frontal 0°                                                                                                     |
| <input type="checkbox"/>            |     | Belted 50 <sup>th</sup> male dummy driver (0 to 48 kmph) (S5.1.1.(b)(1) or S5.1.1(a))                          |
| <input type="checkbox"/>            |     | Belted 50 <sup>th</sup> male dummy passenger (0 to 48 kmph) (S5.1.1.(b)(1) or S5.1.1(a))                       |
| <input type="checkbox"/>            |     | Belted 5 <sup>th</sup> female dummy driver (0 to 48 kmph) (S16.1(a))                                           |
| <input type="checkbox"/>            |     | Belted 5 <sup>th</sup> female dummy passenger (0 to 48 kmph) (S16.1(a))                                        |
| <input type="checkbox"/>            |     | Belted 50 <sup>th</sup> male dummy driver and passenger (0 to 56 kmph) (S5.1.1.(b)(2))                         |
| <input type="checkbox"/>            |     | Unbelted 50 <sup>th</sup> male dummy driver and passenger (0 to 48 kmph) (S5.1.2(a) (1))                       |
| <input checked="" type="checkbox"/> |     | Unbelted 50 <sup>th</sup> male dummy driver (32 to 40 kmph) (S5.1.2.(a)(2) or S5.1.2(b))                       |
| <input checked="" type="checkbox"/> |     | Unbelted 50 <sup>th</sup> male dummy passenger (32 to 40 kmph) (S5.1.2.(a)(2) or S5.1.2(b))                    |
| <input type="checkbox"/>            |     | Unbelted 5 <sup>th</sup> female dummy driver (32 to 40 kmph) (S16.1(b))                                        |
| <input type="checkbox"/>            |     | Unbelted 5 <sup>th</sup> female dummy passenger (32 to 40 kmph) (S16.1(b))                                     |
| <input type="checkbox"/>            |     | 40% Offset 0° Belted 5 <sup>th</sup> female dummy driver and passenger (0 to 40 kmph) (S18.1)                  |
| <input type="checkbox"/>            | 22. | FMVSS 204 Indicant Test                                                                                        |
| <input checked="" type="checkbox"/> | 23. | FMVSS 212 Test                                                                                                 |
| <input checked="" type="checkbox"/> | 24. | FMVSS 219 Indicant Test                                                                                        |
| <input checked="" type="checkbox"/> | 25. | FMVSS 301 Frontal Test                                                                                         |
| <input checked="" type="checkbox"/> | 26. | FMVSS 305 Frontal Indicate Test                                                                                |

For the crash tests, the vehicle was instrumented with 8 accelerometers. The data from the vehicle and dummies were sampled at 10,000 samples per second and processed as specified in SAE J211/1 MAR95 and FMVSS 208, S4.13.

The dynamic tests were recorded using high-speed digital video.

The vehicle does not appear to meet all of the performance requirements to which it was tested. The 2011 Hyundai Sonata Hybrid (CB0502) center rear belt is detachable. Per FMVSS 208 S4.1.5.5.2, the detachable belt system is not permitted in the rear of passenger cars that do not have a fold down seat.

### SECTION 3

#### INJURY RESULT SUMMARY FOR FMVSS 208 TESTS

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance

NHTSA No.: CB0502  
 Test Date: 1/23/12

#### 5<sup>th</sup> Percentile Female Low Risk Deployments

##### 5<sup>th</sup> Percentile Female SN 510 Position 1 (Chin On Module) 1/23/12

| Injury Criteria    | Max. Allowable Injury Assessment Values | Measured Value |
|--------------------|-----------------------------------------|----------------|
| HIC15              | 700                                     | 14             |
| Peak Nij (Nte)     | 1.0                                     | 0.2            |
| Time (ms)          | NA                                      | 100.9          |
| Peak Nij (Ntf)     | 1.0                                     | 0.3            |
| Time (ms)          | NA                                      | 6.8            |
| Peak Nij (Nce)     | 1.0                                     | 0.0            |
| Time (ms)          | NA                                      | 250.4          |
| Peak Nij (Ncf)     | 1.0                                     | 0.2            |
| Time (ms)          | NA                                      | 9.3            |
| Neck Tension       | 2070 N                                  | 718            |
| Neck Compression   | 2520 N                                  | 159            |
| Chest g            | 60 g                                    | 10             |
| Chest Displacement | 52 mm                                   | 6              |
| Left Femur         | 6805 N                                  | 75             |
| Right Femur        | 6805 N                                  | 68             |

Second stage fire time of 150 ms; Injuries calculated on 0 ms to 275 ms.

##### 5<sup>th</sup> Percentile Female SN 510 Position 2 (Chin On Rim) 1/23/12

| Injury Criteria    | Max. Allowable Injury Assessment Values | Measured Value |
|--------------------|-----------------------------------------|----------------|
| HIC15              | 700                                     | 45             |
| Peak Nij (Nte)     | 1.0                                     | 0.3            |
| Time (ms)          | NA                                      | 8.8            |
| Peak Nij (Ntf)     | 1.0                                     | 0.4            |
| Time (ms)          | NA                                      | 71.4           |
| Peak Nij (Nce)     | 1.0                                     | 0.0            |
| Time (ms)          | NA                                      | 169.0          |
| Peak Nij (Ncf)     | 1.0                                     | 0.3            |
| Time (ms)          | NA                                      | 74.7           |
| Neck Tension       | 2070 N                                  | 706            |
| Neck Compression   | 2520 N                                  | 139            |
| Chest g            | 60 g                                    | 19             |
| Chest Displacement | 52 mm                                   | 15             |
| Left Femur         | 6805 N                                  | 26             |
| Right Femur        | 6805 N                                  | 51             |

Second stage fire time of 150 ms; Injuries calculated on 0 ms to 275 ms.

### SECTION 3

#### INJURY RESULT SUMMARY FOR FMVSS 208 TESTS

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance

NHTSA No.: CB0502  
Test Dates: 1/23/12 – 1/24/12

#### 3-Year-Old Low Risk Deployments

##### 3-Year-Old SN 031 Position 1 (Chest On Instrument Panel) 1/24/12

| Injury Criteria    | Max. Allowable Injury Assessment Values | Measured Value |
|--------------------|-----------------------------------------|----------------|
| HIC15              | 570                                     | 37             |
| Peak Nij (Nte)     | 1.0                                     | 0.2            |
| Time (ms)          | NA                                      | 93.7           |
| Peak Nij (Ntf)     | 1.0                                     | 0.0            |
| Time (ms)          | NA                                      | 59.0           |
| Peak Nij (Nce)     | 1.0                                     | 0.0            |
| Time (ms)          | NA                                      | 2.9            |
| Peak Nij (Ncf)     | 1.0                                     | 0.5            |
| Time (ms)          | NA                                      | 15.1           |
| Neck Tension       | 1130 N                                  | 101            |
| Neck Compression   | 1380 N                                  | 561            |
| Chest g            | 55 g                                    | 13             |
| Chest Displacement | 34 mm                                   | 1              |

Second stage fire time of 120 ms; Injuries calculated on 0 ms to 100 ms.

##### 3-Year-Old SN 031 Position 2 (Head On Instrument Panel) 1/23/12

| Injury Criteria    | Max. Allowable Injury Assessment Values | Measured Value |
|--------------------|-----------------------------------------|----------------|
| HIC15              | 570                                     | 3              |
| Peak Nij (Nte)     | 1.0                                     | 0.0            |
| Time (ms)          | NA                                      | 53.1           |
| Peak Nij (Ntf)     | 1.0                                     | 0.1            |
| Time (ms)          | NA                                      | 63.3           |
| Peak Nij (Nce)     | 1.0                                     | 0.3            |
| Time (ms)          | NA                                      | 41.9           |
| Peak Nij (Ncf)     | 1.0                                     | 0.3            |
| Time (ms)          | NA                                      | 13.1           |
| Neck Tension       | 1130 N                                  | 90             |
| Neck Compression   | 1380 N                                  | 476            |
| Chest g            | 55 g                                    | 4              |
| Chest Displacement | 34 mm                                   | 0              |

Second stage fire time of 120 ms; Injuries calculated on 0 ms to 100 ms.



### SECTION 3

#### INJURY RESULT SUMMARY FOR FMVSS 208 TESTS

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance

NHTSA No.: CB0502  
Test Date: 1/24/12

#### 6-Year-Old Low Risk Deployments

##### 6-Year-Old SN 155 Position 1 (Chest On Instrument Panel) 1/24/12

| Injury Criteria    | Max. Allowable Injury Assessment Values | Measured Value |
|--------------------|-----------------------------------------|----------------|
| HIC15              | 700                                     | 160            |
| Peak Nij (Nte)     | 1.0                                     | 0.1            |
| Time (ms)          | NA                                      | 100.0          |
| Peak Nij (Ntf)     | 1.0                                     | 0.0            |
| Time (ms)          | NA                                      | 1.7            |
| Peak Nij (Nce)     | 1.0                                     | 0.0            |
| Time (ms)          | NA                                      | 52.8           |
| Peak Nij (Ncf)     | 1.0                                     | 0.4            |
| Time (ms)          | NA                                      | 20.6           |
| Neck Tension       | 1490 N                                  | 84             |
| Neck Compression   | 1820 N                                  | 566            |
| Chest g            | 60 g                                    | 8              |
| Chest Displacement | 40 mm                                   | 0              |

Second stage fire time of 120 ms; Injuries calculated on 0 ms to 100 ms.

##### 6-Year-Old SN 155 Position 2 (Head On Instrument Panel) 1/24/12

| Injury Criteria    | Max. Allowable Injury Assessment Values | Measured Value |
|--------------------|-----------------------------------------|----------------|
| HIC15              | 700                                     | 9              |
| Peak Nij (Nte)     | 1.0                                     | 0.2            |
| Time (ms)          | NA                                      | 60.4           |
| Peak Nij (Ntf)     | 1.0                                     | 0.0            |
| Time (ms)          | NA                                      | 5.8            |
| Peak Nij (Nce)     | 1.0                                     | 0.2            |
| Time (ms)          | NA                                      | 21.8           |
| Peak Nij (Ncf)     | 1.0                                     | 0.3            |
| Time (ms)          | NA                                      | 14.6           |
| Neck Tension       | 1490 N                                  | 125            |
| Neck Compression   | 1820 N                                  | 613            |
| Chest g            | 60 g                                    | 5              |
| Chest Displacement | 40 mm                                   | 0              |

Second stage fire time of 120 ms; Injuries calculated on 0 ms to 100 ms.

### SECTION 3

#### INJURY RESULT SUMMARY FOR FMVSS 208 TESTS

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance

NHTSA No.: CB0502  
 Test Date: 2/24/12

#### 40 kmph Frontal Crash

|                 |    |     |   |    |
|-----------------|----|-----|---|----|
| Impact Angle:   | 0° |     |   |    |
| Belted Dummies: |    | Yes | X | No |

|              |  |              |   |               |
|--------------|--|--------------|---|---------------|
| Speed Range: |  | 0 to 40 kmph | X | 32 to 40 kmph |
|              |  | 0 to 48 kmph |   | 0 to 56 kmph  |

|                    |      |                   |        |
|--------------------|------|-------------------|--------|
| Test Speed (kmph): | 39.8 | Test Weight (kg): | 1819.8 |
|--------------------|------|-------------------|--------|

|                  |  |                        |   |                       |
|------------------|--|------------------------|---|-----------------------|
| Driver Dummy:    |  | 5 <sup>th</sup> female | X | 50 <sup>th</sup> male |
| Passenger Dummy: |  | 5 <sup>th</sup> female | X | 50 <sup>th</sup> male |

#### 50<sup>th</sup> Percentile Male Frontal Crash Test

Vehicles certified to S5.1.1(b)(1), S5.1.1(b)(2), S5.1.2(a)(2), or S5.1.2(b)

| Injury Criteria    | Max. Allowable Injury Assessment Values | Driver | Passenger |
|--------------------|-----------------------------------------|--------|-----------|
| HIC15              | 700                                     | 71     | 129       |
| N <sub>te</sub>    | 1.0                                     | 0.2    | 0.3       |
| N <sub>tf</sub>    | 1.0                                     | 0.3    | 0.1       |
| N <sub>ce</sub>    | 1.0                                     | 0.2    | 0.1       |
| N <sub>cf</sub>    | 1.0                                     | 0.1    | 0.5       |
| Neck Tension       | 4170 N                                  | 1717   | 872       |
| Neck Compression   | 4000 N                                  | 361    | 2107      |
| Chest g            | 60 g                                    | 47     | 45        |
| Chest Displacement | 63 mm                                   | 22     | 7         |
| Left Femur         | 10,000 N                                | 7397   | 5438      |
| Right Femur        | 10,000 N                                | 5747   | 4357      |

## SECTION 4

### DISCUSSION OF TESTS

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance

NHTSA No.: CB0502  
Test Dates: 1/18/12 - 2/24/12

A blanket and visor were not used in the suppression testing because they did not affect the sensing system used on the vehicle.

The first to second stage time delay used for 5<sup>th</sup> P1 and 5<sup>th</sup> P2 Low Risk Deployment tests conducted on January 23 and January 24, 2012 was 150 ms. HMC representatives provided this updated time delay.

The Low Risk Deployment tests conducted on January 23 and January 24, 2012, erroneously identified the test vehicle as a model year 2012 on the high speed video and photograph signs. The correct model year of the test vehicle was 2011.

The 6-year-old Position 2 Low Risk Deployment test conducted on January 24, 2012 broke the windshield. The subsequent 6-year-old Position 1 test run on January 24, 2012 was conducted with a broken windshield. The windshield was replaced with a new OEM windshield prior to the frontal crash impact.

The 2011 Hyundai Sonata Hybrid (CB0502) center rear belt is detachable. Per FMVSS 208 S4.1.5.5.2, the detachable belt system is not permitted in the rear of passenger cars that do not have a fold down seat.

The 2011 Hyundai Sonata Hybrid (CB0502) was tested to FMVSS 305 in conjunction with the FMVSS 208 frontal impact. The test was performed in accordance with the specifications of the Office of Vehicle Safety Compliance (OVSC) Test Procedures TP-305-00 to determine compliance to the requirements of Federal Motor Vehicle Safety Standards (FMVSS) 305, "Electric Powered Vehicles: Electrolyte Spillage and Electrical Shock Protection". This program is sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-06-C-00030.

The Hyundai Sonata Hybrid is certified to FMVSS 305 based on the contactor between the battery and the traction motor remaining closed after an FMVSS 208 crash test. The post-crash rollover test was performed with the contactor in the closed condition.

Based on the test results, the 2011 Hyundai Sonata Hybrid (CB0502) appears to meet the requirements of FMVSS 305 testing.

**SECTION 5**  
**TEST DATA SHEETS**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance

NHTSA No.: CB0502  
Test Dates: 1/18/12 - 2/24/12

**DATA SHEET 1**  
**COTR VEHICLE WORK ORDER**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance

NHTSA No.: CB0502  
Test Dates: 1/18/12 - 2/24/12

COTR Signature: Brian Smith

Test to be performed for this vehicle are checked below:

|                                                                                               |     |                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/>                                                           | 1.  | Rear Seating Position Seat Belts                                                                                                                                                   |
| <input checked="" type="checkbox"/>                                                           | 2.  | Air Bag Labels (S4.5.1)                                                                                                                                                            |
| <input checked="" type="checkbox"/>                                                           | 3.  | Readiness Indicator (S4.5.2)                                                                                                                                                       |
| <input checked="" type="checkbox"/>                                                           | 4.  | Passenger Air Bag Manual Cut-off Device (S4.5.4)                                                                                                                                   |
| <input checked="" type="checkbox"/>                                                           | 5.  | Lap Belt Lockability (S7.1.1.5)                                                                                                                                                    |
| <input checked="" type="checkbox"/>                                                           | 6.  | Seat Belt Warning System (S7.3)                                                                                                                                                    |
| <input checked="" type="checkbox"/>                                                           | 7.  | Seat Belt Contact Force (S7.4.3)                                                                                                                                                   |
| <input checked="" type="checkbox"/>                                                           | 8.  | Seat Belt Latch Plate Access (S7.4.4)                                                                                                                                              |
| <input checked="" type="checkbox"/>                                                           | 9.  | Seat Belt Retraction (S7.4.5)                                                                                                                                                      |
| <input checked="" type="checkbox"/>                                                           | 10. | Seat Belt Guides and Hardware (S7.4.6)                                                                                                                                             |
| <input checked="" type="checkbox"/>                                                           | 11. | Air bag suppression telltale (S19.2.2)                                                                                                                                             |
| <input checked="" type="checkbox"/>                                                           | 12. | Suppression tests with 12-month-old CRABI dummy (Part 572, Subpart R) using the following indicated child restraints (mid-height seat position):                                   |
| Section B – Rear Facing (unbelted and belted rear facing, unbelted forward facing)            |     |                                                                                                                                                                                    |
| <input type="checkbox"/>                                                                      |     | Century Smart Fit 4543 <input type="checkbox"/> Full Rearward <input type="checkbox"/> Mid Position <input type="checkbox"/> Full Forward                                          |
| <input checked="" type="checkbox"/>                                                           |     | Cosco Arriva 22-013 <input checked="" type="checkbox"/> Full Rearward <input checked="" type="checkbox"/> Mid Position <input checked="" type="checkbox"/> Full Forward            |
| <input type="checkbox"/>                                                                      |     | Evenflo Discovery Adjust Right 212 <input type="checkbox"/> Full Rearward <input type="checkbox"/> Mid Position <input type="checkbox"/> Full Forward                              |
| <input type="checkbox"/>                                                                      |     | Graco Infant 8457 <input type="checkbox"/> Full Rearward <input type="checkbox"/> Mid Position <input type="checkbox"/> Full Forward                                               |
| <input checked="" type="checkbox"/>                                                           |     | Graco Snugride <input checked="" type="checkbox"/> Full Rearward <input checked="" type="checkbox"/> Mid Position <input checked="" type="checkbox"/> Full Forward                 |
| <input checked="" type="checkbox"/>                                                           |     | Peg Perego Viaggio <input checked="" type="checkbox"/> Full Rearward <input checked="" type="checkbox"/> Mid Position <input checked="" type="checkbox"/> Full Forward             |
| Section C – Convertible (unbelted and belted rear facing, unbelted and belted forward facing) |     |                                                                                                                                                                                    |
| <input checked="" type="checkbox"/>                                                           |     | Britax Roundabout E9L02 <input checked="" type="checkbox"/> Full Rearward <input checked="" type="checkbox"/> Mid Position <input checked="" type="checkbox"/> Full Forward        |
| <input checked="" type="checkbox"/>                                                           |     | Cosco High Back Booster 22-209 <input checked="" type="checkbox"/> Full Rearward <input checked="" type="checkbox"/> Mid Position <input checked="" type="checkbox"/> Full Forward |
| <input type="checkbox"/>                                                                      |     | Cosco Touriva 02519 <input type="checkbox"/> Full Rearward <input type="checkbox"/> Mid Position <input type="checkbox"/> Full Forward                                             |
| <input type="checkbox"/>                                                                      |     | Cosco Summit Deluxe 22-262 <input type="checkbox"/> Full Rearward <input type="checkbox"/> Mid Position <input type="checkbox"/> Full Forward                                      |
| <input type="checkbox"/>                                                                      |     | Evenflo Generations 352 <input type="checkbox"/> Full Rearward <input type="checkbox"/> Mid Position <input type="checkbox"/> Full Forward                                         |
| <input type="checkbox"/>                                                                      |     | Evenflo Medallion 254 <input type="checkbox"/> Full Rearward <input type="checkbox"/> Mid Position <input type="checkbox"/> Full Forward                                           |
| <input checked="" type="checkbox"/>                                                           |     | Evenflo Tribute V 379 <input checked="" type="checkbox"/> Full Rearward <input checked="" type="checkbox"/> Mid Position <input checked="" type="checkbox"/> Full Forward          |
| <input type="checkbox"/>                                                                      |     | Graco ComfortSport <input type="checkbox"/> Full Rearward <input type="checkbox"/> Mid Position <input type="checkbox"/> Full Forward                                              |
| <input type="checkbox"/>                                                                      |     | Graco Platinum Cargo <input type="checkbox"/> Full Rearward <input type="checkbox"/> Mid Position <input type="checkbox"/> Full Forward                                            |
| <input checked="" type="checkbox"/>                                                           |     | Graco Safeseat Step 2 <input checked="" type="checkbox"/> Full Rearward <input checked="" type="checkbox"/> Mid Position <input checked="" type="checkbox"/> Full Forward          |
| <input checked="" type="checkbox"/>                                                           | 13. | Suppression tests with newborn infant (Part 572, Subpart K) using the following indicated child restraints (mid-height seat position):                                             |
| Section A – Car Bed (Belted)                                                                  |     |                                                                                                                                                                                    |
| <input checked="" type="checkbox"/>                                                           |     | Angel Guard Angel Ride <input checked="" type="checkbox"/> Full Rearward <input checked="" type="checkbox"/> Mid Position <input checked="" type="checkbox"/> Full Forward         |
| <input type="checkbox"/>                                                                      | 14. | Suppression tests with 3-year-old dummy (Part 572, Subpart P) using the following indicated child restraints where a child restraint is required (mid-height seat position):       |

Section C – Convertible (Belted forward-facing)

|                          |                                |                          |               |                          |              |                          |              |
|--------------------------|--------------------------------|--------------------------|---------------|--------------------------|--------------|--------------------------|--------------|
| <input type="checkbox"/> | Britax Roundabout E9L02        | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Cosco High Back Booster 22-209 | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Cosco Touriva 02519            | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Cosco Summit Deluxe 22-262     | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Evenflo Generations 352        | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Evenflo Medallion 254          | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Evenflo Tribute V 379          | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Graco ComfortSport             | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Graco Platinum Cargo           | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Graco Safeseat Step 2          | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |

Section D – Toddler/Belt Positioning Booster (Belted)

|                          |                                |                          |               |                          |              |                          |              |
|--------------------------|--------------------------------|--------------------------|---------------|--------------------------|--------------|--------------------------|--------------|
| <input type="checkbox"/> | Britax Roadster 9004           | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Cosco High Back Booster 22-209 | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Evenflo Right Fit 245          | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |

15. Suppression tests with representative 3-year-old child using the following indicated child restraints where a child restraint is required (mid-height position).

(Appendix H, Data Sheet 19H and 20H)

Section C – Convertible (Belted forward-facing)

|                          |                                |                          |               |                          |              |                          |              |
|--------------------------|--------------------------------|--------------------------|---------------|--------------------------|--------------|--------------------------|--------------|
| <input type="checkbox"/> | Britax Roundabout E9L02        | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Cosco High Back Booster 22-209 | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Cosco Touriva 02519            | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Cosco Summit Deluxe 22-262     | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Evenflo Generations 352        | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Evenflo Medallion 254          | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Evenflo Tribute V 379          | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Graco ComfortSport             | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Graco Platinum Cargo           | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Graco Safeseat Step 2          | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |

Section D – Toddler/Belt Positioning Booster (Belted)

|                          |                                |                          |               |                          |              |                          |              |
|--------------------------|--------------------------------|--------------------------|---------------|--------------------------|--------------|--------------------------|--------------|
| <input type="checkbox"/> | Britax Roadster 9004           | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Cosco High Back Booster 22-209 | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |
| <input type="checkbox"/> | Evenflo Right Fit 245          | <input type="checkbox"/> | Full Rearward | <input type="checkbox"/> | Mid Position | <input type="checkbox"/> | Full Forward |

- ☐ 16. Suppression tests with 3-year-old dummy (Part 572, Subpart P) in the following positions (mid-height seat position):
- |                                                                                                      |                                        |                                       |                                       |
|------------------------------------------------------------------------------------------------------|----------------------------------------|---------------------------------------|---------------------------------------|
| <input type="checkbox"/> Sitting on seat with back against seat back (S22.2.2.1)                     | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Sitting on seat with back against reclined seat back (S22.2.2.2)            | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Sitting on seat with back not against seat back (S22.2.2.3)                 | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Sitting on seat edge, spine vertical, hands by the child's side (S22.2.2.4) | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Standing on seat, facing forward (S22.2.2.5)                                | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Kneeling on seat facing forward (S22.2.2.6)                                 | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Kneeling on seat facing rearward (S22.2.2.7)                                | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Lying on seat (S22.2.2.8)                                                   | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
- ☐ 17. Suppression tests with representative 3-year-old child in the following positions (mid-height seat position):
- |                                                                                                      |                                        |                                       |                                       |
|------------------------------------------------------------------------------------------------------|----------------------------------------|---------------------------------------|---------------------------------------|
| <input type="checkbox"/> Sitting on seat with back against seat back (S22.2.2.1)                     | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Sitting on seat with back against reclined seat back (S22.2.2.2)            | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Sitting on seat with back not against seat back (S22.2.2.3)                 | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Sitting on seat edge, spine vertical, hands by the child's side (S22.2.2.4) | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Standing on seat, facing forward (S22.2.2.5)                                | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Kneeling on seat facing forward (S22.2.2.6)                                 | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Kneeling on seat facing rearward (S22.2.2.7)                                | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Lying on seat (S22.2.2.8)                                                   | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
- ☐ 18. Suppression tests with 6-year-old dummy (Part 572, Subpart N) using the following indicated child restraints where a child restraint is required (mid-height seat position):
- Section D
- |                                                         |                                        |                                       |                                       |
|---------------------------------------------------------|----------------------------------------|---------------------------------------|---------------------------------------|
| <input type="checkbox"/> Britax Roadster 9004           | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Cosco High Back Booster 22-209 | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Cosco Summit Deluxe 22-262     | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Evenflo Generations 352        | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Evenflo Right Fit 245          | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Graco Platinum Cargo           | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |

- ☐ 19. Suppression tests with representative 6-year-old child using the following indicated child restraints where a child restraint is required (mid-height seat position):
- Section D
- |                                                         |                                        |                                       |                                       |
|---------------------------------------------------------|----------------------------------------|---------------------------------------|---------------------------------------|
| <input type="checkbox"/> Britax Roadster 9004           | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Cosco High Back Booster 22-209 | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Cosco Summit Deluxe 22-262     | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Evenflo Generations 352        | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Evenflo Right Fit 245          | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
| <input type="checkbox"/> Graco Platinum Cargo           | <input type="checkbox"/> Full Rearward | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |
- ☐ 20. Suppression tests with 6-year-old dummy (Part 572, Subpart N) in the following positions (mid-height seat position):
- |                                                                                                           |                                       |                                       |  |
|-----------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------|--|
| <input type="checkbox"/> Sitting on seat with back against seat back (S22.2.2.1)                          |                                       |                                       |  |
| <input type="checkbox"/> Full Rearward                                                                    | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |  |
| <input type="checkbox"/> Sitting on seat with back against reclined seat back (S22.2.2.2)                 |                                       |                                       |  |
| <input type="checkbox"/> Full Rearward                                                                    | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |  |
| <input type="checkbox"/> Sitting on seat edge, spine vertical, hands by the child's side (S22.2.2.4)      |                                       |                                       |  |
| <input type="checkbox"/> Full Rearward                                                                    | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |  |
| <input type="checkbox"/> Sitting back in the seat and leaning on the right front passenger door (S24.2.3) |                                       |                                       |  |
| <input type="checkbox"/> Full Rearward                                                                    | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |  |
- ☐ 21. Suppression tests with representative 6-year-old child in the following positions (mid-height seat position):
- |                                                                                                           |                                       |                                       |  |
|-----------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------|--|
| <input type="checkbox"/> Sitting on seat with back against seat back (S22.2.2.1)                          |                                       |                                       |  |
| <input type="checkbox"/> Full Rearward                                                                    | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |  |
| <input type="checkbox"/> Sitting on seat with back against reclined seat back (S22.2.2.2)                 |                                       |                                       |  |
| <input type="checkbox"/> Full Rearward                                                                    | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |  |
| <input type="checkbox"/> Sitting on seat edge, spine vertical, hands by the child's side (S22.2.2.4)      |                                       |                                       |  |
| <input type="checkbox"/> Full Rearward                                                                    | <input type="checkbox"/> Mid Position | <input type="checkbox"/> Full Forward |  |
| <input type="checkbox"/> Sitting back in the seat and leaning on the right front passenger door (S24.2.3) |                                       |                                       |  |
- ☒ 22. Test of Reactivation of the Passenger Air Bag System with an Unbelted 5<sup>th</sup> percentile female dummy (S20.3, 22.3, S24.3) (mid-height seat position). Perform this test after the following suppression tests: After each restraint.
- ☐ 23. Test of Reactivation of the Passenger Air Bag System with a representative 5<sup>th</sup> percentile female (S20.3, 22.3, S24.3) (mid-height seat position). Perform this test after the following suppression tests:
- ☐ 24. Low risk deployment test with 12-month-old dummy (Part 572, Subpart R) using the following indicated child restraints (full forward, mid-height seat position)(S20.4):
- Section B
- |                                                             |
|-------------------------------------------------------------|
| <input type="checkbox"/> Century Smart Fit 4543             |
| <input type="checkbox"/> Cosco Arriva 22-013                |
| <input type="checkbox"/> Evenflo Discovery Adjust Right 212 |
| <input type="checkbox"/> Graco Infant 8457                  |
| <input type="checkbox"/> Graco Snugride                     |
| <input type="checkbox"/> Peg Perego Viaggio                 |
- Section C
- |                                                  |
|--------------------------------------------------|
| <input type="checkbox"/> Britax Roundabout E9L02 |
| <input type="checkbox"/> Cosco Touriva 02519     |
| <input type="checkbox"/> Evenflo Medallion 254   |
| <input type="checkbox"/> Evenflo Tribute V 379   |
| <input type="checkbox"/> Graco ComfortSport      |



- ☒ 25. Low risk deployment test with 3-year-old dummy (Part 572, Subpart P) in the following positions:
- ☒ Position 1 (rearmost, lowest seat position)
  - ☒ Position 2 (mid-height seat position)
- ☒ 26. Low risk deployment test with 6-year-old dummy (Part 572, Subpart N) in the following positions:
- ☒ Position 1 (rearmost, lowest seat position)
  - ☒ Position 2 (mid-height seat position)
- ☒ 27. Low risk deployment test with 5<sup>th</sup> female dummy (Part 572, Subpart O) in the following positions:
- ☒ Position 1 (mid-height seat position)
  - ☒ Position 2 (mid-height seat position)
- ☒ 28. Impact Tests
- |                                     | Frontal Oblique                                                                                           | Impact Angle:                                                                                         | Test Speed: |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|
| <input type="checkbox"/>            | <input type="checkbox"/>                                                                                  | Belted 50 <sup>th</sup> male dummy driver and passenger (0 to 48 kmph) (S5.1.1(a))                    |             |
|                                     | <input type="checkbox"/>                                                                                  | Unbelted 50 <sup>th</sup> male dummy driver and passenger (0 to 48 kmph) (S5.1.2(a)(1))               |             |
|                                     | <input type="checkbox"/>                                                                                  | Unbelted 50 <sup>th</sup> male dummy driver and passenger (32 to 40 kmph) (S5.1.2(a)(2) or S5.1.2(b)) |             |
| <input checked="" type="checkbox"/> | Frontal 0° - Test Speed: 39.8 kmph                                                                        |                                                                                                       |             |
|                                     | <input type="checkbox"/>                                                                                  | Belted 50 <sup>th</sup> male dummy driver (0 to 48 kmph) (S5.1.1.(b)(1) or S5.1.1(a))                 |             |
|                                     | <input type="checkbox"/>                                                                                  | Belted 50 <sup>th</sup> male dummy passenger (0 to 48 kmph) (S5.1.1.(b)(1) or S5.1.1(a))              |             |
|                                     | <input type="checkbox"/>                                                                                  | Belted 5 <sup>th</sup> female dummy driver (0 to 48 kmph) (S16.1(a)(1))                               |             |
|                                     | <input type="checkbox"/>                                                                                  | Belted 5 <sup>th</sup> female dummy passenger (0 to 48 kmph) (S16.1(a)(1))                            |             |
|                                     | <input type="checkbox"/>                                                                                  | Belted 5 <sup>th</sup> female dummy driver and passenger (0 to 56 kmph) (S16.1(a)(2))                 |             |
|                                     | <input type="checkbox"/>                                                                                  | Belted 50 <sup>th</sup> male dummy driver and passenger (0 to 56 kmph) (S5.1.1.(b)(2))                |             |
|                                     | <input type="checkbox"/>                                                                                  | Unbelted 50 <sup>th</sup> male dummy driver and passenger (0 to 48 kmph) (S5.1.2(a) (1))              |             |
|                                     | <input checked="" type="checkbox"/>                                                                       | Unbelted 50 <sup>th</sup> male dummy driver (32 to 40 kmph) (S5.1.2.(a)(2) or S5.1.2(b))              |             |
|                                     | <input checked="" type="checkbox"/>                                                                       | Unbelted 50 <sup>th</sup> male dummy passenger (32 to 40 kmph) (S5.1.2.(a)(2) or S5.1.2(b))           |             |
|                                     | <input type="checkbox"/>                                                                                  | Unbelted 5 <sup>th</sup> female dummy driver (32 to 40 kmph) (S16.1(b))                               |             |
|                                     | <input type="checkbox"/>                                                                                  | Unbelted 5 <sup>th</sup> female dummy passenger (32 to 40 kmph) (S16.1(b))                            |             |
| <input type="checkbox"/>            | 40% Offset 0° Belted 5 <sup>th</sup> female dummy driver and passenger (0 to 40 kmph) (S18.1) Test Speed: |                                                                                                       |             |
- ☐ 29. FMVSS 204 Indicant Test
- ☒ 30. FMVSS 212 Test
- ☒ 31. FMVSS 219 Indicant Test
- ☒ 32. FMVSS 301 Frontal Test
- ☒ 33. FMVSS 305 Indicant Test

**DATA SHEET 2**  
**REPORT OF VEHICLE CONDITION**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance

NHTSA No.: CB0502  
Test Dates: 1/18/12 - 2/24/12

CONTRACT NO.: DTNH22-08-D-00086

Date: 3/2/12

FROM (Lab and rep name): MGA Research Corporation

TO: NHTSA, OVSC, NVS-220

PURPOSE: (X) Initial Receipt ( ) Received via Transfer (X) Present vehicle condition

MODEL YEAR/MAKE/MODEL/BODY STYLE: 2011 Hyundai Sonata Hybrid 4 Door

MANUFACTURE DATE: MAR/01/11

NHTSA NO. CB0502 GVWR: 2080 kg (4586 lbs)

BODY COLOR: Silver GAWR (Fr): 1100 kg (2425 lbs)

VIN: KMHEC4A42BA002136 GAWR (Rr): 1030 kg (2271 lbs)

ODOMETER READINGS: ARRIVAL (miles): 113 DATE: 6/9/11

COMPLETION (miles): 116 DATE: 2/24/12

PURCHASE PRICE: (\$) 26,180

DEALER'S NAME: John Amato Hyundai 8301 N. 75<sup>th</sup> Street, Milwaukee, WI 53223

- A. All options listed on window sticker are present on the test vehicle:  
X Yes      No
- B. Tires and wheel rims are new and the same as listed: X Yes      No
- C. There are no dents or other interior or exterior flaws: X Yes      No
- D. The vehicle has been properly prepared and is in running condition:  
X Yes      No
- E. Keyless remote is available and working: X Yes      No
- F. The glove box contains an owner's manual, warranty document, consumer information, and extra set of keys: X Yes      No
- G. Proper fuel filler cap is supplied on the test vehicle: X Yes      No
- H. Using permanent marker, identify vehicle with NHTSA number and FMVSS test type(s) on roof line above driver door or for school buses, place a placard with NHTSA number inside the windshield and to the exterior front and rear side of bus:  
X Yes      No
- I. Place vehicle in storage area: X Yes      No
- J. Inspect the vehicle's interior and exterior, including all windows, seats, doors, etc. to confirm that each system is complete and functional per the manufacturer's specifications. Any damage, misadjustment, or other unusual condition that could influence the test program or test results shall be recorded. Report any abnormal condition to the NHTSA COTR before beginning any test:  
X Vehicle OK      Conditions reported below in comment section

Identify the letter above to which any of the following comments apply.

Comments: \_\_\_\_\_  
\_\_\_\_\_

**REPORT OF VEHICLE CONDITION AT THE COMPLETION OF TESTING**

LIST OF FMVSS TESTS PERFORMED BY THIS LAB: FMVSS 208, 212, 219, 301, 305

VEHICLE: 2011 Hyundai Sonata Hybrid

NHTSA NO.: CB0502

REMARKS:

Equipment that is no longer on the test vehicle as noted on previous page:

Right Hand Rear Tail Light, Spare Tire, Jack, Tools, Rear Seat

Explanation for equipment removal:

Components removed for instrumentation installation and to meet target weight.

Test Vehicle Condition:

25 mph frontal impact damage- front suspension & structure damaged, hood & front quarter panels damaged, radiator damaged, air bags & pretensioners deployed, Stoddard in fuel system

RECORDED BY: Jeff Lewandowski

DATE: 3/2/2012

APPROVED BY: David Winkelbauer

DATE: 3/2/2012

#####

**RELEASE OF TEST VEHICLE**

The vehicle described above is released from MGA to be delivered to:

Date:

Time:

Odometer:

Lab Rep's Signature:

Title:

Carrier/Customer Rep:

Date:

### DATA SHEET 3

#### CERTIFICATION LABEL AND TIRE PLACARD INFORMATION

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Tim Novak

NHTSA No.: CB0502  
 Test Date: 2/24/12

| Certification Label (Part 567)                  |                       |
|-------------------------------------------------|-----------------------|
| Manufacturer:                                   | HYUNDAI MOTOR COMPANY |
| Date of Manufacture:                            | MAR/01/11             |
| VIN:                                            | KMHEC4A42BA002136     |
| Vehicle Certified As (Pass. Car/MPV/Truck/Bus): | Passenger Car         |
| Front Axle GVWR:                                | 2080 kg (4586 lbs)    |
| Rear Axle GVWR:                                 | 1100 kg (2425 lbs)    |
| Total GVWR:                                     | 1030 kg (2271 lbs)    |

| Tire Placard for Motor Vehicles with GVWR of 10,000 lb or Less and Passenger Cars (571.110) |                  |
|---------------------------------------------------------------------------------------------|------------------|
| Vehicle Capacity Weight:                                                                    | 410 kg (904 lbs) |
| Designated Seating Capacity Front:                                                          | 2                |
| Designated Seating Capacity Rear:                                                           | 3                |
| Total Designated Seating Capacity:                                                          | 5                |
| Recommended Cold Tire Inflation Pressure Front:                                             | 235 kpa (34 psi) |
| Recommended Cold Tire Inflation Pressure Rear:                                              | 235 kpa (34 psi) |
| Recommended Tire Size:                                                                      | P205/65R16       |
| Tire Size on Vehicle:                                                                       | P205/65R16       |

Signature: 

Date: 2/24/12

**DATA SHEET 4**  
**REAR SEATING POSITION SEAT BELTS**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance  
Test Technician: Wayne Dahlke

NHTSA No.: CB0502  
Test Date: 1/18/12

|                                                       | Yes | No |
|-------------------------------------------------------|-----|----|
| Do all rear seating positions have Type 2 seat belts? | X   |    |

If NO, describe the seat belt installed, the seat location, and any other information about the seat that would explain why a Type 2 seat belt was not installed.

NOTE: While the 2011 Hyundai Sonata Hybrid does have Type 2 seat belts at all rear seating locations; it does have a center rear detachable belt. The detachable belt system is not permitted in the rear of passenger cars that do not have a fold down seat.

REMARKS:

Signature: Wayne Dahlke

Date: 1/18/12

**DATA SHEET 5**  
**AIR BAG LABELS (S4.5.1)**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance  
Test Technician: Wayne Dahlke

NHTSA No.: CB0502  
Test Date: 1/18/12

- ☒ 1. Air Bag Maintenance Label and Owner's Manual Instructions: (S4.5.1(a))
- ☒ 1.1 Does the manufacturer recommend periodic maintenance or replacement of the air bag?
- ☐ Yes (Go to 1.2)
- ☒ No (Go to 2)
- ☐ 1.2 Does the vehicle have a label specifying air bag maintenance or replacement?
- ☐ Yes – Pass
- ☐ No – Fail
- ☐ 1.3 Does the label contain one of the following?
- ☐ Yes – Pass
- ☐ No – Fail
- Check applicable schedule:
- ☐ Schedule on label specifies month and year (Record date\_\_\_\_\_)
- ☐ Schedule on label specifies vehicle mileage (Record mileage\_\_\_\_\_)
- ☐ Schedule on label specifies interval measured from date on certification label (Record interval\_\_\_\_\_)
- ☐ 1.4 Is the label permanently affixed within the passenger compartment such that it cannot be removed without destroying or defacing the label or vehicle part? (3/19/01 legal interpretation to Todd Mitchell)
- ☐ Yes – Pass
- ☐ No – Fail
- ☐ 1.5 Is the label lettered in English?
- ☐ Yes – Pass
- ☐ No – Fail
- ☐ 1.6 Is the label in block capitals and numerals?
- ☐ Yes – Pass
- ☐ No – Fail
- ☐ 1.7 Are the letters and numerals at least 3/32 inches high?
- ☐ Yes – Pass
- ☐ No – Fail
- ☐ 1.8 Does the owner's manual set forth the recommended schedule for maintenance or replacement?
- ☒ 2. Does the owner's manual: (S4.5.1(f))
- ☒ 2.1 Include a description of the vehicle's air bag system in an easily understandable format?
- ☒ Yes – Pass
- ☐ No – Fail
- ☒ 2.2 Include a statement that the vehicle is equipped with an air bag and a lap/shoulder belt at the front outboard seating position?
- ☒ Yes – Pass
- ☐ No – Fail
- ☒ 2.3 Include a statement that the air bag is a supplemental restraint at the front outboard seating position?
- ☒ Yes – Pass
- ☐ No – Fail

- ☒ 2.4 Emphasize that all occupants, including the driver, should always wear their seat belts whether or not an air bag is also provided at their seating positions to minimize the risk of severe injury or death in the event of a crash?  
☒ Yes – Pass  
☐ No – Fail
- ☒ 2.5 Provide any necessary precautions regarding the proper positioning of occupants, including children, at seating positions equipped with air bags to ensure maximum safety protection for those occupants?  
☒ Yes – Pass  
☐ No – Fail
- ☒ 2.6 Explain that no objects should be placed over or near the air bag on the steering wheel or on the instrument panel, because any such objects could cause harm if the vehicle is in a crash severe enough to cause the air bag to inflate?  
☒ Yes – Pass  
☐ No – Fail
- ☒ 2.7 Is the vehicle certified to meet the requirements of S14.5, S15, S17, S19, S21, S23, and S25? (Obtain answer to this question from the COTR) (S4.5.1(f)(2))  
☒ Yes – (Go to 2.7.1)  
☐ No – (Go to 3.)
- ☒ 2.7.1 Explain the proper functioning of the advanced air bag system? (S4.5.1(f)(2))  
☒ Yes – Pass  
☐ No – Fail
- ☒ 2.7.2 Provide a summary of the actions that may affect the proper functioning of the system? (S4.5.1(f)(2))  
☒ Yes – Pass  
☐ No – Fail
- ☒ 2.7.3 Present and explain the main components of the advanced passenger air bag system? (S4.5.1(f)(2)(i))  
☒ Yes – Pass  
☐ No – Fail
- ☒ 2.7.4 Explain how the components function together as part of the advanced passenger air bag system? (S4.5.1(f)(2)(ii))  
☒ Yes – Pass  
☐ No – Fail
- ☒ 2.7.5 Contain the basic requirements for proper operation, including an explanation of the actions that may affect the proper functioning of the system? (S4.5.1(f)(2)(iii))  
☒ Yes – Pass  
☐ No – Fail
- ☒ 2.7.6 Is the vehicle certified to the requirements of S19.2, S21.2, or 23.2 (automatic suppression)?  
☒ Yes, continue with 2.7.6  
☐ No, go to 2.7.7
- ☒ 2.7.6.1 Contain a complete description of the passenger air bag suppression system installed in the vehicle, including a discussion of any suppression zone? (S4.5.1(f)(2)(iv))  
☒ Yes – Pass  
☐ No – Fail
- ☒ 2.7.6.2 Discuss the telltale light, specifying its location in the vehicle and explaining when the light is illuminated?  
☒ Yes – Pass  
☐ No – Fail
- ☒ 2.7.7 Explain the interaction of the advanced passenger air bag system with other vehicle components, such as seat belts, seats or other components? (S4.5.1(f)(2)(v))  
☒ Yes – Pass  
☐ No – Fail

- ☒ 2.7.8 Summarize the expected outcomes when child restraint systems, children and small teenagers or adults are both properly and improperly positioned in the passenger seat, including cautionary advice against improper placement of child restraint systems? (S4.5.1(f)(2)(vi))
- ☒ Yes – Pass  
☐ No – Fail
- ☒ 2.7.9 Provide information on how to contact the vehicle manufacturer concerning modifications for persons with disabilities that may affect the advanced air bag system? (S4.5.1(f)(2)(vii))
- ☒ Yes – Pass  
☐ No – Fail
- ☒ 3. Sun Visor Air Bag Warning Label (S4.5.1(b)): Vehicles certified to meet the requirements of S19, S21 and S23. (S4.5.1(b)(3))
- ☒ 3.1 Is the label permanently affixed (including permanent marking on the visor material or molding into the visor material) to either side of the sun visor at each front outboard seating position such that it cannot be removed without destroying or defacing the label or the sun visor? (S4.5.1(b)(3)) (3/19/01 legal interpretation to Todd Mitchell)
- ☒ Driver Side, Yes – Pass  
☐ Driver Side, No – Fail  
☒ Passenger Side, Yes – Pass  
☐ Passenger Side, No – Fail
- ☒ 3.2 Does the label conform in content to the label shown in Figure 11 at each front outboard seating position? (S4.5.1(b)(2)) **(Vehicles without back seats or the back seat is too small to accommodate a rear-facing child restraint may omit the statement: "Never put a rear-facing child seat in the front." (S4.5.1(b)(3)(v)))**



Figure 11. Sun Visor Label Visible when Visor is in Down Position.



Figure 6b. Sun Visor Label Visible When Visor is in Down Position.

- ☒ Driver Side, Yes – Pass  
☐ Driver Side, No – Fail  
☒ Passenger Side, Yes – Pass  
☐ Passenger Side, No – Fail



- ☒ 3.3 Is the label heading area yellow with the word "WARNING" and the alert symbol in black? (S4.5.1(b)(3)(i))
- ☒ Driver Side, Yes – Pass  
☐ Driver Side, No – Fail  
☒ Passenger Side, Yes – Pass  
☐ Passenger Side, No – Fail
- ☒ 3.4 Is the message area white with black text? (S4.5.1(b)(3)(ii))
- ☒ Driver Side, Yes – Pass  
☐ Driver Side, No – Fail  
☒ Passenger Side, Yes – Pass  
☐ Passenger Side, No – Fail
- ☒ 3.5 Is the message area at least 30 cm<sup>2</sup>? (S4.5.1(b)(3)(ii))
- The message area consists of the total label area minus the yellow heading area and the pictogram. The pictogram is enclosed on the left side and bottom by the edge of the label. The top edge of the pictogram area is defined by a horizontal line midway between the uppermost edge of the pictogram and the lowermost edge of the text. The right side of the pictogram is defined by a vertical line midway between the rightmost edge of the pictogram and the left most edge of the text, including any bullets. (See 5/6/03 interpretation to Gerald Plante on behalf of Subaru)**
- Driver Side: Length 90 mm, Width 40 mm  
 Passenger Side: Length 90 mm, Width 40 mm  
 Driver actual message area 36 cm<sup>2</sup>  
 Passenger actual message area 36 cm<sup>2</sup>
- ☒ Driver Side, Yes – Pass  
☐ Driver Side, No – Fail  
☒ Passenger Side, Yes – Pass  
☐ Passenger Side, No – Fail
- ☒ 3.6 Is the pictogram black on a white background? (S4.5.1(b)(3)(iii))
- ☒ Driver Side, Yes – Pass  
☐ Driver Side, No – Fail  
☒ Passenger Side, Yes – Pass  
☐ Passenger Side, No – Fail
- ☒ 3.7 Is the pictogram at least 30 mm in length? (S4.5.1(b)(3)(iii))
- Driver side: Length: 32 mm  
 Passenger side: Length: 32 mm
- ☒ Driver Side, Yes – Pass  
☐ Driver Side, No – Fail  
☒ Passenger Side, Yes – Pass  
☐ Passenger Side, No – Fail
- ☒ 3.8 Is the same side of the sun visor that contains the air bag warning label free of other information with the exception of the air bag maintenance label and/or the rollover-warning label? (S4.5.1(b)(5)(i))
- ☒ Driver Side, Yes – Pass  
☐ Driver Side, No – Fail  
☒ Passenger Side, Yes – Pass  
☐ Passenger Side, No – Fail
- ☒ 3.9 Is the sun visor free of other information about air bags or the need to wear seat belts with the exception of the air bag alert label and/or the rollover-warning label? (S4.5.1(b)(5)(ii))
- ☒ Driver Side, Yes – Pass  
☐ Driver Side, No – Fail  
☒ Passenger Side, Yes – Pass  
☐ Passenger Side, No – Fail

- ☒ 3.10 Does the driver side visor contain a rollover-warning label on the same side of the visor as the air bag warning label?  
 \_\_\_ Yes (go to 3.10.1)  
☒ No (go to 4., skipping 3.10.1 through 3.10.3)
- ☐ 3.10.1 Are both the rollover-warning label and the air bag warning label surrounded by a continuous solid-lined border?  
 \_\_\_ Yes (go to 3.10.2 and skip 3.10.3)  
 \_\_\_ No (go to 3.10.3 and skip 3.10.2)
- ☐ 3.10.2 Is the shortest distance from the border of the rollover label to the border of the air bag warning label at least 1 cm? (575.105 (d)(1)(iv)(B))  
 \_\_\_\_\_ actual distance  
 \_\_\_ Yes-Pass \_\_\_ **No-FAIL**
- ☐ 3.10.3 Is the shortest distance from any of the lettering or graphics on the rollover-warning label to any of the lettering or graphics of the air bag warning label at least 3 cm? (575.105 (d)(1)(iv)(A))  
 \_\_\_\_\_ actual distance  
 \_\_\_ Yes-Pass \_\_\_ **No-FAIL**
- ☒ 4. Air Bag Alert Label (S4.5.1(c) (A "Rollover Warning Label" or "Rollover Alert Label" may be on the same side of the driver's sun visor as the "Air Bag Alert Label." 575.105(d))
- ☒ 4.1 Is the Sun Visor Warning Label visible when the sun visor is in the stowed position?  
☒ **If yes for driver and passenger, go to 5.**  
☒ Driver Side, Yes  
☐ Driver Side, No  
☒ Passenger Side, Yes  
☐ Passenger Side, No
- ☐ 4.2 Is the air bag alert label permanently affixed (including permanent marking on the visor material or molding into the visor material) to the sun visor at each front outboard seating position such that it cannot be removed without destroying or defacing the label or the sun visor? (S4.5.1(c)) (3/19/01 legal interpretation to Todd Mitchell)  
☐ Driver Side, Yes – Pass  
☐ Driver Side, No – Fail  
☐ Passenger Side, Yes – Pass  
☐ Passenger Side, No – Fail
- ☐ 4.3 Is the air bag alert label visible when the visor is in the stowed position? (S4.5.1(c))  
☐ Driver Side, Yes – Pass  
☐ Driver Side, No – Fail  
☐ Passenger Side, Yes – Pass  
☐ Passenger Side, No – Fail

☐ 4.4 Does the label conform in content to the label shown in Figure 6C? (S4.5.1(c))

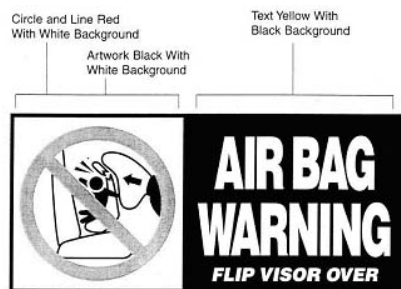


Figure 6c. Sun Visor Label Visible When Visor is in Up Position.

- ☐ Driver Side, Yes – Pass  
☐ Driver Side, No – Fail  
☐ Passenger Side, Yes – Pass  
☐ Passenger Side, No – Fail

☐ 4.5 Is the message area black with yellow text? (S4.5.1(c)(1))

- ☐ Driver Side, Yes – Pass  
☐ Driver Side, No – Fail  
☐ Passenger Side, Yes – Pass  
☐ Passenger Side, No – Fail

☐ 4.6 Is the message area at least 20 cm<sup>2</sup>? (S4.5.1(c)(1)) **The message area consists of the black part of the label.**

Driver Side: Length \_\_\_\_\_, Width \_\_\_\_\_

Passenger Side: Length \_\_\_\_\_, Width \_\_\_\_\_

Actual message area \_\_\_\_\_ cm<sup>2</sup>

- ☐ Driver Side, Yes – Pass  
☐ Driver Side, No – Fail  
☐ Passenger Side, Yes – Pass  
☐ Passenger Side, No – Fail

☐ 4.7 Is the pictogram black with a red circle and slash on a white background? (S4.5.1(c)(2))

- ☐ Driver Side, Yes – Pass  
☐ Driver Side, No – Fail  
☐ Passenger Side, Yes – Pass  
☐ Passenger Side, No – Fail

☐ 4.8 Is the pictogram at least 20 mm in diameter? (S4.5.1(c)(2))

Driver Side: Diameter \_\_\_\_\_ mm

Passenger Side: Diameter \_\_\_\_\_ mm

- ☐ Driver Side, Yes – Pass  
☐ Driver Side, No – Fail  
☐ Passenger Side, Yes – Pass  
☐ Passenger Side, No – Fail

☒ 5. Label on the Dashboard: Vehicles certified to meet the requirements of S19, S21 and S23?

☒ 5.1 Does the vehicle have a label on the dash or steering wheel hub? (S4.5.1(e)(3))

- ☒ Yes – Pass  
☐ No – Fail

☒ 5.2 Is the label clearly visible from all front seating positions? (S4.5.1(e)(3))

- ☒ Yes – Pass  
☐ No – Fail

- ☒ 5.3 Does the label conform in content to the label shown in Figure 12? (S4.5.1(e)(3)) **Vehicles without back seats may omit the statement: "The back seat is the safest place for children." Vehicles without back seats or too small to accommodate a rear-facing child restraint consistent with S4.5.4.1 as determined in DATA SHEET 7 may omit the statement "Never put a rear-facing child seat in the front." (S4.5.1(e)(3)(iii))**

☒ Yes – Pass  
☐ No - Fail

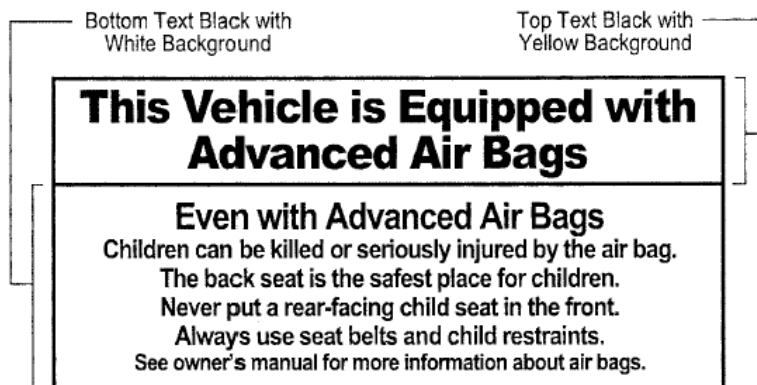


Figure 12. Removable Label on Dash.

- ☒ 5.4 Is the heading area yellow with black text? (S4.5.1(e)(3)(i))  
☒ Yes – Pass  
☐ No - Fail
- ☒ 5.5 Is the message white with black text? (S4.5.1(e)(3)(ii))  
☒ Yes – Pass  
☐ No - Fail
- ☒ 5.6 Is the message area at least 30 cm<sup>2</sup>? (S4.5.1(e)(3)(ii)) **The message area consists of the total label area minus the yellow heading area. (See 5/6/03 interpretation to Gerald Plante on behalf of Subaru)**  
Length 115 mm, Width 31 mm  
Actual message area 35.7 cm<sup>2</sup>  
☒ Yes – Pass  
☐ No - Fail

I certify that I have read and performed each instruction.

Signature: Wayne Zahle

Date: 1/18/12

**DATA SHEET 6**  
**FMVSS 208 READINESS INDICATOR (S4.5.2)**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance  
Test Technician: Wayne Dahlke

NHTSA No.: CB0502  
Test Date: 1/18/12

An occupant restraint system that deploys in the event of a crash shall have a monitoring system with a readiness indicator. A totally mechanical system is exempt from this requirement. (11/8/94 legal interpretation to Lawrence F. Hennegerger on behalf of Breed)

- ☒ 1. Is the system totally mechanical? **(If Yes, this Data Sheet is complete).**  
☐ Yes  
☒ No
- ☒ 2. Describe the location of the readiness indicator: *Lower Center of Instrument Cluster*
- ☒ 3. Is the readiness indicator clearly visible to the driver?  
☒ Yes – Pass  
☐ No - Fail
- ☒ 4. Is a list of the elements in the occupant restraint system, being monitored by the readiness indicator, provided on a label or in the owner's manual?  
☒ Yes – Pass  
☐ No - Fail
- ☒ 5. Does the vehicle have an on-off switch for the passenger air bag?  
☐ If Yes (go to 6)  
☒ If No (this form is complete)
- ☐ 6. Is the air bag readiness indicator off when the passenger air bag switch is in the off position?  
☐ Yes – Pass  
☐ No - Fail

REMARKS:

I certify that I have read and performed each instruction.

Signature: Wayne Dahlke

Date: 1/18/12

## DATA SHEET 7

### PASSENGER AIR BAG MANUAL CUT-OFF DEVICE (S4.5.4)

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Wayne Dahlke

NHTSA No.: CB0502  
 Test Date: 1/18/12

- ☒ 1. Is the vehicle equipped with an on-off switch that deactivates the air bag installed at the right front outboard seating position?  
☐ Yes, go to 2  
☒ No, this sheet is complete
- ☐ 2. Does the vehicle have any forward-facing rear designated seating positions? (S4.5.4.1(a))  
☐ Yes, go to 3  
☐ No, go to 4
- ☐ 3. Verification there is room for a child restraint in the rear seat behind the driver's seat. (S4.5.4.1(b))
- ☐ 3.1 Using all the controls that affect the fore-aft movement of the seat, move the seat to the rearmost position. Mark this position.  
☐ N/A – the seat does not have fore-aft adjustment
- ☐ 3.2 Using all the controls that affect the fore-aft movement of the seat, move the seat to the foremost position. Mark this position.  
☐ N/A – the seat does not have fore-aft adjustment
- ☐ 3.3 Move the seat to the middle of the foremost and rearmost positions. (S8.1.2)  
☐ N/A – the seat does not have a fore-aft adjustment
- ☐ 3.4 If the driver's seat height is adjustable, use all the controls that affect height to put it in the lowest position while maintaining the middle fore-aft position. (S8.1.2)  
☐ N/A – No seat height adjustment
- ☐ 3.5 Position the driver's seat adjustable lumbar supports so that the lumbar support is in its lowest, retracted or deflated adjustment position. (S8.1.3)  
☐ N/A – No lumbar adjustment
- ☐ 3.6 The driver's seat back angle, if adjustable, is set at the manufacturer's nominal design riding position for a 50th percentile adult male in the manner specified by the manufacturer. (S4.5.4.1(b) and S8.1.3)  
☐ N/A – No seat back angle adjustment  
☐ Manufacturer's design driver's seat back angle \_\_\_\_\_  
☐ Tested driver's seat back angle \_\_\_\_\_
- ☐ 3.7 Is the driver seat a bucket seat?  
 \_\_\_ Yes, go to 3.7.1 and skip 3.7.2.  
 \_\_\_ No, go to 3.7.2 and skip 3.7.1.
- ☐ 3.7.1 Bucket seats:
- ☐ 3.7.1.1 Locate and mark a vertical Plane B through the longitudinal centerline of the driver's seat cushion. The longitudinal centerline of a bucket seat cushion is determined at SgRP. (S16.3.1.10) (S4.5.4.1(b)(1))
- ☐ 3.7.1.2 Locate the longitudinal horizontal line in plane B that is tangent to the highest point of the rear seat cushion behind the driver's seat. Measure along this line from the front of the seat back of the rear seat to the rear of the seat back of the driver's seat.  
 \_\_\_\_\_ mm distance  
 \_\_\_\_\_ less than 720 mm – Pass  
 \_\_\_\_\_ more than 720 mm – **FAIL**  
 Go to 4
- ☐ 3.7.2 Bench seats (including split bench seats):
- ☐ 3.7.2.1 Locate and mark a vertical Plane B through the center of the steering wheel parallel to the vehicle longitudinal centerline. (S4.5.4.1(b)(2))

- ☐ 3.7.2.2 Locate the longitudinal horizontal line in plane B that is tangent to the highest point of the rear seat cushion. Measure along this line from the front of the seat back of the rear seat to the rear of the seat back of the front seat.  
       \_\_\_\_\_ mm distance  
       \_\_\_\_\_ less than 720 mm – Pass  
       \_\_\_\_\_ more than 720 mm - **FAIL**  
       Go to 4
- ☐ 4. Does the device turn the air bag on and off using the vehicle's ignition key? (S4.5.4.2)  
       ☐ Yes – Pass  
       ☐ No – Fail
- ☐ 5. Is the on-off device separate from the ignition switch? (S4.5.4.2)  
       ☐ Yes – Pass  
       ☐ No – Fail
- ☐ 6. Is there a telltale light that comes on when the passenger air bag is turned off? (S4.5.4.2)  
       ☐ Yes – Pass  
       ☐ No – Fail
- ☐ 7. Telltale light (S4.5.4.3)  
☐ 7.1 Is the light yellow? (S4.5.4.3(a))  
       ☐ Yes – Pass  
       ☐ No – Fail
- ☐ 7.2 Are the words "PASSENGER AIR BAG OFF" or "PASS AIR BAG OFF" (S4.5.4.3(b))  
☐ 7.2.1 on the telltale?  
       ☐ Yes – Pass, go to 7.3  
       ☐ No – go to 7.2.2
- ☐ 7.2.2 within 25 mm of the telltale?  
       Measurement from the edge of the telltale light (mm):  
       ☐ Yes – Pass  
       ☐ No – Fail
- ☐ 7.3 Does the telltale remain illuminated while the air bag is turned off? (S4.5.4.3c)  
       (Leave the air bag off for 5 minutes.)  
       ☐ Yes – Pass  
       ☐ No – Fail
- ☐ 7.4 Is the telltale illuminated while the air bag is turned on? (S4.5.4.3(d))  
       ☐ Yes – Fail  
       ☐ No – Pass
- ☐ 7.5 Is the telltale combined with the air bag readiness indicator? (S4.5.4.3(e))  
       ☐ Yes – Fail  
       ☐ No – Pass
- ☐ 8. Owner's Manual  
☐ 8.1 Does the owner's manual contain complete instructions on the operation of the on-off switch? (S4.5.4.4(a))  
       ☐ Yes – Pass  
       ☐ No – Fail

☐ 8.2 Does the owner's manual contain a statement that the on-off switch should only be used when a member of one of the following risk groups is occupying the right front passenger seating position? (S4.5.4.4(b))

Infants: there is no back seat  
the rear seat is too small to accommodate a child restraint  
there is a medical condition that must be monitored constantly  
Children aged 1 to 12: there is no back seat  
space is not always available in the rear seat  
there is a medical condition that must be monitored constantly  
Medical condition: medical risk causes special risk for passenger  
greater risk for harm than with the air bag on

☐ Yes – Pass

☐ No – Fail

☐ 8.3 Does the owner's manual contain a warning about the safety consequences of using the on-off switch at other times?

☐ Yes – Pass

☐ No – Fail

REMARKS:

Signature: Wayne Zahle

Date: 1/18/12

I certify that I have read and performed each instruction.



## DATA SHEET 8

### LAP BELT LOCKABILITY

**Passenger cars, trucks, buses, and multipurpose passenger  
Vehicles with a GVWR of 10,000 pounds or less. (S7.1.1.5)**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance  
Test Technician: Wayne Dahlke

NHTSA No.: CB0502  
Test Date: 1/18/12

Complete one of these forms for **each** designated seating position that can be adjusted to forward-facing or that is a forward-facing seat, other than the driver's seat (S7.1.1.5(a), **and** that has seat belt retractors that are not solely automatic locking retractors. (S7.1.1.5(c))

|                              |                 |
|------------------------------|-----------------|
| DESIGNATED SEATING POSITION: | Front Passenger |
|------------------------------|-----------------|

- |                                     |     |                                                                                                                                                                                                                                                                                                           |
|-------------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            |     | N/A – No retractor is at this position                                                                                                                                                                                                                                                                    |
| <input type="checkbox"/>            |     | N/A – The retractor is an automatic locking retractor ONLY                                                                                                                                                                                                                                                |
| <input checked="" type="checkbox"/> | 1.  | Record test fore-aft seat position: <b>REAR</b><br>(S7.1.1.5(c)(1)) (Any position is acceptable)                                                                                                                                                                                                          |
| <input checked="" type="checkbox"/> | 2.  | Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does <b>NOT</b> have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle. (S7.1.1.5(a))        |
|                                     |     | <input checked="" type="checkbox"/> Yes – Pass                                                                                                                                                                                                                                                            |
|                                     |     | <input type="checkbox"/> No – Fail                                                                                                                                                                                                                                                                        |
| <input checked="" type="checkbox"/> | 3.  | Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does <b>NOT</b> require inverting, twisting or deforming of the belt webbing. (S7.1.1.5(a))                                                         |
|                                     |     | <input checked="" type="checkbox"/> Yes – Pass                                                                                                                                                                                                                                                            |
|                                     |     | <input type="checkbox"/> No – Fail                                                                                                                                                                                                                                                                        |
| <input checked="" type="checkbox"/> | 4.  | Place any adjustable seat belt anchorage in the lowest adjustment position.                                                                                                                                                                                                                               |
|                                     |     | <input type="checkbox"/> N/A The anchorage is not adjustable.                                                                                                                                                                                                                                             |
| <input checked="" type="checkbox"/> | 5.  | Buckle the seat belt. (S7.1.1.5(c)(1))                                                                                                                                                                                                                                                                    |
| <input checked="" type="checkbox"/> | 6.  | Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))                                                                                                                                                                                                                                      |
| <input checked="" type="checkbox"/> | 7.  | Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))                                                                                                                              |
| <input checked="" type="checkbox"/> | 8.  | Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing?                                                                                                        |
|                                     |     | <input checked="" type="checkbox"/> Yes (go to 8.1)                                                                                                                                                                                                                                                       |
|                                     |     | <input type="checkbox"/> No (go to 9)                                                                                                                                                                                                                                                                     |
| <input checked="" type="checkbox"/> | 8.1 | Does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system. (S7.1.1.5(b))    |
|                                     |     | <input checked="" type="checkbox"/> Yes – Pass                                                                                                                                                                                                                                                            |
|                                     |     | <input type="checkbox"/> No – Fail                                                                                                                                                                                                                                                                        |
| <input checked="" type="checkbox"/> | 9.  | Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2) & S7.1.1.5(c)(1)) |

- ☒ 10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
- ☒ Measured distance between A and B (inches): 70 1/4
- ☒ 11. Readjust the belt system so that the webbing between points A and B is at 1/2 the maximum length of the webbing. (S7.1.1.5(c)(3))
- ☒ 12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device in Figure 5. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))
- ☒ Measured force application angle: 10° (spec. 5 - 15 degrees)
- ☒ 13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))
- ☒ Measured distance between A and B: 43 1/2 inches
- ☒ 14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))
- Record onset rate: 15 lb/sec (spec. 10 to 50 lb/sec) (S7.1.1.5(c)(5))
- Measured distance between A and B: 44 inches (S7.1.1.5(c)(6))
- ☒ 15. Let the seat belt webbing retract to its minimum length with the seat belt still buckled.
- ☒ 16. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device in Figure 5. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))
- Measured force application angle: 10° (spec. 5 - 15 degrees)
- ☒ 17. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))
- Measured distance between A and B: 22 1/2 inches
- ☒ 18. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))
- Record onset rate: 15 lb/sec (spec. 10 to 50 lb/sec) (S7.1.1.5(c)(5))
- Measured distance between A and B: 23 1/2 inches (S7.1.1.5(c)(6))
- ☒ 19. Subtract the measurement in 13 from the measurement in 14 and the measurement in 17 from the measurement in 18. Is the difference 2 inches or less for both? (S7.1.1.5(c)(7))
- ☒  $14 - 13 = 44 - 43 \frac{1}{2} = \frac{1}{2}$  inch;
- ☒  $18 - 17 = 23 \frac{1}{2} - 22 \frac{1}{2} = 1$  inch
- ☒ Yes – Pass
- ☐ No – Fail

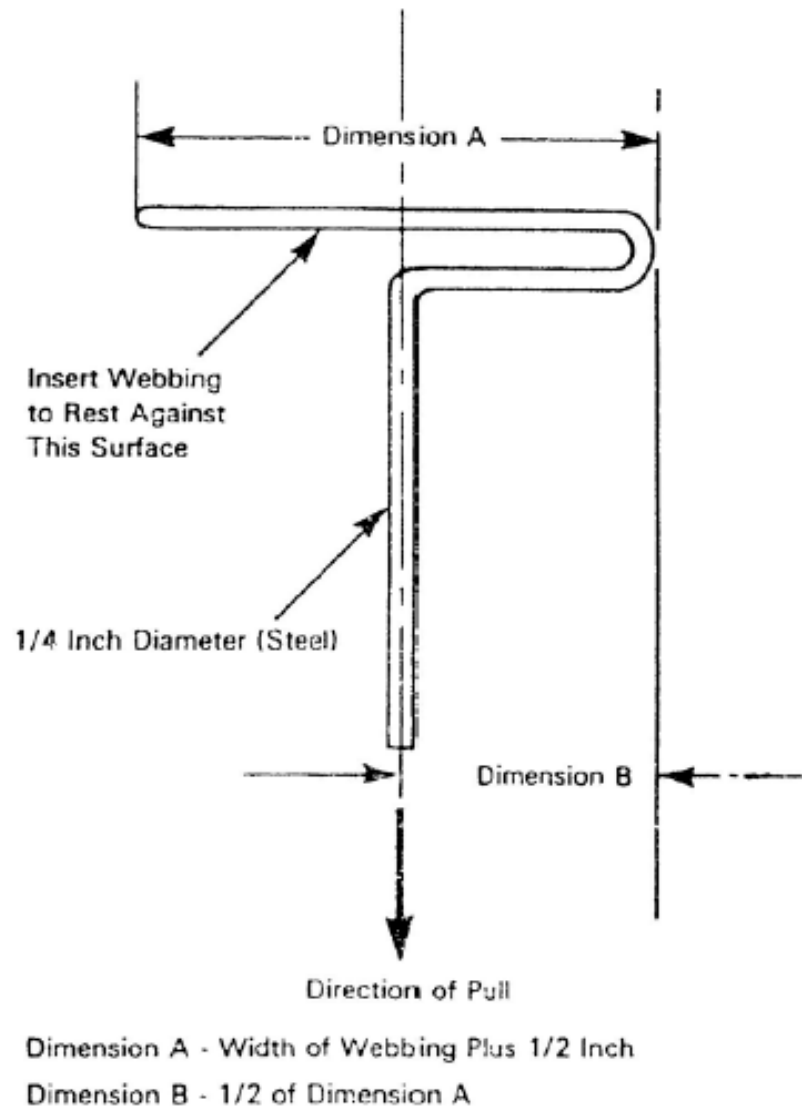
- ☒ 20. Subtract the measurement in 14 from the measurement in 10 and the measurement in 18 from the measurement in 10. Is the difference 3 inches or more for both?  
(S7.1.1.5(c)(8))
- ☒ 10-14 =  $70 \frac{1}{4} - 44 = 26 \frac{1}{4}$  inches;  
☒ 10-18 =  $70 \frac{1}{4} - 23 \frac{1}{2} = 46 \frac{3}{4}$  inches
- ☒ Yes – Pass  
☐ No – Fail

REMARKS:

Signature: Wayne Zuhl

Date: 1/18/12

I certify that I have read and performed each instruction.



**Figure 5. - Webbing Tension Pull Device**

## DATA SHEET 8

### LAP BELT LOCKABILITY

**Passenger cars, trucks, buses, and multipurpose passenger  
Vehicles with a GVWR of 10,000 pounds or less. (S7.1.1.5)**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance  
Test Technician: Wayne Dahlke

NHTSA No.: CB0502  
Test Date: 1/18/12

Complete one of these forms for **each** designated seating position that can be adjusted to forward-facing or that is a forward-facing seat, other than the driver's seat (S7.1.1.5(a), **and** that has seat belt retractors that are not solely automatic locking retractors. (S7.1.1.5(c))

|                              |                     |
|------------------------------|---------------------|
| DESIGNATED SEATING POSITION: | Left Rear Passenger |
|------------------------------|---------------------|

- |                                     |     |                                                                                                                                                                                                                                                                                                           |
|-------------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            |     | N/A – No retractor is at this position                                                                                                                                                                                                                                                                    |
| <input type="checkbox"/>            |     | N/A – The retractor is an automatic locking retractor ONLY                                                                                                                                                                                                                                                |
| <input checked="" type="checkbox"/> | 1.  | Record test fore-aft seat position: <b>FIXED</b><br>(S7.1.1.5(c)(1)) (Any position is acceptable)                                                                                                                                                                                                         |
| <input checked="" type="checkbox"/> | 2.  | Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does <b>NOT</b> have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle. (S7.1.1.5(a))        |
|                                     |     | <input checked="" type="checkbox"/> Yes – Pass                                                                                                                                                                                                                                                            |
|                                     |     | <input type="checkbox"/> No – Fail                                                                                                                                                                                                                                                                        |
| <input checked="" type="checkbox"/> | 3.  | Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does <b>NOT</b> require inverting, twisting or deforming of the belt webbing. (S7.1.1.5(a))                                                         |
|                                     |     | <input checked="" type="checkbox"/> Yes – Pass                                                                                                                                                                                                                                                            |
|                                     |     | <input type="checkbox"/> No – Fail                                                                                                                                                                                                                                                                        |
| <input checked="" type="checkbox"/> | 4.  | Place any adjustable seat belt anchorage in the lowest adjustment position.                                                                                                                                                                                                                               |
|                                     |     | <input checked="" type="checkbox"/> N/A The anchorage is not adjustable.                                                                                                                                                                                                                                  |
| <input checked="" type="checkbox"/> | 5.  | Buckle the seat belt. (S7.1.1.5(c)(1))                                                                                                                                                                                                                                                                    |
| <input checked="" type="checkbox"/> | 6.  | Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))                                                                                                                                                                                                                                      |
| <input checked="" type="checkbox"/> | 7.  | Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))                                                                                                                              |
| <input checked="" type="checkbox"/> | 8.  | Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing?                                                                                                        |
|                                     |     | <input checked="" type="checkbox"/> Yes (go to 8.1)                                                                                                                                                                                                                                                       |
|                                     |     | <input type="checkbox"/> No (go to 9)                                                                                                                                                                                                                                                                     |
| <input checked="" type="checkbox"/> | 8.1 | Does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system. (S7.1.1.5(b))    |
|                                     |     | <input checked="" type="checkbox"/> Yes – Pass                                                                                                                                                                                                                                                            |
|                                     |     | <input type="checkbox"/> No – Fail                                                                                                                                                                                                                                                                        |
| <input checked="" type="checkbox"/> | 9.  | Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2) & S7.1.1.5(c)(1)) |

- ☒ 10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))  
Measured distance between A and B (inches): 72 1/4
- ☒ 11. Readjust the belt system so that the webbing between points A and B is at 1/2 the maximum length of the webbing. (S7.1.1.5(c)(3))
- ☒ 12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device in Figure 5. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))  
Measured force application angle: 10° (spec. 5 - 15 degrees)
- ☒ 13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))  
Measured distance between A and B: 43 1/2 inches
- ☒ 14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))  
Record onset rate: 15 lb/sec (spec. 10 to 50 lb/sec) (S7.1.1.5(c)(5))  
Measured distance between A and B: 43 1/2 inches (S7.1.1.5(c)(6))
- ☒ 15. Let the seat belt webbing retract to its minimum length with the seat belt still buckled.
- ☒ 16. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device in Figure 5. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))  
Measured force application angle: 10° (spec. 5 - 15 degrees)
- ☒ 17. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))  
Measured distance between A and B: 17 inches
- ☒ 18. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))  
Record onset rate: 15 lb/sec (spec. 10 to 50 lb/sec) (S7.1.1.5(c)(5))  
Measured distance between A and B: 18 inches (S7.1.1.5(c)(6))
- ☒ 19. Subtract the measurement in 13 from the measurement in 14 and the measurement in 17 from the measurement in 18. Is the difference 2 inches or less for both? (S7.1.1.5(c)(7))  
14 - 13 = 43 1/2 - 43 1/2 = 0 inch;  
18 - 17 = 18 - 17 = 1 inch
- ☒ Yes - Pass  
☐ No - Fail

- ☒ 20. Subtract the measurement in 14 from the measurement in 10 and the measurement in 18 from the measurement in 10. Is the difference 3 inches or more for both?  
(S7.1.1.5(c)(8))
- ☒ 10-14 =  $72 \frac{1}{4} - 43 \frac{1}{2} = 28 \frac{3}{4}$  inches;
- ☒ 10-18 =  $72 \frac{1}{4} - 18 = 54 \frac{1}{4}$  inches
- ☒ Yes – Pass
- ☐ No – Fail

REMARKS:

Signature: Wayne Zuhl

Date: 1/18/12

I certify that I have read and performed each instruction.

## DATA SHEET 8

### LAP BELT LOCKABILITY

**Passenger cars, trucks, buses, and multipurpose passenger  
Vehicles with a GVWR of 10,000 pounds or less. (S7.1.1.5)**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance  
Test Technician: Wayne Dahlke

NHTSA No.: CB0502  
Test Date: 1/18/12

Complete one of these forms for **each** designated seating position that can be adjusted to forward-facing or that is a forward-facing seat, other than the driver's seat (S7.1.1.5(a), **and** that has seat belt retractors that are not solely automatic locking retractors. (S7.1.1.5(c))

|                              |                       |
|------------------------------|-----------------------|
| DESIGNATED SEATING POSITION: | Center Rear Passenger |
|------------------------------|-----------------------|

- |                                     |     |                                                                                                                                                                                                                                                                                                           |
|-------------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            |     | N/A – No retractor is at this position                                                                                                                                                                                                                                                                    |
| <input type="checkbox"/>            |     | N/A – The retractor is an automatic locking retractor ONLY                                                                                                                                                                                                                                                |
| <input checked="" type="checkbox"/> | 1.  | Record test fore-aft seat position: <b>FIXED</b><br>(S7.1.1.5(c)(1)) (Any position is acceptable)                                                                                                                                                                                                         |
| <input checked="" type="checkbox"/> | 2.  | Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does <b>NOT</b> have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle. (S7.1.1.5(a))        |
|                                     |     | <input checked="" type="checkbox"/> Yes – Pass                                                                                                                                                                                                                                                            |
|                                     |     | <input type="checkbox"/> No – Fail                                                                                                                                                                                                                                                                        |
| <input checked="" type="checkbox"/> | 3.  | Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does <b>NOT</b> require inverting, twisting or deforming of the belt webbing. (S7.1.1.5(a))                                                         |
|                                     |     | <input checked="" type="checkbox"/> Yes – Pass                                                                                                                                                                                                                                                            |
|                                     |     | <input type="checkbox"/> No – Fail                                                                                                                                                                                                                                                                        |
| <input checked="" type="checkbox"/> | 4.  | Place any adjustable seat belt anchorage in the lowest adjustment position.                                                                                                                                                                                                                               |
|                                     |     | <input checked="" type="checkbox"/> N/A The anchorage is not adjustable.                                                                                                                                                                                                                                  |
| <input checked="" type="checkbox"/> | 5.  | Buckle the seat belt. (S7.1.1.5(c)(1))                                                                                                                                                                                                                                                                    |
| <input checked="" type="checkbox"/> | 6.  | Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))                                                                                                                                                                                                                                      |
| <input checked="" type="checkbox"/> | 7.  | Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))                                                                                                                              |
| <input checked="" type="checkbox"/> | 8.  | Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing?                                                                                                        |
|                                     |     | <input checked="" type="checkbox"/> Yes (go to 8.1)                                                                                                                                                                                                                                                       |
|                                     |     | <input type="checkbox"/> No (go to 9)                                                                                                                                                                                                                                                                     |
| <input checked="" type="checkbox"/> | 8.1 | Does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system. (S7.1.1.5(b))    |
|                                     |     | <input checked="" type="checkbox"/> Yes – Pass                                                                                                                                                                                                                                                            |
|                                     |     | <input type="checkbox"/> No – Fail                                                                                                                                                                                                                                                                        |
| <input checked="" type="checkbox"/> | 9.  | Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2) & S7.1.1.5(c)(1)) |



- ☒ 10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
- ☒ Measured distance between A and B (inches): 70
- ☒ 11. Readjust the belt system so that the webbing between points A and B is at  $\frac{1}{2}$  the maximum length of the webbing. (S7.1.1.5(c)(3))
- ☒ 12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device in Figure 5. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))
- ☒ Measured force application angle: 10° (spec. 5 - 15 degrees)
- ☒ 13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))
- ☒ Measured distance between A and B: 45  $\frac{3}{4}$  inches
- ☒ 14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))
- Record onset rate: 15 lb/sec (spec. 10 to 50 lb/sec) (S7.1.1.5(c)(5))
- Measured distance between A and B: 47 inches (S7.1.1.5(c)(6))
- ☒ 15. Let the seat belt webbing retract to its minimum length with the seat belt still buckled.
- ☒ 16. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device in Figure 5. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))
- Measured force application angle: 10° (spec. 5 - 15 degrees)
- ☒ 17. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))
- Measured distance between A and B: 14  $\frac{3}{4}$  inches
- ☒ 18. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))
- Record onset rate: 15 lb/sec (spec. 10 to 50 lb/sec) (S7.1.1.5(c)(5))
- Measured distance between A and B: 15  $\frac{1}{2}$  inches (S7.1.1.5(c)(6))
- ☒ 19. Subtract the measurement in 13 from the measurement in 14 and the measurement in 17 from the measurement in 18. Is the difference 2 inches or less for both? (S7.1.1.5(c)(7))
- ☒  $14 - 13 = 47 - 45 \frac{3}{4} = 1 \frac{1}{4}$  inch;
- ☒  $18 - 17 = 15 \frac{1}{2} - 14 \frac{3}{4} = \frac{3}{4}$  inch
- ☒ Yes – Pass
- ☐ No – Fail



- ☒ 20. Subtract the measurement in 14 from the measurement in 10 and the measurement in 18 from the measurement in 10. Is the difference 3 inches or more for both?  
(S7.1.1.5(c)(8))
- ☒ 10-14 =  $70 - 47 = 23$  inches;  
☒ 10-18 =  $70 - 15 \frac{1}{2} = 54 \frac{1}{2}$  inches
- ☒ Yes – Pass  
☐ No – Fail

REMARKS:

Signature: Wayne Zuhl

Date: 1/18/12

I certify that I have read and performed each instruction.

## DATA SHEET 8

### LAP BELT LOCKABILITY

**Passenger cars, trucks, buses, and multipurpose passenger  
Vehicles with a GVWR of 10,000 pounds or less. (S7.1.1.5)**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance  
Test Technician: Wayne Dahlke

NHTSA No.: CB0502  
Test Date: 1/18/12

Complete one of these forms for **each** designated seating position that can be adjusted to forward-facing or that is a forward-facing seat, other than the driver's seat (S7.1.1.5(a), **and** that has seat belt retractors that are not solely automatic locking retractors. (S7.1.1.5(c))

|                              |                      |
|------------------------------|----------------------|
| DESIGNATED SEATING POSITION: | Right Rear Passenger |
|------------------------------|----------------------|

- |                                     |     |                                                                                                                                                                                                                                                                                                           |
|-------------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            |     | N/A – No retractor is at this position                                                                                                                                                                                                                                                                    |
| <input type="checkbox"/>            |     | N/A – The retractor is an automatic locking retractor ONLY                                                                                                                                                                                                                                                |
| <input checked="" type="checkbox"/> | 1.  | Record test fore-aft seat position: <b>FIXED</b><br>(S7.1.1.5(c)(1)) (Any position is acceptable)                                                                                                                                                                                                         |
| <input checked="" type="checkbox"/> | 2.  | Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does <b>NOT</b> have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle. (S7.1.1.5(a))        |
|                                     |     | <input checked="" type="checkbox"/> Yes – Pass                                                                                                                                                                                                                                                            |
|                                     |     | <input type="checkbox"/> No – Fail                                                                                                                                                                                                                                                                        |
| <input checked="" type="checkbox"/> | 3.  | Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does <b>NOT</b> require inverting, twisting or deforming of the belt webbing. (S7.1.1.5(a))                                                         |
|                                     |     | <input checked="" type="checkbox"/> Yes – Pass                                                                                                                                                                                                                                                            |
|                                     |     | <input type="checkbox"/> No – Fail                                                                                                                                                                                                                                                                        |
| <input checked="" type="checkbox"/> | 4.  | Place any adjustable seat belt anchorage in the lowest adjustment position.                                                                                                                                                                                                                               |
|                                     |     | <input checked="" type="checkbox"/> N/A The anchorage is not adjustable.                                                                                                                                                                                                                                  |
| <input checked="" type="checkbox"/> | 5.  | Buckle the seat belt. (S7.1.1.5(c)(1))                                                                                                                                                                                                                                                                    |
| <input checked="" type="checkbox"/> | 6.  | Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))                                                                                                                                                                                                                                      |
| <input checked="" type="checkbox"/> | 7.  | Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))                                                                                                                              |
| <input checked="" type="checkbox"/> | 8.  | Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing?                                                                                                        |
|                                     |     | <input checked="" type="checkbox"/> Yes (go to 8.1)                                                                                                                                                                                                                                                       |
|                                     |     | <input type="checkbox"/> No (go to 9)                                                                                                                                                                                                                                                                     |
| <input checked="" type="checkbox"/> | 8.1 | Does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system. (S7.1.1.5(b))    |
|                                     |     | <input checked="" type="checkbox"/> Yes – Pass                                                                                                                                                                                                                                                            |
|                                     |     | <input type="checkbox"/> No – Fail                                                                                                                                                                                                                                                                        |
| <input checked="" type="checkbox"/> | 9.  | Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2) & S7.1.1.5(c)(1)) |

- ☒ 10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
- ☒ Measured distance between A and B (inches): 72
- ☒ 11. Readjust the belt system so that the webbing between points A and B is at ½ the maximum length of the webbing. (S7.1.1.5(c)(3))
- ☒ 12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device in Figure 5. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))
- ☒ Measured force application angle: 10° (spec. 5 - 15 degrees)
- ☒ 13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))
- ☒ Measured distance between A and B: 42 ½ inches
- ☒ 14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))
- Record onset rate: 15 lb/sec (spec. 10 to 50 lb/sec) (S7.1.1.5(c)(5))
- Measured distance between A and B: 42 ½ inches (S7.1.1.5(c)(6))
- ☒ 15. Let the seat belt webbing retract to its minimum length with the seat belt still buckled.
- ☒ 16. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device in Figure 5. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))
- Measured force application angle: 10° (spec. 5 - 15 degrees)
- ☒ 17. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))
- Measured distance between A and B: 16 ¼ inches
- ☒ 18. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))
- Record onset rate: 15 lb/sec (spec. 10 to 50 lb/sec) (S7.1.1.5(c)(5))
- Measured distance between A and B: 17 ¼ inches (S7.1.1.5(c)(6))
- ☒ 19. Subtract the measurement in 13 from the measurement in 14 and the measurement in 17 from the measurement in 18. Is the difference 2 inches or less for both? (S7.1.1.5(c)(7))
- ☒  $14 - 13 = 42 \frac{1}{2} - 42 \frac{1}{2} = 0$  inch;
- ☒  $18 - 17 = 17 \frac{1}{4} - 16 \frac{1}{4} = 1$  inch
- ☒ Yes – Pass
- ☐ No – Fail

- ☒ 20. Subtract the measurement in 14 from the measurement in 10 and the measurement in 18 from the measurement in 10. Is the difference 3 inches or more for both?  
(S7.1.1.5(c)(8))
- ☒ 10-14 =  $72 - 42 \frac{1}{2} = 29 \frac{1}{2}$  inches;  
☒ 10-18 =  $72 - 17 \frac{1}{4} = 54 \frac{3}{4}$  inches
- ☒ Yes – Pass  
☐ No – Fail

REMARKS:

Signature: Wayne Zuhl

Date: 1/18/12

I certify that I have read and performed each instruction.

# DATA SHEET 9

## FMVSS 208 SEAT BELT WARNING SYSTEM CHECK (S7.3)

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Wayne Dahlke

NHTSA No.: CB0502  
 Test Date: 1/18/12

- ☒ 1. The occupant is in the driver's seat.
- ☒ 2. The seat belt is in the stowed position.
- ☒ 3. The key is in the "on" or "start" position.
- ☒ 4. The time duration of the audible signal beginning with key "on" or "start" is 6 seconds.
- ☒ 5. The occupant is in the driver's seat.
- ☒ 6. The seat belt is in the stowed position.
- ☒ 7. The key is in the "on" or "start" position.
- ☒ 8. The time duration of the warning light beginning with key "on" or "start" is 6 seconds.
- ☒ 9. The occupant is in the driver's seat.
- ☒ 10. The seat belt is in the latched position and with at least 4 inches of belt webbing extended.
- ☒ 11. The key is in the "on" or "start" position.
- ☒ 12. The time duration of the warning light beginning with key "on" or "start" is 6 seconds.
- ☒ 13. Complete the following table with the data from 4, 8, and 12 to determine which option is used.

|             |                                | Warning light     | Warning light specification | Audible signal   | Audible signal specification* |
|-------------|--------------------------------|-------------------|-----------------------------|------------------|-------------------------------|
| S7.3 (a)(1) | Belt stowed & key on or start  | Item 8: <u>6</u>  | 60 seconds minimum          | Item 4: <u>6</u> | 4 to 8 seconds                |
| S7.3 (a)(2) | Belt latched & key on or start | Item 12: <u>6</u> | 4 to 8 seconds              |                  |                               |
|             | Belt stowed & key on or start  | Item 8: <u>6</u>  | 4 to 8 seconds              | Item 4: <u>6</u> | 4 to 8 seconds                |

\* 49 USCS @ 30124 does NOT allow an audible signal to operate for more than 8 seconds.

A voluntary audible signal after the 4 to 8 second required signal may be provided. It must be differentiated from the required signal (5/25/2001 legal interpretation to Longacre and Associates).

- ☒ 14. The seat belt warning system meets the requirements of (manufacturers may comply with either section).
  - ☐ S7.3 (a)(1)
  - ☒ S7.3 (a)(2)
  - ☐ FAIL – Does NOT meet the requirements of either option.
- ☒ 15. Note wording of visual warning: (S7.3(a)(1) and S7.3(a)(2))
  - ☐ Fasten Seat Belts
  - ☐ Fasten Belts
  - ☒ Symbol 101 - 
  - ☐ FAIL – Does not use any of the above wording or symbol.

REMARKS:

I certify that I have read and performed each instruction.

Signature: Wayne Dahlke

Date: 1/18/12

**DATA SHEET 10**  
**BELT CONTACT FORCE (S7.4.3)**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Wayne Dahlke

NHTSA No.: CB0502  
 Test Date: 1/18/12

Test all Type 2 seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

|                              |                     |
|------------------------------|---------------------|
| DESIGNATED SEATING POSITION: | Left Rear Passenger |
|------------------------------|---------------------|

- |                                                                                                                                                                                                                                                             |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 1.  | Does the vehicle incorporate a webbing tension-relieving device?<br><div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> Yes (this form is complete)<br/> <div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> No (continue with this check sheet)</div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 2.  | Position the seat's adjustable lumbar supports so that the lumbar support is in its lowest, retracted or deflated adjustment position. (S8.1.3)<br><div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> N/A – No lumbar adjustment</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 3.  | Position any adjustable parts of the seat that provide additional support so that they are in the lowest or most open adjustment position. (S16.2.10.2)<br><div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> N/A – No additional support adjustment</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 4.  | Is the fore-aft position of the seat adjustable?<br><div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> No – go to 5<br/> <div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> Yes – go to 4.1</div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 4.1 | Use all the seat controls that have any affect on the fore-aft movement of the seat to move the seat cushion to the rearmost position. <b>Mark</b> this position. (8/31/95 legal interpretation to Hogan and Hartson)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 4.2 | Use all the seat controls that have any affects on the fore-aft movement of the seat to move the seat cushion to the foremost position. <b>Mark</b> this position. (8/31/95 legal interpretation to Hogan and Hartson)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 4.3 | <b>Mark</b> each fore-aft position so that there is a visual indication when the seat is at a particular position. For manual seats, <b>mark</b> each detent. For power seats, mark only the rearmost, middle and foremost positions. Label three of the positions with the following: F for foremost, M for mid-position (if there is no mid-position, label the closest adjustment position to the rear of the mid-point), and R for rearmost. Determine the mid fore-aft seat position based on the foremost and rearmost positions determined in items 4.1 and 4.2. (8/31/95 legal interpretation to Hogan and Hartson)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 4.4 | Move the seat to the mid position.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 4.5 | While maintaining the mid position, move the seat to its lowest position. For seats with adjustable seat cushions, use the manufacturer's recommended seat cushion angle for determining the lowest height position.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 5.  | Is the seat back angle adjustable?<br><div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> No- go to 6<br/> <div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> Yes- go to 5.1</div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 5.1 | Set and mark seat back angle, if adjustable, at the manufacturer's nominal design riding position for a 50 <sup>th</sup> percentile adult male in the manner specified by the manufacturer.<br><div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> N/A – No seat back angle adjustment<br/> <div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> Manufacturer's design seat back angle: _____<br/> <div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> Tested seat back angle: _____</div></div></div> |

- ☒ 6. Is the seat a bucket seat?  
☐ Yes, go to 6.1 and skip 6.2  
☒ No, go to 6.2 and skip 6.1
- ☐ 6.1 Bucket seats:  
 Locate and mark the longitudinal centerline of the seat cushion. The intersection of the vertical longitudinal plane that passes through the SgRP and the seat cushion upper surface determines the longitudinal centerline of a bucket seat cushion. (S10.4.1.2 and S16.3.1.10)
- ☒ 6.2 Bench seats (complete ONLY the one that is applicable to the seat being tested):
- ☐ 6.2.1 Driver Seat  
 Locate and **mark** the longitudinal line on the seat cushion that marks the intersection of the vertical longitudinal plane through the centerline of the steering wheel and the seat cushion upper surface. (S10.4.1.1)
- ☐ 6.2.2 Front Outboard Passenger Seat  
 Locate and **mark** the longitudinal centerline of the passenger seat cushion. The longitudinal centerline is the same distance from the longitudinal centerline of the vehicle as the center of the steering wheel. (S10.4.1.1)  
☐ Record the distance from the longitudinal centerline of the vehicle to the center of the steering wheel. \_\_\_\_\_  
☐ Record the distance from the longitudinal centerline of the vehicle to the longitudinal centerline of the seat cushion. \_\_\_\_\_
- ☒ 6.2.3 Rear designated seating positions  
 Locate and **mark** the longitudinal centerline of the seat cushion. The intersection of the vertical longitudinal plane that passes through the SgRP and the seat cushion upper surface determines the longitudinal centerline.
- ☒ 7. Position the test dummies according to dummy position placement instructions in Appendix F. **Complete the Appendix F check sheets, but include them in the test report ONLY if there is a test failure.**
- ☒ 8. Fasten the seat belt latch.
- ☒ 9. Pull either 12 inches of belt webbing or the maximum available amount of belt webbing, whichever is less, from the retractor and then release it, allowing the belt webbing to return to the dummy's chest.
- ☒ 10. Locate the point where the centerline of the upper torso belt webbing crosses the midsagittal line on the dummy's chest. At that point pull the belt webbing out 3 inches from the dummy's chest and release until it is within one inch from the dummy's chest. (S10.8) Using a force measuring gage with a full scale range of no more than 1.5 pounds, measure the contact force perpendicular to the dummy's chest exerted by the belt webbing.
- ☒ Contact Force (lb): **0.4**  
☒ 0.0 to 0.7 pounds – Pass  
☐ Greater than 0.7 pounds - FAIL

REMARKS:

Signature: Wayne Jahl

Date: 1/18/12

I certify that I have read and performed each instruction.

**DATA SHEET 10**  
**BELT CONTACT FORCE (S7.4.3)**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Wayne Dahlke

NHTSA No.: CB0502  
 Test Date: 1/18/12

Test all Type 2 seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

|                              |                       |
|------------------------------|-----------------------|
| DESIGNATED SEATING POSITION: | Center Rear Passenger |
|------------------------------|-----------------------|

- ☒ 1. Does the vehicle incorporate a webbing tension-relieving device?  
☐ Yes (this form is complete)  
☒ No (continue with this check sheet)
- ☒ 2. Position the seat's adjustable lumbar supports so that the lumbar support is in its lowest, retracted or deflated adjustment position. (S8.1.3)  
☒ N/A – No lumbar adjustment
- ☒ 3. Position any adjustable parts of the seat that provide additional support so that they are in the lowest or most open adjustment position. (S16.2.10.2)  
☒ N/A – No additional support adjustment
- ☒ 4. Is the fore-aft position of the seat adjustable?  
☒ No – go to 5  
☐ Yes – go to 4.1
- ☐ 4.1 Use all the seat controls that have any affect on the fore-aft movement of the seat to move the seat cushion to the rearmost position. **Mark** this position. (8/31/95 legal interpretation to Hogan and Hartson)
- ☐ 4.2 Use all the seat controls that have any affects on the fore-aft movement of the seat to move the seat cushion to the foremost position. **Mark** this position. (8/31/95 legal interpretation to Hogan and Hartson)
- ☐ 4.3 **Mark** each fore-aft position so that there is a visual indication when the seat is at a particular position. For manual seats, **mark** each detent. For power seats, mark only the rearmost, middle and foremost positions. Label three of the positions with the following: F for foremost, M for mid-position (if there is no mid-position, label the closest adjustment position to the rear of the mid-point), and R for rearmost. Determine the mid fore-aft seat position based on the foremost and rearmost positions determined in items 4.1 and 4.2. (8/31/95 legal interpretation to Hogan and Hartson)
- ☐ 4.4 Move the seat to the mid position.
- ☐ 4.5 While maintaining the mid position, move the seat to its lowest position. For seats with adjustable seat cushions, use the manufacturer's recommended seat cushion angle for determining the lowest height position.
- ☒ 5. Is the seat back angle adjustable?  
☒ No- go to 6  
☐ Yes- go to 5.1
- ☐ 5.1 Set and mark seat back angle, if adjustable, at the manufacturer's nominal design riding position for a 50<sup>th</sup> percentile adult male in the manner specified by the manufacturer.  
☐ N/A – No seat back angle adjustment  
☐ Manufacturer's design seat back angle: \_\_\_\_\_  
☐ Tested seat back angle: \_\_\_\_\_



- ☒ 6. Is the seat a bucket seat?  
☐ Yes, go to 6.1 and skip 6.2  
☒ No, go to 6.2 and skip 6.1
- ☐ 6.1 Bucket seats:  
 Locate and mark the longitudinal centerline of the seat cushion. The intersection of the vertical longitudinal plane that passes through the SgRP and the seat cushion upper surface determines the longitudinal centerline of a bucket seat cushion. (S10.4.1.2 and S16.3.1.10)
- ☒ 6.2 Bench seats (complete ONLY the one that is applicable to the seat being tested):
- ☐ 6.2.1 Driver Seat  
 Locate and **mark** the longitudinal line on the seat cushion that marks the intersection of the vertical longitudinal plane through the centerline of the steering wheel and the seat cushion upper surface. (S10.4.1.1)
- ☐ 6.2.2 Front Outboard Passenger Seat  
 Locate and **mark** the longitudinal centerline of the passenger seat cushion. The longitudinal centerline is the same distance from the longitudinal centerline of the vehicle as the center of the steering wheel. (S10.4.1.1)  
☐ Record the distance from the longitudinal centerline of the vehicle to the center of the steering wheel. \_\_\_\_\_  
☐ Record the distance from the longitudinal centerline of the vehicle to the longitudinal centerline of the seat cushion. \_\_\_\_\_
- ☒ 6.2.3 Rear designated seating positions  
 Locate and **mark** the longitudinal centerline of the seat cushion. The intersection of the vertical longitudinal plane that passes through the SgRP and the seat cushion upper surface determines the longitudinal centerline.
- ☒ 7. Position the test dummies according to dummy position placement instructions in Appendix F. **Complete the Appendix F check sheets, but include them in the test report ONLY if there is a test failure.**
- ☒ 8. Fasten the seat belt latch.
- ☒ 9. Pull either 12 inches of belt webbing or the maximum available amount of belt webbing, whichever is less, from the retractor and then release it, allowing the belt webbing to return to the dummy's chest.
- ☒ 10. Locate the point where the centerline of the upper torso belt webbing crosses the midsagittal line on the dummy's chest. At that point pull the belt webbing out 3 inches from the dummy's chest and release until it is within one inch from the dummy's chest. (S10.8) Using a force measuring gage with a full scale range of no more than 1.5 pounds, measure the contact force perpendicular to the dummy's chest exerted by the belt webbing.
- ☒ Contact Force (lb): **0.3**  
☒ 0.0 to 0.7 pounds – Pass  
☐ Greater than 0.7 pounds - FAIL

REMARKS:

Signature: Wayne Jahl

Date: 1/18/12

I certify that I have read and performed each instruction.

**DATA SHEET 10**  
**BELT CONTACT FORCE (S7.4.3)**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Wayne Dahlke

NHTSA No.: CB0502  
 Test Date: 1/18/12

Test all Type 2 seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

|                              |                      |
|------------------------------|----------------------|
| DESIGNATED SEATING POSITION: | Right Rear Passenger |
|------------------------------|----------------------|

- |                                                                                                                                                                                                                                                             |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div style="background-color: yellow; border: 1px solid black; width: 30px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 1.  | Does the vehicle incorporate a webbing tension-relieving device?<br><div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> Yes (this form is complete)<br/> <div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> No (continue with this check sheet)</div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <div style="background-color: yellow; border: 1px solid black; width: 30px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 2.  | Position the seat's adjustable lumbar supports so that the lumbar support is in its lowest, retracted or deflated adjustment position. (S8.1.3)<br><div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> N/A – No lumbar adjustment</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <div style="background-color: yellow; border: 1px solid black; width: 30px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 3.  | Position any adjustable parts of the seat that provide additional support so that they are in the lowest or most open adjustment position. (S16.2.10.2)<br><div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> N/A – No additional support adjustment</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <div style="background-color: yellow; border: 1px solid black; width: 30px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 4.  | Is the fore-aft position of the seat adjustable?<br><div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> No – go to 5<br/> <div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> Yes – go to 4.1</div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <div style="background-color: yellow; border: 1px solid black; width: 30px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 4.1 | Use all the seat controls that have any affect on the fore-aft movement of the seat to move the seat cushion to the rearmost position. <b>Mark</b> this position. (8/31/95 legal interpretation to Hogan and Hartson)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <div style="background-color: yellow; border: 1px solid black; width: 30px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 4.2 | Use all the seat controls that have any affects on the fore-aft movement of the seat to move the seat cushion to the foremost position. <b>Mark</b> this position. (8/31/95 legal interpretation to Hogan and Hartson)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <div style="background-color: yellow; border: 1px solid black; width: 30px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 4.3 | <b>Mark</b> each fore-aft position so that there is a visual indication when the seat is at a particular position. For manual seats, <b>mark</b> each detent. For power seats, mark only the rearmost, middle and foremost positions. Label three of the positions with the following: F for foremost, M for mid-position (if there is no mid-position, label the closest adjustment position to the rear of the mid-point), and R for rearmost. Determine the mid fore-aft seat position based on the foremost and rearmost positions determined in items 4.1 and 4.2. (8/31/95 legal interpretation to Hogan and Hartson)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <div style="background-color: yellow; border: 1px solid black; width: 30px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 4.4 | Move the seat to the mid position.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <div style="background-color: yellow; border: 1px solid black; width: 30px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 4.5 | While maintaining the mid position, move the seat to its lowest position. For seats with adjustable seat cushions, use the manufacturer's recommended seat cushion angle for determining the lowest height position.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <div style="background-color: yellow; border: 1px solid black; width: 30px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 5.  | Is the seat back angle adjustable?<br><div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> No- go to 6<br/> <div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> Yes- go to 5.1</div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <div style="background-color: yellow; border: 1px solid black; width: 30px; height: 20px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> | 5.1 | Set and mark seat back angle, if adjustable, at the manufacturer's nominal design riding position for a 50 <sup>th</sup> percentile adult male in the manner specified by the manufacturer.<br><div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> N/A – No seat back angle adjustment<br/> <div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> Manufacturer's design seat back angle: _____<br/> <div style="margin-top: 5px;"><div style="background-color: yellow; border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center;"><div style="background-color: black; color: white; font-weight: bold; margin: 0 5px;">X</div></div> Tested seat back angle: _____</div></div></div> |

- ☒ 6. Is the seat a bucket seat?  
☐ Yes, go to 6.1 and skip 6.2  
☒ No, go to 6.2 and skip 6.1
- ☐ 6.1 Bucket seats:  
 Locate and mark the longitudinal centerline of the seat cushion. The intersection of the vertical longitudinal plane that passes through the SgRP and the seat cushion upper surface determines the longitudinal centerline of a bucket seat cushion. (S10.4.1.2 and S16.3.1.10)
- ☒ 6.2 Bench seats (complete ONLY the one that is applicable to the seat being tested):
- ☐ 6.2.1 Driver Seat  
 Locate and **mark** the longitudinal line on the seat cushion that marks the intersection of the vertical longitudinal plane through the centerline of the steering wheel and the seat cushion upper surface. (S10.4.1.1)
- ☐ 6.2.2 Front Outboard Passenger Seat  
 Locate and **mark** the longitudinal centerline of the passenger seat cushion. The longitudinal centerline is the same distance from the longitudinal centerline of the vehicle as the center of the steering wheel. (S10.4.1.1)  
☐ Record the distance from the longitudinal centerline of the vehicle to the center of the steering wheel. \_\_\_\_\_  
☐ Record the distance from the longitudinal centerline of the vehicle to the longitudinal centerline of the seat cushion. \_\_\_\_\_
- ☒ 6.2.3 Rear designated seating positions  
 Locate and **mark** the longitudinal centerline of the seat cushion. The intersection of the vertical longitudinal plane that passes through the SgRP and the seat cushion upper surface determines the longitudinal centerline.
- ☒ 7. Position the test dummies according to dummy position placement instructions in Appendix F. **Complete the Appendix F check sheets, but include them in the test report ONLY if there is a test failure.**
- ☒ 8. Fasten the seat belt latch.
- ☒ 9. Pull either 12 inches of belt webbing or the maximum available amount of belt webbing, whichever is less, from the retractor and then release it, allowing the belt webbing to return to the dummy's chest.
- ☒ 10. Locate the point where the centerline of the upper torso belt webbing crosses the midsagittal line on the dummy's chest. At that point pull the belt webbing out 3 inches from the dummy's chest and release until it is within one inch from the dummy's chest. (S10.8) Using a force measuring gage with a full scale range of no more than 1.5 pounds, measure the contact force perpendicular to the dummy's chest exerted by the belt webbing.
- ☒ Contact Force (lb): **0.4**  
☒ 0.0 to 0.7 pounds – Pass  
☐ Greater than 0.7 pounds - FAIL

REMARKS:

Signature: Wayne Zahle

Date: 1/18/12

I certify that I have read and performed each instruction.

