

**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 #: 69.28**WELDING INSPECTION REPORT****Resident Engineer:** Pursell, Gary**Address:** 333 Burma Road**City:** Oakland, CA 94607**Report No:** WIR-001287**Date Inspected:** 19-Jan-2008**Project Name:** SAS Superstructure**OSM Arrival Time:** 600**Prime Contractor:** American Bridge/Fluor Enterprises, a JV**OSM Departure Time:** 1730**Contractor:** Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island **Location:** Shanghai, China**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:** Tower and OBG Fabrication**Summary of Items Observed:**

Caltrans Quality Assurance (QA) Inspector, Mr. Paul Dawson, arrived on site at the Zhenhua Port Machinery Company (ZPMC) facility at Changxing Island, in Shanghai, China, for the purpose of monitoring welding and fabrication of the San Francisco / Oakland Bay Bridge (SFOBB) components. The QA Inspector observed the following:

Orthotropic Box Girder (OBG) and Tower Mock Up:

CWI Inspectors: Wu Ming Kai, Zhao Chen Sun, Li Yi Feng

The QA Inspector observed three ZPMC welders using welding procedure specification WPS-B-T-2132-3 using the flux cored welding process for PL69A fillet welds on six OBG side plate SP008 stiffener welds at the same time. ZPMC has multiple flux cored welding process manipulators attached to a movable gantry that runs on a track along the length of the stiffener plates. The QA Inspector climbed a stairway to gain access to where the welding machines are mounted, overhead of the stiffener plate welding operation. The QA Inspector observed ZPMC QC Inspector Mr. Shi Yan Hao standing on the top of the overhead gantry adjacent to the welding machines and Mr. Hao was using a voltage/welding current measurement device to measure the welding parameters of these welders. The QA Inspector was able to measure the welding current on three of the six welding machines, at which time the welding machines were stopped due to the welding operation reaching the end of the weld joints. The QA Inspector asked ZPMC QC Inspector Mr. Shi Yan Hao what were welding voltages and welding current he had measured for the six welding machines. Mr. Hao then wrote a few of the welding current and voltage values on his welding tracking sheet. The QA Inspector looked at the QC welding

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tracking sheet and observed several of the locations that were intended to be used for recording voltage and welding current for these weld joints were blank. Mr. Hao did not appear to understand the English language and the QA Inspector asked ZPMC QC CWI Mr. Wu Ming Kai to ask Mr. Hao what welding parameters were being used for the welding of OBG side plate SP008 stiffener welds. Mr. Kai determined that Mr. Hao had measured and determined the welding parameters were in compliance with the welding procedure and that Mr. Hao had not recorded the individual welding and voltages which he had measured during the welding of side plate SP008 stiffener welds. Mr. Kai said Mr. Hao should have documented these readings and that Mr. Hao will be recording all future measurements on the QC weld tracking sheets.

Approximately 30 minutes later the QA Inspector observed additional welding of these stiffener plates and the QA inspector measured a welding travel speed of approximately 450 mm per minute. All welders are using 1.4 mm diameter E71T-1 rolls of electrodes that have been marked as being installed earlier today. The QA Inspector observed all six welding machines have a shielding gas flow between 18 and 21 liters per minute as required by the WPS. Welder Mr. Li Xuehua stencil 58174 completed weld SP008-01-010 with a welding current of approximately 295 amps and 30.0 volts and weld SP008-01-009 with a welding current of approximately 295 amps and 30.5 volts. Welder Mr. Xin Meng stencil 53742 completed weld SP008-01-006 with a welding current of approximately 315 amps and 30.8 volts and weld SP008-01-005 with a welding current of approximately 310 amps and 30.8 volts. Welder Mr. Shi Yan Hao stencil 53605 completed weld SP008-01-002 with a welding current of approximately 310 amps and 30.5 volts and weld SP008-01-001 with a welding current of approximately 320 amps and 30.45 volts. Items observed by the QA Inspector do not appear to fully comply with project specifications.

The QA Inspector observed ZPMC welder Mr. Wei Da Shuai stencil 51246 is using welding procedure specification WPS-B-T-2132-B-U2-F preparing to use the flux cored welding process to make groove weld BP020-01-047 that joins two OBG stiffener plates. The QA Inspector observed the location where Mr. Wei Da Shuai is preparing to weld appears to have been welded from the opposite side and the weld joint has been backgouged and partially ground to a bright metal condition. The two ends of the weld joint both had significant areas where the backgouged weld material has not been ground to a bright metal condition. AWS D1.5 paragraph 3.2.6 states: "Air carbon arc gouged surfaces shall be ground to bright metal." The QA Inspector informed Mr. Wu Ming Kai this condition and Mr. Kai said the area will be ground prior to welding. Items observed by the QA Inspector do not appear to fully comply with project specifications. See the photographs below for additional information.

