REPORT NUMBER: 222SB-MGA-2011-001

SAFETY COMPLIANCE TESTING FOR FMVSS NO. 222 SCHOOL BUS PASSENGER SEATING AND CRASH PROTECTION

STARCRAFT BUS
2011 STARCRAFT QUEST SCHOOL BUS
NHTSA NO.: CB0902

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

TEST DATES: MARCH 17, 2011 – AUGUST 30, 2011

FINAL REPORT DATE: DECEMBER 13, 2011

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
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_____
Date of Acceptance

Technical Report Documentation Page

1. Report No. 222SB-MGA-2011-001	*2. Government Accession No.*	*3. Recipient's Catalog No.*	
4. Title and Subtitle Final Report of FMVSS 222 Compliance Testing of 2011 Starcraft Quest School Bus NHTSA No.: CB0902		*5. Report Date* December 13, 2011 *6. Performing Organization Code* MGA	
7. Author(s) Eric Peschman, Project Engineer Michael Janovicz, Program Manager		*8. Performing Organization Report No.* 222SB-MGA-2011-001	
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		*10. Work Unit No.* *11. Contract or Grant No.* DTNH22-08-D-00075	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Enforcement Office of Vehicle Safety Compliance Mail Code: NVS-220 1200 New Jersey Avenue, S.E. Washington, D.C. 20590		*13. Type of Report and Period Covered* Final Report 03/17/11 – 08/30/11 *14. Sponsoring Agency Code* NVS-220	
15. Supplementary Notes			
16. Abstract Compliance tests were conducted on the subject 2011 Starcraft Quest School Bus, NHTSA No.: CB0902, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-222-04 for the determination of FMVSS 222 compliance. Test Failures: See Section 2, Test Data Summary. See Section 9, Laboratory Notice of Test Failure.			
17. Key Words Compliance Testing Safety Engineering FMVSS 222		*18. Distribution Statement* Copies of this report are available from: NHTSA Technical Information Services (TIS) Mail Code: NPO-411 1200 New Jersey Avenue, S.E. Washington, D.C. 20590 Fax No.: (202) 493-2833 E-mail: tis@dot.gov	
19. Security Classif. (of this report) Unclassified	*20. Security Classif. (of this page)* Unclassified	*21. No. of Pages* 141	22. Price

Form DOT F1700.7 (8-72)

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SECTION 1
PURPOSE OF COMPLIANCE TEST

All tests were conducted on a 2011 Starcraft Quest School Bus, NHTSA No.: CB0902, in accordance with the specifications of the Office of Vehicle Safety Compliance (OVSC) Test Procedures TP-222-04 to determine compliance to the requirements of Federal Motor Vehicle Safety Standards (FMVSS) 222, “School Bus Passenger Seating and Crash Protection”.

This program is sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No.: DTNH22-08-D-00075.

SECTION 2
TEST DATA SUMMARY

The passenger seating and crash protection tests were conducted from March 17, 2011 through August 30, 2011. All tests were conducted by MGA Research Corporation at the Wisconsin Operations. The test vehicle, a 2011 Starcraft Quest School Bus NHTSA No.: CB0902, does not appear to meet all the requirements of FMVSS 222. The test failures are listed below.

FAILURE

During the rearward seat back force deflection test for Seat No. S7, the seat reached the maximum allowable deflection of 254 mm before it absorbed 948 joules (316W joules) of energy. The total energy absorbed was 776 Joules. Another rearward seat back force deflection test was run on Seat No. S4 to confirm the results of S7 with similar results. The total energy absorbed by S4 was 820 Joules out of a required 948 Joules.

SECTION 2 (CONTINUED)
TEST DATA SUMMARY

LINEAR AND AREA MEASUREMENTS

Seat to seat/barrier spacing was checked on all seats and found to be 520 mm or less as shown on Data Sheet No. 1.

The seat back height and front surface area of Seat Nos. S1, S5, S6, and S10 were measured in accordance with Section 12.1 of OVSC TP-222-04. As shown in Data Sheet No. 2 for S1, S5, S6, and S10, the seat back area is greater than ninety percent of the seat bench width multiplied by 610.

The restraining barrier position and projected rear surface area of Barrier Nos. B1 and B10 were measured in accordance with OVSC TP-222-04. As shown in Data Sheet No. 3 for B1 and B10, the projected perimeters of the seats S1 and S10 fall completely within the perimeters of the restraining barriers B1 and B10.

SEAT CUSHION RETENTION

Seat No. S2 was tested in accordance with Section 12.3 of OVSC TP-222-04. Seat cushion weight was 24.9 N for S2. The target force for S2 was 124.5 N. For S2, the lower time limit boundary (t1) was approximately 5 seconds with approximate load duration of 11 seconds. As shown in Data Sheet No. 4, the seat cushion tested met all requirements.

SEAT BACK FORCE/DEFLECTION TEST - FORWARD

Seat No. S10 was tested in accordance with Section 12.4 of OVSC TP-222-04. Seat bench width was determined to be 1,000 mm for S10. “W” was calculated to be 3 for S10. The seating reference point (SRP) was 473 mm above the bus floor. The deflection of the seat back at conclusion of lower loading bar loading at 1,557W N load was 72 mm for S10. The allowable maximum deflection without moving the seat back to within 102 mm of another seat or restraining barrier was 356 mm. The seat back movement rate determined by the test engineer was 12.3 mm/sec. The test was stopped when the maximum 356 mm deflection was reached (actual deflection was 358 mm). The minimum required area under the force versus deflection curve of the upper loading bar was 452 W or 1,356 joules for S10. S10 only achieved 1,318 joules. As shown on Data Sheet No. 4, S10 does not meet the force deflection forward requirements.

SECTION 2 (CONTINUED)
TEST DATA SUMMARY

RESTRAINING BARRIER FORCE/DEFLECTION TEST

Barrier No. B1 was tested in accordance with Section 12.4 of OVSC TP-222-04. Seat bench width of the aft seat was determined to be 1,000 mm. "W" was calculated to be 3 for B1. The deflection of the restraining barrier at the conclusion of the lower loading bar loading at 1,557W was 85 mm. The maximum allowed deflection without moving the restraining barrier to within interference of door operation was 356 mm. The barrier movement rate determined by the test engineer was 12.4 mm/sec. The tests were stopped when the maximum deflection of 356 mm was reached for B1. The area under the force versus deflection curve of the upper loading bar was 1,442 joules. The minimum required area under the force versus deflection curve of the upper loading bar was 452 W or 1,356 joules. As shown on Data Sheet No. 6, B1 has met the force deflection requirements.

SEAT BACK FORCE/DEFLECTION TEST - REARWARD

Seat Nos. S7 and S4 were tested in accordance with Section 12.4 of OVSC TP-222-04. Seat bench width was determined to be 1,000 mm and "W" was calculated to be 3 for both seats. The allowable maximum deflection without moving the seat back to within 102 mm of another seat was 254 mm. The seat back movement rate determined by the test engineer was 8.7 mm/sec for S7 and S4. The location of the loading bar was 343 mm above the SRP. The test was stopped when the maximum deflection of the seat back of 254 mm was achieved for S7. The area under the force versus deflection curve of the loading bar was 776 joules for S7, and 820 joules for S7. The minimum required area under the force versus deflection curve of the loading bar was 316 W or 948 joules. As shown in Data Sheet No. 7, S7 and S4 did not meet the force deflection rearward requirements.

HEAD FORM IMPACT ZONE TESTS

Seat Nos. S3 and S8 were tested in accordance with Section 12.6 of OVSC TP-222-04. The mass of the head form was 5.21 kg. All head form contact area, impact energy, and head injury criteria were met for both S3 and S8. Data from these tests are presented in Data Sheet No. 8 and Data Sheet No.9.

KNEE FORM IMPACT ZONE TESTS

Seat Nos. S3 and S8 were tested in accordance with Section 12.7 of OVSC TP-222-04. The mass of the knee form was 4.53 kg. All knee form contact area criteria and impact energy criteria were met for both S3 and S8. Data from these tests are presented on Data Sheet No. 10.

ADMINISTRATIVE DATA SHEET

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

INCOMPLETE VEHICLE (IF APPLICABLE)

Manufacturer:	Chevrolet
Make/Model:	School Bus
VIN:	1GB3G3BG2B1112157
Build Date:	11/10
Certification Date:	11/10

COMPLETED VEHICLE (SCHOOL BUS)

Manufacturer:	Forest River, Inc.
Year/Make/Model:	2011 / Starcraft School Bus / Quest
VIN:	1GB3G3BG2B1112157
NHTSA No.:	CB0902
Color:	Yellow
GVWR:	5,579 kg / 12,300 lb
Build Date:	10/10
Certification Date:	11/10

DATES

Vehicle Receipt:	12/13/10
Start of Compliance Test:	03/17/11
Completion of Compliance Test:	08/30/11

TEST VEHICLE DISPOSITION

Test: All tests were performed in accordance with the references outlined in FMVSS 222 as published in the Federal Register, Volume 41, No. 19, Jan 28, 1976, and as amended in 41FR28528, Jul 12, 1976; 41FR36027, Aug 26, 1976; 41FR54945, Dec 16, 1976; 42FR64120, Dec 23, 1977; 43FR9150, Mar 6, 1978; 44FR18675, Mar 29, 1979; and 48FR12386, Mar 24, 1983.

Compliance Test: All tests were performed in accordance with the references outlined in TP-222-04.

Recorded By: _____

Approved By: _____ Date: 08/30/11

GENERAL TEST DATA SHEET

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

SCHOOL BUS IDENTIFICATION

Model Year/Mfr./Make/Model:	2011 / Starcraft Bus / Quest
Passenger Capacity:	(1 Driver, 29 Passengers)
NHTSA No.:	CB0902
VIN:	1GB3G3BG2B1112157
Conventional or Forward Control:	Conventional
Wheel Base:	4026
GAWR (Certification Label) FRONT:	1,950 kg / 4,300 lb
GAWR (Certification Label) REAR:	3,901 kg / 8,600 lb
GVWR (Certification Label) TOTAL:	5,579 kg / 12,300 lb

TEST CONDITIONS

Date(s) of Test:	03/17/11 – 08/30/11
Ambient Temperature (°C):	21°C
Required Temperature Range (°C):	0°C to 32°C

SEAT IDENTIFICATION

Seat Manufacturer:	The C.E. White Co.
Model Name & Number:	
Description of Seats:	Seat frames are constructed of 25.4 mm square and round welded steel tubing. The seat back is a steel pan welded to the tubing. The front of the seat is covered with 60 mm of soft foam. The rear of the seat back is covered with 25 mm Styrofoam and 25 mm of thick soft foam. The seat back vertical frame members are covered in 50 mm Styrofoam. The seat cushion is constructed of 8 mm plywood; which is 100 mm tapering to 75 mm seat foam. The seats are covered in 0.6 mm of vinyl.

SECTION 3
COMPLIANCE TEST DATA

The following data sheets document the results of testing on the 2011 Starcraft Quest School Bus, NHTSA No.: CB0902.

DATA SHEET 1

SEAT TO SEAT/BARRIER SPACING

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

Seat Number	Measurement of Spacing From SRP Forward to Seat/Barrier (mm)	Requirement ≤ 610 mm (≤ 24") Class 1 Buses Only PASS/FAIL
S1	**490**	**PASS**
S2	**500**	**PASS**
S3	**495**	**PASS**
S4	**475**	**PASS**
S5	**465**	**PASS**
S6	**520**	**PASS**
S7	**510**	**PASS**
S8	**510**	**PASS**
S9	**512**	**PASS**
S10	**515**	**PASS**

Comments: None

Recorded By: 

Approved By:  Date: 03/17/11

DATA SHEET 2

SEAT BACK HEIGHT AND FRONT SURFACE AREA TEST

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

SEAT NUMBER: S1

1. Maximum vertical height of the seat back above the SRP = 611 mm

		PASS/FAIL
2.	Is item 1 > 610 mm? (S5.1.2) Yes – Pass; No – Fail	**PASS**

3. Maximum transverse width of the seat cushion (W1) = 1,000 mm
4. Calculate the following: 0.75 x W1 = 750 mm
5. Calculate the following: 0.9 x W1 x 610 mm = 549,000 mm^2
6. Project the front surface of the seat back onto a vertical transverse plane. Measure the projected surface area that falls between:
   - A horizontal plane that passes through the SRP and a horizontal plane 610 mm above the SRP; and
   - A vertical longitudinal plane that passes through the inboard-most point of the seat cushion and a vertical longitudinal plane that passes through the outboard-most point of the seat cushion.

Use the following for a typical trapezoidal shape:

6.1 Seat back width at 610 mm above the SRP height (A) = 895 mm

6.2 Seat back width at the SRP height (B) = 960 mm

6.3 Area = ½ (A+B) x 610 mm = 565,775 mm^2

		PASS/FAIL
7.	Is item 6.1 > item 4? (S5.1.2) Yes – Pass; No – Fail	**PASS**
8.	Is item 6.3 > item 5? (S5.1.2) Yes – Pass; No – Fail	**PASS**

Comments: None

Recorded By: _____

Approved By: _____ Date: 03/18/11

DATA SHEET 2

SEAT BACK HEIGHT AND FRONT SURFACE AREA TEST

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

SEAT NUMBER: S5

1. Maximum vertical height of the seat back above the SRP = 612 mm

		PASS/FAIL
2.	Is item 1 > 610 mm? (S5.1.2) Yes – Pass; No – Fail	**PASS**

3. Maximum transverse width of the seat cushion (W1) = 760 mm
4. Calculate the following: 0.75 x W1 = 570 mm
5. Calculate the following: 0.9 x W1 x 610 mm = 417,240 mm^2
6. Project the front surface of the seat back onto a vertical transverse plane. Measure the projected surface area that falls between:
   - A horizontal plane that passes through the SRP and a horizontal plane 610 mm above the SRP; and
   - A vertical longitudinal plane that passes through the inboard-most point of the seat cushion and a vertical longitudinal plane that passes through the outboard-most point of the seat cushion.

Use the following for a typical trapezoidal shape:

6.1 Seat back width at 610 mm above the SRP height (A) = 670 mm

6.2 Seat back width at the SRP height (B) = 750 mm

6.3 Area = ½ (A+B) x 610 mm = 433,100 mm^2

		PASS/FAIL
7.	Is item 6.1 > item 4? (S5.1.2) Yes – Pass; No – Fail	**PASS**
8.	Is item 6.3 > item 5? (S5.1.2) Yes – Pass; No – Fail	**PASS**

Comments: None

Recorded By: _____

Approved By: _____ Date: 03/18/11

DATA SHEET 2

SEAT BACK HEIGHT AND FRONT SURFACE AREA TEST

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

SEAT NUMBER: S6

1. Maximum vertical height of the seat back above the SRP = 612 mm

		PASS/FAIL
2.	Is item 1 > 610 mm? (S5.1.2) Yes – Pass; No – Fail	**PASS**

3. Maximum transverse width of the seat cushion (W1) = 770 mm
4. Calculate the following: 0.75 x W1 = 578 mm
5. Calculate the following: 0.9 x W1 x 610 mm = 422,730 mm^2
6. Project the front surface of the seat back onto a vertical transverse plane. Measure the projected surface area that falls between:
   - A horizontal plane that passes through the SRP and a horizontal plane 610 mm above the SRP; and
   - A vertical longitudinal plane that passes through the inboard-most point of the seat cushion and a vertical longitudinal plane that passes through the outboard-most point of the seat cushion.

Use the following for a typical trapezoidal shape:

6.1 Seat back width at 610 mm above the SRP height (A) = 690 mm

6.2 Seat back width at the SRP height (B) = 750 mm

6.3 Area = ½ (A+B) x 610 mm = 439,200 mm^2

		PASS/FAIL
7.	Is item 6.1 > item 4? (S5.1.2) Yes – Pass; No – Fail	**PASS**
8.	Is item 6.3 > item 5? (S5.1.2) Yes – Pass; No – Fail	**PASS**

Comments: None

Recorded By: _____

Approved By: _____ Date: 03/18/11

DATA SHEET 2

SEAT BACK HEIGHT AND FRONT SURFACE AREA TEST

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

SEAT NUMBER: S10

1. Maximum vertical height of the seat back above the SRP = 611 mm

		PASS/FAIL
2.	Is item 1 > 610 mm? (S5.1.2) Yes – Pass; No – Fail	**PASS**

3. Maximum transverse width of the seat cushion (W1) = 1,000 mm
4. Calculate the following: 0.75 x W1 = 750 mm
5. Calculate the following: 0.9 x W1 x 610 mm = 549,000 mm^2
6. Project the front surface of the seat back onto a vertical transverse plane. Measure the projected surface area that falls between:
   - A horizontal plane that passes through the SRP and a horizontal plane 610 mm above the SRP; and
   - A vertical longitudinal plane that passes through the inboard-most point of the seat cushion and a vertical longitudinal plane that passes through the outboard-most point of the seat cushion.

   Use the following for a typical trapezoidal shape:

6.1 Seat back width at 610 mm above the SRP height (A) = 905 mm
6.2 Seat back width at the SRP height (B) = 970 mm
6.3 Area = ½ (A+B) x 610 mm = 571,875 mm^2

		PASS/FAIL
7.	Is item 6.1 > item 4? (S5.1.2) Yes – Pass; No – Fail	**PASS**
8.	Is item 6.3 > item 5? (S5.1.2) Yes – Pass; No – Fail	**PASS**

Comments: None

Recorded By: _____

Approved By: _____ Date: 03/18/11

DATA SHEET 3

RESTRAINING BARRIER POSITION AND PROJECTED REAR SURFACE AREA

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

BARRIER NUMBER: B1

1. Measure the distance (X) from SRP of seat immediately aft of barrier in a horizontal longitudinal line forward to barrier. X = 515 mm.

		PASS/FAIL
2.	Is distance X $\leq$ 610 mm? (S5.2) Yes – Pass; No – Fail	**PASS**

3. Measure distance U at inboard (i) and outboard (o) side of barrier.

   U_i = 360 mm U_o = 360 mm

4. Measure distance V at inboard (i) and outboard (o) sides of seat.

   V_i = 473 mm V_o = 473 mm

		PASS/FAIL
5.	Is $U_i \leq V_i$? Yes – Pass; No – Fail	**PASS**

		PASS/FAIL
6.	Is $U_o \leq V_o$? Yes – Pass; No – Fail	**PASS**

7. Maximum vertical height of the barrier above the SRP of the seat located immediately rearward of the barrier (S) = 661 mm

		PASS/FAIL
8.	Is item 7 $\geq$ 610 mm? (S5.2 & S5.1.2) Yes – Pass; No – Fail	**PASS**

9. Maximum transverse width of the seat cushion of the seat immediately rearward of the barrier (W1) = 1,000 mm
10. Calculate the following: Calculate the following: 0.75 x W1 = 750 mm
11. Calculate the following: 0.9 x W1 x 610 mm = 549,000 mm^2

DATA SHEET 3 (CONTINUED)

RESTRAINING BARRIER POSITION AND PROJECTED REAR SURFACE AREA

12. Project the front surface of the barrier onto a vertical transverse plane. Measure the projected surface area (± 2%) that falls between the following planes, which are determined relative to the seat located immediately rearward of the barrier:
    - A horizontal plane that passes through the SRP and a horizontal plane 610 mm above the SRP; and
    - A vertical longitudinal plane that passes through the inboard-most point of the seat cushion and a vertical longitudinal plane that passes through the outboard-most point of the seat cushion.

Use the following for a typical trapezoidal shape:

12.1 Seat back width at 610 mm above the SRP height (A) = 890 mm

12.2 Seat back width at the SRP height (B) = 970 mm

12.3 Area = ½ (A+B) x 610 mm = 567,300 mm^2

		PASS/FAIL
13.	Is item 12.1 > item 10? (S5.1.2) Yes – Pass; No – Fail	**PASS**
14.	Is item 12.3 > item 11? (S5.1.2) Yes – Pass; No – Fail	**PASS**

Comments: None

Recorded By: _____

Approved By: _____ Date: 03/18/11

DATA SHEET 3

RESTRAINING BARRIER POSITION AND PROJECTED REAR SURFACE AREA

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

BARRIER NUMBER: B10

1. Measure the distance (X) from SRP of seat immediately aft of barrier in a horizontal longitudinal line forward to barrier. X = 523 mm.

		PASS/FAIL
2.	Is distance X $\leq$ 610 mm? (S5.2) Yes – Pass; No – Fail	**PASS**

3. Measure distance U at inboard (i) and outboard (o) side of barrier.
   U_i = 360 mm U_o = 360 mm
4. Measure distance V at inboard (i) and outboard (o) sides of seat.
   V_i = 473 mm V_o = 473 mm

		PASS/FAIL
5.	Is $U_i \leq V_i$? Yes – Pass; No – Fail	**PASS**

		PASS/FAIL
6.	Is $U_o \leq V_o$? Yes – Pass; No – Fail	**PASS**

7. Maximum vertical height of the barrier above the SRP of the seat located immediately rearward of the barrier (S) = 665 mm

		PASS/FAIL
8.	Is item 7 $\geq$ 610 mm? (S5.2 & S5.1.2) Yes – Pass; No – Fail	**PASS**

9. Maximum transverse width of the seat cushion of the seat immediately rearward of the barrier (W1) = 1,000 mm
10. Calculate the following: Calculate the following: 0.75 x W1 = 750 mm
11. Calculate the following: 0.9 x W1 x 610 mm = 549,000 mm^2

DATA SHEET 3 (CONTINUED)

RESTRAINING BARRIER POSITION AND PROJECTED REAR SURFACE AREA

12. Project the front surface of the barrier onto a vertical transverse plane. Measure the projected surface area (± 2%) that falls between the following planes, which are determined relative to the seat located immediately rearward of the barrier:
    - A horizontal plane that passes through the SRP and a horizontal plane 610 mm above the SRP; and
    - A vertical longitudinal plane that passes through the inboard-most point of the seat cushion and a vertical longitudinal plane that passes through the outboard-most point of the seat cushion.

Use the following for a typical trapezoidal shape:

12.1 Seat back width at 610 mm above the SRP height (A) = 896 mm

12.2 Seat back width at the SRP height (B) = 980 mm

12.3 Area = ½ (A+B) x 610 mm = 572,180 mm^2

		PASS/FAIL
13.	Is item 12.1 > item 10? (S5.1.2) Yes – Pass; No – Fail	**PASS**
14.	Is item 12.3 > item 11? (S5.1.2) Yes – Pass; No – Fail	**PASS**

Comments: None

Recorded By: _____

Approved By: _____ Date: 03/18/11

DATA SHEET 4

SEAT CUSHION LATCHING AND RETENTION TEST

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

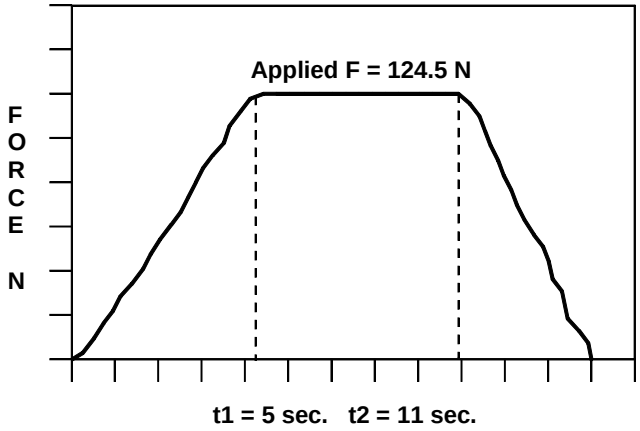
SEAT NUMBER: S2

1. Is the passenger seat cushion designed to be removable without tools or to flip up?

   Yes

		PASS/FAIL
1.1.	Is the seat equipped with a self-latching mechanism? (S5.1.5 (a)) Yes – Pass; No – Fail	**PASS**

2. Cushion Weight = 24.9 N
3. Cushion Weight x 5 = F = 124.5 N (S5.1.5 (b))
4. Complete the following force/time graph:



F must be 5 x Cushion Weight; t1 and t2 must be according to the following expressions:

1 sec. < t1 < 5 sec. (+1.0 sec. and -0.0 sec.)

t2 = t1 + 5sec. (+1.0 sec. and -0.0 sec.)

		PASS/FAIL
5.	Did seat cushion separate from the seat structure at any attachment point? (S5.1.5 (b)) Yes – Fail; No – Pass	**PASS**

Describe Seat Cushion Attachments: Two fixed clips at leading edge and two rotating clips at rear edge.

Comments: None

Recorded By: _____

Approved By: _____ Date: 07/13/11

DATA SHEET 5

SEAT BACK FORCE DEFLECTION TEST - FORWARD

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

SEAT NUMBER: S10

1. Seat Bench Width = 1,000 mm
   W = (Seat Bench Width)/381 mm (round to nearest whole number) = (3)
2. Seat Reference Point (SRP) location is: (Description of location as supplied by the COTR): 473 mm Above Floor, 0 mm from center
3. Location of lower loading bar is 0 mm above the SRP.
   (Requirement: Between 102 mm above and 102 mm below the SRP) (S5.1.3.1)
   Length of lower loading bar = 876 mm
   Seat Back width at SRP = 970 mm
   (Loading Bar Length = Seat Back Width – 102 mm, +13, -6.3)
4. Include x-y plot of Force vs. Time for the lower loading bar.
5. Deflection of the seat back at conclusion of lower bar loading (1,557W position) = 72 mm.
6. Maximum deflection allowed without moving the seat back to within 102 mm of another seat or restraining barrier = 356 mm (must be 356 mm of less) (S5.1.3)
7. Seat back movement rate selected by the test engineer = 12.3 mm/sec
8. Location of upper loading bar is in a horizontal plane 406 mm above the SRP.
   (Requirement: 406 mm) (S5.1.3.3).
   Upper Loading Bar Length = 839 mm
   Seat back width at 406 mm above the SRP height = 940 mm
   (Loading Bar Length = Seat Back Width – 102 mm, +13, -6.3)
9. Reason for stopping seat back deflection:
   ___ Reached deflection determined in Item 5 above (if less than 356 mm)
   _X_ Reached 356 mm maximum allowed deflection (Actual deflection was 358 mm)
   ___ Force exceeded 10,676 N
   ___ Separation was about to occur
10. Include the x-y plot of force vs. deflection for the upper loading bar with boundaries of Figure 14 (OVSC TP-222) superimposed.

		PASS/FAIL
11.	Is the seat in its final deflected position within 102 mm of the next seat or barrier? Yes – Fail; No – Pass	**PASS**

DATA SHEET 5 (CONTINUED)

SEAT BACK FORCE DEFLECTION TEST – FORWARD

		PASS/FAIL
12.	Does the forward force vs. deflection trace of the seat back lie within the unshaded area? (S5.1.3) Yes – Pass; No – Fail	**PASS**

13. Include a deflection vs. time plot for the upper loading bar.

14. The area within the force vs. deflection curve = 1,318 joules N-m

15. 452W = 1,356 joules N-m (S5.1.3.4)

		PASS/FAIL
16.	Is item 14 ≥ item 15? (S5.1.3.4) Yes – Pass; No – Fail	**FAIL**

Comments: Data indicates possible non-compliance. At the direction of the COTR, no formal Laboratory Notice of Test Failure will be issued.

Recorded By: _____

Approved By: _____ Date: 05/24/11

DATA SHEET 6

RESTRAINING BARRIER FORCE/DEFLECTION TEST

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

BARRIER NUMBER: B1

1. Seat cushion width of seat immediately rearward of restraining barrier = 1,000 mm
   W = (Seat Cushion Width)/381 mm (round to nearest whole number) = (3)
2. Location of SRP of seat rearward of restraining barrier is: (Description of location as supplied by the manufacturer): 473 mm Above Floor.
3. Location of lower loading bar is 0 mm above/below the SRP.
   (Requirement: between 102 mm above and 102 mm below the SRP) (S5.1.3.1)
   Length of loading bar = 876 mm
   Width of barrier at SRP = 973 mm
   (Loading Bar Length = Seat Back Width – 102 mm, +13, -6.3)
4. Include the x-y plot of force vs. time for the lower loading bar.
5. Deflection of the barrier at the conclusion of lower bar loading (1,557W position) = 85 mm.
6. Maximum deflection allowed without moving the restraining barrier to within interference of door operation = 356 mm (must be 356 mm or less).
7. Barrier movement rate selected by the test engineer = 12.4 mm/sec
8. Location of upper loading bar is in a horizontal plane 406 mm above the SRP.
   (Requirement: 406 mm) (S5.1.3.3)
   Upper loading bar length = 839 mm
   Barrier width at 406 mm above the SRP height = 940 mm
   (Loading Bar Length = Seat Back Width – 102 mm, +13, -6.3)
9. Reason for stopping restraining barrier deflection:
   _X_ Reached 356 mm maximum
   ___ Force exceeded 10,676 N
   ___ Separation was about to occur
   ___ Interference with door operation
10. Maximum deflection of barrier 356 mm.
    (Requirement: maximum allowed is 356 mm) (S5.2.3 (b))

		PASS/FAIL
11.	Does the restraining barrier interfere with the normal operation of the door? (S5.2.3 (c)) Yes – Fail; No – Pass	**PASS**

DATA SHEET 6 (CONTINUED)

RESTRAINING BARRIER FORCE/DEFLECTION TEST

		PASS/FAIL
12.	Did any separation of barrier component or the separation of the barrier from the vehicle occur? (S5.1.3 (d) & (e)) Yes – Fail; No – Pass	**PASS**

13. Include the x-y plot of force vs. deflection for the upper loading bar with boundaries of Figure 14 (OVSC TP-222) superimposed.

		PASS/FAIL
14.	Does the forward force vs. deflection trace of the barrier back lie within the unshaded area? (S5.2.3(a)) Yes – Pass; No – Fail	**PASS**

15. Include a deflection vs. time plot for the upper loading bar.

16. The area within the force vs. deflection curve = 1,442 joules N-m

17. 452W = 1,356 joules N-m (S5.2.3) (S5.1.3.4)

		PASS/FAIL
18.	Is item 16 > item 17? Yes – Pass; No – Fail	**PASS**

Comments: None

Recorded By: _____

Approved By: _____ Date: 05/26/11

DATA SHEET 7

SEAT BACK FORCE DEFLECTION TEST – REARWARD

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

SEAT NUMBER: S7

1. Seat bench width = 1,000 mm
   W = (Seat Cushion Width)/381 mm (round to nearest whole number) = (3)
2. Location of the loading bar is in a horizontal plane 343 mm above the SRP of the test seat. (Requirement: 343 mm above SRP) (S5.1.4.1)
   Loading bar length = 825 mm
   Seat back width at 343 mm above the SRP height = 927 mm
   (Loading Bar Length = Seat Back Width – 102 mm, +13, -6.3)
3. Deflection of the seat back at 222 N preload = 21.7 mm
4. Maximum deflection allowed without moving the seat back to within 102 mm of another seat = 254 mm (maximum allowed + 254 mm) (S5.1.4)
5. Seat back movement rate selected by the test engineer = 8.7 mm/sec
6. Reason for stopping deflection:
   ___ Reached deflection determined in item 4 above
   _X_ Reached 254 mm maximum allowed deflection
   ___ Force exceeded 9,786 N
   ___ Separation was about to occur
7. Include the x-y plot of force vs. deflection for the loading bar with the boundaries of Figure 18 (OVSC TP-222) superimposed.

		PASS/FAIL
8.	Does the force vs. deflection plot lie within the boundaries of Figure 18 (OVSC TP-222) Yes – Pass; No – Fail	**PASS**

9. Include a deflection vs. time plot for the loading bar.
10. 316W = 948 joules N-m
11. The area within the force vs. deflection curve = 776 joules N-m

		PASS/FAIL
12.	Is item 11 ≥ item 10? (S5.1.4.2) Yes – Pass; No – Fail	**FAIL**

Comments: None

Recorded By: _____

Approved By: _____ Date: 07/08/11

DATA SHEET 7

SEAT BACK FORCE DEFLECTION TEST – REARWARD

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

SEAT NUMBER: S4

1. Seat bench width = 1,000 mm
   W = (Seat Cushion Width)/381 mm (round to nearest whole number) = (3)
2. Location of the loading bar is in a horizontal plane 343 mm above the SRP of the test seat. (Requirement: 343 mm above SRP) (S5.1.4.1)
   Loading bar length = 851 mm
   Seat back width at 343 mm above the SRP height = 928 mm
   (Loading Bar Length = Seat Back Width – 102 mm, +13, -6.3)
3. Deflection of the seat back at 222 N preload = 22.2 mm
4. Maximum deflection allowed without moving the seat back to within 102 mm of another seat = 254 mm (maximum allowed + 254 mm) (S5.1.4)
5. Seat back movement rate selected by the test engineer = 8.7 mm/sec
6. Reason for stopping deflection:
   ___ Reached deflection determined in item 4 above
   _X_ Reached 254 mm maximum allowed deflection
   ___ Force exceeded 9,786 N
   ___ Separation was about to occur
7. Include the x-y plot of force vs. deflection for the loading bar with the boundaries of Figure 18 (OVSC TP-222) superimposed.

		PASS/FAIL
8.	Does the force vs. deflection plot lie within the boundaries of Figure 18 (OVSC TP-222) Yes – Pass; No – Fail	**PASS**

9. Include a deflection vs. time plot for the loading bar.
10. 316W = 948 joules N-m
11. The area within the force vs. deflection curve = 820 joules N-m

		PASS/FAIL
12.	Is item 11 ≥ item 10? (S5.1.4.2) Yes – Pass; No – Fail	**FAIL**

Comments: This test was performed to confirm the failure of Seat S7.

Recorded By: _____

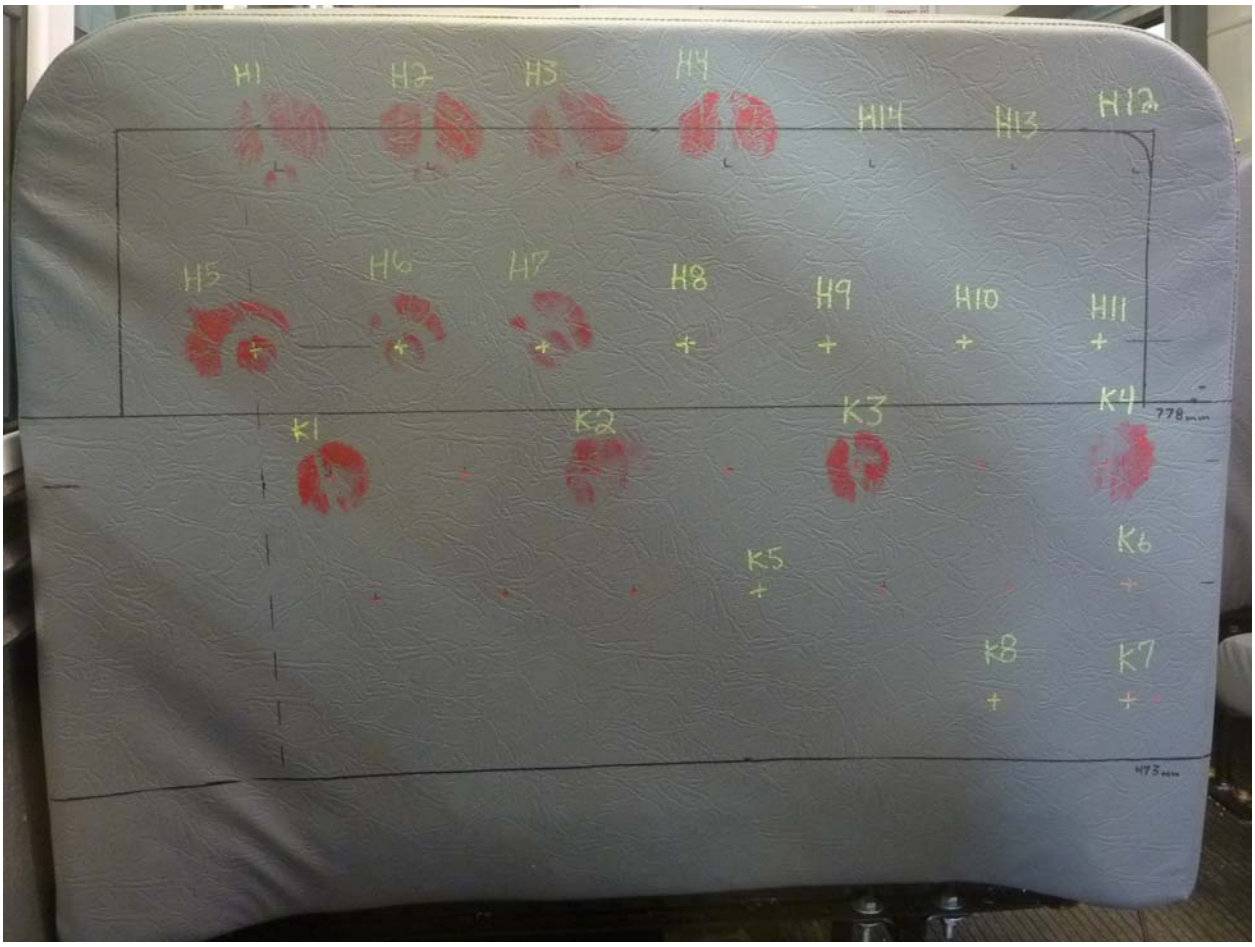
Approved By: _____ Date: 08/30/11

DATA SHEET 8

HEAD FORM IMPACT CONTACT AREA REQUIREMENT

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

SEAT NUMBER: S3



REAR SURFACE

1. Locate x-y reference point on sketch above for head form impact locations. (Label the positive and negative directions, if applicable)
2. Identify head form impact location on sketch by placing H1, H2, H3, H4, H5, H6, and H7 in the appropriate location.
3. Define the plane of reference for head form impact angle:
   0° = Parallel with Floor, (+) is Up, (-) is Down
   X = From Inboard Edge of Seat
   Y = Measured Vertically from the SRP

DATA SHEET 8 (CONTINUED)

HEAD FORM IMPACT CONTACT AREA REQUIREMENT

4. Complete the following table:

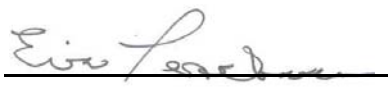
(1)	(2)			(3)	(4)*	(5)	(6)	(7)
Head Impact & Test #	Location			Speed Trap Impact Velocity** mps	Derived Velocity mps	Contact Area (CA) mm^2	CA ≥ 1935 mm^2	
	X	Y	Angle				Yes-PASS	No-FAIL
H1	-747	486	0º	1.58	1.87	4,130	**PASS**	
H2	-640	486	0º	1.59	1.49	3,870	**PASS**	
H3	-532	487	0º	1.60	1.98	3,640	**PASS**	
H4	-424	487	0º	1.60	1.25	3,830	**PASS**	
H5	-770	357	0º	1.59	1.47	4,400	**PASS**	
H6	-664	357	0º	1.59	1.21	2,640	**PASS**	
H7	-557	357	0º	1.60	2.04	2,680	**PASS**	

* Contact Velocity from Item 7 below

** Velocity Range = 1.52 mps, +0.08, -0 mps

5. Attach Contact Area Prints.
6. Attach acceleration versus time plots for each impact.
7. Integrate the acceleration versus time plots and attach plots of the results that show velocity versus time.

Comments: All measurements are referenced to the point where the horizontal plane through the SRP intersects the vertical line tangent to the inboard edge at the seat. In the case of Seat No. S3, the inboard edge of the seat is on the right hand side of the seat as viewed from the rear.

Recorded By: 

Approved By:  Date: 04/20/11

DATA SHEET 8

HEAD FORM IMPACT CONTACT AREA REQUIREMENT

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

SEAT NUMBER: S8

REAR SURFACE

1. Locate x-y reference point on sketch above for head form impact locations. (Label the positive and negative directions, if applicable)
2. Identify head form impact location on sketch by placing H1, H2, H3, H4, H5, and H6 in the appropriate location.
3. Define the plane of reference for head form impact angle:

   0° = Parallel with Floor, (+) is Up, (-) is Down

   X = From Inboard Edge of Seat

   Y = Measured Vertically from the SRP

DATA SHEET 8 (CONTINUED)

HEAD FORM IMPACT CONTACT AREA REQUIREMENT

4. Complete the following table:

(1)	(2)			(3)	(4)*	(5)	(6)	(7)
Head Impact & Test #	Location			Speed Trap Impact Velocity** mps	Derived Velocity mps	Contact Area (CA) mm^2	CA ≥ 1935 mm^2	
	X	Y	Angle				Yes-PASS	No-FAIL
H1	459	482	0º	1.60	1.59	3,940	**PASS**	
H2	575	485	0º	1.58	1.41	3,950	**PASS**	
H3	685	485	0º	1.58	1.74	3,980	**PASS**	
H4	453	335	0º	1.58	1.69	2,530	**PASS**	
H5	551	335	0º	1.59	1.66	2,480	**PASS**	
H6	665	336	0º	1.59	1.50	2,660	**PASS**	

* Contact Velocity from Item 7 below

** Velocity Range = 1.52 mps, +0.08, -0 mps

5. Attach Contact Area Prints.
6. Attach acceleration versus time plots for each impact.
7. Integrate the acceleration versus time plots and attach plots of the results that show velocity versus time.

Comments: All measurements are referenced to the point where the horizontal plane through the SRP intersects the vertical line tangent to the inboard edge at the seat. In the case of Seat No. S8, the inboard edge of the seat is on the right hand side of the seat as viewed from the rear.

Recorded By: _____

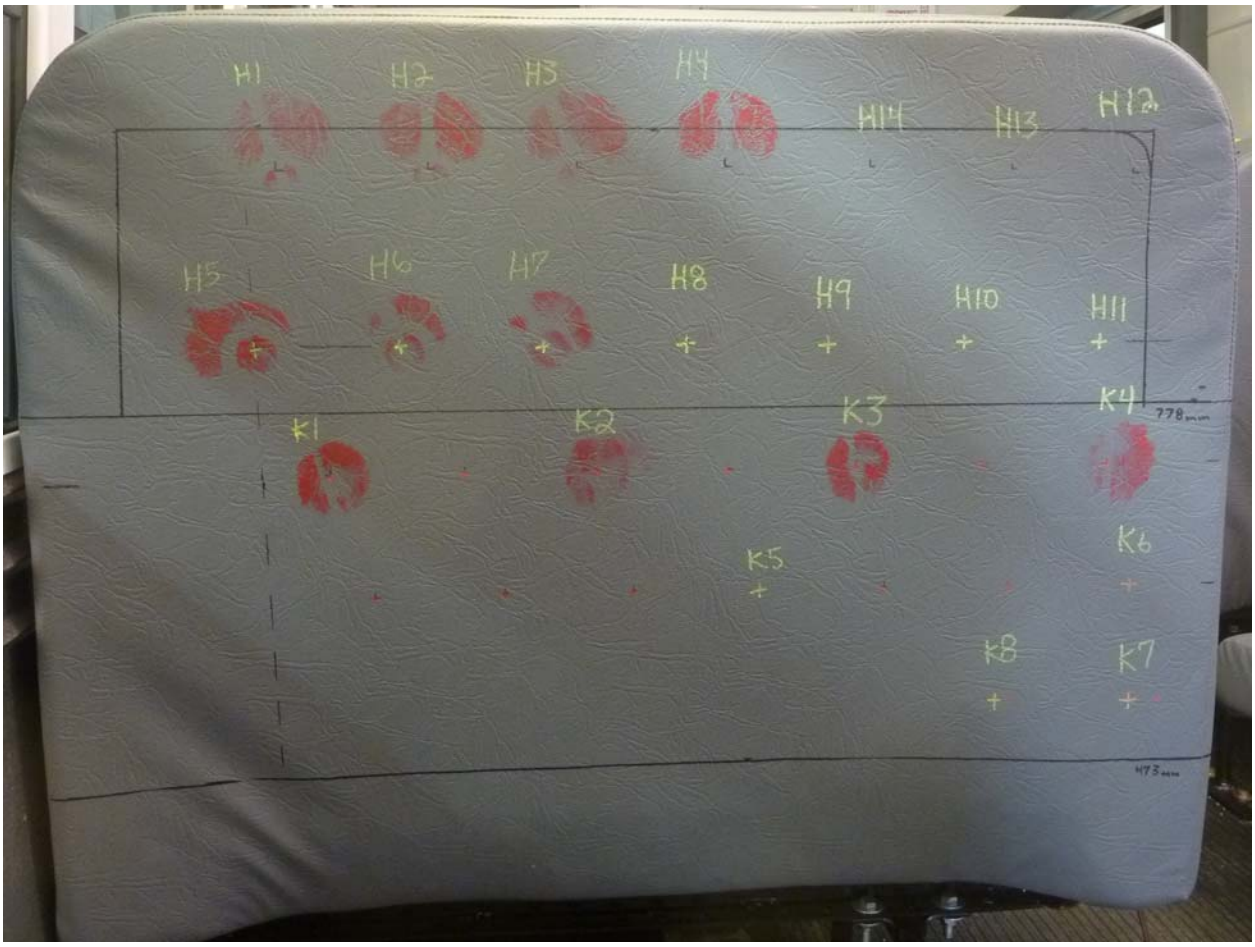
Approved By: _____ Date: 04/25/11

DATA SHEET 9

HEAD FORM IMPACT ENERGY REQUIREMENT

Test Vehicle:	**2011 Starcraft Quest School Bus**	NHTSA No.:	**CB0902**
Test Lab:	**MGA Research Corporation**	Test Dates:	**03/17/11 – 08/30/11**

SEAT NUMBER: S3



REAR SURFACE

1. Locate x-y reference point on sketch above for head form impact locations. (Label the positive and negative directions, if applicable)
2. Identify head form impact location on sketch by placing H8, H9, H10, H11, H12, H13 and H14 in the appropriate location.
3. Define the plane of reference for head form impact angle:
   0° = Parallel with Floor, (+) is Up, (-) is Down
   X = From Inboard Edge of Seat
   Y = Measured Vertically from the SRP

DATA SHEET 9 (CONTINUED)

HEAD FORM IMPACT ENERGY REQUIREMENT

4. Complete the following table:

(1)	(2)			(3)	(4)*	(5)	(6)	(7)		(8)	
Head impact & Test #	Location			Speed Trap Impact Velocity ** mps	Derived Velocity ** mps	Max HIC	Energy Req'd joules	Column 5 < 1000		Column 6 > 4.5 joules	
	X	Y	Angle					Yes-PASS	No-FAIL	Yes-PASS	No-FAIL
H8	-450	357	0º	6.66	6.75	114	11.83	PASS		PASS	
H9	-341	357	0º	6.63	6.76	102	12.23	PASS		PASS	
H10	-235	357	0º	6.65	6.81	84	14.02	PASS		PASS	
H11	-127	356	0º	6.66	6.76	152	10.85	PASS		PASS	
H12	-113	484	0º	6.66	6.77	117	8.29	PASS		PASS	
H13	-208	485	0º	6.63	6.79	101	9.32	PASS		PASS	
H14	-315	488	0º	6.65	6.80	104	9.02	PASS		PASS	

* Impact velocity from item No. 6 below

** Impact velocity range = 6.69 mps, +0, -0.08 mps

5. Attach acceleration versus time plots for each impact.
6. Integrate the acceleration versus time plots and attach plots of the results that show velocity versus time.

Comments: All measurements are referenced to the point where the horizontal plane through the SRP intersects the vertical line tangent to the inboard edge at the seat. In the case of Seat No. S3, the inboard edge of the seat is on the right hand side of the seat as viewed from the rear.

Recorded By: _____

Approved By: _____ Date: 04/21/11

DATA SHEET 9

HEAD FORM IMPACT ENERGY REQUIREMENT

Test Vehicle:	**2011 Starcraft Quest School Bus**	NHTSA No.:	**CB0902**
Test Lab:	**MGA Research Corporation**	Test Dates:	**03/17/11 – 08/30/11**

SEAT NUMBER: S8

REAR SURFACE

1. Locate x-y reference point on sketch above for head form impact locations. (Label the positive and negative directions, if applicable)
2. Identify head form impact location on sketch by placing H8, H9, H10, H11, H12, and H13 in the appropriate location.
3. Define the plane of reference for head form impact angle:
   0° = Parallel with Floor, (+) is Up, (-) is Down
   X = From Inboard Edge of Seat
   Y = Measured Vertically from the SRP

DATA SHEET 9 (CONTINUED)

HEAD FORM IMPACT ENERGY REQUIREMENT

4. Complete the following table:

(1)	(2)			(3)	(4)*	(5)	(6)	(7)		(8)	
Head impact & Test #	Location			Speed Trap Impact Velocity ** mps	Derived Velocity ** mps	Max HIC	Energy Req'd joules	Column 5 < 1000		Column 6 > 4.5 joules	
	X	Y	Angle					Yes-PASS	No-FAIL	Yes-PASS	No-FAIL
H8	112	480	0º	6.68	6.84	117	7.98	PASS		PASS	
H9	229	480	0º	6.67	6.79	98	9.87	PASS		PASS	
H10	343	480	0º	6.69	6.79	101	9.50	PASS		PASS	
H11	105	335	0º	6.68	7.01	170	9.35	PASS		PASS	
H12	221	335	0º	6.67	6.88	89	14.82	PASS		PASS	
H13	335	335	0º	6.64	6.77	101	15.50	PASS		PASS	

* Impact velocity from item No. 6 below

** Impact velocity range = 6.69 mps, +0, -0.08 mps

5. Attach acceleration versus time plots for each impact.
6. Integrate the acceleration versus time plots and attach plots of the results that show velocity versus time.

Comments: All measurements are referenced to the point where the horizontal plane through the SRP intersects the vertical line tangent to the inboard edge at the seat. In the case of Seat No. S8, the inboard edge of the seat is on the right hand side of the seat as viewed from the rear.

Recorded By: _____

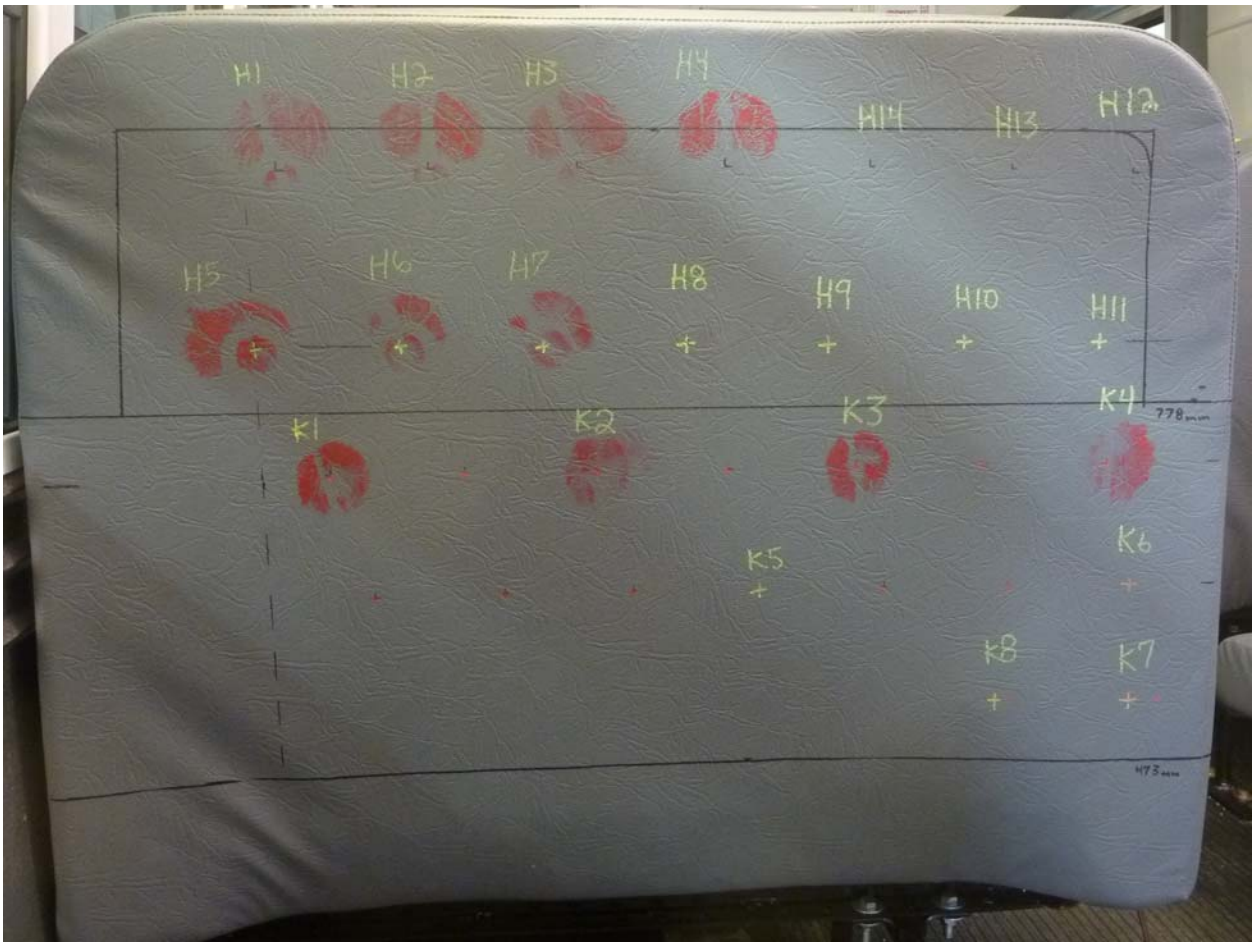
Approved By: _____ Date: 04/25/11

DATA SHEET 10

KNEE FORM IMPACT TEST

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

SEAT NUMBER: S3



REAR SURFACE

1. Locate x-y reference point on sketch above for knee form impact locations. (Label the positive and negative directions, if applicable)
2. Identify knee form impact location on sketch by placing K1, K2, K3, K4, K5, K6, K7, and K8 in the appropriate location.
3. Define the plane of reference for knee form impact angle:
   0° = Parallel with Floor, (+) is Up, (-) is Down
   X = From Inboard Edge of the Seat
   Y = Measured Vertically from the SRP

DATA SHEET 10 (CONTINUED)

KNEE FORM IMPACT TEST

4. Complete the following table:

(1)	(2)			(3)	(4)*	(5)	(6)	(7)		(8)	
Knee impact & Test #	Location			Speed Trap Impact Velocity ** mps	Derived Velocity ** mps	Cont. Area mm^2	Resist Force (N)	Column 5 > 1935 mm^2		Column 6 < 2669N	
	X	Y	Angle					Yes-PASS	No-FAIL	Yes-PASS	No-FAIL
K1	-722	257	0º	4.86	5.02	2,710	1,408	PASS			
K2	-520	257	0º	4.90	5.01	2,430	1,169	PASS			
K3	-315	257	0º	4.87	5.04	2,430	1,359	PASS			
K4	-111	256	0º	4.86	5.04	3,070	1,655	PASS			
K5	-389	156	0º	4.83	4.63		1,442			PASS	
K6	-84	155	0º	4.81	4.91		2,053			PASS	
K7	-75	53	0º	4.84	4.67		2,286			PASS	
K8	-189	55	0º	4.83	4.80		1,428			PASS	

* Impact velocity from item No. 7 below

** Impact velocity range = 4.86 mps, +0.076, -0 mps for contact area (K1 through K4)

** Impact velocity range = 4.86 mps, +0, -0.076 mps for contact area (K5 through K8)

5. Attach Contact Area Prints for K1, K2, K3 and K4.
6. Attach acceleration versus time plots for each impact.
7. Integrate the acceleration versus time plots and attach plots of the results that show velocity versus time for each plot K1 through K8.
8. Attach force vs. time plots for K5, K6, K7 and K8.

