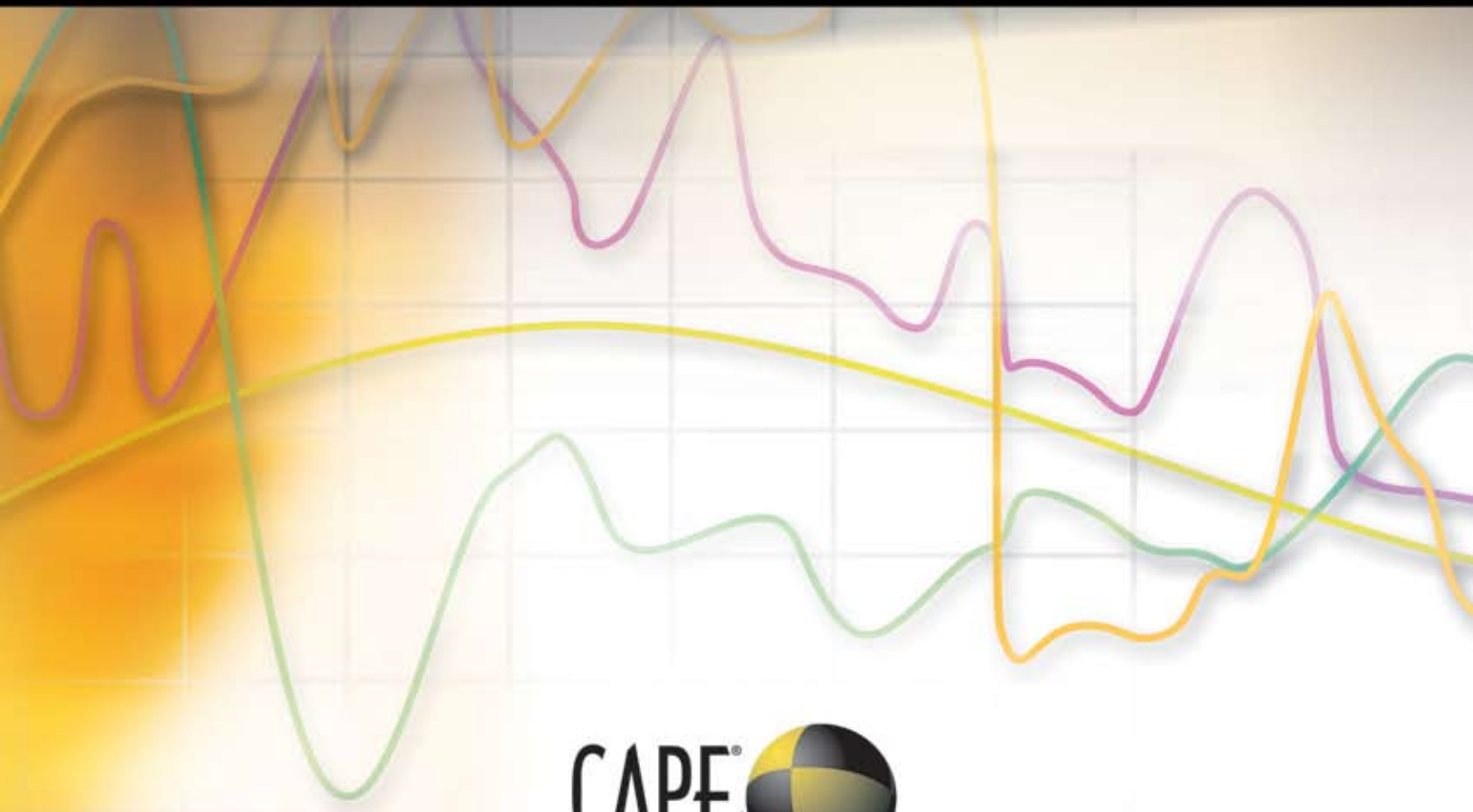




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Test Report

Location of Test Laboratory:

Center for Advanced Product Evaluation
18881 IMMI Way
Westfield, IN 46074-1020
317-896-9531 phone
317-867-2305 fax
www.capetesting.com

CAPE Test Request Number:

CTR11780

Test Subject:

Medix Specialty Vehicles Ambulance Modules

Test Methods Used:

SAE J3057, Ambulance Modular Body Evaluation-Quasi-Static Loading For Type I and Type III Modular Ambulance Bodies

Receipt of Test Items Date:

June 19, 2017

Test Date:

June 26, 2017

Customer:

Medix Specialty Vehicles

Report Approved By:
Ryan Hoover

CAPE Technical Director

Report Prepared By:
Seth Biddle

CAPE Test Engineer



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Appendix A

Test Matrix
Test Results

Appendix B

Pre Test Photographs
Data Plots
Post Test Photographs



CTR11780 Test Report

Purpose

The purpose of this test series is to evaluate the crush resistance, operation of doors, and body mount-to-frame connections of the Medix Specialty Vehicles ambulance type III modules to SAE J3057₁ specifications.

Procedure

Dynamic Preload and Quasi-Static Roof Strength

SAE J3057 requires a platen to impact the vehicle. The platen used for the test series was manufactured as a specialty cart, with a rigid vertical steel platen fastened to the front of the vehicle.

The total weight of the cart with platen is 14,530 lbs. Table 1, Dynamic Impact Target Values summarizes the target energy values for the dynamic tests.

The quasi-static roof strength portion of SAE J3057 for test 002 was performed by using a four post hydraulically controlled load platen with load cells and LVDT. The platen was lowered to a force two and a half times the curb weight for the vehicle and brought back to curb weight at which time the doors are tested to ensure they will open. The curb weights and target loads are listed in table 2.

Table 1, Dynamic Impact Target Values

Test	Module	Target speed of cart at impact [kph (mph)]	Kinetic energy of cart at impact [J (ft-lbf)]
001	Medix 170 M2 Type III	12.2 (7.6)	37,965 (28,000)

Table 2, Vehicle Curb Weights and Target Loads

Test	Module	Curb Weight [kg (lbf)]	Target Load [N (lbf)]
002	Medix 170 M2 Type III	6,230 (13,735)	152,743 (34,338)

Pre-test and post-test photographs were taken to document the test set-up and the condition of the cabs. The pre-test and post-test photographs may be found in the appendices of the test report.

CAPE instrumentation systems and post-processing software follow SAE J2114 performance requirements and SAE J1733₅ coordinate systems. Standard calculations and numerical methods for processing safety test instrumentation data acquired during impact tests with instruments installed in



CTR11780 Test Report

ATD's, vehicle structures and laboratory fixtures are processed following SAE J1727₆. The test data plots may be found in the appendices of the test report. Off-board high-speed digital imagers were set up to capture the impact event of each sled run. The video files are included with the electronic test report.

Test Requirements

Table 3, Performance Criteria

Item	Description
1	For the dynamic pre-load phase of the test, the minimum energy level is 37965 Joules (28000 ft-lbf).
2	The Modular Body must remain attached to the Simulated Frame Rails through at least two Body Mounts, with at least one Body Mount attached on each Simulated Frame Rail, through both phases of testing (dynamic and quasi-static roof crush)
3	The test floor fixture used in the dynamic test remained at 20 +/-1 degrees post-test
4	All doors remained latched during each phase of testing (dynamic, quasi-static roof crush).
5	Verify that the maximum measured vertical displacement at any one or more of the four indicated reference points in the Modular Body did not exceed 130 mm (5.125 in).
6	Verify that all entry doors were able to be opened as per 5.8.5.2 and 6.8.9.



CTR11780 Test Report

References

1. SAE J3057, Ambulance Modular Body Evaluation-Quasi-Static Loading For Type I and Type III Modular Ambulance Bodies, February 2017
2. SAE J211-1, Instrumentation for Impact Testing – Part 1 – Electronic Instrumentation, 03/2014
3. SAE J1733, Sign Convention for Vehicle Crash Testing, November 2007
4. SAE J1727, Calculation Guidelines for Impact Testing, Feb 2015

Multimedia Overview

Included with this test report are folders containing the report text, data plots, test photographs, and test video. The electronic data is broken into the following folders: report, data, photos-pre, photos-post and video. The report is in adobe .PDF format. The data plots are stored in the data folder in .pdf format. The photographs are in their respective folders of photos-pre and photos-post. The photographs are in .jpg format. The test video is located in the Video folder. The video files may be viewed using any media player.

Contact

Ryan Hoover (317) 867-8389
CAPE Technical Director

John Porter (317) 867-8440
Operations Manager

Jennifer Wylor (317) 867-8225
Administrative Assistant



CTR11780 Appendix A



CTR11780 Test Matrix

18881 IMMI Way
 Westfield, IN 46074-1020
 317-896-9531 phone
 317-867-2305 fax

Test Number:	CTR11780	Test Date:	6/26/2017
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Customer:	Medix Specialty Vehicles	Test Results: Graphs, pre, and post-test photographs may be found in the accompanying sheets.
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Test Matrix

Test #	Module	Test	Platen Weight [lbs]	Cart Speed [mph]	Curb Weight [lbs]	Notes
001	Medix 170 M2 Type III	Dynamic Pre-Load	14,530	7.6	NA	
002	Medix 170 M2 Type III	Quasi-Static	NA	NA	13,735	



CTR11780 Test Results

18881 IMMI Way
 Westfield, IN 46074-1020
 317-896-9531 phone
 317-867-2305 fax

Test Number:	CTR11780	Test Date:	6/26/2017
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Customer:	Medix Specialty Vehicles	Test Results: Graphs, pre, and post-test photographs may be found in the accompanying sheets.
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Test Results

Test #	Module	Test	Energy >37,965 J	Body Maintained Mounting	Fixture Remained at 20 degrees	Doors Remain Latched	Displacement < 5.125 inch	Doors Able to be Opened
001	Medix 170 M2 Type III	Dynamic Pre-Load	Yes	Yes	Yes	Yes	N/A	Yes
002	Medix 170 M2 Type III	Quasi-Static	N/A	Yes	N/A	Yes	Yes	Yes



CTR11780

CTR11780 Appendix B



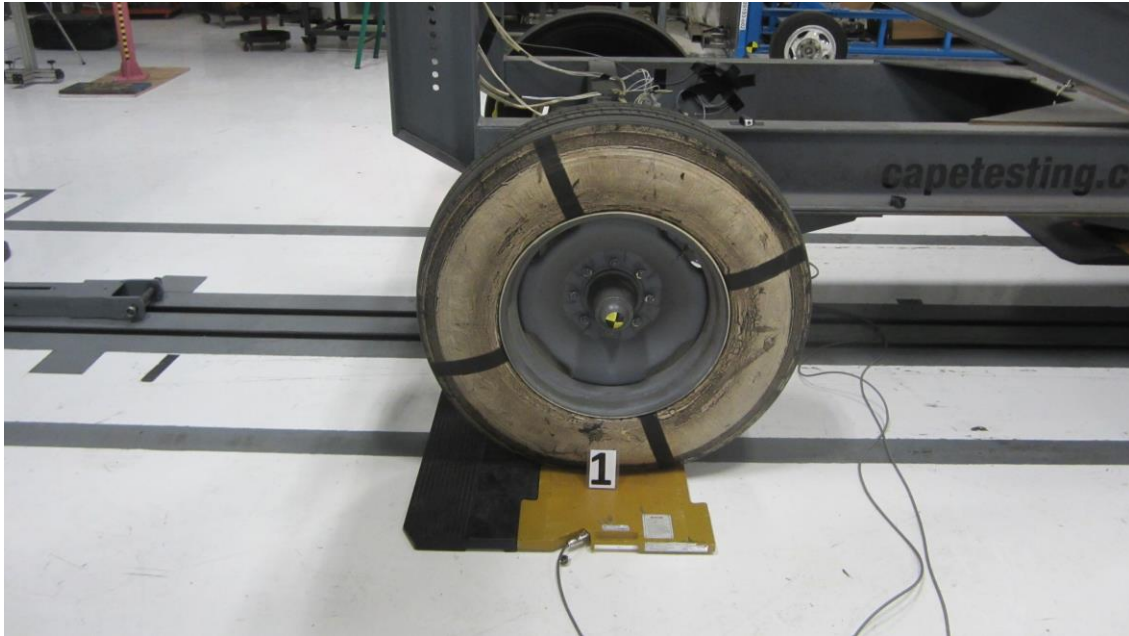
CTR11780-001 Pre-Test Photographs

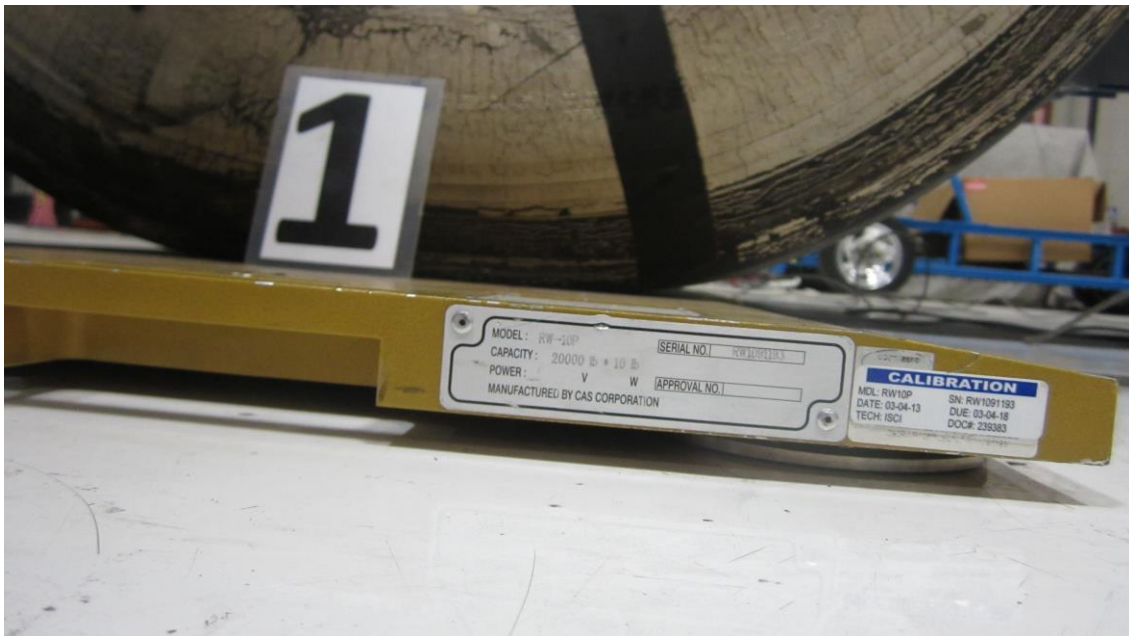


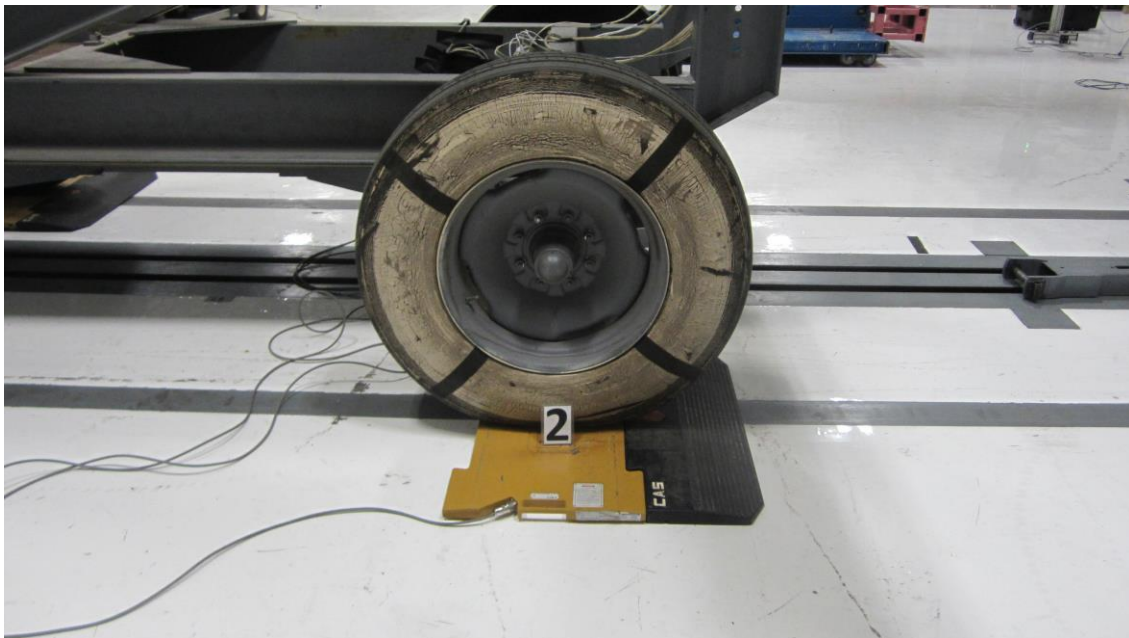
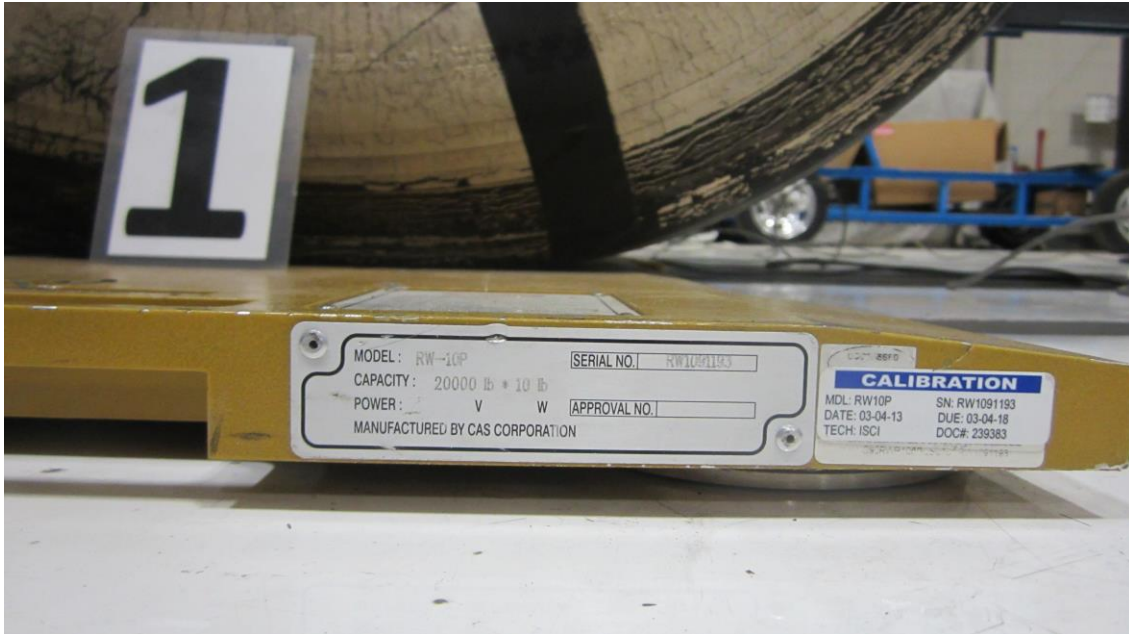




