DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
Office of Structural Materials
Quality Assurance and Source Inspection

Bay Area Branch
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Contract #: 04-0120F4
Cty: SF/ALA Rte: 80 PM: 13.2/13.9
File #: 1.28

WELDING INSPECTION REPORT

Resident Engineer: Siegenthaler, Peter
Address: 333 Burma Road
City: Oakland, CA 94607

Report No: WIR-025280
Date Inspected: 23-Jul-2011

Project Name: SAS Superstructure
Prime Contractor: American Bridge/Fluor Enterprises, a JV
Contractor: American Bridge/Fluor Enterprises, a JV

OSM Arrival Time: 700
OSM Departure Time: 1530
Location: Job Site

CWI Name: John Pagliero

Inspected CWI report:	☐ Yes	☑ No	☐ N/A	**CWI Present:**	☑ Yes	☐ No	
Electrode to specification:	☑ Yes	☐ No	☐ N/A	**Rod Oven in Use:**	☐ Yes	☐ No	☑ N/A
Qualified Welders:	☑ Yes	☐ No	☐ N/A	**Weld Procedures Followed:**	☑ Yes	☐ No	☐ N/A
Approved Drawings:	☑ Yes	☐ No	☐ N/A	**Verified Joint Fit-up:**	☑ Yes	☐ No	☐ N/A
				Approved WPS:	☑ Yes	☐ No	☐ N/A
				Delayed / Cancelled:	☐ Yes	☑ No	☐ N/A

Bridge No: 34-0006
Component: SAS Tower

Summary of Items Observed:

Caltrans Office of Structural Material (OSM) Quality Assurance Inspector (QAI) Joselito Lizardo was present at the Self Anchored Suspension (SAS) job site as requested to perform observations on the welding of components for the San Francisco Oakland Bay Bridge (SFOBB) Project.

Day after the welding incident on the Electro Slag Welding (ESW) of T-joint W-041 location ‘W’, this QA performed after the fact random inspection on the completely welded T-joint. QA was able to see the surface profile of the inside and outside of the weld after the Post Weld Heat Treatment (PWHT) that was performed after the incident. QA was also able to have direct conversation to ABF personnel who were directly involved in shifting/jumping the water cooled weld shoes during the ESW incident. The following observations were gathered in relation to their reactions during the fiasco;

1. During welding at around four (4) feet below the run off of the ESW, it was noted by ABF personnel that there was water leakage on the fitting on one of the hoses of one weld shoe (1st). ABF tried to fix the leakage, but while fixing the 1st leakage another water leakage was noted on one of the hoses of another weld shoe (2nd). According to the personnel doing the shifting/jumping of the weld shoe, they tried to control the water by bending and squeezing the water hoses but there was tremendous pressure into the water hoses that they cannot control the water flow. They noted that this time the pressure was so intense and different from previously welded ESW joint where they have to do the same bending and squeezing of the hose whenever they have a similar problem. While they were bending and squeezing the water hose line, the pressure built up tremendously and could not hold the line anymore. The water squirted and splashed partly into the just welded/hot area of the joint causing steam all over the inside area. According to the contractors personnel, when the water pressure squirted they pointed the

hose to the wall away from the weld joint being welded and no water was directly sprayed into the weld puddle. The commotion and finding a way to fix the leak lasted around fifteen (15) minutes according to the contractor personnel.

2. ABF personnel were able to fix the 1st leak on the 1st weld shoe and they used it to alternate with the remaining weld shoe (3rd) that had no leak. Since the ESW was almost to the top of the seam, they were able to use two (2) weld shoes instead of three (3) as they used to from the beginning.

3. Despite the incident and using only two weld shoes on the last few feet of the joint, ABF personnel were able to complete the ESW all the way to the run off tab.

4. Per ABF personnel, the three cooling shoes from the outside were never having a problem. It was only from the inside where the two (2) different weld shoes have water leakage on one of its hoses.

5. During the incident, Caltrans Inspector Mr. Doug Wright called his senior Mr. Mark Woods and informed him about the situation. According to Mr. Doug Wright, it was recommended by Mr. Woods to perform the Post Weld Heat Treatment right after the ESW welding on this particular weld joint.