Comments: All measurements are referenced to the point where the horizontal plane through the SRP intersects the vertical line tangent to the inboard edge at the seat. In the case of Seat No. S3, the inboard edge of the seat is on the right hand side of the seat as viewed from the rear.

Recorded By: 

Approved By:  Date: 04/19/11

DATA SHEET 10

KNEE FORM IMPACT TEST

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

SEAT NUMBER: S8

REAR SURFACE

1. Locate x-y reference point on sketch above for knee form impact locations. (Label the positive and negative directions, if applicable)
2. Identify knee form impact location on sketch by placing K1, K2, K3, K4, K5, K6, K7, and K8 in the appropriate location.
3. Define the plane of reference for knee form impact angle:
   0° = Parallel with Floor, (+) is Up, (-) is Down
   X = From Inboard Edge of the Seat
   Y = Measured Vertically from the SRP

DATA SHEET 10 (CONTINUED)

KNEE FORM IMPACT TEST

4. Complete the following table:

(1)	(2)			(3)	(4)*	(5)	(6)	(7)		(8)	
Knee impact & Test #	Location			Speed Trap Impact Velocity ** mps	Derived Velocity ** mps	Cont. Area mm^2	Resist Force (N)	Column 5 > 1935 mm^2		Column 6 < 2669N	
	X	Y	Angle					Yes-PASS	No-FAIL	Yes-PASS	No-FAIL
K1	386	207	0º	4.89	5.00	2,470	1,463	PASS			
K2	489	207	0º	4.89	4.99	2,310	1,390	PASS			
K3	591	207	0º	4.89	4.98	2,560	1,376	PASS			
K4	694	207	0º	4.89	4.86	2,460	1,435	PASS			
K5	81	205	0º	4.82	5.14		2,527			PASS	
K6	182	206	0º	4.85	5.02		1,201			PASS	
K7	51	61	0º	4.86	4.99		2,332			PASS	
K8	152	61	0º	4.84	4.87		1,245			PASS	

* Impact velocity from item No. 7 below

** Impact velocity range = 4.86 mps, +0.076, -0 mps for contact area (K1 through K4)

** Impact velocity range = 4.86 mps, +0, -0.076 mps for contact area (K5 through K8)

5. Attach Contact Area Prints for K1, K2, K3 and K4.
6. Attach acceleration versus time plots for each impact.
7. Integrate the acceleration versus time plots and attach plots of the results that show velocity versus time for each plot K1 through K8.
8. Attach force vs. time plots for K5, K6, K7 and K8.

Comments: All measurements are referenced to the point where the horizontal plane through the SRP intersects the vertical line tangent to the inboard edge at the seat. In the case of Seat No. S8, the inboard edge of the seat is on the right hand side of the seat as viewed from the rear.

Recorded By: 

Approved By:  Date: 04/26/11

SECTION 4

INSTRUMENTATION AND EQUIPMENT LIST

Equipment	Description	Model / Serial No.	Cal. Date	Cal. Due Date
Load Cell	Interface	1210AF-300 / 184552	06/14/11	12/14/11
Load Cell	PCB	1315-101-01A / 634-10k	04/07/11	10/07/11
Load Cell	PCB	1315-101-01A / 671	02/10/11	08/10/11
Load Cell	Key Transducer	1315-101-01 / 260	02/11/11	08/11/11
Load Cell	Key Transducer	1315-101-01 / 271	02/11/11	08/11/11
Load Cell	Interface	1210AF-25K-B / 137781	12/16/10	06/16/11
String Pot.	Ametek	P-40A / 0108-27165	02/11/11	08/11/11
String Pot.	Ametek	P-40A / 0504-21782	02/11/11	08/11/11
Inclinometer	Digital Protractor	Pro 360 / 001	Daily	Daily
Steel Tape	Stanley	Powerlock / 173	02/28/11	08/28/11
Impact Fixture	MGA	IF2003A	---	---
Camera	Sony	DSC-575	---	---
Planimeter	Sokkia Corp.	Planix5 / 007319	Daily	Daily

SECTION 5

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Test Vehicle:	**2011 Starcraft Quest School Bus**	NHTSA No.:	**CB0902**
Test Lab:	**MGA Research Corporation**	Test Dates:	**03/17/11 – 08/30/11**

Left Side View of School Bus

Right Side View of School Bus

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

¾ Front View From Left Side of School Bus

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

¾ Front View From Right Side of School Bus

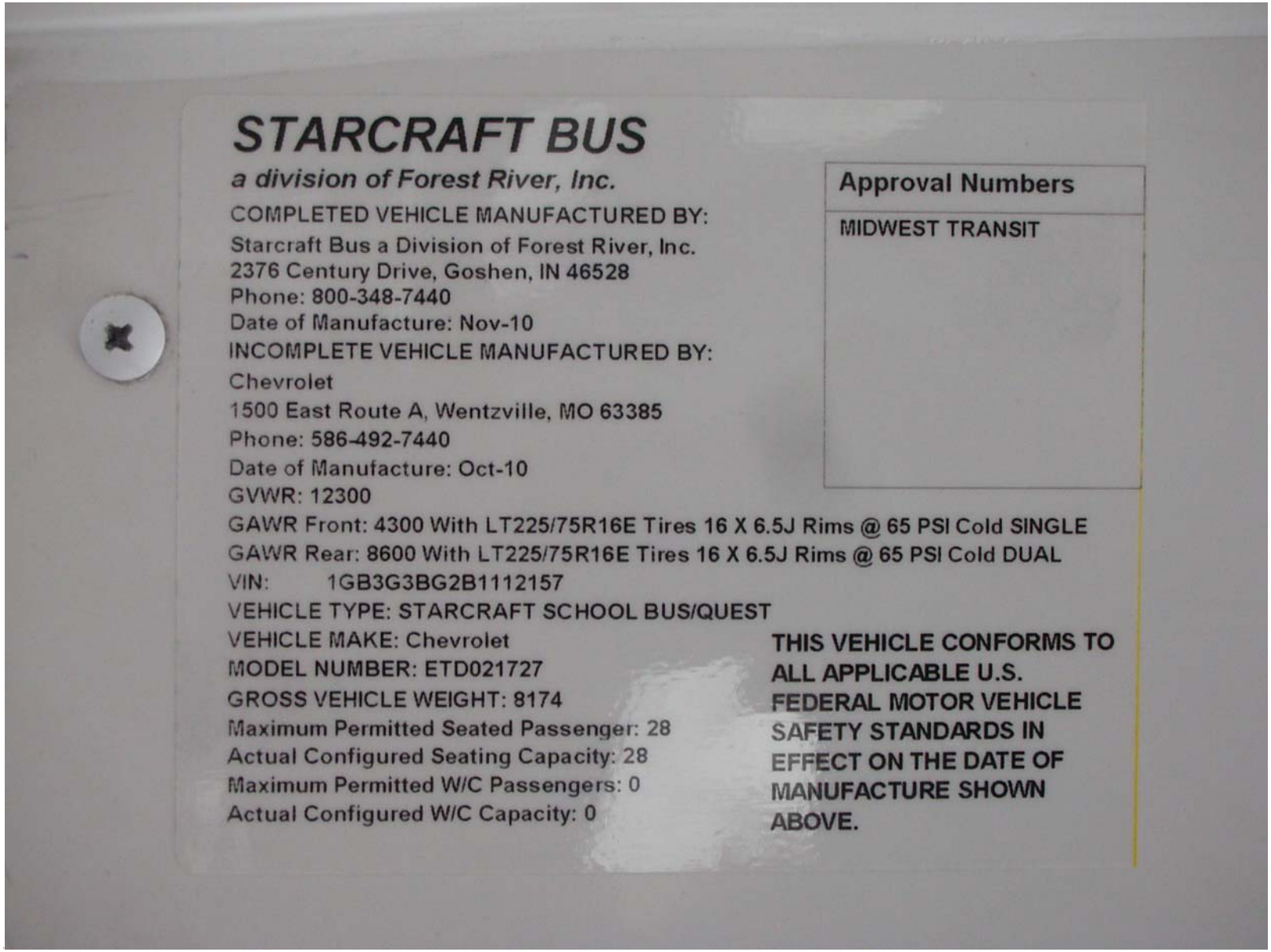
Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

¾ Rear View From Left Side of School Bus

Test Vehicle: **2011 Starcraft Quest School Bus** NHTSA No.: **CB0902**
Test Lab: **MGA Research Corporation** Test Dates: **03/17/11 – 08/30/11**

¾ Rear View From Right Side of School Bus

Certification Label & Tire Placard



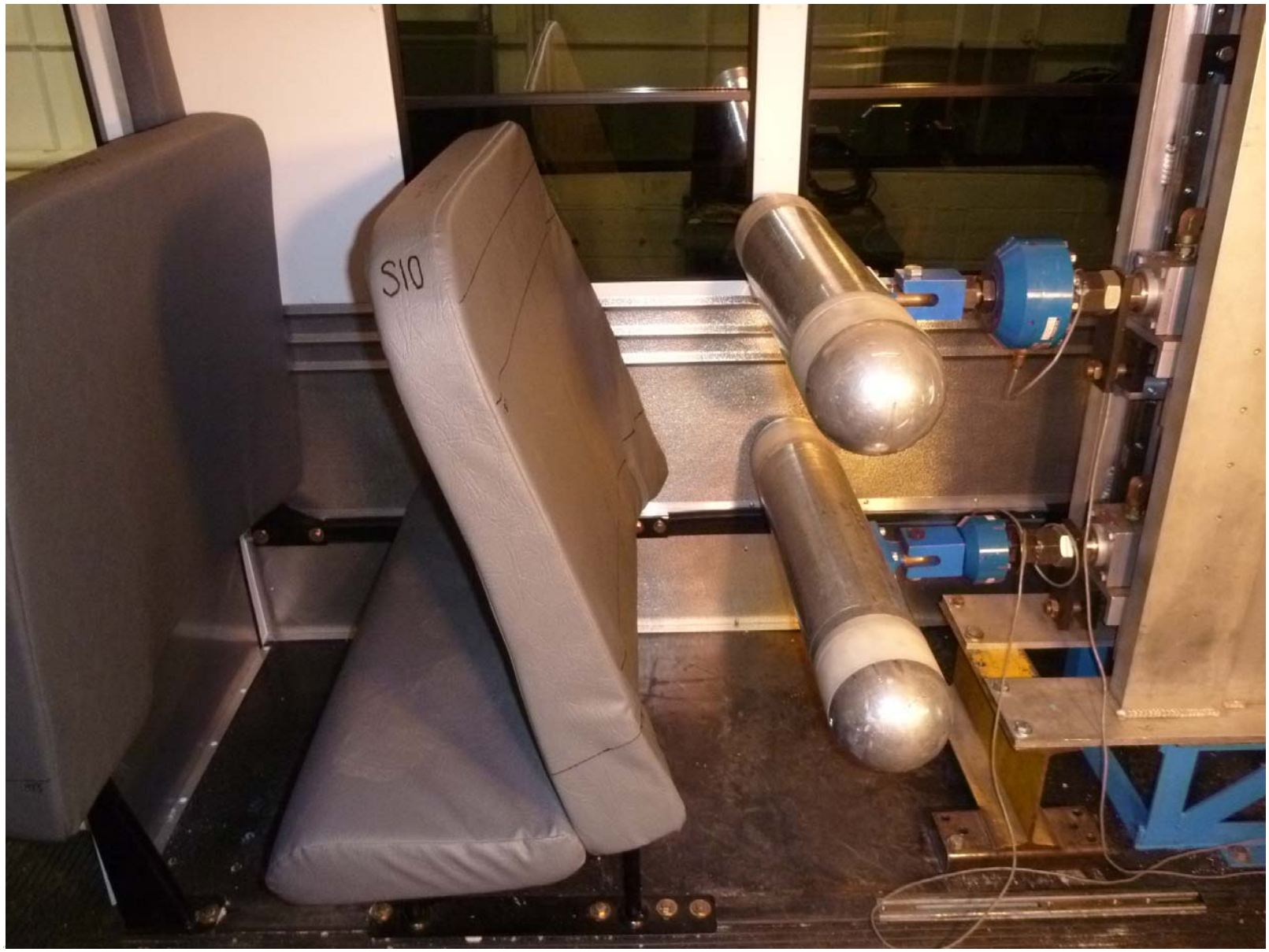
Incomplete Vehicle Label

Vehicle Interior View From Front to Rear

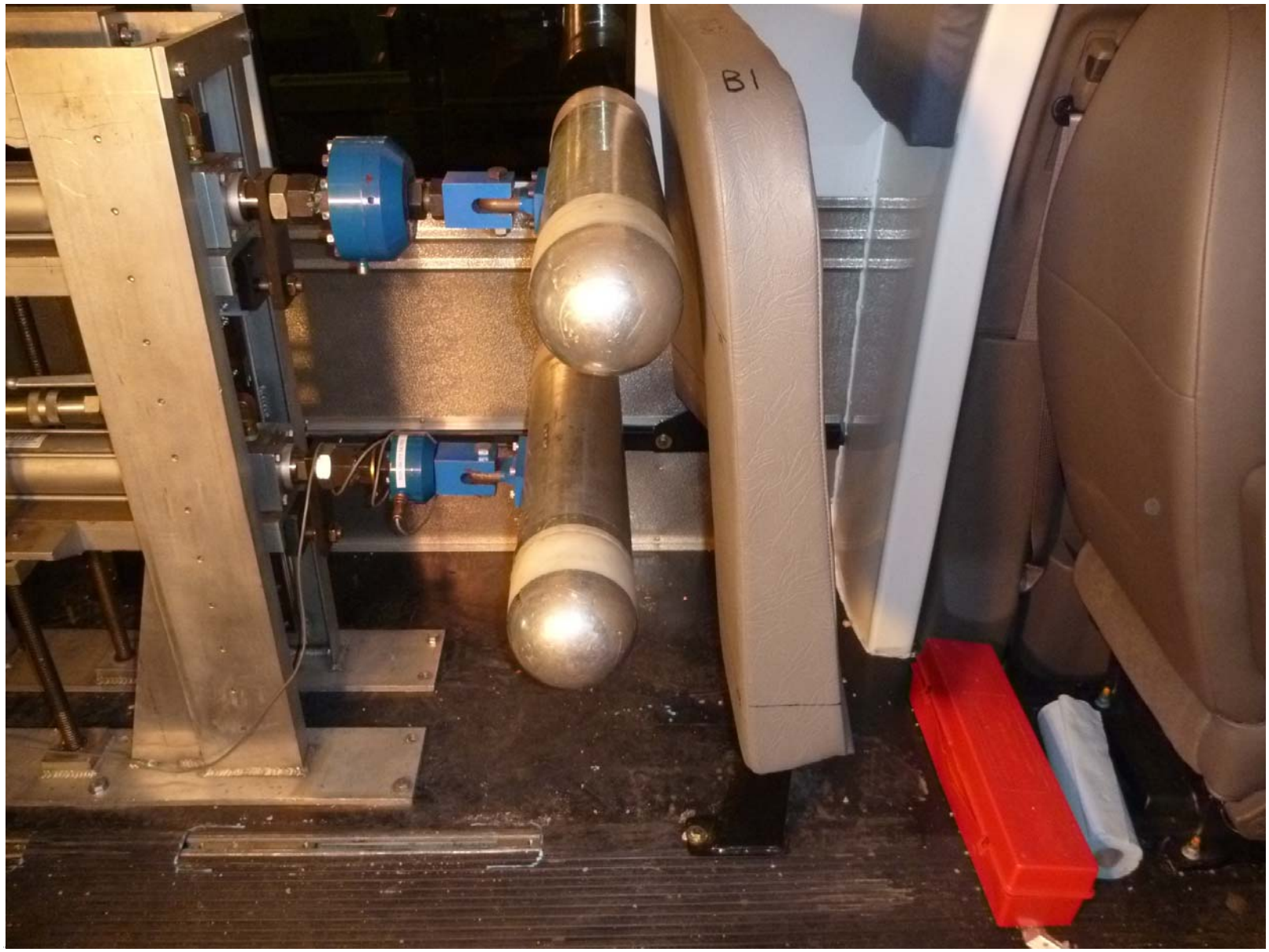
Vehicle Interior View From Rear to Front

Pre-Test of Seat Cushion Retention Set Up on Seat S2

Pre-Test of Seat Back S10 Force Deflection Forward Test

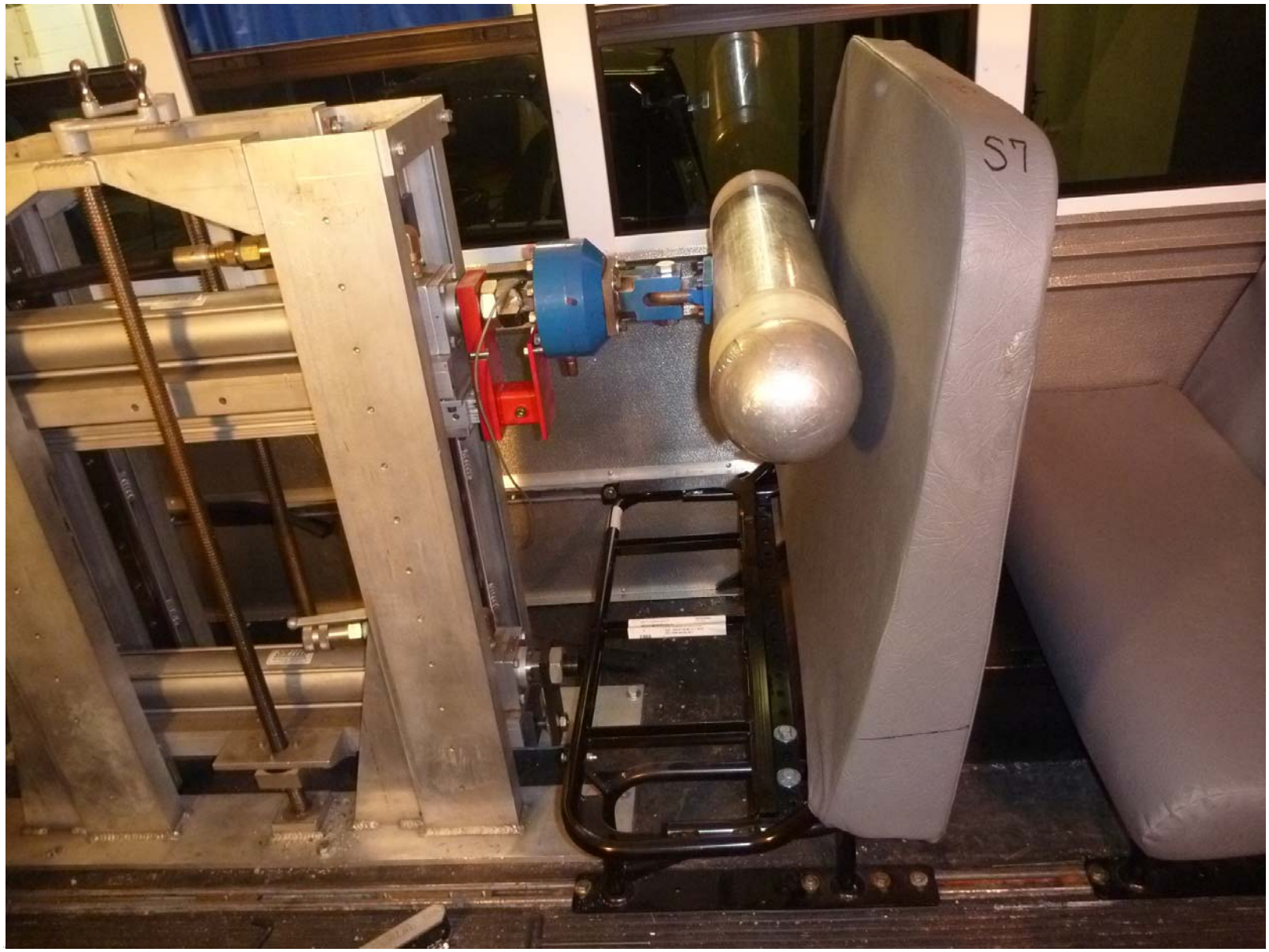


Post-Test of Seat Back S10 Force Deflection Forward Test



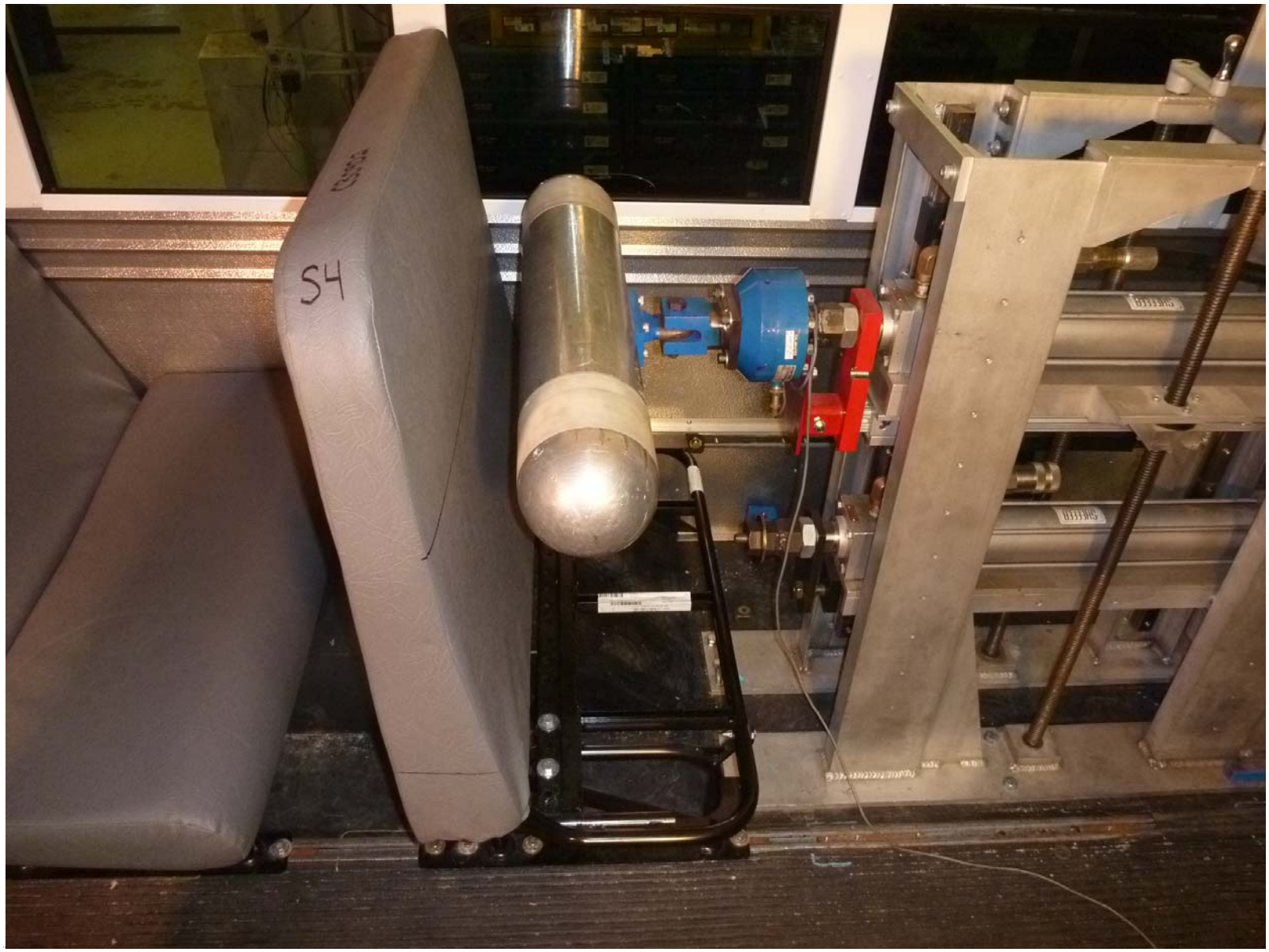
Pre-Test of Barrier B1 Force Deflection Forward Test

Post-Test of Barrier B1 Force Deflection Forward Test

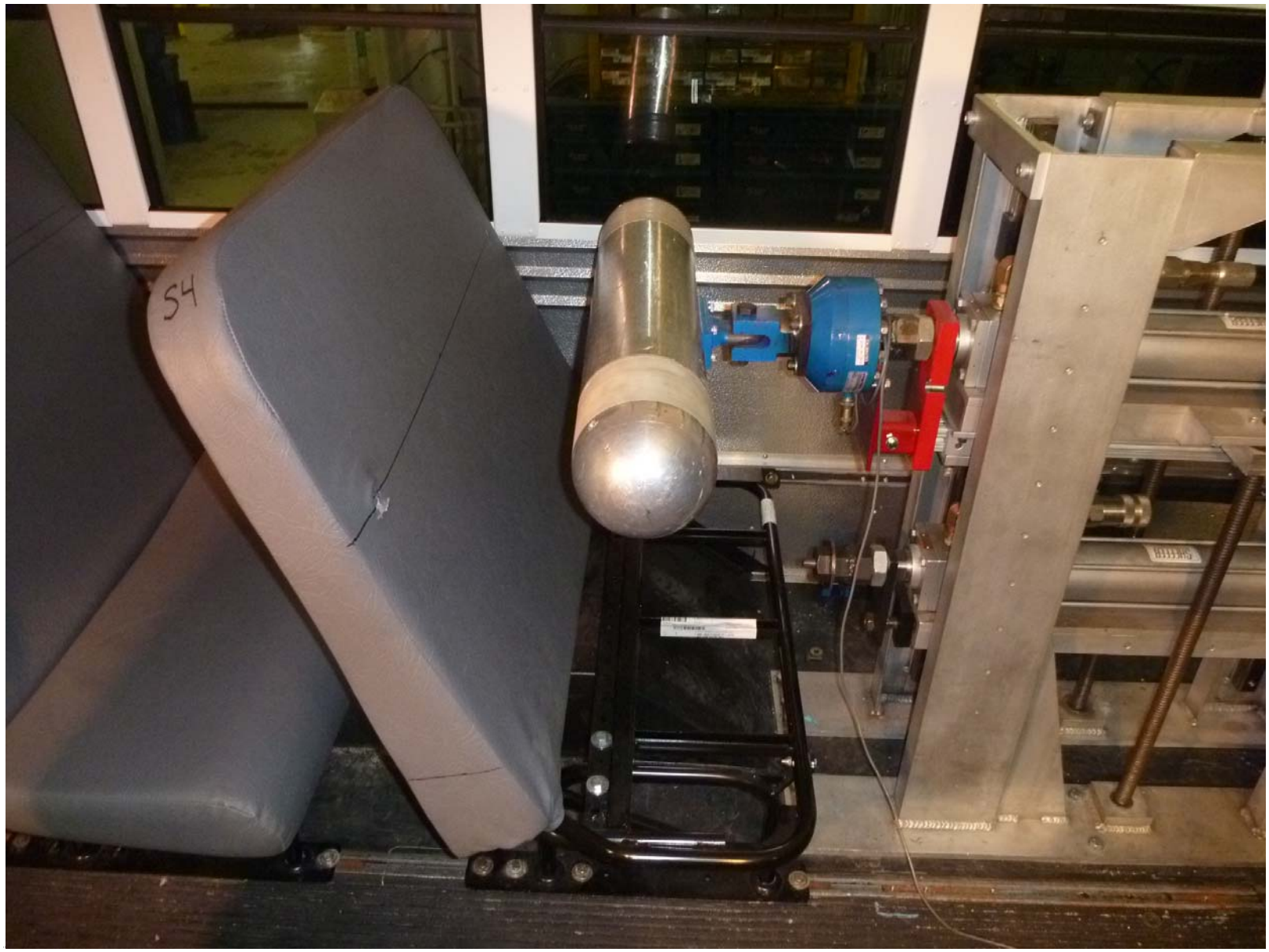


Pre-Test of Seat Back S7 Force Deflection Rearward Test

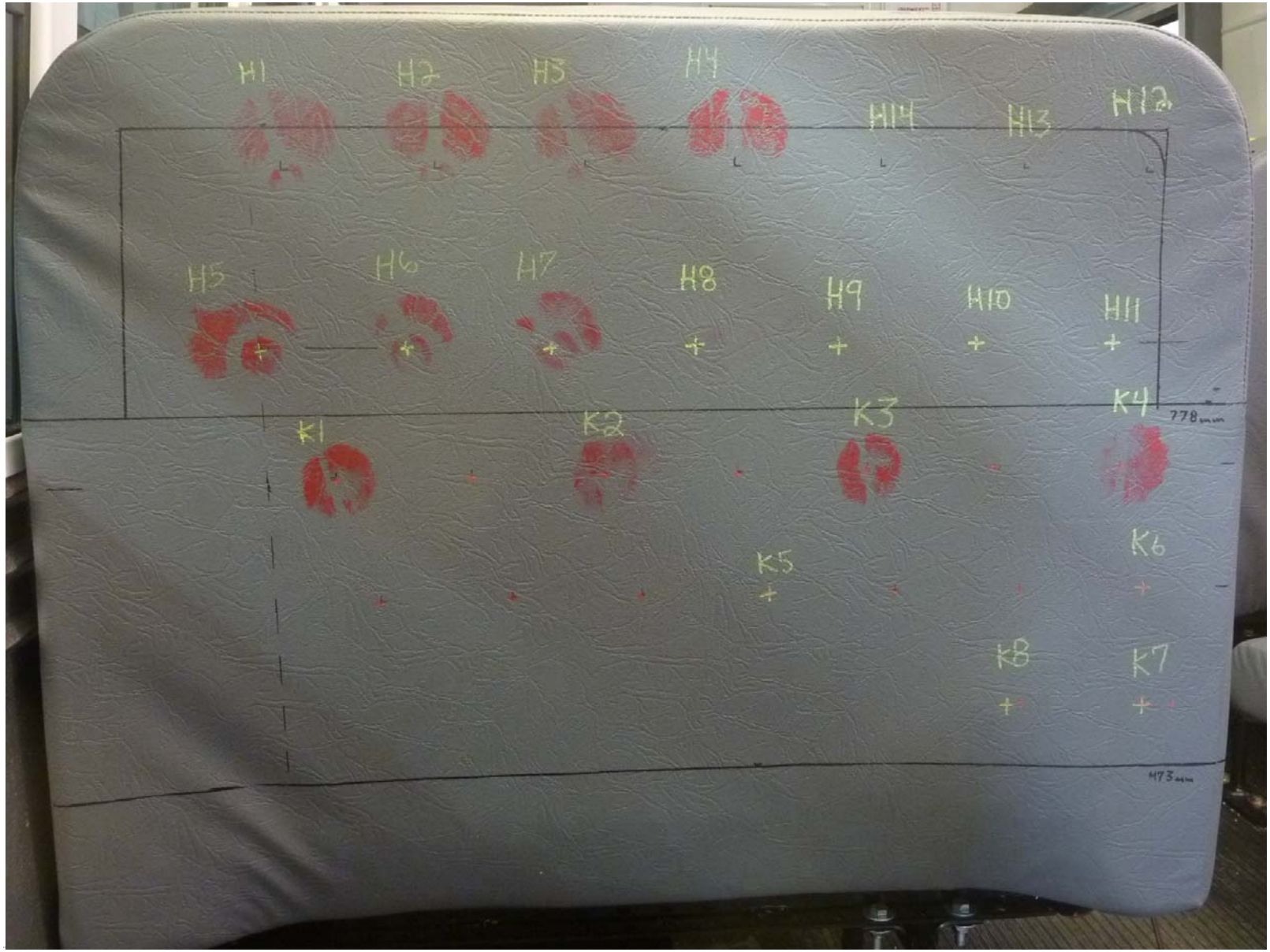
Post-Test of Seat Back S7 Force Deflection Rearward Test



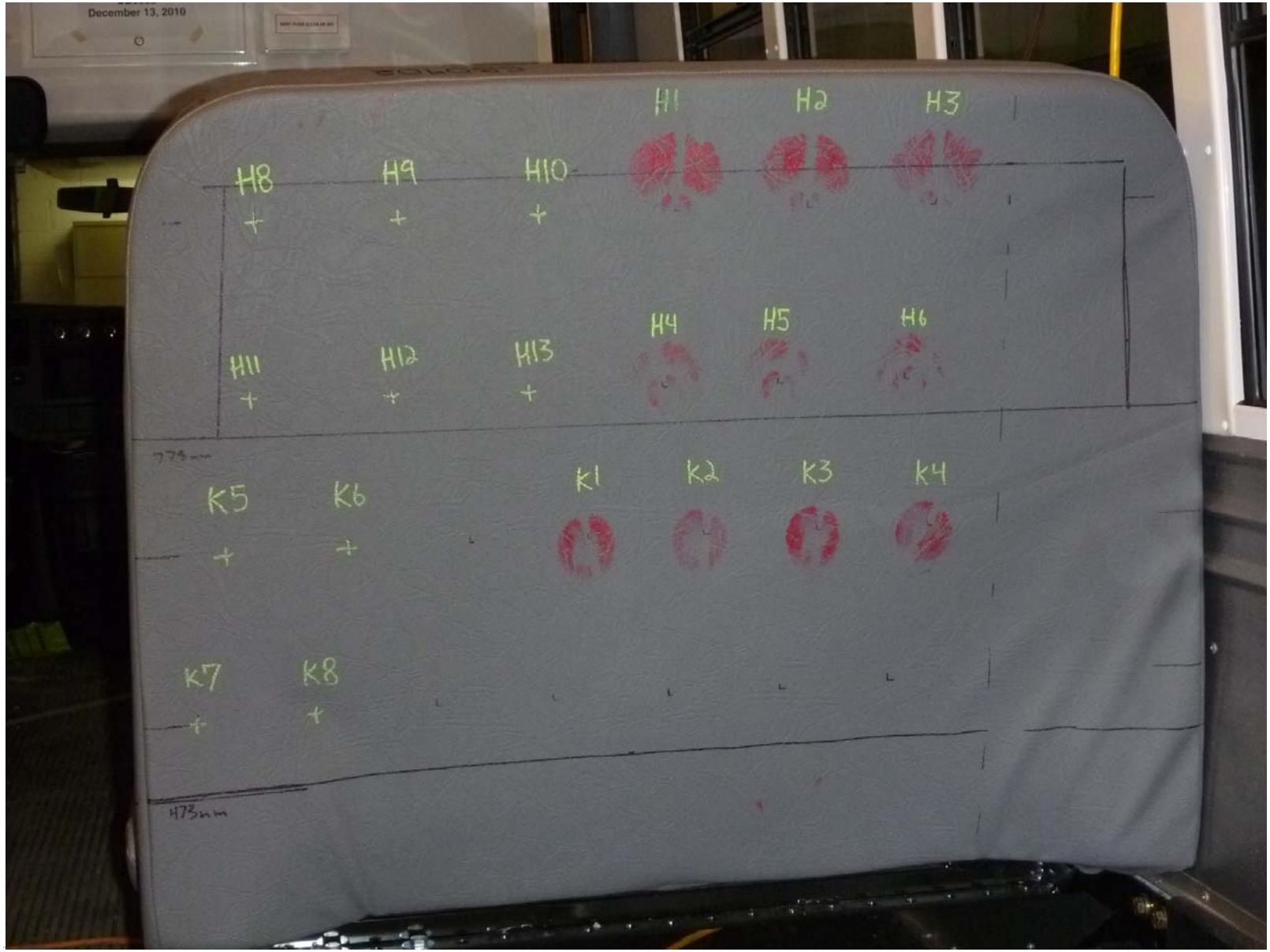
Pre-Test of Seat Back S4 Force Deflection Rearward Test



Post-Test of Seat Back S4 Force Deflection Rearward Test



Post-Test of Head and Knee Impact Locations on Seat S3



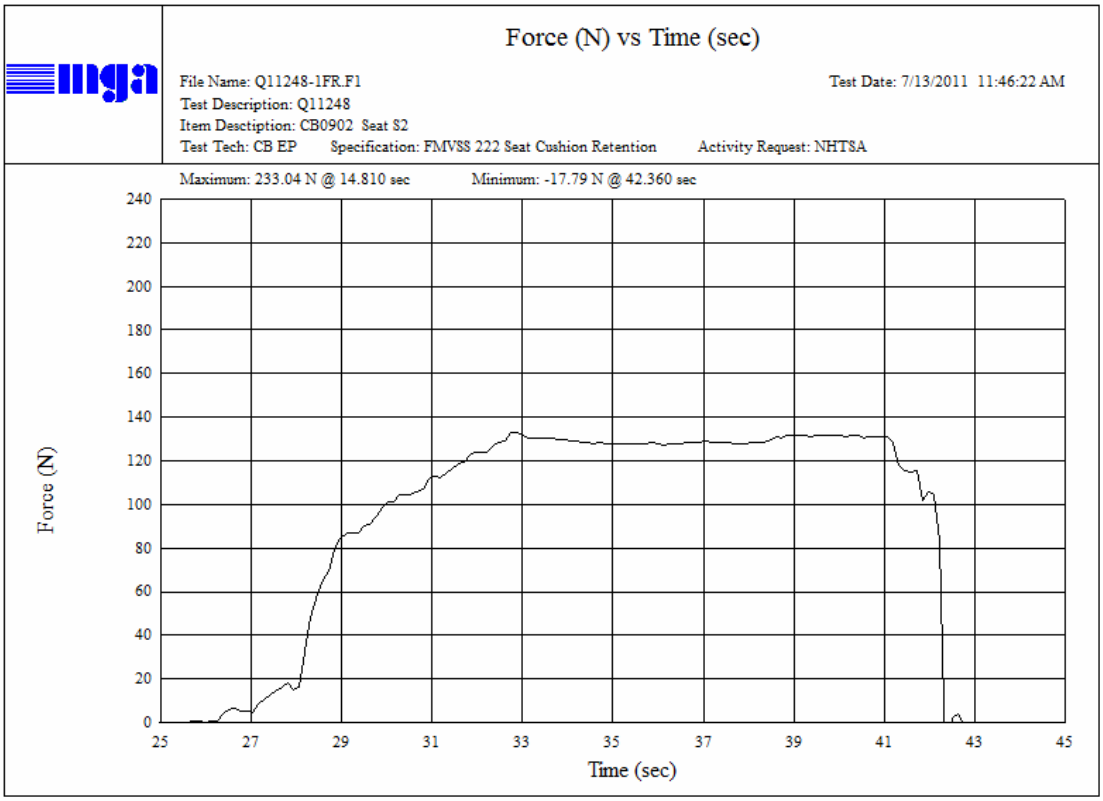
Post-Test of Head and Knee Impact Locations on Seat S8

SECTION 6

TEST PLOTS

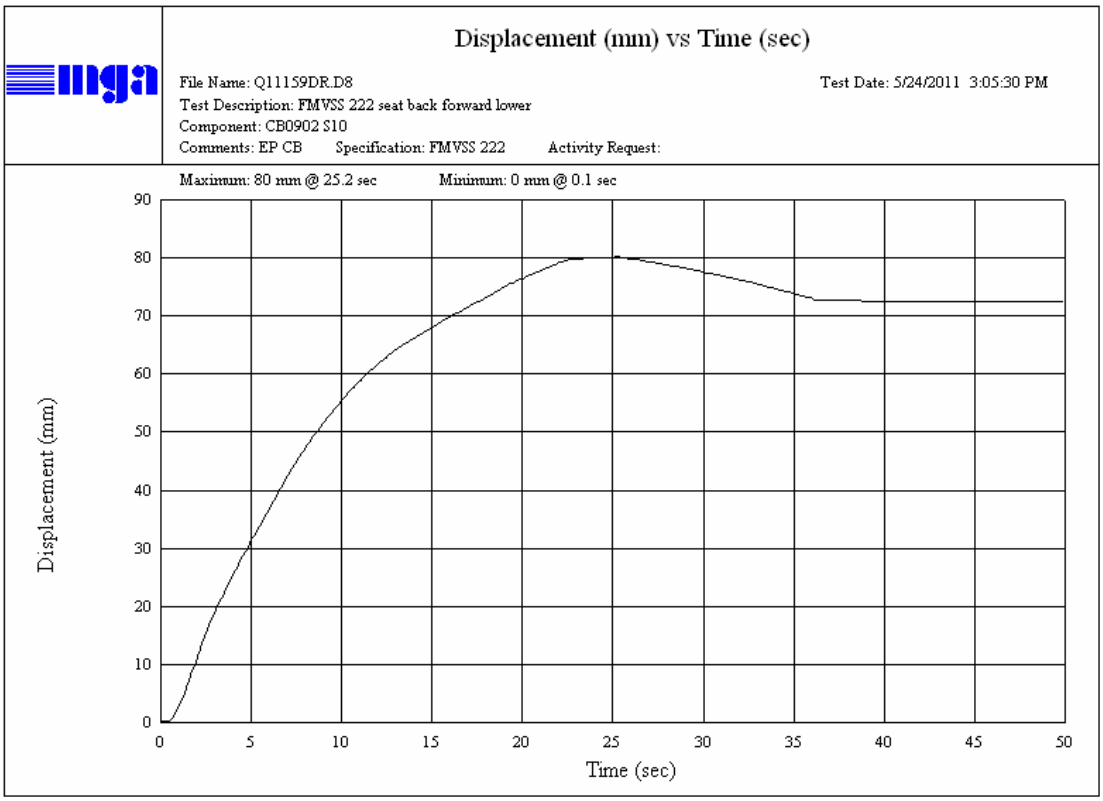
TABLE OF TEST PLOTS

TABLE OF TEST PLOTS

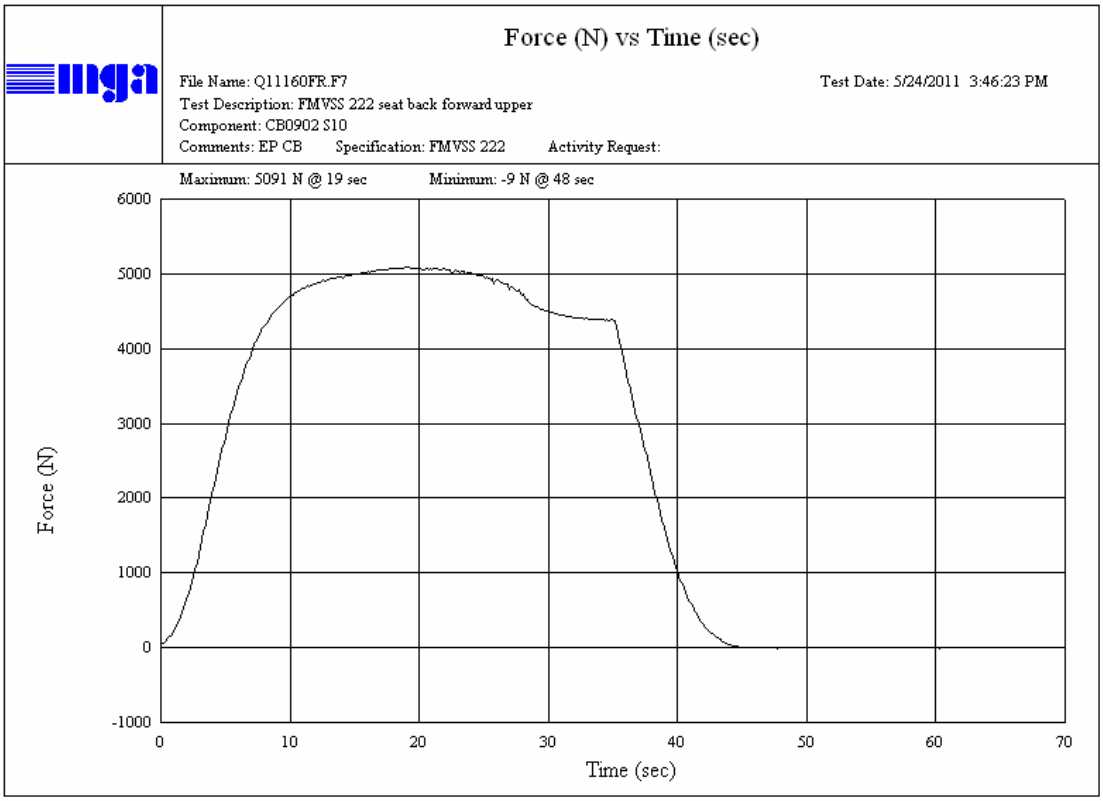


Seat Cushion Retention Seat S2 Force vs. Time

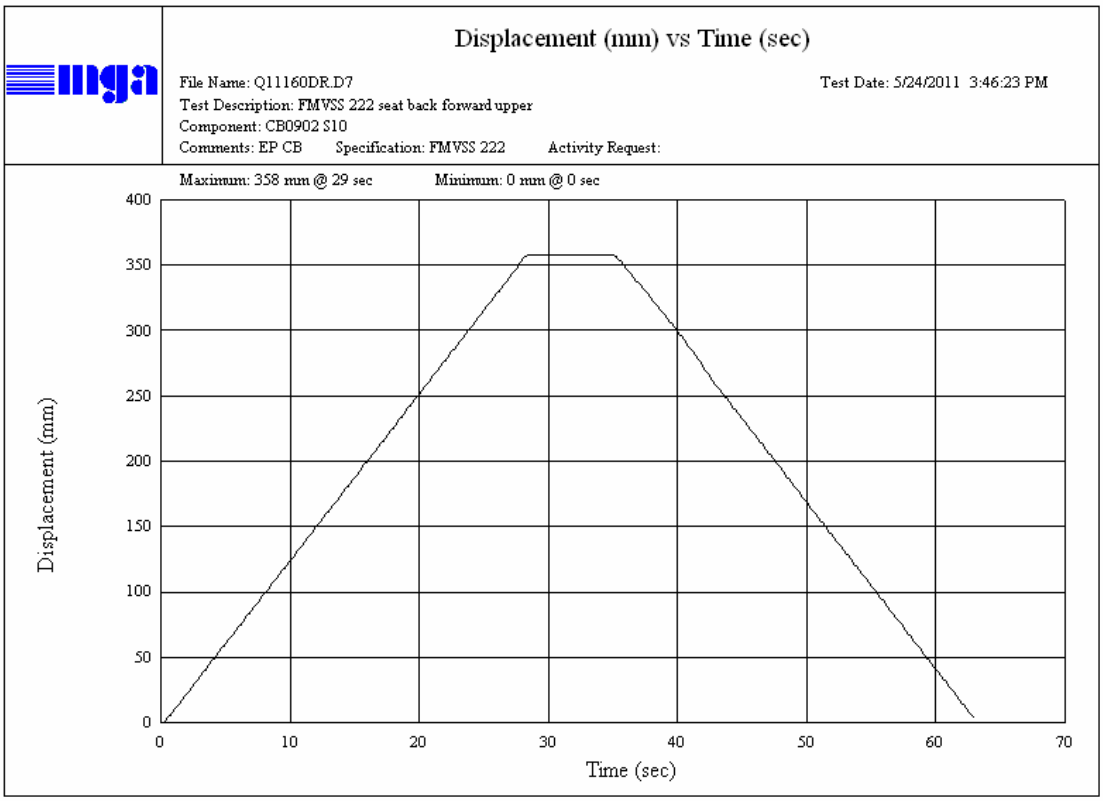
Seat Back Forward Deflection Seat S10 (Lower) Force vs. Time



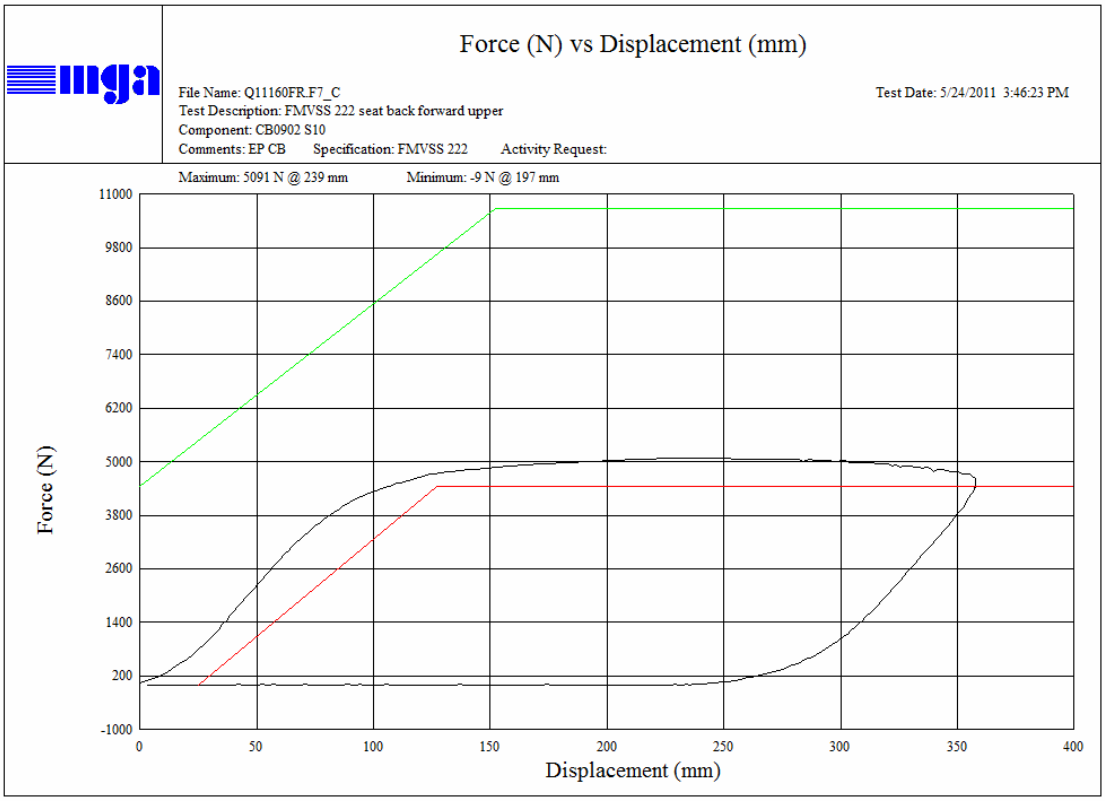
Seat Back Forward Deflection Seat S10 (Lower) Displacement vs. Time