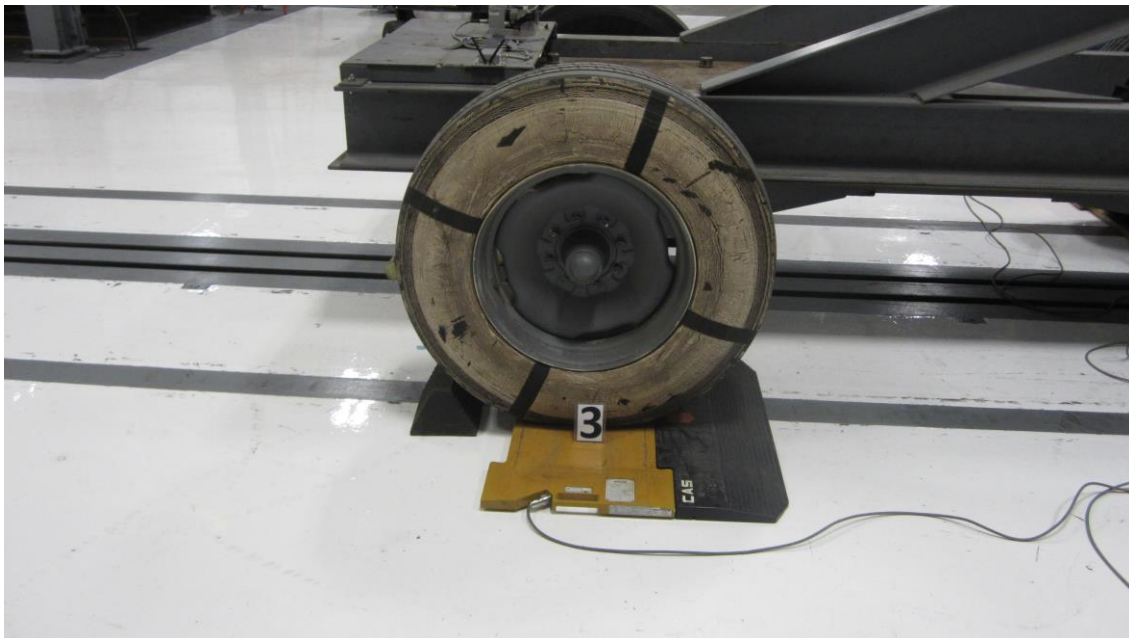




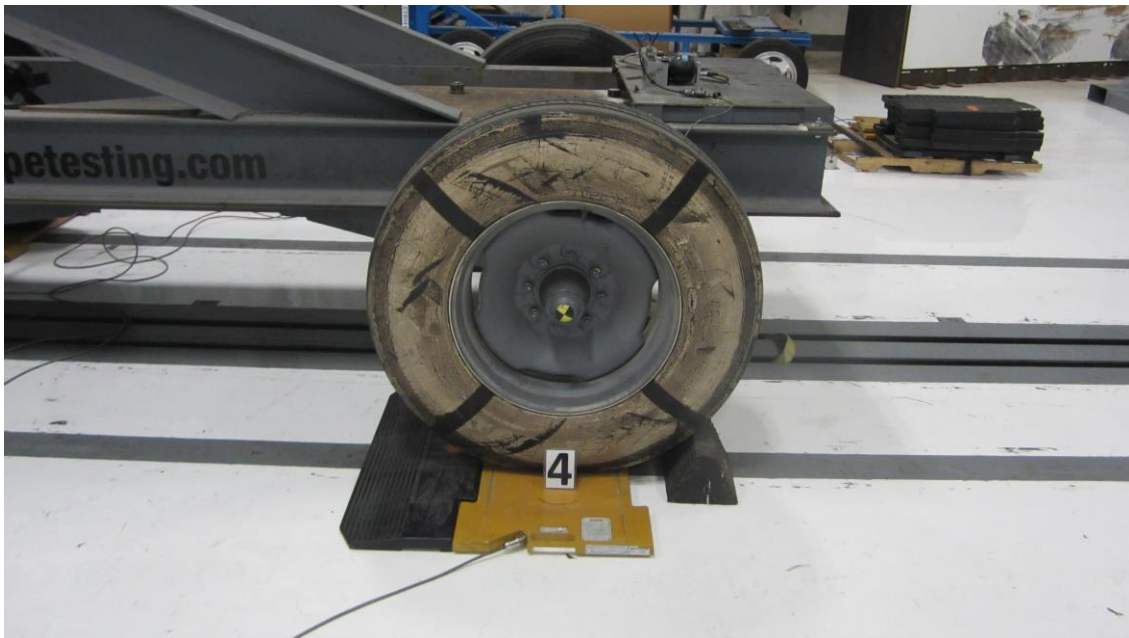




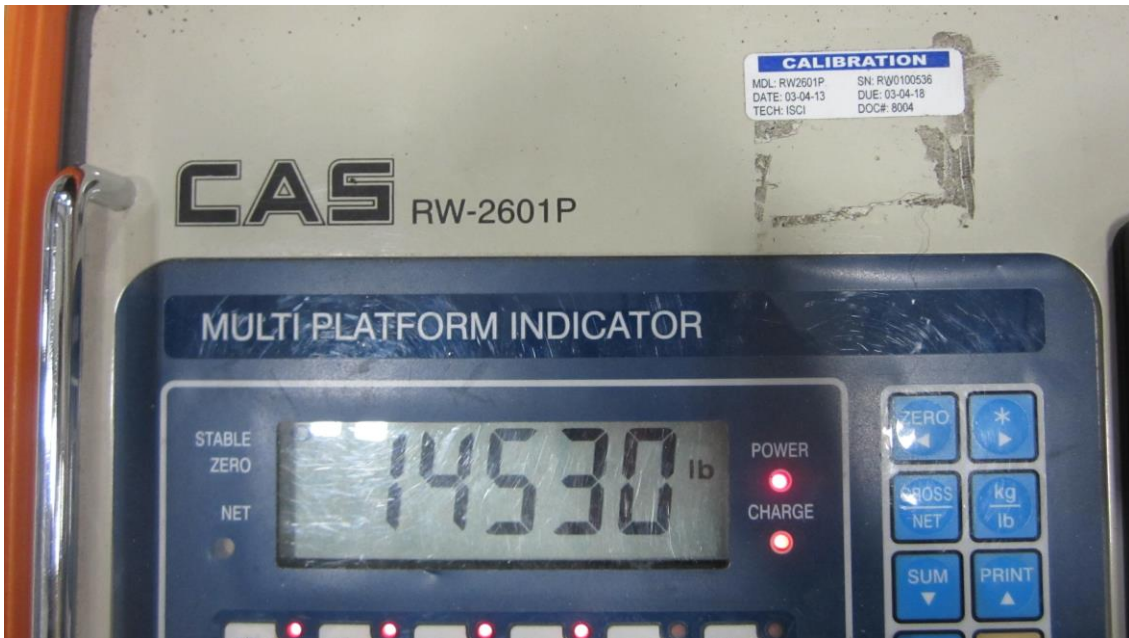






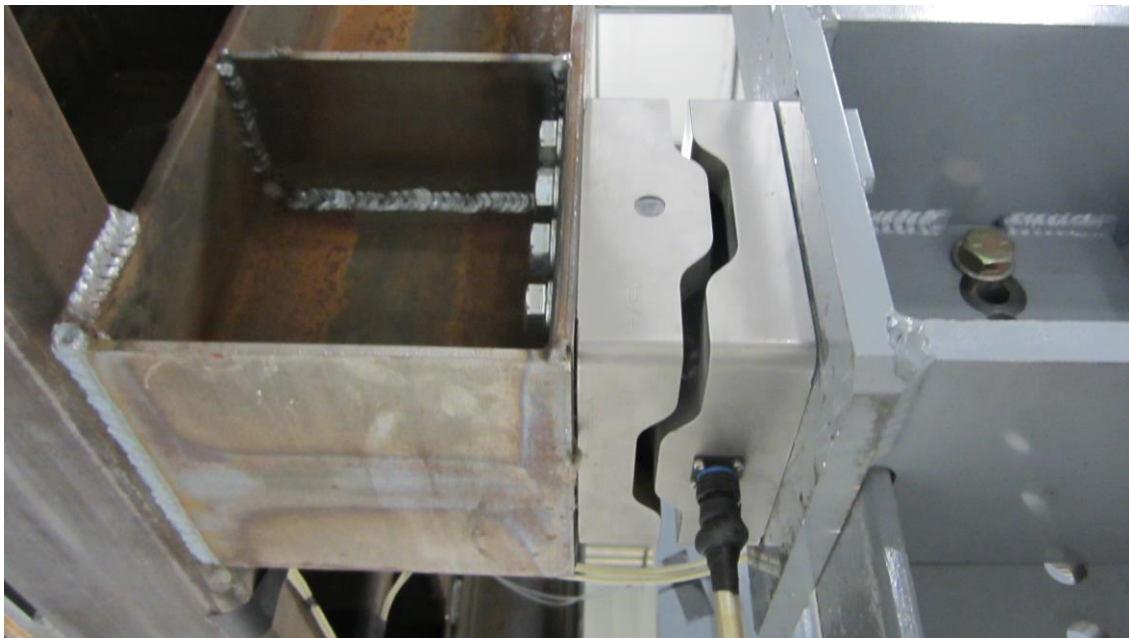


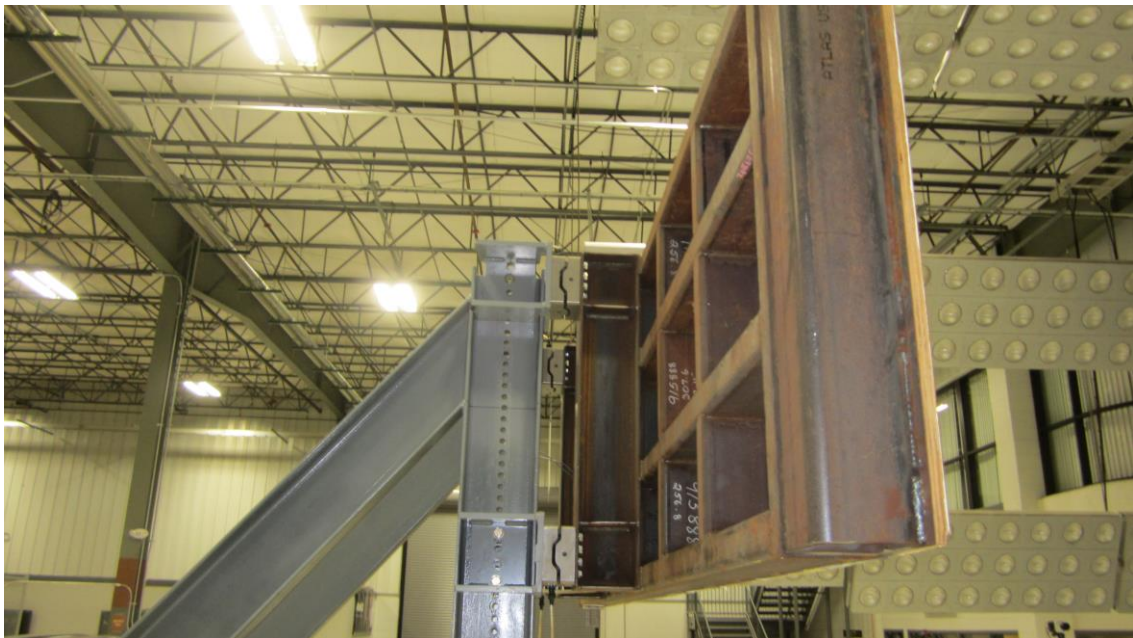




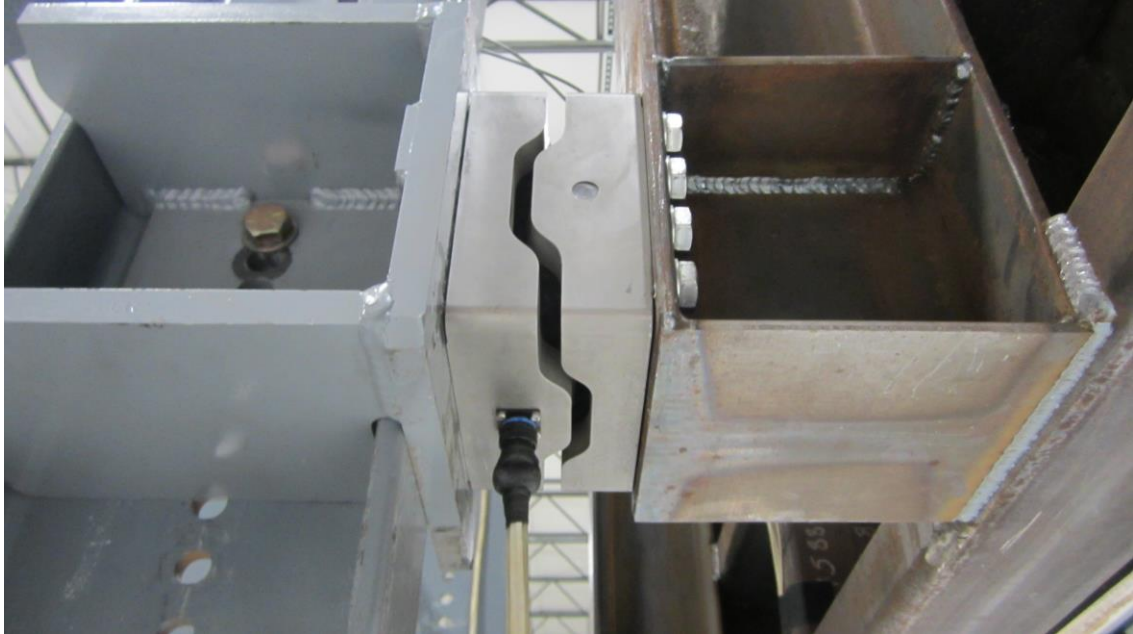






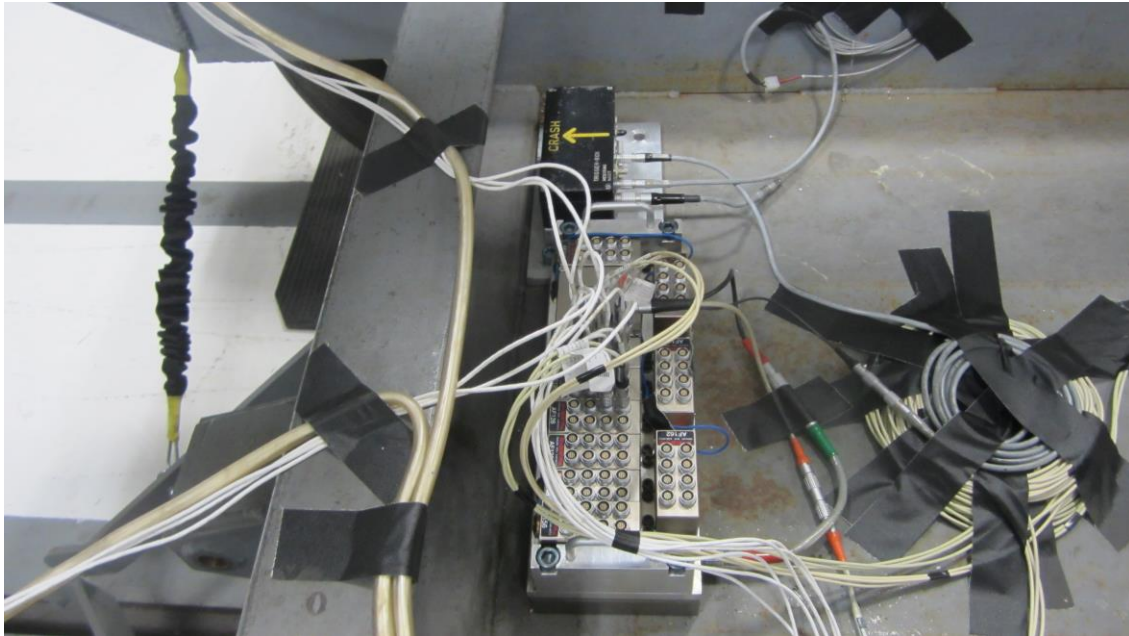






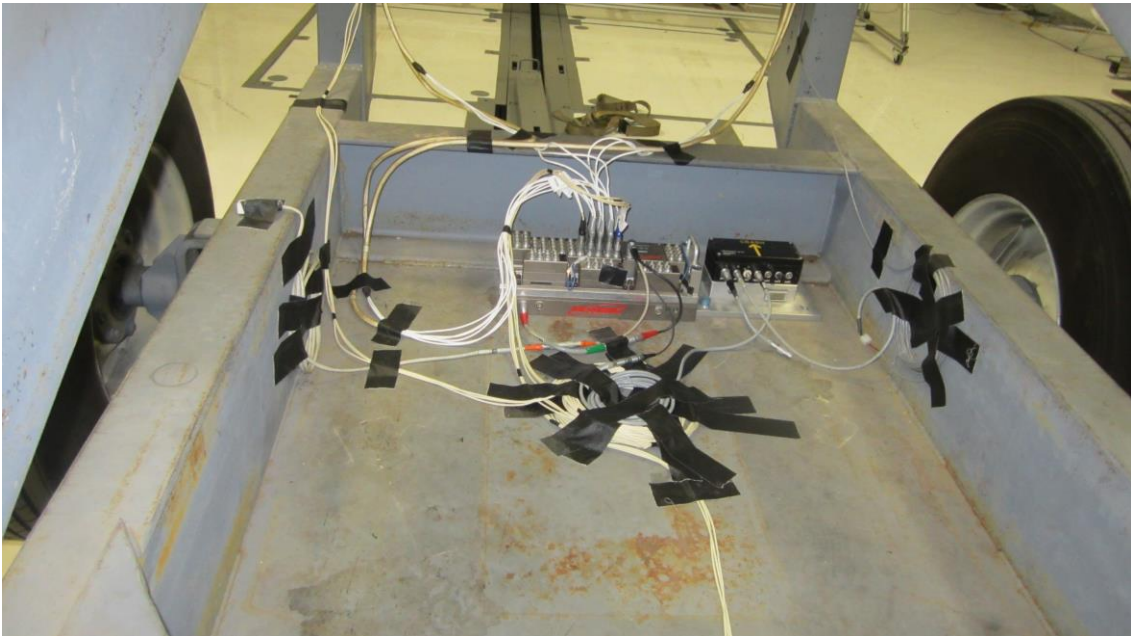


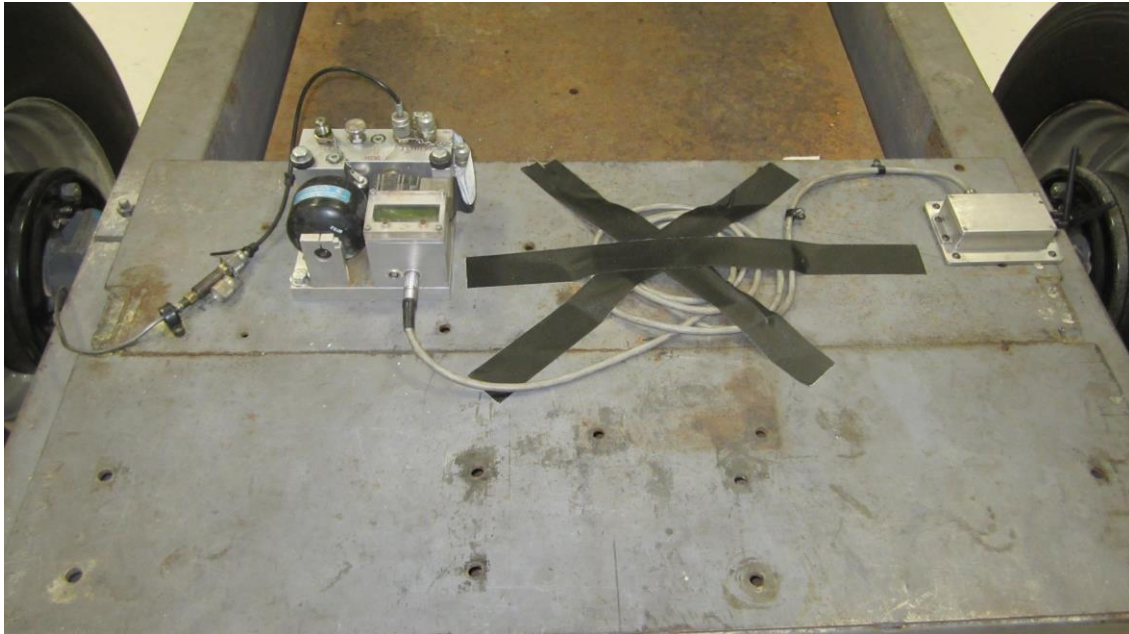


