

REPORT NUMBER: 208-MGA-2009-011

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

**KIA MOTORS CORPORATION
2009 KIA OPTIMA PASSENGER CAR
NHTSA NO.: C90508**

**PREPARED BY:
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TEST DATES: MARCH 2, 2009 – APRIL 23, 2009

FINAL REPORT DATE: JULY 22, 2010

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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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 2009 Kia Optima, NHTSA No. C90508, meets certain performance requirements of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Mounting"; FMVSS 219, "Windshield Zone Intrusion"; and FMVSS 301, "Fuel System Integrity". 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: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance

NHTSA No.: C90508
 Test Dates: 3/2/09 - 4/23/09

The following checked items indicate the tests that were performed:

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

☐ 40% Offset 0° Belted 5th female dummy driver and passenger (0 to 40 kmph)
(S18.1)

☐	22. FMVSS 204 Indicant Test
☒	23. FMVSS 212 Test
☒	24. FMVSS 219 Indicant Test
☒	25. FMVSS 301 Frontal Test

For the crash tests, the vehicle was instrumented with 8 accelerometers. The accelerometer 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 appears to meet the performance requirements to which it was tested.

SECTION 3

INJURY RESULT SUMMARY FOR FMVSS 208 TESTS

Test Vehicle: 2009 Kia Optima
Test Program: FMVSS 208 Compliance

NHTSA No.: C90508
Test Date: 3/31/09

5th Percentile Female Low Risk Deployments

5th Percentile Female SN 505 Position 1 (Chin On Module) 3/31/09

Injury Criteria	Max. Allowable Injury Assessment Values	Measured Value
HIC15	700	40
Peak Nij (Nte)	1.0	0.4
Time (ms)	NA	59.5
Peak Nij (Ntf)	1.0	0.3
Time (ms)	NA	9.3
Peak Nij (Nce)	1.0	0.4
Time (ms)	NA	151.2
Peak Nij (Ncf)	1.0	0.1
Time (ms)	NA	198.8
Neck Tension	2070 N	863
Neck Compression	2520 N	370
Chest g	60 g	13
Chest Displacement	52 mm	7
Left Femur	6805 N	108
Right Femur	6805 N	99

Second stage fire time of 100 ms; Injuries calculated on 0 ms to 225 ms

5th Percentile Female SN 505 Position 2 (Chin On Rim) 3/31/09

Injury Criteria	Max. Allowable Injury Assessment Values	Measured Value
HIC15	700	8
Peak Nij (Nte)	1.0	0.5
Time (ms)	NA	16.1
Peak Nij (Ntf)	1.0	0.2
Time (ms)	NA	26.6
Peak Nij (Nce)	1.0	0.1
Time (ms)	NA	165.9
Peak Nij (Ncf)	1.0	0.0
Time (ms)	NA	84.7
Neck Tension	2070 N	687
Neck Compression	2520 N	52
Chest g	60 g	33
Chest Displacement	52 mm	22
Left Femur	6805 N	14
Right Femur	6805 N	8

Second stage fire time of 100 ms; Injuries calculated on 0 ms to 225 ms

SECTION 3

INJURY RESULT SUMMARY FOR FMVSS 208 TESTS

Test Vehicle: 2009 Kia Optima
Test Program: FMVSS 208 Compliance

NHTSA No.: C90508
Test Date: 3/31/09

3-Year-Old Low Risk Deployments

3-Year-Old SN 032 Position 1 (Chest On Instrument Panel) 3/31/09

Injury Criteria	Max. Allowable Injury Assessment Values	Measured Value
HIC15	570	35
Peak Nij (Nte)	1.0	0.1
Time (ms)	NA	99.8
Peak Nij (Ntf)	1.0	0.2
Time (ms)	NA	12.1
Peak Nij (Nce)	1.0	0.2
Time (ms)	NA	27.3
Peak Nij (Ncf)	1.0	0.3
Time (ms)	NA	24.3
Neck Tension	1130 N	258
Neck Compression	1380 N	612
Chest g	55 g	13
Chest Displacement	34 mm	2

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

3-Year-Old SN 032 Position 2 (Head On Instrument Panel) 3/31/09

Injury Criteria	Max. Allowable Injury Assessment Values	Measured Value
HIC15	570	4
Peak Nij (Nte)	1.0	0.1
Time (ms)	NA	86.3
Peak Nij (Ntf)	1.0	0.0
Time (ms)	NA	11.7
Peak Nij (Nce)	1.0	0.4
Time (ms)	NA	35.1
Peak Nij (Ncf)	1.0	0.2
Time (ms)	NA	62.0
Neck Tension	1130 N	37
Neck Compression	1380 N	542
Chest g	55 g	7
Chest Displacement	34 mm	0

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

SECTION 3

INJURY RESULT SUMMARY FOR FMVSS 208 TESTS

Test Vehicle: 2009 Kia Optima
Test Program: FMVSS 208 Compliance

NHTSA No.: C90508
Test Dates: 4/1/09

6-Year-Old Low Risk Deployments

6-Year-Old SN 155 Position 1 (Chest On Instrument Panel) 4/1/09

Injury Criteria	Max. Allowable Injury Assessment Values	Measured Value
HIC15	700	40
Peak Nij (Nte)	1.0	0.0
Time (ms)	NA	5.5
Peak Nij (Ntf)	1.0	0.1
Time (ms)	NA	15.4
Peak Nij (Nce)	1.0	0.1
Time (ms)	NA	1.2
Peak Nij (Ncf)	1.0	0.4
Time (ms)	NA	28.7
Neck Tension	1490 N	154
Neck Compression	1820 N	748
Chest g	60 g	11
Chest Displacement	40 mm	2

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

6-Year-Old SN 155 Position 2 (Head On Instrument Panel) 4/1/09

Injury Criteria	Max. Allowable Injury Assessment Values	Measured Value
HIC15	700	7
Peak Nij (Nte)	1.0	0.1
Time (ms)	NA	18.8
Peak Nij (Ntf)	1.0	0.0
Time (ms)	NA	2.7
Peak Nij (Nce)	1.0	0.3
Time (ms)	NA	60.3
Peak Nij (Ncf)	1.0	0.2
Time (ms)	NA	12.9
Neck Tension	1490 N	187
Neck Compression	1820 N	406
Chest g	60 g	4
Chest Displacement	40 mm	0

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

SECTION 3
INJURY RESULT SUMMARY FOR FMVSS 208 TESTS

Test Vehicle: 2009 Kia Optima NHTSA No.: C90508
 Test Program: FMVSS 208 Compliance Test Date: 4/23/09

48 kmph Frontal Crash

Impact Angle: Zero degrees

Belted Dummies: X Yes No
 Speed Range: 0 to 40 kmph 32 to 40 kmph
X 0 to 48 kmph 0 to 56 kmph

Test Speed: 47.6 kmph Test Weight: 1578.5 kg

Driver Dummy: X 5th female 50th male
 Passenger Dummy: X 5th female 50th male

5th Percentile Female Frontal Crash Test
Vehicles certified to S16.1(a)(1), S16.1(a)(2), S16.1(b), or S18.1

Injury Criteria	Max. Allowable Injury Assessment Values	Driver	Passenger
HIC15	700	87	216
N _{te}	1.0	0.7	0.5
N _{tf}	1.0	0.2	0.2
N _{ce}	1.0	0.1	0.5
N _{cf}	1.0	0.2	0.1
Neck Tension	2620 N	1301	758
Neck Compression	2520 N	138	306
Chest g	60 g	36	41
Chest Displacement	52 mm	20	22
Left Femur	6805 N	1645	481
Right Femur	6805 N	2614	1014

SECTION 4
DISCUSSION OF TESTS

Test Vehicle: 2009 Kia Optima
Test Program: FMVSS 208 Compliance

NHTSA No.: C90508
Test Dates: 3/2/09 - 4/23/09

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

The photographs and real-time video signs for pre test and post test 3 year old position 1 and position 2 low risk deployments conducted on 3-31-09 incorrectly indicate that the test vehicle is a Kia Borrego. The placard in the photographs and real-time video should indicate a Kia Optima.

SECTION 5
TEST DATA SHEETS

Test Vehicle: 2009 Kia Optima
Test Program: FMVSS 208 Compliance

NHTSA No.: C90508
Test Dates: 3/2/09 - 4/23/09

DATA SHEET 1

COTR VEHICLE WORK ORDER

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance

NHTSA No.: C90508
 Test Dates: 3/2/09 - 4/23/09

COTR Signature: Brian Smith

Test to be performed for this vehicle are checked below:

- | | |
|-------------------------------------|--|
| ☒ | 1. Rear Seating Position Seat Belts |
| ☒ | 2. Air Bag Labels (S4.5.1) |
| ☒ | 3. Readiness Indicator (S4.5.2) |
| ☒ | 4. Passenger Air Bag Manual Cut-off Device (S4.5.4) |
| ☒ | 5. Lap Belt Lockability (S7.1.1.5) |
| ☒ | 6. Seat Belt Warning System (S7.3) |
| ☒ | 7. Seat Belt Contact Force (S7.4.3) |
| ☒ | 8. Seat Belt Latch Plate Access (S7.4.4) |
| ☒ | 9. Seat Belt Retraction (S7.4.5) |
| ☒ | 10. Seat Belt Guides and Hardware (S7.4.6) |
| ☒ | 11. Air bag suppression telltale (S19.2.2) |
| ☒ | 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)

☒	Britax Handle with Care 191	☒	Full Rearward	☒	Mid Position	☒	Full Forward
	Century Assura 4553		Full Rearward		Mid Position		Full Forward
	Century Smart Fit 4543		Full Rearward		Mid Position		Full Forward
	Cosco Arriva 02727		Full Rearward		Mid Position		Full Forward
	Cosco Opus 35 02603		Full Rearward		Mid Position		Full Forward
	Evenflo Discovery Adjust Right 212		Full Rearward		Mid Position		Full Forward
☒	Evenflo First Choice 204	☒	Full Rearward	☒	Mid Position	☒	Full Forward
☒	Graco Infant 8457	☒	Full Rearward	☒	Mid Position	☒	Full Forward

Section C – Convertible (unbelted and belted rear facing, unbelted and belted forward facing)

☒	Britax Roundabout 161	☒	Full Rearward	☒	Mid Position	☒	Full Forward
☒	Century Encore 4612	☒	Full Rearward	☒	Mid Position	☒	Full Forward
	Century STE 1000 4416		Full Rearward		Mid Position		Full Forward
	Cosco Olympian 02803		Full Rearward		Mid Position		Full Forward
	Cosco Touriva 02519		Full Rearward		Mid Position		Full Forward
	Evenflo Horizon V 425		Full Rearward		Mid Position		Full Forward
☒	Evenflo Medallion 254	☒	Full Rearward	☒	Mid Position	☒	Full Forward

- | | |
|-------------------------------------|--|
| ☒ | 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)

☒	Cosco Dream Ride 02-719	☒	Full Rearward	☒	Mid Position	☒	Full Forward
-------------------------------------	-------------------------	-------------------------------------	---------------	-------------------------------------	--------------	-------------------------------------	--------------

- | | |
|--------------------------|--|
| ☐ | 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)

☐	Britax Roundabout 161	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Century Encore 4612	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Century STE 1000 4416	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Cosco Olympian 02803	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Cosco Touriva 02519	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Evenflo Horizon V 425	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Evenflo Medallion 254	☐	Full Rearward	☐	Mid Position	☐	Full Forward

Section D – Toddler/Belt Positioning Booster (Belted)

☐	Britax Roadster 9004	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Century Next Step 4920	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Cosco High Back Booster 02-442	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Evenflo Right Fit 245	☐	Full Rearward	☐	Mid Position	☐	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)

☐	Britax Roundabout 161	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Century Encore 4612	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Century STE 1000 4416	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Cosco Olympian 02803	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Cosco Touriva 02519	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Evenflo Horizon V 425	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Evenflo Medallion 254	☐	Full Rearward	☐	Mid Position	☐	Full Forward

Section D – Toddler/Belt Positioning Booster (Belted)

☐	Britax Roadster 9004	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Century Next Step 4920	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Cosco High Back Booster 02-442	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Evenflo Right Fit 245	☐	Full Rearward	☐	Mid Position	☐	Full Forward

- ☐ 16. Suppression tests with 3-year-old dummy (Part 572, Subpart P) in the following positions (mid-height seat position):

☐	Sitting on seat with back against seat back (S22.2.2.1)	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Sitting on seat with back against reclined seat back (S22.2.2.2)	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Sitting on seat with back not against seat back (S22.2.2.3)	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Sitting on seat edge, spine vertical, hands by the child's side (S22.2.2.4)	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Standing on seat, facing forward (S22.2.2.5)	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Kneeling on seat facing forward (S22.2.2.6)	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Kneeling on seat facing rearward (S22.2.2.7)	☐	Full Rearward	☐	Mid Position	☐	Full Forward
☐	Lying on seat (S22.2.2.8)	☐	Full Rearward	☐	Mid Position	☐	Full Forward

- ☐ 17. Suppression tests with representative 3-year-old child in the following positions (mid-height seat position):

☐	Sitting on seat with back against seat back (S22.2.2.1)		
☐	☐ Full Rearward	☐ Mid Position	☐ Full Forward
☐	Sitting on seat with back against reclined seat back (S22.2.2.2)		
☐	☐ Full Rearward	☐ Mid Position	☐ Full Forward
☐	Sitting on seat with back not against seat back (S22.2.2.3)		
☐	☐ Full Rearward	☐ Mid Position	☐ Full Forward
☐	Sitting on seat edge, spine vertical, hands by the child's side (S22.2.2.4)		
☐	☐ Full Rearward	☐ Mid Position	☐ Full Forward
☐	Standing on seat, facing forward (S22.2.2.5)		
☐	☐ Full Rearward	☐ Mid Position	☐ Full Forward
☐	Kneeling on seat facing forward (S22.2.2.6)		
☐	☐ Full Rearward	☐ Mid Position	☐ Full Forward
☐	Kneeling on seat facing rearward (S22.2.2.7)		
☐	☐ Full Rearward	☐ Mid Position	☐ Full Forward
☐	Lying on seat (S22.2.2.8)		
☐	☐ Full Rearward	☐ Mid Position	☐ 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

☐	Britax Roadster 9004	☐ Full Rearward	☐ Mid Position	☐ Full Forward
☐	Century Next Step 4920	☐ Full Rearward	☐ Mid Position	☐ Full Forward
☐	Cosco High Back Booster 02-442	☐ Full Rearward	☐ Mid Position	☐ Full Forward
☐	Evenflo Right Fit 245	☐ Full Rearward	☐ Mid Position	☐ 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

☐	Britax Roadster 9004	☐ Full Rearward	☐ Mid Position	☐ Full Forward
☐	Century Next Step 4920	☐ Full Rearward	☐ Mid Position	☐ Full Forward
☐	Cosco High Back Booster 02-442	☐ Full Rearward	☐ Mid Position	☐ Full Forward
☐	Evenflo Right Fit 245	☐ Full Rearward	☐ Mid Position	☐ Full Forward

- ☐ 20. Suppression tests with 6-year-old dummy (Part 572, Subpart N) in the following positions (mid-height seat position):

☐	Sitting on seat with back against seat back (S22.2.2.1)		
☐	☐ Full Rearward	☐ Mid Position	☐ Full Forward
☐	Sitting on seat with back against reclined seat back (S22.2.2.2)		
☐	☐ Full Rearward	☐ Mid Position	☐ Full Forward
☐	Sitting on seat edge, spine vertical, hands by the child's side (S22.2.2.4)		
☐	☐ Full Rearward	☐ Mid Position	☐ Full Forward
☐	Sitting back in the seat and leaning on the right front passenger door (S24.2.3)		
☐	☐ Full Rearward	☐ Mid Position	☐ Full Forward

- ☐ 21. Suppression tests with representative 6-year-old child in the following positions (mid-height seat position):

☐	Sitting on seat with back against seat back (S22.2.2.1)		
☐	☐ Full Rearward	☐ Mid Position	☐ Full Forward
☐	Sitting on seat with back against reclined seat back (S22.2.2.2)		
☐	☐ Full Rearward	☐ Mid Position	☐ Full Forward
☐	Sitting on seat edge, spine vertical, hands by the child's side (S22.2.2.4)		
☐	☐ Full Rearward	☐ Mid Position	☐ Full Forward
☐	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 5th percentile female dummy (S20.3, 22.3, S24.3) (mid-height seat position). Perform this test after the following suppression tests:
- ☒ 23. Test of Reactivation of the Passenger Air Bag System with a representative 5th percentile female (S20.3, 22.3, S24.3) (mid-height seat position). Perform this test after the following suppression tests: After each restraint.
- ☐ 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

☐	Britax Handle with Care 191
☐	Century Assura 4553
☐	Century Smart Fit 4543
☐	Cosco Arriva 02727
☐	Evenflo Discovery Adjust Right 212
☐	Evenflo First Choice 204
☐	Graco Infant 8457

Section C

☐	Britax Roundabout 161
☐	Century Encore 4612
☐	Century STE 1000 4416
☐	Cosco Olympian 02803
☐	Cosco Touriva 02519
☐	Evenflo Horizon V 425
☐	Evenflo Medallion 254

- ☒ 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 5th 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:
☐	Belted 50 th male dummy driver and passenger (0 to 48 kmph) (S5.1.1(a))		
☐	Unbelted 50 th male dummy driver and passenger (0 to 48 kmph) (S5.1.2(a)(1))		
☐	Unbelted 50 th male dummy driver and passenger (32 to 40 kmph) (S5.1.2(a)(2) or S5.1.2(b))		

X	Frontal 0° - Test Speed: 47.6 kmph
	Belted 50 th male dummy driver (0 to 48 kmph) (S5.1.1.(b)(1) or S5.1.1(a))
	Belted 50 th male dummy passenger (0 to 48 kmph) (S5.1.1.(b)(1) or S5.1.1(a))
X	Belted 5 th female dummy driver (0 to 48 kmph) (S16.1(a)(1))
X	Belted 5 th female dummy passenger (0 to 48 kmph) (S16.1(a)(1))
	Belted 5 th female dummy driver and passenger (0 to 56 kmph) (S16.1(a)(2))
	Belted 50 th male dummy driver and passenger (0 to 56 kmph) (S5.1.1.(b)(2))
	Unbelted 50 th male dummy driver and passenger (0 to 48 kmph) (S5.1.2(a) (1))
	Unbelted 50 th male dummy driver (32 to 40 kmph) (S5.1.2.(a)(2) or S5.1.2(b))
	Unbelted 50 th male dummy passenger (32 to 40 kmph) (S5.1.2.(a)(2) or S5.1.2(b))
	Unbelted 5 th female dummy driver (32 to 40 kmph) (S16.1(b))
	Unbelted 5 th female dummy passenger (32 to 40 kmph) (S16.1(b))
	40% Offset 0° Belted 5 th female dummy driver and passenger (0 to 40 kmph) (S18.1)
	Test Speed:

	29. FMVSS 204 Indicant Test
X	30. FMVSS 212 Test
X	31. FMVSS 219 Indicant Test
X	32. FMVSS 301 Frontal Test

DATA SHEET 2
REPORT OF VEHICLE CONDITION

Test Vehicle: 2009 Kia Optima
Test Program: FMVSS 208 Compliance

NHTSA No.: C90508
Test Dates: 3/2/09-4/23/09

CONTRACT NO.: DTNH22-08-D-00086

Date: 4/29/09

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: 2009 Kia Optima 4 Door

MANUFACTURE DATE: 08/08

NHTSA NO. C90508

GVWR: 1910 kg (4211 lbs)

BODY COLOR: Silver

GAWR (Fr): 1120 kg (2469 lbs)

VIN: KNAGE228695281958

GAWR (Rr): 1020 kg (2249 lbs)

ODOMETER READINGS: ARRIVAL (miles): 133 DATE: 2/12/09

COMPLETION (miles): 143 DATE: 4/23/09

PURCHASE PRICE: (\$) 15,292

DEALER'S NAME: Boucher Fleet Group – 1421 East Moreland Blvd., Waukesha, 58186

- 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

VEHICLE: 2009 Kia Optima

NHTSA NO.: C90508

REMARKS:

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

Trunk carpet, spare tire, jack and right rear taillight

Explanation for equipment removal:

Components removed for instrumentation installation and to meet target weight.

Test Vehicle Condition:

30 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: 4/29/2009

APPROVED BY: David Winkelbauer

DATE: 4/29/2009

#####

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

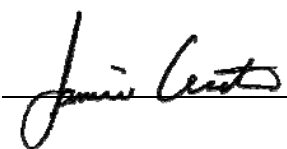
CERTIFICATION LABEL AND TIRE PLACARD INFORMATION

Test Vehicle: 2009 Kia Optima
Test Program: FMVSS 208 Compliance
Test Technician: Jamie Aide

NHTSA No.: C90508
Test Date: 4/23/09

Certification Label (Part 567)	
Manufacturer:	KIA MOTORS CORPORATION
Date of Manufacture:	08/08
VIN:	KNAGE228695281958
Vehicle Certified As (Pass. Car/MPV/Truck/Bus):	Passenger Car
Front Axle GVWR:	1120 kg (2469 lbs)
Rear Axle GVWR:	1020 kg (2249 lbs)
Total GVWR:	1910 kg (4211 lbs)

Tire Placard for Motor Vehicles with GVWR of 10,000 lb or Less and Passenger Cars (571.110)	
Vehicle Capacity Weight:	385 kg (849 lbs)
Designated Seating Capacity Front:	2
Designated Seating Capacity Rear:	3
Total Designated Seating Capacity:	5
Recommended Cold Tire Inflation Pressure Front:	220 kpa (32psi)
Recommended Cold Tire Inflation Pressure Rear:	220 kpa (32psi)
Recommended Tire Size:	P205/60R16
Tire Size on Vehicle:	P205/60R16

Signature: 
Date: 4/23/09

DATA SHEET 4
REAR SEATING POSITION SEAT BELTS

Test Vehicle: 2009 Kia Optima
Test Program: FMVSS 208 Compliance
Test Technician: Wayne Dahlke

NHTSA No.: C90508
Test Date: 3/2/09

	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.

REMARKS:

Signature: Wayne Dahlke

Date: 3/2/09

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

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Wayne Dahlke

NHTSA No.: C90508
 Test Date: 3/2/09

☒	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

X

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.

X

X

X

X

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

X

3.3

Is the label heading area yellow with the word "WARNING" and the alert symbol in black? (S4.5.1(b)(3)(i))

X

X

X

X

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

X

3.4

Is the message area white with black text? (S4.5.1(b)(3)(ii))

X

X

X

X

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 cm²? (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 87 mm, Width 40 mm
 Passenger Side: Length 87 mm, Width 40 mm
 Driver actual message area 34.8 cm²
 Passenger actual message area 34.8 cm²
- ☒ 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: 34 mm
 Passenger side: Length: 34 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)
X 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 cm²? (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 _____ cm²

- ☐ 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

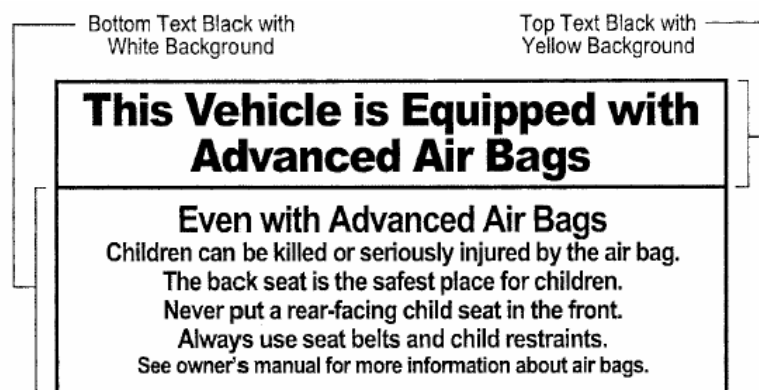


Figure 12. Removable Label on Dash.

- ☒ 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 cm²? (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 116 mm , Width 33 mm
Actual message area 38.3 cm²
- ☒ Yes – Pass
☐ No - Fail

I certify that I have read and performed each instruction.

Signature: Wayne Zable

Date: 3/2/09

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

Test Vehicle: 2009 Kia Optima
Test Program: FMVSS 208 Compliance
Test Technician: Wayne Dahlke

NHTSA No.: C90508
Test Date: 3/2/09

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 Right*
- ☒ 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: 3/2/09

DATA SHEET 7

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

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Wayne Dahlke

NHTSA No.: C90508
 Test Date: 3/2/09

- | | | |
|-------------------------------------|---------|--|
| ☒ | 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 <u>driver's seat</u> . (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:

I certify that I have read and performed each instruction.

Signature: Wayne Gahlh

Date: 3/2/09

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: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Wayne Dahlke

NHTSA No.: C90508
 Test Date: 3/2/09

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
------------------------------	-----------------

☐		N/A – No retractor is at this position
☐		N/A – The retractor is an automatic locking retractor ONLY
☒	1.	Record test fore-aft seat position: REAR (S7.1.1.5(c)(1)) (Any position is acceptable)
☒	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 NOT 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))
		☒ Yes – Pass
		☐ No – Fail
☒	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 NOT require inverting, twisting or deforming of the belt webbing. (S7.1.1.5(a))
		☒ Yes – Pass
		☐ No – Fail
☒	4.	Place any adjustable seat belt anchorage in the lowest adjustment position.
		☐ N/A The anchorage is not adjustable.
☒	5.	Buckle the seat belt. (S7.1.1.5(c)(1))
☒	6.	Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))
☒	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))
☒	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?
		☒ Yes (go to 8.1)
		☐ No (go to 9)
☒	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))
		☒ Yes – Pass
		☐ No – Fail
☒	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): <u>79</u>

- ☒ 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: 43 $\frac{3}{4}$ 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: 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: 27 $\frac{3}{4}$ 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: 28 $\frac{1}{4}$ 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))
- ☒ $14 - 13 = 44 - 43 \frac{3}{4} = \frac{1}{4}$ inch;
- ☒ $18 - 17 = 28 \frac{1}{4} - 27 \frac{3}{4} = \frac{1}{2}$ 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 = $79 - 44 = 35$ inches;
- ☒ 10-18 = $79 - 28 \frac{1}{4} = 50 \frac{3}{4}$ inches
- ☒ Yes – Pass
- ☐ No – Fail

REMARKS:

Signature: Wayne Zahle Date: 3/2/09

I certify that I have read and performed each instruction.

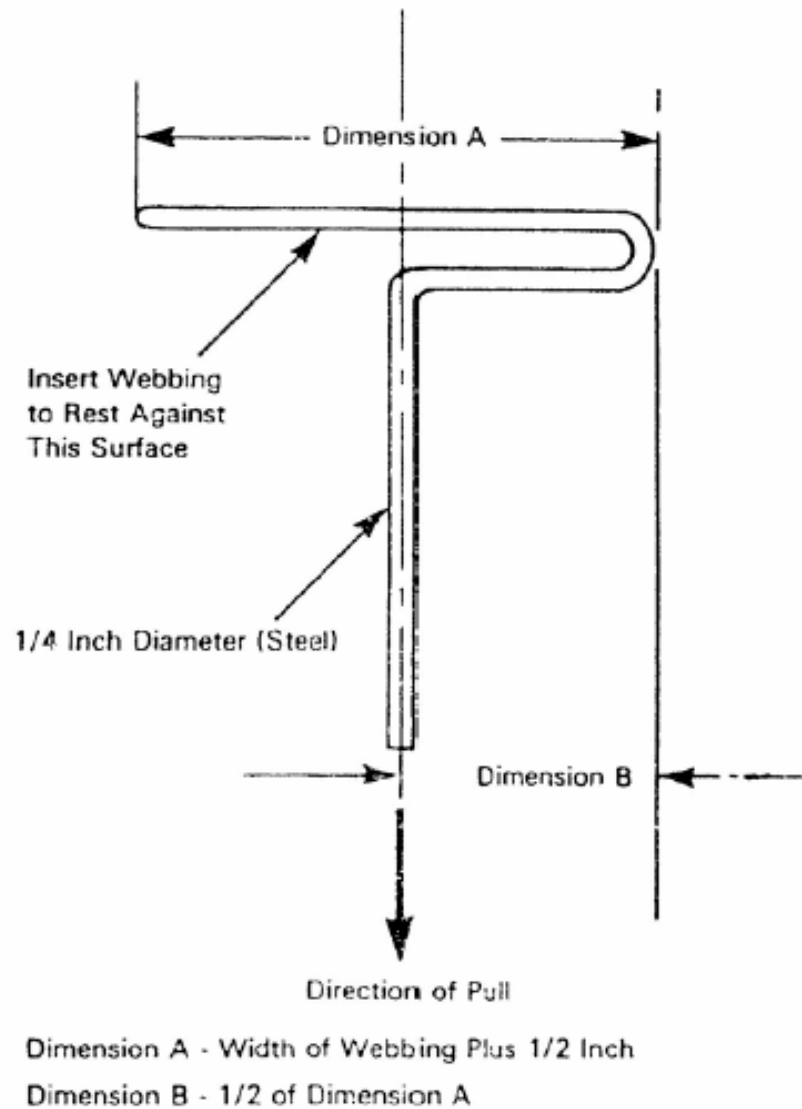


Figure 5. - Webbing Tension Pull Device

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: 2009 Kia Optima
Test Program: FMVSS 208 Compliance
Test Technician: Jaime Aide

NHTSA No.: C90508
Test Date: 3/2/09

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
------------------------------	---------------------

☐		N/A – No retractor is at this position
☐		N/A – The retractor is an automatic locking retractor ONLY
☒	1.	Record test fore-aft seat position: FIXED (S7.1.1.5(c)(1)) (Any position is acceptable)
☒	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 NOT 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))
		☒ Yes – Pass
		☐ No – Fail
☒	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 NOT require inverting, twisting or deforming of the belt webbing. (S7.1.1.5 (a))
		☒ Yes – Pass
		☐ No – Fail
☒	4.	Place any adjustable seat belt anchorage in the lowest adjustment position.
		☒ N/A The anchorage is not adjustable.
☒	5.	Buckle the seat belt. (S7.1.1.5(c)(1))
☒	6.	Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))
☒	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))
☒	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?
		☒ Yes (go to 8.1)
		☐ No (go to 9)
☒	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))
		☒ Yes – Pass
		☐ No – Fail
☒	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): <u>63 ½</u>

- ☒ 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: 32 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: 32 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: 12 $\frac{1}{2}$ 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: 12 $\frac{1}{2}$ 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))
- ☒ $14 - 13 = 32 - 32 = 0$ inches;
- ☒ $18 - 17 = 12 \frac{1}{2} - 12 \frac{1}{2} = 0$ inches
- ☒ 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 = $63\frac{1}{2} - 32 = 31\frac{1}{2}$ inches;

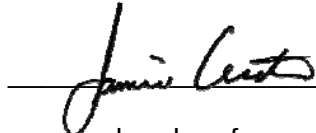
☒ 10-18 = $63\frac{1}{2} - 12\frac{1}{2} = 51$ inches

☒ Yes – Pass

☐ No – Fail

REMARKS:

Signature: _____



Date: 3/2/09

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: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Wayne Dahlke

NHTSA No.: C90508
 Test Date: 3/2/09

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
------------------------------	-----------------------

☐		N/A – No retractor is at this position
☐		N/A – The retractor is an automatic locking retractor ONLY
☒	1.	Record test fore-aft seat position: FIXED (S7.1.1.5(c)(1)) (Any position is acceptable)
☒	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 NOT 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))
		☒ Yes – Pass
		☐ No – Fail
☒	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 NOT require inverting, twisting or deforming of the belt webbing. (S7.1.1.5(a))
		☒ Yes – Pass
		☐ No – Fail
☒	4.	Place any adjustable seat belt anchorage in the lowest adjustment position.
		☒ N/A The anchorage is not adjustable.
☒	5.	Buckle the seat belt. (S7.1.1.5(c)(1))
☒	6.	Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))
☒	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))
☒	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?
		☒ Yes (go to 8.1)
		☐ No (go to 9)
☒	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))
		☒ Yes – Pass
		☐ No – Fail
☒	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): <u>61</u>

- ☒ 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: 33 $\frac{1}{2}$ 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: 33 $\frac{1}{2}$ 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: 9 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: 9 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))
- ☒ $14 - 13 = 33 \frac{1}{2} - 33 \frac{1}{2} = 0$ inches;
- ☒ $18 - 17 = 9 - 9 = 0$ inches
- ☒ 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 = $61 - 33 \frac{1}{2} = 27 \frac{1}{2}$ inches;

☒ 10-18 = $61 - 9 = 52$ inches

☒ Yes – Pass

☐ No – Fail

REMARKS:

Signature: Wayne Zuhl Date: 3/2/09

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: 2009 Kia Optima
Test Program: FMVSS 208 Compliance
Test Technician: Wayne Dahlke

NHTSA No.: C90508
Test Date: 3/2/09

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
------------------------------	----------------------

☐		N/A – No retractor is at this position
☐		N/A – The retractor is an automatic locking retractor ONLY
☒	1.	Record test fore-aft seat position: FIXED (S7.1.1.5(c)(1)) (Any position is acceptable)
☒	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 NOT 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))
		☒ Yes – Pass
		☐ No – Fail
☒	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 NOT require inverting, twisting or deforming of the belt webbing. (S7.1.1.5(a))
		☒ Yes – Pass
		☐ No – Fail
☒	4.	Place any adjustable seat belt anchorage in the lowest adjustment position.
		☒ N/A The anchorage is not adjustable.
☒	5.	Buckle the seat belt. (S7.1.1.5(c)(1))
☒	6.	Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))
☒	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))
☒	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?
		☒ Yes (go to 8.1)
		☐ No (go to 9)
☒	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))
		☒ Yes – Pass
		☐ No – Fail
☒	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): <u>61 ½</u>

- ☒ 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: 33 $\frac{1}{2}$ 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: 33 $\frac{1}{2}$ 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: 12 $\frac{1}{2}$ 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: 12 $\frac{1}{2}$ 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 = 33 $\frac{1}{2}$ - 33 $\frac{1}{2}$ = 0 inches;
- ☒ 18 – 17 = 12 $\frac{1}{2}$ - 12 $\frac{1}{2}$ = 0 inches
- ☒ 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 = $61\frac{1}{2} - 33\frac{1}{2} = 28$ inches;

☒ 10-18 = $61\frac{1}{2} - 12\frac{1}{2} = 49$ inches

☒ Yes – Pass

☐ No – Fail

REMARKS:

Signature: Wayne Zuhl Date: 3/2/09

I certify that I have read and performed each instruction.

DATA SHEET 9

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

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Wayne Dahlke

NHTSA No.: C90508
 Test Date: 3/2/09

- | | | |
|-------------------------------------|-----|---|
| ☒ | 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 <u>6</u> 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 <u>6</u> 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 <u>6</u> 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 |

I certify that I have read and performed each instruction.

Signature: _____

Wayne Dahlke

Date: 3/2/09

DATA SHEET 10

BELT CONTACT FORCE (S7.4.3)

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Wayne Dahlke

NHTSA No.: C90508
 Test Date: 3/2/09

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;">X</div> | 1. | Does the vehicle incorporate a webbing tension-relieving device? |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"></div> Yes (this form is complete) |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">X</div> No (continue with this check sheet) |
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">X</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) |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">X</div> N/A – No lumbar adjustment |
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">X</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) |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">X</div> N/A – No additional support adjustment |
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">X</div> | 4. | Is the fore-aft position of the seat adjustable? |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">X</div> No – go to 5 |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"></div> Yes – go to 4.1 |
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"></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. Mark this position. (8/31/95 legal interp 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> | 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 interp 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> | 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 interp 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> | 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> | 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;">X</div> | 5. | Is the seat back angle adjustable? |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">X</div> No- go to 6 |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"></div> Yes- go to 5.1 |
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"></div> | 5.1 | Set and mark seat back angle, if adjustable, at the manufacturer's nominal design riding position for a 50 th percentile adult male in the manner specified by the manufacturer. |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"></div> N/A – No seat back angle adjustment |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"></div> Manufacturer's design seat back angle: _____ |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"></div> 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): **0.5**
- ☒ 0.0 to 0.7 pounds – Pass
- ☐ Greater than 0.7 pounds - FAIL

REMARKS:

I certify that I have read and performed each instruction.

Signature: Wayne Gahl

Date: 3/2/09

DATA SHEET 10

BELT CONTACT FORCE (S7.4.3)

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Wayne Dahlke

NHTSA No.: C90508
 Test Date: 3/2/09

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
------------------------------	-----------------------

- | | | |
|---|-----|---|
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">X</div> | 1. | Does the vehicle incorporate a webbing tension-relieving device? |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"></div> Yes (this form is complete) |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">X</div> No (continue with this check sheet) |
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">X</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) |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">X</div> N/A – No lumbar adjustment |
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">X</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) |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">X</div> N/A – No additional support adjustment |
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">X</div> | 4. | Is the fore-aft position of the seat adjustable? |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">X</div> No – go to 5 |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"></div> Yes – go to 4.1 |
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"></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. Mark this position. (8/31/95 legal interp 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> | 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 interp 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> | 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 interp 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> | 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> | 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;">X</div> | 5. | Is the seat back angle adjustable? |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">X</div> No- go to 6 |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"></div> Yes- go to 5.1 |
| <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"></div> | 5.1 | Set and mark seat back angle, if adjustable, at the manufacturer's nominal design riding position for a 50 th percentile adult male in the manner specified by the manufacturer. |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"></div> N/A – No seat back angle adjustment |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"></div> Manufacturer's design seat back angle: _____ |
| | | <div style="background-color: yellow; border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"></div> 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): **0.5**
- ☒ 0.0 to 0.7 pounds – Pass
- ☐ **Greater than 0.7 pounds - FAIL**

REMARKS:

I certify that I have read and performed each instruction.

Signature: Wayne J. Hall

Date: 3/2/09

DATA SHEET 10

BELT CONTACT FORCE (S7.4.3)

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Wayne Dahlke

NHTSA No.: C90508
 Test Date: 3/2/09

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
------------------------------	----------------------

- | | | |
|-------------------------------------|-----|---|
| ☒ | 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 interp 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 interp 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 interp 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 th 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): 0.4 ☒ 0.0 to 0.7 pounds – Pass ☐ Greater than 0.7 pounds - FAIL

REMARKS:

I certify that I have read and performed each instruction.

Signature: Wayne Zahl

Date: 3/2/09

DATA SHEET 11

LATCH PLATE ACCESS (S7.4.4)

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Wayne Dahlke

NHTSA No.: C90508
 Test Date: 3/2/09

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 interp 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 **50th 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 50th 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:

I certify that I have read and performed each instruction.

Signature: Wayne J. Ahl

Date: 3/2/09

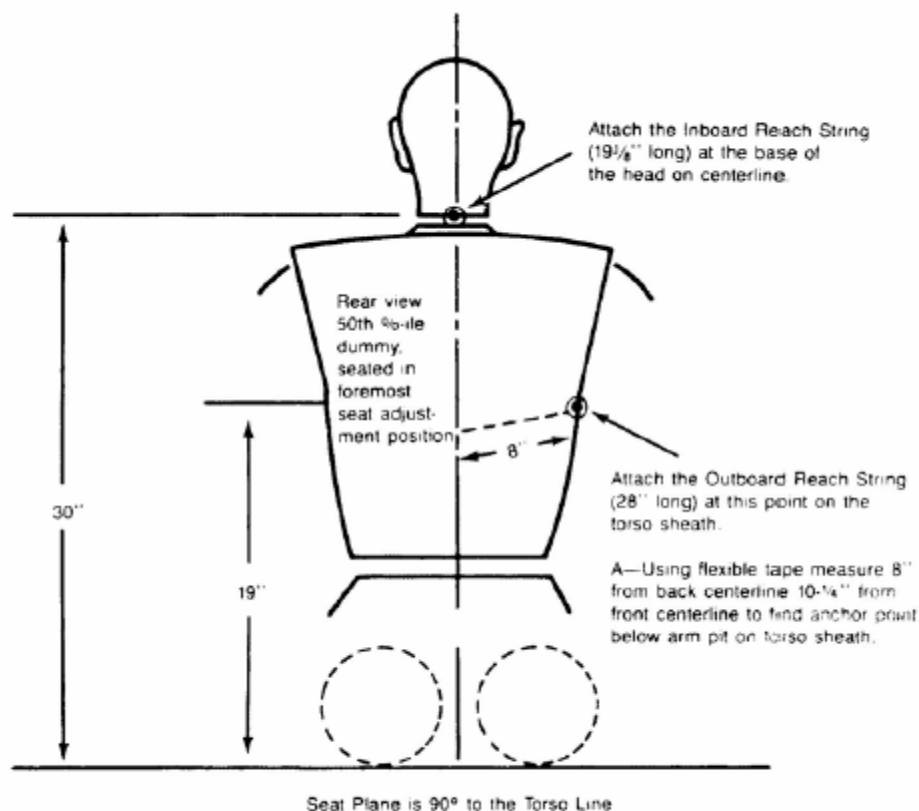


Figure 3. Location of Anchoring Points for Latchplate Reach Limiting Chains or Strings to Test for Latchplate Accessibility Using Subpart E Test Device

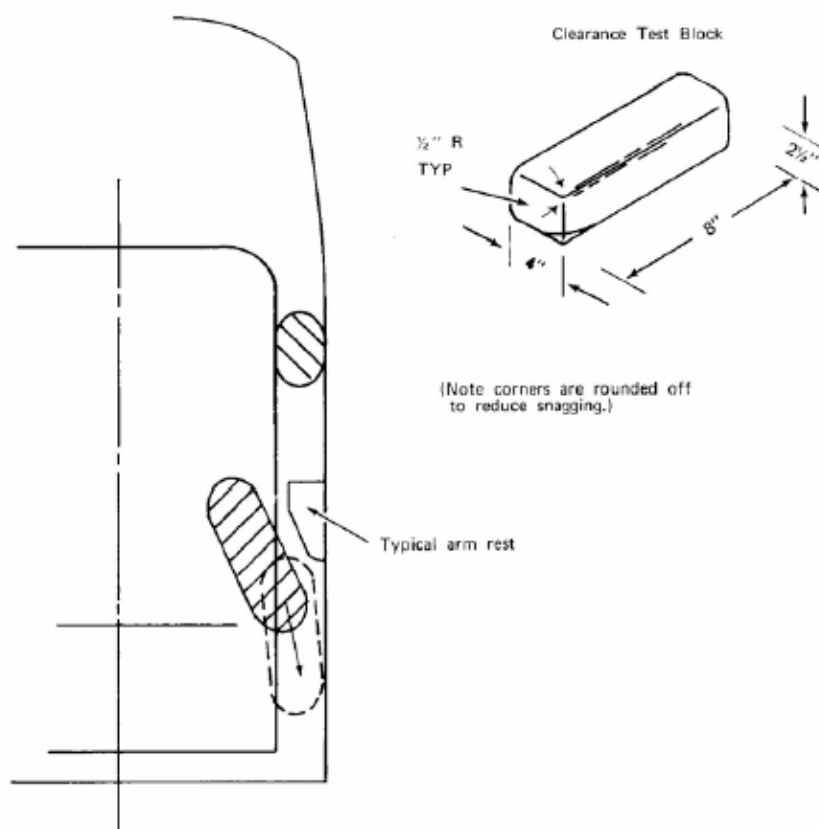


Figure 4—USE OF CLEARANCE TEST BLOCK TO DETERMINE HAND/ARM ACCESS

DATA SHEET 12

SEAT BELT RETRACTION (S7.4.5)

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Wayne Dahlke

NHTSA No.: C90508
 Test Date: 3/2/09

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
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- ☒ 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 interp 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 interp 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 interp 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 **50th 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. _____
- ☐ 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 11.2
- ☐ 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?
- ☐ N/A – Not an open body vehicle
- ☐ Yes – Pass
- ☐ No – Fail

REMARKS:

Signature: Wayne Jahlh

Date: 3/2/09

I certify that I have read and performed each instruction.

DATA SHEET 13

SEAT BELT GUIDES AND HARDWARE (S7.4.6)

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Wayne Dahlke

NHTSA No.: C90508
 Test Date: 3/2/09

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

- | | | | | |
|-------------------------------------|-----|--|---|--|
| ☒ | 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 |
| ☒ | 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: 3/2/09

I certify that I have read and performed each instruction.

DATA SHEET 13

SEAT BELT GUIDES AND HARDWARE (S7.4.6)

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Wayne Dahlke

NHTSA No.: C90508
 Test Date: 3/2/09

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 |
| ☒ | 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: 3/2/09

I certify that I have read and performed each instruction.

DATA SHEET 13

SEAT BELT GUIDES AND HARDWARE (S7.4.6)

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Wayne Dahlke

NHTSA No.: C90508
 Test Date: 3/2/09

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

- | | | | | |
|-------------------------------------|-----|--|---|--|
| ☒ | 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 |
| ☒ | 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: 3/2/09

I certify that I have read and performed each instruction.

DATA SHEET 16

AIR BAG SUPPRESSION TELLTALE (S19.2.2)

Test Vehicle: 2009 Kia Optima
Test Program: FMVSS 208 Compliance
Test Technician: Wayne Dahlke

NHTSA No.: C90508
Test Date: 3/16/09

- X1. Is the vehicle certified to any suppression performance standards of FMVSS 208?
X Yes - go to 2
___ No - this form is complete
- X2. Does telltale emit yellow light when the air bag is suppressed? (S19.2.2(a))
X Yes - Pass ___ **NO - FAIL**
- X3. Are the words "PASSENGER AIR BAG OFF" or "PASS AIR BAG OFF" (S19.2.2(b))
X3.1 on the telltale? (S19.2.2(b))
___ Yes - Pass, go to 4
X No - go to 3.2
- X3.2 Within 25 mm of the telltale? (S19.2.2(b)) 2 mm from the edge of the telltale light
X Yes - Pass ___ **NO - FAIL**
- X4. Is the telltale separate from the air bag readiness indicator? (S19.2.2(c))
X Yes - Pass ___ **NO - FAIL**
- X5. Is the telltale within the interior of the vehicle? (S19.2.2(d))
X Yes - Pass ___ **NO - FAIL**
- X6. 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**
- X7. 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**
- X8. 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**
- X9. Is the telltale visible or recognizable during the night? (S19.2.2(e))
X Yes - Pass ___ **NO - FAIL**
- X10. Is the telltale visible or recognizable during the day? (S19.2.2(e))
X Yes - Pass ___ **NO - FAIL**
- X11. 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**
- X12. 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**
- X13. 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**



I certify that I have read and performed each instruction.

3/16/09
Date

DATA SHEET 17 SUMMARY

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

NHTSA NO.:	C90508	TEST DATE:	3/16/09
LABORATORY:	MGA	TECHNICIANS:	WD
DUMMY TYPE:	12 Month Old	DUMMY SERIAL NO.:	062

CHILD RESTRAINT NAME:	Britax
CHILD RESTRAINT MODEL:	Handle With Care 191
DATE OF MANUFACTURE:	5-26-2000

Base: __On __Off X N/A-Restraint does not have a removable base

Manufacturer's design seat back angle: 5.2° on Headrest post
 Tested seat back angle: 5.2° on Headrest post
 Manufacturer's specified anchorage position: 2 (5 total detents, most upper as 0)
 Tested anchorage position: 2 (5 total detents, most upper as 0)

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 Rear Facing	Forward 6 *	133	Suppressed
	Middle	132	Suppressed
	Rearward	129	Suppressed
Unbelted Rear Facing	Forward 6 *	N/A	Suppressed
	Middle	N/A	Suppressed
	Rearward	N/A	Suppressed
Unbelted Forward Facing	Forward 2 *	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; 22 = Full Rearward; 22 total Seat Slide detents)

Successful Unbelted Representative 5th Percentile Female Reactivation was performed with the seat in the Rearward position. (Human Identification Code 036; 49.3 kg 149.9 cm)

DATA SHEET 17 SUMMARY

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

NHTSA NO.:	C90508	TEST DATE:	3/16/09
LABORATORY:	MGA	TECHNICIANS:	WD
DUMMY TYPE:	12 Month Old	DUMMY SERIAL NO.:	062

CHILD RESTRAINT NAME:	Evenflo
CHILD RESTRAINT MODEL:	First Choice 204
DATE OF MANUFACTURE:	6-20-2000

Base: __On __Off ☒ N/A-Restraint does not have a removable base

Manufacturer's design seat back angle: 5.2° on Headrest post
 Tested seat back angle: 5.2° on Headrest post
 Manufacturer's specified anchorage position: 2 (5 total detents, most upper as 0)
 Tested anchorage position: 2 (5 total detents, most upper as 0)

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 Rear Facing	Forward 10 *	133	Suppressed
	Middle	131	Suppressed
	Rearward	127	Suppressed
Unbelted Rear Facing	Forward	N/A	N/A
	Middle	N/A	Suppressed
	Rearward	N/A	Suppressed
Unbelted Forward Facing	Forward 4 *	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; 22 = Full Rearward; 22 total Seat Slide detents)

Successful Unbelted Representative 5th Percentile Female Reactivation was performed with the seat in the Middle position. (Human Identification Code 036; 49.3 kg 149.9 cm)

DATA SHEET 17 SUMMARY

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

NHTSA NO.:	C90508	TEST DATE:	3/16/09
LABORATORY:	MGA	TECHNICIANS:	WD
DUMMY TYPE:	12 Month Old	DUMMY SERIAL NO.:	062

CHILD RESTRAINT NAME:	Graco
CHILD RESTRAINT MODEL:	Infant 8457
DATE OF MANUFACTURE:	8-31-2000

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

Manufacturer's design seat back angle: 5.2° on Headrest post
 Tested seat back angle: 5.2° on Headrest post
 Manufacturer's specified anchorage position: 2 (5 total detents, most upper as 0)
 Tested anchorage position: 2 (5 total detents, most upper as 0)

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 Rear Facing	Forward 5 *	133	Suppressed
	Middle	130	Suppressed
	Rearward	127	Suppressed
Unbelted Rear Facing	Forward 6 *	N/A	Suppressed
	Middle	N/A	Suppressed
	Rearward	N/A	Suppressed
Unbelted Forward Facing	Forward 5 *	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; 22 = Full Rearward; 22 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.:	C90508	TEST DATE:	3/16/09
LABORATORY:	MGA	TECHNICIANS:	WD
DUMMY TYPE:	12 Month Old	DUMMY SERIAL NO.:	062

CHILD RESTRAINT NAME:	Graco
CHILD RESTRAINT MODEL:	Infant 8457
DATE OF MANUFACTURE:	8-31-2000

Base: __On __XOff __N/A-Constraint does not have a removable base

Manufacturer's design seat back angle: 5.2° on Headrest post
 Tested seat back angle: 5.2° on Headrest post
 Manufacturer's specified anchorage position: 2 (5 total detents, most upper as 0)
 Tested anchorage position: 2 (5 total detents, most upper as 0)

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 Rear Facing	Forward 6 *	133	Suppressed
	Middle	130	Suppressed
	Rearward	131	Suppressed
Unbelted Rear Facing	Forward 7 *	N/A	Suppressed
	Middle	N/A	Suppressed
	Rearward	N/A	Suppressed
Unbelted Forward Facing	Forward 4 *	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; 22 = Full Rearward; 22 total Seat Slide detents)

Successful Unbelted Representative 5th Percentile Female Reactivation was performed with the seat in the Rearward position. (Human Identification Code 036; 49.3 kg 149.9 cm)

DATA SHEET 17 SUMMARY

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

NHTSA NO.:	C90508	TEST DATE:	3/17/09
LABORATORY:	MGA	TECHNICIANS:	WD
DUMMY TYPE:	12 Month Old	DUMMY SERIAL NO.:	062

CHILD RESTRAINT NAME:	Britax
CHILD RESTRAINT MODEL:	Roundabout 161
DATE OF MANUFACTURE:	7-21-2000

Base: __On __Off X N/A-Restraint does not have a removable base

Manufacturer's design seat back angle: 5.2° on Headrest post
Tested seat back angle: 5.2° on Headrest post
Manufacturer's specified anchorage position: 2 (5 total detents, most upper as 0)
Tested anchorage position: 2 (5 total detents, most upper as 0)

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 Forward Facing	Forward	133	Suppressed
	Middle	131	Suppressed
	Rearward	127	Suppressed
Unbelted Forward Facing	Forward	N/A	Suppressed
	Middle	N/A	Suppressed
	Rearward	N/A	Suppressed
Belted Rear Facing	Forward	131	Suppressed
	Middle	132	Suppressed
	Rearward	128	Suppressed
Unbelted Rear Facing	Forward	N/A	Suppressed
	Middle	N/A	Suppressed
	Rearward	N/A	Suppressed

Successful Unbelted Representative 5th Percentile Female Reactivation was performed with the seat in the Forward position. (Human Identification Code 036; 49.3 kg 149.9 cm)

DATA SHEET 17 SUMMARY

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

NHTSA NO.:	C90508	TEST DATE:	3/17/09
LABORATORY:	MGA	TECHNICIANS:	WD
DUMMY TYPE:	12 Month Old	DUMMY SERIAL NO.:	062

CHILD RESTRAINT NAME:	Century
CHILD RESTRAINT MODEL:	Encore 4612
DATE OF MANUFACTURE:	8-16-2000

Base: __On __Off X N/A-Restraint does not have a removable base

Manufacturer's design seat back angle: 5.2° on Headrest post
 Tested seat back angle: 5.2° on Headrest post
 Manufacturer's specified anchorage position: 2 (5 total detents, most upper as 0)
 Tested anchorage position: 2 (5 total detents, most upper as 0)

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 Forward Facing	Forward	127	Suppressed
	Middle	133	Suppressed
	Rearward	129	Suppressed
Unbelted Forward Facing	Forward	N/A	Suppressed
	Middle	N/A	Suppressed
	Rearward	N/A	Suppressed
Belted Rear Facing	Forward 3 *	133	Suppressed
	Middle	133	Suppressed
	Rearward	131	Suppressed
Unbelted Rear Facing	Forward 4 *	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; 22 = Full Rearward; 22 total Seat Slide detents)

Successful Unbelted Representative 5th Percentile Female Reactivation was performed with the seat in the Forward position. (Human Identification Code 036; 49.3 kg 149.9 cm)

DATA SHEET 17 SUMMARY

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

NHTSA NO.:	C90508	TEST DATE:	3/17/09
LABORATORY:	MGA	TECHNICIANS:	WD
DUMMY TYPE:	12 Month Old	DUMMY SERIAL NO.:	062

CHILD RESTRAINT NAME:	Evenflo
CHILD RESTRAINT MODEL:	Medallion 254
DATE OF MANUFACTURE:	6-1-2000

Base: __On __Off X N/A-Restraint does not have a removable base

Manufacturer's design seat back angle: 5.2° on Headrest post
 Tested seat back angle: 5.2° on Headrest post
 Manufacturer's specified anchorage position: 2 (5 total detents, most upper as 0)
 Tested anchorage position: 2 (5 total detents, most upper as 0)

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 Forward Facing	Forward	133	Suppressed
	Middle	128	Suppressed
	Rearward	127	Suppressed
Unbelted Forward Facing	Forward	N/A	Suppressed
	Middle	N/A	Suppressed
	Rearward	N/A	Suppressed
Belted Rear Facing	Forward 3 *	133	Suppressed
	Middle	131	Suppressed
	Rearward	132	Suppressed
Unbelted Rear Facing	Forward 6 *	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; 22 = Full Rearward; 22 total Seat Slide detents)

Successful Unbelted Representative 5th Percentile Female Reactivation was performed with the seat in the Middle position. (Human Identification Code 036; 49.3 kg 149.9 cm)

DATA SHEET 18 SUMMARY

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

NHTSA NO.:	C90508	TEST DATE:	3/16/09
LABORATORY:	MGA	TECHNICIANS:	WD
DUMMY TYPE:	Newborn Infant	DUMMY SERIAL NO.:	003

CAR BED NAME:	Cosco
CAR BED MODEL:	Dream Ride 02-719
DATE OF MANUFACTURE:	6-16-2000

Base: __On __Off X N/A-Constraint 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: 5.2° on Headrest post
Tested seat back angle: 5.2° on Headrest post
Manufacturer's specified anchorage position: 2 (5 total detents, most upper as 0)
Tested anchorage position: 2 (5 total detents, most upper as 0)

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 Representative 5th Percentile Female Reactivation was performed with the seat in the Forward position. (Human Identification Code 036; 49.3 kg 149.9 cm)

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.:	C90508	TEST DATE:	3/31/09
LABORATORY:	MGA	TECHNICIANS:	WD / AP
DUMMY TYPE:	3 Year Old	DUMMY SERIAL NO.:	032

Manufacturer's design seat back angle:	<u>5.2° on Headrest post</u>
Tested seat back angle:	<u>5.2° on Headrest post</u>
Tested seat position:	<u>Full Aft</u>
Thorax cavity angle:	<u>0.1°</u>
Thigh angle:	<u>47.0°</u>
Point 1 height:	<u>0 mm – At Plane C Air Bag Height</u>

Air Bag Deployment Timing

Stage No.	Firing time (ms)	Recorded firing time (ms)
1	0.0	0.0
2	100.0	100.1

3-Year-Old SN 032 Position 1 (Chest on Instrument Panel) 3/31/09

Injury Criteria	Max. Allowable Injury Assessment Values	Measured Value
HIC15	570	35
Peak Nij (Nte)	1.0	0.1
Time (ms)	NA	99.8
Peak Nij (Ntf)	1.0	0.2
Time (ms)	NA	12.1
Peak Nij (Nce)	1.0	0.2
Time (ms)	NA	27.3
Peak Nij (Ncf)	1.0	0.3
Time (ms)	NA	24.3
Neck Tension	1130 N	258
Neck Compression	1380 N	612
Chest g	55 g	13
Chest Displacement	34 mm	2

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 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.:	C90508	TEST DATE:	3/31/09
LABORATORY:	MGA	TECHNICIANS:	WD / AP
DUMMY TYPE:	3 Year Old	DUMMY SERIAL NO.:	032

Manufacturer's design seat back angle: 5.2° on Headrest post
Tested seat back angle: 5.2° on Headrest post
Tested seat position: Full Forward

Thorax cavity angle: 5.0°
Thigh angle: 7.0°

Air Bag Deployment Timing

Stage No.	Firing time (ms)	Recorded firing time (ms)
1	0.0	0.0
2	100.0	100.1

3-Year-Old SN 032 Position 2 (Head on Instrument Panel) 3/31/09

Injury Criteria	Max. Allowable Injury Assessment Values	Measured Value
HIC15	570	4
Peak Nij (Nte)	1.0	0.1
Time (ms)	NA	86.3
Peak Nij (Ntf)	1.0	0.0
Time (ms)	NA	11.7
Peak Nij (Nce)	1.0	0.4
Time (ms)	NA	35.1
Peak Nij (Ncf)	1.0	0.2
Time (ms)	NA	62.0
Neck Tension	1130 N	37
Neck Compression	1380 N	542
Chest g	55 g	7
Chest Displacement	34 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 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.:	C90508	TEST DATE:	4/1/09
LABORATORY:	MGA	TECHNICIANS:	WD / AP
DUMMY TYPE:	6 Year Old	DUMMY SERIAL NO.:	155

Manufacturer's design seat back angle: 5.2° on Headrest post
 Tested seat back angle: 5.2° on Headrest post
 Tested seat position: Full Aft

Thorax cavity angle: 5.6°
 Point 1 height: 65 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	100.0	100.1

6-Year-Old SN 155 Position 1 (Chest on Instrument Panel) 4/1/09

Injury Criteria	Max. Allowable Injury Assessment Values	Measured Value
HIC15	700	40
Peak Nij (Nte)	1.0	0.0
Time (ms)	NA	5.5
Peak Nij (Ntf)	1.0	0.1
Time (ms)	NA	15.4
Peak Nij (Nce)	1.0	0.1
Time (ms)	NA	1.2
Peak Nij (Ncf)	1.0	0.4
Time (ms)	NA	28.7
Neck Tension	1490 N	154
Neck Compression	1820 N	748
Chest g	60 g	11
Chest Displacement	40 mm	2

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 were used for this deployment.

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 (S24.4.2)

NHTSA NO.:	C90508	TEST DATE:	4/1/09
LABORATORY:	MGA	TECHNICIANS:	AP / WD
DUMMY TYPE:	6 Year Old	DUMMY SERIAL NO.:	155

Manufacturer's design seat back angle: 5.2° on Headrest post
Tested seat back angle: 5.2° on Headrest post
Tested seat position: Full Forward

Thorax cavity angle: 24.2°
Thigh angle: 6.5°

Air Bag Deployment Timing

Stage No.	Firing time (ms)	Recorded firing time (ms)
1	0.0	0.0
2	100.0	100.1

6-Year-Old SN 155 Position 2 (Head on Instrument Panel) 4/1/09

Injury Criteria	Max. Allowable Injury Assessment Values	Measured Value
HIC15	700	7
Peak Nij (Nte)	1.0	0.1
Time (ms)	NA	18.8
Peak Nij (Ntf)	1.0	0.0
Time (ms)	NA	2.7
Peak Nij (Nce)	1.0	0.3
Time (ms)	NA	60.3
Peak Nij (Ncf)	1.0	0.2
Time (ms)	NA	12.9
Neck Tension	1490 N	187
Neck Compression	1820 N	406
Chest g	60 g	4
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 were used for this deployment.

DATA SHEET 29 SUMMARY

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

NHTSA NO.:	C90508	TEST DATE:	3/31/09
LABORATORY:	MGA	TECHNICIANS:	JL / WD
DUMMY TYPE:	5 th Percentile Female	DUMMY SERIAL NO.:	505

Manufacturer's design seat back angle: 5.2° on Headrest post
Tested seat back angle: 5.2° on Headrest post
Tested seat position: Full Aft

Tested steering wheel angle: 23.4°
Thorax cavity angle: 29.4°
Bottom of chin height: 2 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	100.0	100.0

5th Percentile Female SN 505 Position 1 (Chin On Module) 3/31/09

Injury Criteria	Max. Allowable Injury Assessment Values	Measured Value
HIC15	700	40
Peak Nij (Nte)	1.0	0.4
Time (ms)	NA	59.5
Peak Nij (Ntf)	1.0	0.3
Time (ms)	NA	9.3
Peak Nij (Nce)	1.0	0.4
Time (ms)	NA	151.2
Peak Nij (Ncf)	1.0	0.1
Time (ms)	NA	198.8
Neck Tension	2070 N	863
Neck Compression	2520 N	370
Chest g	60 g	13
Chest Displacement	52 mm	7
Left Femur	6805 N	108
Right Femur	6805 N	99

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 100 ms; Injuries calculated on 0 ms to 225 ms

The original equipment parts were used for this deployment.

DATA SHEET 30 SUMMARY

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

NHTSA NO.:	C90508	TEST DATE:	3/31/09
LABORATORY:	MGA	TECHNICIANS:	WD
DUMMY TYPE:	5 th Percentile Female	DUMMY SERIAL NO.:	505

Manufacturer's design seat back angle: 5.2° on Headrest post

Tested seat back angle: 5.2° on Headrest post

Tested seat position: Full Aft

Tested steering wheel angle: 21.3°

Thorax cavity angle: 27.5°

Chin Point height: 0 mm - At 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	100.0	100.0

5th Percentile Female SN 505 Position 2 (Chin On Rim) 3/31/09

Injury Criteria	Max. Allowable Injury Assessment Values	Measured Value
HIC15	700	8
Peak Nij (Nte)	1.0	0.5
Time (ms)	NA	16.1
Peak Nij (Ntf)	1.0	0.2
Time (ms)	NA	26.6
Peak Nij (Nce)	1.0	0.1
Time (ms)	NA	165.9
Peak Nij (Ncf)	1.0	0.0
Time (ms)	NA	84.7
Neck Tension	2070 N	687
Neck Compression	2520 N	52
Chest g	60 g	33
Chest Displacement	52 mm	22
Left Femur	6805 N	14
Right Femur	6805 N	8

Calculated on data recorded for 125ms 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 100 ms; Injuries calculated on 0 ms to 225 ms

A new air bag, steering column and steering wheel were used for this deployment.

DATA SHEET 32

VEHICLE WEIGHT, FUEL TANK, AND ATTITUDE DATA

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Jamie Aide

NHTSA No.: C90508
 Test Date: 4/23/09

IMPACT ANGLE:	Zero Degrees		
BELTED DUMMIES (YES/NO):	YES		
TEST SPEED:	32 to 40 kmph	X 0 to 48 kmph	0 to 56 kmph
DRIVER DUMMY:	X 5 th female		50 th male
PASSENGER DUMMY:	X 5 th female		50 th 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: 62.0 liters (16.38 gallons) |
| X | 5. | Record the fuel tank capacity supplied in the owner's manual. |
| X | | Useable Fuel Tank Capacity in owner's manual: 62.0 liters (16.38 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: 62.0 liters (16.38 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:	32 psi	LF:	32 psi	RR:	32 psi	LR:	32 psi
Owner's manual pressure:	RF:	32 psi	LF:	32 psi	RR:	32 psi	LR:	32 psi
Actual inflated pressure:	RF:	32 psi	LF:	32 psi	RR:	32 psi	LR:	32 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):	445.9	Right Rear (kg):	272.2
Left Front (kg):	425.5	Left Rear (kg):	299.8
Total Front (kg):	871.4	Total Rear (kg):	572.0
% Total Weight:	60.4	% Total Weight:	39.6
UVW = TOTAL FRONT PLUS TOTAL REAR (KG):		1443.4	

- | | | |
|---|------|---|
| 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:	707	LF:	707	RR:	709	LR:	700
-----	-----	-----	-----	-----	-----	-----	-----

☒ 14. Calculate the Rated Cargo and Luggage Weight (RCLW): 45 kg
☒ 14.1 Does the vehicle have the vehicle capacity weight (VCW) on the certification label or tire placard?
☒ ☒ Yes, go to 14.3
☐ ☐ No, go to 14.2
☐ 14.2 VCW = Gross Vehicle Weight - UVW
VCW = _____ - _____ = _____
☒ 14.3 VCW = 385 kg (849 lbs)
☒ 14.4 Does the certification or tire placard contain the Designated Seating Capacity (DSC)?
☒ ☐ Yes, go to 14.6
☐ ☐ No, go to 14.5 and skip 14.6
☐ 14.5 DSC = Total number of seat belt assemblies = _____
☒ 14.6 DSC = 5
☒ 14.7 RCLW = VCW - (68 kg x DSC) = 385 kg - (68 kg x 5) = 45 kg
☒ 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)
☒ ☐ No, use the RCLW calculated in 14.7
☒ 15. Fully Loaded Weight (100% fuel fill): 1586.2 kg
☒ 15.1 Place the appropriate test dummy in both front outboard seating positions.
Driver: ☒ 5th female ☐ 50th male
Passenger: ☒ 5th female ☐ 50th male
☒ 15.2 Load the vehicle with the RCLW from 14.7 or 14.8 whichever is applicable.
☒ 15.3 Place the RCLW in the cargo area. Center the load over the longitudinal centerline of the vehicle. (S8.1.1 (d))
☒ 15.4 Record the vehicle weight at each wheel to determine the Fully Loaded Weight.

Right Front (kg):	472.2	Right Rear (kg):	319.3
Left Front (kg):	446.8	Left Rear (kg):	347.9
Total Front (kg):	919.0	Total Rear (kg):	667.2
% Total Weight:	57.9	% Total Weight:	42.1
% GVW	58.6	% GVW	53.4
(% GVW = Axle GVW divided by Vehicle GVW)			
Fully Loaded Weight = Total Front Plus Total Rear (kg):			1586.2

☒ 16. Fully Loaded Test Vehicle Attitude: (All dimensions in millimeters)
☒ 16.1 Place the vehicle on a level surface.
☒ 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:	687	LF:	685	RR:	679	LR:	668
-----	-----	-----	-----	-----	-----	-----	-----

☒ 17. Drain the fuel system
☒ 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. Fuel tank capacity x .94 = 62.0 liters (16.38 gallons) x .94 = 52.3 liters (15.4 gallons)
Amount added: 57.6 liters (15.23 gallons) 93.0%
☒

☒	19.	Crank the engine to fill the fuel delivery system with Stoddard solvent
☒	20.	Calculate the test weight range.
☒	20.1	Calculated Weight = UVW (see 12 above) + RCLW (see 14 above) + 2x(dummy weight) <u>1586.4 kg = 1443.4 kg + 45.0 kg + 98.0 kg</u>
☒	20.2	Test Weight Range = Calculated Weight (- 4.5 kg, - 9 kg.) Max. Test Weight = Calculated Test Weight - 4.5 kg = <u>1581.9 kg</u> Min. Test Weight = Calculated Test Weight - 9 kg = <u>1577.4 kg</u>
☒	21.	Remove the RCLW from the cargo area.
☒	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.
☒	23.	Vehicle Components Removed For Weight Reduction: <u>Spare tire, jack, trunk carpet and rear right tail light</u>
☒	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.
☒	25.	If necessary, add ballast to achieve the actual test weight.
☐		N/A
☒		Weight of Ballast: 18.1 kg
☒	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.
☒	27.	Record the vehicle weight at each wheel to determine the actual test weight.

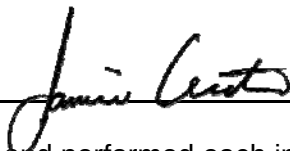
Right Front (kg):	454.5	Right Rear (kg):	328.4
Left Front (kg):	453.1	Left Rear (kg):	342.5
Total Front (kg):	907.6	Total Rear (kg):	670.9
% Total Weight:	57.5	% Total Weight:	42.5
% GVW	58.6	% GVW	53.4
(% GVW = Axle GVW divided by Vehicle GVW)			
TOTAL FRONT PLUS TOTAL REAR (kg):			1578.5

☒	28.	Is the test weight between the Max. Weight and the Min. Weight (See 20.2)?								
☒		Yes								
☐		No, explain why not.								
☒	29.	Test Weight Vehicle Attitude: (all dimensions in millimeters)								
☒	29.1	Place the vehicle on a level surface								
☒	29.2	Measure perpendicular to the level surface to the 4 points marked on the body (see 13 above) and record the measurements								
		<table border="1" style="display: inline-table;"> <tr> <td>RF:</td> <td>689</td> <td>LF:</td> <td>688</td> <td>RR:</td> <td>681</td> <td>LR:</td> <td>669</td> </tr> </table>	RF:	689	LF:	688	RR:	681	LR:	669
RF:	689	LF:	688	RR:	681	LR:	669			
☒	30.	Summary of test attitude								

☒	30.1	AS DELIVERED:
		RF: 707 LF: 707 RR: 709 LR: 700
		AS TESTED:
		RF: 689 LF: 688 RR: 681 LR: 669
		FULLY LOADED:
		RF: 687 LF: 685 RR: 679 LR: 668
☒	30.2	Is the "as tested" test attitude equal to or between the "fully loaded" and "as delivered" attitude?
☒		Yes
☐		No, explain why not.

REMARKS:

Signature: _____



Date: 4/23/09

I certify that I have read and performed each instruction.

DATA SHEET 33

VEHICLE ACCELEROMETER LOCATION AND MEASUREMENT

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Jamie Aide

NHTSA No.: C90508
 Test Date: 4/23/09

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

- X

 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.
- X

 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.
- X

 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.
- X

 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.
- X

 5. Install an accelerometer on the right front brake caliper to record x-direction accelerations. Record the location on the following chart.
- X

 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.
- X

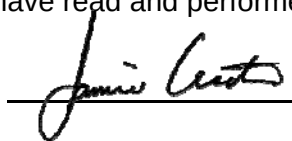
 7. Install an accelerometer on the left front brake caliper to record x-direction accelerations. Record the location on the following chart.
- X

 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.

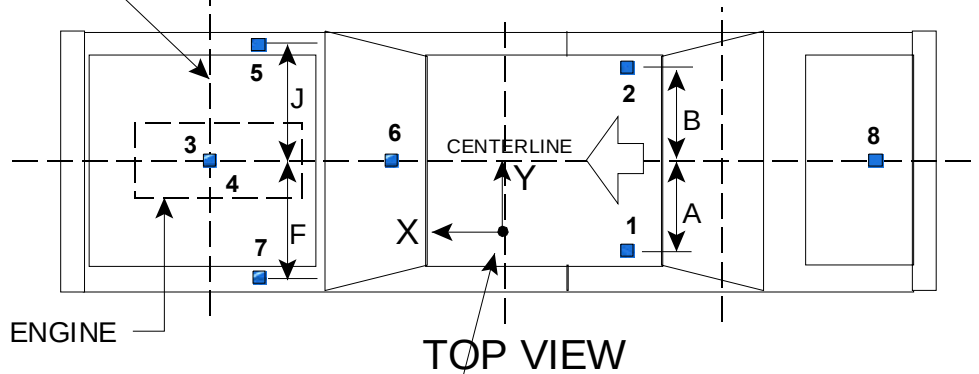
Signature: _____



Date: 4/23/09

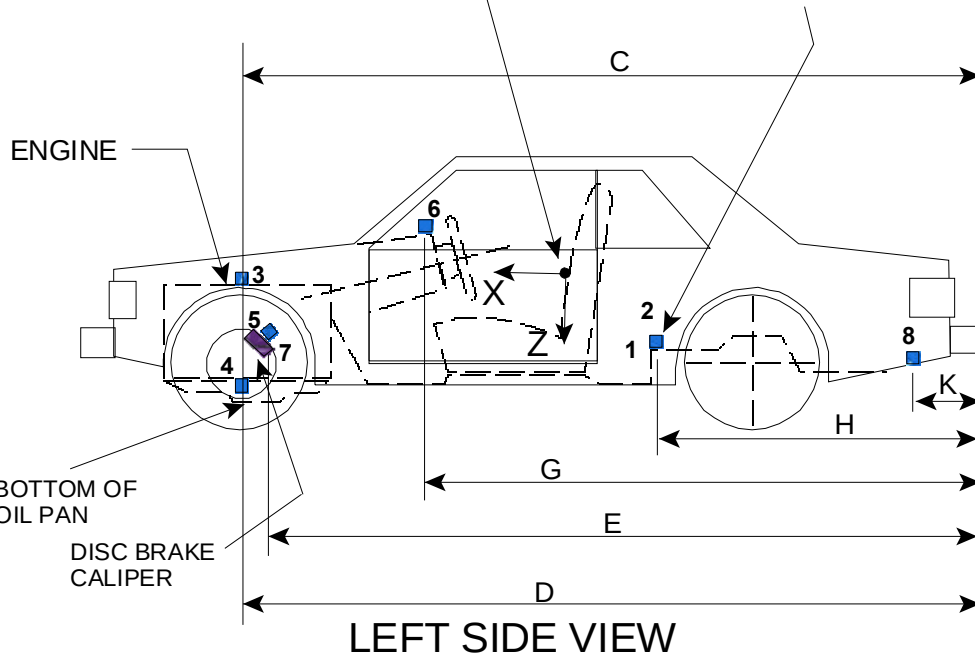
VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

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.

DATA SHEET 33
VEHICLE ACCELEROMETER LOCATION AND MEASUREMENTS

<u>DIMENSION</u>	<u>LENGTH (mm)</u>	
<u>PRETEST VALUES</u>		
<u>A</u> (LH Rear Seat Xmbr)	353	
<u>B</u> (RH Rear Seat Xmbr)	341	
<u>C</u> (Engine Top)	3998	
<u>D</u> (Engine Bottom)	4039	
<u>E</u> (Caliper)	Right Side: 3682	Left Side: 3682
<u>F</u> (Left Caliper)	700	
<u>G</u> (IP)	3041	
<u>H</u> (Seat)	1867	
<u>J</u> (Right Caliper)	700	
<u>K</u> (Trunk)	242	
<u>POST TEST VALUES</u>		
<u>A</u> (LH Rear Seat Xmbr)	353	
<u>B</u> (RH Rear Seat Xmbr)	341	
<u>C</u> (Engine Top)	3867	
<u>D</u> (Engine Bottom)	3910	
<u>E</u> (Caliper)	Right Side: 3662	Left Side: 3665
<u>F</u> (Left Caliper)	718	
<u>G</u> (IP)	3041	
<u>H</u> (Seat)	1867	
<u>J</u> (Right Caliper)	716	
<u>K</u> (Trunk)	242	

DATA SHEET 34

PHOTOGRAPHIC TARGETS

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Jamie Aide

NHTSA No.: C90508
 Test Date: 4/23/09

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

- | | | |
|-------------------------------------|------|--|
| ☒ | 1. | FMVSS 208 vehicle targeting requirements (See Figures 28A and 28B) |
| ☒ | 1.1 | Targets A1 and A2 are on flat rectangular panels. |
| ☒ | 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.
Distance between targets (mm): <u>100 mm</u> |
| ☒ | 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.
Distance between targets (mm): <u>100 mm</u> |
| ☒ | 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.
Distance between the first and last circular targets (mm): <u>915 mm</u> |
| ☒ | 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. |
| ☒ | 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. |
| ☒ | 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.
Distance between targets (mm): <u>620 mm</u> |
| ☒ | 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.
Distance between targets (mm): <u>621 mm</u> |
| ☒ | 1.9 | Place tape with squares having alternating colors on the top portion of the steering wheel. |
| ☒ | 1.10 | Chalk the bottom portion of the steering wheel. |
| ☒ | 1.11 | Is this an offset test?
☐ Yes, continue with this section
☒ No, go to 2. |
| ☐ | 1.12 | Measure the width of the vehicle.
Vehicle width (mm): |
| ☐ | 1.13 | Find the centerline of the vehicle. ($\frac{1}{2}$ of the vehicle width) |
| ☐ | 1.14 | Find the line parallel to the centerline of the vehicle and 0.1 x vehicle width from the centerline of the vehicle. |

☐	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)
☒	2.	Barrier Targeting
☒	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.
☒	2.2	Targets D1 and D2 are on a rectangular panel.
☒	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.
☒		Distance between circular targets on D1 (mm): <u>100 mm</u>
☒		Distance between circular targets on D2 (mm): <u>100 mm</u>
☒	3.	FMVSS 208 Dummy Targeting Requirements
☒	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).
☒	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).
☒	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.
☒	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.
☒	4.	FMVSS 204 Targeting Requirements
☒	4.1	Is an FMVSS 204 indicant test ordered on the "COTR Vehicle Work Order?"
☐		Yes, continue with this form.
☒		No, this form is complete.
☐	4.2	Resection panel (Figure 28C)
☐	4.2.1	The panel deviates no more than 6 mm from perfect flatness when suspended vertically
☐	4.2.2	The 8 targets on the panel are circular targets at least 90 mm in diameter and with black and yellow quadrants.
☐	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.
☐	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.
☐	4.2.5	The center of the 4 inner targets are placed at the midpoints of each of the 228 mm sides.
☐	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.
☐	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.

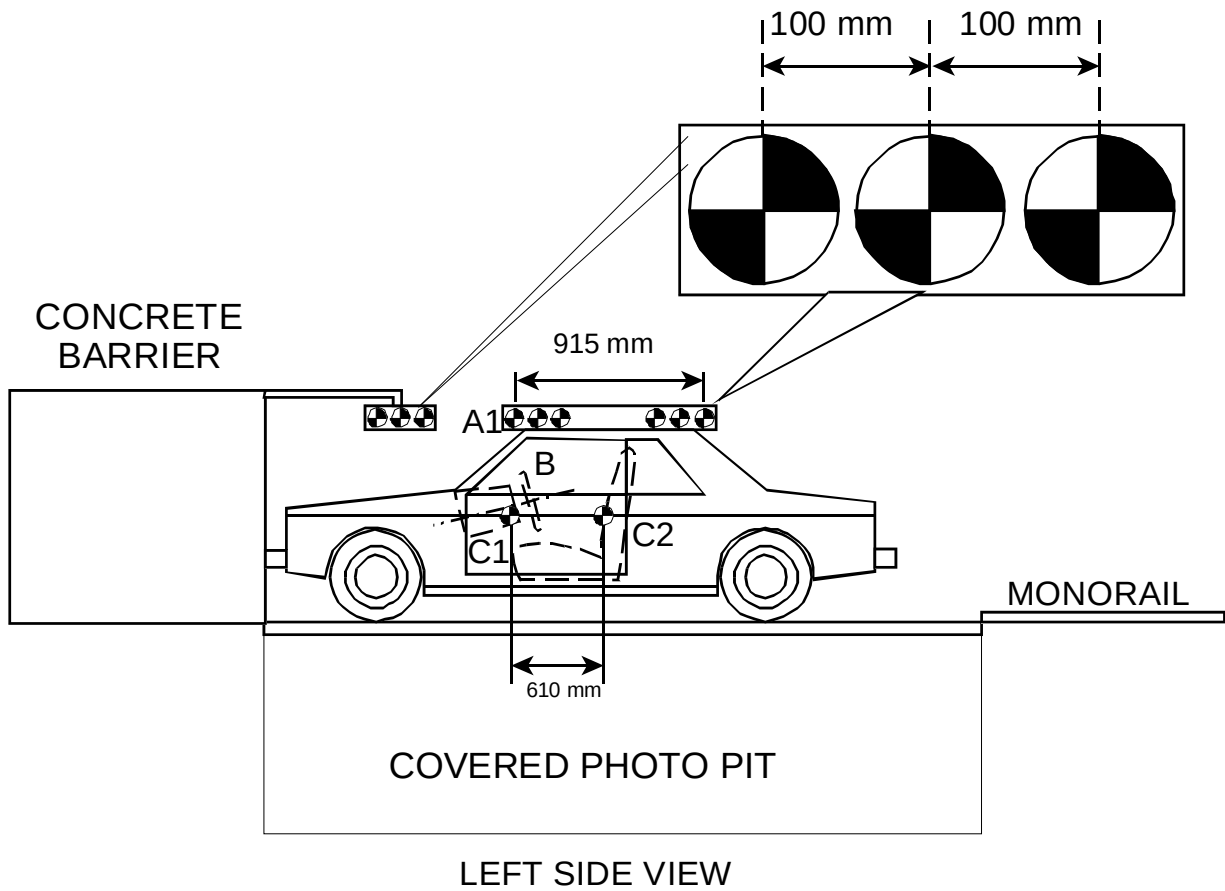
REMARKS:

Signature: 

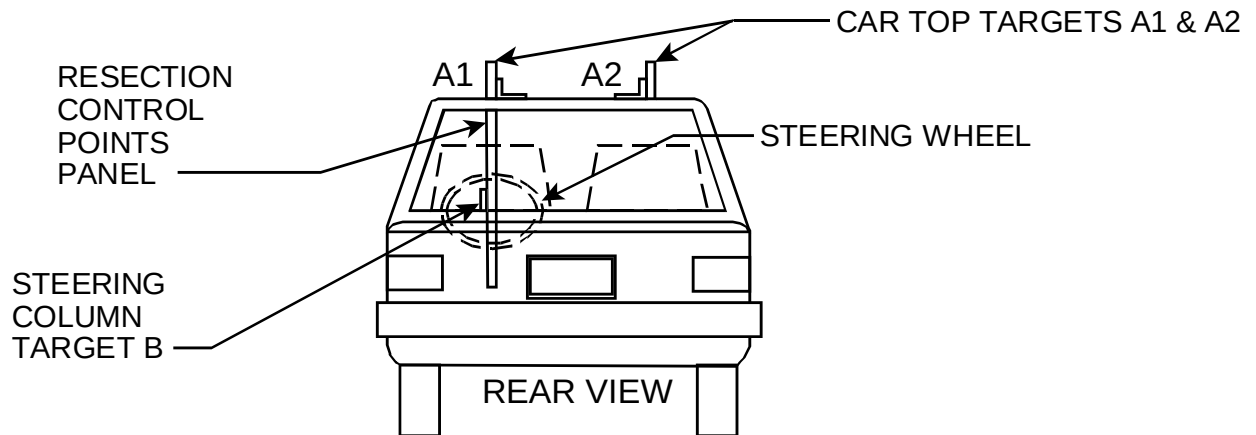
Date: 4/23/09

I certify that I have read and performed each instruction.