Seat Back Forward Deflection Seat S10 (Upper) Force vs. Time

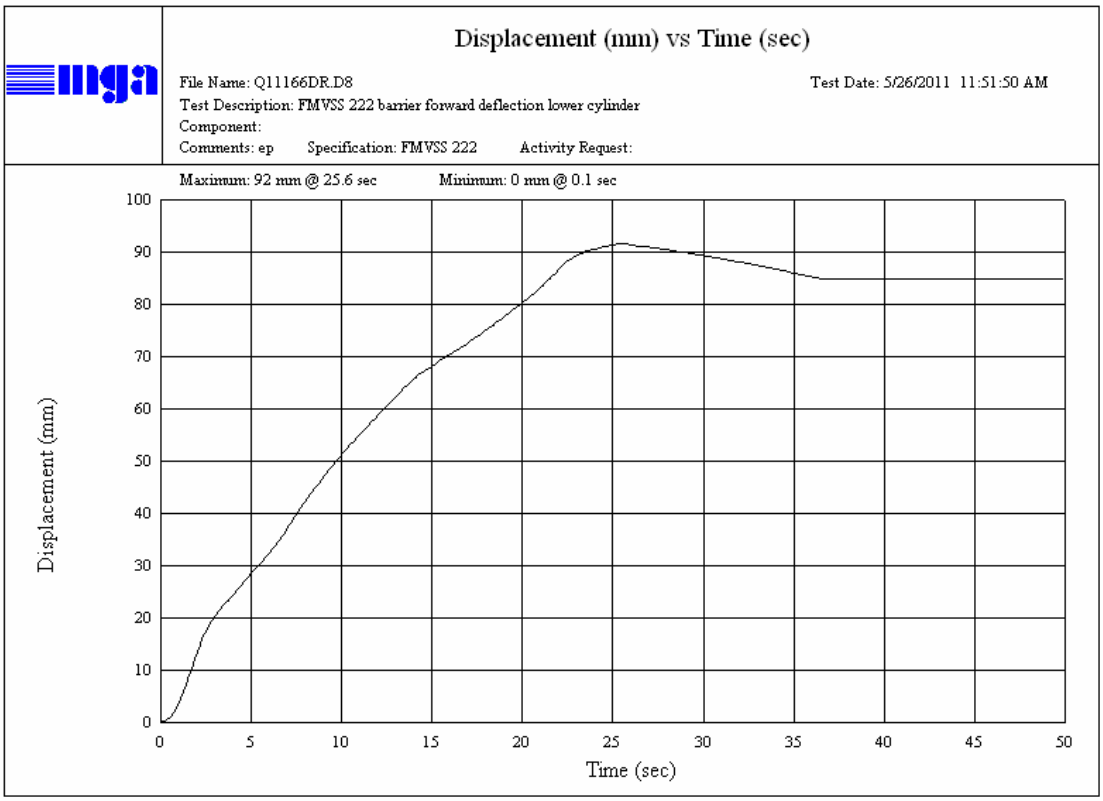


Seat Back Forward Deflection Seat S10 (Upper) Displacement vs. Time

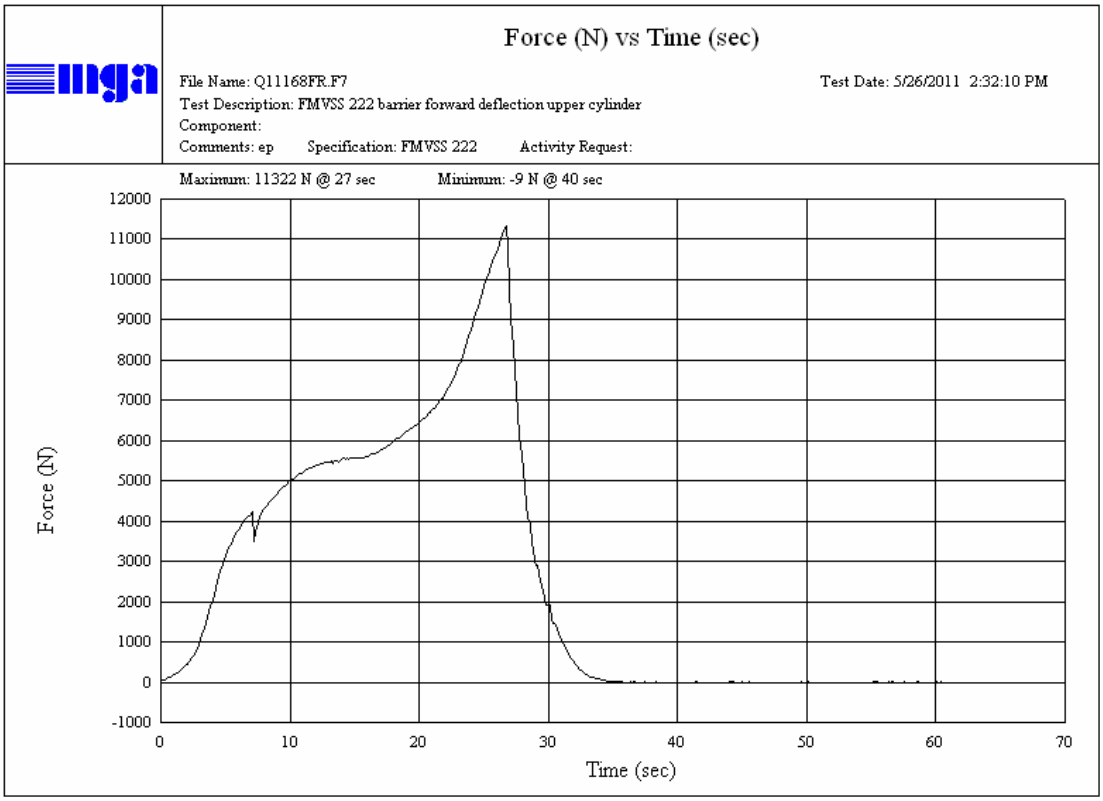


Seat Back Forward Deflection Seat S10 (Upper) Force vs. Displacement

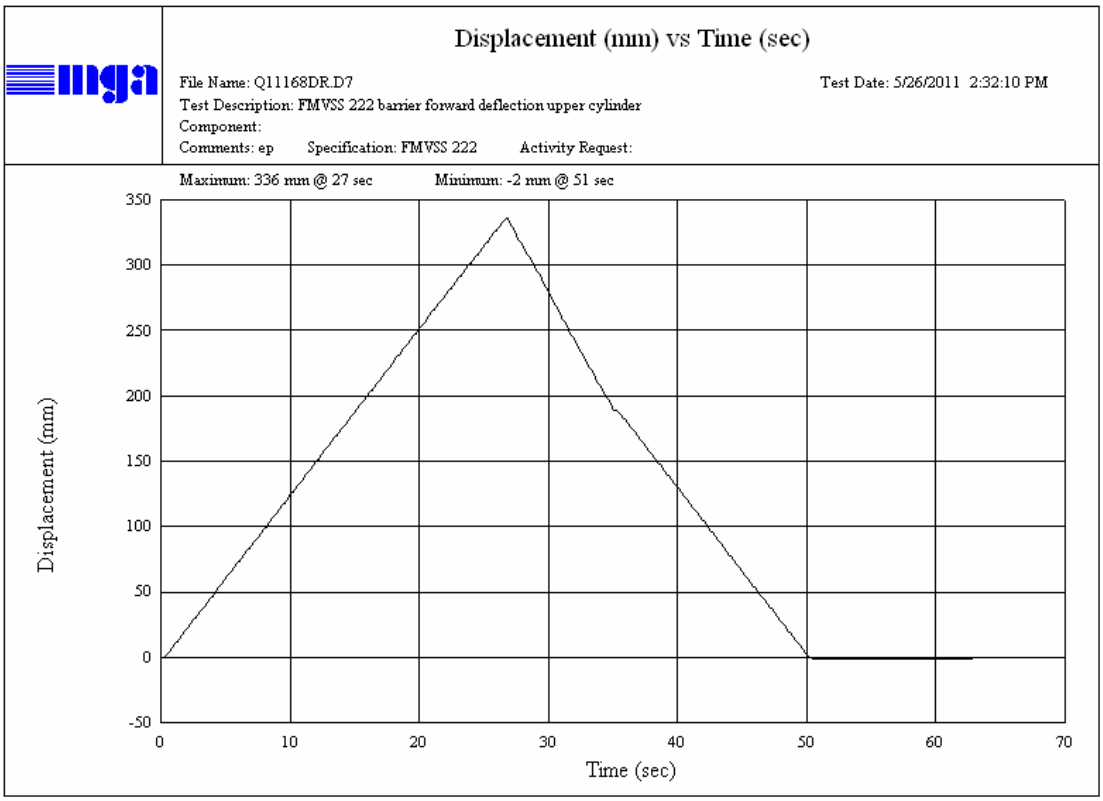
Barrier Forward Deflection Barrier B1 (Lower) Force vs. Time



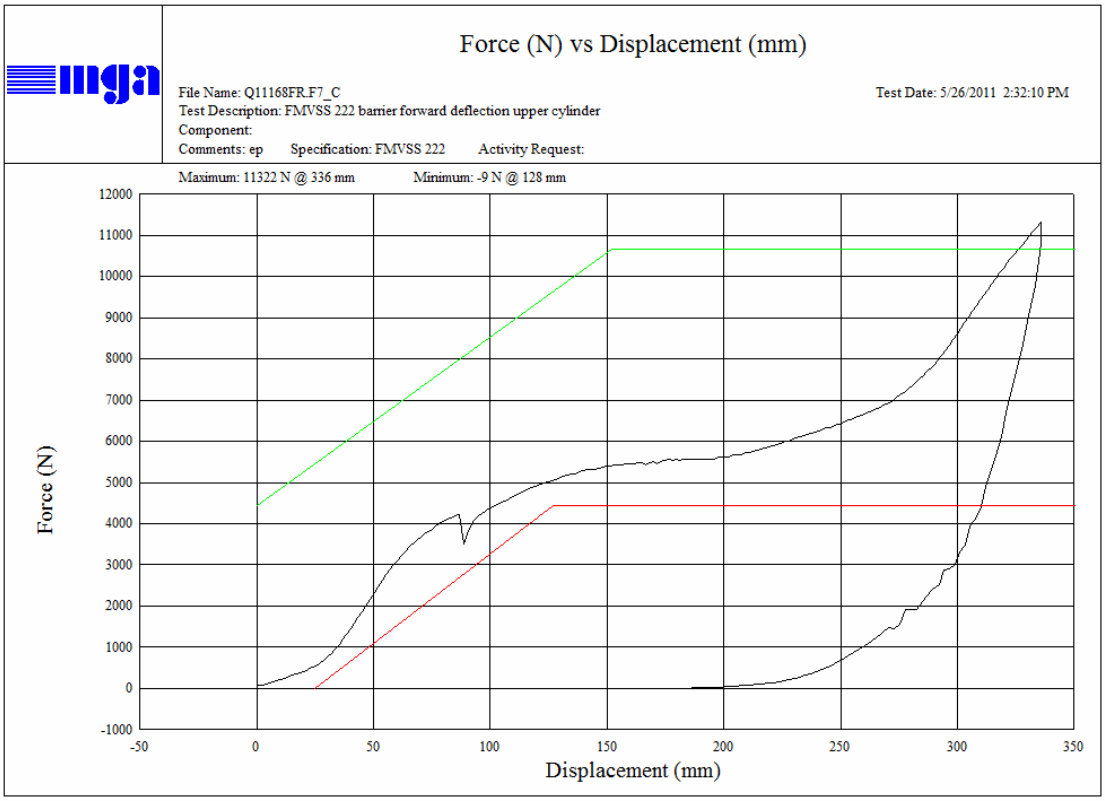
Barrier Forward Deflection Barrier B1 (Lower) Displacement vs. Time



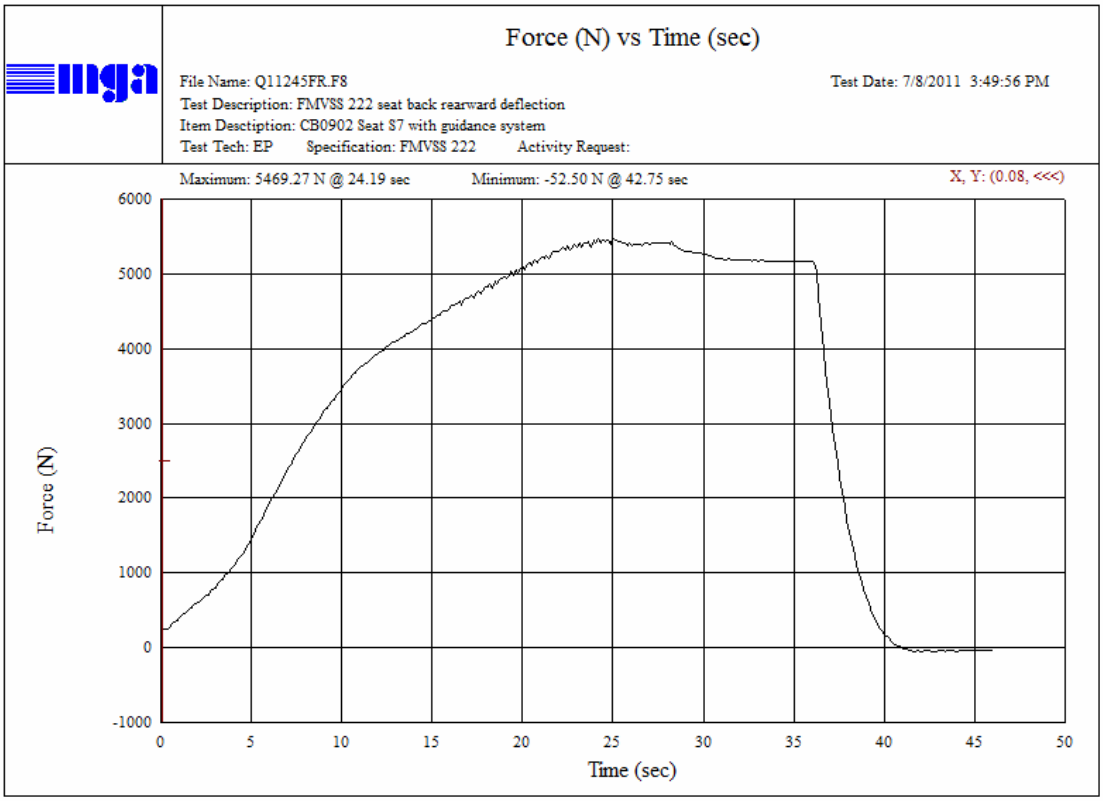
Barrier Forward Deflection Barrier B1 (Upper) Force vs. Time



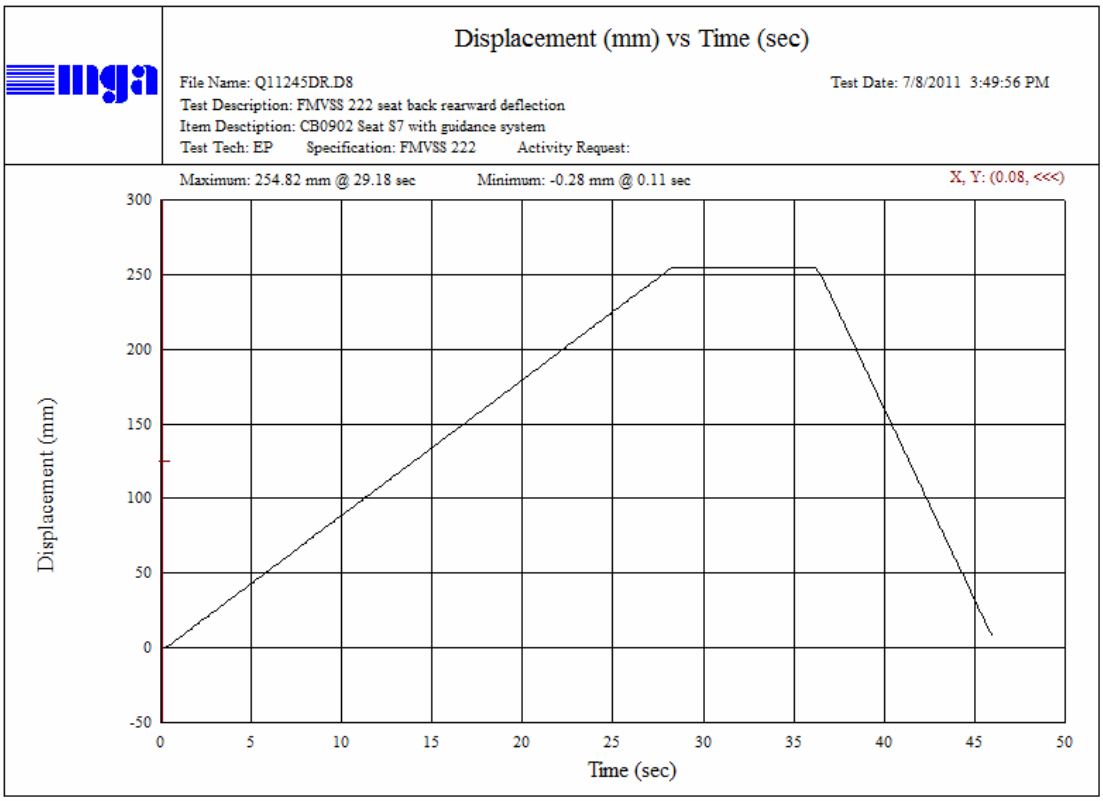
Barrier Forward Deflection Barrier B1 (Upper) Displacement vs. Time



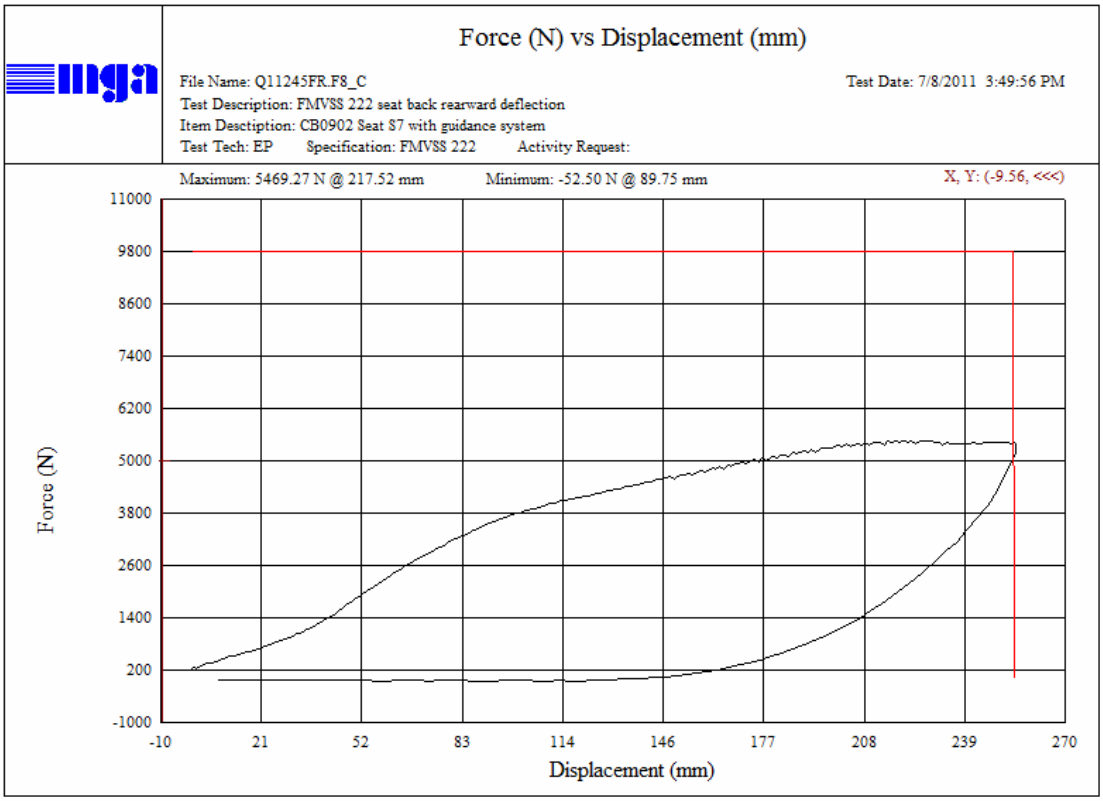
Barrier Forward Deflection Barrier B1 (Upper) Force vs. Displacement



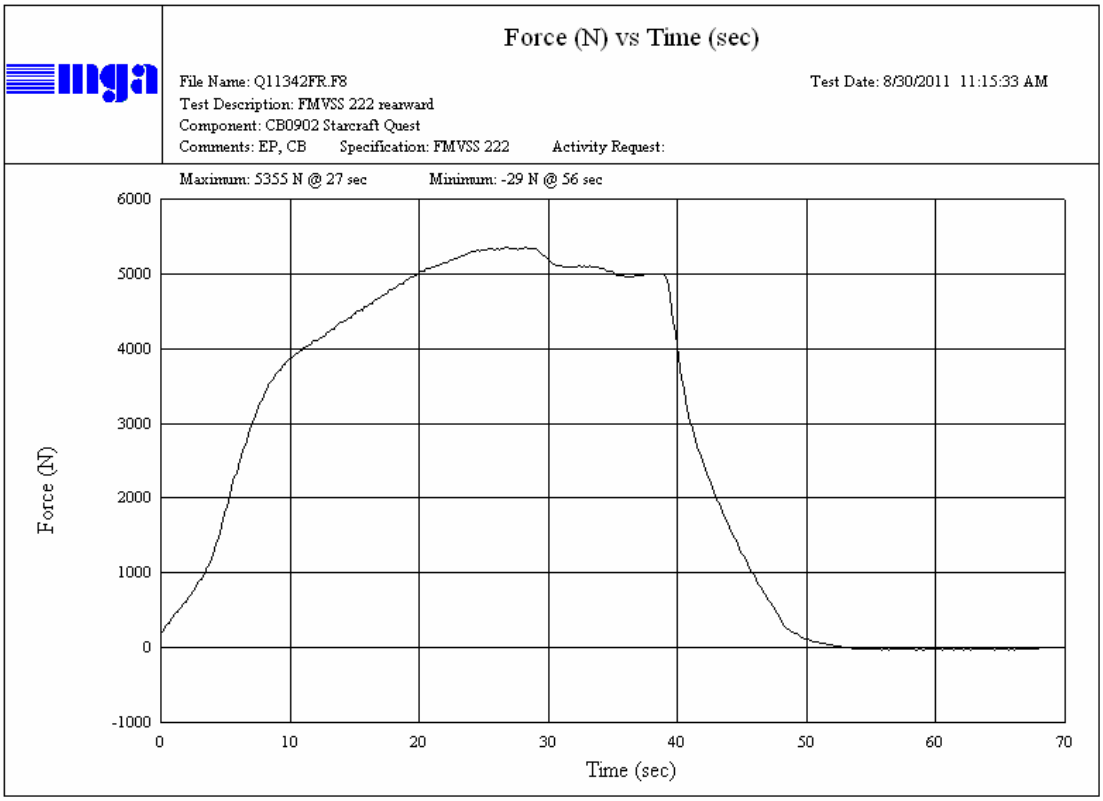
Seat Back Rearward Deflection Seat S7 Force vs. Time



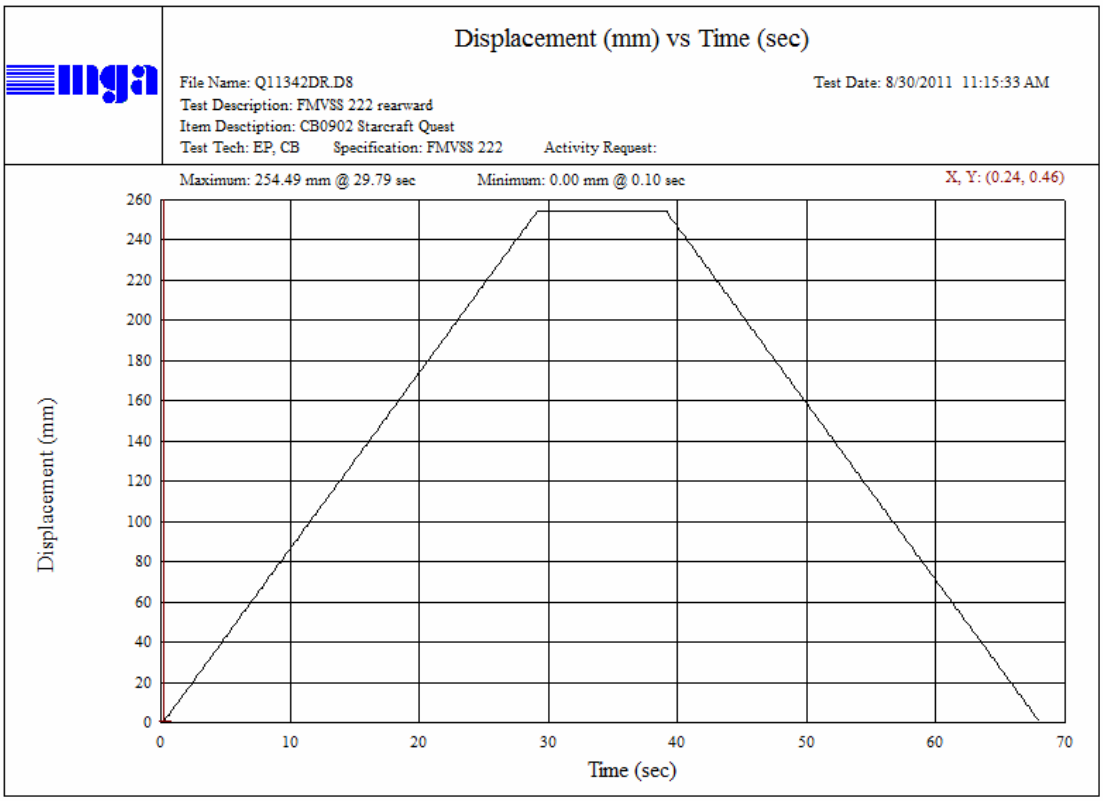
Seat Back Rearward Deflection Seat S7 Displacement vs. Time



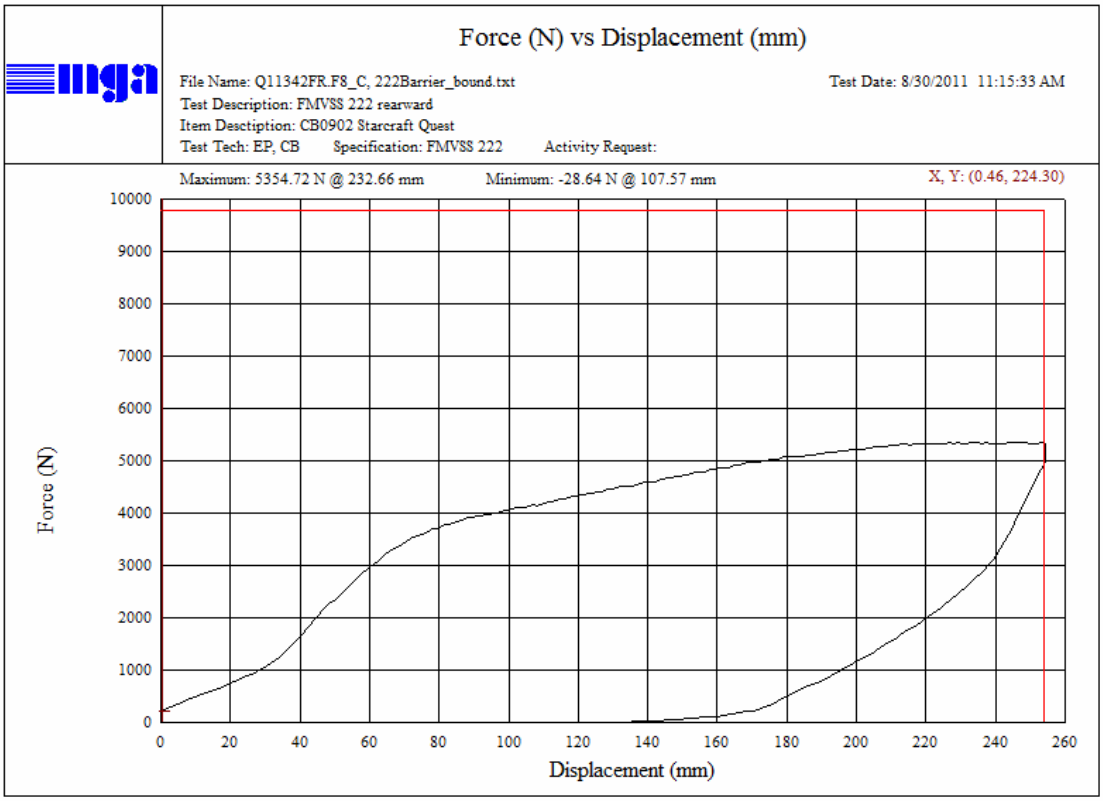
Seat Back Rearward Deflection Seat S7 Force vs. Displacement



Seat Back Rearward Deflection Seat S4 Force vs. Time

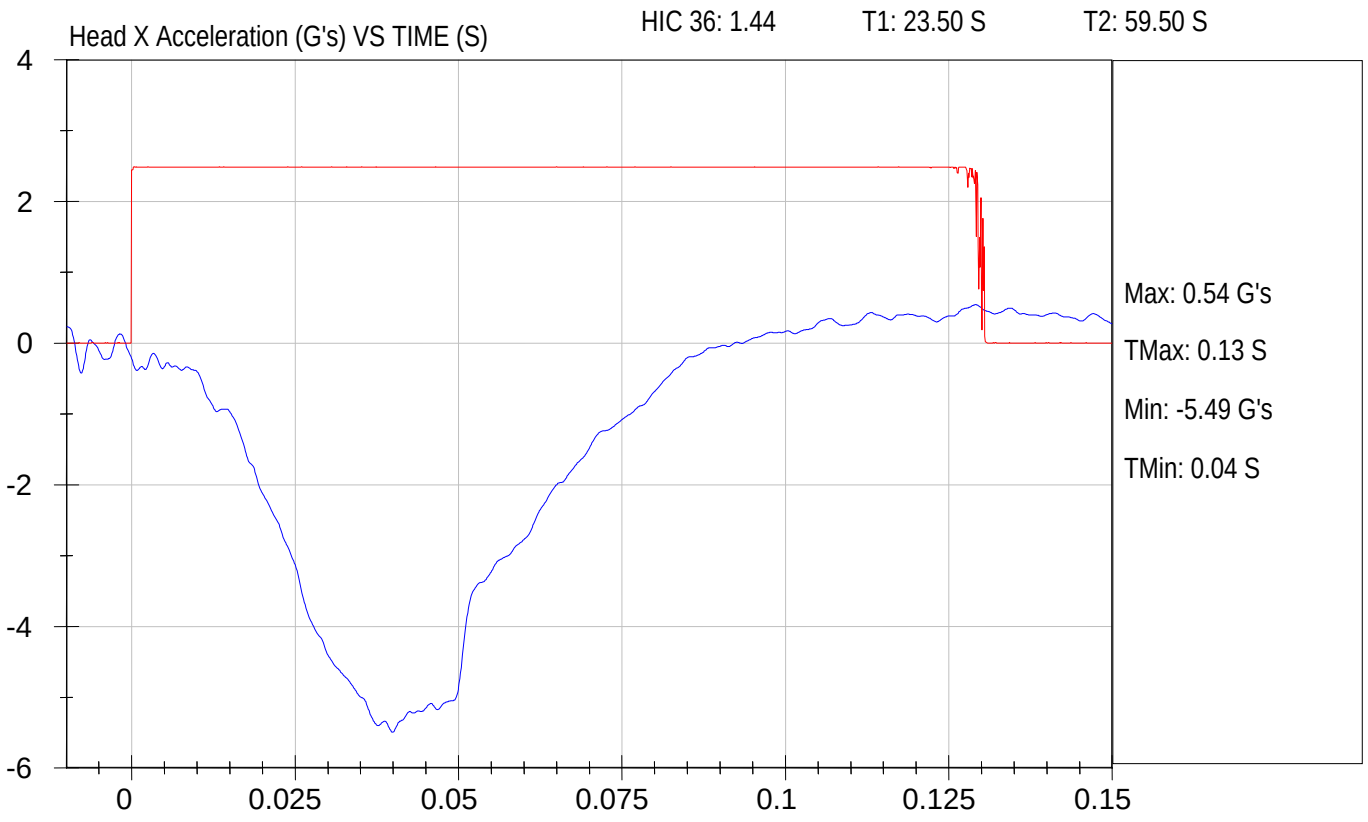


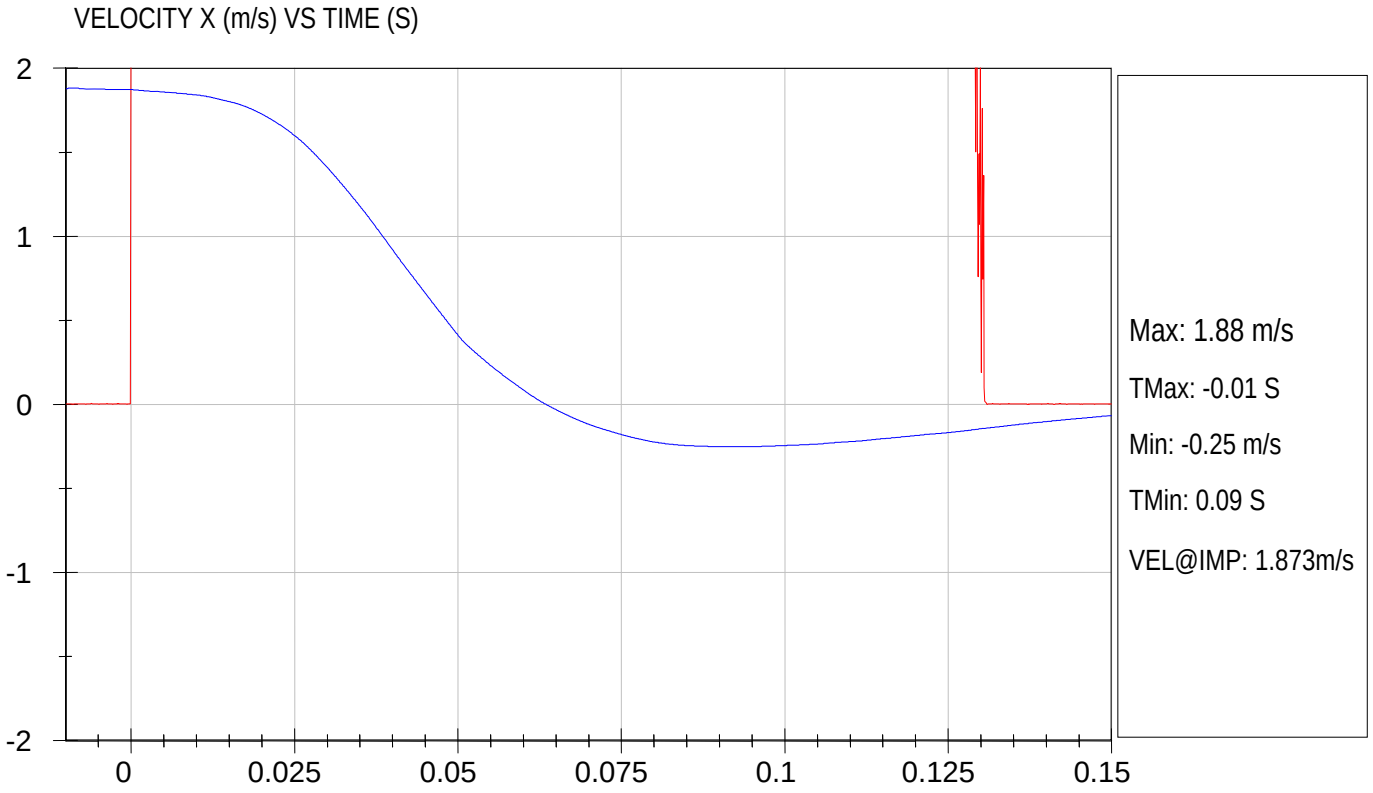
Seat Back Rearward Deflection Seat S4 Displacement vs. Time



Seat Back Rearward Deflection Seat S4 Force vs. Displacement

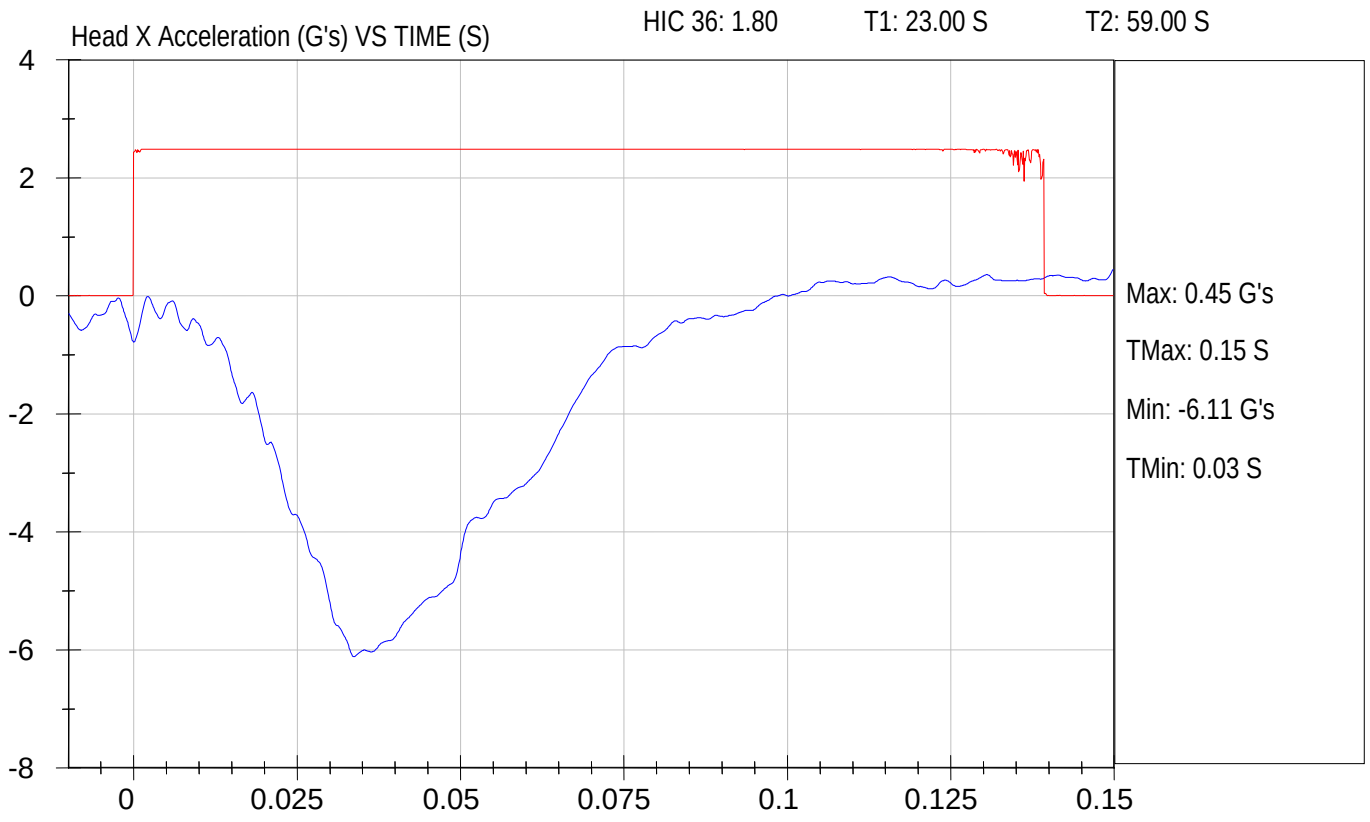
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s) Test Date: 4-19-2011
Component ID: 2011 Starcraft Quest NHTSA #: CB0902
Location: S3H1 speed trap: 1.582 m/s

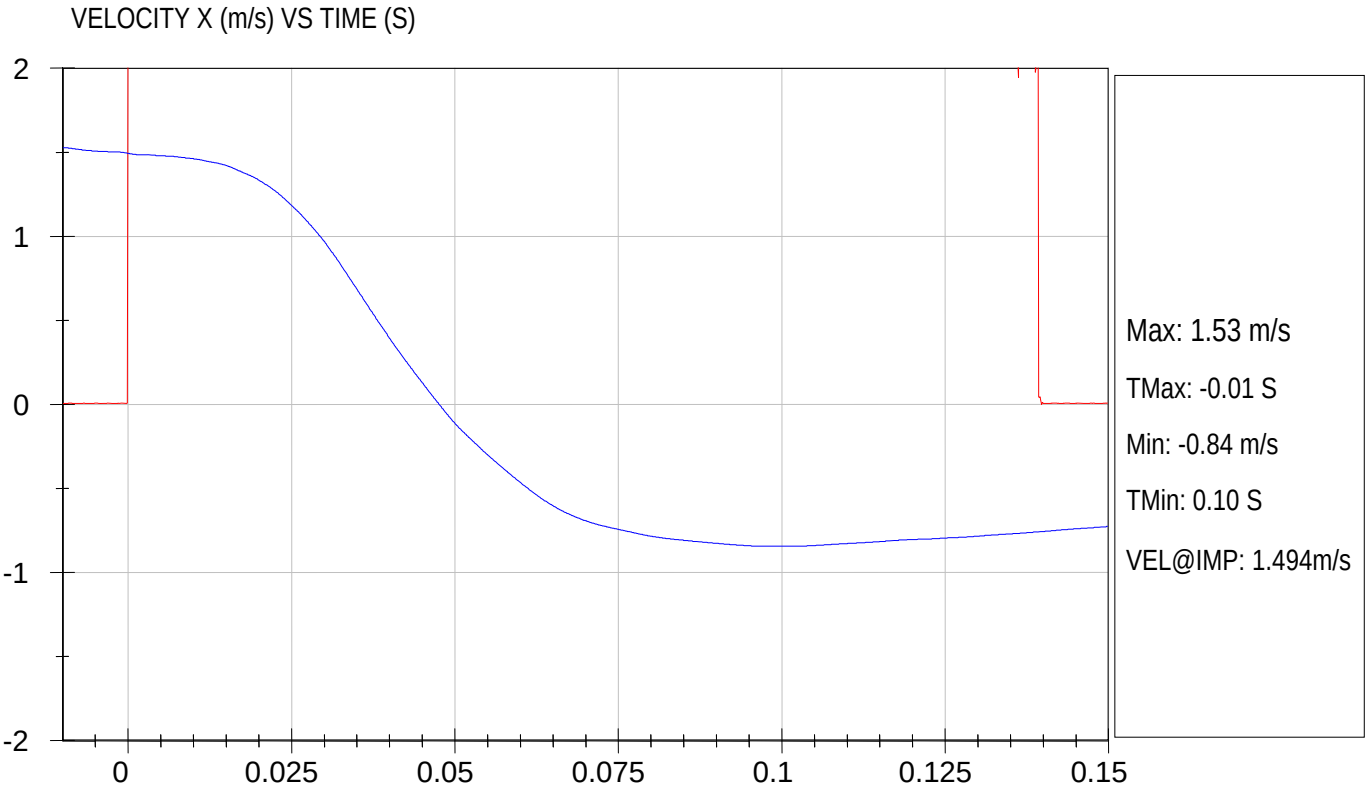




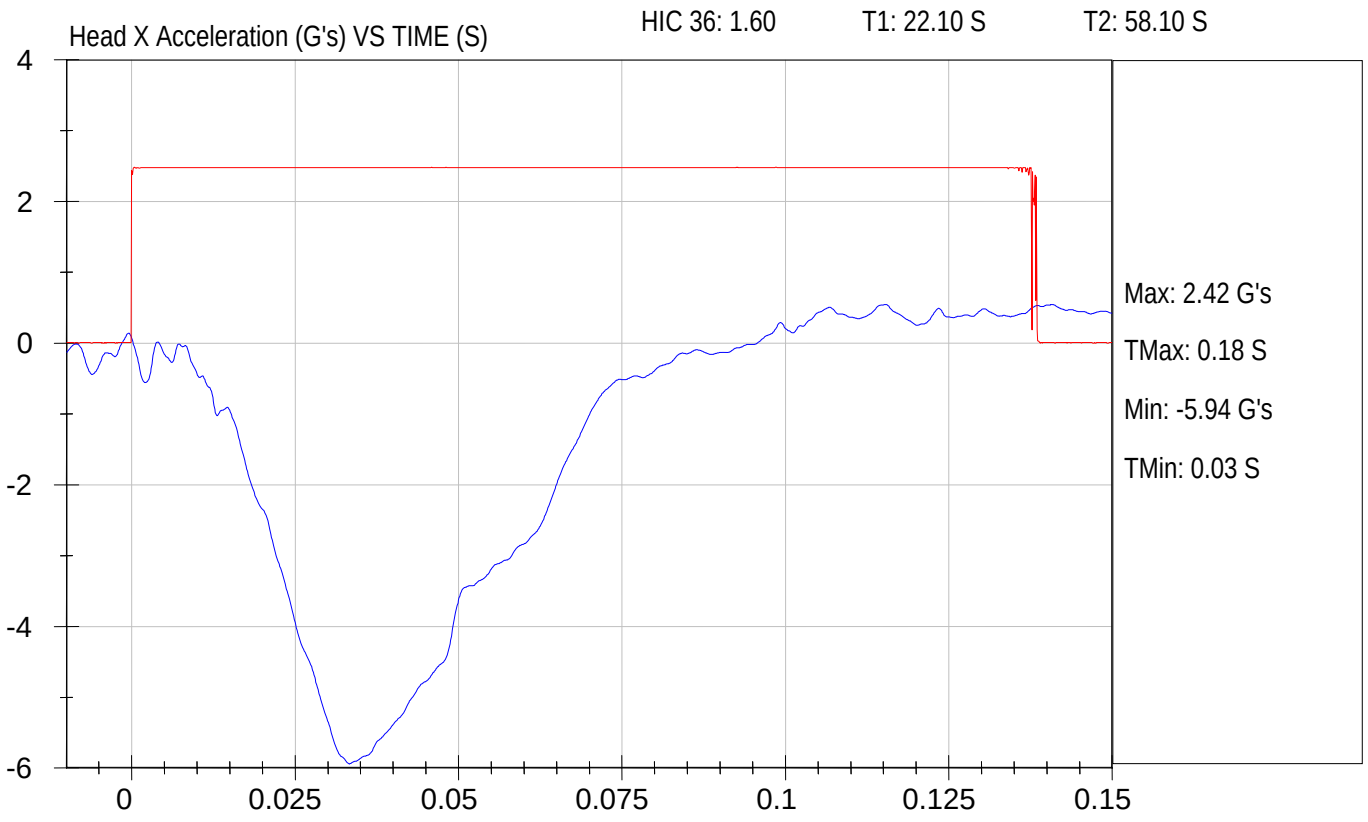
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)
Component ID: 2011 Starcraft Quest
Location: S3H2 speed trap: 1.594 m/s

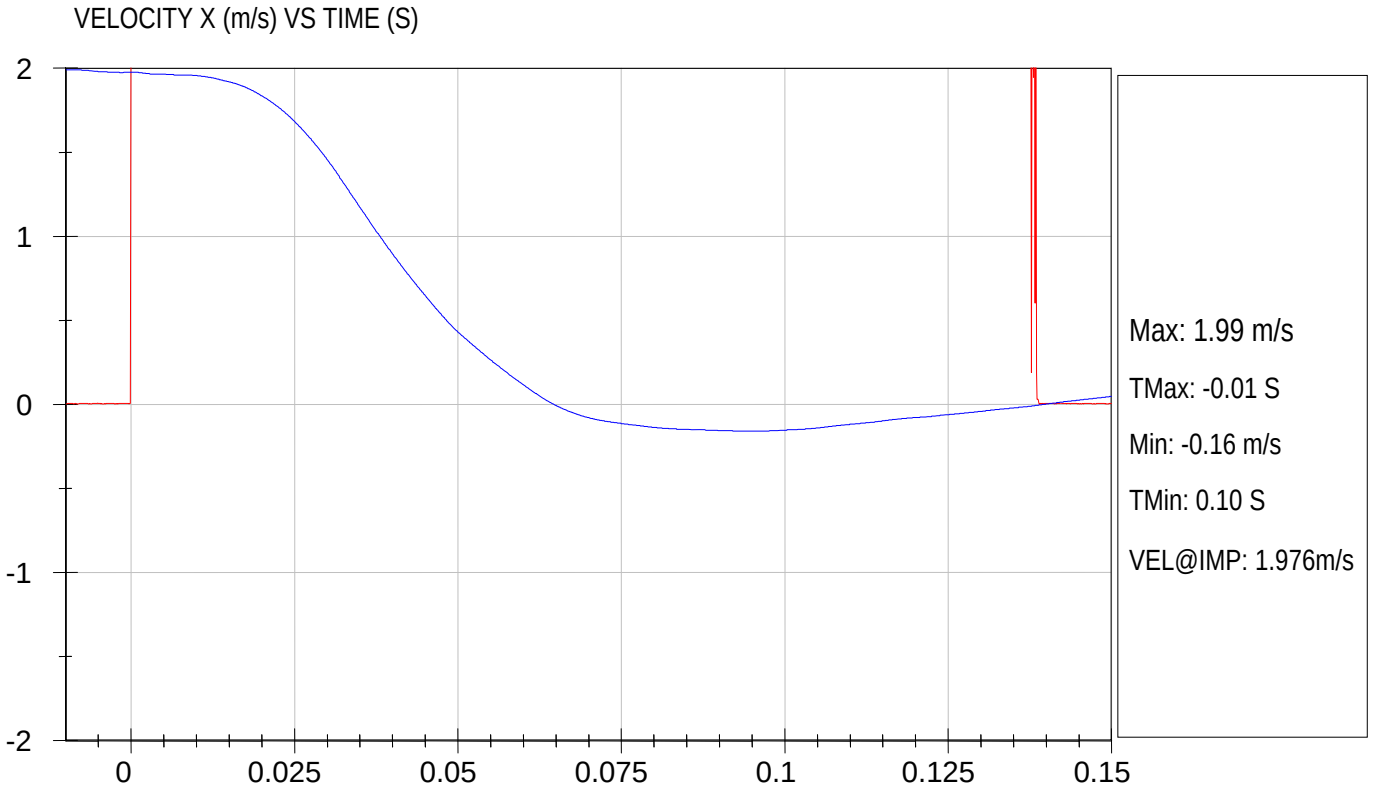
Test Date: 4-20-2011
NHTSA #: CB0902





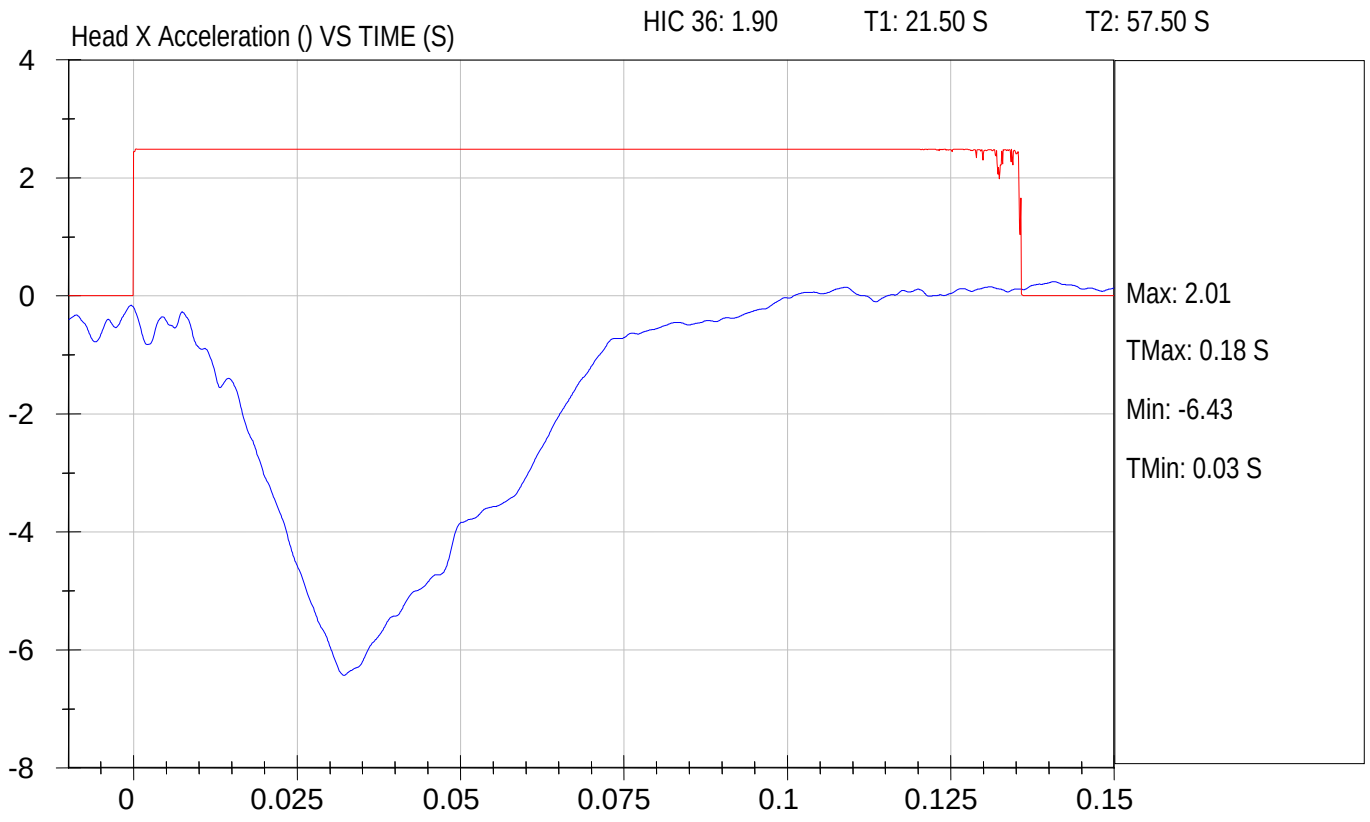
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s) Test Date: 4-20-2011
Component ID: 2011 Starcraft Quest NHTSA #: CB0902
Location: S3H3 speed trap: 1.602 m/s

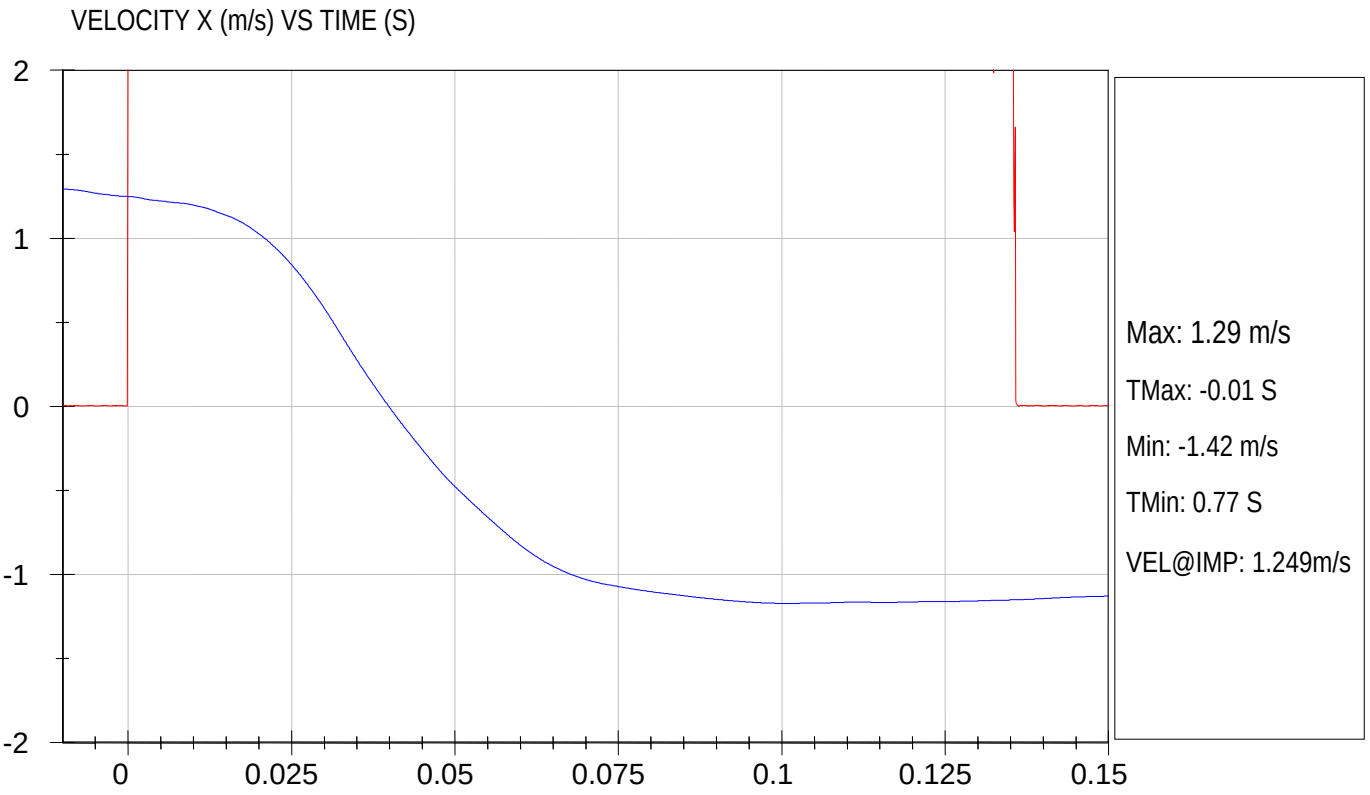




FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)
Component ID: 2011 Starcraft Quest
Location: S3H4 speed trap: 1.597 m/s