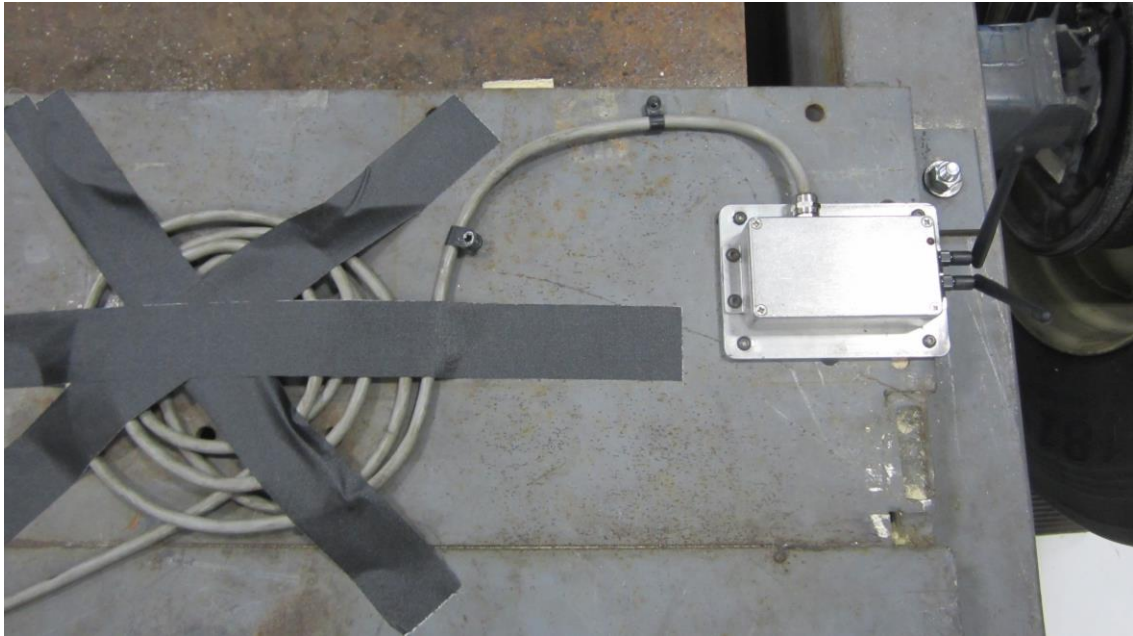






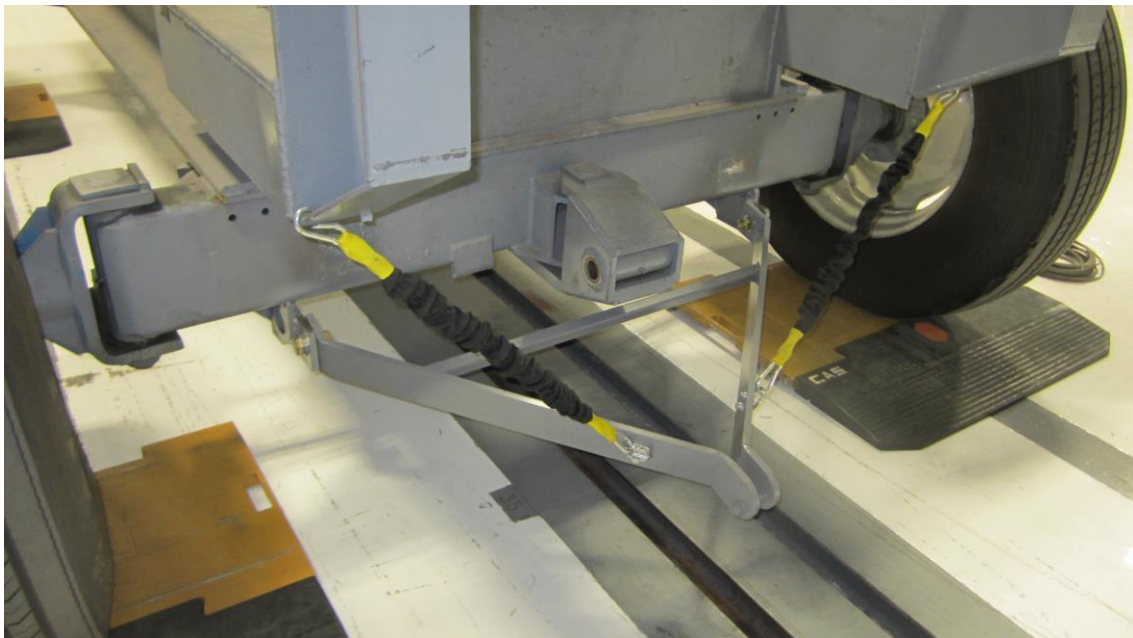


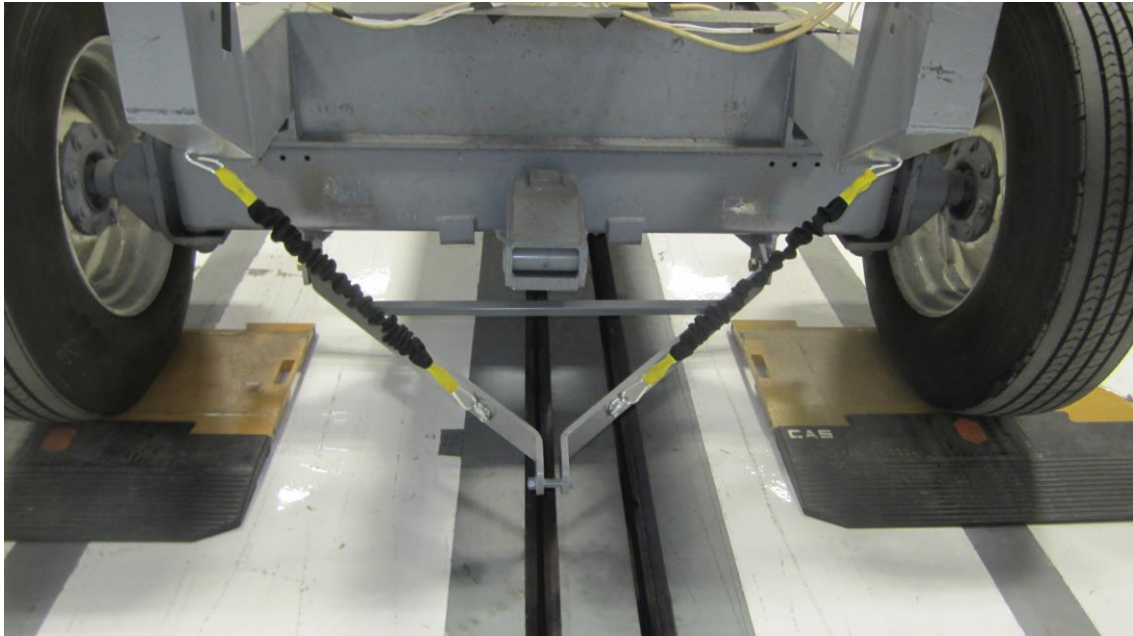


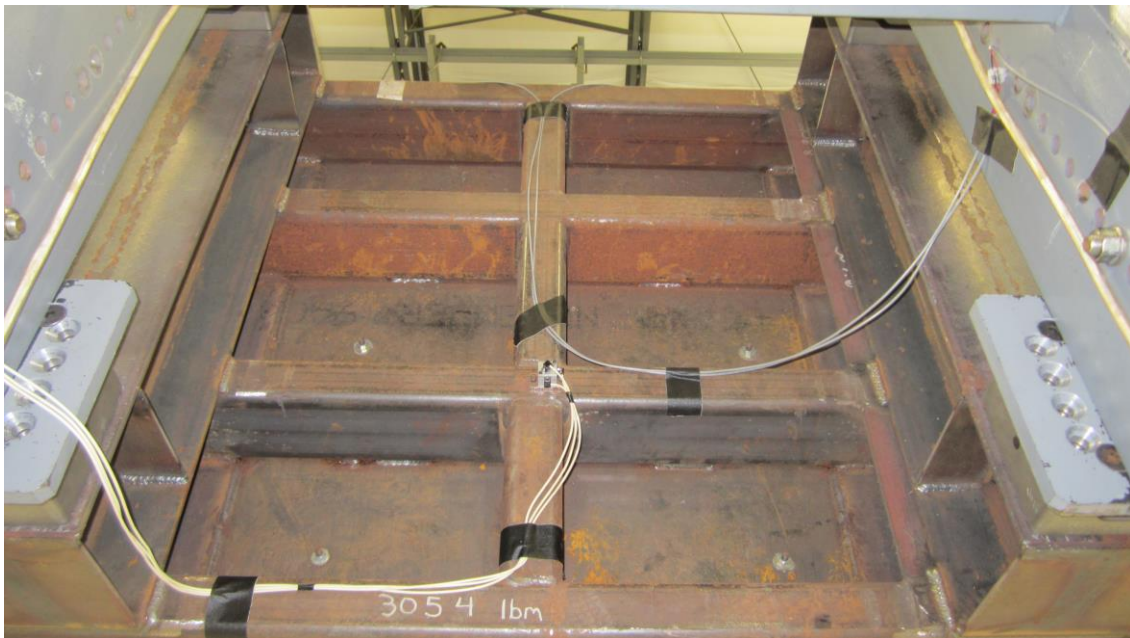








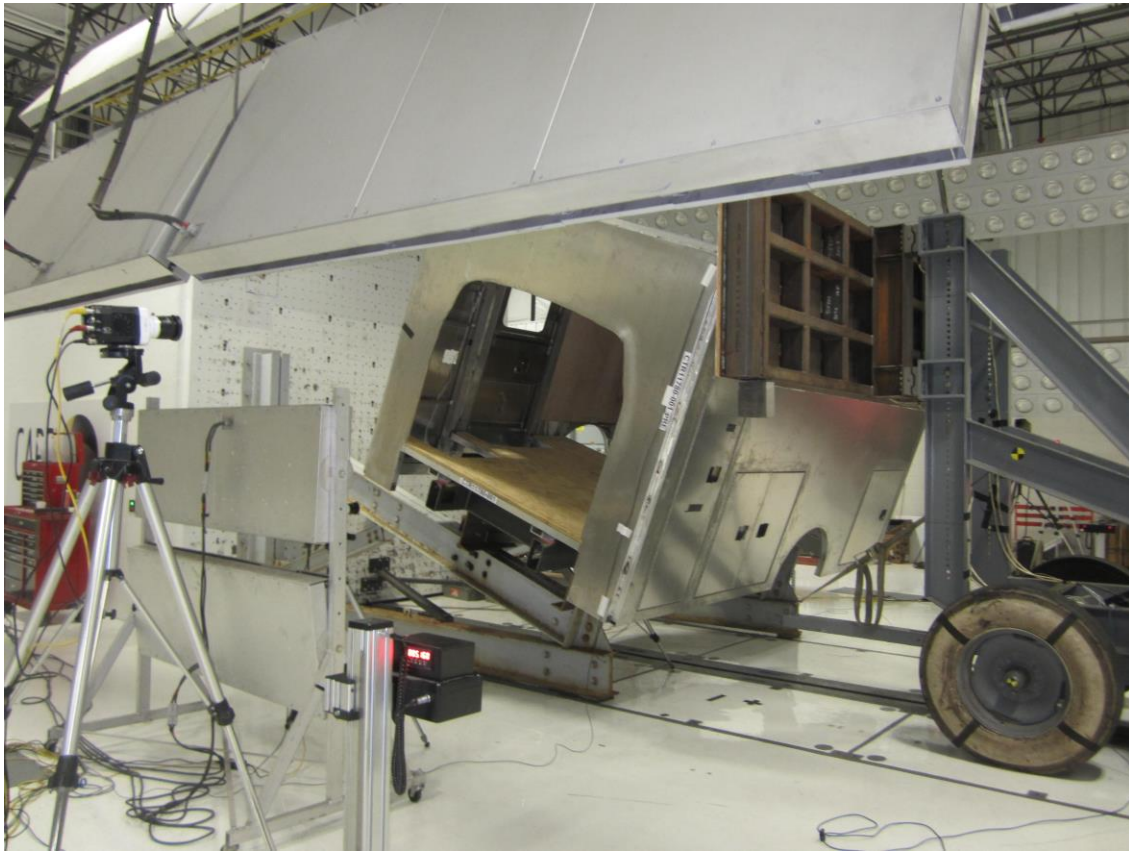








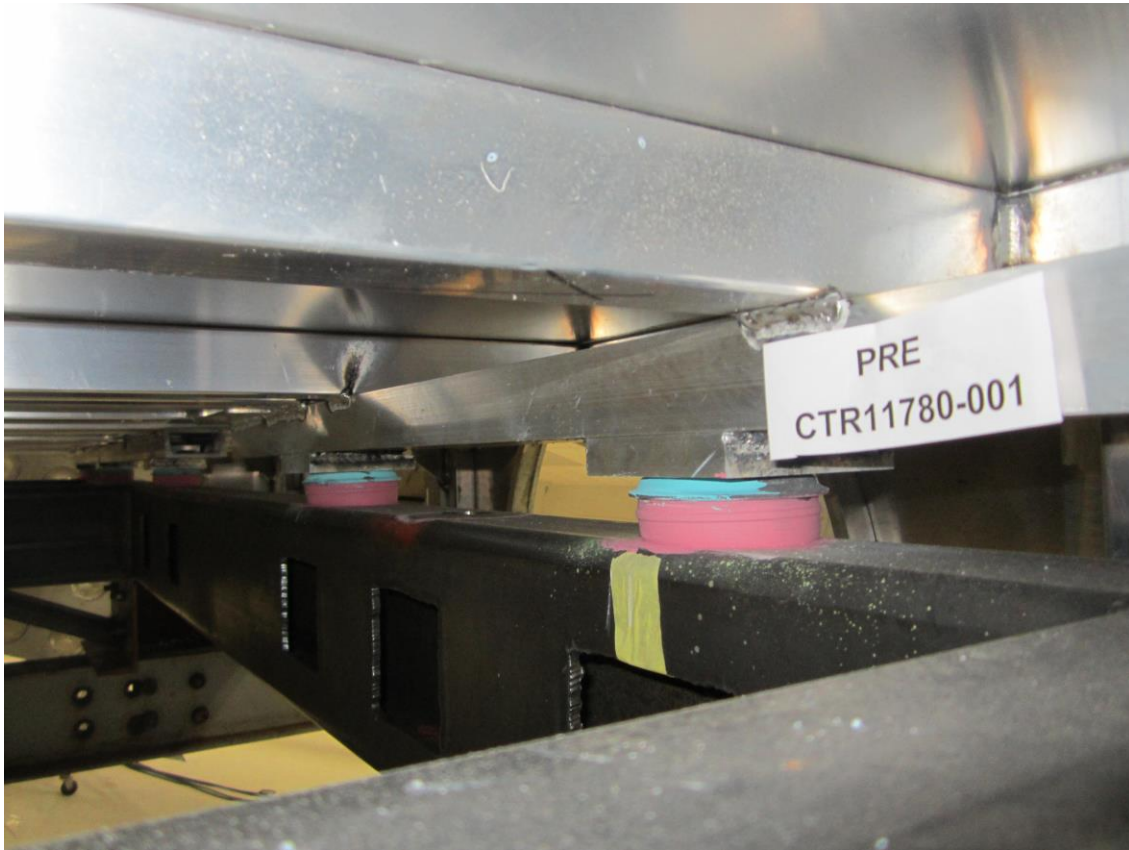


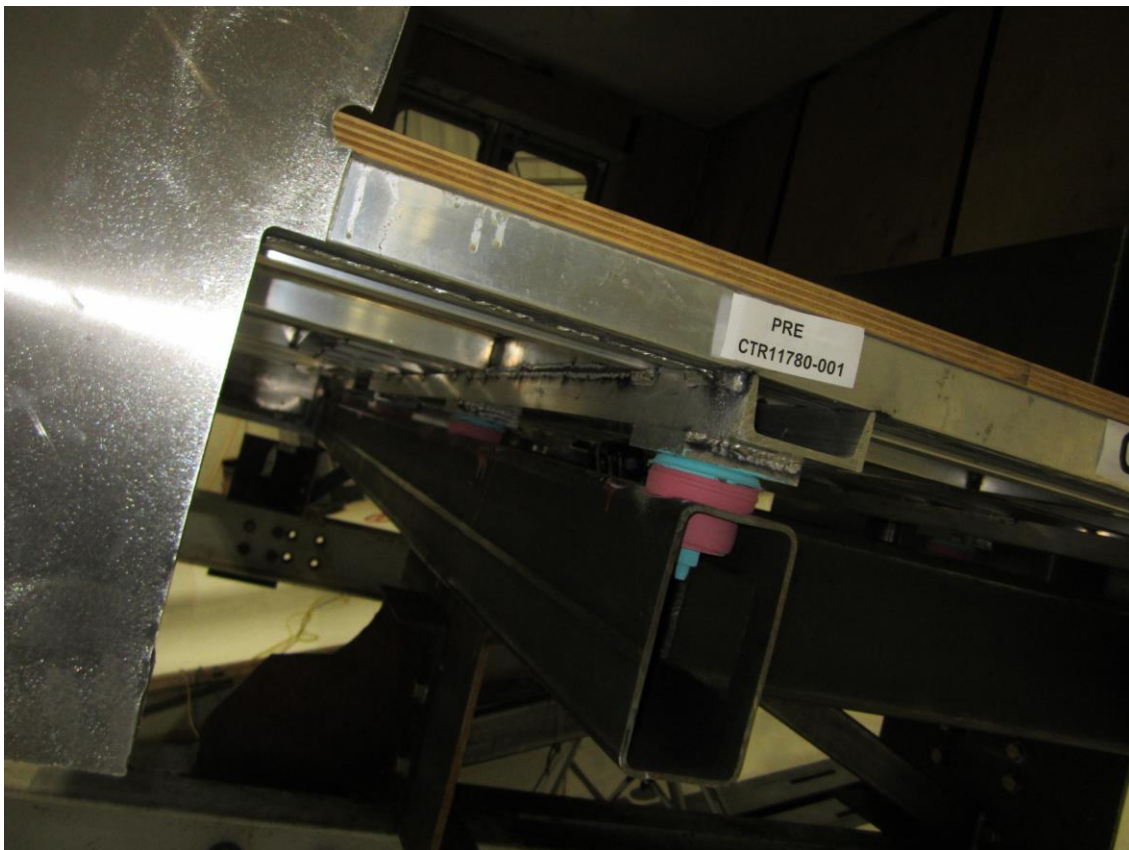


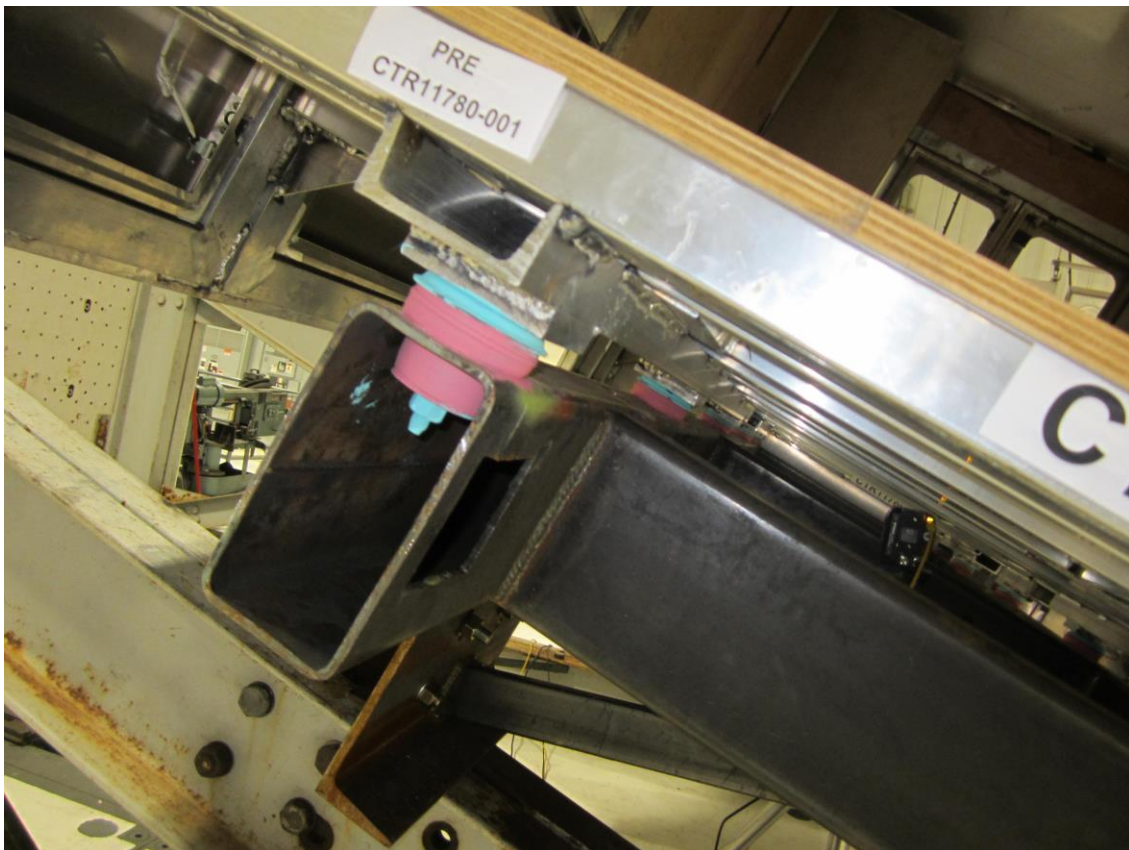
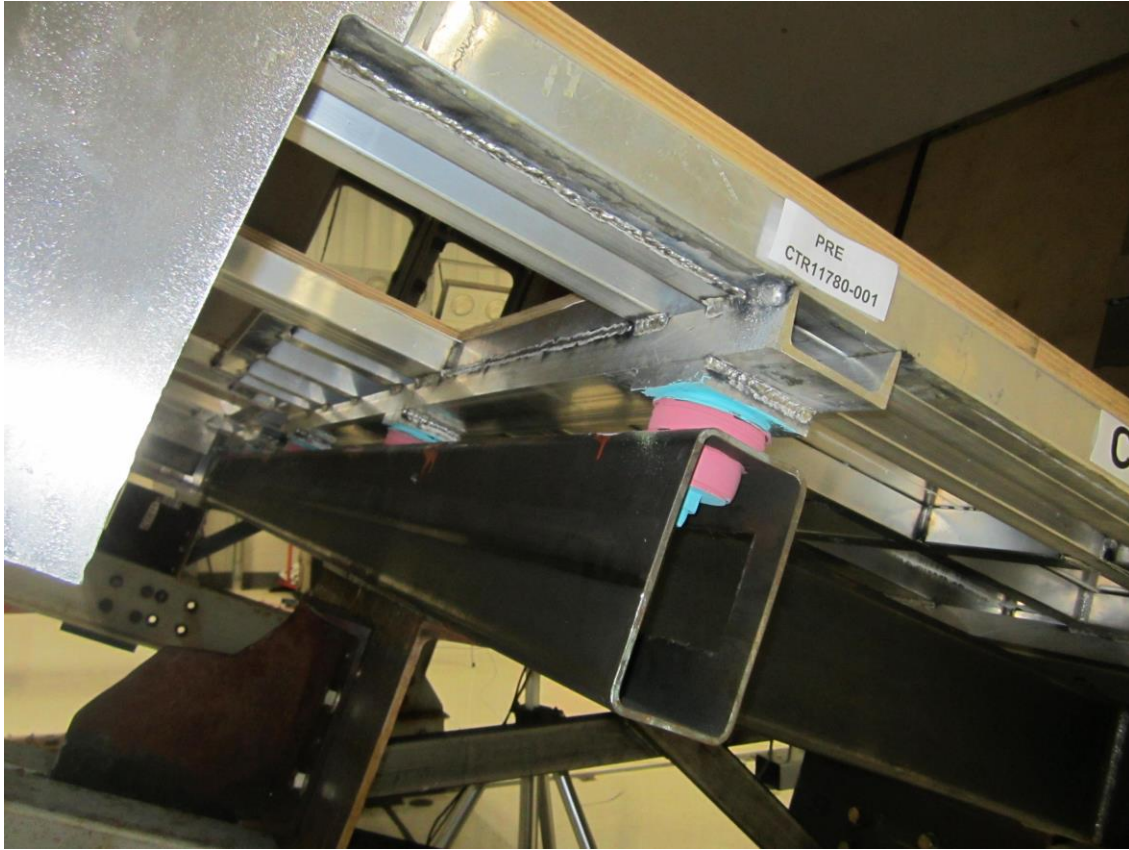


