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Load Tests of the Charles W. Cullen Bridge at Indian River Inlet

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January, 2016

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Executive Summary

The following is a summary of findings from a series of four controlled load tests conducted by The University of Delaware Center for Innovative Bridge Engineering on the new Charles W. Cullen Bridge at the Indian River Inlet.

The Charles W. Cullen Bridge at the Indian River Inlet, also commonly referred to as the Indian River Inlet Bridge (IRIB), is a 1,750-foot long cable stayed bridge with a 950-foot main span and two 400-foot back spans. The bridge has an out-to-out with of 106 feet, 2 inches and carries four lanes of traffic, two shoulders, and a 12-foot wide pedestrian walkway. The walkway is located on the east side of the bridge. Steel was precluded by the owner as a material option because of the bridge's close proximity to the Atlantic Ocean and the heavy presence of chlorides. Another constraint imposed on the design was that the horizontal clearance was to be 900 feet, to allow for possible future widening of the inlet channel.

Construction of the bridge began in 2009 with the driving of piles for the pylons. The bridge was opened to limited traffic in the winter of 2012 and was opened to full traffic in May of 2012.

A structural health monitoring (SHM) system with 7 different types of sensors to measure strain, tilt, displacement, acceleration, wind speed and direction, chloride, and temperature, at various locations on the bridge. In total, 150 sensors are installed on the bridge. The different sensors were selected to measure the structural response of the bridge under various environmental loads and live load conditions. Because strain, tilt, and bearing displacement are the primary focus of the controlled load tests, these sensors are described in the most detail, and the data from these sensors will be the primary focus of the evaluation.

A series of four controlled load tests were scheduled and conducted to coincide with the opening of the bridge to full traffic (April 30, 2012), after six months of service (November 28, 2012), one year of service (May 9, 2013), and two years of service (May 7, 2014). The load tests were conducted using the permanent structural monitoring system on the bridge and up to six test vehicles with a maximum combined weight of 380 kips.

Based on the tests, a standard set of truck passes has been established. Evaluation of the recorded response confirms that the SHM system is functioning properly and that the bridge is behaving as expected. Further evaluation has allowed peak response to be determined for the strain, tilt, and displacement sensors and all of the load configurations. Load distribution characteristics of the bridge deck have also been determined.

Finally, the results of the first two tests have been used to establish a baseline against which the results of future tests can be compared. By establishing a baseline, the owner, the Delaware Department of Transportation, can compare the results of future tests to this baseline to determine if there has been any change in the behaviour of the bridge that might indicate deterioration or damage to the bridge. The one year and two year tests have been compared to the baseline response and the comparison indicates that that little change has occurred and the

bridge remains in a condition very similar to when it was first opened to traffic in 2012.

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1 Introduction

The University of Delaware Center for Innovative Bridge Engineering conducted a series of four controlled load tests on the new Charles W. Cullen Bridge at the Indian River Inlet. The tests were scheduled and conducted to coincide with the opening of the bridge to full traffic (April 30, 2012), after six months of service (November 28, 2012), one year of service (May 9, 2013), and two years of service (May 7, 2014). The load tests were conducted using the permanent structural health monitoring (SHM) system on the bridge. During the load tests, live loads were applied using up to six test vehicles with a maximum combined weight of 380 kips. The results of the early tests (zero and six months) established a baseline for the new bridge response against which the results of future tests can be compared. This comparison has been done with the one year and two year tests and is reported herein. By having an established baseline, the owner, the Delaware Department of Transportation, can compare the results of any future test to this baseline to determine if there has been a change in the behaviour of the bridge that might indicate deterioration or damage to the bridge.

Presented in this report is a description of the bridge, a description of the monitoring system, the test procedures, the results of the individual tests, a comparison of the results of the four tests, and recommendations for future testing, and conclusions.

2 Description of the bridge

The new Charles W. Cullen Bridge at the Indian River Inlet, also commonly referred to as the Indian River Inlet Bridge (IRIB), is a 1,750-foot long cable stayed bridge with a 950-foot main span and two 400-foot back spans. The bridge has an out-to-out with of 106 feet 2 inches and carries four lanes of traffic, two shoulders, and a 12-foot wide pedestrian walkway. The walkway is located on the east side of the bridge. A steel superstructure was precluded by the owner as a material option because of the bridge’s close proximity to the Atlantic Ocean and the heavy presence of chlorides. Another constraint imposed on the design was that the horizontal clearance was to be 900 feet, to allow for possible future widening of the inlet channel (currently 500 feet).

The bridge was designed using a combination of precast and cast-in-place reinforced concrete. There are two sets of twin pylons which each reach a height of 248 feet above the ground. The pylons have a hollow box shape that is uniform below the deck level and then taper to the top of each pylon. Only a grade beam connects the twin pylons at their base – designers were able to eliminate the conventional cross-strut typically seen in bridges of this type through the use of an aerodynamically efficient cross-section and by minimizing the eccentricity of the stay plane with respect to the centroid of the cross-section. The pylons were cast-in-place using slip-form construction. The pylons are supported on a 10-foot thick spread footing that is supported by 42 prestressed concrete piles. The deck consists of two edge girders, transverse floor beams spaced at 12 feet on center, and a cast-in-place deck. The portions of the deck over land, comprising approximately 66% of the span, were constructed on falsework, which was faster and more economical. In this region, the floorbeams were precast pretensioned I-sections that taper in depth from the center to their ends. The edge girders, which are roughly rectangular in shape, are 6 feet deep and 5 feet wide. They are continuous and were cast-in-place. The regions over water were constructed in 24 foot sections using a form traveller. Post-tensioning was used in the deck, edge girders, and the connection of the precast floorbeams to the edge girders. There are a total of 152 stays, 38 per pylon; 19 stays emanate from each side of the pylons and are anchored to the edge girder on 24-foot centers. The stay cables consist of seven wire strands in bundles of 19 to 61. The strands are waxed and encapsulated in high-density polyethylene sheathing. The stays are enclosed in an HDPE pipe with a raised helical strake to minimize the potential for wind-rain induced vibrations. The bridge is fixed at the northern pylon and is free to expand at the south pylon and abutments. A more detailed description of the bridge design and construction can be found in Nelson (2011).

Construction of the bridge began in 2009 with the driving of the piles for the pylons. The bridge was opened to limited traffic in the winter of 2012 and was completed and open to full traffic in May of 2012.

3 Description of the monitoring system

The SHM system includes 7 different types of sensors to measure strain, tilt, displacement, acceleration, wind speed and direction, chloride, and temperature, at various locations on the bridge. In total, 150 sensors are installed on the bridge. The different sensors are designed to measure the structural response of the bridge under various environmental loads and live load conditions. Because strain is the primary focus of the controlled load test, these sensors are described in the most detail, and the resulting data from these sensors will be the primary focus of the evaluation.

A general layout sketch that shows the locations of the strain and displacement sensors on the bridge is shown in . To aid in describing the SHM system and sensor layout, a three dimensional Cartesian coordinate system is thought to be placed on the bridge (with the origin at the southwest corner of the bridge roadway). The X direction is along the length of the bridge, positive pointing north. The Y direction is perpendicular to X, in the plane of the road, positive pointing west. The Z direction is perpendicular to X and Y, positive pointing up.

Each sensor has two designations, the “CMS” designation which is shorter and was set up primarily for the convenience of displaying and referencing within the SHM monitoring system, and the “UD” designation, which is somewhat longer but more descriptive, and therefore is convenient for quick recognition and reporting purposes, particularly for those who do not work with the system on a regular basis. The CMS designation is 4 to 6 characters. The first character denotes the type of measurement (“A” for acceleration, “S” for strain, etc). This is followed by a “dash.” For strains, displacements, and tilts, the third character refers to the sensor cardinal location on the bridge (i.e., “E” for “East”, “W” for “West”, etc). For strains in the pylons this is followed by another directional designator to denote the pylon cardinal face in which the sensor is located. For accelerations the third character denotes the measurement direction (“X”, “Y”, or

“Z”), the fourth character is the directional designation of the pylon in which it is located, and this is followed by a numeric designation. Examples of the CMS designation are presented in Table 3.1. The UD designation is a 6 to 10 character designation. The first character denotes the type of measurement, similar to the CMS first character (chloride sensors are defined by their first two characters). The next one or two characters denote the member, i.e., “D” for deck, “S” for stay, “P5” for pylon 5, or “P6” for pylon 6. The next character denotes the sensor cardinal location on the bridge (i.e., “E” for “East”, “W” for “West”). This is followed by an “underscore” character “_”. The remaining characters define the location of the sensor on the bridge and, if needed, the sensory direction. For example, “108B” refers to section 108 and bottom of the edge girder; “TOPX” refers to the top of a pylon measuring in the X direction. Examples of the UD designation are also shown in Table 3.1. A view of the sensor layout, as viewed in “Intellioptics” (explained below) is shown in Figure 3.2.

Strain is measured at 70 locations on the bridge, including in the edge girders, pylons, and deck. All of the strain measurements are made using Micron Optics os3600 strain sensors. The sensors have a gauge length of 9.8 inches, a range of +/- 2500 $\mu\varepsilon$, and a sensitivity of 1.2 pm/$\mu\varepsilon$. Figure 3.3 shows the strain sensor with the mounting brackets used to anchor it to reinforcing steel.

Strain is measured in the pylons at 24 different locations. The pylon sensors are placed in groups of 4 at different elevations, measuring the vertical (Z direction) strain in each wall of the pylon. In pylon 5 East the strains are measured at the B1 level (elevation 18’) and at lift T4 (elevation 115.5’). In pylons 6 East and 6 West the strains are measured at lift T1 (elevation ~52 ft) and T4 (elevation 115.5’). Cross-sections of the pylons which show the locations of the strain sensors are shown in Figure 3.4 through Figure 3.6. The photograph in Figure 3.7 shows a strain sensor mounted to the rebar in the pylon.

Strain is measured at 11 different longitudinal positions along the length of the bridge. The longitudinal positions correspond to approximately 1/8 points on the main span and back spans. At each position the strain is measured in both the top and bottom of both the east and west edge girders (i.e., 4 unique strain measurements at each longitudinal position). As a result, edge girder strain is measured at 44 locations. In all cases the strain in the edge girder is measured in the longitudinal (X) direction. At any given edge girder location the strain is measured in the top of the edge girder, approximately 5 inches from the top of the girder, and in the bottom of the edge girder, approximately 5 inches from the bottom of the girder. The strains are measured at the approximate transverse center of the cross section. A cross-section of the edge girder that shows general location of the strain sensors in the girder is shown in Figure 3.8. The photograph in Figure 3.9 shows a strain sensor mounted at the top of the rebar cage of the edge girder.

Strain is measured at 2 locations in the deck. In both cases the strain is measured in the Y direction (transverse to the travel direction). These sensors are located 6” up from the bottom face of the deck and are anchored to the side of the upper mat of rebar. The deck strain sensor locations are shown in Figure 3.2.

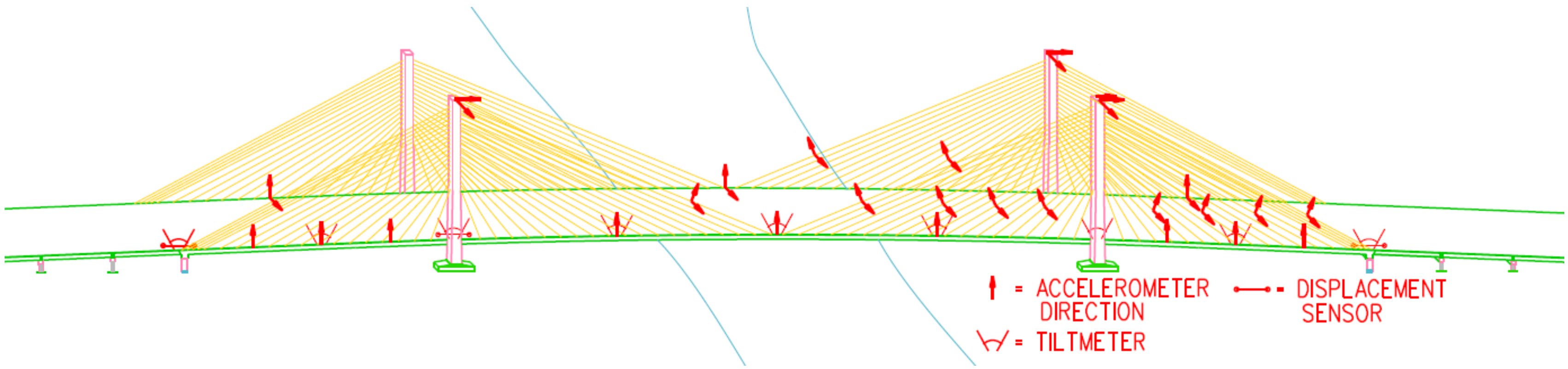
Tilt (rotation/slope) of the bridge deck is measured at 9 different longitudinal positions along the length of the bridge. The longitudinal positions correspond to both ends, at both pylons, at mid-span, at the quarter points of the main span, and at mid-span of both back spans. Rotation is measured about the Y axis, positive being counterclockwise when viewing the bridge from the east toward the west. All sensors are located on the top of the east edge girder, with the exception of the sensor at pylon 5 east, which is mounted to the bottom of the deck next to the bearing displacement transducer. Tilts are measured using FBG Tech model FBG-TI-310 sensors, which have a measurement range of +/- 3 degrees, a sensitivity of greater than 450 pm/deg, resolution of +/- 0.05FS. Figure 3.10 shows a tilt senor mounted to the bottom of the deck at pylon 5 east.

Displacement at each of the two expansion joints and at the bearing on pylon 5 East are measured using a Cleveland Electric Labs model ATG-FOLS-7126-20 displacement transducer. The transducers have a range of 20 in and a resolution of 0.05 inches. In all cases the transducer is positioned on the east side of the bridge and measures the longitudinal movement, in the direction of traffic, i.e., the X direction. The location of the displacement transducers are shown in Figure 3.1. The transducers at pier 4 and pylon 5 are mounted such that a positive displacement indicates a movement of the bridge toward the south; at pier 7 a positive displacement indicates a movement of the bridge toward the north. Figure 3.11 shows the displacement sensor installed at pier 4. It should be noted, however, that all three the displacement gauges were replaced after the first load test because of corrosion that was occurring on the sensor plunger and other key components. The corrosion was believed to have affected the sensor operation and therefore the measurements during load test 1.

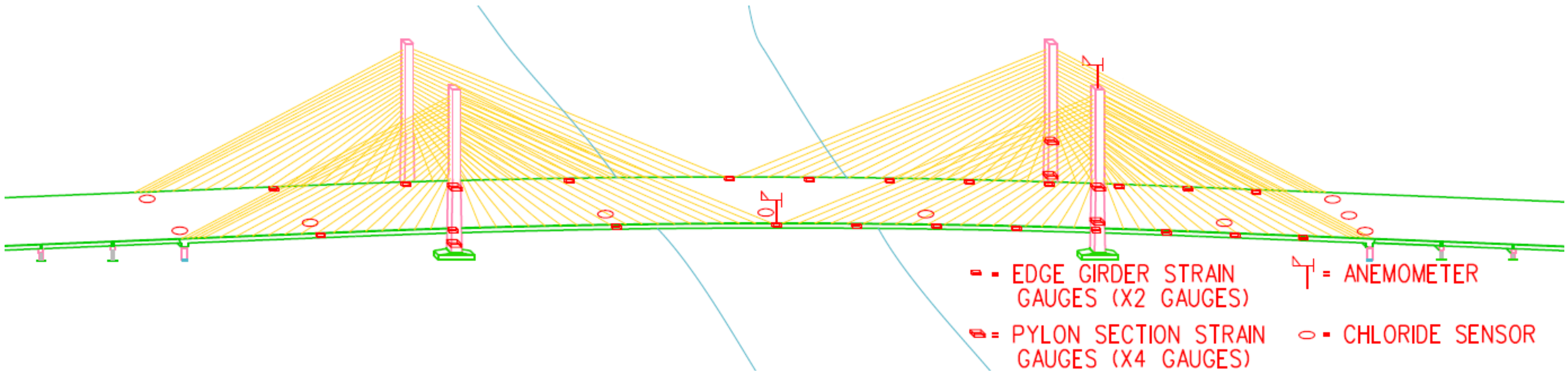
The heart of the fiber-optic system are two Micro Optics SM130 Interrogators. Each interrogator has 4-channels, but a 16 channel multiplexer is connected to each which increases the effective number of main fibers of the system to 32. Interrogator "A" can sample at a maximum rate of 500 Hz; the unit is normally set to run at 125 Hz and handles all of the sensors except the accelerometers and a few strain sensors. Interrogator B can sample at a maximum rate of 1000 Hz; the unit is normally set to run at 250 Hz and handles all of the accelerometers and the few remaining strain sensors. The back end control software for the system is Micro Optic's "Enlight" software. This is where all of the fundamental control parameters for the system are set and the sensor parameters are stored. On the front end is running Cleveland Electric Labs/Chandler Monitoring Systems, "Intellioptics" software. This is a GUI program that provides overall control and database management of the SHM system. Figure 3.12 shows the control cabinet in the communications hut underneath the bridge.

Table 3.1 CMS/UD sensor designation nomenclature

Sensor	CMS Nomenclature		UD Nomenclature	
	Example	Description	Example	Description
Pylon acceleration	A-XE3	Acceleration, X-direction, east pylon, number 3	APE6E_TOPX	Acceleration, pylon 6 east, east side, top, x direction
Stay acceleration	A-ZW5	Acceleration, Z-direction, west side, number 5	ASW_310Z	Acceleration, stay, west side, section 310, z direction
Deck acceleration	A-ZW1	Acceleration, Z-direction, west side, number 1	ADW_108Z	Acceleration, deck, west side, section 108, z direction
Displacement	D-E3	Displacement, east, number 3	DDE_415	Displacement, deck, east side, section 415
Tilt	T-E7	Tilt, east, number 7	IDE_301	Inclination, deck, east side, section 301
Edge girder strain	S-W4	Strain, edge girder west, number 4	SDW_108B	Strain, deck, west side, section 108, bottom
Pylon strain	S-W23N	Strain, pylon, number 23, north face	SP6W_T1N	Strain, pylon 6, west side, lift T1, north face



(a) Acceleration, tilt, and displacement sensors



(b) Strain, anemometer, and chloride sensors

Figure 3.1. View showing sensor layout on the bridge (not shown are deck strain gauges and temperature sensors)

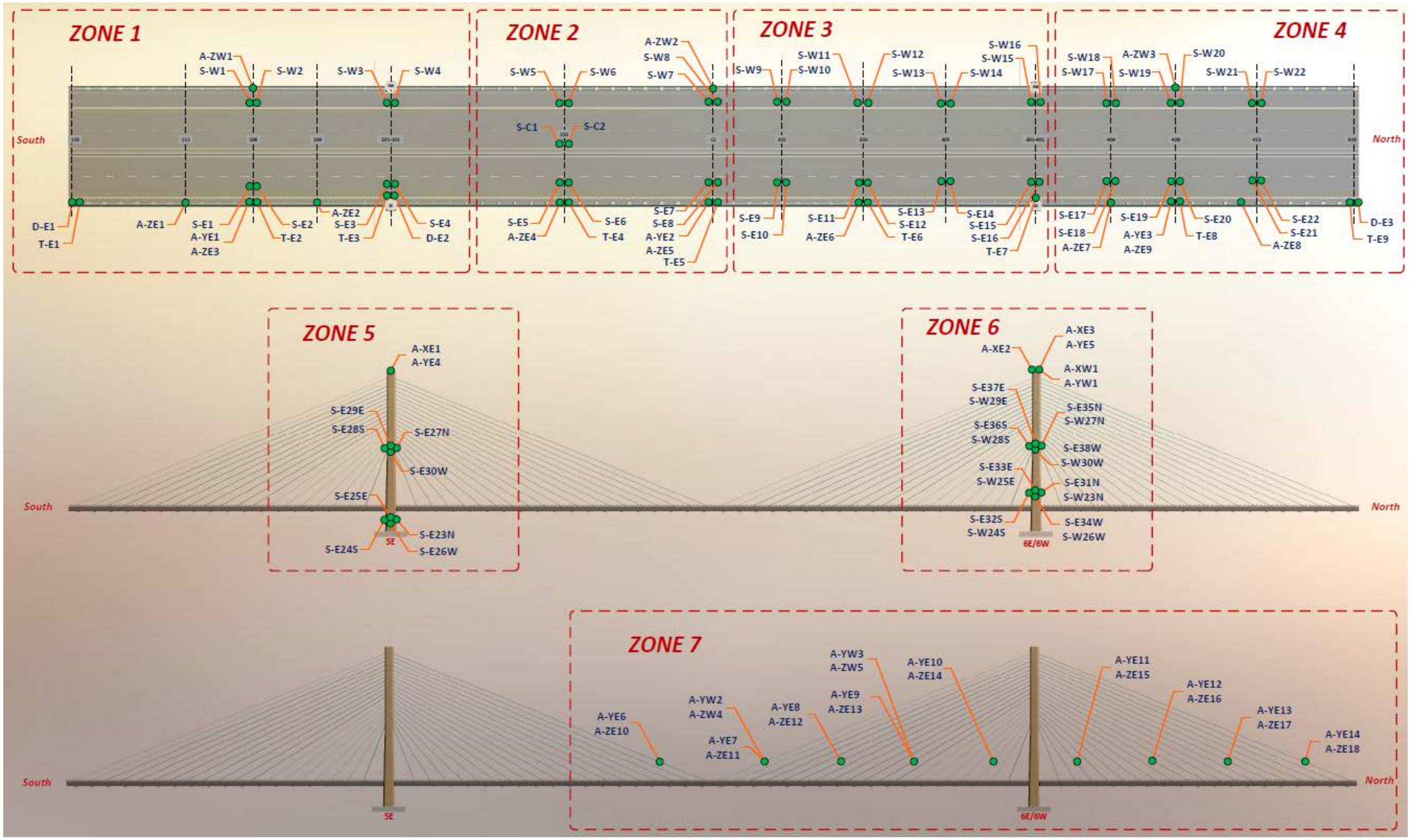


Figure 3.2. View showing sensor layout on the bridge as viewed in *Intellioptics* (CMS sensor notation; not shown are chloride sensors and temperature sensors)

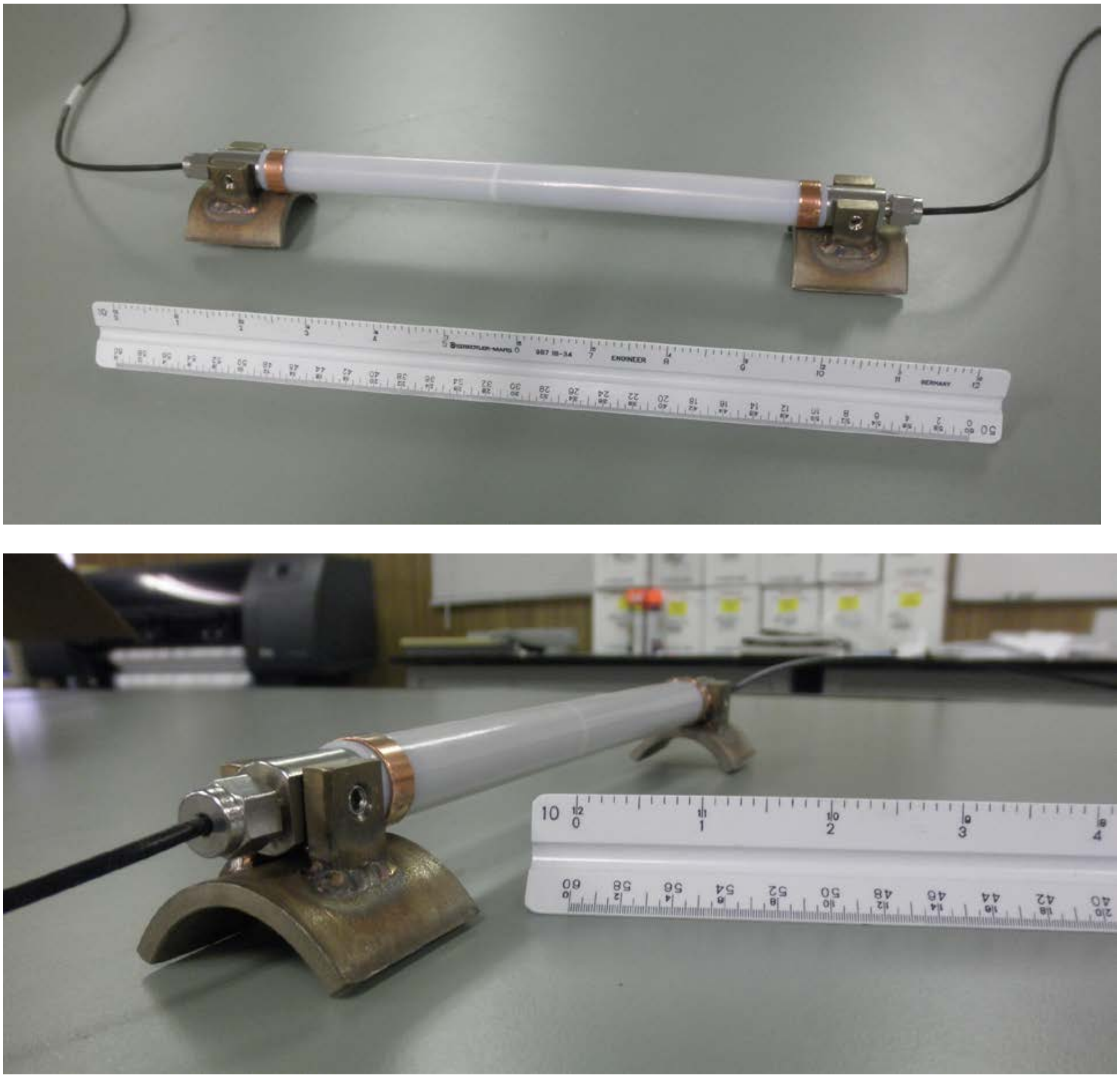


Figure 3.3. Micron-Optics os3600 strain sensor with mounting brackets

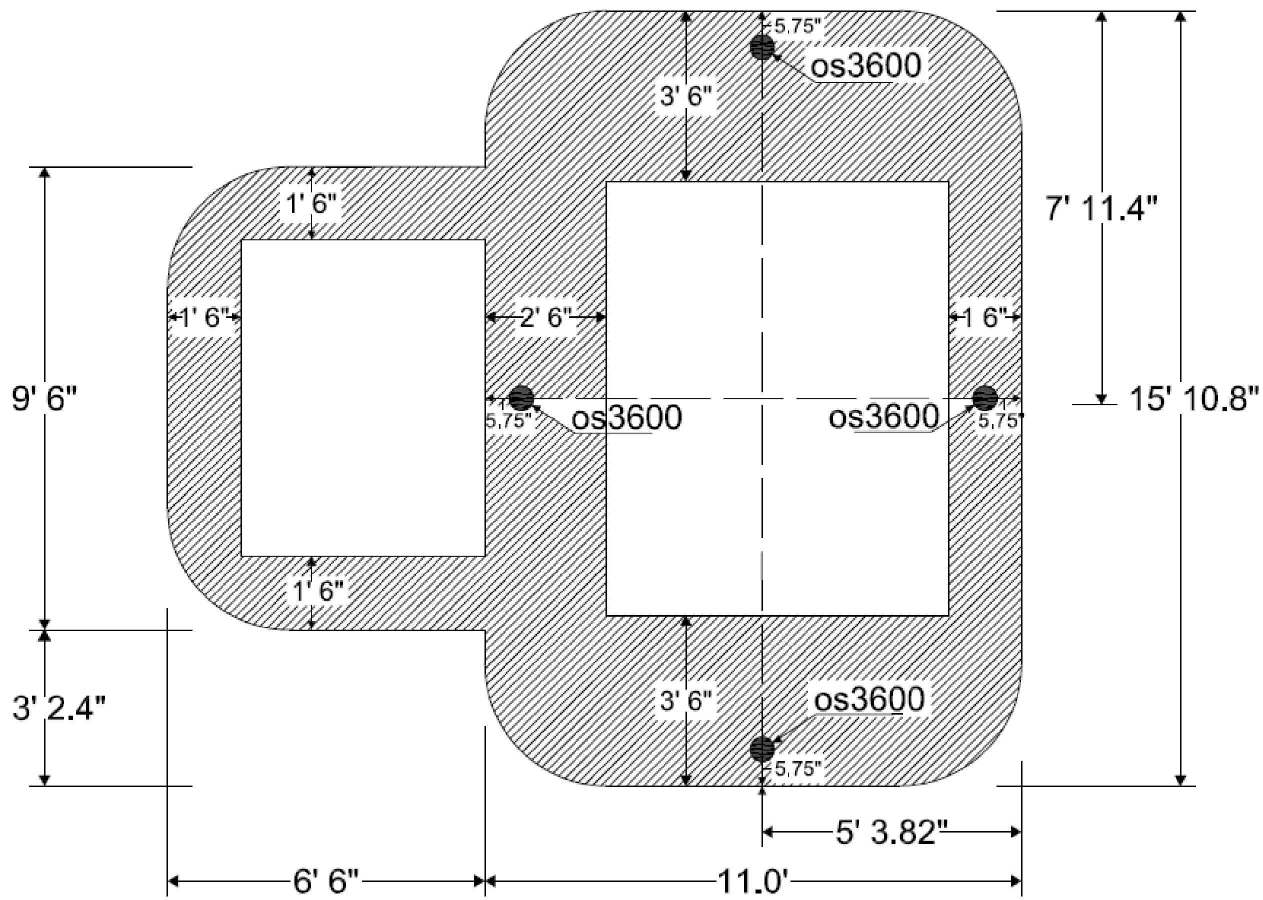


Figure 3.4. Cross-section of pylon 5 East showing location of strain sensors at lift B1 (elevation 18')

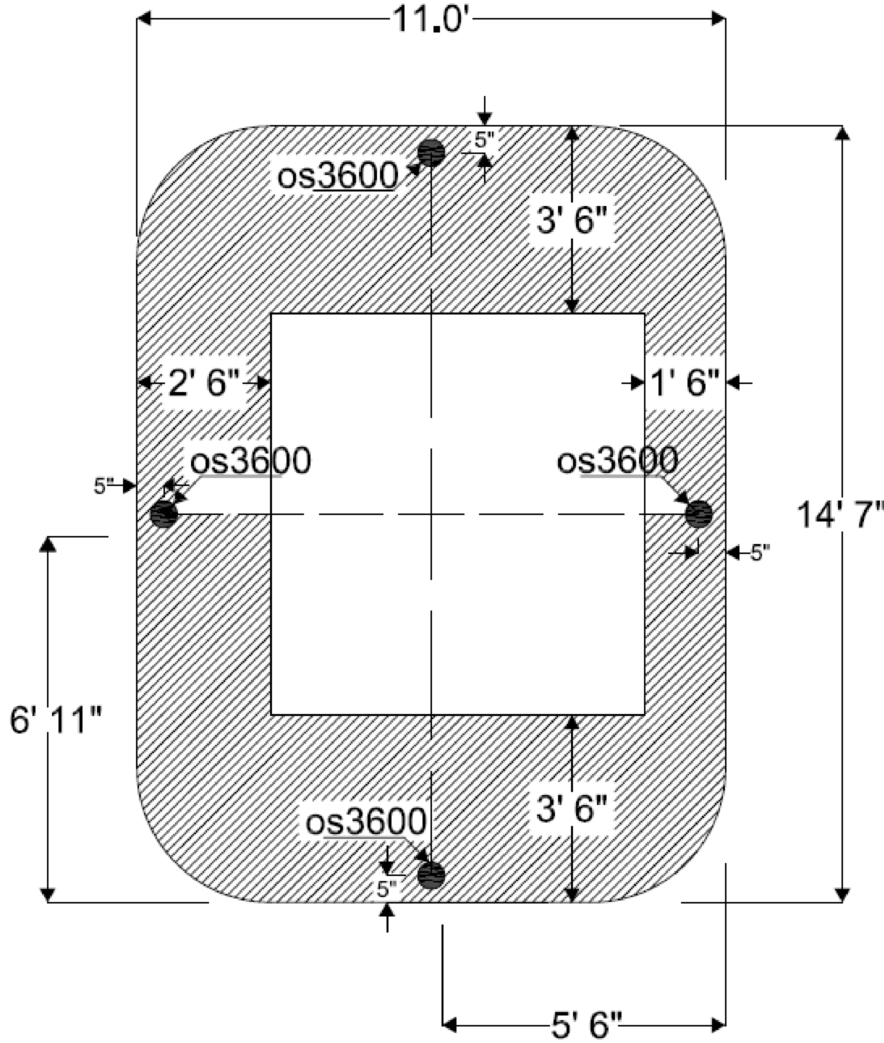


Figure 3.5. Cross-section of pylons 6 East and 6 West showing location of strain sensors at lift T1 (elevation 52')

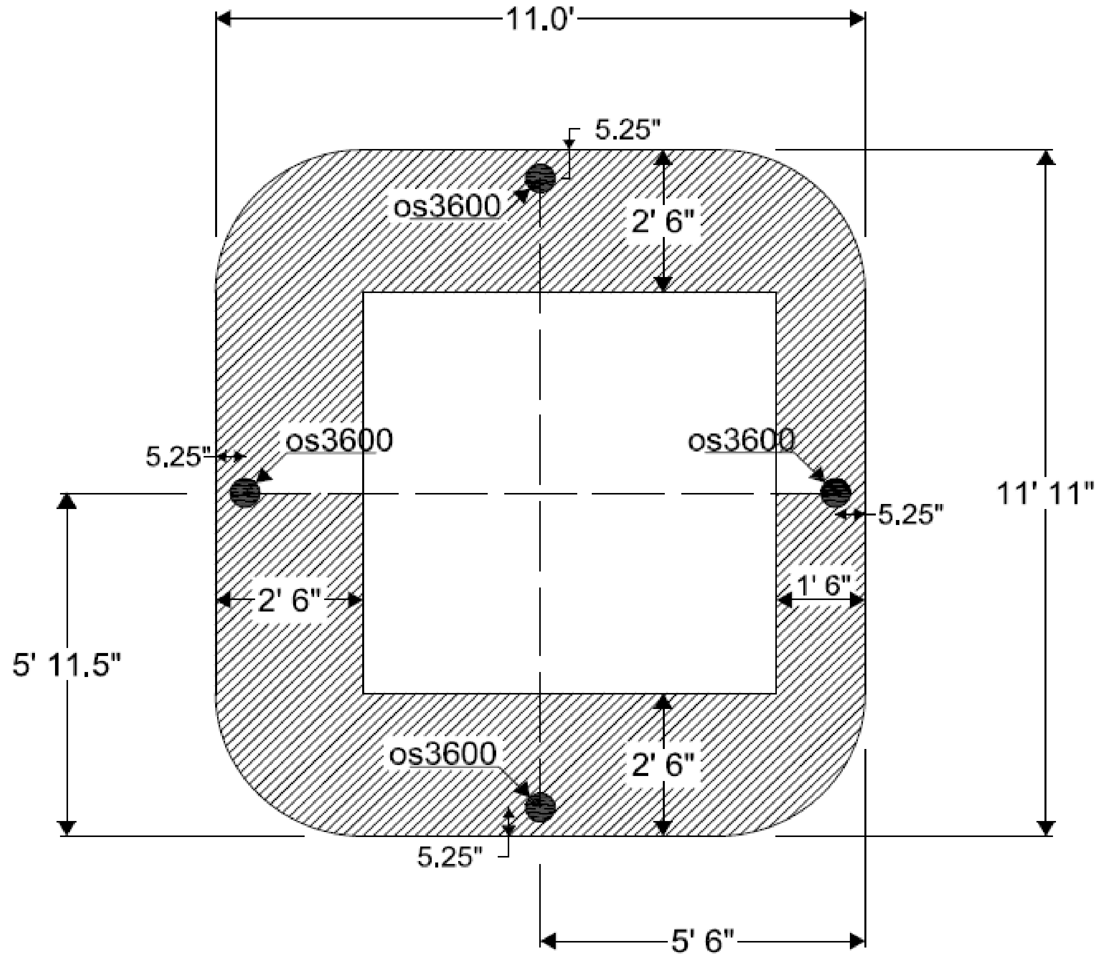


Figure 3.6. Cross-section of pylons 6 East and 6 West showing location of strain sensors at lift T4 (elevation 115.5')

Figure 3.7. Photograph of strain sensor anchored to rebar in pylon

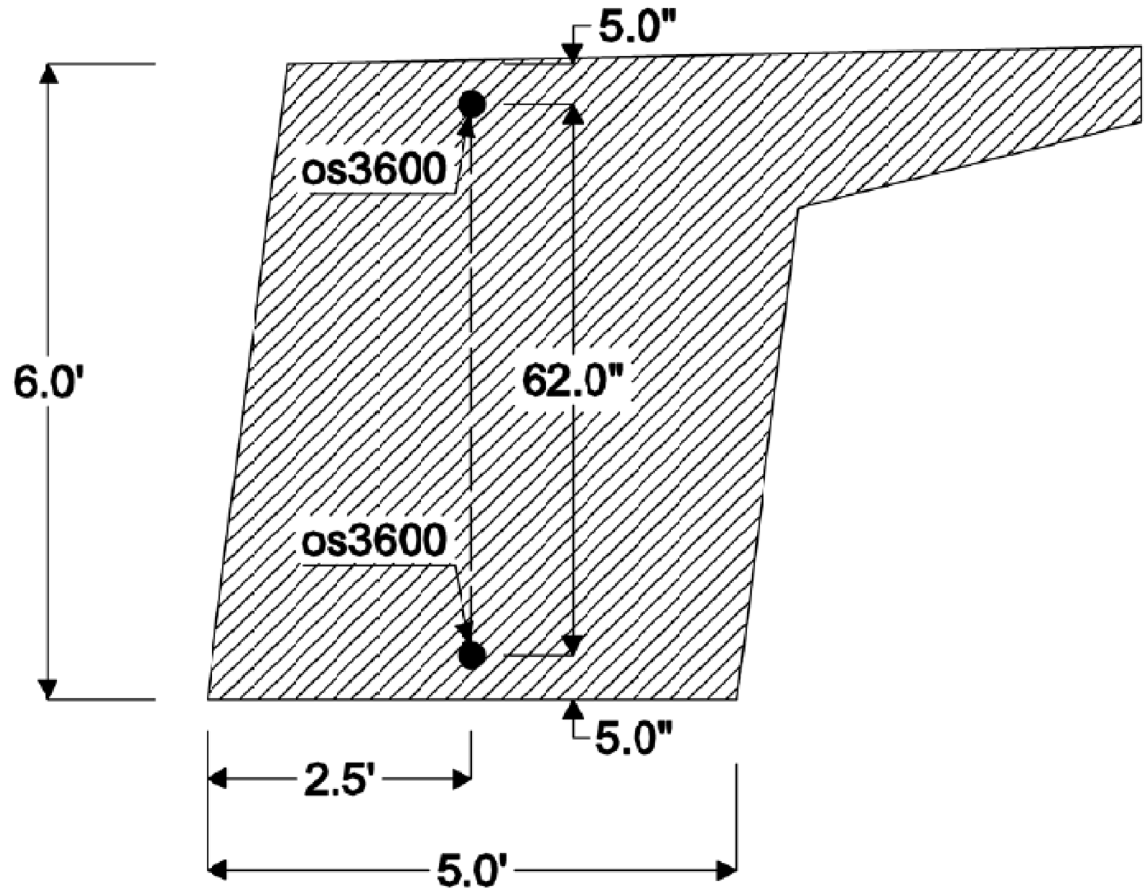


Figure 3.8. Cross-section of edge girder showing location of strain sensors

Figure 3.9. Photograph showing strain sensor installed at top of edge girder

(a) **FBG Tech tilt sensor**

(b) **Sensor mounted to bottom of deck at pylon 5 east**

Figure 3.10. Photograph showing tilt sensor

Figure 3.11. Photograph showing displacement sensor installed at pier 4

Figure 3.12. Photograph showing control cabinet

4 Test procedures

The procedures for the four load tests were all very similar; however, there were unique aspects to each. The general test procedure is described first, followed by a description of the unique elements of each of the four tests.

All of the load tests were conducted during the week, at night. By conducting the test at night and during the week, traffic disruption was minimized. Also, the effects of thermal variations and radiant heating due to the sun were minimized. The tests started at approximately 10:00 pm and lasted until between 1:30 and 3:00 am. Maintenance of traffic was provided by DelDOT crews and the state police: ambient traffic was prohibited from crossing the bridge while data was being collected.

Six loaded 10-wheel dump trucks were used as a controlled live load for all of the tests, except the first test, which used only four trucks. While all of the trucks used for each of the tests were very similar in configuration and the target loaded weights were similar, no effort was made to use the exact same trucks for each test, or require the weights to be exactly the same. The truck axles were weighed offsite by DelDOT; the weights were confirmed onsite using portable truck scales at the first load test. Axle spacing's were measured and recorded for each truck, before the start of each test.

Two different types of load passes (load cases) were made during the tests: slow crawl passes (approximately 5 to 10 mph) and dynamic (approximately 55 mph). Load passes were made using single trucks and also multiple trucks in various configurations: 2, 3, 4, and 6 truck formations. In the report, each truck pass is identified by a *pass number* and a *pass identifier*. The pass number is simply the number that denotes the order in which the pass was made, e.g., 1,2,3, etc, during the test. The pass identifier (2 characters – a number followed by a letter) indicates the number of trucks used in the pass (the number) and the lane configuration and direction of travel (the letter). For example, "1a" is a single truck in the southbound shoulder, "6b" is six trucks side-by-side in all lanes and shoulders. Truck passes with the same *pass identifier* can be considered equivalent from one test to another; truck passes with the same *pass number* may not be equivalent from one test to another. The trucks used in each of the tests along with their weights, and the average truck weight for the test, are shown in Table 4.1. The truck passes with their identifier are shown in Table 4.2 through Table 4.5.

In all cases for the slow passes the truck or trucks were staged a short distance from the beginning of the cable supported spans. The signal was given to start the data collection then the signal was given for the truck or trucks to proceed across the span. Data collection was stopped once the vehicle or vehicles passed off of the cable supported spans. During the first and second load tests the trucks traveled in a southbound or a northbound direction, depending on the pass. In the third and fourth tests, all passes were made in a northbound direction. Figure 4.10 shows two photographs taken during testing.

For the high speed passes the trucks were staged approximately ¼ mile from the start of the cable supported spans. The signal was given to start the data collection and then the signal was given for the truck or trucks to approach the bridge. The trucks were instructed to cross the bridge at the posted speed limit (55 mph) or the maximum speed they could reach. Data collection stopped once the last truck was off the cable supported spans. Data was collected at a higher sample rate for the dynamic passes.

Two data files were created for each load pass, one from SHM interrogator A and one from SHM interrogator B. The files were given a common pre-fix name and the date and time when the file was created is appended to the file name.

4.1 Load test 1 – April 30, 2012

In the first load test only four trucks were used. The trucks, each identified by their 4 digit number, and their gross weights are listed in Table 4.1. The average truck weight was 63.5 kips. Figure 4.1 shows the wheel spacing's and wheel loads of each truck.

A total of 17 passes were made in the first load test, 15 slow crawl passes and two dynamic passes. The first four passes were single truck passes and were all conducted using the same truck in each of the four lanes. Next, six passes were made with two trucks in specified formations. Lastly, five passes were made in which all four trucks were used in different formations. The pass number, pass identifier, and the truck formations for the slow passes are shown in Table 4.2. The formations are shown in Figure 4.5, Figure 4.6, and Figure 4.8.

The dynamic, or high speed tests, were conducted with all four trucks traveling at approximately 55 mph with approximately 100-foot intervals between the trucks.

In load test 1, data was collected at a rate of 125 samples-per-second on interrogator A and 250 samples-per-second on interrogator B, for both the slow passes and the dynamic passes in load test 1.

4.2 Load test 2 – November 28, 2012

After analyzing the results of load test 1 and reviewing the test procedure, a decision was made to add two more trucks in load test 2. By doing this all lanes and both shoulders could be loaded simultaneously, thereby increasing the strain readings and representing the maximum loading across the width of the bridge. Six trucks were also used in load tests 3 and 4.

The test trucks used, each identified by their 4 digit number, and their gross weights are listed in Table 4.1. The average truck weight was 62.4 kips. Figure 4.2 shows the wheel spacing's and wheel loads of each truck.

A total of 25 passes were made in the second load test, 23 slow crawl passes and two dynamic passes. The first six passes were single truck passes in each of the four lanes and two shoulders. Next, eight two-truck passes were made in different formations and alignments. This was followed by two, three-truck passes, and then five four-truck passes. Finally, six trucks were used to make two passes in a side-by-side formation. The pass number, pass identifier, and the truck formations for the slow passes are shown in Table 4.3. The formations are shown in Figure 4.5 through Figure 4.9.

The dynamic, or high speed tests, were conducted with all four trucks traveling at approximately 55 mph with approximately 100 foot intervals between the trucks.

For the slow passes data was collected at a rate of 125 samples-per-second on interrogator A and 250 samples-per-second on interrogator B. Rates of 125 samples-per-second and 250 samples-per-second were used on interrogator A and interrogator B, respectively, for the dynamic passes.

4.3 Load test 3 – May 9, 2013

After reviewing the results of load tests 1 and 2 a decision was made to reduce the number and variety of load passes. It was determined that the single, four, and six truck passes were the most valuable in understanding the bridge response, and therefore the two and three truck passes were eliminated. However, in an effort to begin to assess the repeatability of the test results, replicate passes were conducted for each configuration in load test 3.

The test trucks used, each identified by their 4 digit number, and their gross weights are listed in Table 4.1. The average truck weight was 60.2 kips. Figure 4.3 shows the wheel spacing's and wheel loads of each truck.

A total of 18 passes were made in the third load test, 16 slow crawl passes and two dynamic passes. The first 12 passes were single truck passes in each of the four lanes and two shoulders. Next, two four truck passes were made with the trucks in a side-by-side formation. Finally, two six-truck passes were made with the trucks in a side-by-side formation. The pass number, pass identifier, and the truck formations for the slow passes are shown in Table 4.4. The formations are shown in Figure 4.5, Figure 4.8, and Figure 4.9. This set of 18 passes has been defined as the "standard" set and will be used for all future tests.

After reviewing the results of the dynamic passes from load tests 1 and 2 a decision was made to use only one truck for the high speed pass in test 3. Even though the vehicles were fairly well separated in the previous tests, there remained concern about possible superposition of effects from multiple vehicles being on the bridge during the test. Therefore, the high speed tests were conducted with only one truck traveling at approximately 55 mph.

After reviewing the results of load tests 1 and 2 a decision was made to reduce the sample rate of the slow pass tests, to reduce the amount of data that was collected: for the slow passes data was collected at a rate of 15.6 samples-per-second on interrogator A. Unfortunately interrogator

B was not activated to record during any of the slow speed passes (1 through 16) and therefore no data was collected for the few strain sensors on interrogator B for those passes. A rate of 125 samples-per-second was set on both interrogator A and B, respectively, for the dynamic passes; data was collected on interrogator B for the high speed passes

4.4 Load test 4 – May 7, 2014

The plan for load test 4 was identical to that of load test 3, with the exception that additional replicate passes were made for one of the single truck configurations and for the six truck configuration.

The test trucks used, each identified by their 4 digit number, and their gross weights are listed in Table 4.1. The average truck weight was 63.4 kips. Figure 4.4 shows the wheel spacing's and wheel loads of each truck.

A total of 26 passes were made in the fourth load test, 24 slow crawl passes and two dynamic passes. The first 18 passes were identical to the 18 conducted in load test 3. To better assess the repeatability of the pass results, additional replicate passes were made of single truck pass 1a (single truck in the southbound shoulder) and the six truck side-by-side pass, 6b. The pass number, pass identifier, and the truck formations for the slow passes are shown in Table 4.5. The formations are shown in Figure 4.5, Figure 4.8, and Figure 4.9.

The high speed tests were conducted with only one truck traveling at approximately 55 mph.

For the slow passes data was collected at a rate of 15.6 samples-per-second on both interrogator A and interrogator B. Rates of 125 samples-per-second were set on both interrogator A and interrogator B, for the dynamic passes.

Table 4.1 Trucks and truck weights: load tests 1 through 4

Load Test 1		Load test 2		Load Test 3		Load Test 4	
Truck #	Gross Weight (kips)	Truck #	Gross Weight (kips)	Truck #	Gross Weight (kips)	Truck #	Gross Weight (kips)
2829	63.2	2969	62.5	2948	59.3	2677	62.4
2677	63.7	2829	63.1	2677	59.9	2771	64.0
2784	63.4	2758	61.2	2829	60.9	2818	63.8
2904	63.6	2784	62.4	2771	60.8	2829	64.0
		2677	62.7	2790	61.0	2863	62.4
		2771	62.4	2904	59.2	2904	64.0
Average	63.5	Average	62.4	Average	60.2	Average	63.4
Sum	253.9	Sum	374.3	Sum	361.1	Sum	380.6

Table 4.2. Truck passes: load test 1

Pass	Identifier	Description	Direction of travel
One truck			
1	1a	southbound slow-lane	SB
2	1d	northbound slow-lane	NB
3	1b	southbound fast-lane	SB
4	1c	northbound fast-lane	NB
Two trucks			
5	2a	side by side, southbound, one fast-lane, one slow-lane	SB
6	2d	side by side, northbound, one fast-lane, one slow-lane	NB
7	2b	2 truck train, southbound, slow-lane	SB
8	2f	2 truck train, northbound, slow-lane	NB
9	2c	2 truck train, southbound, fast-lane	SB
10	2e	2 truck train, northbound, fast-lane	NB
Four trucks			
11	4a	side by side, southbound, one in each lane	SB
12	4c	all trucks traveling northbound in square formation	NB
13	4b	all trucks traveling southbound in square formation	SB
14	4e	4 truck train, northbound, all in slow-lane	NB
15	4d	4 truck train, southbound, all in slow-lane	SB
Four truck high speed passes			
16	4f	4 truck train, ~100 ft spacing, northbound, slow-lane	NB
17	4g	4 truck train, ~100 ft spacing, southbound, slow-lane	SB

Table 4.3 Truck passes: load test 2

Pass	Identifier	Description	Direction of travel
One truck			
1	1e	southbound shoulder	SB
2	1a	southbound slow-lane	SB
3	1b	southbound fast-lane	SB
5	1f	northbound shoulder	NB
6	1d	northbound slow-lane	NB
7	1c	northbound fast-lane	NB
Two trucks			
9	2g	side by side, southbound, shoulder, one slow-lane	SB
10	2a	side by side, southbound, one fast-lane, one slow-lane	SB
11	2b	2 truck train, southbound, slow-lane	SB
12	2h	side by side, northbound, shoulder, one slow-lane	NB
13	2d	side by side, northbound, one fast-lane, one slow-lane	NB
14	2f	2 truck train, northbound, slow-lane	NB
15	2c	2 truck train, southbound, fast-lane	SB
17	2e	2 truck train, northbound, fast-lane	NB
Three Trucks			
4_1	3a	side by side, southbound, shoulder, one slow-lane, one fast-lane	SB
8	3b	side by side, northbound, shoulder, one slow-lane, one fast-lane	NB
Four trucks			
16	4b	all trucks traveling southbound in square formation	SB
18	4c	all trucks traveling northbound in square formation	NB
21	4a	side by side, southbound, one in each lane	SB
22	4e	4 truck train, northbound, all in slow-lane	NB
23	4d	4 truck train, southbound, all in slow-lane	SB
Six trucks			
19	6a	side by side, southbound, one in each lane and shoulder	SB

20	6b	side by side, northbound, one in each lane and shoulder	NB
Four truck high speed passes			
24	4f	4 truck train, ~100 ft spacing, northbound, slow-lane	NB
25	4g	4 truck train, ~100 ft spacing, southbound, slow-lane	SB

Table 4.4 Truck passes: load test 3

Pass	Identifier	Description	Direction of travel
One truck			
1,7	1e	southbound shoulder	NB
2,8	1a	southbound slow-lane	
3,9	1b	southbound fast-lane	
6,12	1f	northbound shoulder	
5,11	1d	northbound slow-lane	
4,10	1c	northbound fast-lane	
Four trucks			
13,14	4a[1]	side by side, one in each lane	NB
Six trucks			
15,16	6b	side by side, one in each lane and shoulder	NB
One truck high speed passes			
17,18	1a	southbound, slow-lane	NB

Table 4.5 Truck passes: load test 4

Pass	Identifier	Description	Direction of travel
One truck			
1,7	1e	southbound shoulder	NB
2,8	1a	southbound slow-lane	
3,9	1b	southbound fast-lane	
6,12	1f	northbound shoulder	
5,11	1d	northbound slow-lane	
4,10	1c	northbound fast-lane	
Four trucks			
13,14	4a[1]	side by side, one in each lane	NB
Six trucks			
15,16	6b	side by side, one in each lane and shoulder	NB
One truck high speed passes			
17,18	1a	southbound, slow-lane	NB
Additional Passes			
19–22	6b	Repeat pass 15 four times	NB
23-26	1a	Repeat pass 2 four times	NB
27		Pedestrian walkway	
29		Ambient data, no traffic on the bridge for 5 min.	

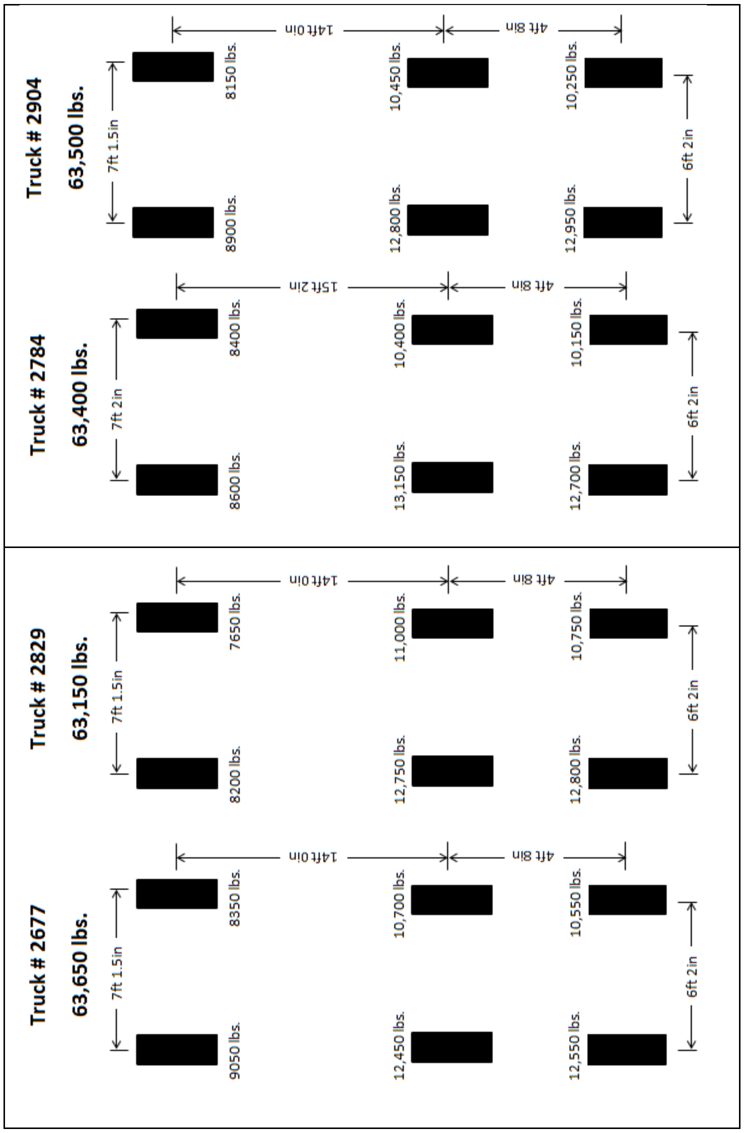


Figure 4.1 Vehicle layouts showing wheel weights: load test 1

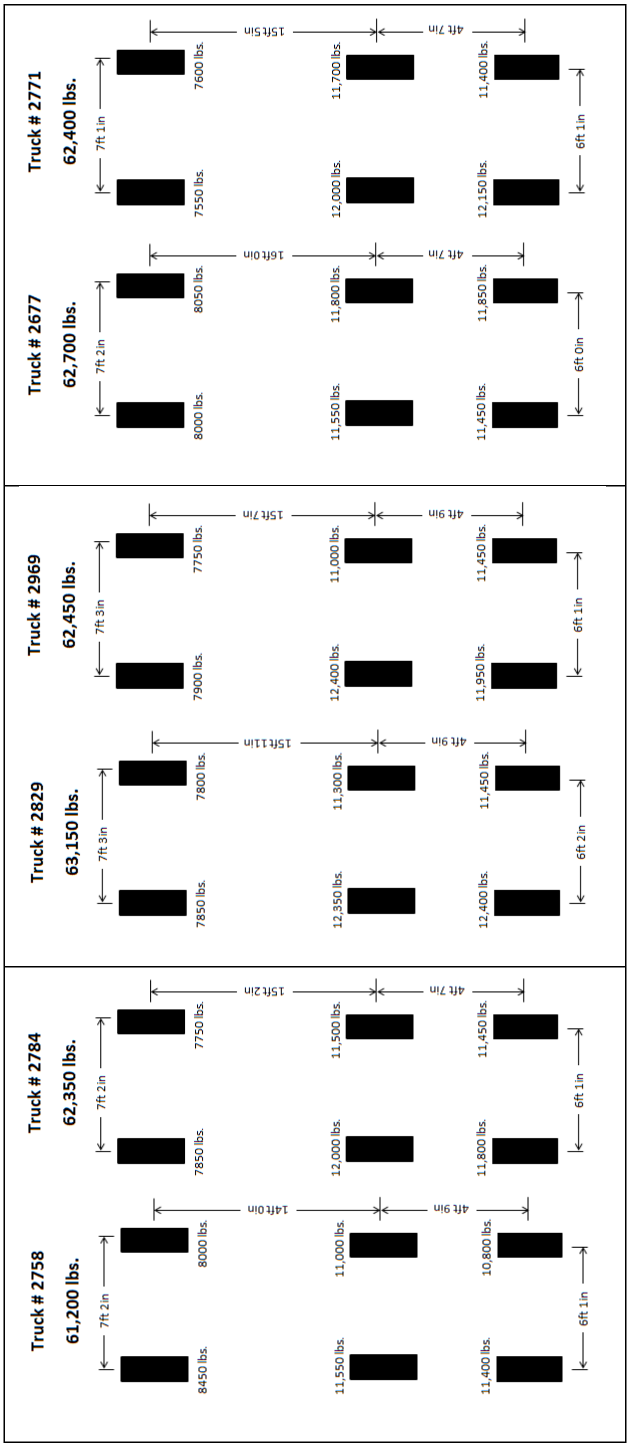


Figure 4.2 Vehicle layout showing wheel weights: load test 2

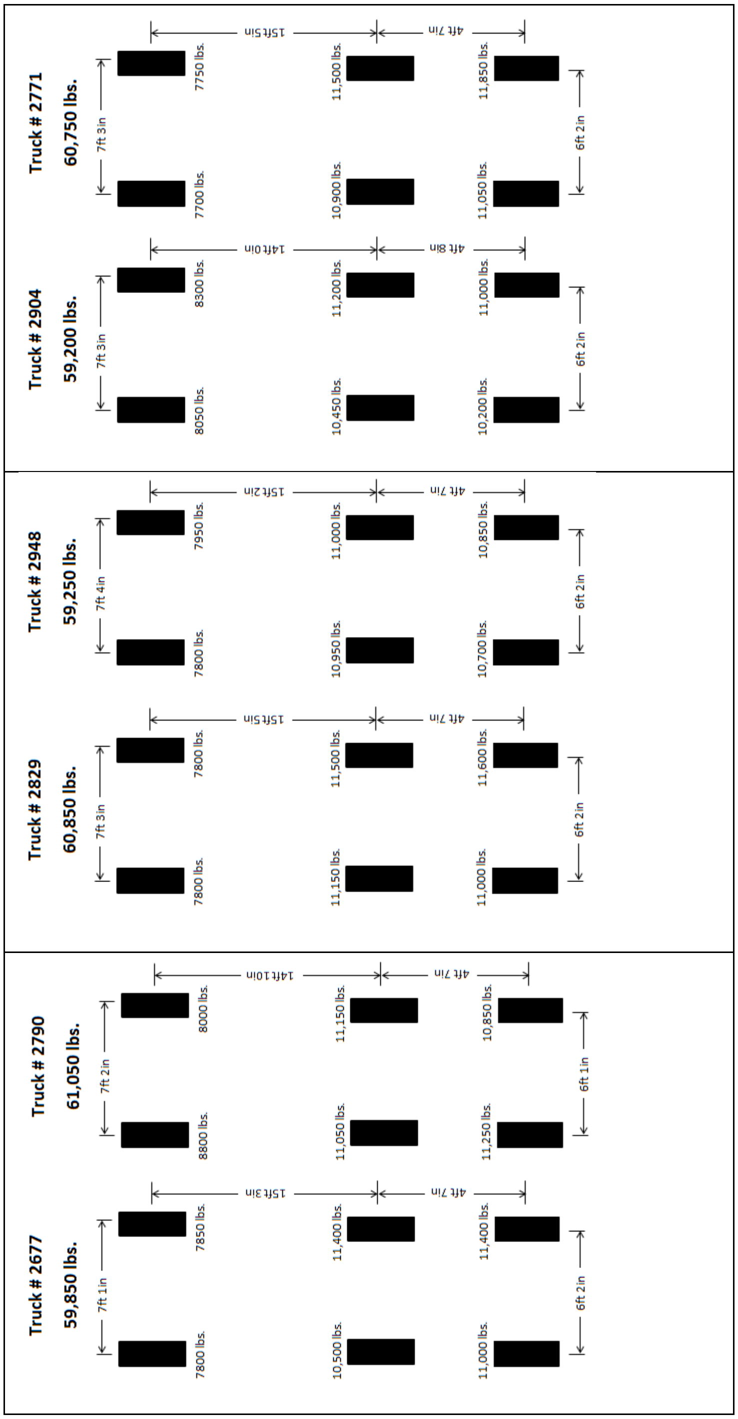


Figure 4.3 Vehicle layout showing wheel weights: load test 3

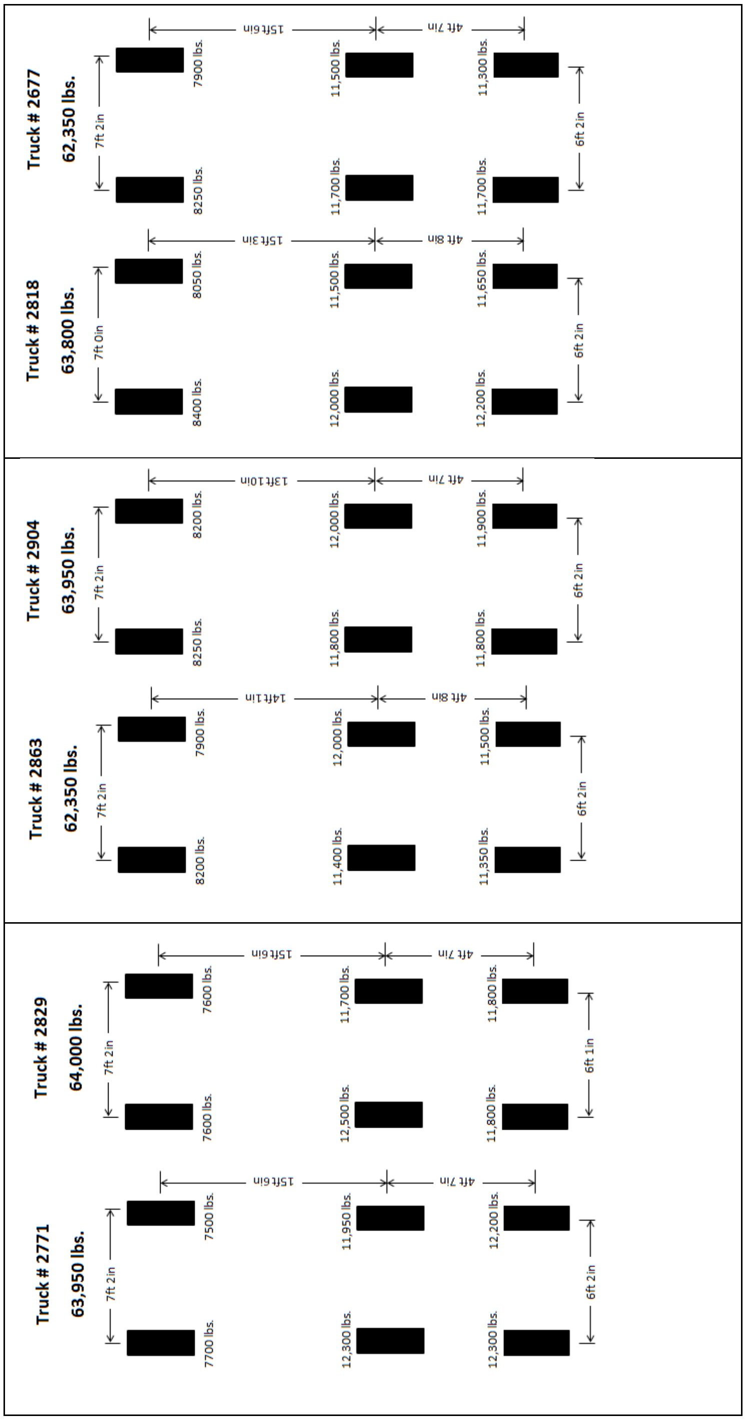


Figure 4.4 Vehicle layout showing wheel weights: load test 4

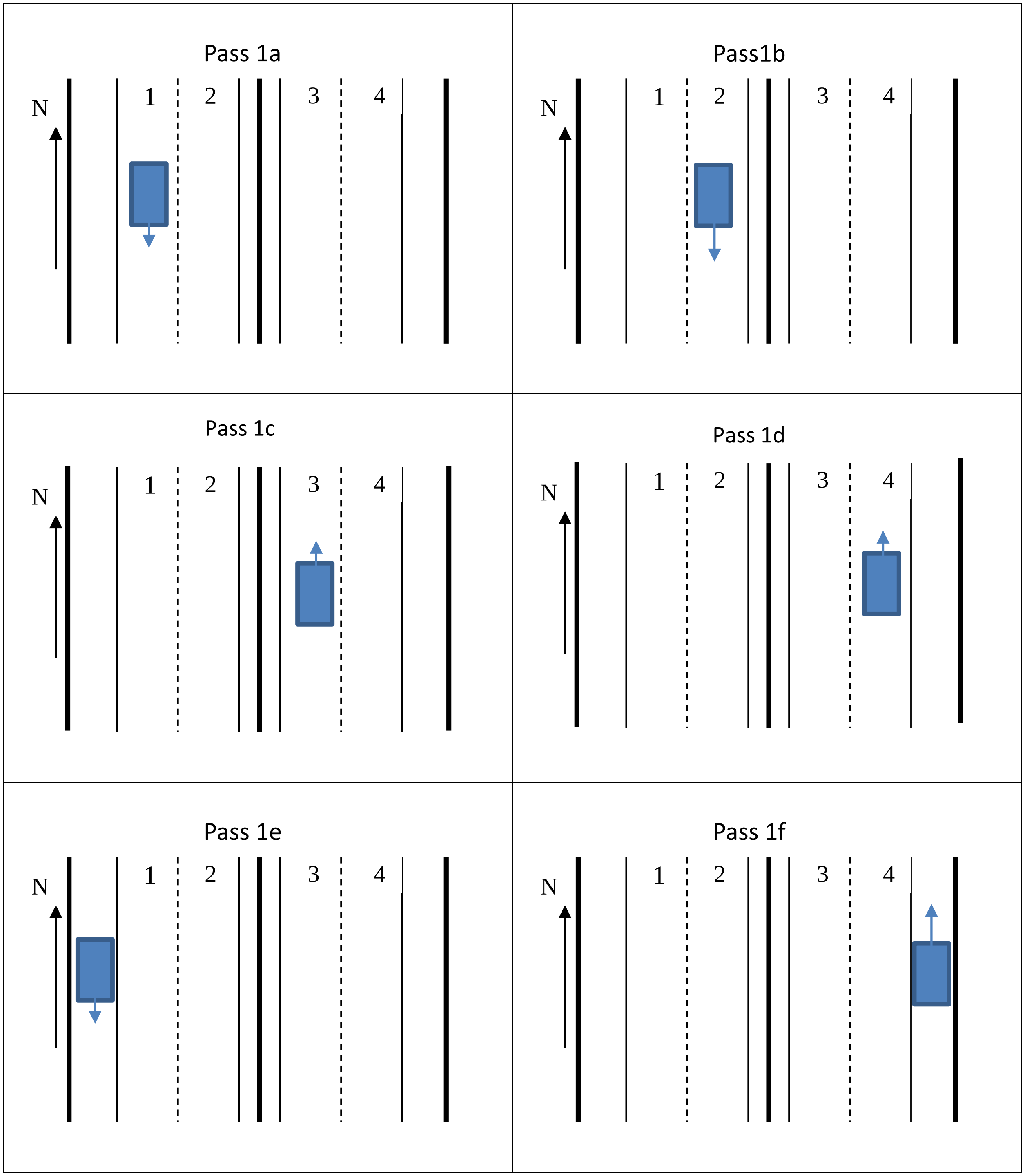
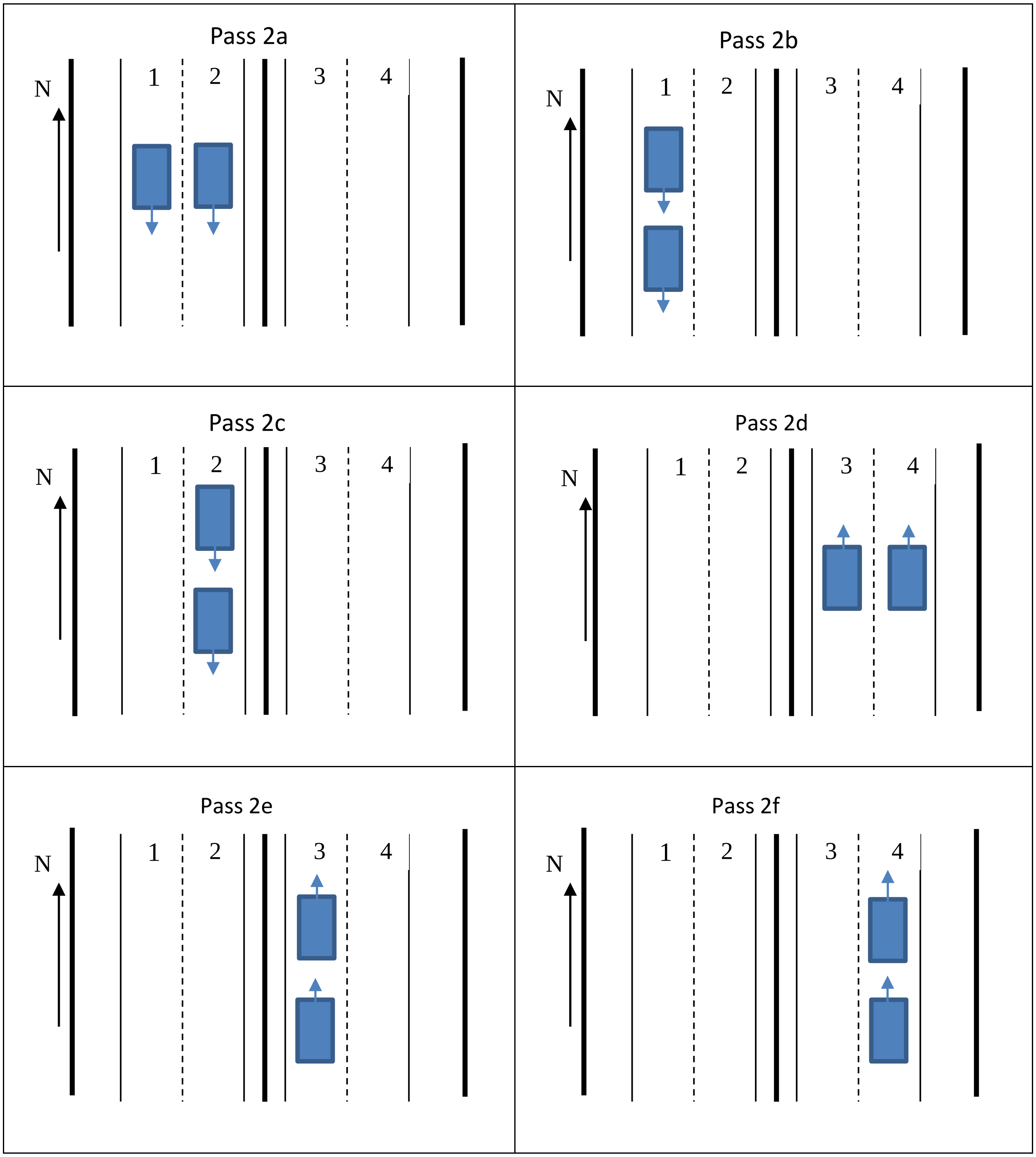


Figure 4.5 One truck slow speed passes


Pass 2a
N
1
2
3
4
Pass 2b
N
1
2
3
4
Pass 2c
N
1
2
3
4
Pass 2d
N
1
2
3
4
Pass 2e
N
1
2
3
4
Pass 2f
N
1
2
3
4

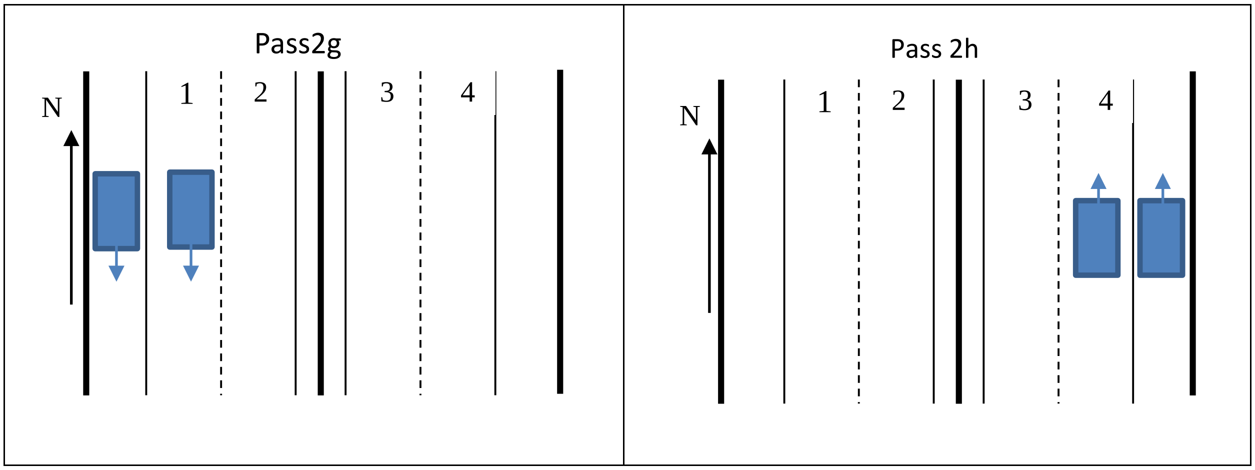


Figure 4.6 Two truck slow speed passes

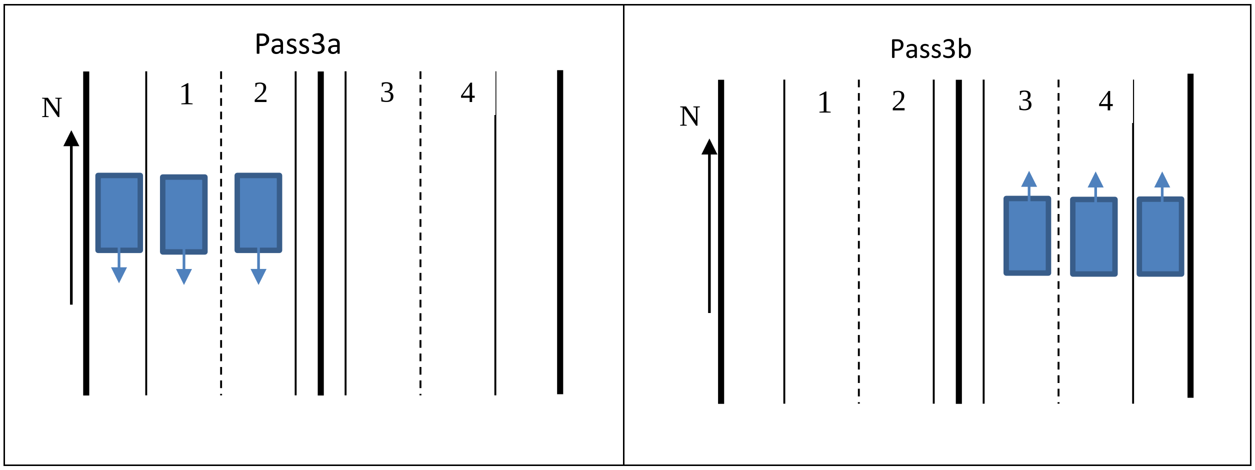


Figure 4.7 Three truck slow speed passes

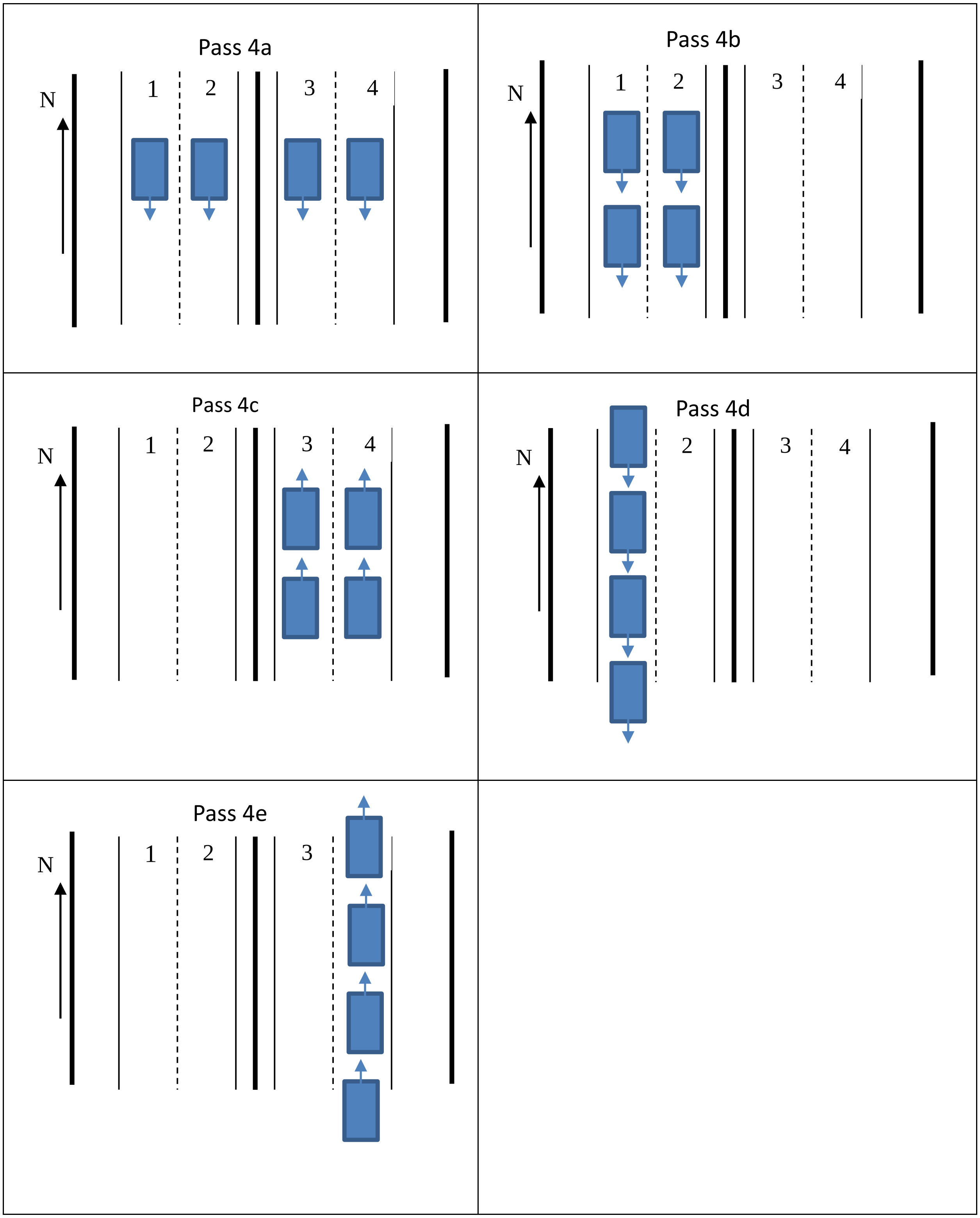


Figure 4.8 Four truck slow speed passes

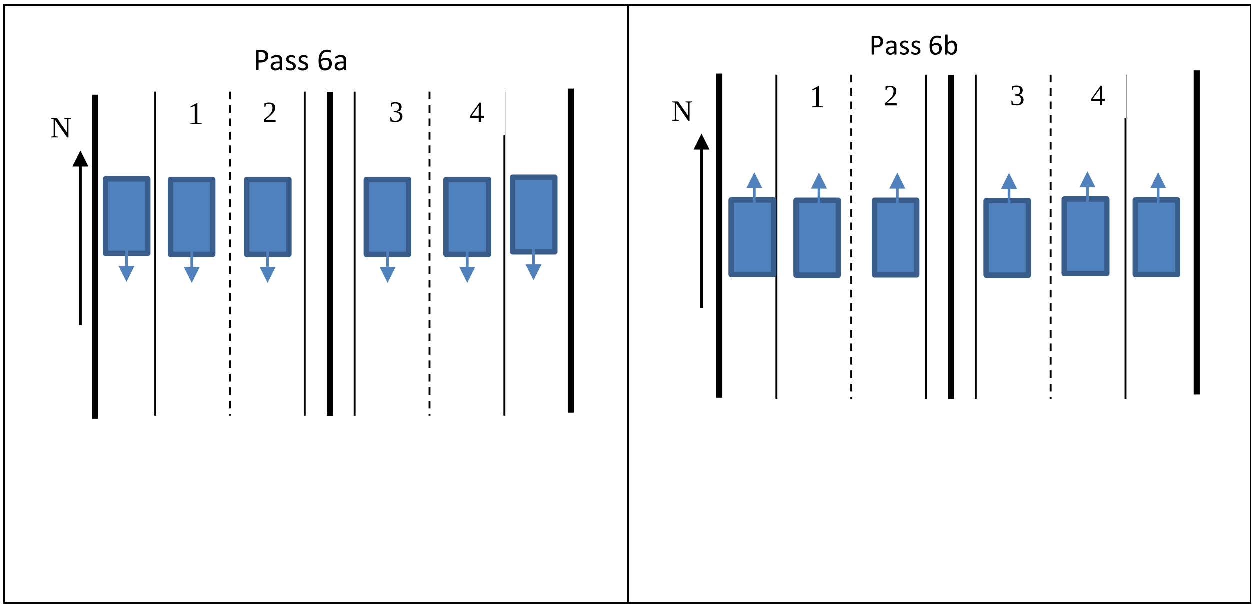


Figure 4.9 Six truck slow speed passes

Figure 4.10 Photographs showing typical truck passes during a test

5 Results: individual load tests

Note that in the presentation of the results when referring to strain or stress, a positive value indicates tension and a negative value indicates compression. That means that maximum strains indicate the largest live-load tensile strain recorded and minimum strains indicate the largest live-load compression strain recorded. A live load tensile strain/stress does not mean that the element is in a state of net tension, as there can and usually is, a large dead load compression component due to prestressing or post-tensioning that keeps the element in compression. Where live-load stress is reported, it is obtained by multiplying strain by 29,000 ksi (Young's modulus) for steel and by multiplying by 5,164 ksi for concrete (Young's modulus for the concrete was computed based on an average compressive strength of 8,240 psi from the tests of the cylinders made during the concrete pours).

Post Processing of the Test Data

The same procedure was used to post-process all of the test results. For each sensor time history the record was first "re-zeroed" by taking the average of the first 25 data points and subtracting it from the entire time history. In this way any slight initial offset in the record was eliminated. Next a moving average was completed on the record using a window of 1.6 seconds (25 data points for the data recorded at 15.6 Hz). This was done to eliminate the inherent low level noise in the sensor data. Finally the maximum and minimum values of the record were determined. All of the post-processing was completed in the data analysis program Matlab.

Calculation of Distribution Factors

Utilizing various load passes, load distribution to the two edge girders can be evaluated. Since the controlling location for the edge girder is within 4 feet of the longitudinal location of gauges S_E22 and S_W22, response recorded at those gauges is used to evaluate the load distribution.

If one sums the two peak edge girder bottom strains (S_E22 + S_W22) for a pass with the most side-by-side trucks used during that particular test, one gets the total bottom strain caused by the side-by-side trucks (191.2 $\mu\varepsilon$ = 89.1 $\mu\varepsilon$ + 102.1 $\mu\varepsilon$ in the case of pass 4a in load test 1). Dividing that strain by the number of side-by-side trucks, four in this case, one gets the strain caused by one truck (47.8 $\mu\varepsilon$ = 191.2 $\mu\varepsilon$/4). Using the peak edge girder bottom strain recorded for a one truck pass, a two truck pass, and a four truck pass, and dividing that strain by the strain caused by one truck (47.8 $\mu\varepsilon$ in the case of load test 1), one can compute the one-lane, two-lane, and four-lane distribution factors. One should note that for a two-girder system, the maximum values for single-lane, two-lane, four-lane, and six-lane distribution factors are 1, 2, 4, and 6 respectively (that assumes one girder carries the entire load).

5.1 Load test 1 – April 30, 2012

The absolute maximum and minimum strains, displacements, and tilts recorded during any of the 17 load passes are presented in Table 5.1. A more detailed discussion of the results of load test 1 are reported in Shenton, et al (2013). Presented here are the key results as presented in the summary of the first report:

- Based on the results of load test 1, the bridge was found to be behaving as expected.
- Based on the repeatability of the recorded data, and the fact that the recorded time history response of the bridge is consistent with the expected bridge response, the structural health monitoring system is deemed to be functioning properly.
- For the edge girder (which happens to be the element that, in most cases, governs the load rating of the bridge for the strength limit state (Load Rating Manual, 2013)), the maximum strain recorded during any of the load passes was 102.1 $\mu\varepsilon$ at gauge S_W22 during pass 4a (four tucks side-by side, one in each travel lane). This gauge is located at the bottom of the western edge girder between pylon 6W and pier 7 (within 4 feet of the governing location for load rating; hereafter, this location will be referred to as the "controlling location" (Load Rating Manual, 2013)). The strain of 102.1 $\mu\varepsilon$ corresponds to a live-load tensile stress in the rebar of 2.96 ksi and a live-load tensile stress in the concrete of 527 psi.
- The minimum edge girder strain recorded during any of the load passes was -44.9 $\mu\varepsilon$ at gauge S_W21 during pass 4a. This gauge is located at the same location as gauge S_W22 (the controlling location), but is in the top of the western edge girder. This strain corresponds to a live-load compression stress of 1.30 ksi in the rebar and a live-load compression stress in the concrete of 232 psi.
- The maximum and minimum pylon strains recorded during any of the load passes were 27.6 $\mu\varepsilon$ and -37.5 $\mu\varepsilon$ at gauge S_W24S during passes 4f and 4g respectively. Gauge S_W24S is located at pylon 6W above the deck.
- The maximum and minimum displacements recorded during any of the load passes were 0.294 inches and -0.327 inches at gauge D_E2 during passes 4e and 4c respectively. Gauge D_E2 is located at pylon 5E.
- The maximum and minimum deck tilts recorded during any of the load passes were 0.074 degrees at gauge T_E9 during pass 4c and -0.080 degrees at gauge T_E1 during passes 4a. Gauge T_E1 is located at pier 4 and gauge T_E9 is located at pier 7. These values are smaller than those reported in Shenton, et al (2013). The reason is that the data from load test 1 was reprocessed again after the publication of Shenton, et al (2013) using a moving average filter that was consistent with that used in load tests 2 through 4. This eliminated much of the noise in the tilt measurements, which in turn reduced the maximum and minimum values reported.
- Based on the results from single truck passes, a single truck weighing 63,500 lbs and crossing in the slow lane would be expected to cause peak strains in the edge girders at the controlling location and at midspan on the order of 30 $\mu\varepsilon$. This corresponds to a live-

load tensile stress in the rebar of 0.87 ksi and a live-load tensile stress in the concrete of 155 psi.

- Based on passes involving a two-truck train, a long permit vehicle (on the order of 65 feet long) and weighing 127,000 lbs and crossing in the slow lane would be expected to cause peak strains at the controlling location and at midspan on the order of 50 $\mu\varepsilon$. This corresponds to a live-load tensile stress in the rebar of 1.45 ksi and a live-load tensile stress in the concrete of 258 psi.
- When a truck is in the western most lane (southbound slow lane), 69.3% of the truck load goes to the western edge girder. When a truck is in the eastern most lane (northbound slow lane), 63.4% of the truck load goes to the eastern edge girder.
- When loaded with four trucks across the bridge (one in each travel lane), 53.4% of the total load goes to the western edge girder.
- The computed one-lane, two-lane, and four-lane distribution factors for load test 1 were found to be 0.67, 1.27, and 2.14 respectively. The calculations to get these values are, one-lane distribution factor of 0.67 = 32.1 $\mu\varepsilon$/47.8 $\mu\varepsilon$, two-lane distribution factor of 1.27 = 60.8 $\mu\varepsilon$/47.8 $\mu\varepsilon$, and four-lane distribution factor of 2.14 = 102.1 $\mu\varepsilon$/47.8 $\mu\varepsilon$. The strain caused by one truck is found from pass 4a in which the sum of the peak values for S_E22 and S_W22 is 191.2 $\mu\varepsilon$ = 89.1 $\mu\varepsilon$ + 102.1 $\mu\varepsilon$ and therefore the strain due to one truck would be 47.8 $\mu\varepsilon$ = 191.2 $\mu\varepsilon$/4.

Tables A.1 to A.20 of Appendix A present the maximum and minimum values for each sensor during each load pass, and also present the absolute maximum and minimum value for each sensor for all slow speed passes and for all high speed passes. Within these tables are the maximum and minimum bearing displacements (Tables A.1 to A.2), the maximum and minimum deck tilts (Tables A.3 to A.4), the maximum and minimum pylon strains in pylons 5E, 6E, and 6W (Tables A.5 to A.10), the maximum and minimum east girder strains (Tables A.11 to A.14), the maximum and minimum west girder strains (Tables A.15 to A.18), and the maximum and minimum deck strains (Tables A.19 to A.20).

Time history plots of strain, displacement, and tilt for all sensors for pass 4a can be found in Figures A.1 to A.41 of Appendix A. The strain time histories for gauges in the edge girders (Figures A.1 to A.23) have two curves per plot, one corresponding to the top gauge and one corresponding to the bottom gauge, both at the same section along the girder. The pylon strain plots (Figures A.24 to A.29) show the response recorded by the four gauges all at the same pylon cross-section. The displacement time history plots (Figures A.30 to A.32) at the bearings and the deck tilt time history plots (Figures A.33 to A.41) both have a single curve per plot. All plots have time on the x-axis.

5.2 Load test 2 – November 28, 2012

Load test 2 was conducted roughly six months after the first load test. During this test, a maximum load of six side-by-side trucks was implemented (representing trucks in all four marked lanes and in the two shoulders). This maximum loading will become the “baseline” loading for future tests, and test 2 will be considered the “baseline” test results for future comparisons. As would be expected, by using 6 trucks in load tests 2 through 4, the peak responses are greater than they were in load test 1.

Time History Response

Since load test 2 was the first test to use 6 vehicles, select time histories for pass 6b (six tucks side-by side traveling northbound with one in each travel lane) are presented and discussed here. The complete set of time histories for all sensors for pass 6b can be found in Appendix B. In all of these plots the x-axis is time in seconds, and since the data acquisition was started before the vehicles entered the bridge and after they exited the bridge, there is a period of time at the start of the record and at the end of the record where there is no recorded response.

Edge Girder Strain Time History

Figure 5.1 shows the stain time history of gauges in the western edge girder at the controlling location that includes the maximum peak response of 150.9 $\mu\varepsilon$ given in Table 5.2. Another edge girder strain time history of interest is the one corresponding to gauges at midspan (Figure 5.2). In both plots the peak response occurs when the trucks are at the location of the plotted gauge (t=178 seconds and t=131 seconds respectively). Note also in both plots the reflected nature of the upper and lower gauges, and that the strains go to zero when the trucks are at the ends of the backspans (t=68 seconds and t=188 seconds) as well as when the trucks are at the pylons (at approximately t=100 seconds and t=160 seconds). The fact that the magnitude of the lower gauge is considerably higher than the magnitude of the upper gauge shows that the neutral axis location of the section is, as expected, much closer to the top face of the girder. The response also shows how the girder experiences positive bending when the trucks are in the span above the gauge, but the girder experiences negative bending when the trucks are in an adjacent span(s). These plots are very similar to what was observed in load test 1 (Shenton, et al, 2013), except that the magnitude of strain is higher due to the heavier loads.

Pylon Strain Time History

Figure 5.3 shows a typical stain time history for the four gauges in a pylon at a given lift location (in this case Pylon 6 west, lift T1). As the trucks traverse the southern back span traveling northbound, pylon 6 experiences very little bending (between 68 and 100 seconds). Once they move onto the main span the pylon bends toward the south, putting the southern face in compression as shown by the negative strain in gauge S-E32S, and the northern face in tension as shown by gauge S-E31N. There is very little out-of-plane bending, as indicated by the very low strains recorded by the gauges on the east (S-E33E) and west (S-E34W) faces of the pylon. When the trucks reach pylon 6 at 160 seconds all of the strains go to zero. As they move onto the north back span the pylon bends toward the north and the south face experiences tension and the north face experiences compression.

Deck Strain Time History

Figure 5.4 shows a typical stain time history for the strain gauges in the deck at Section 210. The deck strain gauges are in the roadway and their response is quite localized (the deck strain occurs when the truck is between adjacent stays). The strains recorded by gauges S-C1 and S-C2 at Section 210 are of comparable magnitude as would be expected, peaking at -48 and -39 $\mu\varepsilon$ respectively, when the trucks are above the gauges. This magnitude of strain corresponds to compression stresses in the concrete of 248 and 201 psi, respectively.

Bearing Displacement Time History

Figure 5.5 shows a typical bearing displacement time history for the bearing at Pylon 5. The movements recorded under the live load are quite small, as would be expected, ranging in this case from +0.23 to -0.17 inches. There is movement at the bearing in the positive direction as the vehicles move onto the southern back span. The bearing returns zero when they are at pylon 5, and move in the negative direction as they traverse the main span. It returns to zero again when they exit the bridge, around 180 seconds.

Deck Tilt Time History

Figure 5.6 shows a typical deck tilt time history for the tilt gauge on the deck at midspan. As expected, the deck tilts in one direction as the trucks move onto the south back span and go to zero when the vehicles are at pylon 5 (at 100 seconds). As they move onto the main span the mid-span rotates in a positive direction, reaching a maximum of approximately 0.065 degrees before the vehicles are at mid-span. When the trucks are at midspan (at 130 seconds), the deflection at midspan will be a maximum and the tilt goes to zero. This same behavior occurs but with opposite signs, as the trucks move towards pylon 6 and onto the north back span. The maximum negative tilt is approximately -0.065 degrees. The entre time history is asymmetric, which would be expected for the mid-span rotation.

Key Results

The absolute maximum and minimum strains, displacements, and tilts recorded during any of the 25 load passes are presented in Table 5.2. Presented here are the key results from test 2:

- Based on the results of load test 2, the bridge was found to be behaving as expected.
- Based on the repeatability of the recorded data, and the fact that the recorded time history response of the bridge is consistent with the expected bridge response, the structural health monitoring system is deemed to be functioning properly.
- For the edge girder (which happens to be the element that, in most cases, governs the load rating of the bridge for the strength limit state), the maximum strain recorded during any of the load passes was 151 $\mu\varepsilon$ at gauge S_W22 during pass 6b (six tucks side-by side, one in each travel lane and one in each shoulder). This gauge is located at the bottom of the western edge girder between pylon 6W and pier 7 (within 4 feet of the controlling

location for load rating). The strain of 151 με corresponds to a live-load tensile stress in the rebar of 4.38 ksi and a live-load tensile stress in the concrete of 780 psi.

- The minimum edge girder strain recorded during any of the load passes was -59.1 με at gauge S_W21 during pass 6a. This gauge is located at the same location as gauge S_W22 (the controlling location), but is in the top of the western edge girder. This strain corresponds to a live-load compression stress of 1.71 ksi in the rebar and a live-load compression stress in the concrete of 305 psi.
- The maximum and minimum pylon strains recorded during any of the load passes were 35.7 με and -41.7 με at gauge S_W24S during passes 6a and 6b respectively. Gauge S_W24S is located at pylon 6W above the deck.
- The maximum and minimum displacements recorded during any of the load passes were 0.230 inches and -0.192 inches at gauge D_E2 during passes 6b and 6a respectively. Gauge D_E2 is located at pylon 5E.
- The maximum and minimum deck tilts recorded during any of the load passes were 0.099 degrees at gauge T_E9 during passes 6b and -0.119 degrees at gauge T_E1 during pass 6a. Gauge T_E1 is located at pier 4 and gauge T_E9 is located at pier 7.
- The computed one-lane, two-lane, four-lane, and six-lane distribution factors for load test 2 were found to be 0.70, 1.31, 1.94, and 3.21 respectively. The calculations to get these values are, one-lane distribution factor of 0.70 = 32.8 με/47.1 με, two-lane distribution factor of 1.31 = 61.8 με/47.1 με, four-lane distribution factor of 1.94 = 91.1 με/47.1 με, and six-lane distribution factor of 3.21 = 150.9 με/47.1 με. The strain caused by one truck is found from pass 6b in which the sum of the peak values for S_E22 and S_W22 is 282.4 με = 131.5 με + 150.9 με and therefore the strain due to one truck would be 47.1 με = 282.4 με/6.

Tables B.1 to B.20 of Appendix B present the maximum and minimum values for each sensor during each load pass, and also present the absolute maximum and minimum value for each sensor for all slow speed passes and for all high speed passes. Within these tables are the maximum and minimum bearing displacements (Tables B.1 to B.2), the maximum and minimum deck tilts (Tables B.3 to B.4), the maximum and minimum pylon strains in pylons 5E, 6E, and 6W (Tables B.5 to B.10), the maximum and minimum east girder strains (Tables B.11 to B.14), the maximum and minimum west girder strains (Tables B.15 to B.18), and the maximum and minimum deck strains (Tables B.19 to A.20).

Presented in Figure 5.1 through Figure 5.6 are time history responses for a select few sensors for the maximum load case, pass 6b. Figure 5.1 shows the strain in the west edge girder near the controlling location. The bottom sensor first goes into compression due to negative bending as the vehicles cross the center span; the top sensor experiences a small tensile strain. When the vehicles are in the back span the bottom sensor experiences tension and the top sensor compression. Figure 5.2 shows the response at mid-span of the bridge. Here you see a fairly symmetric response with time, with the maximum/minimum strains occurring when the vehicles are right at mid-span. The strain response of pylon 6 east is shown in Figure 5.3. The strain in the deck is shown in Figure 5.4. The displacement at the bearing on Pylon 5 is shown in Figure 5.5. Finally, the tilt at mid-span of the bridge is shown in Figure 5.6.

A complete set of recorded time history plots for pass 6b are presented in Figures B.1 to B.41 of Appendix B. Figures B.1 to B.23 represent strain time history plots recorded by all east and west girder strain gauges. Figures B.24 to B.29 represent strain time history plots recorded by all pylon strain gauges. Figures B.30 to B.32 represent bearing displacement time history plots recorded by all bearing displacement transducers. Figures B.33 to B.41 represent deck tilt time history plots recorded by all tilt meters.

A discussion of the comparison of load test 1 to load test 2 is found in Chapter 6.

5.3 Load test 3 – May 9, 2013

Load test 3 was conducted roughly one year after the first load test. During this test, a maximum load of six side-by-side trucks was used (representing trucks in all four marked lanes and in the two shoulders).

For this load test, 18 passes were used, and these 18 passes have been selected as the "standard" passes for all future tests. If, during future tests, additional information is desired, additional passes can be included beyond the "standard" set.

In the "standard" set of passes, two replicate passes are conducted for each of the 9 unique truck pass configurations. Repeatability of the results from replicate passes provides a degree of confidence in the operation of the structural health monitoring system.

The absolute maximum and minimum strains, displacements, and tilts recorded during any of the 18 load passes are presented in Table 5.3. Presented here are the key results from test 3:

- Based on the results of load test 3, the bridge was found to be behaving as expected.
- Based on the repeatability of the recorded data, and the fact that the recorded time history response of the bridge is consistent with the expected bridge response, the structural health monitoring system is deemed to be functioning properly.
- For the edge girder (which happens to be the element that, in most cases, governs the load rating of the bridge for the strength limit state), the maximum strain recorded during any of the load passes was 149 $\mu\varepsilon$ at gauge S_W22 during pass 6b (six tucks side-by side, one in each travel lane and one in each shoulder). This gauge is located at the bottom of the western edge girder between pylon 6W and pier 7 (within 4 feet of the controlling location for load rating) . The strain of 149 $\mu\varepsilon$ corresponds to a live-load tensile stress in the rebar of 4.32 ksi and a live-load tensile stress in the concrete of 769 psi.
- The minimum edge girder strain recorded during any of the load passes was -59.4 $\mu\varepsilon$ at gauge S_W21 during pass 6b. This gauge is located at the same location as gauge S_W22 (the controlling location), but is in the top of the western edge girder. This strain corresponds to a live-load compression stress of 1.72 ksi in the rebar and a live-load

compression stress in the concrete of 307 psi.

- The maximum and minimum pylon strains recorded during any of the load passes were 35.0 με and -43.0 με at gauge S_W24S during passes 6b and 6b respectively. Gauge S_W24S is located at pylon 6W above the deck.
- The maximum and minimum displacements recorded during any of the load passes were 0.171 inches and -0.172 inches at gauge D_E2 during passes 6b and 6b respectively. Gauge D_E2 is located at pylon 5E.
- The maximum and minimum deck tilts recorded during the slow speed passes were 0.066 degrees at gauge T_E6 and -0.064 degrees at gauge T_E5, both during pass 6b. Gauge T_E5 is located at mid-span of the main span and gauge T_E6 is located at the north end quarter point of the main span. Gauges T_E1 and T_E9, which normally see the maximum and minimum tilts, were not recorded during the slow speed passes because interrogator B, which T_E1 and T_E9 are on, was not activated to record during the slow speed passes. The maximum and minimum deck tilts recorded during the high speed passes, when interrogator B was activated, were 0.096 degrees at gauge T_E9 and -0.090 degrees at gauge T_E3, both during high speed pass 1a. Gauge T_E9 is located at pier 7 and gauge T_E3 is located at pylon 5.
- The computed one-lane, four-lane, and six-lane distribution factors for load test 3 were found to be 0.68, 2.04, and 3.32 respectively. The calculations to get these values are, one-lane distribution factor of 0.68 = 29.7 με/43.6 με, four-lane distribution factor of 2.04 = 88.8 με/43.6 με, and six-lane distribution factor of 3.32 = 144.8 με/43.6 με. The strain caused by one truck is found from pass 6b in which the sum of the peak values for S_E22 and S_W22 is 261.5 με = 116.7 με + 144.8 με and therefore the strain due to one truck would be 43.6 με = 261.5 με/6.

Tables C.1 to C.20 of Appendix C present the maximum and minimum values for each sensor during each load pass, and also present the absolute maximum and minimum value for each sensor for all slow speed passes and for all high speed passes. Within these tables are the maximum and minimum bearing displacements (Tables C.1 to C.2), the maximum and minimum deck tilts (Tables C.3 to C.4), the maximum and minimum pylon strains in pylons 5E, 6E, and 6W (Tables C.5 to C.10), the maximum and minimum east girder strains (Tables C.11 to C.14), the maximum and minimum west girder strains (Tables C.15 to C.18), and the maximum and minimum deck strains (Tables C.19 to A.20).

Recorded time history responses recorded for pass 6b, the largest load applied to the bridge (six trucks side-by-side), are presented in Figures C.1 to C.41 of Appendix C. Figures C.1 to C.23 represent strain time history plots recorded by all east and west girder strain gauges. Figures C.24 to C.29 represent strain time history plots recorded by all pylon strain gauges. Figures C.30 to C.32 represent bearing displacement time history plots recorded by all bearing displacement transducers. Figures C.33 to C.41 represent deck tilt time history plots recorded by all tilt meters.

A discussion of the comparison of load test 3 to load test 2 (the “baseline” test) is found in Chapter 6.

5.4 Load test 4 – May 7, 2014

Load test 4 was conducted roughly two years after the first load test. During this test, the “standard” load passes as established in test 3 were used. This included a maximum load of six side-by-side trucks was used (representing trucks in all four marked lanes and in the two shoulders).

In addition to the “standard” 18 passes, additional passes were used to more rigorously asses the variability of results for repeated passes. While some measure of variability can be determined from two replicate passes, it is not enough to establish a statistical measure of the variability. In load test 4, six passes were conducted for a single truck pass and six were conducted for a six-truck pass. Furthermore, 5 minutes of ambient data was recorded (no traffic on the bridge) in order to assess the ambient “noise” of the sensors and the environment.

The absolute maximum and minimum strains, displacements, and tilts recorded during any of the 18 load passes are presented in Table 5.4. Presented here are the key results from test 4:

- Based on the results of load test 4, the bridge was found to be behaving as expected.
- Based on the repeatability of the recorded data, and the fact that the recorded time history response of the bridge is consistent with the expected bridge response, the structural health monitoring system is deemed to be functioning properly.
- For the edge girder (which happens to be the element that, in most cases, governs the load rating of the bridge for the strength limit state), the maximum strain recorded during any of the load passes was 156 $\mu\varepsilon$ at gauge S_W22 during pass 6b (six tucks side-by side, one in each travel lane and one in each shoulder). This gauge is located at the bottom of the western edge girder between pylon 6W and pier 7 (within 4 feet of the controlling location). The strain of 156 $\mu\varepsilon$ corresponds to a live-load tensile stress in the rebar of 4.52 ksi and a live-load tensile stress in the concrete of 806 psi.
- The minimum edge girder strain recorded during any of the load passes was -61.6 $\mu\varepsilon$ at gauge S_W21 during pass 6b. This gauge is located at the same location as gauge S_W22 (the controlling location), but is in the top of the western edge girder. This strain corresponds to a live-load compression stress of 1.79 ksi in the rebar and a live-load compression stress in the concrete of 318 psi.
- The maximum and minimum pylon strains recorded during any of the load passes were 36.4 $\mu\varepsilon$ and -43.3 $\mu\varepsilon$ at gauge S_W24S during passes 6b and 6b respectively. Gauge S_W24S is located at pylon 6W above the deck.
- The maximum and minimum displacements recorded during any of the load passes were 0.196 inches and -0.205 inches at gauge D_E2 during passes 6b and 6b respectively. Gauge D_E2 is located at pylon 5E.
- The maximum and minimum deck tilts recorded during any of the load passes were 0.108

degrees and -0.132 degrees at gauges T_E9 and T_E1 respectively, during pass 6b. Gauge T_E1 is located at pier 4 and gauge T_E9 is located at pier 7.

- The computed one-lane, four-lane, and six-lane distribution factors for load test 4 were found to be 0.63, 2.07, and 3.31 respectively. The calculations to get these values are, one-lane distribution factor of 0.63 = 29.9 $\mu\varepsilon$/47.15 $\mu\varepsilon$, four-lane distribution factor of 2.07 = 97.4 $\mu\varepsilon$/47.15 $\mu\varepsilon$, and six-lane distribution factor of 3.31 = 155.8 $\mu\varepsilon$/47.15 $\mu\varepsilon$. The strain caused by one truck is found from pass 6b in which the sum of the peak values for S_E22 and S_W22 is 282.9 $\mu\varepsilon$ = 127.1 $\mu\varepsilon$ + 155.8 $\mu\varepsilon$ and therefore the strain due to one truck would be 47.15 $\mu\varepsilon$ = 282.9 $\mu\varepsilon$/6.

Tables D.1 to D.20 of Appendix D present the maximum and minimum values for each sensor during each load pass, and also present the absolute maximum and minimum value for each sensor for all slow speed passes and for all high speed passes. Within these tables are the maximum and minimum bearing displacements (Tables D.1 to D.2), the maximum and minimum deck tilts (Tables D.3 to D.4), the maximum and minimum pylon strains in pylons 5E, 6E, and 6W (Tables D.5 to D.10), the maximum and minimum east girder strains (Tables D.11 to D.14), the maximum and minimum west girder strains (Tables D.15 to D.18), and the maximum and minimum deck strains (Tables D.19 to A.20).

Recorded time history responses recorded for pass 6b, the largest load applied to the bridge (six trucks side-by-side), are presented in Figures D.1 to D.41 of Appendix D. Figures D.1 to D.23 represent strain time history plots recorded by all east and west girder strain gauges. Figures D.24 to D.29 represent strain time history plots recorded by all pylon strain gauges. Figures D.30 to D.32 represent bearing displacement time history plots recorded by all bearing displacement transducers. Figures D.33 to D.41 represent deck tilt time history plots recorded by all tilt meters.

A discussion of the comparison of load test 4 to load test 2 (the "baseline" test) is found in Chapter 6.

As mentioned previously, one goal of load test 4 was to assess the variability of the test results for single truck passes and six truck passes. The question to be answered here is what is the inherent variability of the test results, e.g., the peak strain in any sensor, if the same test is repeated multiple times? This becomes very important when comparing the results of similar load passes from one test to another. Under the conditions that the controlled load tests are conducted, variability is due to (1) slight differences in the position of the truck or trucks, and (2) the inherent "noise" in the sensors and data acquisition process. For the single truck passes, the variability due to truck position is only because of differences in the transverse position of the truck. For multi-truck passes, the variability due to truck position is due to differences in the transverse <u>and</u> longitudinal positions of the trucks relative to each other. To assess this, six single truck passes (1a – truck in the southbound slow lane) were completed, one after another, using the same test truck. Maximum and minimum strains in each strain sensor were then determined for each of the six passes. To evaluate the variability of the peaks, the average and standard deviation of the max/min values were calculated. While the average peak value, max or min, may be of interest, the variability is reflected in the standard deviation. Next, the average standard deviation of the peaks was calculated for all sensors of a similar type, in this way yielding a single average measure of the variability. The same procedure was used for the six trucks pass: six truck passes (6b – six trucks side-by-side) were completed, one after another, using the same trucks in the same alignment. Again, maximum and minimum strains in each strain sensor were then determined for each of the six passes, and the average and standard deviation of the max/min values were calculated. Finally, the average standard deviation for sensors of a similar type were calculated. These results are shown in rows 1 and 2 in Table 5.5. One can see that the variability of the six truck passes is greater than the corresponding variability of the single trucks passes, as would be expected.

Another unique test conducted in load test 4 was the measurement of ambient "noise" of the sensors. For this test all traffic was stopped and no cars or trucks and were on the bridge while data was recorded. Data was recorded for 5 minutes at 125 samples/second. Each record was then demeaned and smoothed using the same procedure used to process the load test results. The Root-Mean-Square (RMS)

$$X_{RMS} = \sqrt{\frac{1}{n}\sum_{i=1}^{n}\left|X_i\right|^2}$$

value was then calculated for each sensor. Finally, the average RMS was calculated for all sensors of a similar type. These values are shown in row 3 of Table 5.5.

Note that the variability due to ambient noise is also present in the peaks recorded during the six replicate single and six truck passes. However, six replicate passes is insufficient to ensure that the full range of the ambient noise is being captured.

The combined variability due to truck position and ambient noise is a combination of the two measured values. A common method for combining the effects is to calculate the square-root-sum-of-squares of the individual variabilities. Here, if we assume that each effect is normally distributed and use twice the standard deviation of each, then the total would be calculated as

$$\sigma_{TOT} = \sqrt{\left(2\sigma_V\right)^2 + \left(2\sigma_N\right)^2}$$

In which σ_{TOT}, σ_V, and σ_N represent the total estimated variability, the variability due to vehicle position, and the ambient noise variability. Finally, when comparing two values from different tests, to determine if the difference is significant, we will take 2 times σ_{TOT} as the needed difference. These values are shown in the last two rows of Table 5.5. The data suggests that the threshold for a meaningful difference between measured strain values from different tests but from similar passes is +/- 4 $\mu\varepsilon$.

Table 5.1. Absolute maximum and minimum strains, displacements, and tilts – Load Test 1

Member	Sensor	Location	Max	Min	Pass
Edge girder	S_W21	Top, west edge girder, between pylon 6W and pier 7		-44.9 με	4a
	S_W22	Bottom, west edge girder, between pylon 6W and pier 7	102.1 με		4a
Pylon	S_W24S	6W (above deck)	27.6 με		4b
	S_W24S			-37.5 με	4d
Displacement	D_E2	Pylon 5E	0.294 in		4e
	D_E2			-.327 in	4c
Tilt	T_E1	Pier 4	0.074 deg		4c
	T_E1			-0.080 deg	4a

Table 5.2. Absolute maximum and minimum strains, displacements, and tilts – Load Test 2

Member	Sensor	Location	Max	Min	Pass
Edge girder	S_W21	Top, west edge girder, between pylon 6W and pier 7		-59.1 με	6a
	S_W22	Bottom, west edge girder, between pylon 6W and pier 7	150.9 με		6b
Pylon	S_W24S	6W (above deck)	35.7 με		6a
	S_W24S			-41.7 με	6a
Displacement	D_E2	Pylon 5E	0.230 in		6b
	D_E2			-.192 in	6a
Tilt	T_E9	Pier 7	0.099 deg		6b
	T_E1	Pier 4		-0.119 deg	6a

Table 5.3. Absolute maximum and minimum strains, displacements, and tilts – Load Test 3

Member	Sensor	Location	Max	Min	Pass
Edge girder	S_W21	Top, west edge girder, between pylon 6W and pier 7		-59.4 με	6b
	S_W22	Bottom, west edge girder, between pylon 6W and pier 7	144.8 με		6b
Pylon	S_W24S	6W (above deck)	35.0 με		6b
	S_W24S			-43.0 με	6b
Displacement[1]	D_E2	Pylon 5E	0.171 in		6b
	D_E2			-.172 in	6b
Tilt[1]	T_E6	Northern quarter point, main span	0.066 deg		6b
	T_E5	Mid-span, main span		-0.064 deg	6b

1 – higher values during high speed passes.

Table 5.4. Absolute maximum and minimum strains, displacements, and tilts – Load Test 4

Member	Sensor	Location	Max	Min	Pass
Edge girder	S_W21	Top, west edge girder, between pylon 6W and pier 7		-61.6 με	6b
	S_W22	Bottom, west edge girder, between pylon 6W and pier 7	155.8 με		6b
Pylon	S_W24S	6W (above deck)	36.4 με		6b
	S_W24S			-43.3 με	6b
Displacement	D_E3	Pylon 5E	0.196 in		6b
	D_E2			-.205 in	6b
Tilt	T_E9	Pier 7	0.108 deg		6b
	T_E1	Pier 4		-0.132 deg	6b

Table 5.5. Summary of results of variability analysis – Load Test 4

Load/Traffic	Variability Measure	Strain (microstrain)	Tilt (Degrees)	Displacement (in.)
One truck pass "1a"	Average standard deviation of max/min	0.46	0.0010	0.0041
Six truck pass "6b"	Average standard deviation of max/min	0.56	0.0017	0.0063
Ambient – No traffic	Root-Mean-Square	0.74	0.0020	0.0045
Combined Variabilities				
One truck pass "1a"	2X Square Root Sum of Squares	3.46	0.0090	0.0240
Six truck pass "6b"	2X Square Root Sum of Squares	3.70	0.0110	0.0310

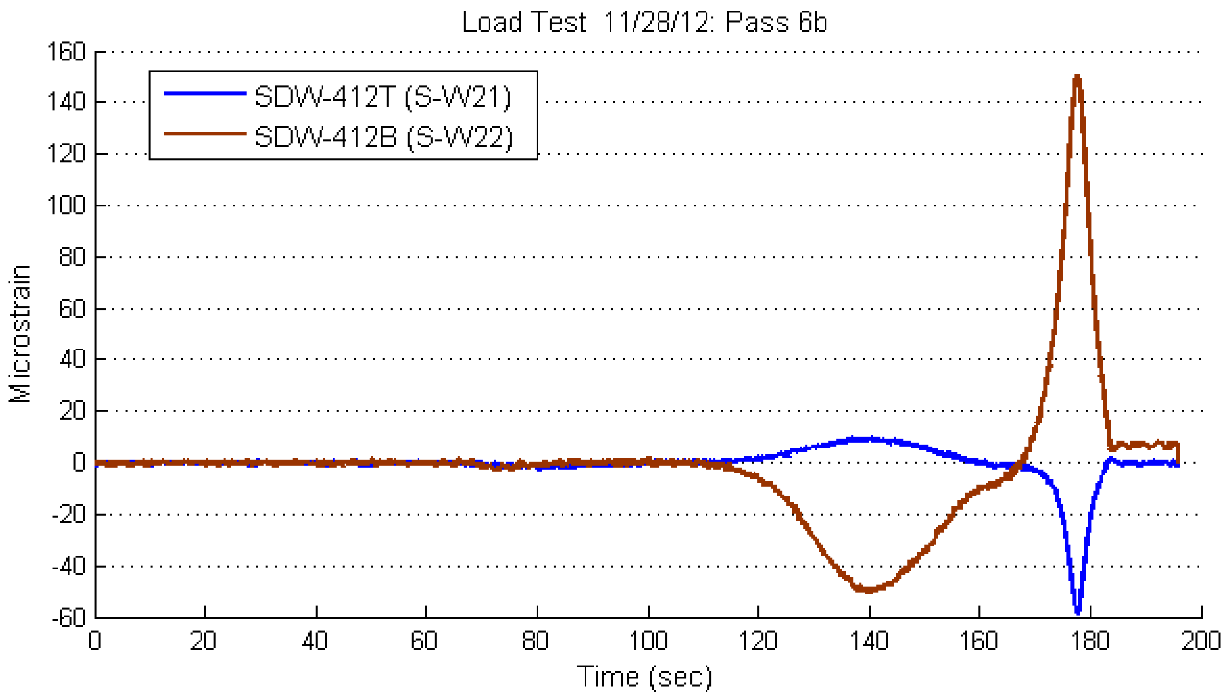


Figure 5.1. Edge girder strain time history - section 412

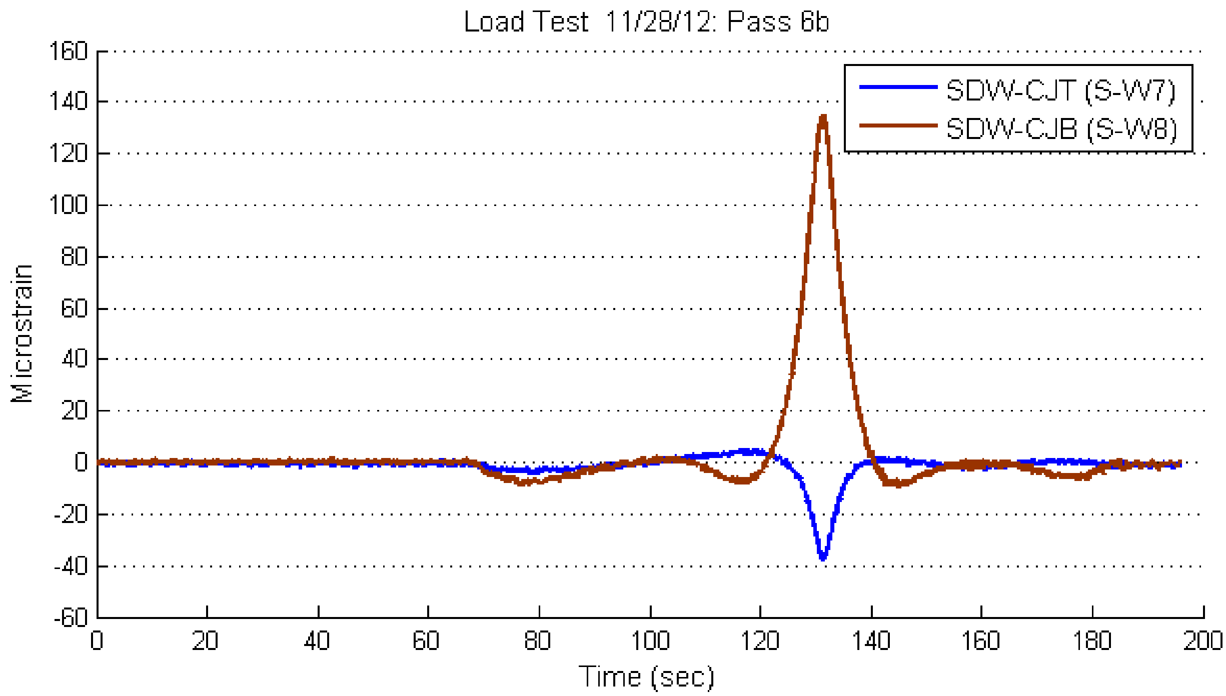


Figure 5.2. West edge girder strain time history - closure joint

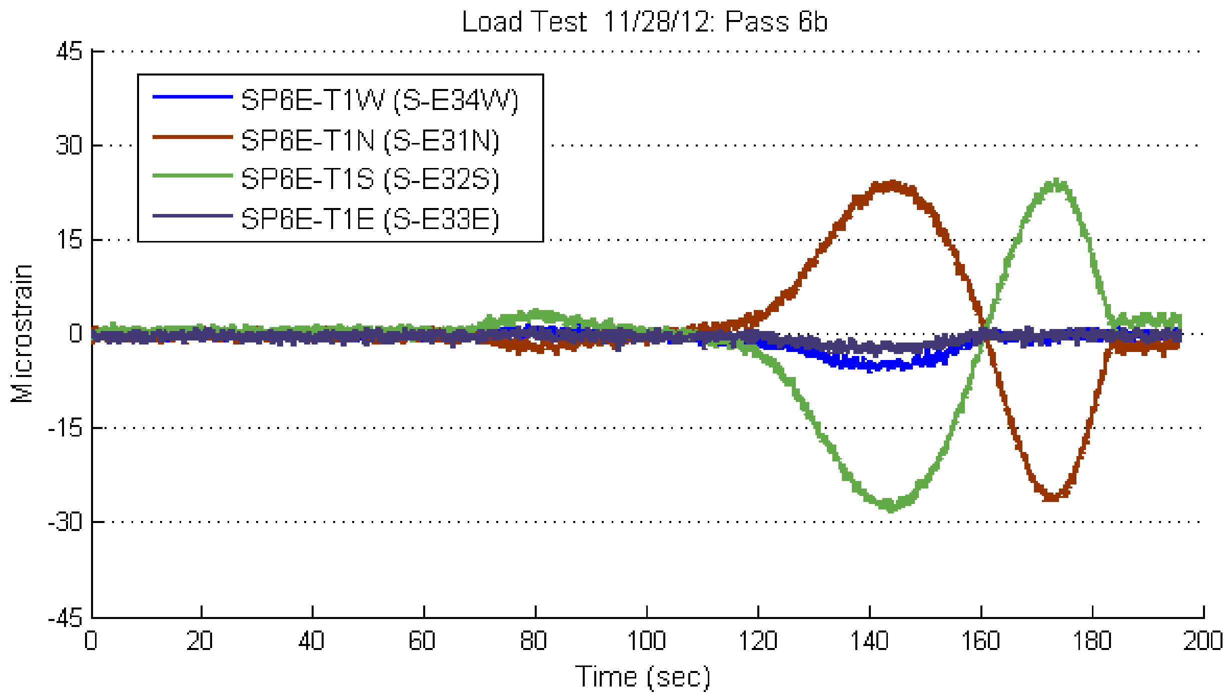


Figure 5.3. Pylon 6 east strain time history - lift T1

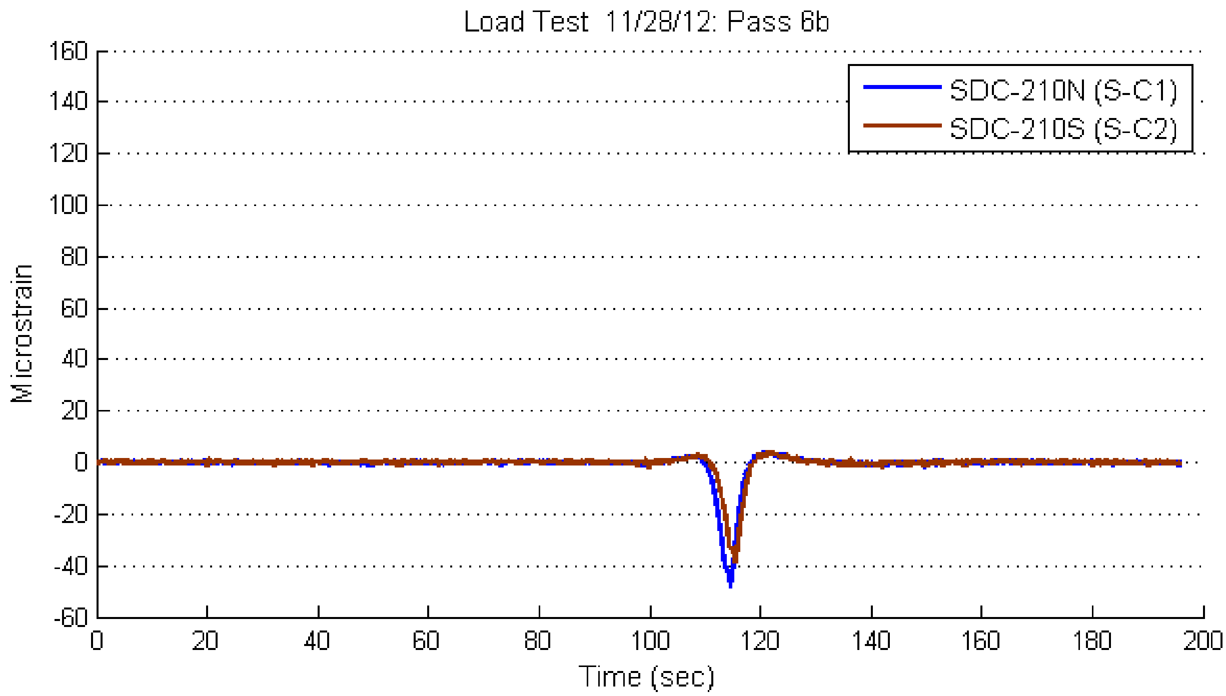


Figure 5.4. Deck strain time history - Section 210

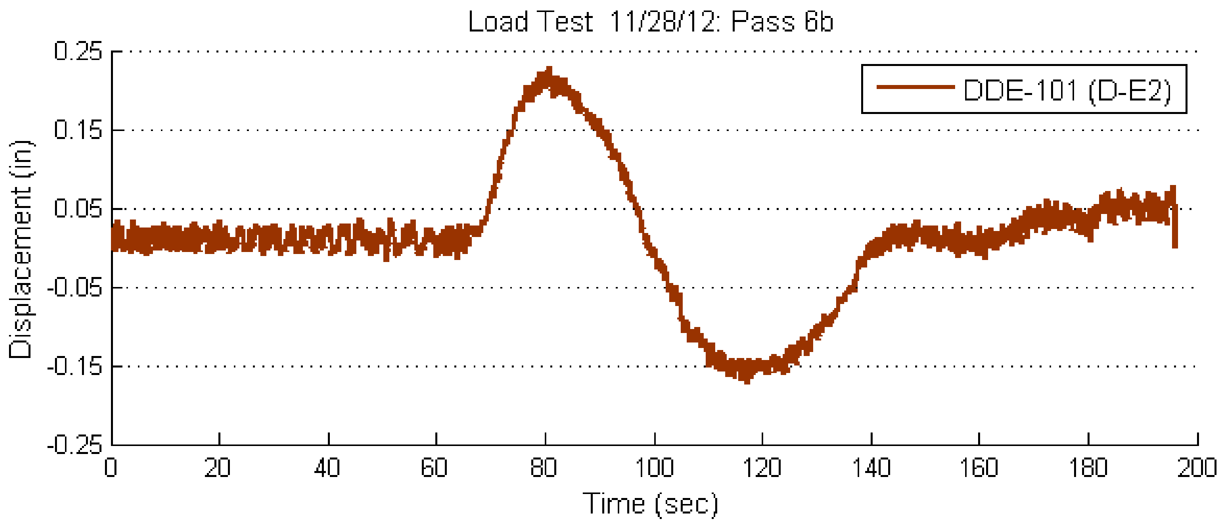


Figure 5.5. Bearing displacement time history – Pylon 5

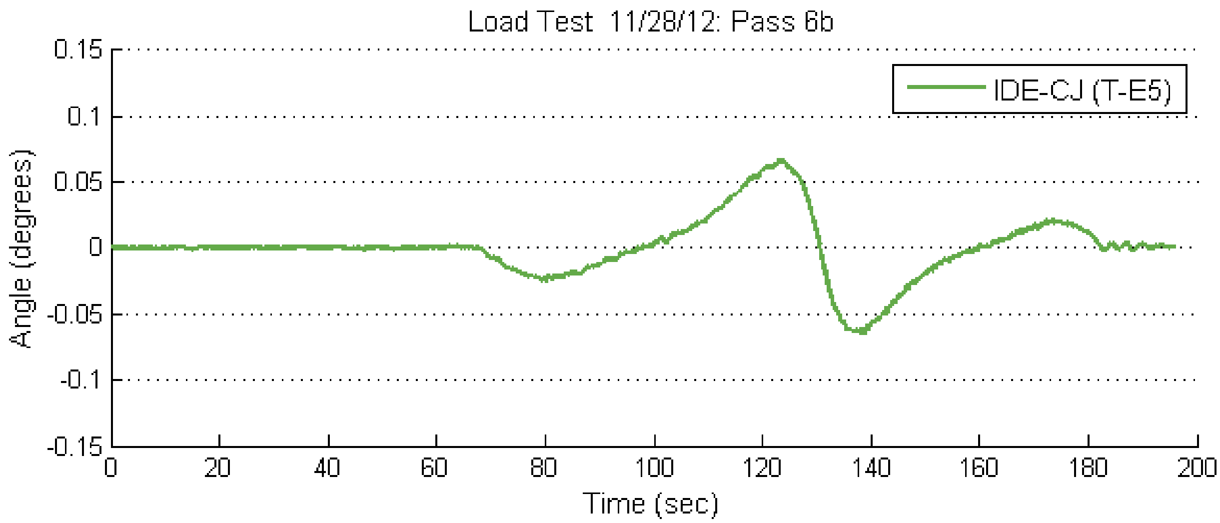


Figure 5.6. Deck tilt time history - Section Closure Joint

6 Results: comparison of load test results

The results of the four individual load tests were presented in Chapter 5. In this chapter, the results from the various tests will be compared. Comparisons of peak values during individual load passes and comparisons of time history plots, are presented. These comparisons will help indicate if changes have occurred in the bridge response between the time it was "new" through the two-year anniversary. To conduct the comparisons, and to establish a "baseline" dataset against which future comparisons can be made, a single set of test results will be defined and used as the "baseline" results for future comparisons. The baseline dataset represents the new, undamaged or "healthy" state of the bridge. If future test results indicate a change relative to the baseline data, this can be attributable to changes in the sensor or monitoring system and/or changes in the bridge condition (caused either by slow, long-term deterioration or damage caused by a particular event).

The initial sections will present comparisons to the "baseline" test. At the end of the chapter, comparisons of all four load tests will be presented.

6.1 Comparison of load test 1 to load test 2 results

Since the weight of the loaded trucks varied slightly from test to test, in order to minimize the effect of the varying truck weights, the results for load test 2 have been normalized by multiplying them by the ratio of (average truck weight in load test 1)/(average truck weight in load test 2).

Appendix E presents a comparison of load test 1 to load test 2. The passes selected for this comparison include passes 1a to 1d (a single truck in each of the four travel lanes), passes 2a to 2f (two trucks either side-by-side or in a train), passes 4a to 4e (four trucks either side-by-side, in a four truck train, or in side-by-side two truck trains), and the high speed passes 4f and 4g (four trucks in a train travelling at full speed approximately 100 feet apart).

To enable a qualitative comparison, Appendix E includes time history plots for the edge girder strains (Figure E.1 to E.18 and E.20 to E.23), deck strains (Figure E.19), pylon strains (Figures E.24 to E.29), bearing displacement (Figures E.30 to E.32), deck tilts (Figures E.33 to E.41).

To enable a more quantitative comparison, percentage differences have been computed using the peak values measured during the selected load pass. The percent differences for peak bearing displacements are presented in Table E.1 and E.2, peak deck tilts in Table E.4, peak pylon strains in Tables E.5 to E.10, peak edge girder strains in Tables E.11 to E.18, and peak deck strains (Tables E.19 and E.20). Details of how the comparison is calculated is presented in the beginning of Appendix E and also the subsequent appendices F and G.

In these tables (and similar ones to follow) percent differences are only presented for values from a given sensor in the two tests at that meet certain criteria for minimum magnitude and minimum difference. The reason for doing this is that calculating percent differences between very small measurements, or measurements that yield a difference that is within the variability of the sensor measurements, can lead to large percent differences that are numerical manifestations and not meaningful when making comparisons of the response. The two criteria are: (1) both sensor readings must exceed 10% of the maximum value recorded during load test 1 from all sensors of a similar type, and (2) the difference between the two sensor readings must exceed the value of the combined variability for a given type of sensor, as shown in Table 5.5. These "threshold" are shown in Table 6.1 for of the sensor types (strain the edge girder and strain in the pylons are given separate thresholds since the magnitudes measured in the edge girders are so much greater than they are in the pylons). When one or both of these criteria are not meet for a pair of readings, the table cell is shown as empty.

Time History Comparison

In comparing selected time history responses for load tests 1 and 2 (Figures 6.1 to 6.4), we should first note that time plotted on the x-axis is different for each test. During each test, data collection is started before the trucks move onto the bridge and then continues until the trucks leave the bridge. Since the trucks travel at a different speed in each test, and since the starting location of the trucks at time zero varies, the tests are independent in terms of their time values (x-axis). Nevertheless, one can see that the nature of the responses is very similar.

In evaluating all of the comparison response plots (Figures E.1 to E.41), one can again see that the nature of the response in all cases is very similar. While these comparisons are qualitative in nature, this is a reassuring result and will enable future time history responses to be evaluated against baseline results (a discussion of the baseline selection follows in Section 6.2).

Peak Value Comparisons

In order to more quantitatively evaluate the difference between load tests, let us look more closely at the percent differences shown in Tables E.1 to E.20.

In making these comparisons, the potential variability of the various pass configurations should be noted. For single truck passes (1a to 1d), the major variability comes from differences in the transverse location within the lane as well as truck weight. While the trucks were normalized by the average gross truck weight, there is also some variability between trucks in terms of weight distribution. For two truck passes (2a to 2f), the major variability comes from differences in the transverse location within the lane, spacing of the trucks transversely or longitudinally, alignment of side-by-side trucks, and truck weight. One would expect more variability in the two truck passes as compared to the single truck passes. For four truck passes, the major variability is the same as it is for two truck passes and comes from differences in the transverse location within the lane, spacing of the trucks transversely or longitudinally, alignment of side-by-side trucks, and truck weight. As more trucks are included, the process of normalizing by the average truck weight will minimize the effect of individual truck weight variability. Furthermore, as more trucks are involved in a pass, it becomes slightly easier to ensure alignment in side-by-side passes (it is easier to see that four trucks are in a straight line across the bridge as opposed to only two trucks). The high-speed passes introduce additional variability that relates to the variation of truck speeds.

Table E.1 and E.2 show a comparison of peak bearing displacements for load test 1 and load test 2. The bearing displacement gauges during load test 1 were not functioning properly, as noted in Chapter 3, and therefore the values on Tables E.1 to E.2 are not relevant.

Table E.3 and E.4 show a comparison of peak deck tilts for load test 1 and load test 2. The location that will record the largest rotations is at midspan, so we will look at the differences in maximum rotations at sensor E5. The lack of values in any of the E5 columns indicates that the recorded rotations were all within the variability of the system. The time history responses indicate some variability while the nature of the curves looks similar (Figures E.33 to E.41).

Table E.5 to E.10 show a comparison of peak pylon strains for load test 1 and load test 2. Like the rotation readings, virtually none of the peak pylon strains were beyond the threshold of the expected variability. As such, a numerical evaluation of variability is not possible. When comparing the time histories (Figure E.24 to E.29), one sees significant similarity in the plots.

