

**DEPARTMENT OF TRANSPORTATION**

DIVISION OF ENGINEERING SERVICES

Office of Structural Materials

Quality Assurance and Source Inspection



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Contract #: 04-0120F4Cty: SF/ALA Rte: 80 PM: 13.2/13.9File #: 1.28**WELDING INSPECTION REPORT****Resident Engineer:** Siegenthaler, Peter**Address:** 333 Burma Road**City:** Oakland, CA 94607**Report No:** WIR-019155**Date Inspected:** 06-Jan-2011**Project Name:** SAS Superstructure**OSM Arrival Time:** 630**Prime Contractor:** American Bridge/Fluor Enterprises, a JV**OSM Departure Time:** 1500**Contractor:** American Bridge/Fluor Enterprises, a JV**Location:** Job Site**CWI Name:** See Below**CWI Present:** Yes No**Inspected CWI report:** Yes No N/A**Rod Oven in Use:** Yes No N/A**Electrode to specification:** Yes No N/A**Weld Procedures Followed:** Yes No N/A**Qualified Welders:** Yes No N/A**Verified Joint Fit-up:** Yes No N/A**Approved Drawings:** Yes No N/A**Approved WPS:** Yes No N/A**Delayed / Cancelled:** Yes No N/A**Bridge No:** 34-0006**Component:** Orthotropic Box Girders**Summary of Items Observed:**

At the start of the shift the Quality Assurance Inspector (QAI) traveled to the project site and observed the following work performed by American Bridge/Fluor Enterprises (AB/F) personnel at the locations noted below:

- A). Lifting Lug Holes
- B). Field Splice W8/W9
- C). Deck Access Holes
- D). QC Inspection Request
- E). Pipe Supports
- F). QC Ultrasonic Testing
- G). Miscellaneous Tasks

## A). Lifting Lug Hole

The QAI observed the QC inspector perform the field fit-up of the weld joints identified as WN: 2W-PP15-W3, Weld No.'s W3 and W4 located along the grid line W3 of the OBG identified as W2. At the conclusion of the inspection the QC inspector accepted the fit-up and alignment of the weld joints. The welding was performed by the welder, Mike Jiminez ID-6471, utilizing the Shielded Metal Arc Welding (SMAW) process and the 4.0 mm, E7018 H4R electrode as per the Welding Procedure Specification (WPS) ABF-WPS-D15-1070A, Rev. 1. The WPS was also utilized by the QC inspector, Mike Johnson, as a reference to monitor the welding and to verify the welding parameters. The QC verification of the welding parameters was observed by the QAI and recorded as 215 amps and the minimum preheat temperature of 60 degrees Celsius and the maximum interpass temperature of 230

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## WELDING INSPECTION REPORT

( Continued Page 2 of 5 )

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degrees Celsius was also verified by the QAI. The welding was performed in the flat (1G) position with the weld joint in an approximately horizontal plane and the weld metal deposited from the upper side. The CJP welding was completed not during this shift and appeared to comply with contract specifications.

The QAI also observed the welder, Darcel Jackson ID-9967, perform the Complete Joint Penetration (CJP) groove welding of the Lifting Lug Hole (LLH) identified as WN: 3W-PP20-W4-Weld No. 1, 2 and 3 located along the grid line W4 of the OBG identified as W2. The welding was performed utilizing the Shielded Metal Arc Welding (SMAW) process and the 4.8 mm, E7018 H4R electrode as per the Welding Procedure Specification (WPS) ABF-WPS-D15-1070A, Rev. 1. The WPS was also utilized by the QC inspector, Mike Johnson, as a reference to monitor the welding, verify the welding parameters and to inspect the field fit-up. The QC verification of the welding parameters was observed by the QAI and recorded as 246 amps and the minimum preheat temperature of 60 degrees Celsius and the maximum interpass temperature of 230 degrees Celsius was also verified by the QC inspector. The welding conducted during this shift was performed in the flat (1G) position with the work in an approximately horizontal plane and the weld metal deposited from the upper side of the weld joint. The welding was not completed during this shift and appeared to be in compliance with the contract specifications.