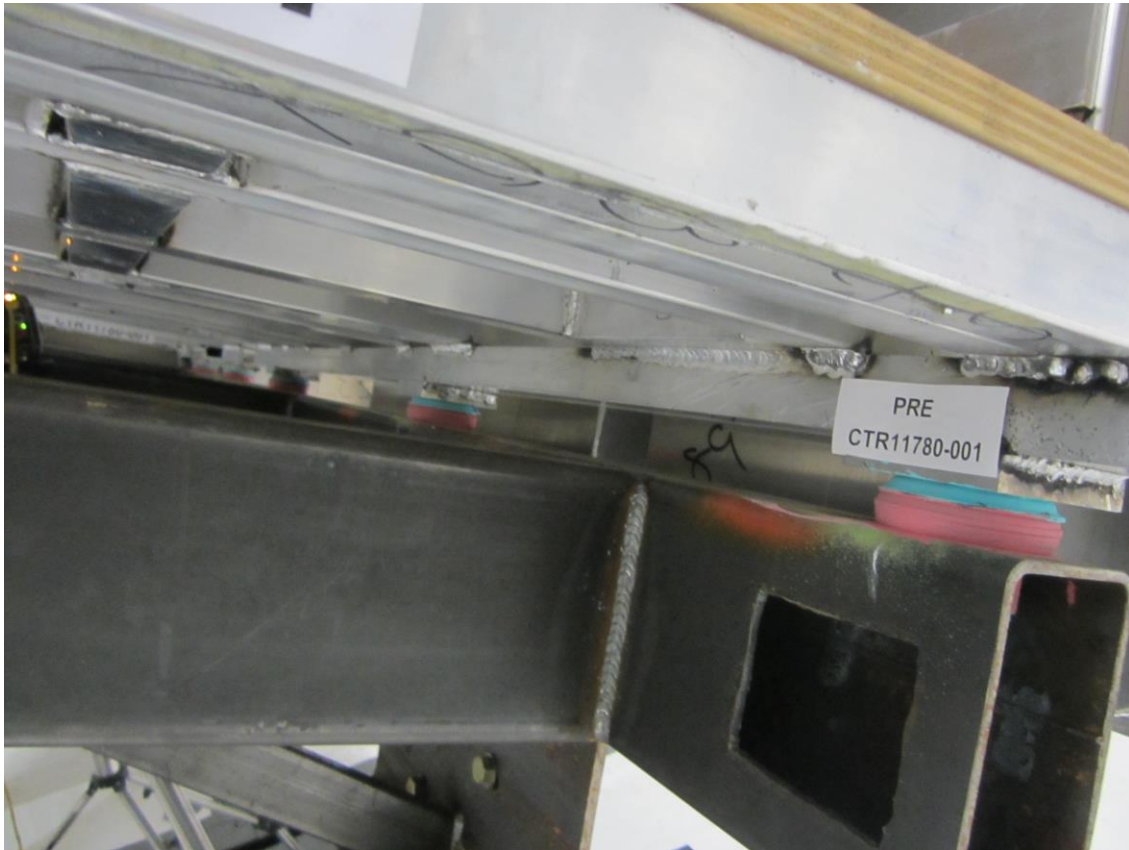
















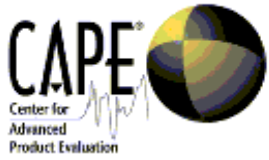






CTR11780-001

Data Plots



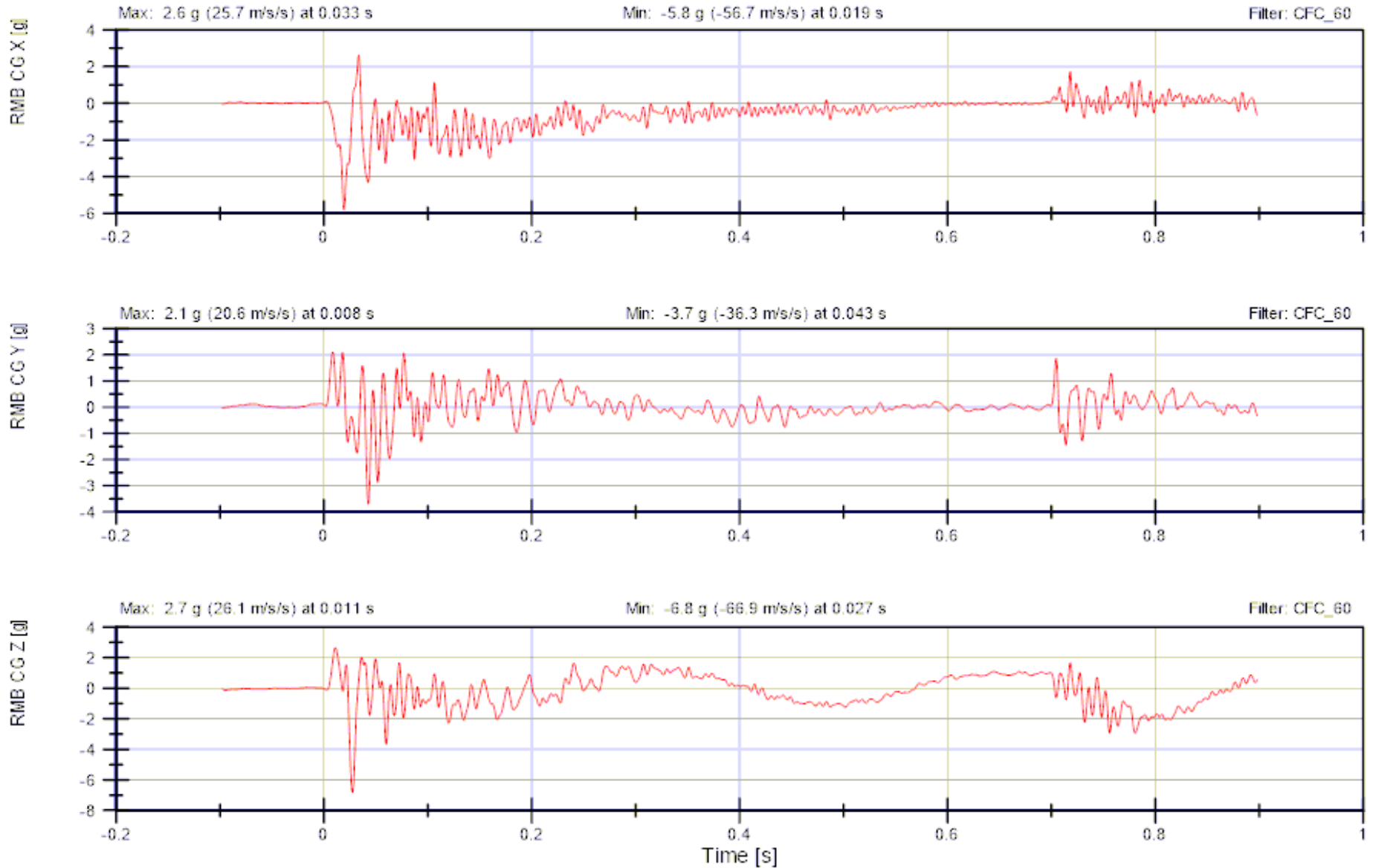
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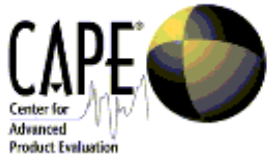
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Test Date: 26-Jun-2017

Comment:





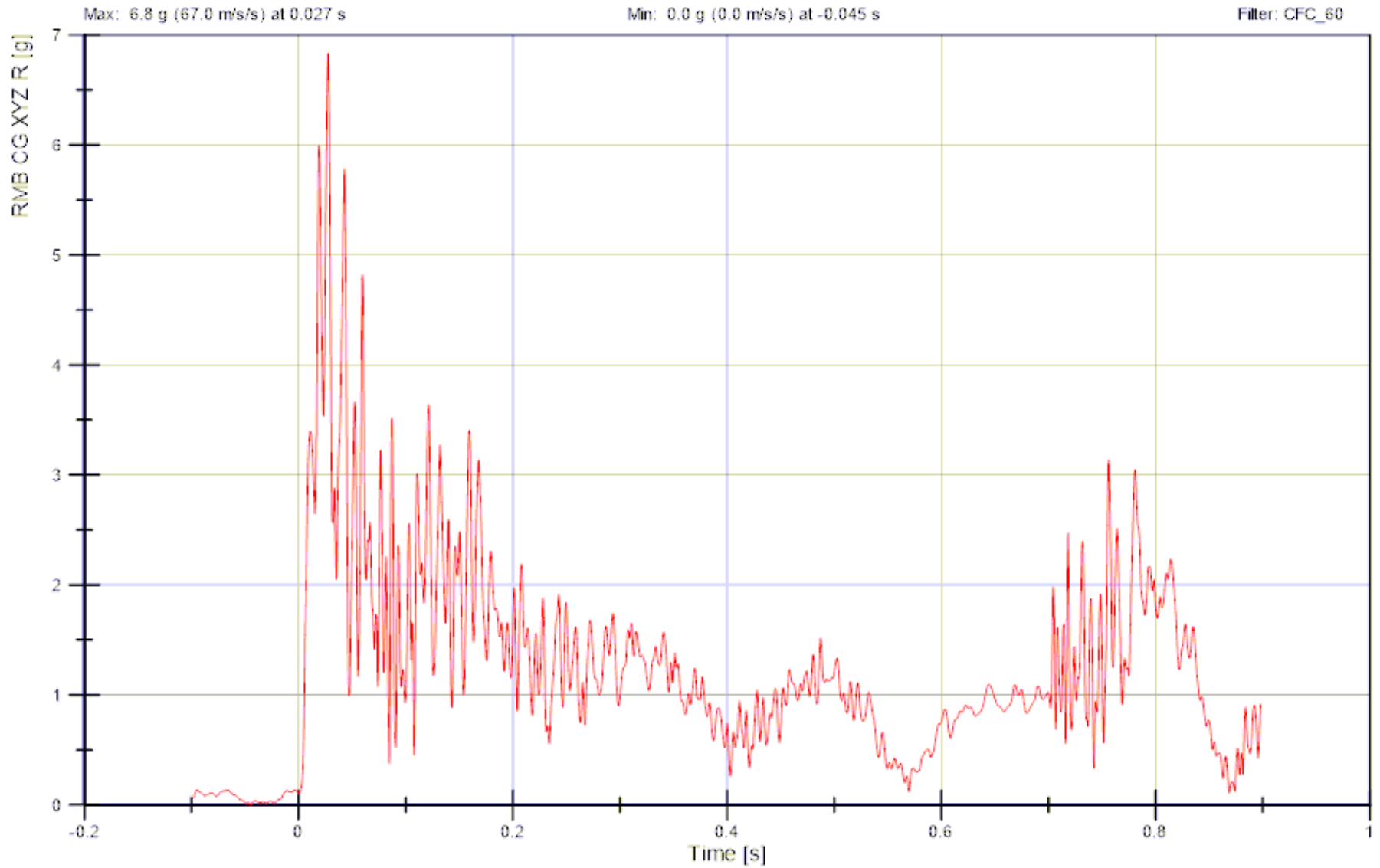
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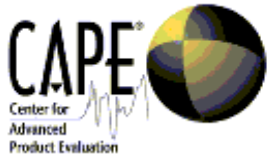
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Test Date: 26-Jun-2017

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Comment:





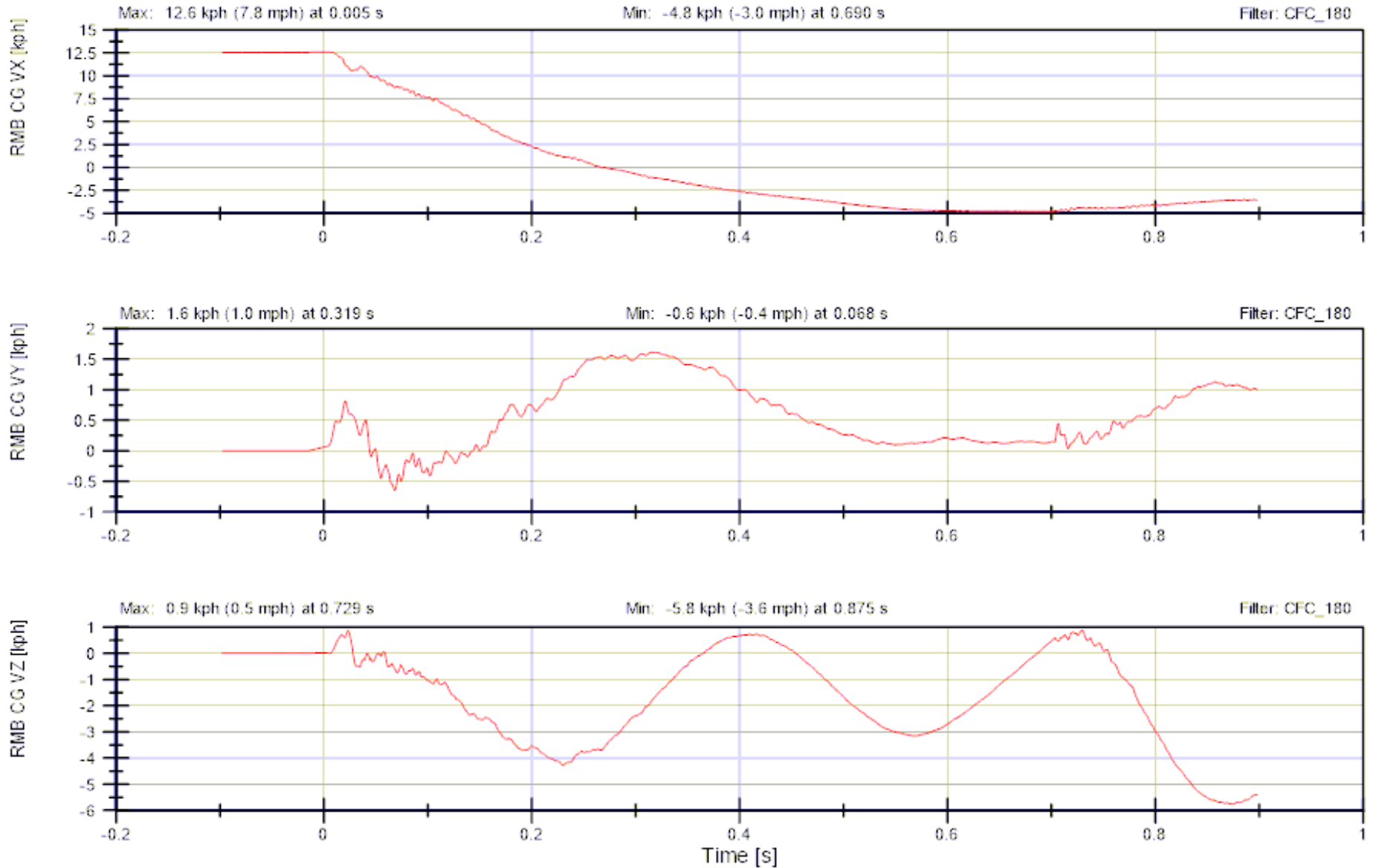
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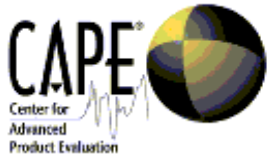
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Test Date: 26-Jun-2017

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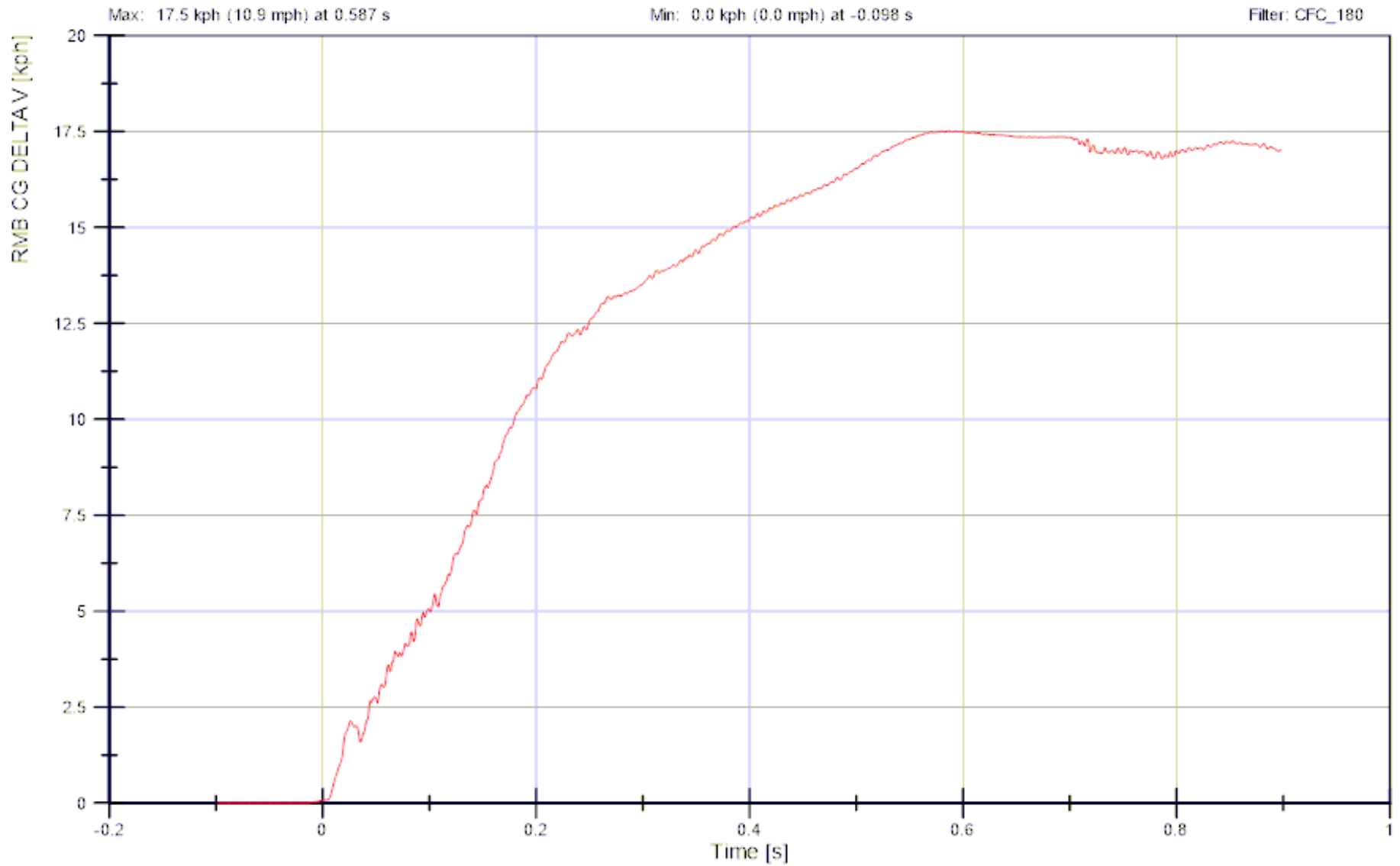
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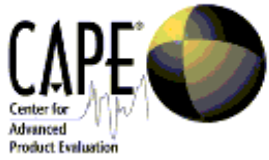
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Test Date: 26-Jun-2017