Table E.11 to E.18 show a comparison of peak edge girder strains for load test 1 and load test 2. We will focus on differences of the east and west edge girder bottom strains at the midspan (SE8 and SW8) and controlling location (SE22 and SW22) for the four truck passes (4a, 4b, 4c, 4d, and 4e). These represent the largest loads and corresponding largest strains. For these sensors, the percent differences range from -6 to -14 percent (negative meaning that test 1 values were larger) indicating that some stiffening may have occurred during the first six months (perhaps due to concrete strengthening). The time histories associated with the edge girder strains (Figures E.1 to E.23) show excellent correlation.

Table E.19 and E.20 show a comparison of peak deck strains for load test 1 and load test 2. Of all of the strain sensors on the bridge, the deck strains are the most sensitive to the exact position of the trucks on the bridge and the localized pressure of a wheel load. In addition, the magnitude of peak deck strain is much lower than the maximum strains in the edge girders. Thus, even for those few measurements that exceed the strain thresholds for comparison, larger difference are not unexpected.

Table 6.1. Threshold values for calculating percent differences between load test results

Measurement	Minimum threshold for magnitude	Minimum threshold for difference
Edge girder strain (με)	10.2	3.7
Pylon strain ( )	3.76	3.7
Displacement (in)	0.327	0.031
Tilt (rad)	0.008	0.011

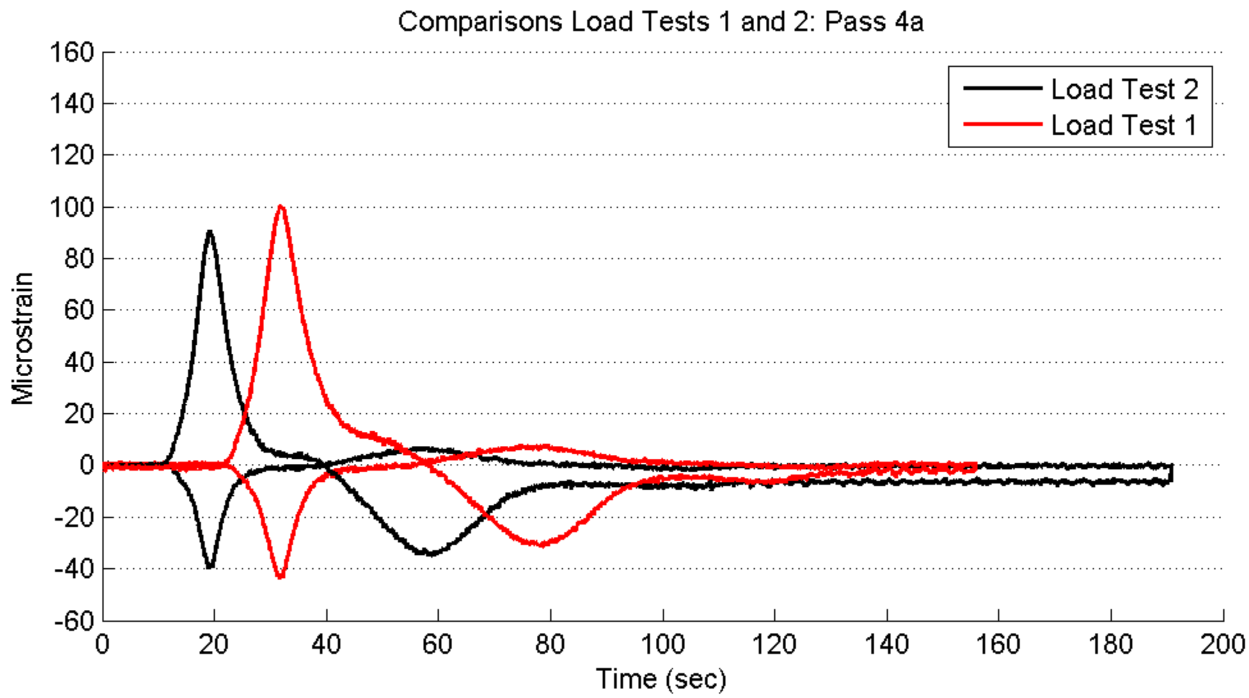


Figure 6.1 Comparison of load test 1 to load test 2, sensors W21 and W22 (results scaled to load test 2)

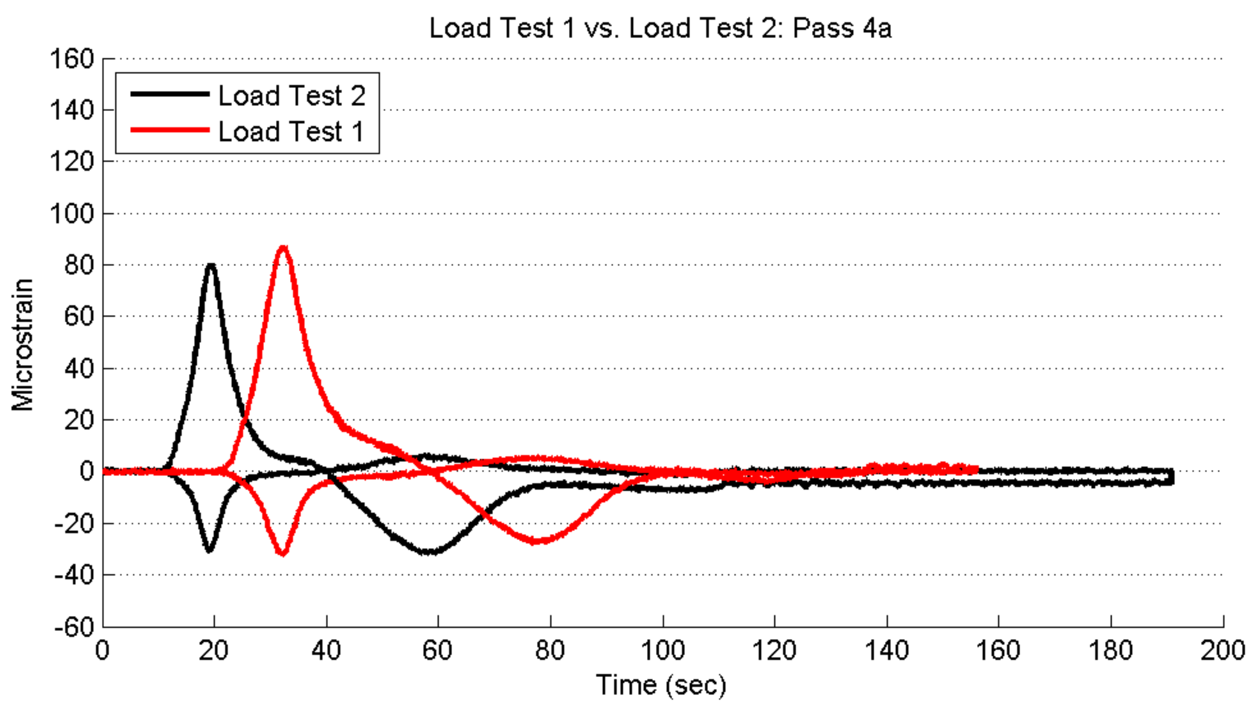


Figure 6.2 Comparison of load test 1 to load test 2, sensors E21 and E22 (results scaled to load test 2)

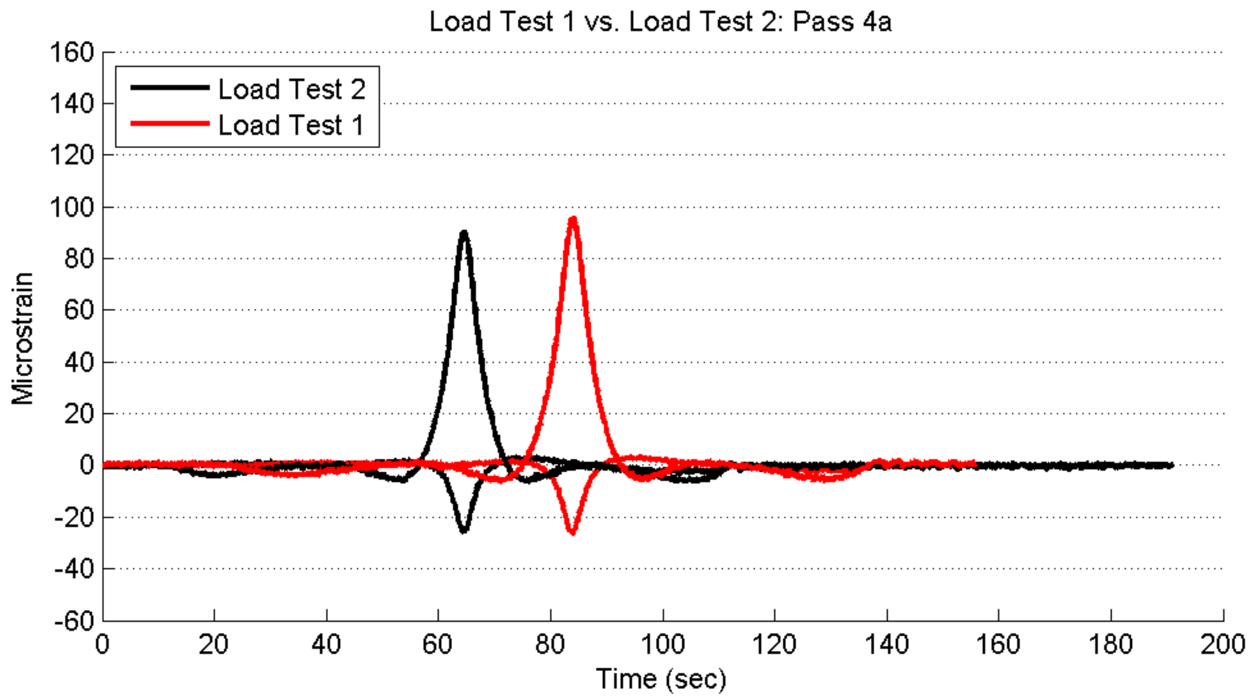


Figure 6.3 Comparison of load test 1 to load test 2, sensors W7 and W8 (results scaled to load test 2)

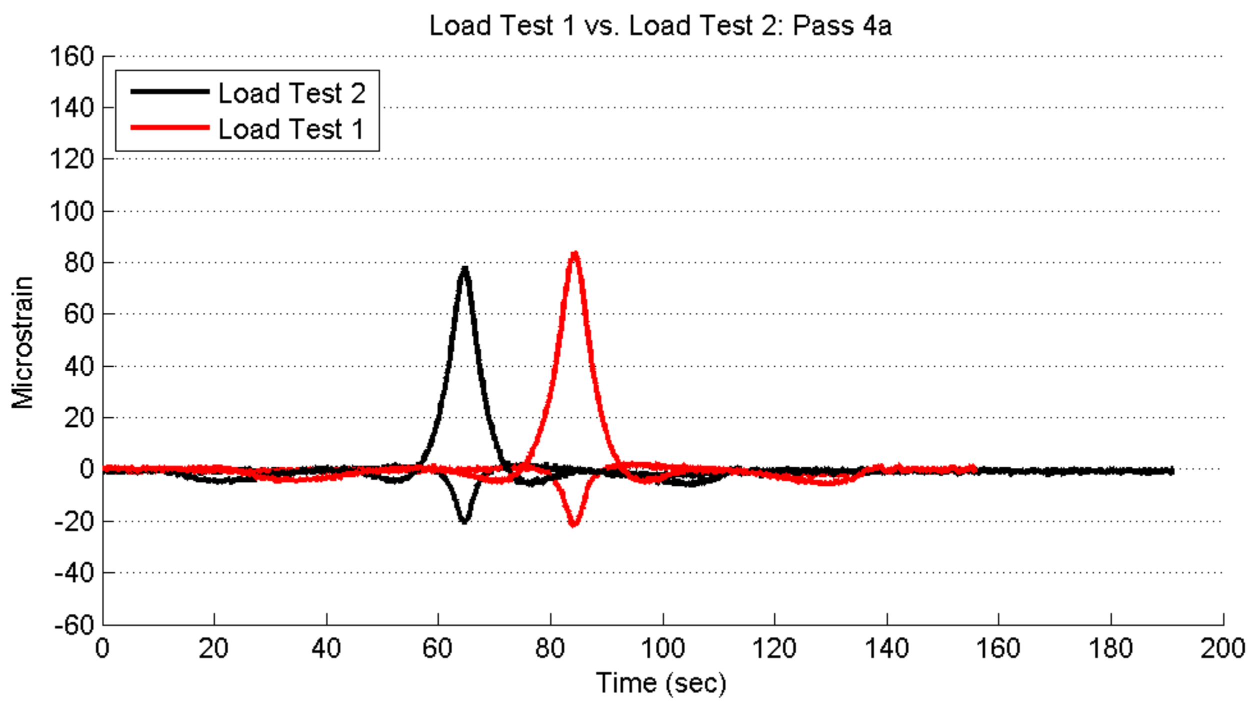


Figure 6.4 Comparison of load test 1 to load test 2, sensors E7 and E8 (results scaled to load test 2)

6.2 Baseline Dataset and Common Load Passes

Through the first four load tests, there was an evolution of load passes, as well as some additional load passes conducted to examine specific phenomena. During the first load test, a combination of single-truck, two-truck, three-truck, and four-truck passes were conducted (see Section 4.1). Starting with the second load test, and continuing forward, six-truck passes were included in each of the load tests and three-truck passes were eliminated (see Sections 4.2, 4.3, and 4.4).

Test 2 has been selected as the “baseline” test for several reasons. First, the six side-by-side truck passes that were initiated in test 2 represent the largest controlled loading applied to the bridge, and going forward, this will continue to be the largest loading used as part of the “common” load passes (described below). Second, based on the comparison of load test 1 and 2 presented in Section 6.1, it has been shown that the two tests yielded very similar results and that it is reasonable to take the condition at six months (the time of load test 2) as the “baseline” or “healthy” condition for future comparisons. Third, it will be shown later in Section 6.5 that the test results from load test 2 represent the stiffest condition of the bridge. This may be due to the fact that concrete strengthening during the early life of the structure had a greater stiffening effect than longer term creep and shrinkage effects had a softening effect. The data will show that while the bridge appears to have stiffened over the first six months, beyond six months, the bridge response appears to be less stiff. For these reasons, the “baseline” dataset has been defined as the one associated with load test 2.

In addition to defining a “baseline” dataset, a set of “common” load passes have also been selected for current and future comparison. These are the six single truck passes: passes 1a to 1f (single truck in either shoulder or one of the four travel lanes), the one four truck pass, pass 4 (four trucks side-by side, one in each travel lane and all travelling in the same direction), and the one six truck pass, pass 6 (six trucks side-by side, one in each travel lane and one in each shoulder and all travelling in the same direction). No full-speed passes are included in the “common” set.

The full “baseline” dataset has already been presented in Section 5.2 and Appendix B. Going forward, there is a certain subset of data that we will be the focus of future comparisons. The most important data are the time histories and associated peak edge girder strains at midpsan (SW7/8 and SE7/8) and at the controlling point (SW21/22 and SE21/22) due to passes with single trucks (passes 1a to 1f), passes with four trucks side-by side (pass 4), and passes with six trucks side-by side (pass 6).

Tables 6.1 and 6.4 give the “baseline” maximum (peak positive or tensile) and minimum (peak negative or compressive) strains at midspan and the controlling location for the six common load passes. One can see that the west girder experiences the largest strains because traffic is skewed towards that side of the bridge due to the wide pedestrian sidewalk on the east side of the bridge. For the single truck passes, pass 1e produces the largest strains because that pass consists of a truck in the west shoulder. In all cases, pass 4a produces the peak strains, and for all but the maximum bottom strain at the controlling location (sensor S_W22), pass 6a produces the peak strain.

Figure 6.5 though Figure 6.10 show the “baseline” strain time histories at midspan and at the controlling location defined as pass 1e (single truck), pass 4a (four trucks side-by-side), and pass 6a (six trucks side-by-side).

These passes produce all of the peak values in the prior tables except for the maximum bottom strain at the controlling location (SW22). At this location, pass 6b produces a strain of 150.9 $\mu\varepsilon$ which is only 2.0 $\mu\varepsilon$ greater than the value of 148.9 $\mu\varepsilon$ measured at the same location during pass 6a. Due to the fact that pass 6a produced the three other peak values, and that the difference at SW22 was less than 1.5%, it seems reasonable to select pass 6a as the “baseline” six truck response. The “baseline” values for these three passes, 1e, 4a, and 6a, represent the peak “baseline” values for single truck, four truck, and six truck passes and are the values shown in bold in Tables 6.1 to 6.4.

Since, as mentioned earlier, the weight of the loaded trucks used varies slightly from test to test, in order to minimize the effect of the different truck weights, the measured results for all future load tests should be normalized with respect to the average truck weight used in load test 2. The “baseline” average truck weight to be used when normalizing the data is 62,400 lb.

Table 6.2. Baseline Maximum and Minimum Edge Girder Strains at Midspan for Single Truck Passes

Member	Sensor	Location	Max	Min	Pass
Edge girder	S_W7	Top, west edge girder, at midpsan		-12.3 με	1a
	S_W8	Bottom, west edge girder, at midpsan	32.8 με		1a
Edge girder	S_W7	Top, west edge girder, at midpsan		-8.9 με	1b
	S_W8	Bottom, west edge girder, at midpsan	27.7 με		1b
Edge girder	S_E7	Top, west edge girder, at midpsan		-8.7 με	1c
	S_E8	Bottom, west edge girder, at midpsan	23.5 με		1c
Edge girder	S_E7	Top, west edge girder, at midpsan		-10.0 με	1d
	S_E8	Bottom, west edge girder, at midpsan	30.2 με		1d
Edge girder	**S_W7**	**Top, west edge girder, at midpsan**		**-13.7 με**	**1e**
	S_W8	**Bottom, west edge girder, at midpsan**	**36.2 με**		**1e**
Edge girder	S_E7	Top, west edge girder, at midpsan		-13.0 με	1f
	S_E8	Bottom, west edge girder, at midpsan	32.4 με		1f

Table 6.3. Baseline Maximum and Minimum Edge Girder Strains at the Controlling Location for all Single Truck Passes

Member	Sensor	Location	Max	Min	Pass
Edge girder	S_W21	Top, west edge girder, between pylon 6W and pier 7		-16.4 με	1a
	S_W22	Bottom, west edge girder, between pylon 6W and pier 7	29.9 με		1a
Edge girder	S_W21	Top, west edge girder, between pylon 6W and pier 7		-13.7 με	1b
	S_W22	Bottom, west edge girder, between pylon 6W and pier 7	26.4 με		1b
Edge girder	S_E21	Top, west edge girder, between pylon 6W and pier 7		-10.6 με	1c
	S_E22	Bottom, west edge girder, between pylon 6W and pier 7	22.4 με		1c
Edge girder	S_E21	Top, west edge girder, between pylon 6W and pier 7		-14.6 με	1d
	S_E22	Bottom, west edge girder, between pylon 6W and pier 7	26.9 με		1d
Edge girder	**S_W21**	**Top, west edge girder, between pylon 6W and pier 7**		**-18.1 με**	**1e**
	S_W22	**Bottom, west edge girder, between pylon 6W and pier 7**	**32.8 με**		**1e**
Edge girder	S_E21	Top, west edge girder, between pylon 6W and pier 7		-16.3 με	1f
	S_E22	Bottom, west edge girder, between pylon 6W and pier 7	29.6 με		1f

Table 6.4. Baseline Maximum and Minimum Edge Girder Strains at Midspan for Four and Six Side-by-Side Truck Passes

Member	Sensor	Location	Max	Min	Pass
Edge girder	**S_W7**	**Top, west edge girder, at midpsan**		**-25.9 με**	**4a**
	S_W8	**Bottom, west edge girder, at midpsan**	**90.8 με**		**4a**
Edge girder	**S_W7**	**Top, west edge girder, at midpsan**		**-41.0 με**	**6a**
	S_W8	**Bottom, west edge girder, at midpsan**	**138.0 με**		**6a**

Table 6.5. Baseline Maximum and Minimum Edge Girder Strains at the Controlling Location for Four and Six Side-by-Side Truck Passes

Member	Sensor	Location	Max	Min	Pass
Edge girder	**S_W21**	**Top, west edge girder, between pylon 6W and pier 7**		**-40.0 με**	**4a**
	S_W22	**Bottom, west edge girder, between pylon 6W and pier 7**	**91.1 με**		**4a**
Edge girder	**S_W21**	**Top, west edge girder, between pylon 6W and pier 7**		**-59.1 με**	**6a**
	S_W22	**Bottom, west edge girder, between pylon 6W and pier 7**	**148.9 με**		**6a[1]**

1 – pass 6b produced the absolute maximum strain of 150.9 με, however because it is only 1.5% higher, and for sake of simplicity, the pass 6a results are selected for the baseline set.

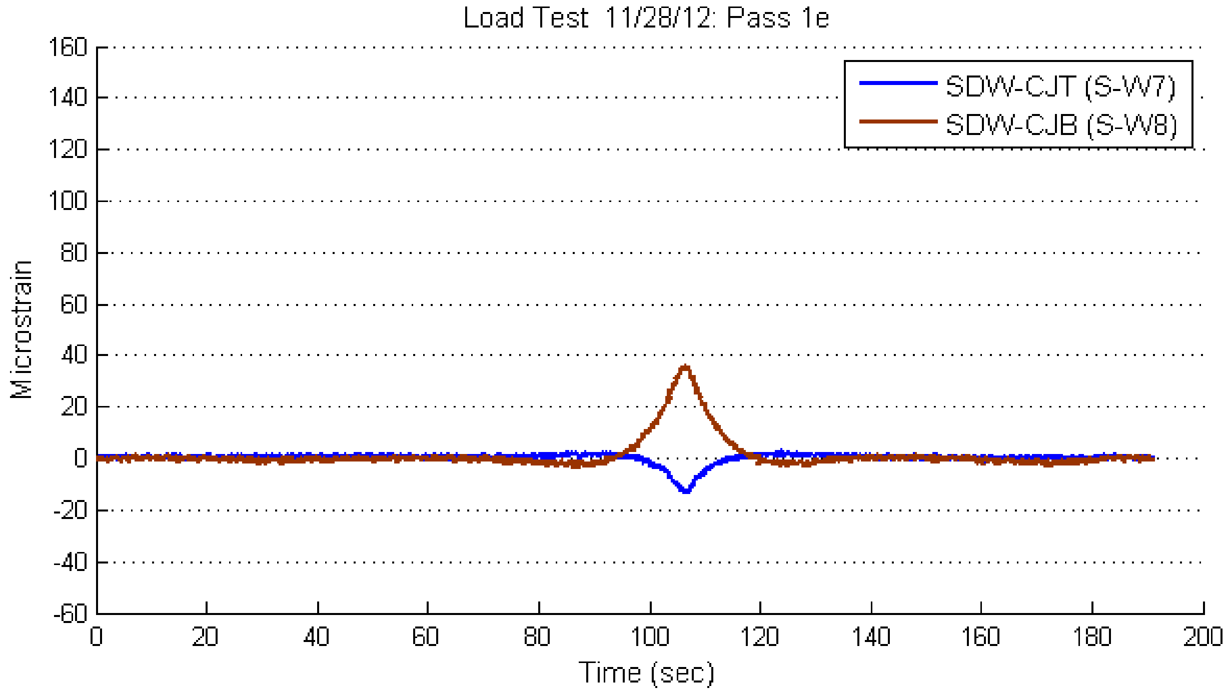


Figure 6.5 "Baseline" strain time history for W7 and W8, Pass 1e

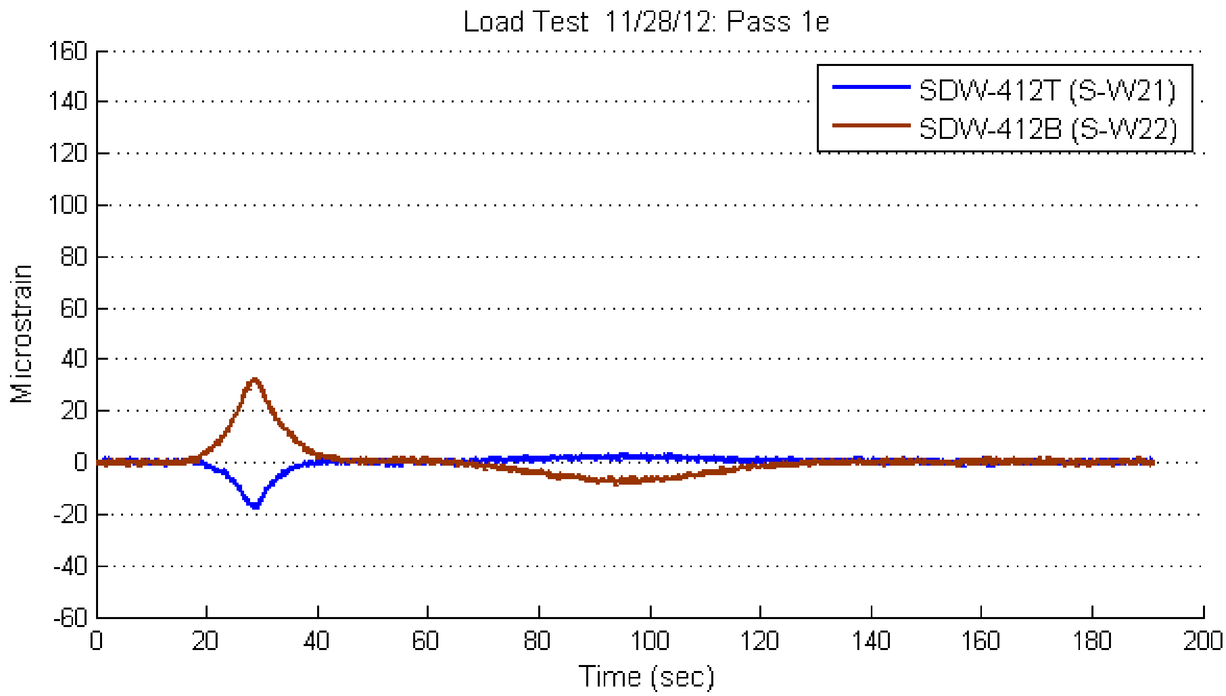


Figure 6.6 "Baseline" strain time history for W21 and W22, Pass 1e

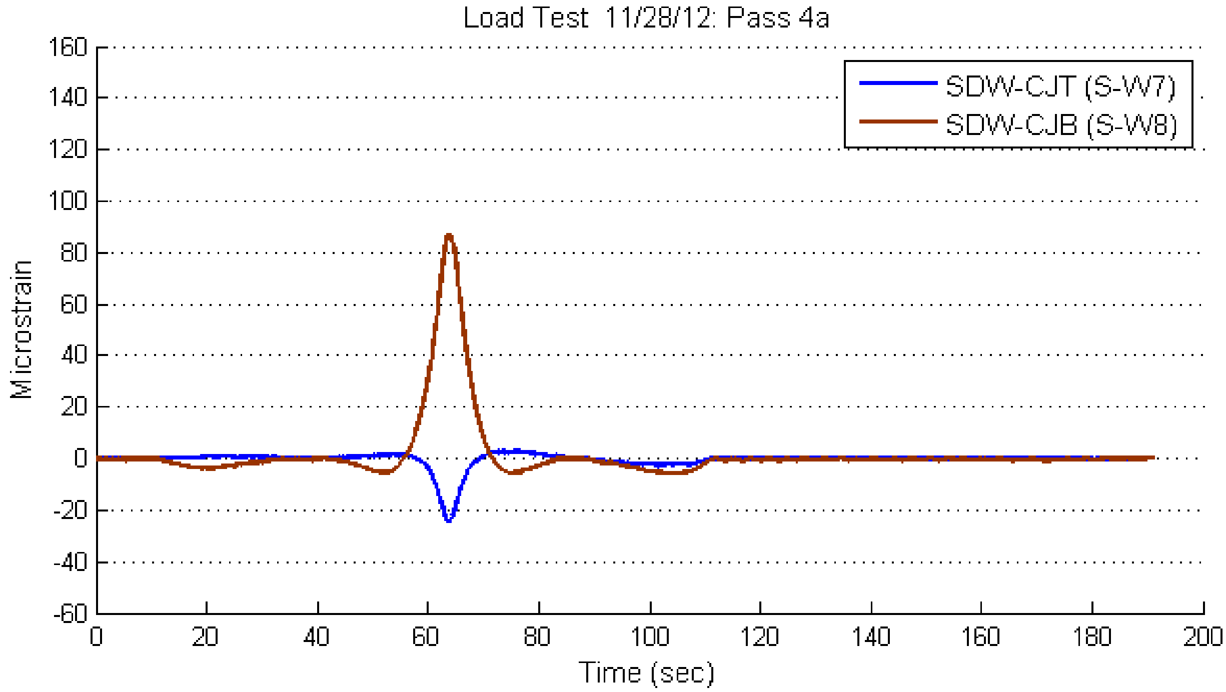


Figure 6.7 "Baseline" strain time history for W7 and W8, Pass 4a

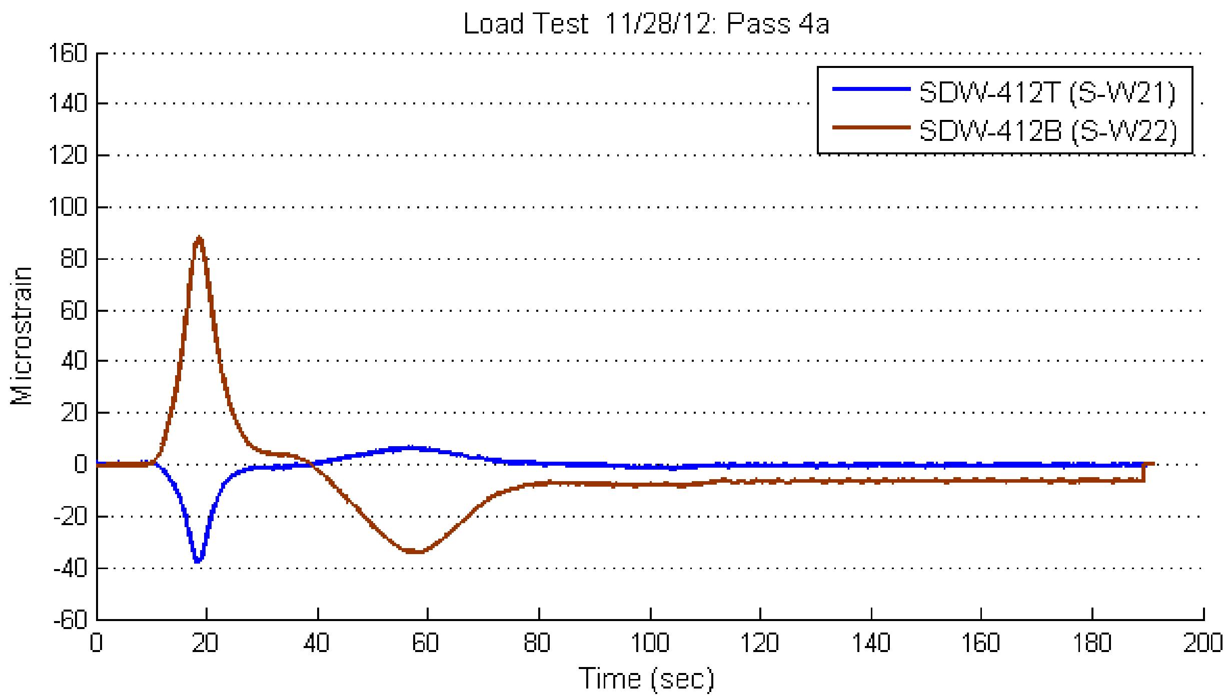


Figure 6.8 "Baseline" strain time history for W21 and W22, Pass 4a

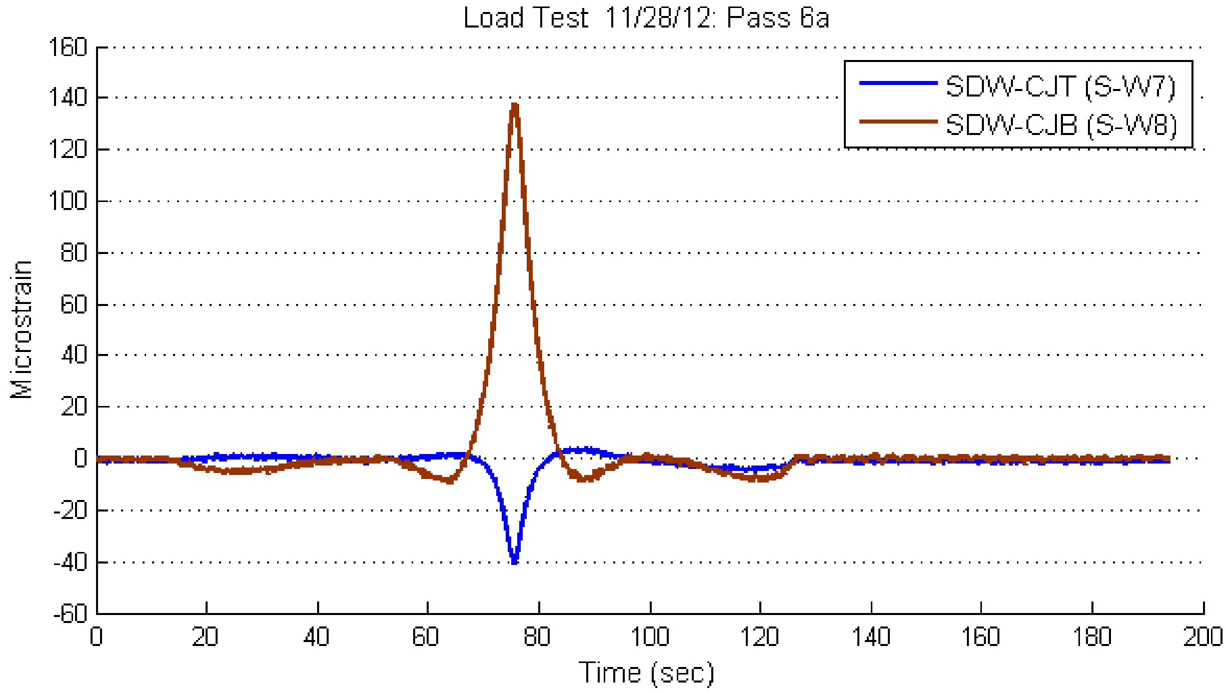


Figure 6.9 "Baseline" strain time history for W7 and W8, Pass 6a

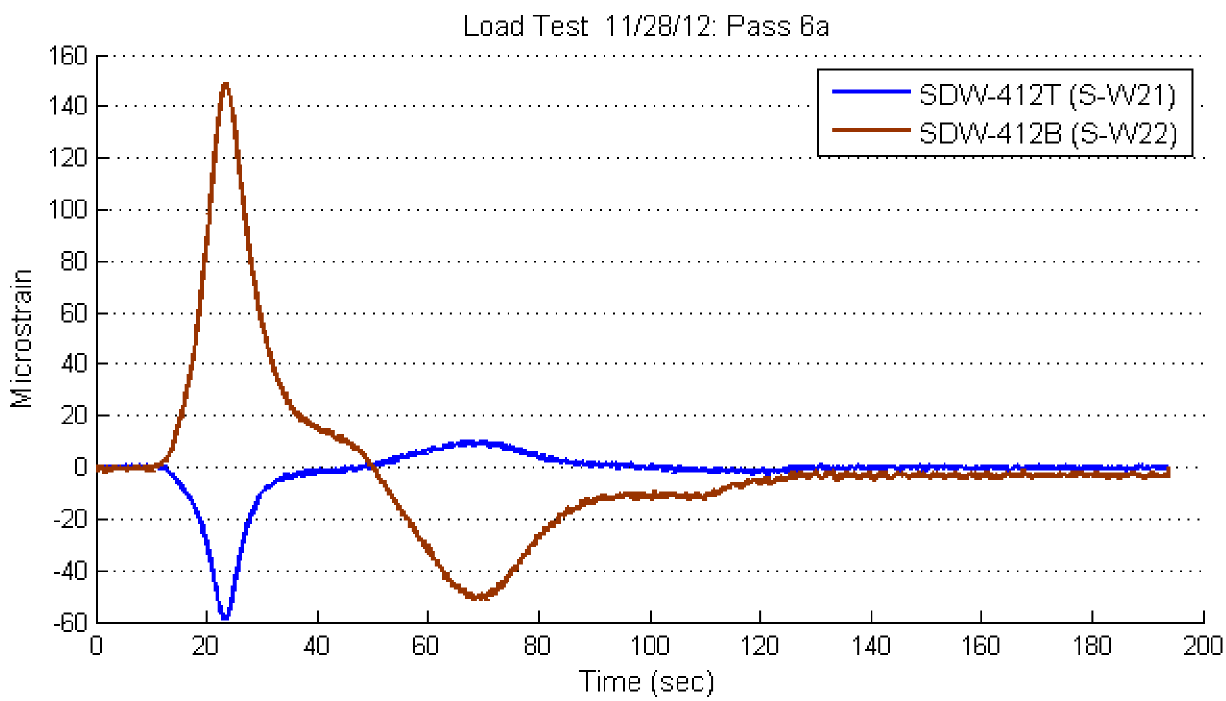


Figure 6.10 "Baseline" strain time history for W21 and W22, Pass 6a

6.3 Comparison of load test 3 to baseline results

Appendix F presents a comparison of load test 3 to the baseline test (load test 2). The passes used for this comparison are the "common" set of passes which are passes 1a to 1f (representing a single truck in either a shoulder or one of the four travel lanes), pass 4 (four trucks side-by side, one in each travel lane and all travelling in the same direction), and pass 6 (six trucks side-by side, one in each travel lane and one in each shoulder and all travelling in the same direction). The data has been normalized using the "baseline" average truck weight.

Time History Comparison

To enable a qualitative comparison, Appendix F includes time history plots for the edge girder strains (Figure F.1 to F.18 and F.20 to F.23), deck strains (Figure F.19), pylon strains (Figures F.24 to F.29), bearing displacement (Figures F.30 to F.32) – note that the interrogator B gave no data during test 3 and therefore there is no Figure F.31 or F.32, and deck tilts (Figures F.33 to F.41). In evaluating all of the comparison response plots (Figures F.1 to F.41), we can see that the nature of the response in all cases is very similar.

Peak Value Comparisons

To enable a more quantitative comparison, percentage differences have been computed using the peak values measured during the selected load pass (see Tables F.1 to F.20). The percent differences for peak bearing displacements are presented in Table F.1 and F.2, peak deck tilts in Table F.3 and F.4, peak pylon strains in Tables F.5 to F.10, peak edge girder strains in Tables F.11 to F.18, and peak deck strains (Tables F.19 and F.20). As before, the percent differences are only shown for values that exceed the thresholds for magnitude and difference as presented in Table 6.1 and discussed earlier.

Once again, in making these comparisons, the potential variability of the various pass configurations should be noted. For single truck passes (1a to 1f), the major variability comes from differences in the transverse location within the lane as well as truck weight. While the trucks were normalized by the average truck weight, there is some variability between trucks. For four side-by-side truck passes (4), the major variability are spacing between trucks and the alignment of the trucks. Individual truck weight variability becomes smaller with more trucks, and even the spacing and alignment issue become smaller. For the six side-by-side truck passes (6), the major variability is the spacing between trucks and the alignment of the trucks. Individual truck weight variability becomes even smaller with six trucks, and the spacing and alignment issue also becomes smaller.

Table F.1 and F.2 show a comparison of peak bearing displacements for load test 3 and load test 2. Because interrogator B gave no data, only the comparison of DE2 is relevant. For this gauge, in only one case did the data exceed the threshold criteria. For this case, which occurred during the six truck pass, the difference was 23 percent. The time history comparison for these two passes

(Figure F.30), as previously mentioned, is very similar in nature.

Table F.3 and F.4 shows a comparison of peak deck tilts for load test 3 and load test 2. In only 3 cases did the data exceed the threshold criteria. For these three cases, the differences were between -46 and -67 percent. The general lack of values indicates that the recorded rotations were all within the variability of the system. The time history responses indicate some variability while the nature of the curves looks similar (Figures F.33 to F.41).

Table F.5 to F.10 show a comparison of peak pylon strains for load test 3 and load test 2. In no cases did the difference exceed the threshold. Since none of the peak pylon strains were beyond the threshold of the expected variability, a numerical evaluation of variability is not possible. When comparing the time histories (Figure F.24 to F.29), one sees significant similarity in the plots.

Table F.11 to F.18 show a comparison of peak edge girder strains for load test 3 and load test 2. We will focus on differences of the east and west edge girder bottom strains at the midspan (SE8 and SW8) and controlling location (SE22 and SW22) for the four and six truck passes (4a and 6a). These represent the largest loads and corresponding largest strains. For these sensors, the percent differences range from -8 to 8 percent (negative meaning that test 2 values were larger while positive means test 3 values are larger). The time histories associated with the edge girder strains (Figures F.1 to F.23) show excellent correlation.

Table F.19 and F.20 show a comparison of peak deck strains for load test 3 and load test 2. The general lack of values indicates that the recorded deck strains were within the variability of the system. The two values in the tables represented differences of 19 and 9 percent; these differences can be explained by the very localized effect of the location of a wheel load. The time histories associated with the deck strains (Figures F.19) indicate excellent correlation.

6.4 Comparison of load test 4 to baseline results

Appendix G presents a comparison of load test 4 to the baseline test (load test 2). The passes used for this comparison are the “common” set of passes which are passes 1a to 1f (representing a single truck in either a shoulder or one of the four travel lanes), pass 4 (four trucks side-by side, one in each travel lane and all travelling in the same direction), and pass 6 (six trucks side-by side, one in each travel lane and one in each shoulder and all travelling in the same direction). The data has been normalized using the “baseline” average truck weight.

Time History Comparison

To enable a qualitative comparison, Appendix G includes time history plots for the edge girder strains (Figure G.1 to G.18 and G.20 to G.23), deck strains (Figure G.19), pylon strains (Figures G.24 to G.29), bearing displacement (Figures G.30 to G.32), and deck tilts (Figures G.33 to G.41).

In evaluating all of the comparison response plots (Figures G.1 to G.41), we can see that the nature of the response in all cases is very similar.

Peak Value Comparisons
To enable a more quantitative comparison, percentage differences have been computed using the peak values measured during the selected load pass (see Tables G.1 to G.20). The percent differences for peak bearing displacements are presented in Table G.1 and G.2, peak deck tilts in Table G.3 and G.4, peak pylon strains in Tables G.5 to G.10, peak edge girder strains in Tables G.11 to G.18, and peak deck strains (Tables G.19 and G.20). As before, the percent differences are only shown for values that exceed the thresholds for magnitude and difference as presented in Table 6.1 and discussed earlier.

Table G.1 and G.2 show a comparison of peak bearing displacements for load test 4 and load test 2. In most of the six truck passes, and one of the four truck passes, the measured data exceeded the threshold. For these case, the differences ranged from -80 to 69 percent. The time history comparison for these passes (Figures G.30 to G.32) show decent but clearly not perfect similarity. While similar peaks are reached, the nature of the curves do differ in some cases. This may be due to some sticking of the gages during operation. In general, the absolute magnitude of the variation in peaks is fairly small as seen by the plots.

Table G.3 and G.4 shows a comparison of peak deck tilts for load test 4 and load test 2. In only 7 cases did the data exceed the threshold. For these seven cases, the differences were between -17 and 150 percent. The general lack of values indicates that the recorded rotations were mostly within the variability of the system. The time history responses indicate some variability in peaks while the nature of the curves are very similar (Figures G.33 to G.41).

Table G.5 to G.10 show a comparison of peak pylon strains for load test 4 and load test 2. In only one cases did the data exceed the threshold (for this case, the difference was -12 percent). When comparing the time histories (Figure G.24 to G.29), one sees significant similarity in the plots.

Table G.11 to G.18 show a comparison of peak edge girder strains for load test 4 and load test 2. We will focus on differences of the east and west edge girder bottom strains at the midspan (SE8 and SW8) and controlling location (SE22 and SW22) for the four and six truck passes (4a and 6a). These represent the largest loads and corresponding largest strains. For these sensors, the percent differences range from -11 to 5 percent (negative meaning that test 2 values were larger while positive means test 4 values are larger). The time histories associated with the edge girder strains (Figures G.1 to G.23) show excellent correlation.

Table G.19 and G.20 show a comparison of peak deck strains for load test 4 and load test 2. The general lack of values indicates that the recorded deck strains were within the variability of the system. The one value in the tables represented a difference of 24 percent; this difference can be explained by the very localized effect of the location of a wheel load. The time histories associated with the deck strains (Figures G.19) indicate excellent correlation.

6.5 Comparison of all four load tests

By comparing the results from all four load tests, we can get an indication as to whether or not changes in bridge behavior over the first two years of service of the bridge has occurred. In making this comparison, we will focus on the effects of the largest loads, the four and six side-by-side truck passes, and we will limit our comparison to edge girder strains at midspan (sensors SW7/SW8 and SE7/SE8) and at the controlling location (sensors SW21/SW22 and SE21/SE22).

Figures 6.11 to 6.14 show a comparison of the time histories for sensors SW7/SW8, SE7/SE8, SW21/SW22, and SE21/SE22 for the six side-by-side truck passes (load tests 2 to 4). While the curves are shifted due to the speed of the trucks and the initiation time of data collection, the nature of the time histories are very similar. While this is a relatively qualitative comparison, it clearly indicates that the global behavior of the bridge has not changed in any significant way during the first two years of service.

In order to make a more quantitative comparison, we will look at the sum of the peak edge girder bottom strains at midspan (SW8 + SE8) and at the controlling location (SW22 + SE22). The sum of these peak strains can be seen in Table 6.5 (not normalized for truck weights) and Table 6.6 (normalized for truck weights). By using the sum of the two strains, some of the variability due to differences in transverse truck location can be eliminated. In a way, the sum of the peak strains is closely correlated to the total moment across the section at the two locations. Note that in Table 6.6 the strain values have been adjusted by normalizing the average weight of the test trucks used in the baseline test (load test 2). The normalized baseline value for the sum of the bottom strains at midspan (SW8+SE8) is 254 $\mu\varepsilon$ while the baseline value for the sum of the bottom strains at the controlling location (SW22+SE22) is 282 $\mu\varepsilon$.

Table 6.8 shows the percent difference in these peak strain summations compared to the baseline test (load test 2). Values greater than one mean that the strains are larger than the baseline, and values less than one mean that the strains are smaller than the baseline. From the comparison we can see that the bridge response over the two years is very stable and relatively unchanged. None of the percentage differences exceeds 9%, and the average of the percent differences is 3.3%. This level of variability is close to the range of variability that is expected from experimental measurement variability as shown in Table 6.9. In this table, +/- 3.7 $\mu\varepsilon$ (based on the results shown in Table 6.1) is assumed for all passes. Table 6.9 shows that due to the expected variability of measured strain, differences on the order of 2 to 4% are not meaningful. Only three values (5, 6, and 9%) in Table 6.7 exceed this threshold, and the average of all of the differences (3.3%) is within this threshold.

The greatest changes occurred between test 1 and test 2 (6 and 9% for the two four-truck passes). In both cases the strains measured during load test 1 were larger than during load test 2. Aside from variability in testing, the trend of a slight decrease in strain (increase in bridge stiffness) over this first six months may be explained by the expected increase in concrete strength during the early life of the structure. Between test 3 and test 2 (the next six months), the results for three of the four passes would indicate a very slight increase in strain (decrease in stiffness). While there seems to be a slight trend, when averaged over all four passes, the change is a virtually insignificant (0.5%). Finally, comparing test 4 to test 2 (one and a half years apart), the results indicate a continued, but very small, increase in strain (decrease in stiffness). On average, the test 4 strains are 3% larger than the test 2 strains. This slight trend towards increasing strain and decreasing stiffness might be explained by the effects of changes in post-tensioned cable forces and cable stay forces due to creep and shrinkage.

Finally, Table 6.9 presents computed distribution factors for the edge girders (DF) for each of the tests. Transverse load distribution is an important characteristic of the bridge and is a useful quantity to track over time. The distribution factors were computed at the controlling location based on one, two, four, and six loaded lanes (going forward, only one, four, and six lane DF's will be computed). The table presents DF's computed for each individual load test, the maximum values over all of the tests (which is considered to be a conservative value), and standard deviations computed from the data. One can see that the results are very consistent over the suite of tests (the values of standard deviation are very low ranging from 0.03 to 0.08). There does not seem to be a significant trend towards increasing or decreasing load distribution, but rather a fairly stable pattern.

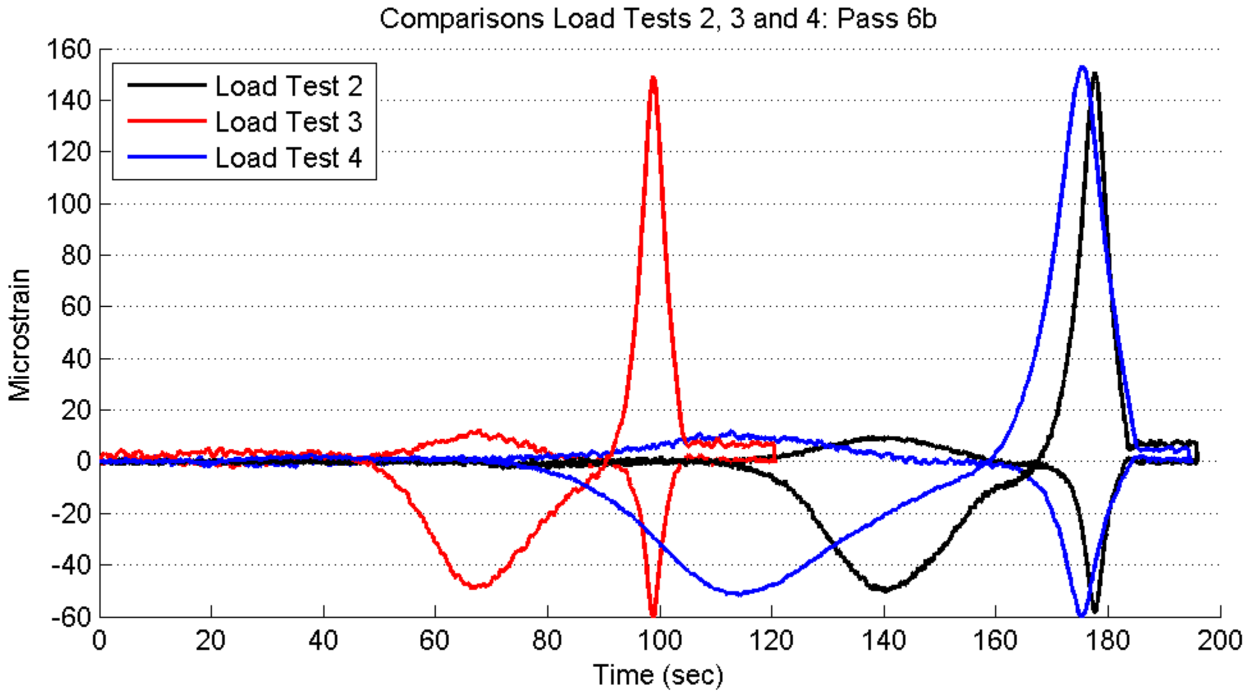


Figure 6.11 Comparison of load test 2, 3, and 4, sensors W21 and W22 (results scaled to load test 2)

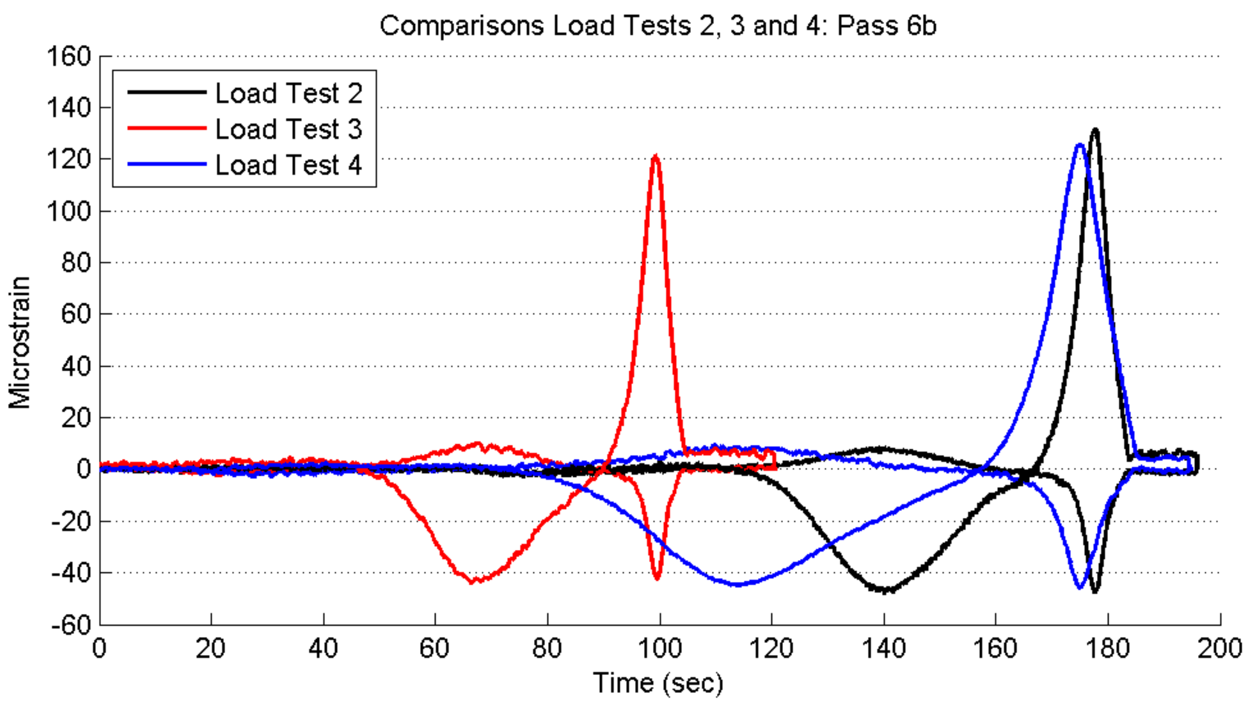


Figure 6.12 Comparison of load test 2, 3, and 4, sensors E21 and E22 (results scaled to load test 2)

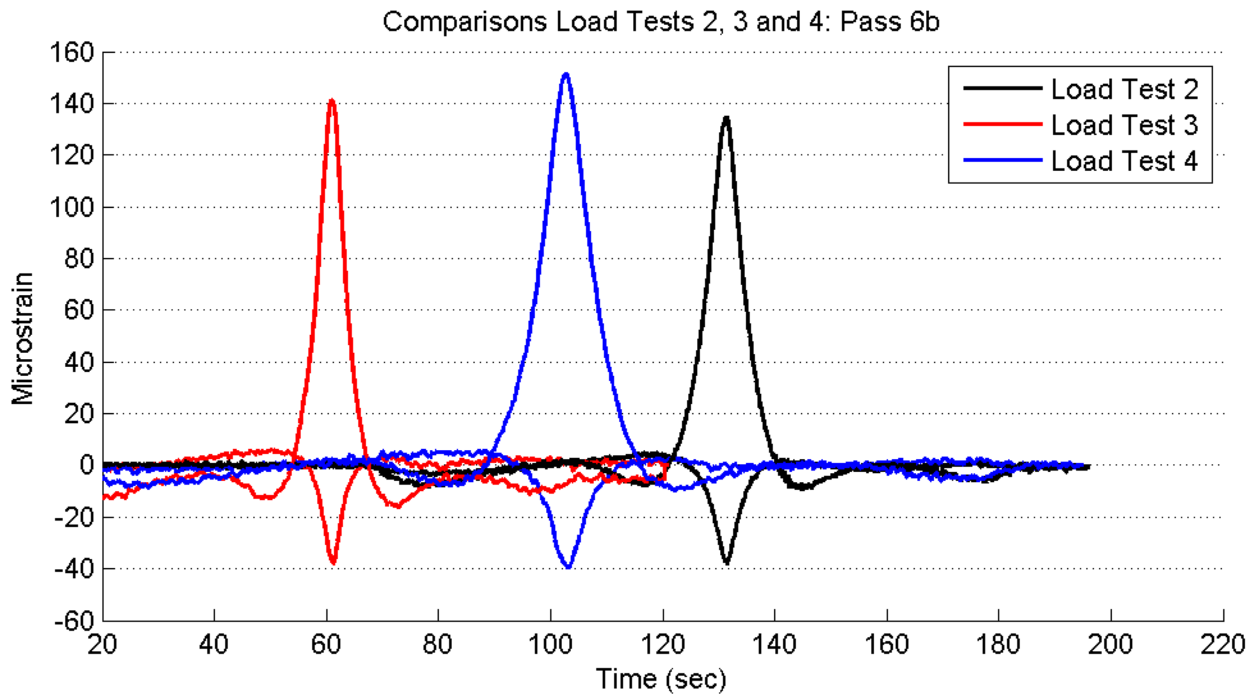


Figure 6.13 Comparison of load test 2, 3, and 4, sensors W7 and W8 (results scaled to load test 2)

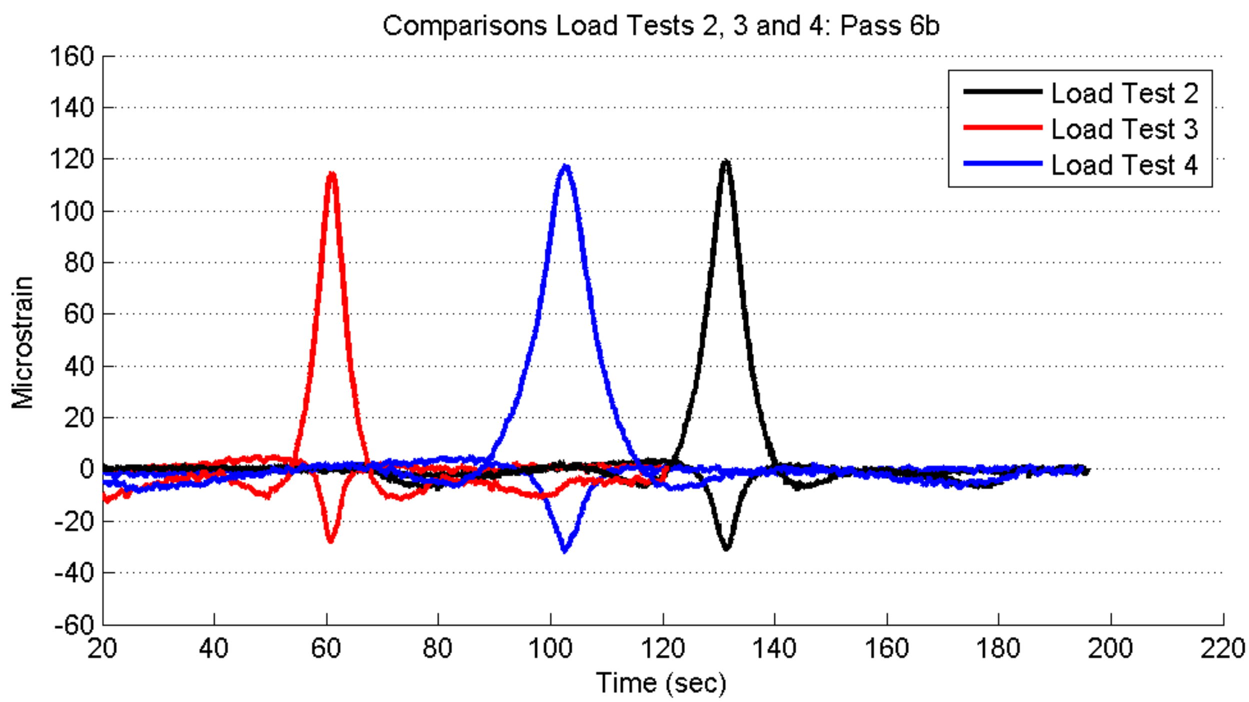


Figure 6.14 Comparison of load test 2, 3, and 4, sensors E7 and E8 (results scaled to load test 2)

Table 6.6. Summation of West and East Edge Girder Bottom Strains at Midspan and Governing Location

	Test 1 (με)	**Test 2 (με)**	Test 3 (με)	Test 4 (με)
4 Truck – Pass 4a				
S-W8 + S-E8	183	**169**	168	179
S-W22 + S-E22	191	**172**	166	181
6 Truck – Pass 6b				
S-W8 + S-E8		**254**	255	271
S-W22 + S-E22		**282**	262	283

Table 6.7. Normalized Summation of West and East Edge Girder Bottom Strains at Midspan and Governing Location

	Test 1 (με)	**Test 2 (με)**	Test 3 (με)	Test 4 (με)
4 Truck – Pass 4a				
S-W8 + S-E8	180	**169**	174	176
S-W22 + S-E22	188	**172**	172	178
6 Truck – Pass 6b				
S-W8 + S-E8		**254**	264	267
S-W22 + S-E22		**282**	271	278
Average Truck Weight (kips)				
	63.5	**62.4**	60.2	63.4

Table 6.8. Percentage Difference in Normalized Summation of West and East Edge Girder Bottom Strains at Midspan and Governing Location from Baseline (Test 2)

% Difference in Strain	Test 1	**Test 2**	Test 3	Test 4
4 Trucks – Pass 4a				
S-W8 + S-E8	6%	**0%**	3%	4%
S-W22 + S-E22	9%	**0%**	1%	4%
6 trucks – Pass 6b				
S-W8 + S-E8	-	**0%**	4%	5%
S-W22 + S-E22	-	**0%**	-4%	-1%

Average difference = 3.3%

Table 6.9. Expected Differences in Normalized Summation of West and East Edge Girder Bottom Strains at Midspan and Governing Location from Baseline (Test 2) Due to Measured Variability

	Baseline Strain (με)	Expected Variability (με)	Expected Percent Difference
4 Trucks – Pass 4a			
S-W8 + S-E8	**169**	**+/- 3.7**	4.4%
S-W22 + S-E22	**172**	**+/- 3.7**	4.3%
6 trucks – Pass 6b			
S-W8 + S-E8	**254**	**+/- 3.7**	2.9%
S-W22 + S-E22	**282**	**+/- 3.7**	2.6%

Table 6.10. Edge Girder Distribution Factors for One, Two, Four, and Six Lanes Loaded

DF	Test 1	**Test 2**	Test 3	Test 4	**Max.**	Std. Dev.
One Lane	0.67	**0.70**	0.68	0.63	**0.70**	0.03
Two Lanes	1.27	**1.31**			**1.31**	0.03
Four Lanes	**2.14**	1.94	2.04	2.07	**2.14**	0.08
Six Lanes		**3.21**	3.32	3.30	**3.32**	0.06

7 Summary

The following is a summary of the key findings from the controlled load tests that were conducted on the new Charles W. Cullen Bridge at the Indian River Inlet on April 30, 2012 (when the bridge opened for service), on November 28, 2012 (after six months of service), on May 9, 2013 (after one year of service), and on May 7, 2014 (after two years of service). All load tests were conducted using the permanent structural monitoring system on the bridge and up to six test vehicles with a maximum combined weight of 380 kips.

Overall results:

- A permanent structural heath monitoring system has been successfully deployed on the Charles W. Cullen Bridge.
- The “baseline” response for the bridge, representing a “new” state, has been established.
- A set of standard passes involving one, four, and six trucks has been established.
- Based on the results of all four load tests, the bridge was found to be behaving as expected.
- Based on the repeatability of the recorded data, and the fact that the recorded time history response of the bridge is consistent with the expected bridge response, the structural health monitoring system is deemed to be functioning properly.
- Based on repetitive pass and ambient vibration data collected during test 4, the threshold for a meaningful difference between measured strain values from different tests but from similar passes is +/- 4 $\mu\varepsilon$.

Maximum recorded responses:

- For the edge girder (which happens to be the element that, in most cases, governs the load rating of the bridge for the strength limit state), the maximum strain recorded during any of the load tests and passes was 156 $\mu\varepsilon$ at gauge S_W22 during pass 6b of test 4 (six tucks side-by side, one in each travel lane and one in each shoulder). This gauge is located at the bottom of the western edge girder between pylon 6W and pier 7 (within 4 feet of the controlling location). The strain of 156 $\mu\varepsilon$ corresponds to a live-load tensile stress in the rebar of 4.52 ksi and a live-load tensile stress in the concrete of 806 psi.
- For the edge girder, the minimum edge girder strain recorded during any of the load tests and passes was -61.6 $\mu\varepsilon$ at gauge S_W21 during pass 6b of test 4. This gauge is located at the same location as gauge S_W22 (the controlling location), but is in the top of the western edge girder. This strain corresponds to a live-load compression stress of 1.79 ksi in the rebar and a live-load compression stress in the concrete of 318 psi.
- The maximum and minimum pylon strains recorded during any of the load tests and passes were 36.4 $\mu\varepsilon$ and -43.3 $\mu\varepsilon$ at gauge S_W24S during passes 6b of test 4 respectively. Gauge S_W24S is located at pylon 6W above the deck.
- The maximum and minimum displacements recorded during any of the load passes for six side-by-side trucks were 0.230 inches and -0.205 inches at gauge D_E2 during passes 6b of tests 2 and 4 respectively. Gauge D_E2 is located at pylon 5E.

- The maximum and minimum deck tilts recorded during any of the load passes were 0.108 degrees at gauge T_E9 and -0.132 degrees at gauge T_E1 during pass 6b of test 4. Gauge T_E1 is located at pier 4 and gauge T_E9 is located at pier 7.

Response due to a single truck or a simulated permit truck:

- A single truck weighing 63,500 lbs and crossing in the slow lane would be expected to cause peak strains in the edge girders at the controlling location and at midspan on the order of 30 $\mu\varepsilon$. This corresponds to a live-load tensile stress in the rebar of 0.87 ksi and a live-load tensile stress in the concrete of 155 psi.
- Based on passes involving a two-truck train, a long permit vehicle (on the order of 65 feet long) and weighing 127,000 lbs and crossing in the slow lane would be expected to cause peak strains at the controlling location and at midspan on the order of 50 $\mu\varepsilon$. This corresponds to a live-load tensile stress in the rebar of 1.45 ksi and a live-load tensile stress in the concrete of 258 psi.

Load distribution and associated distribution factors:

- When a truck is in the western most lane (southbound slow lane), roughly 70% of the truck load goes to the western edge girder. When a truck is in the eastern most lane (northbound slow lane), roughly 63% of the truck load goes to the eastern edge girder.
- When loaded with four trucks across the bridge (one in each travel lane), roughly 53% of the total load goes to the western edge girder.
- The largest computed (i.e. conservative) one-lane, two-lane, four-lane, and six-lane distribution factors based on the four tests were found to be 0.70, 1.31, 2.07, and 3.32 respectively.

Baseline data and standard passes:

- The average weight of a truck associated with the baseline test is 62,400 lbs.
- Baseline values have been established for the baseline passes.
- The baseline value for one-lane, two-lane, four-lane, and six-lane distribution factors based on the four tests were found to be 0.70, 1.31, 1.94, and 3.21 respectively.
- The baseline value for the sum of the bottom strains at midspan (SW8+SE8) is 254 $\mu\varepsilon$ while the baseline value for the sum of the bottom strains at the controlling location (SW22+SE22) is 282 $\mu\varepsilon$.

Variability over the four load tests:

- The variability of peak strain summations for gauges at the bottom face of the edge girder at midspan or the governing location for tests 1, 3, and 4 is relatively small. The percent difference in no case exceeds 9%, and the average of the percent differences is 3.3%.
- The greatest change in the peak strain summations for gauges at the bottom face of the

edge girder at midspan or the governing location occurred between test 1 and test 2 (6 and 9% for the two four truck passes). In both cases the strains measured during load test 1 were larger than during load test 2. Aside from variability in testing, the trend of a slight decrease in strain (increase in bridge stiffness) over this first six months may be explained by the expected increase in concrete strength during the early life of the structure.

- Between test 3 and test 2 (the next six months), the results for three of the four passes would indicate a very slight increase in peak strain summations (decrease in stiffness). While there seems to be a slight trend, when averaged over all four passes, the change is a virtually insignificant (0.5%).
- Comparing test 4 to test 2 (one and a half years apart), the results indicate a continued, but very small, increase in peak strain summations (decrease in stiffness). On average, the test 4 strains are 3% larger than the test 2 strains. This slight trend towards increasing strain and decreasing stiffness might be explained by the effects of changes in post-tensioned cable forces and cable stay forces due to creep and shrinkage.
- The distribution factors computed for one, two, four, and six loaded lanes are very consistent over the suite of four load tests (the values of standard deviation are very low ranging from 0.03 to 0.08) and there does not seem to be a significant trend towards increasing or decreasing load distribution, but rather a fairly stable pattern.

8 Recommendation for future load tests and for the SHM system

This following are a set of recommendations regarding future load tests and the SHM system in general:

- Load tests should be conducted every 2 years. The next load test should be conducted in May of 2016 (after four years of service).
- The set of standard passes involving one, four, and six trucks should be used in all load tests.
- Data should be collected at 15.6 Hz.
- Collected data should be compared to the "baseline" response to evaluate changes in behavior.
- Research conducted using tilt measurements has shown promise for predicting mid-span displacements. To further confirm the methodology absolute deflections at mid-span should be measured using a total station during the next load test.
- The SHM system should be maintained in good working order.
- Continued research should be conducted to enable the SHM data to be used for a variety of evaluation applications.

References

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Appendix A Tables and Figures – Load Test 1 (4/30/12)

Table A.1 Bearing Displacement: Maximums Load Test 1 (4/30/12)

No. trucks	Pass	Displacement (in)	
		DDE_101 D-E2	DDE_415 D-E3
Slow speed passes			
1	1a	0.1	0.034
	1b	0.129	0.021
	1c	0.171	0.023
	1d	0.141	0.026
2	2a	0.197	0.046
	2b	0.089	0.031
	2c	0.133	0.055
	2d	0.126	0.056
	2e	0.108	0.043
	2f	0.171	0.033
4	4a	0.259	0.105
	4b	0.198	0.094
	4c	0.191	0.142
	4d	0.191	0.063
	4e	0.294	0.113
Maximum		0.294	0.142

High speed passes			
4	4f	0.218	0.056
	4g	0.089	0.021
Maximum		0.294	0.113

Table A.2 Bearing Displacement: Minimums Load Test 1 (4/30/12)

No. of trucks	Pass	Displacement (in)	
		DDE_101 D-E2	DDE_415 D-E3
Slow speed passes			
1	1a	-0.146	-0.011
	1b	-0.108	-0.022
	1c	-0.086	-0.022
	1d	-0.115	-0.022
2	2a	-0.109	-0.015
	2b	-0.238	-0.034
	2c	-0.184	-0.01
	2d	-0.242	-0.021
	2e	-0.237	-0.027
	2f	-0.191	-0.047
4	4a	-0.245	-0.124
	4b	-0.243	-0.116
	4c	-0.327	-0.069
	4d	-0.223	-0.109
	4e	-0.201	-0.081
Minimum		-0.327	-0.124

High speed passes			
4	4f	-0.175	-0.018
	4g	-0.251	-0.04
Minimum		-0.124	-0.04

Table A.3 Deck Tilt: Maximums

No. of trucks	Pass	Tilt sensor (Deg.)								
		IDE_115 T-E1	IDE_108 T-E2	IDE_101 T-E3	IDE_210 T-E4	IDE_CJ T-E5	IDE_310 T-E6	IDE_301 T-E7	IDE_408 T-E8	IDE_415 T-E9
Slow speed passes										
1	1a	0.011	0.009	0.005	0.001	0.006	0.006	0.004	0.003	0.014
	1b	0.011	0.010	0.008	0.002	0.010	0.008	0.007	0.010	0.016
	1c	0.012	0.012	0.008	0.001	0.012	0.014	0.007	0.004	0.021
	1d	0.010	0.013	0.010	0.002	0.015	0.017	0.008	0.007	0.018
2	2a	0.021	0.013	0.008	0.002	0.014	0.016	0.008	0.007	0.031
	2b	0.018	0.010	0.010	0.003	0.013	0.014	0.006	0.006	0.028
	2c	0.021	0.016	0.009	0.003	0.018	0.014	0.009	0.008	0.030
	2d	0.022	0.027	0.017	0.004	0.029	0.032	0.009	0.005	0.036
	2e	0.023	0.006	0.013	0.002	0.029	0.031	0.021	0.012	0.033
	2f	0.020	0.024	0.019	0.002	0.029	0.032	0.015	0.008	0.038
4	4a	0.050	0.039	0.026	0.006	0.044	0.045	0.017	0.011	0.073
	4b	0.047	0.028	0.019	0.003	0.027	0.031	0.016	0.011	0.061
	4c	0.053	0.045	0.034	0.007	0.051	0.057	0.023	0.012	0.074
	4d	0.041	0.018	0.020	0.003	0.022	0.023	0.014	0.009	0.048
	4e	0.053	0.035	0.036	0.004	0.050	0.053	0.023	0.014	0.070
Maximum		0.053	0.045	0.036	0.007	0.051	0.057	0.023	0.014	0.074

High speed passes										
4	4f	0.044	0.025	0.021	0.014	0.040	0.039	0.023	0.010	0.042
	4g	0.032	0.010	0.015	0.012	0.017	0.015	0.009	0.013	0.029
Maximum		0.044	0.025	0.021	0.014	0.040	0.039	0.023	0.013	0.042

Table A.4 Deck Tilt: Minimums

No. of trucks	Pass	IDE_115 T-E1	IDE_108 T-E2	IDE_101 T-E3	IDE_210 T-E4	IDE_CJ T-E5	IDE_310 T-E6	IDE_301 T-E7	IDE_408 T-E8	IDE_415 T-E9
		Tilt sensor (Deg.)								
Slow speed passes										
1	1a	-0.016	-0.002	-0.005	-0.002	-0.007	-0.003	-0.004	-0.006	-0.007
	1b	-0.018	-0.001	-0.005	-0.003	-0.010	-0.006	-0.004	-0.003	-0.009
	1c	-0.018	-0.004	-0.009	-0.006	-0.014	-0.003	-0.006	-0.012	-0.007
	1d	-0.021	-0.005	-0.009	-0.007	-0.015	-0.005	-0.006	-0.011	-0.008
2	2a	-0.033	-0.006	-0.013	-0.005	-0.014	-0.004	-0.009	-0.010	-0.011
	2b	-0.033	-0.006	-0.007	-0.003	-0.011	-0.003	-0.009	-0.010	-0.013
	2c	-0.034	-0.007	-0.012	-0.005	-0.015	-0.009	-0.009	-0.012	-0.015
	2d	-0.040	-0.006	-0.015	-0.010	-0.025	-0.008	-0.015	-0.023	-0.018
	2e	-0.036	-0.006	-0.016	-0.010	-0.020	-0.002	-0.003	-0.014	-0.018
	2f	-0.041	-0.010	-0.014	-0.012	-0.031	-0.009	-0.012	-0.021	-0.015
4	4a	-0.080	-0.014	-0.023	-0.015	-0.040	-0.013	-0.022	-0.034	-0.036
	4b	-0.071	-0.011	-0.018	-0.011	-0.027	-0.008	-0.014	-0.023	-0.036
	4c	-0.077	-0.017	-0.026	-0.020	-0.054	-0.012	-0.023	-0.037	-0.038
	4d	-0.060	-0.010	-0.012	-0.006	-0.015	-0.006	-0.012	-0.018	-0.035
	4e	-0.069	-0.017	-0.026	-0.021	-0.051	-0.013	-0.023	-0.029	-0.035
Minimum		-0.080	-0.017	-0.026	-0.021	-0.054	-0.013	-0.023	-0.037	-0.038

High speed passes										
4	4f	-0.043	-0.012	-0.022	-0.028	-0.023	-0.013	-0.011	-0.020	-0.028
	4g	-0.042	-0.010	-0.014	-0.008	-0.017	-0.013	-0.012	-0.006	-0.020
Minimum		-0.043	-0.012	-0.022	-0.028	-0.023	-0.013	-0.012	-0.020	-0.028

Table A.5 Plyon 5E Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Below Deck – Level B1)				Strain sensor (με) (Above Deck – Level T4)			
		SP5E_B1W S-E26W	SP5E_B1N S-E23N	SP5E_B1E S-E25E	SP5E_B1S S-E24S	SP5E_T4W S-E30W	SP5E_T4N S-E27N	SP5E_T4E S-E29E	SP5E_T4S S-E28S
Slow speed passes									
1	1a	3.7	1	1.8	3.6	1.4	1.7	1.2	1.5
	1b	3.1	1.7	2	4.7	2.1	2.3	1.5	2
	1c	2.6	0.8	2.7	5.1	0.8	2.2	2	2.8
	1d	1.9	1.6	1.1	5.4	2	1.5	1.8	4.8
2	2a	1.8	1.9	1.2	6.7	1.8	1.7	1.5	4
	2b	1.5	0.8	2.1	6.3	1.3	1.4	1.7	2.9
	2c	0.9	2.6	1.2	7.5	1.1	2.1	1.3	5.2
	2d	2.5	2.3	1.8	10.7	1.2	3.2	2.6	5.9
	2e	2.4	1.5	1.9	10.1	0.5	2.1	2.4	5.1
	2f	1.4	1.9	1.5	11.5	2.1	2.9	1.4	5.4
4	4a	2.8	1.8	2.1	18	1.1	3	1.1	9
	4b	1.8	2.4	1.6	12.8	1.2	3.5	1.7	5.7
	4c	2.3	2.5	2.1	19.4	2.2	3	1.5	10.3
	4d	1.9	1.4	1.3	11	1.8	2	1.5	4.6
	4e	2.2	3.6	1.5	21.4	1.2	2.6	1.4	11.4
Maximum		3.7	3.6	2.7	21.4	2.2	3.5	2.6	11.4

High speed passes									
4	4f	1.7	2.3	1.3	15.7	1.1	2	1.6	6.1
	4g	3	2.2	4.2	8.2	0.6	1.6	1.7	4.7
Maximum		3	2.3	4.2	15.7	1.1	1.6	1.7	4.7

Table A.6 Plyon 5E Strain: Minimums

No. of trucks	Pass	Strain sensor (με)(Below Deck – Level B1)				Strain sensor (με) (Above Deck – Level T4)			
		SP5E_B1W S-E26W	SP5E_B1N S-E23N	SP5E_B1E S-E25E	SP5E_B1S S-E24S	SP5E_T4W S-E30W	SP5E_T4N S-E27N	SP5E_T4E S-E29E	SP5E_T4S S-E28S
Slow speed passes									
1	1a	-1	-2	-1	-3.4	-1.7	-3.3	-1.6	-2.1
	1b	-1.7	-2.6	-1.3	-4.8	-2.3	-2.9	-1.4	-2.7
	1c	-1	-2.4	-1.3	-6.6	-2.8	-4.3	-1.6	-2.4
	1d	-1.8	-1.8	-2.1	-7.9	-2.7	-5.1	-1.5	-1.8
2	2a	-2	-2.3	-2.5	-7.2	-2.2	-5	-1.9	-2.2
	2b	-1.7	-2.3	-1.3	-6.2	-2	-4	-2.3	-4.5
	2c	-3.2	-1.3	-1.9	-7.8	-2.7	-4.9	-1.9	-1.9
	2d	-1.4	-2.4	-2.4	-12.4	-3.8	-7.4	-2	-4.3
	2e	-1.7	-3.3	-1.9	-10.2	-5.8	-7.5	-1.6	-4
	2f	-2.1	-2.4	-1.5	-13.2	-2.9	-7.7	-2.3	-5.4
4	4a	-1.7	-2.6	-2	-17.9	-5	-12	-2.3	-5.9
	4b	-2.3	-3.7	-1.9	-13.5	-3.4	-7.1	-1.8	-4.4
	4c	-2.5	-3	-3.1	-25	-4.6	-15.1	-3.4	-7.8
	4d	-2.1	-3.2	-2.1	-10.5	-2.7	-6.2	-2.2	-4
	4e	-2.3	-3.1	-2.8	-23.6	-5.8	-15.6	-2.7	-6
Minimum		-3.2	-3.7	-3.1	-25	-5.8	-15.6	-3.4	-7.8

High speed passes									
4	4f	-2.6	-6.7	-2.3	-14.1	-4.9	-10.4	-2.7	-5.1
	4g	-1.8	-1.4	-1.8	-6.7	-2.9	-4.5	-2	-1
Minimum		-2.6	-6.7	-2.3	-14.1	-4.9	-10.4	-2.7	-5.1

Table A.7 Plyon 6E Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6E_T1W S-E34W	SP6E_T1N-E31N	SP6E_T1E S-E33E	SP6E_T1S S-E32S	SP6E_T4W S-E38W	SP6E_T4N S-E35N	SP6E_T4E S-E37E	SP6E_T4S S-E36S
Slow speed passes									
1	1a	4.6	3.3	2	3.3	2.4	3.6	3	2.1
	1b	3.9	4.4	4.1	2.9	2.5	2.7	2.2	1.4
	1c	1.5	5.3	1	4.1	1.8	3.2	1.3	2.1
	1d	2	6.4	1.4	5.2	1.2	3.6	1.9	1.8
2	2a	2.5	5.8	4	6	2	4.3	2.5	2.8
	2b	3.4	5.9	1	5.1	2.2	4.3	1.4	1.9
	2c	0.7	7	4.5	6.5	1.4	4	4	1.5
	2d	2.2	11.4	3	9.3	2.9	6.4	1.4	4.5
	2e	2	9.6	1.7	8.2	2.4	5.9	1.8	1.8
	2f	4	12.2	3	10	1.5	7.8	1.9	2.7
4	4a	5	17.4	0.7	15.6	3.8	10.8	0.8	4.4
	4b	2	13.9	1.9	12	2.2	8	1.8	3.3
	4c	2.1	21	1.9	17.3	1.5	13.4	1.2	3.1
	4d	1.2	11.6	4.4	9.3	4.3	6.2	2.2	2.2
	4e	2.3	23.2	4.3	17.5	2.5	13.6	2	3.4
Maximum		5	23.2	4.5	17.5	4.3	13.6	4	4.5

High speed passes									
4	4f	4.8	16.4	1.9	9.3	2.3	9.2	2.6	2.3
	4g	2.1	8.1	2.5	6.2	1.6	4.2	2.4	2
Maximum		4.8	16.4	2.5	9.3	2.3	9.2	2.6	2.3

Table A.8 Plyon 6E Strain: Minimums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6E_T1W S-E34W	SP6E_T1N-E31N	SP6E_T1E S-E33E	SP6E_T1S S-E32S	SP6E_T4W S-E38W	SP6E_T4N S-E35N	SP6E_T4E S-E37E	SP6E_T4S S-E36S
Slow speed passes									
1	1a	-0.9	-3.9	-3.2	-3.4	-2.2	-1.4	-1.1	-2.3
	1b	-2.6	-4.6	-6	-6.1	-3.9	-2.9	-1.4	-3.8
	1c	-2.7	-5.5	-2.3	-6.7	-1.6	-3.8	-1.6	-4.1
	1d	-2	-6.4	-2.3	-7.2	-2.8	-3	-1.4	-5.1
2	2a	-2.3	-7.9	-3.2	-7.8	-2.9	-2.5	-1.5	-4.8
	2b	-4.1	-6.1	-2.8	-6.5	-4.1	-1.7	-2.7	-4.6
	2c	-4	-8.3	-1.9	-8.3	-3	-3.2	-0.8	-6.6
	2d	-3.1	-10.8	-2.9	-13.2	-1.7	-4.4	-2	-9.5
	2e	-2.9	-9.9	-2.1	-11.4	-1.5	-3.4	-1.2	-8.9
	2f	-3.4	-12	-1.8	-14.1	-2.2	-3.8	-1.7	-10.2
4	4a	-2.6	-19.3	-3.9	-21	-1.7	-6	-3.2	-14.2
	4b	-3.4	-13.1	-1.7	-14.8	-1.9	-4.5	-2.2	-9.9
	4c	-5.3	-21.8	-2.9	-26.4	-2	-5.9	-2.4	-18.6
	4d	-3.6	-10.7	-2.2	-12.5	-1.4	-3.6	-3.7	-7.5
	4e	-6.4	-21	-2.3	-28	-3.1	-5.7	-2.3	-18.4
Minimum		-6.4	-21.8	-6	-28	-4.1	-6	-3.7	-18.6

High speed passes									
4	4f	-4.1	-11.1	-3.5	-19.9	-2.7	-4.8	-2.1	-12.6
	4g	-2.3	-6.8	-1.9	-9.9	-2.7	-1.7	-1.1	-5.4
Minimum		-4.1	-11.1	-3.5	-19.9	-2.7	-4.8	-2.1	-12.6

Table A.9 Pylon 6W Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6W_T1W S-W26W	SP6W_T1N S-W23N	SP6W_T1E S-W25E	SP6W_T1S S-W24S	SP6W_T4W S-W30W	SP6W_T4E S-W29E	SP6W_T4S S-W28S	SP6W_T4N S-W27N
Slow speed passes									
1	1a	1.3	3.2	2.1	8.1	0.3	1.1	4	5.8
	1b	0.2	1.2	2.1	8.2	2.2	1.3	2.5	5.1
	1c	1.9	2.3	0.6	4.9	1.2	1.6	1.5	4
	1d	1.3	2	2.3	5.4	2.5	2.1	2.3	3.5
2	2a	1.3	2.8	2.2	14.2	5.2	1.4	3.5	9.4
	2b	2.8	2.2	2	14.9	1.8	2.4	3.1	10.4
	2c	2	1.9	2.3	12.3	3	1.6	3.9	9.5
	2d	1.8	2	1.5	9.4	2.1	2.5	4.1	6.8
	2e	1	1.4	2.8	10.8	2.1	2.2	3	7.6
	2f	3.7	1.5	1.3	8.3	2.9	1.4	2.6	5.6
4	4a	2.9	3	2.4	24.9	1.9	1.3	6.6	16
	4b	1.7	3.6	2.7	27.6	3.2	1.8	6.8	18.5
	4c	1.3	2.4	2	19.5	2.5	1.7	4.6	12.1
	4d	0.8	3.4	1.8	26.6	1.6	1.4	5.8	17.6
	4e	2.2	2	1.4	17.7	1.3	2	4.3	9.5
Maximum		3.7	3.6	2.8	27.6	5.2	2.5	6.8	18.5
High speed passes									
4	4f	1.9	2	1.6	10.1	1.4	2.4	3.3	6.9
	4g	2.1	2.2	2.2	16.5	1.3	1.7	2.8	12.2
Maximum		2.1	2.2	2.2	16.5	1.4	2.4	3.3	12.2

Table A.10 Pylon 6W Strain: Minimums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6W_T1W S-W26W	SP6W_T1N S-W23N	SP6W_T1E S-W25E	SP6W_T1S S-W24S	SP6W_T4W S-W30W	SP6W_T4E S-W29E	SP6W_T4S S-W28S	SP6W_T4N S-W27N
Slow speed passes									
1	1a	-3.5	-1.8	-2.7	-10	-3.7	-3	-8	-2.9
	1b	-3.2	-4	-2.1	-8.1	-2.7	-2.2	-5.9	-2.9
	1c	-1.1	-1.3	-2.5	-8	-2.2	-1.3	-5.5	-2.3
	1d	-2.3	-0.9	-1.6	-5.4	-1.6	-1.6	-4.3	-2
2	2a	-3.3	-2.5	-2.8	-18.7	-3.3	-3	-13.6	-5.4
	2b	-2.1	-2.8	-3.6	-20.4	-4.6	-2.2	-14.9	-5
	2c	-1.8	-2.4	-3	-18.1	-3	-4.1	-11.9	-4.8
	2d	-2.2	-2.2	-2.3	-12.6	-2.7	-2.5	-9.1	-3.8
	2e	-3	-2.4	-1.6	-14.3	-2.6	-2.9	-9.9	-3.9
	2f	-1.3	-4.2	-3	-11.4	-2	-2.2	-8	-4.3
4	4a	-2.6	-2.8	-3.8	-30.3	-5.4	-3	-21.1	-8.8
	4b	-3	-2.9	-4.3	-37.1	-4.6	-3.7	-24.8	-9.5
	4c	-3.1	-3.3	-3.3	-23.1	-3.8	-2.5	-16	-7.8
	4d	-3.1	-3.2	-5.8	-37.5	-6.4	-3.5	-25	-9.3
	4e	-1.7	-3	-3.8	-18.9	-3.8	-2.8	-13.1	-5.9
Minimum		-3.5	-4.2	-5.8	-37.5	-6.4	-4.1	-25	-9.5

High speed passes									
4	4f	-2.1	-4.8	-3.7	-15.4	-3.6	-1.9	-9.1	-3.9
	4g	-2.8	-3.5	-4.1	-30.9	-5	-3.6	-18.4	-5.1
Minimum		-2.8	-4.8	-4.1	-30.9	-5	-3.6	-18.4	-5.1

Table A.11 East Edge Girder – Top Strain: Maximums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108T S-E1	SDE_101T S-E3	SDE_210T S-E5	SDE_CJT S-E7	SDE_315T S-E9	SDE_310T S-E11	SDE_305T S-E13	SDE_301T S-E15	SDE_404T S-E17	SDE_408T S-E19	SDE_412T S-E21
Slow speed passes												
1	1a	2.1	1.6	2	2.1	1	1.8	2.7	2.6	1.8	2.2	2.4
	1b	1.4	1.8	2.5	2.3	2	0.8	1.2	4.2	2.2	1.4	2.1
	1c	4.7	1.6	1.1	2.1	1.2	1.7	4.4	5.8	2.6	2	1.6
	1d	1.9	1.8	3.2	1.8	1.9	1.7	3.4	7	2	2.7	2.9
2	2a	1.4	2.3	2.8	1.9	1.7	2.8	2.3	5.1	1.3	3.2	2.8
	2b	1.5	1.6	2	2	1.8	1.9	2	2.9	1.3	1.8	2.3
	2c	5	1.7	1.2	1.6	2.2	2.3	3.2	5.8	1.9	1.1	4
	2d	1.6	1.8	4	3.4	2.4	2.1	4.3	12.6	3.8	2.4	4
	2e	2.4	1.3	2.6	2.8	3.4	2.8	3.4	9.3	3.5	1.8	3.9
	2f	2.1	1.9	2.8	4	3.8	2.3	4	11.9	4.2	1.3	3.7
4	4a	2.2	0.9	3.5	2.8	4.2	2.7	4.4	16.9	6.2	3.7	5.9
	4b	2.8	2.4	2.5	1.9	1.9	4.8	2.1	8.4	2.1	2.1	6
	4c	2.2	1.5	4.3	4.3	5.6	2.1	3.9	21.3	6.1	2.2	7.5
	4d	2.7	2.3	1.8	1.5	2	3.1	2.3	5	2.1	1.8	4.7
	4e	4.9	1	4.4	5.3	6	2.5	3.9	20.9	4.7	1.4	6.1
Maximum		5	2.4	4.4	5.3	6	4.8	4.4	21.3	6.2	3.7	7.5

High speed passes												
4	4f	2.8	3.5	3.4	2.3	3.5	2.9	3.8	9.6	3.3	2.6	5.2
	4g	2.1	3	2.4	2.9	2.8	1.8	2.2	3.3	1.9	1.9	3.7
Maximum		2.8	3.5	3.4	2.9	3.5	2.9	3.8	9.6	3.3	2.6	5.2

Table A.12 East Edge Girder – Top Strain: Minimums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108T S-E1	SDE_101T S-E3	SDE_210T S-E5	SDE_CJT S-E7	SDE_315T S-E9	SDE_310T S-E11	SDE_305T S-E13	SDE_301T S-E15	SDE_404T S-E17	SDE_408T S-E19	SDE_412T S-E21
Slow speed passes												
1	1a	-1.8	-3.8	-1.9	-1.3	-1.8	-1.5	-1.4	-1.9	-0.9	-1	-3.2
	1b	-3.2	-5.1	-3.3	-3.7	-3.5	-3.4	-4.9	-1.9	-3	-3.6	-6.2
	1c	-4.2	-8.2	-7.6	-7.3	-7.9	-5.8	-7.9	-3.4	-5.4	-5.1	-10.7
	1d	-7.6	-9.5	-8.9	-11.5	-11.1	-9	-10.7	-3.2	-9.1	-8	-14.5
2	2a	-2.7	-7.5	-2.1	-3.8	-3	-1.8	-4.4	-2.9	-3.6	-2.5	-9.2
	2b	-1.7	-6.4	-2.6	-5.3	-2.1	-2.4	-2.7	-3.2	-1.6	-2.3	-7.1
	2c	-3.3	-9	-4.6	-5.9	-4.3	-3.6	-5.6	-2.6	-3.6	-4.1	-9.4
	2d	-12.2	-16.5	-15.7	-18.6	-18.7	-14.5	-17.6	-3.6	-14.8	-13.5	-24
	2e	-6.9	-14.1	-8.5	-11.7	-10.2	-8.3	-10.6	-3.5	-7	-8.1	-16.3
	2f	-10.8	-17.6	-12.7	-16.2	-16.3	-12.7	-13.8	-4.2	-11.6	-11.9	-21.7
4	4a	-15.3	-25.3	-17.3	-22.3	-20.4	-17.3	-21.8	-4.7	-15.5	-14.7	-33.3
	4b	-1.2	-13.9	-3.3	-5.2	-4.1	-3.3	-4.3	-4.3	-2.9	-3	-12.6
	4c	-11.9	-29.4	-15.6	-21.1	-20.7	-16.2	-17.5	-5.6	-14.2	-12.9	-27.2
	4d	-1.2	-10.1	-3.9	-4.6	-3.3	-2	-3	-3.7	-2.8	-3.3	-8
	4e	-9.6	-31.3	-10.5	-15.5	-16	-12.4	-12.3	-6.2	-11.4	-11.2	-23.2
Minimum		-15.3	-31.3	-17.3	-22.3	-20.7	-17.3	-21.8	-6.2	-15.5	-14.7	-33.3

High speed passes												
4	4f	-6.8	-21.2	-9.5	-12	-12.3	-10	-12	-5	-10.3	-9.4	-15.4
	4g	-1.6	-9	-2.3	-2.4	-3	-2.7	-2.7	-3	-2.3	-2.1	-4.8
Minimum		-6.8	-21.2	-9.5	-12	-12.3	-10	-12	-5	-10.3	-9.4	-15.4

Table A.13 East Edge Girder – Bottom Strain: Maximums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108B S-E2	SDE_101B S-E4	SDE_210B S-E6	SDE_CJB S-E8	SDE_315B S-E10	SDE_E310B S-E12	SDE_305B S-E14	SDE_301B S-E16	SDE_404B S-E18	SDE_408B S-E20	SDE_412B S-E22
Slow speed passes												
1	1a	8.4	2.3	11.1	12.3	10.4	7.2	6.2	2.5	5.8	9.6	14.2
	1b	11.5	3.9	11.9	18.3	16.5	10.6	9.4	2.5	8.9	13.2	19.7
	1c	16.5	5.2	20.8	24.9	21.6	15.2	14.5	2	12.8	20.2	23.9
	1d	21.2	7.2	25.5	30.9	27.2	20.4	18.6	1.7	18.5	25.8	30.3
2	2a	18.5	5.1	25.5	27.9	24.5	17.6	14.6	2.3	13.5	22.1	34.1
	2b	12.3	3.3	16.8	22.5	19.2	11.6	10.5	2.3	8.8	15.9	26.8
	2c	20.2	5.4	24.4	30	27	18.3	16.7	2.5	13.3	22.8	34.1
	2d	38.6	11.8	45	56.5	48.2	35.4	31.4	1.3	30.4	44.1	52
	2e	27.6	8.4	32.2	43.7	36.2	26	22.6	3.4	19.2	33	42.3
	2f	34.9	11.8	38.4	52.9	45.1	32	25.5	1.5	25.6	40.5	48.8
4	4a	58.3	14.8	64.4	85.5	72.9	54	45.9	2.2	40.5	65.4	89.1
	4b	26.8	6.9	30.1	45.6	40	23.6	18.3	2.9	13.4	30.3	54.1
	4c	44.5	22	53.1	77.8	63.2	42.7	33.5	2.1	33.1	52.4	72.5
	4d	17.3	4.6	14.6	27	25.2	13.2	10.8	3.5	7	17.6	38.5
	4e	35.1	20.4	43	61.3	47	24.5	21.1	2.8	23	40.1	61.1
Maximum		58.3	22	64.4	85.5	72.9	54	45.9	3.5	40.5	65.4	89.1

High speed passes												
4	4f	25.4	10.7	29.3	44.5	31.7	16.2	16.8	3.5	17.2	29.5	32
	4g	11.4	3.1	9.4	15.9	15.2	7.5	5.2	3.4	4	9.8	20.5
Maximum		25.4	10.7	29.3	44.5	31.7	16.2	16.8	3.5	17.2	29.5	32

Table A.14 East Edge Girder – Bottom Strain: Minimums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108B S-E2	SDE_101B S-E4	SDE_210B S-E6	SDE_CJB S-E8	SDE_315B S-E10	SDE_E310B S-E12	SDE_305B S-E14	SDE_301B S-E16	SDE_404B S-E18	SDE_408B S-E20	SDE_412B S-E22
Slow speed passes												
1	1a	-3.1	-2.3	-4.6	-2.2	-3.9	-3.3	-4.1	-3.1	-4.1	-3.8	-5.9
	1b	-5.1	-1.8	-8.6	-1.6	-4.8	-5.5	-5.6	-4.3	-5.3	-4.9	-6.3
	1c	-5.5	-2.6	-6.7	-2.3	-5.9	-7.3	-7.2	-7.5	-7.4	-5.2	-7.7
	1d	-6.5	-2.8	-8.7	-3.2	-6.5	-7.4	-7.5	-9.1	-7.7	-6.3	-8.1
2	2a	-6.1	-2.6	-7.3	-3.9	-7.6	-7	-8.3	-8.3	-9.1	-6.2	-9.5
	2b	-6	-2.9	-7.6	-2.7	-6.6	-7	-6.7	-5.7	-7.3	-5.4	-10.7
	2c	-6.5	-3.4	-8.6	-3.8	-7.1	-7	-8.1	-8.1	-10	-6.9	-11.2
	2d	-10	-4.1	-13.8	-3.8	-10.8	-12.7	-15.8	-15	-13.8	-10.1	-15.4
	2e	-8	-3.8	-11.7	-3.3	-10.7	-11.6	-13.2	-11.3	-13.2	-9.5	-15
	2f	-9.9	-4.3	-15.7	-4.5	-11.9	-12.9	-17	-16.3	-15.3	-10.1	-16.7
4	4a	-15.7	-5.6	-21.7	-6.2	-17.5	-19.6	-22.7	-21	-21.5	-14.7	-28.3
	4b	-11.4	-4.2	-16.1	-6.4	-12.3	-13.2	-15.5	-12.8	-16.3	-10	-27
	4c	-19	-6.7	-25.9	-7.3	-21.5	-23.5	-29.1	-24.2	-24.2	-18.4	-32.5
	4d	-8.8	-3.9	-13	-5	-8.9	-8.8	-10.4	-8.4	-11.5	-8.4	-22.4
	4e	-19.2	-7.7	-24.7	-6.4	-21.2	-23.2	-28.5	-26	-22.3	-19	-32.6
Minimum		-19.2	-7.7	-25.9	-7.3	-21.5	-23.5	-29.1	-26	-24.2	-19	-32.6

High speed passes												
4	4f	-14.7	-5.2	-14.5	-8.8	-15.6	-18.2	-18.3	-17.2	-18.1	-14.6	-22.5
	4g	-7	-2.8	-8.7	-7.1	-7.2	-6.3	-5.7	-7.6	-6.1	-7.9	-15.9
Minimum		-14.7	-5.2	-14.5	-8.8	-15.6	-18.2	-18.3	-17.2	-18.1	-14.6	-22.5

Table A.15 West Edge Girder – Top Strain: Maximums

No. of trucks	Pass	Strain sensor (με)										
		SDW_108T S-W1	SDW_101T S-W3	SDW_210T S-W5	SDW_CJT S-W7	SDW_315T S-W9	SDW_310T S-W11	SDW_305T S-W13	SDW_301T S-W15	SDW_404T S-W17	SDW_408T S-W19	SDW_412T S-W21
Slow speed passes												
1	1a	1.4	7.6	3.8	0.6	2.2	1	2.9	7.6	3.1	1.2	3.1
	1b	1.6	7.2	2.7	1.2	4.3	1.2	1.6	6.9	2.5	0.9	2.1
	1c	0.7	4.8	2.2	1.1	2.9	3.3	0.8	5.2	1.2	2.2	2.4
	1d	1.2	3	1.5	3.3	3.1	1.8	1.8	4	2.1	2.7	2.4
2	2a	2.2	12.6	2.9	3.3	5.6	1.8	3.9	13.1	4.1	2.7	4.4
	2b	1.7	13.1	3.2	3.3	4.8	2.5	3.1	12.8	4	2.4	5.4
	2c	2.2	10.2	2.3	3	5.1	4.4	3.4	11.2	3.1	1.9	4.3
	2d	1.6	6.7	2.4	1.3	7.2	2.1	2.7	7.3	1.7	2.1	4.4
	2e	2	7.6	1.5	2.2	2.2	2.2	2.2	8.1	1.4	3.1	4.6
	2f	2.2	5.3	2.4	1.9	2.9	2	2.3	6.1	0.9	1.5	2.9
4	4a	2.3	17.7	4.2	3.7	5	2.6	3.9	20.5	5.7	3.6	8.2
	4b	1.8	22.1	4	4.1	5.7	4	4.9	26.8	6.9	2	8.7
	4c	1.8	13.1	2.3	2.8	3.5	2.4	2.4	12.6	1.5	1.6	7.1
	4d	1.3	21.4	3.5	3.7	7.3	3.2	3.2	23.3	4.9	2.5	8
	4e	1.2	7.9	1.8	2.1	4.6	2.9	1.7	8.7	1.9	2.5	5.8
Maximum		2.3	22.1	4.2	4.1	7.3	4.4	4.9	26.8	6.9	3.6	8.7

High speed passes												
4	4f	1.1	4.6	2.1	2.7	2.7	2	3	5.9	2.6	1.8	6.2
	4g	2.1	11.2	3	2.5	4.5	3.5	2.1	14.1	3.2	2	6.5
Maximum		2.1	11.2	3	2.7	4.5	3.5	3	14.1	3.2	2	6.5

Table A.16 West Edge Girder – Top Strain: Minimums

No. of trucks	Pass	Strain sensor (με) SDW_108T S-W1	SDW_101T S-W3	SDW_210T S-W5	SDW_CJT S-W7	SDW_315T S-W9	SDW_310T S-W11	SDW_305T S-W13	SDW_301T S-W15	SDW_404T S-W17	SDW_408T S-W19	SDW_412T S-W21
Slow speed passes												
1	1a	-10.7	-3	-10.8	-14.3	-12.9	-12.7	-11.5	-2.7	-9.1	-9.9	-17.9
	1b	-6.9	-2.9	-8.2	-9.5	-8.8	-9.4	-9.9	-3.1	-7	-7.6	-15.2
	1c	-4.9	-2.4	-4.4	-5.5	-8.2	-4.6	-6.3	-1.8	-4.4	-4.1	-10.2
	1d	-2.6	-3.5	-2.7	-2.4	-2.6	-2.1	-2.9	-1.4	-2.1	-2.4	-7.2
2	2a	-17.1	-5.5	-19.2	-21.4	-19.7	-20	-20.2	-4.1	-16.8	-15.7	-32.2
	2b	-13.8	-6.5	-15.8	-17.8	-18	-15	-16.3	-3.8	-11.8	-12.2	-25.6
	2c	-10.4	-5.5	-11.8	-13.8	-12.1	-11.6	-11.5	-4.7	-9.3	-10.2	-22.4
	2d	-5.5	-3	-5.7	-7.5	-5.5	-6.7	-8	-3.6	-5.6	-5.1	-15.7
	2e	-5.5	-3	-7.1	-8	-8.6	-7.5	-7.7	-2.4	-5.9	-5.8	-15.7
	2f	-2.4	-2.7	-3.2	-3.9	-2.8	-3.1	-4.4	-2.7	-3.1	-3.6	-11.1
4	4a	-20.6	-7.5	-24.2	-27	-25.6	-24.2	-27.7	-5.5	-20.5	-20.1	-44.9
	4b	-18.2	-9.9	-21.2	-26.5	-27	-21.6	-20.8	-6.7	-16	-17.3	-38.1
	4c	-5	-4.8	-5.9	-8.4	-7.7	-7.2	-8.6	-3.4	-6.5	-6.1	-19.7
	4d	-12.6	-10	-14	-18	-17.8	-14	-14.2	-7.1	-9.6	-11.8	-29.5
	4e	-3.5	-5	-3.9	-4	-5.8	-4	-5.7	-3.4	-3.6	-2.8	-15
Minimum		-20.6	-10	-24.2	-27	-27	-24.2	-27.7	-7.1	-20.5	-20.1	-44.9

High speed passes												
4	4f	-2.4	-2.2	-2.9	-2.9	-4.1	-3	-3.9	-4.1	-4.5	-3.6	-8.1
	4g	-9.3	-6.5	-11.2	-11.8	-11.4	-10.1	-11.4	-4.4	-10	-9.7	-19.9
Minimum		-9.3	-6.5	-11.2	-11.8	-11.4	-10.1	-11.4	-4.4	-10	-9.7	-19.9

Table A.17 West Edge Girder – Bottom Strain: Maximums

No. of trucks	Pass	Strain sensor (με)									
		SDW_108B S-W2	SDW_101B S-W4	SDW_210B S-W6	SDW_CJB S-W8	SDW_315B S-W10	SDW_310B S-W12	SDW_305B S-W14	SDW_404B S-W18	SDW_408B S-W20	SDW_412B S-W22
Slow speed passes											
1	1a	33.1	3.3	32.4	36.1	31.1	24.3	19.7	16.9	30.8	32.1
	1b	25.2	3.3	29.1	29.7	26.2	18.8	16	13.6	25.1	26.2
	1c	18.6	1	19	21.5	19.7	15	13.1	10.1	18.5	21.1
	1d	13.5	2.2	14.1	16.7	14.5	10.2	8.3	7.1	12.6	17.5
2	2a	55.8	1.4	57.1	64.5	57	43.6	35.9	30.5	54.3	60.8
	2b	50	1.6	47.7	56.7	54	37.4	29.7	22.9	46	52.6
	2c	42.2	2.3	40	48.5	44.1	31.4	24.8	20.7	39.1	46
	2d	30.5	1	33.4	36.4	32.7	25	20.3	15.9	29.6	38.1
	2e	30.7	1.7	30.4	38.1	34.3	24	18.8	14.7	29.6	39.2
	2f	23.1	2.8	23	29.3	25.6	18.3	15	11	21.5	30
4	4a	85.4	1.9	87.3	97.4	90.3	67.9	54.7	44.7	84.3	102.1
	4b	70.9	1.7	67.3	89	81.9	53.1	40.2	32.1	65.2	87.8
	4c	37.8	5.3	41.1	52.8	46.8	29.2	23.7	19.4	36.9	60.7
	4d	51.8	1.2	38.1	64.8	57.1	33	27	16.9	45.7	66.9
	4e	24.5	2	28.2	36.6	30	16.1	11	11.2	23.3	44.3
Maximum		85.4	5.3	87.3	97.4	90.3	67.9	54.7	44.7	84.3	102.1

High speed passes											
4	4f	17.1	3	19.8	26.2	18.9	10.5	8.8	10.3	16.2	24
	4g	33	2.2	24.4	36.5	32.9	23	17.6	14.4	28.6	38.6
Maximum		17.1	3	24.4	36.5	32.9	23	17.6	14.4	28.6	38.6

Table A.18 West Edge Girder – Bottom Strain: Minimums

No. of trucks	Pass	Strain sensor (με)									
		SDW_108B S-W2	SDW_101B S-W4	SDW_210B S-W6	SDW_CJB S-W8	SDW_315B S-W10	SDW_310B S-W12	SDW_305B S-W14	SDW_404B S-W18	SDW_408B S-W20	SDW_412B S-W22
Slow speed passes											
1	1a	-7.4	-9.1	-9.1	-2.8	-8.3	-9.3	-10.6	-8.1	-5.7	-8.2
	1b	-6.9	-6.6	-6.7	-2.7	-7.1	-8.5	-9.1	-7.1	-6	-9.4
	1c	-6	-7.3	-7.6	-3.3	-5.4	-6.5	-6.7	-5.9	-4.2	-7.8
	1d	-5.5	-3.8	-5.9	-2.2	-4.8	-5	-6.1	-4.5	-3.8	-6
2	2a	-14.2	-17.1	-17.2	-5.2	-14.3	-16	-17.7	-14.6	-10	-13.6
	2b	-14.7	-16.7	-18.1	-6.1	-13.2	-16.3	-17.9	-15.8	-11	-15.3
	2c	-13.3	-14.4	-17.2	-4.9	-12.1	-13.8	-15.5	-13.3	-10	-14.1
	2d	-10.1	-10.7	-10.9	-5	-9.6	-9.4	-10.8	-10.6	-7.2	-12.3
	2e	-10.5	-11.3	-12.7	-4.1	-9.3	-10.8	-11.9	-11.3	-8.3	-12.4
	2f	-7.9	-7.2	-9.4	-3.1	-7.9	-8.2	-8.2	-8.1	-6.3	-11.5
4	4a	-23.3	-26.4	-26.5	-7	-21.3	-24.2	-27.7	-24.4	-17.2	-32
	4b	-26.5	-28.9	-32.2	-7.7	-24.5	-29.5	-33.5	-27.7	-20.3	-37.9
	4c	-17.5	-16.6	-19.5	-6.4	-16.5	-17.2	-19.5	-17.7	-12.9	-24.5
	4d	-28	-31	-30.5	-5.9	-22.1	-26.8	-29.7	-24.6	-20.9	-35
	4e	-15.7	-14.1	-16	-5.9	-13.3	-14.7	-16.3	-13.6	-11.5	-22.5
Minimum		-28	-31	-32.2	-7.7	-24.5	-29.5	-33.5	-27.7	-20.9	-37.9

High speed passes											
4	4f	-13.1	-12.5	-10.8	-7.9	-11.9	-11.9	-10.4	-10.2	-9	-16
	4g	-21.6	-21.6	-21.6	-6.1	-13.9	-17.7	-19.1	-11.7	-17.4	-23.9
Minimum		-21.6	-21.6	-21.6	-7.9	-13.9	-17.7	-19.1	-11.7	-17.4	-23.9

Table A.19 Deck Strain: Maximums

No. of trucks	Pass	Strain sensor (με)	
		SDC_210N S-C1	SDC_210S S-C2
Slow speed passes			
1	1a	1.8	1.4
	1b	2	1.8
	1c	2.3	1.2
	1d	1.3	1.4
2	2a	2.5	2.1
	2b	2.7	1.9
	2c	2.4	2.8
	2d	2.2	2.2
	2e	2.1	2.1
	2f	3	2
4	4a	3.7	2.6
	4b	2.9	3.2
	4c	3.1	3.3
	4d	2.7	2.6
	4e	1.8	2.1
Maximum		3.7	3.3

High speed passes			
4	4f	1.7	1.8
	4g	1.8	1.4
Maximum		1.8	1.8

Table A.20 Deck Strain: Minimums

No. of trucks	Pass	Strain sensor (με)	
		SDC_210N S-C1	SDC_210S S-C2
Slow speed passes			
1	1a	-6.5	-4.6
	1b	-9.6	-8.4
	1c	-16.9	-15.6
	1d	-9.5	-7.7
2	2a	-14.8	-12.9
	2b	-7.4	-6.4
	2c	-12.1	-9.1
	2d	-27.4	-25.1
	2e	-20.2	-18.3
	2f	-10.8	-9.4
4	4a	-38.9	-33.5
	4b	-14.8	-11.9
	4c	-26.5	-22.8
	4d	-5.8	-4.3
	4e	-11.1	-8.5
Minimum		-38.9	-33.5