**DATA SHEET 11**  
**LATCH PLATE ACCESS (S7.4.4)**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Wayne Dahlke

NHTSA No.: CB0502  
 Test Date: 1/18/12

Test all front outboard seat belts **other than those in** walk-in van-type vehicles and those at front outboard designated seating positions in **passenger cars**. Complete a form for each applicable seat belt.

|                              |                                                 |
|------------------------------|-------------------------------------------------|
| DESIGNATED SEATING POSITION: | Not Applicable For Any Position - Passenger Car |
|------------------------------|-------------------------------------------------|

- ☐ 1. Position the seat's adjustable lumbar supports so that the lumbar support is in its lowest, retracted or deflated adjustment position. (S8.1.3)
  - ☐ N/A – No lumbar adjustment
- ☐ 2. Position any adjustable parts of the seat that provide additional support so that they are in the lowest or most open adjustment position. (S16.2.10.2)
  - ☐ N/A – No additional support adjustment
- ☐ 3. Is the fore-aft position of the seat adjustable?
  - ☐ No – go to 4
  - ☐ Yes – go to 3.1
- ☐ 3.1 Use all the seat controls that have any affect on the fore-aft movement of the seat to move the seat cushion to the rearmost position. **Mark** this position. (8/31/95 legal interpretation to Hogan and Hartson)
- ☐ 3.2 While maintaining the forward most position, move the seat to its lowest position. For seats with adjustable seat cushions, use the manufacturer's recommended seat cushion angle for determining the lowest height position.
- ☐ 4. Is the seat back angle adjustable?
  - ☐ No- go to 5
  - ☐ Yes- go to 4.1
- ☐ 4.1 Set and mark seat back angle, if adjustable, at the manufacturer's nominal design riding position for a **50<sup>th</sup> percentile adult male** in the manner specified by the manufacturer.
  - ☐ N/A – No seat back angle adjustment
  - ☐ Manufacturer's design seat back angle: \_\_\_\_\_
  - ☐ Tested seat back angle: \_\_\_\_\_
- ☐ 5. Is the seat a bucket seat?
  - ☐ Yes, go to 5.1 and skip 5.2
  - ☐ No, go to 5.2 and skip 5.1
- ☐ 5.1 Bucket seats:
 

Locate and **mark** the longitudinal centerline of the seat cushion. The intersection of the vertical longitudinal plane that passes through the SgRP and the seat cushion upper surface determines the longitudinal centerline of a bucket seat cushion. (S10.4.1.2 and S16.3.1.10)
- ☐ 5.2 Bench seats (complete ONLY the one that is applicable to the seat being tested):
  - ☐ 5.2.1 Driver Seat
 

Locate and **mark** the longitudinal line on the seat cushion that marks the intersection of the vertical longitudinal plane through the centerline of the steering wheel and the seat cushion upper surface. (S10.4.1.1)

☐ 5.2.2 Front Outboard Passenger Seat

Locate and **mark** the longitudinal centerline of the passenger seat cushion.

The longitudinal centerline is the same distance from the longitudinal centerline of the vehicle as the center of the steering wheel. (S10.4.1.1)

☐ Record the distance from the longitudinal centerline of the vehicle to the center of the steering wheel. \_\_\_\_\_

☐ Record the distance from the longitudinal centerline of the vehicle to the longitudinal centerline of the seat cushion. \_\_\_\_\_

☐ 6. Position the test dummy using the procedures in Appendix F. (Some modifications to the positioning procedure may need to be made because the seat is in the forward most position. Note on the Appendix F positioning check sheet any deviations necessary to position the Part 572, Subpart E dummy). **Complete the Appendix F check sheets, but include them in the test report ONLY if there is a test failure.**

☐ 7. Position the adjustable seat belt anchorage in the manufacturer's nominal design position for a 50<sup>th</sup> percentile adult male occupant.

☐ 8. Attach the inboard reach string to the base of the head following the instructions on Figure 3.

☐ 9. Attach the outboard reach string to the torso sheath following the instructions on Figure 3.

☐ 10. Place the latch plate in the stowed position.

☐ 11. Extend the inboard reach string in front of the dummy and then backward and outboard to the latch plate to generate arcs of the reach envelope of the test dummy's arms. Is the latch plate within the reach envelope?

☐ Yes – Pass

☐ No

☐ 12. Extend the outboard reach string in front of the dummy and then backward and outboard to the latch plate to generate arcs of the reach envelope of the test dummy's arms. Is the latch plate within the reach envelope?

☐ Yes – Pass

☐ No

☐ 13. Is the latch plate within the inboard (item 11) or outboard (item 12) reach envelope?

☐ Yes – Pass

☐ No – Fail

☐ 14. Using the clearance test block, specified in Figure 4, is there sufficient clearance between the vehicle seat and the side of vehicle interior to allow the test block to move unhindered to the latch plate or buckle?

☐ Yes – Pass

☐ No – Fail

REMARKS:

Signature: Wayne Zahle

Date: 1/18/12

I certify that I have read and performed each instruction.

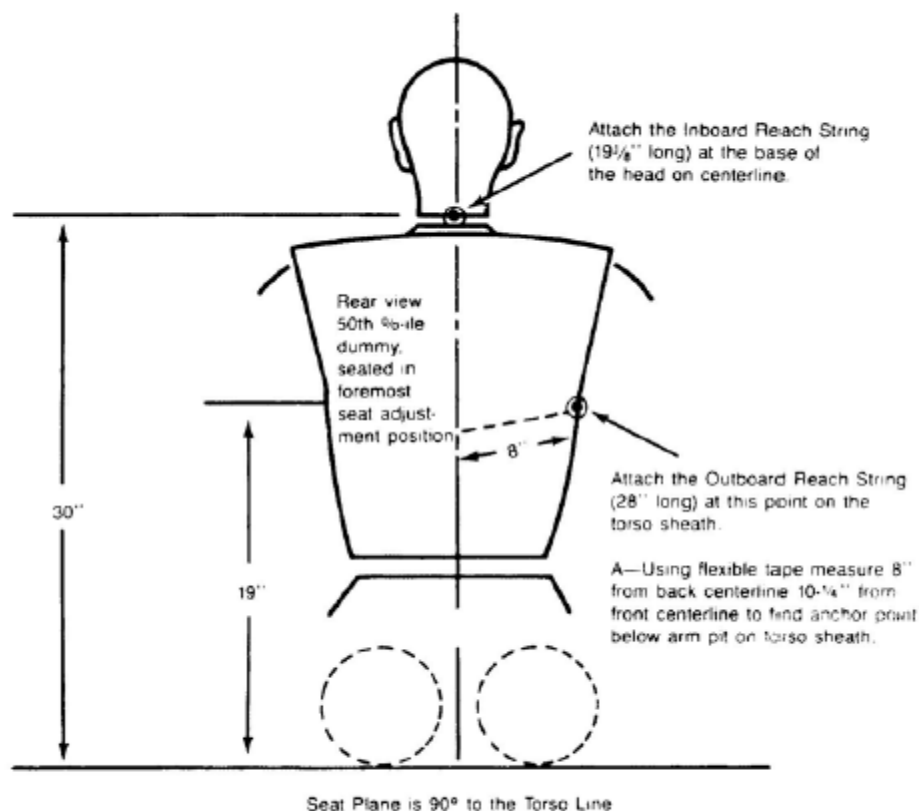


Figure 3. Location of Anchoring Points for Latchplate Reach Limiting Chains or Strings to Test for Latchplate Accessibility Using Subpart E Test Device

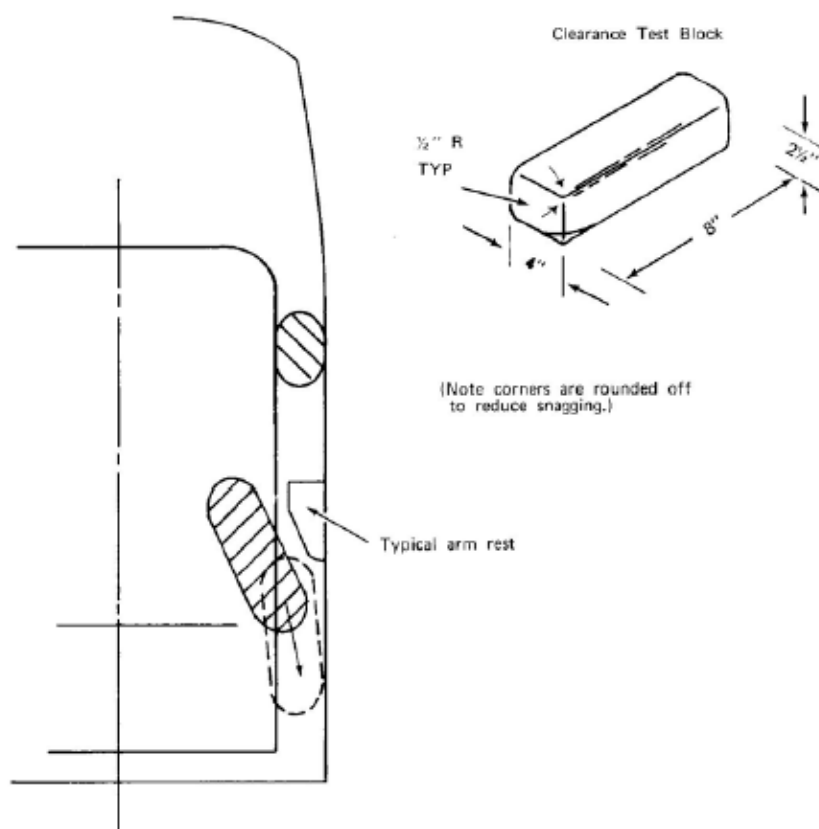


Figure 4—USE OF CLEARANCE TEST BLOCK TO DETERMINE HAND/ARM ACCESS

# **DATA SHEET 12** **SEAT BELT RETRACTION (S7.4.5)**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Wayne Dahlke

NHTSA No.: CB0502  
 Test Date: 1/18/12

Test all front outboard seat belts, except those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

|                              |                                                 |
|------------------------------|-------------------------------------------------|
| DESIGNATED SEATING POSITION: | Not Applicable For Any Position – Passenger Car |
|------------------------------|-------------------------------------------------|

- ☒ 1. Is the vehicle a passenger car or walk-in van-type vehicle?
  - ☒ Yes, this form is complete
  - ☐ No
- ☐ 2. Position the seat's adjustable lumbar supports so that the lumbar support is in its lowest, retracted or deflated adjustment position. (S8.1.3)
  - ☐ N/A – No lumbar adjustment
- ☐ 3. Position any adjustable parts of the seat that provide additional support so that they are in the lowest or most open adjustment position. (S16.2.10.2)
  - ☐ N/A – No additional support adjustment
- ☐ 4. Is the fore-aft position of the seat adjustable?
  - ☐ No – go to 5
  - ☐ Yes – go to 4.1
- ☐ 4.1 Use all the seat controls that have any affect on the fore-aft movement of the seat to move the seat cushion to the rearmost position. **Mark** this position. (8/31/95 legal interpretation to Hogan and Hartson)
- ☐ 4.2 Use all the seat controls that have any affects on the fore-aft movement of the seat to move the seat cushion to the foremost position. **Mark** this position. (8/31/95 legal interpretation to Hogan and Hartson)
- ☐ 4.3 **Mark** each fore-aft position so that there is a visual indication when the seat is at a particular position. For manual seats, **mark** each detent. For power seats, mark only the rearmost, middle and foremost positions. Label three of the positions with the following: F for foremost, M for mid-position (if there is no mid-position, label the closest adjustment position to the rear of the mid-point), and R for rearmost. Determine the mid fore-aft seat position based on the foremost and rearmost positions determined in items 4.1 and 4.2. (8/31/95 legal interpretation to Hogan and Hartson)
- ☐ 4.4 Move the seat to the mid position.
- ☐ 4.5 While maintaining the mid position, move the seat to its lowest position. For seats with adjustable seat cushions, use the manufacturer's recommended seat cushion angle for determining the lowest height position.
- ☐ 5. Is the seat back angle adjustable?
  - ☐ No- go to 6
  - ☐ Yes- go to 5.1
- ☐ 5.1 Set and mark seat back angle, if adjustable, at the manufacturer's nominal design riding position for a **50<sup>th</sup> percentile adult male** in the manner specified by the manufacturer.
  - ☐ N/A – No seat back angle adjustment
  - ☐ Manufacturer's design seat back angle: \_\_\_\_\_
  - ☐ Tested seat back angle: \_\_\_\_\_
- ☐ 6. Is the seat a bucket seat?
  - ☐ Yes, go to 6.1 and skip 6.2
  - ☐ No, go to 6.2 and skip 6.1

- ☐ 6.1 Bucket Seats:  
Locate and **mark** the longitudinal centerline of the seat cushion. The intersection of the vertical longitudinal plane that passes through the SgRP and the seat cushion upper surface determines the longitudinal centerline of a bucket seat cushion. (S10.4.1.2 and S16.3.1.10)
- ☐ 6.2 Bench seats (complete ONLY the one that is applicable to the seat being tested):
- ☐ 6.2. Driver Seat
- ☐ 1 Locate and **mark** the longitudinal line on the seat cushion that marks the intersection of the vertical longitudinal plane through the centerline of the steering wheel and the seat cushion upper surface. (S10.4.1.1)
- ☐ 6.2. Front Outboard Passenger Seat
- ☐ 2 Locate and **mark** the longitudinal centerline of the passenger seat cushion. The longitudinal centerline is the same distance from the longitudinal centerline of the vehicle as the center of the steering wheel. (S10.4.1.1)
- ☐ Record the distance from the longitudinal centerline of the vehicle to the center of the steering wheel. \_\_\_\_\_
- ☐ Record the distance from the longitudinal centerline of the vehicle to the longitudinal centerline of the seat cushion. \_\_\_\_\_
- ☐ 7. Position the Part 572 Subpart E test dummy according to dummy position placement instructions in Appendix F. **Complete the Appendix F check sheets, but include them in the test report ONLY if there is a test failure.**
- ☐ 8. Fasten the seat belt around the dummy.
- ☐ 9. Remove all slack from the lap belt portion. (S10.9)
- ☐ N/A, the seat does not have a fore-aft adjustment
- ☐ 10. Pull the upper torso webbing out of the retractor and allow it to retract; repeat this four times. (S10.9)
- ☐ 11. Apply a 2 to 4 pound tension load to the lap belt. (S10.9)
- Pound load applied:**
- ☐ 12. Is the belt system equipped with a tension relieving device?
- ☐ Yes, continue
- ☐ No, go to 14
- ☐ 13. Introduce the maximum amount of slack into the upper torso belt that is recommended by the vehicle manufacturer in the vehicle owner's manual. (S10.9).
- ☐ 14. Check the statement that applies to this test vehicle:
- ☐ 14.1 The torso and lap belt webbing of the seat belt system automatically retracts to a stowed position when the adjacent vehicle door is in an open position and the seat belt latch plate is released.
- ☐ Yes – Pass go to 16
- ☐ No – go to 14.2
- ☐ 14.2 The torso and lap belt webbing of the seat belt system automatically retracts when the seat belt latch plate is released.
- ☐ Yes – Pass go to 15
- ☐ No – go to 14.3
- ☐ 14.3 Neither 14.1 nor 14.2 apply.
- ☐ Fail
- ☐ 15. With the webbing and hardware in the stowed position are the webbing and hardware prevented from being pinched when the door is closed?
- ☐ Yes – Pass
- ☐ No – Fail



- ☐ 16. If this test vehicle has an open body (without doors) and has a belt system with a tension relieving device, does the belt system fully retract when the tension-relieving device is deactivated?
- |                          |                                |
|--------------------------|--------------------------------|
| <input type="checkbox"/> | N/A – Not an open body vehicle |
| <input type="checkbox"/> | Yes – Pass                     |
| <input type="checkbox"/> | No – Fail                      |

REMARKS:

Signature: Wayne Zahle Date: 1/18/12

I certify that I have read and performed each instruction.

# DATA SHEET 13

## SEAT BELT GUIDES AND HARDWARE (S7.4.6)

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Wayne Dahlke

NHTSA No.: CB0502  
 Test Date: 1/18/12

Test seat belts except those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

DESIGNATED SEATING POSITION: Left Rear Passenger

- |                                     |     |                                                                                                                                                                                                                                                                                                        |                                                           |                                                                                                  |
|-------------------------------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | 1.  | Is the seat cushion movable so that the seat back serves a function other than seating? (S7.4.6.1(b))                                                                                                                                                                                                  | <input type="checkbox"/> Yes, this form is complete       | <input checked="" type="checkbox"/> No, go to 2                                                  |
| <input checked="" type="checkbox"/> | 2.  | Is the seat removable? (S7.4.6.1(b))                                                                                                                                                                                                                                                                   | <input type="checkbox"/> Yes, this form is complete       | <input checked="" type="checkbox"/> No, go to 3                                                  |
| <input checked="" type="checkbox"/> | 3.  | Is the seat movable so that the space formerly occupied by the seat can be used for a secondary function? (S7.4.6.1(b))                                                                                                                                                                                | <input type="checkbox"/> Yes, this form is complete       | <input checked="" type="checkbox"/> No, go to 4                                                  |
| <input checked="" type="checkbox"/> | 4.  | Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back? (S7.4.6.1(a))                                                                                                                                                                                      | <input checked="" type="checkbox"/> Yes, go to 5          | <input type="checkbox"/> No, this form is complete                                               |
| <input checked="" type="checkbox"/> | 5.  | Does one of the following three parts, the seat belt latch plate, the buckle, or the seat belt webbing, stay on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant)? (S7.4.6.1(a)) | <input checked="" type="checkbox"/> Yes – Pass            | <input type="checkbox"/> No – Fail                                                               |
|                                     |     | Identify the part(s) on top or above the seat.                                                                                                                                                                                                                                                         | <input checked="" type="checkbox"/> Seat belt latch plate | <input checked="" type="checkbox"/> Buckle <input checked="" type="checkbox"/> Seat belt webbing |
| <input checked="" type="checkbox"/> | 6.  | Are the remaining two seat belt parts accessible under normal conditions?                                                                                                                                                                                                                              | <input checked="" type="checkbox"/> Yes – Pass            | <input type="checkbox"/> No – Fail                                                               |
| <input checked="" type="checkbox"/> | 7.  | The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the belt is completely retracted or, if the belt is nonretractable, the belt is unlatched. (S7.4.6.2)                                                                                     | <input checked="" type="checkbox"/> Yes – Pass            | <input type="checkbox"/> No – Fail                                                               |
| <input checked="" type="checkbox"/> | 8.  | The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the seat is moved to any position to which it is designed to be adjusted. (S7.4.6.2)                                                                                                      | <input checked="" type="checkbox"/> Yes – Pass            | <input type="checkbox"/> No – Fail                                                               |
| <input checked="" type="checkbox"/> | 9.  | The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the seat back, if foldable, is folded forward as far as possible and then moved backward into position. (S7.4.6.2)                                                                        | <input checked="" type="checkbox"/> Yes – Pass            | <input type="checkbox"/> No – Fail                                                               |
| <input checked="" type="checkbox"/> | 10. | Is the inboard receptacle end of the seat belt assembly, installed in the front outboard designated seating position, accessible with the center armrest in any position to which it can be adjusted (without moving the armrest)? (S7.4.6.2)                                                          | <input type="checkbox"/> Yes – Pass                       | <input type="checkbox"/> No – Fail <input checked="" type="checkbox"/> N/A – Rear seat           |

REMARKS:

Signature: Wayne Dahlke

Date: 1/18/12

I certify that I have read and performed each instruction.

# DATA SHEET 13

## SEAT BELT GUIDES AND HARDWARE (S7.4.6)

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Wayne Dahlke

NHTSA No.: CB0502  
 Test Date: 1/18/12

Test seat belts except those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

DESIGNATED SEATING POSITION: Center Rear Passenger

- ☒

1. Is the seat cushion movable so that the seat back serves a function other than seating? (S7.4.6.1(b))

☐ Yes, this form is complete

☒ No, go to 2
- ☒

2. Is the seat removable? (S7.4.6.1(b))

☐ Yes, this form is complete

☒ No, go to 3
- ☒

3. Is the seat movable so that the space formerly occupied by the seat can be used for a secondary function? (S7.4.6.1(b))

☐ Yes, this form is complete

☒ No, go to 4
- ☒

4. Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back? (S7.4.6.1(a))

☒ Yes, go to 5

☐ No, this form is complete
- ☒

5. Does one of the following three parts, the seat belt latch plate, the buckle, or the seat belt webbing, stay on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant)? (S7.4.6.1(a))

☒ Yes – Pass

☐ No – Fail

Identify the part(s) on top or above the seat.

☒ Seat belt latch plate

☒ Buckle

☒ Seat belt webbing
- ☒

6. Are the remaining two seat belt parts accessible under normal conditions?

☒ Yes – Pass

☐ No – Fail
- ☒

7. The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the belt is completely retracted or, if the belt is nonretractable, the belt is unlatched. (S7.4.6.2)

☒ Yes – Pass

☐ No – Fail
- ☒

8. The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the seat is moved to any position to which it is designed to be adjusted. (S7.4.6.2)

☒ Yes – Pass

☐ No – Fail
- ☒

9. The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the seat back, if foldable, is folded forward as far as possible and then moved backward into position. (S7.4.6.2)

☒ Yes – Pass

☐ No – Fail
- ☒

10. Is the inboard receptacle end of the seat belt assembly, installed in the front outboard designated seating position, accessible with the center armrest in any position to which it can be adjusted (without moving the armrest)? (S7.4.6.2)

☐ Yes – Pass

☐ No – Fail

☒ N/A – Rear seat

REMARKS:

Signature: Wayne Dahlke

Date: 1/18/12

I certify that I have read and performed each instruction.

# DATA SHEET 13

## SEAT BELT GUIDES AND HARDWARE (S7.4.6)

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Wayne Dahlke

NHTSA No.: CB0502  
 Test Date: 1/18/12

Test seat belts except those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

DESIGNATED SEATING POSITION: Right Rear Passenger

- |                                     |     |                                                                                                                                                                                                                                                                                                        |                                                           |                                                                                                  |
|-------------------------------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | 1.  | Is the seat cushion movable so that the seat back serves a function other than seating? (S7.4.6.1(b))                                                                                                                                                                                                  | <input type="checkbox"/> Yes, this form is complete       | <input checked="" type="checkbox"/> No, go to 2                                                  |
| <input checked="" type="checkbox"/> | 2.  | Is the seat removable? (S7.4.6.1(b))                                                                                                                                                                                                                                                                   | <input type="checkbox"/> Yes, this form is complete       | <input checked="" type="checkbox"/> No, go to 3                                                  |
| <input checked="" type="checkbox"/> | 3.  | Is the seat movable so that the space formerly occupied by the seat can be used for a secondary function? (S7.4.6.1(b))                                                                                                                                                                                | <input type="checkbox"/> Yes, this form is complete       | <input checked="" type="checkbox"/> No, go to 4                                                  |
| <input checked="" type="checkbox"/> | 4.  | Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back? (S7.4.6.1(a))                                                                                                                                                                                      | <input checked="" type="checkbox"/> Yes, go to 5          | <input type="checkbox"/> No, this form is complete                                               |
| <input checked="" type="checkbox"/> | 5.  | Does one of the following three parts, the seat belt latch plate, the buckle, or the seat belt webbing, stay on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant)? (S7.4.6.1(a)) | <input checked="" type="checkbox"/> Yes – Pass            | <input type="checkbox"/> No – Fail                                                               |
|                                     |     | Identify the part(s) on top or above the seat.                                                                                                                                                                                                                                                         | <input checked="" type="checkbox"/> Seat belt latch plate | <input checked="" type="checkbox"/> Buckle <input checked="" type="checkbox"/> Seat belt webbing |
| <input checked="" type="checkbox"/> | 6.  | Are the remaining two seat belt parts accessible under normal conditions?                                                                                                                                                                                                                              | <input checked="" type="checkbox"/> Yes – Pass            | <input type="checkbox"/> No – Fail                                                               |
| <input checked="" type="checkbox"/> | 7.  | The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the belt is completely retracted or, if the belt is nonretractable, the belt is unlatched. (S7.4.6.2)                                                                                     | <input checked="" type="checkbox"/> Yes – Pass            | <input type="checkbox"/> No – Fail                                                               |
| <input checked="" type="checkbox"/> | 8.  | The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the seat is moved to any position to which it is designed to be adjusted. (S7.4.6.2)                                                                                                      | <input checked="" type="checkbox"/> Yes – Pass            | <input type="checkbox"/> No – Fail                                                               |
| <input checked="" type="checkbox"/> | 9.  | The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the seat back, if foldable, is folded forward as far as possible and then moved backward into position. (S7.4.6.2)                                                                        | <input checked="" type="checkbox"/> Yes – Pass            | <input type="checkbox"/> No – Fail                                                               |
| <input checked="" type="checkbox"/> | 10. | Is the inboard receptacle end of the seat belt assembly, installed in the front outboard designated seating position, accessible with the center armrest in any position to which it can be adjusted (without moving the armrest)? (S7.4.6.2)                                                          | <input type="checkbox"/> Yes – Pass                       | <input type="checkbox"/> No – Fail <input checked="" type="checkbox"/> N/A – Rear seat           |

REMARKS:

Signature: Wayne Dahlke

Date: 1/18/12

I certify that I have read and performed each instruction.

## DATA SHEET 15

### H-POINT DETERMINATION FOR 50<sup>TH</sup> PERCENTILE MALE DUMMY

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance  
Test Technician: Tim Bratz

NHTSA No.: CB0502  
Test Date: 2/24/12

☒ Driver Designated Seating Position      ☐ Passenger Designated Seating Position

- ☒ 1. Position the seat's adjustable lumbar supports so that the lumbar support is in its lowest, retracted or deflated adjustment position. (S8.1.3)  
    ☐ N/A – No lumbar adjustment
- ☒ 2. Position any adjustable parts of the seat that provide additional support so that they are in the lowest or most open adjustment position. (S16.2.10.2)  
    ☒ N/A – No additional support adjustment
- ☒ 3. Use all the seat controls that have any affect on the fore-aft movement of the seat to move the seat cushion to the rearmost position. **Mark** this position. (8/31/95 legal interpretation to Hogan and Hartson)
- ☒ 4. Use all the seat controls that have any affect on the fore-aft movement of the seat to move the seat cushion to the foremost position. **Mark** this position. (8/31/95 legal interpretation to Hogan and Hartson)
- ☒ 5. **Mark** each fore-aft position so that there is a visual indication when the seat is at a particular position. For manual seats, **mark** each detent. For power seats, **mark** only the rearmost, middle, and foremost positions. Label three of the positions with the following: F for foremost, M for mid-position (if there is no mid-position, label the closest adjustment position to the rear of the mid-point), and R for rearmost. Determine the mid fore-aft seat position based on the foremost and rearmost positions determined in items 3 and 4. (8/31/95 legal interpretation to Hogan and Hartson)
- ☒ 6. Move the seat to the mid position.
- ☒ 7. While maintaining the mid position, move the seat to its lowest position. **Mark** the height position. For seats with adjustable seat cushions, use the manufacturer's recommended seat cushion angle for determining the lowest height position.
- ☒ 8. Visually **mark** the seat back angle, if adjustable, at the manufacturer's nominal design riding position for a **50th percentile adult male** in the manner specified by the manufacturer.  
    ☐ N/A – No seat back angle adjustment  
    Manufacturer's design seat back angle 23° (9.21° on Headrest)
- ☒ 9. Is the seat a bucket seat?  
    ☒ Yes, go to 10 and skip 11  
    ☐ No, go to 11 and skip 10
- ☒ 10. Bucket seats:  
    Locate and **mark** for future reference the longitudinal centerline of the seat cushion. The intersection of the vertical longitudinal plane that passes through the SgRP and the seat cushion upper surface determines the longitudinal centerline of a bucket seat cushion. (S10.4.1.2 and S16.3.1.10)

- ☐ 11. Bench seats (complete ONLY the one that is applicable to the seat being marked):
- 11.1 Driver Seat  
Locate and **mark** for future reference the longitudinal line on the seat cushion that marks the intersection of the vertical longitudinal plane through the centerline of the steering wheel and the seat cushion upper surface. (S10.4.1.1)
- 11.2 Passenger Seat  
Locate and **mark** for future reference the longitudinal centerline of the passenger seat cushion. The longitudinal centerline is the same distance from the longitudinal centerline of the vehicle as the center of the steering wheel. (S10.4.1.1)  
Record the distance from the longitudinal centerline of the vehicle to the center of the steering wheel. \_\_\_\_\_  
Record the distance from the longitudinal centerline of the vehicle to the longitudinal centerline of the seat cushion. \_\_\_\_\_
- ☒ 12. Place a 910 mm<sup>2</sup> piece of muslin cotton cloth over the seat area. (The muslin cloth shall be comparable to 48 threads/in<sup>2</sup> and density of 2.85 lb/yd.) Tuck the muslin cloth in a sufficient amount to prevent hammocking of the material.
- ☒ 13. Place the seat and back assembly of the H-Point machine at the centerline of the seat as determined in item 10 or 11.
- ☒ 14. Install the lower leg, and foot segments.
- ☒ 15. Set the length of the lower leg segment at 16.3 inches and the length of the thigh bar at 15.8 inches.
- ☒ 16. Leg and foot placement.
- ☒ 16.1 Driver Designated Seating Position.
- ☒ 16.1.1 Insert the pin so that the foot angle is never less than 87 degrees.
- ☒ 16.1.2 Place the right foot on the undepressed accelerator pedal with the sole of the foot on the pedal and the heel as far forward as allowable. Do not place the heel on the toe board.
- ☒ 16.1.3 Adjust the left leg to be the same distance from H-point machine centerline as the right leg.
- ☒ 16.1.4 With the T-bar level, place the left foot on the toe board with the rearmost point of the heel resting on the floor pan as close as possible to the point of intersection of the planes described by the toe board and the floor pan and not on the wheel well projection. If the foot cannot be positioned on the toe board, set it on the floor pan.  
☒ Foot on toe board.  
☐ Foot on floor pan.
- ☐ 16.2 Passenger Designated Seating Position.
- ☐ 16.2.1 Insert the pin so that the foot angle is never less than 87 degrees.
- ☐ 16.2.2 Space the lower legs 10.6 inches apart, equally spaced about the centerline of the H-point machine.

- ☐ 16.2.3 With the T-bar level, place the left foot on the toe board with the rearmost point of the heel resting on the floor pan as close as possible to the point of intersection of the planes described by the toe board and the floor pan and not on the wheel well projection. If the foot cannot be positioned on the toe board, set it on the floor pan.
- ☐ Foot on toe board.
  - ☐ Foot on floor pan.
- ☐ 16.2.4 With the T-bar level, place the right foot on the toe board with the rearmost point of the heel resting on the floor pan as close as possible to the point of intersection of the planes described by the toe board and the floor pan and not on the wheel well projection. If the foot cannot be positioned on the toe board, set it on the floor pan.
- ☐ Foot on toe board.
  - ☐ Foot on floor pan.
- ☒ 17. Apply the lower leg weights.
- ☒ 18. Apply the thigh weights.
- ☒ 19. Tilt the back pan forward against the forward stop and draw the H-point machine away from the seatback using the T-bar.
- ☒ 20. Repositioning the back pan.
- ☒ 20.1 Allow the H-point machine to slide rearward until a forward horizontal restraining load on the T-bar is no longer required due to the seat pan contacting the seat back.
- ☐ The seat pan does not slide rearward. Go to 20.2
- ☐ 20.2 Slide the H-point machine rearward by a horizontal rearward load applied at the T-bar until the seat pan contacts the seat back.
- ☒ 21. Apply a 10 kg load at the intersection of the hip angle quadrant and the T-bar housing along a line from the above intersection to a point just above the thigh bar housing.
- ☒ 22. Again apply a 10 kg load at the intersection of the hip angle quadrant and the T-bar housing along a line from the above intersection to a point just above the thigh bar housing.
- ☒ 23. Carefully return the back pan to the seat back.
- ☒ 24. Install the right and left buttock weights.
- ☒ 25. Install the eight torso weights alternately the installation between right and left.
- ☒ 26. Tilt the back pan forward until the stop is contacted.
- ☒ 27. Rock the H-point from side to side over a 10 degree arc (5 degrees to each side of the vertical centerline) for three complete cycles. Restrain the T-bar during rocking so that the seat pan does not change position. Minimize any inadvertent exterior loads applied in a vertical or fore-aft direction. The feet are free to move during this rocking motion.
- ☒ 28. Without applying a forward or lateral load lift the right foot off the floor the minimum amount necessary until no additional forward foot movement is obtained.
- ☒ 29. Lower the right foot until the heel is in contact with the floor pan and the ball of the foot is in contact with the floor, toe board, or undepressed accelerator pedal.

- X 30. Without applying a forward or lateral load lift the left foot off the floor the minimum amount necessary until no additional forward foot movement is obtained.
- X 31. Lower the left foot until the heel is in contact with the floor pan and the ball of the foot is in contact with the floor or toe board.
- X 32. Is the seat pan level?  
\_\_\_ Yes. Go to 34  
X No. Go to 33
- X 33. Apply a sufficient lateral load to the top of the seatback pan to level the H-point machine seat pan on the seat.
- X 34. Holding the T-bar to prevent the H-point from sliding forward on the seat cushion, return the seatback pan to the seatback.
- X 35. Holding the T-bar to prevent the H-point from sliding forward on the seat cushion, apply sufficient rearward force perpendicular to the back angle bar just above the torso weights to increase the hip angle 3 degrees. Minimize the exterior downward or side forces applied to the H-point machine. Release the force. Repeat this step until the hip angle readout is identical. Complete as many force applications as necessary and record the results in the following table:

| Force Application | Hip Angle |
|-------------------|-----------|
| 1                 | 96        |
| 2                 | 98        |
| 3                 | 99        |
| 4                 | 99        |
| 5                 |           |

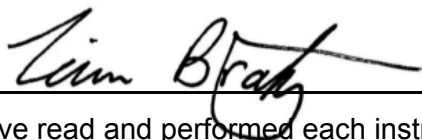
- X 36. Is the H-point machine level?  
X Yes, go to 37.  
\_\_\_ No, relevel. Go back to item 26 and repeat using a new data sheet.



- X37. Record the H-point location.  
Describe and mark the measuring reference point.

| Driver H-Point  |     |
|-----------------|-----|
| HP to Floor Z   | 245 |
| HP to Hinge X   | 742 |
| HP to Sill Y    | 268 |
| HP to Striker X | 250 |
| HP to Dash X    | 515 |
| HP to Header Z  | 763 |

| H-Point Machine  |      |
|------------------|------|
| Left Knee        | 129  |
| Right Knee       | 130  |
| Left Foot Angle  | 123° |
| Right Foot Angle | 98°  |
| Left Leg         | 110  |
| Right Leg        | 130  |
| Hip Angle        | 99°  |
| Back Angle       | 23°  |

Signature: 

Date: 2/24/12

I certify that I have read and performed each instruction.

## DATA SHEET 15

### H-POINT DETERMINATION FOR 50<sup>TH</sup> PERCENTILE MALE DUMMY

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance  
Test Technician: Joe Fleck

NHTSA No.: CB0502  
Test Date: 2/24/12

☐ Driver Designated Seating Position      ☒ Passenger Designated Seating Position

- ☒ 1. Position the seat's adjustable lumbar supports so that the lumbar support is in its lowest, retracted or deflated adjustment position. (S8.1.3)  
☒ N/A – No lumbar adjustment
- ☒ 2. Position any adjustable parts of the seat that provide additional support so that they are in the lowest or most open adjustment position. (S16.2.10.2)  
☒ N/A – No additional support adjustment
- ☒ 3. Use all the seat controls that have any affect on the fore-aft movement of the seat to move the seat cushion to the rearmost position. **Mark** this position. (8/31/95 legal interpretation to Hogan and Hartson)
- ☒ 4. Use all the seat controls that have any affect on the fore-aft movement of the seat to move the seat cushion to the foremost position. **Mark** this position. (8/31/95 legal interpretation to Hogan and Hartson)
- ☒ 5. **Mark** each fore-aft position so that there is a visual indication when the seat is at a particular position. For manual seats, **mark** each detent. For power seats, **mark** only the rearmost, middle, and foremost positions. Label three of the positions with the following: F for foremost, M for mid-position (if there is no mid-position, label the closest adjustment position to the rear of the mid-point), and R for rearmost. Determine the mid fore-aft seat position based on the foremost and rearmost positions determined in items 3 and 4. (8/31/95 legal interpretation to Hogan and Hartson)
- ☒ 6. Move the seat to the mid position.
- ☒ 7. While maintaining the mid position, move the seat to its lowest position. **Mark** the height position. For seats with adjustable seat cushions, use the manufacturer's recommended seat cushion angle for determining the lowest height position.
- ☒ 8. Visually **mark** the seat back angle, if adjustable, at the manufacturer's nominal design riding position for a **50th percentile adult male** in the manner specified by the manufacturer.  
☐ N/A – No seat back angle adjustment  
Manufacturer's design seat back angle 21° (7.21° on Headrest)
- ☒ 9. Is the seat a bucket seat?  
☒ Yes, go to 10 and skip 11  
☐ No, go to 11 and skip 10
- ☒ 10. Bucket seats:  
Locate and **mark** for future reference the longitudinal centerline of the seat cushion. The intersection of the vertical longitudinal plane that passes through the SgRP and the seat cushion upper surface determines the longitudinal centerline of a bucket seat cushion. (S10.4.1.2 and S16.3.1.10)

11. Bench seats (complete ONLY the one that is applicable to the seat being marked):

11.1 Driver Seat

Locate and **mark** for future reference the longitudinal line on the seat cushion that marks the intersection of the vertical longitudinal plane through the centerline of the steering wheel and the seat cushion upper surface. (S10.4.1.1)

11.2 Passenger Seat

Locate and **mark** for future reference the longitudinal centerline of the passenger seat cushion. The longitudinal centerline is the same distance from the longitudinal centerline of the vehicle as the center of the steering wheel. (S10.4.1.1)

Record the distance from the longitudinal centerline of the vehicle to the center of the steering wheel. \_\_\_\_\_

Record the distance from the longitudinal centerline of the vehicle to the longitudinal centerline of the seat cushion. \_\_\_\_\_

X 12. Place a 910 mm<sup>2</sup> piece of muslin cotton cloth over the seat area. (The muslin cloth shall be comparable to 48 threads/in<sup>2</sup> and density of 2.85 lb/yd.) Tuck the muslin cloth in a sufficient amount to prevent hammocking of the material.

X 13. Place the seat and back assembly of the H-Point machine at the centerline of the seat as determined in item 10 or 11.

X 14. Install the lower leg, and foot segments.

X 15. Set the length of the lower leg segment at 16.3 inches and the length of the thigh bar at 15.8 inches.

X 16. Leg and foot placement.

     16.1 Driver Designated Seating Position.

     16.1.1 Insert the pin so that the foot angle is never less than 87 degrees.

     16.1.2 Place the right foot on the undepressed accelerator pedal with the sole of the foot on the pedal and the heel as far forward as allowable. Do not place the heel on the toe board.

     16.1.3 Adjust the left leg to be the same distance from H-point machine centerline as the right leg.

     16.1.4 With the T-bar level, place the left foot on the toe board with the rearmost point of the heel resting on the floor pan as close as possible to the point of intersection of the planes described by the toe board and the floor pan and not on the wheel well projection. If the foot cannot be positioned on the toe board, set it on the floor pan.

         Foot on toe board.

         Foot on floor pan.

X 16.2 Passenger Designated Seating Position.

X 16.2.1 Insert the pin so that the foot angle is never less than 87 degrees.

X 16.2.2 Space the lower legs 10.6 inches apart, equally spaced about the centerline of the H-point machine.

- X 16.2.3 With the T-bar level, place the left foot on the toe board with the rearmost point of the heel resting on the floor pan as close as possible to the point of intersection of the planes described by the toe board and the floor pan and not on the wheel well projection. If the foot cannot be positioned on the toe board, set it on the floor pan.
- X Foot on toe board.  
\_\_ Foot on floor pan.
- X 16.2.4 With the T-bar level, place the right foot on the toe board with the rearmost point of the heel resting on the floor pan as close as possible to the point of intersection of the planes described by the toe board and the floor pan and not on the wheel well projection. If the foot cannot be positioned on the toe board, set it on the floor pan.
- X Foot on toe board.  
\_\_ Foot on floor pan.
- X 17. Apply the lower leg weights.
- X 18. Apply the thigh weights.
- X 19. Tilt the back pan forward against the forward stop and draw the H-point machine away from the seatback using the T-bar.
- X 20. Repositioning the back pan.
- X 20.1 Allow the H-point machine to slide rearward until a forward horizontal restraining load on the T-bar is no longer required due to the seat pan contacting the seat back.
- \_\_The seat pan does not slide rearward. Go to 20.2
- \_\_ 20.2 Slide the H-point machine rearward by a horizontal rearward load applied at the T-bar until the seat pan contacts the seat back.
- X 21. Apply a 10 kg load at the intersection of the hip angle quadrant and the T-bar housing along a line from the above intersection to a point just above the thigh bar housing.
- X 22. Again apply a 10 kg load at the intersection of the hip angle quadrant and the T-bar housing along a line from the above intersection to a point just above the thigh bar housing.
- X 23. Carefully return the back pan to the seat back.
- X 24. Install the right and left buttock weights.
- X 25. Install the eight torso weights alternately the installation between right and left.
- X 26. Tilt the back pan forward until the stop is contacted.
- X 27. Rock the H-point from side to side over a 10 degree arc (5 degrees to each side of the vertical centerline) for three complete cycles. Restrained the T-bar during rocking so that the seat pan does not change position. Minimize any inadvertent exterior loads applied in a vertical or fore-aft direction. The feet are free to move during this rocking motion.
- X 28. Without applying a forward or lateral load lift the right foot off the floor the minimum amount necessary until no additional forward foot movement is obtained.
- X 29. Lower the right foot until the heel is in contact with the floor pan and the ball of the foot is in contact with the floor, toe board, or undepressed accelerator pedal.

- X 30. Without applying a forward or lateral load lift the left foot off the floor the minimum Amount necessary until no additional forward foot movement is obtained.
- X 31. Lower the left foot until the heel is in contact with the floor pan and the ball of the foot is In contact with the floor or toe board.
- X 32. Is the seat pan level?  
       X Yes. Go to 34  
       \_\_\_ No. Go to 33
- \_\_\_ 33. Apply a sufficient lateral load to the top of the seatback pan to level the H-point machine seat pan on the seat.
- X 34. Holding the T-bar to prevent the H-point from sliding forward on the seat cushion, return the seatback pan to the seatback.
- X 35. Holding the T-bar to prevent the H-point from sliding forward on the seat cushion, apply sufficient rearward force perpendicular to the back angle bar just above the torso weights to increase the hip angle 3 degrees. Minimize the exterior downward or side forces applied to the H-point machine. Release the force. Repeat this step until the hip angle readout is identical. Complete as many force applications as necessary and record the results in the following table:

| Force Application | Hip Angle |
|-------------------|-----------|
| 1                 | 99        |
| 2                 | 100       |
| 3                 | 100       |
| 4                 |           |
| 5                 |           |

- X 36. Is the H-point machine level?  
       X Yes, go to 37.  
       \_\_\_ No, relevel. Go back to item 26 and repeat using a new data sheet.

- X37. Record the H-point location.  
Describe and mark the measuring reference point.

| Passenger H-Point |     |
|-------------------|-----|
| HP to Floor Z     | 164 |
| HP to Hinge X     | 773 |
| HP to Sill Y      | 264 |
| HP to Striker X   | 218 |
| HP to Dash X      | 546 |
| HP to Header Z    | 786 |

| H-Point Machine  |      |
|------------------|------|
| Left Knee        | 133  |
| Right Knee       | 131  |
| Left Foot Angle  | 107° |
| Right Foot Angle | 106° |
| Left Leg         | 132  |
| Right Leg        | 132  |
| Hip Angle        | 100° |
| Back Angle       | 25°  |

Signature: 

Date: 2/24/12

I certify that I have read and performed each instruction.

## DATA SHEET 16

### AIR BAG SUPPRESSION TELLTALE (S19.2.2)

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance  
Test Technician: Wayne Dahlke

NHTSA No.: CB0502  
Test Date: 1/19/12

- X 1. Is the vehicle certified to any suppression performance standards of FMVSS 208?  
X Yes - go to 2  
\_\_\_ No - this form is complete
- X 2. Does telltale emit yellow light when the air bag is suppressed? (S19.2.2(a))  
X Yes - Pass \_\_\_ **NO - FAIL**
- X 3. Are the words "PASSENGER AIR BAG OFF" or "PASS AIR BAG OFF" (S19.2.2(b))  
X 3.1 on the telltale? (S19.2.2(b))  
\_\_\_ Yes - Pass, go to 4  
X No - go to 3.2
- X 3.2 Within 25 mm of the telltale? (S19.2.2(b)) 5 mm from the edge of the telltale light?  
X Yes - Pass \_\_\_ **NO - FAIL**
- X 4. Is the telltale separate from the air bag readiness indicator? (S19.2.2(c))  
X Yes - Pass \_\_\_ **NO - FAIL**
- X 5. Is the telltale within the interior of the vehicle? (S19.2.2(d))  
X Yes - Pass \_\_\_ **NO - FAIL**
- X 6. Is the telltale forward of and above the design H-point of both the driver's and the front outboard passenger's seat when the seats are in their forwardmost seating positions? (S19.2.2(d))  
X Yes - Pass \_\_\_ **NO - FAIL**
- X 7. Is the telltale away from surfaces that can be used for temporary or permanent storage of objects that could obscure the telltale from either the driver's or front outboard passenger's view? (S19.2.2(d))  
X Yes - Pass \_\_\_ **NO - FAIL**
- X 8. Is the telltale located so that it is not obscured from the driver or front outboard passenger by a rear-facing child restraint in Appendix A installed in the front outboard passenger seat? (S19.2.2(d))  
X Yes - Pass \_\_\_ **NO - FAIL**
- X 9. Is the telltale visible or recognizable during the night? (S19.2.2(e))  
X Yes - Pass \_\_\_ **NO - FAIL**
- X 10. Is the telltale visible or recognizable during the day? (S19.2.2(e))  
X Yes - Pass \_\_\_ **NO - FAIL**
- X 11. If there is a visibility adjustment, do all the adjustment levels make the telltale visible and recognizable? (S19.2.2(g))  
X N/A-No visibility adjustment  
\_\_\_ Yes - Pass \_\_\_ **NO - FAIL**
- X 12. Does the telltale remain illuminated while the air bag is suppressed? (S19.2.2(h)) (Leave the air bag suppressed for 5 minutes.)  
X Yes - Pass \_\_\_ **NO - FAIL**
- X 13. Is the telltale off while the air bag is activated? (S19.2.2(h)) (Leave the air bag activated for 5 minutes.)  
X Yes - Pass \_\_\_ **NO - FAIL**

Signature: Wayne Dahlke

Date: 1/19/12

I certify that I have read and performed each instruction.

## DATA SHEET 17 SUMMARY

### Suppression Test Using 12-Month-Old CRABI Dummy (Part 572, Subpart R) Section B Rear Facing CRS

|             |              |                   |         |
|-------------|--------------|-------------------|---------|
| NHTSA NO.:  | CB0502       | TEST DATE:        | 1/19/12 |
| LABORATORY: | MGA          | TECHNICIAN(S):    | WD      |
| DUMMY TYPE: | 12 Month Old | DUMMY SERIAL NO.: | 062     |

|                        |               |
|------------------------|---------------|
| CHILD RESTRAINT NAME:  | Cosco         |
| CHILD RESTRAINT MODEL: | Arriva 22-013 |
| DATE OF MANUFACTURE:   | 8-20-2008     |

Base:   X   On    Off    N/A-Constraint does not have a removable base

Manufacturer's design seat back angle: 7.2° on Headrest Post

Tested seat back angle: 7.2° on Headrest Post

Manufacturer's specified anchorage position: Full Up

Tested anchorage position: Full Up

A blanket and visor were not used in the suppression testing because they did not affect the weight sensing system used on the vehicle.

#### Test Summary

| Seat Belt                     | Seat Slide | Cinch Load (N) | Result     |
|-------------------------------|------------|----------------|------------|
| Belted<br>Rear<br>Facing      | Forward 3* | 127            | Suppressed |
|                               | Middle     | 128            | Suppressed |
|                               | Rearward   | 122            | Suppressed |
| Unbelted<br>Rear<br>Facing    | Forward    | N/A            | Suppressed |
|                               | Middle     | N/A            | Suppressed |
|                               | Rearward   | N/A            | Suppressed |
| Unbelted<br>Forward<br>Facing | Forward 1* | N/A            | Suppressed |
|                               | Middle     | N/A            | Suppressed |
|                               | Rearward   | N/A            | Suppressed |

\* The CRS would not fit in this Forward Seat Slide position. If there is a number in the Seat Slide column, it indicates the fore-aft detent position with respect to the foremost position. (1 = Full Forward; 25 = Full Rearward; 25 total Seat Slide detents)



## DATA SHEET 17 SUMMARY

### Suppression Test Using 12-Month-Old CRABI Dummy (Part 572, Subpart R) Section B Rear Facing CRS

|             |              |                   |         |
|-------------|--------------|-------------------|---------|
| NHTSA NO.:  | CB0502       | TEST DATE:        | 1/19/12 |
| LABORATORY: | MGA          | TECHNICIAN(S):    | WD      |
| DUMMY TYPE: | 12 Month Old | DUMMY SERIAL NO.: | 062     |

|                        |               |
|------------------------|---------------|
| CHILD RESTRAINT NAME:  | Cosco         |
| CHILD RESTRAINT MODEL: | Arriva 22-013 |
| DATE OF MANUFACTURE:   | 8-20-2008     |

Base: \_\_On X Off \_\_N/A-Constraint does not have a removable base

Manufacturer's design seat back angle: 7.2° on Headrest Post

Tested seat back angle: 7.2° on Headrest Post

Manufacturer's specified anchorage position: Full Up

Tested anchorage position: Full Up

A blanket and visor were not used in the suppression testing because they did not affect the weight sensing system used on the vehicle.

#### Test Summary

| Seat Belt                     | Seat Slide | Cinch Load (N) | Result     |
|-------------------------------|------------|----------------|------------|
| Belted<br>Rear<br>Facing      | Forward    | 130            | Suppressed |
|                               | Middle     | 127            | Suppressed |
|                               | Rearward   | 128            | Suppressed |
| Unbelted<br>Rear<br>Facing    | Forward    | N/A            | Suppressed |
|                               | Middle     | N/A            | Suppressed |
|                               | Rearward   | N/A            | Suppressed |
| Unbelted<br>Forward<br>Facing | Forward    | N/A            | Suppressed |
|                               | Middle     | N/A            | Suppressed |
|                               | Rearward   | N/A            | Suppressed |

Successful Unbelted 5th percentile Female Dummy Reactivation was performed with the seat in the Rearward position. (SN506)

## DATA SHEET 17 SUMMARY

Suppression Test Using 12-Month-Old CRABI Dummy (Part 572, Subpart R)  
Section B Rear Facing CRS

|             |              |                   |         |
|-------------|--------------|-------------------|---------|
| NHTSA NO.:  | CB0502       | TEST DATE:        | 1/19/12 |
| LABORATORY: | MGA          | TECHNICIAN(S):    | WD      |
| DUMMY TYPE: | 12 Month Old | DUMMY SERIAL NO.: | 062     |

|                        |           |
|------------------------|-----------|
| CHILD RESTRAINT NAME:  | Graco     |
| CHILD RESTRAINT MODEL: | Snugride  |
| DATE OF MANUFACTURE:   | 5-24-2007 |

Base: ☒ On ☐ Off ☐ N/A-Restraint does not have a removable base

Manufacturer's design seat back angle: 7.2° on Headrest Post

Tested seat back angle: 7.2° on Headrest Post

Manufacturer's specified anchorage position: Full Up

Tested anchorage position: Full Up

A blanket and visor were not used in the suppression testing because they did not affect the weight sensing system used on the vehicle.

### Test Summary

| Seat Belt                     | Seat Slide | Cinch Load (N) | Result     |
|-------------------------------|------------|----------------|------------|
| Belted<br>Rear<br>Facing      | Forward    | 132            | Suppressed |
|                               | Middle     | 132            | Suppressed |
|                               | Rearward   | 132            | Suppressed |
| Unbelted<br>Rear<br>Facing    | Forward    | N/A            | Suppressed |
|                               | Middle     | N/A            | Suppressed |
|                               | Rearward   | N/A            | Suppressed |
| Unbelted<br>Forward<br>Facing | Forward    | N/A            | Suppressed |
|                               | Middle     | N/A            | Suppressed |
|                               | Rearward   | N/A            | Suppressed |

## DATA SHEET 17 SUMMARY

### Suppression Test Using 12-Month-Old CRABI Dummy (Part 572, Subpart R) Section B Rear Facing CRS

|             |              |                   |         |
|-------------|--------------|-------------------|---------|
| NHTSA NO.:  | CB0502       | TEST DATE:        | 1/19/12 |
| LABORATORY: | MGA          | TECHNICIAN(S):    | WD      |
| DUMMY TYPE: | 12 Month Old | DUMMY SERIAL NO.: | 062     |

|                        |           |
|------------------------|-----------|
| CHILD RESTRAINT NAME:  | Graco     |
| CHILD RESTRAINT MODEL: | Snugride  |
| DATE OF MANUFACTURE:   | 5-24-2007 |

Base: ☐ On ☒ Off ☐ N/A-Restraint does not have a removable base

Manufacturer's design seat back angle: 7.2° on Headrest Post

Tested seat back angle: 7.2° on Headrest Post

Manufacturer's specified anchorage position: Full Up

Tested anchorage position: Full Up

A blanket and visor were not used in the suppression testing because they did not affect the weight sensing system used on the vehicle.

### Test Summary

| Seat Belt                     | Seat Slide | Cinch Load (N) | Result     |
|-------------------------------|------------|----------------|------------|
| Belted<br>Rear<br>Facing      | Forward 3* | 131            | Suppressed |
|                               | Middle     | 129            | Suppressed |
|                               | Rearward   | 129            | Suppressed |
| Unbelted<br>Rear<br>Facing    | Forward 4* | N/A            | Suppressed |
|                               | Middle     | N/A            | Suppressed |
|                               | Rearward   | N/A            | Suppressed |
| Unbelted<br>Forward<br>Facing | Forward    | N/A            | Suppressed |
|                               | Middle     | N/A            | Suppressed |
|                               | Rearward   | N/A            | Suppressed |

\* The CRS would not fit in this Forward Seat Slide position. If there is a number in the Seat Slide column, it indicates the fore-aft detent position with respect to the foremost position. (1 = Full Forward; 25 = Full Rearward; 25 total Seat Slide detents)

Successful Unbelted 5th percentile Female Dummy Reactivation was performed with the seat in the Middle position. (SN506)

## DATA SHEET 17 SUMMARY

Suppression Test Using 12-Month-Old CRABI Dummy (Part 572, Subpart R)  
Section B Rear Facing CRS

|             |              |                   |         |
|-------------|--------------|-------------------|---------|
| NHTSA NO.:  | CB0502       | TEST DATE:        | 1/19/12 |
| LABORATORY: | MGA          | TECHNICIAN(S):    | WD      |
| DUMMY TYPE: | 12 Month Old | DUMMY SERIAL NO.: | 062     |

|                        |            |
|------------------------|------------|
| CHILD RESTRAINT NAME:  | Peg Perego |
| CHILD RESTRAINT MODEL: | Viaggio    |
| DATE OF MANUFACTURE:   | 8-27-2007  |

Base: ☒ On ☐ Off ☐ N/A-Restraint does not have a removable base

Manufacturer's design seat back angle: 7.2° on Headrest Post

Tested seat back angle: 7.2° on Headrest Post

Manufacturer's specified anchorage position: Full Up

Tested anchorage position: Full Up

A blanket and visor were not used in the suppression testing because they did not affect the weight sensing system used on the vehicle.

### Test Summary

| Seat Belt                     | Seat Slide | Cinch Load (N) | Result     |
|-------------------------------|------------|----------------|------------|
| Belted<br>Rear<br>Facing      | Forward    | 128            | Suppressed |
|                               | Middle     | 129            | Suppressed |
|                               | Rearward   | 127            | Suppressed |
| Unbelted<br>Rear<br>Facing    | Forward    | N/A            | Suppressed |
|                               | Middle     | N/A            | Suppressed |
|                               | Rearward   | N/A            | Suppressed |
| Unbelted<br>Forward<br>Facing | Forward    | N/A            | Suppressed |
|                               | Middle     | N/A            | Suppressed |
|                               | Rearward   | N/A            | Suppressed |

## DATA SHEET 17 SUMMARY

### Suppression Test Using 12-Month-Old CRABI Dummy (Part 572, Subpart R) Section B Rear Facing CRS

|             |              |                   |         |
|-------------|--------------|-------------------|---------|
| NHTSA NO.:  | CB0502       | TEST DATE:        | 1/19/12 |
| LABORATORY: | MGA          | TECHNICIAN(S):    | WD      |
| DUMMY TYPE: | 12 Month Old | DUMMY SERIAL NO.: | 062     |

|                        |            |
|------------------------|------------|
| CHILD RESTRAINT NAME:  | Peg Perego |
| CHILD RESTRAINT MODEL: | Viaggio    |
| DATE OF MANUFACTURE:   | 8-27-2007  |

Base: \_\_On X Off \_\_N/A-Constraint does not have a removable base

Manufacturer's design seat back angle: 7.2° on Headrest Post

Tested seat back angle: 7.2° on Headrest Post

Manufacturer's specified anchorage position: Full Up

Tested anchorage position: Full Up

A blanket and visor were not used in the suppression testing because they did not affect the weight sensing system used on the vehicle.

#### Test Summary

| Seat Belt                     | Seat Slide | Cinch Load (N) | Result     |
|-------------------------------|------------|----------------|------------|
| Belted<br>Rear<br>Facing      | Forward    | 131            | Suppressed |
|                               | Middle     | 130            | Suppressed |
|                               | Rearward   | 128            | Suppressed |
| Unbelted<br>Rear<br>Facing    | Forward    | N/A            | Suppressed |
|                               | Middle     | N/A            | Suppressed |
|                               | Rearward   | N/A            | Suppressed |
| Unbelted<br>Forward<br>Facing | Forward    | N/A            | Suppressed |
|                               | Middle     | N/A            | Suppressed |
|                               | Rearward   | N/A            | Suppressed |

Successful Unbelted 5th percentile Female Dummy Reactivation was performed with the seat in the Forward position. (SN506)

## DATA SHEET 17 SUMMARY

### Suppression Test Using 12-Month-Old CRABI Dummy (Part 572, Subpart R) Section C Forward Facing Convertible CRS

|             |              |                   |         |
|-------------|--------------|-------------------|---------|
| NHTSA NO.:  | CB0502       | TEST DATE:        | 1/19/12 |
| LABORATORY: | MGA          | TECHNICIAN(S):    | WD      |
| DUMMY TYPE: | 12 Month Old | DUMMY SERIAL NO.: | 062     |

|                        |                  |
|------------------------|------------------|
| CHILD RESTRAINT NAME:  | Britax           |
| CHILD RESTRAINT MODEL: | Roundabout E9L02 |
| DATE OF MANUFACTURE:   | 7-2-2008         |

Base: \_\_On \_\_Off X N/A-Constraint does not have a removable base

Manufacturer's design seat back angle: 7.2° on Headrest Post

Tested seat back angle: 7.2° on Headrest Post

Manufacturer's specified anchorage position: Full Up

Tested anchorage position: Full Up

A blanket was not used in the suppression testing because it did not affect the weight sensing system used on the vehicle.

### Test Summary

| Seat Belt                     | Seat Slide | Cinch Load (N) | Result     |
|-------------------------------|------------|----------------|------------|
| Belted<br>Forward<br>Facing   | Forward    | 132            | Suppressed |
|                               | Middle     | 130            | Suppressed |
|                               | Rearward   | 130            | Suppressed |
| Unbelted<br>Forward<br>Facing | Forward    | N/A            | Suppressed |
|                               | Middle     | N/A            | Suppressed |
|                               | Rearward   | N/A            | Suppressed |
| Belted<br>Rear<br>Facing      | Forward    | 129            | Suppressed |
|                               | Middle     | 131            | Suppressed |
|                               | Rearward   | 129            | Suppressed |
| Unbelted<br>Rear<br>Facing    | Forward    | N/A            | Suppressed |
|                               | Middle     | N/A            | Suppressed |
|                               | Rearward   | N/A            | Suppressed |

Successful Unbelted 5th percentile Female Dummy Reactivation was performed with the seat in the Forward position. (SN506)

## DATA SHEET 17 SUMMARY

### Suppression Test Using 12-Month-Old CRABI Dummy (Part 572, Subpart R) Section C Forward Facing Convertible CRS

|             |              |                   |         |
|-------------|--------------|-------------------|---------|
| NHTSA NO.:  | CB0502       | TEST DATE:        | 1/19/12 |
| LABORATORY: | MGA          | TECHNICIAN(S):    | WD      |
| DUMMY TYPE: | 12 Month Old | DUMMY SERIAL NO.: | 062     |

|                        |                          |
|------------------------|--------------------------|
| CHILD RESTRAINT NAME:  | Cosco                    |
| CHILD RESTRAINT MODEL: | High Back Booster 22-209 |
| DATE OF MANUFACTURE:   | 10-7-2008                |

Base: \_\_On \_\_Off X N/A-Restraint does not have a removable base

Manufacturer's design seat back angle: 7.2° on Headrest Post

Tested seat back angle: 7.2° on Headrest Post

Manufacturer's specified anchorage position: Full Up

Tested anchorage position: Full Up

A blanket was not used in the suppression testing because it did not affect the weight sensing system used on the vehicle.

#### Test Summary

| Seat Belt                     | Seat Slide | Cinch Load (N) | Result     |
|-------------------------------|------------|----------------|------------|
| Belted<br>Forward<br>Facing   | Forward    | 127            | Suppressed |
|                               | Middle     | 129            | Suppressed |
|                               | Rearward   | 127            | Suppressed |
| Unbelted<br>Forward<br>Facing | Forward    | N/A            | Suppressed |
|                               | Middle     | N/A            | Suppressed |
|                               | Rearward   | N/A            | Suppressed |
| Unbelted<br>Rear<br>Facing    | Forward 3* | N/A            | Suppressed |
|                               | Middle     | N/A            | Suppressed |
|                               | Rearward   | N/A            | Suppressed |

\* The CRS would not fit in this Forward Seat Slide position. If there is a number in the Seat Slide column, it indicates the fore-aft detent position with respect to the foremost position. (1 = Full Forward; 25 = Full Rearward; 25 total Seat Slide detents)

Successful Unbelted 5th percentile Female Dummy Reactivation was performed with the seat in the Middle position. (SN506)

The Cosco High Back Booster 22-209 Does Not Have A Rear Facing Belt Path.

## DATA SHEET 17 SUMMARY

### Suppression Test Using 12-Month-Old CRABI Dummy (Part 572, Subpart R) Section C Forward Facing Convertible CRS

|             |              |                   |         |
|-------------|--------------|-------------------|---------|
| NHTSA NO.:  | CB0502       | TEST DATE:        | 1/19/12 |
| LABORATORY: | MGA          | TECHNICIAN(S):    | WD      |
| DUMMY TYPE: | 12 Month Old | DUMMY SERIAL NO.: | 062     |

|                        |               |
|------------------------|---------------|
| CHILD RESTRAINT NAME:  | Evenflo       |
| CHILD RESTRAINT MODEL: | Tribute V 379 |
| DATE OF MANUFACTURE:   | 6-20-2008     |

Base: \_\_On \_\_Off X N/A-Restraint does not have a removable base

Manufacturer's design seat back angle: 7.2° on Headrest Post

Tested seat back angle: 7.2° on Headrest Post

Manufacturer's specified anchorage position: Full Up

Tested anchorage position: Full Up

A blanket was not used in the suppression testing because it did not affect the weight sensing system used on the vehicle.

### Test Summary

| Seat Belt                     | Seat Slide | Cinch Load (N) | Result     |
|-------------------------------|------------|----------------|------------|
| Belted<br>Forward<br>Facing   | Forward    | 131            | Suppressed |
|                               | Middle     | 127            | Suppressed |
|                               | Rearward   | 128            | Suppressed |
| Unbelted<br>Forward<br>Facing | Forward    | N/A            | Suppressed |
|                               | Middle     | N/A            | Suppressed |
|                               | Rearward   | N/A            | Suppressed |
| Belted<br>Rear<br>Facing      | Forward    | 132            | Suppressed |
|                               | Middle     | 130            | Suppressed |
|                               | Rearward   | 130            | Suppressed |
| Unbelted<br>Rear<br>Facing    | Forward    | N/A            | Suppressed |
|                               | Middle     | N/A            | Suppressed |
|                               | Rearward   | N/A            | Suppressed |

Successful Unbelted 5th percentile Female Dummy Reactivation was performed with the seat in the Rearward position. (SN506)



## DATA SHEET 17 SUMMARY

### Suppression Test Using 12-Month-Old CRABI Dummy (Part 572, Subpart R) Section C Forward Facing Convertible CRS

|             |              |                   |         |
|-------------|--------------|-------------------|---------|
| NHTSA NO.:  | CB0502       | TEST DATE:        | 1/19/12 |
| LABORATORY: | MGA          | TECHNICIAN(S):    | WD      |
| DUMMY TYPE: | 12 Month Old | DUMMY SERIAL NO.: | 062     |

|                        |                         |
|------------------------|-------------------------|
| CHILD RESTRAINT NAME:  | Graco                   |
| CHILD RESTRAINT MODEL: | Toddler SafeSeat Step 2 |
| DATE OF MANUFACTURE:   | 5-24-2007               |

Base: \_\_On \_\_Off X N/A-Constraint does not have a removable base

Manufacturer's design seat back angle: 7.2° on Headrest Post

Tested seat back angle: 7.2° on Headrest Post

Manufacturer's specified anchorage position: Full Up

Tested anchorage position: Full Up

A blanket was not used in the suppression testing because it did not affect the weight sensing system used on the vehicle.

### Test Summary

| Seat Belt                     | Seat Slide | Cinch Load (N) | Result     |
|-------------------------------|------------|----------------|------------|
| Belted<br>Forward<br>Facing   | Forward    | 132            | Suppressed |
|                               | Middle     | 131            | Suppressed |
|                               | Rearward   | 132            | Suppressed |
| Unbelted<br>Forward<br>Facing | Forward    | N/A            | Suppressed |
|                               | Middle     | N/A            | Suppressed |
|                               | Rearward   | N/A            | Suppressed |
| Unbelted<br>Rear<br>Facing    | Forward 7* | N/A            | Suppressed |
|                               | Middle     | N/A            | Suppressed |
|                               | Rearward   | N/A            | Suppressed |

\* The CRS would not fit in this Forward Seat Slide position. If there is a number in the Seat Slide column, it indicates the fore-aft detent position with respect to the foremost position. (1 = Full Forward; 25 = Full Rearward; 25 total Seat Slide detents)

Successful Unbelted 5th percentile Female Dummy Reactivation was performed with the seat in the Middle position. (SN506)

The Graco Toddler SafeSeat Step 2 Does Not Have A Rear Facing Belt Path.

## DATA SHEET 18 SUMMARY

### Suppression Test Using Newborn Infant Dummy (Part 572, Subpart K) Section A Car Bed

|             |                |                   |         |
|-------------|----------------|-------------------|---------|
| NHTSA NO.:  | CB0502         | TEST DATE:        | 1/19/12 |
| LABORATORY: | MGA            | TECHNICIAN(S):    | WD      |
| DUMMY TYPE: | Newborn Infant | DUMMY SERIAL NO.: | 003     |

|                      |             |
|----------------------|-------------|
| CAR BED NAME:        | Angel Guard |
| CAR BED MODEL:       | Angel Ride  |
| DATE OF MANUFACTURE: | 4-15-2008   |

Base: ☐ On ☐ Off ☒ N/A-Restraint does not have a removable base  
(A car bed with a removable base shall be treated as two separate models, i.e. this form and test procedure will be completed with the base on and then repeated on a new form with the base off.)

Manufacturer's design seat back angle: 7.2° on the Headrest Post  
Tested seat back angle: 7.2° on the Headrest Post  
Manufacturer's specified anchorage position: Full Up  
Tested anchorage position: Full Up

A blanket and visor were not used in the suppression testing because they did not affect the weight sensing system used on the vehicle.

#### Test Summary

| Seat Belt | Seat Slide | Result     |
|-----------|------------|------------|
| Belted    | Forward    | Suppressed |
|           | Middle     | Suppressed |
|           | Rearward   | Suppressed |

Successful Unbelted 5th percentile Female Dummy Reactivation was performed with the seat in the Forward position. (SN506)

## DATA SHEET 25 SUMMARY

Low Risk Deployment Tests Using an Unbelted 3 Year Old Dummy  
(Part 572, Subpart P) (S22) Position 1 - Chest On Instrument Panel (S22.4.2)

|             |            |                   |         |
|-------------|------------|-------------------|---------|
| NHTSA NO.:  | CB0502     | TEST DATE:        | 1/24/12 |
| LABORATORY: | MGA        | TECHNICIAN(S):    | BR / WD |
| DUMMY TYPE: | 3 Year Old | DUMMY SERIAL NO.: | 031     |

Manufacturer's design seat back angle: 7.2° on the Headrest Post  
Tested seat back angle: 7.2° on the Headrest Post  
Tested seat position: Full Aft

Thorax cavity angle: 0.2°  
Thigh angle: 50.9°  
Point 1 height: 4 mm Below Plane C Air Bag Height

### Air Bag Deployment Timing

| Stage No. | Firing time (ms) | Recorded firing time (ms) |
|-----------|------------------|---------------------------|
| 1         | 0.0              | 0.0                       |
| 2         | 120.0            | 120.0                     |

### 3-Year-Old SN 031 Position 1 (Chest on Instrument Panel) 1/24/12

| Injury Criteria    | Max. Allowable Injury Assessment Values | Measured Value |
|--------------------|-----------------------------------------|----------------|
| HIC15              | 570                                     | 37             |
| Peak Nij (Nte)     | 1.0                                     | 0.2            |
| Time (ms)          | NA                                      | 93.7           |
| Peak Nij (Ntf)     | 1.0                                     | 0.0            |
| Time (ms)          | NA                                      | 59.0           |
| Peak Nij (Nce)     | 1.0                                     | 0.0            |
| Time (ms)          | NA                                      | 2.9            |
| Peak Nij (Ncf)     | 1.0                                     | 0.5            |
| Time (ms)          | NA                                      | 15.1           |
| Neck Tension       | 1130 N                                  | 101            |
| Neck Compression   | 1380 N                                  | 561            |
| Chest g            | 55 g                                    | 13             |
| Chest Displacement | 34 mm                                   | 1              |

Calculated on data recorded for 100 ms after the initial deployment of the air bag. (S4.11(b))

**A new air bag and instrument panel cover were used for this deployment.**

## DATA SHEET 26 SUMMARY

Low Risk Deployment Tests Using an Unbelted 3 Year Old Dummy  
(Part 572, Subpart P) (S22) Position 2 - Head On Instrument Panel (S22.4.3)

|             |            |                   |         |
|-------------|------------|-------------------|---------|
| NHTSA NO.:  | CB0502     | TEST DATE:        | 1/23/12 |
| LABORATORY: | MGA        | TECHNICIAN(S):    | BR / WD |
| DUMMY TYPE: | 3 Year Old | DUMMY SERIAL NO.: | 031     |

Manufacturer's design seat back angle: 7.2° on the Headrest Post  
Tested seat back angle: 7.2° on the Headrest Post  
Tested seat position: Full Forward

Thorax cavity angle: 0.1°  
Thigh angle: 8.5°

### Air Bag Deployment Timing

| Stage No. | Firing time (ms) | Recorded firing time (ms) |
|-----------|------------------|---------------------------|
| 1         | 0.0              | 0.0                       |
| 2         | 120.0            | 120.0                     |

### 3-Year-Old SN 031 Position 2 (Head on Instrument Panel) 1/23/12

| Injury Criteria    | Max. Allowable Injury Assessment Values | Measured Value |
|--------------------|-----------------------------------------|----------------|
| HIC15              | 570                                     | 3              |
| Peak Nij (Nte)     | 1.0                                     | 0.0            |
| Time (ms)          | NA                                      | 53.1           |
| Peak Nij (Ntf)     | 1.0                                     | 0.1            |
| Time (ms)          | NA                                      | 63.3           |
| Peak Nij (Nce)     | 1.0                                     | 0.3            |
| Time (ms)          | NA                                      | 41.9           |
| Peak Nij (Ncf)     | 1.0                                     | 0.3            |
| Time (ms)          | NA                                      | 13.1           |
| Neck Tension       | 1130 N                                  | 90             |
| Neck Compression   | 1380 N                                  | 476            |
| Chest g            | 55 g                                    | 4              |
| Chest Displacement | 34 mm                                   | 0              |

Calculated on data recorded for 100 ms after the initial deployment of the air bag. (S4.11(b))

**The original equipment parts were used for this deployment.**

## DATA SHEET 27 SUMMARY

Low Risk Deployment Tests Using an Unbelted 6-Year-Old Dummy (Part 572, Subpart N) (S24)  
Position 1 – Chest on Instrument Panel (S24.4.2)

|             |            |                   |         |
|-------------|------------|-------------------|---------|
| NHTSA NO.:  | CB0502     | TEST DATE:        | 1/24/12 |
| LABORATORY: | MGA        | TECHNICIAN(S):    | BR / WD |
| DUMMY TYPE: | 6 Year Old | DUMMY SERIAL NO.: | 155     |

Manufacturer's design seat back angle: 7.2° on the Headrest Post  
Tested seat back angle: 7.2° on the Headrest Post  
Tested seat position: Full Aft

Thorax cavity angle: 6.1°  
Point 1 height: 52 mm Below Plane C Air Bag Height

### Air Bag Deployment Timing

| Stage No. | Firing time (ms) | Recorded firing time (ms) |
|-----------|------------------|---------------------------|
| 1         | 0.0              | 0.0                       |
| 2         | 120.0            | 120.0                     |

### 6-Year-Old SN 155 Position 1 (Chest on Instrument Panel) 1/24/12

| Injury Criteria    | Max. Allowable Injury Assessment Values | Measured Value |
|--------------------|-----------------------------------------|----------------|
| HIC15              | 700                                     | 160            |
| Peak Nij (Nte)     | 1.0                                     | 0.1            |
| Time (ms)          | NA                                      | 100.0          |
| Peak Nij (Ntf)     | 1.0                                     | 0.0            |
| Time (ms)          | NA                                      | 1.7            |
| Peak Nij (Nce)     | 1.0                                     | 0.0            |
| Time (ms)          | NA                                      | 52.8           |
| Peak Nij (Ncf)     | 1.0                                     | 0.4            |
| Time (ms)          | NA                                      | 20.6           |
| Neck Tension       | 1490 N                                  | 84             |
| Neck Compression   | 1820 N                                  | 566            |
| Chest g            | 60 g                                    | 8              |
| Chest Displacement | 40 mm                                   | 0              |

Calculated on data recorded for 100 ms after the initial deployment of the air bag. (S4.11(b))

**A new air bag and instrument panel cover were used for this deployment.**

**The test was conducted with a cracked windshield.**

## DATA SHEET 28 SUMMARY

Low Risk Deployment Tests Using an Unbelted 6 Year Old Dummy  
(Part 572, Subpart P) (S24) Position 2 - Head On Instrument Panel (S24.4.3)

|             |            |                   |         |
|-------------|------------|-------------------|---------|
| NHTSA NO.:  | CB0502     | TEST DATE:        | 1/24/12 |
| LABORATORY: | MGA        | TECHNICIAN(S):    | BR / WD |
| DUMMY TYPE: | 6 Year Old | DUMMY SERIAL NO.: | 155     |

Manufacturer's design seat back angle: 7.2° on the Headrest Post  
Tested seat back angle: 7.2° on the Headrest Post  
Tested seat position: Full Forward

Thorax cavity angle: 30.8°  
Thigh angle: 9.7°

### Air Bag Deployment Timing

| Stage No. | Firing time (ms) | Recorded firing time (ms) |
|-----------|------------------|---------------------------|
| 1         | 0.0              | 0.0                       |
| 2         | 120.0            | 120.0                     |

### 6-Year-Old SN 155 Position 2 (Head on Instrument Panel) 1/24/12

| Injury Criteria    | Max. Allowable Injury Assessment Values | Measured Value |
|--------------------|-----------------------------------------|----------------|
| HIC15              | 700                                     | 9              |
| Peak Nij (Nte)     | 1.0                                     | 0.2            |
| Time (ms)          | NA                                      | 60.4           |
| Peak Nij (Ntf)     | 1.0                                     | 0.0            |
| Time (ms)          | NA                                      | 5.8            |
| Peak Nij (Nce)     | 1.0                                     | 0.2            |
| Time (ms)          | NA                                      | 21.8           |
| Peak Nij (Ncf)     | 1.0                                     | 0.3            |
| Time (ms)          | NA                                      | 14.6           |
| Neck Tension       | 1490 N                                  | 125            |
| Neck Compression   | 1820 N                                  | 613            |
| Chest g            | 60 g                                    | 5              |
| Chest Displacement | 40 mm                                   | 0              |

Calculated on data recorded for 100 ms after the initial deployment of the air bag. (S4.11(b))

**A new air bag and instrument panel cover were used for this deployment.**

**The windshield cracked during this test.**

## DATA SHEET 29 SUMMARY

Low Risk Deployment Tests Using an Unbelted 5<sup>th</sup> Percentile Female  
Dummy (Part 572, Subpart O) (S26) Position 1 - Chin On Module (S26.2)

|             |                                   |                   |         |
|-------------|-----------------------------------|-------------------|---------|
| NHTSA NO.:  | CB0502                            | TEST DATE:        | 1/23/12 |
| LABORATORY: | MGA                               | TECHNICIAN(S):    | BR / WD |
| DUMMY TYPE: | 5 <sup>th</sup> Percentile Female | DUMMY SERIAL NO.: | 510     |

Manufacturer's design seat back angle: 9.2° on the Headrest Post  
Tested seat back angle: 9.2° on the Headrest Post  
Tested seat position: Full Aft  
  
Tested steering wheel angle: 24.2°  
Thorax cavity angle: 30.5°  
Bottom of chin height: 3 mm - Above Plane F Module Height

### Air Bag Deployment Timing

| Stage No. | Firing time (ms) | Recorded firing time (ms) |
|-----------|------------------|---------------------------|
| 1         | 0.0              | 0.0                       |
| 2         | 150.0            | 150.0                     |

### 5<sup>th</sup> Percentile Female SN 510 Position 1 (Chin On Module) 1/23/12

| Injury Criteria    | Max. Allowable Injury Assessment Values | Measured Value |
|--------------------|-----------------------------------------|----------------|
| HIC15              | 700                                     | 14             |
| Peak Nij (Nte)     | 1.0                                     | 0.2            |
| Time (ms)          | NA                                      | 100.9          |
| Peak Nij (Ntf)     | 1.0                                     | 0.3            |
| Time (ms)          | NA                                      | 6.8            |
| Peak Nij (Nce)     | 1.0                                     | 0.0            |
| Time (ms)          | NA                                      | 250.4          |
| Peak Nij (Ncf)     | 1.0                                     | 0.2            |
| Time (ms)          | NA                                      | 9.3            |
| Neck Tension       | 2070 N                                  | 718            |
| Neck Compression   | 2520 N                                  | 159            |
| Chest g            | 60 g                                    | 10             |
| Chest Displacement | 52 mm                                   | 6              |
| Left Femur         | 6805 N                                  | 75             |
| Right Femur        | 6805 N                                  | 68             |

Calculated on data recorded for 125 ms after the initiation of the final stage of air bag deployment designed to deploy in any full frontal rigid barrier crash up to 26 km/h. (S4.11(d))  
Second stage fire time of 150 ms; Injuries calculated on 0 ms to 275 ms.

**The original equipment parts were used for this deployment.**

### DATA SHEET 30 SUMMARY

Low Risk Deployment Tests Using an Unbelted 5<sup>th</sup> Percentile Female Dummy (Part 572, Subpart O) (S26) Position 2 - Chin On Rim (S26.3)

|             |                                   |                   |         |
|-------------|-----------------------------------|-------------------|---------|
| NHTSA NO.:  | CB0502                            | TEST DATE:        | 1/23/12 |
| LABORATORY: | MGA                               | TECHNICIAN(S):    | BR / WD |
| DUMMY TYPE: | 5 <sup>th</sup> Percentile Female | DUMMY SERIAL NO.: | 510     |

Manufacturer's design seat back angle: 9.2° on the Headrest Post

Tested seat back angle: 9.2° on the Headrest Post

Tested seat position: Full Aft

Tested steering wheel angle: 24.2°

Thorax cavity angle: 30.6°

Chin Point height: 3 mm - Below Steering Wheel Target

Note: The chin on rim steering wheel target is 10 mm below the highest point on the steering wheel

#### Air Bag Deployment Timing

| Stage No. | Firing time (ms) | Recorded firing time (ms) |
|-----------|------------------|---------------------------|
| 1         | 0.0              | 0.0                       |
| 2         | 150.0            | 150.0                     |

#### 5<sup>th</sup> Percentile Female SN 510 Position 2 (Chin On Rim) 1/23/12

| Injury Criteria    | Max. Allowable Injury Assessment Values | Measured Value |
|--------------------|-----------------------------------------|----------------|
| HIC15              | 700                                     | 45             |
| Peak Nij (Nte)     | 1.0                                     | 0.3            |
| Time (ms)          | NA                                      | 8.8            |
| Peak Nij (Ntf)     | 1.0                                     | 0.4            |
| Time (ms)          | NA                                      | 71.4           |
| Peak Nij (Nce)     | 1.0                                     | 0.0            |
| Time (ms)          | NA                                      | 169.0          |
| Peak Nij (Ncf)     | 1.0                                     | 0.3            |
| Time (ms)          | NA                                      | 74.7           |
| Neck Tension       | 2070 N                                  | 706            |
| Neck Compression   | 2520 N                                  | 139            |
| Chest g            | 60 g                                    | 19             |
| Chest Displacement | 52 mm                                   | 15             |
| Left Femur         | 6805 N                                  | 26             |
| Right Femur        | 6805 N                                  | 51             |

Calculated on data recorded for 125 ms after the initiation of the final stage of air bag deployment designed to deploy in any full frontal rigid barrier crash up to 26 km/h. (S4.11(d))

Second stage fire time of 150 ms; Injuries calculated on 0 ms to 275 ms.

**A new air bag was used for this deployment.**



## DATA SHEET 32

### VEHICLE WEIGHT, FUEL TANK, AND ATTITUDE DATA

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Tim Novak

NHTSA No.: CB0502  
 Test Date: 2/24/12

|                          |      |               |                        |              |                       |
|--------------------------|------|---------------|------------------------|--------------|-----------------------|
| IMPACT ANGLE:            | Zero |               |                        |              |                       |
| BELTED DUMMIES (YES/NO): | NO   |               |                        |              |                       |
| TEST SPEED:              | X    | 32 to 40 kmph |                        | 0 to 48 kmph | 0 to 56 kmph          |
| DRIVER DUMMY:            |      |               | 5 <sup>th</sup> female | X            | 50 <sup>th</sup> male |
| PASSENGER DUMMY:         |      |               | 5 <sup>th</sup> female | X            | 50 <sup>th</sup> male |

- |   |     |                                                                                                                                                                                                                                                       |
|---|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X | 1.  | Fill the transmission with transmission fluid to the satisfactory range.                                                                                                                                                                              |
| X | 2.  | Drain fuel from vehicle.                                                                                                                                                                                                                              |
| X | 3.  | Run the engine until fuel remaining in the fuel delivery system is used and the engine stops.                                                                                                                                                         |
| X | 4.  | Record the useable fuel tank capacity supplied by the COTR.                                                                                                                                                                                           |
| X |     | Useable Fuel Tank Capacity supplied by COTR: 65.1 liters (17.2 gallons)                                                                                                                                                                               |
| X | 5.  | Record the fuel tank capacity supplied in the owner's manual.                                                                                                                                                                                         |
| X |     | Useable Fuel Tank Capacity in owner's manual: 65.1 liters (17.2 gallons)                                                                                                                                                                              |
| X | 6.  | Using purple dyed Stoddard solvent having the physical and chemical properties of Type 1 solvent or cleaning fluid, Table 1, ASTM Standard D484-71, "Standard Specifications for Hydrocarbon Dry-cleaning Solvents," or gasoline, fill the fuel tank. |
| X |     | Amount Added: 60.6 liters (16 gallons)                                                                                                                                                                                                                |
| X | 7.  | Fill the coolant system to capacity.                                                                                                                                                                                                                  |
| X | 8.  | Fill the engine with motor oil to the Max. mark on the dip stick.                                                                                                                                                                                     |
| X | 9.  | Fill the brake reservoir with brake fluid to its normal level.                                                                                                                                                                                        |
| X | 10. | Fill the windshield washer reservoir to capacity.                                                                                                                                                                                                     |
| X | 11. | Inflate the tires to the tire pressure on the tire placard. If no tire placard is available, inflate the tires to the recommended pressure in the owner's manual.                                                                                     |

|                           |     |        |     |        |     |        |     |        |
|---------------------------|-----|--------|-----|--------|-----|--------|-----|--------|
| Tire placard pressure:    | RF: | 34 psi | LF: | 34 psi | RR: | 34 psi | LR: | 34 psi |
| Owner's manual pressure:  | RF: | 34 psi | LF: | 34 psi | RR: | 34 psi | LR: | 34 psi |
| Actual inflated pressure: | RF: | 34 psi | LF: | 34 psi | RR: | 34 psi | LR: | 34 psi |

- |   |     |                                                                                                                      |
|---|-----|----------------------------------------------------------------------------------------------------------------------|
| X | 12. | Record the vehicle weight at each wheel to determine the unloaded vehicle weight (UVW), i.e. "as delivered" weight). |
|---|-----|----------------------------------------------------------------------------------------------------------------------|

|                                         |       |                  |       |
|-----------------------------------------|-------|------------------|-------|
| Right Front (kg):                       | 499.0 | Right Rear (kg): | 301.2 |
| Left Front (kg):                        | 468.1 | Left Rear (kg):  | 332.5 |
| Total Front (kg):                       | 967.1 | Total Rear (kg): | 633.7 |
| % Total Weight:                         | 60.4  | % Total Weight:  | 39.6  |
| UVW = TOTAL FRONT PLUS TOTAL REAR (KG): |       | 1600.8           |       |

- |   |      |                                                                                                            |
|---|------|------------------------------------------------------------------------------------------------------------|
| X | 13.  | UVW Test Vehicle Attitude: (All dimensions in millimeters)                                                 |
| X | 13.1 | Mark a point on the vehicle above the center of each wheel.                                                |
| X | 13.2 | Place the vehicle on a level surface.                                                                      |
| X | 13.3 | Measure perpendicular to the level surface to the 4 points marked on the body and record the measurements. |

|     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|
| RF: | 700 | LF: | 691 | RR: | 696 | LR: | 706 |
|-----|-----|-----|-----|-----|-----|-----|-----|

X

14.

Calculate the Rated Cargo and Luggage Weight (RCLW): 70 kg

X

14.1

Does the vehicle have the vehicle capacity weight (VCW) on the certification label or tire placard?

X

X

Yes, go to 14.3

No, go to 14.2

14.2

VCW = Gross Vehicle Weight - UVW

VCW = \_\_\_\_\_ - \_\_\_\_\_ = \_\_\_\_\_

X

14.3

VCW = 410 kg (904 lbs)

X

14.4

Does the certification or tire placard contain the Designated Seating Capacity (DSC)?

X

Yes, go to 14.6

No, go to 14.5 and skip 14.6

14.5

DSC = Total number of seat belt assemblies = \_\_\_\_\_

X

14.6

DSC = 5

X

14.7

RCLW = VCW - (68 kg x DSC) = 410 kg - (68 kg x 5) = 70 kg

X

14.8

Is the vehicle certified as a truck, MPV or bus (see the certification label on the door jamb)?

Yes, if the calculated RCLW is greater than 136 kg, use 136 kg as the RCLW. (S8.1.1)

X

No, use the RCLW calculated in 14.7

X

15.

Fully Loaded Weight (100% fuel fill): 1826.6 kg

X

15.1

Place the appropriate test dummy in both front outboard seating positions.

Driver:

5<sup>th</sup> female

X 50<sup>th</sup> male

Passenger:

5<sup>th</sup> female

X 50<sup>th</sup> male

X

15.2

Load the vehicle with the RCLW from 14.7 or 14.8 whichever is applicable.

X

15.3

Place the RCLW in the cargo area. Center the load over the longitudinal centerline of the vehicle. (S8.1.1(d))

X

15.4

Record the vehicle weight at each wheel to determine the Fully Loaded Weight.

|                                                         |        |                  |        |
|---------------------------------------------------------|--------|------------------|--------|
| Right Front (kg):                                       | 534.3  | Right Rear (kg): | 377.4  |
| Left Front (kg):                                        | 505.3  | Left Rear (kg):  | 409.6  |
| Total Front (kg):                                       | 1039.6 | Total Rear (kg): | 787.0  |
| % Total Weight:                                         | 56.9   | % Total Weight:  | 43.1   |
| % GVW                                                   | 52.9   | % GVW            | 49.5   |
| (% GVW = Axle GVW divided by Vehicle GVW)               |        |                  |        |
| Fully Loaded Weight = Total Front Plus Total Rear (kg): |        |                  | 1826.6 |

X

16.

Fully Loaded Test Vehicle Attitude: (All dimensions in millimeters)

X

16.1

Place the vehicle on a level surface.

X

16.2

Measure perpendicular to the level surface to the 4 points marked on the body (see 13.1 above) and record the measurements.

RF: 690 LF: 683 RR: 669 LR: 678

X

17.

Drain the fuel system.

X

18.

Using purple dyed Stoddard solvent having the physical and chemical properties of Type 1 solvent or cleaning fluid, Table 1, ASTM Standard D484-71, "Standard Specifications for Hydrocarbon Dry-cleaning Solvents," fill the fuel tank to 92 - 94 percent of useable capacity.

X

Fuel tank capacity x .94 = 65.1 liters (17.2 gallons) x .94 = 61.2 liters (16.2 gallons)

X

Amount added: 60.6 liters (16.0 gallons) 93.0%

X

19.

Crank the engine to fill the fuel delivery system with Stoddard solvent.

X

20.

Calculate the test weight range.

X

20.1

Calculated Weight = UVW (see 12 above) + RCLW (see 14 above) + 2x(dummy weight)

1826.8 kg = 1600.8 kg + 45.0 kg + 156.0 kg

X

20.2

Test Weight Range = Calculated Weight (- 4.5 kg, - 9 kg.)

Max. Test Weight = Calculated Test Weight - 4.5 kg = 1822.3 kg

Min. Test Weight = Calculated Test Weight - 9 kg = 1817.8 kg

X

21.

Remove the RCLW from the cargo area.

X

22.

Drain transmission fluid, engine coolant, motor oil, and windshield washer fluid from the test vehicle so that Stoddard solvent leakage from the fuel system will be evident.

X

23.

Vehicle Components Removed For Weight Reduction:

Right Hand Rear Tail Light, Spare Tire, Jack, Tools, Rear Seat

X

24.

Secure the equipment and ballast in the load carrying area and distribute it, as nearly as possible, to obtain the proportion of axle weight indicated by the gross axle weight ratings and center it over the longitudinal centerline of the vehicle.

X

25.

If necessary, add ballast to achieve the actual test weight.

N/A

X

Weight of Ballast: 22.2 kg

X

26.

Ballast, including test equipment, must be contained so that it will not shift during the impact event or interfere with data collection or interfere with high-speed film recordings or affect the structural integrity of the vehicle or do anything else to affect test results. Care must be taken to assure that any attachment hardware added to the vehicle is not in the vicinity of the fuel tank or lines.

X

27.

Record the vehicle weight at each wheel to determine the actual test weight.

|                                           |        |                  |        |
|-------------------------------------------|--------|------------------|--------|
| Right Front (kg):                         | 531.2  | Right Rear (kg): | 380.1  |
| Left Front (kg):                          | 497.1  | Left Rear (kg):  | 411.4  |
| Total Front (kg):                         | 1028.3 | Total Rear (kg): | 791.5  |
| % Total Weight:                           | 56.5   | % Total Weight:  | 43.5   |
| % GVW                                     | 52.9   | % GVW            | 49.5   |
| (% GVW = Axle GVW divided by Vehicle GVW) |        |                  |        |
| TOTAL FRONT PLUS TOTAL REAR (kg):         |        |                  | 1819.8 |

X

28.

Is the test weight between the Max. Weight and the Min. Weight (See 20.2)?

X

Yes

No, explain why not.

X

29.

Test Weight Vehicle Attitude: (all dimensions in millimeters)

X

29.1

Place the vehicle on a level surface.

X

29.2

Measure perpendicular to the level surface to the 4 points marked on the body (see 13 above) and record the measurements.

|     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|
| RF: | 695 | LF: | 688 | RR: | 672 | LR: | 682 |
|-----|-----|-----|-----|-----|-----|-----|-----|

|   |
|---|
| X |
| X |

30. Summary of test attitude  
30.1 AS DELIVERED:

|     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|
| RF: | 700 | LF: | 691 | RR: | 696 | LR: | 706 |
|-----|-----|-----|-----|-----|-----|-----|-----|

AS TESTED:

|     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|
| RF: | 695 | LF: | 688 | RR: | 672 | LR: | 682 |
|-----|-----|-----|-----|-----|-----|-----|-----|

FULLY LOADED:

|     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|
| RF: | 690 | LF: | 683 | RR: | 669 | LR: | 678 |
|-----|-----|-----|-----|-----|-----|-----|-----|

|   |
|---|
| X |
|---|

30.2 Is the "as tested" test attitude equal to or between the "fully loaded" and "as delivered" attitude?

|   |
|---|
| X |
|   |

Yes

No, explain why not.

REMARKS:

Signature: *Jim Norak*

Date: 2/24/12

I certify that I have read and performed each instruction.

# DATA SHEET 33

## VEHICLE ACCELEROMETER LOCATION AND MEASUREMENT

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Tim Novak

NHTSA No.: CB0502  
 Test Date: 2/24/12

|                          |      |               |                        |              |                       |
|--------------------------|------|---------------|------------------------|--------------|-----------------------|
| IMPACT ANGLE:            | Zero |               |                        |              |                       |
| BELTED DUMMIES (YES/NO): | NO   |               |                        |              |                       |
| TEST SPEED:              | X    | 32 to 40 kmph |                        | 0 to 48 kmph | 0 to 56 kmph          |
| DRIVER DUMMY:            |      |               | 5 <sup>th</sup> female | X            | 50 <sup>th</sup> male |
| PASSENGER DUMMY:         |      |               | 5 <sup>th</sup> female | X            | 50 <sup>th</sup> male |

- ☒ 1. Find the location where the vertical plane parallel to the longitudinal centerline of the vehicle and through the center of the left front outboard seating position intersects the left rear seat cross member. Install an accelerometer at this intersection on the rear seat cross member to record x-direction accelerations. Record the location on the following chart.
- ☒ 2. Find the location where the vertical plane parallel to the longitudinal centerline of the vehicle and through the center of the right front outboard seating position intersects the right rear seat cross member. Install an accelerometer at this intersection on the rear seat cross member to record x-direction accelerations. Record the location on the following chart.
- ☒ 3. Find the location where a vertical plane through the longitudinal centerline of the vehicle and a vertical transverse plane through the center of the two wheels on opposite sides of the engine intersect at the top of the engine. Install an accelerometer at this intersection to record x-direction accelerations. Record the location on the following chart.
- ☒ 4. Find the location where a vertical plane through the longitudinal centerline of the vehicle and a vertical transverse plane through the center of the two wheels on opposite sides of the engine intersect the bottom of the engine. Install an accelerometer at this intersection to record x-direction accelerations. Record the location on the following chart.
- ☒ 5. Install an accelerometer on the right front brake caliper to record x-direction accelerations. Record the location on the following chart.
- ☒ 6. Find the location where a vertical plane through the longitudinal centerline of the vehicle intersects the top of the instrument panel. Install an accelerometer at this intersection to record x-direction accelerations. Record the location on the following chart.
- ☒ 7. Install an accelerometer on the left front brake caliper to record x-direction accelerations. Record the location on the following chart.
- ☒ 8. Find the location where a vertical plane through the longitudinal centerline of the vehicle intersects the floor of the trunk. Install an accelerometer on the trunk floor at this intersection to record z-direction accelerations. Record the location on the following chart.

REMARKS:

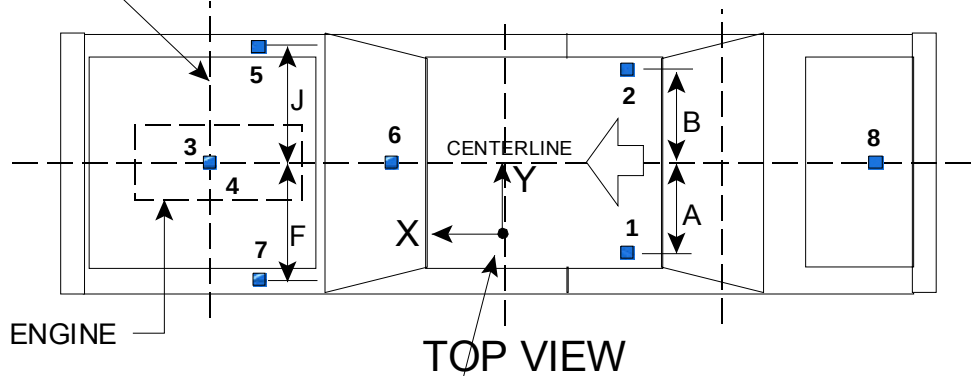
I certify that I have read and performed each instruction.

Signature: Tim Novak

Date: 2/24/12

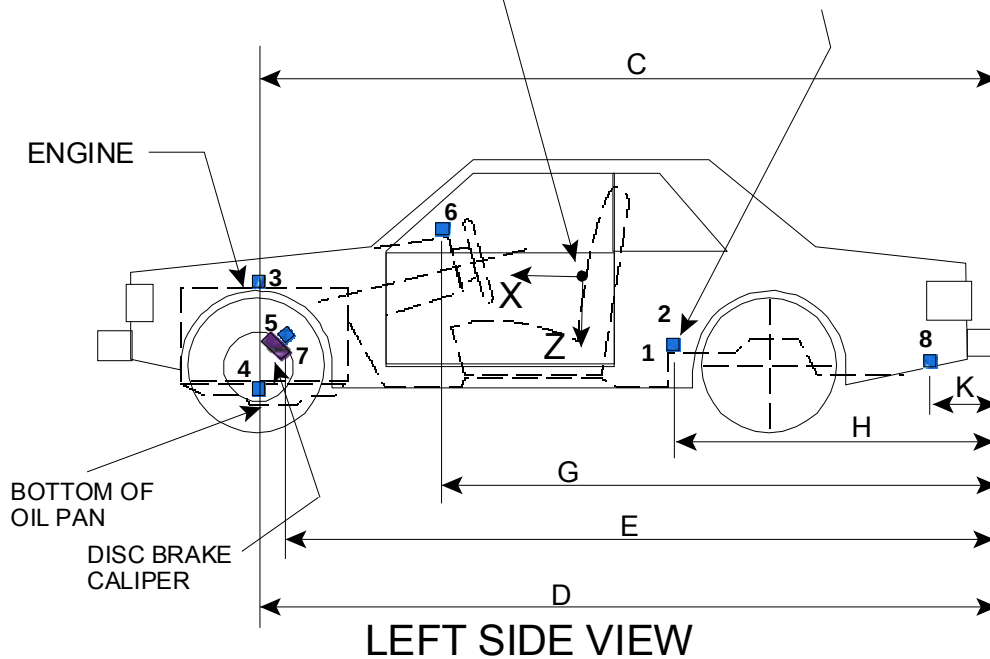
# VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

CENTERLINE OF  
FRONT WHEELS



ACCELEROMETER  
COORDINATE SYSTEM  
(POSITIVE DIRECTION SHOWN)

REAR SEAT CUSHION  
ASSY. FRONT ATTACHMENT  
BRACKET SUPPORT



Dimensions Corresponding To The Letters "A" Through "K" (Excluding "I") Are Recorded In The Table On The Following Page.

Accelerometers Corresponding To The Numbers 1 Through 8 Are Specified On The Preceding Page.