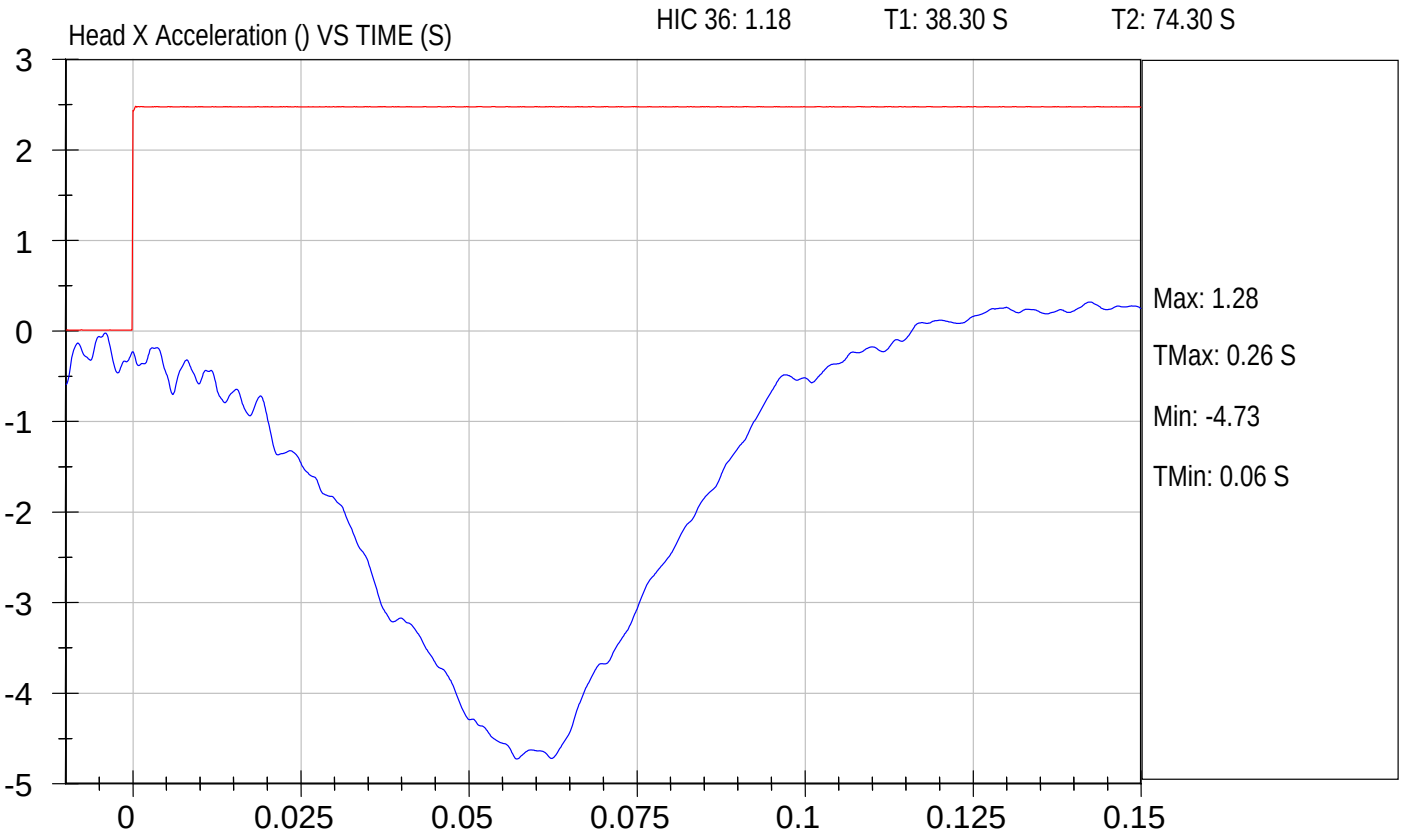
Test Date: 4-20-2011
NHTSA #: CB0902

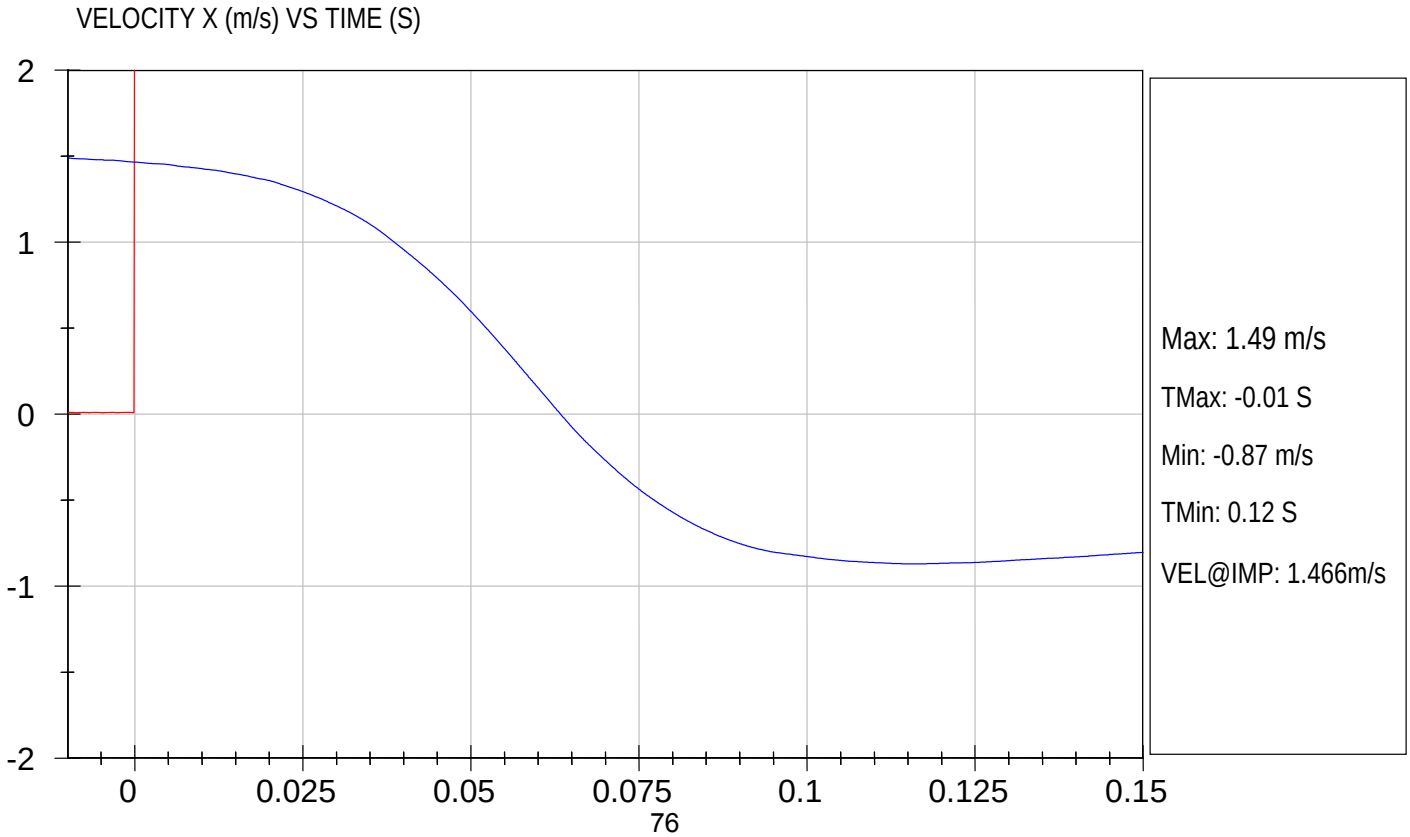




FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)
Component ID: 2011 Starcraft Quest
Location: S3H5 speed trap: 1.589 m/s

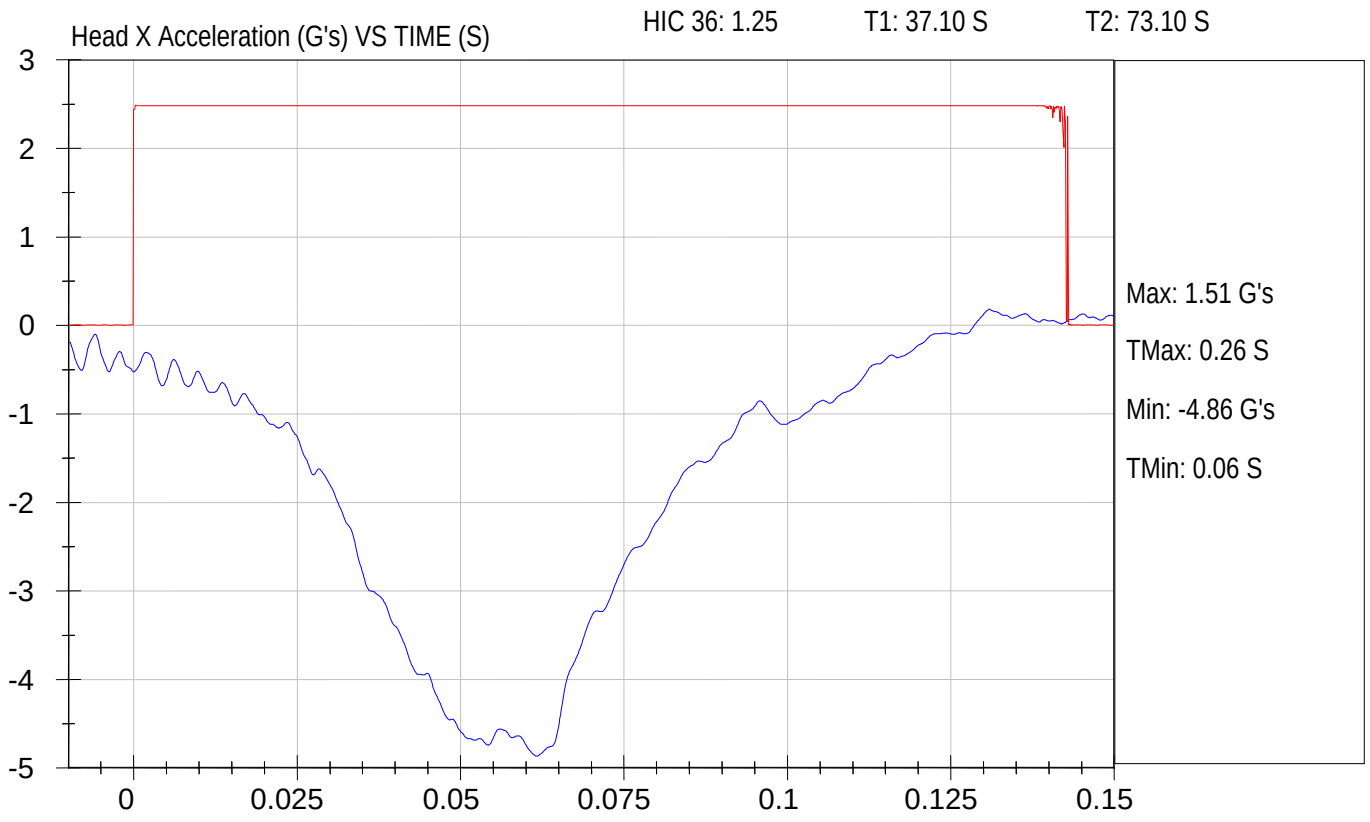
Test Date: 4-20-2011
NHTSA #: CB0902

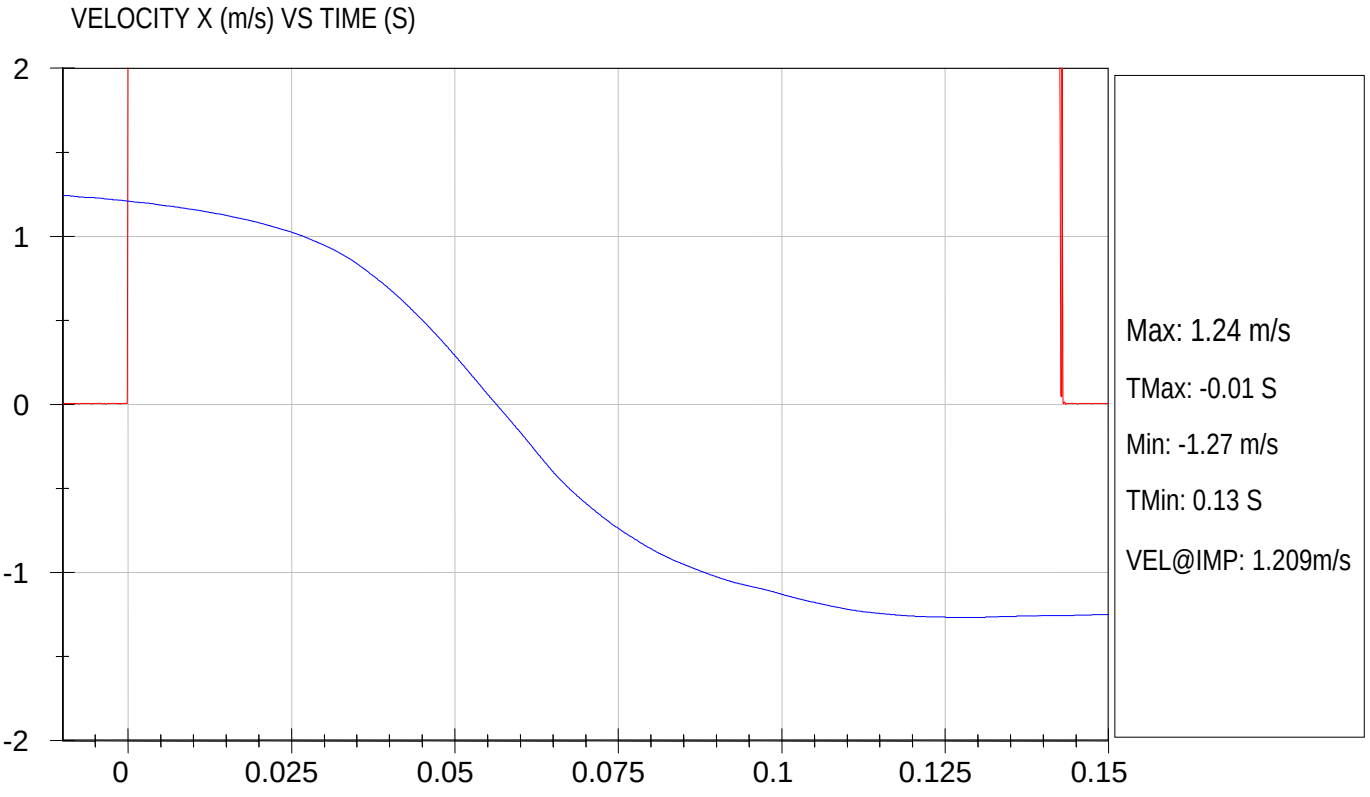




FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)
Component ID: 2011 Starcraft Quest
Location: S3H6 speed trap: 1.587 m/s

Test Date: 4-20-2011
NHTSA #: CB0902



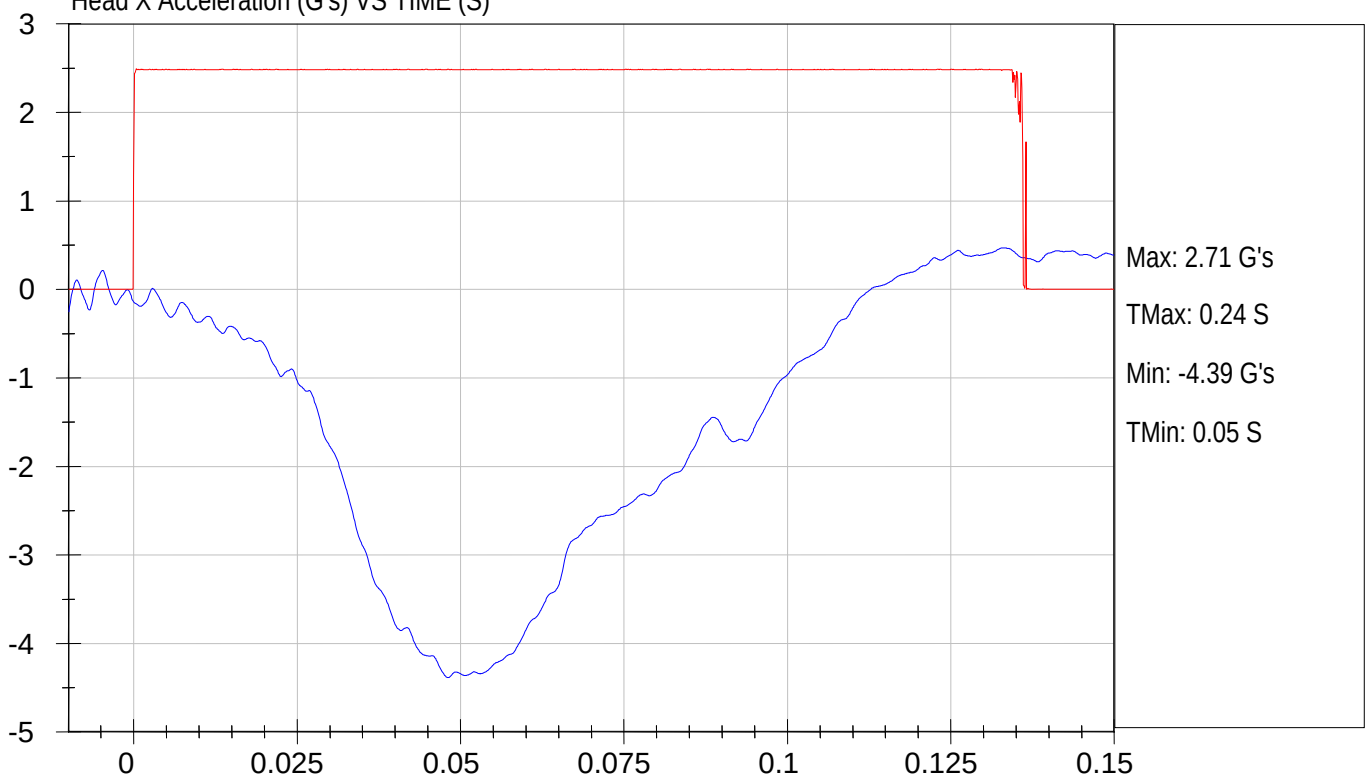


FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)
Component ID: 2011 Starcraft Quest
Location: S3H7 speed trap: 1.599 m/s

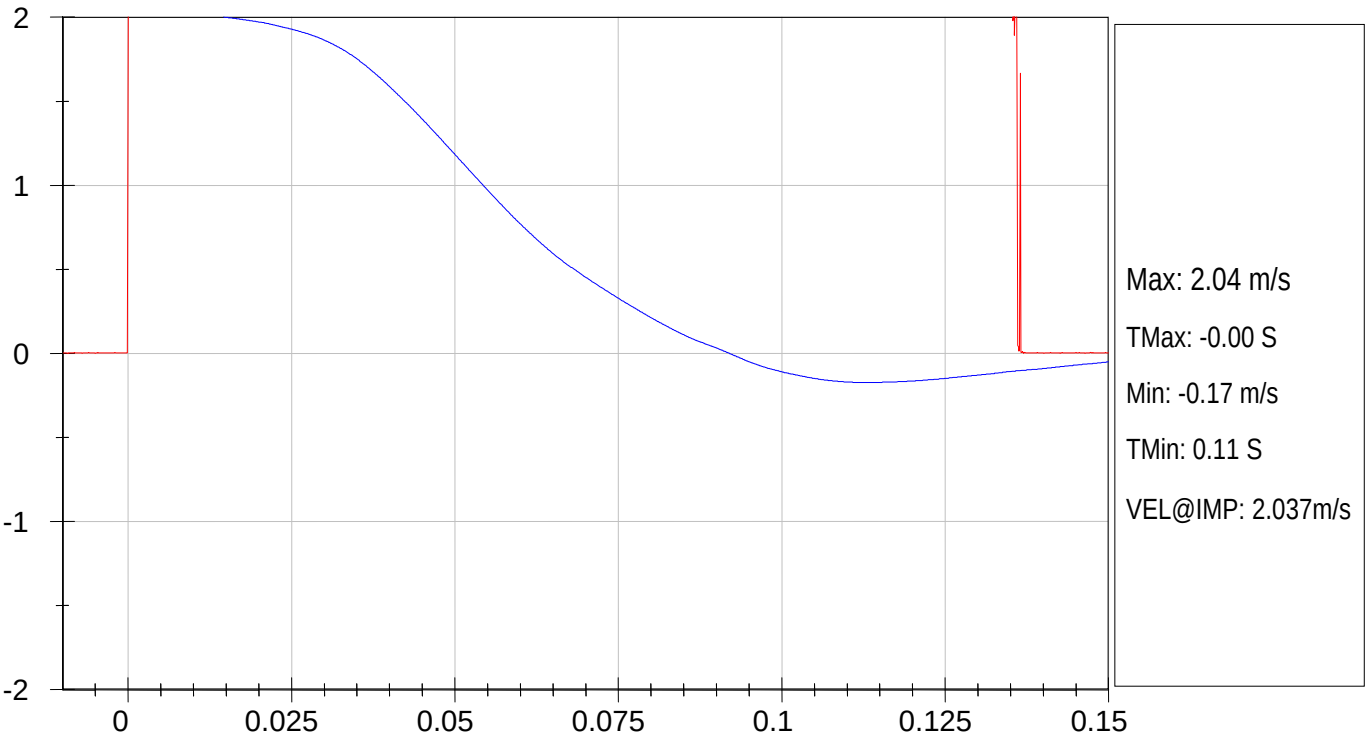
Test Date: 4-20-2011
NHTSA #: CB0902

Head X Acceleration (G's) VS TIME (S)

HIC 36: 0.98 T1: 33.90 S T2: 69.90 S

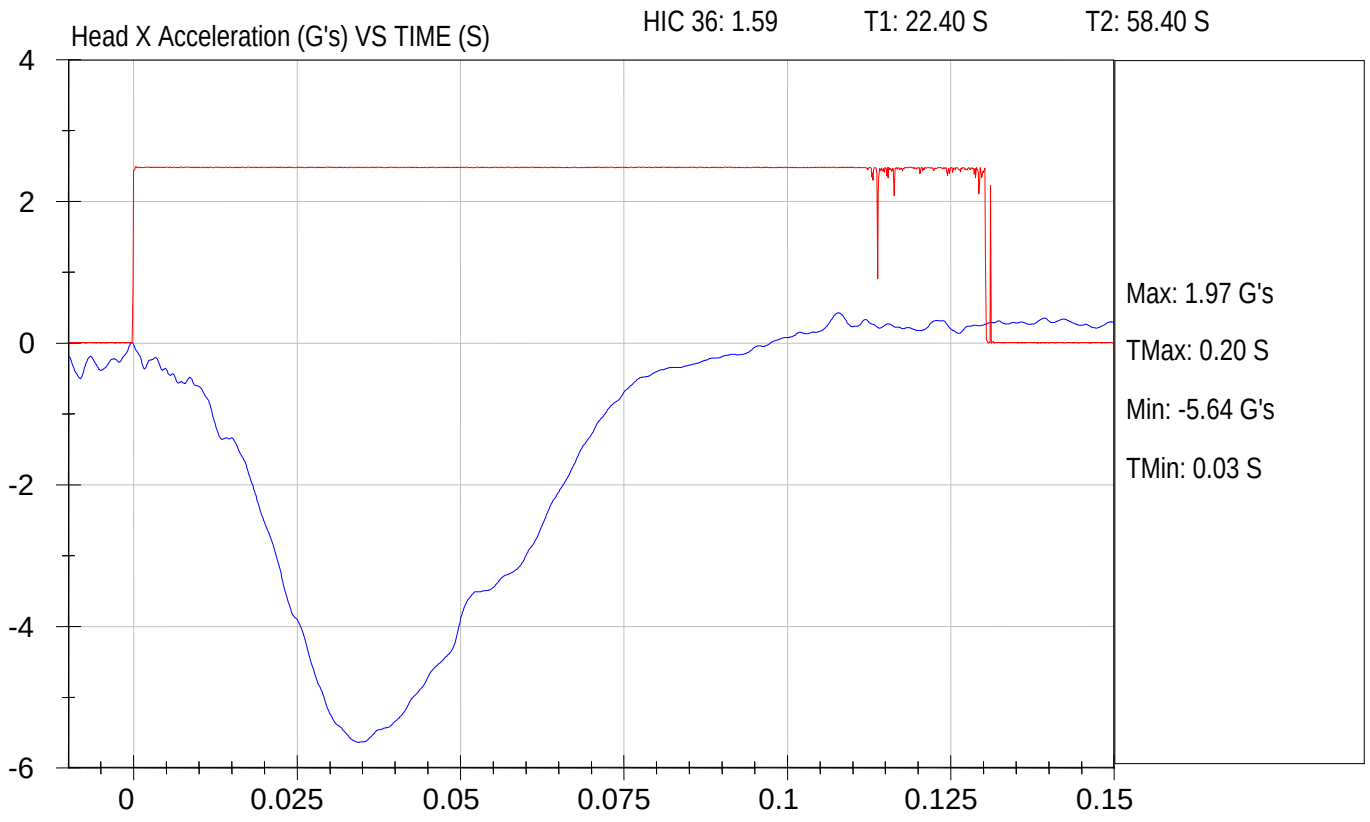


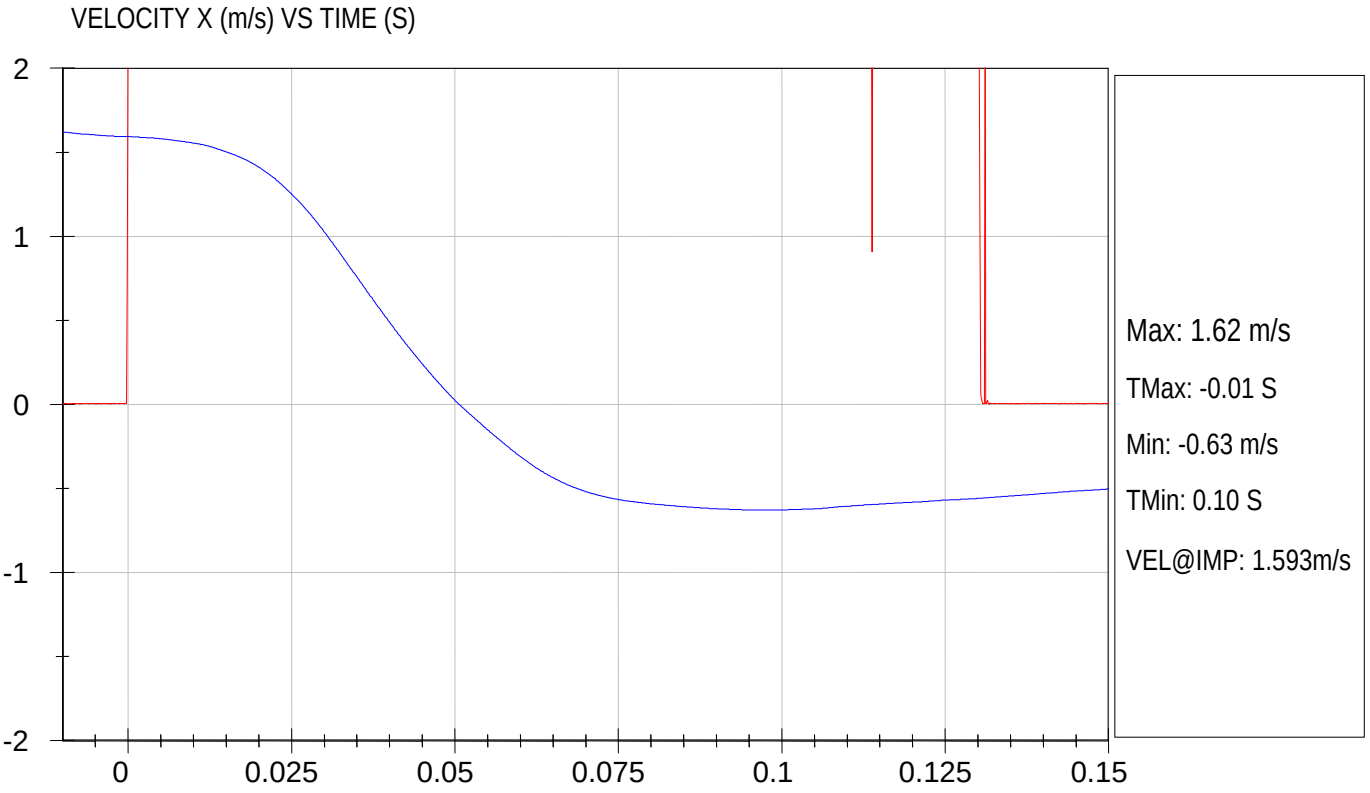
VELOCITY X (m/s) VS TIME (S)



FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)
Component ID: 2011 Starcraft Quest
Location: S8H1 speed trap: 1.599 m/s

Test Date: 4-21-2011
NHTSA #: CB0902

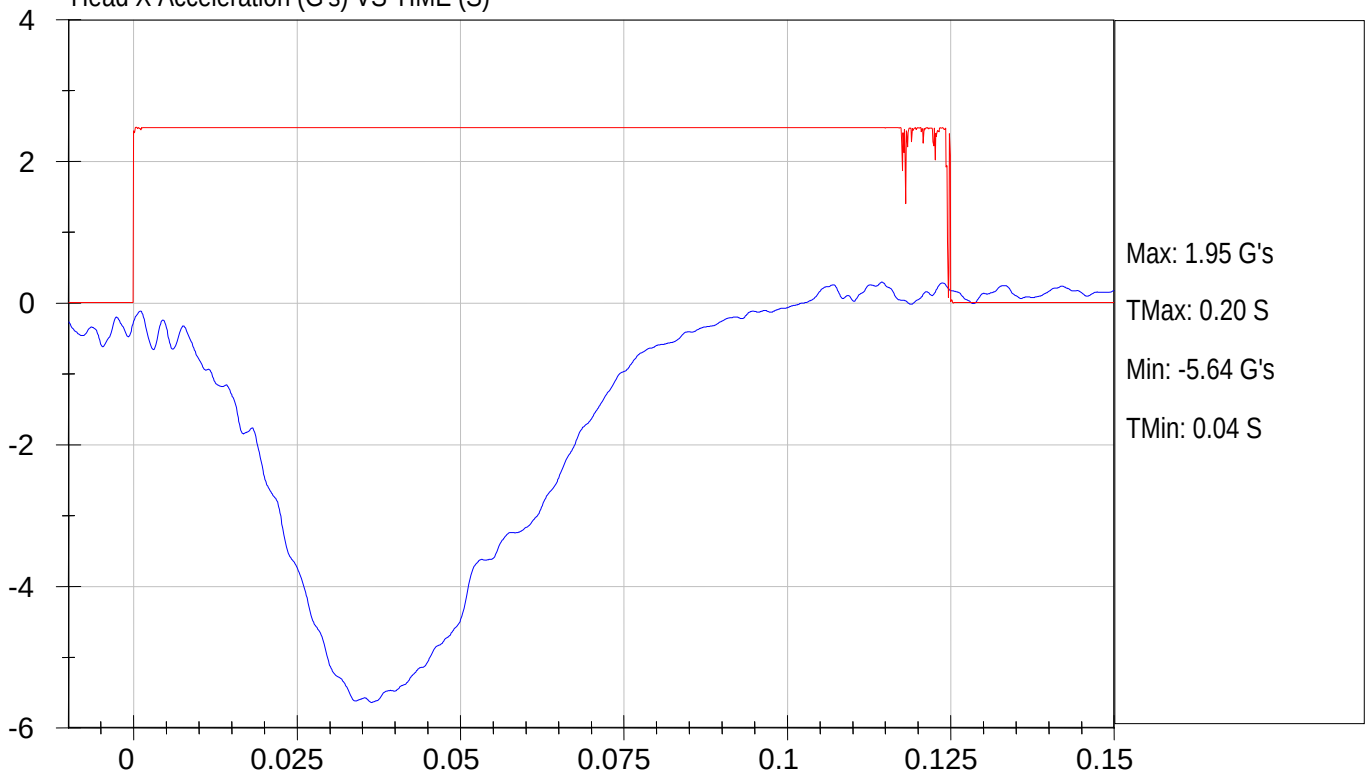


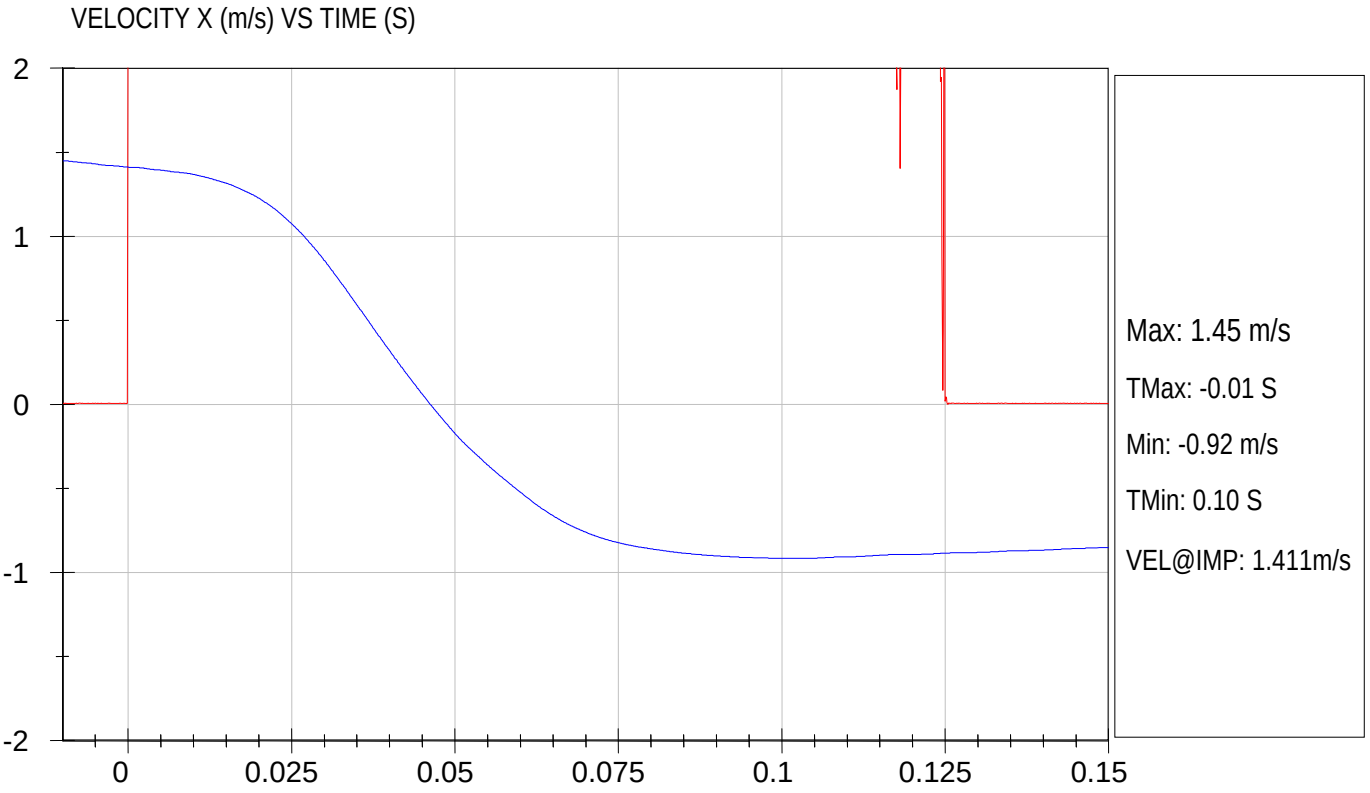


FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)
Component ID: 2011 Starcraft Quest
Location: S8H2 speed trap: 1.579 m/s

Test Date: 4-24-2011
NHTSA #: CB0902

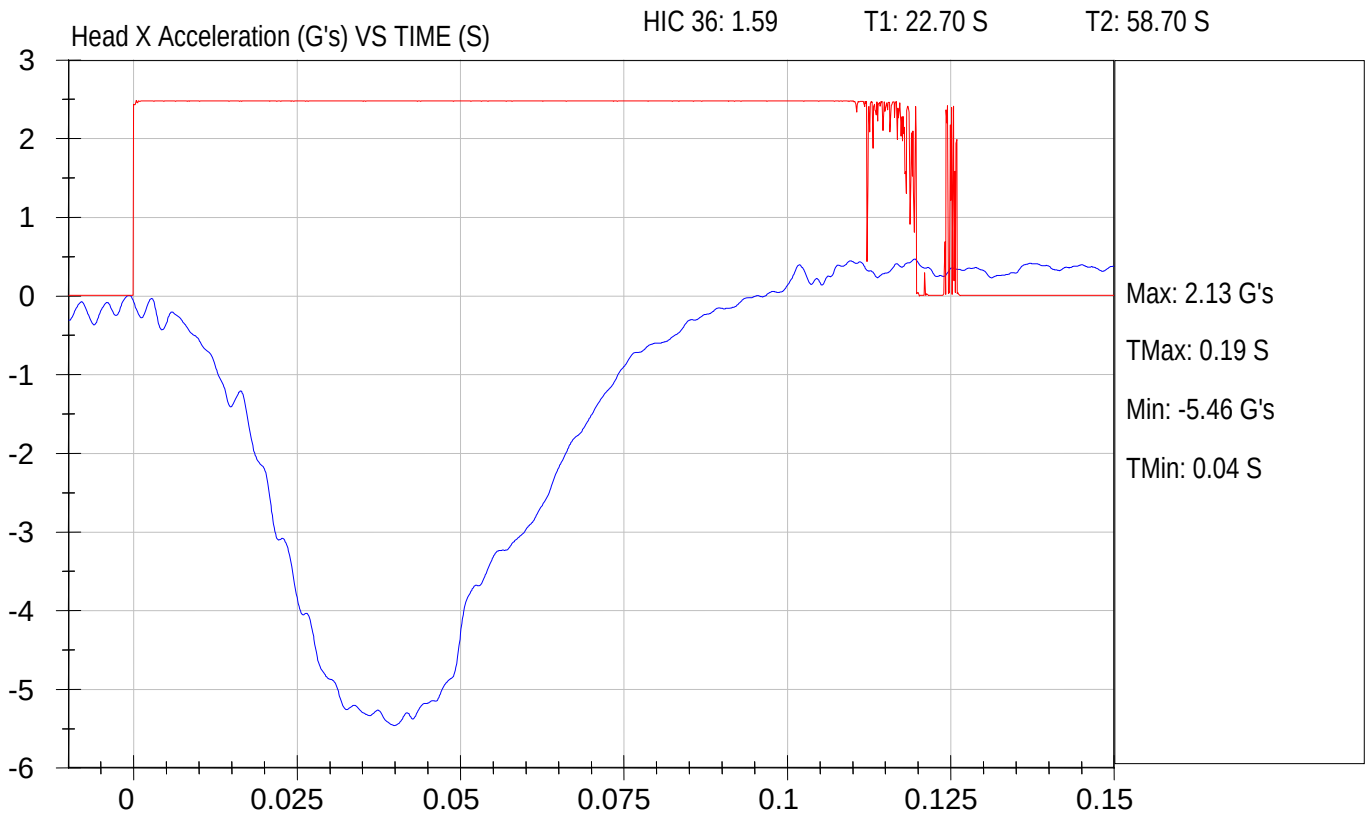
HIC 36: 1.66 T1: 22.90 S T2: 58.90 S

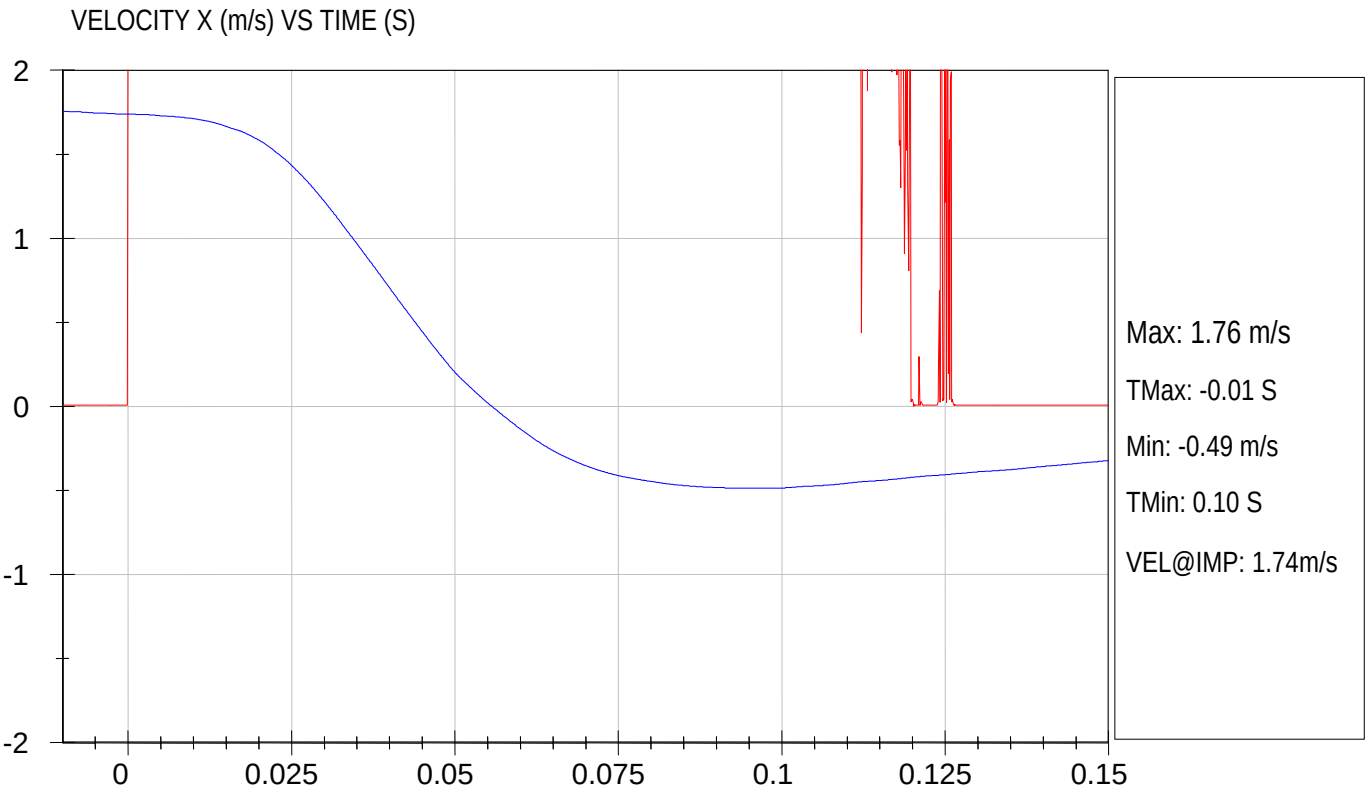




FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)
Component ID: 2011 Starcraft Quest
Location: S8H3 speed trap: 1.579 m/s

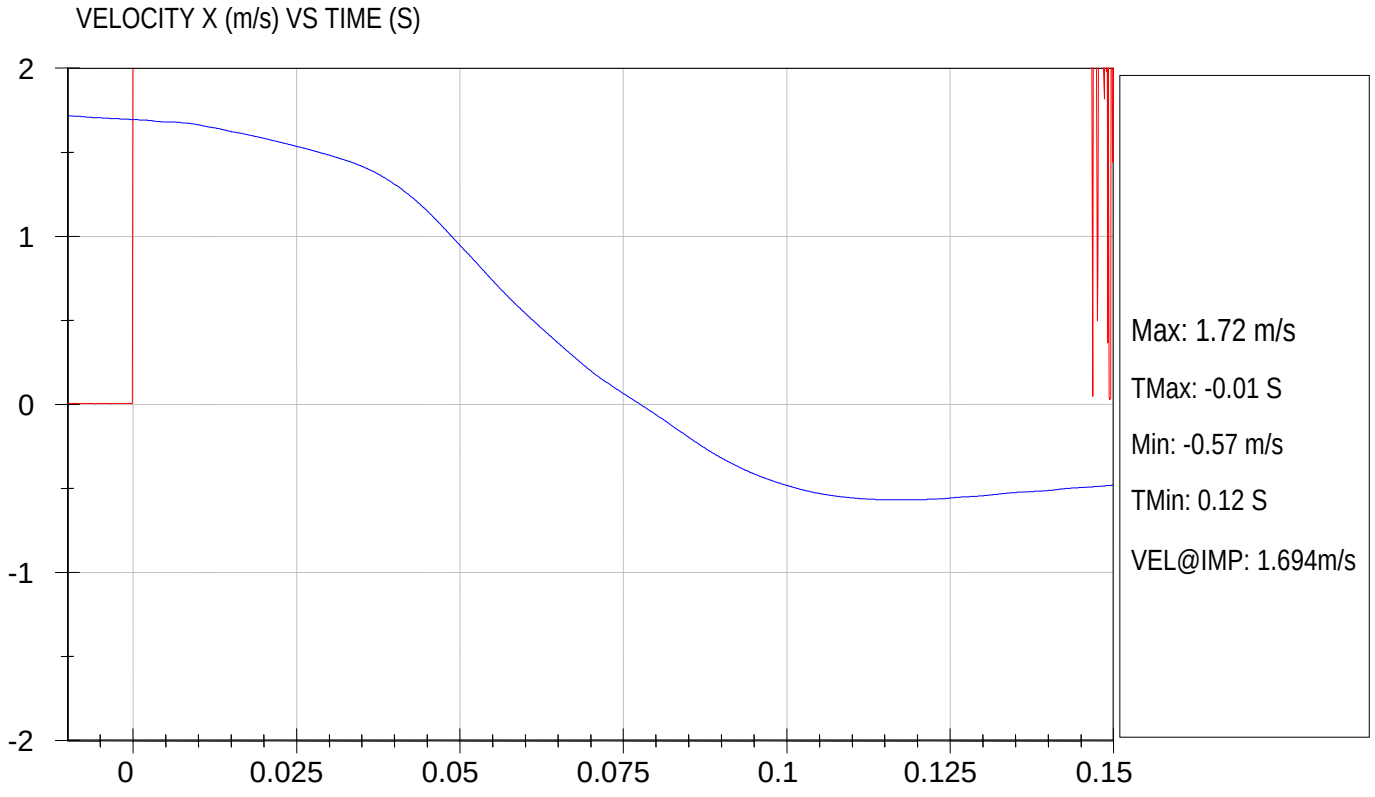
Test Date: 4-24-2011
NHTSA #: CB0902





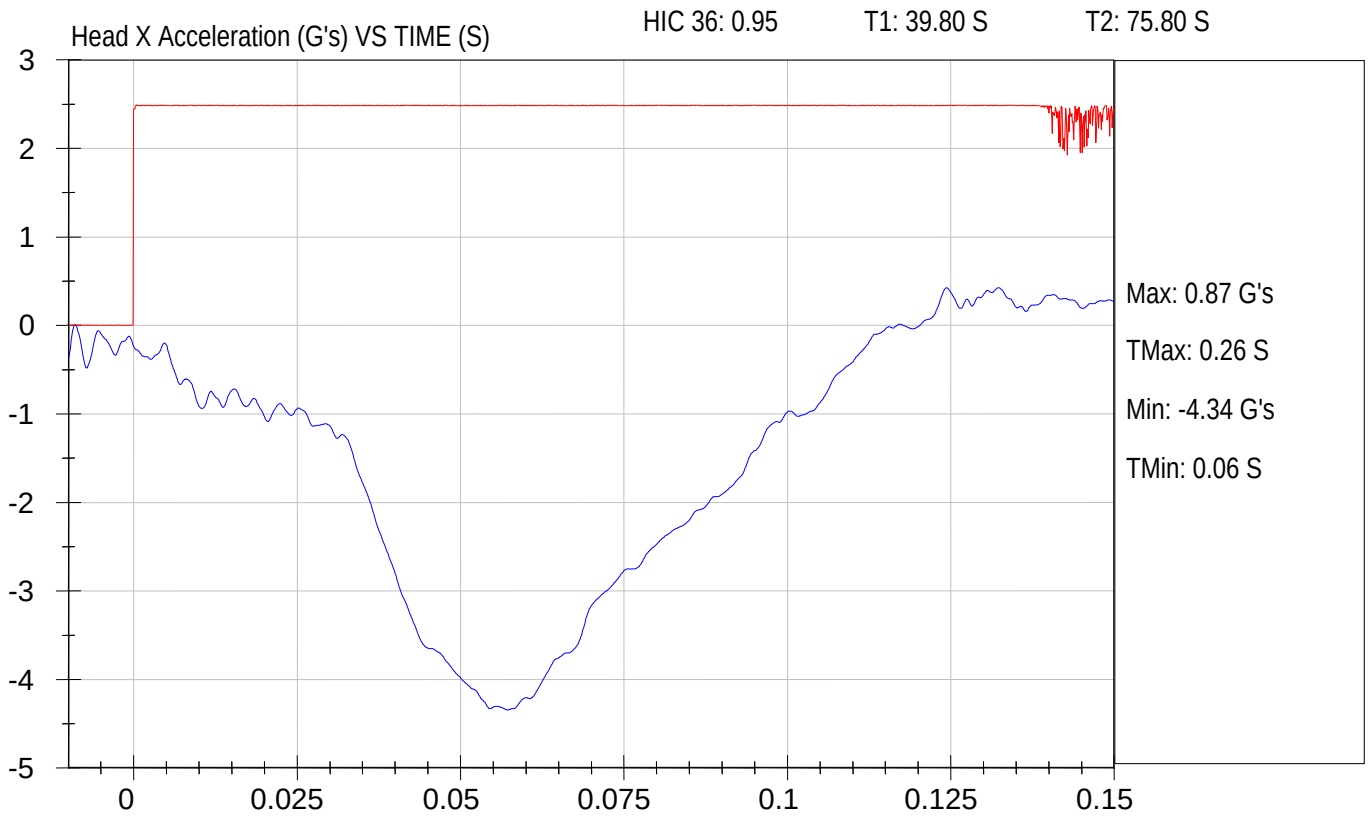
FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)
Component ID: 2011 Starcraft Quest
Location: S8H4 speed trap: 1.580 m/s

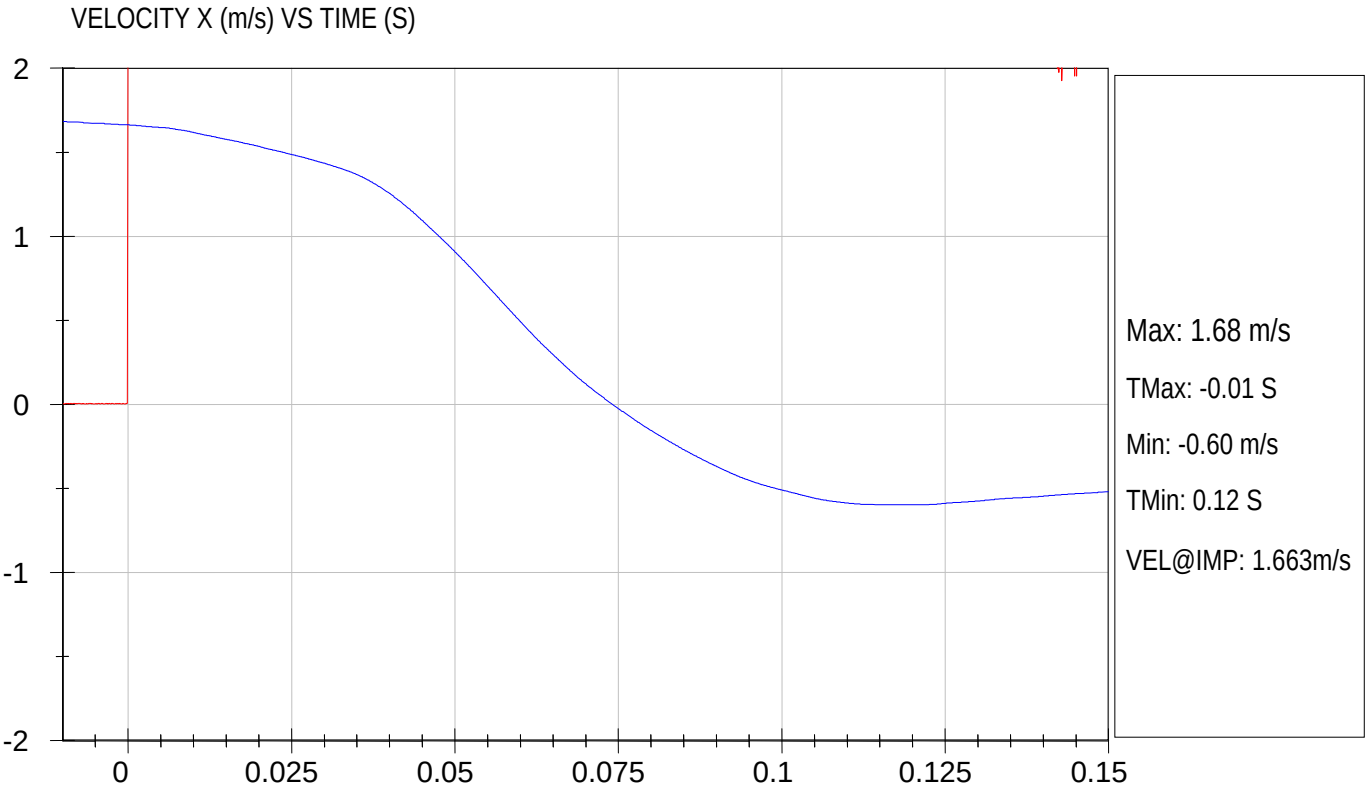
Test Date: 4-24-2011
NHTSA #: CB0902



FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)
Component ID: 2011 Starcraft Quest
Location: S8H5 speed trap: 1.587 m/s