6. Right after the incident, it was noted that the automatic (hopper) flux feeder was on top of the weld area approximately 3 feet away and was not contaminated. A three (3) foot hose was connected from the hopper to the top of the weld shoe to pour the flux. The flux feeder was noted to be dry and never contaminated. The main storage for the flux was around 30 feet away to the weld area and so there was also no chance of contamination.

7. As soon as the welding was completed and the information was relayed directly from Caltrans Mr. Doug Wright that ABF need to perform the PWHT, ABF personnel led by ABF Superintendent Dan Ieraci prepared the heater blankets for the inside and outside. ABF also cut the strong backs from inside and outside of the weld joint to have access for the heater blankets. It was around 15:30 hours when they completed the preparation for the PWHT and started ramping up the temperature. At around 15:45 hours, one of the lines for the Miller Proheat 35 Induction Heating System became disconnected and squirted the liquid from the hose to the plate being PWHT, causing another steam reaction. The PWHT Heating Machine shut off immediately.

8. ABF personnel removed all the heater blankets from the inside and outside and prepared a new set up of blankets for the PWHT. It took longer than expected for the preparation of the PWHT. At around 18:30 hours when they completed the set up for the PWHT, during this time ABF personnel was noted to be programming the machine to ramp up the heat to 690°F per hour with a soak temperature of 435°F and a soak time of six (6) hours. The PWHT went well this time and at around 19:00 hours the temperature was already noted 451°F. Per suggestion from Caltrans, QA does not need to watch the complete duration of the PWHT. At 19:30 hours, this QA informed Caltrans Engineer Mr. Doug Wright QA was leaving and informed him the PWHT was ongoing. ABF Sr. Field Engineer Daniel Hester and ABF Production Manager John Callaghan were noted watching the ongoing PWHT.

9. The following day after the PWHT of the ESW weld joint, this QA talked to Mr. Daniel Hester who was one of the ABF Personnel who stayed and watched the PWHT, he mentioned that it was completed at 0100hours the following day for a complete duration of more than six (6) hours PWHT.

10. This QA performed a random visual review on the completed ESW joint particularly on the areas where the hose where water leakage had occurred and noted a normal weld surface profile of the weld without any indication of blemishes or anomalies to the weld.

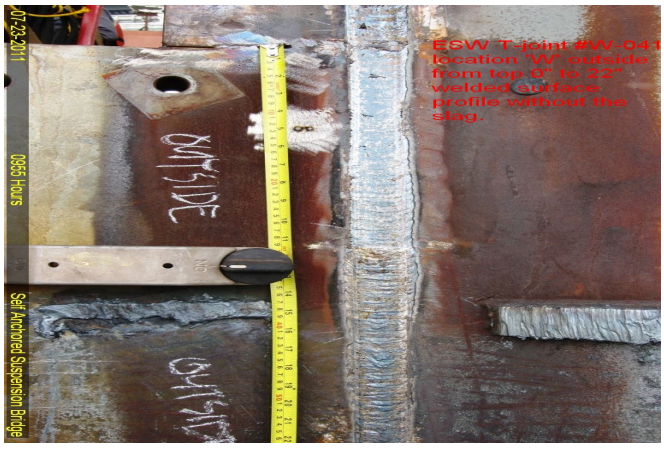
11. The information provided by this QA related to the actual account of the cooling hose leakage issue and actions that were taken by ABF personnel during the incident was based on direct conversation with ABF personnel who were directly involved to the job.