# VEHICLE ACCELEROMETER LOCATION AND MEASUREMENTS

| <u>DIMENSION</u>             | <u>LENGTH (mm)</u> |                 |
|------------------------------|--------------------|-----------------|
| <u>PRETEST VALUES</u>        |                    |                 |
| <u>A</u> (LH Rear Seat Xmbr) | 532                |                 |
| <u>B</u> (RH Rear Seat Xmbr) | 532                |                 |
| <u>C</u> (Engine Top)        | 4078               |                 |
| <u>D</u> (Engine Bottom)     | 4074               |                 |
| <u>E</u> (Caliper)           | Right Side: 3785   | Left Side: 3785 |
| <u>F</u> (Left Caliper)      | 708                |                 |
| <u>G</u> (IP)                | 3400               |                 |
| <u>H</u> (Seat)              | 1861               |                 |
| <u>J</u> (Right Caliper)     | 708                |                 |
| <u>K</u> (Trunk)             | 305                |                 |
| <u>POST TEST VALUES</u>      |                    |                 |
| <u>A</u> (LH Rear Seat Xmbr) | 532                |                 |
| <u>B</u> (RH Rear Seat Xmbr) | 532                |                 |
| <u>C</u> (Engine Top)        | 3911               |                 |
| <u>D</u> (Engine Bottom)     | 3901               |                 |
| <u>E</u> (Caliper)           | Right Side: 3725   | Left Side: 3727 |
| <u>F</u> (Left Caliper)      | 706                |                 |
| <u>G</u> (IP)                | 3400               |                 |
| <u>H</u> (Seat)              | 1861               |                 |
| <u>J</u> (Right Caliper)     | 701                |                 |
| <u>K</u> (Trunk)             | 305                |                 |

# DATA SHEET 34

## PHOTOGRAPHIC TARGETS

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Tim Novak

NHTSA No.: CB0502  
 Test Date: 2/24/12

|                          |      |               |                        |              |                       |
|--------------------------|------|---------------|------------------------|--------------|-----------------------|
| IMPACT ANGLE:            | Zero |               |                        |              |                       |
| BELTED DUMMIES (YES/NO): | NO   |               |                        |              |                       |
| TEST SPEED:              | X    | 32 to 40 kmph |                        | 0 to 48 kmph | 0 to 56 kmph          |
| DRIVER DUMMY:            |      |               | 5 <sup>th</sup> female | X            | 50 <sup>th</sup> male |
| PASSENGER DUMMY:         |      |               | 5 <sup>th</sup> female | X            | 50 <sup>th</sup> male |

- |                                     |      |                                                                                                                                                                                                                                                                                                 |
|-------------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | 1.   | <b>FMVSS 208 vehicle targeting requirements</b> (See Figures 28A and 28B)                                                                                                                                                                                                                       |
| <input checked="" type="checkbox"/> | 1.1  | Targets A1 and A2 are on flat rectangular panels.                                                                                                                                                                                                                                               |
| <input checked="" type="checkbox"/> | 1.2  | Three circular targets at least 90 mm in diameter and with black and yellow quadrants are mounted at the front on the outboard sides of A1 and A2. The center of each circular target is 100 mm from the one next to it.                                                                        |
| <input checked="" type="checkbox"/> |      | Distance between targets (mm): <u>100 mm</u>                                                                                                                                                                                                                                                    |
| <input checked="" type="checkbox"/> | 1.3  | Three circular targets at least 90 mm in diameter and with black and yellow quadrants are mounted at the back on the outboard sides of on A1 and A2. The center of each circular target is 100 mm from the one next to it.                                                                      |
| <input checked="" type="checkbox"/> |      | Distance between targets (mm): <u>100 mm</u>                                                                                                                                                                                                                                                    |
| <input checked="" type="checkbox"/> | 1.4  | The distance between the first circular target at the front of A1 and A2 and the last circular target at the back of A1 and A2 is at least 915 mm.                                                                                                                                              |
| <input checked="" type="checkbox"/> |      | Distance between the first and last circular targets (mm): <u>915 mm</u>                                                                                                                                                                                                                        |
| <input checked="" type="checkbox"/> | 1.5  | Firmly fix target A1 on the vehicle roof in the vertical longitudinal plane that is coincident with the midsagittal plane of the driver dummy.                                                                                                                                                  |
| <input checked="" type="checkbox"/> | 1.6  | Firmly fix target A2 on the vehicle roof in the vertical longitudinal plane that is coincident with the midsagittal plane of the passenger dummy.                                                                                                                                               |
| <input checked="" type="checkbox"/> | 1.7  | Two circular targets (C1 and C2) at least 90 mm in diameter and with black and yellow quadrants are mounted on the outside of the driver door. The centers of each circular target are at least 610 mm apart.                                                                                   |
| <input checked="" type="checkbox"/> |      | Distance between targets (mm): <u>610 mm</u>                                                                                                                                                                                                                                                    |
| <input checked="" type="checkbox"/> | 1.8  | Two circular targets (C1 and C2) at least 90 mm in diameter and with black and yellow quadrants are mounted on the outside of the passenger door. The centers of each circular target are at least 610 mm apart.                                                                                |
| <input checked="" type="checkbox"/> |      | Distance between targets (mm): <u>612 mm</u>                                                                                                                                                                                                                                                    |
| <input checked="" type="checkbox"/> | 1.9  | Place tape with squares having alternating colors on the top portion of the steering wheel.                                                                                                                                                                                                     |
| <input checked="" type="checkbox"/> | 1.10 | Chalk the bottom portion of the steering wheel.                                                                                                                                                                                                                                                 |
| <input checked="" type="checkbox"/> | 1.11 | Is this an offset test?                                                                                                                                                                                                                                                                         |
| <input type="checkbox"/>            |      | <b>Yes, continue with this section</b>                                                                                                                                                                                                                                                          |
| <input checked="" type="checkbox"/> |      | <b>No, go to 2.</b>                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | 1.12 | Measure the width of the vehicle.                                                                                                                                                                                                                                                               |
| <input type="checkbox"/>            |      | Vehicle width (mm):                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | 1.13 | Find the centerline of the vehicle. ( $\frac{1}{2}$ of the vehicle width)                                                                                                                                                                                                                       |
| <input type="checkbox"/>            | 1.14 | Find the line parallel to the centerline of the vehicle and 0.1 x vehicle width from the centerline of the vehicle.                                                                                                                                                                             |
| <input type="checkbox"/>            | 1.15 | Apply 25 mm wide tape with alternating black and yellow squares parallel to and on each side of the line found in 1.14. The edge of each tape shall be 50 mm from the line found in 1.14. The tape shall extend from the bottom of the bumper to the front edge of the windshield. (Figure 28D) |



|                                     |       |                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | 2.    | <b>Barrier Targeting</b>                                                                                                                                                                                                                                                                                                  |
| <input checked="" type="checkbox"/> | 2.1   | Fix two stationary targets D1 and D2 to the barrier as shown in the Figure 28A. One target is in the vertical longitudinal plane that is coincident with the midsagittal plane of the driver dummy. The other is in the vertical longitudinal plane that is coincident with the midsagittal plane of the passenger dummy. |
| <input checked="" type="checkbox"/> | 2.2   | Targets D1 and D2 are on a rectangular panel.                                                                                                                                                                                                                                                                             |
| <input checked="" type="checkbox"/> | 2.3   | Three circular targets at least 90 mm in diameter and with black and yellow quadrants are mounted on the sides of the rectangular panel away from the longitudinal centerline of the vehicle. The center of each circular target is 100 mm from the one next to it.                                                       |
| <input checked="" type="checkbox"/> |       | Distance between circular targets on D1 (mm): <u>100 mm</u>                                                                                                                                                                                                                                                               |
| <input checked="" type="checkbox"/> |       | Distance between circular targets on D2 (mm): <u>100 mm</u>                                                                                                                                                                                                                                                               |
| <input checked="" type="checkbox"/> | 3.    | <b>FMVSS 208 Dummy Targeting Requirements</b>                                                                                                                                                                                                                                                                             |
| <input checked="" type="checkbox"/> | 3.1   | Place a circular target with black and yellow quadrants on both sides of the driver dummy head as close as possible to the center of gravity of the head in the x and z direction (relative to the measuring directions of the accelerometers).                                                                           |
| <input checked="" type="checkbox"/> | 3.2   | Place a circular target with black and yellow quadrants on both sides of the passenger dummy head as close as possible to the center of gravity of the head in the x and z direction (relative to the measuring directions of the accelerometers).                                                                        |
| <input checked="" type="checkbox"/> | 3.3   | Place a circular target with black and yellow quadrants on the outboard shoulder of the driver dummy. Place the target as high up on the arm as possible at the intersection of the arm and shoulder. The sleeve of the shirt on the dummy may be cut to make the target visible, but do not remove any material.         |
| <input checked="" type="checkbox"/> | 3.4   | Place a circular target with black and yellow quadrants on the outboard shoulder of the passenger dummy. Place the target as high up on the arm as possible at the intersection of the arm and shoulder. The sleeve of the shirt on the dummy may be cut to make the target visible, but do not remove any material.      |
| <input checked="" type="checkbox"/> | 4.    | <b>FMVSS 204 Targeting Requirements</b>                                                                                                                                                                                                                                                                                   |
| <input checked="" type="checkbox"/> | 4.1   | Is an FMVSS 204 indicant test ordered on the "COTR Vehicle Work Order?"                                                                                                                                                                                                                                                   |
| <input type="checkbox"/>            |       | Yes, continue with this form.                                                                                                                                                                                                                                                                                             |
| <input checked="" type="checkbox"/> |       | No, this form is complete.                                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/>            | 4.2   | Resection panel (Figure 28C)                                                                                                                                                                                                                                                                                              |
| <input type="checkbox"/>            | 4.2.1 | The panel deviates no more than 6 mm from perfect flatness when suspended vertically                                                                                                                                                                                                                                      |
| <input type="checkbox"/>            | 4.2.2 | The 8 targets on the panel are circular targets at least 90 mm in diameter and with black and yellow quadrants.                                                                                                                                                                                                           |
| <input type="checkbox"/>            | 4.2.3 | The center of each of the 4 outer targets are placed within 1 mm of the corners of a square measuring 914 mm on each side.                                                                                                                                                                                                |
| <input type="checkbox"/>            | 4.2.4 | Locate another square with 228 mm sides and with the center of this square coincident with the center of the 914 mm square.                                                                                                                                                                                               |
| <input type="checkbox"/>            | 4.2.5 | The center of the 4 inner targets are placed at the midpoints of each of the 228 mm sides.                                                                                                                                                                                                                                |
| <input type="checkbox"/>            | 4.3   | Place a circular target at least 90 mm in diameter and with black and yellow quadrants on a material (cardboard, metal, etc.) that can be taped to the top of the steering column.                                                                                                                                        |
| <input type="checkbox"/>            | 4.4   | Tape the target from 4.3 to the top of the steering column in a manner that does not interfere with the movement of the steering column in a crash.                                                                                                                                                                       |

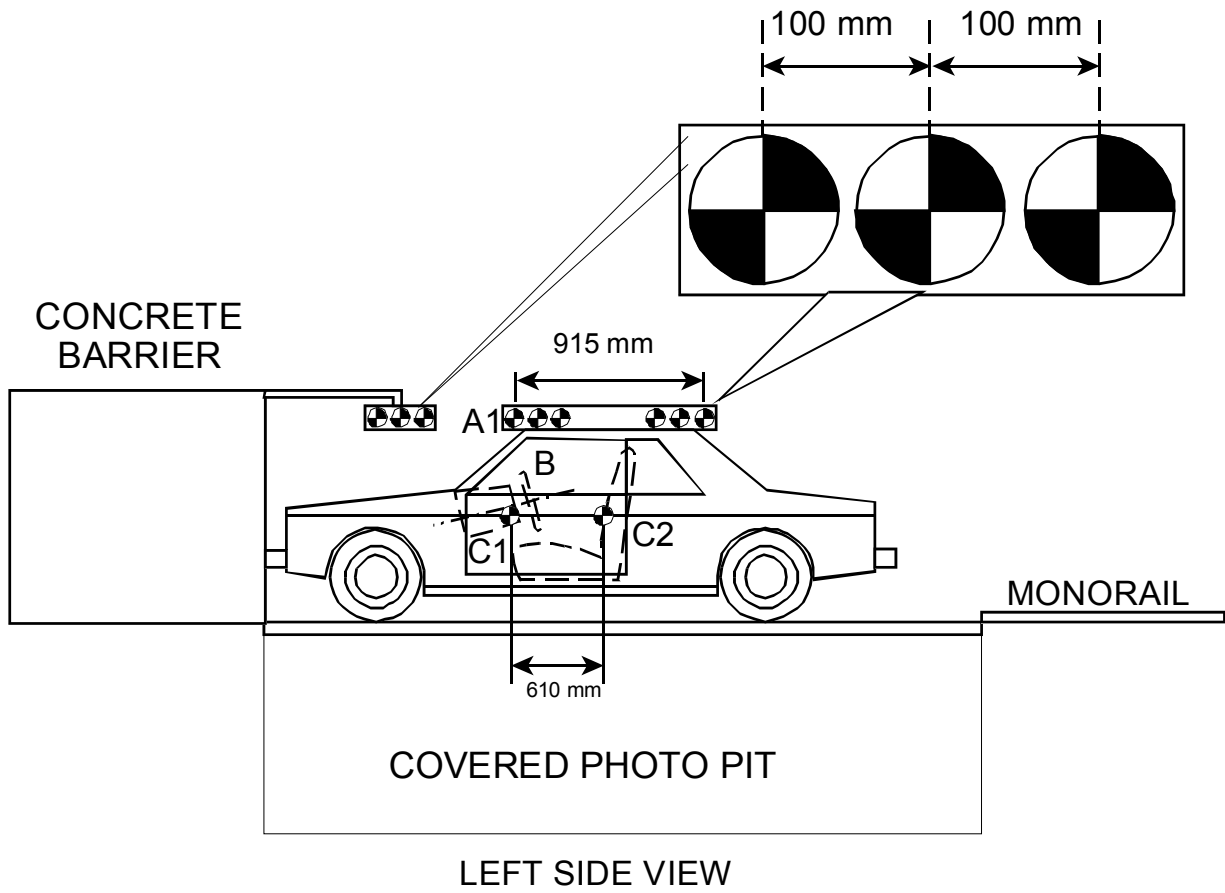
REMARKS:

Signature: *Jim Norick*

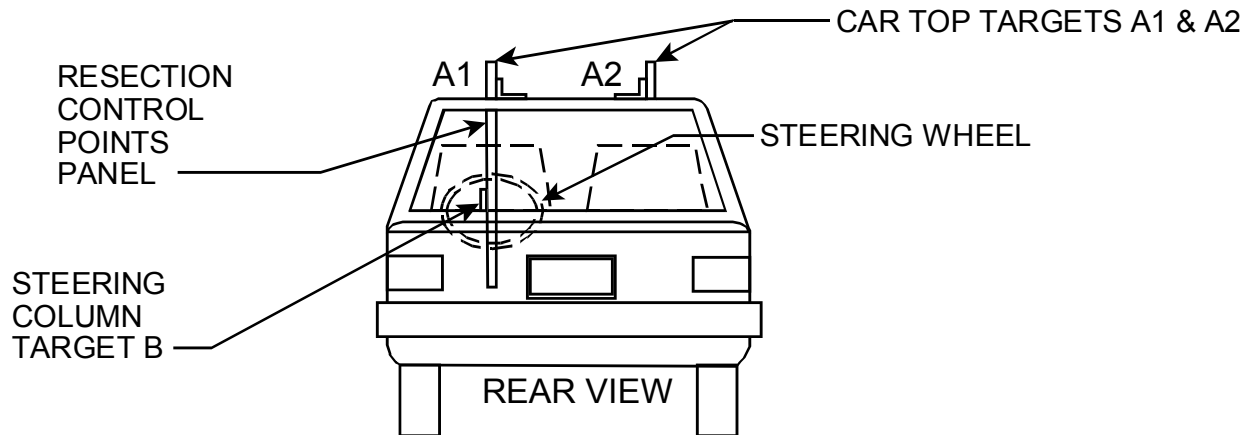
Date: 2/24/12

I certify that I have read and performed each instruction.

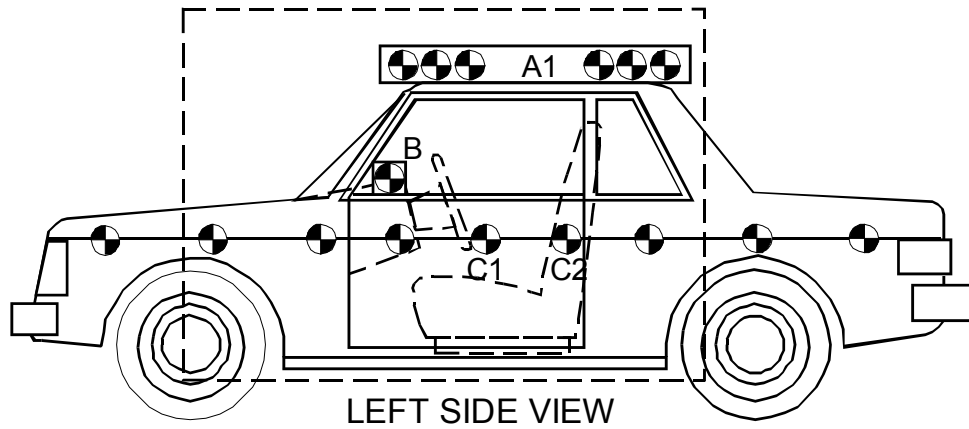
## REFERENCE PHOTO TARGETS



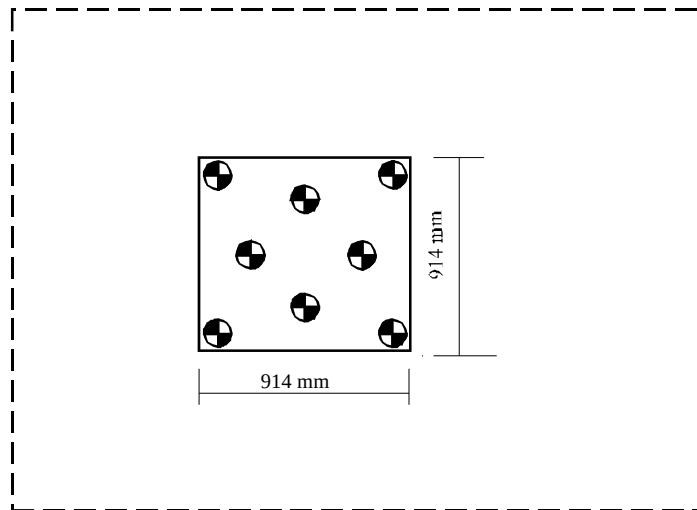
## RESECTION PANEL TARGETING ALIGNMENT



## TEST RUN STEERING COLUMN CAMERA VIEW OF TYPICAL TIME ZERO VEHICLE POSITION



## PRE-RUN STEERING COLUMN HIGH SPEED CAMERA VIEW



LEFT SIDE VIEW

**DATA SHEET 35**  
**CAMERA LOCATIONS**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance

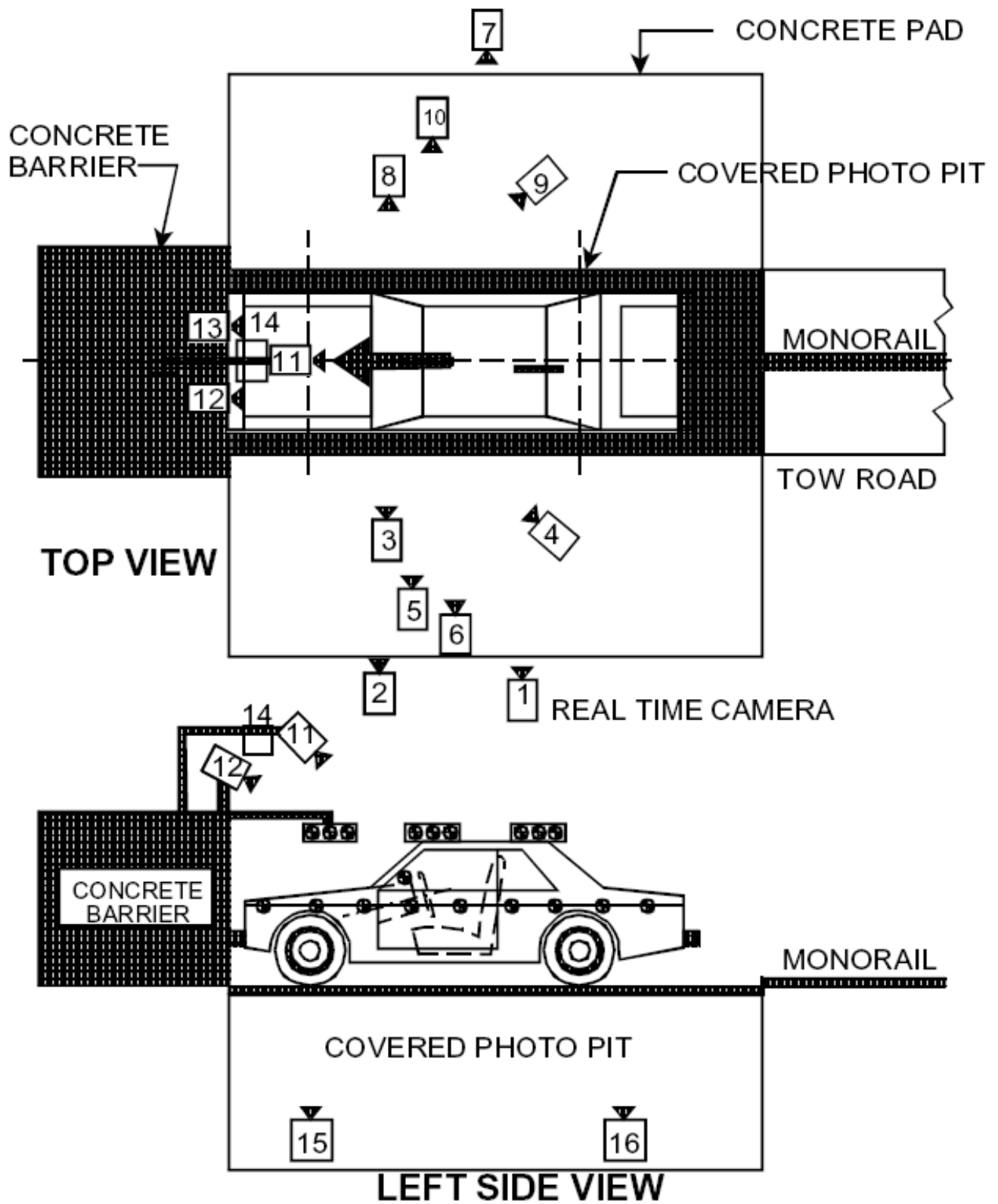
NHTSA No.: CB0502  
Test Date: 2/24/12  
Time: 11:19 am

| CAMERA NO. | VIEW                                                          | CAMERA POSITIONS (mm) * |       |       | LENS (mm) | SPEED (fps) |
|------------|---------------------------------------------------------------|-------------------------|-------|-------|-----------|-------------|
|            |                                                               | X                       | Y     | Z     |           |             |
| 1          | Real Time Left Side View                                      |                         |       |       | 13        | 24          |
| 2          | Left Side View (Barrier face to front seat backs)             | 1230                    | -4890 | 1070  | 24        | 1000        |
| 3          | Left Side View (Driver)                                       | 1560                    | -6440 | 1850  | 35        | 1000        |
| 4          | Left Side View (B-post aimed toward center of steering wheel) | 5790                    | -4920 | 1900  | 50        | 1000        |
| 5          | Left Side View (Steering Column)                              | 660                     | -5300 | 1240  | 24        | 1000        |
| 6          | Left Side View (Steering Column)                              | 640                     | -5240 | 830   | 24        | 1000        |
| 7          | Right Side View (Overall)                                     | 2250                    | 6530  | 1060  | 20        | 1000        |
| 8          | Right Side View (Passenger)                                   | 1790                    | 6650  | 1780  | 35        | 1000        |
| 9          | Right Side View (Angle)                                       | 5900                    | 4900  | 1930  | 50        | 1000        |
| 10         | Right Side View (Front door)                                  | 1350                    | 4890  | 1040  | 24        | 1000        |
| 11         | Front View Windshield                                         | -260                    | 0     | 2860  | 20        | 1000        |
| 12         | Front View Driver                                             | -30                     | -360  | 2270  | 12.5      | 1000        |
| 13         | Front View Passenger                                          | -30                     | 360   | 2270  | 12.5      | 1000        |
| 14         | Overhead Barrier Impact View                                  | 1980                    | 0     | 4910  | 14        | 1000        |
| 15         | Pit Camera Engine View                                        | 1230                    | 0     | -3150 | 24        | 1000        |
| 16         | Pit Camera Fuel Tank View                                     | 3160                    | 0     | -3150 | 24        | 1000        |

**\*COORDINATES:**

- +X - forward of impact plane
- +Y - right of monorail centerline
- +Z - above ground level

# CAMERA POSITIONS FOR FMVSS 208



# DATA SHEET 36

## APPENDIX F

### DUMMY POSITIONING PROCEDURES FOR DRIVER TEST DUMMY CONFORMING TO SUBPART E OF PART 572

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Joe Fleck

NHTSA No.: CB0502  
 Test Date: 2/24/12

|                          |      |               |                        |              |                       |
|--------------------------|------|---------------|------------------------|--------------|-----------------------|
| IMPACT ANGLE:            | Zero |               |                        |              |                       |
| BELTED DUMMIES (YES/NO): | NO   |               |                        |              |                       |
| TEST SPEED:              | X    | 32 to 40 kmph |                        | 0 to 48 kmph | 0 to 56 kmph          |
| DRIVER DUMMY:            |      |               | 5 <sup>th</sup> female | X            | 50 <sup>th</sup> male |
| PASSENGER DUMMY:         |      |               | 5 <sup>th</sup> female | X            | 50 <sup>th</sup> male |

- X 1. Position the seat's adjustable lumbar supports so that the lumbar support is in its lowest, retracted or deflated adjustment position. (S8.1.3)  
 \_\_\_ N/A – No lumbar adjustment
- X 2. Position any adjustable parts of the seat that provide additional support so that they are in the lowest or most open adjustment position. (S16.2.10.2)  
X N/A – No additional support adjustment
- X 3. Use all the seat controls that have any affect on the fore-aft movement of the seat to move the seat cushion to the rearmost position. **Mark** this position. (8/31/95 legal interpretation to Hogan and Hartson)
- X 4. Use all the seat controls that have any affect on the fore-aft movement of the seat to move the seat cushion to the foremost position. **Mark** this position. (8/31/95 legal interpretation to Hogan and Hartson)
- X 5. **Mark** each fore-aft position so that there is a visual indication when the seat is at a particular position. For manual seats, **mark** each detent. For power seats, **mark** only the rearmost, middle, and foremost positions. Label three of the positions with the following: F for foremost, M for mid-position (if there is no mid-position, label the closest adjustment position to the rear of the mid-point), and R for rearmost. Determine the mid fore-aft seat position based on the foremost and rearmost positions determined in items 3 and 4. (8/31/95 legal interpretation to Hogan and Hartson)
- X 6. Move the seat to the mid position.
- X 7. While maintaining the mid position, move the seat to its lowest position. **Mark** the height position. For seats with adjustable seat cushions, use the manufacturer's recommended seat cushion angle for determining the lowest height position.  
 \_\_\_ N/A- No cushion angle adjustment  
 Manufacturer's seat cushion angle: Full down, 0.0° of 5.0°  
 Tested seat cushion angle: Full down, 0.0° of 5.0°
- X 8. Visually **mark** the seat back angle, if adjustable, at the manufacturer's nominal design riding position for a **50th percentile adult male** in the manner specified by the manufacturer.  
 \_\_\_ N/A – No seat back angle adjustment  
 Manufacturer's design seat back angle: 9.21° on head rest post  
 Tested seat back angle: 9.2° on head rest post

- ☒ 9. Is the seat a bucket seat?  
    ☒ Yes, go to 10 and skip 11  
    \_\_\_ No, go to 11 and skip 10
- ☒ 10. Bucket seats:  
    Locate and **mark** the longitudinal centerline of the seat cushion. The intersection of the vertical longitudinal plane that passes through the SgRP and the seat cushion upper surface determines the longitudinal centerline of a bucket seat cushion. (S10.4.1.2 and S16.3.1.10)
- \_\_\_ 11. Bench seats:  
    Locate and **mark** the longitudinal line on the seat cushion that marks the intersection of the vertical longitudinal plane through the centerline of the steering wheel and the seat cushion upper surface. (S10.4.1.1)
- ☒ 12. If adjustable, set the head restraint at the full up position. (S8.1.3) If there are adjustments other than vertical, adjust them as recommended by the manufacturer.  
    \_\_\_ N/A – No head restraint adjustment
- ☒ 13. Place any adjustable seat belt anchorages at the vehicle manufacturer's nominal design position for a 50th percentile adult male occupant (S8.1.3)  
    \_\_\_ N/A – No adjustable upper seat belt anchorage  
    Manufacturer's specified anchorage position: Zero of 5; Top as Zero  
    Tested anchorage position: Zero of 5; Top as Zero
- ☒ 14. Place adjustable pedals in the full forward position.  
    ☒ N/A – the pedals are not adjustable.
- ☒ 15. Is the steering wheel adjustable up and down and/or in and out?  
    ☒ Yes – go to 16  
    \_\_\_ No – go to 19
- ☒ 16. Find and **mark** each up and down position. Label three of the positions with the following: H for highest, M for mid-position (if there is no mid-position, label the next lowest adjustment position), and L for lowest.  
    \_\_\_ N/A – steering wheel is not adjustable up and down
- ☒ 17. Find and **mark** each in and out position. Label three of the positions with the following: F for foremost, M for mid-position (if there is no mid-position, label the next rearmost adjustment position), and R for rearmost.  
    \_\_\_ N/A – steering wheel is not adjustable in and out.
- ☒ 18. Set the steering wheel hub at the geometric center of the full range of driving positions including any telescoping positions.
- ☒ 19. Place the dummy in the seat such that the midsagittal plane is coincident with the longitudinal seat cushion markings as determined in item 10 or 11 and the upper torso rests against the seat back. (S10.4.1.1 & S10.4.1.2)
- ☒ 20. Rest the thighs on the seat cushion. (S10.5)



☒ 21. Position the H-point of the dummy within 0.5 inch of the vertical dimension and 0.5 inch of the horizontal dimension of a point 0.25 inch below the H-point determined in Data Sheet 15. (S10.4.2.1) Then measure the pelvic angle with respect to the horizontal using the pelvic angle gage. Adjust the dummy position until these three measurements are within the specifications. (S10.4.2.1 and S10.4.2.2)

0.236" horizontal inches from the point 0.25 below the determined H-point (0.5" max.) (S10.4.2.1)

0.157" vertical inches from the point 0.25 below the determined H-point (0.5" max.) (S10.4.2.1)

24.7° pelvic angle (20° to 25°)

☒ 22. Is the head level within  $\pm 0.5^\circ$ ? (S10.1)

☒ Yes, go to 23

☐ No, go to 22.1

☐ 22.1 Adjust the position of the H-point. (S10.1)

☐ 22.2 Is the head level within  $\pm 0.5^\circ$ ? (S10.1)

☐ Yes, record the following, then go to 23. ☐ No, go to 22.3

☐ horizontal inches from the point 0.25 below the determined H-point (0.5" max.) (S10.4.2.1)

☐ vertical inches from the point 0.25 below the determined H-point (0.5" max.) (S10.4.2.1)

☐ pelvic angle (20° to 25°) (S10.4.2.2)

☐ 22.3 Adjust the pelvic angle. (S10.1)

☐ 22.4 Is the head level within  $\pm 0.5^\circ$ ? (S10.1)

☐ Yes, record the following, then go to 23. ☐ No, go to 22.5

☐ horizontal inches from the point 0.25 below the determined H-point (0.5 inch max.) (S10.4.2.1)

☐ vertical inches from the point 0.25 below the determined H-point (0.5 inch max.) (S10.4.2.1)

☐ pelvic angle (20° to 25°) (S10.4.2.2)

☐ 22.5 Adjust the neck bracket of the dummy the minimum amount necessary from the nonadjusted "0" setting until the head is level within  $\pm 0.5^\circ$ . (S10.1) Record the following, then go to 23

☐ horizontal inches from the point 0.25 below the determined H-point (0.5 inch max.) (S10.4.2.1)

☐ vertical inches from the point 0.25 below the determined H-point (0.5 inch max.) (S10.4.2.1)

☐ pelvic angle (20° to 25°) (S10.4.2.2)

☒ 23. Set the distance between the outboard knee clevis flange surfaces at 10.6 inches.

10.6" measured distance (10.6 inches) (S10.5)

☒ 24. Can the right foot be placed on the accelerator?

☒ Yes, go to 24.1 and skip 24.2

☐ No, go to 24.2

☒ 24.1. To the extent practicable keep the right thigh and the leg in a vertical plane (S10.5) while resting the foot on the undepressed accelerator pedal with the rearmost point of the heel on the floor pan in the plane of the pedal. (S10.6.1.1)

- ☐ 24.2 Initially set the foot perpendicular to the leg and then place it as far forward as possible in the direction of the pedal centerline with the rearmost point of the heel resting on the floor pan. (S10.6.1.1)
- ☐ 24.2.1 Move the adjustable pedal to its most rearward position or until the right foot is flat on the pedal, whichever occurs first. (S10.6.1.1)
- ☐ N/A – the accelerator pedal is not adjustable
- ☒ 25. Does the vehicle have a foot rest?
- ☒ Yes, go to 25.1
- ☐ No, go to 25.2
- ☒ 25.1 With the left thigh and leg in a vertical plane, place the left foot on the foot rest with the heel resting on the floor pan. (S10.6.1.2)
- ☒ 25.1.1 Is the left foot elevated above the right foot?
- ☐ Yes, go to 25.2 and position the foot off the foot rest
- ☒ No, go to 26
- ☐ 25.2 Check the ONLY one of the following that applies
- ☐ The left foot reaches the toeboard without adjusting the foot or leg. To the extent practicable keep the left thigh and the leg in a vertical longitudinal plane (S10.5) and place the foot on the toeboard, skip 25.3 (S10.6.1.2)
- ☐ The left foot reaches the toeboard but contacts the brake or clutch pedal and must be rotated to avoid pedal contact. To the extent practicable keep the left thigh and the leg in a vertical longitudinal plane (S10.5) and place the foot on the toeboard. The foot was rotated about the leg to avoid pedal contact, skip 25.3 (S10.6.1.2)
- ☐ The left foot reaches the toeboard but contacts the brake or clutch pedal and the foot and leg must be rotated to avoid pedal contact. To the extent practicable keep the left thigh and the leg in a vertical longitudinal plane (S10.5) and place the foot on the toeboard. The foot was rotated about the leg and the leg was rotated outboard about the hip the minimum distance necessary to avoid pedal contact, skip 12.3 (S10.6.1.2)
- ☐ N/A – the foot does not reach the toeboard, go to 25.3
- ☐ 25.3 Check the ONLY one of the following that applies
- ☐ The left foot did not contact the brake or clutch pedal. To the extent practicable keep the left thigh and the leg in a vertical longitudinal plane (S10.5). Set the foot perpendicular to the leg and place it as far forward as possible with the heel resting on the floor pan. (S10.6.1.2)
- ☐ The left foot did contact the brake or clutch pedal and the foot was rotated to avoid contact. To the extent practicable keep the left thigh and the leg in a vertical longitudinal plane (S10.5). Set the foot perpendicular to the leg and place it as far forward as possible with the heel resting on the floor pan and rotate the foot the minimum amount to avoid pedal contact. (S10.6.1.2)
- ☐ The left foot did contact the brake or clutch pedal and the foot was rotated about the leg and the leg was rotated outboard about the hip the minimum distance necessary to avoid pedal contact. Set the foot perpendicular to the leg and place it as far forward as possible with the heel resting on the floor pan and rotate the foot about the leg and the thigh and leg outboard about the hip the minimum distance necessary to avoid pedal contact. (S10.6.1.2)
- ☒ 26. Place the right upper arm adjacent to the torso with the centerline as close to a vertical plane as possible. (S10.2.1)

X   27. Is the driver seat belt used for this test?

   Yes, continue

  X   No, go to 28

   27.1 Fasten the seat belt around the dummy.

   27.2 Remove all slack from the lap belt portion. (S10.9)

   27.3 Pull the upper torso webbing out of the retractor and allow it to retract; repeat this four times. (S10.9)

   27.4 Apply a 2 to 4 pound tension load to the lap belt. (S10.9)  
       pound load applied

   27.5 Is the belt system equipped with a tension-relieving device?

   Yes, continue

   No, go to 28

   27.6 Introduce the maximum amount of slack into the upper torso bet that is recommended by the vehicle manufacturer in the vehicle owner's manual. (S10.9).

  X   28. Place the left upper arm adjacent to the torso with the centerline as close to a vertical plane as possible. (S10.2.1)

  X   29. Place the right hand with the palm in contact with the steering wheel at the rim's horizontal centerline and with the thumb over the steering wheel. (S10.3.1)

  X   30. Place the left hand with the palm in contact with the steering wheel at the rim's horizontal centerline and with the thumb over the steering wheel. (S10.3.1)

  X   31. Tape the thumb of each hand to the steering wheel by using masking tape with a width of 0.25 inch. The length of the tape shall only be enough to go around the thumb and steering wheel one time.

Signature:           Joe Fleck          

Date:   2/24/12  

I certify that I have read and performed each instruction.

# DATA SHEET 36

## APPENDIX F

### DUMMY POSITIONING PROCEDURES FOR PASSENGER TEST DUMMY CONFORMING TO SUBPART E OF PART 572

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance  
Test Technician: Tim Bratz

NHTSA No.: CB0502  
Test Date: 2/24/12

|                          |      |               |                        |              |                       |
|--------------------------|------|---------------|------------------------|--------------|-----------------------|
| IMPACT ANGLE:            | Zero |               |                        |              |                       |
| BELTED DUMMIES (YES/NO): | NO   |               |                        |              |                       |
| TEST SPEED:              | X    | 32 to 40 kmph |                        | 0 to 48 kmph | 0 to 56 kmph          |
| DRIVER DUMMY:            |      |               | 5 <sup>th</sup> female | X            | 50 <sup>th</sup> male |
| PASSENGER DUMMY:         |      |               | 5 <sup>th</sup> female | X            | 50 <sup>th</sup> male |

- X 1. The seat is a bench seat for which the adjustments have already been made for the driver and there are no independent adjustments that can be made for the passenger. Go to 12.  
X N/A- the passenger seat adjusts independently of the driver seat.
- X 2. Position the seat's adjustable lumbar supports so that the lumbar support is in its lowest, retracted or deflated adjustment position. (S8.1.3)  
X N/A – No lumbar adjustment
- X 3. Position any adjustable parts of the seat that provide additional support so that they are in the lowest or most open adjustment position. (S16.2.10.2)  
X N/A – No additional support adjustment
- X 4. Use all the seat controls that have any affect on the fore-aft movement of the seat to move the seat cushion to the rearmost position. **Mark** this position. (8/31/95 legal interpretation to Hogan and Hartson)
- X 5. Use all the seat controls that have any affect on the fore-aft movement of the seat to move the seat cushion to the foremost position. **Mark** this position. (8/31/95 legal interpretation to Hogan and Hartson)
- X 6. **Mark** each fore-aft position so that there is a visual indication when the seat is at a particular position. For manual seats, **mark** each detent. For power seats, **mark** only the rearmost, middle, and foremost positions. Label three of the positions with the following: F for foremost, M for mid-position (if there is no mid-position, label the closest adjustment position to the rear of the mid-point), and R for rearmost. Determine the mid fore-aft seat position based on the foremost and rearmost positions determined in items 3 and 4. (8/31/95 legal interpretation to Hogan and Hartson)
- X 7. Move the seat to the mid position.
- X 8. While maintaining the mid position, move the seat to its lowest position. **Mark** the height position. For seats with adjustable seat cushions, use the manufacturer's recommended seat cushion angle for determining the lowest height position.  
X N/A- No cushion angle adjustment  
Manufacturers seat cushion angle: \_\_\_\_\_  
Tested seat cushion angle: \_\_\_\_\_

- ☒ 9. Visually **mark** the seat back angle, if adjustable, at the manufacturer's nominal design riding position for a **50th percentile adult male** in the manner specified by the manufacturer.  
    \_\_\_ N/A – No seat back angle adjustment  
    Manufacturer's design seat back angle: 7.21° on Head Rest Pole
- ☒ 10. Is the seat a bucket seat?  
    ☒ Yes, go to 11 and skip 12  
    \_\_\_ No, go to 12 and skip 11
- ☒ 11. Bucket seats:  
    Locate and **mark** for future reference the longitudinal centerline of the seat cushion. The intersection of the vertical longitudinal plane that passes through the SgRP and the seat cushion upper surface determines the longitudinal centerline of a bucket seat cushion. (S10.4.1.2 and S16.3.1.10)
- \_\_\_ 12. Bench seats:  
    Locate and **mark** for future reference the longitudinal centerline of the passenger seat cushion. The longitudinal centerline is the same distance from the longitudinal centerline of the vehicle as the center of the steering wheel. (S10.4.1.1)  
    Record the distance from the longitudinal centerline of the vehicle to the center of the steering wheel. \_\_\_\_\_  
    Record the distance from the longitudinal centerline of the vehicle to the longitudinal centerline of the seat cushion. \_\_\_\_\_
- ☒ 13. If adjustable, set the head restraint at the full up position. (S8.1.3) If there are adjustments other than vertical, adjust them as recommended by the manufacturer.  
    \_\_\_ N/A – No head restraint adjustment
- ☒ 14. Place any adjustable seat belt anchorages at the vehicle manufacturer's nominal design position for a 50th percentile adult male occupant (S8.1.3)  
    \_\_\_ N/A – No adjustable upper seat belt anchorage  
    Manufacturer's specified anchorage position: Zero of 5; Top as Zero  
    Tested anchorage position: Zero of 5; Top as Zero
- ☒ 15. Place the dummy in the seat such that the midsagittal plane is coincident with the longitudinal seat cushion markings as determined in item 11 or 12 and the upper torso rests against the seat back. (S10.4.1.1 & S10.4.1.2)
- ☒ 16. Rest the thighs on the seat cushion. (S10.5)
- ☒ 17. Position the H-point of the dummy within 0.5 inch of the vertical dimension and 0.5 inch of the horizontal dimension of a point 0.25 inch below the H-point determined by using the equipment and procedures specified in SAE J826 (APR 1980). (S10.4.2.1) Then measure the pelvic angle with respect to the horizontal using the pelvic angle gage. Adjust the dummy position until these three measurements are within the specifications. (S10.4.2.1 and S10.4.2.2)  
    0.039" horizontal inches from the point 0.25 below the determined H-point  
    (0.5" max.) (S10.4.2.1)  
    0.210" vertical inches from the point 0.25 below the determined H-point  
    (0.5" max.) (S10.4.2.1)  
    24.0° pelvic angle (20° to 25°)
- ☒ 18. Is the head level within  $\pm 0.5^\circ$ ? (S10.1)  
    ☒ Yes, go to 19  
    \_\_\_ No, go to 18.1

- ☐ 18.1 Adjust the position of the H-point. (S10.1 and S10.4.2.1)
- ☐ 18.2 Is the head level within  $\pm 0.5^\circ$ ? (S10.1)
- ☐ Yes, record the following, then go to 19. ☒ No, go to 18.3
  - ☐ horizontal inches from the point 0.25 below the determined H-point (0.5" max.) (S10.4.2.1)
  - ☐ vertical inches from the point 0.25 below the determined H-point (0.5" max.) (S10.4.2.1)
  - ☐ pelvic angle ( $20^\circ$  to  $25^\circ$ )(S10.4.2.2)
- ☐ 18.3 Adjust the pelvic angle. (S10.1)
- ☐ 18.4 Is the head level within  $\pm 0.5^\circ$ ? (S10.1)
- ☐ Yes, record the following, then go to 19. ☒ No, go to 18.5
  - ☐ horizontal inches from the point 0.25 below the determined H-point (0.5" max.) (S10.4.2.1)
  - ☐ vertical inches from the point 0.25 below the determined H-point (0.5" max.) (S10.4.2.1)
  - ☐ pelvic angle ( $20^\circ$  to  $25^\circ$ )(S10.4.2.2)
- ☐ 18.5 Adjust the neck bracket of the dummy the minimum amount necessary from the nonadjusted "0" setting until the head is level within  $\pm 0.5^\circ$ . (S10.1) Record the following, then go to 19.
- ☐ horizontal inches from the point 0.25 below the determined H-point (0.5" max.) (S10.4.2.1)
  - ☐ vertical inches from the point 0.25 below the determined H-point (0.5" max.) (S10.4.2.1)
  - ☐ pelvic angle ( $20^\circ$  to  $25^\circ$ )(S10.4.2.2)
- ☒ 19. Set the distance between the outboard knee clevis flange surfaces at 10.6 inches.
- ☐ 10.6" measured distance (10.6 inches) (S10.5)
- ☒ 20. Check the only one of the following that applies:
- ☒ To the extent practicable keep the left thigh and leg in a vertical plane and the right thigh and leg in a vertical plane, place the feet on the toeboard with the heels resting on the floor pan as close as possible to the intersection of the floor pan and toeboard.
  - ☐ The feet cannot be placed flat on the toeboard. To the extent practicable keep the left thigh and leg in a vertical plane and the right thigh and leg in a vertical plane, set the feet perpendicular to the legs and place them as far forward as possible with the heels resting on the floor pan.
  - ☐ The vehicle has a wheelhouse projection. To the extent practicable keep the left thigh and leg in a vertical plane and the right thigh and leg in a vertical plane, set the feet perpendicular to the legs and place them as far forward as possible with the heels resting on the floor pan. Do not set the feet on the wheelhouse projection.
  - ☐ The vehicle has a wheelhouse projection and the feet cannot be placed on the toeboard. To the extent practicable keep the left thigh and leg in a vertical plane and the right thigh and leg in a vertical plane, set the feet perpendicular to the legs and place them as far forward as possible with the heel resting on the floor pan. Do not set the feet on the wheelhouse projection.
- ☒ 21. Place the left upper arm in contact with the seat back and side of the torso. (S10.2.2)

X 22. Is the passenger seat belt used for this test?

     Yes, continue

X No, go to 23

     22.1 Fasten the seat belt around the dummy.

     22.2 Remove all slack from the lap belt portion. (S10.9)

     22.3 Pull the upper torso webbing out of the retractor and allow it to retract; repeat this four times. (S10.9)

     22.4 Apply a 2 to 4 pound tension load to the lap belt. (S10.9)  
         pound load applied

     22.5 Is the belt system equipped with a tension relieving device?

     Yes, continue

     No, go to 23

     22.6 Introduce the maximum amount of slack into the upper torso bet that is recommended by the vehicle manufacturer in the vehicle owner's manual. (S10.9). Go to 23.

X 23. Place the right upper arm in contact with the seat back and side of the torso. (S10.2.2)

X 24. Place the left hand palm in contact with the outside of the left thigh and the little finger in contact with the seat cushion. (S10.3.2)

X 25. Place the right hand palm in contact with the outside of the right thigh and the little finger in contact with the seat cushion. (S10.3.2)

Signature:     *Tim Brab*    

Date: 2/24/12

I certify that I have read and performed each instruction.

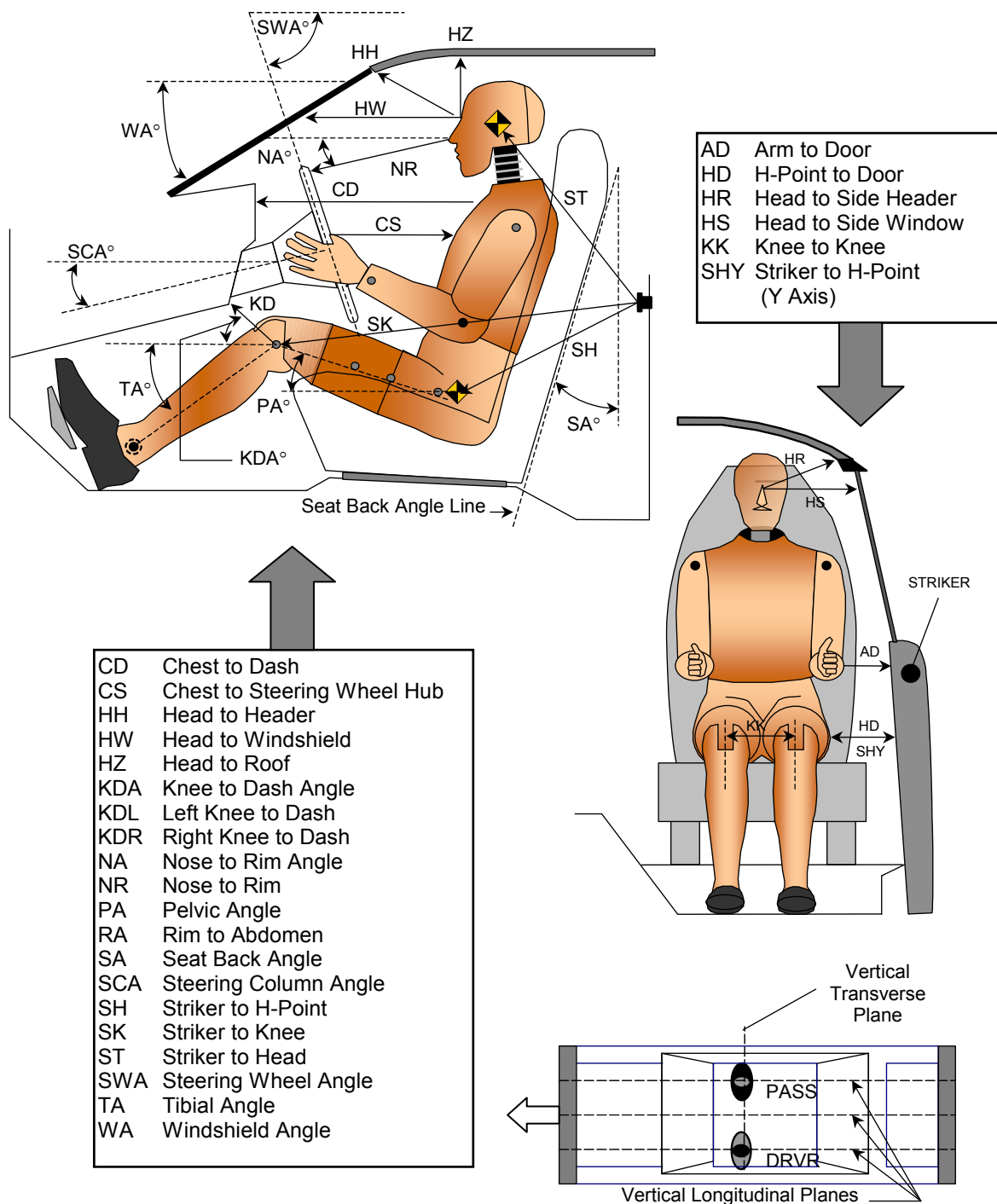
# DATA SHEET 37

## DUMMY MEASUREMENTS

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Jordan Haynes

NHTSA No.: CB0502  
 Test Date: 2/24/12

### DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS

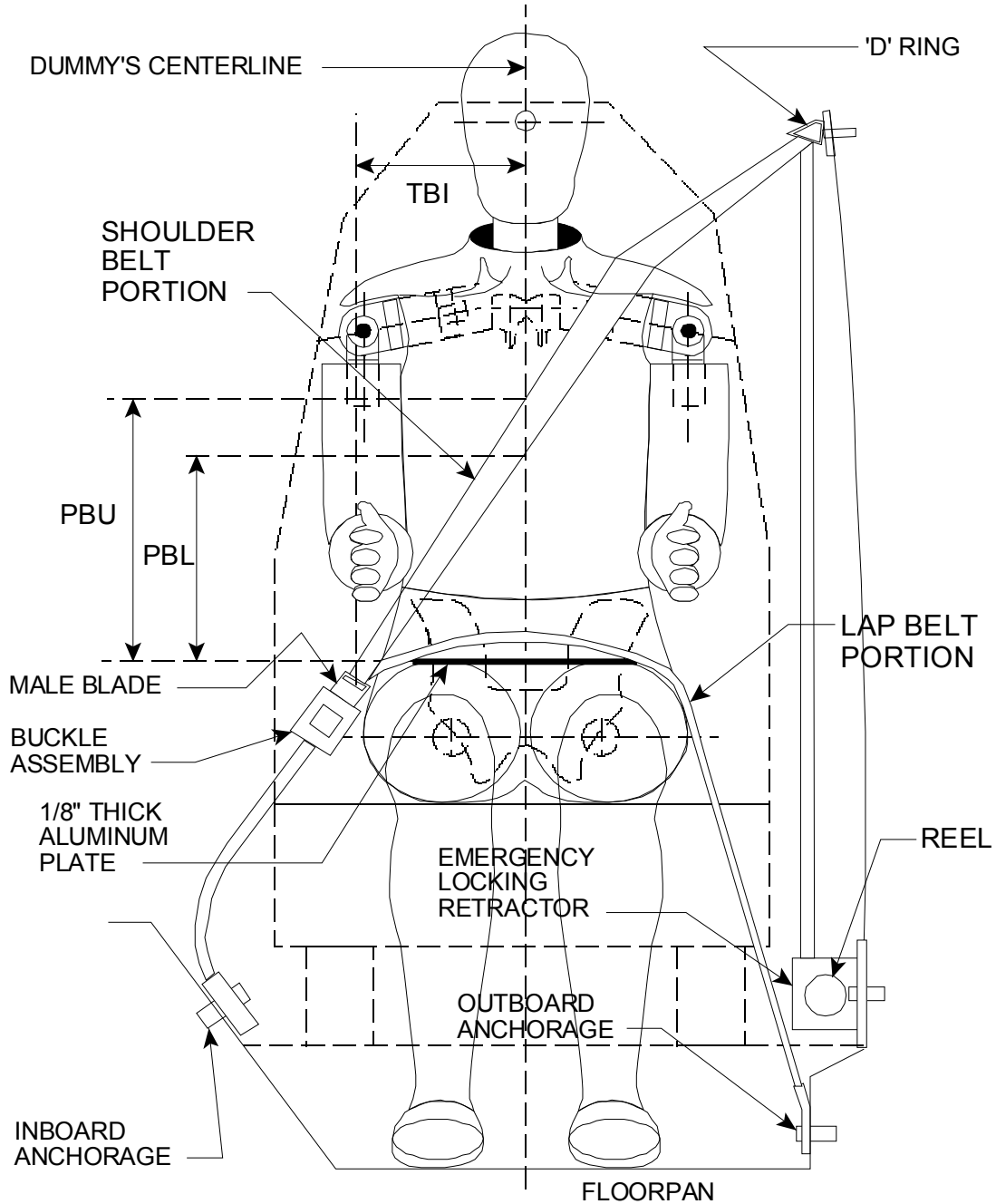




### TEST DUMMY POSITION MEASUREMENTS

| Code | Measurement Description            | Driver SN 401 |           | Passenger SN 403 |           |
|------|------------------------------------|---------------|-----------|------------------|-----------|
|      |                                    | Length (mm)   | Angle (°) | Length (mm)      | Angle (°) |
| WA   | Windshield Angle                   |               | 23.2      |                  |           |
| SWA  | Steering Wheel Angle               |               | 24.7      |                  |           |
| SCA  | Steering Column Angle              |               | 65.3      |                  |           |
| SA   | Seat Back Angle (On Headrest Post) |               | 9.2       |                  | 9.2       |
| HZ   | Head to Roof (Z)                   | 204           |           | 222              |           |
| HH   | Head to Header                     | 341           | 21.0      | 382              | 24.9      |
| HW   | Head to Windshield                 | 702           | 0.0       | 753              | 0.0       |
| HR   | Head to Side Header (Y)            | 206           |           | 227              |           |
| NR   | Nose to Rim                        | 430           | 10.4      |                  |           |
| CD   | Chest to Dash                      | 560           |           | 566              |           |
| CS   | Chest to Steering Hub              | 353           | 3.1       |                  |           |
| RA   | Rim to Abdomen                     | 204           | 0.0       |                  |           |
| KDL  | Left Knee to Dash                  | 205           | 26.5      | 202              |           |
| KDR  | Right Knee to Dash                 | 142           |           | 225              | 26.5      |
| PA   | Pelvic Angle                       |               | 24.7      |                  | 24.0      |
| TA   | Tibia Angle                        |               | 38.4      |                  | 41.3      |
| KK   | Knee to Knee (Y)                   | 360           |           | 285              |           |
| SK   | Striker to Knee                    | 620           | 103.7     | 617              | 105.9     |
| ST   | Striker to Head                    | 400           | 14.6      | 378              | 14.3      |
| SH   | Striker to H-Point                 | 347           | 135.9     | 379              | 147.8     |
| SHY  | Striker to H-Point (Y)             | 329           |           | 285              |           |
| HS   | Head to Side Window                | 338           |           | 352              |           |
| HD   | H-Point to Door (Y)                | 160           |           | 160              |           |
| AD   | Arm to Door (Y)                    | 123           |           | 83               |           |
| AA   | Ankle to Ankle                     | 360           |           | 215              |           |

## SEAT BELT POSITIONING DATA



## FRONT VIEW OF DUMMY

### SEAT BELT POSITIONING MEASUREMENTS

| Measurement Description                           | Units | Driver | Passenger |
|---------------------------------------------------|-------|--------|-----------|
| PBU - Top surface of reference to belt upper edge | mm    | N/A    | N/A       |
| PBL - Top surface of reference to belt lower edge | mm    | N/A    | N/A       |

# DATA SHEET 38

## CRASH TEST

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Jordan Haynes

NHTSA No.: CB0502  
 Test Date: 2/24/12

|                          |      |                        |   |                       |
|--------------------------|------|------------------------|---|-----------------------|
| IMPACT ANGLE:            | Zero |                        |   |                       |
| BELTED DUMMIES (YES/NO): | NO   |                        |   |                       |
| TEST SPEED:              | X    | 32 to 40 kmph          |   | 0 to 56 kmph          |
| DRIVER DUMMY:            |      | 5 <sup>th</sup> female | X | 50 <sup>th</sup> male |
| PASSENGER DUMMY:         |      | 5 <sup>th</sup> female | X | 50 <sup>th</sup> male |

- |                                     |     |                                                                                                                                                                                            |
|-------------------------------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | 1.  | Vehicle underbody painted.                                                                                                                                                                 |
| <input checked="" type="checkbox"/> | 2.  | The speed measuring devices are in place and functioning.                                                                                                                                  |
| <input checked="" type="checkbox"/> | 3.  | The speed measuring devices are <u>1.0</u> m from the barrier (spec. 1.5 m) and <u>30</u> cm from the barrier (spec. is 30 cm).                                                            |
| <input checked="" type="checkbox"/> | 4.  | Convertible top is in the closed position.                                                                                                                                                 |
| <input checked="" type="checkbox"/> |     | <input checked="" type="checkbox"/> N/A, not a convertible.                                                                                                                                |
| <input checked="" type="checkbox"/> | 5.  | Instrumentation and wires are placed so motion of dummies during impact is not affected.                                                                                                   |
| <input checked="" type="checkbox"/> | 6.  | Tires inflated to pressure on tire placard or if it does not have a tire placard because it is not a passenger car, then inflated to the tire pressure specified in the owner information. |
|                                     |     | <u>235 kpa</u> front left tire <u>235 kpa</u> specified on tire placard or in owner information                                                                                            |
|                                     |     | <u>235 kpa</u> front right tire <u>235 kpa</u> specified on tire placard or in owner information                                                                                           |
|                                     |     | <u>235 kpa</u> rear left tire <u>235 kpa</u> specified on tire placard or in owner information                                                                                             |
|                                     |     | <u>235 kpa</u> rear right tire <u>235 kpa</u> specified on tire placard or in owner information                                                                                            |
| <input checked="" type="checkbox"/> | 7.  | Time zero contacts on barrier in place.                                                                                                                                                    |
| <input checked="" type="checkbox"/> | 8.  | Pre test zero and shunt calibration adjustments performed and recorded.                                                                                                                    |
| <input checked="" type="checkbox"/> | 9.  | Dummy temperature meets requirements of section 12.2 of the test procedure.                                                                                                                |
| <input checked="" type="checkbox"/> | 10. | Vehicle hood closed and latched.                                                                                                                                                           |
| <input checked="" type="checkbox"/> | 11. | Transmission placed in neutral.                                                                                                                                                            |
| <input checked="" type="checkbox"/> | 12. | Parking brake off.                                                                                                                                                                         |
| <input checked="" type="checkbox"/> | 13. | Are the heads still level?                                                                                                                                                                 |
|                                     |     | <input checked="" type="checkbox"/> Yes, go to 14                                                                                                                                          |
|                                     |     | <input type="checkbox"/> No, Adjust dummy so that head is at the angle recorded in the Appendix F or G data sheets and then continue.                                                      |
| <input checked="" type="checkbox"/> | 14. | Ignition in the ON position.                                                                                                                                                               |
| <input checked="" type="checkbox"/> | 15. | Doors closed and latched but not locked.                                                                                                                                                   |
| <input checked="" type="checkbox"/> | 16. | Post test zero and shunt calibration checks performed and recorded.                                                                                                                        |
| <input checked="" type="checkbox"/> | 17. | Actual test speed: <u>39.8 kmph</u>                                                                                                                                                        |
| <input checked="" type="checkbox"/> | 18. | Vehicle rebound from the barrier: <u>184</u> cm                                                                                                                                            |
| <input checked="" type="checkbox"/> | 19. | Describe whether the doors open after the test and what method is used to open the doors.                                                                                                  |
|                                     |     | <input checked="" type="checkbox"/> Left Front Door: Door remained closed and latched; Door opened without tools.                                                                          |
|                                     |     | <input checked="" type="checkbox"/> Right Front Door: Door remained closed and latched; Door opened without tools.                                                                         |
|                                     |     | <input checked="" type="checkbox"/> Left Rear Door: Door remained closed and latched; Door opened without tools.                                                                           |
|                                     |     | <input checked="" type="checkbox"/> Right Rear Door: Door remained closed and latched; Door opened without tools.                                                                          |

- ☒ 20. Describe the contact points of the dummy with the interior of the vehicle.
- ☒ Driver Dummy: Head to Air Bag, Header and Visor; Chest to Air Bag; Knees to Knee Bolster and Steering Column.
- ☒ Passenger Dummy: Head to Air Bag and Curtain Airbag; Chest to Air Bag; Knees to Glove Box.

REMARKS:

Signature: Jordan Haynes

Date: 2/24/12

I certify that I have read and performed each instruction.

# DATA SHEET 40

## ACCIDENT INVESTIGATION MEASUREMENTS

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Tim Novak

NHTSA No.: CB0502  
 Test Date: 2/24/12

|                          |      |               |                        |              |                       |
|--------------------------|------|---------------|------------------------|--------------|-----------------------|
| IMPACT ANGLE:            | Zero |               |                        |              |                       |
| BELTED DUMMIES (YES/NO): | NO   |               |                        |              |                       |
| TEST SPEED:              | X    | 32 to 40 kmph |                        | 0 to 48 kmph |                       |
| DRIVER DUMMY:            |      |               | 5 <sup>th</sup> female | X            | 50 <sup>th</sup> male |
| PASSENGER DUMMY:         |      |               | 5 <sup>th</sup> female | X            | 50 <sup>th</sup> male |

|                                     |                                          |
|-------------------------------------|------------------------------------------|
| Vehicle Year/Make/Model/Body Style: | 2011 Hyundai Sonata Hybrid Passenger Car |
| VIN:                                | KMHEC4A42BA002136                        |
| Wheelbase:                          | 2800 mm                                  |
| Build Date:                         | MAR/01/11                                |
| Vehicle Size Category:              | 3                                        |
| Test Weight:                        | 1819.8 kg                                |
| Front Overhang:                     | 925 mm                                   |
| Overall Width:                      | 1820 mm                                  |
| Overall Length Center:              | 4795 mm                                  |

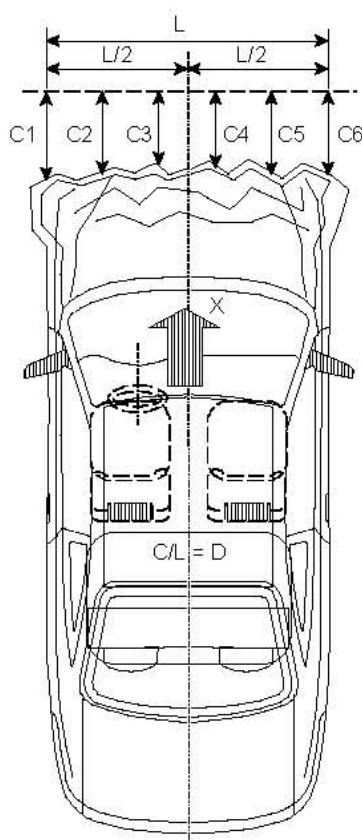
| Accelerometer Data |                                      |
|--------------------|--------------------------------------|
| Location:          | As per measurements on Data Sheet 33 |
| Linearity:         | >99.9%                               |

|                        |             |
|------------------------|-------------|
| Integration Algorithm: | Trapezoidal |
| Vehicle Impact Speed:  | 39.8 kmph   |
| Time of Separation:    | 88.0 ms     |
| Velocity Change:       | 44.7 kmph   |

## CRUSH PROFILE

Collision Deformation Classification: 12FDEW2  
 Midpoint of Damage: Vehicle Longitudinal Centerline  
 Damage Region Length (mm): 1320  
 Impact Mode: Frontal Barrier

| No. | Measurement Description    | Units | Pre-Test | Post-Test | Difference |
|-----|----------------------------|-------|----------|-----------|------------|
| C1  | Crush zone 1 at left side  | mm    | 4672     | 4520      | 152        |
| C2  | Crush zone 2 at left side  | mm    | 4746     | 4515      | 231        |
| C3  | Crush zone 3 at left side  | mm    | 4785     | 4546      | 239        |
| C4  | Crush zone 4 at right side | mm    | 4785     | 4581      | 204        |
| C5  | Crush zone 5 at right side | mm    | 4746     | 4576      | 170        |
| C6  | Crush zone 6 at right side | mm    | 4672     | 4563      | 109        |



REMARKS:

Signature: *Jim Norick*

Date: 2/24/12

I certify that I have read and performed each instruction.

**DATA SHEET 41**  
**WINDSHIELD MOUNTING (FMVSS 212)**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Tim Novak

NHTSA No.: CB0502  
 Test Date: 2/24/12

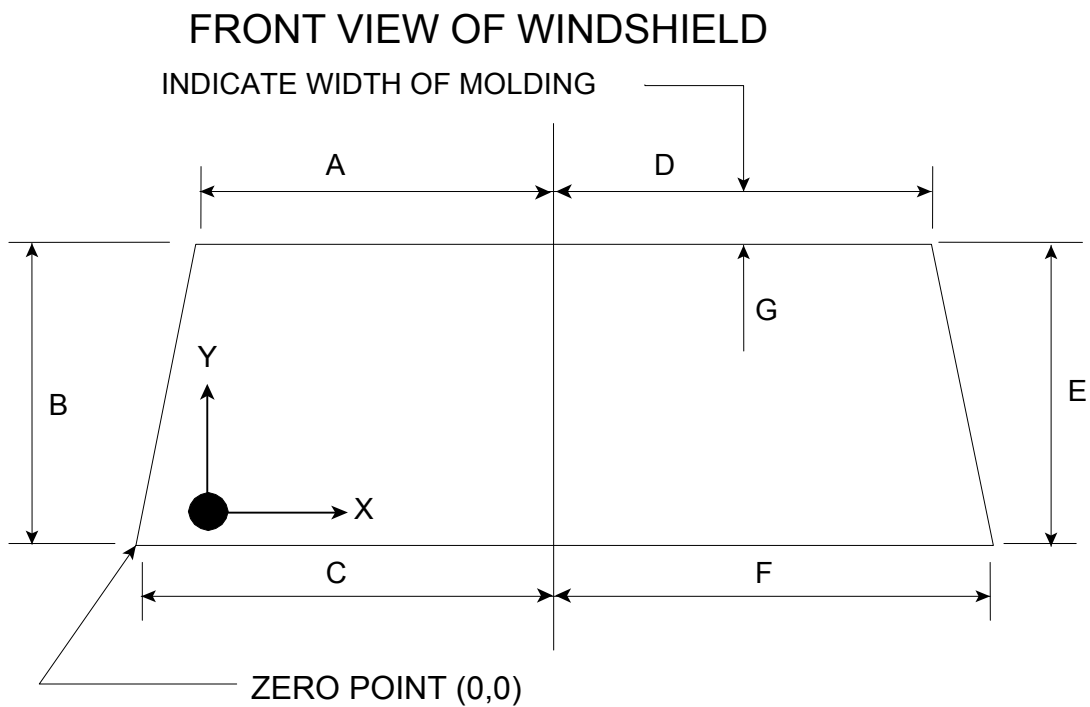
|                          |                                                   |                                       |                                       |                                       |                       |
|--------------------------|---------------------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|-----------------------|
| IMPACT ANGLE:            | Zero                                              |                                       |                                       |                                       |                       |
| BELTED DUMMIES (YES/NO): | NO                                                |                                       |                                       |                                       |                       |
| TEST SPEED:              | <input checked="" type="checkbox"/> 32 to 40 kmph | <input type="checkbox"/> 0 to 48 kmph | <input type="checkbox"/> 0 to 56 kmph |                                       |                       |
| DRIVER DUMMY:            |                                                   |                                       | 5 <sup>th</sup> female                | <input checked="" type="checkbox"/> X | 50 <sup>th</sup> male |
| PASSENGER DUMMY:         |                                                   |                                       | 5 <sup>th</sup> female                | <input checked="" type="checkbox"/> X | 50 <sup>th</sup> male |

1. Pre-Crash
  - ☒ 1.1 Describe from visual inspection how the windshield is mounted and describe any trim material.  
  
 Retained with glue  
 Rubber and plastic trim
  - ☒ 1.2 Mark the longitudinal centerline of the windshield.
  - ☒ 1.3 Measure pre-crash A, B, and C for the left side and record in the chart below.
  - ☒ 1.4 Measure pre-crash C, D, and E for the right side and record in the chart below.
  - ☒ 1.5 Measure from the edge of the retainer or molding to the edge of the windshield.  
 Dimension G (mm): 8 mm
2. Post Crash
  - ☒ 2.1 Can a single thickness of copier type paper (as small a piece as necessary) slide between the windshield and the vehicle body?
    - ☒ No - Pass. Skip to the table of measurements, complete it by repeating the pre-crash measurements in the post crash column, and calculate the retention percentage, which will be 100%.
    - ☐ Yes, go to 2.2
  - ☐ 2.2 Visibly mark the beginning and end of the portions of the periphery where the paper slides between the windshield and the vehicle body.
  - ☐ 2.3 Measure and record post-crash A, B, C, D, E, and F such that the measurements do not include any of the parts of the windshield where the paper slides between the windshield and the vehicle body.
  - ☐ 2.4 Calculate and record the percent retention for the right and left side of the windshield.
  - ☐ 2.5 Is total right side percent retention less than 75%?
    - ☐ Yes, Fail
    - ☐ No, Pass
  - ☐ 2.6 Is total left side percent retention less than 75%?
    - ☐ Yes, Fail
    - ☐ No, Pass

## WINDSHIELD RETENTION MEASUREMENTS

|            | Dimension | Pre-Crash<br>(mm) | Post-Crash<br>(mm) | Percent Retention<br>(Post-Test ÷ Pre-Crash) |
|------------|-----------|-------------------|--------------------|----------------------------------------------|
| Left Side  | A         | 596               | 596                | 100%                                         |
|            | B         | 827               | 827                | 100%                                         |
|            | C         | 730               | 730                | 100%                                         |
|            | Total     | 2153              | 2153               | 100%                                         |
| Right Side | D         | 596               | 596                | 100%                                         |
|            | E         | 827               | 827                | 100%                                         |
|            | F         | 730               | 730                | 100%                                         |
|            | Total     | 2153              | 2153               | 100%                                         |

Indicate area of mounting failure: NONE



REMARKS:

Signature: *Jim Norack*

Date: 2/24/12

I certify that I have read and performed each instruction.



**DATA SHEET 42**  
**WINDSHIELD ZONE INTRUSION (FMVSS 219)**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Tim Novak

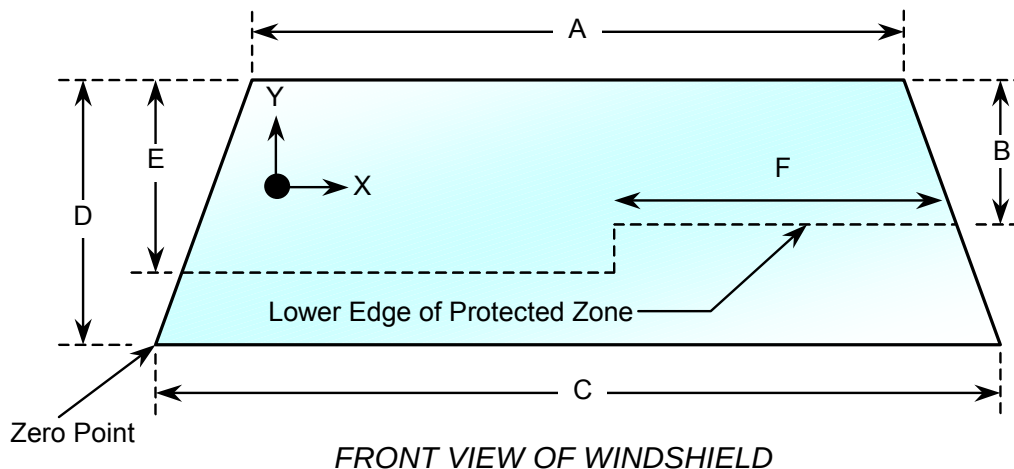
NHTSA No.: CB0502  
 Test Date: 2/24/12

|                          |      |                        |   |                       |
|--------------------------|------|------------------------|---|-----------------------|
| IMPACT ANGLE:            | Zero |                        |   |                       |
| BELTED DUMMIES (YES/NO): | NO   |                        |   |                       |
| TEST SPEED:              | X    | 32 to 40 kmph          |   | 0 to 56 kmph          |
| DRIVER DUMMY:            |      | 5 <sup>th</sup> female | X | 50 <sup>th</sup> male |
| PASSENGER DUMMY:         |      | 5 <sup>th</sup> female | X | 50 <sup>th</sup> male |

This standard specifies limits for the displacement of vehicle components into the windshield area during a frontal barrier impact test at any speed up to and including 48 kmph.

- ☒ 1. Place a 165 mm diameter rigid sphere, with a mass of 6.8 kg on the instrument panel so that it is simultaneously touching the instrument panel and the windshield. (571.219 S6.1(a))
- ☒ 2. Roll the sphere from one side of the windshield to the other while marking on the windshield where the sphere contacts the windshield. (571.219 S6.1(b))
- ☒ 3. From the outermost contactable points on the windshield draw a horizontal line to the edges of the windshield. (571.219 S6.1(b))
- ☒ 4. Draw a line on the inner surface of the windshield that is 13 mm below the line determined in items 2 and 3.
- ☒ 5. After the crash test, record any points where a part of the exterior of the vehicle has marked, penetrated, or broken the windshield.

Provide all dimensions necessary to reproduce the protected area.



### WINDSHIELD DIMENSIONS

| Item | Units | Value |
|------|-------|-------|
| A    | mm    | 1192  |
| B    | mm    | 589   |
| C    | mm    | 1460  |
| D    | mm    | 827   |
| E    | mm    | 532   |
| F    | mm    | 474   |

### AREA OF PROTECTED ZONE FAILURES:

- B. Provide coordinates of the area that the protected zone was penetrated more than 0.25 inches by a vehicle component other than one which is normally in contact with the windshield.

| X    | Y |
|------|---|
| NONE |   |
|      |   |
|      |   |
|      |   |

- C. Provide coordinates of the area beneath the protected zone template that the inner surface of the windshield was penetrated by a vehicle component.

| X    | Y |
|------|---|
| NONE |   |
|      |   |
|      |   |
|      |   |

### REMARKS:

I certify that I have read and performed each instruction.

Signature: 

Date: 2/24/12

**DATA SHEET 43**  
**FUEL SYSTEM INTEGRITY (FMVSS 301)**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance  
Test Technician: Tim Novak

NHTSA No.: CB0502  
Test Date: 2/24/12

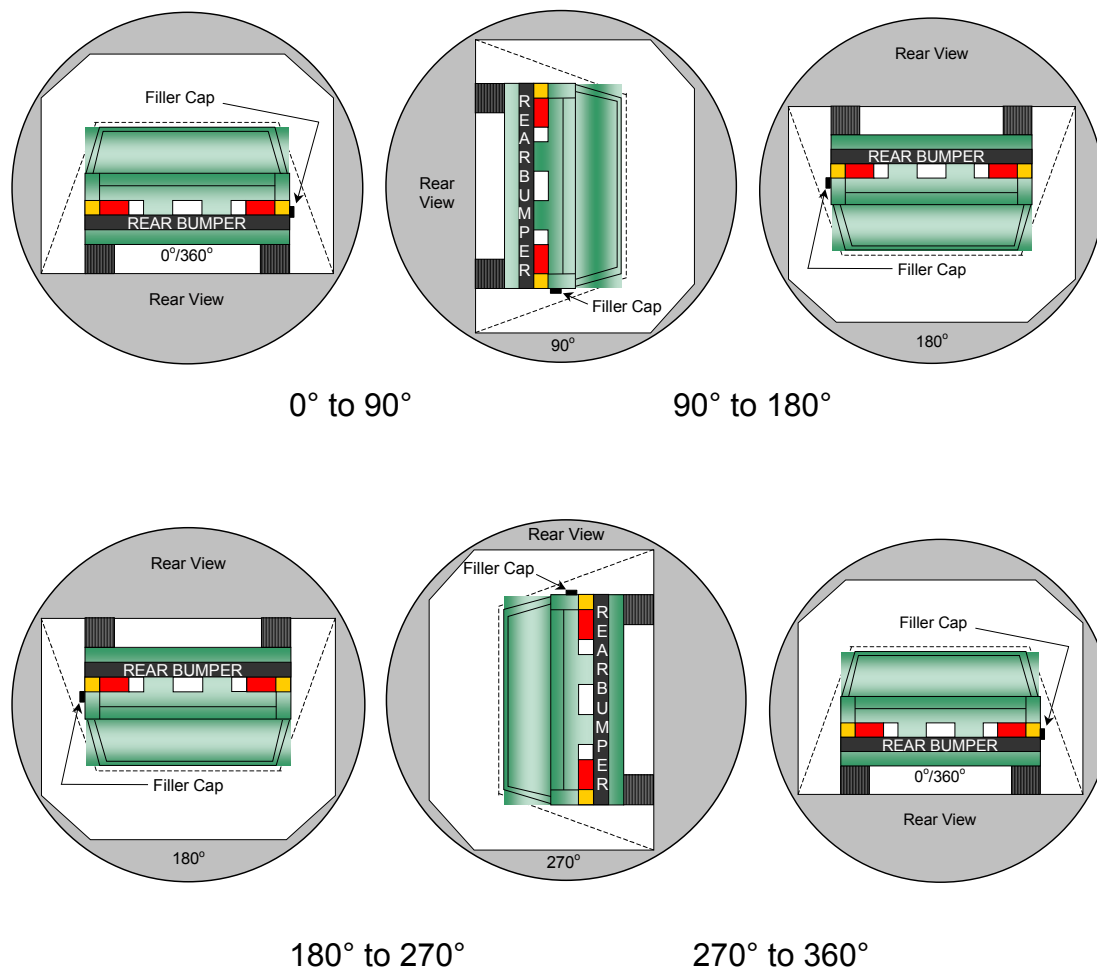
|                 |                 |
|-----------------|-----------------|
| TYPE OF IMPACT: | 25 mph Unbelted |
|-----------------|-----------------|

**Stoddard Solvent Spillage Measurements**

- A. From impact until vehicle motion ceases: 0.0 grams  
(Maximum Allowable = 28 grams)
- B. For the 5 minute period after motion ceases: 0.0 grams  
(Maximum Allowable = 142 grams)
- C. For the following 25 minutes: 0.0 grams  
(Maximum Allowable = 28 grams/minute)
- D. Spillage: NONE

REMARKS: NO SPILLAGE

## FMVSS 301 STATIC ROLLOVER DATA



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 (grams) |
|--------------|----------------------|------------------|------------------|
| 0° to 90°    | 122                  | 300              | 0.0              |
| 90° to 180°  | 116                  | 300              | 0.0              |
| 180° to 270° | 108                  | 300              | 0.0              |
| 270° to 360° | 117                  | 300              | 0.0              |

**FMVSS 305**  
**ELECTRIC POWERED VEHICLES: ELECTROLYTE**  
**SPILLAGE AND ELECTRICAL SHOCK PROTECTION**

This electric vehicle, a 2011 Hyundai Sonata Hybrid (NHTSA No. CB0502), in conjunction with the FMVSS 208, was tested to FMVSS 305.

The test was performed in accordance with the specifications of the Office of Vehicle Safety Compliance (OVSC) Test Procedures TP-305-01 to determine compliance to the requirements of Federal Motor Vehicle Safety Standards (FMVSS) 305, "Electric Powered Vehicles: Electrolyte Spillage and Electrical Shock Protection".

Based on the test results, the 2011 Hyundai Sonata Hybrid appears to meet the requirements of FMVSS 305 testing.

If a measured voltage was zero and resulted in a division by zero "Zero Volts" was reported. This condition is considered being compliant as stated in TP-305-01 12.4 F.

This program is sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-06-C-00030.

The following data sheets document the results of the FMVSS 305 test.

**DATA SHEET 1**  
**ELECTRIC VEHICLE PROPULSION SYSTEM**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance  
Test Technician: Joe Fleck

NHTSA No.: CB0502  
Test Date: 2/24/12

**VEHICLE PROPULSION SYSTEM**

|                                                               |                                |
|---------------------------------------------------------------|--------------------------------|
| Type of Electric Vehicle (Electric/Hybrid):                   | Gasoline Electric Hybrid       |
| Propulsion Battery Type:                                      | Lithium-Ion Polymer            |
| Nominal Voltage (V):                                          | 270 V                          |
| Physical Location of Automatic Propulsion Battery Disconnect: | Inside the Battery Pack System |
| Auxiliary Battery Type:                                       | Lead Acid Battery              |

**ELECTRIC ENERGY STORAGE CONVERSION/DEVICE SYSTEM DATA  
(COTR SUPPLIED DATA)**

|                                                                                                  |                                                                         |                                   |
|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------|
| Electrolyte Fluid Type:                                                                          | Polymer Gel                                                             |                                   |
| Electrolyte Fluid Specific Gravity:                                                              | 1.25 g/ml                                                               |                                   |
| Electrolyte Kinematic Viscosity (centistokes):                                                   | 3.cP@25°C                                                               |                                   |
| Electrolyte Fluid Color:                                                                         | Colorless                                                               |                                   |
| Electric Energy Storage/Conversion System Coolant Type, Color, Specific Gravity (if applicable): | Air                                                                     |                                   |
| Location of Battery Modules:                                                                     | <input checked="" type="checkbox"/>                                     | Inside Passenger Compartment      |
|                                                                                                  | <input type="checkbox"/>                                                | Outside Passenger Compartment     |
|                                                                                                  | The high voltage battery is mounted behind the rear seat of the vehicle |                                   |
| Electric Energy Storage/Conversion System State of Charge:                                       | <input type="checkbox"/>                                                | Maximum State of Charge           |
|                                                                                                  | <input checked="" type="checkbox"/>                                     | Range of Normal Operating Voltage |
| Range                                                                                            | 200 V – 310 V                                                           |                                   |
| Test Voltage - No less than 95% of maximum State of Charge:                                      | 264.7 V                                                                 |                                   |
| Range of Normal Operating Voltage:                                                               | 200 V – 310 V                                                           |                                   |
| Test Voltage – Within Normal Operative Voltage Range:                                            | 264.7 V                                                                 |                                   |
| Test Vehicle Equipped with Electrical Isolation Monitoring                                       | The HEV system has an isolation monitoring system in the BCM            |                                   |

**VEHICLE CHASSIS GROUND POINT(S) LOCATION(S)**

|                                                          |                                                             |
|----------------------------------------------------------|-------------------------------------------------------------|
| Details of Vehicle Chassis Ground Point(s) & Location(s) | Back panel of rear seat, remove rear seat, behind seat back |
|----------------------------------------------------------|-------------------------------------------------------------|

**ELECTRIC ENERGY STORAGE/CONVERSION TEST POINTS**

|                                                                   |                                                                                                                                                                        |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Details of Electric Energy Storage/Conversion System Test Points: | The positive and negative test points are on the RH side of the battery accessible by removing the cover. Chassis ground is on the vehicle structure near the battery. |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### DATA SHEET 3

#### PRE-IMPACT ELECTRIC ISOLATION MEASUREMENTS & CALCULATIONS

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance  
Test Technician: Joe Fleck

NHTSA No.: CB0502  
Test Date: 2/24/12

#### VOLTMETER INFORMATION

|                                         |                          |
|-----------------------------------------|--------------------------|
| Make:                                   | Fluke                    |
| Model:                                  | 11                       |
| Serial Number:                          | 17210161                 |
| Internal Impedance Value (M $\Omega$ ): | > 10 M $\Omega$ < 100 pF |
| Resolution (V):                         | .001 Volts               |
| Last Calibration Date:                  | 10/31/2011               |

#### ELECTRIC ENERGY STORAGE/CONVERSION SYSTEM VOLTAGE

Measurement shall be made with Energy Storage/Conversion System connected to the vehicle propulsion system, and the vehicle in the "ready-to-drive" (propulsion system energized) position.

If voltage measurement is not at the voltage or within the normal operating voltage range specified by the manufacturer, the battery must be charged.

|         |       |
|---------|-------|
| Vb (V): | 264.7 |
|---------|-------|

#### ELECTRIC ENERGY STORAGE/CONVERSION SYSTEM TO VEHICLE CHASSIS

Vehicle chassis point(s) determined and supplied to contractor by COTR.

|         |       |
|---------|-------|
| V1 (V): | 113.7 |
| V2 (V): | 135.6 |

#### ELECTRIC ENERGY STORAGE/CONVERSION SYSTEM TO VEHICLE CHASSIS ACROSS RESISTOR

The known resistance Ro (in ohms) should be approximately 500 times the normal operating voltage of the vehicle (in volts) per SAE J1766.

|                  |                 |
|------------------|-----------------|
| Ro ( $\Omega$ ): | 200200 $\Omega$ |
|------------------|-----------------|



### DATA SHEET 3 (CONTINUED)

#### PRE-IMPACT ELECTRICAL ISOLATION MEASUREMENTS & CALCULATIONS

##### ELECTRICAL ISOLATION MEASUREMENT

Note: If measured voltage is zero and results in a division by zero, record "Zero Volts". This "zero voltage" condition is considered as being compliant.

|                                                  |         |
|--------------------------------------------------|---------|
| V1' (V):                                         | 37.1    |
| $R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$ |         |
| Ri1 (Ω):                                         | 906,318 |
| V2' (V):                                         | 43.0    |
| $R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$ |         |
| Ri2 (Ω):                                         | 792,628 |
| Ri = The lesser of Ri1 and Ri2                   |         |
| Ri Pre-Test ((Ω):                                | 792,628 |
| Ri/Vb (Ω/V):                                     | 2994.4  |
| Minimum Electrical Isolation Value is 500 Ω/V    |         |

Note: Measurements completed within 15 minutes prior to impact.

| Is the measured Electrical Isolation Value:                                 | Yes, Pass | No, Fail |
|-----------------------------------------------------------------------------|-----------|----------|
| $\geq 500 \text{ } \Omega/\text{V}$ without electrical isolation monitoring | X         |          |
| $\geq 100 \text{ } \Omega/\text{V}$ with electrical isolation monitoring    |           |          |

**DATA SHEET 4**  
**POST-IMPACT DATA**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
Test Program: FMVSS 208 Compliance  
Test Technician: Joe Fleck

NHTSA No.: CB0502  
Test Date: 2/24/12

**VOLTMETER INFORMATION**

|                                                                                            |                  |
|--------------------------------------------------------------------------------------------|------------------|
| Make:                                                                                      | Fluke            |
| Model:                                                                                     | 11               |
| Serial Number:                                                                             | 17210161         |
| Internal Impedance Value (MΩ):                                                             | > 10 MΩ < 100 pF |
| Nominal Propulsion Battery Voltage (Vb) (V):                                               | 270              |
| Resolution (V):                                                                            | 0.001            |
| NOTE: Record V1, V2, V1', V2' voltage measurements at a minimum of 5 seconds after impact. |                  |

**ELECTRIC ENERGY STORAGE/CONVERSION SYSTEM  
VOLTAGE LOCATION OF MEASUREMENT**

Measurement is made from the side of the automatic disconnect connected to the electric powertrain.

|         |        |
|---------|--------|
| Vb (V): | 264.1V |
|---------|--------|

**ELECTRIC ENERGY STORAGE/CONVERSION SYSTEM VOLTAGE**

|       |      |   |              |   |         |    |   |
|-------|------|---|--------------|---|---------|----|---|
| V1 =  | 13.5 | V | Impact Time: | 0 | Minutes | 30 | s |
| V2 =  | 10.4 | V | Impact Time: | 0 | Minutes | 51 | s |
| V1' = | 1.2  | V | Impact Time: | 0 | Minutes | 41 | s |
| V2' = | 1.75 | V | Impact Time: | 0 | Minutes | 57 | s |

**ELECTRICAL ISOLATION MEASUREMENT**

Note: If measured voltage is zero and results in a division by zero, record "Zero Volts". This "zero voltage" condition is considered as being compliant.

|                                                            |           |     |              |   |         |    |   |
|------------------------------------------------------------|-----------|-----|--------------|---|---------|----|---|
| $R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$           |           |     |              |   |         |    |   |
| Ri1 =                                                      | 3,632,889 | Ω   | Impact Time: | 0 | Minutes | 51 | s |
| $R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$           |           |     |              |   |         |    |   |
| Ri2 =                                                      | 2,274,085 | Ω   | Impact Time: | 0 | Minutes | 57 | s |
| Ri = The lesser of Ri1 and Ri2                             |           |     |              |   |         |    |   |
| Ri =                                                       | 2,274,085 | Ω   | Impact Time: | 0 | Minutes | 57 | s |
| Ri/Vb = electrical Isolation Value/Nominal Battery Voltage |           |     |              |   |         |    |   |
| Minimum Electrical Value is 500 Ω/V                        |           |     |              |   |         |    |   |
| Ri/Vb =                                                    | 8591      | Ω/V | Impact Time: | 0 | Minutes | 57 | s |

|                                                  |           |          |
|--------------------------------------------------|-----------|----------|
| Is the measured Electrical Isolation Value:      | Yes, Pass | No, Fail |
| ≥500 Ω/V without electrical isolation monitoring | X         |          |
| ≥100 Ω/V with electrical isolation monitoring    |           |          |

## DATA SHEET 4 (CONTINUED)

### POST-IMPACT DATA

#### ELECTRIC ENERGY STORAGE/CONVERSION DEVICE

|                                                        | Inside Passenger Compartment | Outside Passenger Compartment |
|--------------------------------------------------------|------------------------------|-------------------------------|
| Location of Electric Energy Storage/Conversion Device: | X                            |                               |

|                                                                                                                                     | Yes, Pass | No, Fail |
|-------------------------------------------------------------------------------------------------------------------------------------|-----------|----------|
| All Components of Electrical Energy Storage/Conversion Device remained attached to the vehicle with at least one mounting location. | X         |          |

|                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------|
| Describe Electric Energy Storage/Conversion Device movement within the passenger compartment [Supply photographs as appropriate]: |
| No movement apparent                                                                                                              |

|                                                                                           | Yes, Fail | No, Pass |
|-------------------------------------------------------------------------------------------|-----------|----------|
| Has the Electric Energy Storage/Conversion Device moved within the passenger compartment? |           | X        |

|                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------|
| Describe intrusion of an outside Electric Energy Storage/Conversion Device into the passenger compartment [Supply photographs as appropriate]: |
| None; No Movement                                                                                                                              |

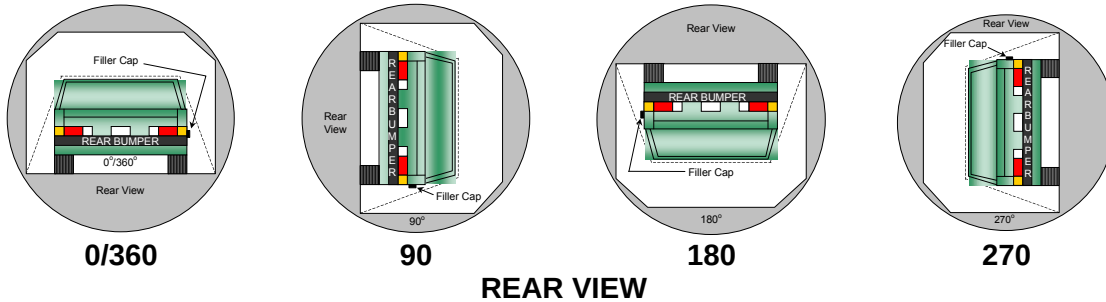
|                                                                                                   | Yes, Fail | No, Pass |
|---------------------------------------------------------------------------------------------------|-----------|----------|
| Has an outside Electric Energy Storage/Conversion Device intruded into the passenger compartment? |           | X        |

|                                                                                                         | Yes, Fail | No, Pass |
|---------------------------------------------------------------------------------------------------------|-----------|----------|
| Is Electric Energy Storage/Conversion Device electrolyte spillage visible in the passenger compartment? |           | X        |

**DATA SHEET 5**  
**STATIC ROLLOVER TEST DATA**

Test Vehicle: 2011 Hyundai Sonata Hybrid  
 Test Program: FMVSS 208 Compliance  
 Test Technician: Joe Fleck

NHTSA No.: CB0502  
 Test Date: 2/24/12



**DETERMINATION OF ELECTRIC ENERGY STORAGE/CONVERSION DEVICE  
 ELECTROLYTE COLLECTION TIME PERIOD**

| Rollover Stage | Rotation Time<br>(spec. 1-3 min) |         |    |         | FMVSS<br>301 Hold<br>Time | Total Time |   |         |    |         | Next Whole<br>Minute<br>Interval |         |
|----------------|----------------------------------|---------|----|---------|---------------------------|------------|---|---------|----|---------|----------------------------------|---------|
| 0° - 90°       | 2                                | minutes | 02 | seconds | 5                         | minutes    | 7 | minutes | 02 | seconds | 8                                | minutes |
| 90° - 180°     | 1                                | minutes | 56 | seconds | 5                         | minutes    | 6 | minutes | 56 | seconds | 7                                | minutes |
| 180° - 270°    | 1                                | minutes | 48 | seconds | 5                         | minutes    | 6 | minutes | 48 | seconds | 7                                | minutes |
| 270° - 360°    | 1                                | minutes | 57 | seconds | 5                         | minutes    | 6 | minutes | 57 | seconds | 7                                | minutes |

**ACTUAL TEST VEHICLE ELECTRIC ENERGY STORAGE/CONVERSION DEVICE  
 ELECTROLYTE SPILLAGE**

| Rollover Stage | Electric Energy Storage/Conversion<br>Device Electrolyte Spillage (L) | Spillage Location |
|----------------|-----------------------------------------------------------------------|-------------------|
| 0° to 90°      | 0                                                                     | Not Applicable    |
| 90° to 180°    | 0                                                                     | Not Applicable    |
| 180° to 270°   | 0                                                                     | Not Applicable    |
| 270° to 360°   | 0                                                                     | Not Applicable    |

Total Spillage: 0 L

|                                                                                                         | Yes, Fail | No, Pass |
|---------------------------------------------------------------------------------------------------------|-----------|----------|
| Is the total spillage of Electric Energy Storage/Conversion Device electrolyte greater than 5.0 Liters? |           | X        |
| Is Electric Energy Storage/Conversion Device electrolyte spillage visible in the passenger compartment? |           | X        |

**DATA SHEET 5 (CONTINUED)**  
**STATIC ROLLOVER TEST DATA**

**VOLTMETER INFORMATION**

|                                                                                                                                                  |                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Make:                                                                                                                                            | Fluke            |
| Model:                                                                                                                                           | 11               |
| Serial Number:                                                                                                                                   | 17210161         |
| Internal Impedance Value (MΩ):                                                                                                                   | > 10 MΩ < 100 pF |
| Nominal Electric Energy Storage/Conversion Device Voltage (Vb) (V):                                                                              | 264.7            |
| Record V1, V2, V1', V2' voltage measurements at the start of each successive increment of 90°, 180°, 270°, and 360° of the static rollover test. |                  |

**ELECTRICAL ISOLATION MEASUREMENT**

|       |       |   |      |       |   |         |    |   |
|-------|-------|---|------|-------|---|---------|----|---|
| V1 =  | 35.4  | V | 0°   | Time: |   | Minutes |    | s |
| V1 =  | 29.5  | V | 90°  | Time: | 2 | Minutes | 15 | s |
| V1 =  | 35.8  | V | 180° | Time: | 2 | Minutes | 08 | s |
| V1 =  | 21.9  | V | 270° | Time: | 1 | Minutes | 56 | s |
| V1 =  | 37.1  | V | 360° | Time: | 2 | Minutes | 40 | s |
| V2 =  | 16.4  | V | 0°   | Time: |   | Minutes |    | s |
| V2 =  | 15.7  | V | 90°  | Time: | 2 | Minutes | 44 | s |
| V2 =  | 16.9  | V | 180° | Time: | 2 | Minutes | 33 | s |
| V2 =  | 36.8  | V | 270° | Time: | 3 | Minutes | 47 | s |
| V2 =  | 17.8  | V | 360° | Time: | 2 | Minutes | 55 | s |
| V1' = | 5.0   | V | 0°   | Time: |   | Minutes |    | s |
| V1' = | 14.7  | V | 90°  | Time: | 2 | Minutes | 19 | s |
| V1' = | 6.1   | V | 180° | Time: | 2 | Minutes | 17 | s |
| V1' = | 3.9   | V | 270° | Time: | 2 | Minutes | 09 | s |
| V1' = | 6.8   | V | 360° | Time: | 2 | Minutes | 47 | s |
| V2' = | 3.9   | V | 0°   | Time: |   | Minutes |    | s |
| V2' = | 6.7   | V | 90°  | Time: | 2 | Minutes | 56 | s |
| V2' = | 4.5   | V | 180° | Time: | 2 | Minutes | 35 | s |
| V2' = | 4.8   | V | 270° | Time: | 3 | Minutes | 55 | s |
| V2' = | 10.9  | V | 360° | Time: | 3 | Minutes | 10 | s |
| Vb =  | 263.4 | V | 0°   | Time: |   | Minutes |    | s |
| Vb =  | 263.4 | V | 90°  | Time: | 2 | Minutes | 09 | s |
| Vb =  | 263.3 | V | 180° | Time: | 2 | Minutes | 00 | s |
| Vb =  | 263.3 | V | 270° | Time: | 1 | Minutes | 46 | s |
| Vb =  | 263.2 | V | 360° | Time: | 2 | Minutes | 35 | s |

**DATA SHEET 5 (CONTINUED)**  
**STATIC ROLLOVER TEST DATA**

**ELECTRICAL ISOLATION CALCULATION**

Note: If measured voltage is zero and results in a division by zero, record "Zero Volts". This "zero voltage" condition is considered as being compliant.

|                                                                                                              |         |     |      |       |   |         |    |   |
|--------------------------------------------------------------------------------------------------------------|---------|-----|------|-------|---|---------|----|---|
| $R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$                                                             |         |     |      |       |   |         |    |   |
| Ri1 =                                                                                                        | 1781124 | Ω   | 0°   | Time: |   | Minutes |    | s |
| Ri1 =                                                                                                        | 308834  | Ω   | 90°  | Time: | 2 | Minutes | 19 | s |
| Ri1 =                                                                                                        | 1434889 | Ω   | 180° | Time: | 2 | Minutes | 17 | s |
| Ri1 =                                                                                                        | 2476658 | Ω   | 270° | Time: | 2 | Minutes | 09 | s |
| Ri1 =                                                                                                        | 1320068 | Ω   | 360° | Time: | 2 | Minutes | 47 | s |
| $R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$                                                             |         |     |      |       |   |         |    |   |
| Ri2 =                                                                                                        | 2026728 | Ω   | 0°   | Time: |   | Minutes |    | s |
| Ri2 =                                                                                                        | 774231  | Ω   | 90°  | Time: | 2 | Minutes | 56 | s |
| Ri2 =                                                                                                        | 1720272 | Ω   | 180° | Time: | 2 | Minutes | 35 | s |
| Ri2 =                                                                                                        | 2128938 | Ω   | 270° | Time: | 3 | Minutes | 55 | s |
| Ri2 =                                                                                                        | 390876  | Ω   | 360° | Time: | 3 | Minutes | 10 | s |
| Ri = The lesser of Ri1 and Ri2                                                                               |         |     |      |       |   |         |    |   |
| Ri =                                                                                                         | 1781124 | Ω   | 0°   | Time: |   | Minutes |    | s |
| Ri =                                                                                                         | 308834  | Ω   | 90°  | Time: | 2 | Minutes | 19 | s |
| Ri =                                                                                                         | 1434889 | Ω   | 180° | Time: | 2 | Minutes | 17 | s |
| Ri =                                                                                                         | 2128938 | Ω   | 270° | Time: | 2 | Minutes | 09 | s |
| Ri =                                                                                                         | 390876  | Ω   | 360° | Time: | 2 | Minutes | 47 | s |
| Ri/Vb = Electrical Isolation Value/Nominal Battery Voltage<br>Minimum Electrical Isolation Value is 500 Ω /V |         |     |      |       |   |         |    |   |
| Ri/Vb =                                                                                                      | 6729    | Ω/V | 0°   | Time: |   | Minutes |    | s |
| Ri/Vb =                                                                                                      | 1167    | Ω/V | 90°  | Time: | 2 | Minutes | 19 | s |
| Ri/Vb =                                                                                                      | 5421    | Ω/V | 180° | Time: | 2 | Minutes | 17 | s |
| Ri/Vb =                                                                                                      | 8043    | Ω/V | 270° | Time: | 2 | Minutes | 09 | s |
| Ri/Vb =                                                                                                      | 1477    | Ω/V | 360° | Time: | 2 | Minutes | 47 | s |

|                                                  |           |          |
|--------------------------------------------------|-----------|----------|
| Is the measured Electrical Isolation Value:      | Yes, Pass | No, Fail |
| ≥500 Ω/V without electrical isolation monitoring | X         |          |
| ≥100 Ω/V with electrical isolation monitoring    |           |          |

## APPENDIX A

### CRASH TEST DATA

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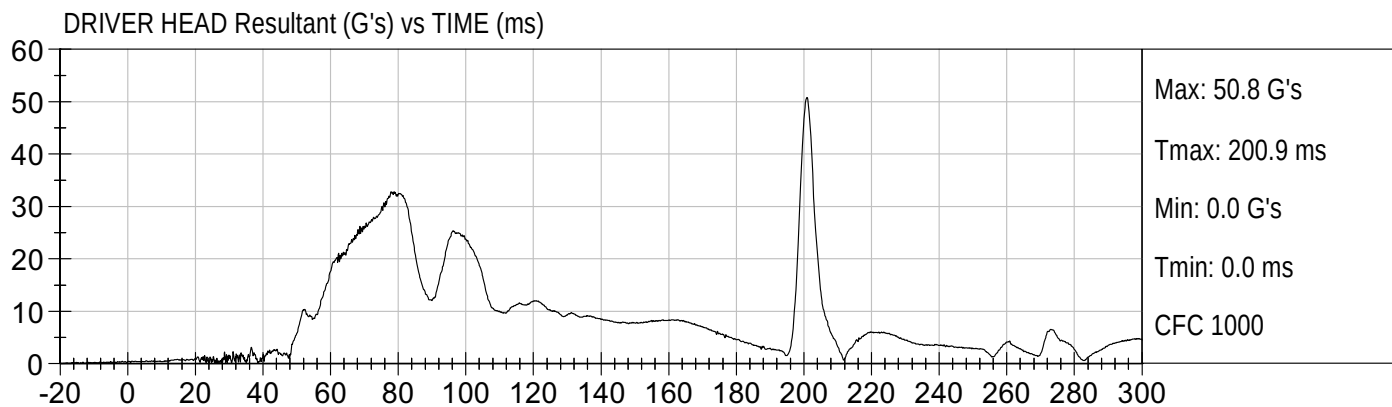
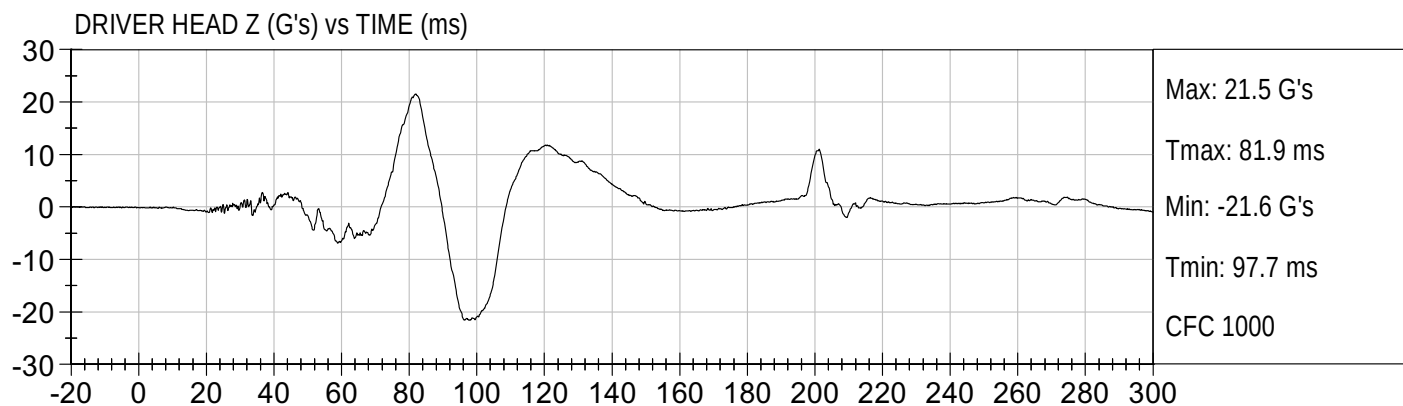
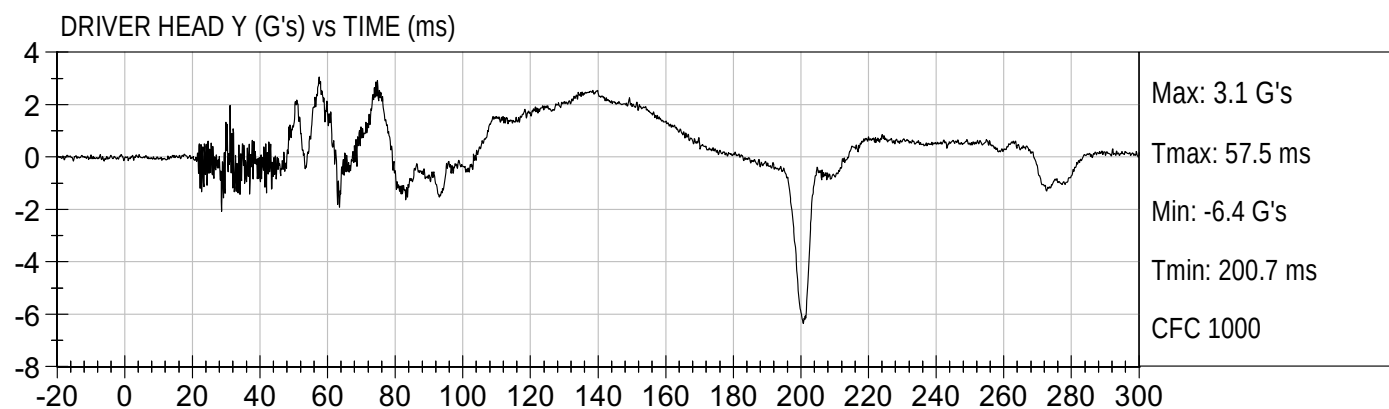
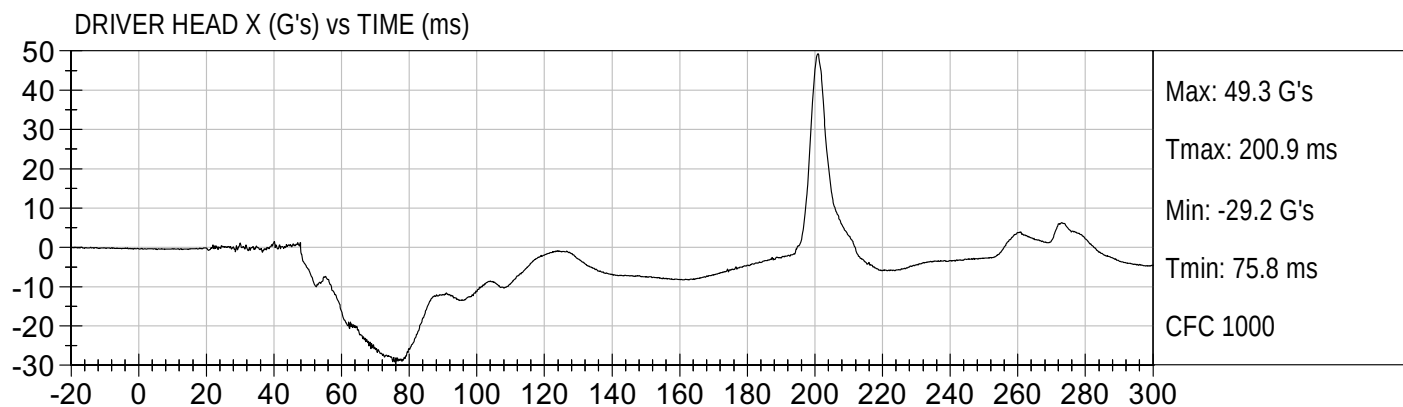