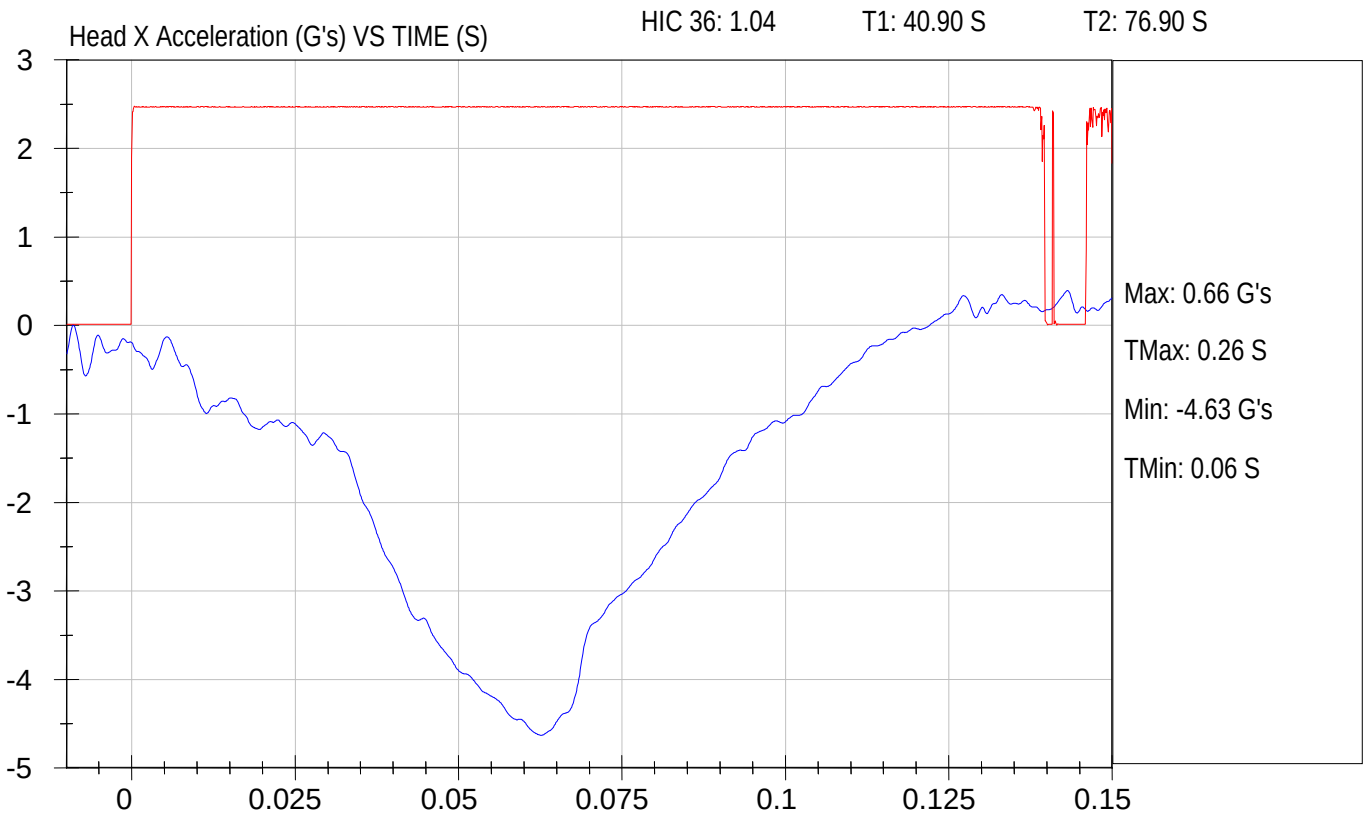
Test Date: 4-24-2011
NHTSA #: CB0902

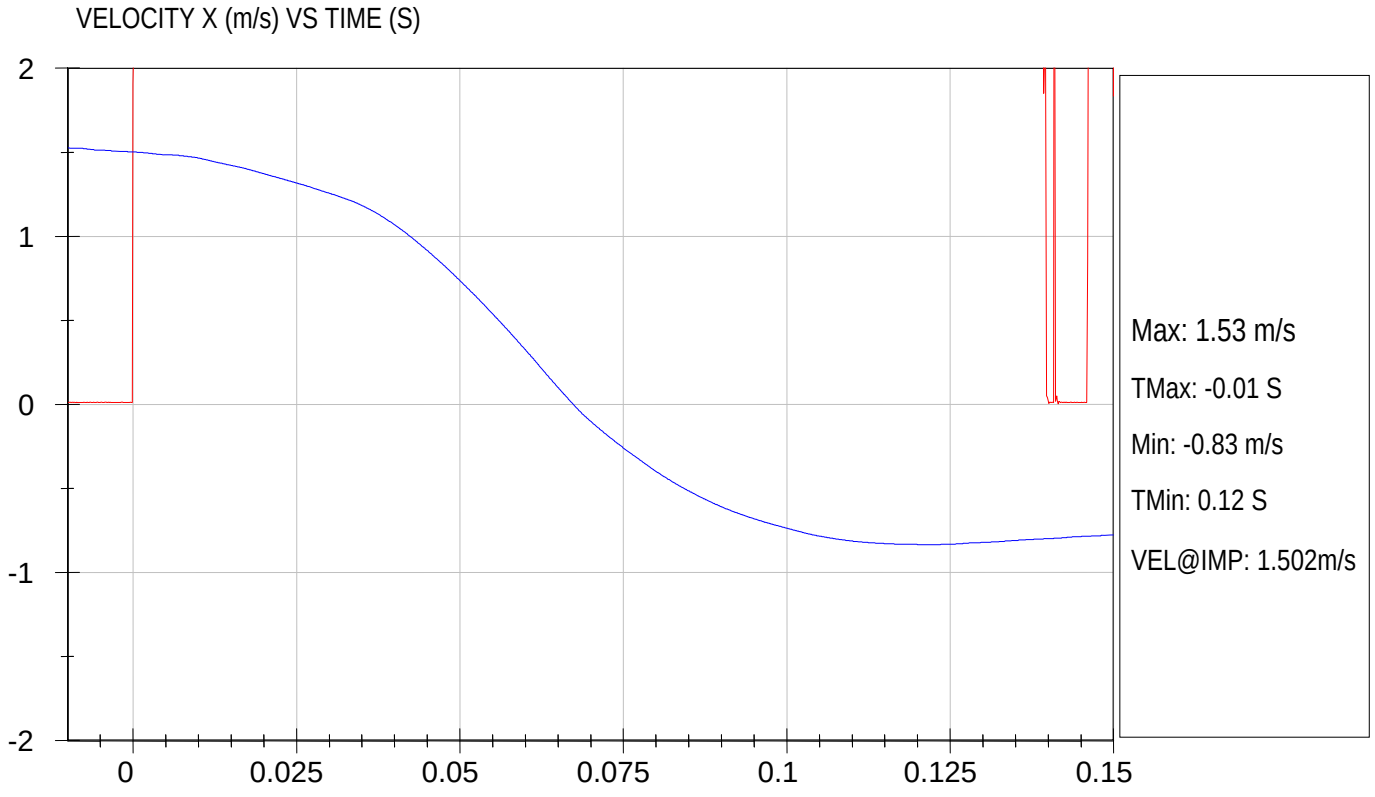




FMVSS 222 HEAD FORM IMPACTS (1.5 m/s)
Vehicle: 2011 Starcraft Quest
Location: S8H6 speed trap: 1.594 m/s

Test Date: 4-24-2011
NHTSA #: CB0902





HEAD FORM IMPACT (6.69 m/s)

Test Date: 4-20-2011

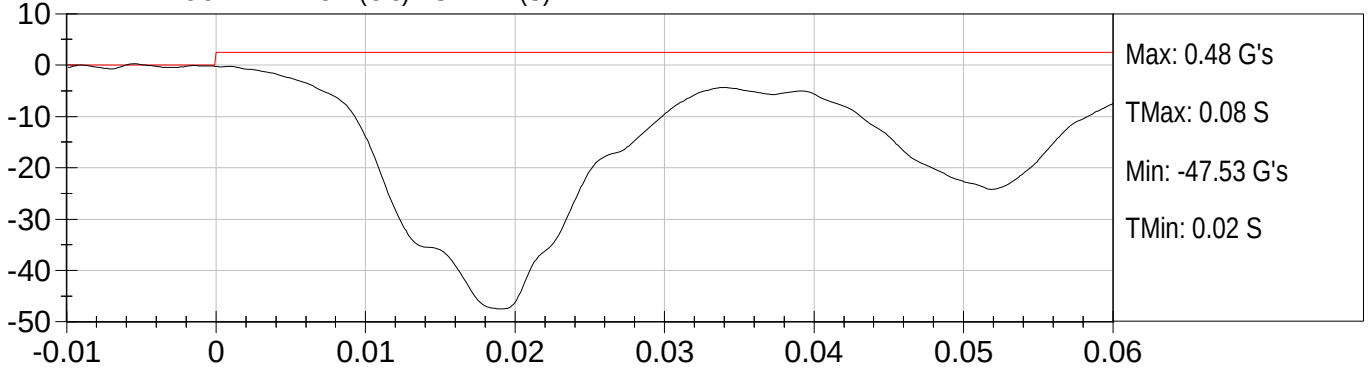
Component ID: 2011 Starcraft Quest

NHTSA#: CB0902

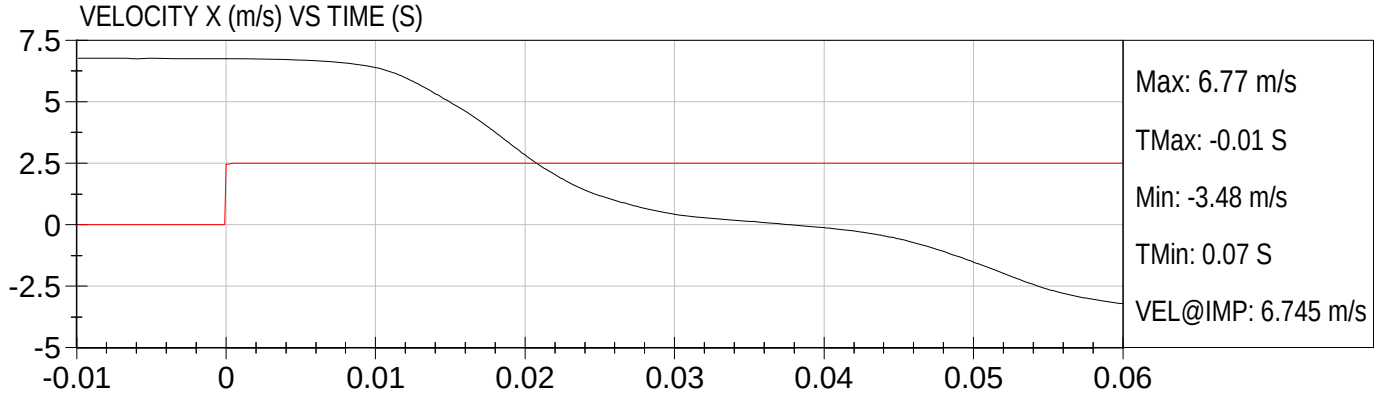
Location: S3H8 speed trap: 6.656 m/s

Hic: 114.31 T1: 11.20 ms T2: 24.70 ms

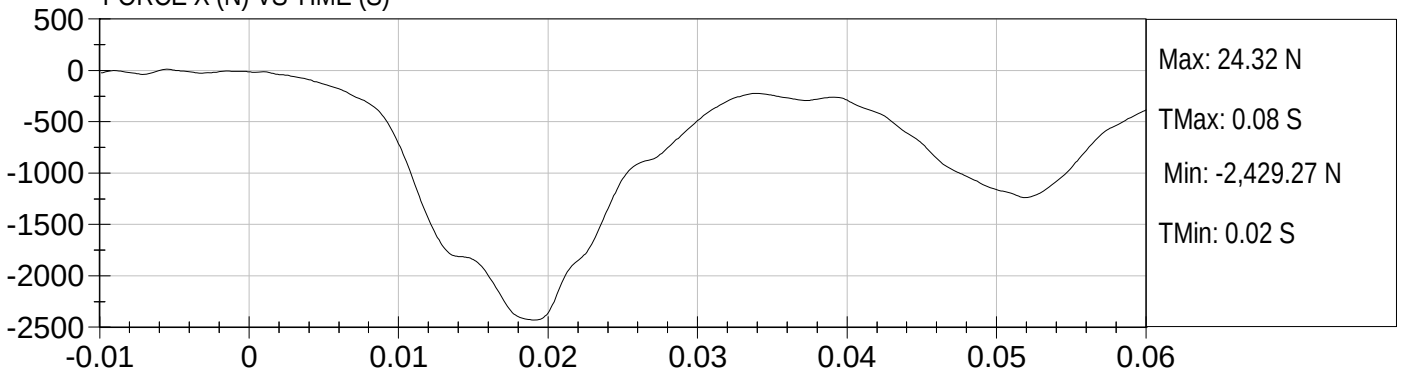
HEAD X ACCELERATION (G's) VS TIME (S)



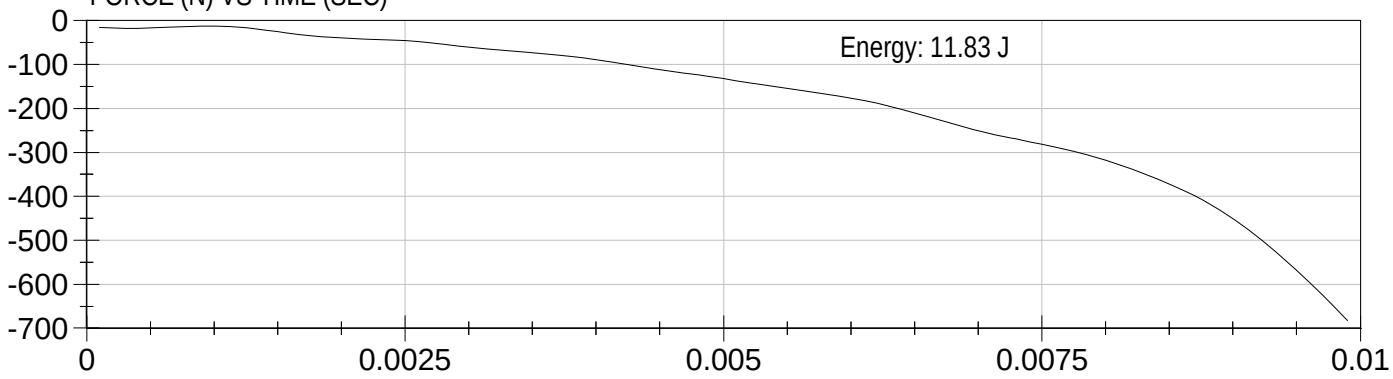
VELOCITY X (m/s) VS TIME (S)



FORCE X (N) VS TIME (S)



FORCE (N) VS TIME (SEC)



HEAD FORM IMPACT (6.69 m/s)

Test Date: 4-20-2011

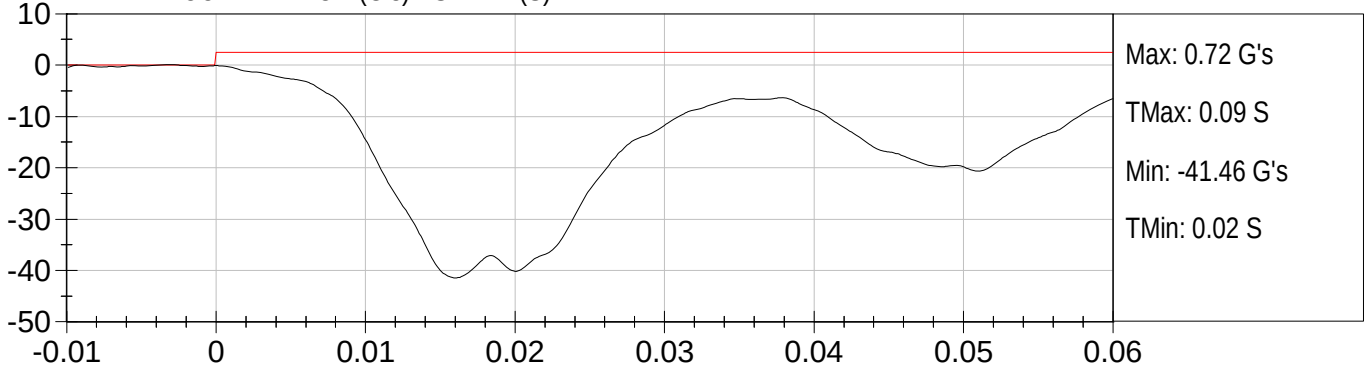
Component ID: 2011 Starcraft Quest

NHTSA#: CB0902

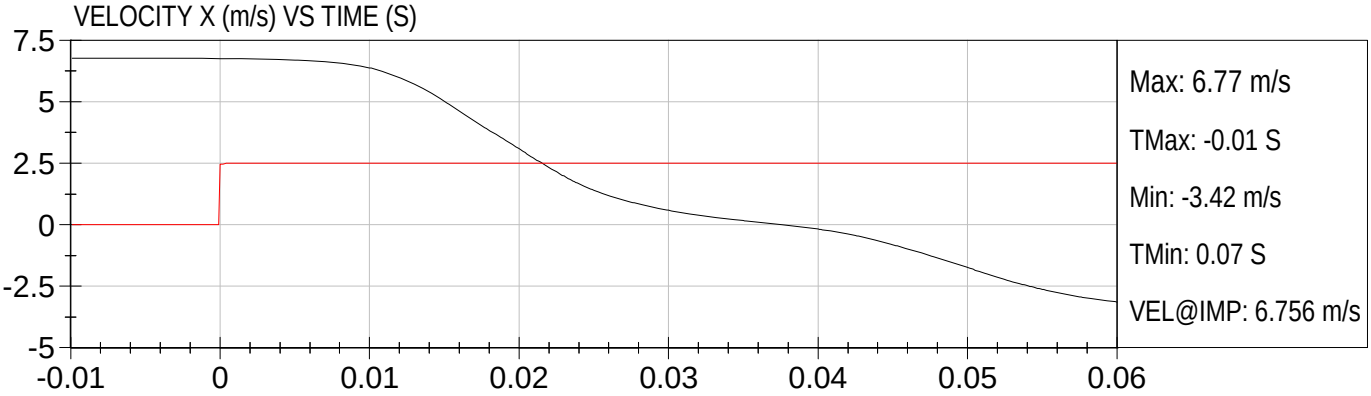
Location: S3H9 speed trap: 6.632 m/s

Hic: 101.96 T1: 11.10 ms T2: 26.00 ms

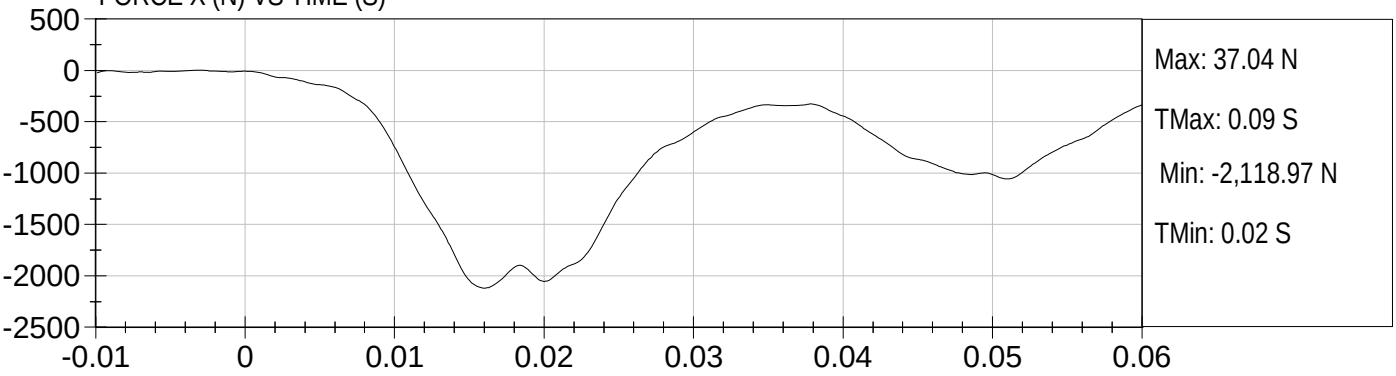
HEAD X ACCELERATION (G's) VS TIME (S)



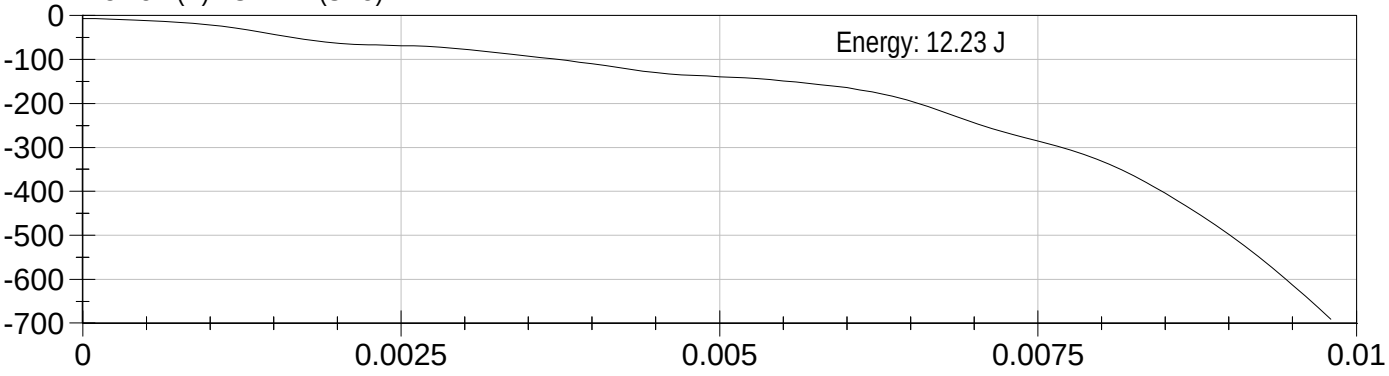
VELOCITY X (m/s) VS TIME (S)



FORCE X (N) VS TIME (S)



FORCE (N) VS TIME (SEC)



HEAD FORM IMPACT (6.69 m/s)

Test Date: 4-21-2011

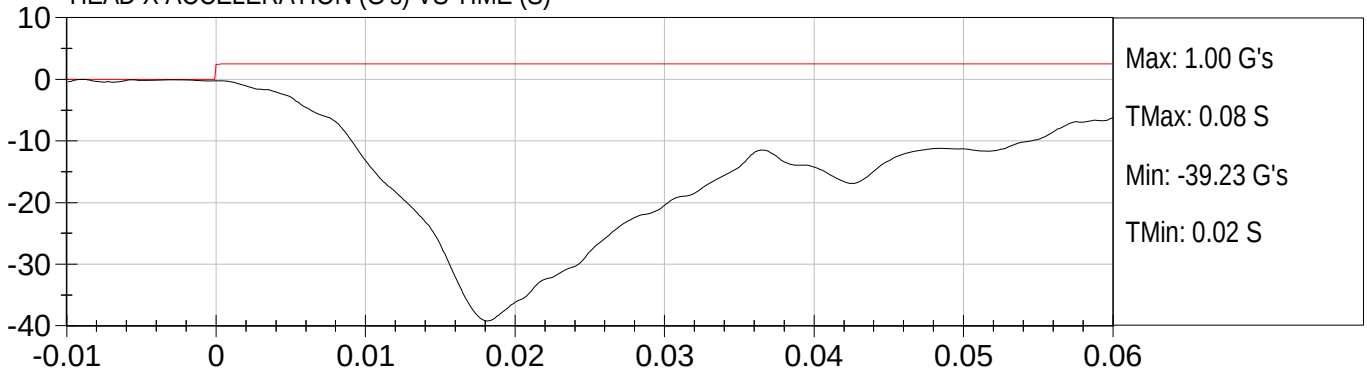
Component ID: 2011 Starcraft Quest

NHTSA#: CB0902

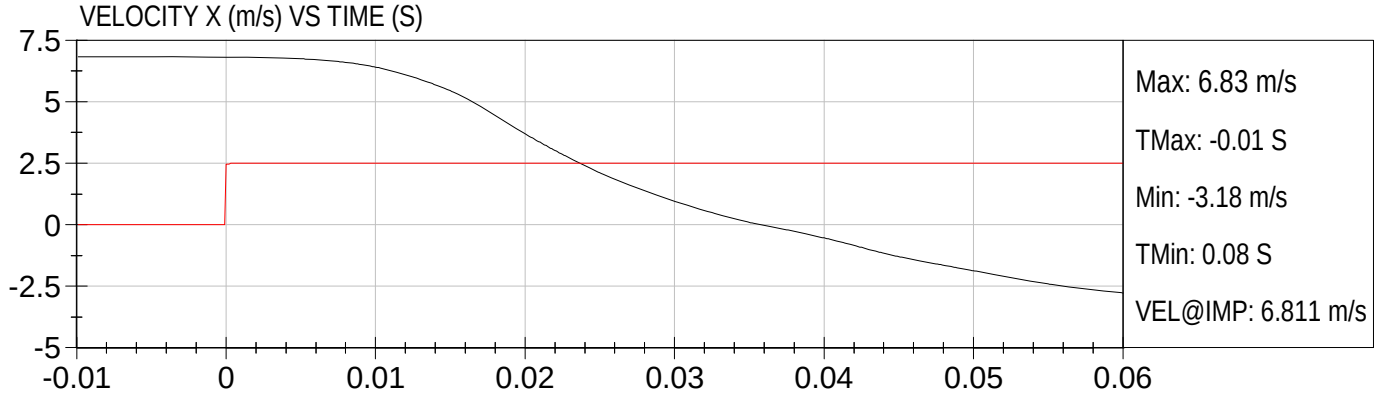
Location: S3H10 speed trap: 6.649 m/s

Hic: 84.36 T1: 11.00 ms T2: 33.60 ms

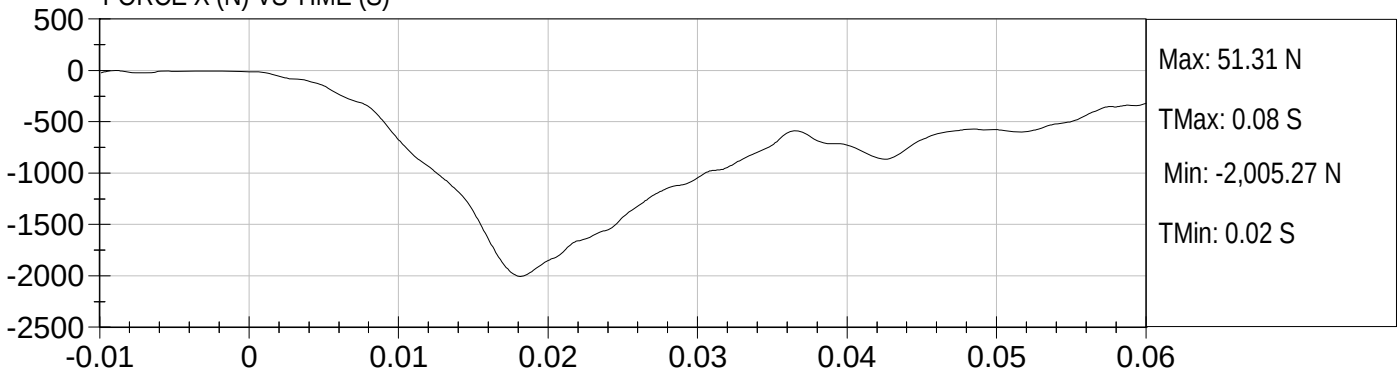
HEAD X ACCELERATION (G's) VS TIME (S)



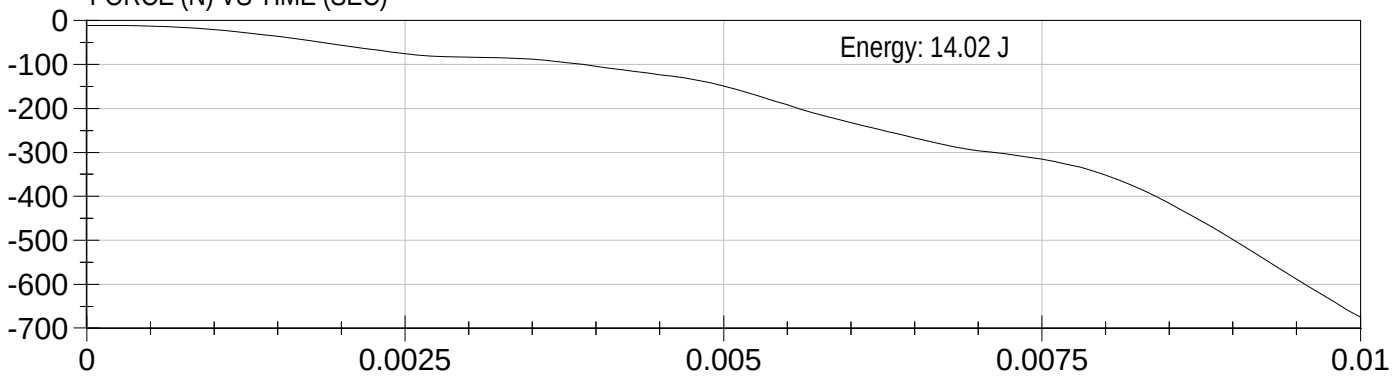
VELOCITY X (m/s) VS TIME (S)



FORCE X (N) VS TIME (S)



FORCE (N) VS TIME (SEC)



HEAD FORM IMPACT (6.69 m/s)

Test Date: 4-21-2011

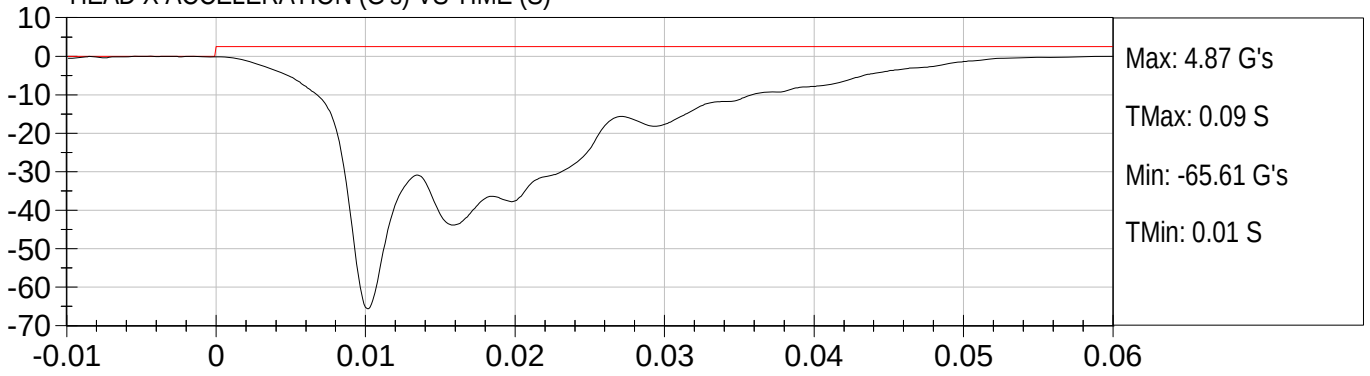
Component ID: 2011 Starcraft Quest

NHTSA#: CB0902

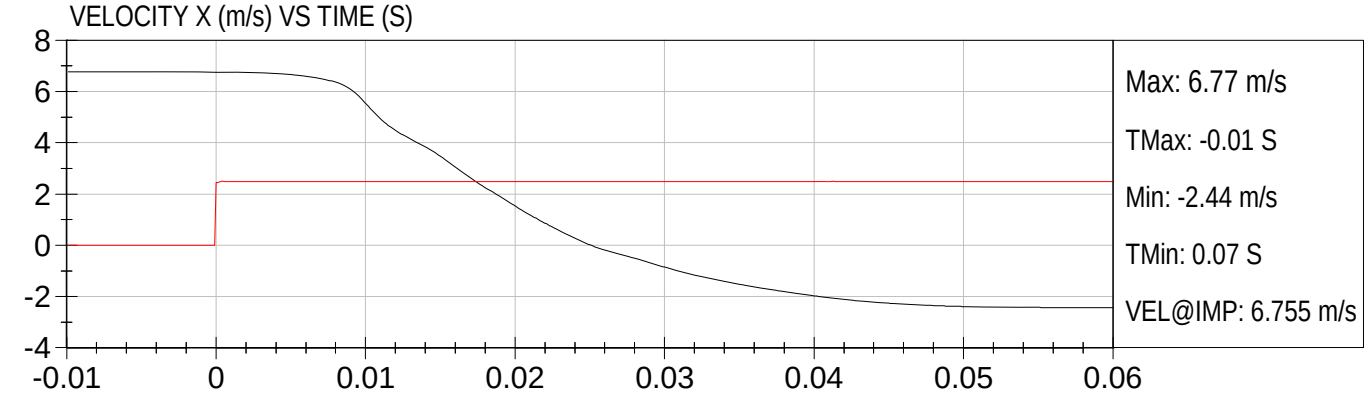
Location: S3H11 speed trap: 6.657 m/s

Hic: 152.20 T1: 8.30 ms T2: 25.20 ms

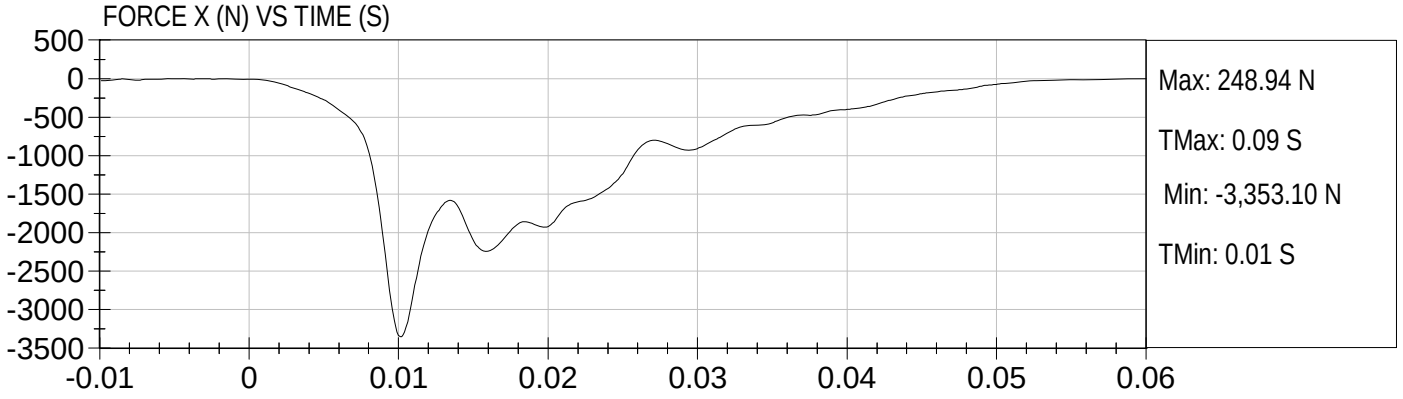
HEAD X ACCELERATION (G's) VS TIME (S)



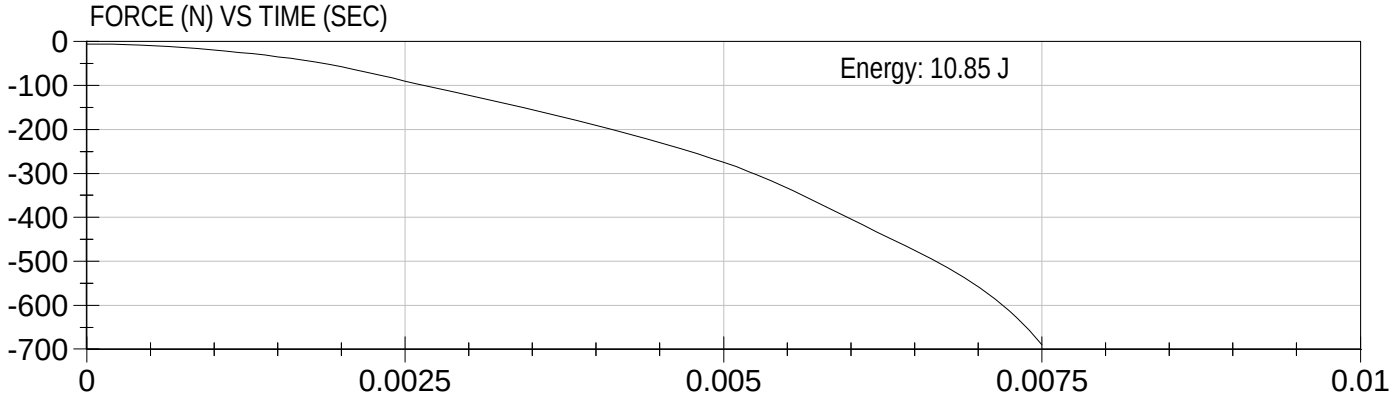
VELOCITY X (m/s) VS TIME (S)



FORCE X (N) VS TIME (S)



FORCE (N) VS TIME (SEC)



HEAD FORM IMPACT (6.69 m/s)

Test Date: 4-21-2011

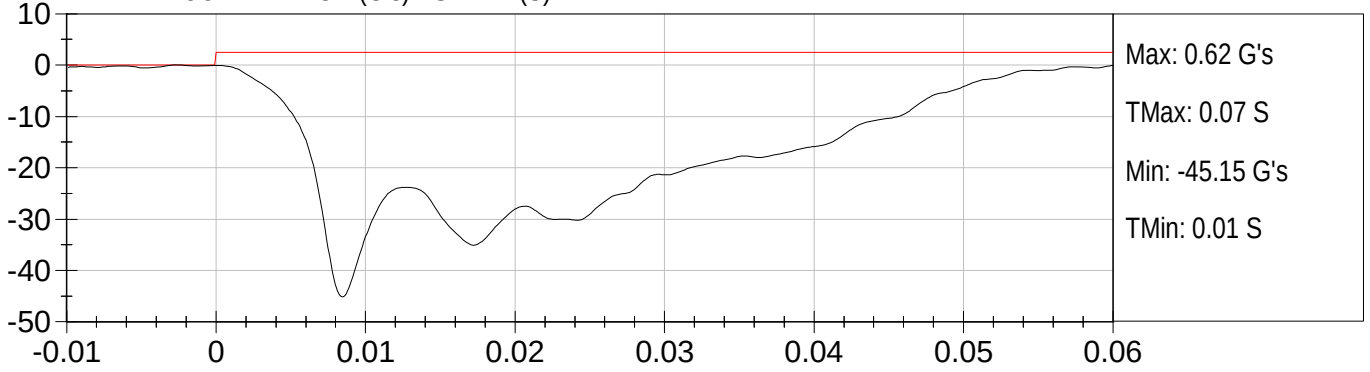
Component ID: 2011 Starcraft Quest

NHTSA#: CB0902

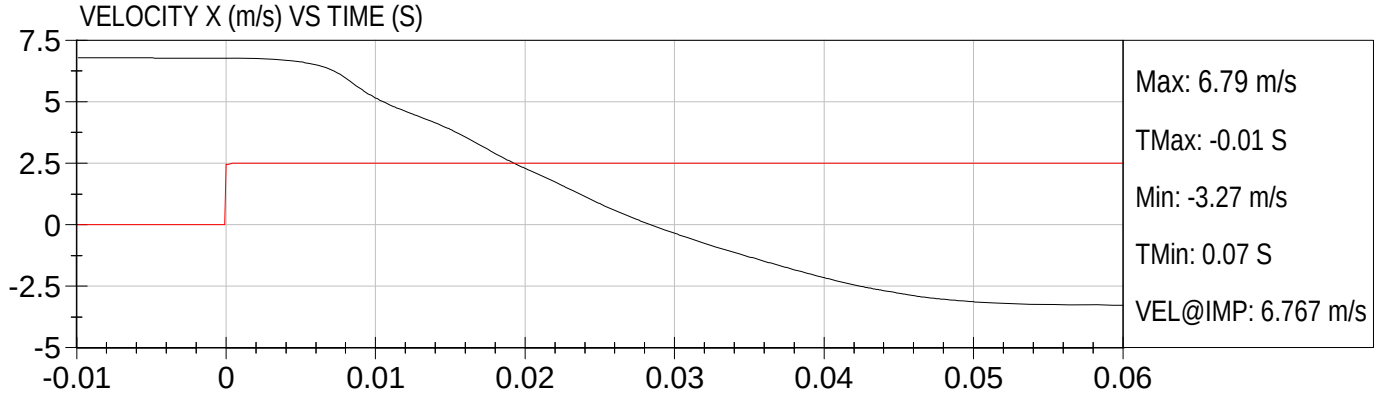
Location: S3H12 speed trap: 6.662 m/s

Hic: 116.50 T1: 6.10 ms T2: 40.80 ms

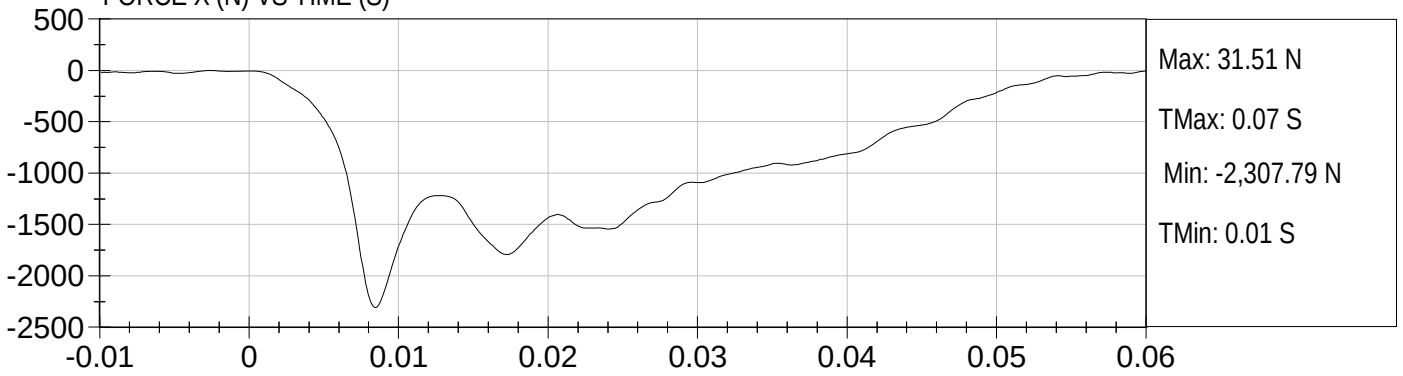
HEAD X ACCELERATION (G's) VS TIME (S)



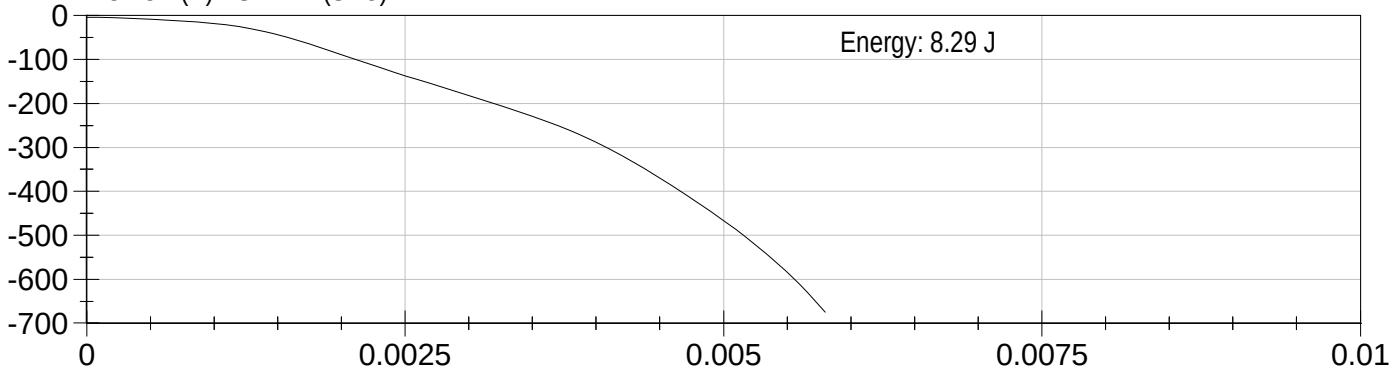
VELOCITY X (m/s) VS TIME (S)



FORCE X (N) VS TIME (S)



FORCE (N) VS TIME (SEC)



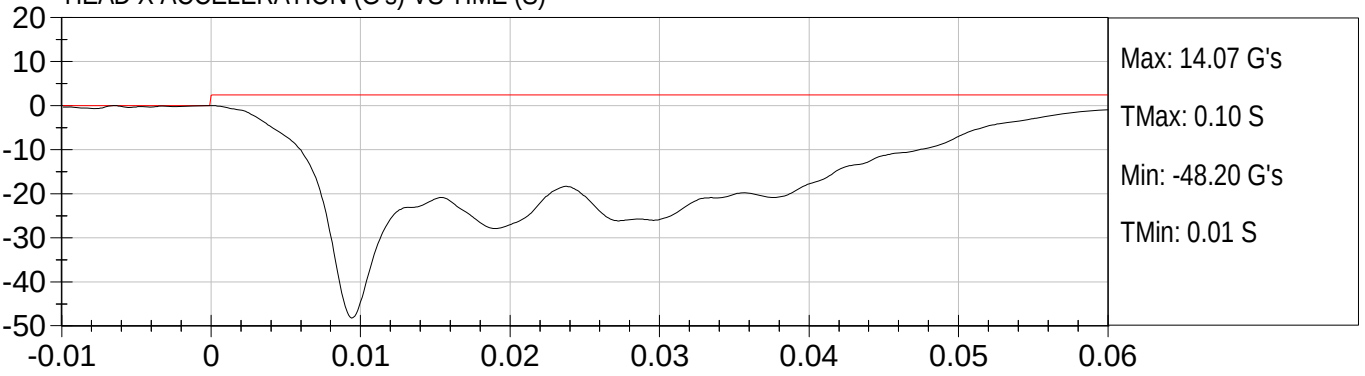
HEAD FORM IMPACT (6.69 m/s) Test Date: 4-21-2011

Component ID: 2011 Starcraft Quest NHTSA#: CB0902

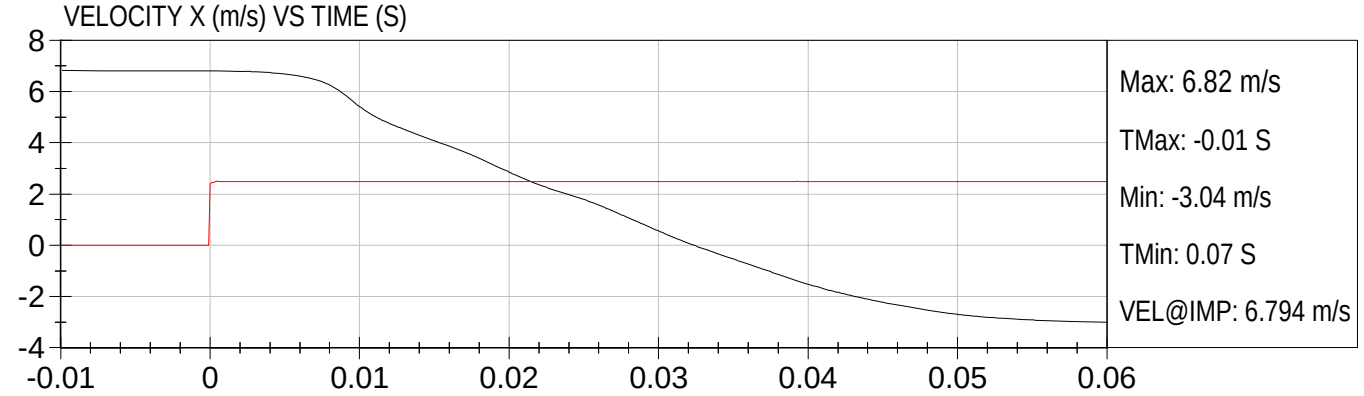
Location: S3H13 speed trap: 6.633 m/s

Hic: 100.82 T1: 6.80 ms T2: 42.00 ms

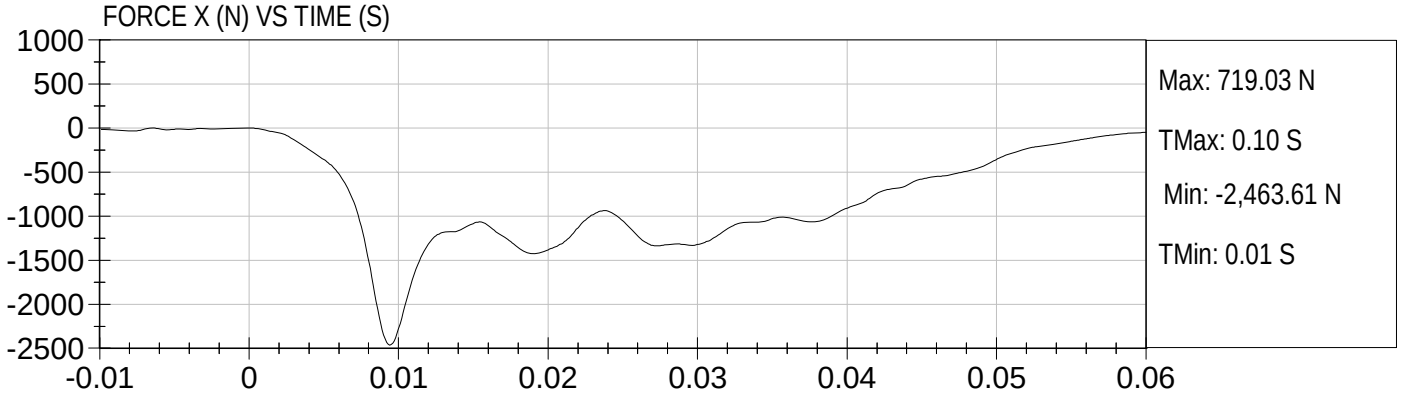
HEAD X ACCELERATION (G's) VS TIME (S)



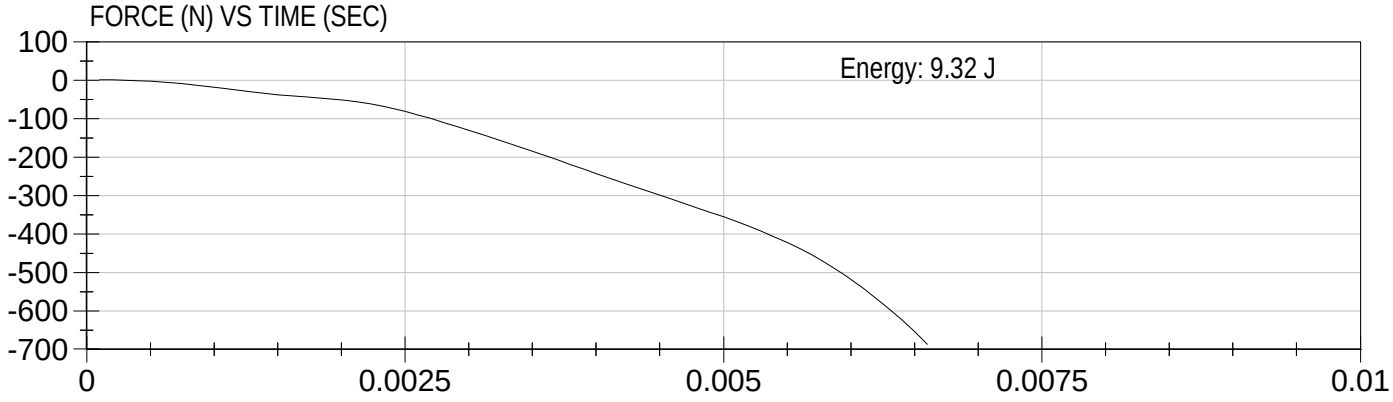
VELOCITY X (m/s) VS TIME (S)



FORCE X (N) VS TIME (S)



FORCE (N) VS TIME (SEC)



HEAD FORM IMPACT (6.69 m/s)