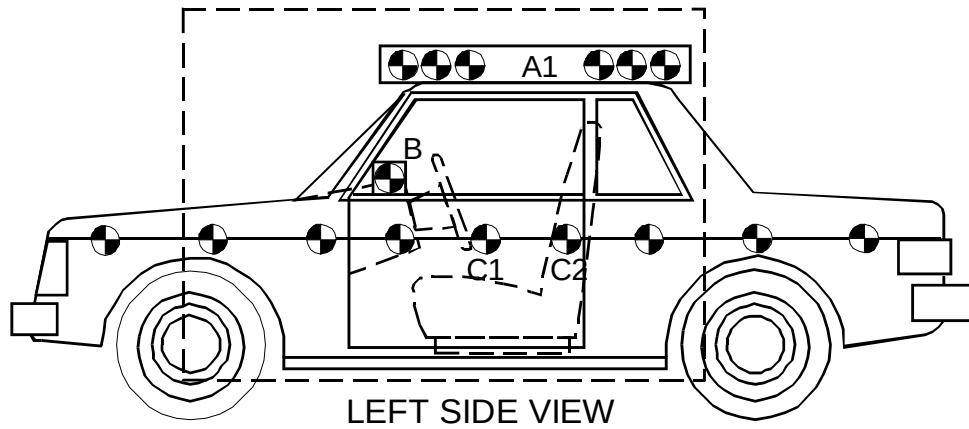
REFERENCE PHOTO TARGETS



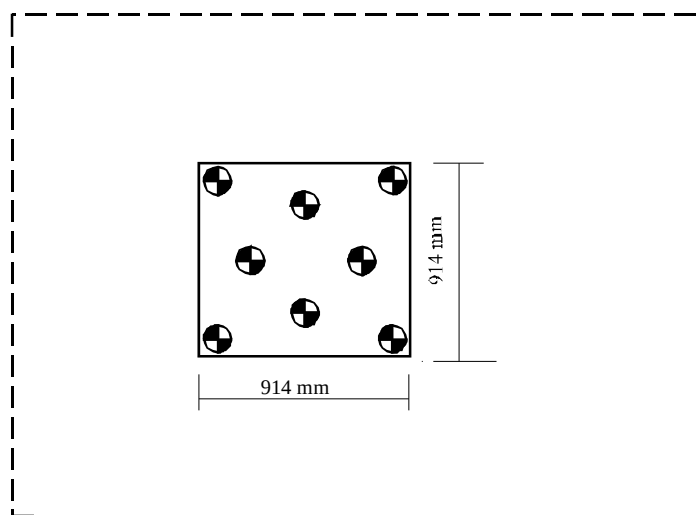
RESECTION PANEL TARGETING ALIGNMENT



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: 2009 Kia Optima
Test Program: FMVSS 208 Compliance

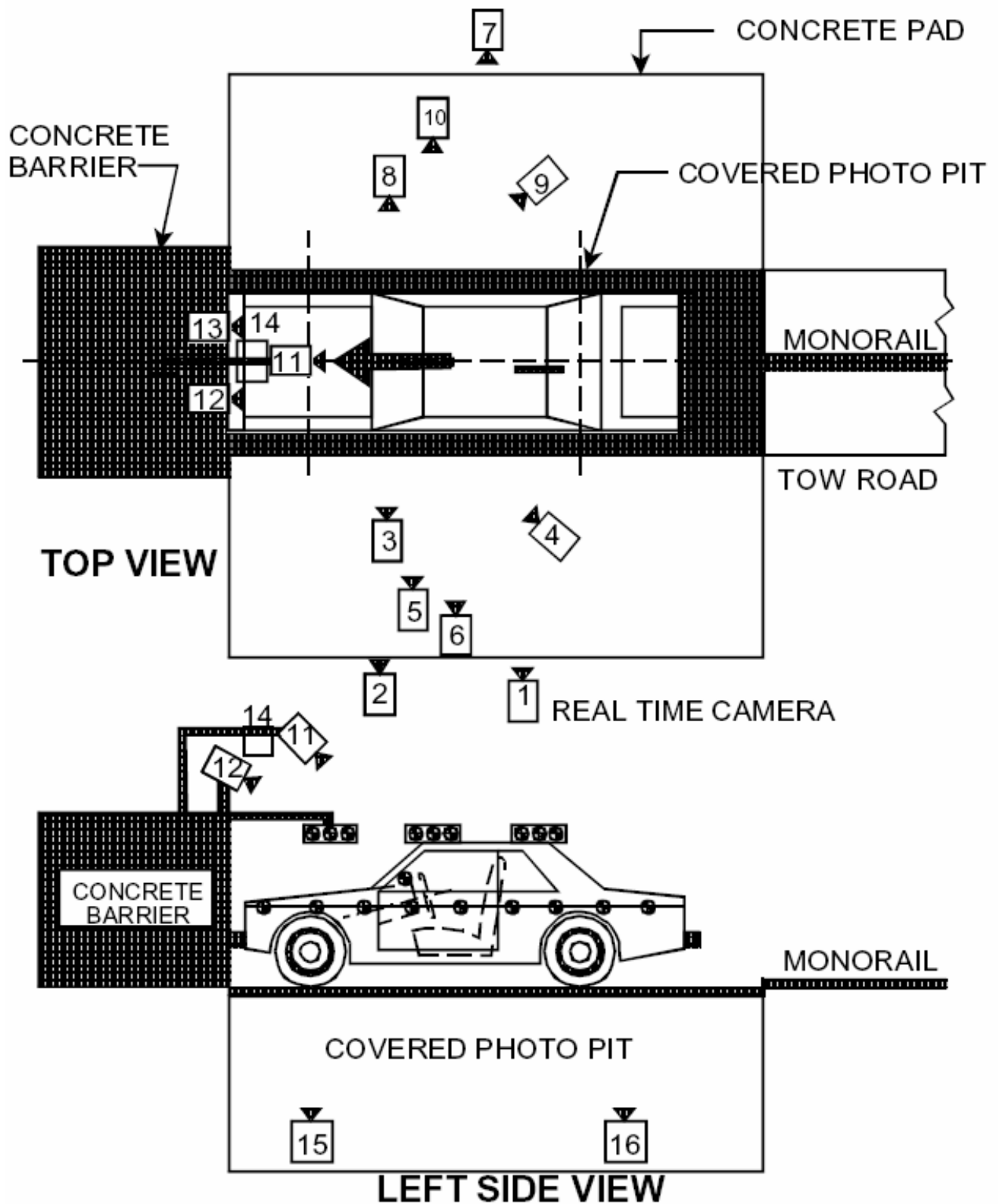
NHTSA No.: C90508
Test Date: 4/23/09
Time: 10:35 am

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)	1310	-5310	1120	24	1000
3	Left Side View (Driver)	1330	-6710	1280	35	1000
4	Left Side View (B-post aimed toward center of steering wheel)	6490	-5360	1960	50	1000
5	Left Side View (Steering Column)	510	-5050	1130	25	1000
6	Left Side View (Steering Column)	490	-5100	760	25	1000
7	Right Side View (Overall)	2170	6380	1150	20	1000
8	Right Side View (Passenger)	1540	6560	1320	35	1000
9	Right Side View (Angle)	6510	5080	2020	50	1000
10	Right Side View (Front door)	1330	5350	1140	24	1000
11	Front View Windshield	-285	0	2860	12.5	1000
12	Front View Driver	-135	-470	2180	16	1000
13	Front View Passenger	-110	420	2180	16	1000
14	Overhead Barrier Impact View	1620	0	5050	14	1000
15	Pit Camera Engine View	1110	0	-3150	24	1000
16	Pit Camera Fuel Tank View	3410	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 G
DUMMY POSITIONING PROCEDURES
FOR 5th PERCENTILE FEMALE DRIVER TEST DUMMY
CONFORMING TO SUBPART O OF PART 572

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Jordan Haynes

NHTSA No.: C90508
 Test Date: 4/23/09

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

Seating Procedure 5th Percentile Female Driver Dummy (Part 572, Subpart O) (S16.2-S16.3)

1. Seat Position

 X 1.1 Position the seat's adjustable lumbar supports so that the lumbar supports are in the lowest, retracted or deflated adjustment positions. (S16.2.10.1, S20.1.9.1, S20.4.1, S22.1.7.1)

 X N/A – No lumbar adjustment

 X 1.2 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, S20.1.9.2, S20.4.1, S22.1.7.1, S22.4.2.1, S22.4.3.1, S24.4.2.1, S26.2.3, S26.3.1)

 X N/A – No additional support adjustment

 X 1.3 Position an adjustable leg support system in its rearmost position. (8/27/04 interpretation to Toyota)

 X N/A – No adjustable leg support system

 X 1.4 **Mark** a point (seat cushion reference point) on the side of the seat cushion that is between 150 mm and 250 mm from the front edge of the seat cushion. (S16.3.1.12)

 X 1.5 Draw a line (seat cushion reference line) through the seat cushion reference point. (S16.3.1.13)

 X 1.6 Use only the controls that primarily move the seat in the fore-aft direction to move the seat cushion reference point to the rearmost position. (S16.2.10.3.1, S22.1.7.3)

 X 1.7 If the seat cushion adjusts fore-aft, independent of the seat back, use only the controls that primarily move the seat cushion in the fore-aft direction to move the seat cushion reference point to the rearmost position. (S16.2.10.3.1, S20.1.9.3)

 X N/A – No independent fore-aft seat cushion adjustment

 X 1.8 Use any part of any control, other than the parts just used for fore-aft positioning, to determine the range of angles of the seat cushion reference line and to set the seat cushion reference line at the mid-angle. (S16.2.10.3.1)

Maximum angle 5.0°

Minimum angle 0.0°

Mid-angle 2.5°

- ☒ 1.9 If the seat and/or seat cushion height is adjustable, use any part of any control other than the parts which primarily move the seat or seat cushion fore-aft, to put the seat cushion reference point in its lowest position with the seat cushion reference line angle at the mid-angle found in 1.8. (S16.2.10.3.1)
☐ N/A – No seat height adjustment
- ☒ 1.10 Use only the controls that primarily move the seat in the fore-aft direction to verify the seat is in the rearmost position.
- ☒ 1.11 Use only the controls that primarily move the seat in the fore-aft direction to **mark** the fore-aft seat positions. **Mark** each position so that there is a visual indication when the seat is at a particular position. For manual seats, move the seat forward one detent at a time and **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.
- ☒ 1.12 Use only the controls that primarily move the seat in the fore-aft direction to place the seat in the rearmost position.
- ☒ 1.13 Use any part of any control, other than the parts which primarily move the seat or seat cushion fore-aft, to find and visually **mark** the maximum, minimum, and middle height of the seat cushion reference point with the seat cushion reference line at the mid-angle determined in 1.8. (S20.1.9.4, S22.1.2, S22.1.7.4, S22.3.1, S22.4.3.1, S24.1.2, S24.3.1, S24.4.3.1, S26.2.3, S26.3.1)
☐ N/A – No seat height adjustment. Go to 1.18
- ☒ 1.14 Use only the controls that primarily move the seat and/or seat cushion in the fore-aft direction to place the seat in the mid-fore-aft position.
- ☒ 1.15 Use any part of any control, other than the parts which primarily move the seat or seat cushion fore-aft, to find and visually **mark** the maximum, minimum, and middle height of the seat cushion reference point with the seat cushion reference line at the mid-angle determined in 1.8. (S20.1.9.4, S22.1.2, S22.1.7.4, S22.3.1, S24.1.2, S24.3.1)
- ☒ 1.16 Use only the control that change the seat in the fore-aft direction to place the seat in the foremost position. (S16.2.10.3.2)
- ☒ 1.17 Use any part of any control, other than the parts which primarily move the seat or seat cushion fore-aft, to find and visually **mark** the maximum, minimum, and middle height of the seat cushion reference point with the seat cushion reference line at the mid-angle determined in 1.8. (S16.2.10.3.3, S20.1.9.4, S22.1.2, S22.1.7.4, S22.3.1, S24.1.2, S24.3.1)
- ☒ 1.18. Is the seat a bucket seat?
☒ Yes, go to 1.19 and skip 1.20
☐ No, go to 1.20 and skip 1.19
- ☒ 1.19 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. (S16.3.1.10 & S20.1.10)

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

2. Head Restraint Position

- ☐ N/A Vehicle contains automatic head restraints.
☐ N/A, there is no head restraint adjustment Go to 3
- ☒ 2.1 Adjust the head restraint to its lowest position. (S16.2.10.2, S20.1.9.6 S20.4.1, S22.1.7.6, S22.4.2.1, S22.4.3.1, S24.4.3.1, S26.2.3, S26.3.1)
- ☒ 2.2 All adjustments of the head restraint shall be used to position it full forward. For example, if it rotates, rotate it such that the head restraint extends as far forward as possible. **Mark** the foremost position. (S16.2.10.2 & S16.3.4.4 & S20.1.9.6, S20.4.1, S22.4.2.1, S22.4.3.1, S24.4.3.1, S26.2.3, S26.3.1)
- ☒ 2.3 Measure the vertical distance from the top most point of the head restraint to the bottom most point. Locate and **mark** a horizontal plane through the midpoint of this distance. (S16.3.4.3)
Vertical height of head restraint 240 mm
Mid-point height 120 mm
- ☒ 3. Is the **steering wheel** adjustable up and down and/or in and out?
☒ Yes – go to 3.1
☐ No – Go to 4
- ☒ 3.1. Find and **mark** for future reference 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
- ☐ 3.2. Find and **mark** for future references 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.
- ☒ 3.3. Use the markings to position the steering controls in the mid-position or if applicable next lowest detent position. (S16.2.9)
- ☒ 4. Place the SCRP in the full rearward, mid-height position, and mid-seat cushion angle, determined in Item 1. (S16.3.2.1.1)
- ☒ 5. If the vehicle has an adjustable accelerator pedal, place it in the full forward position. (S16.3.2.2.1)
☒ N/A accelerator pedal not adjustable
- ☒ 6. Fully recline the seat back. (S16.3.2.1.2)
☐ N/A seat back not adjustable.
- ☒ 7. Place the dummy in the seat with the legs at an angle of 120 degrees to the thighs. The calves should not be touching the seat cushion. (S16.3.2.1.2)
- ☒ 8. Position the dummy in the seat such that the midsagittal plane is coincident with the longitudinal seat cushion markings as determined in Item 1.19 or 1.20. (S16.3.2.1.3 and S16.3.2.1.4)

- ☒ 9. Hold down the dummy's thighs and push rearward on the upper torso to maximize the pelvic angle. (S16.3.2.1.5)
- ☒ 10. Set the angle between the legs and the thighs to 120 degrees. (S16.3.2.1.6)
- ☒ 11. Set the transverse distance between the centers of the front of the knees at 160 to 170 mm. (6.3 to 6.7 inches) Center the knee separation with respect to the longitudinal seat cushion marking as determined in Item 1.19 or 1.20. (S16.3.2.1.6)
Record Knee Separation 170
- ☒ 12. Push rearward on the dummy's knees until the pelvis contacts the seat back, or the backs of the calves contact the seat cushion, whichever occurs first. (S16.3.2.1.6)
☐ Pelvis contacted seat back.
☒ Calves contacted seat cushion.
- ☒ 13. Gently rock the upper torso ± 5 degrees (approximately 51 mm (2 inches)) side-to-side three time. (S16.3.2.1.7)
- ☒ 14. If needed, extend the legs until the feet do not contact the floor pan. The thighs should be resting on the seat cushion. (S16.3.2.1.8)
- ☒ 15. Position the right foot until the foot is in line with a longitudinal vertical plane passing through the center of the accelerator pedal. Maintain the leg and thigh in a vertical plane. (S16.3.2.1.8)
- ☒ 16. Rotate the left leg and thigh laterally to equalize the distance between each knee and the longitudinal seat cushion marking as determined in Item 1.19 or 1.20. (S16.3.2.1.8)
- ☒ 17. Attempt to return the seat to the foremost fore-aft position, mid-height, and seat cushion mid-angle as determined in Item 1. The foot may contact and depress the accelerator and/or change the angle of the foot with respect to the leg. (S16.3.2.1.8)
☒ Foremost position achieved. Proceed to step 22.
☐ Foremost not achieved because of foot interference. Proceed to step 19.
☐ Foremost not achieved because of steering wheel contact.
- ☐ 18. If either of the dummy's legs contact the steering wheel, move the steering wheel up the minimum amount required to avoid contact. If the steering wheel is not adjustable separate the knees the minimum required to avoid contact. (S16.3.2.1.8)
☐ N/A- there was no leg contact
☐ Steering wheel repositioned
☐ Knees separated
- ☐ 19. If the left foot interferes with the clutch or brake pedals, rotate the left foot about the leg to provide clearance. If this is not sufficient, rotate the thigh outboard at the hip the minimum amount required for clearance. (S16.3.2.1.8)
☐ N/A, No foot interference with pedals.
☐ Foot adjusted to provide clearance.
☐ Foot and Thigh adjusted to provide clearance.

- ☐ 20. Continue to move the seat. Use seat controls to line up the seat markings determined during item 1 to set the foremost fore-aft position, mid-height position and the seat cushion mid-angle. If the dummy contacts the interior move the seat rearward until a maximum clearance of 5 mm (0.2 inches) is achieved or the seat is in the closest detent position that does not cause dummy contact. (S16.3.2.1.8)
- ☐ Foremost, mid-height position and the seat cushion mid-angle reached
- ☐ Dummy contact. Clearance set at maximum of 5mm
Measured Clearance _____
- ☐ Dummy Contact. Seat set at nearest detent position.
Seat position _____ detent positions rearward of foremost
(foremost is position zero)
- ☐ 21. If the steering wheel was repositioned in step 18, return the steering wheel to the original position. If the steering wheel contacts the dummy before reaching the original position, position the wheel until a maximum clearance of 5mm (.2 inches) is achieved, or the steering wheel is in the closest detent position that does not cause dummy contact. (S16.3.2.1.8)
- ☐ N/A Steering wheel was not repositioned.
- ☐ Original position achieved.
- ☐ Dummy contact. Clearance set at maximum of 5mm
Measured Clearance _____
- ☐ Dummy Contact. Steering wheel set at nearest detent position.
Steering wheel position _____ detent positions upward of original position.
(Original position is position zero)
- ☒ 22. If the seat back is adjustable, rotate the seat back forward while holding the thighs in place. Continue rotating the seat back forward until the transverse instrument platform of the dummy head is level ± 0.5 degrees. If the head cannot be leveled using the seat back adjustment, or the seat back is not adjustable, use the lower neck bracket adjustment to level the head. If a level position cannot be achieved, minimize the angle. (S16.3.2.1.9)
- ☒ Head Level Achieved. (Check all that apply)
- ☒ Head leveled using the adjustable seat back
- ☐ Head leveled using the neck bracket.
Head Angle 0.2 degrees
- ☐ Head Level NOT Achieved. (Check all that apply)
- ☐ Head adjusted using the adjustable seat back
- ☐ Head adjusted using the neck bracket.
Head Angle _____ degrees
- ☒ 23. Verify the pelvis is not interfering with the seat bight. (S16.3.2.1.9)
- ☒ No interference
- ☐ Pelvis moved forward the minimum amount so that it is not caught in the seat bight.
- ☒ 24. Verify the dummy abdomen is properly installed. (S16.3.2.1.9)
- ☒ Abdomen still seated properly into dummy
- ☐ Abdomen was adjusted because it was not seated properly into dummy

☒ 25. Head Angle

☒ N/A, neither the pelvis nor the abdomen were adjusted.

☒ 25.1 Head still level (Go to 26)

☐ 25.2 Head level adjusted

☐ Head Level Achieved. (Check all that apply)

☐ Head leveled using the adjustable seat back

☐ Head leveled using the neck bracket.

Head Angle _____ degrees

☐ Head Level NOT Achieved. (Check all that apply)

☐ Head level adjusted using the adjustable seat back

☐ Head level adjusted using the neck bracket.

Head Angle _____ degrees

☒ 26. If the dummy torso contacts the steering wheel while performing step 22, reposition the steering wheel in the following order to eliminate contact. (S16.3.2.1.9)

☒ N/A, No dummy torso contact with the steering wheel.

☐ 26.1 Adjust telescoping mechanism.

☐ N/A No telescoping adjustment.

☐ Adjustment performed (fill in appropriate change)

Steering wheel moved _____ detent positions in the forward direction.

Steering wheel moved _____ mm in the forward direction.

☐ 26.2 Adjust tilt mechanism.

☐ N/A No tilt adjustment.

☐ No adjustment performed.

☐ Adjustment performed. (circle one)

Steering wheel moved _____ detent positions Upward/Downward.

Steering wheel moved _____ degrees Upward/Downward

☐ 26.3 Adjust Seat in the aft direction.

☐ No Adjustment performed.

☐ Seat moved aft _____ mm from original position.

☐ Seat moved aft _____ detent positions from the original position.

☒ 27. Measure and set the pelvic angle using the pelvic angle gage TE-2504. The pelvic angle should be 20.0 degrees $\pm$ 2.5 degrees. If the pelvic angle cannot be set to the specified range because the head will not be level or because the dummy will have need major repositioning, adjust the pelvis as closely as possible to the angle range, but keep the head level. (S16.3.2.1.11)

☒ Pelvic angle set to 20.0 degrees $\pm$ 2.5 degrees.

☐ Pelvic angle of 20.0 degrees not achieved, the angular difference was minimized.

☒ Record the pelvic angle. 20.1 degrees

☒ 28. Check the dummy for contact with the interior after completing adjustments. (S16.3.2.1.12)

☒ No contact.

☐ Dummy in contact with interior.

☐ Seat moved aft _____ mm from the previous position.

☐ Seat moved aft _____ detent positions from the previous position.

- ☒ 29. Check the dummy to see if additional interior clearance is obtained, allowing the seat to be moved forward. (S16.3.2.1.12)
☒ N/A, Seat already at foremost position.
☒ Clearance unchanged. No adjustments required.
☐ Additional clearance available
☐ Seat moved Forward _____ mm from the previous position.
☐ Seat moved Forward _____ detent positions from the previous position.
- ☒ 30. Driver's foot positioning, right foot. Place the foot perpendicular to the leg and determine if the heel contacts the floor pan at any leg position. If the heel contacts the floor pan proceed to step 31 otherwise, proceed to step 32. (S16.3.2.2.1)
- ☒ 31. Perform the following steps until either all steps are completed, or the foot contacts the accelerator pedal. Step 31.6 shall be completed in all cases. (S16.3.2.2.1(a))
- ☒ 31.1 With the rear of the heel contacting the floor pan, move the foot forward until pedal contact occurs or the foot is at the full forward position.
- ☐ 31.2 If the vehicle has an adjustable accelerator pedal, move the pedals rearward until pedal contact occurs or the pedals reach the full rearward position.
- ☐ 31.3 Extend the leg, allowing the heel to lose contact with the floor until the foot contacts the pedal. Do not raise the toe of the foot higher than the top of the accelerator pedal. If the foot does not contact the pedal, proceed to the next step. If pedal contact does occur, place a tapered foam block as shown in Figure G1 under the heel with the shallow part of the taper facing forward. (S16.3.2.2.3)
- ☐ 31.4 Angle the foot to achieve contact between the foot and the pedal. If the foot does not contact the pedal, return the foot to the perpendicular orientation. If pedal contact does occur, place a tapered foam block as shown in Figure G1 under the heel with the shallow part of the taper facing forward. (S16.3.2.2.3)
- ☐ 31.5 Align the centerline of the foot with the vertical-longitudinal plane passing through the center of the accelerator pedal. Place a tapered foam block as shown in Figure G1 under the heel with the shallow part of the taper facing forward. (S16.3.2.2.3)
- ☒ 31.6 Record foot position
☒ Pedal Contact achieved. Contact occurred at step 31.1.
☒ Heel contacts floor pan
☐ Heel set _____ mm from floor pan.
☐ Pedal Contact not achieved. Heel set _____ mm from the floor pan.

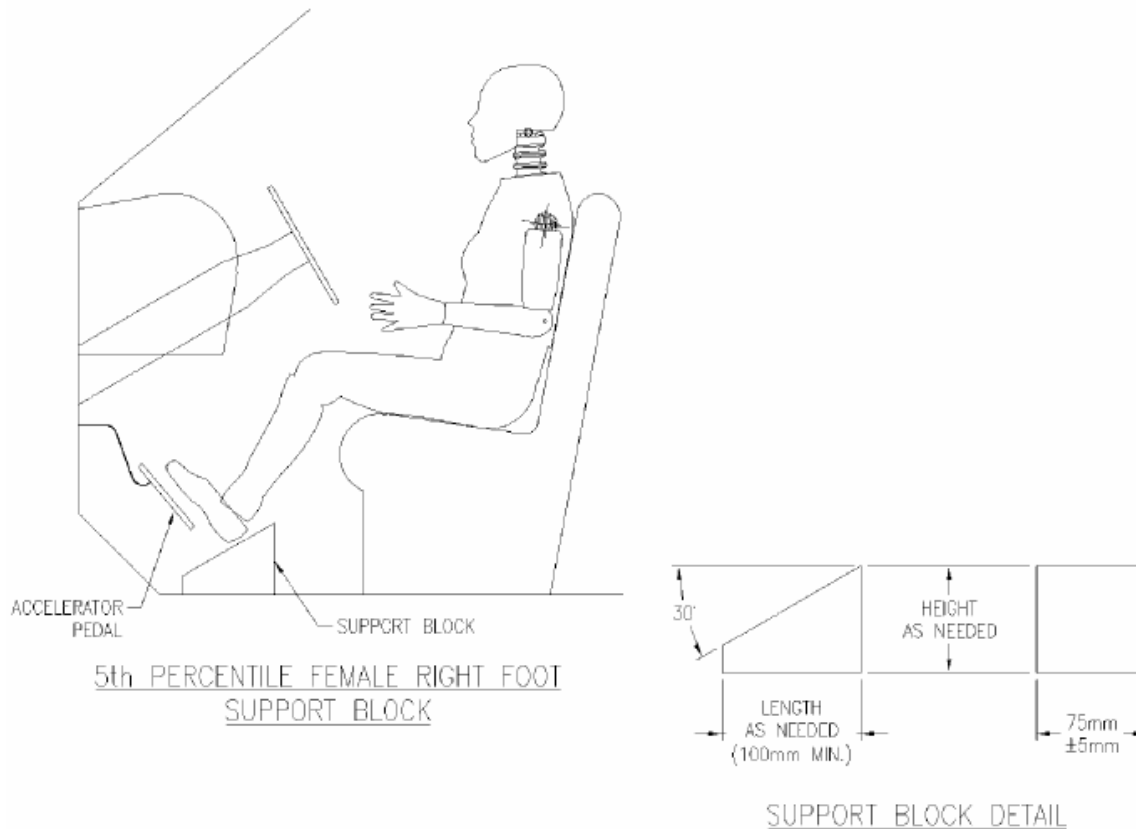


FIGURE G1

- ___ 32. Perform the following steps until either all steps are completed, or the foot contacts the accelerator pedal. Step 30.5 shall be completed in all cases.
- ___ 32.1 Extend the leg until the foot contacts the pedal. Do not raise the toe of the foot higher than the top of the accelerator pedal. If the foot does not contact the pedal, proceed to the next step. If pedal contact does occur, place a tapered foam block as shown in Figure G1 under the heel with the shallow part of the taper facing forward. (S16.3.2.2.1(b) & S16.3.2.2.3)
- ___ 32.2 If the vehicle has an adjustable accelerator pedal, move the pedals rearward until pedal contact occurs or the pedals reach the full rearward position. If pedal contact does occur, place a tapered foam block as shown in Figure G1 under the heel with the shallow part of the taper facing forward. (S16.3.2.2.1(b) & S16.3.2.2.3)
- ___ N/A No pedal adjustment
- ___ 32.3 Angle the foot to achieve contact between the foot and the pedal. If the foot does not contact the pedal, return the foot to the perpendicular orientation. If pedal contact does occur, place a tapered foam block as shown in Figure G1 under the heel with the shallow part of the taper facing forward. (S16.3.2.2.2 & S16.3.2.2.3)
- ___ 32.4 Align the centerline of the foot in the same horizontal plane as the centerline of the accelerator pedal. Place a tapered foam block as shown in Figure G1 under the heel with the shallow part of the taper facing forward. (S16.3.2.2.3)
- ___ 32.5 Record foot position
- ___ Pedal Contact achieved. Contact occurred at step ____.
- ___ Heel set ____ mm from floor pan.
- ___ Pedal Contact not achieved. Heel set ____ mm from the floor pan.

X 33. Driver's foot positioning, left foot.

X 33.1 Place the foot perpendicular to the leg and determine if the heel contacts the floor pan at any leg position. If the heel contacts the floor pan proceed to step 33.2, otherwise position the leg as perpendicular to the thigh as possible with the foot parallel to the floor pan. (S16.2.2.6)

X 33.2 Place the foot on the toe board with the heel resting on the floor pan as close to the intersection of the floor pan and the toe board as possible. Adjust the angle of the foot if necessary to contact the toe board. If the foot will not contact the toe board, set the foot perpendicular to the leg, and set the heel on the floor pan as far forward as possible. Avoid contact with the brake pedal, clutch pedal, wheel well projection, and footrest. To avoid this contact use the following three manipulations in the order listed, with each subsequent option incorporating the previous, until contact is avoided: rotate the foot about the lower leg (abduction/adduction), plantar flex the foot, rotate the leg outboard about the hip. Movement should be the minimum amount necessary. If it is not possible to avoid all foot contact, give priority to avoiding brake or clutch pedal contact. (S16.2.2.4 & S16.2.2.5 & S16.2.2.7)

X No contact

 Foot rotated about the leg (abduction/adduction)

 Foot rotated about the leg, and foot plantar flexed

 Foot rotated about the leg, foot plantar flexed, and the leg rotated about the hip.

X 33.3 Record foot position.

 Heel does not contact floor pan.

 Heel on floor pan and foot on toe board.

X Heel on floor pan and foot not on toe board.

X 34. Driver arm/hand positioning.

X 34.1 Place the dummy's upper arms adjacent to the torso with the arm centerlines as close to a vertical longitudinal plane as possible. (S16.3.2.3.1)

X 34.2 Place the palms of the dummy in contact with the outer part of the steering wheel rim at its horizontal centerline with the thumbs over the steering wheel rim. (S16.3.2.3.2)

 34.3 If it is not possible to position the thumbs inside the steering wheel rim at its horizontal centerline, then position them above and as close to the horizontal centerline of the steering wheel rim as possible. (S16.3.2.3.3)

X 34.4 Lightly tape the hands to the steering wheel rim so that if the hand of the test dummy is pushed upward by a force of not less than 9 N (2 lb) and not more than 22 N (5 lb), the tape releases the hand from the steering wheel rim. S16.3.2.3.4

X 35. Adjustable head restraints

 N/A, there is no head restraint adjustment

 35.1 If the head restraint has an automatic adjustment, leave it where the system positions the restraint after the dummy is placed in the seat. (S16.3.4.1) Go to 36.

X 35.2 Adjust each head restraint vertically so that the mid-horizontal plane determined in Item 2 is aligned with the center of gravity (CG) of the dummy head. (S16.3.4.3)

X 35.3 If the above position is not attainable, move the vertical center of the head restraint to the closest detent below the center of the head CG. (S16.3.4.3)

 N/A midpoint position attained in previous step

X Headrest set at nearest detent below the head CG

X 35.4 If the head restraint has a fore and aft adjustment, place the restraint in the foremost position or until contact with the head is made, whichever occurs first. (S16.3.4.4)

X 36. Driver and passenger manual belt adjustment (for tests conducted with a belted dummy). (S16.3.5)

 N/A Dummies are unbelted for this test.

X 36.1 If an adjustable seat belt D-ring anchorage exists, place it in the manufacturer's design position for a 5th percentile adult female. (S16.3.5.1) **This information will be supplied by the COTR.**

Manufacturer's specified position Full Down

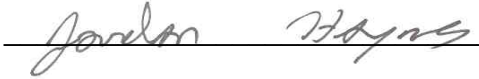
Actual Position Full Down

X 36.2 Place the Type 2 manual belt around the test dummy and fasten the latch. (S16.3.5.2)

X 36.3 Ensure that the dummy's head remains as level as possible. (S16.3.5.3)

X 36.4 Remove all slack from the lap belt. Pull the upper torso webbing out of the retractor and allow it to retract; repeat this operation four times. Apply a 9 N (2 lbf) to 18 N (4 lbf) tension load to the lap belt. If the belt system is equipped with a tension-relieving device, introduce the maximum amount of slack into the upper torso belt that is recommended by the manufacturer. If the belt system is not equipped with a tension-relieving device, allow the excess webbing in the shoulder belt to be retracted by the retractive force of the retractor. (S16.3.5.4)

I certify that I have read and performed each instruction.

Signature:  Date: 4/23/09

DATA SHEET 36 - APPENDIX G
DUMMY POSITIONING PROCEDURES
FOR 5th PERCENTILE FEMALE PASSENGER TEST DUMMY
CONFORMING TO SUBPART O OF PART 572

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Joe Fleck

NHTSA No.: C90508
 Test Date: 4/23/09

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

(Check this item ONLY if it applies to this vehicle.)

 The passenger seat adjustments are controlled by the adjustments made to the driver's seat. Therefore, positioning of the passenger dummy is made simultaneously with the driver dummy. Adjustments made to the seat to position the driver will over ride any adjustments that would normally be made to position the passenger. (S16.2.10.3)

1. Seat Position

X 1.1 Position the seat's adjustable lumbar supports so that the lumbar supports are in the lowest, retracted or deflated adjustment positions. (S16.2.10.1, S20.1.9.1, S20.4.1, S22.1.7.1)

X N/A – No lumbar adjustment

X 1.2 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, S20.1.9.2, S20.4.1, S22.1.7.1, S22.4.2.1, S22.4.3.1, S24.4.2.1, S26.2.3, S26.3.1)

X N/A – No additional support adjustment

X 1.3 Position an adjustable leg support system in its rearmost position. (8/27/04 interpretation to Toyota)

X N/A – No adjustable leg support system

X 1.4 **Mark** a point (seat cushion reference point) on the side of the seat cushion that is between 150 mm and 250 mm from the front edge of the seat cushion. (S16.3.1.12)

X 1.5 Draw a line (seat cushion reference line) through the seat cushion reference point. (S16.3.1.13)

X 1.6 Use only the controls that primarily move the seat in the fore-aft direction to move the seat cushion reference point to the rearmost position. (S16.2.10.3.1, S22.1.7.3)

X 1.7 If the seat cushion adjusts fore-aft, independent of the seat back, use only the controls that primarily move the seat cushion in the fore-aft direction to move the seat cushion reference point to the rearmost position. (S16.2.10.3.1, S20.1.9.3)

X N/A – No independent fore-aft seat cushion adjustment

- ☒ 1.8 Use any part of any control, other than the parts just used for fore-aft positioning, to determine the range of angles of the seat cushion reference line and to set the seat cushion reference line at the mid-angle. (S16.2.10.3.1)
Maximum angle Zero
Minimum angle Zero
Mid-angle Zero
- ☒ 1.9 If the seat and/or seat cushion height is adjustable, use any part of any control other than the parts which primarily move the seat or seat cushion fore-aft, to put the seat cushion reference point in its lowest position with the seat cushion reference line angle at the mid-angle found in 1.8. (S16.2.10.3.1)
☒ N/A – No seat height adjustment
- ☒ 1.10 Use only the controls that primarily move the seat in the fore-aft direction to verify the seat is in the rearmost position.
- ☒ 1.11 Use only the controls that primarily move the seat in the fore-aft direction to **mark** the fore-aft seat positions. **Mark** each position so that there is a visual indication when the seat is at a particular position. For manual seats, move the seat forward one detent at a time and **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.
- ☒ 1.12 Use only the controls that primarily move the seat in the fore-aft direction to place the seat in the rearmost position.
- ☒ 1.13 Use any part of any control, other than the parts which primarily move the seat or seat cushion fore-aft, to find and visually **mark** the maximum, minimum, and middle height of the seat cushion reference point with the seat cushion reference line at the mid-angle determined in 1.8. (S20.1.9.4, S22.1.2, S22.1.7.4, S22.3.1, S22.4.3.1, S24.1.2, S24.3.1, S24.4.3.1, S26.2.3, S26.3.1)
☒ N/A – No seat height adjustment. Go to 1.18
- ☐ 1.14 Use only the controls that primarily move the seat and/or seat cushion in the fore-aft direction to place the seat in the mid-fore-aft position.
- ☐ 1.15 Use any part of any control, other than the parts which primarily move the seat or seat cushion fore-aft, to find and visually **mark** the maximum, minimum, and middle height of the seat cushion reference point with the seat cushion reference line at the mid-angle determined in 1.8. (S20.1.9.4, S22.1.2, S22.1.7.4, S22.3.1, S24.1.2, S24.3.1)
- ☐ 1.16 Use only the controls that change the seat in the fore-aft direction to place the seat in the foremost position. (S16.2.10.3.2)
- ☐ 1.17 Use any part of any control, other than the parts which primarily move the seat or seat cushion fore-aft, to find and visually **mark** the maximum, minimum, and middle height of the seat cushion reference point with the seat cushion reference line at the mid-angle determined in 1.8. (S16.2.10.3.3, S20.1.9.4, S22.1.2, S22.1.7.4, S22.3.1, S24.1.2, S24.3.1)
- ☒ 1.18. Is the seat a bucket seat?
☒ Yes, go to 1.19 and skip 1.20
☐ No, go to 1.20 and skip 1.19

X 1.19 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. (S16.3.1.10 & S20.1.10)

 1.20 Bench seats:

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. (S20.2.1.4, S22.2.1.3, S24.2.3, S20.4.4, S22.2.2.1(b), S22.2.2.3(b), S22.2.2.4(a), S22.2.2.5(a), S22.2.2.6(a), S22.2.2.7(a), S24.2.3(a))

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. (The vertical plane through this longitudinal centerline is Plane B for suppression.) _____

2. Head Restraint Position

 N/A Vehicle contains automatic head restraints.

 N/A, there is no head restraint adjustment Go to 3

X 2.1 Adjust the head restraint to its lowest position. (S16.2.10.2, S20.1.9.6 S20.4.1, S22.1.7.6, S22.4.2.1, S22.4.3.1, S24.4.3.1, S26.2.3, S26.3.1)

X 2.2 All adjustments of the head restraint shall be used to position it full forward. For example, if it rotates, rotate it such that the head restraint extends as far forward as possible. **Mark** the foremost position. (S16.2.10.2 & S16.3.4.4 & S20.1.9.6, S20.4.1, S22.4.2.1, S22.4.3.1, S24.4.3.1, S26.2.3, S26.3.1)

X 2.3 Measure the vertical distance from the top most point of the head restraint to the bottom most point. Locate and **mark** a horizontal plane through the midpoint of this distance. (S16.3.4.3)

Vertical height of head restraint 240 mm

Mid-point height 120 mm

X 3. Place the SCRIP in the full rearward, mid-height position, and mid-seat cushion angle. (S16.3.3.1.1)

X 4. Fully recline the seat back. (S16.3.3.1.2)

 N/A seat back not adjustable.

X 5. Place the dummy in the seat with the legs at an angle of 120 degrees to the thighs. The calves should not be touching the seat cushion. (S16.3.3.1.2)

X 6. Position the dummy in the seat such that the midsagittal plane is coincident with the longitudinal seat cushion marking that was determined in item 1.19 or 1.20. (S16.3.3.1.3 and S16.3.3.1.4)

X 7. Hold down the dummy's thighs and push rearward on the upper torso to maximize the pelvic angle. (S16.3.3.1.5)

X 8. Set the angle between the legs and the thighs to 120 degrees. (S16.3.3.1.6)

- X 9. Set the transverse distance between the centers of the front of the knees at 160 to 170 mm. (6.3 to 6.7 inches). Center the knee separation with respect to the longitudinal seat cushion marking that was determined in item 1.19 or 1.20. (S16.3.3.1.6)
Record Knee Separation: 165
- X 10. Push rearward on the dummy's knees until the pelvis contacts the seat back, or the backs of the calves contact the seat cushion, whichever occurs first. (S16.3.3.1.6)
 Pelvis contacted seat back.
X Calves contacted seat cushion.
- X 11. Gently rock the upper torso ± 5 degrees (approximately 51 mm (2 inches)) side-to-side three times. (S16.3.3.1.7)
- X 12. If needed, extend the legs until the feet do not contact the floor pan. The thighs should be resting on the seat cushion. (S16.3.3.1.8)
- X 13. Use seat controls to line up the seat markings determined during the completion of item 1 to set the foremost fore-aft position, mid-height position and the seat cushion mid-angle. If the dummy contacts the interior move the seat rearward until a maximum clearance of 5 mm (0.2 inches) is achieved or the seat is in the closest detent position that does not cause dummy contact. (S16.3.3.1.8)
X Foremost, mid-height position and the seat cushion mid-angle reached
 Dummy contact. Clearance set at maximum of 5mm
Measured Clearance
 Dummy Contact. Seat set at nearest detent position.
Seat position detent positions rearward of foremost
(foremost is position zero)
- X 14. If the seat back is adjustable, rotate the seat back forward while holding the thighs in place. Continue rotating the seat back forward until the transverse instrument platform of the dummy head is level ± 0.5 degrees. If head cannot be leveled using the seat back adjustment, or the seat back is not adjustable, use the lower neck bracket adjustment to level the head. If a level position cannot be achieved, adjust the head as closely as possible to the ± 0.5 degree range. (S16.3.3.1.9 and S16.3.3.1.10)
(Check All That Apply)
 Seat back not adjustable
 Seat back not independent of driver side seat back
X Head Level Achieved. (Check all that apply)
 Head leveled using the adjustable seat back
 Head leveled using the neck bracket.
Head Angle 0.2 degrees
 Head Level NOT Achieved. (Check all that apply)
 Head adjusted using the adjustable seat back
 Head adjusted using the neck bracket.
Head Angle degrees
- X 15. Verify the pelvis is not interfering with the seat bight. (S16.3.3.1.9)
X No interference
 Pelvis moved forward the minimum amount so that it is not caught in the seat bight.
- X 16. Verify the dummy abdomen is properly installed. (S16.3.3.1.9)
X Abdomen still seated properly into dummy
 Abdomen was adjusted because it was not seated properly into dummy
- X 17. Head Angle
X N/A, neither the pelvis nor the abdomen were adjusted.

☒ 17.1 Head still level (Go to 18)

☐ 17.2 Head level adjusted

☐ Head Level Achieved. (Check all that apply)

☐ Head leveled using the adjustable seat back

☐ Head leveled using the neck bracket.

Head Angle _____ degrees

☐ Head Level NOT Achieved. (Check all that apply)

☐ Head adjusted using the adjustable seat back

☐ Head adjusted using the neck bracket.

Head Angle _____ degrees

☒ 18. Measure and set the pelvic angle using the pelvic angle gage TE-2504. The pelvic angle should be 20.0 degrees $\pm$ 2.5 degrees. If the pelvic angle cannot be set to the specified range because the head will not be level or because the dummy will have need major repositioning, adjust the pelvis as closely as possible to the angle range, but keep the head level.

☒ Pelvic angle set to 20.0 degrees $\pm$ 2.5 degrees.

☐ Pelvic angle of 20.0 degrees not achieved, the angular difference was minimized.

☒ Record the pelvic angle. 20.8 degrees

☒ 19. Check the dummy for contact with the interior after completing adjustments.

☒ No contact.

☐ Dummy in contact with interior.

☐ Seat moved aft _____ mm from the previous position.

☐ Seat moved aft _____ detent positions from the previous position.

☒ 20. Verify the transverse instrument platform of the dummy head is level $\pm$ 0.5 degrees. Use the lower neck bracket adjustment to level the head. If a level position cannot be achieved, minimize the angle. (S16.3.3.1.9, S16.3.3.1.10, and S16.3.3.1.11)

☒ Head Level Achieved

Head Angle 0.3 degrees

☐ Head Level NOT Achieved.

Head Angle _____ degrees

☒ 21. Check the dummy to see if additional interior clearance is obtained, allowing the seat to be moved forward. (S16.3.3.1.12)

☐ N/A Bench Seat

☒ N/A Seat already at full forward position.

☐ Clearance unchanged. No adjustments required.

☐ Additional clearance available

☐ Seat moved Forward _____ mm from the previous position.

☐ Seat moved Forward _____ detent positions from the previous position.

☐ Seat moved Forward, Full Forward position reached.

☒ 22. Passenger foot positioning. (Indicate final position achieved) (S16.3.3.2)

☐ 22.1 Place feet flat on the toe board; OR (S16.3.3.2.1)

☒ 22.2 If the feet cannot be placed flat on the toe board, set the feet perpendicular to the lower leg, and rest the heel as far forward on the floor pan as possible; OR (S16.3.3.2.2)

☐ 22.3 If the heels do not touch the floor pan, set the legs as perpendicular to the thighs as possible and set the feet parallel to the floor pan. (S16.3.3.2.2)

☒ 23. Passenger arm/hand positioning. (S16.3.3.3)

☒ 23.1 Place the dummy's upper arms adjacent to the torso with the arm centerlines as close to a vertical longitudinal plane as possible. (S16.3.3.3.1)

☒ 23.2 Place the palms of the dummy in contact with the outer part of the thighs (S16.3.3.3.2)

☒ 23.3 Place the little fingers in contact with the seat cushion. (S16.3.3.3.3)

☒ 24. Adjustable head restraints (S16.3.4)
☐ N/A, there is no head restraint adjustment

☐ 24.1 If the head restraint has an automatic adjustment, leave it where the system positions the restraint after the dummy is placed in the seat. (S16.3.4.1) Go to 25.

☒ 24.2 Adjust each head restraint vertically so that the horizontal plane determined in Item 2 is aligned with the center of gravity (CG) of the dummy head. (S16.3.4.3)

☒ 24.3 If the above position is not attainable, move the vertical center of the head restraint to the closest detent below the center of the head CG. (S16.3.4.3)

☐ N/A midpoint position attained in previous step

☒ Headrest set at nearest detent below the head CG

☒ 24.4 If the head restraint has a fore and aft adjustment, place the restraint in the foremost position or until contact with the head is made, whichever occurs first. (S16.3.4.4)

☒ 25. Manual belt adjustment (for tests conducted with a belted dummy) S16.3.5
☐ N/A, Unbelted test

☒ 25.1 If an adjustable seat belt D-ring anchorage exists, place it in the manufacturer's design position for a 5th percentile adult female. **This information will be supplied by the COTR.** (S16.3.5.1)

Manufacturer's specified position Full Down

Actual Position Full Down

☒ 25.2 Place the Type 2 manual belt around the test dummy and fasten the latch. (S16.3.5.2)

☒ 25.3 Ensure that the dummy's head remains as level as possible. (S16.3.5.3)

☒ 25.4 Remove all slack from the lap belt. Pull the upper torso webbing out of the retractor and allow it to retract; repeat this operation four times. Apply a 9 N (2 lbf) to 18 N (4 lbf) tension load to the lap belt. If the belt system is equipped with a tension-relieving device, introduce the maximum amount of slack into the upper torso belt that is recommended by the manufacturer. If the belt system is not equipped with a tension-relieving device, allow the excess webbing in the shoulder belt to be retracted by the retractive force of the retractor. (S16.3.5.4)

I certify that I have read and performed each instruction.

Signature: 

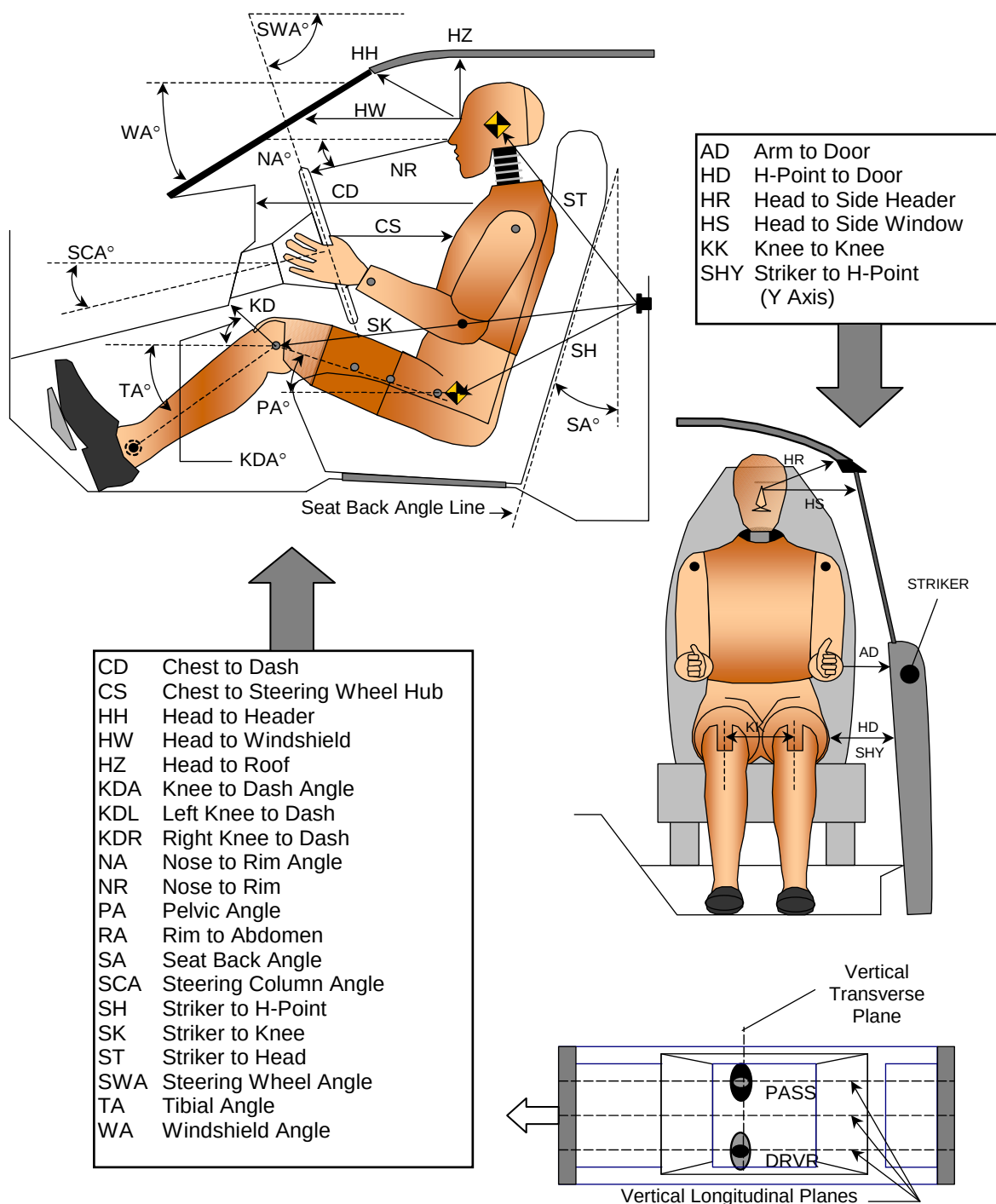
Date: 4/23/09

DATA SHEET 37 **DUMMY MEASUREMENTS**

Test Vehicle: 2009 Kia Optima
Test Program: FMVSS 208 Compliance
Test Technician: Jordan Haynes

NHTSA No.: C90508
Test Date: 4/23/09

DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS



DATA SHEET 37
DUMMY MEASUREMENTS

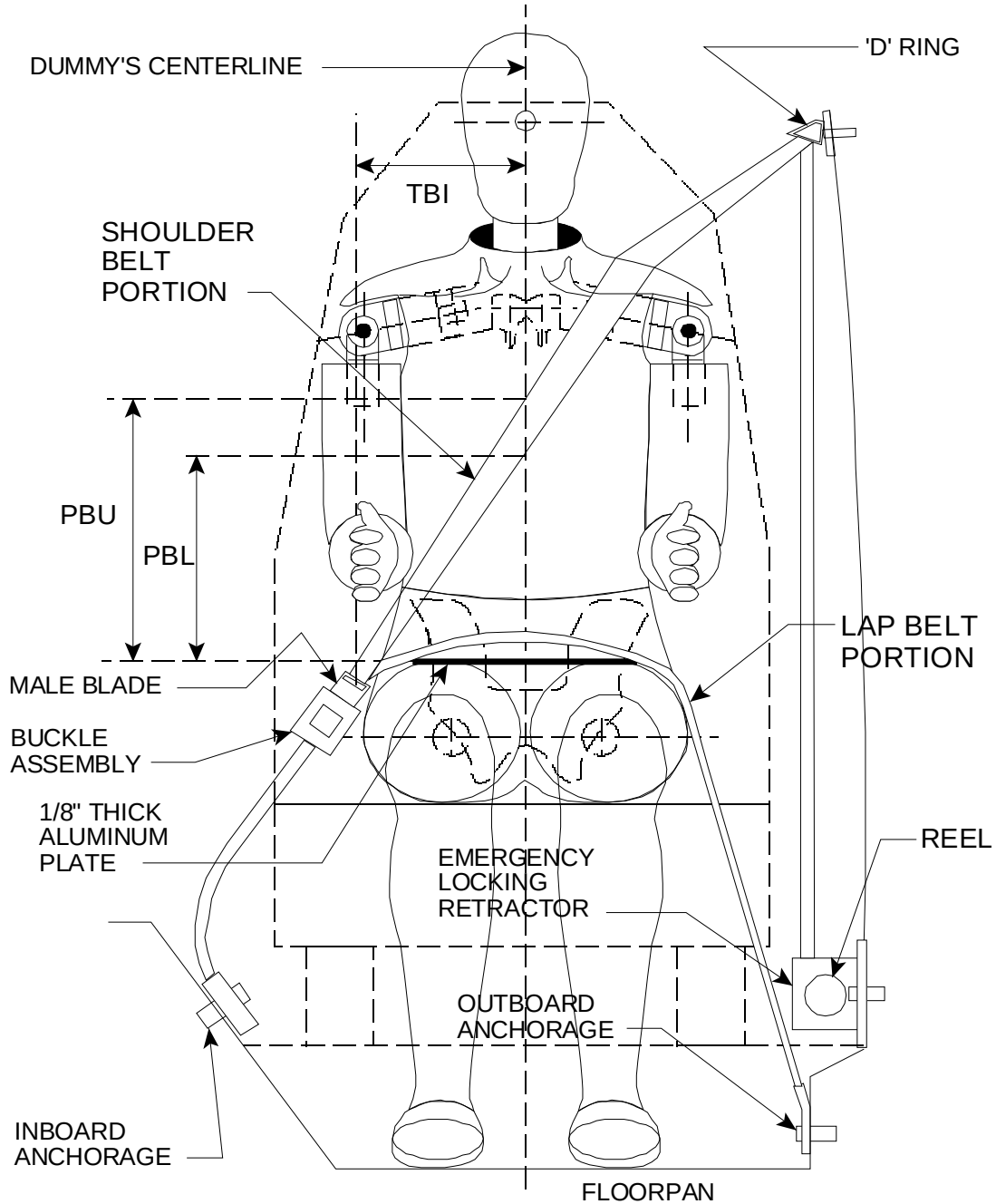
Test Vehicle: 2009 Kia Optima
Test Program: FMVSS 208 Compliance
Test Technician: Jordan Haynes

NHTSA No.: C90508
Test Date: 4/23/09

TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	Driver SN 516		Passenger SN 505	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA	Windshield Angle		29.4		
SWA	Steering Wheel Angle		66.7		
SCA	Steering Column Angle		23.3		
SA	Seat Back Angle (On Headrest Post)		2.6		2.9
HZ	Head to Roof (Z)	195		229	
HH	Head to Header	251	49.0	297	49.8
HW	Head to Windshield	523	0.0	592	0.0
HR	Head to Side Header (Y)	236		247	
NR	Nose to Rim	254	12.9		
CD	Chest to Dash	407		413	
CS	Chest to Steering Hub	178	5.3		
RA	Rim to Abdomen	61	0.0		
KDL	Left Knee to Dash	88	32.2	92	
KDR	Right Knee to Dash	78		119	40.4
PA	Pelvic Angle		20.1		20.8
TA	Tibia Angle		51.2		54.3
KK	Knee to Knee (Y)	290		230	
SK	Striker to Knee	721	97.2	693	101.1
ST	Striker to Head	560	26.5	472	30.8
SH	Striker to H-Point	387	109.5	375	115.1
SHY	Striker to H-Point (Y)	327		316	
HS	Head to Side Window	350		355	
HD	H-Point to Door (Y)	238		261	
AD	Arm to Door (Y)	178		181	
AA	Ankle to Ankle	285		175	

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	270	270
PBL - Top surface of reference to belt lower edge	mm	180	180

DATA SHEET 38

CRASH TEST

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Jordan Haynes

NHTSA No.: C90508
 Test Date: 4/23/09

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

- | | | |
|-------------------------------------|-----|--|
| ☒ | 1. | Vehicle underbody painted |
| ☒ | 2. | The speed measuring devices are in place and functioning. |
| ☒ | 3. | The speed measuring devices are <u>1.0</u> m from the barrier (spec. 1.5m) and <u>30</u> cm from the barrier (spec. is 30 cm) |
| ☒ | 4. | Convertible top is in the closed position. |
| ☒ | | ☒ N/A, not a convertible |
| ☒ | 5. | Instrumentation and wires are placed so motion of dummies during impact is not affected. |
| ☒ | 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>220 kpa</u> front left tire <u>220 kpa</u> specified on tire placard or in owner information |
| | | <u>220 kpa</u> front right tire <u>220 kpa</u> specified on tire placard or in owner information |
| | | <u>220 kpa</u> rear left tire <u>220 kpa</u> specified on tire placard or in owner information |
| | | <u>220 kpa</u> rear right tire <u>220 kpa</u> specified on tire placard or in owner information |
| ☒ | 7. | Time zero contacts on barrier in place. |
| ☒ | 8. | Pre test zero and shunt calibration adjustments performed and recorded. |
| ☒ | 9. | Dummy temperature meets requirements of section 12.2 of the test procedure. |
| ☒ | 10. | Vehicle hood closed and latched |
| ☒ | 11. | Transmission placed in neutral |
| ☒ | 12. | Parking brake off |
| ☒ | 13. | Are the heads still level? |
| | | ☒ Yes, go to 14 |
| | | ☐ No, Adjust dummy so that head is at the angle recorded in the Appendix F or G data sheets and then continue. |
| ☒ | 14. | Ignition in the ON position |
| ☒ | 15. | Doors closed and latched but not locked. |
| ☒ | 16. | Posttest zero and shunt calibration checks performed and recorded. |
| ☒ | 17. | Actual test speed <u>47.6 kmph</u> |
| ☒ | 18. | Vehicle rebound from the barrier <u>253</u> cm |
| ☒ | 19. | Describe whether the doors open after the test and what method is used to open the doors. |
| | | ☒ Left Front Door: Door remained closed and latched; Door opened without tools |
| | | ☒ Right Front Door: Door remained closed and latched; Door opened without tools |
| | | ☒ Left Rear Door: Door remained closed and latched; Door opened without tools |
| | | ☒ 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 and Headrest; Chest to Air Bag; Knees to Knee Bolster |
| | | ☒ Passenger Dummy: Head to Air Bag and Headrest; Chest to Air Bag; Knees to Glove Box |

REMARKS:

Signature: _____

Jordan Haynes

Date: _____

4/23/09

I certify that I have read and performed each instruction.

DATA SHEET 40

ACCIDENT INVESTIGATION MEASUREMENTS

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Jamie Aide

NHTSA No.: C90508
 Test Date: 4/23/09

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

Vehicle Year/Make/Model/Body Style:	2009 Kia Optima Passenger Car
VIN:	KNAGE228695281958
Wheelbase:	2720 mm
Build Date:	08/08
Vehicle Size Category:	3
Test Weight:	1578.5 kg
Front Overhang:	768 mm
Overall Width:	1820 mm
Overall Length Center:	4757 mm

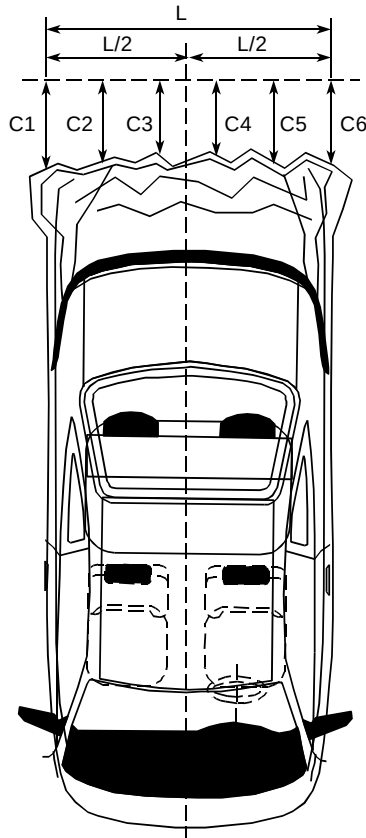
Accelerometer Data	
Location:	As per measurements on Data Sheet 33
Linearity:	>99.9%

Integration Algorithm:	Trapezoidal
Vehicle Impact Speed:	47.6 kmph
Time of Separation:	91.7 ms
Velocity Change:	54.9 kmph

CRUSH PROFILE

Collision Deformation Classification: 12FDEW6
 Midpoint of Damage: Vehicle Longitudinal Centerline
 Damage Region Length (mm): 1440
 Impact Mode: Frontal Barrier

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	Mm	4560	4263	297
C2	Crush zone 2 at left side	mm	4676	4269	407
C3	Crush zone 3 at left side	mm	4738	4321	417
C4	Crush zone 4 at right side	mm	4739	4309	430
C5	Crush zone 5 at right side	mm	4676	4331	345
C6	Crush zone 6 at right side	mm	4559	4322	237



REMARKS:

Signature: _____

James C. [Signature]

Date: 4/23/09

I certify that I have read and performed each instruction.

DATA SHEET 41
WINDSHIELD MOUNTING (FMVSS 212)

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Jamie Aide

NHTSA No.: C90508
 Test Date: 4/23/09

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

1. Pre-Crash
 - 1.1 Describe from visual inspection how the windshield is mounted and describe any trim material.

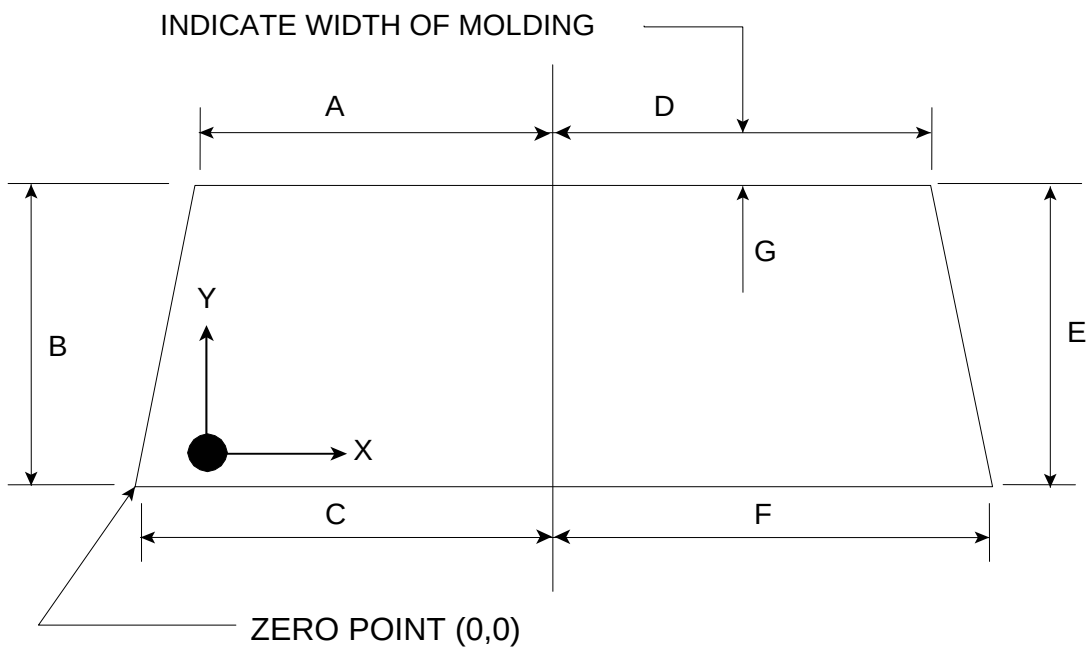
 Retained with glue
 Rubber and plastic trim
 - 1.2 Mark the longitudinal centerline of the windshield.
 - 1.3 Measure pre-crash A, B, and C for the left side and record in the chart below.
 - 1.4 Measure pre-crash C, D, and E for the right side and record in the chart below.
 - 1.5 Measure from the edge of the retainer or molding to the edge of the windshield.
 Dimension G (mm): 15 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 (mm)	Post-Crash (mm)	Percent Retention (Post-Test ÷ Pre-Crash)
Left Side	A	577	577	100%
	B	789	789	100%
	C	743	743	100%
	Total	2109	2109	100%
Right Side	D	577	577	100%
	E	789	789	100%
	F	743	743	100%
	Total	2109	2109	100%

Indicate area of mounting failure: NONE

FRONT VIEW OF WINDSHIELD



REMARKS:

Signature: _____

James Crest

Date: 4/23/09

I certify that I have read and performed each instruction.

DATA SHEET 42
WINDSHIELD ZONE INTRUSION (FMVSS 219)

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance
 Test Technician: Jamie Aide

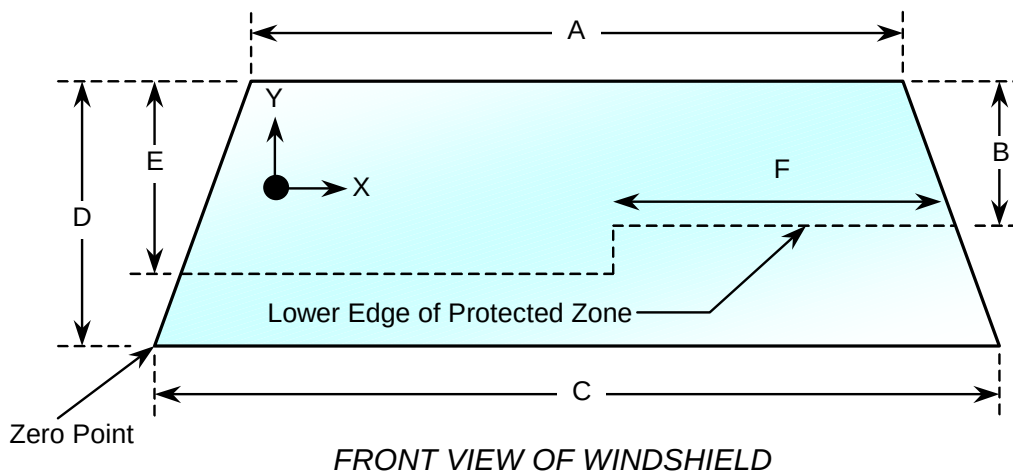
NHTSA No.: C90508
 Test Date: 4/23/09

IMPACT ANGLE:	Zero Degrees		
BELTED DUMMIES (YES/NO):	Yes		
TEST SPEED:	32 to 40 kmph	☒ 0 to 48 kmph	0 to 56 kmph
DRIVER DUMMY:	☒ 5 th female	50 th male	
PASSENGER DUMMY:	☒ 5 th female	50 th 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	1154
B	mm	496
C	mm	1486
D	mm	789
E	mm	500
F	mm	540

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: 4/23/09

DATA SHEET 43
FUEL SYSTEM INTEGRITY (FMVSS 301)

Test Vehicle: 2009 Kia Optima
Test Program: FMVSS 208 Compliance
Test Technician: Jordan Haynes

NHTSA No.: C90508
Test Date: 4/23/09

TYPE OF IMPACT:	30 MPH Belted Flat Frontal
-----------------	----------------------------

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

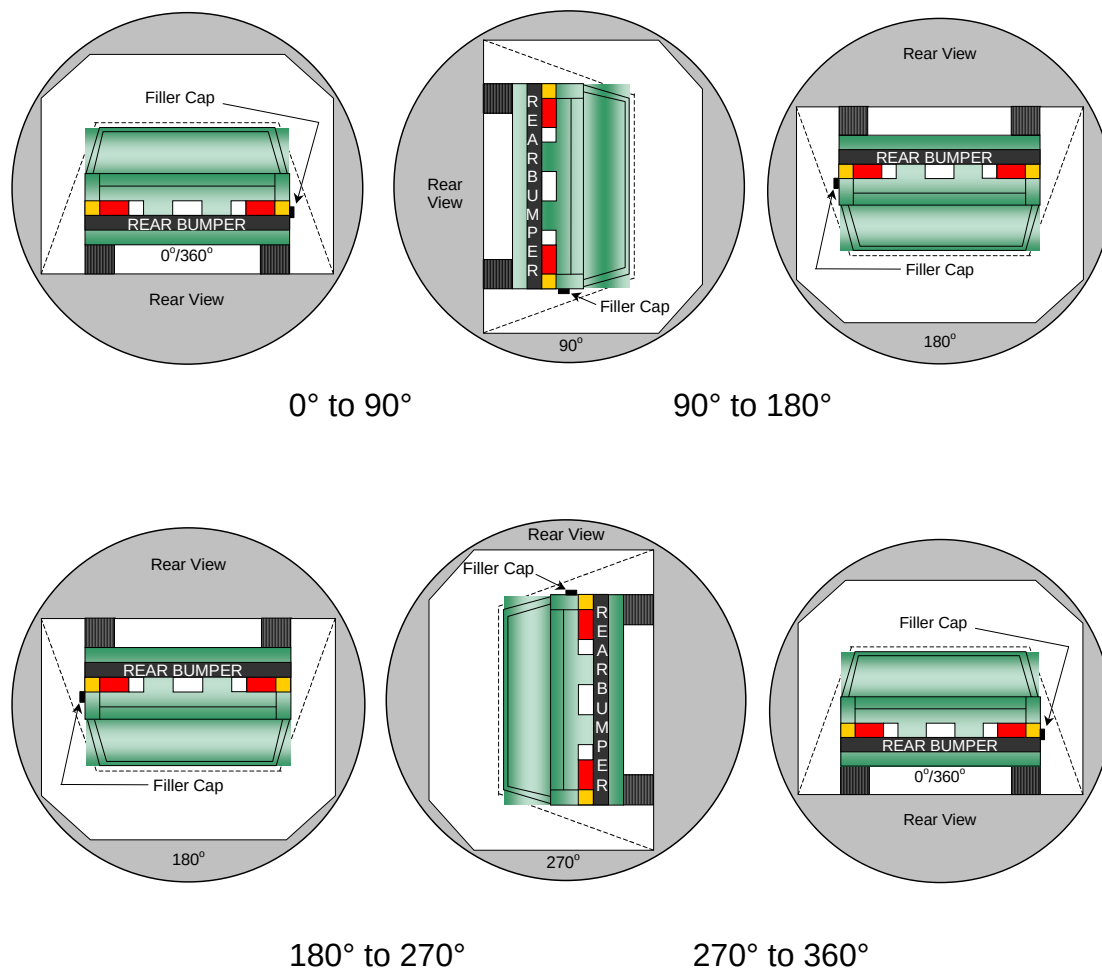
REMARKS: NO SPILLAGE

DATA SHEET 43

FMVSS 301 STATIC ROLLOVER DATA

Test Vehicle: 2009 Kia Optima
 Test Program: FMVSS 208 Compliance

NHTSA No.: C90508
 Test Date: 4/23/09



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°	123	300	0.0
90° to 180°	117	300	0.0
180° to 270°	110	300	0.0
270° to 360°	121	300	0.0

APPENDIX A

CRASH TEST DATA

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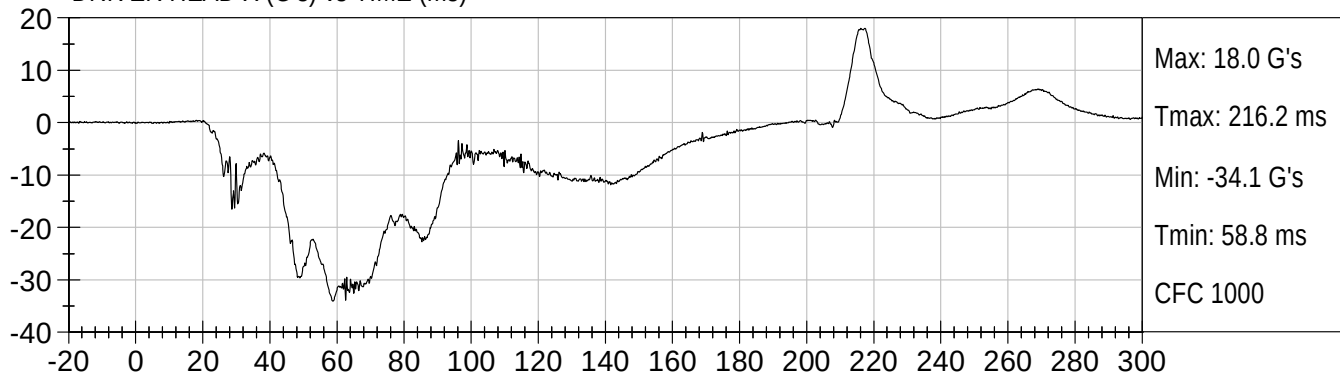
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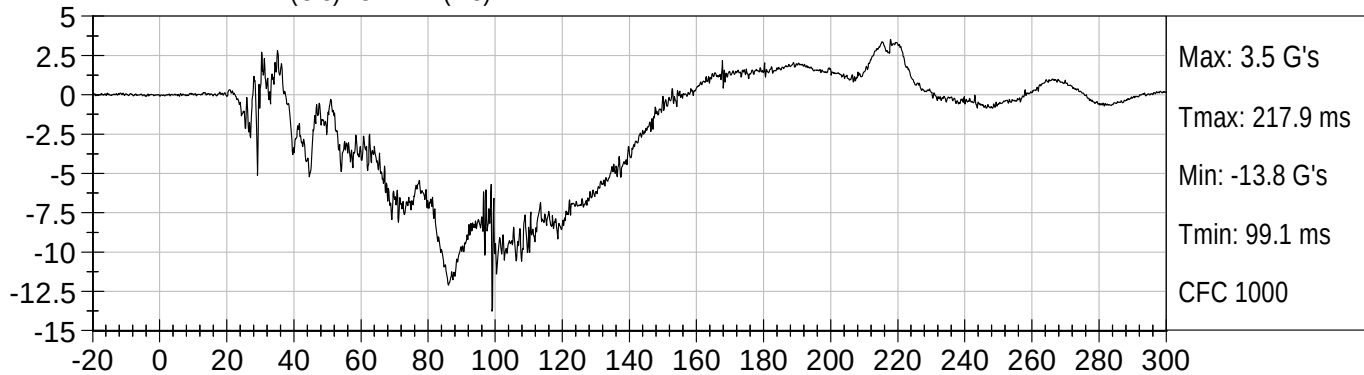
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2009 KIA OPTIMA (C90508)

Test Date: 04/23/2009
Speed: 29.6 mph (47.6 km/h)

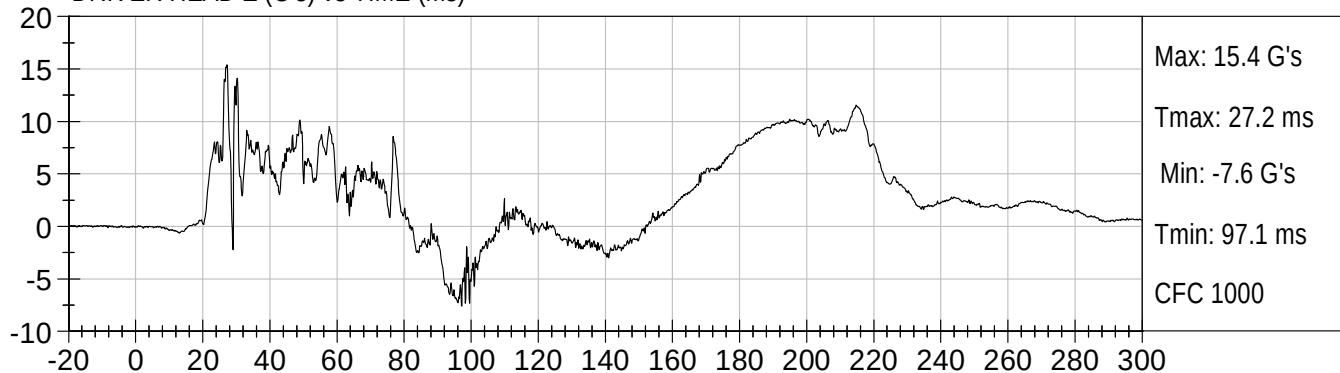
DRIVER HEAD X (G's) vs TIME (ms)



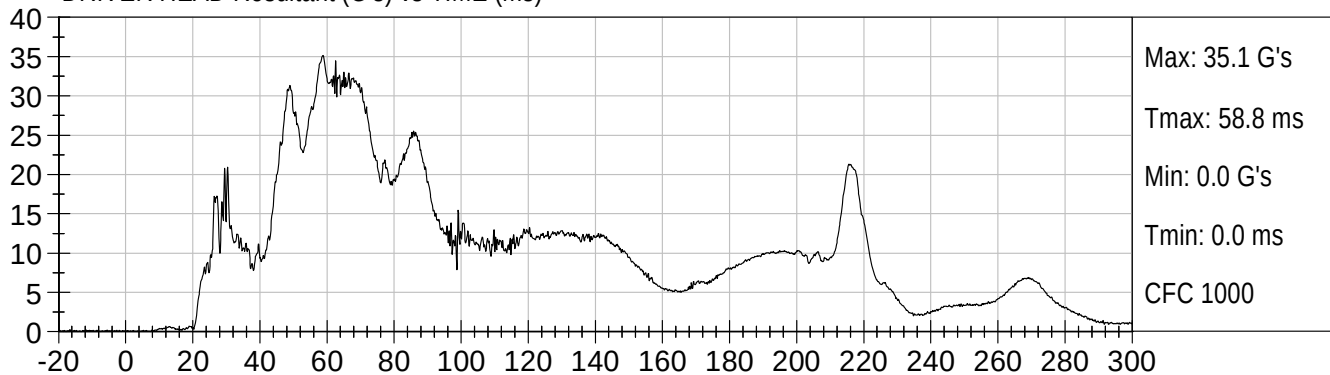
DRIVER HEAD Y (G's) vs TIME (ms)



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



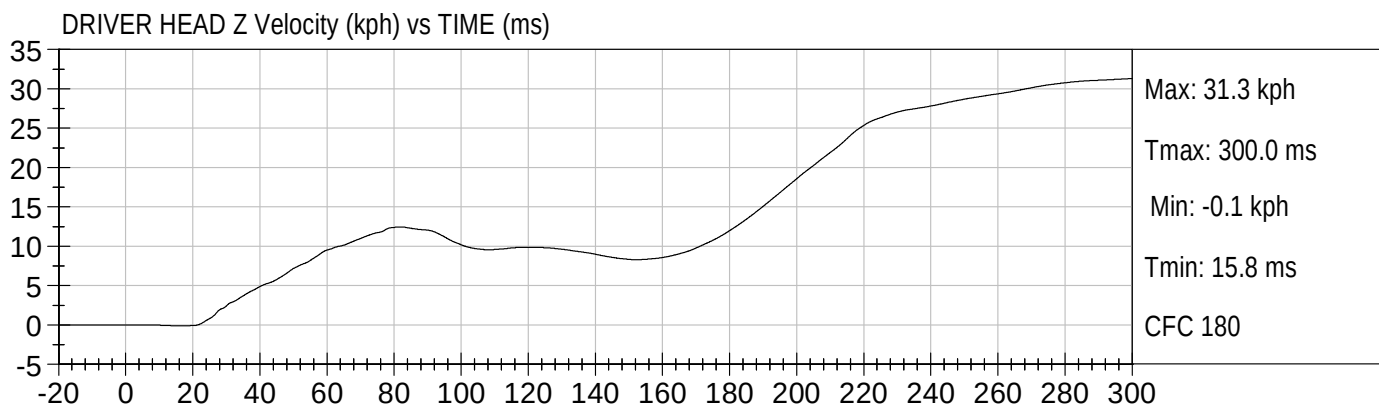
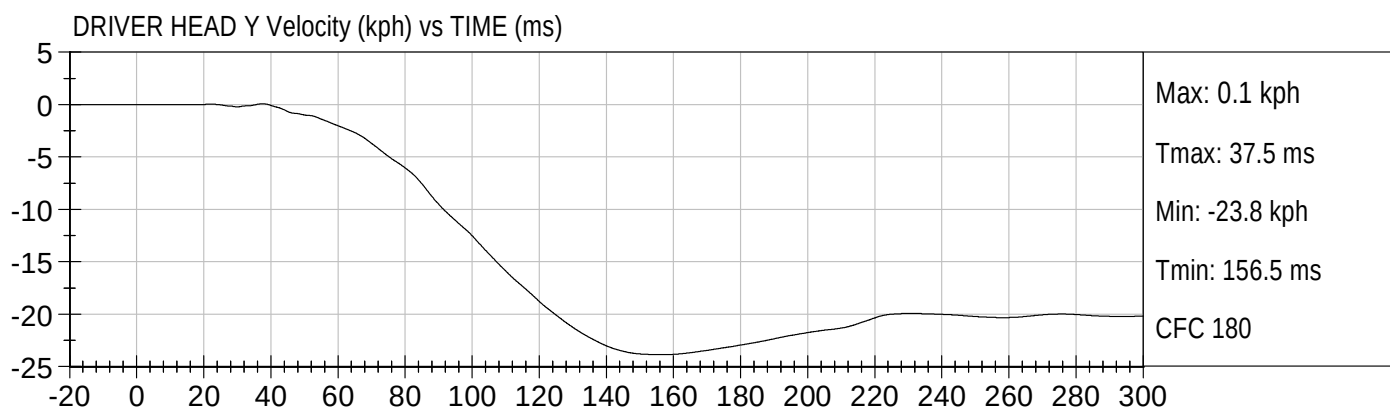
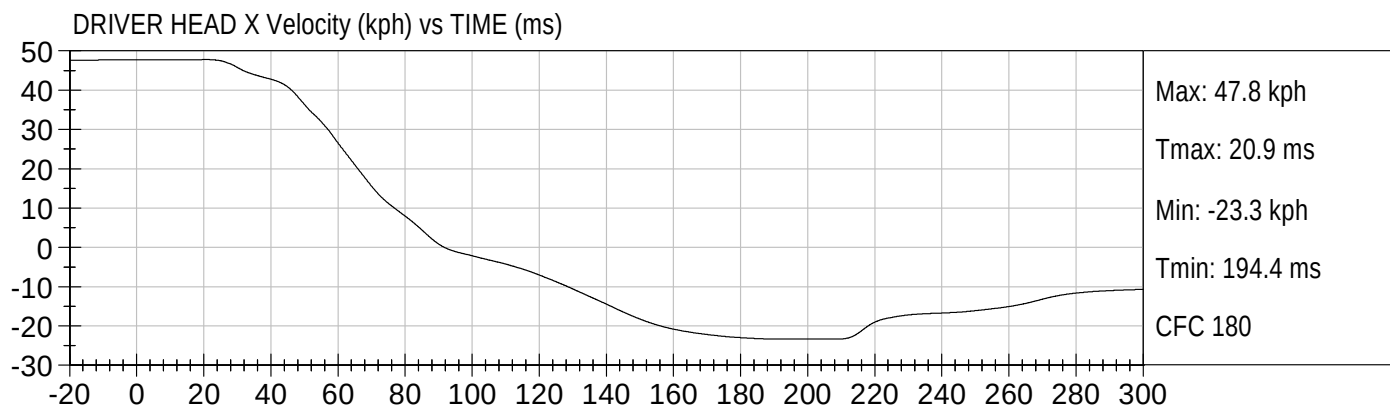
DRIVER HEAD Resultant (G's) vs TIME (ms)





30 MPH FRONTAL BELTED 5THS
2009 KIA OPTIMA (C90508)

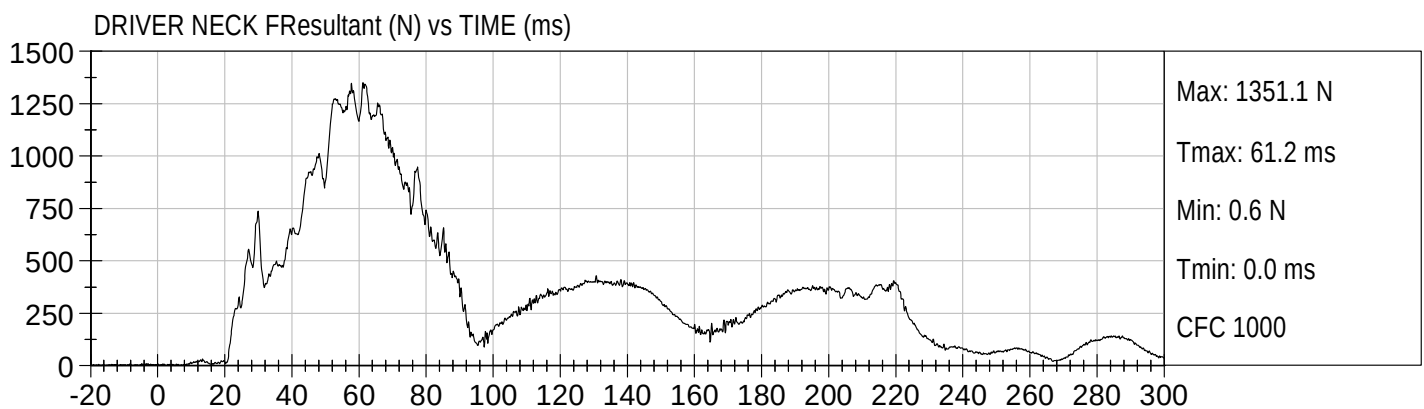
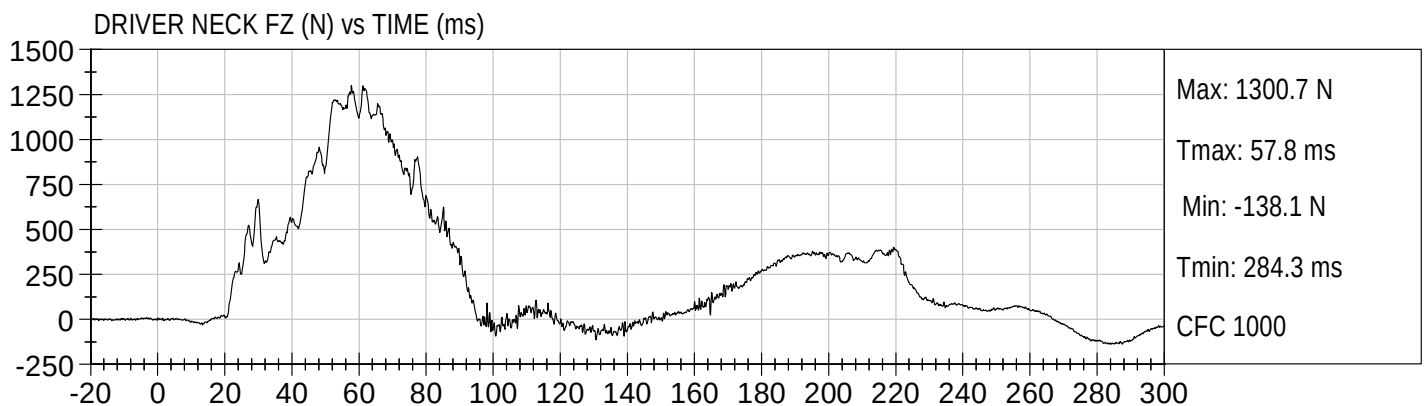
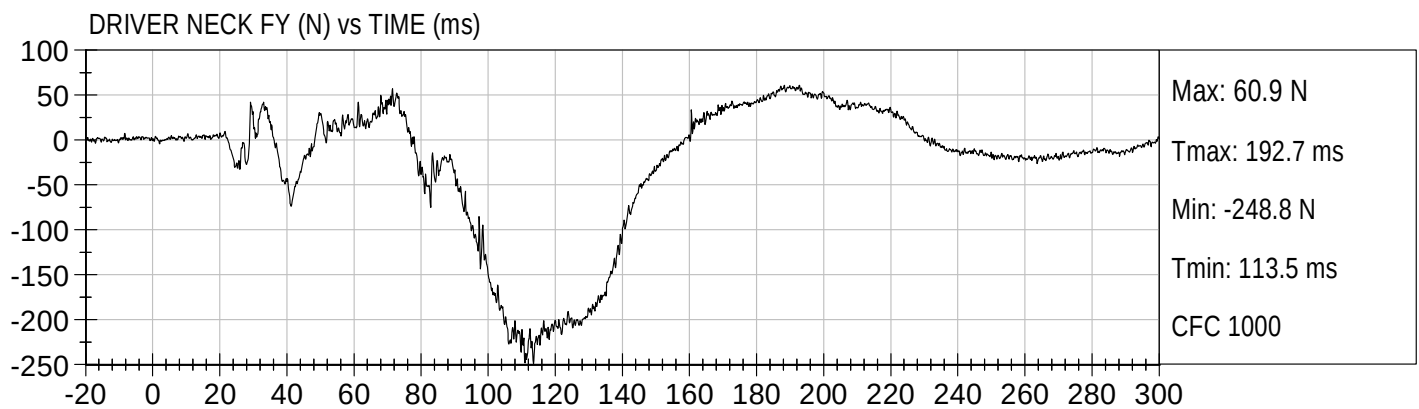
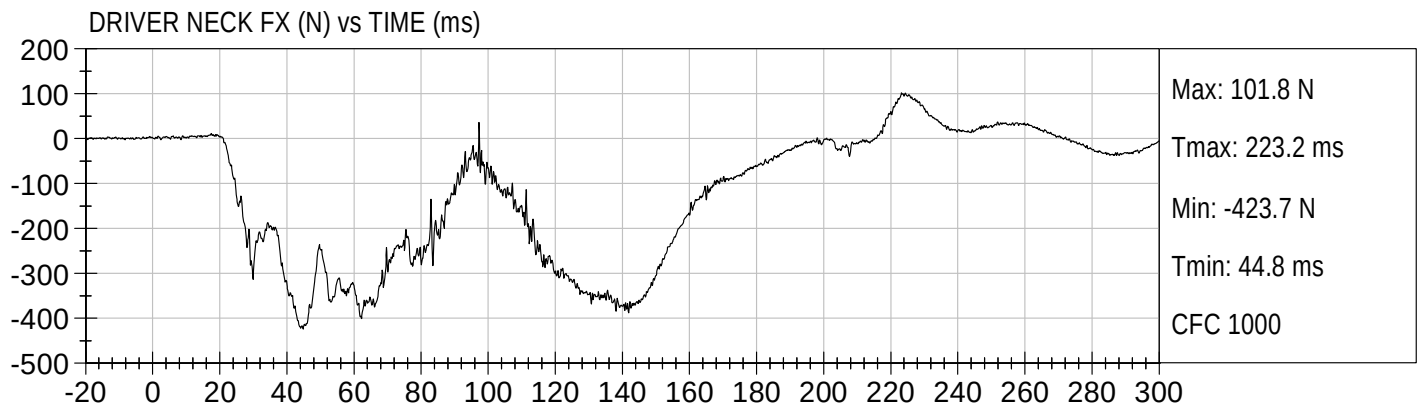
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30 MPH FRONTAL BELTED 5THS
2009 KIA OPTIMA (C90508)

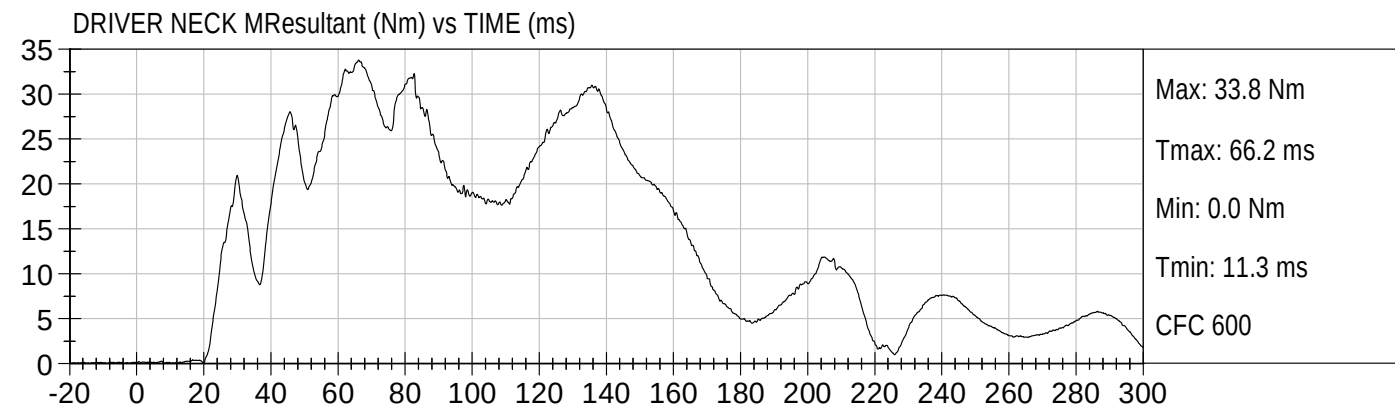
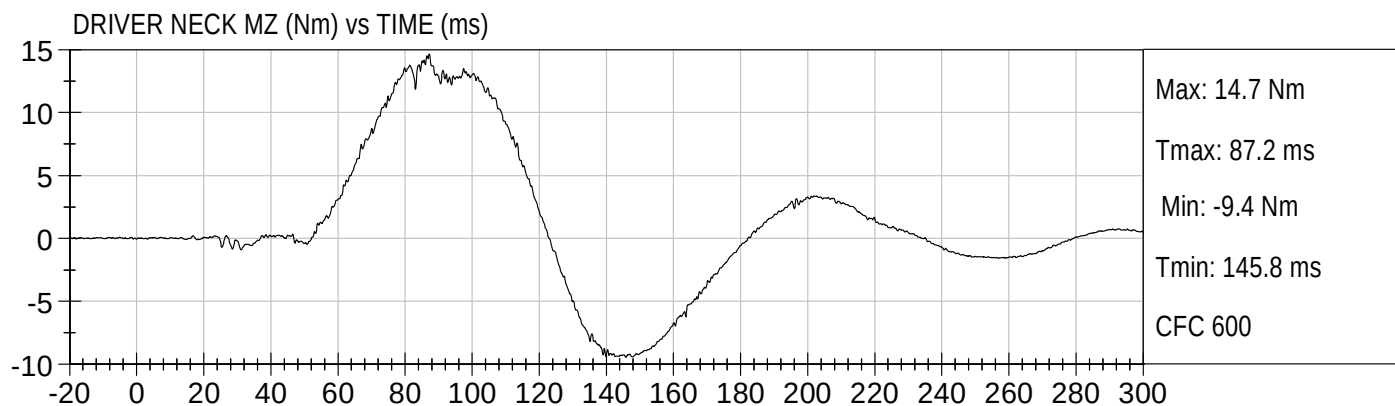
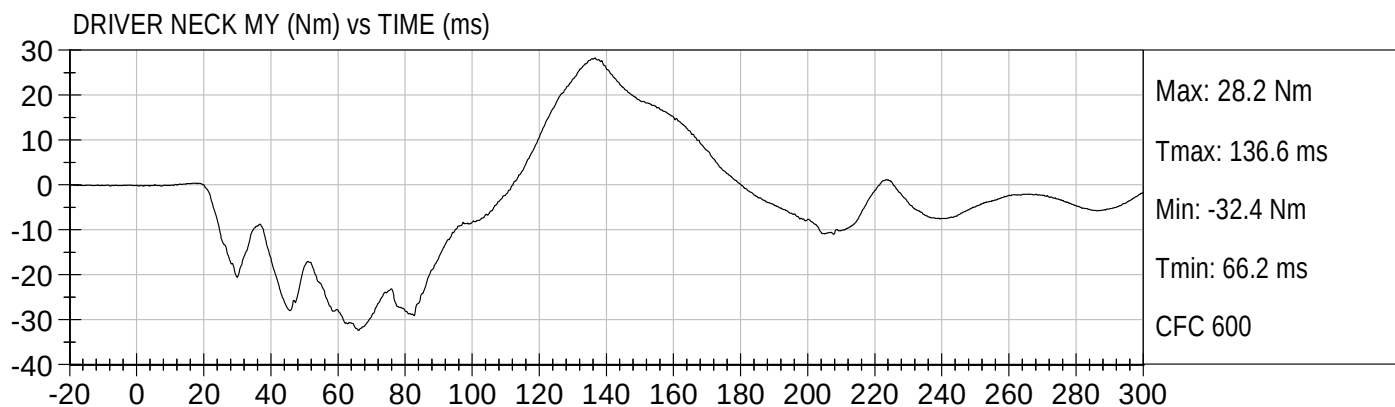
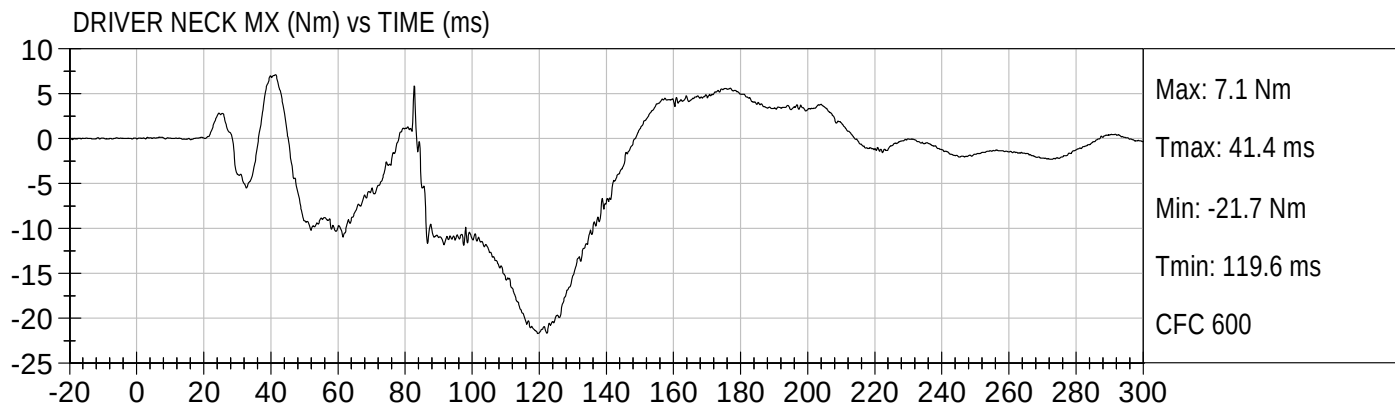
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Speed: 29.6 mph (47.6 km/h)





30 MPH FRONTAL BELTED 5THS
2009 KIA OPTIMA (C90508)

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Speed: 29.6 mph (47.6 km/h)

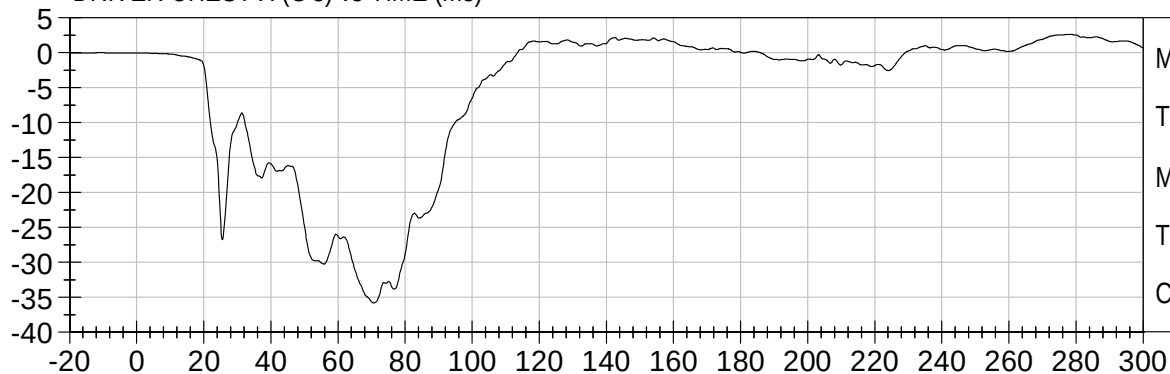




30 MPH FRONTAL BELTED 5THS
2009 KIA OPTIMA (C90508)

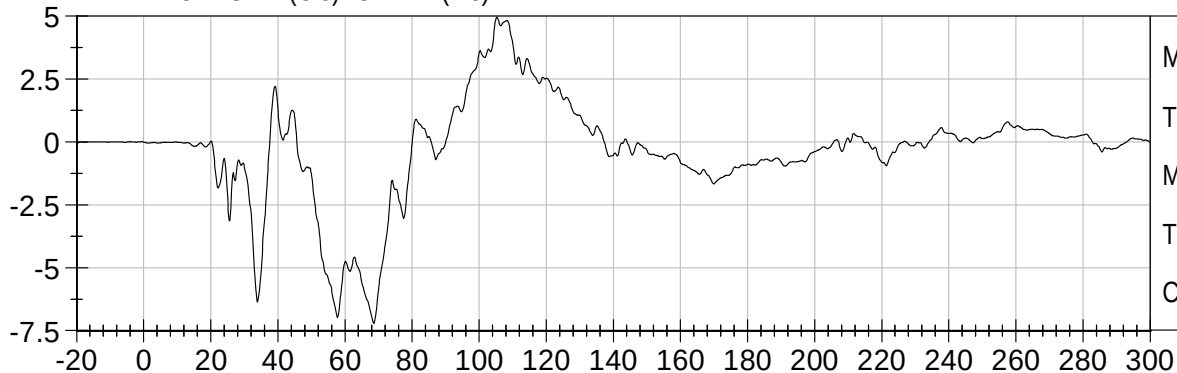
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DRIVER CHEST X (G's) vs TIME (ms)



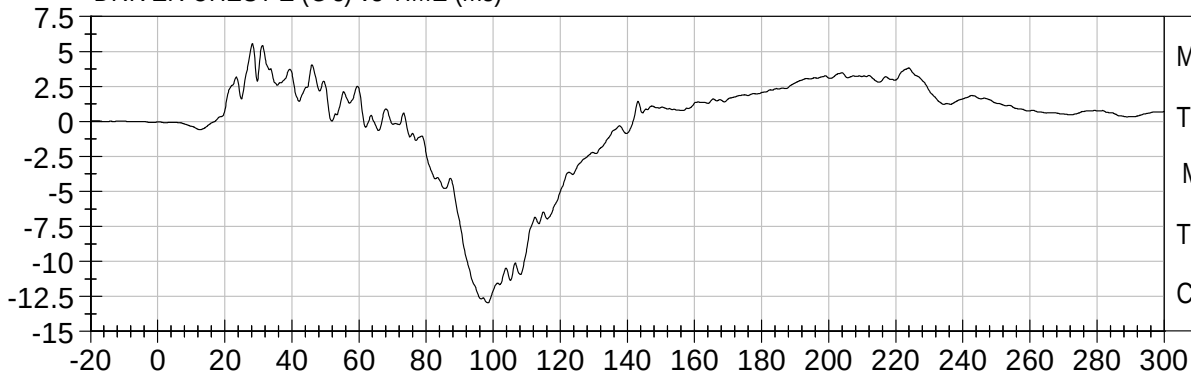
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Min: -35.8 G's
Tmin: 70.6 ms
CFC 180

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



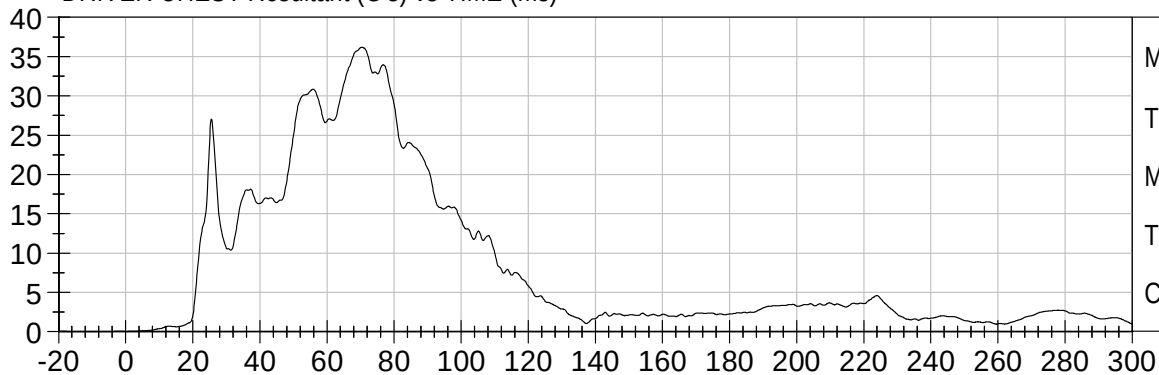
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Min: -7.2 G's
Tmin: 68.6 ms
CFC 180

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

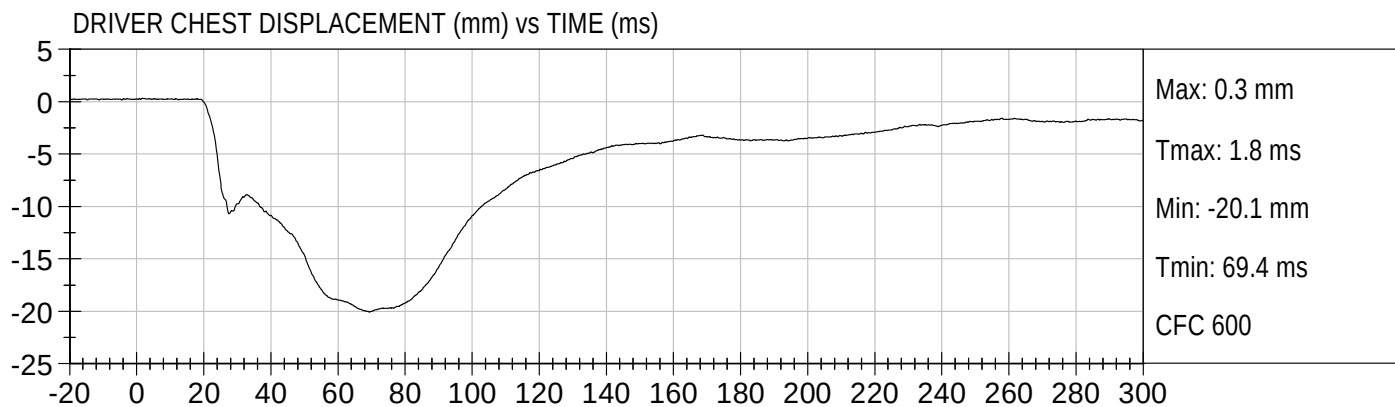
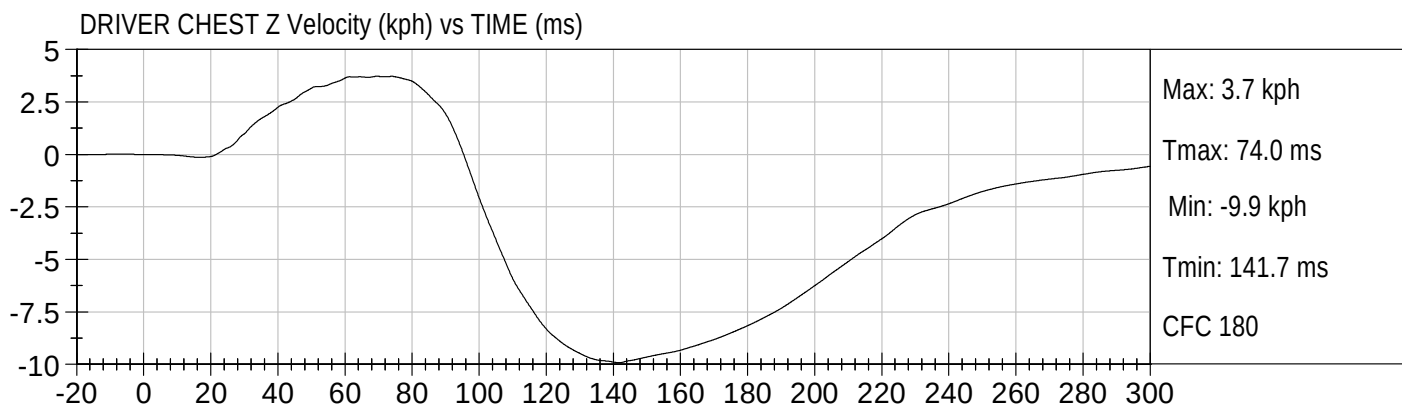
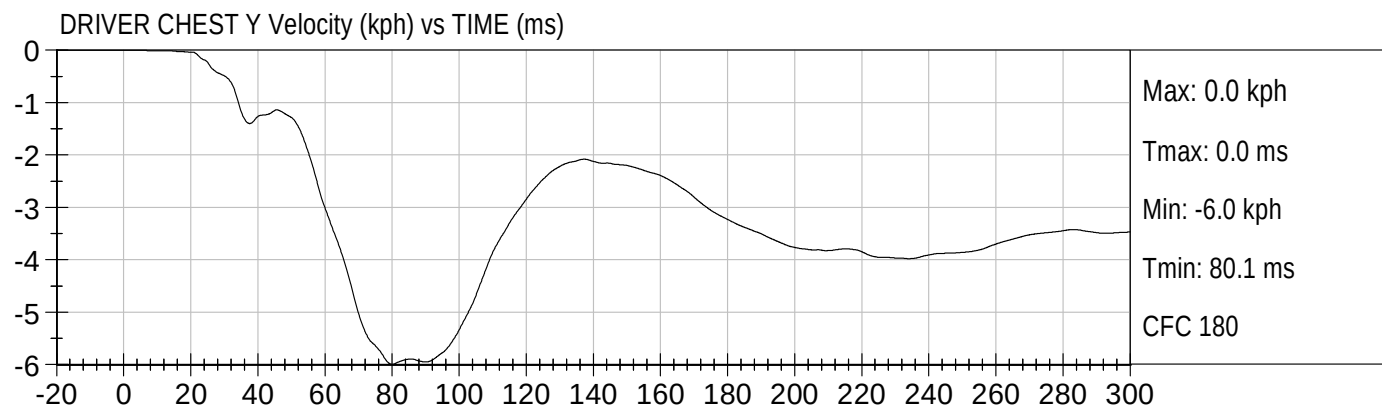
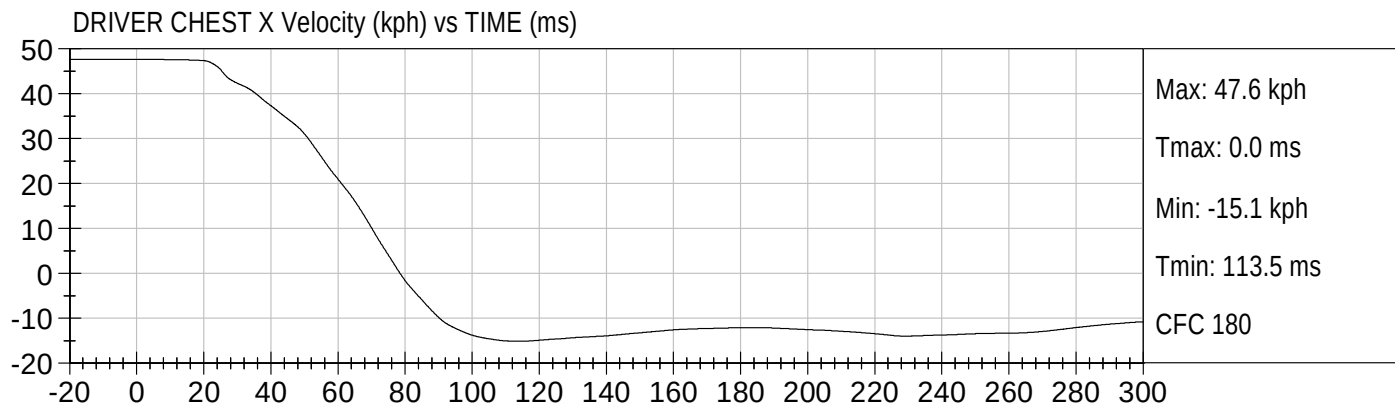


Max: 5.6 G's
Tmax: 28.2 ms
Min: -12.9 G's
Tmin: 98.5 ms
CFC 180

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



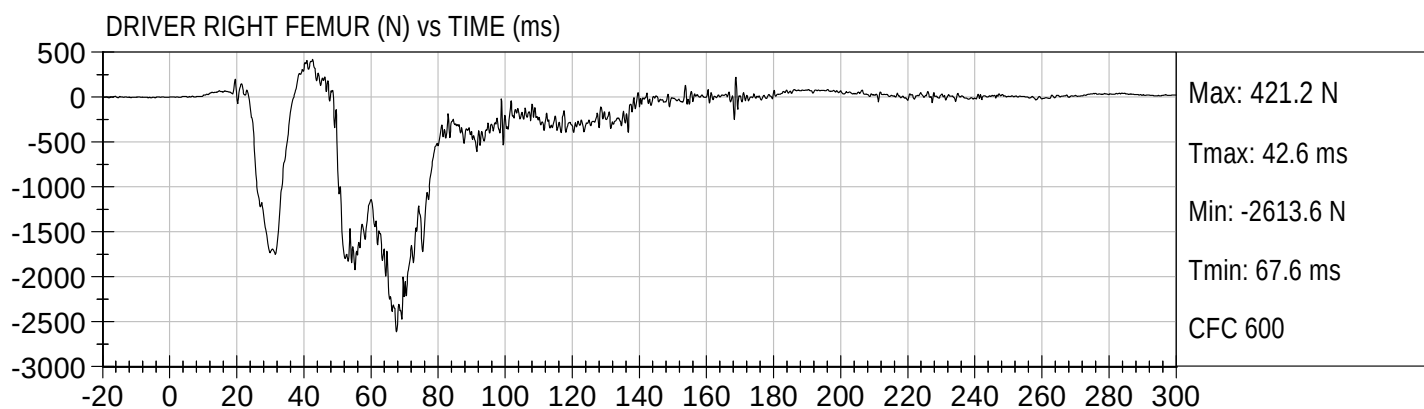
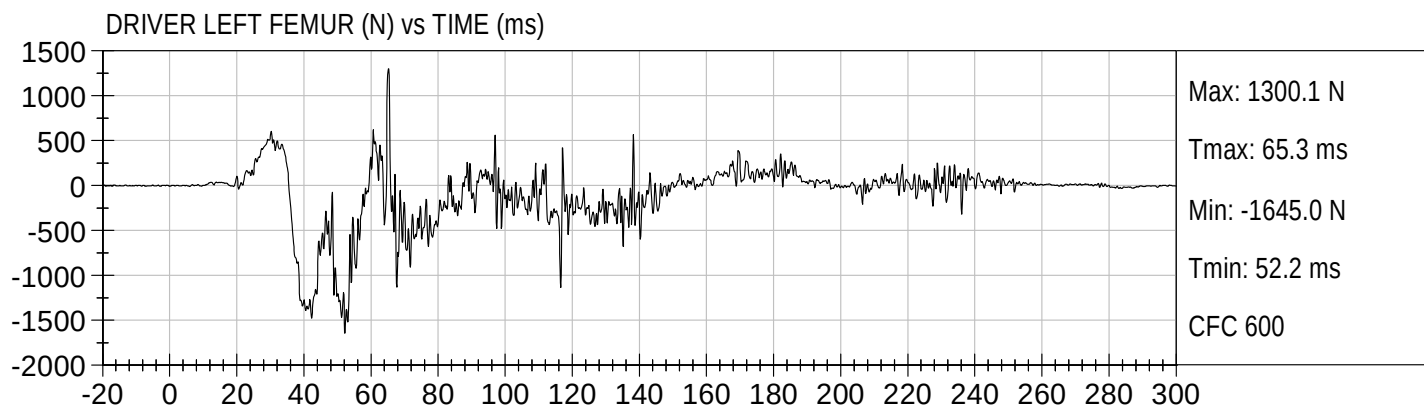
Max: 36.2 G's
Tmax: 70.3 ms
Min: 0.0 G's
Tmin: 0.0 ms
CFC 180





30 MPH FRONTAL BELTED 5THS
2009 KIA OPTIMA (C90508)

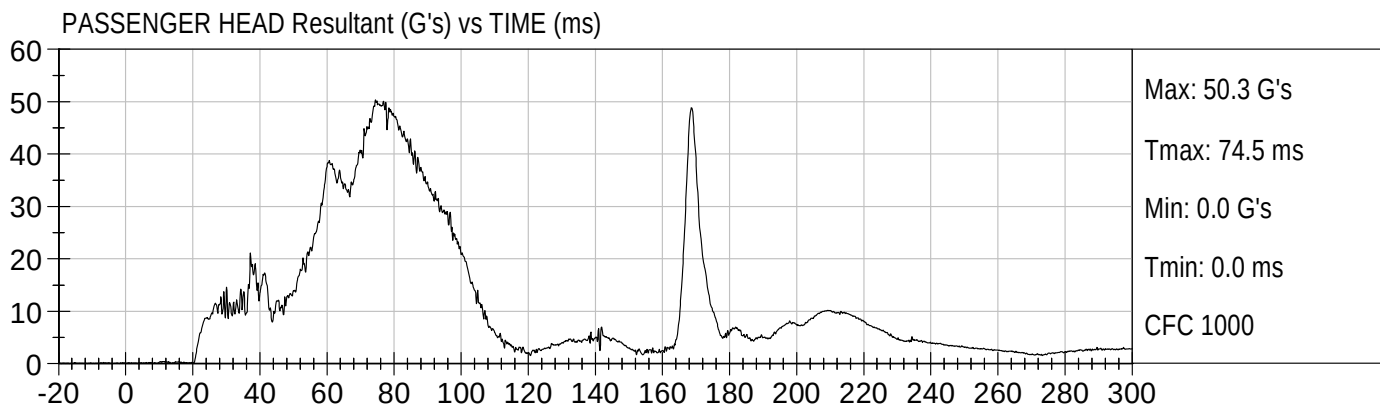
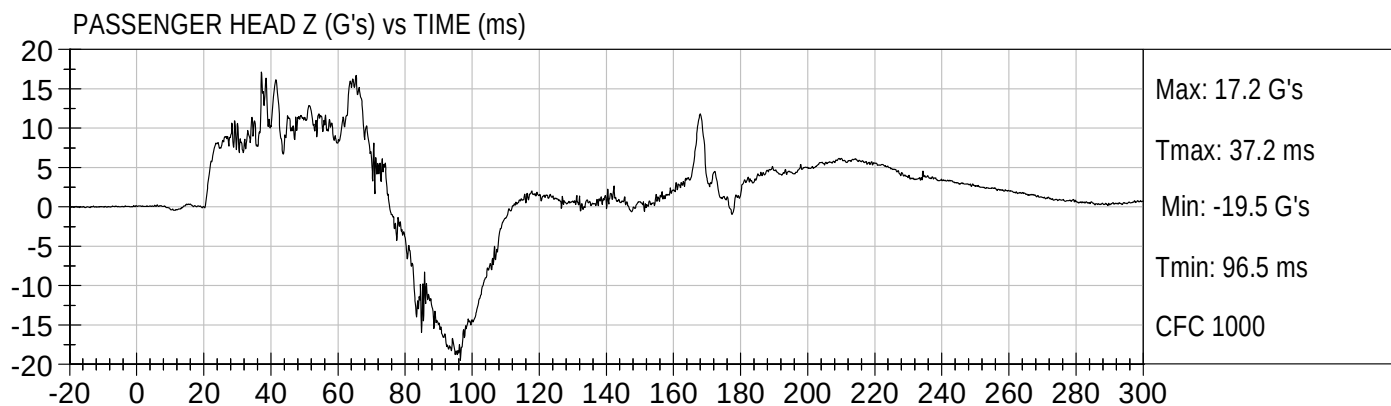
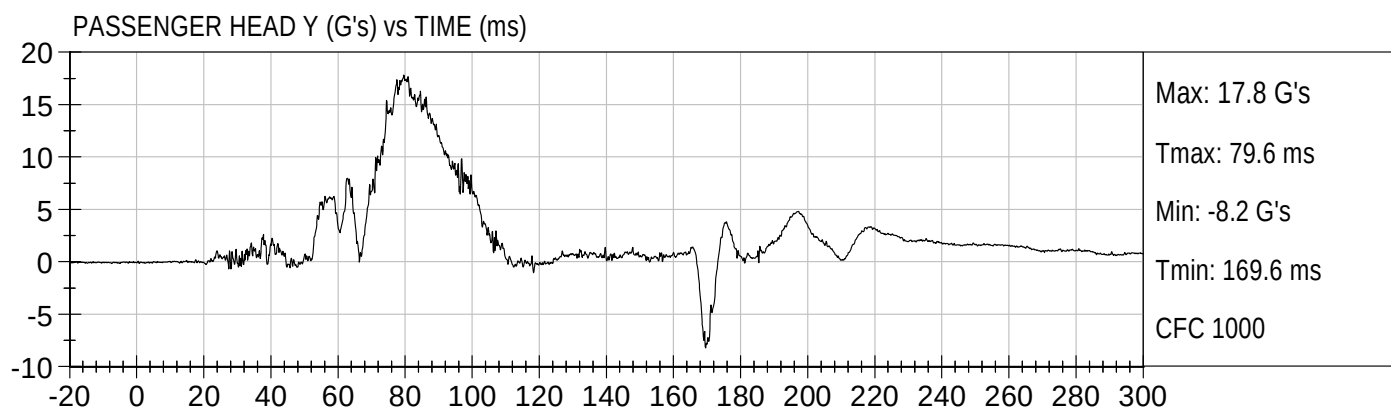
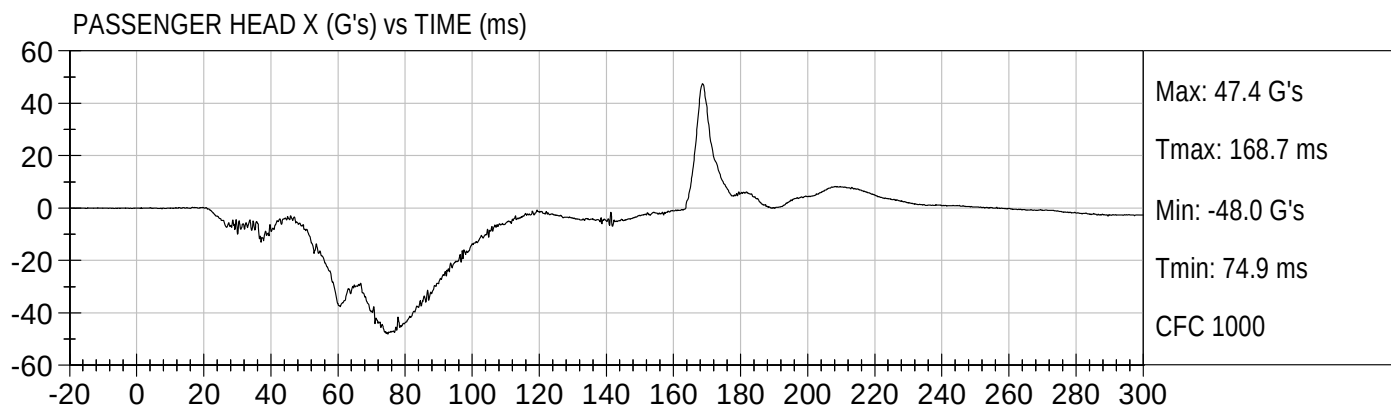
Test Date: 04/23/2009
Speed: 29.6 mph (47.6 km/h)





30 MPH FRONTAL BELTED 5THS
2009 KIA OPTIMA (C90508)

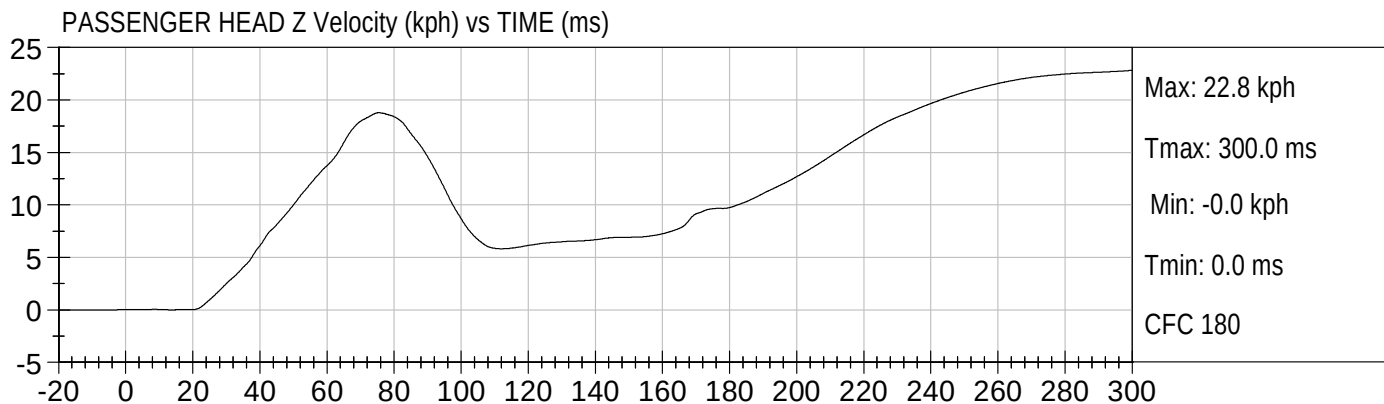
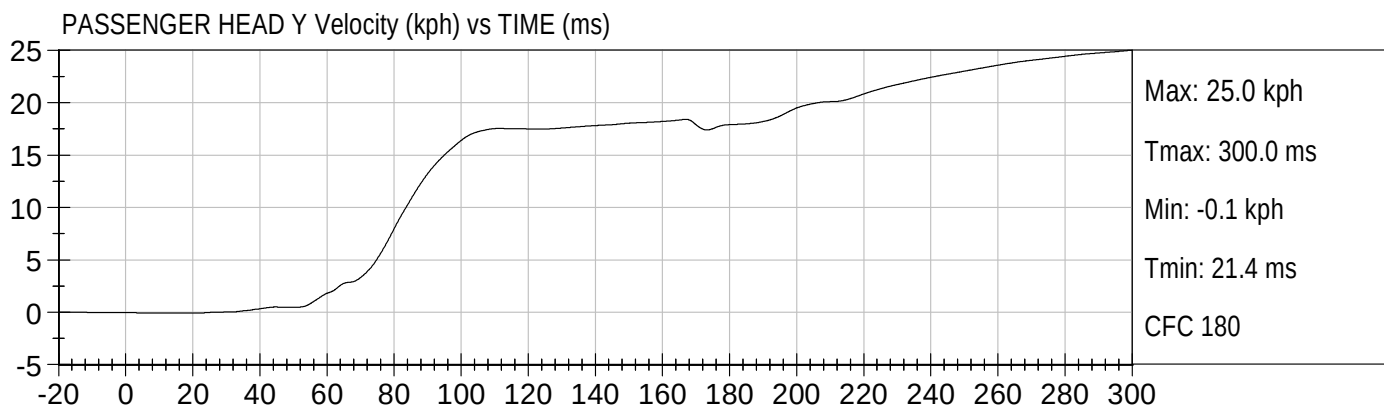
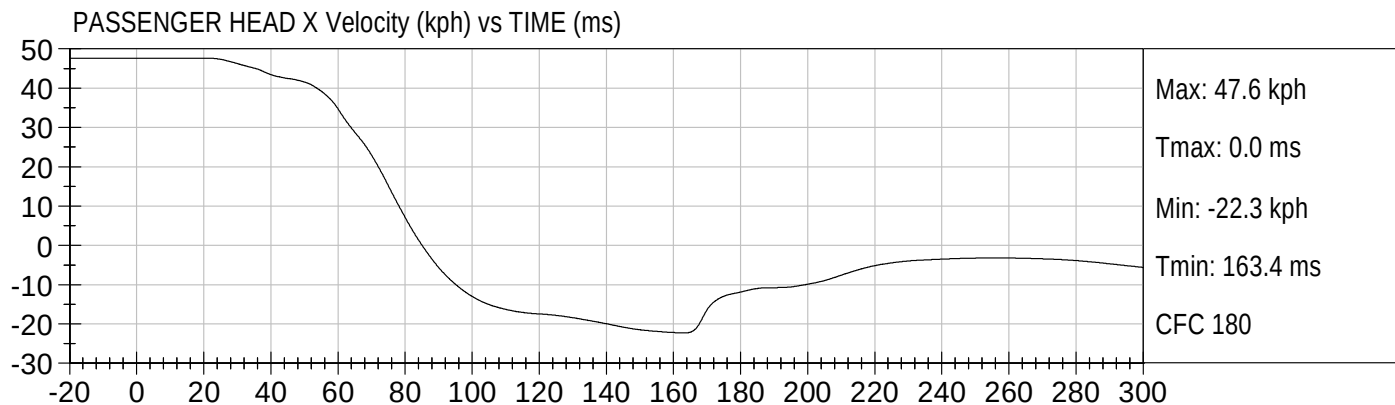
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30 MPH FRONTAL BELTED 5THS
2009 KIA OPTIMA (C90508)

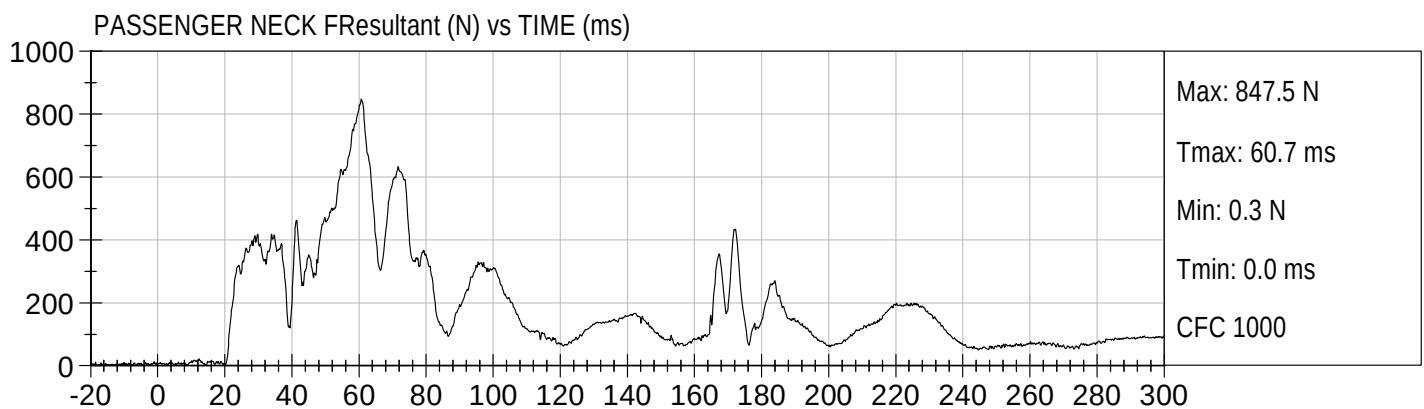
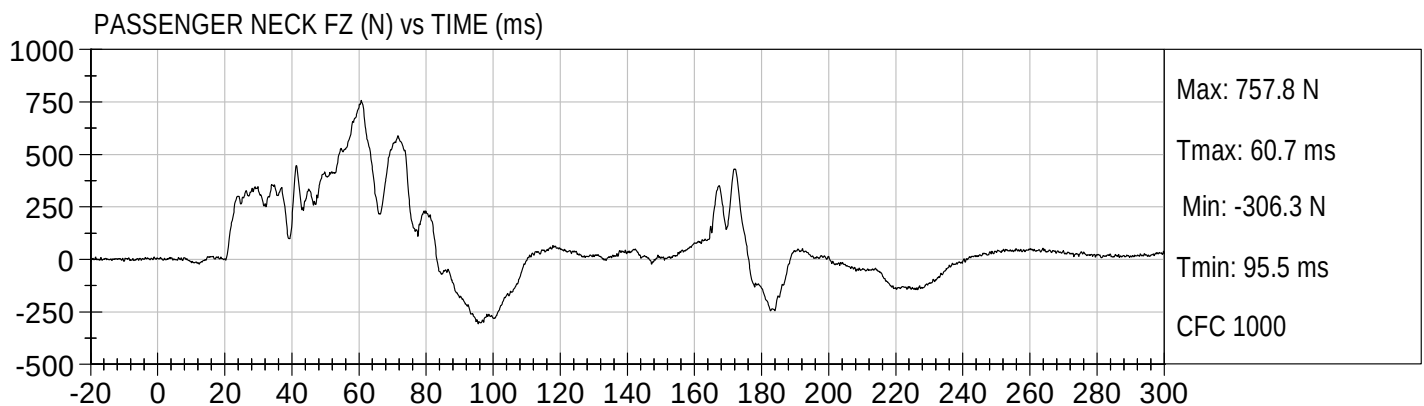
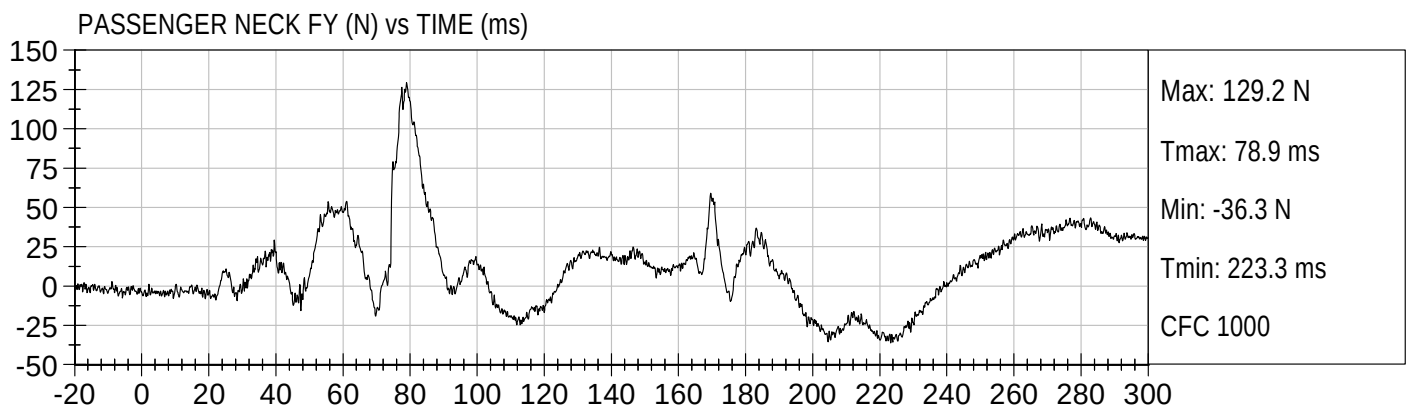
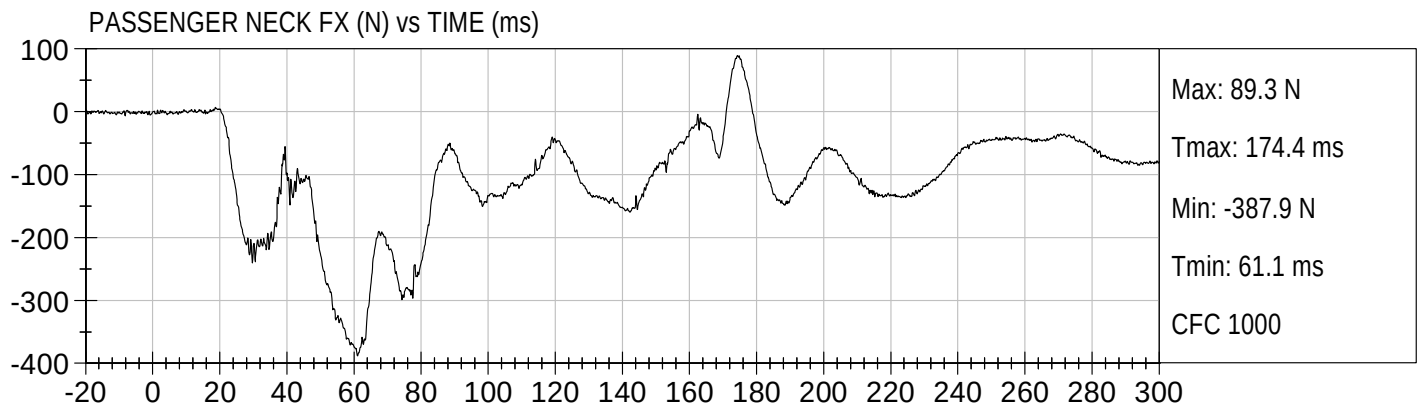
Test Date: 04/23/2009
Speed: 29.6 mph (47.6 km/h)





30 MPH FRONTAL BELTED 5THS
2009 KIA OPTIMA (C90508)

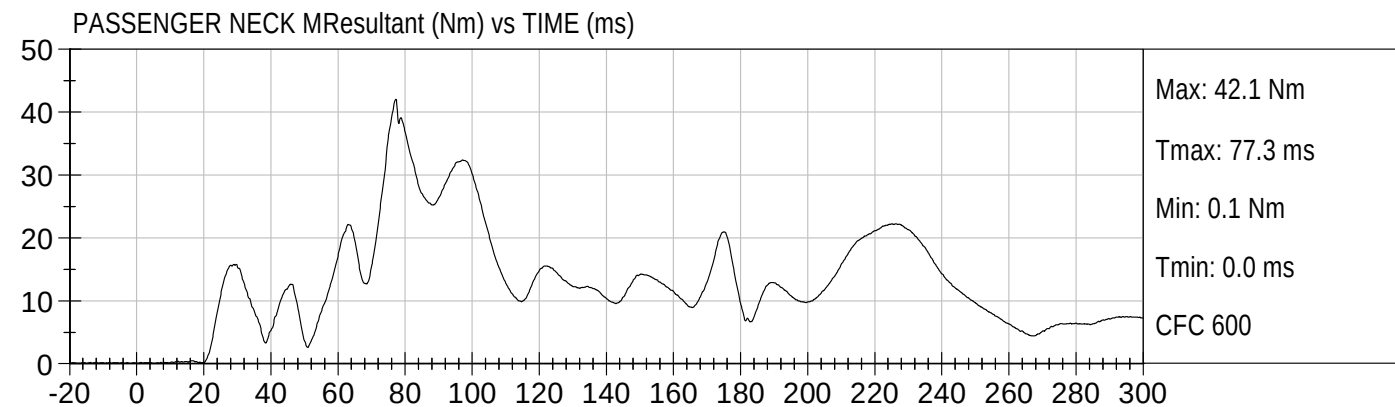
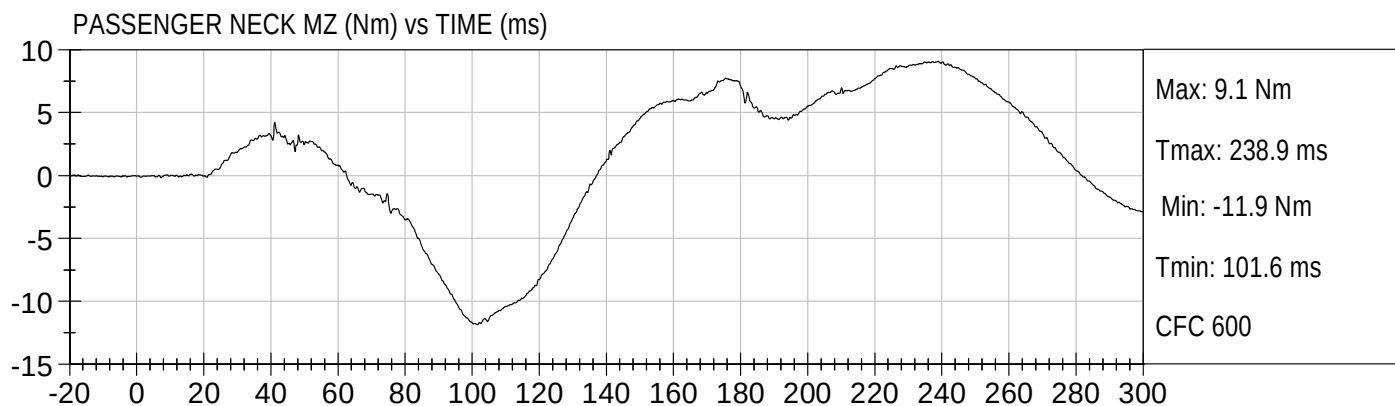
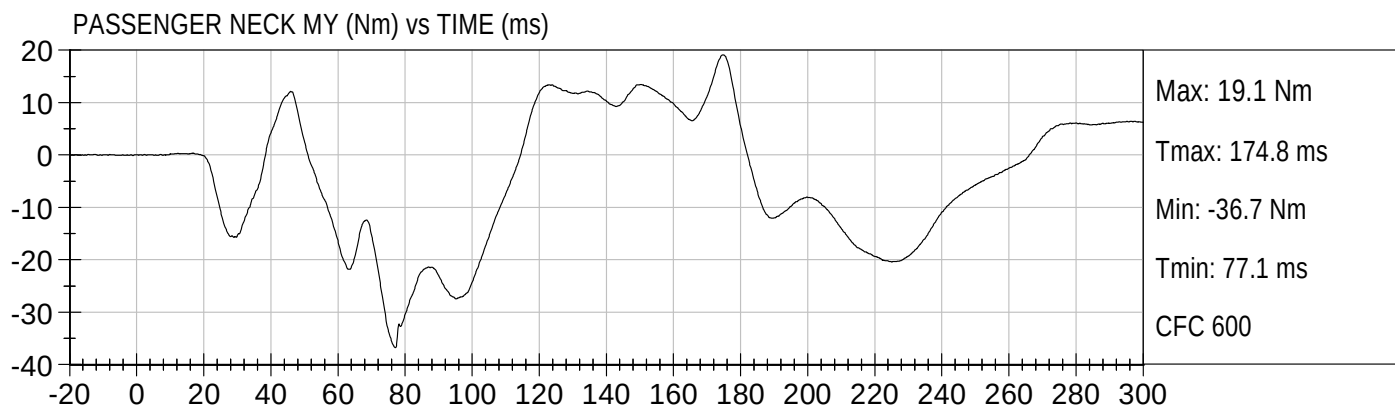
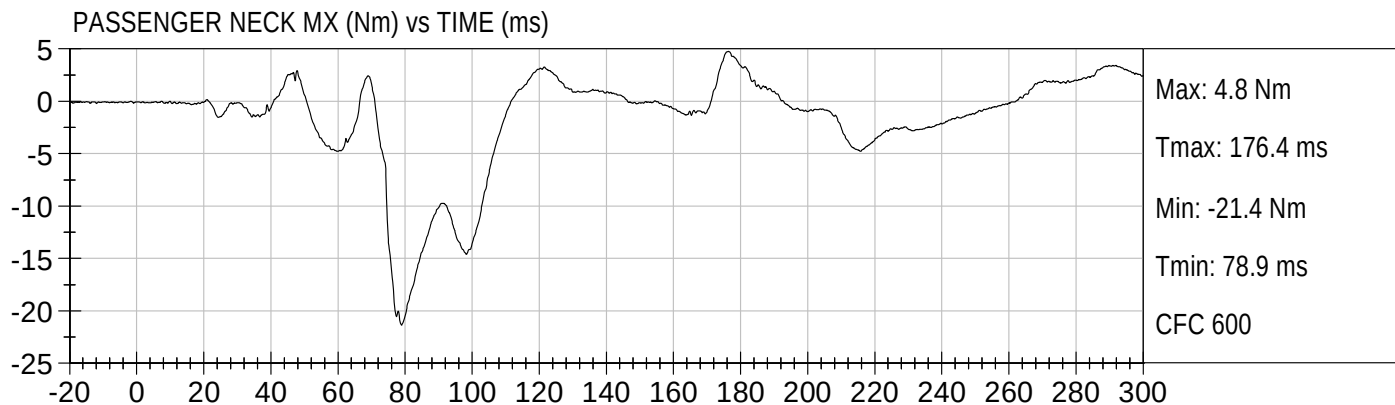
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Speed: 29.6 mph (47.6 km/h)





30 MPH FRONTAL BELTED 5THS
2009 KIA OPTIMA (C90508)

Test Date: 04/23/2009
Speed: 29.6 mph (47.6 km/h)

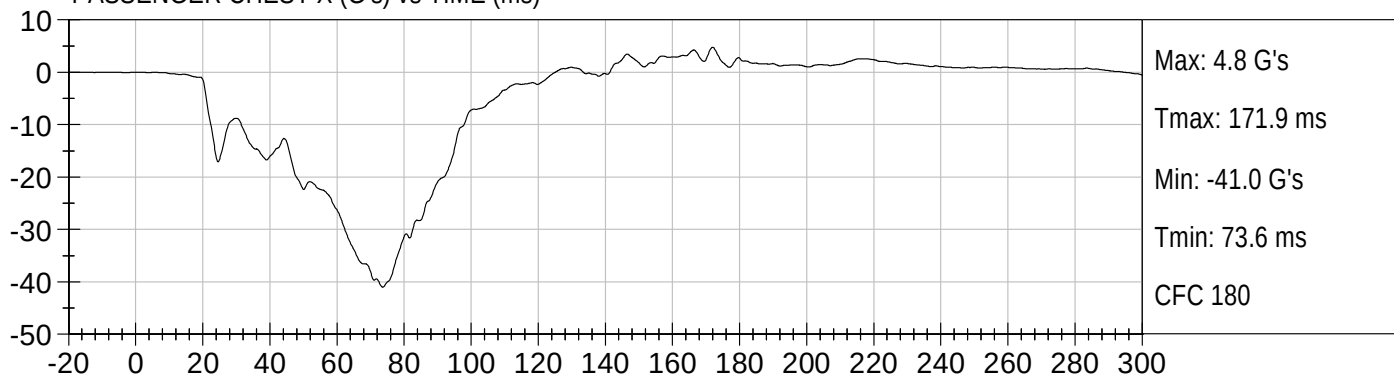




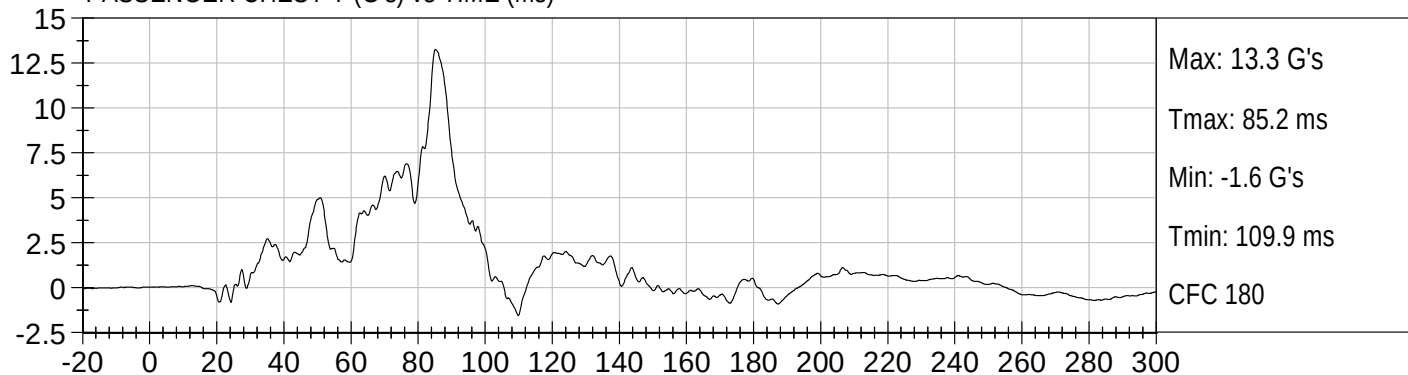
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2009 KIA OPTIMA (C90508)

Test Date: 04/23/2009
Speed: 29.6 mph (47.6 km/h)

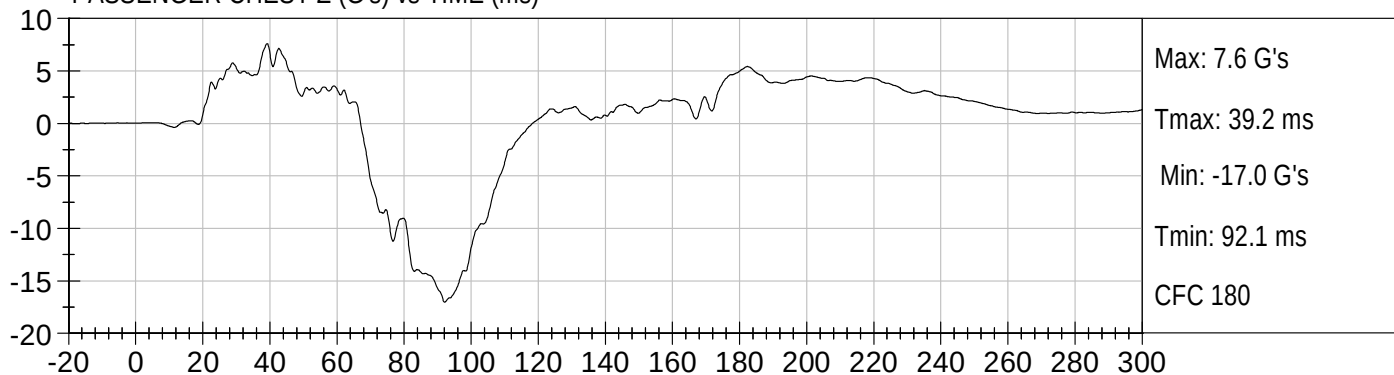
PASSENGER CHEST X (G's) vs TIME (ms)



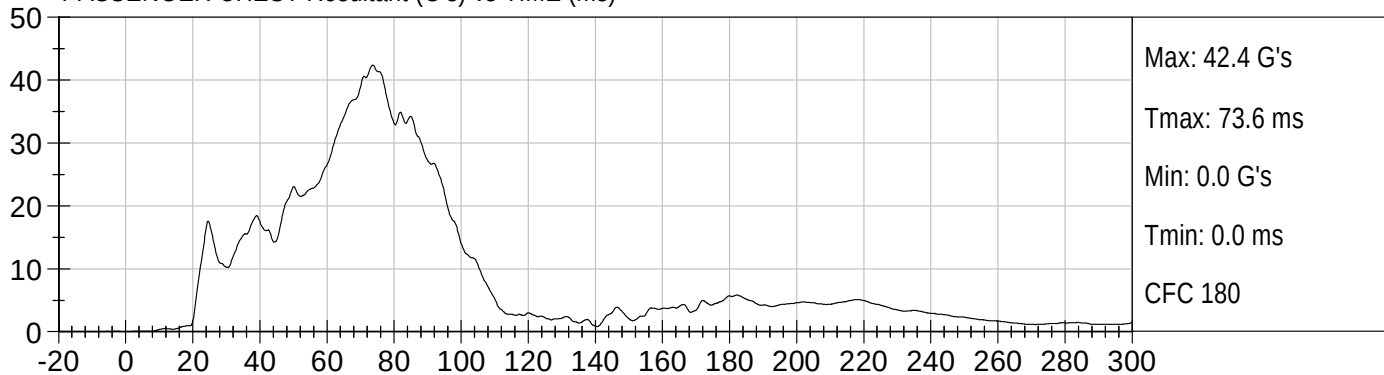
PASSENGER CHEST Y (G's) vs TIME (ms)



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

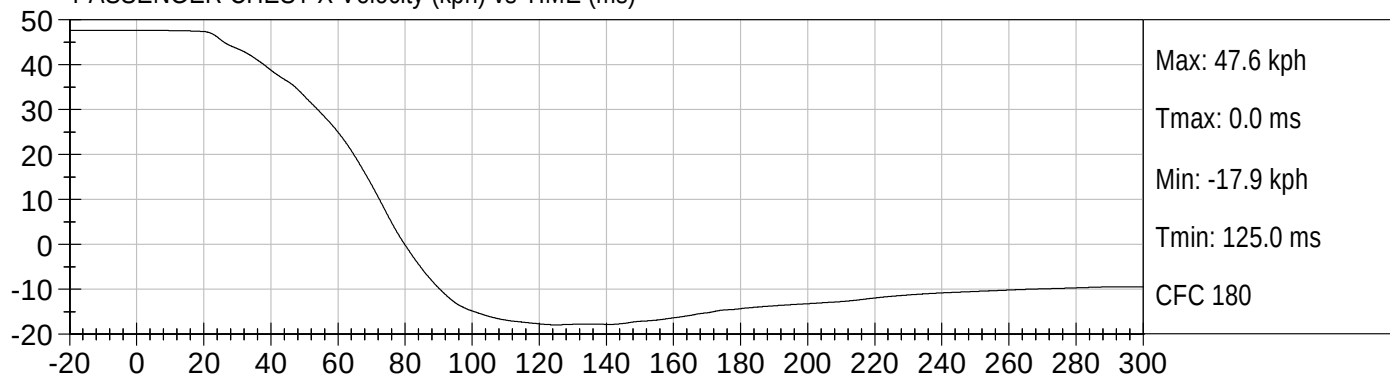


PASSENGER CHEST Resultant (G's) vs TIME (ms)

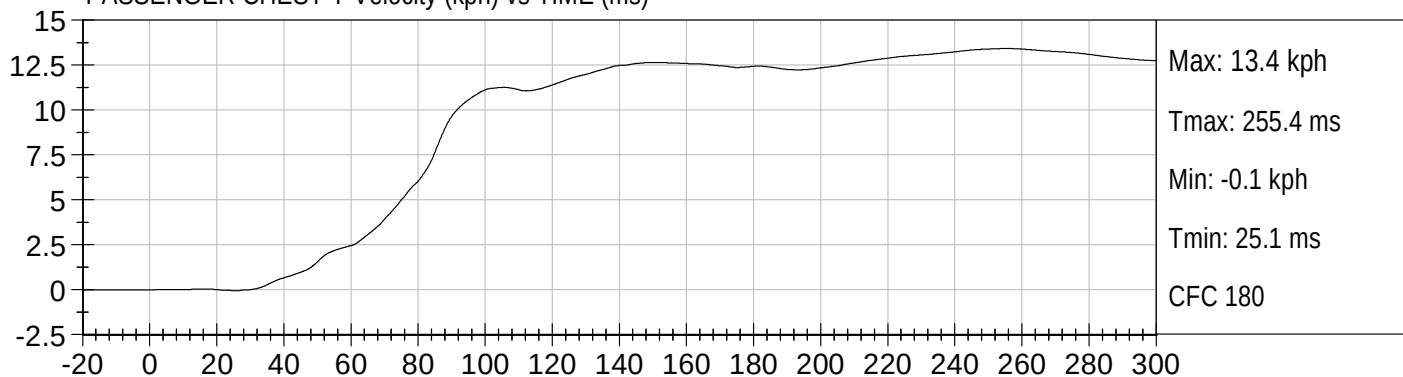




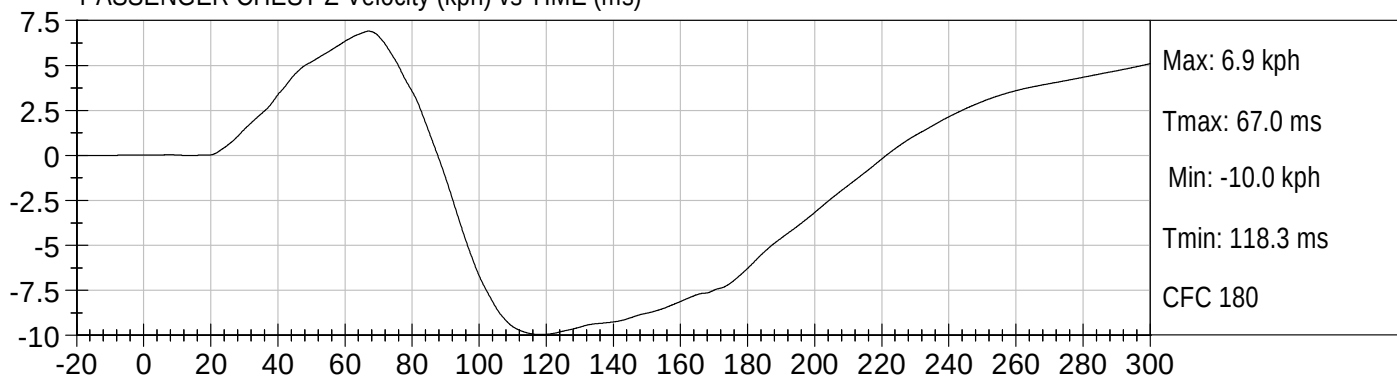
PASSENGER CHEST X Velocity (kph) vs TIME (ms)



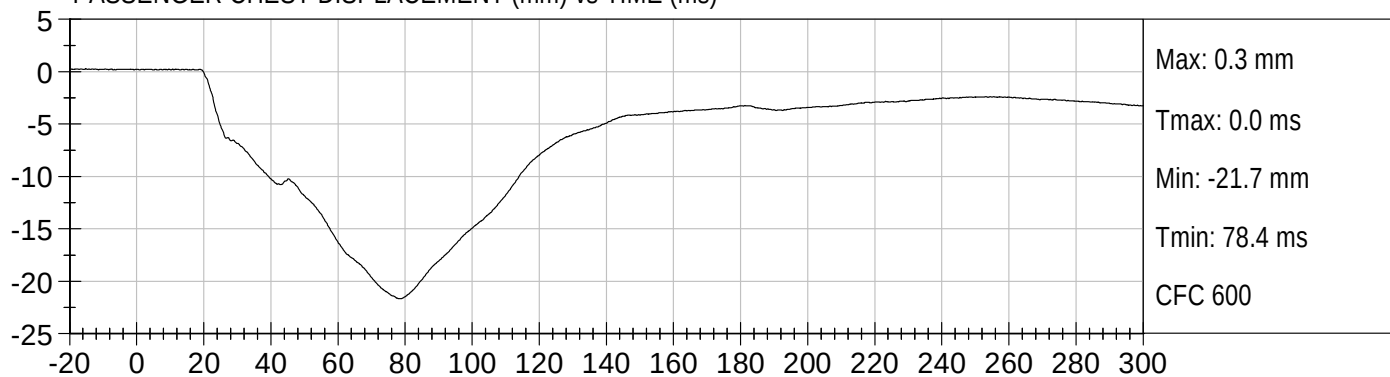
PASSENGER CHEST Y Velocity (kph) vs TIME (ms)



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



PASSENGER CHEST DISPLACEMENT (mm) vs TIME (ms)

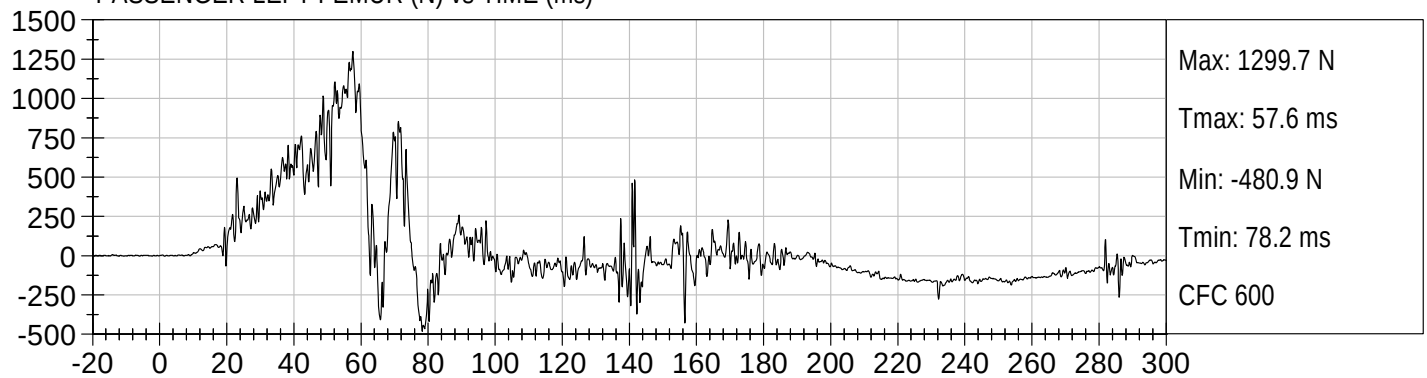




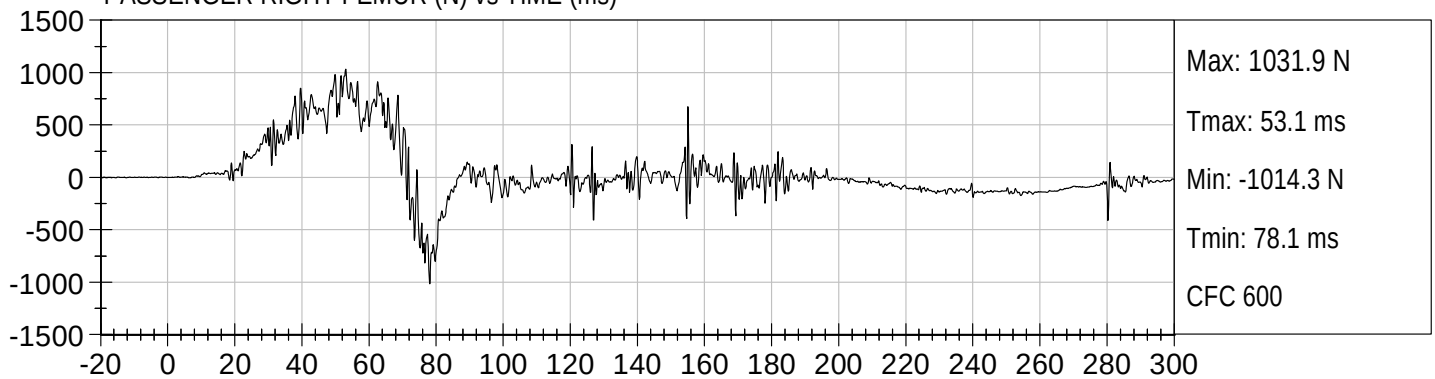
30 MPH FRONTAL BELTED 5THS
2009 KIA OPTIMA (C90508)

Test Date: 04/23/2009
Speed: 29.6 mph (47.6 km/h)

PASSENGER LEFT FEMUR (N) vs TIME (ms)



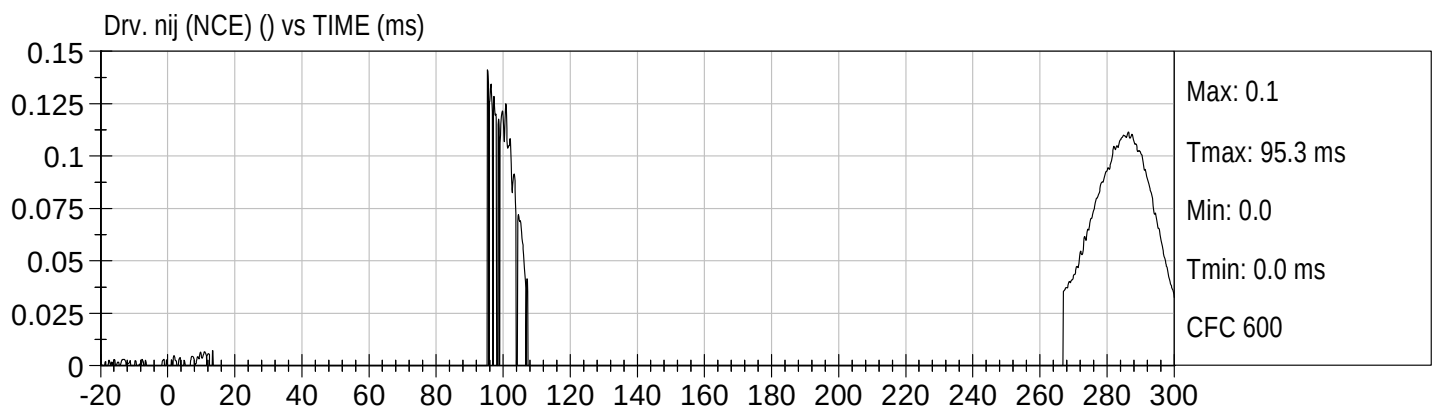
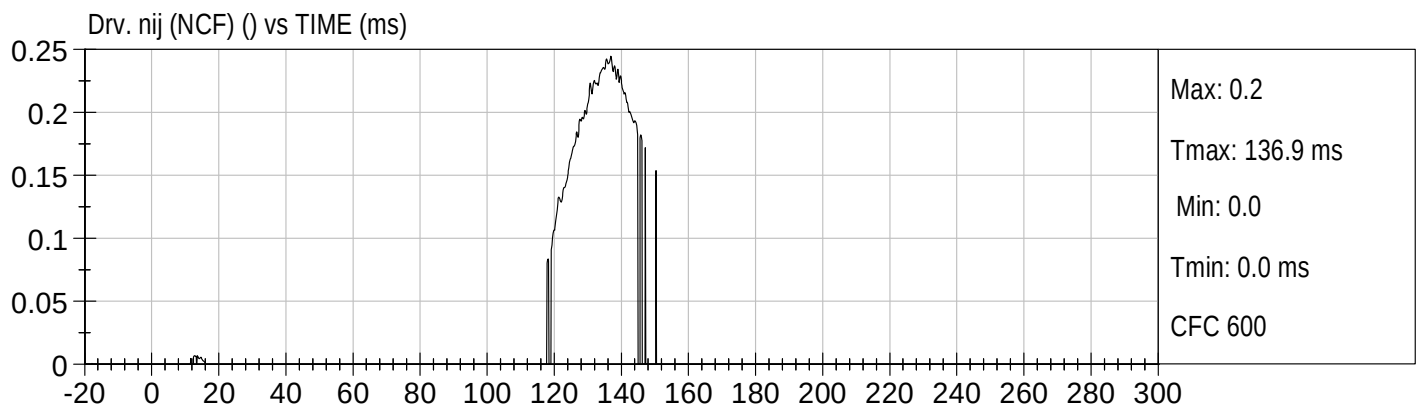
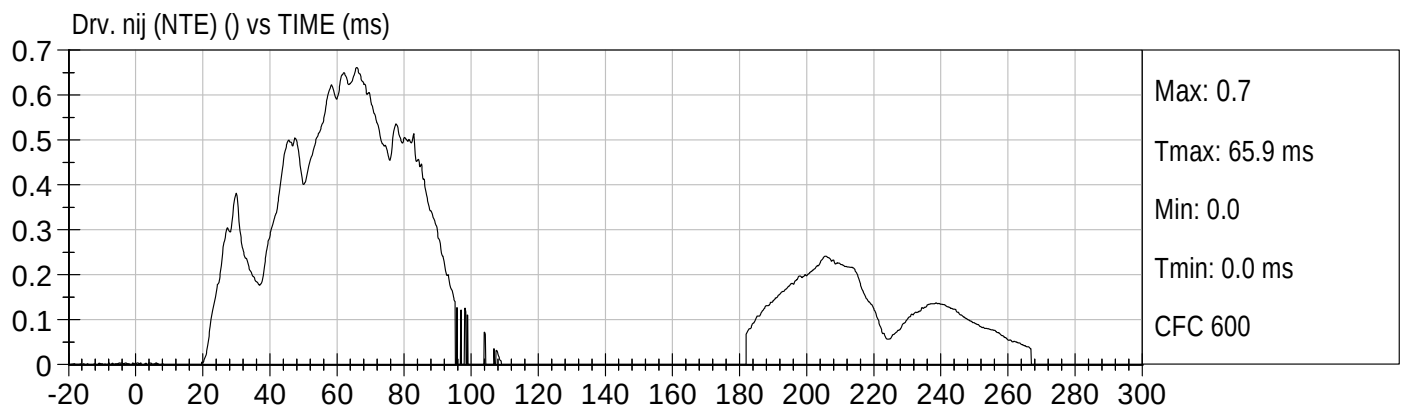
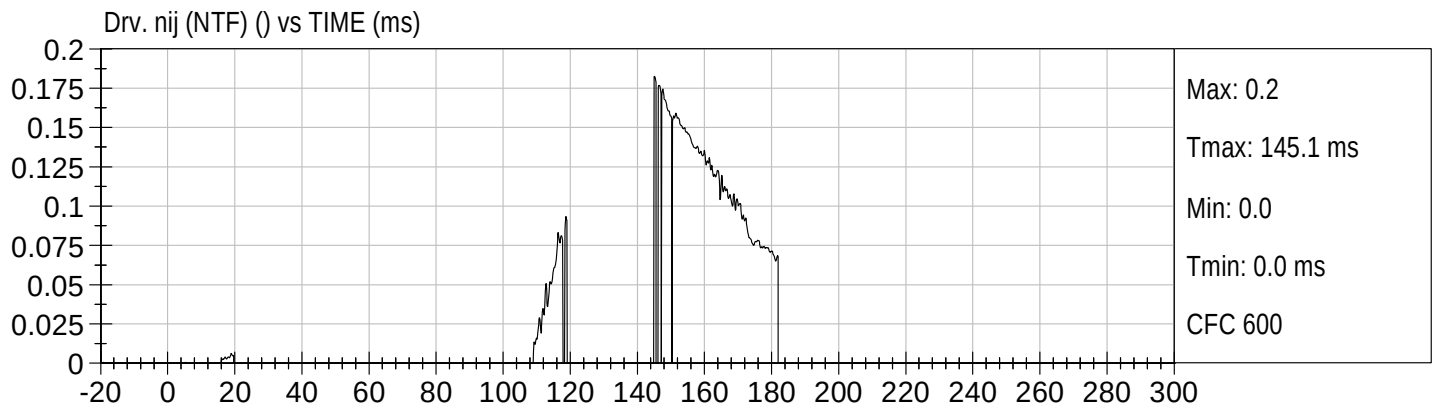
PASSENGER RIGHT FEMUR (N) vs TIME (ms)





30 MPH FRONTAL BELTED 5THS
2009 KIA OPTIMA (C90508)

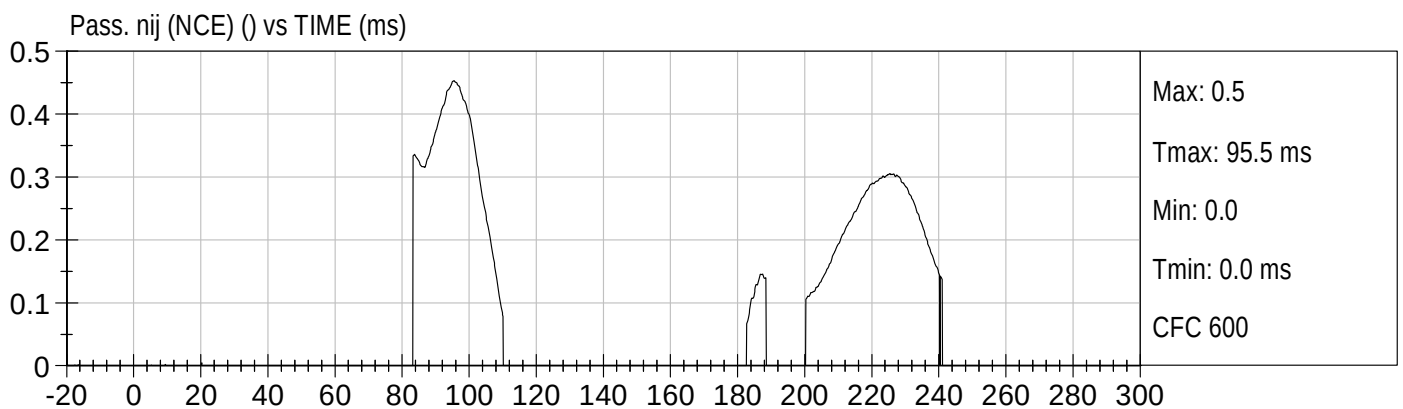
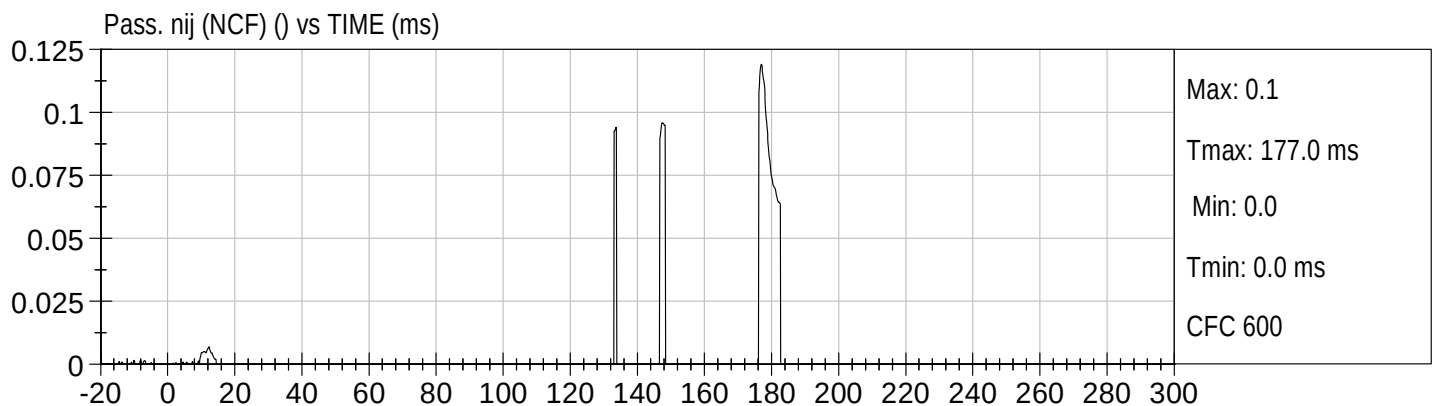
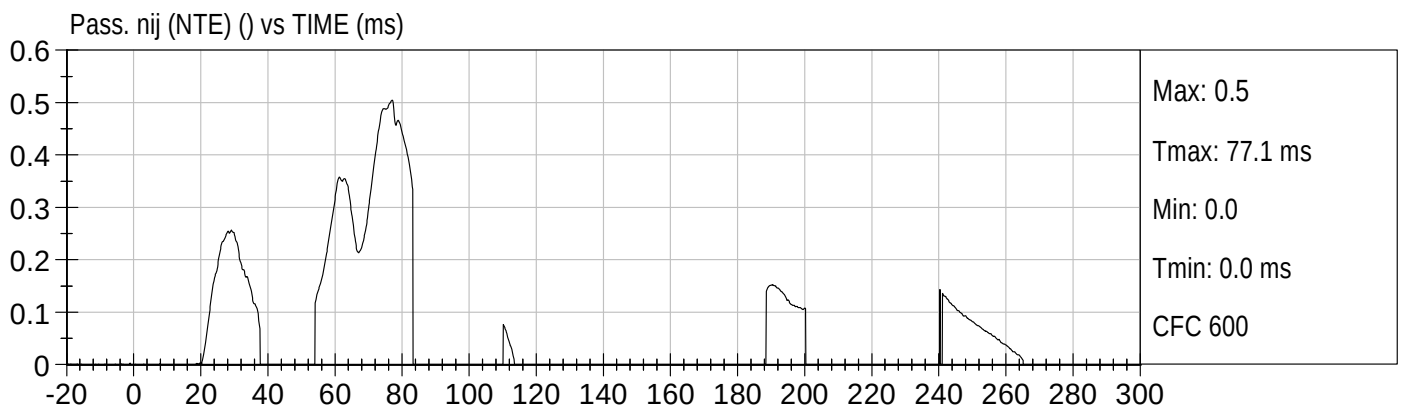
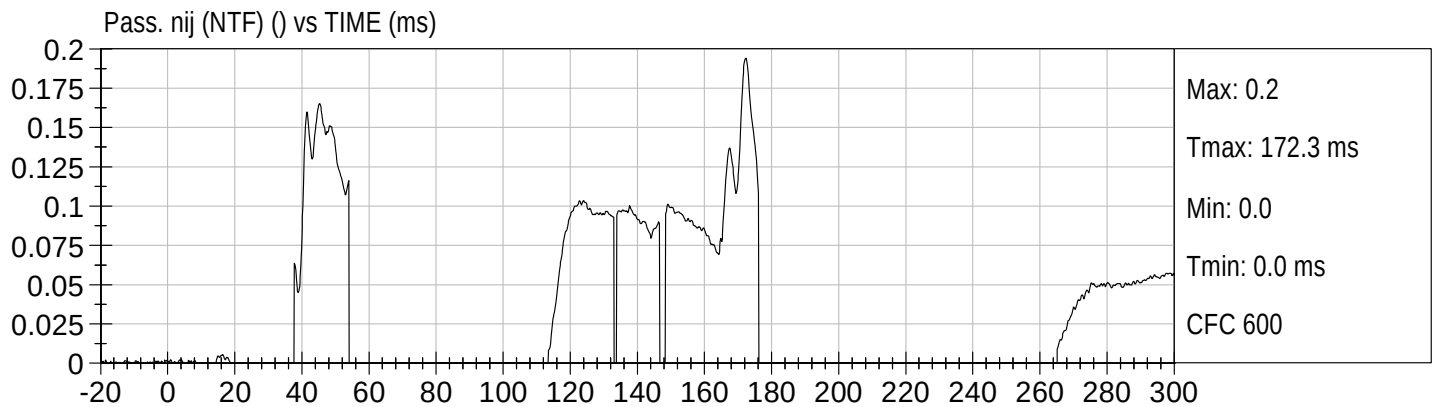
Test Date: 04/23/2009
Speed: 29.6 mph (47.6 km/h)





30 MPH FRONTAL BELTED 5THS
2009 KIA OPTIMA (C90508)

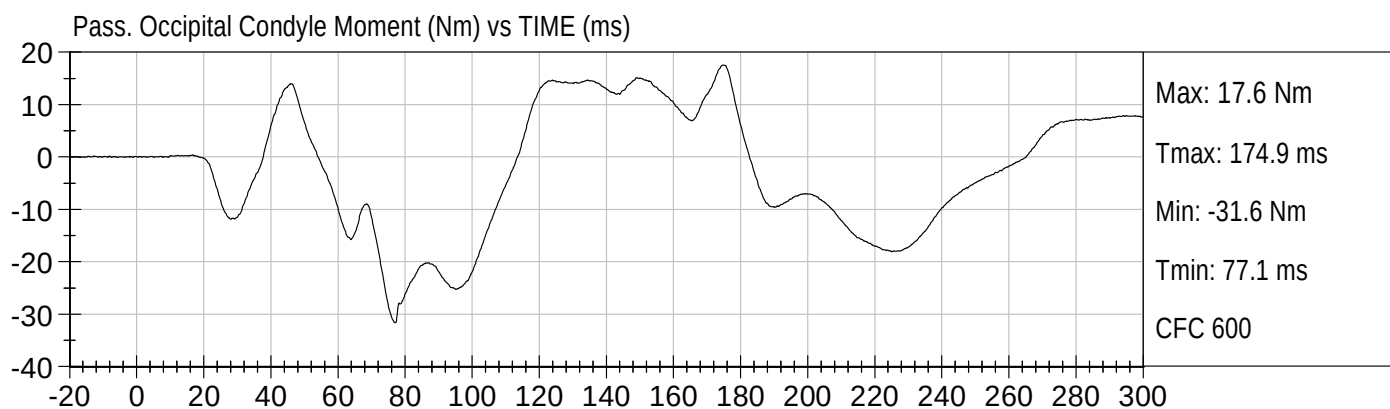
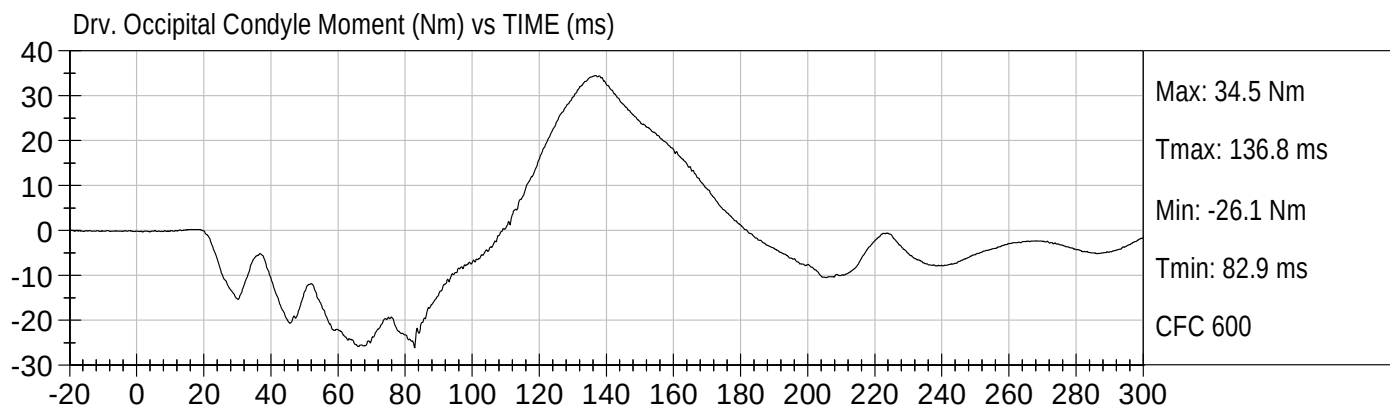
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Speed: 29.6 mph (47.6 km/h)





30 MPH FRONTAL BELTED 5THS
2009 KIA OPTIMA (C90508)

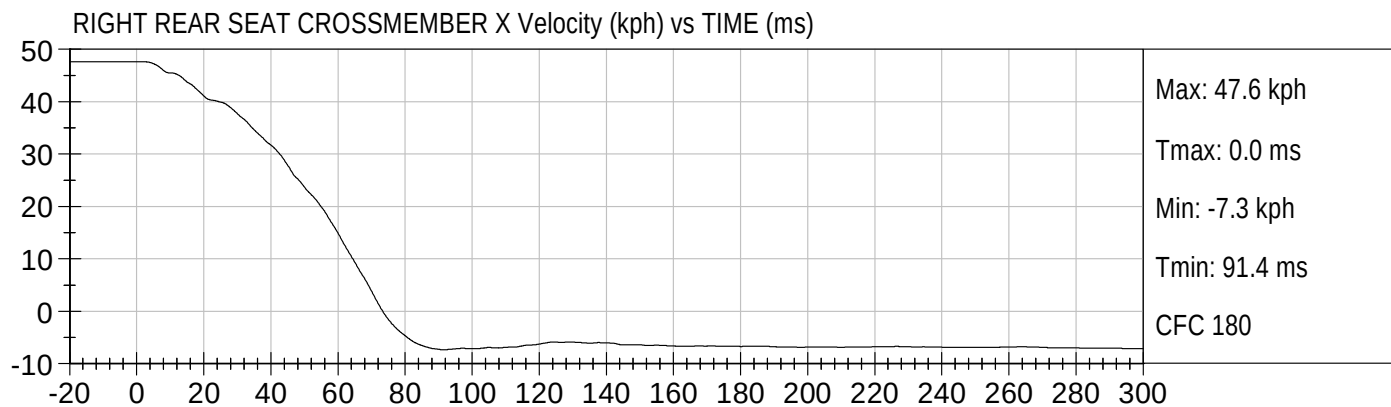
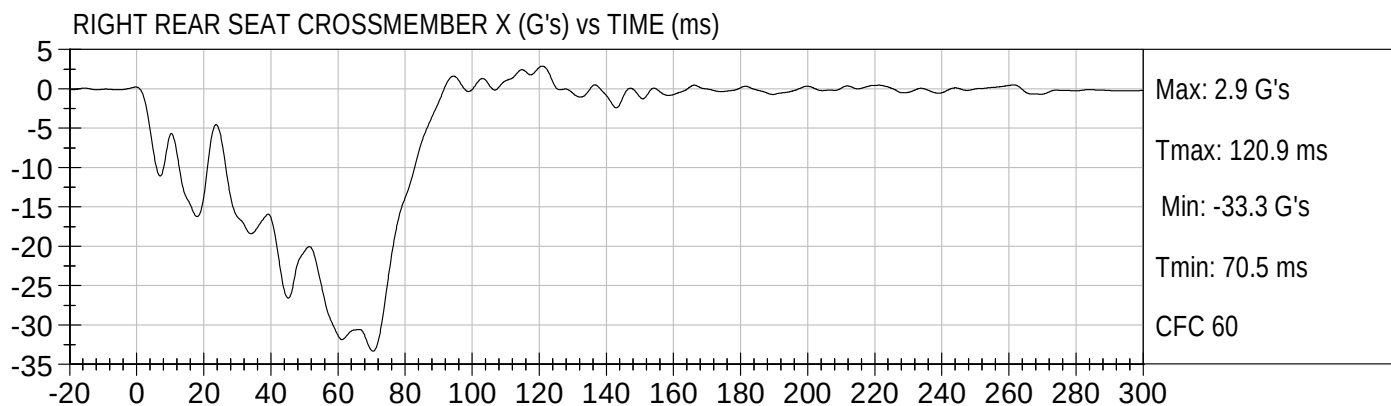
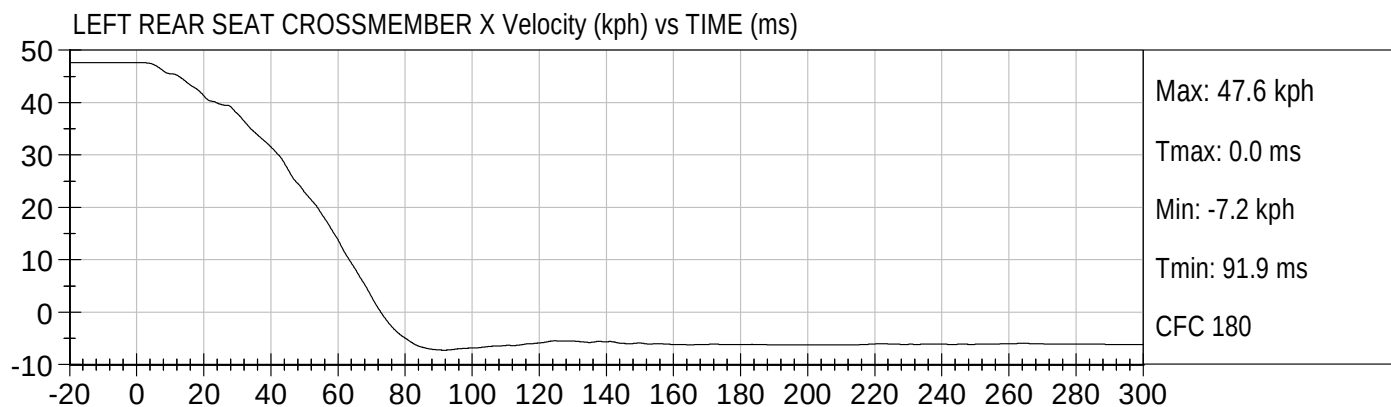
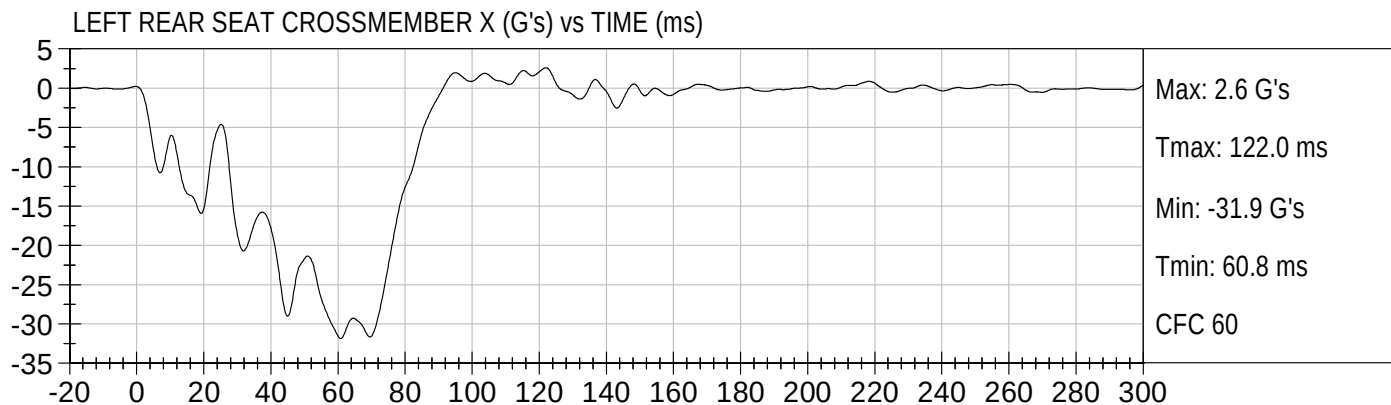
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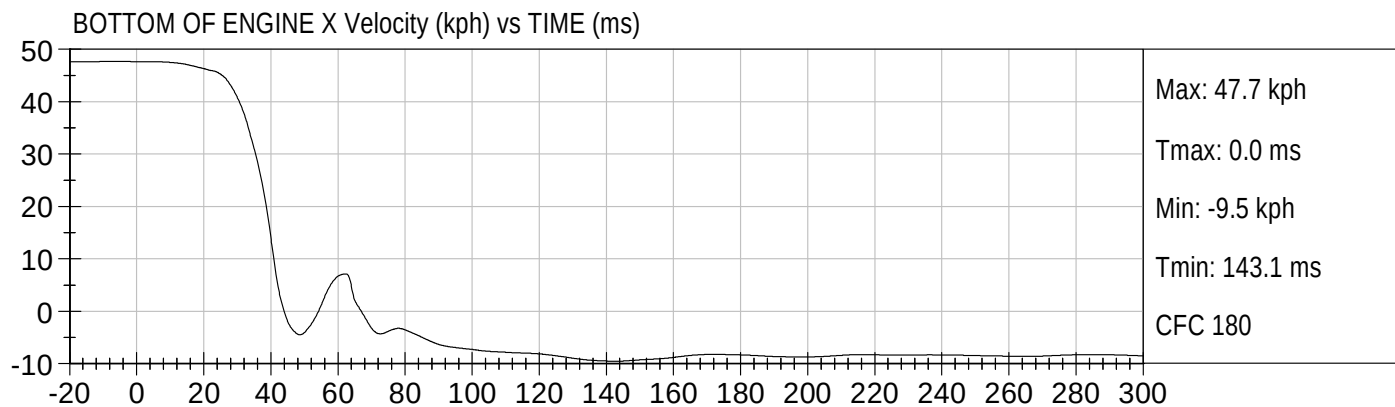
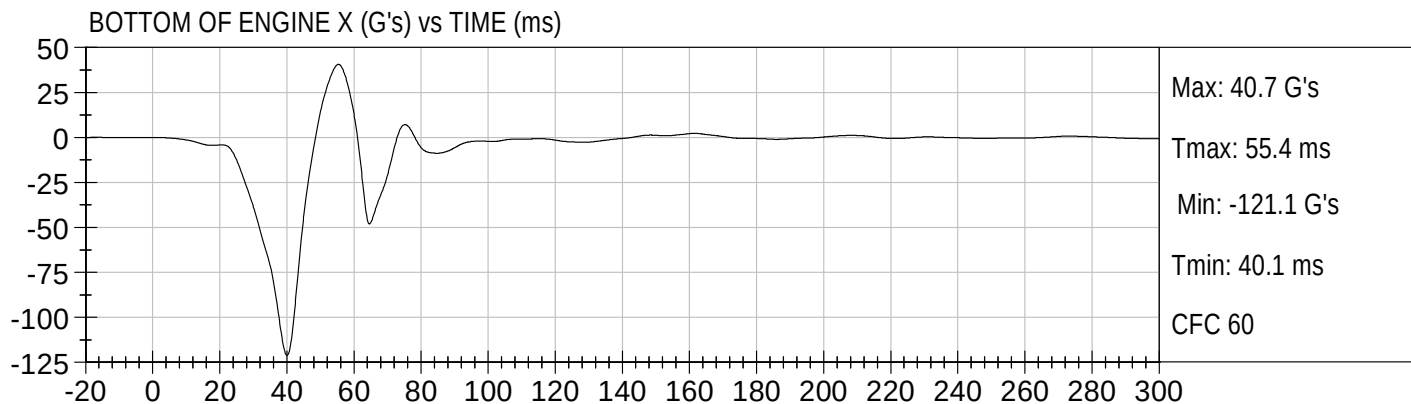
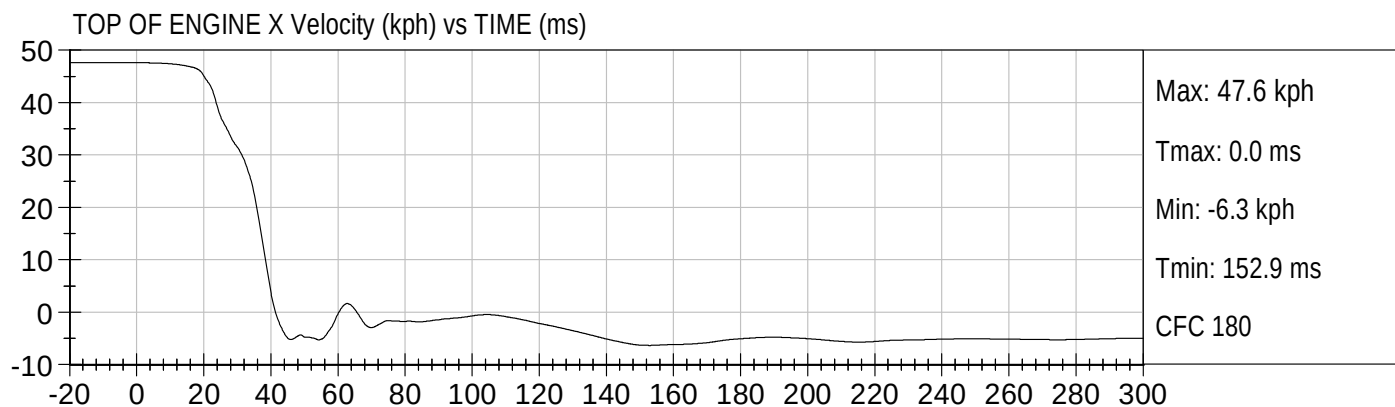
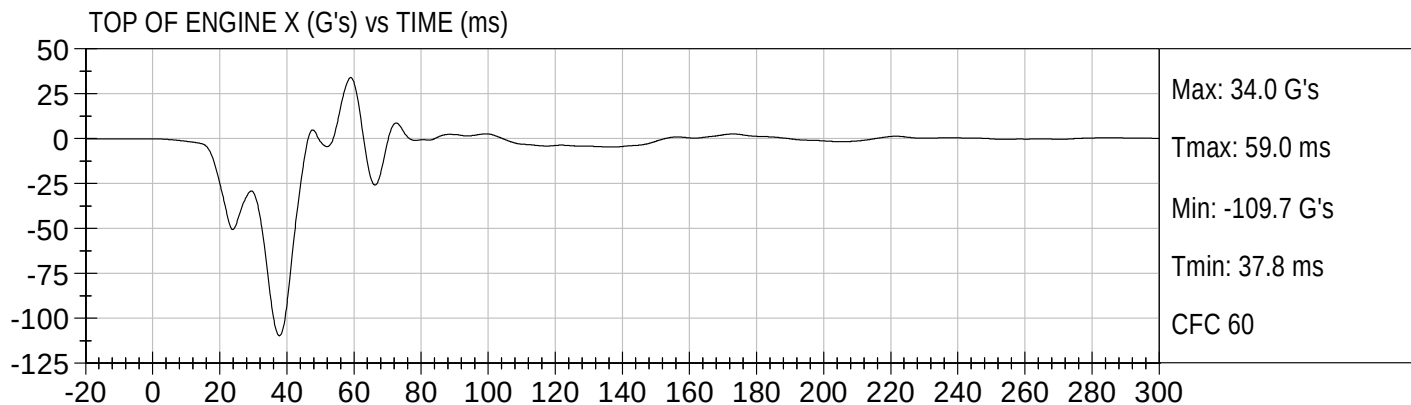
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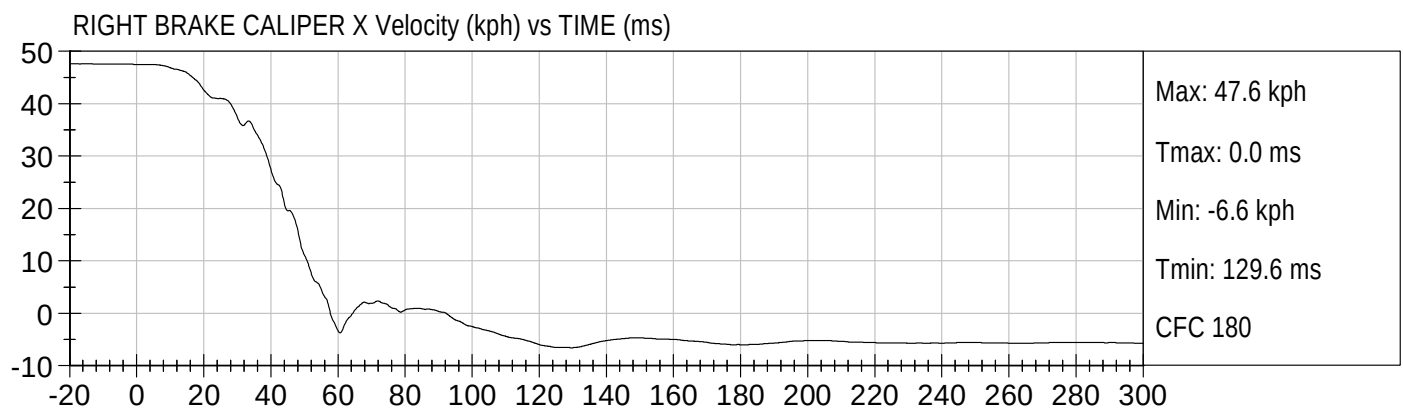
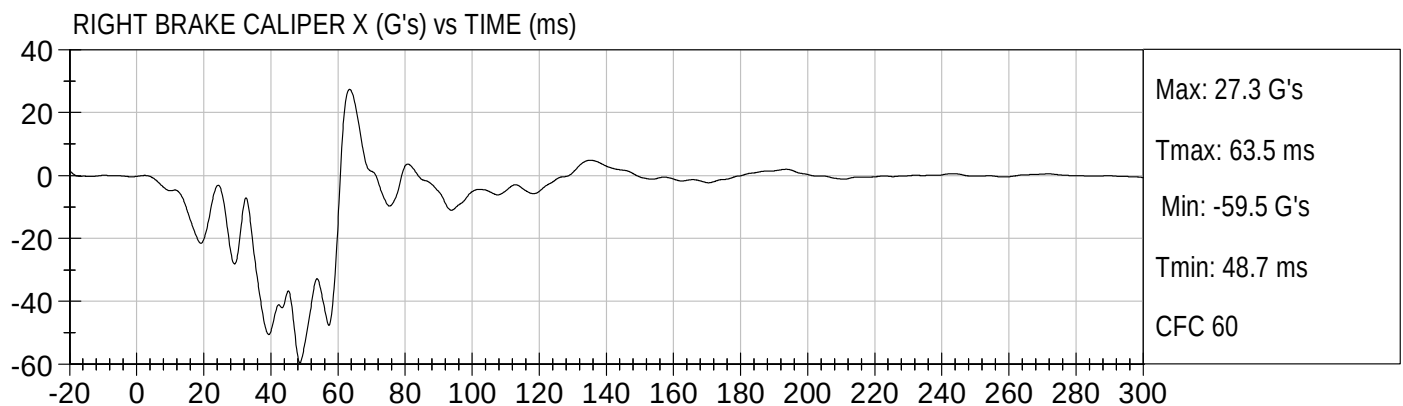
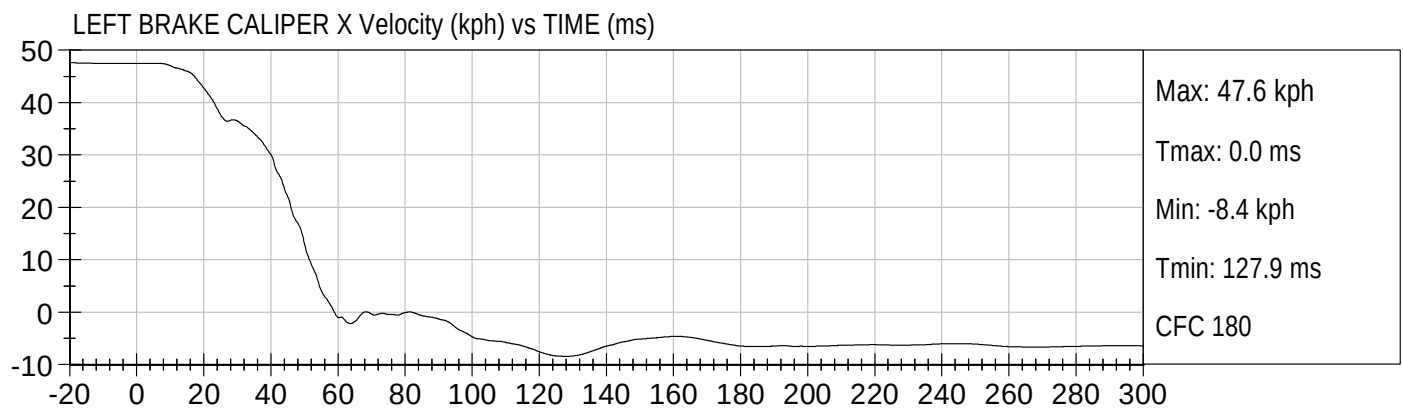
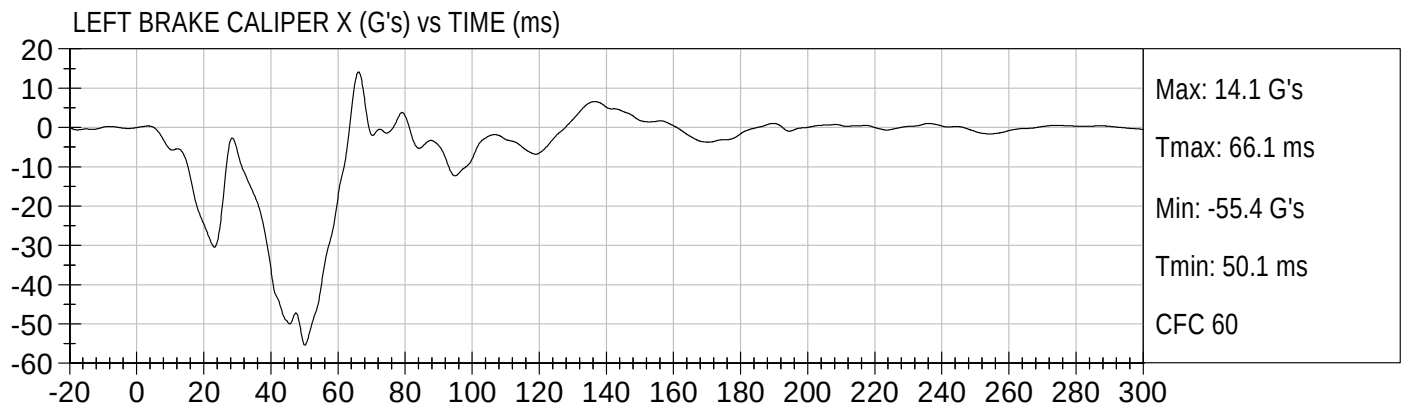
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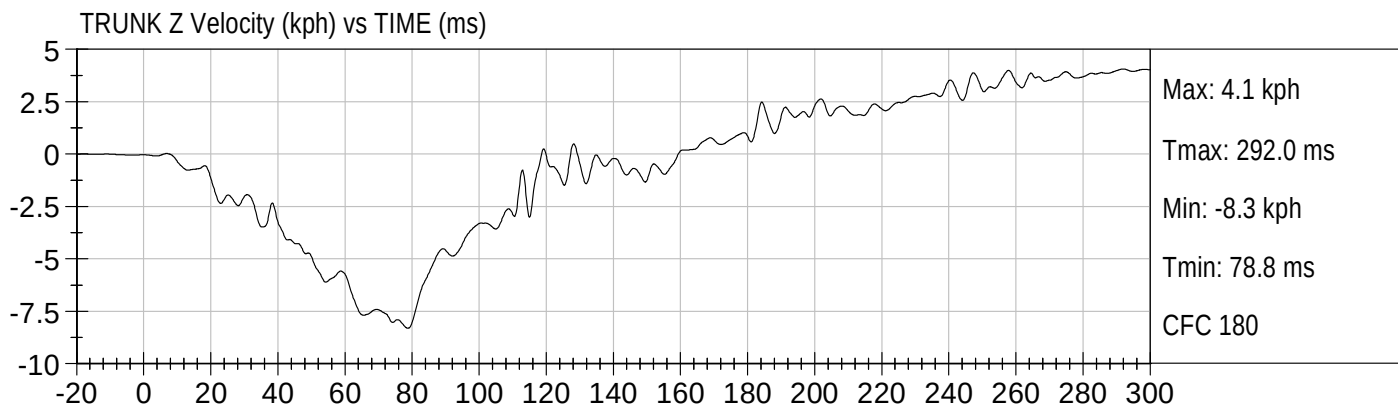
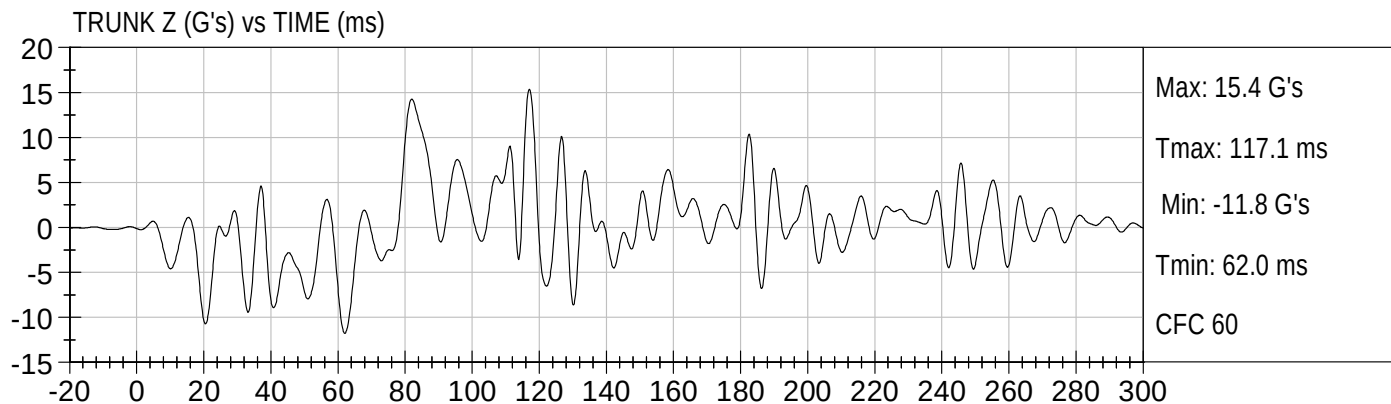
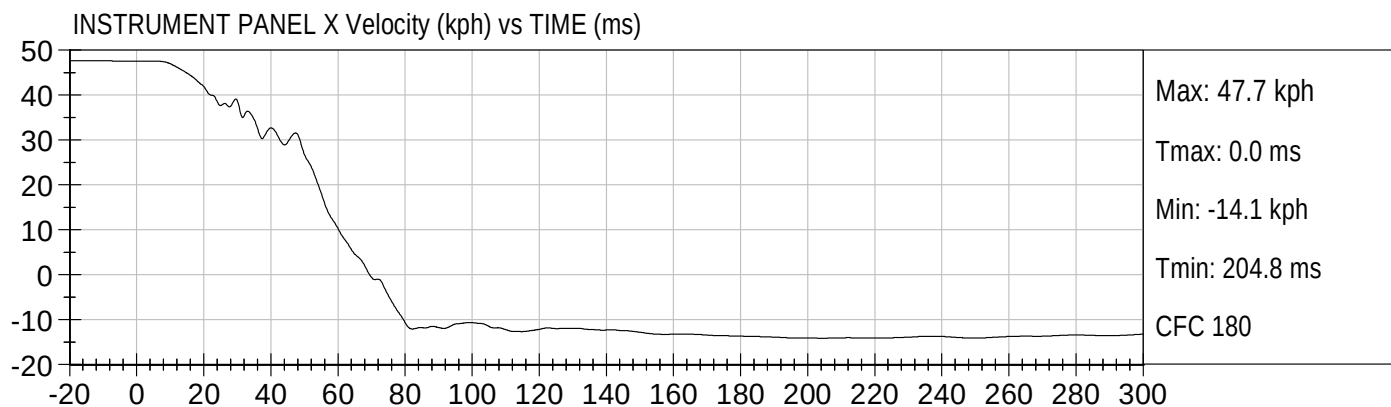
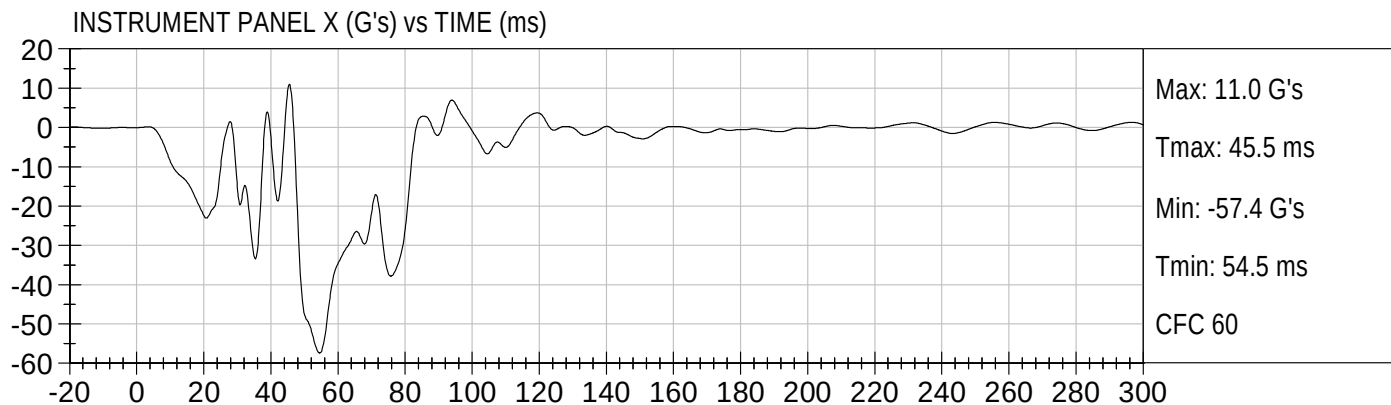
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30 MPH FRONTAL BELTED 5THS
2009 KIA OPTIMA (C90508)

Test Date: 04/23/2009
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APPENDIX B

LOW RISK TEST DATA

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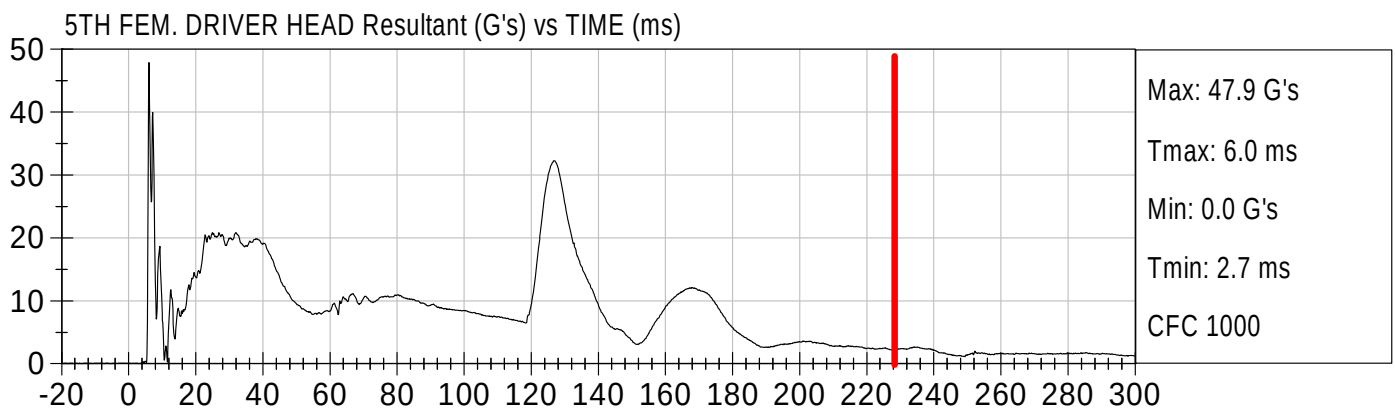
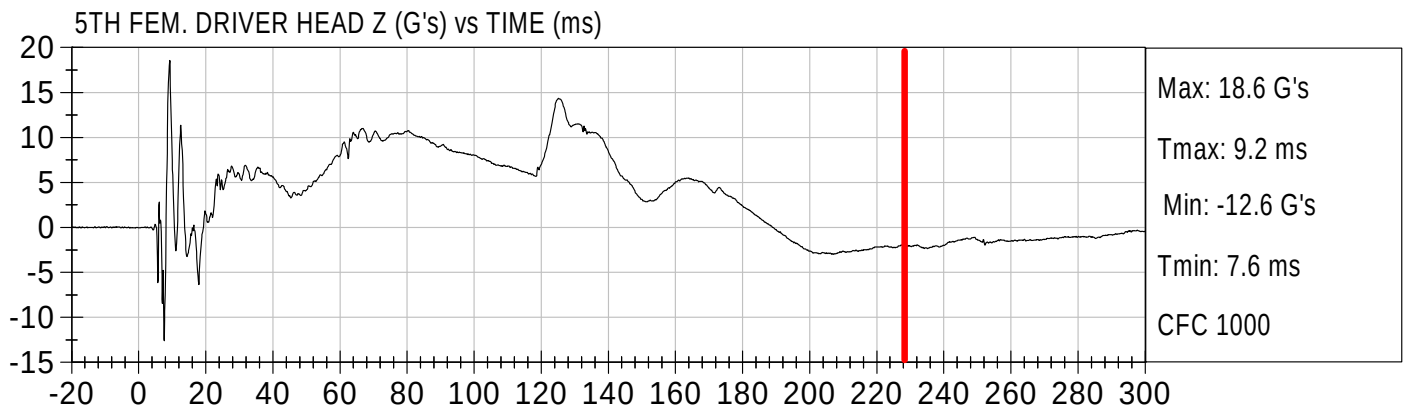
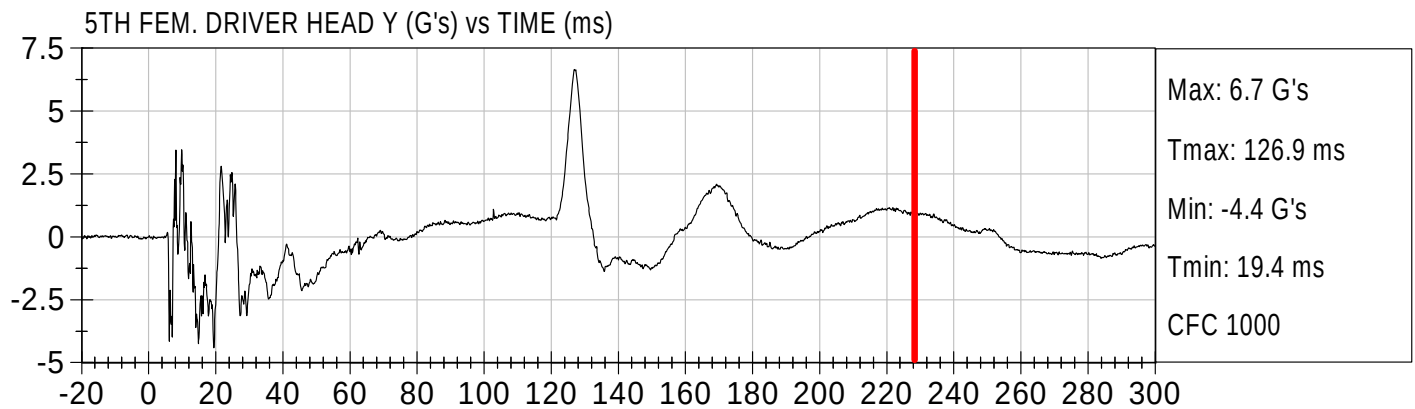
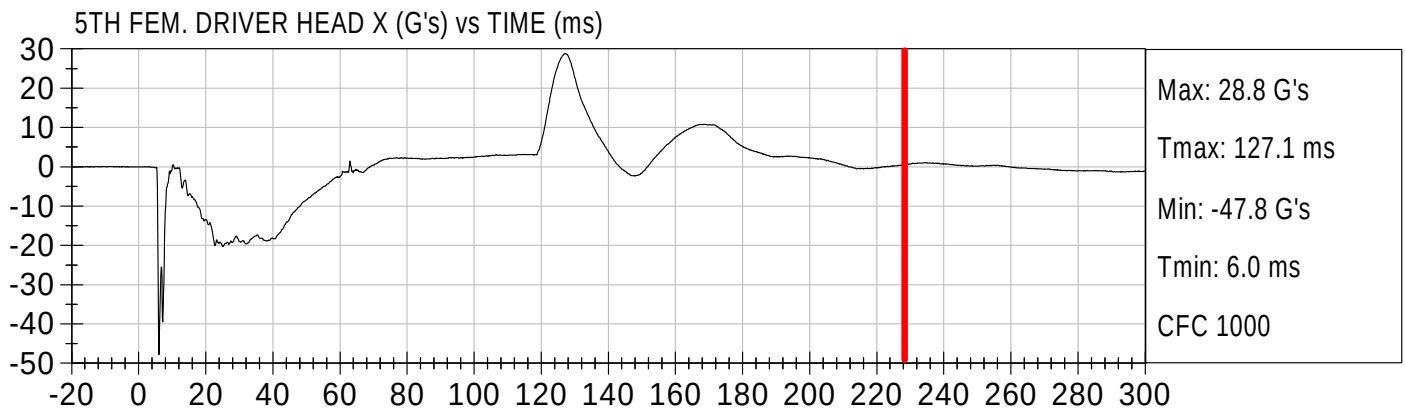
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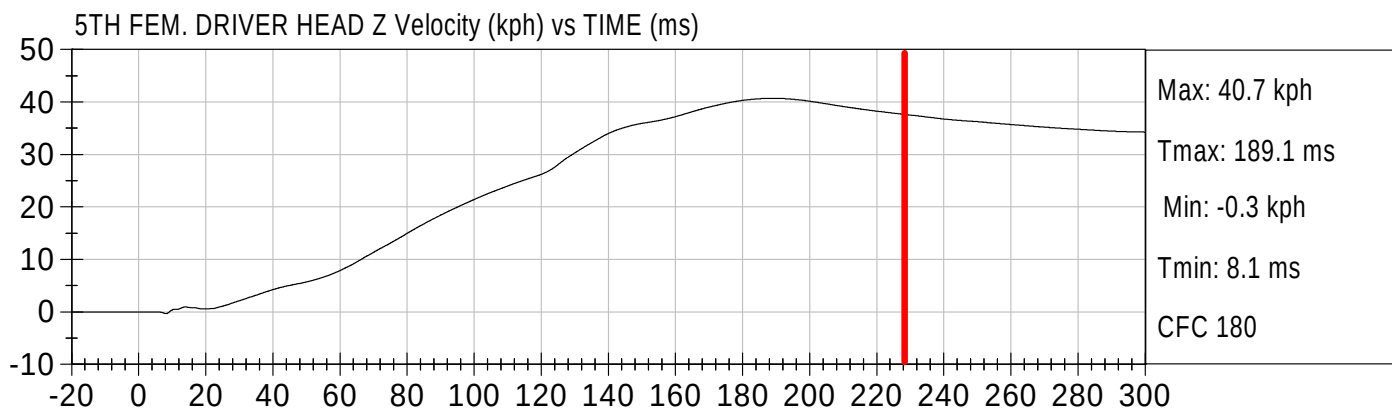
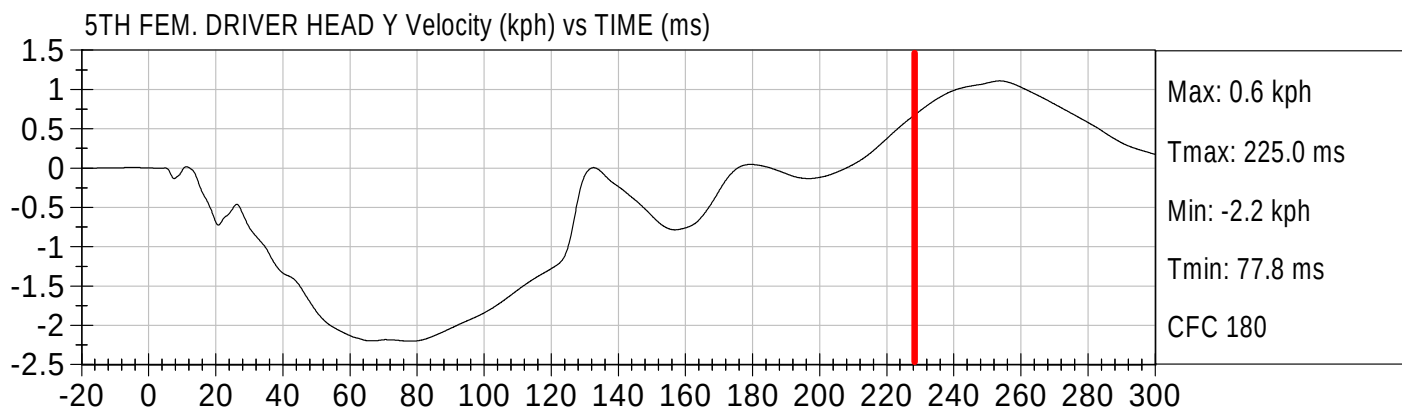
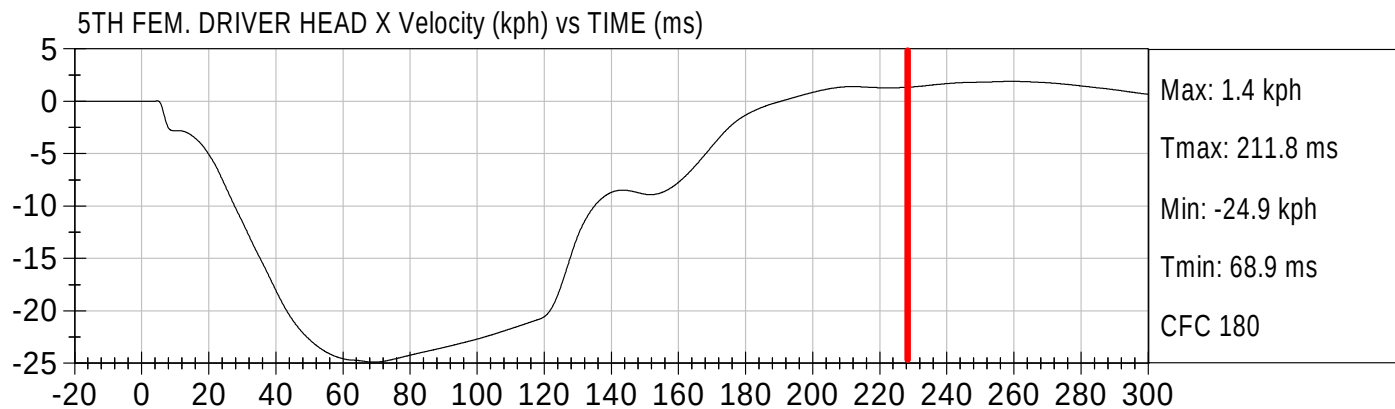


Injury Values Calculated between 0ms and 225ms



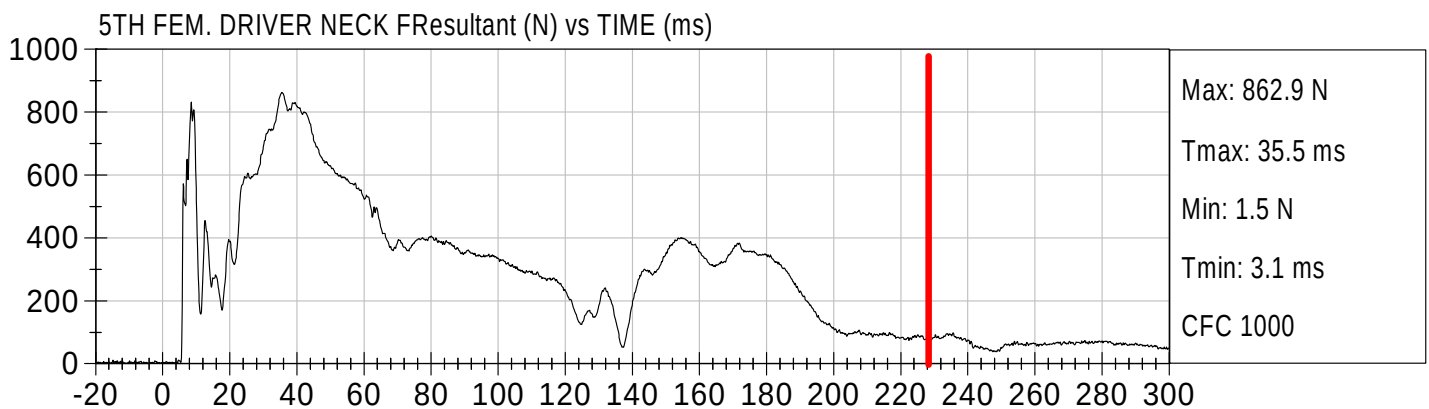
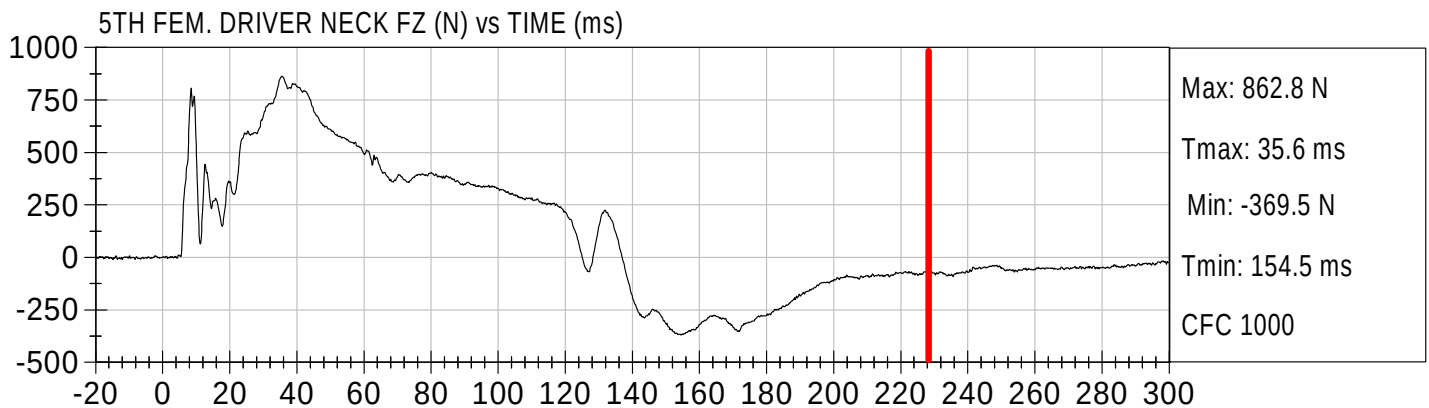
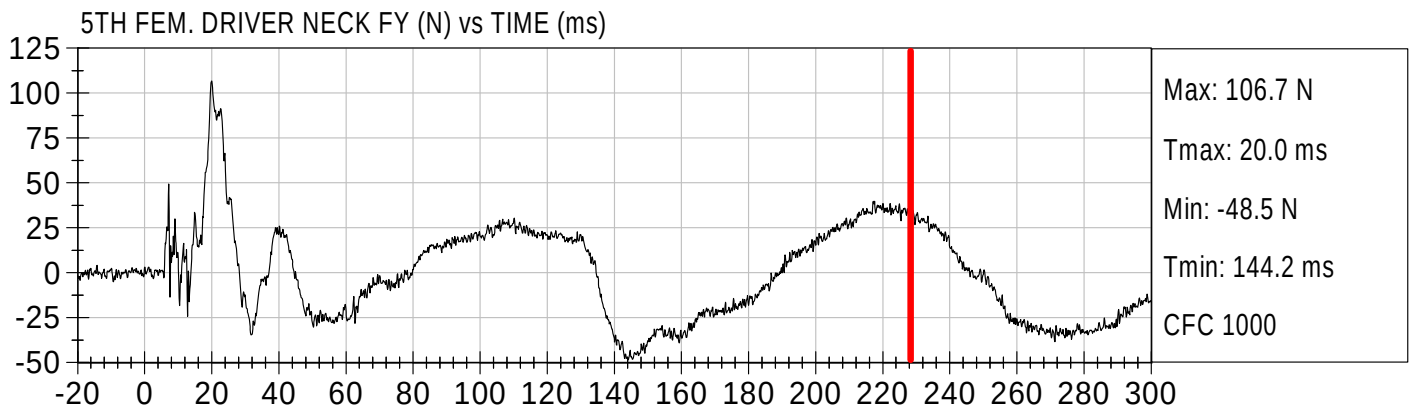
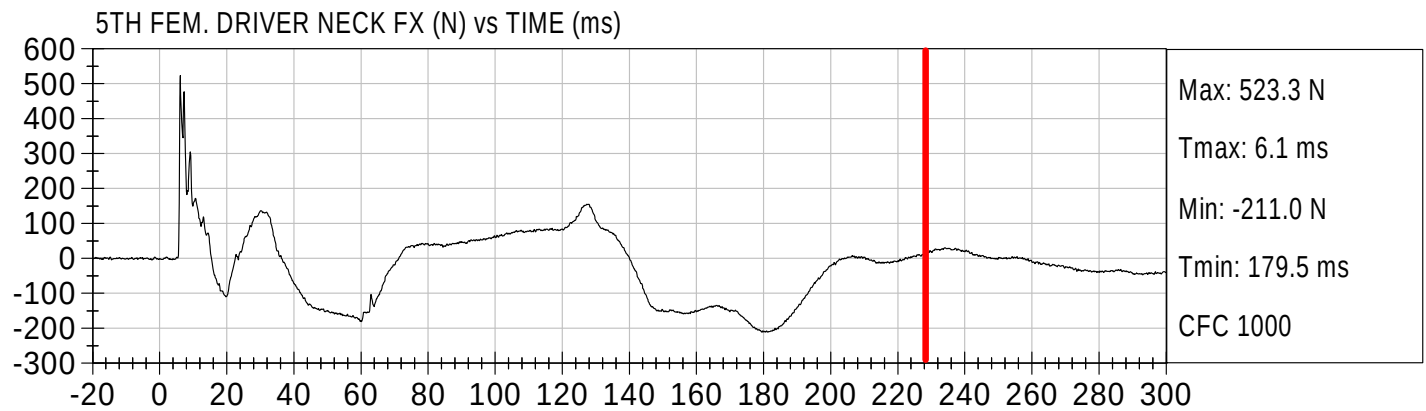


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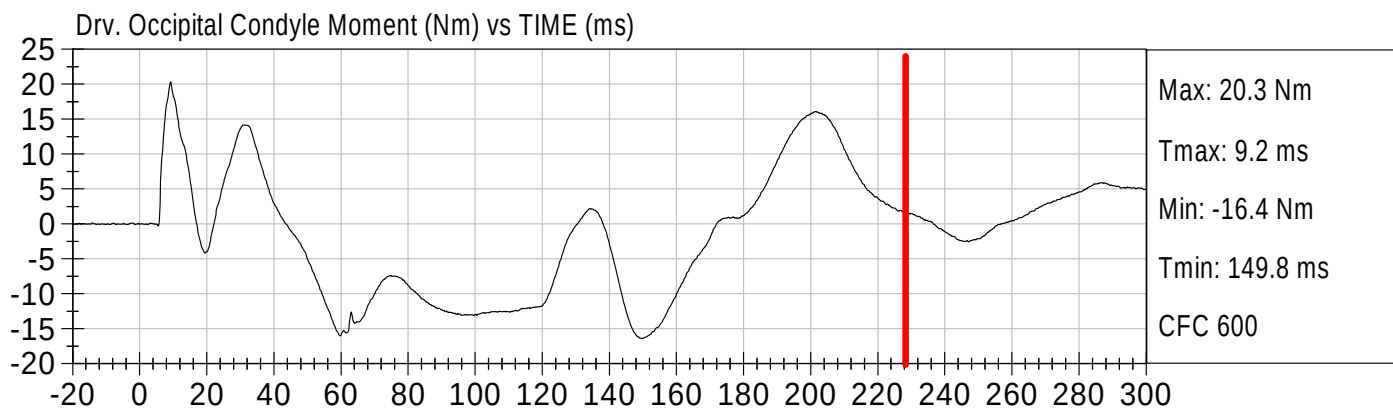
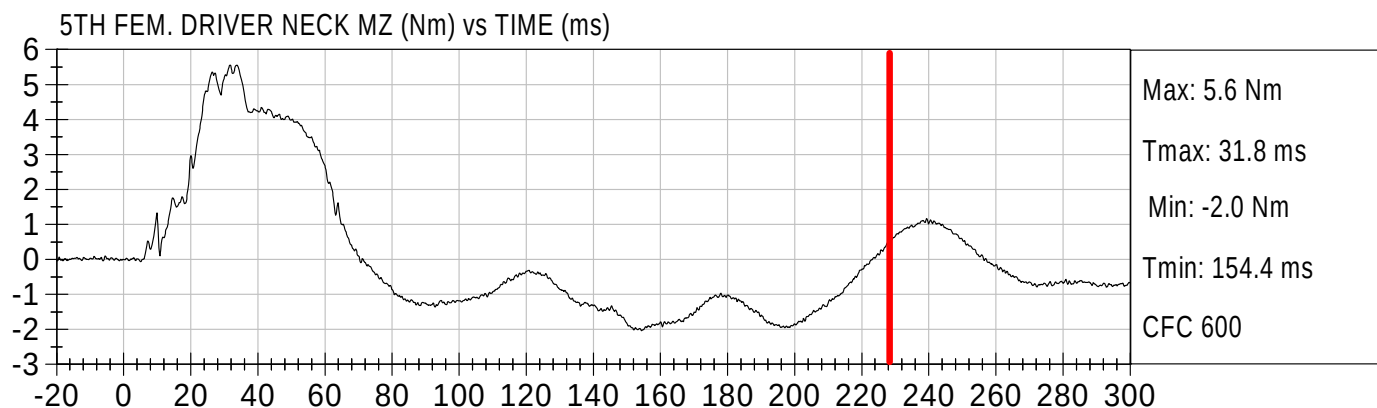
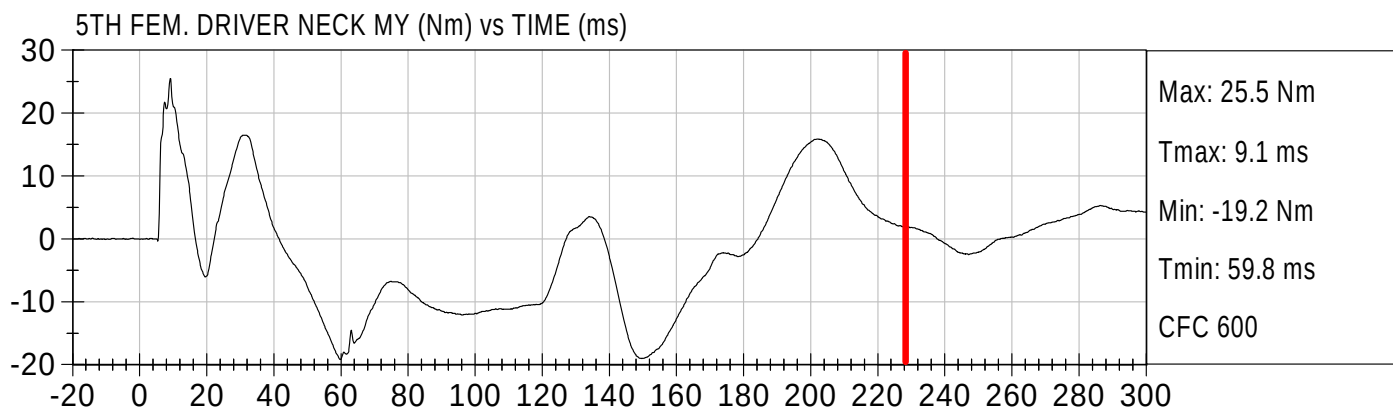
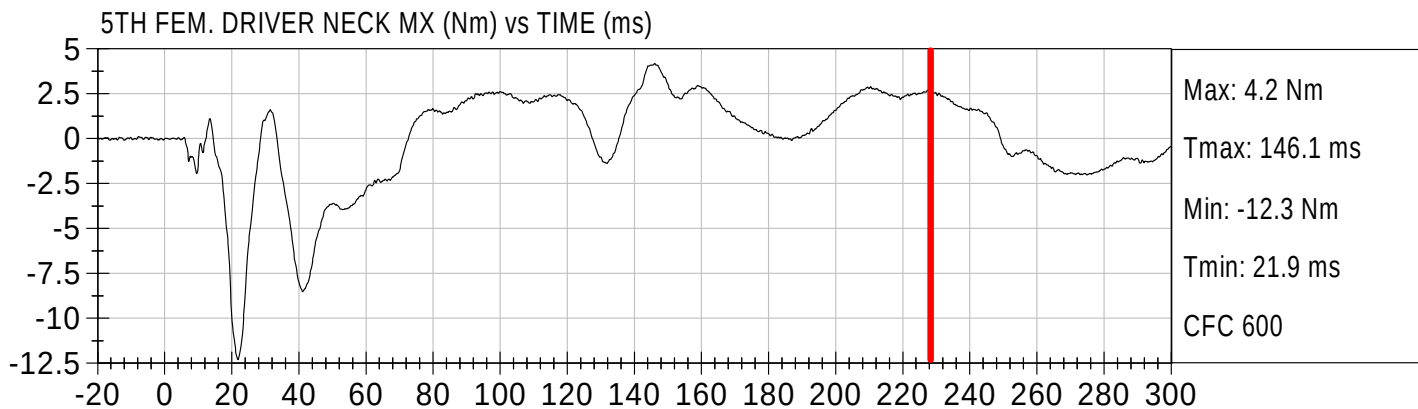


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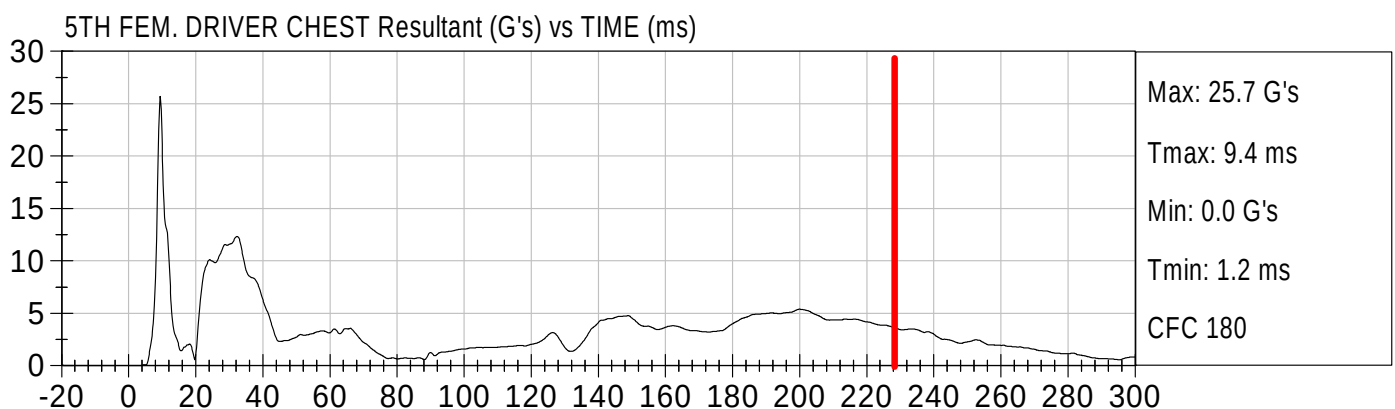
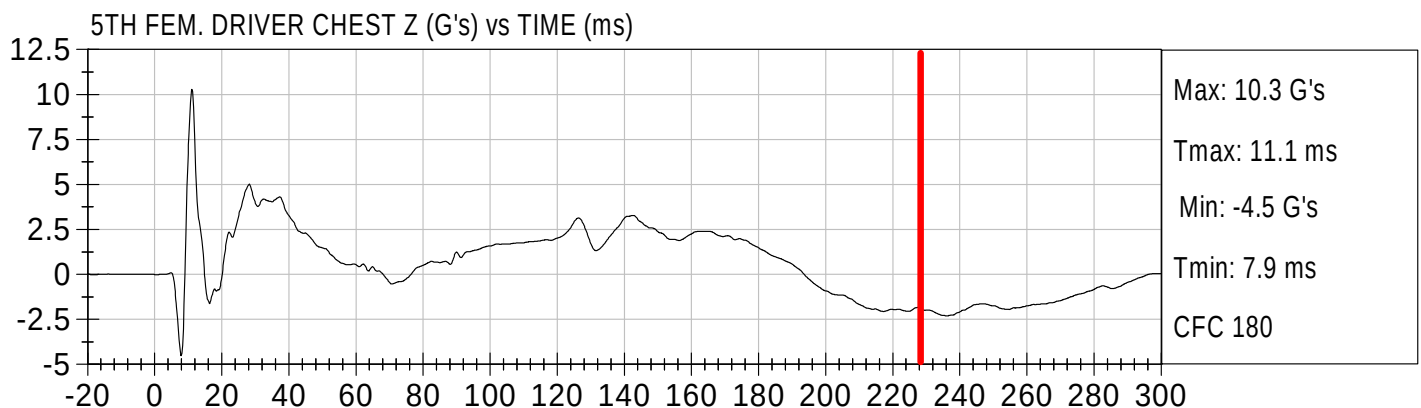
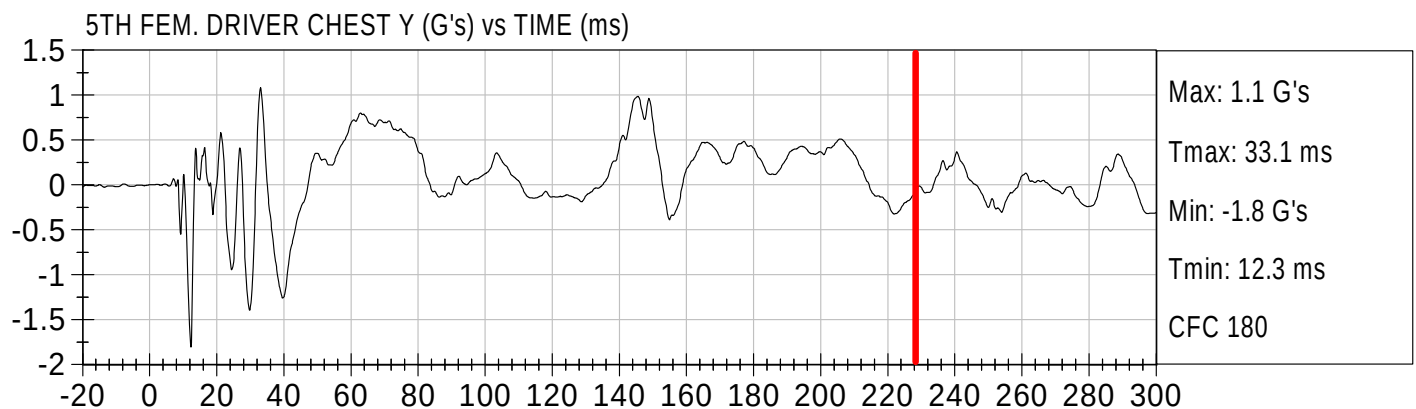
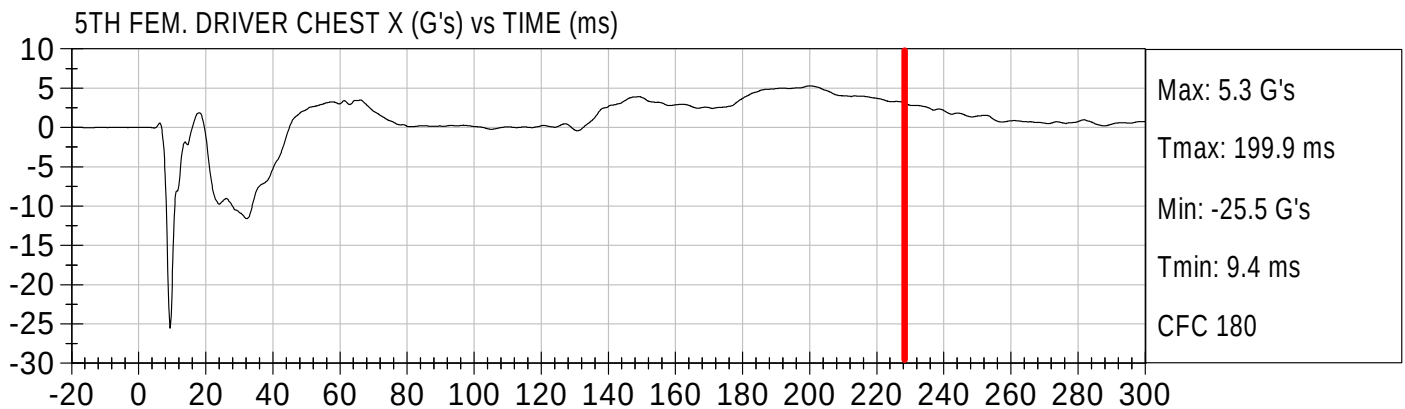


Injury Values Calculated between 0ms and 225ms



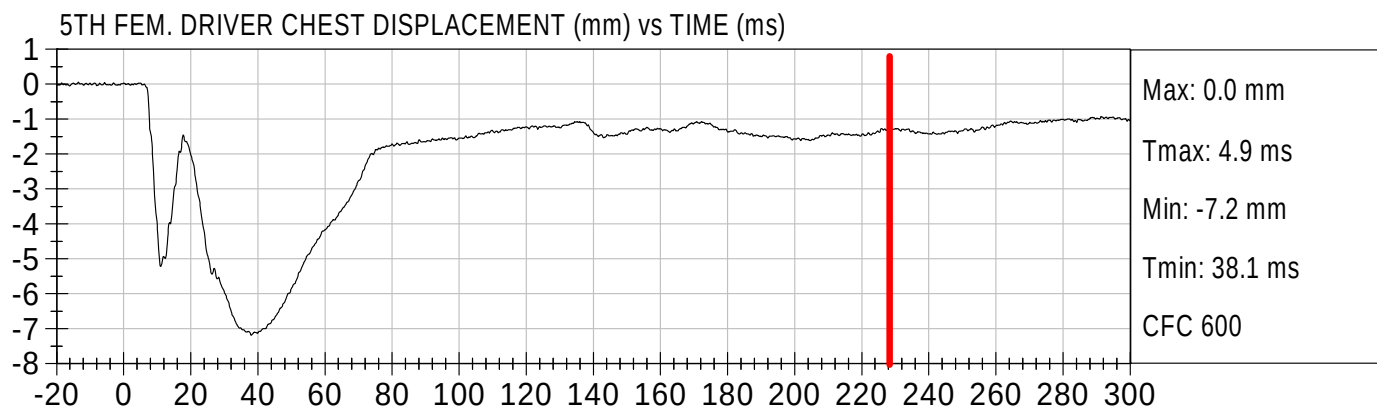
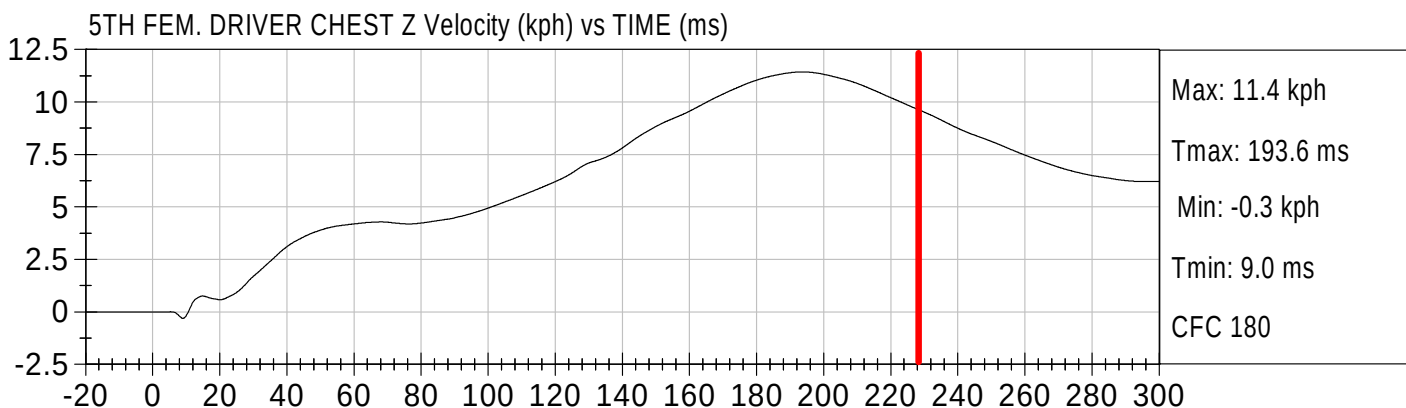
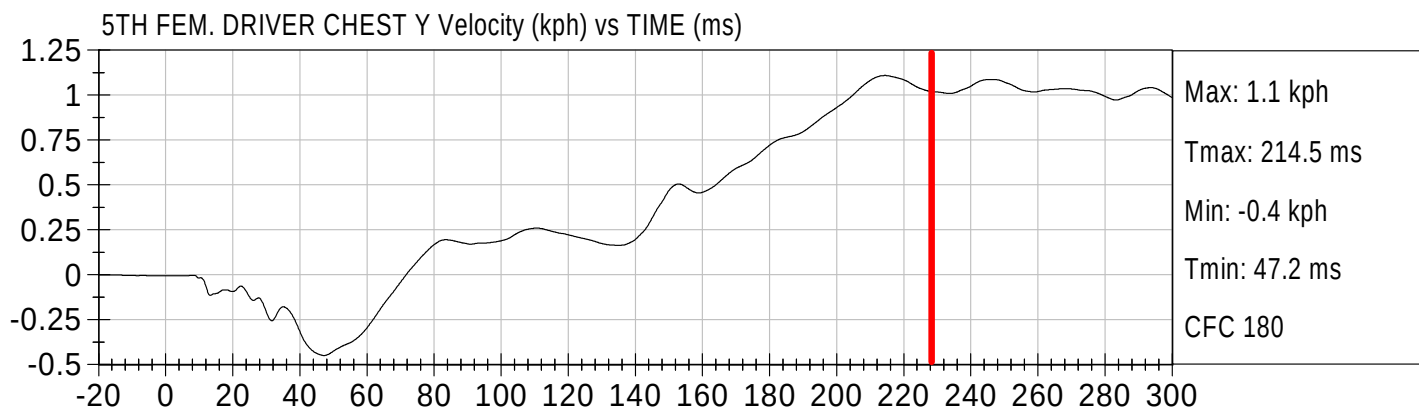
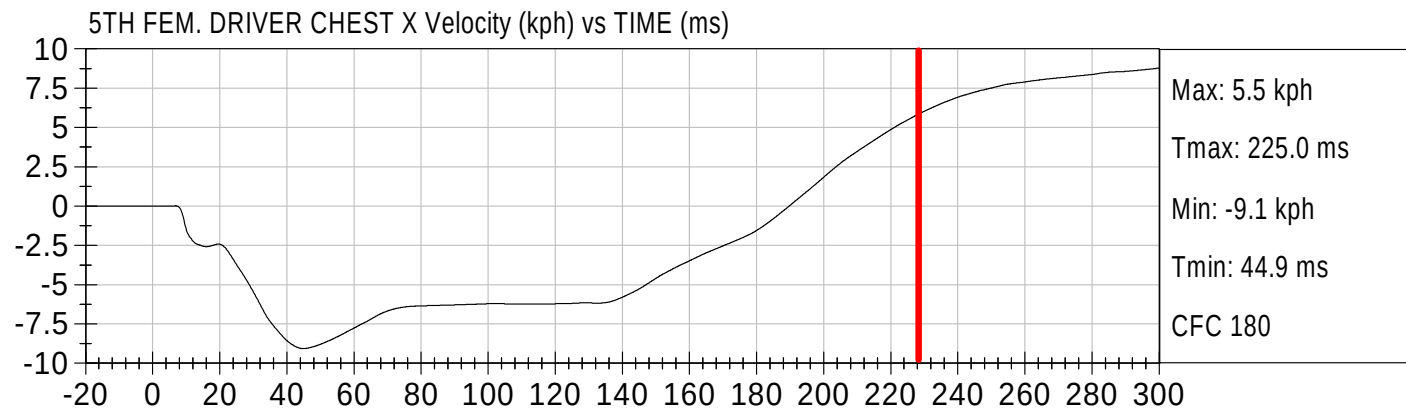


Injury Values Calculated between 0ms and 225ms



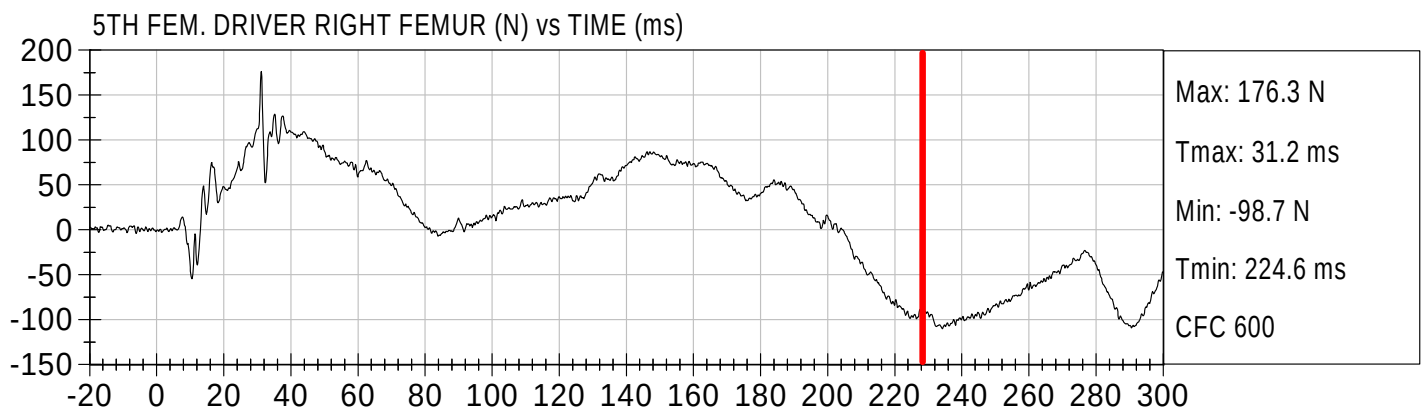
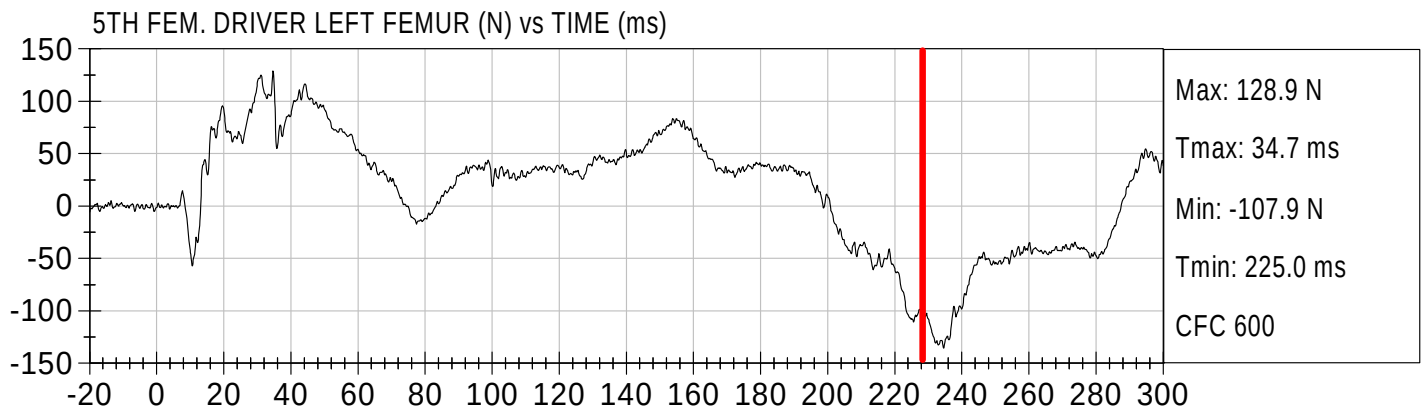


Injury Values Calculated between 0ms and 225ms





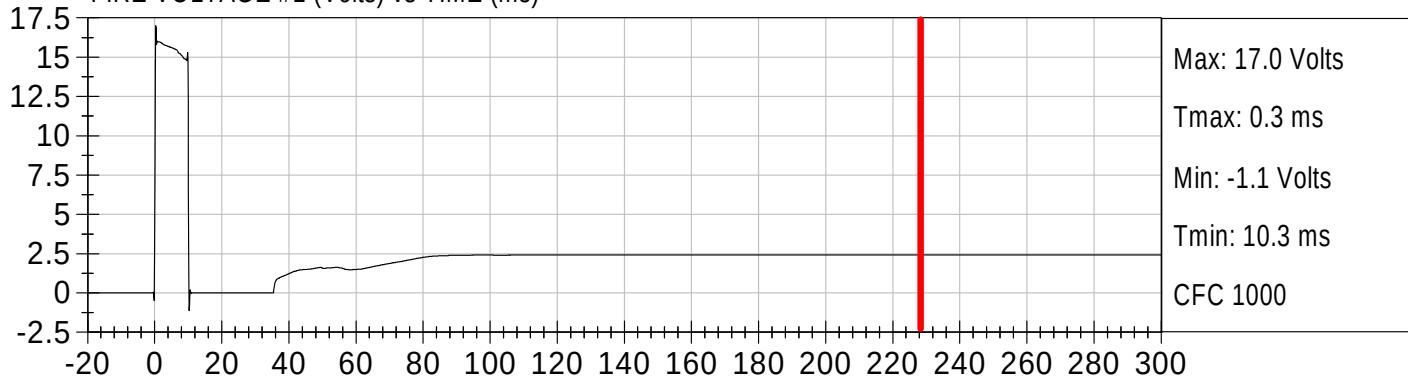
Injury Values Calculated between 0ms and 225ms



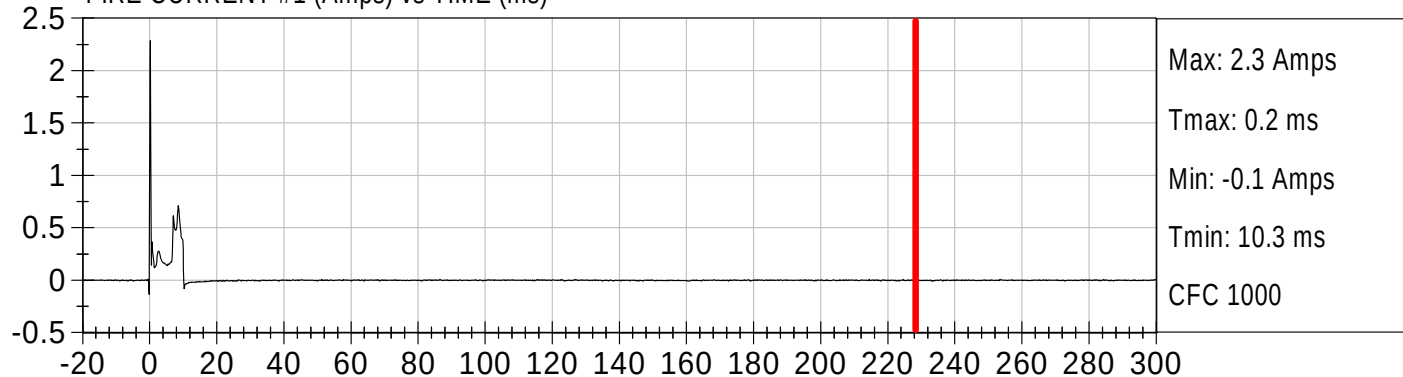


Injury Values Calculated between 0ms and 225ms

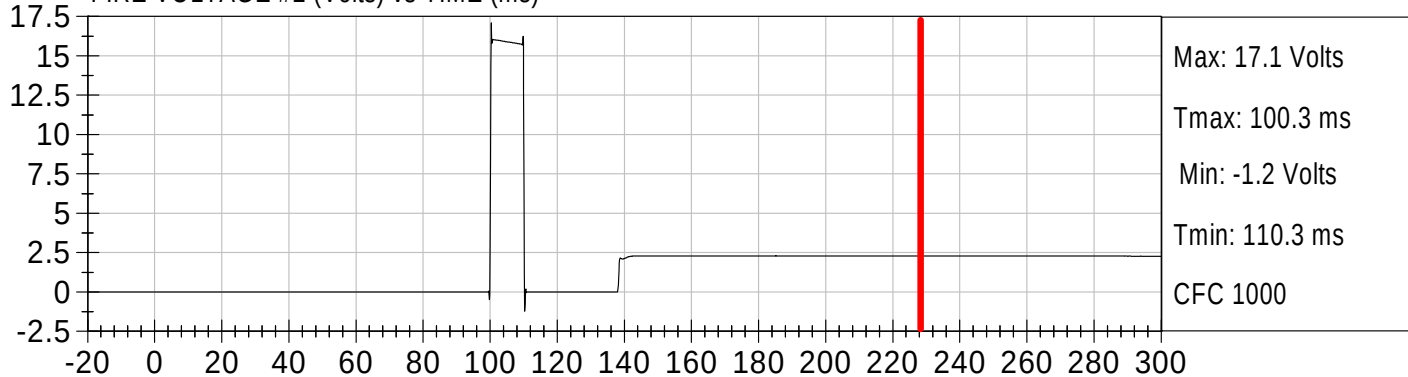
FIRE VOLTAGE #1 (Volts) vs TIME (ms)



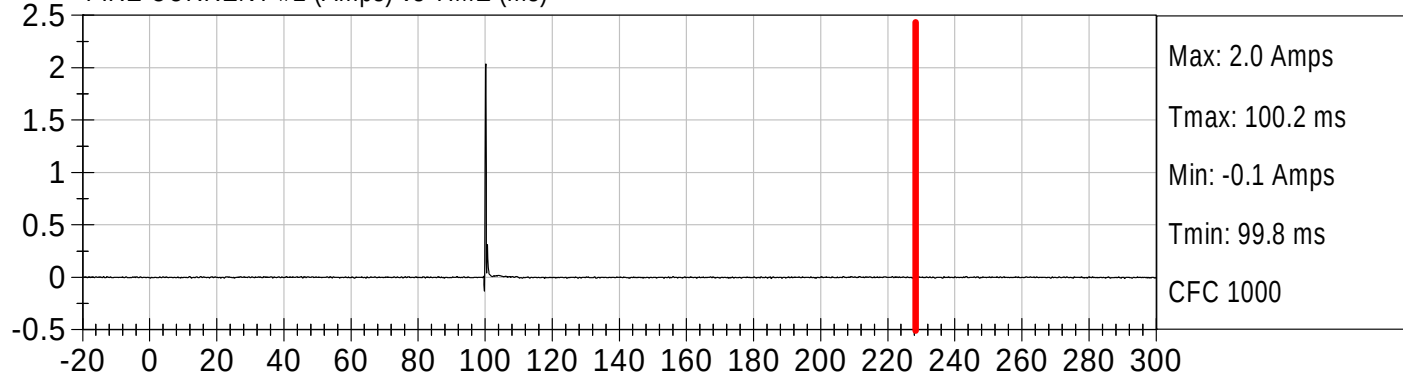
FIRE CURRENT #1 (Amps) vs TIME (ms)



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

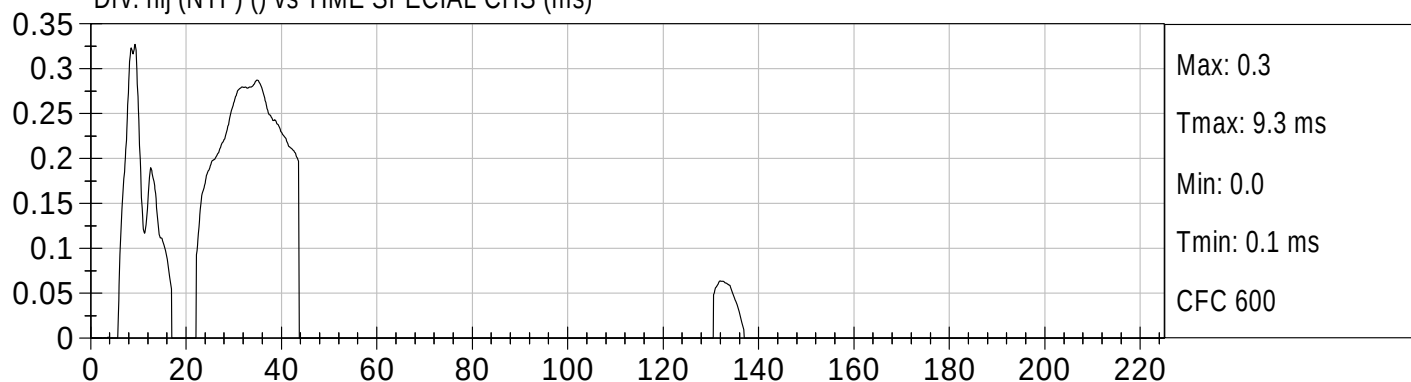


FIRE CURRENT #2 (Amps) vs TIME (ms)

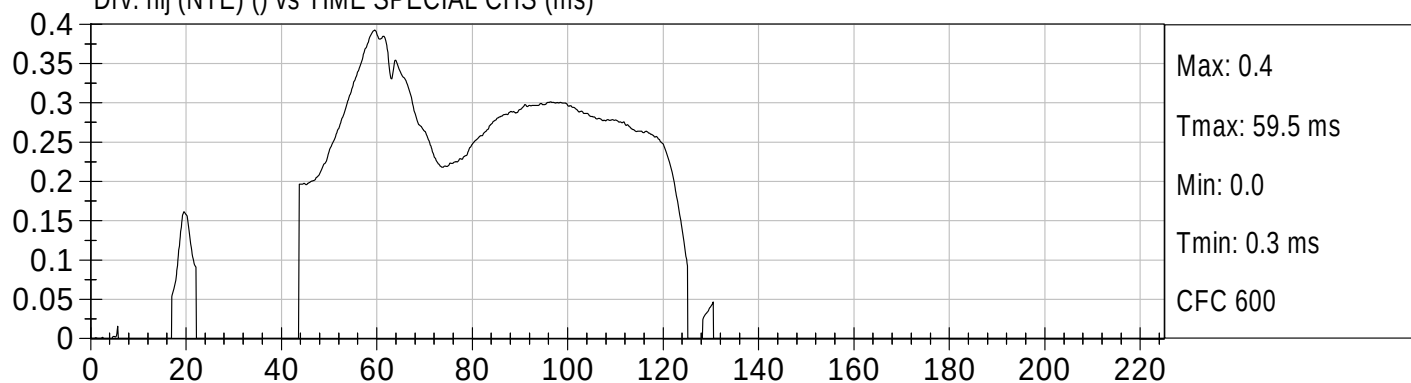




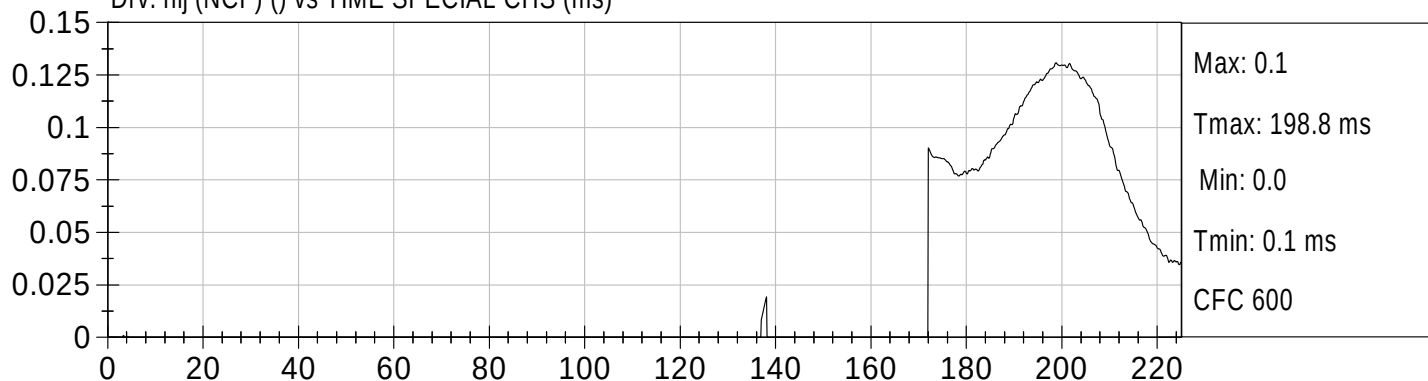
Drv. nij (NTF) () vs TIME SPECIAL CHS (ms)



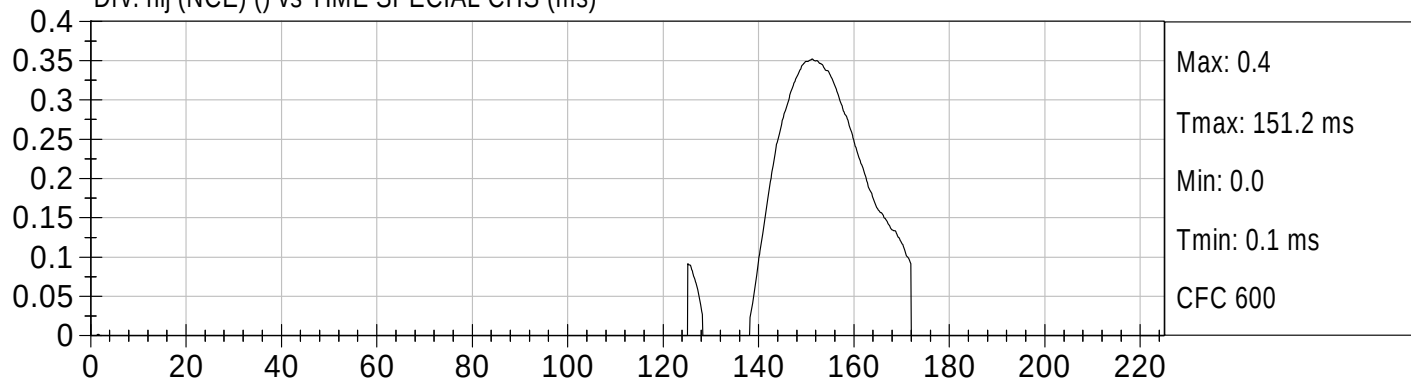
Drv. nij (NTE) () vs TIME SPECIAL CHS (ms)



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

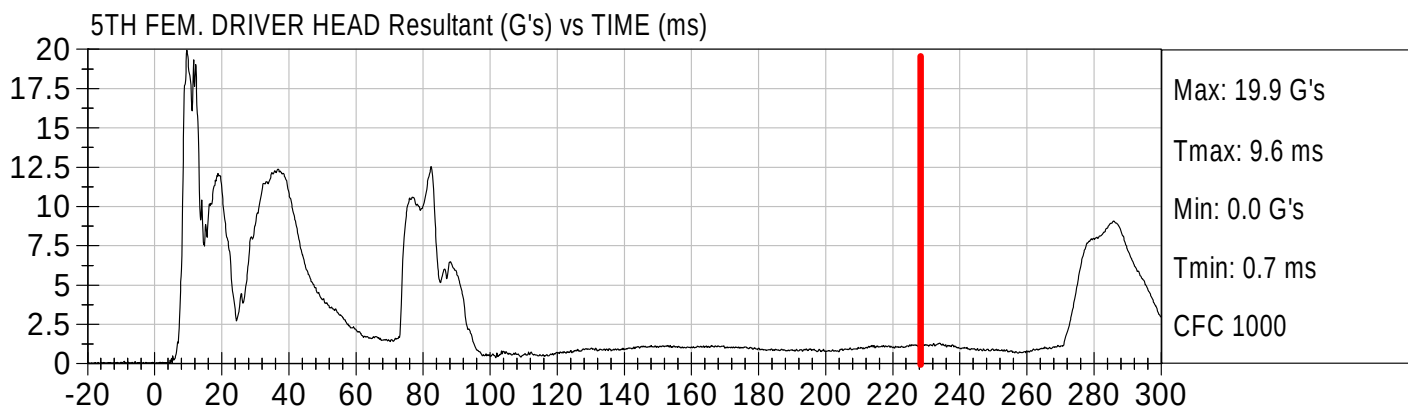
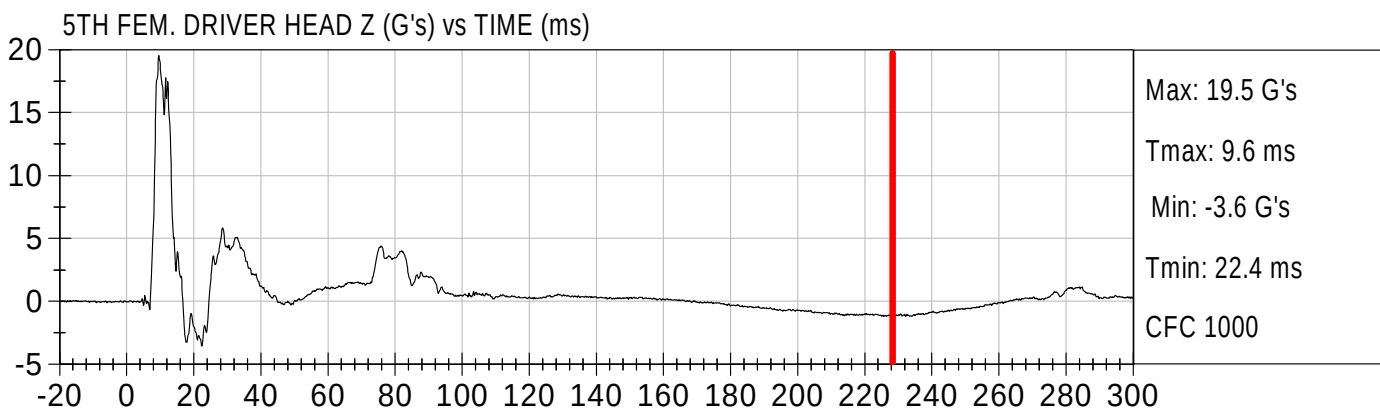
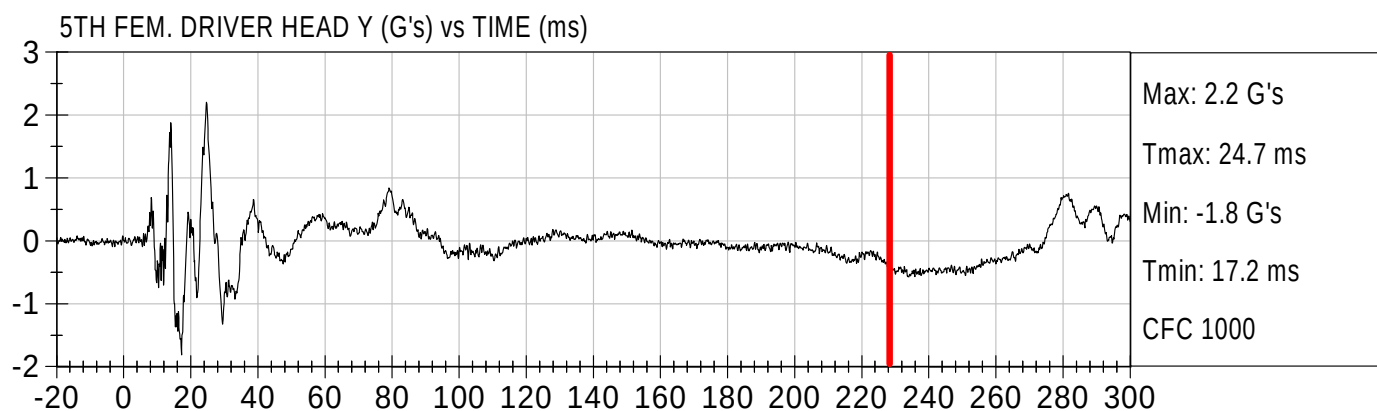
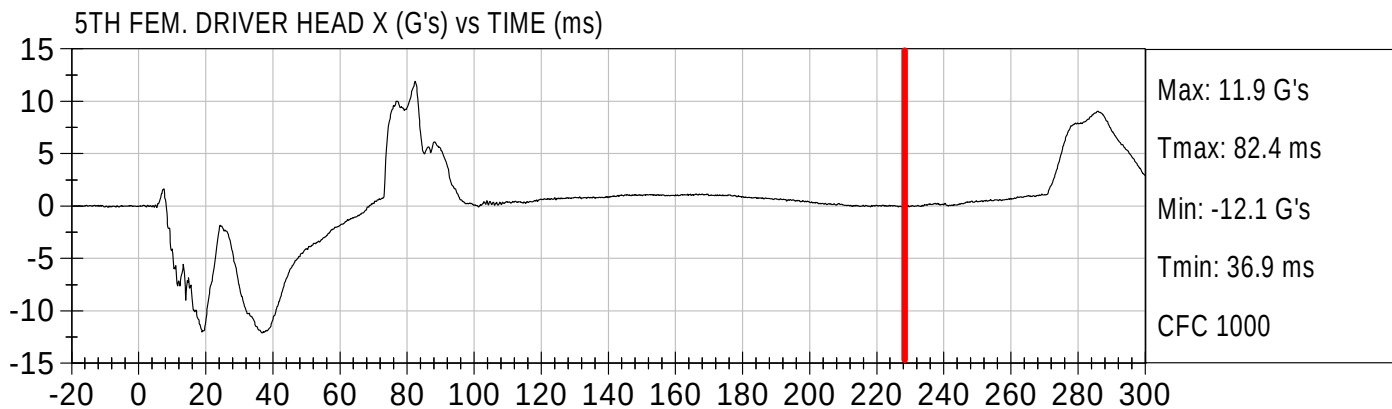


Drv. nij (NCE) () vs TIME SPECIAL CHS (ms)



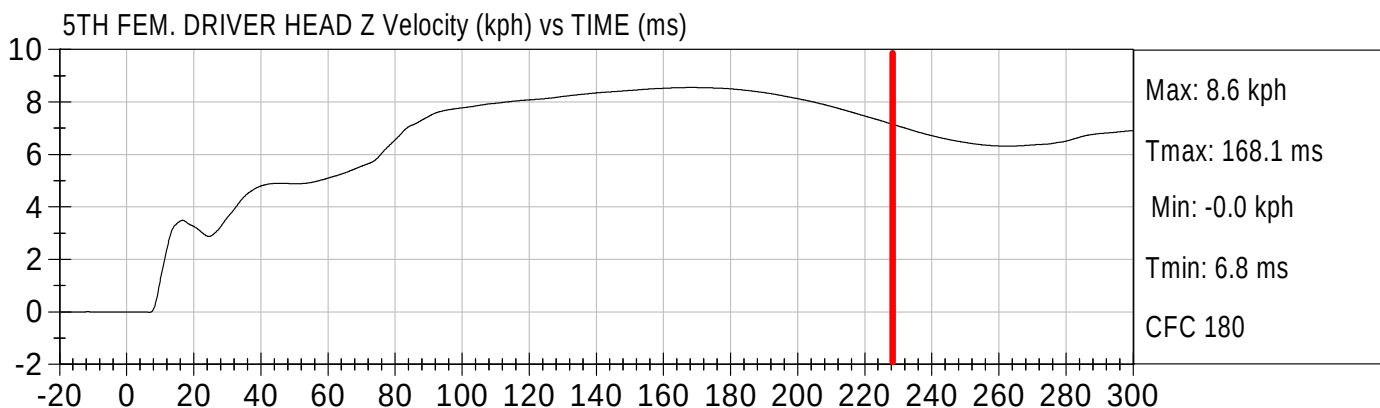
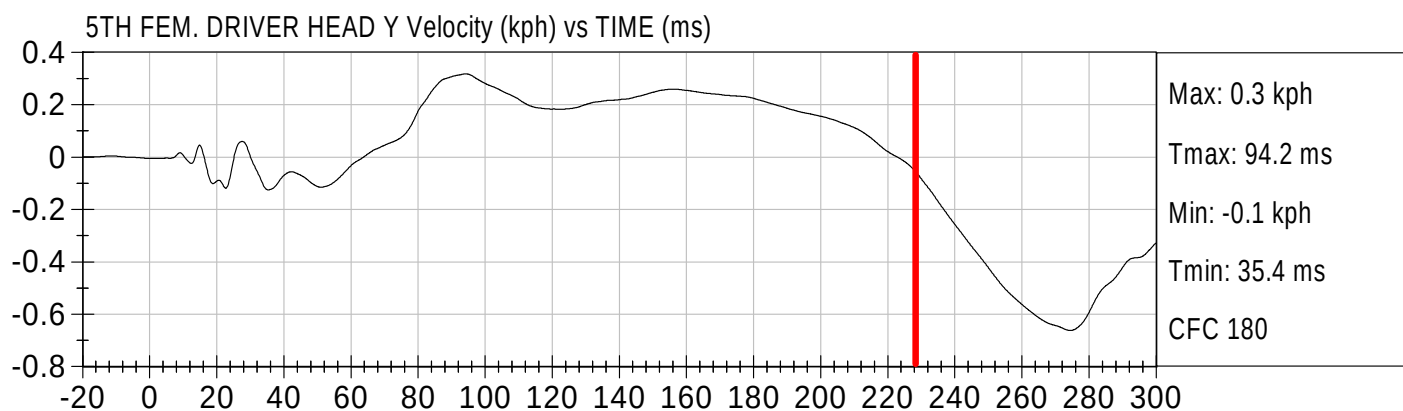
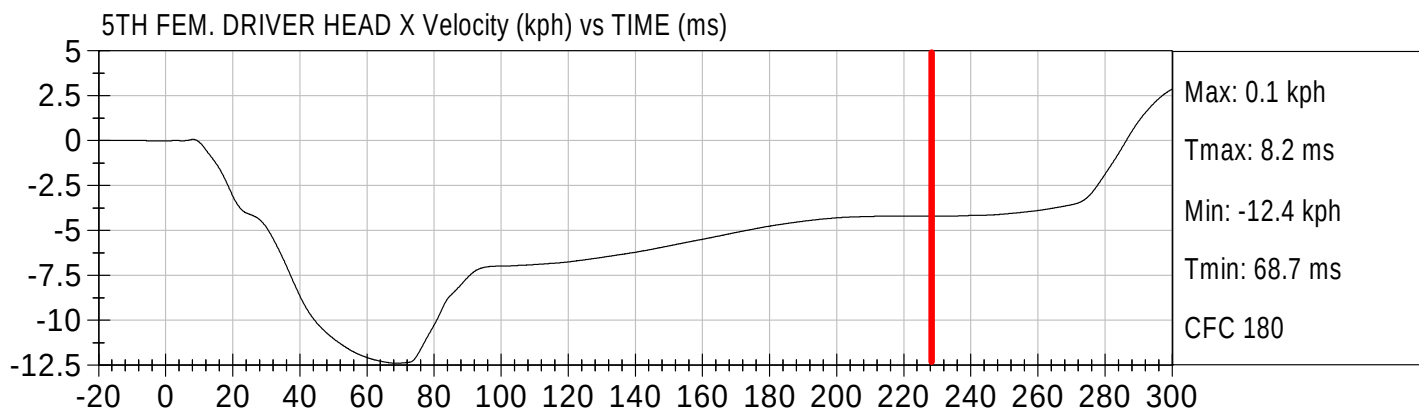


Injury Values Calculated between 0ms and 225ms



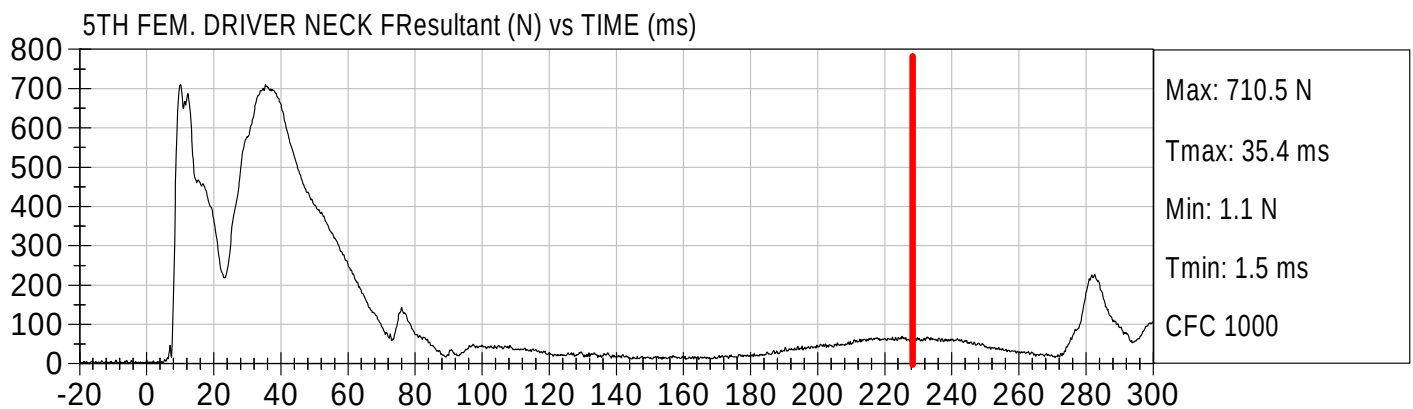
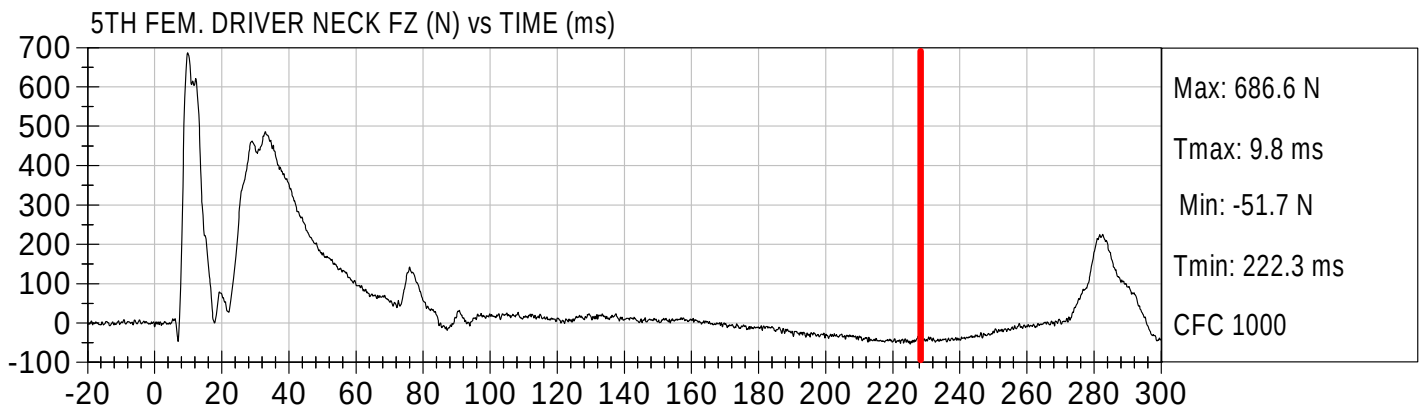
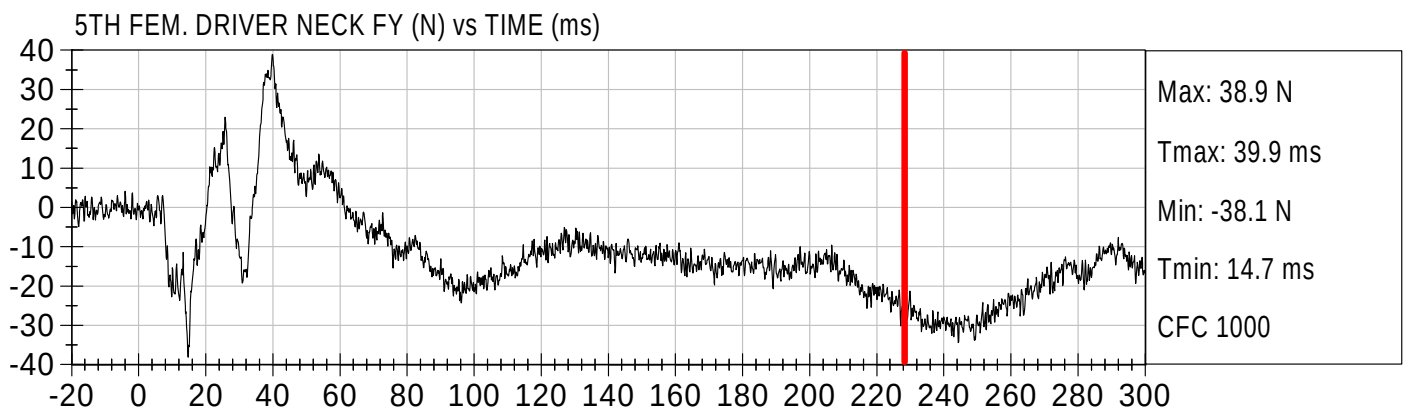
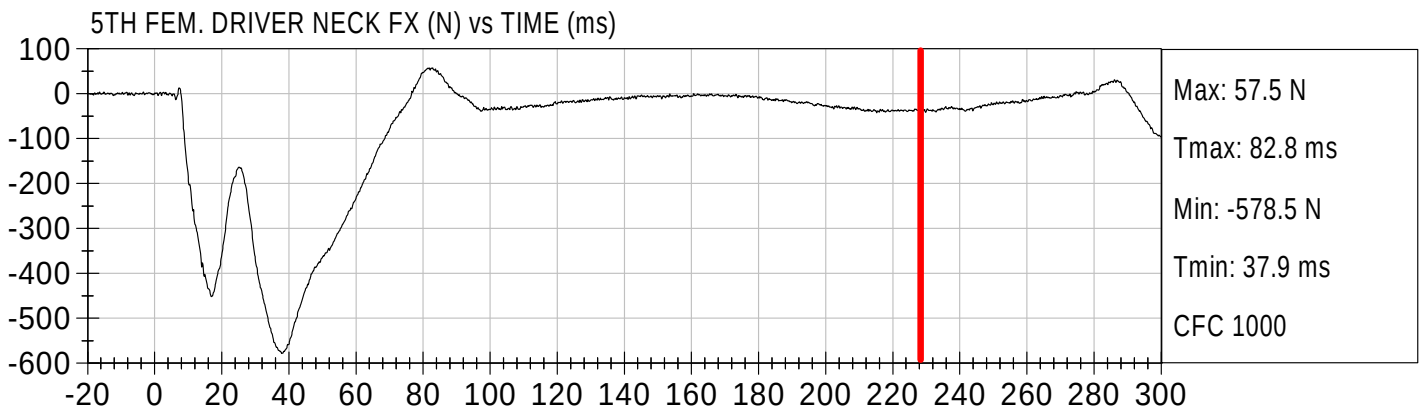


Injury Values Calculated between 0ms and 225ms



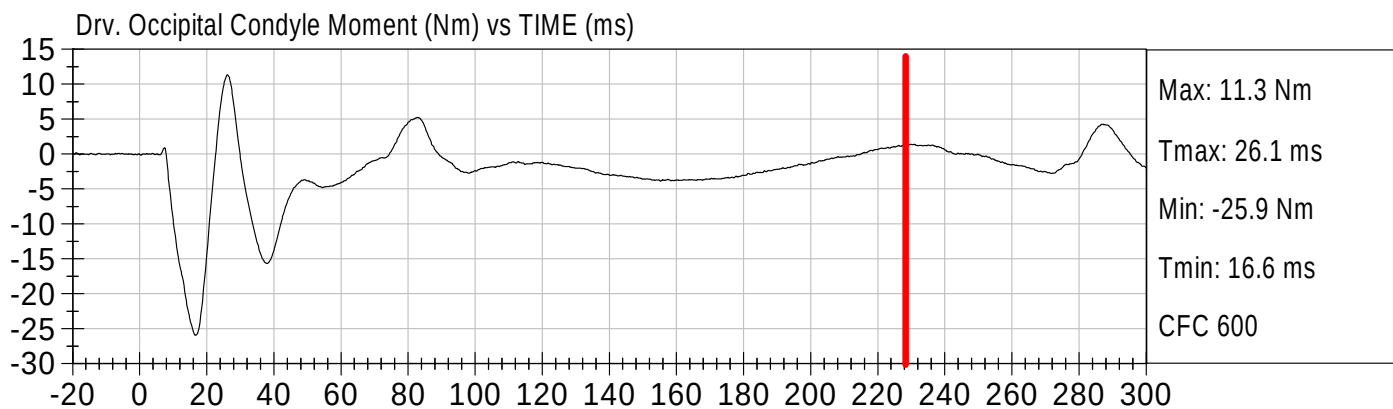
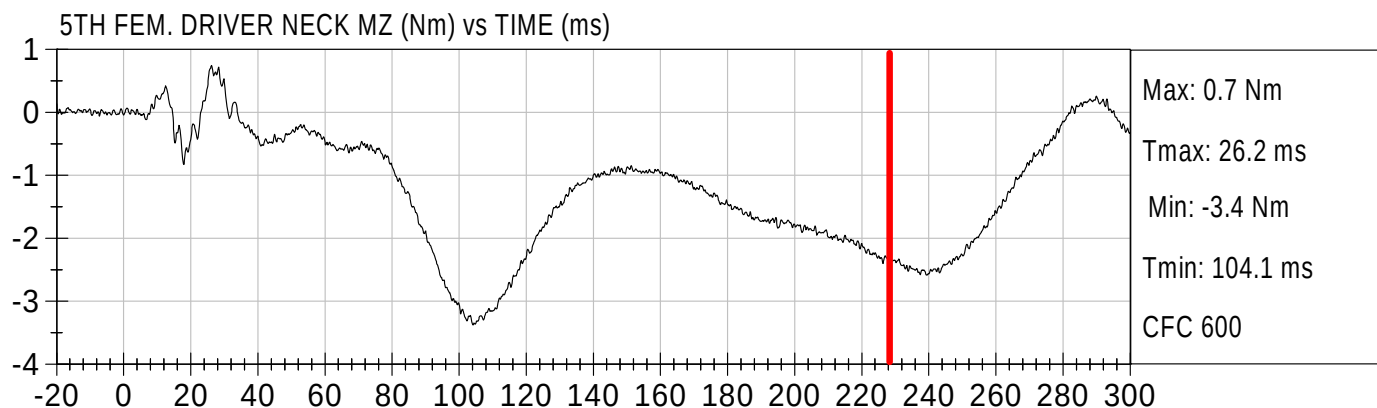
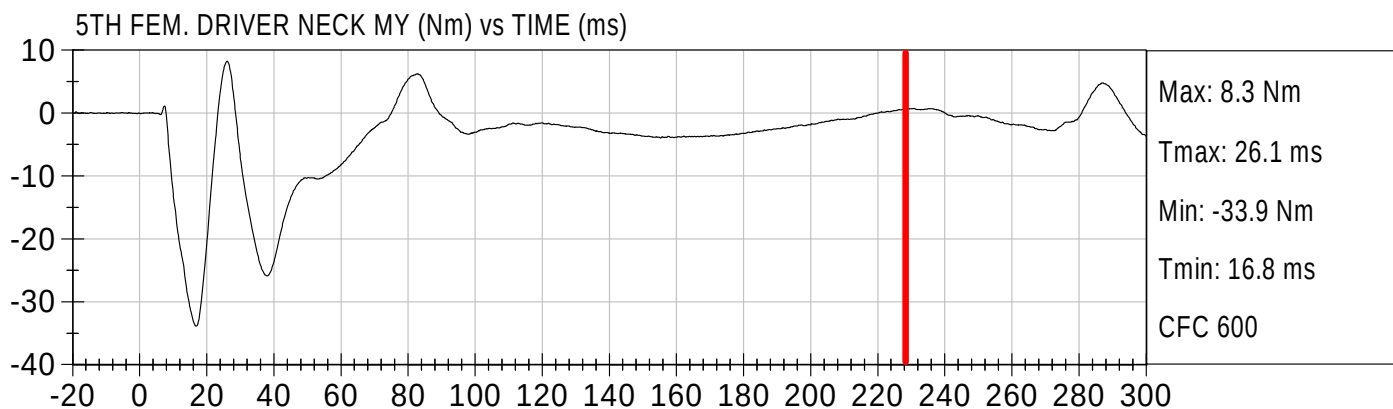
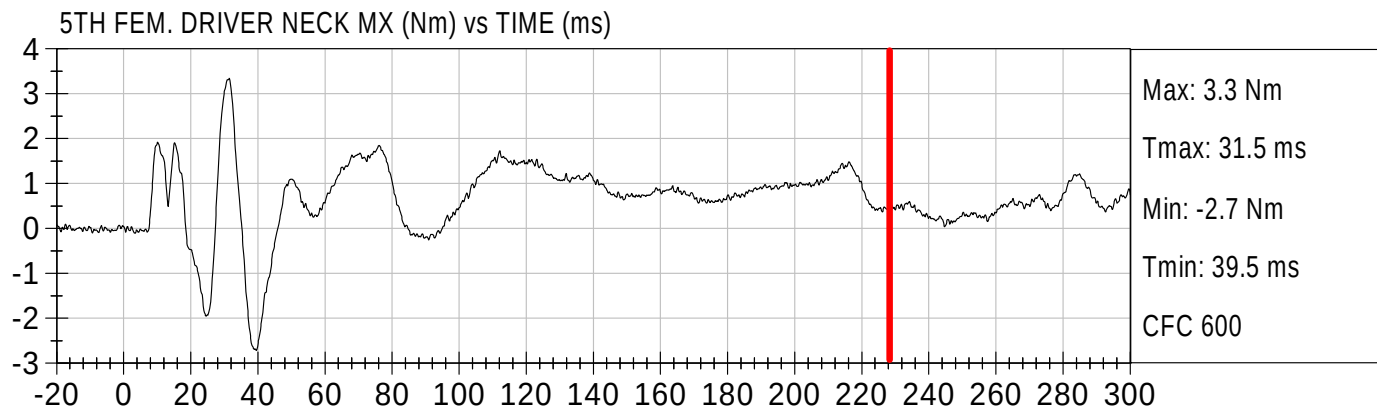


Injury Values Calculated between 0ms and 225ms



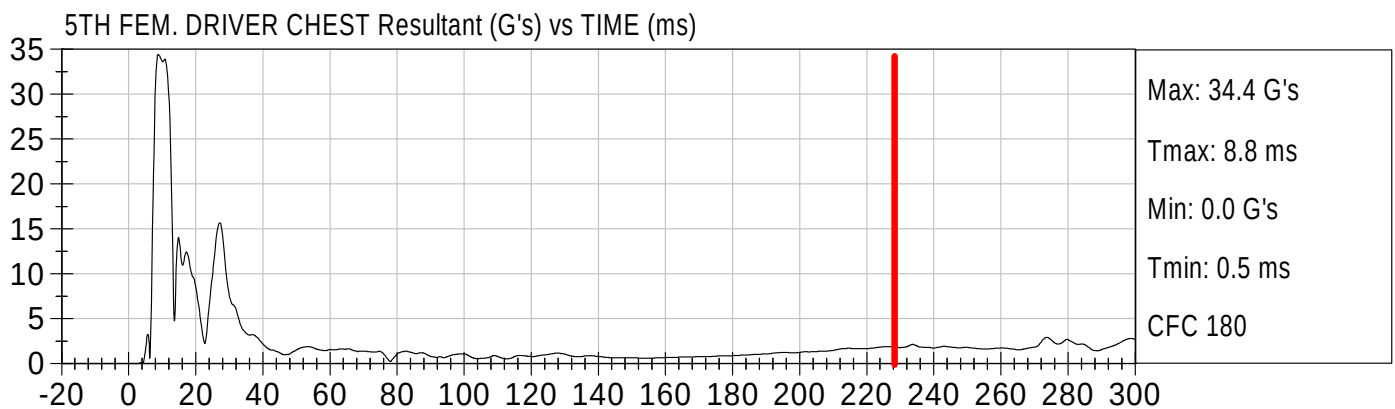
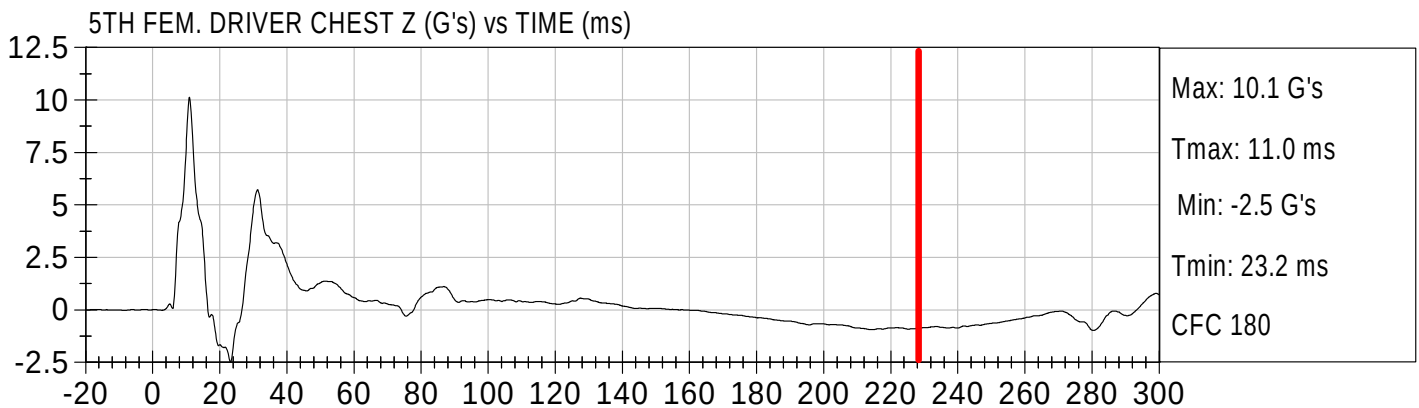
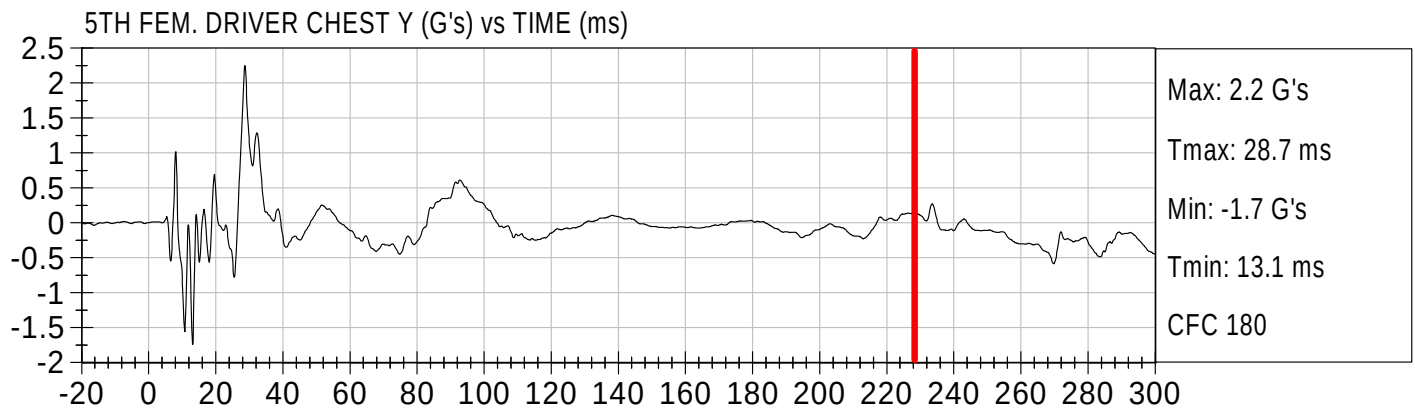
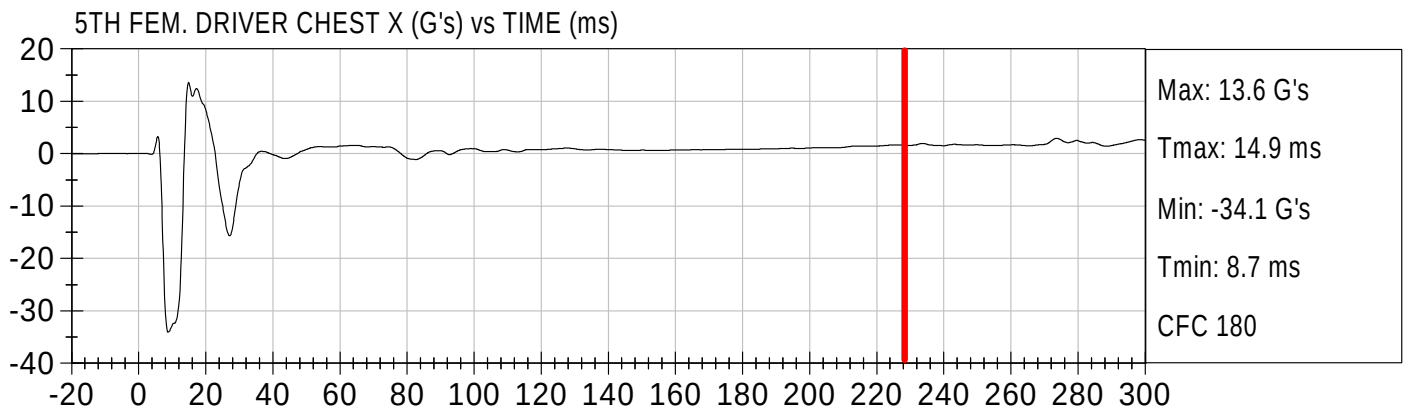


Injury Values Calculated between 0ms and 225ms



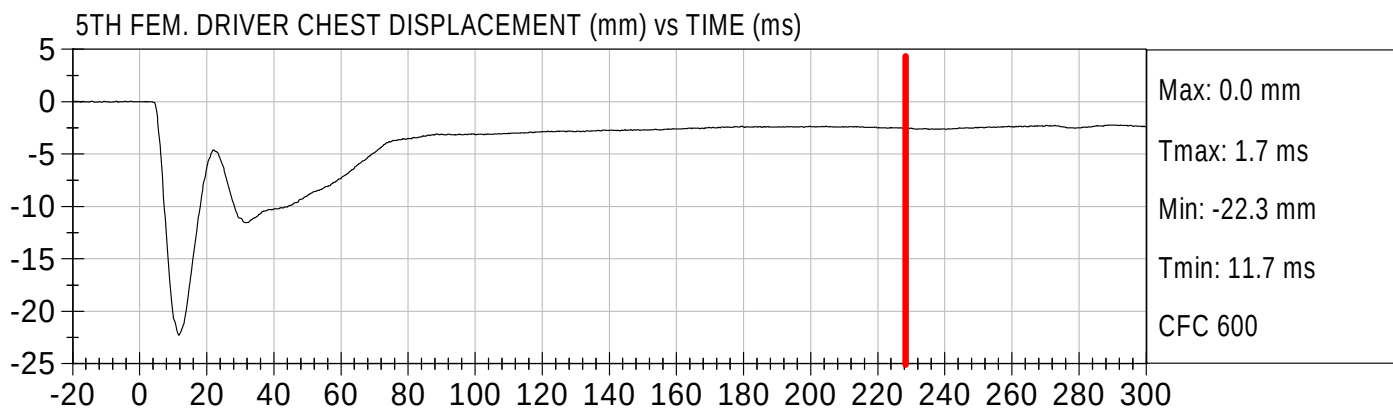
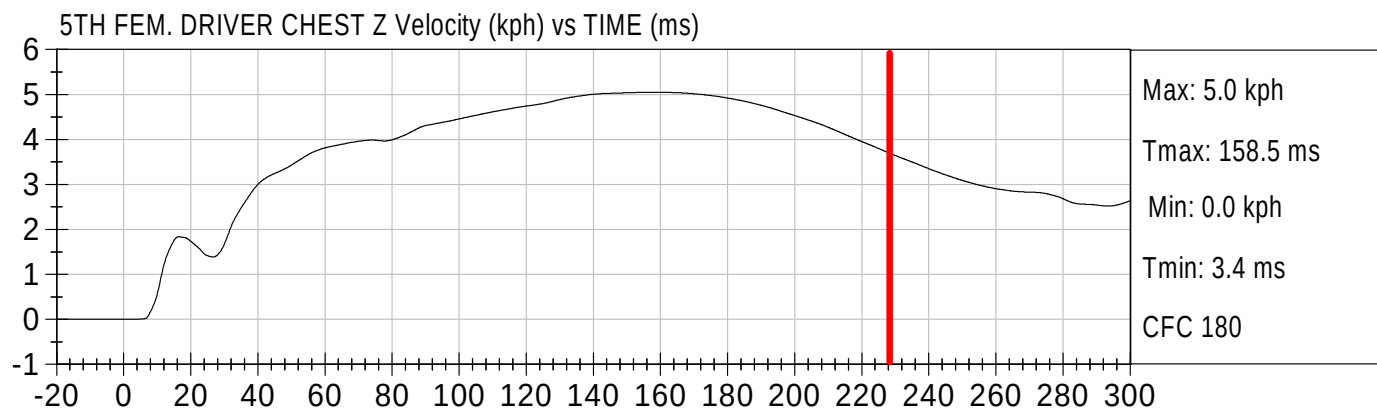
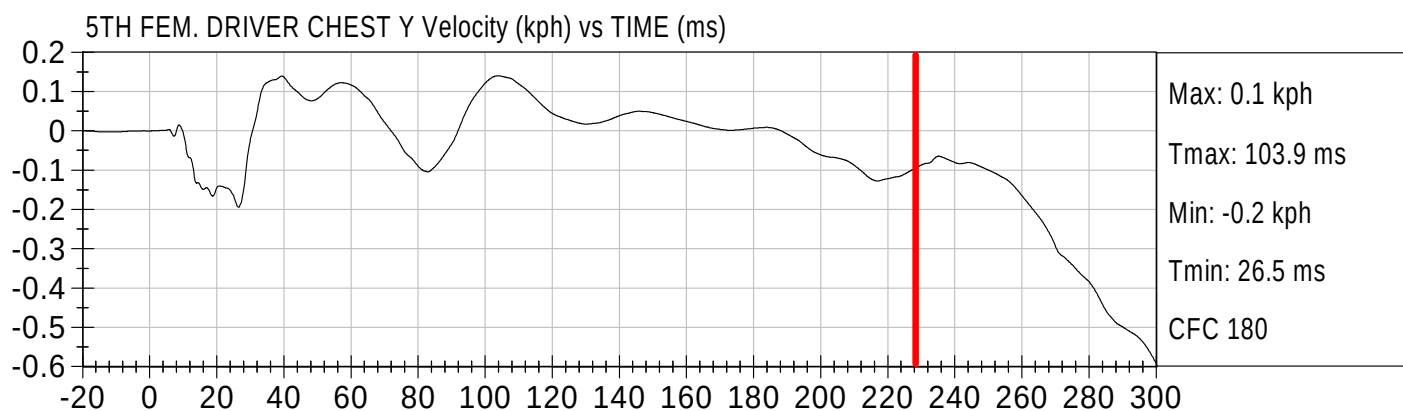
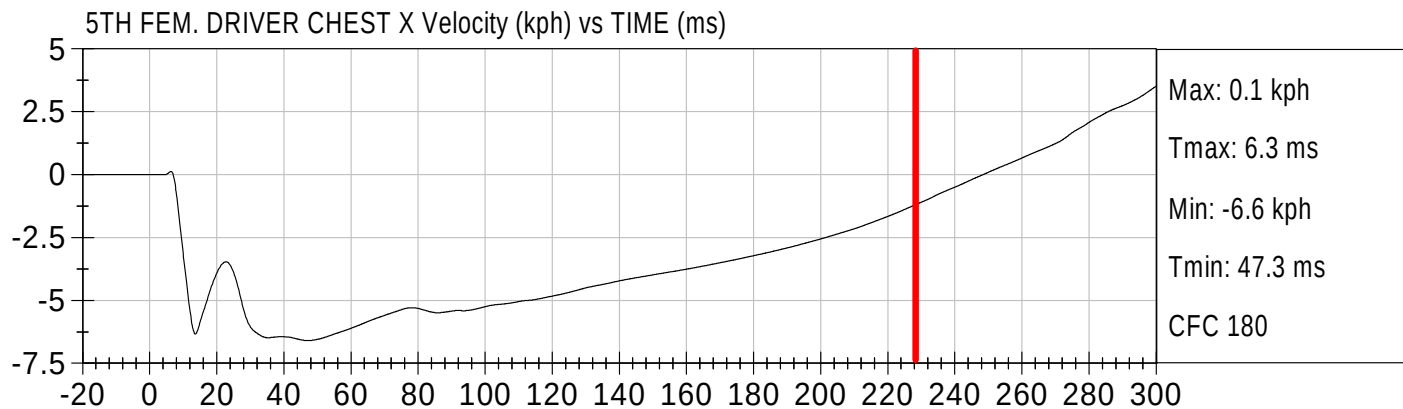


Injury Values Calculated between 0ms and 225ms



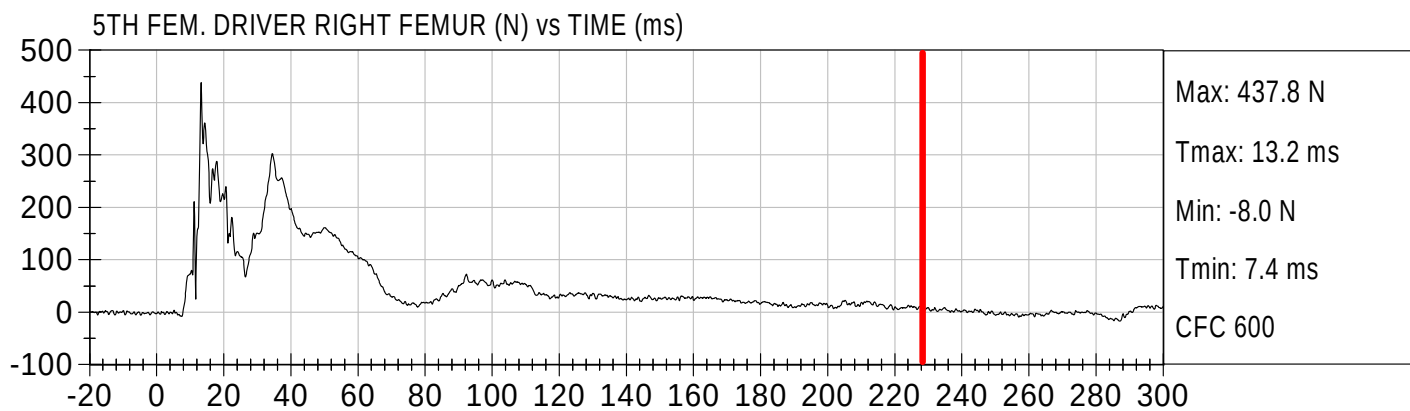
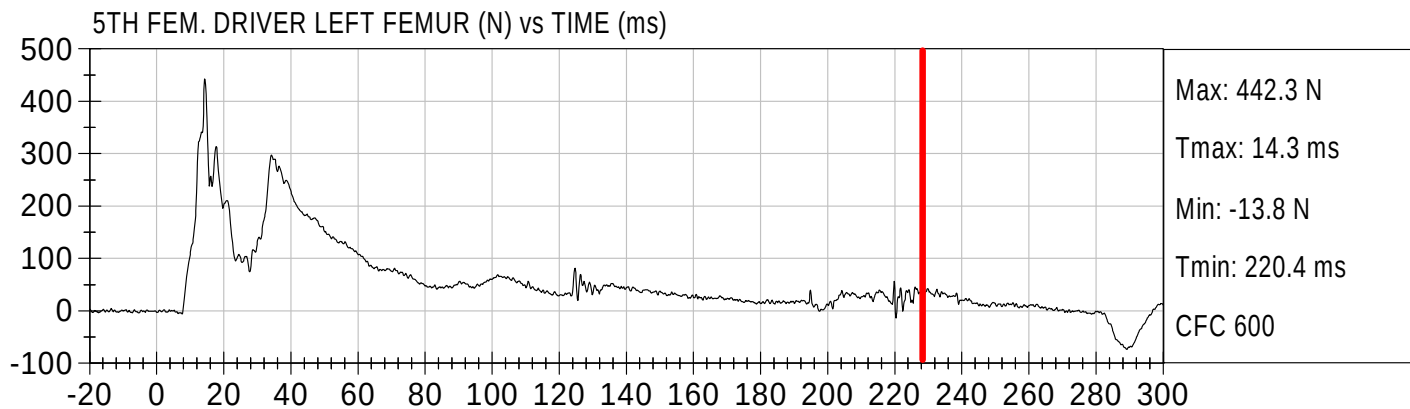


Injury Values Calculated between 0ms and 225ms





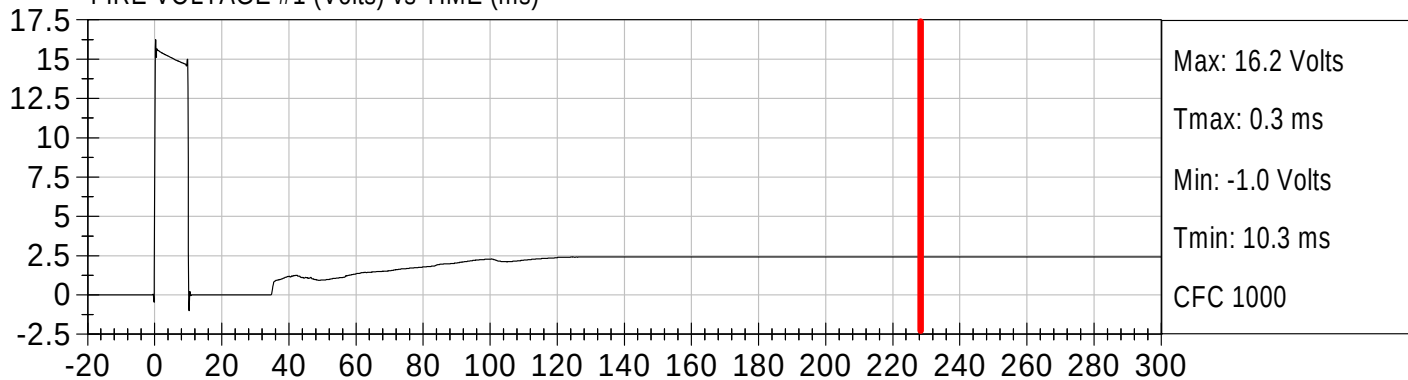
Injury Values Calculated between 0ms and 225ms



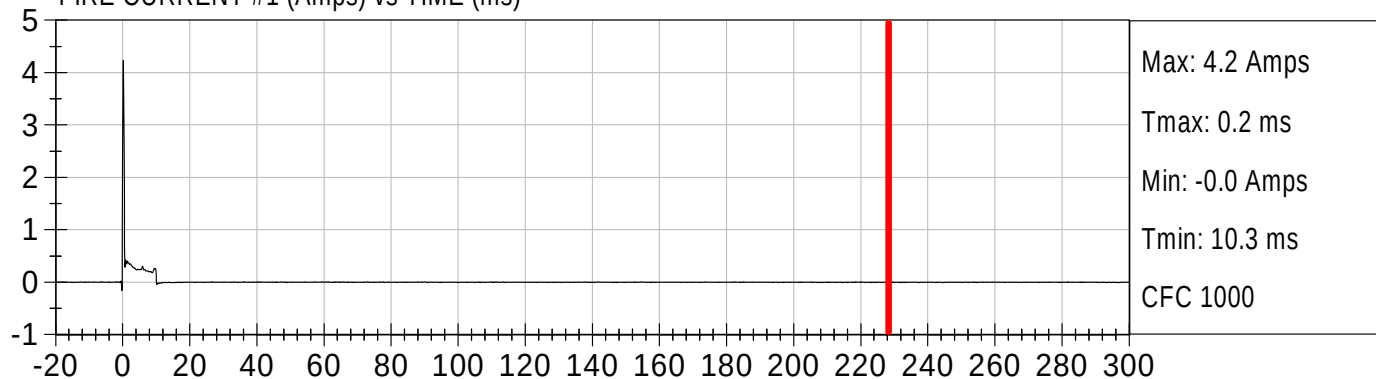


Injury Values Calculated between 0ms and 225ms

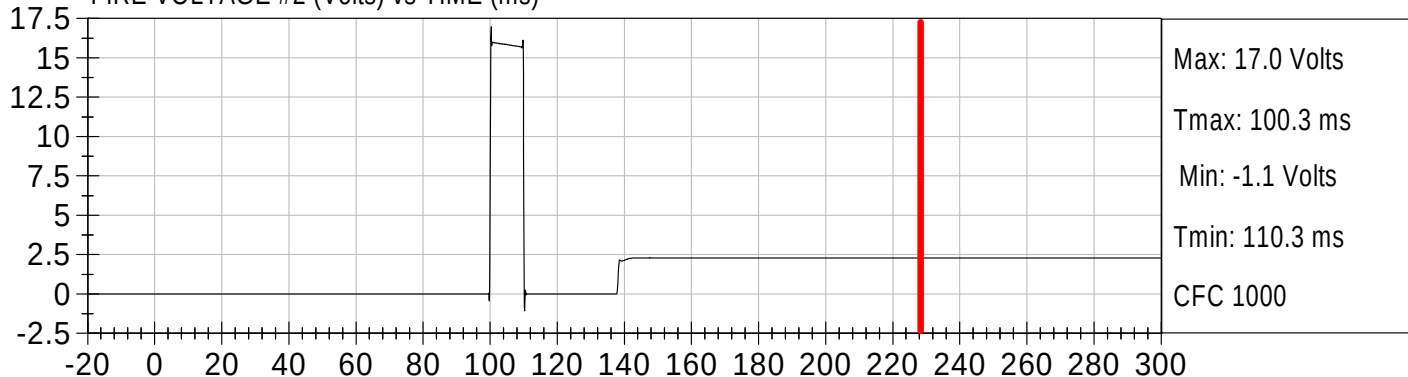
FIRE VOLTAGE #1 (Volts) vs TIME (ms)



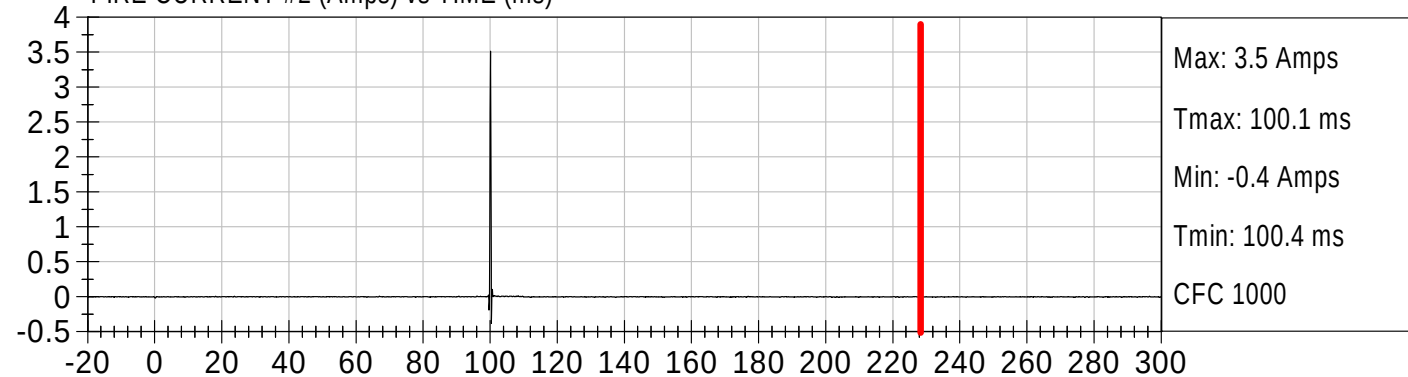
FIRE CURRENT #1 (Amps) vs TIME (ms)

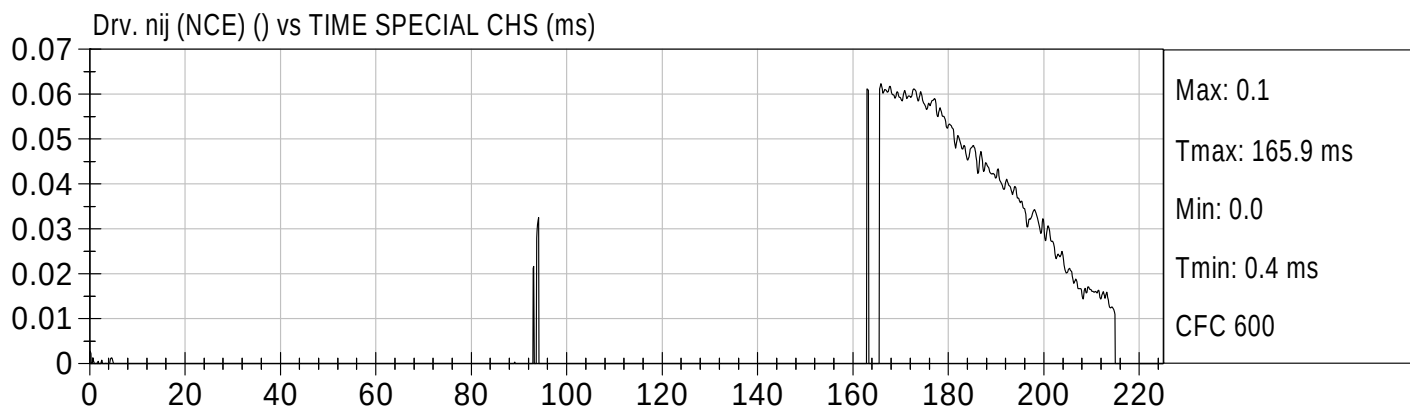
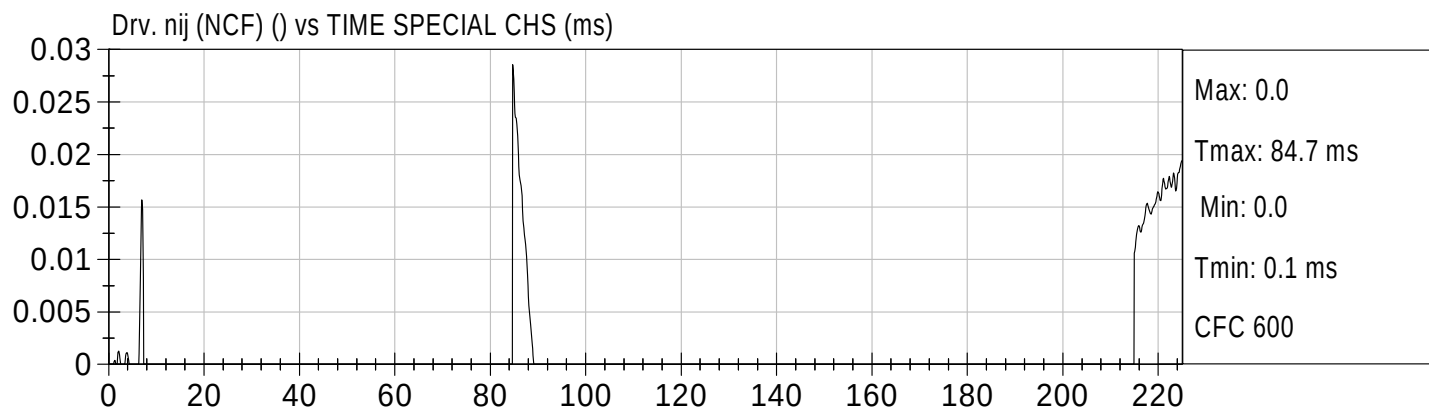
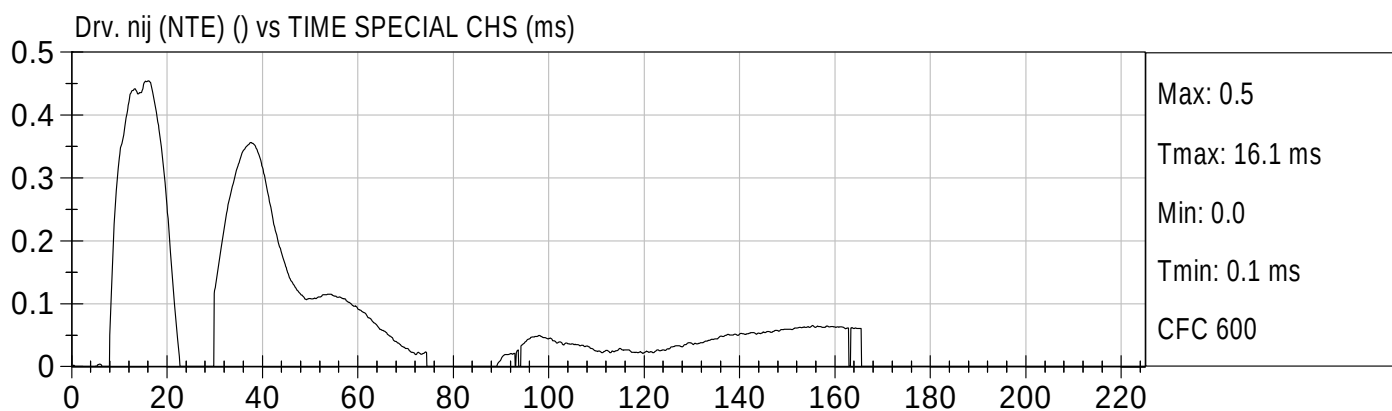
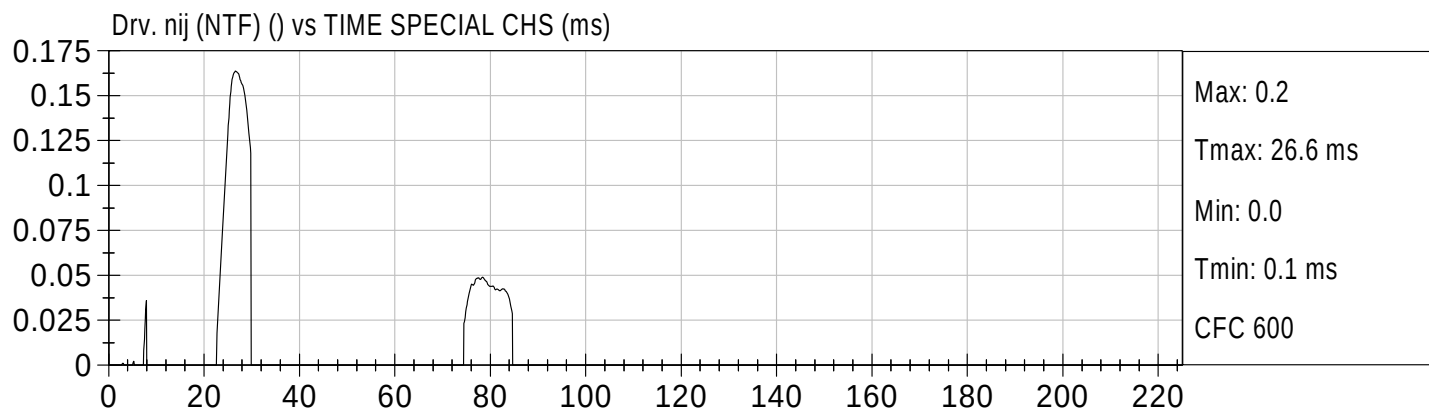


FIRE VOLTAGE #2 (Volts) vs TIME (ms)



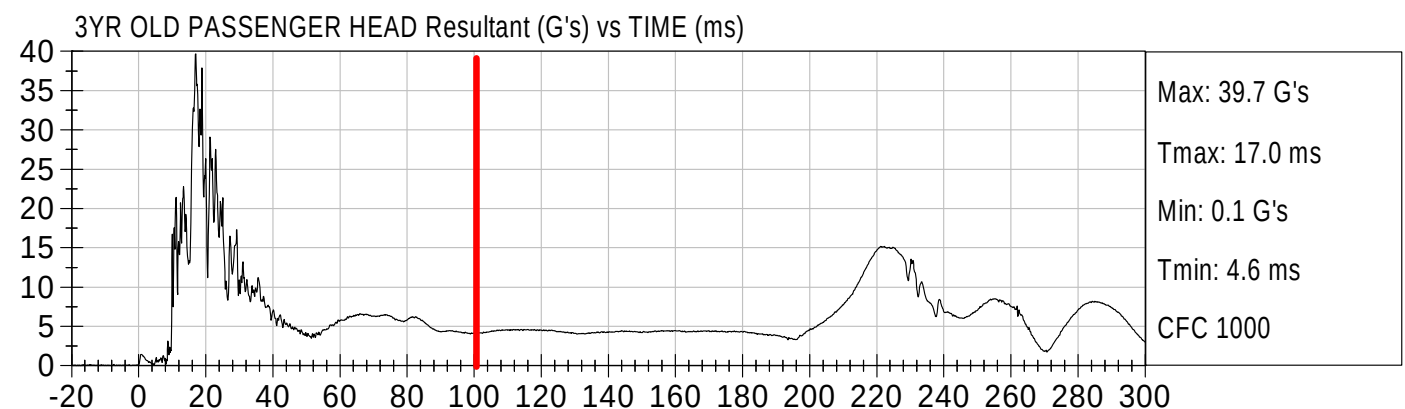
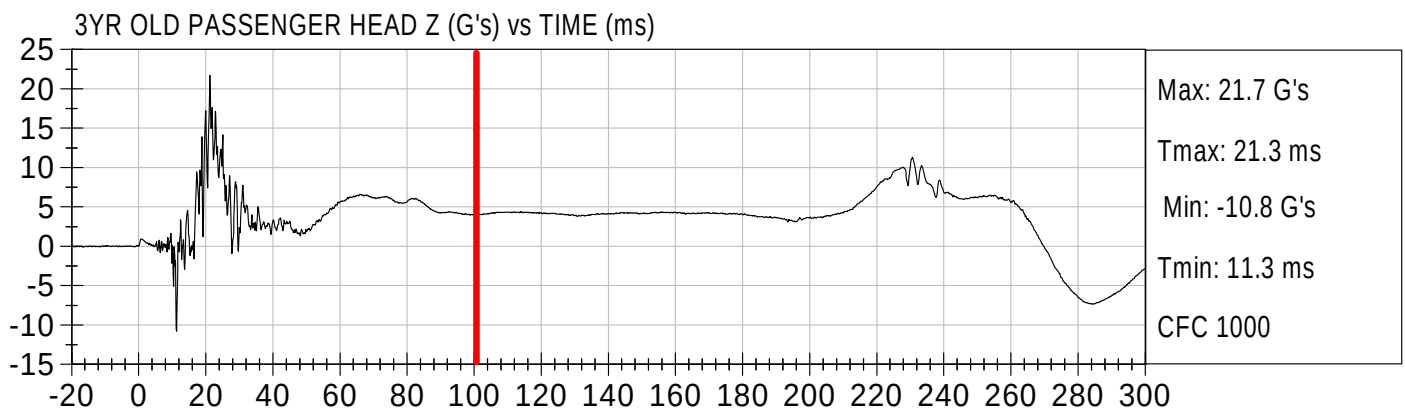
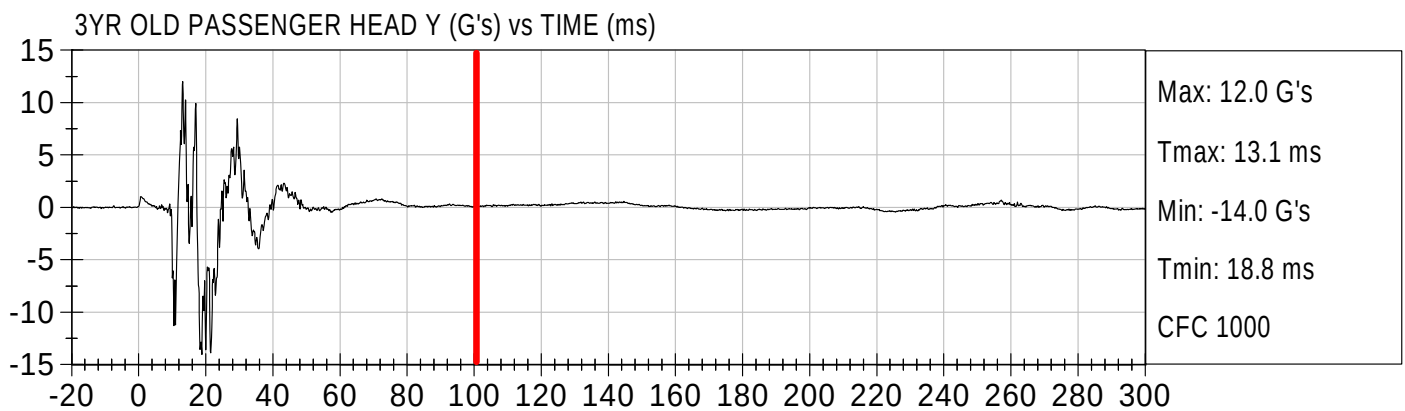
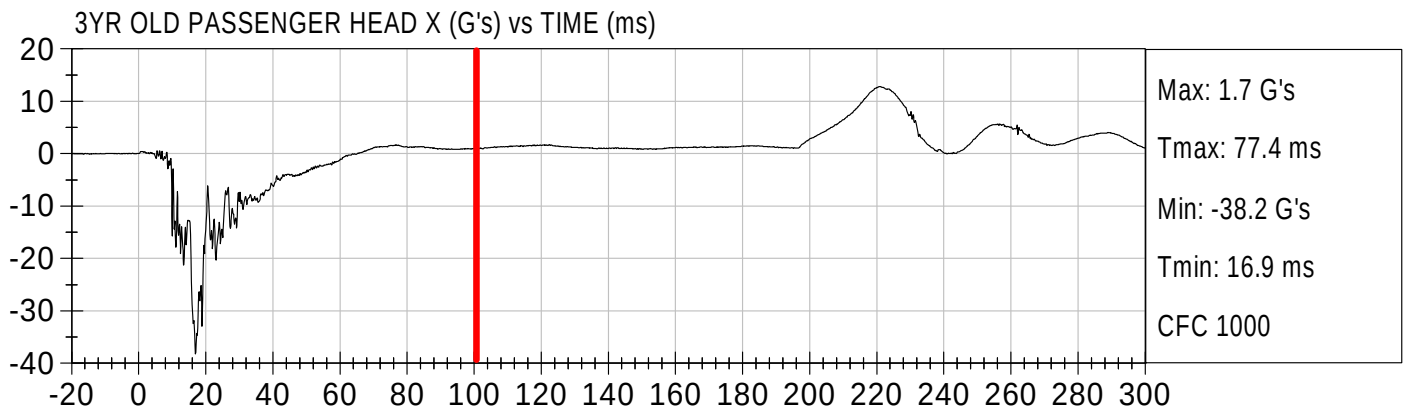
FIRE CURRENT #2 (Amps) vs TIME (ms)







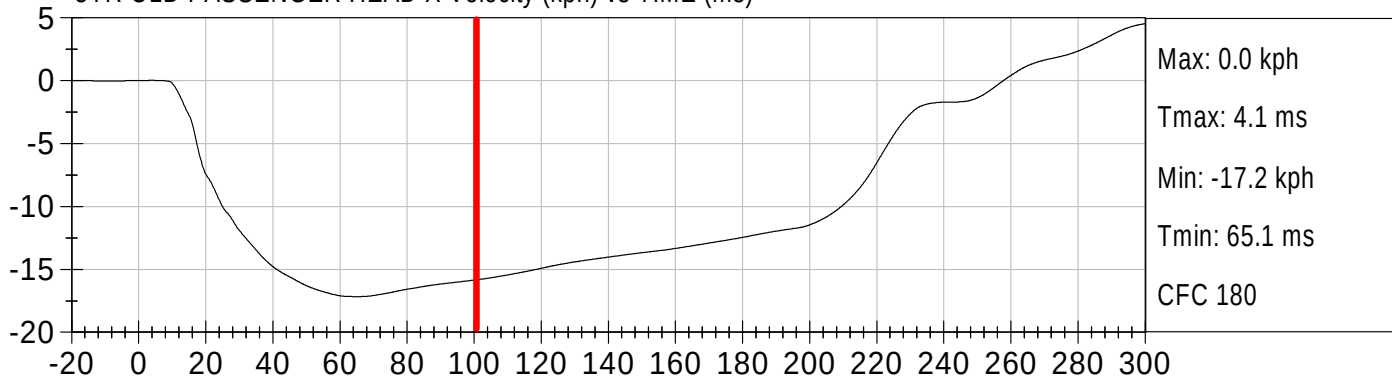
Injury Values Calculated between 0ms and 100ms



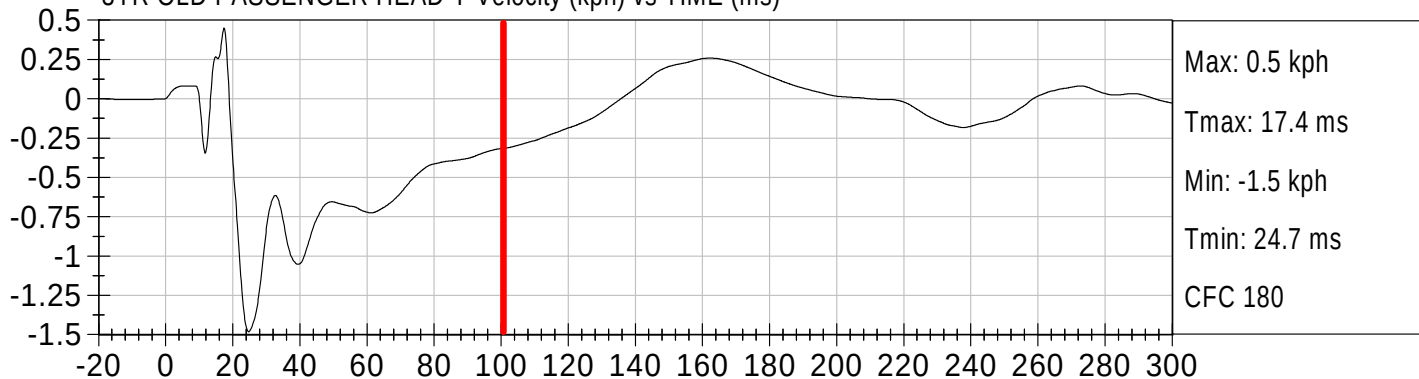


Injury Values Calculated between 0ms and 100ms

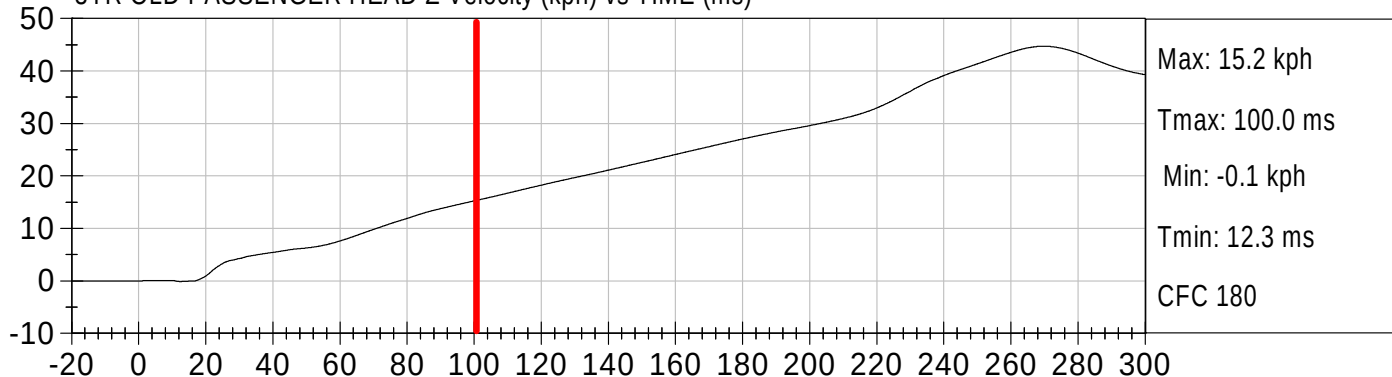
3YR OLD PASSENGER HEAD X Velocity (kph) vs TIME (ms)



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



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

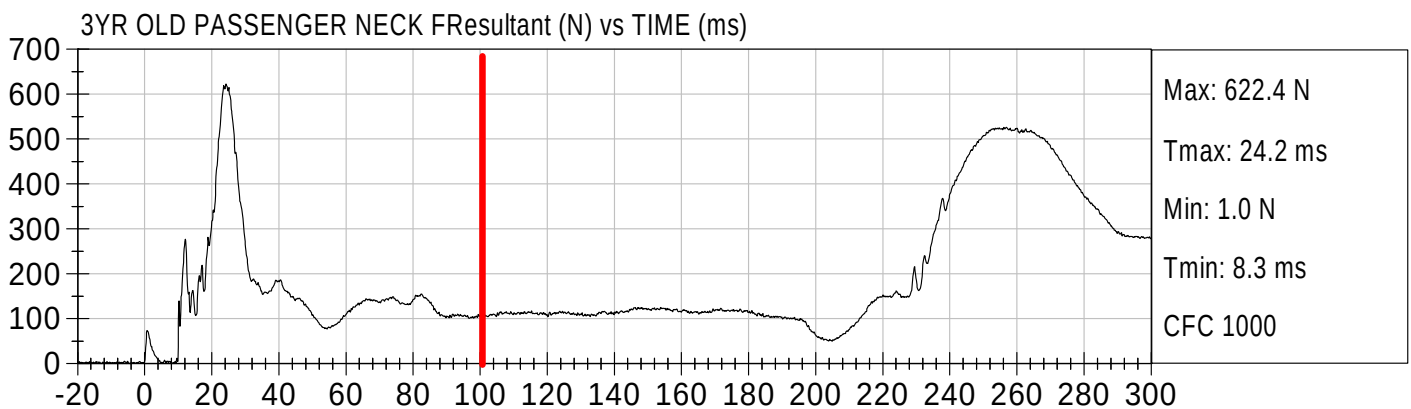
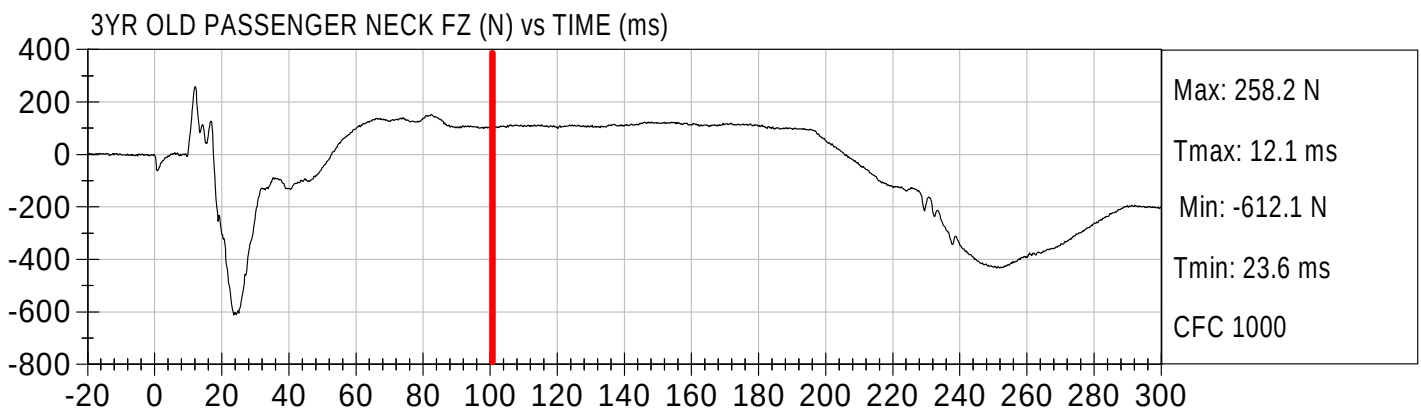
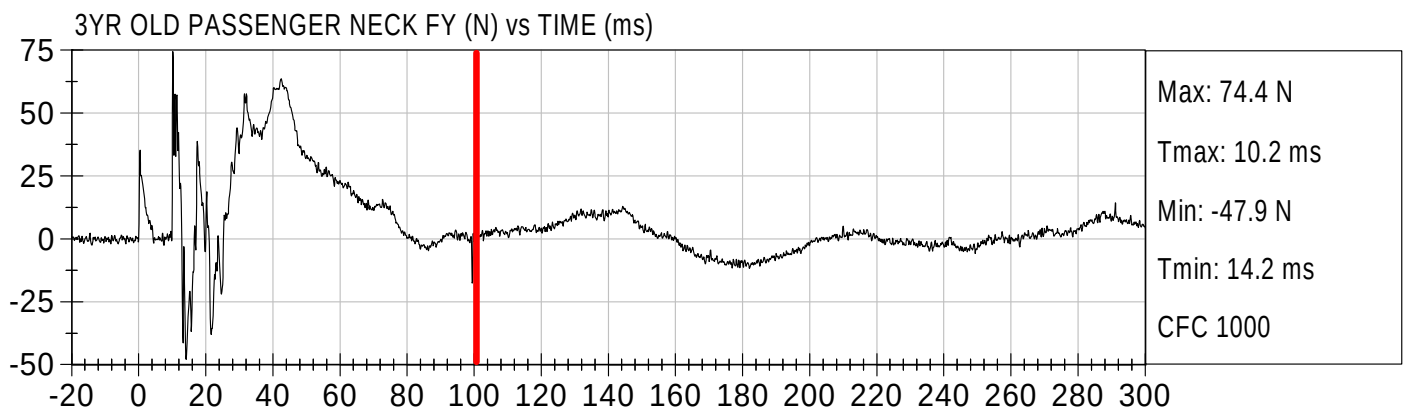
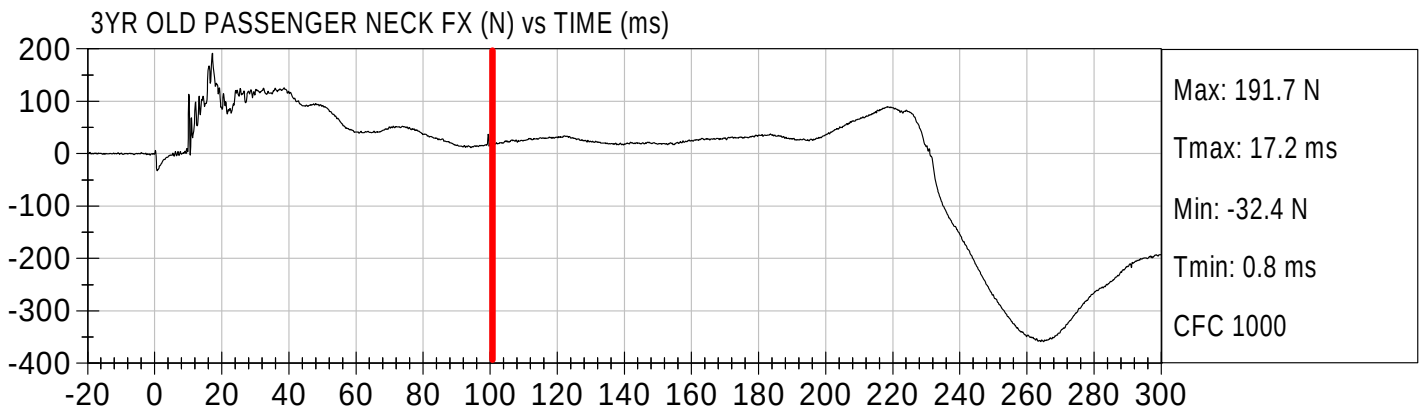




LOW RISK DEPLOYMENT
2009 Kia Optima (C90508) (3YO P1)

Test Date: 3/31/09
Speed: 0.0 mph (0.0 km/h)

Injury Values Calculated between 0ms and 100ms

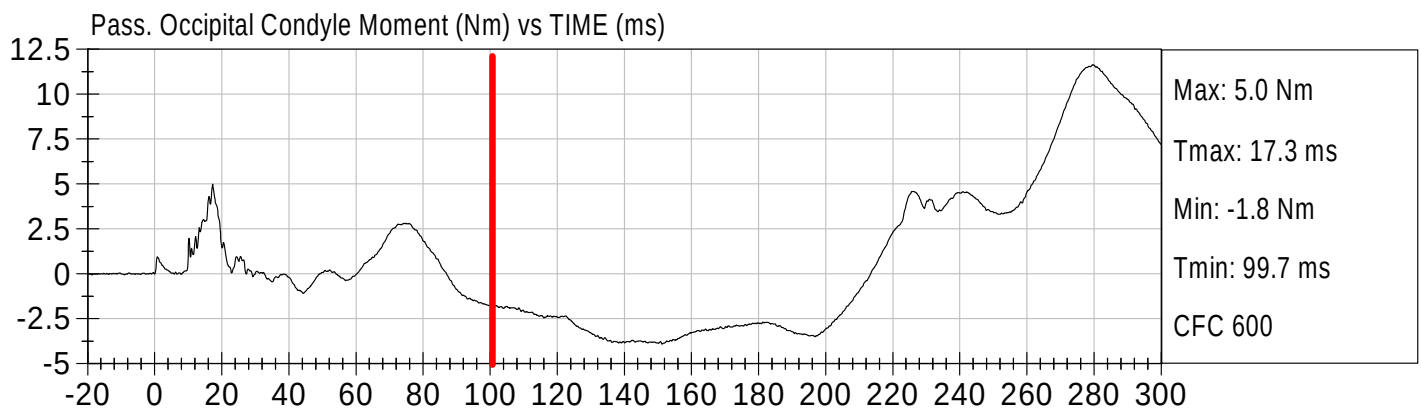
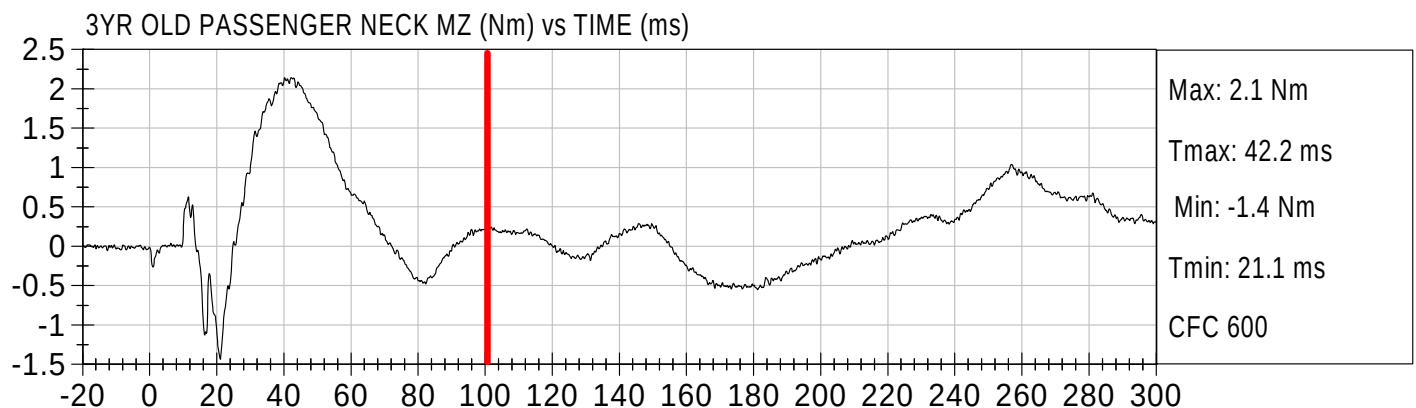
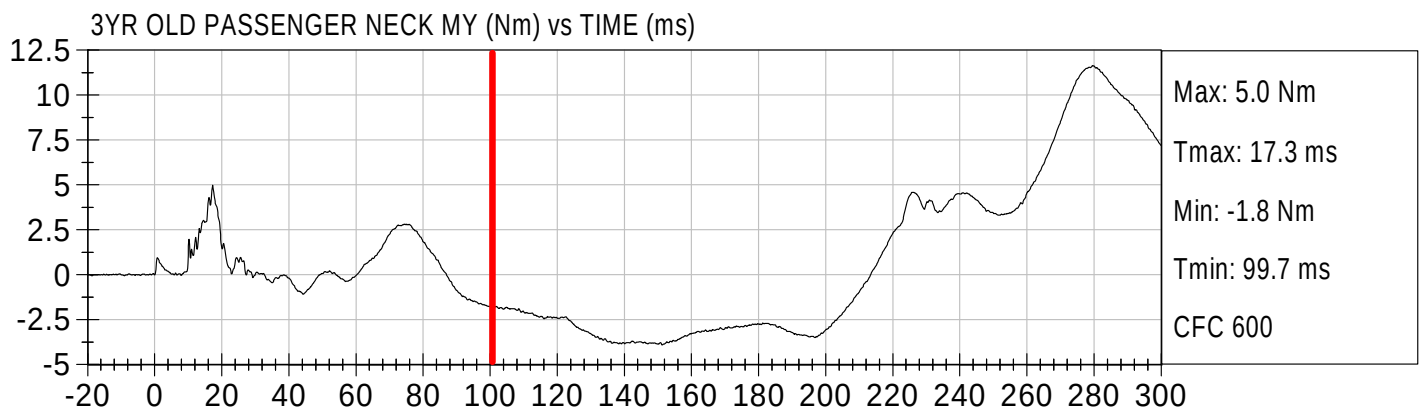
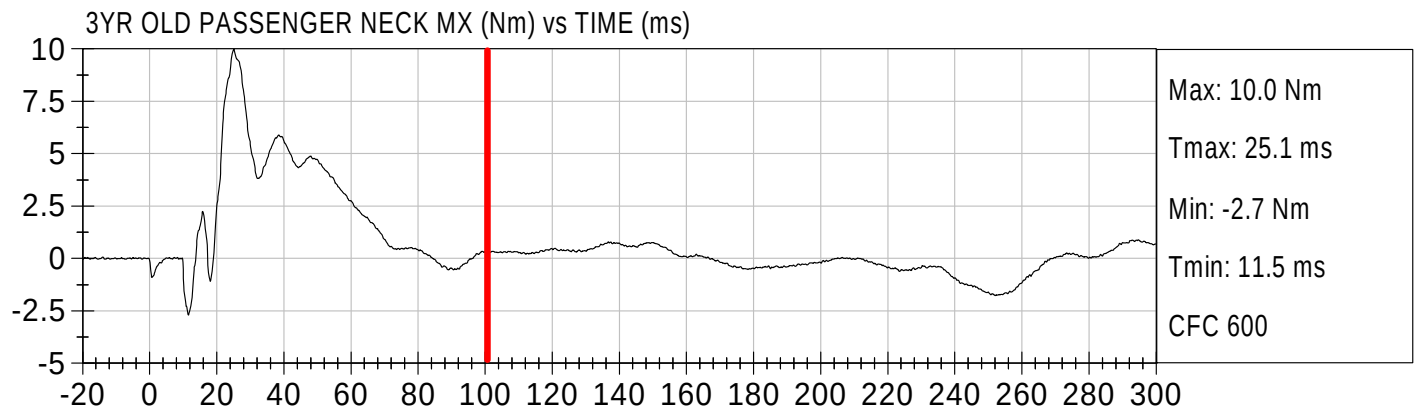




LOW RISK DEPLOYMENT
2009 Kia Optima (C90508) (3YO P1)

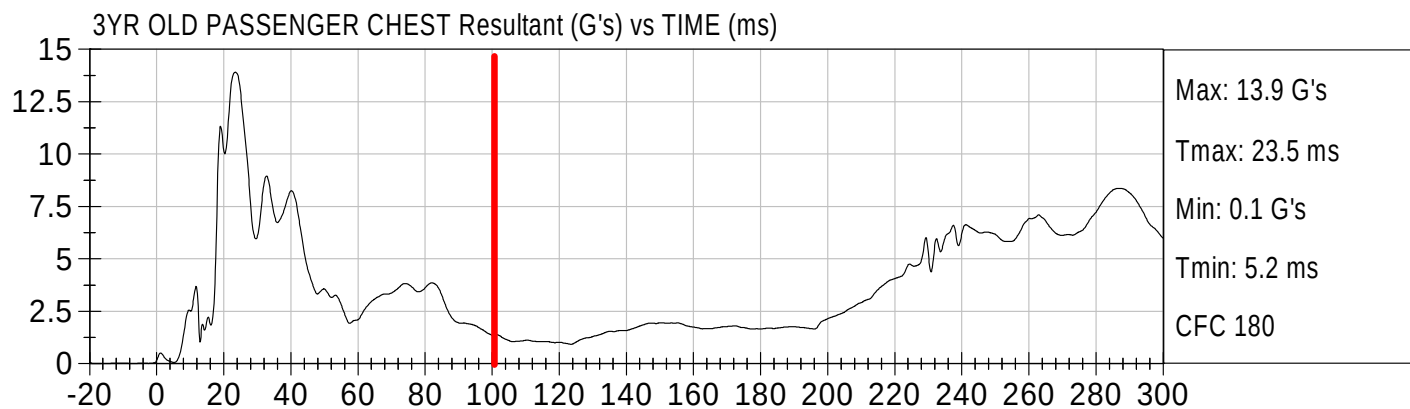
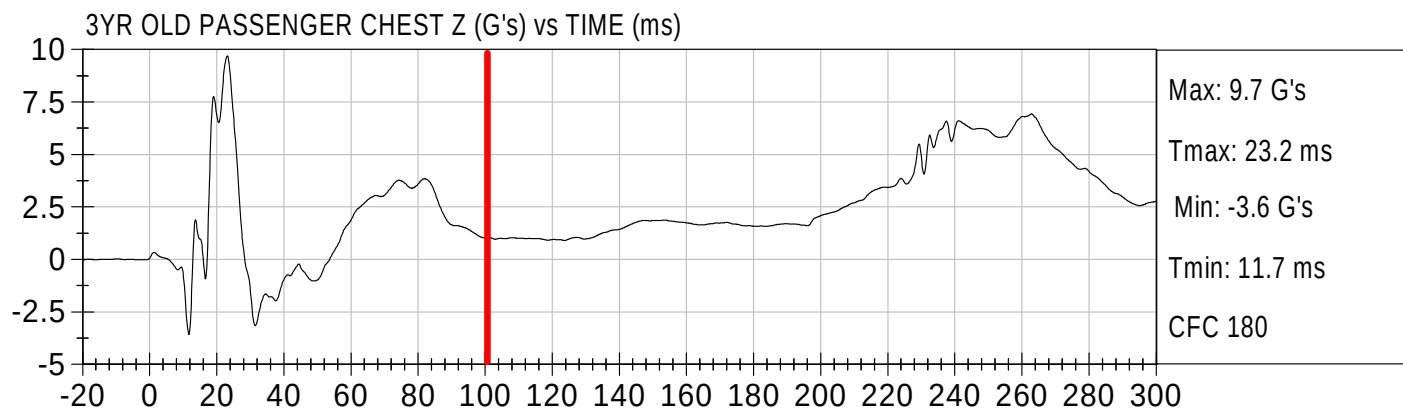
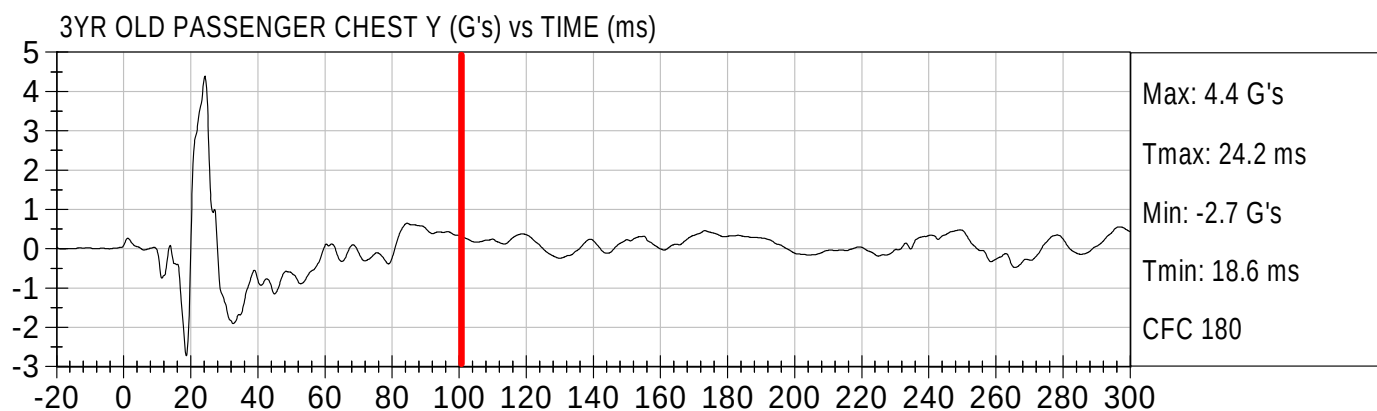
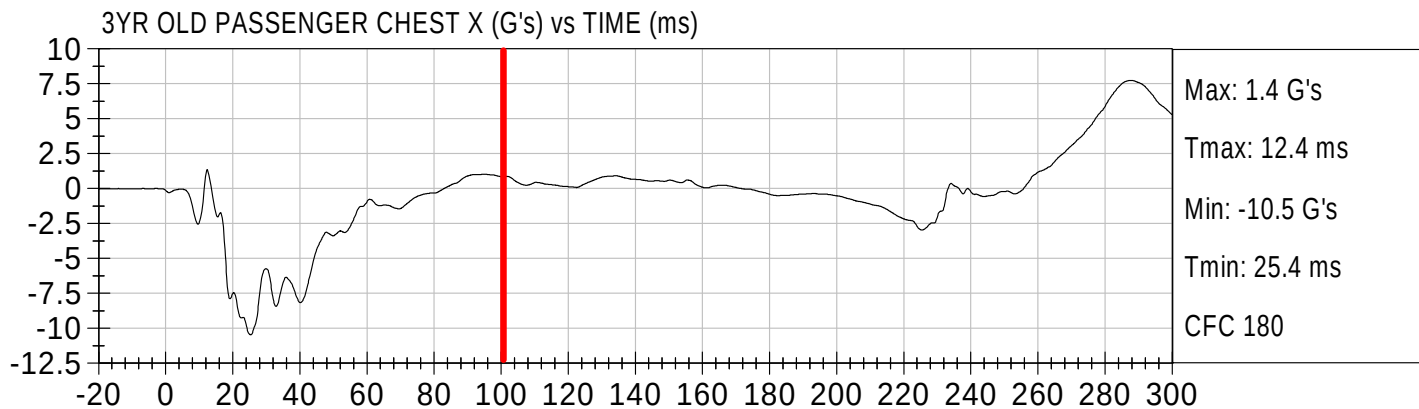
Test Date: 3/31/09
Speed: 0.0 mph (0.0 km/h)

Injury Values Calculated between 0ms and 100ms



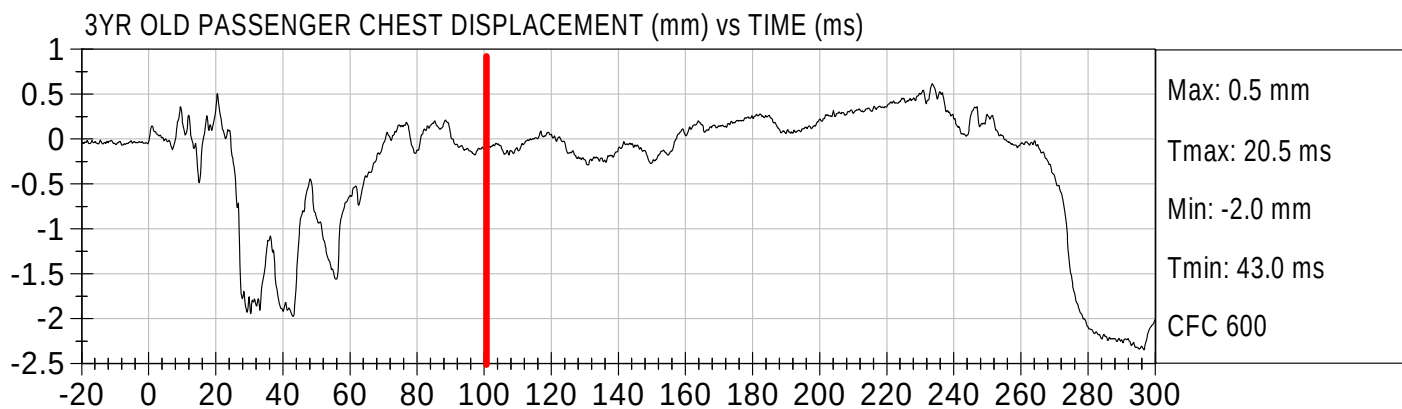
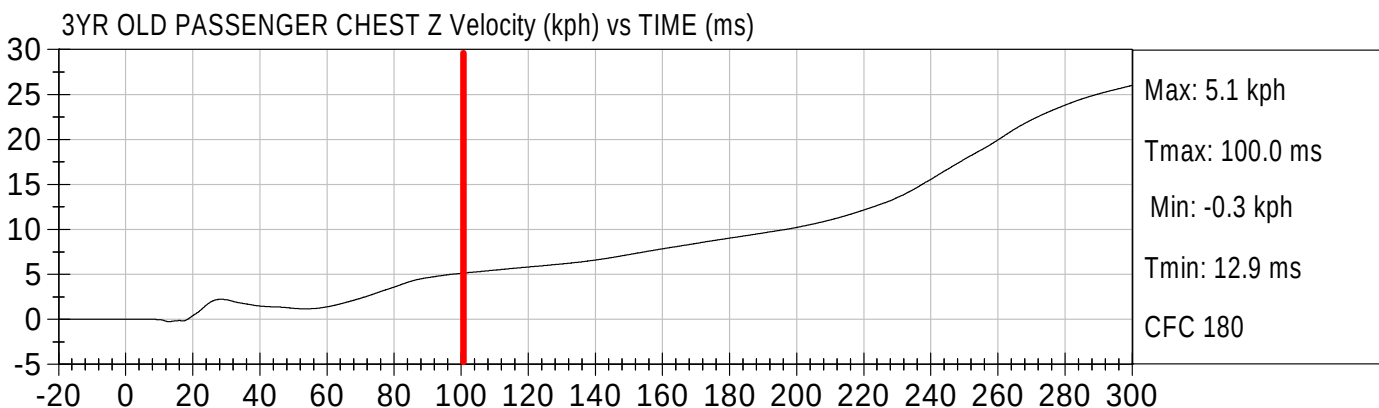
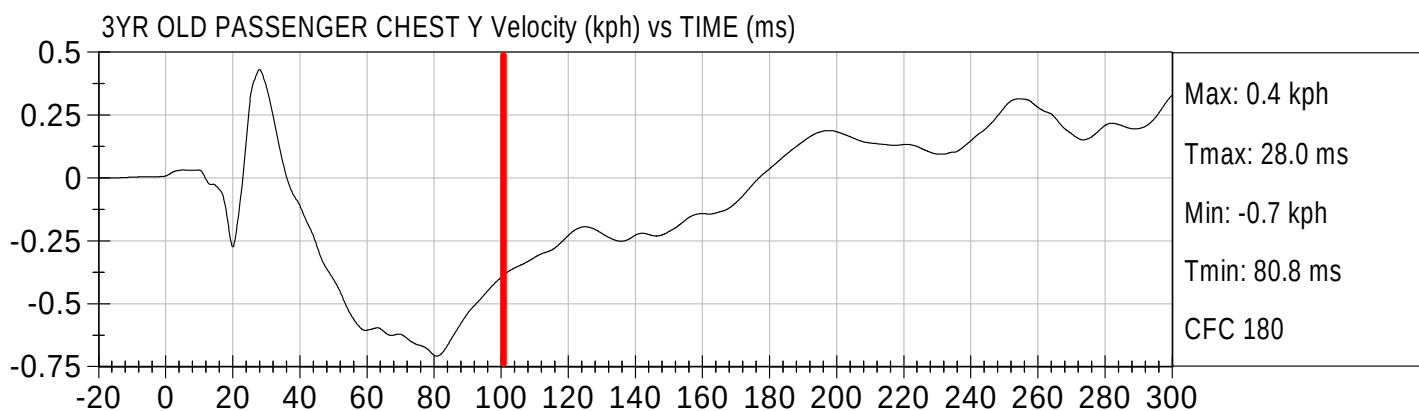
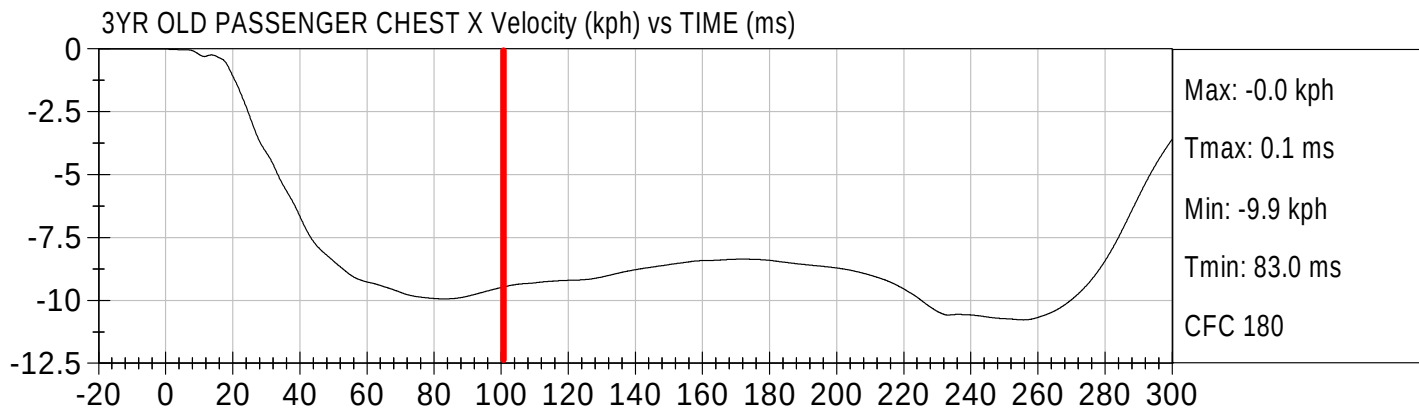


Injury Values Calculated between 0ms and 100ms





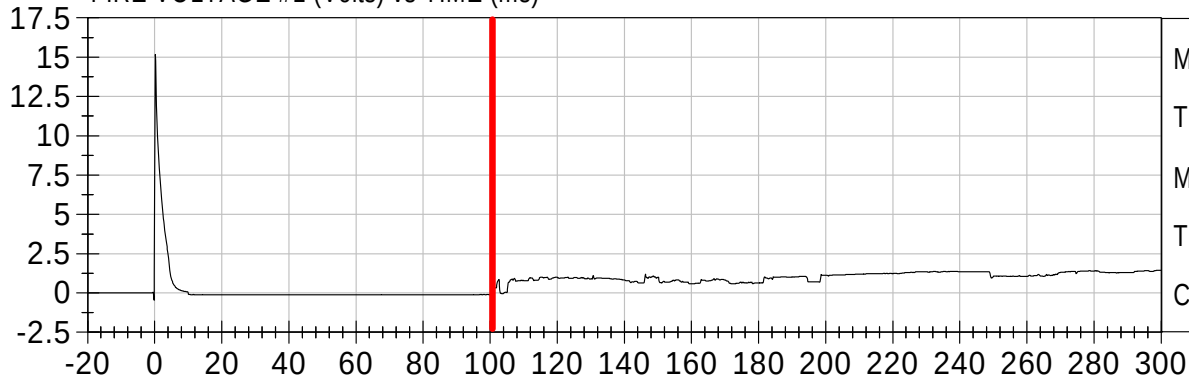
Injury Values Calculated between 0ms and 100ms





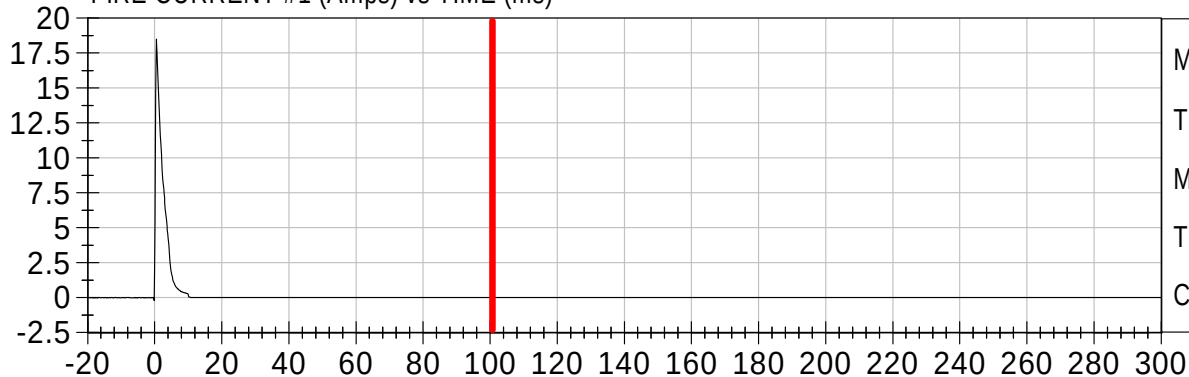
Injury Values Calculated between 0ms and 100ms

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



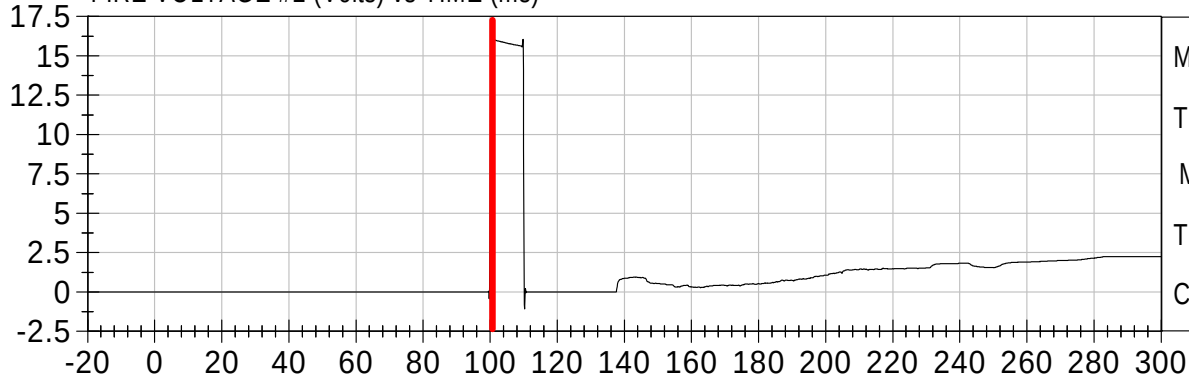
Max: 15.2 Volts
Tmax: 0.2 ms
Min: -0.1 Volts
Tmin: 73.7 ms
CFC 1000

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



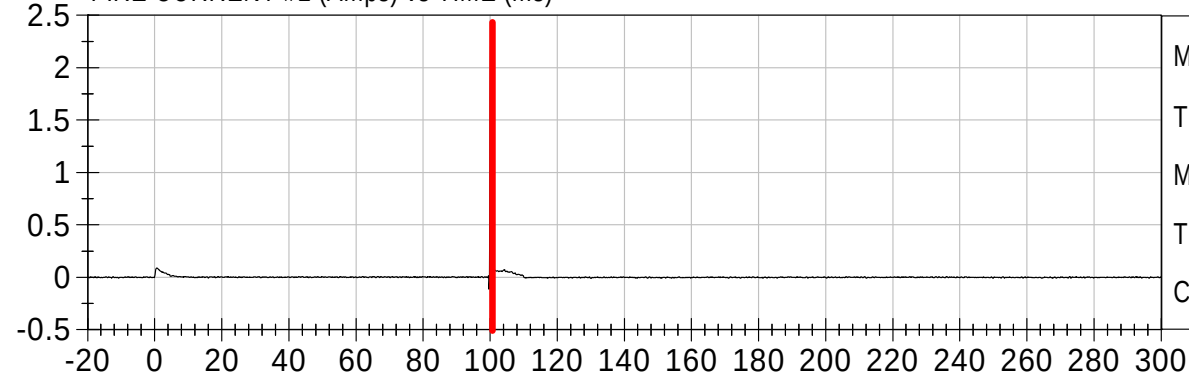
Max: 18.5 Amps
Tmax: 0.5 ms
Min: 0.0 Amps
Tmin: 46.9 ms
CFC 1000

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

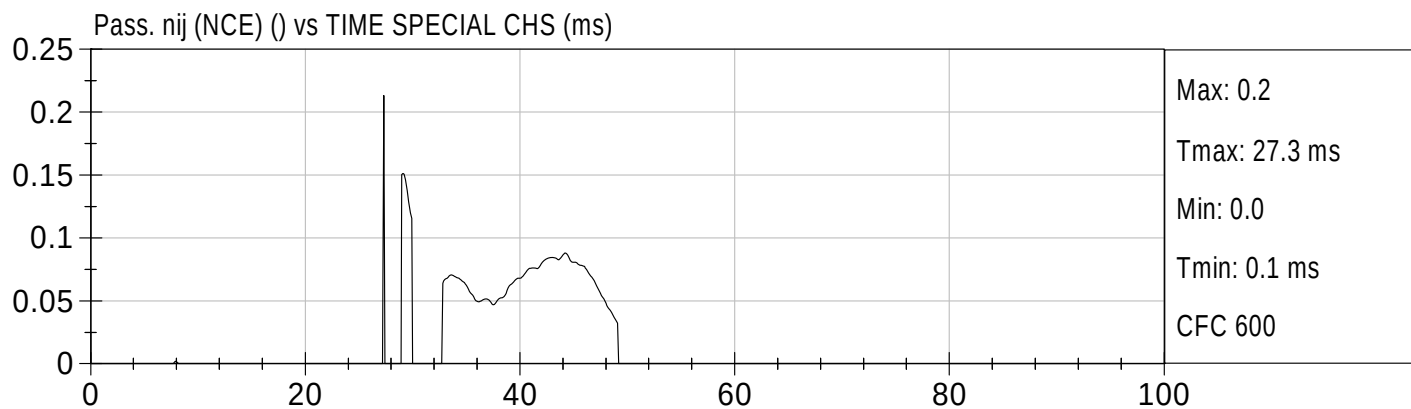
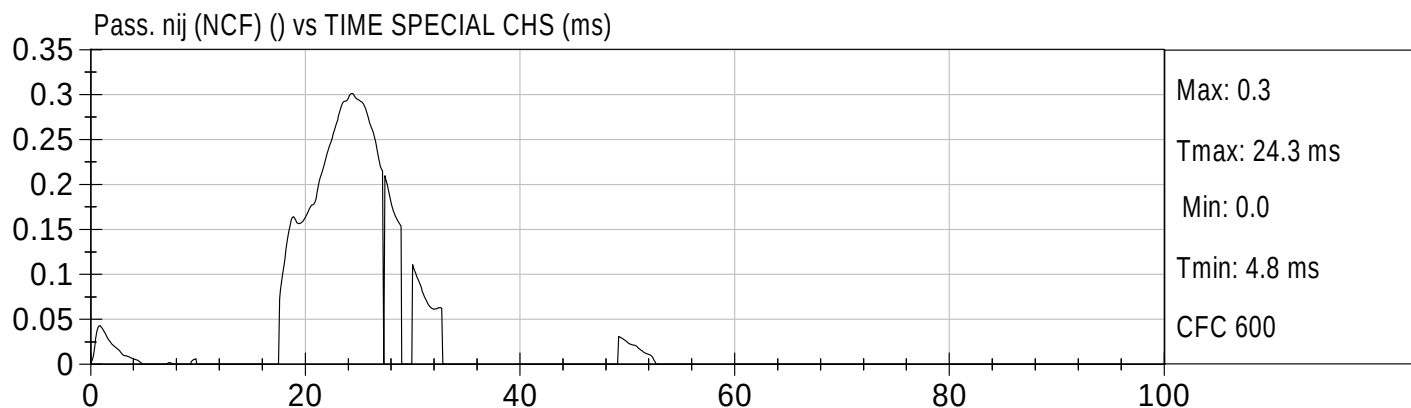
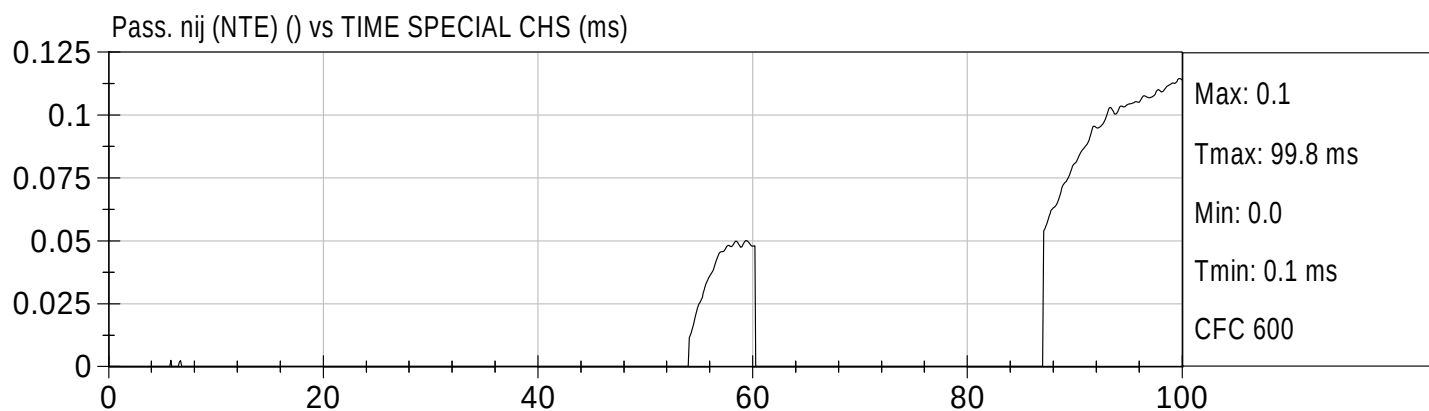
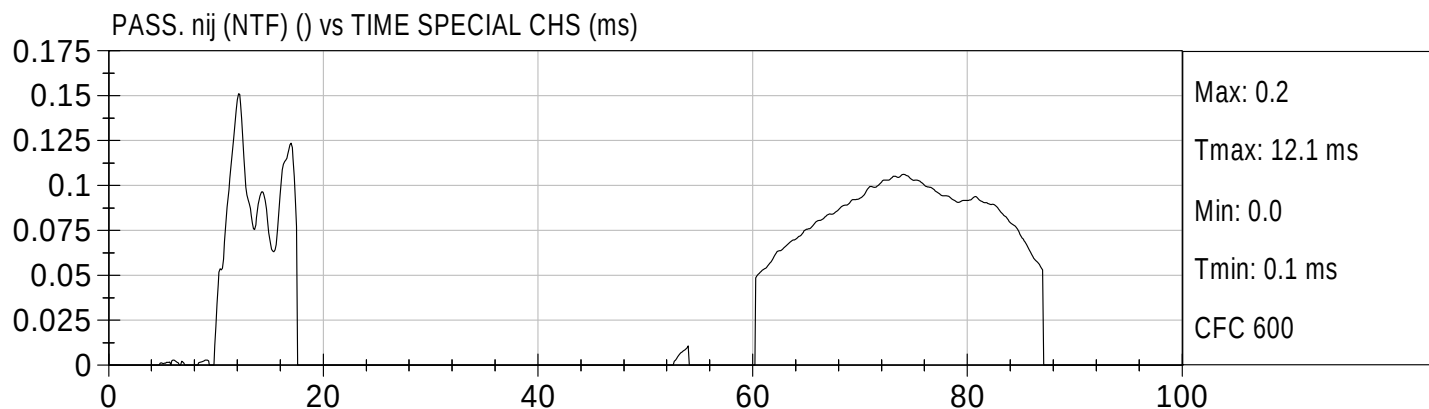


Max: 6.4 Volts
Tmax: 100.0 ms
Min: -0.4 Volts
Tmin: 99.8 ms
CFC 1000

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

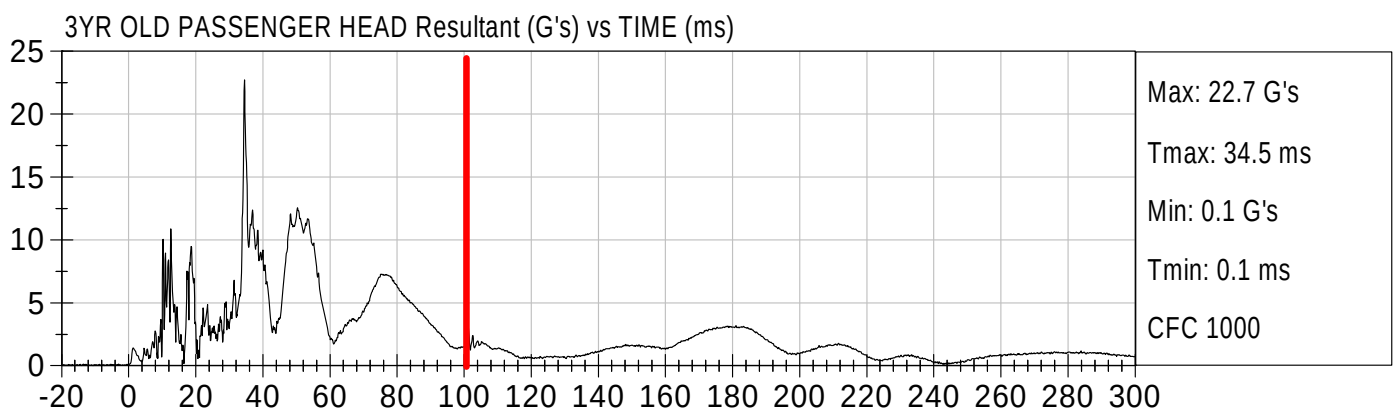
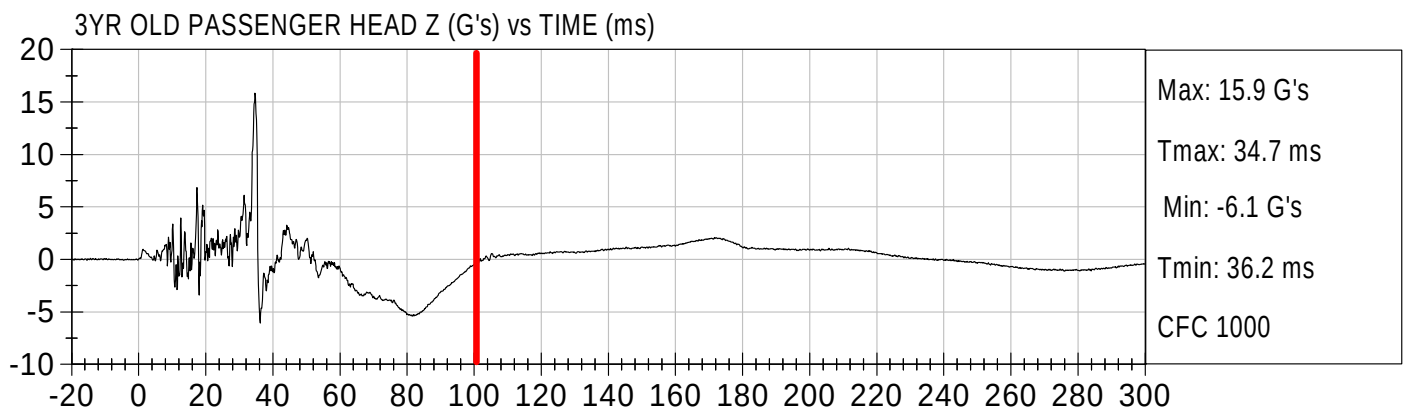
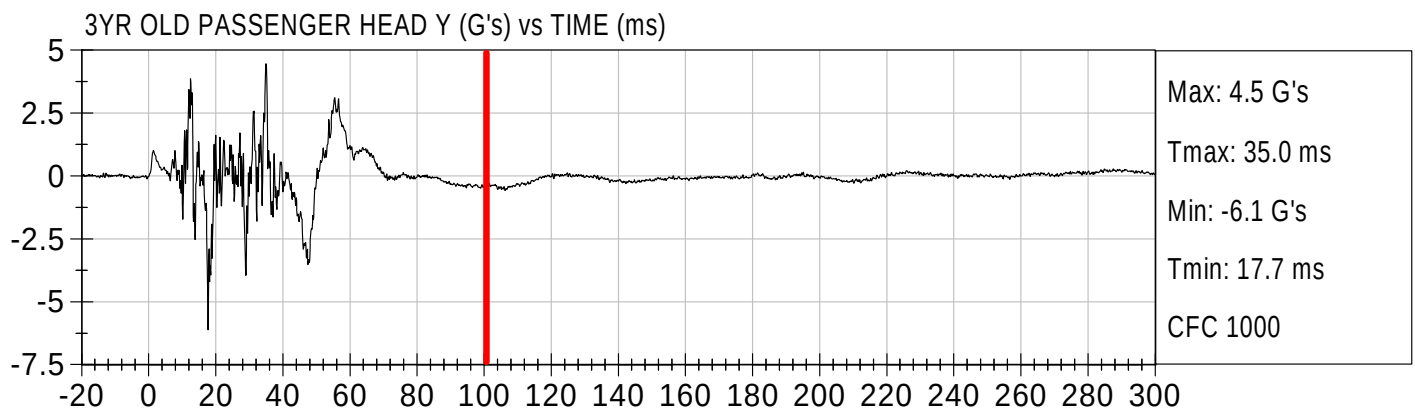
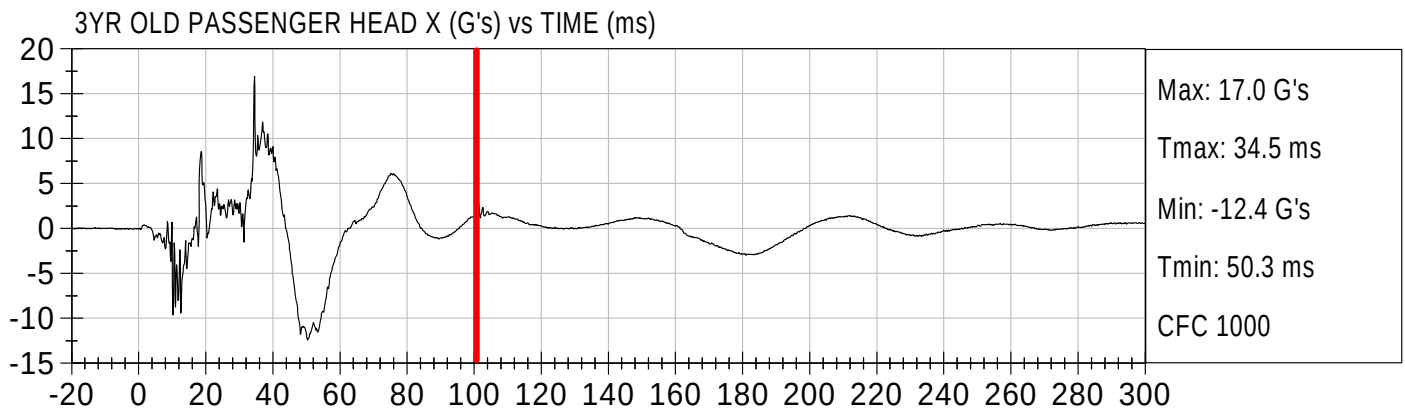


Max: 1.7 Amps
Tmax: 100.0 ms
Min: -0.1 Amps
Tmin: 99.7 ms
CFC 1000





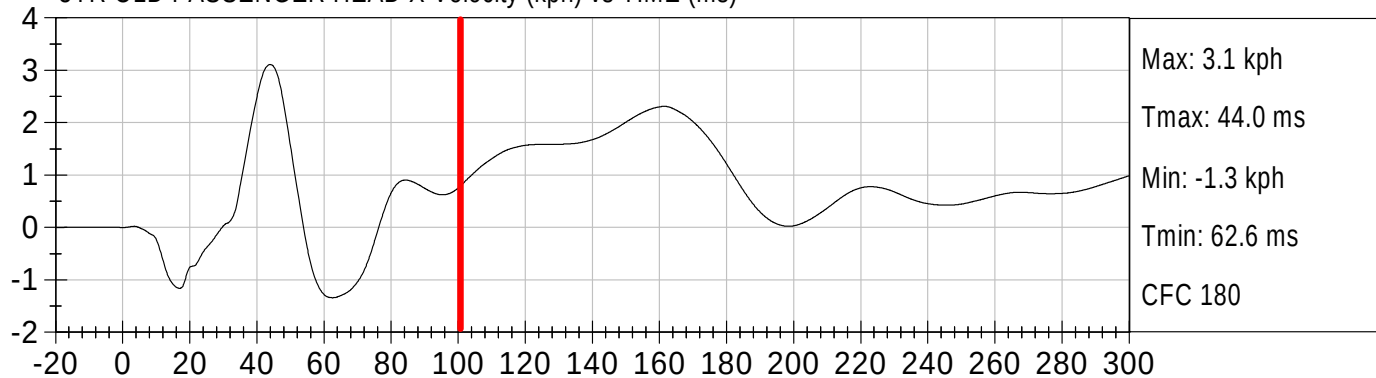
Injury Values Calculated between 0ms and 100ms



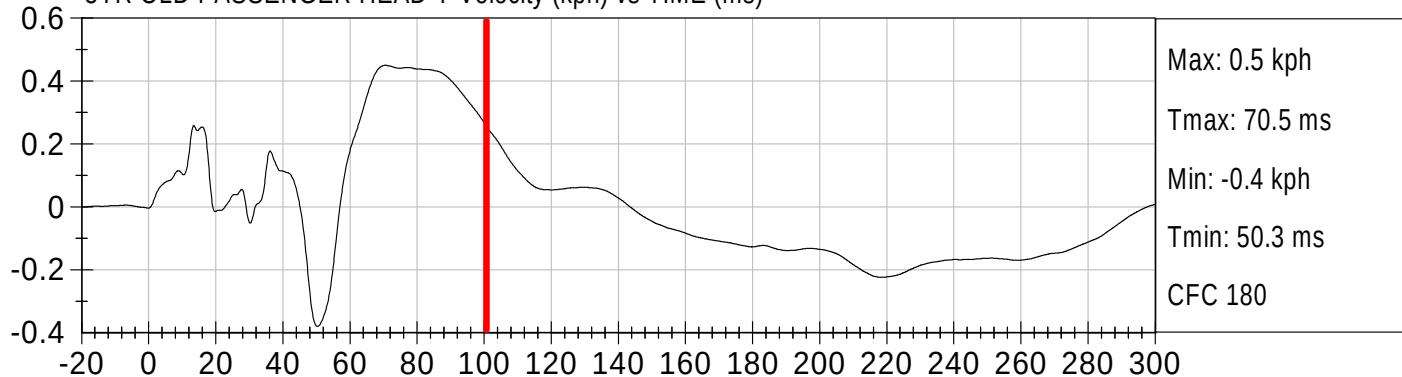


Injury Values Calculated between 0ms and 100ms

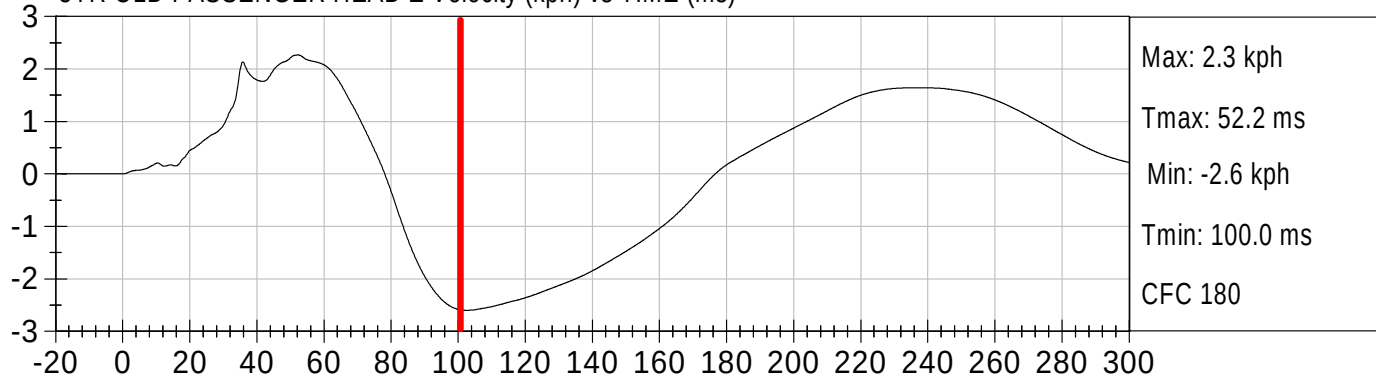
3YR OLD PASSENGER HEAD X Velocity (kph) vs TIME (ms)



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



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

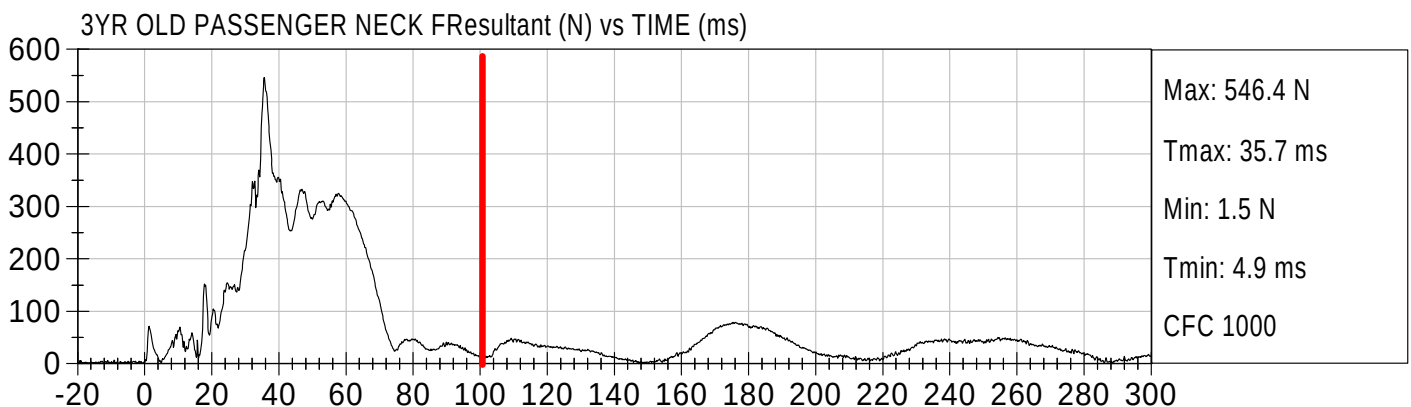
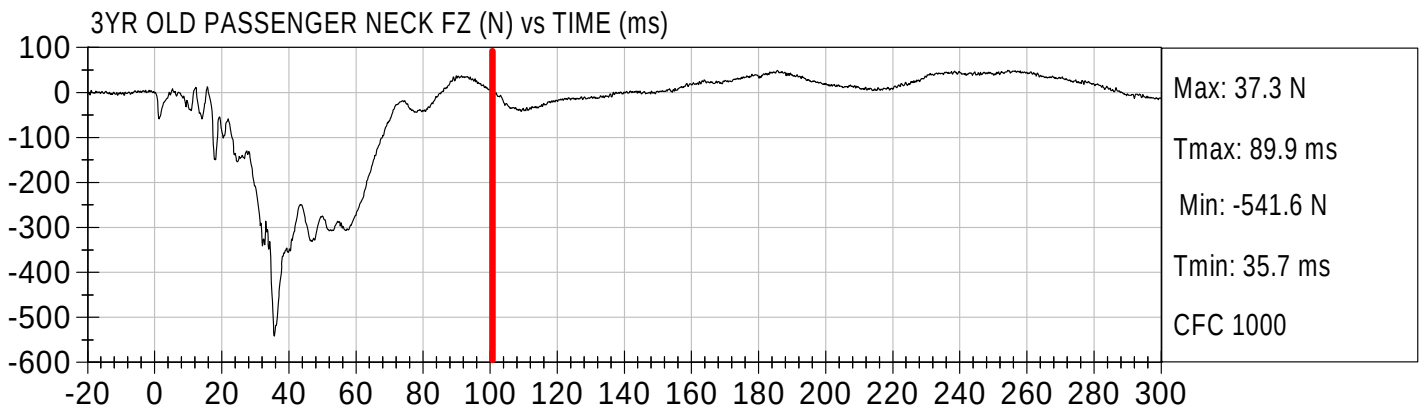
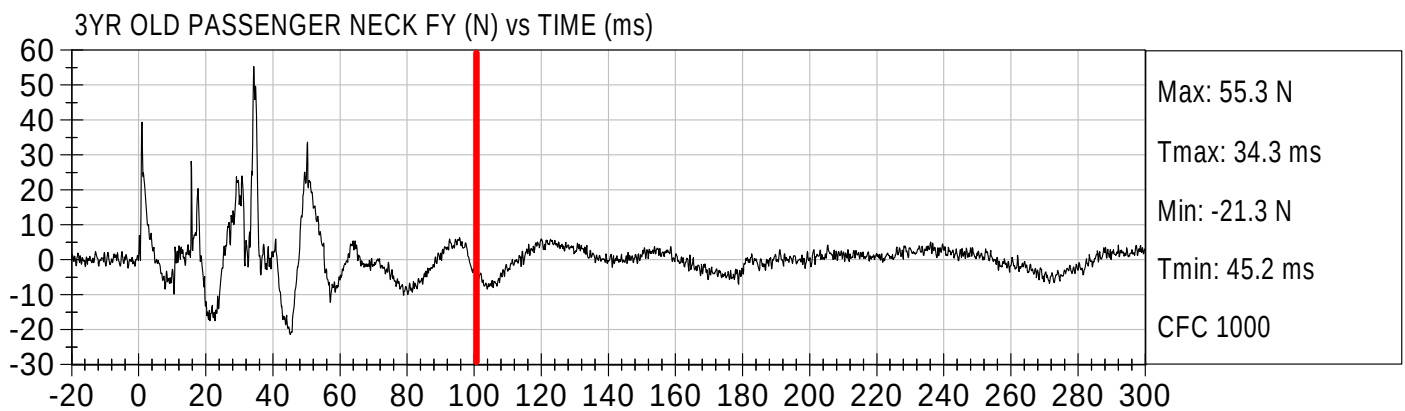
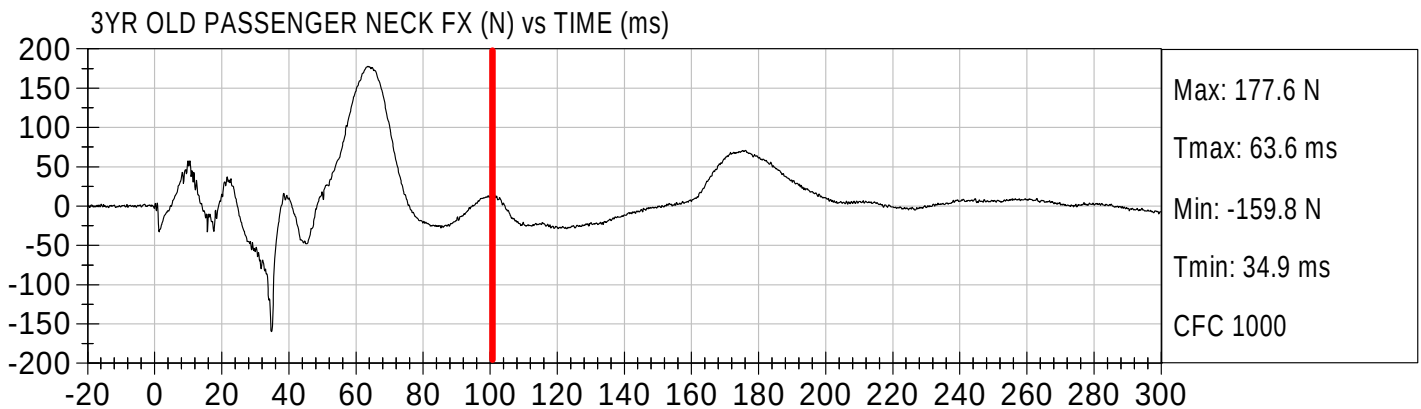




LOW RISK DEPLOYMENT
2009 Kia Optima (C90508) (3YO P2)

Test Date: 3/31/09
Speed: 0.0 mph (0.0 km/h)

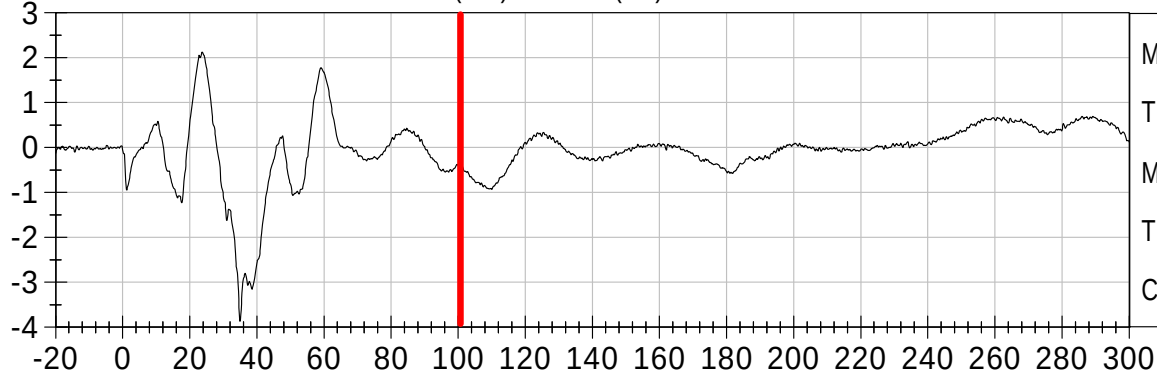
Injury Values Calculated between 0ms and 100ms



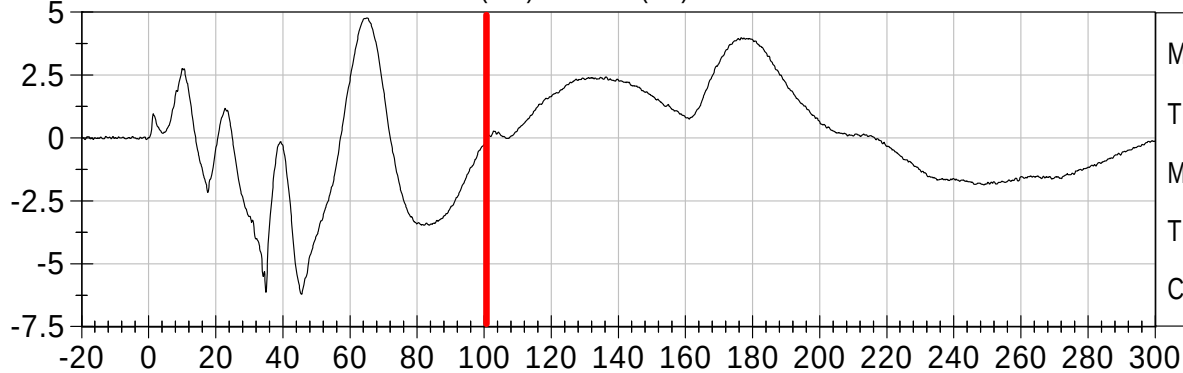


Injury Values Calculated between 0ms and 100ms

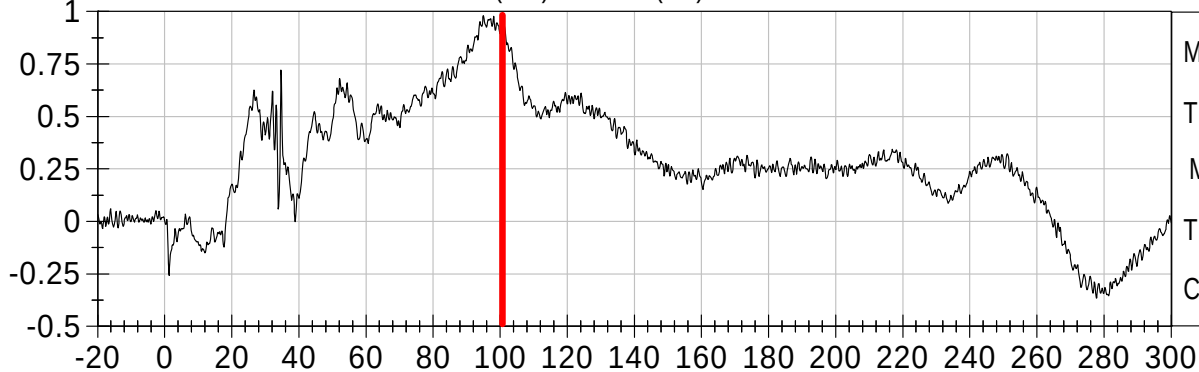
3YR OLD PASSENGER NECK MX (Nm) vs TIME (ms)



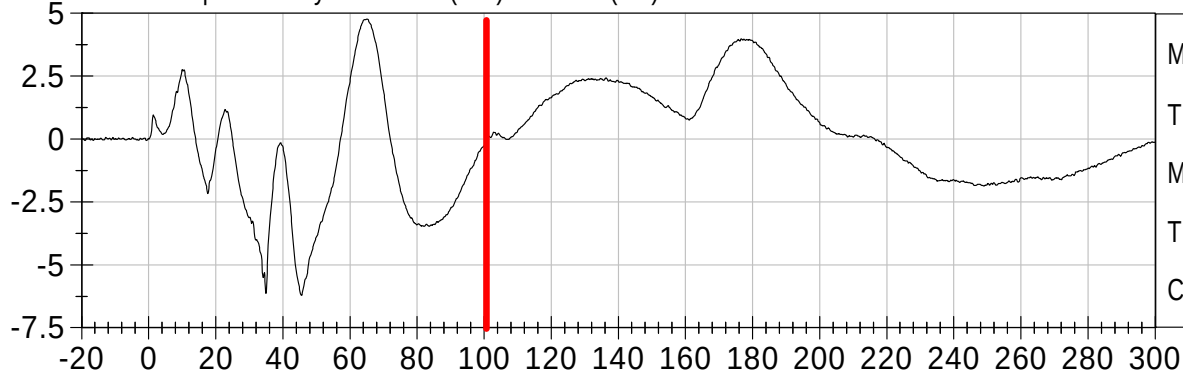
3YR OLD PASSENGER NECK MY (Nm) vs TIME (ms)



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



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



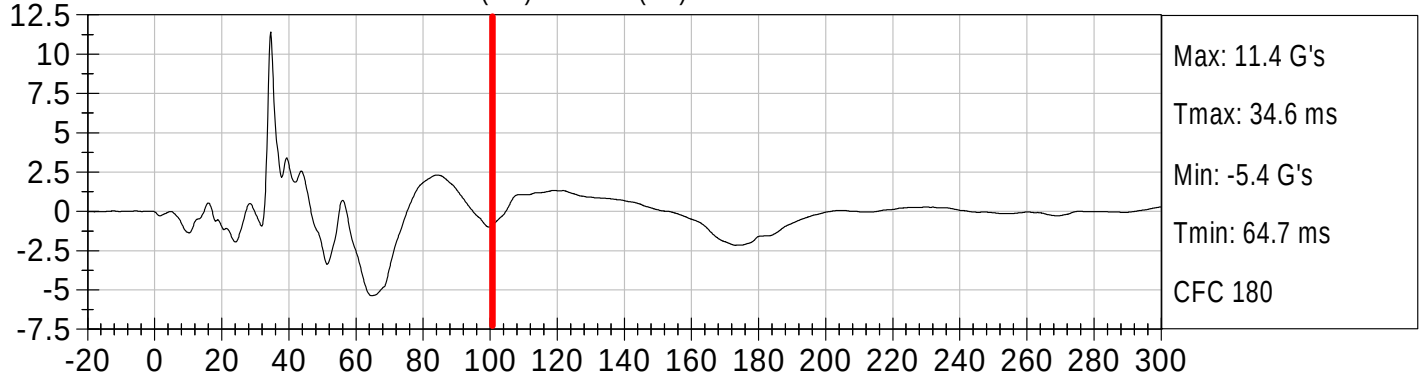


LOW RISK DEPLOYMENT
2009 Kia Optima (C90508) (3YO P2)

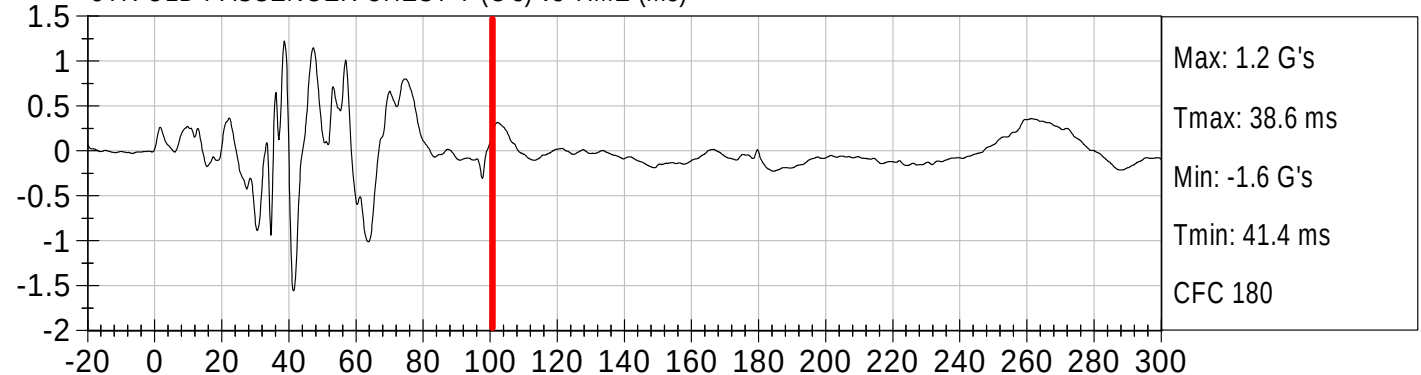
Test Date: 3/31/09
Speed: 0.0 mph (0.0 km/h)

Injury Values Calculated between 0ms and 100ms

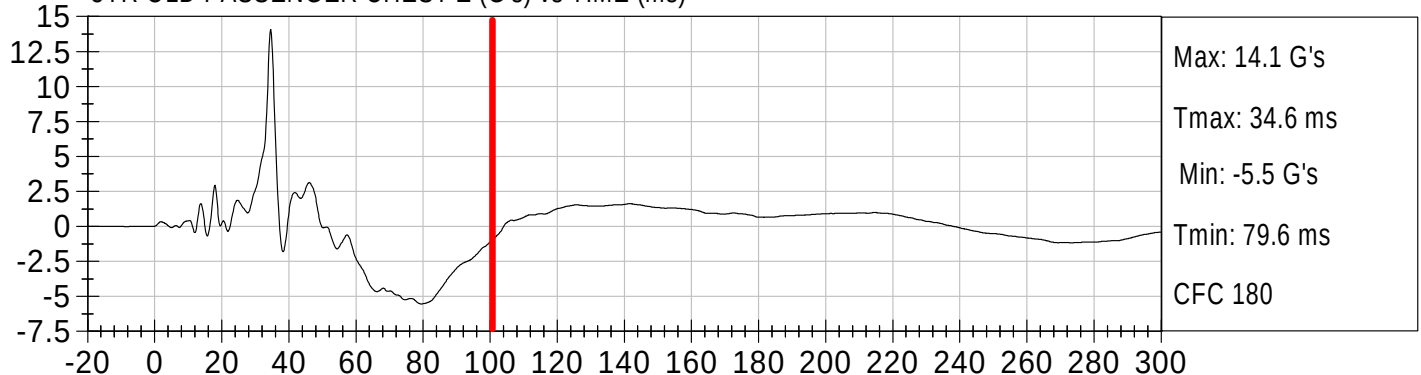
3YR OLD PASSENGER CHEST X (G's) vs TIME (ms)



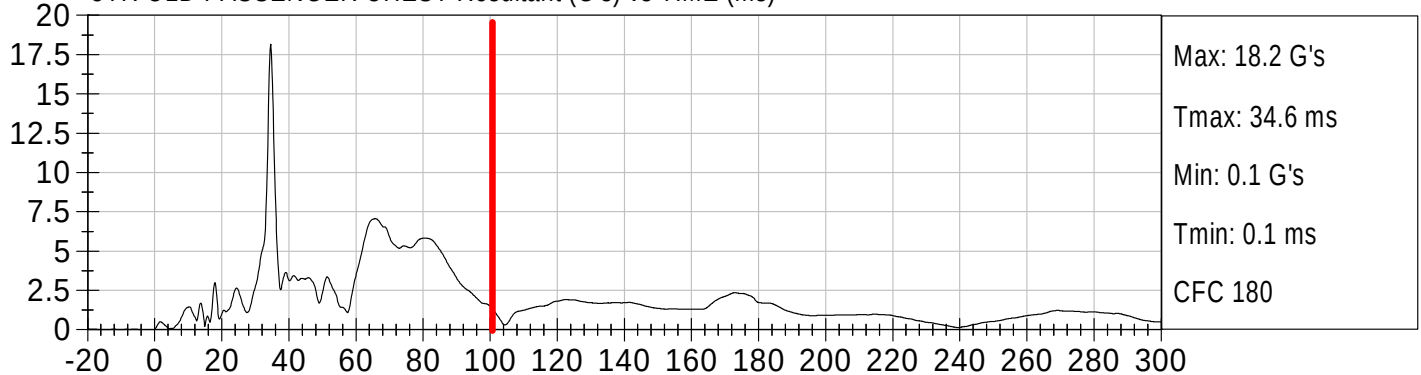
3YR OLD PASSENGER CHEST Y (G's) vs TIME (ms)



3YR OLD PASSENGER CHEST Z (G's) vs TIME (ms)

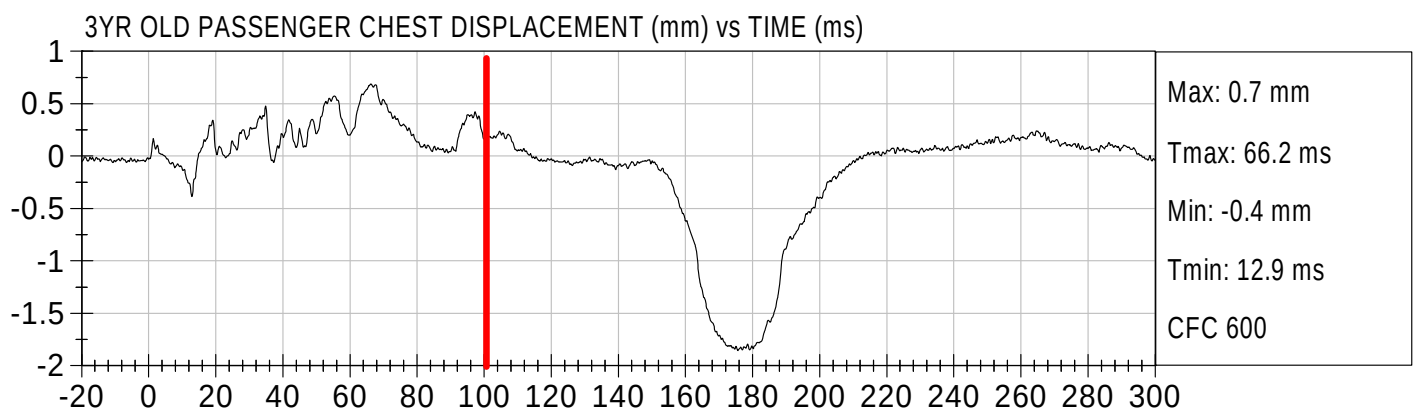
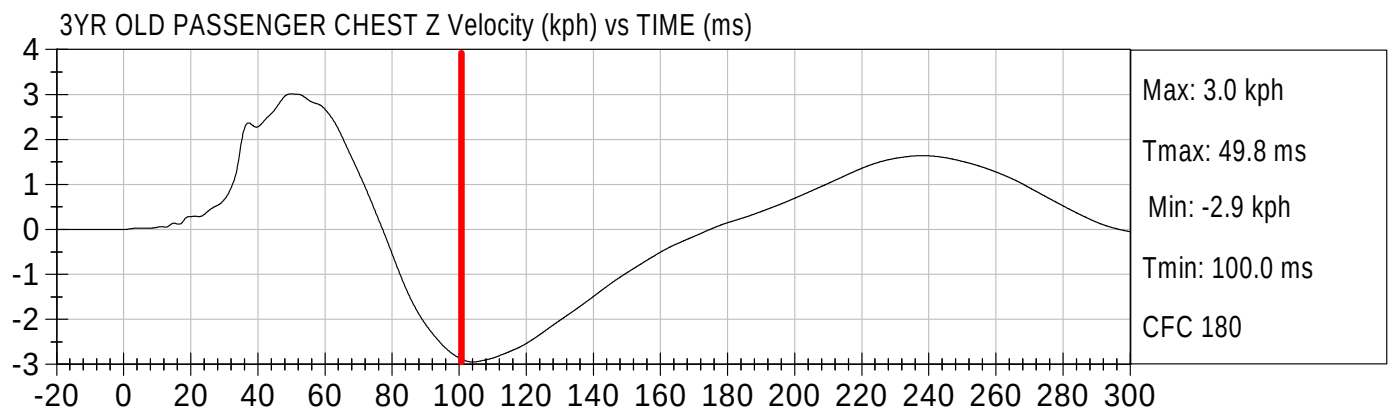
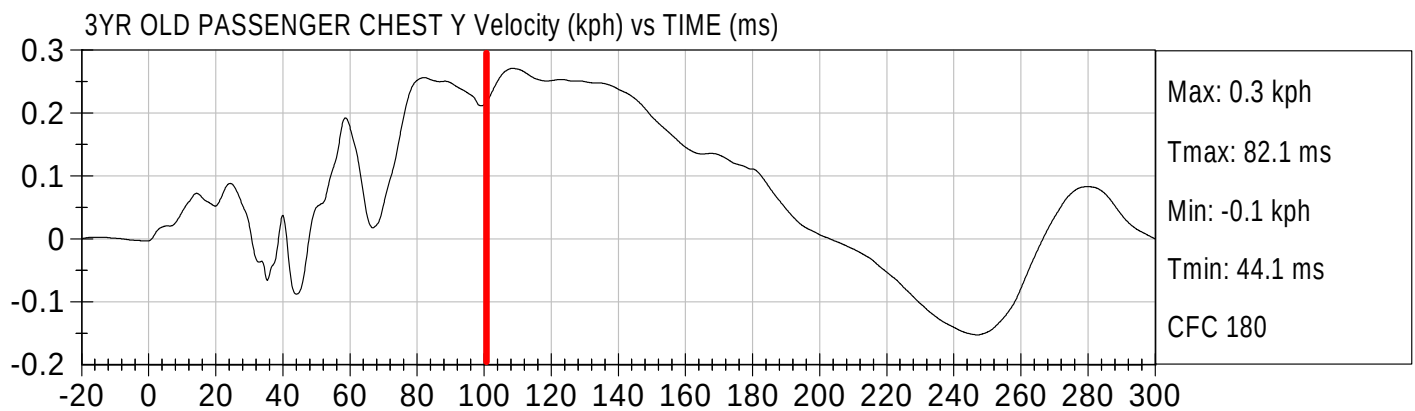
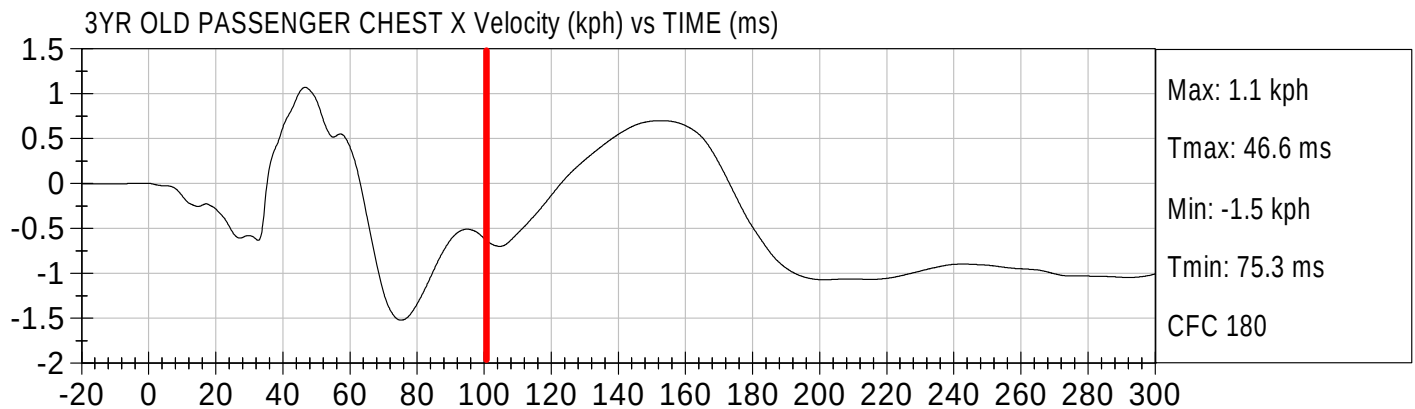


3YR OLD PASSENGER CHEST Resultant (G's) vs TIME (ms)



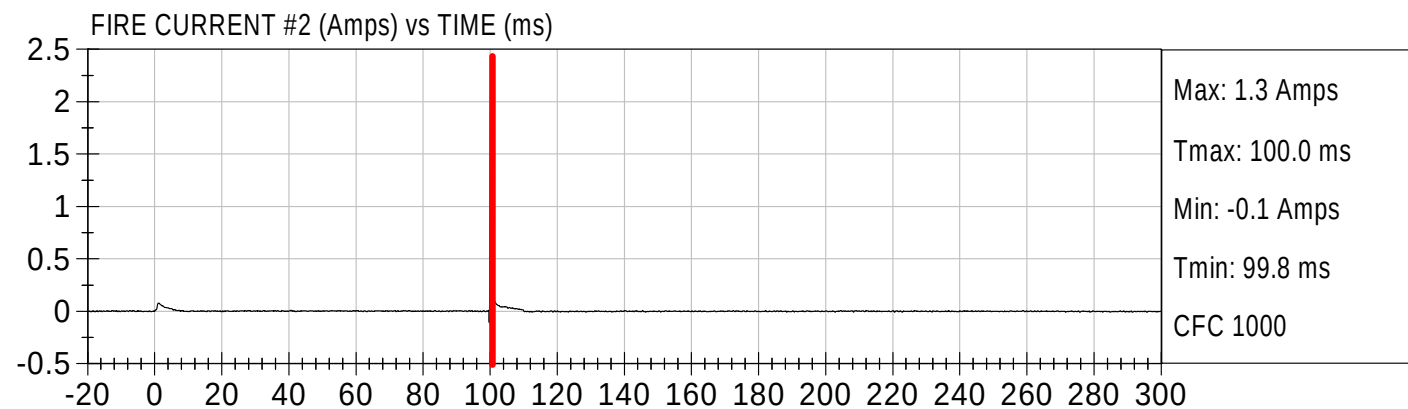
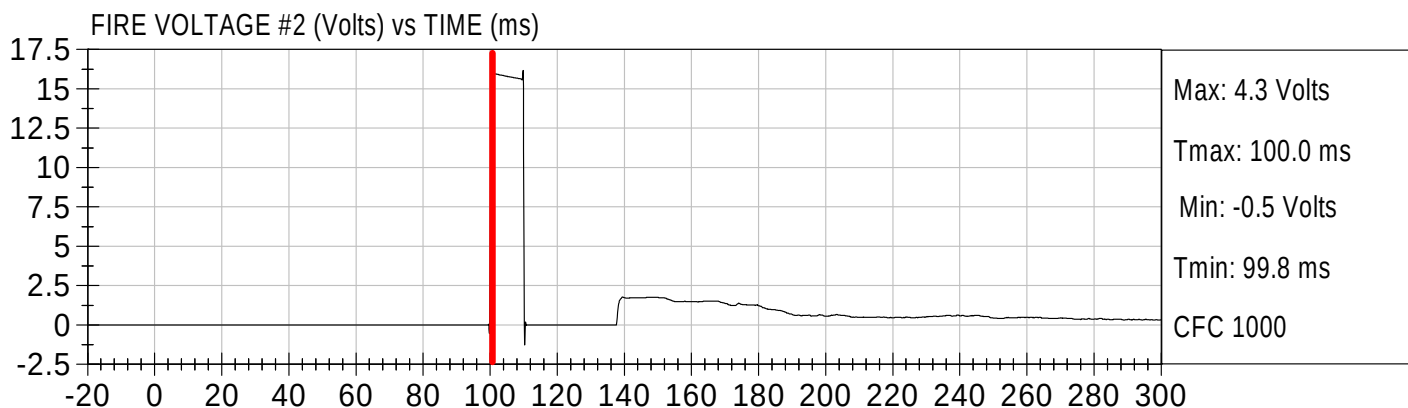
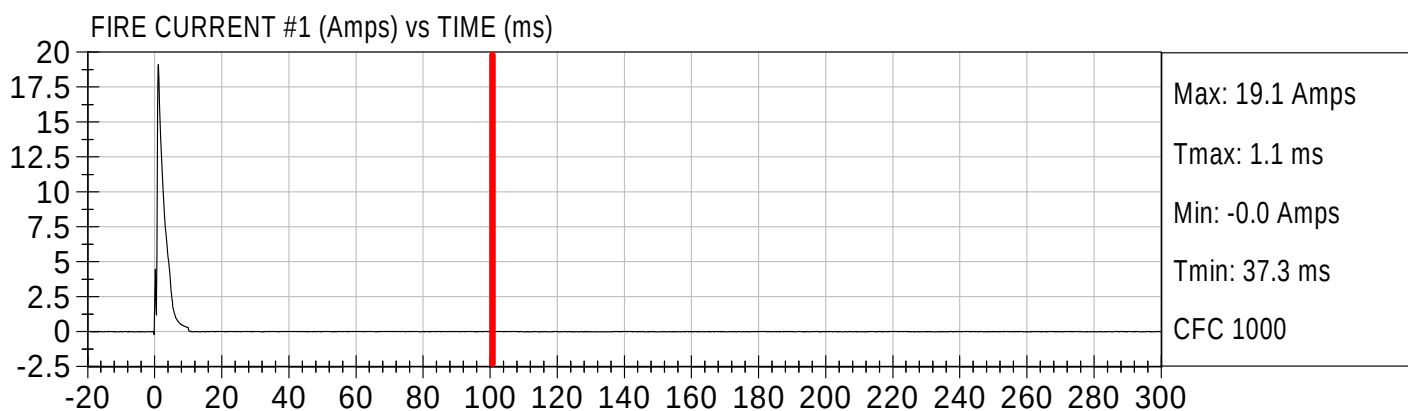
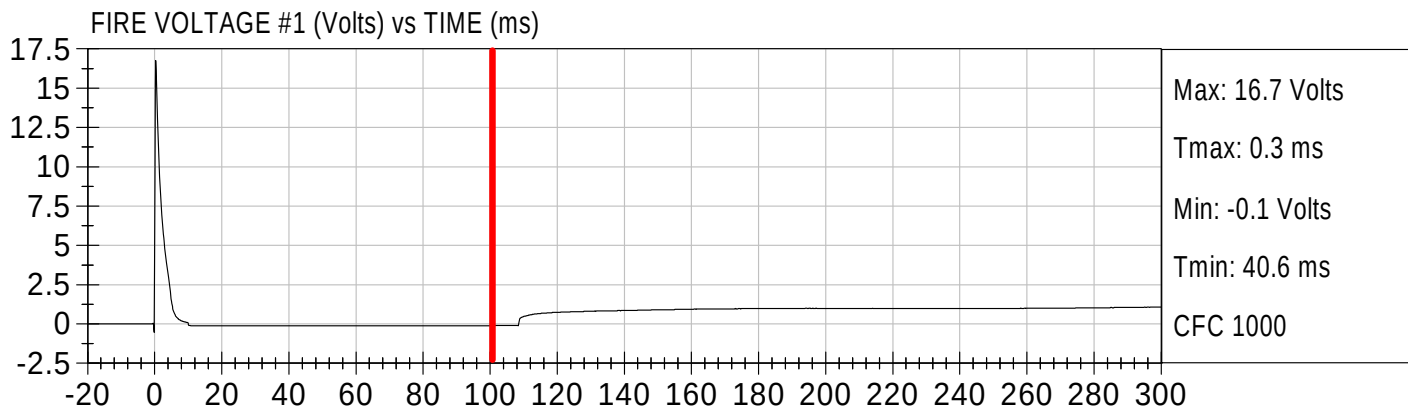


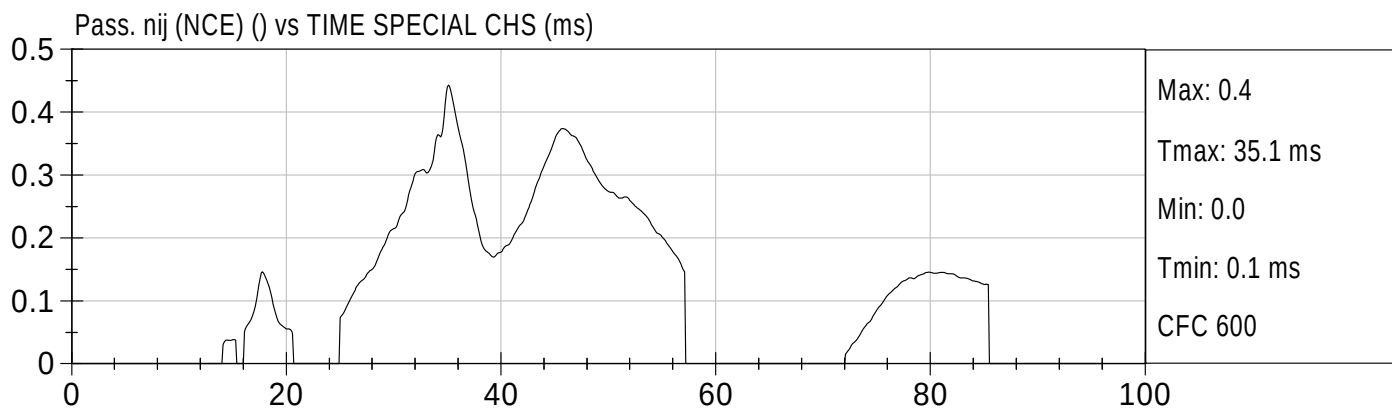
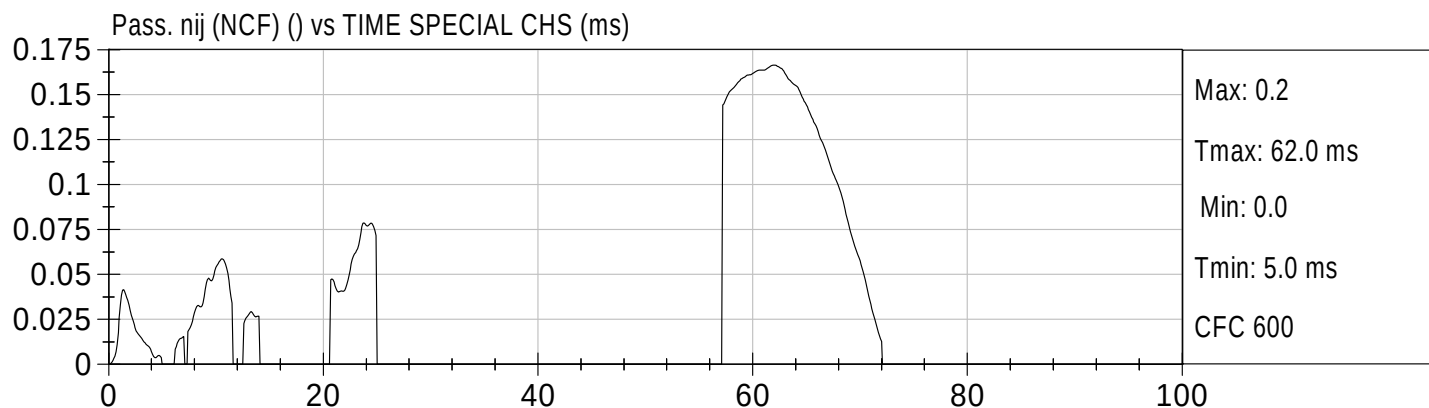
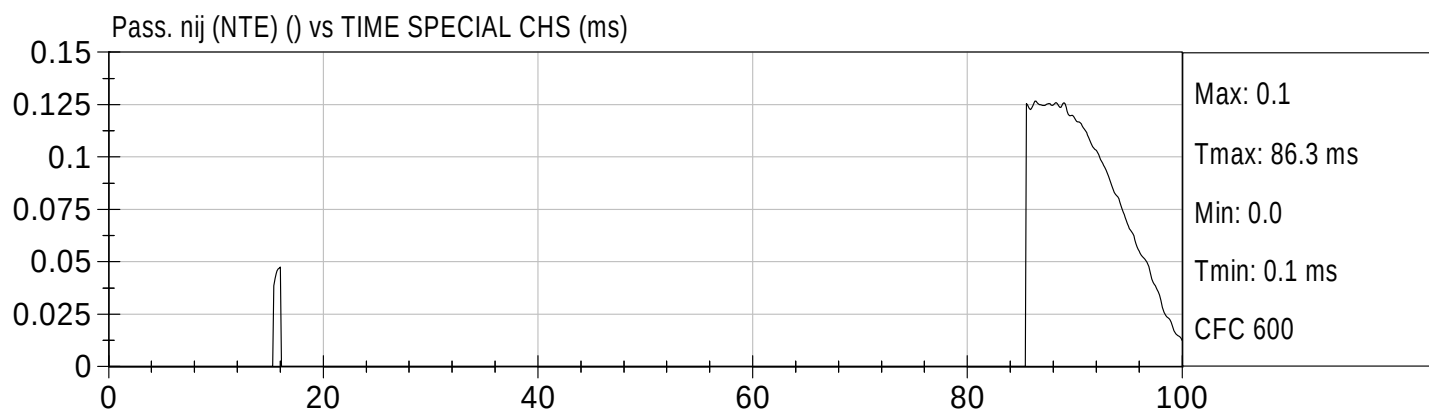
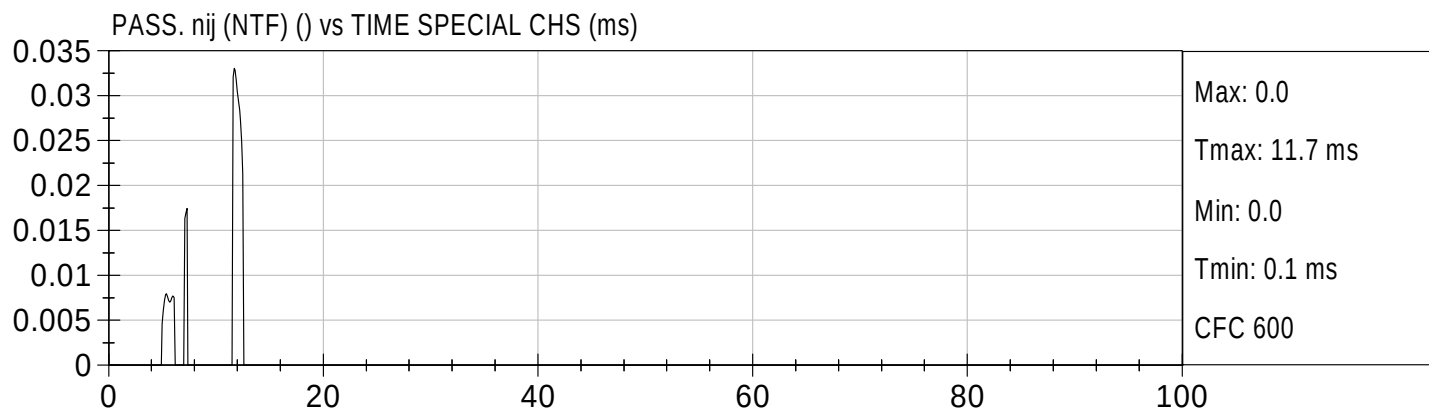
Injury Values Calculated between 0ms and 100ms





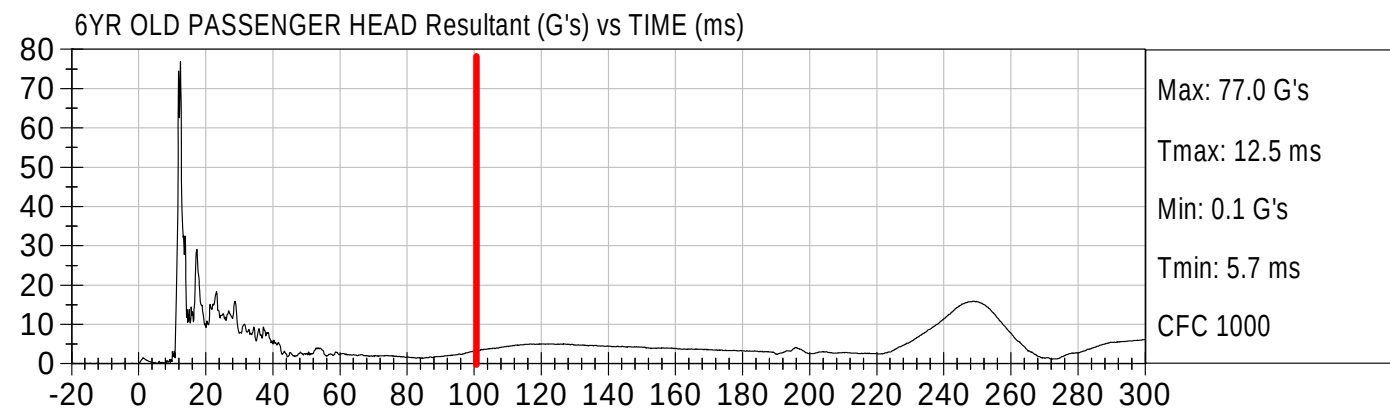
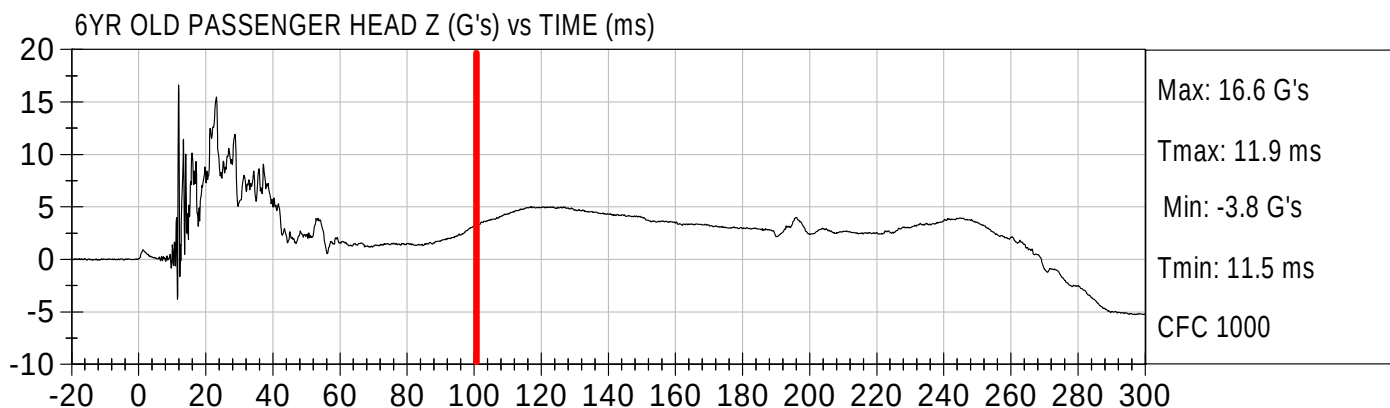
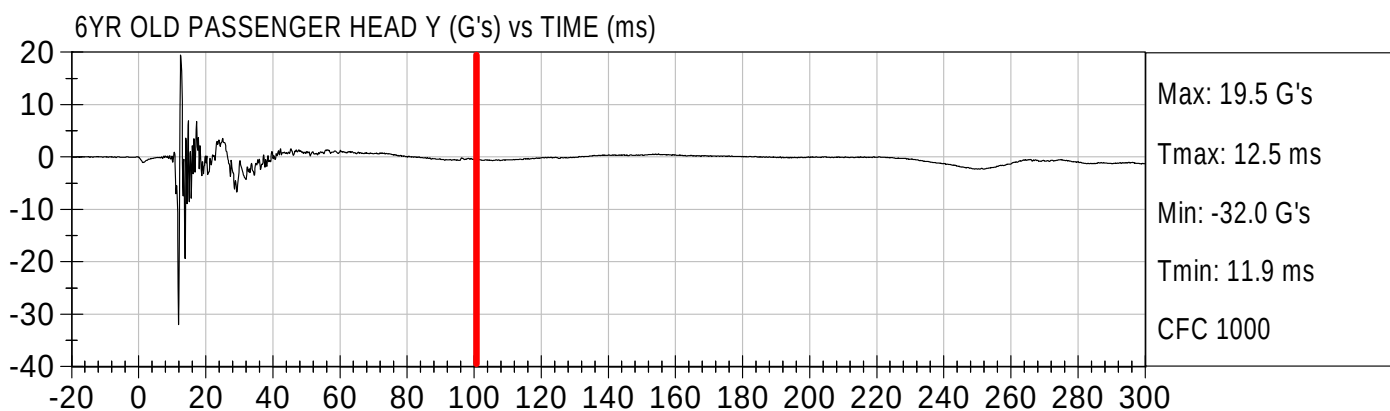
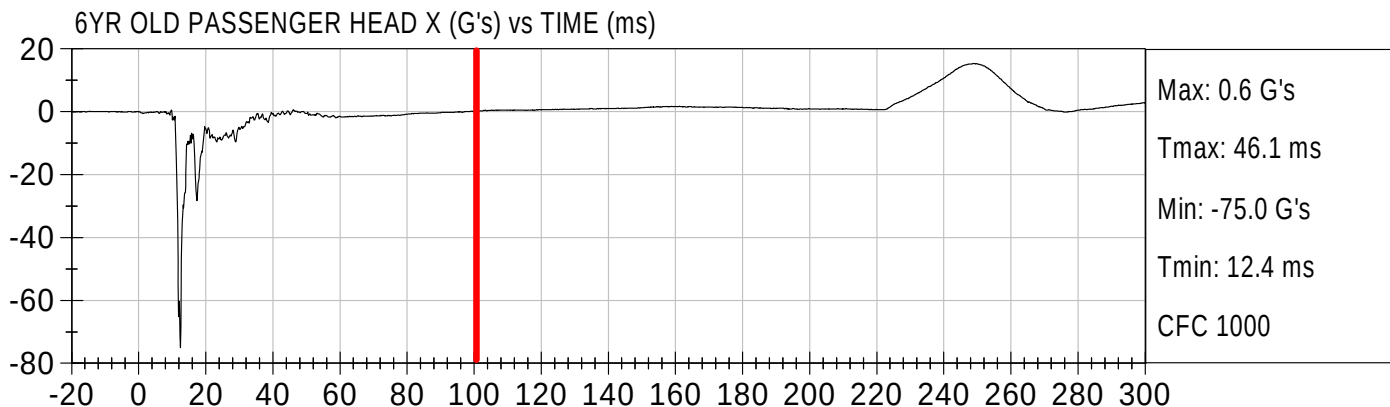
Injury Values Calculated between 0ms and 100ms







Injury Values Calculated between 0ms and 100ms

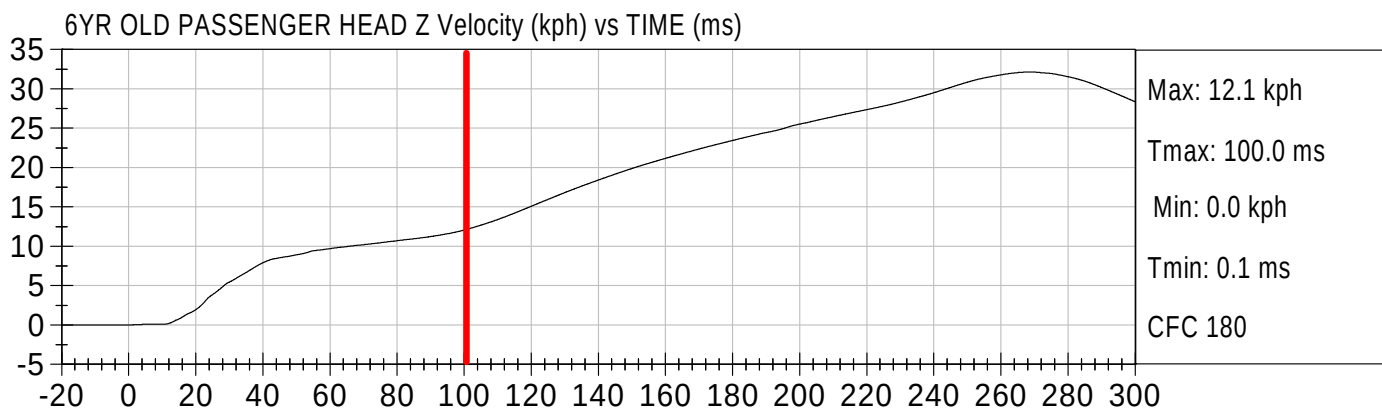
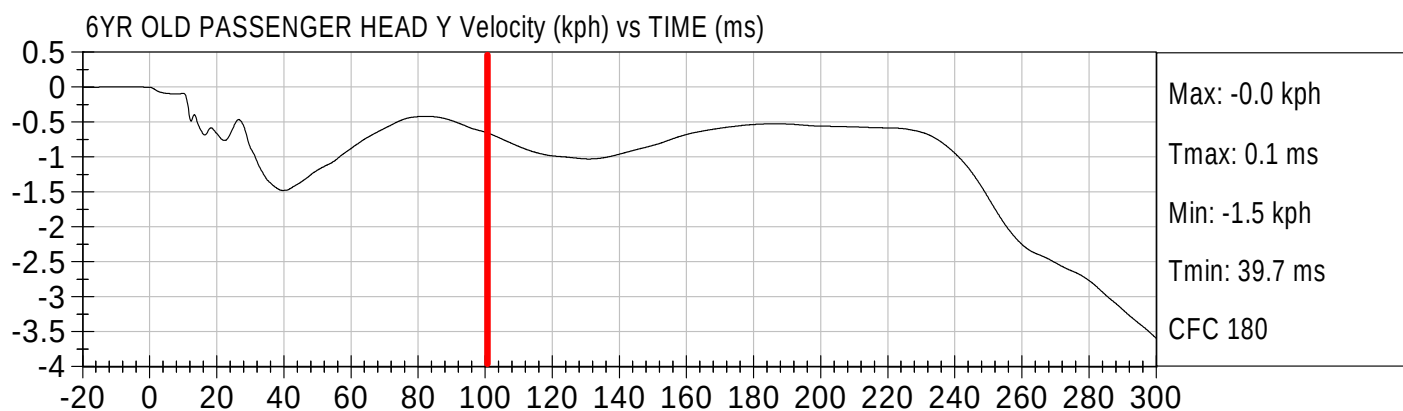
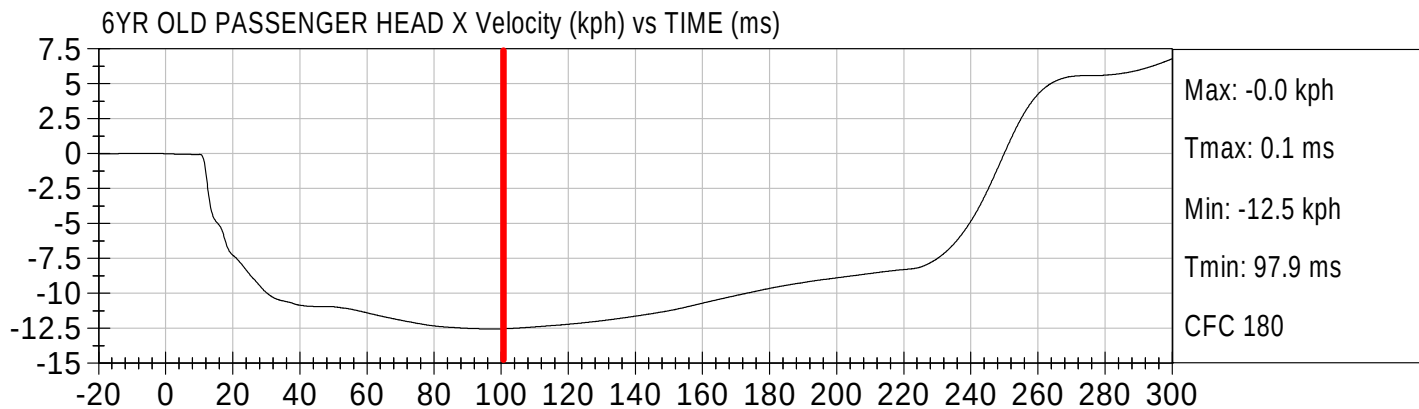




LOW RISK DEPLOYMENT
2009 Kia Optima (C90508) (6YO P1)

Test Date: 4/1/09
Speed: 0.0 mph (0.0 km/h)

Injury Values Calculated between 0ms and 100ms

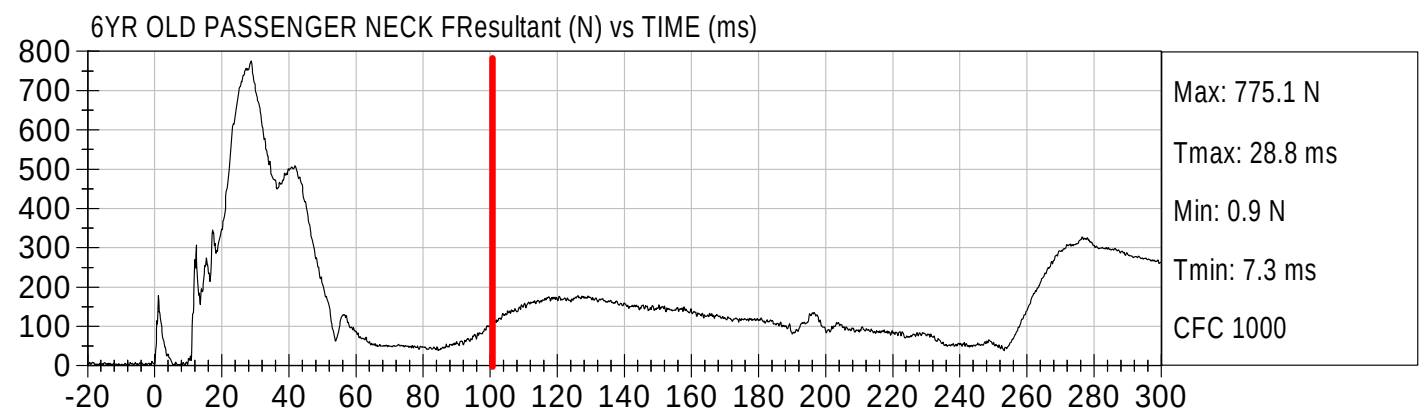
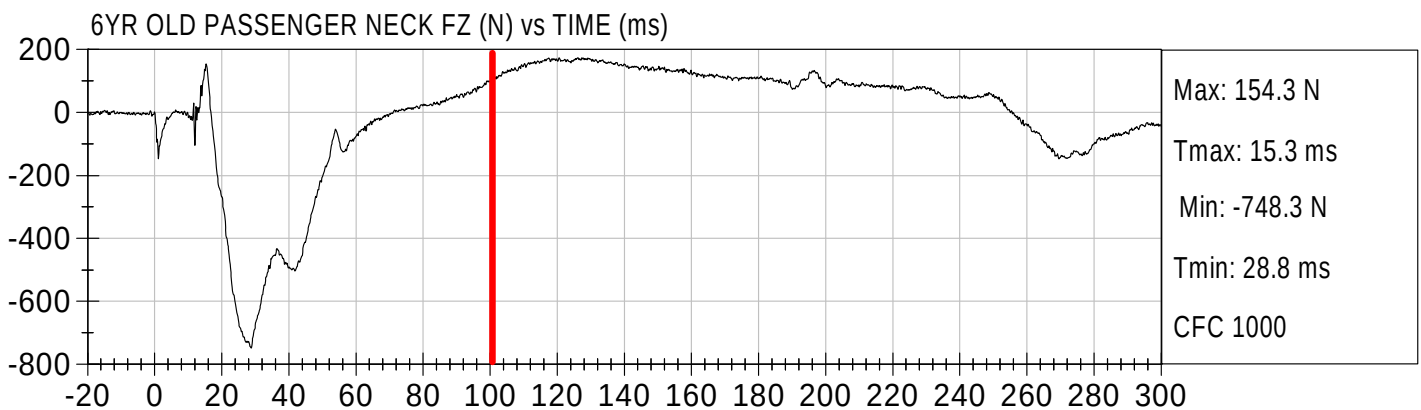
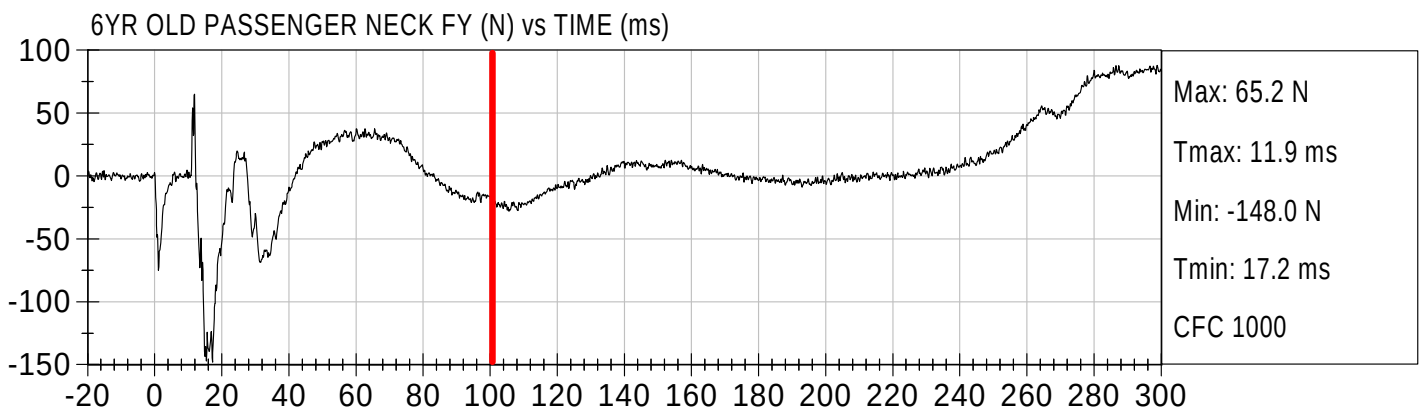
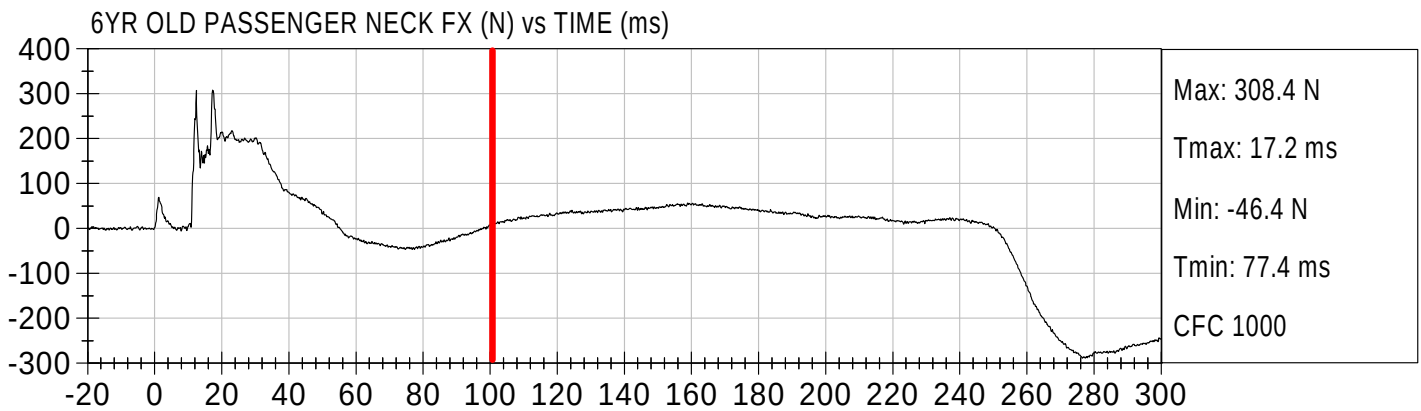




LOW RISK DEPLOYMENT
2009 Kia Optima (C90508) (6YO P1)

Test Date: 4/1/09
Speed: 0.0 mph (0.0 km/h)

Injury Values Calculated between 0ms and 100ms

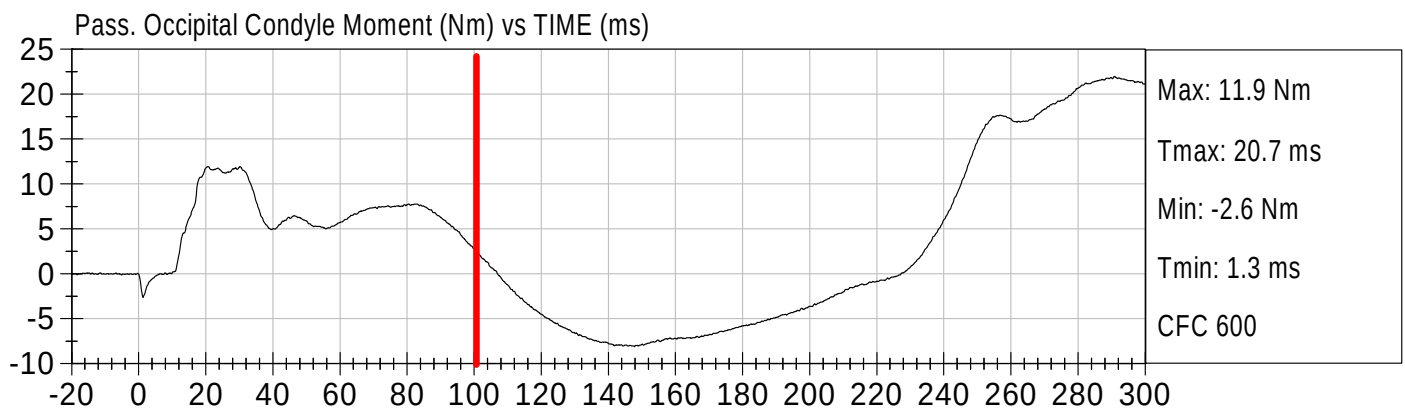
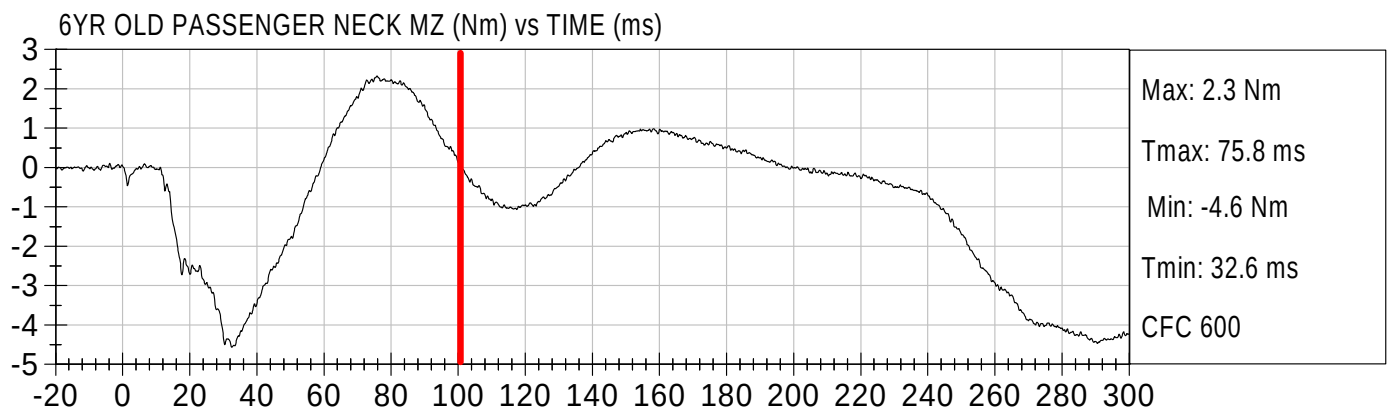
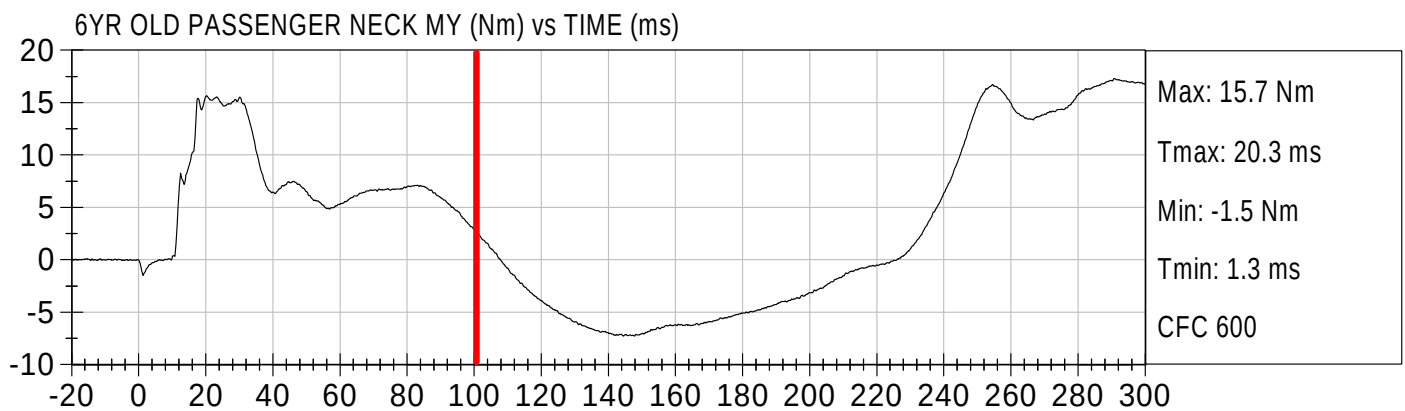
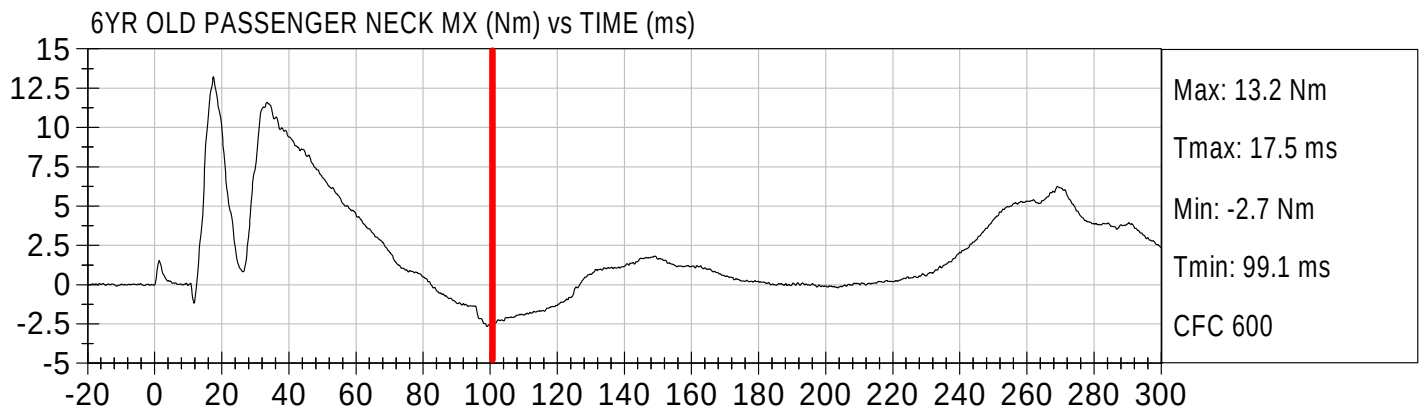




LOW RISK DEPLOYMENT
2009 Kia Optima (C90508) (6YO P1)

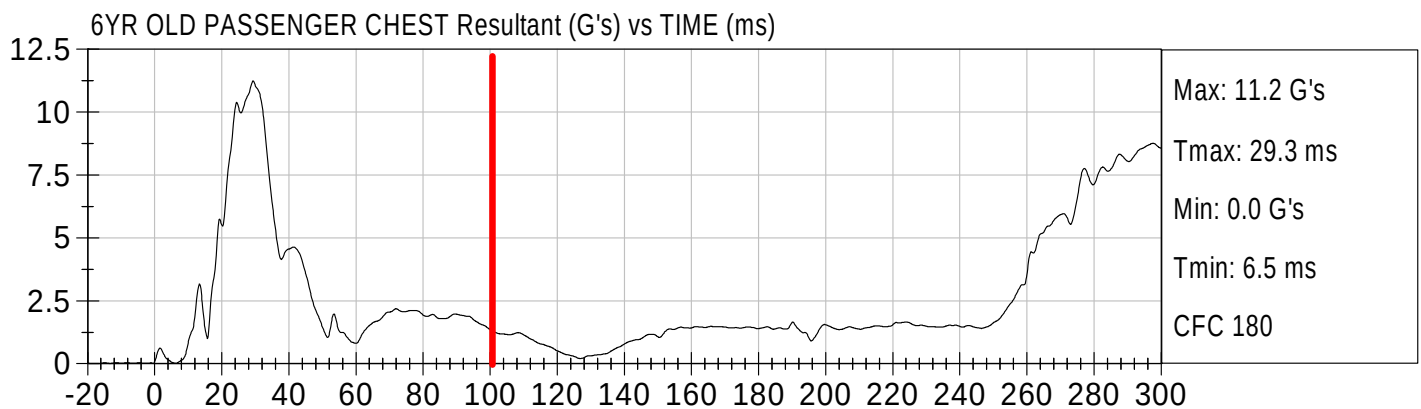
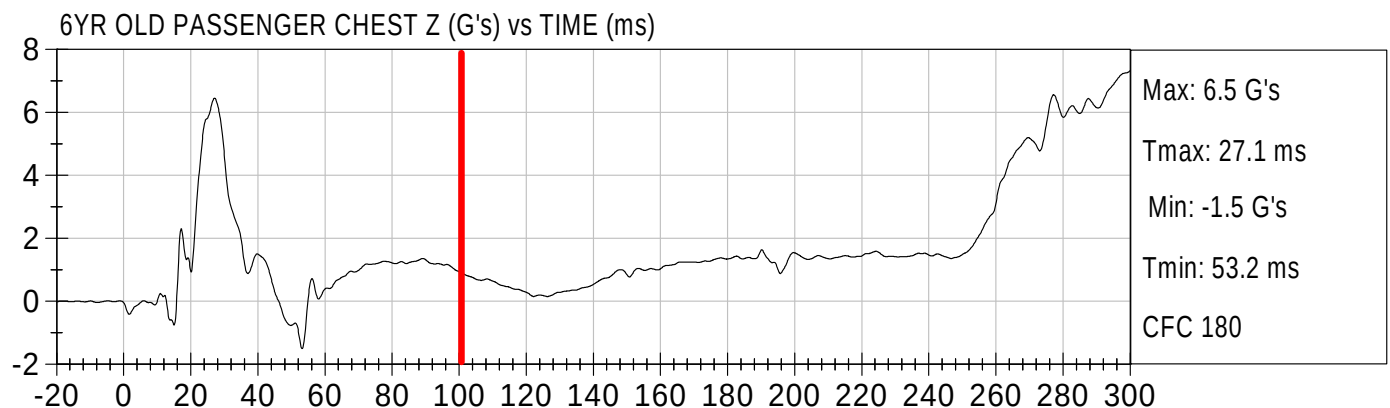
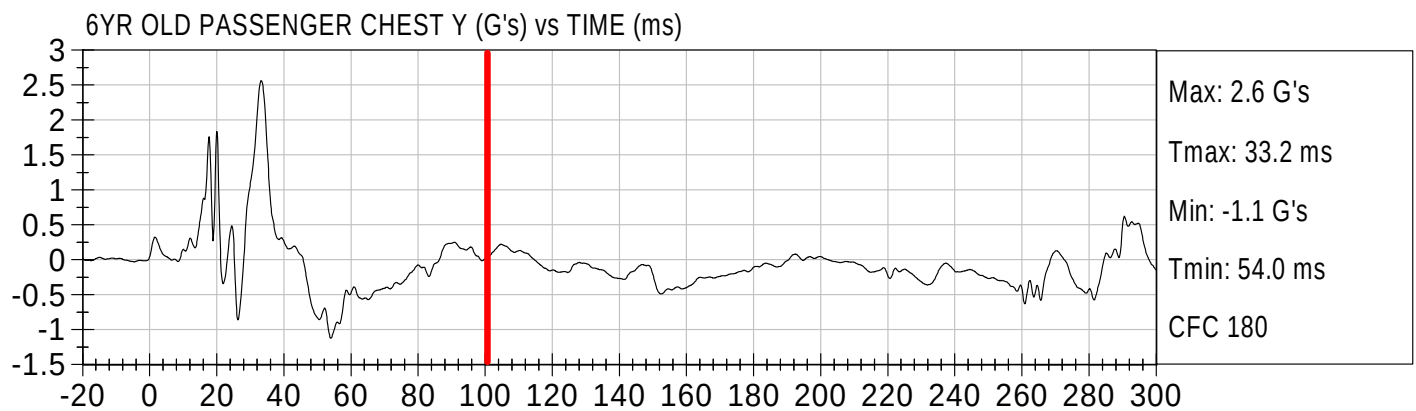
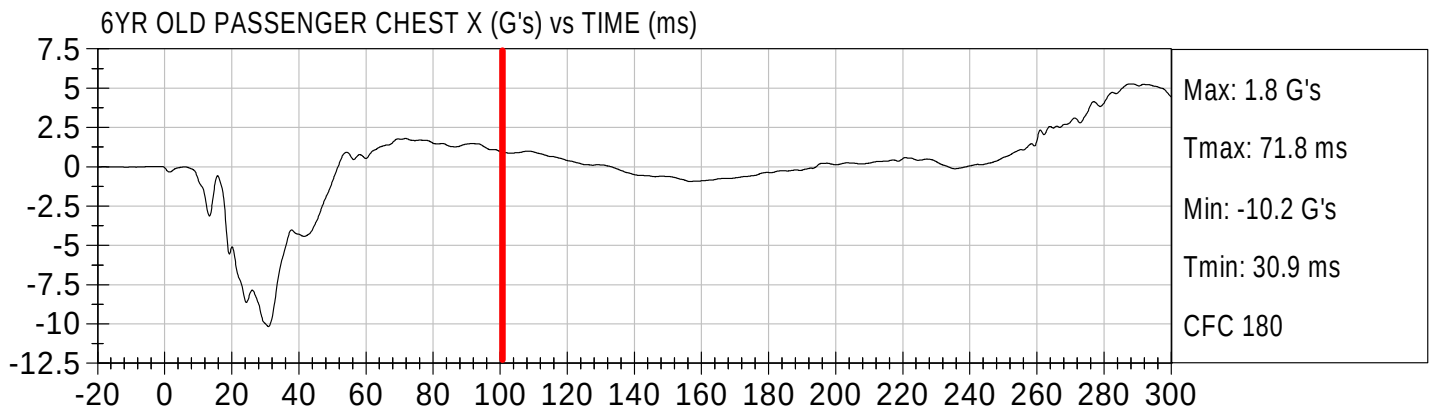
Test Date: 4/1/09
Speed: 0.0 mph (0.0 km/h)

Injury Values Calculated between 0ms and 100ms





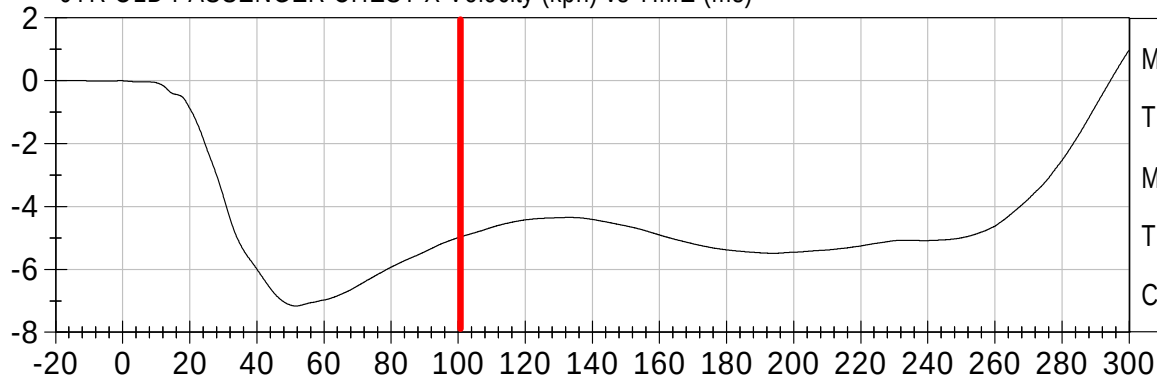
Injury Values Calculated between 0ms and 100ms



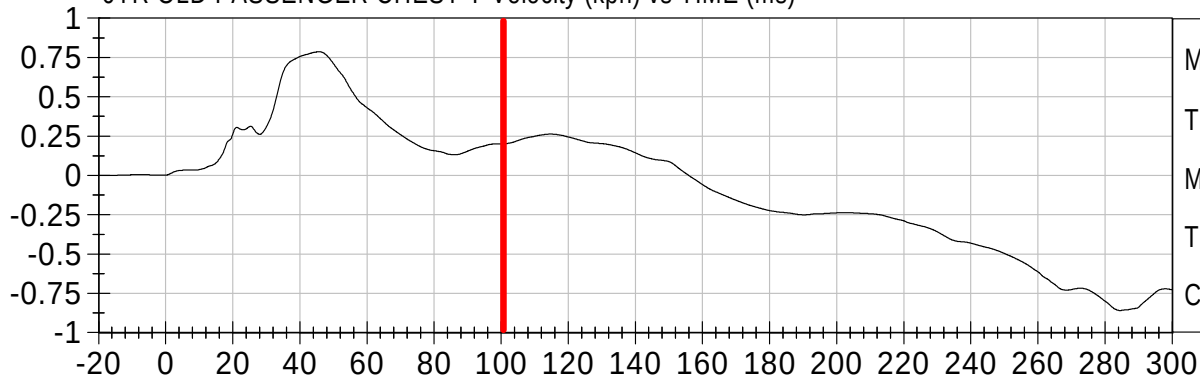


Injury Values Calculated between 0ms and 100ms

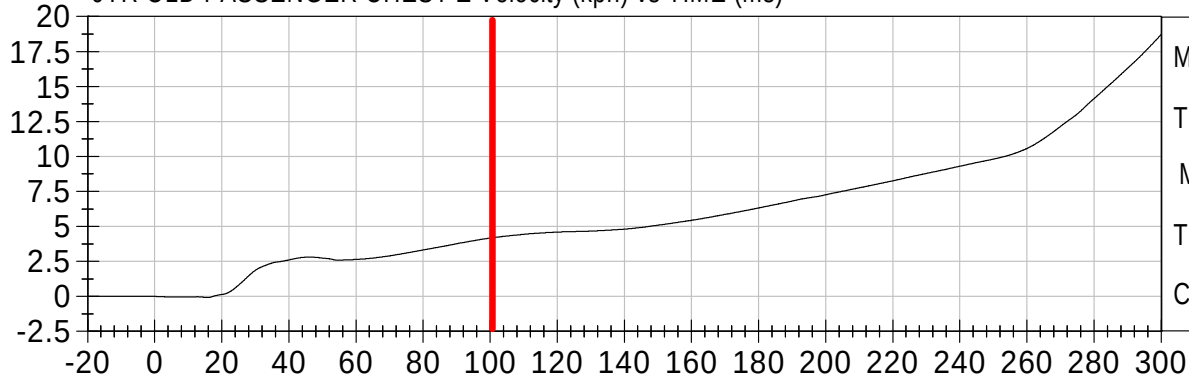
6YR OLD PASSENGER CHEST X Velocity (kph) vs TIME (ms)



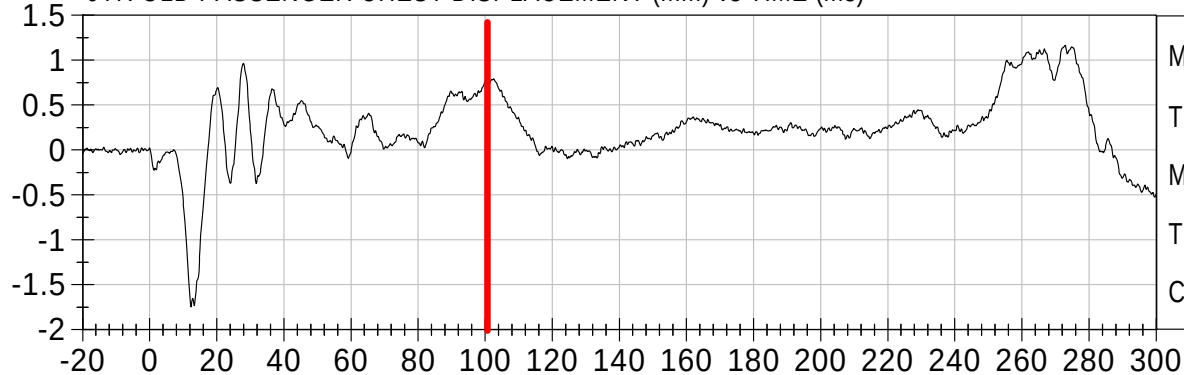
6YR OLD PASSENGER CHEST Y Velocity (kph) vs TIME (ms)



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



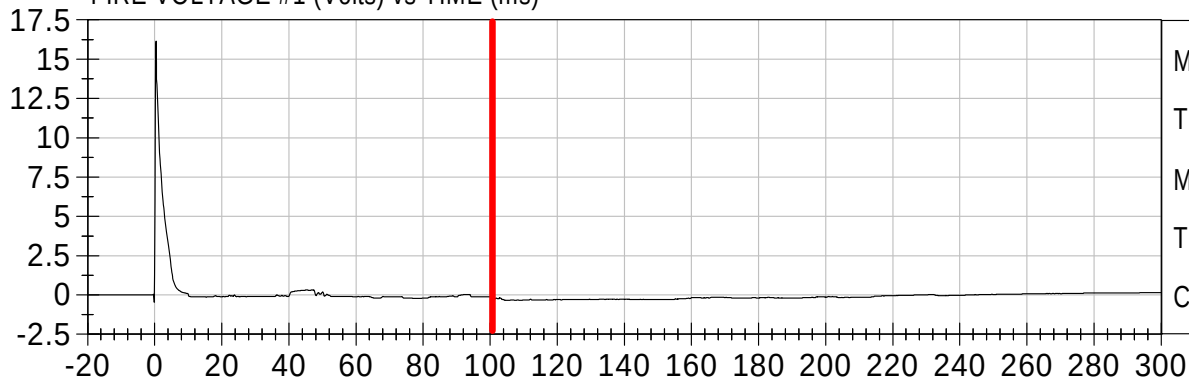
6YR OLD PASSENGER CHEST DISPLACEMENT (mm) vs TIME (ms)





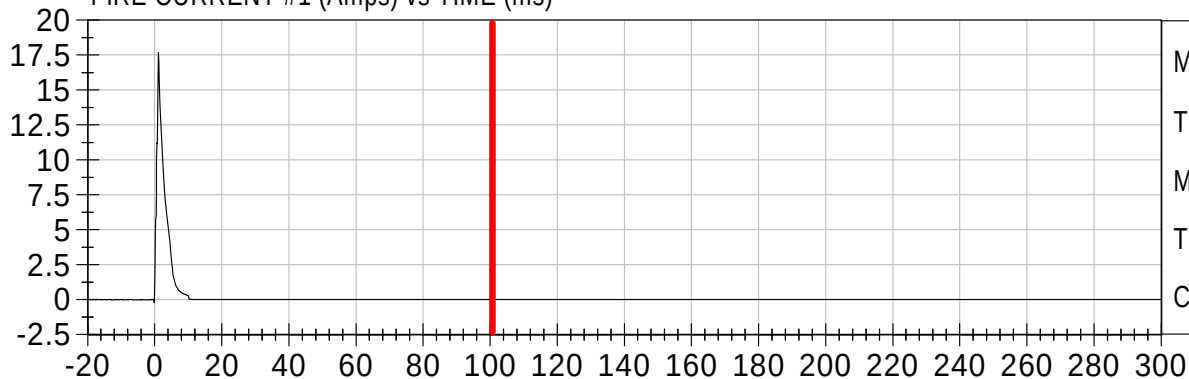
Injury Values Calculated between 0ms and 100ms

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



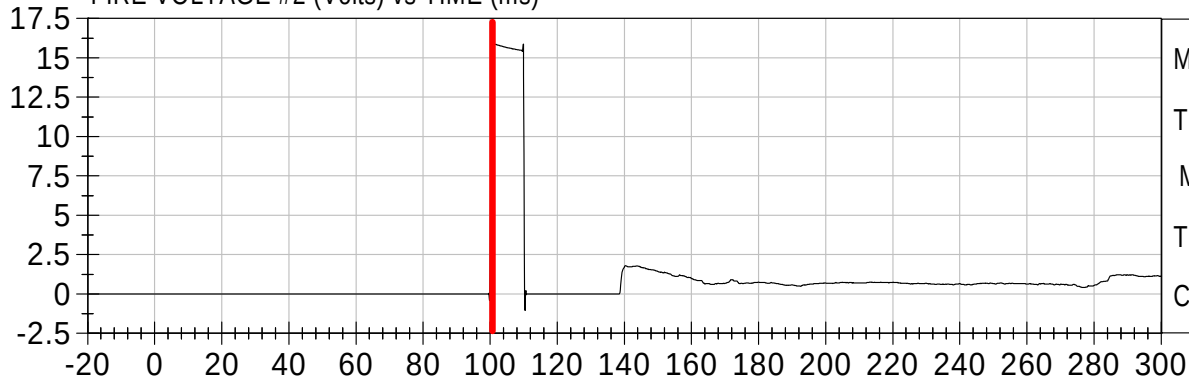
Max: 16.2 Volts
Tmax: 0.4 ms
Min: -0.2 Volts
Tmin: 78.5 ms
CFC 1000

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



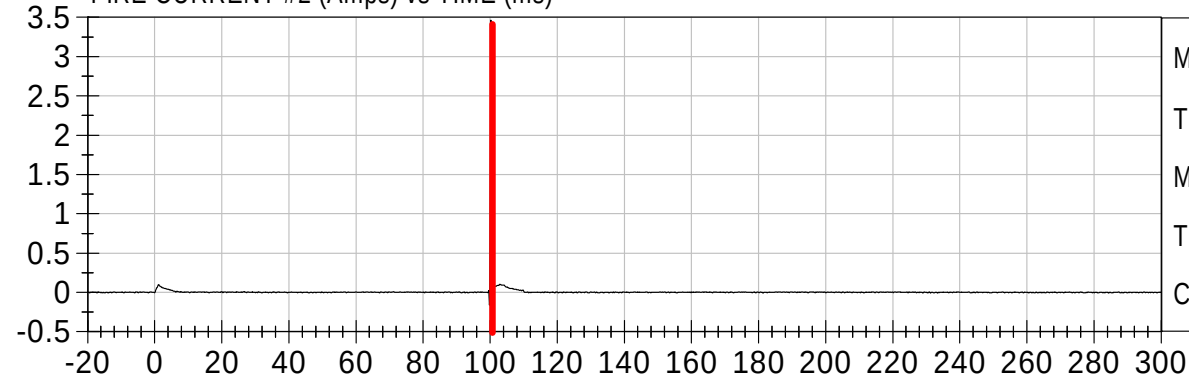
Max: 17.7 Amps
Tmax: 1.1 ms
Min: 0.0 Amps
Tmin: 52.2 ms
CFC 1000

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

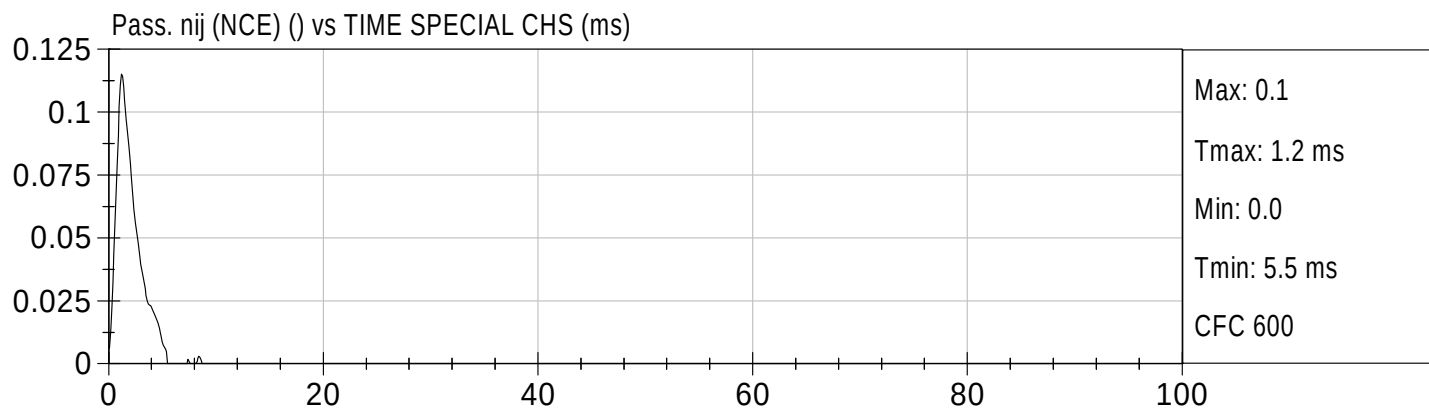
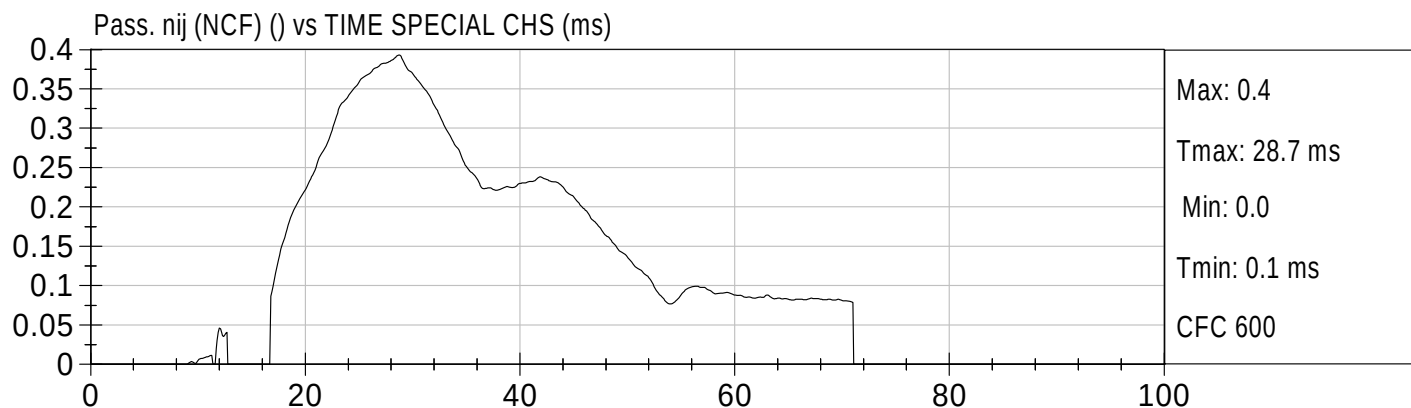
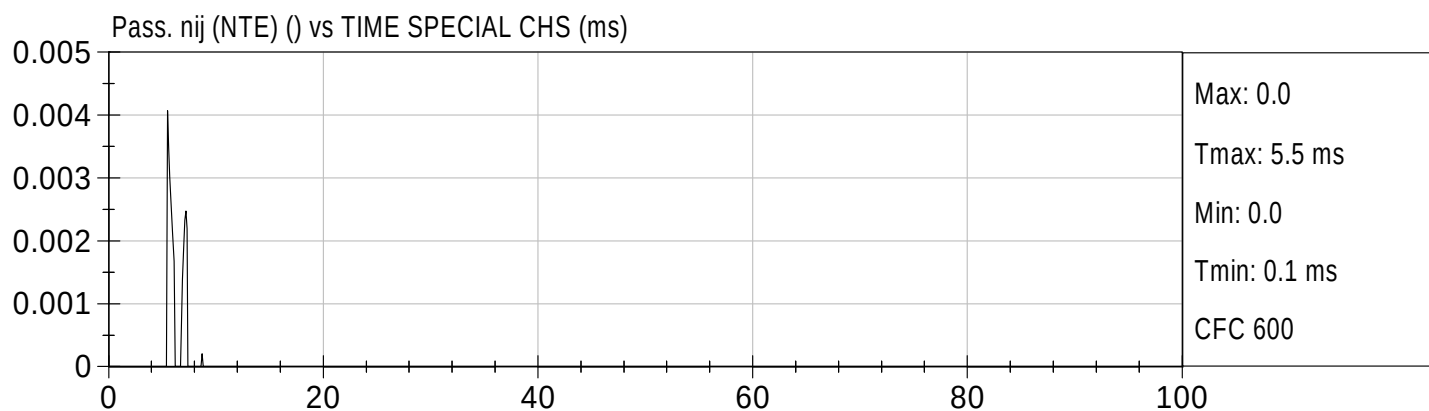
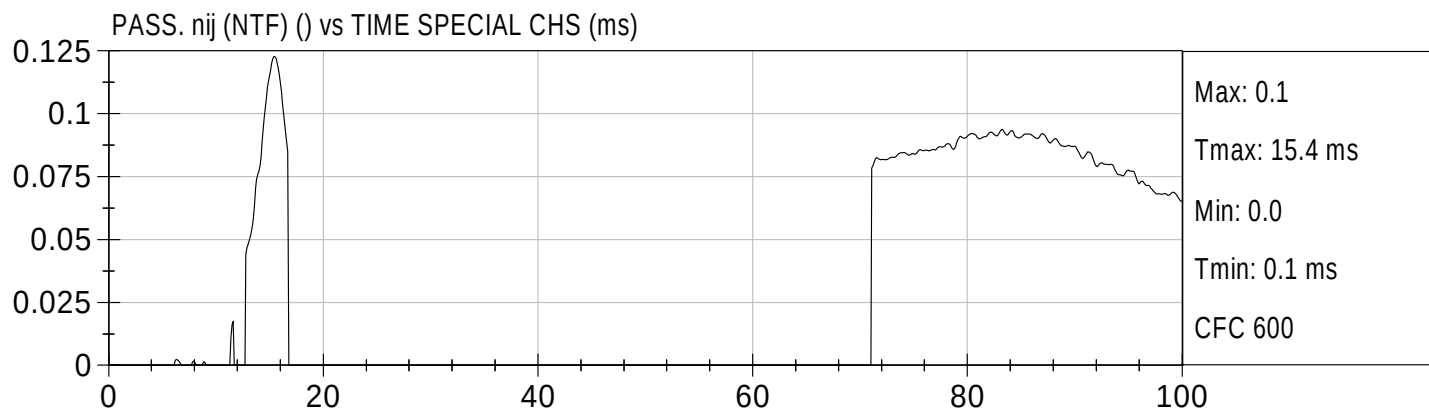


Max: 1.4 Volts
Tmax: 100.0 ms
Min: -0.4 Volts
Tmin: 99.9 ms
CFC 1000

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

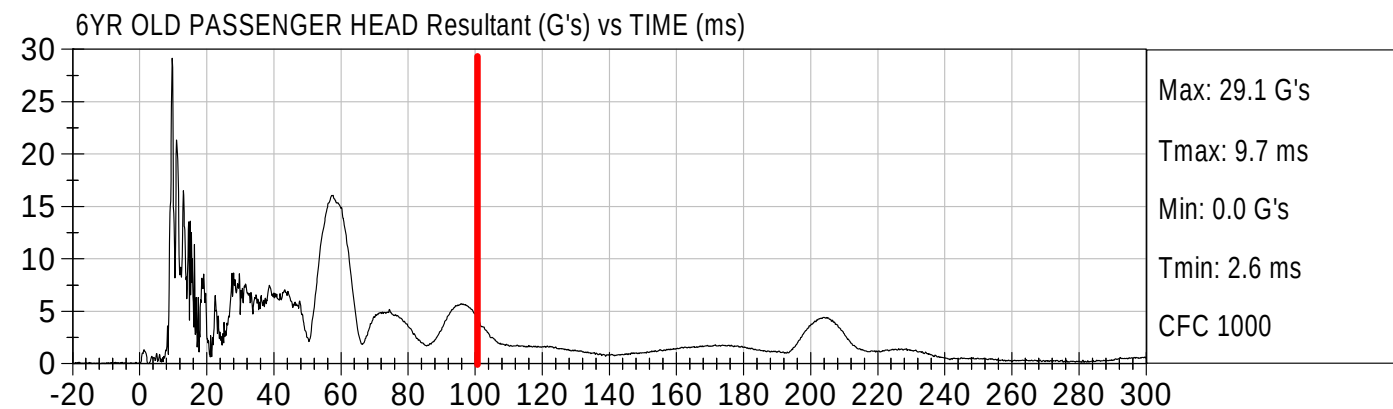
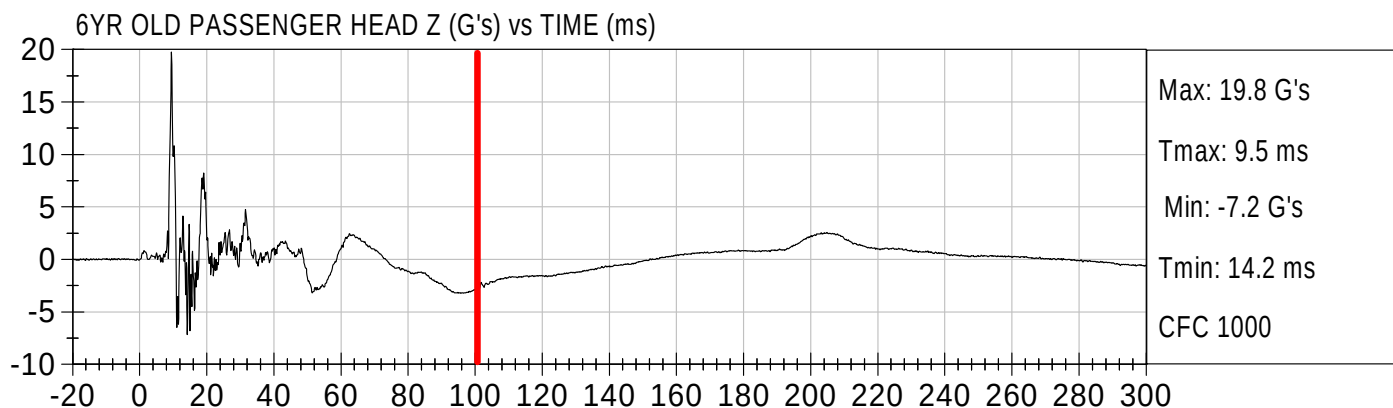
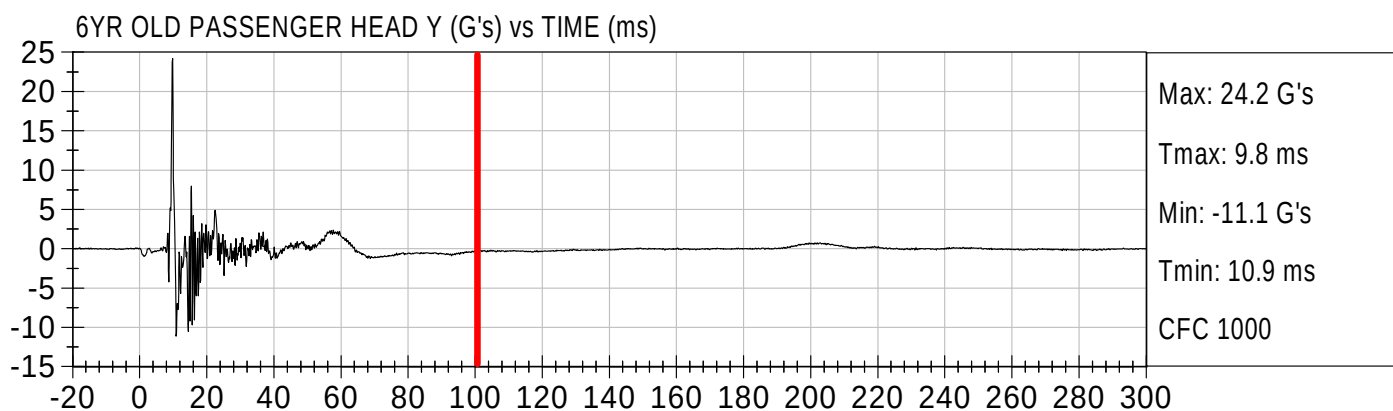
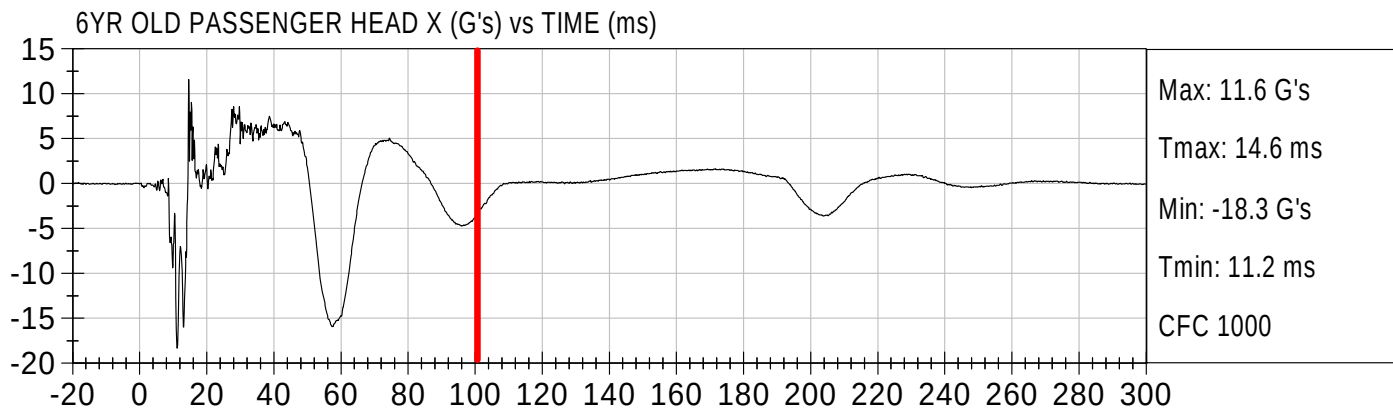


Max: 0.8 Amps
Tmax: 100.0 ms
Min: -0.2 Amps
Tmin: 99.8 ms
CFC 1000





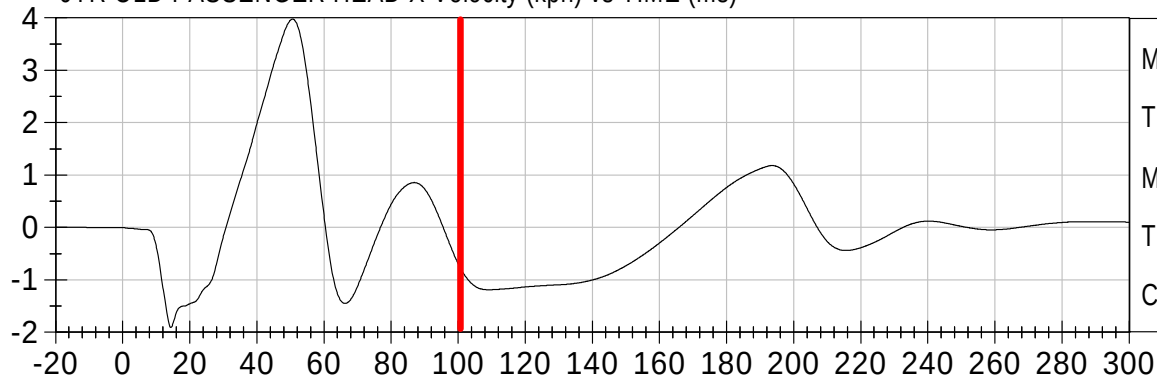
Injury Values Calculated between 0ms and 100ms





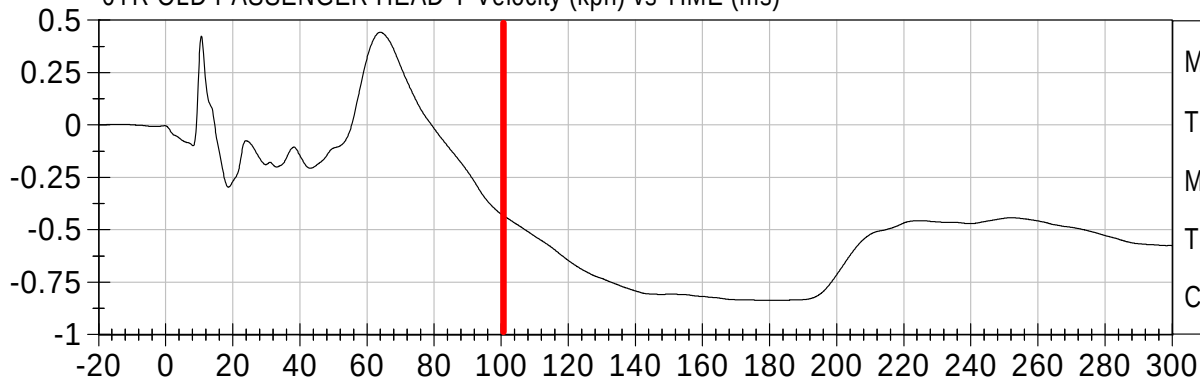
Injury Values Calculated between 0ms and 100ms

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



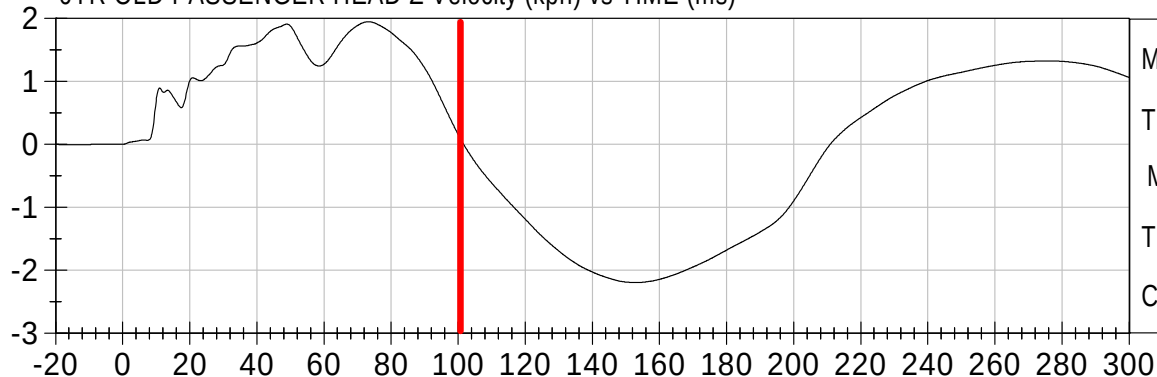
Max: 4.0 kph
Tmax: 50.6 ms
Min: -1.9 kph
Tmin: 14.3 ms
CFC 180

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



Max: 0.4 kph
Tmax: 64.0 ms
Min: -0.4 kph
Tmin: 100.0 ms
CFC 180

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



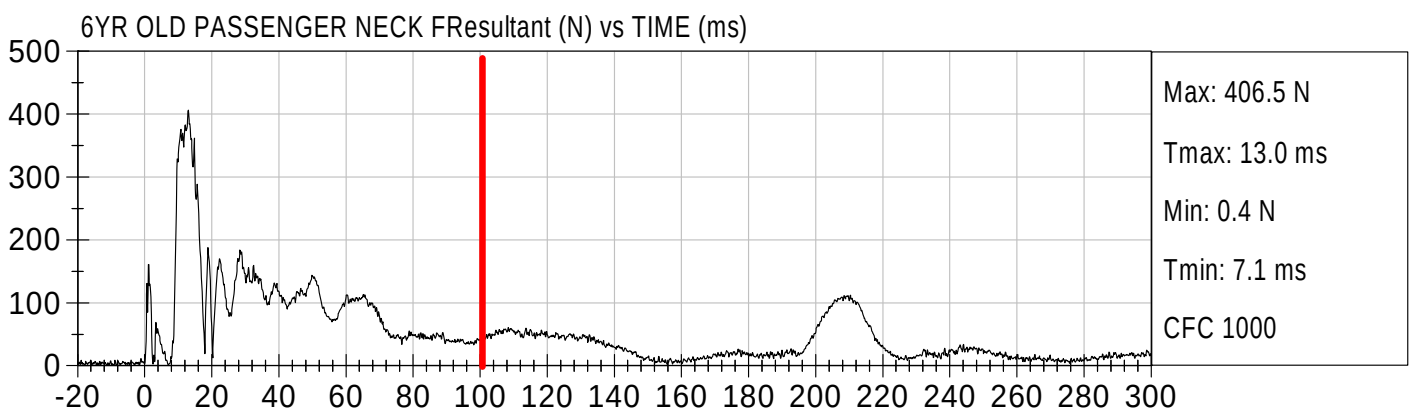
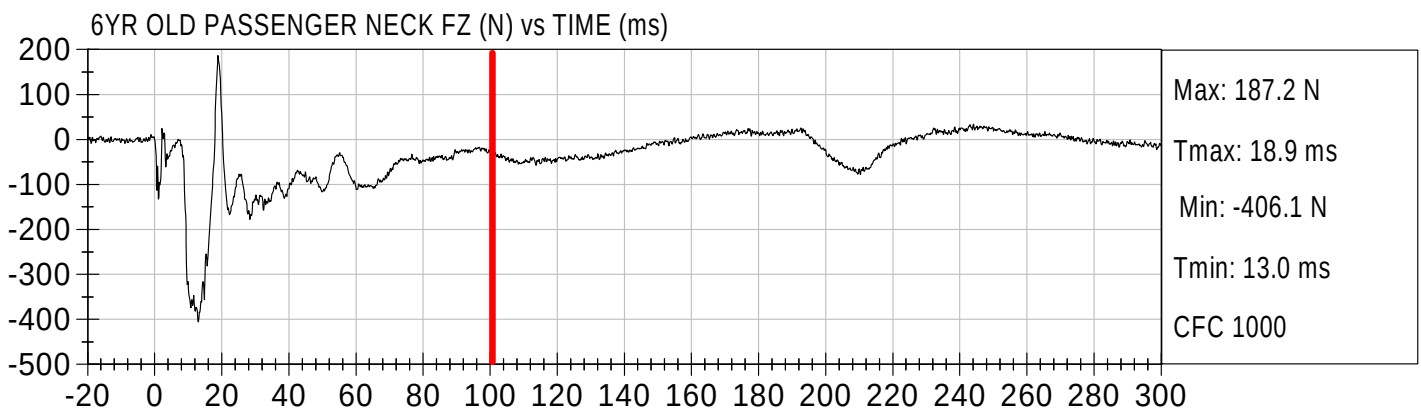
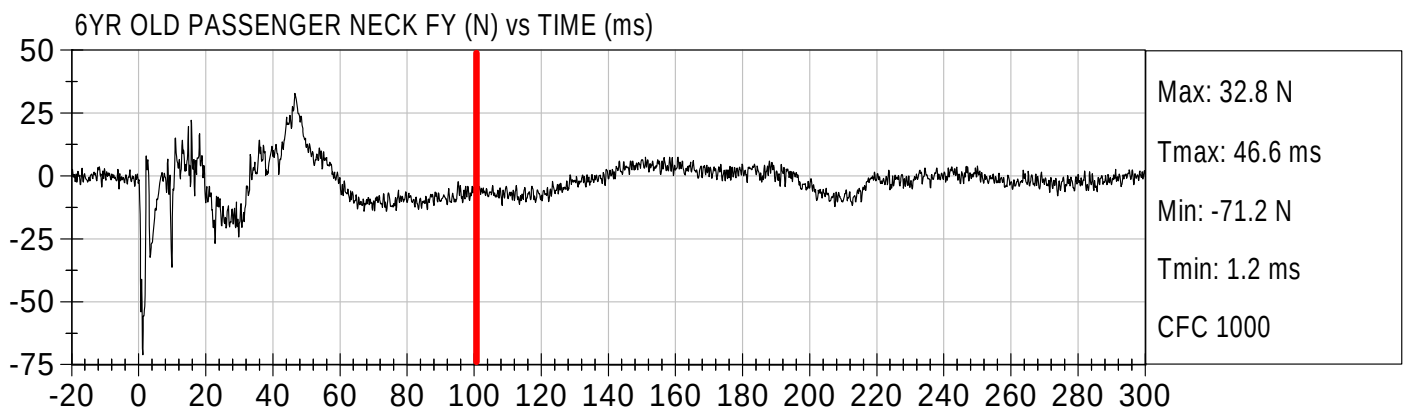
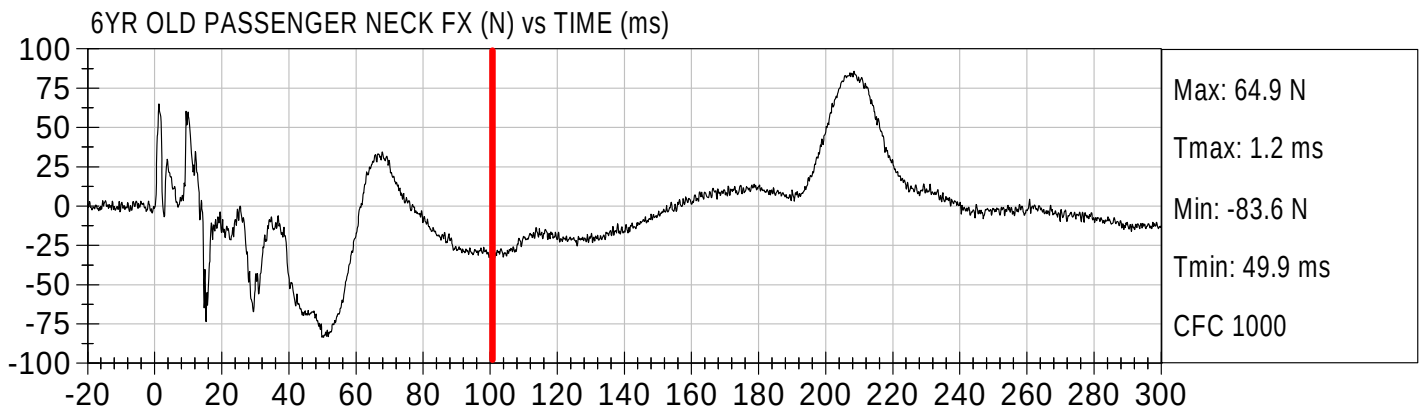
Max: 1.9 kph
Tmax: 73.3 ms
Min: 0.0 kph
Tmin: 0.1 ms
CFC 180



LOW RISK DEPLOYMENT
2009 Kia Optima (C90508) (6YO P2)

Test Date: 4/1/09
Speed: 0.0 mph (0.0 km/h)

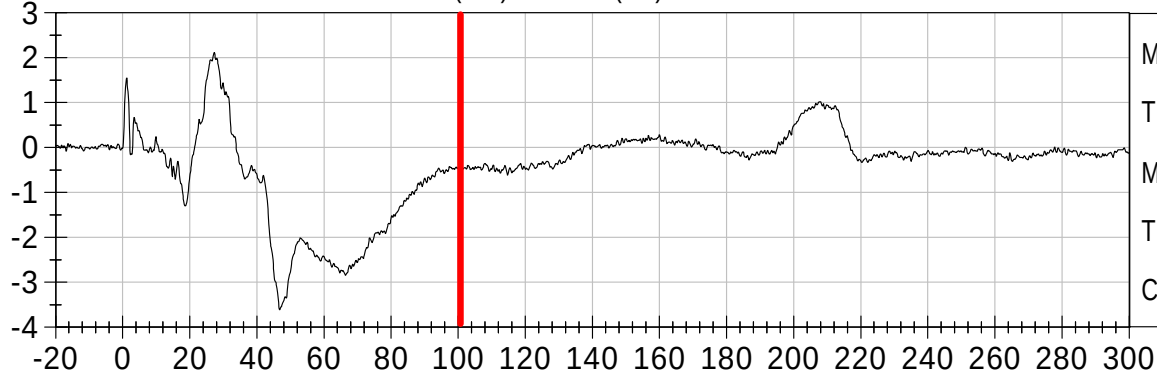
Injury Values Calculated between 0ms and 100ms





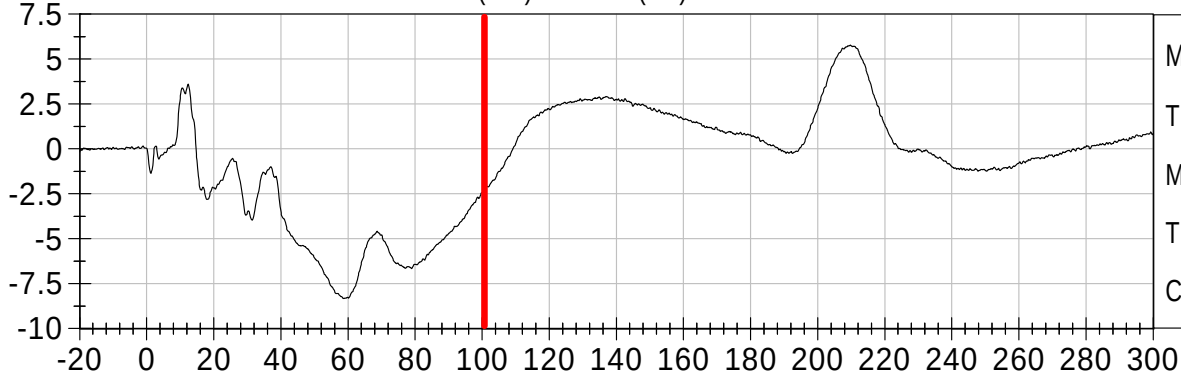
Injury Values Calculated between 0ms and 100ms

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



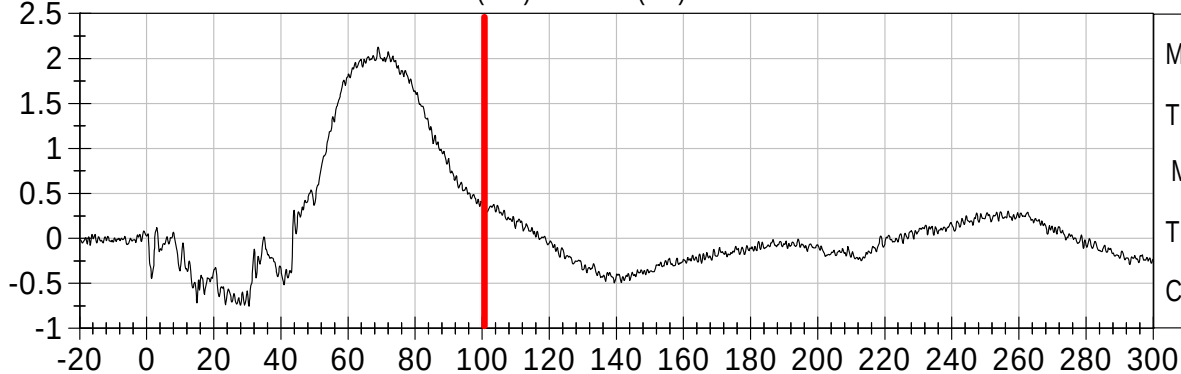
Max: 2.1 Nm
Tmax: 27.3 ms
Min: -3.6 Nm
Tmin: 46.8 ms
CFC 600

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



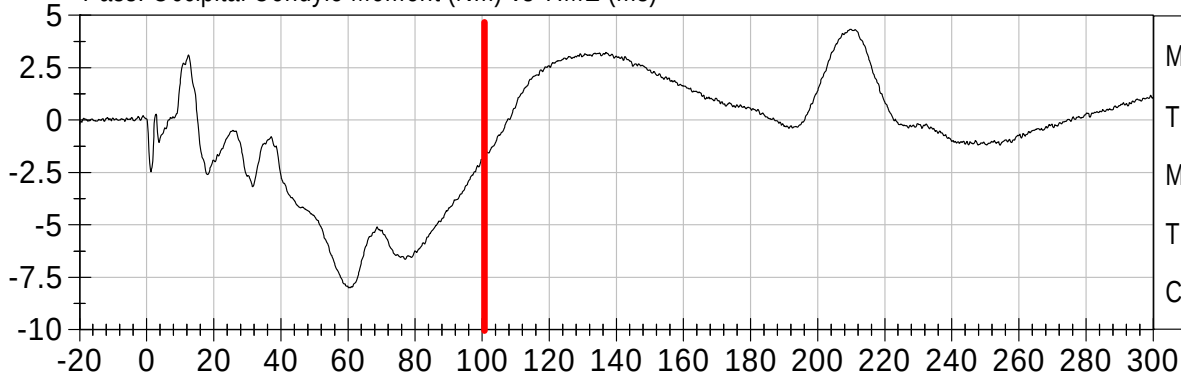
Max: 3.6 Nm
Tmax: 12.3 ms
Min: -8.3 Nm
Tmin: 58.8 ms
CFC 600

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



Max: 2.1 Nm
Tmax: 69.0 ms
Min: -0.8 Nm
Tmin: 30.5 ms
CFC 600

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

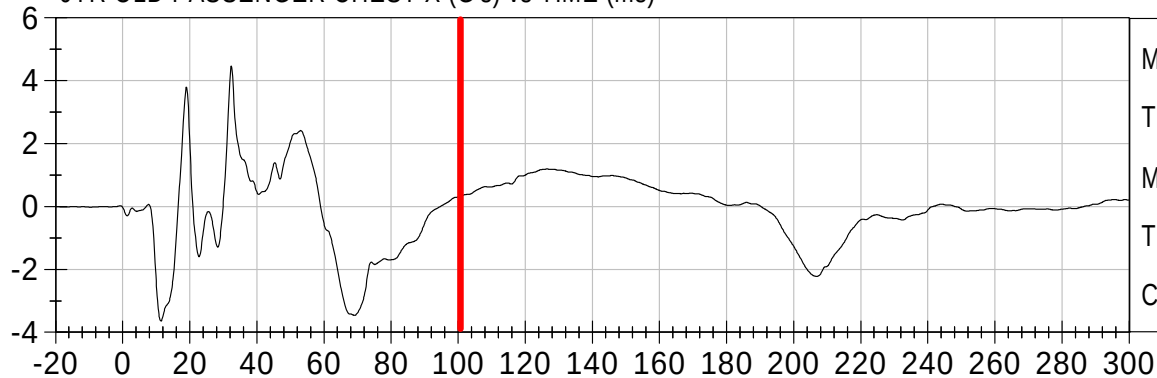


Max: 3.1 Nm
Tmax: 12.5 ms
Min: -8.0 Nm
Tmin: 60.3 ms
CFC 600



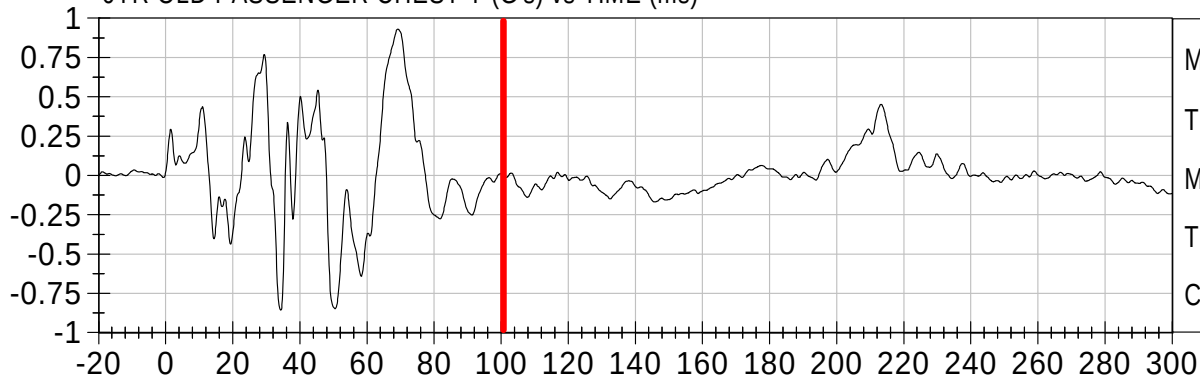
Injury Values Calculated between 0ms and 100ms

6YR OLD PASSENGER CHEST X (G's) vs TIME (ms)



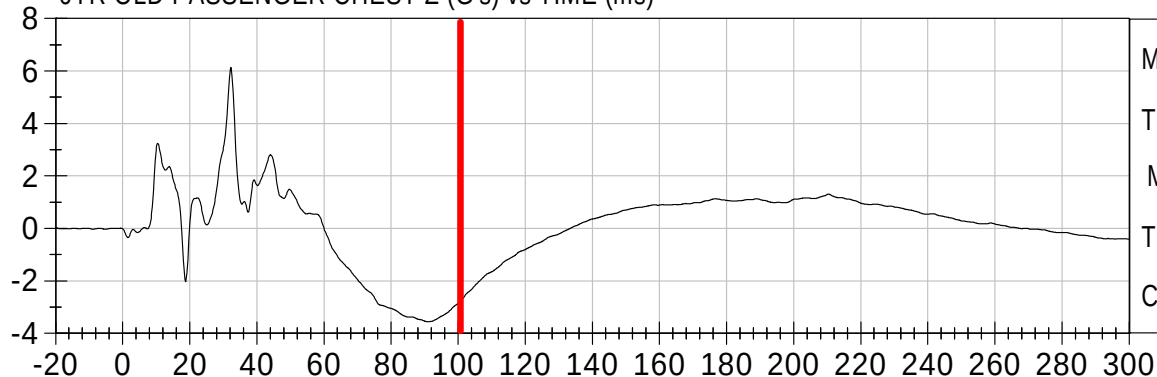
Max: 4.5 G's
Tmax: 32.4 ms
Min: -3.6 G's
Tmin: 11.4 ms
CFC 180

6YR OLD PASSENGER CHEST Y (G's) vs TIME (ms)



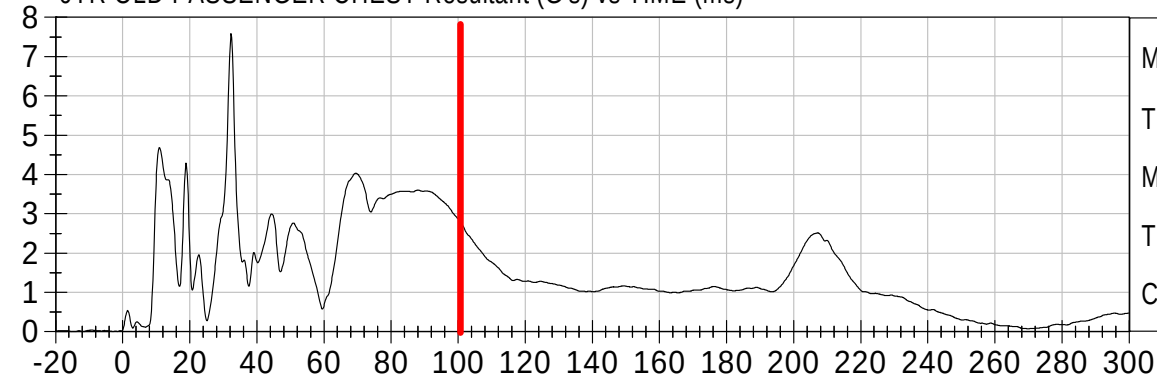
Max: 0.9 G's
Tmax: 69.2 ms
Min: -0.9 G's
Tmin: 34.3 ms
CFC 180

6YR OLD PASSENGER CHEST Z (G's) vs TIME (ms)



Max: 6.1 G's
Tmax: 32.3 ms
Min: -3.6 G's
Tmin: 91.0 ms
CFC 180

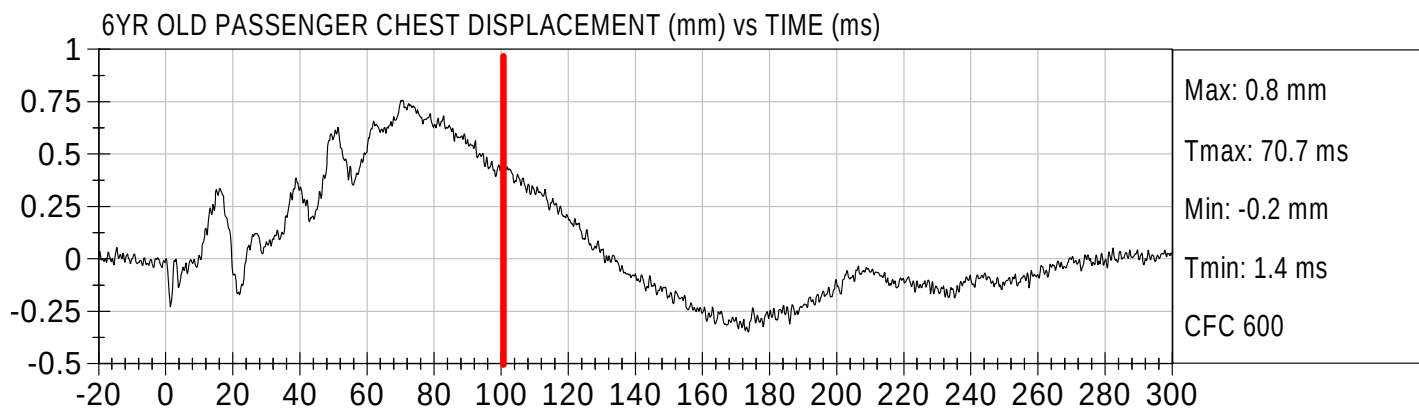
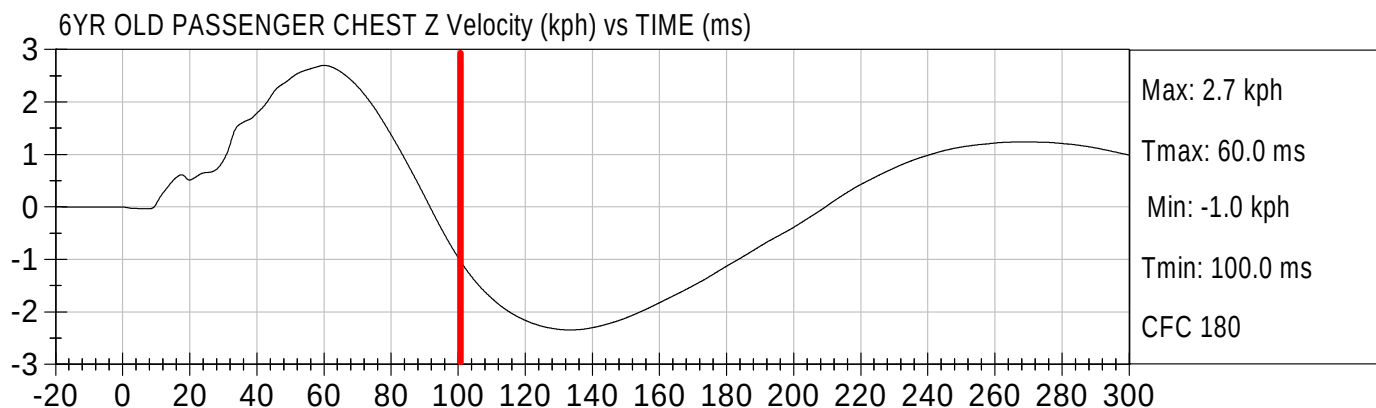
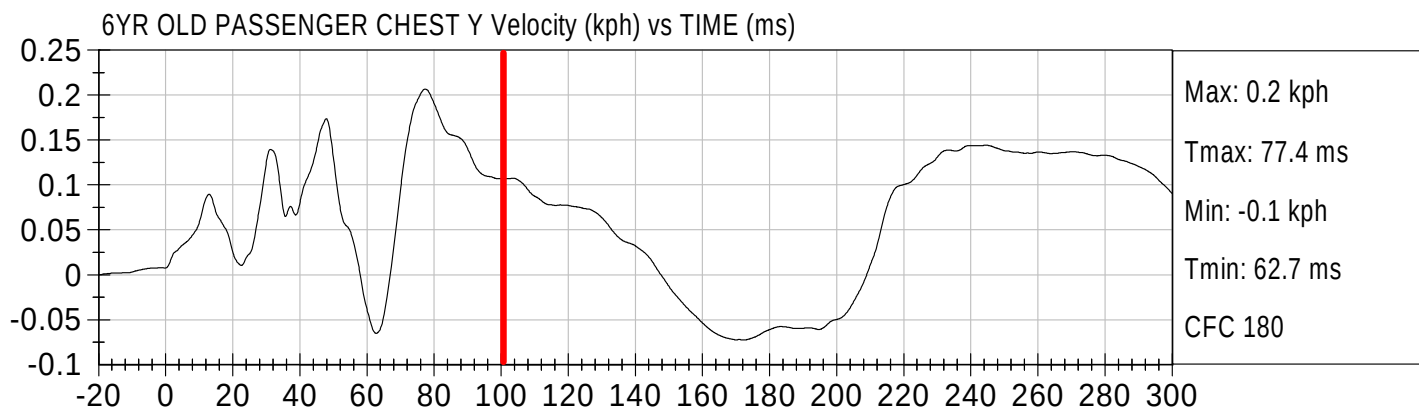
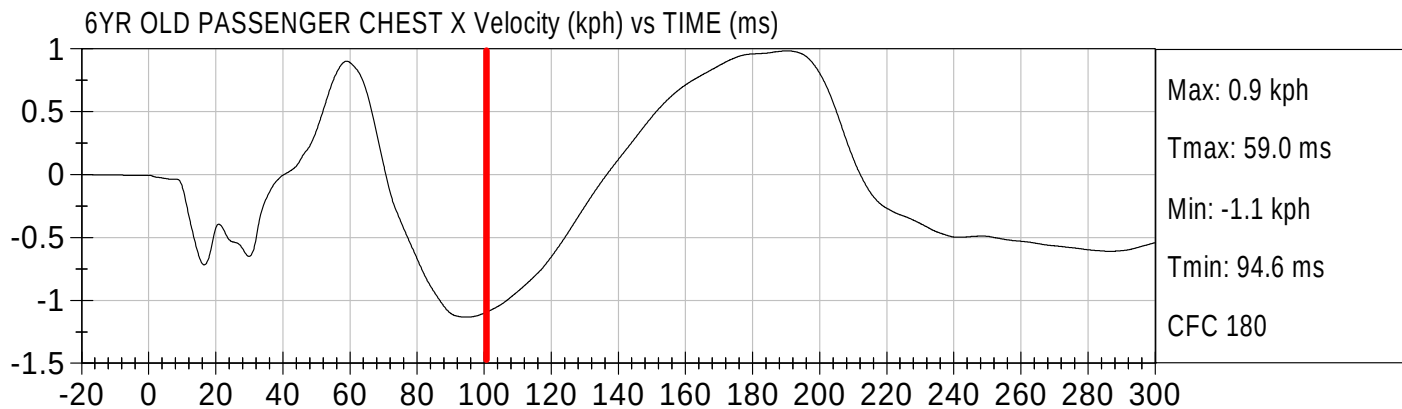
6YR OLD PASSENGER CHEST Resultant (G's) vs TIME (ms)



Max: 7.6 G's
Tmax: 32.3 ms
Min: 0.1 G's
Tmin: 0.1 ms
CFC 180



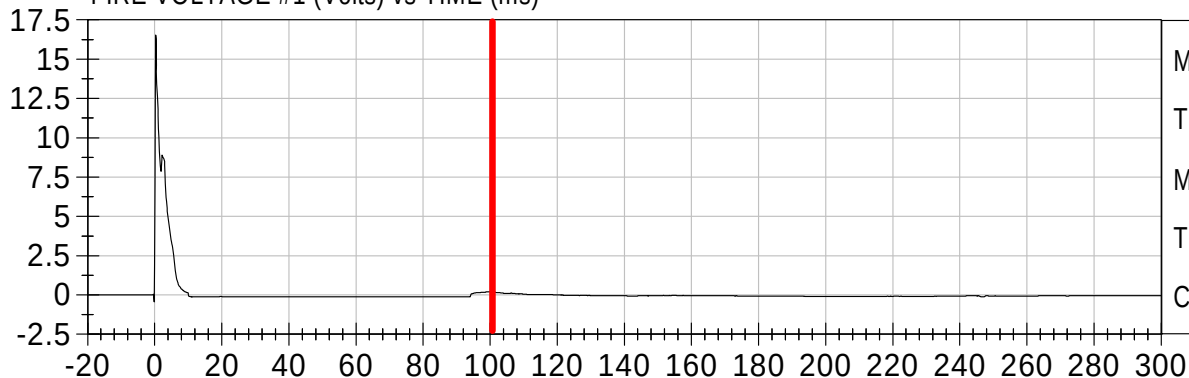
Injury Values Calculated between 0ms and 100ms





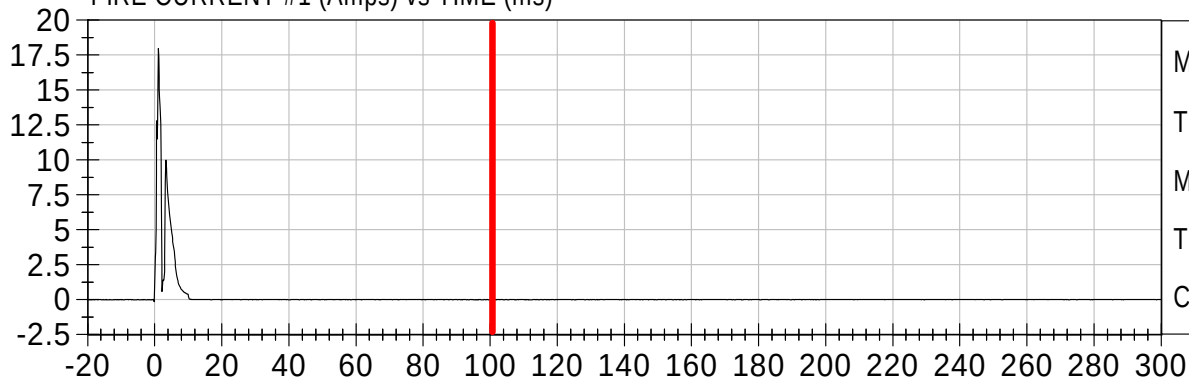
Injury Values Calculated between 0ms and 100ms

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



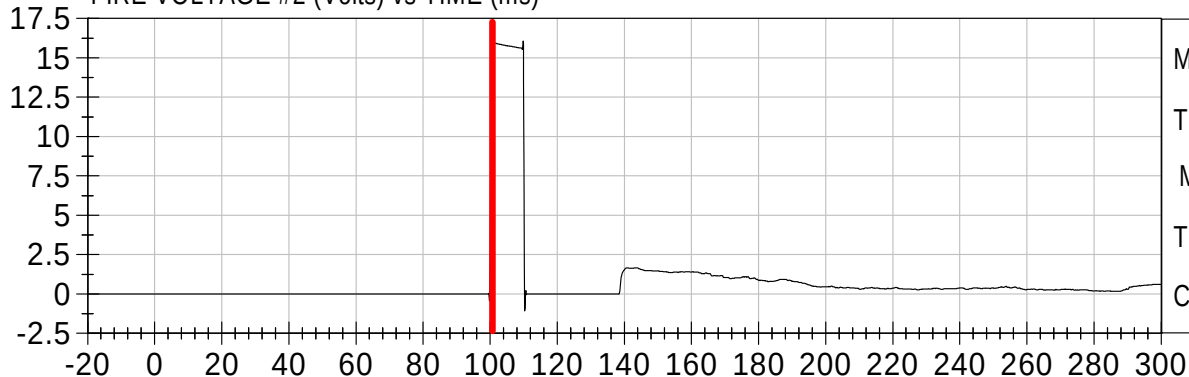
Max: 16.5 Volts
Tmax: 0.3 ms
Min: -0.1 Volts
Tmin: 11.1 ms
CFC 1000

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



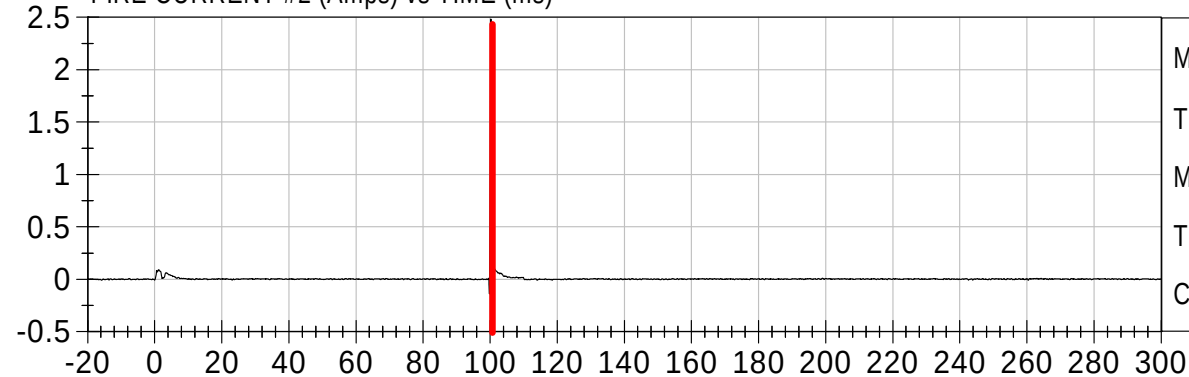
Max: 18.0 Amps
Tmax: 1.1 ms
Min: -0.0 Amps
Tmin: 100.0 ms
CFC 1000

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



Max: 2.1 Volts
Tmax: 100.0 ms
Min: -0.5 Volts
Tmin: 99.8 ms
CFC 1000

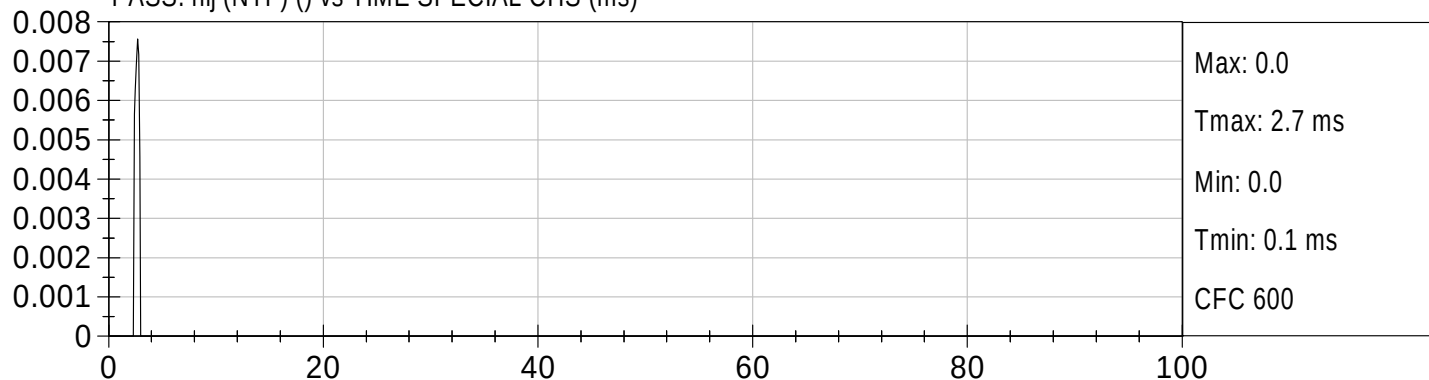
FIRE CURRENT #2 (Amps) vs TIME (ms)



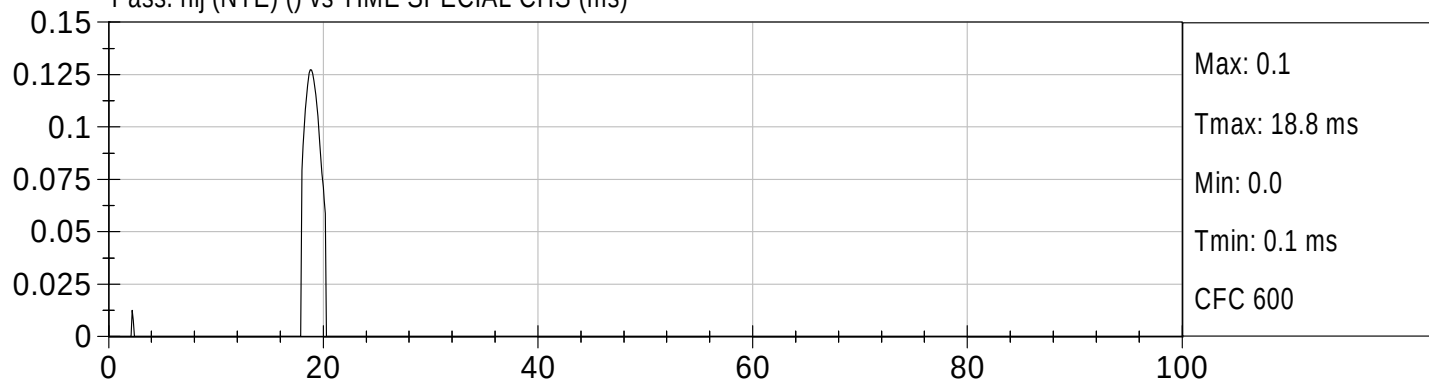
Max: 0.8 Amps
Tmax: 100.0 ms
Min: -0.1 Amps
Tmin: 99.8 ms
CFC 1000



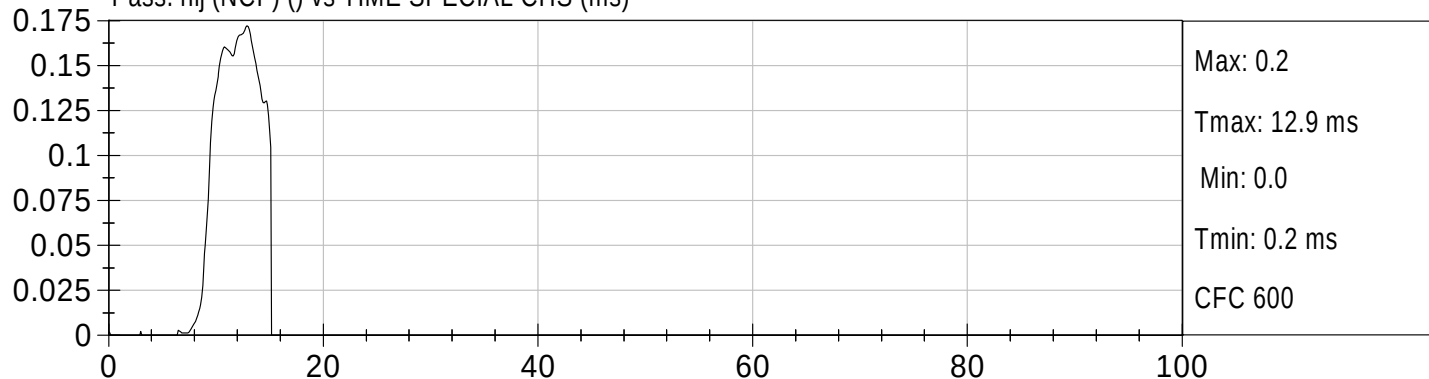
PASS. nij (NTF) () vs TIME SPECIAL CHS (ms)



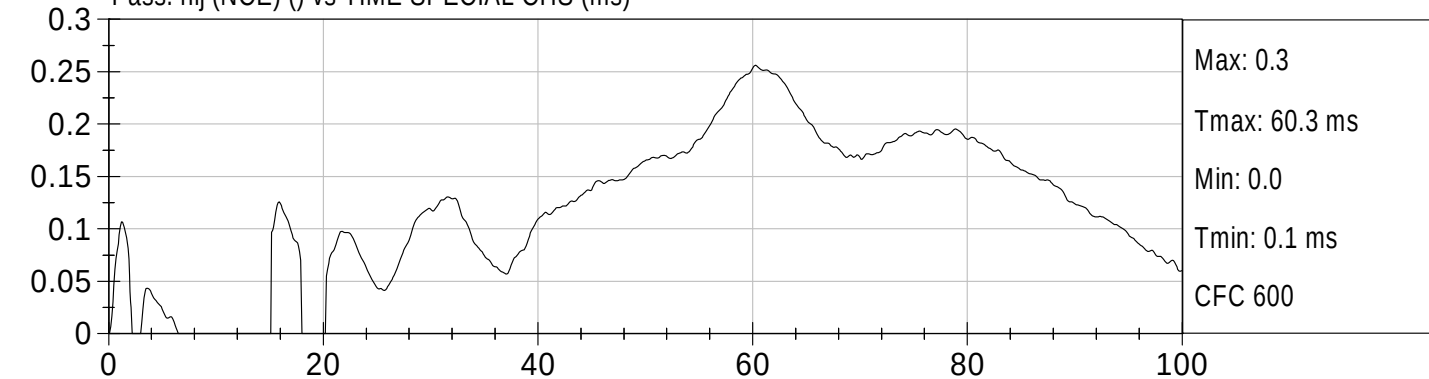
Pass. nij (NTE) () vs TIME SPECIAL CHS (ms)



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



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



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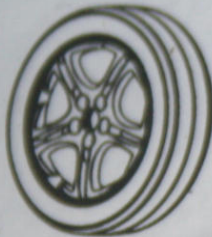
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Vehicle Certification Label

P205/60R16



TIRE AND LOADING INFORMATION

RENSEIGNEMENTS SUR LES PNEUS ET LE CHARGEMENT

SEATING CAPACITY	TOTAL 5	FRONT 2	REAR 3
NOMBRE DE SIÈGES	TOTAL 5	AVANT 2	ARRIÈRE 3

The combined weight of occupants and cargo should never exceed 385kg or 849 lbs.
 Le poids total des occupants et des marchandises ne doit jamais dépasser 385kg ou 849 lb.

TIRE / PNEU	SIZE / DIMENSIONS	COLD TIRE PRESSURE / PRESSION DES PNEUS À FROID
FRONT / AVANT	P205/60R16	220kPa, 32psi
REAR / ARRIÈRE	P205/60R16	220kPa, 32psi
SPARE / DE RECHANGE	T125/80D16	420kPa, 60psi

SEE OWNER'S
MANUAL FOR
ADDITIONAL
INFORMATION

VOIR LE
MANUEL DE
L'USAGER POUR
PLUS DE
RENSEIGNEMENTS



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

C-21.



Pre-Test Engine Compartment View



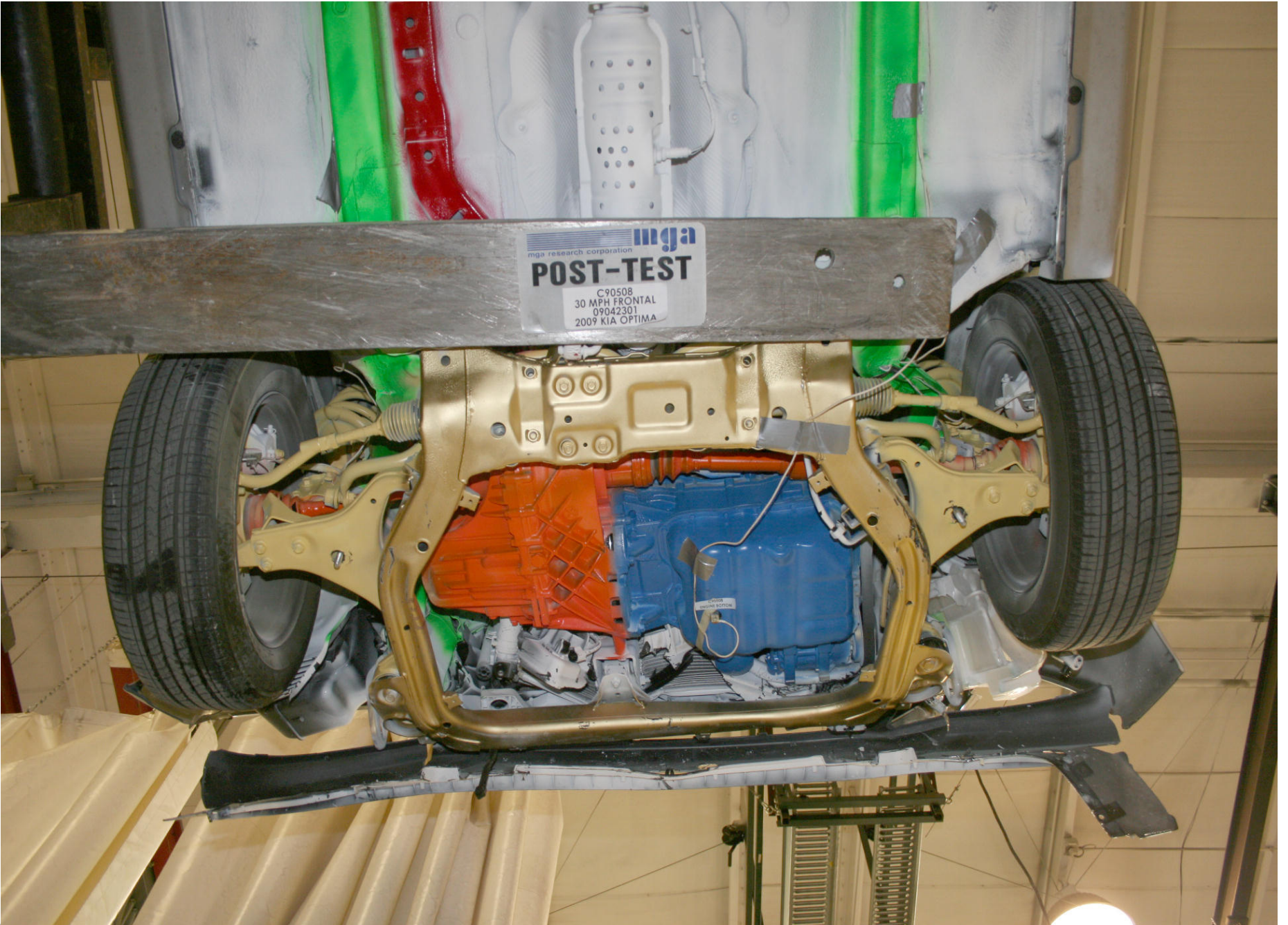
Post-Test Engine Compartment View



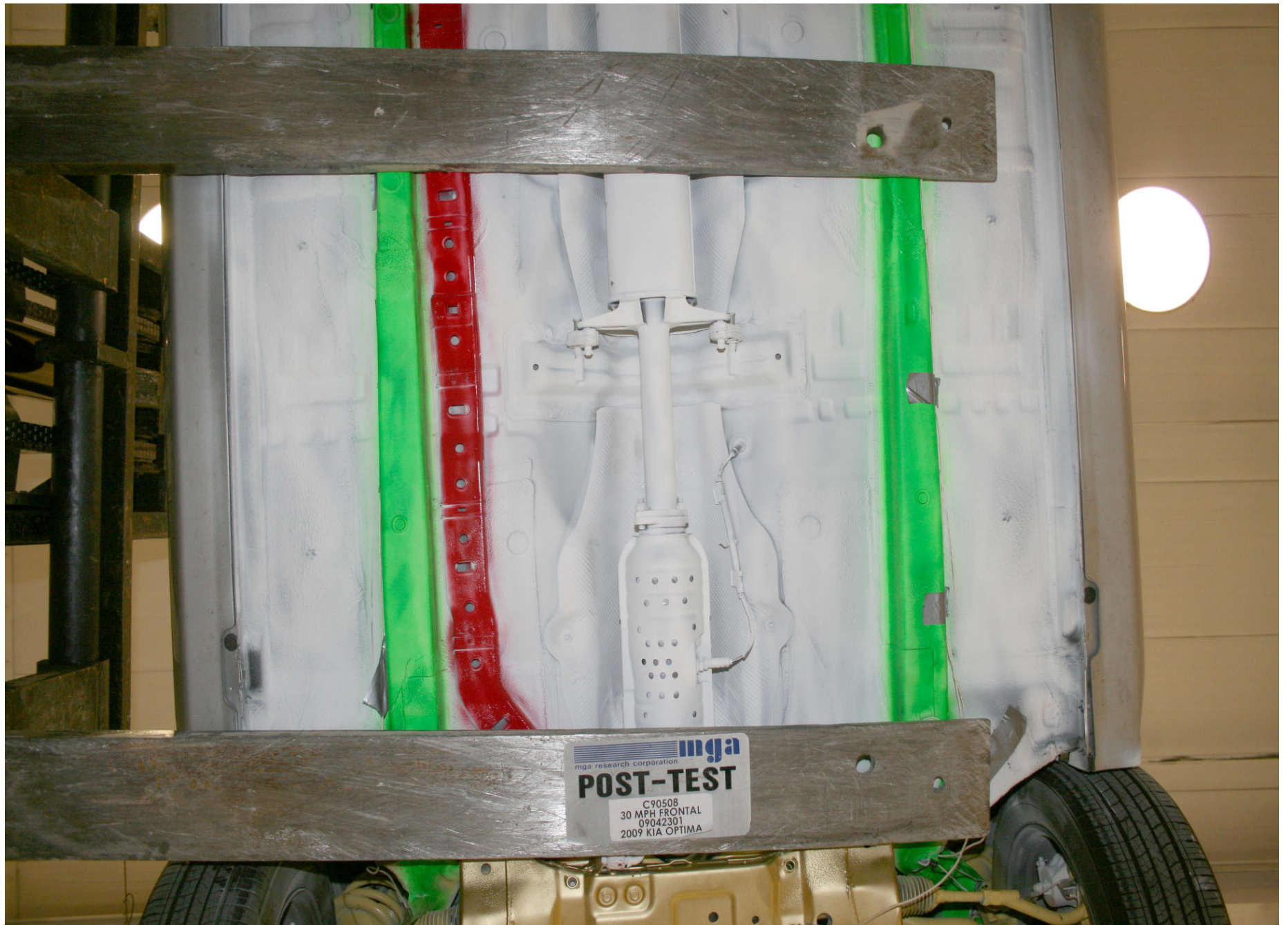
Pre-Test Fuel Filler Cap View



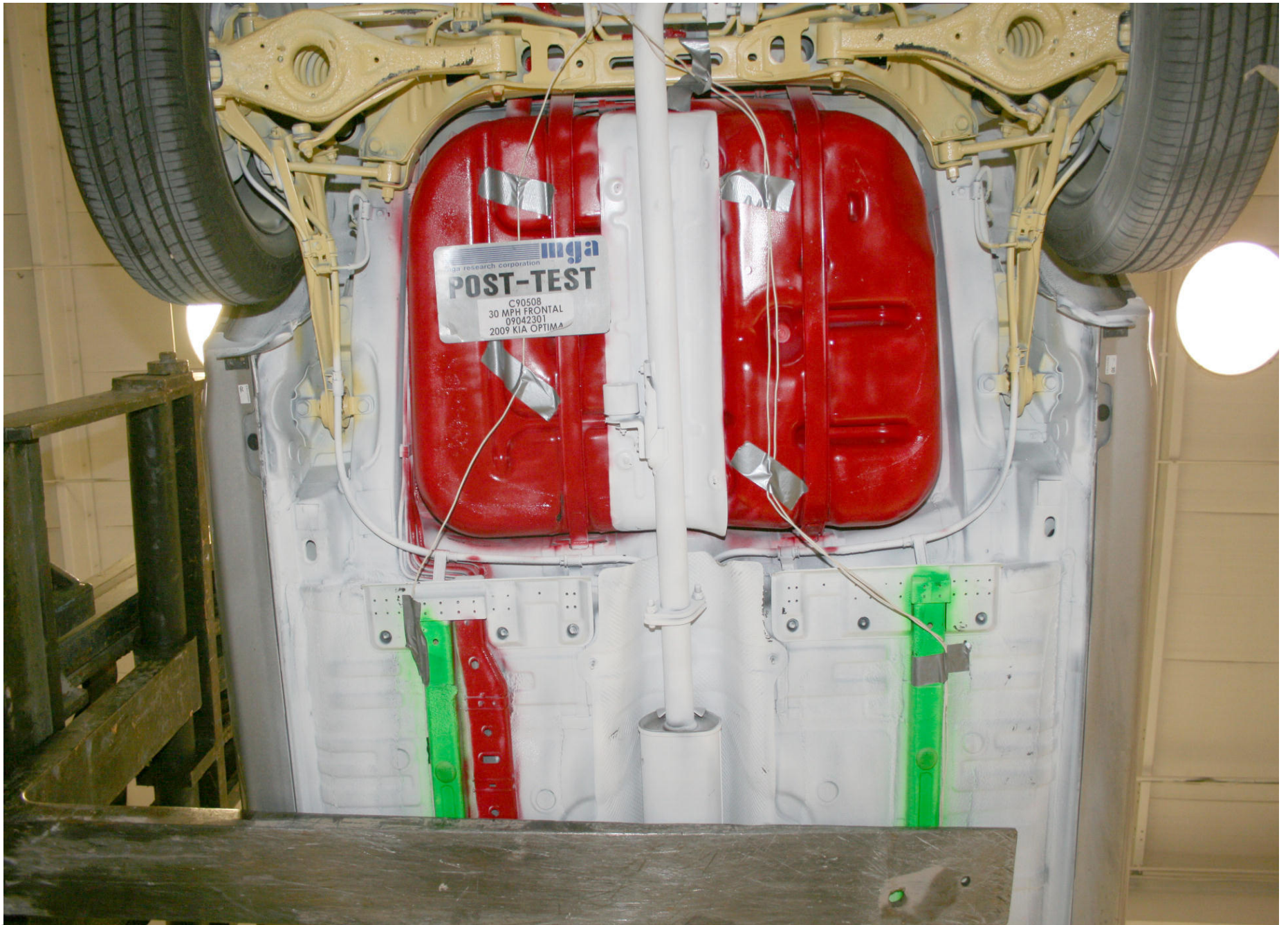
Post-Test Fuel Filler Cap View



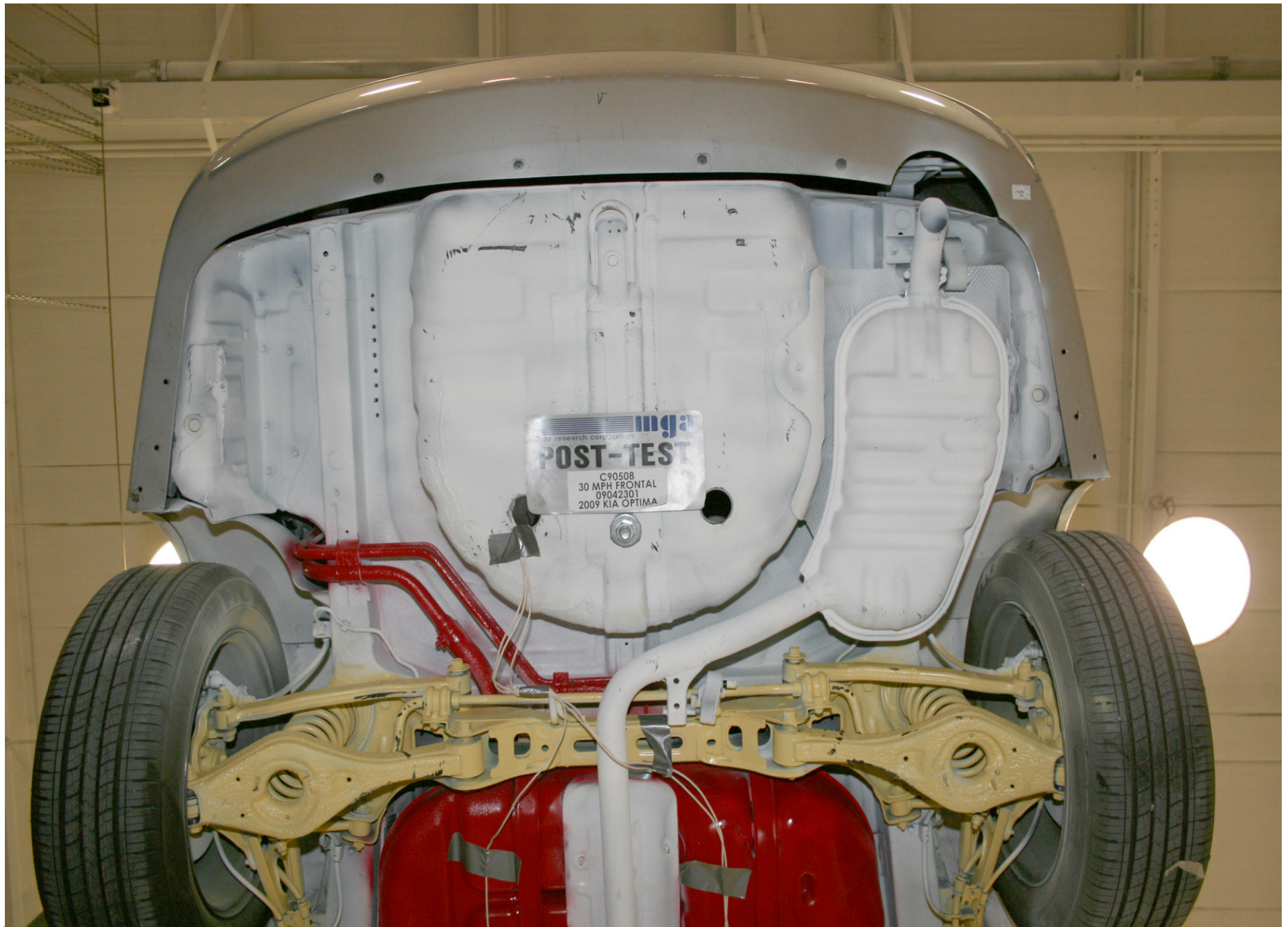
Post-Test Front Underbody View



Post-Test Mid Front Underbody View



Post-Test Mid 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



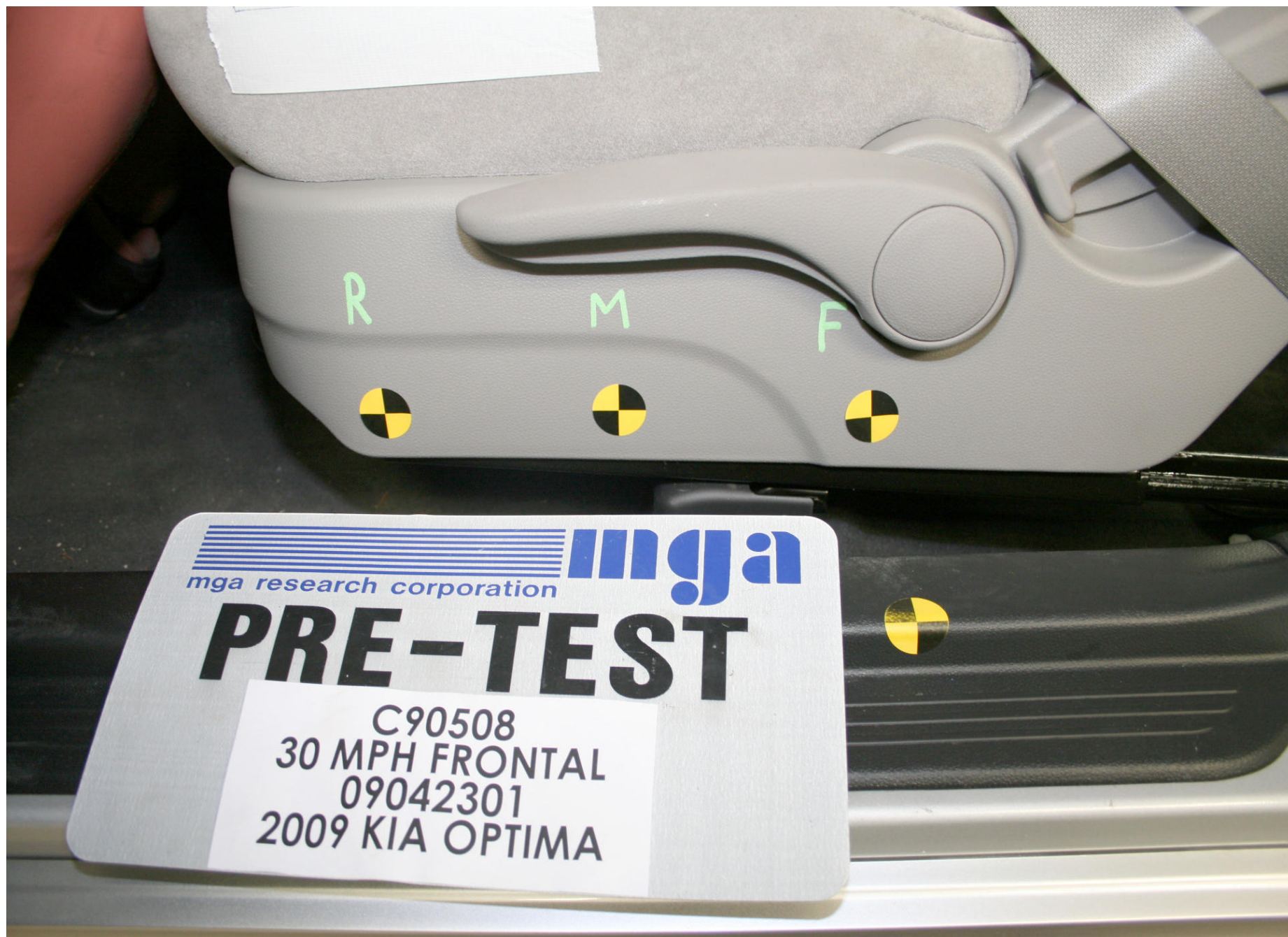
Post-Test Driver Dummy Position Left Side View



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

C-38.



Post-Test Driver Dummy Feet Position



Pre-Test Driver Side Knee Bolster View



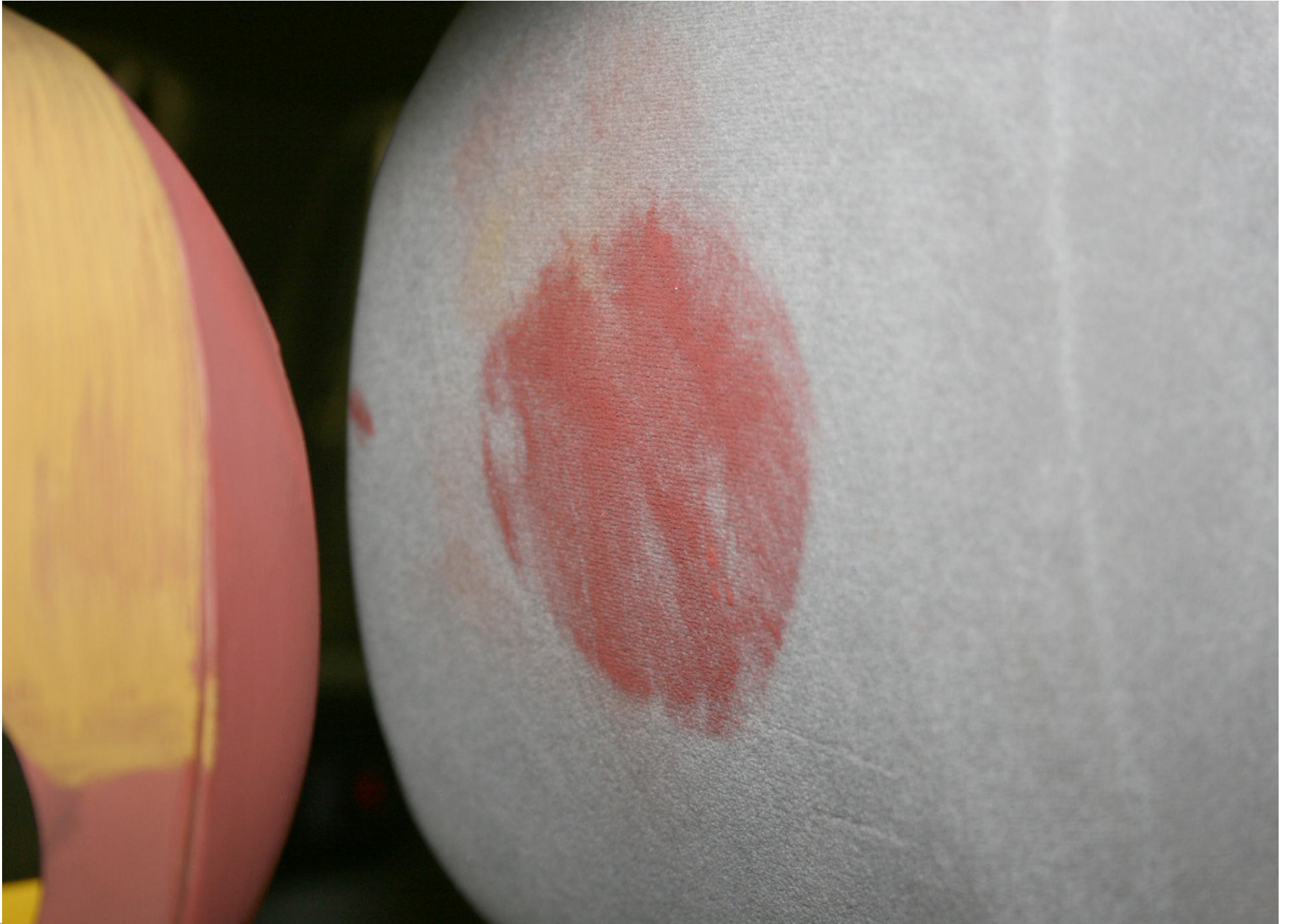
Post-Test Driver Side Knee Bolster View

C-41.



Post-Test Driver Dummy Airbag Contact

C-42.



Post-Test Driver Dummy Head Contact (headrest)

C-43.



Post-Test Driver Dummy Knee Contact (left side view)

C-44.



Post-Test Driver Dummy Knee Contact (right side view)



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

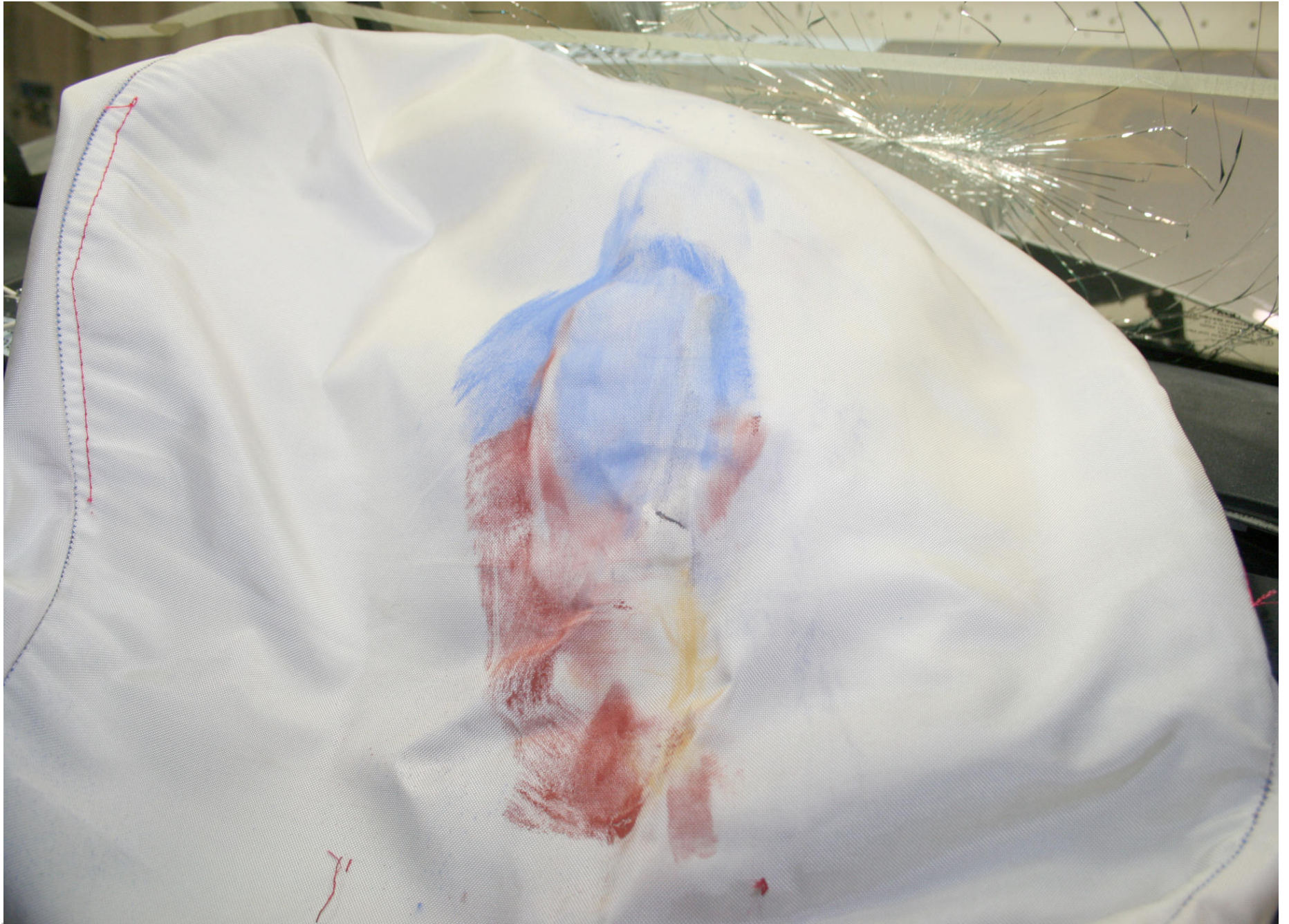


Pre-Test Passenger Side Knee Bolster View

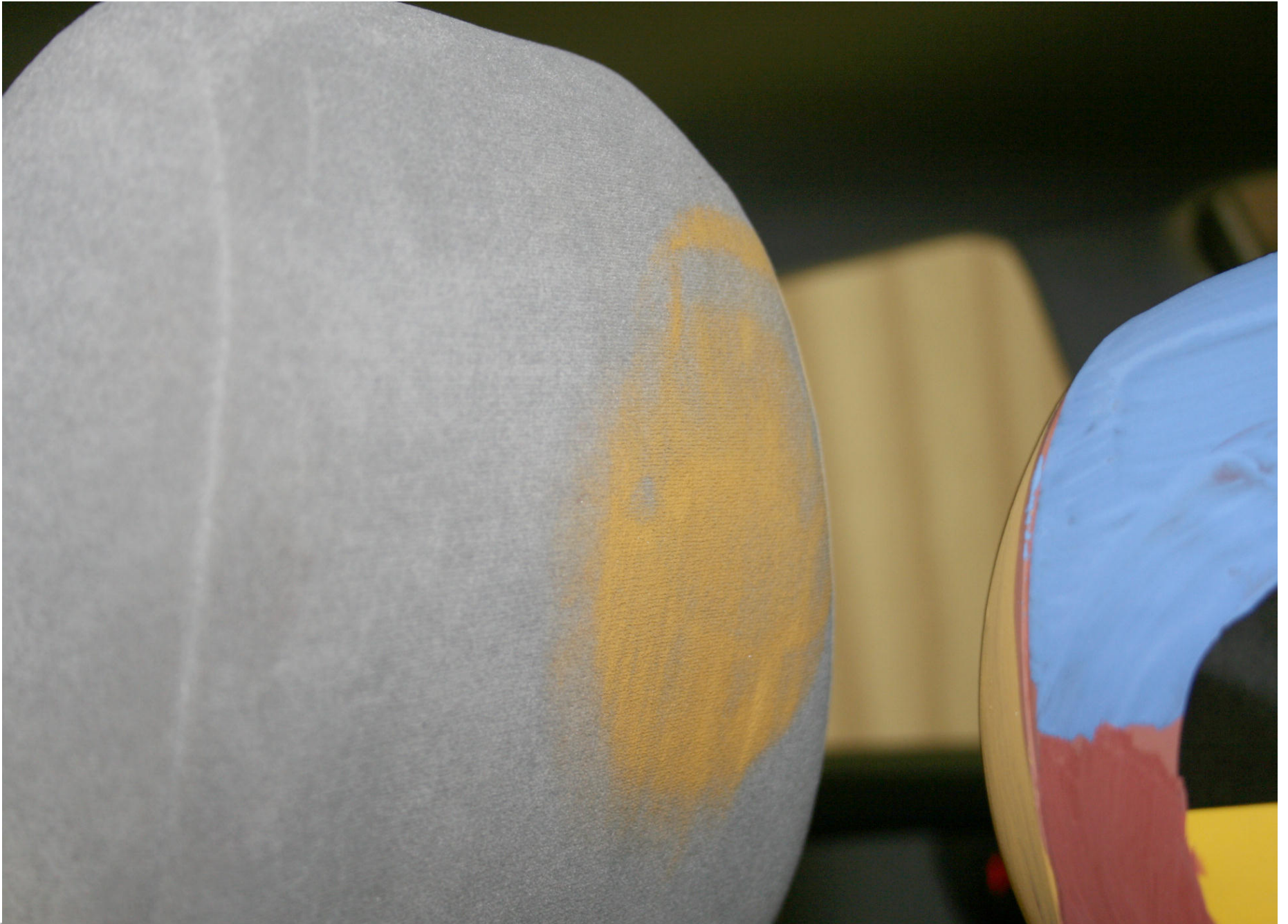


Post-Test Passenger Side Knee Bolster View

C-57.



Post-Test Passenger Dummy Airbag Contact



Post-Test Passenger Dummy Head Contact (headrest)



Post-Test Passenger Dummy Knee Contact (left side view)

C-60.

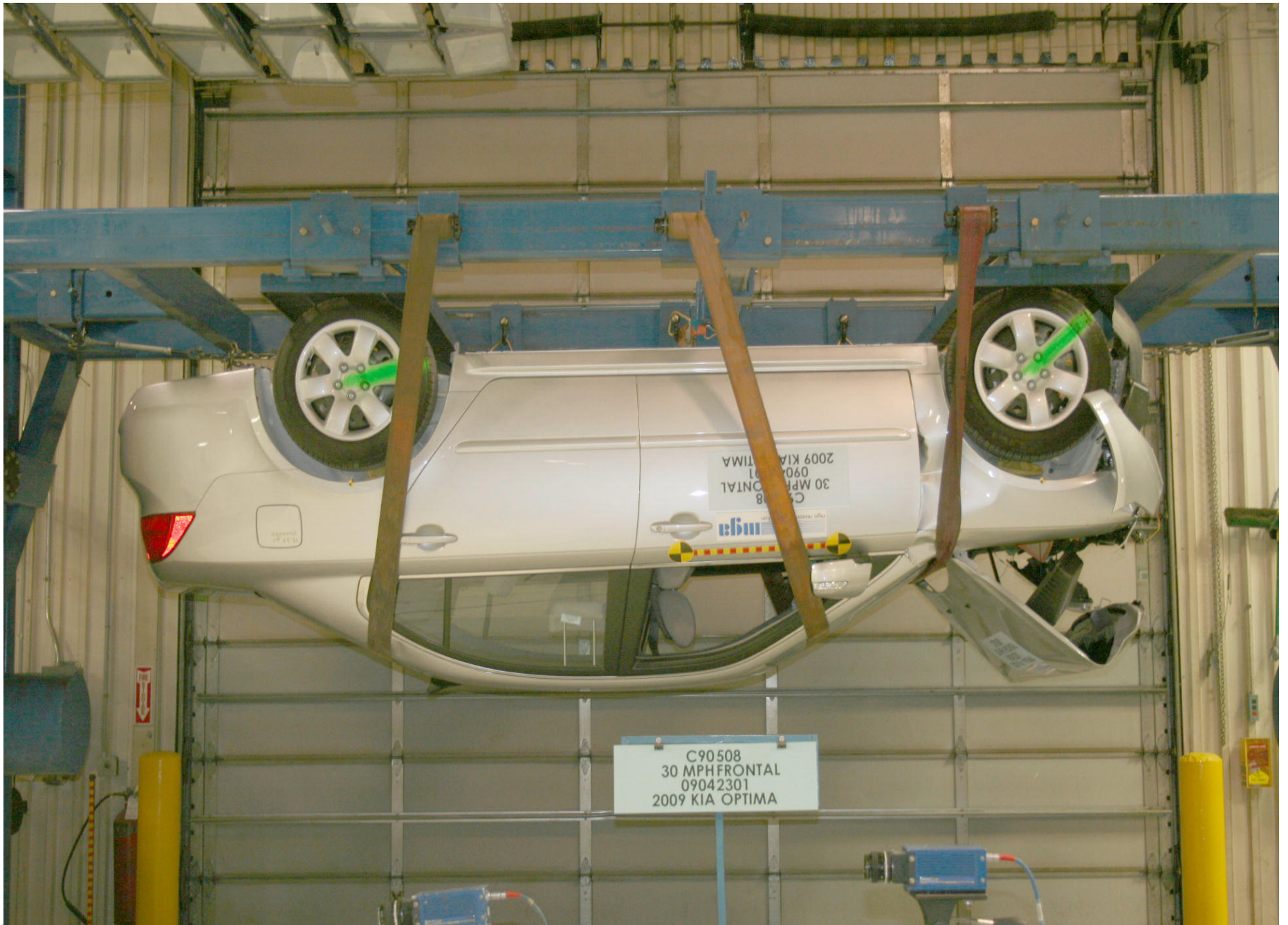


Post-Test Passenger Dummy Knee Contact (right side view)

C-61.



Rollover 90 Degrees



Rollover 180 Degrees

C-63.

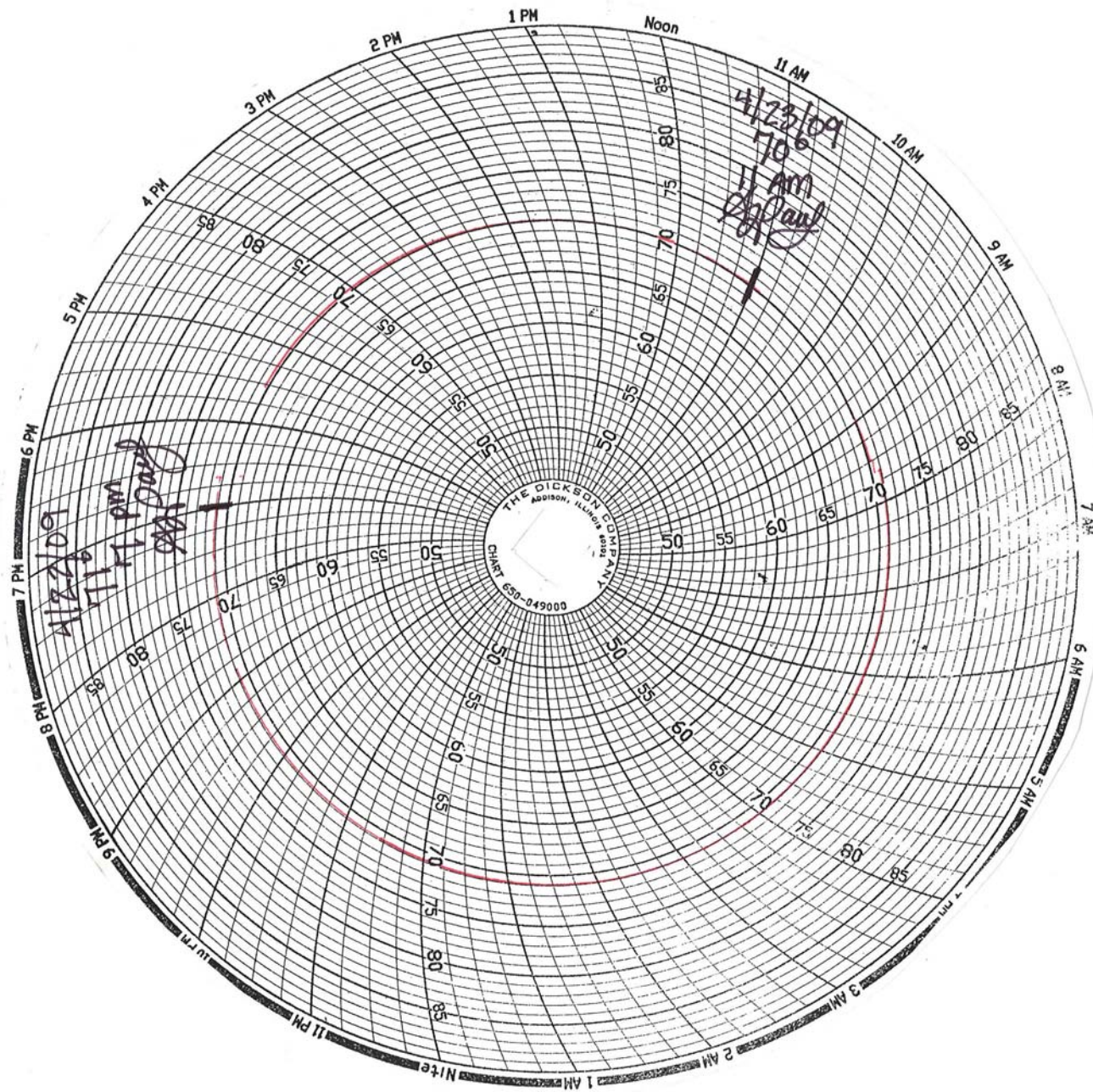


Rollover 270 Degrees

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Rollover 360 Degrees



Temperature Plot

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 Head Contact (headrest)



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



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

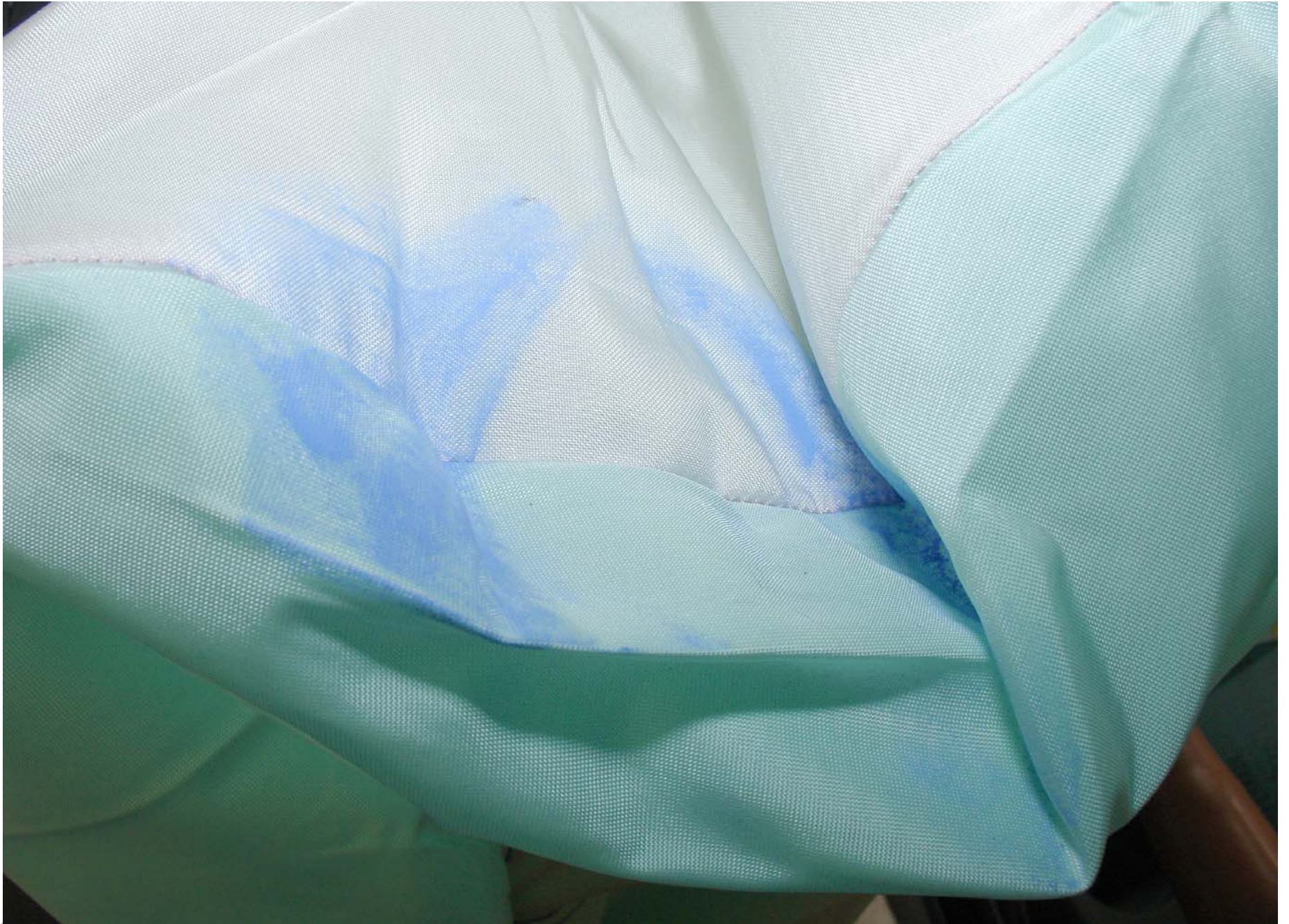


Pre-Test 5th Fem. P2 Driver Dummy Right Side View



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

D-11.



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)



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



PLEASE NOTE: The vehicle (Kia Optima) was erroneously identified on test signs as a Kia Borrego.

Pre-Test 3YO P1 Passenger Dummy Left Side View



Post-Test 3YO P1 Passenger Dummy Left Side View



PLEASE NOTE: The vehicle (Kia Optima) was erroneously identified on test signs as a Kia Borrego.

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 Right Side View

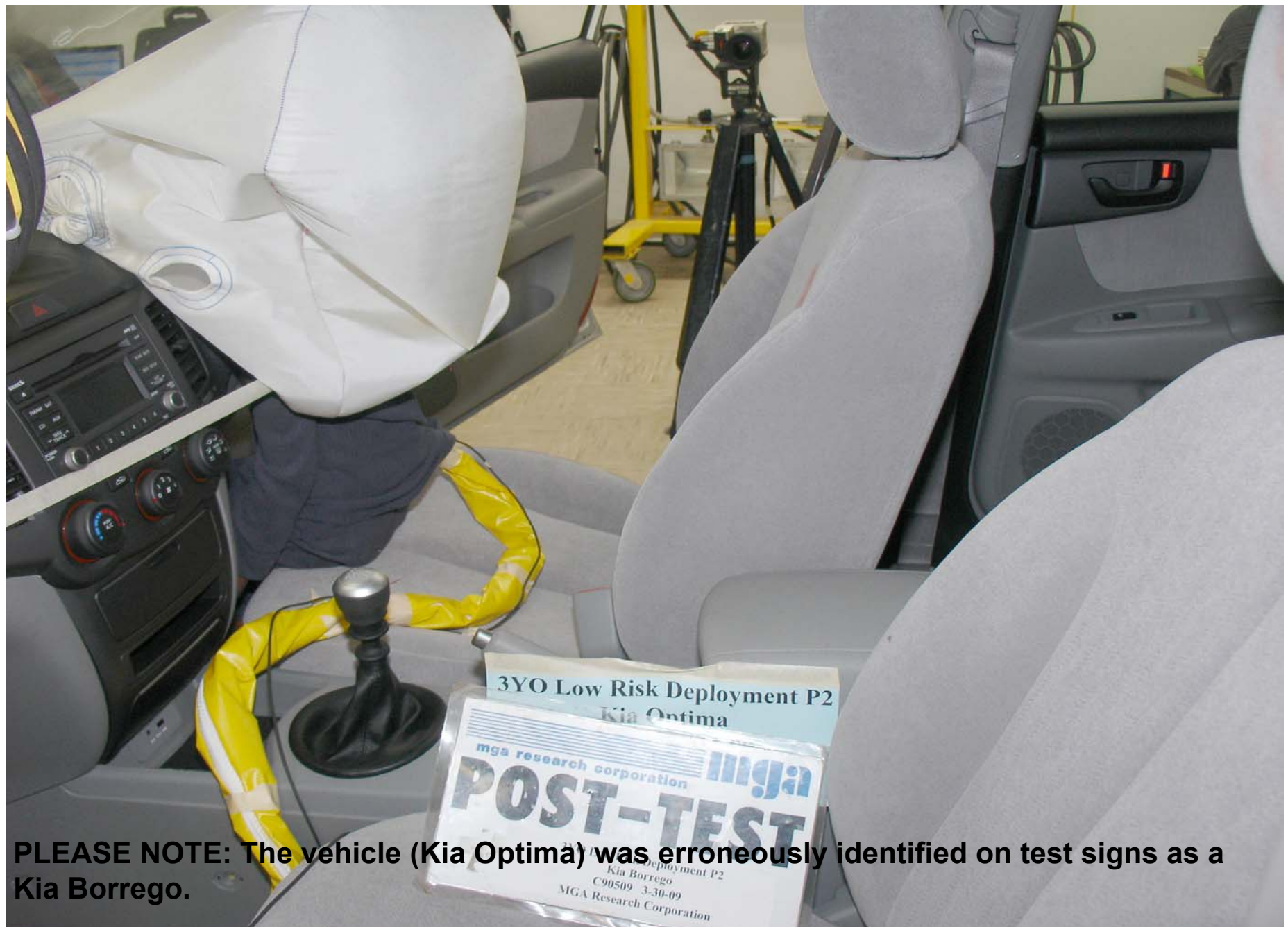


Post-Test 3YO P1 Passenger Dummy Airbag Contact



PLEASE NOTE: The vehicle (Kia Optima) was erroneously identified on test signs as a Kia Borrego.

Pre-Test 3YO P2 Passenger Dummy Left Side View



PLEASE NOTE: The vehicle (Kia Optima) was erroneously identified on test signs as a Kia Borrego.

Post-Test 3YO P2 Passenger Dummy Left Side View



PLEASE NOTE: The vehicle (Kia Optima) was erroneously identified on test signs as a Kia Borrego.

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 Right Side View



Post-Test 3YO P2 Passenger Dummy Airbag Contact



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



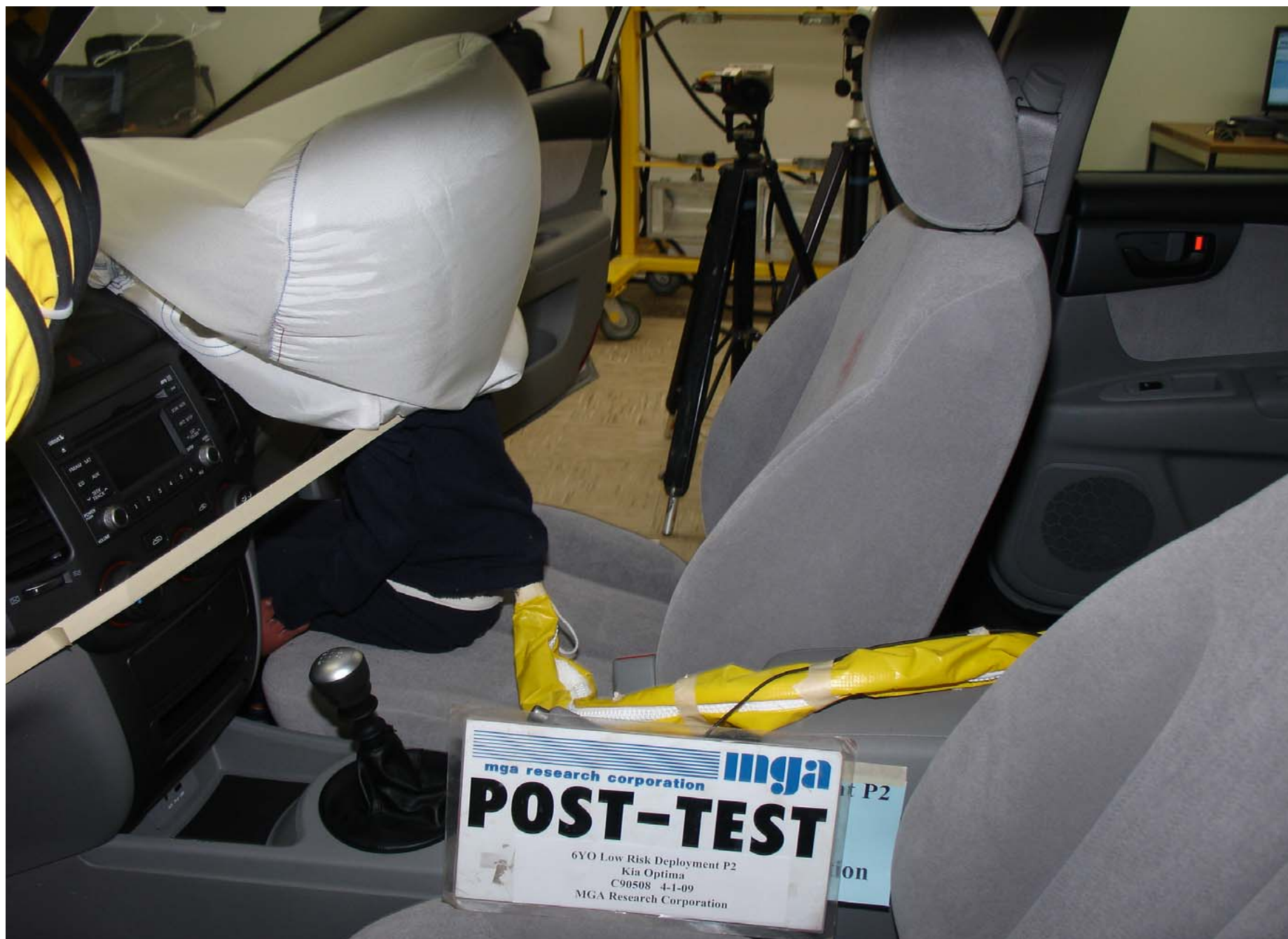
Post-Test 6YO P1 Passenger Dummy Airbag Right Side View



Post-Test 6YO P1 Passenger Dummy Head Contact (seatback)



Pre-Test 6YO P2 Passenger Dummy Left Side View



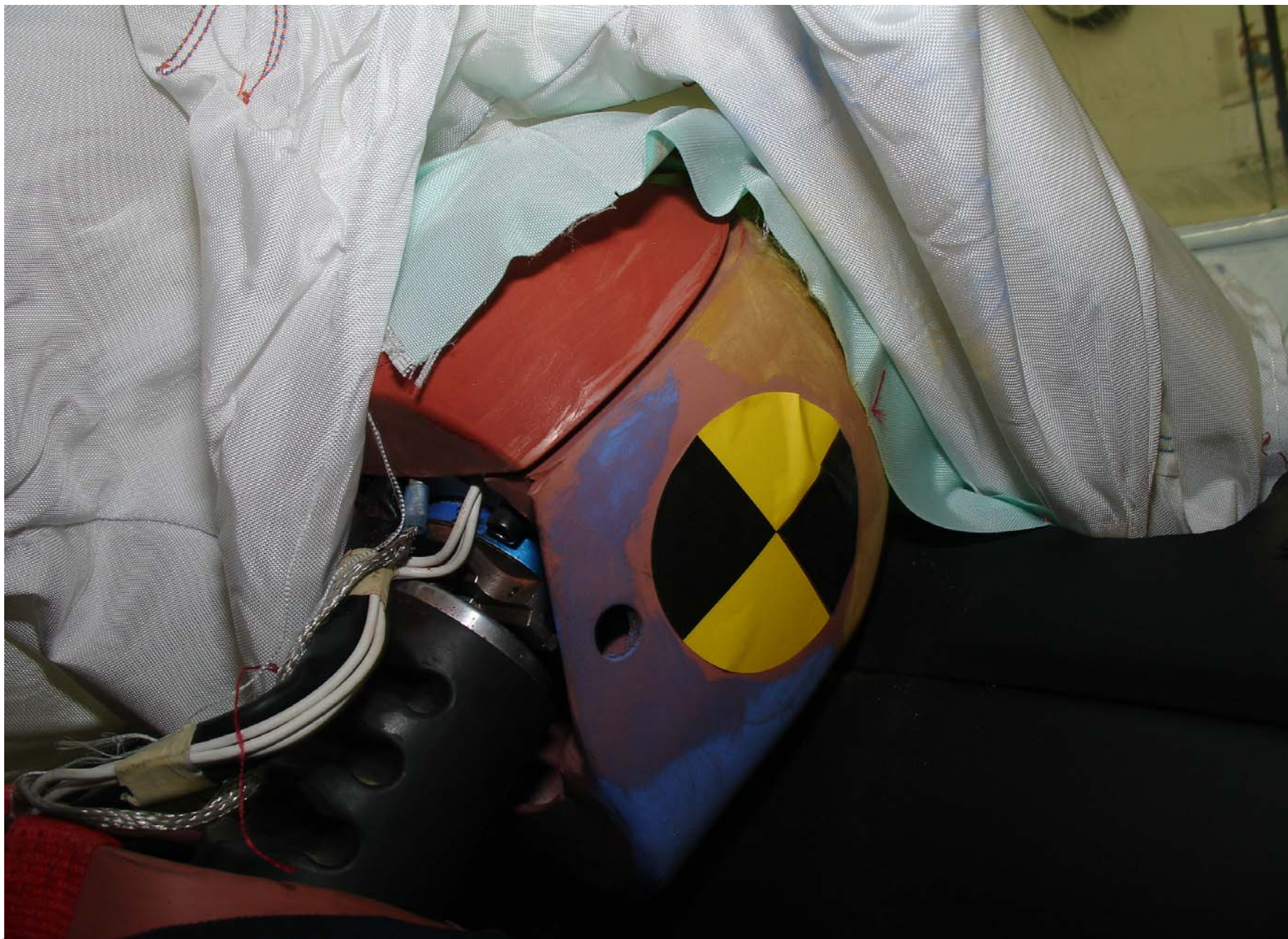
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Pre-Test 6YO P2 Passenger Dummy Right Side View



Post-Test 6YO P2 Passenger Dummy Right Side View



Post-Test 6YO P2 Passenger Dummy Airbag Right Side View

APPENDIX E

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Cosco Dream Ride Car Bed Belted, Forward Seat Track



Cosco Dream Ride Car Bed Belted, Middle Seat Track



Cosco Dream Ride Car Bed Belted, Rearward Seat Track



Unbelted 5th Percentile Female Reactivation, Forward Seat Track

E-2



Britax Handle With Care 191 Belted, Forward Seat Track



Britax Handle With Care 191 Belted, Middle Seat Track



Britax Handle With Care 191 Belted, Rearward Seat Track



Britax Handle With Care 191 Unbelted, Forward Seat Track

E-3



Britax Handle With Care 191 Unbelted, Middle Seat Track



Britax Handle With Care 191 Unbelted, Rearward Seat Track



Britax Handle With Care 191 Forward Facing Unbelted, Forward Seat Track

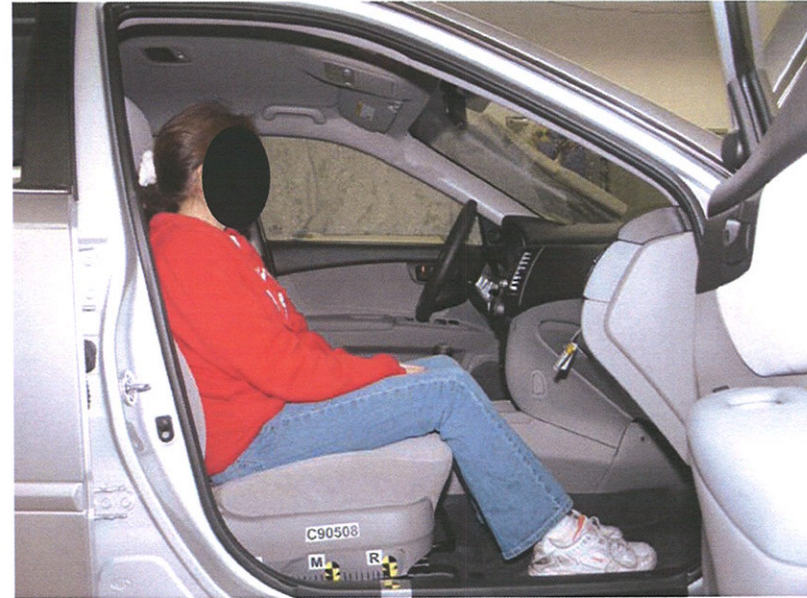


Britax Handle With Care 191 Forward Facing Unbelted, Middle Seat Track

E-4



Britax Handle With Care 191 Forward Facing Unbelted, Rearward Seat Track



Unbelted 5th Percentile Female Reactivation, Rearward Seat Track

E-5



Evenflo First Choice 204 Belted, Forward Seat Track



Evenflo First Choice 204 Belted, Middle Seat Track



Evenflo First Choice 204 Belted, Rearward Seat Track



Evenflo First Choice 204 Unbelted, Middle Seat Track

E-6



Evenflo First Choice 204 Unbelted, Rearward Seat Track



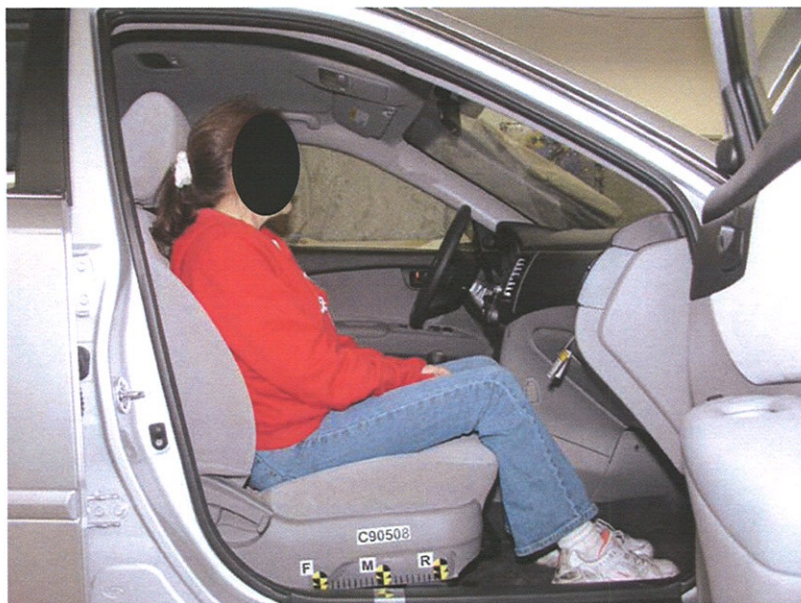
Evenflo First Choice 204 Forward Facing Unbelted, Forward Seat Track



Evenflo First Choice 204 Forward Facing Unbelted, Middle Seat Track



Evenflo First Choice 204 Forward Facing Unbelted, Rearward Seat Track



Unbelted 5th Percentile Female Reactivation, Middle Seat Track

E-8



Graco Infant W Base Belted, Forward Seat Track



Graco Infant W Base Belted, Middle Seat Track



Graco Infant W Base Belted, Rearward Seat Track



Graco Infant W Base Unbelted, Forward Seat Track



Graco Infant W Base Unbelted, Middle Seat Track



Graco Infant W Base Unbelted, Rearward Seat Track



Graco Infant W Base Forward Facing Unbelted, Forward Seat Track



Graco Infant W Base Forward Facing Unbelted, Middle Seat Track

E-10



Graco Infant W Base Forward Facing Unbelted, Rearward Seat Track



Graco Infant WO Base Belted, Forward Seat Track



Graco Infant WO Base Belted, Middle Seat Track



Graco Infant WO Base Belted, Rearward Seat Track

E-11



Graco Infant WO Base Unbelted, Forward Seat Track



Graco Infant WO Base Unbelted, Middle Seat Track



Graco Infant WO Base Unbelted, Rearward Seat Track



Graco Infant WO Base Forward Facing Unbelted, Forward Seat Track

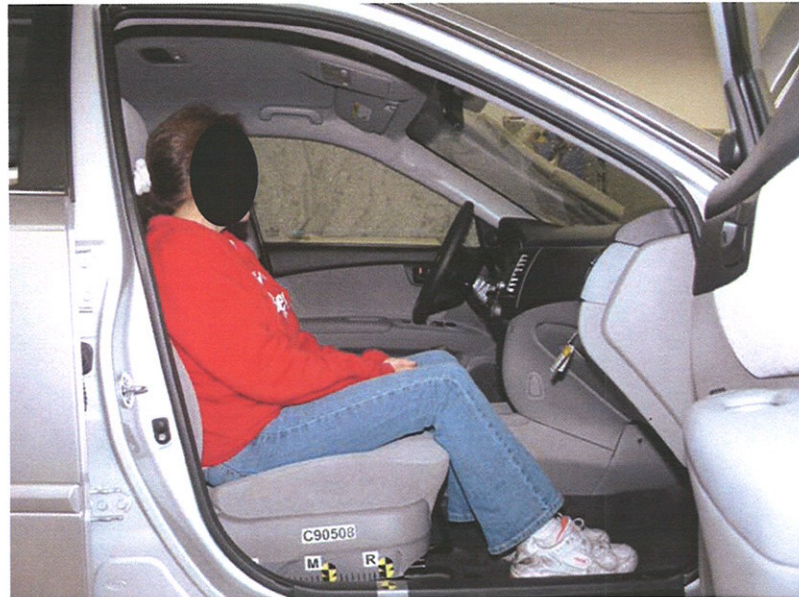
E-12



Graco Infant WO Base Forward Facing Unbelted, Middle Seat Track



Graco Infant WO Base Forward Facing Unbelted, Rearward Seat Track



Unbelted 5th Percentile Female Reactivation, Rearward Seat Track

E-13



Britax Roundabout 161 Forward Facing Belted, Forward Seat Track



Britax Roundabout 161 Forward Facing Belted, Middle Seat Track



Britax Roundabout 161 Forward Facing Belted, Rearward Seat Track



Britax Roundabout 161 Forward Facing Unbelted, Forward Seat Track

E-14



Britax Roundabout 161 Forward Facing Unbelted, Middle Seat Track



Britax Roundabout 161 Forward Facing Unbelted, Rearward Seat Track



Britax Roundabout 161 Rear Facing Belted, Forward Seat Track



Britax Roundabout 161 Rear Facing Belted, Middle Seat Track



Britax Roundabout 161 Rear Facing Belted, Rearward Seat Track



Britax Roundabout 161 Rear Facing Unbelted, Forward Seat Track



Britax Roundabout 161 Rear Facing Unbelted, Middle Seat Track



Britax Roundabout 161 Rear Facing Unbelted, Rearward Seat Track



Unbelted 5th Percentile Female Reactivation, Forward Seat Track



Century Encore Forward Facing Belted, Forward Seat Track



Century Encore Forward Facing Belted, Middle Seat Track



Century Encore Forward Facing Belted, Rearward Seat Track



Century Encore Forward Facing Unbelted, Forward Seat Track



Century Encore Forward Facing Unbelted, Middle Seat Track



Century Encore Forward Facing Unbelted, Rearward Seat Track



Century Encore Rear Facing Belted, Forward Seat Track



Century Encore Rear Facing Belted, Middle Seat Track



Century Encore Rear Facing Belted, Rearward Seat Track



Century Encore Rear Facing Unbelted, Forward Seat Track



Century Encore Rear Facing Unbelted, Middle Seat Track



Century Encore Rear Facing Unbelted, Rearward Seat Track



Unbelted 5th Percentile Female Reactivation, Forward Seat Track



Evenflo Medallion 254 Forward Facing Belted, Forward Seat Track



Evenflo Medallion 254 Forward Facing Belted, Middle Seat Track



Evenflo Medallion 254 Forward Facing Belted, Rearward Seat Track



Evenflo Medallion 254 Forward Facing Unbelted, Forward Seat Track



Evenflo Medallion 254 Forward Facing Unbelted, Middle Seat Track



Evenflo Medallion 254 Forward Facing Unbelted, Rearward Seat Track



Evenflo Medallion 254 Rear Facing Belted, Forward Seat Track



Evenflo Medallion 254 Rear Facing Belted, Middle Seat Track

E-23



Evenflo Medallion 254 Rear Facing Belted, Rearward Seat Track



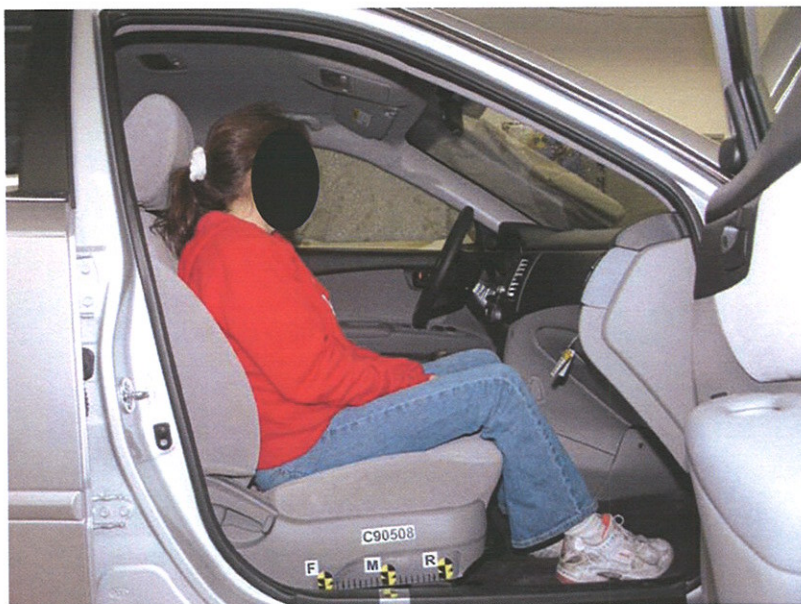
Evenflo Medallion 254 Rear Facing Unbelted, Forward Seat Track



Evenflo Medallion 254 Rear Facing Unbelted, Middle Seat Track



Evenflo Medallion 254 Rear Facing Unbelted, Rearward Seat Track



Unbelted 5th Percentile Female Reactivation, Middle Seat Track

APPENDIX F

INSTRUMENTATION CALIBRATION

INSTRUMENTS FOR DRIVER DUMMY NO.: 516

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	P59641	Endevco	12/31/08
Head Y	P59640	Endevco	12/31/08
Head Z	P59642	Endevco	12/31/08
Neck Load Cell	252	Denton	04/03/09
Chest X	P59631	Endevco	12/31/08
Chest Y	P59632	Endevco	12/31/08
Chest Z	P59634	Endevco	12/31/08
Chest Displacement	516	Servo	01/13/09
Left Femur Load Cell	959	GSE	01/29/09
Right Femur Load Cell	950	GSE	01/29/09

INSTRUMENTS FOR PASSENGER DUMMY NO.: 505

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	P59665	Endevco	02/10/09
Head Y	P59667	Endevco	02/10/09
Head Z	P59669	Endevco	02/10/09
Neck Load Cell	1021	Denton	01/08/09
Chest X	P59657	Endevco	02/10/09
Chest Y	P59658	Endevco	02/10/09
Chest Z	P59659	Endevco	02/10/09
Chest Displacement	505	Servo	02/25/09
Left Femur Load Cell	1362	Denton	01/29/09
Right Femur Load Cell	1361	Denton	01/29/09

INSTRUMENTS FOR LOW RISK 5TH FEMALE DUMMY NO.: 505 (P1 & P2)

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	P59665	Endevco	02/10/09
Head Y	P59667	Endevco	02/10/09
Head Z	P59669	Endevco	02/10/09
Neck Load Cell	1021	Denton	01/08/09
Chest X	P59657	Endevco	02/10/09
Chest Y	P59658	Endevco	02/10/09
Chest Z	P59659	Endevco	02/10/09
Chest Displacement	505	Servo	02/25/09
Left Femur Load Cell	1362	Denton	01/29/09
Right Femur Load Cell	1361	Denton	01/29/09

INSTRUMENTS FOR LOW RISK 3 YEAR OLD DUMMY NO.: 032 (P1 & P2)

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	P49481	Endevco	02/26/09
Head Y	P52134	Endevco	02/26/09
Head Z	P52145	Endevco	02/26/09
Neck Load Cell	233	Denton	02/05/09
Chest X	P52172	Endevco	02/26/09
Chest Y	P52173	Endevco	02/26/09
Chest Z	P52174	Endevco	02/26/09
Chest Displacement	032	Servo	02/27/09

INSTRUMENTS FOR LOW RISK 6 YEAR OLD DUMMY NO.: 155 (P1 & P2)

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	P59397	Endevco	02/26/09
Head Y	P59398	Endevco	02/26/09
Head Z	P59399	Endevco	02/26/09
Neck Load Cell	376	Denton	01/08/09
Chest X	P49510	Endevco	02/26/09
Chest Y	P49511	Endevco	02/26/09
Chest Z	P49518	Endevco	02/26/09
Chest Displacement	155	Servo	02/25/09

VEHICLE INSTRUMENTS

	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	L02-Z13	Entran	12/13/08
Right Rear Seat Crossmember X	A07-R11	Entran	02/16/09
Top of Engine X	A29-M05	Entran	02/16/09
Bottom of Engine X	F14-B19	Entran	12/13/08
Left Brake Caliper X	C24-J01	Entran	01/13/09
Right Brake Caliper X	A12-Z02	Entran	12/18/08
Instrument Panel X	H31-Z05	Entran	12/18/08
Trunk Z	A05-A09	Entran	12/18/08