High speed passes			
4	4f	-9.4	-7.5
	4g	-5.4	-4.9
Minimum		-9.4	-7.5

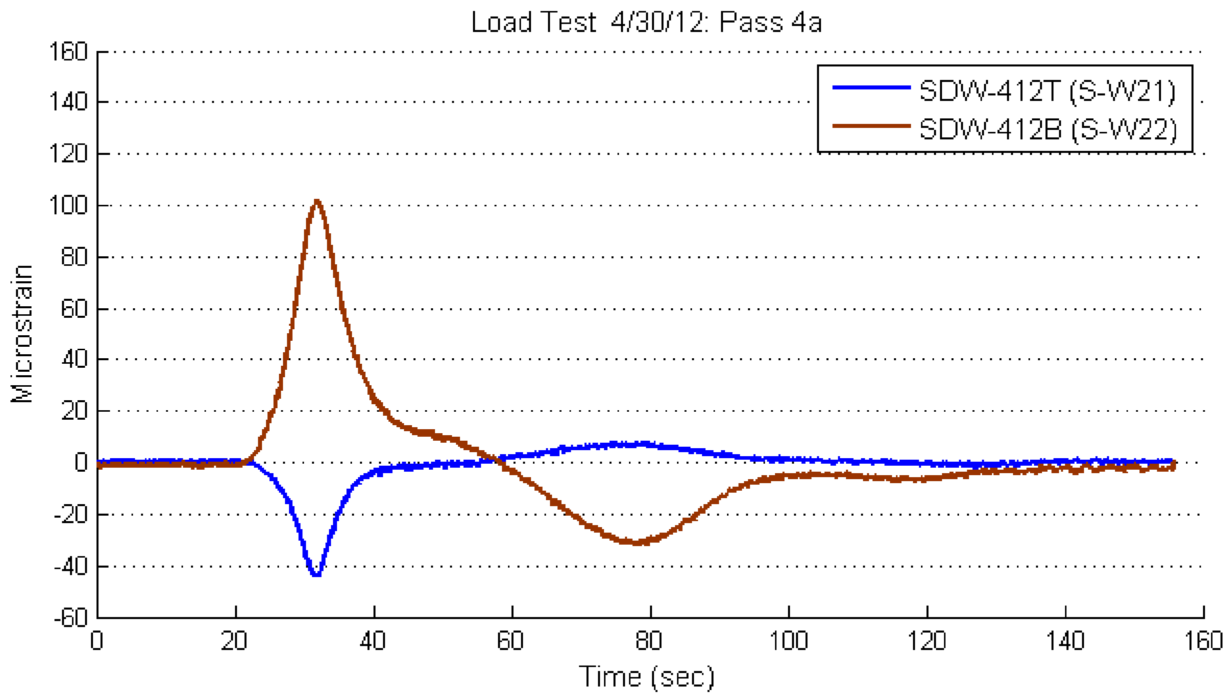


Figure A.1 Edge girder strain time history - section 412

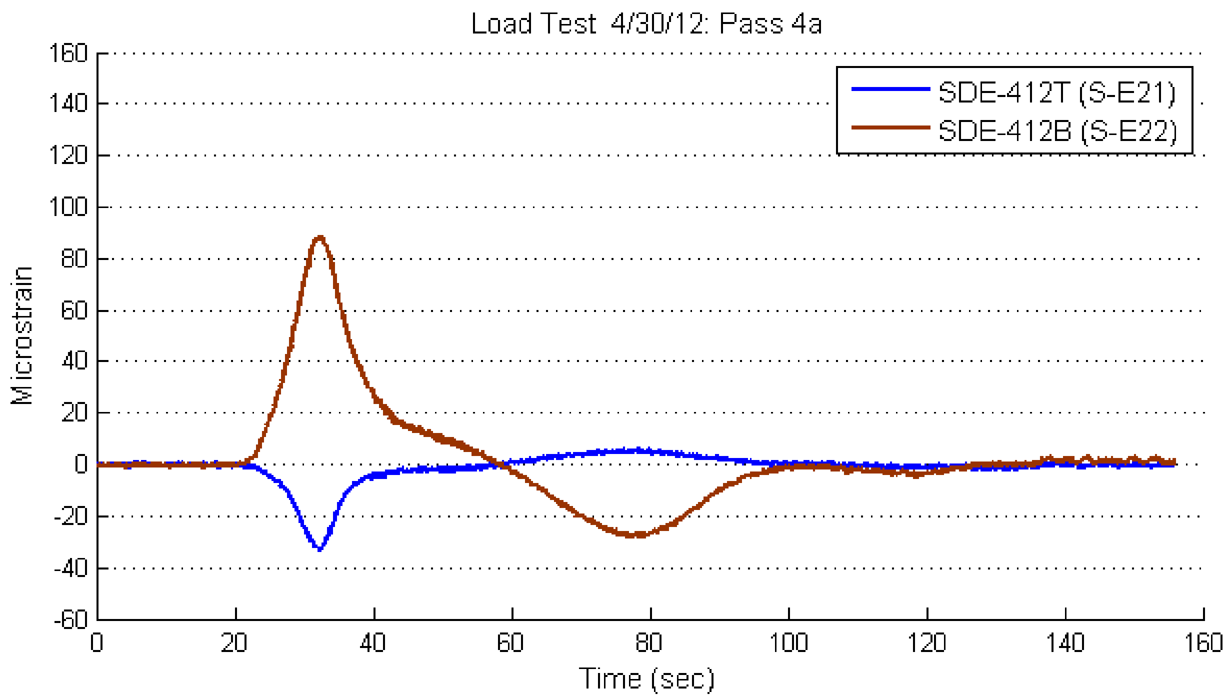


Figure A.2 Edge girder strain time history - section 412

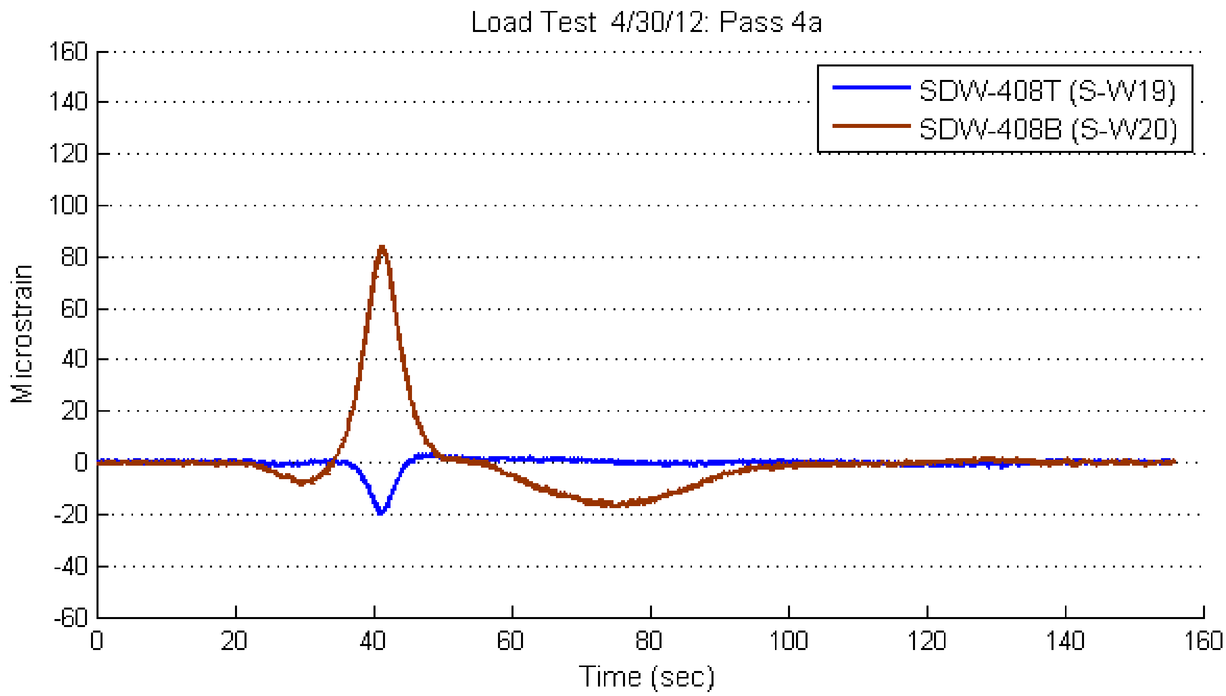


Figure A.3 West edge girder strain time history - section 408

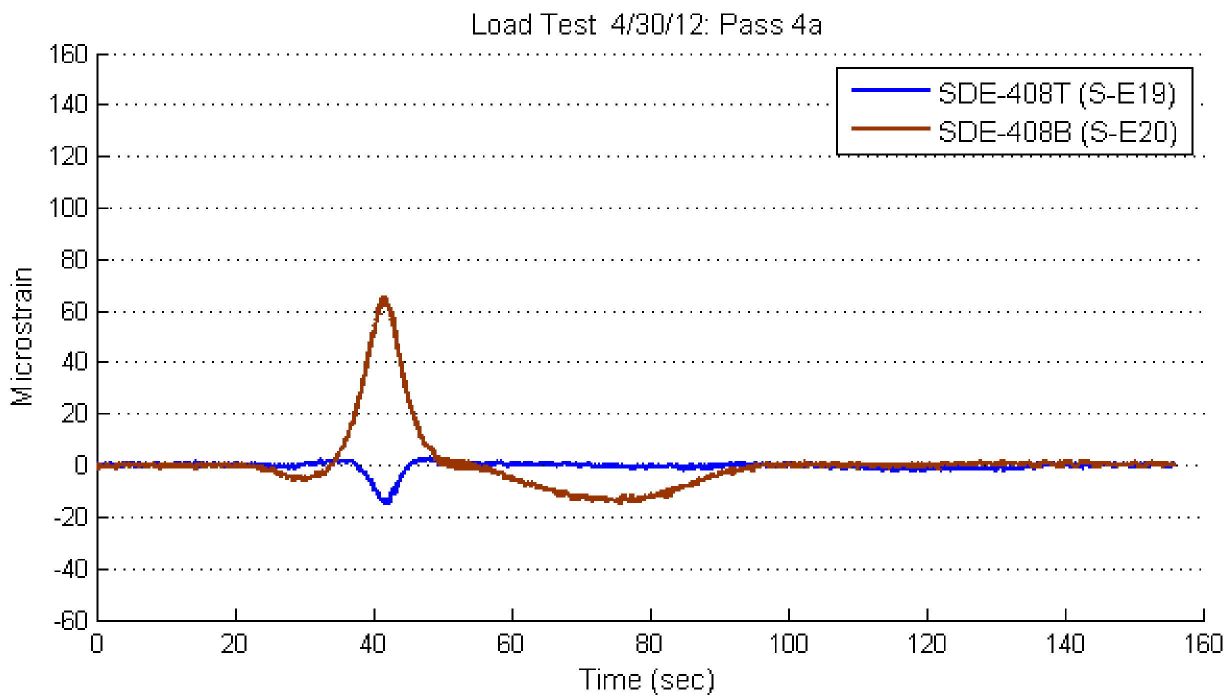


Figure A.4 East edge girder strain time history - section 408

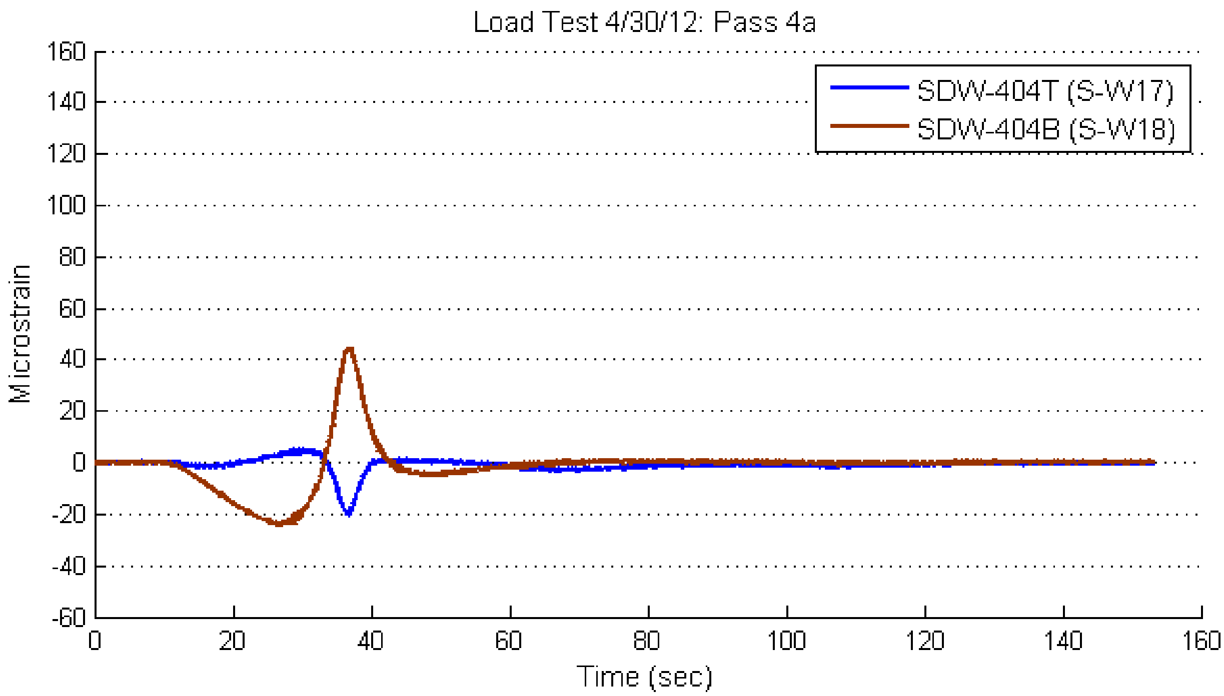


Figure A.5 West edge girder strain time history - section 404

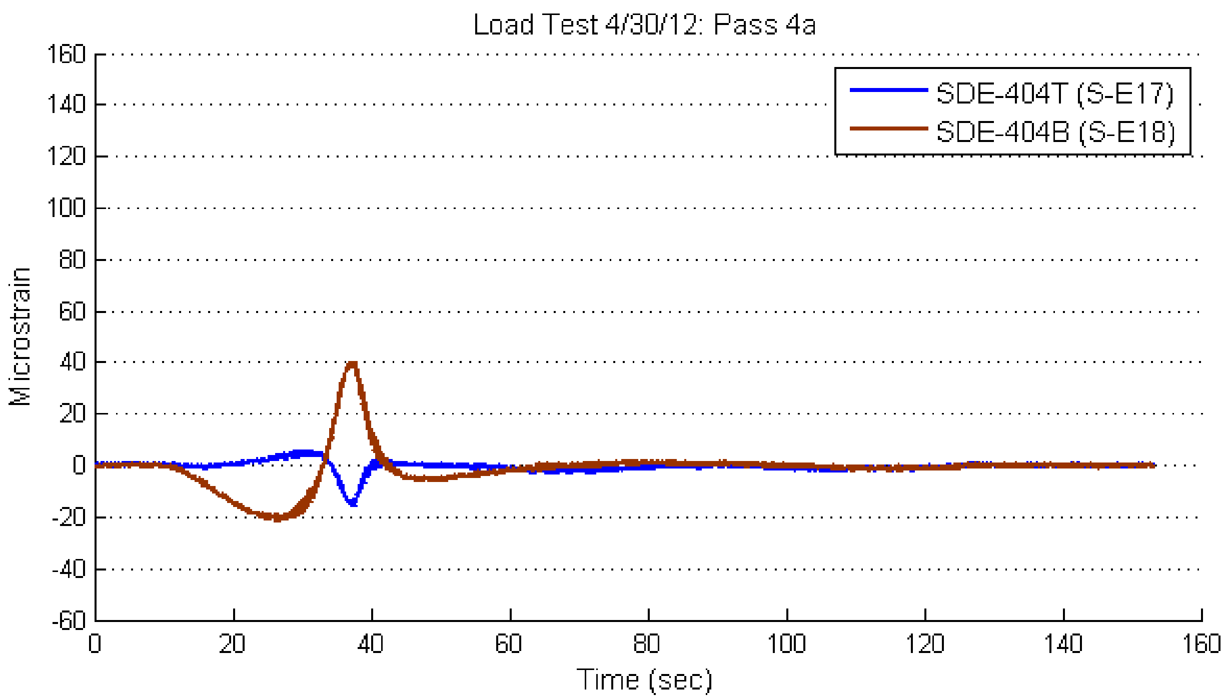


Figure A.6 East edge girder strain time history - section 404

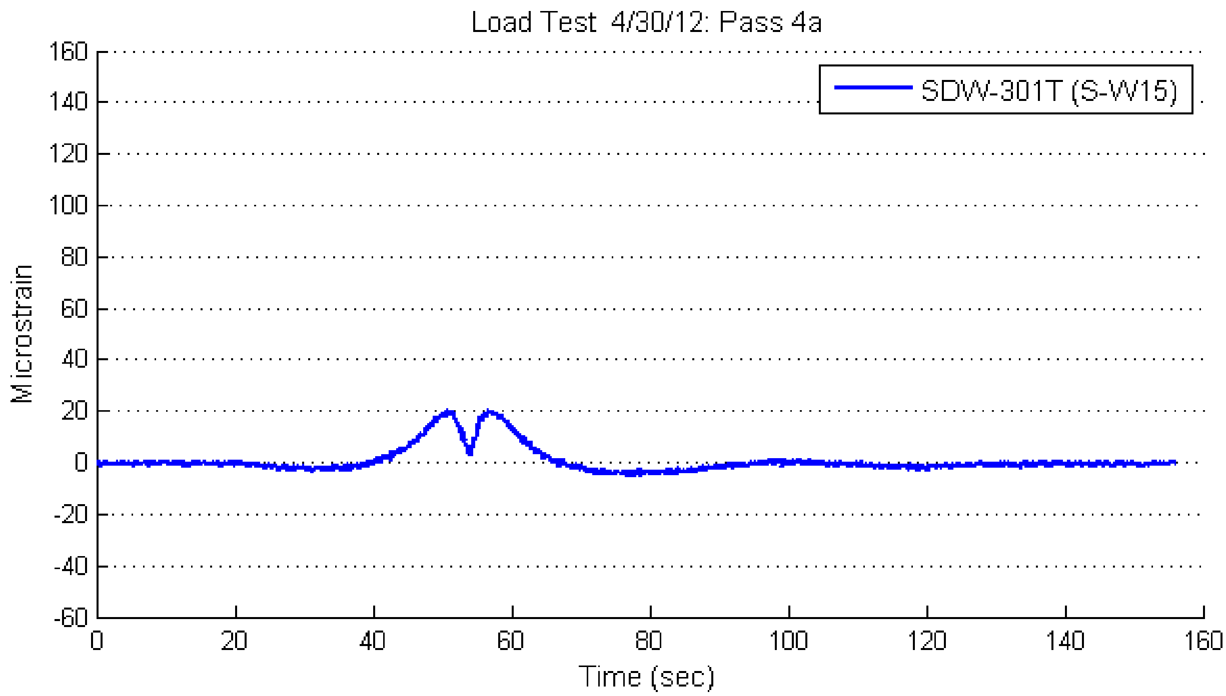


Figure A.7 West edge girder strain time history - section 301

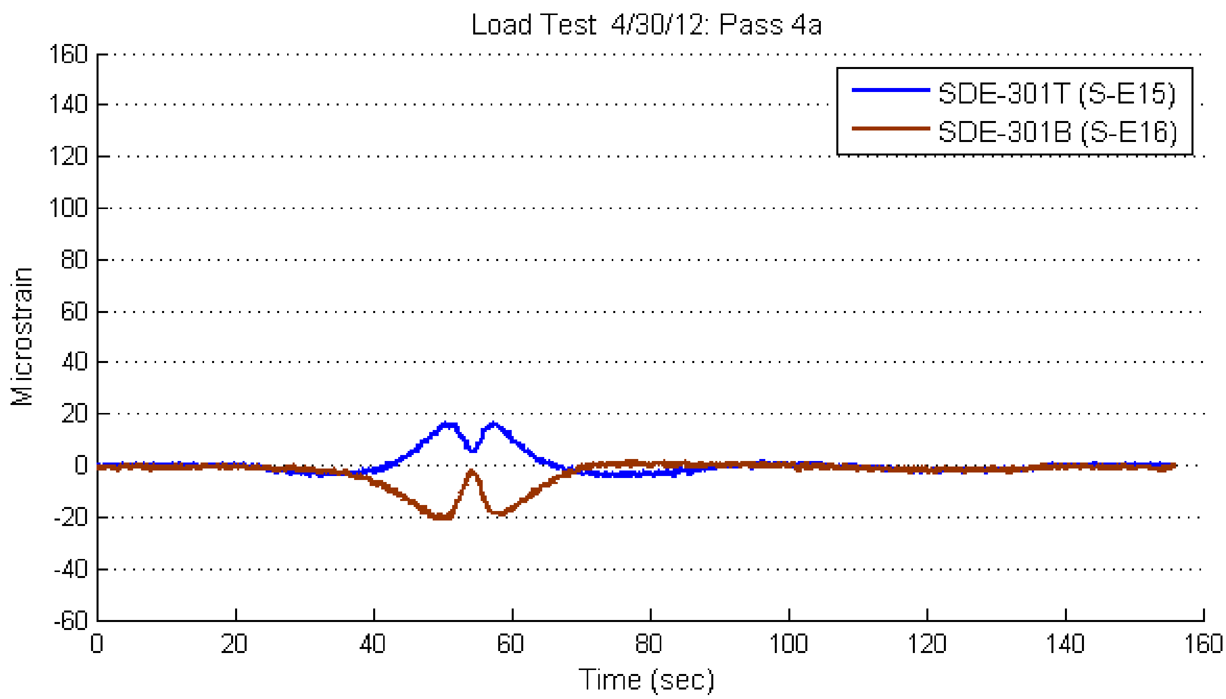


Figure A.8 East edge girder strain time history - section 301

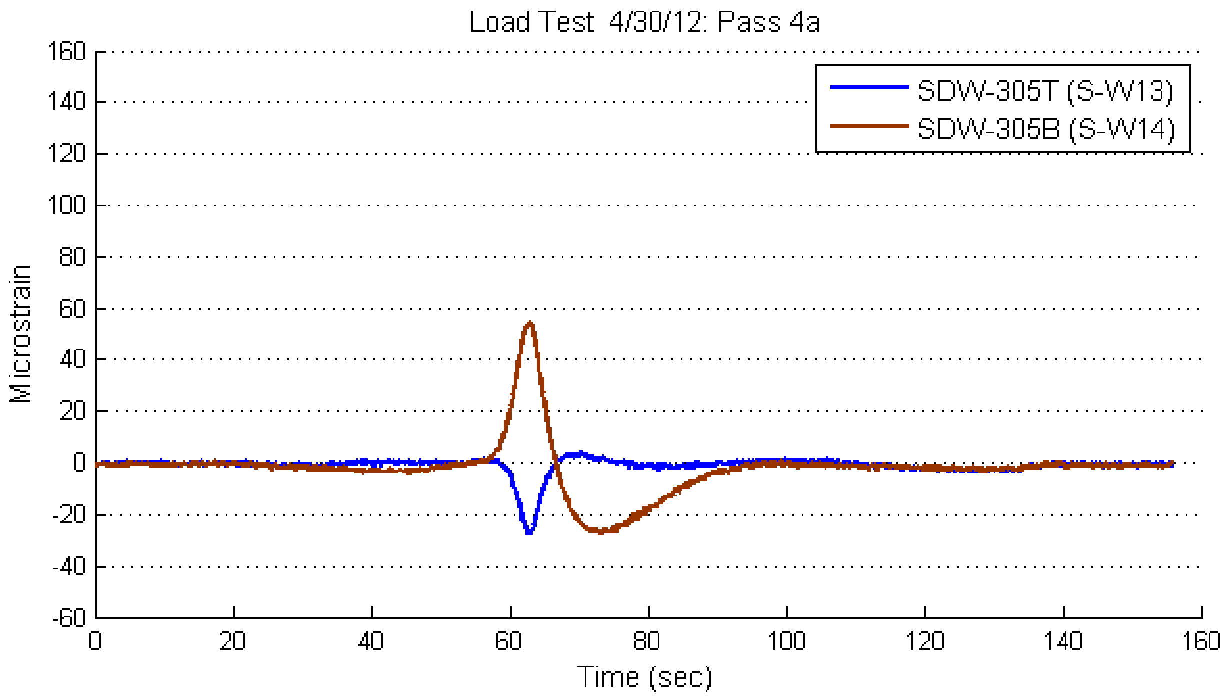


Figure A.9 West edge girder strain time history - section 305

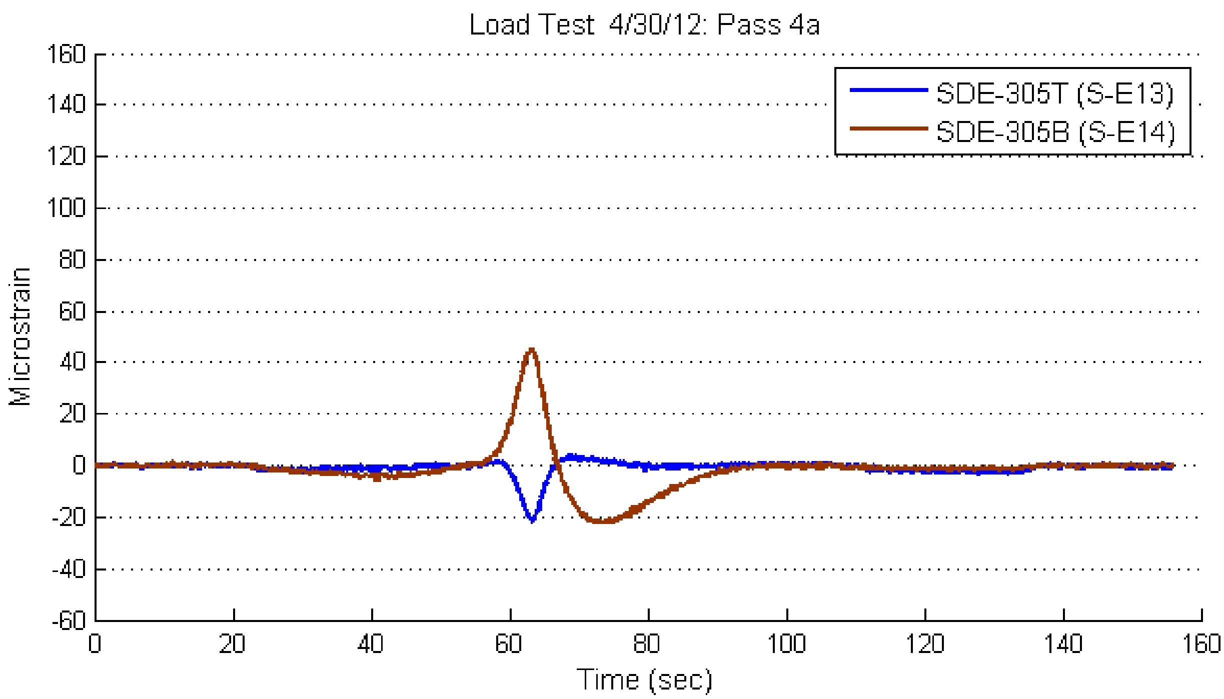


Figure A.10 East edge girder strain time history - section 305

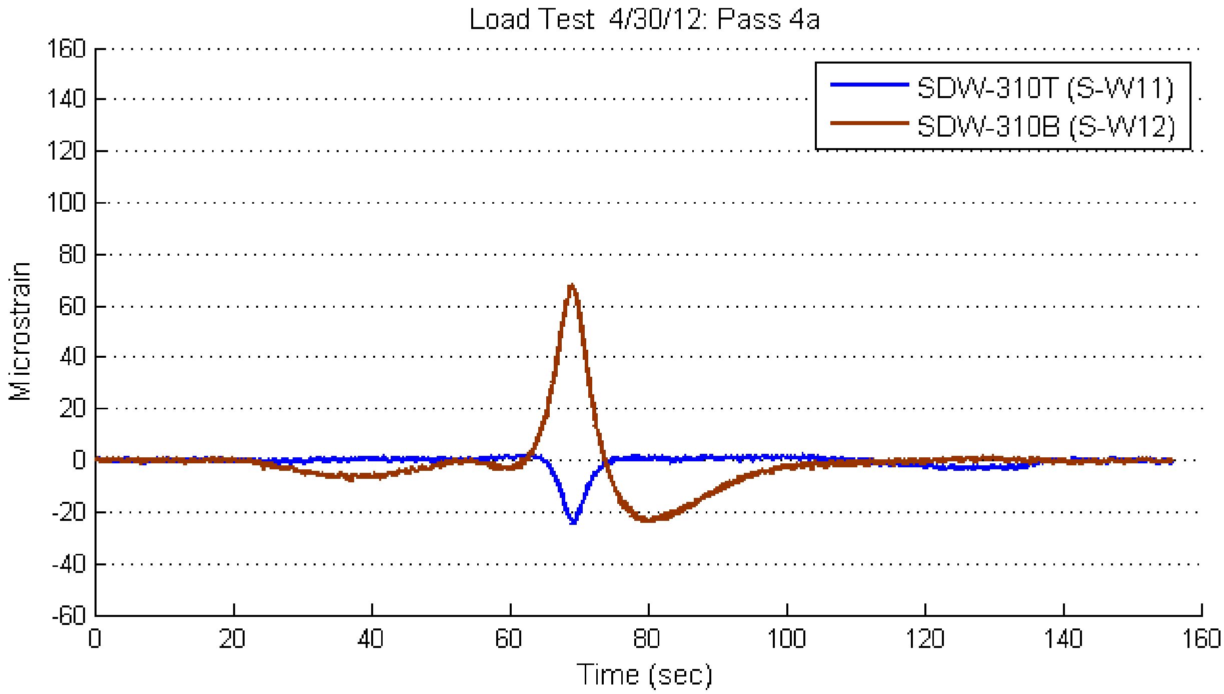


Figure A.11 East edge girder strain time history - section 310

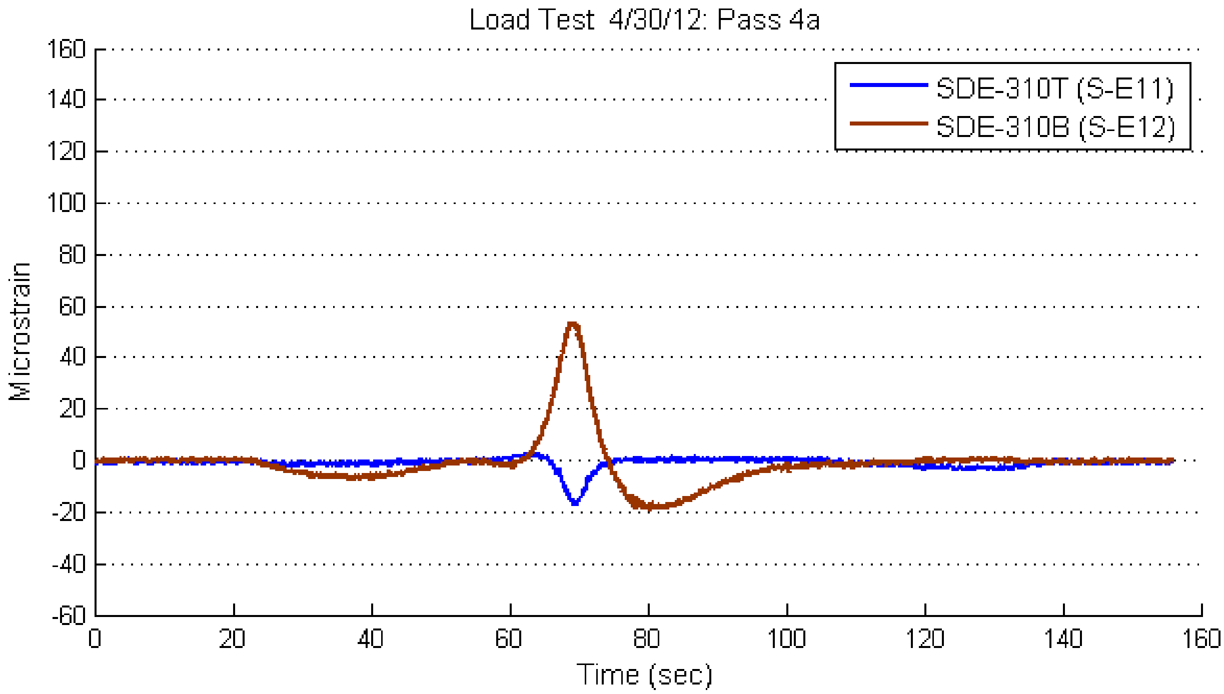


Figure A.12 East edge girder strain time history - section 310

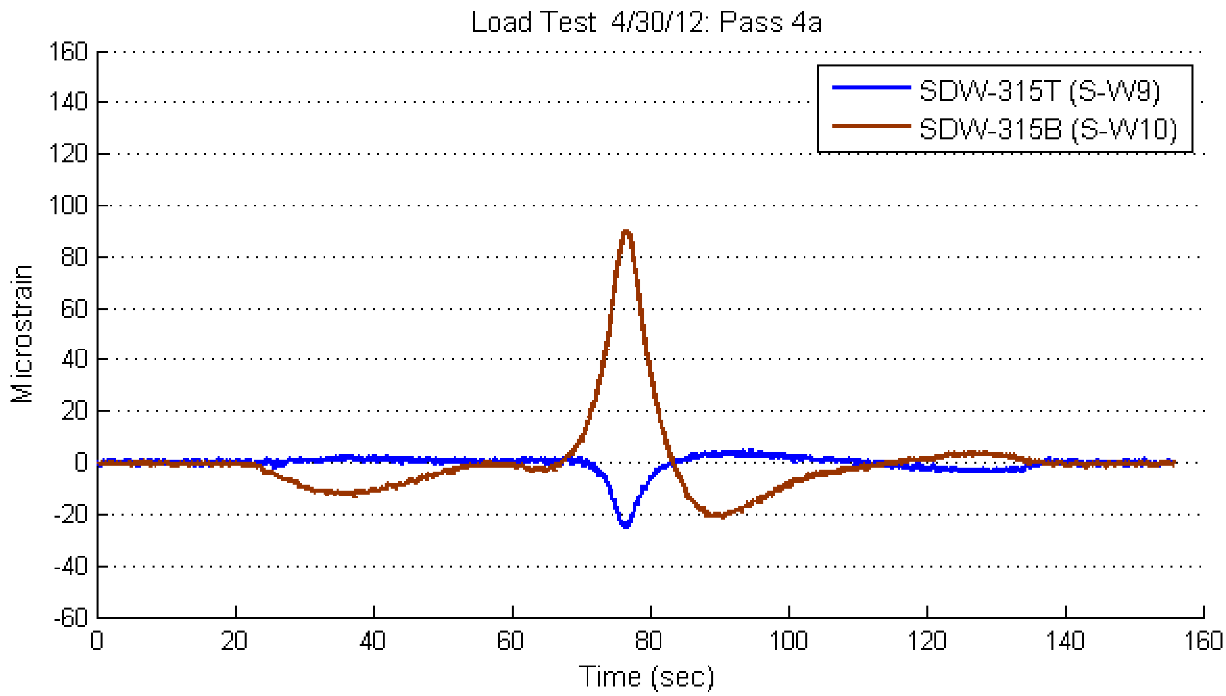


Figure A.13 West edge girder strain time history - section 315

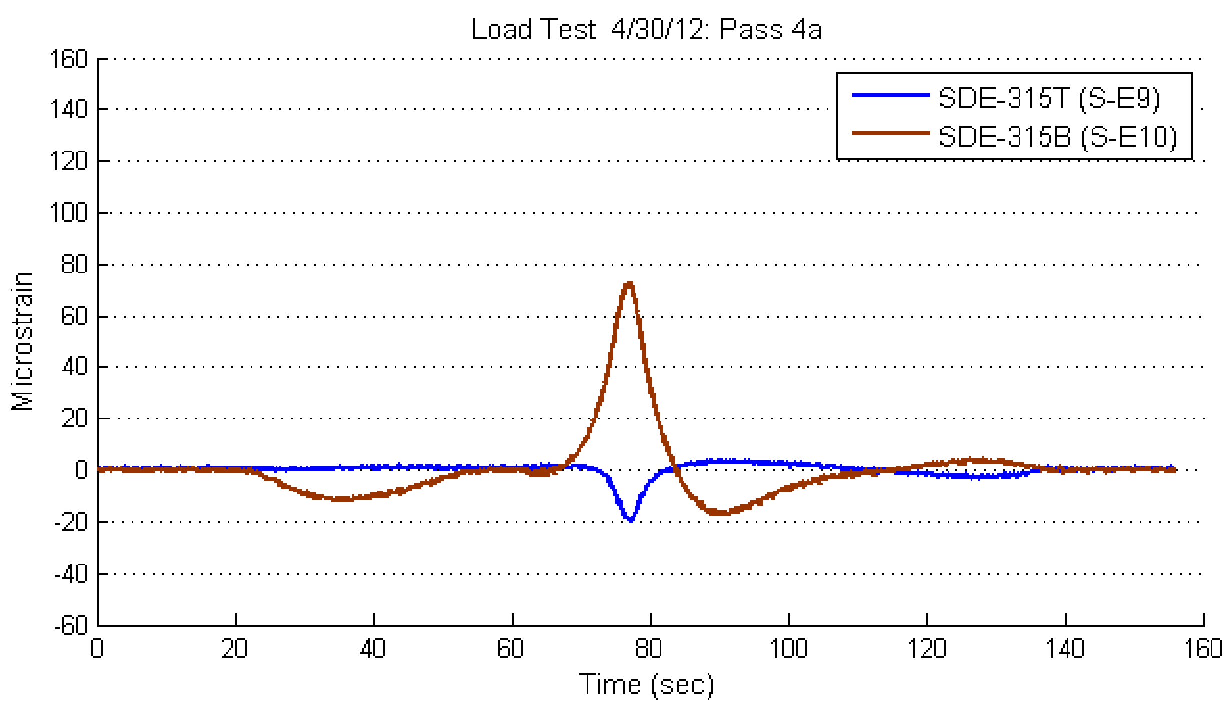


Figure A.14 East edge girder strain time history - section 315

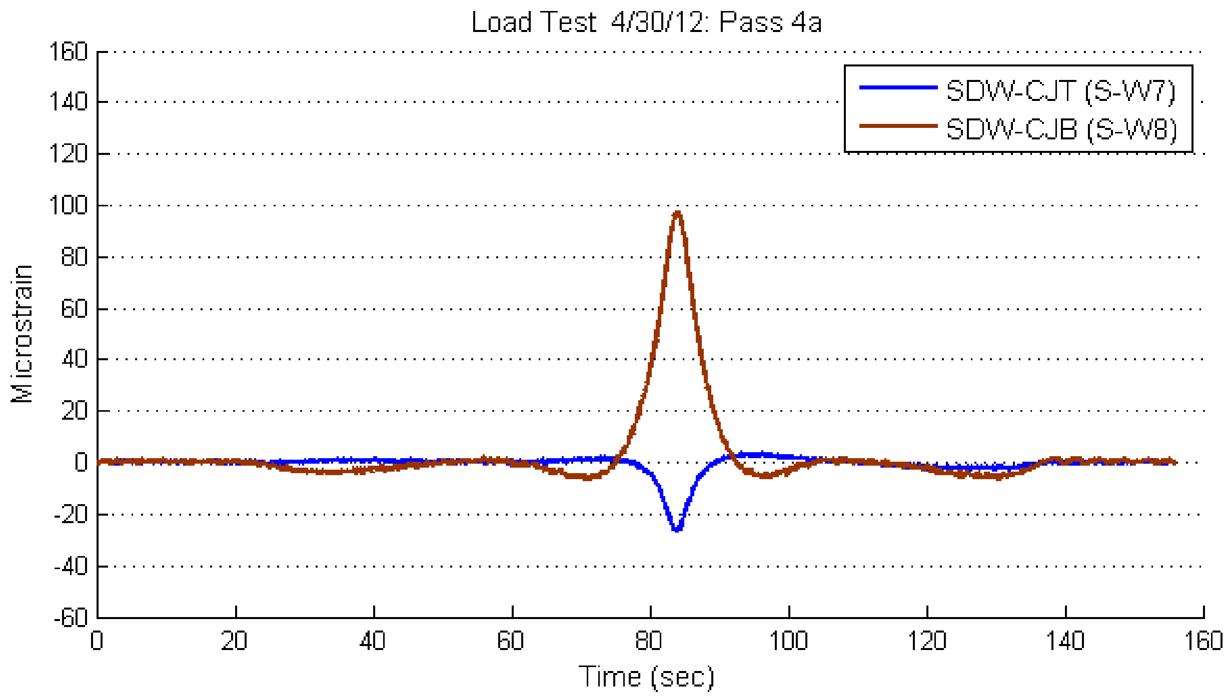


Figure A.15 West edge girder strain time history - closure joint

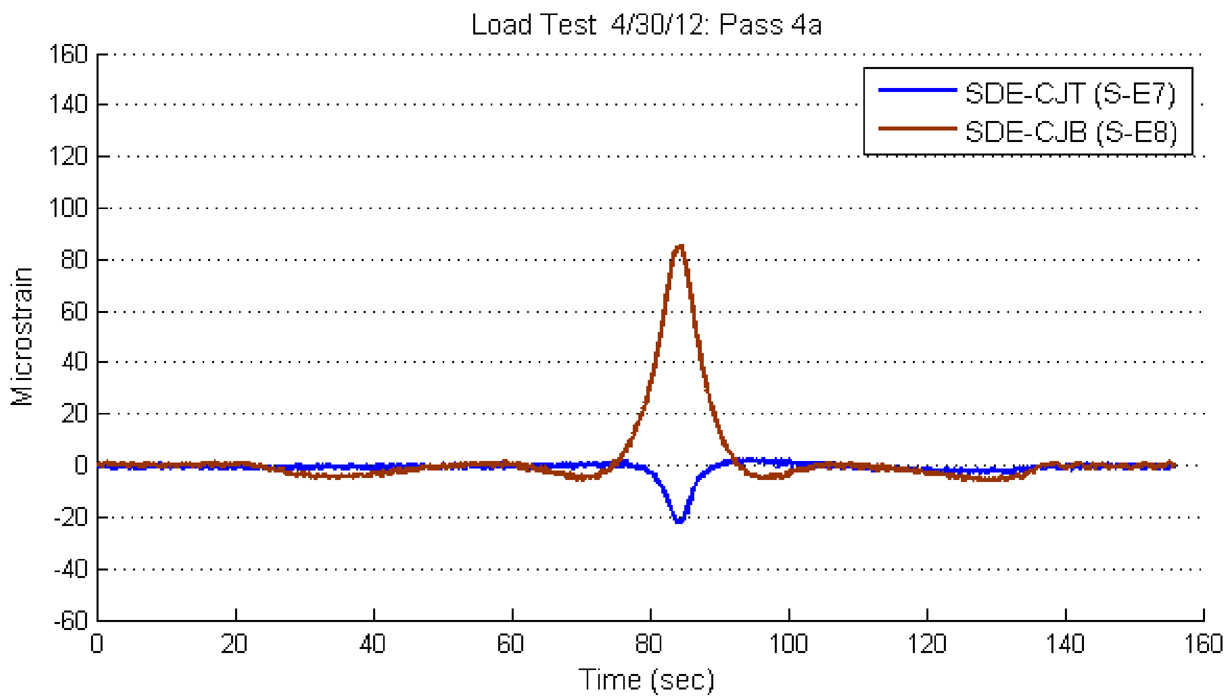


Figure A.16 East edge girder strain time history - closure joint

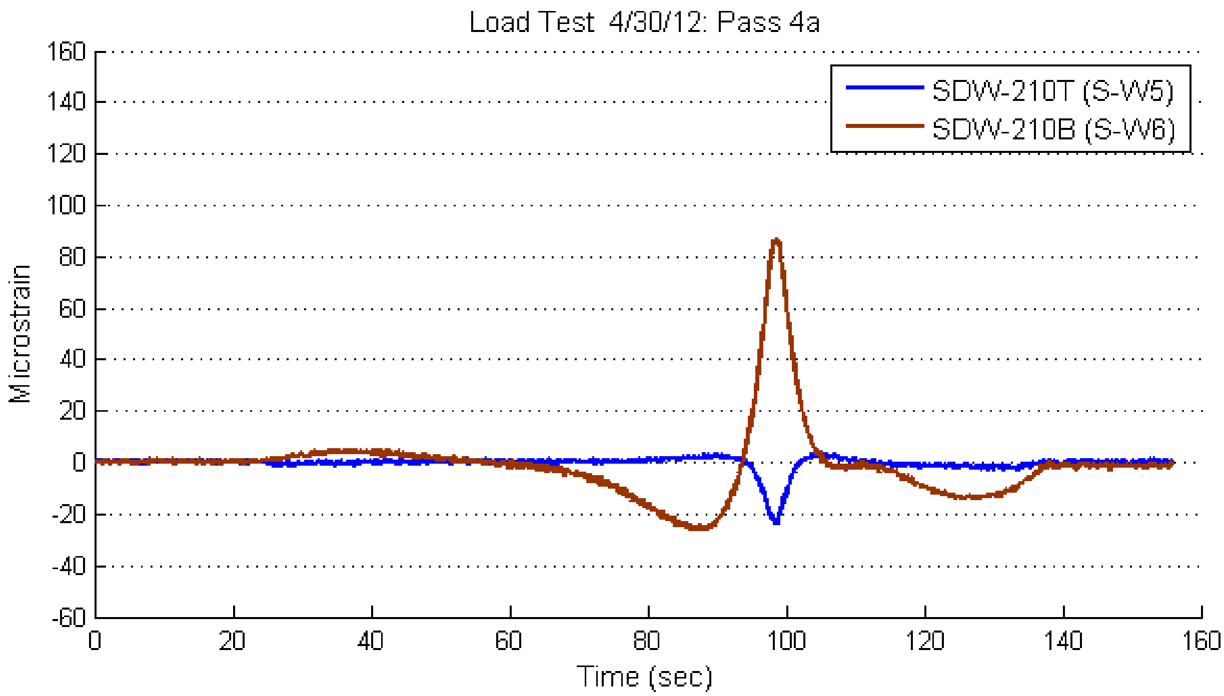


Figure A.17 West edge girder strain time history - section 210

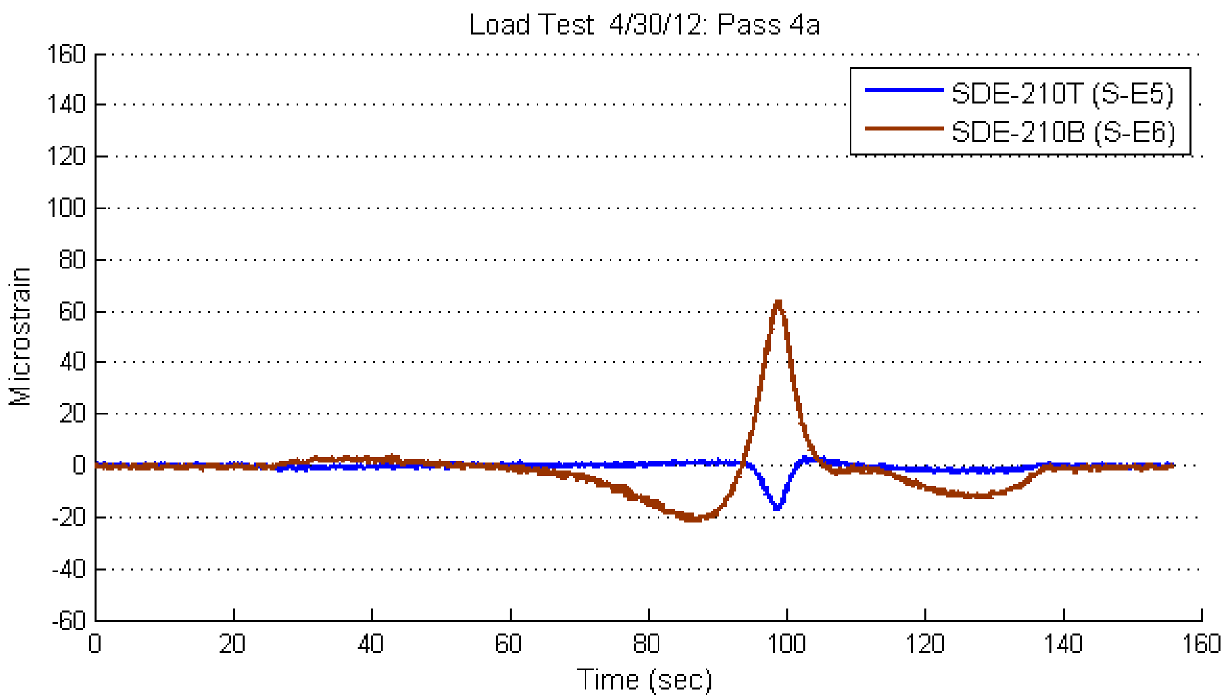


Figure A.18 East edge girder strain time history - section 210

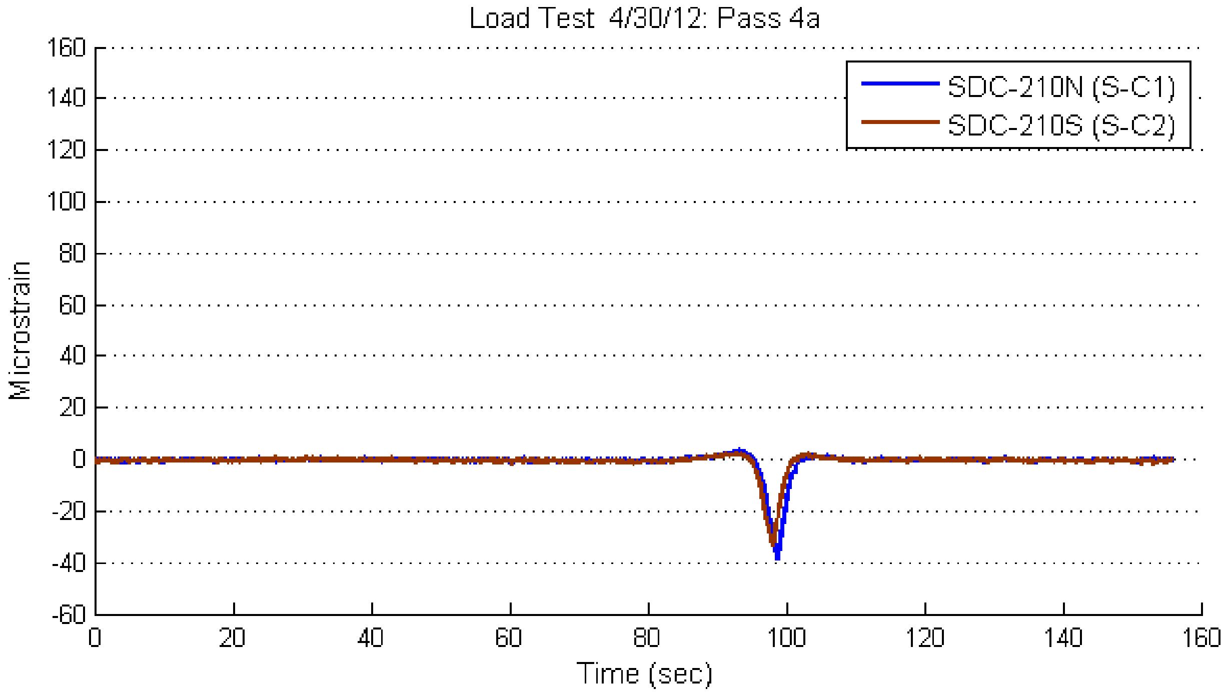


Figure A.19 Deck strain time history - section 210

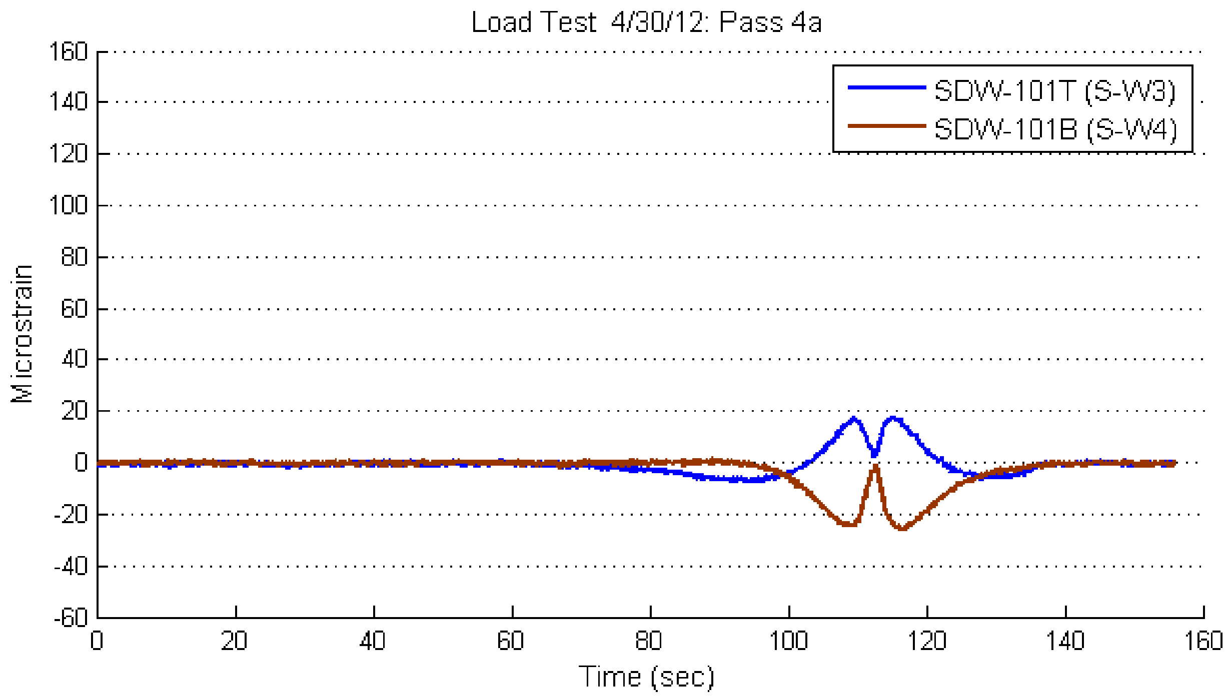


Figure A.20 West edge girder strain time history - section 101

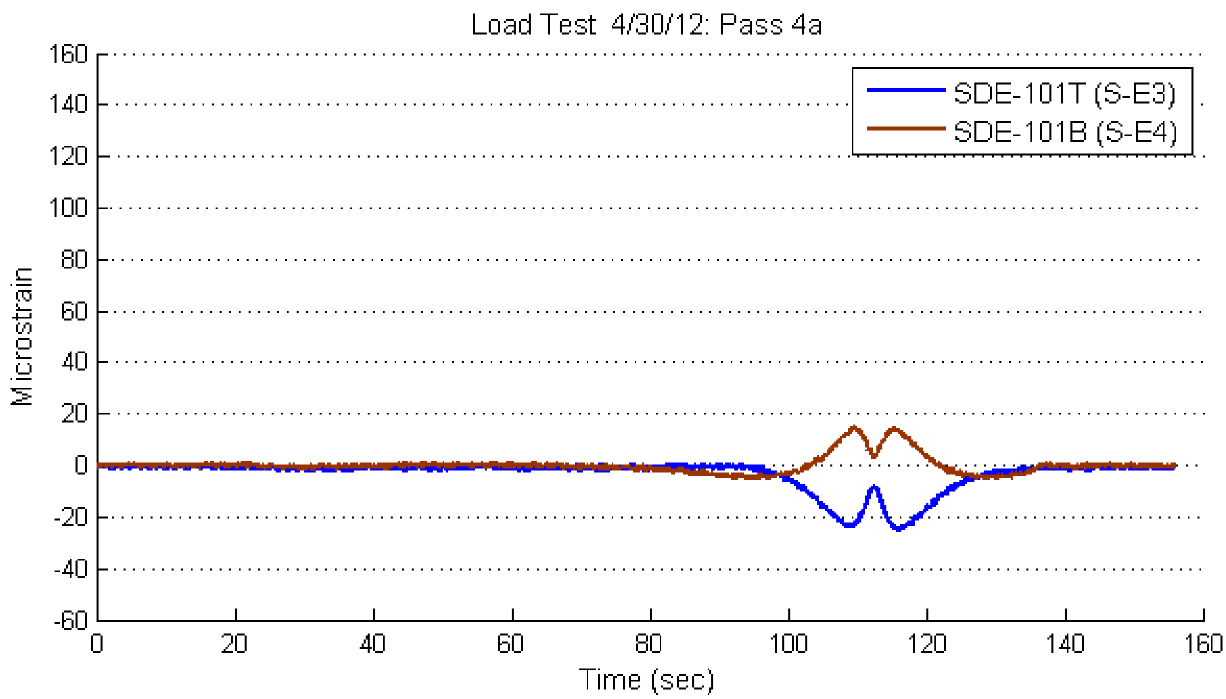


Figure A.21 East edge girder strain time history - section 101

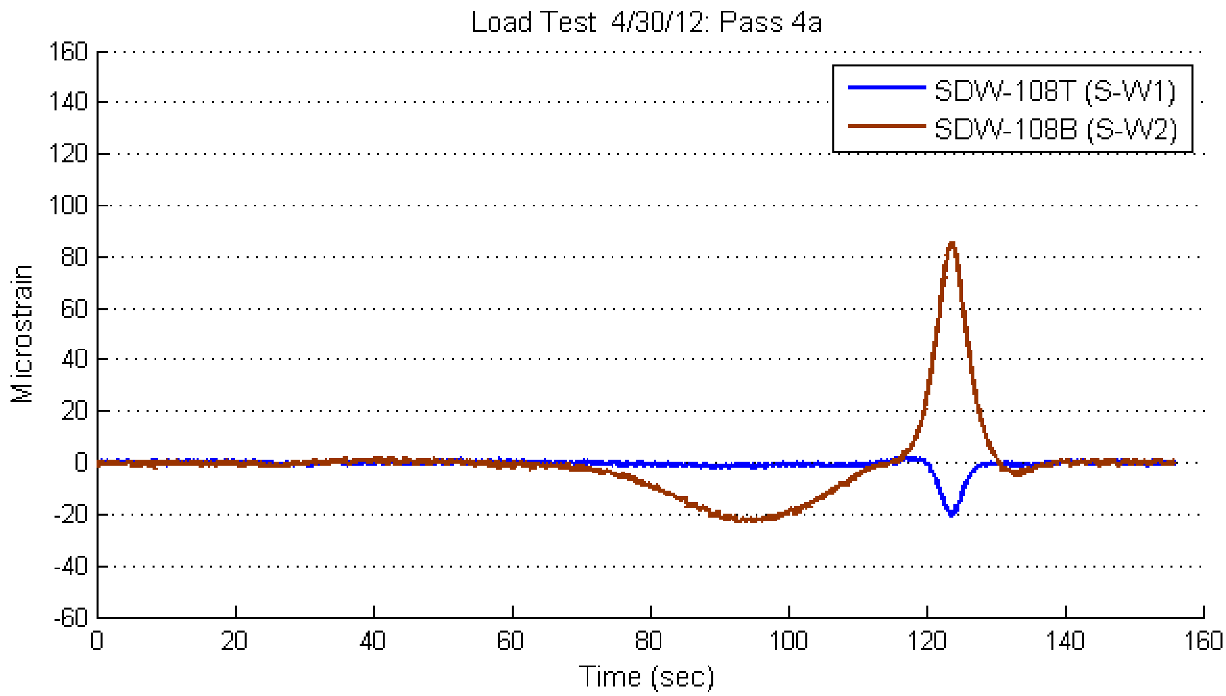


Figure A.22 West edge girder strain time history - section 108

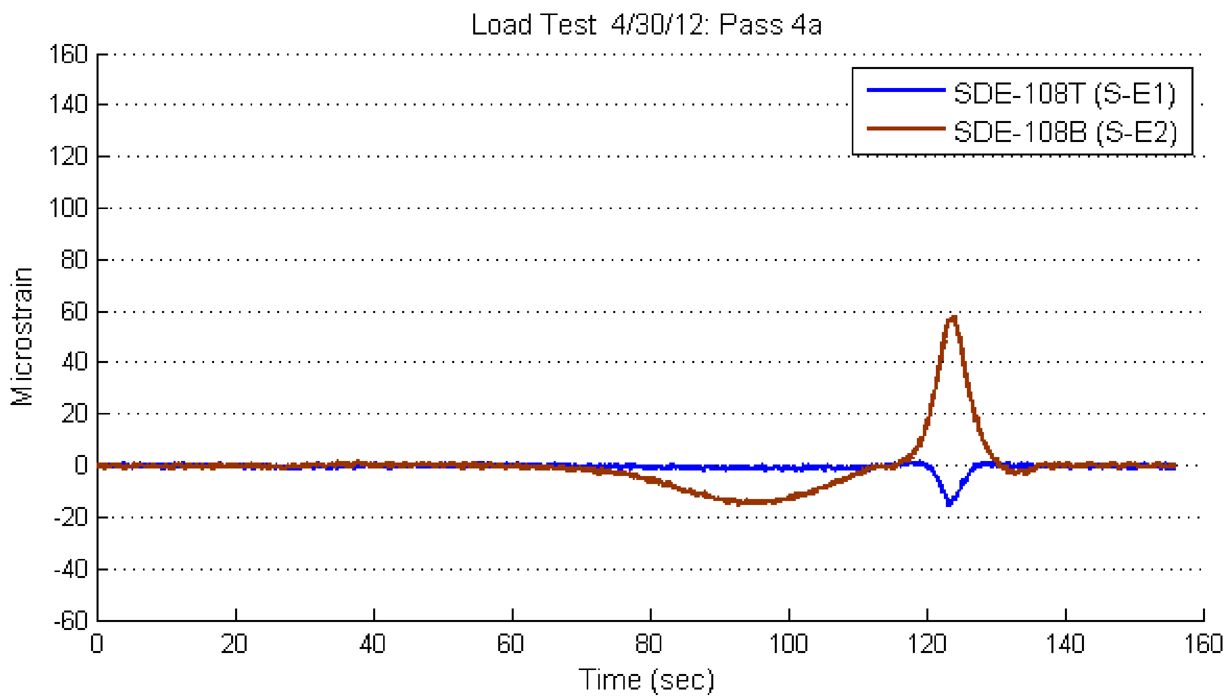


Figure A.23 East edge girder strain time history - section 108

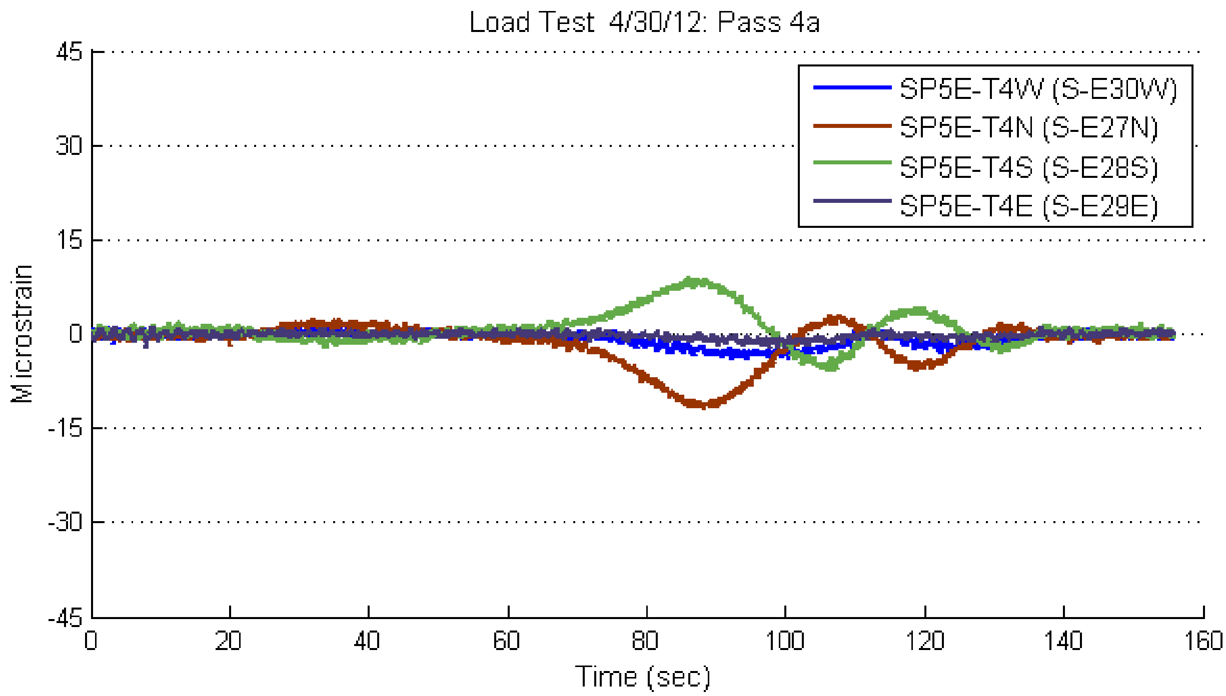


Figure A.24 Pylon 5 east strain time history - lift T4

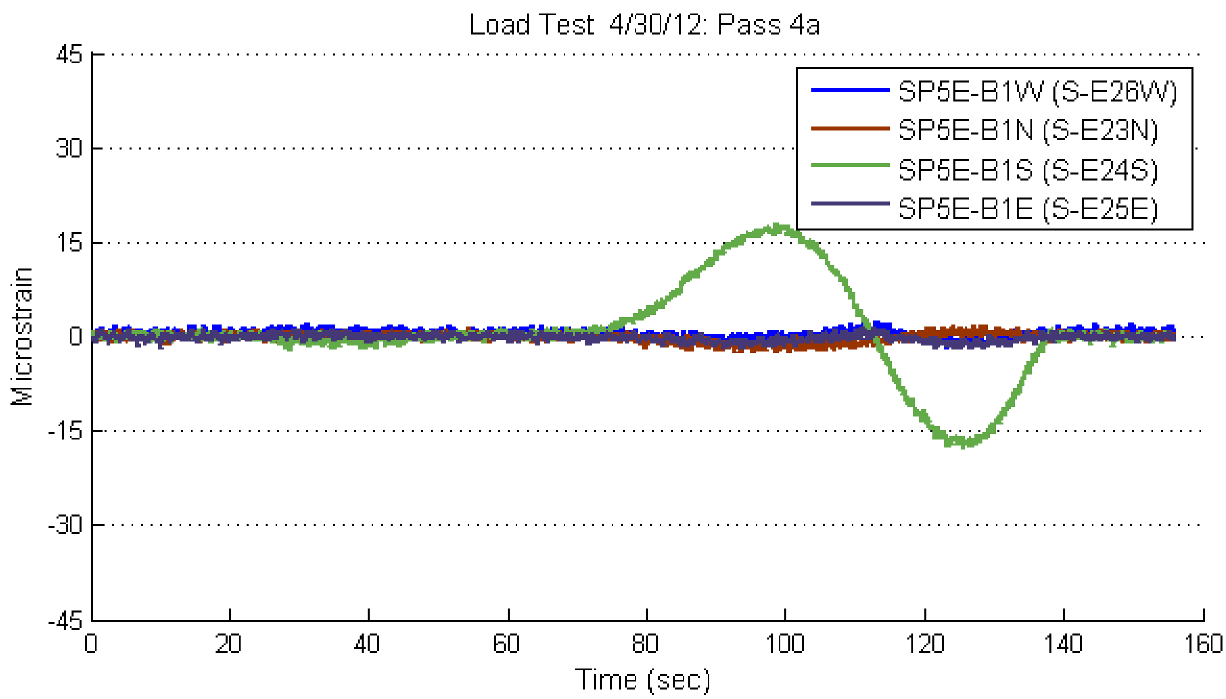


Figure A.25 Pylon 5 east strain time history - lift B1

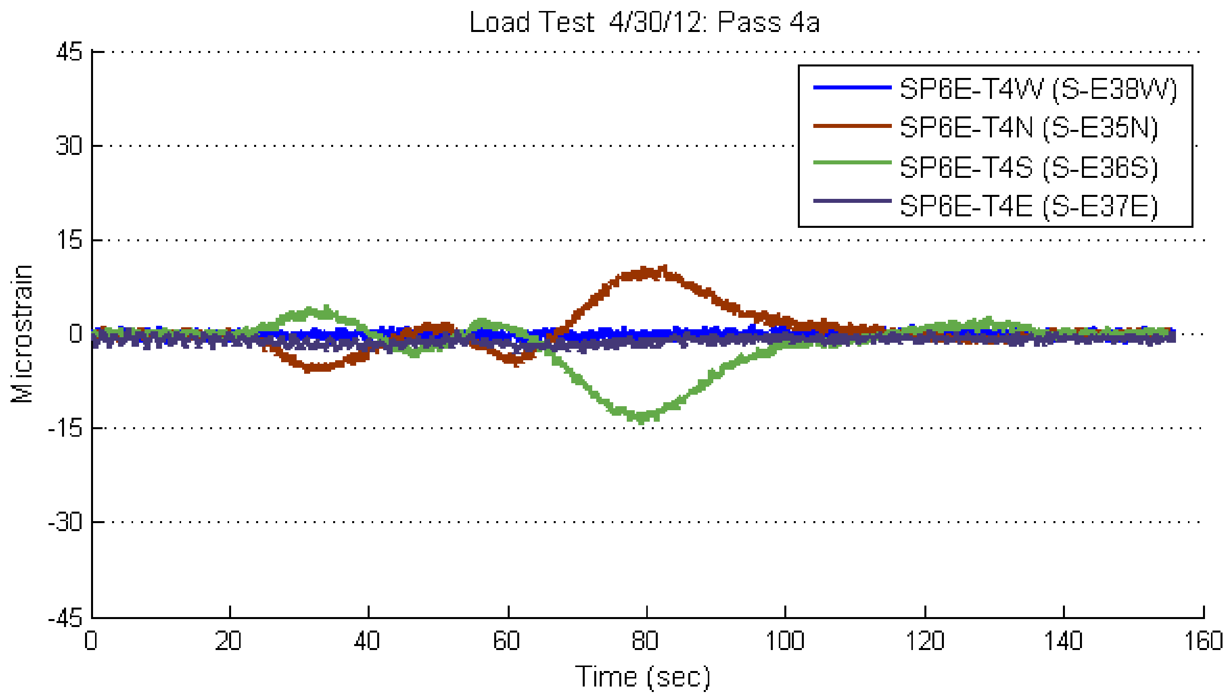


Figure A.26 Pylon 6 east strain time history - lift T4

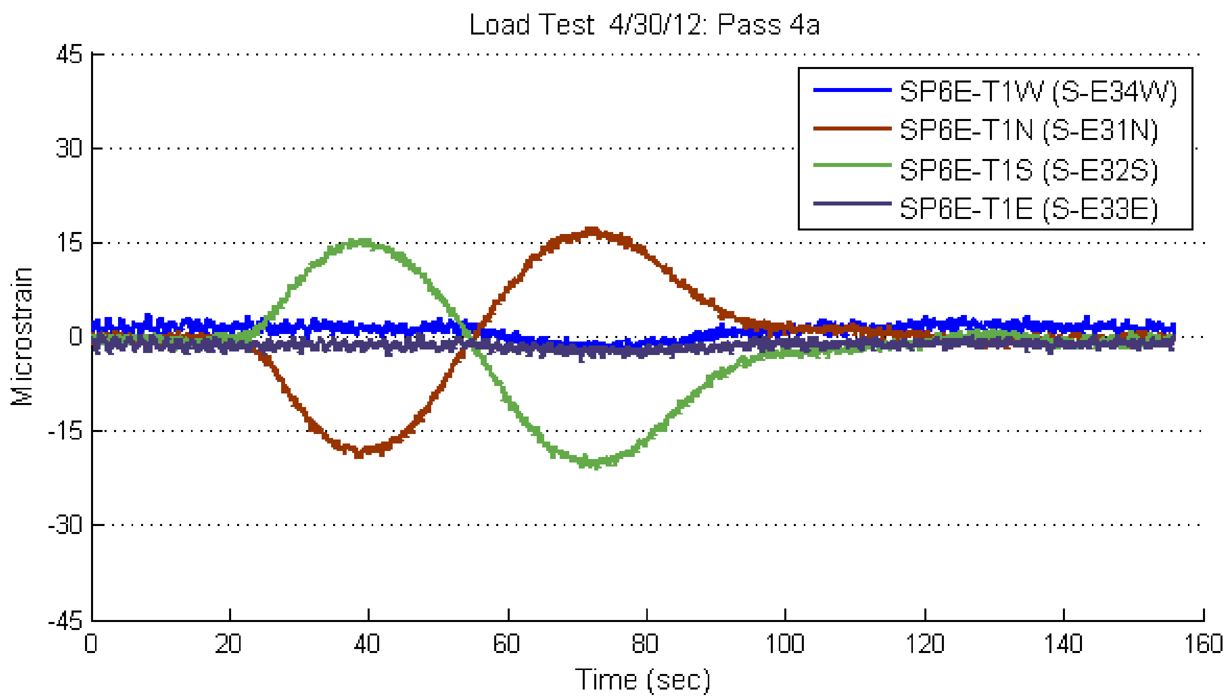


Figure A.27 Pylon 6 east strain time history - lift T1

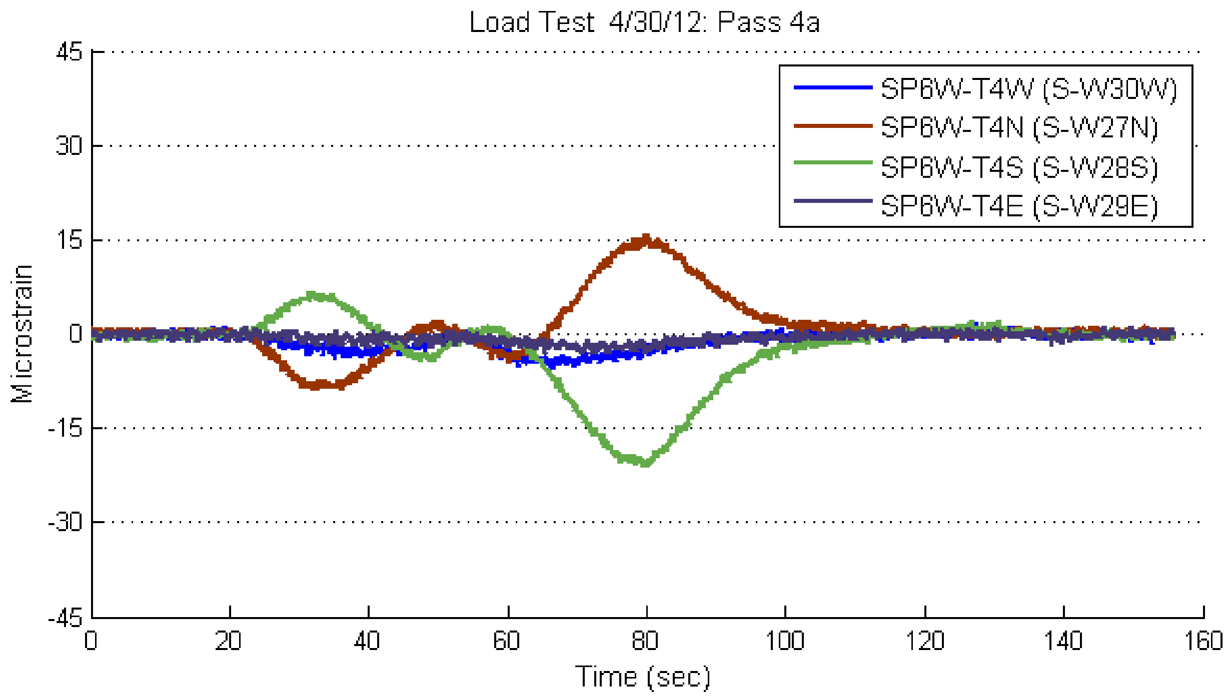


Figure A.28 Pylon 6 west strain time history - lift T4

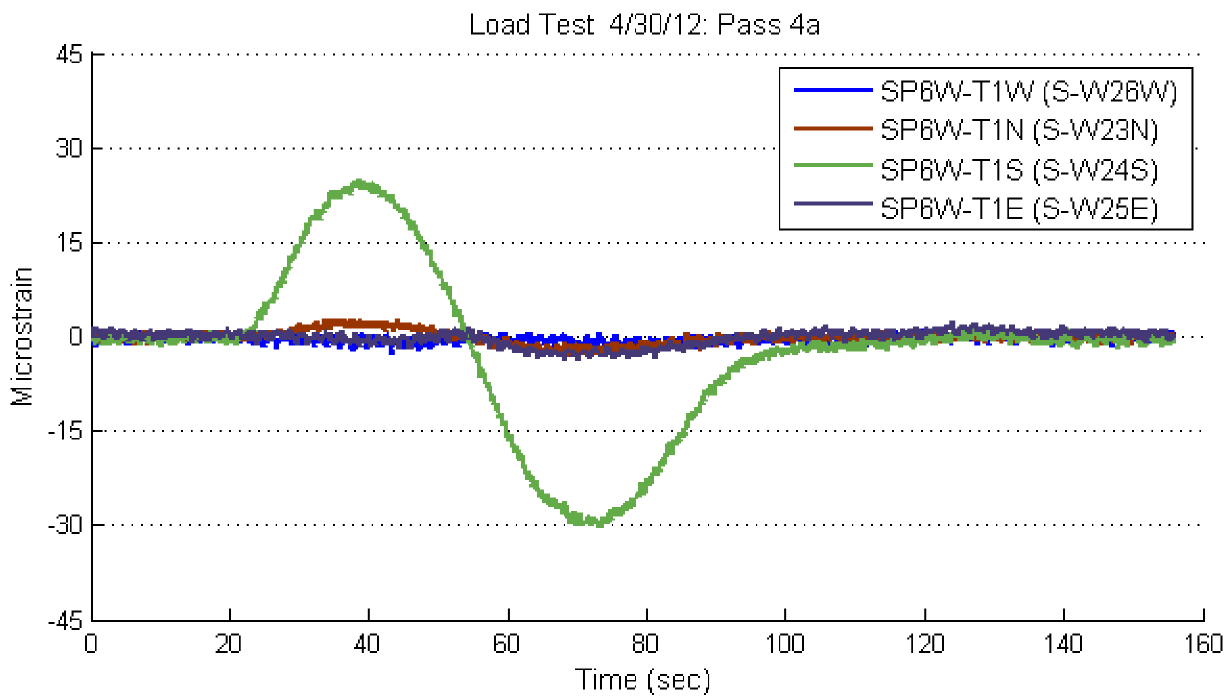


Figure A.29 Pylon 6 west strain time history - lift T1

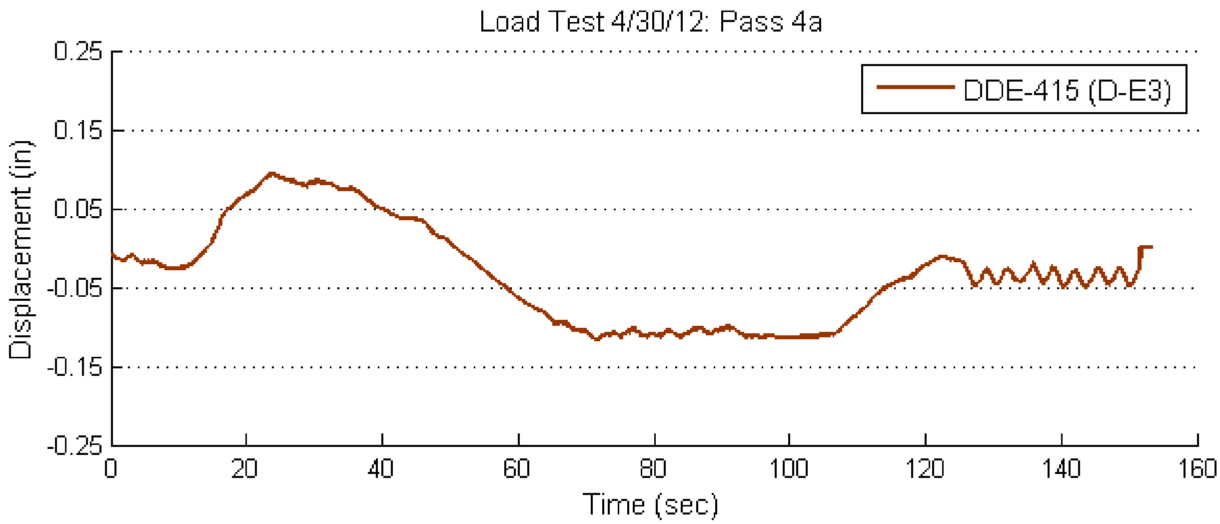


Figure A.30 Bearing displacement time history – north abutment

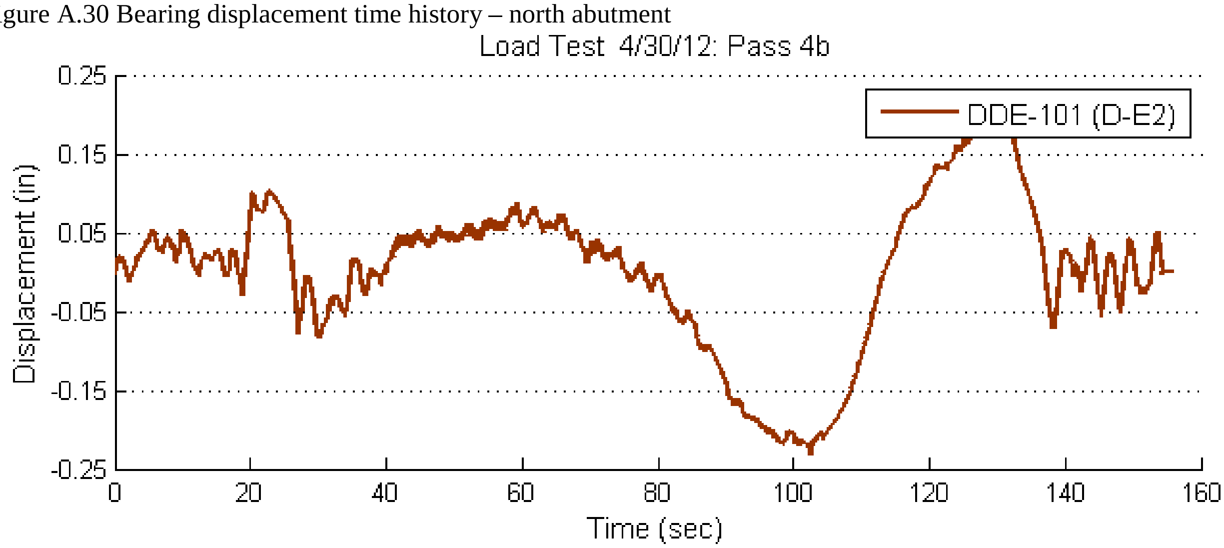


Figure A.31 Bearing displacement time history – pylon 5

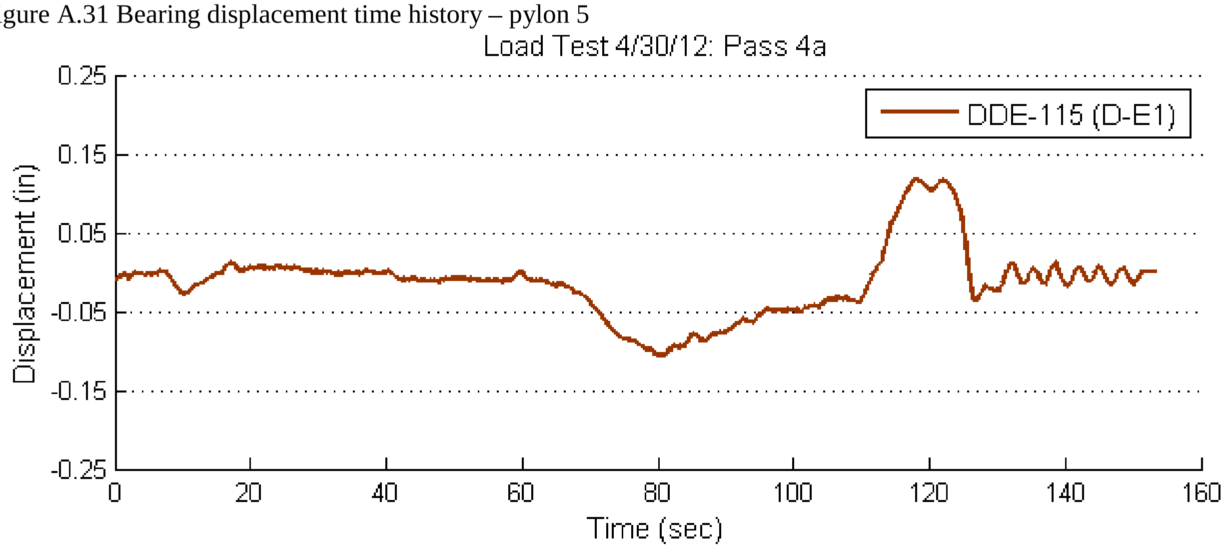


Figure A.32 Bearing displacement time history – south abutment

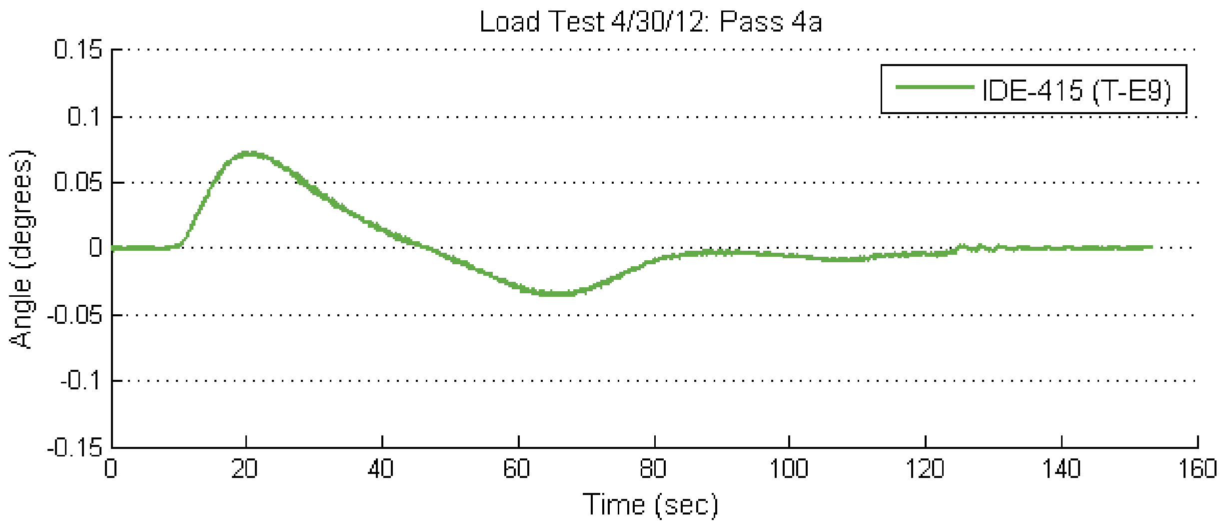


Figure A.33 Deck tilt time history - section 415

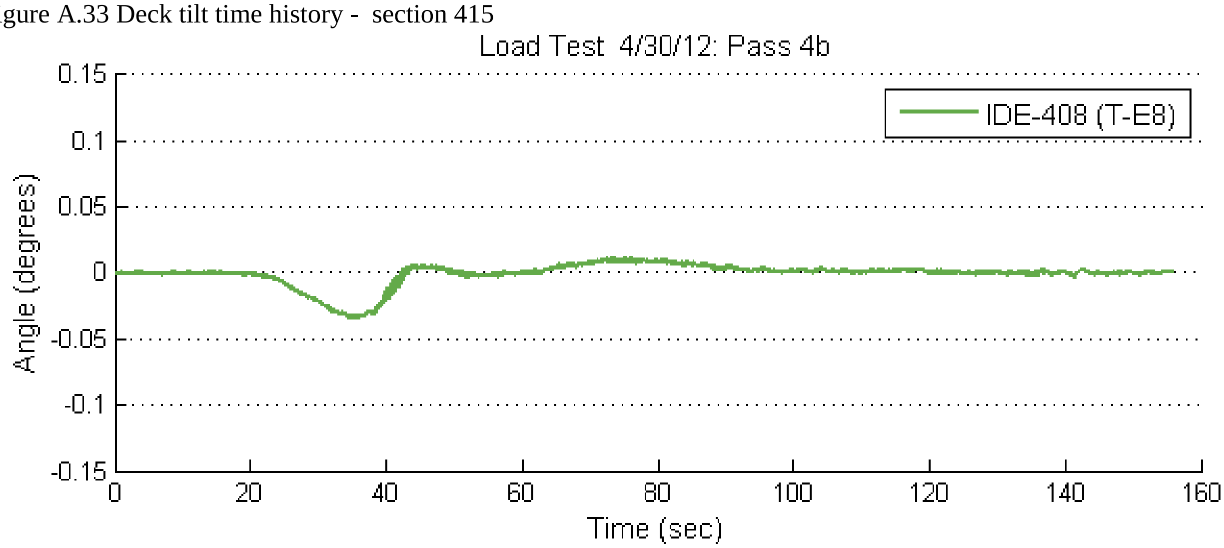


Figure A.34 Deck tilt time history - section 408

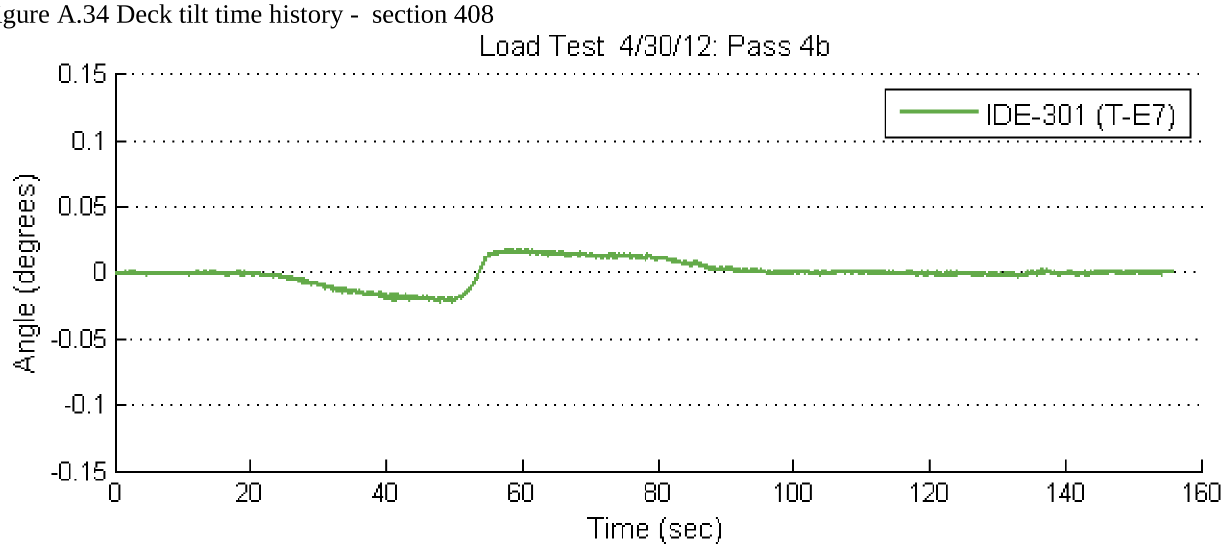


Figure A.35 Deck tilt time history - section 301

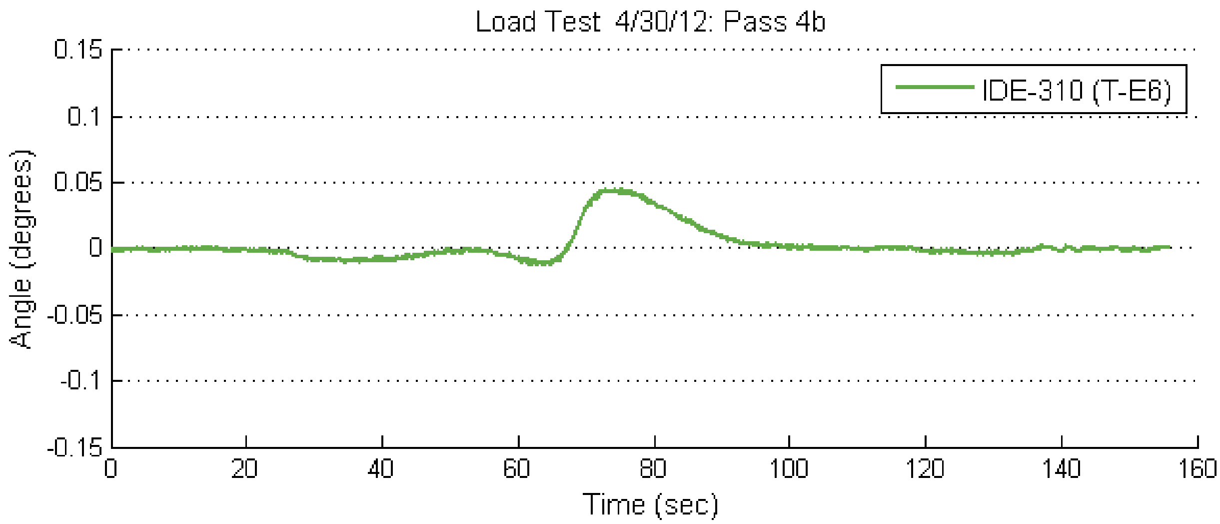


Figure A.36 Deck tilt time history - section 310

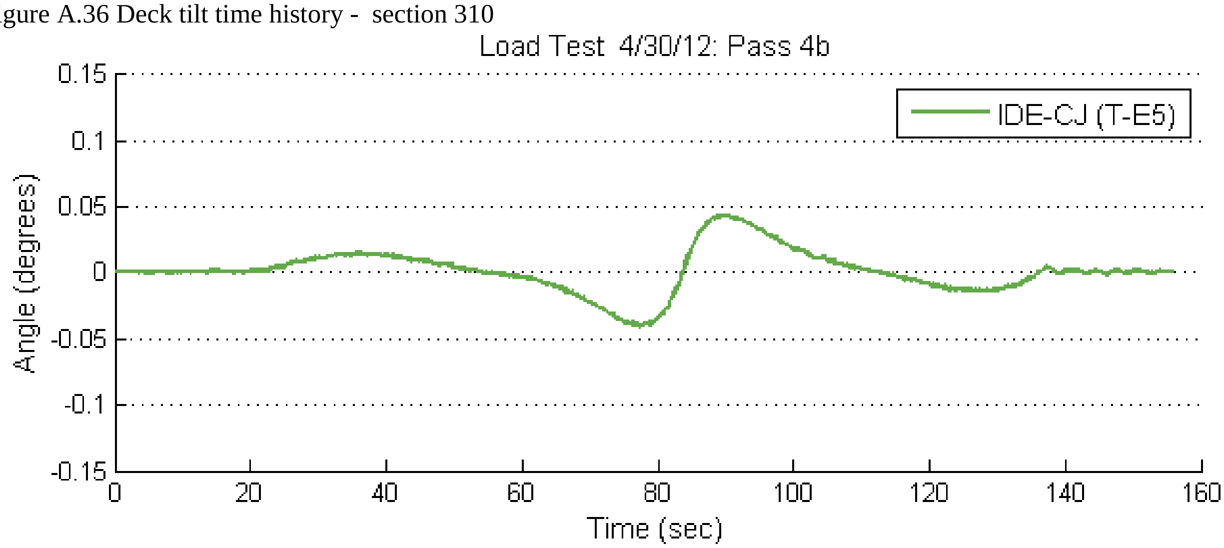


Figure A.37 Deck tilt time history - section closure joint

Figure A.38 Deck tilt time history - section 210

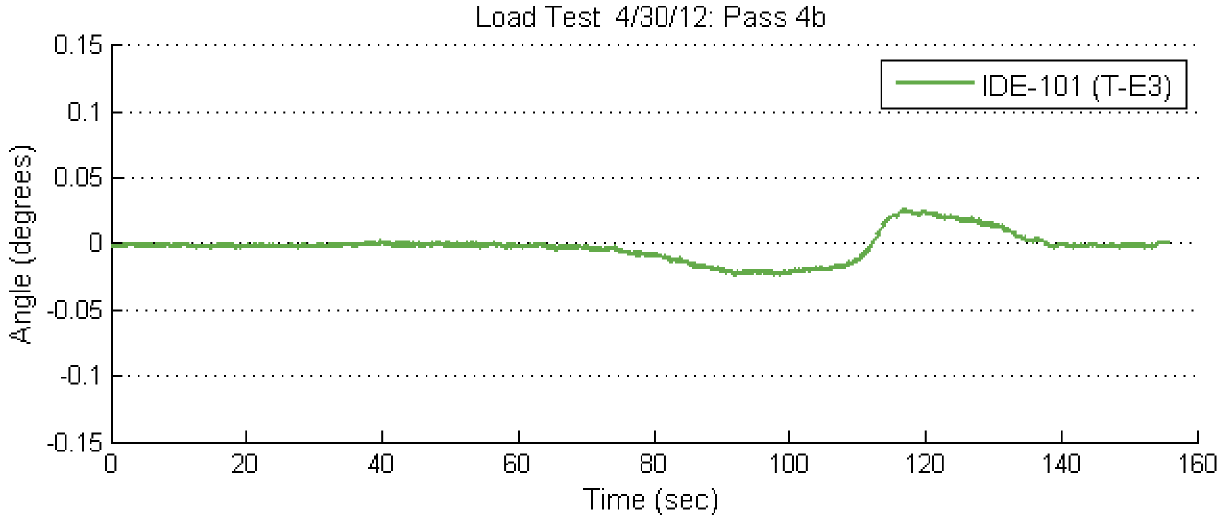


Figure A.39 Deck tilt time history - section 101

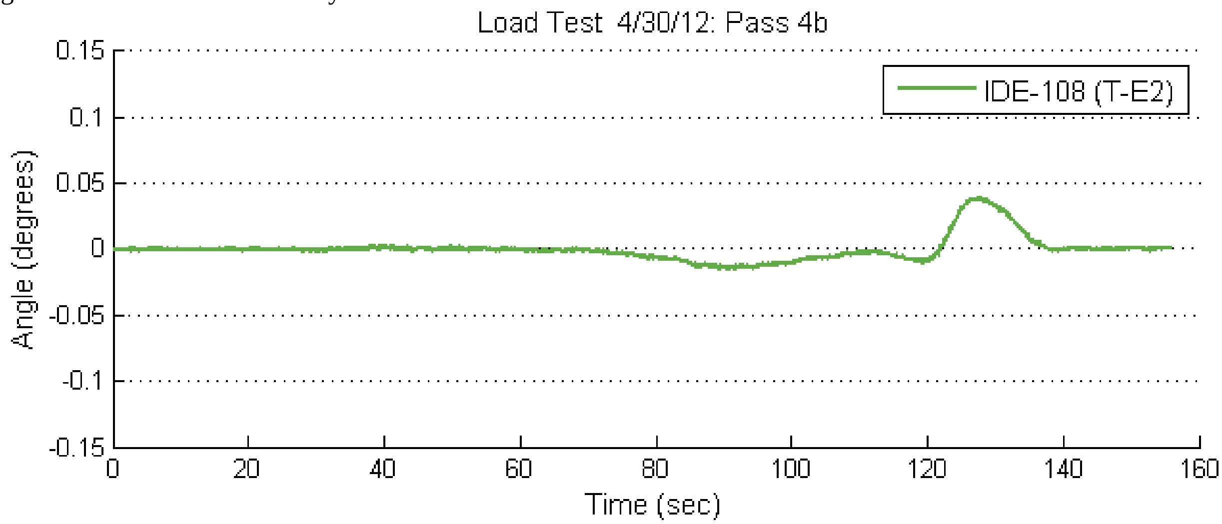


Figure A.40 Deck tilt time history - section 108

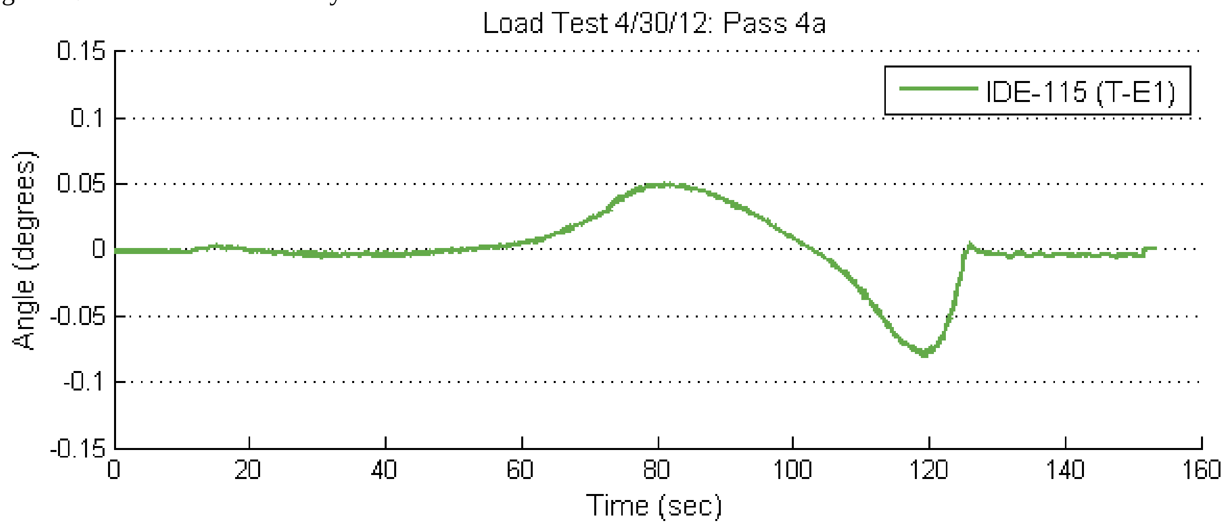


Figure A.41 Deck tilt time history - section 115

Appendix B Tables and Figures – Load Test 2 (11/28/12)

Table B.1 Bearing Displacement: Maximums

No. trucks	Pass	Displacement (in)		
		DDE_115 D-E1	DDE_101 D-E2	DDE_415 D-E3
Slow speed passes				
1	1a	0.017	0.065	0.015
	1b	0.023	0.051	0.014
	1c	0.025	0.041	0.019
	1d	0.021	0.056	0.019
	1e	0.019	0.058	0.018
	1f	0.029	0.050	0.025
2	2a	0.031	0.102	0.024
	2b	0.030	0.067	0.024
	2c	0.021	0.092	0.025
	2d	0.033	0.105	0.033
	2e	0.035	0.094	0.043
	2f	0.027	0.109	0.023
	2g	0.034	0.073	0.023
	2h	0.033	0.095	0.020
3	3a	0.052	0.094	0.062
	3b	0.060	0.135	0.073
4	4a	0.124	0.137	0.063
	4b	0.069	0.126	0.098
	4c	0.093	0.153	0.125
	4d	0.081	0.113	0.036
	4e	0.056	0.143	0.093
6	6a	0.139	0.219	0.185
	6b	0.138	0.230	0.203
Maximum		0.139	0.230	0.203

High speed passes				
4	4f	0.042	0.129	0.060
	4g	0.032	0.091	0.027
Maximum		0.042	0.129	0.060

Table B.2 Bearing Displacement: Minimums

No. trucks	Pass	Displacement (in) DDE_115 D-E1	Displacement (in) DDE_101 D-E2	Displacement (in) DDE_415 D-E3
Slow speed passes				
1	1a	-0.018	-0.029	-0.015
	1b	-0.016	-0.032	-0.020
	1c	-0.012	-0.056	-0.020
	1d	-0.018	-0.046	-0.018
	1e	-0.018	-0.031	-0.015
	1f	-0.019	-0.055	-0.016
2	2a	-0.016	-0.036	-0.020
	2b	-0.013	-0.071	-0.019
	2c	-0.022	-0.056	-0.022
	2d	-0.013	-0.062	-0.017
	2e	-0.039	-0.065	-0.020
	2f	-0.022	-0.067	-0.024
	2g	-0.012	-0.063	-0.049
	2h	-0.033	-0.083	-0.031
3	3a	-0.024	-0.101	-0.018
	3b	-0.046	-0.108	-0.050
4	4a	-0.023	-0.136	-0.107
	4b	-0.036	-0.125	-0.069
	4c	-0.049	-0.141	-0.064
	4d	-0.026	-0.110	-0.086
	4e	-0.077	-0.152	-0.069
6	6a	-0.087	-0.192	-0.153
	6b	-0.107	-0.172	-0.145
Minimum		-0.107	-0.192	-0.153

High speed passes				
4	4f	-0.060	-0.143	-0.059
	4g	-0.027	-0.119	-0.057
Minimum		-0.060	-0.143	-0.059

Table B.3 Deck Tilt: Maximums

No. of trucks	Pass	Tilt sensor (Deg.)								
		IDE_115 T-E1	IDE_108 T-E2	IDE_101 T-E3	IDE_210 T-E4	IDE_CJ T-E5	IDE_310 T-E6	IDE_301 T-E7	IDE_408 T-E8	IDE_415 T-E9
Slow speed passes										
1	1a	0.010	0.002	0.002	0.000	0.004	0.006	0.004	0.003	0.008
	1b	0.010	0.005	0.003	0.002	0.009	0.011	0.004	0.006	0.009
	1c	0.013	0.008	0.006	0.002	0.013	0.014	0.005	0.005	0.012
	1d	0.010	0.009	0.012	0.001	0.013	0.017	0.006	0.004	0.012
	1e	0.009	0.004	0.005	0.000	0.006	0.007	0.003	0.002	0.008
	1f	0.011	0.005	0.010	0.002	0.015	0.017	0.007	0.007	0.016
2	2a	0.019	0.010	0.007	0.003	0.016	0.011	0.008	0.006	0.021
	2b	0.018	0.008	0.009	0.003	0.015	0.010	0.004	0.003	0.020
	2c	0.019	0.009	0.012	0.001	0.016	0.016	0.007	0.004	0.021
	2d	0.020	0.019	0.018	0.005	0.029	0.027	0.011	0.007	0.025
	2e	0.025	0.013	0.014	0.002	0.026	0.026	0.011	0.007	0.026
	2f	0.020	0.016	0.017	0.002	0.029	0.028	0.013	0.008	0.025
	2g	0.020	0.011	0.008	0.003	0.011	0.011	0.006	0.005	0.017
	2h	0.019	0.014	0.016	0.004	0.030	0.031	0.008	0.009	0.026
3	3a	0.029	0.014	0.012	0.005	0.022	0.018	0.008	0.006	0.039
	3b	0.031	0.027	0.024	0.004	0.044	0.042	0.017	0.012	0.042
4	4a	0.045	0.025	0.024	0.005	0.043	0.040	0.018	0.012	0.053
	4b	0.043	0.016	0.019	0.003	0.026	0.025	0.013	0.009	0.047
	4c	0.045	0.032	0.033	0.005	0.055	0.054	0.021	0.012	0.061
	4d	0.040	0.015	0.019	0.002	0.020	0.022	0.014	0.009	0.035
	4e	0.048	0.024	0.034	0.003	0.053	0.055	0.023	0.011	0.051
6	6a	0.074	0.048	0.038	0.004	0.064	0.063	0.028	0.017	0.087
	6b	0.074	0.044	0.042	0.006	0.066	0.064	0.027	0.015	0.099
Maximum		0.074	0.048	0.042	0.006	0.066	0.064	0.028	0.017	0.099

High speed passes										
4	4f	0.048	0.015	0.020	0.019	0.042	0.058	0.024	0.013	0.049
	4g	0.044	0.007	0.016	0.007	0.025	0.024	0.015	0.014	0.037
Maximum		0.048	0.015	0.020	0.019	0.042	0.058	0.024	0.014	0.049

Table B.4 Deck Tilt: Minimums

No. of trucks	Pass	Tilt sensor (Deg.)								
		IDE_115 T-E1	IDE_108 T-E2	IDE_101 T-E3	IDE_210 T-E4	IDE_CJ T-E5	IDE_310 T-E6	IDE_301 T-E7	IDE_408 T-E8	IDE_415 T-E9
Slow speed passes										
1	1a	-0.014	-0.004	-0.005	-0.005	-0.008	-0.001	-0.003	-0.005	-0.005
	1b	-0.015	-0.003	-0.007	-0.003	-0.009	0.000	-0.006	-0.005	-0.007
	1c	-0.018	-0.003	-0.008	-0.004	-0.014	-0.002	-0.006	-0.009	-0.008
	1d	-0.019	-0.002	-0.004	-0.006	-0.017	-0.001	-0.006	-0.011	-0.007
	1e	-0.015	-0.002	-0.003	-0.003	-0.004	0.000	-0.003	-0.006	-0.004
	1f	-0.019	-0.005	-0.008	-0.006	-0.018	-0.005	-0.005	-0.011	-0.006
2	2a	-0.032	-0.004	-0.012	-0.003	-0.012	-0.005	-0.006	-0.010	-0.010
	2b	-0.030	-0.003	-0.006	-0.003	-0.008	-0.005	-0.008	-0.010	-0.009
	2c	-0.031	-0.007	-0.006	-0.007	-0.017	-0.004	-0.008	-0.013	-0.012
	2d	-0.037	-0.004	-0.013	-0.007	-0.028	-0.007	-0.010	-0.018	-0.014
	2e	-0.034	-0.006	-0.012	-0.009	-0.023	-0.004	-0.008	-0.015	-0.013
	2f	-0.036	-0.004	-0.011	-0.010	-0.031	-0.008	-0.012	-0.019	-0.013
	2g	-0.029	-0.001	-0.008	-0.003	-0.011	-0.003	-0.007	-0.010	-0.014
	2h	-0.043	-0.009	-0.017	-0.012	-0.034	-0.010	-0.015	-0.021	-0.017
3	3a	-0.048	-0.006	-0.014	-0.009	-0.018	-0.006	-0.012	-0.017	-0.018
	3b	-0.058	-0.006	-0.017	-0.015	-0.044	-0.012	-0.017	-0.028	-0.023
4	4a	-0.076	-0.012	-0.023	-0.017	-0.045	-0.010	-0.017	-0.028	-0.036
	4b	-0.064	-0.010	-0.016	-0.009	-0.029	-0.007	-0.014	-0.021	-0.024
	4c	-0.078	-0.013	-0.025	-0.019	-0.054	-0.012	-0.019	-0.034	-0.032
	4d	-0.057	-0.007	-0.013	-0.007	-0.022	-0.004	-0.009	-0.016	-0.031
	4e	-0.067	-0.014	-0.023	-0.021	-0.054	-0.009	-0.019	-0.029	-0.032
6	6a	-0.119	-0.016	-0.030	-0.027	-0.065	-0.016	-0.024	-0.047	-0.057
	6b	-0.115	-0.016	-0.029	-0.035	-0.065	-0.015	-0.023	-0.049	-0.055
Minimum		-0.119	-0.016	-0.030	-0.035	-0.065	-0.016	-0.024	-0.049	-0.057

High speed passes										
4	4f	-0.057	-0.011	-0.026	-0.031	-0.048	-0.013	-0.018	-0.021	-0.038
	4g	-0.048	-0.012	-0.014	-0.020	-0.024	-0.006	-0.012	-0.016	-0.029
Minimum		-0.057	-0.012	-0.026	-0.031	-0.048	-0.013	-0.018	-0.021	-0.038

Table B.5 Plyon 5E Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Below Deck – Level B1)				Strain sensor (με) (Above Deck – Level T4)			
		SP5E_B1W S-E26W	SP5E_B1N S-E23N	SP5E_B1E S-E25E	SP5E_B1S S-E24S	SP5E_T4W S-E30W	SP5E_T4N S-E27N	SP5E_T4E S-E29E	SP5E_T4S S-E28S
Slow speed passes									
1	1a	1.4	2.0	2.1	4.3	0.0	0.0	0.0	0.0
	1b	3.1	1.6	1.5	4.5	0.0	0.0	0.0	0.0
	1c	2.6	1.4	1.5	5.2	0.0	0.0	0.0	0.0
	1d	2.1	1.0	1.7	6.1	0.0	0.0	0.0	0.0
	1e	3.3	2.4	1.9	2.3	0.0	0.0	0.0	0.0
	1f	1.6	1.0	0.9	6.6	0.0	0.0	0.0	0.0
2	2a	3.2	1.9	1.5	7.2	0.0	0.0	0.0	0.0
	2b	2.7	1.7	1.0	4.9	0.0	0.0	0.0	0.0
	2c	1.9	1.7	1.2	7.8	0.0	0.0	0.0	0.0
	2d	2.9	1.6	1.7	10.6	0.0	0.0	0.0	0.0
	2e	2.8	1.4	1.7	10.4	0.0	0.0	0.0	0.0
	2f	2.2	2.0	1.4	11.1	0.0	0.0	0.0	0.0
	2g	2.6	1.6	1.7	5.5	0.0	0.0	0.0	0.0
	2h	2.1	1.0	1.4	11.3	0.0	0.0	0.0	0.0
3	3a	1.4	1.7	0.8	8.5	0.0	0.0	0.0	0.0
	3b	3.1	2.2	1.5	16.4	0.0	0.0	0.0	0.0
4	4a	1.6	2.1	1.5	16.1	0.0	0.0	0.0	0.0
	4b	2.9	2.0	2.0	12.9	0.0	0.0	0.0	0.0
	4c	1.7	2.2	1.4	20.5	0.0	0.0	0.0	0.0
	4d	2.4	1.3	1.5	10.2	0.0	0.0	0.0	0.0
	4e	2.2	2.7	1.4	20.6	0.0	0.0	0.0	0.0
6	6a	3.6	2.7	2.7	24.8	0.0	0.0	0.0	0.0
	6b	2.4	1.4	1.9	25.0	0.0	0.0	0.0	0.0
Maximum		3.6	2.7	2.7	25.0	0.0	0.0	0.0	0.0
High speed passes									
4	4f	1.7	1.3	1.6	19.5	0.0	0.0	0.0	0.0
	4g	1.7	0.8	1.3	11.1	0.0	0.0	0.0	0.0
Maximum		1.7	1.3	1.6	19.5	0.0	0.0	0.0	0.0

Table B.6 Plyon 5E Strain: Minimums

No. of trucks	Pass	Strain sensor (με) (Below Deck – Level B1)				Strain sensor (με) (Above Deck – Level T4)			
		SP5E_B1W S-E26W	SP5E_B1N S-E23N	SP5E_B1E S-E25E	SP5E_B1S S-E24S	SP5E_T4W S-E30W	SP5E_T4N S-E27N	SP5E_T4E S-E29E	SP5E_T4S S-E28S
Slow speed passes									
1	1a	-3.0	-1.5	-1.0	-3.3	0.0	0.0	0.0	0.0
	1b	-1.2	-2.0	-1.2	-3.7	0.0	0.0	0.0	0.0
	1c	-1.8	-1.8	-1.2	-6.0	0.0	0.0	0.0	0.0
	1d	-2.1	-2.3	-1.5	-6.3	0.0	0.0	0.0	0.0
	1e	-1.3	-0.9	-1.0	-3.7	0.0	0.0	0.0	0.0
	1f	-2.8	-2.4	-2.1	-7.3	0.0	0.0	0.0	0.0
2	2a	-1.4	-1.2	-1.3	-6.5	0.0	0.0	0.0	0.0
	2b	-1.7	-1.4	-2.2	-6.5	0.0	0.0	0.0	0.0
	2c	-2.6	-1.9	-2.0	-7.1	0.0	0.0	0.0	0.0
	2d	-2.2	-2.0	-1.6	-11.6	0.0	0.0	0.0	0.0
	2e	-2.0	-2.2	-1.4	-10.3	0.0	0.0	0.0	0.0
	2f	-2.8	-1.7	-2.4	-12.2	0.0	0.0	0.0	0.0
	2g	-2.7	-1.6	-1.4	-5.2	0.0	0.0	0.0	0.0
	2h	-2.9	-2.6	-2.2	-13.5	0.0	0.0	0.0	0.0
3	3a	-3.1	-2.2	-2.3	-9.1	0.0	0.0	0.0	0.0
	3b	-2.4	-2.2	-2.1	-17.5	0.0	0.0	0.0	0.0
4	4a	-3.0	-2.3	-2.2	-17.4	0.0	0.0	0.0	0.0
	4b	-1.7	-1.9	-1.7	-11.5	0.0	0.0	0.0	0.0
	4c	-3.8	-2.8	-3.1	-22.2	0.0	0.0	0.0	0.0
	4d	-1.8	-2.1	-1.7	-11.2	0.0	0.0	0.0	0.0
	4e	-3.0	-3.1	-2.6	-22.4	0.0	0.0	0.0	0.0
6	6a	-2.2	-2.5	-2.6	-24.8	0.0	0.0	0.0	0.0
	6b	-3.0	-4.6	-3.0	-27.0	0.0	0.0	0.0	0.0
Minimum		-3.8	-4.6	-3.1	-27.0	0.0	0.0	0.0	0.0

High speed passes									
4	4f	-3.2	-3.2	-1.7	-19.2	0.0	0.0	0.0	0.0
	4g	-2.6	-2.7	-1.8	-8.8	0.0	0.0	0.0	0.0
Minimum		-3.2	-3.2	-1.8	-19.2	0.0	0.0	0.0	0.0

Table B.7 Plyon 6E Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6E_T1W S-E34W	SP6E_T1N S-E31N	SP6E_T1E S-E33E	SP6E_T1S S-E32S	SP6E_T4W S-E38W	SP6E_T4N S-E35N	SP6E_T4E S-E37E	SP6E_T4S S-E36S
Slow speed passes									
1	1a	1.5	3.4	1.5	3.6	0.0	2.6	2.0	1.6
	1b	1.0	4.1	1.8	3.7	0.0	5.1	1.7	1.8
	1c	1.4	4.9	2.2	4.2	0.0	4.0	1.3	1.7
	1d	1.8	6.0	0.4	5.5	0.0	4.7	1.2	2.4
	1e	1.5	2.3	1.4	3.9	0.0	2.7	1.0	1.7
	1f	1.7	7.3	1.4	6.2	0.0	5.1	1.2	2.4
2	2a	1.1	6.2	1.2	5.9	0.0	4.6	1.4	2.0
	2b	1.2	6.0	1.4	6.4	0.0	4.7	1.6	2.1
	2c	1.6	7.7	1.4	7.0	0.0	4.6	1.8	3.1
	2d	0.6	10.3	1.5	10.0	0.0	8.0	1.3	2.1
	2e	1.4	9.1	2.0	8.9	0.0	7.0	3.1	2.3
	2f	2.4	10.2	1.6	10.2	0.0	8.0	1.2	2.5
	2g	2.3	6.0	1.1	5.2	0.0	4.4	1.7	2.5
	2h	1.5	11.4	1.3	10.9	0.0	9.0	1.7	2.5
3	3a	1.9	6.6	2.0	9.1	0.0	5.5	1.4	3.5
	3b	1.7	15.1	1.5	14.9	0.0	11.0	1.2	4.4
4	4a	2.4	16.2	1.8	14.7	0.0	10.8	1.7	3.8
	4b	1.3	11.1	1.7	11.5	0.0	7.1	2.3	4.0
	4c	2.1	19.1	1.6	18.0	0.0	14.7	1.7	4.1
	4d	1.5	10.5	1.5	9.1	0.0	6.1	0.9	2.0
	4e	1.8	20.4	2.7	19.0	0.0	13.4	1.1	3.8
6	6a	2.2	23.6	1.6	24.0	0.0	14.4	1.6	6.9
	6b	1.5	24.5	1.4	24.7	0.0	15.6	1.5	6.1
Maximum		2.4	24.5	2.7	24.7	0.0	15.6	3.1	6.9

High speed passes									
4	4f	2.0	19.8	1.7	18.5	0.0	10.6	0.7	3.3
	4g	1.4	8.8	1.6	9.7	0.0	6.4	1.5	2.4
Maximum		2.0	19.8	1.7	18.5	0.0	10.6	1.5	3.3

Table B.8 Plyon 6E Strain: Minimums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6E_T1W S-E34W	SP6E_T1N S-E31N	SP6E_T1E S-E33E	SP6E_T1S S-E32S	SP6E_T4W S-E38W	SP6E_T4N S-E35N	SP6E_T4E S-E37E	SP6E_T4S S-E36S
Slow speed passes									
1	1a	-1.7	-3.7	-1.7	-3.4	0.0	-2.6	-1.3	-2.8
	1b	-2.3	-4.7	-1.4	-4.8	0.0	-2.0	-1.4	-3.7
	1c	-2.7	-5.6	-0.7	-6.4	0.0	-4.0	-1.4	-4.7
	1d	-3.1	-6.6	-2.4	-7.2	0.0	-3.4	-1.6	-4.8
	1e	-1.8	-4.0	-1.5	-2.4	0.0	-2.7	-1.8	-2.6
	1f	-3.2	-6.1	-1.6	-7.2	0.0	-3.0	-1.5	-5.9
2	2a	-3.0	-7.3	-1.7	-7.5	0.0	-3.8	-1.5	-5.2
	2b	-2.7	-6.0	-1.8	-5.9	0.0	-2.7	-1.2	-4.4
	2c	-2.1	-7.0	-1.7	-7.4	0.0	-4.2	-1.9	-4.8
	2d	-3.7	-11.0	-2.1	-12.0	0.0	-4.2	-2.2	-9.0
	2e	-2.7	-10.9	-1.6	-10.9	0.0	-4.2	-0.3	-8.4
	2f	-2.8	-12.2	-2.1	-12.4	0.0	-3.6	-2.9	-9.9
	2g	-1.8	-4.7	-2.1	-5.9	0.0	-3.3	-1.6	-4.0
	2h	-3.5	-12.1	-2.3	-12.9	0.0	-5.4	-1.9	-10.5
3	3a	-2.3	-10.4	-1.3	-8.3	0.0	-4.3	-2.2	-6.2
	3b	-4.6	-16.8	-2.5	-18.5	0.0	-5.8	-2.6	-13.5
4	4a	-4.2	-16.7	-2.5	-19.4	0.0	-5.6	-2.7	-13.2
	4b	-3.3	-14.3	-1.9	-13.7	0.0	-6.5	-1.3	-8.4
	4c	-4.8	-21.1	-3.5	-24.0	0.0	-5.9	-2.6	-16.4
	4d	-2.8	-9.8	-1.8	-11.5	0.0	-4.7	-2.1	-7.8
	4e	-5.5	-21.4	-1.9	-24.1	0.0	-6.9	-2.6	-16.8
6	6a	-5.0	-27.4	-3.3	-28.1	0.0	-10.1	-2.8	-19.0
	6b	-6.2	-26.5	-3.7	-28.3	0.0	-9.6	-2.7	-20.3
Minimum		-6.2	-27.4	-3.7	-28.3	0.0	-10.1	-2.9	-20.3
High speed passes									
4	4f	-4.5	-19.3	-2.5	-23.1	0.0	-5.1	-2.8	-15.1
	4g	-3.1	-10.9	-1.5	-10.5	0.0	-2.8	-1.5	-7.1
Minimum		-4.5	-19.3	-2.5	-23.1	0.0	-5.1	-2.8	-15.1

Table B.9 Pylon 6W Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6W_T1W S-W26W	SP6W_T1N S-W23N	SP6W_T1E S-W25E	SP6W_T1S S-W24S	SP6W_T4W S-W30W	SP6W_T4N S-W27N	SP6W_T4E S-W29E	SP6W_T4S S-W28S
Slow speed passes									
1	1a	1.6	1.6	1.2	7.7	2.2	1.3	2.8	5.5
	1b	1.2	1.4	1.6	8.1	1.5	2.4	4.0	4.7
	1c	1.0	1.1	2.0	5.4	1.5	1.5	2.3	3.9
	1d	1.4	1.4	2.2	4.9	1.4	1.1	2.5	3.8
	1e	1.2	1.1	1.2	9.4	1.5	2.2	4.2	5.9
	1f	1.1	0.6	1.0	3.4	0.9	0.9	2.1	3.6
2	2a	1.4	2.1	1.5	15.4	0.6	1.8	5.5	10.5
	2b	1.4	1.9	1.7	15.4	1.3	1.8	4.8	10.7
	2c	0.5	2.1	1.5	13.9	1.4	1.7	4.6	9.6
	2d	1.5	2.7	1.4	9.8	2.0	1.6	4.2	6.8
	2e	1.7	1.6	1.2	10.9	2.8	1.3	4.4	7.6
	2f	0.8	2.0	2.9	9.2	1.0	1.5	4.2	5.2
	2g	1.7	2.6	1.8	15.8	1.3	2.1	5.8	10.8
	2h	1.4	1.8	0.8	8.8	1.3	3.3	4.9	6.0
	3a	1.6	2.5	1.7	21.7	1.5	2.1	7.5	13.6
	3b	1.5	1.5	2.0	14.3	1.2	1.1	6.3	9.4
4	4a	1.7	2.3	0.6	24.7	2.2	1.7	8.5	13.7
	4b	1.6	3.3	1.1	28.7	1.7	2.0	8.3	17.7
	4c	2.2	2.3	0.7	19.1	1.7	1.5	6.4	12.2
	4d	0.9	2.7	1.2	27.2	1.9	2.0	7.2	17.4
	4e	1.3	2.1	0.7	16.2	1.7	1.6	5.7	10.0
	6a	2.2	3.5	1.4	35.7	1.6	1.8	12.0	21.0
	6b	1.5	3.2	1.7	34.0	1.9	1.7	10.3	21.7
Maximum		2.2	3.5	2.9	35.7	2.8	3.3	12.0	21.7

High speed passes									
4	4f	1.5	1.5	1.1	14.9	1.8	1.4	5.7	9.6
	4g	1.3	3.7	1.2	26.5	0.9	1.6	4.5	15.8
Maximum		1.5	3.7	1.2	26.5	1.8	1.6	5.7	15.8

Table B.10 Pylon 6W Strain: Minimums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6W_T1W S-W26W	SP6W_T1N S-W23N	SP6W_T1E S-W25E	SP6W_T1S S-W24S	SP6W_T4W S-W30W	SP6W_T4N S-W27N	SP6W_T4E S-W29E	SP6W_T4S S-W28S
Slow speed passes									
1	1a	-1.7	-1.4	-2.9	-10.9	-1.3	-2.4	-7.6	-4.2
	1b	-1.4	-2.1	-1.9	-9.0	-2.3	-1.8	-7.5	-4.1
	1c	-1.8	-1.5	-1.6	-8.0	-1.4	-1.6	-6.1	-4.2
	1d	-1.0	-1.2	-1.1	-6.2	-1.6	-2.2	-5.5	-2.7
	1e	-1.5	-2.1	-3.2	-11.0	-2.4	-2.0	-8.2	-4.1
	1f	-1.2	-1.7	-1.9	-6.6	-2.2	-1.7	-4.4	-3.2
2	2a	-2.1	-1.6	-3.4	-18.2	-4.6	-1.9	-12.0	-5.7
	2b	-2.0	-2.1	-3.4	-19.4	-3.6	-2.6	-12.8	-5.7
	2c	-2.7	-1.6	-3.9	-17.2	-3.4	-2.4	-11.6	-5.4
	2d	-1.1	-0.9	-2.5	-12.8	-2.1	-1.9	-8.0	-4.7
	2e	-1.6	-1.9	-3.1	-13.2	-1.6	-1.7	-8.4	-4.4
	2f	-2.0	-1.6	-1.5	-11.1	-2.5	-2.6	-8.1	-5.6
	2g	-1.7	-1.5	-4.4	-20.0	-4.4	-2.5	-14.1	-6.5
	2h	-1.3	-1.5	-3.0	-10.3	-2.1	-1.0	-6.6	-5.4
3	3a	-2.0	-2.4	-4.2	-27.6	-5.7	-2.3	-19.0	-10.4
	3b	-1.9	-2.1	-2.9	-15.8	-3.2	-2.1	-10.7	-6.4
4	4a	-1.6	-2.8	-5.0	-26.4	-5.4	-3.2	-18.4	-10.5
	4b	-1.9	-2.3	-6.0	-33.0	-6.0	-3.0	-23.5	-11.0
	4c	-1.3	-2.0	-4.1	-22.0	-3.3	-1.8	-15.5	-7.7
	4d	-2.4	-2.5	-5.5	-34.5	-6.1	-3.5	-23.7	-9.6
	4e	-1.7	-2.0	-3.6	-19.7	-3.0	-2.0	-13.1	-7.7
6	6a	-2.2	-2.7	-6.6	-41.7	-7.3	-3.7	-27.3	-15.1
	6b	-2.3	-3.2	-5.7	-41.5	-7.4	-3.5	-28.1	-14.2
Minimum		-2.7	-3.2	-6.6	-41.7	-7.4	-3.7	-28.1	-15.1

High speed passes									
4	4f	-1.3	-1.8	-3.2	-19.6	-2.4	-2.3	-11.8	-6.2
	4g	-2.4	-2.0	-5.1	-31.5	-6.3	-3.2	-22.9	-8.9
Minimum		-2.4	-2.0	-5.1	-31.5	-6.3	-3.2	-22.9	-8.9

Table B.11 East Edge Girder – Top Strain: Maximums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108T S-E1	SDE_101T S-E3	SDE_210T S-E5	SDE_CJT S-E7	SDE_315T S-E9	SDE_310T S-E11	SDE_305T S-E13	SDE_301T S-E15	SDE_404T S-E17	SDE_408T S-E19	SDE_412T S-E21
Slow speed passes												
1	1a	2.5	1.7	1.7	1.9	1.0	1.9	1.6	2.5	1.6	0.9	1.7
	1b	2.5	2.1	1.8	1.8	3.1	1.8	1.6	3.8	1.7	1.9	1.7
	1c	1.6	1.4	2.3	1.1	3.2	3.2	3.2	6.0	2.3	1.6	2.1
	1d	2.2	1.7	1.2	3.1	2.4	3.4	3.3	6.7	1.9	2.0	1.5
	1e	1.1	1.3	1.7	2.0	4.1	2.8	2.6	1.9	1.6	2.3	1.4
	1f	1.9	2.2	2.4	2.2	3.6	2.1	3.3	8.0	2.4	2.4	1.5
2	2a	1.5	2.8	1.6	2.1	2.1	2.0	3.7	5.0	2.1	1.7	2.9
	2b	2.2	2.3	2.3	1.3	2.3	2.6	2.5	4.3	1.8	1.7	2.5
	2c	1.6	2.1	2.3	2.3	2.4	1.7	2.3	5.2	1.7	0.9	3.8
	2d	2.2	1.1	2.7	2.4	4.0	2.1	3.4	12.6	3.0	1.4	4.1
	2e	2.1	1.6	2.8	2.4	4.0	1.5	3.6	9.5	3.1	1.0	4.2
	2f	0.0	1.7	2.3	2.9	4.8	2.9	4.1	11.6	4.3	2.1	4.4
	2g	2.3	2.4	1.8	2.8	3.1	2.4	3.2	3.6	1.4	2.4	3.0
	2h	3.0	1.3	3.7	3.4	4.4	2.6	4.9	14.2	4.2	2.2	4.1
3	3a	2.0	2.8	3.0	3.0	3.1	4.3	3.5	5.9	2.1	2.5	3.9
	3b	2.0	1.4	3.5	3.5	5.2	2.9	7.2	19.1	5.4	1.9	5.0
4	4a	2.5	2.0	2.7	2.6	3.0	4.0	4.0	16.9	5.0	2.8	6.8
	4b	2.2	2.9	3.0	2.2	2.6	2.3	3.1	7.7	2.3	2.1	5.5
	4c	3.1	2.1	3.5	3.9	5.8	2.9	5.2	20.6	5.7	1.2	7.1
	4d	1.8	3.5	2.7	2.7	2.4	2.3	2.4	4.9	1.1	2.5	5.1
	4e	1.6	0.8	4.0	3.8	6.6	3.8	5.3	21.9	5.3	1.6	6.0
6	6a	2.6	1.9	4.6	3.9	4.6	5.1	5.6	23.4	7.7	4.8	9.0
	6b	3.9	2.4	5.4	4.0	6.6	4.6	6.2	22.2	6.9	2.7	8.7
Maximum		3.9	3.5	5.4	4.0	6.6	5.1	7.2	23.4	7.7	4.8	9.0

High speed passes												
4	4f	2.1	2.6	3.7	4.0	5.3	3.8	4.6	19.7	5.4	1.2	7.1
	4g	2.8	3.0	2.1	2.6	3.2	2.3	3.0	4.6	3.2	1.9	5.7
Maximum		2.8	3.0	3.7	4.0	5.3	3.8	4.6	19.7	5.4	1.9	7.1

Table B.12 East Edge Girder – Top Strain: Minimums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108T S-E1	SDE_101T S-E3	SDE_210T S-E5	SDE_CJT S-E7	SDE_315T S-E9	SDE_310T S-E11	SDE_305T S-E13	SDE_301T S-E15	SDE_404T S-E17	SDE_408T S-E19	SDE_412T S-E21
Slow speed passes												
1	1a	-0.9	-3.7	-2.0	-1.2	-3.4	-3.2	-2.9	-1.8	-1.0	-2.3	-4.2
	1b	-2.5	-5.3	-2.6	-3.2	-2.9	-4.2	-5.6	-2.0	-2.4	-3.6	-6.5
	1c	-6.3	-8.0	-5.6	-8.7	-7.0	-5.0	-6.6	-2.7	-5.9	-6.0	-10.6
	1d	-7.7	-9.5	-9.1	-10.0	-11.0	-7.7	-10.0	-4.0	-8.9	-8.2	-14.6
	1e	-3.0	-3.6	-2.7	-1.5	-2.0	-3.4	-1.8	-1.7	-1.5	-1.8	-2.4
	1f	-9.1	-10.1	-10.5	-13.0	-11.6	-10.5	-12.8	-3.8	-10.1	-9.9	-16.3
2	2a	-2.4	-7.4	-2.7	-3.3	-2.9	-2.3	-4.2	-2.5	-2.6	-3.2	-8.3
	2b	-1.8	-6.2	-1.8	-1.8	-2.8	-2.2	-3.0	-2.2	-1.3	-2.1	-5.8
	2c	-3.7	-8.5	-3.2	-3.8	-4.1	-3.6	-4.7	-2.8	-3.1	-3.9	-7.5
	2d	-13.4	-17.1	-14.1	-17.6	-17.2	-14.8	-17.9	-4.4	-13.8	-14.5	-22.5
	2e	-6.0	-12.8	-6.7	-9.9	-8.7	-8.0	-8.6	-4.1	-6.5	-7.9	-13.9
	2f	0.0	-17.0	-9.8	-12.9	-13.7	-11.5	-11.1	-5.5	-8.4	-8.8	-15.9
	2g	-1.5	-6.4	-2.8	-2.2	-3.8	-4.5	-1.9	-3.0	-2.6	-3.0	-4.5
	2h	-16.5	-19.2	-17.5	-21.5	-22.5	-18.6	-20.5	-5.5	-17.0	-17.4	-28.5
3	3a	-2.1	-10.3	-1.9	-2.2	-2.3	-3.5	-5.3	-3.2	-2.7	-1.6	-10.8
	3b	-21.1	-25.9	-24.5	-27.8	-29.1	-23.7	-27.5	-6.9	-22.8	-21.9	-37.4
4	4a	-14.1	-23.5	-16.4	-20.9	-21.0	-15.7	-21.3	-4.5	-15.1	-14.6	-30.9
	4b	-2.0	-13.3	-2.7	-3.4	-3.8	-3.4	-4.1	-4.3	-2.9	-3.1	-12.9
	4c	-12.9	-27.2	-16.7	-21.5	-21.8	-15.9	-18.7	-7.5	-14.4	-16.0	-28.5
	4d	-2.6	-9.7	-2.9	-2.1	-3.8	-3.0	-4.0	-3.9	-2.8	-1.9	-7.4
	4e	-9.7	-31.0	-11.1	-17.1	-16.8	-13.0	-14.1	-8.7	-10.4	-10.9	-21.9
6	6a	-21.9	-35.0	-22.5	-29.8	-28.5	-22.8	-31.9	-8.0	-21.9	-21.1	-47.1
	6b	-22.0	-36.3	-24.1	-31.2	-30.3	-25.4	-32.9	-9.8	-26.3	-24.0	-48.0
Minimum		-22.0	-36.3	-24.5	-31.2	-30.3	-25.4	-32.9	-9.8	-26.3	-24.0	-48.0

High speed passes												
4	4f	-7.7	-27.4	-8.1	-12.9	-14.5	-9.5	-11.1	-7.7	-8.2	-9.4	-19.2
	4g	-2.1	-11.1	-3.0	-3.3	-3.2	-3.5	-3.5	-3.6	-2.9	-2.5	-8.0
Minimum		-7.7	-27.4	-8.1	-12.9	-14.5	-9.5	-11.1	-7.7	-8.2	-9.4	-19.2

Table B.13 East Edge Girder – Bottom Strain: Maximums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108B S-E2	SDE_101B S-E4	SDE_210B S-E6	SDE_CJB S-E8	SDE_315B S-E10	SDE_E310B S-E12	SDE_305B S-E14	SDE_301B S-E16	SDE_404B S-E18	SDE_408B S-E20	SDE_412B S-E22
Slow speed passes												
1	1a	9.0	1.8	10.1	11.2	9.7	7.8	6.5	1.5	5.8	8.9	14.5
	1b	13.1	3.8	14.1	16.5	14.8	12.0	10.3	1.4	8.1	14.0	17.0
	1c	18.6	5.4	20.3	23.5	21.9	15.4	15.0	1.2	13.1	20.4	22.4
	1d	22.0	7.5	24.1	30.2	25.4	18.9	18.5	1.3	17.5	24.6	26.9
	1e	6.9	2.0	7.6	9.4	7.9	4.7	4.9	1.8	3.7	5.7	10.7
	1f	27.0	7.6	28.2	32.4	29.6	23.5	20.6	1.5	18.8	27.6	29.6
2	2a	17.7	4.5	22.4	25.9	23.0	17.0	16.2	1.5	12.8	20.3	29.5
	2b	13.6	3.0	14.9	19.2	17.4	11.5	9.8	1.8	7.6	14.1	22.4
	2c	20.2	5.7	20.6	25.8	23.6	17.3	13.1	1.6	11.6	20.0	27.4
	2d	40.1	10.8	42.5	54.7	47.9	36.5	33.2	1.4	28.4	44.0	49.7
	2e	26.4	8.1	27.2	37.2	33.3	24.3	20.6	1.6	18.4	29.6	36.7
	2f	30.7	11.2	30.8	43.5	39.0	27.2	23.7	2.0	20.7	32.6	37.9
	2g	14.3	2.0	16.1	19.5	17.9	12.3	12.5	2.4	8.5	14.0	23.0
	2h	48.4	13.6	50.0	61.7	55.3	42.5	40.3	1.3	35.0	51.7	55.6
3	3a	25.2	5.8	30.0	35.9	31.8	22.0	20.1	3.6	15.9	26.2	44.1
	3b	61.7	16.6	69.2	83.1	75.3	56.6	51.5	2.0	43.4	68.3	79.1
4	4a	58.9	14.4	62.2	78.4	72.0	53.3	48.3	1.2	40.2	63.1	80.5
	4b	23.8	7.1	29.6	41.9	37.1	24.0	19.0	3.1	15.9	29.7	52.6
	4c	53.9	19.3	60.4	79.2	68.7	45.3	39.4	1.5	34.2	58.4	78.8
	4d	19.1	4.8	20.0	28.9	27.1	15.5	11.7	2.3	8.1	17.7	33.2
	4e	37.8	20.6	40.6	60.9	56.2	34.6	29.6	2.0	21.9	44.2	59.3
6	6a	85.7	20.5	92.5	115.2	107.7	80.1	71.4	1.9	57.6	95.0	128.7
	6b	90.1	23.3	95.9	119.3	109.5	79.9	71.6	2.9	60.6	94.4	131.5
Maximum		90.1	23.3	95.9	119.3	109.5	80.1	71.6	3.6	60.6	95.0	131.5

High speed passes												
4	4f	30.7	15.8	27.4	50.3	46.9	30.5	24.7	2.4	13.2	35.2	47.3
	4g	18.0	4.4	15.9	25.4	22.6	12.1	8.2	3.4	8.0	15.7	30.6
Maximum		30.7	15.8	27.4	50.3	46.9	30.5	24.7	3.4	13.2	35.2	47.3

Table B.14 East Edge Girder – Bottom Strain: Minimums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108B S-E2	SDE_101B S-E4	SDE_210B S-E6	SDE_CJB S-E8	SDE_315B S-E10	SDE_E310B S-E12	SDE_305B S-E14	SDE_301B S-E16	SDE_404B S-E18	SDE_408B S-E20	SDE_412B S-E22
Slow speed passes												
1	1a	-4.3	-2.3	-4.0	-2.7	-3.6	-3.5	-3.9	-3.9	-3.7	-3.0	-4.8
	1b	-4.8	-2.1	-4.5	-2.4	-3.7	-4.4	-5.7	-5.7	-5.6	-4.1	-7.8
	1c	-7.4	-3.0	-7.7	-2.4	-5.7	-6.9	-7.5	-6.8	-7.6	-5.2	-8.3
	1d	-8.3	-2.3	-8.5	-2.1	-6.4	-8.1	-9.4	-8.1	-8.1	-6.5	-8.6
	1e	-5.4	-3.2	-3.9	-1.7	-3.1	-3.9	-3.0	-3.0	-3.5	-3.7	-5.6
	1f	-8.2	-3.3	-8.5	-2.4	-6.8	-7.9	-9.5	-9.2	-9.1	-7.1	-9.2
2	2a	-8.2	-2.9	-7.7	-3.8	-7.3	-6.8	-6.7	-7.1	-8.9	-6.2	-10.7
	2b	-8.3	-2.4	-6.0	-3.8	-5.3	-5.2	-6.0	-5.6	-7.6	-5.0	-10.6
	2c	-6.5	-3.0	-8.5	-3.7	-7.3	-6.5	-9.5	-7.7	-9.9	-6.5	-10.7
	2d	-10.8	-4.8	-14.1	-3.0	-11.8	-12.9	-15.1	-13.9	-15.4	-10.7	-14.8
	2e	-10.2	-4.5	-12.2	-3.2	-10.4	-11.4	-12.4	-11.8	-13.1	-9.0	-14.3
	2f	-12.2	-5.0	-14.6	-5.0	-12.0	-13.2	-15.6	-13.8	-15.3	-12.2	-15.4
	2g	-6.7	-4.5	-6.4	-4.1	-5.0	-5.7	-5.4	-5.4	-7.8	-5.7	-11.7
	2h	-12.6	-4.4	-15.2	-4.2	-13.0	-14.5	-16.0	-16.0	-16.4	-11.2	-16.5
3	3a	-9.4	-3.1	-9.8	-4.2	-9.9	-9.7	-10.1	-8.6	-12.3	-9.1	-13.4
	3b	-17.4	-7.5	-19.8	-6.1	-17.8	-19.3	-22.5	-21.8	-22.1	-15.7	-22.9
4	4a	-15.3	-6.1	-21.1	-6.9	-17.2	-19.2	-21.7	-21.3	-21.5	-16.9	-32.1
	4b	-13.1	-4.9	-14.8	-5.3	-12.5	-12.8	-13.3	-11.8	-16.1	-12.7	-23.5
	4c	-18.2	-8.1	-24.6	-5.6	-21.8	-24.7	-27.5	-24.6	-26.5	-20.2	-30.5
	4d	-11.5	-3.8	-11.6	-4.9	-8.8	-10.2	-10.2	-9.1	-12.1	-9.7	-24.2
	4e	-21.2	-7.9	-24.5	-5.9	-20.1	-24.4	-25.9	-25.9	-24.3	-20.9	-33.9
6	6a	-25.4	-7.8	-29.6	-8.6	-25.4	-27.3	-30.9	-29.6	-32.3	-21.9	-46.1
	6b	-24.2	-6.9	-30.2	-8.4	-26.0	-29.7	-32.5	-30.8	-32.3	-24.5	-48.2
Minimum		-25.4	-8.1	-30.2	-8.6	-26.0	-29.7	-32.5	-30.8	-32.3	-24.5	-48.2

High speed passes												
4	4f	-19.9	-8.5	-23.1	-8.1	-18.7	-21.6	-26.0	-23.6	-22.2	-21.7	-32.8
	4g	-10.3	-4.5	-12.2	-8.2	-9.0	-9.9	-9.9	-8.6	-11.0	-11.5	-23.0
Minimum		-19.9	-8.5	-23.1	-8.2	-18.7	-21.6	-26.0	-23.6	-22.2	-21.7	-32.8

Table B.15 West Edge Girder – Top Strain: Maximums

No. of trucks	Pass	Strain sensor (με) SDW_108T S-W1	SDW_101T S-W3	SDW_210T S-W5	SDW_CJT S-W7	SDW_315T S-W9	SDW_310T S-W11	SDW_305T S-W13	SDW_301T S-W15	SDW_404T S-W17	SDW_408T S-W19	SDW_412T S-W21
Slow speed passes												
1	1a	1.3	6.7	2.0	3.0	1.8	1.9	2.8	8.0	2.0	1.9	3.4
	1b	2.4	6.6	2.2	2.3	2.0	1.2	3.6	7.1	1.7	1.4	2.3
	1c	1.5	4.0	2.2	1.5	2.4	1.9	1.5	4.5	0.7	2.6	2.7
	1d	1.8	3.0	2.4	1.8	3.6	2.0	1.4	3.1	1.0	1.5	2.5
	1e	1.6	7.5	2.6	2.9	3.0	1.6	1.9	8.1	2.2	2.2	3.8
	1f	2.5	1.8	1.5	1.5	1.7	1.9	2.3	3.1	1.3	2.3	3.0
2	2a	2.0	11.8	3.0	2.5	4.1	1.9	3.3	14.0	3.3	2.1	5.3
	2b	1.9	11.0	3.0	3.8	5.0	1.9	2.8	14.1	3.9	3.2	4.4
	2c	1.5	10.6	2.6	2.8	4.2	1.7	1.8	10.2	2.1	1.0	4.0
	2d	1.4	7.3	1.9	3.1	2.8	1.7	1.7	7.6	1.2	0.7	4.4
	2e	1.4	6.3	1.9	2.5	2.8	2.3	2.2	7.3	0.7	1.1	3.9
	2f	1.4	4.8	2.3	2.2	3.2	2.3	2.1	4.9	0.8	2.0	3.5
	2g	3.0	14.1	4.6	3.6	4.3	3.2	4.9	15.9	4.0	2.7	6.3
	2h	2.0	4.3	1.6	2.5	3.8	2.4	2.8	5.0	1.2	1.2	3.5
3	3a	2.7	19.9	4.4	3.7	5.7	2.7	4.9	22.2	6.0	2.6	6.7
	3b	2.2	7.9	3.0	2.6	4.9	3.1	1.8	9.5	1.0	2.5	4.8
4	4a	2.1	16.7	3.3	3.7	5.4	3.5	5.2	20.2	3.7	2.1	7.2
	4b	1.1	22.6	3.9	4.6	4.7	2.7	4.2	25.3	6.1	3.2	7.6
	4c	1.8	9.7	2.2	3.7	3.3	3.0	2.8	11.3	1.7	2.2	6.6
	4d	2.1	21.2	3.5	4.0	5.7	2.9	4.1	23.2	3.4	2.3	8.6
	4e	1.8	8.4	1.9	2.9	3.8	2.4	1.8	8.8	1.2	2.6	6.7
6	6a	2.1	26.0	4.7	4.1	6.1	3.7	3.7	30.1	7.5	4.7	10.5
	6b	3.6	27.7	4.9	5.3	7.7	3.9	4.9	28.6	5.2	2.9	9.9
Maximum		3.6	27.7	4.9	5.3	7.7	3.9	5.2	30.1	7.5	4.7	10.5

High speed passes												
4	4f	1.2	5.8	1.6	3.8	3.0	3.2	3.1	7.7	1.8	1.5	7.2
	4g	1.1	19.1	3.7	4.7	5.3	3.2	2.8	21.6	2.2	2.5	7.7
Maximum		1.2	19.1	3.7	4.7	5.3	3.2	3.1	21.6	2.2	2.5	7.7

Table B.16 West Edge Girder – Top Strain: Minimums

No. of trucks	Pass	Strain sensor (με)										
		SDW_108T S-W1	SDW_101T S-W3	SDW_210T S-W5	SDW_CJT S-W7	SDW_315T S-W9	SDW_310T S-W11	SDW_305T S-W13	SDW_301T S-W15	SDW_404T S-W17	SDW_408T S-W19	SDW_412T S-W21
Slow speed passes												
1	1a	-9.4	-3.5	-11.4	-12.3	-13.0	-11.3	-11.4	-3.6	-9.0	-9.2	-16.4
	1b	-6.5	-2.6	-8.4	-8.9	-10.1	-9.5	-7.0	-3.6	-6.7	-7.9	-13.7
	1c	-3.6	-2.9	-3.8	-5.7	-4.4	-4.6	-5.1	-3.0	-3.8	-3.0	-7.3
	1d	-2.0	-2.1	-2.3	-2.7	-2.8	-2.7	-3.8	-2.6	-1.7	-2.4	-5.7
	1e	-10.7	-3.7	-13.0	-13.7	-14.5	-13.5	-12.5	-4.5	-10.4	-10.6	-18.1
	1f	-0.8	-2.5	-2.1	-2.4	-3.2	-1.6	-1.5	-2.1	-1.8	-1.7	-4.1
2	2a	-15.6	-5.7	-17.6	-20.8	-20.0	-18.5	-19.0	-6.2	-15.8	-15.6	-27.4
	2b	-9.2	-5.7	-13.0	-14.0	-13.5	-12.7	-12.7	-5.7	-9.7	-10.9	-20.8
	2c	-8.7	-4.0	-10.9	-12.1	-11.1	-10.9	-10.8	-6.6	-7.7	-8.8	-16.8
	2d	-4.1	-2.5	-5.2	-4.8	-5.2	-5.3	-7.2	-3.2	-5.7	-5.5	-12.2
	2e	-3.6	-3.0	-4.8	-6.8	-6.9	-5.5	-6.0	-5.2	-4.9	-5.7	-12.1
	2f	-2.8	-2.5	-2.8	-4.1	-4.9	-3.2	-4.6	-3.5	-2.9	-2.8	-8.0
	2g	-18.5	-5.7	-23.8	-26.2	-24.9	-21.8	-22.3	-7.1	-18.8	-19.9	-32.1
	2h	-1.9	-3.3	-3.1	-2.8	-2.8	-2.3	-3.4	-4.1	-2.6	-2.9	-9.3
3	3a	-24.3	-7.0	-30.2	-33.5	-31.8	-29.9	-30.5	-8.1	-25.3	-25.0	-45.5
	3b	-4.4	-4.1	-6.4	-6.3	-5.0	-5.7	-10.3	-4.7	-6.3	-4.6	-16.4
4	4a	-19.2	-7.0	-22.8	-25.9	-24.2	-22.3	-25.1	-7.0	-20.2	-20.0	-40.0
	4b	-16.7	-8.9	-21.0	-24.9	-23.7	-19.1	-19.6	-9.4	-15.8	-16.4	-36.5
	4c	-4.9	-4.5	-6.3	-7.8	-7.1	-5.8	-7.2	-5.6	-5.9	-5.9	-18.1
	4d	-12.5	-9.6	-15.5	-20.0	-18.8	-15.0	-12.6	-10.0	-11.3	-11.1	-25.1
	4e	-1.8	-3.6	-2.9	-4.9	-3.8	-3.8	-5.5	-4.7	-3.4	-3.4	-12.5
6	6a	-30.8	-10.4	-34.1	-41.0	-35.4	-34.9	-39.9	-10.4	-28.7	-26.8	-59.1
	6b	-27.4	-9.4	-33.2	-38.3	-35.0	-34.1	-36.6	-11.7	-31.5	-29.0	-58.8
Minimum		-30.8	-10.4	-34.1	-41.0	-35.4	-34.9	-39.9	-11.7	-31.5	-29.0	-59.1

High speed passes												
4	4f	-2.3	-3.2	-2.4	-3.0	-4.1	-2.6	-4.5	-6.1	-3.8	-4.0	-9.7
	4g	-12.0	-8.5	-12.1	-15.0	-14.5	-11.6	-11.1	-10.2	-9.8	-10.1	-21.8
Minimum		-12.0	-8.5	-12.1	-15.0	-14.5	-11.6	-11.1	-10.2	-9.8	-10.1	-21.8

Table B.17 West Edge Girder – Bottom Strain: Maximums

No. of trucks	Pass	Strain sensor (με)									
		SDW_108B S-W2	SDW_101B S-W4	SDW_210B S-W6	SDW_CJB S-W8	SDW_315B S-W10	SDW_310B S-W12	SDW_305B S-W14	SDW_404B S-W18	SDW_408B S-W20	SDW_412B S-W22
Slow speed passes											
1	1a	31.8	0.6	28.9	32.8	29.6	23.3	19.8	15.8	27.9	29.9
	1b	25.4	1.7	26.0	27.7	24.7	19.3	16.9	12.6	22.0	26.4
	1c	18.9	1.5	18.0	21.8	17.7	13.6	10.0	8.6	15.4	18.9
	1d	13.2	0.8	13.7	15.9	13.1	11.1	7.9	6.2	12.4	15.0
	1e	34.6	1.4	32.0	36.2	31.4	25.9	20.6	18.1	30.9	32.8
	1f	10.3	1.7	10.0	13.1	10.5	7.1	6.1	4.9	9.0	12.3
2	2a	55.9	1.7	53.2	59.8	54.9	41.4	33.9	28.4	49.3	54.6
	2b	41.5	2.2	37.8	45.9	39.7	29.8	23.4	18.4	37.1	43.8
	2c	39.6	0.9	34.7	41.5	36.5	26.2	20.4	15.8	30.9	36.6
	2d	29.6	2.2	29.5	33.4	29.4	20.5	17.9	14.1	25.4	33.1
	2e	25.6	1.9	24.2	30.7	27.3	18.3	15.8	12.3	25.5	32.5
	2f	20.9	2.0	19.4	26.9	22.6	15.6	12.1	8.3	16.7	23.7
	2g	64.2	1.5	59.0	66.9	62.6	47.0	42.1	33.4	57.5	61.8
	2h	23.0	2.8	23.9	26.6	22.3	16.9	14.0	10.6	18.7	28.3
3	3a	89.2	1.6	85.7	93.6	87.0	67.6	57.5	46.2	81.3	92.5
	3b	40.6	2.2	40.8	45.4	40.5	29.2	24.0	18.3	34.3	47.4
4	4a	83.9	1.1	82.1	90.8	85.9	65.2	56.0	42.5	76.4	91.1
	4b	66.6	1.5	65.9	82.8	72.7	49.8	38.6	32.8	64.2	89.1
	4c	43.3	2.6	44.7	52.8	46.0	30.1	22.9	18.0	37.4	59.0
	4d	56.4	1.8	49.9	66.0	57.8	35.9	26.1	21.8	46.4	59.4
	4e	28.0	2.2	27.1	36.1	32.0	18.4	15.2	9.5	22.4	41.2
6	6a	128.8	2.4	126.6	138.0	132.1	97.8	82.5	65.2	116.4	148.9
	6b	126.1	1.7	123.0	135.0	127.2	96.7	81.1	63.7	114.6	150.9
Maximum		128.8	2.8	126.6	138.0	132.1	97.8	82.5	65.2	116.4	150.9

High speed passes											
4	4f	23.6	4.1	19.0	31.4	27.5	17.9	13.2	6.3	19.0	32.3
	4g	44.8	1.6	41.4	53.8	43.4	24.0	18.4	19.7	40.3	50.1
Maximum		44.8	4.1	41.4	53.8	43.4	24.0	18.4	19.7	40.3	50.1

Table B.18 West Edge Girder – Bottom Strain: Minimums

No. of trucks	Pass	Strain sensor (με) SDW_108B S-W2	SDW_101B S-W4	SDW_210B S-W6	SDW_CJB S-W8	SDW_315B S-W10	SDW_310B S-W12	SDW_305B S-W14	SDW_404B S-W18	SDW_408B S-W20	SDW_412B S-W22
Slow speed passes											
1	1a	-7.6	-10.5	-9.8	-4.0	-6.9	-9.6	-9.8	-8.2	-6.2	-7.6
	1b	-7.7	-8.2	-8.9	-3.4	-5.9	-7.7	-8.3	-7.2	-6.9	-7.0
	1c	-5.2	-6.1	-6.7	-1.8	-4.8	-5.6	-7.4	-5.9	-4.0	-7.0
	1d	-5.3	-5.7	-5.0	-2.5	-4.1	-4.2	-6.4	-4.9	-3.1	-7.2
	1e	-8.6	-10.0	-10.5	-3.9	-8.8	-8.9	-12.0	-8.7	-7.2	-8.6
	1f	-4.3	-3.9	-4.7	-2.4	-3.5	-4.0	-5.1	-5.0	-3.4	-6.2
2	2a	-14.1	-16.3	-15.7	-5.1	-11.2	-14.5	-17.9	-15.4	-10.9	-14.9
	2b	-14.9	-16.3	-17.0	-4.4	-12.9	-14.8	-18.4	-15.4	-12.1	-15.2
	2c	-12.8	-14.6	-14.9	-5.2	-11.9	-13.4	-16.3	-13.5	-10.9	-14.7
	2d	-8.9	-9.1	-10.2	-3.5	-7.6	-9.3	-11.3	-10.3	-7.1	-12.3
	2e	-9.7	-9.9	-10.7	-4.0	-8.6	-10.6	-11.1	-10.7	-6.7	-12.3
	2f	-8.9	-7.5	-9.5	-3.0	-6.5	-8.7	-9.1	-8.5	-5.8	-11.2
	2g	-15.2	-18.8	-20.0	-5.3	-13.0	-17.7	-18.0	-16.5	-12.6	-17.5
	2h	-7.6	-6.5	-7.7	-4.0	-7.3	-7.3	-8.1	-8.9	-7.4	-10.0
3	3a	-21.4	-25.3	-24.8	-6.4	-19.4	-23.0	-25.4	-23.2	-16.2	-22.4
	3b	-12.5	-12.9	-14.2	-5.8	-11.1	-11.5	-14.5	-14.4	-9.0	-18.2
4	4a	-23.6	-25.6	-26.6	-7.0	-19.1	-22.2	-24.1	-24.5	-19.1	-35.0
	4b	-27.2	-28.3	-30.9	-7.1	-23.2	-27.2	-30.6	-27.7	-20.5	-30.8
	4c	-17.3	-16.7	-18.6	-7.1	-15.0	-16.0	-18.9	-18.5	-12.7	-24.0
	4d	-28.9	-27.6	-30.4	-6.1	-22.2	-27.7	-29.6	-24.3	-22.8	-36.0
	4e	-14.7	-13.2	-14.4	-5.4	-12.1	-13.3	-15.1	-15.2	-12.0	-23.5
6	6a	-34.7	-38.5	-39.1	-10.0	-29.3	-33.2	-39.1	-36.3	-26.2	-51.3
	6b	-33.1	-37.4	-37.1	-9.6	-28.8	-32.5	-37.4	-35.3	-26.9	-50.8
Minimum		-34.7	-38.5	-39.1	-10.0	-29.3	-33.2	-39.1	-36.3	-26.9	-51.3

High speed passes											
4	4f	-15.1	-12.0	-14.9	-6.6	-11.1	-12.6	-14.5	-14.7	-12.7	-23.6
	4g	-28.8	-29.6	-27.2	-8.7	-20.0	-26.4	-28.2	-17.0	-22.1	-31.9
Minimum		-28.8	-29.6	-27.2	-8.7	-20.0	-26.4	-28.2	-17.0	-22.1	-31.9

Table B.19 Deck Strain: Maximums

No. of trucks	Pass	Strain sensor (με)	
		SDC_210N S-C1	SDC_210S S-C2
Slow speed passes			
1	1a	1.6	1.9
	1b	2.2	2.5
	1c	1.5	1.4
	1d	1.8	1.4
	1e	1.4	1.9
	1f	1.6	1.4
2	2a	2.3	1.8
	2b	1.7	1.4
	2c	2.2	1.9
	2d	2.1	1.1
	2e	2.2	2.0
	2f	1.3	1.9
	2g	2.6	1.6
	2h	2.4	1.3
3	3a	2.8	2.5
	3b	3.0	2.2
4	4a	4.2	2.6
	4b	2.5	3.5
	4c	2.8	1.9
	4d	2.8	1.5
	4e	2.8	2.0
6	6a	4.9	4.1
	6b	4.2	4.4
Maximum		4.9	4.4

High speed passes			
4	4f	2.1	1.4
	4g	1.4	2.0
Maximum		2.1	2.0

Table B.20 Deck Strain: Minimums

No. of trucks	Pass	Strain sensor (με)	
		SDC_210N S-C1	SDC_210S S-C2
Slow speed passes			
1	1a	-5.9	-4.8
	1b	-9.7	-7.7
	1c	-18.1	-13.2
	1d	-9.3	-7.0
	1e	-4.0	-2.7
	1f	-6.4	-4.6
2	2a	-14.8	-12.3
	2b	-6.3	-5.4
	2c	-10.3	-8.0
	2d	-22.3	-17.1
	2e	-16.9	-13.2
	2f	-9.8	-6.9
	2g	-9.4	-8.6
	2h	-14.9	-12.2
3	3a	-19.5	-14.5
	3b	-30.5	-23.9
4	4a	-39.0	-31.2
	4b	-14.3	-10.2
	4c	-23.6	-18.9
	4d	-7.0	-5.5
	4e	-10.9	-8.3
6	6a	-47.1	-40.6
	6b	-48.2	-38.5
Minimum		-48.2	-40.6