Test Date: 4-21-2011

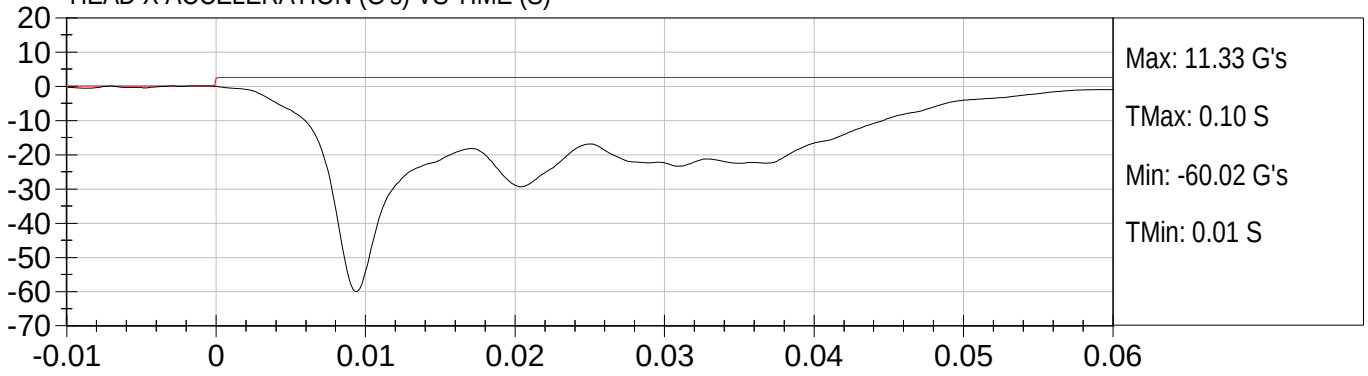
Component ID: 2011 Starcraft Quest

NHTSA#: CB0902

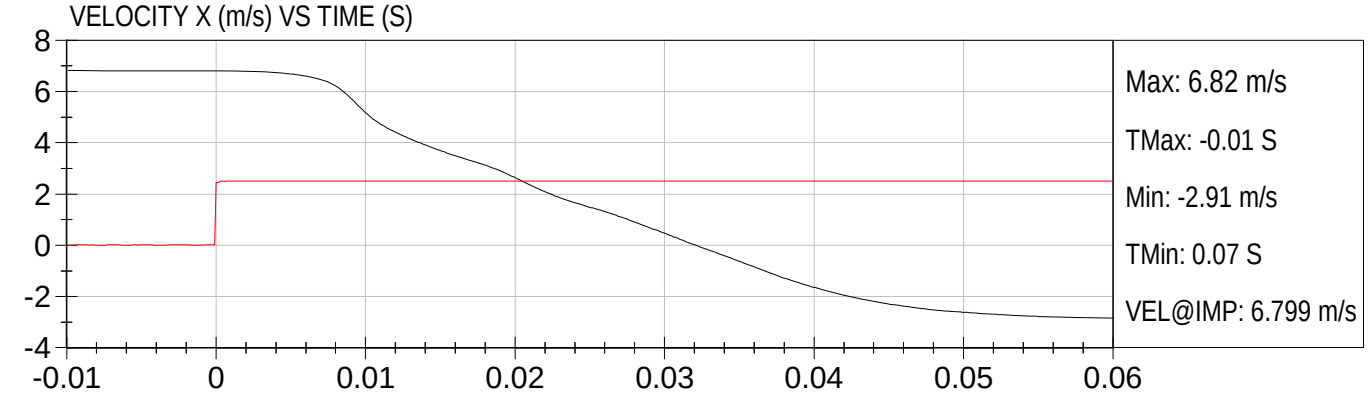
Location: S3H14 speed trap: 6.650 m/s

Hic: 104.12 T1: 6.70 ms T2: 41.70 ms

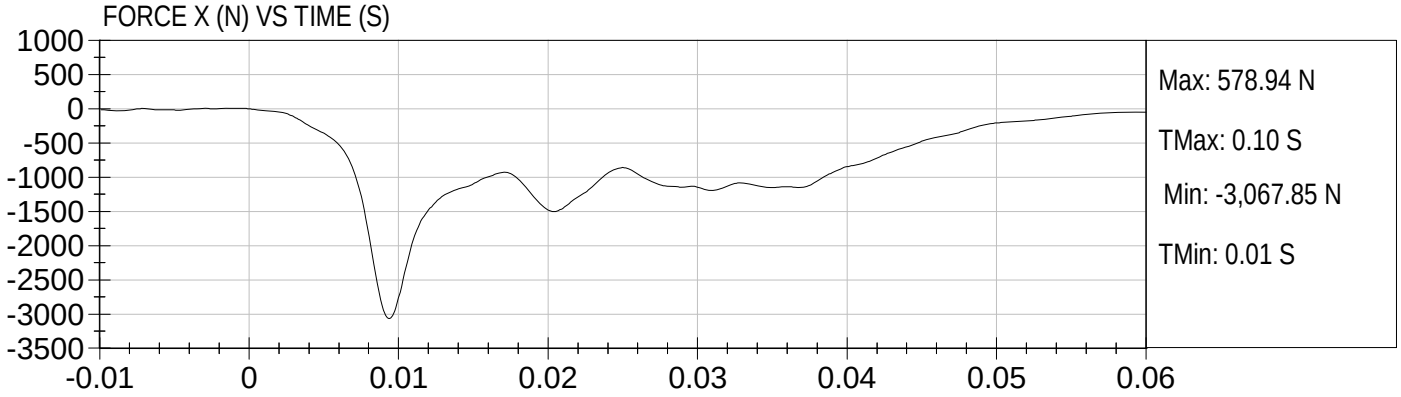
HEAD X ACCELERATION (G's) VS TIME (S)



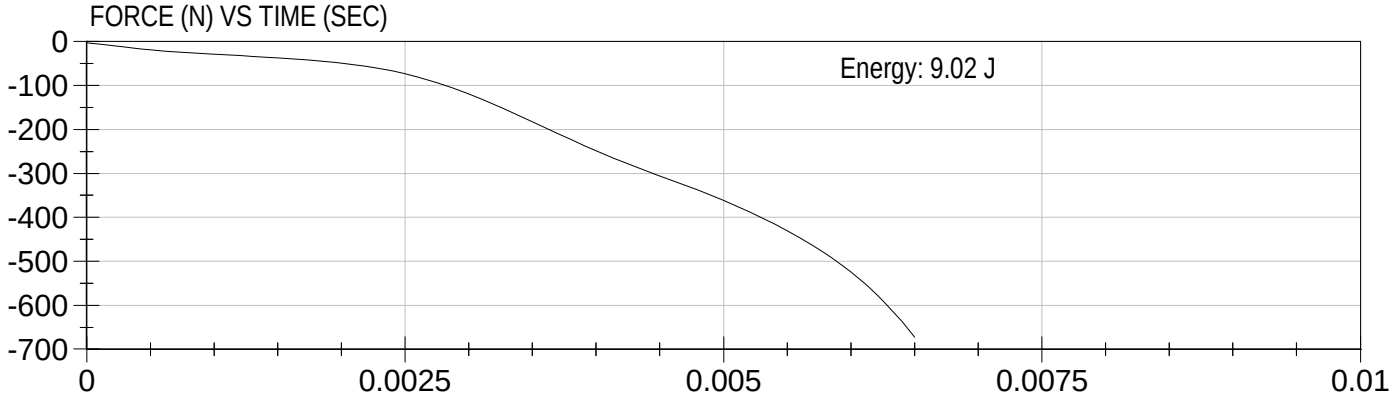
VELOCITY X (m/s) VS TIME (S)



FORCE X (N) VS TIME (S)



FORCE (N) VS TIME (SEC)



HEAD FORM IMPACT (6.69 m/s)

Test Date: 4-24-2011

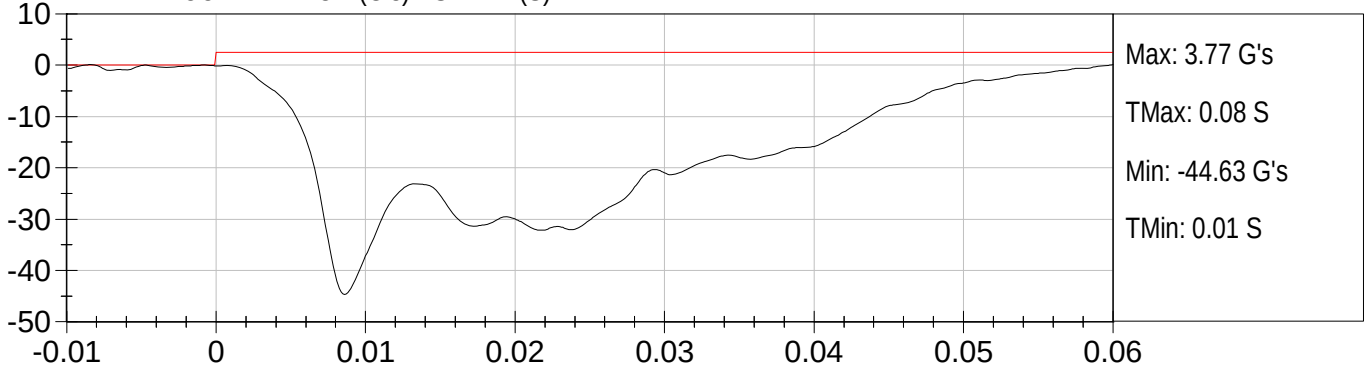
Component ID: 2011 Starcraft Quest

NHTSA#: CB0902

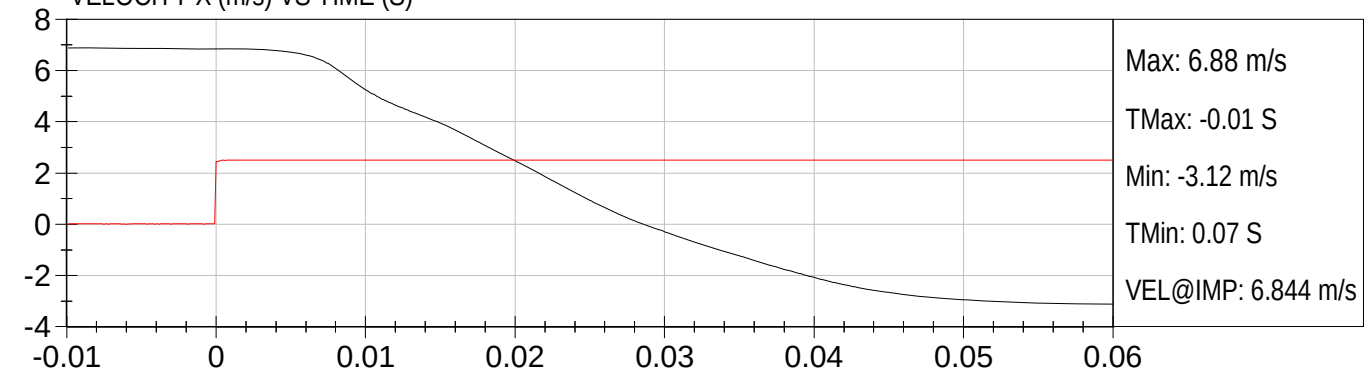
Location: S8H8 speed trap: 6.676 m/s

Hic: 117.37 T1: 6.20 ms T2: 40.30 ms

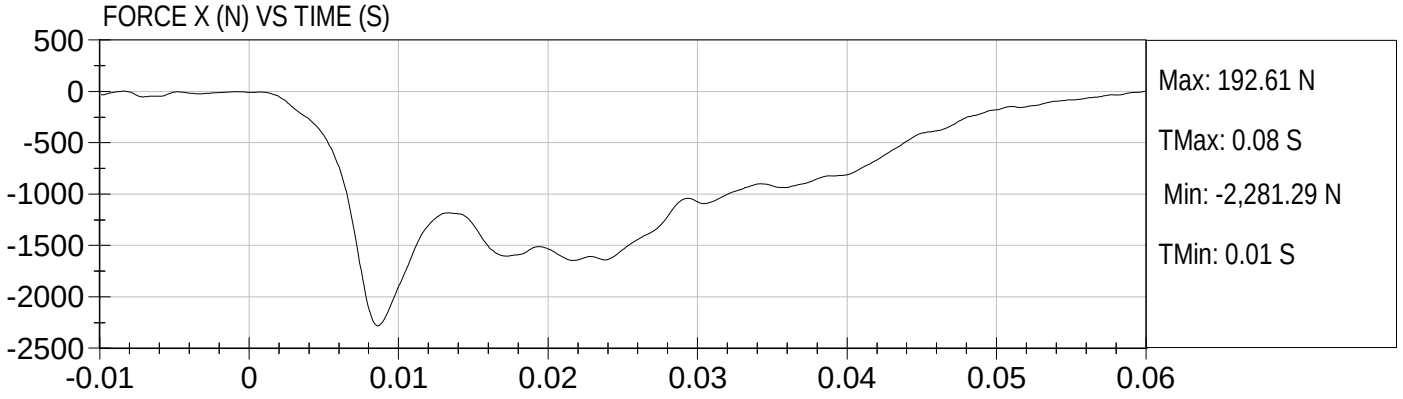
HEAD X ACCELERATION (G's) VS TIME (S)



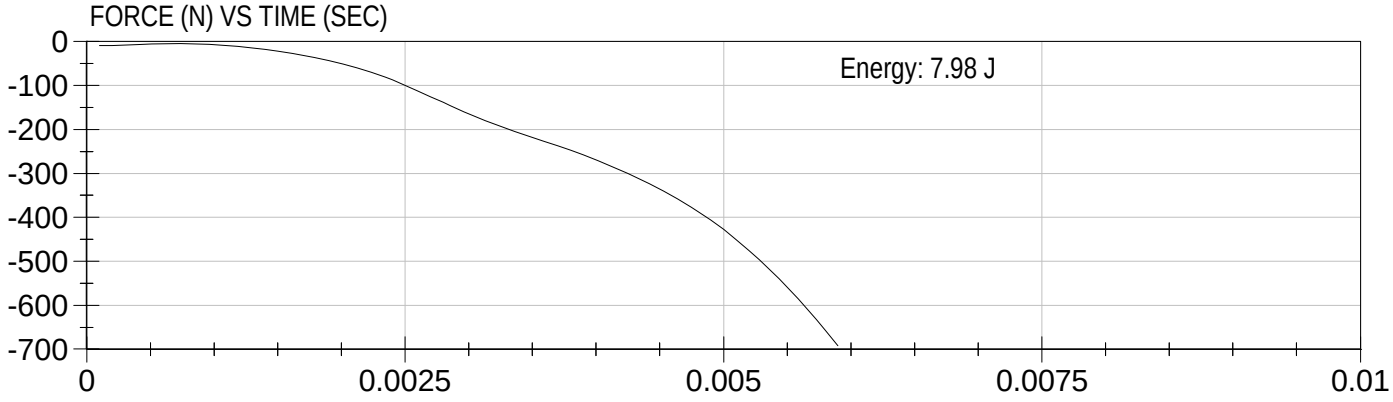
VELOCITY X (m/s) VS TIME (S)



FORCE X (N) VS TIME (S)



FORCE (N) VS TIME (SEC)



HEAD FORM IMPACT (6.69 m/s)

Test Date: 4-24-2011

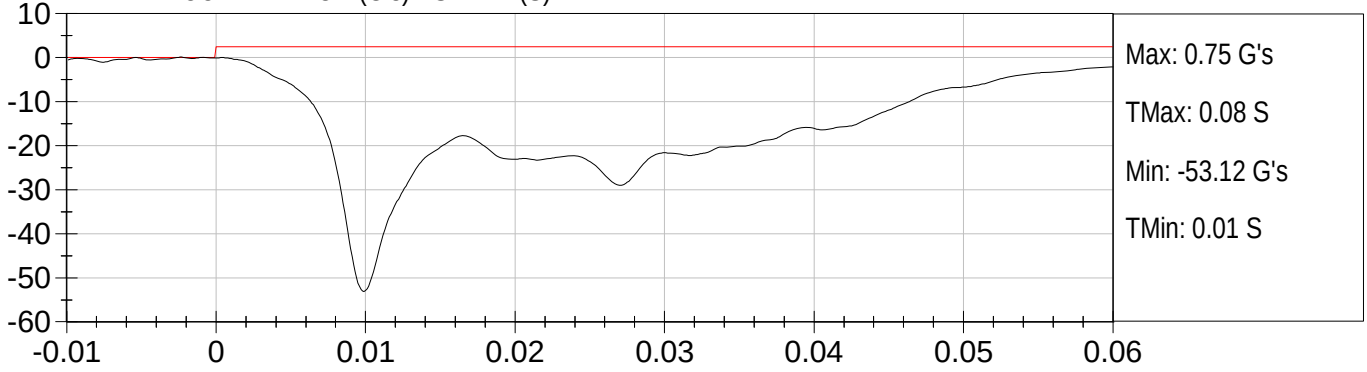
Component ID: 2011 Starcraft Quest

NHTSA#: CB0902

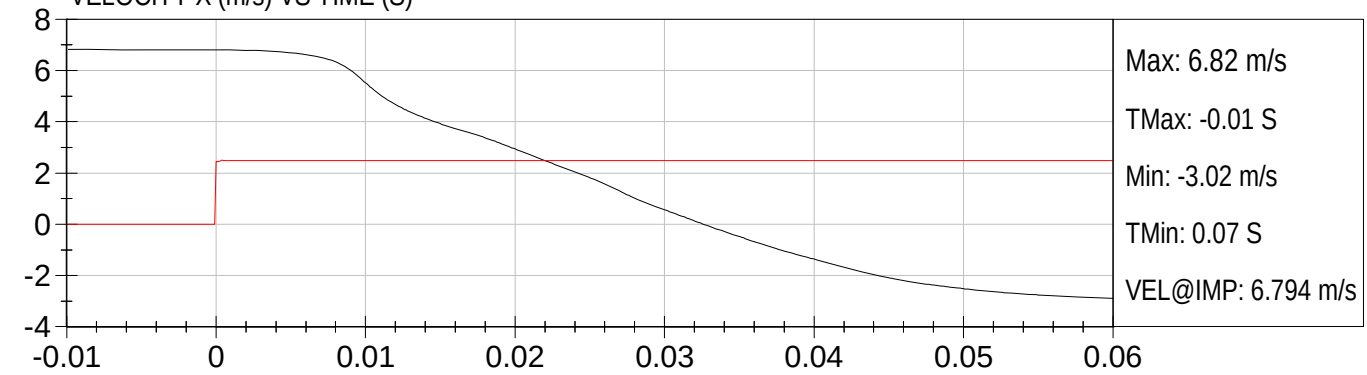
Location: S8H9 speed trap: 6.665 m/s

Hic: 97.55 T1: 7.10 ms T2: 43.50 ms

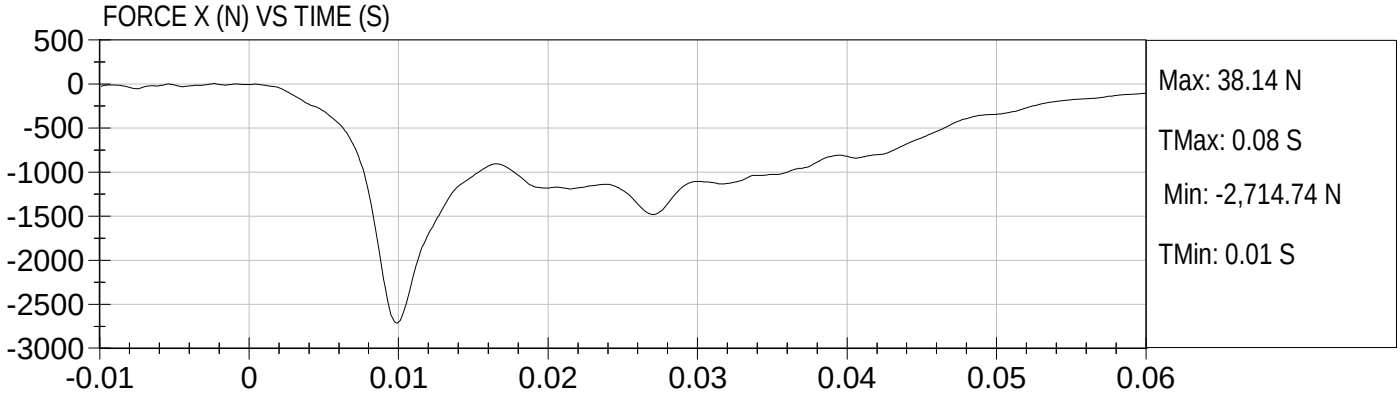
HEAD X ACCELERATION (G's) VS TIME (S)



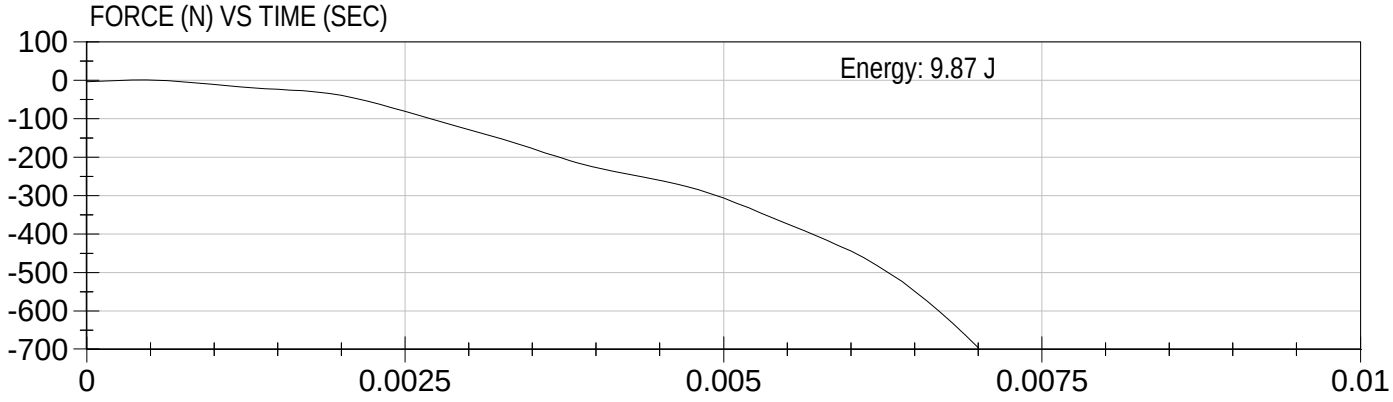
VELOCITY X (m/s) VS TIME (S)



FORCE X (N) VS TIME (S)



FORCE (N) VS TIME (SEC)



HEAD FORM IMPACT (6.69 m/s)

Test Date: 4-24-2011

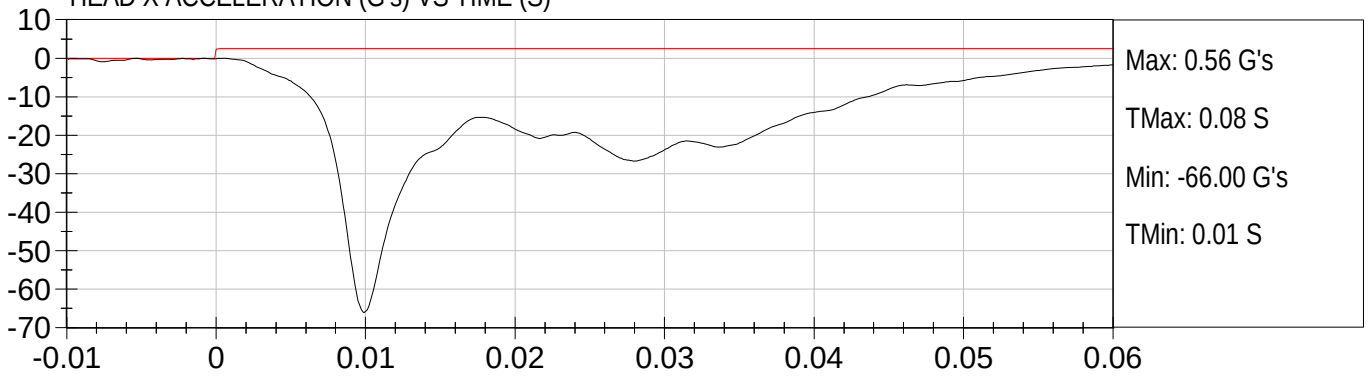
Component ID: 2011 Starcraft Quest

NHTSA#: CB0902

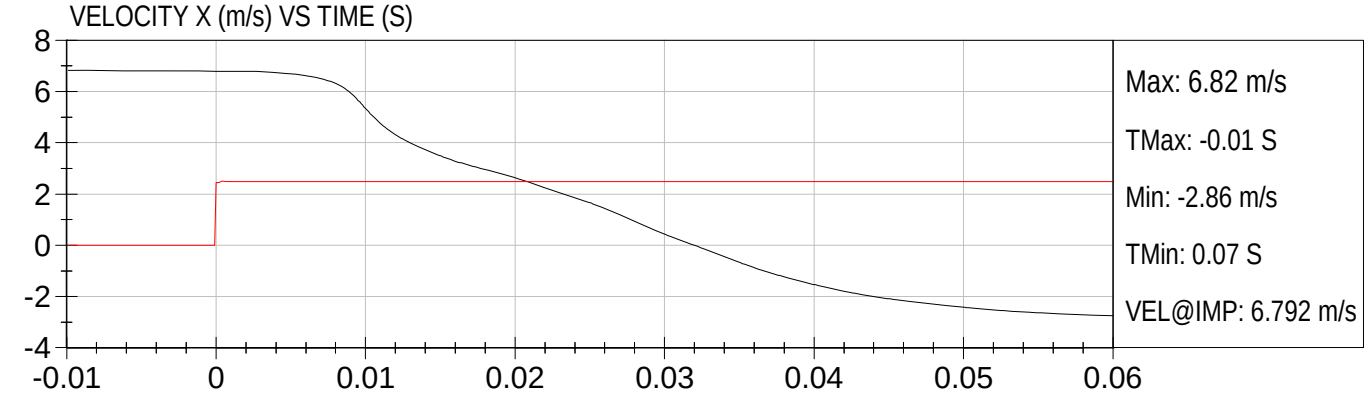
Location: S8H10 speed trap: 6.690 m/s

Hic: 101.47 T1: 7.10 ms T2: 38.90 ms

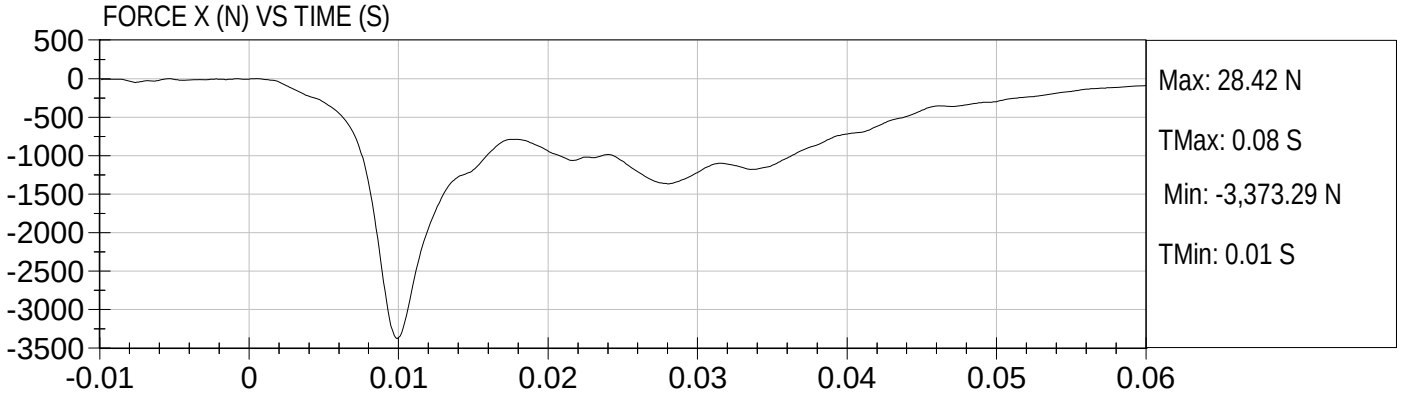
HEAD X ACCELERATION (G's) VS TIME (S)



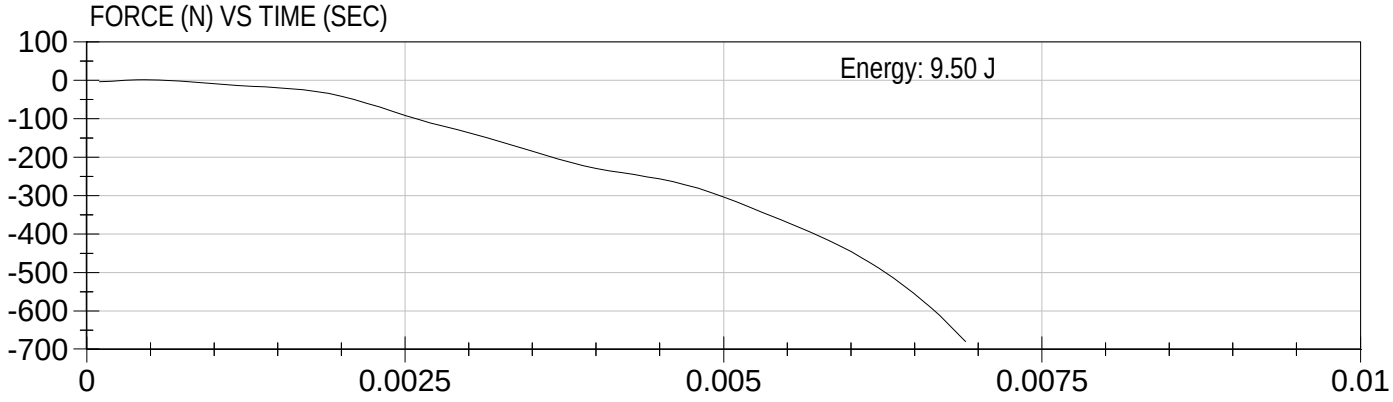
VELOCITY X (m/s) VS TIME (S)



FORCE X (N) VS TIME (S)



FORCE (N) VS TIME (SEC)



HEAD FORM IMPACT (6.69 m/s)

Test Date: 4-24-2011

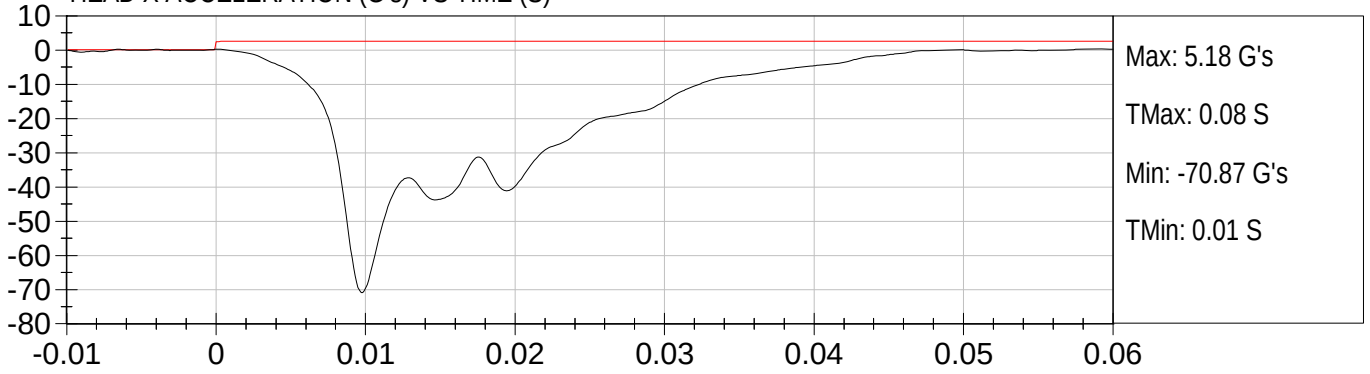
Component ID: 2011 Starcraft Quest

NHTSA#: CB0902

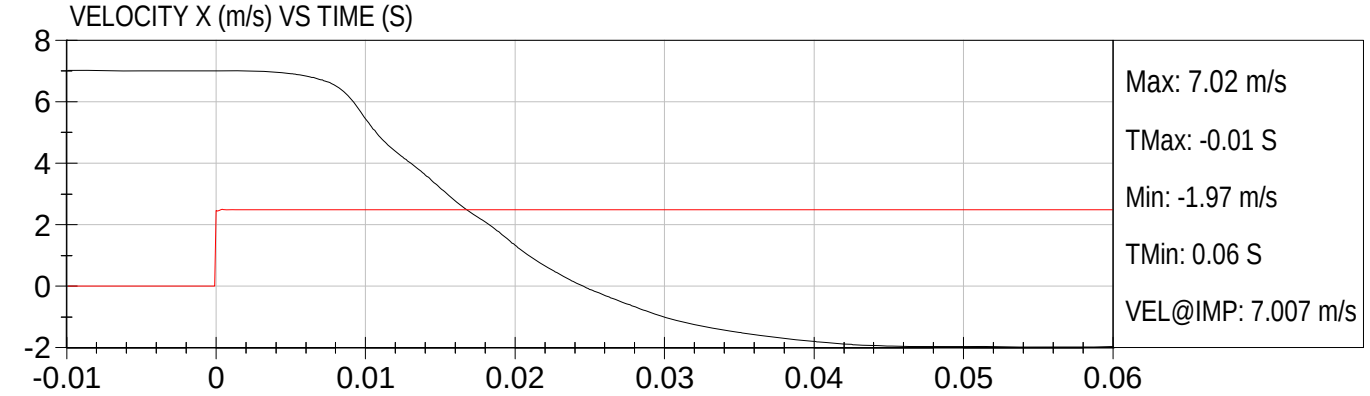
Location: S8H11 speed trap: 6.681 m/s

Hic: 169.51 T1: 7.80 ms T2: 24.10 ms

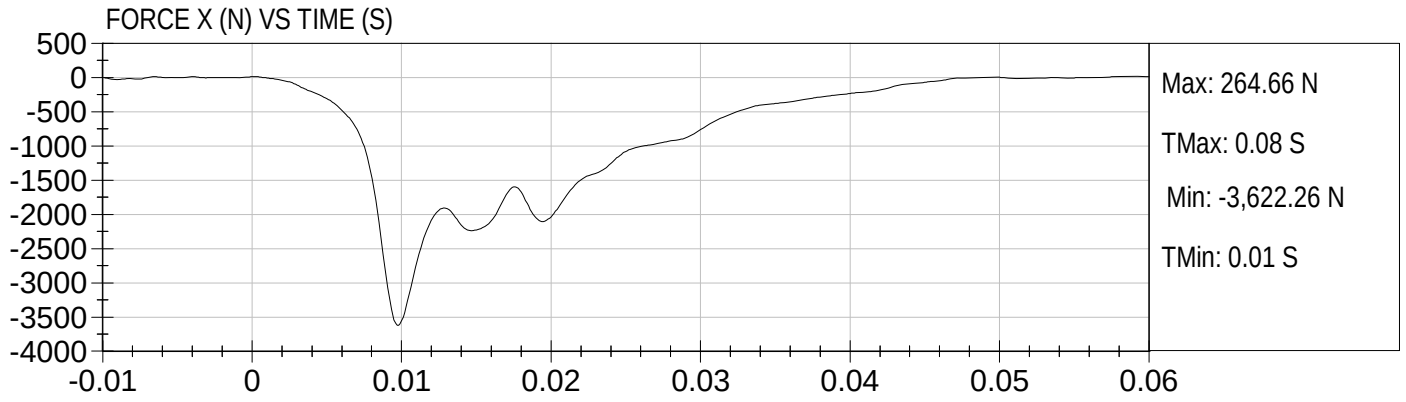
HEAD X ACCELERATION (G's) VS TIME (S)



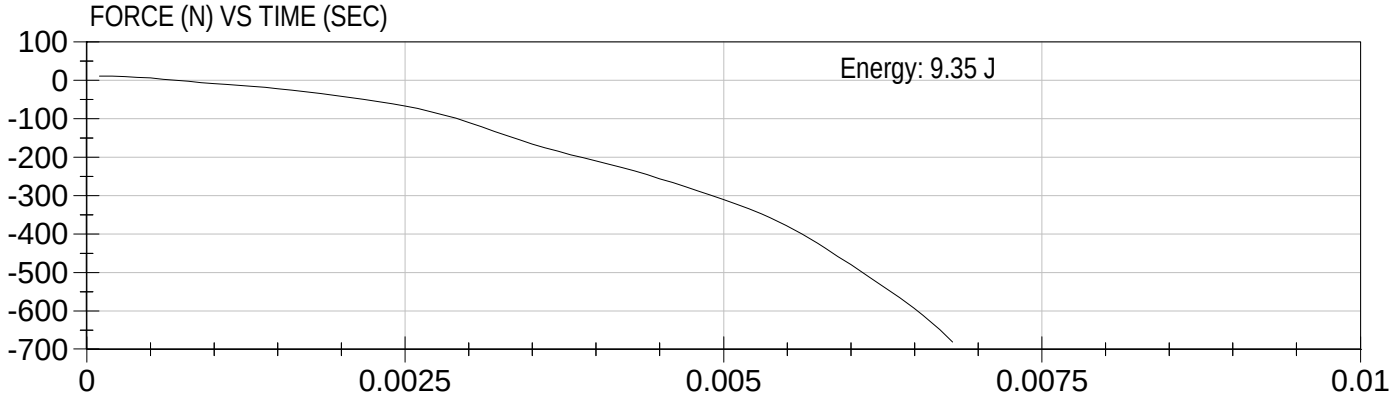
VELOCITY X (m/s) VS TIME (S)



FORCE X (N) VS TIME (S)



FORCE (N) VS TIME (SEC)



HEAD FORM IMPACT (6.69 m/s)

Test Date: 4-24-2011

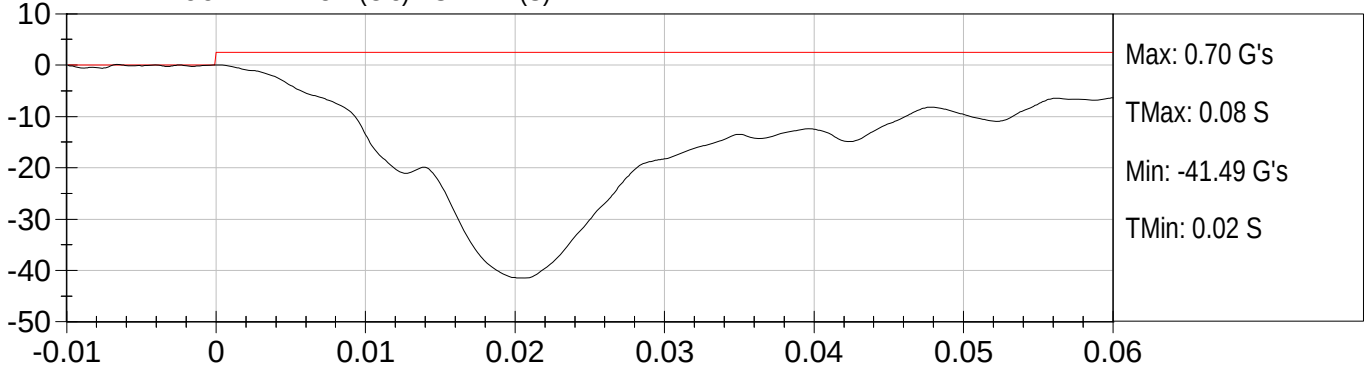
Component ID: 2011 Starcraft Quest

NHTSA#: CB0902

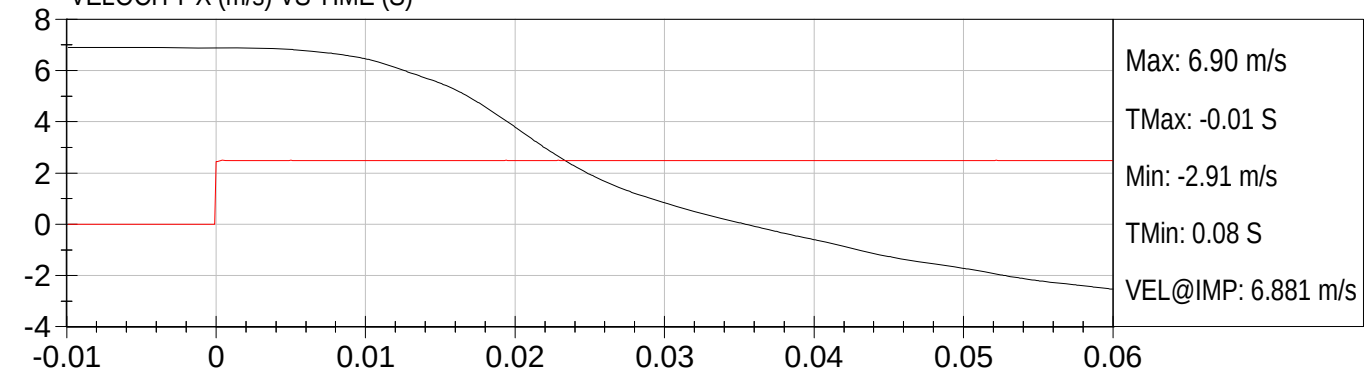
Location: S8H12 speed trap: 6.667 m/s

Hic: 88.56 T1: 10.80 ms T2: 31.10 ms

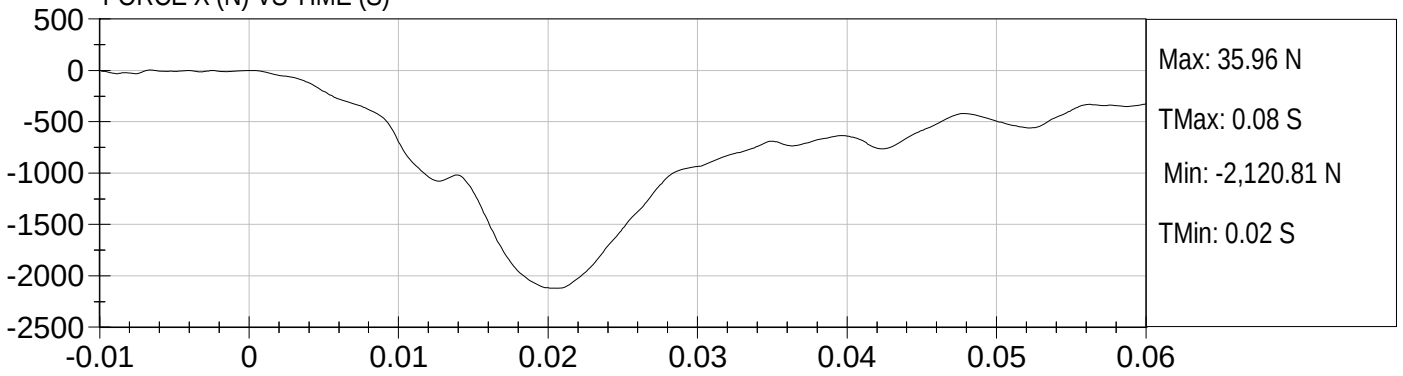
HEAD X ACCELERATION (G's) VS TIME (S)



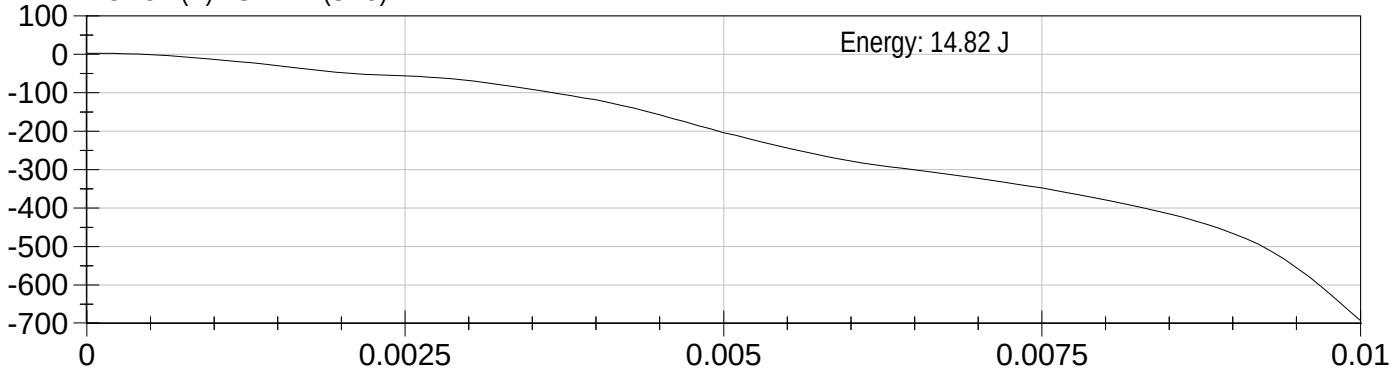
VELOCITY X (m/s) VS TIME (S)



FORCE X (N) VS TIME (S)



FORCE (N) VS TIME (SEC)



HEAD FORM IMPACT (6.69 m/s)

Test Date: 4-25-2011

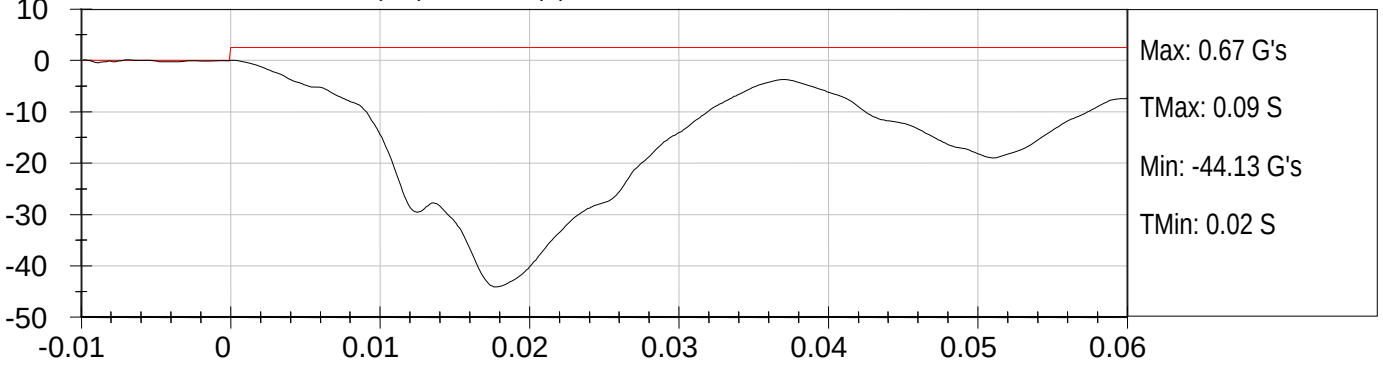
Component ID: 2011 Starcraft Quest

NHTSA#: CB0902

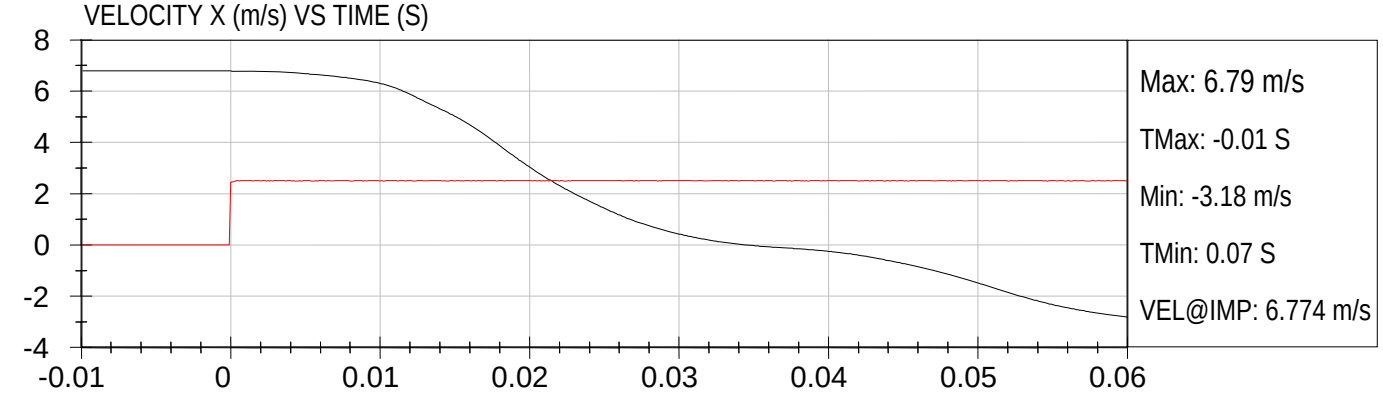
Location: S8H13 speed trap: 6.636 m/s

Hic: 100.63 T1: 10.70 ms T2: 27.80 ms

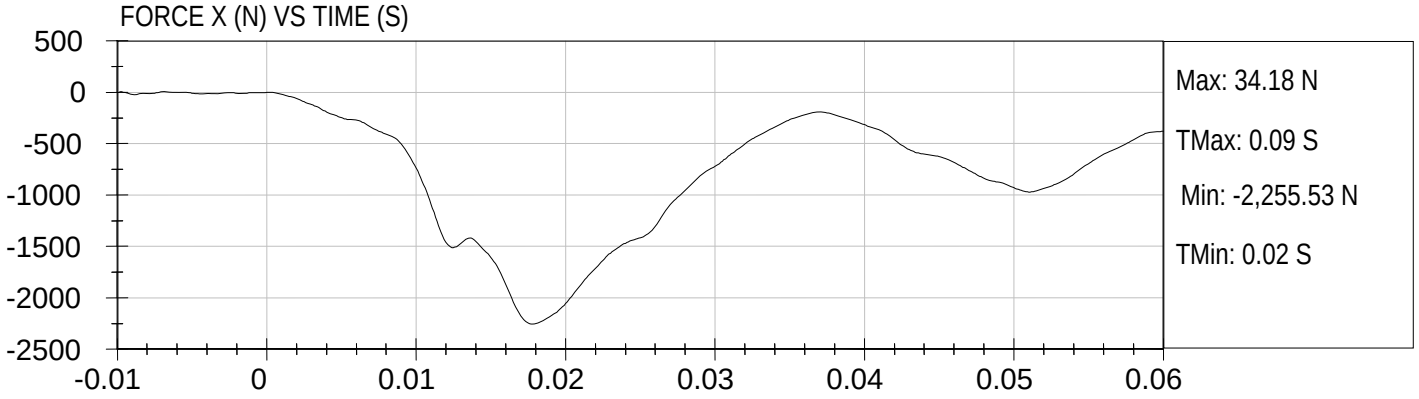
HEAD X ACCELERATION (G's) VS TIME (S)



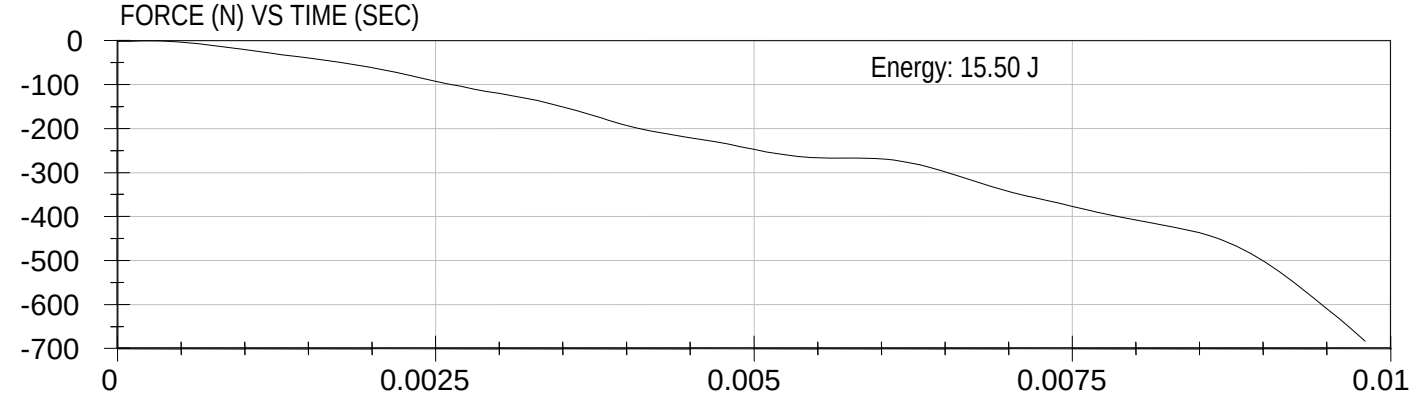
VELOCITY X (m/s) VS TIME (S)



FORCE X (N) VS TIME (S)

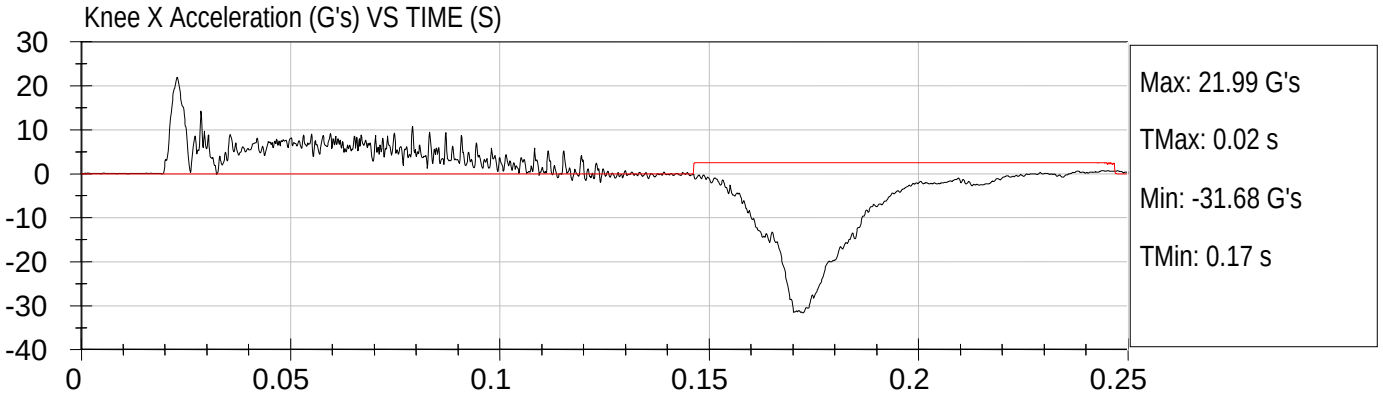


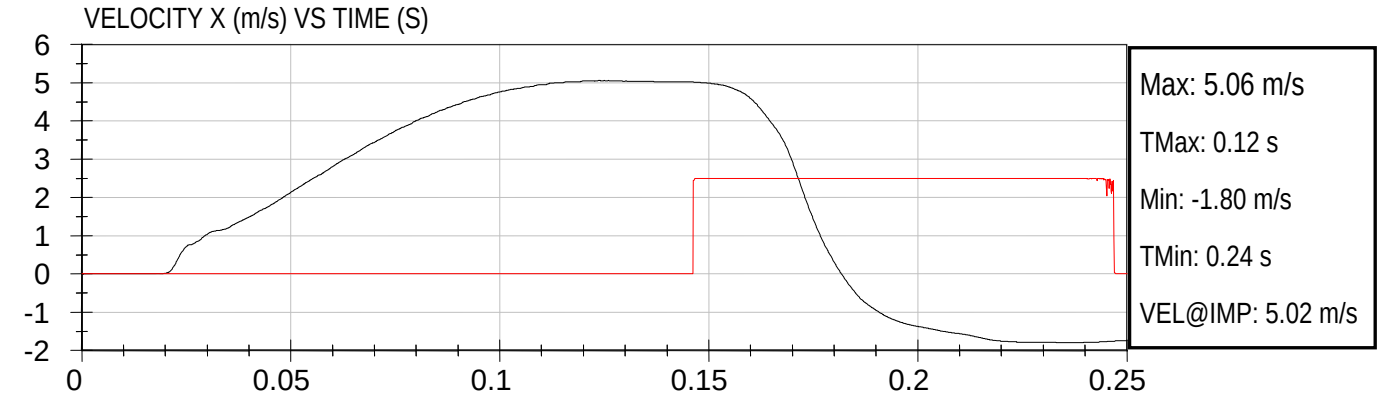
FORCE (N) VS TIME (SEC)