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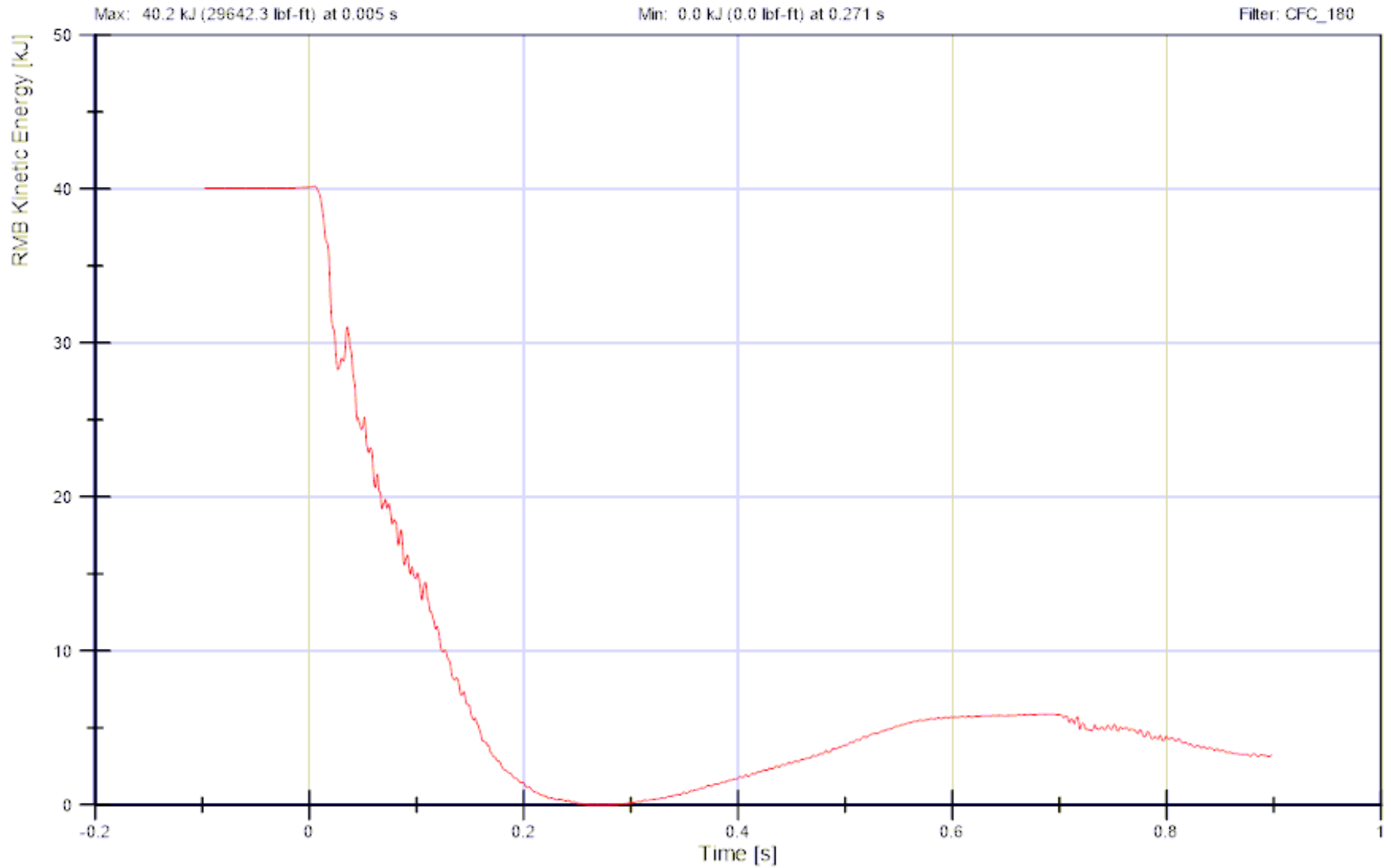
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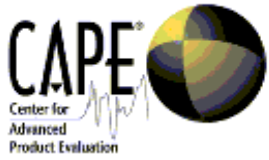
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Test Date: 26-Jun-2017

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Comment:





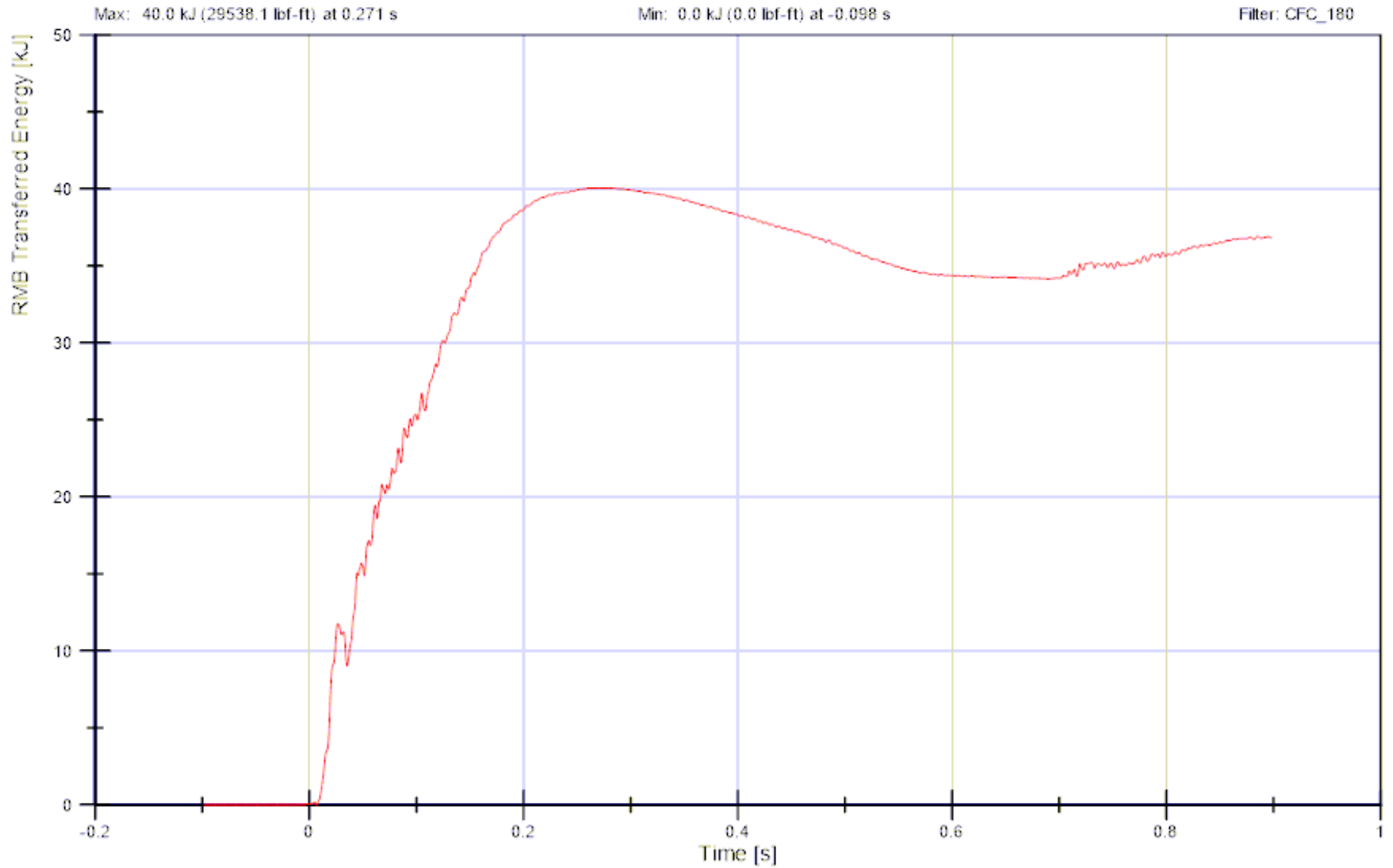
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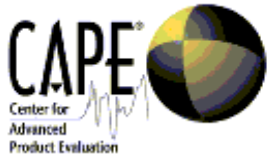
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Test Date: 26-Jun-2017

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Comment:





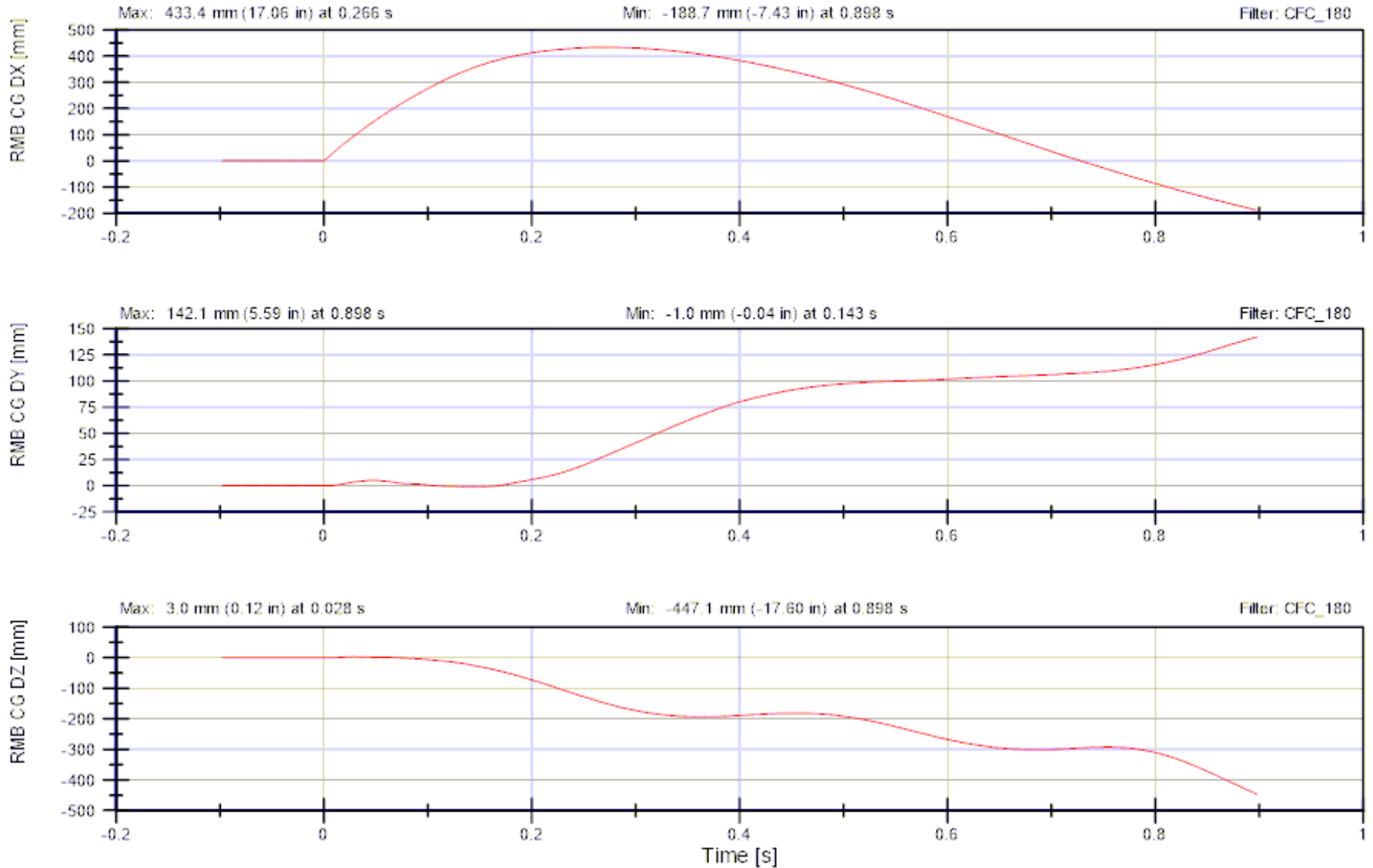
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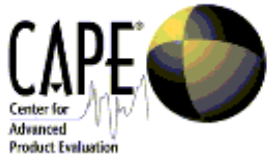
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Test Date: 26-Jun-2017

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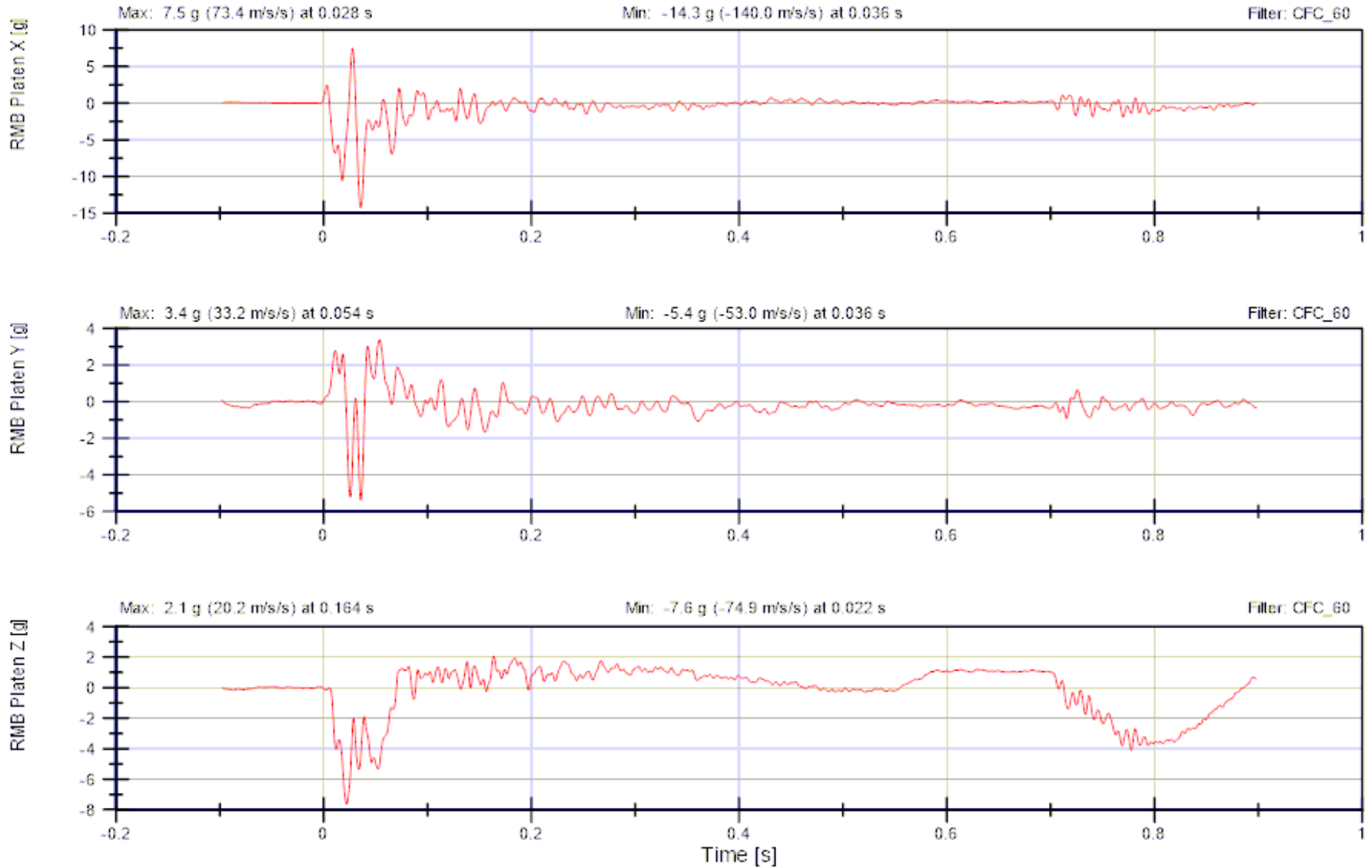
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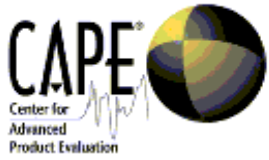
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Test Date: 26-Jun-2017

Comment:





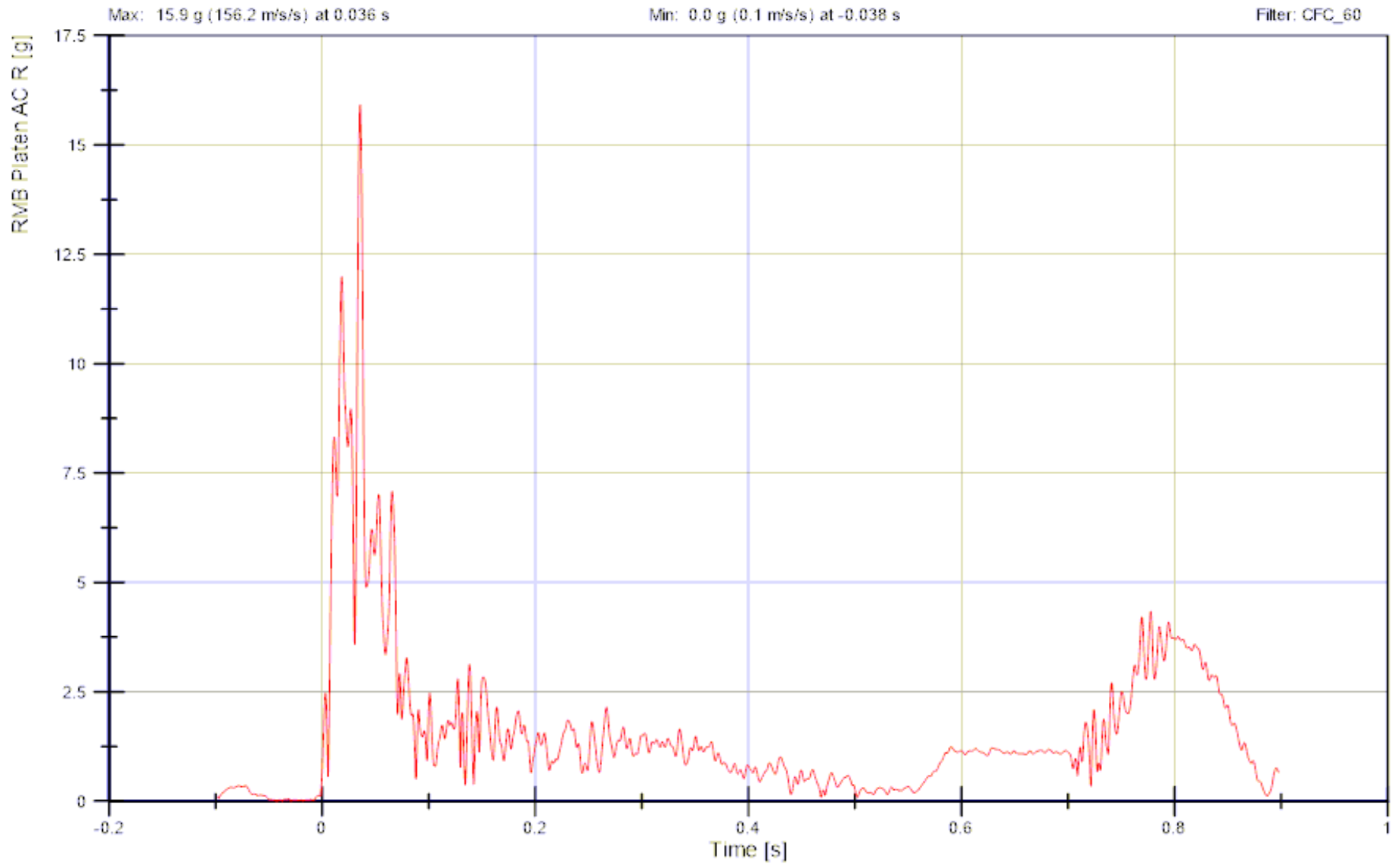
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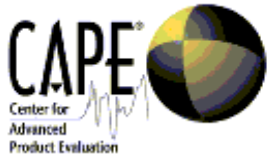
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Test Date: 26-Jun-2017

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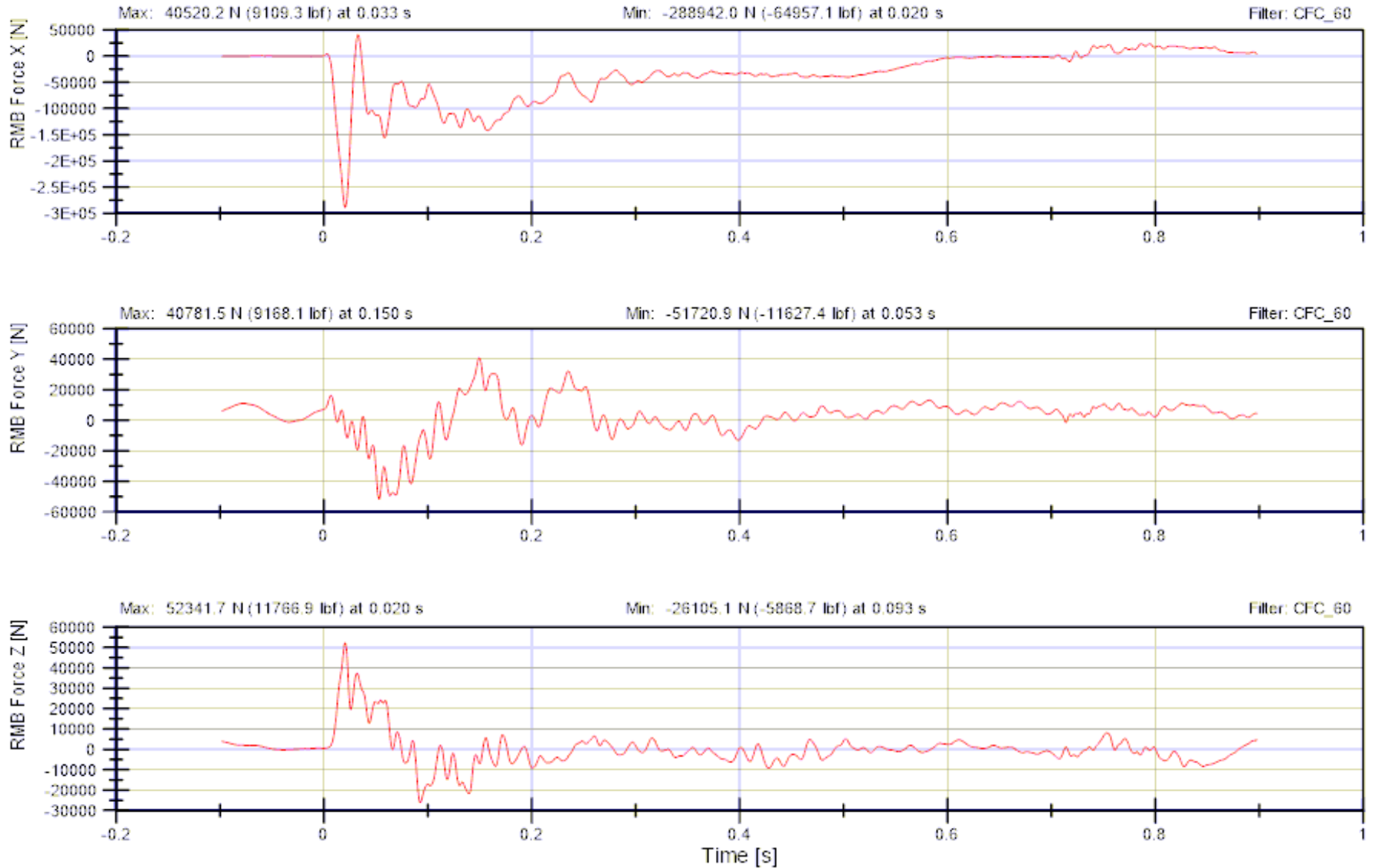
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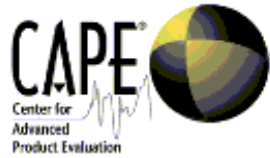
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Title: Rigid Moving Barrier Force