High speed passes			
4	4f	-8.8	-7.4
	4g	-6.0	-4.7
Minimum		-8.8	-7.4

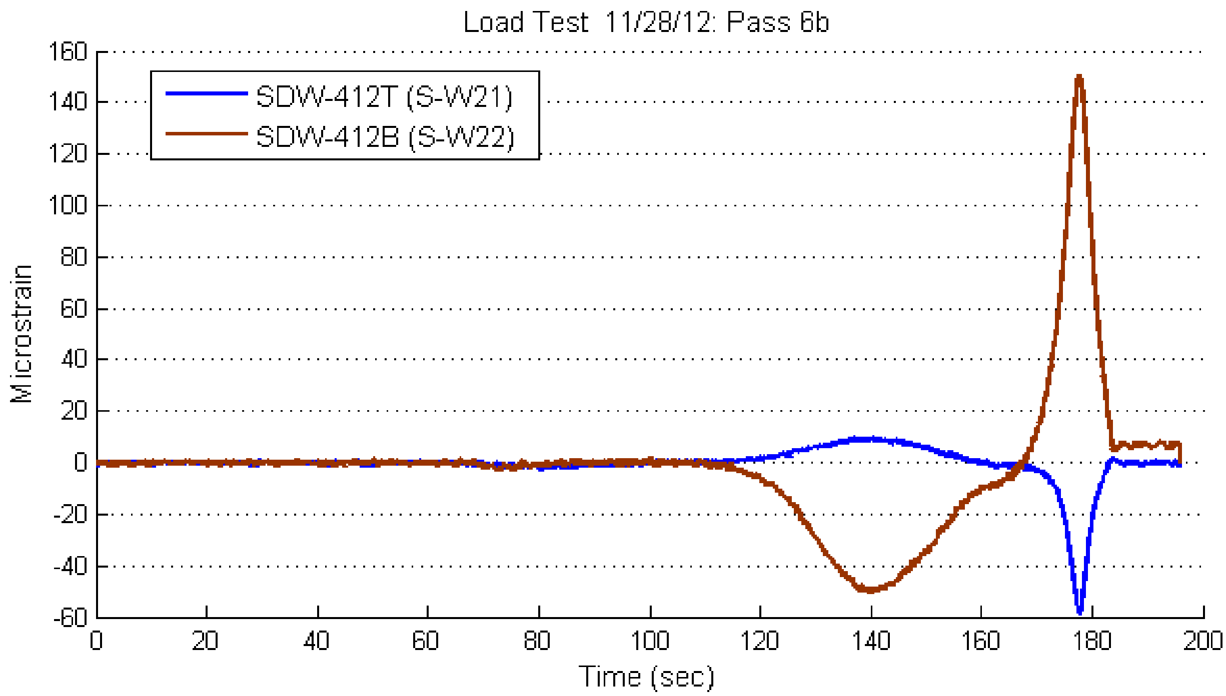


Figure B.1 Edge girder strain time history - section 412

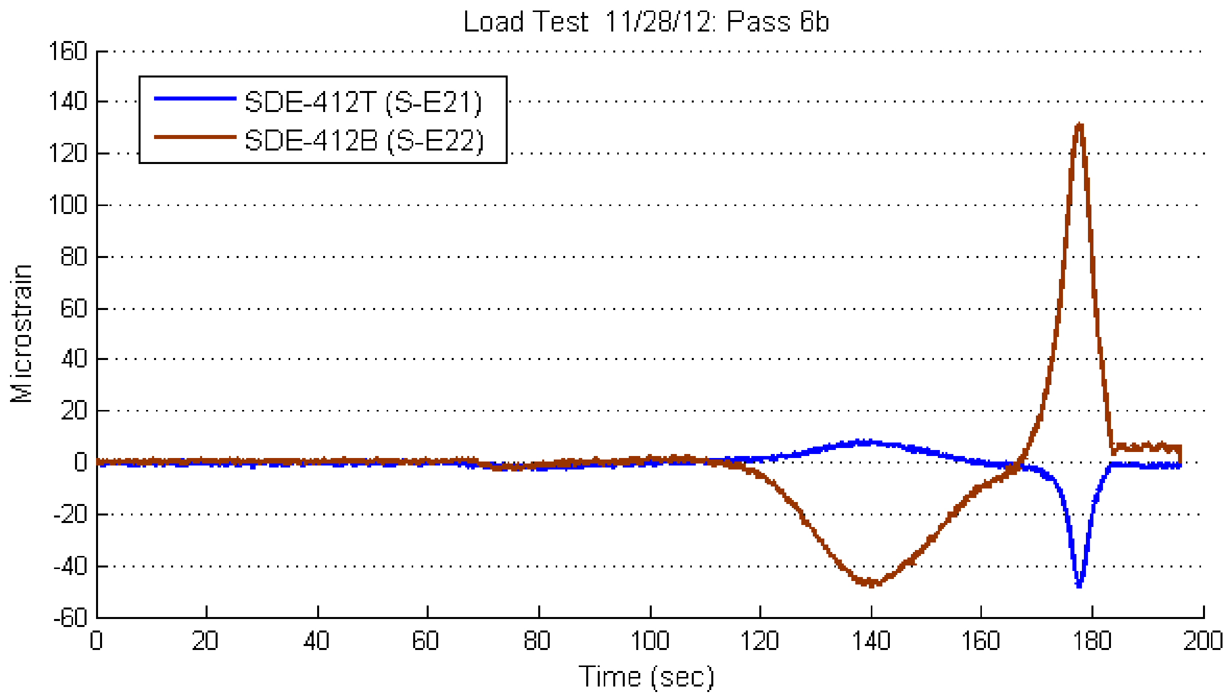


Figure B.2 Edge girder strain time history - section 412

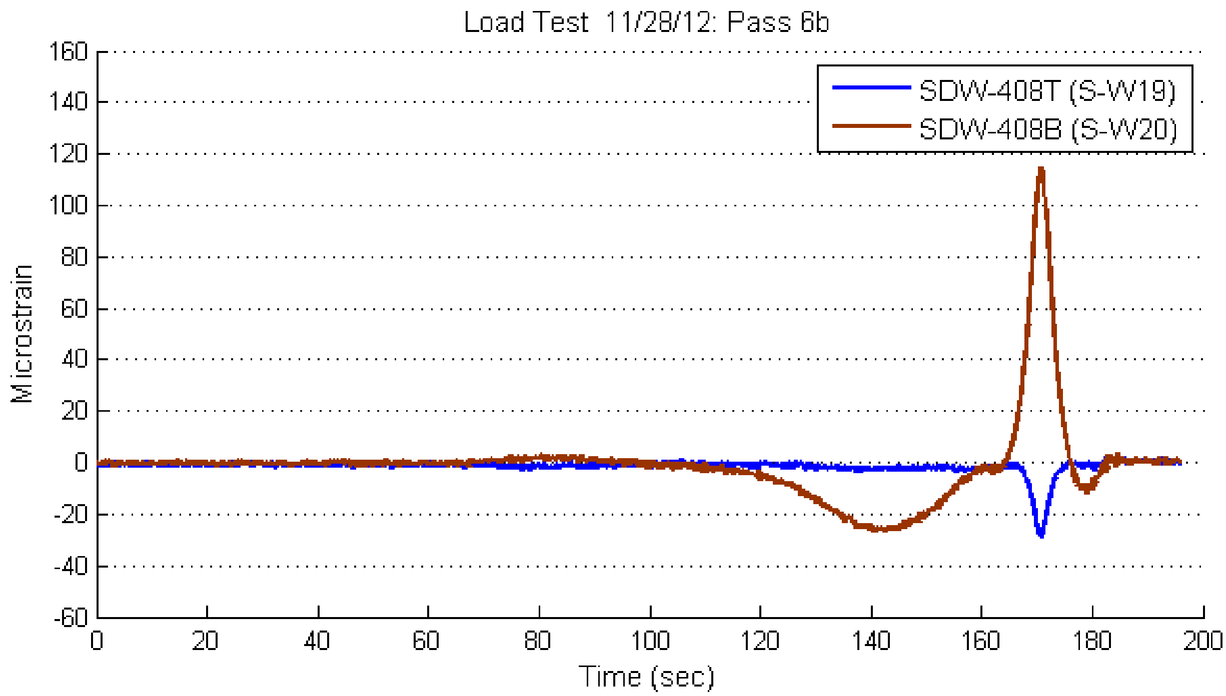


Figure B.3 West edge girder strain time history - section 408

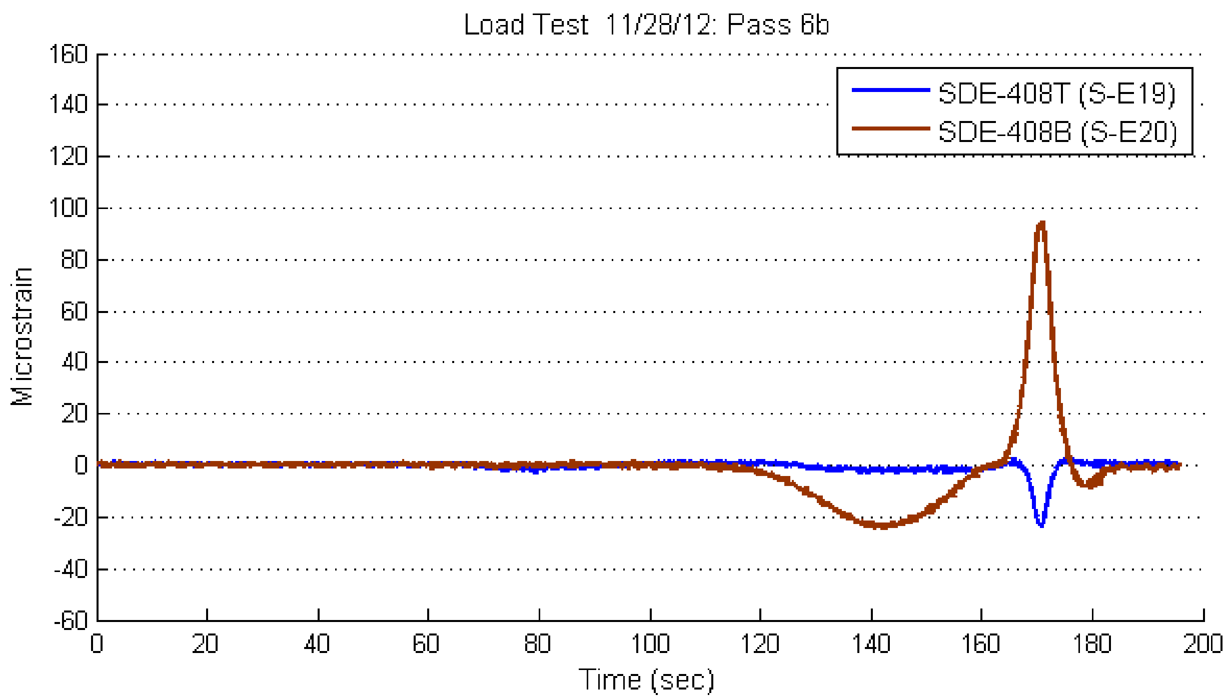


Figure B.4 East edge girder strain time history - section 408

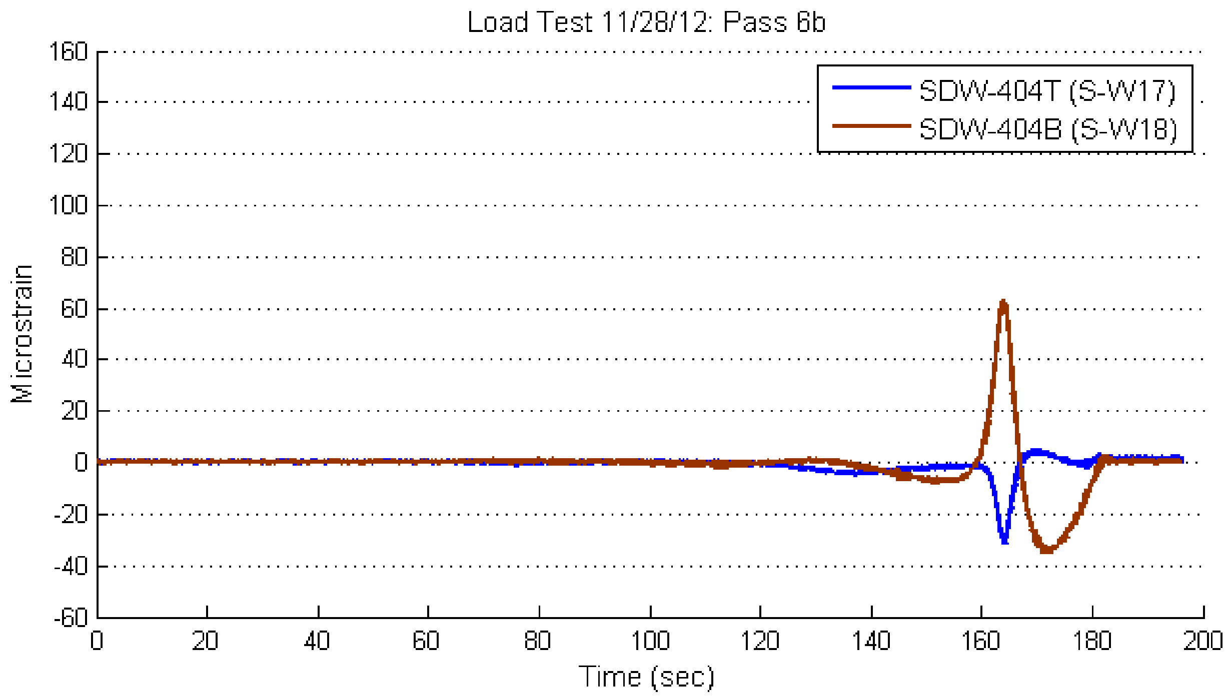


Figure B.5 West edge girder strain time history - section 404

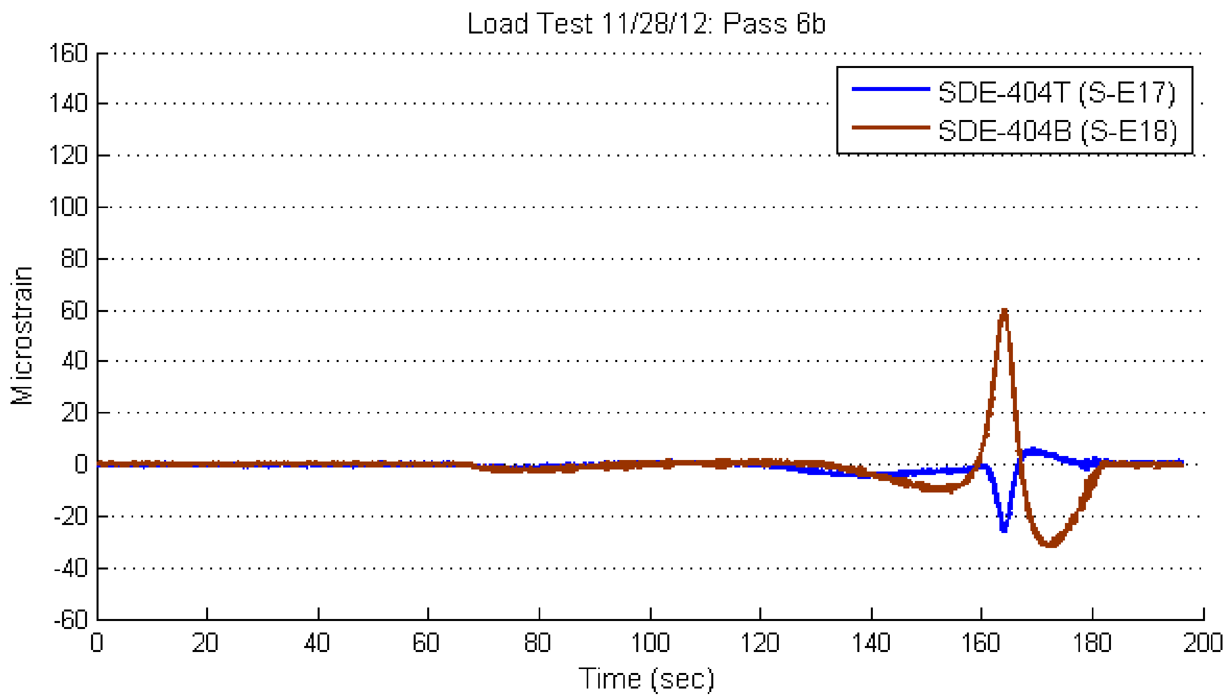


Figure B.6 East edge girder strain time history - section 404

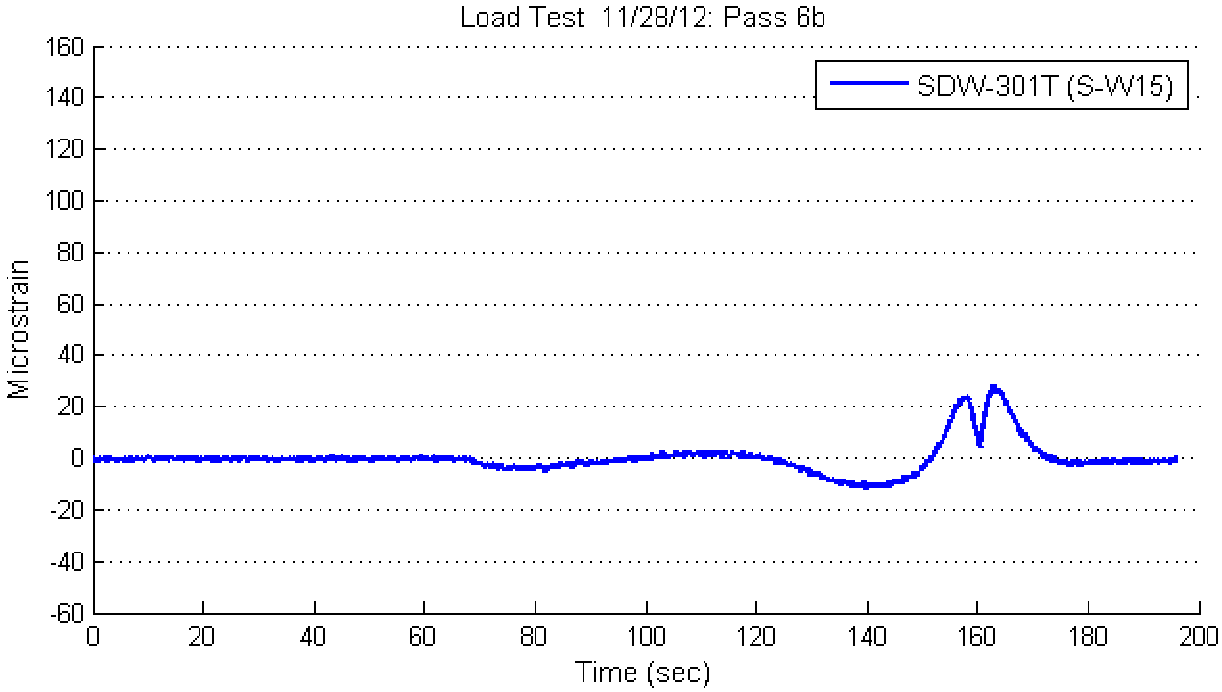


Figure B.7 West edge girder strain time history - section 301

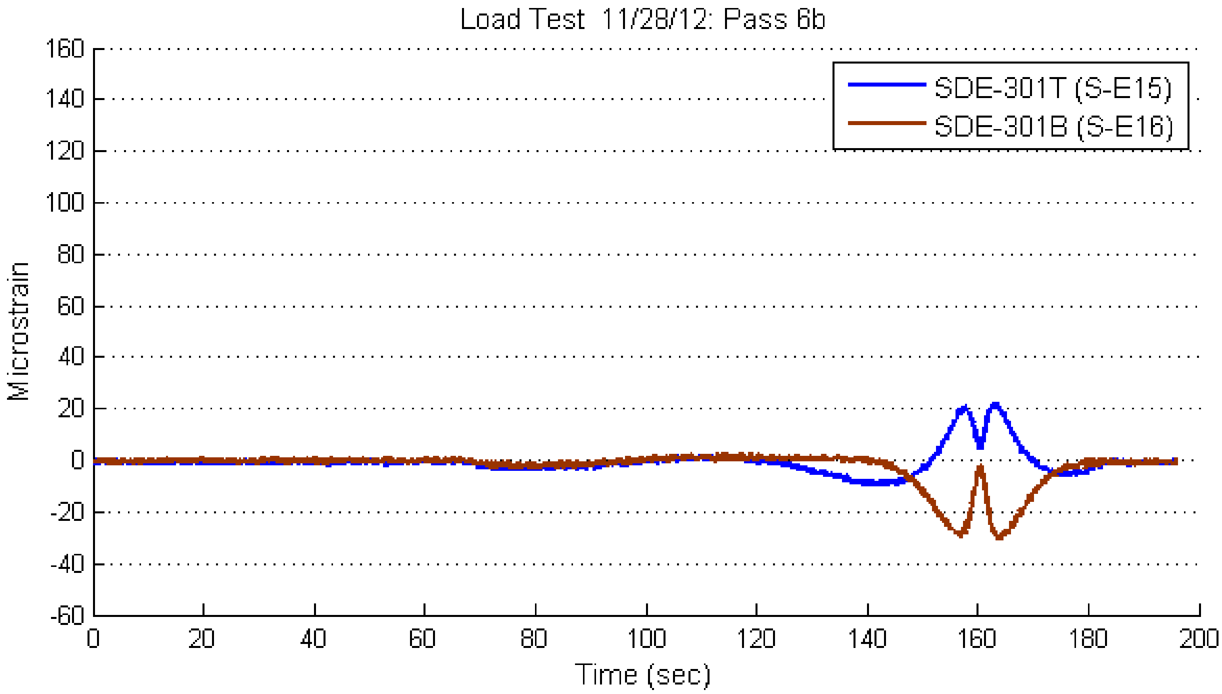


Figure B.8 East edge girder strain time history - section 301

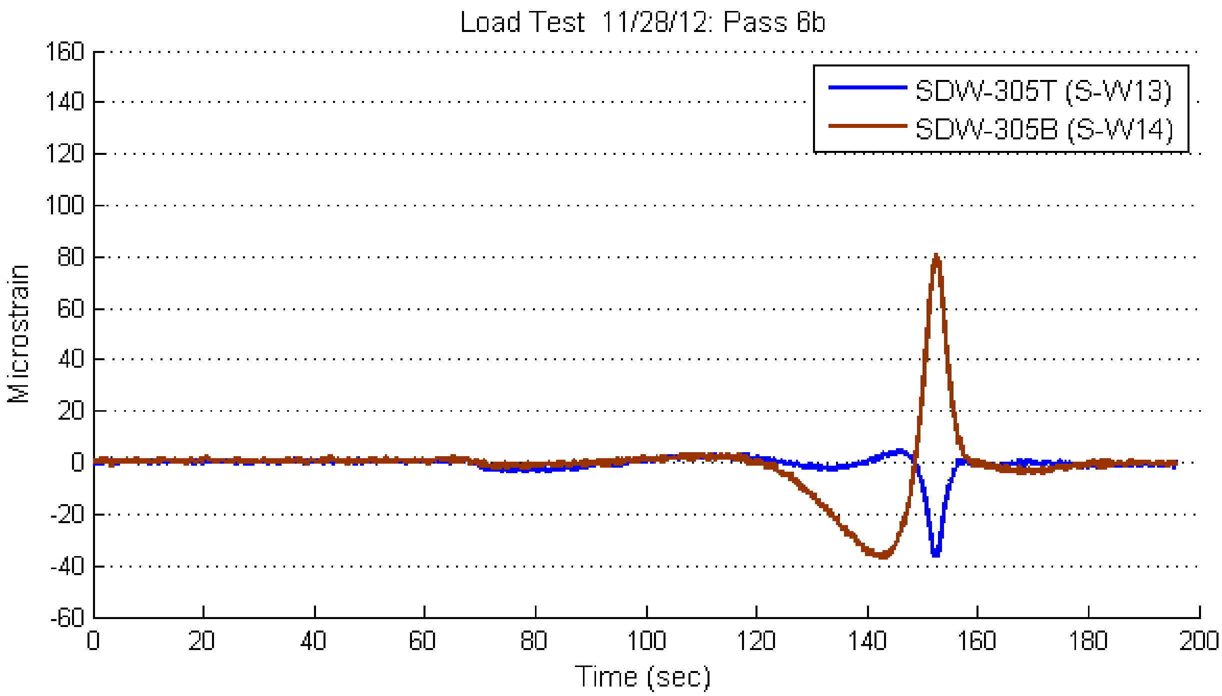


Figure B.9 West edge girder strain time history - section 305

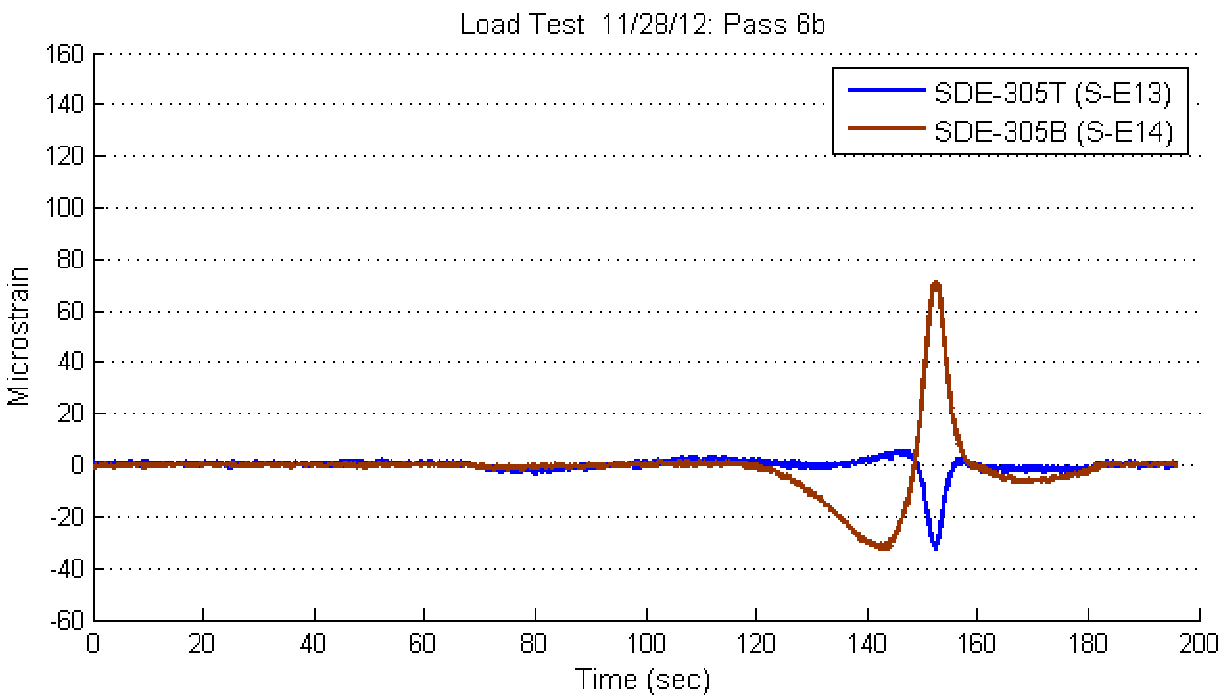


Figure B.10 East edge girder strain time history - section 305

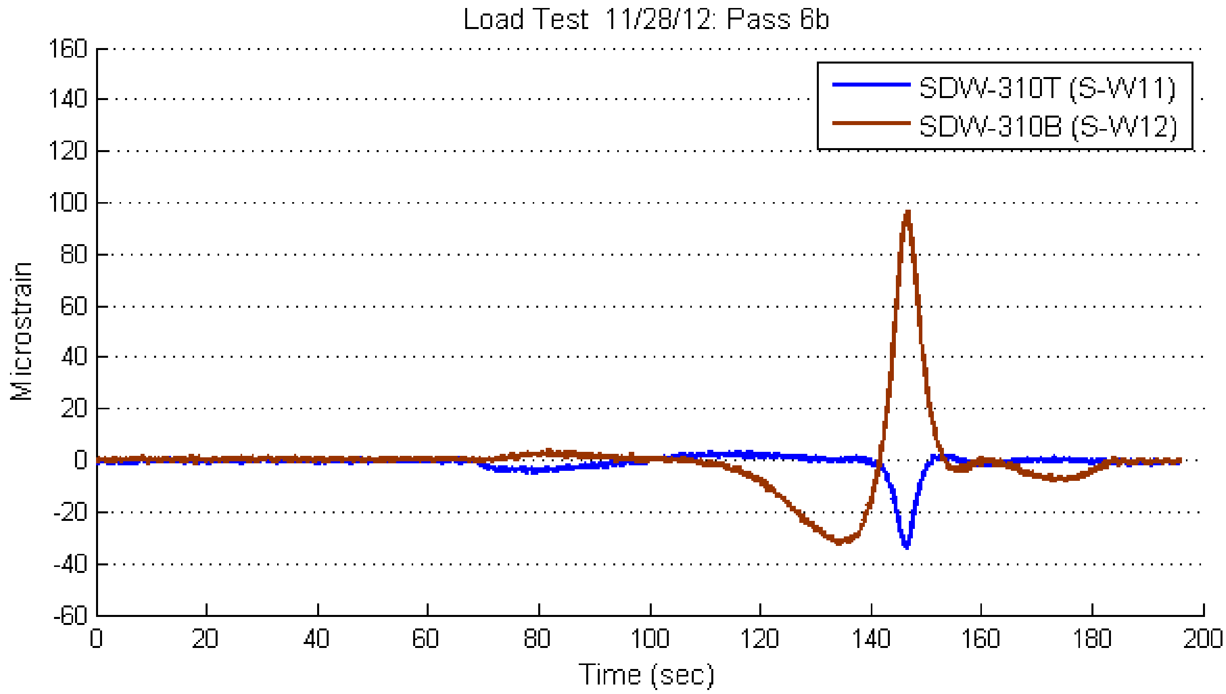


Figure B.11 East edge girder strain time history - section 310

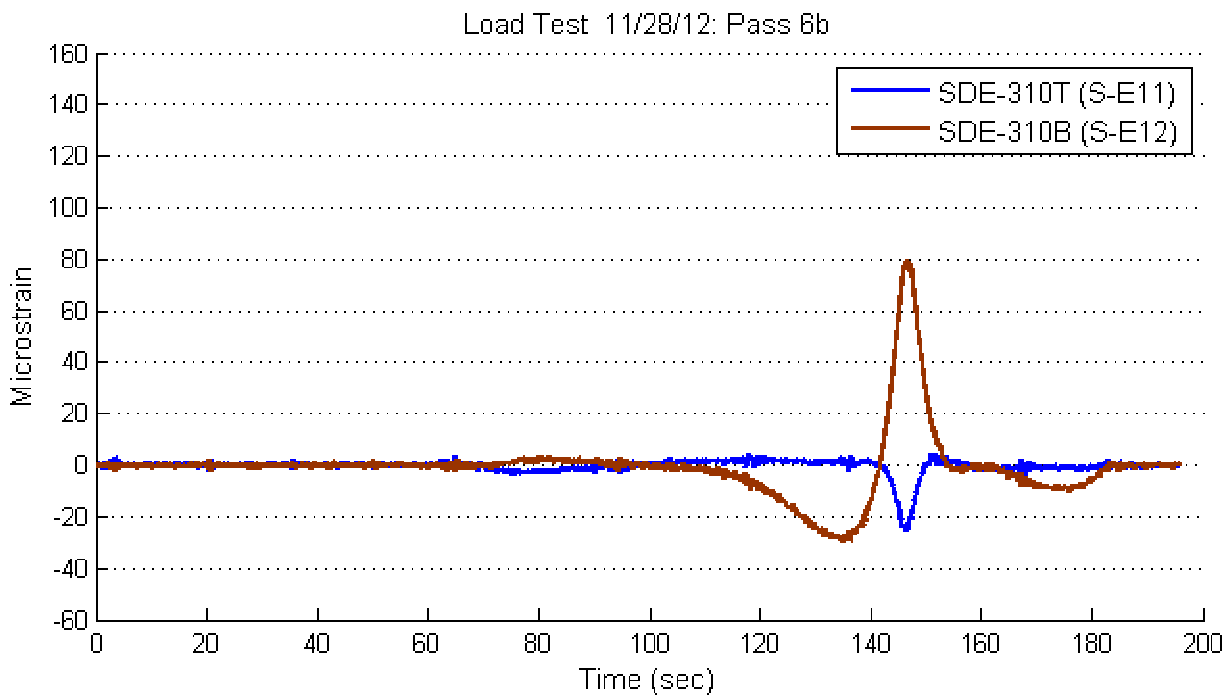


Figure B.12 East edge girder strain time history - section 310

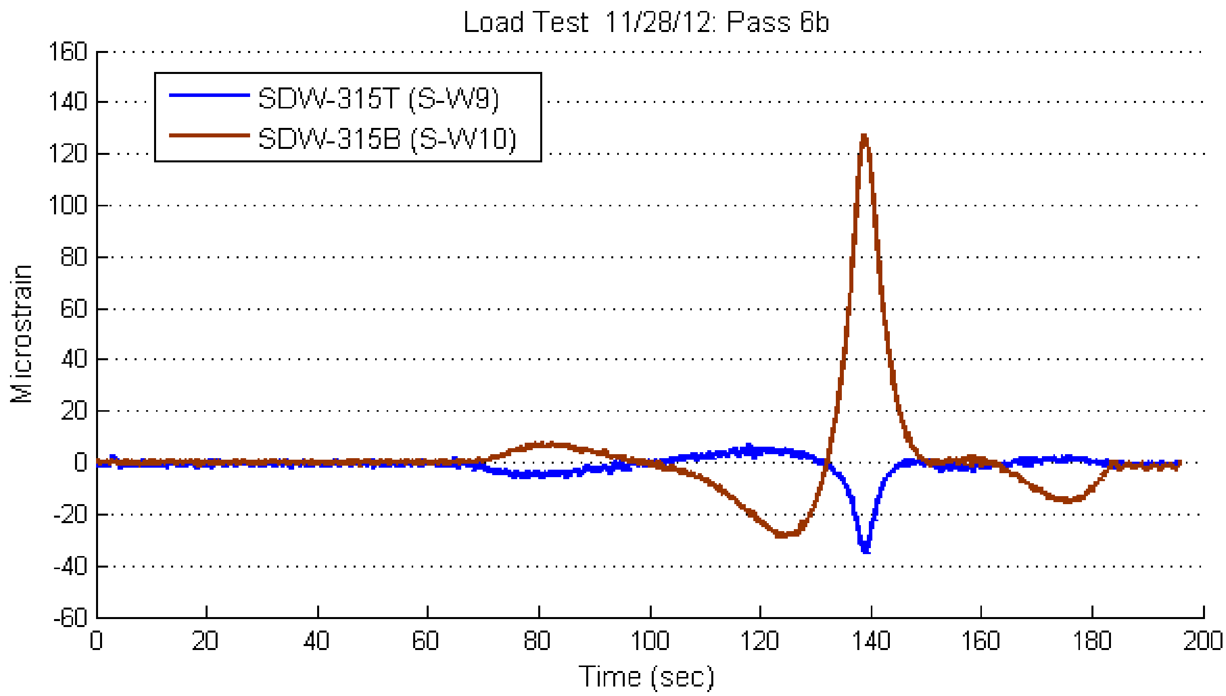


Figure B.13 West edge girder strain time history - section 315

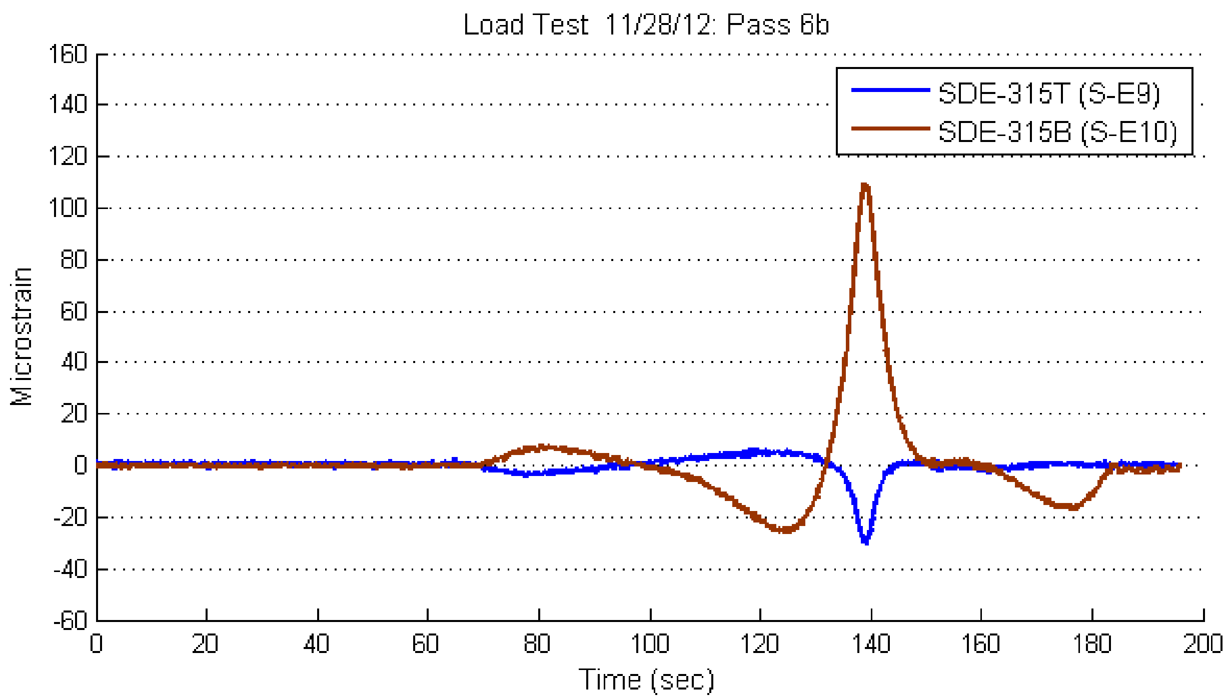


Figure B.14 East edge girder strain time history - section 315

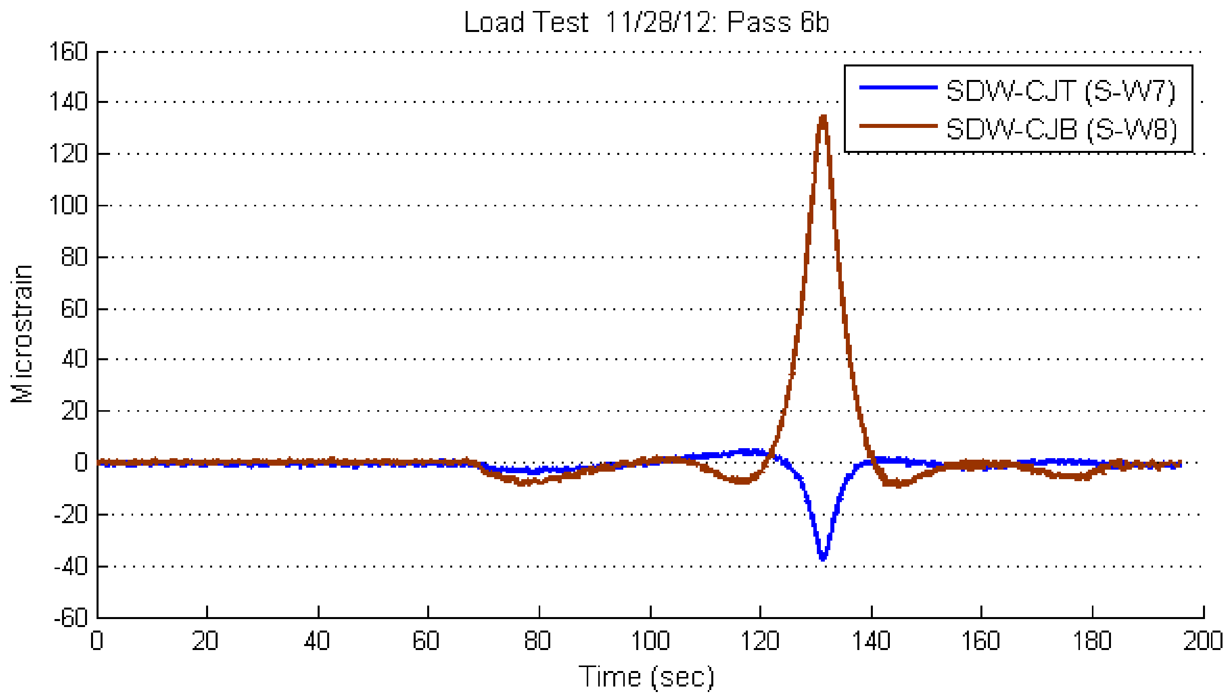


Figure B.15 West edge girder strain time history - closure joint

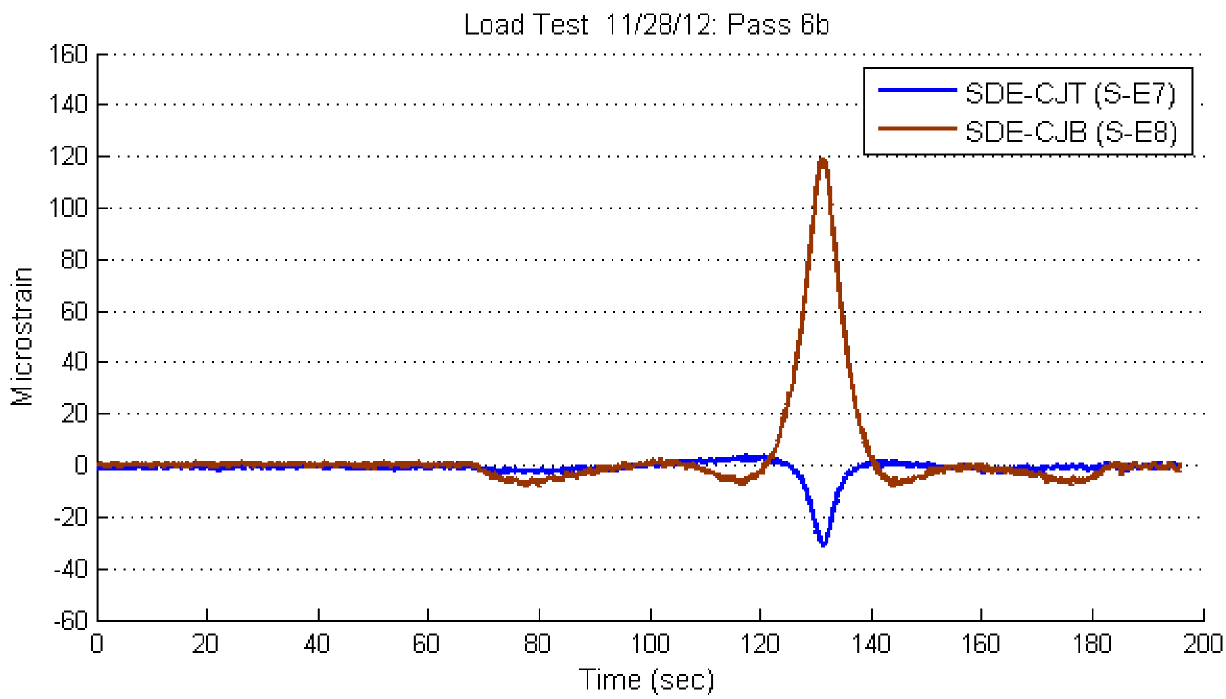


Figure B.16 East edge girder strain time history - closure joint

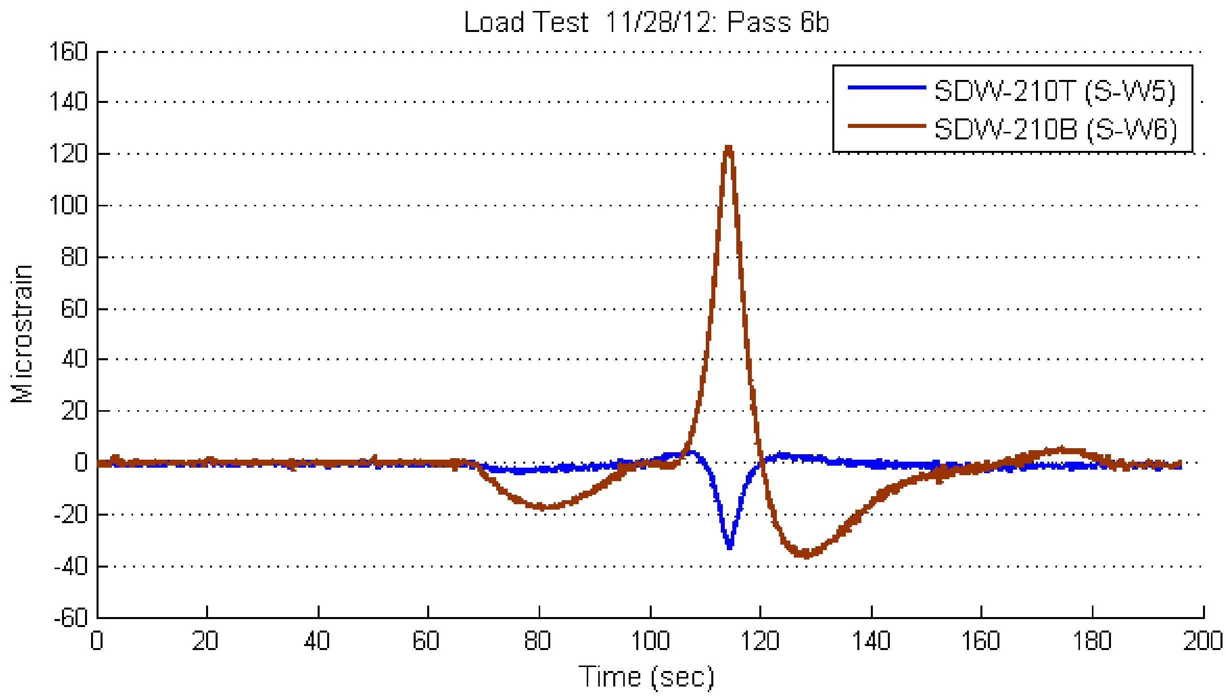


Figure B.17 West edge girder strain time history - section 210

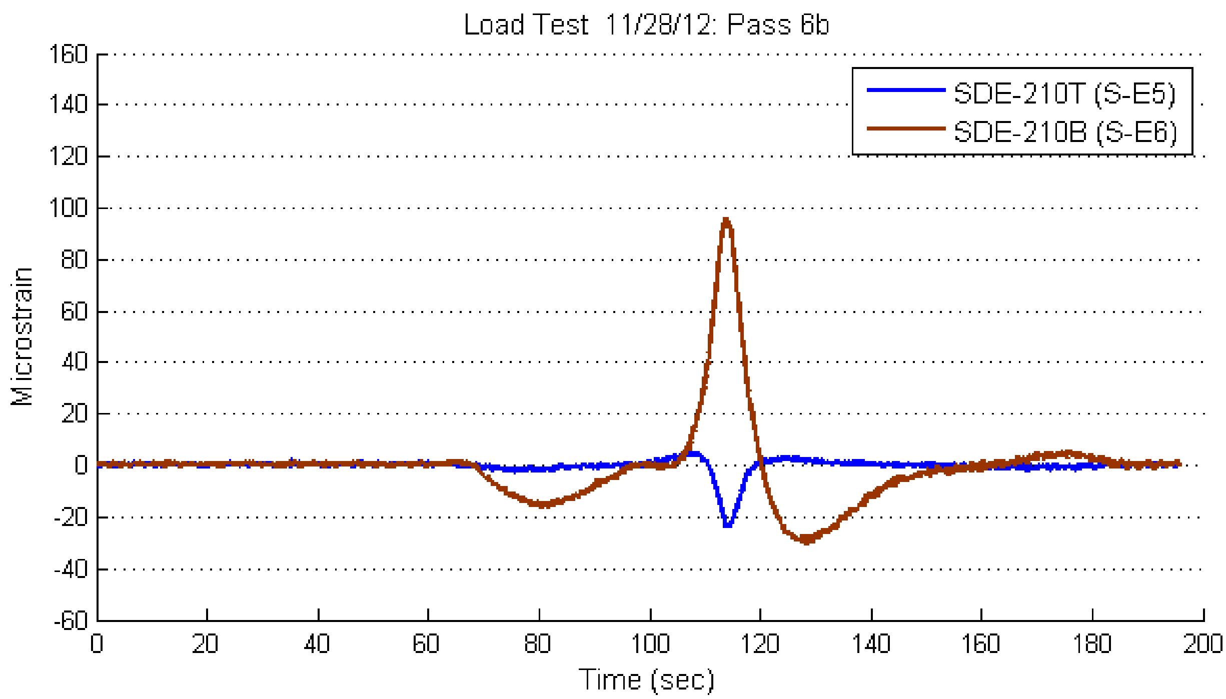


Figure B.18 East edge girder strain time history - section 210

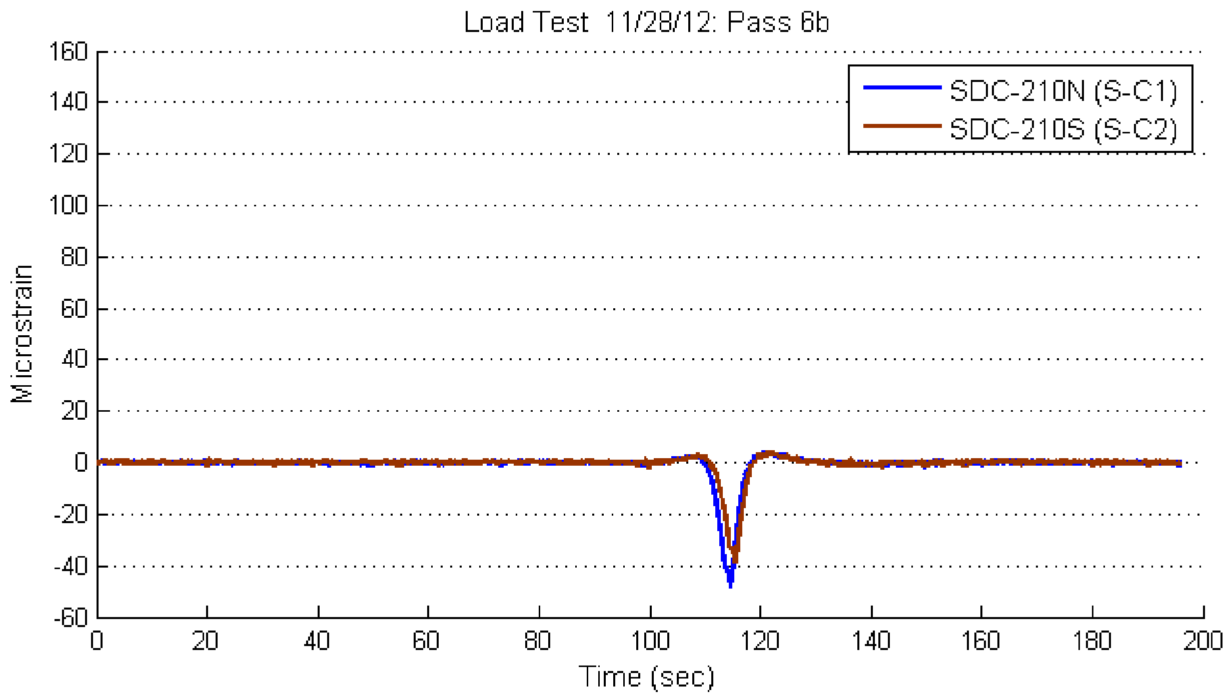


Figure B.19 Deck strain time history - section 210

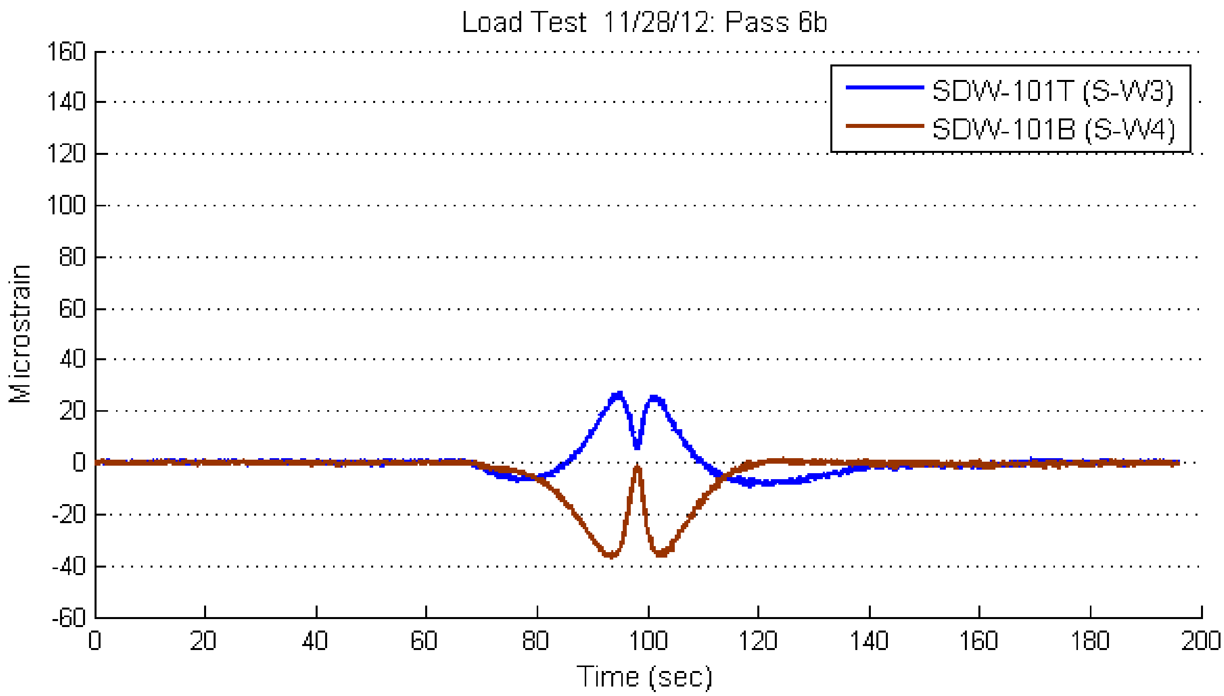


Figure B.20 West edge girder strain time history - section 101

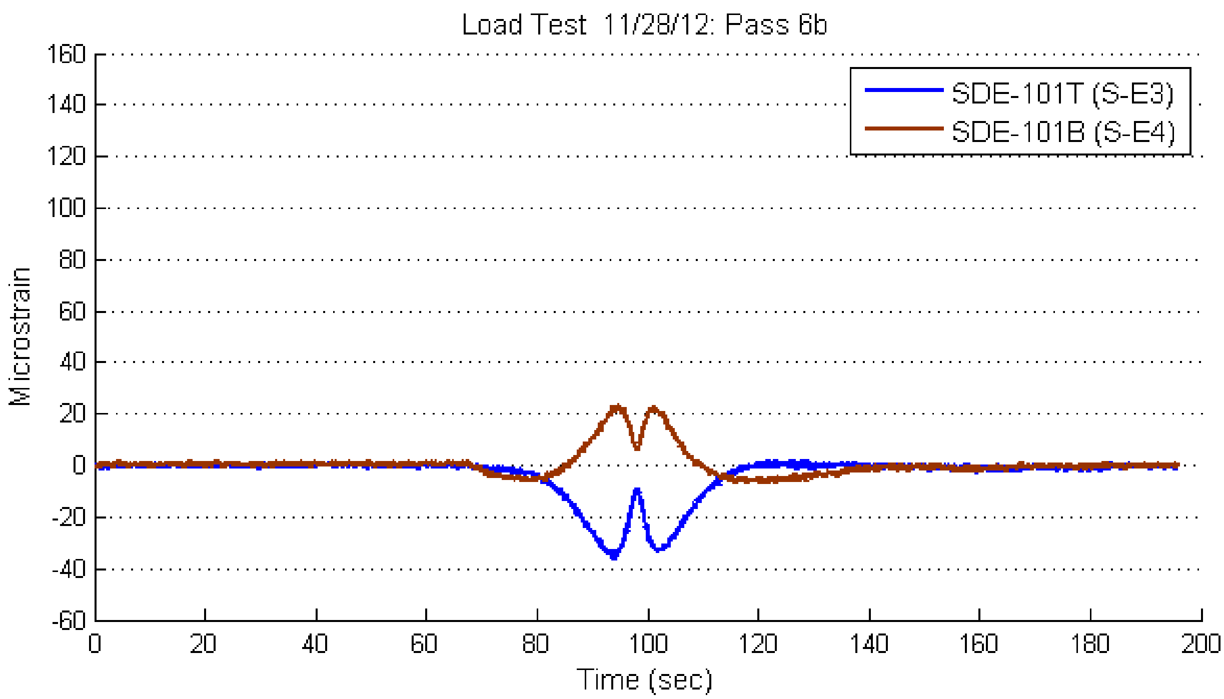


Figure B.21 East edge girder strain time history - section 101

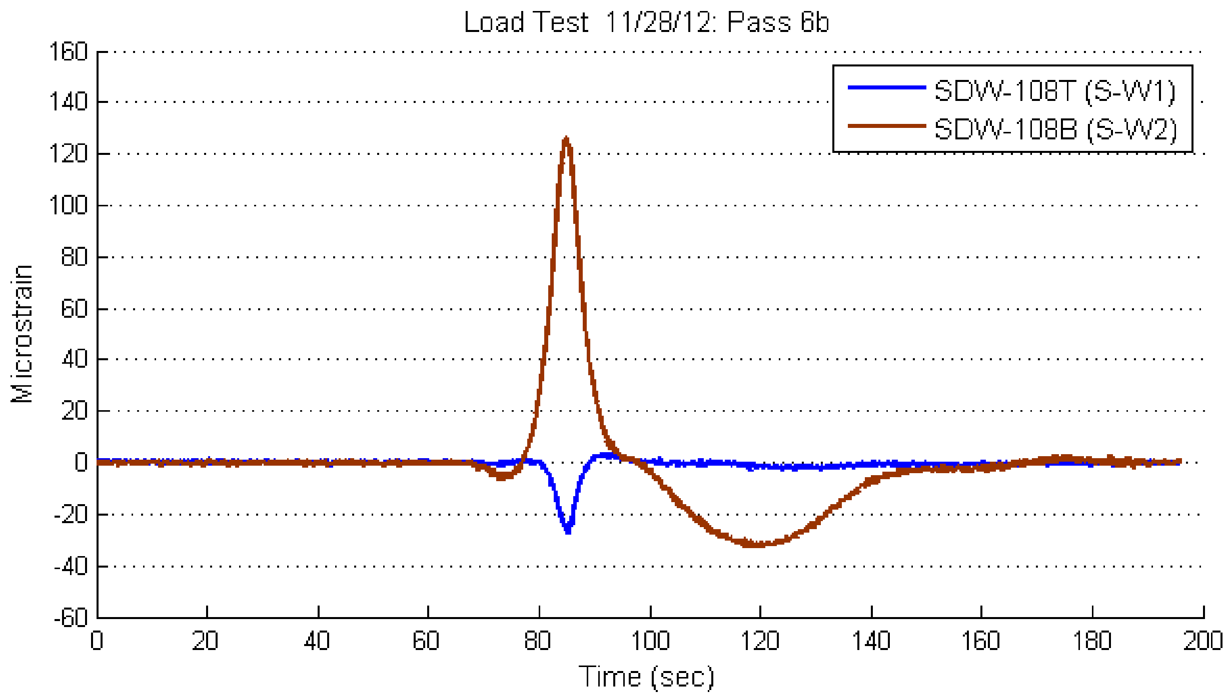


Figure B.22 West edge girder strain time history - section 108

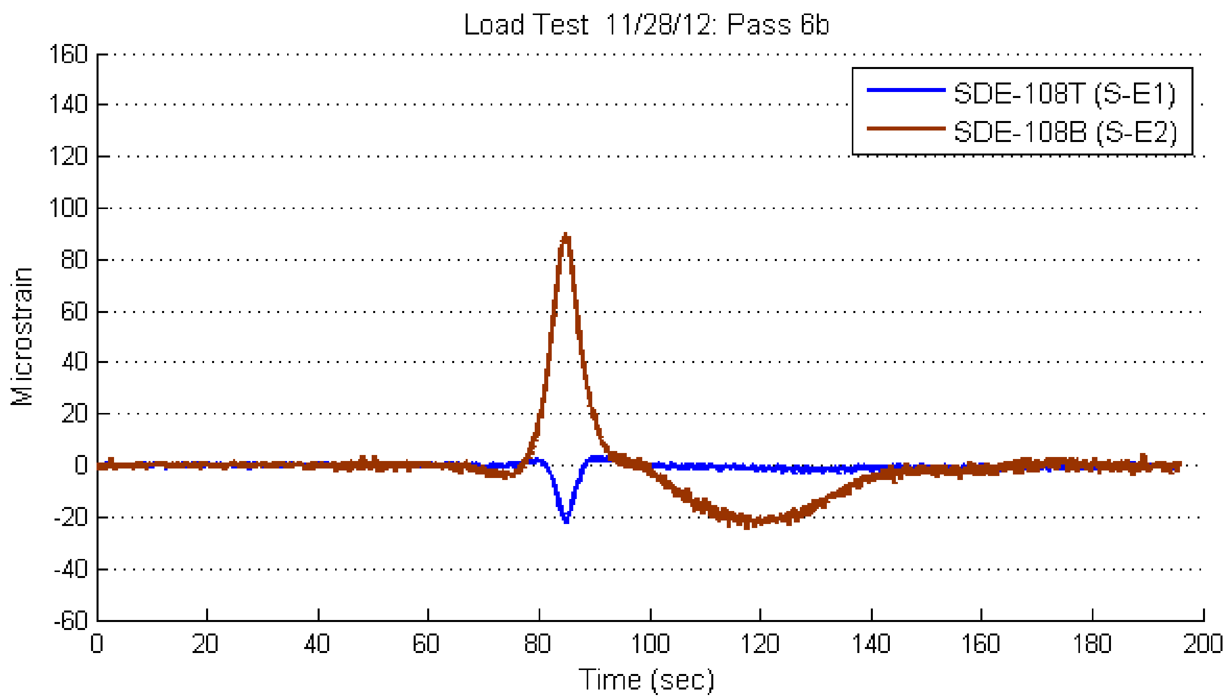


Figure B.23 East edge girder strain time history - section 108

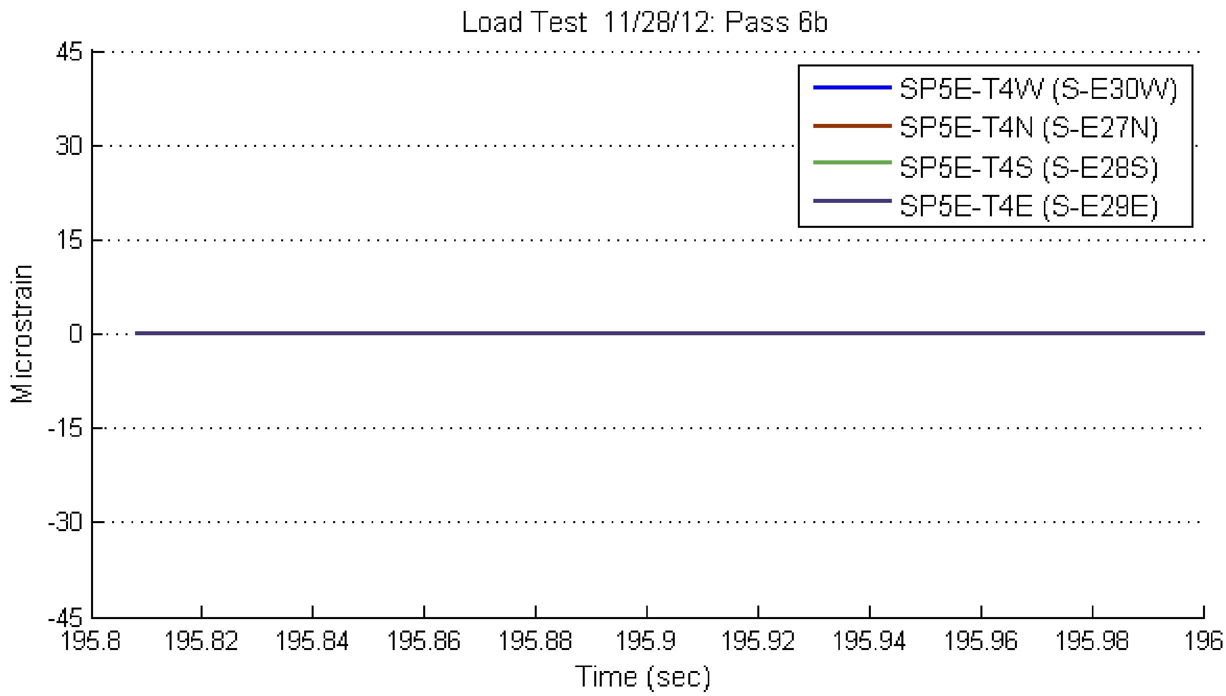


Figure B.24 Pylon 5 east strain time history - lift T4

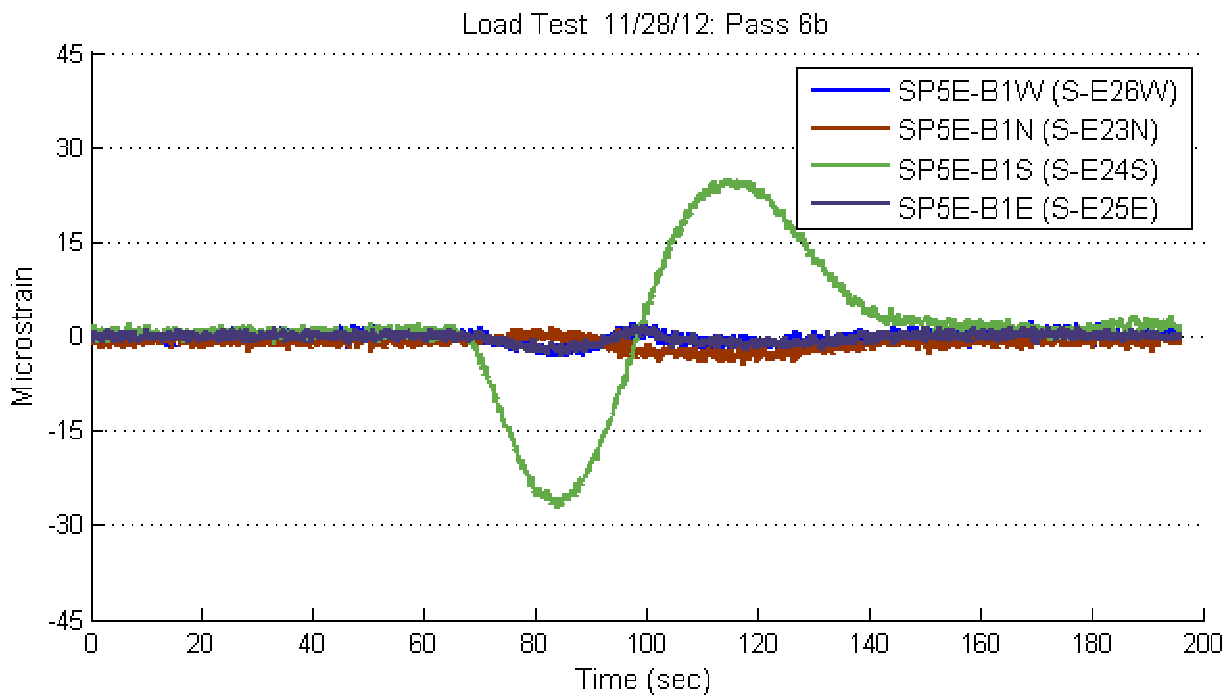


Figure B.25 Pylon 5 east strain time history - lift B1

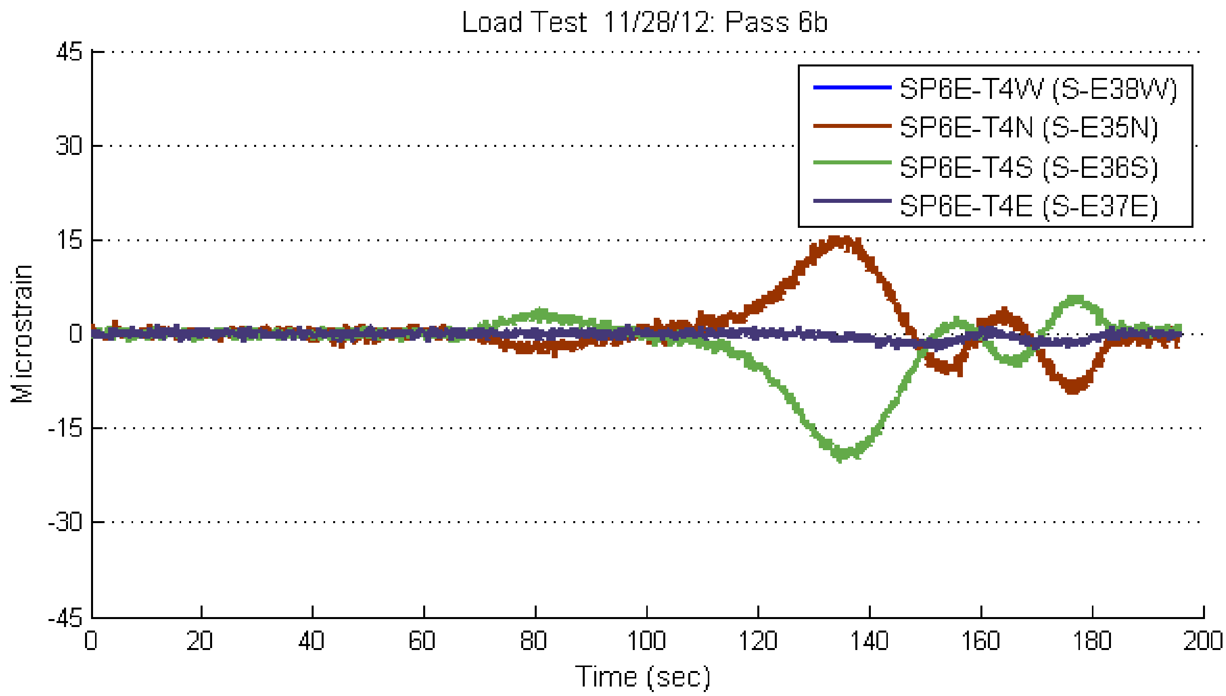


Figure B.26 Pylon 6 east strain time history - lift T4

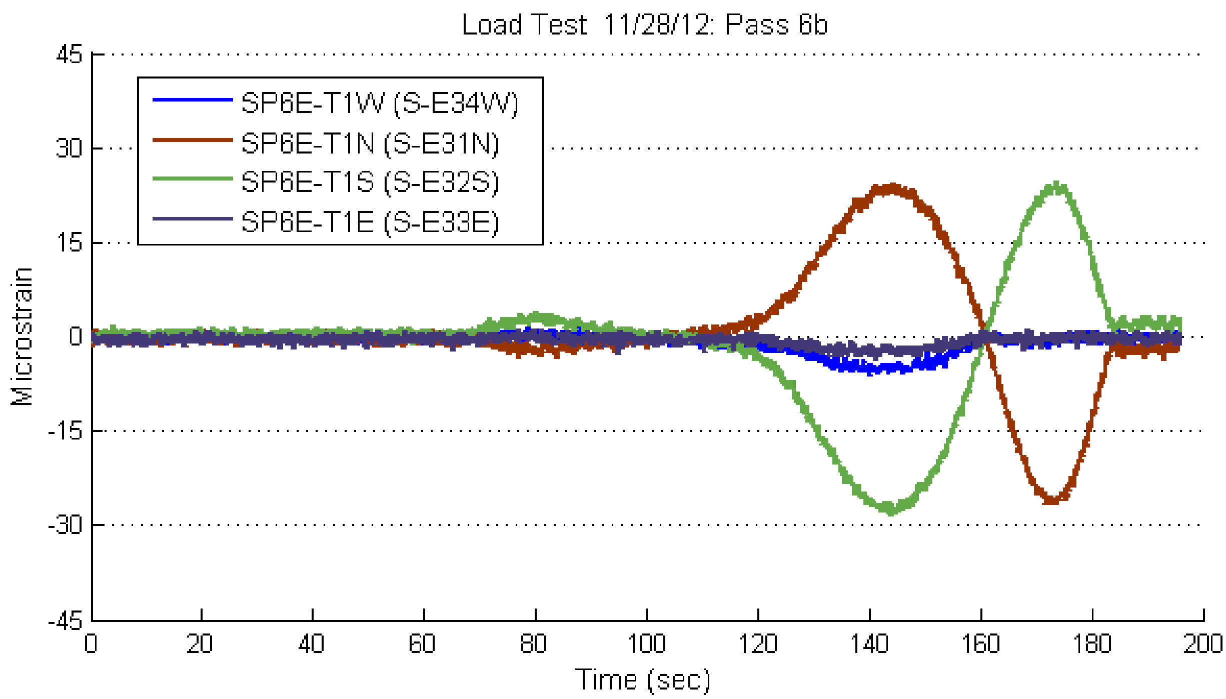


Figure B.27 Pylon 6 east strain time history - lift T1

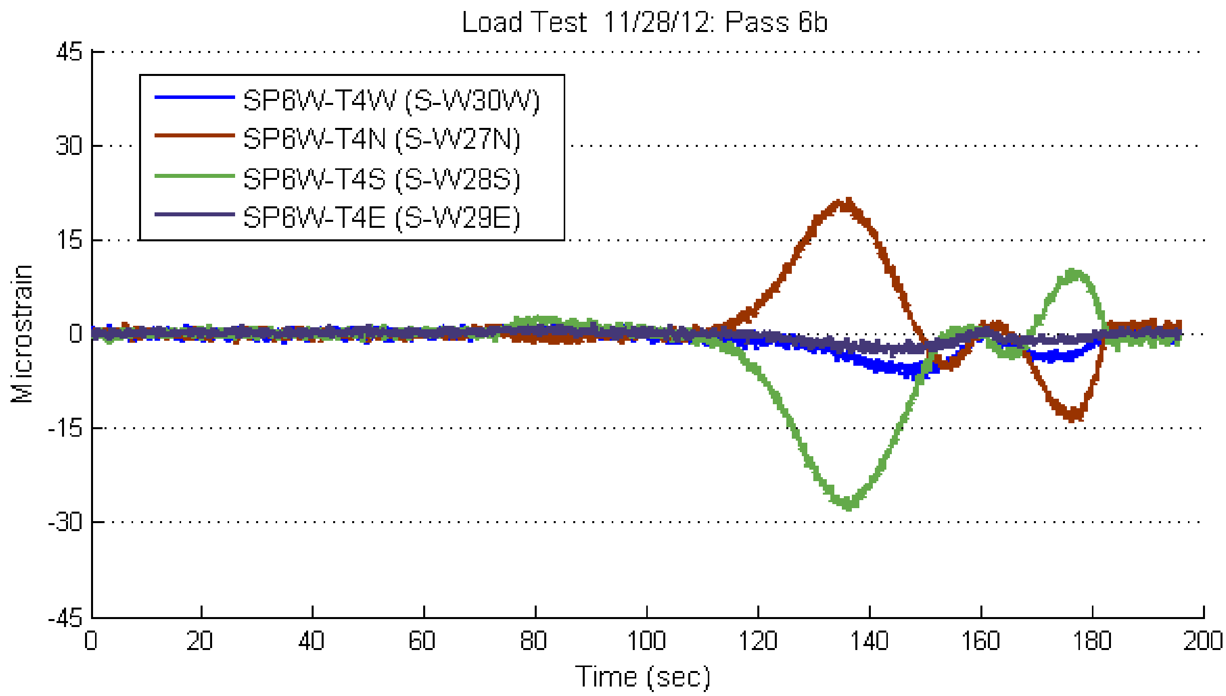


Figure B.28 Pylon 6 west strain time history - lift T4

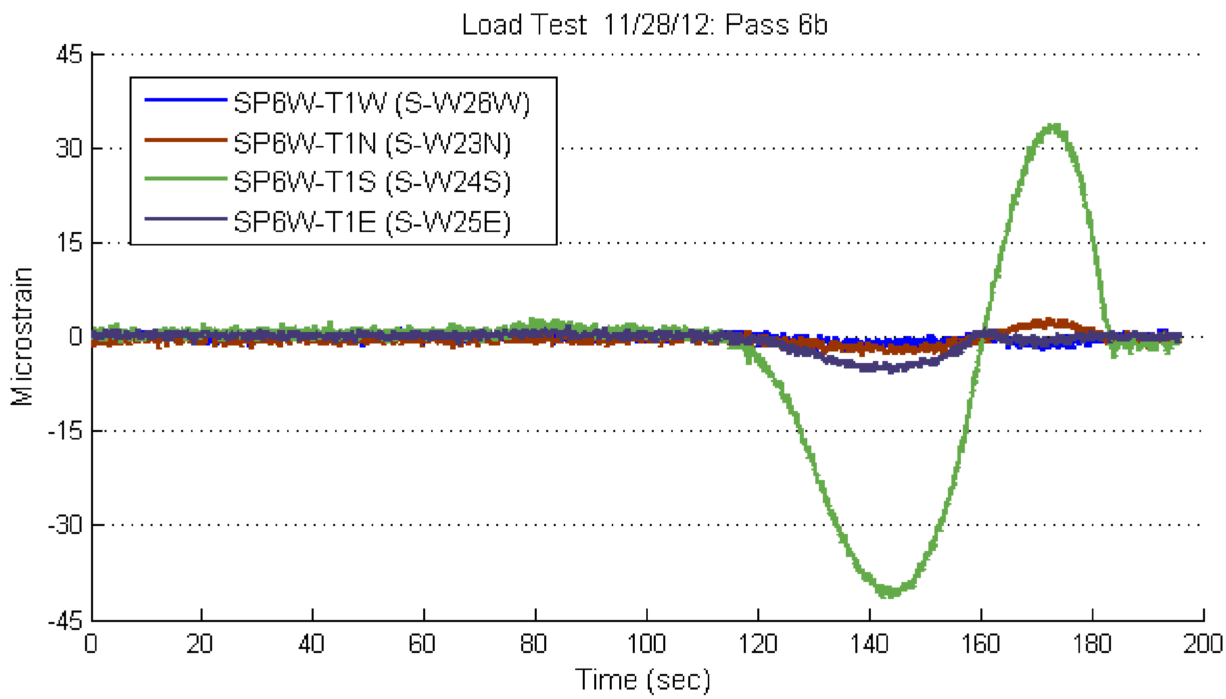


Figure B.29 Pylon 6 west strain time history - lift T1

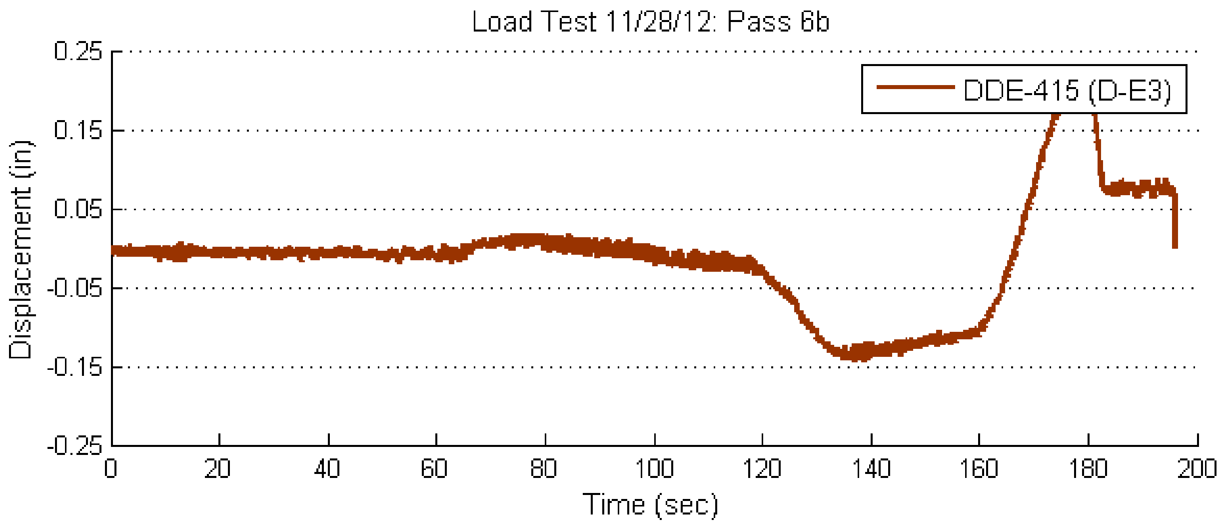


Figure B.30 Bearing displacement time history – north abutment

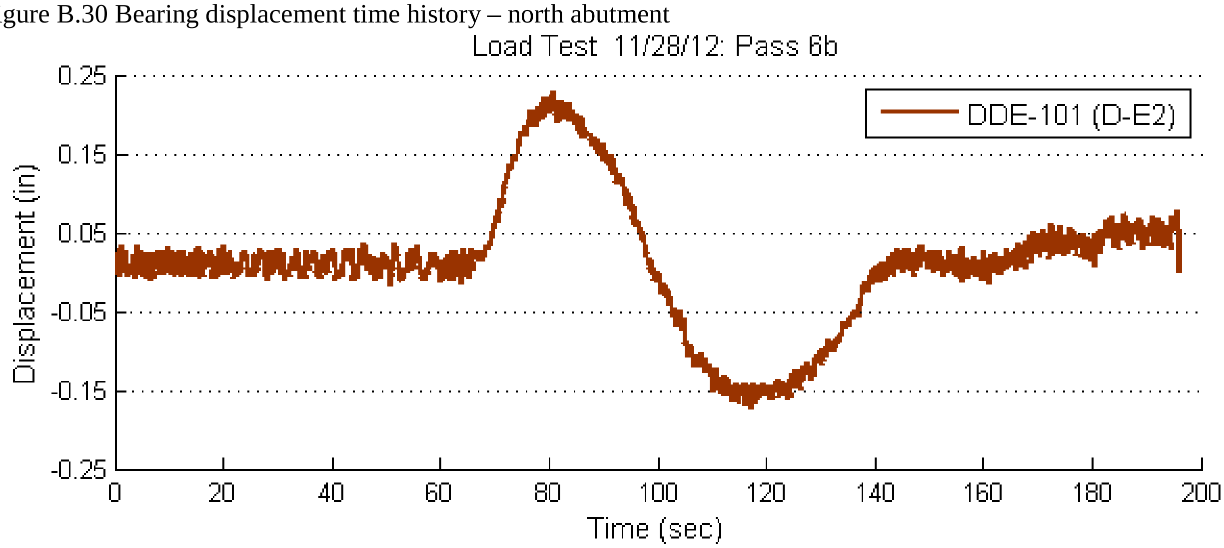


Figure B.31 Bearing displacement time history – pylon 5

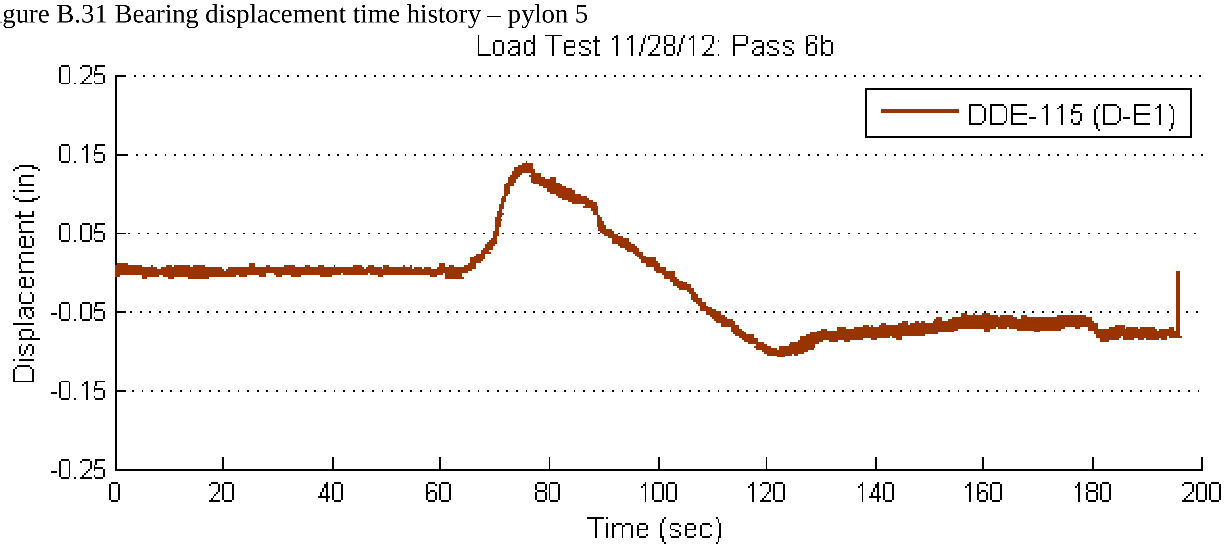


Figure B.32 Bearing displacement time history – south abutment

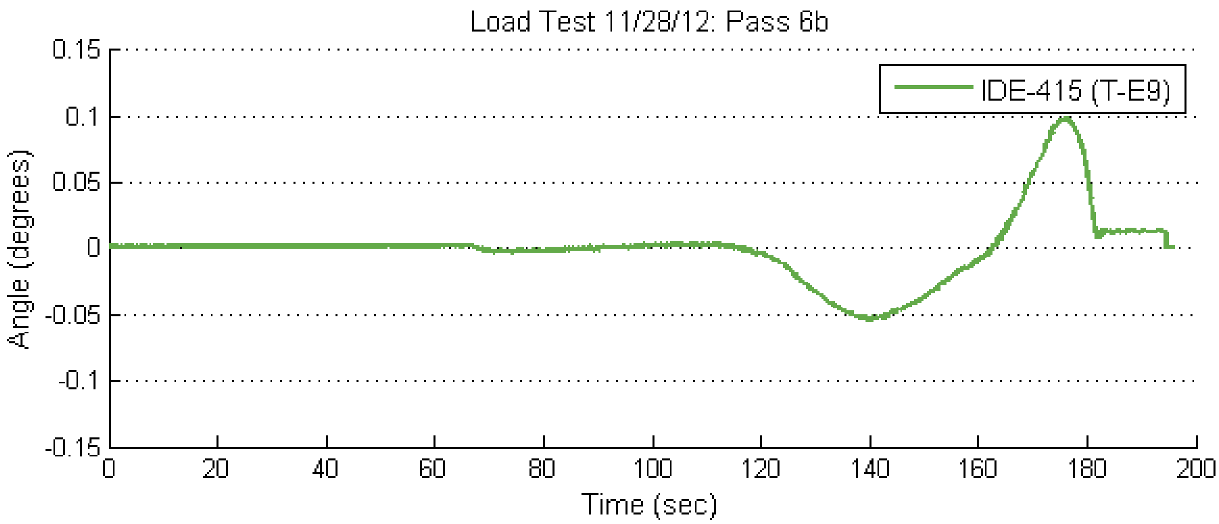


Figure B.33 Deck tilt time history - section 415

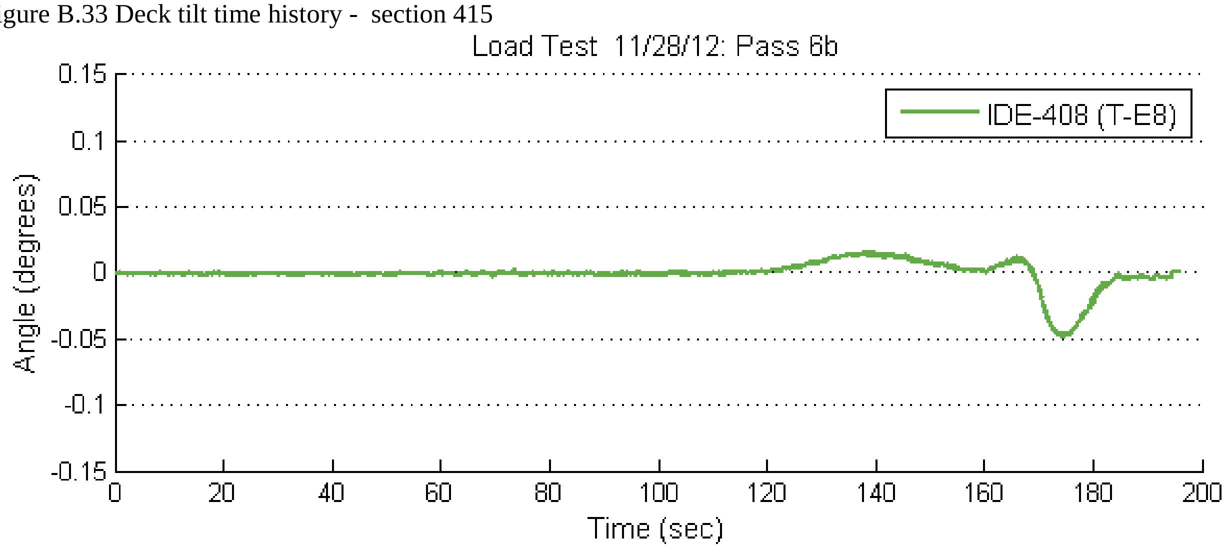


Figure B.34 Deck tilt time history - section 408

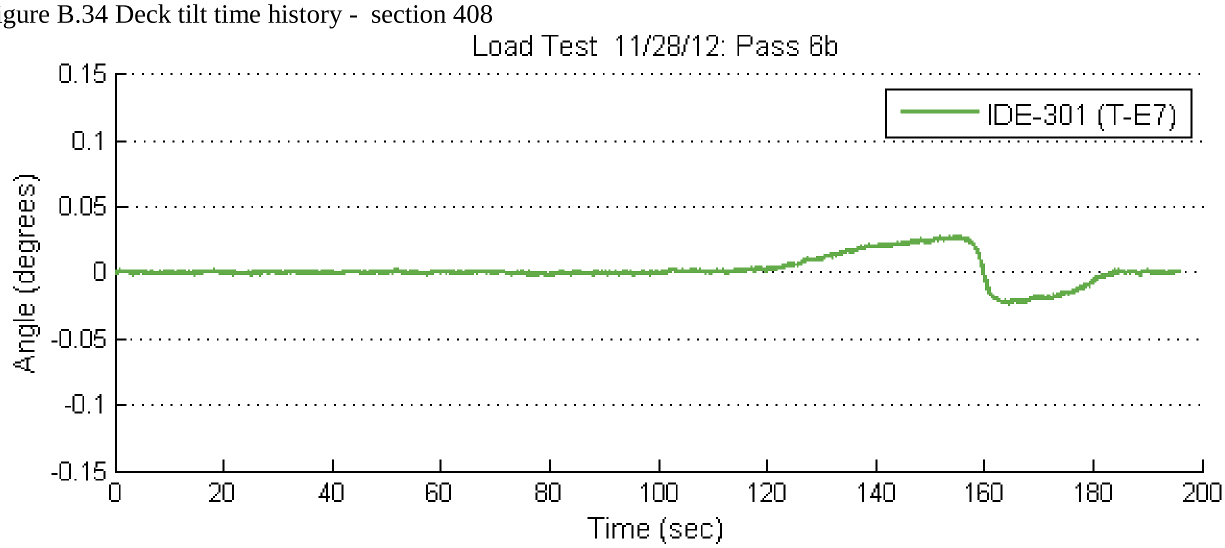


Figure B.35 Deck tilt time history - section 301

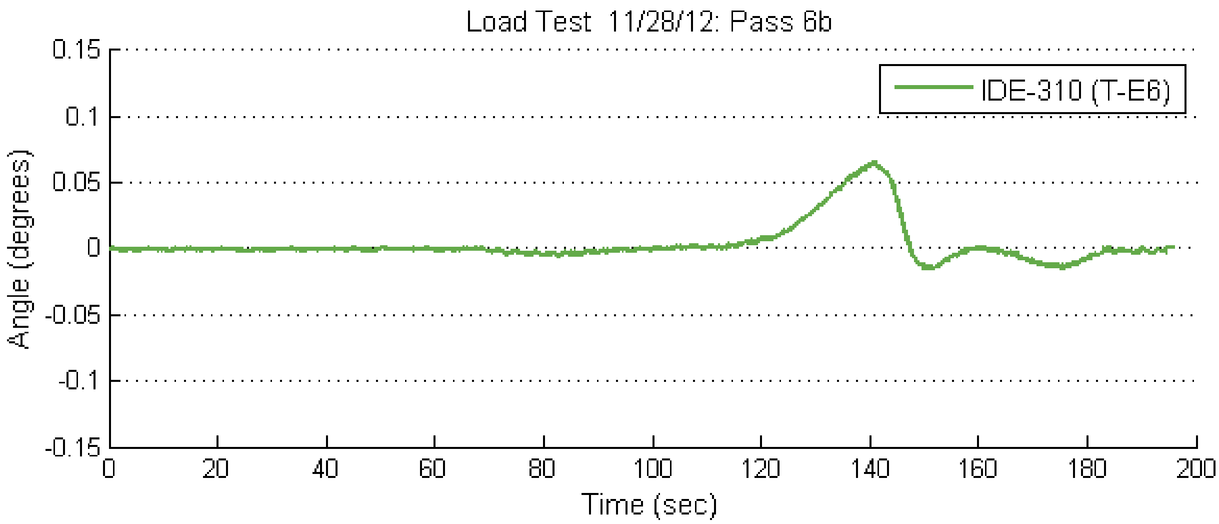


Figure B.36 Deck tilt time history - section 310

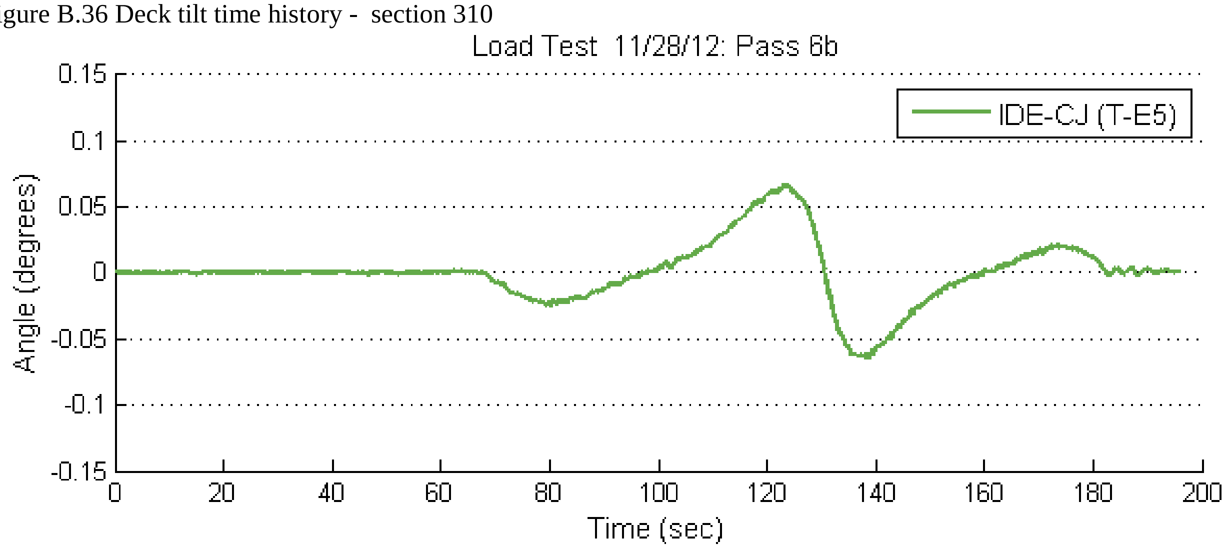


Figure B.37 Deck tilt time history - section closure joint

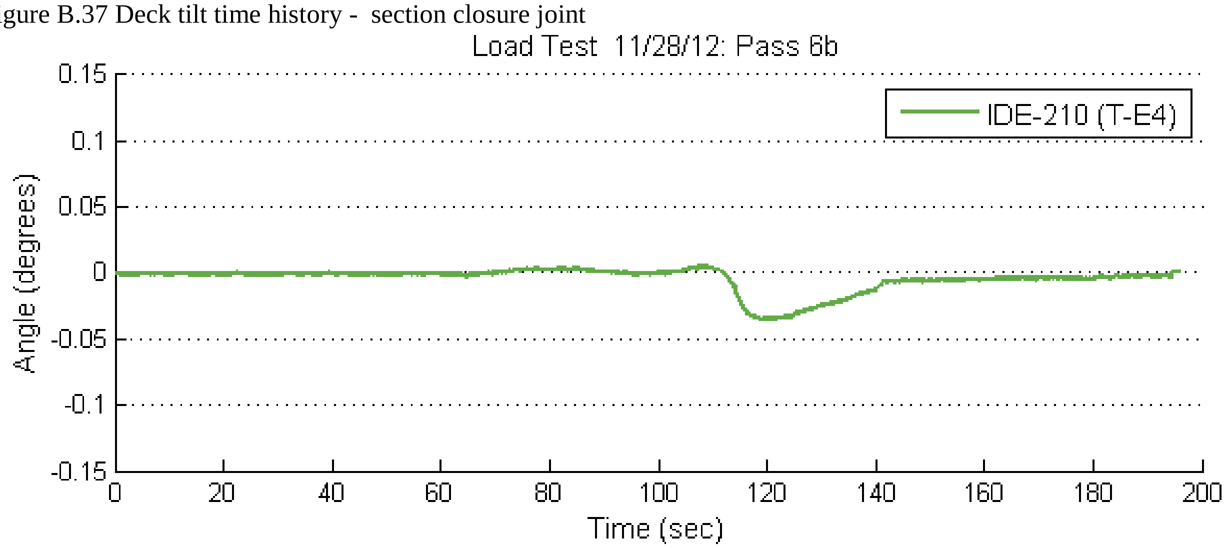


Figure B.38 Deck tilt time history - section 210

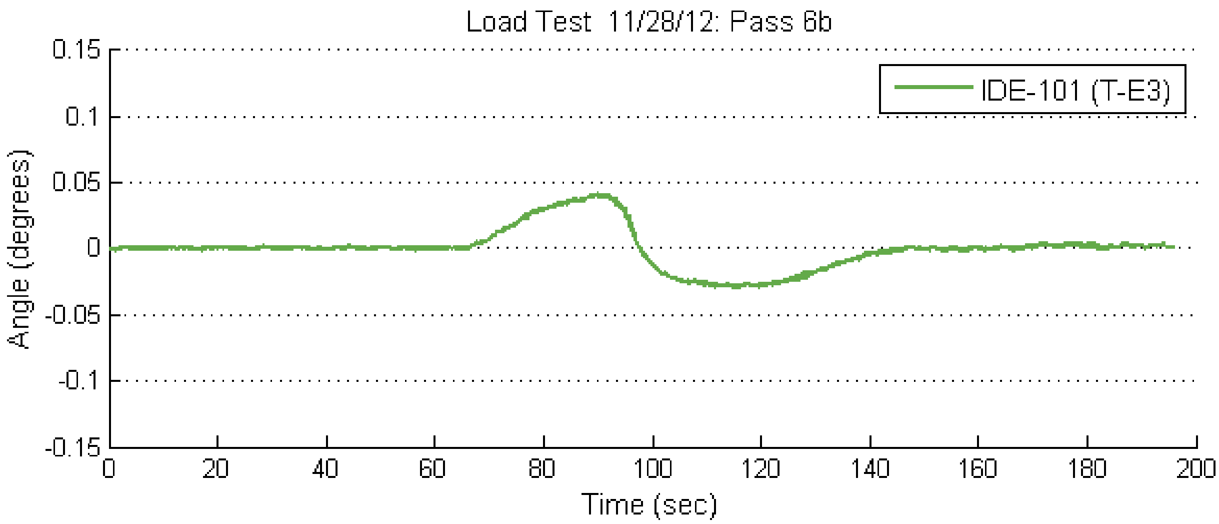


Figure B.39 Deck tilt time history - section 101

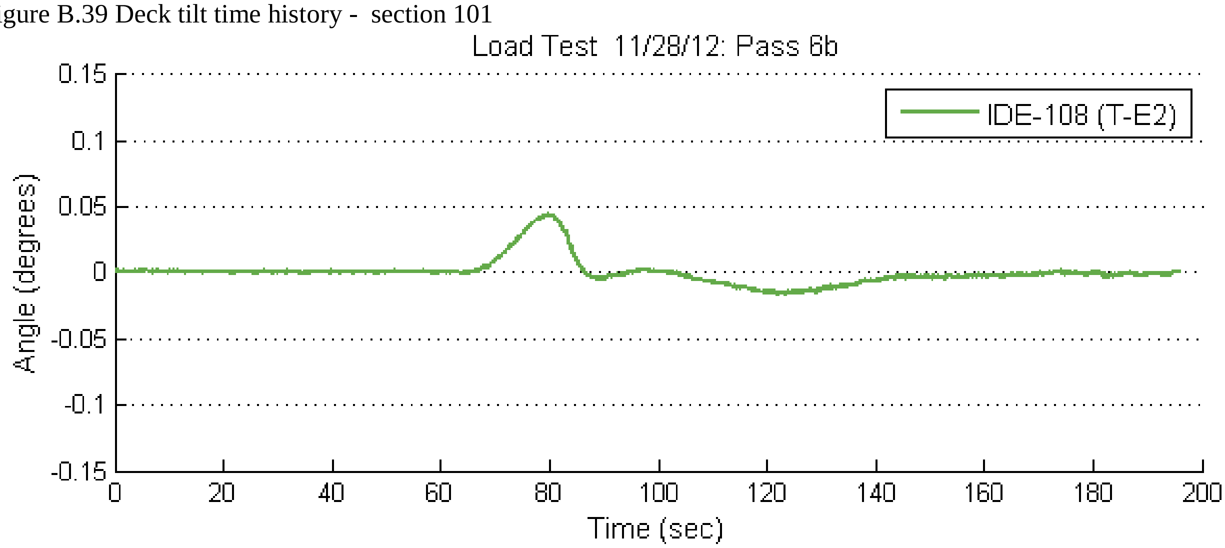


Figure B.40 Deck tilt time history - section 108

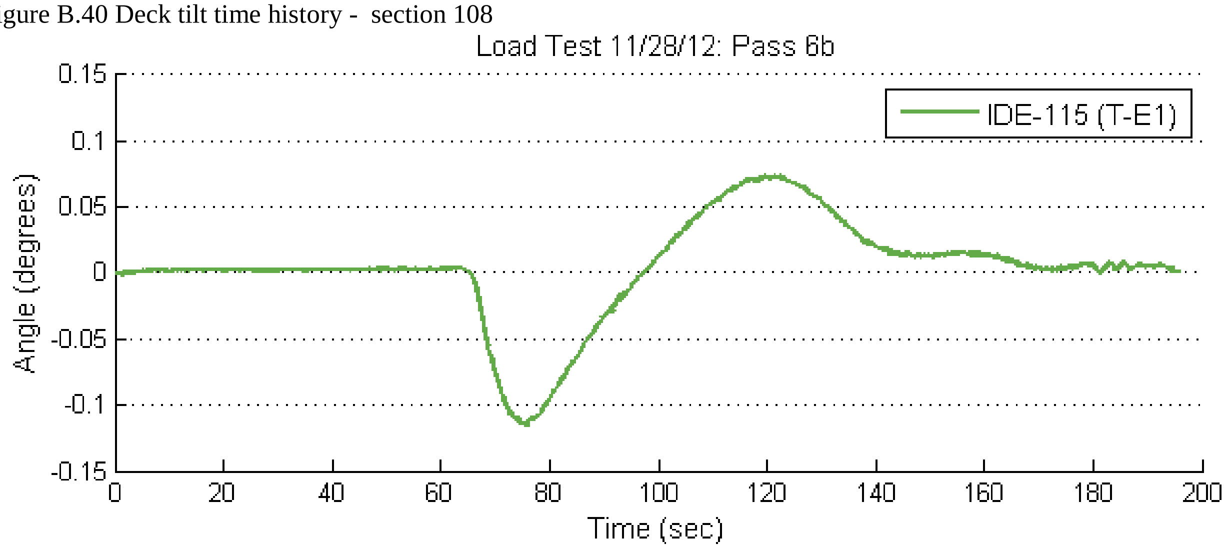


Figure B.41 Deck tilt time history - section 115

Appendix C Tables and Figures – Load Test 3 (5/9/13)

Table C.1 Bearing Displacement: Maximums

No. trucks	Pass	Displacement (in)	
		DDE_101 D-E2	DDE_415 D-E3
Slow speed passes			
1	1a	0.037	
	1b	0.041	
	1c	0.041	
	1d	0.044	
	1e	0.031	
	1f	0.050	
4	4a	0.127	
6	6b	0.171	
Maximum		0.171	
High speed passes			
1	1a	0.048	1.013
Maximum		0.048	1.013

Table C.2 Bearing Displacement: Minimums

No. of trucks	Pass	Displacement (in)	
		DDE_101 D-E2	DDE_415 D-E3
Slow speed passes			
1	1a	-0.030	
	1b	-0.028	
	1c	-0.034	
	1d	-0.038	
	1e	-0.027	
	1f	-0.032	
4	4a	-0.109	
6	6b	-0.172	
Minimum		-0.172	
High speed passes			
1	1a	-0.033	-0.885
Minimum		-0.033	-0.885

Table C.3 Deck Tilt: Maximums

No. of trucks	Pass	Tilt sensor (Deg.)								
		IDE_115 T-E1	IDE_108 T-E2	IDE_101 T-E3	IDE_210 T-E4	IDE_CJ T-E5	IDE_310 T-E6	IDE_301 T-E7	IDE_408 T-E8	IDE_415 T-E9
Slow speed passes										
1	1a		0.010	0.011	0.005	0.008	0.009	0.008	0.008	
	1b		0.010	0.013	0.005	0.012	0.013	0.009	0.007	
	1c		0.016	0.012	0.005	0.013	0.015	0.009	0.009	
	1d		0.018	0.012	0.005	0.018	0.018	0.010	0.008	
	1e		0.007	0.009	0.007	0.009	0.008	0.007	0.008	
	1f		0.018	0.016	0.007	0.021	0.024	0.009	0.009	
4	4a		0.040	0.032	0.008	0.045	0.047	0.025	0.015	
6	6b		0.062	0.047	0.013	0.065	0.066	0.030	0.022	
Maximum			0.062	0.047	0.013	0.065	0.066	0.030	0.022	
High speed passes										
1	1a	0.072	0.062	0.100	0.022	0.068	0.077	0.054	0.072	0.096
Maximum		0.072	0.062	0.100	0.022	0.068	0.077	0.054	0.072	0.096

Table C.4 Deck Tilt: Minimums

No. of trucks	Pass	Tilt sensor (Deg.)								
		IDE_115 T-E1	IDE_108 T-E2	IDE_101 T-E3	IDE_210 T-E4	IDE_CJ T-E5	IDE_310 T-E6	IDE_301 T-E7	IDE_408 T-E8	IDE_415 T-E9
Slow speed passes										
1	1a		-0.008	-0.008	-0.007	-0.011	-0.009	-0.007	-0.010	
	1b		-0.008	-0.005	-0.007	-0.010	-0.006	-0.006	-0.009	
	1c		-0.008	-0.011	-0.007	-0.017	-0.007	-0.008	-0.013	
	1d		-0.008	-0.013	-0.011	-0.019	-0.008	-0.010	-0.013	
	1e		-0.010	-0.006	-0.006	-0.008	-0.007	-0.007	-0.007	
	1f		-0.009	-0.013	-0.009	-0.020	-0.005	-0.009	-0.015	
4	4a		-0.019	-0.023	-0.022	-0.044	-0.013	-0.019	-0.035	
6	6b		-0.023	-0.033	-0.055	-0.064	-0.021	-0.029	-0.052	
Minimum			-0.023	-0.033	-0.055	-0.064	-0.021	-0.029	-0.052	
High speed passes										
1	1a	-0.084	-0.077	-0.090	-0.025	-0.073	-0.084	-0.052	-0.076	-0.070
Minimum		-0.084	-0.077	-0.090	-0.025	-0.073	-0.084	-0.052	-0.076	-0.070

Table C.5 Plyon 5E Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Below Deck – Level B1)				Strain sensor (με) (Above Deck – Level T4)			
		SP5E_B1W S-E26W	SP5E_B1N S-E23N	SP5E_B1E S-E25E	SP5E_B1S S-E24S	SP5E_T4W S-E30W	SP5E_T4N S-E27N	SP5E_T4E S-E29E	SP5E_T4S S-E28S
Slow speed passes									
1	1a	3.3	2.3	1.9	3.2	0.0	0.0	0.0	0.0
	1b	1.9	1.7	1.8	4.2	0.0	0.0	0.0	0.0
	1c	2.9	1.4	2.7	6.8	0.0	0.0	0.0	0.0
	1d	2.7	1.8	2.1	7.0	0.0	0.0	0.0	0.0
	1e	2.5	1.8	2.1	3.2	0.0	0.0	0.0	0.0
	1f	2.0	2.7	1.6	7.1	0.0	0.0	0.0	0.0
4	4a	2.5	2.7	1.8	15.	0.0	0.0	0.0	0.0
6	6b	3.3	2.9	1.8	22.3	0.0	0.0	0.0	0.0
Maximum		3.3	2.9	2.7	22.3	0.0	0.0	0.0	0.0
High speed passes									
1	1a	3.2	2.5	2.1	4.1	0.0	0.0	0.0	0.0
Maximum		3.2	2.5	2.1	4.1	0.0	0.0	0.0	0.0

Table C.6 Plyon 5E Strain: Minimums

No. of trucks	Pass	Strain sensor (με)(Below Deck – Level B1)				Strain sensor (με) (Above Deck – Level T4)			
		SP5E_B1W S-E26W	SP5E_B1N S-E23N	SP5E_B1E S-E25E	SP5E_B1S S-E24S	SP5E_T4W S-E30W	SP5E_T4N S-E27N	SP5E_T4E S-E29E	SP5E_T4S S-E28S
Slow speed passes									
1	1a	-2.5	-2.5	-2.5	-4.3	0.0	0.0	0.0	0.0
	1b	-3.7	-2.6	-2.3	-5.2	0.0	0.0	0.0	0.0
	1c	-2.5	-3.5	-1.4	-5.5	0.0	0.0	0.0	0.0
	1d	-2.9	-2.9	-2.1	-6.8	0.0	0.0	0.0	0.0
	1e	-3.1	-2.6	-2.0	-3.2	0.0	0.0	0.0	0.0
	1f	-3.5	-2.0	-2.4	-7.5	0.0	0.0	0.0	0.0
4	4a	-3.5	-3.5	-3.1	-19.6	0.0	0.0	0.0	0.0
6	6b	-3.0	-4.1	-2.9	-29.0	0.0	0.0	0.0	0.0
Minimum		-3.7	-4.1	-3.1	-29.0	0.0	0.0	0.0	0.0
High speed passes									
1	1a	-4.2	-2.1	-2.3	-5.6	0.0	0.0	0.0	0.0
Minimum		-4.2	-2.1	-2.3	-5.6	0.0	0.0	0.0	0.0

Table C.7 Plyon 6E Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6E_T1W S-E34W	SP6E_T1N S - E31N	SP6E_T1E S-E33E	SP6E_T1S S-E32S	SP6E_T4W S-E38W	SP6E_T4N S-E35N	SP6E_T4E S-E37E	SP6E_T4S S-E36S
Slow speed passes									
1	1a	2.3	4.3	3.2	3.5	0.0	3.1	2	1.9
	1b	2.8	4.9	1.7	4.0	0.0	2.9	2.6	2.7
	1c	2.3	5.7	3.8	6.0	0.0	4.0	2.6	1.7
	1d	2.1	6.9	2.7	4.8	0.0	5.4	1.7	2.4
	1e	2.7	2.3	2.4	3.2	0.0	2.8	1.9	1.8
	1f	2.3	6.9	2.7	6.5	0.0	4.6	1.6	1.8
4	4a	2.8	18.1	2.2	14.9	0.0	11.3	2.1	4.5
6	6b	2.4	27.2	3.5	22.6	0.0	16.6	1.6	5.8
Maximum		2.8	27.2	3.8	22.6	0.0	16.6	2.6	5.8
High speed passes									
1	1a	2.1	4.8	2.5	4.2	0.0	3.6	1.6	2.9
Maximum		2.1	4.8	2.5	4.2	0.0	3.6	1.6	2.9

Table C.8 Plyon 6E Strain: Minimums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6E_T1W S-E34W	SP6E_T1N S - E31N	SP6E_T1E S-E33E	SP6E_T1S S-E32S	SP6E_T4W S-E38W	SP6E_T4N S-E35N	SP6E_T4E S-E37E	SP6E_T4S S-E36S
Slow speed passes									
1	1a	-2.3	-3.3	-2.6	-4.3	0.0	-2.7	-2.4	-3.4
	1b	-1.8	-4.2	-3.4	-4.2	0.0	-2.8	-1.1	-3.2
	1c	-3.1	-6.4	-2.1	-5.7	0.0	-3.2	-1.9	-5.9
	1d	-2.6	-6.5	-3.0	-7.9	0.0	-3.0	-2.5	-5.1
	1e	-2.2	-3.4	-3.0	-2.5	0.0	-2.4	-2.4	-2.4
	1f	-3.2	-7.3	-4.0	-7.5	0.0	-2.5	-2.6	-6.6
4	4a	-4.9	-16.7	-3.9	-20.9	0.0	-5.7	-2.0	-14.3
6	6b	-5.6	-25.0	-4.0	-30.3	0.0	-8.8	-2.6	-20.7
Minimum		-5.6	-25.0	-4.0	-30.3	0.0	-8.8	-2.6	-20.7
High speed passes									
1	1a	-2.6	-4.7	-2.3	-4.5	0.0	-3.2	-2.3	-3.4
Minimum		-2.6	-4.7	-2.3	-4.5	0.0	-3.2	-2.3	-3.4

Table C.9 Pylon 6W Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6W_T1W S-W26W	SP6W_T1N S-W23N	SP6W_T1E S-W25E	SP6W_T1S S-W24S	SP6W_T4W S-W30W	SP6W_T4E S-W29E	SP6W_T4S S-W28S	SP6W_T4N S-W27N
Slow speed passes									
1	1a	2.4	3.1	2.4	8.7	2.1	2.1	3.2	6.2
	1b	1.8	3.2	2.6	6.4	1.6	2.4	3.2	6.0
	1c	2.1	2.0	2.0	5.9	1.5	2.0	1.5	4.1
	1d	1.4	2.4	1.8	5.3	2.3	1.4	3.3	3.7
	1e	1.9	3.0	2.3	8.5	2.0	2.8	2.9	6.8
	1f	1.5	2.2	1.9	4.7	1.8	2.2	3.1	3.7
4	4a	2.2	4.1	2.0	22.6	1.8	1.4	7.5	15.0
6	6b	2.2	4.3	2.3	35.0	1.4	1.7	10.3	21.3
Maximum		2.4	4.3	2.6	35.0	2.3	2.8	10.3	21.3
High speed passes									
1	1a	2.0	2.2	2.5	9.0	2.1	2.7	2.8	6.3
Maximum		2.0	2.2	2.5	9.0	2.1	2.7	2.8	6.3

Table C.10 Pylon 6W Strain: Minimums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6W_T1W S-W26W	SP6W_T1N S-W23N	SP6W_T1E S-W25E	SP6W_T1S S-W24S	SP6W_T4W S-W30W	SP6W_T4E S-W29E	SP6W_T4S S-W28S	SP6W_T4N S-W27N
Slow speed passes									
1	1a	-1.9	-3.5	-2.4	-9.8	-2.5	-2.0	-8.0	-3.8
	1b	-1.8	-2.5	-2.8	-9.8	-2.1	-2.0	-6.8	-2.9
	1c	-1.8	-4.0	-2.4	-7.2	-2.3	-2.1	-6.4	-3.8
	1d	-2.2	-2.4	-2.4	-6.4	-1.4	-2.5	-4.2	-3.1
	1e	-2.2	-2.7	-2.6	-11.2	-2.7	-1.7	-8.4	-3.4
	1f	-2.2	-3.5	-2.1	-5.5	-1.5	-1.6	-3.8	-3.0
4	4a	-2.1	-3.5	-4.2	-29.4	-4.9	-3.4	-20.0	-10.0
6	6b	-1.9	-3.9	-6.3	-43.0	-6.6	-3.9	-29.3	-14.4
Minimum		-2.2	-4.0	-6.3	-43.0	-6.6	-3.9	-29.3	-14.4
High speed passes									
1	1a	-2.2	-2.8	-2.3	-11.0	-2.6	-2.6	-8.8	-4.4
Minimum		-2.2	-2.8	-2.3	-11.0	-2.6	-2.6	-8.8	-4.4

Table C.11 East Edge Girder – Top Strain: Maximums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108T S-E1	SDE_101T S-E3	SDE_210T S-E5	SDE_CJT S-E7	SDE_315T S-E9	SDE_310T S-E11	SDE_305T S-E13	SDE_301T S-E15	SDE_404T S-E17	SDE_408T S-E19	SDE_412T S-E21
Slow speed passes												
1	1a	0.0	1.8	3.6	1.6	2.8	2.7	2.3	2.6		2.3	2.2
	1b	0.0	1.8	3.0	2.1	2.8	2.2	3.1	3.2		2.2	1.7
	1c	0.0	1.6	2.2	2.3	2.9	2.1	2.5	5.8		1.3	2.6
	1d	0.0	1.6	2.7	1.6	3.1	2.3	2.9	7.2		2.2	2.8
	1e	0.0	2.0	2.9	2.1	2.5	2.8	2.7	2.1		2.7	1.9
	1f	0.0	1.9	3.6	2.7	3.0	2.4	2.9	7.7		1.9	2.9
4	4a	0.0	2.0	3.4	2.9	3.8	3.0	3.6	15.1		2.6	6.5
6	6b	0.0	3.0	5.4	5.1	5.0	3.6	5.2	21.9		2.5	8.5
Maximum		0.0	3.0	5.4	5.1	5.0	3.6	5.2	21.9		2.7	8.5
High speed passes												
1	1a	0.0	3.5	2.4	2.7	3.2	2.7	3.0	3.4	2.6	2.6	3.2
Maximum		0.0	3.5	2.4	2.7	3.2	2.7	3.0	3.4	2.6	2.6	3.2

Table C.12 East Edge Girder – Top Strain: Minimums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108T S-E1	SDE_101T S-E3	SDE_210T S-E5	SDE_CJT S-E7	SDE_315T S-E9	SDE_310T S-E11	SDE_305T S-E13	SDE_301T S-E15	SDE_404T S-E17	SDE_408T S-E19	SDE_412T S-E21
Slow speed passes												
1	1a	0.0	-3.9	-2.5	-2.6	-3.9	-2.5	-3.5	-2.6		-2.0	-3.4
	1b	0.0	-4.5	-3.2	-2.7	-2.4	-2.1	-2.5	-2.4		-2.4	-4.9
	1c	0.0	-8.1	-7.2	-7.6	-6.2	-6.2	-7.4	-2.4		-5.7	-9.7
	1d	0.0	-9.1	-9.1	-10.5	-8.5	-8.1	-8.9	-2.3		-7.8	-13.0
	1e	0.0	-2.7	-2.7	-1.9	-3.3	-2.5	-2.5	-2.3		-1.8	-2.3
	1f	0.0	-10.9	-9.7	-11.9	-10.6	-10.1	-11.1	-2.8		-9.8	-14.3
4	4a	0.0	-22.5	-15.1	-19.5	-17.8	-15.5	-19.7	-4.7		-14.9	-30.0
6	6b	0.0	-31.3	-21.4	-27.1	-24.9	-21.3	-26.2	-6.6		-20.4	-42.5
Minimum		0.0	-31.3	-21.4	-27.1	-24.9	-21.3	-26.2	-6.6		-20.4	-42.5
High speed passes												
1	1a	0.0	-5.3	-2.9	-2.2	-2.2	-2.4	-3.3	-3.2	-3.0	-2.5	-4.1
Minimum		0.0	-5.3	-2.9	-2.2	-2.2	-2.4	-3.3	-3.2	-3.0	-2.5	-4.1

Table C.13 East Edge Girder – Bottom Strain: Maximums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108B S-E2	SDE_101B S-E4	SDE_210B S-E6	SDE_CJB S-E8	SDE_315B S-E10	SDE_E310B S-E12	SDE_305B S-E14	SDE_301B S-E16	SDE_404B S-E18	SDE_408B S-E20	SDE_412B S-E22
Slow speed passes												
1	1a	0.0	2.7	9.5	9.9	9.3	6.7	5.8	1.6		7.8	12.1
	1b	0.0	2.7	12.5	14.7	12.9	9.1	8.2	2.1		10.3	14.5
	1c	0.0	5.2	20.0	24.5	20.6	15.8	13.1	2.1		18.9	21.8
	1d	0.0	6.2	26.1	29.4	25.1	19.1	16.6	2.9		24.5	26.0
	1e	0.0	1.5	7.8	7.8	6.7	5.1	4.0	2.3		5.8	9.8
	1f	0.0	7.2	27.0	31.6	26.9	19.2	18.1	2.1		26.1	28.5
4	4a	0.0	15.4	64.5	77.2	67.5	48.5	42.0	3.4		60.8	77.6
6	6b	0.0	20.8	91.7	114.1	99.8	70.8	58.7	2.8		87.0	116.7
Maximum		0.0	20.8	91.7	114.1	99.8	70.8	58.7	3.4		87.0	116.7
High speed passes												
1	1a	0.0	2.9	10.9	11.5	11.9	7.3	6.3	3.0	5.7	9.6	14.4
Maximum		0.0	2.9	10.9	11.5	11.9	7.3	6.3	3.0	5.7	9.6	14.4

Table C.14 East Edge Girder – Bottom Strain: Minimums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108B S-E2	SDE_101B S-E4	SDE_210B S-E6	SDE_CJB S-E8	SDE_315B S-E10	SDE_E310B S-E12	SDE_305B S-E14	SDE_301B S-E16	SDE_404B S-E18	SDE_408B S-E20	SDE_412B S-E22
Slow speed passes												
1	1a	0.0	-2.1	-5.2	-3.2	-3.6	-4.1	-3.7	-4.5		-3.1	-5.6
	1b	0.0	-2.7	-6.3	-3.0	-4.2	-5.8	-4.4	-4.5		-5.0	-6.4
	1c	0.0	-3.1	-8.3	-3.1	-5.4	-6.3	-7.3	-6.8		-5.6	-6.8
	1d	0.0	-3.5	-8.0	-3.4	-6.2	-7.0	-7.9	-7.6		-5.7	-7.3
	1e	0.0	-2.7	-4.5	-3.0	-3.9	-3.7	-2.8	-2.3		-3.0	-5.1
	1f	0.0	-3.1	-9.0	-3.4	-6.8	-8.3	-8.9	-8.1		-6.4	-7.7
4	4a	0.0	-5.4	-20.0	-6.1	-16.8	-19.3	-21.8	-19.9		-14.4	-27.7
6	6b	0.0	-7.1	-29.0	-9.2	-23.2	-27.0	-32.7	-28.7		-19.7	-42.8
Minimum		0.0	-7.1	-29.0	-9.2	-23.2	-27.0	-32.7	-28.7		-19.7	-42.8
High speed passes												
1	1a	0.0	-3.4	-5.5	-4.4	-4.7	-5.1	-5.7	-4.5	-6.1	-4.4	-6.8
Minimum		0.0	-3.4	-5.5	-4.4	-4.7	-5.1	-5.7	-4.5	-6.1	-4.4	-6.8

Table C.15 West Edge Girder – Top Strain: Maximums

No. of trucks	Pass	Strain sensor (με)										
		SDW_108T S-W1	SDW_101T S-W3	SDW_210T S-W5	SDW_CJT S-W7	SDW_315T S-W9	SDW_310T S-W11	SDW_305T S-W13	SDW_301T S-W15	SDW_404T S-W17	SDW_408T S-W19	SDW_412T S-W21
Slow speed passes												
1	1a	2.2	7.1	2.8	2.3	3.4	2.1	1.9	7.6		2.1	2.9
	1b	1.6	5.8	2.9	2.3	3.3	2.4	2.6	6.8		2.7	3.3
	1c	1.8	3.9	2.3	2.2	4.3	1.9	1.6	5.3		2.1	3.0
	1d	1.4	3.2	3.1	2.5	2.6	2.4	1.7	3.4		2.2	3.0
	1e	1.7	7.4	2.4	2.0	2.8	1.9	2.5	8.7		1.5	3.0
	1f	1.5	2.5	2.5	2.3	3.5	2.0	2.0	3.5		1.6	2.8
4	4a	2.4	17.3	3.9	3.9	5.3	3.1	2.7	17.8		2.6	7.0
6	6b	3.3	26.0	6.1	5.0	6.9	4.4	4.4	27.6		2.7	10.9
Maximum		3.3	26.0	6.1	5.0	6.9	4.4	4.4	27.6		2.7	10.9
High speed passes												
1	1a	3.4	8.0	2.9	2.9	2.8	2.5	3.1	7.6	2.7	2.8	3.9
Maximum		3.4	8.0	2.9	2.9	2.8	2.5	3.1	7.6	2.7	2.8	3.9

Table C.16 West Edge Girder – Top Strain: Minimums

No. of trucks	Pass	Strain sensor (με)										
		SDW_108T S-W1	SDW_101T S-W3	SDW_210T S-W5	SDW_CJT S-W7	SDW_315T S-W9	SDW_310T S-W11	SDW_305T S-W13	SDW_301T S-W15	SDW_404T S-W17	SDW_408T S-W19	SDW_412T S-W21
Slow speed passes												
1	1a	-8.4	-3.4	-10.7	-11.3	-11.4	-10.0	-9.8	-3.0		-9.0	-16.3
	1b	-6.7	-3.4	-7.1	-8.6	-8.3	-7.6	-7.8	-2.8		-5.8	-12.4
	1c	-3.0	-3.0	-3.4	-4.4	-4.0	-4.0	-5.6	-2.2		-3.2	-7.8
	1d	-2.5	-2.6	-3.4	-2.4	-3.3	-2.5	-3.0	-2.6		-2.4	-5.5
	1e	-10.1	-3.7	-12.2	-13.0	-13.6	-12.1	-11.5	-3.2		-10.1	-18.7
	1f	-2.1	-2.5	-3.0	-2.1	-2.6	-2.2	-1.8	-2.2		-2.1	-4.0
4	4a	-17.8	-6.8	-19.9	-24.7	-21.5	-20.7	-23.3	-5.8		-18.1	-39.0
6	6b	-26.9	-9.4	-30.9	-38.3	-34.3	-33.3	-35.3	-7.8		-28.0	-59.4
Minimum		-26.9	-9.4	-30.9	-38.3	-34.3	-33.3	-35.3	-7.8		-28.0	-59.4
High speed passes												
1	1a	-8.6	-4.4	-9.8	-11.9	-12.0	-11.9	-10.9	-3.6	-8.3	-9.1	-16.6
Minimum		-8.6	-4.4	-9.8	-11.9	-12.0	-11.9	-10.9	-3.6	-8.3	-9.1	-16.6

Table C.17 West Edge Girder – Bottom Strain: Maximums

No. of trucks	Pass	Strain sensor (με)									
		SDW_108B S-W2	SDW_101B S-W4	SDW_210B S-W6	SDW_CJB S-W8	SDW_315B S-W10	SDW_310B S-W12	SDW_305B S-W14	SDW_404B S-W18	SDW_408B S-W20	SDW_412B S-W22
Slow speed passes											
1	1a	27.6	2.9	27.6	32.0	27.5	21.4	16.6		27.2	27.3
	1b	22.0	2.1	24.7	28.0	23.3	19.3	14.0		21.6	24.0
	1c	15.8	2.6	15.7	19.8	16.7	12.4	9.1		15.0	17.8
	1d	12.1	2.8	12.7	15.2	14.2	9.9	7.6		11.1	15.3
	1e	32.1	2.3	29.6	36.0	30.7	24.8	20.3		29.7	29.7
	1f	9.8	2.2	9.9	12.4	10.7	8.6	5.8		7.6	12.8
4	4a	75.1	1.4	78.7	91.1	81.2	60.6	48.1		72.5	88.8
6	6b	119.8	2.7	118.5	140.8	127.7	94.7	75.2		112.9	144.8
Maximum		119.8	2.9	118.5	140.8	127.7	94.7	75.2		112.9	144.8
High speed passes											
1	1a	28.3	3.2	27.3	32.1	30.0	24.3	18.6	14.0	27.1	28.6
Maximum		28.3	3.2	27.3	32.1	30.0	24.3	18.6	14.0	27.1	28.6

Table C.18 West Edge Girder – Bottom Strain: Minimums

No. of trucks	Pass	Strain sensor (με)									
		SDW_108B S-W2	SDW_101B S-W4	SDW_210B S-W6	SDW_CJB S-W8	SDW_315B S-W10	SDW_310B S-W12	SDW_305B S-W14	SDW_404B S-W18	SDW_408B S-W20	SDW_412B S-W22
Slow speed passes											
1	1a	-7.5	-9.5	-9.4	-3.9	-7.0	-9.2	-9.2		-5.8	-7.7
	1b	-6.9	-7.7	-7.7	-3.2	-6.0	-7.7	-8.0		-5.2	-7.0
	1c	-5.2	-6.3	-7.1	-2.7	-5.4	-6.2	-6.7		-5.1	-6.4
	1d	-4.7	-5.0	-5.3	-3.4	-4.1	-5.1	-4.4		-3.8	-6.4
	1e	-7.8	-9.8	-10.7	-4.3	-7.7	-10.2	-10.1		-5.7	-8.3
	1f	-3.7	-4.9	-4.9	-2.6	-3.7	-4.2	-4.4		-3.7	-5.7
4	4a	-20.6	-25.5	-25.1	-6.9	-18.4	-22.8	-24.3		-15.5	-30.7
6	6b	-32.0	-37.1	-39.0	-10.6	-28.9	-35.3	-39.5		-24.3	-48.5
Minimum		-32.0	-37.1	-39.0	-10.6	-28.9	-35.3	-39.5		-24.3	-48.5
High speed passes											
1	1a	-8.7	-10.1	-11.3	-6.5	-8.0	-9.2	-9.5	-9.6	-6.2	-10.0
Minimum		-8.7	-10.1	-11.3	-6.5	-8.0	-9.2	-9.5	-9.6	-6.2	-10.0

Table C.19 Deck Strain: Maximums

No. of trucks	Pass	Strain sensor (με)	
		SDC_210N S-C1	SDC_210S S-C2
Slow speed passes			
1	1a	1.6	3.0
	1b	1.5	1.7
	1c	1.9	2.1
	1d	2.0	1.4
	1e	1.6	1.7
	1f	2.5	1.8
4	4a	3.4	3.2
6	6b	4.5	3.9
Maximum		4.5	3.9
High speed passes			
1	1a	2.1	2.5
Maximum		2.1	2.5

Table C.20 Deck Strain: Minimums

No. of trucks	Pass	Strain sensor (με)	
		SDC_210N S-C1	SDC_210S S-C2
Slow speed passes			
1	1a	-5.5	-3.7
	1b	-9.0	-7.4
	1c	-14.1	-10.6
	1d	-8.9	-7.5
	1e	-4.0	-3.2
	1f	-6.4	-4.9
4	4a	-34.1	-28.2
6	6b	-45.4	-38.7
Minimum		-45.4	-38.7
High speed passes			
1	1a	-5.8	-4.1
Minimum		-5.8	-4.1