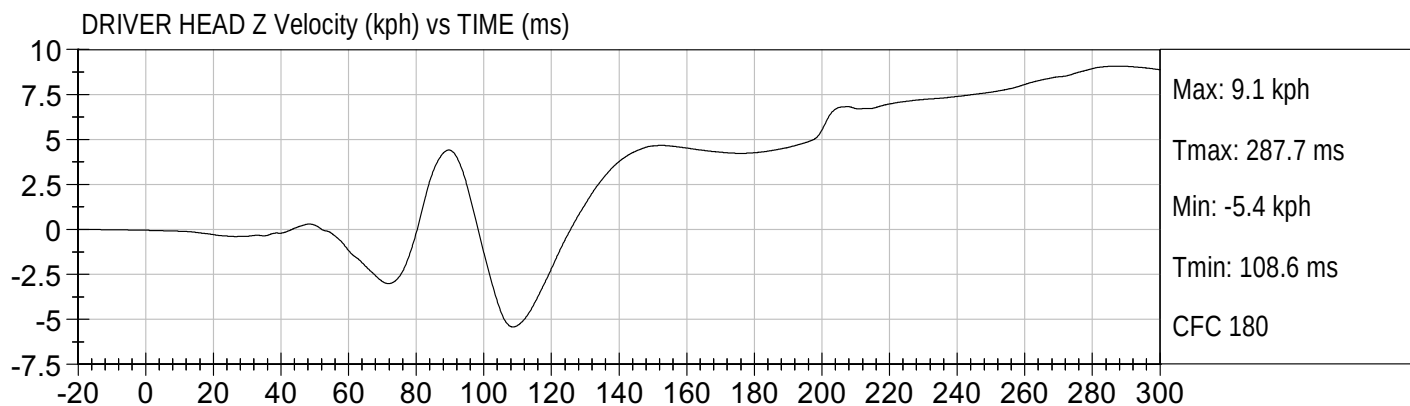
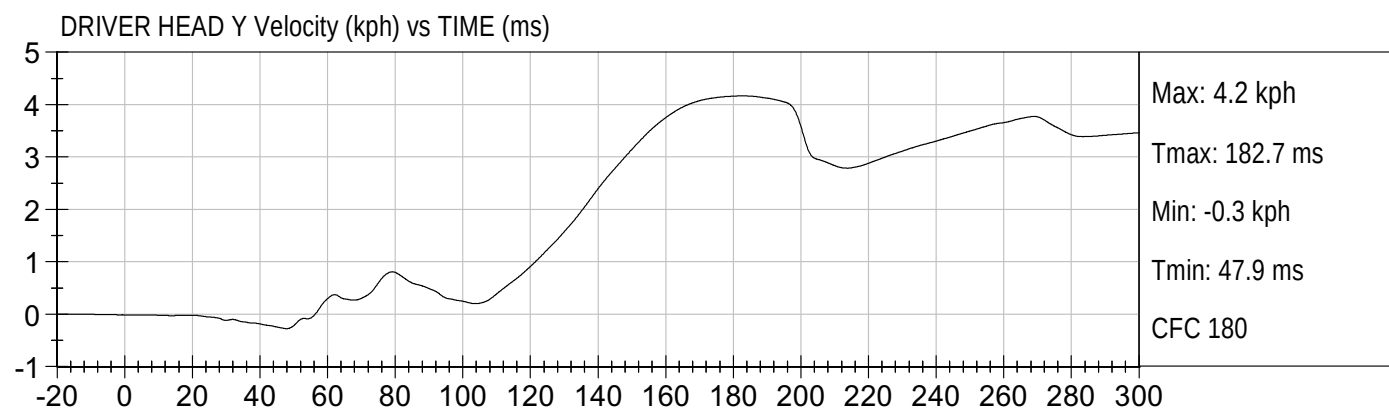
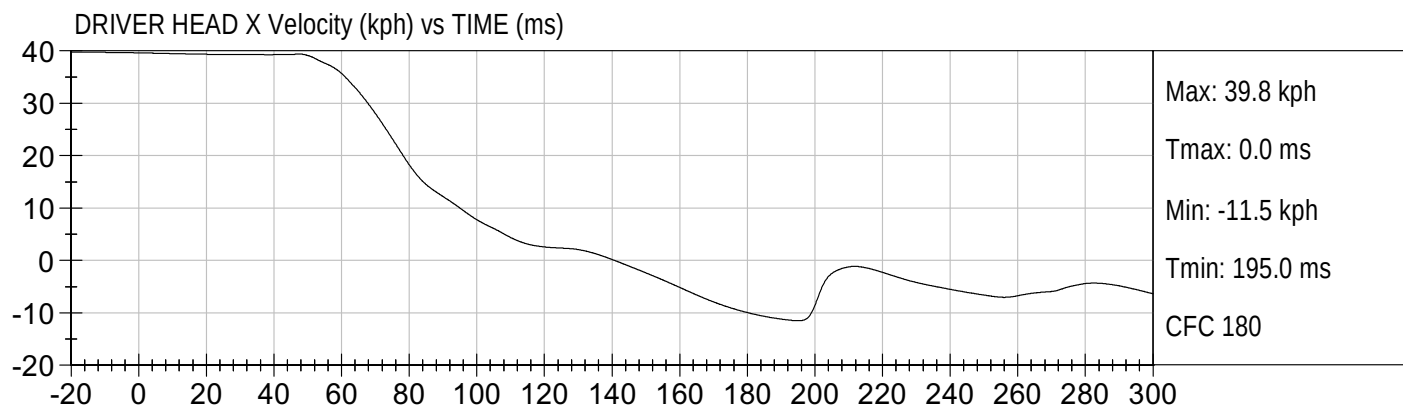
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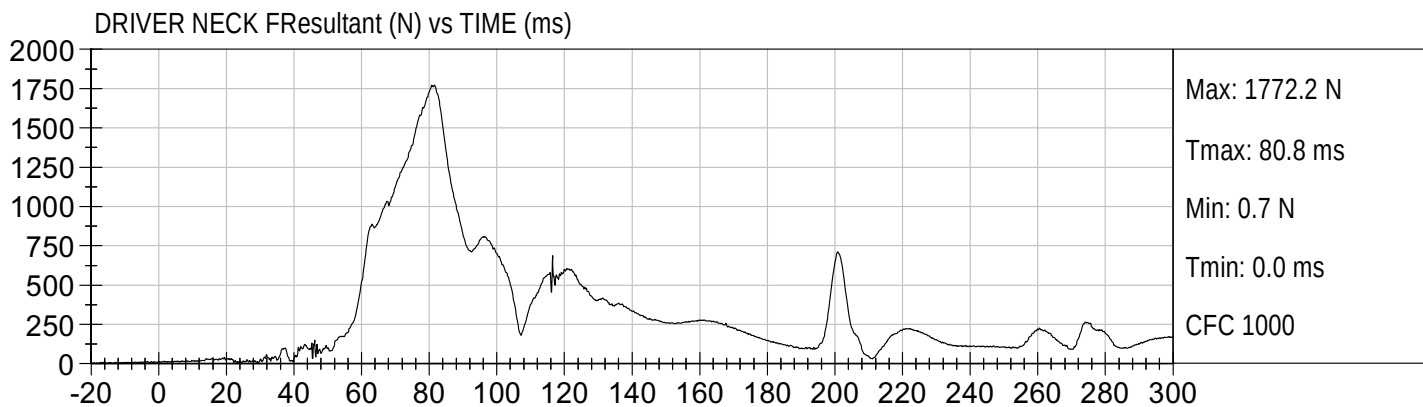
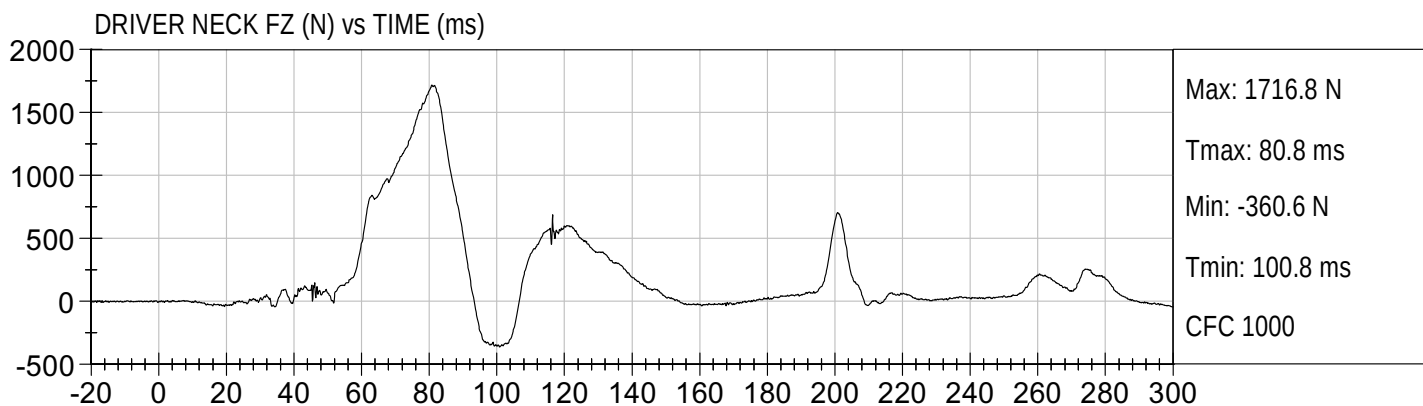
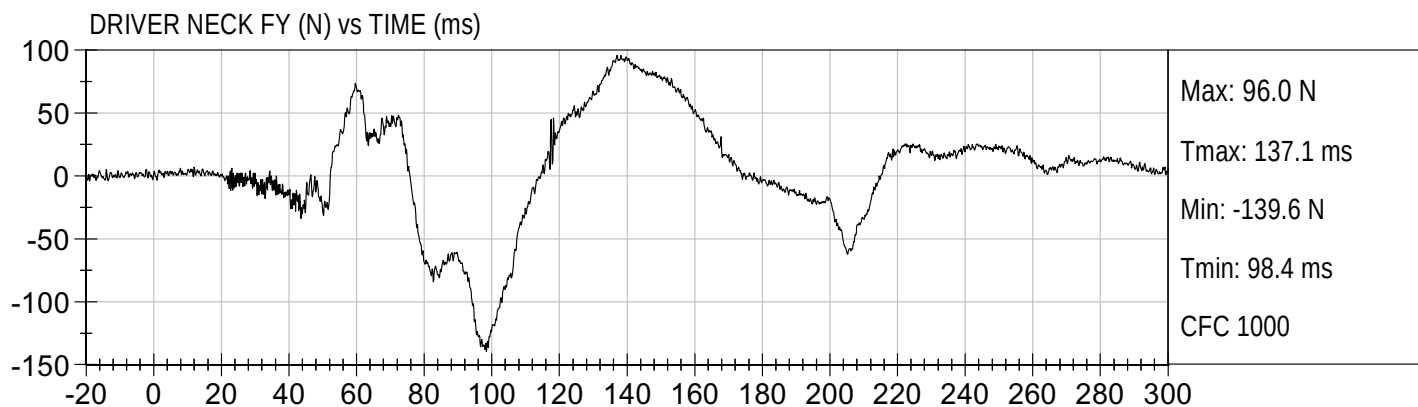
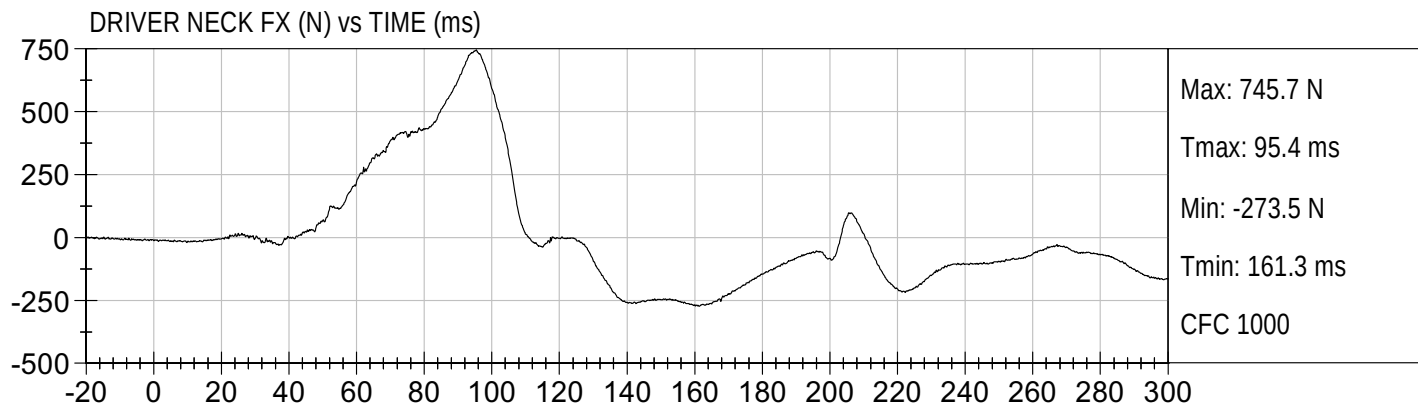


25mph Frontal Unbelted 50ths  
2011 Hyundai Sonata Hybrid (CB0502)

Test Date: 02/24/2012  
Speed: 24.7 mph (39.8 km/h)



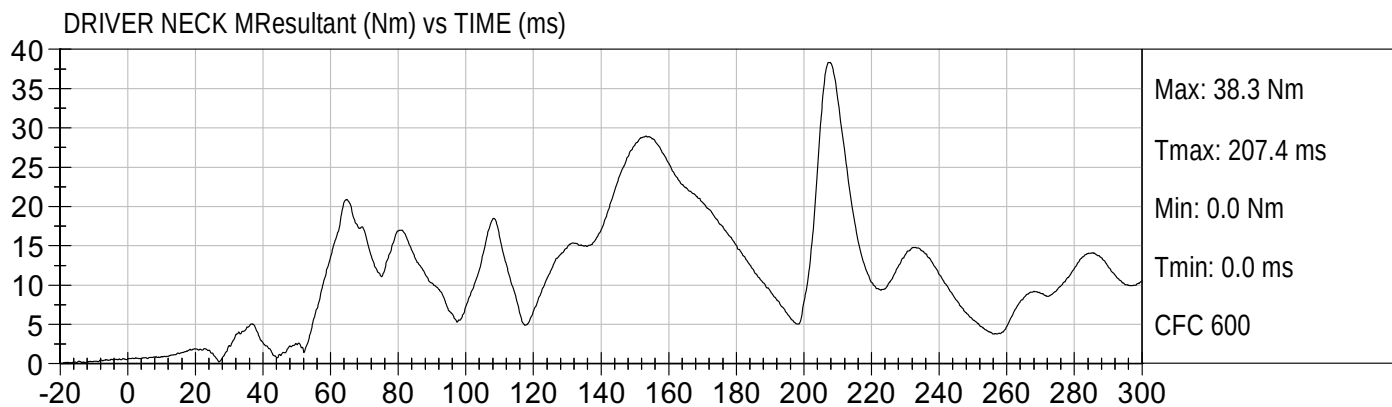
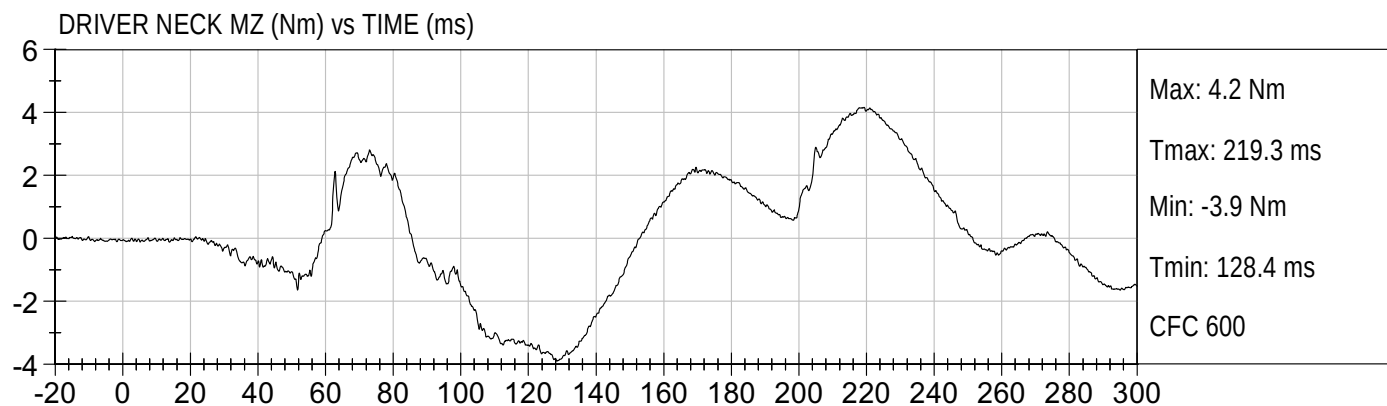
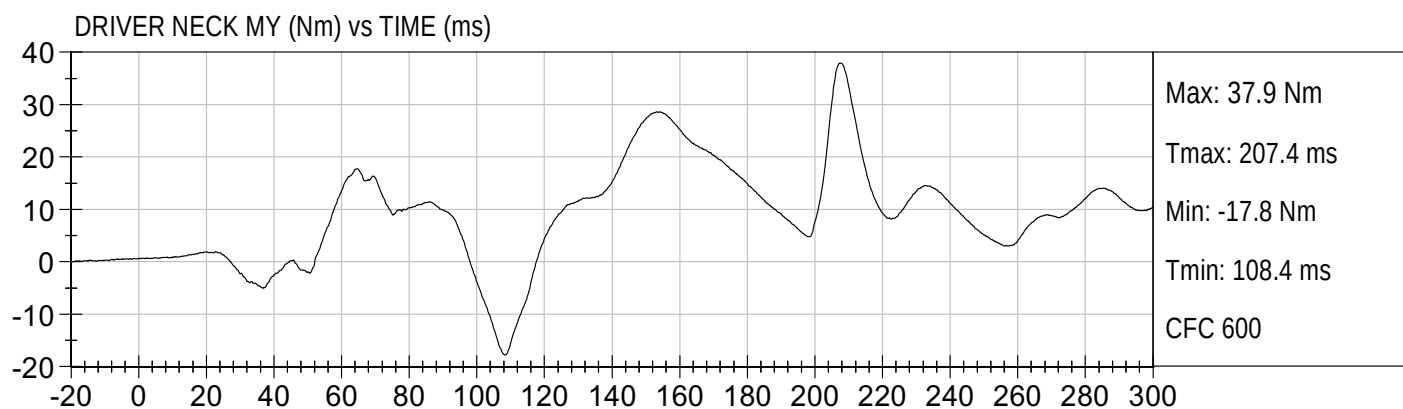
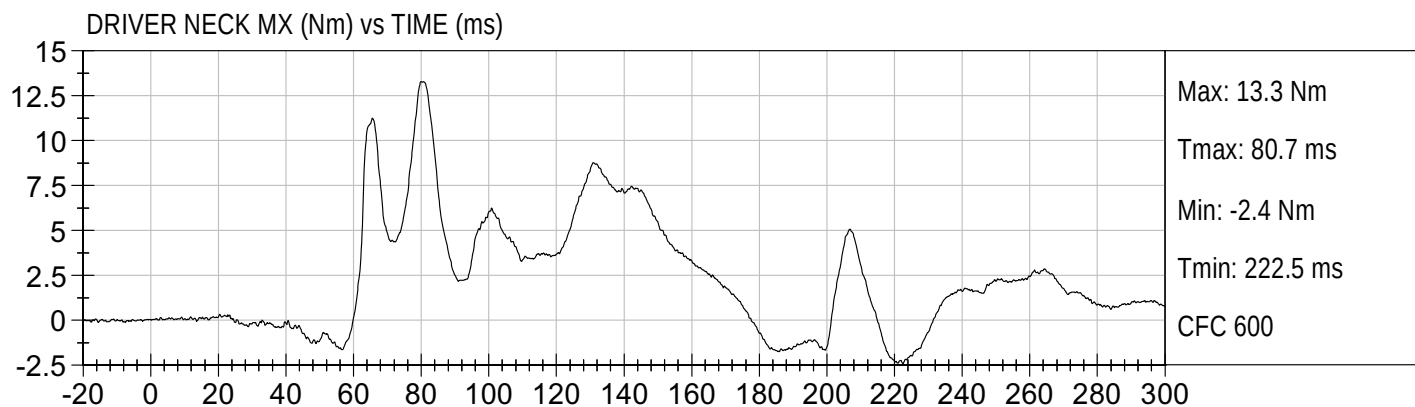


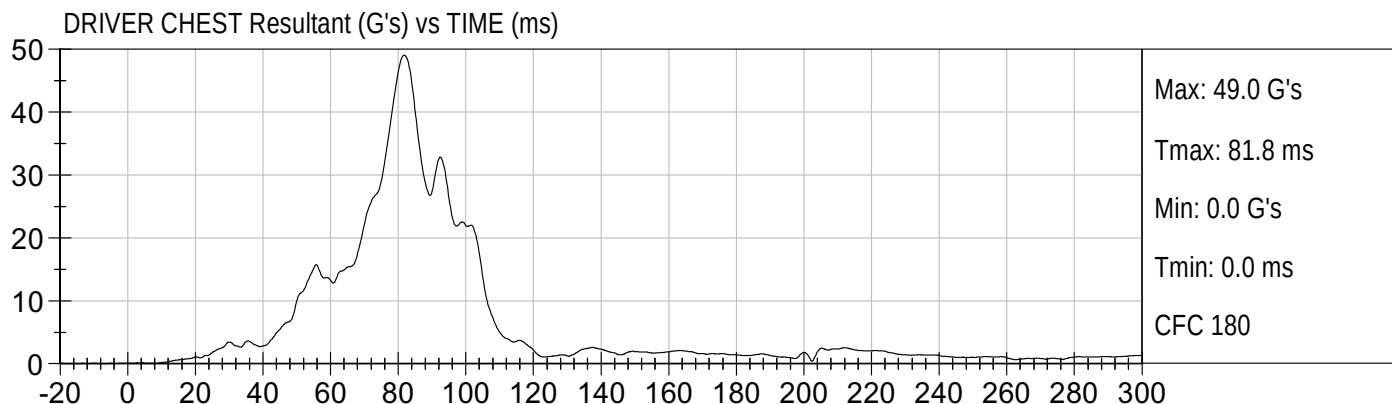
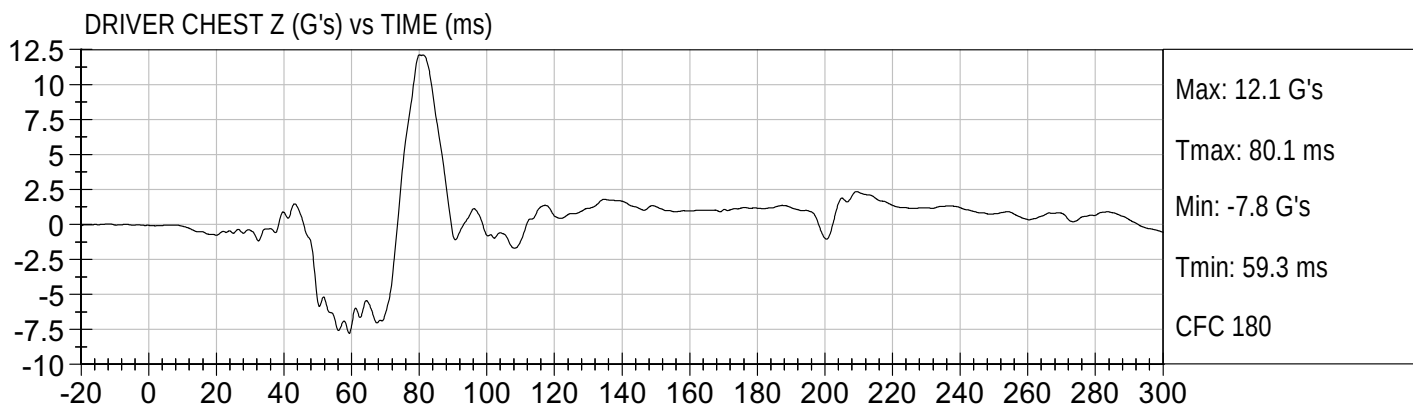
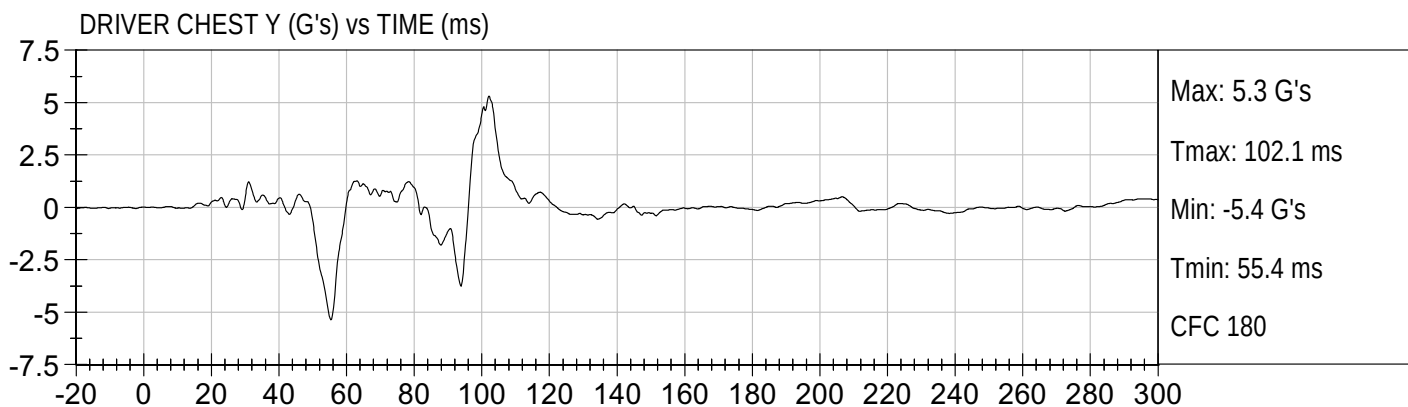
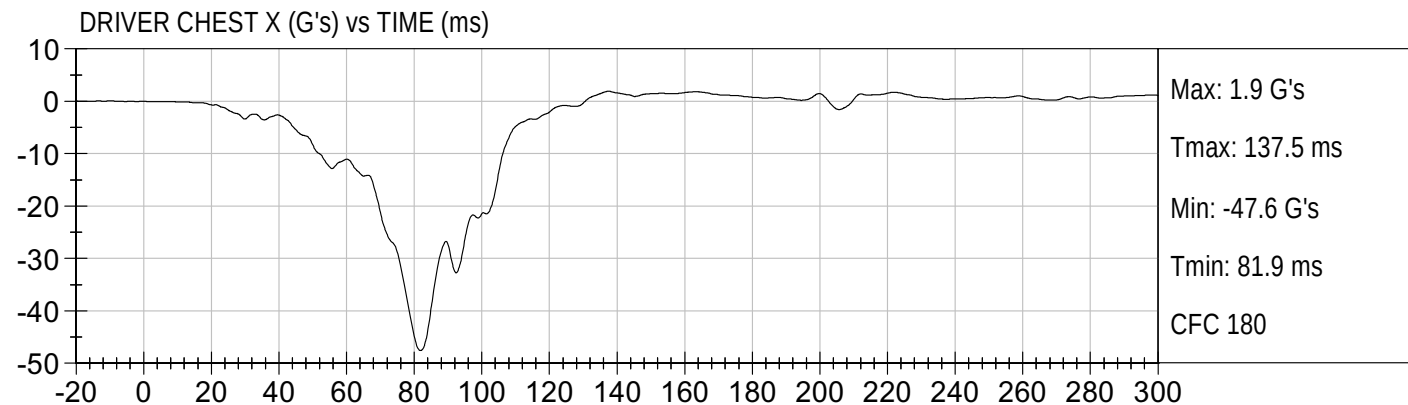


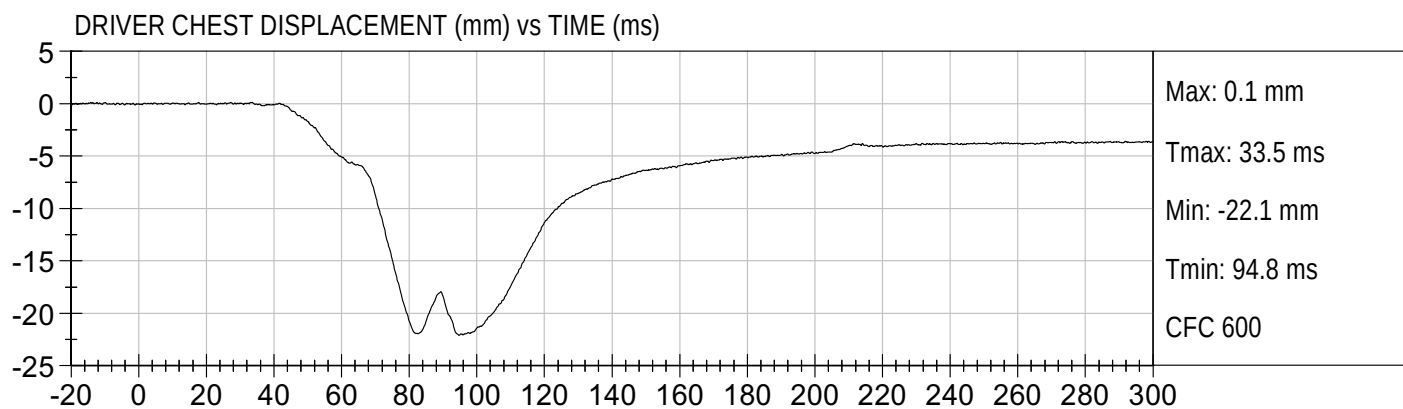
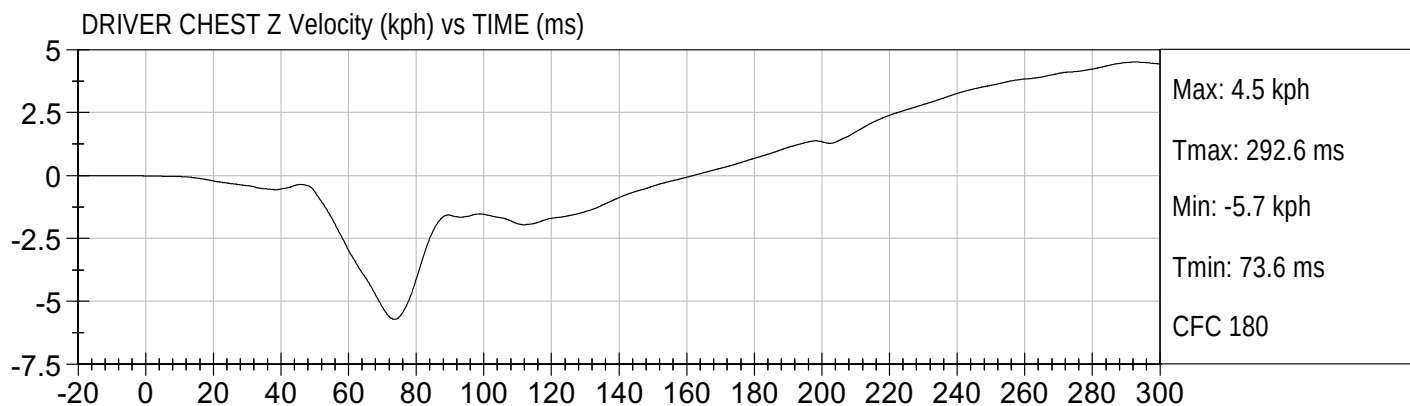
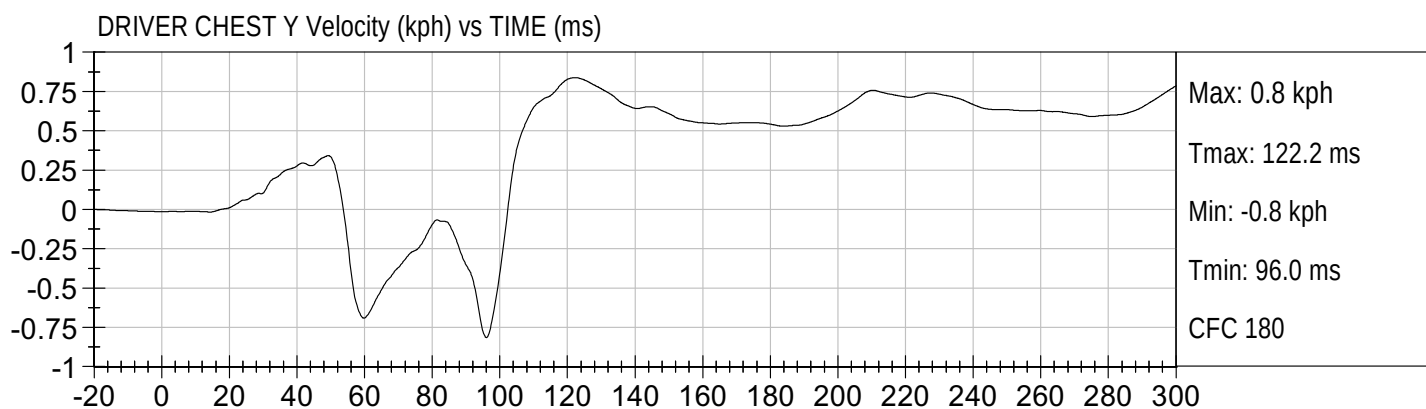
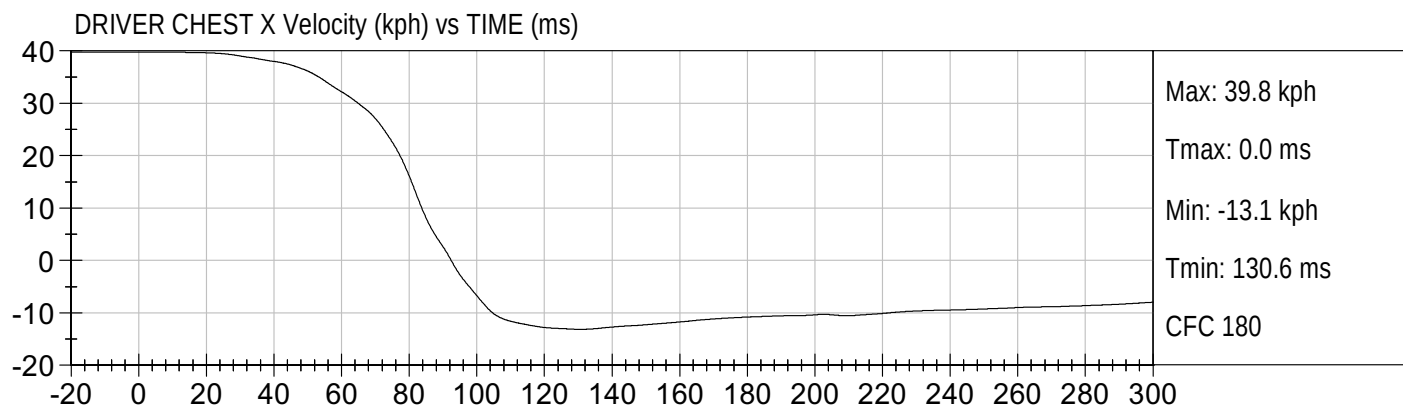


25mph Frontal Unbelted 50ths  
2011 Hyundai Sonata Hybrid (CB0502)

Test Date: 02/24/2012  
Speed: 24.7 mph (39.8 km/h)



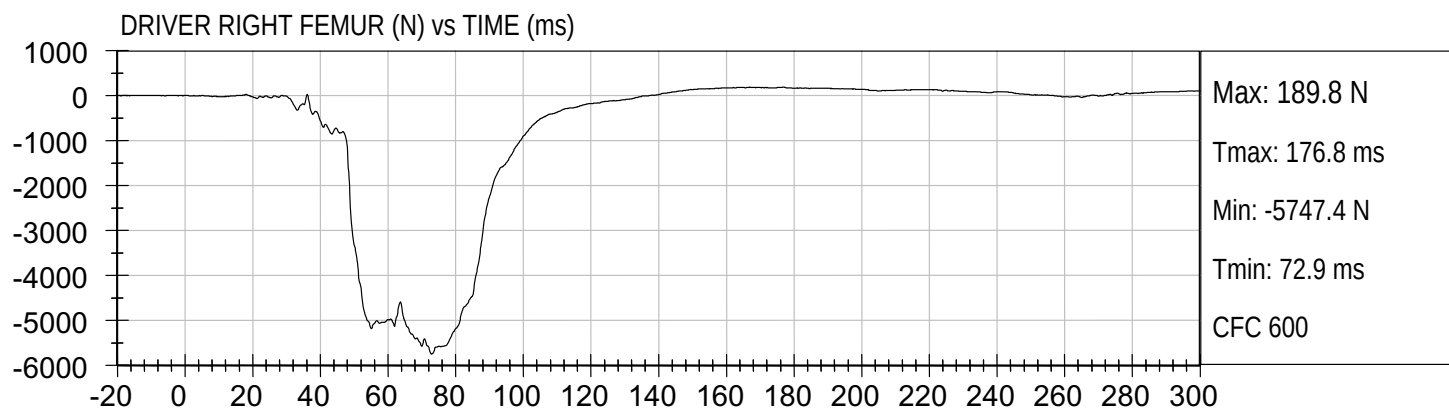
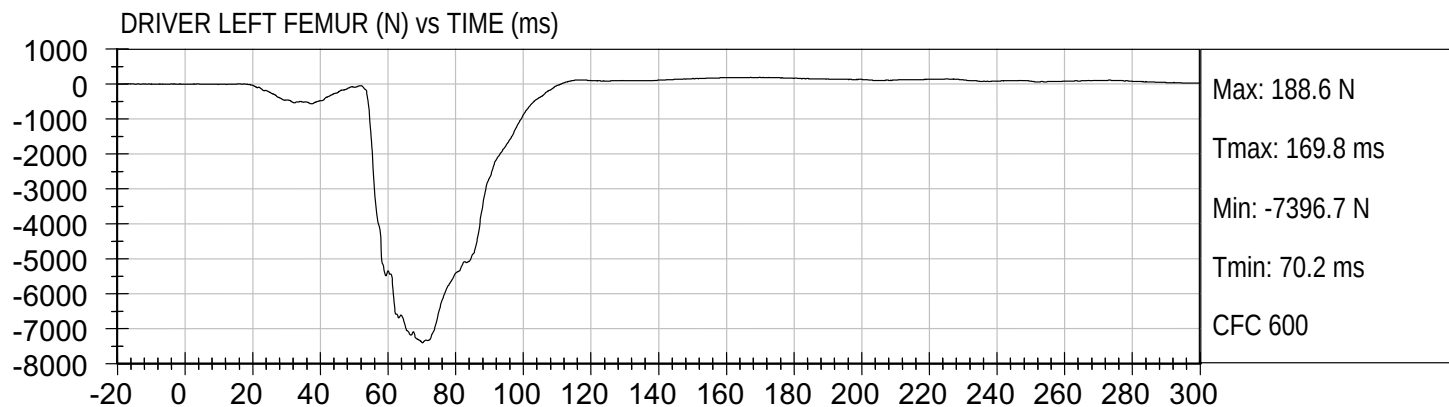






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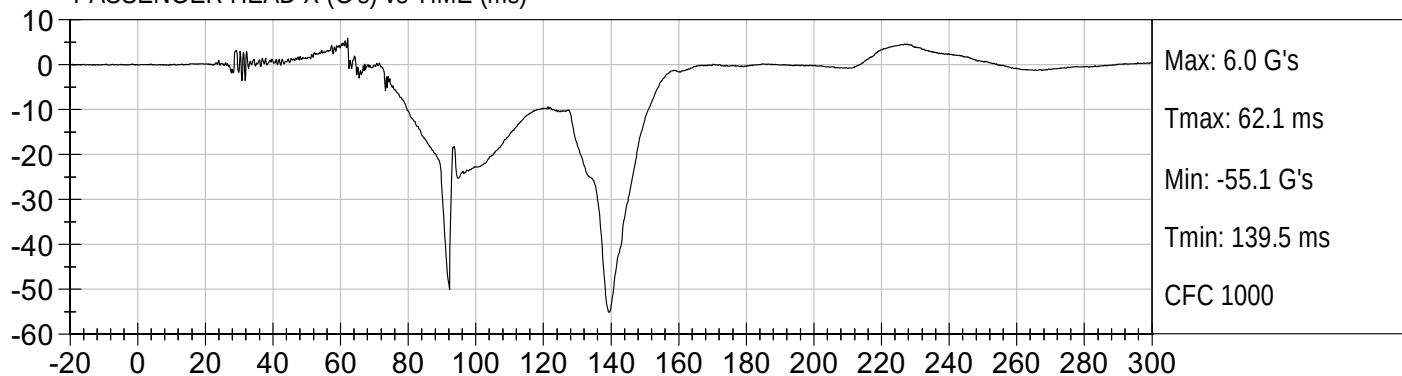




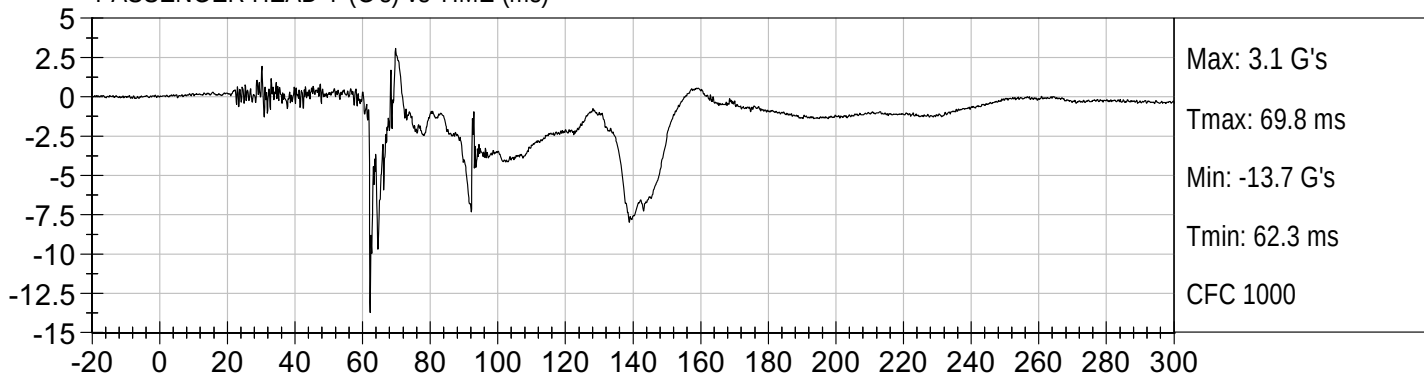
25mph Frontal Unbelted 50ths  
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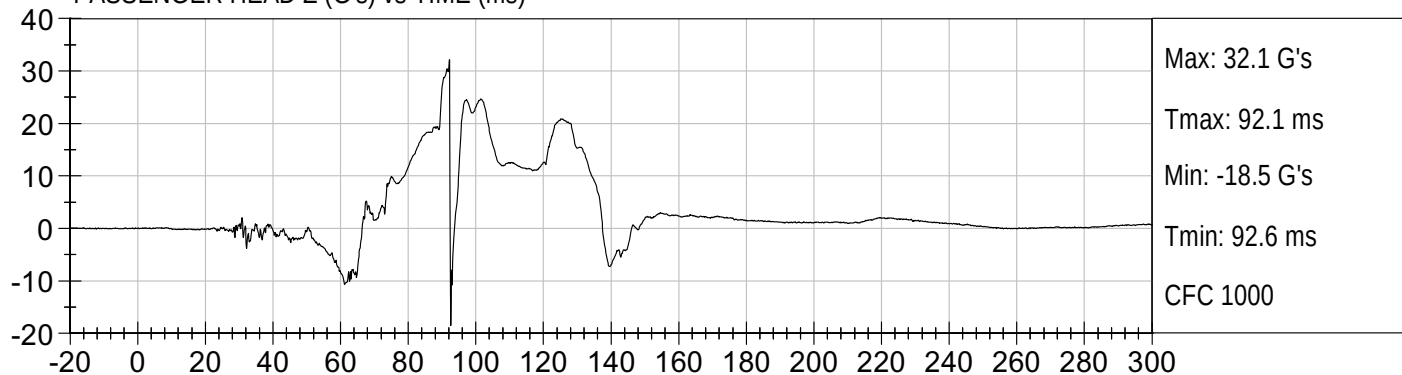
PASSENGER HEAD X (G's) vs TIME (ms)



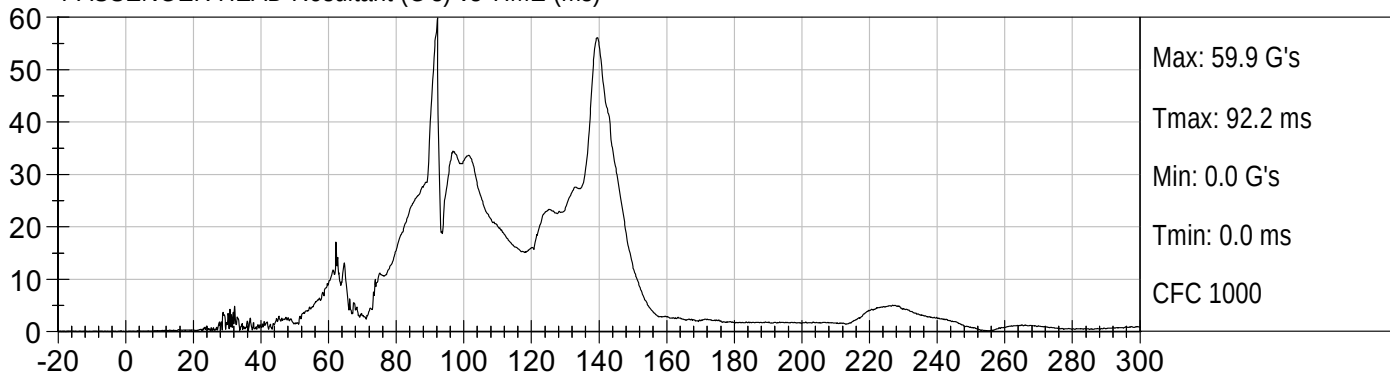
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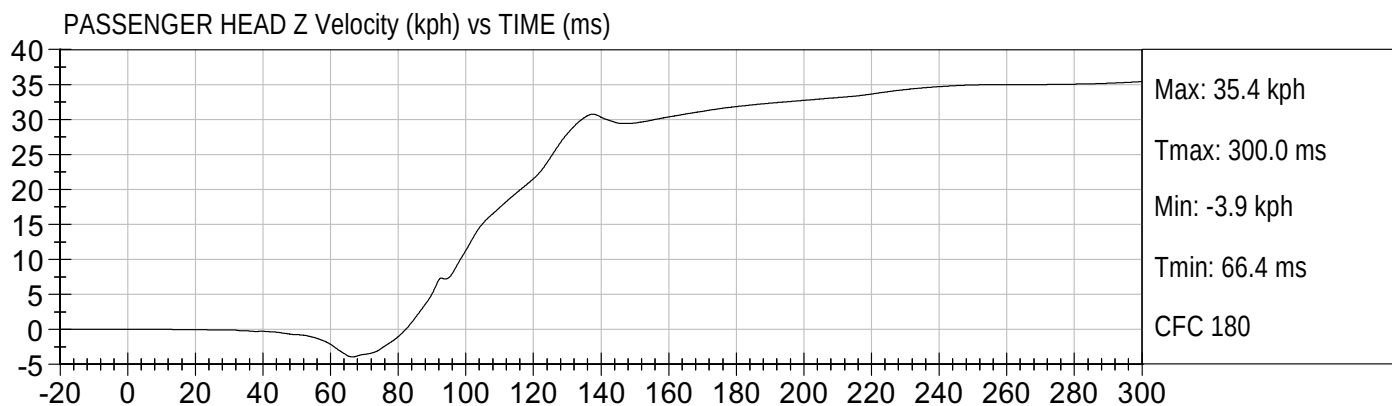
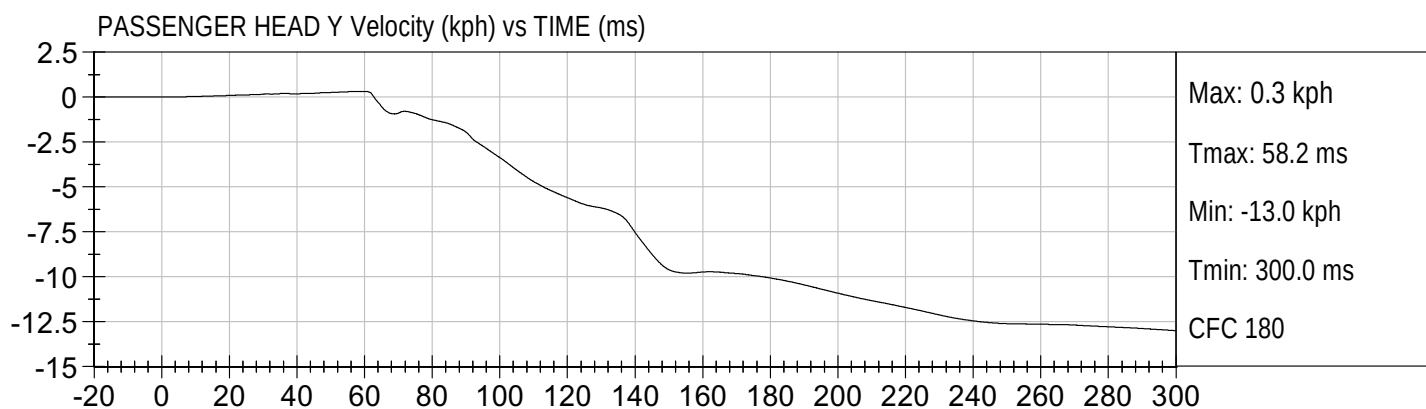
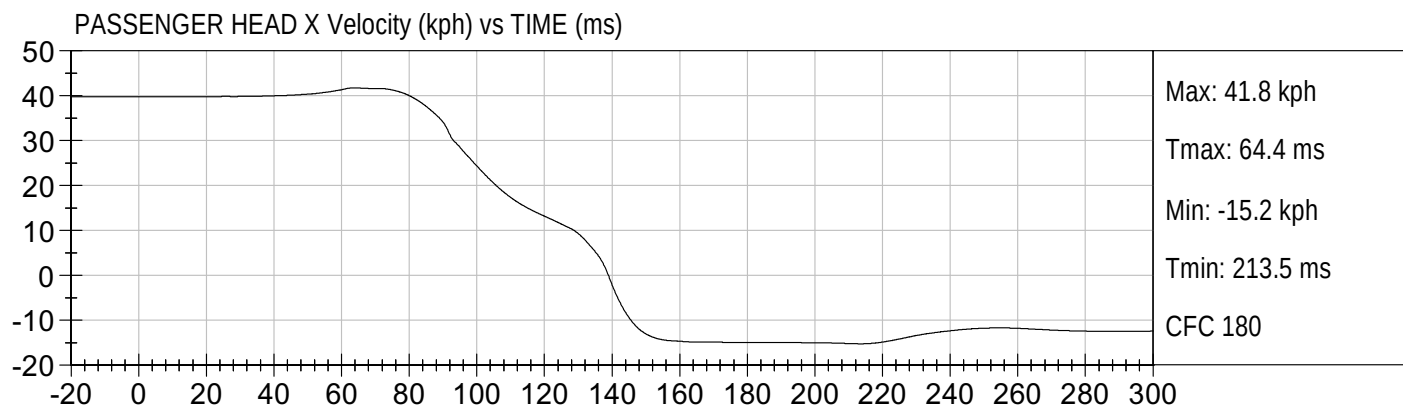


PASSENGER HEAD Z (G's) vs TIME (ms)



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



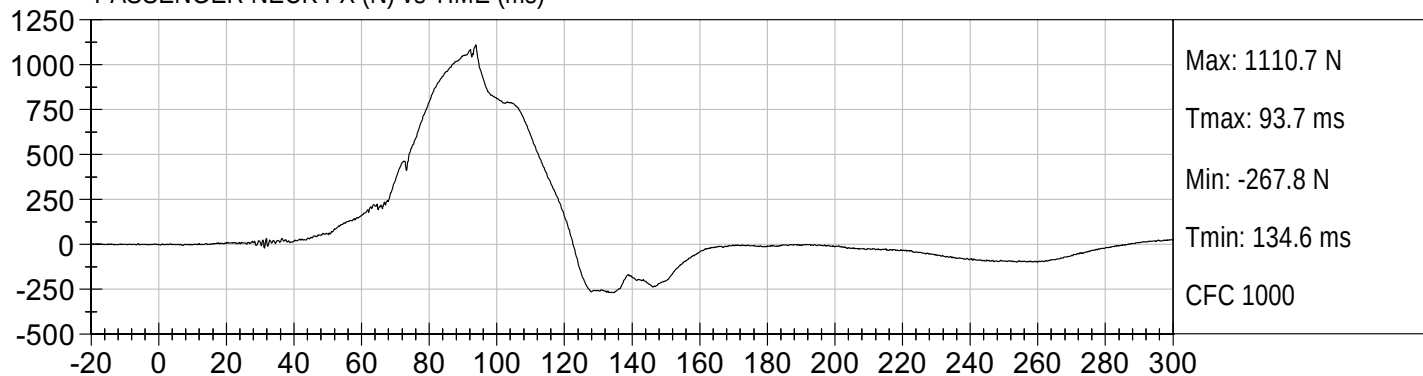




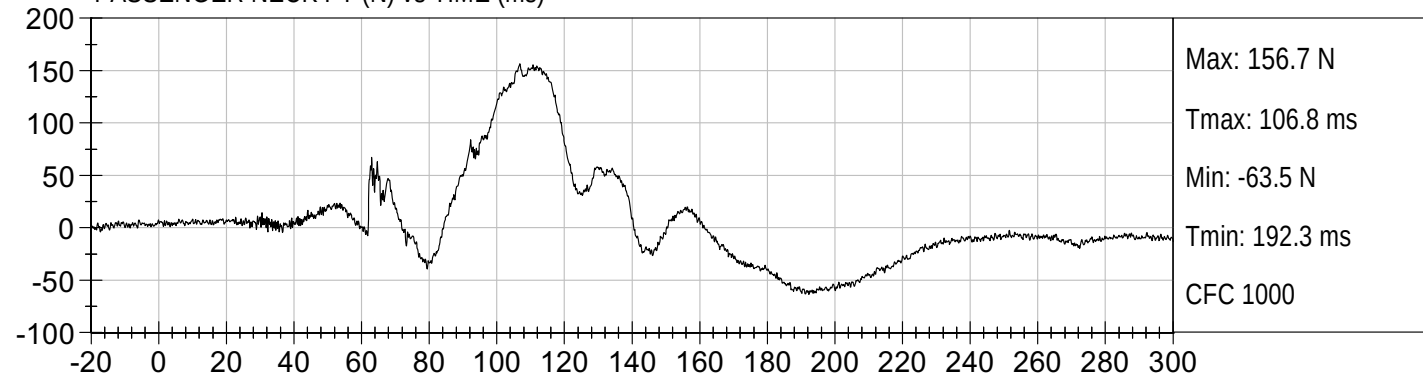
25mph Frontal Unbelted 50ths  
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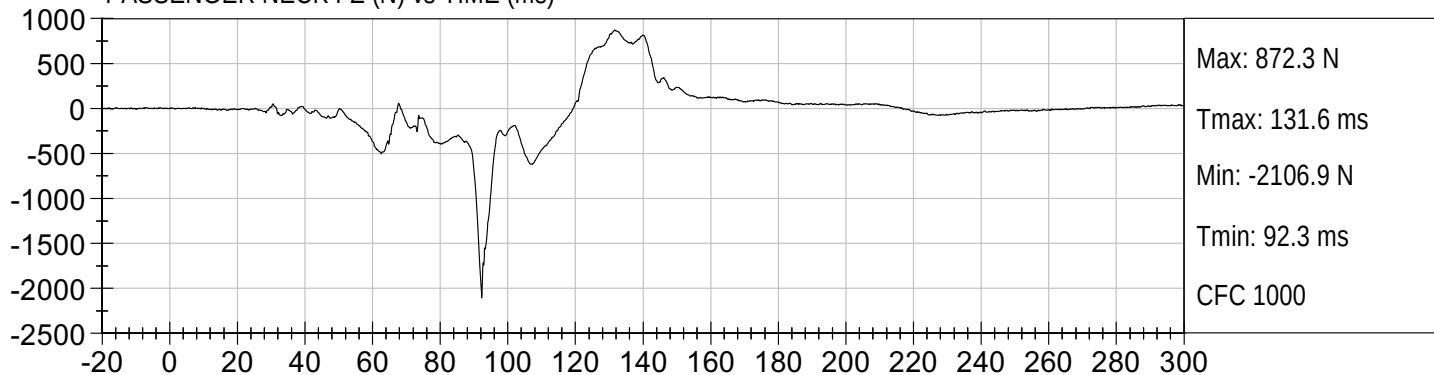
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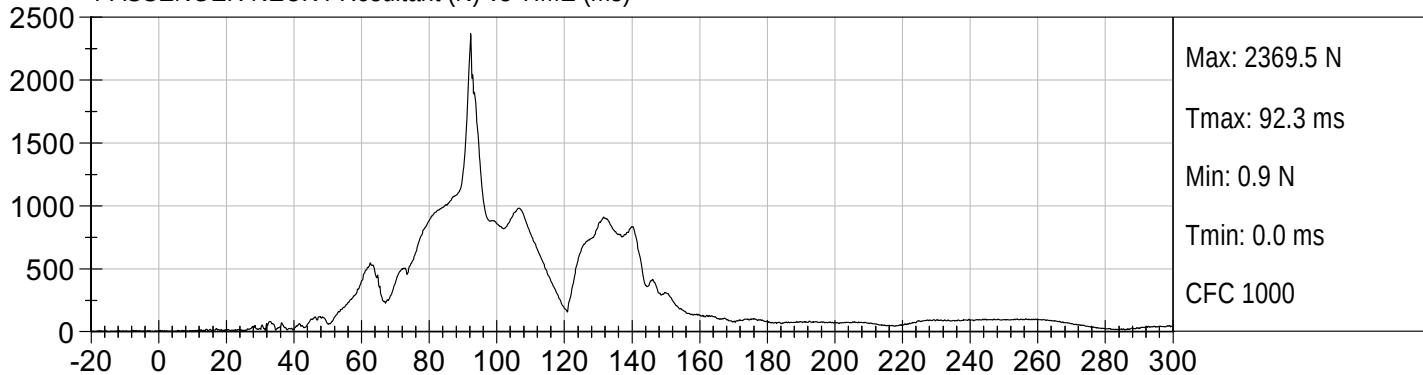
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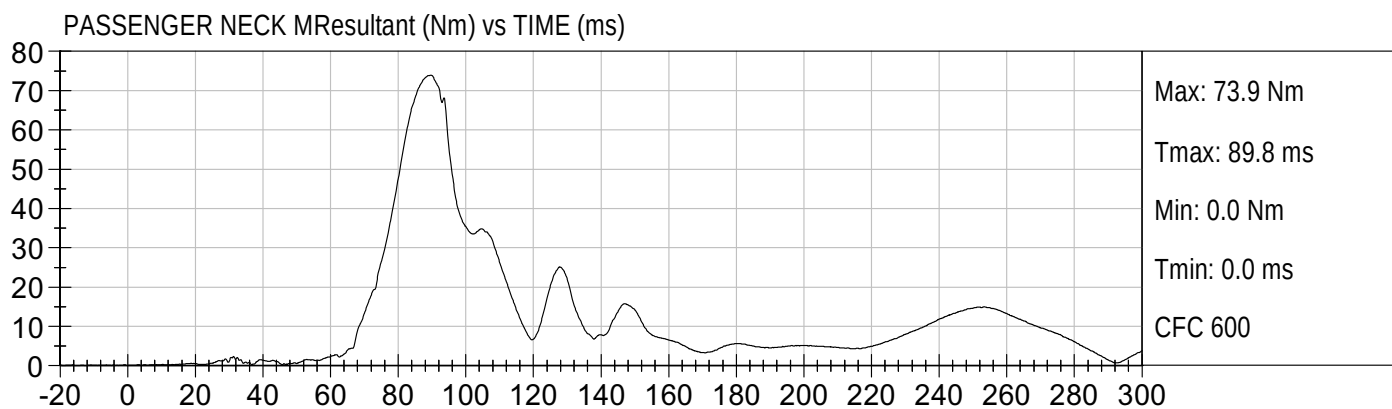
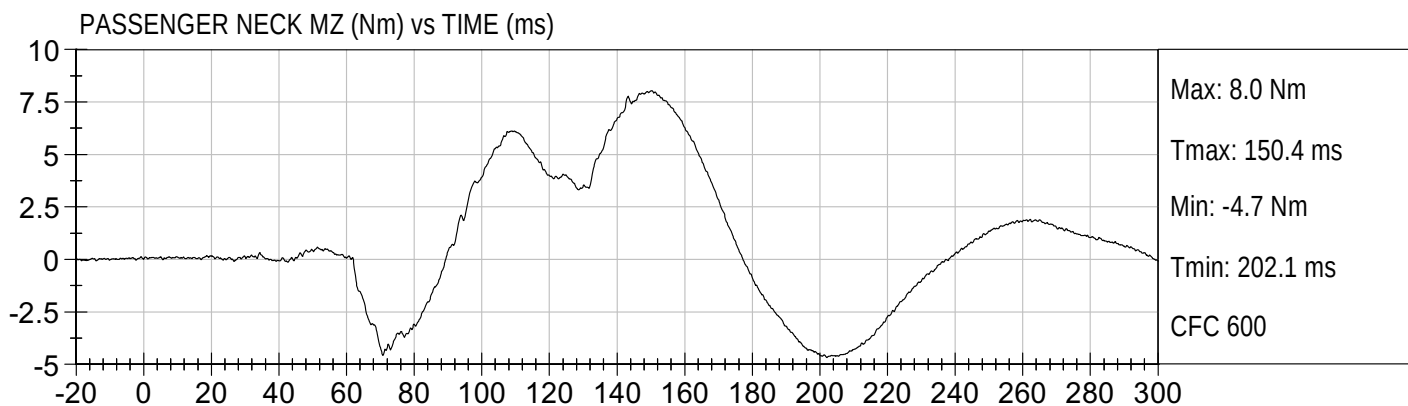
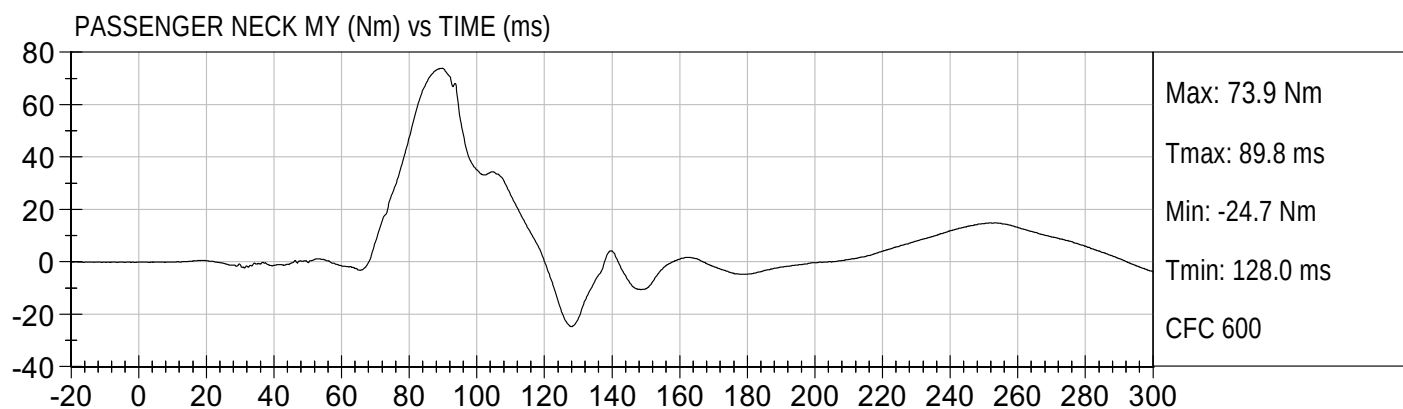
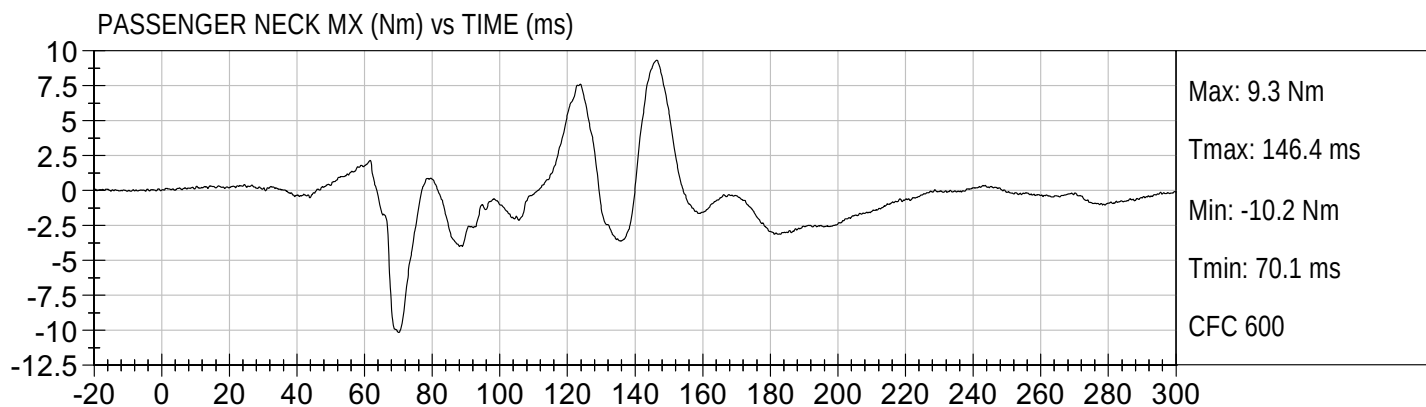
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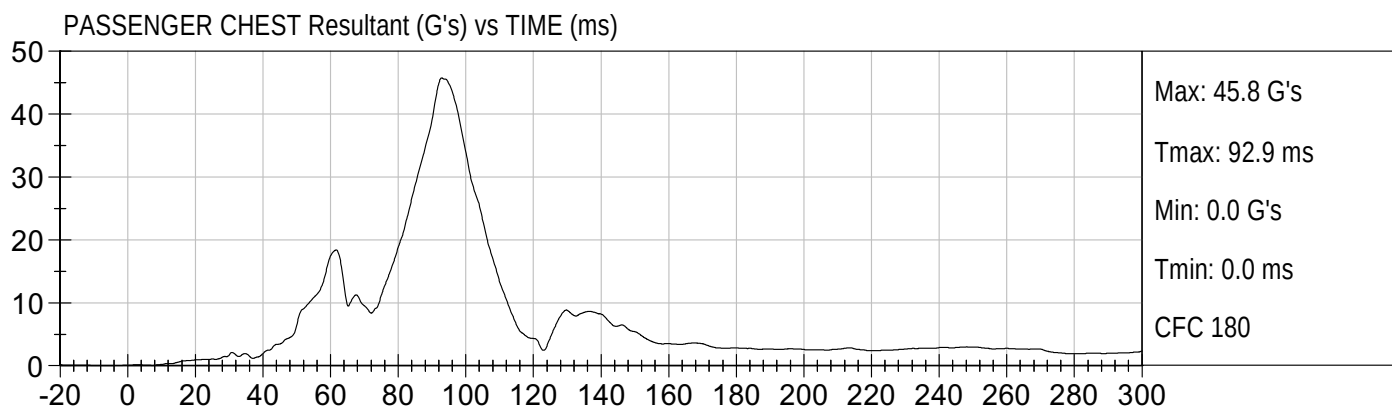
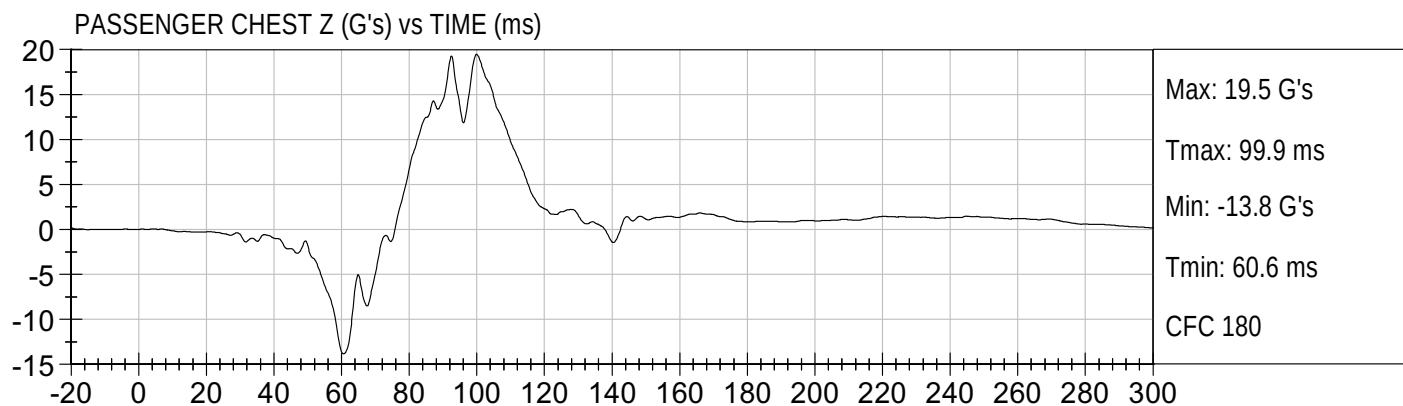
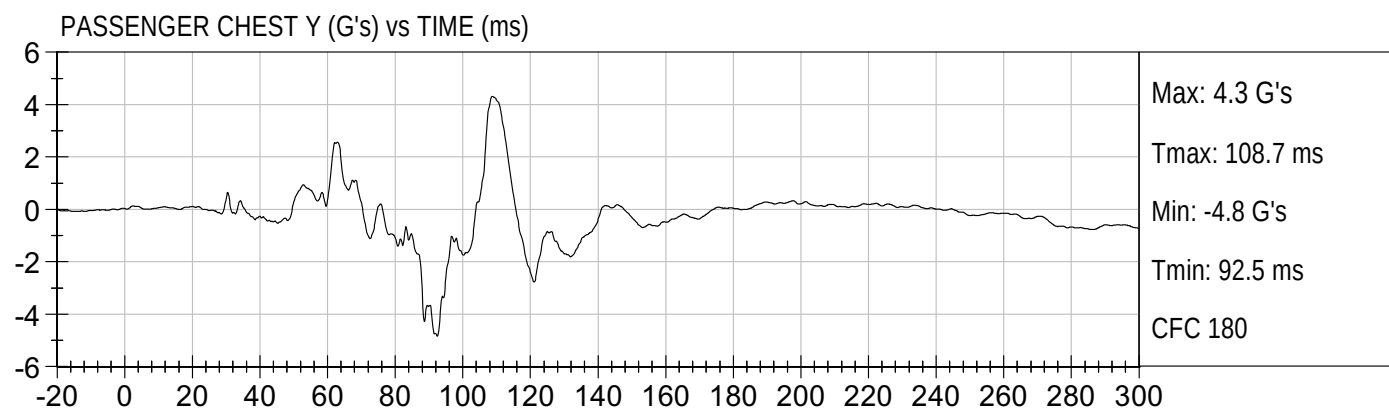
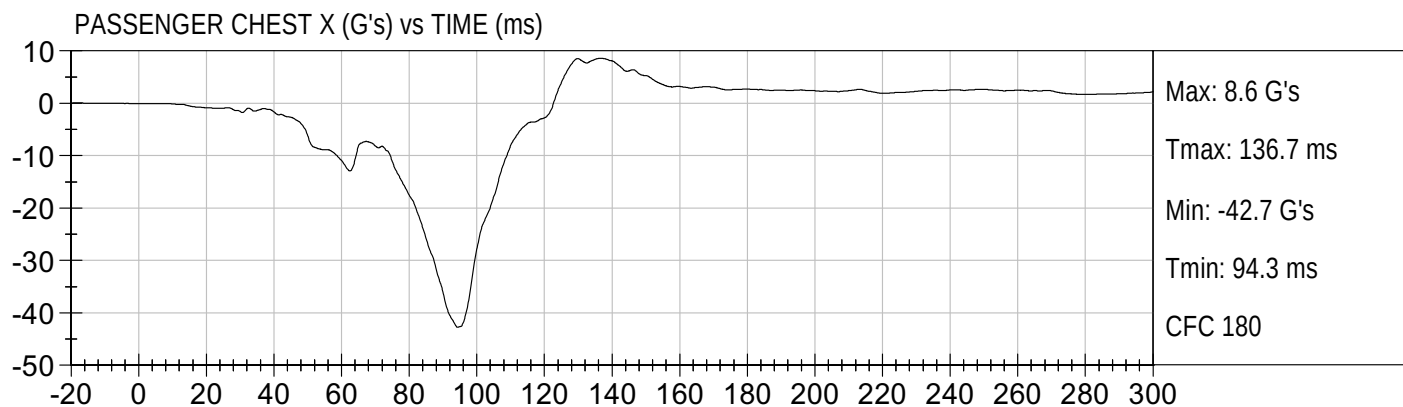


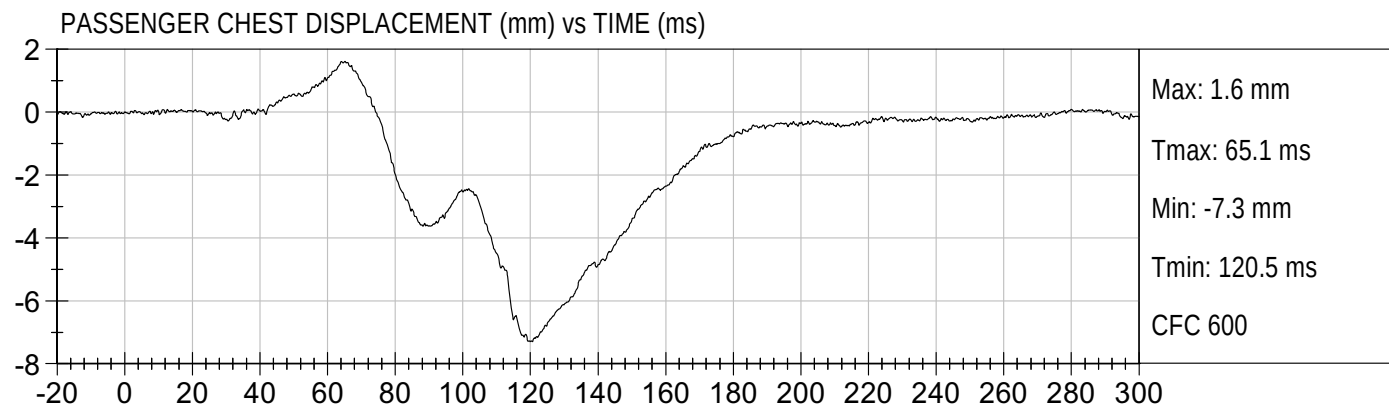
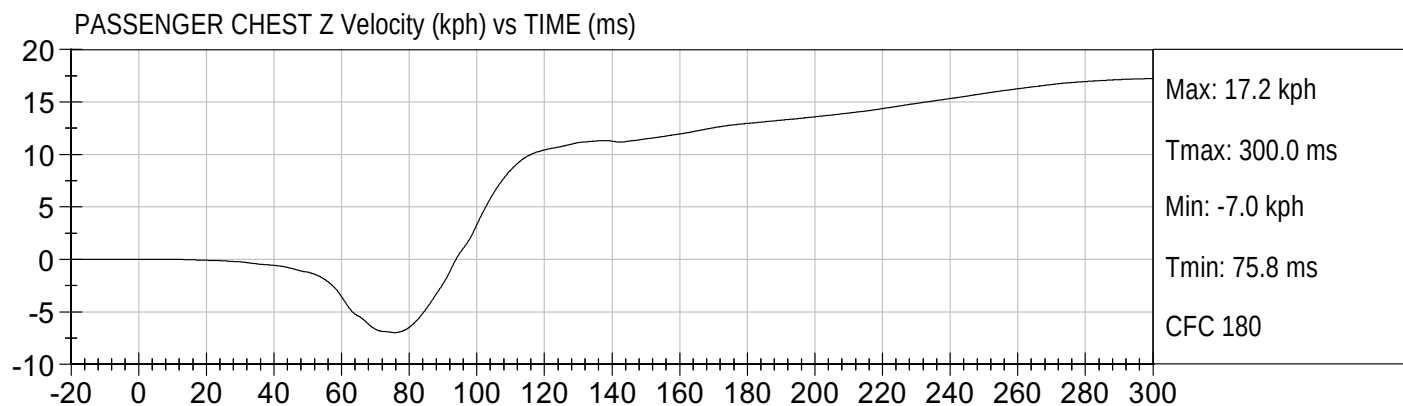
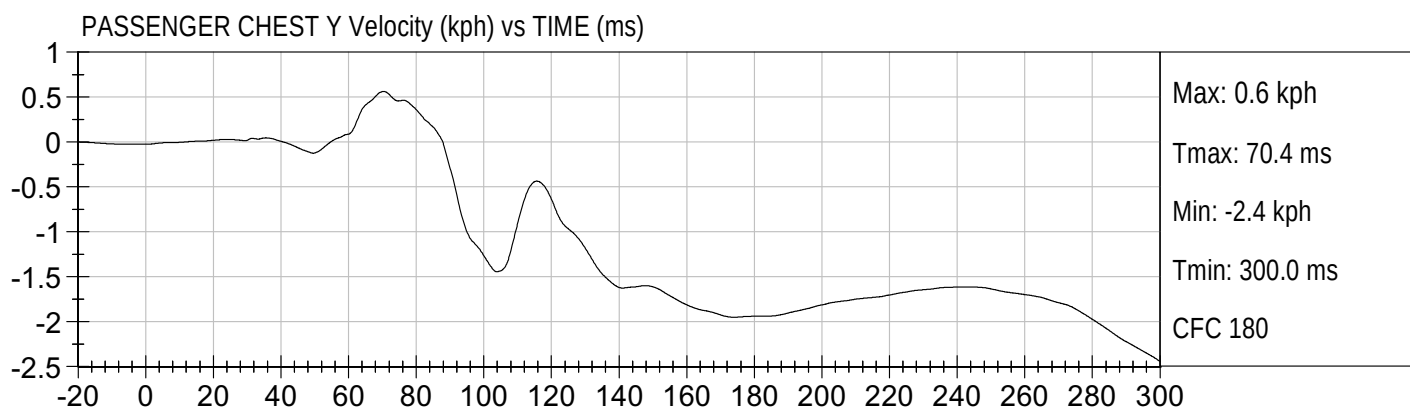
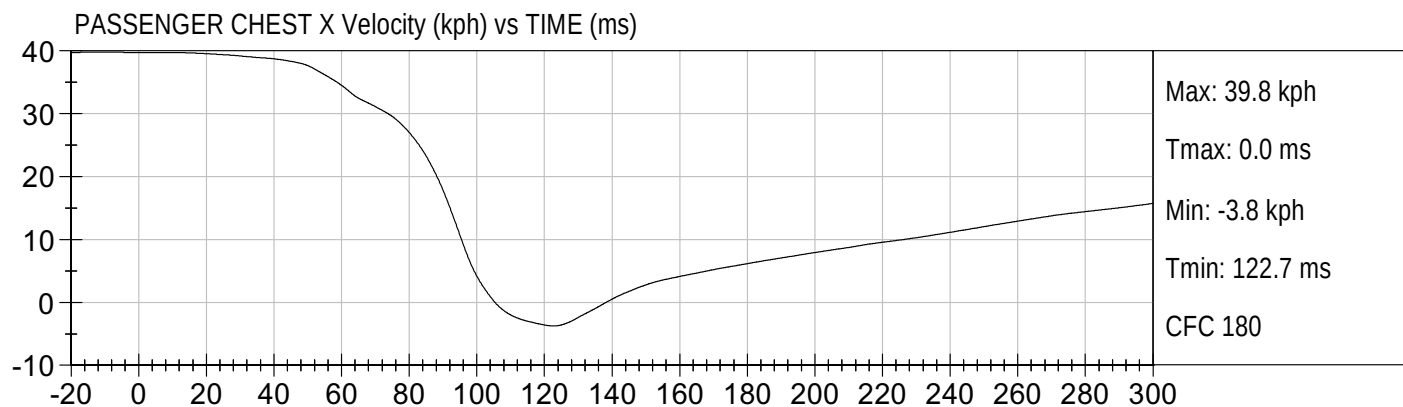


25mph Frontal Unbelted 50ths  
2011 Hyundai Sonata Hybrid (CB0502)

Test Date: 02/24/2012  
Speed: 24.7 mph (39.8 km/h)



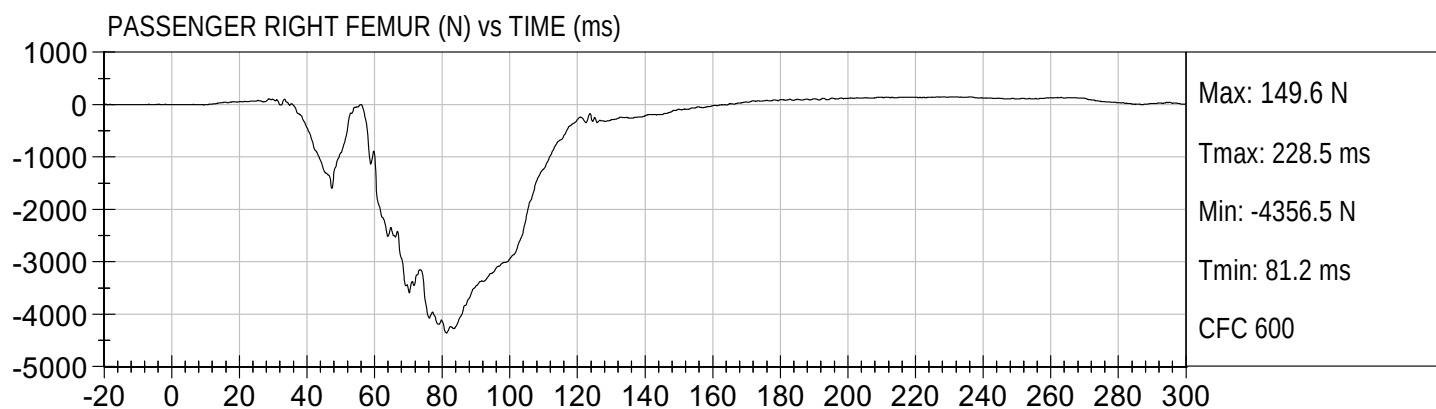
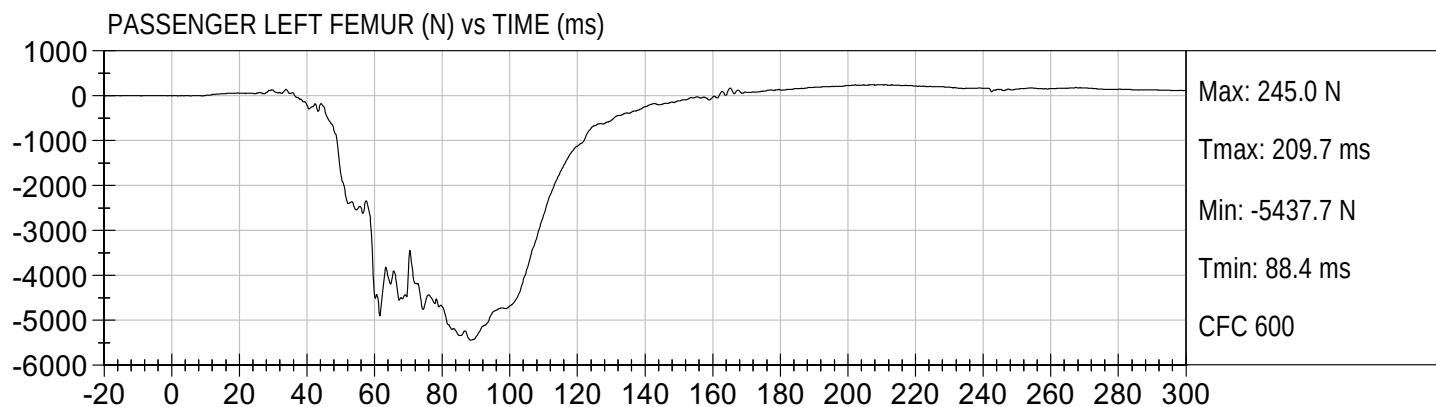






25mph Frontal Unbelted 50ths  
2011 Hyundai Sonata Hybrid (CB0502)

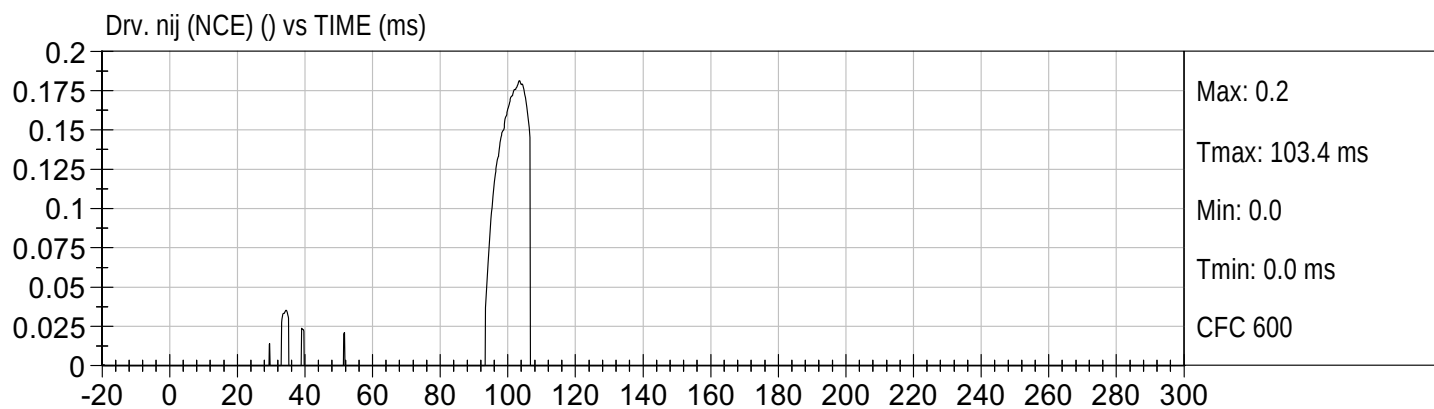
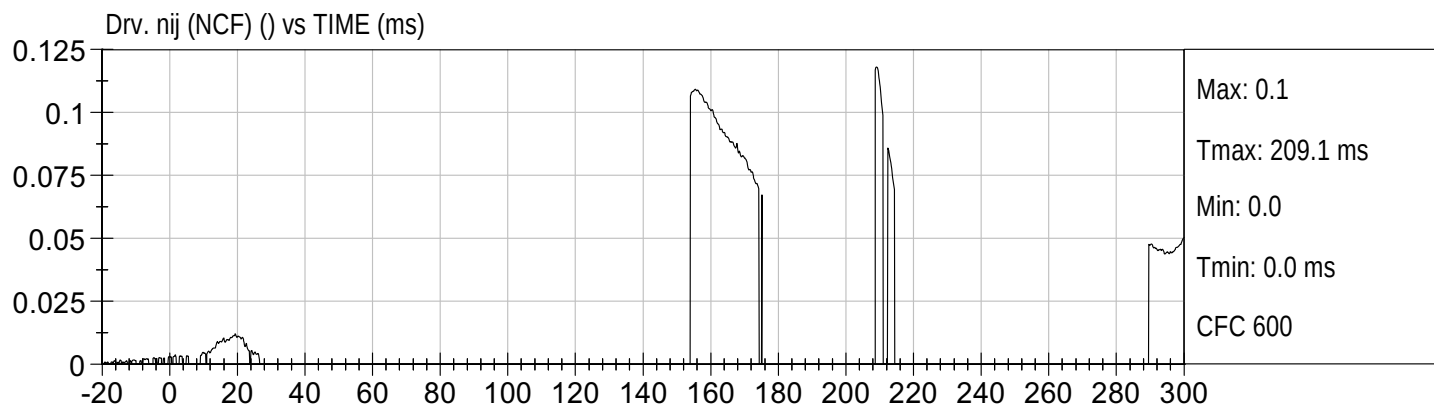
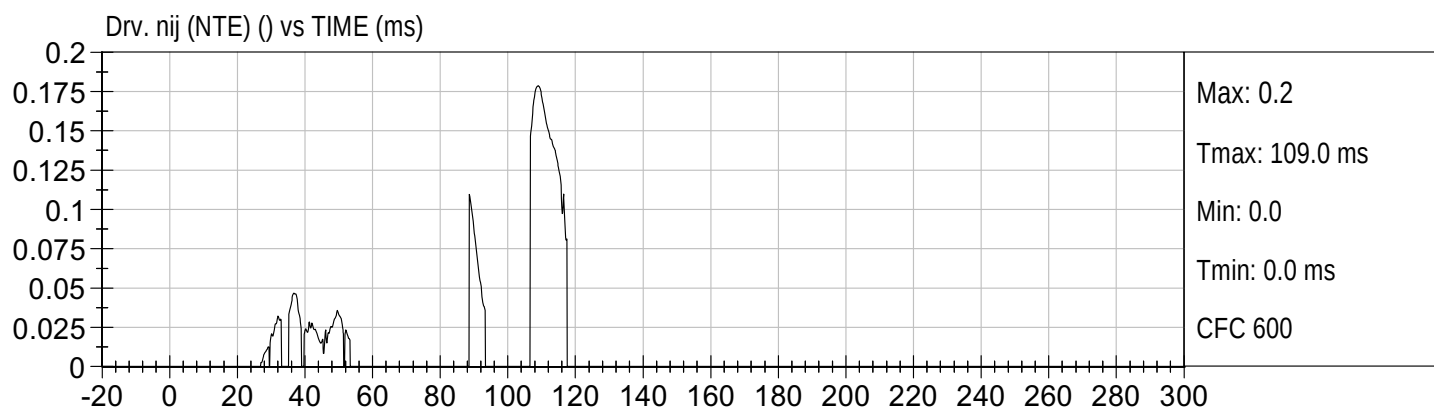
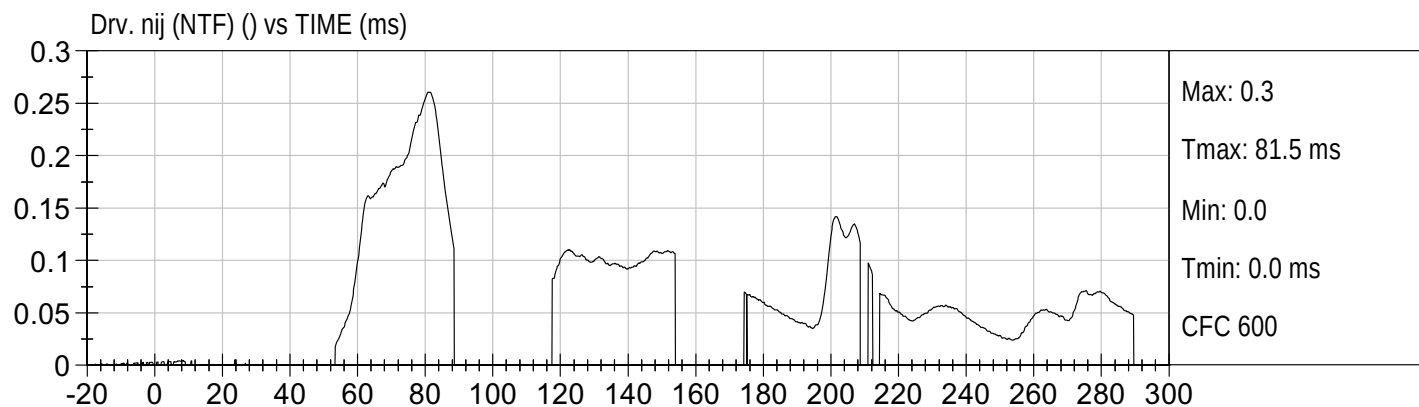
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Test Date: 02/24/2012  
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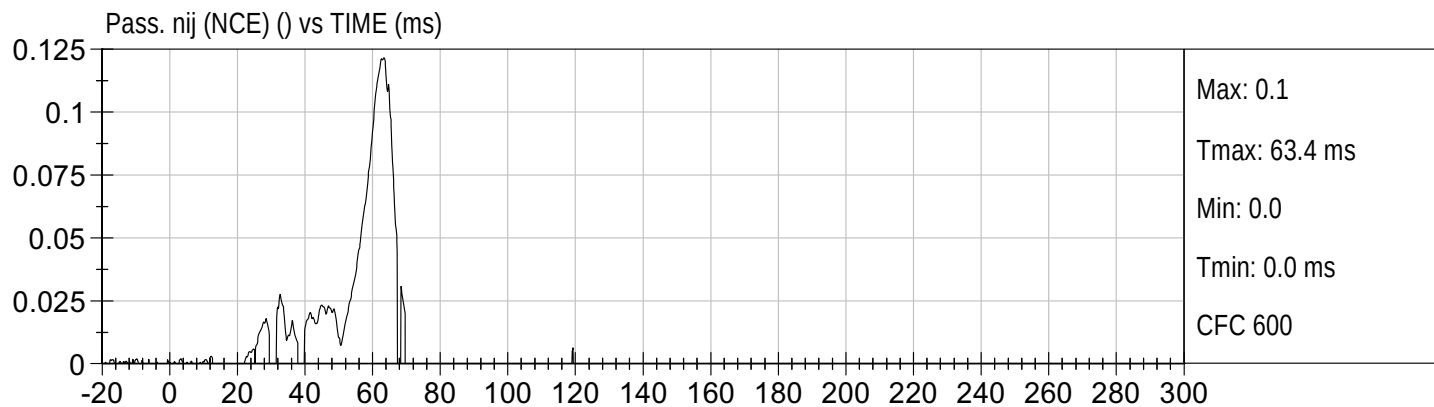
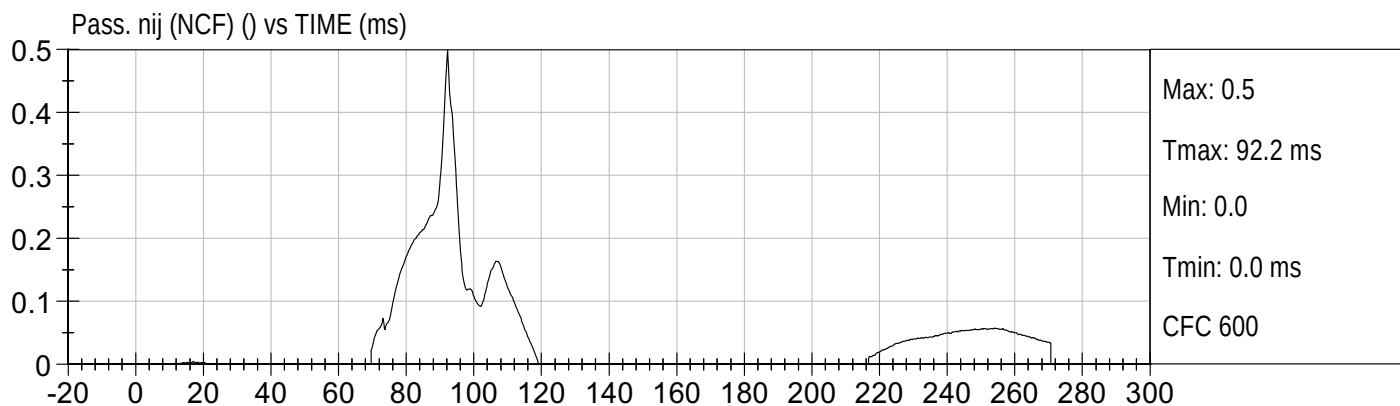
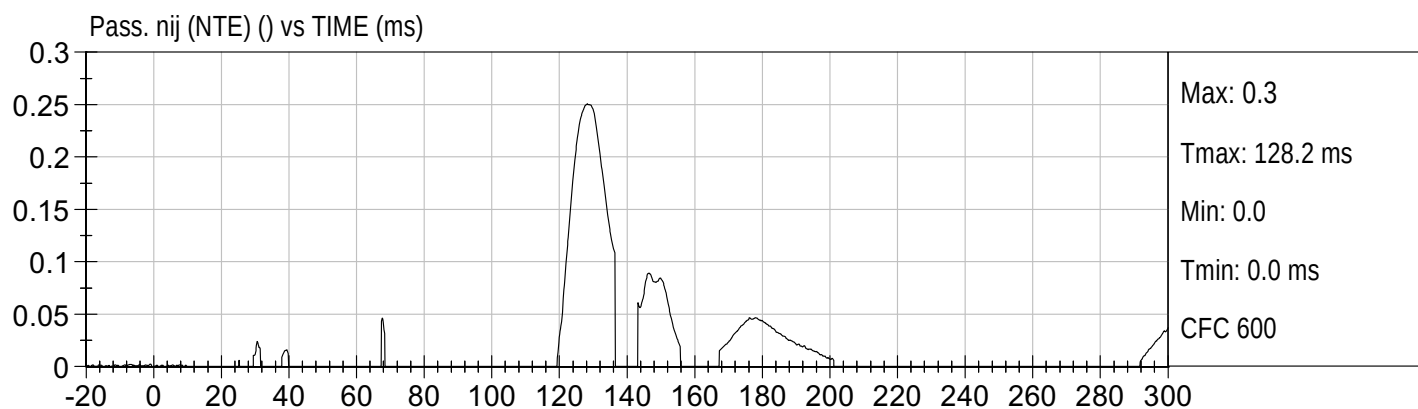
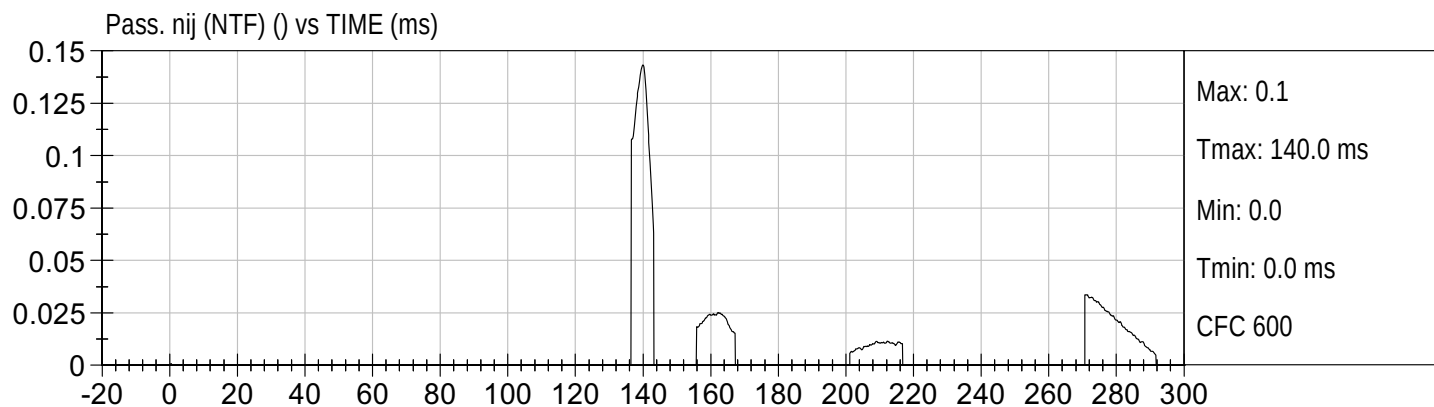






25mph Frontal Unbelted 50ths  
2011 Hyundai Sonata Hybrid (CB0502)

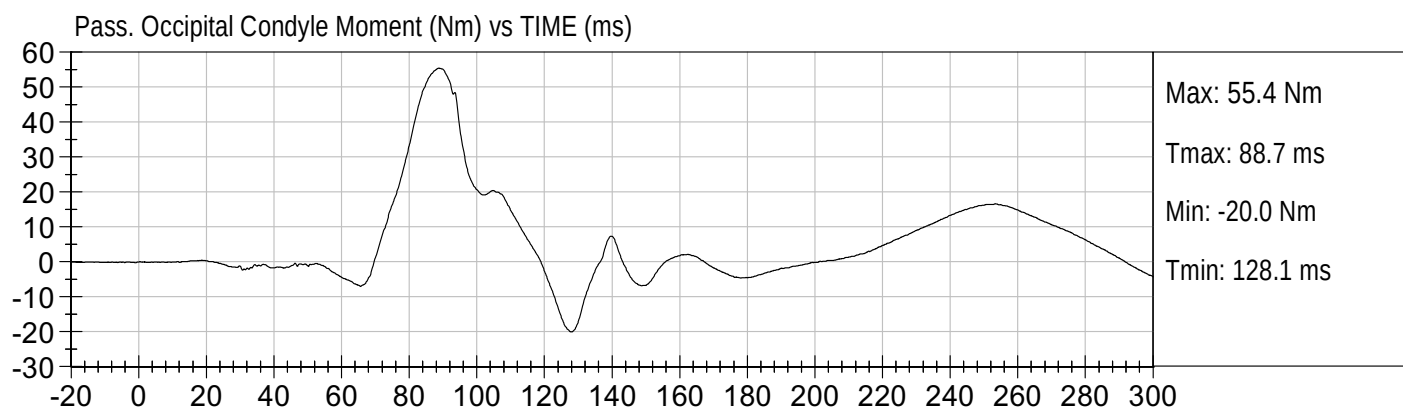
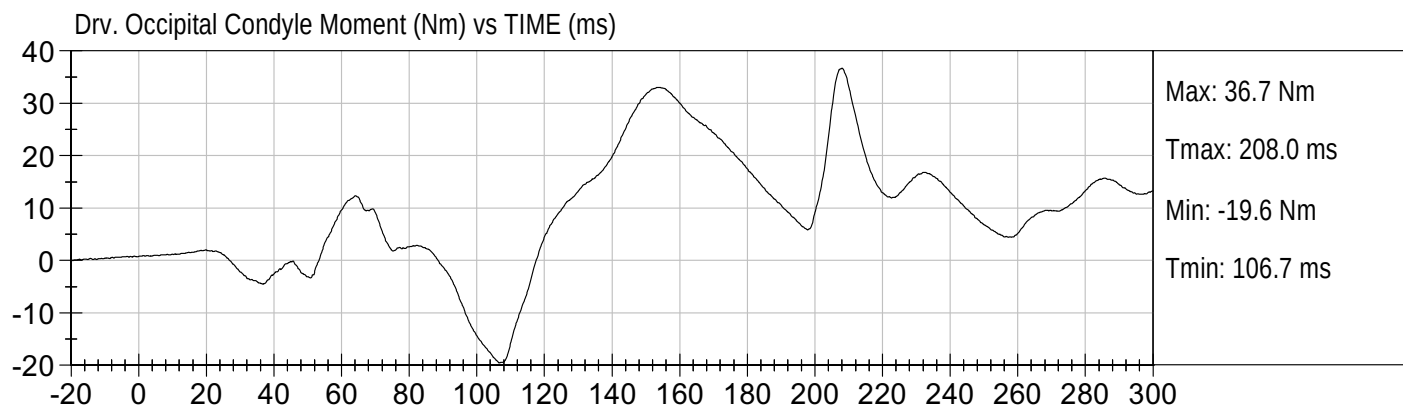
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Speed: 24.7 mph (39.8 km/h)

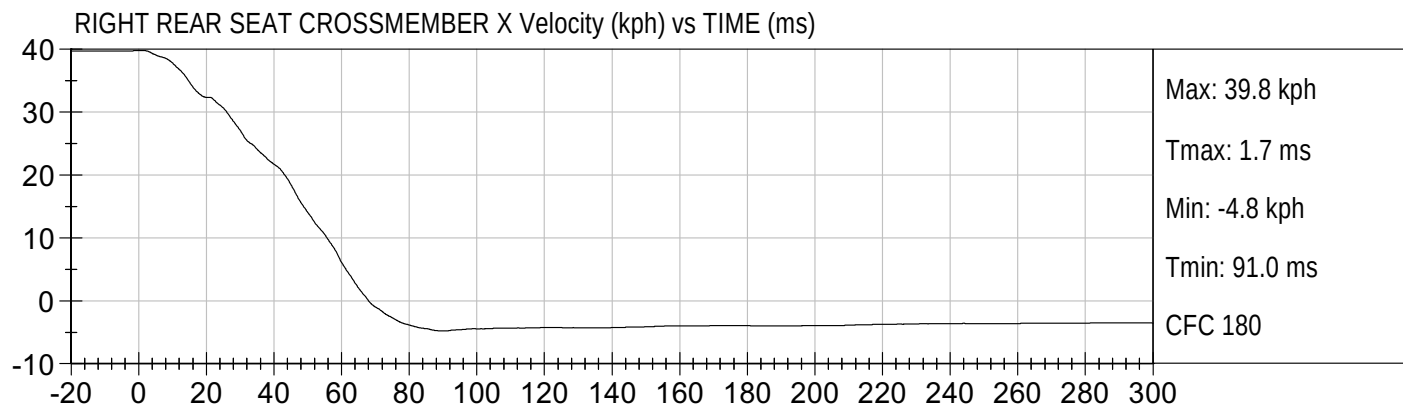
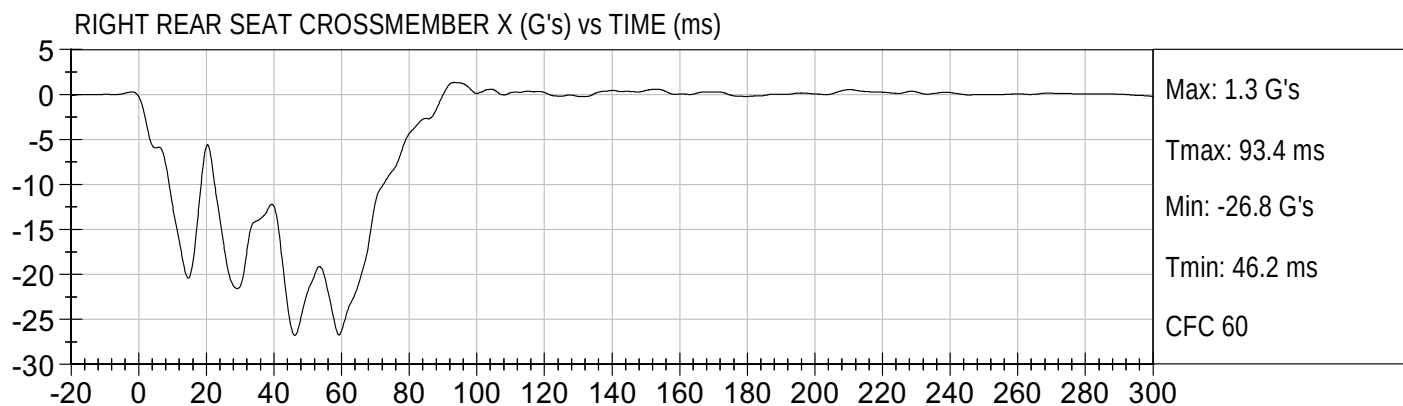
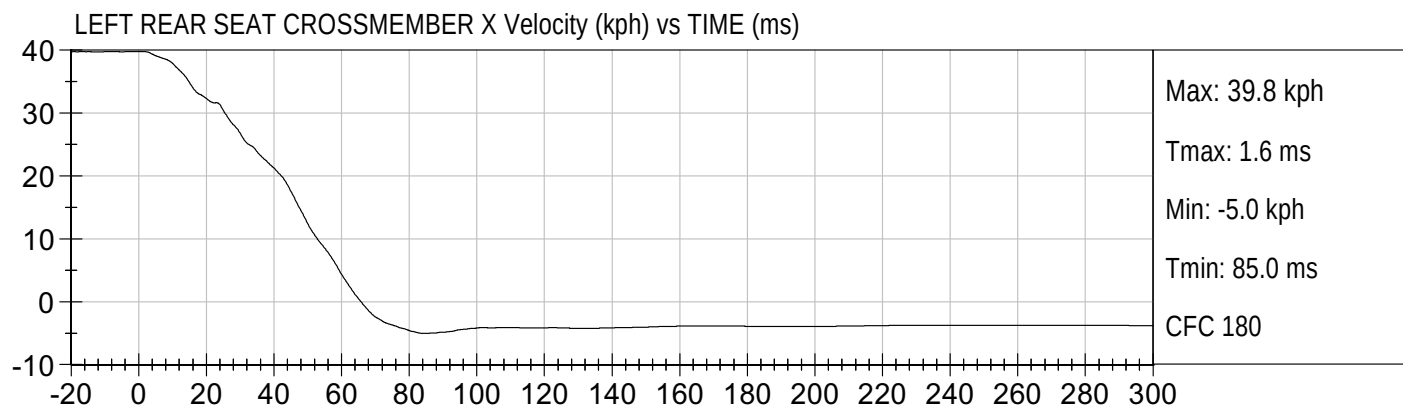
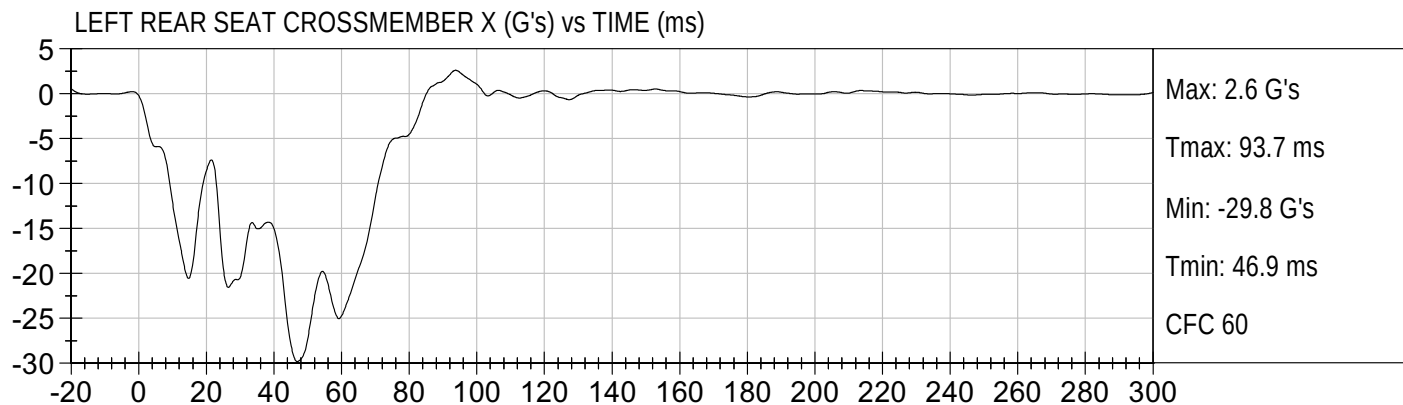