Test Date: 26-Jun-2017

Comment:





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Westfield IN 46074
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Test ID: CTR11780-001

Title: PARAMETER SUMMARY

Test Date: 26-Jun-2017

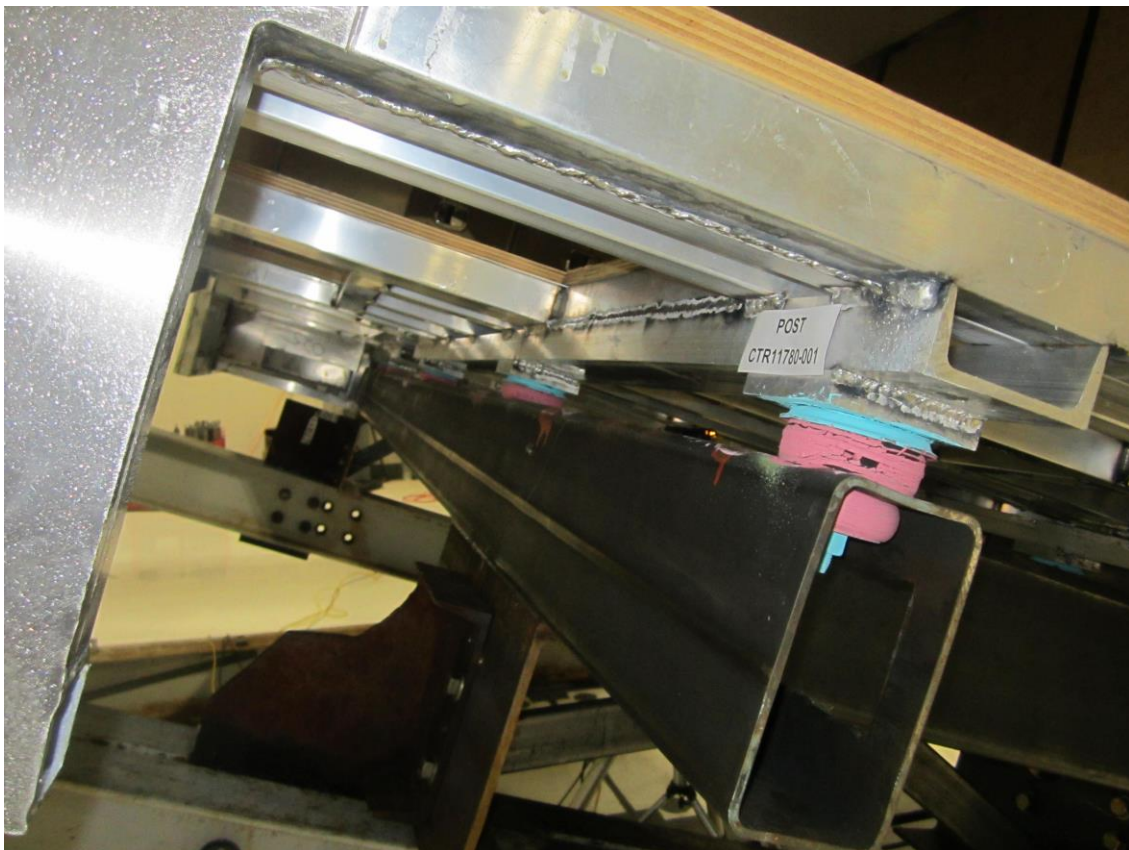
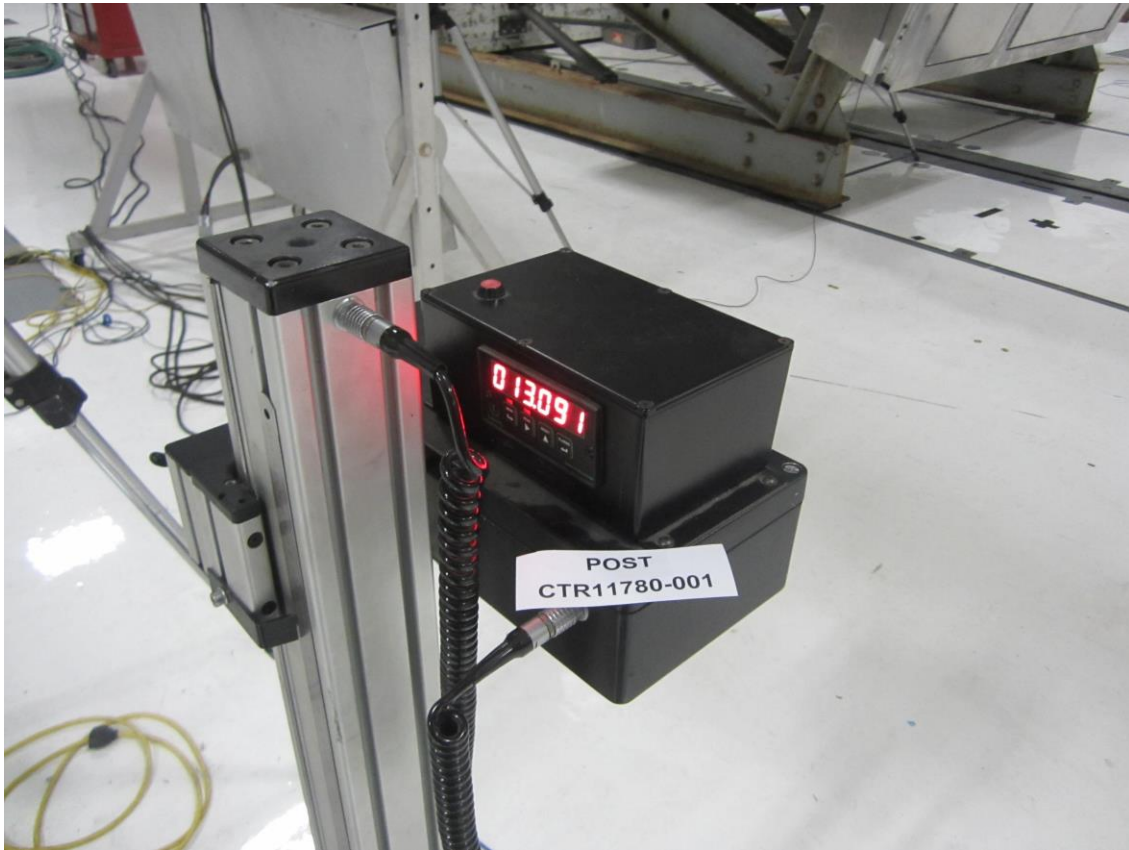
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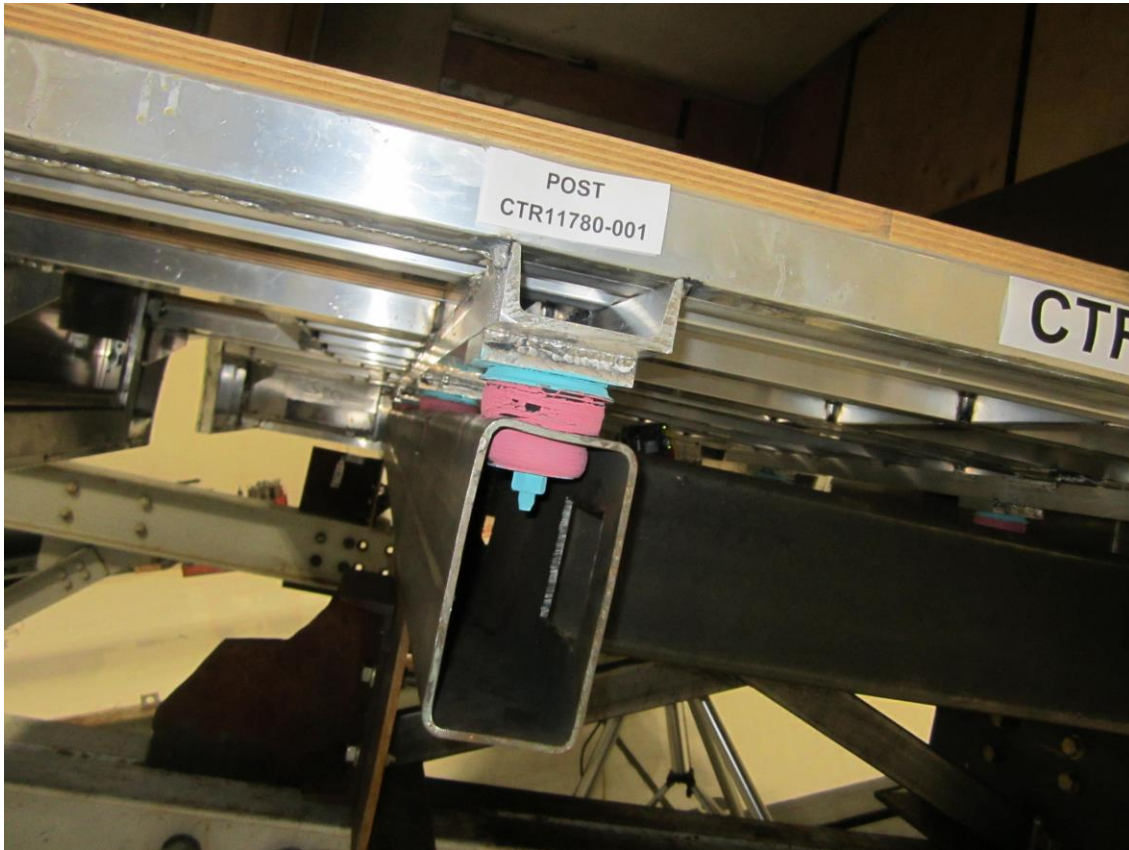
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RMB CG Y	g	-3.7	43	2.1	8
RMB CG Z	g	-8.8	27	2.7	11
RMB CG XYZ R	g	0.0	-45	6.8	27
RMB CG VX	kph	-4.8	690	12.6	5
RMB CG VY	kph	-0.6	68	1.6	319
RMB CG VZ	kph	-5.8	875	0.9	729
RMB CG DELTA V	kph	0.0	-98	17.5	587
RMB Kinetic Energy	kJ	0.0	271	40.2	5
RMB Transferred Energy	kJ	0.0	-98	40.0	271
RMB CG DX	mm	-188.7	898	433.4	266
RMB CG DY	mm	-1.0	143	142.1	898
RMB CG DZ	mm	-447.1	898	3.0	28
RMB Platen X	g	-14.3	36	7.5	28
RMB Platen Y	g	-5.4	36	3.4	54
RMB Platen Z	g	-7.6	22	2.1	164
RMB Platen AC R	g	0.0	-38	15.9	36
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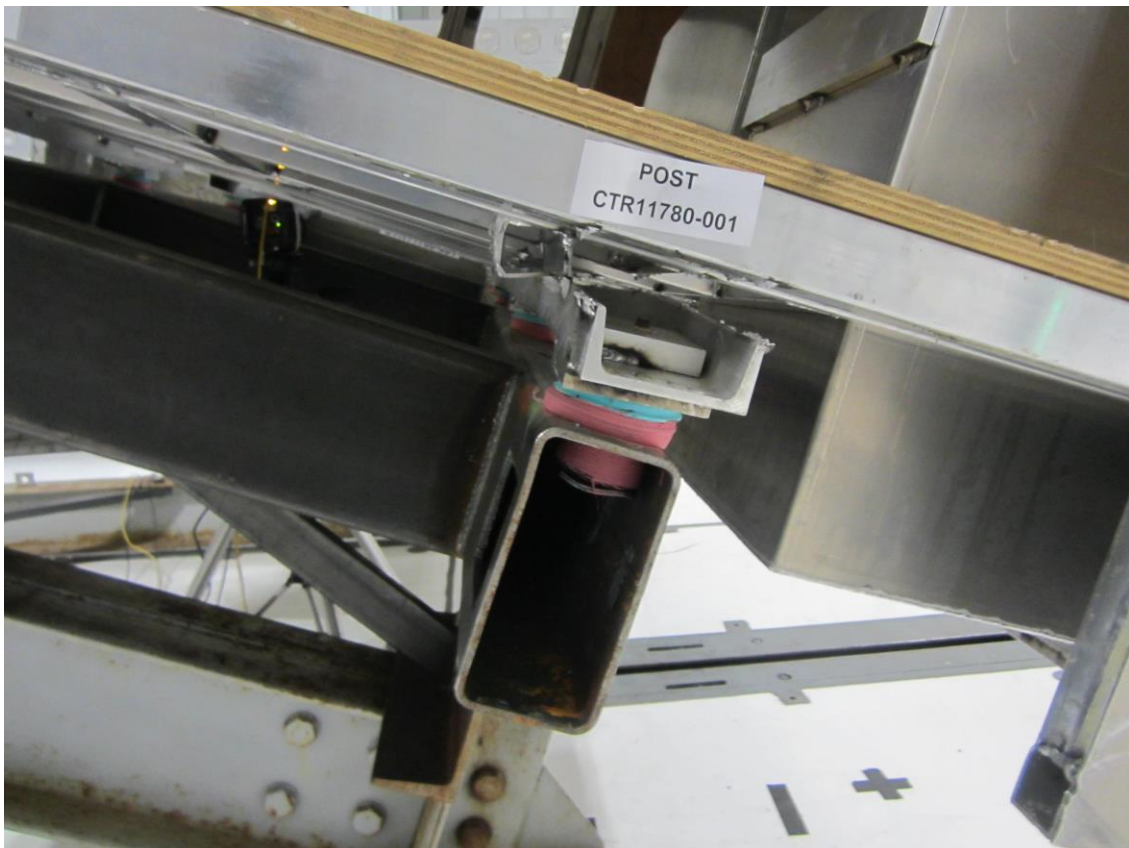
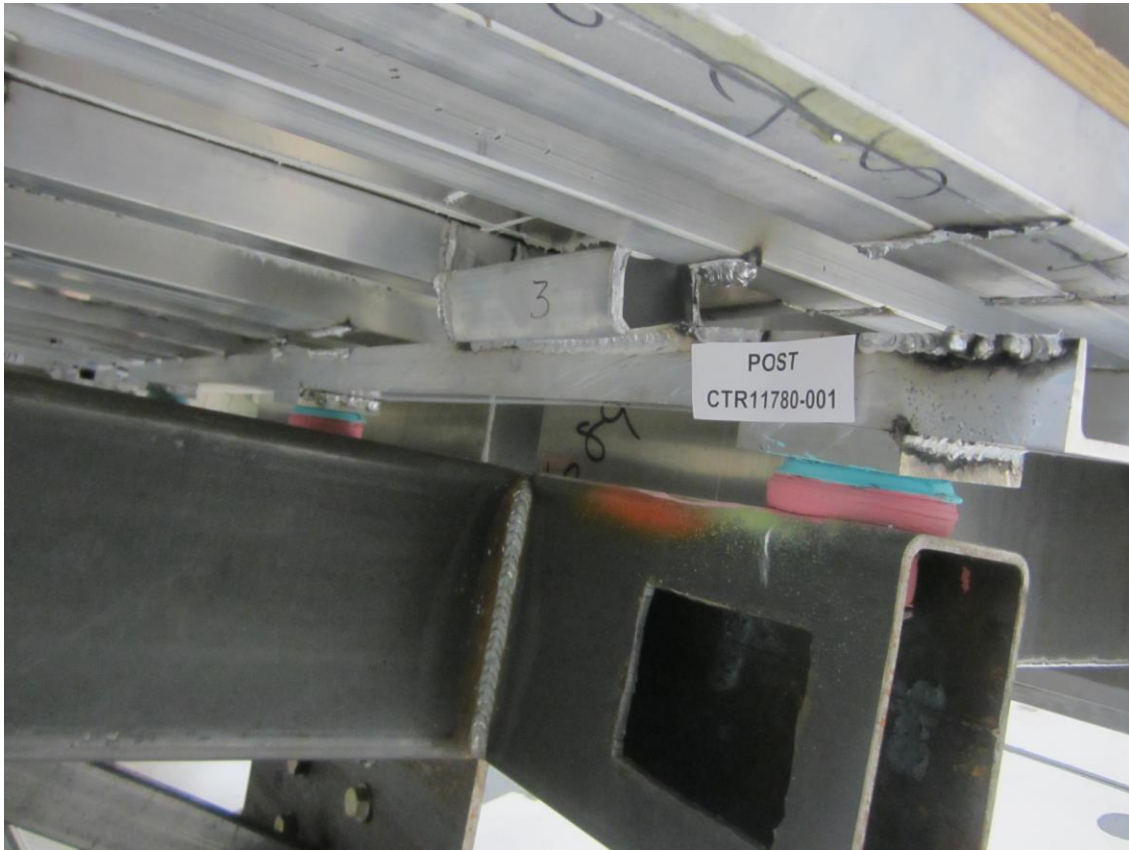
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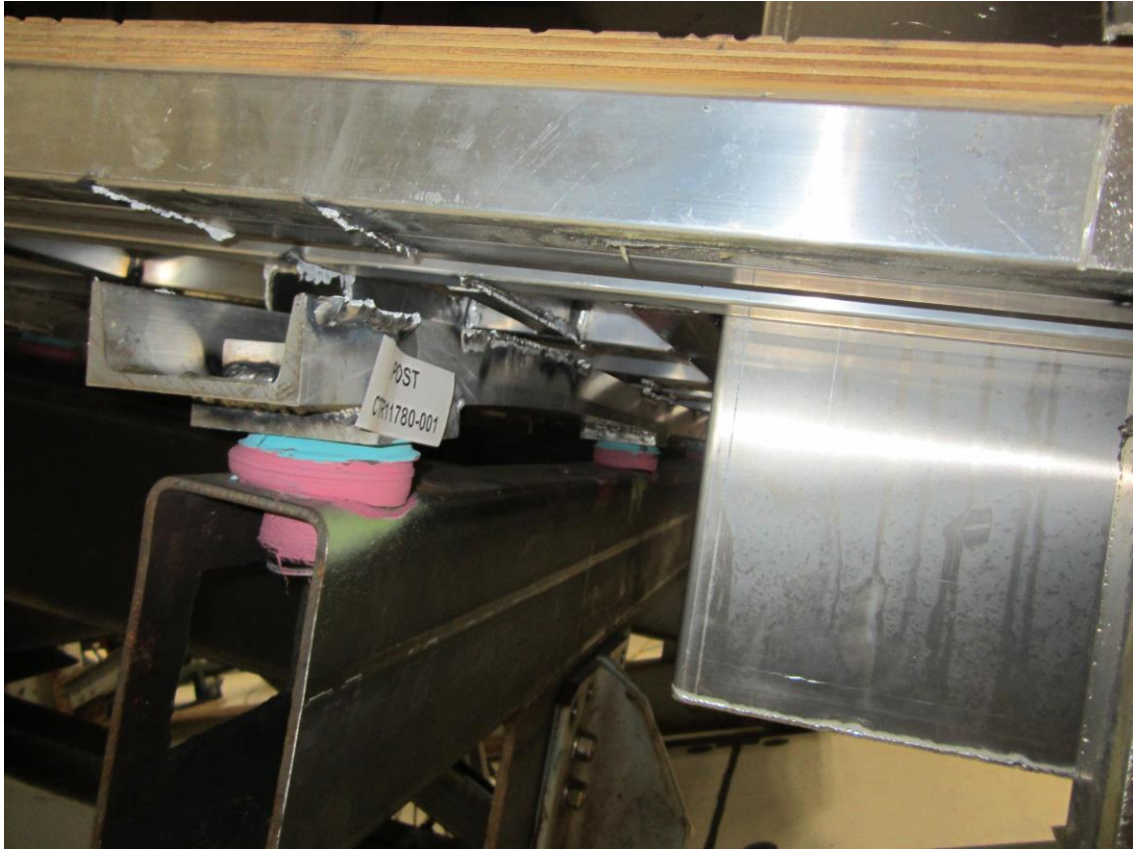