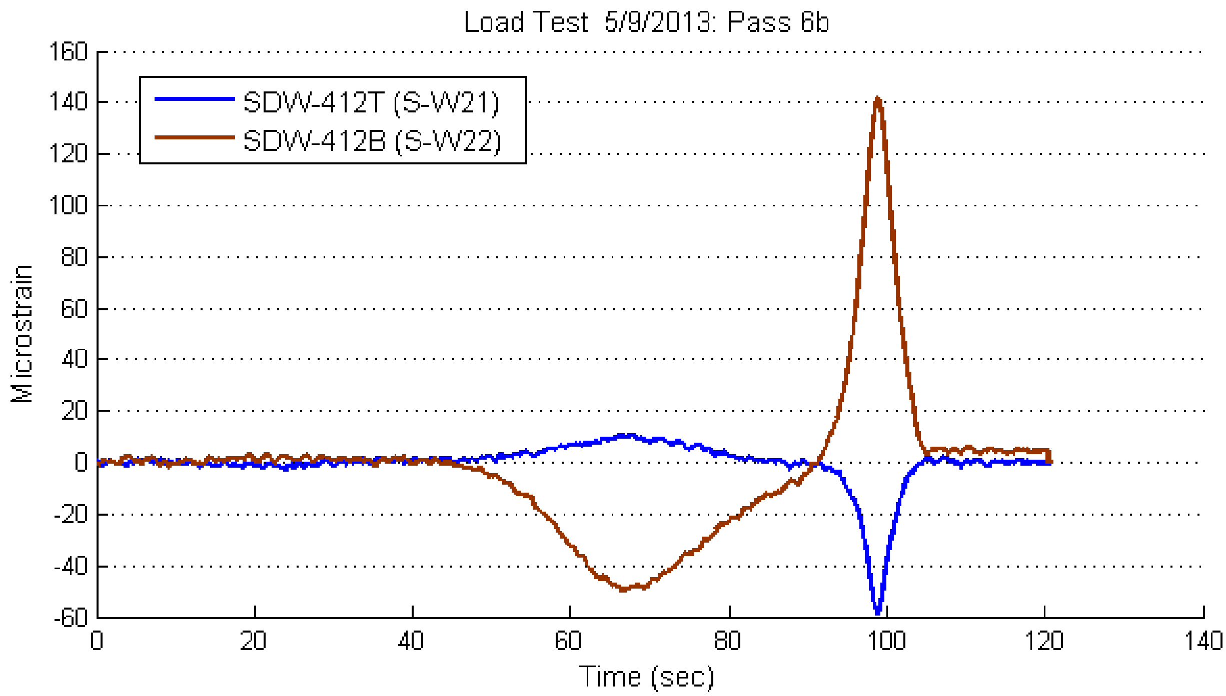


Figure C.1 Edge girder strain time history - section 412

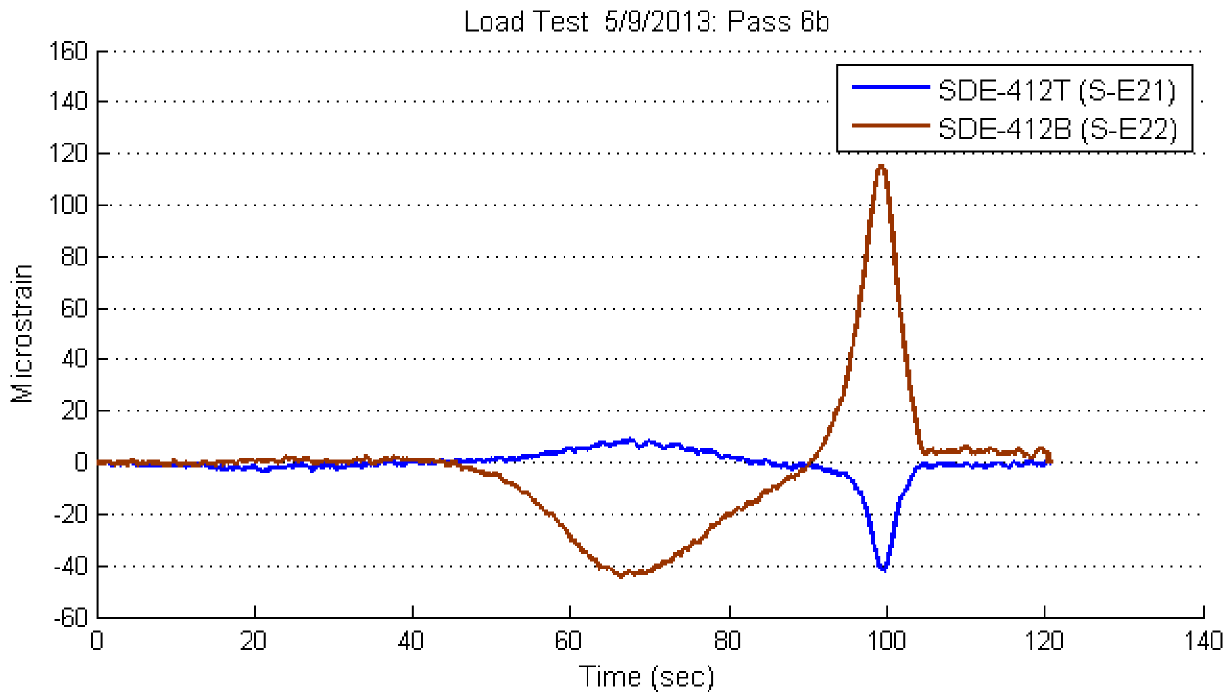


Figure C.2 Edge girder strain time history - section 412

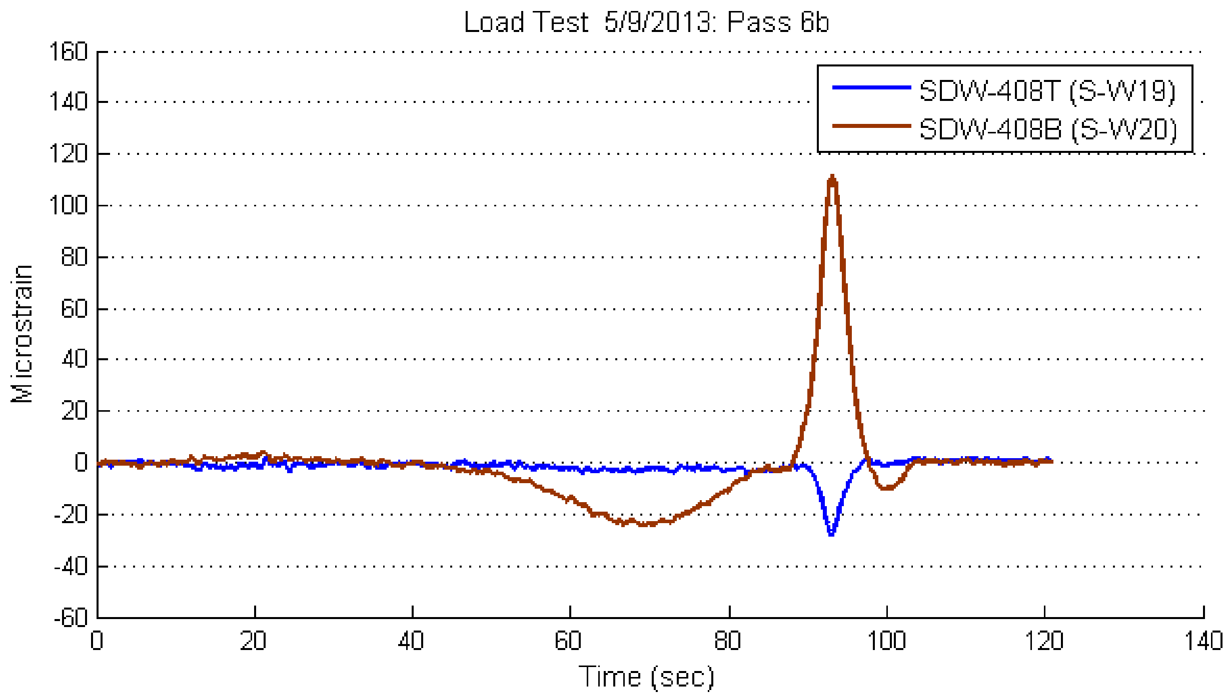


Figure C.3 West edge girder strain time history - section 408

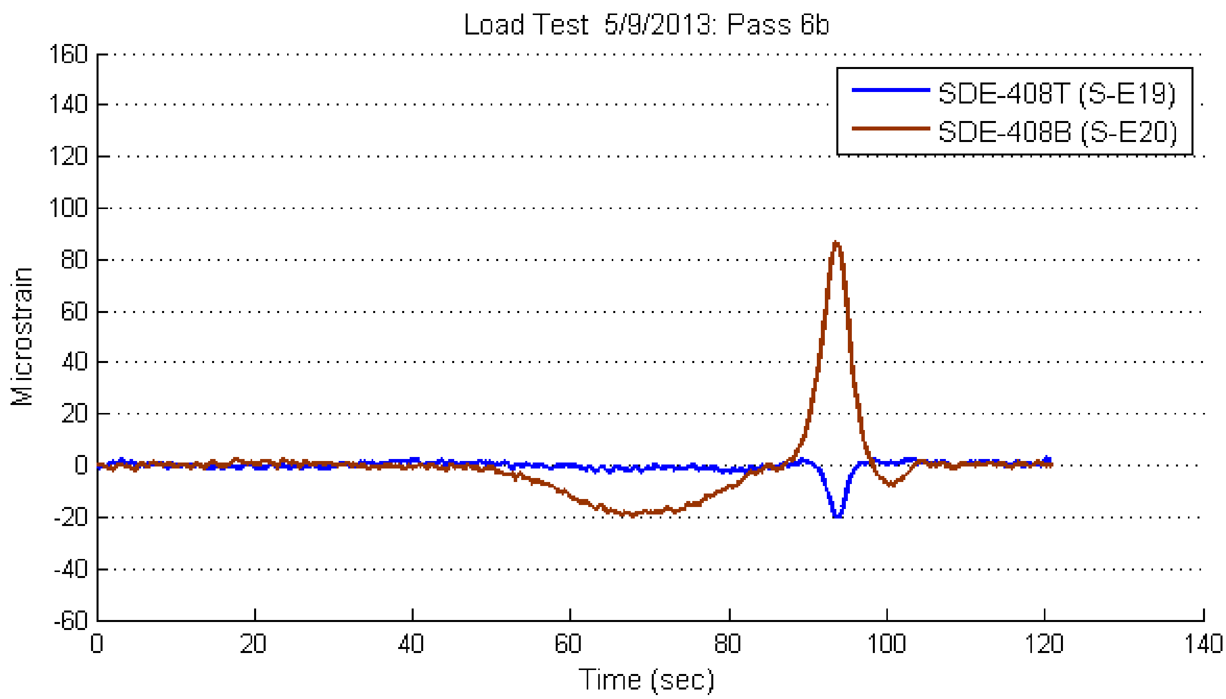


Figure C.4 East edge girder strain time history - section 408

Figure C.5 West edge girder strain time history - section 404

Figure C.6 East edge girder strain time history - section 404

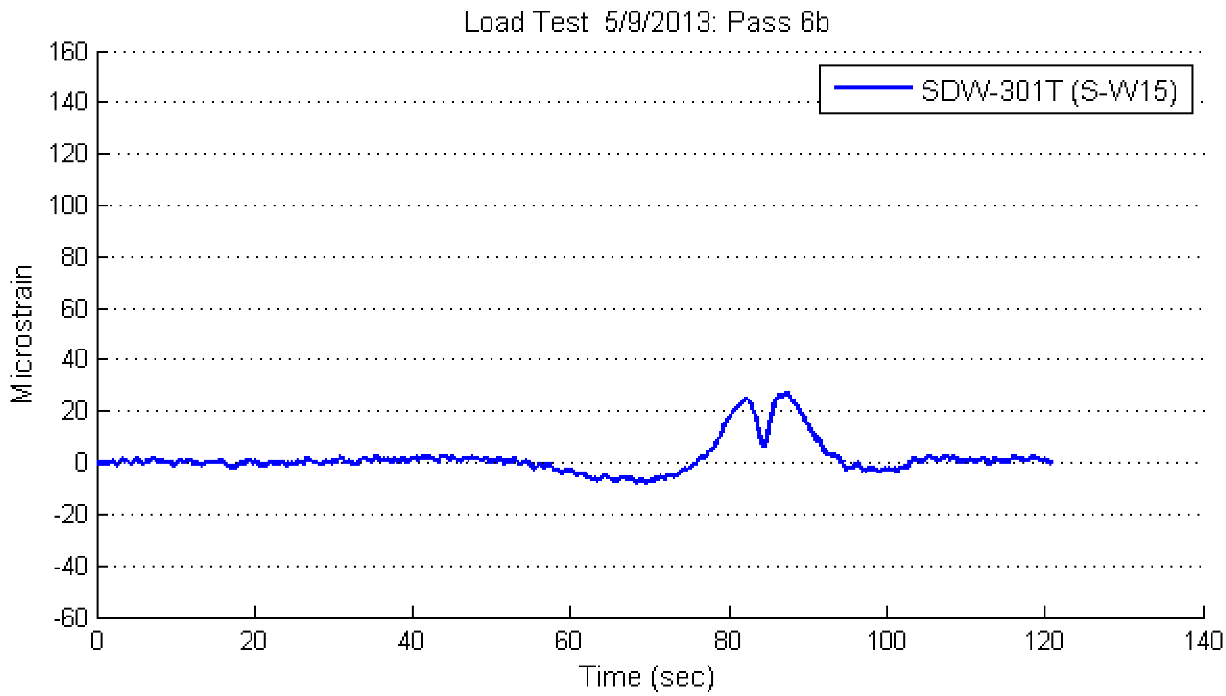


Figure C.7 West edge girder strain time history - section 301

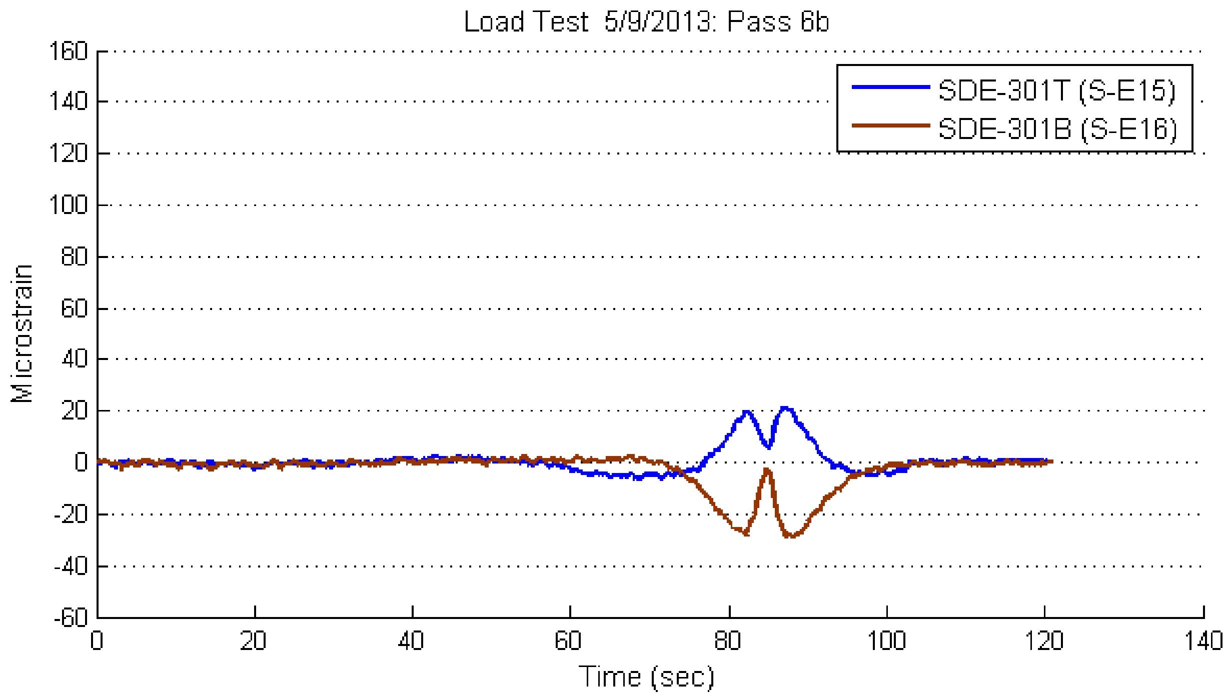


Figure C.8 East edge girder strain time history - section 301

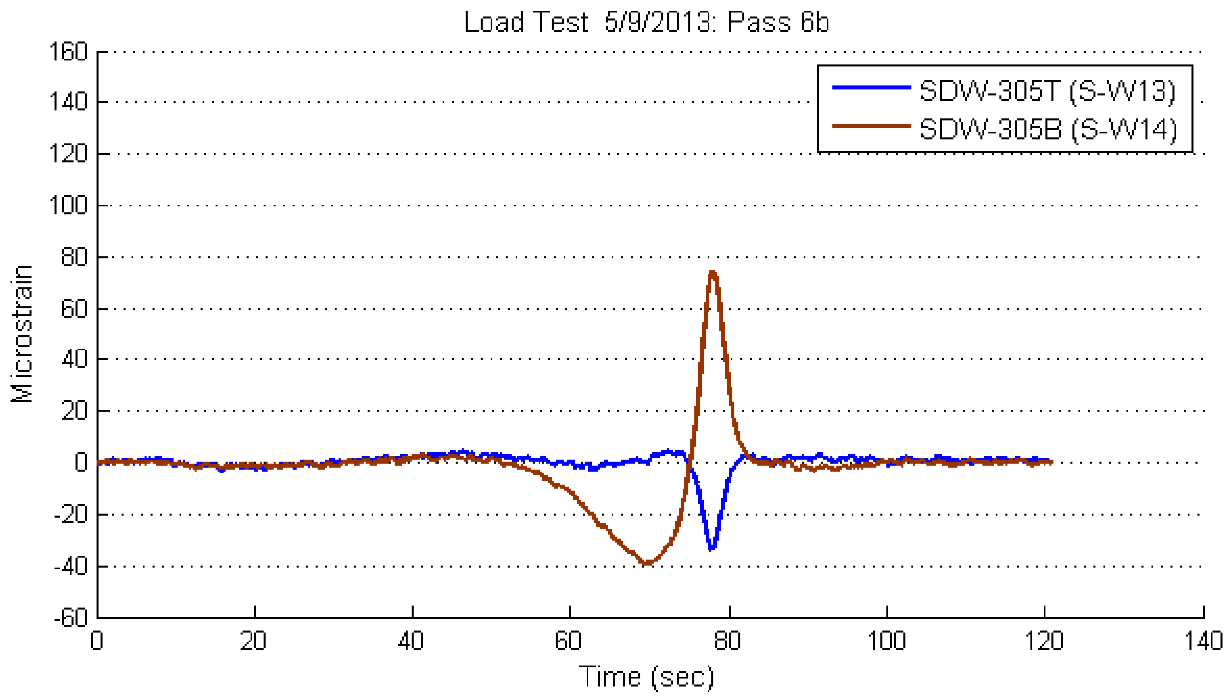


Figure C.9 West edge girder strain time history - section 305

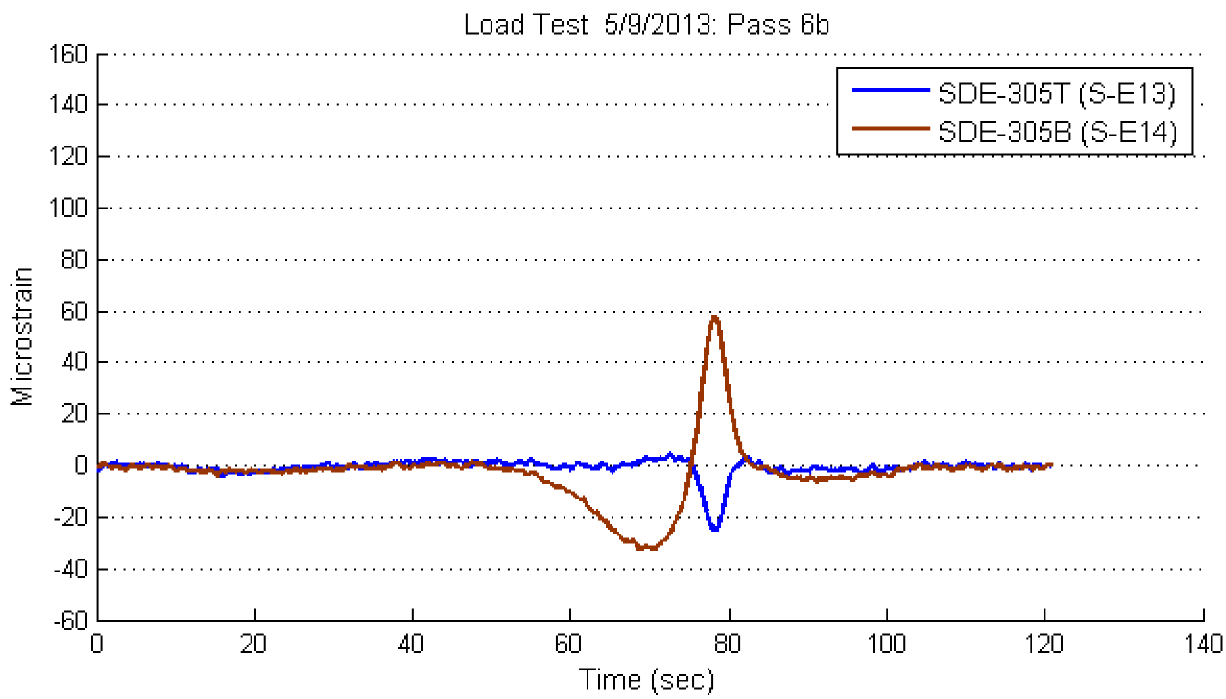


Figure C.10 East edge girder strain time history - section 305

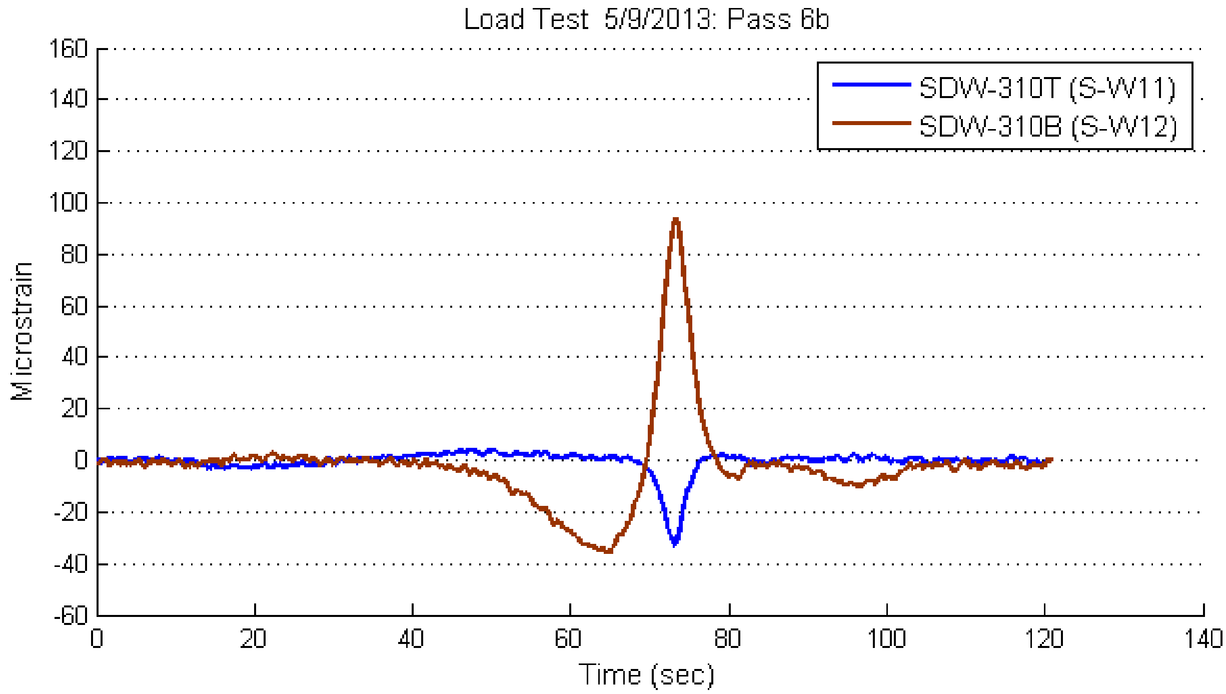


Figure C.11 East edge girder strain time history - section 310

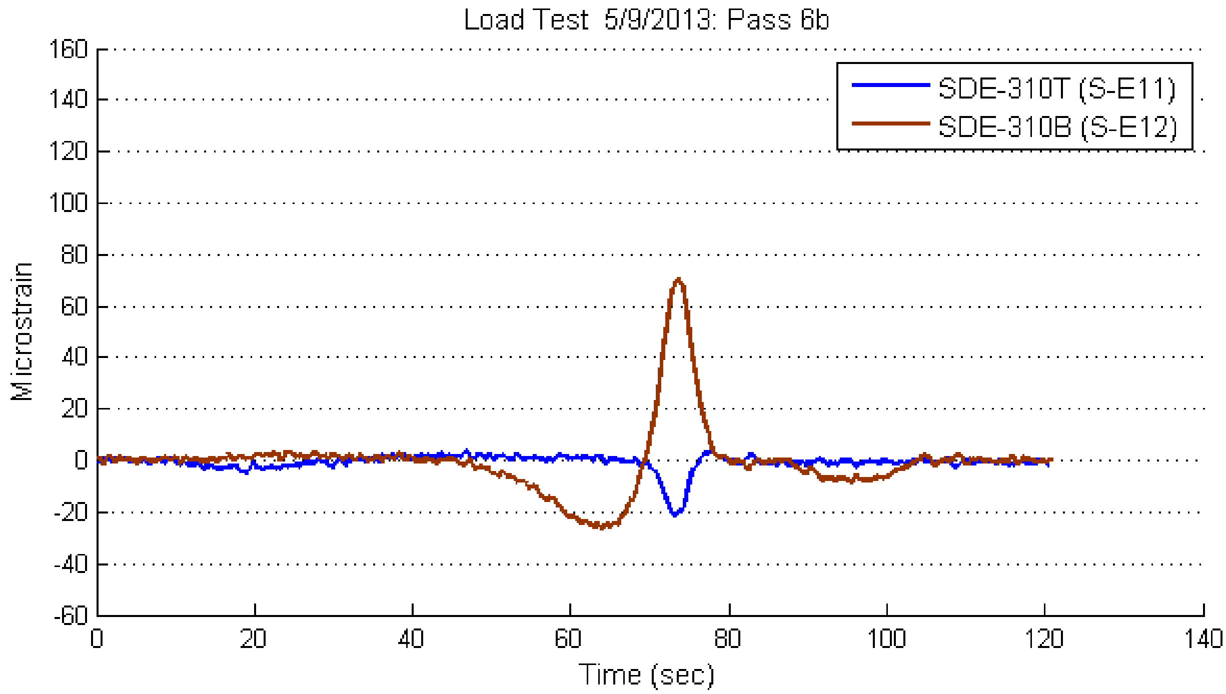


Figure C.12 East edge girder strain time history - section 310

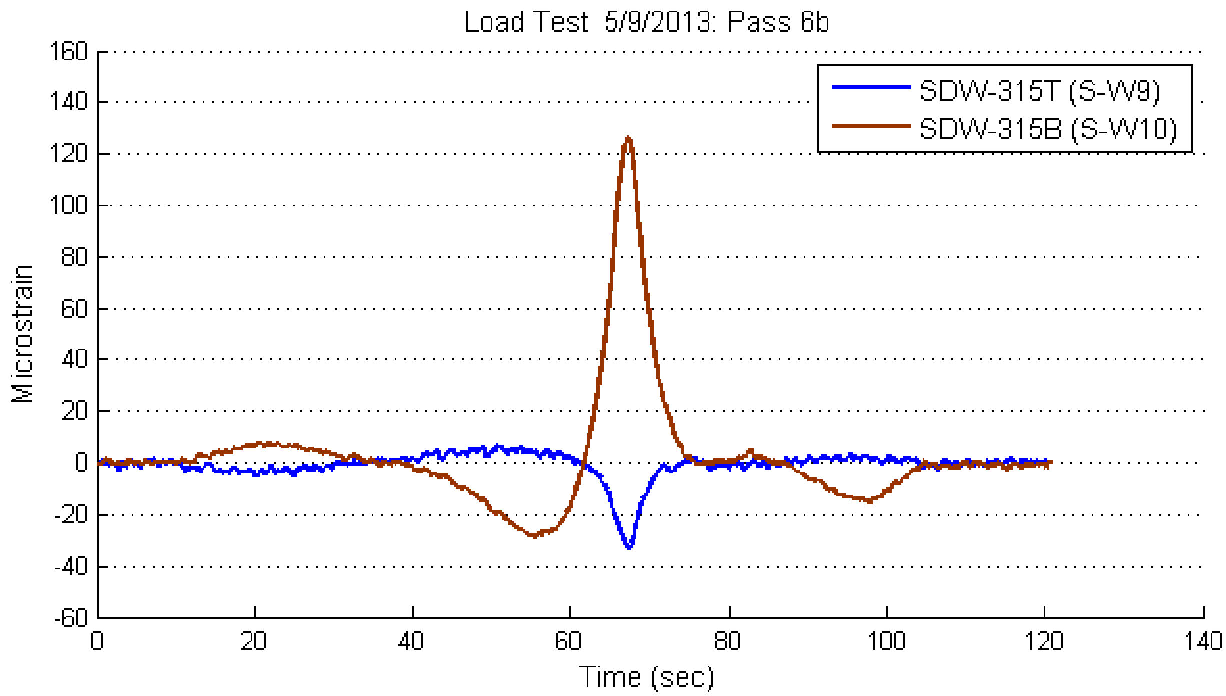


Figure C.13 West edge girder strain time history - section 315

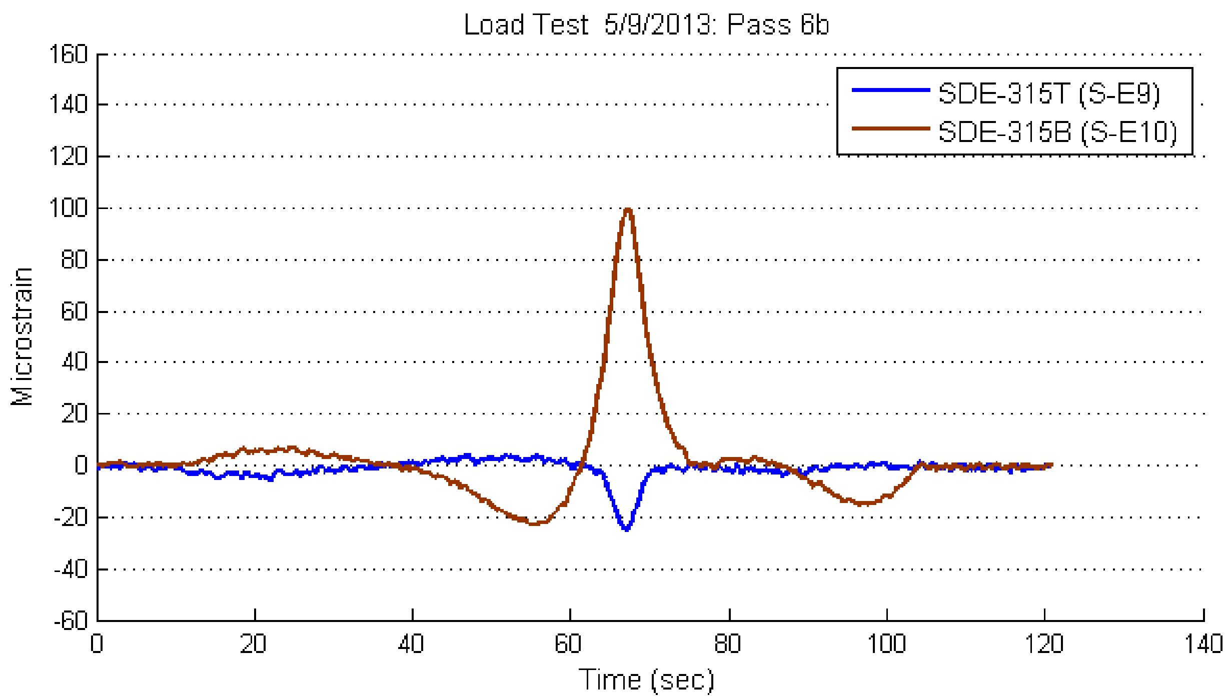


Figure C.14 East edge girder strain time history - section 315

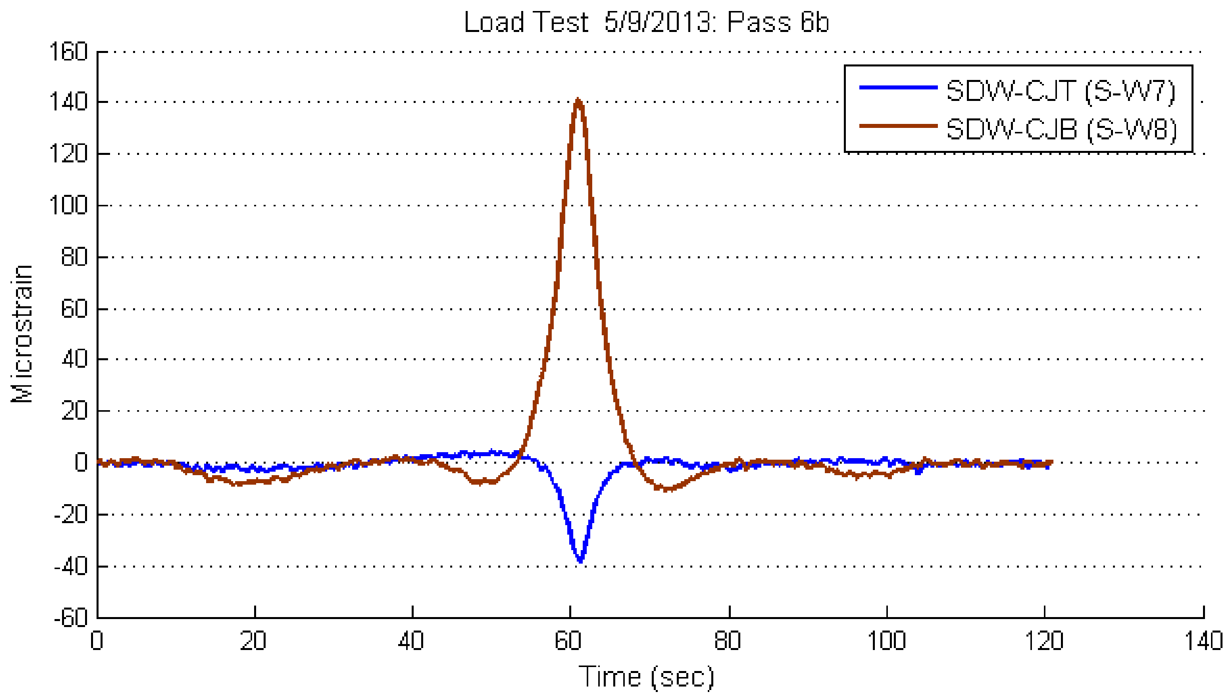


Figure C.15 West edge girder strain time history - closure joint

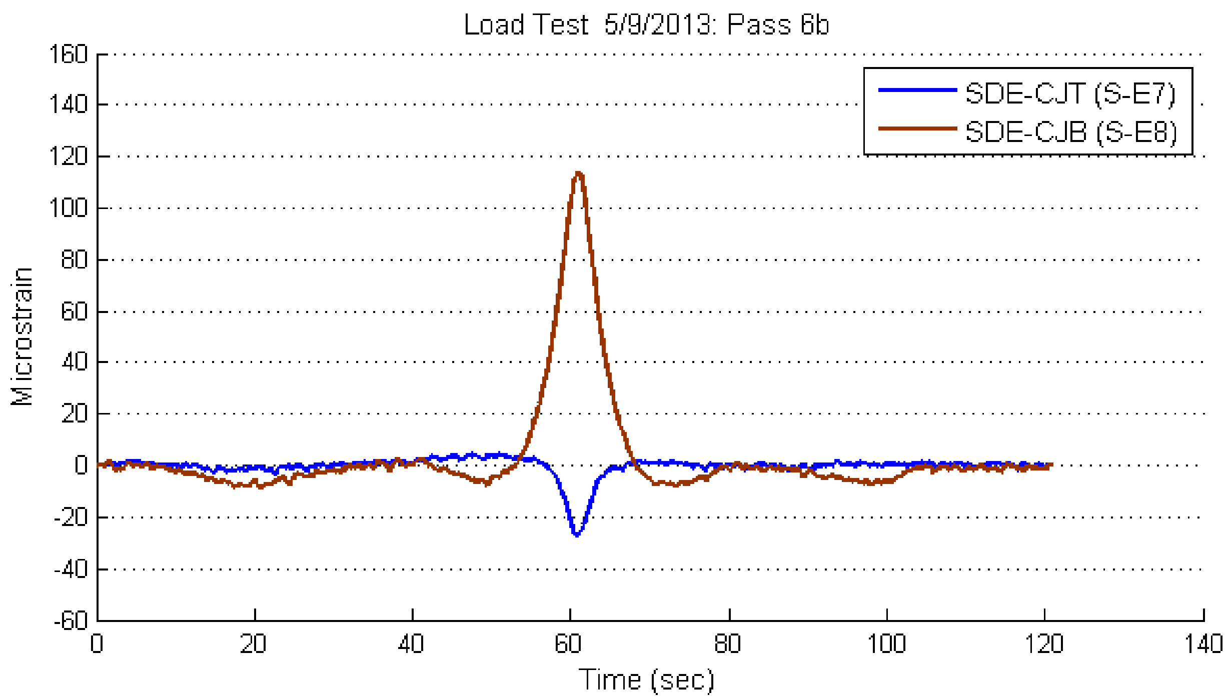


Figure C.16 East edge girder strain time history - closure joint

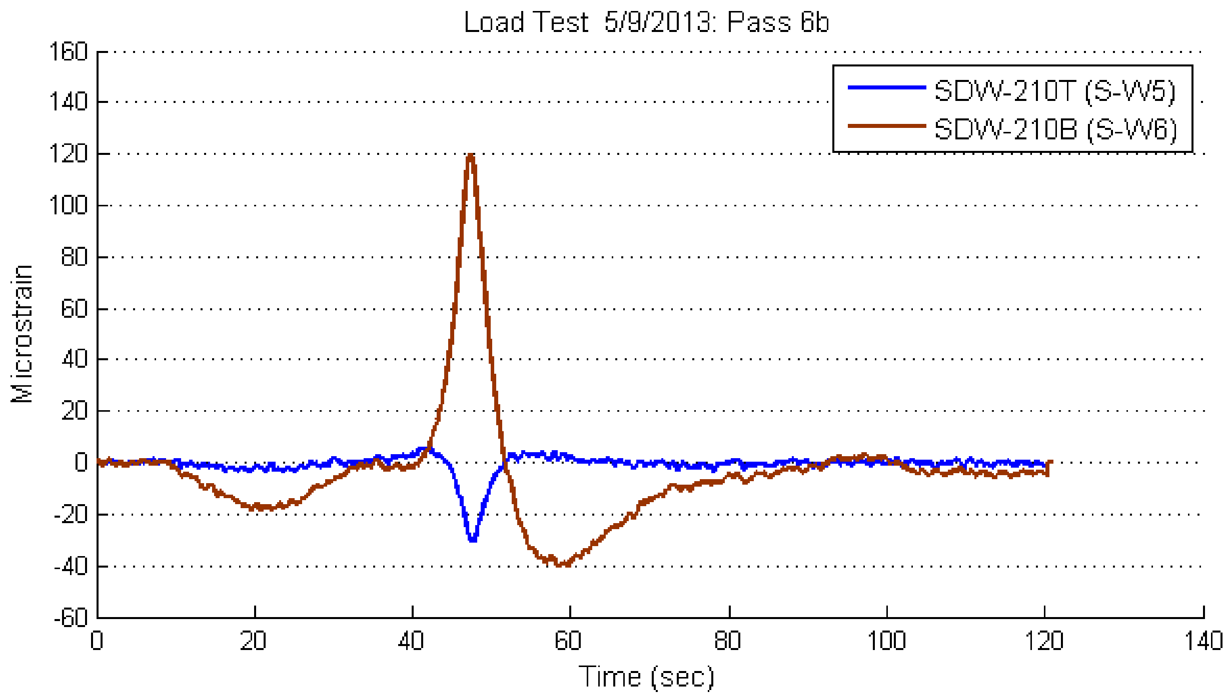


Figure C.17 West edge girder strain time history - section 210

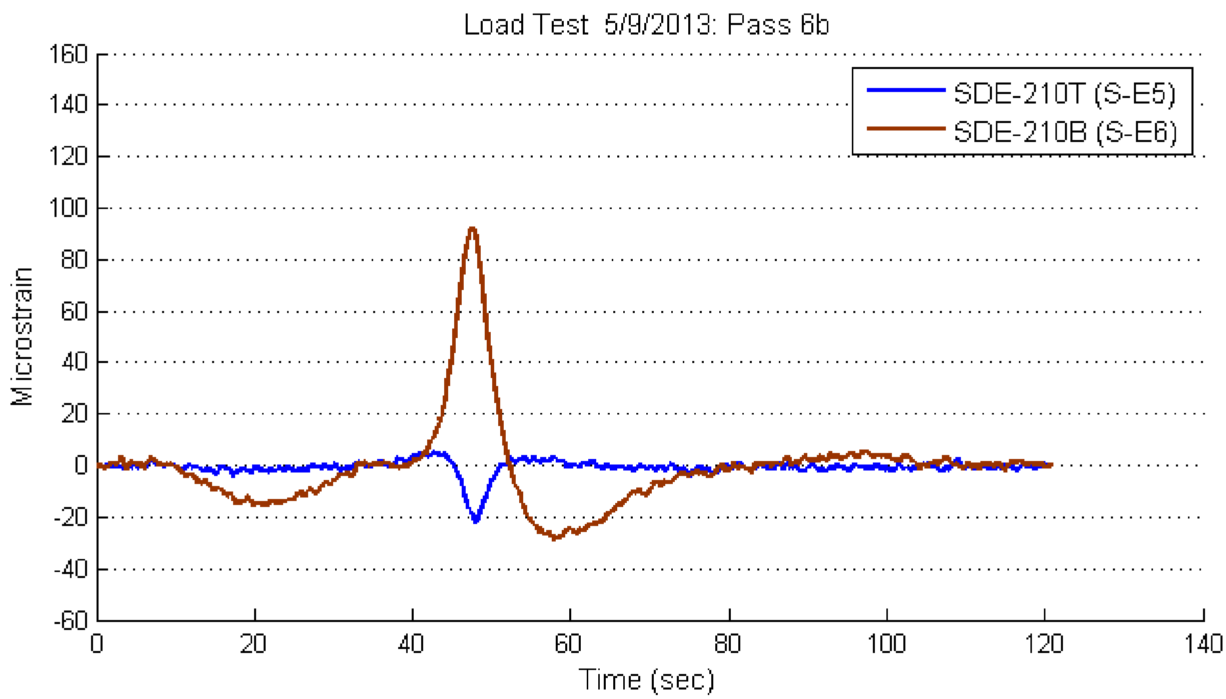


Figure C.18 East edge girder strain time history - section 210

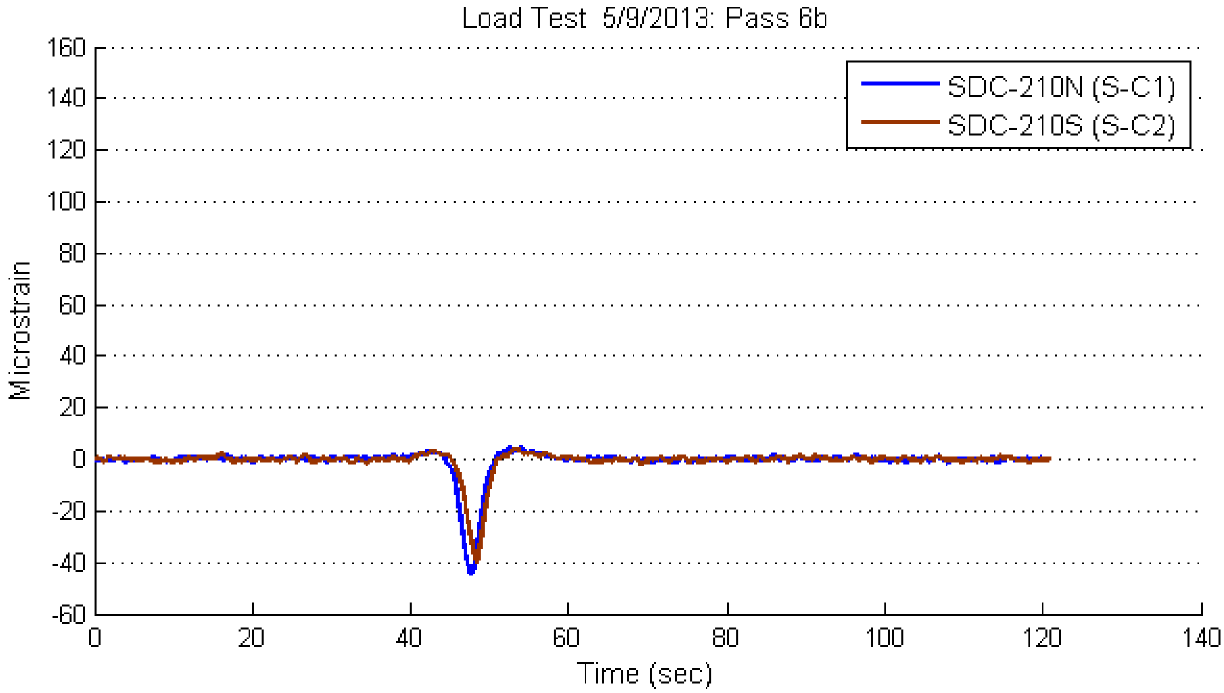


Figure C.19 Deck strain time history - section 210

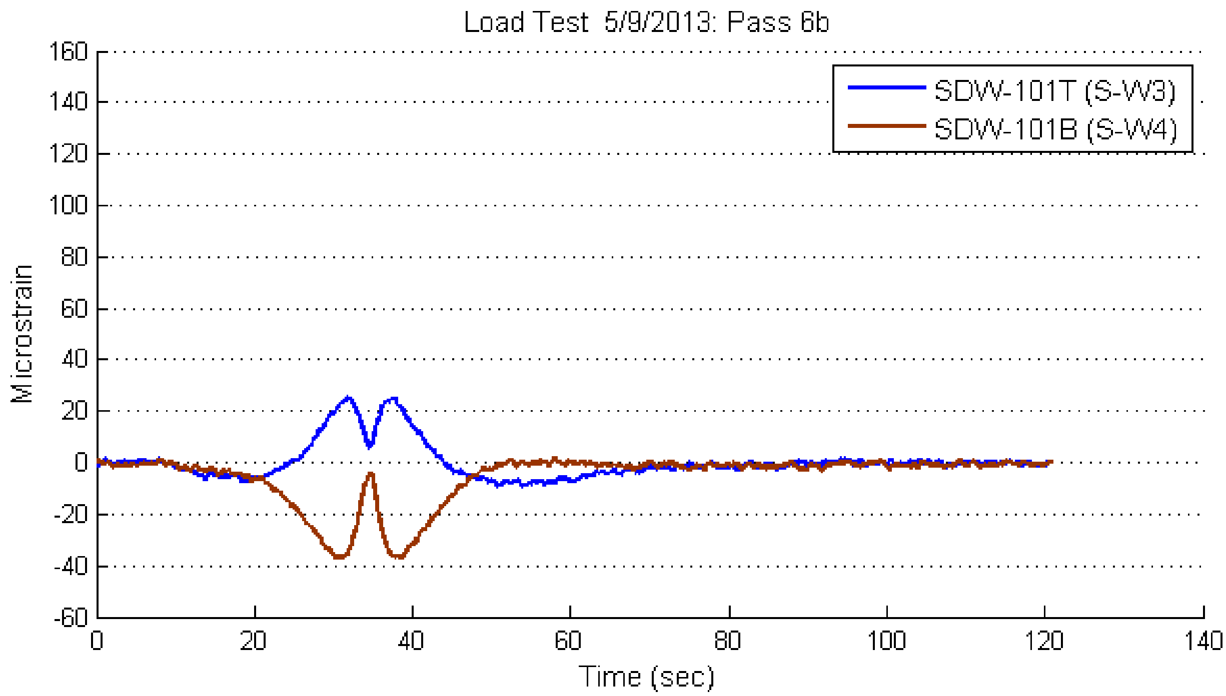


Figure C.20 West edge girder strain time history - section 101

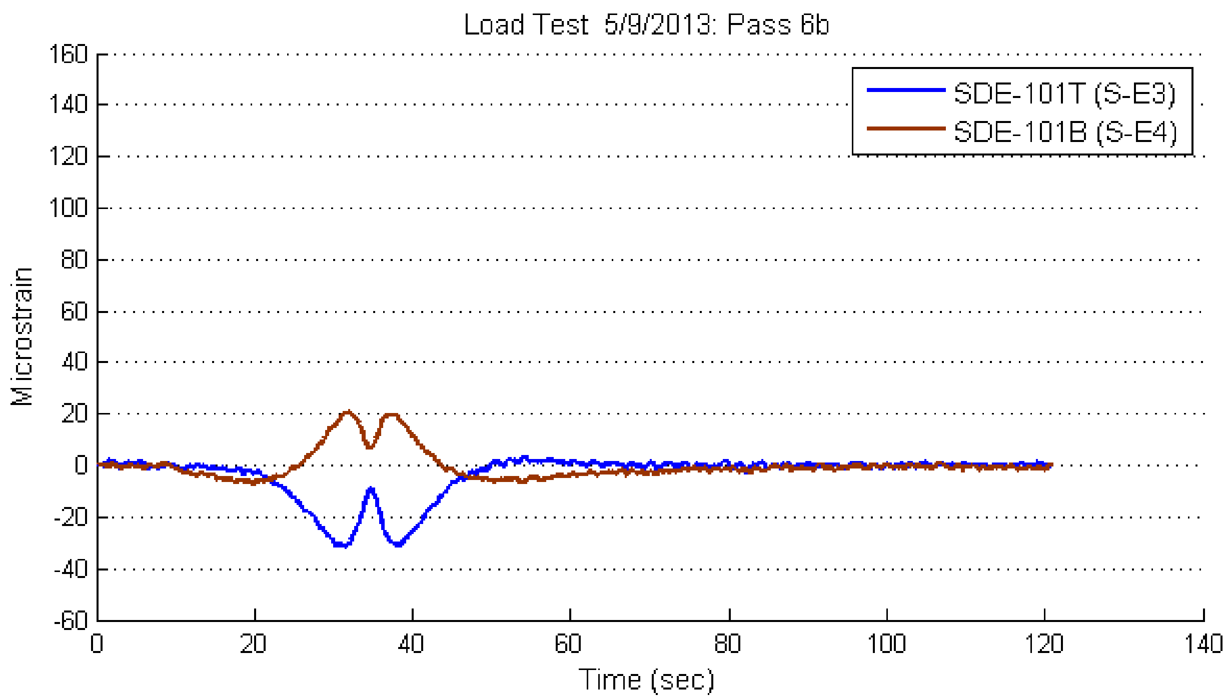


Figure C.21 East edge girder strain time history - section 101

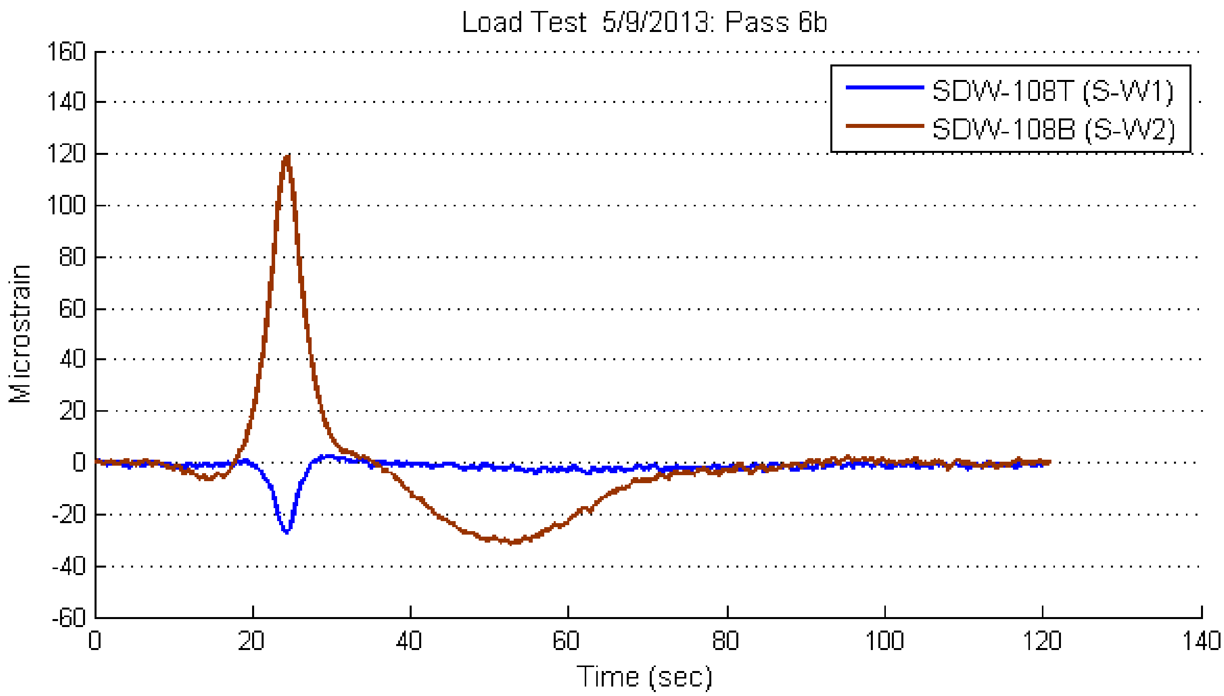


Figure C.22 West edge girder strain time history - section 108

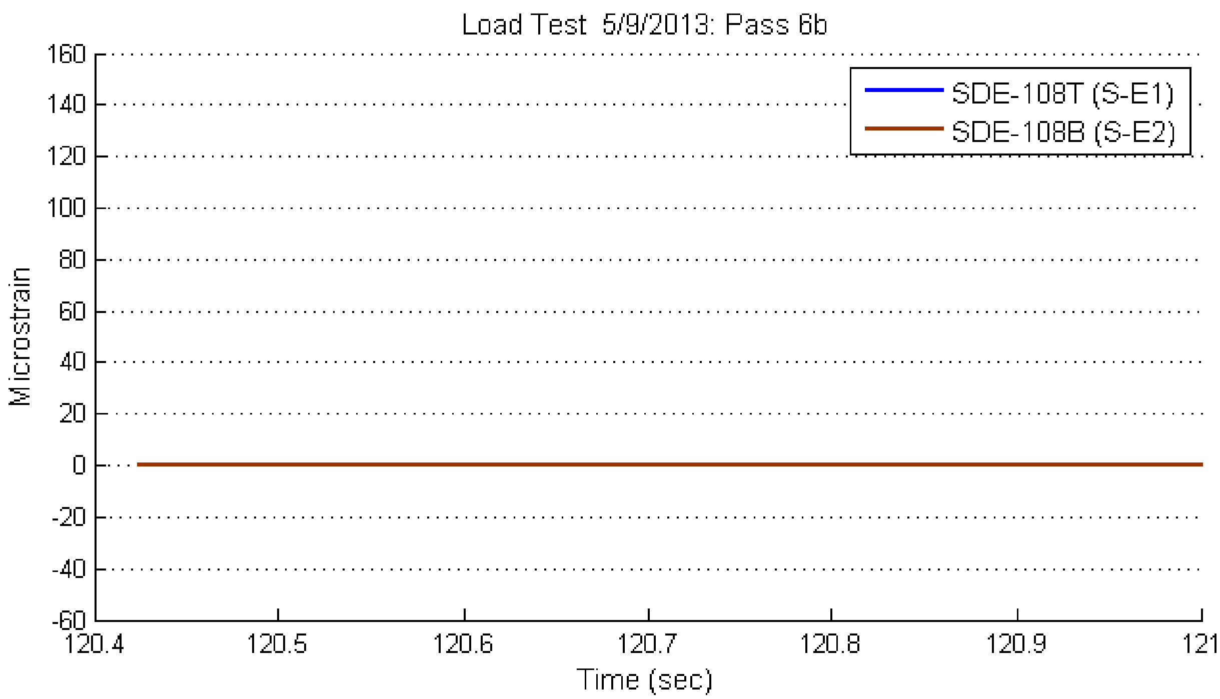


Figure C.23 East edge girder strain time history - section 108

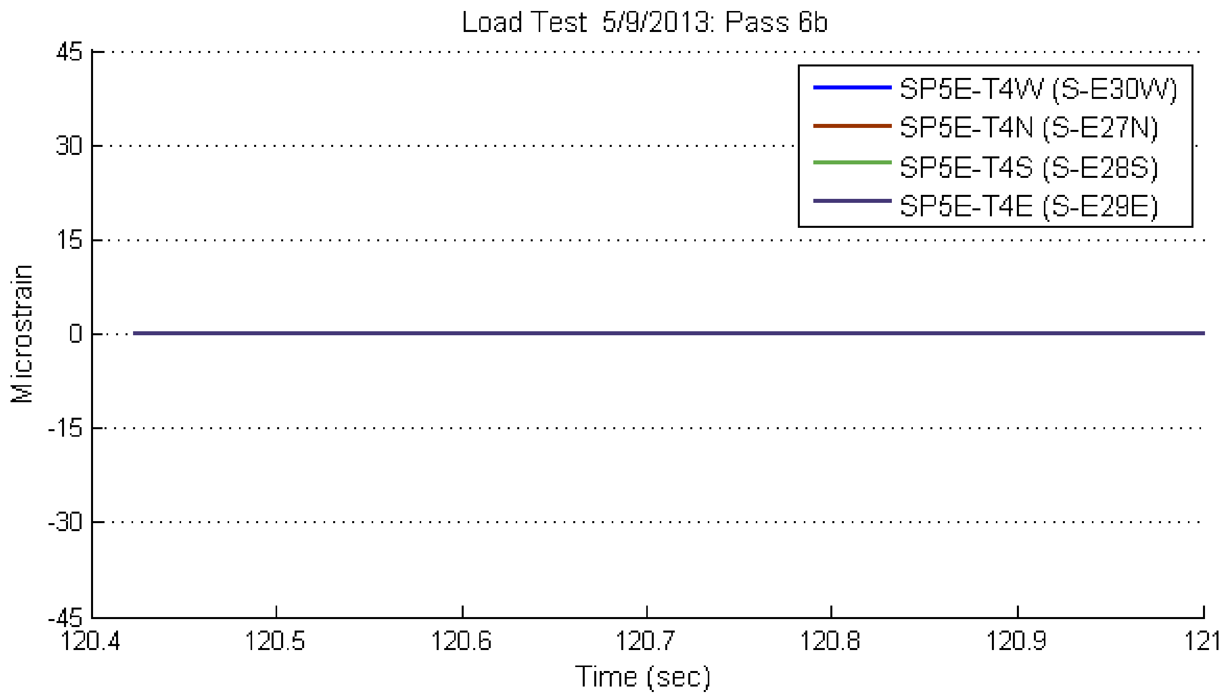


Figure C.24 Pylon 5 east strain time history - lift T4

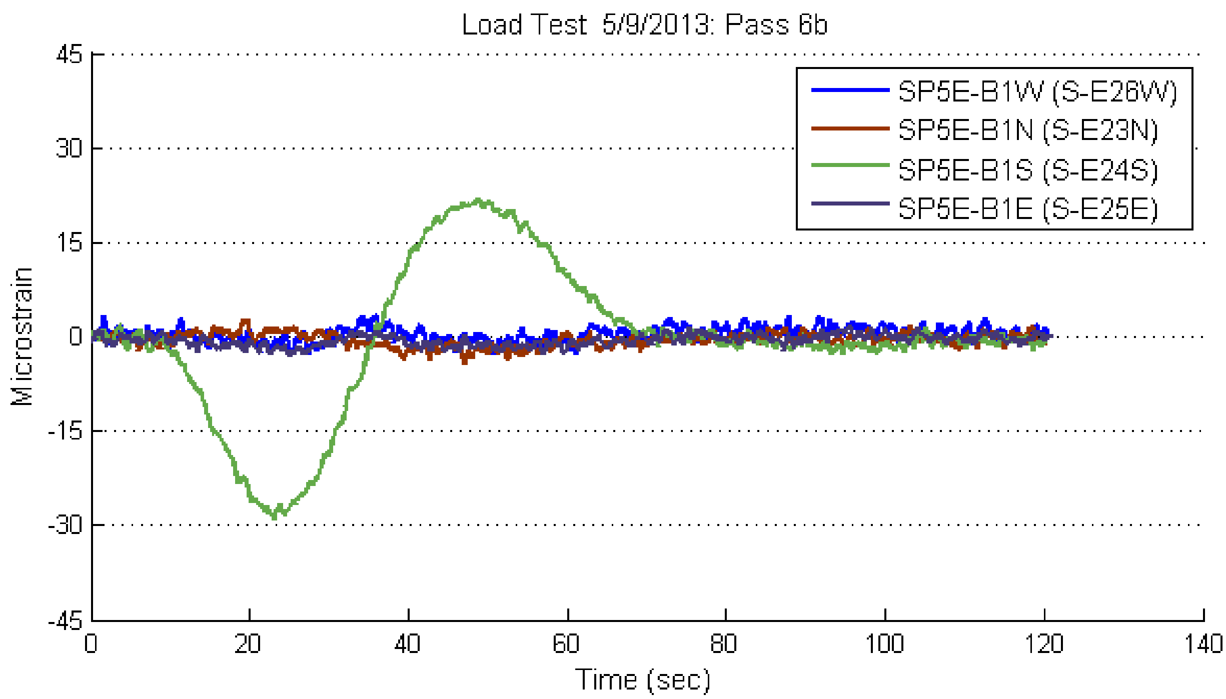


Figure C.25 Pylon 5 east strain time history - lift B1

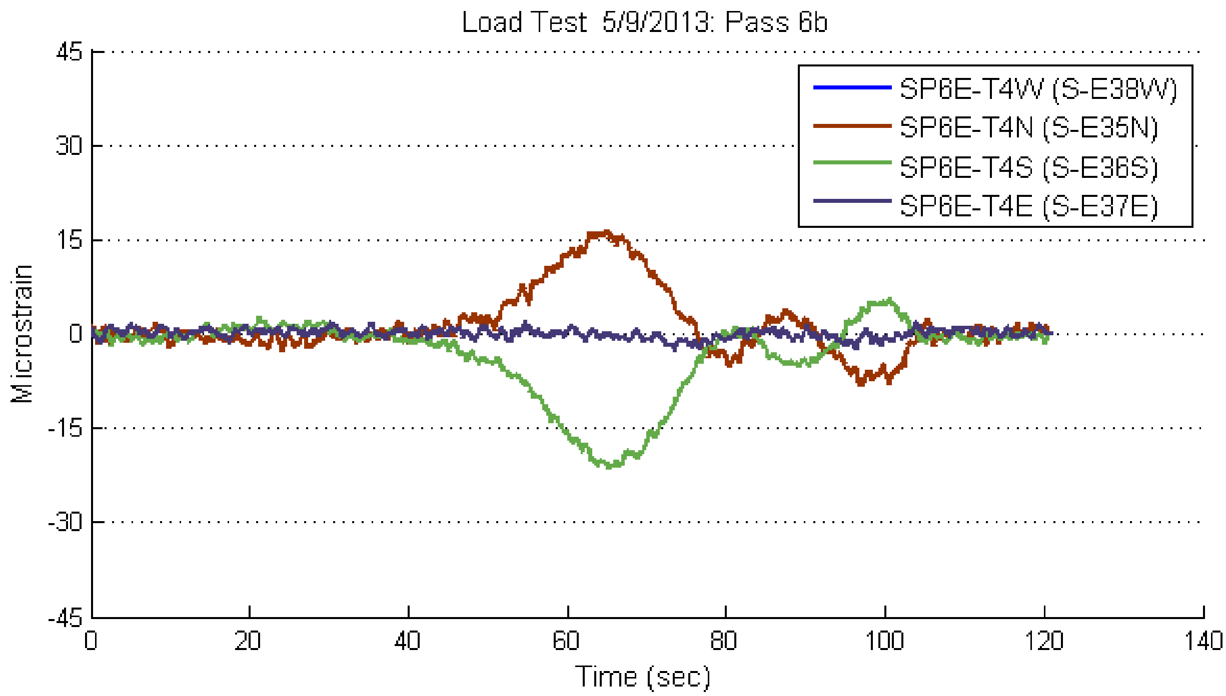


Figure C.26 Pylon 6 east strain time history - lift T4

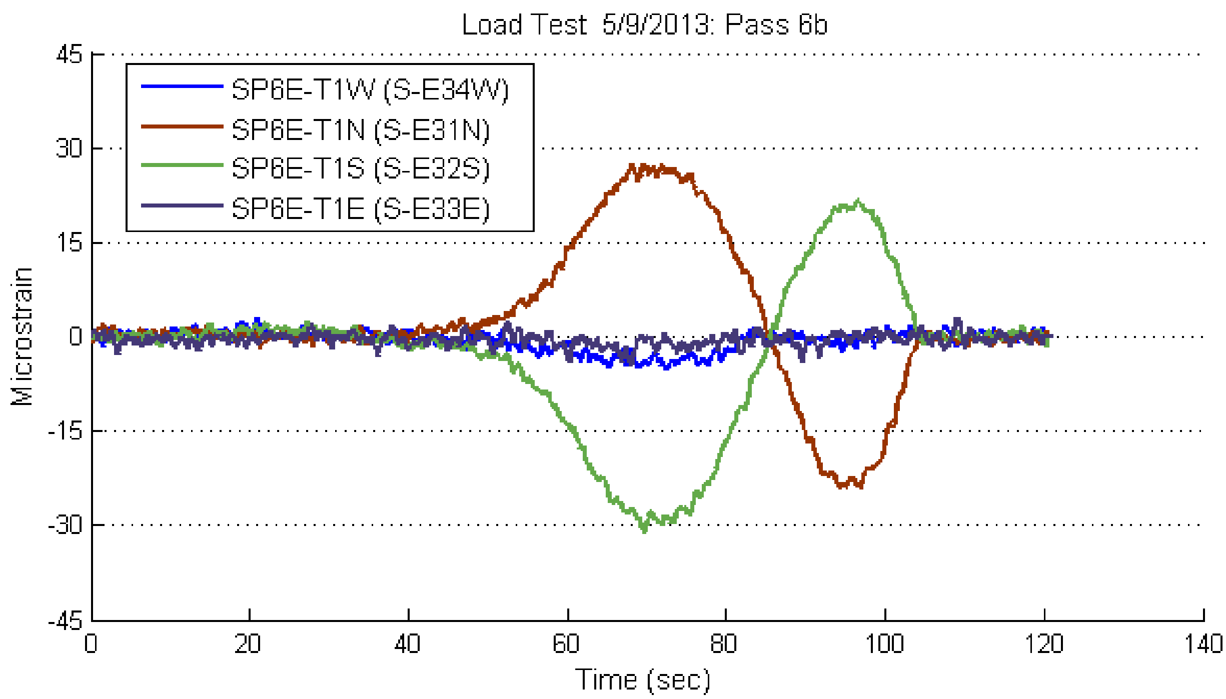


Figure C.27 Pylon 6 east strain time history - lift T1

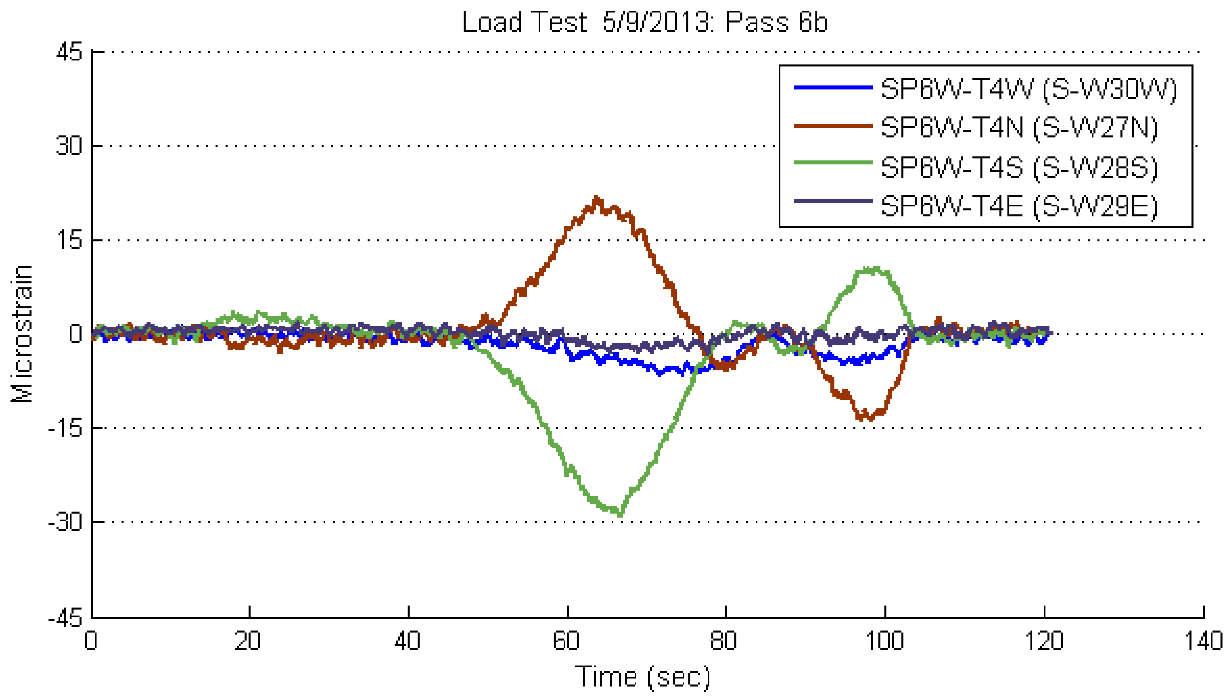


Figure C.28 Pylon 6 west strain time history - lift T4

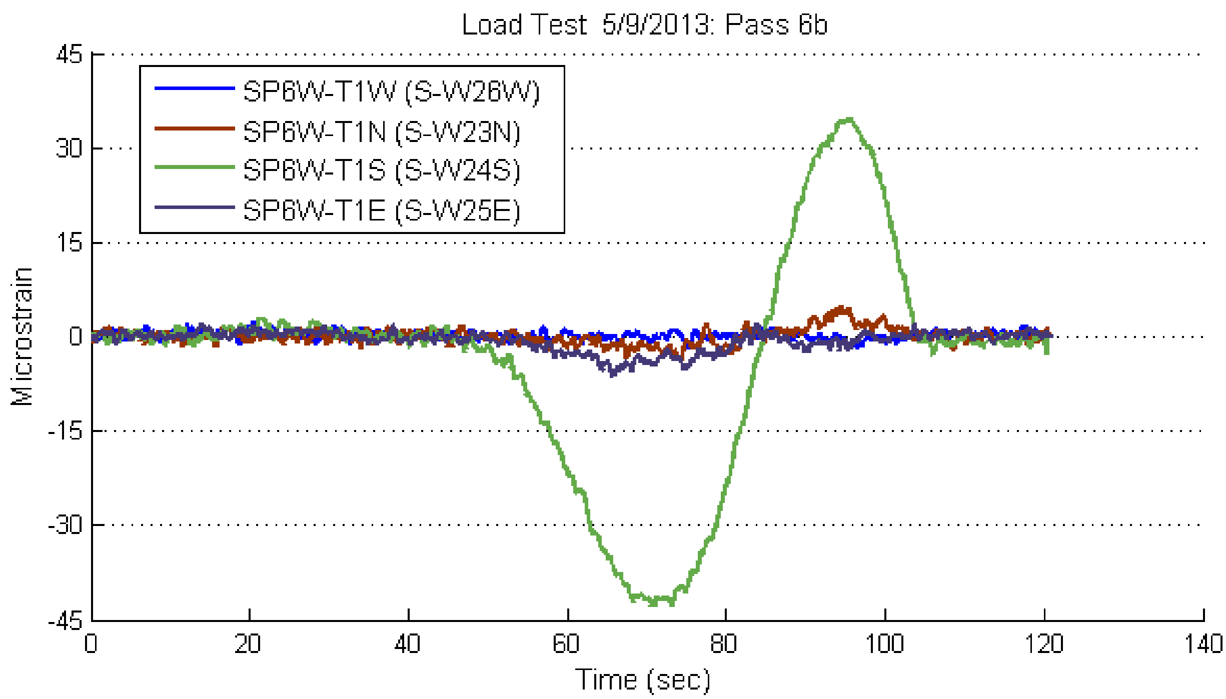


Figure C.29 Pylon 6 west strain time history - lift T1

Figure C.30 Bearing displacement time history – north abutment

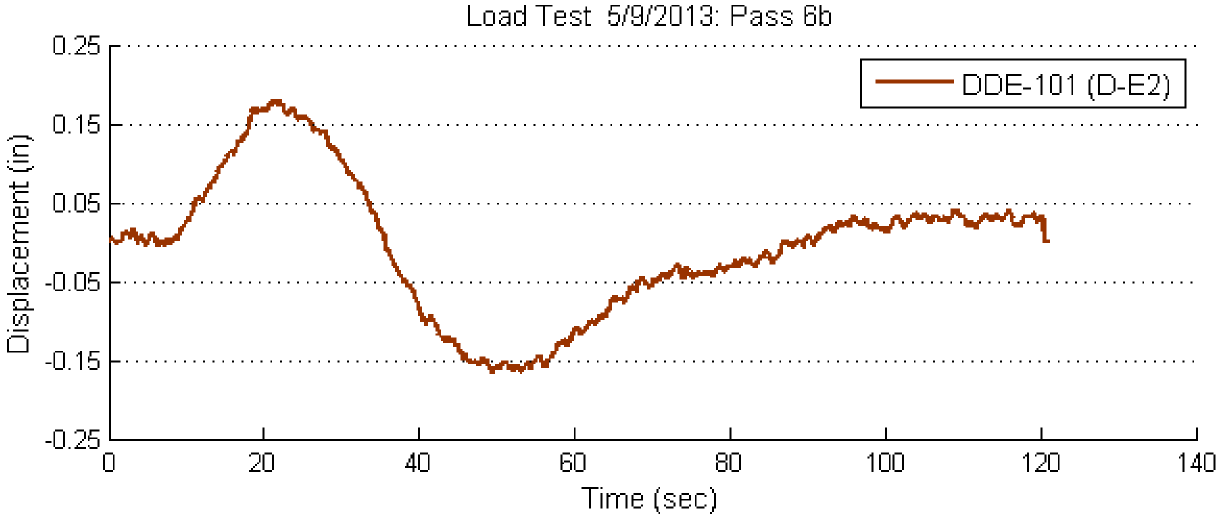


Figure C.31 Bearing displacement time history – pylon 5

Figure C.32 Bearing displacement time history – south abutment

Figure C.33 Deck tilt time history - section 415

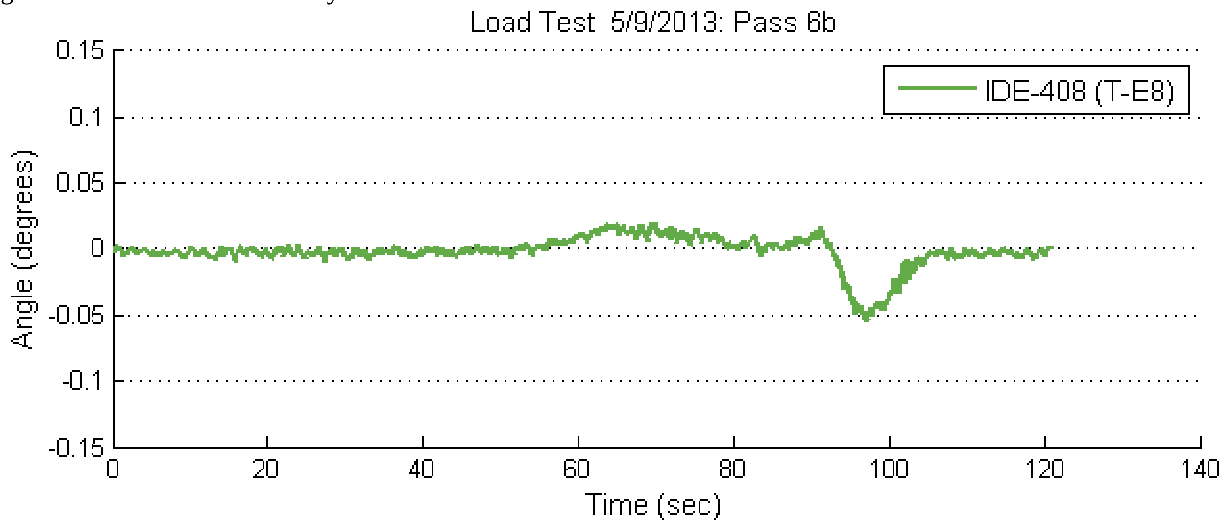


Figure C.34 Deck tilt time history - section 408

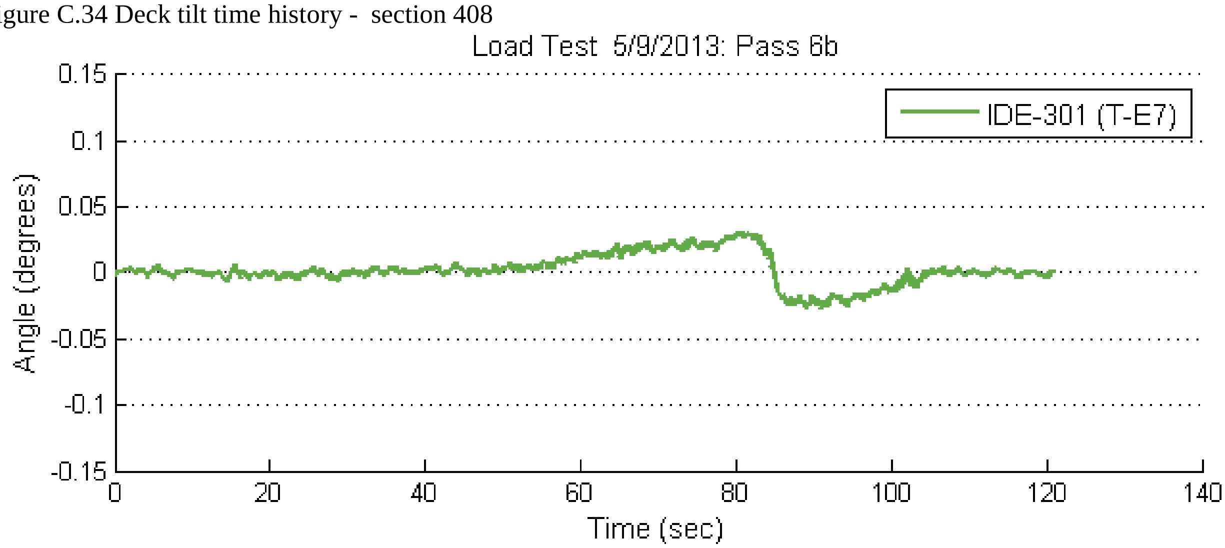


Figure C.35 Deck tilt time history - section 301

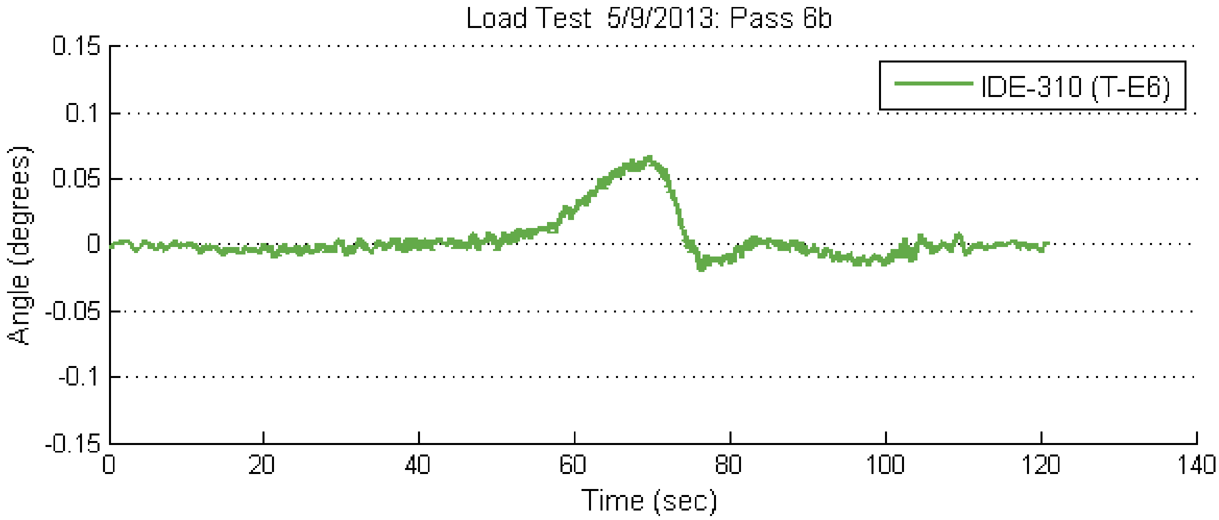


Figure C.36 Deck tilt time history - section 310

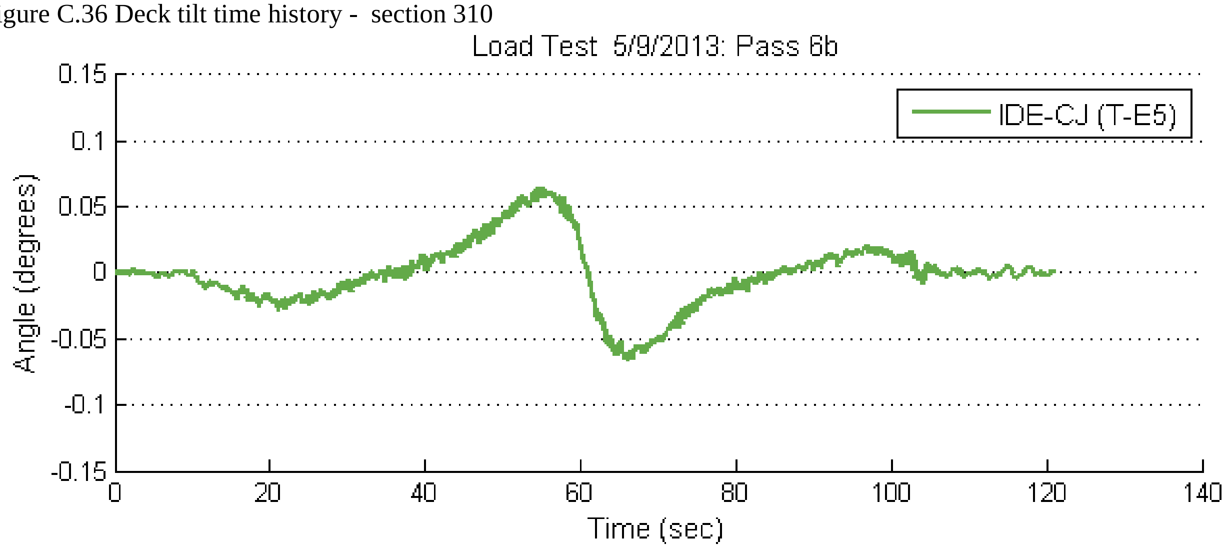


Figure C.37 Deck tilt time history - section closure joint

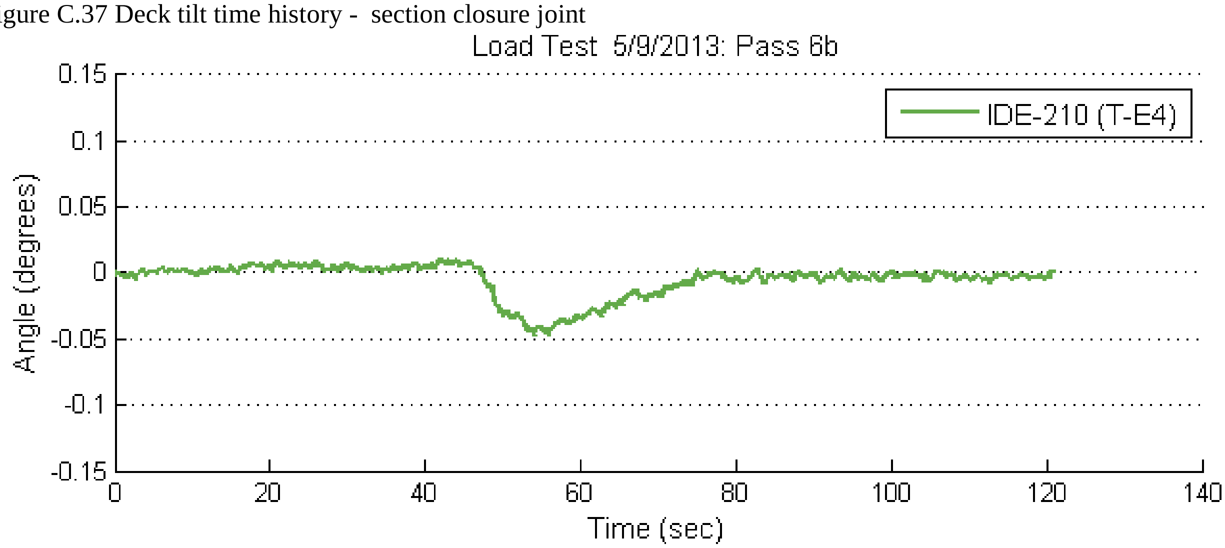


Figure C.38 Deck tilt time history - section 210

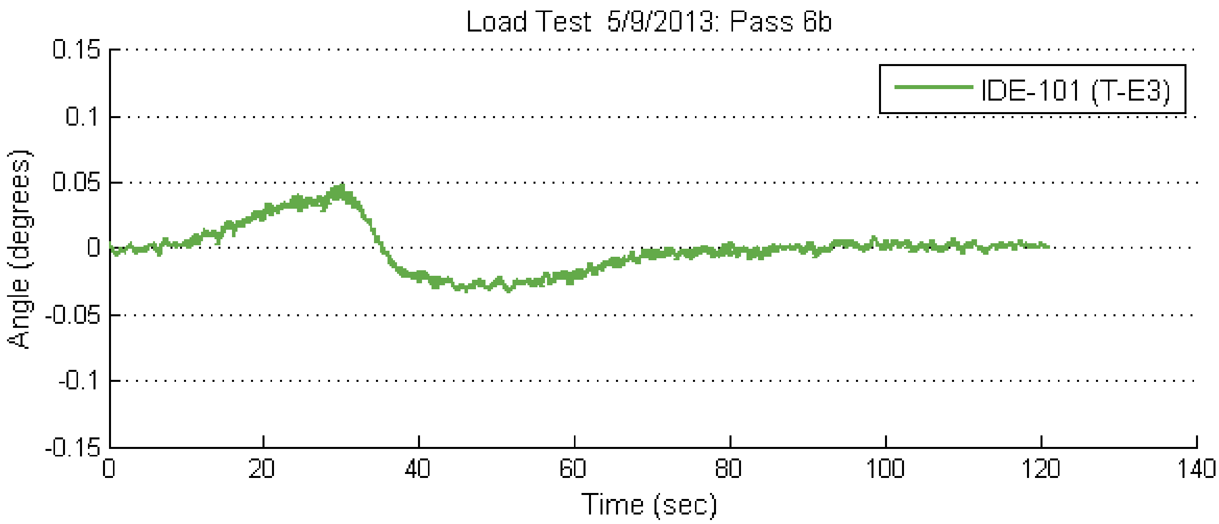


Figure C.39 Deck tilt time history - section 101

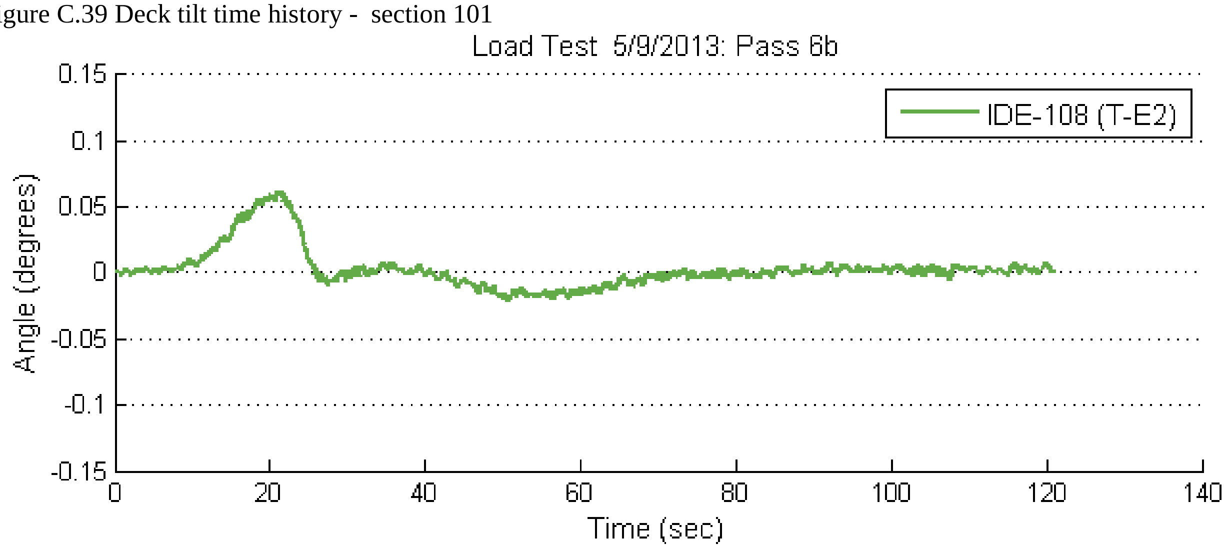


Figure C.40 Deck tilt time history - section 108

Figure C.41 Deck tilt time history - section 115

Appendix D Tables and Figures – Load Test 4 (5/7/14)

Table D.1 Bearing Displacement: Maximums

No. trucks	Pass	Displacement (in)	
		DDE_101 D-E2	DDE_415 D-E3
Slow speed passes			
1	1a	0.041	0.014
	1b	0.044	0.015
	1c	0.041	0.015
	1d	0.031	0.017
	1e	0.037	0.011
	1f	0.047	0.017
4	4a	0.146	0.115
6	6b	0.188	0.196
Maximum		0.188	0.196
High speed passes			
1	1a	0.061	0.015
Maximum		0.061	0.015

Table D.2 Bearing Displacement: Minimums

No. of trucks	Pass	Displacement (in)	
		DDE_101 D-E2	DDE_415 D-E3
Slow speed passes			
1	1a	-0.035	-0.014
	1b	-0.037	-0.015
	1c	-0.048	-0.012
	1d	-0.055	-0.013
	1e	-0.032	-0.015
	1f	-0.045	-0.014
4	4a	-0.121	-0.101
6	6b	-0.205	-0.190
Minimum		-0.205	-0.190
High speed passes			
1	1a	-0.029	-0.011
Minimum		-0.029	-0.011

Table D.3 Deck Tilt: Maximums

No. of trucks	Pass	Tilt sensor (Deg.) IDE_115 T-E1	IDE_108 T-E2	IDE_101 T-E3	IDE_210 T-E4	IDE_CJ T-E5	IDE_310 T-E6	IDE_301 T-E7	IDE_408 T-E8	IDE_415 T-E9
Slow speed passes										
1	1a	0.010	0.009	0.010	0.006	0.010	0.011	0.007	0.000	0.013
	1b	0.011	0.010	0.010	0.007	0.014	0.011	0.008	0.000	0.015
	1c	0.011	0.013	0.011	0.007	0.015	0.016	0.008	0.000	0.015
	1d	0.013	0.015	0.014	0.007	0.019	0.018	0.010	0.000	0.017
	1e	0.013	0.011	0.009	0.007	0.011	0.011	0.008	0.000	0.014
	1f	0.012	0.016	0.016	0.009	0.021	0.022	0.012	0.000	0.018
4	4a	0.041	0.044	0.030	0.011	0.041	0.046	0.019	0.000	0.067
6	6b	0.062	0.065	0.045	0.016	0.065	0.068	0.030	0.000	0.108
Maximum		0.062	0.065	0.045	0.016	0.065	0.068	0.030	0.000	0.108
High speed passes										
1	1a	0.058	0.046	0.056	0.057	0.056	0.050	0.040	0.000	0.091
Maximum		0.058	0.046	0.056	0.057	0.056	0.050	0.040	0.000	0.091

Table D.4 Deck Tilt: Minimums

No. of trucks	Pass	Tilt sensor (Deg.) IDE_115 T-E1	IDE_108 T-E2	IDE_101 T-E3	IDE_210 T-E4	IDE_CJ T-E5	IDE_310 T-E6	IDE_301 T-E7	IDE_408 T-E8	IDE_415 T-E9
Slow speed passes										
1	1a	-0.017	-0.008	-0.008	-0.007	-0.009	-0.006	-0.008	0.000	-0.008
	1b	-0.017	-0.008	-0.009	-0.008	-0.009	-0.008	-0.007	0.000	-0.008
	1c	-0.020	-0.011	-0.010	-0.012	-0.016	-0.007	-0.009	0.000	-0.011
	1d	-0.022	-0.011	-0.011	-0.013	-0.018	-0.010	-0.009	0.000	-0.010
	1e	-0.017	-0.008	-0.008	-0.013	-0.010	-0.008	-0.006	0.000	-0.009
	1f	-0.022	-0.009	-0.010	-0.012	-0.020	-0.007	-0.008	0.000	-0.010
4	4a	-0.082	-0.015	-0.024	-0.044	-0.049	-0.013	-0.019	0.000	-0.038
6	6b	-0.132	-0.021	-0.034	-0.066	-0.066	-0.018	-0.027	0.000	-0.063
Minimum		-0.132	-0.021	-0.034	-0.066	-0.066	-0.018	-0.027	0.000	-0.063
High speed passes										
1	1a	-0.063	-0.044	-0.056	-0.056	-0.048	-0.059	-0.043	0.000	-0.060
Minimum		-0.063	-0.044	-0.056	-0.056	-0.048	-0.059	-0.043	0.000	-0.060

Table D.5 Plyon 5E Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Below Deck – Level B1)				Strain sensor (με) (Above Deck – Level T4)			
		SP5E_B1W S-E26W	SP5E_B1N S-E23N	SP5E_B1E S-E25E	SP5E_B1S S-E24S	SP5E_T4W S-E30W	SP5E_T4N S-E27N	SP5E_T4E S-E29E	SP5E_T4S S-E28S
Slow speed passes									
1	1a	0.0	2.3	2.0	3.7	0.0	0.0	0.0	0.0
	1b	0.0	1.9	2.5	4.3	0.0	0.0	0.0	0.0
	1c	0.0	2.0	2.3	6.3	0.0	0.0	0.0	0.0
	1d	0.0	2.6	2.4	7.3	0.0	0.0	0.0	0.0
	1e	0.0	1.7	2.1	4.1	0.0	0.0	0.0	0.0
	1f	0.0	2.4	2.2	8.0	0.0	0.0	0.0	0.0
4	4a	0.0	2.1	2.8	16.	0.0	0.0	0.0	0.0
6	6b	0.0	2.8	2.2	23.2	0.0	0.0	0.0	0.0
Maximum		0.0	2.8	2.8	23.2	0.0	0.0	0.0	0.0
High speed passes									
1	1a	0.0	1.9	2.1	3.6	0.0	0.0	0.0	0.0
Maximum		0.0	1.9	2.1	3.6	0.0	0.0	0.0	0.0

Table D.6 Plyon 5E Strain: Minimums

No. of trucks	Pass	Strain sensor (με)(Below Deck – Level B1)				Strain sensor (με) (Above Deck – Level T4)			
		SP5E_B1W S-E26W	SP5E_B1N S-E23N	SP5E_B1E S-E25E	SP5E_B1S S-E24S	SP5E_T4W S-E30W	SP5E_T4N S-E27N	SP5E_T4E S-E29E	SP5E_T4S S-E28S
Slow speed passes									
1	1a	0.0	-2.7	-2.3	-4.3	0.0	0.0	0.0	0.0
	1b	0.0	-3.4	-2.0	-5.0	0.0	0.0	0.0	0.0
	1c	0.0	-2.7	-2.1	-5.9	0.0	0.0	0.0	0.0
	1d	0.0	-2.1	-2.8	-6.7	0.0	0.0	0.0	0.0
	1e	0.0	-3.1	-3.3	-3.3	0.0	0.0	0.0	0.0
	1f	0.0	-2.5	-2.5	-7.2	0.0	0.0	0.0	0.0
4	4a	0.0	-3.9	-2.8	-19.6	0.0	0.0	0.0	0.0
6	6b	0.0	-4.0	-3.3	-29.4	0.0	0.0	0.0	0.0
Minimum		0.0	-4.0	-3.3	-29.4	0.0	0.0	0.0	0.0
High speed passes									
1	1a	0.0	-2.7	-2.1	-4.7	0.0	0.0	0.0	0.0
Minimum		0.0	-2.7	-2.1	-4.7	0.0	0.0	0.0	0.0

Table D.7 Plyon 6E Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6E_T1W S-E34W	SP6E_T1N S-E31N	SP6E_T1E S-E33E	SP6E_T1S S-E32S	SP6E_T4W S-E38W	SP6E_T4N S-E35N	SP6E_T4E S-E37E	SP6E_T4S S-E36S
Slow speed passes									
1	1a	2.3	4.2	2.6	4.0	3.1	2.8	2	2.0
	1b	2.1	4.5	3.2	4.3	3.0	2.8	1.3	2.8
	1c	2.3	6.2	2.2	5.3	2.6	5.0	1.3	2.0
	1d	1.5	6.3	2.8	6.7	3.1	4.3	1.7	2.2
	1e	2.5	3.3	3.6	3.7	2.8	2.2	2.3	1.4
	1f	2.0	7.2	2.2	7.1	4.0	4.8	1.9	2.2
4	4a	2.3	19.3	2.2	15.5	3.2	11.8	2.2	5.5
6	6b	2.2	27.4	2.8	24.4	2.7	16.7	2.0	6.8
Maximum		2.5	27.4	3.6	24.4	4.0	16.7	2.3	6.8
High speed passes									
1	1a	2.8	4.2	2.0	4.9	3.9	3.0	2.1	2.9
Maximum		2.8	4.2	2.0	4.9	3.9	3.0	2.1	2.9

Table D.8 Plyon 6E Strain: Minimums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6E_T1W S-E34W	SP6E_T1N S-E31N	SP6E_T1E S-E33E	SP6E_T1S S-E32S	SP6E_T4W S-E38W	SP6E_T4N S-E35N	SP6E_T4E S-E37E	SP6E_T4S S-E36S
Slow speed passes									
1	1a	-2.0	-3.9	-3.0	-4.0	-2.5	-2.5	-1.7	-3.3
	1b	-3.4	-4.6	-2.6	-4.2	-2.8	-2.7	-2.5	-3.5
	1c	-2.2	-5.6	-3.8	-6.8	-3.0	-2.4	-2.5	-5.3
	1d	-3.2	-7.0	-3.1	-8.1	-2.6	-3.4	-1.9	-6.0
	1e	-2.6	-3.4	-1.9	-2.2	-2.2	-2.5	-1.3	-2.9
	1f	-2.8	-7.3	-3.9	-7.9	-2.4	-2.9	-2.1	-6.5
4	4a	-4.7	-17.9	-4.0	-22.1	-3.1	-6.4	-2.4	-14.9
6	6b	-5.9	-26.7	-3.7	-32.2	-3.0	-9.6	-2.7	-22.2
Minimum		-5.9	-26.7	-4.0	-32.2	-3.1	-9.6	-2.7	-22.2
High speed passes									
1	1a	-2.0	-4.6	-2.6	-4.5	-3.2	-3.0	-2.4	-3.0
Minimum		-2.0	-4.6	-2.6	-4.5	-3.2	-3.0	-2.4	-3.0

Table D.9 Pylon 6W Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6W_T1W S-W26W	SP6W_T1N S-W23N	SP6W_T1E S-W25E	SP6W_T1S S-W24S	SP6W_T4W S-W30W	SP6W_T4E S-W29E	SP6W_T4S S-W28S	SP6W_T4N S-W27N
Slow speed passes									
1	1a	2.0	2.5	2.1	8.7	2.0	1.8	2.8	6.3
	1b	1.6	2.8	2.0	7.6	1.8	1.2	2.8	5.9
	1c	2.1	3.0	1.9	6.6	1.8	1.4	2.7	4.9
	1d	1.4	2.7	2.2	6.1	1.4	1.6	2.9	3.6
	1e	2.1	2.8	1.8	9.0	1.5	1.4	3.4	5.9
	1f	2.2	2.5	2.9	5.3	1.6	2.1	2.8	3.5
4	4a	2.0	4.5	2.0	25.1	2.9	1.7	7.5	15.1
6	6b	2.1	4.2	2.4	36.4	2.6	1.8	10.9	22.4
Maximum		2.2	4.5	2.9	36.4	2.9	2.1	10.9	22.4
High speed passes									
1	1a	2.6	2.4	1.3	9.3	3.0	2.3	3.4	6.3
Maximum		2.6	2.4	1.3	9.3	3.0	2.3	3.4	6.3

Table D.10 Pylon 6W Strain: Minimums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6W_T1W S-W26W	SP6W_T1N S-W23N	SP6W_T1E S-W25E	SP6W_T1S S-W24S	SP6W_T4W S-W30W	SP6W_T4E S-W29E	SP6W_T4S S-W28S	SP6W_T4N S-W27N
Slow speed passes									
1	1a	-2.1	-2.5	-2.7	-10.6	-2.7	-2.0	-8.5	-4.1
	1b	-2.7	-2.9	-2.3	-9.6	-2.2	-2.0	-7.6	-3.8
	1c	-1.8	-2.3	-2.8	-7.1	-2.1	-2.2	-5.1	-3.5
	1d	-2.6	-2.2	-2.0	-5.9	-2.0	-1.8	-4.8	-3.1
	1e	-2.3	-3.2	-2.7	-11.9	-2.6	-2.5	-8.1	-4.0
	1f	-1.6	-2.6	-1.2	-5.8	-1.8	-1.7	-3.7	-3.2
4	4a	-2.2	-2.6	-4.5	-29.4	-4.3	-4.3	-20.8	-10.4
6	6b	-2.4	-3.9	-6.1	-43.3	-6.6	-4.2	-30.9	-14.6
Minimum		-2.7	-3.9	-6.1	-43.3	-6.6	-4.3	-30.9	-14.6
High speed passes									
1	1a	-1.9	-2.3	-4.1	-11.2	-2.3	-2.8	-8.2	-4.4
Minimum		-1.9	-2.3	-4.1	-11.2	-2.3	-2.8	-8.2	-4.4

Table D.11 East Edge Girder – Top Strain: Maximums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108T S-E1	SDE_101T S-E3	SDE_210T S-E5	SDE_CJT S-E7	SDE_315T S-E9	SDE_310T S-E11	SDE_305T S-E13	SDE_301T S-E15	SDE_404T S-E17	SDE_408T S-E19	SDE_412T S-E21
Slow speed passes												
1	1a	0.0	2.1	2.6	2.5	2.6	2.5	2.8	2.3	1.5	0.0	2.1
	1b	0.0	3.1	3.3	2.8	3.4	2.8	3.8	3.3	1.7	0.0	2.2
	1c	0.0	2.1	2.7	2.4	4.9	2.8	3.0	6.7	2.1	0.0	3.3
	1d	0.0	1.7	2.4	3.5	4.2	2.8	3.0	7.7	2.1	0.0	3.0
	1e	0.0	2.7	3.1	3.4	3.7	3.2	2.8	3.6	1.7	0.0	2.2
	1f	0.0	1.6	2.8	3.2	3.6	3.1	4.0	8.7	2.6	0.0	3.5
4	4a	0.0	2.6	4.6	3.5	6.1	3.2	4.7	16.8	2.9	0.0	7.0
6	6b	0.0	2.7	5.5	5.3	4.8	3.8	5.4	23.5	4.7	0.0	9.6
Maximum		0.0	3.1	5.5	5.3	6.1	3.8	5.4	23.5	4.7	0.0	9.6
High speed passes												
1	1a	0.0	3.7	2.3	3.0	1.4	2.7	4.6	3.6	1.8	0.0	2.7
Maximum		0.0	3.7	2.3	3.0	1.4	2.7	4.6	3.6	1.8	0.0	2.7

Table D.12 East Edge Girder – Top Strain: Minimums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108T S-E1	SDE_101T S-E3	SDE_210T S-E5	SDE_CJT S-E7	SDE_315T S-E9	SDE_310T S-E11	SDE_305T S-E13	SDE_301T S-E15	SDE_404T S-E17	SDE_408T S-E19	SDE_412T S-E21
Slow speed passes												
1	1a	0.0	-4.6	-2.6	-2.1	-1.9	-2.0	-2.6	-2.4	-1.6	0.0	-3.5
	1b	0.0	-4.7	-2.3	-3.6	-3.7	-2.1	-3.0	-2.8	-2.1	0.0	-6.2
	1c	0.0	-8.9	-5.5	-8.1	-8.6	-6.8	-7.5	-2.2	-4.9	0.0	-10.8
	1d	0.0	-10.5	-9.4	-10.5	-11.0	-8.0	-9.9	-3.0	-7.6	0.0	-13.3
	1e	0.0	-2.7	-1.9	-1.8	-4.1	-1.6	-3.4	-2.1	-1.4	0.0	-2.7
	1f	0.0	-11.7	-11.7	-13.3	-13.2	-10.1	-11.5	-3.2	-7.3	0.0	-14.5
4	4a	0.0	-23.4	-15.0	-22.4	-21.1	-16.9	-21.4	-5.9	-13.8	0.0	-32.4
6	6b	0.0	-33.7	-21.7	-30.6	-19.7	-24.0	-31.1	-6.7	-19.1	0.0	-45.8
Minimum		0.0	-33.7	-21.7	-30.6	-21.1	-24.0	-31.1	-6.7	-19.1	0.0	-45.8
High speed passes												
1	1a	0.0	-4.4	-2.4	-2.5	-3.4	-2.3	-3.3	-3.3	-2.0	0.0	-4.2
Minimum		0.0	-4.4	-2.4	-2.5	-3.4	-2.3	-3.3	-3.3	-2.0	0.0	-4.2

Table D.13 East Edge Girder – Bottom Strain: Maximums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108B S-E2	SDE_101B S-E4	SDE_210B S-E6	SDE_CJB S-E8	SDE_315B S-E10	SDE_E310B S-E12	SDE_305B S-E14	SDE_301B S-E16	SDE_404B S-E18	SDE_408B S-E20	SDE_412B S-E22
Slow speed passes												
1	1a	0.0	2.6	10.1	12.1	0.0	7.3	5.7	2.5	5.2	0.0	12.7
	1b	0.0	3.5	12.6	15.7	0.0	9.6	8.7	2.7	8.1	0.0	15.5
	1c	0.0	5.6	21.1	24.4	0.0	15.4	14.4	2.2	12.4	0.0	22.8
	1d	0.0	7.6	26.0	29.6	0.0	20.7	18.2	3.0	16.6	0.0	27.3
	1e	0.0	2.2	7.3	8.8	0.0	5.3	3.9	2.8	2.6	0.0	9.5
	1f	0.0	8.1	29.0	33.7	0.0	23.6	19.7	2.4	17.5	0.0	29.6
4	4a	0.0	15.7	64.9	81.2	0.0	51.3	44.7	3.4	39.3	0.0	83.4
6	6b	0.0	22.2	94.4	119.6	0.0	76.6	65.1	3.1	56.9	0.0	127.1
Maximum		0.0	22.2	94.4	119.6	0.0	76.6	65.1	3.4	56.9	0.0	127.1
High speed passes												
1	1a	0.0	2.7	11.1	12.5	0.0	8.3	6.8	3.3	6.4	0.0	14.0
Maximum		0.0	2.7	11.1	12.5	0.0	8.3	6.8	3.3	6.4	0.0	14.0

Table D.14 East Edge Girder – Bottom Strain: Minimums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108B S-E2	SDE_101B S-E4	SDE_210B S-E6	SDE_CJB S-E8	SDE_315B S-E10	SDE_E310B S-E12	SDE_305B S-E14	SDE_301B S-E16	SDE_404B S-E18	SDE_408B S-E20	SDE_412B S-E22
Slow speed passes												
1	1a	0.0	-2.6	-5.2	-2.6	0.0	-4.9	-4.4	-3.7	-4.3	0.0	-4.8
	1b	0.0	-2.5	-6.3	-2.5	0.0	-5.7	-5.8	-4.6	-5.0	0.0	-5.5
	1c	0.0	-2.8	-7.9	-2.7	0.0	-8.1	-6.6	-7.3	-7.5	0.0	-6.5
	1d	0.0	-2.4	-9.5	-3.1	0.0	-7.9	-8.3	-8.6	-8.4	0.0	-7.3
	1e	0.0	-2.4	-4.6	-2.6	0.0	-5.4	-3.2	-2.5	-3.5	0.0	-4.0
	1f	0.0	-2.7	-9.2	-2.9	0.0	-8.1	-9.4	-8.7	-9.2	0.0	-7.8
4	4a	0.0	-5.5	-21.3	-6.9	0.0	-20.1	-23.3	-20.9	-21.4	0.0	-28.3
6	6b	0.0	-7.0	-30.4	-9.1	0.0	-28.9	-34.2	-30.1	-30.7	0.0	-45.1
Minimum		0.0	-7.0	-30.4	-9.1	0.0	-28.9	-34.2	-30.1	-30.7	0.0	-45.1
High speed passes												
1	1a	0.0	-3.1	-5.1	-4.9	0.0	-4.8	-5.4	-4.6	-5.7	0.0	-6.0
Minimum		0.0	-3.1	-5.1	-4.9	0.0	-4.8	-5.4	-4.6	-5.7	0.0	-6.0

Table D.15 West Edge Girder – Top Strain: Maximums

No. of trucks	Pass	Strain sensor (με) SDW_108T S-W1	SDW_101T S-W3	SDW_210T S-W5	SDW_CJT S-W7	SDW_315T S-W9	SDW_310T S-W11	SDW_305T S-W13	SDW_301T S-W15	SDW_404T S-W17	SDW_408T S-W19	SDW_412T S-W21
Slow speed passes												
1	1a	2.2	7.7	2.9	2.9	3.3	2.7	2.0	8.0	1.9	0.0	3.2
	1b	2.0	6.3	3.0	2.2	2.8	1.8	2.1	7.1	1.5	0.0	4.2
	1c	1.5	5.8	2.6	2.0	3.6	2.1	2.3	4.5	1.0	0.0	3.0
	1d	1.9	3.6	2.2	2.6	2.6	2.2	2.2	3.9	1.2	0.0	3.3
	1e	2.4	7.9	3.3	2.9	3.5	2.7	2.6	9.1	2.3	0.0	3.5
	1f	1.7	3.9	3.3	2.6	3.0	2.2	2.3	2.6	1.0	0.0	2.8
4	4a	3.2	17.5	4.6	4.0	6.0	3.3	2.3	19.4	2.6	0.0	7.6
6	6b	4.6	27.2	6.6	6.8	8.5	4.4	5.0	30.3	4.9	0.0	11.7
Maximum		4.6	27.2	6.6	6.8	8.5	4.4	5.0	30.3	4.9	0.0	11.7
High speed passes												
1	1a	2.1	8.1	2.9	2.9	4.1	3.0	3.1	8.7	3.2	0.0	3.7
Maximum		2.1	8.1	2.9	2.9	4.1	3.0	3.1	8.7	3.2	0.0	3.7

Table D.16 West Edge Girder – Top Strain: Minimums

No. of trucks	Pass	Strain sensor (με)										
		SDW_108T S-W1	SDW_101T S-W3	SDW_210T S-W5	SDW_CJT S-W7	SDW_315T S-W9	SDW_310T S-W11	SDW_305T S-W13	SDW_301T S-W15	SDW_404T S-W17	SDW_408T S-W19	SDW_412T S-W21
Slow speed passes												
1	1a	-9.4	-3.7	-11.1	-12.0	-13.0	-11.1	-10.7	-3.6	-9.1	0.0	-17.0
	1b	-7.4	-3.5	-9.1	-9.7	-10.5	-8.3	-8.3	-3.7	-7.0	0.0	-13.6
	1c	-3.8	-2.1	-4.5	-5.2	-4.7	-4.2	-4.3	-3.0	-3.2	0.0	-8.0
	1d	-2.3	-2.7	-3.3	-2.9	-3.7	-2.8	-3.4	-2.1	-1.7	0.0	-6.1
	1e	-10.7	-3.8	-12.5	-13.4	-13.9	-12.7	-12.0	-3.5	-9.8	0.0	-18.6
	1f	-2.4	-2.5	-2.2	-2.4	-3.8	-2.3	-2.3	-2.4	-1.3	0.0	-4.8
4	4a	-18.7	-7.3	-21.4	-25.7	-24.2	-23.2	-25.6	-6.5	-21.2	0.0	-40.0
6	6b	-28.9	-9.6	-32.5	-40.1	-37.2	-35.2	-36.7	-9.1	-33.3	0.0	-61.6
Minimum		-28.9	-9.6	-32.5	-40.1	-37.2	-35.2	-36.7	-9.1	-33.3	0.0	-61.6
High speed passes												
1	1a	-10.9	-4.4	-12.3	-12.3	-12.2	-12.0	-13.1	-3.7	-8.7	0.0	-17.2
Minimum		-10.9	-4.4	-12.3	-12.3	-12.2	-12.0	-13.1	-3.7	-8.7	0.0	-17.2

Table D.17 West Edge Girder – Bottom Strain: Maximums

No. of trucks	Pass	Strain sensor (με)									
		SDW_108B S-W2	SDW_101B S-W4	SDW_210B S-W6	SDW_CJB S-W8	SDW_315B S-W10	SDW_310B S-W12	SDW_305B S-W14	SDW_404B S-W18	SDW_408B S-W20	SDW_412B S-W22
Slow speed passes											
1	1a	31.1	2.2	29.7	34.9	30.2	24.1	19.8	15.6	0.0	29.9
	1b	25.7	2.8	24.3	29.2	24.9	20.9	17.0	12.7	0.0	25.4
	1c	17.7	2.0	17.1	20.7	17.6	14.1	10.8	8.4	0.0	18.6
	1d	13.3	2.3	12.2	17.0	13.3	9.6	7.8	5.6	0.0	15.3
	1e	33.9	2.6	31.7	36.4	33.5	27.3	21.9	17.3	0.0	32.0
	1f	10.4	2.3	11.2	13.8	11.8	7.8	6.8	5.0	0.0	13.6
4	4a	89.0	1.6	81.3	97.9	87.1	66.5	54.0	41.7	0.0	97.4
6	6b	132.6	2.1	122.1	151.6	134.5	100.7	81.7	64.5	0.0	155.8
Maximum		132.6	2.8	122.1	151.6	134.5	100.7	81.7	64.5	0.0	155.8
High speed passes											
1	1a	32.7	2.7	29.8	34.6	30.8	27.0	22.5	15.6	0.0	31.1
Maximum		32.7	2.7	29.8	34.6	30.8	27.0	22.5	15.6	0.0	31.1

Table D.18 West Edge Girder – Bottom Strain: Minimums

No. of trucks	Pass	Strain sensor (με)									
		SDW_108B S-W2	SDW_101B S-W4	SDW_210B S-W6	SDW_CJB S-W8	SDW_315B S-W10	SDW_310B S-W12	SDW_305B S-W14	SDW_404B S-W18	SDW_408B S-W20	SDW_412B S-W22
Slow speed passes											
1	1a	-7.7	-9.0	-9.9	-3.5	-7.6	-9.1	-9.6	-8.1	0.0	-7.5
	1b	-6.6	-6.8	-8.4	-2.7	-6.7	-8.2	-8.7	-6.7	0.0	-6.9
	1c	-5.0	-6.2	-7.1	-3.4	-4.8	-6.1	-5.9	-5.4	0.0	-6.0
	1d	-4.3	-4.5	-5.6	-2.2	-4.2	-5.0	-5.4	-5.0	0.0	-5.1
	1e	-7.9	-9.4	-10.6	-4.5	-7.8	-9.2	-10.1	-8.6	0.0	-7.9
	1f	-4.1	-3.4	-4.1	-2.2	-3.6	-4.9	-4.1	-4.2	0.0	-4.8
4	4a	-21.1	-24.2	-24.9	-7.6	-19.8	-23.6	-26.6	-23.5	0.0	-31.2
6	6b	-33.2	-35.9	-37.6	-9.9	-29.7	-36.0	-40.7	-35.4	0.0	-51.9
Minimum		-33.2	-35.9	-37.6	-9.9	-29.7	-36.0	-40.7	-35.4	0.0	-51.9
High speed passes											
1	1a	-7.6	-9.0	-9.7	-6.8	-8.7	-10.2	-10.4	-9.4	0.0	-8.3
Minimum		-7.6	-9.0	-9.7	-6.8	-8.7	-10.2	-10.4	-9.4	0.0	-8.3

Table D.19 Deck Strain: Maximums

No. of trucks	Pass	Strain sensor (με) SDC_210N S-C1	Strain sensor (με) SDC_210S S-C2
Slow speed passes			
1	1a	2.2	2.2
	1b	2.0	2.3
	1c	2.7	2.1
	1d	2.2	1.9
	1e	2.2	2.7
	1f	2.4	2.1
4	4a	3.8	3.1
6	6b	4.8	4.2
Maximum		4.8	4.2
High speed passes			
1	1a	2.9	2.5
Maximum		2.9	2.5

Table D.20 Deck Strain: Minimums

No. of trucks	Pass	Strain sensor (με)	
		SDC_210N S-C1	SDC_210S S-C2
Slow speed passes			
1	1a	-6.0	-4.8
	1b	-9.5	-7.4
	1c	-13.9	-10.8
	1d	-9.3	-7.2
	1e	-3.9	-2.2
	1f	-6.8	-5.8
4	4a	-38.9	-31.5
6	6b	-45.4	-40.1
Minimum		-45.4	-40.1
High speed passes			
1	1a	-7.4	-5.7
Minimum		-7.4	-5.7