### B). Field Splice W8/W9

The QAI observed the excavation of the unacceptable discontinuities on the deck plate field splice identified as WN: 8W-9W-A, repair cycle # R1. The rejectable discontinuities were discovered during the Ultrasonic Testing (UT) performed by the QC technician, Patrick Swain. The discontinuities appeared to travel in the longitudinal direction of the weld axis. The excavations of the rejected areas was performed by the welder Wai Kitlai ID-2953 utilizing a high cycle grinder to remove the defects and a rotary file to bring the excavated area into compliance with the Weld Procedure Specification (WPS) ABF-WPS-D15-1001 Repair, Rev. 0. At the conclusion of the excavations the QAI observed the QC inspector, Mr. Swain, performed a visual inspection and a Magnetic Particle Test (MPT) of the excavated areas and no rejectable indications were noted. At the conclusion of the VT and MPT, the welder commenced the welding of the repairs. The welding was performed by Mr. Kitlai utilizing the Shielded Metal Arc Welding (SMAW) process as per the WPS which was also utilized by the QC inspector, Gary Erhsam, to monitor the welding and to verify the DC welding parameters. The QC inspector verified the DC welding parameters as 185 amps and the minimum preheat temperature of 40 degrees Celsius and the maximum interpass temperature of 230 degrees Celsius appeared to comply with the contract documents. The welding was performed in the flat (1G) position utilizing a 4.0 mm low hydrogen electrode. The welding of the repairs were not completed during the scheduled shift.

The QAI observed the Shielded Metal Arc Welding (SMAW) process of the edge plate field splice identified as Weld No. (WN): 8W-9W-B1. The welding was performed by Hua Qiang Hwang ID-2930 utilizing the Welding Procedure Specification (WPS) ABF-WPS-D15-1110A, Rev. 1. The WPS was also used by the Quality Control (QC) Inspector Gary Erhsam as a reference to verify the Direct Current Electrode Positive (DCEP) welding parameters and to monitor the Complete Joint Penetration (CJP) welding. Later in the shift, the QAI also observed the QC inspector verifying the welding parameters and were noted as 152 amps. The minimum preheat temperature of 20 degrees Celsius and the maximum interpass temperature of 230 degrees Celsius appeared to comply with contract documents. The welding was performed in the vertical (3G) position with the work placed in an approximately vertical plane with the groove approximately vertical.

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## WELDING INSPECTION REPORT

( Continued Page 3 of 5 )

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The QAI also observed the Flux Cored Arc Welding (FCAW-G) of the side plate field splice identified as Weld No. (WN): 8W-9W-E1 and E2. The Complete Joint Penetration (CJP) groove welding was performed by welding personnel Song Tao Huang utilizing the Welding Procedure Specification (WPS) ABF-WPS-D15-3042B-1 Rev. 0. The WPS was also used by the Quality Control (QC) Inspector Fred Van Huff as a reference when performing QC verification of the Direct Current Electrode Positive (DCEP) welding parameters during the CJP welding. The groove joint appeared to comply with the AWS joint designation identified as B-U2a. The QAI also observed the QC inspector verify the average welding parameters and were observed as follows: 255 amps, 23.7 volts and a travel speed measured at 270 mm/minute. The minimum preheat temperature of 60 degrees Celsius and the maximum interpass temperature of 230 degrees Celsius were also verified by the QC inspector and appeared to be in compliance with the contract documents.

### C). Deck Access Hole at WN: 8W-PP70.5-W5-SE

The QAI observed the welder, Jorge Lopez ID-6149, perform the CJP welding of the Deck Access Hole- Insert Plate (DAH-IP) identified as Weld Number (WN): 8W-PP70.5-W5-SE located on the "A" deck of the Orthotropic Box Girder (OBG) W8. The welding was performed utilizing the SMAW process as per the Welding Procedure Specification (WPS) ABF-WPS-D15-1110, Rev. 1. The WPS was also utilized by the QC inspector, Fred Von Huff, as a reference to monitor the welding and to verify the welding parameters which was recorded as 120 amps by the QC inspector. The 3.2 mm low hydrogen electrode, E7018 H4R, was utilized with the welding performed in the overhead (4G) position with the work placed in an approximately horizontal plane with the weld metal deposited from the under side of the groove joint. The minimum preheat temperature of 60 degrees Celsius and the maximum interpass temperature of 230 degrees Celsius were verified by the QC inspector. The welding was not completed during this shift and appeared to comply with the contract documents.

### D). QC Inspection Request

At the request of Quality Control Field Supervisor, Bonifacio Daquinag, the QAI randomly verified the QC visual inspection of the Complete Joint Penetration (CJP) welding of the following longitudinal stiffeners; WN: 5E-PP31-E3-W2 and W3, WN: 5E-PP31-E3-W1, W2, W3 and W4. The QAI verification was performed to verify that the welding and visual weld inspection performed by the QC inspector meet the requirements of the contract documents. At the conclusion of the QAI verification it appeared that the welds and the QC inspection complies with the contract documents.

### E). Pipe Supports

The QAI observe the on going installation, field welding of the pipe supports along the W5 grid line located on the "A" deck of the OBG's identified as W7, W8 and W9. The QC inspection was performed by Mike Johnson utilizing the Welding Procedure Specification (WPS) identified as Fillet Murex to monitor the tack welding and to verify the welding parameters. The welding parameters were observed and recorded as 92 amps utilizing 2.4 mm electrodes with the welding performed in the 2F and 3F position. The tack welding was performed by Rick Kiikvee ID-5319 and David Garcia ID-8789.

### F). QC Ultrasonic Testing

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## WELDING INSPECTION REPORT

( Continued Page 4 of 5 )

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The QAI observed the Ultrasonic Testing (UT) of the R1 repairs on the Deck Access Hole (DAH) identified as WN: 6E-PP46.5-E5-SE. The testing was performed by the QC technician Steve McConnell utilizing a G.E./Krautkramer USM 35X. The examination of the repairs was conducted utilizing UT Procedure identified as SE-UT-D1.5-CT-100 Rev.4 and the applicable contract documents. The QC technician performed the required longitudinal wave technique, utilizing a 25.4mm diameter transducer, to perform the examination for base metal soundness and the shear wave technique for the examination of weld soundness which was performed utilizing a 16mm x 19mm rectangular transducer. At the conclusion of the testing no rejectable indications were noted by the QC technician.

Later in the shift, the QAI also observed the Ultrasonic Testing (UT) of the R1 repairs on the Deck Access Hole (DAH) identified as WN: 6W-PP46.5-W5-SE. The testing was performed by the QC technician John Pagliero utilizing a G.E./Krautkramer USM 35X. The examination of the repairs was conducted utilizing UT Procedure identified as SE-UT-D1.5-CT-100 Rev.4 and the applicable contract documents. The QC technician performed the required longitudinal wave technique, utilizing a 25.4mm diameter transducer, to perform the examination for base metal soundness and the shear wave technique for the examination of weld soundness which was performed utilizing a 16mm x 19mm rectangular transducer. At the conclusion of the testing no rejectable indications were noted by the QC technician.

### G). Miscellaneous Task

This QAI also performed a review and update of the project progress utilizing QA field reports and NDT reports. The updated project information was documented into the various QA tracking logs.

### QA Observation and Verification Summary

The QA inspector observed the QC activities and the welding of the field splices utilizing the WPS as noted above, which appeared to be posted at the weld station. The welding parameters and surface temperatures were verified by the QC inspector and utilizing a Fluke 337 clamp meter for the electrical welding parameters and a Fluke 63 IR Thermometer for verifying the preheat and interpass temperatures. The ESAB consumables utilized for the SMAW welding process appeared to comply with the AWS Specification and AWS Classification. The QC inspection, testing and welding performed on this shift appeared to be in general compliance with the contract documents. At random intervals, the QAI verified the QC inspection, testing, welding parameters and the surface temperatures utilizing various inspection equipment and gages which included a Fluke 337 Clamp Meter and Tempilstik Temperature indicators.

The digital photographs on page 5 of this report illustrate some of the work observed during this scheduled shift.

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# WELDING INSPECTION REPORT

( Continued Page 5 of 5 )

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## Summary of Conversations:

There were general conversations with Quality Control Inspector Bonifacio Daquinag, Jr. at the start of the shift regarding the location of American Bridge/Fluor welding, inspection and N.D.E. testing personnel scheduled for this shift.

## Comments

This report is for the purpose of determining conformance with the contract documents and is not for the purpose of making repair or fit for purpose recommendations. Should you require recommendations concerning repairs or remedial efforts please contact Nina Choy 510-385-5910, who represents the Office of Structural Materials for your project.

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<b>Inspected By:</b>	Reyes, Danny	Quality Assurance Inspector
<b>Reviewed By:</b>	Levell, Bill	QA Reviewer

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