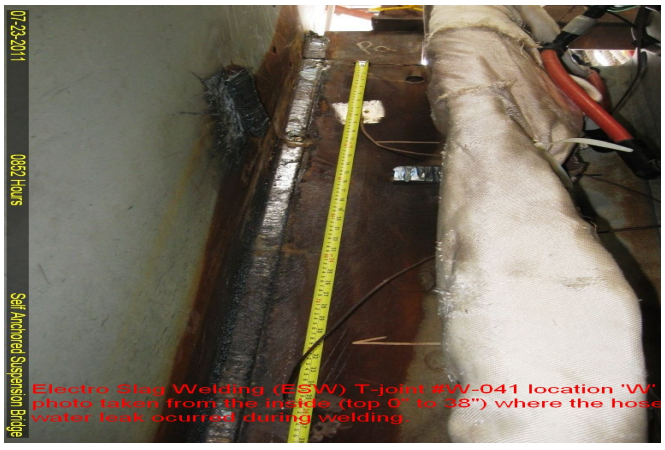
12. The information provided by this QA should also serve as in addition to the information provided by fellow QA Craig Hager who was assigned to observe the ESW and also due to his full time presence at the area during welding and when the incident occurred.

13. Attached digital photographs were taken after the PWHT and these showed the weld surface profile from the inside and outside of the weld joint. More emphasis were taken at the top of the weld joint where the water leakage had occurred during ESW welding.

At the Tower Base Electro Slag Welding (ESW), this QA performed a joint fit up verification on the next ESW T-joint E-041 location ‘R’ to be welded next. The measured root gap was noted 17mm minimum and 23.4mm maximum. There was no lesser than 16mm nor more than 25mm root gap noted from the bottom to the top of the T-joint. With the measurements that were taken during the fit up verification, the fit up of the weld T- joint was deemed in compliance to the contract requirements.

Still at the Tower Base, ABF personnel were noted re-routing the ESW welding cables as well as water hoses for the cooling system of the weld shoes to the South side of the Tower. Other ABF personnel were also noted installing the Hilti unistrut columns that will hold the weld shoes in place during the ESW welding. ABF welder Jeremy Dolman was noted tack welding the 3” x 3” angular to the previously welded strong back and Hilti unistrut. The welder was noted using Shielded Metal Arc Welding (SMAW) with 1/8” diameter E7018H4R electrode.





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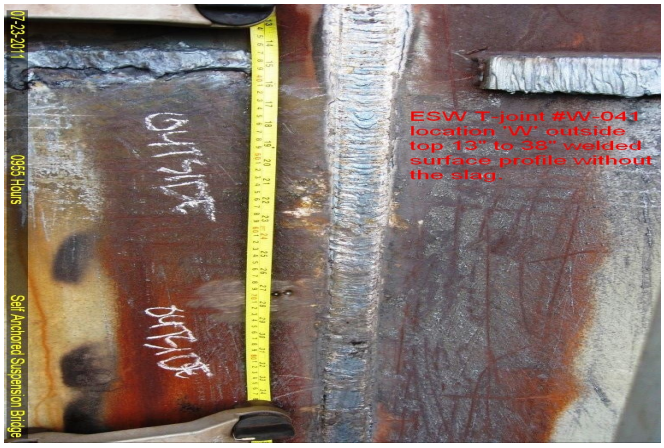

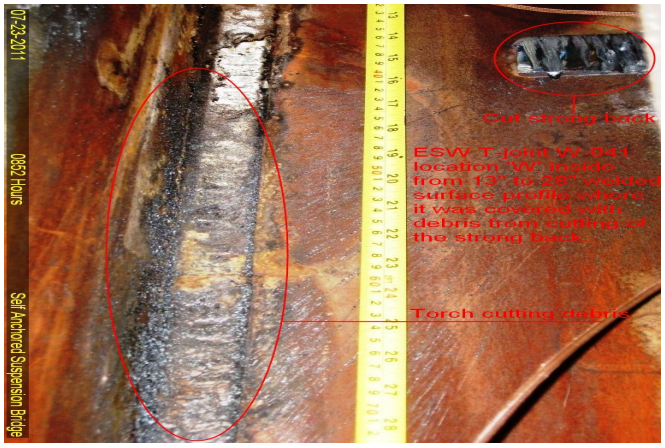

Summary of Conversations:

As stated above.

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 SMR Nina Choy 510-385-5910, who represents the Office of Structural Materials for your project.

Inspected By:	Lizardo,Joselito	Quality Assurance Inspector
Reviewed By:	Levell,Bill	QA Reviewer