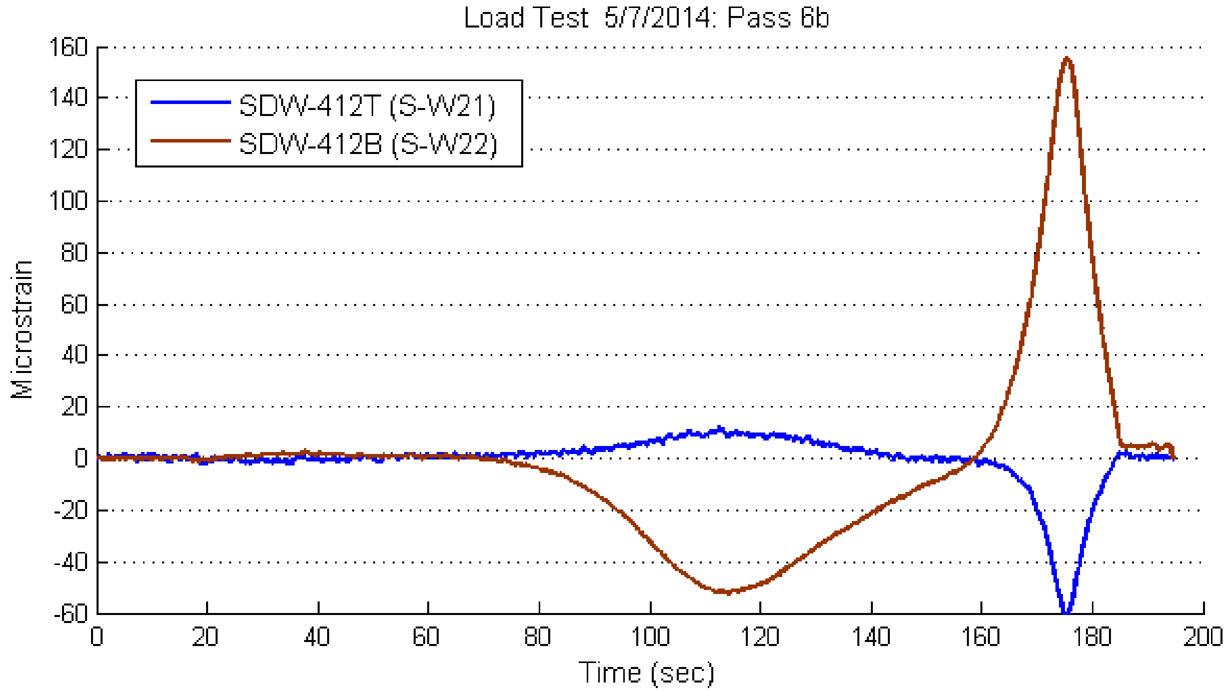


Figure D.1 Edge girder strain time history - section 412

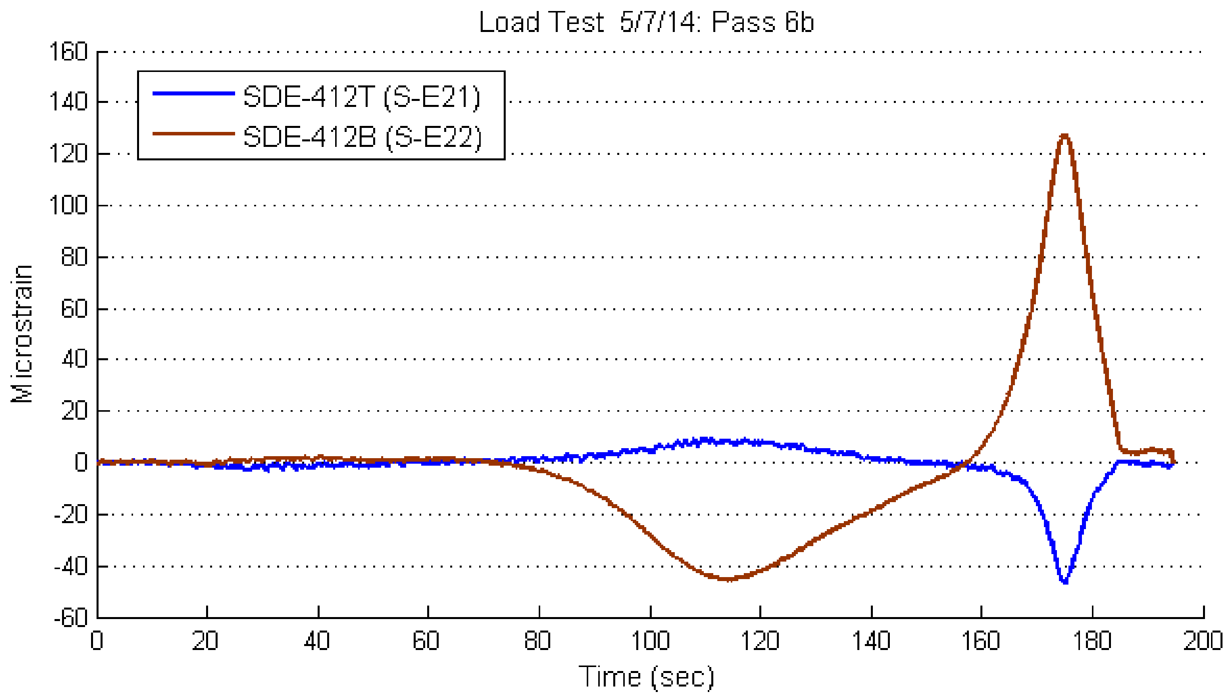


Figure D.2 Edge girder strain time history - section 412

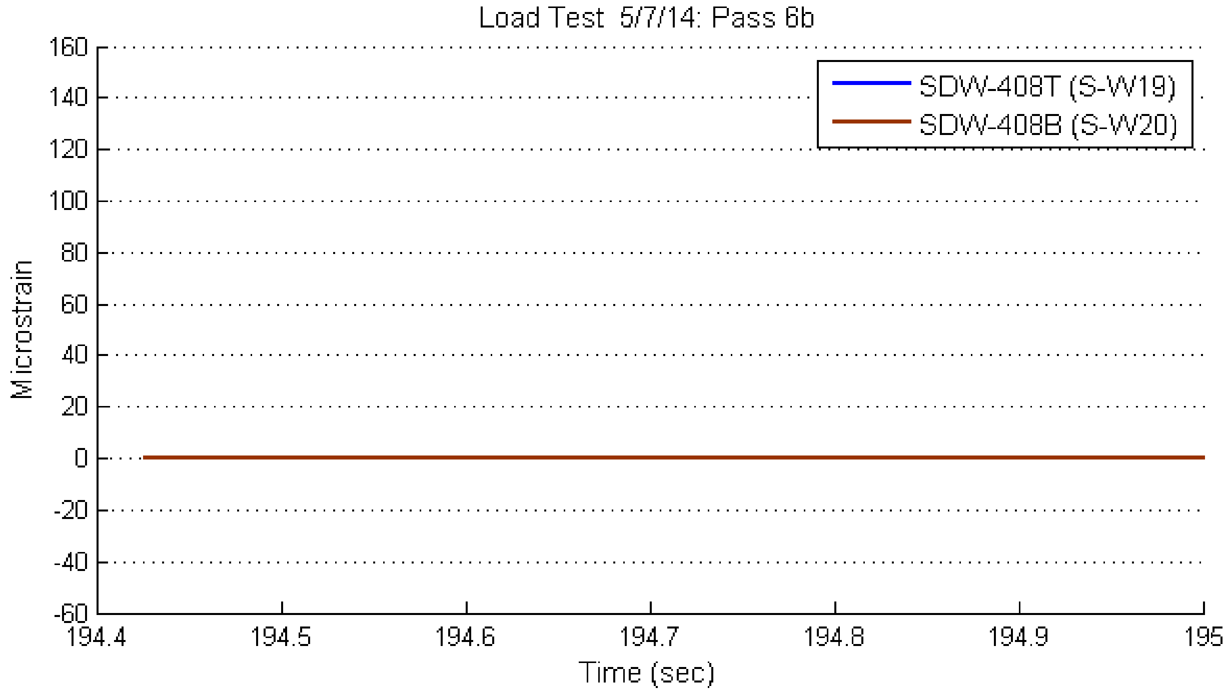


Figure D.3 West edge girder strain time history - section 408

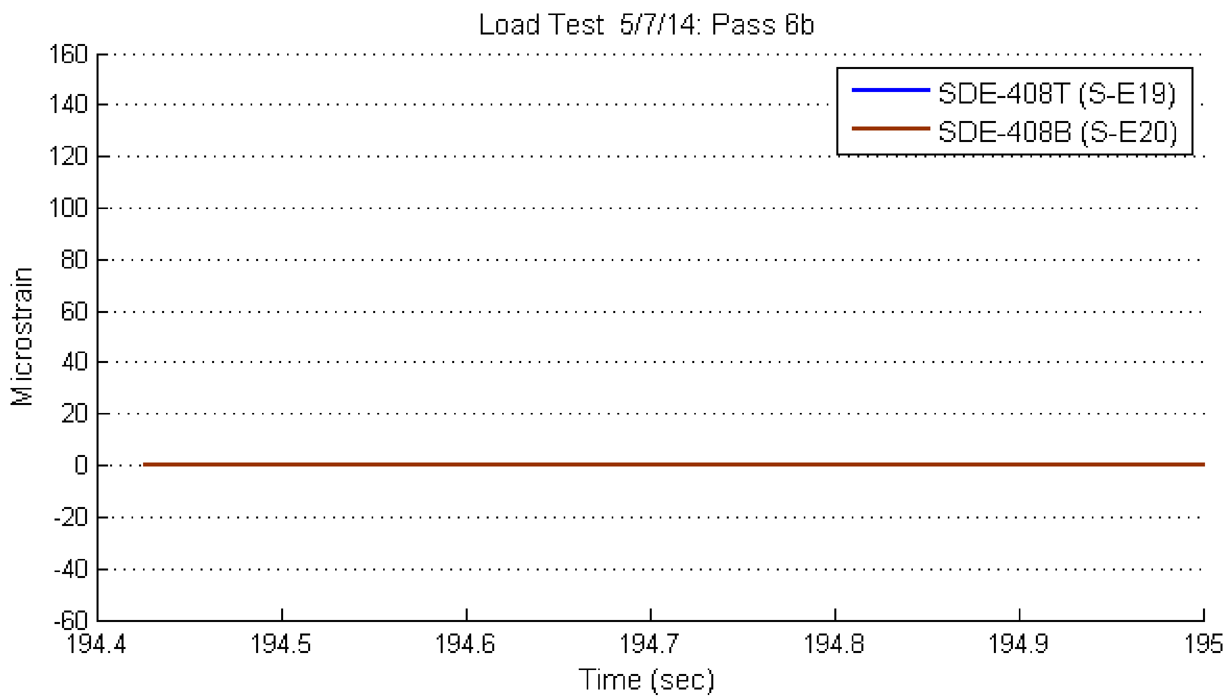


Figure D.4 East edge girder strain time history - section 408

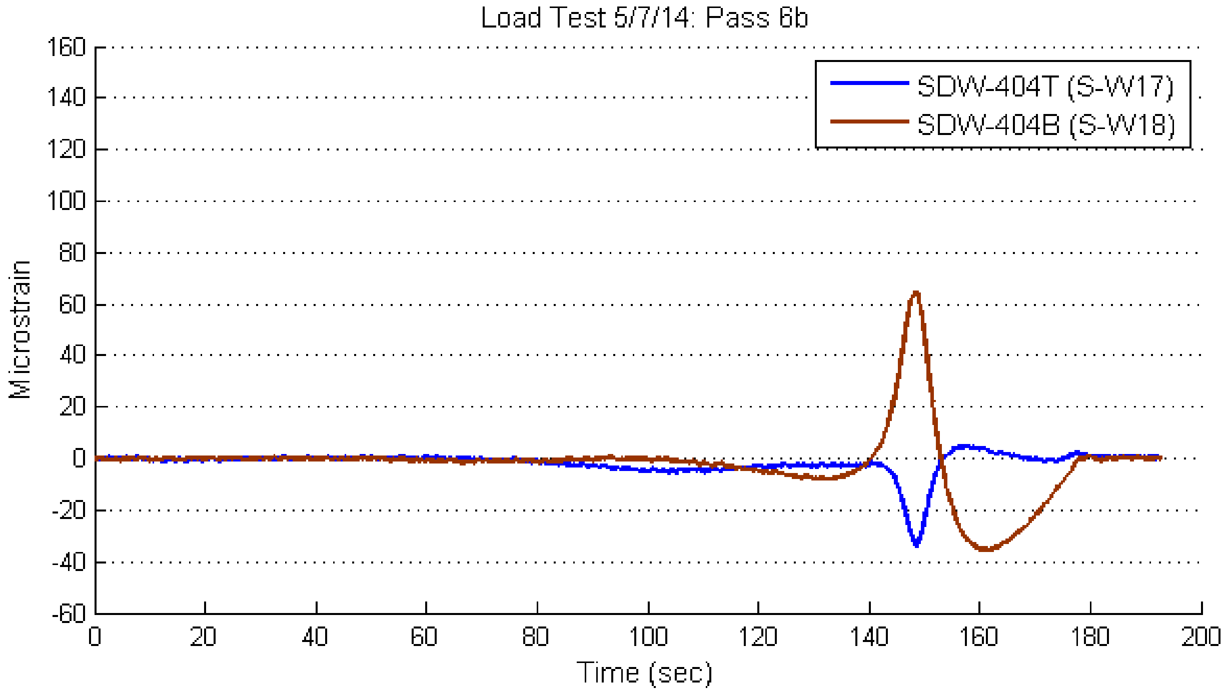


Figure D.5 West edge girder strain time history - section 404

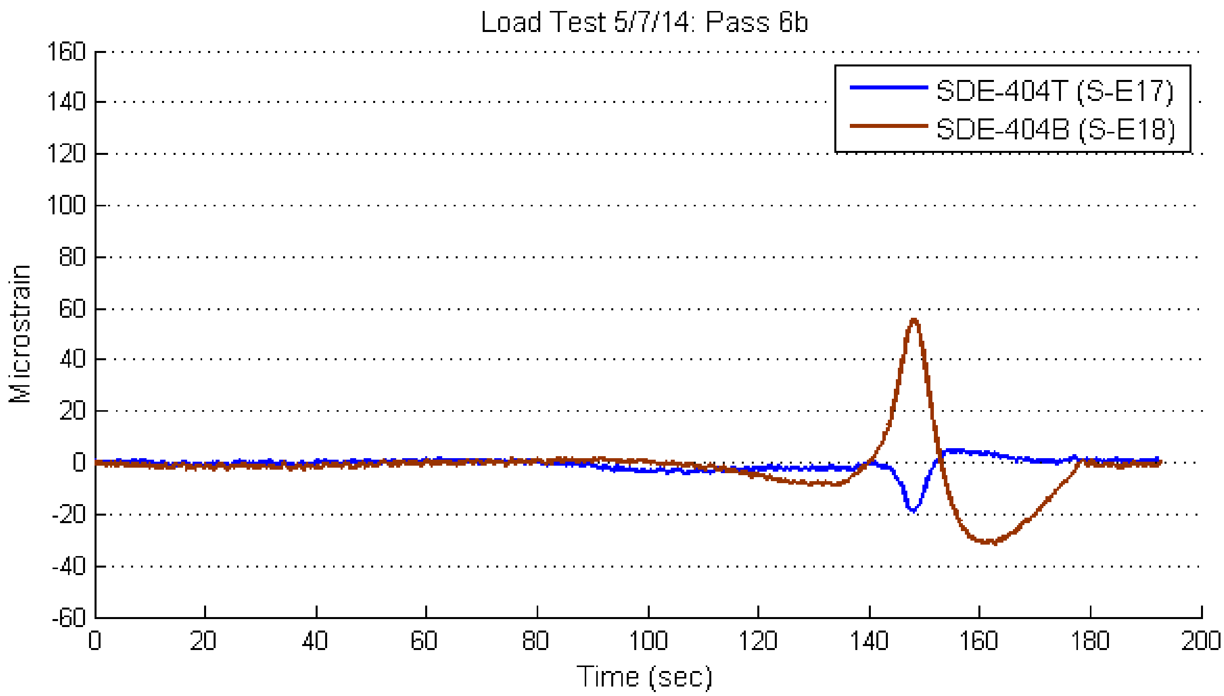


Figure D.6 East edge girder strain time history - section 404

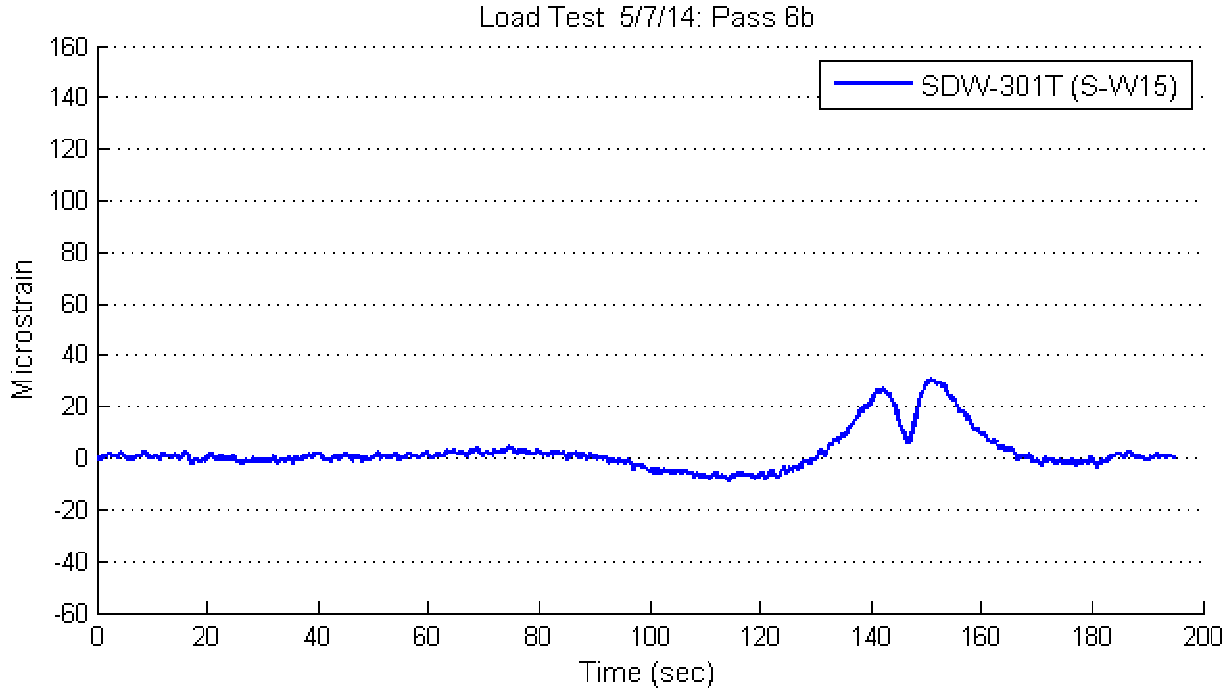


Figure D.7 West edge girder strain time history - section 301

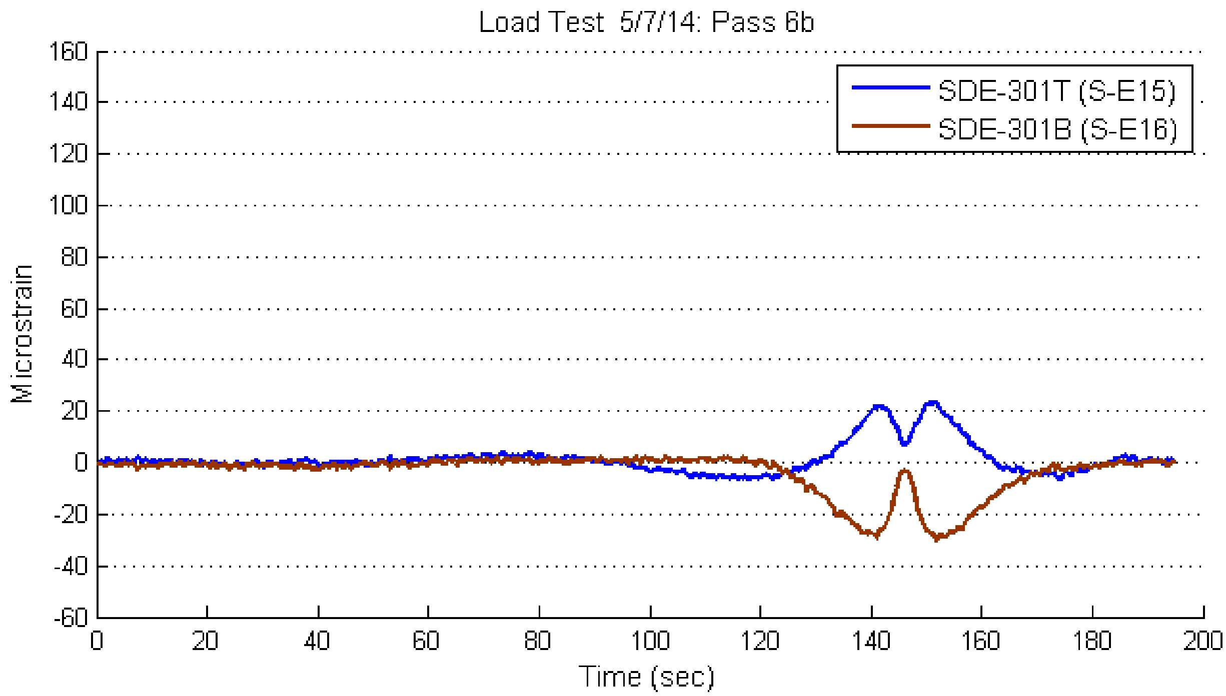


Figure D.8 East edge girder strain time history - section 301

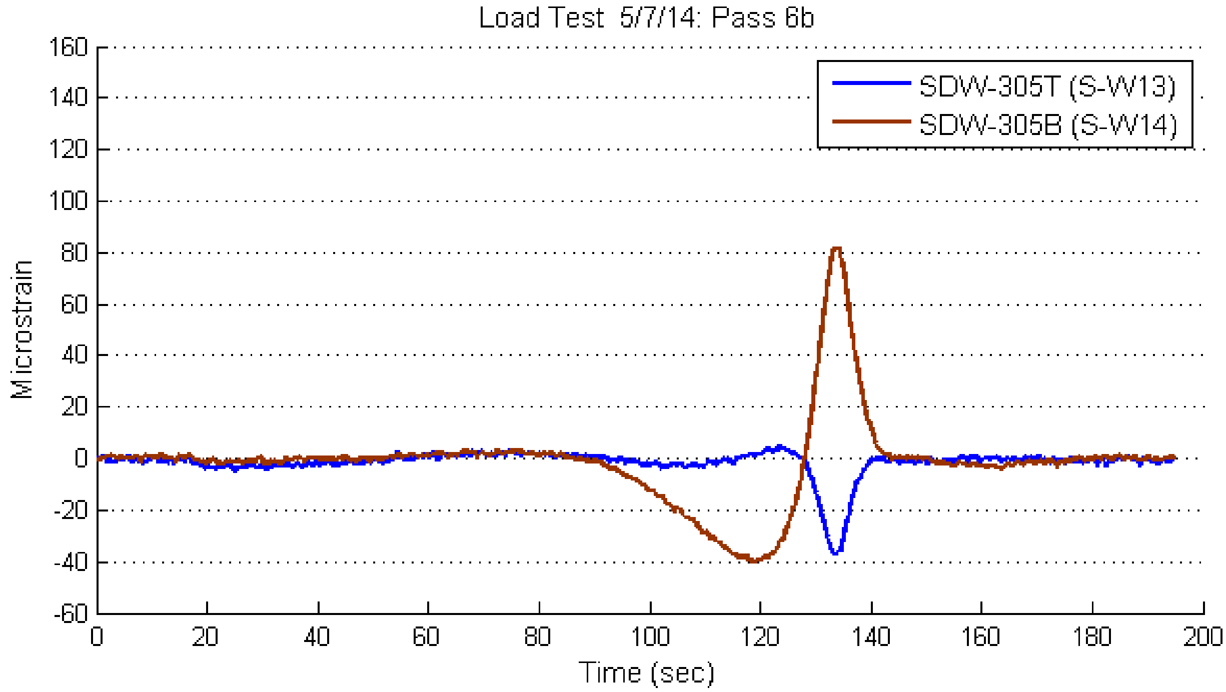


Figure D.9 West edge girder strain time history - section 305

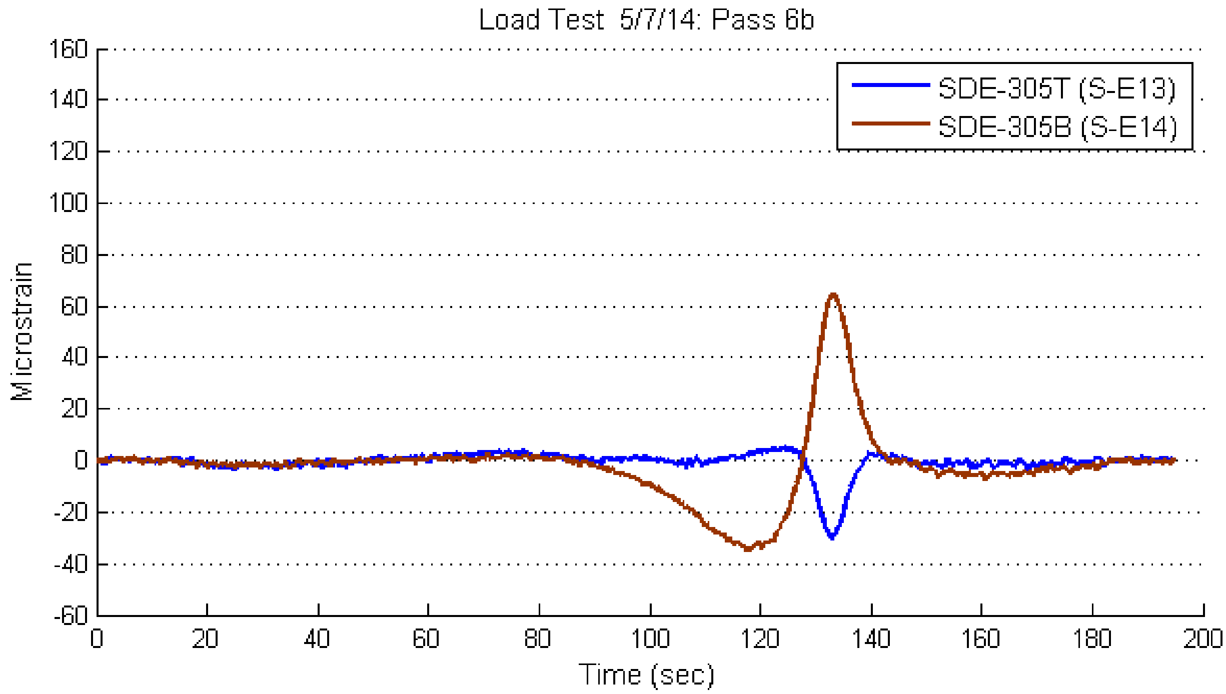


Figure D.10 East edge girder strain time history - section 305

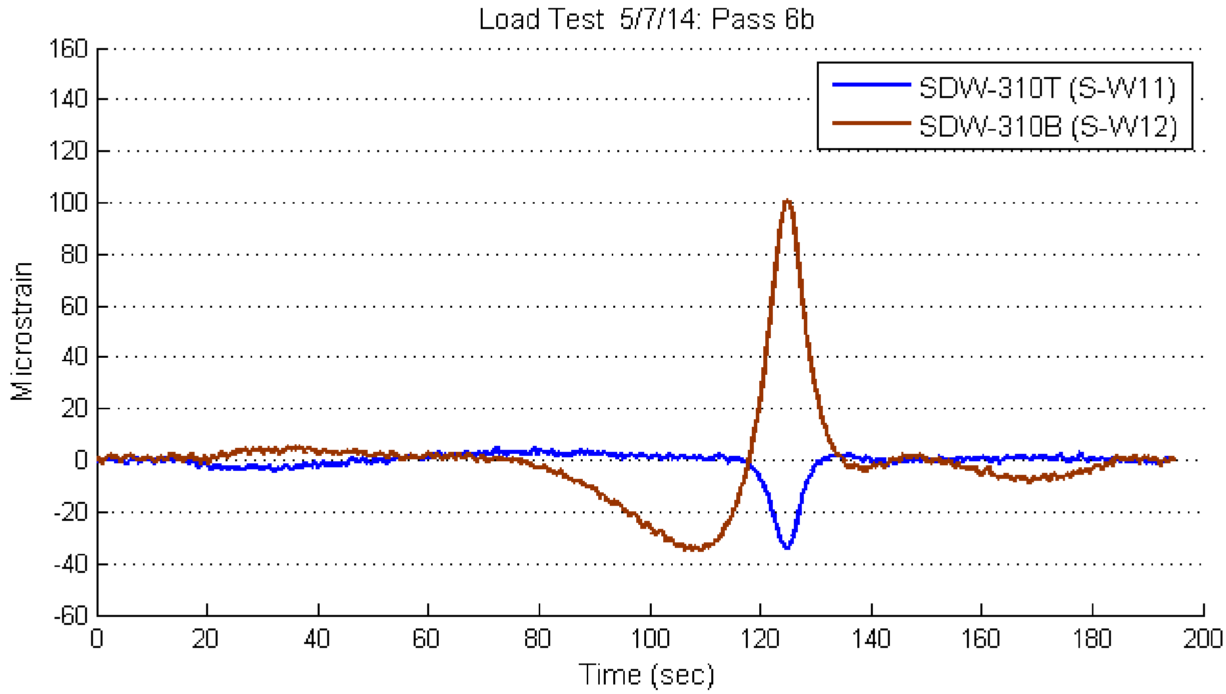


Figure D.11 East edge girder strain time history - section 310

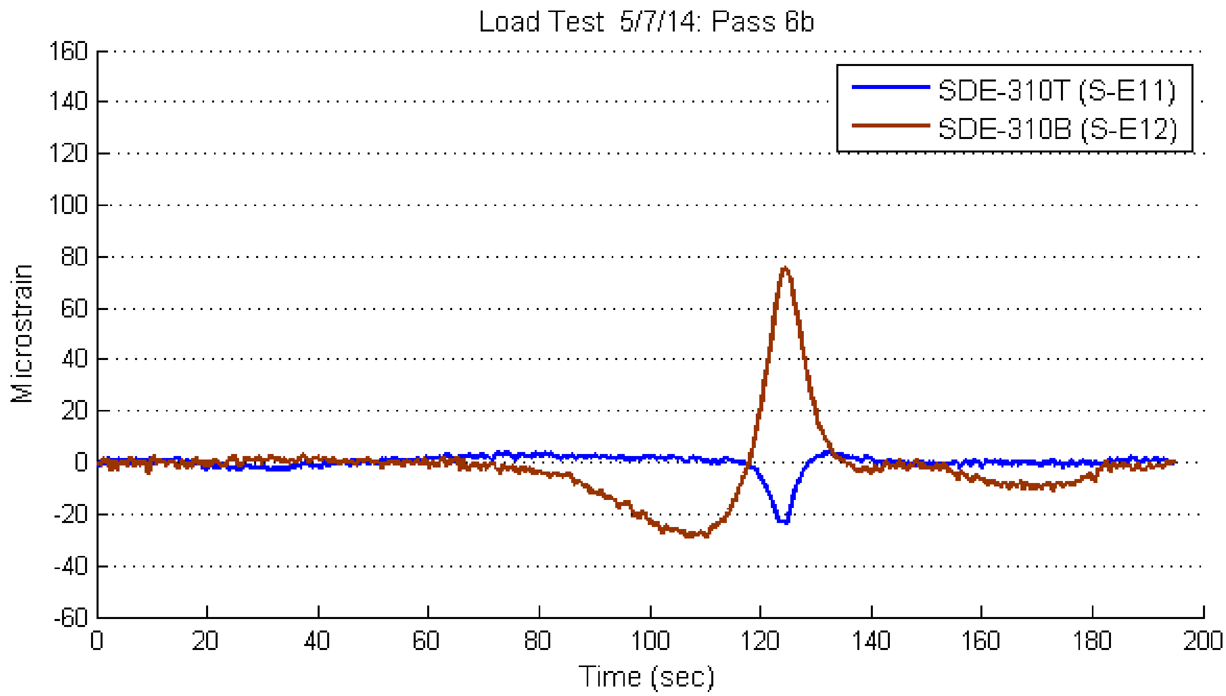


Figure D.12 East edge girder strain time history - section 310

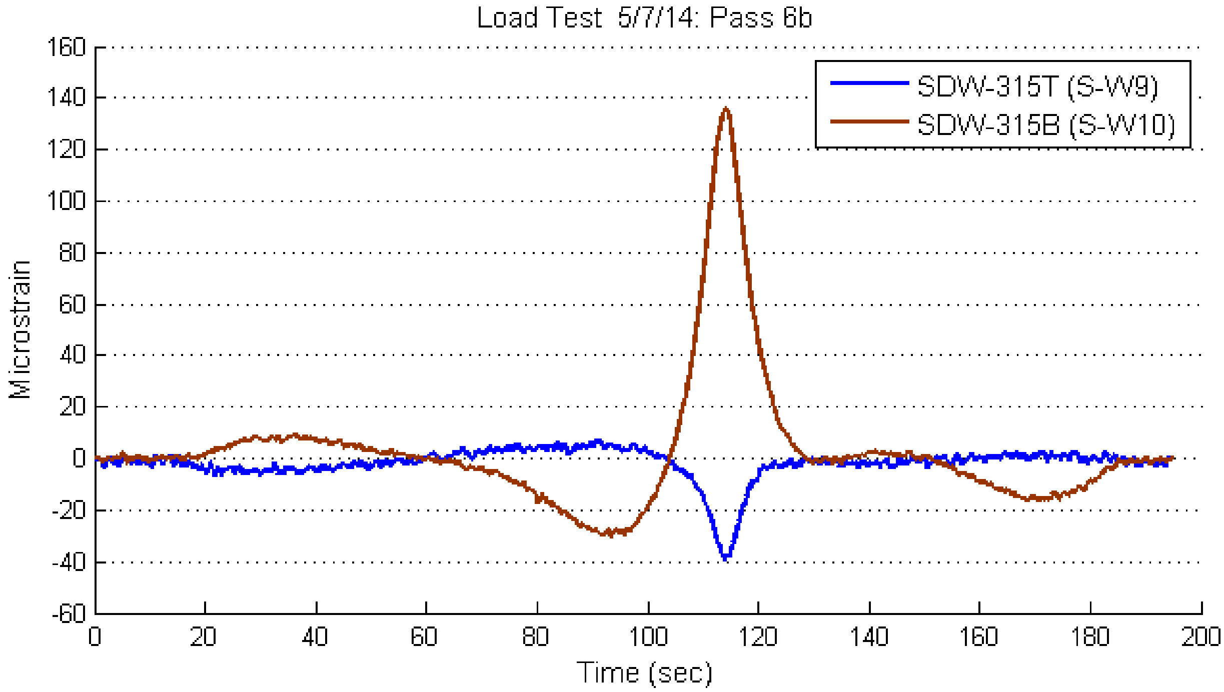


Figure D.13 West edge girder strain time history - section 315

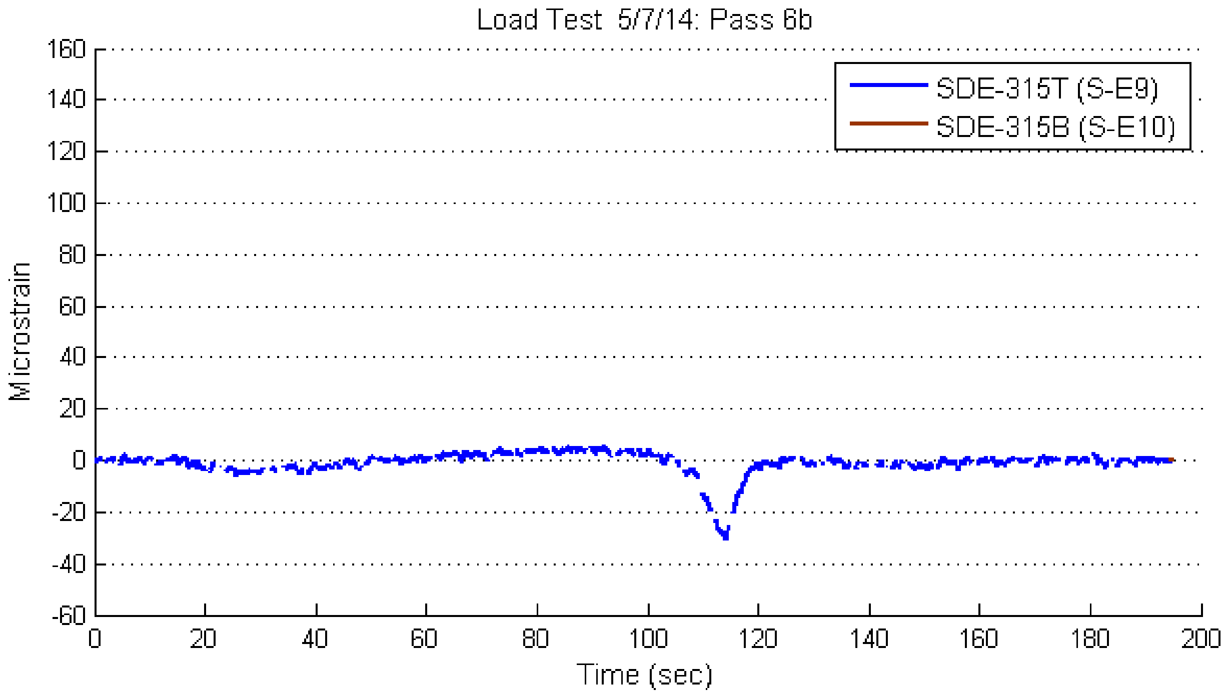


Figure D.14 East edge girder strain time history - section 315

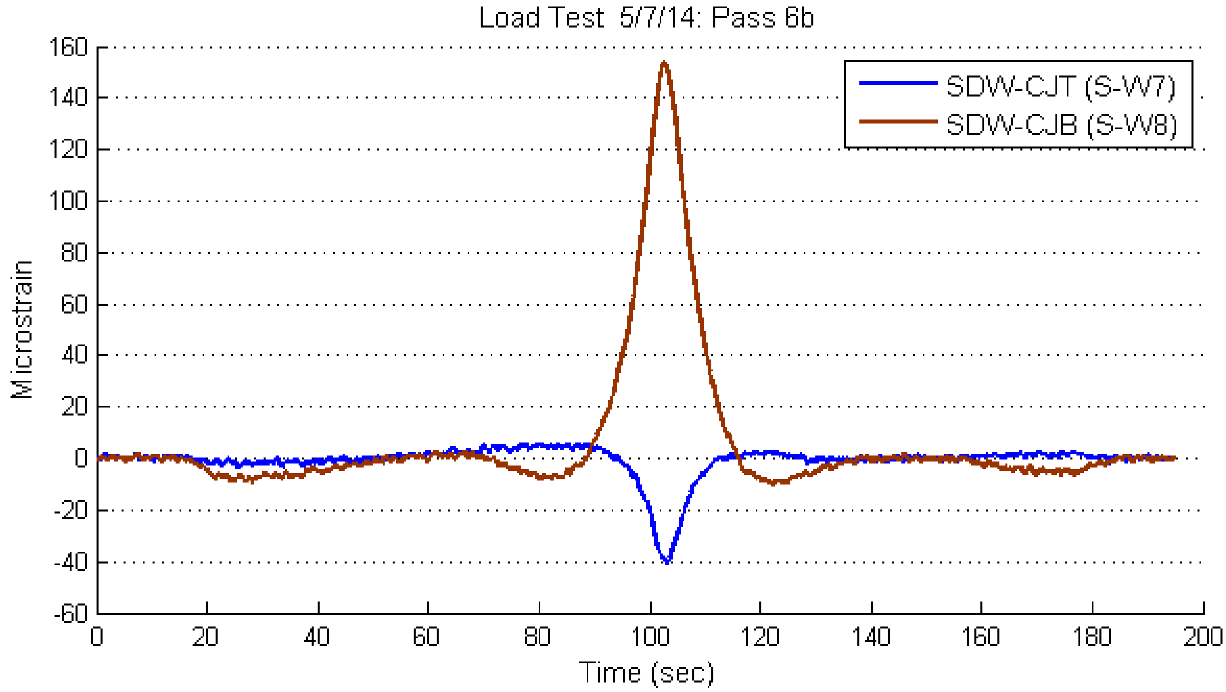


Figure D.15 West edge girder strain time history - closure joint

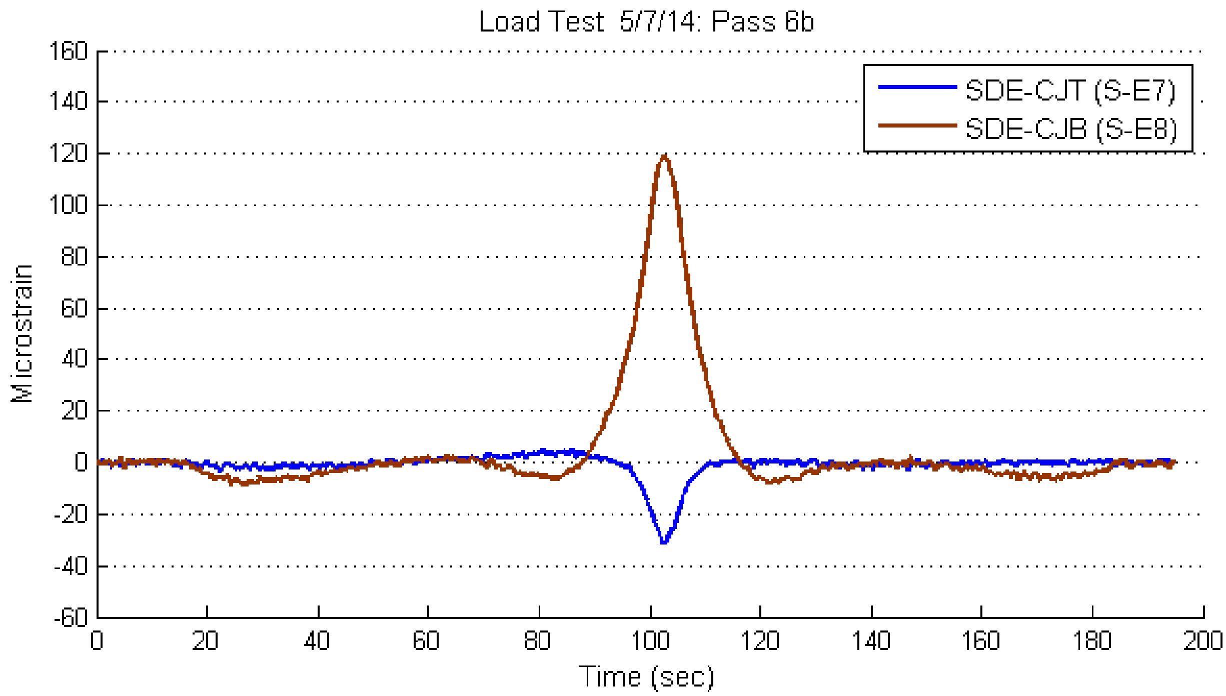


Figure D.16 East edge girder strain time history - closure joint

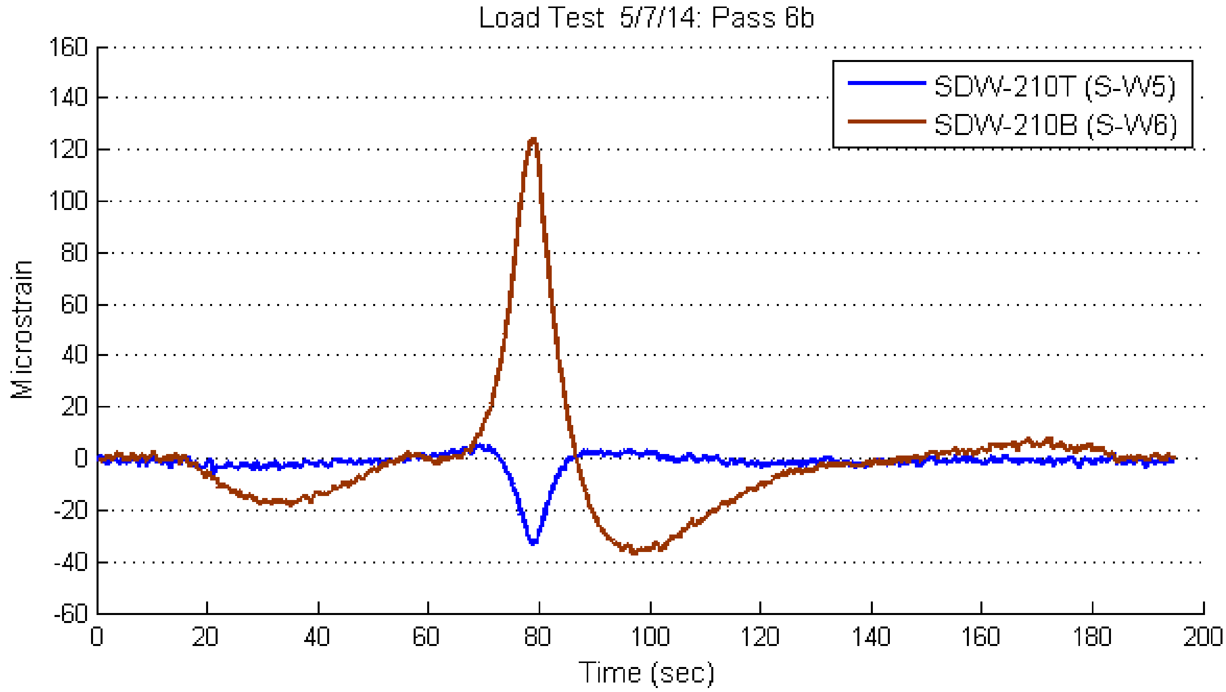


Figure D.17 West edge girder strain time history - section 210

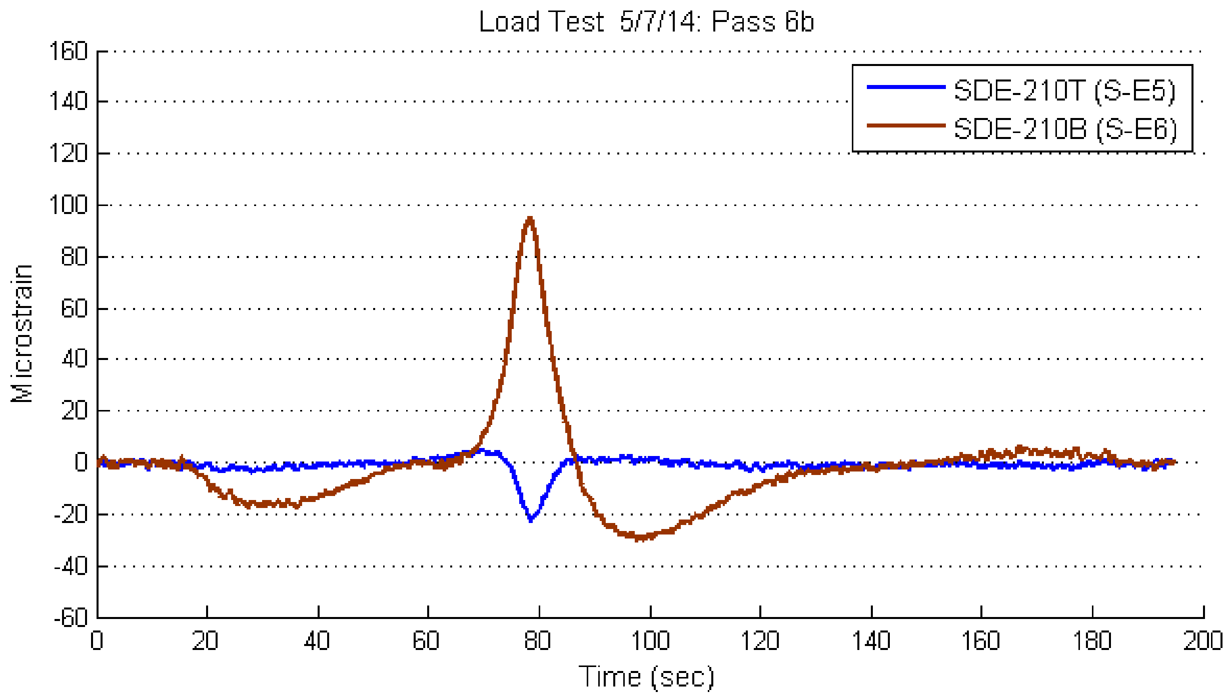


Figure D.18 East edge girder strain time history - section 210

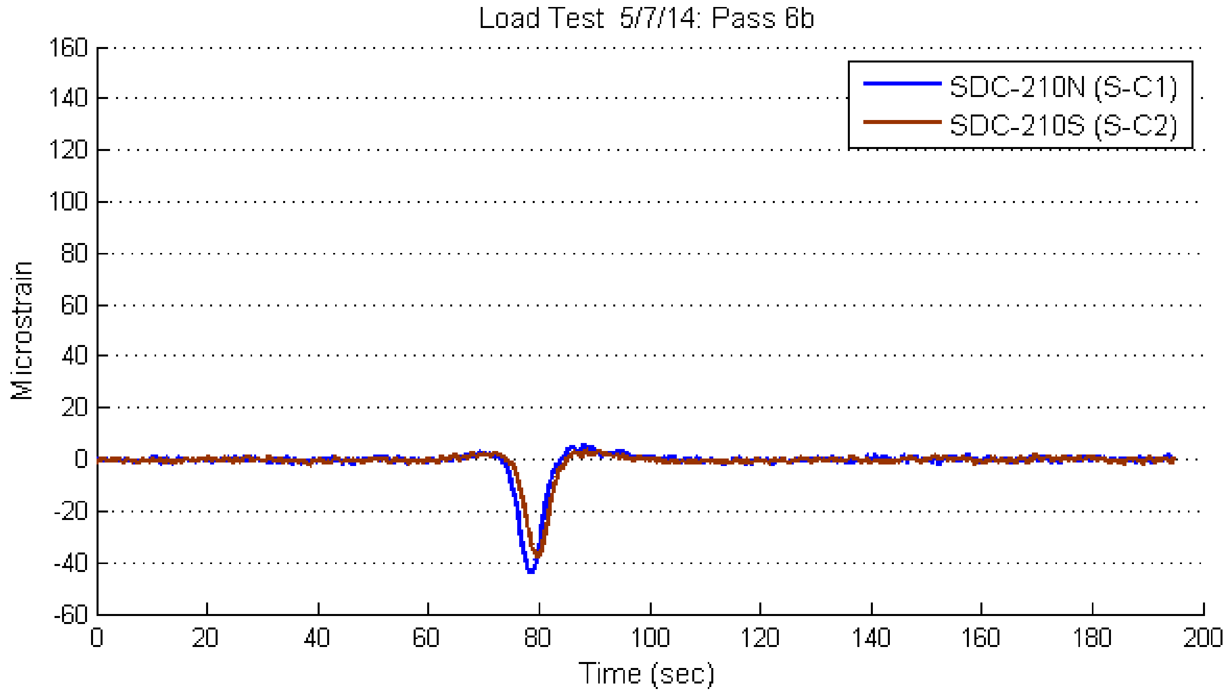


Figure D.19 Deck strain time history - section 210

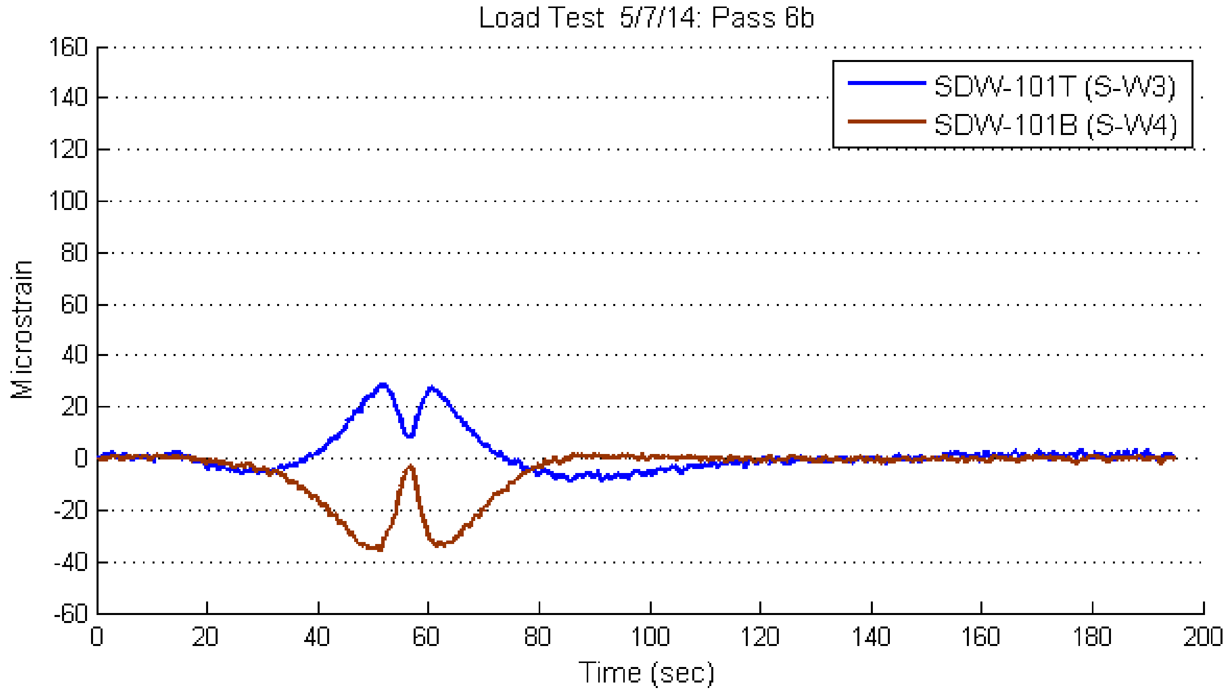


Figure D.20 West edge girder strain time history - section 101

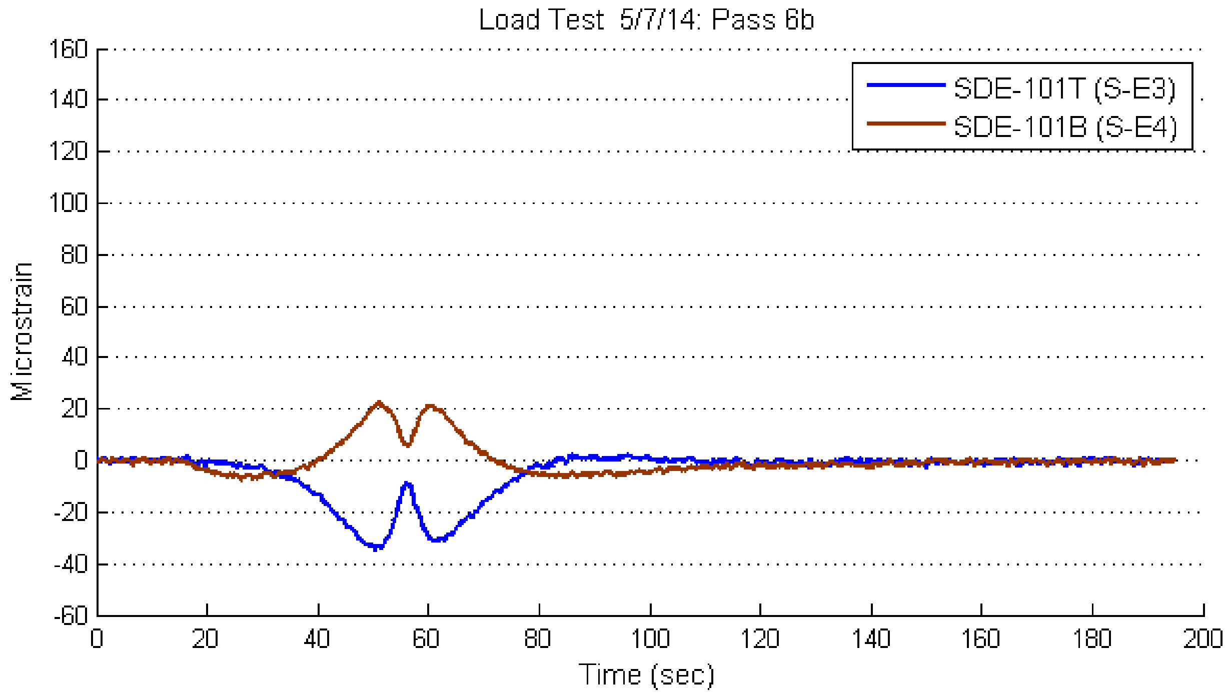


Figure D.21 East edge girder strain time history - section 101

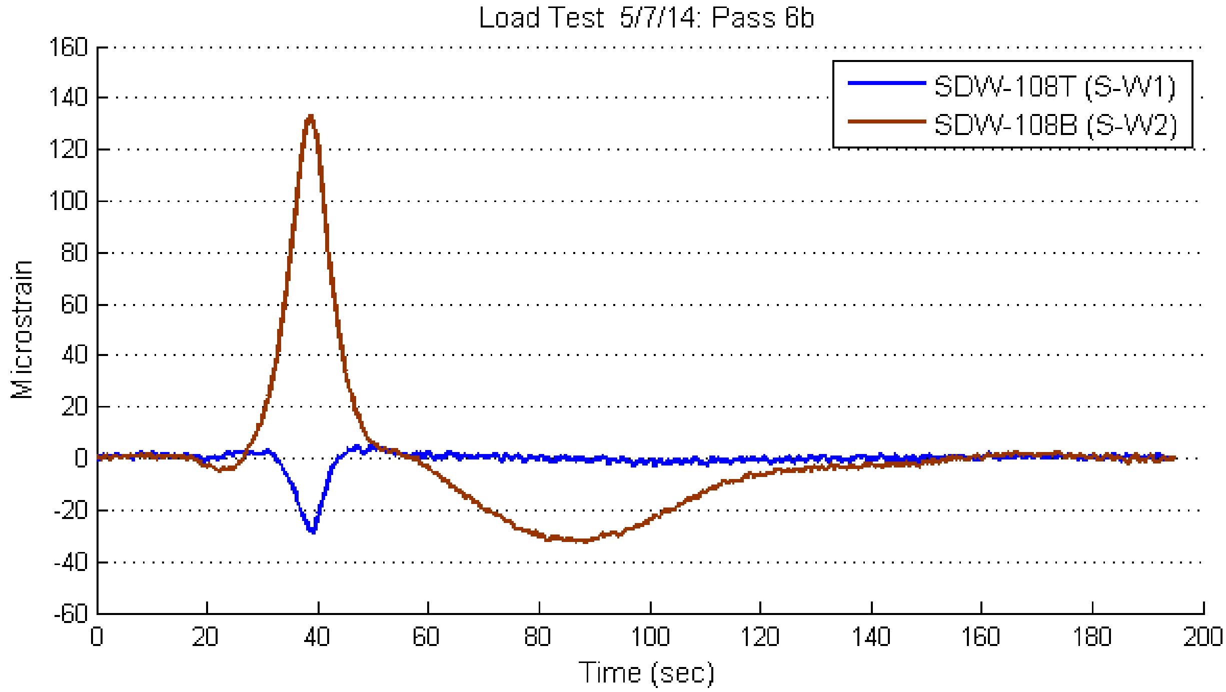


Figure D.22 West edge girder strain time history - section 108

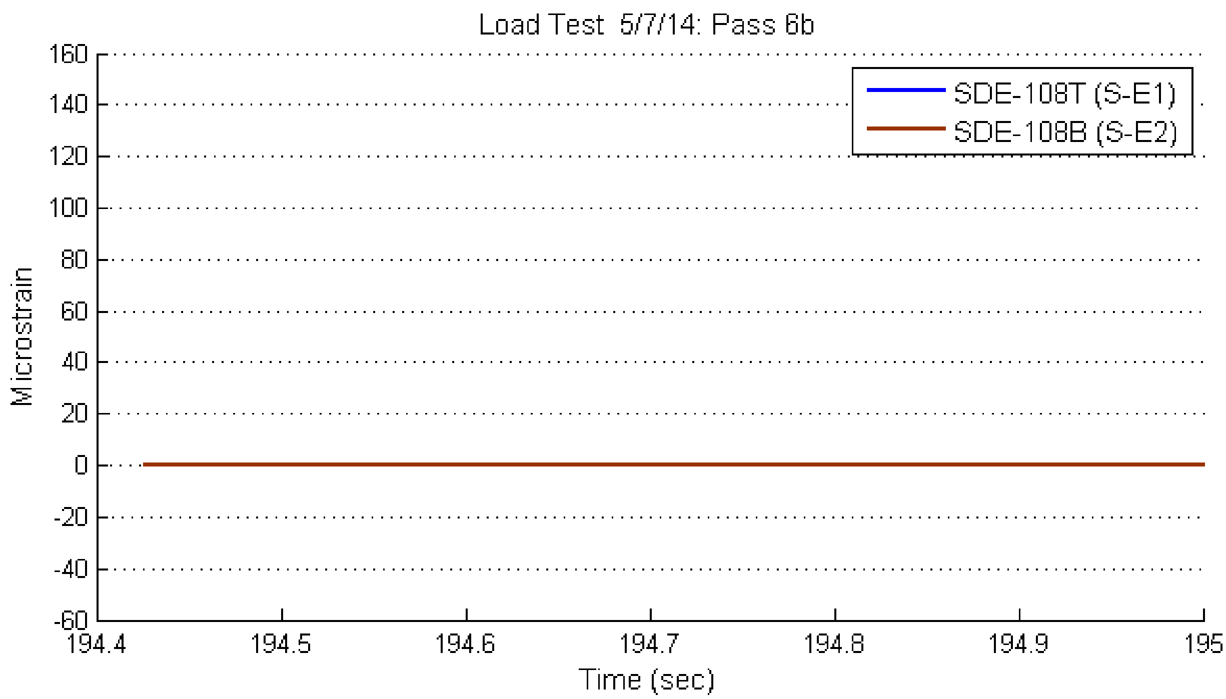


Figure D.23 East edge girder strain time history - section 108

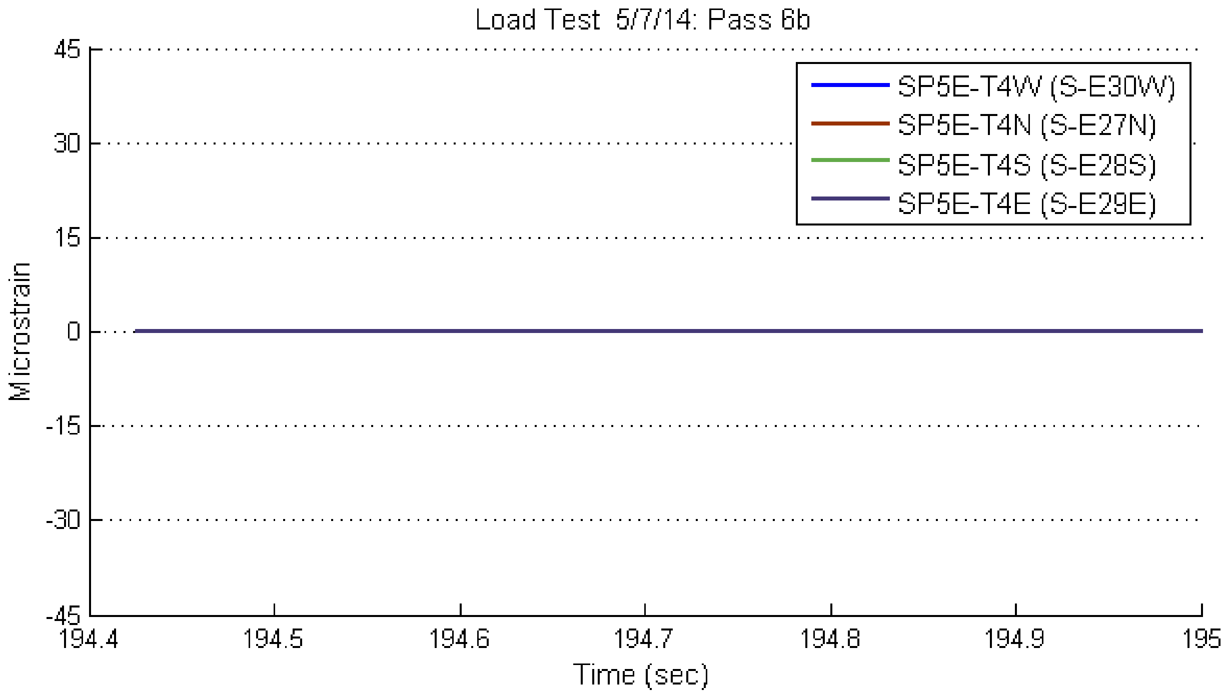


Figure D.24 Pylon 5 east strain time history - lift T4

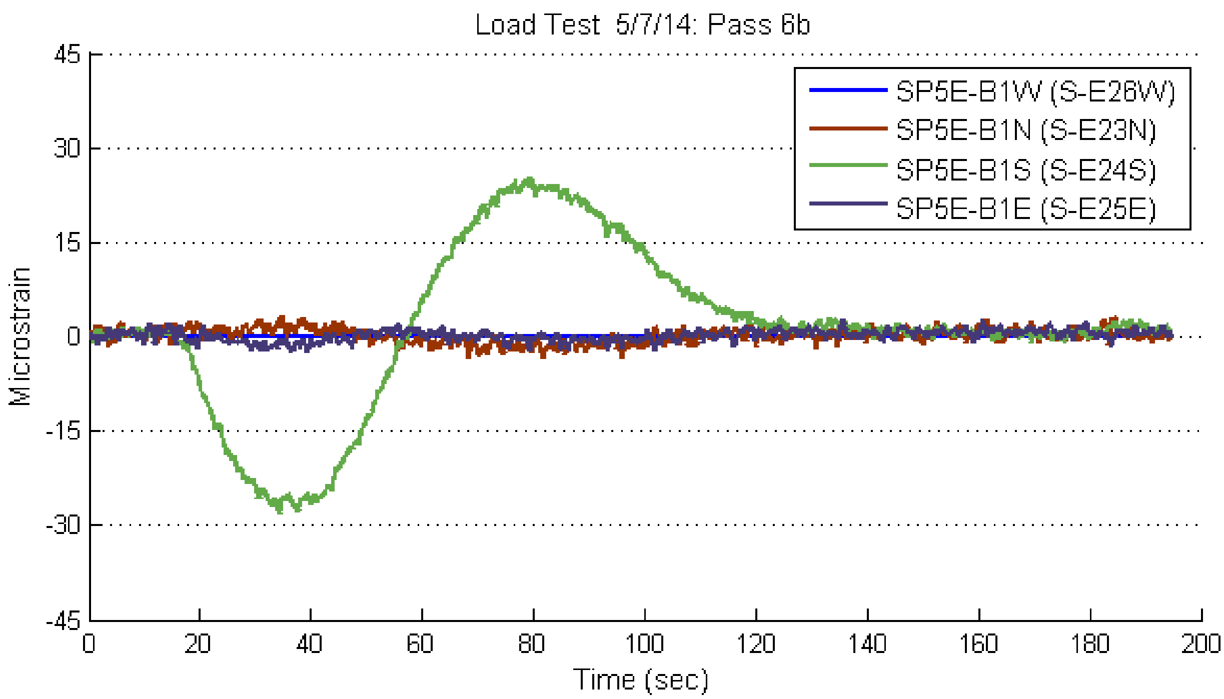


Figure D.25 Pylon 5 east strain time history - lift B1

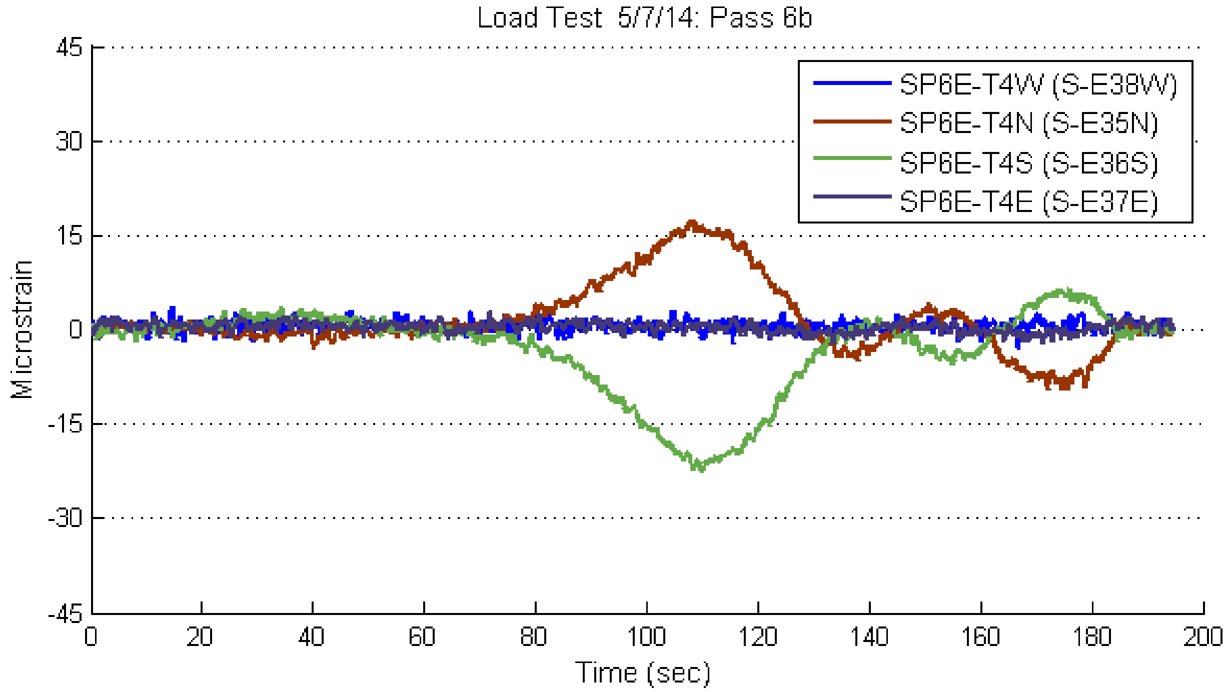


Figure D.26 Pylon 6 east strain time history - lift T4

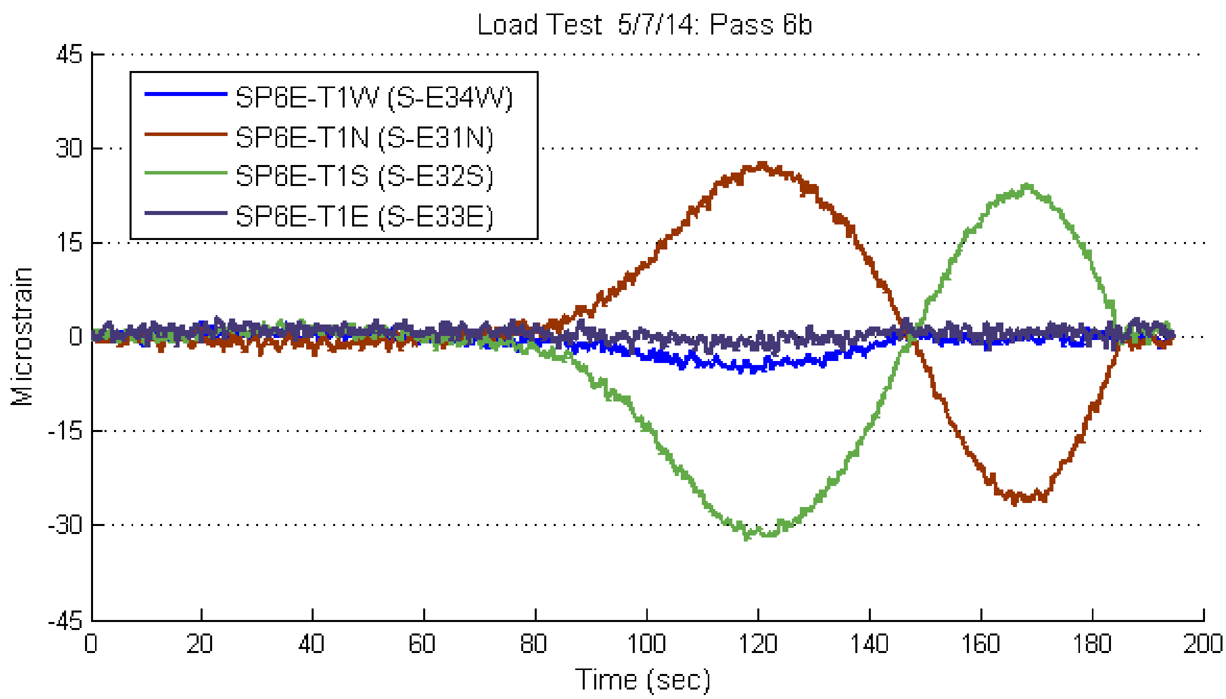


Figure D.27 Pylon 6 east strain time history - lift T1

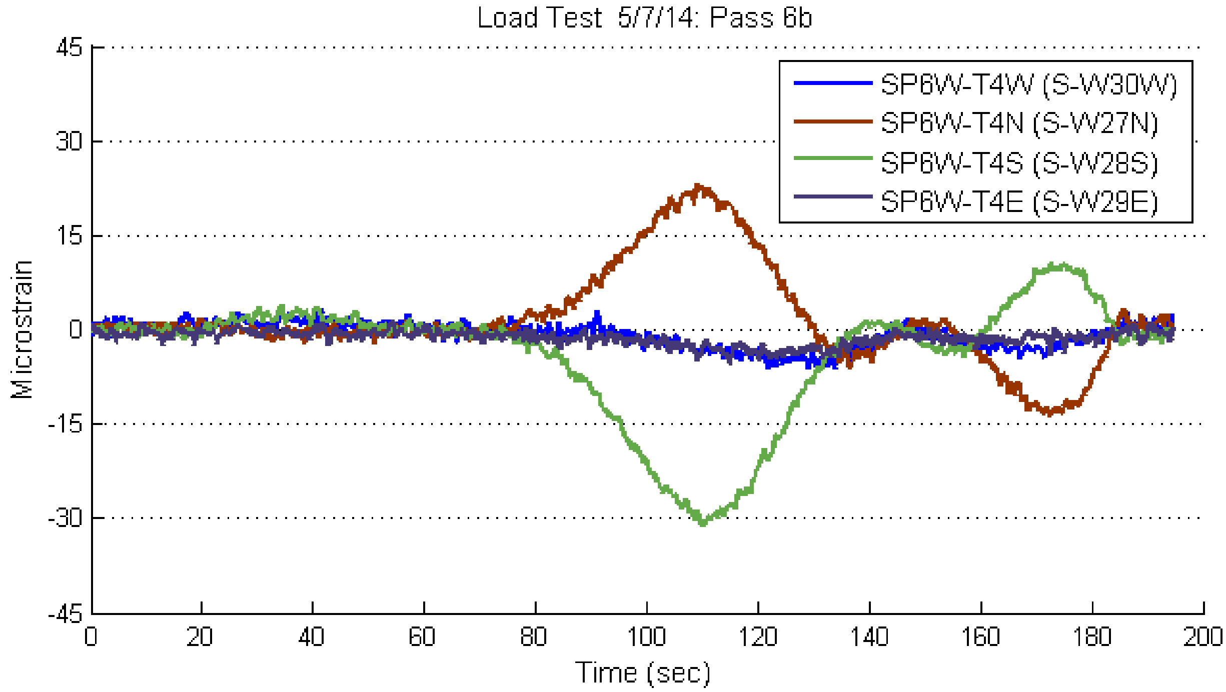


Figure D.28 Pylon 6 west strain time history - lift T4

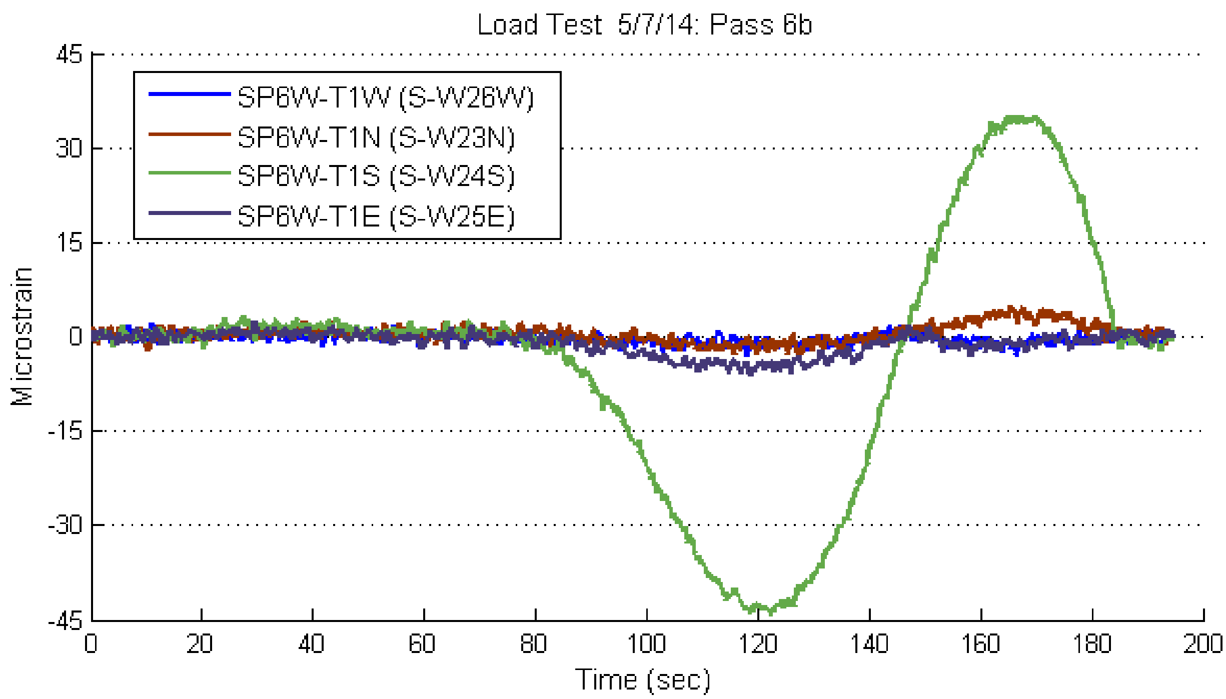


Figure D.29 Pylon 6 west strain time history - lift T1

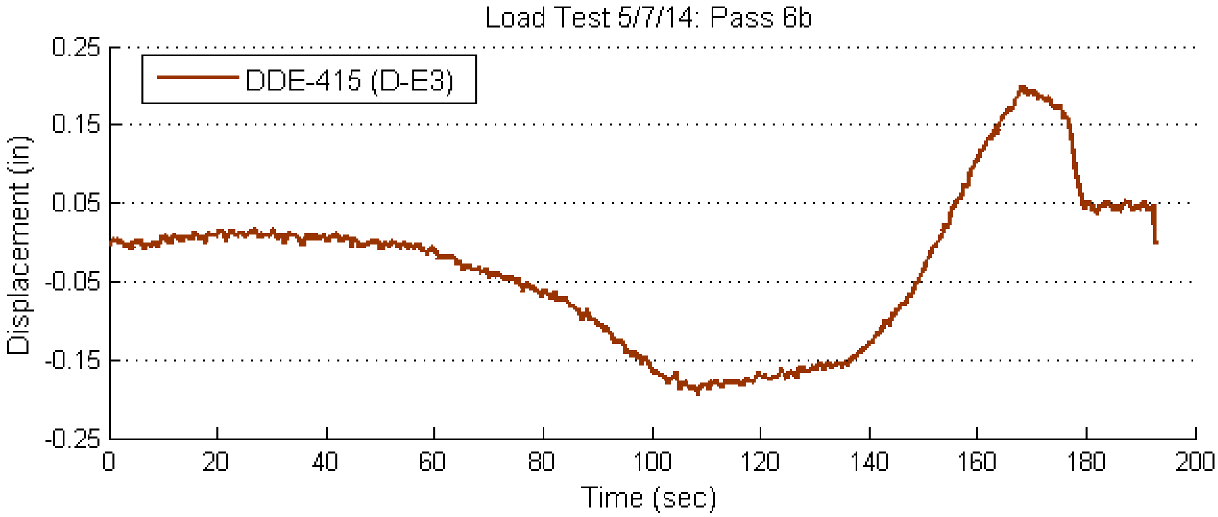


Figure D.30 Bearing displacement time history – north abutment

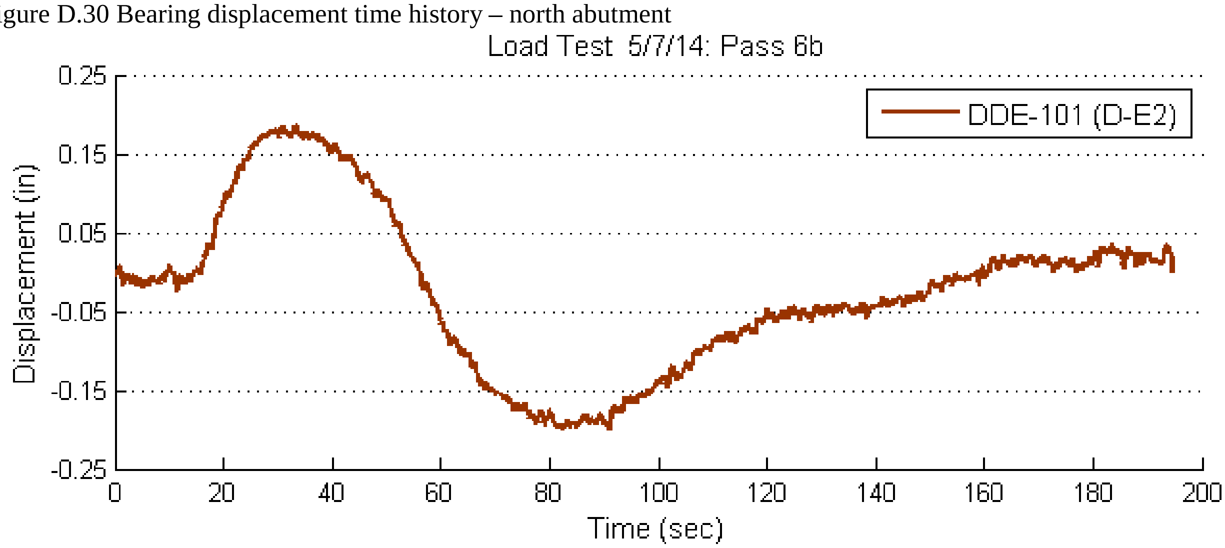


Figure D.31 Bearing displacement time history – pylon 5

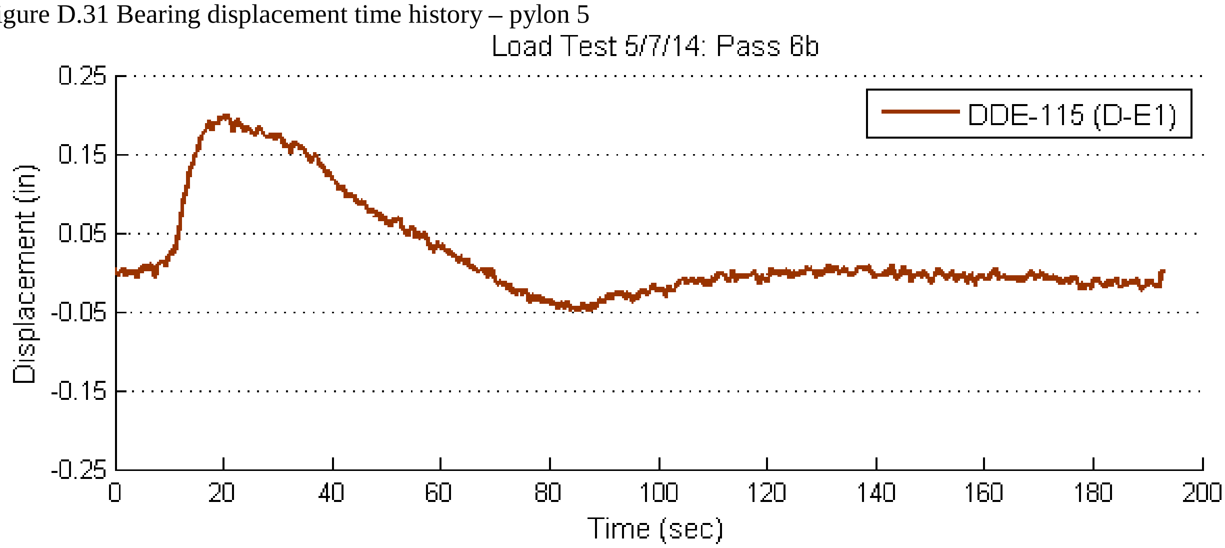


Figure D.32 Bearing displacement time history – south abutment

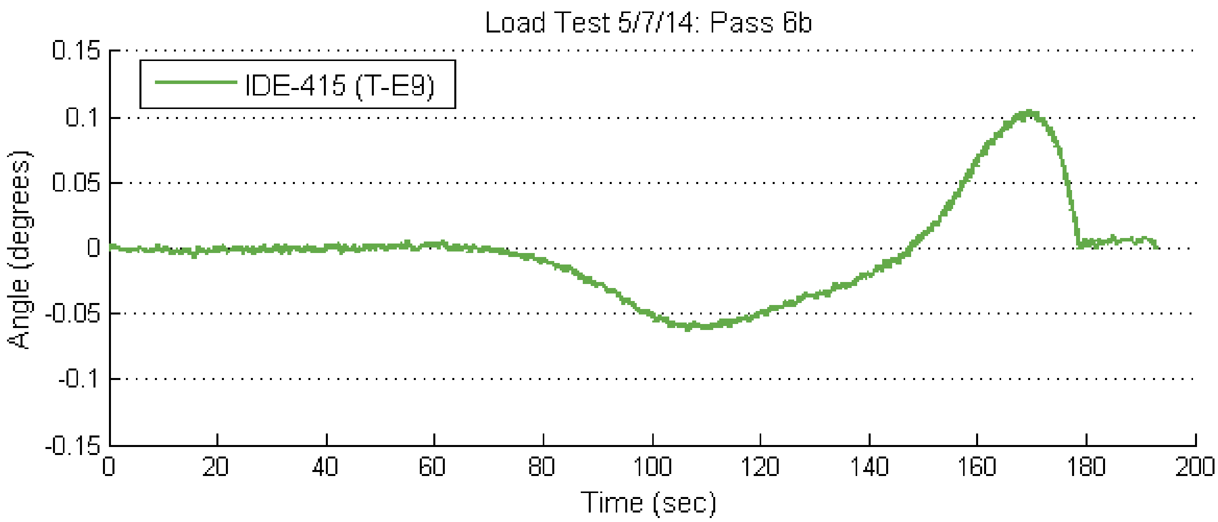


Figure D.33 Deck tilt time history - section 415

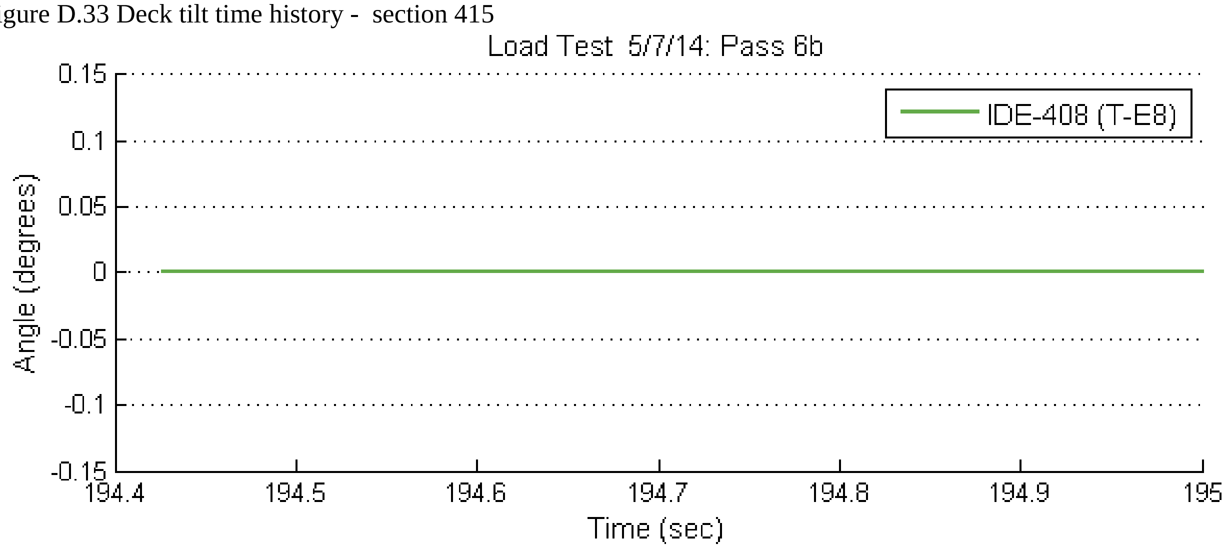


Figure D.34 Deck tilt time history - section 408

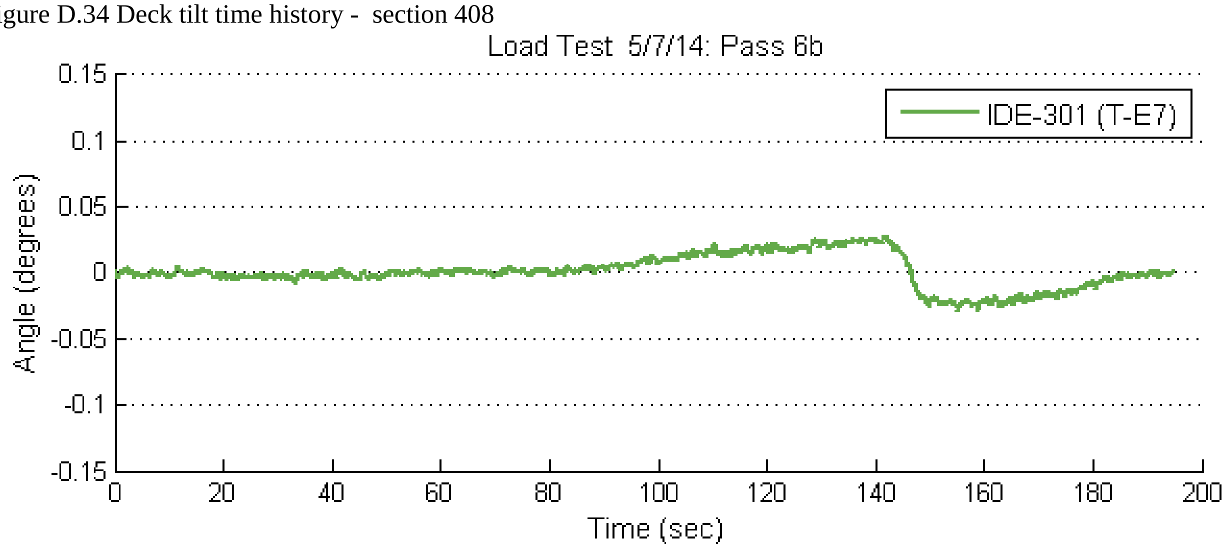


Figure D.35 Deck tilt time history - section 301

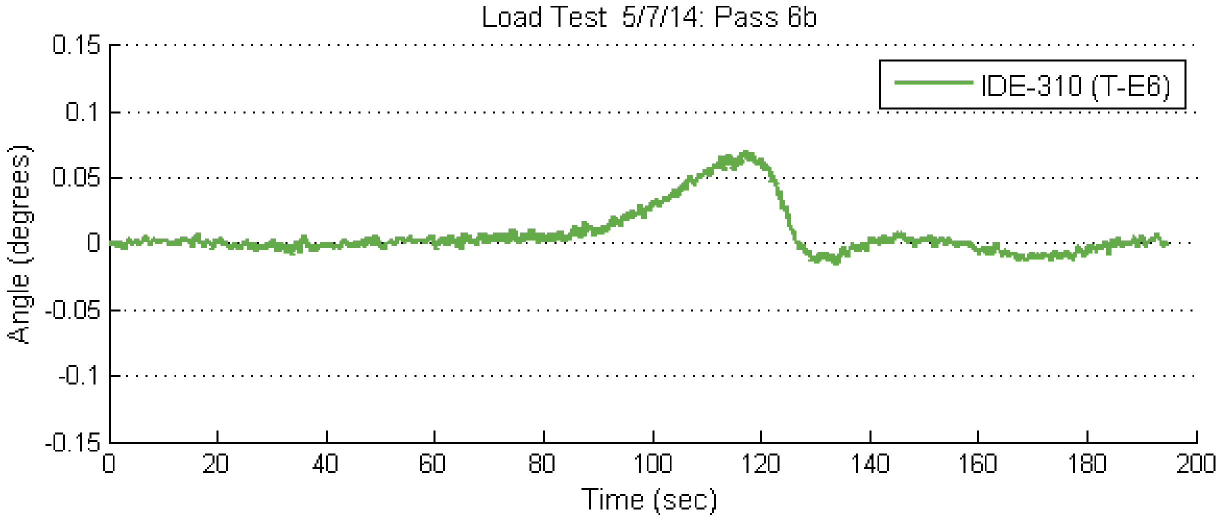


Figure D.36 Deck tilt time history - section 310

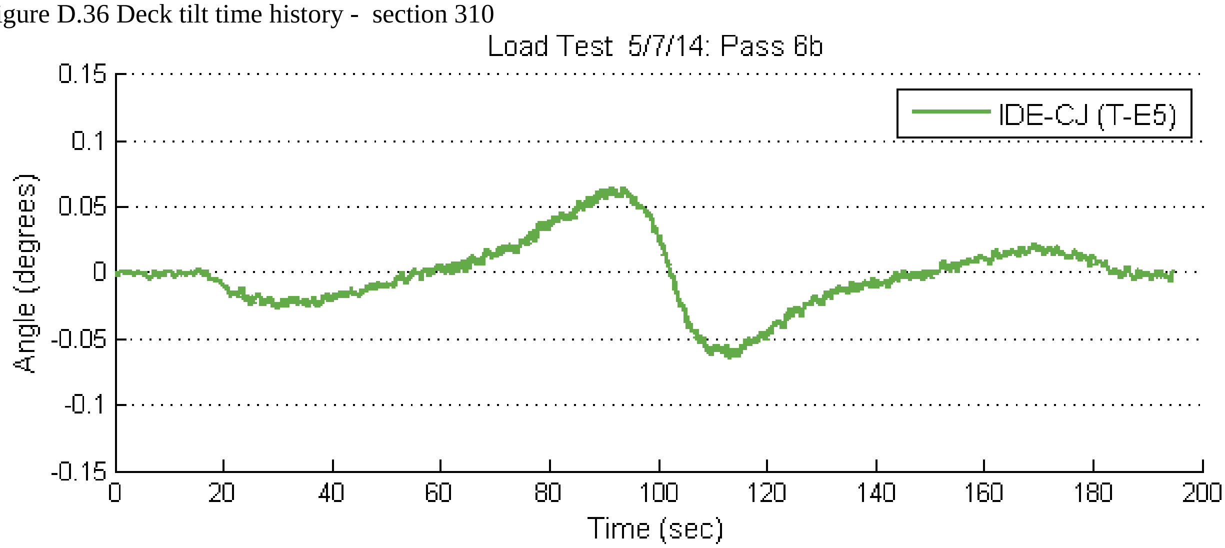


Figure D.37 Deck tilt time history - section closure joint

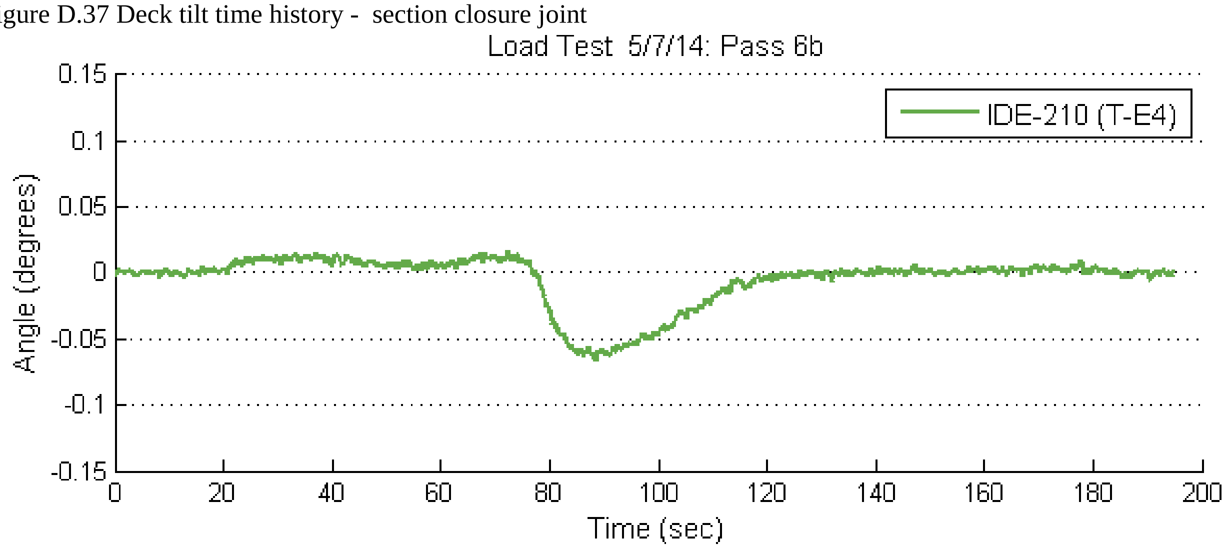


Figure D.38 Deck tilt time history - section 210

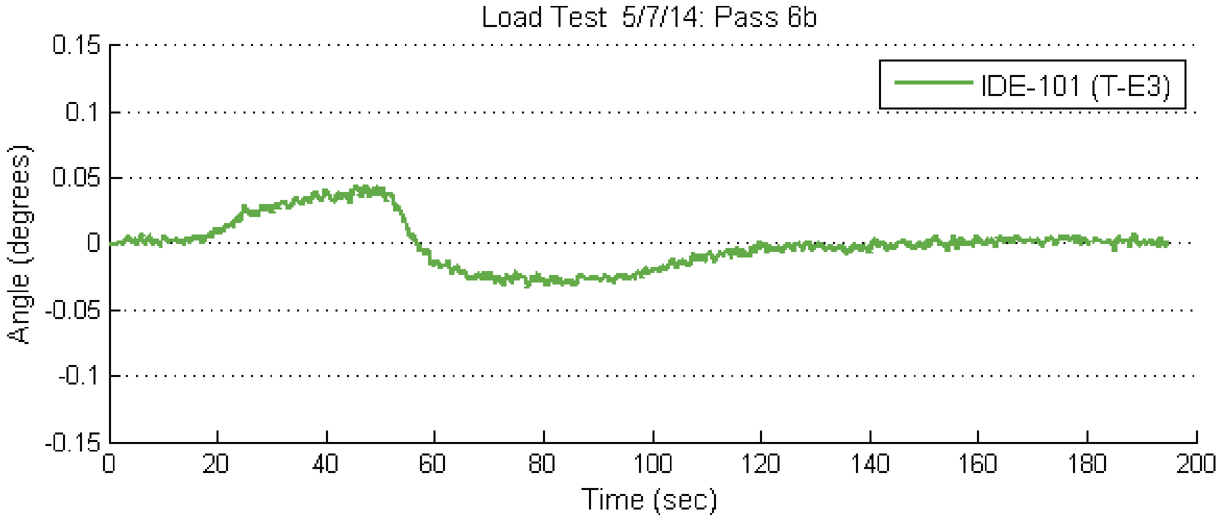


Figure D.39 Deck tilt time history - section 101

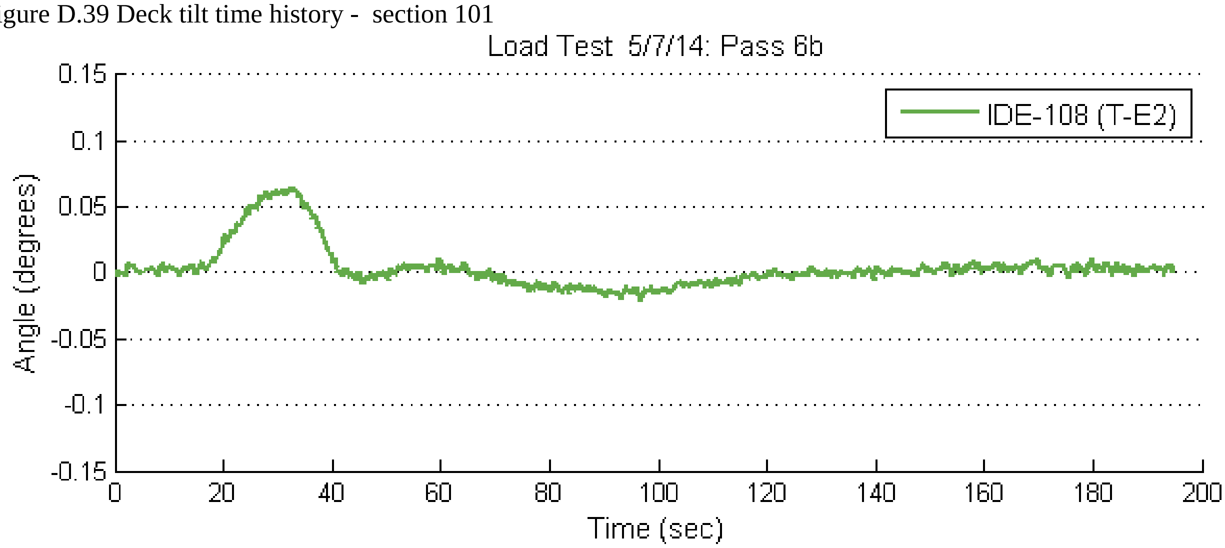


Figure D.40 Deck tilt time history - section 108

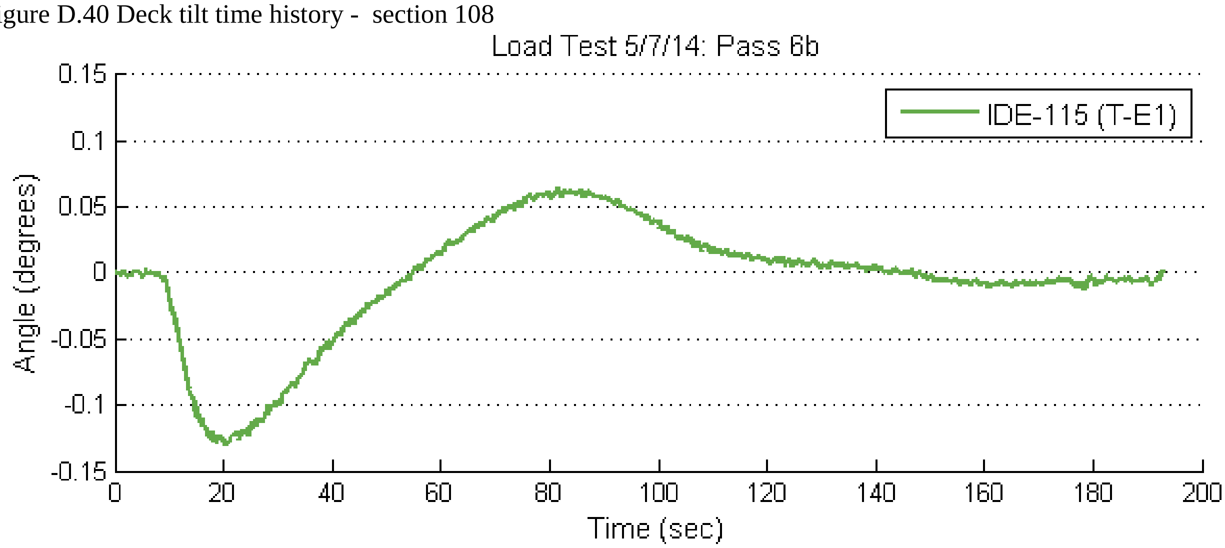


Figure D.41 Deck tilt time history - section 115

Appendix E Comparison Tables and Figures – Load Test 2 (11/28/12) Compared To Load Test 1

Presented in this appendix are tables that compare the peak results from Load Test 2 to the corresponding peak results from Load Test 1. Results are reported in the tables as a percentage difference, calculated as follows:

$$\Delta\% = \frac{\tilde{\phi}_1 - \phi_2}{\phi_2} x100$$

where

$$\tilde{\phi}_1 = \phi_1 x \frac{W_2}{W_1}$$

and:

ϕ_2	= a peak measurand (strain, tilt, displacement, etc) from Load Test 2
ϕ_1	=peak measurand (strain, tilt, displacement, etc) from Load Test 1
$\tilde{\phi}_1$	= peak measurand from Load Test 1 adjusted for the difference in vehicle weight
$\Delta\%$	= Percent difference in measurand
W_2	= average weight of test vehicle for Load Test 2
W_1	= average weight of test vehicle for Load Test 1

Table E.1 Bearing Displacement: Maximums

No. trucks	Pass	Displacement (in)		
		DDE_115 D-E1	DDE_101 D-E2	DDE_415 D-E3
Slow speed passes				
1	1a		-51	
	1b		-147	
	1c		-307	
	1d		-147	
2	2a		-90	
	2b			
	2c		-41	
	2d	-138		
	2e	-111		
	2f		-54	
4	4a		-84	-64
	4b	-142	-54	
	4c	-70	-23	
	4d	-59	-65	
	4e		-103	

High speed passes				
4	4f		-66	
	4g			

Table E.2 Bearing Displacement: Minimums

No. trucks	Pass	Displacement (in)		
		DDE_115 D-E1	DDE_101 D-E2	DDE_415 D-E3
Slow speed passes				
1	1a			
	1b			
	1c			
	1d		-144	
2	2a		-200	
	2b		-228	
	2c		-223	
	2d		-284	
	2e		-307	
	2f		-182	
4	4a		-76	
	4b		-91	-65
	4c	-145	-127	
	4d		-99	
	4e	-120	-29	

High speed passes				
4	4f	-97	-20	
	4g		-106	

Table E.3 Deck Tilt: Maximums

No. of trucks	Pass	Tilt sensor (Deg.)								
		IDE_115 T-E1	IDE_108 T-E2	IDE_101 T-E3	IDE_210 T-E4	IDE_CJ T-E5	IDE_310 T-E6	IDE_301 T-E7	IDE_408 T-E8	IDE_415 T-E9
Slow speed passes										
1	1a									
	1b									
	1c									
	1d									
2	2a									
	2b									
	2c									
	2d									
	2e									
	2f									-46
4	4a		-53							-35
	4b		-73							-26
	4c		-39							-20
	4d									-34
	4e		-44							-36
High speed passes										
4	4f						34			
	4g	28								

Table E.4 Deck Tilt: Minimums

No. of trucks	Pass	Tilt sensor (Deg.) IDE_115 T-E1	IDE_108 T-E2	IDE_101 T-E3	IDE_210 T-E4	IDE_CJ T-E5	IDE_310 T-E6	IDE_301 T-E7	IDE_408 T-E8	IDE_415 T-E9
Slow speed passes										
1	1a									
	1b									
	1c									
	1d									
2	2a									
	2b									
	2c									
	2d									
	2e									
	2f									
4	4a									
	4b									-48
	4c									
	4d									
	4e									
High speed passes										
4	4f	26				54				
	4g									

Table E.5 Plyon 5E Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Below Deck – Level B1)				Strain sensor (με) (Above Deck – Level T4)			
		SP5E_B1W S-E26W	SP5E_B1N S-E23N	SP5E_B1E S-E25E	SP5E_B1S S-E24S	SP5E_T4W S-E30W	SP5E_T4N S-E27N	SP5E_T4E S-E29E	SP5E_T4S S-E28S
Slow speed passes									
1	1a								
	1b								
	1c								
	1d								
2	2a								
	2b								
	2c								
	2d								
	2e				-53				
	2f								
4	4a								
	4b								
	4c								
	4d								
	4e								
High speed passes									
4	4f				20				
	4g								

Table E.6 Plyon 5E Strain: Minimums

No. of trucks	Pass	Strain sensor (με) (Below Deck – Level B1)				Strain sensor (με) (Above Deck – Level T4)			
		SP5E_B1W S-E26W	SP5E_B1N S-E23N	SP5E_B1E S-E25E	SP5E_B1S S-E24S	SP5E_T4W S-E30W	SP5E_T4N S-E27N	SP5E_T4E S-E29E	SP5E_T4S S-E28S
Slow speed passes									
1	1a								
	1b								
	1c								
	1d								
2	2a								
	2b								
	2c								
	2d								
	2e								
	2f								
4	4a								
	4b								
	4c								
	4d								
	4e								
High speed passes									
4	4f				28				
	4g								

Table E.7 Plyon 6E Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6E_T1W S-E34W	SP6E_T1N S-E31N	SP6E_T1E S-E33E	SP6E_T1S S-E32S	SP6E_T4W S-E38W	SP6E_T4N S-E35N	SP6E_T4E S-E37E	SP6E_T4S S-E36S
Slow speed passes									
1	1a								
	1b								
	1c								
	1d								
2	2a								
	2b								
	2c								
	2d								
	2e								
	2f								
4	4a								
	4b								
	4c								
	4d								
	4e								
High speed passes									
4	4f				50				
	4g								

Table E.8 Plyon 6E Strain: Minimums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6E_T1W S-E34W	SP6E_T1N S-E31N	SP6E_T1E S-E33E	SP6E_T1S S-E32S	SP6E_T4W S-E38W	SP6E_T4N S-E35N	SP6E_T4E S-E37E	SP6E_T4S S-E36S
Slow speed passes									
1	1a								
	1b								
	1c								
	1d								
2	2a								
	2b								
	2c								
	2d								
	2e								
	2f								
4	4a								
	4b								
	4c								
	4d								
	4e				-14				
High speed passes									
4	4f		43						
	4g		38						

Table E.9 Pylon 6W Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6W_T1W S-W26W	SP6W_T1N S-W23N	SP6W_T1E S-W25E	SP6W_T1S S-W24S	SP6W_T4W S-W30W	SP6W_T4N S-W27N	SP6W_T4E S-W29E	SP6W_T4S S-W28S
Slow speed passes									
1	1a								
	1b								
	1c								
	1d								
2	2a								
	2b								
	2c								
	2d								
	2e								
	2f								
4	4a								
	4b								
	4c								
	4d								
	4e								
High speed passes									
4	4f				34				
	4g				39				25

Table E.10 Pylon 6W Strain: Minimums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6W_T1W S-W26W	SP6W_T1N S-W23N	SP6W_T1E S-W25E	SP6W_T1S S-W24S	SP6W_T4W S-W30W	SP6W_T4N S-W27N	SP6W_T4E S-W29E	SP6W_T4S S-W28S
Slow speed passes									
1	1a								
	1b								
	1c								
	1d								
2	2a								
	2b								
	2c								
	2d								
	2e								
	2f								
4	4a				-13				
	4b				-11				
	4c								
	4d								
	4e								
High speed passes									
4	4f				23				
	4g							21	44

Table E.11 East Edge Girder – Top Strain: Maximums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108T S-E1	SDE_101T S-E3	SDE_210T S-E5	SDE_CJT S-E7	SDE_315T S-E9	SDE_310T S-E11	SDE_305T S-E13	SDE_301T S-E15	SDE_404T S-E17	SDE_408T S-E19	SDE_412T S-E21
Slow speed passes												
1	1a											
	1b											
	1c											
	1d											
2	2a											
	2b											
	2c											
	2d											
	2e											
	2f											
4	4a											
	4b											
	4c											
	4d											
	4e											
High speed passes												
4	4f											
	4g											

Table E.12 East Edge Girder – Top Strain: Minimums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108T S-E1	SDE_101T S-E3	SDE_210T S-E5	SDE_CJT S-E7	SDE_315T S-E9	SDE_310T S-E11	SDE_305T S-E13	SDE_301T S-E15	SDE_404T S-E17	SDE_408T S-E19	SDE_412T S-E21
Slow speed passes												
1	1a											
	1b											
	1c											
	1d											
2	2a											
	2b											
	2c											
	2d											
	2e											
	2f											-34
4	4a											
	4b											
	4c											
	4d											
	4e											
High speed passes												
4	4f		24									21
	4g											

Table E.13 East Edge Girder – Bottom Strain: Maximums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108B S-E2	SDE_101B S-E4	SDE_210B S-E6	SDE_CJB S-E8	SDE_315B S-E10	SDE_E310B S-E12	SDE_305B S-E14	SDE_301B S-E16	SDE_404B S-E18	SDE_408B S-E20	SDE_412B S-E22
Slow speed passes												
1	1a											
	1b											
	1c											
	1d											
2	2a											-13
	2b											-18
	2c			-16	-15							-22
	2d											
	2e			-27	-18							-14
	2f	-11		-23	-20	-13	-16			-21	-22	-27
4	4a				-7							-9
	4b				-7							
	4c	19		13		10		16			12	10
	4d			29								-14
	4e					18	30	30			11	
High speed passes												
4	4f	18	33		13	34	48	34		-28	18	34
	4g	38			39	34						34

Table E.14 East Edge Girder – Bottom Strain: Minimums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108B S-E2	SDE_101B S-E4	SDE_210B S-E6	SDE_CJB S-E8	SDE_315B S-E10	SDE_E310B S-E12	SDE_305B S-E14	SDE_301B S-E16	SDE_404B S-E18	SDE_408B S-E20	SDE_412B S-E22
Slow speed passes												
1	1a											
	1b											
	1c											
	1d											
2	2a											
	2b											
	2c											
	2d											
	2e											
	2f											
4	4a											13
	4b											
	4c											
	4d											
	4e											
High speed passes												
4	4f	27		38				31	29	20	35	33
	4g											32

Table E.15 West Edge Girder – Top Strain: Maximums

No. of trucks	Pass	Strain sensor (με)										
		SDW_108T S-W1	SDW_101T S-W3	SDW_210T S-W5	SDW_CJT S-W7	SDW_315T S-W9	SDW_310T S-W11	SDW_305T S-W13	SDW_301T S-W15	SDW_404T S-W17	SDW_408T S-W19	SDW_412T S-W21
Slow speed passes												
1	1a											
	1b											
	1c											
	1d											
2	2a											
	2b											
	2c											
	2d											
	2e											
	2f											
4	4a											
	4b											
	4c											
	4d											
	4e											
High speed passes												
4	4f											
	4g		44						36			

Table E.16 West Edge Girder – Top Strain: Minimums

No. of trucks	Pass	Strain sensor (με)										
		SDW_108T S-W1	SDW_101T S-W3	SDW_210T S-W5	SDW_CJT S-W7	SDW_315T S-W9	SDW_310T S-W11	SDW_305T S-W13	SDW_301T S-W15	SDW_404T S-W17	SDW_408T S-W19	SDW_412T S-W21
Slow speed passes												
1	1a											
	1b											
	1c											
	1d											
2	2a											-15
	2b				-25	-30						-20
	2c											-31
	2d											
	2e											
	2f											
4	4a											-10
	4b											
	4c											
	4d											-15
	4e											
High speed passes												
4	4f											
	4g											

Table E.17 West Edge Girder – Bottom Strain: Maximums

No. of trucks	Pass	Strain sensor (με)									
		SDW_108B S-W2	SDW_101B S-W4	SDW_210B S-W6	SDW_CJB S-W8	SDW_315B S-W10	SDW_310B S-W12	SDW_305B S-W14	SDW_404B S-W18	SDW_408B S-W20	SDW_412B S-W22
Slow speed passes											
1	1a										
	1b										
	1c										
	1d										
2	2a			-5	-6					-8	-9
	2b	-18		-24	-21	-33	-24	-25	-22	-22	-18
	2c			-13	-15	-19	-18	-19	-29	-24	-24
	2d			-11			-20			-15	-13
	2e			-37	-26	-20	-28			-13	-17
	2f									-27	-24
4	4a			-4	-6	-3				-8	-10
	4b	-4			-6	-11					
	4c	14									
	4d	10		25					24		-11
	4e							29			
High speed passes											
4	4f	29			18	32	42				27
	4g	28		42	33	26			28	30	24

Table E.18 West Edge Girder – Bottom Strain: Minimums

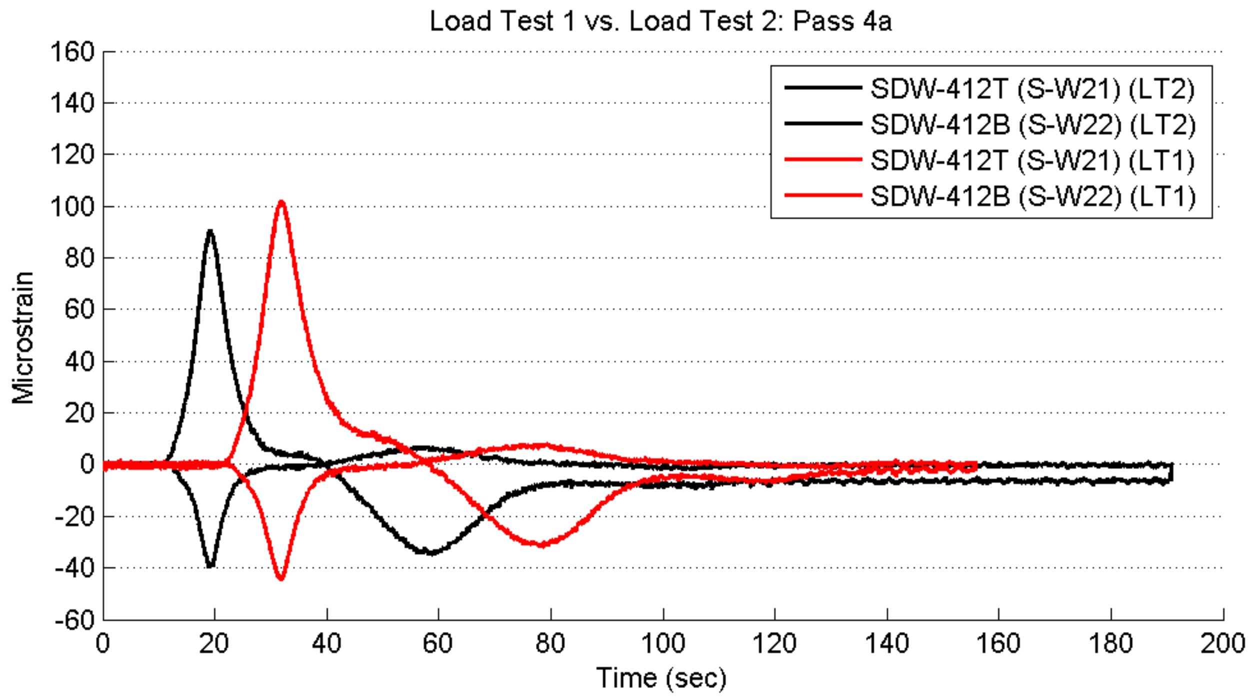
No. of trucks	Pass	Strain sensor (με)									
		SDW_108B S-W2	SDW_101B S-W4	SDW_210B S-W6	SDW_CJB S-W8	SDW_315B S-W10	SDW_310B S-W12	SDW_305B S-W14	SDW_404B S-W18	SDW_408B S-W20	SDW_412B S-W22
Slow speed passes											
1	1a										
	1b										
	1c										
	1d										
2	2a										
	2b										
	2c										
	2d										
	2e										
	2f										
4	4a										
	4b										-21
	4c										
	4d										
	4e										
High speed passes											
4	4f			29							33
	4g	26	29	22		31	34	33	32	23	26

Table E.19 Deck Strain: Maximums

No. of trucks	Pass	Strain sensor (με)	
		SDC_210N S-C1	SDC_210S S-C2
Slow speed passes			
1	1a		
	1b		
	1c		
	1d		
2	2a		
	2b		
	2c		
	2d		
	2e		
	2f		
4	4a		
	4b		
	4c		
	4d		
	4e		
High speed passes			
4	4f		
	4g		

Table E.20 Deck Strain: Minimums

No. of trucks	Pass	Strain sensor (με)	
		SDC_210N S-C1	SDC_210S S-C2
Slow speed passes			
1	1a		
	1b		
	1c		
	1d		
2	2a		
	2b		
	2c		
	2d	-21	-44
	2e		-33
	2f		
4	4a		
	4b		
	4c		-18
	4d		
	4e		
High speed passes			
4	4f		
	4g		