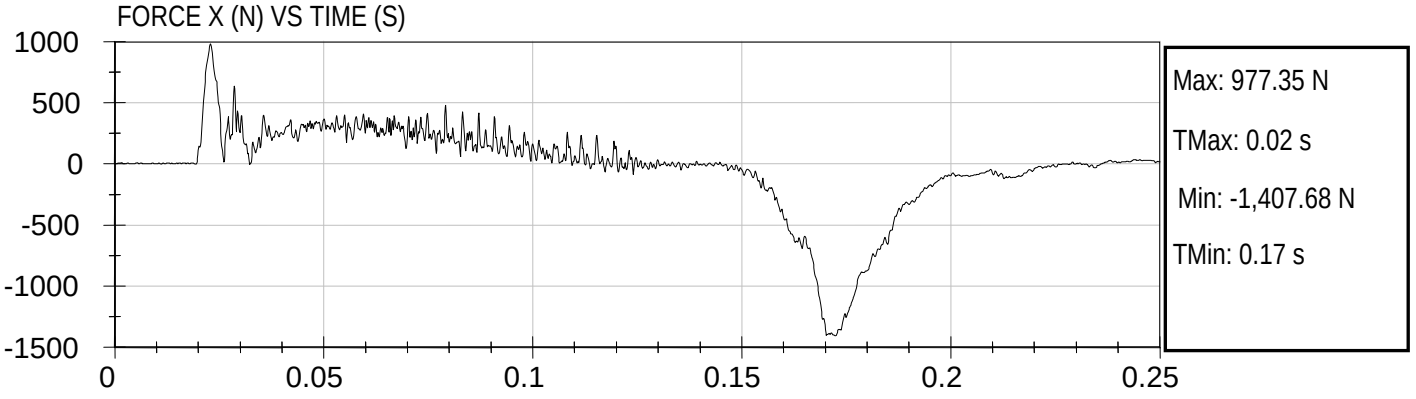


FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Starcraft Quest
Location: S3K1 speed trap: 4.863 m/s

Test Date: 4-19-2011
NHTSA #: CB0902

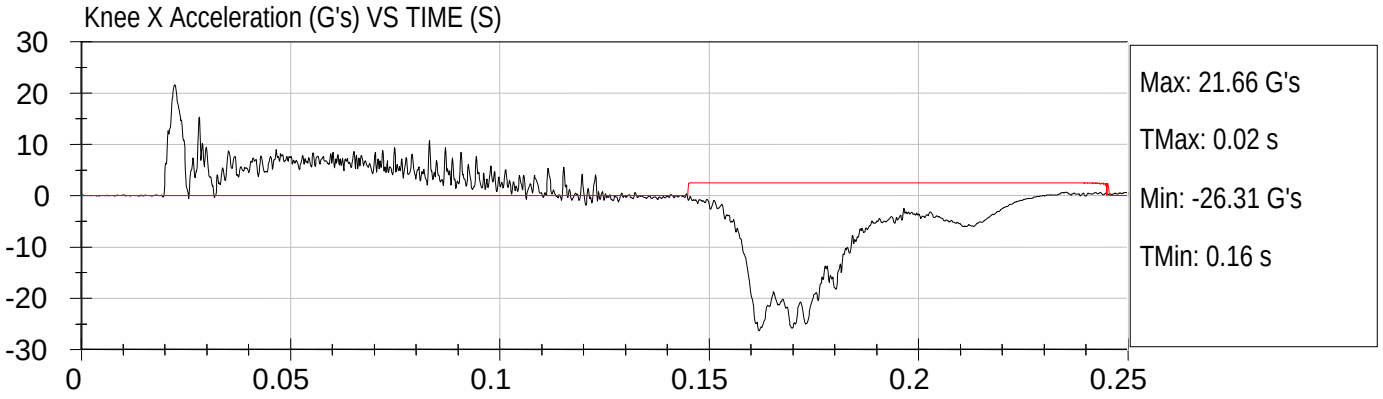


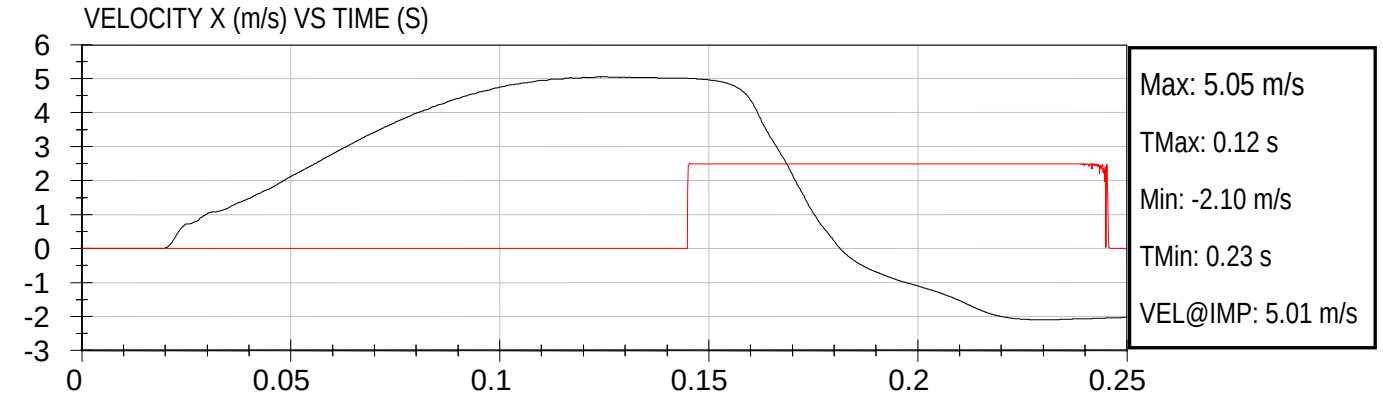


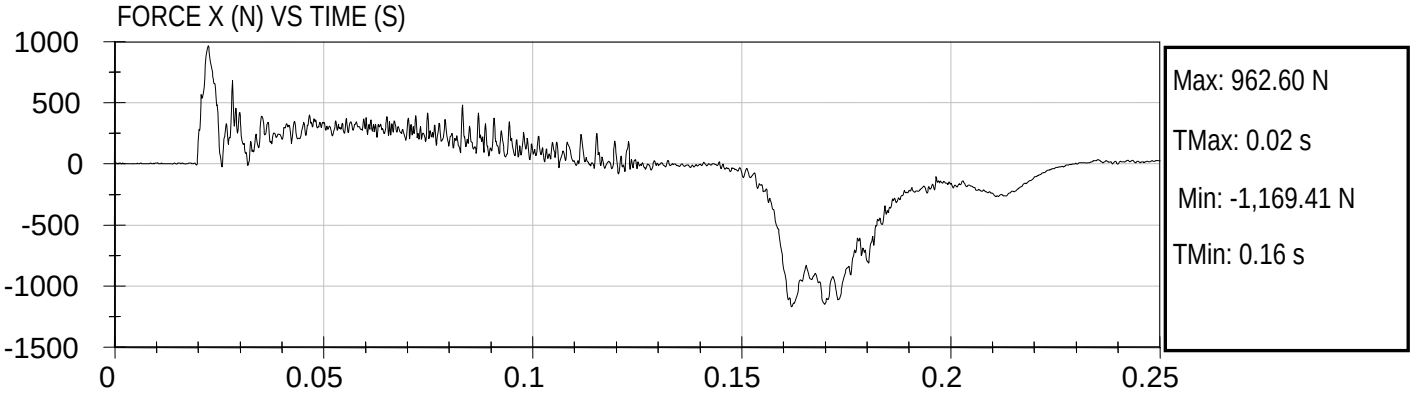


FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Starcraft Quest
Location: S3K2 speed trap: 4.895 m/s

Test Date: 4-19-2011
NHTSA #: CB0902



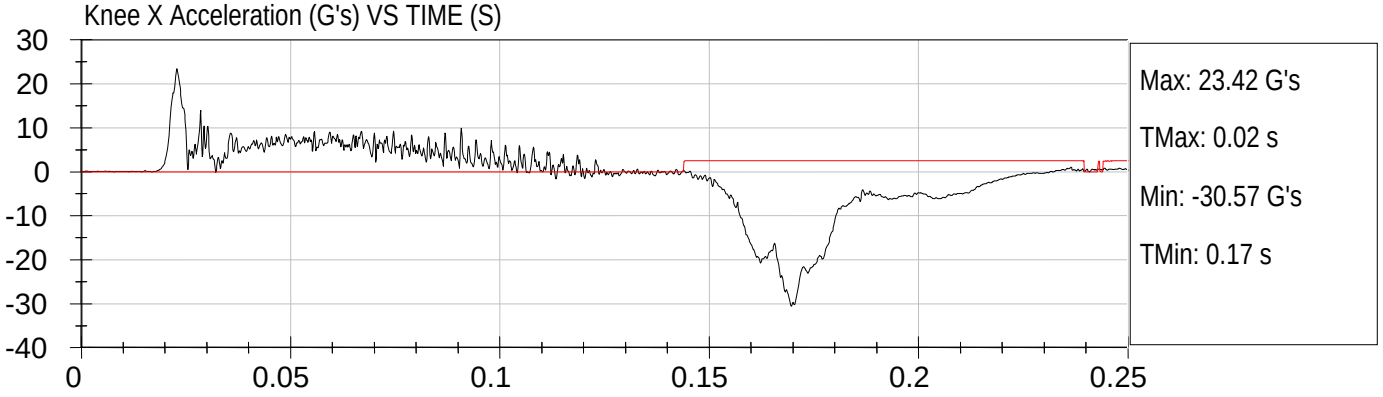




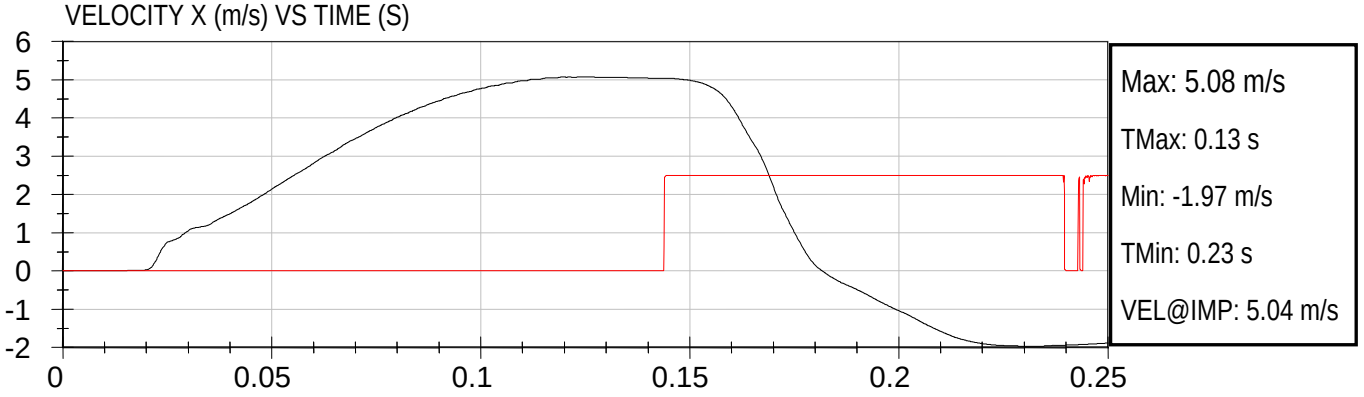
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Starcraft Quest
Location: S3K3 speed trap: 4.871 m/s

Test Date: 4-19-2011
NHTSA #: CB0902

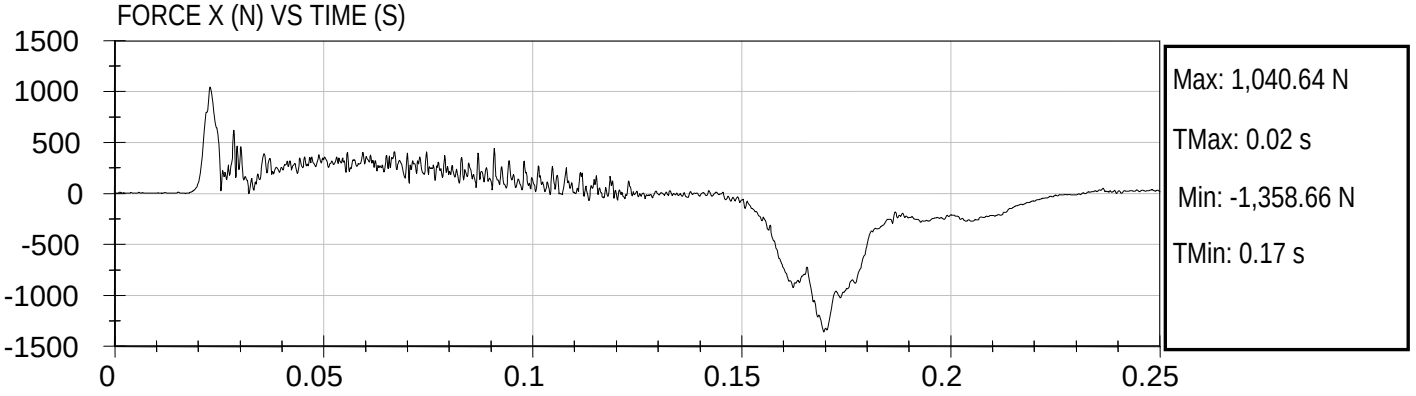
Knee X Acceleration (G's) VS TIME (S)



VELOCITY X (m/s) VS TIME (S)

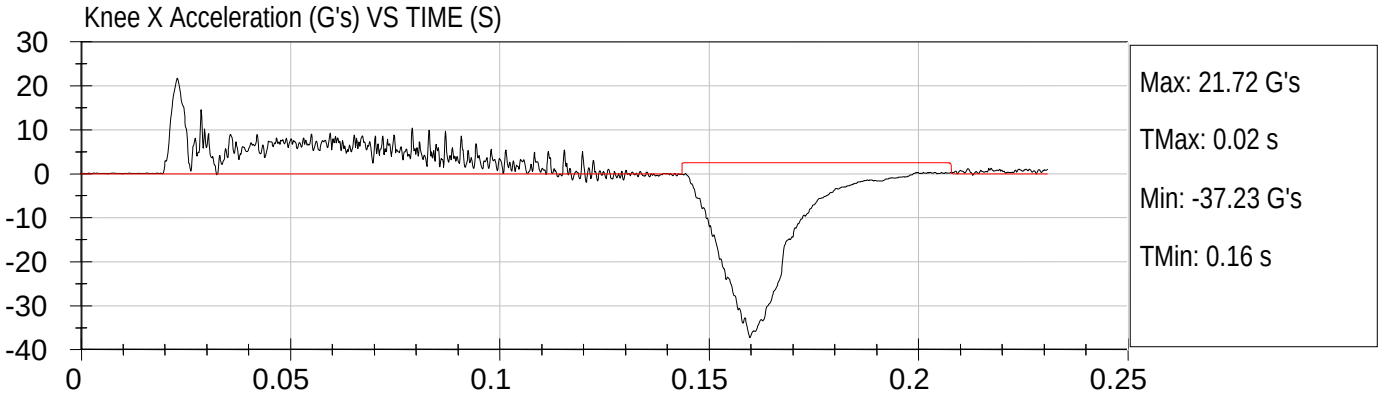


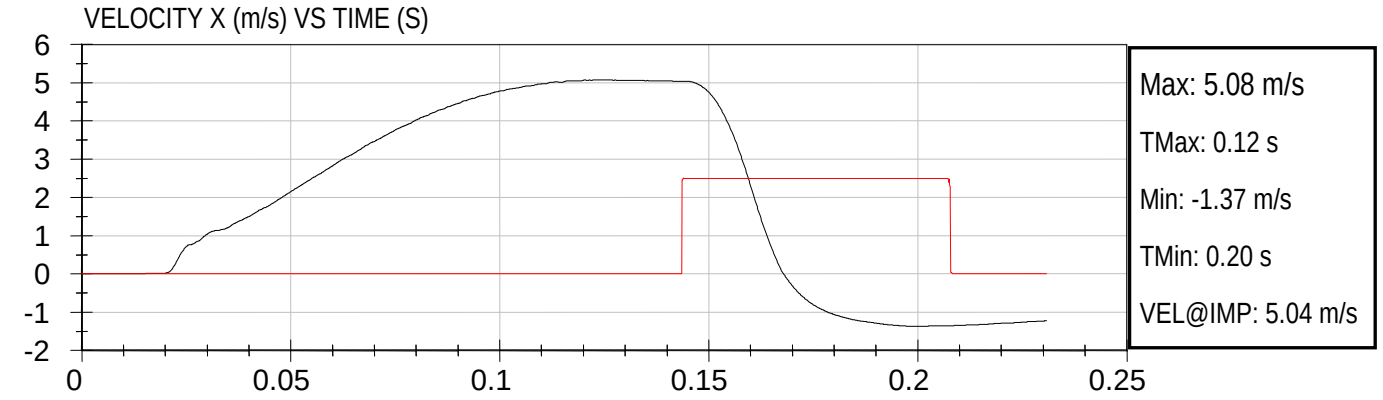
FORCE X (N) VS TIME (S)

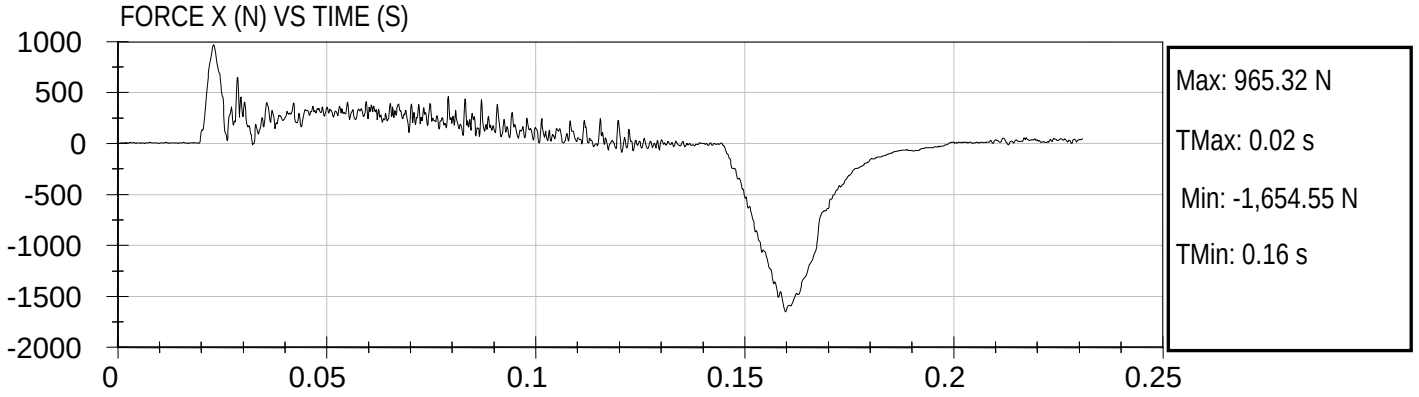


FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Starcraft Quest
Location: S3K4 speed trap: 4.858 m/s

Test Date: 4-19-2011
NHTSA #: CB0902

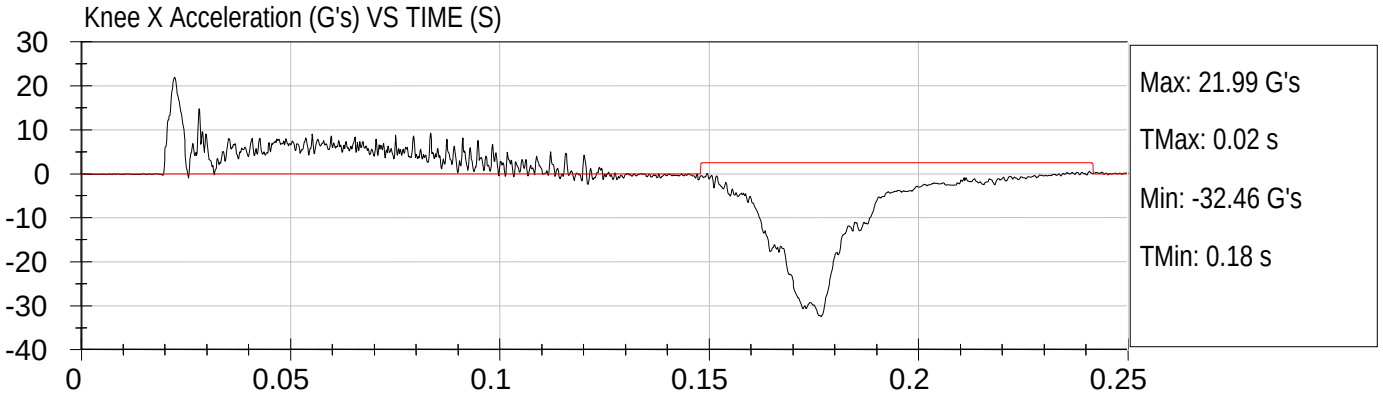


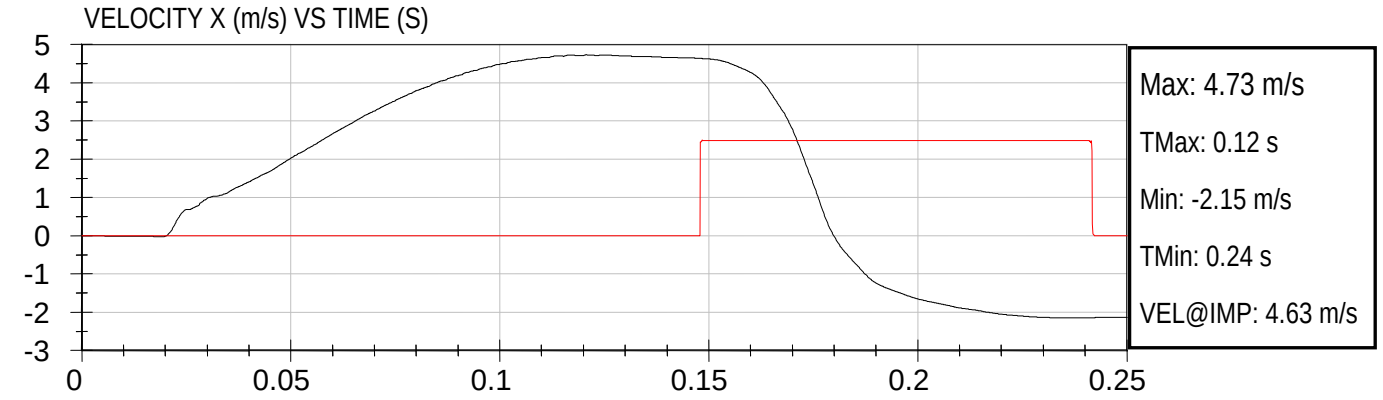


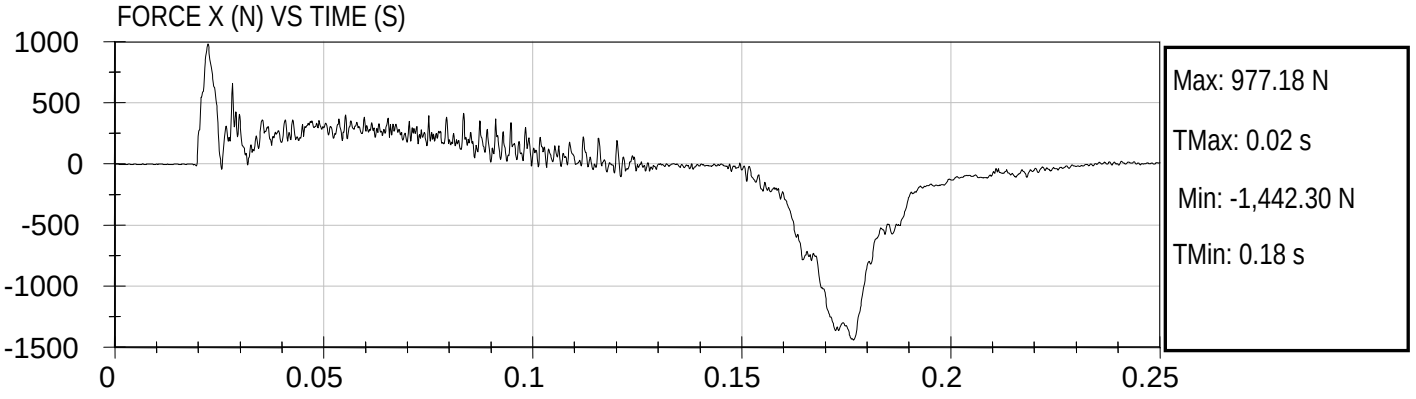


FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Starcraft Quest
Location: S3K5 speed trap: 4.828 m/s

Test Date: 4-19-2011
NHTSA #: CB0902

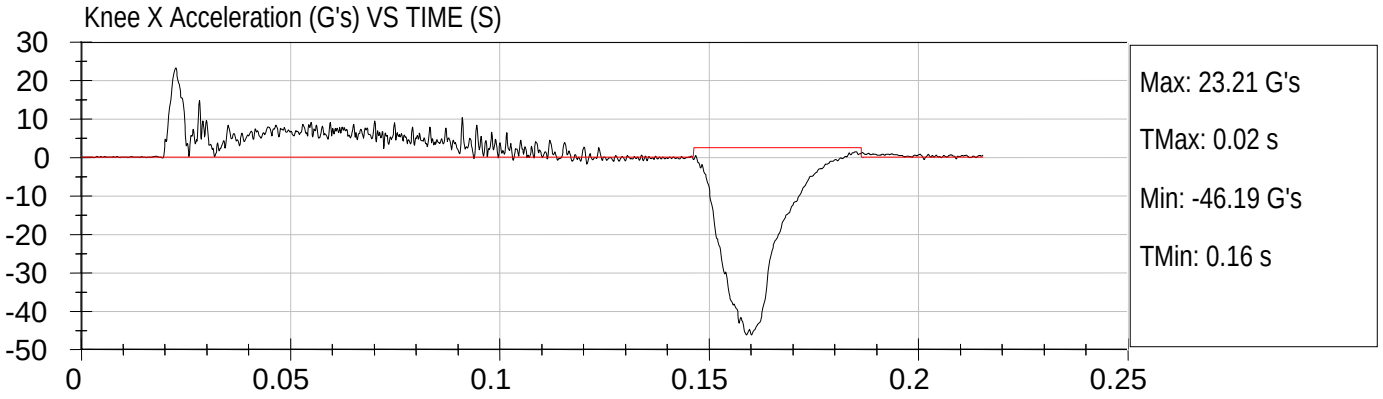


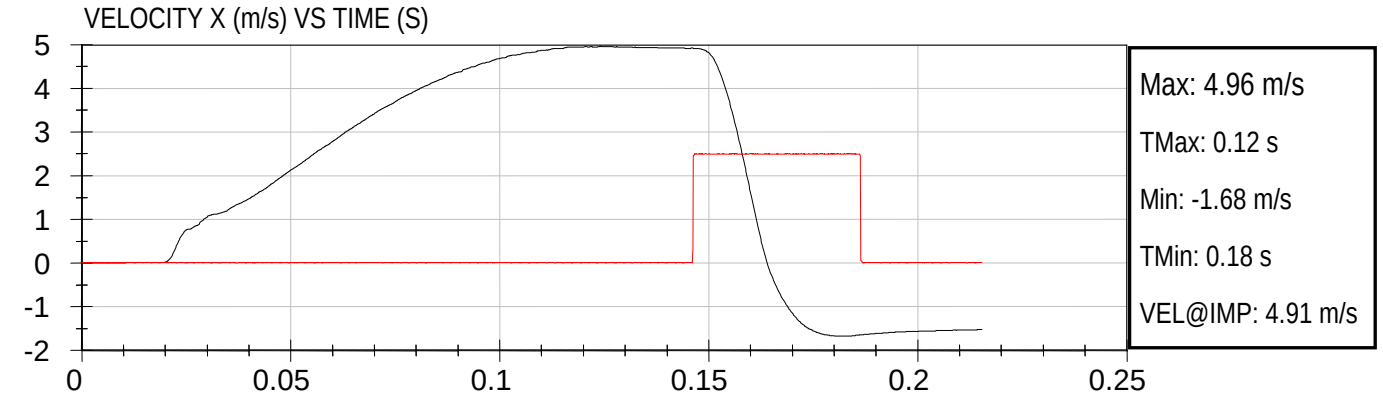


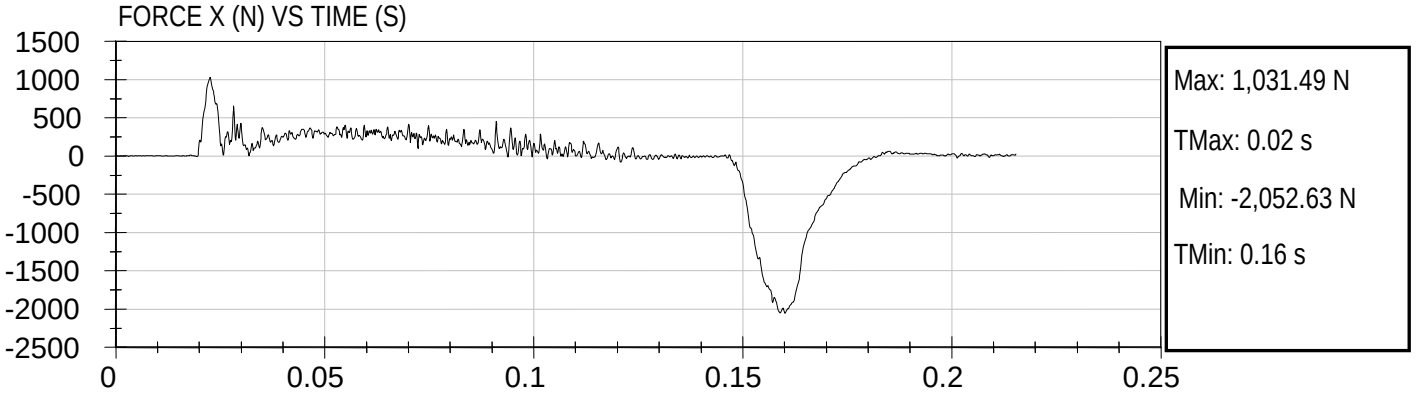


FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Starcraft Quest
Location: S3K6 speed trap: 4.814 m/s

Test Date: 4-19-2011
NHTSA #: CB0902



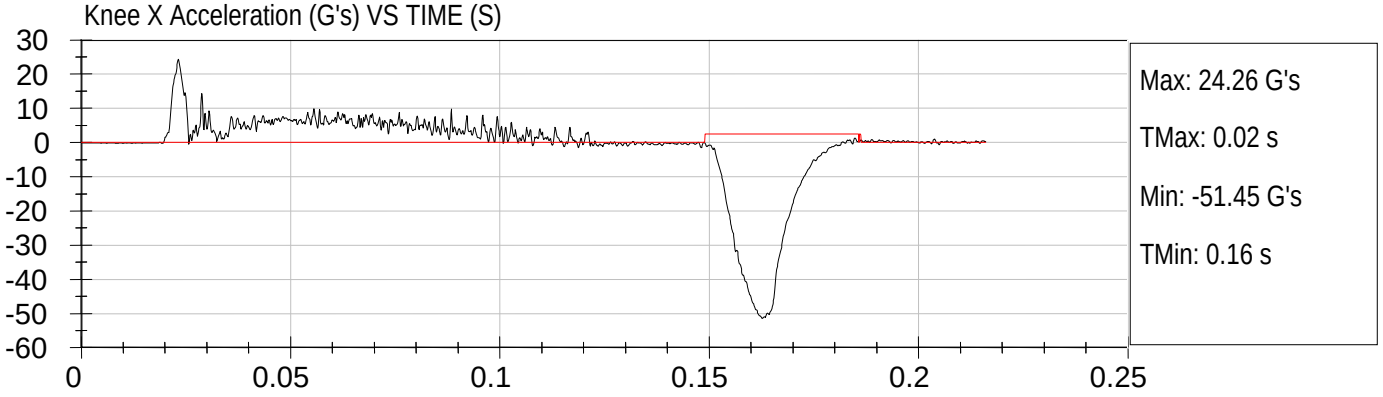




FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Starcraft Quest
Location: S3K7 speed trap: 4.840 m/s

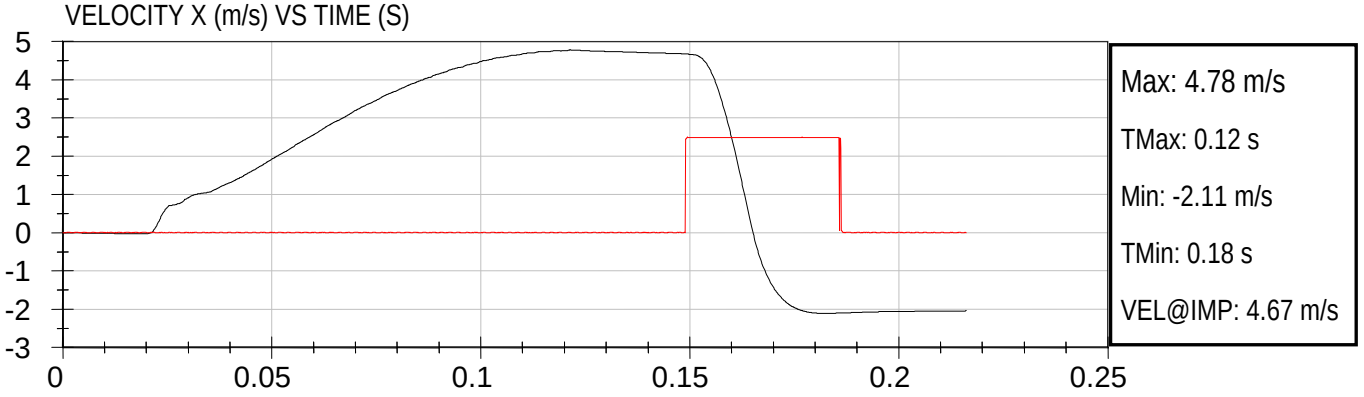
Test Date: 4-19-2011
NHTSA #: CB0902

Knee X Acceleration (G's) VS TIME (S)



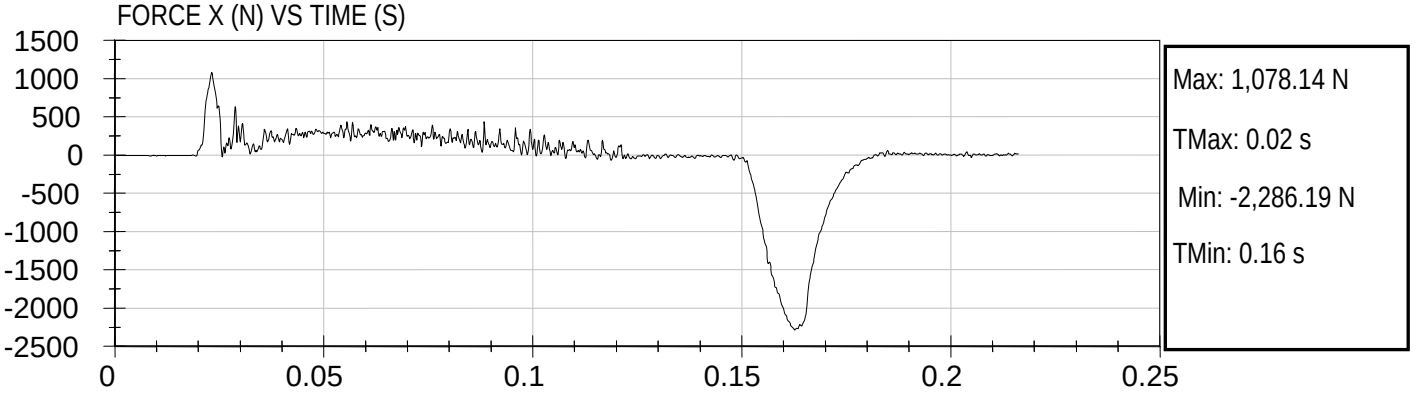
Max: 24.26 G's
TMax: 0.02 s
Min: -51.45 G's
TMin: 0.16 s

VELOCITY X (m/s) VS TIME (S)



Max: 4.78 m/s
TMax: 0.12 s
Min: -2.11 m/s
TMin: 0.18 s
VEL@IMP: 4.67 m/s

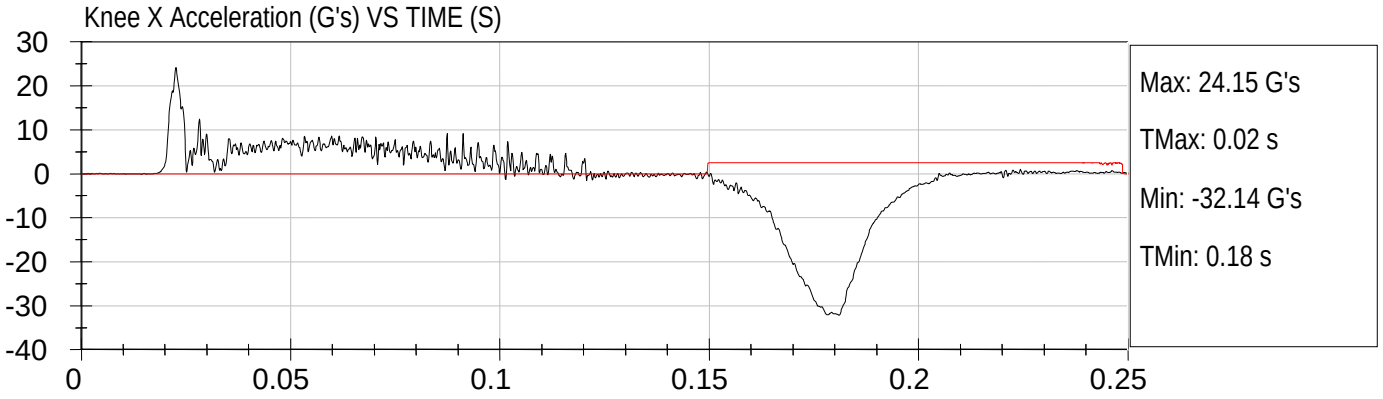
FORCE X (N) VS TIME (S)

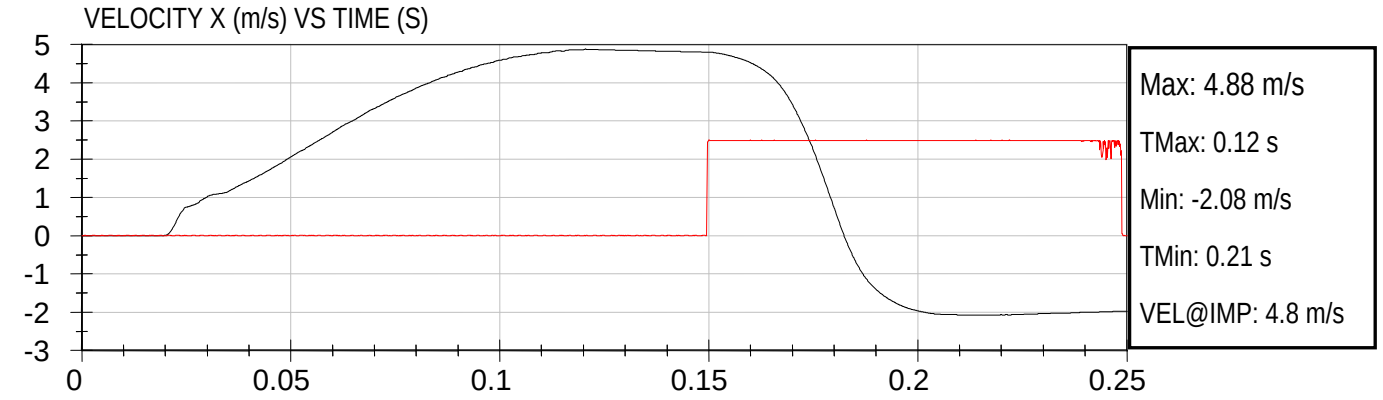


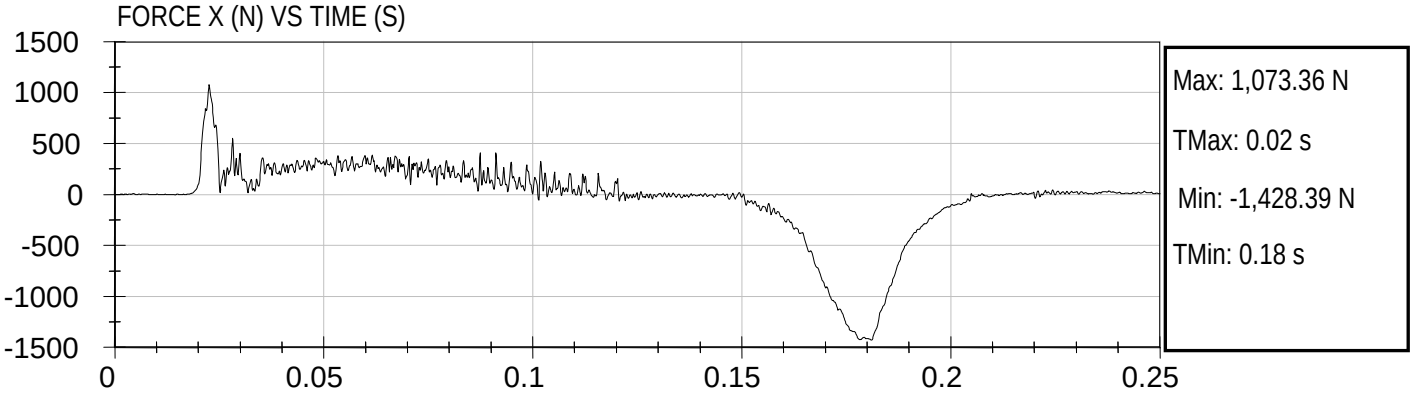
Max: 1,078.14 N
TMax: 0.02 s
Min: -2,286.19 N
TMin: 0.16 s

FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Starcraft Quest
Location: S3K8 speed trap: 4.827 m/s

Test Date: 4-19-2011
NHTSA #: CB0902

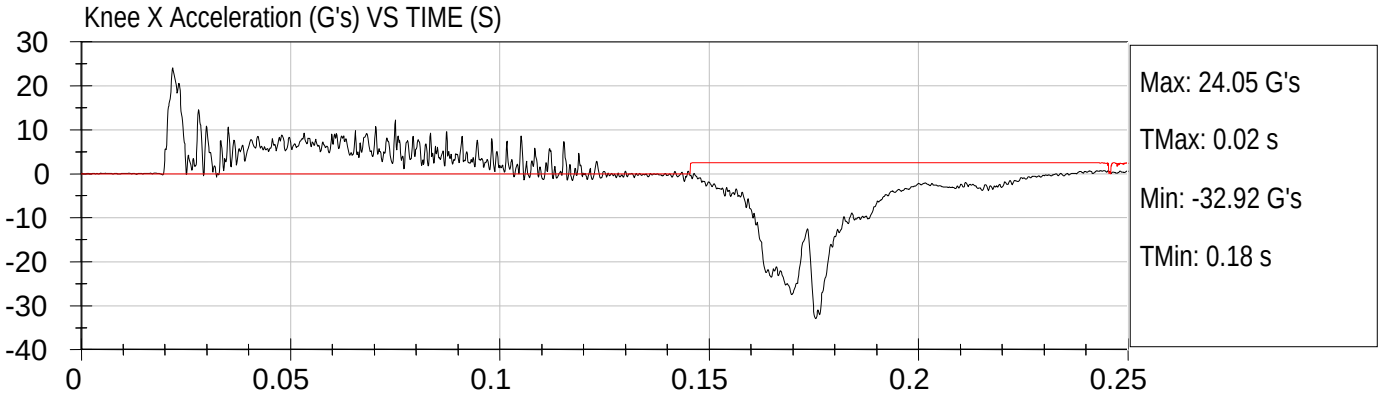


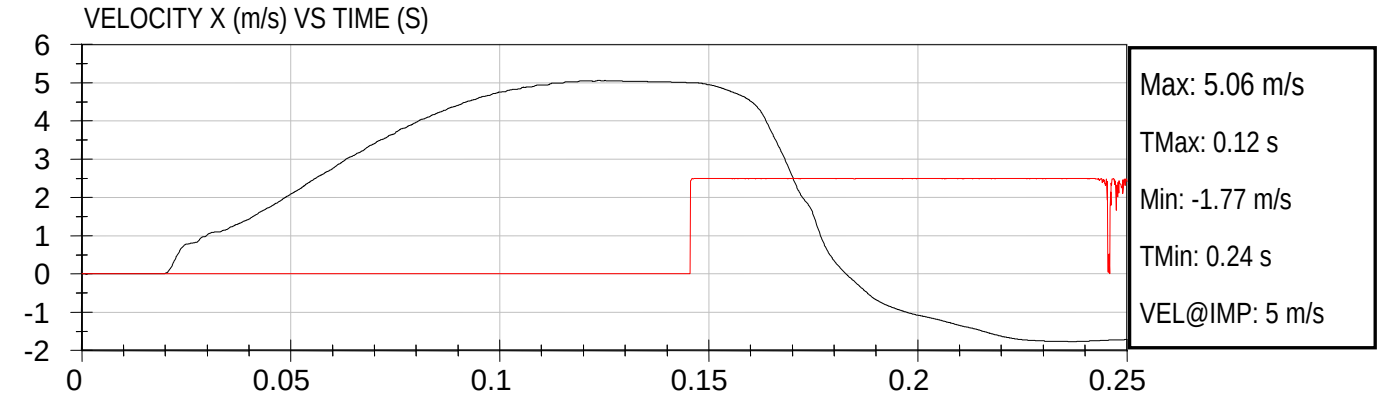


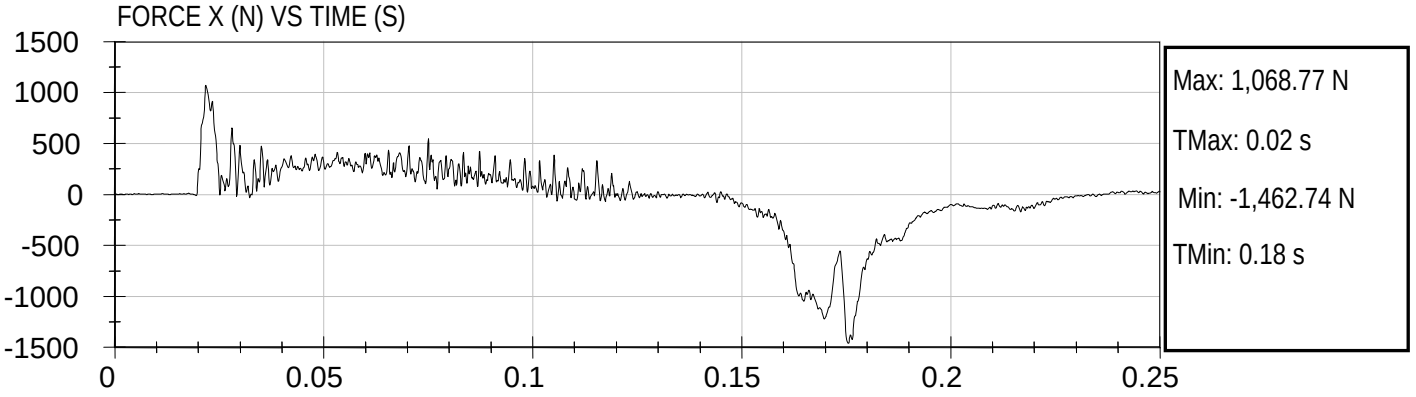


FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Starcraft Quest
Location: S8K1 speed trap: 4.893 m/s

Test Date: 4-24-2011
NHTSA #: CB0902

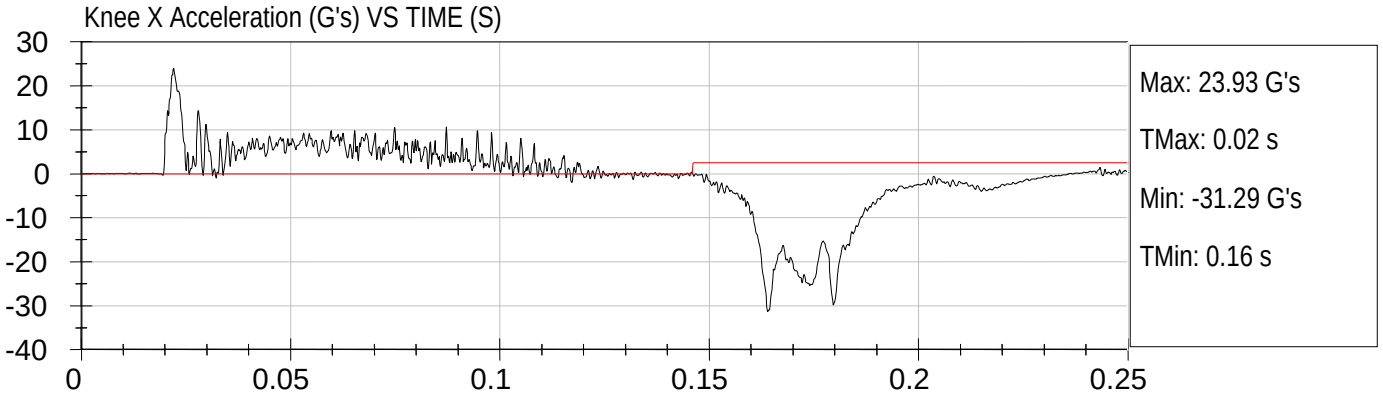


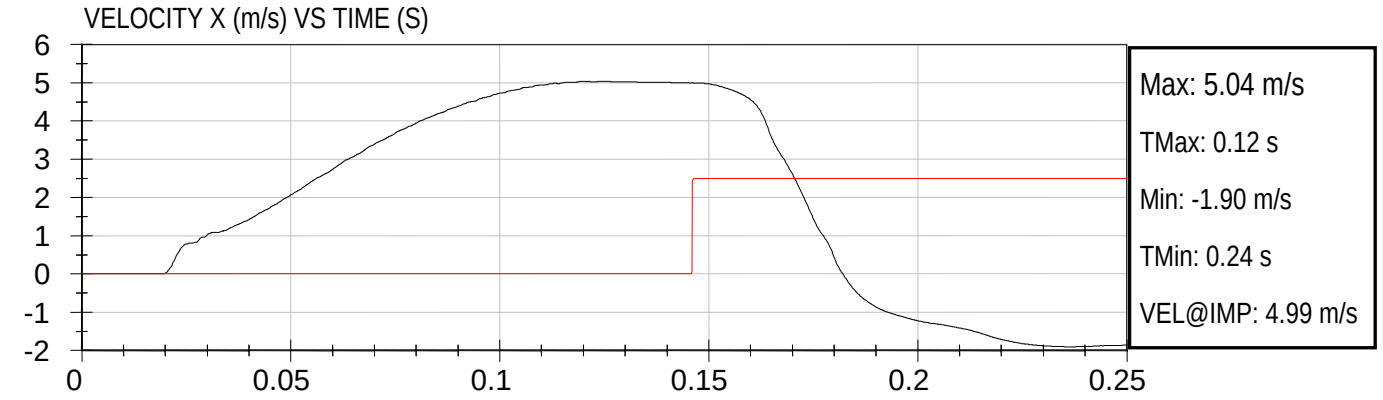


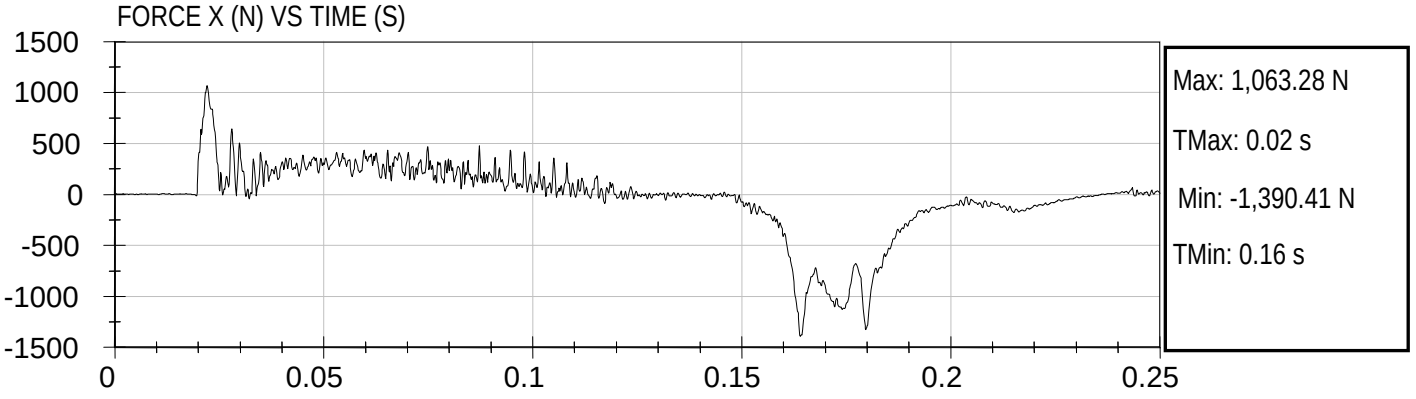


FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Starcraft Quest
Location: S8K2 speed trap: 4.890 m/s