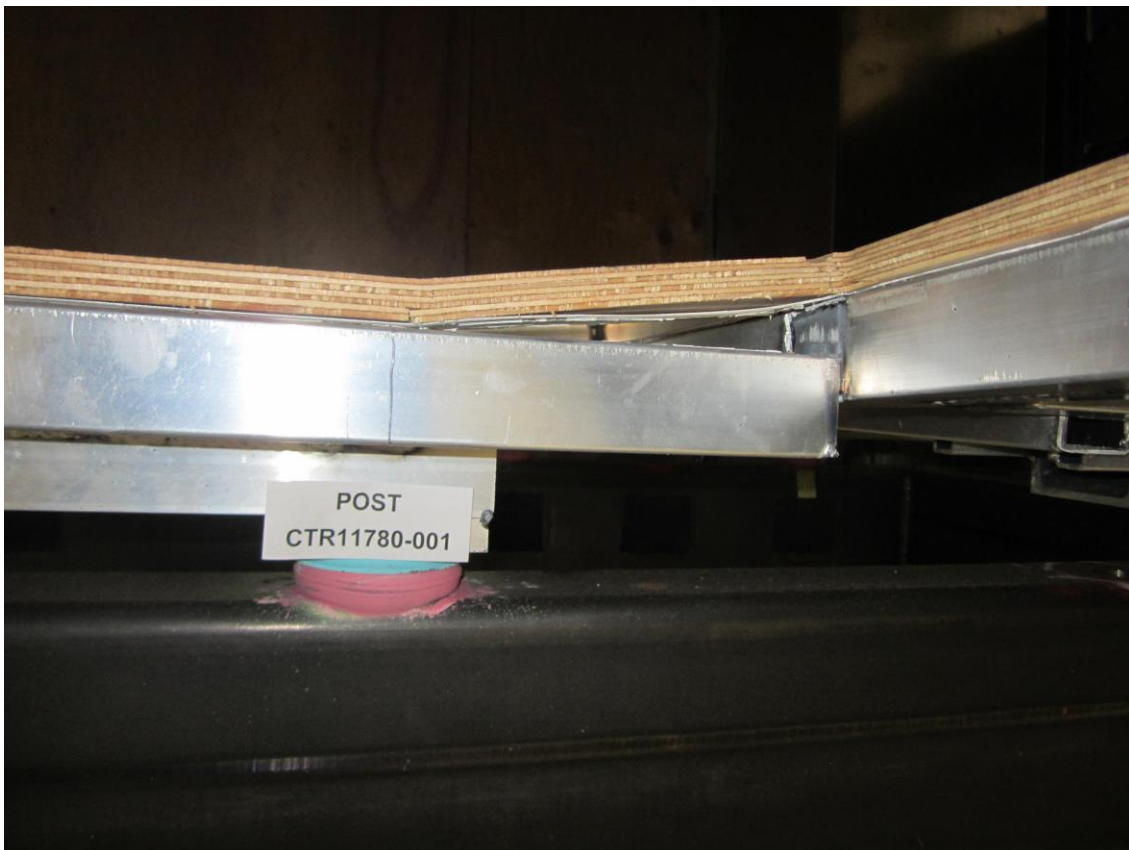
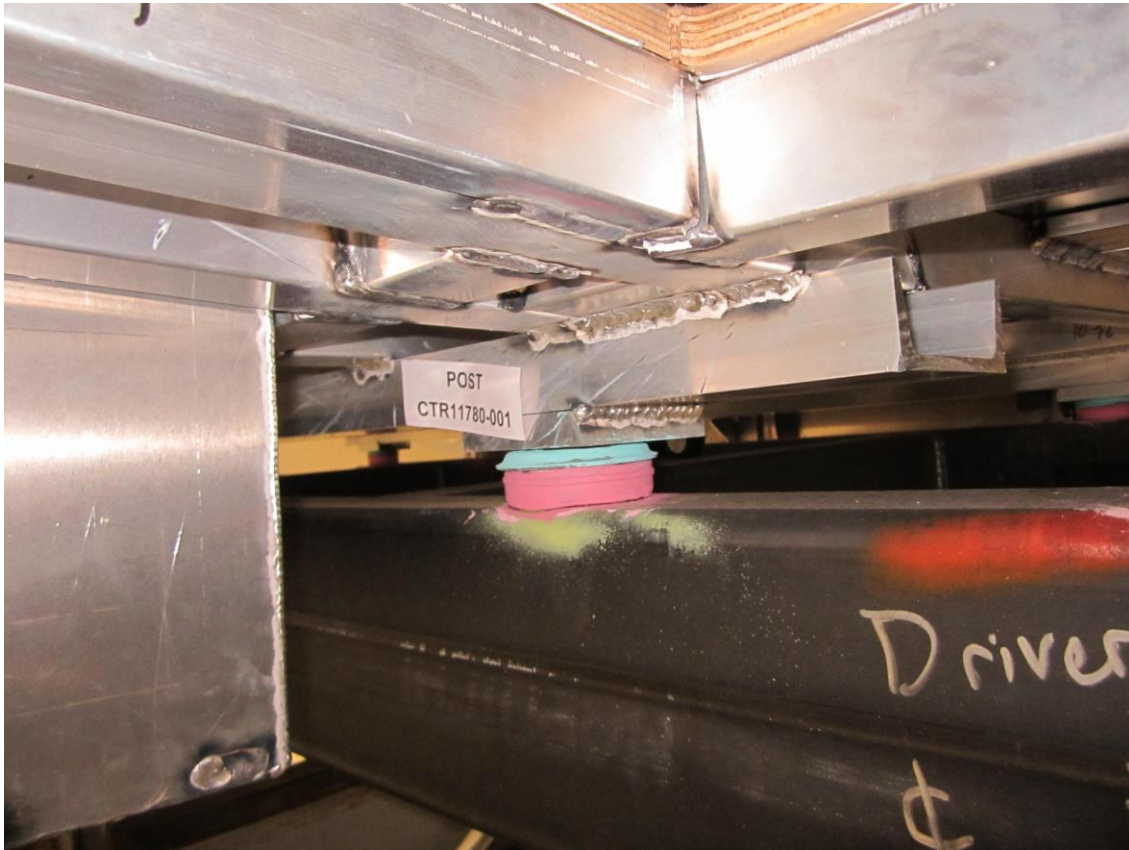
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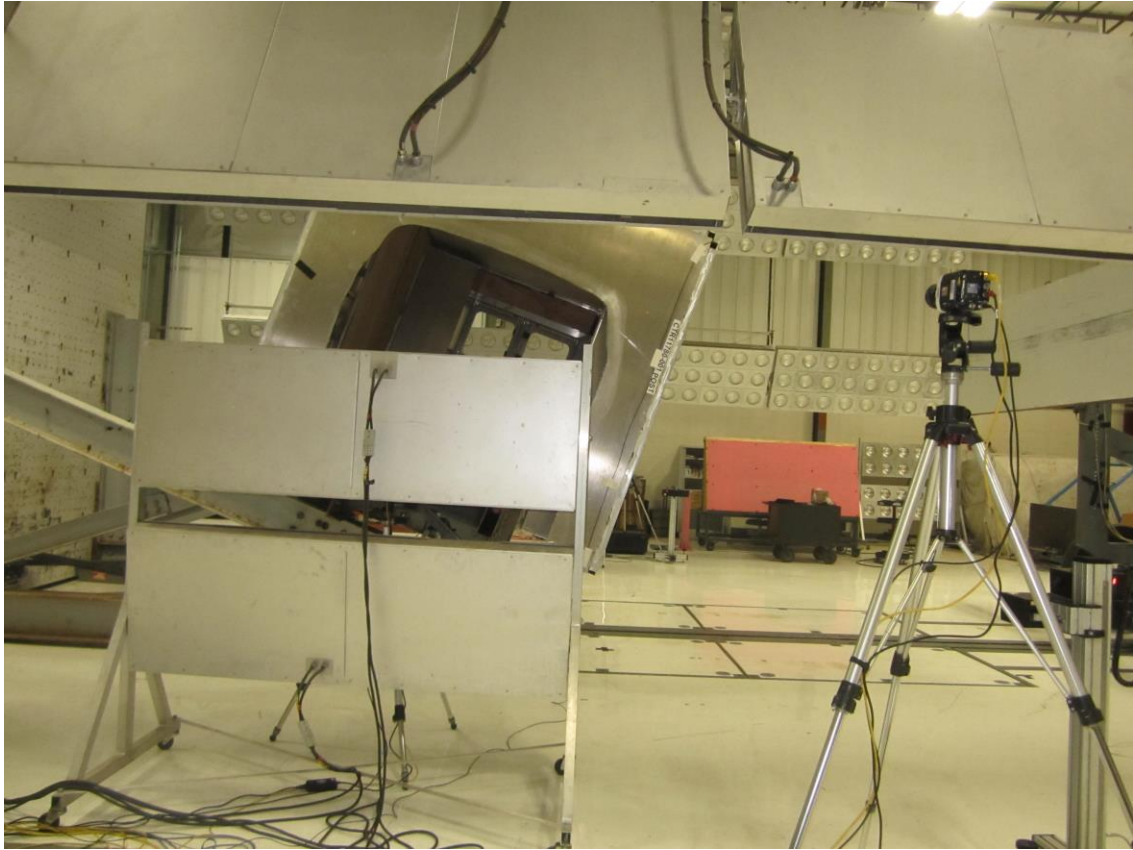


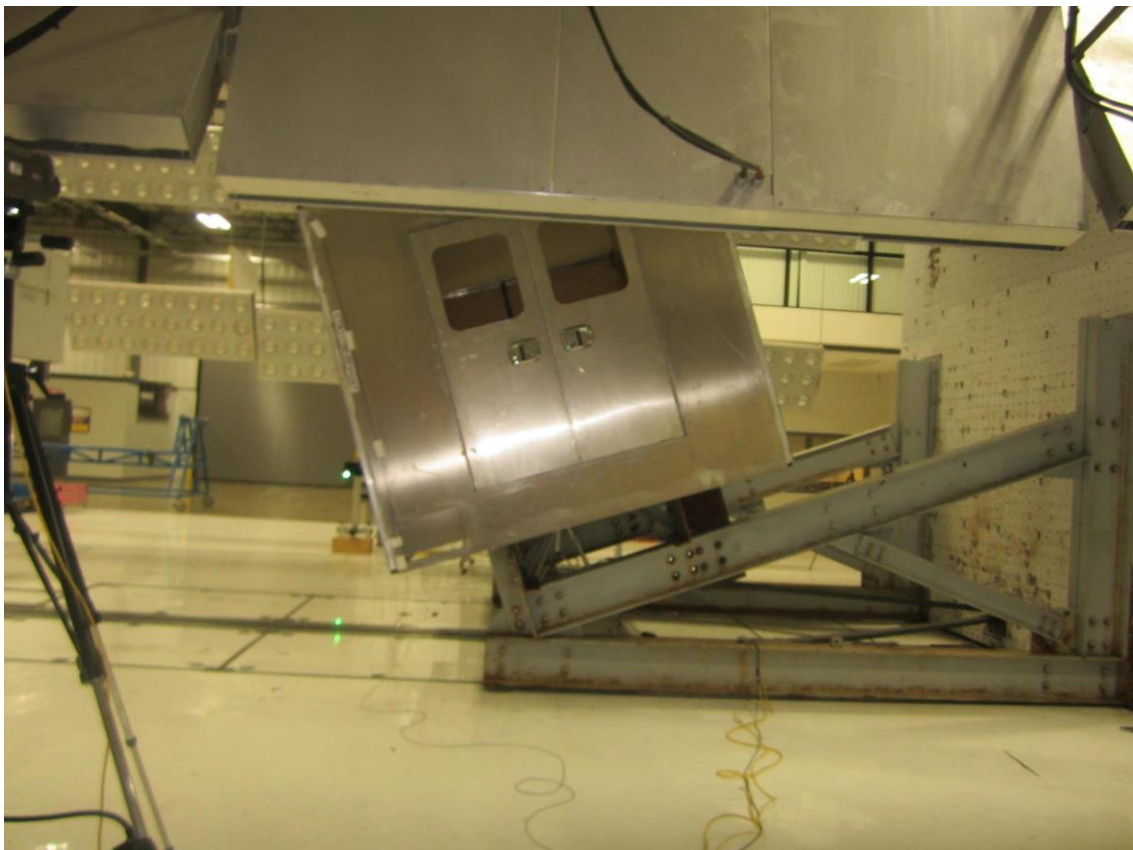








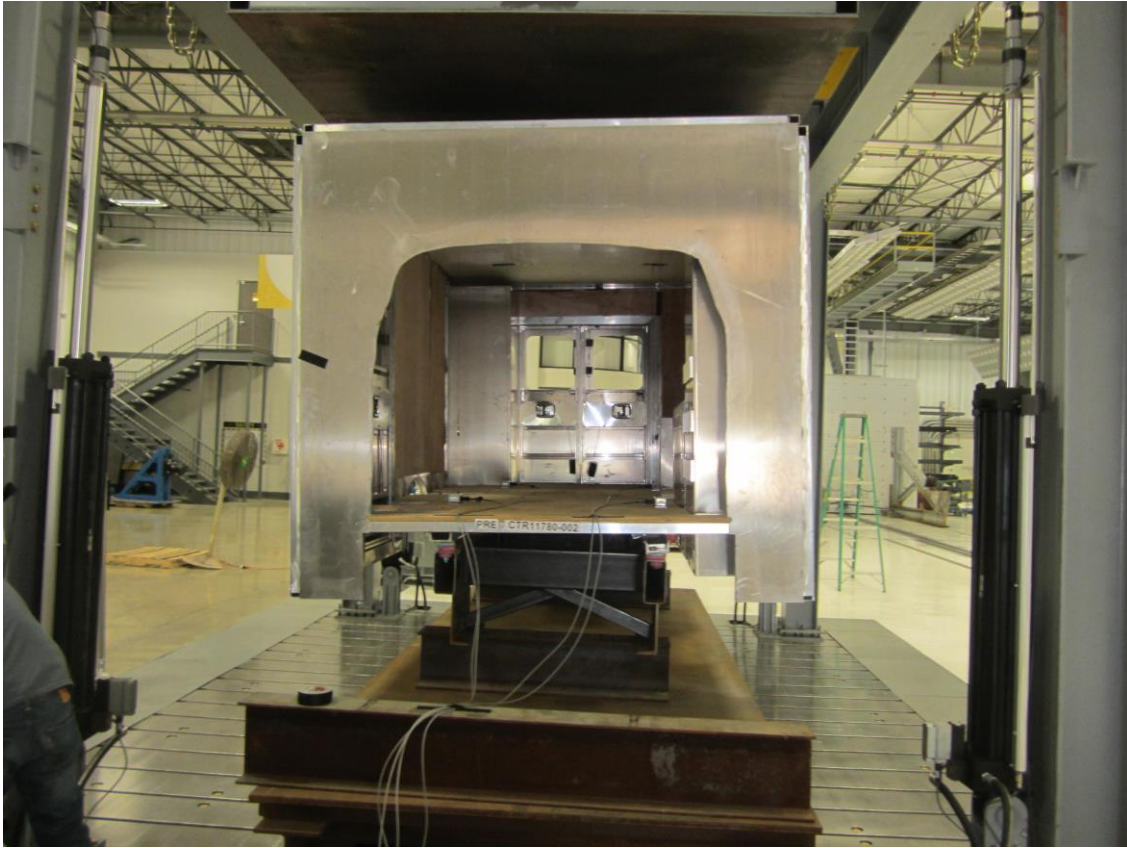








CTR11780-002 Pre-Test Photographs



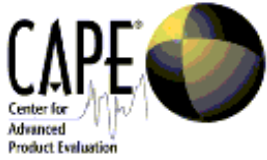






CTR11780-002

Data Plots



18881 IMMI Way
Westfield IN 46074
(317) 867-8225
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Test ID: CTR11780-002

Title: Total Load

Test Date: 06/26/2017

Comment:

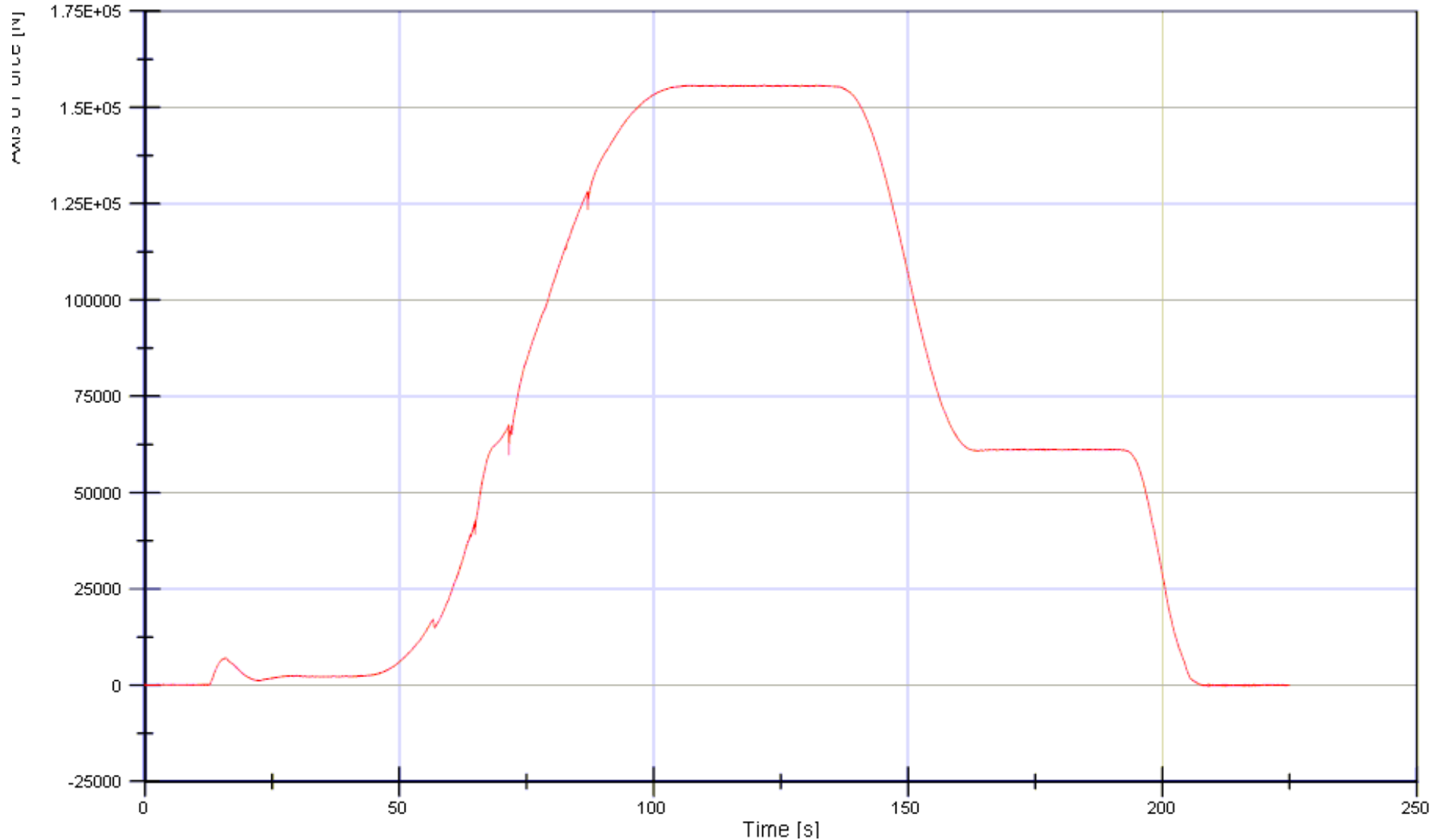
Load Application Rate: 2607.3 N/s (586.1 lbf/s)

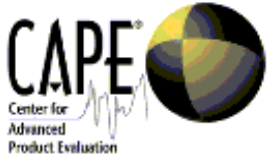
Time Above Target Load: 40.1 s

Max: 155798.2 N (35025.0 lbf) at 132.070 s

Min: -399.9 N (-89.9 lbf) at 208.990 s

Filter: None





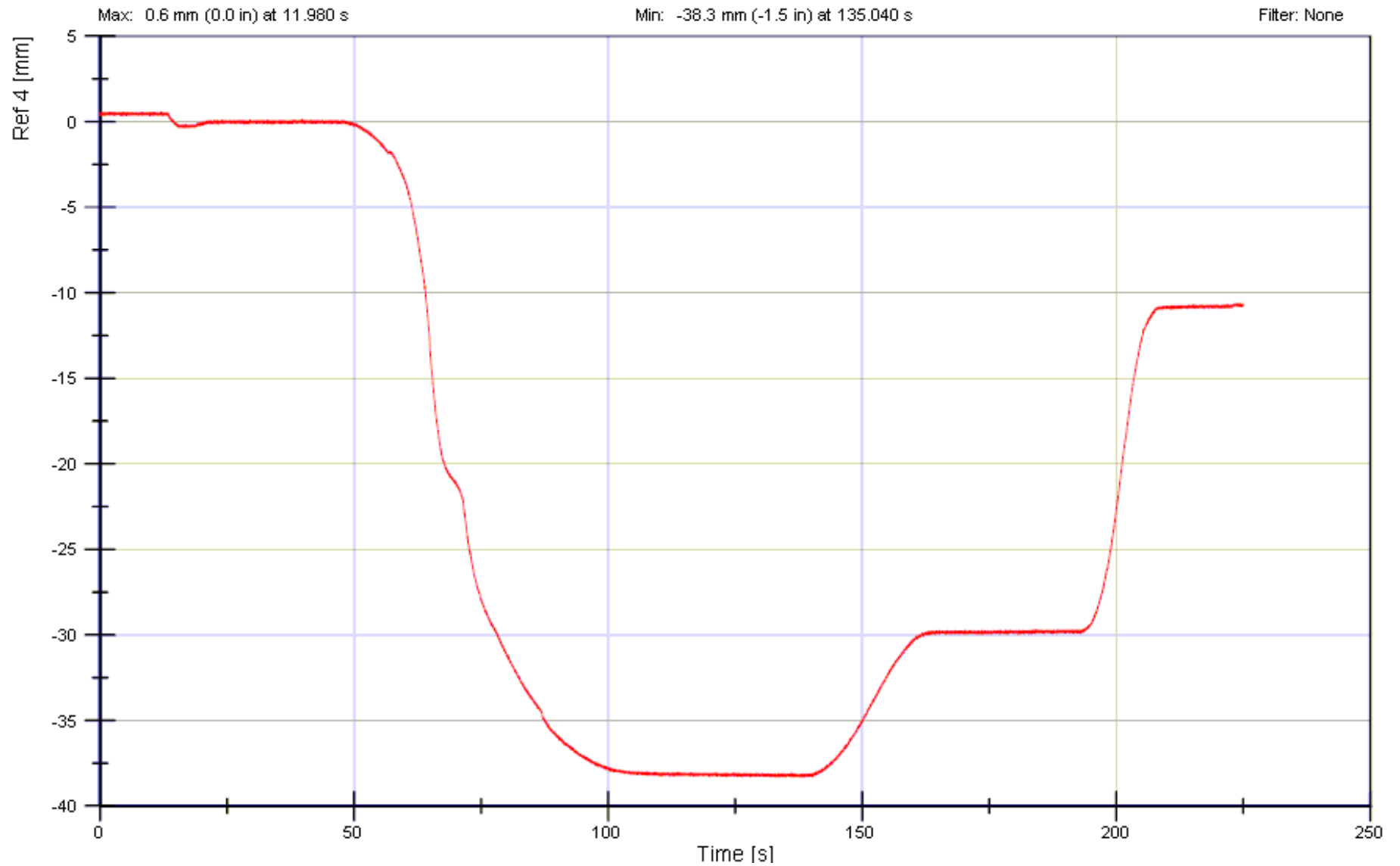
18881 IMMI Way
Westfield IN 46074
(317) 867-8225
www.capectesting.com