FigureE.1 Edge girder strain time history - section 412

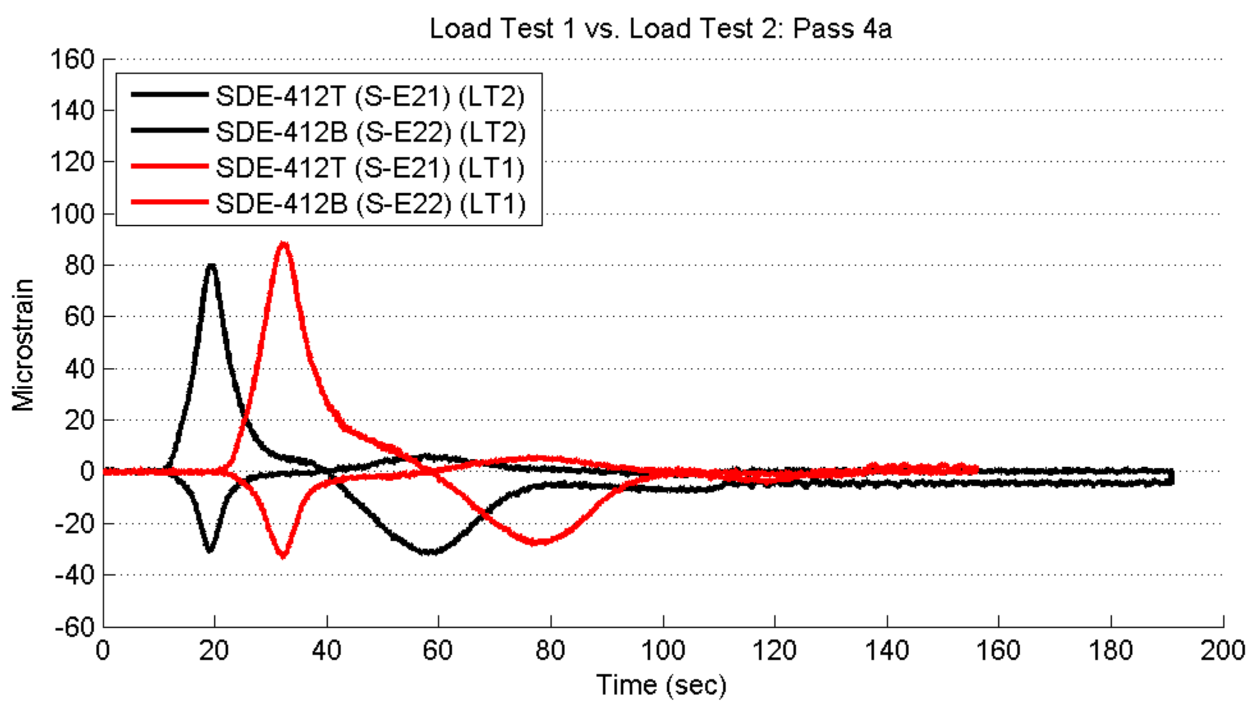


Figure E.2 Edge girder strain time history - section 412

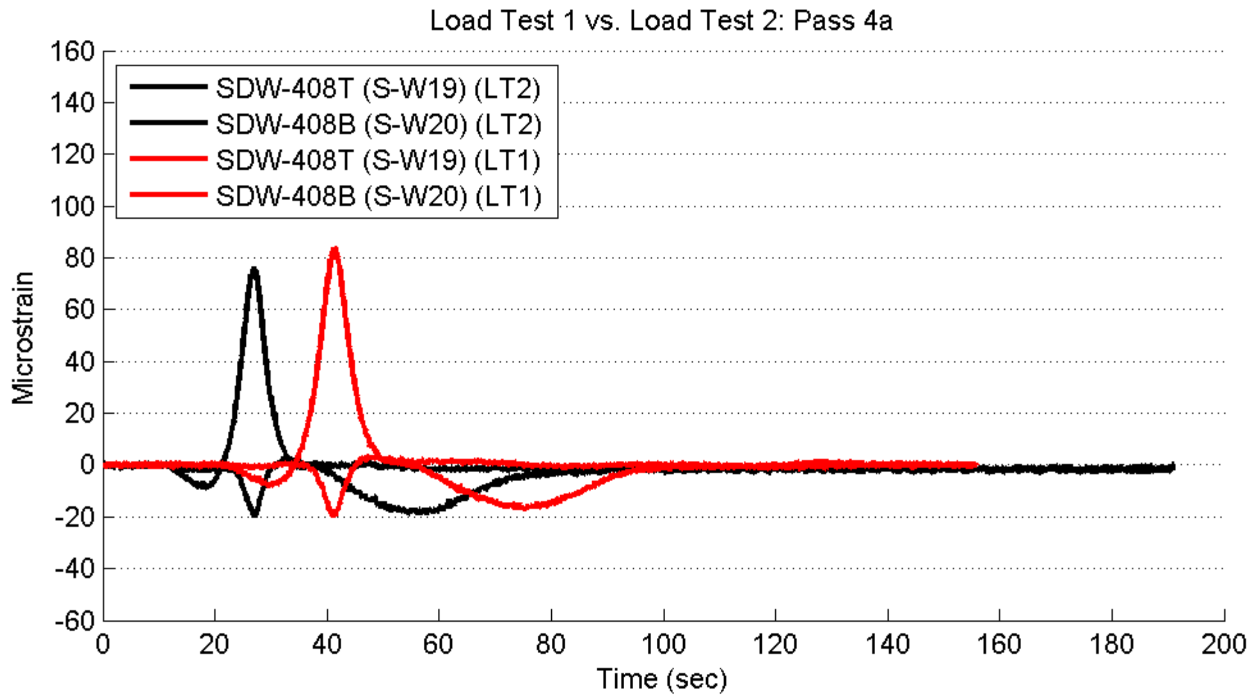


Figure E.3 West edge girder strain time history - section 408

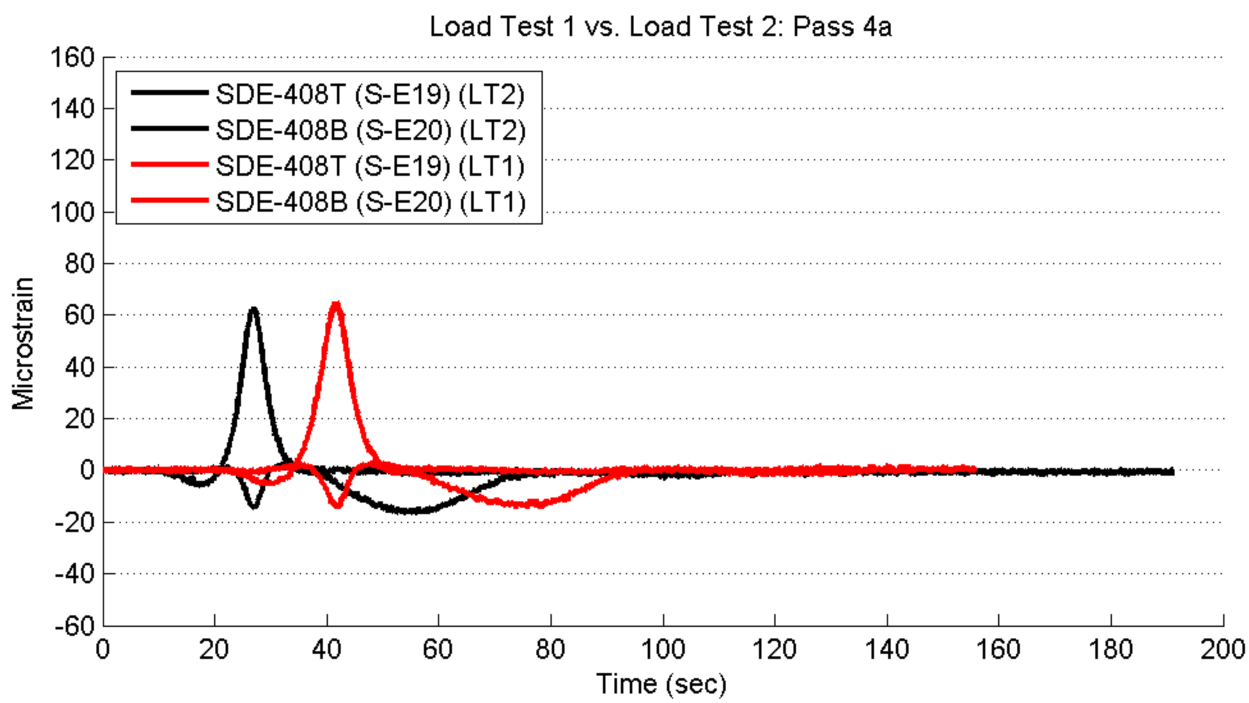


Figure E.4 East edge girder strain time history - section 408

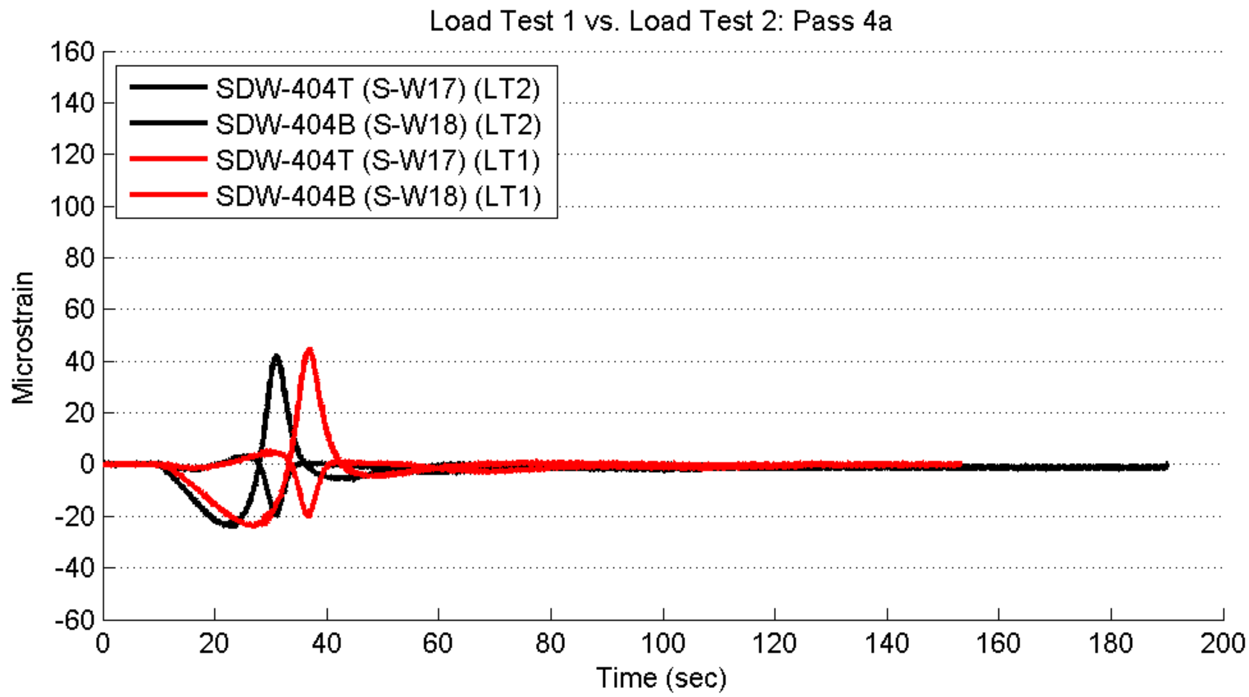


Figure E.5 West edge girder strain time history - section 404

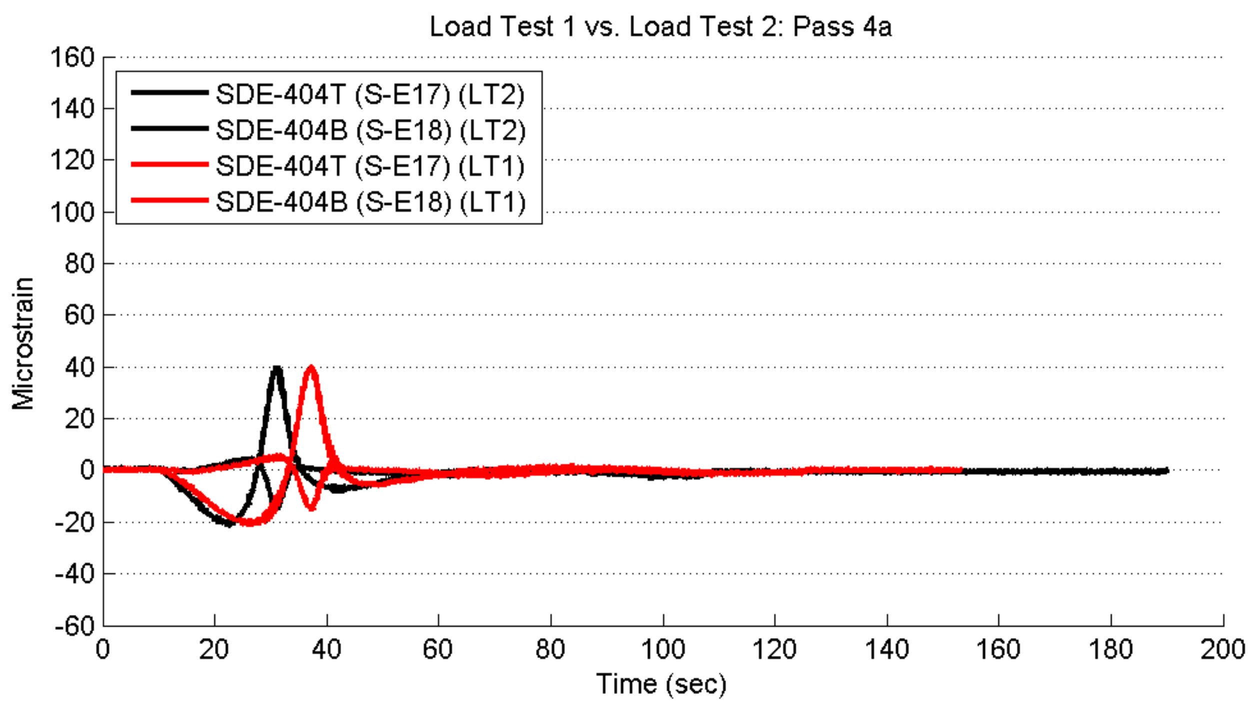


Figure E.6 East edge girder strain time history - section 404

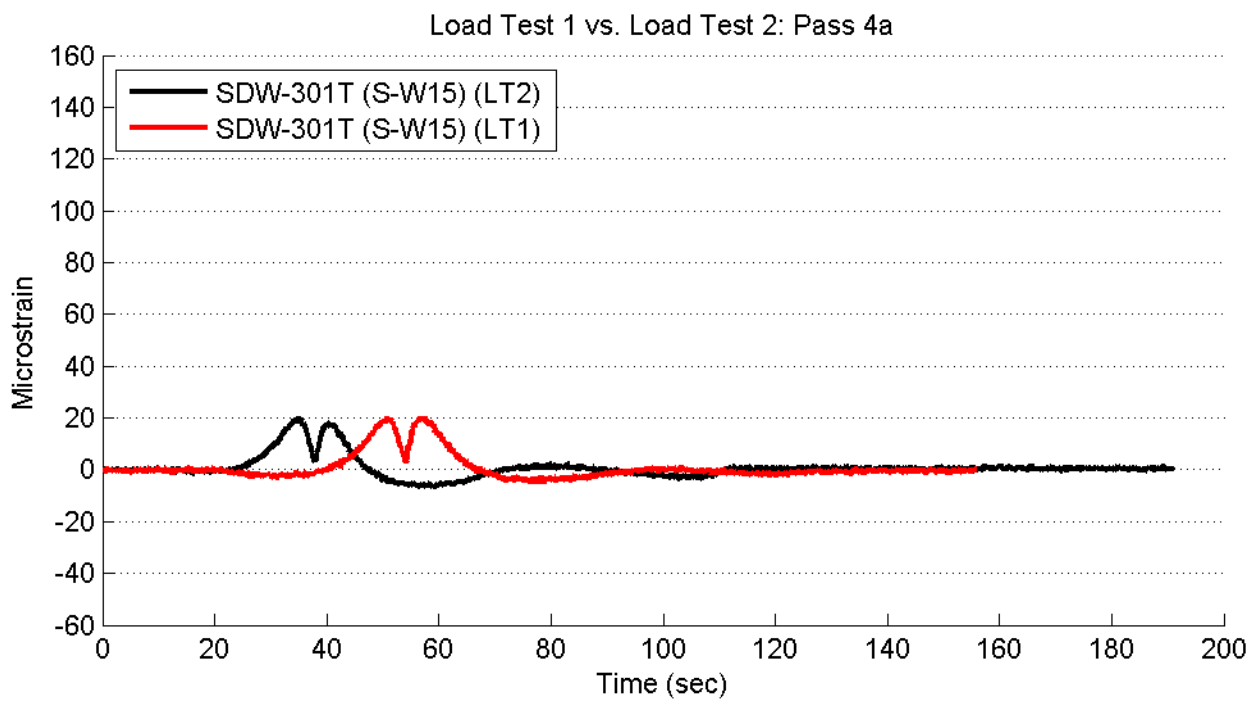


Figure E.7 West edge girder strain time history - section 301

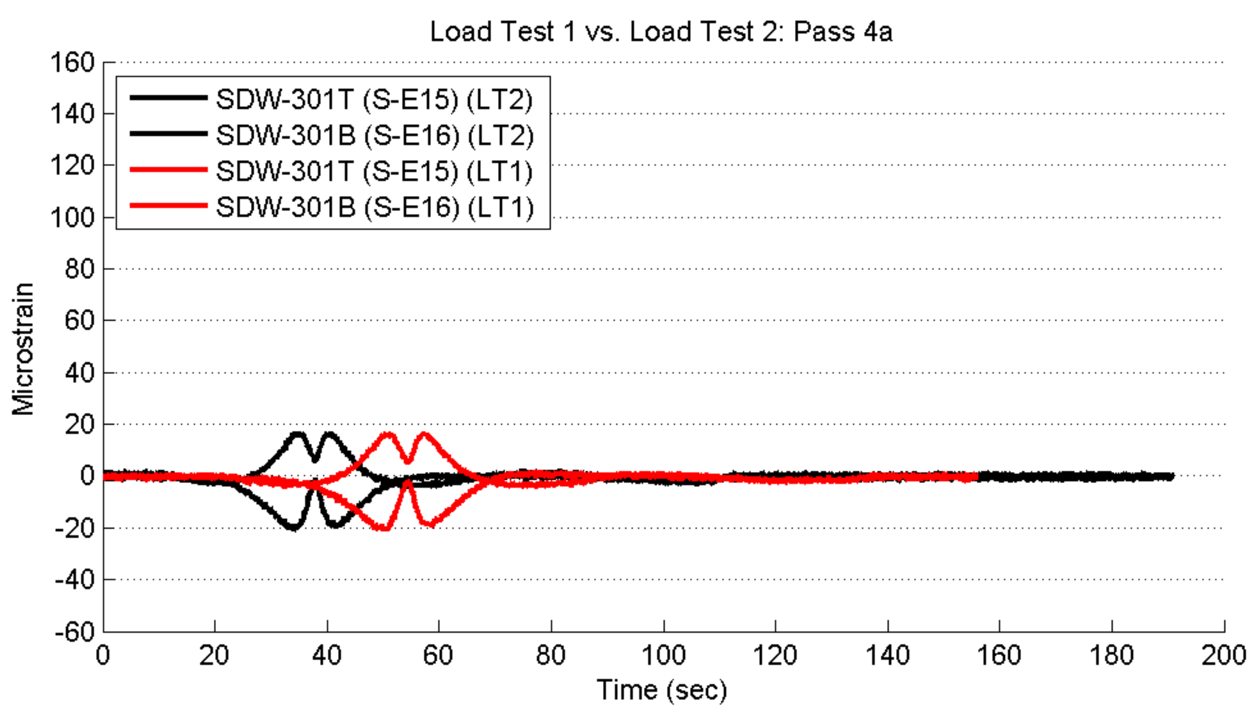


Figure E.8 East edge girder strain time history - section 301

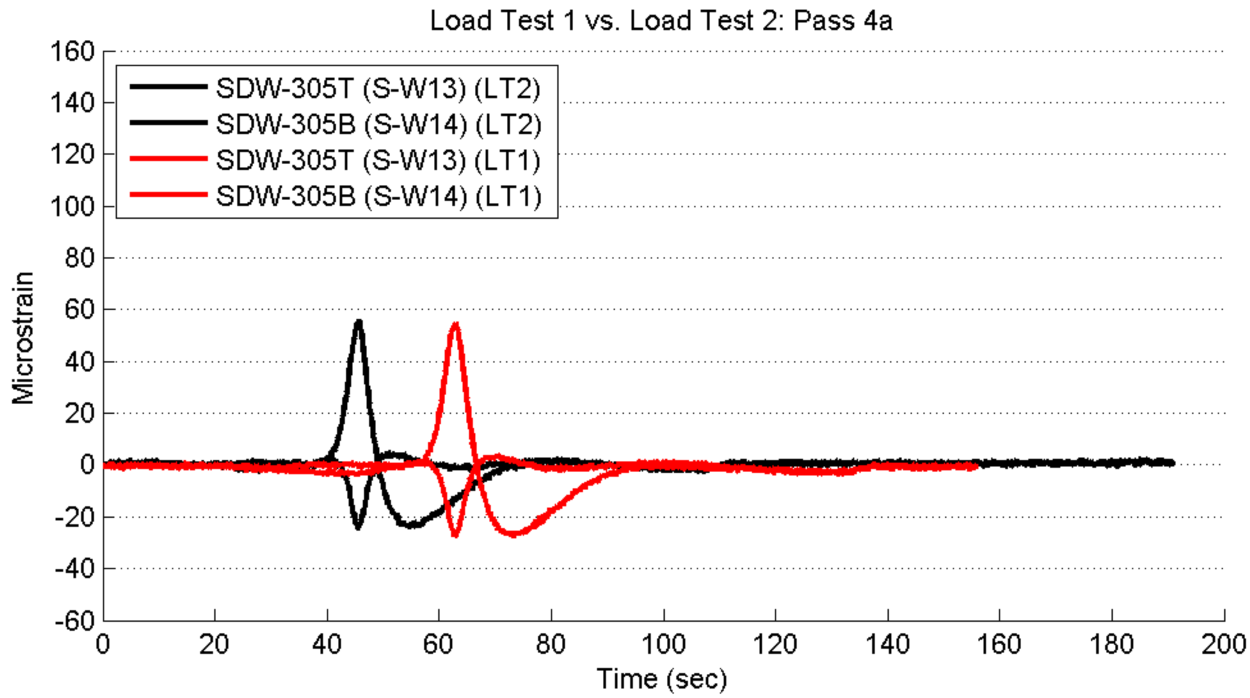


Figure E.9 West edge girder strain time history - section 305

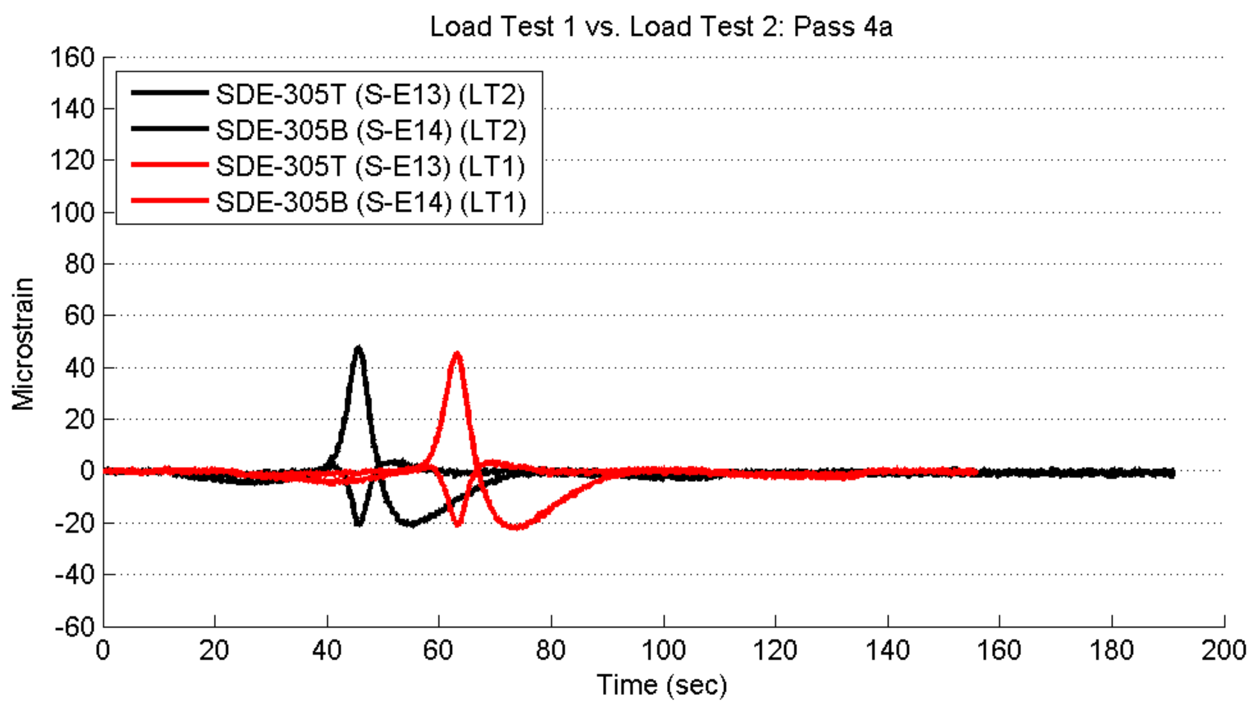


Figure E.10 East edge girder strain time history - section 305

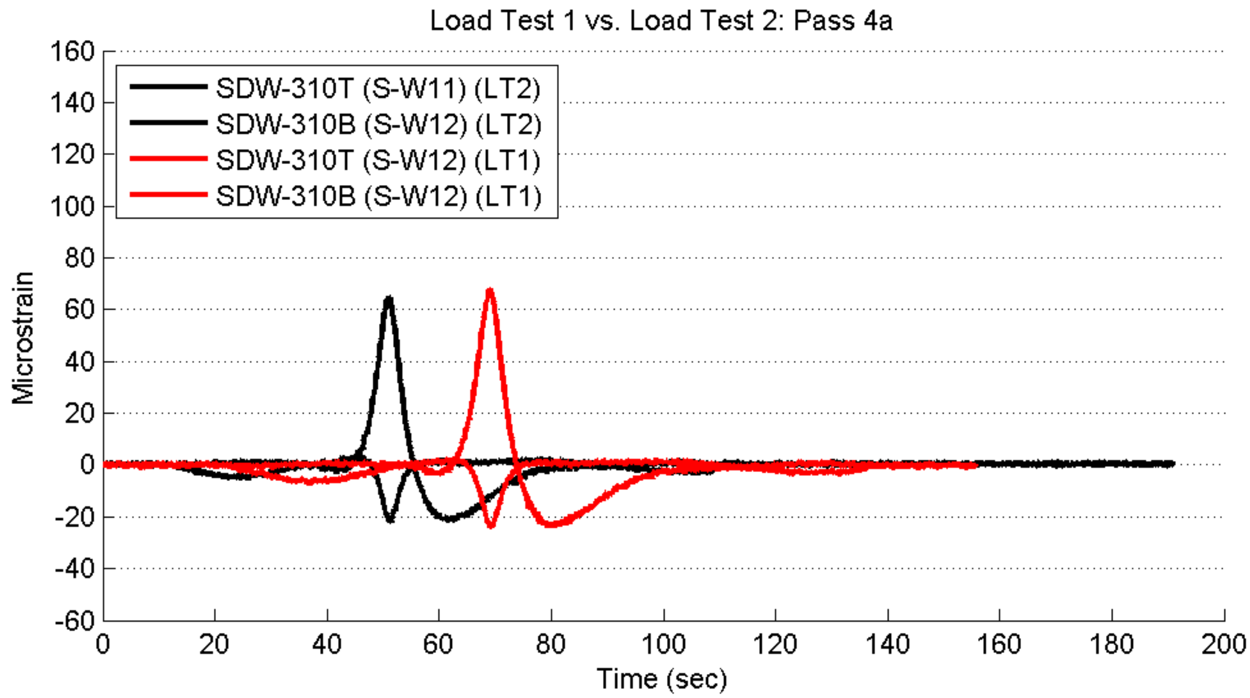


Figure E.11 East edge girder strain time history - section 310

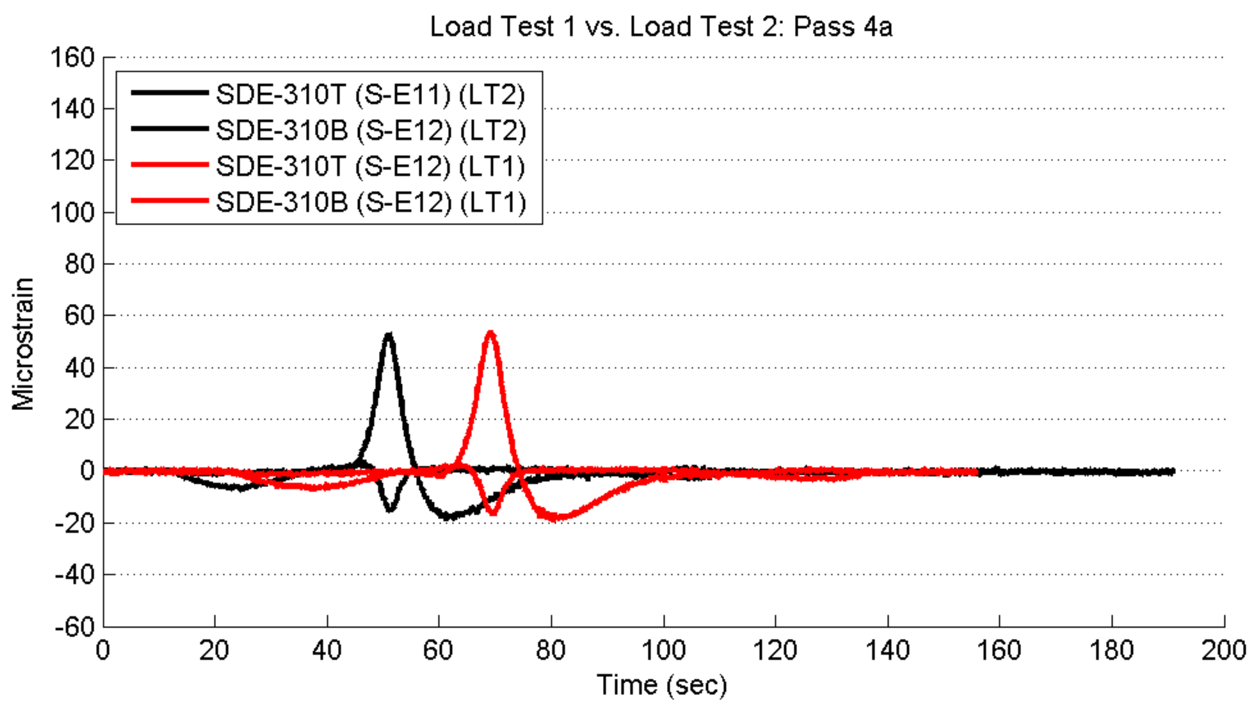


Figure E.12 East edge girder strain time history - section 310

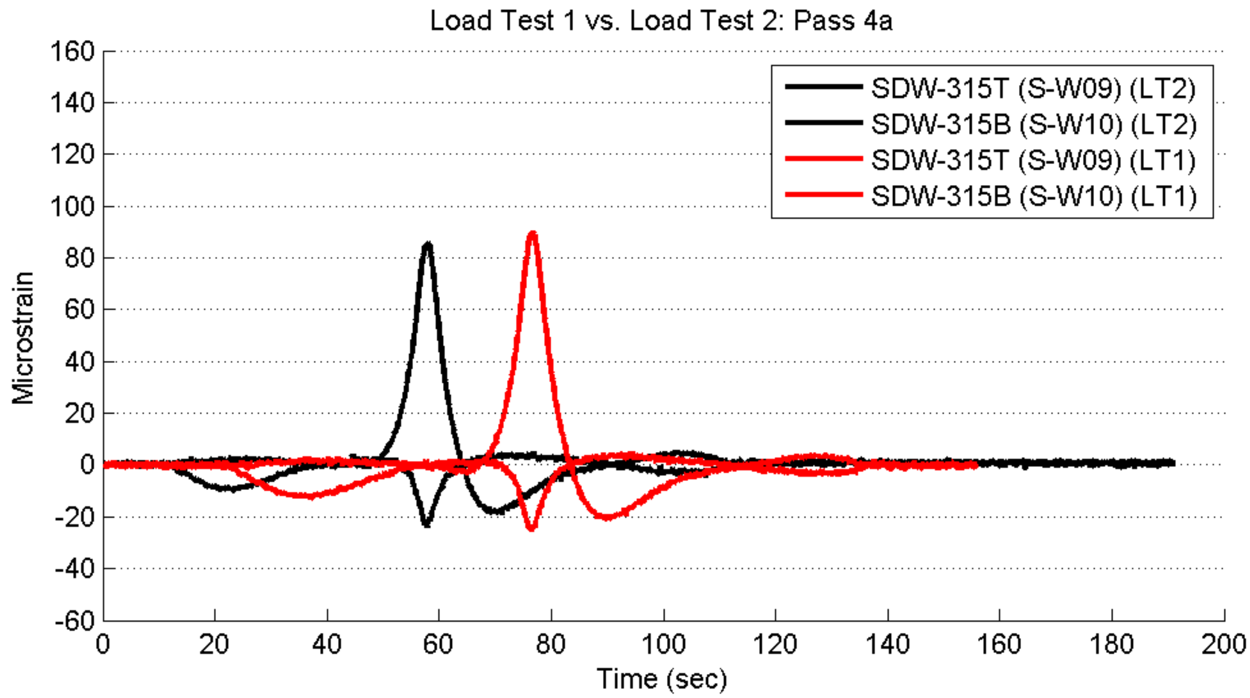


Figure E.13 West edge girder strain time history - section 315

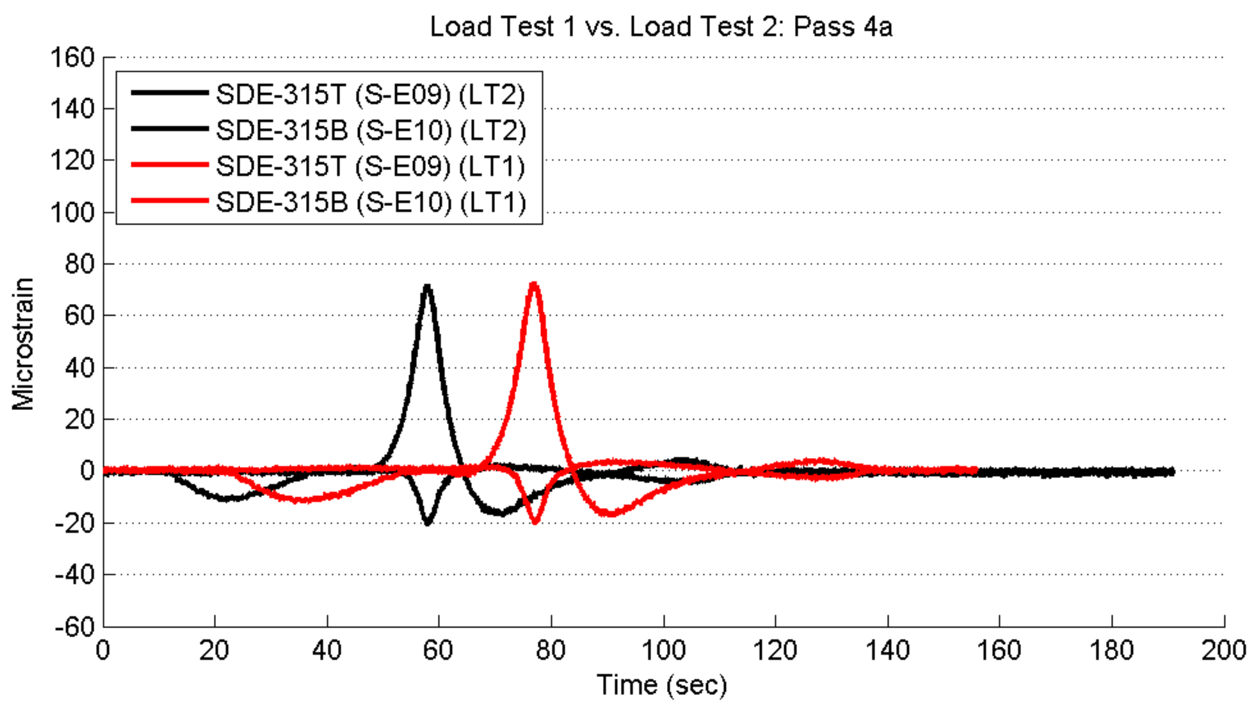


Figure E.14 East edge girder strain time history - section 315

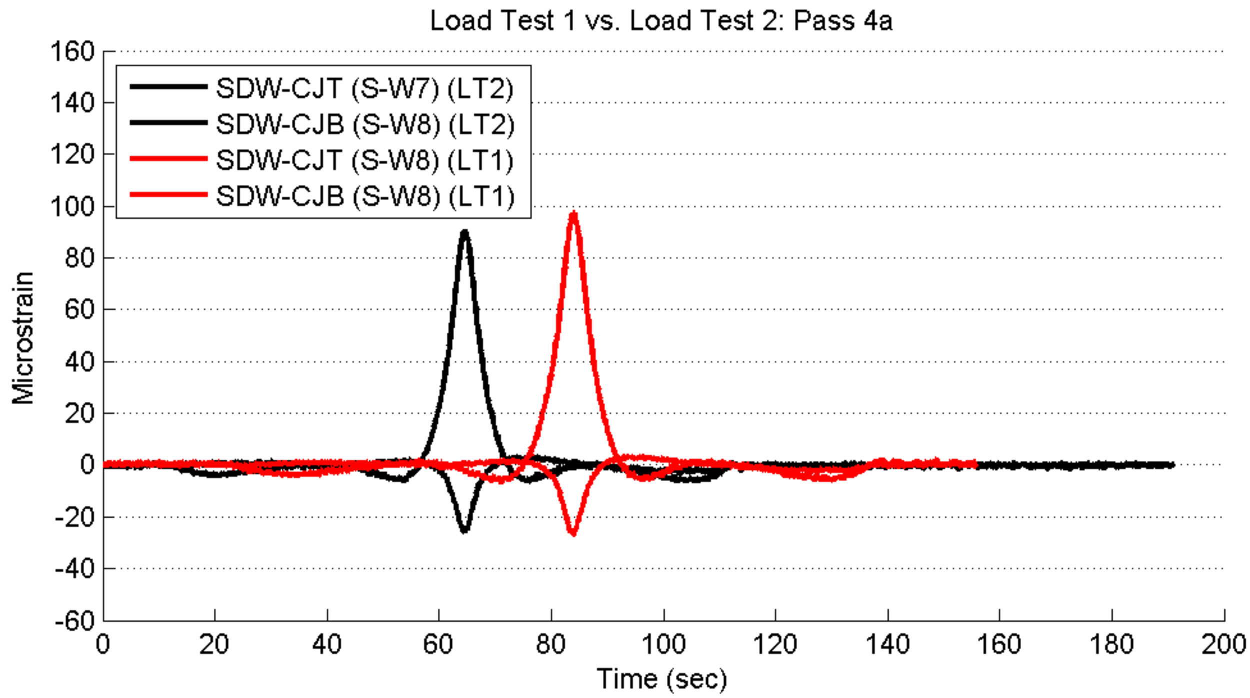


Figure E.15 West edge girder strain time history - closure joint

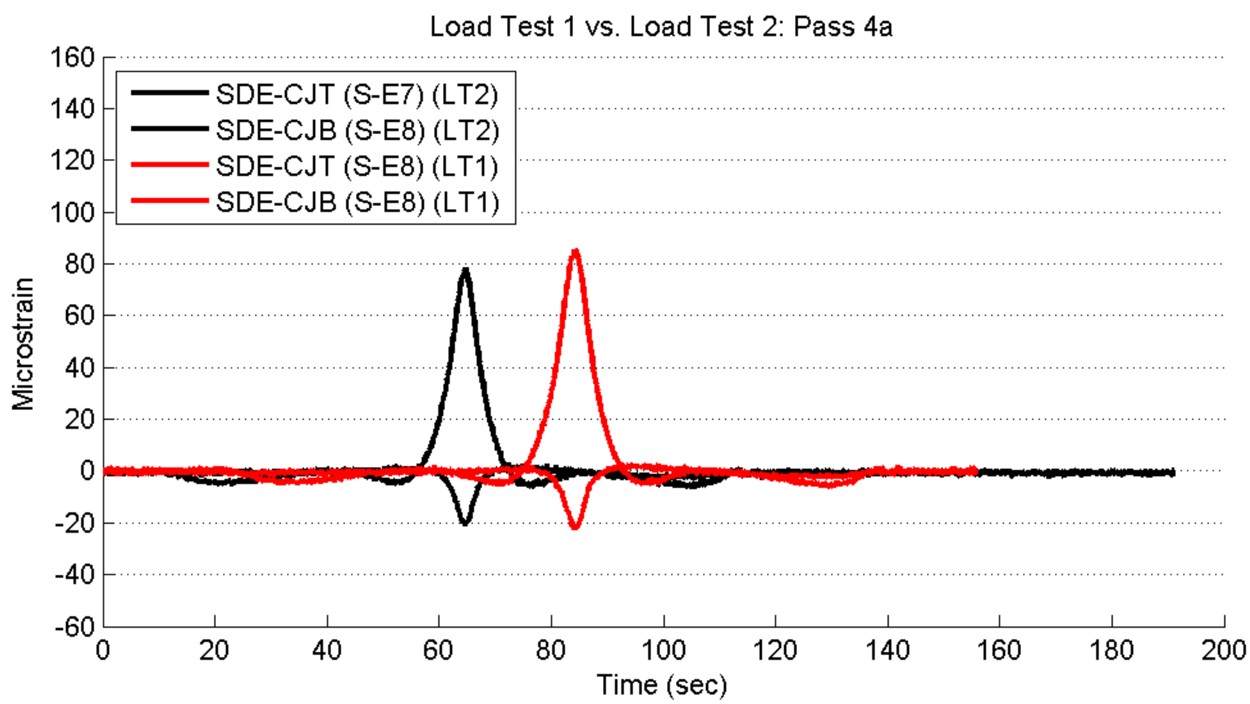


Figure E.16 East edge girder strain time history - closure joint

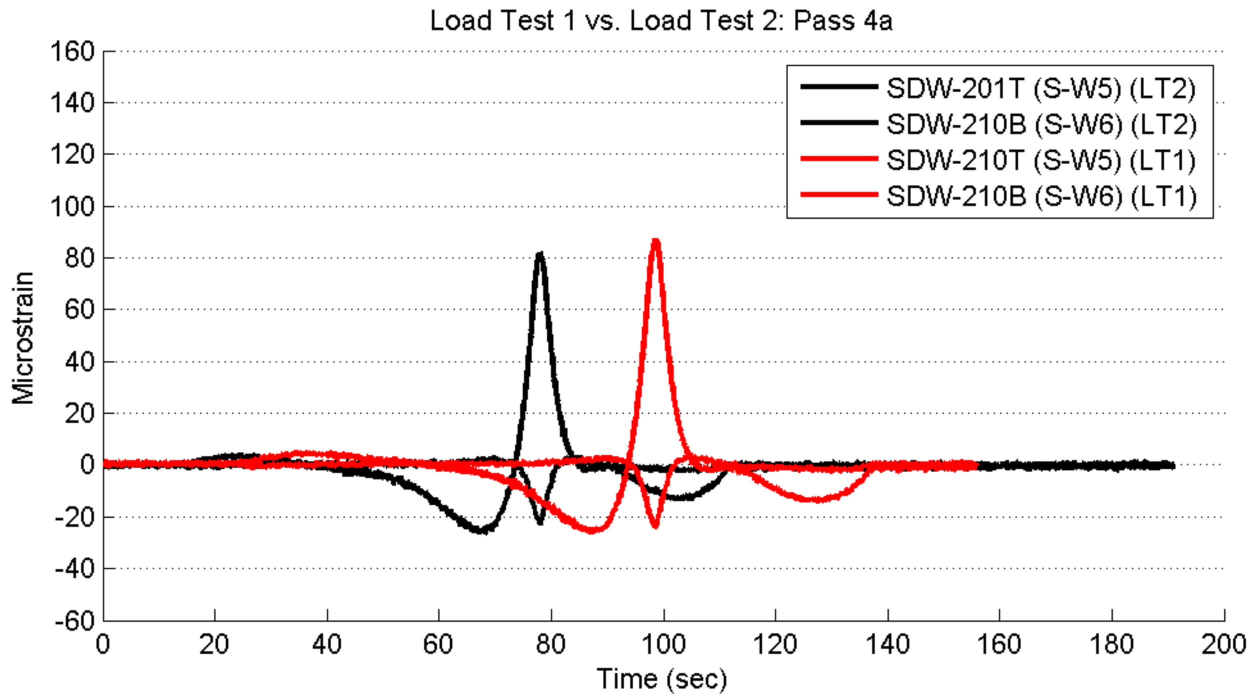


Figure E.17 West edge girder strain time history - section 210

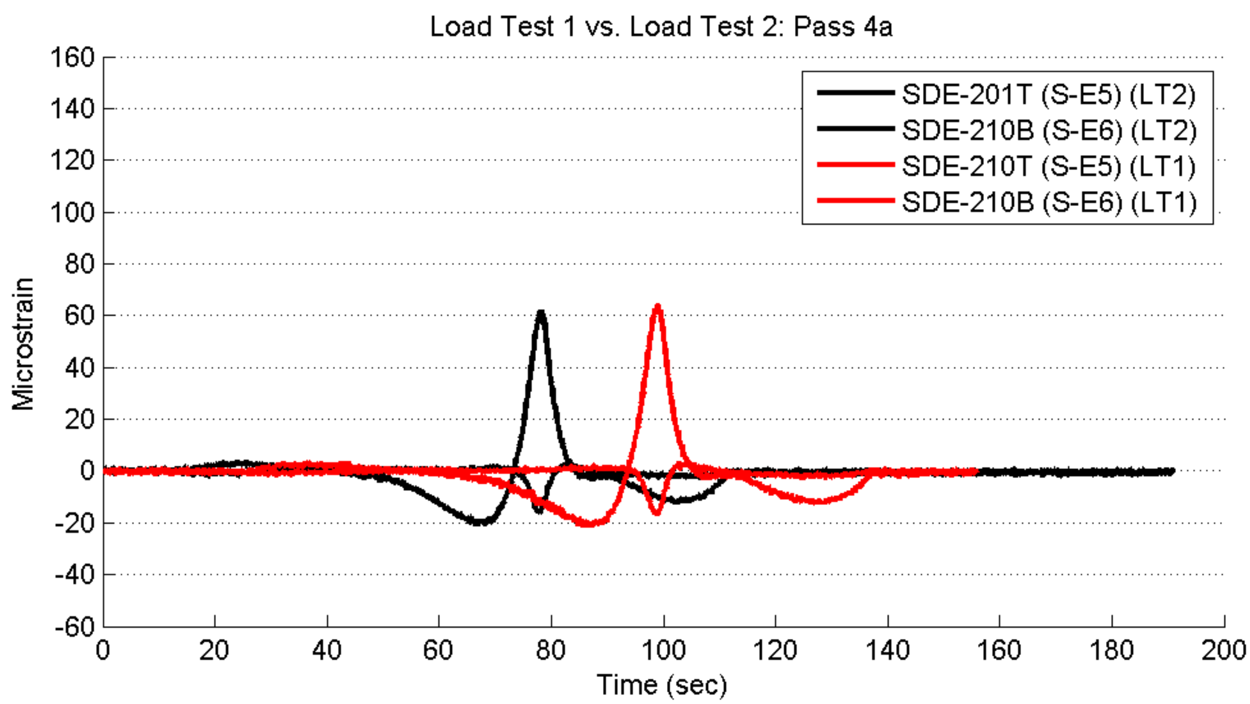


Figure E.18 East edge girder strain time history - section 210

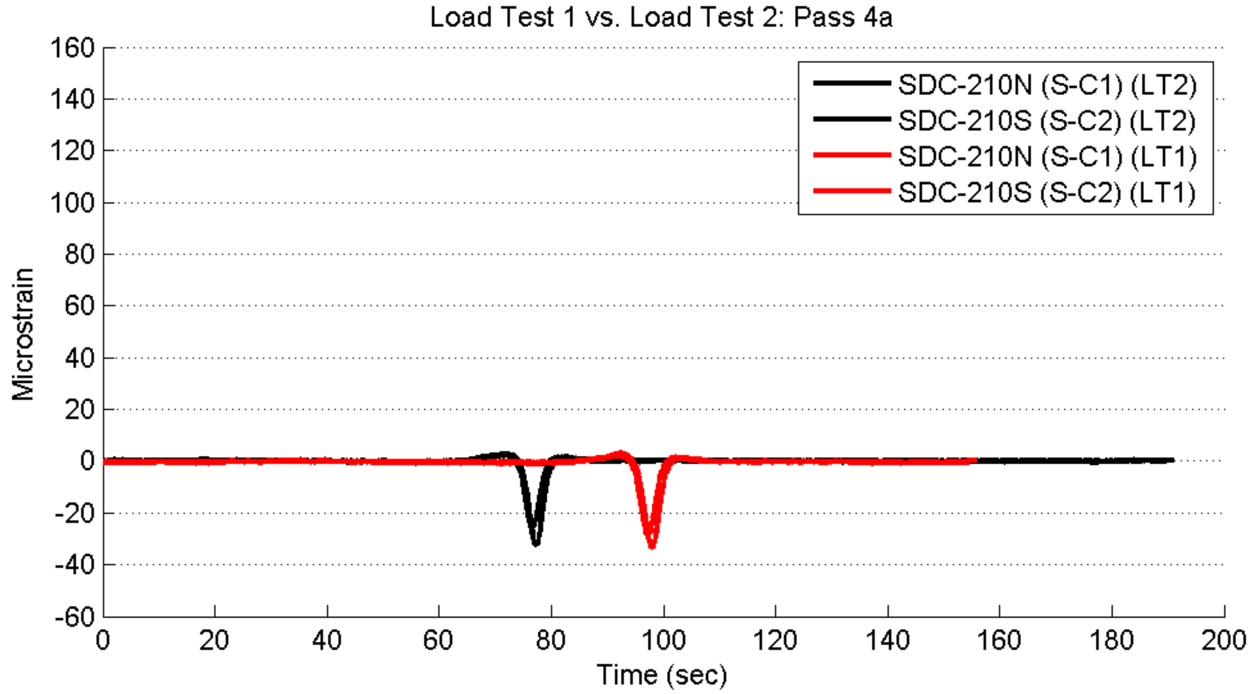


Figure E.19 Deck strain time history - section 210

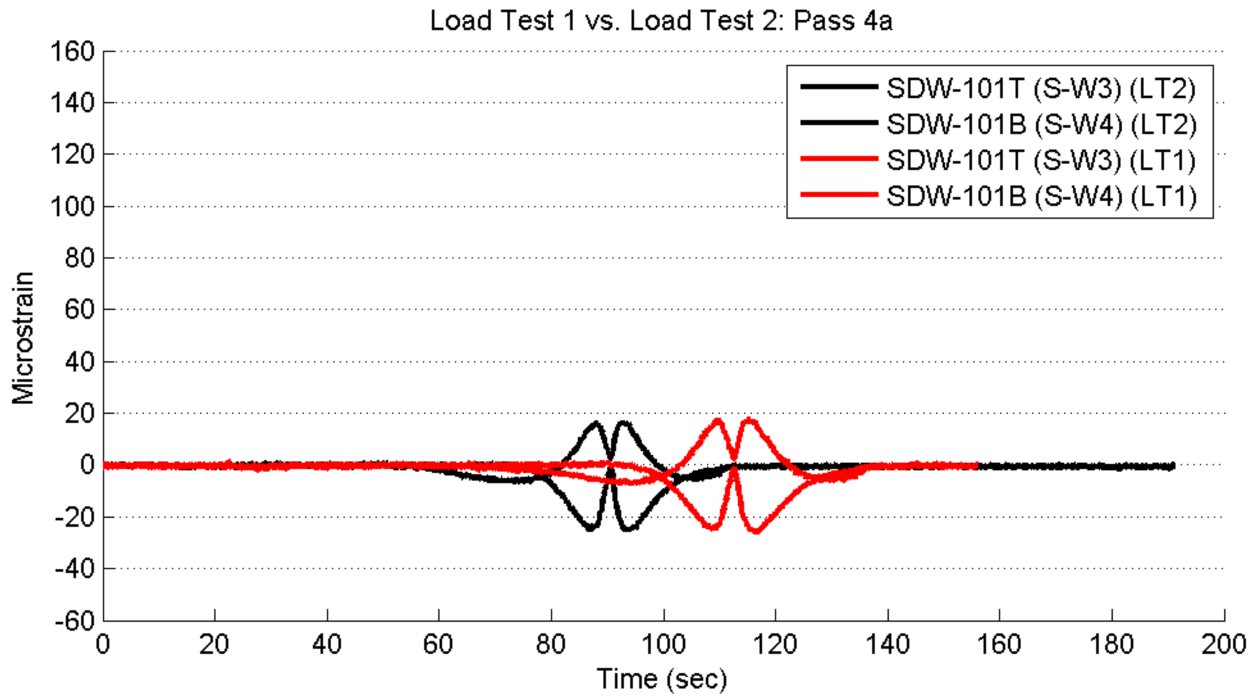


Figure E.20 West edge girder strain time history - section 101

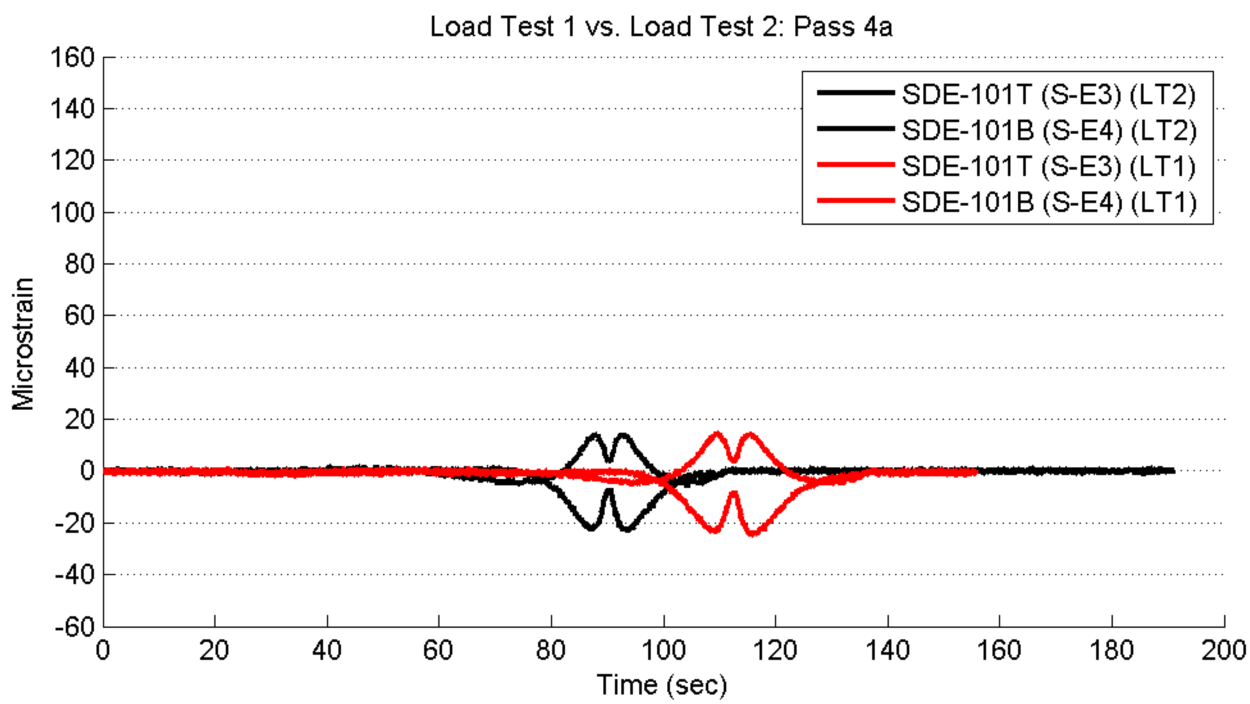


Figure E.21 East edge girder strain time history - section 101

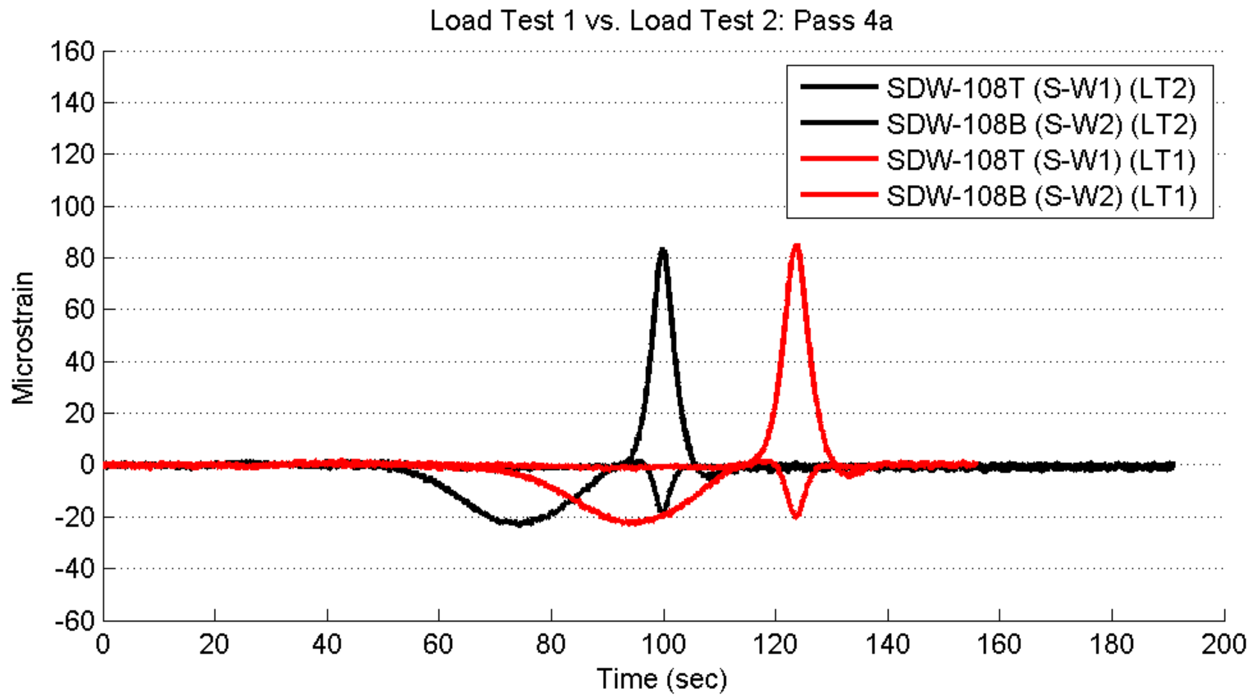


Figure E.22 West edge girder strain time history - section 108

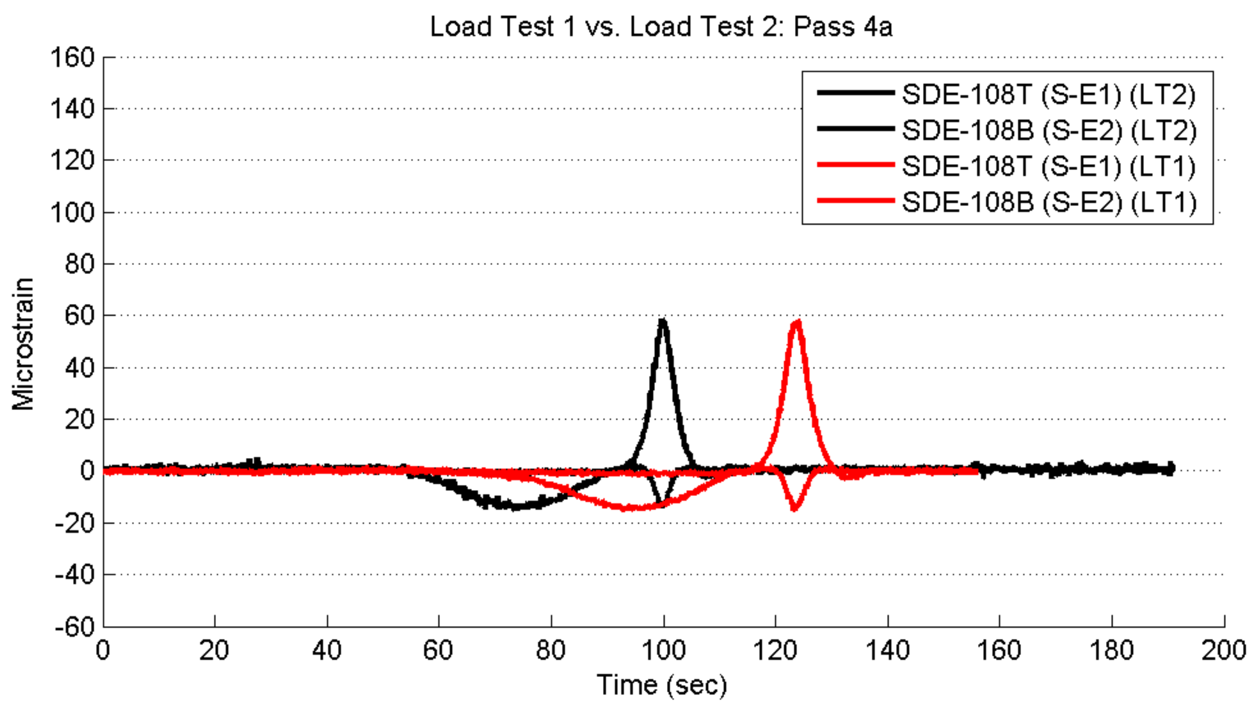


Figure E.23 East edge girder strain time history - section 108

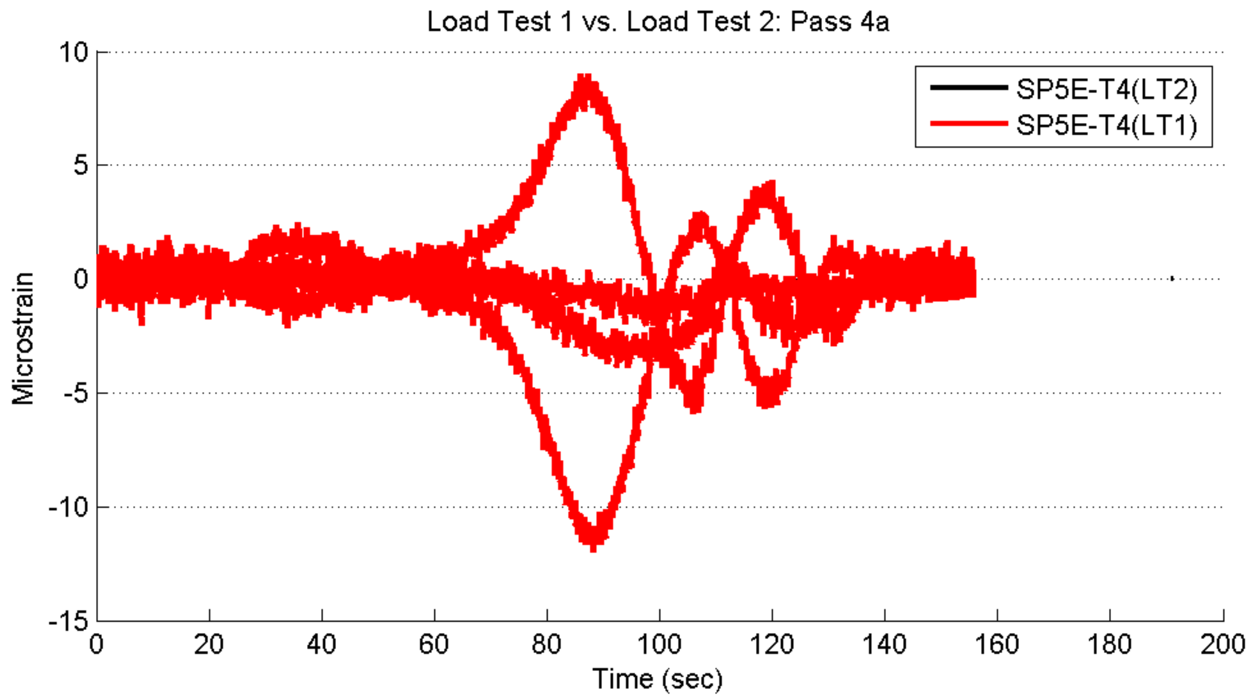


Figure E.24 Pylon 5 east strain time history - lift T4

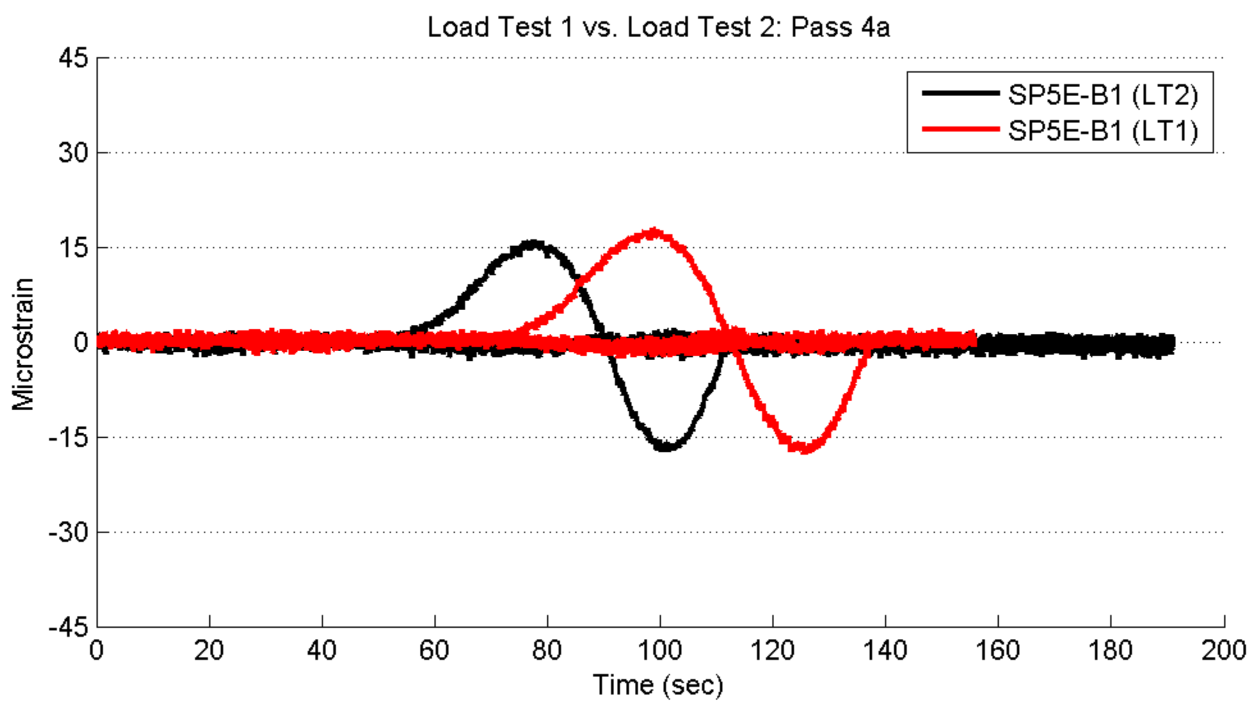


Figure E.25 Pylon 5 east strain time history - lift B1

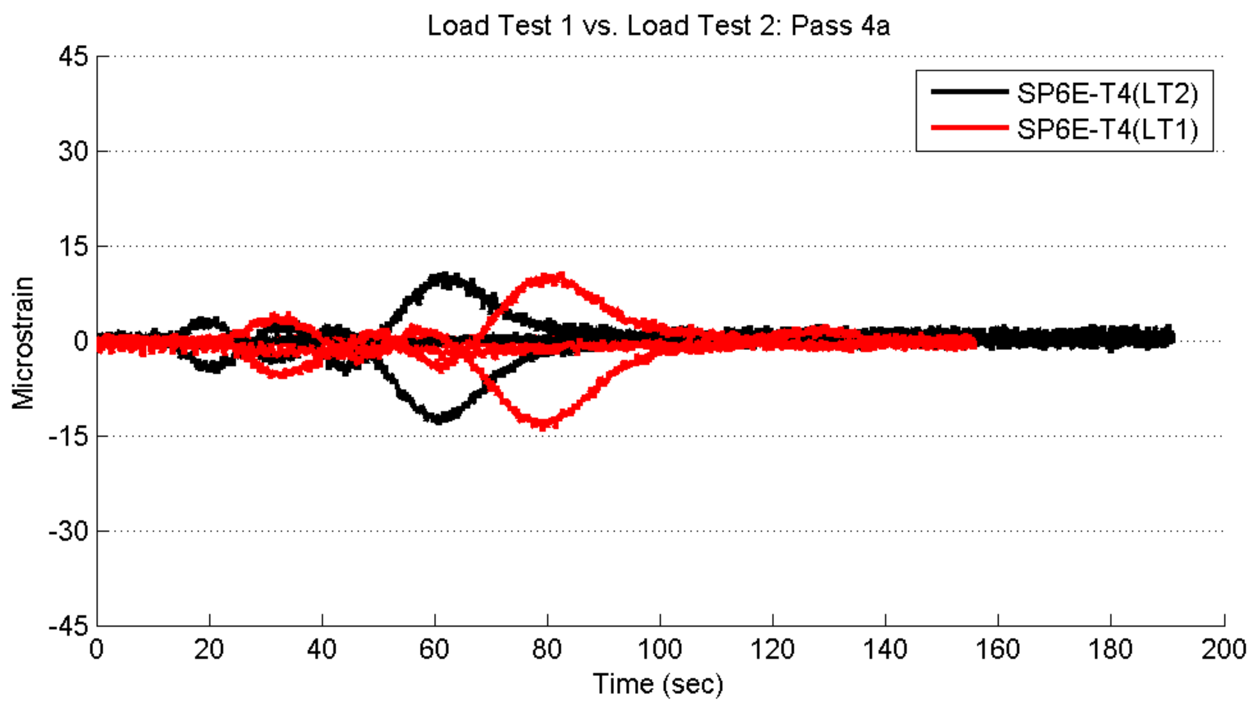


Figure E.26 Pylon 6 east strain time history - lift T4

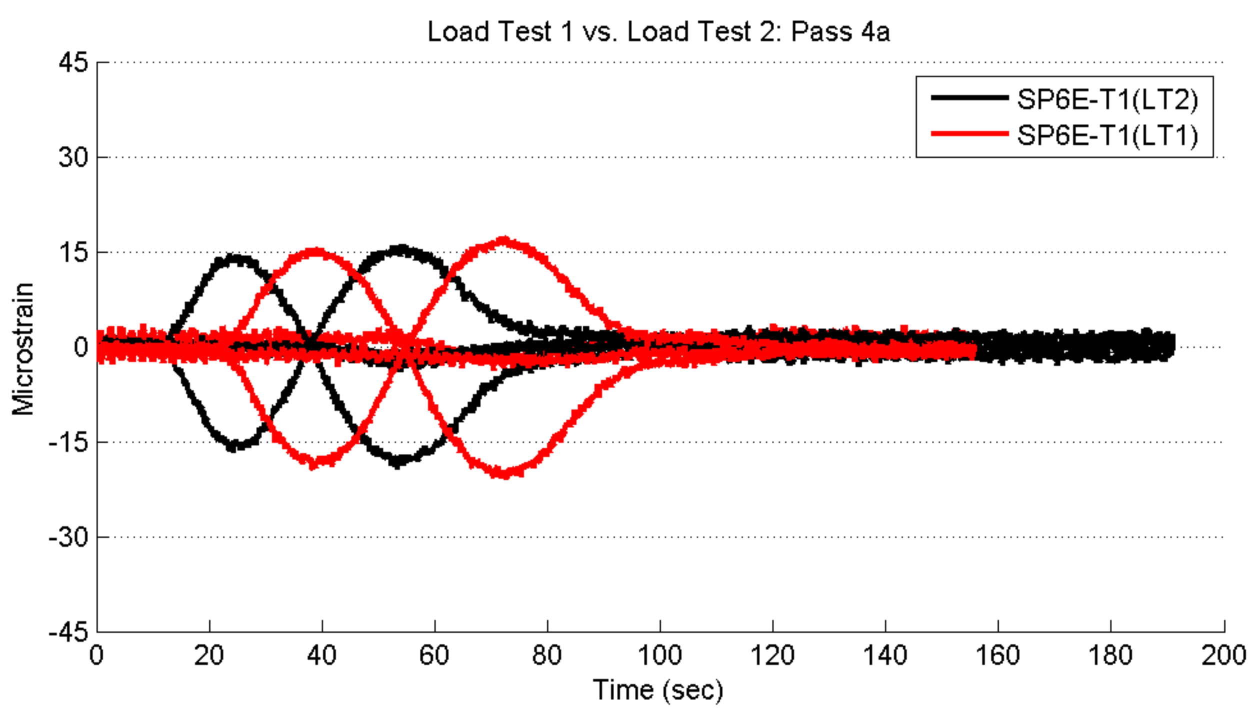


Figure E.27 Pylon 6 east strain time history - lift T1

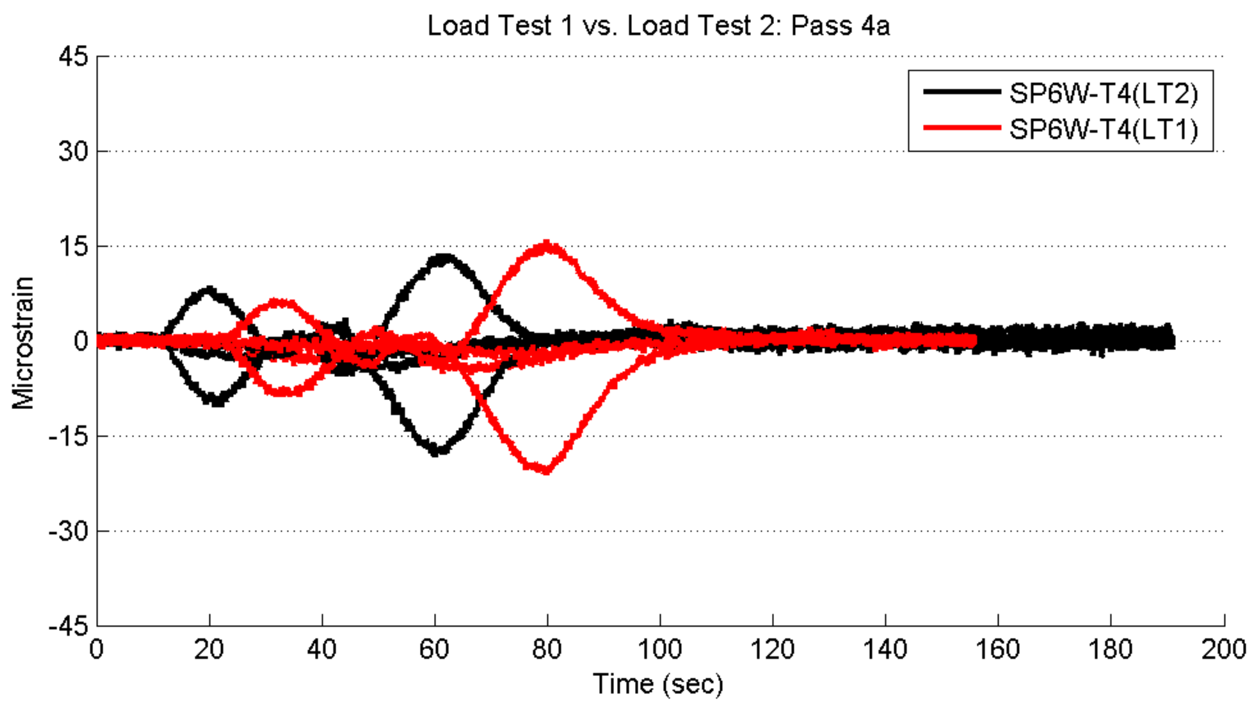


Figure E.28 Pylon 6 west strain time history - lift T4

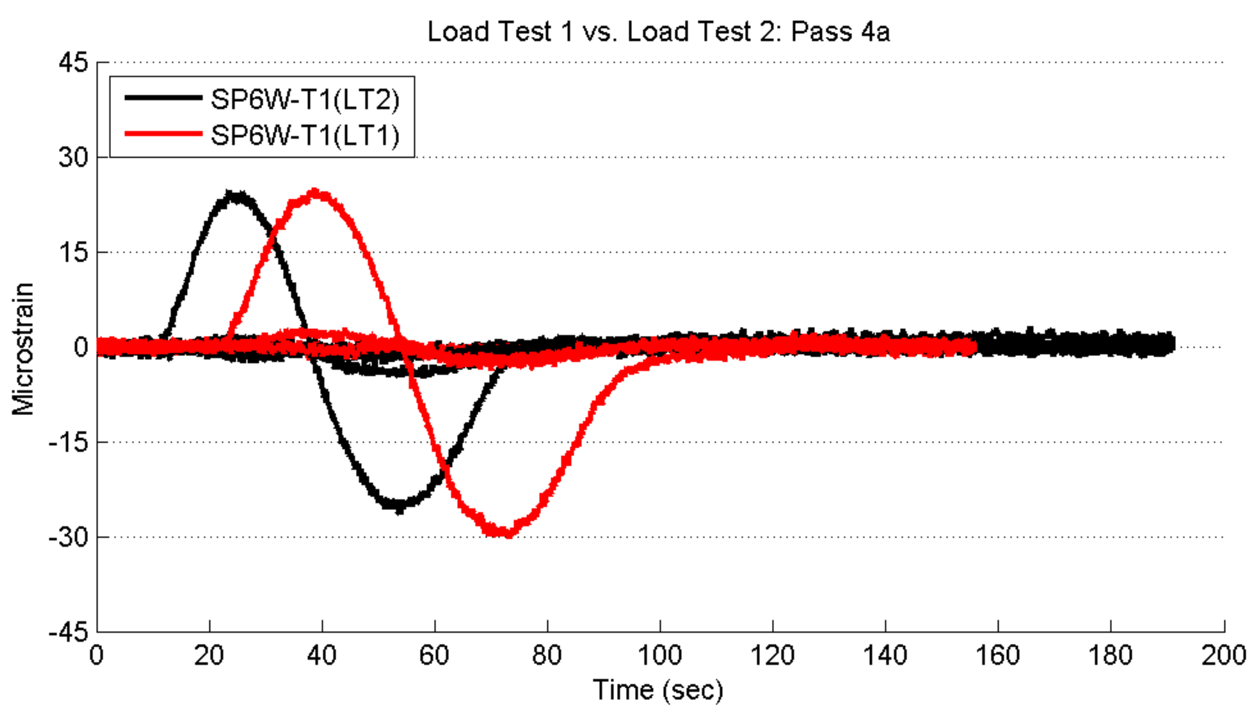


Figure E.29 Pylon 6 west strain time history - lift T1

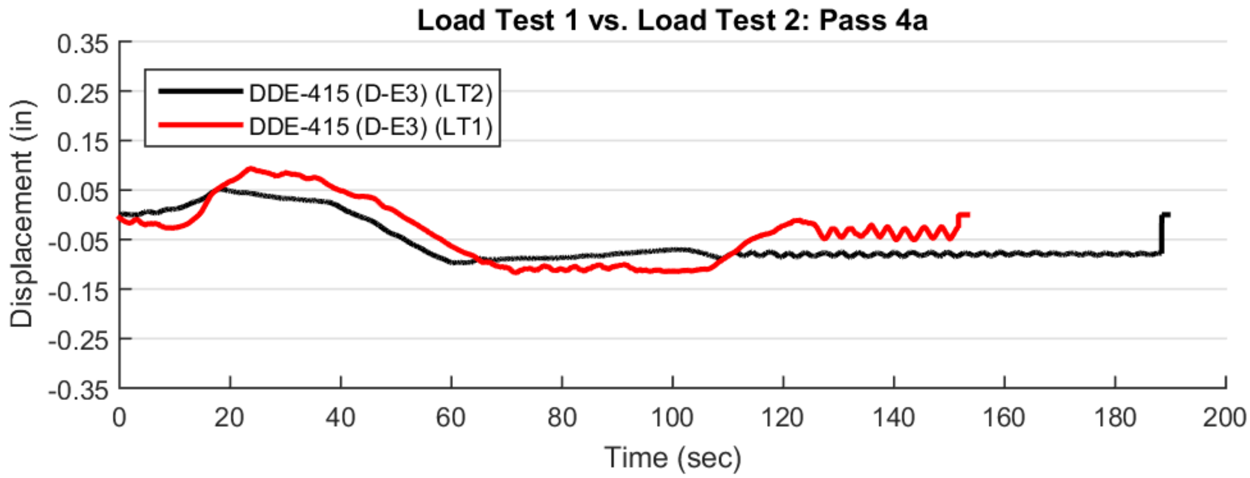


Figure E.30 Bearing displacement time history – north abutment

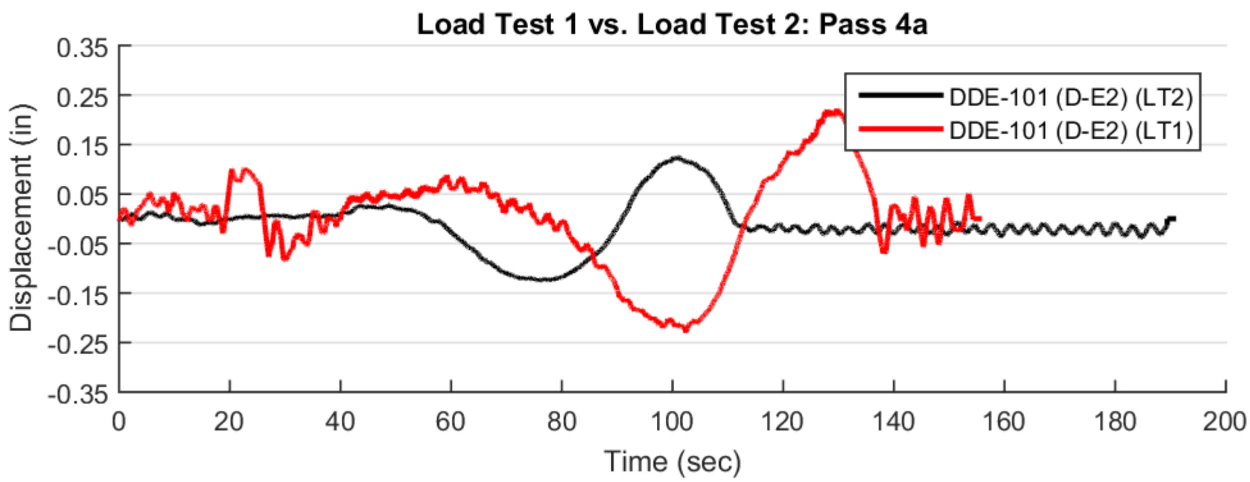


Figure E.31 Bearing displacement time history – pylon 5

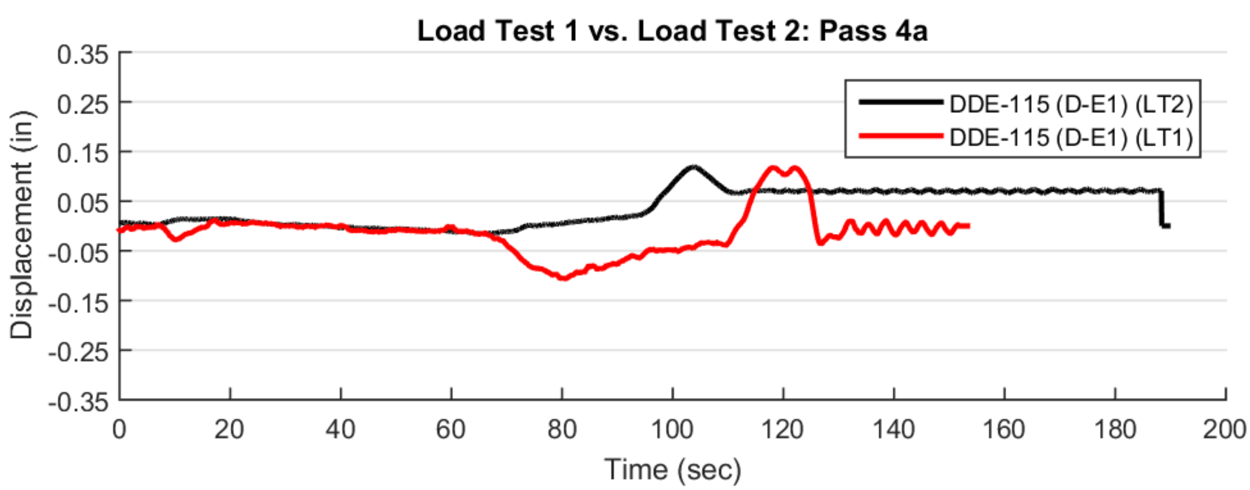


Figure E.32 Bearing displacement time history – south abutment

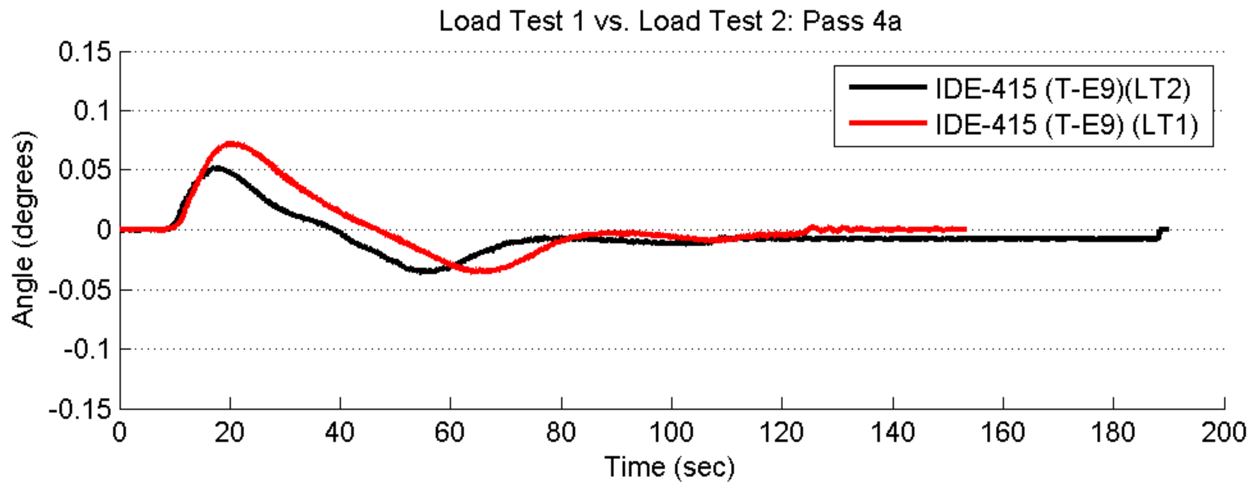


Figure E.33 Deck tilt time history - section 415

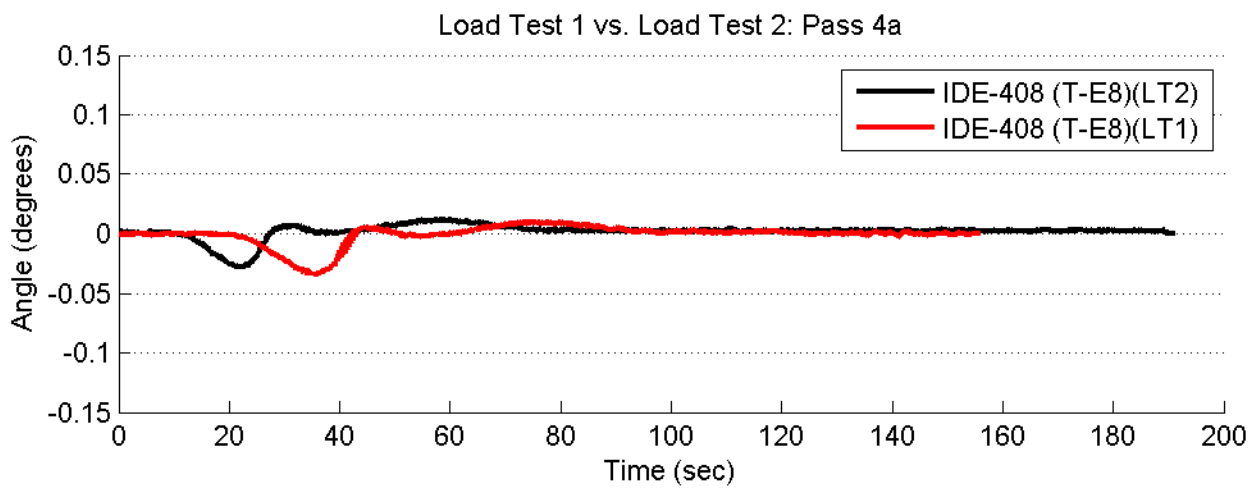


Figure E.34 Deck tilt time history - section 408

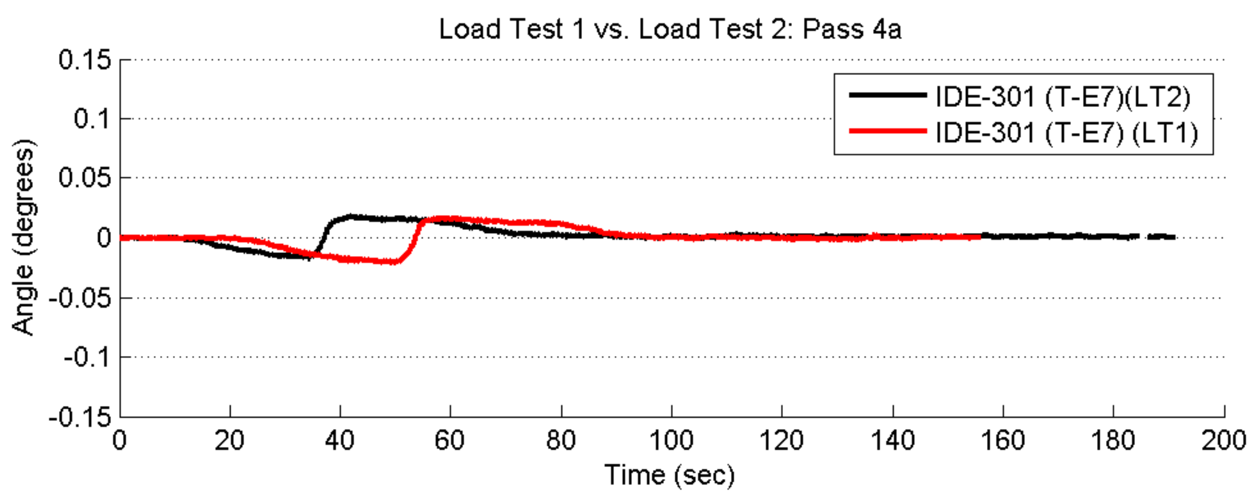


Figure E.35 Deck tilt time history - section 301

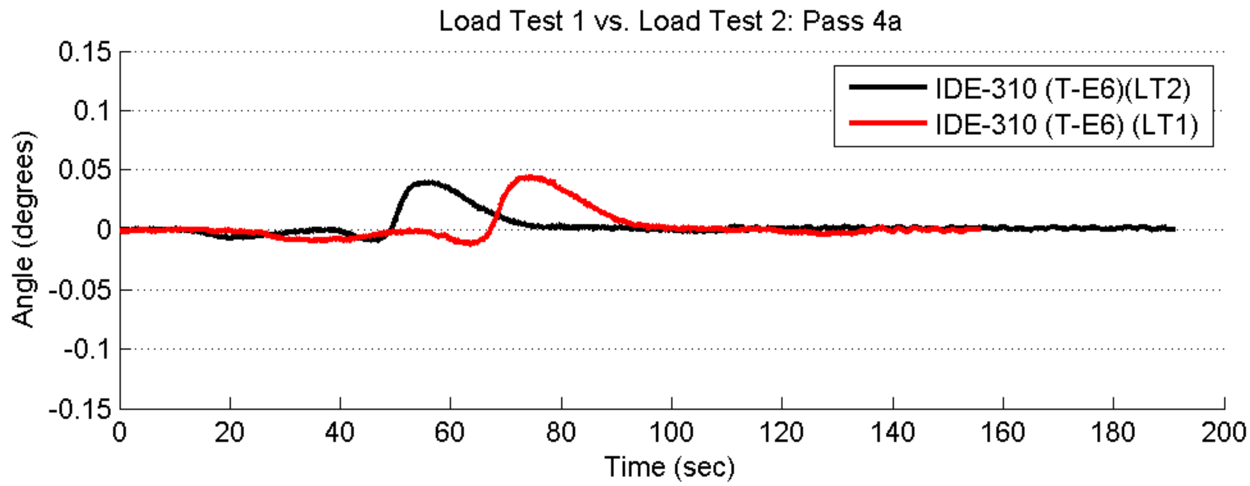


Figure E.36 Deck tilt time history - section 310

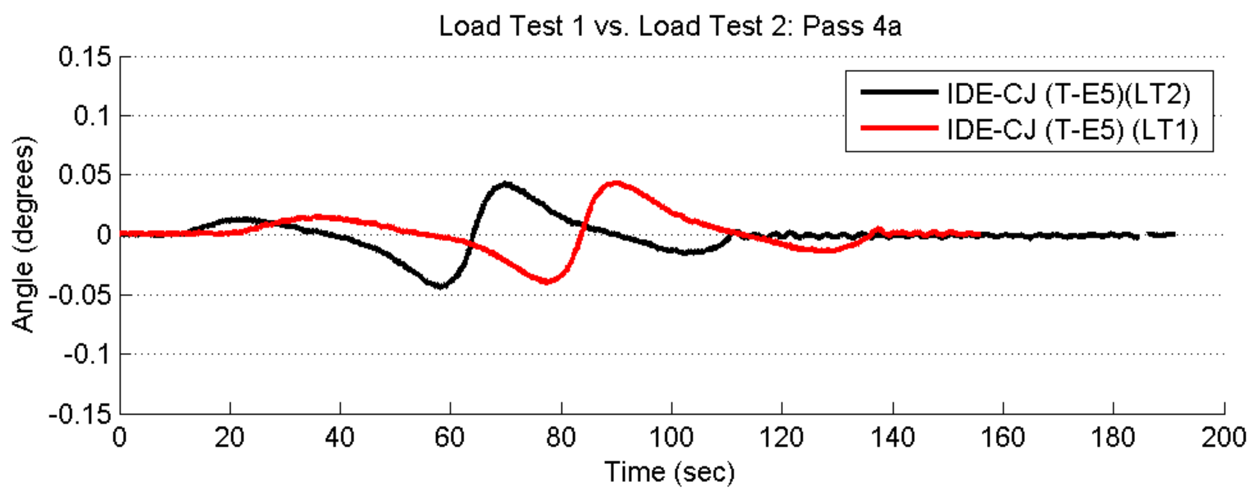


Figure E.37 Deck tilt time history - section closure joint

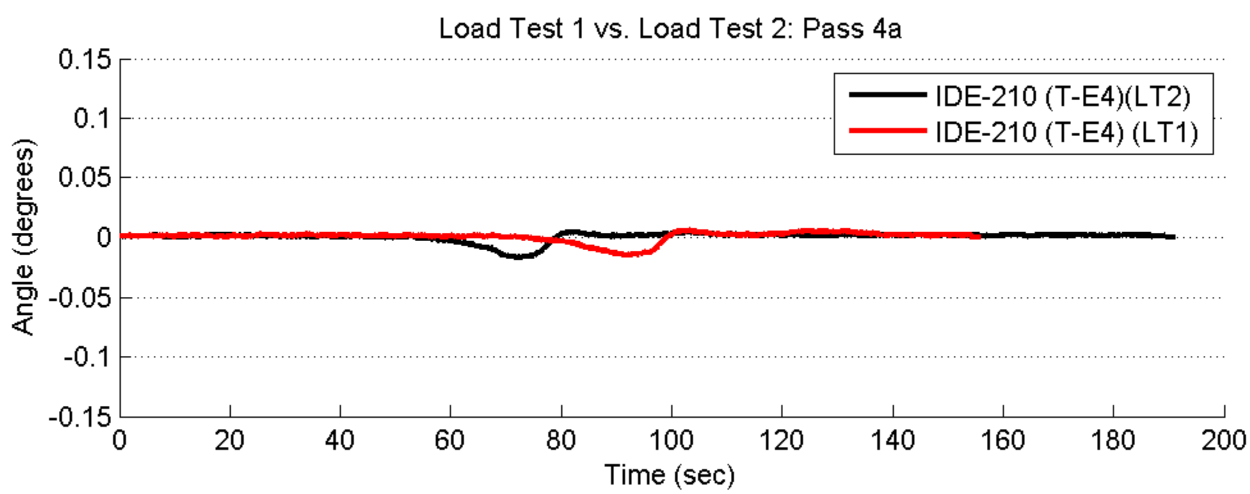


Figure E.38 Deck tilt time history - section 210

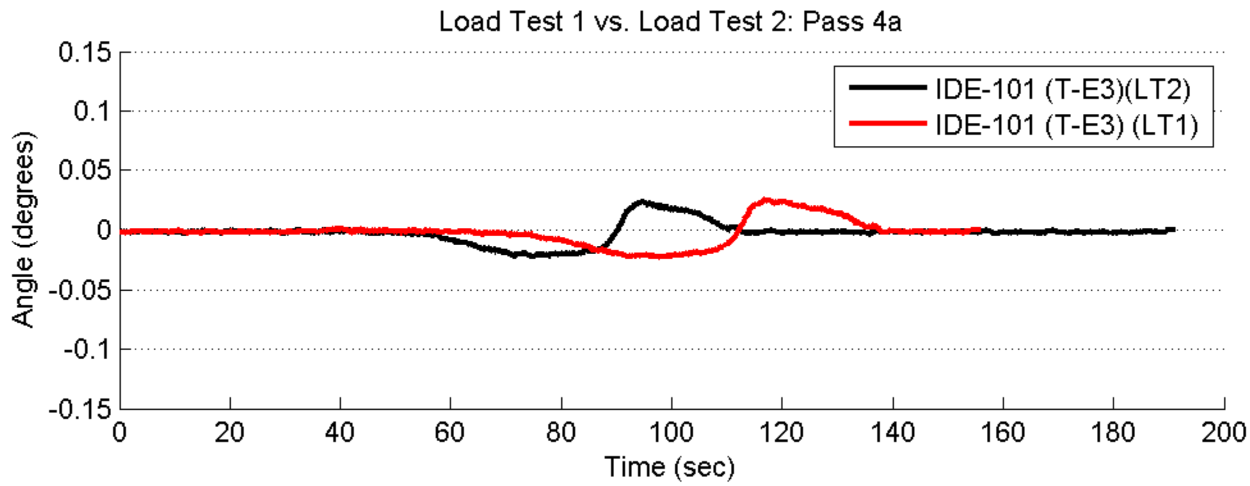


Figure E.39 Deck tilt time history - section 101

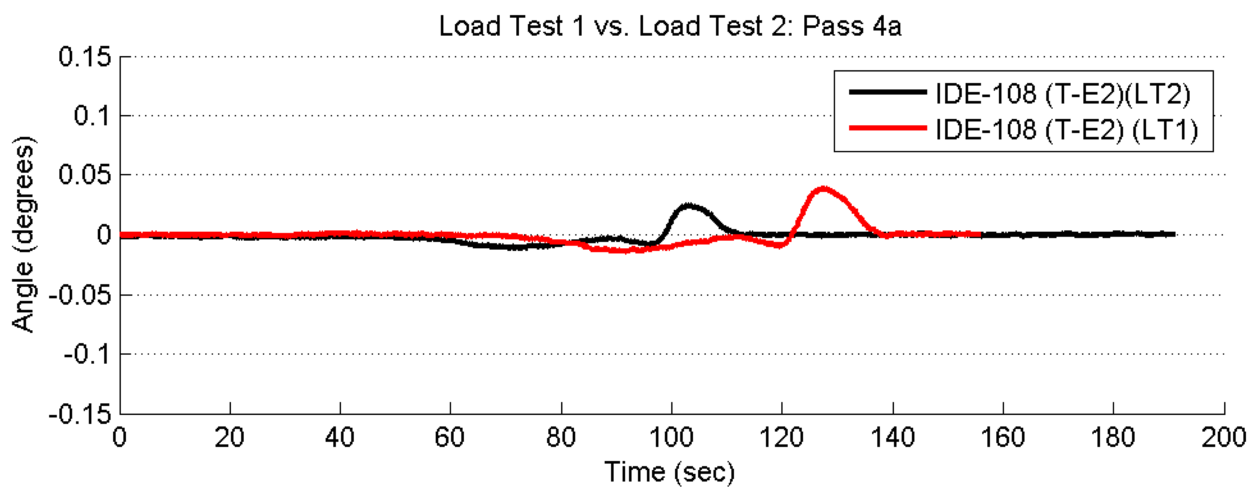


Figure E.40 Deck tilt time history - section 108

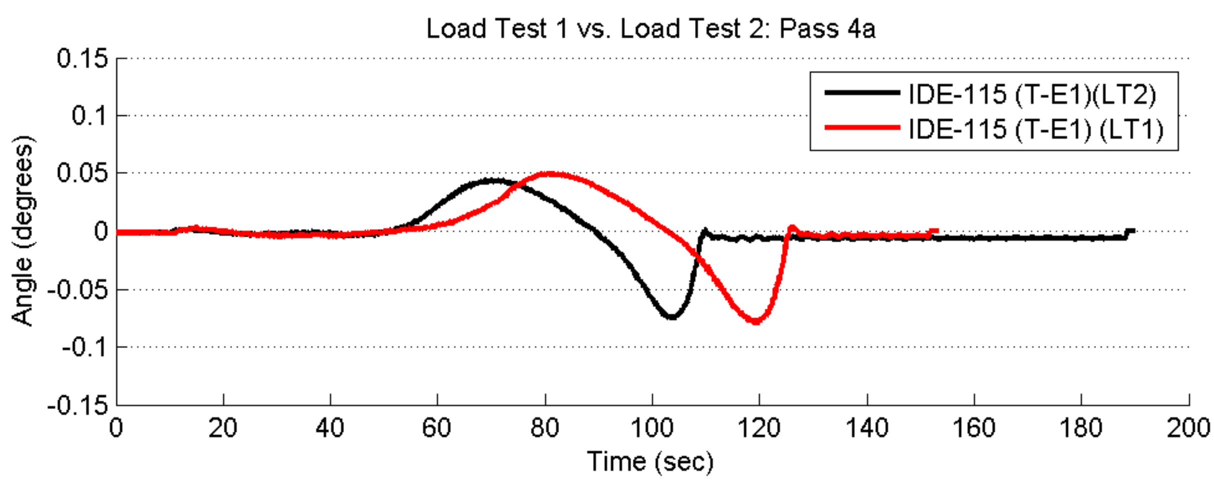


Figure E.41 Deck tilt time history - section 115

Appendix F Comparison Tables and Figures – Load Test 3 (5/9/13) to Baseline

Presented in this appendix are tables that compare the peak results from Load Test 3 to the corresponding peak results from Load Test 2. Results are reported in the tables as a percentage difference, calculated as follows:

$$\Delta\% = \frac{\tilde{\phi}_3 - \phi_2}{\phi_2} x100$$

where

$$\tilde{\phi}_3 = \phi_3 x \frac{W_2}{W_3}$$

and:

ϕ_2 = a peak measurand (strain, tilt, displacement, etc) from Load Test 2

ϕ_3 =peak measurand (strain, tilt, displacement, etc) from Load Test 3

$\tilde{\phi}_3$ = peak measurand from Load Test 3 adjusted for the difference in vehicle weight

$\Delta\%$ = Percent difference in measurand

W_3 = average weight of test vehicle for Load Test 3

W_2 = average weight of test vehicle for Load Test 2

Table F.1 Bearing Displacement: Maximums (% difference LT3 relative to Baseline)

No. trucks	Pass	Displacement (in)	
		DDE_101 D-E2	DDE_415 D-E3
Slow speed passes			
1	1a		
	1b		
	1c		
	1d		
	1e		
	1f		
4	4a		
6	6b	23	

Table F.2 Bearing Displacement: Minimums

No. of trucks	Pass	Displacement (in)	
		DDE_101 D-E2	DDE_415 D-E3
Slow speed passes			
1	1a		
	1b		
	1c		
	1d		
	1e		
	1f		
4	4a		
6	6b		

Table F.3 Deck Tilt: Maximums

No. of trucks	Pass	Tilt sensor (Deg.)								
		IDE_115 T-E1	IDE_108 T-E2	IDE_101 T-E3	IDE_210 T-E4	IDE_CJ T-E5	IDE_310 T-E6	IDE_301 T-E7	IDE_408 T-E8	IDE_415 T-E9
Slow speed passes										
1	1a									
	1b									
	1c									
	1d									
	1e									
	1f									
4	4a		-67							
6	6b		-46							

Table F.4 Deck Tilt: Minimums

No. of trucks	Pass	Tilt sensor (Deg.)								
		IDE_115 T-E1	IDE_108 T-E2	IDE_101 T-E3	IDE_210 T-E4	IDE_CJ T-E5	IDE_310 T-E6	IDE_301 T-E7	IDE_408 T-E8	IDE_415 T-E9
Slow speed passes										
1	1a									
	1b									
	1c									
	1d									
	1e									
	1f									
4	4a									
6	6b				-61					

Table F.5 Plyon 5E Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Below Deck – Level B1)				Strain sensor (με) (Above Deck – Level T4)			
		SP5E_B1W S-E26W	SP5E_B1N S-E23N	SP5E_B1E S-E25E	SP5E_B1S S-E24S	SP5E_T4W S-E30W	SP5E_T4N S-E27N	SP5E_T4E S-E29E	SP5E_T4S S-E28S
Slow speed passes									
1	1a								
	1b								
	1c								
	1d								
	1e								
	1f								
4	4a								
6	6b								

Table F.6 Plyon 5E Strain: Minimums

No. of trucks	Pass	Strain sensor ($\mu\varepsilon$)(Below Deck – Level B1)				Strain sensor ($\mu\varepsilon$) (Above Deck – Level T4)			
		SP5E_B1W S-E26W	SP5E_B1N S-E23N	SP5E_B1E S-E25E	SP5E_B1S S-E24S	SP5E_T4W S-E30W	SP5E_T4N S-E27N	SP5E_T4E S-E29E	SP5E_T4S S-E28S
Slow speed passes									
1	1a								
	1b								
	1c								
	1d								
	1e								
	1f								
4	4a								
6	6b								

Table F.7 Plyon 6E Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6E_T1W S-E34W	SP6E_T1N S - E31N	SP6E_T1E S-E33E	SP6E_T1S S-E32S	SP6E_T4W S-E38W	SP6E_T4N S-E35N	SP6E_T4E S-E37E	SP6E_T4S S-E36S
Slow speed passes									
1	1a								
	1b								
	1c								
	1d								
	1e								
	1f								
4	4a								
6	6b								

Table F.8 Plyon 6E Strain: Minimums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6E_T1W S-E34W	SP6E_T1N S - E31N	SP6E_T1E S-E33E	SP6E_T1S S-E32S	SP6E_T4W S-E38W	SP6E_T4N S-E35N	SP6E_T4E S-E37E	SP6E_T4S S-E36S
Slow speed passes									
1	1a								
	1b								
	1c								
	1d								
	1e								
	1f								
4	4a								
6	6b								

Table F.9 Pylon 6W Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6W_T1W S-W26W	SP6W_T1N S-W23N	SP6W_T1E S-W25E	SP6W_T1S S-W24S	SP6W_T4W S-W30W	SP6W_T4E S-W29E	SP6W_T4S S-W28S	SP6W_T4N S-W27N
Slow speed passes									
1	1a								
	1b								
	1c								
	1d								
	1e								
	1f								
4	4a								
6	6b								

Table F.10 Pylon 6W Strain: Minimums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6W_T1W S-W26W	SP6W_T1N S-W23N	SP6W_T1E S-W25E	SP6W_T1S S-W24S	SP6W_T4W S-W30W	SP6W_T4E S-W29E	SP6W_T4S S-W28S	SP6W_T4N S-W27N
Slow speed passes									
1	1a								
	1b								
	1c								
	1d								
	1e								
	1f								
4	4a								
6	6b								

Table F.11 East Edge Girder – Top Strain: Maximums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108T S-E1	SDE_101T S-E3	SDE_210T S-E5	SDE_CJT S-E7	SDE_315T S-E9	SDE_310T S-E11	SDE_305T S-E13	SDE_301T S-E15	SDE_404T S-E17	SDE_408T S-E19	SDE_412T S-E21
Slow speed passes												
1	1a											
	1b											
	1c											
	1d											
	1e											
	1f											
4	4a											
6	6b											

Table F.12 East Edge Girder – Top Strain: Minimums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108T S-E1	SDE_101T S-E3	SDE_210T S-E5	SDE_CJT S-E7	SDE_315T S-E9	SDE_310T S-E11	SDE_305T S-E13	SDE_301T S-E15	SDE_404T S-E17	SDE_408T S-E19	SDE_412T S-E21
Slow speed passes												
1	1a											
	1b											
	1c											
	1d											
	1e											
	1f											
4	4a											
6	6b		11		10	15	13	17				8

Table F.13 East Edge Girder – Bottom Strain: Maximums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108B S-E2	SDE_101B S-E4	SDE_210B S-E6	SDE_CJB S-E8	SDE_315B S-E10	SDE_E310B S-E12	SDE_305B S-E14	SDE_301B S-E16	SDE_404B S-E18	SDE_408B S-E20	SDE_412B S-E22
Slow speed passes												
1	1a											
	1b										24	
	1c											
	1d											
	1e											
	1f						15					
4	4a					3	6	10				
6	6b			1	1	6	8	15			4	8

Table F.14 East Edge Girder – Bottom Strain: Minimums

No. of trucks	Pass	Strain sensor ($\mu\varepsilon$)										
		SDE_108B S-E2	SDE_101B S-E4	SDE_210B S-E6	SDE_CJB S-E8	SDE_315B S-E10	SDE_E310B S-E12	SDE_305B S-E14	SDE_301B S-E16	SDE_404B S-E18	SDE_408B S-E20	SDE_412B S-E22
Slow speed passes												
1	1a											
	1b											
	1c											
	1d											
	1e											
	1f											
4	4a											11
6	6b										17	8

Table F.15 West Edge Girder – Top Strain: Maximums

No. of trucks	Pass	Strain sensor (με)										
		SDW_108T S-W1	SDW_101T S-W3	SDW_210T S-W5	SDW_CJT S-W7	SDW_315T S-W9	SDW_310T S-W11	SDW_305T S-W13	SDW_301T S-W15	SDW_404T S-W17	SDW_408T S-W19	SDW_412T S-W21
Slow speed passes												
1	1a											
	1b											
	1c											
	1d											
	1e											
	1f											
4	4a											
6	6b											

Table F.16 West Edge Girder – Top Strain: Minimums

No. of trucks	Pass	Strain sensor (με)										
		SDW_108T S-W1	SDW_101T S-W3	SDW_210T S-W5	SDW_CJT S-W7	SDW_315T S-W9	SDW_310T S-W11	SDW_305T S-W13	SDW_301T S-W15	SDW_404T S-W17	SDW_408T S-W19	SDW_412T S-W21
Slow speed passes												
1	1a											
	1b											
	1c											
	1d											
	1e											
	1f											
4	4a											
6	6b											

Table F.17 West Edge Girder – Bottom Strain: Maximums

No. of trucks	Pass	Strain sensor (με)									
		SDW_108B S-W2	SDW_101B S-W4	SDW_210B S-W6	SDW_CJB S-W8	SDW_315B S-W10	SDW_310B S-W12	SDW_305B S-W14	SDW_404B S-W18	SDW_408B S-W20	SDW_412B S-W22
Slow speed passes											
1	1a	10									
	1b										
	1c										
	1d										
	1e										
	1f										
4	4a	7				2	4	11		2	
6	6b	2			-8			4			1

Table F.18 West Edge Girder – Bottom Strain: Minimums

No. of trucks	Pass	Strain sensor (με)									
		SDW_108B S-W2	SDW_101B S-W4	SDW_210B S-W6	SDW_CJB S-W8	SDW_315B S-W10	SDW_310B S-W12	SDW_305B S-W14	SDW_404B S-W18	SDW_408B S-W20	SDW_412B S-W22
Slow speed passes											
1	1a										
	1b										
	1c										
	1d										
	1e										
	1f										
4	4a										9
6	6b										

Table F.19 Deck Strain: Maximums

No. of trucks	Pass	Strain sensor (με)	
		SDC_210N S-C1	SDC_210S S-C2
Slow speed passes			
1	1a		
	1b		
	1c		
	1d		
	1e		
	1f		
4	4a		
6	6b		

Table F.20 Deck Strain: Minimums

No. of trucks	Pass	Strain sensor (με)	
		SDC_210N S-C1	SDC_210S S-C2
Slow speed passes			
1	1a		
	1b		
	1c	19	
	1d		
	1e		
	1f		
4	4a	9	
6	6b		