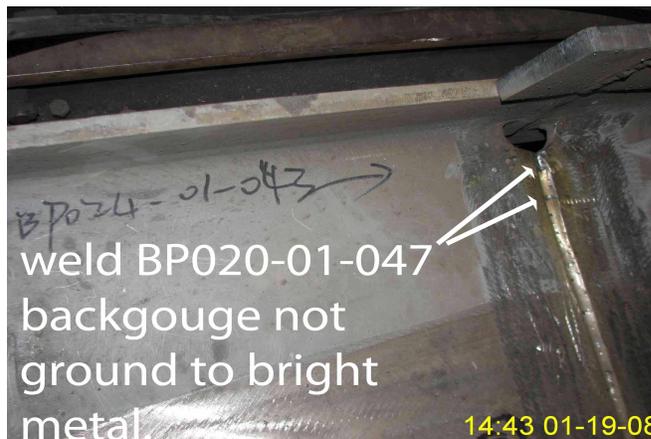
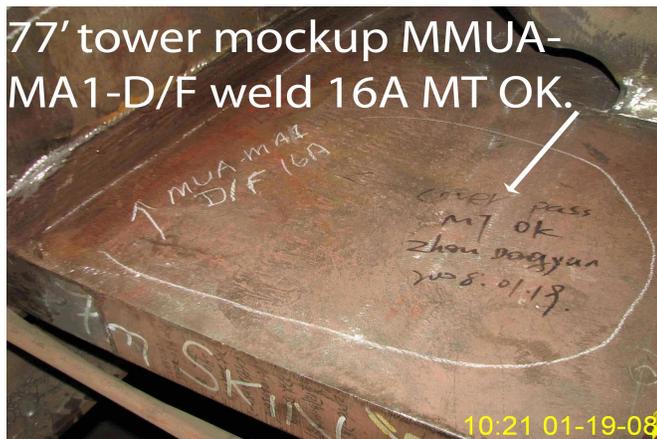
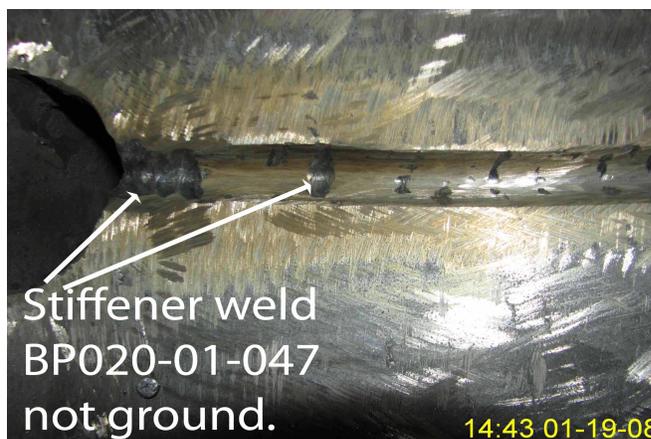
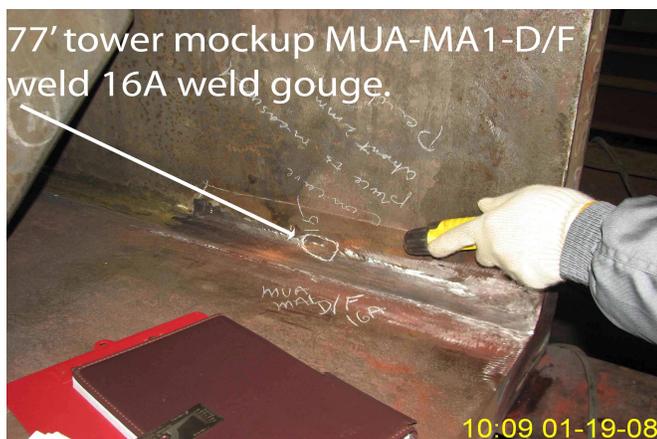
### Bay 2

ZPMC QC CWI Inspector Mr. Li Yi Feng informed the QA this weld is ready for Caltrans final visual and magnetic particle inspections. The QA Inspector observed ZPMC personnel had written that the magnetic particle inspection of the 77' tower mockup MUA-MA1-D/F weld 16A is acceptable. The QA Inspector performed random visual inspection of this weld and observed weld 16A has a 2mm deep and 25 mm long grinding gouge (below flush) at the inside top surface of the weld approximately 300 mm from the east end of the weld. AWS D1.5 2002 prohibits groove welds to have underfill conditions. The QA Inspector showed this gouge to ZPMC QC CWI Inspector Mr. Li Yi Feng and after Mr. Feng measured this location Mr. Feng said the gouge is 2mm deep and the area will be weld repaired. Items observed by the QA Inspector do not appear to fully comply with project specifications and a Quality Assurance Incident Report was issued to document this procedure violation. See the photographs below for additional information.

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The QA Inspector observed ZPMC welder Mr. Niu Duo Jun stencil 40690 is using welding procedure WPS-B-T-4313-TC-P4-1 using the shielded metal arc process for groove weld on MUSQ-SA95 weld #59. The QA Inspector observed E7018, 4.0 mm diameter electrodes, a welding current of approximately 190 amps and a minimum base material preheat temperature of approximately 100° C. The WPS requires a minimum base material temperature of 180° C and the actual temperature is below this minimum temperature. The QA Inspector showed ZPMC QC CWI Inspector Mr. Zhao Chen Sun the base material is below the minimum temperature and Mr. Sun said only one weld pass has been made by this welder and ZPMC will install electric heaters to heat the base material to a minimum temperature of 180° C prior to any additional welding. Later in the shift the QA Inspector observed ZPMC has installed electric heaters and the base material has a preheat temperature of 180° C where Mr. Niu Duo Jun is welding. Items observed by the QA Inspector do not appear to fully comply with project specifications.



## Summary of Conversations:

See above for summary of conversations.

## 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 Mazen Wahbeh, (818) 292-0659, who represents the Office of Structural Materials for your project.

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**Inspected By:** Dawson,Paul

Quality Assurance Inspector

**Reviewed By:** Cochran,Jim

QA Reviewer