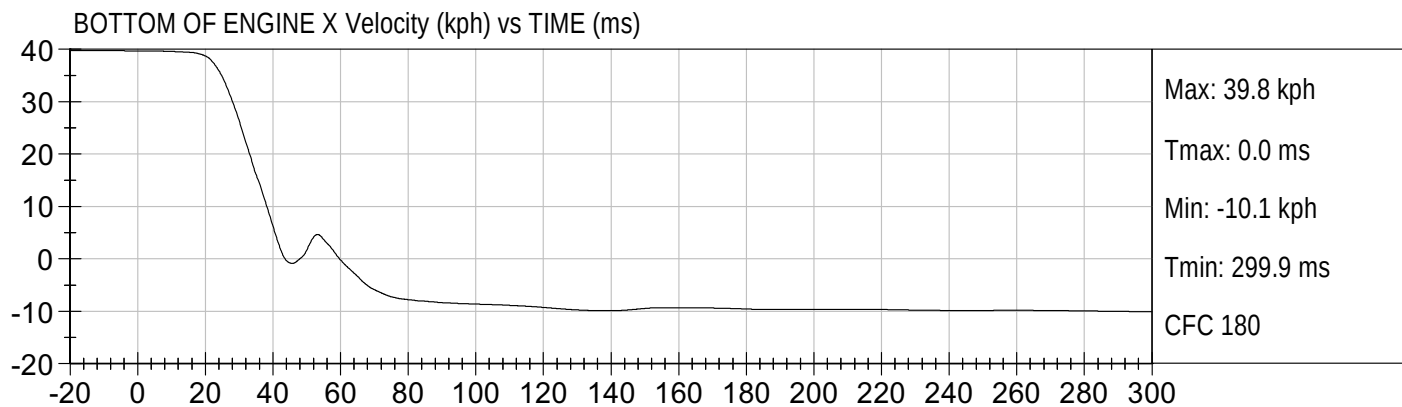
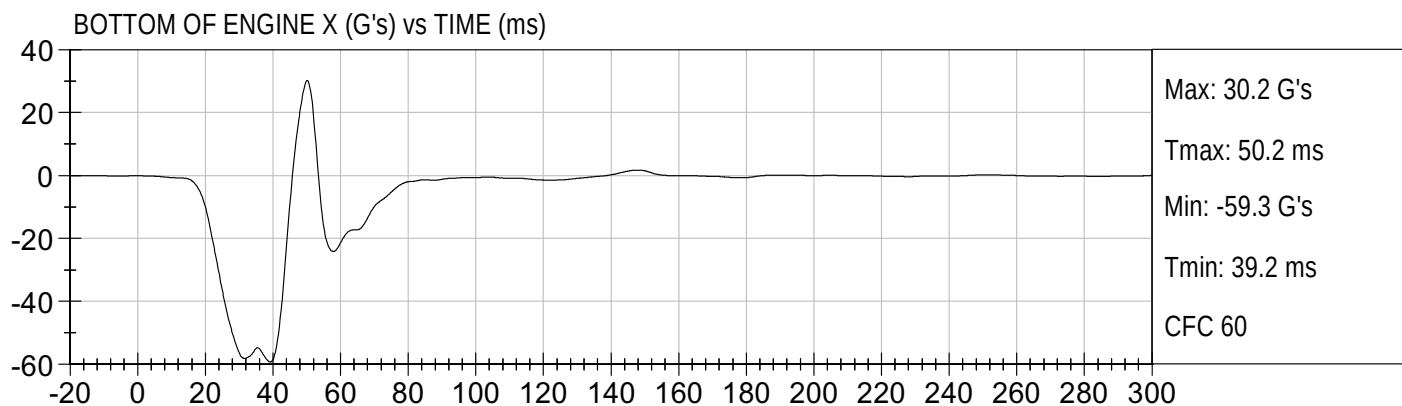
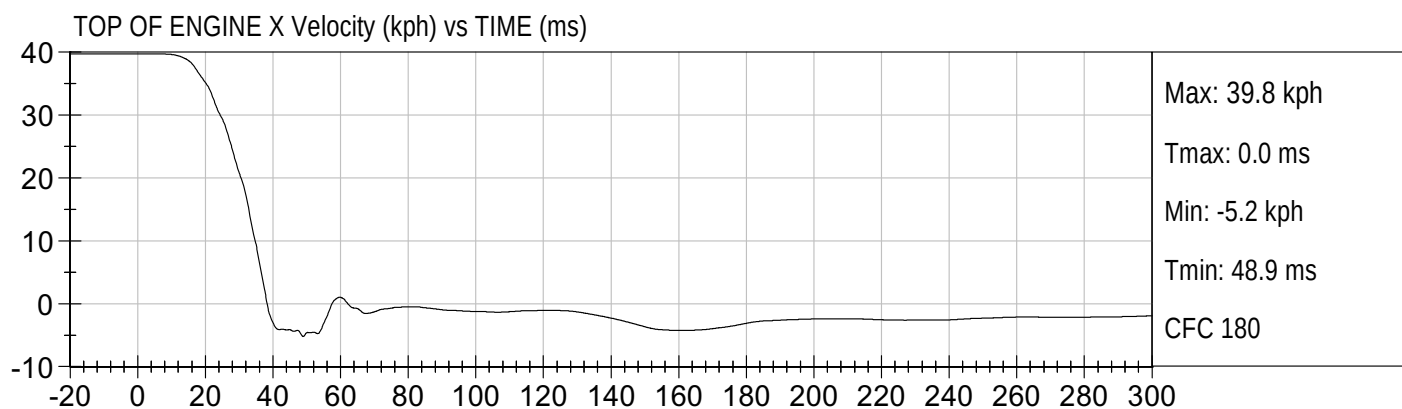
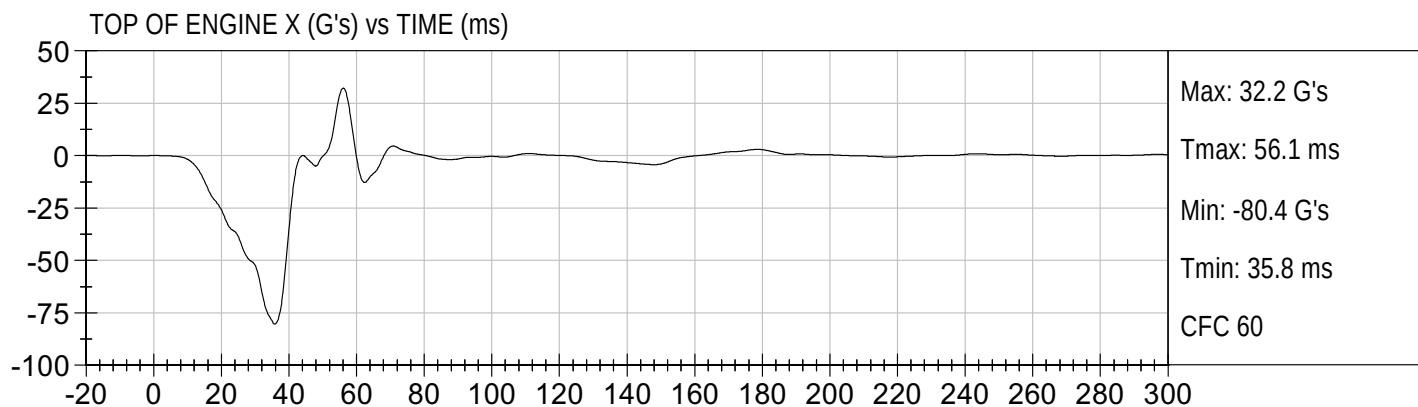


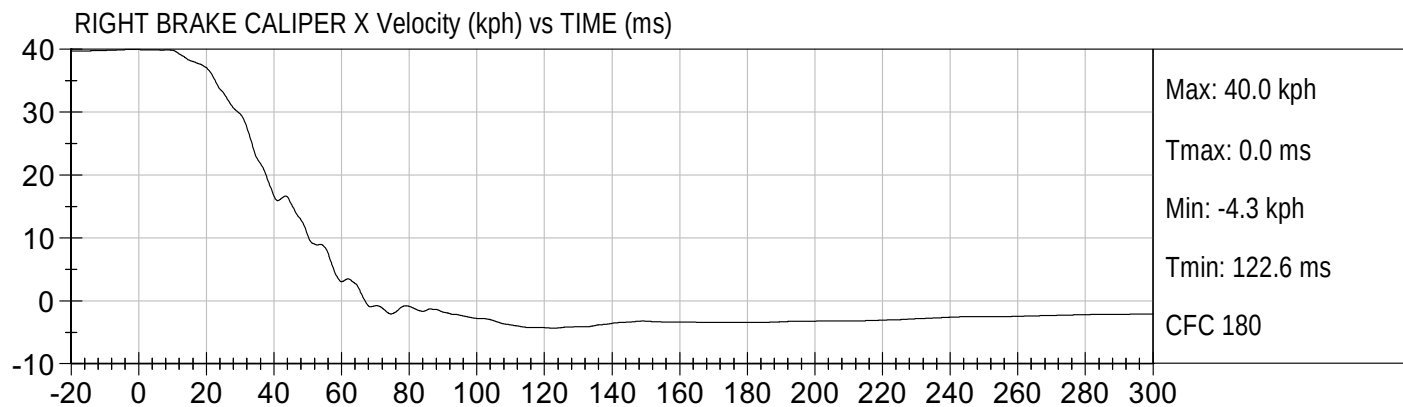
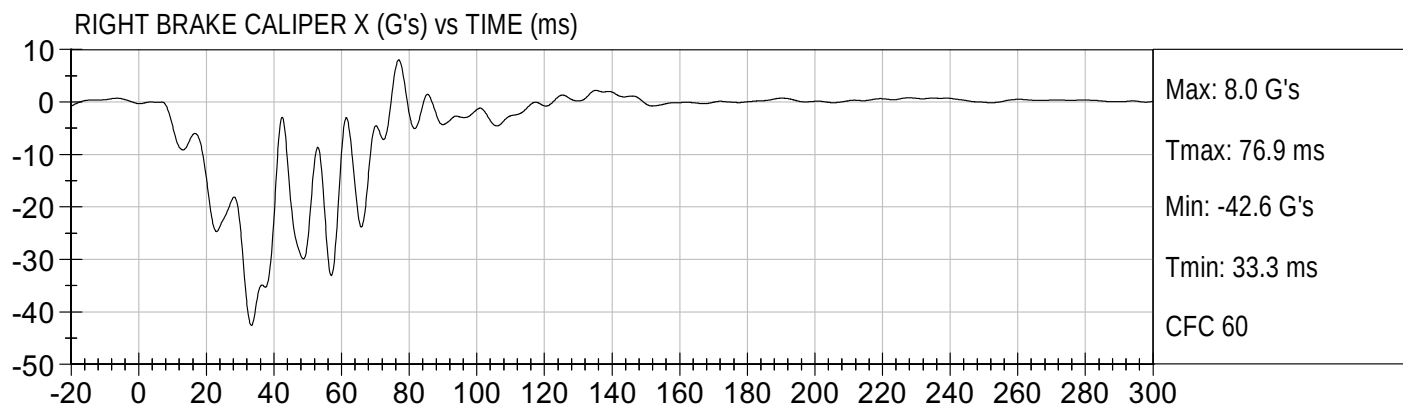
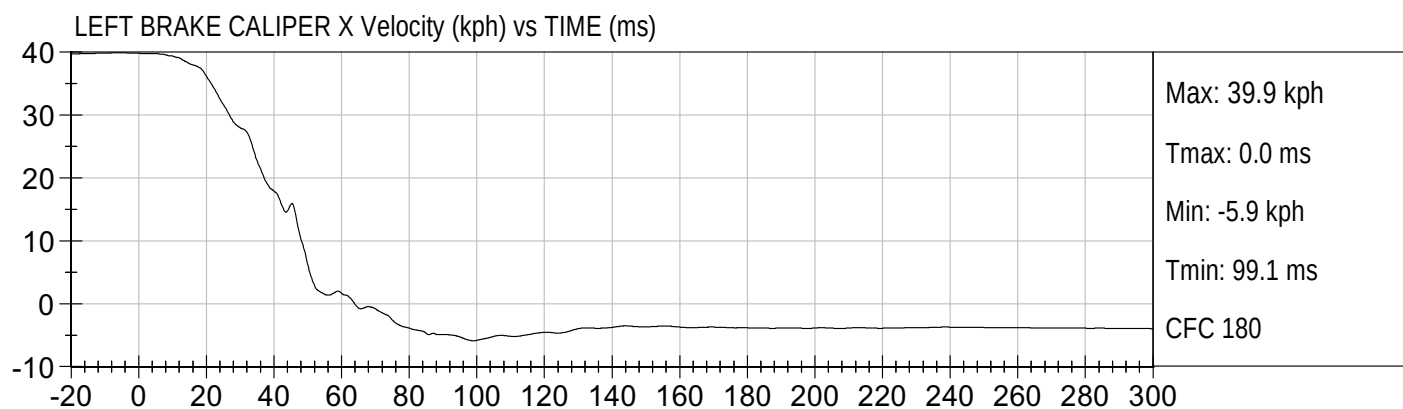
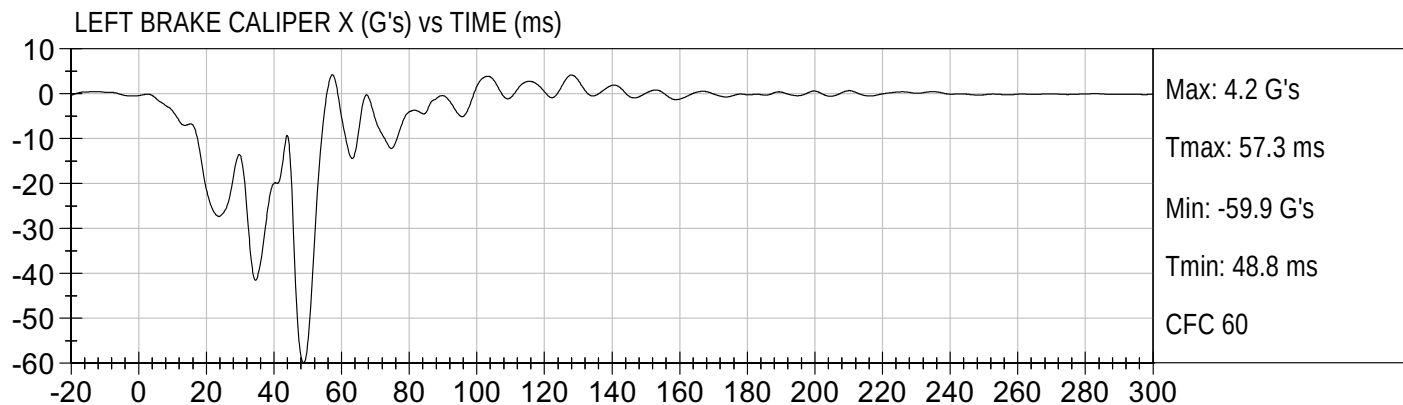
25mph Frontal Unbelted 50ths  
2011 Hyundai Sonata Hybrid (CB0502)

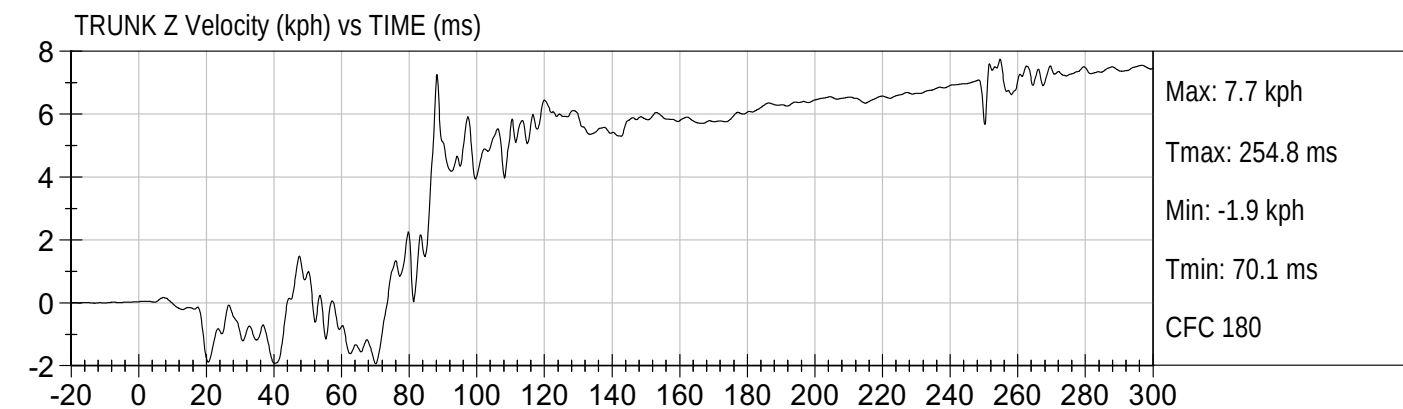
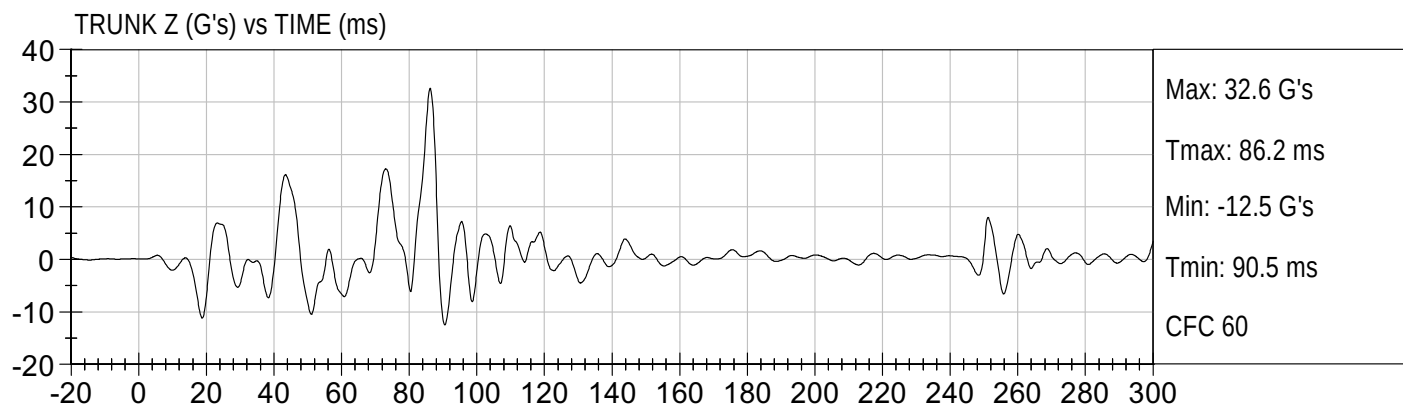
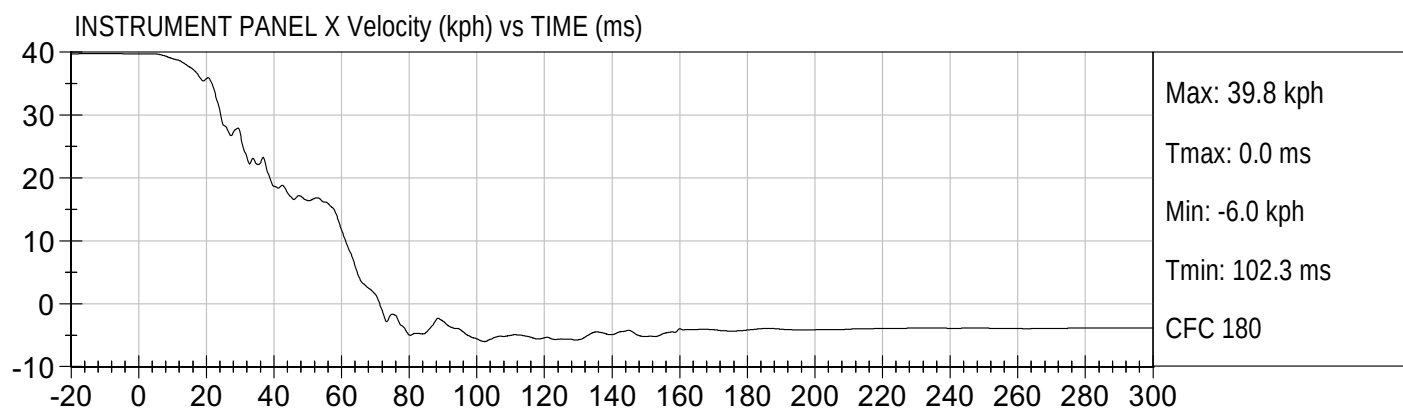
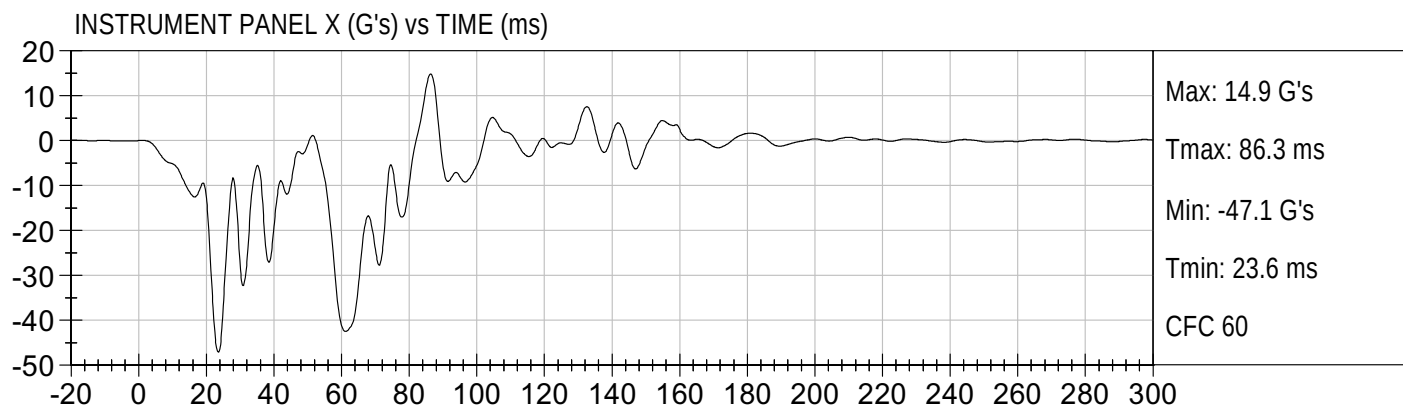
Test Date: 02/24/2012  
Speed: 24.7 mph (39.8 km/h)











## APPENDIX B

### LOW RISK TEST DATA

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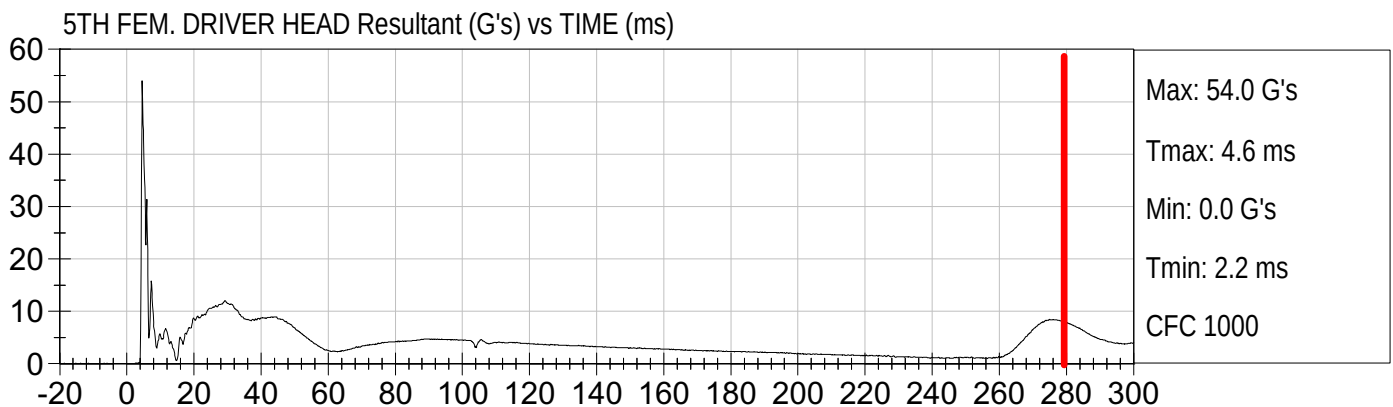
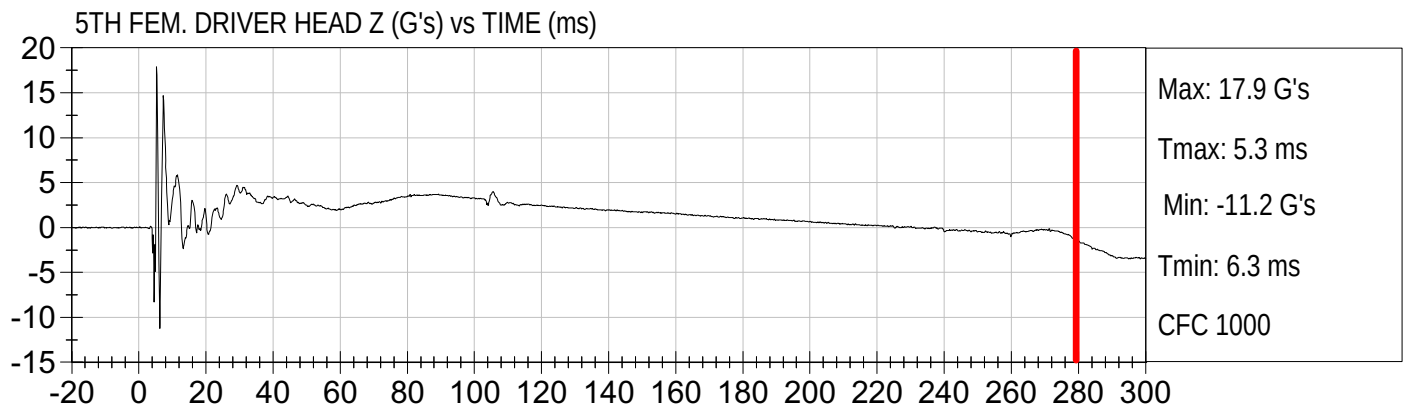
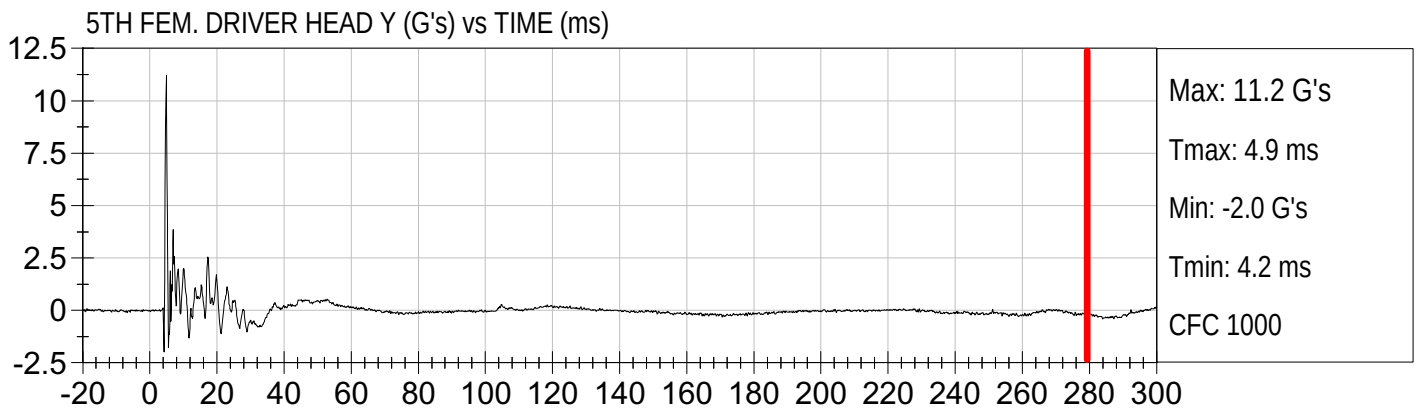
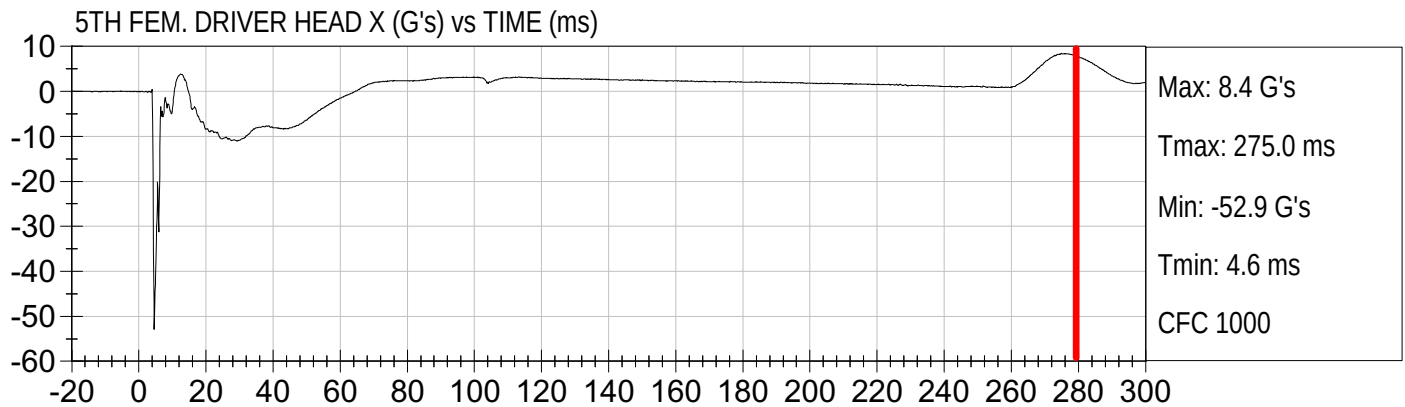
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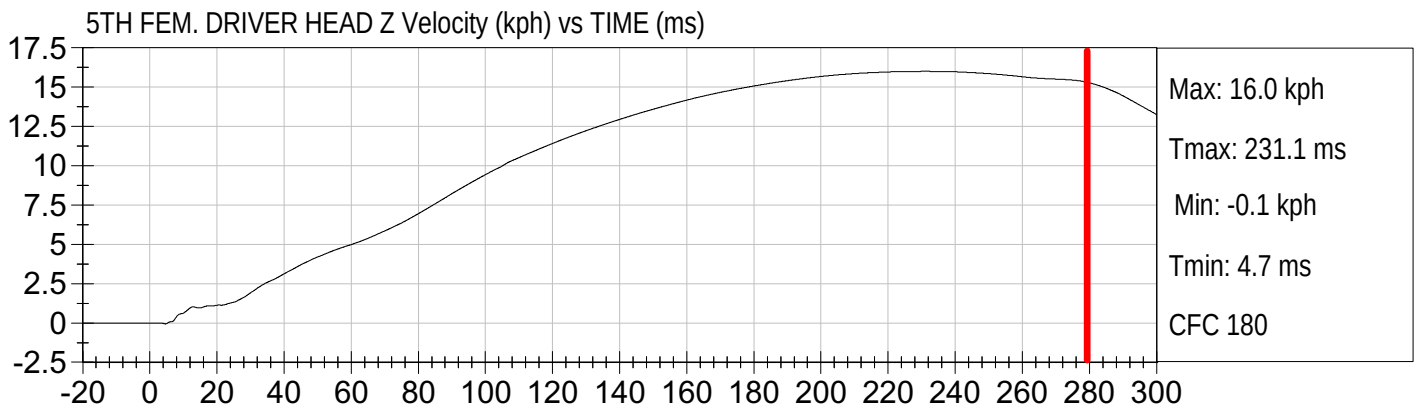
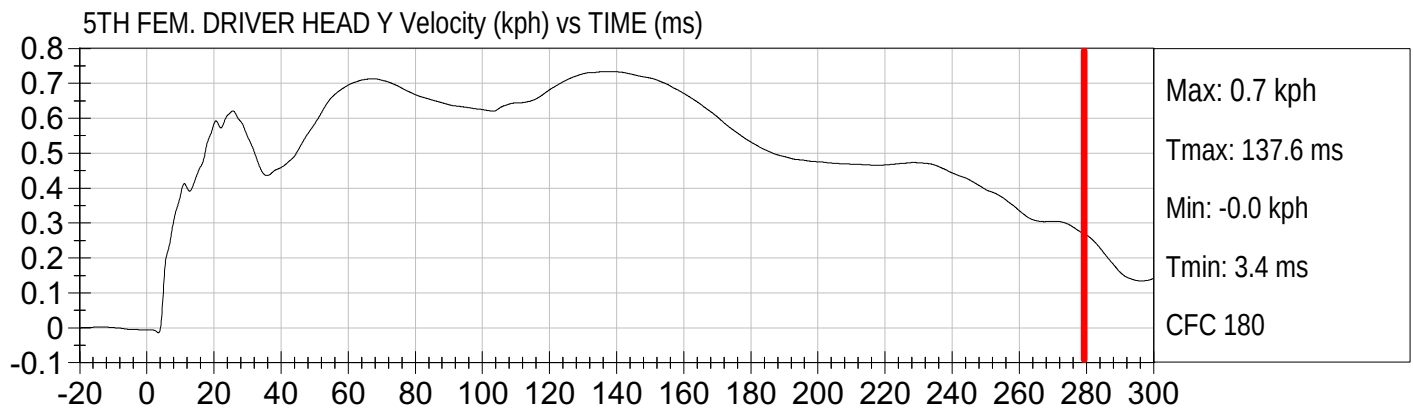
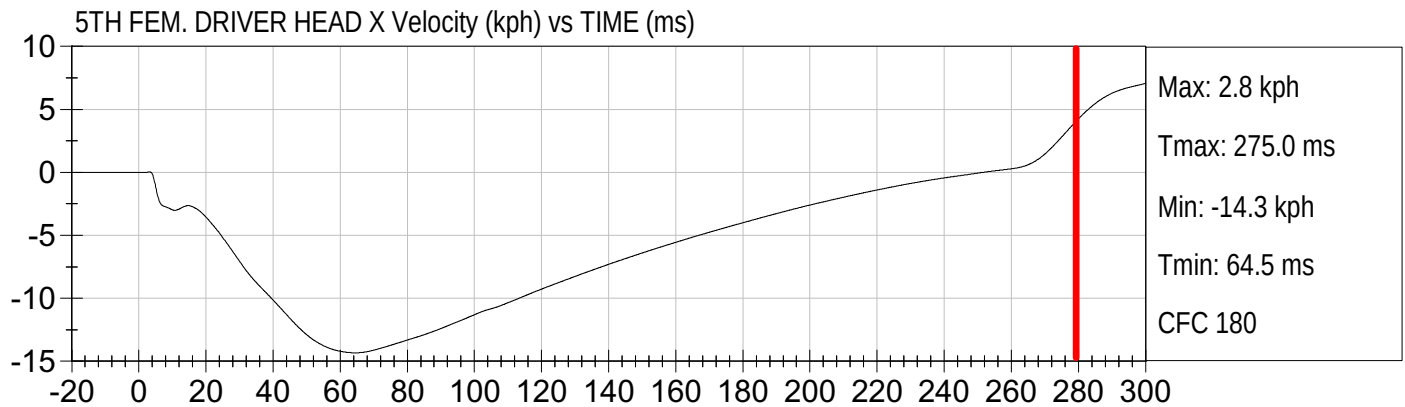


Injury Values Calculated between 0ms and 275ms



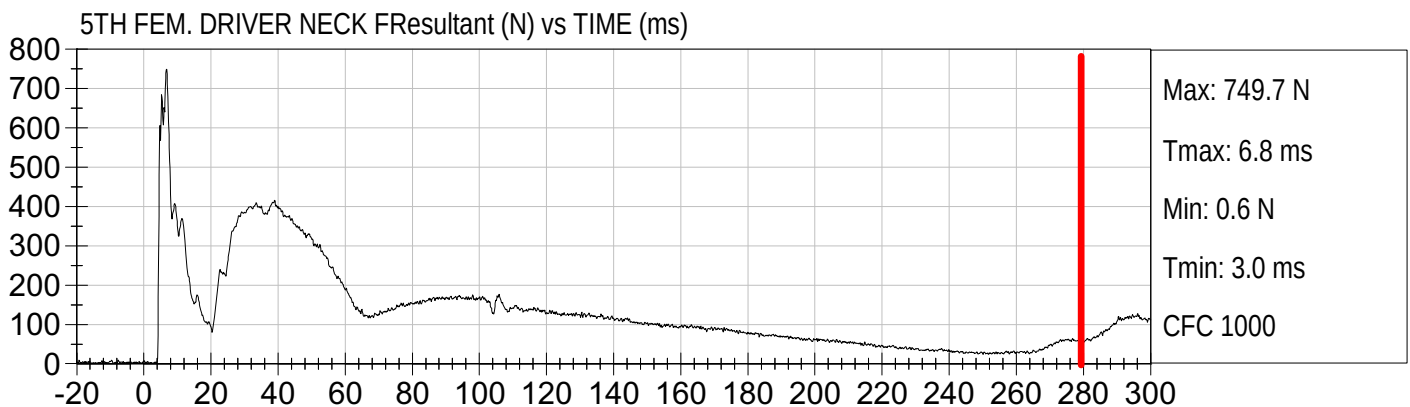
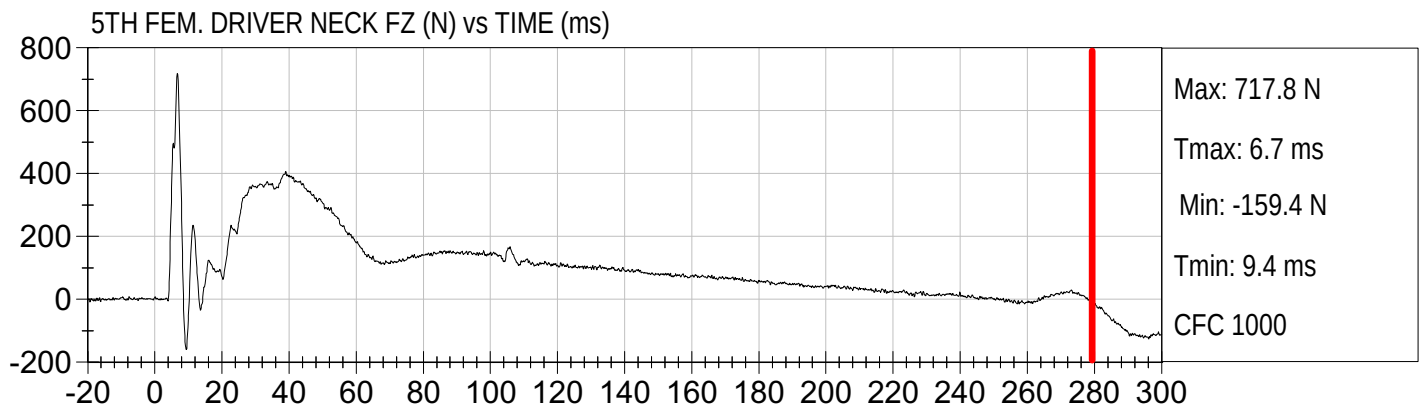
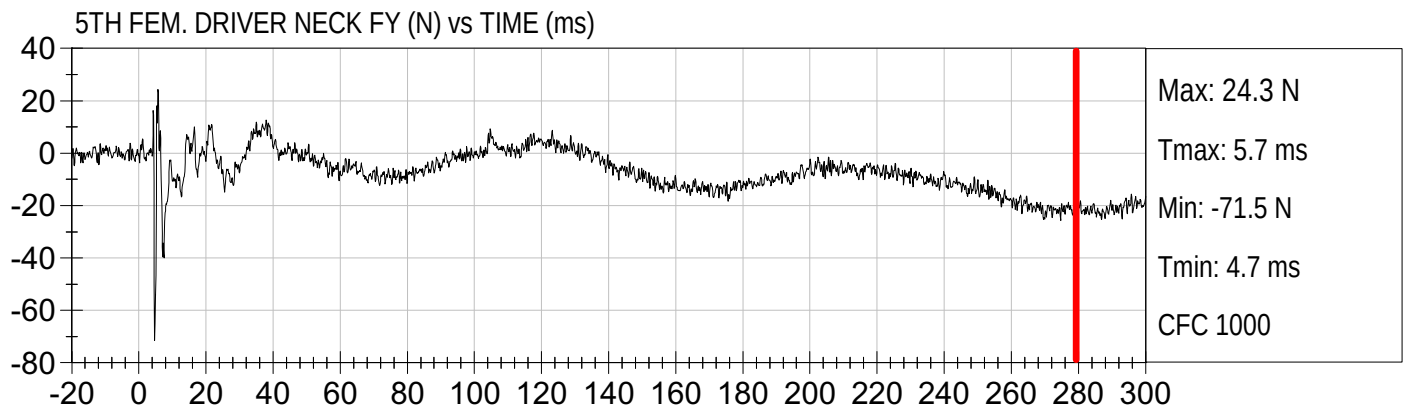
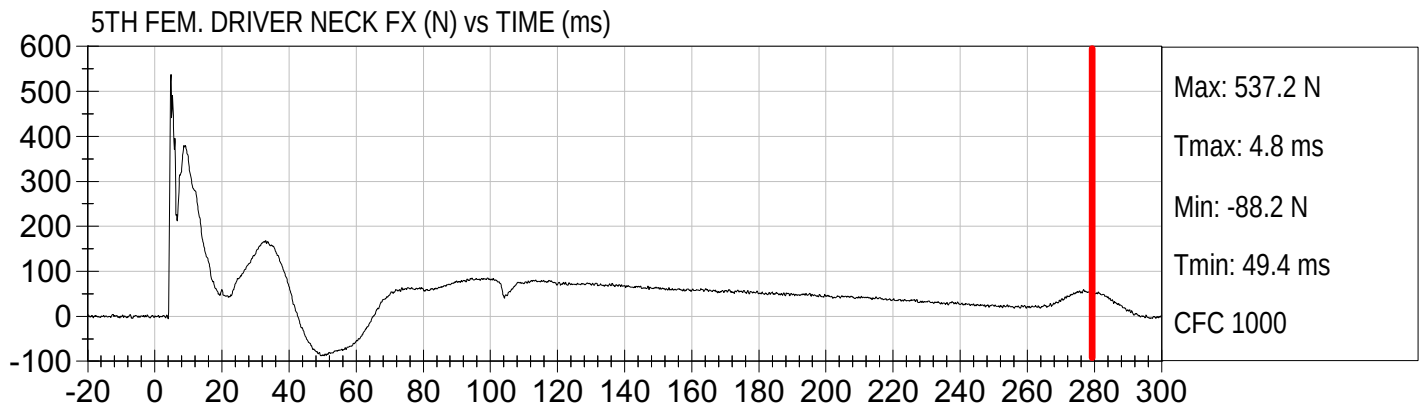


Injury Values Calculated between 0ms and 275ms





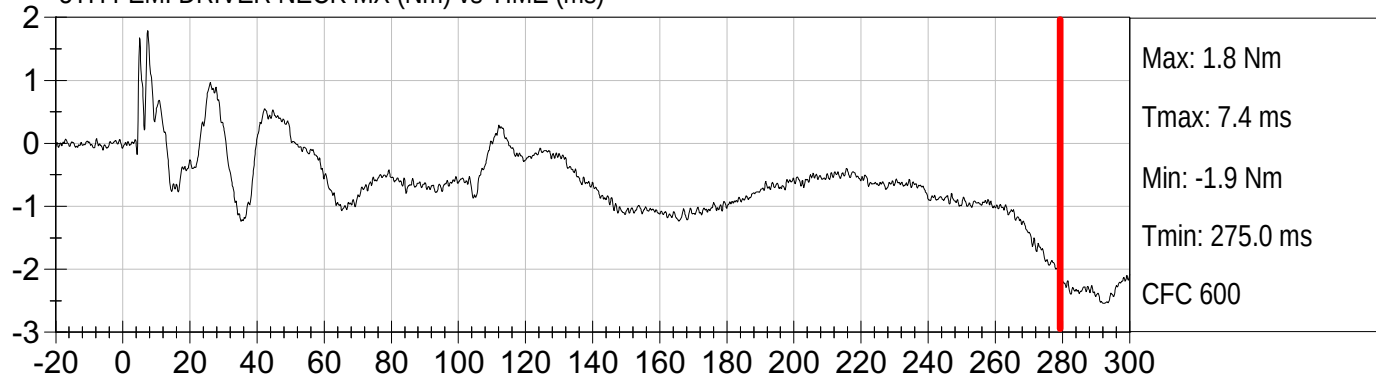
Injury Values Calculated between 0ms and 275ms



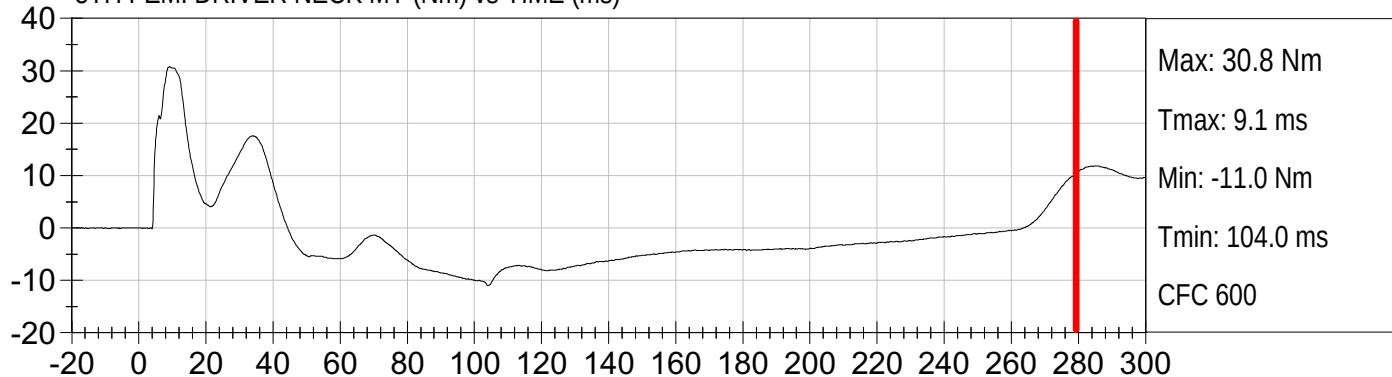


Injury Values Calculated between 0ms and 275ms

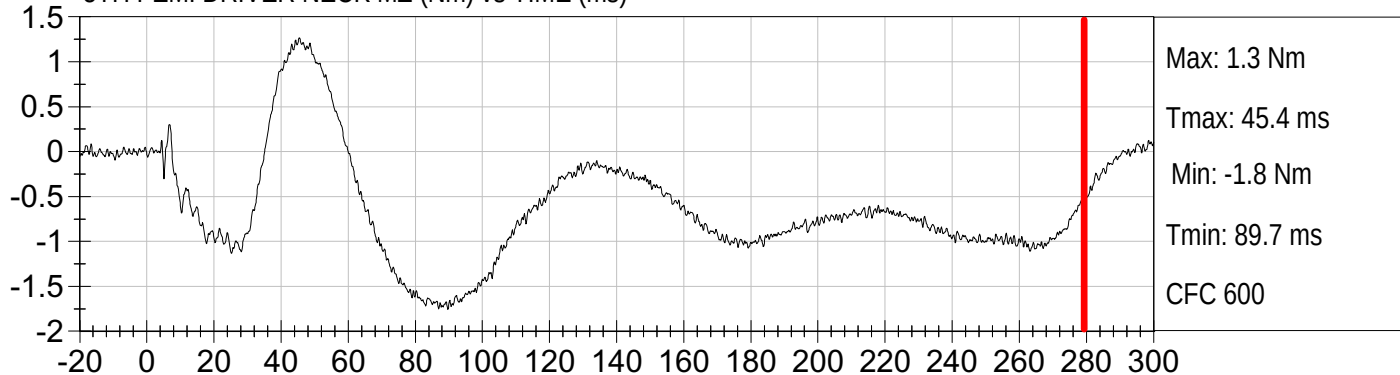
5TH FEM. DRIVER NECK MX (Nm) vs TIME (ms)



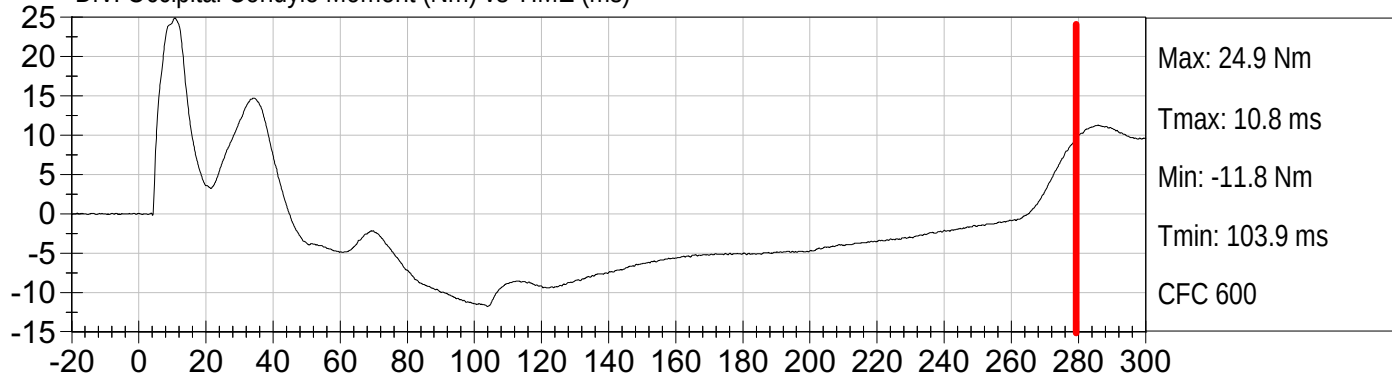
5TH FEM. DRIVER NECK MY (Nm) vs TIME (ms)



5TH FEM. DRIVER NECK MZ (Nm) vs TIME (ms)



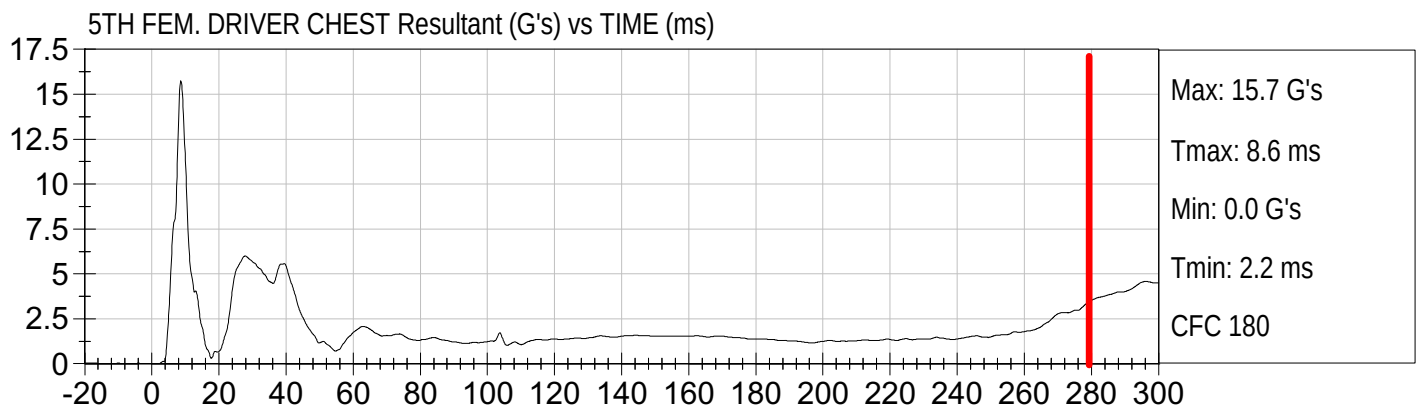
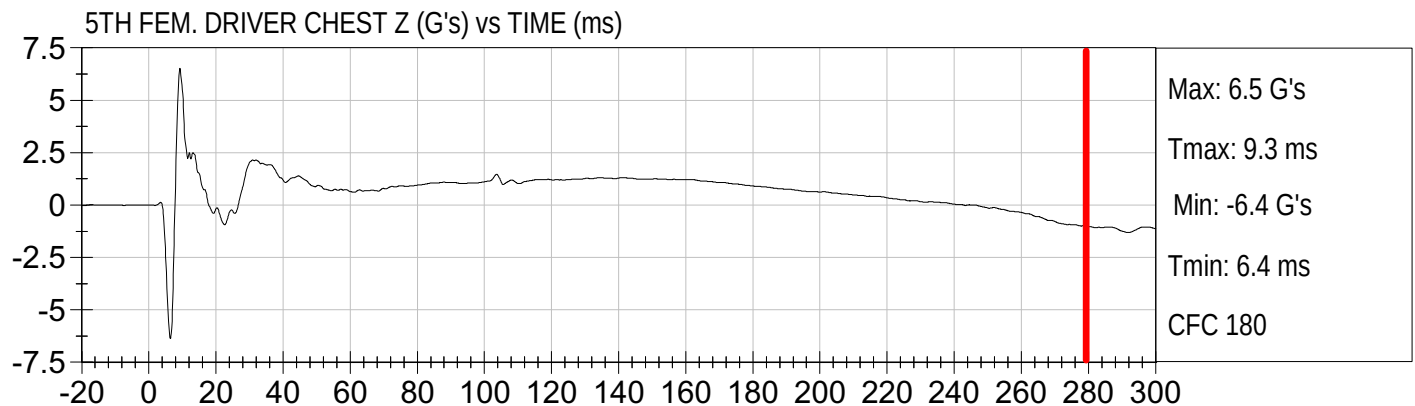
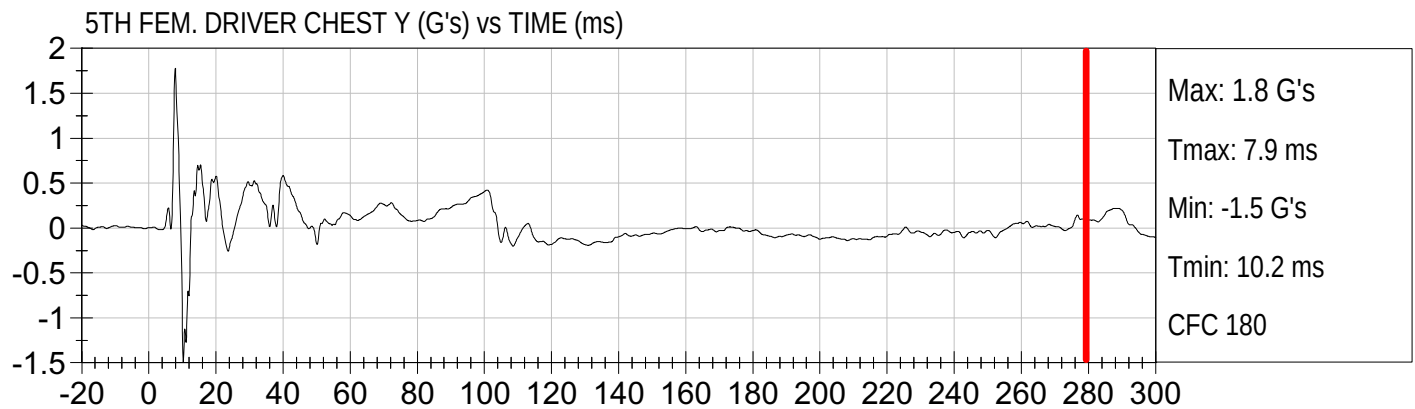
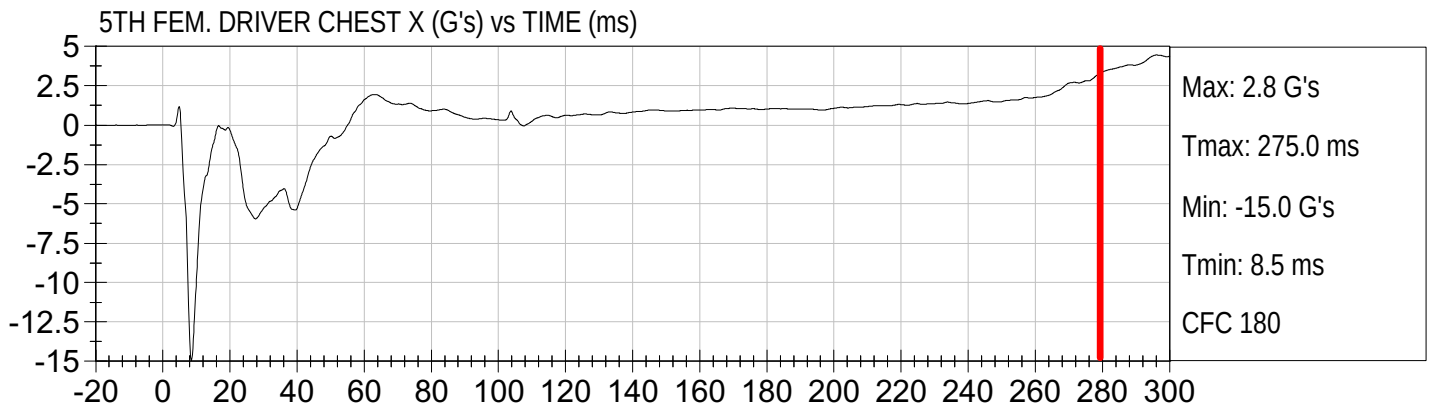
Drv. Occipital Condyle Moment (Nm) vs TIME (ms)





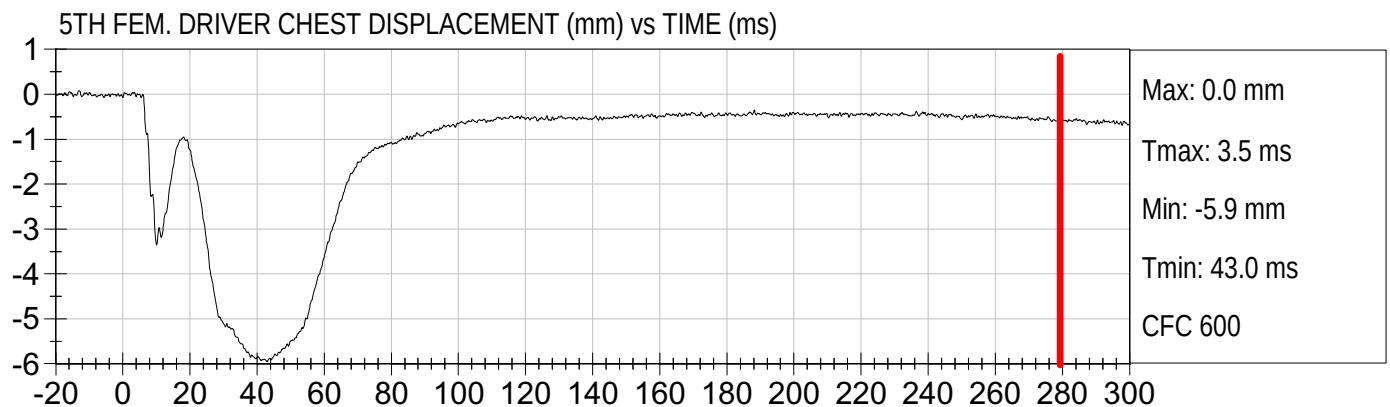
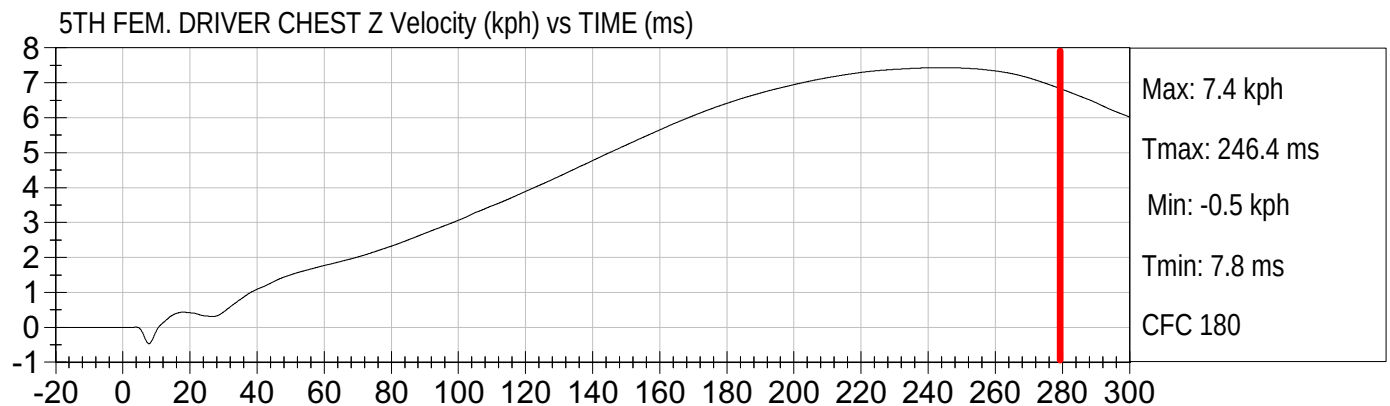
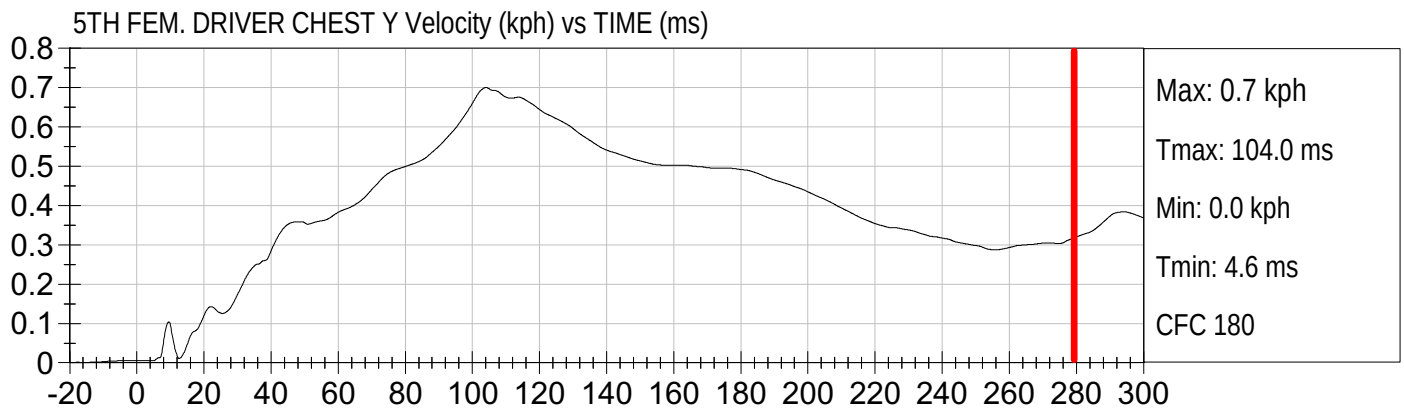
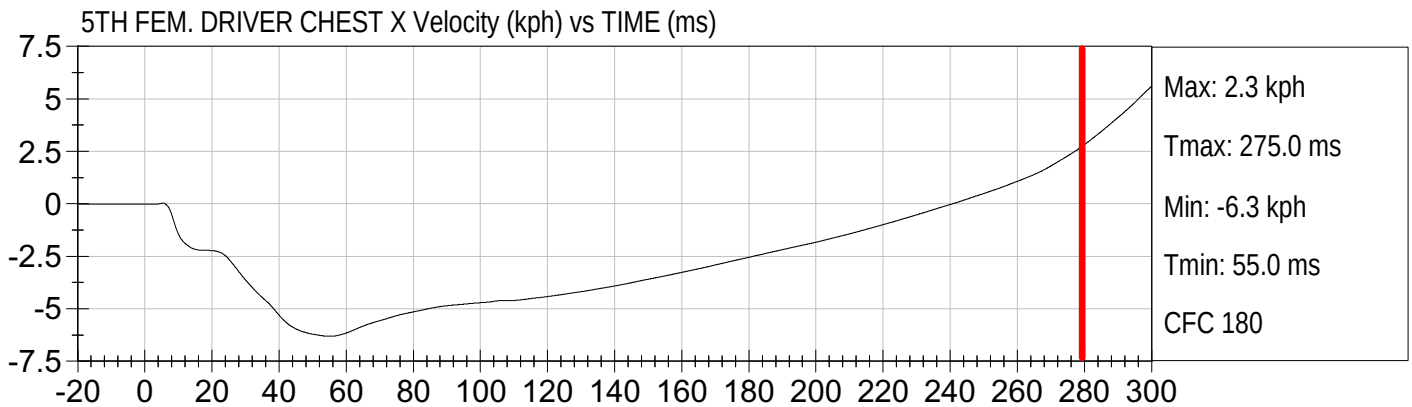


Injury Values Calculated between 0ms and 275ms



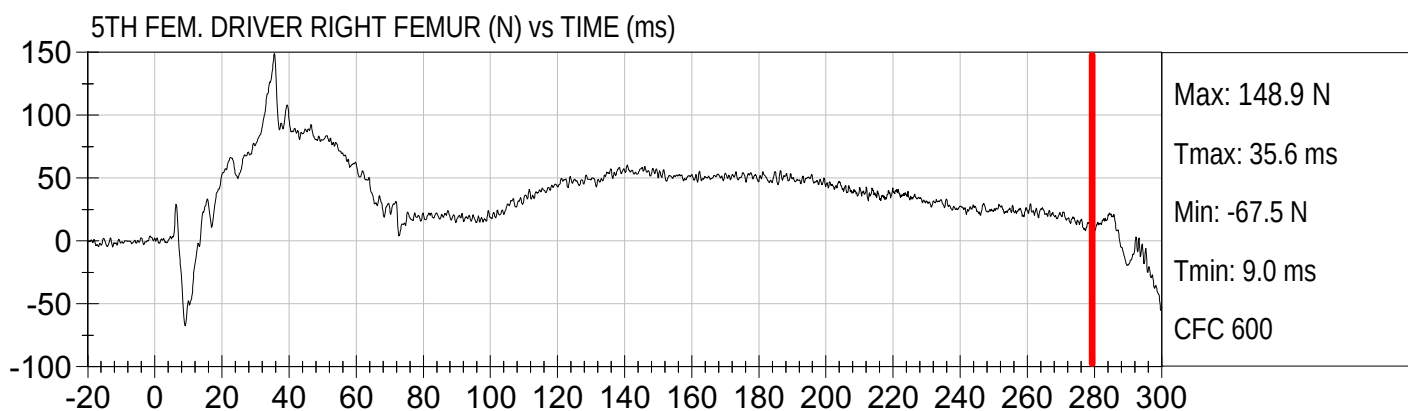
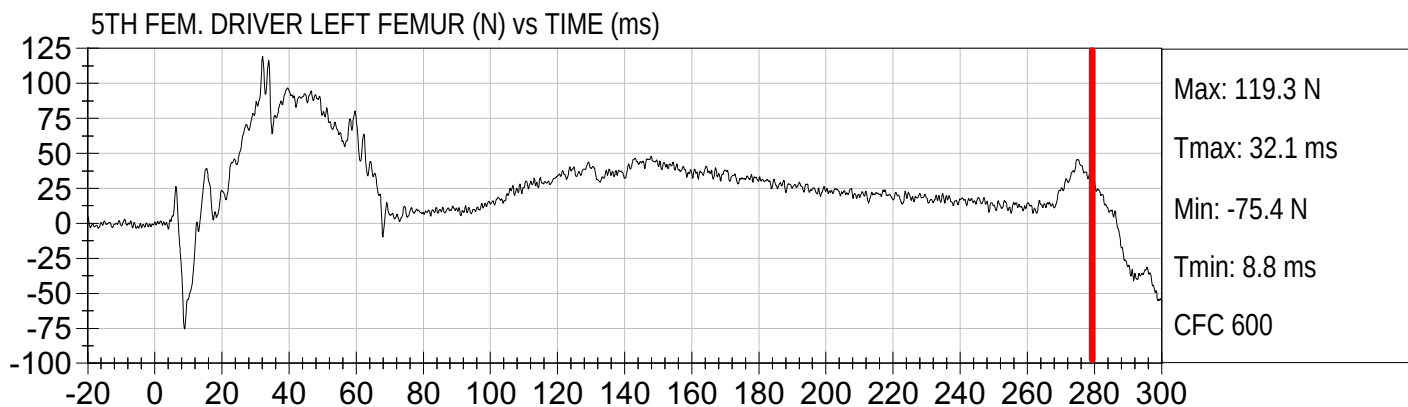


Injury Values Calculated between 0ms and 275ms





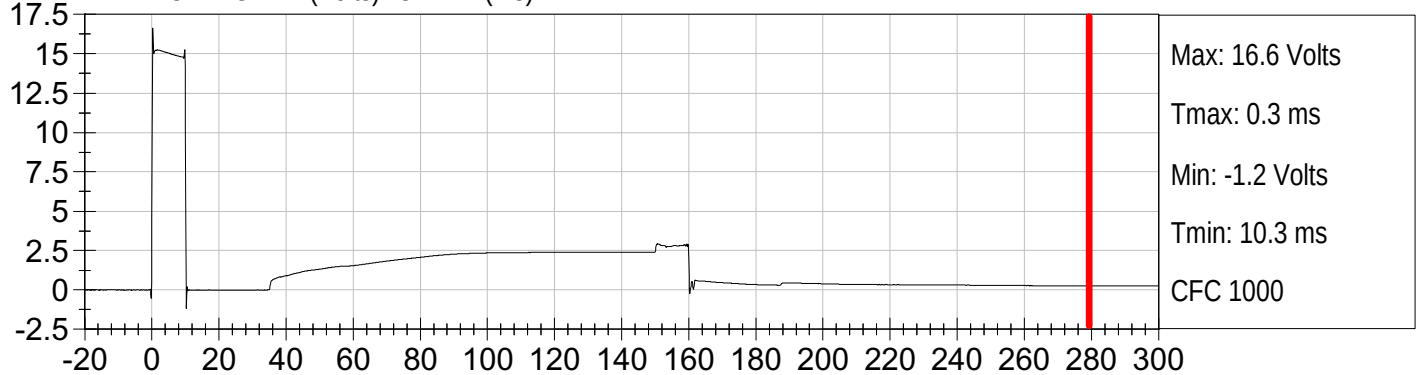
Injury Values Calculated between 0ms and 275ms



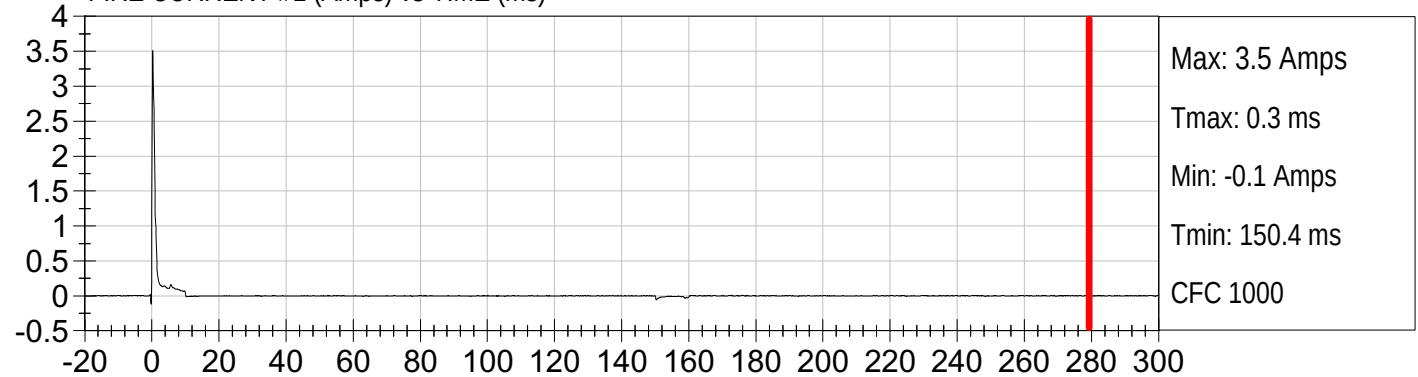


Injury Values Calculated between 0ms and 275ms

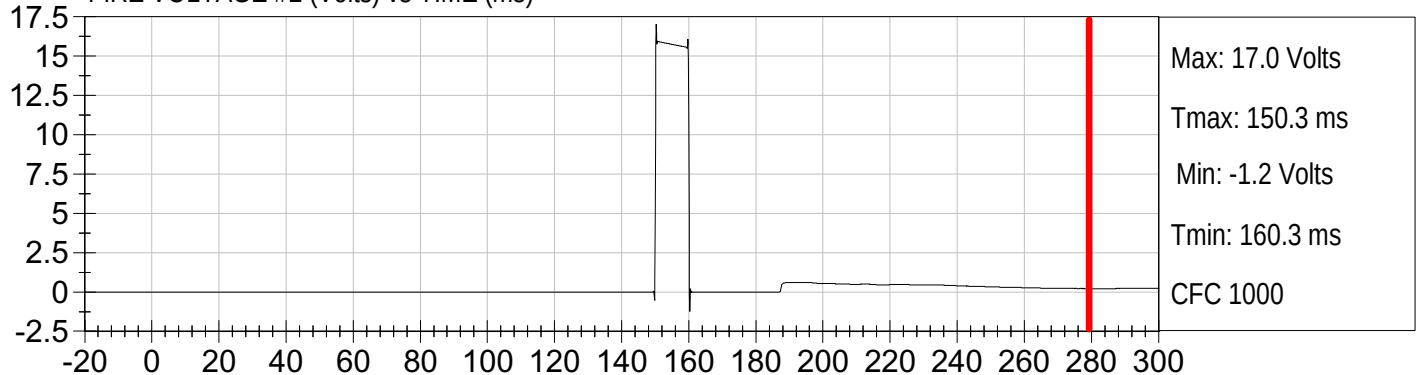
FIRE VOLTAGE #1 (Volts) vs TIME (ms)



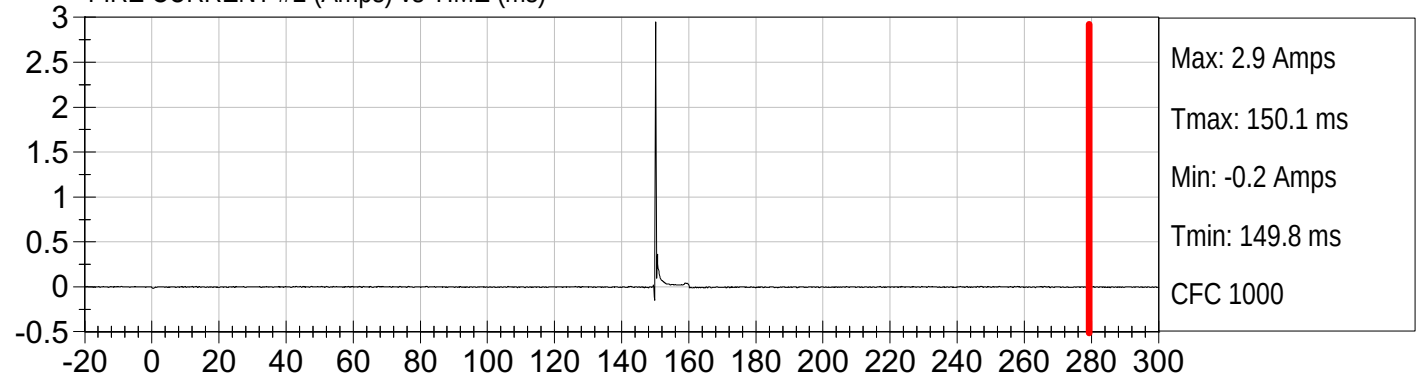
FIRE CURRENT #1 (Amps) vs TIME (ms)



FIRE VOLTAGE #2 (Volts) vs TIME (ms)

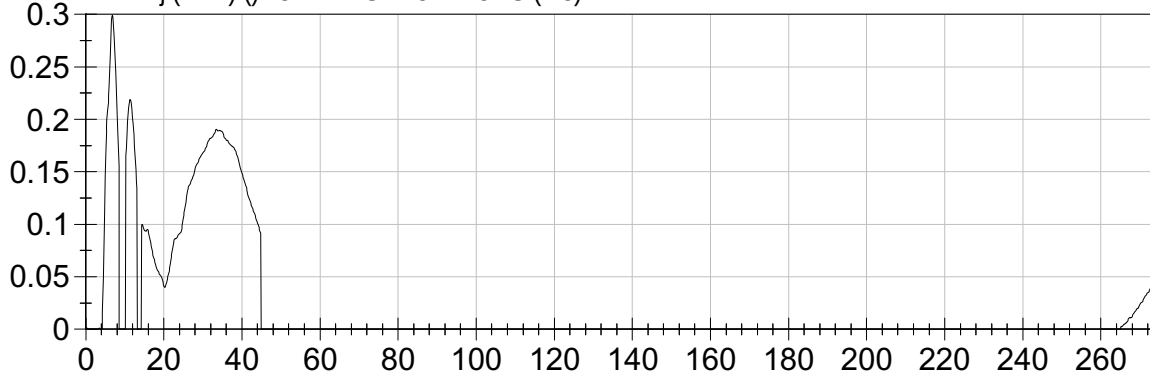


FIRE CURRENT #2 (Amps) vs TIME (ms)



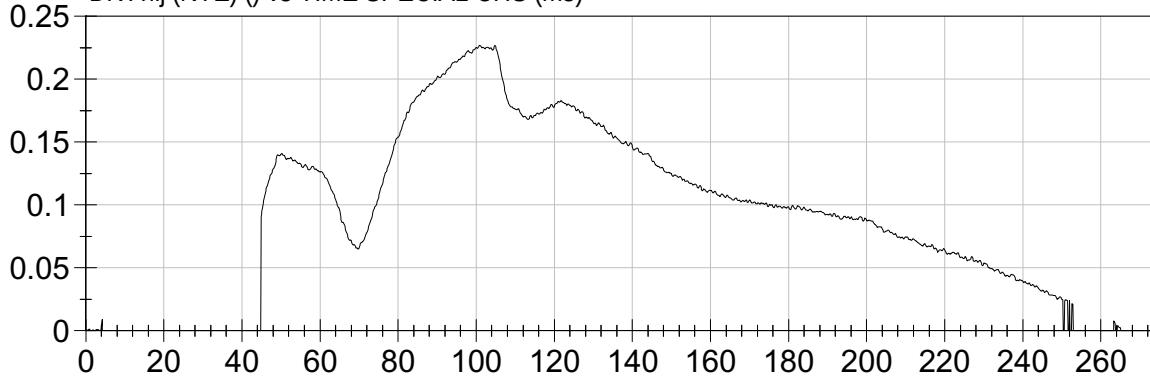


Drv. nij (NTF) () vs TIME SPECIAL CHS (ms)



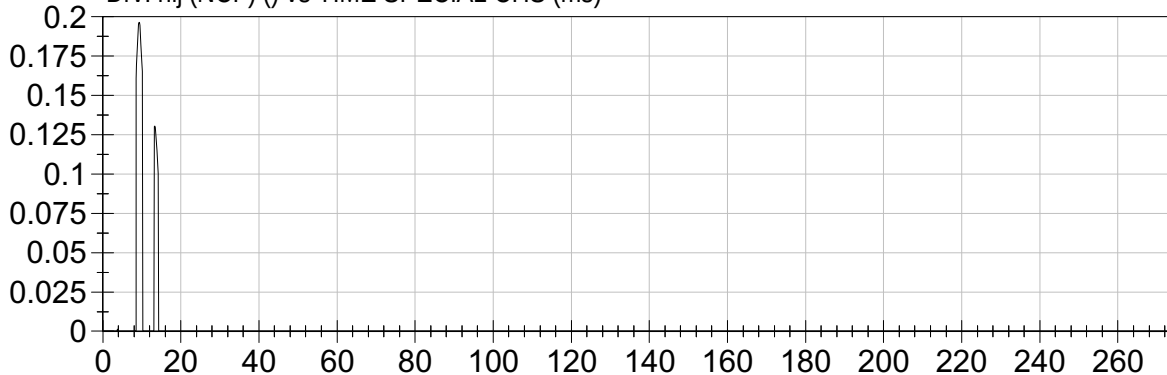
Max: 0.3  
Tmax: 6.8 ms  
Min: 0.0  
Tmin: 0.5 ms  
CFC 600

Drv. nij (NTE) () vs TIME SPECIAL CHS (ms)



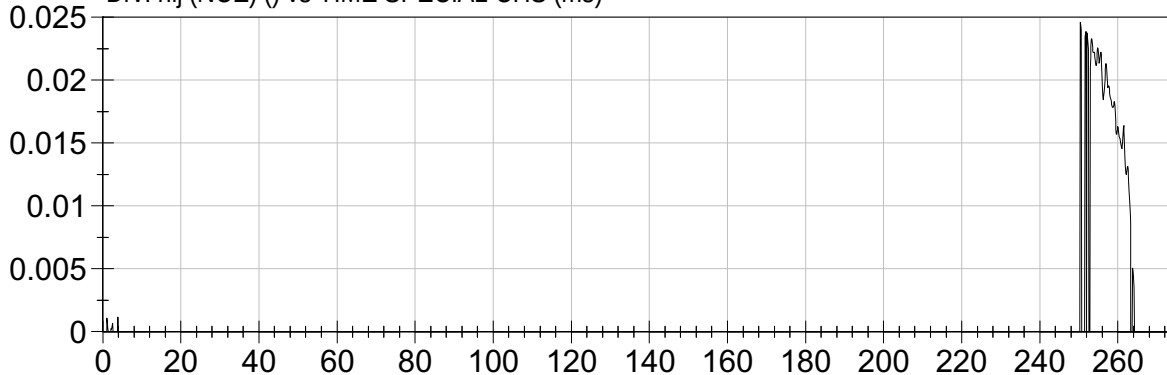
Max: 0.2  
Tmax: 100.9 ms  
Min: 0.0  
Tmin: 0.1 ms  
CFC 600

Drv. nij (NCF) () vs TIME SPECIAL CHS (ms)



Max: 0.2  
Tmax: 9.3 ms  
Min: 0.0  
Tmin: 0.1 ms  
CFC 600

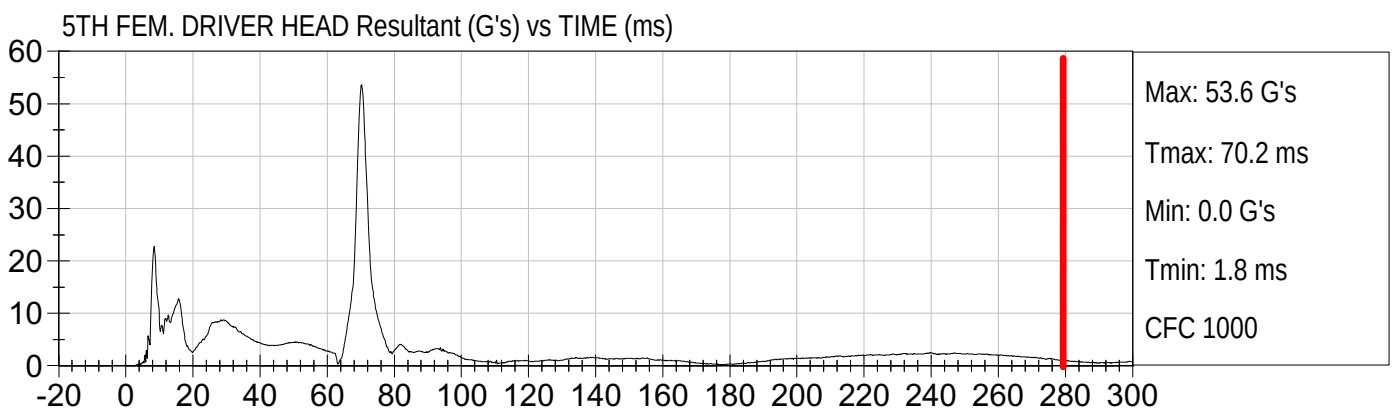
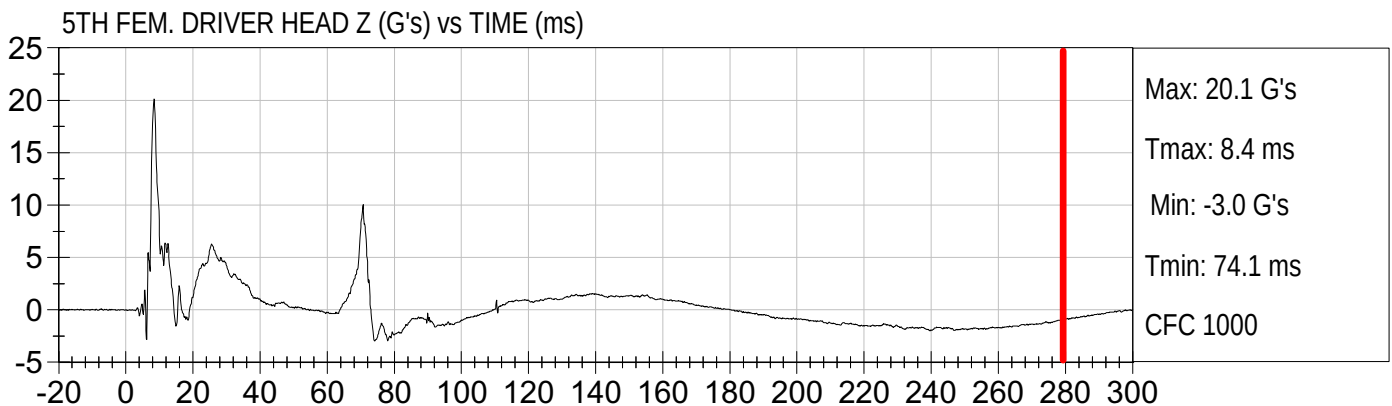
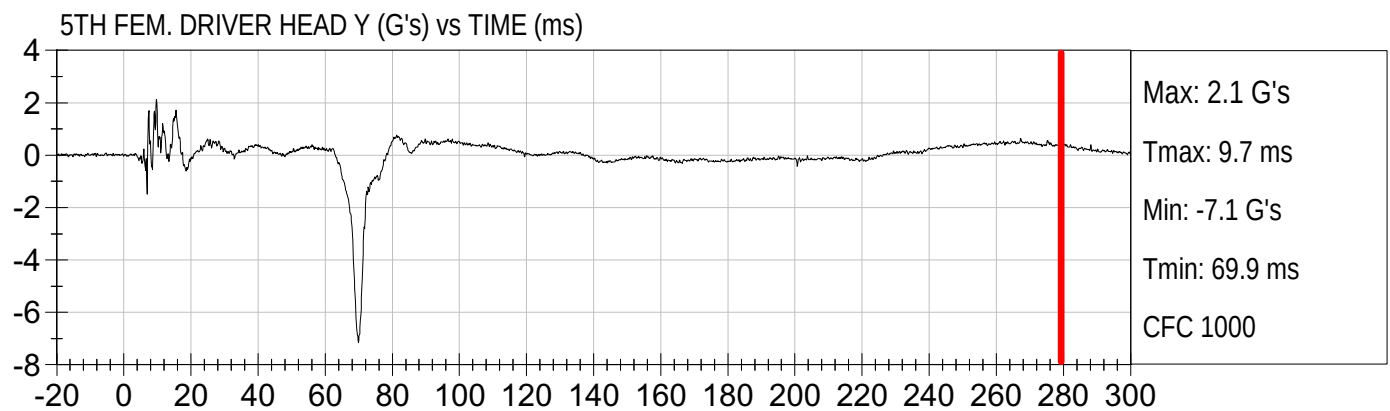
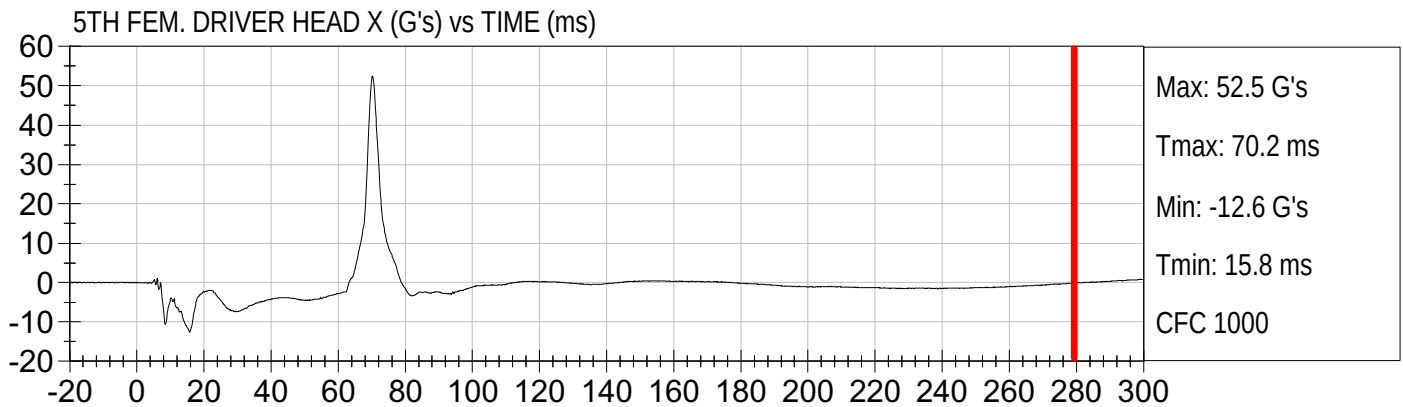
Drv. nij (NCE) () vs TIME SPECIAL CHS (ms)



Max: 0.0  
Tmax: 250.4 ms  
Min: 0.0  
Tmin: 0.1 ms  
CFC 600

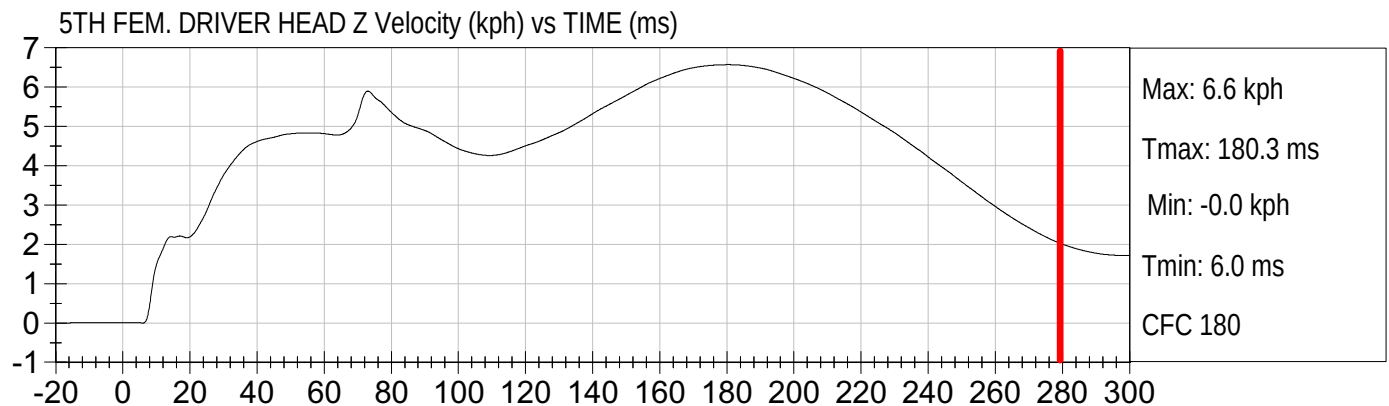
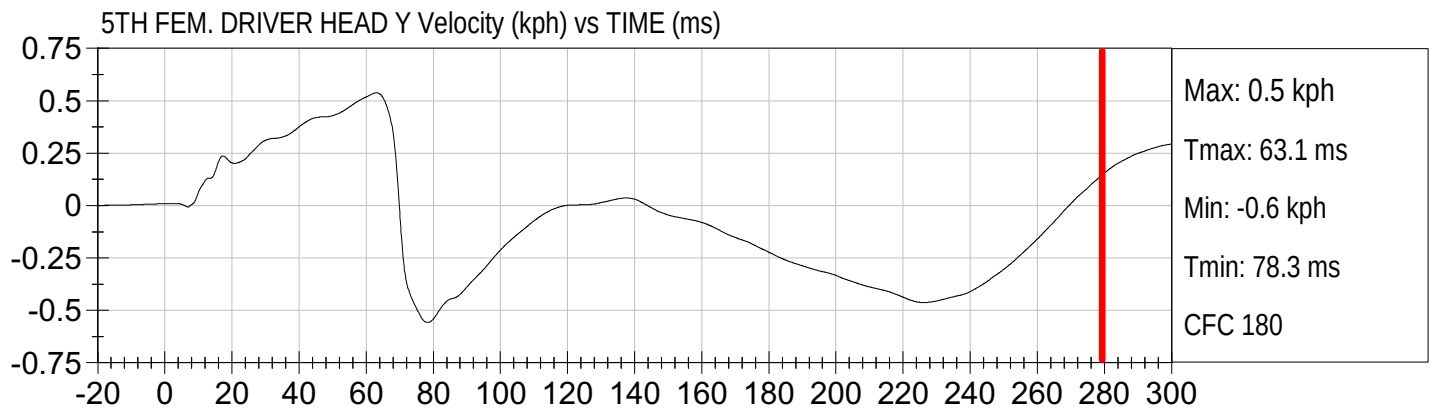
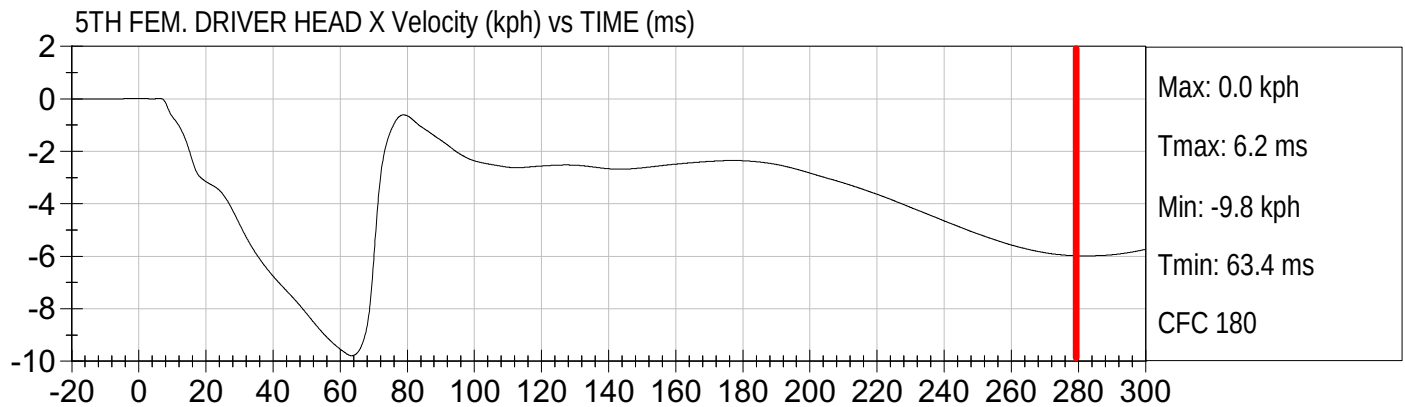


Injury Values Calculated between 0ms and 275ms



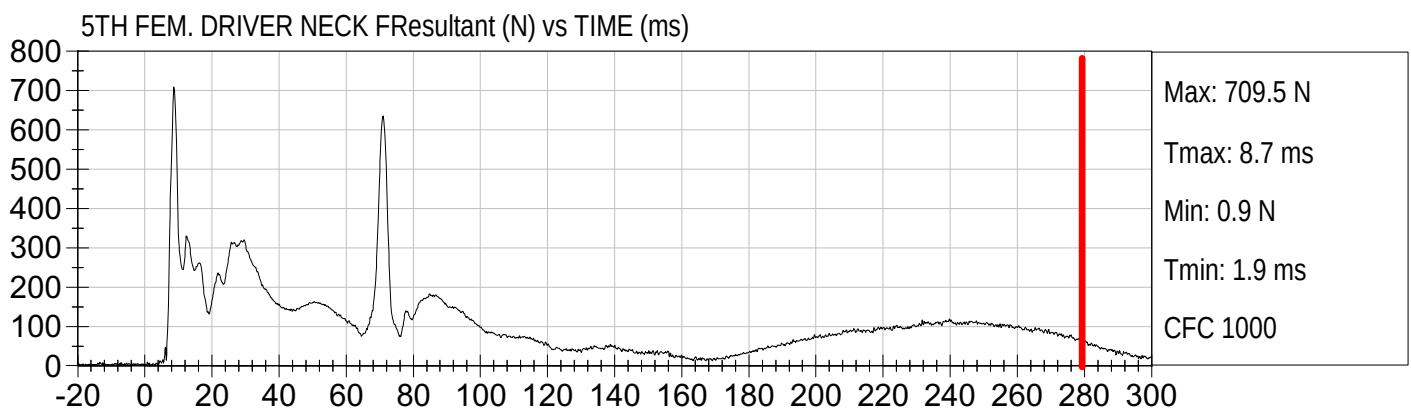
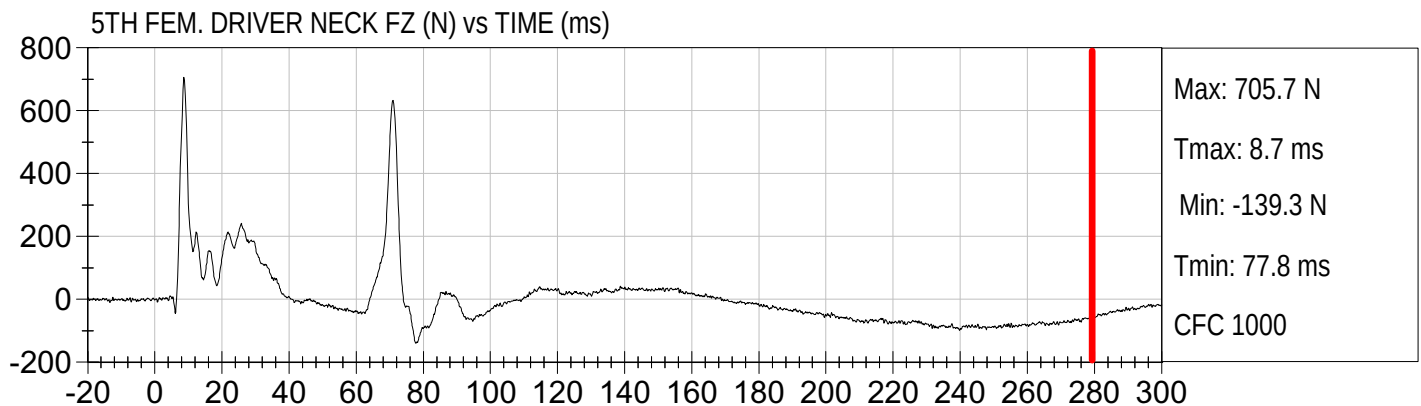
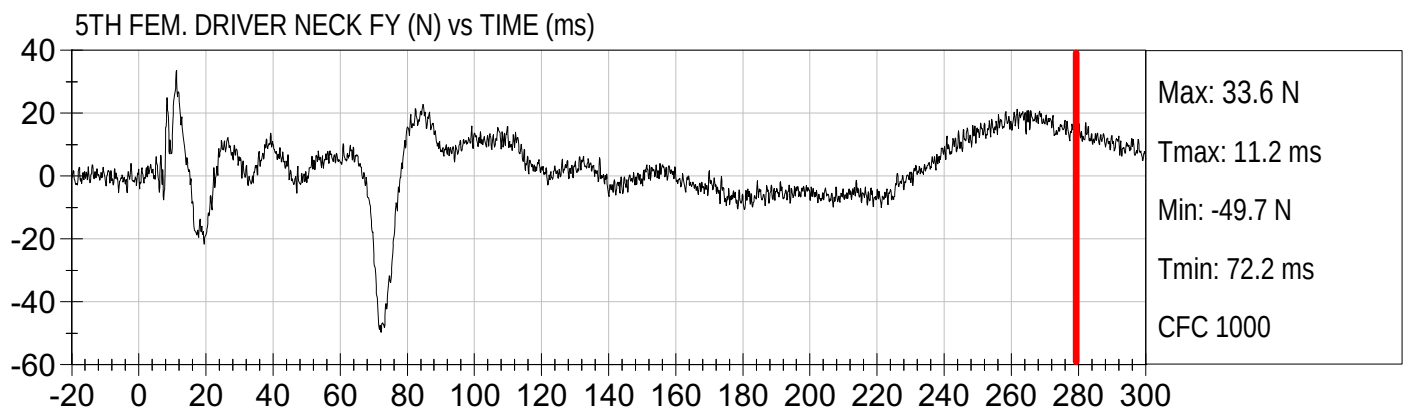
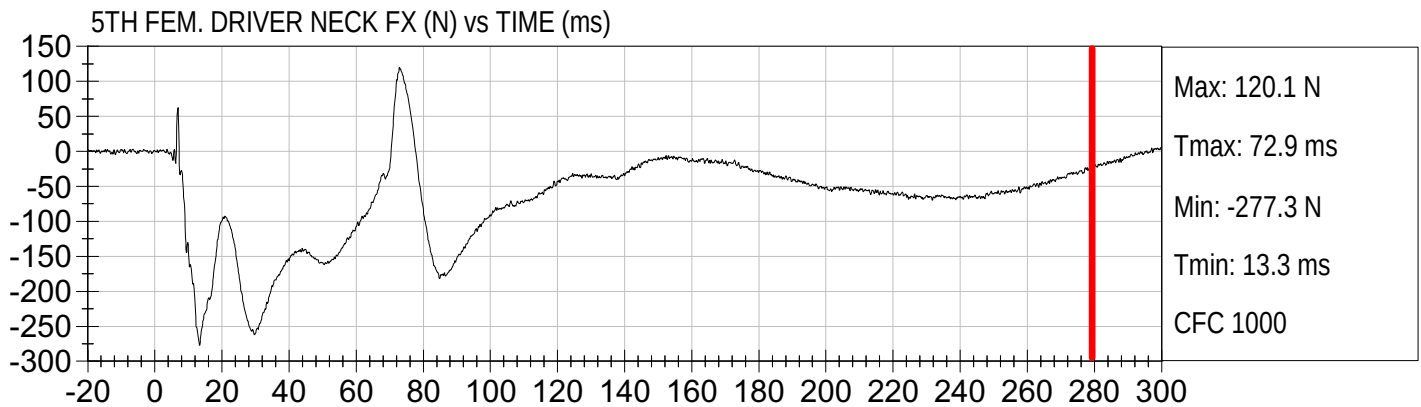


Injury Values Calculated between 0ms and 275ms





Injury Values Calculated between 0ms and 275ms

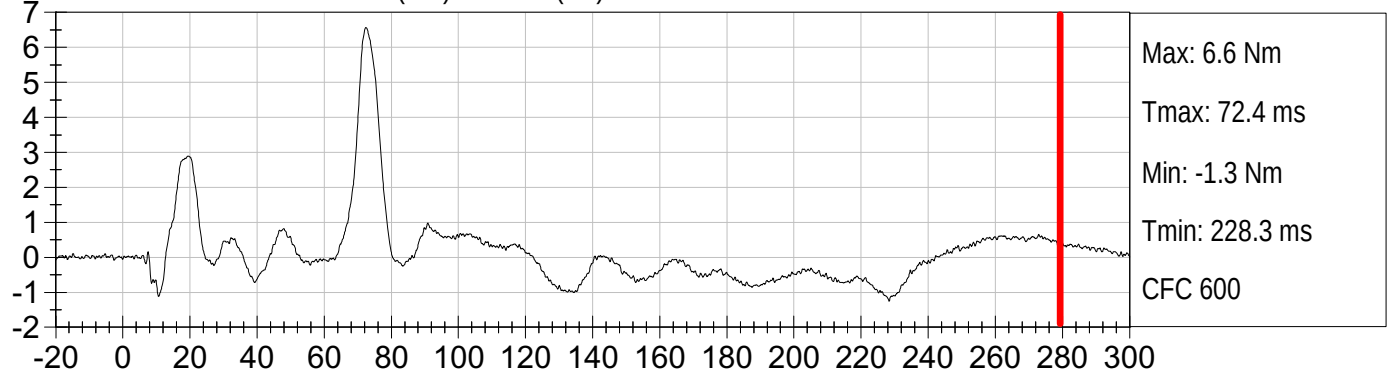




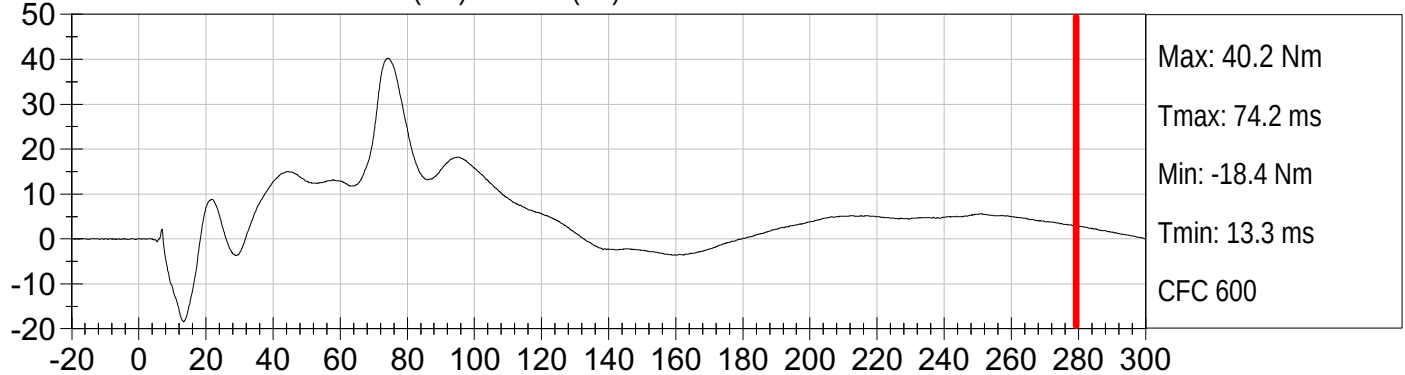


Injury Values Calculated between 0ms and 275ms

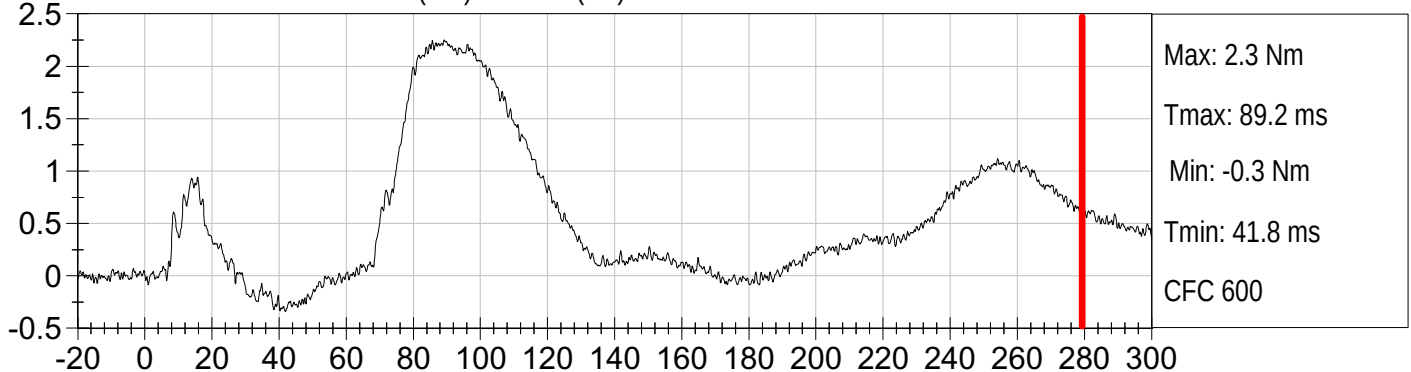
5TH FEM. DRIVER NECK MX (Nm) vs TIME (ms)



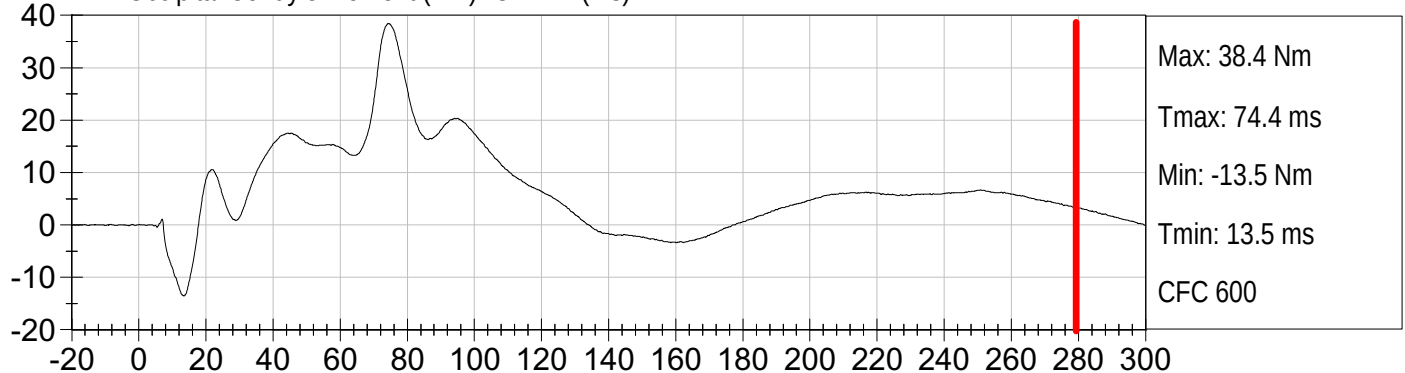
5TH FEM. DRIVER NECK MY (Nm) vs TIME (ms)



