

**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-023959**Date Inspected:** 26-May-2011**Project Name:** SAS Superstructure**OSM Arrival Time:** 700**Prime Contractor:** American Bridge/Fluor Enterprises, a JV**OSM Departure Time:** 1930**Contractor:** American Bridge/Fluor Enterprises, a JV**Location:** Job Site**CWI Name:** Pat Swain**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:** Tower**Summary of Items Observed:**

This Quality Assurance (QA) Inspector, Craig Hager was on site at the job site between the times noted above. This QA Inspector was on site to randomly observe Quality Control (QC) personnel perform Non-Destructive Testing (NDT) and monitor American Bridge/Fluor (ABF) welding operations. This Quality Assurance (QA) Inspector, Craig Hager observed the following.

This QA Inspector observed ABF personnel working at the 9 meter level in an effort to weld the external diaphragm plates to the various shear plates and tower skin plates. This QA Inspector observed the following during the shift noted above.

This QA Inspector observed ABF personnel were in the process of setting up the induction preheating equipment at weld joints #55 and #56 at approximately 0730 hours. The induction heating blankets were placed at the South end of each weld joint. At approximately 0900 hours QC Inspector Pat Swain informed this QA Inspector the minimum preheat temperature of 225°F had been obtained. This QA Inspector verified the preheat temperature using an electronic temperature gauge.

This QA Inspector observed ABF welding personnel Jin Quan Huang (#9340) was setting up the Flux Cored Arc Welding (FCAW) equipment to begin welding on weld joint #55.

This QA Inspector observed ABF welding personnel Wai Kitlai (#2953) was setting up FCAW equipment to begin welding on weld joint #56.

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At approximately 0945 hours FCAW began at both weld joints. This QA Inspector observed as QC Inspector Pat Swain verified the following welding parameters; Jin Quan Huang (#9340) - 280 amperes and 25.2 volts at a travel speed of 464 mm per minute to produce a heat input of 0.91 Kj per mm and Wai Kitlai (#2953) - 278 amperes and 25.3 volts at a travel speed of 520 mm per minute to produce a heat input of 0.81 Kj per mm. These parameters appeared to comply with Welding Procedure Specification (WPS) ABF-WPS-D15-3160-1.

This QA Inspector observed QC Inspector Pat Swain perform a visual and Magnetic Particle Testing (MT) on the root pass of each weld joint. QC Inspector Pat Swain informed this QA Inspector he had accepted both inspections of both welds. This QA Inspector observed the MT inspection also included the ground cascaded end of the previous weld length. This QA Inspector performed a random visual verification of the root pass. The work observed appeared to comply with the contract requirements.

This QA Inspector randomly observed ABF welding personnel Wai Kitlai (#2953) welded the North end of weld joint #55, approximately 1100 mm in length.

This QA Inspector randomly observed ABF welding personnel Jin Quan Huang (#9340) welded the North end of weld joint #56, approximately 1200 mm in length.

This QA Inspector periodically observed QC Inspector Pat Swain monitor the welding at this location.

This QA Inspector observed both weld joints appeared to be 80% completed by the end of welding at approximately 1200 hours this date.

This QA Inspector observed the induction heat blankets were placed over the welds at approximately 1230 hours this date for the 3 hour post weld heating.

This QA Inspector was informed by QCM Jim Bowers and ABF Welding Engineer John Callahan that Electro Slag Welding (ESW) would be performed this date and anticipated starting the ESW early this afternoon. ABF has elected to start the ESW process at the weld joint identified as S0-45, which is a 90 degree Tee-Joint located at the Southwest corner of the center section of the tower base. QC Inspector Steve McConnell had inspected the root gap the previous day, which had also been verified by this QA Inspector.

ABF Welding Engineer John Callahan, QCM Jim Bowers and ABF welding Supervisor Danny Ieraci (#3232) addressed the QC Inspectors assigned to this project (Steve McConnell and Pat Swain) and QA Personnel Danny Reyes and this QA Inspector that ABF personnel will be working in close quarters, that QC inspections are minimal due to the ESW process and that it is critical that QC and QA personnel do not get in the way of ABF personnel setting up and/or operating the ESW equipment.

This QA Inspector observed from a distance the mock-up test plate on the 13-meter deck was started at approximately 1130 hours this date. QCM Jim Bowers later informed this QA Inspector the mock-up test plate was successfully accomplished.

This QA Inspector observed the Consumable Guide (CG) tube was set into the weld gap at approximately 1300 hours and the alignment process began.

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This QA Inspector observed that ABF personnel had started inserting the ceramic insulators between the CG and the lads of the weld joint.

This QA Inspector observed that ABF personnel started positioning the cooling lines and weld shoes into the starting position at the 3-meter elevation at approximately 1530 hours.

At approximately 1630 hours ABF welding Supervisor Danny Ieraci (#3232) stated most of the set up had been completed and started to go through the ABF check list of set up items. This QA Inspector randomly observed as QC Inspector Steve McConnell checked the CG distance from the sump and informed this QA Inspector it complied with the checklist requirements. Previously QCM Jim Bowers informed this QA Inspector this was not a code requirement and was solely a means and methods check; therefore QA personnel were requested not to perform any type of verification inspection at this time.

This QA Inspector observed from a distance the ESW process had started at approximately 1715 hours. Shortly after starting the process this QA Inspector observed multiple ABF personnel proceeding to the 3-meter elevation where the welding shoes had been positioned. This QA Inspector was later informed by QCM Jim Bowers this had been a "false" start because the initial wire did not produce an arc to start the process but had fussed to the steel plate in the sump, the wire had been cut free, fresh flux put into the sump and that another start would be happening soon.

At approximately 1750 hours this QA Inspector observed from a distance the ESW process had been started again. This time the ESW process appeared to have started, you could hear a crackling sound as wires and CG started to melt and form the sump, then the sound decreased to a low hum. At this time it appeared the ESW process had started successfully. At approximately 1830 Dan Banks informed this QA Inspector that everything appeared to work properly.

This QA Inspector observed from a distance as several welding shoes were transferred up the weld joint. This QA Inspector observed both QC Inspectors Pat Swain and Steve McConnell had been monitoring the ESW process from a distance as well and remained on site. At approximately 1915 this QA Inspector left the immediate area and the ESW process appeared to working properly. See photos below of the CG set up and work area on the 13-meter deck.

### **Summary of Conversations:**

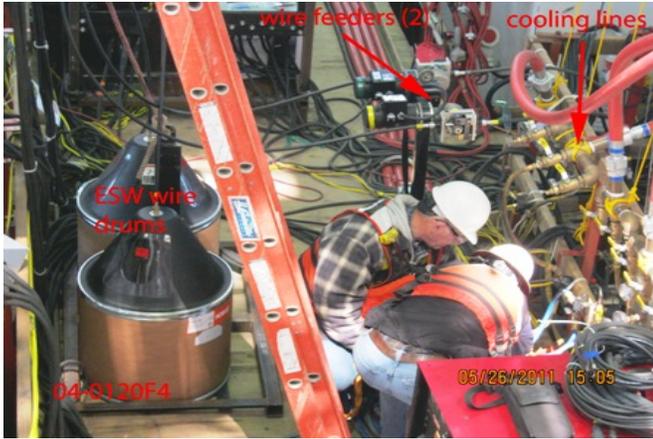
This QA Inspector had general conversations with American Bridge/Fluor (ABF) and Caltrans personnel during this shift. Except as described above and noted below there were no notable conversations.

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## 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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**Inspected By:** Hager,Craig

Quality Assurance Inspector

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**Reviewed By:** Levell,Bill

QA Reviewer