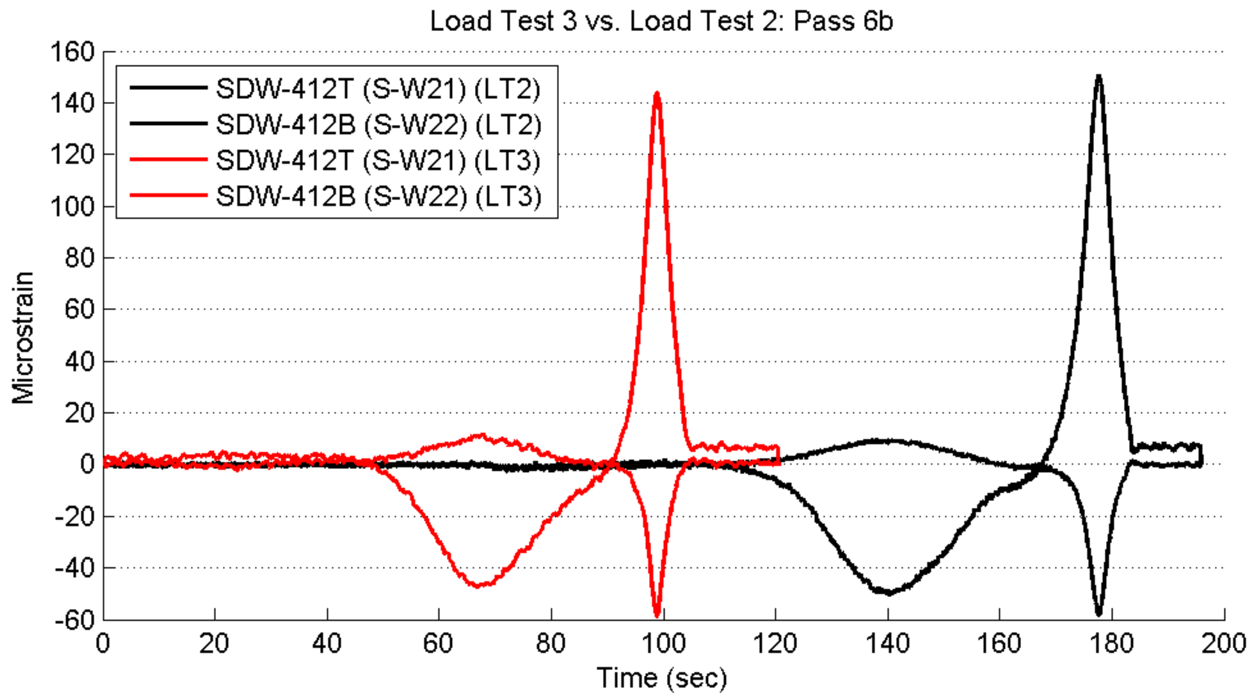


Figure F.1 Edge girder strain time history - section 412

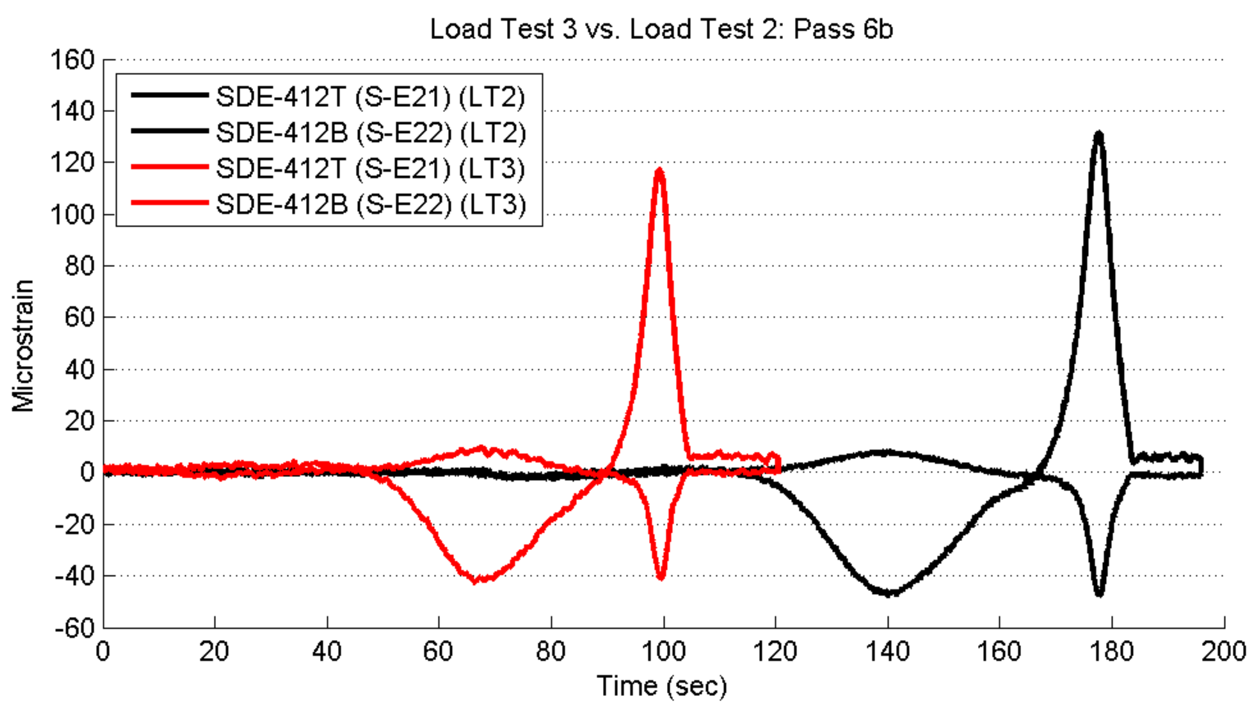


Figure F.2 Edge girder strain time history - section 412

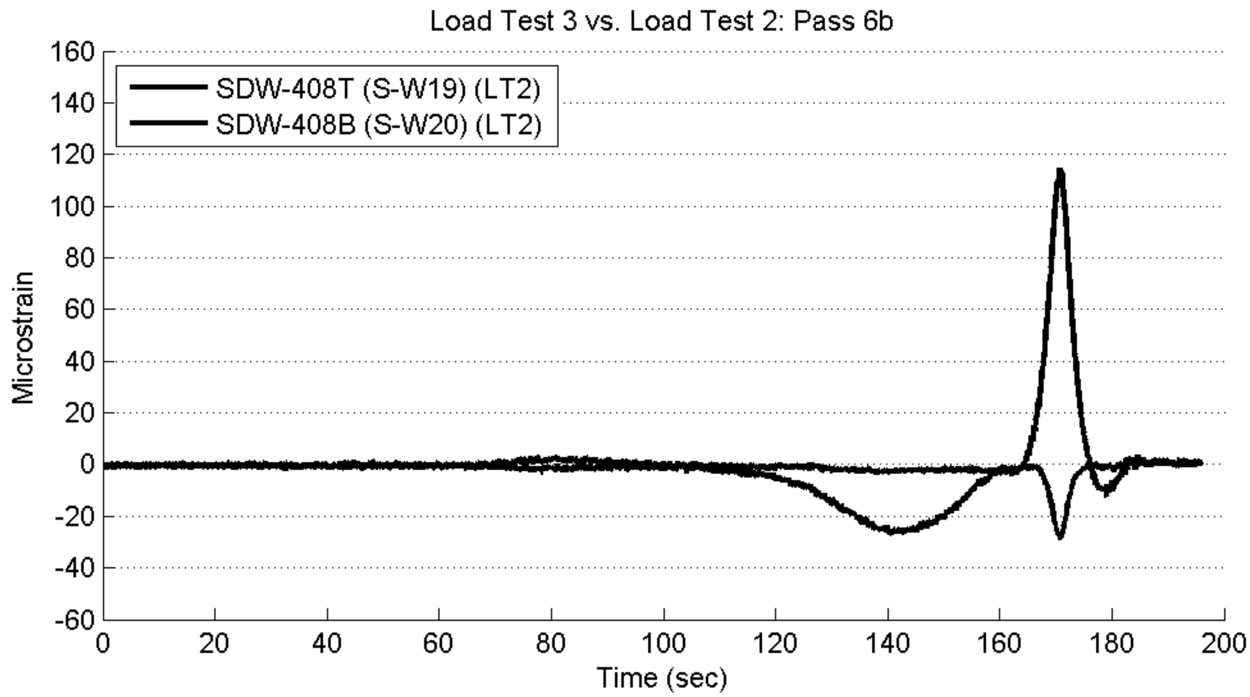


Figure F.3 West edge girder strain time history - section 408

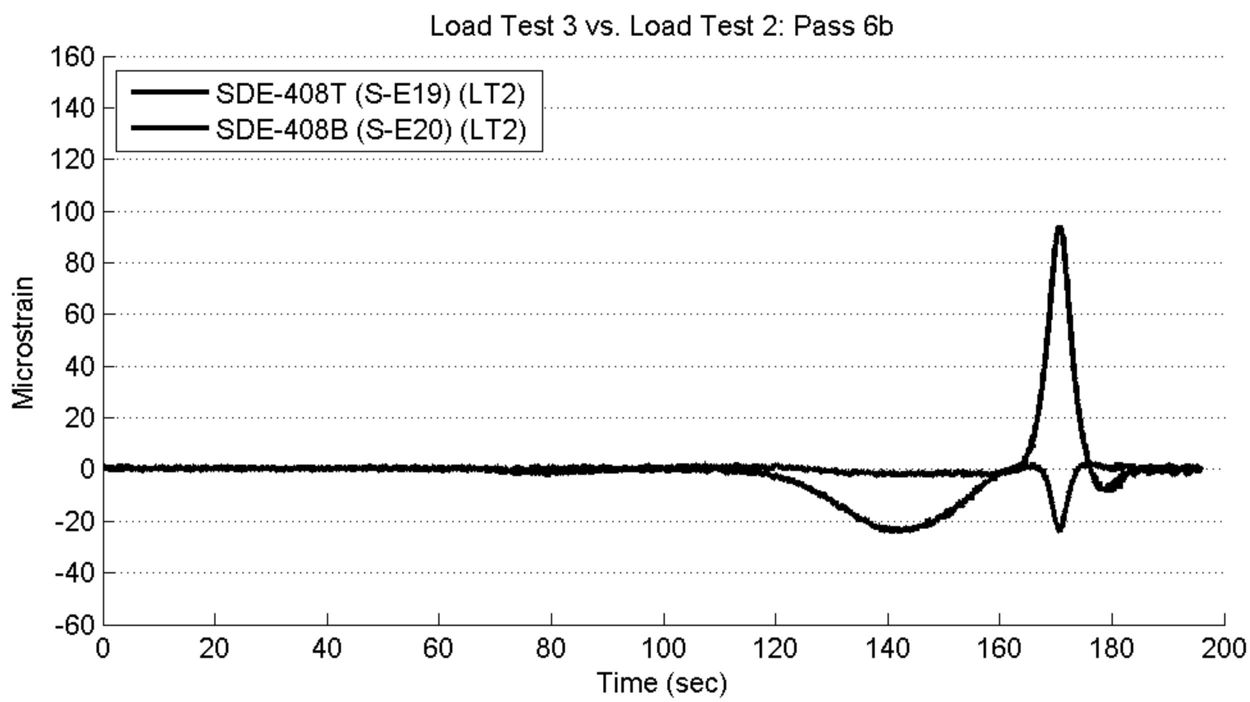


Figure F.4 East edge girder strain time history - section 408

No data interrogator B this test

Figure F.5 West edge girder strain time history - section 404

No data interrogator B this test

Figure F.6 East edge girder strain time history - section 404

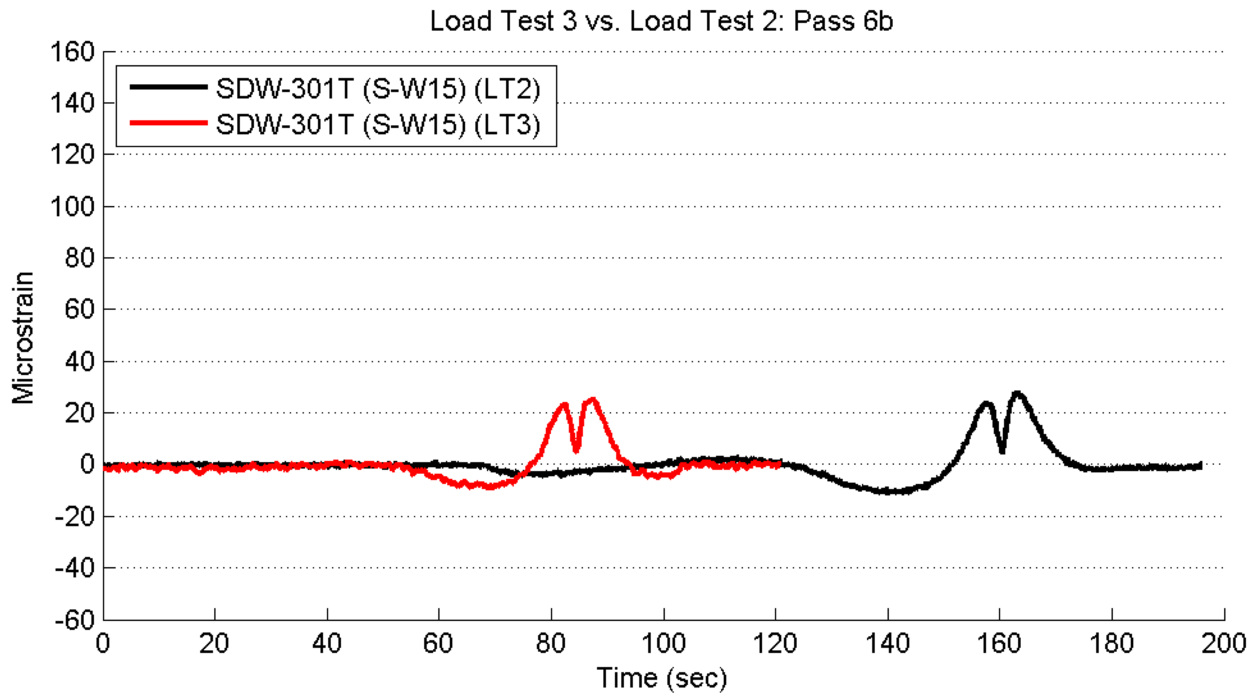


Figure F.7 West edge girder strain time history - section 301

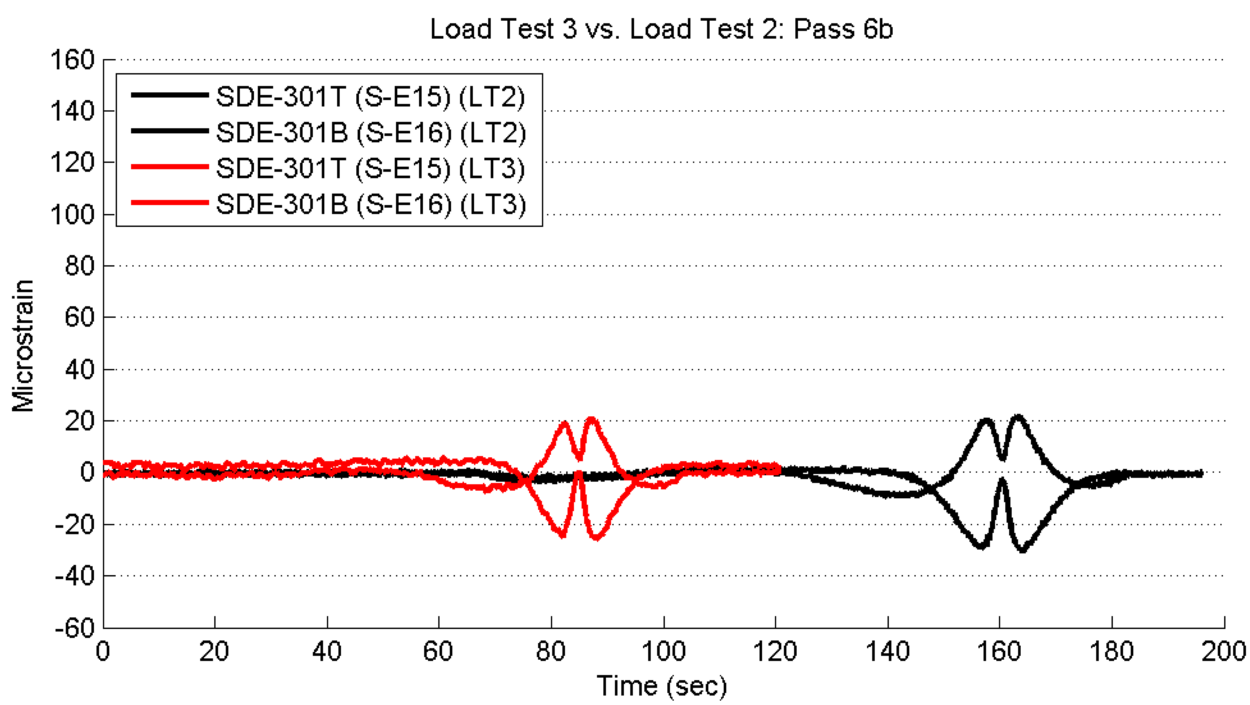


Figure F.8 East edge girder strain time history - section 301

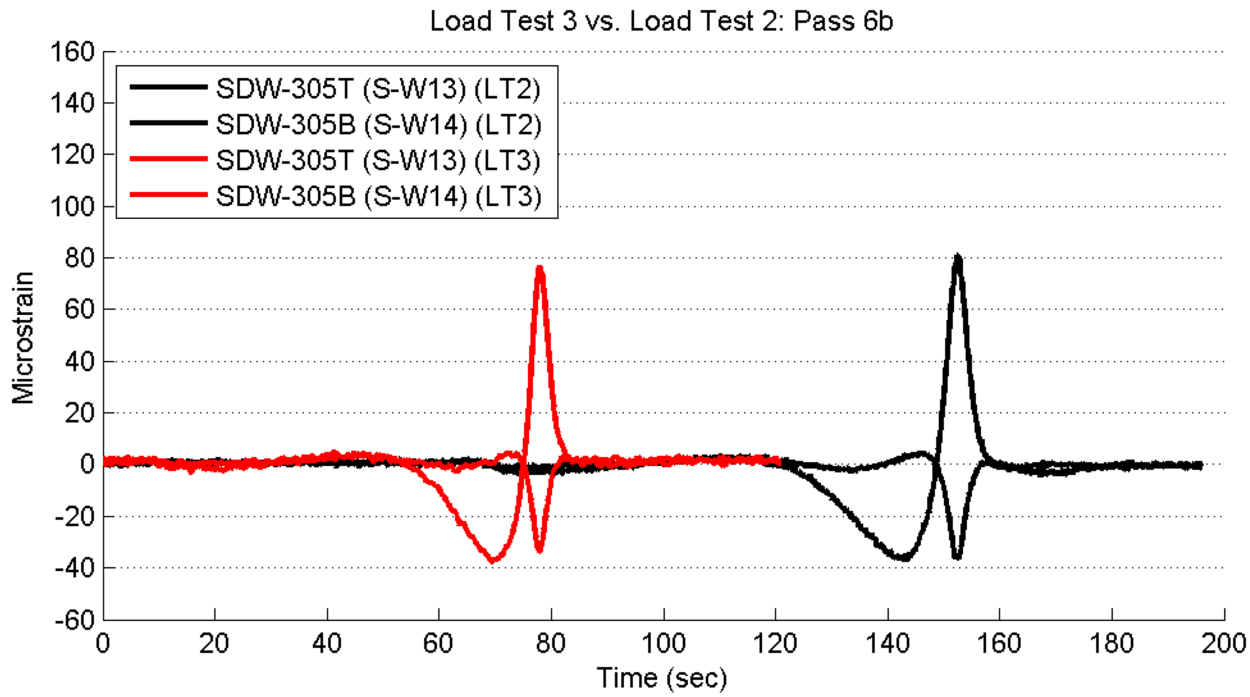


Figure F.9 West edge girder strain time history - section 305

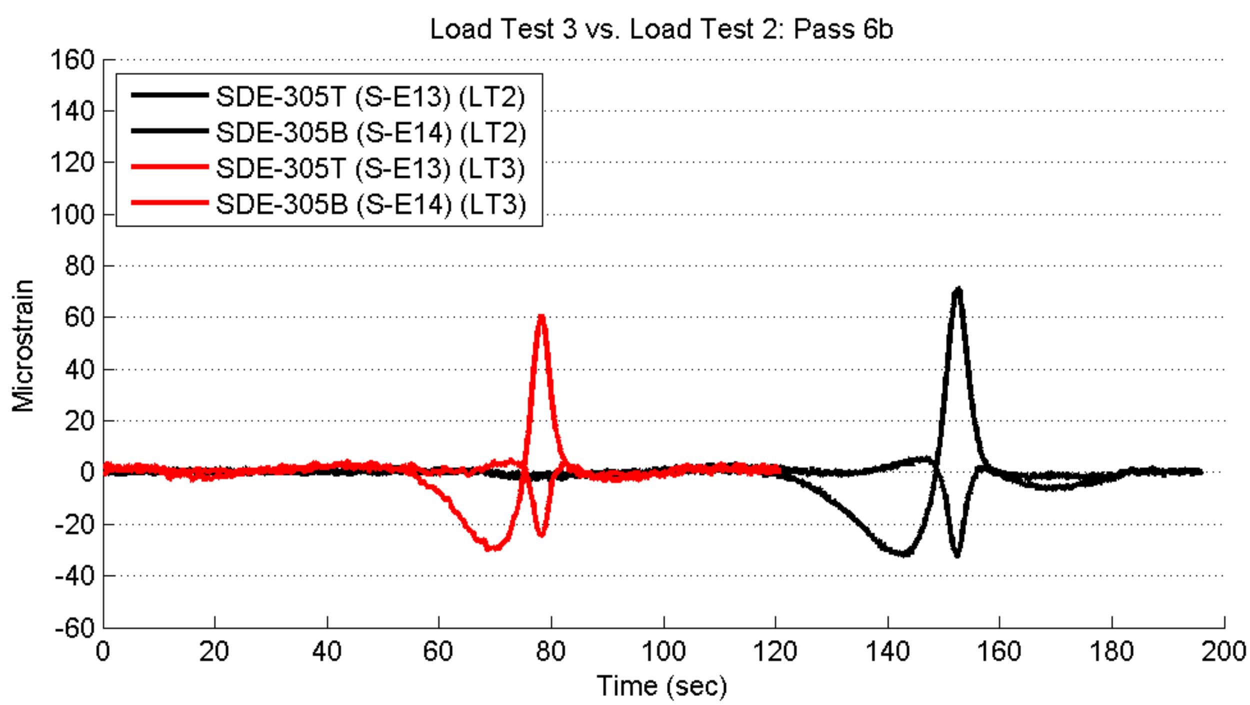


Figure F.10 East edge girder strain time history - section 305

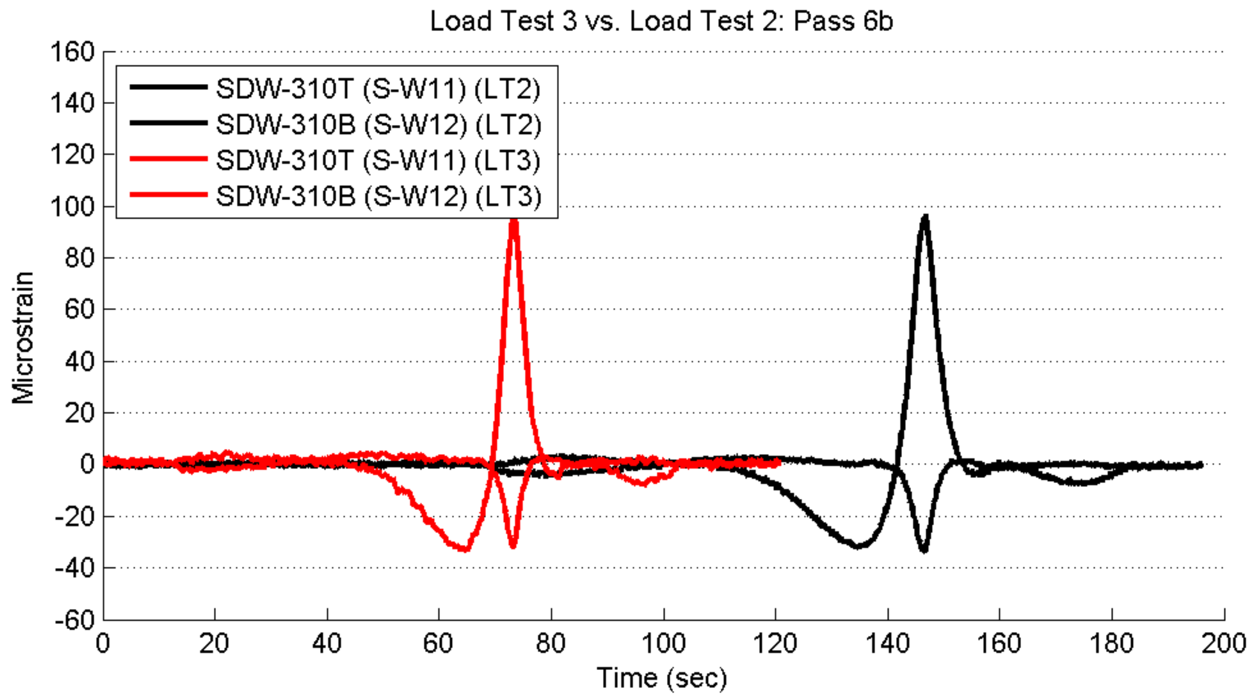


Figure F.11 East edge girder strain time history - section 310

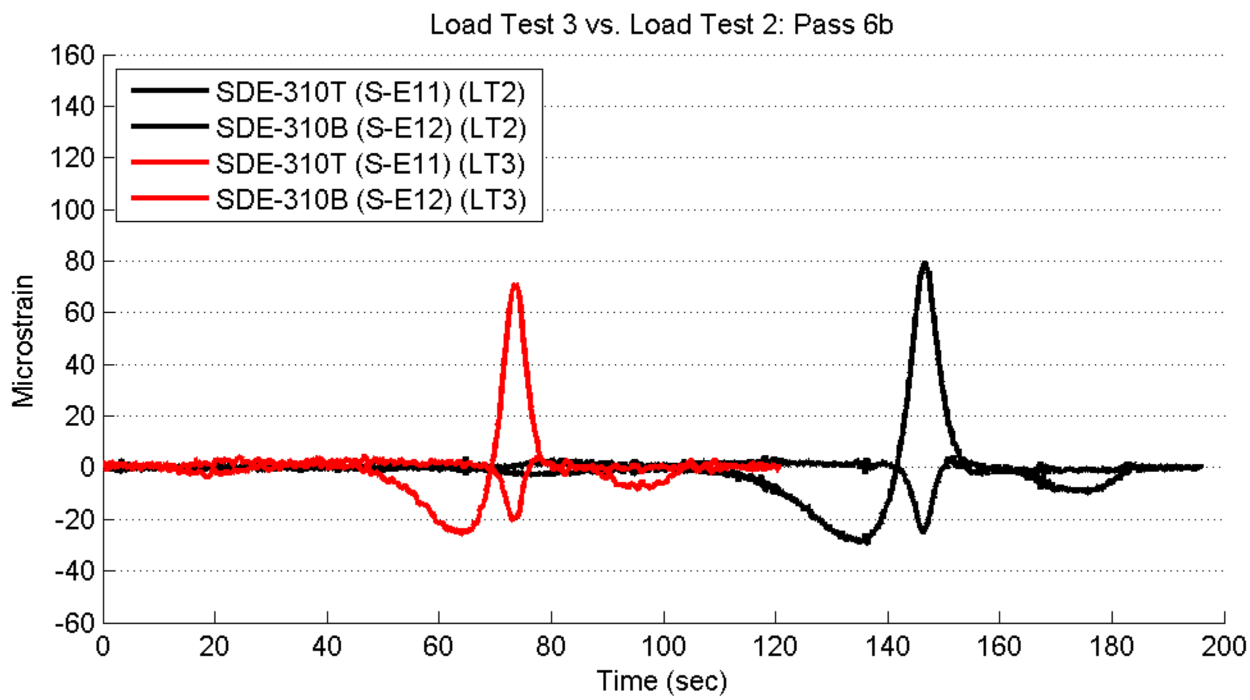


Figure F.12 East edge girder strain time history - section 310

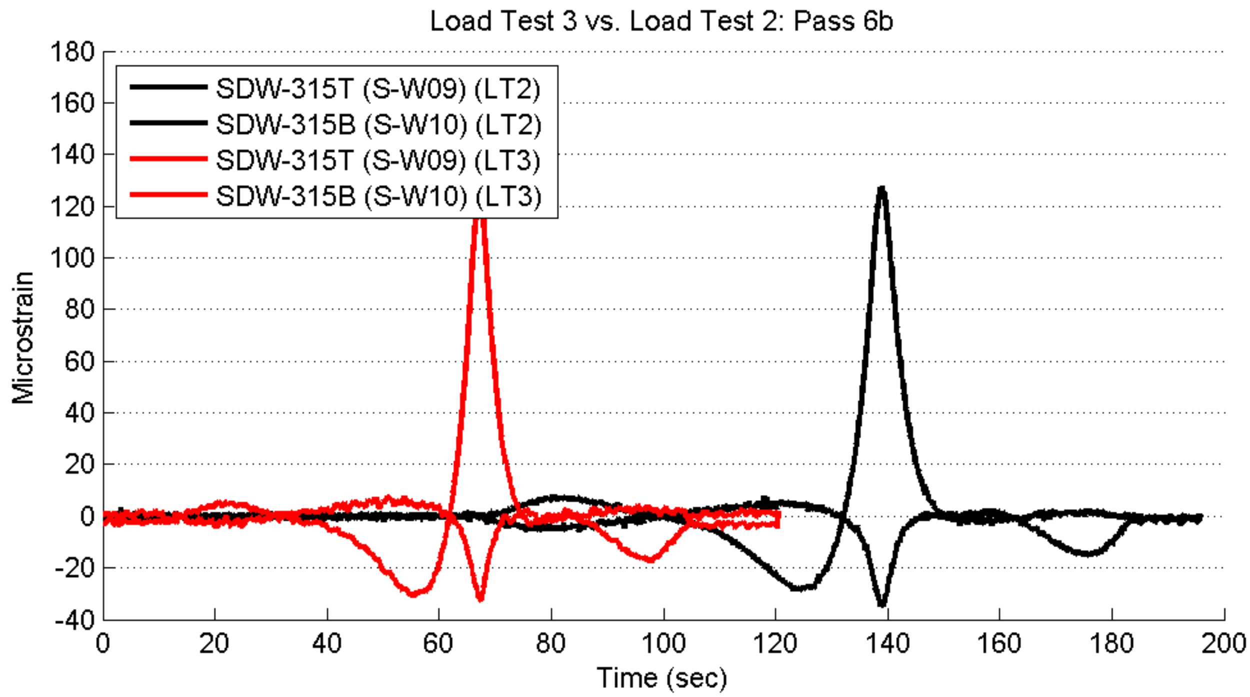


Figure F.13 West edge girder strain time history - section 315

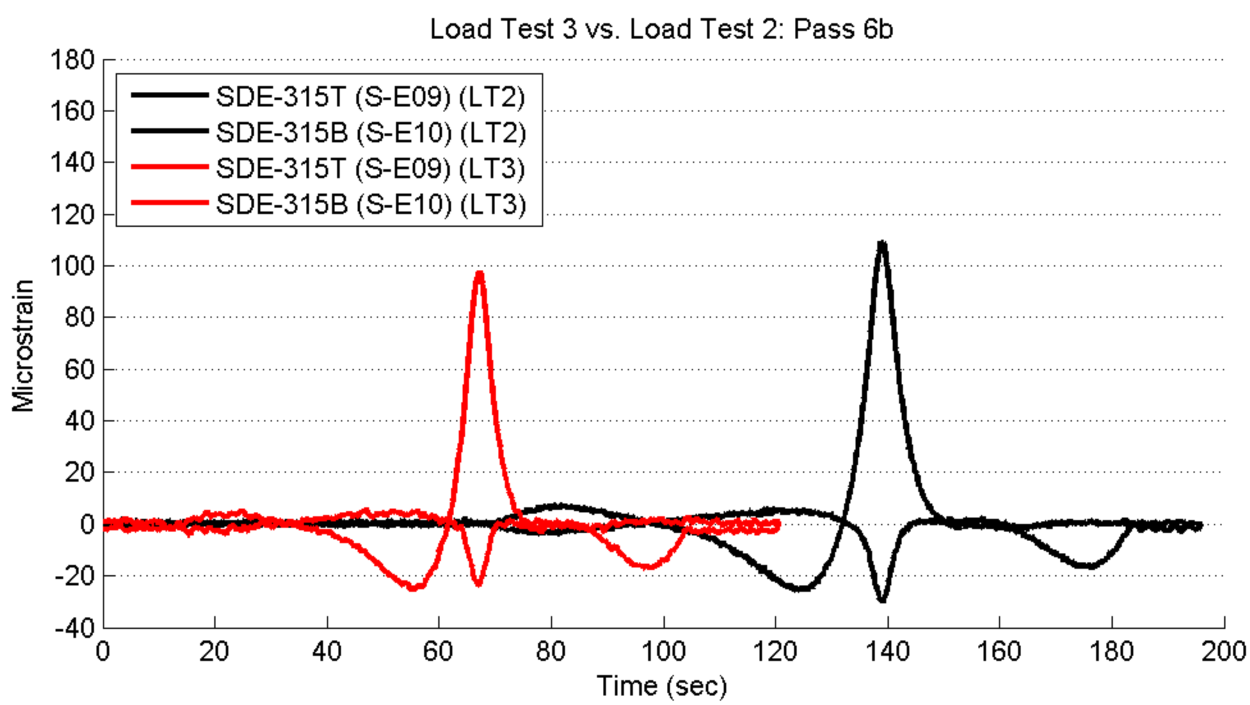


Figure F.14 East edge girder strain time history - section 315

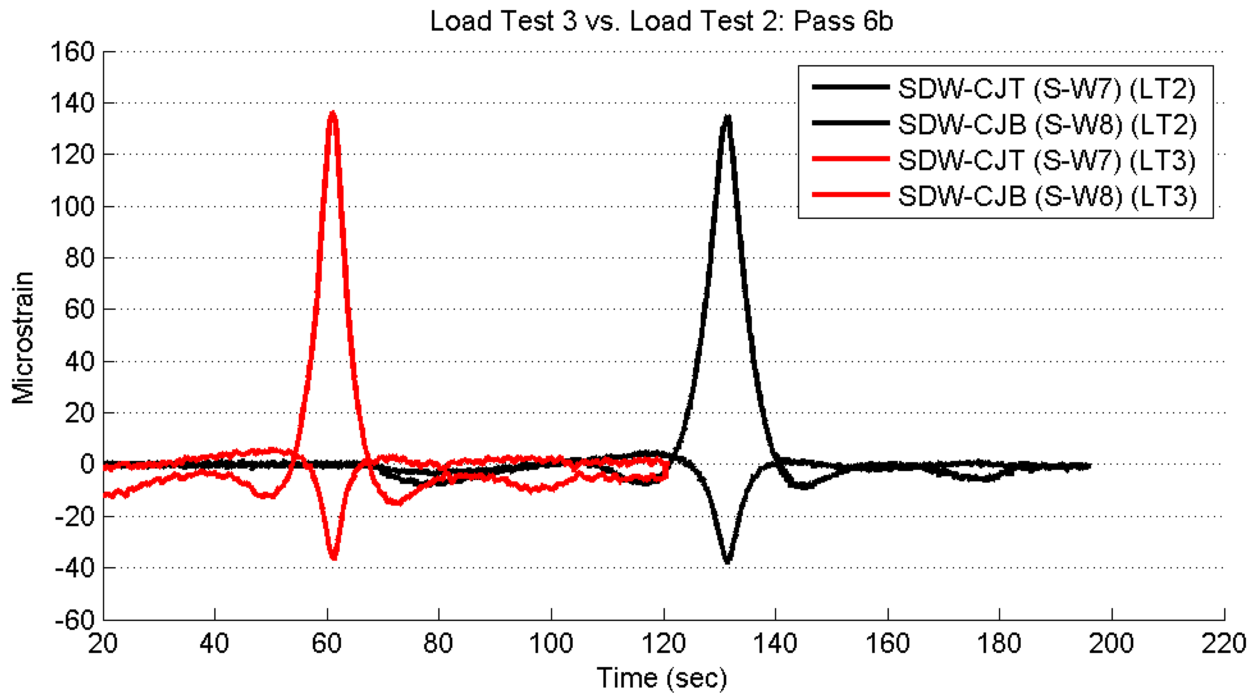


Figure F.15 West edge girder strain time history - closure joint

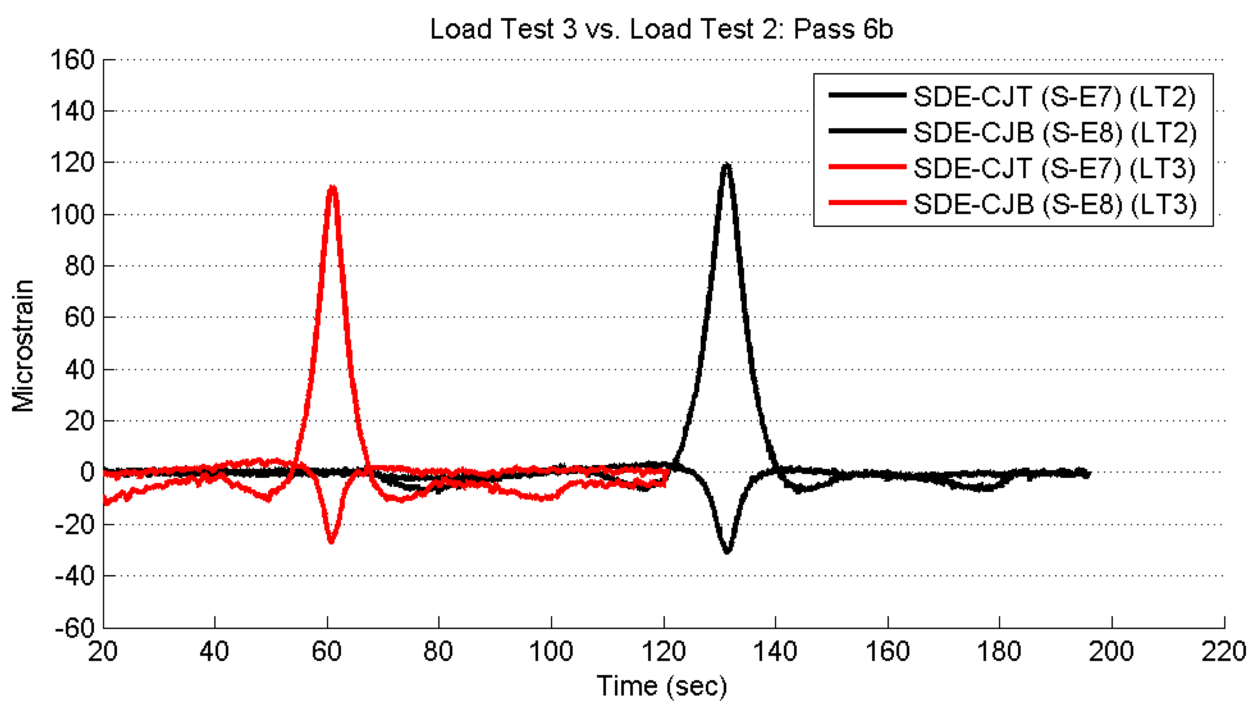


Figure F.16 East edge girder strain time history - closure joint

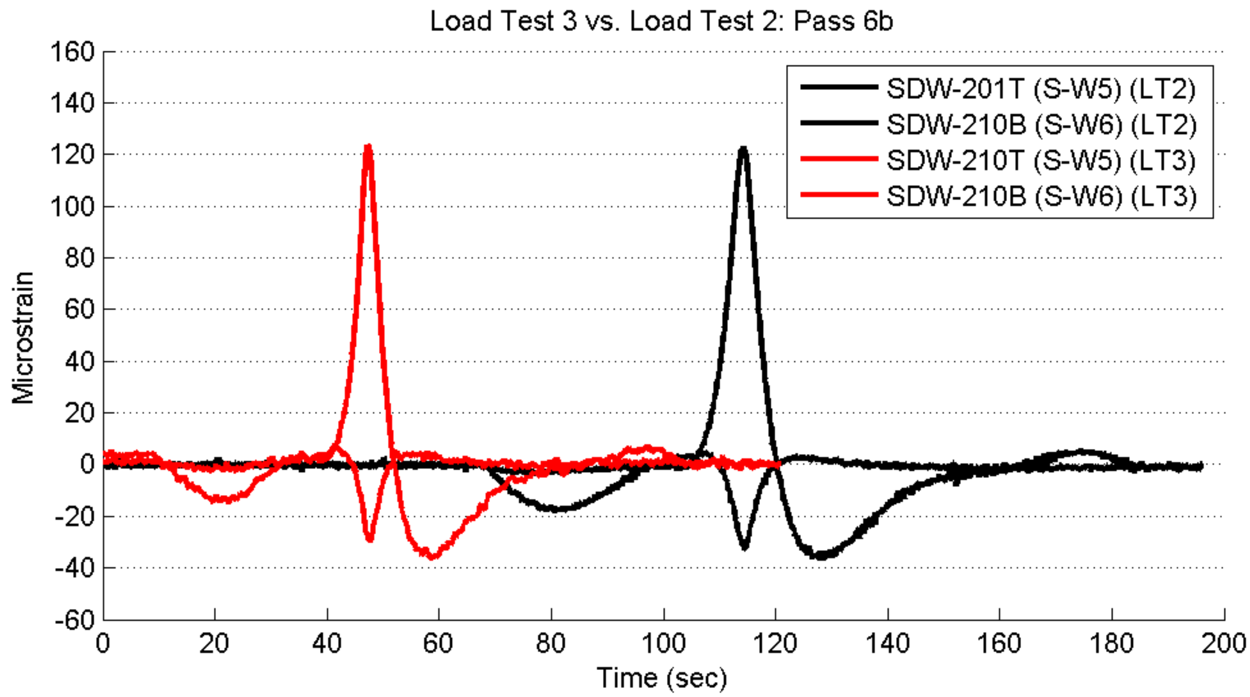


Figure F.17 West edge girder strain time history - section 210

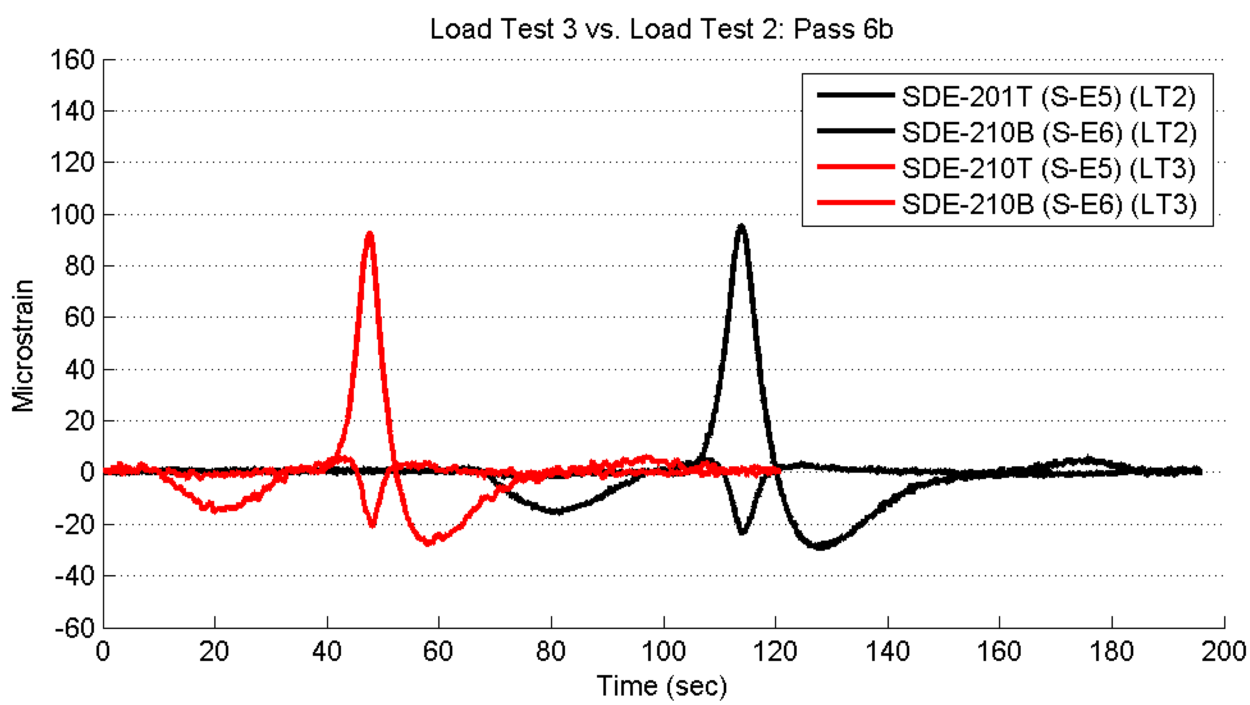


Figure F.18 East edge girder strain time history - section 210

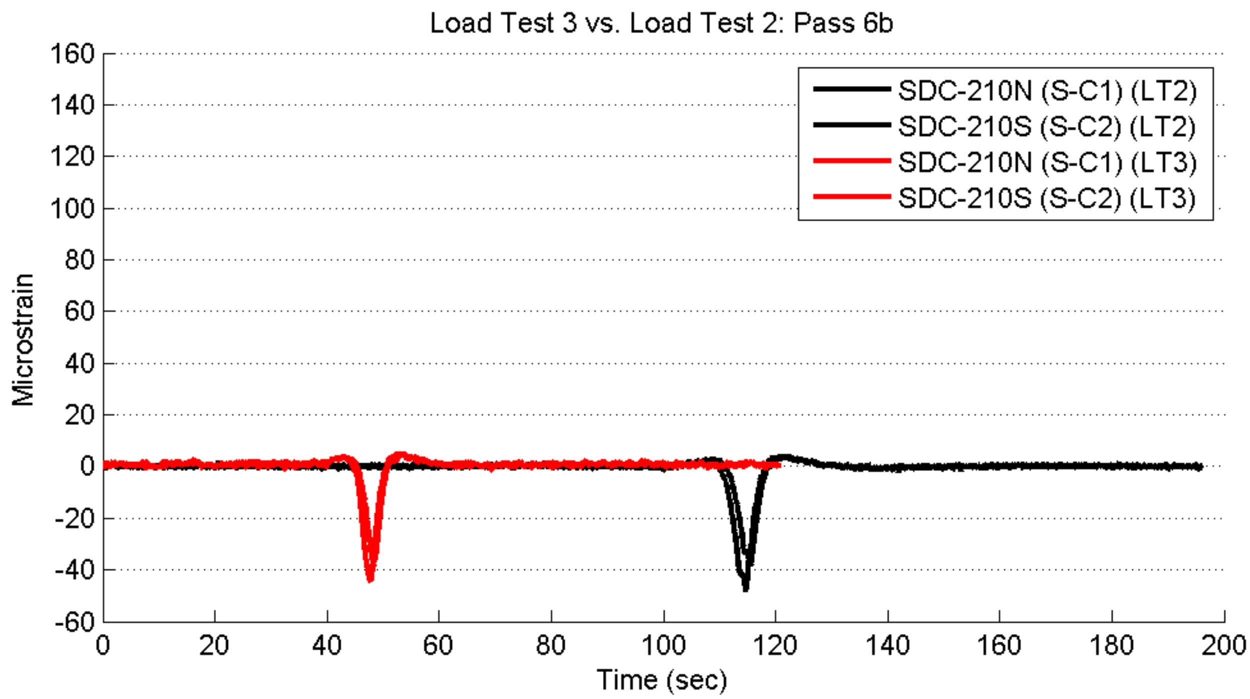


Figure F.19 Deck strain time history - section 210

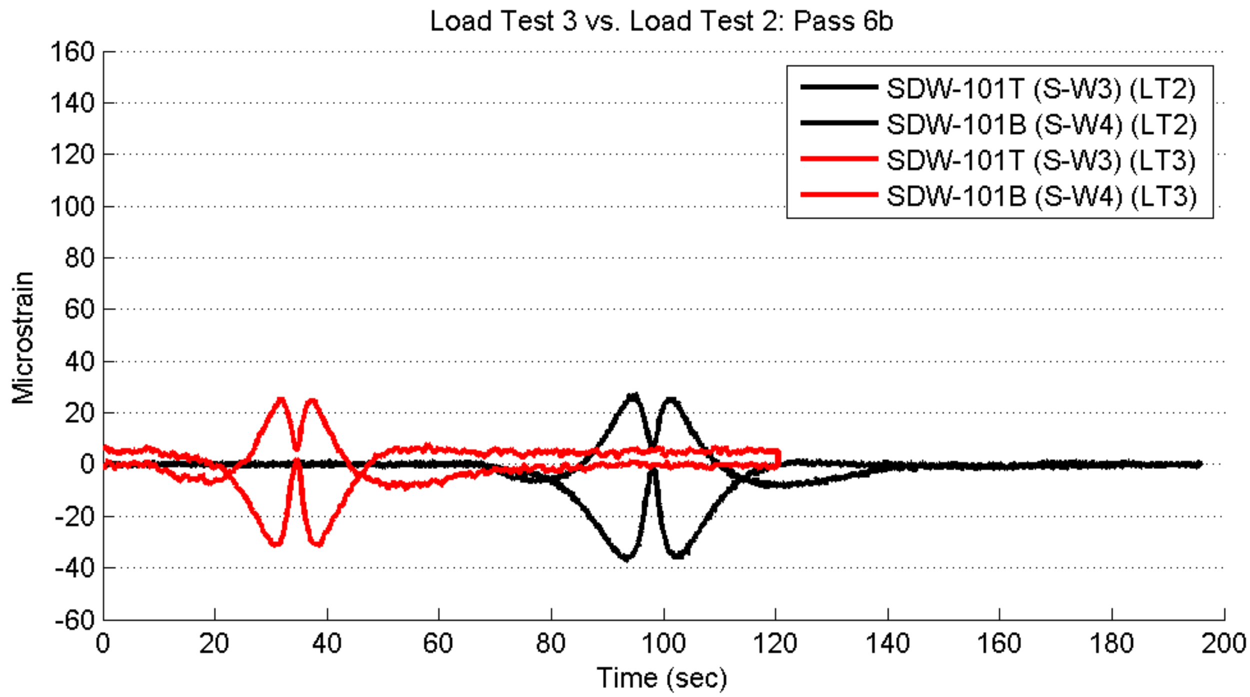


Figure F.20 West edge girder strain time history - section 101

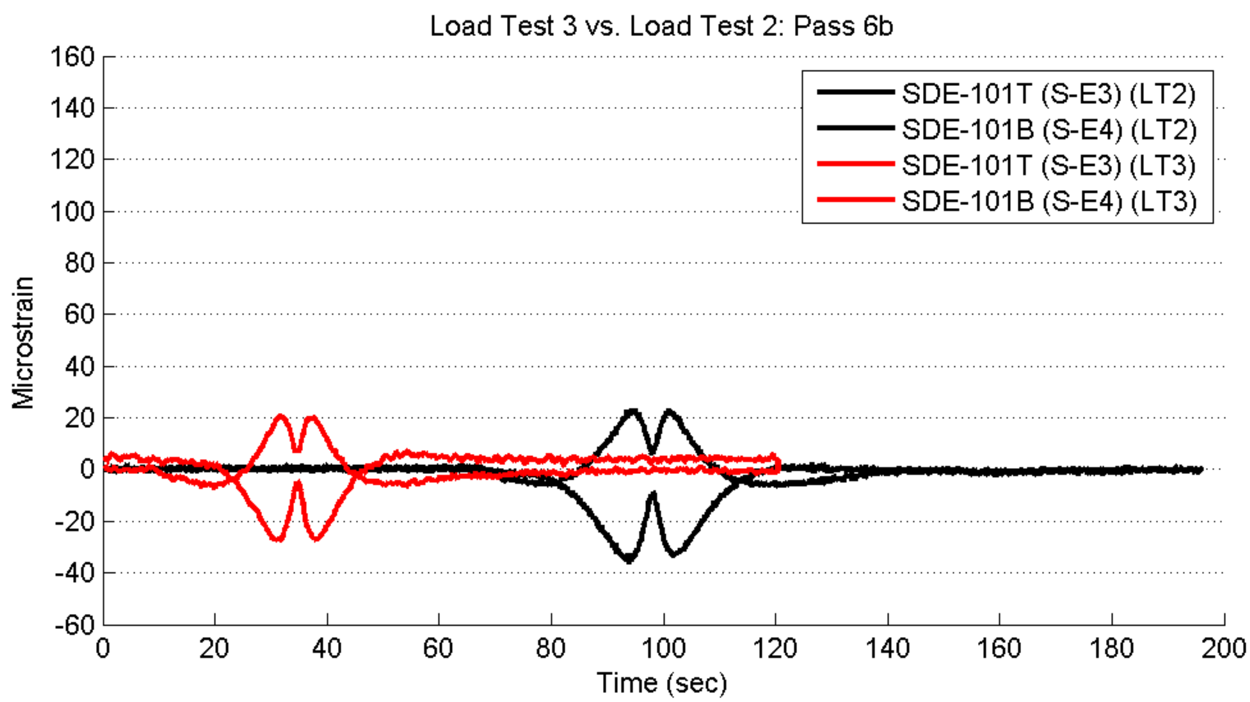


Figure F.21 East edge girder strain time history - section 101

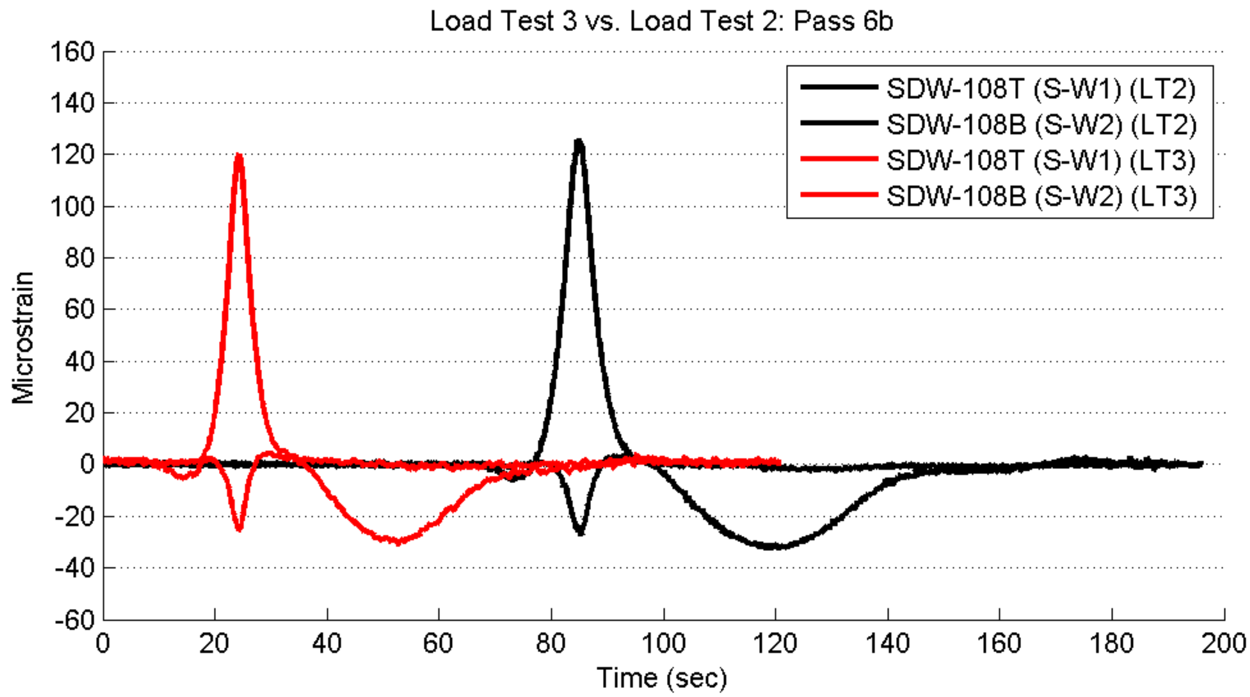


Figure F.22 West edge girder strain time history - section 108

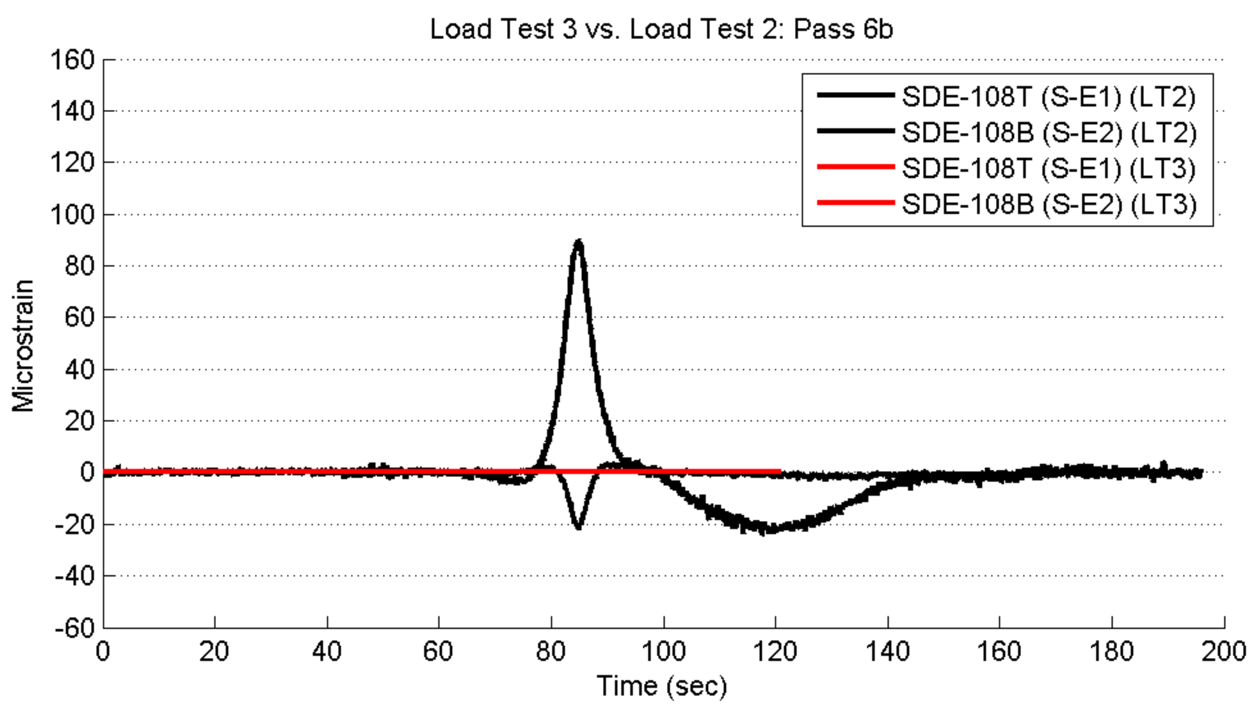


Figure F.23 East edge girder strain time history - section 108

No data

Figure F.24 Pylon 5 east strain time history - lift T4

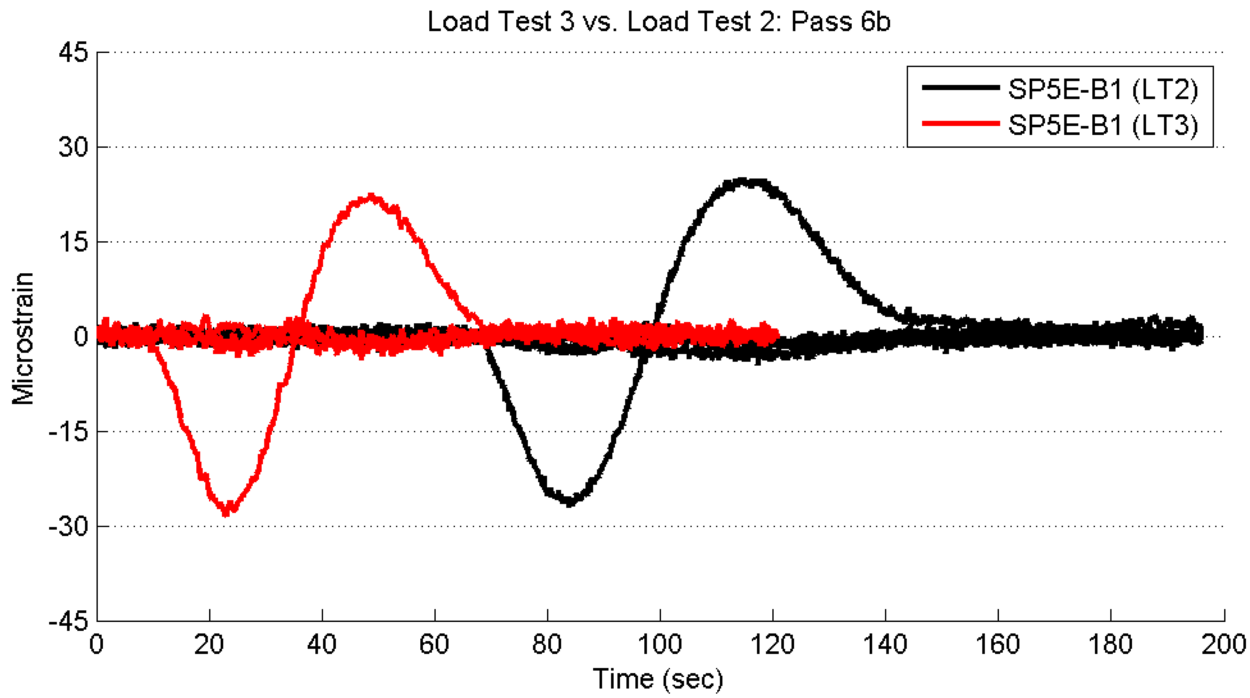


Figure F.25 Pylon 5 east strain time history - lift B1

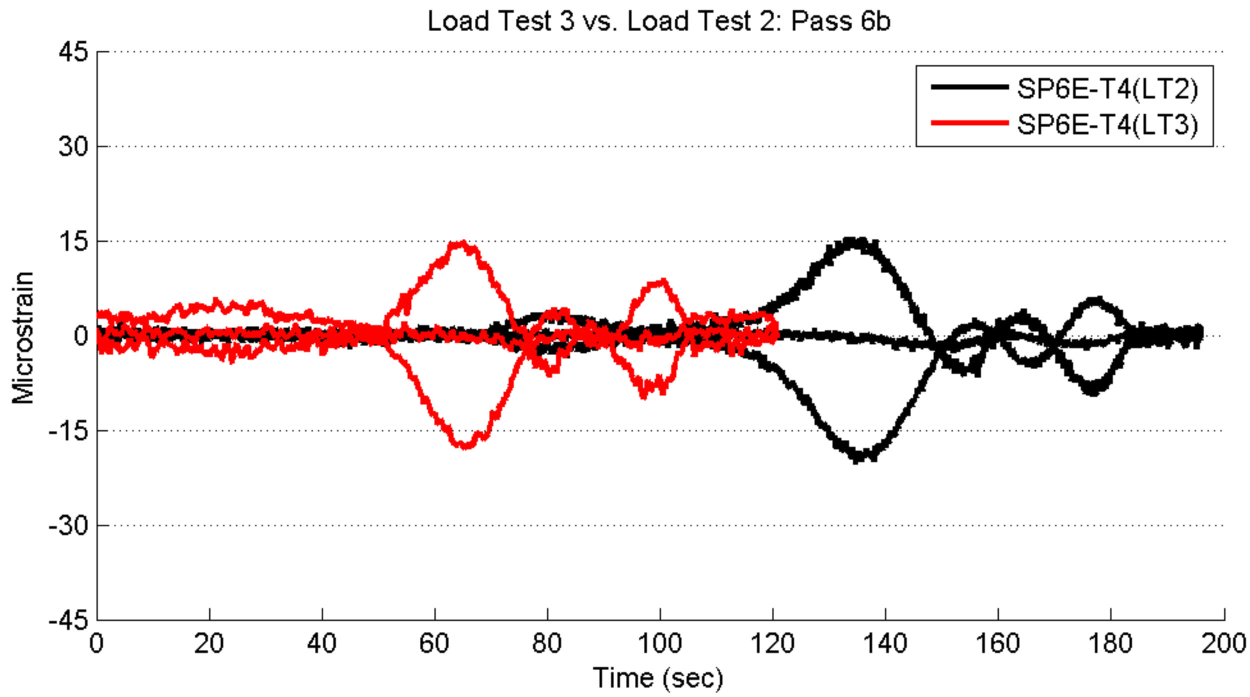


Figure F.26 Pylon 6 east strain time history - lift T4

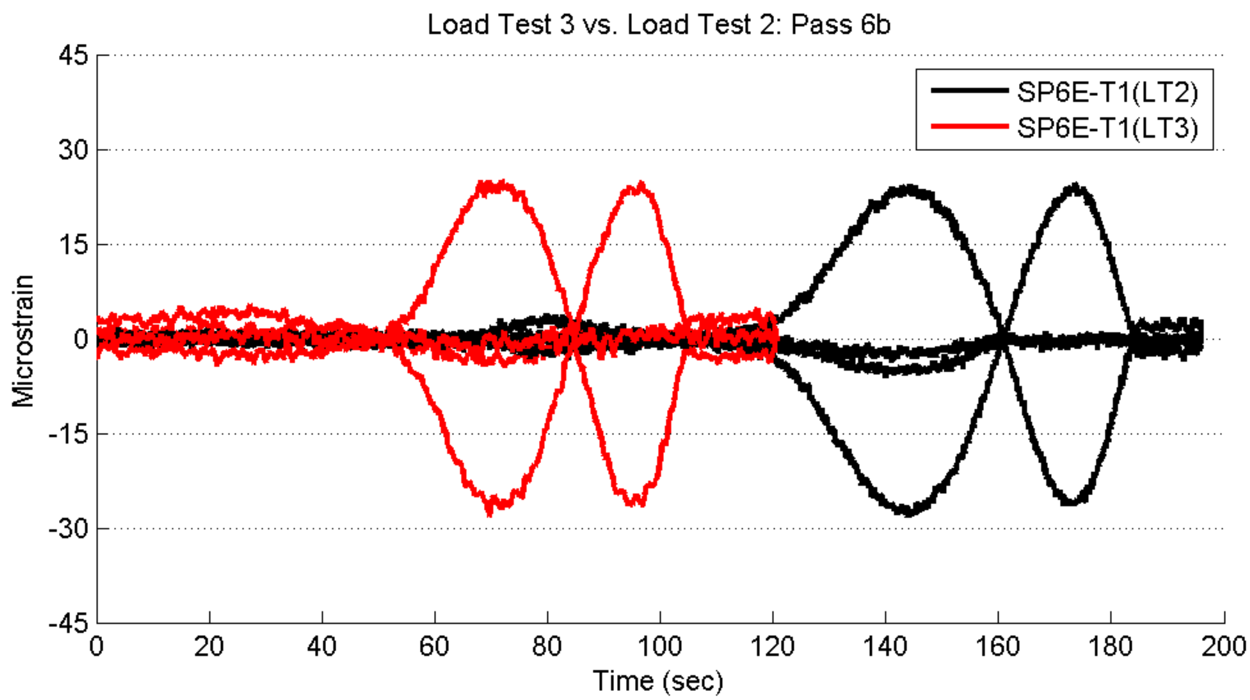


Figure F.27 Pylon 6 east strain time history - lift T1

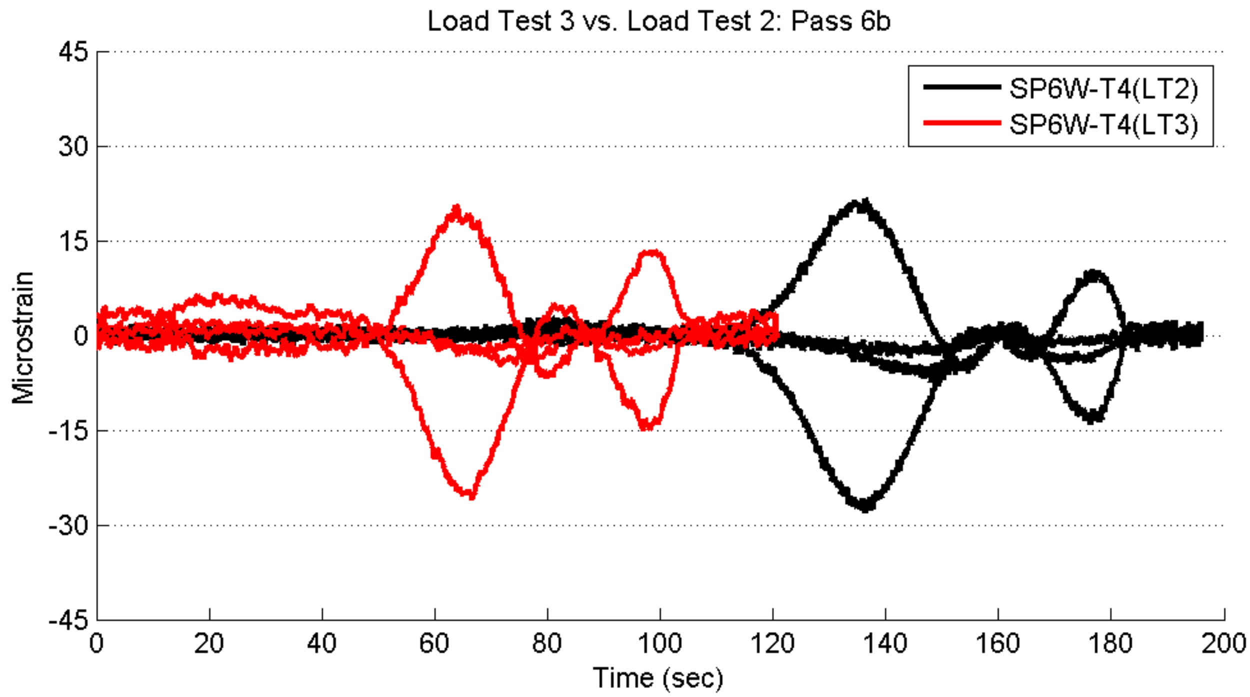


Figure F.28 Pylon 6 west strain time history - lift T4

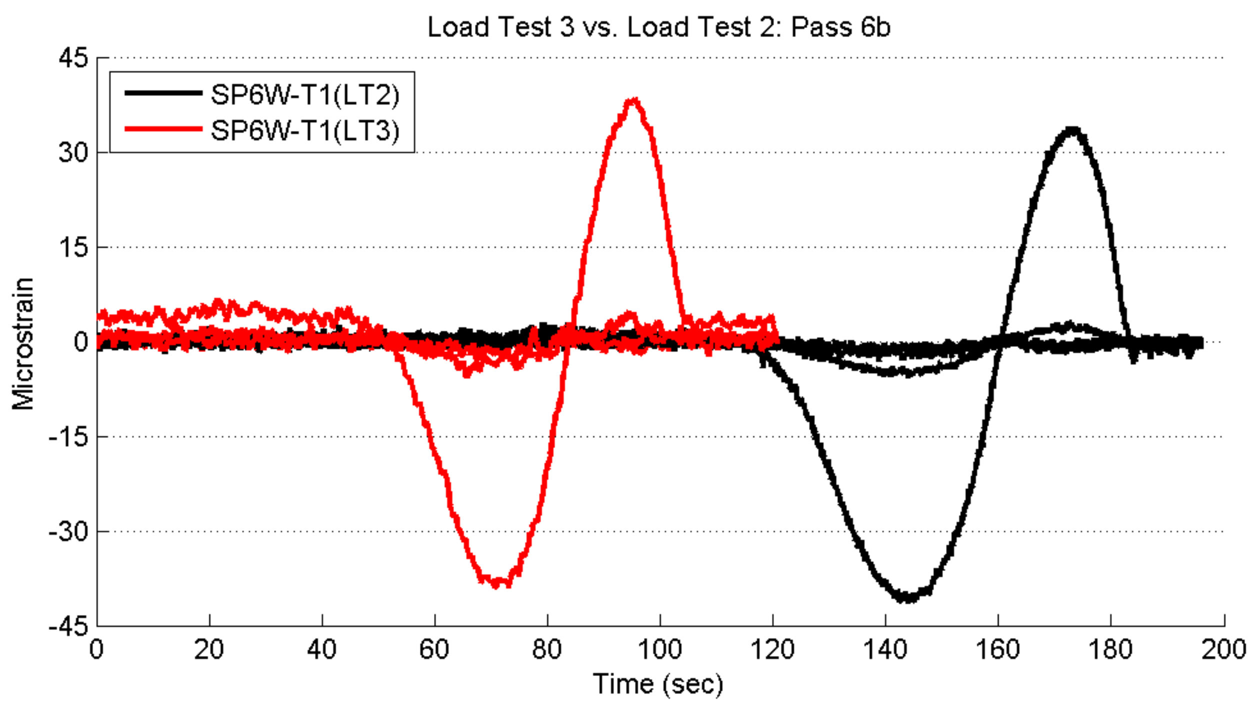


Figure F.29 Pylon 6 west strain time history - lift T1

No data interrogator B this test

Figure F.30 Bearing displacement time history – north abutment

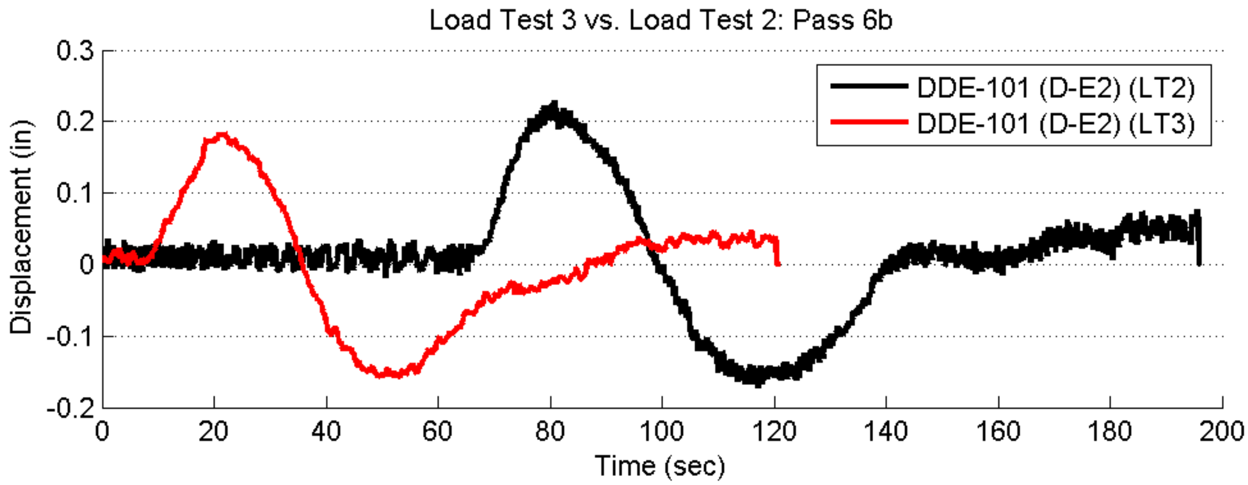


Figure F.31 Bearing displacement time history – pylon 5

No data interrogator B this test

Figure F.32 Bearing displacement time history – south abutment

No data interrogator B this test

Figure F.33 Deck tilt time history - section 415

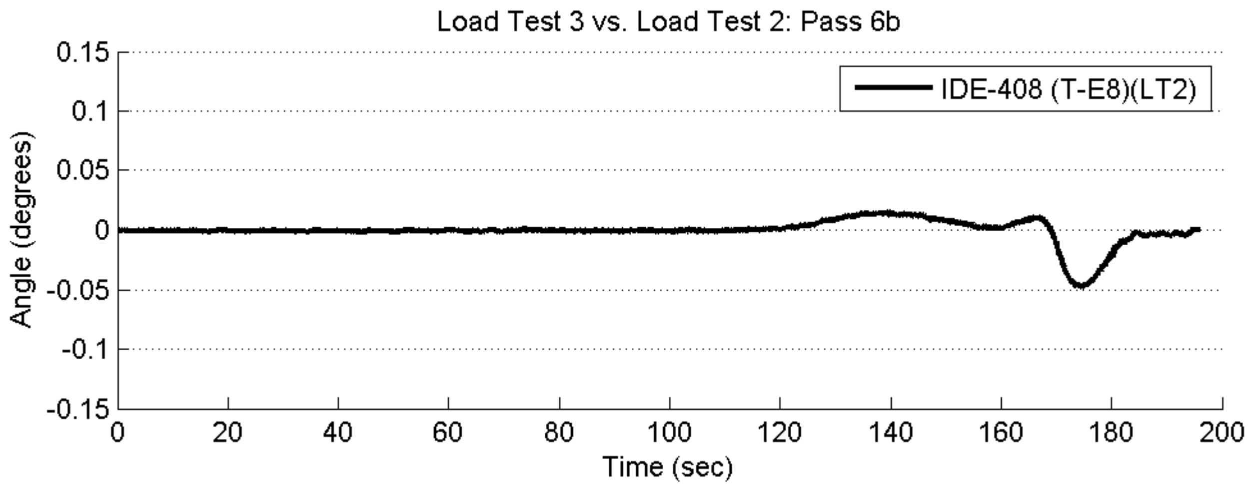


Figure F.34 Deck tilt time history - section 408

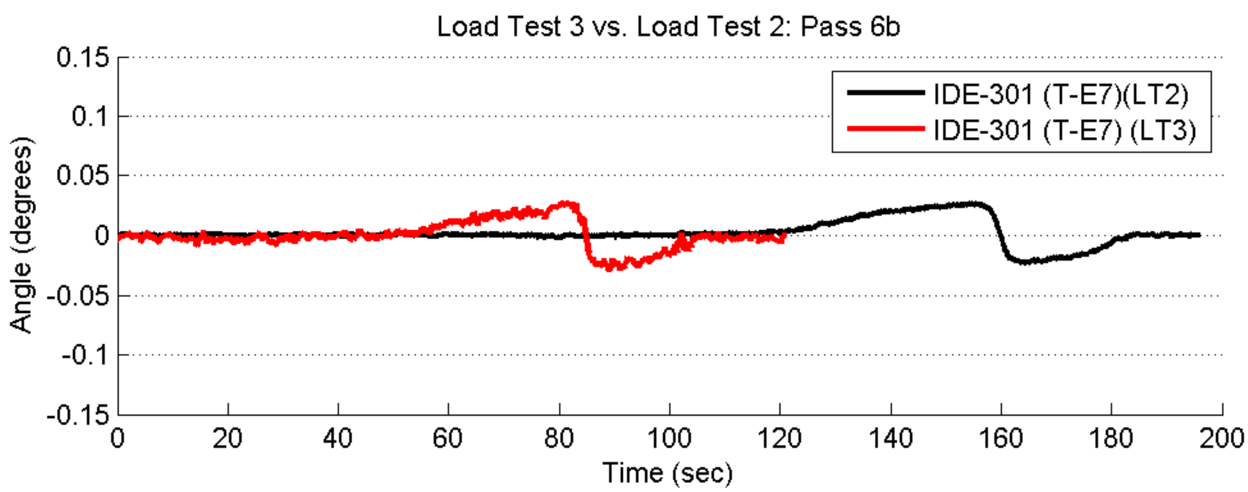


Figure F.35 Deck tilt time history - section 301

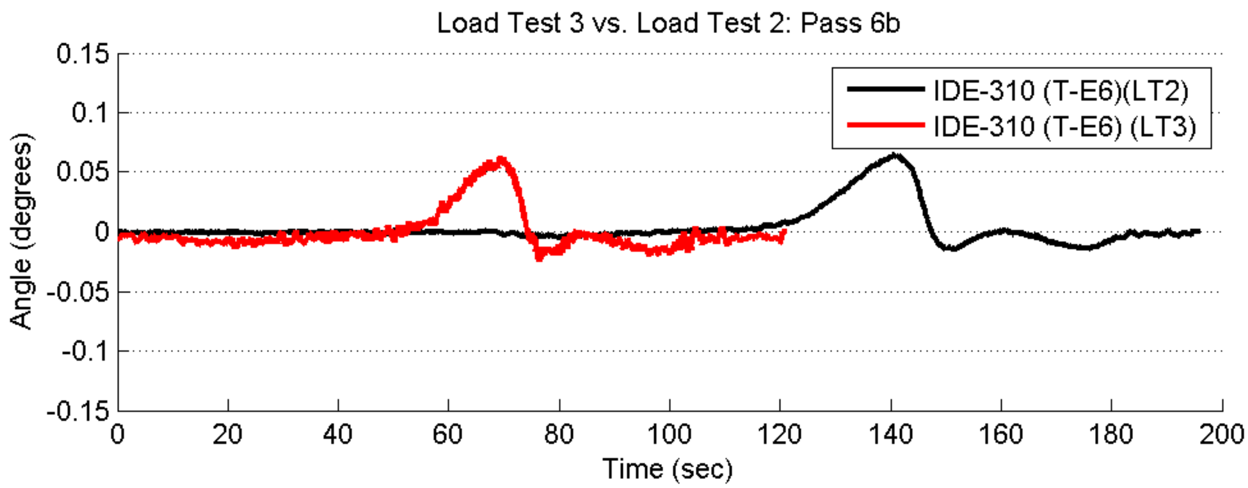


Figure F.36 Deck tilt time history - section 310

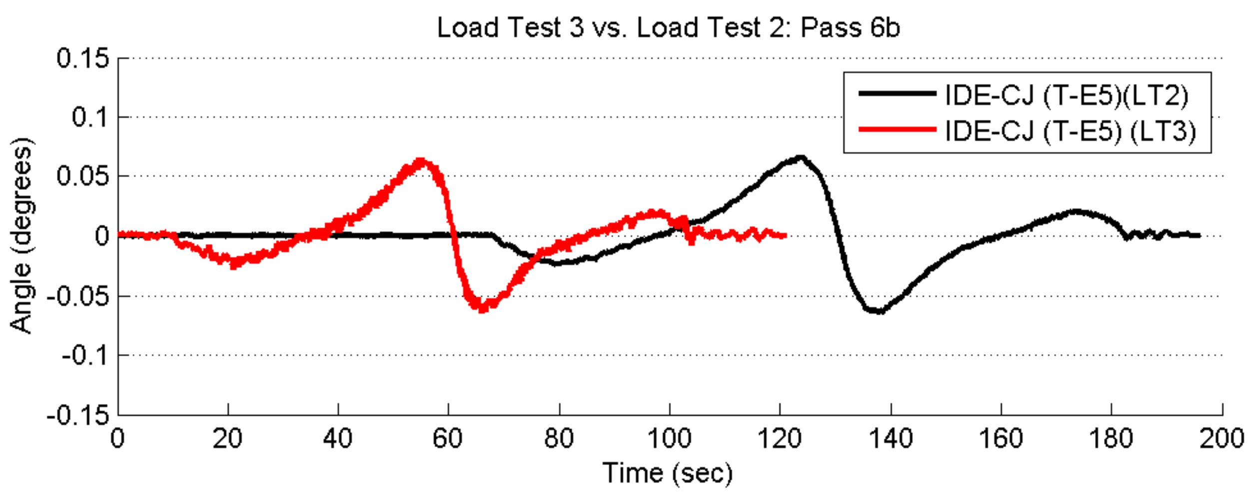


Figure F.37 Deck tilt time history - section closure joint

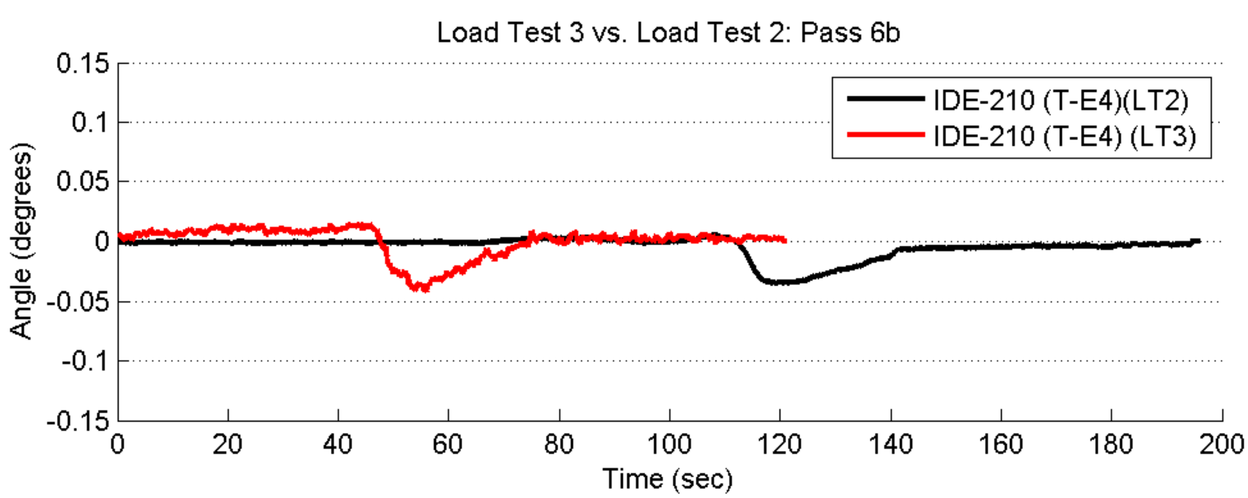


Figure F.38 Deck tilt time history - section 210

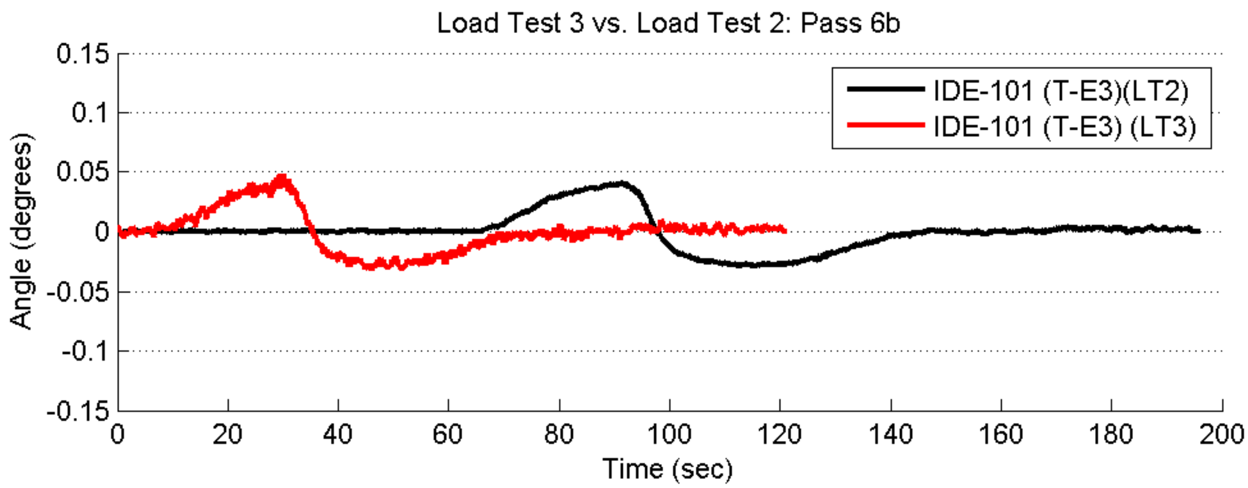


Figure F.39 Deck tilt time history - section 101

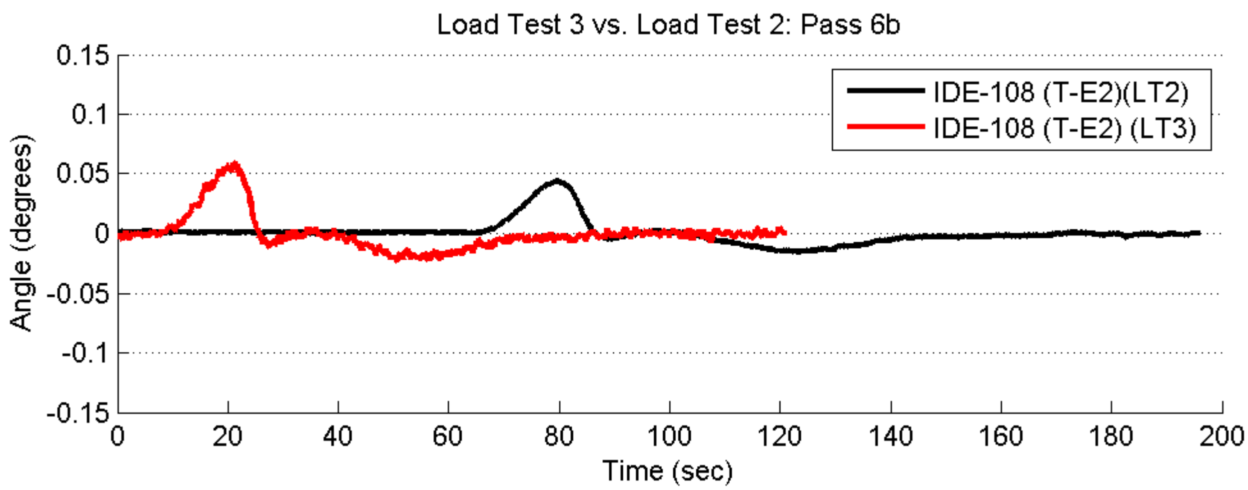


Figure F.40 Deck tilt time history - section 108

No data interrogator B this test

Figure F.41 Deck tilt time history - section 115

Appendix G Comparison Tables and Figures – Load Test 4 (5/7/14) to Baseline

Presented in this appendix are tables that compare the peak results from Load Test 4 to the corresponding peak results from Load Test 2. Results are reported in the tables as a percentage difference, calculated as follows:

$$\Delta\% = \frac{\tilde{\phi}_4 - \phi_2}{\phi_2} x100$$

where

$$\tilde{\phi}_4 = \phi_4 x \frac{W_2}{W_4}$$

and:

ϕ_2	= a peak measurand (strain, tilt, displacement, etc) from Load Test 2
ϕ_4	=peak measurand (strain, tilt, displacement, etc) from Load Test 4
$\tilde{\phi}_4$	= peak measurand from Load Test 4 adjusted for the difference in vehicle weight
$\Delta\%$	= Percent difference in measurand
W_4	= average weight of test vehicle for Load Test 4
W_2	= average weight of test vehicle for Load Test 2

Table G.1 Bearing Displacement: Maximums

No. trucks	Pass	Displacement (in)		
		DDE_115 D-E1	DDE_101 D-E2	DDE_415 D-E3
Slow speed passes				
1	1a			
	1b			
	1c			
	1d			
	1e			
	1f			
4	4a			-80
6	6b	-55	20	

Table G.2 Bearing Displacement: Minimums

No. trucks	Pass	Displacement (in)		
		DDE_115 D-E1	DDE_101 D-E2	DDE_415 D-E3
Slow speed passes				
1	1a			
	1b			
	1c			
	1d			
	1e			
	1f			
4	4a			
6	6b	69	-17	-29

Table G.3 Deck Tilt: Maximums

No. of trucks	Pass	Tilt sensor (Deg.)								
		IDE_115 T-E1	IDE_108 T-E2	IDE_101 T-E3	IDE_210 T-E4	IDE_CJ T-E5	IDE_310 T-E6	IDE_301 T-E7	IDE_408 T-E8	IDE_415 T-E9
Slow speed passes										
1	1a									
	1b									
	1c									
	1d									
	1e									
	1f									
4	4a		-74							-24
6	6b	17	-45							

Table G.4 Deck Tilt: Minimums

No. of trucks	Pass	Tilt sensor (Deg.)								
		IDE_115 T-E1	IDE_108 T-E2	IDE_101 T-E3	IDE_210 T-E4	IDE_CJ T-E5	IDE_310 T-E6	IDE_301 T-E7	IDE_408 T-E8	IDE_415 T-E9
Slow speed passes										
1	1a									
	1b									
	1c									
	1d									
	1e									
	1f									
4	4a				-150					
6	6b	-13			-83					

Table G.5 Plyon 5E Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Below Deck – Level B1)				Strain sensor (με) (Above Deck – Level T4)			
		SP5E_B1W S-E26W	SP5E_B1N S-E23N	SP5E_B1E S-E25E	SP5E_B1S S-E24S	SP5E_T4W S-E30W	SP5E_T4N S-E27N	SP5E_T4E S-E29E	SP5E_T4S S-E28S
Slow speed passes									
1	1a								
	1b								
	1c								
	1d								
	1e								
	1f								
4	4a								
6	6b								

Table G.6 Plyon 5E Strain: Minimums

No. of trucks	Pass	Strain sensor (με)(Below Deck – Level B1)				Strain sensor (με) (Above Deck – Level T4)			
		SP5E_B1W S-E26W	SP5E_B1N S-E23N	SP5E_B1E S-E25E	SP5E_B1S S-E24S	SP5E_T4W S-E30W	SP5E_T4N S-E27N	SP5E_T4E S-E29E	SP5E_T4S S-E28S
Slow speed passes									
1	1a								
	1b								
	1c								
	1d								
	1e								
	1f								
4	4a								
6	6b								

Table G.7 Plyon 6E Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6E_T1W S-E34W	SP6E_T1N S - E31N	SP6E_T1E S-E33E	SP6E_T1S S-E32S	SP6E_T4W S-E38W	SP6E_T4N S-E35N	SP6E_T4E S-E37E	SP6E_T4S S-E36S
Slow speed passes									
1	1a								
	1b								
	1c								
	1d								
	1e								
	1f								
4	4a								
6	6b								

Table G.8 Plyon 6E Strain: Minimums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6E_T1W S-E34W	SP6E_T1N S - E31N	SP6E_T1E S-E33E	SP6E_T1S S-E32S	SP6E_T4W S-E38W	SP6E_T4N S-E35N	SP6E_T4E S-E37E	SP6E_T4S S-E36S
Slow speed passes									
1	1a								
	1b								
	1c								
	1d								
	1e								
	1f								
4	4a								
6	6b				-12				

Table G.9 Pylon 6W Strain: Maximums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6W_T1W S-W26W	SP6W_T1N S-W23N	SP6W_T1E S-W25E	SP6W_T1S S-W24S	SP6W_T4W S-W30W	SP6W_T4E S-W29E	SP6W_T4S S-W28S	SP6W_T4N S-W27N
Slow speed passes									
1	1a								
	1b								
	1c								
	1d								
	1e								
	1f								
4	4a								
6	6b								

Table G.10 Pylon 6W Strain: Minimums

No. of trucks	Pass	Strain sensor (με) (Above Deck – Level T1)				Strain sensor (με) (Above Deck – Level T4)			
		SP6W_T1W S-W26W	SP6W_T1N S-W23N	SP6W_T1E S-W25E	SP6W_T1S S-W24S	SP6W_T4W S-W30W	SP6W_T4E S-W29E	SP6W_T4S S-W28S	SP6W_T4N S-W27N
Slow speed passes									
1	1a								
	1b								
	1c								
	1d								
	1e								
	1f								
4	4a								
6	6b								

Table G.11 East Edge Girder – Top Strain: Maximums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108T S-E1	SDE_101T S-E3	SDE_210T S-E5	SDE_CJT S-E7	SDE_315T S-E9	SDE_310T S-E11	SDE_305T S-E13	SDE_301T S-E15	SDE_404T S-E17	SDE_408T S-E19	SDE_412T S-E21
Slow speed passes												
1	1a											
	1b											
	1c											
	1d											
	1e											
	1f											
4	4a											
6	6b											

Table G.12 East Edge Girder – Top Strain: Minimums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108T S-E1	SDE_101T S-E3	SDE_210T S-E5	SDE_CJT S-E7	SDE_315T S-E9	SDE_310T S-E11	SDE_305T S-E13	SDE_301T S-E15	SDE_404T S-E17	SDE_408T S-E19	SDE_412T S-E21
Slow speed passes												
1	1a											
	1b											
	1c											
	1d											
	1e											
	1f											
4	4a											
6	6b					36				29		

Table G.13 East Edge Girder – Bottom Strain: Maximums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108B S-E2	SDE_101B S-E4	SDE_210B S-E6	SDE_CJB S-E8	SDE_315B S-E10	SDE_E310B S-E12	SDE_305B S-E14	SDE_301B S-E16	SDE_404B S-E18	SDE_408B S-E20	SDE_412B S-E22
Slow speed passes												
1	1a											
	1b											
	1c											
	1d											
	1e											
	1f											
4	4a											
6	6b							11		8		5

Table G.14 East Edge Girder – Bottom Strain: Minimums

No. of trucks	Pass	Strain sensor (με)										
		SDE_108B S-E2	SDE_101B S-E4	SDE_210B S-E6	SDE_CJB S-E8	SDE_315B S-E10	SDE_E310B S-E12	SDE_305B S-E14	SDE_301B S-E16	SDE_404B S-E18	SDE_408B S-E20	SDE_412B S-E22
Slow speed passes												
1	1a											
	1b											
	1c											
	1d											
	1e											
	1f											
4	4a											13
6	6b											

Table G.15 West Edge Girder – Top Strain: Maximums

No. of trucks	Pass	Strain sensor (με)										
		SDW_108T S-W1	SDW_101T S-W3	SDW_210T S-W5	SDW_CJT S-W7	SDW_315T S-W9	SDW_310T S-W11	SDW_305T S-W13	SDW_301T S-W15	SDW_404T S-W17	SDW_408T S-W19	SDW_412T S-W21
Slow speed passes												
1	1a											
	1b											
	1c											
	1d											
	1e											
	1f											
4	4a											
6	6b											

Table G.16 West Edge Girder – Top Strain: Minimums

No. of trucks	Pass	Strain sensor (με)										
		SDW_108T S-W1	SDW_101T S-W3	SDW_210T S-W5	SDW_CJT S-W7	SDW_315T S-W9	SDW_310T S-W11	SDW_305T S-W13	SDW_301T S-W15	SDW_404T S-W17	SDW_408T S-W19	SDW_412T S-W21
Slow speed passes												
1	1a											
	1b											
	1c											
	1d											
	1e											
	1f											
4	4a											
6	6b											

Table G.17 West Edge Girder – Bottom Strain: Maximums

No. of trucks	Pass	Strain sensor (με)									
		SDW_108B S-W2	SDW_101B S-W4	SDW_210B S-W6	SDW_CJB S-W8	SDW_315B S-W10	SDW_310B S-W12	SDW_305B S-W14	SDW_404B S-W18	SDW_408B S-W20	SDW_412B S-W22
Slow speed passes											
1	1a										
	1b										
	1c										
	1d										
	1e										
	1f										
4	4a	-4			-6						-5
6	6b	-3			-11	-4	-2				-2

Table G.18 West Edge Girder – Bottom Strain: Minimums

No. of trucks	Pass	Strain sensor (με)									
		SDW_108B S-W2	SDW_101B S-W4	SDW_210B S-W6	SDW_CJB S-W8	SDW_315B S-W10	SDW_310B S-W12	SDW_305B S-W14	SDW_404B S-W18	SDW_408B S-W20	SDW_412B S-W22
Slow speed passes											
1	1a										
	1b										
	1c										
	1d										
	1e										
	1f										
4	4a										12
6	6b										

Table G.19 Deck Strain: Maximums

No. of trucks	Pass	Strain sensor (με)	
		SDC_210N S-C1	SDC_210S S-C2
Slow speed passes			
1	1a		
	1b		
	1c		
	1d		
	1e		
	1f		
4	4a		
6	6b		

Table G.20 Deck Strain: Minimums

No. of trucks	Pass	Strain sensor (με)	
		SDC_210N S-C1	SDC_210S S-C2
Slow speed passes			
1	1a		
	1b		
	1c	24	
	1d		
	1e		
	1f		
4	4a		
6	6b		

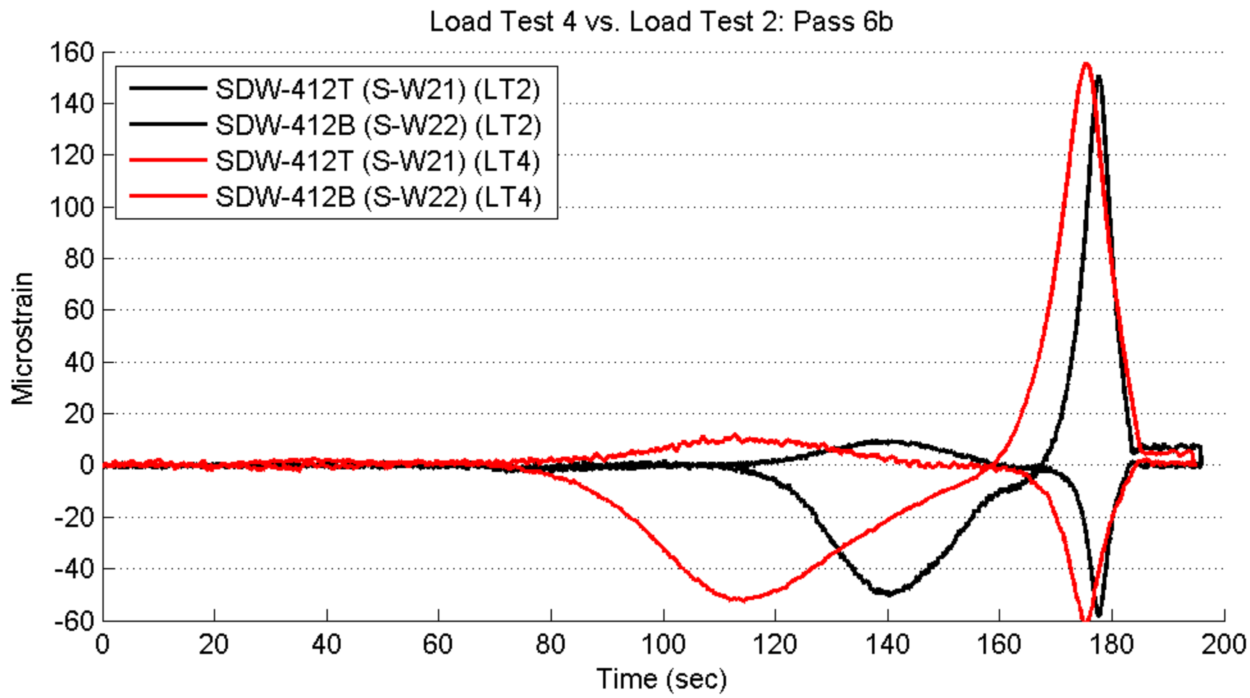


Figure G.1 Edge girder strain time history - section 412

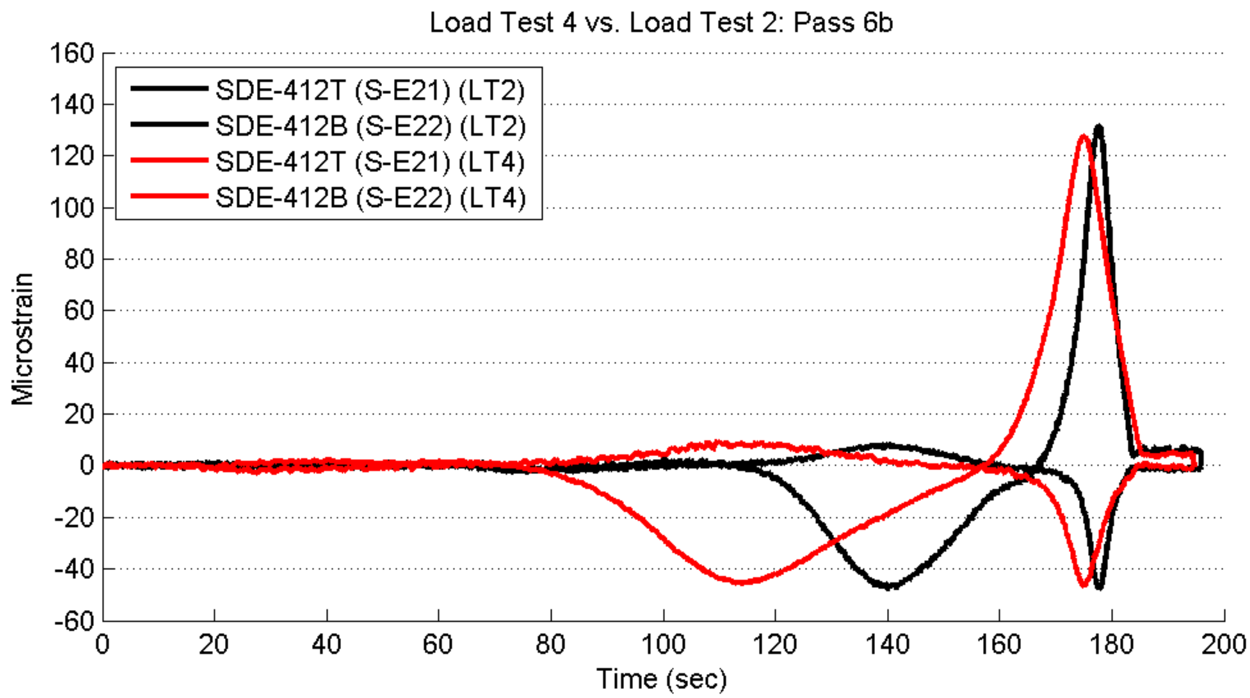


Figure G.2 Edge girder strain time history - section 412

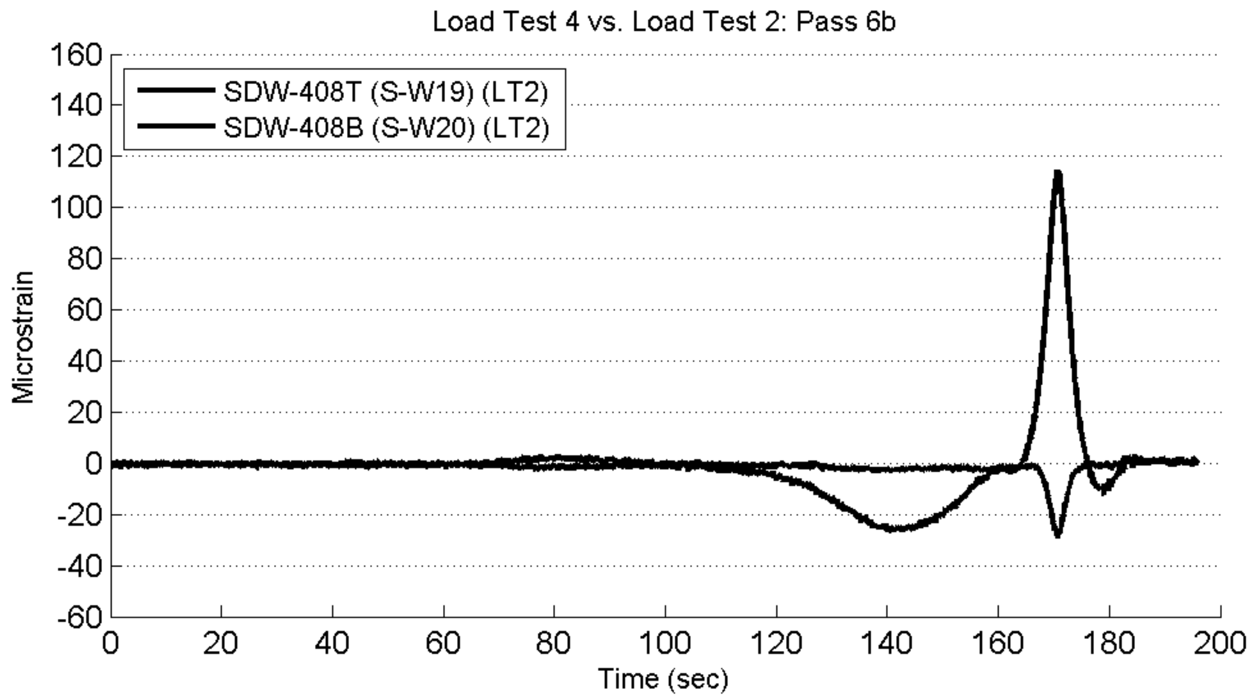


Figure G.3 West edge girder strain time history - section 408

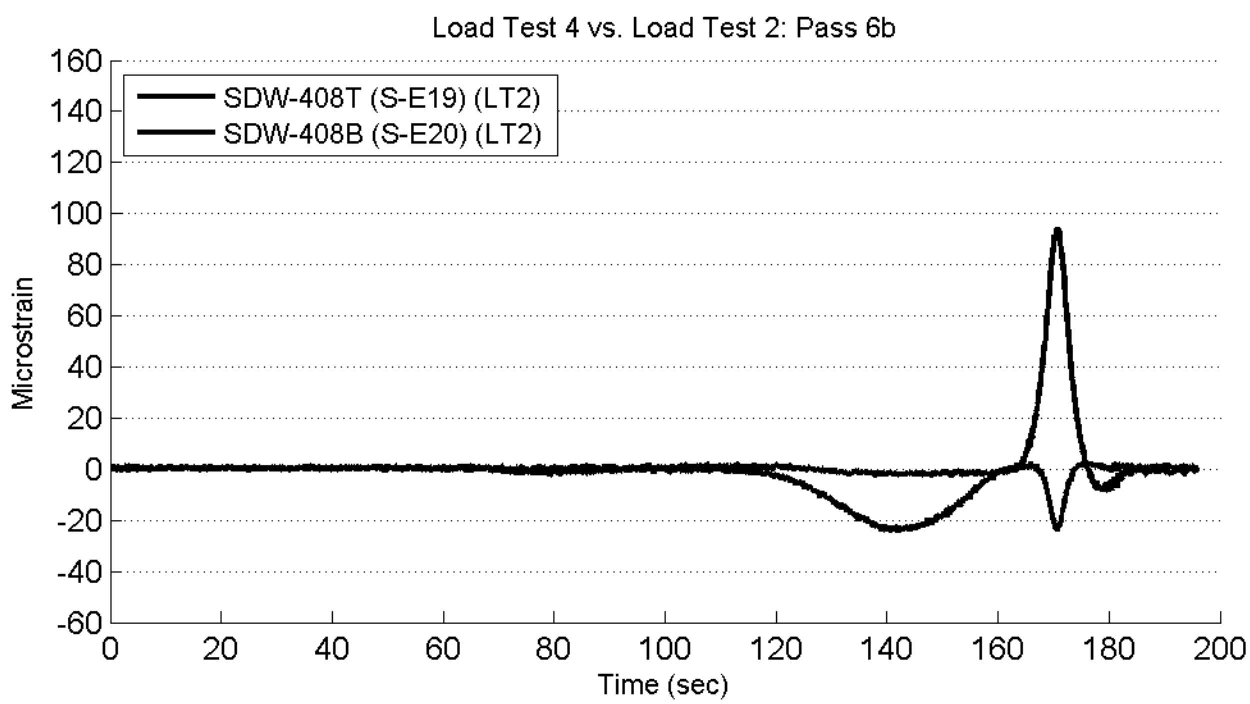


Figure G.4 East edge girder strain time history - section 408

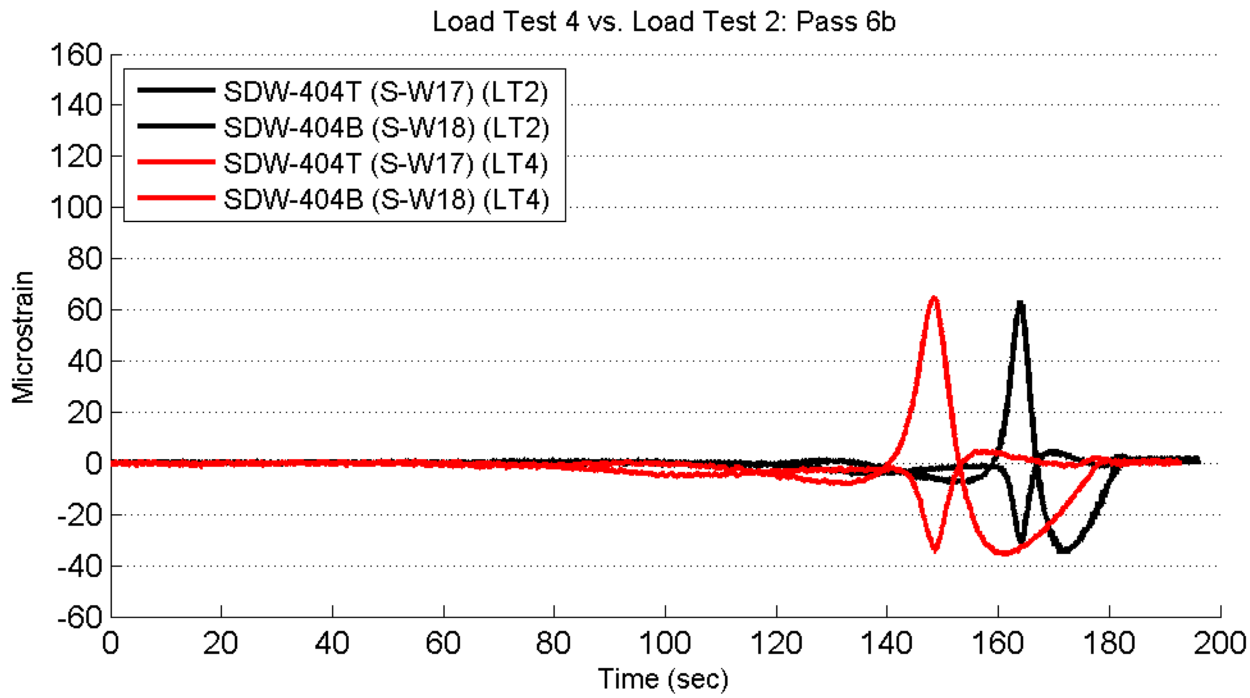


Figure G.5 West edge girder strain time history - section 404

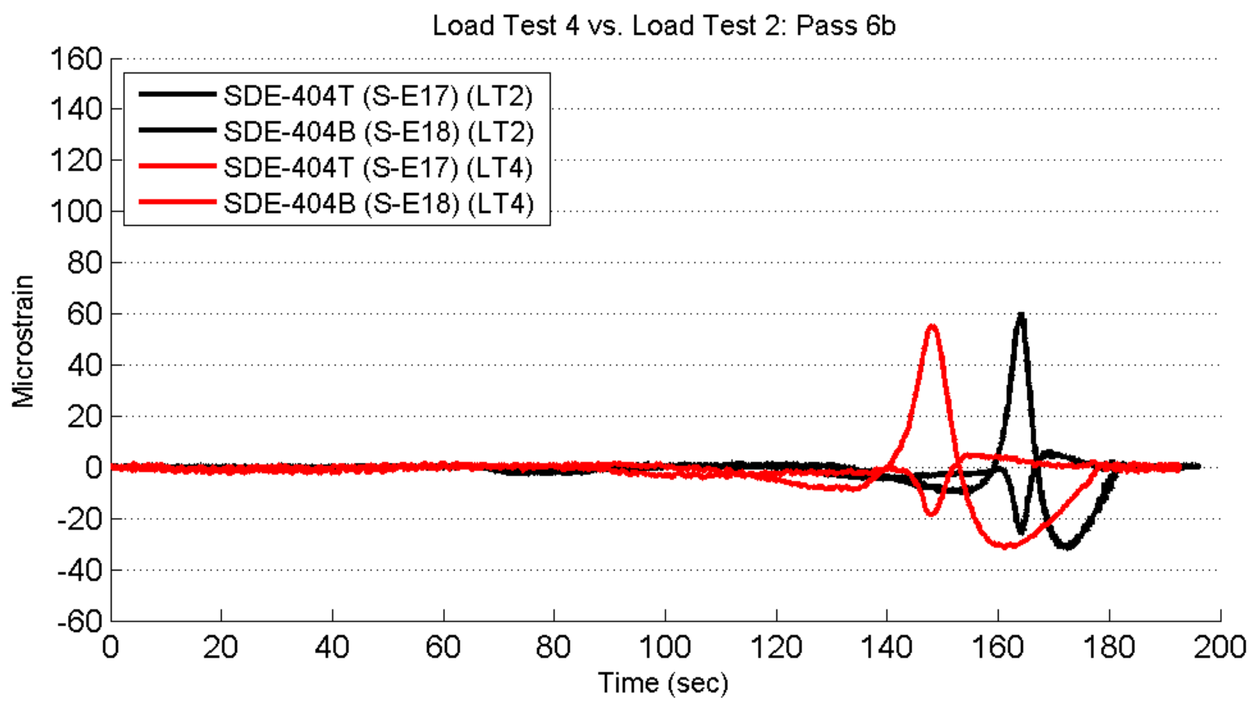


Figure G.6 East edge girder strain time history - section 404

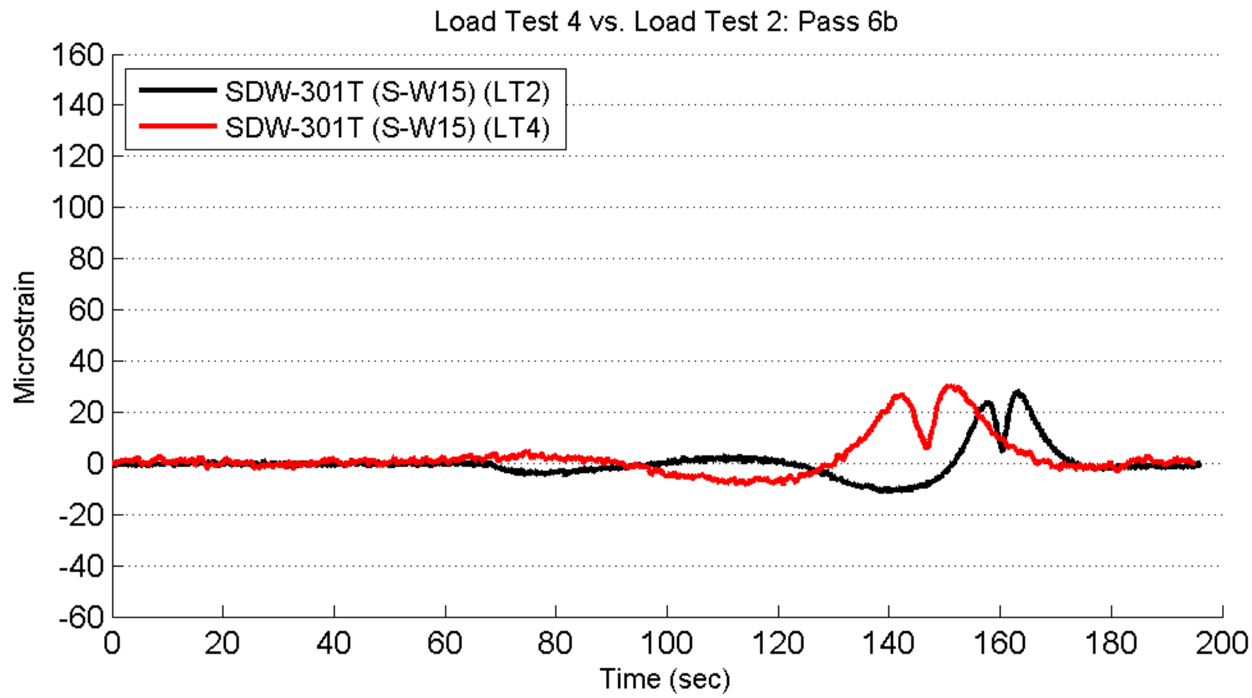


Figure G.7 West edge girder strain time history - section 301

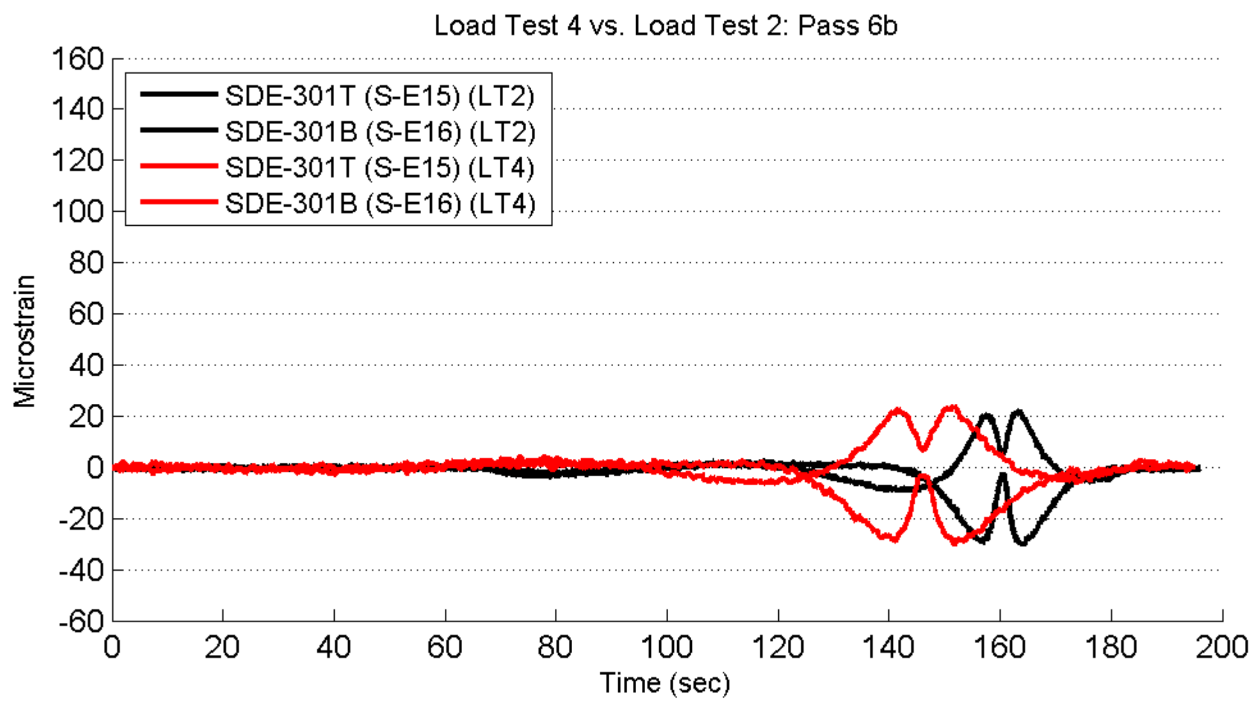


Figure G.8 East edge girder strain time history - section 301

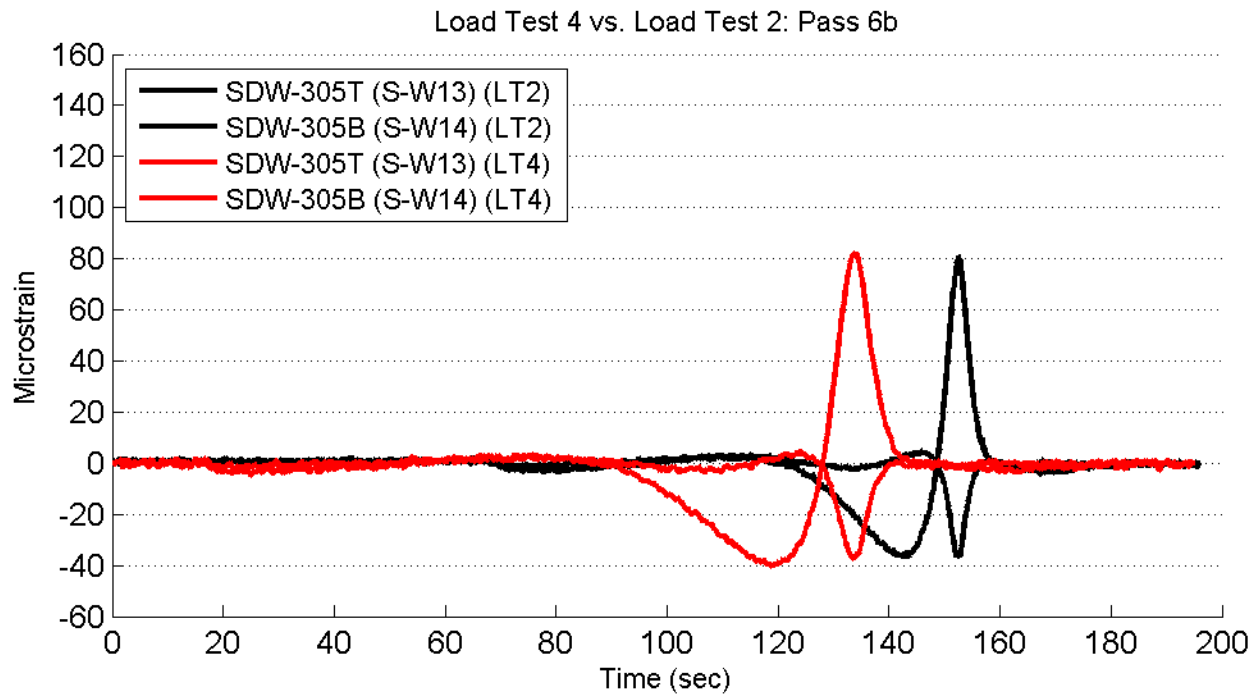


Figure G.9 West edge girder strain time history - section 305

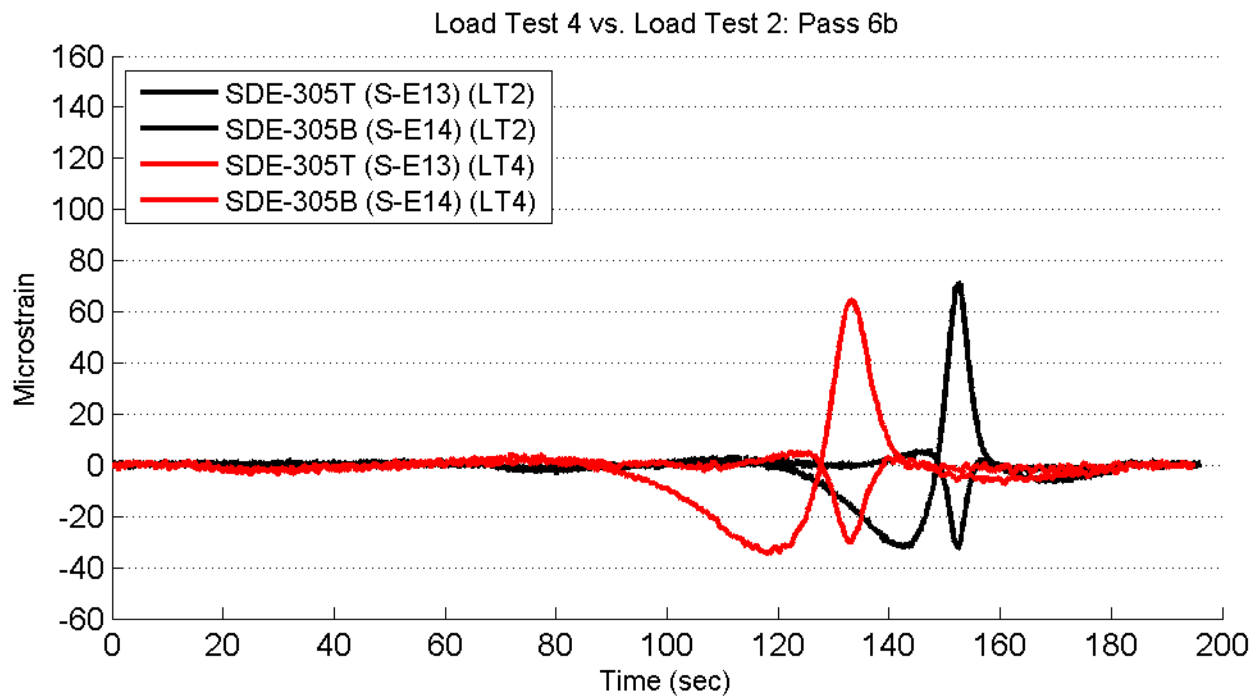


Figure G.10 East edge girder strain time history - section 305

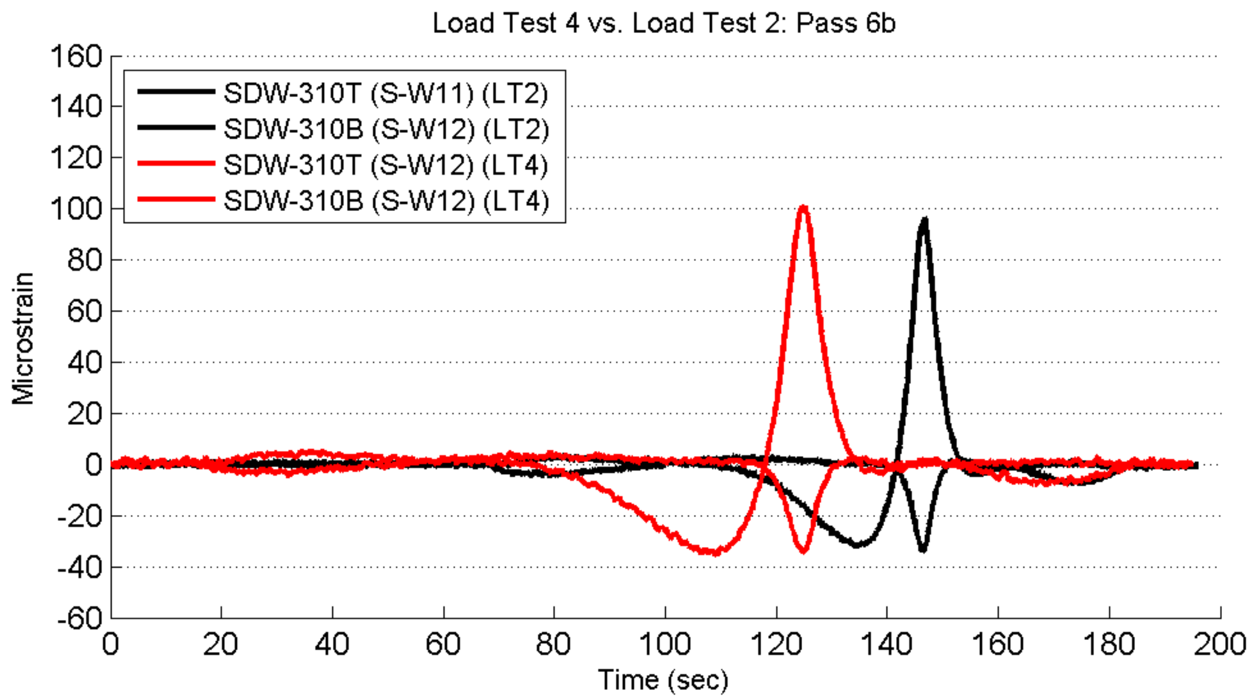


Figure G.11 East edge girder strain time history - section 310

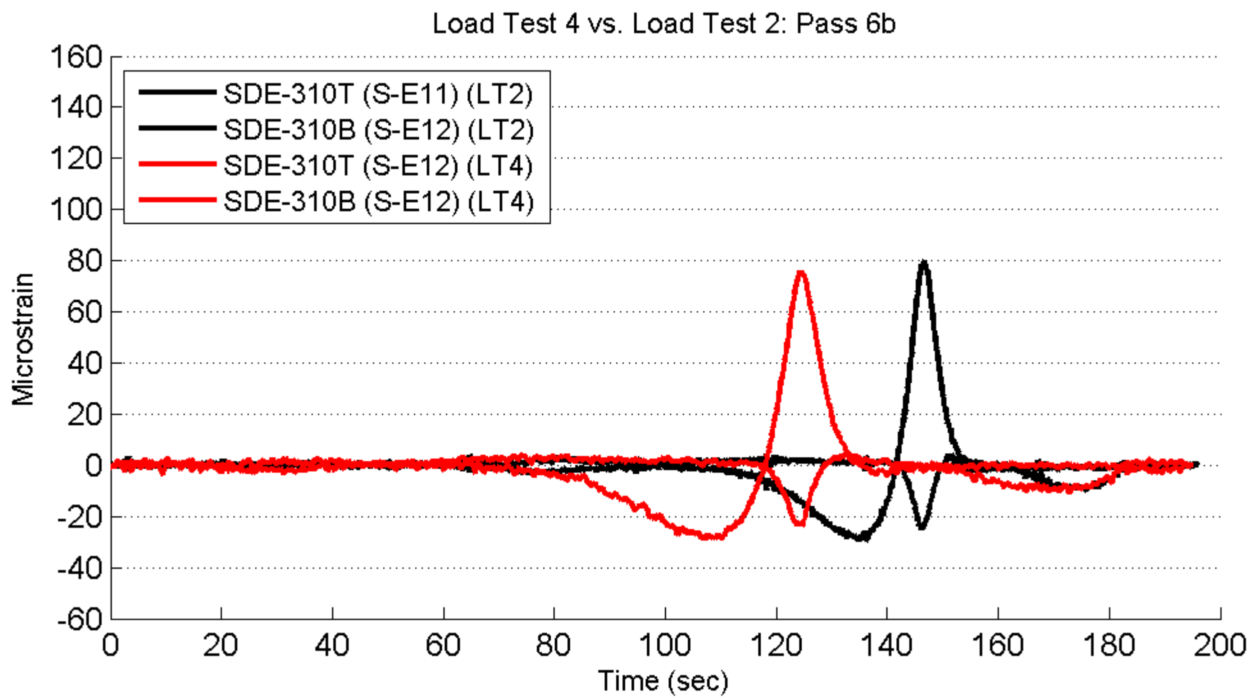


Figure G.12 East edge girder strain time history - section 310

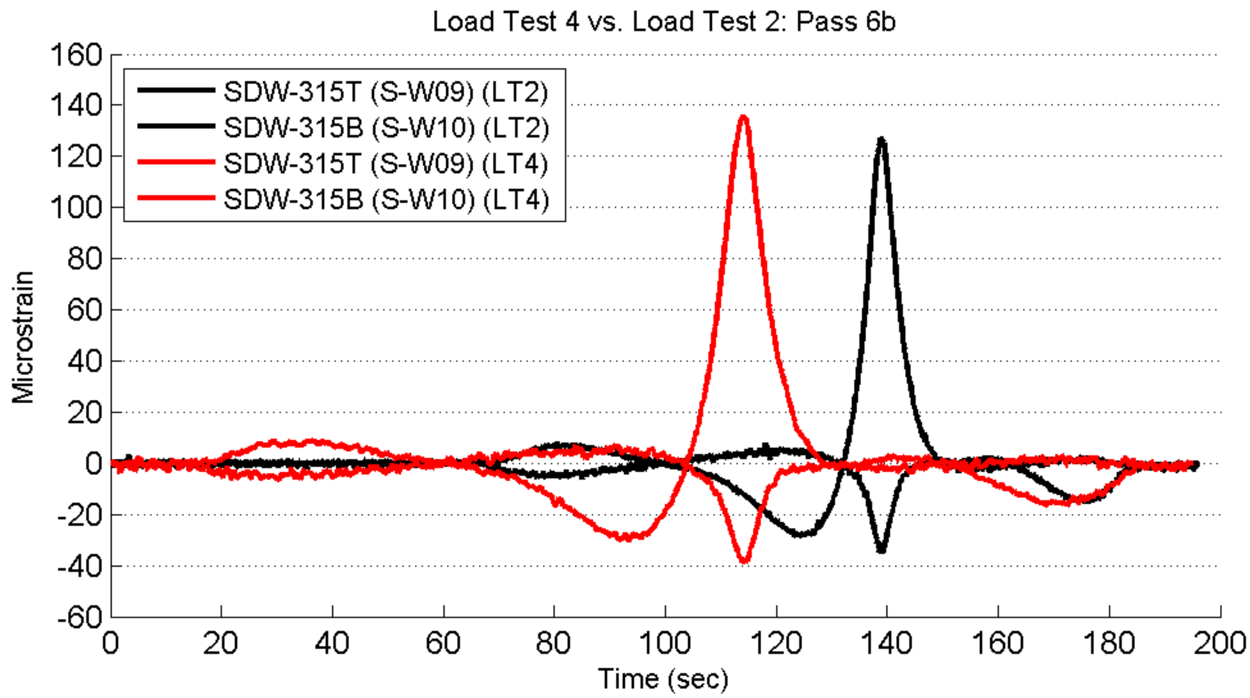


Figure G.13 West edge girder strain time history - section 315

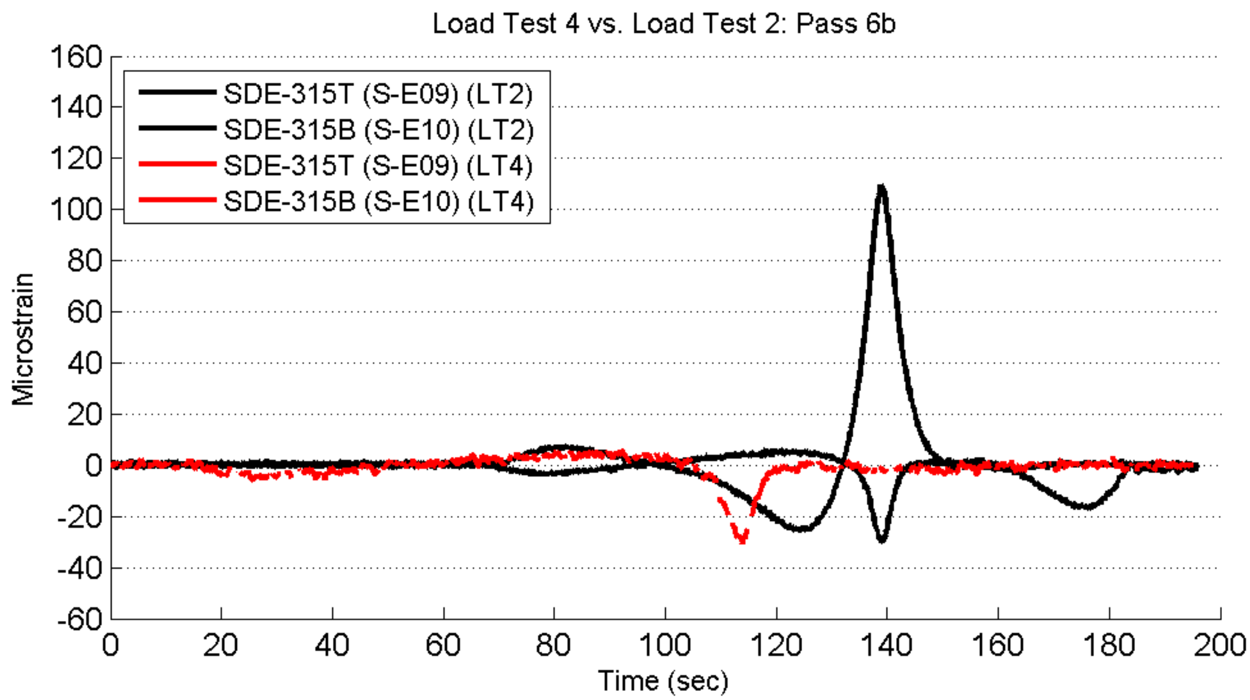


Figure G.14 East edge girder strain time history - section 315

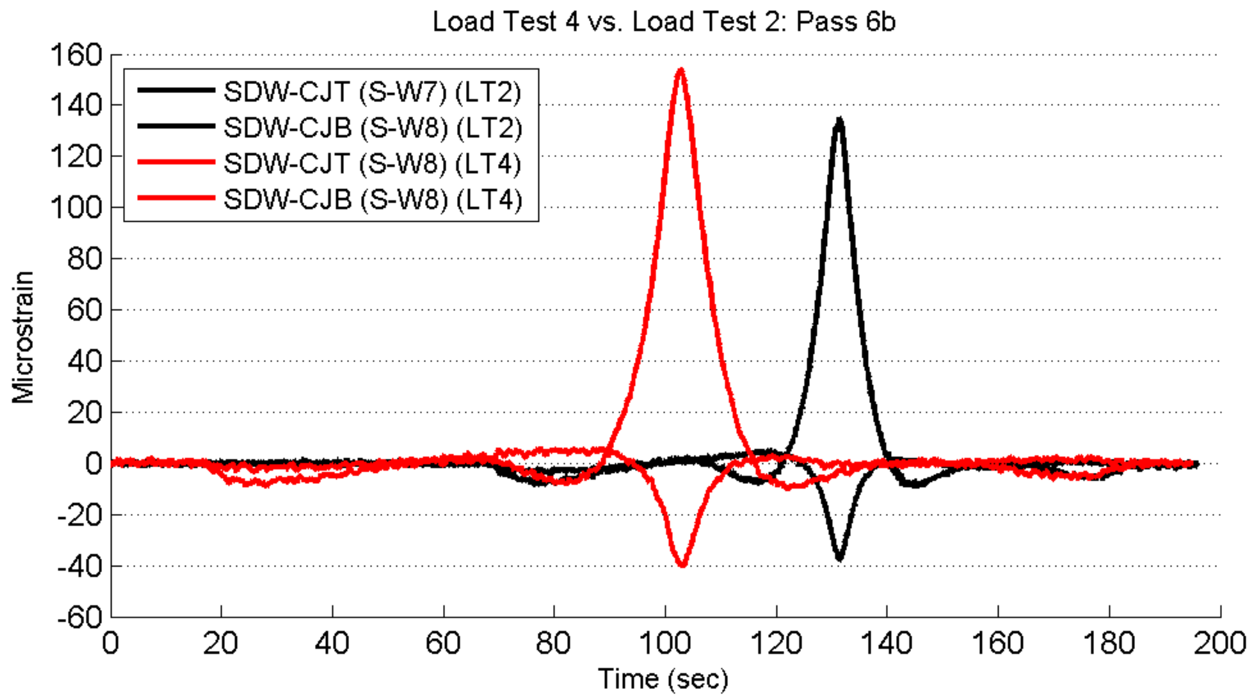


Figure G.15 West edge girder strain time history - closure joint

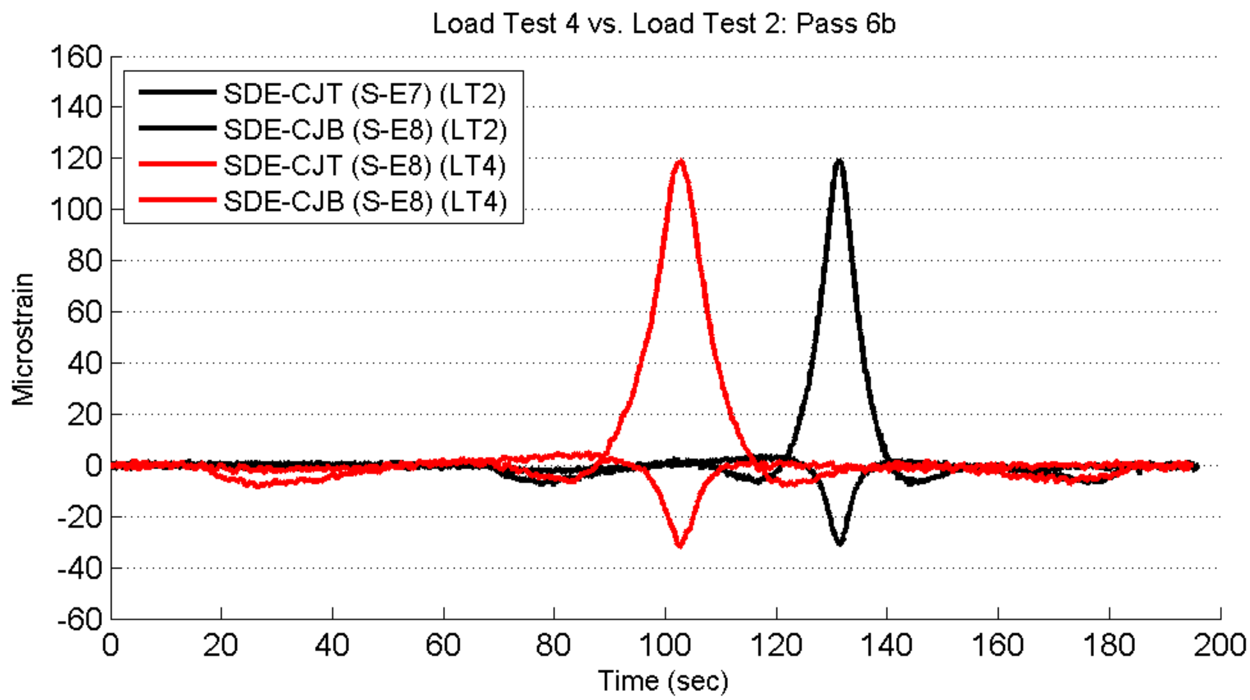


Figure G.16 East edge girder strain time history - closure joint

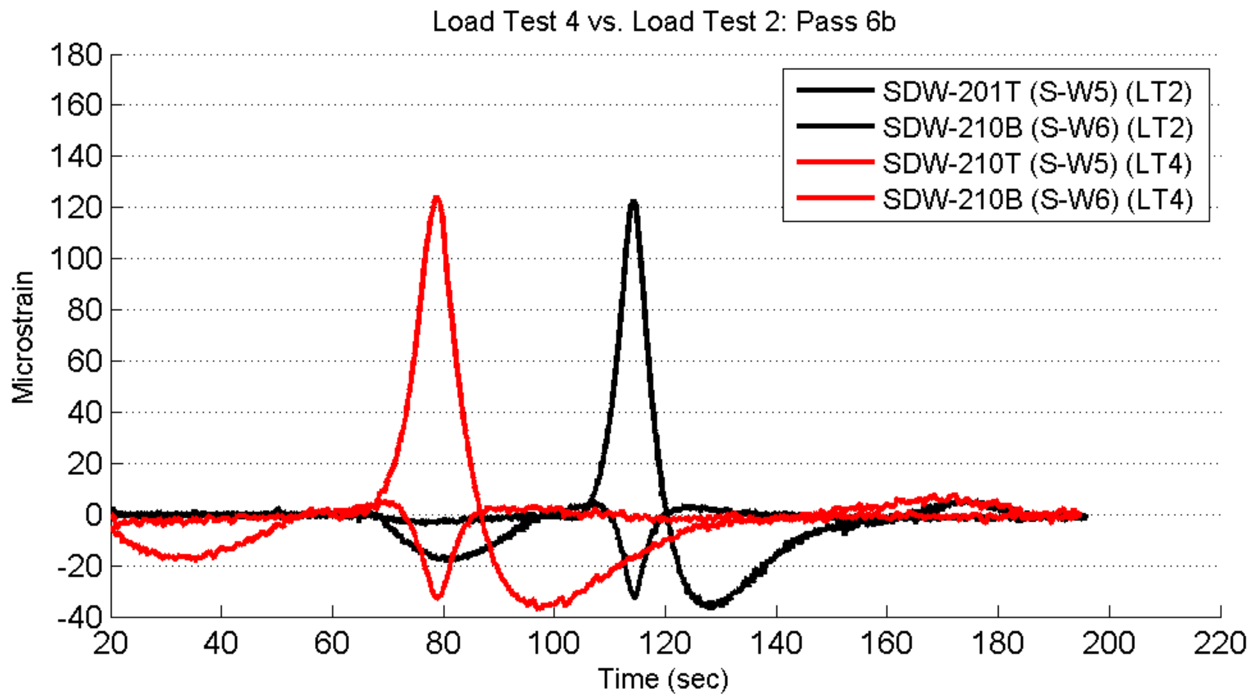


Figure G.17 West edge girder strain time history - section 210

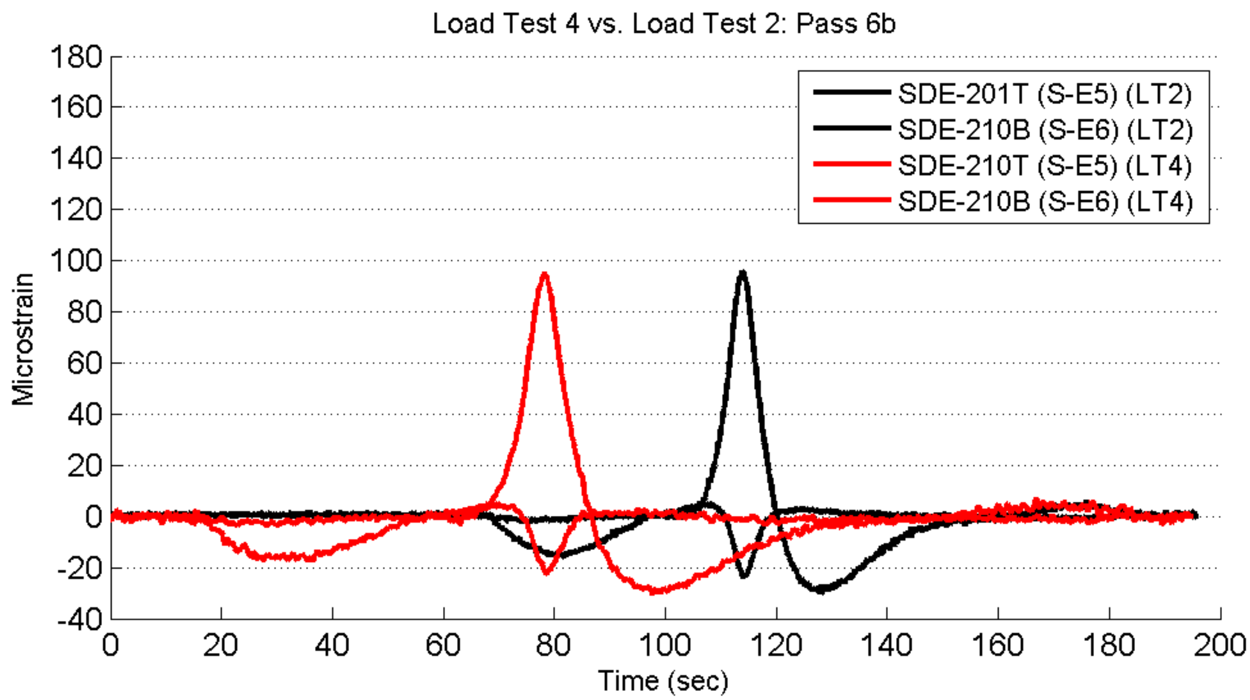


Figure G.18 East edge girder strain time history - section 210

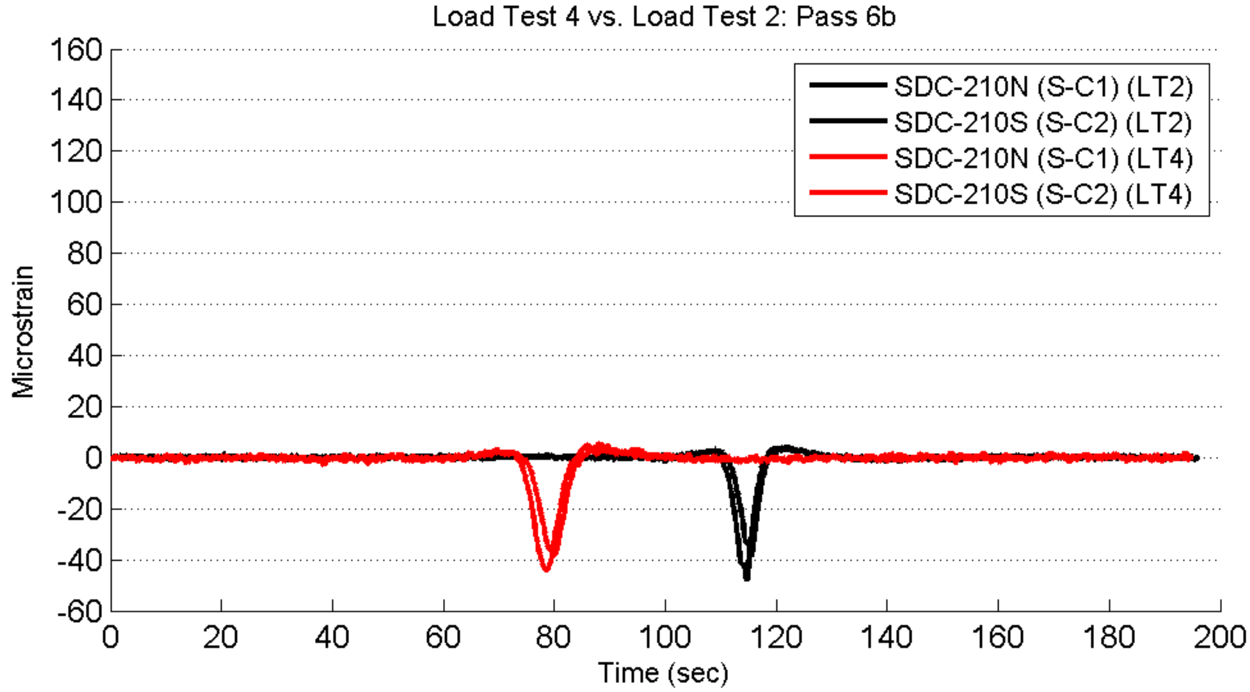


Figure G.19 Deck strain time history - section 210

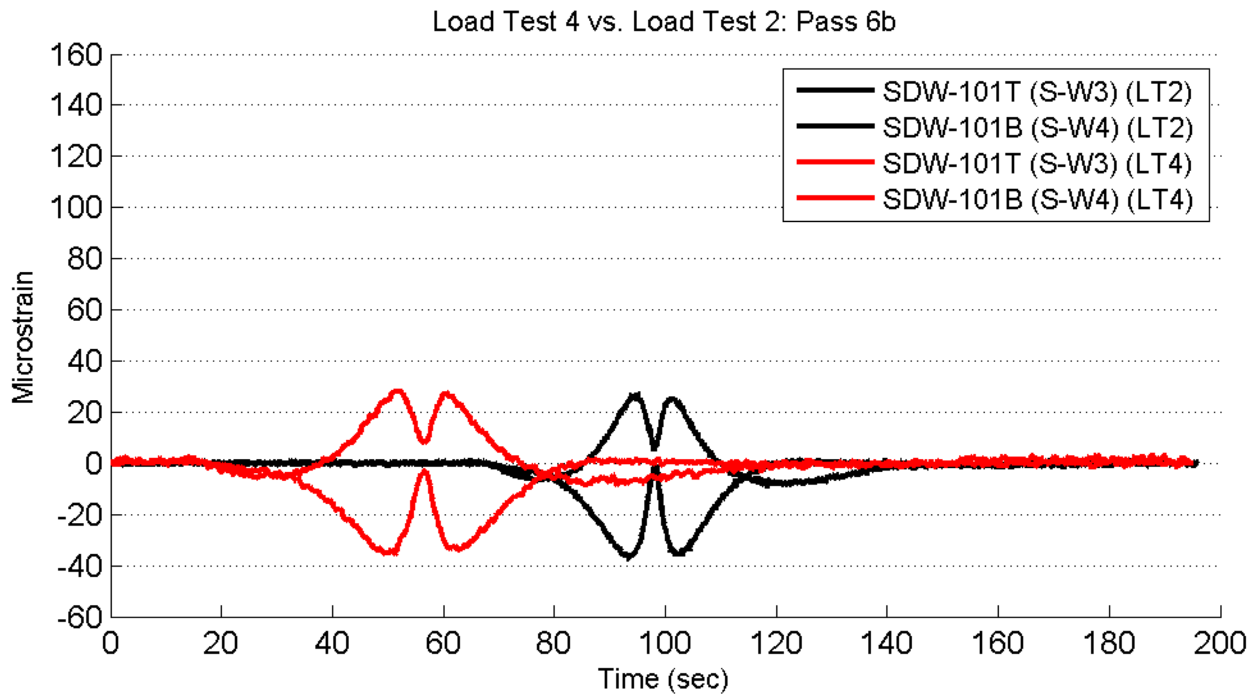


Figure G.20 West edge girder strain time history - section 101

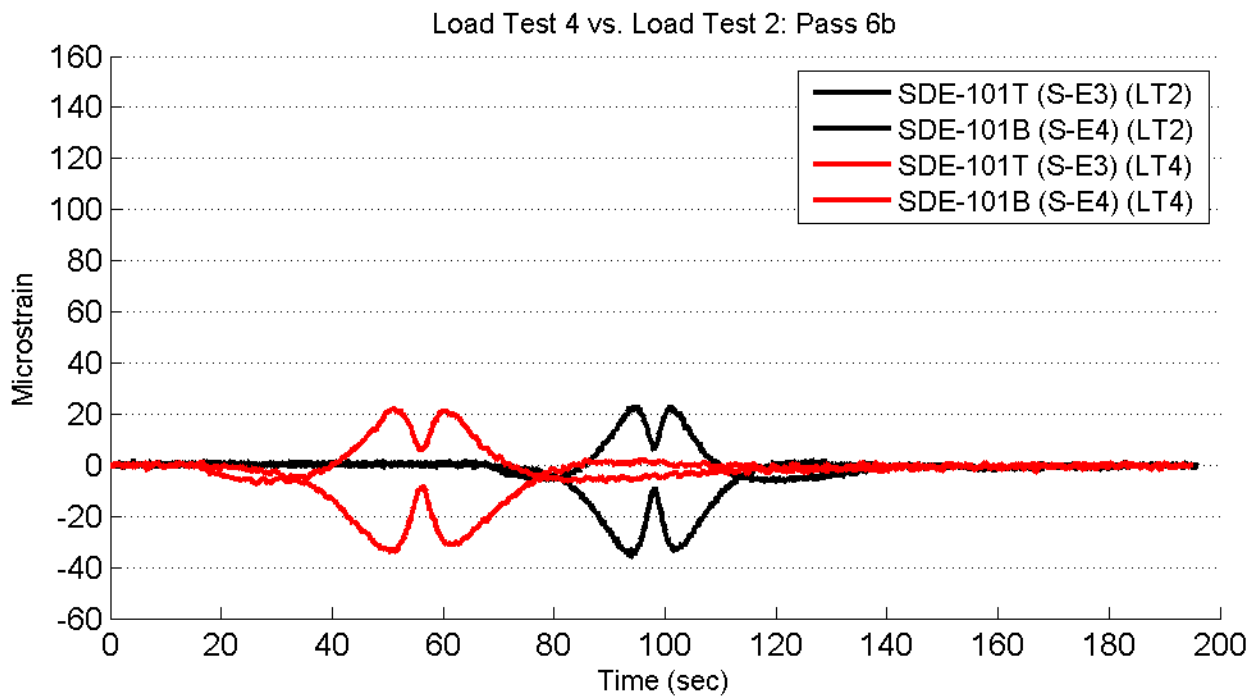


Figure G.21 East edge girder strain time history - section 101

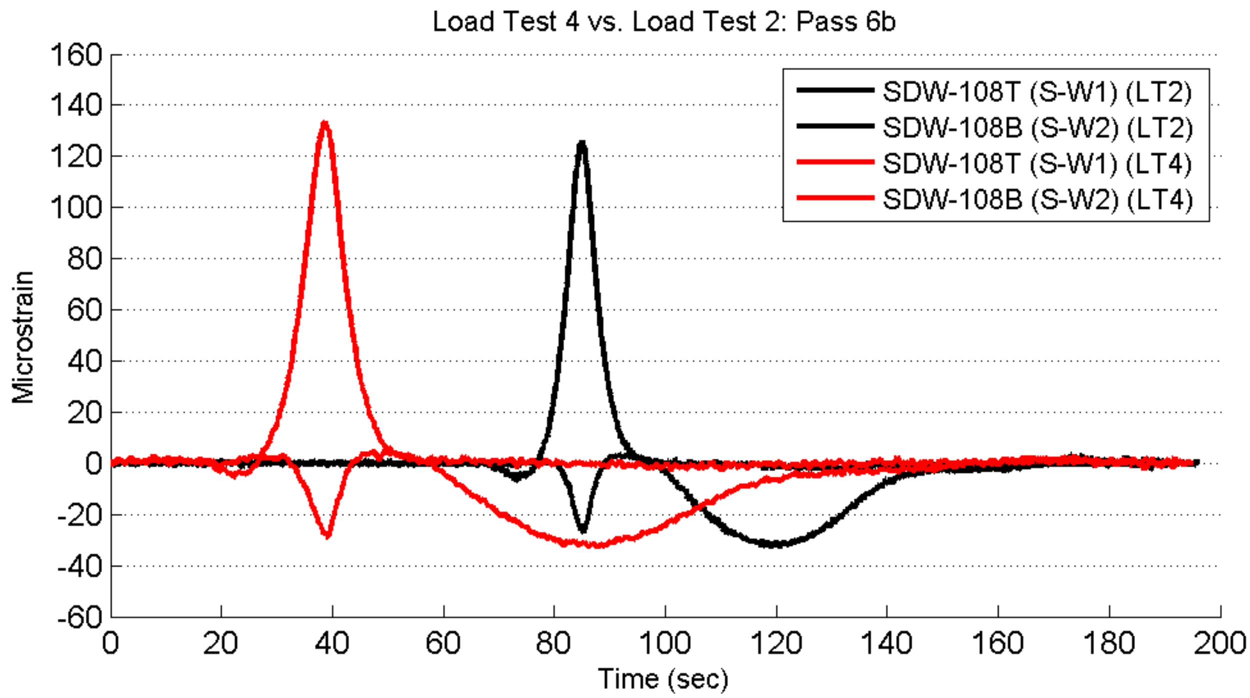


Figure G.22 West edge girder strain time history - section 108

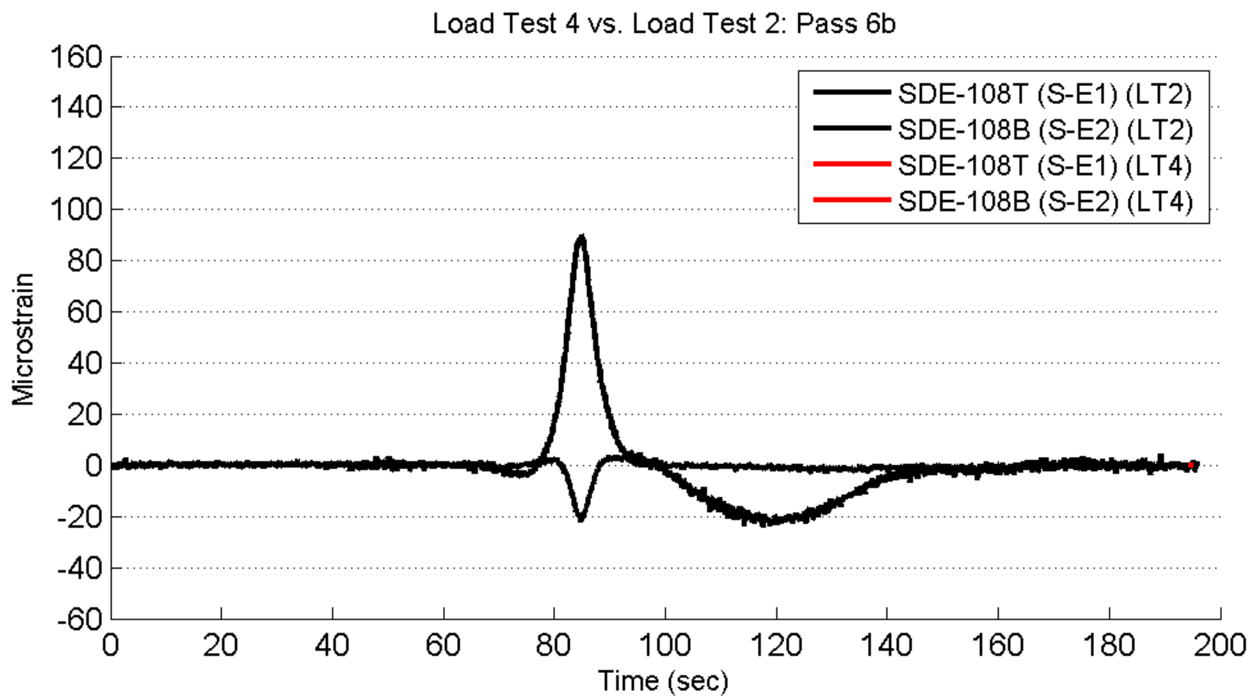


Figure G.23 East edge girder strain time history - section 108

No data

Figure G.24 Pylon 5 east strain time history - lift T4

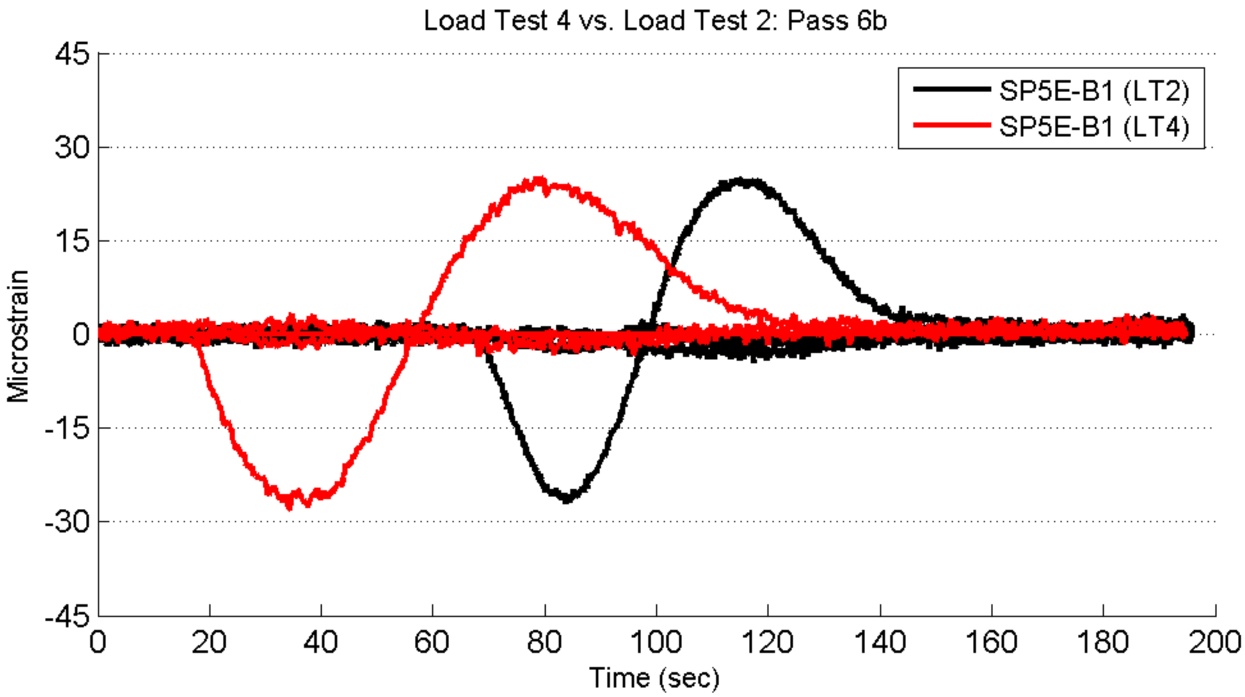


Figure G.25 Pylon 5 east strain time history - lift B1

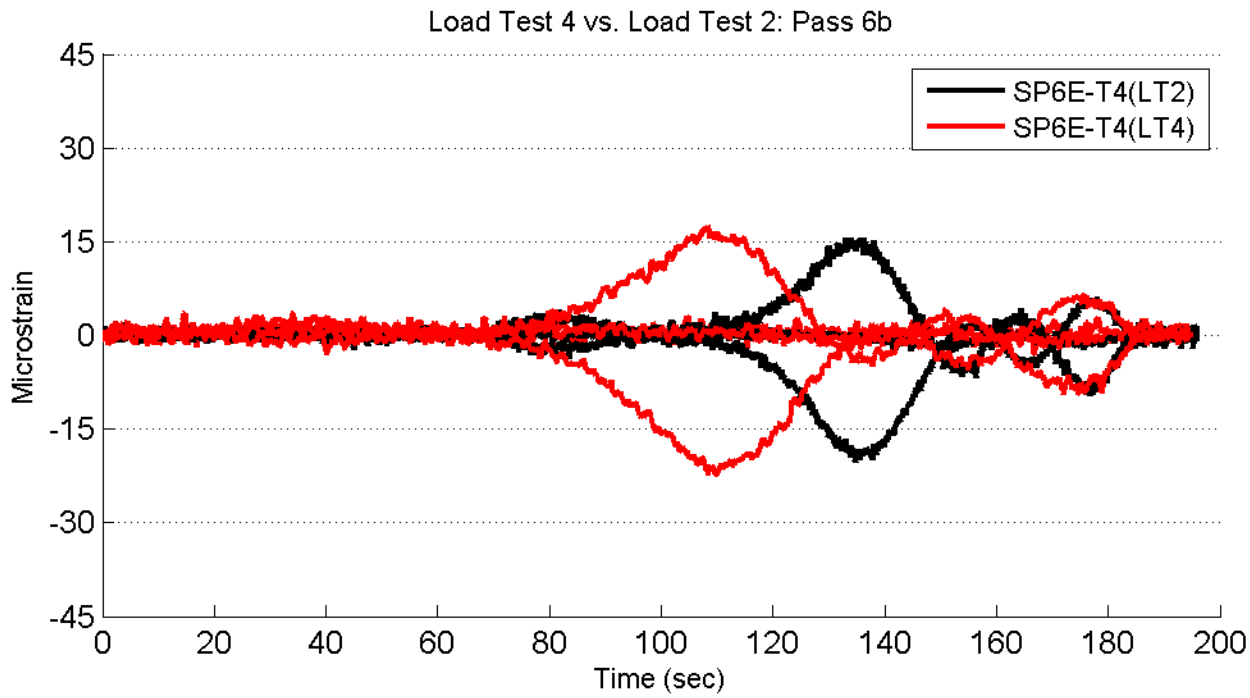


Figure G.26 Pylon 6 east strain time history - lift T4

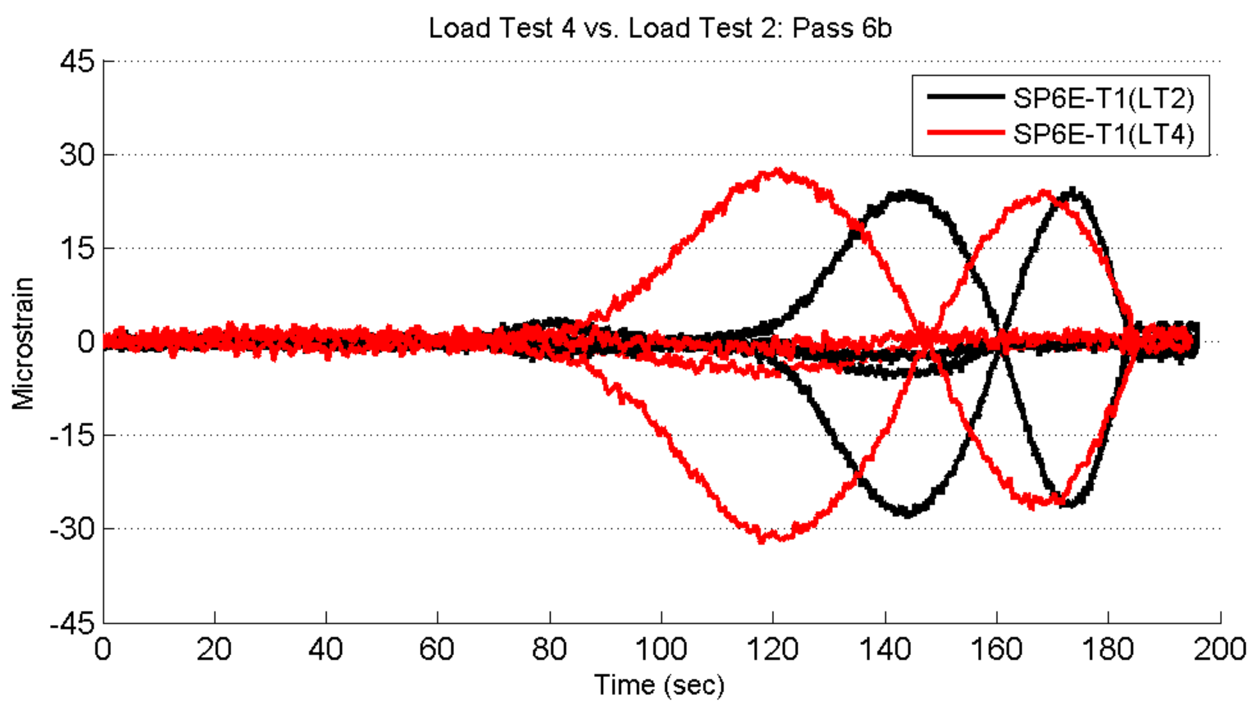


Figure G.27 Pylon 6 east strain time history - lift T1

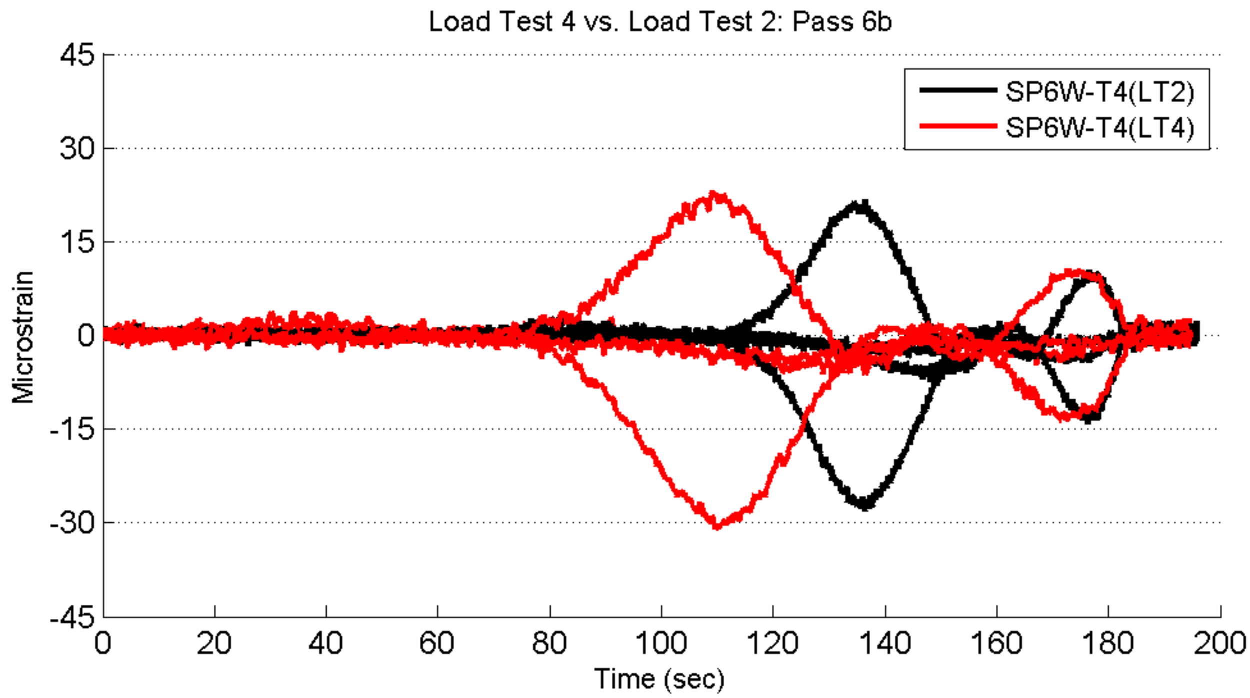


Figure G.28 Pylon 6 west strain time history - lift T4

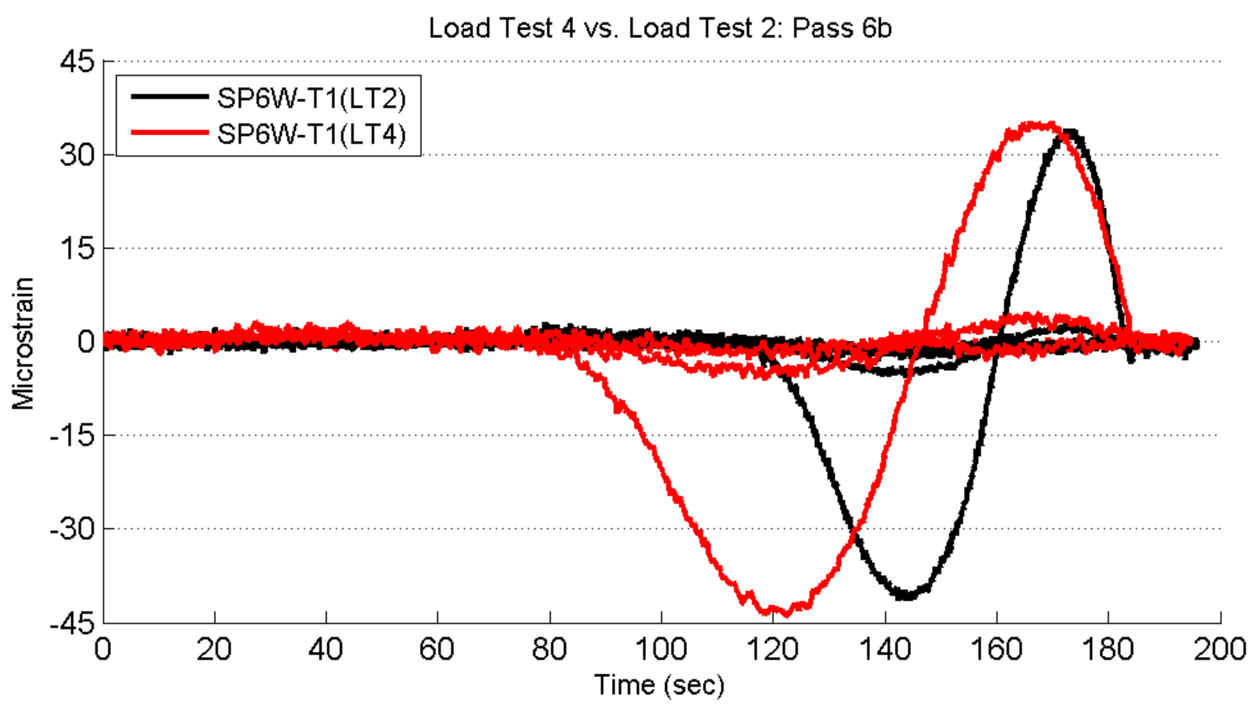


Figure G.29 Pylon 6 west strain time history - lift T1

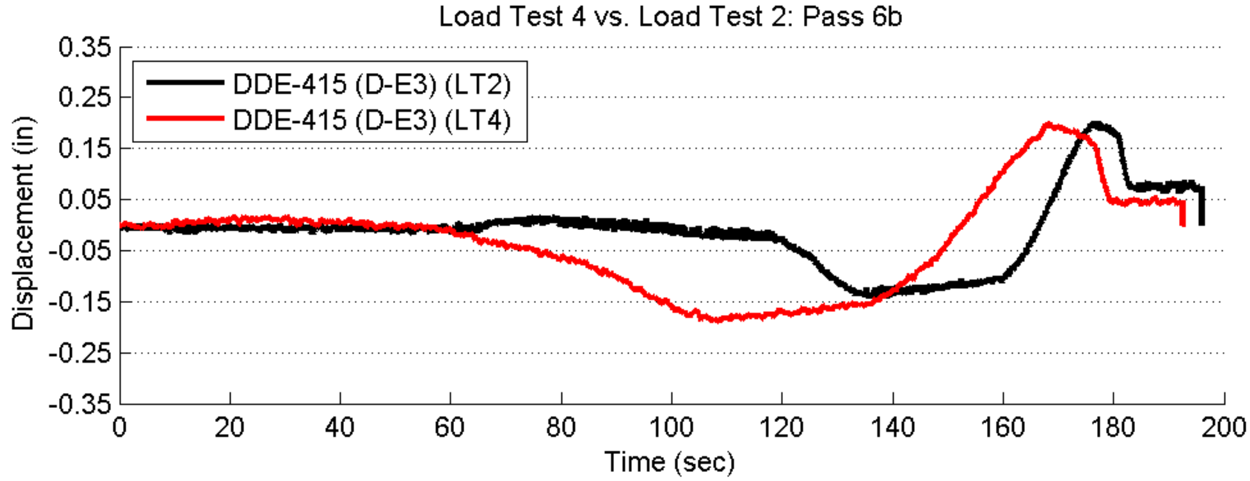


Figure G.30 Bearing displacement time history – north abutment

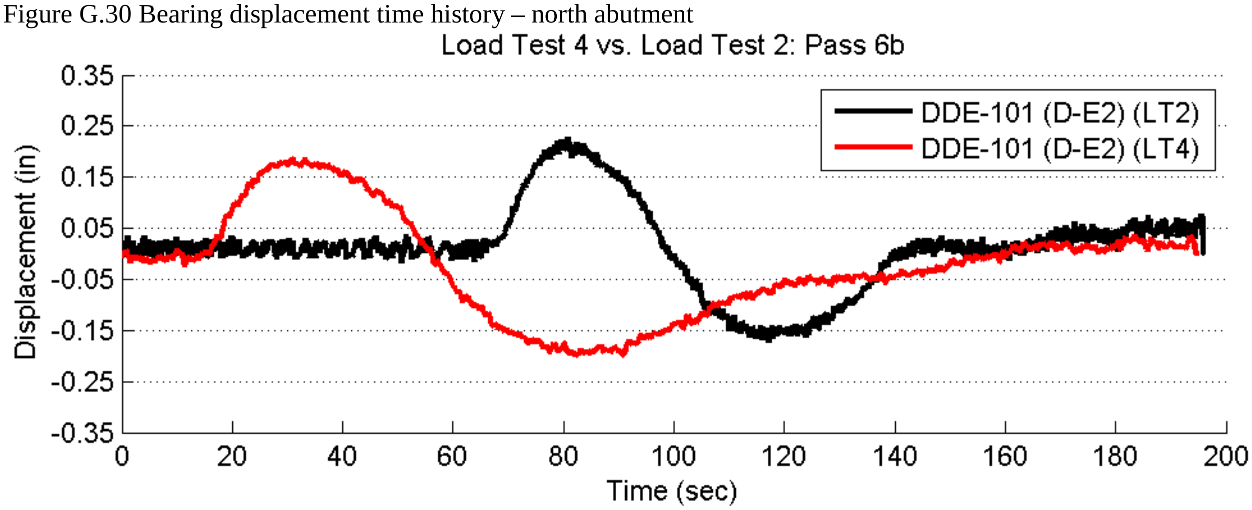


Figure G.31 Bearing displacement time history – pylon 5

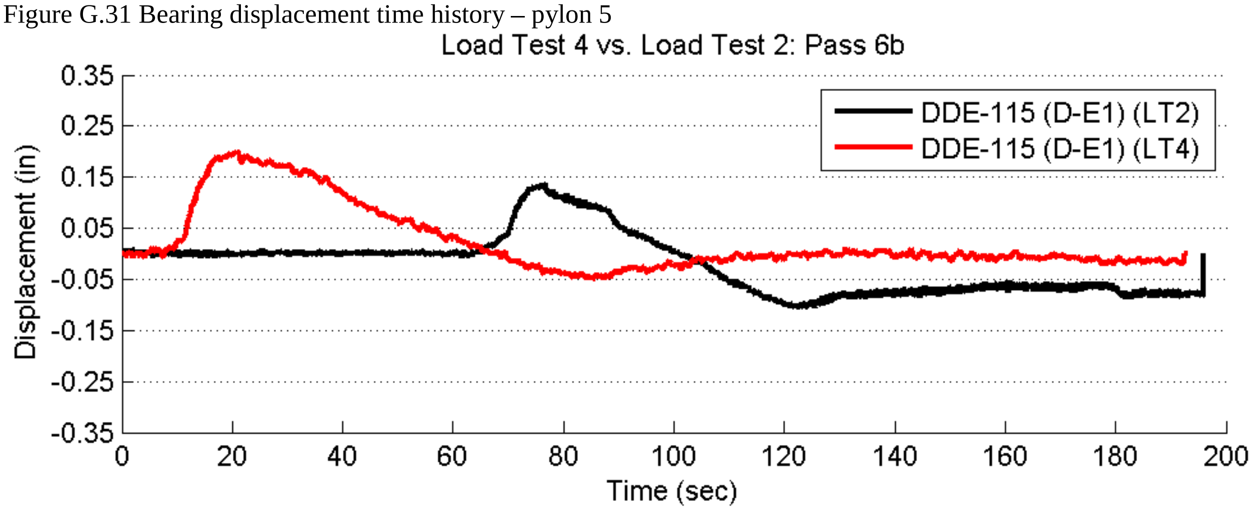


Figure G.32 Bearing displacement time history – south abutment

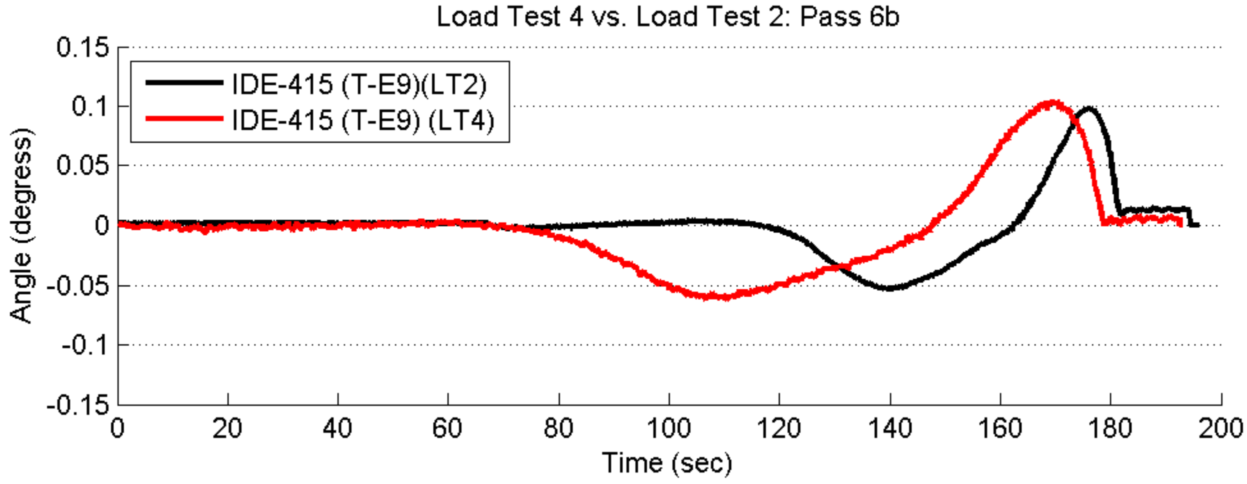


Figure G.33 Deck tilt time history - section 415

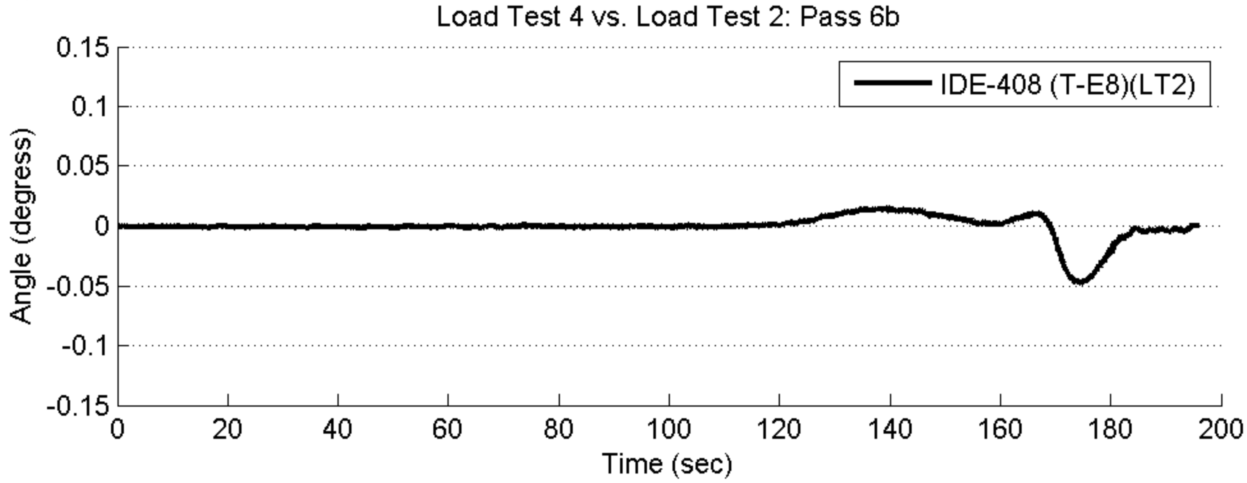


Figure G.34 Deck tilt time history - section 408

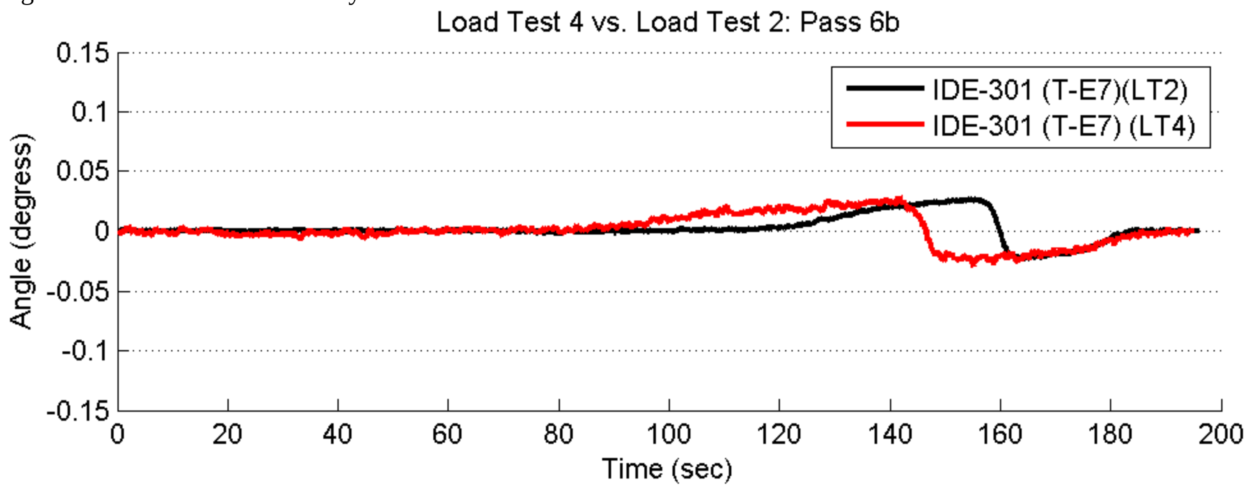


Figure G.35 Deck tilt time history - section 301

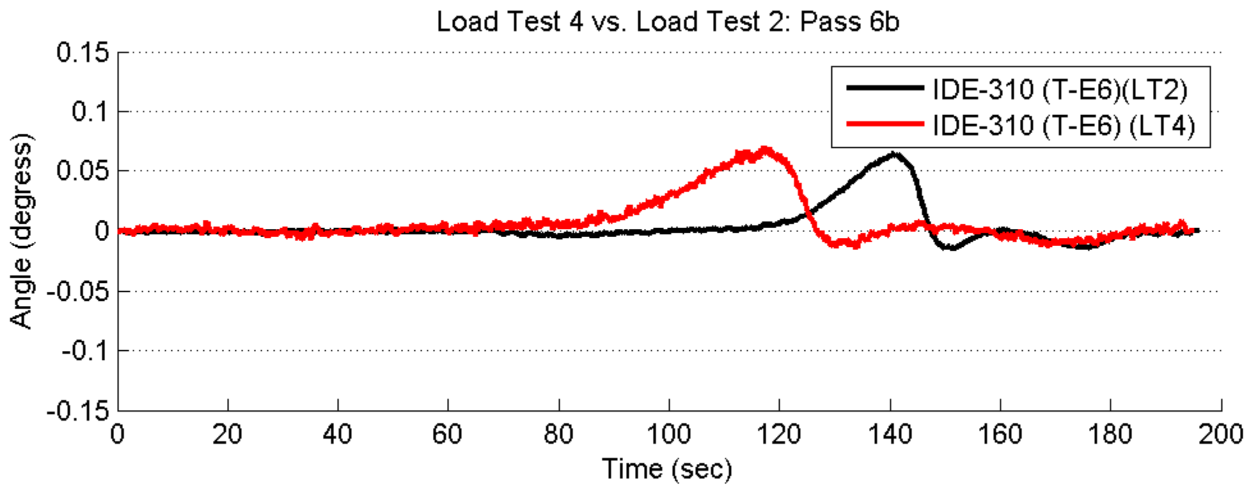


Figure G.36 Deck tilt time history - section 310

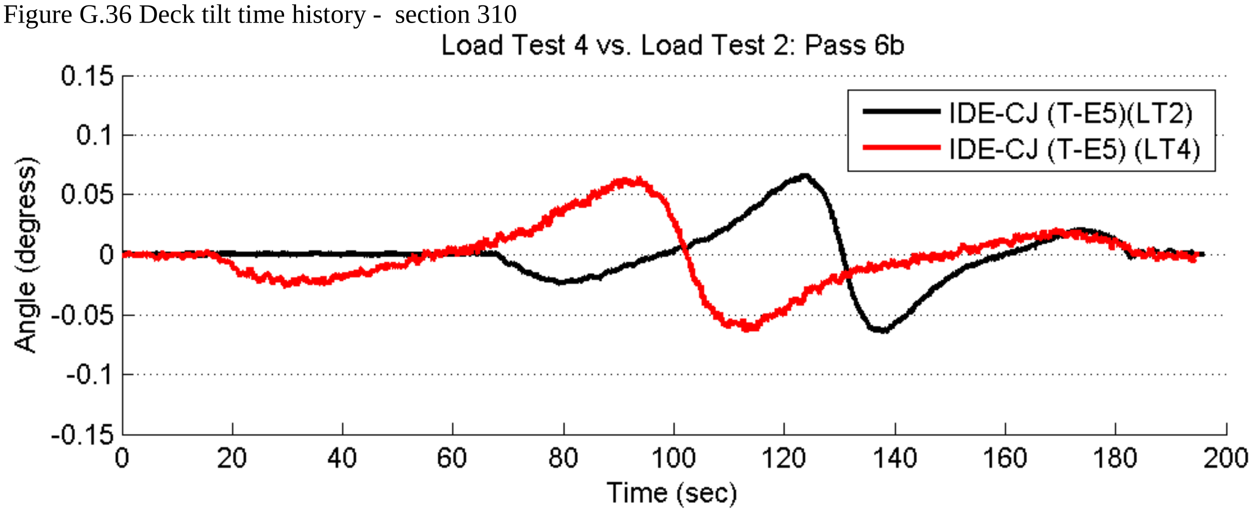


Figure G.37 Deck tilt time history - section closure joint

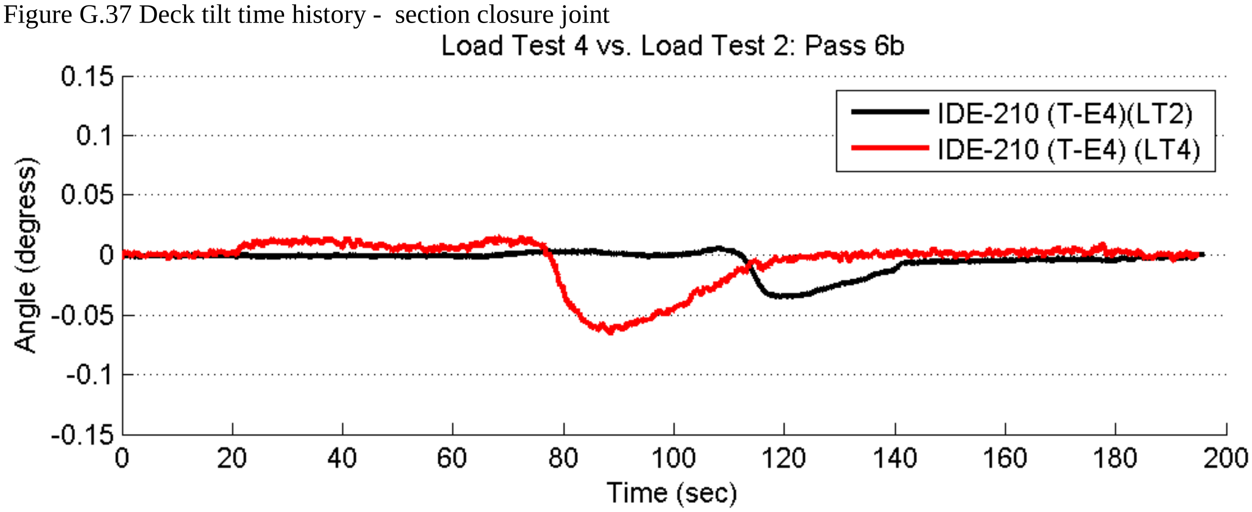


Figure G.38 Deck tilt time history - section 210

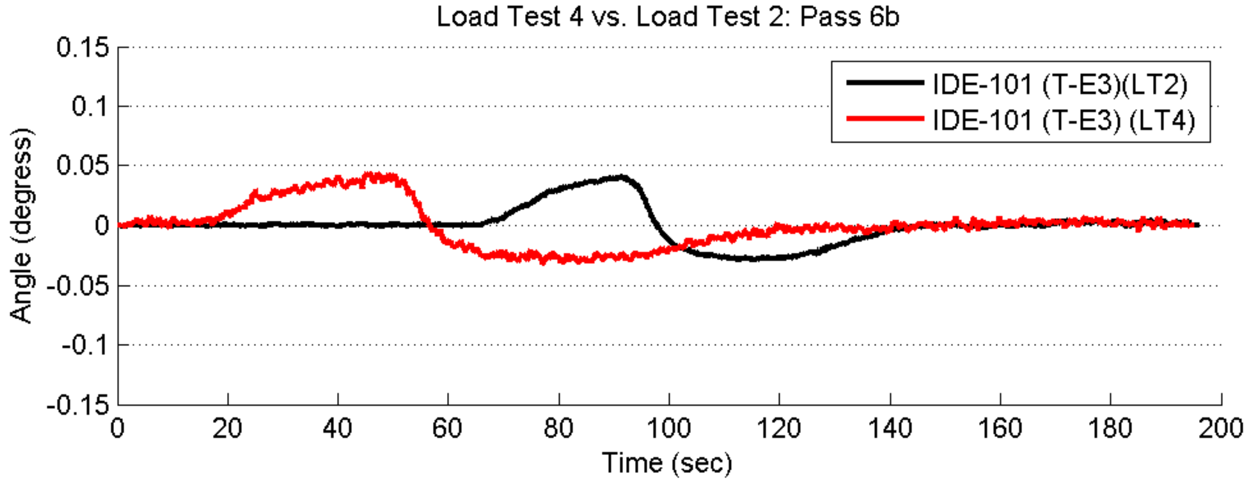


Figure G.39 Deck tilt time history - section 101

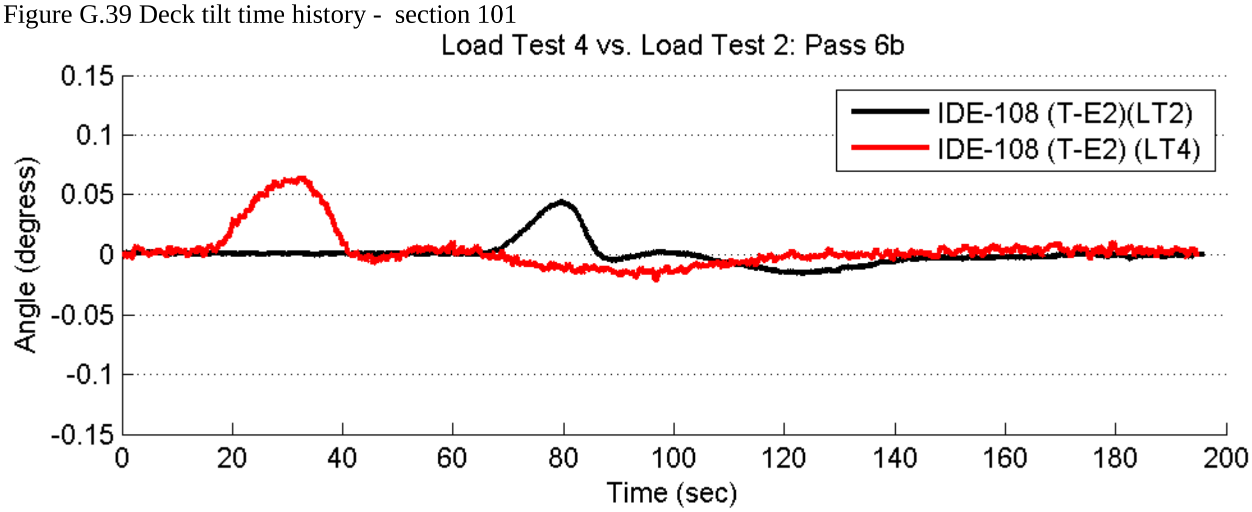


Figure G.40 Deck tilt time history - section 108

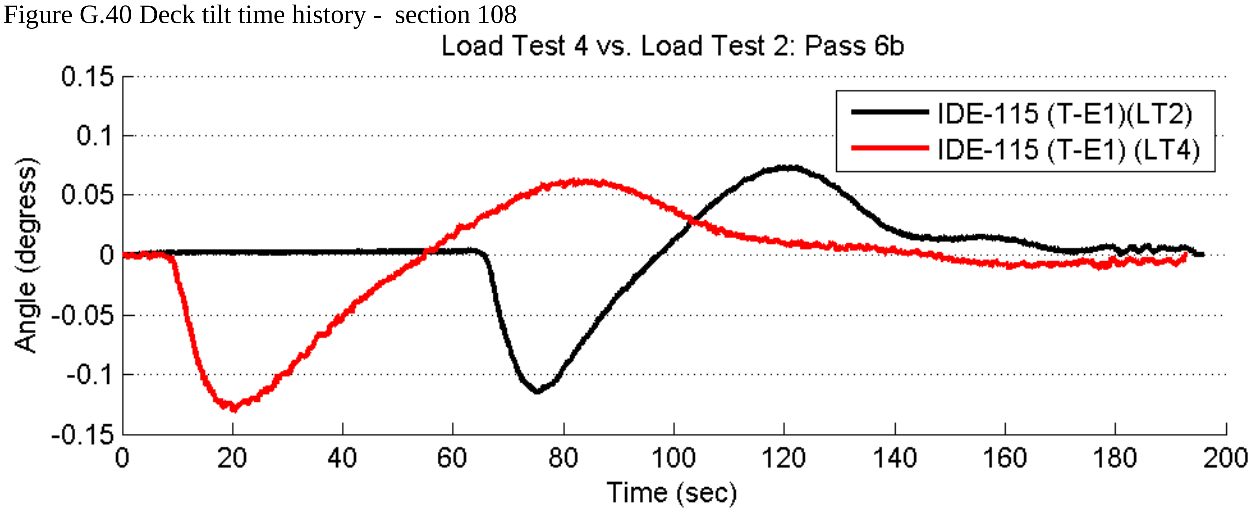


Figure G.41 Deck tilt time history - section 115

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