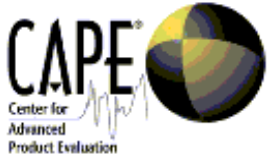
Test ID: CTR11780-002

Title: Front Left Displacement

Test Date: 06/26/2017

Comment:





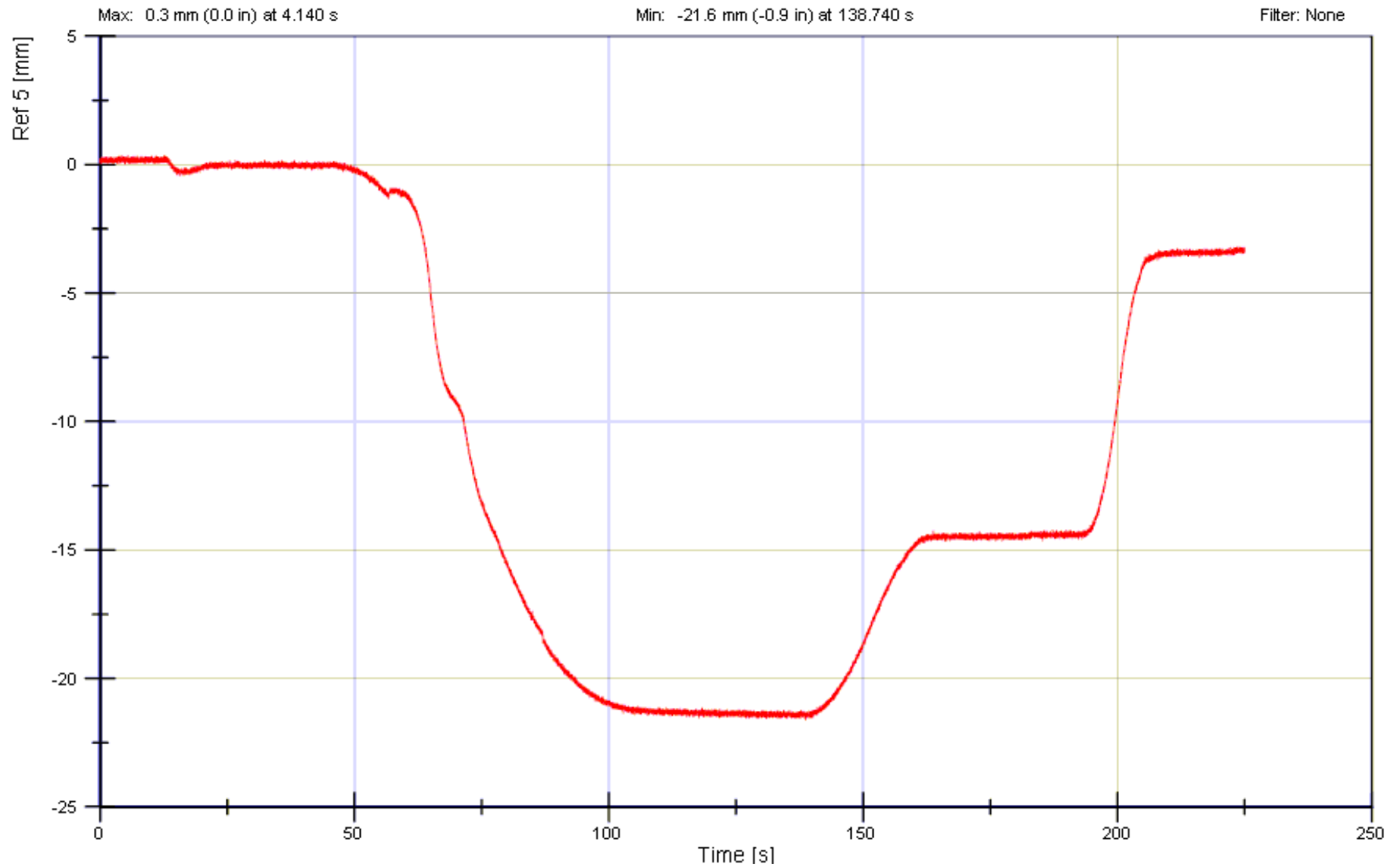
18881 IMMI Way
Westfield IN 46074
(317) 867-8225
www.capeesting.com

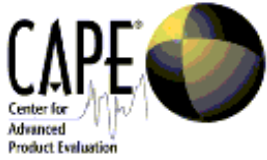
Test ID: CTR11780-002

Title: Front Right Displacement

Test Date: 06/26/2017

Comment:





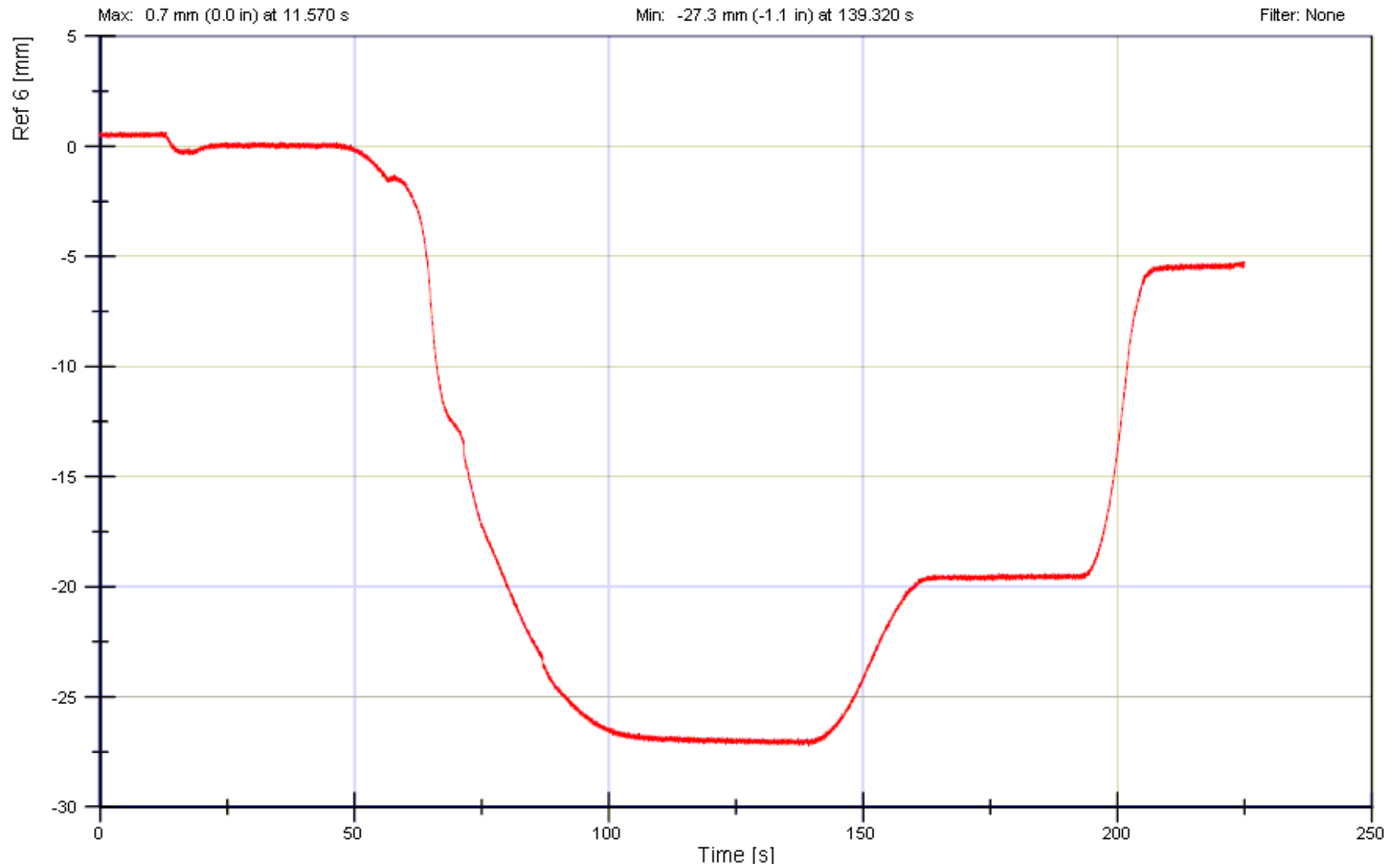
18881 IMMI Way
Westfield IN 46074
(317) 867-8225
www.capetesting.com

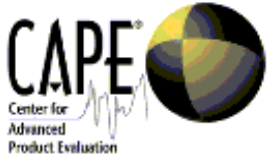
Test ID: CTR11780-002

Title: Rear Right Displacement

Test Date: 06/26/2017

Comment:





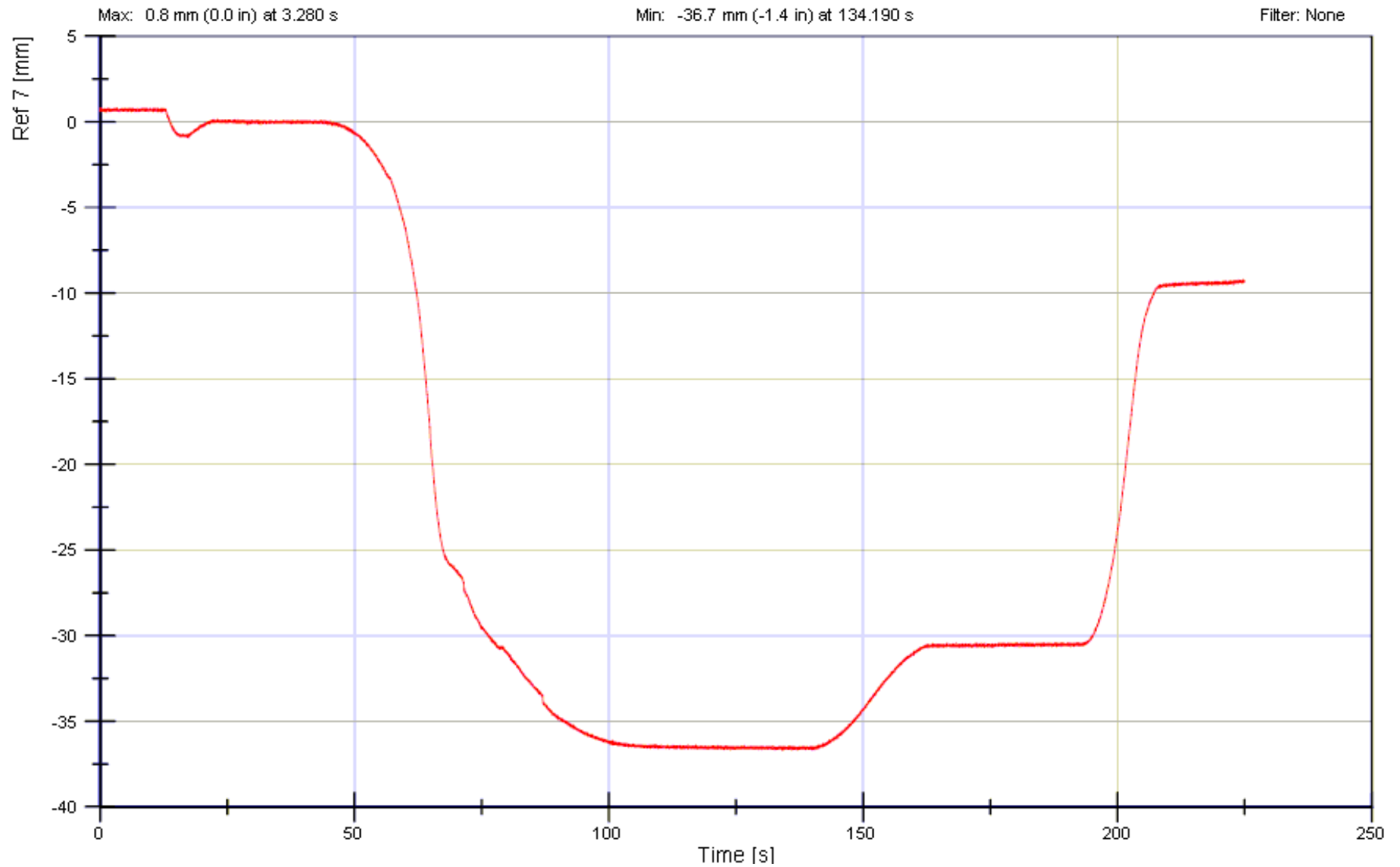
18881 IMMI Way
Westfield IN 46074
(317) 867-8225
www.capetesting.com

Test ID: CTR11780-002

Title: Rear Left Displacement

Test Date: 06/26/2017

Comment:





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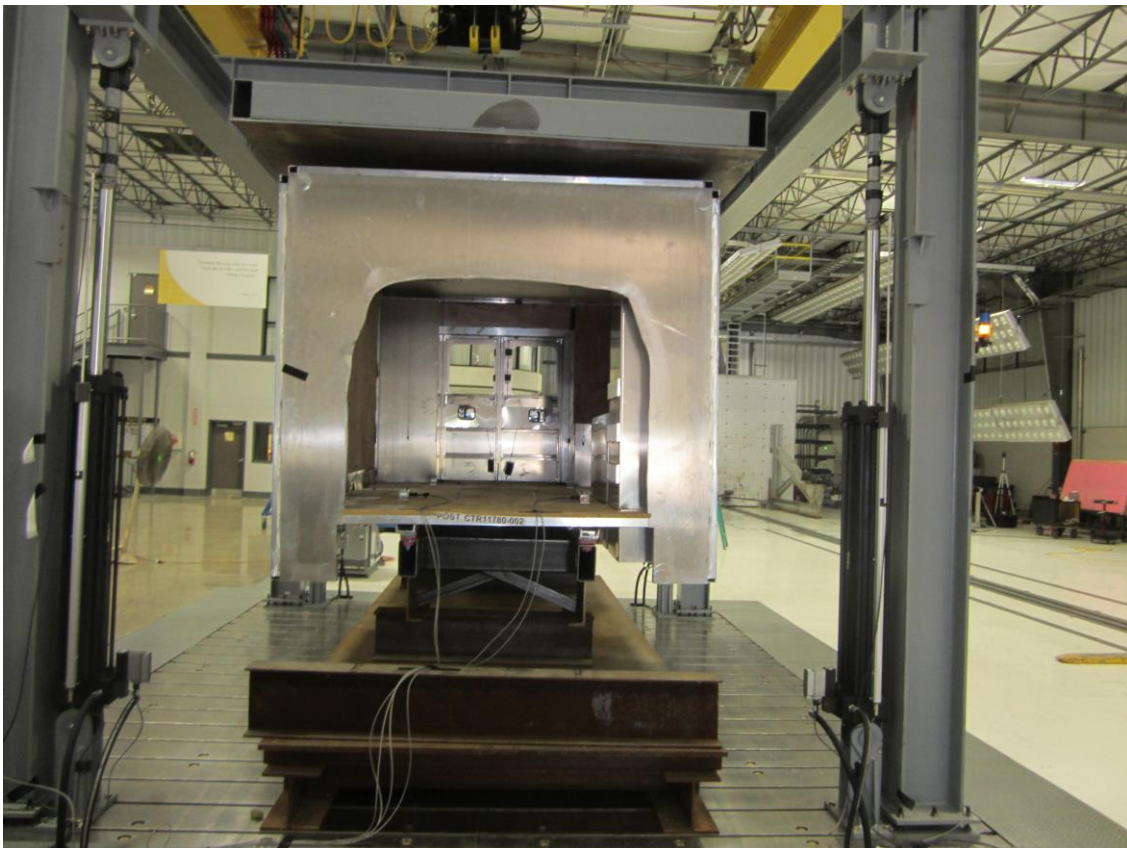
Test ID: CTR11780-002
 Test Date: 06/26/2017

Title: TEST SUMMARY
 Comment:

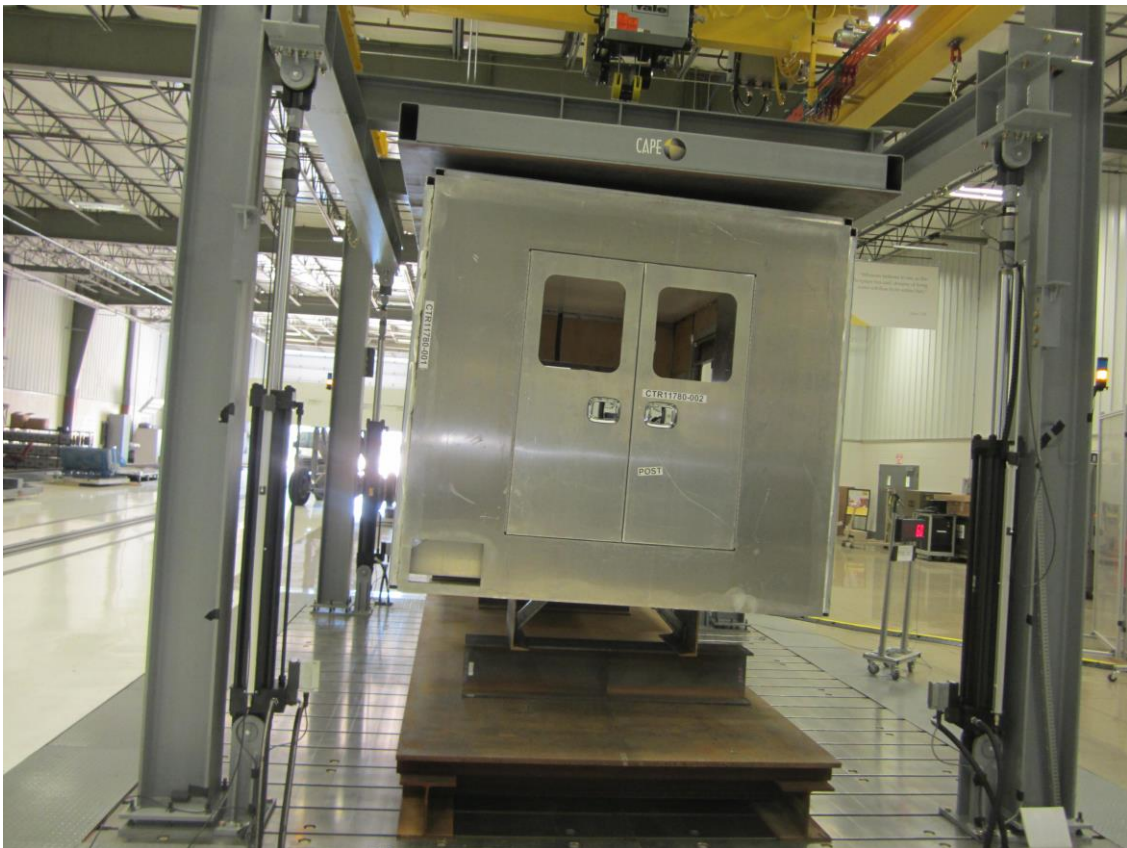
Description	Cylinder/Aux #	Units	Min. at	Seconds	Max. at	Seconds
Total Load	Axis 8 Force	N	-399.9	209.0	155798.2	132.1
Total Load	Axis 8 Force lbf	lbf	-89.9	209.0	35024.8	132.1
Time Above Target Load (152741.0 N)		s		99.3	40.1	139.5
Load Application Rate (N/s)		N/s			2607.3	
Load Application Rate (lbf/s)		lbf/s			586.1	
Front Left Displacement	Ref 4	mm	-38.3	135.0	0.6	12.0
Front Left Displacement	Ref 4 inch	in	-1.5	135.0	0.0	12.0
Front Right Displacement	Ref 5	mm	-21.6	138.7	0.3	4.1
Front Right Displacement	Ref 5 inch	in	-0.9	138.7	0.0	4.1
Rear Right Displacement	Ref 6	mm	-27.3	139.3	0.7	11.6
Rear Right Displacement	Ref 6 inch	in	-1.1	139.3	0.0	11.6
Rear Left Displacement	Ref 7	mm	-36.7	134.2	0.8	3.3
Rear Left Displacement	Ref 7 inch	in	-1.4	134.2	0.0	3.3



CTR11780-002 Post-Test Photographs











CTR11780

CTR11780

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