Test Date: 4-26-2011
NHTSA #: CB0902



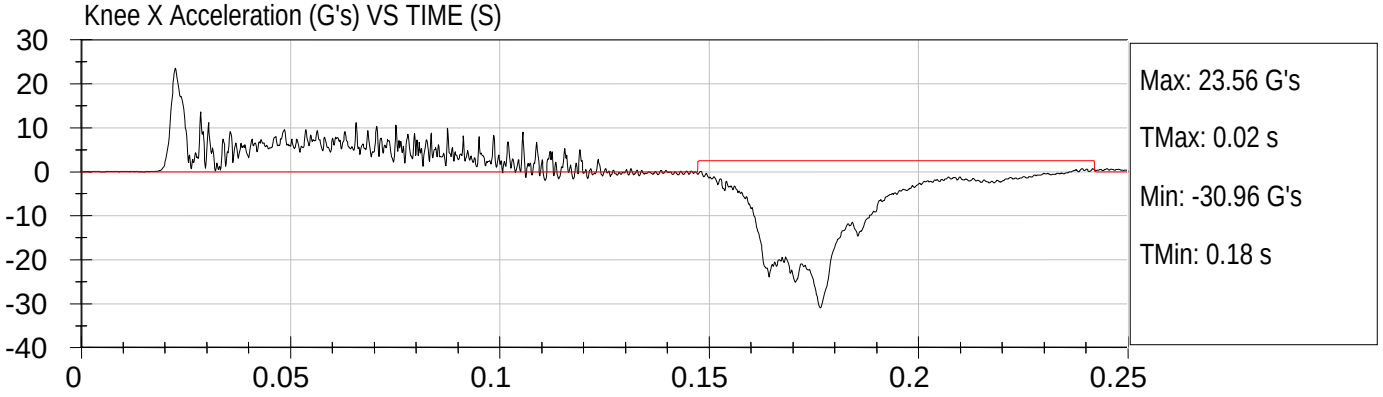




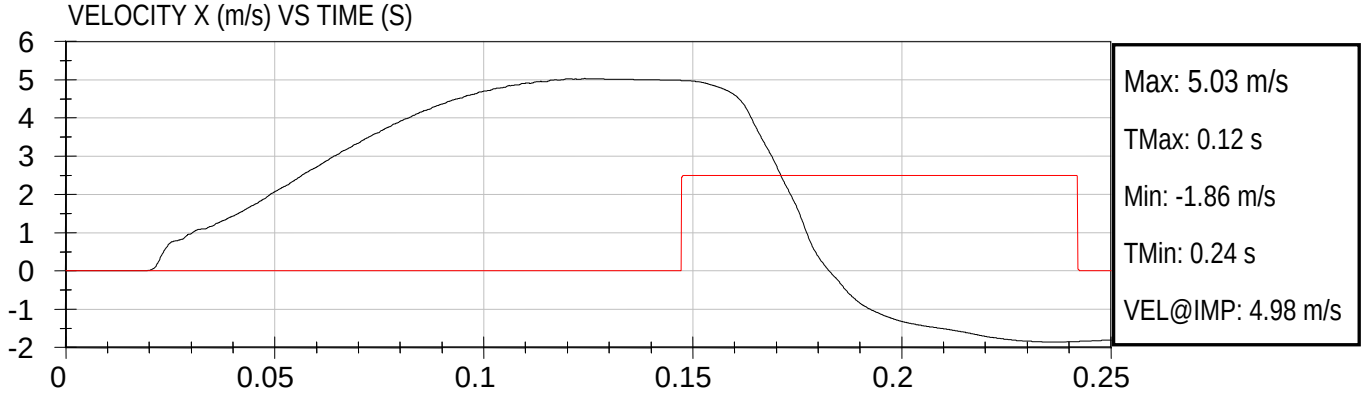
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Starcraft Quest
Location: S8K3 speed trap: 4.890 m/s

Test Date: 4-26-2011
NHTSA #: CB0902

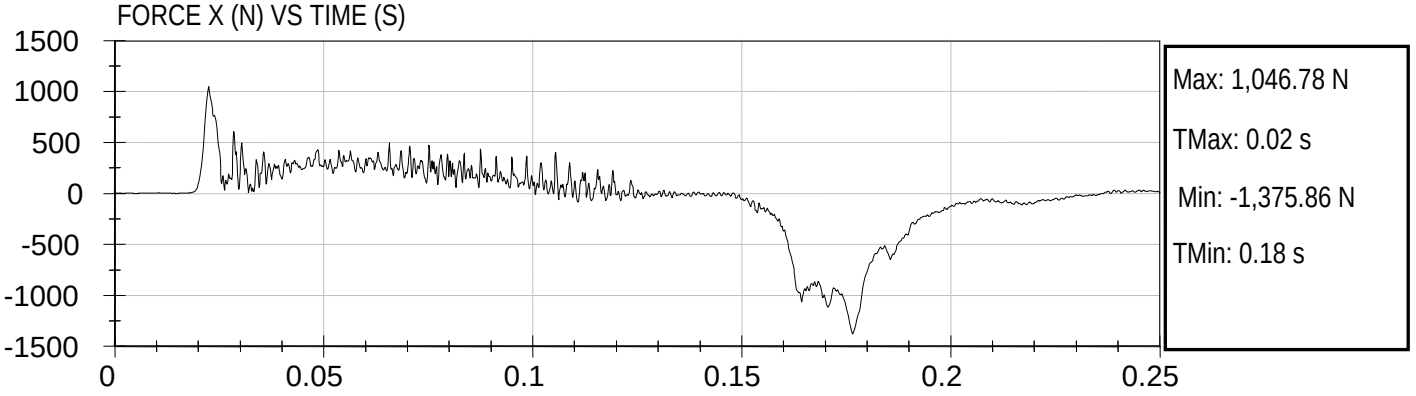
Knee X Acceleration (G's) VS TIME (S)



VELOCITY X (m/s) VS TIME (S)



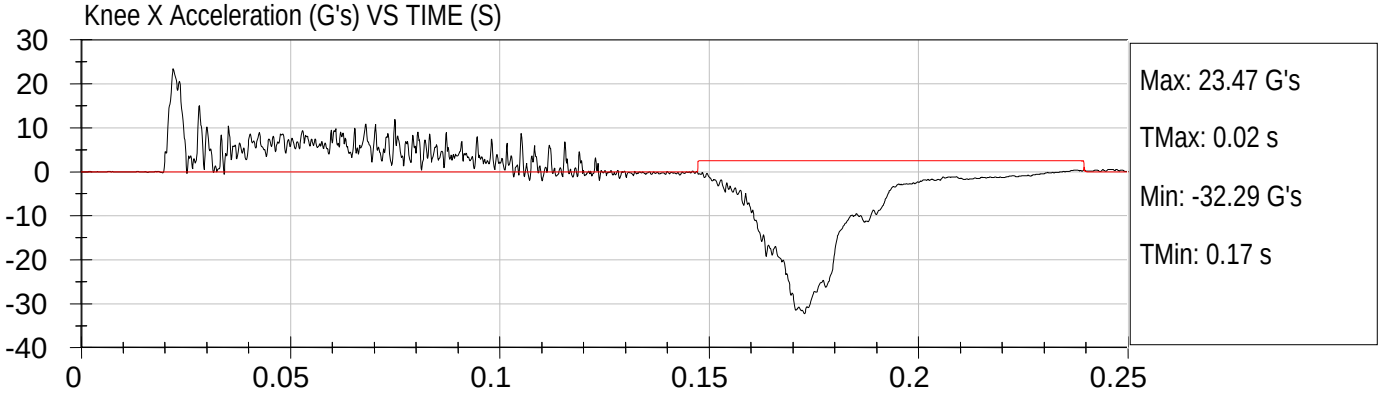
FORCE X (N) VS TIME (S)



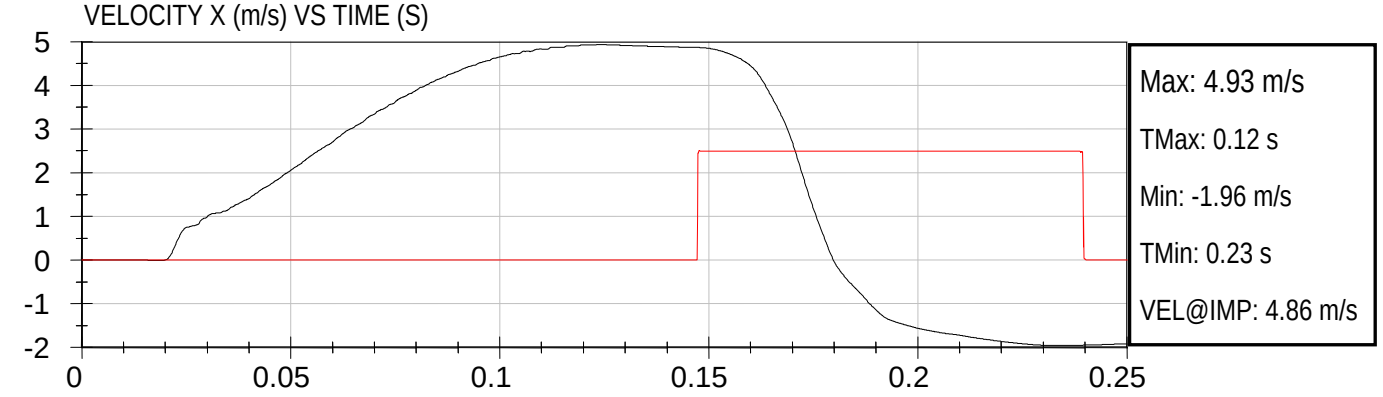
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Starcraft Quest
Location: S8K4 speed trap: 4.892 m/s

Test Date: 4-26-2011
NHTSA #: CB0902

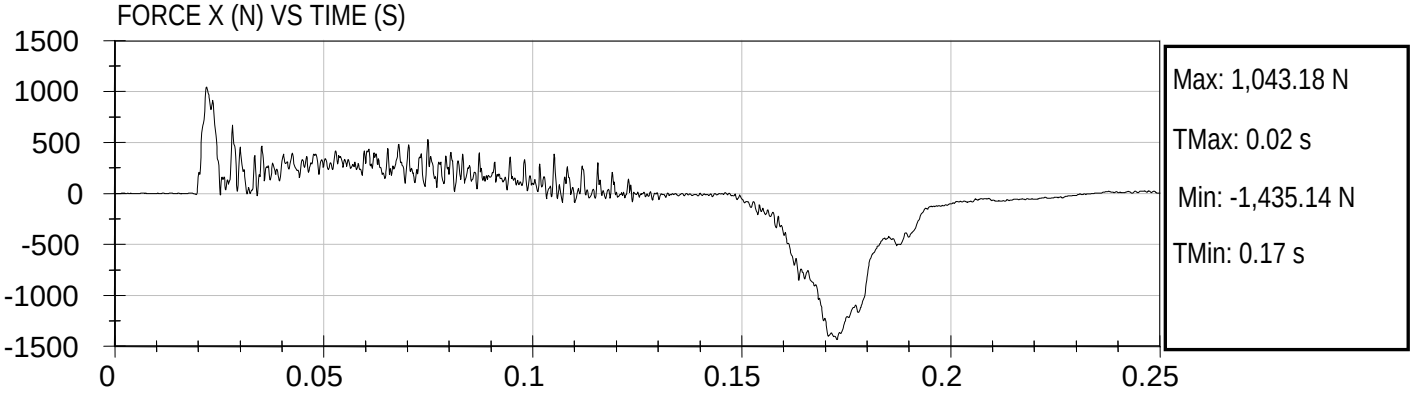
Knee X Acceleration (G's) VS TIME (S)



VELOCITY X (m/s) VS TIME (S)

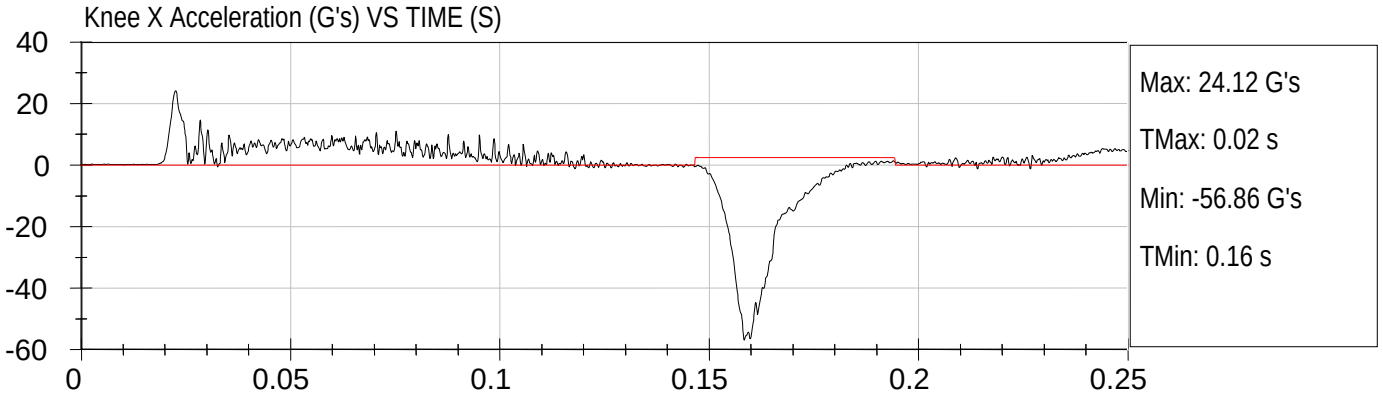


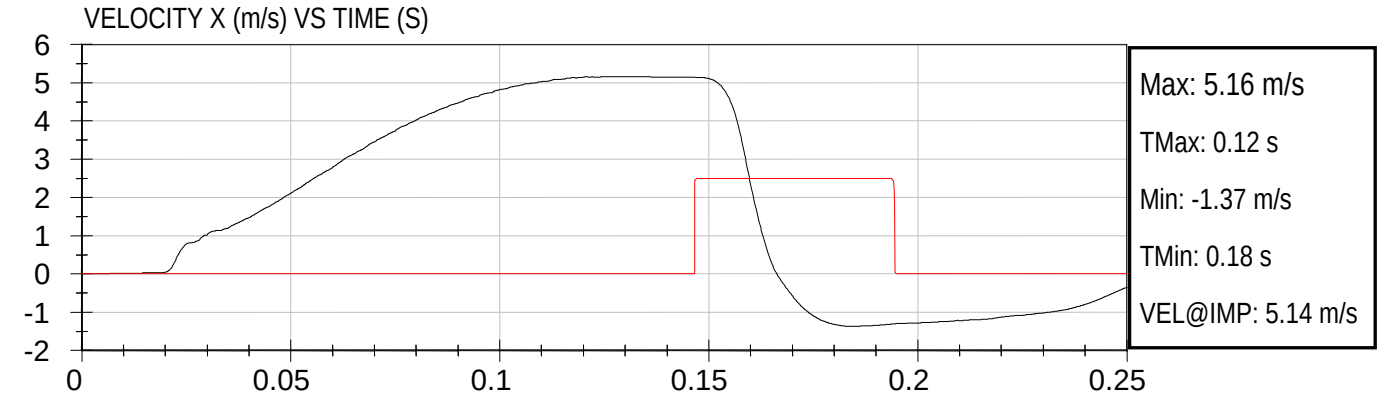
FORCE X (N) VS TIME (S)

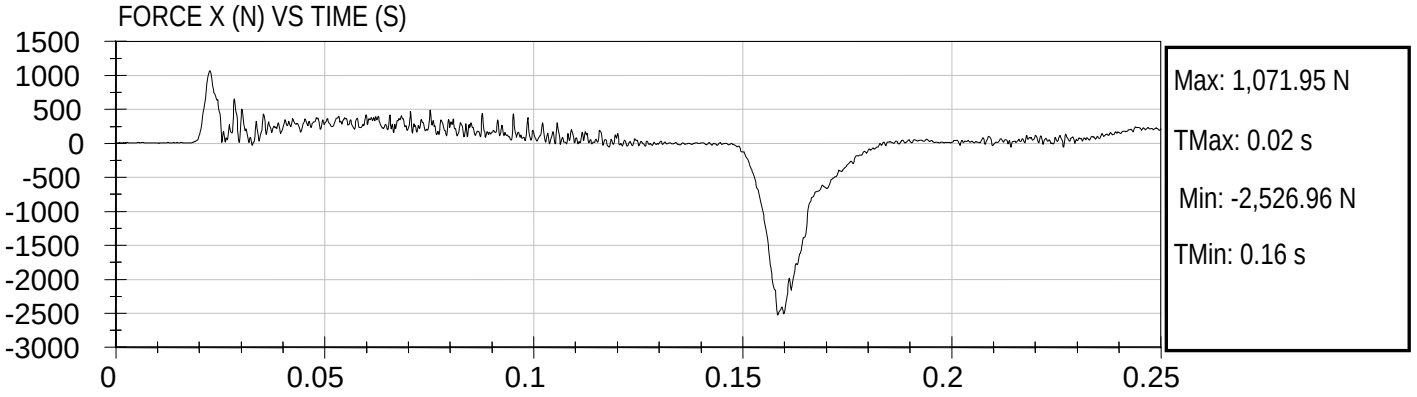


FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Starcraft Quest
Location: S8K5 speed trap: 4.823 m/s

Test Date: 4-26-2011
NHTSA #: CB0902



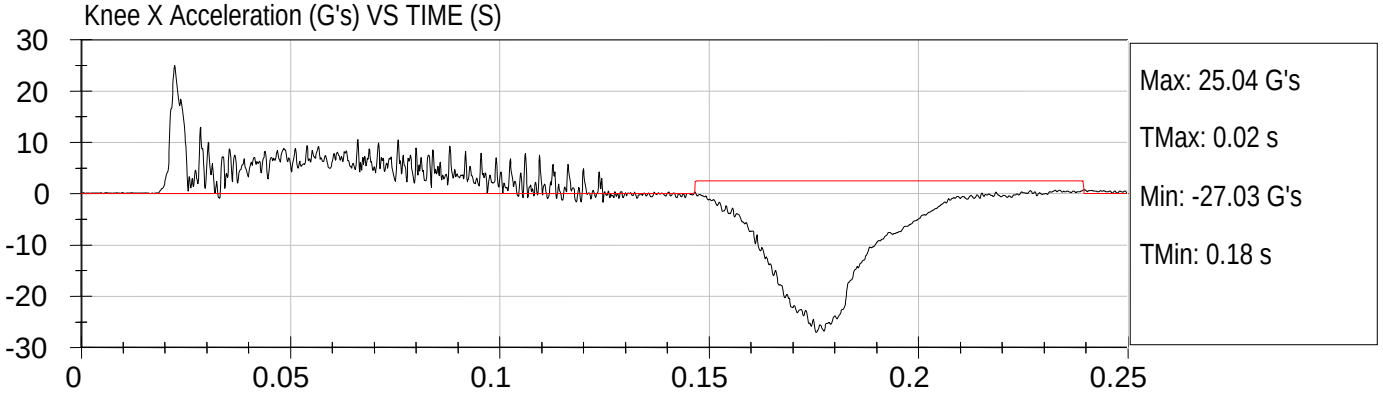




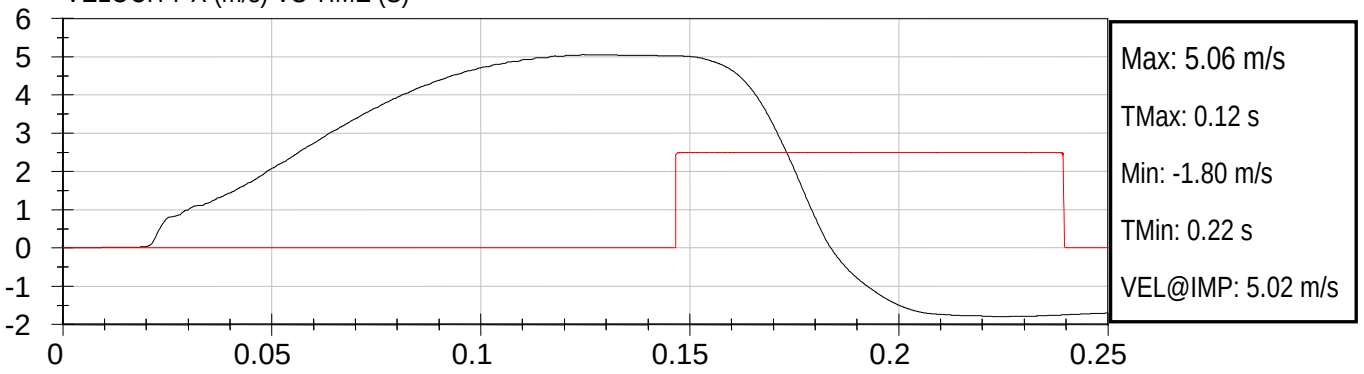
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Starcraft Quest
Location: S8K6 speed trap: 4.851 m/s

Test Date: 4-26-2011
NHTSA #: CB0902

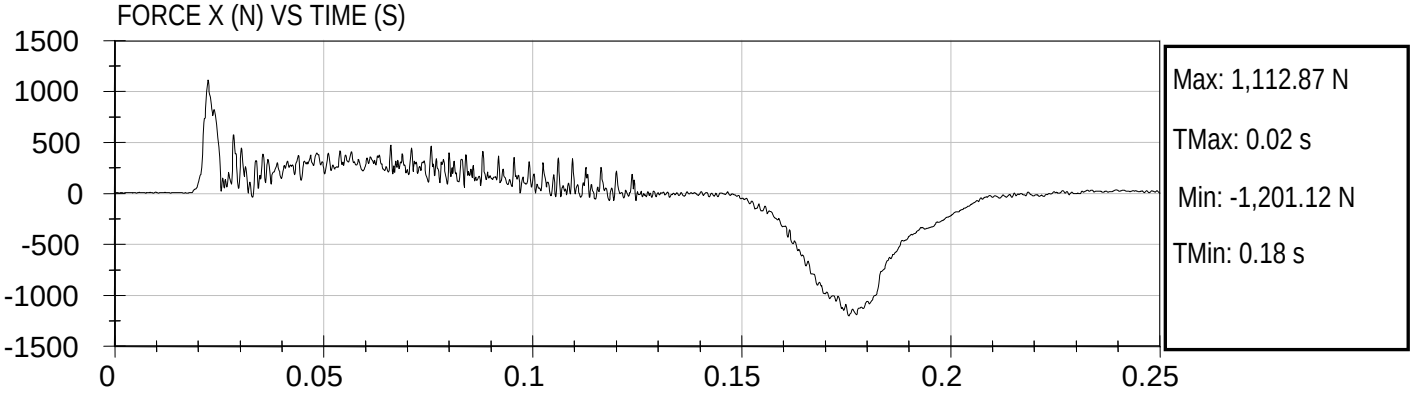
Knee X Acceleration (G's) VS TIME (S)



VELOCITY X (m/s) VS TIME (S)

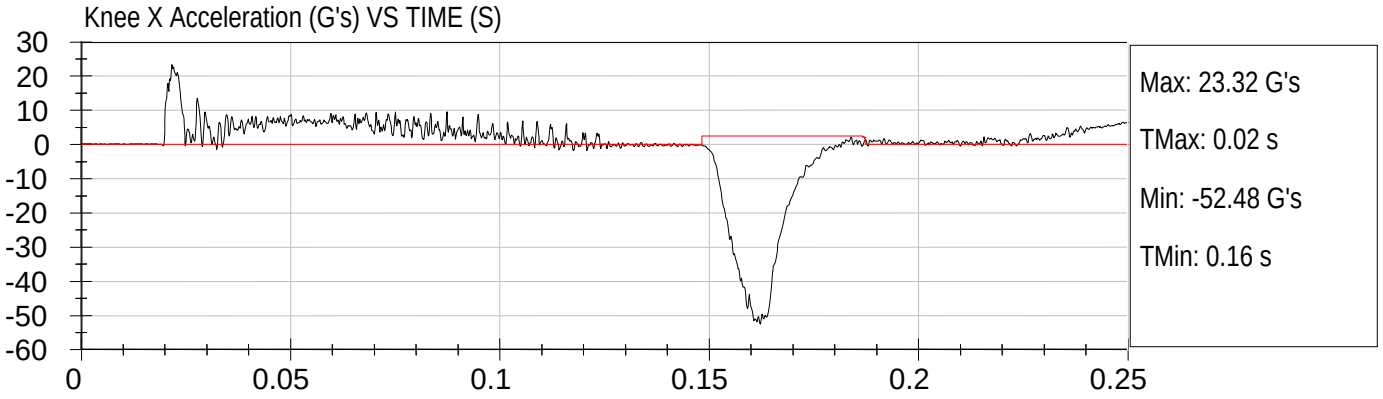


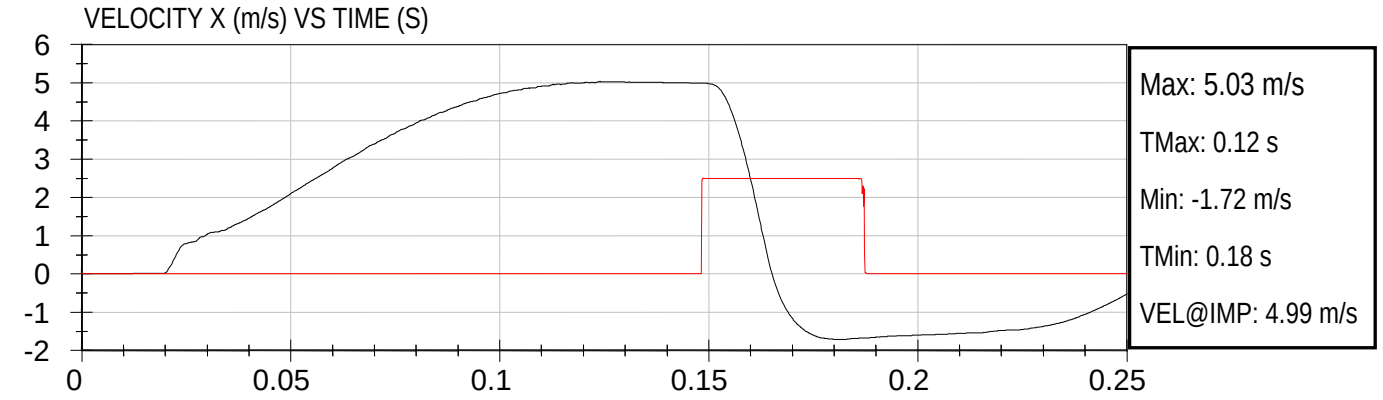
FORCE X (N) VS TIME (S)

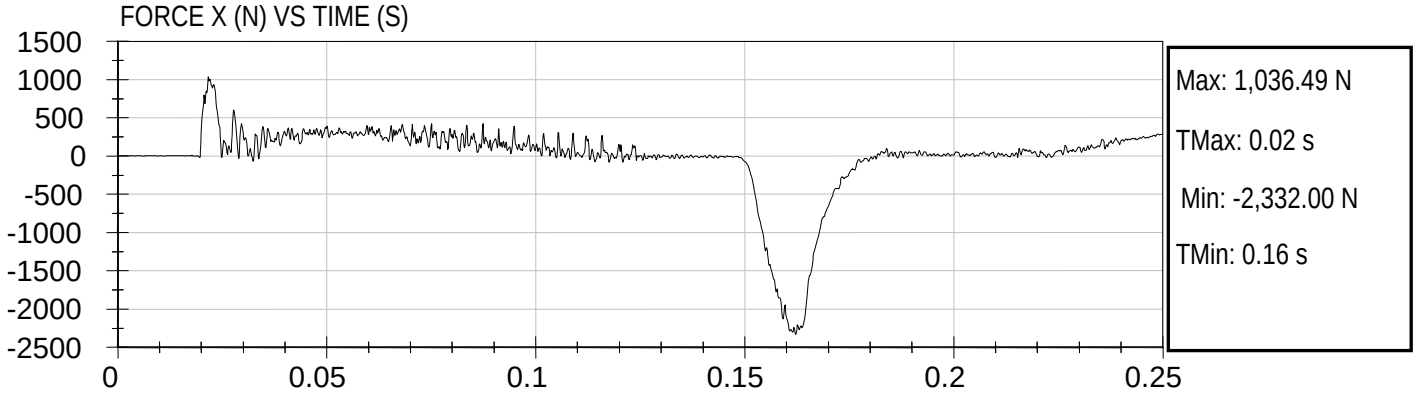


FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Starcraft Quest
Location: S8K7 speed trap: 4.856 m/s

Test Date: 4-26-2011
NHTSA #: CB0902



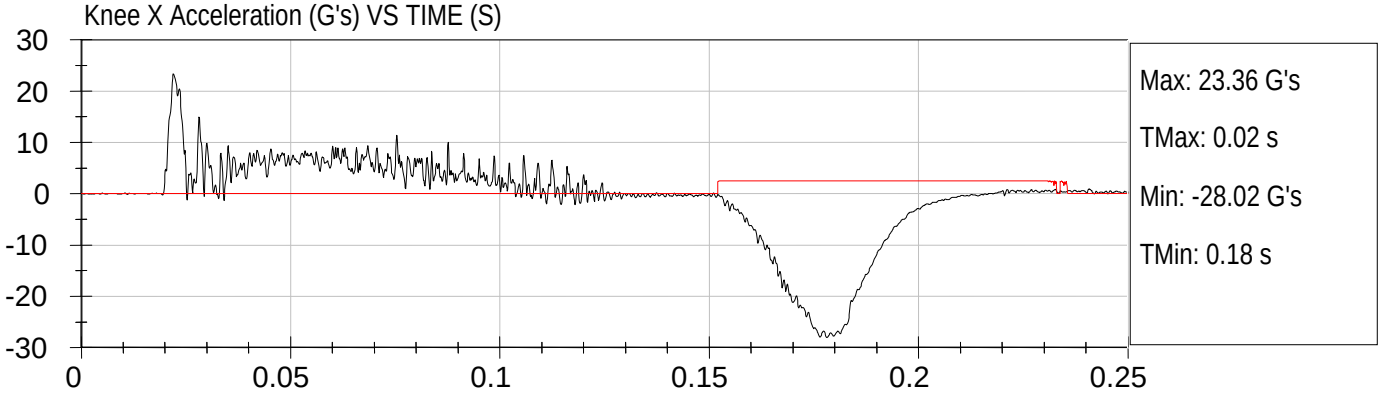




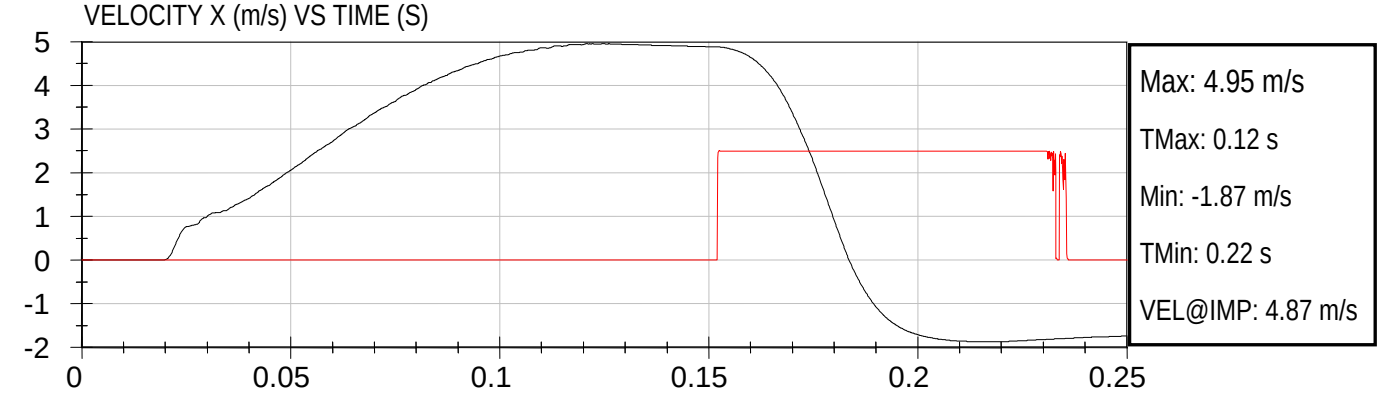
FMVSS 222 KNEE FORM IMPACTS
Component ID: 2011 Starcraft Quest
Location: S8K8 speed trap: 4.837 m/s

Test Date: 4-26-2011
NHTSA #: CB0902

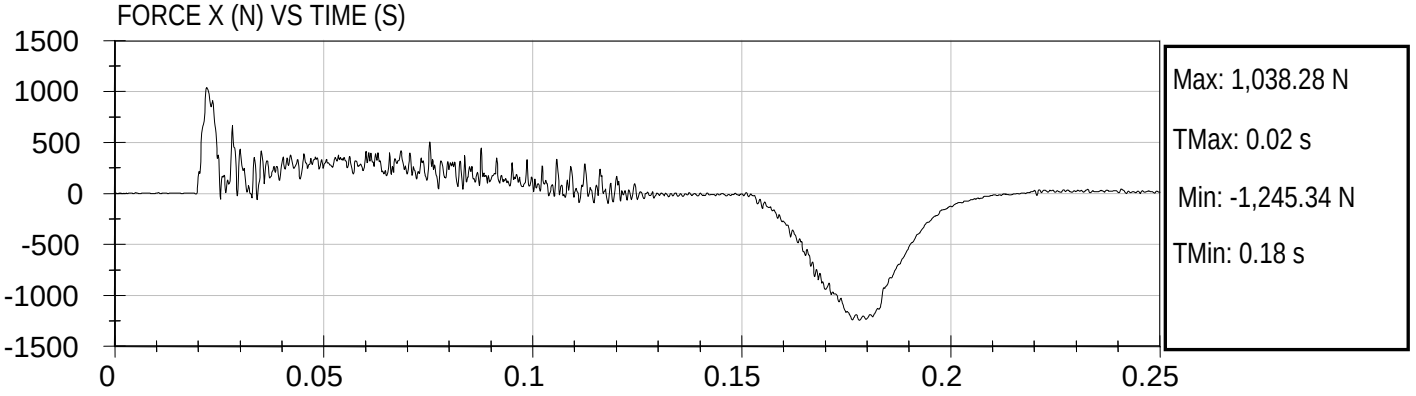
Knee X Acceleration (G's) VS TIME (S)



VELOCITY X (m/s) VS TIME (S)



FORCE X (N) VS TIME (S)

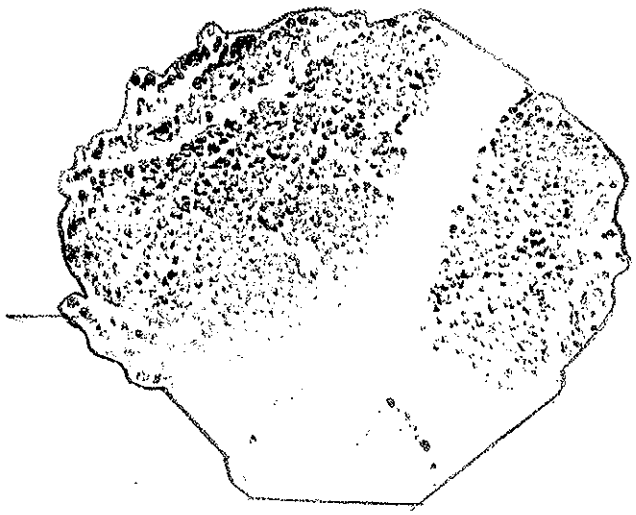


SECTION 7
WELT CONTACT POINTS

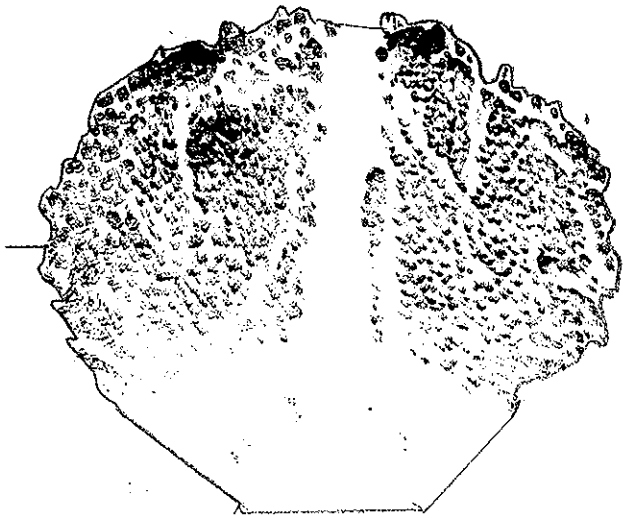
CB0902
4-19-2011
S3H1

4130 mm2

CB090a
4-20-2011
53HJ
3870 mm²

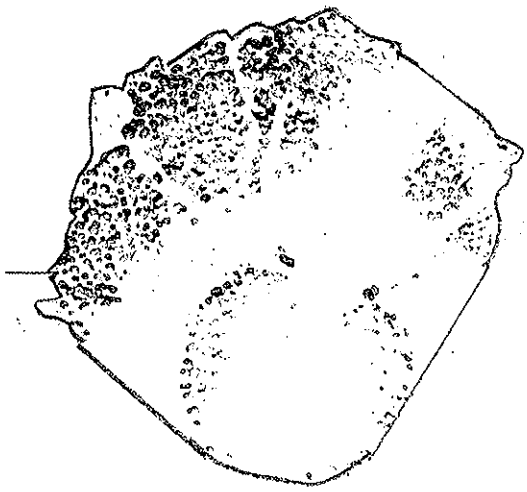


CB0902
4-20-2011
53H3
3640 mm²

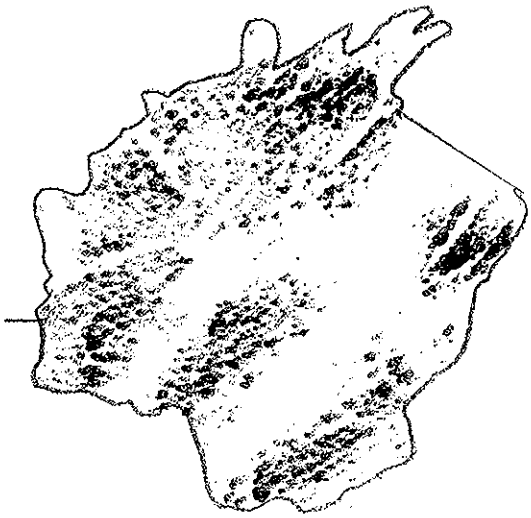


CB0902
4-20-2011
53 H4
3830 mm²

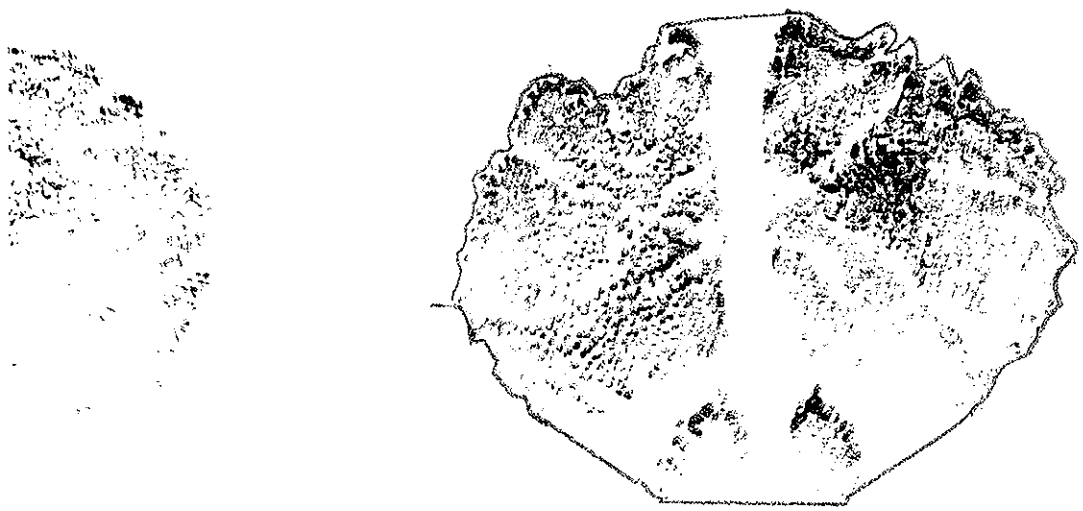
CB0902
4-20-2011
S3H5
4400 mm2



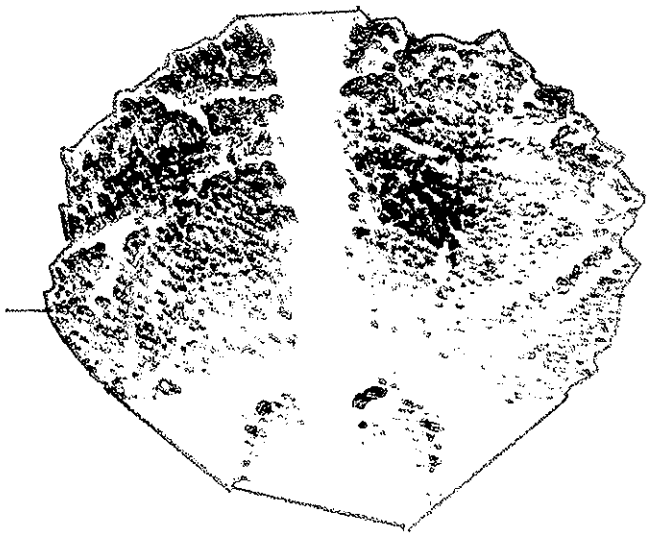
CB0902
4-20-2011
5346
2640 mm²



CB0902
4-20-2011
53 H7
2680 mm²

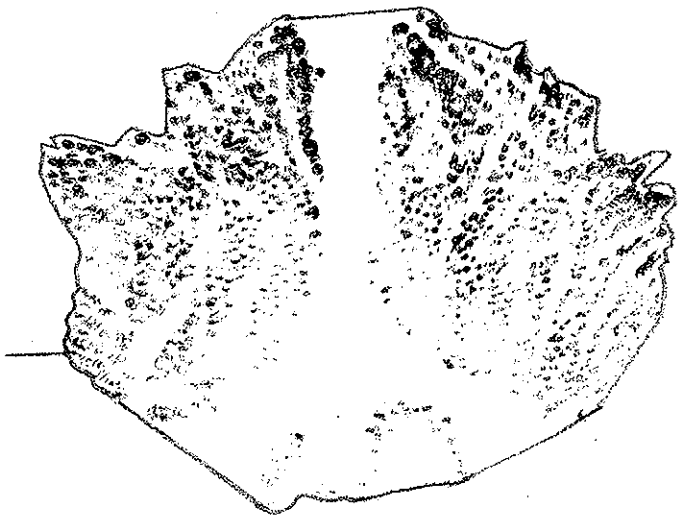


CB09Ø2
4-21-2011
58H1
3940 mm

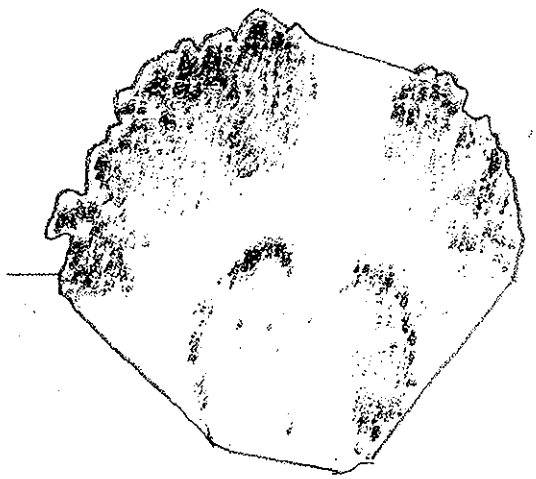


CB0902
4-29-2011
58H2

3950 MM2

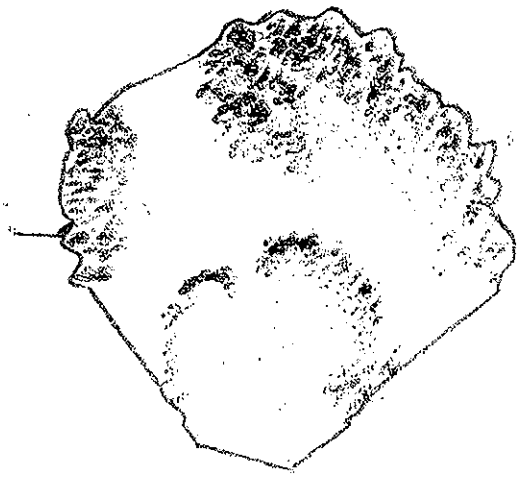


CBG902
4-24-2011
S8H3
3980 MM2



CB0902
4-24-2011
S8 44

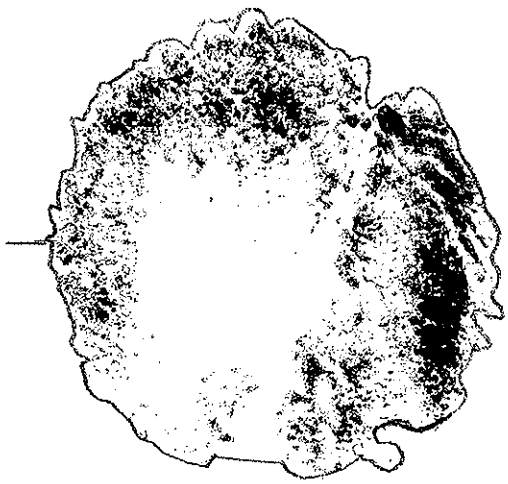
25-30 mm²



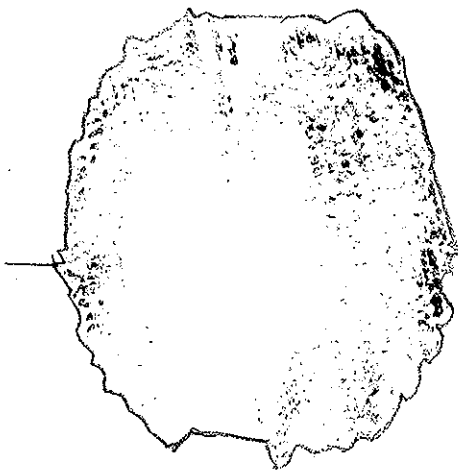
CB0902
4-25-2011
S8 H5
2480 mm²

CB0902
4-24-2011
SB H6

2660 mm²

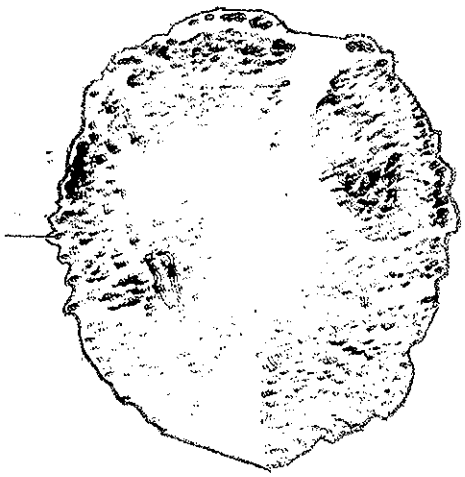


CBO903
4-19-2011
53 KI
27.10
mm²

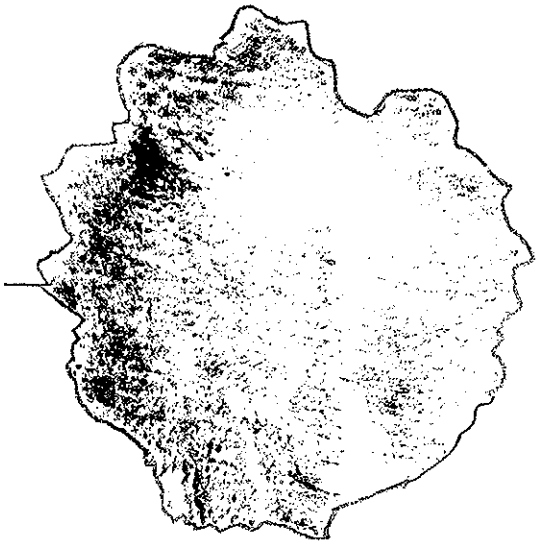


CB3902
4-19-2911
S3 E2

2430 mm²

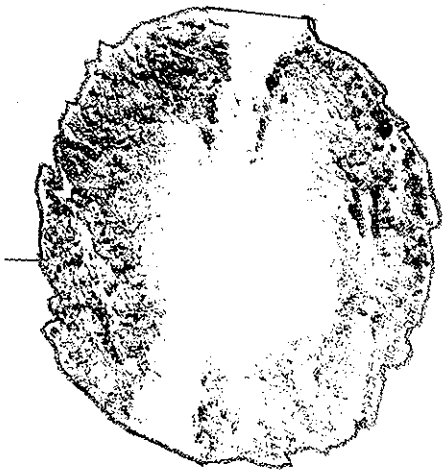


CB0902
4-19-2011
S3K3
2430mm2

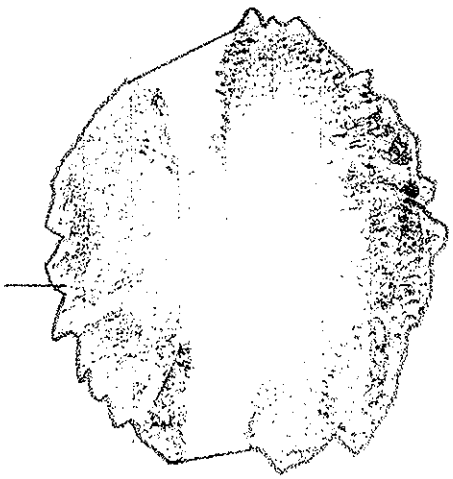


CB0902
4-19-2011
53K4

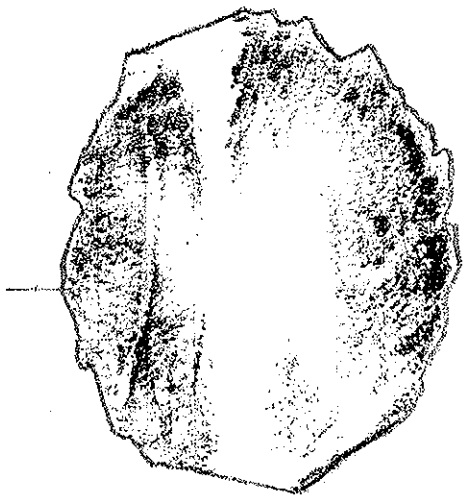
3070 mm2



CB0902
4-26-2011
SBKI
2470 MM2

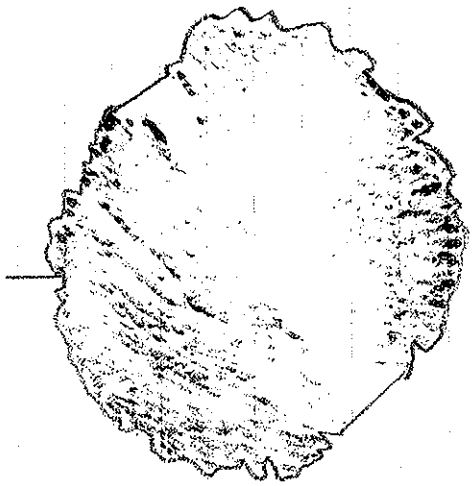


CB0902
4-26-2011
S8 K2
230 mm2



CB0902
4-26-2011
SB K3

2500 mm²

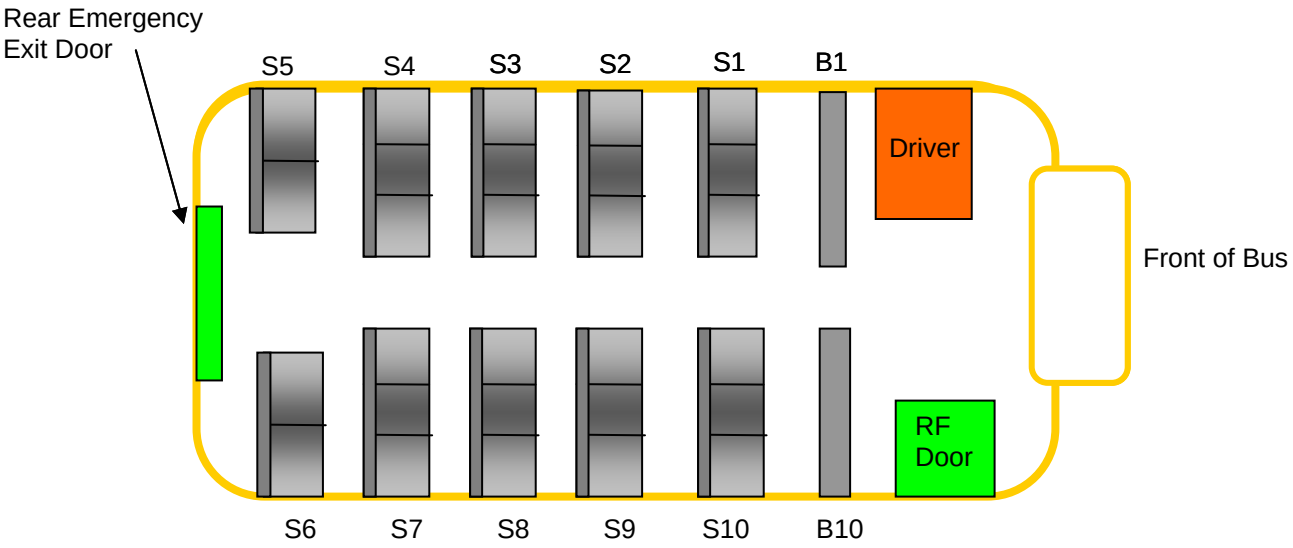


CBΦ9Φ2
4-26-2011
S8 K4

2460 mm²

SECTION 8

BUS FLOOR PLAN



SECTION 9

LABORATORY NOTICE OF TEST FAILURE

LABORATORY NOTICE OF TEST FAILURE TO OVSC

Test Procedure:	FMVSS 222
Test Vehicle:	2011 Starcraft Quest Bus
NHTSA No.:	CB0902
Contract No.:	DTNH22-08-D-00075
Manufacturer.:	Forest River, Inc.
Manufacture Date:	11/10
Test Date:	07/05/11
Test Lab:	MGA Research Corp.
Project Engineer:	Eric Peschman
Delivery Order No.:	1
VIN:	1GB3G3BG2B1112157

TEST FAILURE DESCRIPTION

During the rearward seat back force deflection test for Seat No. S4, the test article failed to absorb 948 joules (316W joules) of energy before it reached the displacement limit of 254 mm. The total energy absorbed was 820 Joules.

FMVSS REQUIREMENTS DESCRIPTION

Paragraph S5.1.4 *Seat performance rearward.* When a school bus passenger seat that has another seat behind it is subjected to the application of force as specified in S5.1.4.1 and S5.1.4.2:

(b) Seat back deflection shall not exceed 254 mm; (for determination of (a) and (b) the force/deflection curve describes only the force applied through the loading bar, and only the rearward travel of the pivot attachment point of the loading bar, measured from the point at which the initial application of 222 N is attained.

S5.1.4.2 Apply additional force horizontally rearward through the loading bar until 316W joules (J) of energy has been absorbed in deflecting the seat back.

Remarks: No remarks.

Notification to NHTSA (COTR): Lawrence Valvo

Date: 07/05/11

By: