

**DEPARTMENT OF TRANSPORTATION**

DIVISION OF ENGINEERING SERVICES

Office of Structural Materials

Quality Assurance and Source Inspection



Bay Area Branch  
690 Walnut Ave. St. 150  
Vallejo, CA 94592-1133  
(707) 649-5453  
(707) 649-5493

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-016640**Date Inspected:** 01-Sep-2010**Project Name:** SAS Superstructure**OSM Arrival Time:** 1000**Prime Contractor:** American Bridge/Fluor Enterprises, a JV**OSM Departure Time:** 1830**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). OBG E1, Field Welding of Erection Access Insert Plates
- B). Field Splice E3/E4, "A" Deck Stiffeners
- C). Field Splice E4/E5
- D). Field Splice E5/E6
- E). Field Splice W1/W2, "A" Deck Stiffeners

A). OBG E1, Field Welding Erection Access Insert Plates

The QAI observed the Shielded Metal Arc Welding (SMAW) of the erection access hole insert plate identified as Weld Number (WN): 1E-PP11-E3-W1 on the "A" deck of the Orthotropic Box Girder (OBG) E1. The welder James Zhen ID-6001 performed the welding of the root to covers on the Complete Joint Penetration (CJP) utilizing the Welding Procedure Specification (WPS) ABF-WPS-D15-1050A, Rev. 1. The WPS was also utilized by the QC inspector William Sherwood as a reference to monitor the welding and verify the Direct Current Electrode Positive (DCEP) welding parameters which was recorded as 175 amps by the QC inspector. The 4.0mm Lincoln electrode was utilized with the welding performed in the flat (1G) position with the work placed in an approximately horizontal plane and the weld metal deposited from the upper side. The groove joint appeared to comply with the AWS joint designation identified as B-U4a. The minimum preheat temperature of 20 degrees Celsius and the maximum interpass temperature of 230 degrees Celsius were verified by the QC inspector. The

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Welding of the "A" face was completed during this shift.

Later in the shift the QAI observed the welder, Mr. Zhen, welding the root pass of the CJP groove weld identified as 1E-PP9.5-E3-W2 utilizing the 3.2 mm electrode as per the WPS. The QAI verified the welding parameters at 119 amps.

The QAI also observed the Overhead (O.H.) welding of the weld joint identified as 1E-PP11-E3-W1 performed by Jin Pei Wang ID-7299. The welder utilized the SMAW welding process as per the WPS identified as ABF-WPS-D15-1110-B to perform the CJP groove welding. The WPS was also utilized by the QC inspector John Pagliero to monitor the welding and verify the welding parameters which were observed by the QAI and recorded by the QC inspector as 120 amps. Later in the shift the QC inspector performed a visual inspection of the welding and minor weld repair was marked and noted by the QC inspector. The areas marked were repaired and followed by grinding. At the conclusion of the repair work the QC inspector performed the inspection of these areas and no additional repair work was noted. The QAI concurs with the QC inspector's assessment.

### B). Field Splice E3/E4, "A" Deck Stiffeners

The QAI observed the welder, Hua Qiang Hwang ID-2930, perform the Complete Joint Penetration (CJP) groove welding on the longitudinal stiffener field splice identified as WN: 3E-4E-A-LS2. The welder utilized the SMAW process as per the Welding Procedure Specification (WPS) identified as ABF-WPS-D15-1012-3, Rev.0 and was also utilized by the QC inspector John Pagliero as a reference. The amperage was recorded as 126 amps and the minimum preheat of 100 degrees Celsius and the maximum interpass temperature of 230 degrees Celsius was verified.

At the conclusion of the welding on the "A" face, the welder Hua Qiang Hwang, performed the back grinding on the "B" side of the weld joint to a bright metal in preparation for the visual inspection and the Magnetic Particle Testing (MPT). The application and evaluation of the MPT appeared to comply with the MPT procedure identified as SE-MT-CT-D1.5-101 Rev. 4. The MPT was performed by Salvador Moreno and no rejectable indications were noted. At the conclusion of the testing the welder commence the CJP welding of the weld joint utilizing the Shielded Metal Arc Welding (SMAW) process and 3.2mm electrode as per the WPS identified as ABF-WPS-D15-1012-3, Rev. 0. The WPS was also used by the QC inspector, Mr. Pasqualone as a reference to monitor and verify the Direct Current welding parameters and were noted as 127 amps. The welding was performed in the vertical position (3G) with the work positioned approximately in the vertical plane with the groove approximately vertical and the weld progression up.

### C). Field Splice E4/E5

The QAI observed Fred Kaddu ID-2188 perform the repair welding of the areas previously marked during QC visual inspection on the side and bottom plates Complete Joint Penetration (CJP) groove welds identified as WN: 4E-5E-C, D and E. The repair welding was performed utilizing the Shielded Metal Arc Welding (SMAW) process and the 3.2mm electrode as per the Welding Procedure Specification (WPS) identified as ABF-WPS-1000 Repair Rev. 2. The WPS was also used by the QC inspector, Steve McConnell, as a reference to monitor and verify the Direct Current welding parameters and were noted as 125 amps. The welding was performed in the flat (1G) and the vertical (3G) position with the work positioned approximately in the vertical plane, in regards to the side plates,

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with the groove approximately vertical and the weld progression up. In regards to the bottom plate, the work was positioned approximately in the horizontal plane with the weld metal deposited from the upper side.

### D). Field Splice E5/E6

The QAI observed continued the Ultrasonic Testing (UT) on the side plate field splice identified as WN: 5E-6E-D1 and D2. The testing was performed by the QC technician Steve McConnell utilizing a G.E. /Krautkramer USM 35X and the UT Procedure identified as SE-UT-D1.5-CT-100 Rev.4. The QC technician performed the required longitudinal testing for base metal soundness and shear wave testing for weld soundness which was performed utilizing a 16mm x 19mm rectangular transducer. The testing was not completed during this shift.

### E). Field Splice W1/W2, "A" Deck Stiffeners

The QAI observed the welder, Wai Kit Lai ID-2953, correcting the excessive root openings on the longitudinal stiffener field splices identified as WN: 1W-2W-A-LS1 through LS3. The measured dimensions of the root openings appeared to be 12mm to 19mm.

The QAI also observed a second welder, Wao Xin Liang ID-7238, correcting the excessive root openings on the longitudinal stiffener field splices identified as WN: 1W-2W-A-LS4 through LS6. The measured dimensions of the root openings appeared to be 9mm to 15mm.

The welders utilized the Shielded Metal Arc Welding (SMAW) process as per the Welding Procedure Specification (WPS) identified as ABF-WPS-D15-1012-3, Rev.0 and was also utilized by the QC inspector Tom Pasqualone as a reference to monitor the welding and verify the welding parameters. The amperages were recorded as 123 amps and 122 amps accordingly and the minimum preheat of 100 degrees Celsius and the maximum interpass temperature of 230 degrees Celsius were also verified.

The welding was performed in the vertical (3G) position with the work placed in an approximately vertical plane and the groove approximately vertical. The welders utilized slag hammers, pneumatic air gun with an attached chisel and a wire wheels attached to a 4" high cycle grinders to remove slag after deposit of each fill pass. The electrodes were stored in electrically heated, thermostatically controlled oven after removal from sealed containers. The exposure limits of the electrodes identified as E9018-H4R and the minimum storage oven temperature of 250 degrees Celsius appeared to be in compliance with the contract documents. At the time of the observation no issues were noted by the QAI.

### 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 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

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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 below illustrate the work observed during this scheduled shift.



### Summary of Conversations:

There were general conversations with Quality Control Inspector Bonifacio Daquinag, Jr. and Mike Johnson 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 Mohammad Fatemi (916) 813-3677, who represents the Office of Structural Materials for your project.

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