5TH FEM. DRIVER NECK MZ (Nm) vs TIME (ms)

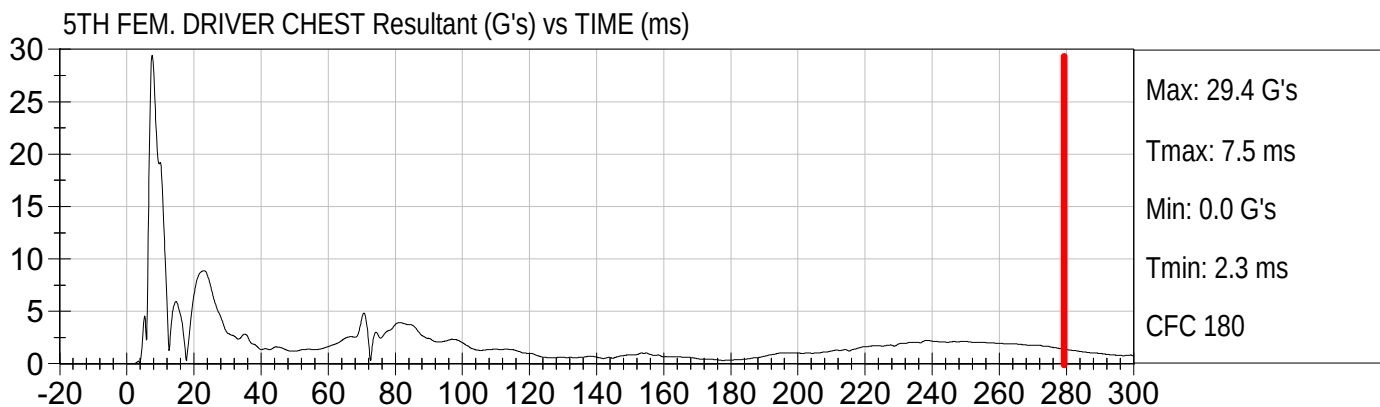
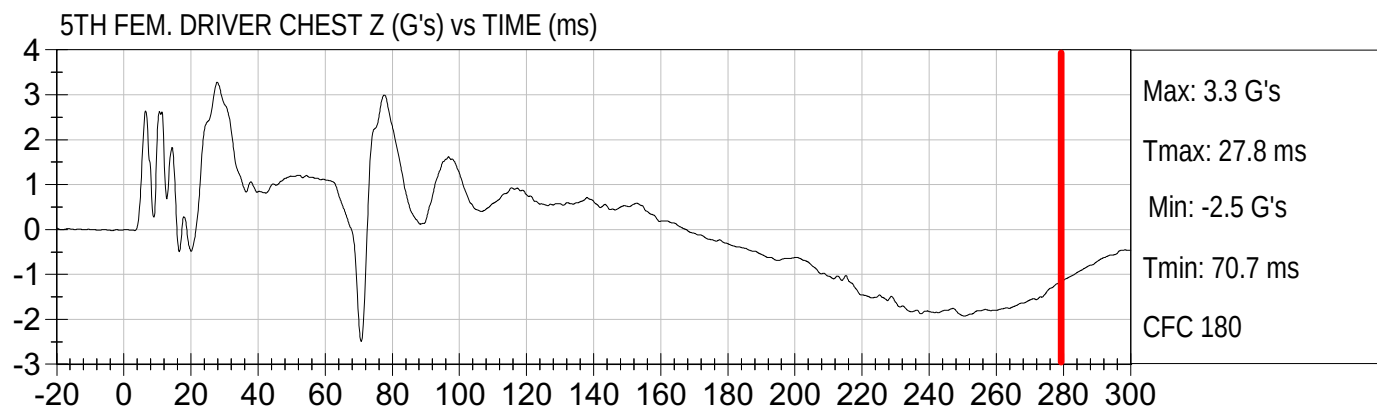
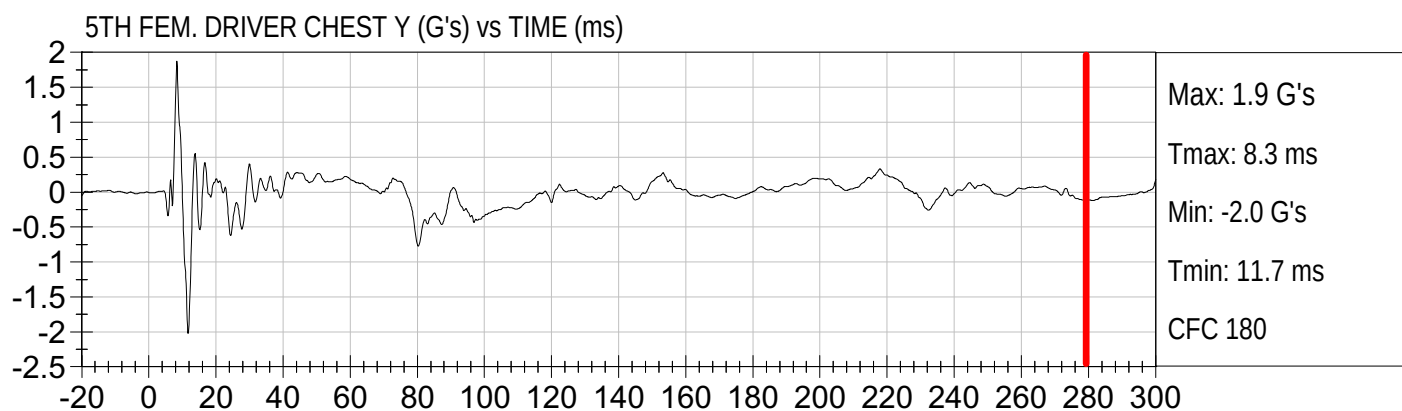
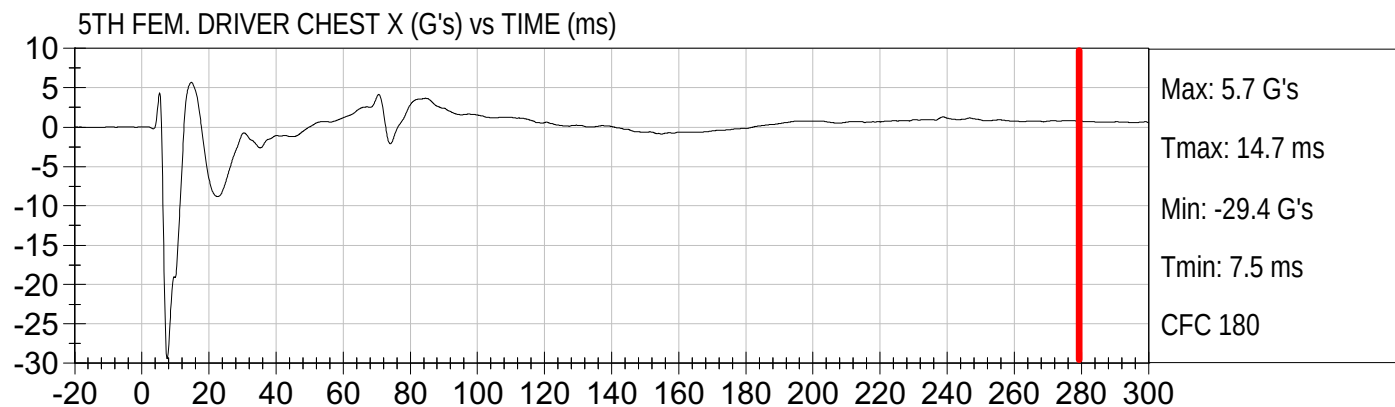


Drv. Occipital Condyle Moment (Nm) vs TIME (ms)





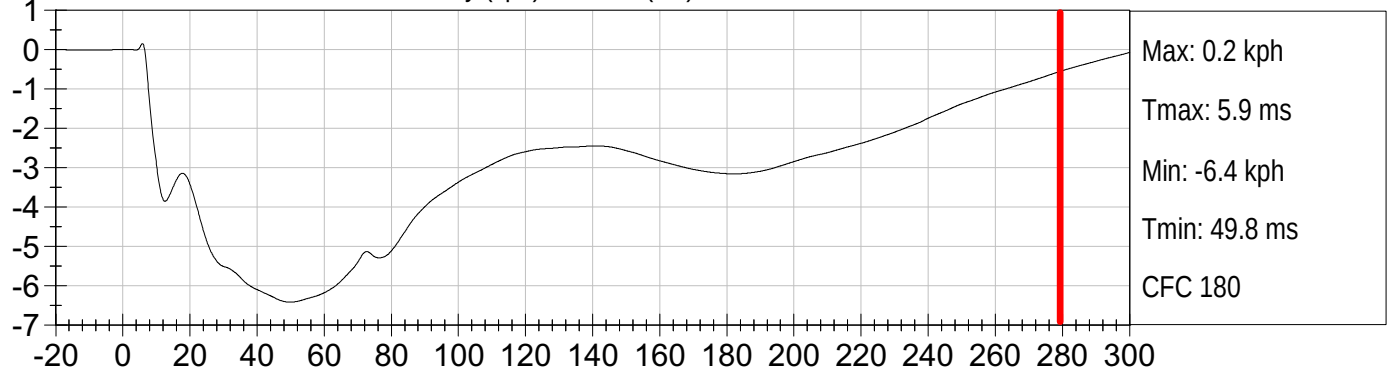
Injury Values Calculated between 0ms and 275ms



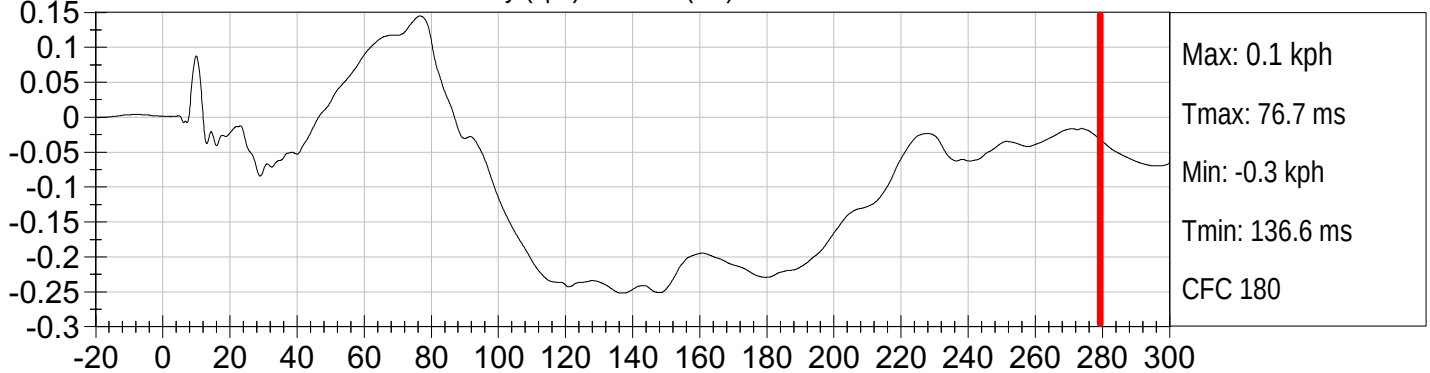


Injury Values Calculated between 0ms and 275ms

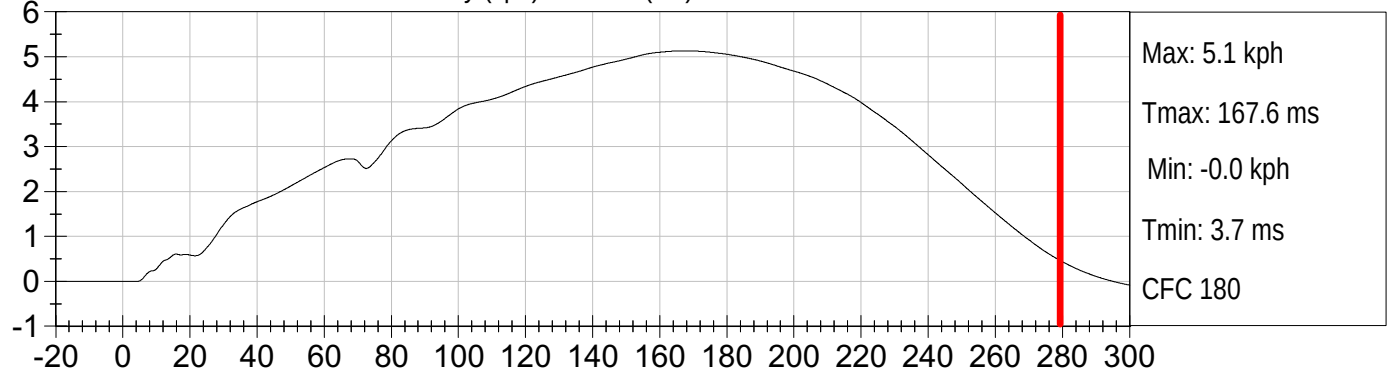
5TH FEM. DRIVER CHEST X Velocity (kph) vs TIME (ms)



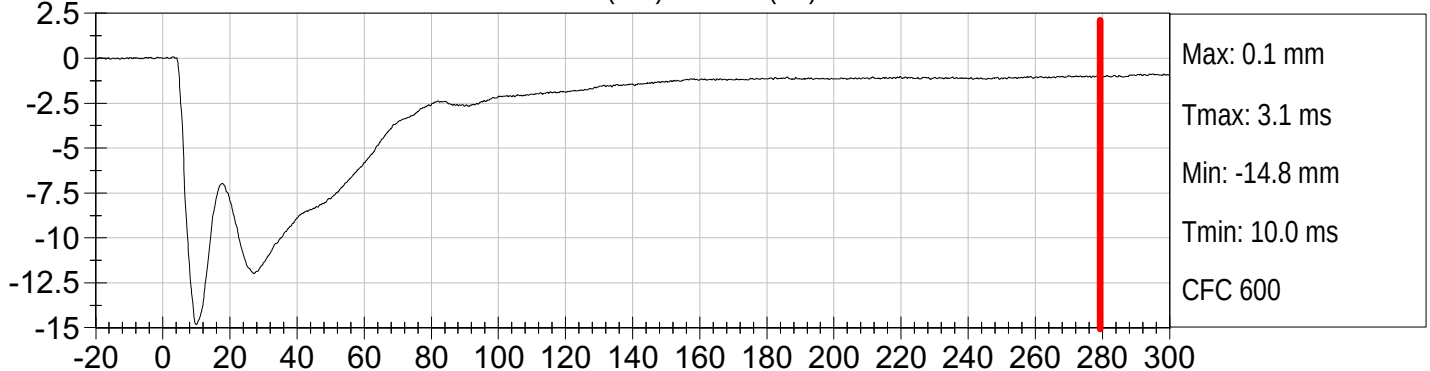
5TH FEM. DRIVER CHEST Y Velocity (kph) vs TIME (ms)



5TH FEM. DRIVER CHEST Z Velocity (kph) vs TIME (ms)

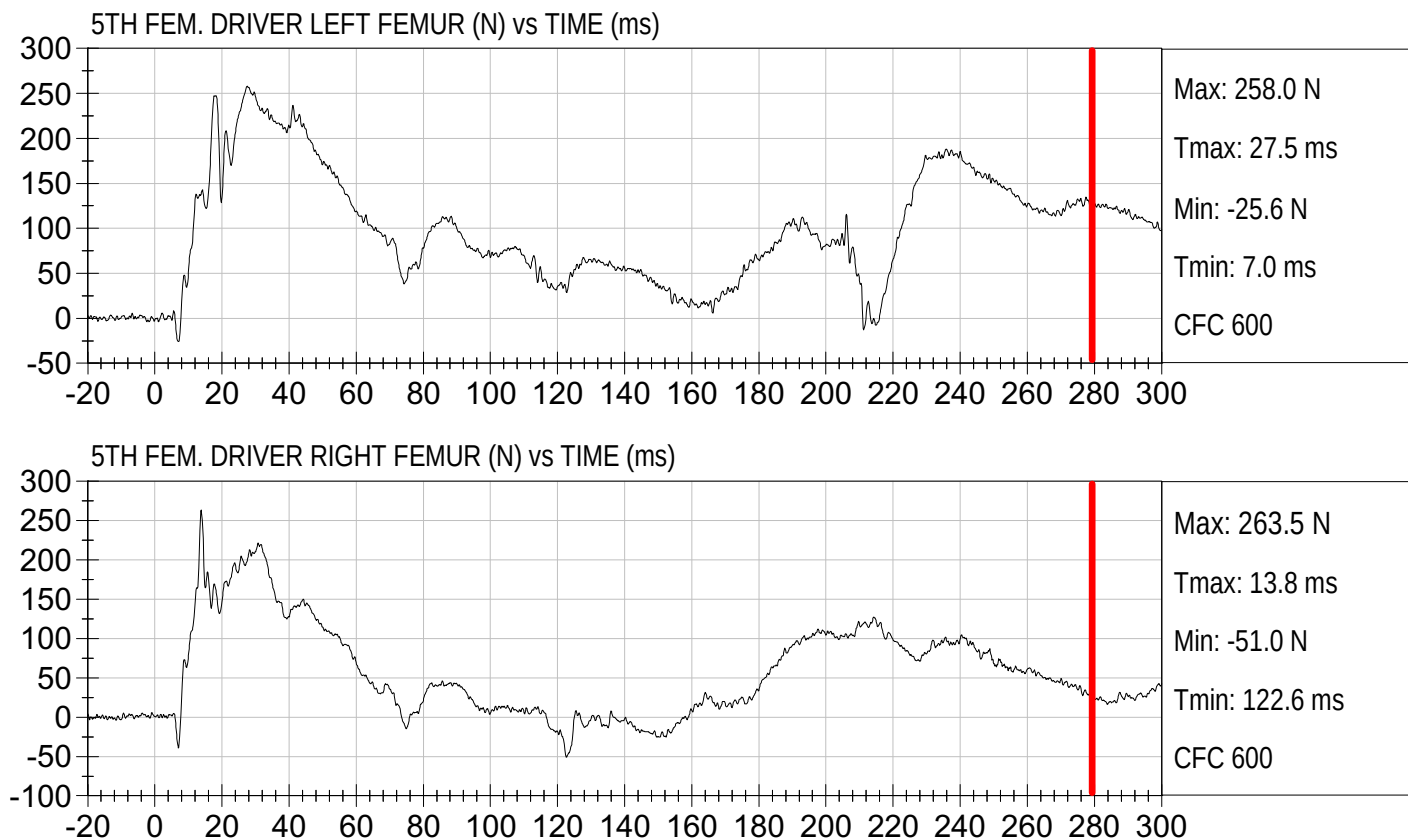


5TH FEM. DRIVER CHEST DISPLACEMENT (mm) vs TIME (ms)



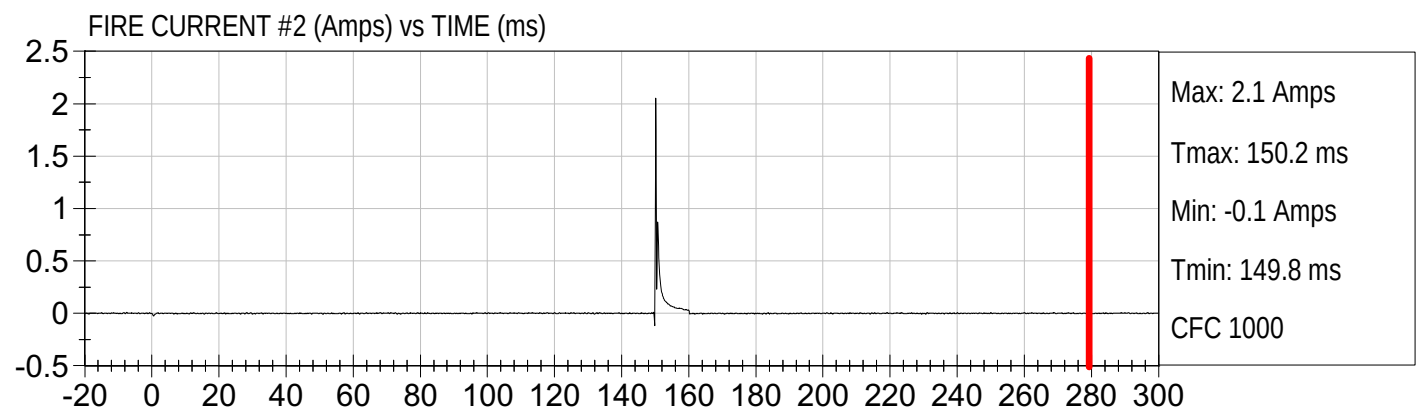
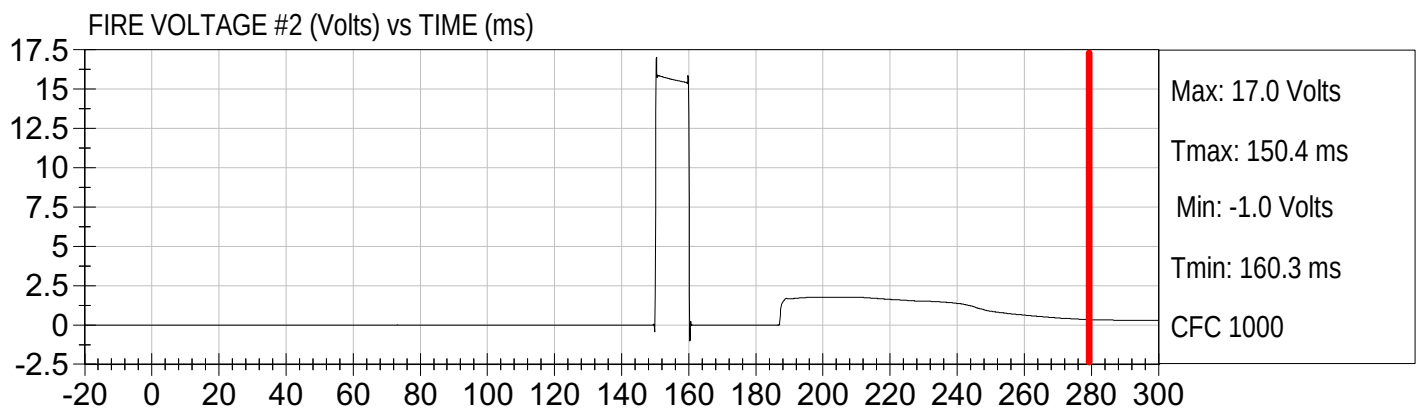
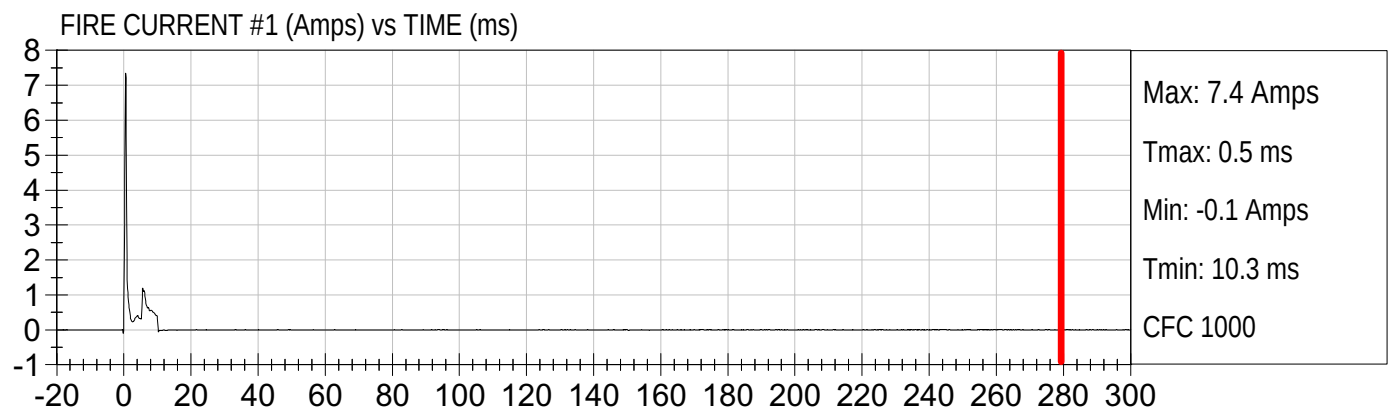
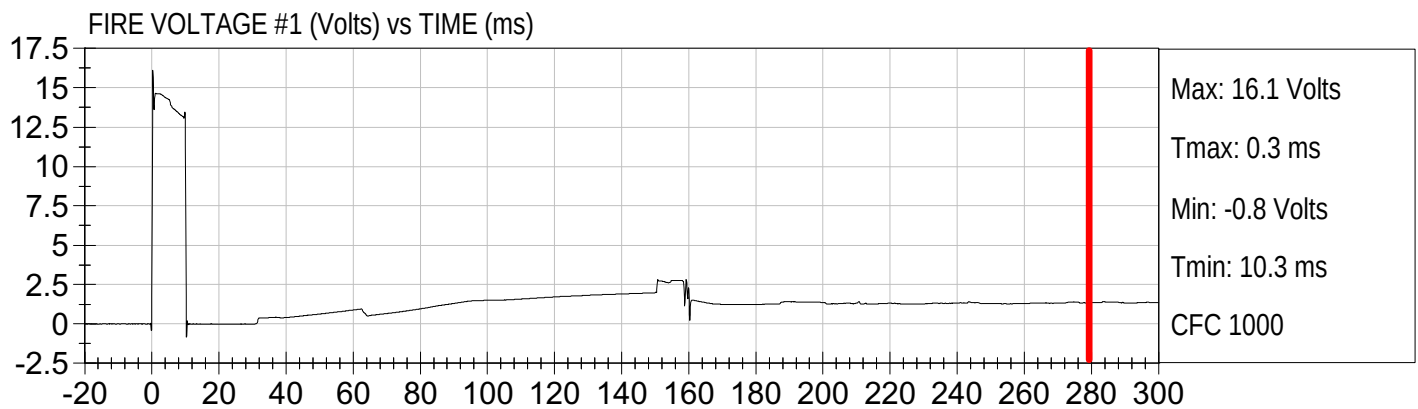


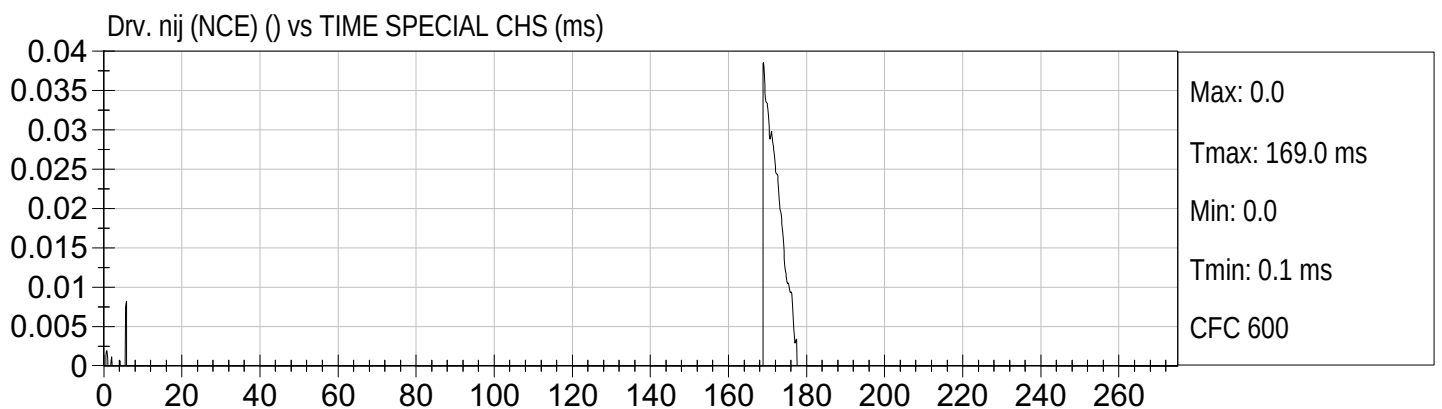
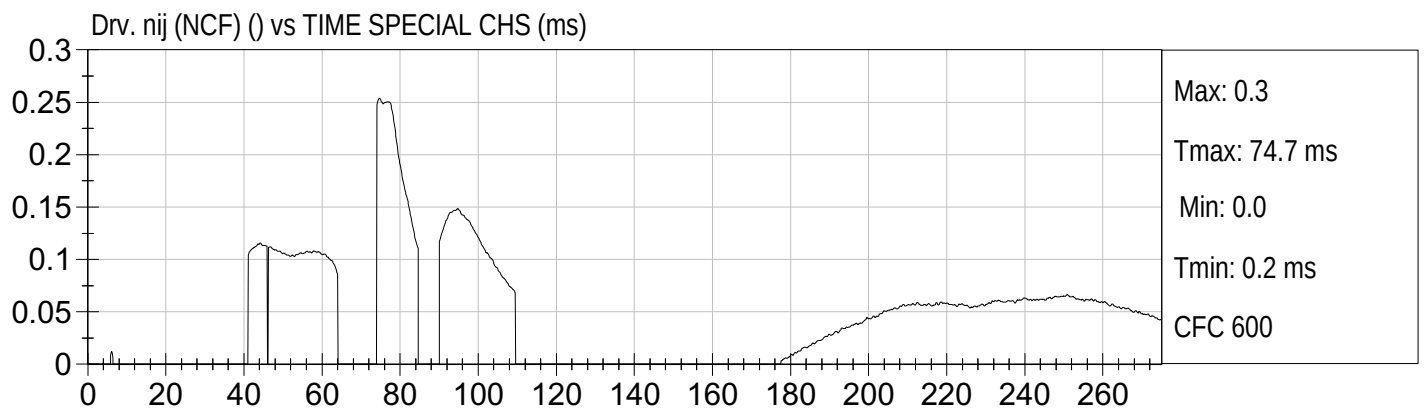
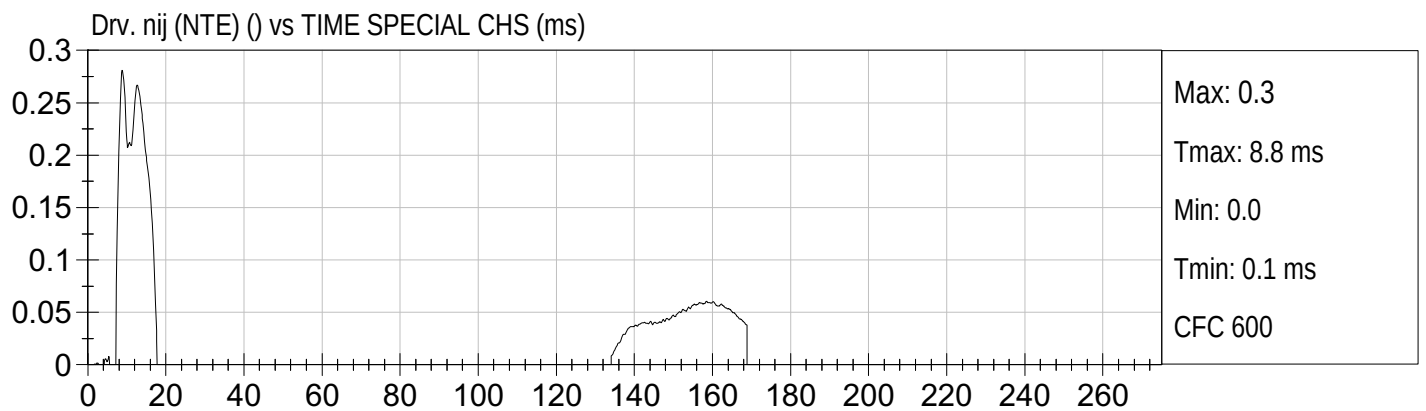
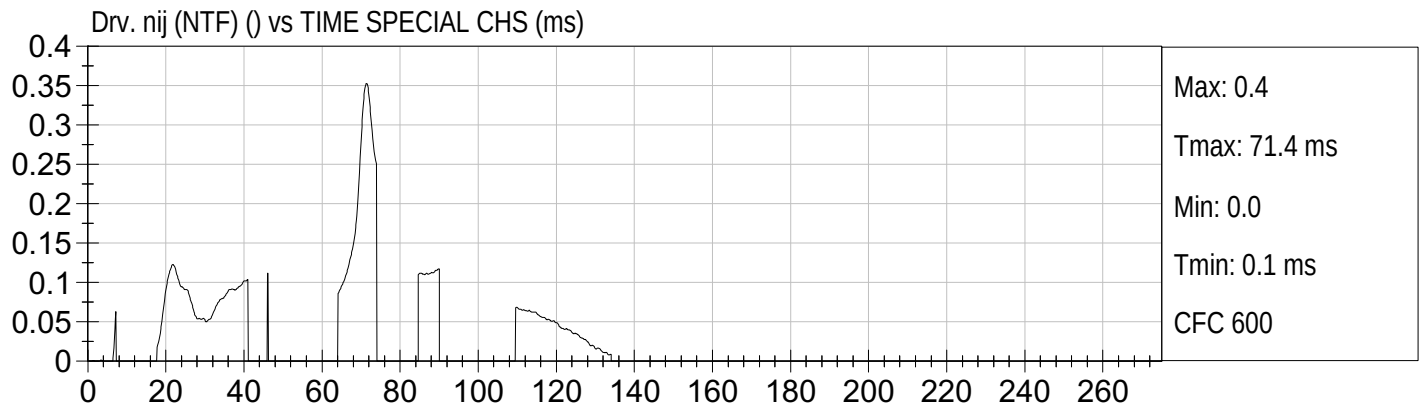
Injury Values Calculated between 0ms and 275ms





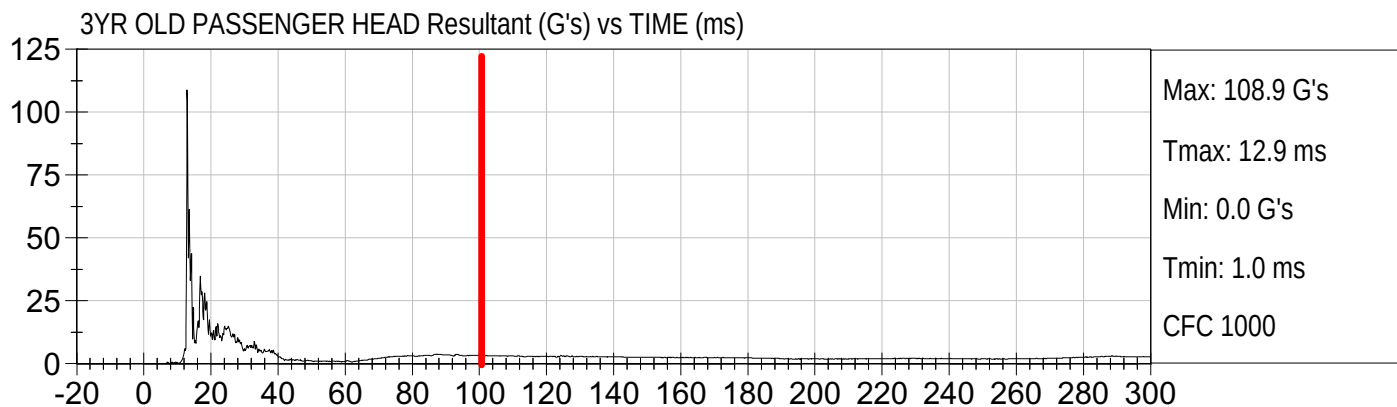
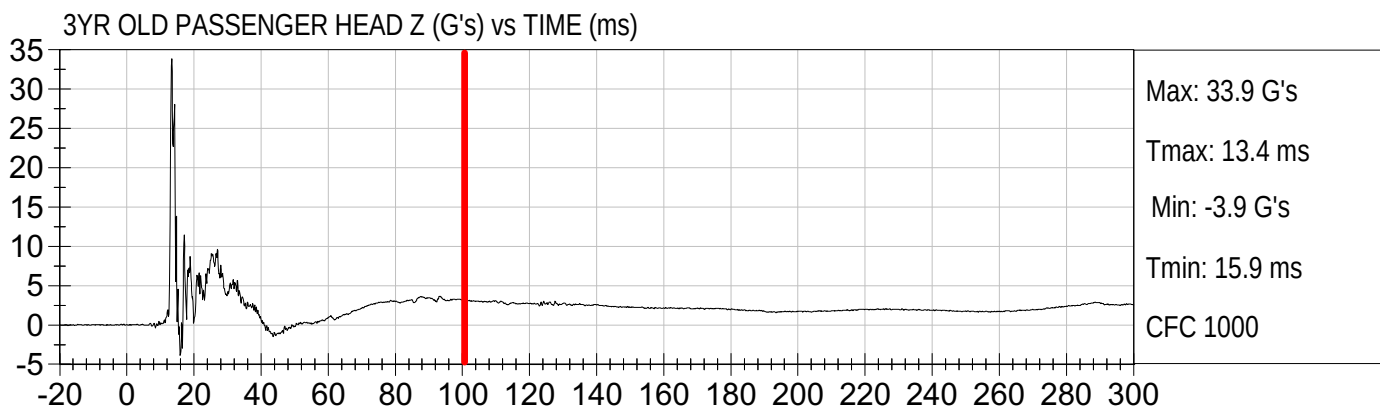
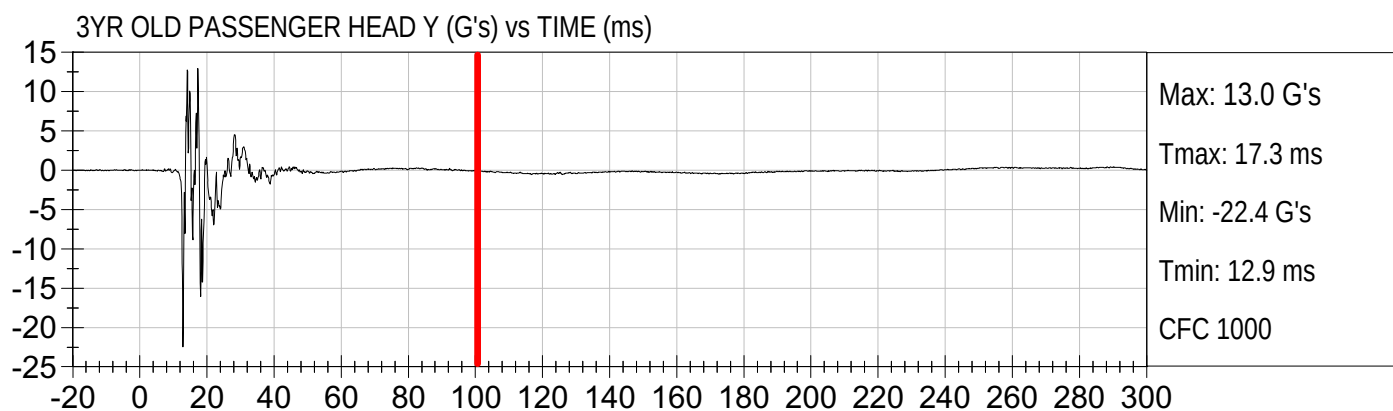
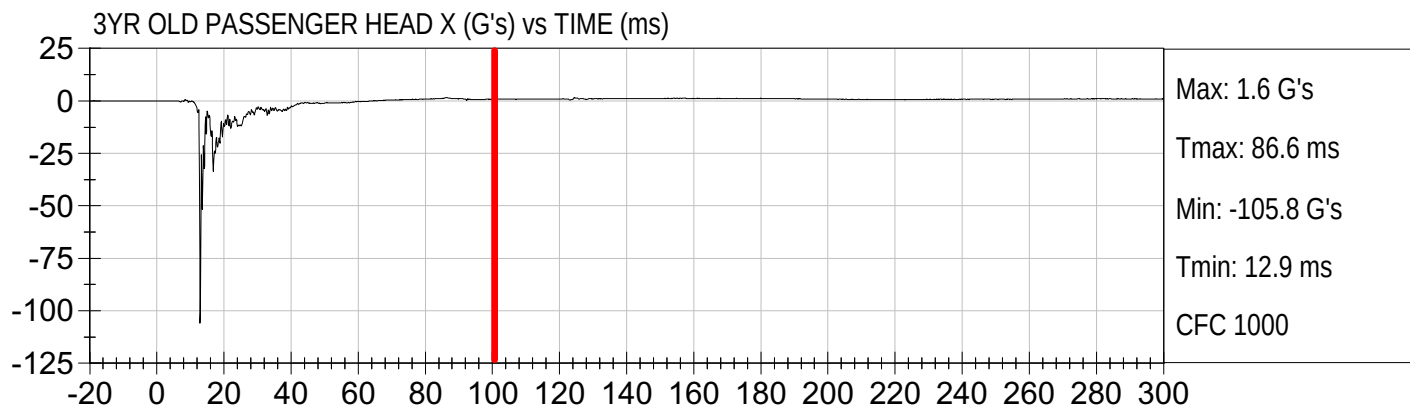
Injury Values Calculated between 0ms and 275ms





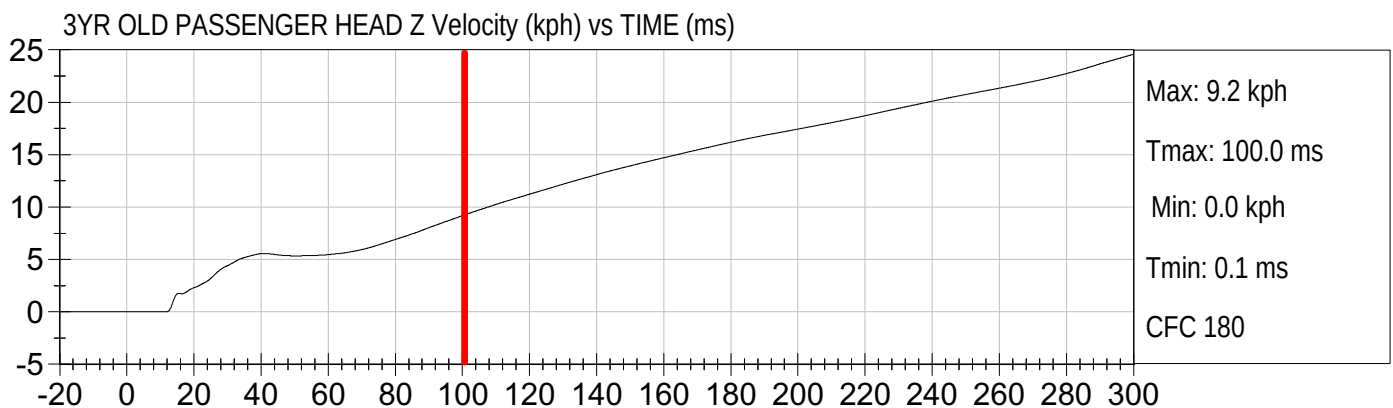
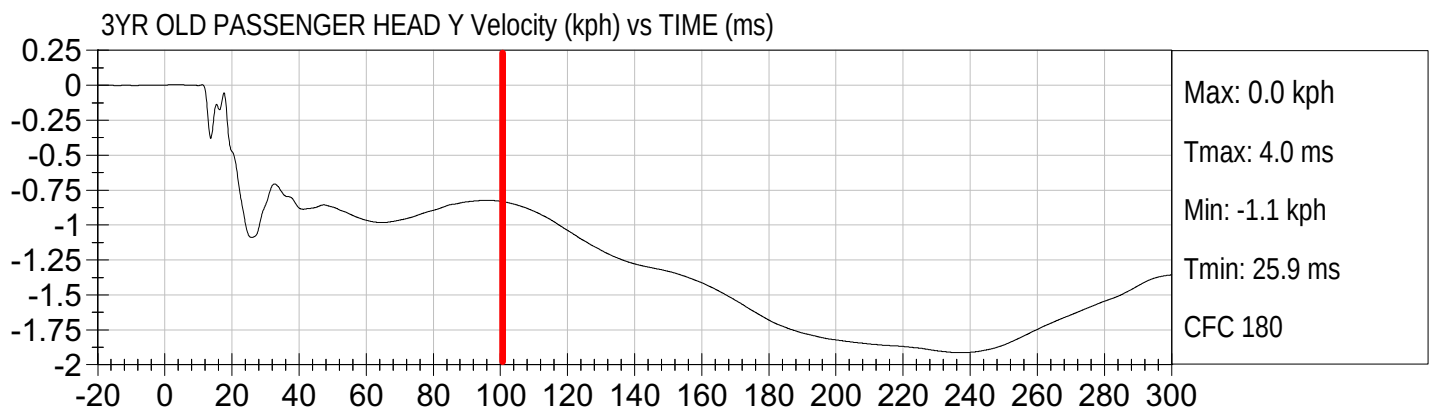
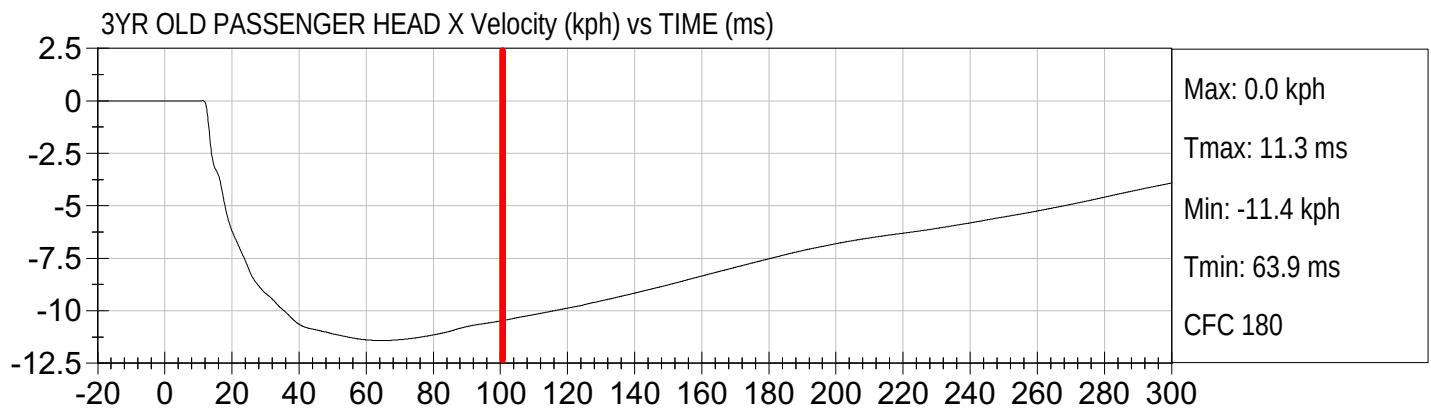


Injury Values Calculated between 0ms and 100ms





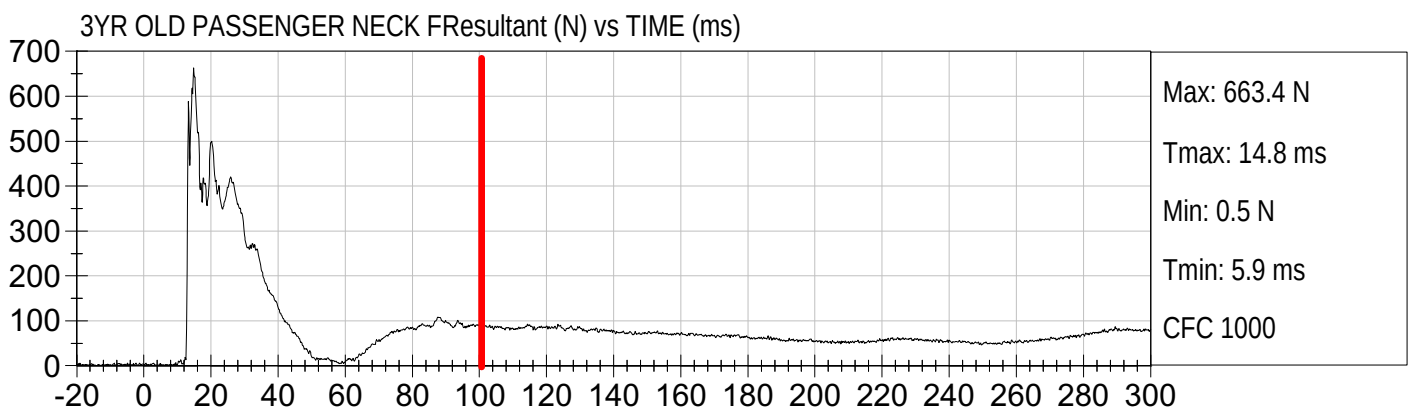
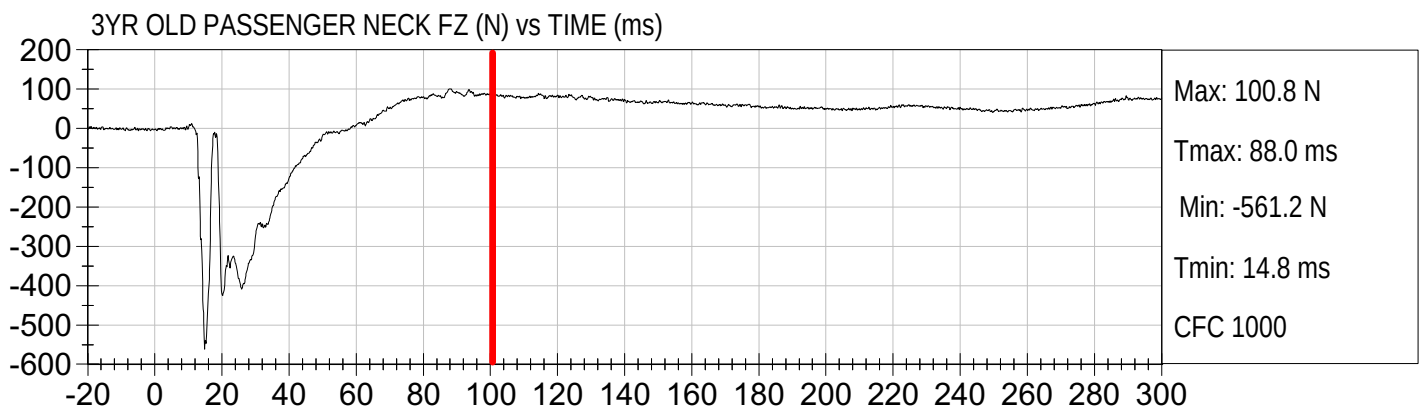
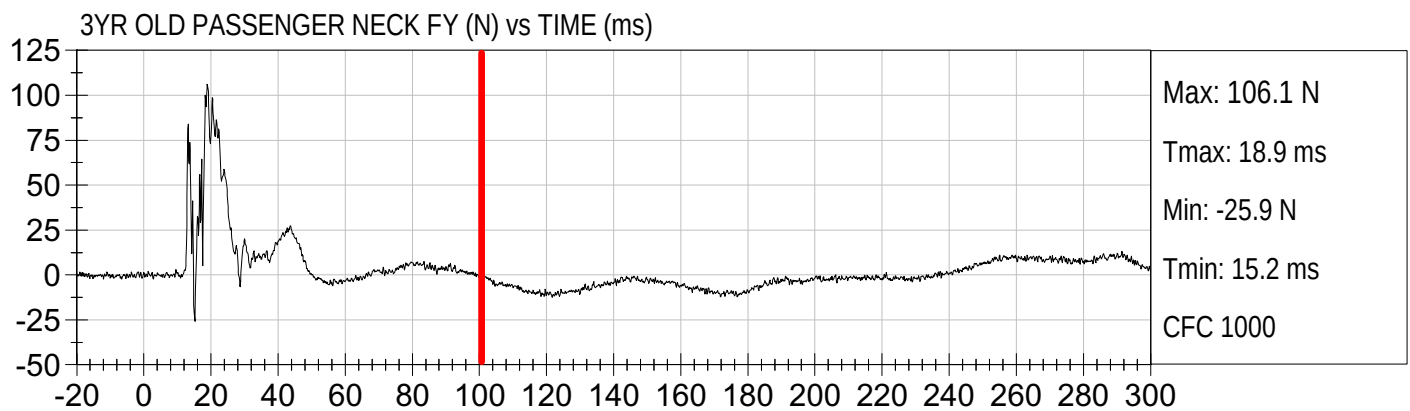
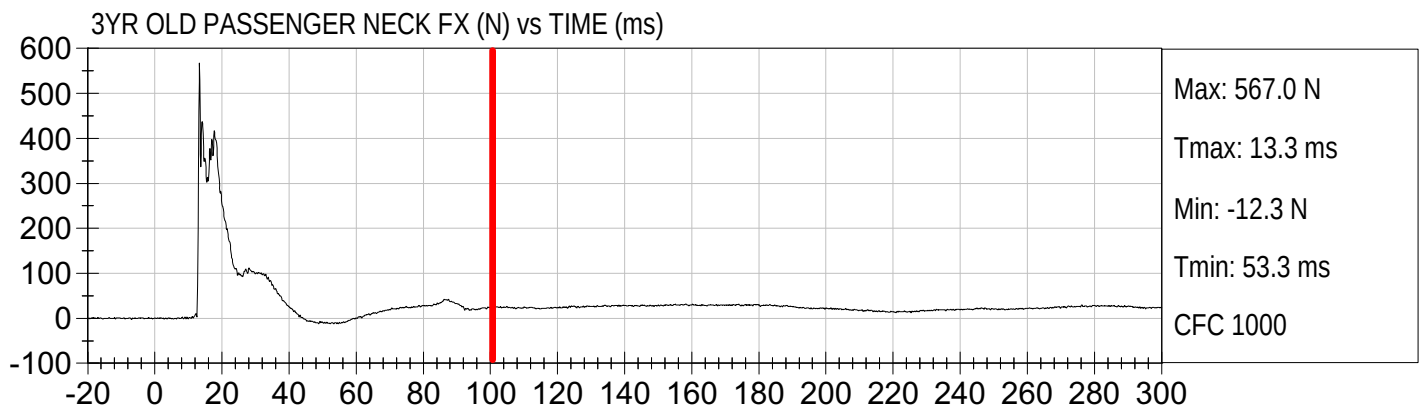
Injury Values Calculated between 0ms and 100ms





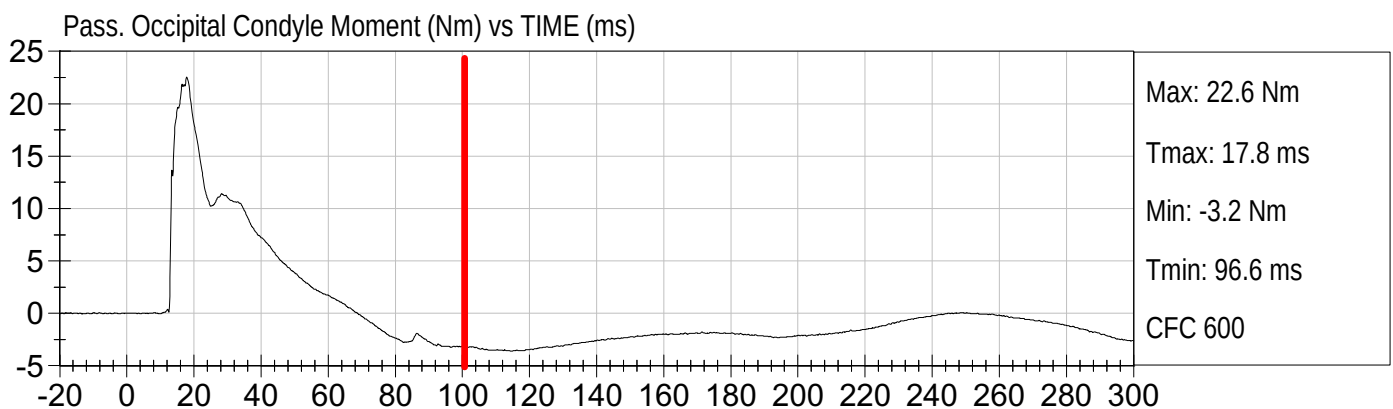
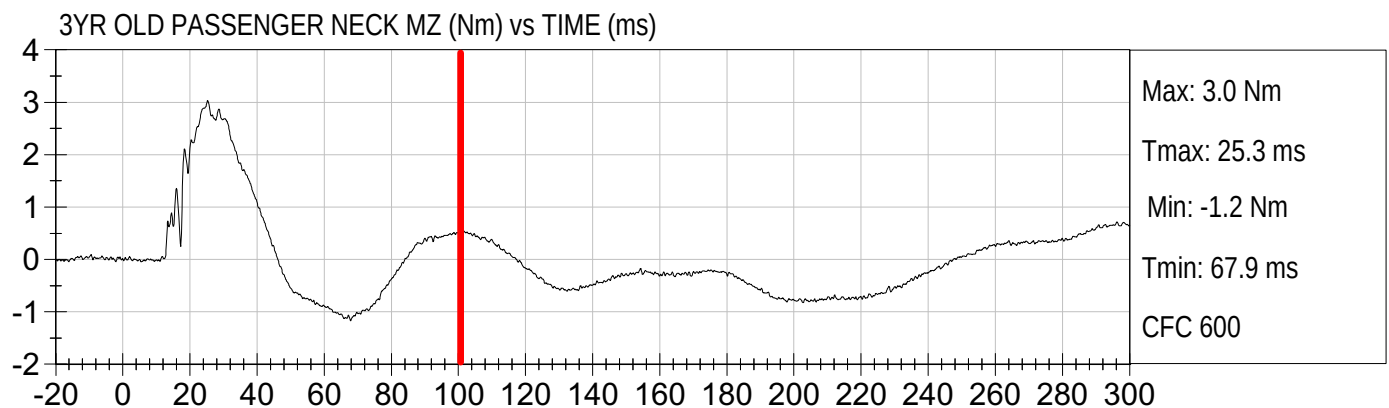
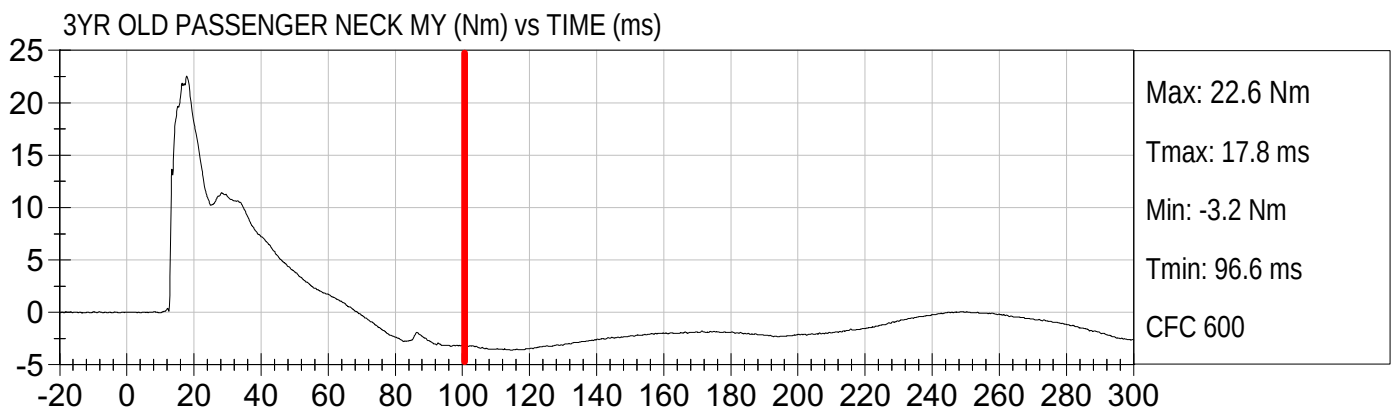
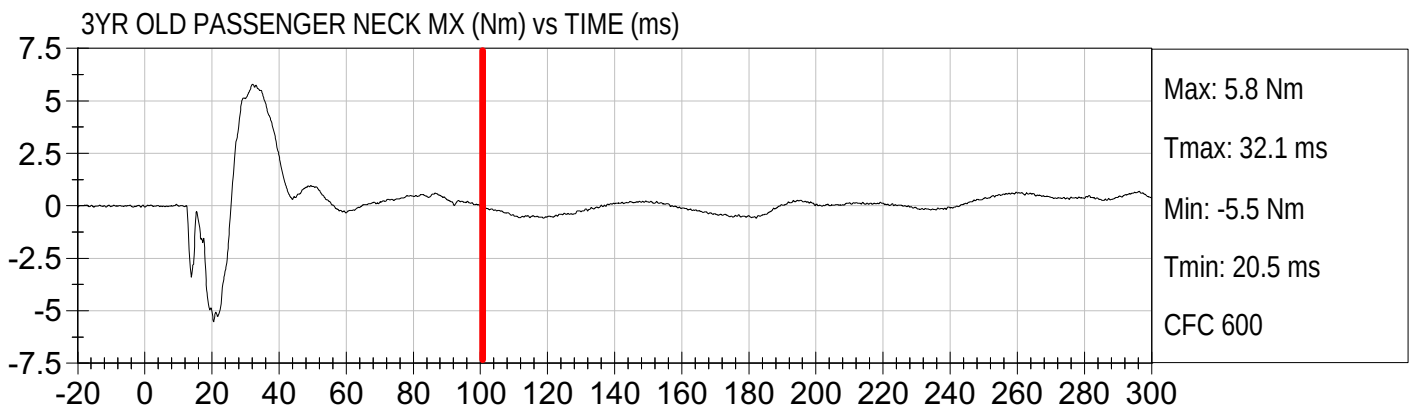


Injury Values Calculated between 0ms and 100ms



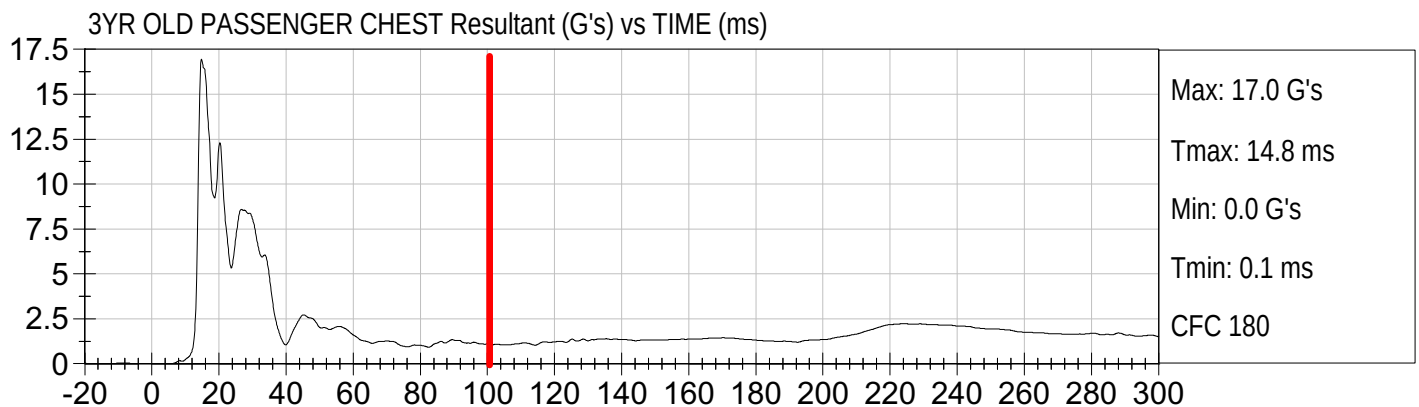
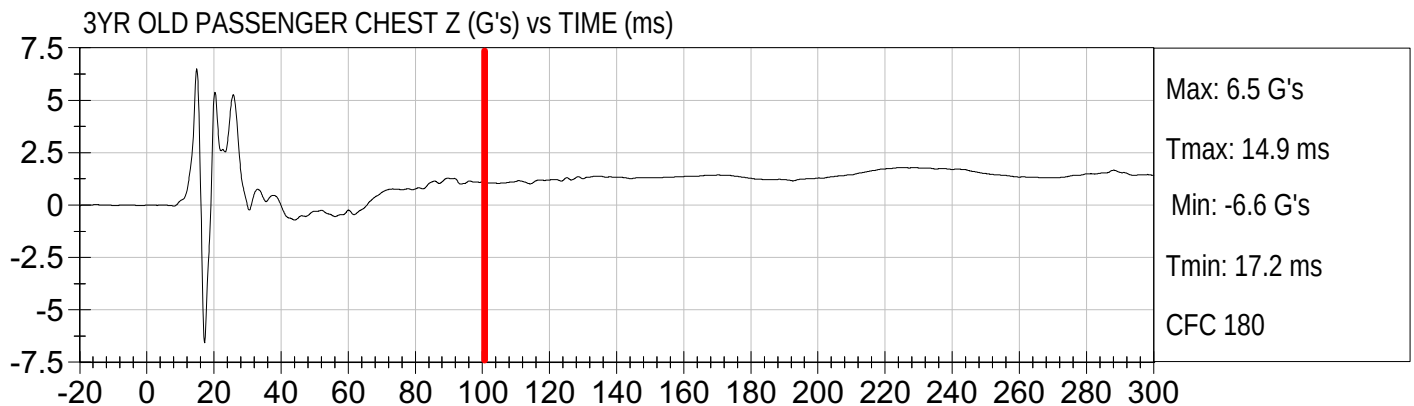
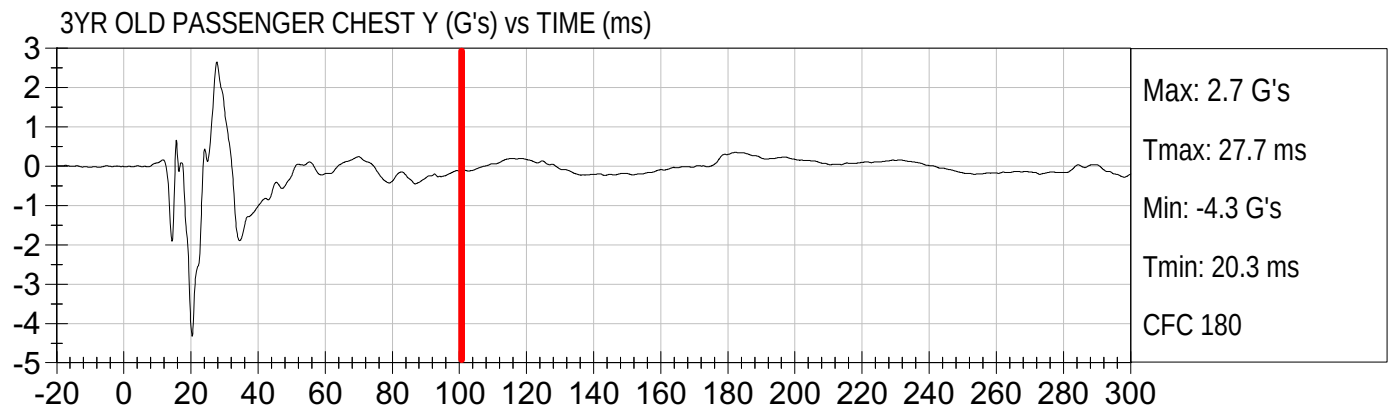
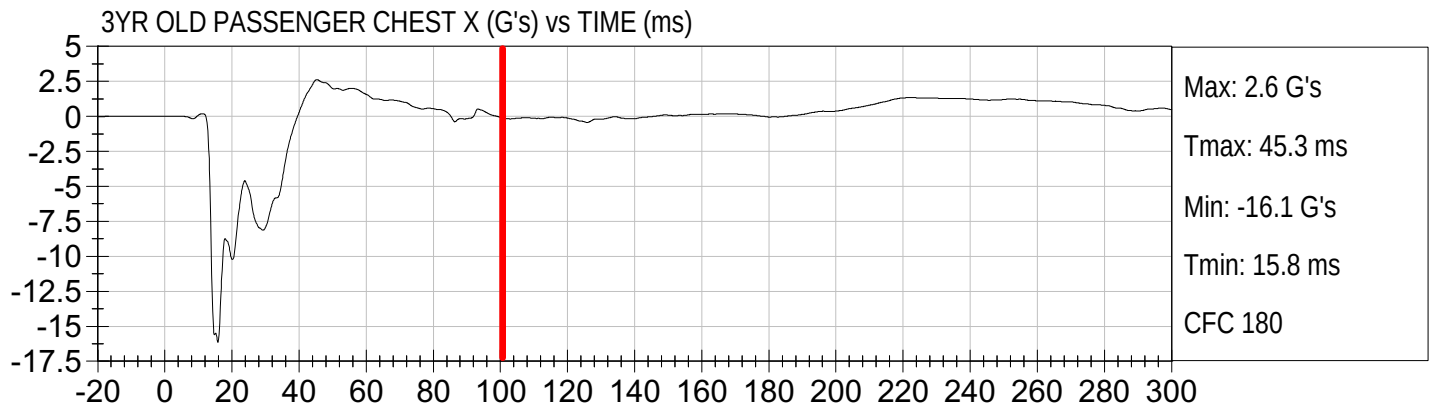


Injury Values Calculated between 0ms and 100ms





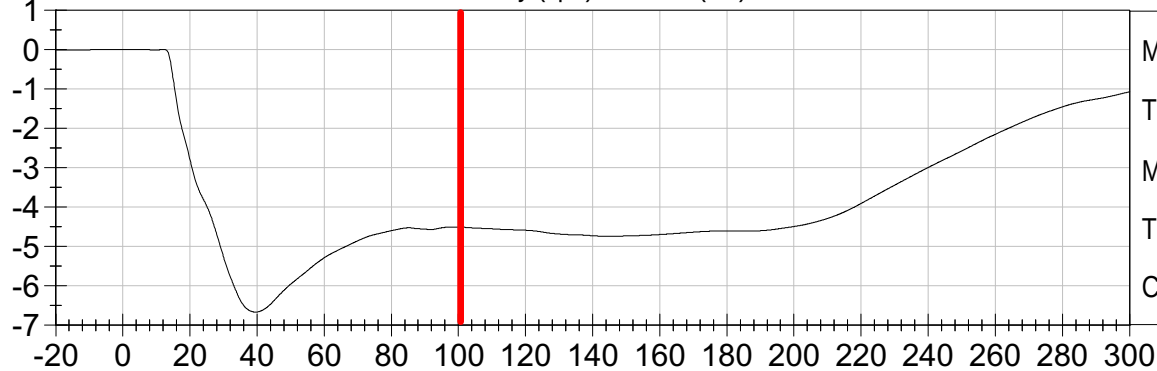
Injury Values Calculated between 0ms and 100ms





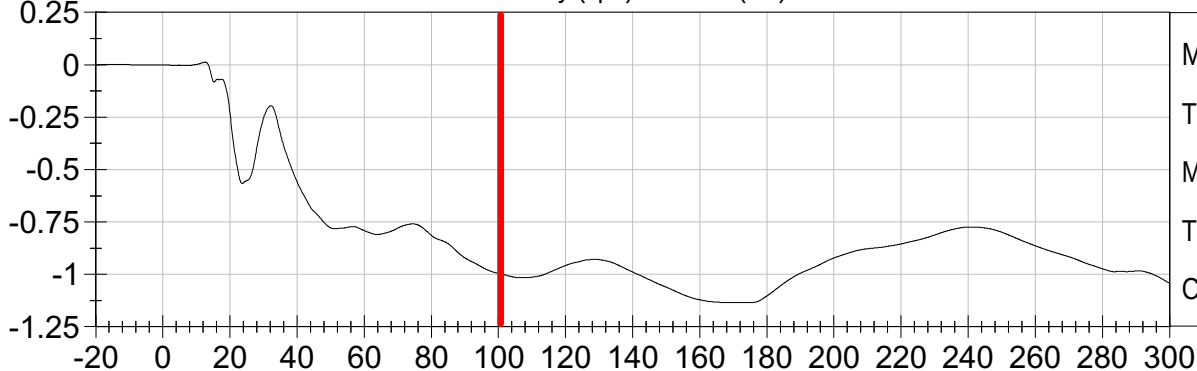
Injury Values Calculated between 0ms and 100ms

3YR OLD PASSENGER CHEST X Velocity (kph) vs TIME (ms)



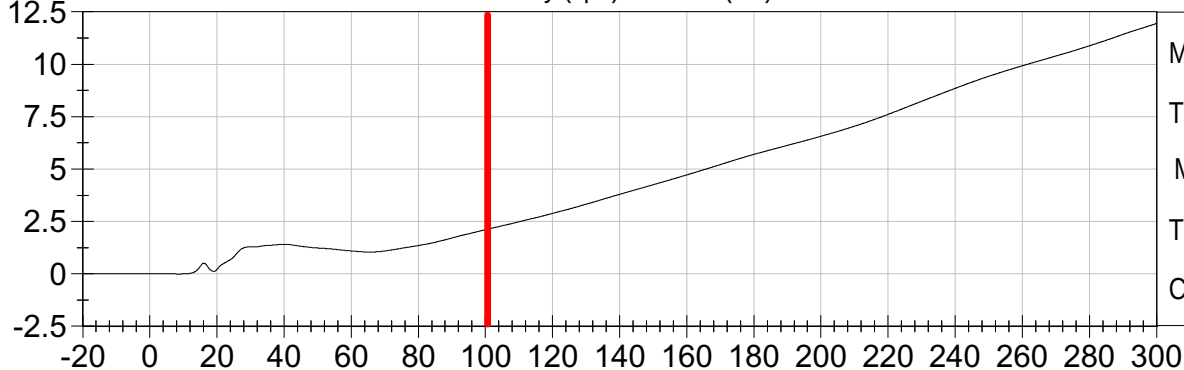
Max: 0.0 kph  
Tmax: 12.2 ms  
Min: -6.7 kph  
Tmin: 39.5 ms  
CFC 180

3YR OLD PASSENGER CHEST Y Velocity (kph) vs TIME (ms)



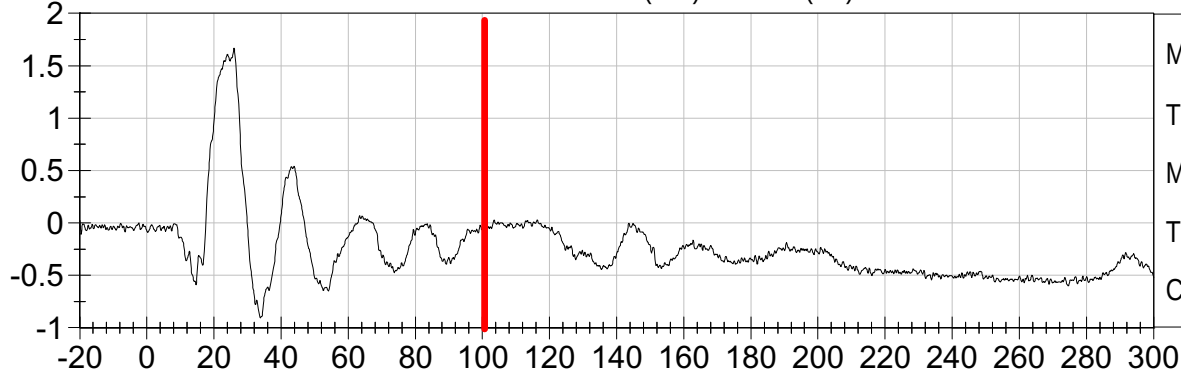
Max: 0.0 kph  
Tmax: 12.6 ms  
Min: -1.0 kph  
Tmin: 100.0 ms  
CFC 180

3YR OLD PASSENGER CHEST Z Velocity (kph) vs TIME (ms)



Max: 2.1 kph  
Tmax: 100.0 ms  
Min: -0.0 kph  
Tmin: 8.8 ms  
CFC 180

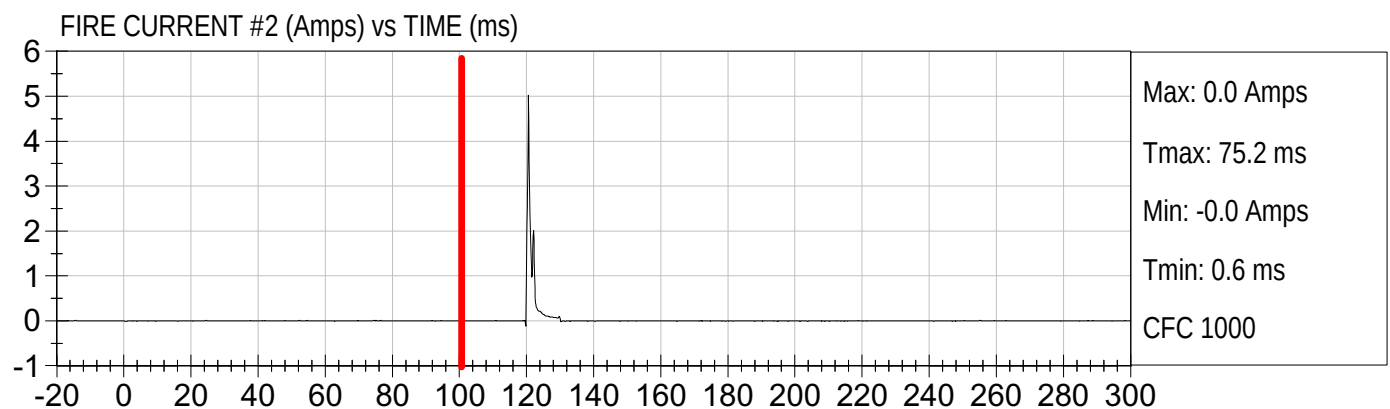
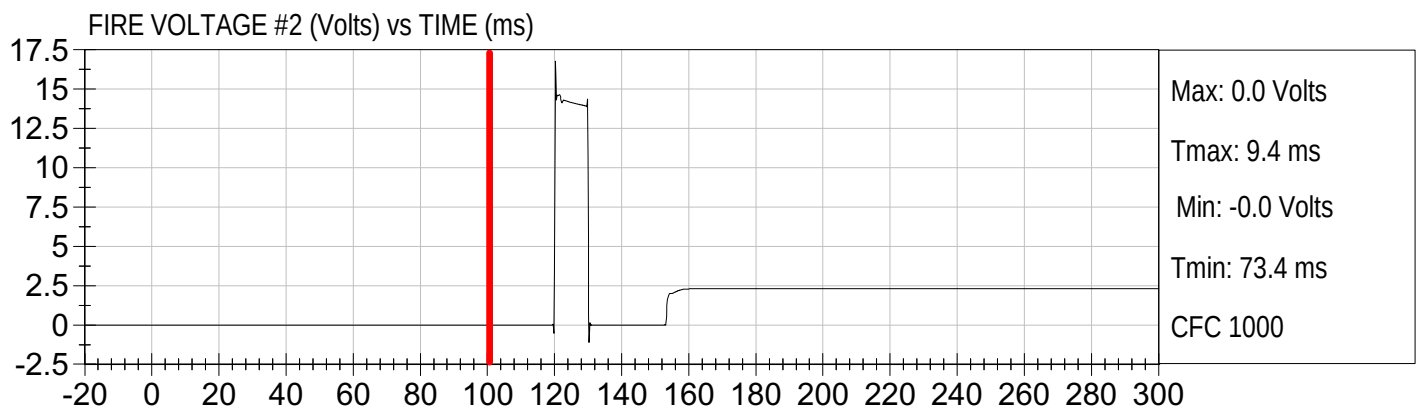
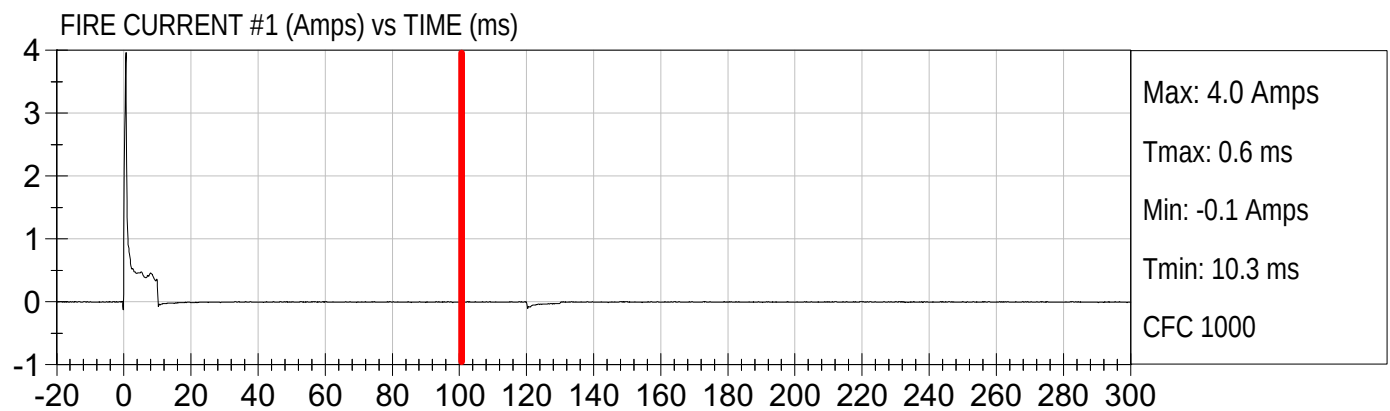
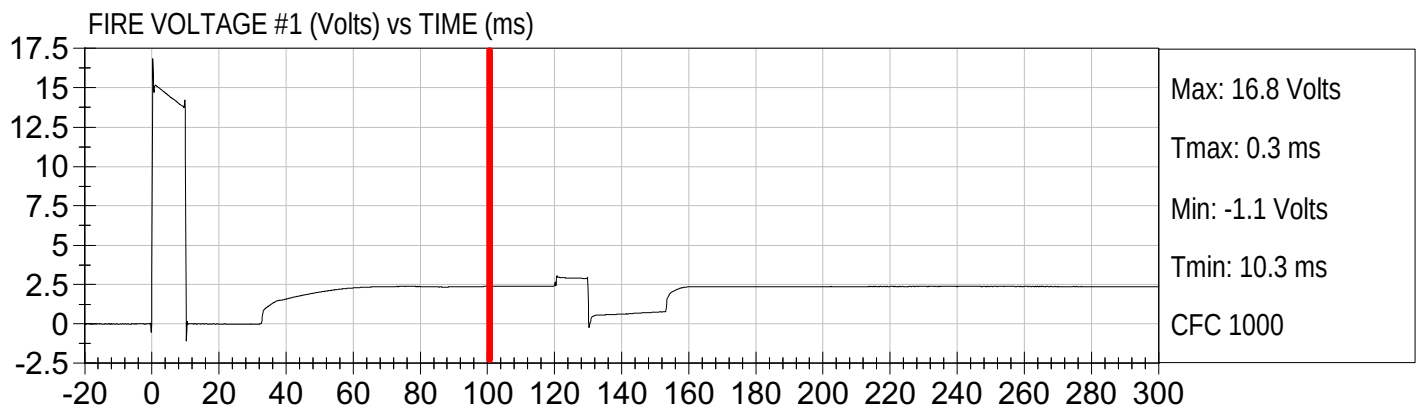
3YR OLD PASSENGER CHEST DISPLACEMENT (mm) vs TIME (ms)



Max: 1.7 mm  
Tmax: 26.0 ms  
Min: -0.9 mm  
Tmin: 33.8 ms  
CFC 600

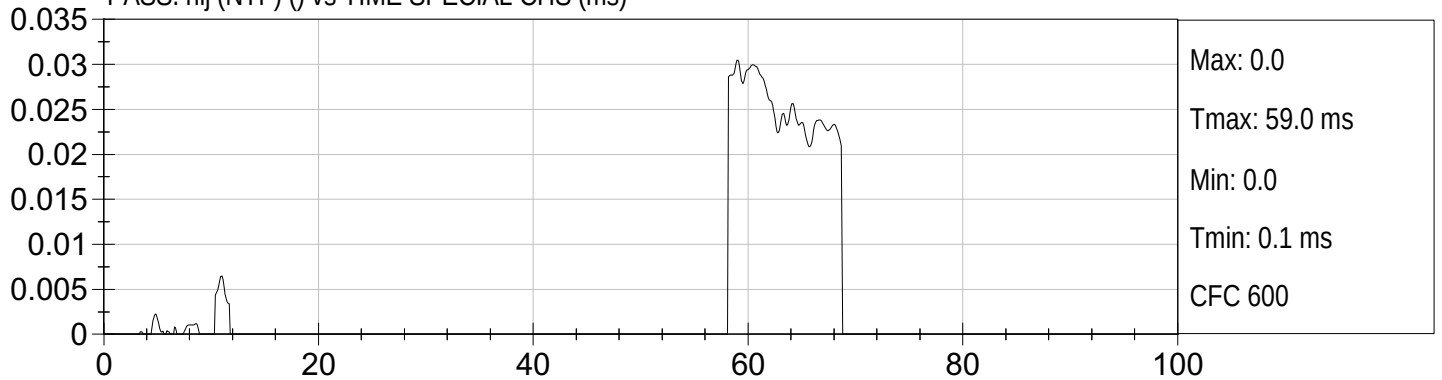


Injury Values Calculated between 0ms and 100ms

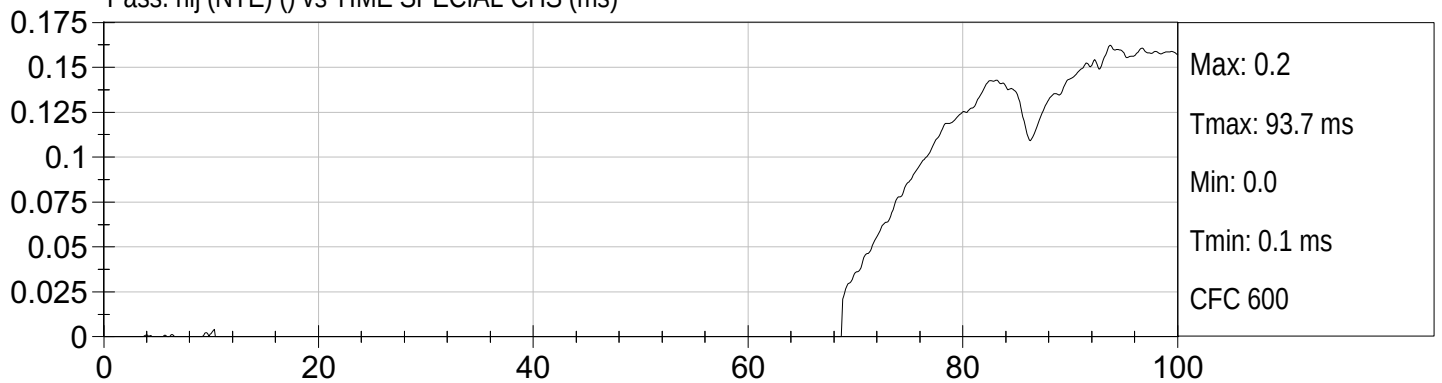




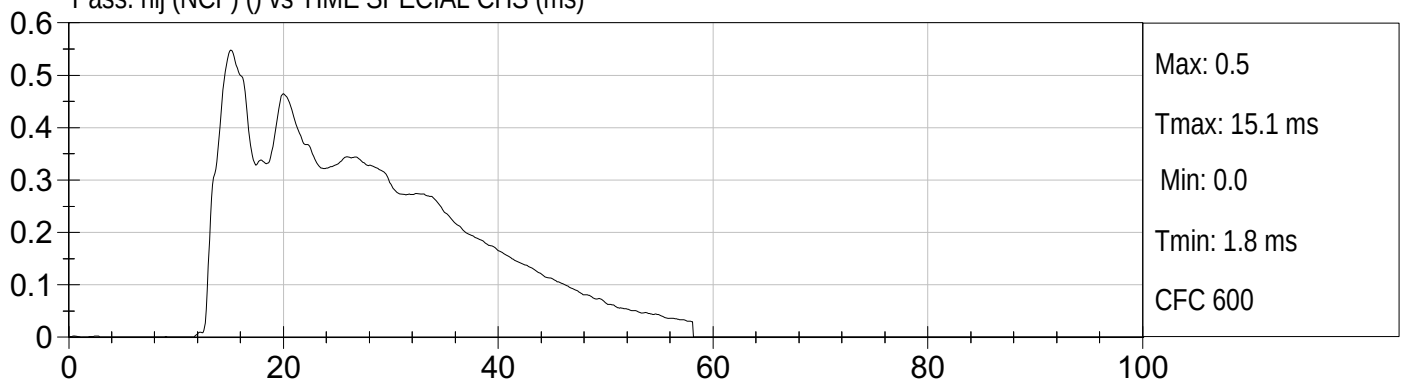
PASS. nij (NTF) () vs TIME SPECIAL CHS (ms)



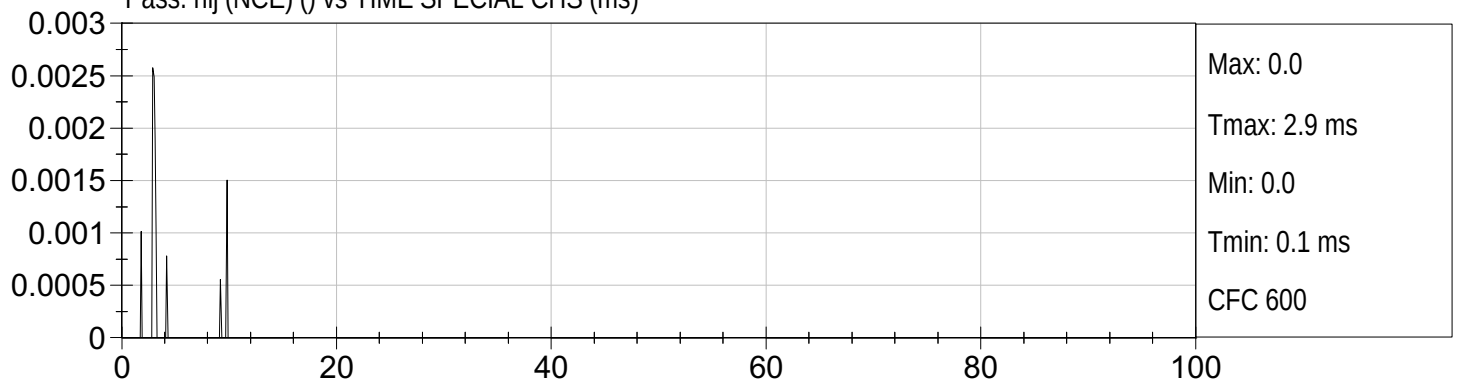
Pass. nij (NTE) () vs TIME SPECIAL CHS (ms)



Pass. nij (NCF) () vs TIME SPECIAL CHS (ms)

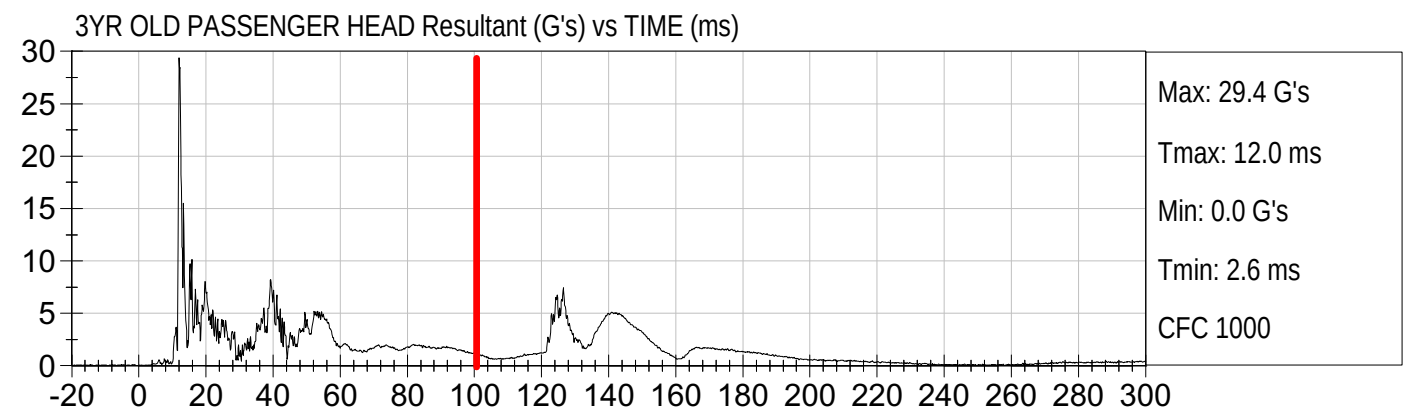
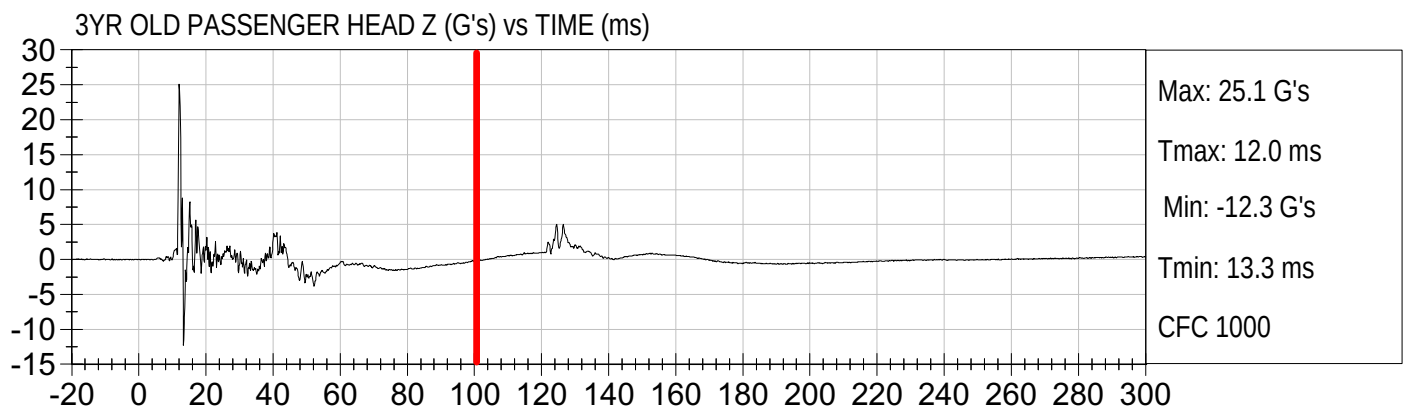
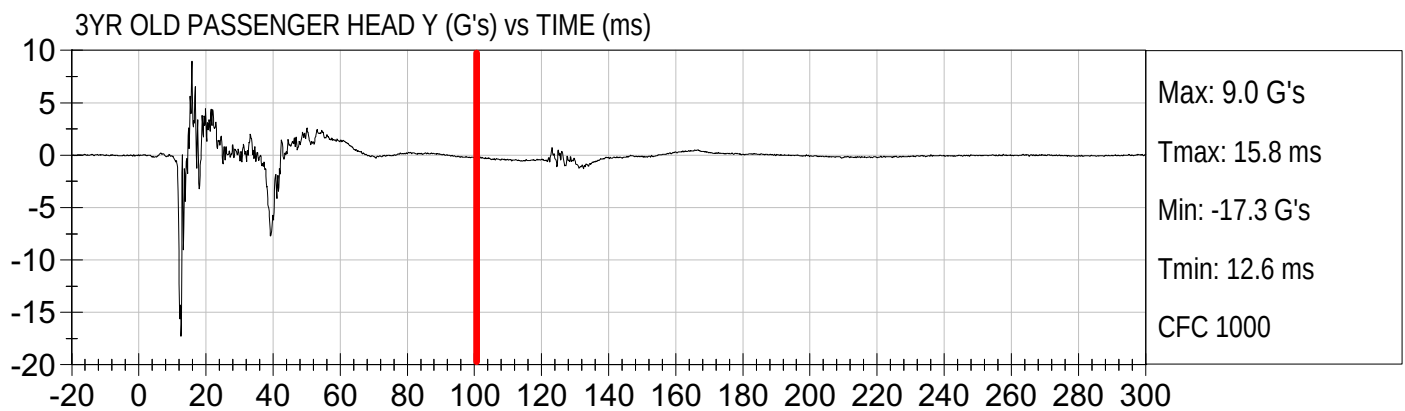
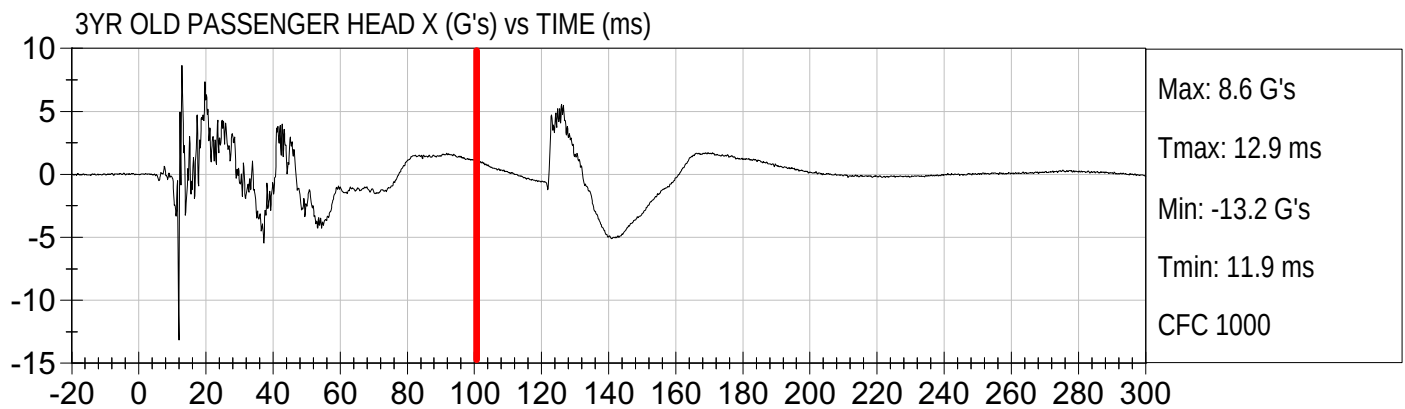


Pass. nij (NCE) () vs TIME SPECIAL CHS (ms)



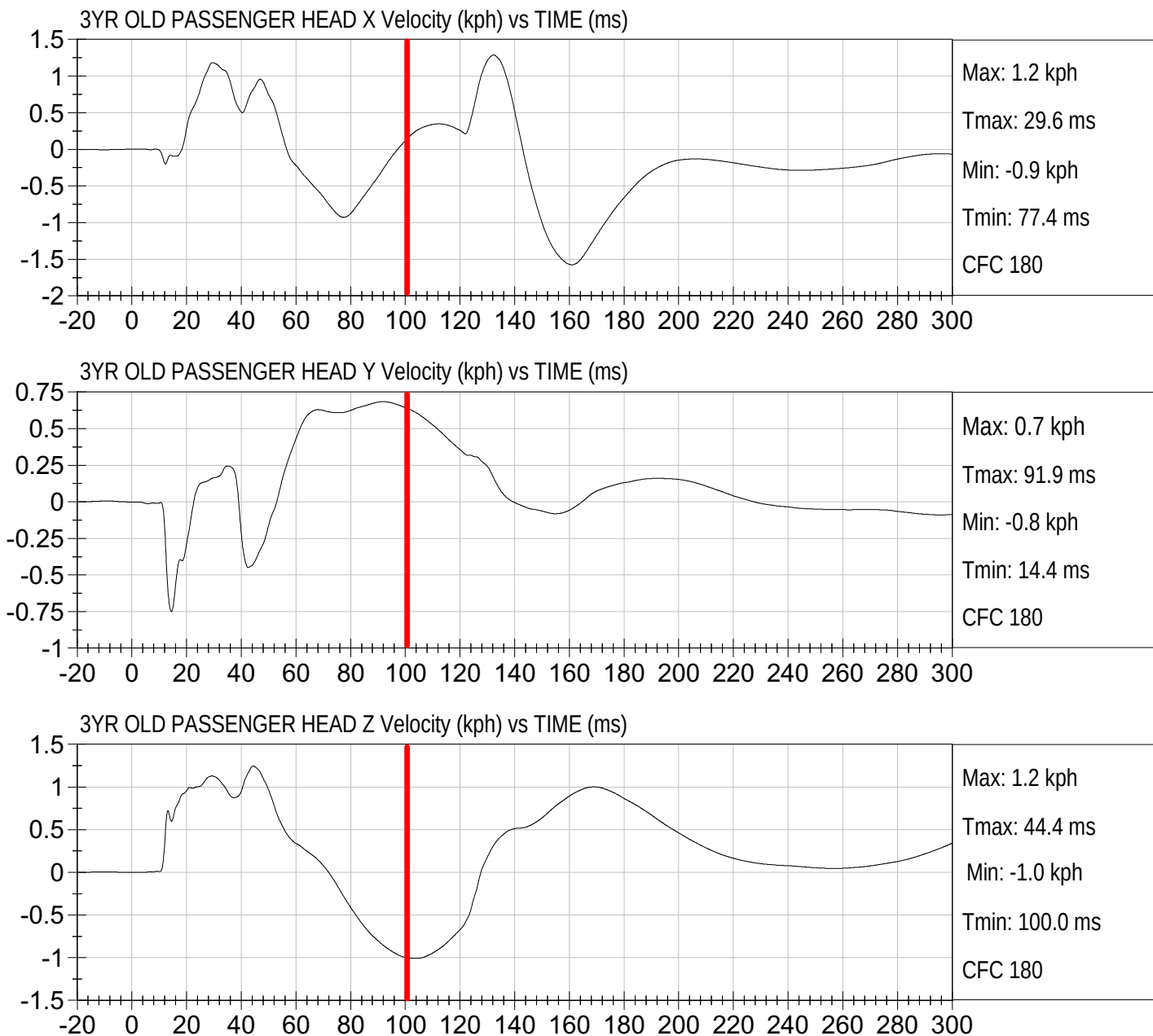


Injury Values Calculated between 0ms and 100ms





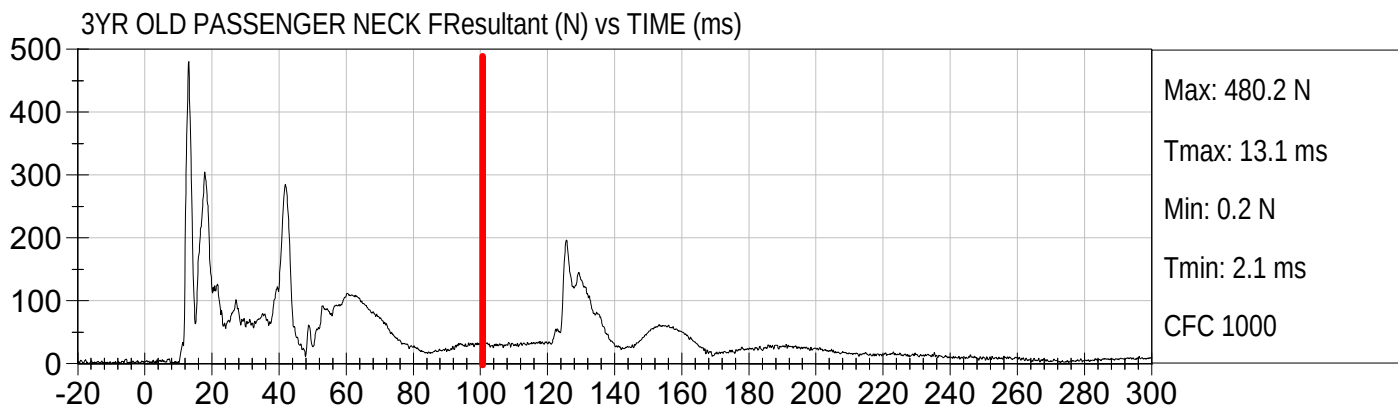
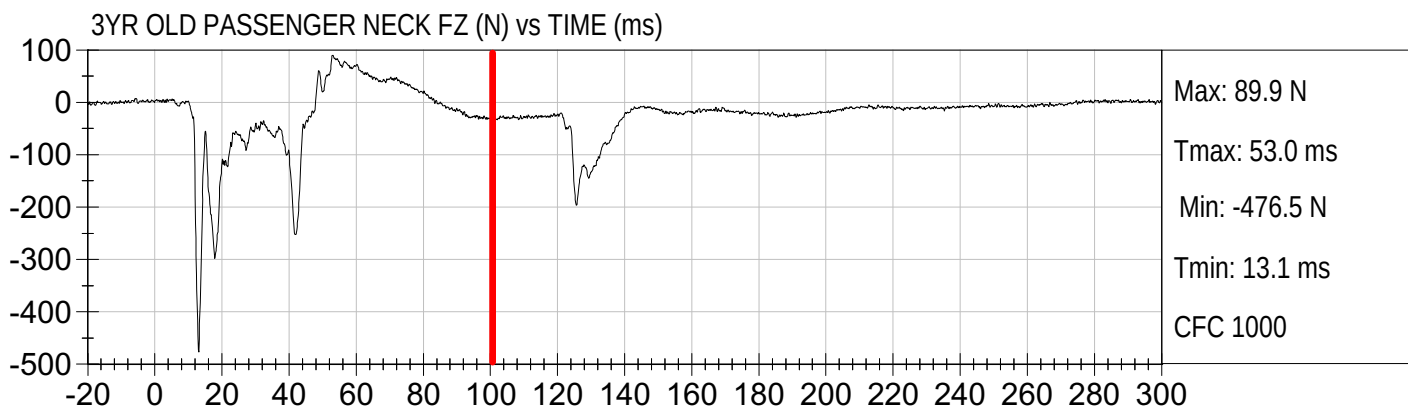
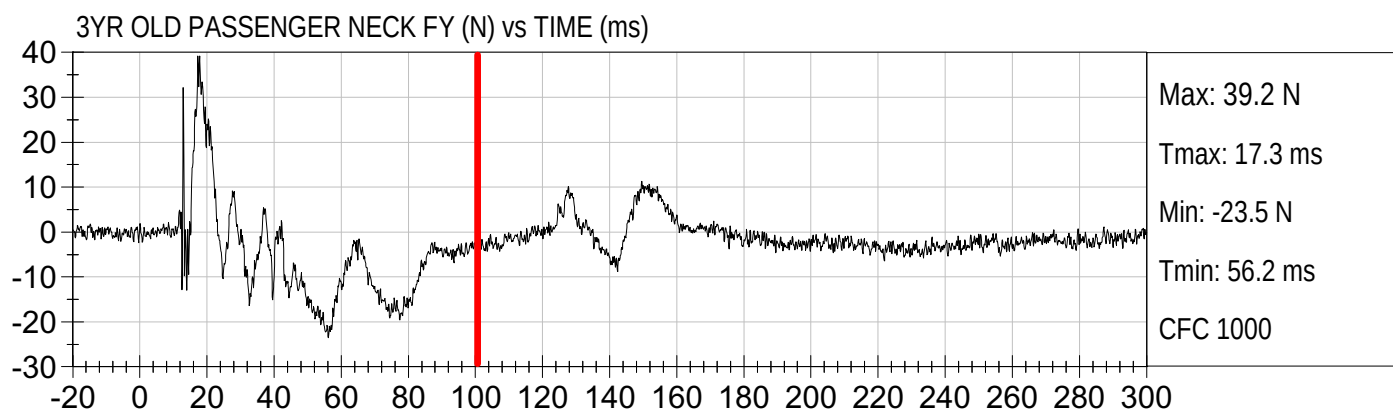
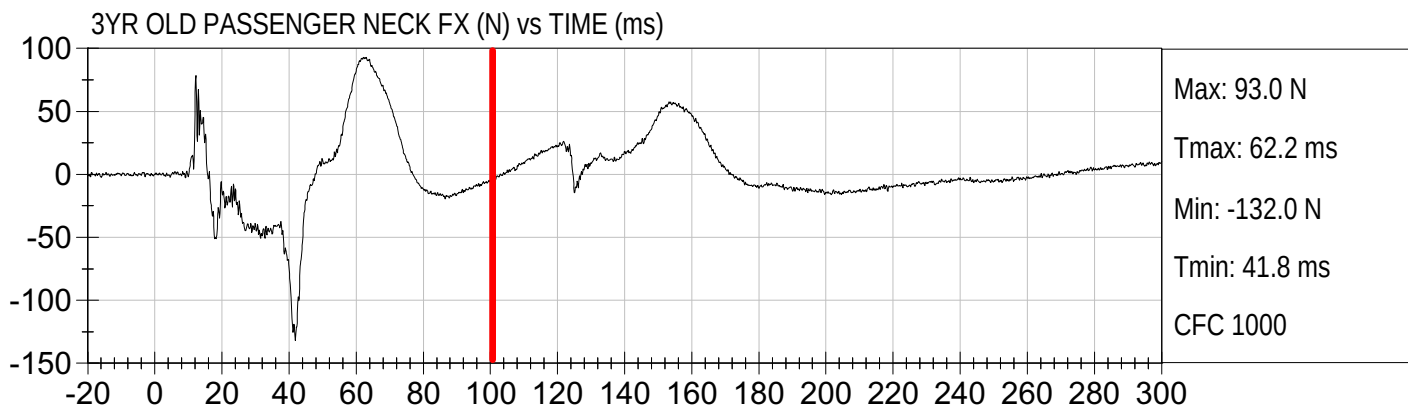
Injury Values Calculated between 0ms and 100ms







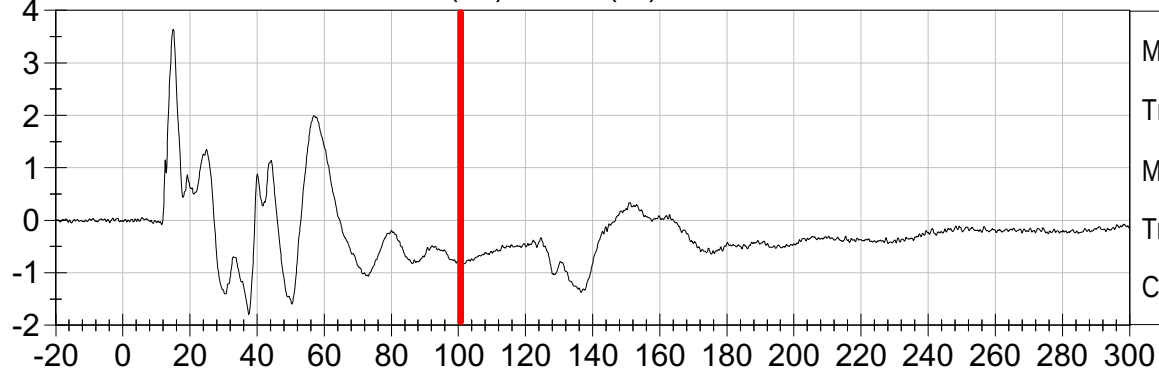
Injury Values Calculated between 0ms and 100ms





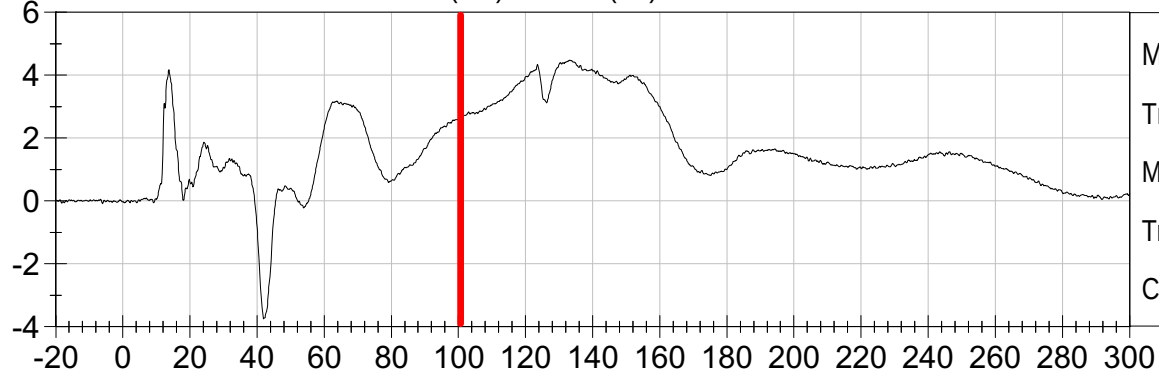
Injury Values Calculated between 0ms and 100ms

3YR OLD PASSENGER NECK MX (Nm) vs TIME (ms)



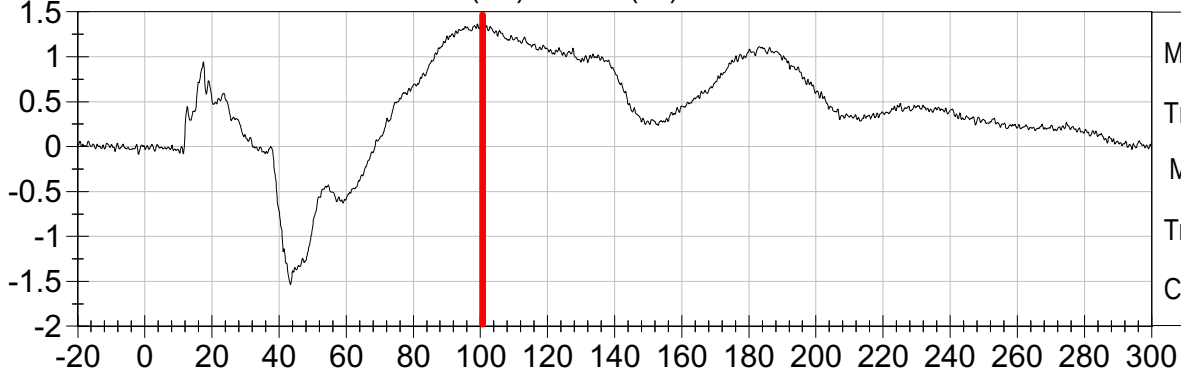
Max: 3.6 Nm  
Tmax: 15.0 ms  
Min: -1.8 Nm  
Tmin: 37.5 ms  
CFC 600

3YR OLD PASSENGER NECK MY (Nm) vs TIME (ms)



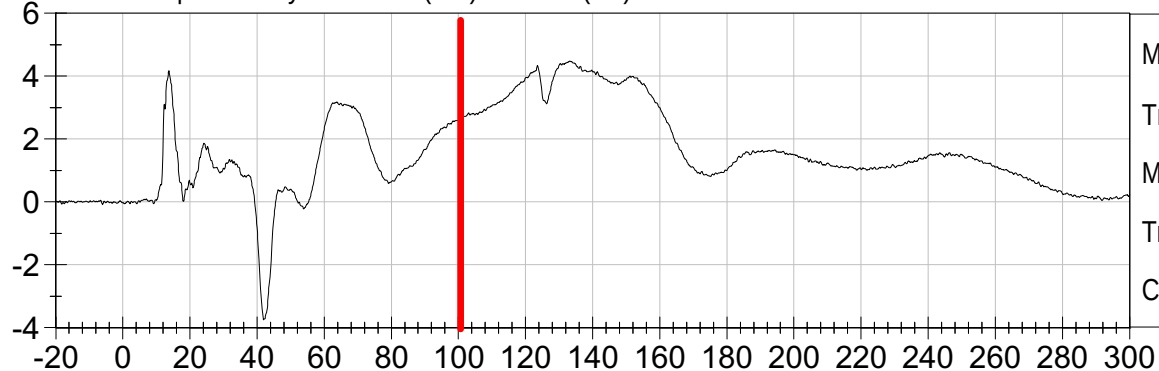
Max: 4.2 Nm  
Tmax: 13.7 ms  
Min: -3.7 Nm  
Tmin: 41.9 ms  
CFC 600

3YR OLD PASSENGER NECK MZ (Nm) vs TIME (ms)



Max: 1.4 Nm  
Tmax: 99.1 ms  
Min: -1.5 Nm  
Tmin: 43.4 ms  
CFC 600

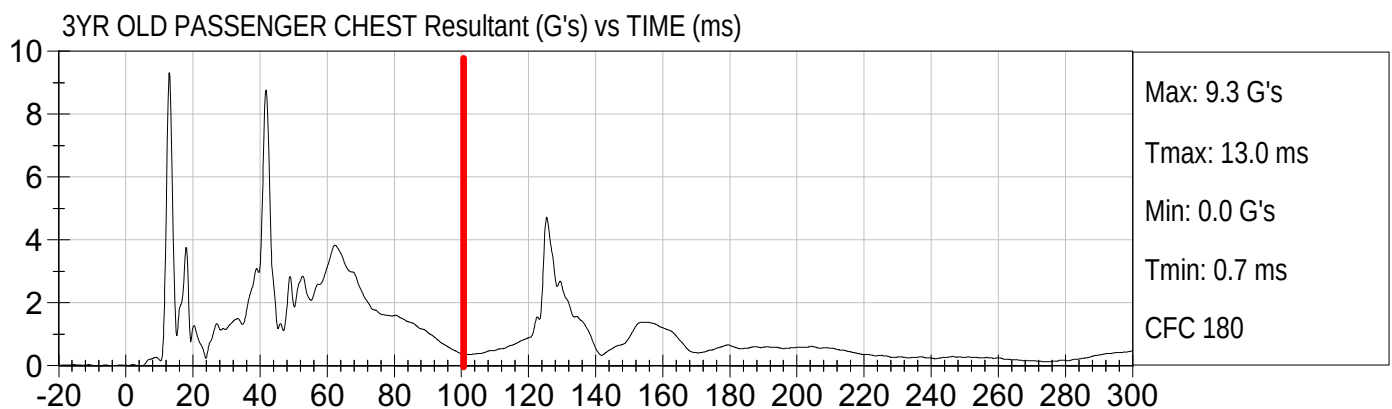
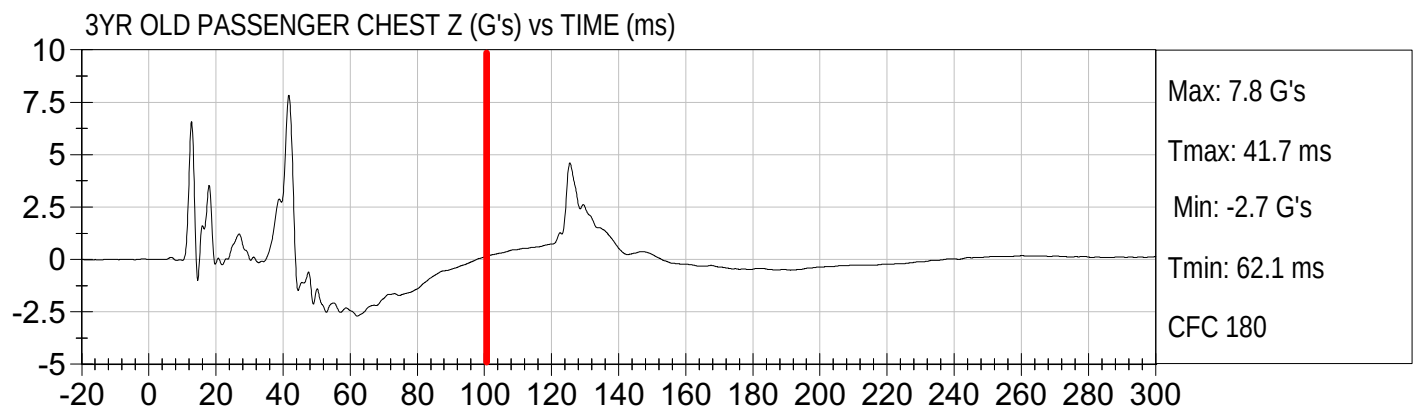
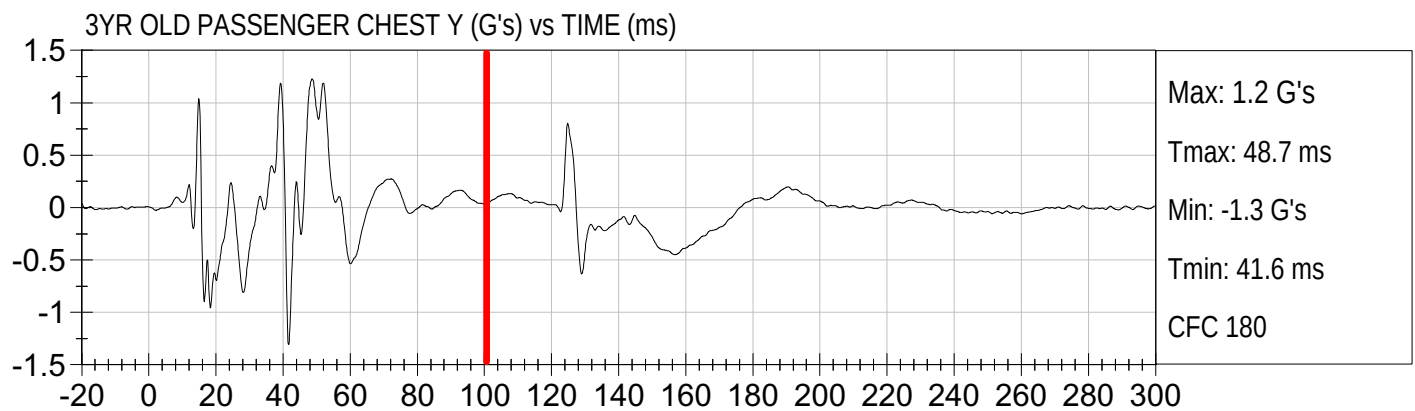
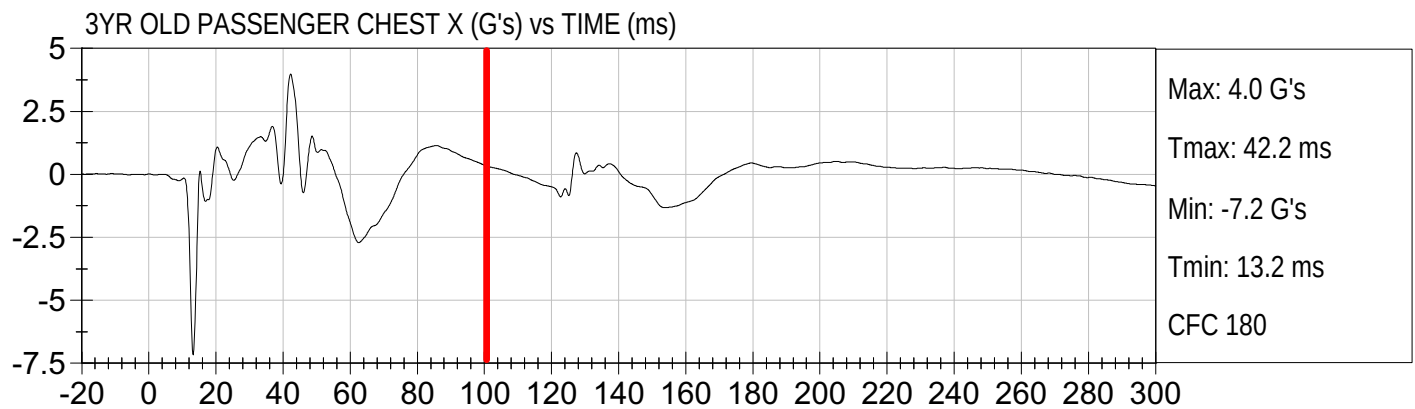
Pass. Occipital Condyle Moment (Nm) vs TIME (ms)



Max: 4.2 Nm  
Tmax: 13.7 ms  
Min: -3.7 Nm  
Tmin: 41.9 ms  
CFC 600

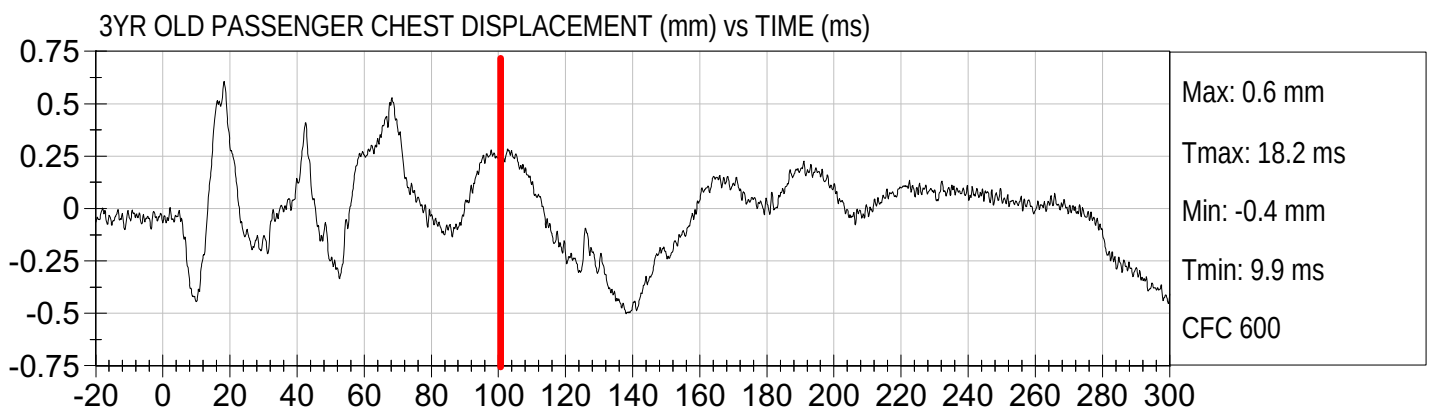
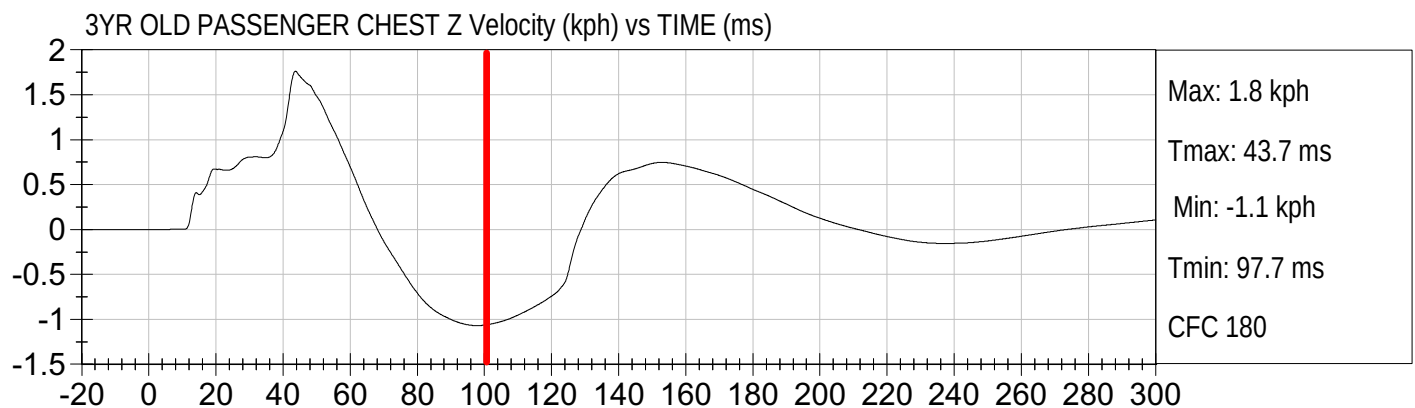
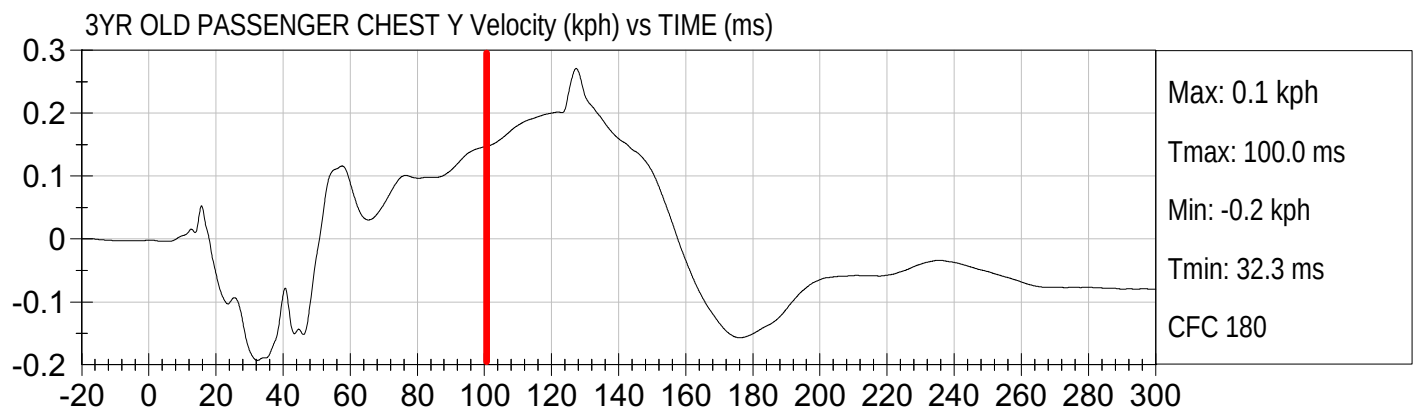
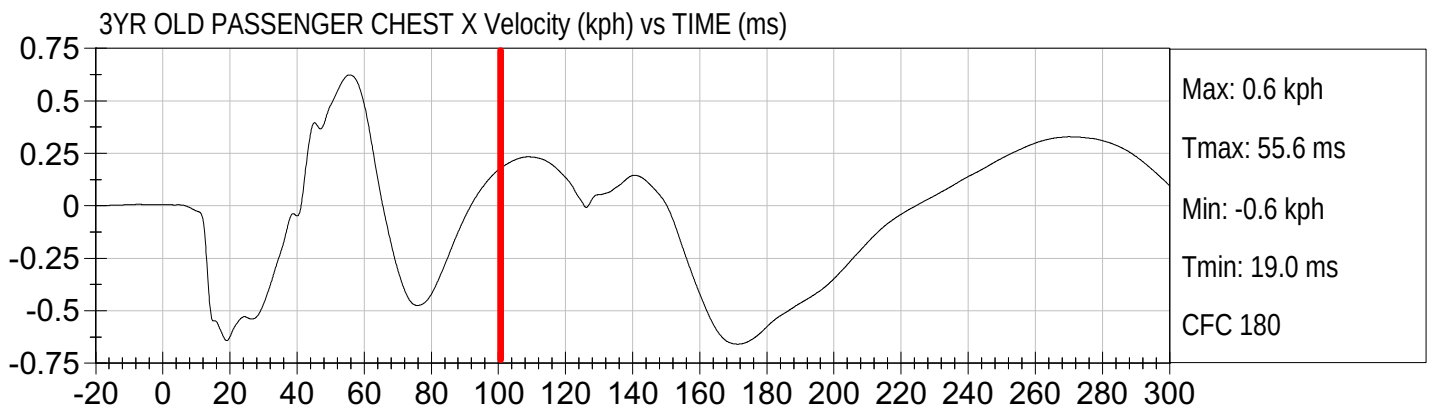


Injury Values Calculated between 0ms and 100ms





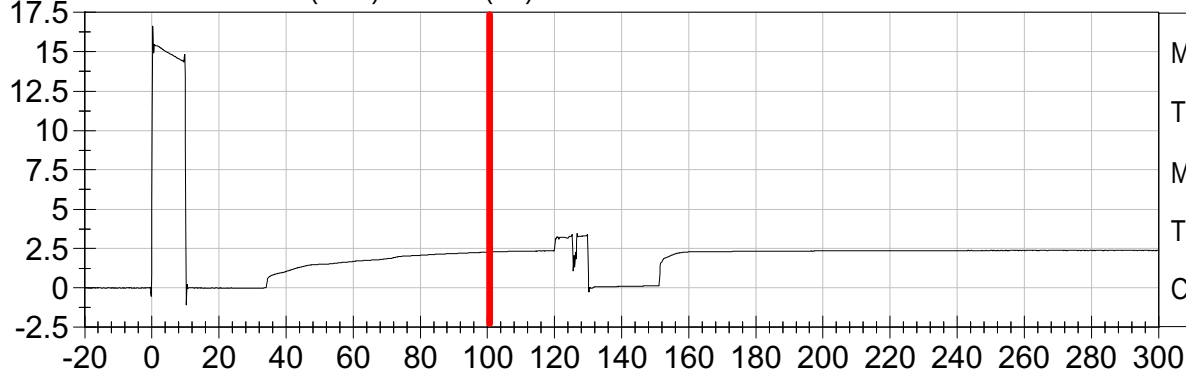
Injury Values Calculated between 0ms and 100ms



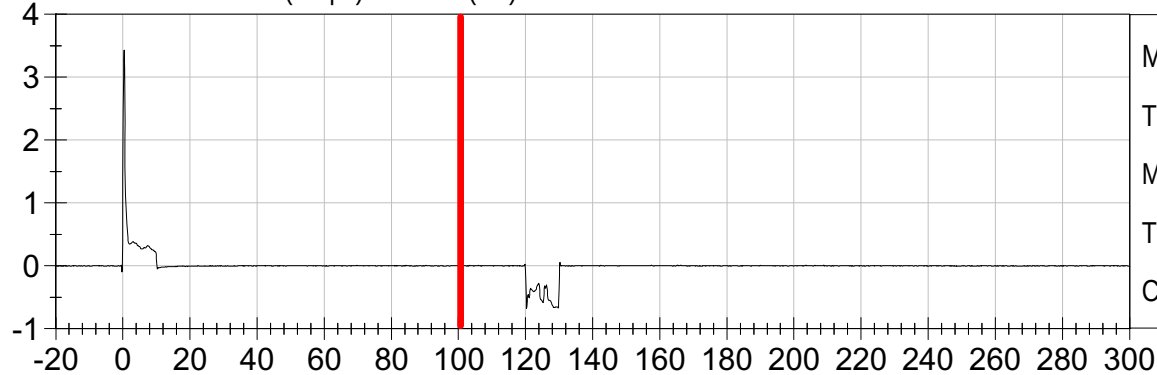


Injury Values Calculated between 0ms and 100ms

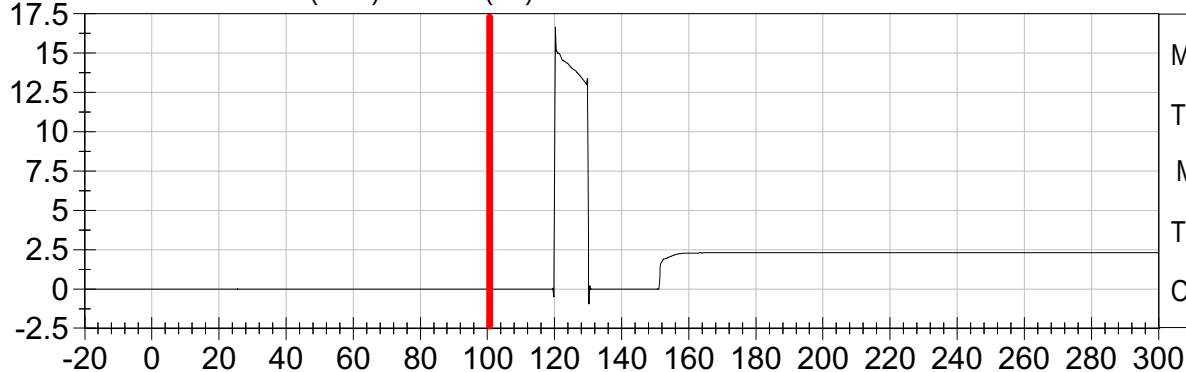
FIRE VOLTAGE #1 (Volts) vs TIME (ms)



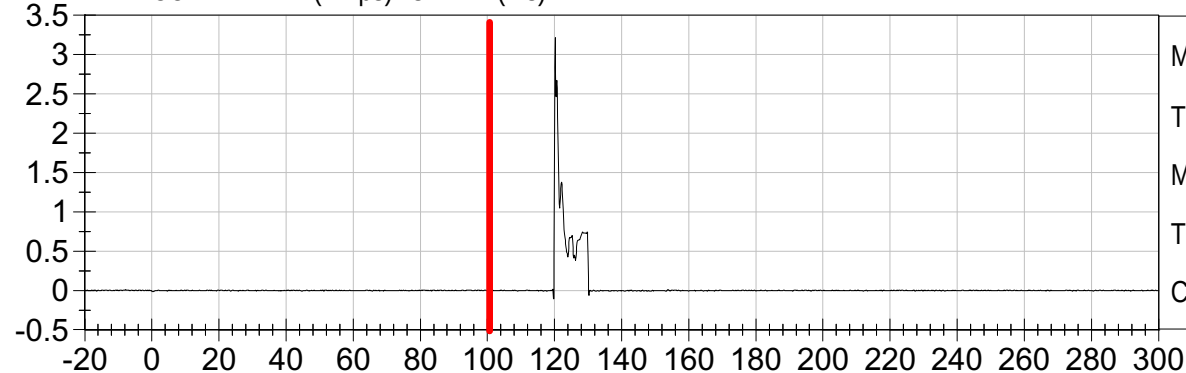
FIRE CURRENT #1 (Amps) vs TIME (ms)

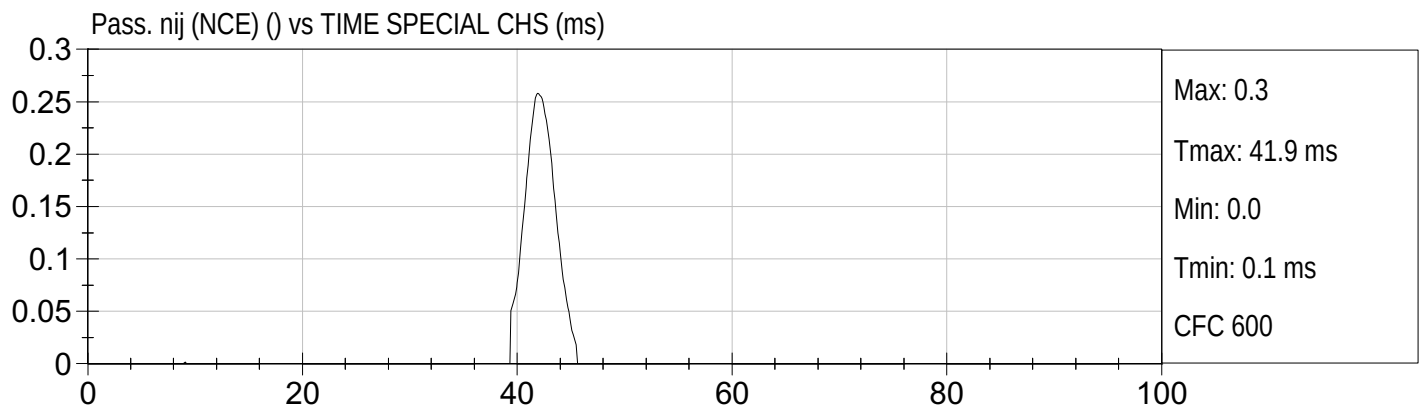
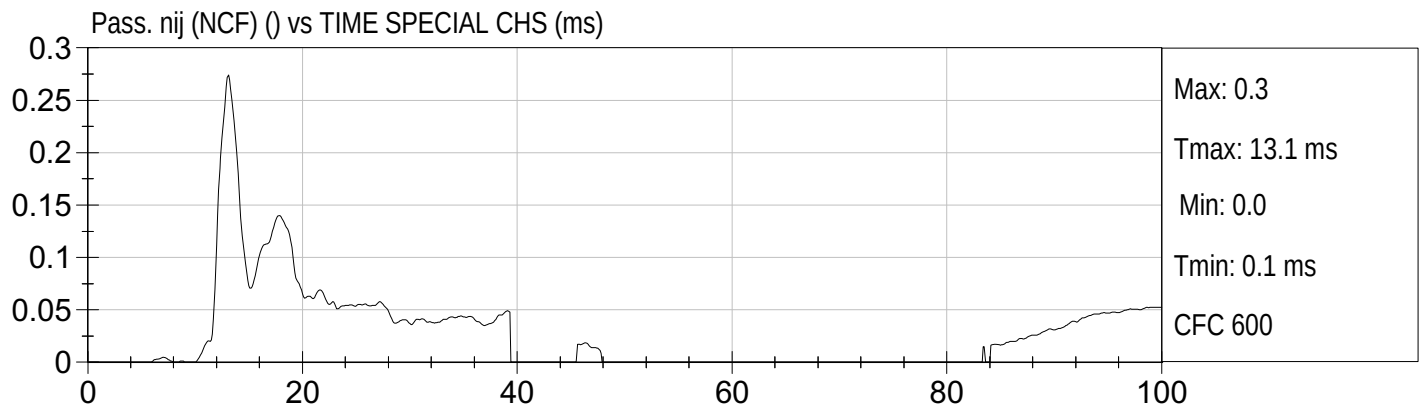
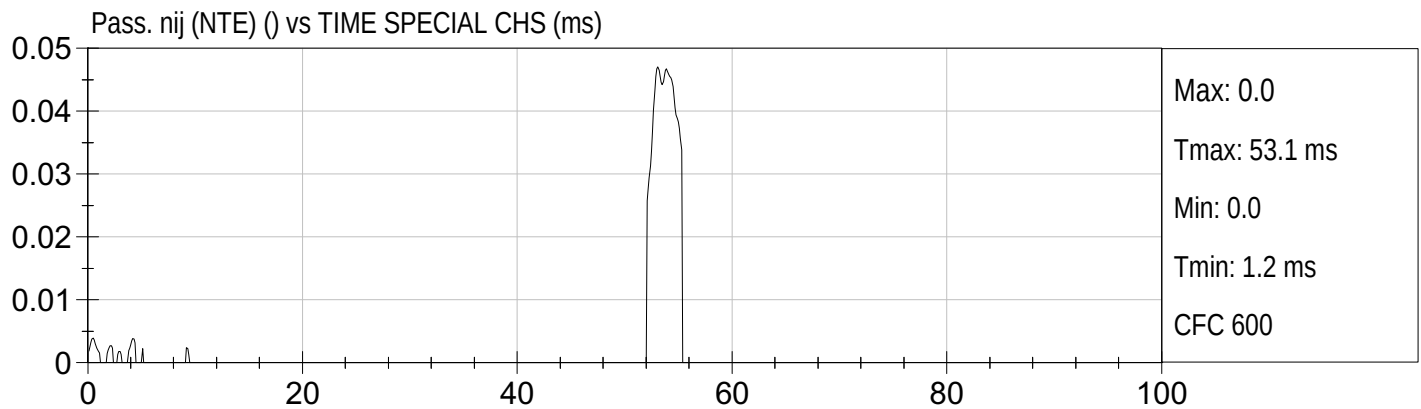
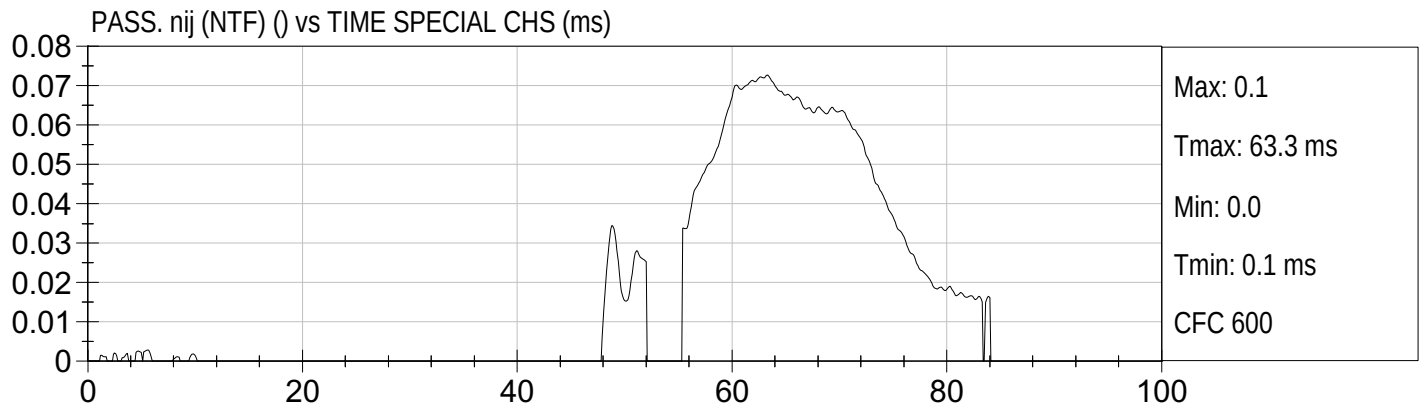


FIRE VOLTAGE #2 (Volts) vs TIME (ms)



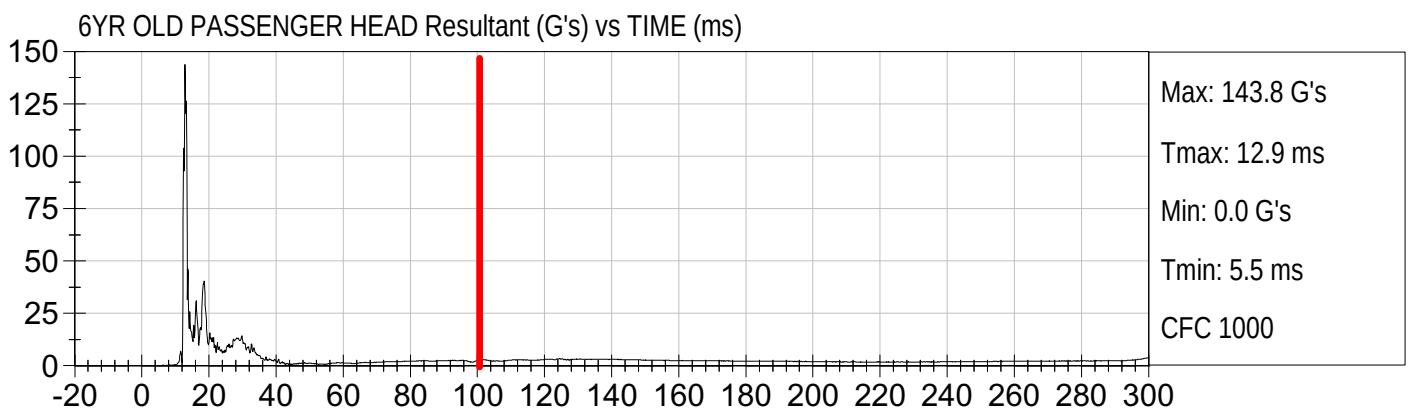
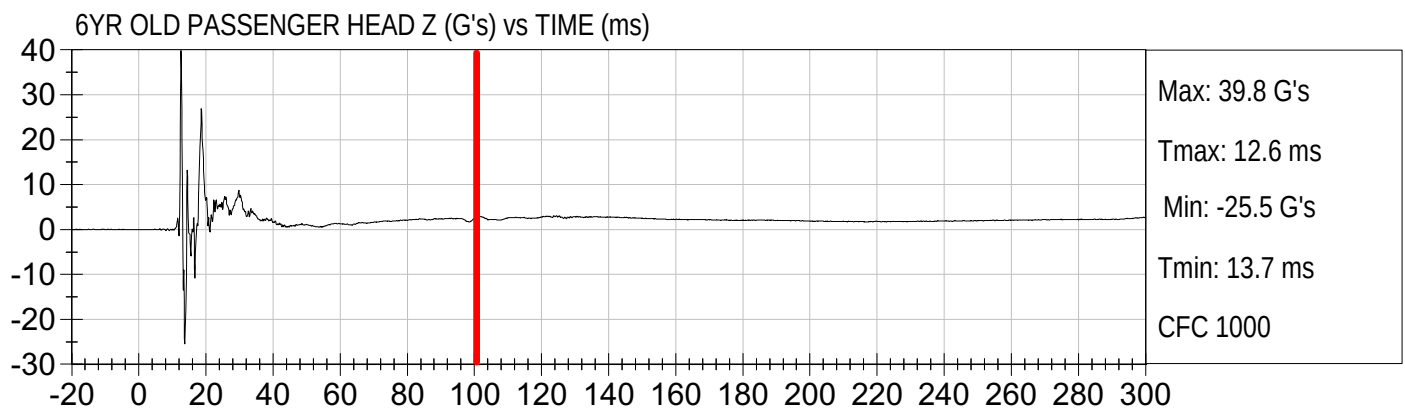
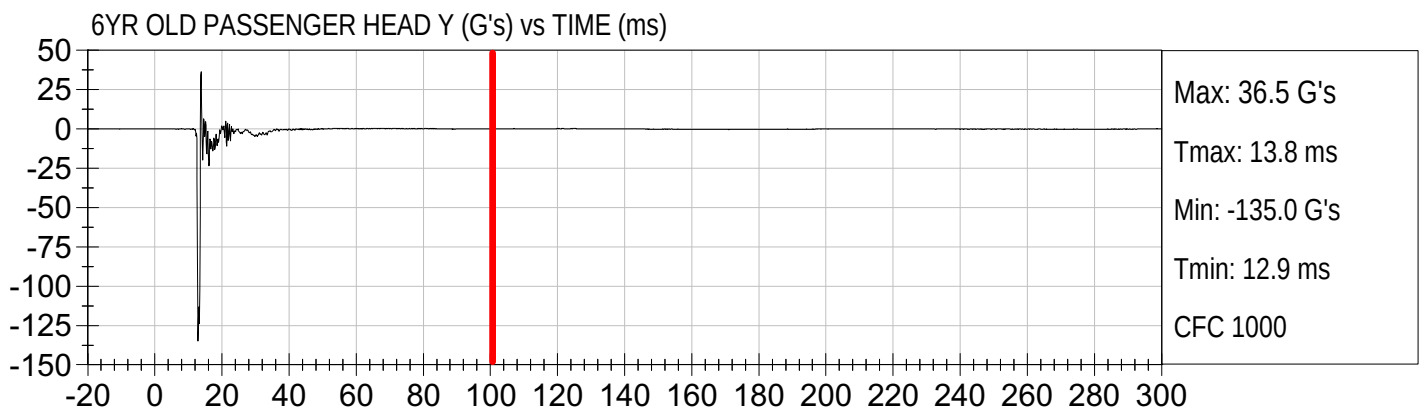
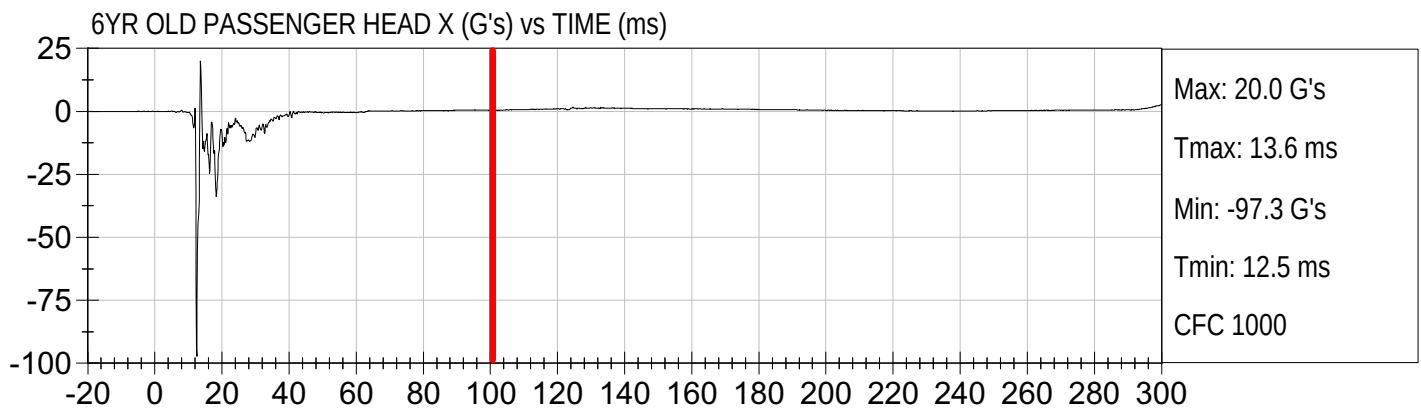
FIRE CURRENT #2 (Amps) vs TIME (ms)





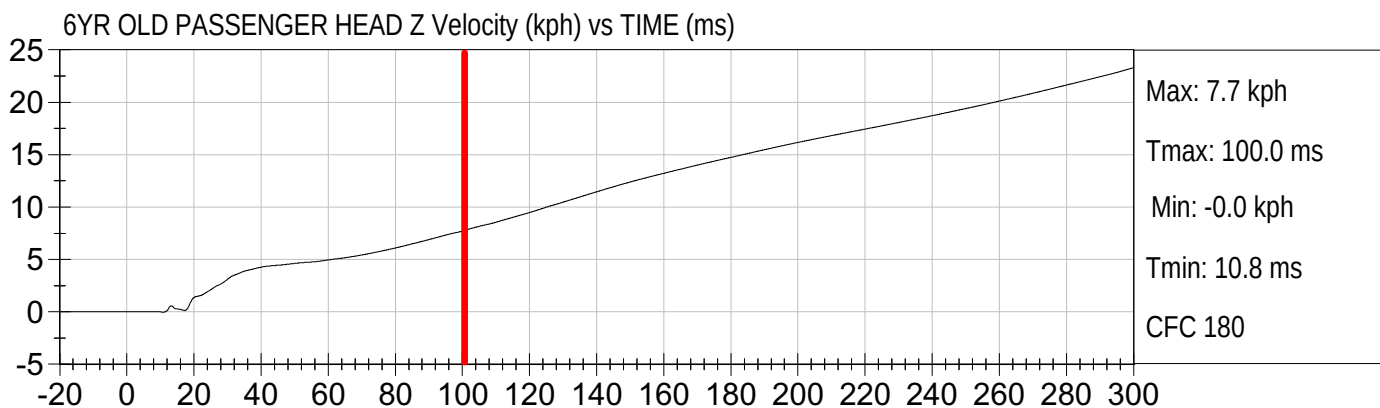
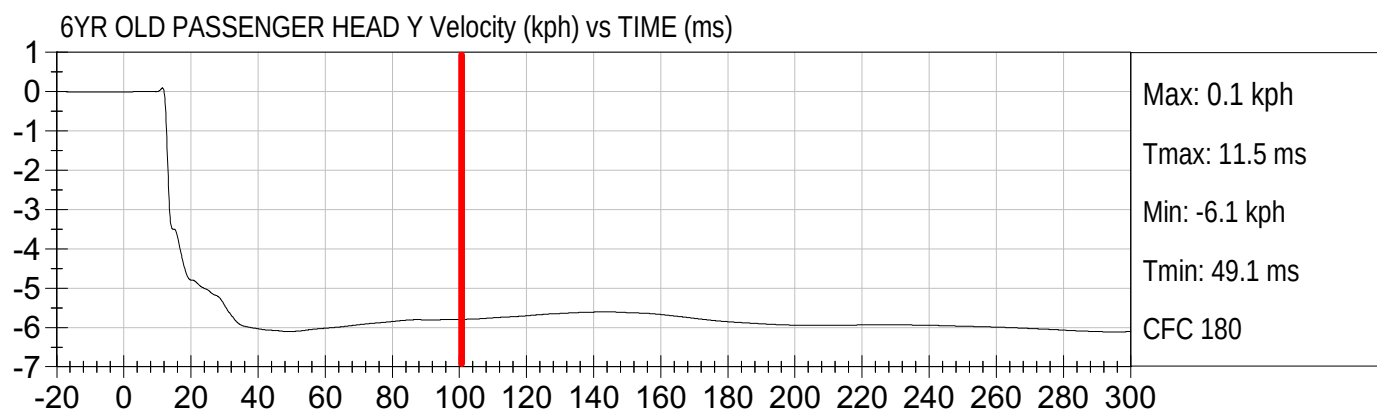
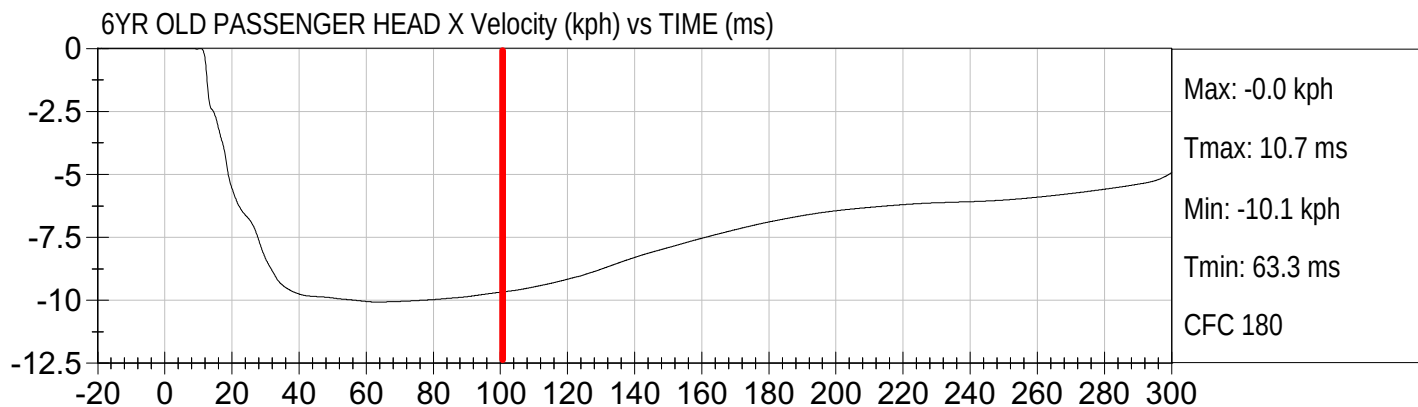


Injury Values Calculated between 0ms and 100ms





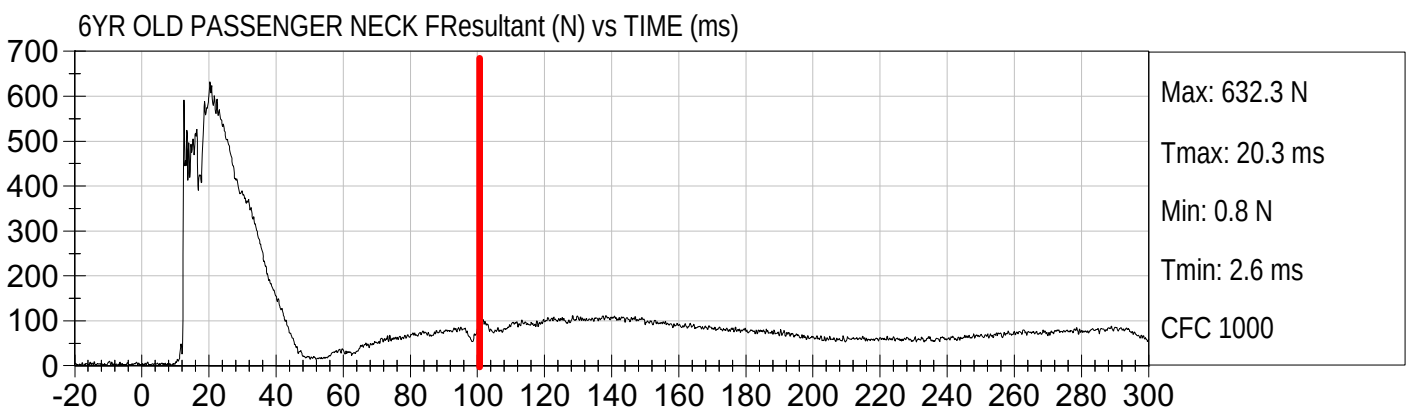
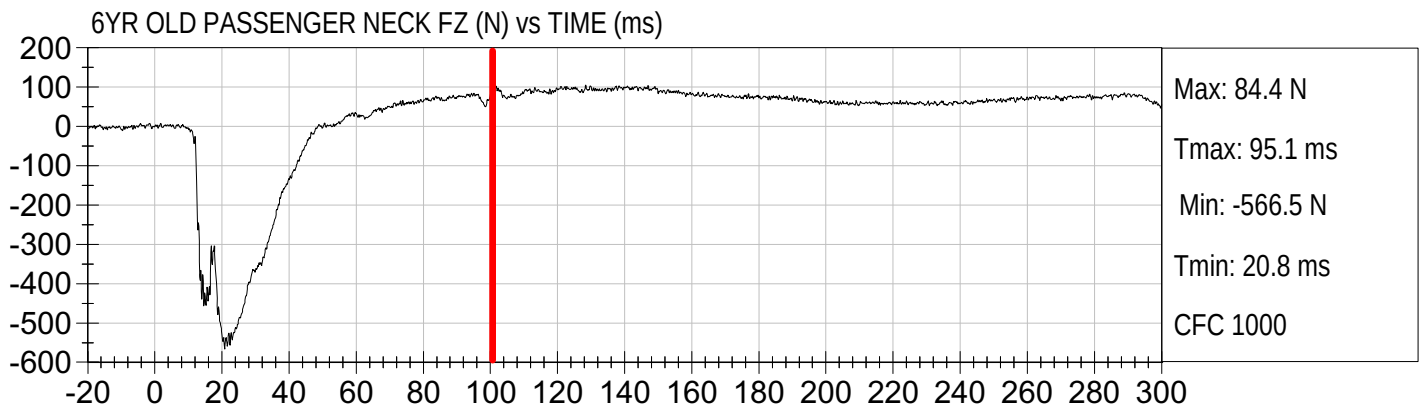
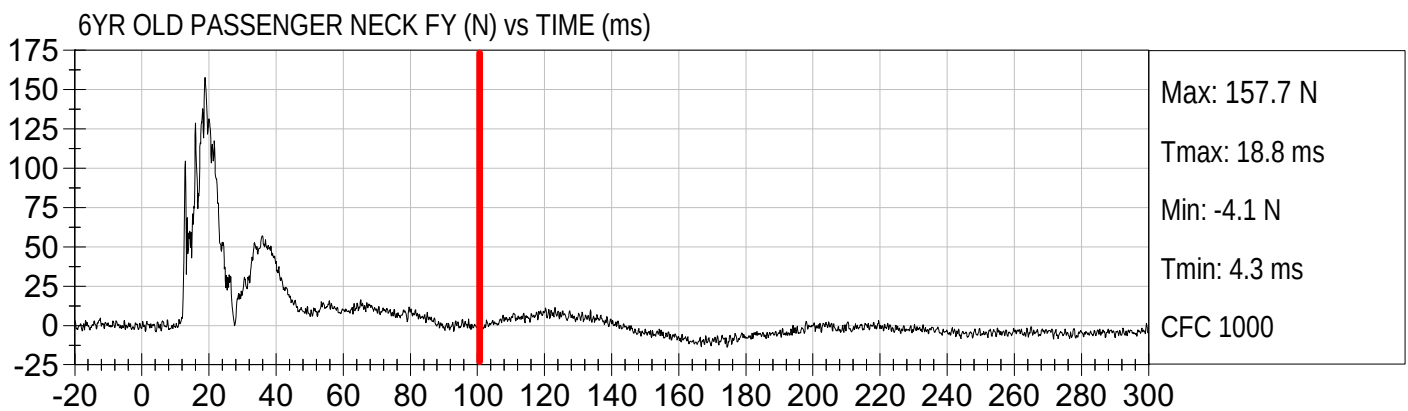
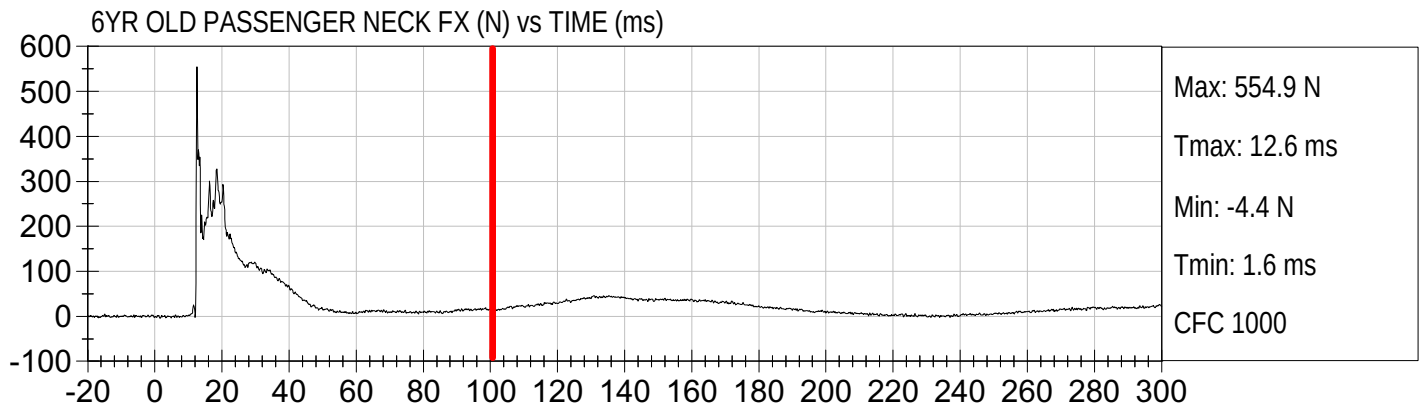
Injury Values Calculated between 0ms and 100ms





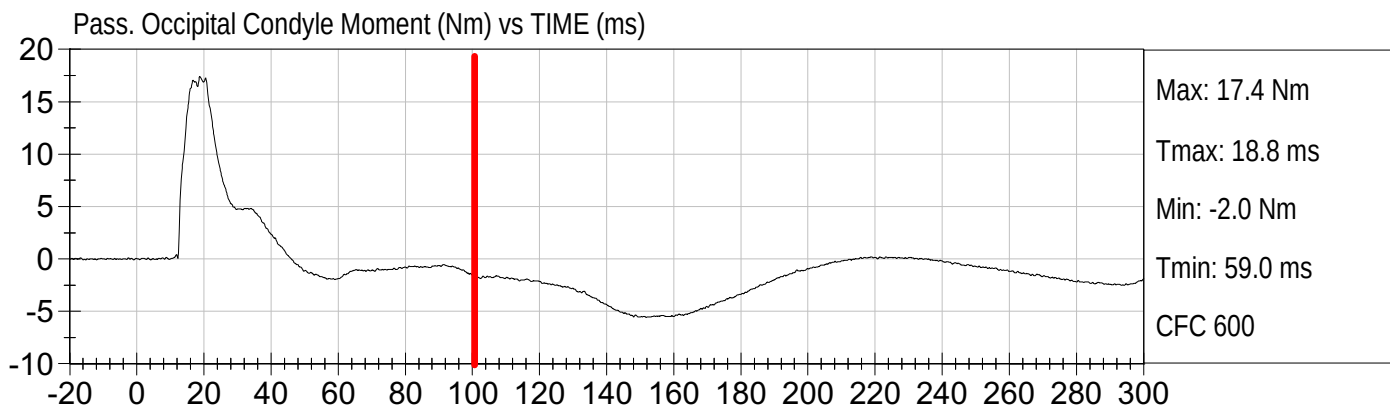
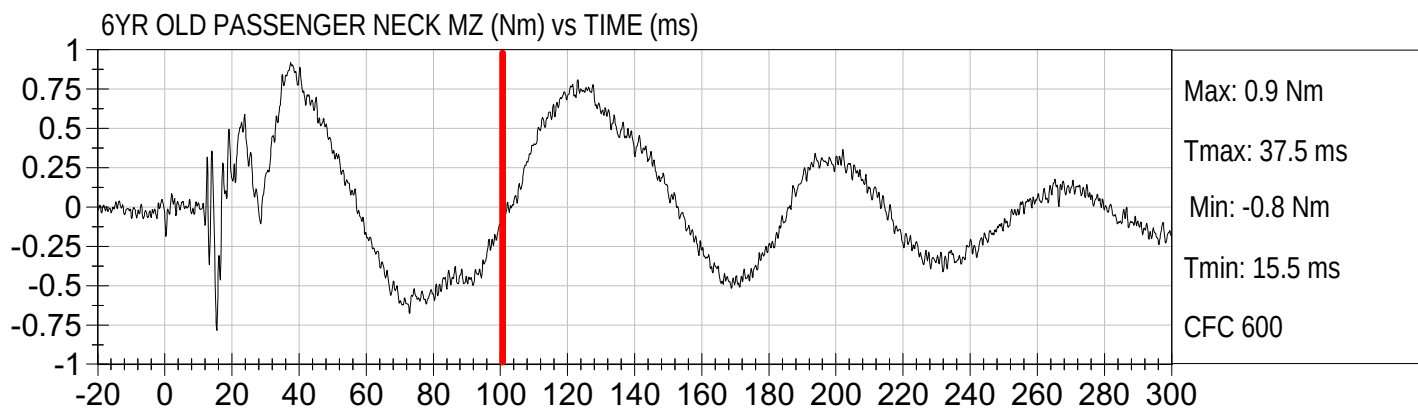
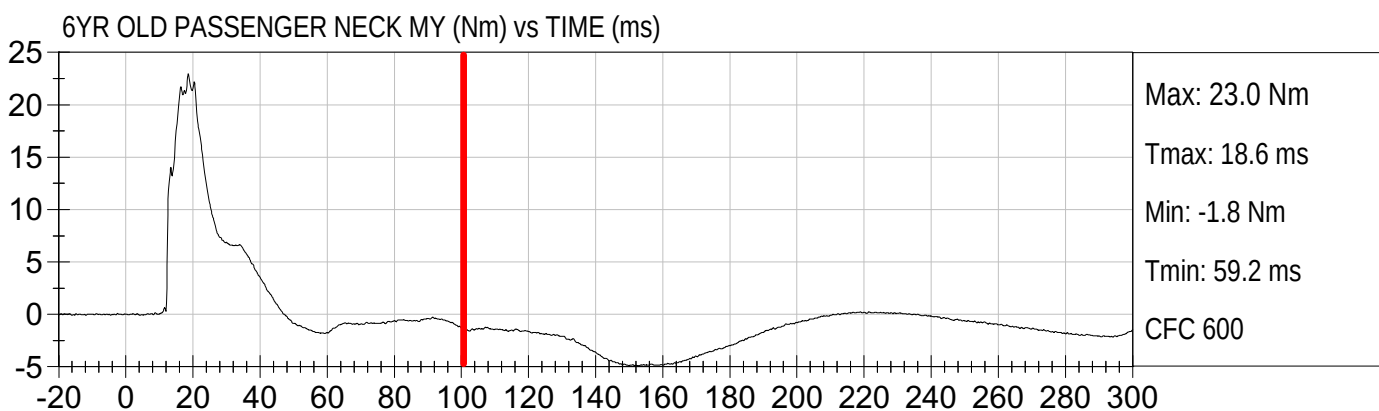
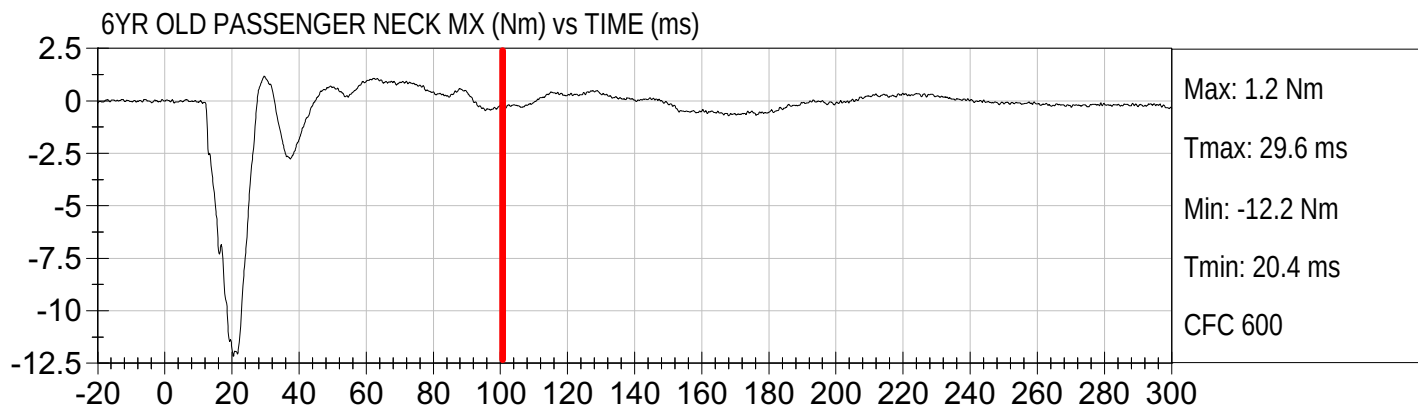


Injury Values Calculated between 0ms and 100ms



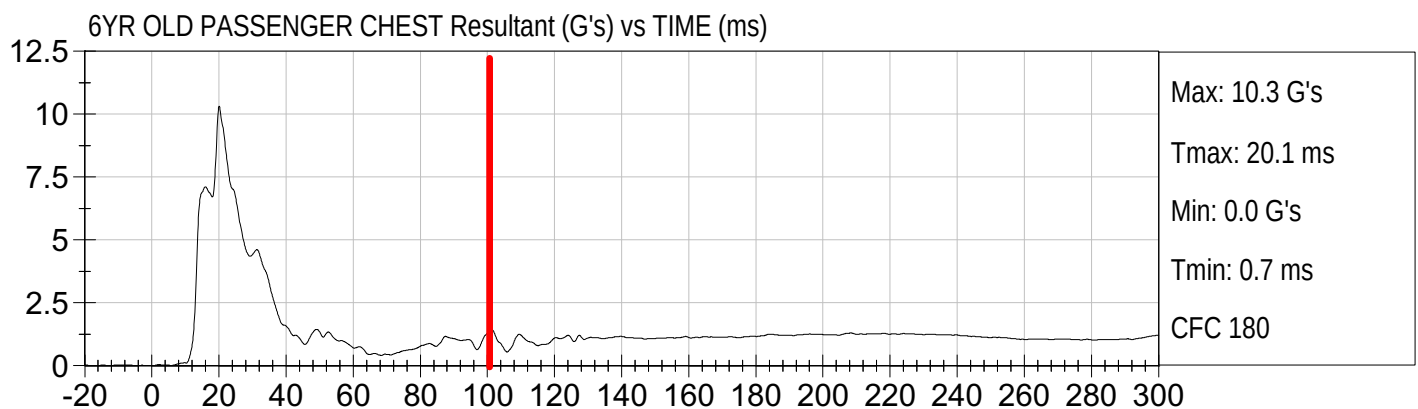
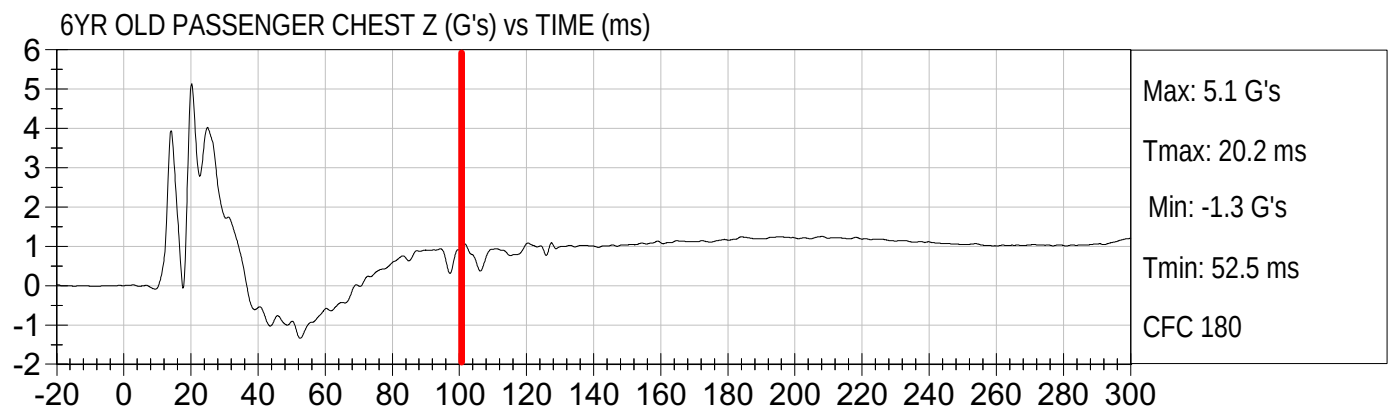
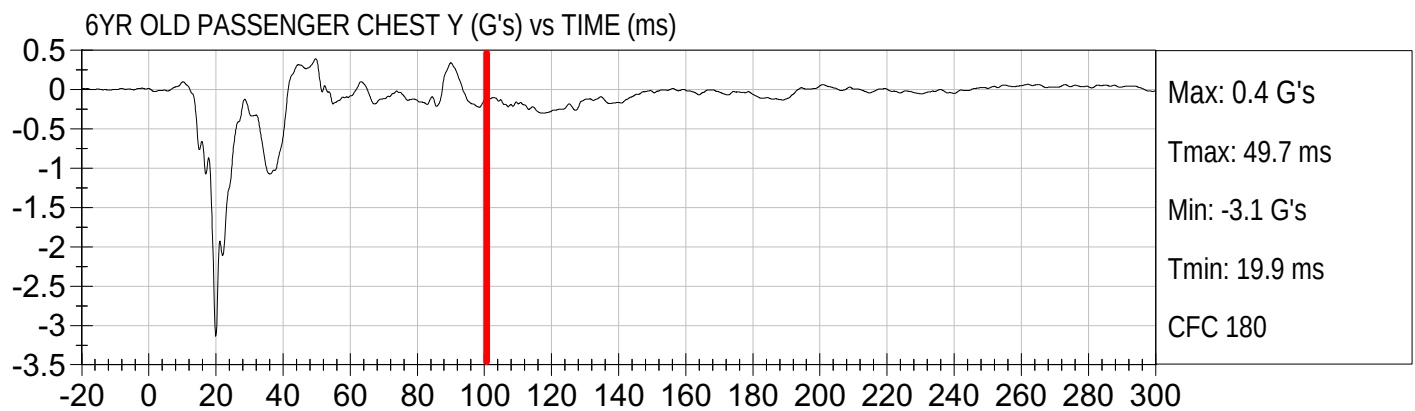
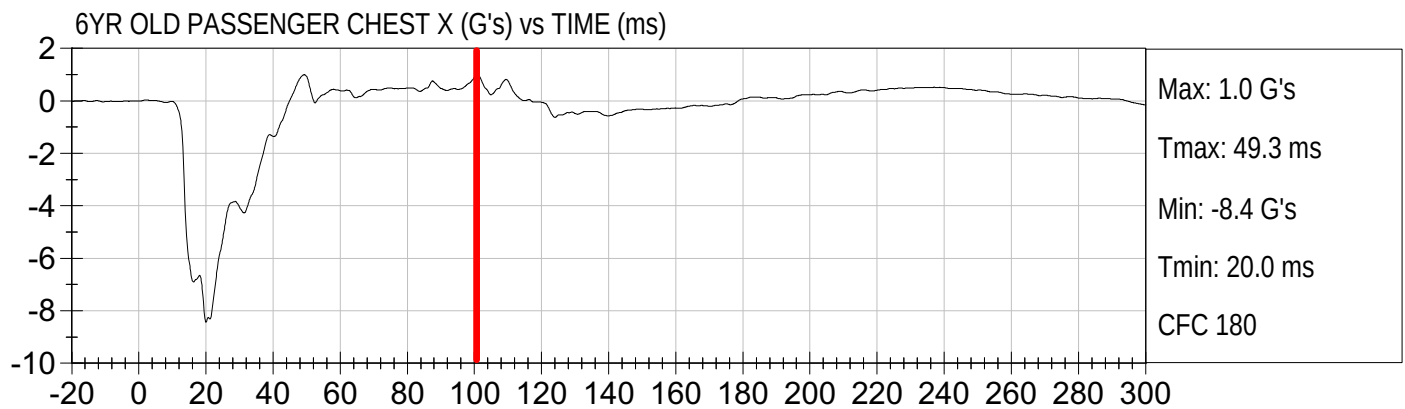


Injury Values Calculated between 0ms and 100ms





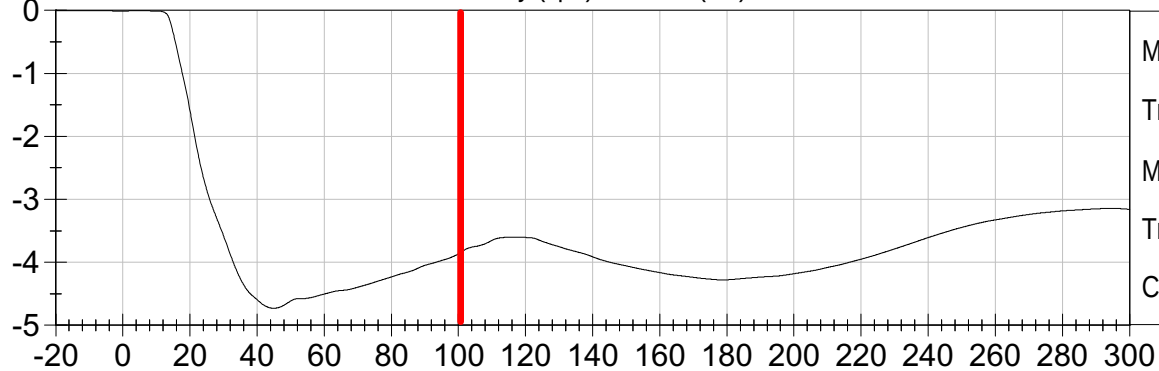
Injury Values Calculated between 0ms and 100ms



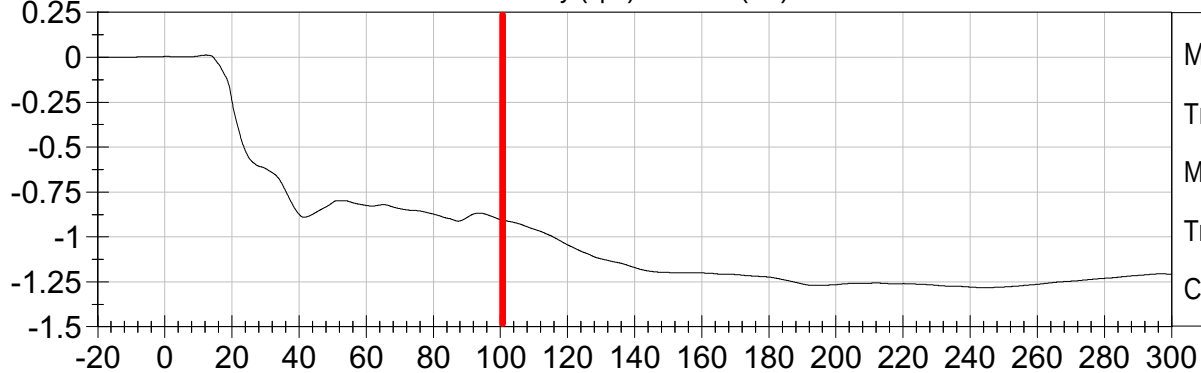


Injury Values Calculated between 0ms and 100ms

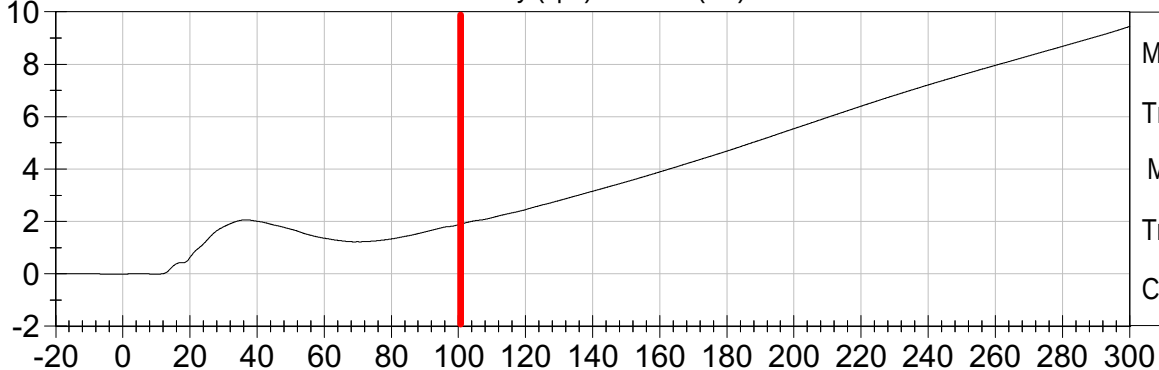
6YR OLD PASSENGER CHEST X Velocity (kph) vs TIME (ms)



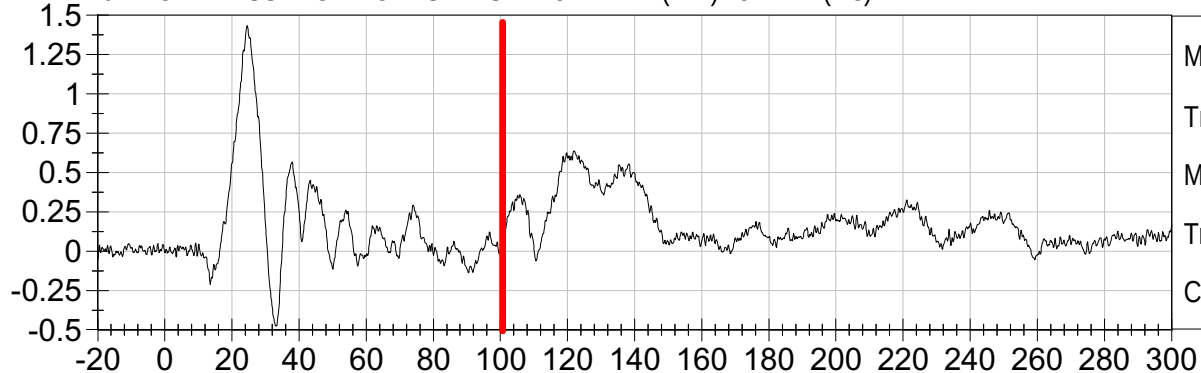
6YR OLD PASSENGER CHEST Y Velocity (kph) vs TIME (ms)



6YR OLD PASSENGER CHEST Z Velocity (kph) vs TIME (ms)



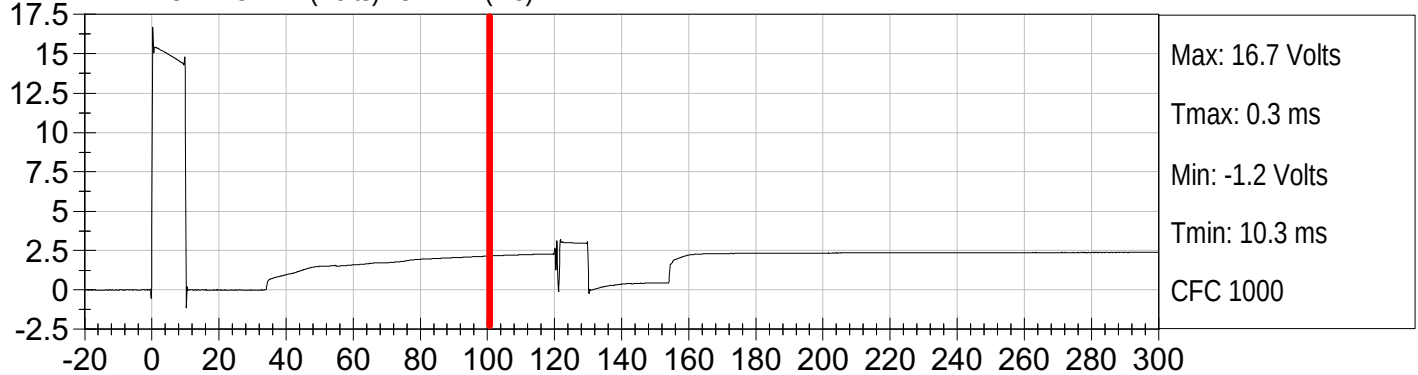
6YR OLD PASSENGER CHEST DISPLACEMENT (mm) vs TIME (ms)



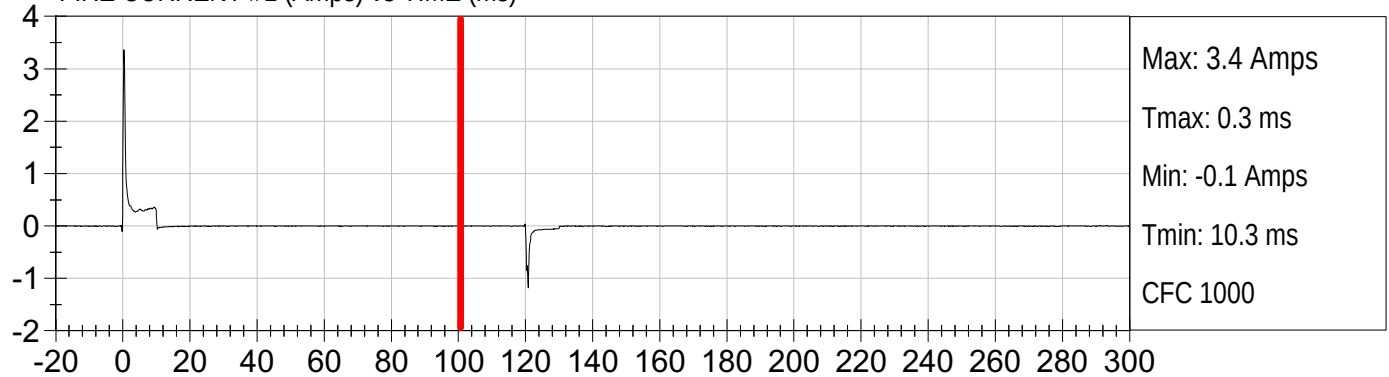


Injury Values Calculated between 0ms and 100ms

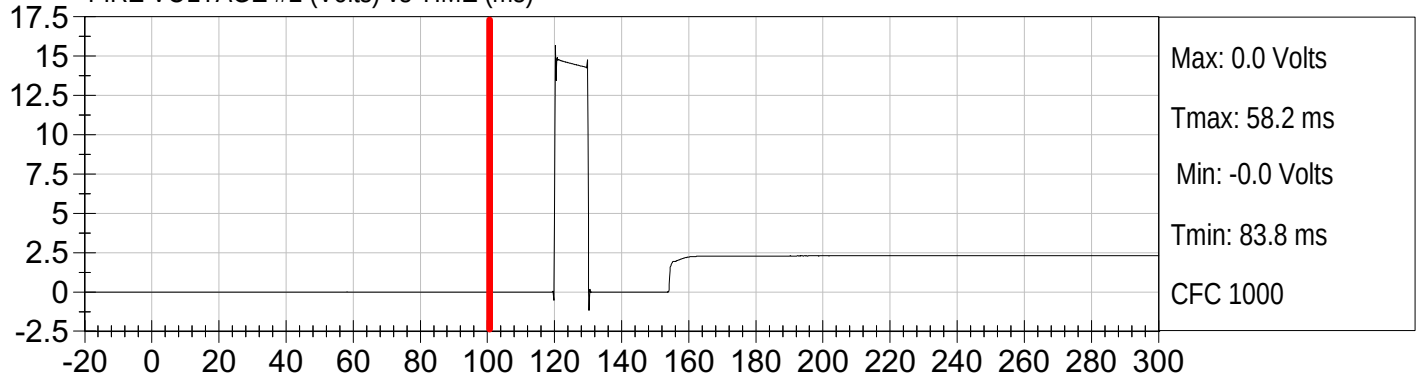
FIRE VOLTAGE #1 (Volts) vs TIME (ms)



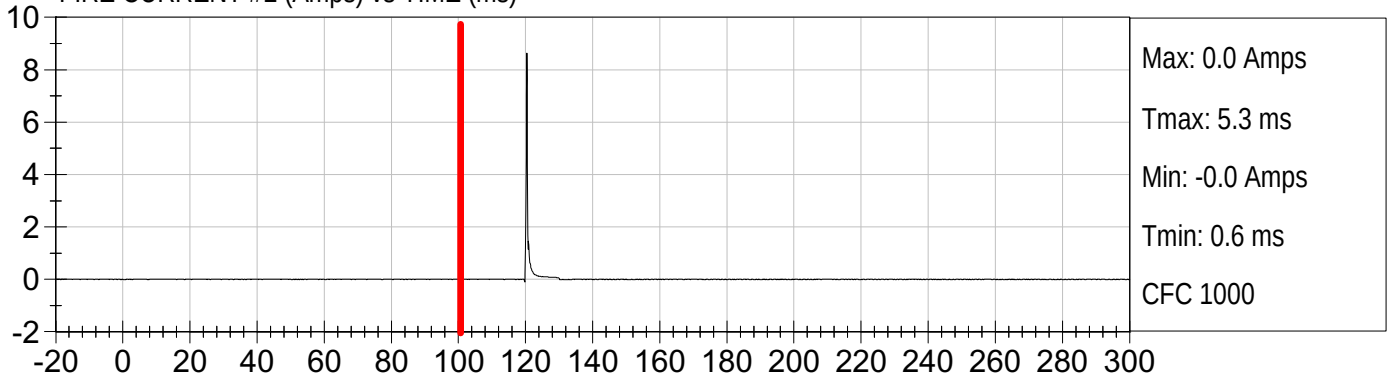
FIRE CURRENT #1 (Amps) vs TIME (ms)

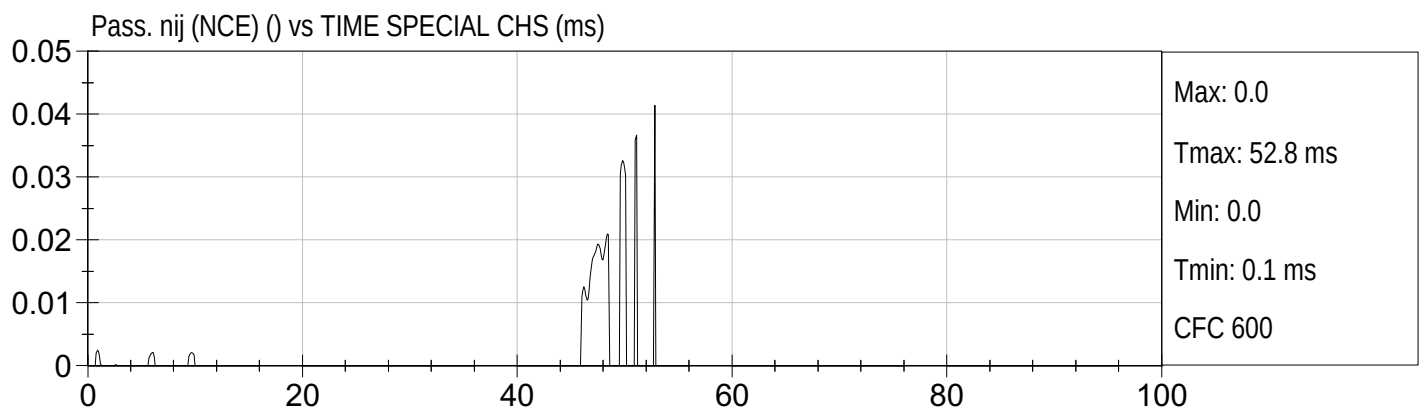
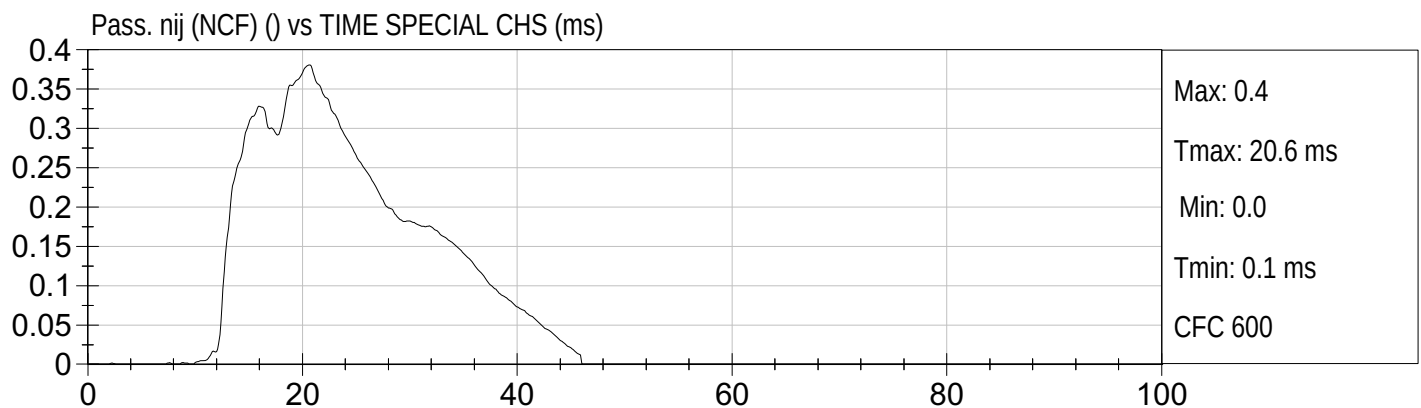
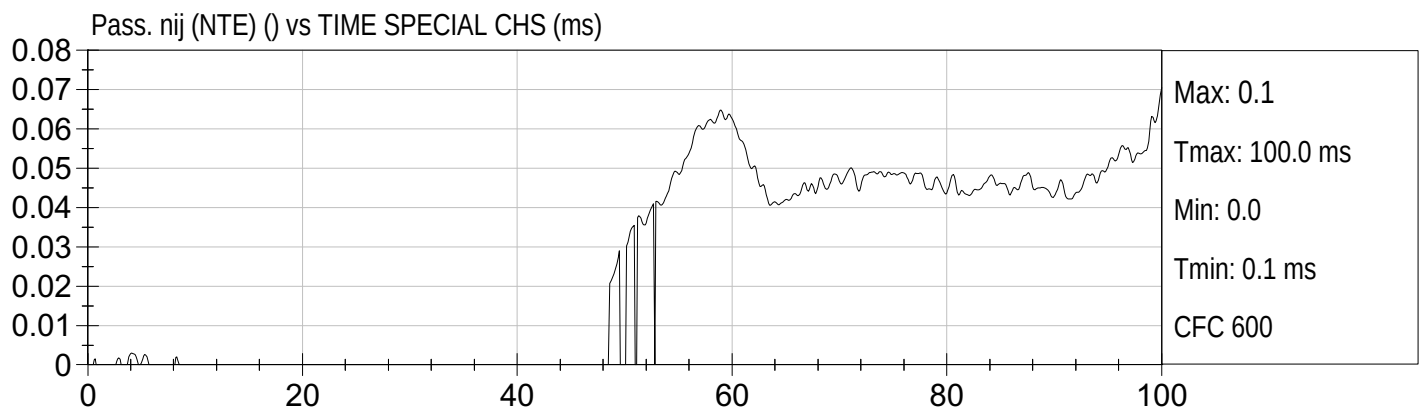
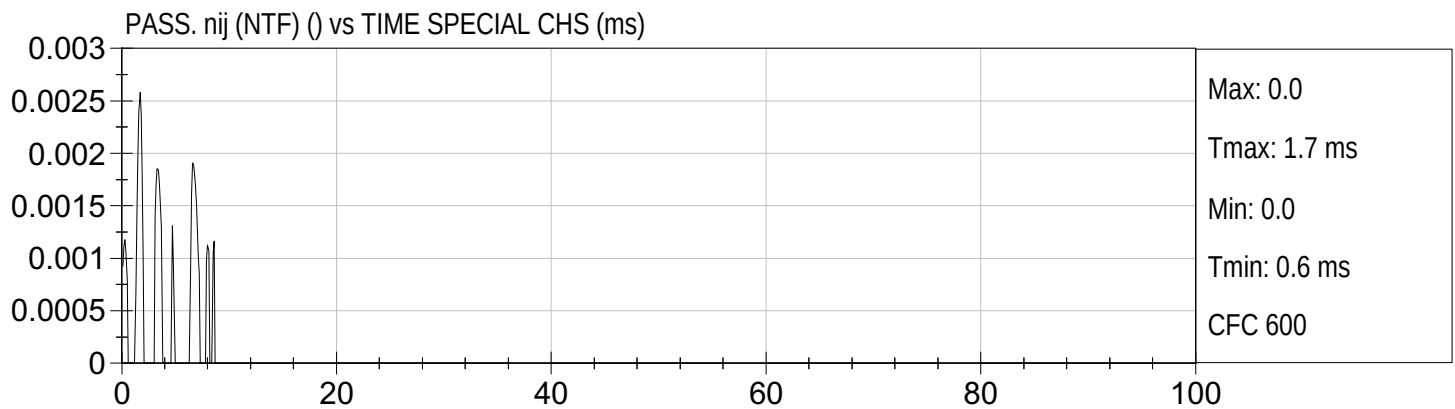


FIRE VOLTAGE #2 (Volts) vs TIME (ms)



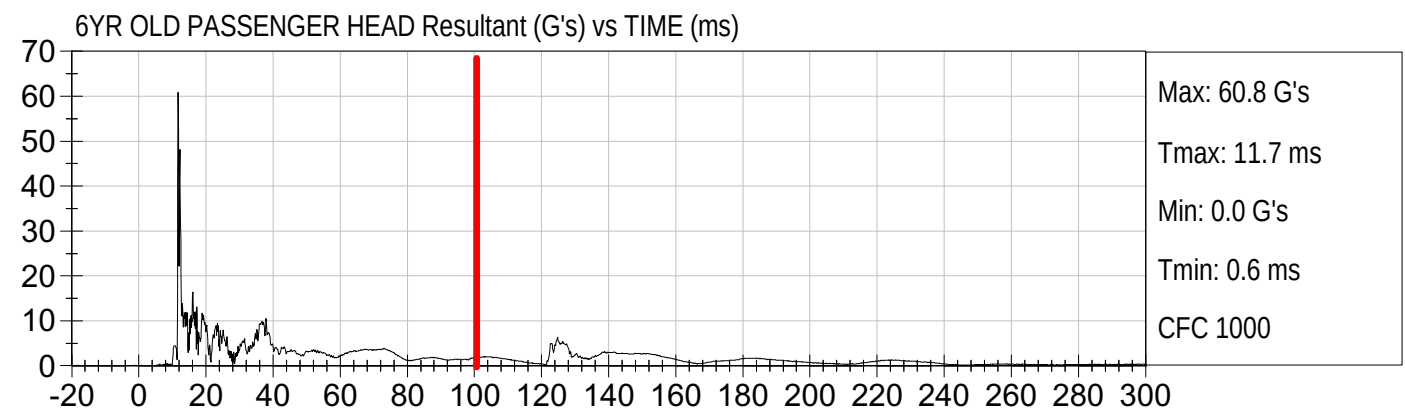
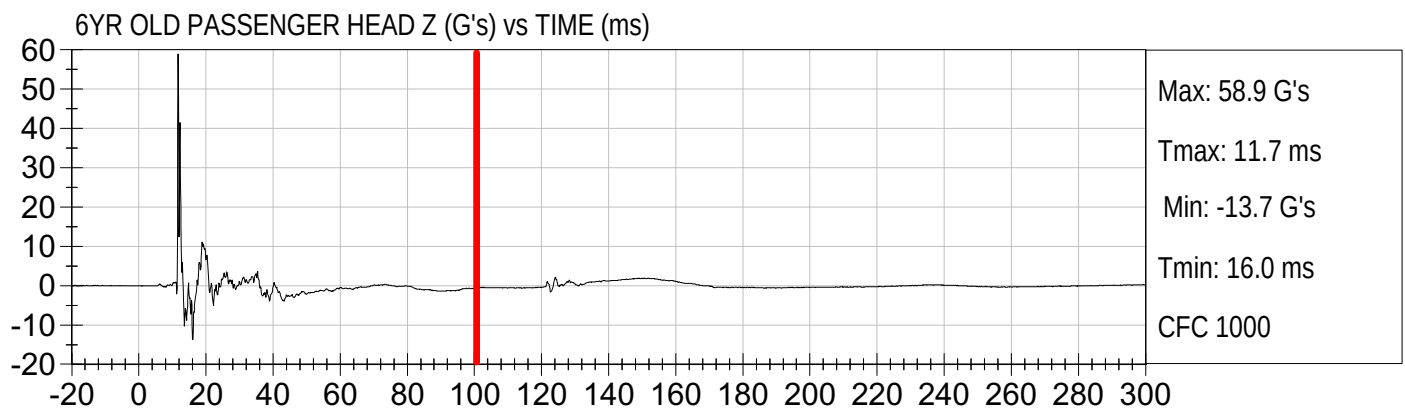
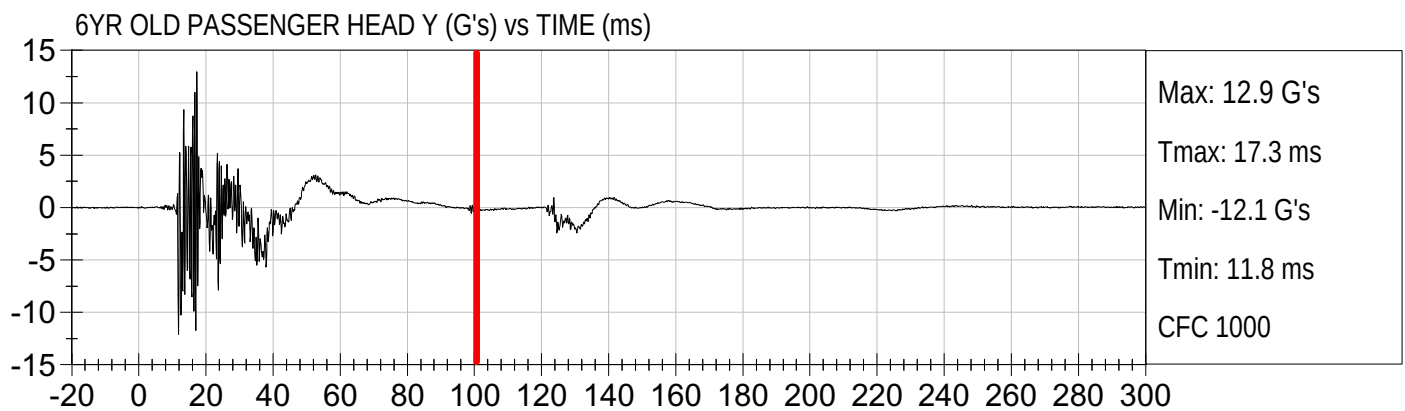
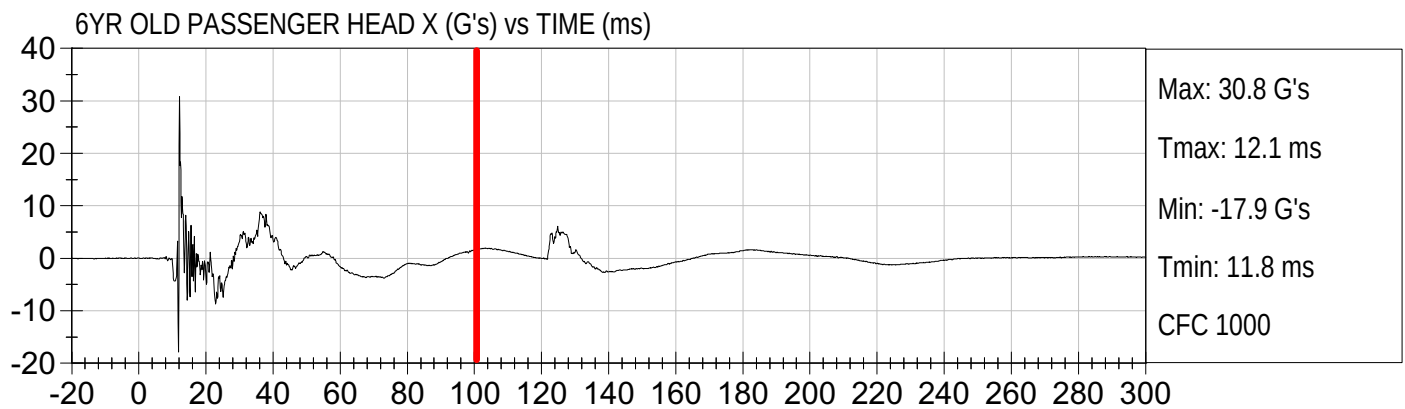
FIRE CURRENT #2 (Amps) vs TIME (ms)





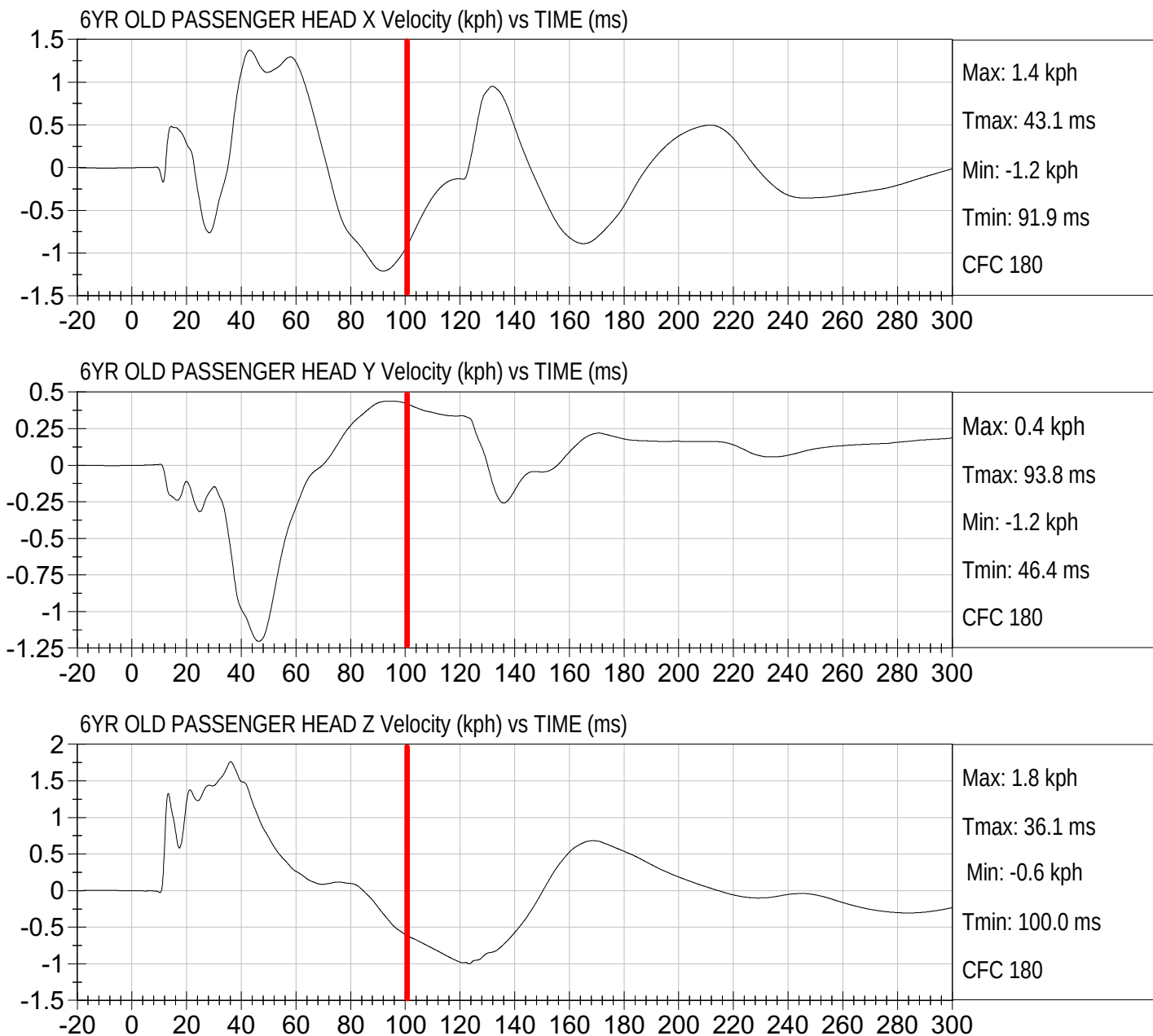


Injury Values Calculated between 0ms and 100ms





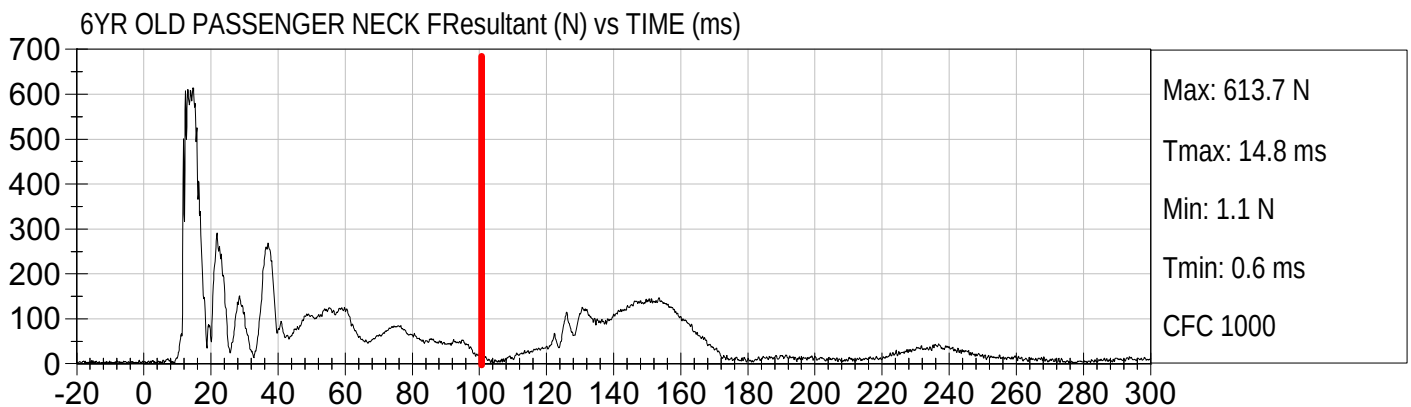
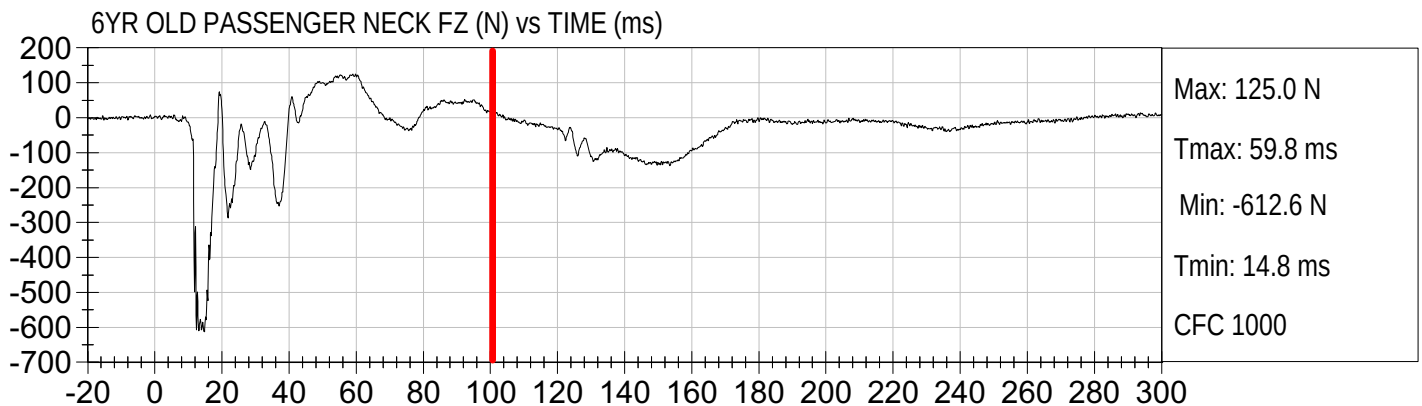
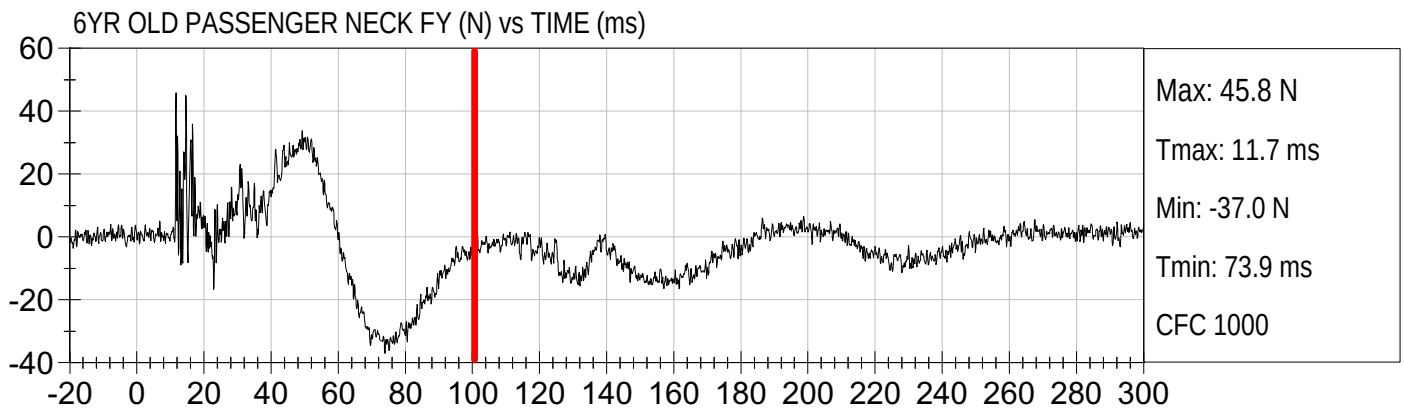
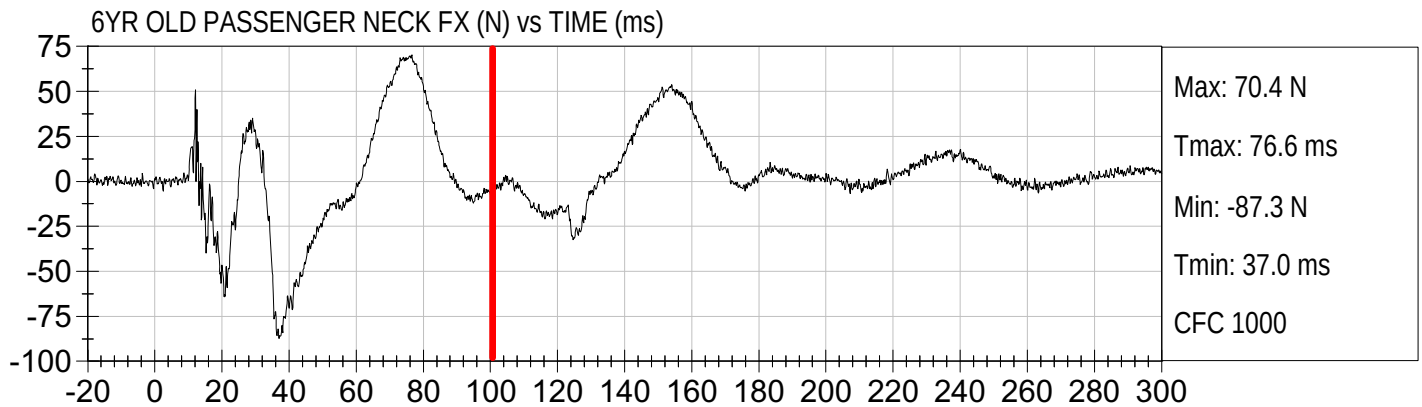
Injury Values Calculated between 0ms and 100ms







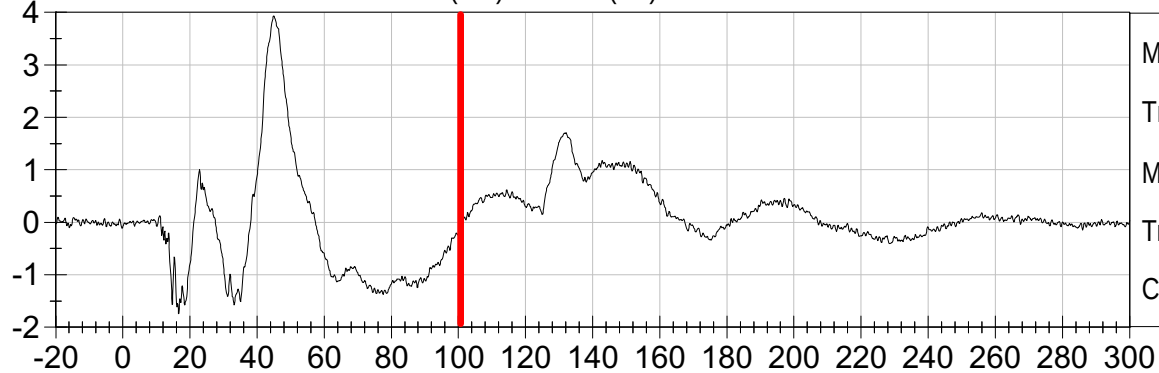
Injury Values Calculated between 0ms and 100ms





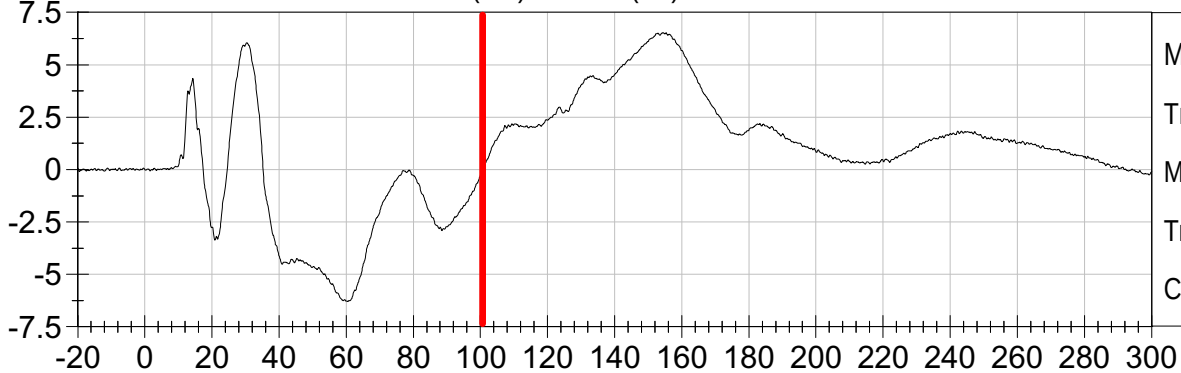
Injury Values Calculated between 0ms and 100ms

6YR OLD PASSENGER NECK MX (Nm) vs TIME (ms)



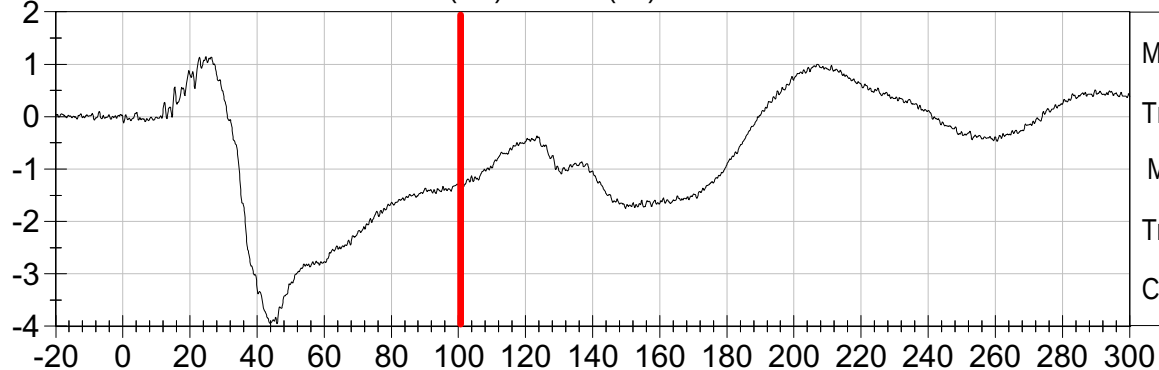
Max: 3.9 Nm  
Tmax: 45.0 ms  
Min: -1.7 Nm  
Tmin: 16.7 ms  
CFC 600

6YR OLD PASSENGER NECK MY (Nm) vs TIME (ms)



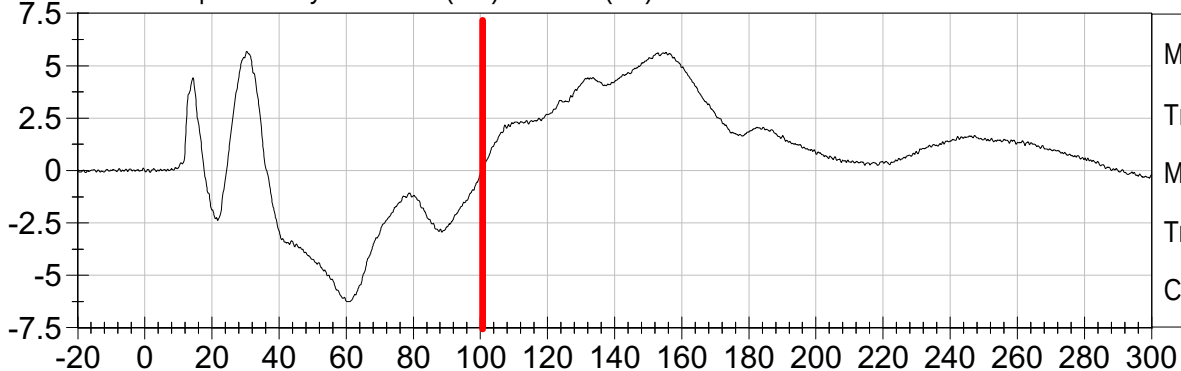
Max: 6.0 Nm  
Tmax: 30.4 ms  
Min: -6.3 Nm  
Tmin: 60.5 ms  
CFC 600

6YR OLD PASSENGER NECK MZ (Nm) vs TIME (ms)



Max: 1.1 Nm  
Tmax: 24.7 ms  
Min: -4.0 Nm  
Tmin: 46.0 ms  
CFC 600

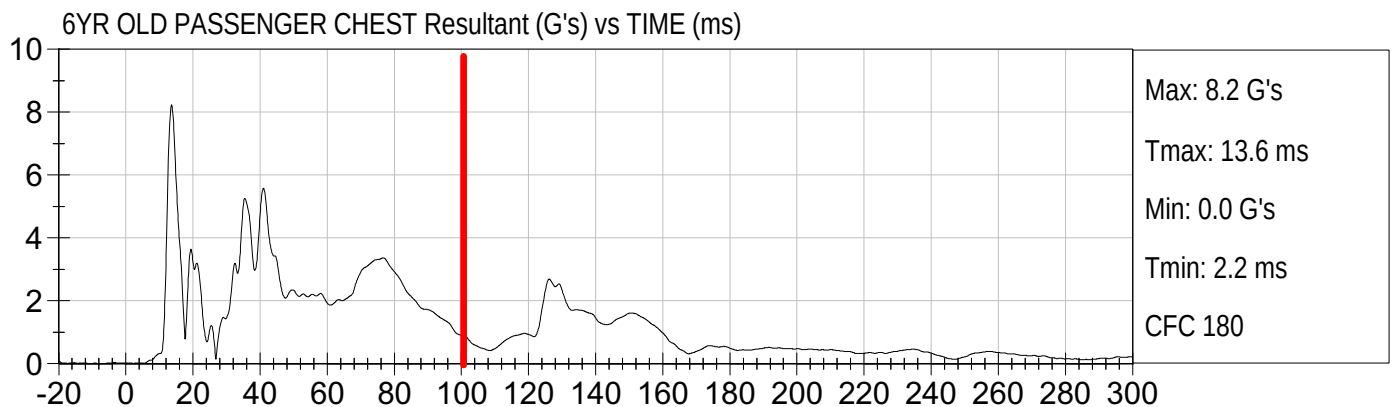
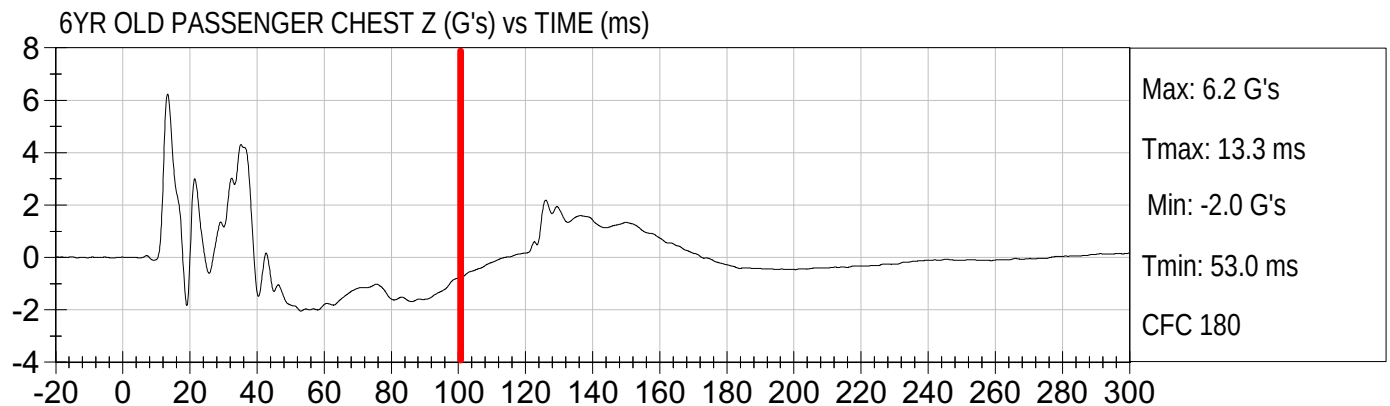
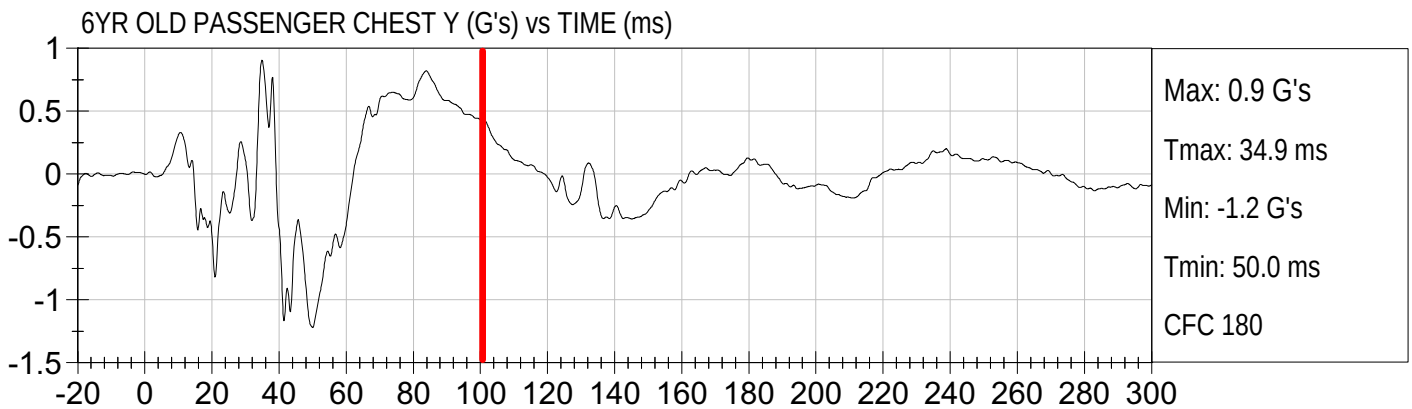
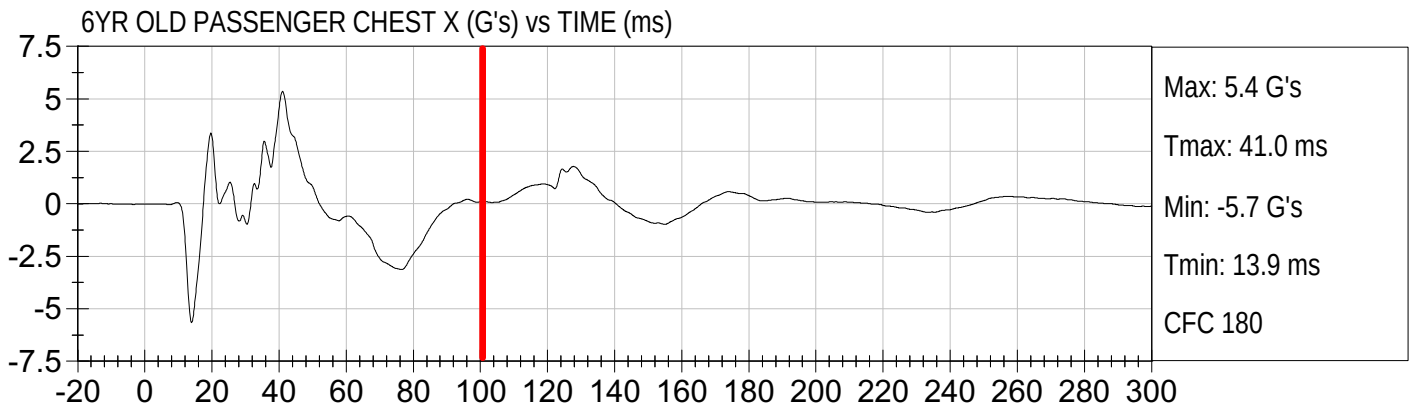
Pass. Occipital Condyle Moment (Nm) vs TIME (ms)



Max: 5.7 Nm  
Tmax: 30.4 ms  
Min: -6.3 Nm  
Tmin: 60.4 ms  
CFC 600

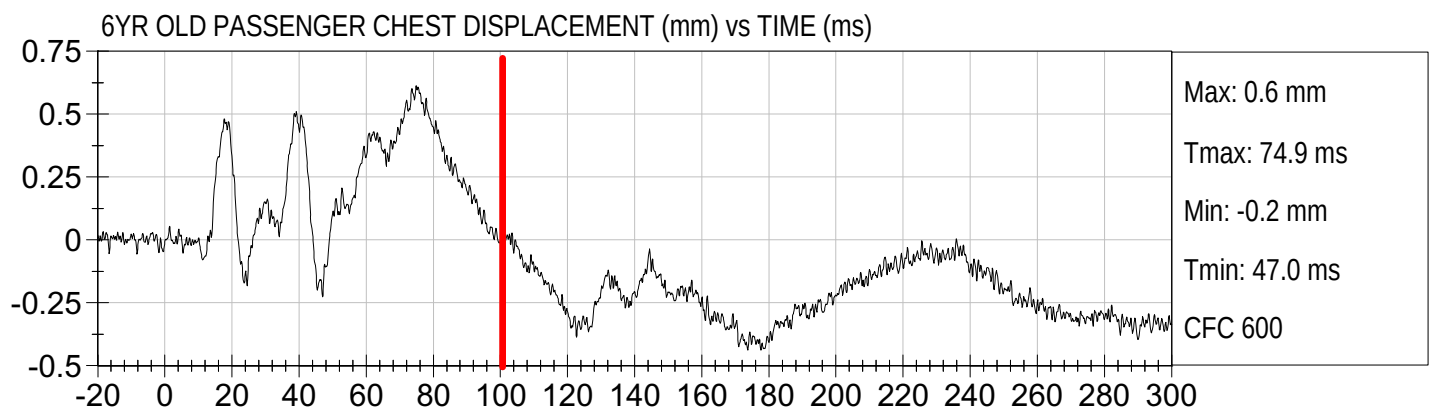
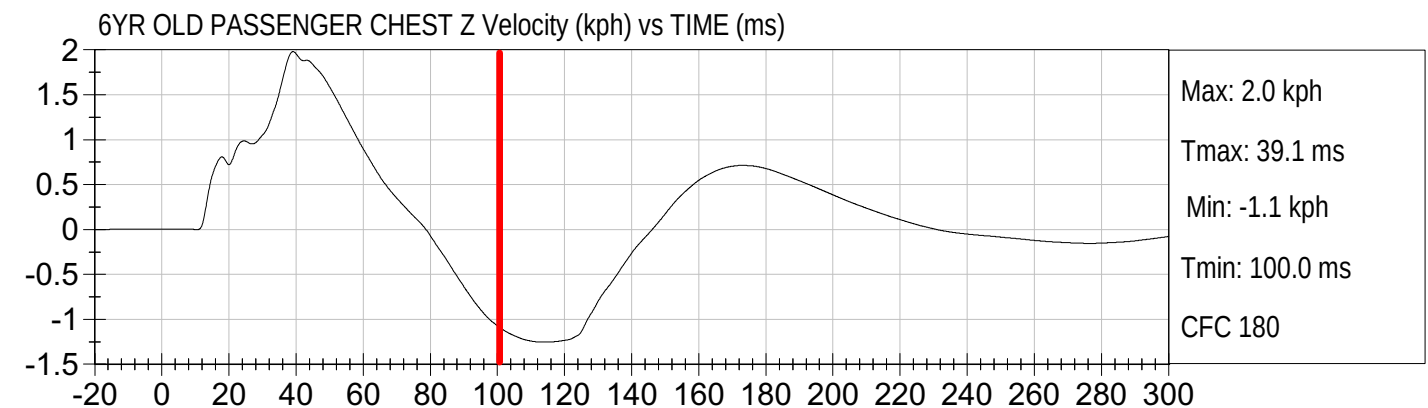
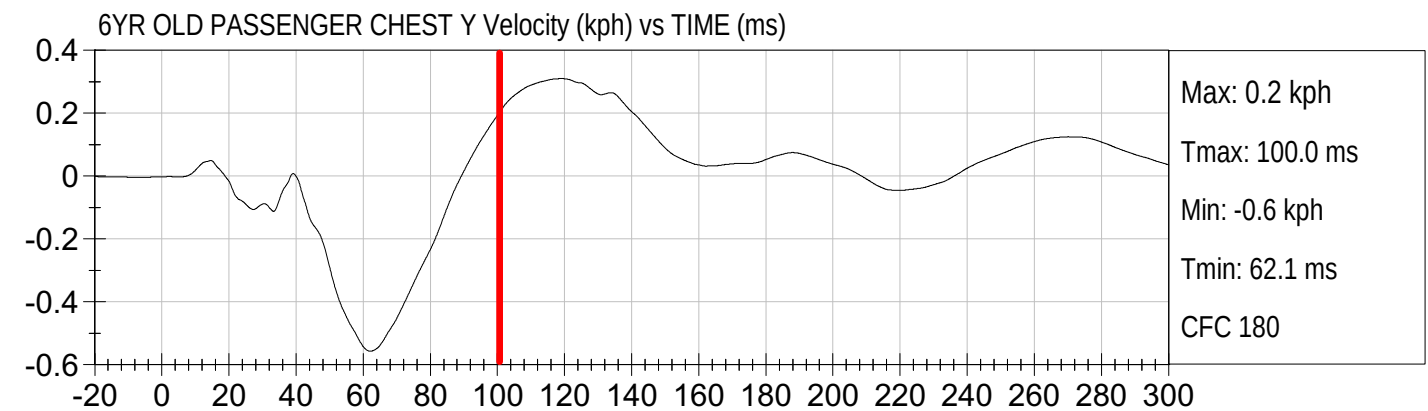
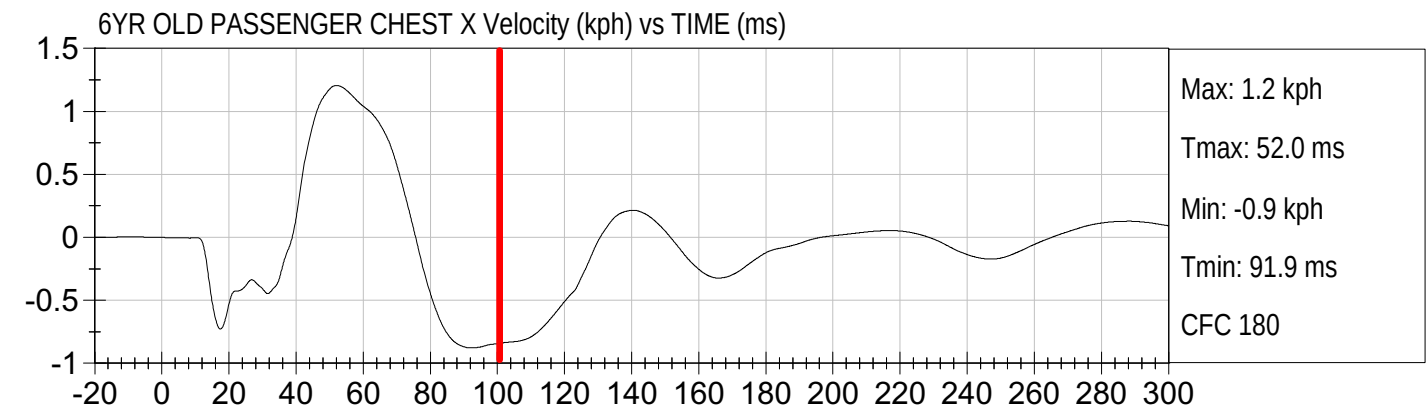


Injury Values Calculated between 0ms and 100ms



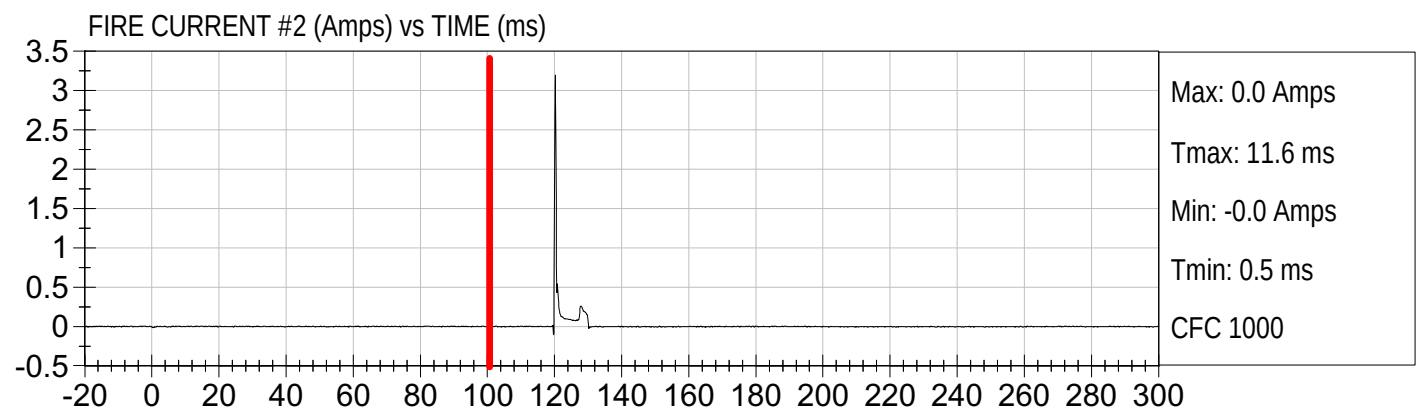
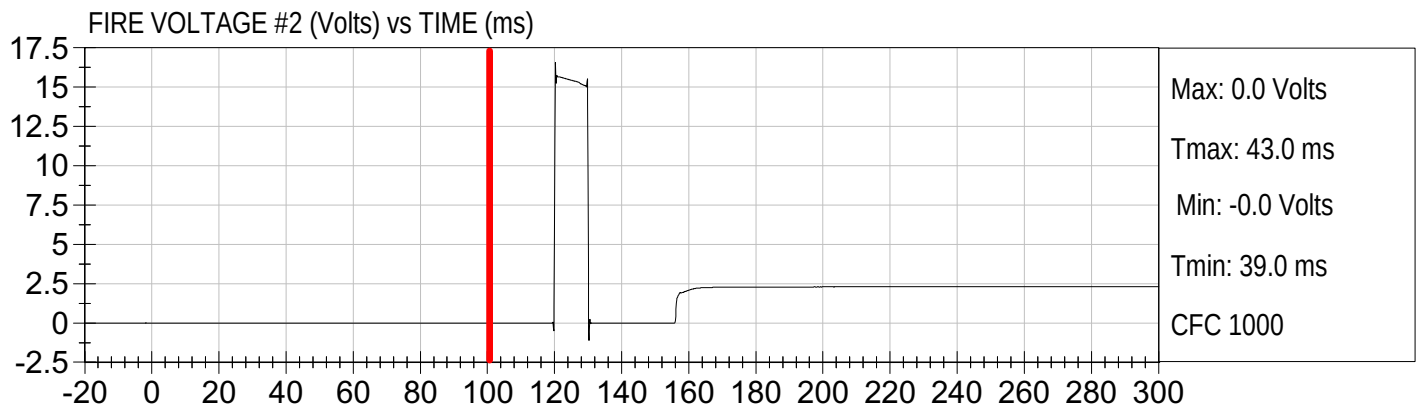
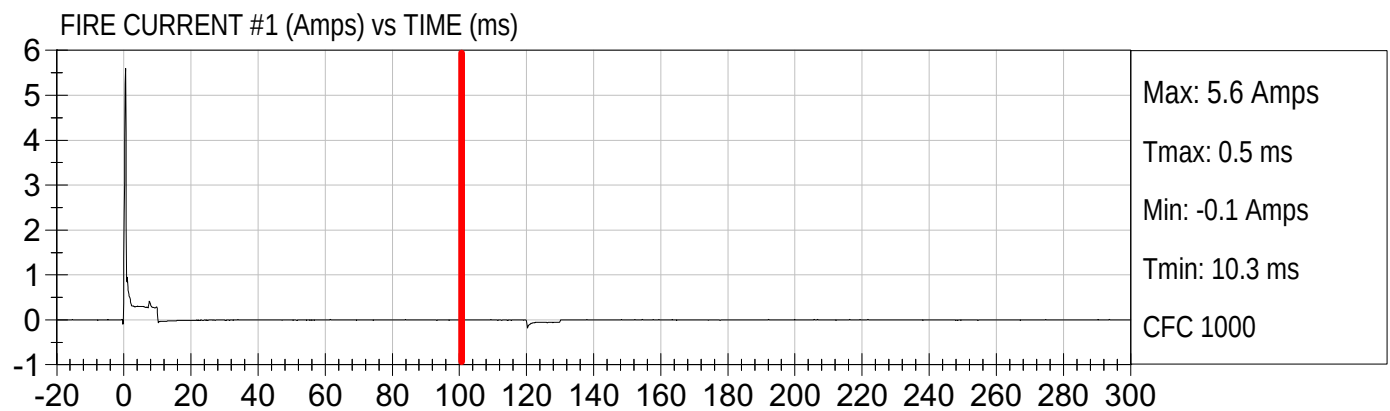
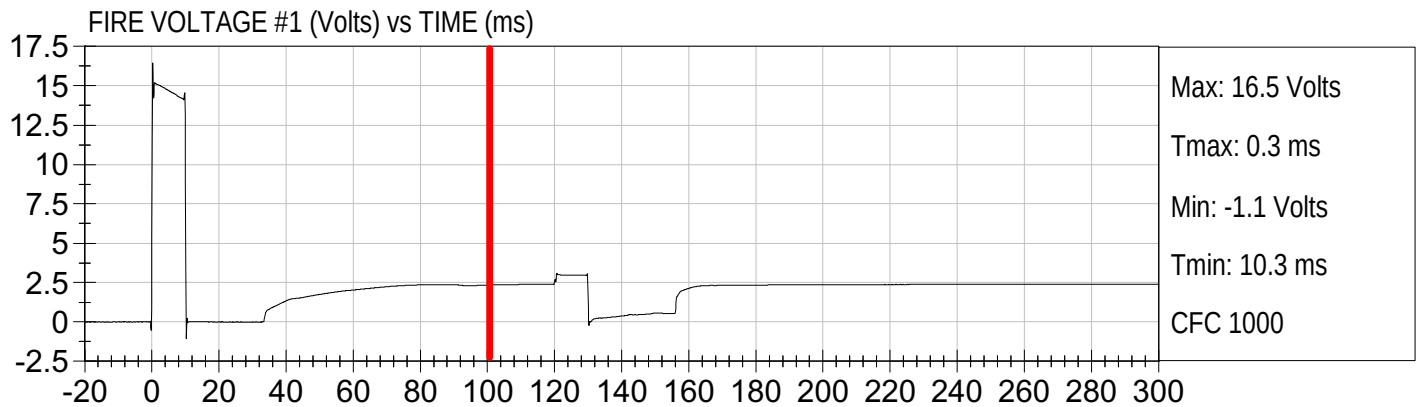


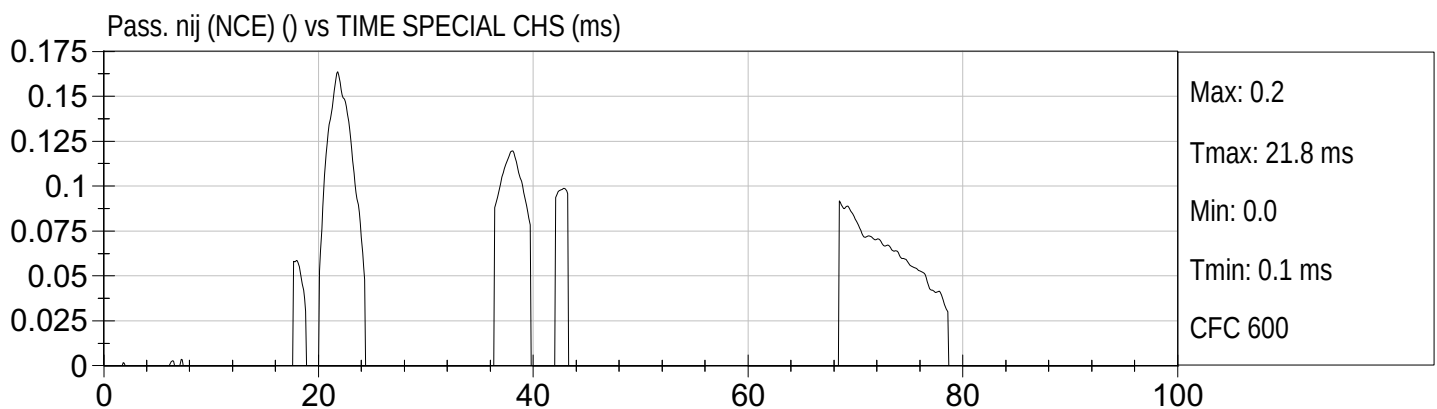
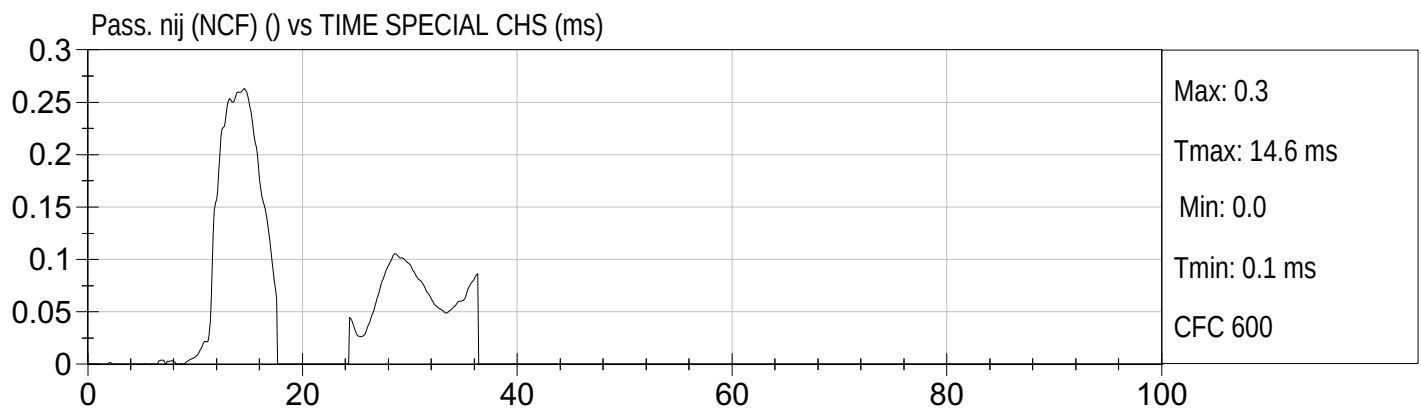
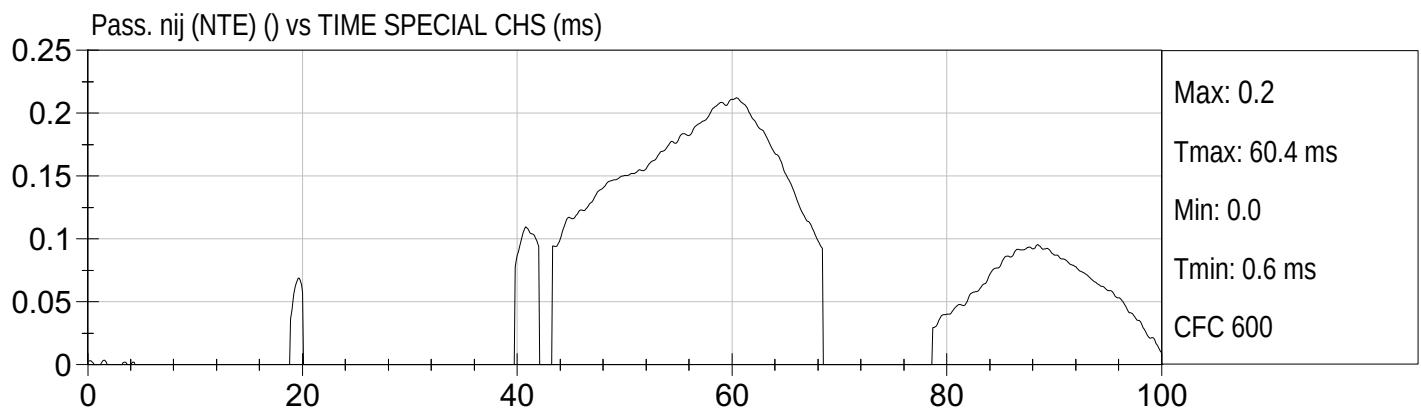
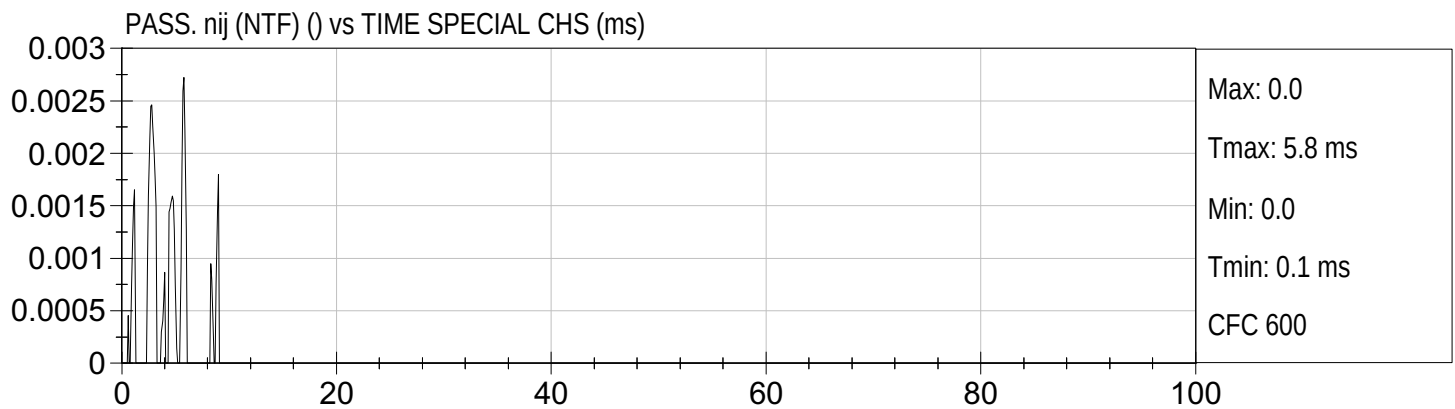
Injury Values Calculated between 0ms and 100ms





Injury Values Calculated between 0ms and 100ms





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CB0502

 MANUFACTURED IN KOREA BY  
HYUNDAI MOTOR COMPANY  
MAR/01/11 GVWR 4586 lbs PAINT Y5  
GAWR FRONT 2425 lbs GAWR REAR 2271 lbs TRIM RAS  
THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S.A. FEDERAL  
MOTOR VEHICLE SAFETY, BUMPER, AND THEFT PREVENTION STANDARDS  
IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE  
V.I.N KMHEC4A42BA002136  
PASSENGER CAR  






**TIRE AND LOADING INFORMATION**  
**RENSEIGNEMENTS SUR LES PNEUS ET LE CHARGEMENT**

|                                      |         |                  |                   |
|--------------------------------------|---------|------------------|-------------------|
| SEATING CAPACITY<br>NOMBRE DE PLACES | TOTAL 5 | FRONT<br>AVANT 2 | REAR<br>ARRIÈRE 3 |
|--------------------------------------|---------|------------------|-------------------|

The combined weight of occupants and cargo should never exceed 410 kg or 904 lbs.  
Le poids total des occupants et du chargement ne doit jamais dépasser 410 kg ou 904 lb.

| TIRE<br>PNEU        | SIZE<br>DIMENSIONS | COLD TIRE PRESSURE<br>PRESSION DES<br>PNEUS À FROID |
|---------------------|--------------------|-----------------------------------------------------|
| FRONT<br>AVANT      | P205/65R16         | 235kPa, 34psi                                       |
| REAR<br>ARRIÈRE     | P205/65R16         | 235kPa, 34psi                                       |
| SPARE<br>DE SECOURS | NONE<br>AUCUN      |                                                     |

**SEE OWNER'S  
MANUAL FOR  
ADDITIONAL  
INFORMATION**  
**VOIR LE MANUEL  
DE L'USAGER  
POUR PLUS DE  
RENSEIGNEMENTS**

**R1**

# CB0502





Pre-Test Front View of Test Vehicle





Post-Test Front View of Test Vehicle





Pre-Test Left Side View of Test Vehicle





Post-Test Left Side View of Test Vehicle





Pre-Test Right Side View of Test Vehicle





Post-Test Right Side View of Test Vehicle





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





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





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





Post-Test Rear View of Test Vehicle





Pre-Test Windshield View





Post-Test Windshield View





Pre-Test Engine Compartment View





Post-Test Engine Compartment View





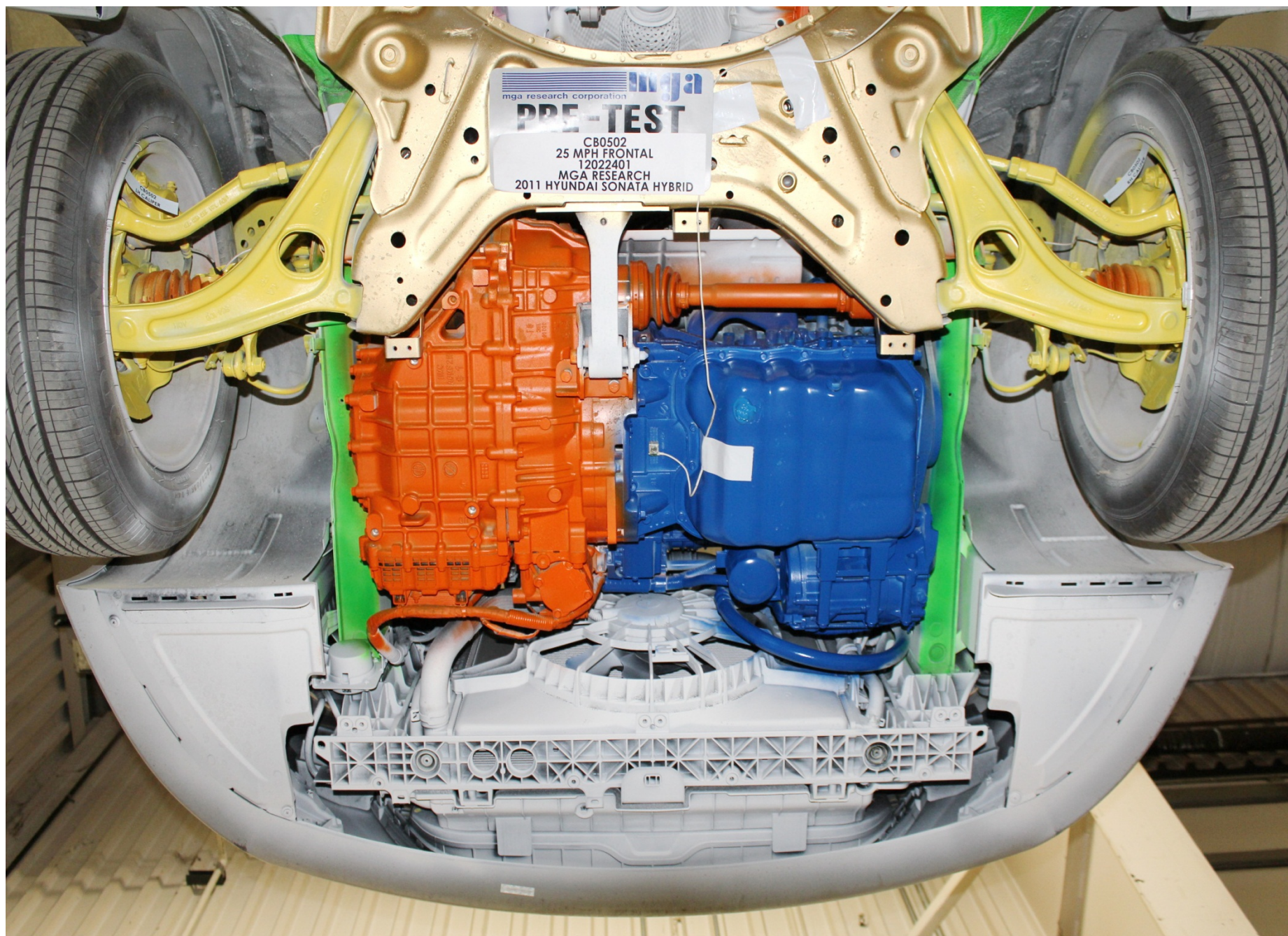
Pre-Test Fuel Filler Cap View





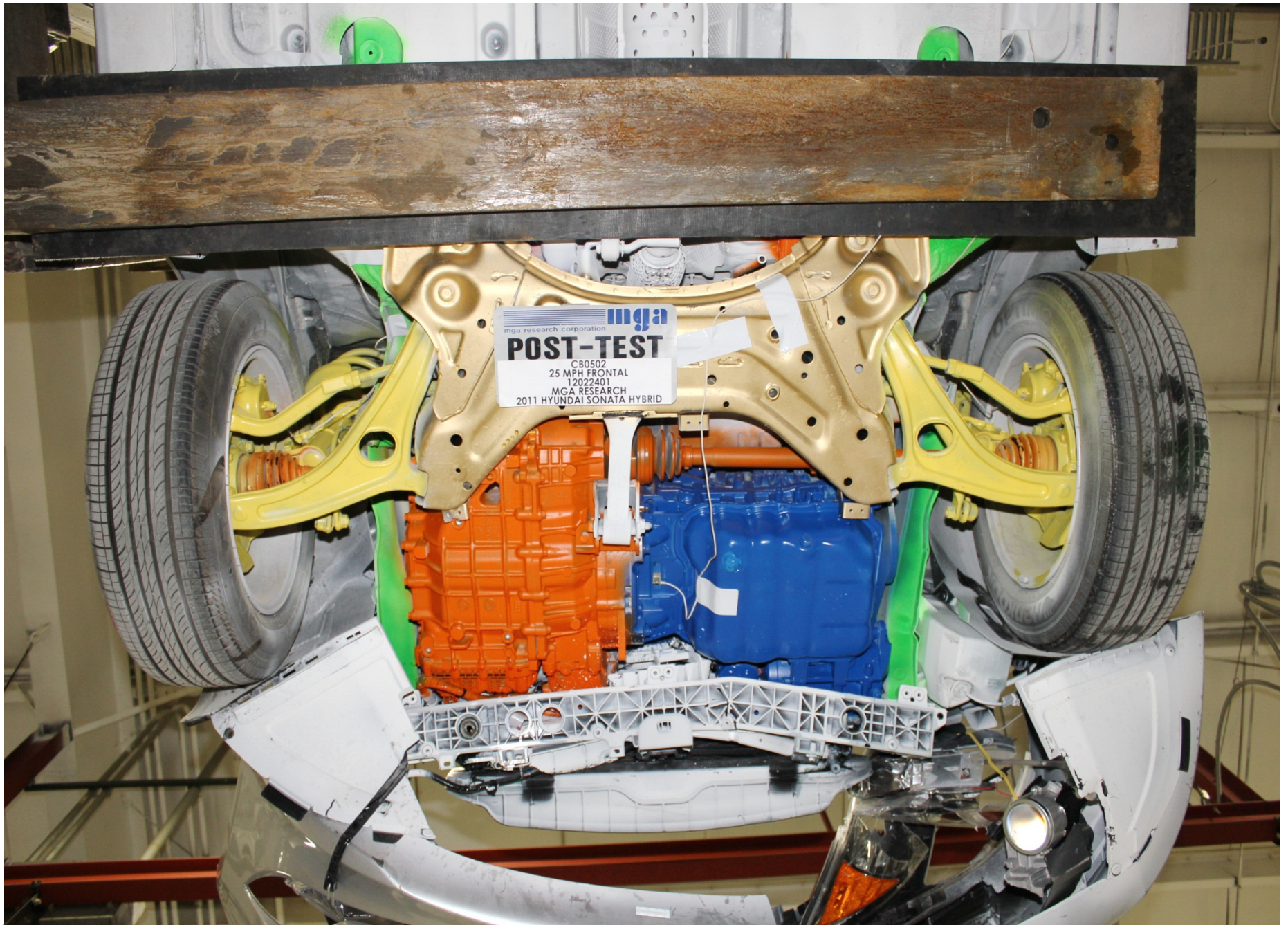
Post-Test Fuel Filler Cap View





Pre-Test Front Underbody View





Post-Test Front Underbody View





Pre-Test Mid Underbody View





Post-Test Mid Underbody View





Pre-Test Mid Rear Underbody View





Post-Test Mid Rear Underbody View





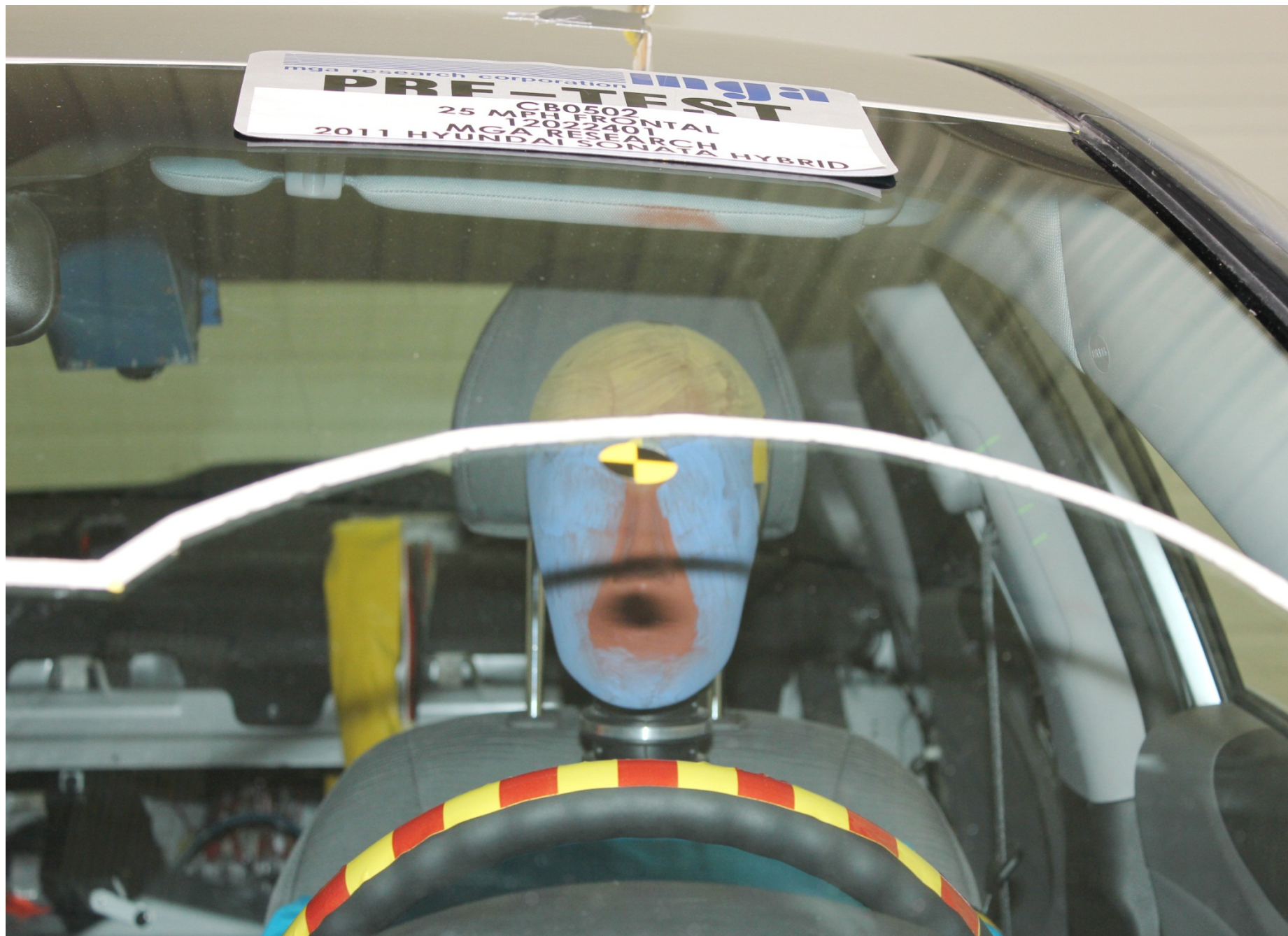
Pre-Test Rear Underbody View





Post-Test Rear Underbody View





Pre-Test Driver Dummy Front View (head position)





Post-Test Driver Dummy Front View (head position)





Pre-Test Driver Dummy Position Left Side View



### Post-Test Driver Dummy Position Left Side View





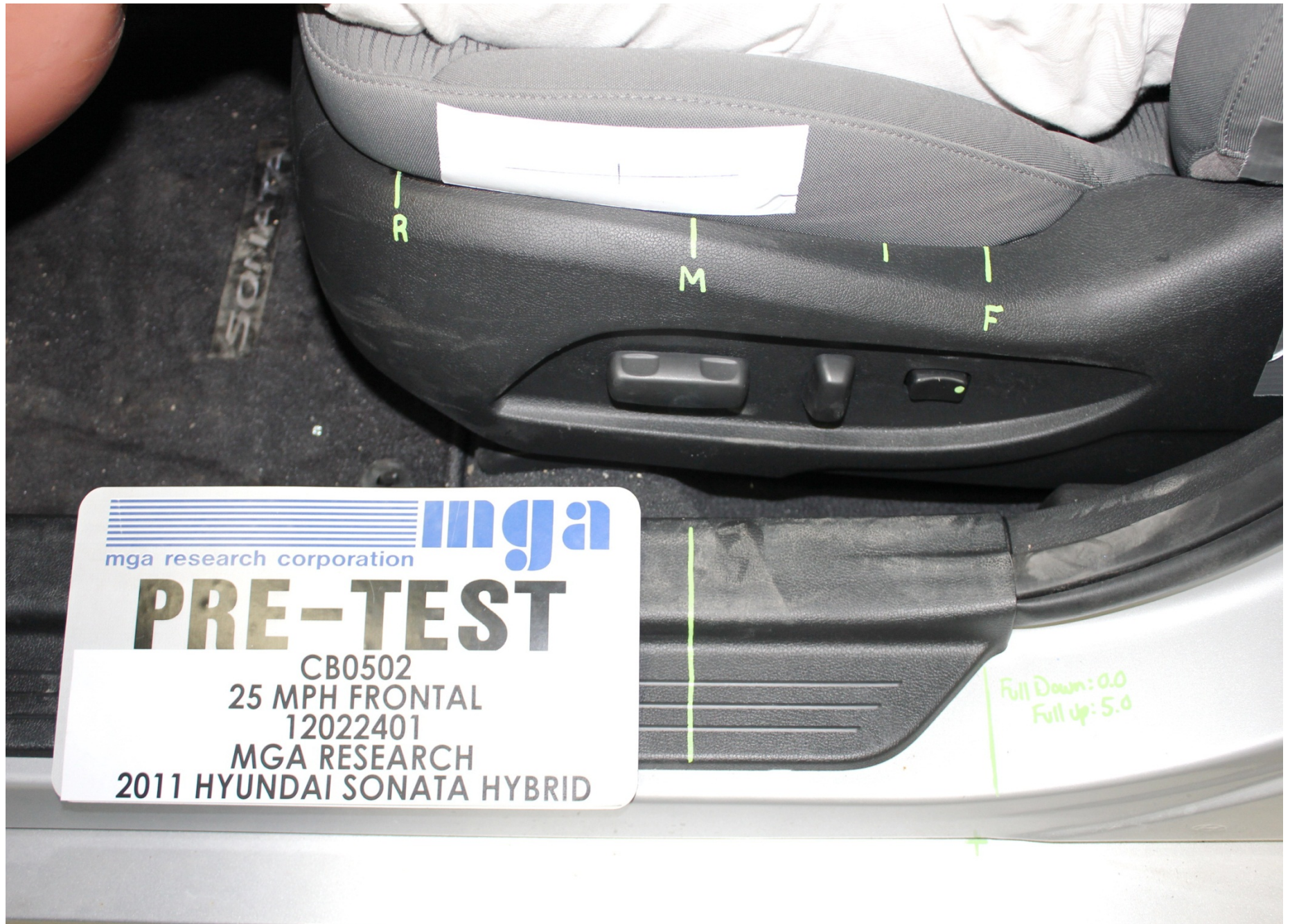
Pre-Test Driver Dummy Position Left Side View (door open)





Post-Test Driver Dummy Position Left Side View (door open)





Pre-Test Driver Dummy Seat Position





Post-Test Driver Dummy Seat Position





Pre-Test Driver Dummy Feet Position





Post-Test Driver Dummy Feet Position





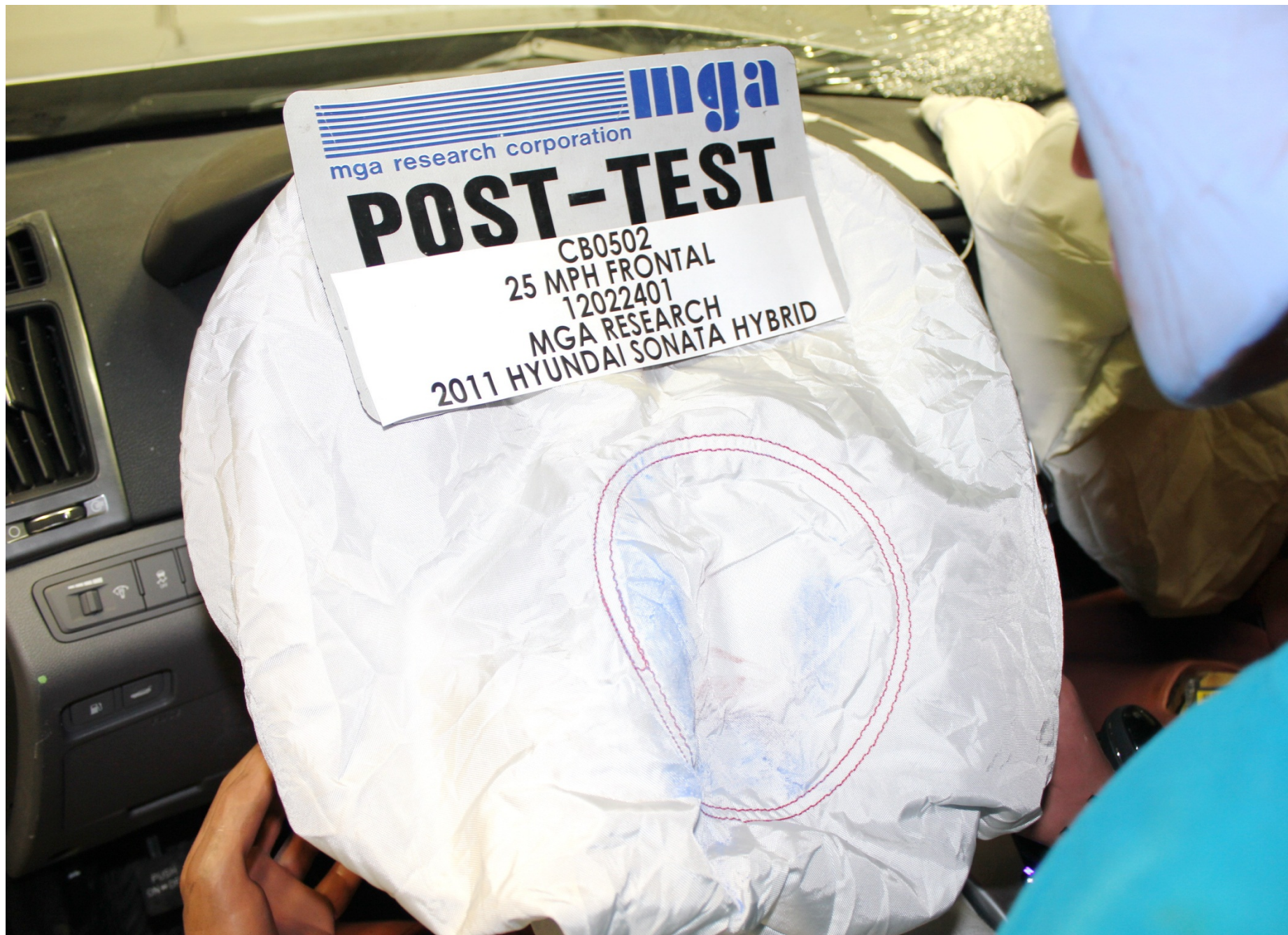
Pre-Test Driver Side Knee Bolster View





Post-Test Driver Side Knee Bolster View





Post-Test Driver Dummy Airbag Contact





Post-Test Driver Dummy Head Contact (visor)





Post-Test Driver Dummy Knee Contact





Pre-Test Passenger Dummy Front View (head position)





Post-Test Passenger Dummy Front View (head position)





Pre-Test Passenger Dummy Position Right Side View





Post-Test Passenger Dummy Position Right Side View





Pre-Test Passenger Dummy Position Right Side View (door open)





Post-Test Passenger Dummy Position Right Side View (door open)





Pre-Test Passenger Dummy Seat Position





Post-Test Passenger Dummy Seat Position





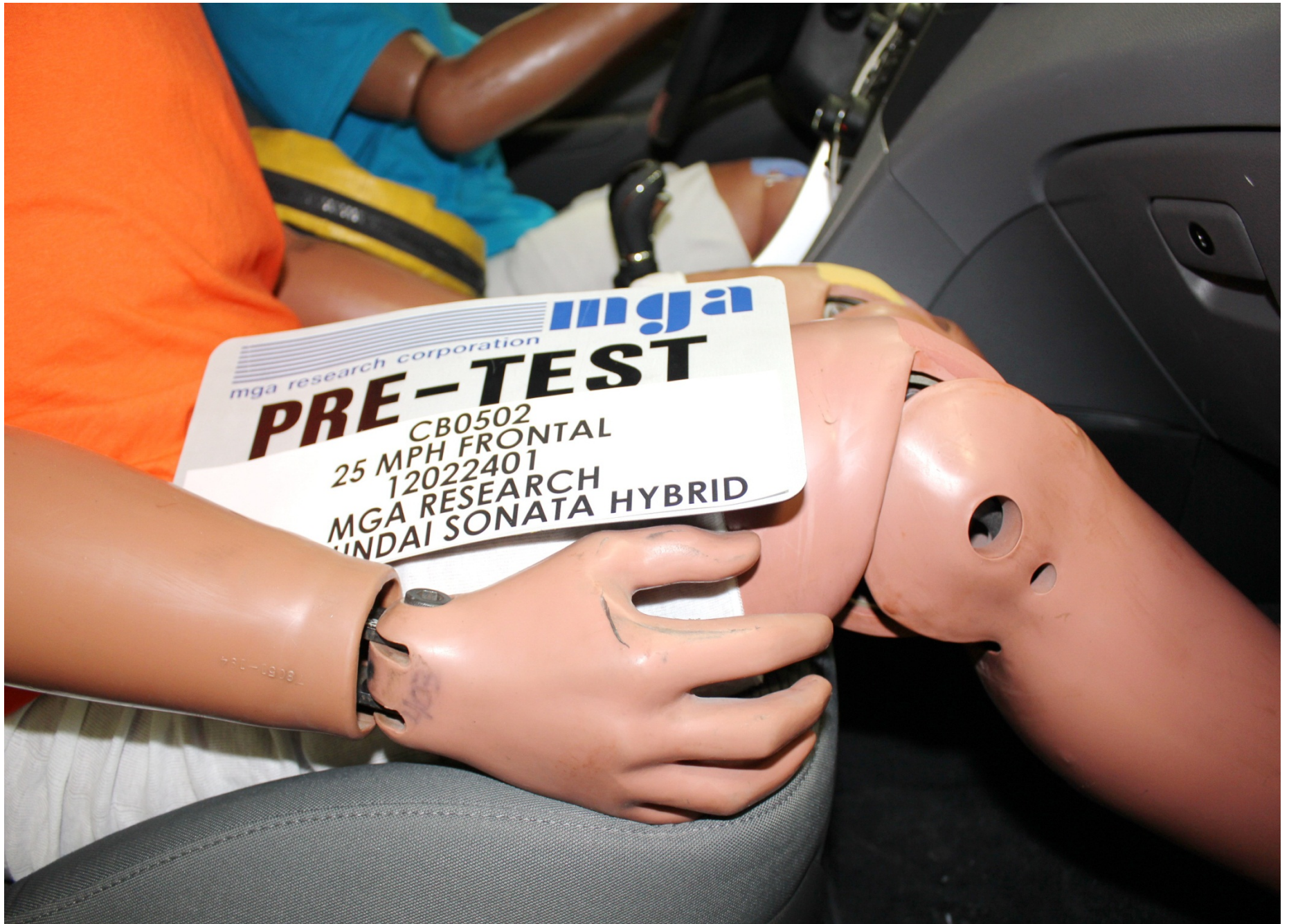
Pre-Test Passenger Dummy Feet Position





Post-Test Passenger Dummy Feet Position





Pre-Test Passenger Side Knee Bolster View





Post-Test Passenger Side Knee Bolster View





Post-Test Passenger Dummy Airbag Contact





Post-Test Passenger Dummy Head Contact (side airbag)





Post-Test Passenger Dummy Knee Contact (glove box)

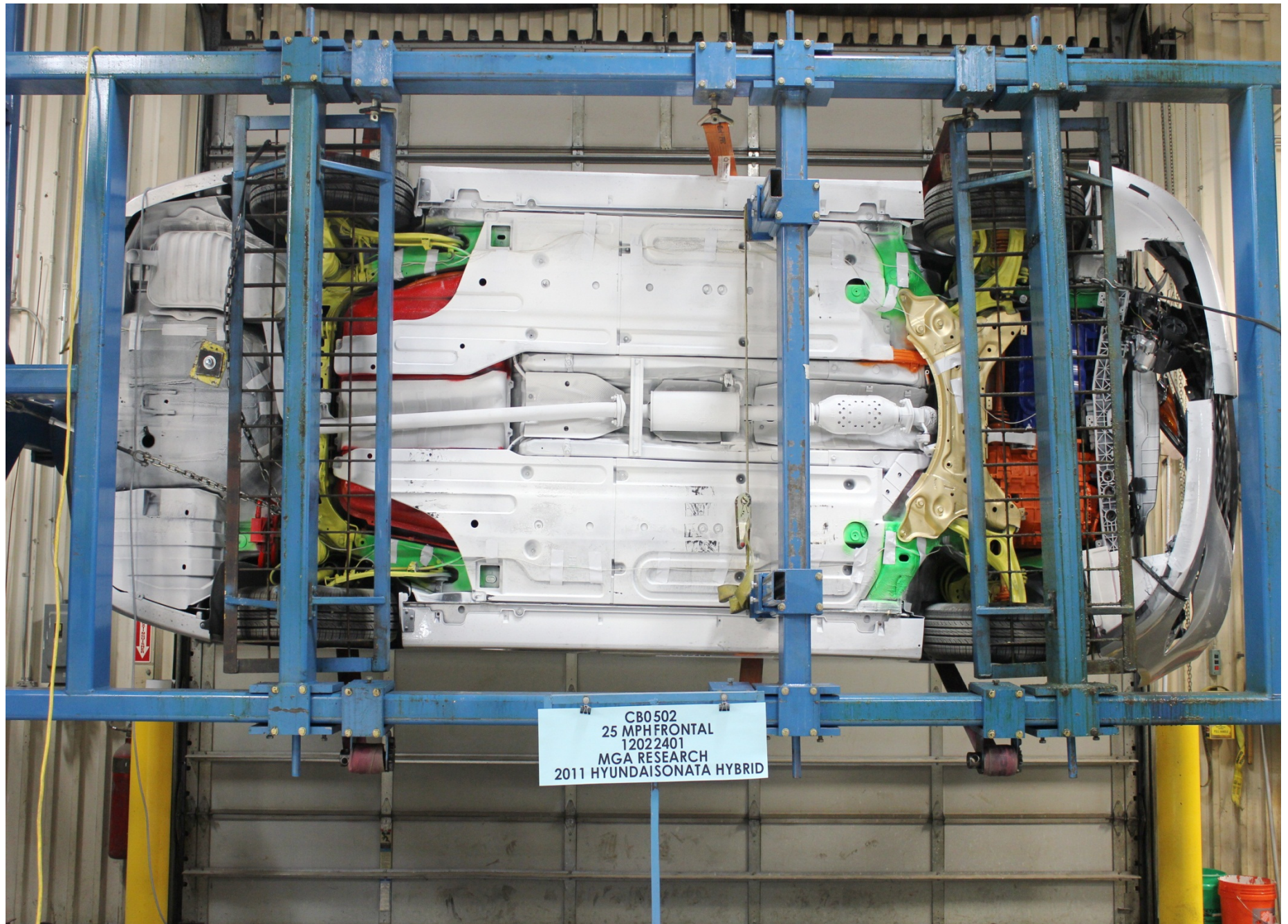




Post-Test Passenger Dummy Knee Contact (airbag)



C-64



Rollover 90 Degrees





Rollover 180 Degrees





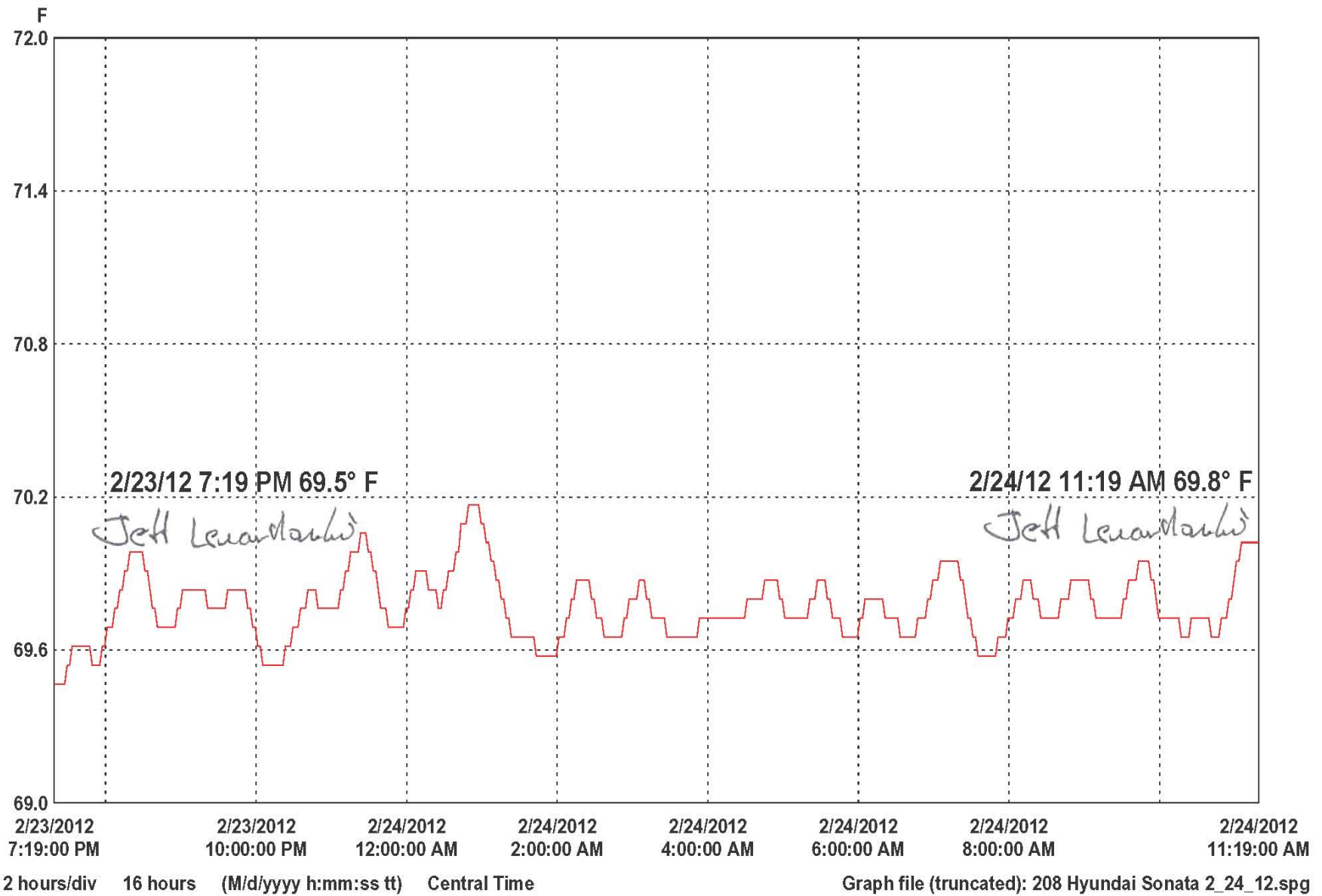
Rollover 270 Degrees





Rollover 360 Degrees

C-68



| LN | Serial # | Description | CH | Value | Maximum | Average | Minimum | Units | CH description | Logger file         |
|----|----------|-------------|----|-------|---------|---------|---------|-------|----------------|---------------------|
| 1  | 07082326 | Prep 1      | 1  |       | 70.17   | 69.77   | 69.47   | F     | Temperature    | 07082326_Prep_1.spl |

Temperature Plot





Pre-Test View of Electrical Propulsion Drive





Post-Test View of Electrical Propulsion Drive





Pre-Test View of Vehicle's Passenger Compartment Adjacent to Electric Energy Storage Conversion System View 1





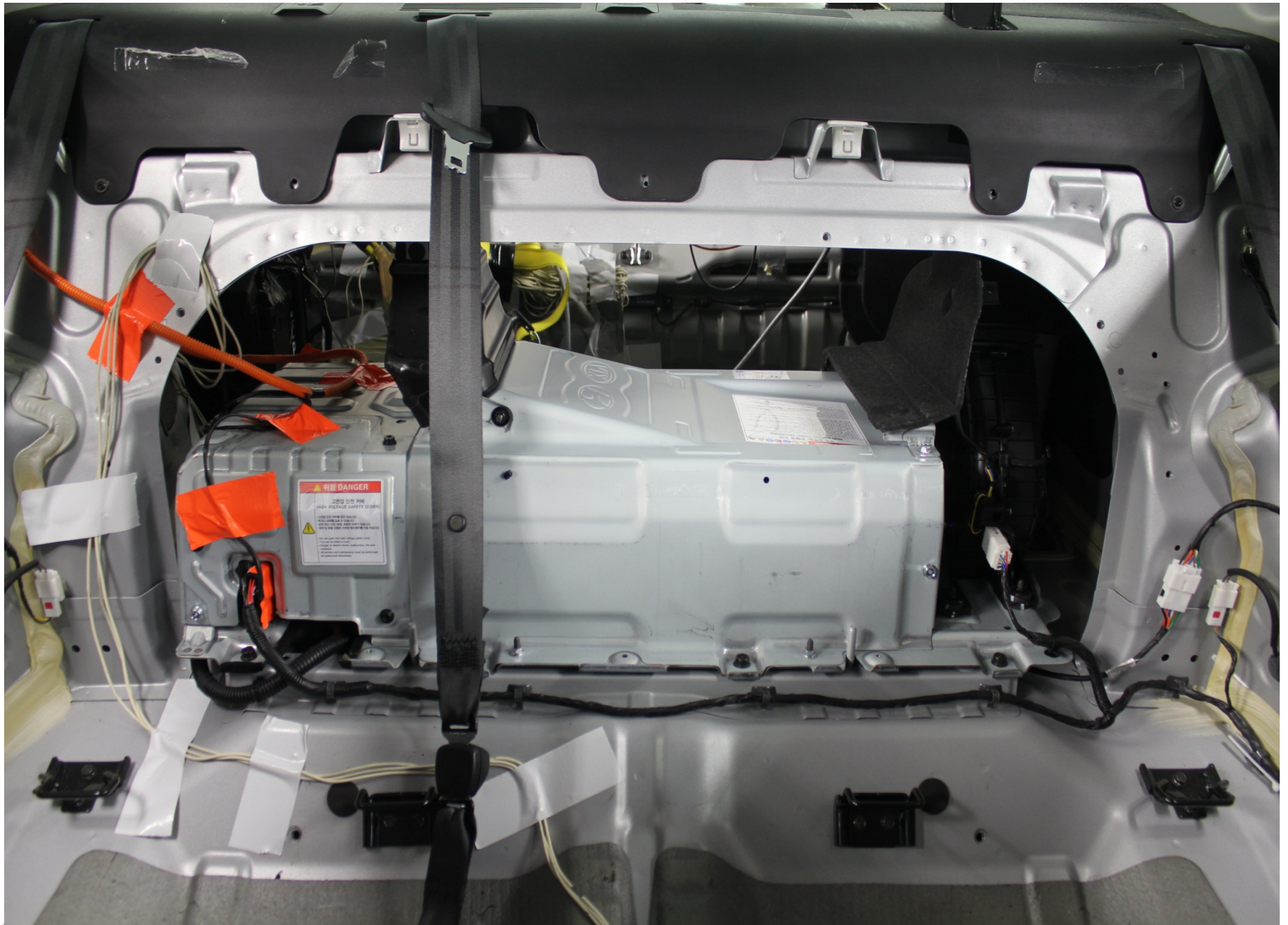
Post-Test View of Vehicle's Passenger Compartment Adjacent to Electric Energy Storage Conversion System View 1





Pre-Test View of Vehicle's Passenger Compartment Adjacent to Electric Energy Storage Conversion System View 2





Post-Test View of Vehicle's Passenger Compartment Adjacent to Electric Energy Storage Conversion System View 2





Manual High Voltage Service Disconnect Plug





Manual High Voltage Service Disconnect Plug Close Up View





Manual High Voltage Service Disconnect Plug Removed





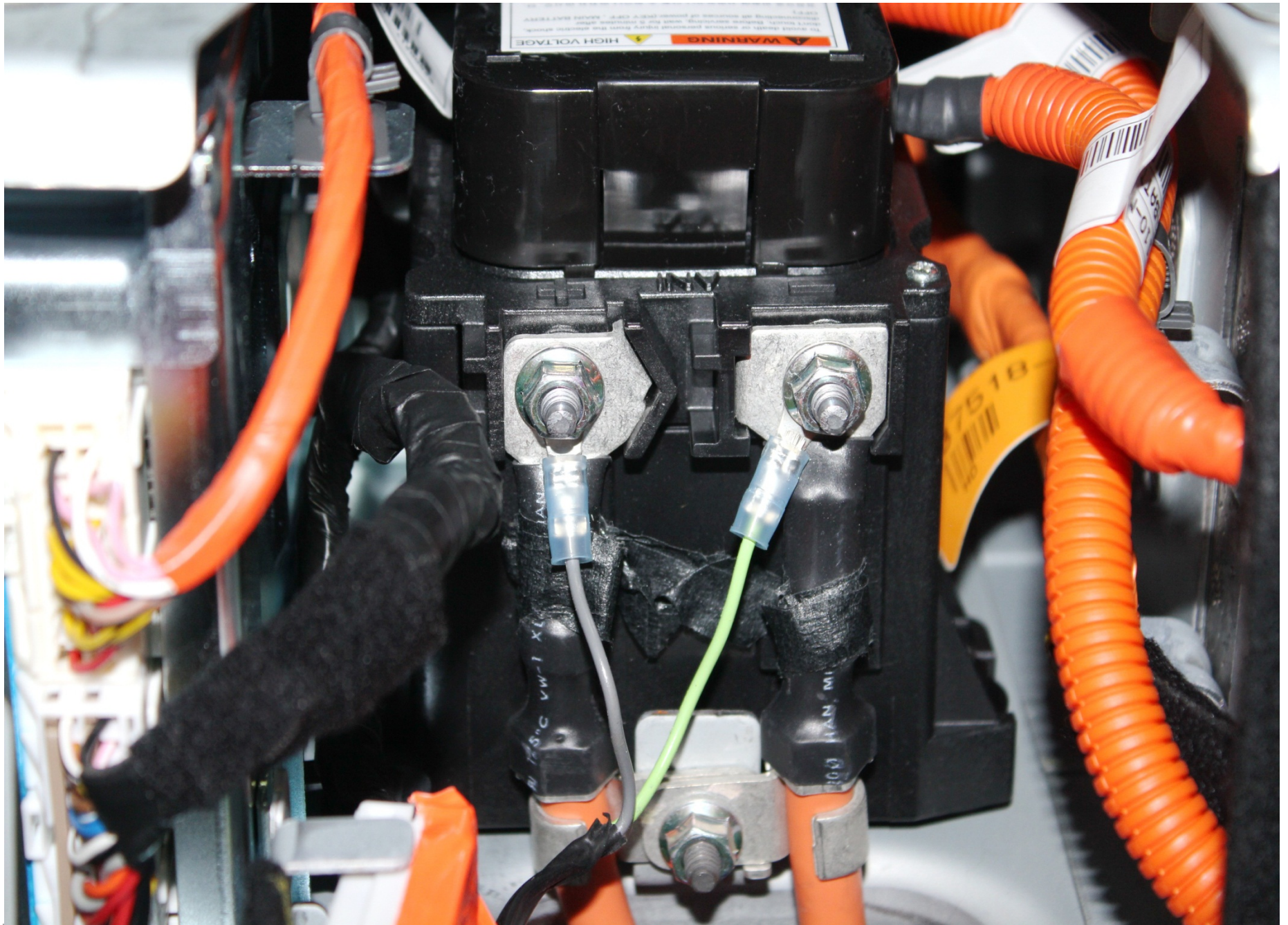
High Voltage Warning Label





High Voltage Warning Label





Positive and Negative Attachment Point to the Propulsion Battery System



## APPENDIX D

### LOW RISK PHOTOGRAPHS

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Pre-Test 5th Fem. P1 Driver Dummy Left Side View





Post-Test 5th Fem. P1 Driver Dummy Left Side View





Pre-Test 5th Fem. P1 Driver Dummy Right Side View





Post-Test 5th Fem. P1 Driver Dummy Right Side View





Post-Test 5th Fem. P1 Driver Dummy Airbag Left Side View





Post-Test 5th Fem. P1 Driver Dummy Airbag Right Side View





Post-Test 5th Fem. P1 Driver Dummy Head Contact (headrest)





Pre-Test 5th Fem. P2 Driver Dummy Left Side View



Post-Test 5th Fem. P2 Driver Dummy Left Side View





Pre-Test 5th Fem. P2 Driver Dummy Right Side View





Post-Test 5th Fem. P2 Driver Dummy Right Side View





Post-Test 5th Fem. P2 Driver Dummy Airbag Left Side View





Post-Test 5th Fem. P2 Driver Dummy Airbag Right Side View





Post-Test 5th Fem. P2 Driver Dummy Head Contact (visor)





Pre-Test 3YO P1 Passenger Dummy Left Side View





Post-Test 3YO P1 Passenger Dummy Left Side View





Pre-Test 3YO P1 Passenger Dummy Right Side View





Post-Test 3YO P1 Passenger Dummy Right Side View





Post-Test 3YO P1 Passenger Dummy Airbag Left Side View





Post-Test 3YO P1 Passenger Dummy Airbag Right Side View





Pre-Test 3YO P2 Passenger Dummy Left Side View





Post-Test 3YO P2 Passenger Dummy Left Side View





Pre-Test 3YO P2 Passenger Dummy Right Side View





Post-Test 3YO P2 Passenger Dummy Right Side View





Post-Test 3YO P2 Passenger Dummy Airbag Left Side View





Post-Test 3YO P2 Passenger Dummy Airbag Right Side View





Pre-Test 6YO P1 Passenger Dummy Left Side View





Post-Test 6YO P1 Passenger Dummy Left Side View





Pre-Test 6YO P1 Passenger Dummy Right Side View





Post-Test 6YO P1 Passenger Dummy Right Side View





Post-Test 6YO P1 Passenger Dummy Airbag Left Side View





Post-Test 6YO P1 Passenger Dummy Airbag Right Side View





Post-Test 6YO P1 Passenger Dummy Head Contact (seatback)





Pre-Test 6YO P2 Passenger Dummy Left Side View





Post-Test 6YO P2 Passenger Dummy Left Side View





Pre-Test 6YO P2 Passenger Dummy Right Side View





Post-Test 6YO P2 Passenger Dummy Right Side View





Post-Test 6YO P2 Passenger Dummy Airbag Left Side View

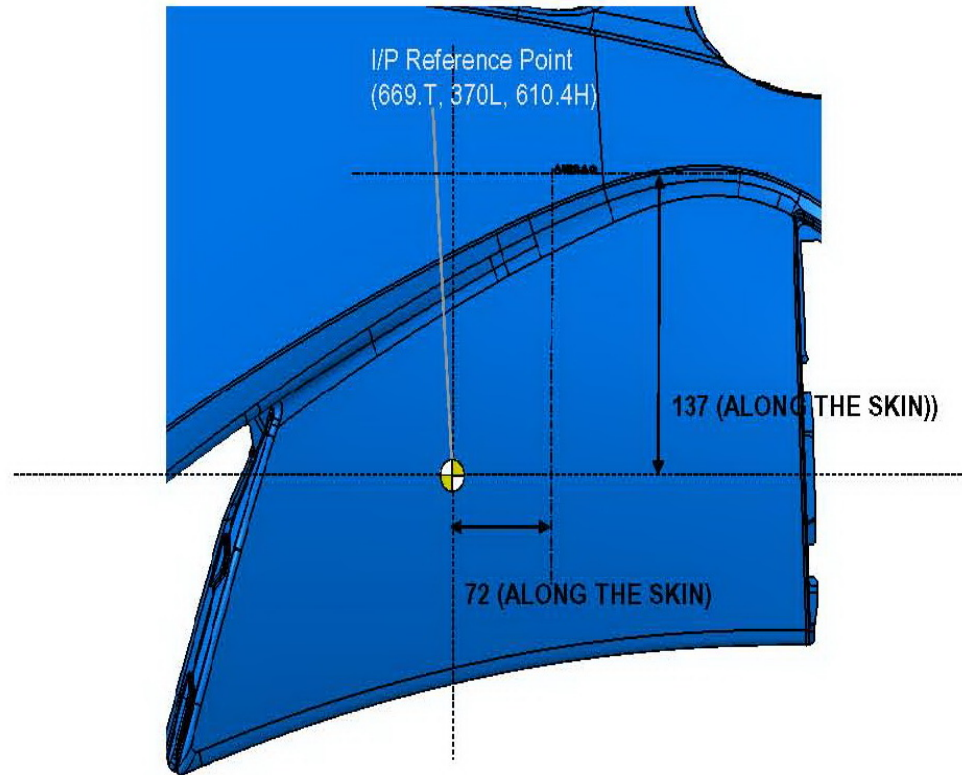
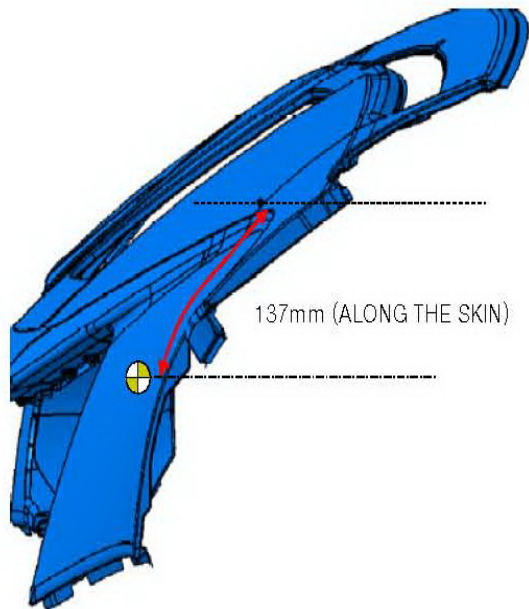




Post-Test 6YO P2 Passenger Dummy Airbag Right Side View



Measurement Method. 1



## APPENDIX E

### SUPPRESSION PHOTOGRAPHS

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Angel Guard Angel Ride Car Bed Belted, Forward Seat Track



Angel Guard Angel Ride Car Bed Belted, Middle Seat Track



Angel Guard Angel Ride Car Bed Belted, Rearward Seat Track



Unbelted 5th Percentile Female Dummy Reactivation, Forward Seat Track



DOT/NHTSA 208 Suppression Test - 2011 Hyundai Sonata Hybrid (CB0502)  
12 Month  
Section B

Rear Facing CRS



Cosco Arriva WBase, Belted, Rear Facing, Forward Seat Track



Cosco Arriva WBase, Belted, Rear Facing, Middle Seat Track



Cosco Arriva WBase, Belted, Rear Facing, Rearward Seat Track



Cosco Arriva WBase, Unbelted, Rear Facing, Forward Seat Track



Cosco Arriva WBase, Unbelted, Rear Facing, Middle Seat Track



Cosco Arriva WBase, Unbelted, Rear Facing, Rearward Seat Track



Cosco Arriva WBase, Unbelted, Forward Facing, Forward Seat Track



Cosco Arriva WBase, Unbelted, Forward Facing, Middle Seat Track





Cosco Arriva WBase, Unbelted, Forward Facing, Rearward Seat Track



Cosco Arriva WOut Base, Belted, Rear Facing, Forward Seat Track



Cosco Arriva WOut Base, Belted, Rear Facing, Middle Seat Track



Cosco Arriva WOut Base, Belted, Rear Facing, Rearward Seat Track



DOT/NHTSA 208 Suppression Test - 2011 Hyundai Sonata Hybrid (CB0502)  
12 Month  
Section B

Rear Facing CRS



Cosco Arriva WOut Base, Unbelted, Rear Facing, Forward Seat Track



Cosco Arriva WOut Base, Unbelted, Rear Facing, Middle Seat Track



Cosco Arriva WOut Base, Unbelted, Rear Facing, Rearward Seat Track



Cosco Arriva WOut Base, Unbelted, Forward Facing, Forward Seat Track



Cosco Arriva WOut Base, Unbelted, Forward Facing, Middle Seat Track



Cosco Arriva WOut Base, Unbelted, Forward Facing, Rearward Seat Track



Unbelted 5th Percentile Female Dummy Reactivation, Rearward Seat Track





Graco Snug Ride WBase, Belted, Rear Facing, Forward Seat Track



Graco Snug Ride WBase, Belted, Rear Facing, Middle Seat Track



Graco Snug Ride WBase, Belted, Rear Facing, Rearward Seat Track



Graco Snug Ride WBase, Unbelted, Rear Facing, Forward Seat Track





Graco Snug Ride WBase, Unbelted, Rear Facing, Middle Seat Track



Graco Snug Ride WBase, Unbelted, Rear Facing, Rearward Seat Track



Graco Snug Ride WBase, Unbelted, Forward Facing, Forward Seat Track



Graco Snug Ride WBase, Unbelted, Forward Facing, Middle Seat Track





Graco Snug Ride WBase, Unbelted, Forward Facing, Rearward Seat Track



Graco Snug Ride WOut Base, Belted, Rear Facing, Forward Seat Track



Graco Snug Ride WOut Base, Belted, Rear Facing, Middle Seat Track



Graco Snug Ride WOut Base, Belted, Rear Facing, Rearward Seat Track





Graco Snug Ride WOut Base, Unbelted, Rear Facing, Forward Seat Track



Graco Snug Ride WOut Base, Unbelted, Rear Facing, Middle Seat Track



Graco Snug Ride WOut Base, Unbelted, Rear Facing, Rearward Seat Track



Graco Snug Ride WOut Base, Unbelted, Forward Facing, Forward Seat Track





Graco Snug Ride WOut Base, Unbelted, Forward Facing, Middle Seat Track



Graco Snug Ride WOut Base, Unbelted, Forward Facing, Rearward Seat Track



Unbelted 5th Percentile Female Dummy Reactivation, Middle Seat Track



Peg Perego Viaggio WBase, Belted, Rear Facing, Forward Seat Track



Peg Perego Viaggio WBase, Belted, Rear Facing, Middle Seat Track



Peg Perego Viaggio WBase, Belted, Rear Facing, Rearward Seat Track



Peg Perego Viaggio WBase, Unbelted, Rear Facing, Forward Seat Track





Peg Perego Viaggio WBase, Unbelted, Rear Facing, Middle Seat Track



Peg Perego Viaggio WBase, Unbelted, Rear Facing, Rearward Seat Track



Peg Perego Viaggio WBase, Unbelted, Forward Facing, Forward Seat Track



Peg Perego Viaggio WBase, Unbelted, Forward Facing, Middle Seat Track





Peg Perego Viaggio WBase, Unbelted, Forward Facing, Rearward Seat Track



Peg Perego Viaggio WOut Base, Belted, Rear Facing, Forward Seat Track



Peg Perego Viaggio WOut Base, Belted, Rear Facing, Middle Seat Track



Peg Perego Viaggio WOut Base, Belted, Rear Facing, Rearward Seat Track



Peg Perego Viaggio WOut Base, Unbelted, Rear Facing, Forward Seat Track



Peg Perego Viaggio WOut Base, Unbelted, Rear Facing, Middle Seat Track



Peg Perego Viaggio WOut Base, Unbelted, Rear Facing, Rearward Seat Track



Peg Perego Viaggio WOut Base, Unbelted, Forward Facing, Forward Seat Track





Peg Perego Viaggio WOut Base, Unbelted, Forward Facing, Middle Seat Track



Peg Perego Viaggio WOut Base, Unbelted, Forward Facing, Rearward Seat Track



Unbelted 5th Percentile Female Dummy Reactivation, Forward Seat Track



DOT/NHTSA 208 Suppression Test - 2011 Hyundai Sonata Hybrid (CB0502)  
12 Month  
Section C

Forward Facing Convertible CRS



Britax Roundabout Forward Facing Belted, Forward Seat Track



Britax Roundabout Forward Facing Belted, Middle Seat Track



Britax Roundabout Forward Facing Belted, Rearward Seat Track



Britax Roundabout Forward Facing Unbelted, Forward Seat Track



Britax Roundabout Forward Facing Unbelted, Middle Seat Track



Britax Roundabout Forward Facing Unbelted, Rearward Seat Track



Britax Roundabout Rear Facing Belted, Forward Seat Track



Britax Roundabout Rear Facing Belted, Middle Seat Track



DOT/NHTSA 208 Suppression Test - 2011 Hyundai Sonata Hybrid (CB0502)  
12 Month  
Section C

Forward Facing Convertible CRS

E-19



Britax Roundabout Rear Facing Belted, Rearward Seat Track



Britax Roundabout Rear Facing Unbelted, Forward Seat Track



Britax Roundabout Rear Facing Unbelted, Middle Seat Track



Britax Roundabout Rear Facing Unbelted, Rearward Seat Track





Unbelted 5th Percentile Female Dummy Reactivation, Forward Seat Track



Cosco High Back Booster Forward Facing Belted, Forward Seat Track



Cosco High Back Booster Forward Facing Belted, Middle Seat Track



Cosco High Back Booster Forward Facing Belted, Rearward Seat Track



Cosco High Back Booster Forward Facing Unbelted, Forward Seat Track



DOT/NHTSA 208 Suppression Test - 2011 Hyundai Sonata Hybrid (CB0502)  
12 Month  
Section C

Forward Facing Convertible CRS



Cosco High Back Booster Forward Facing Unbelted, Middle Seat Track



Cosco High Back Booster Forward Facing Unbelted, Rearward Seat Track



Cosco High Back Booster Rear Facing Unbelted, Forward Seat Track

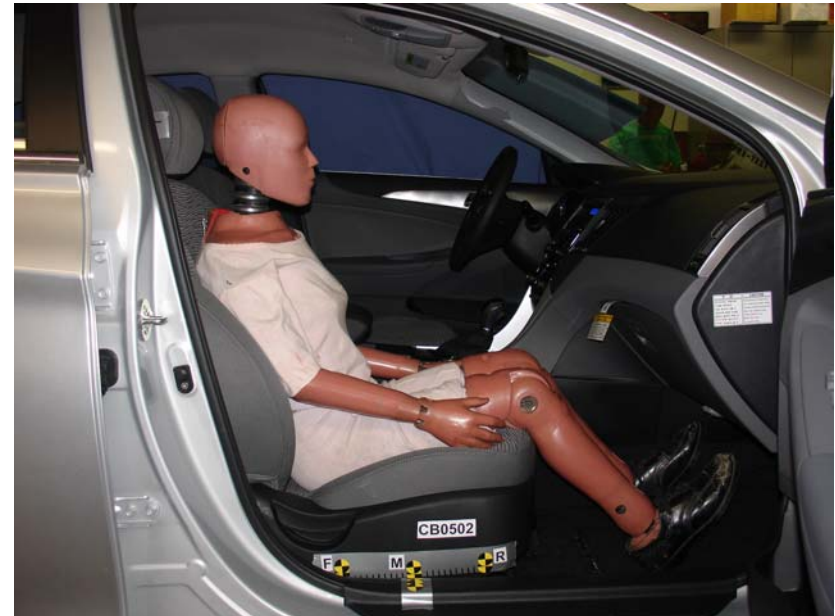


Cosco High Back Booster Rear Facing Unbelted, Middle Seat Track





Cosco High Back Booster Rear Facing Unbelted, Rearward Seat Track



Unbelted 5th Percentile Female Dummy Reactivation, Middle Seat Track



Evenflo Tribute Forward Facing Belted, Forward Seat Track



Evenflo Tribute Forward Facing Belted, Middle Seat Track



Evenflo Tribute Forward Facing Belted, Rearward Seat Track



Evenflo Tribute Forward Facing Unbelted, Forward Seat Track





Evenflo Tribute Forward Facing Unbelted, Middle Seat Track



Evenflo Tribute Forward Facing Unbelted, Rearward Seat Track



Evenflo Tribute Rear Facing Belted, Forward Seat Track



Evenflo Tribute Rear Facing Belted, Middle Seat Track





Evenflo Tribute Rear Facing Belted, Rearward Seat Track



Evenflo Tribute Rear Facing Unbelted, Forward Seat Track



Evenflo Tribute Rear Facing Unbelted, Middle Seat Track



Evenflo Tribute Rear Facing Unbelted, Rearward Seat Track



Unbelted 5th Percentile Female Dummy Reactivation, Rearward Seat Track





Graco Safeseat Forward Facing Belted, Forward Seat Track



Graco Safeseat Forward Facing Belted, Middle Seat Track



Graco Safeseat Forward Facing Belted, Rearward Seat Track



Graco Safeseat Forward Facing Unbelted, Forward Seat Track





Graco Safeseat Forward Facing Unbelted, Middle Seat Track



Graco Safeseat Forward Facing Unbelted, Rearward Seat Track



Graco Safeseat Rear Facing Unbelted, Forward Seat Track



Graco Safeseat Rear Facing Unbelted, Middle Seat Track



Graco Safeseat Rear Facing Unbelted, Rearward Seat Track



Unbelted 5th Percentile Female Dummy Reactivation, Middle Seat Track

## APPENDIX F

### INSTRUMENTATION CALIBRATION

#### INSTRUMENTS FOR DRIVER DUMMY NO.: 401

|                       | SERIAL NO. | MANUFACTURER | CALIBRATION DATE |
|-----------------------|------------|--------------|------------------|
| Head X                | AH5P1      | Endevco      | 02/13/12         |
| Head Y                | AH467      | Endevco      | 02/13/12         |
| Head Z                | AGH90      | Endevco      | 02/13/12         |
| Neck Load Cell        | N701       | Denton       | 10/04/11         |
| Chest X               | AGH74      | Endevco      | 02/13/12         |
| Chest Y               | C10686     | Endevco      | 02/13/12         |
| Chest Z               | C13046     | Endevco      | 02/13/12         |
| Chest Displacement    | 401        | Servo        | 02/16/12         |
| Left Femur Load Cell  | F995       | Denton       | 12/28/11         |
| Right Femur Load Cell | F991       | Denton       | 12/28/11         |

#### INSTRUMENTS FOR PASSENGER DUMMY NO.: 403

|                       | SERIAL NO. | MANUFACTURER | CALIBRATION DATE |
|-----------------------|------------|--------------|------------------|
| Head X                | C12863     | Endevco      | 02/16/12         |
| Head Y                | AGH79      | Endevco      | 02/16/12         |
| Head Z                | AGH55      | Endevco      | 02/16/12         |
| Neck Load Cell        | N356       | Denton       | 11/28/11         |
| Chest X               | AH5N9      | Endevco      | 02/16/12         |
| Chest Y               | AH5D9      | Endevco      | 02/16/12         |
| Chest Z               | AH5L1      | Endevco      | 02/16/12         |
| Chest Displacement    | 403        | Servo        | 02/16/12         |
| Left Femur Load Cell  | F1362      | Denton       | 09/21/11         |
| Right Femur Load Cell | F1361      | Denton       | 09/21/11         |



**INSTRUMENTS FOR LOW RISK 5<sup>TH</sup> FEMALE DUMMY NO.: 510 (P1 & P2)**

|                       | SERIAL NO. | MANUFACTURER | CALIBRATION DATE |
|-----------------------|------------|--------------|------------------|
| Head X                | P66798     | Endevco      | 01/17/12         |
| Head Y                | P66799     | Endevco      | 01/17/12         |
| Head Z                | P66800     | Endevco      | 01/17/12         |
| Neck Load Cell        | N937       | Denton       | 08/02/11         |
| Chest X               | P66801     | Endevco      | 01/17/12         |
| Chest Y               | P66802     | Endevco      | 01/17/12         |
| Chest Z               | P66803     | Endevco      | 01/17/12         |
| Chest Displacement    | 510        | Servo        | 01/18/12         |
| Left Femur Load Cell  | F2025      | Denton       | 11/21/11         |
| Right Femur Load Cell | F2024      | Denton       | 11/21/11         |

**INSTRUMENTS FOR LOW RISK 3 YEAR OLD DUMMY NO.: 031 (P1 & P2)**

|                    | SERIAL NO. | MANUFACTURER | CALIBRATION DATE |
|--------------------|------------|--------------|------------------|
| Head X             | P66770     | Endevco      | 01/16/12         |
| Head Y             | P66771     | Endevco      | 01/16/12         |
| Head Z             | P66772     | Endevco      | 01/16/12         |
| Neck Load Cell     | N233       | Denton       | 11/23/11         |
| Chest X            | P66767     | Endevco      | 01/16/12         |
| Chest Y            | P66768     | Endevco      | 01/16/12         |
| Chest Z            | P66769     | Endevco      | 01/16/12         |
| Chest Displacement | 031        | Servo        | 01/17/12         |

**INSTRUMENTS FOR LOW RISK 6 YEAR OLD DUMMY NO.: 155 (P1 & P2)**

|                    | SERIAL NO. | MANUFACTURER | CALIBRATION DATE |
|--------------------|------------|--------------|------------------|
| Head X             | P73890     | Endevco      | 01/20/12         |
| Head Y             | P73891     | Endevco      | 01/20/12         |
| Head Z             | P73892     | Endevco      | 01/20/12         |
| Neck Load Cell     | N1206      | Denton       | 08/02/11         |
| Chest X            | P73894     | Endevco      | 01/20/12         |
| Chest Y            | P73955     | Endevco      | 01/20/12         |
| Chest Z            | P73956     | Endevco      | 01/20/12         |
| Chest Displacement | 155        | Servo        | 01/18/12         |

**VEHICLE INSTRUMENTS**

|                               | SERIAL NO. | MANUFACTURER | CALIBRATION DATE |
|-------------------------------|------------|--------------|------------------|
| Left Rear Seat Crossmember X  | P45392     | Endevco      | 09/12/11         |
| Right Rear Seat Crossmember X | P47115     | Endevco      | 09/12/11         |
| Top of Engine X               | P63538     | Endevco      | 12/13/11         |
| Bottom of Engine X            | P63289     | Endevco      | 01/12/12         |
| Left Brake Caliper X          | P63399     | Endevco      | 09/12/11         |
| Right Brake Caliper X         | P63516     | Endevco      | 11/04/11         |
| Instrument Panel X            | P63280     | Endevco      | 11/04/11         |
| Trunk Z                       | P59283     | Endevco      | 01/12/12         |

## **APPENDIX G**

### **NOTICE OF TEST FAILURE**



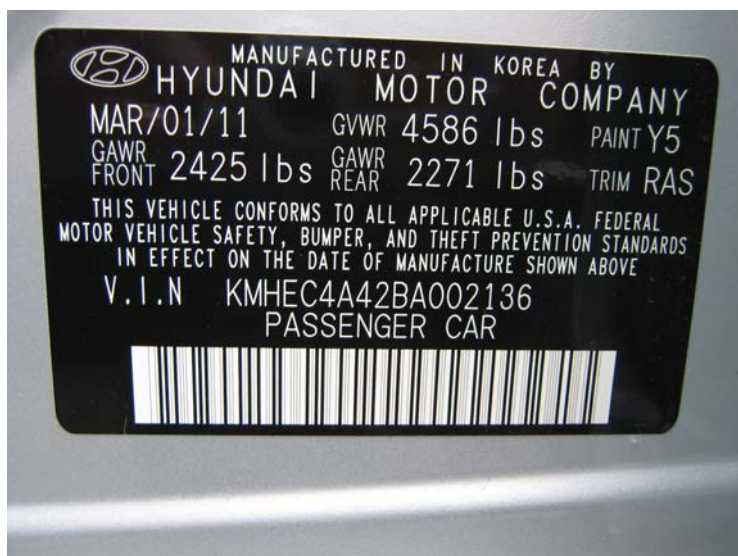
# LABORATORY NOTICE OF APPARENT TEST FAILURE TO OVSC

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FMVSS NO. 208 TEST DATE:            | February 24, 2012                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| LABORATORY:                         | MGA Research Corporation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| CONTRACT NO.:                       | DTNH22-08-D-00086                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| DELIVERY ORDER NO.:                 | 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| LABORATORY PROJECT ENGINEER'S NAME: | Jeff Lewandowski                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| TEST SPECIMEN DESCRIPTION:          | 2011 Hyundai Sonata Hybrid Passenger Car                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| VEHICLE NHTSA NO.:                  | CB0502                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| VEHICLE VIN:                        | KMHEC4A42BA002136                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| VEHICLE MANUFACTURER:               | Hyundai Motor Company                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| APPARENT TEST FAILURE DESCRIPTION:  | The detachable belt system is not permitted in the rear of passenger cars that do not have a fold down seat.<br>The center rear belt is detachable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| FMVSS REQUIREMENT, PARAGRAPHS:      | S4.1.5.5.1 Except as provided in S4.1.5.5.2, each passenger car shall have a Type 2 seat belt assembly;<br>S4.1.5.5.2 Any inboard designated seating position on a seat for which the entire seat back can be folded (including the head restraints and any other part of the vehicle attached to the seat back) such that no part of the seat back extends above a horizontal plane located 250 mm above the highest SRP located on the seat may meet the requirements of S4.1.5.5.1 by use of a belt incorporating a release mechanism that detaches both the lap and shoulder portion at either the upper or lower anchorage point, but not both. The means of detachment shall be a key or key-like object. |
| NOTIFICATION TO NHTSA (COTR):       | Brian Smith                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

REMARKS: See the attached photograph of the certification label.

BY: Jeff Lewandowski

DATE: 2/24/12



Vehicle certification label