

**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 #: 69.28**WELDING INSPECTION REPORT****Resident Engineer:** Pursell, Gary**Address:** 333 Burma Road**City:** Oakland, CA 94607**Report No:** WIR-004503**Date Inspected:** 24-Oct-2008**Project Name:** SAS Superstructure**OSM Arrival Time:** 2300**Prime Contractor:** American Bridge/Fluor Enterprises, a JV**OSM Departure Time:** 730**Contractor:** Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island **Location:** Shanghai, China**CWI Name:** Li Yan Hua, An Qing Xiang**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:** OBG, Tower**Summary of Items Observed:**

Caltrans Quality Assurance (QA) Inspector, Ken Jobes, arrived on site at the Zhenhua Port Machinery Company (ZPMC) facility at Changxing Island, in Shanghai, China, to randomly monitor welding and Quality Control (QC) functions. While on site, the QA Inspector observed and/or discovered the following:

**OBG Sub-Assembly Shop – Bay 1**

Caltrans Quality Assurance (QA) Inspector, Ken Jobes, was present to monitor activities associated with the Production Monitoring Test (PMT) of Orthotropic Box Girder (OBG) Deck Panel U-rib welds. The PMT representing Deck Panels DP206-001 and DP447-001 was monitored. After MT of the tack welds was accepted by ZPMC Level II MT Technician, Wang Wei, the three ribs (six welds) were simultaneously welded to simulated deck plates in the horizontal groove (2G) welding position. The Welding Procedure Specification (WPS) used was WPS-B-T-2342-U1(Urib)-4. It is a combination procedure using gas metal arc welding (GMAW) for the root pass and submerged arc welding (SAW) for the cover or fill pass. The filler metals being used were verified to be as specified on the WPS; 1.4 mm diameter, ER70S-6 (JM-56) for GMAW and 4.8 mm diameter EH14K (H14) for SAW. During the test, the Caltrans QA Inspector recorded the parameters observed on the U-Ribs PMT Inspection Sheet, dated 10-25-08, for both welding processes. The name of the gantry operators and each of the welding operators' identification numbers were also recorded on the U-Ribs PMT Inspection Sheet. ZPMC Certified Welding Inspector (CWI), Li Yan Hua (07120701) and ABF QA Inspector Huang Wen Guang were present during welding.

The final weld was visually examined and accepted by ZPMC CWI, Li Yan Hua; and ABF QA Inspector Huang

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# WELDING INSPECTION REPORT

( Continued Page 2 of 3 )

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Wen Guang. All welds appeared to meet the specified visual examination acceptance criteria. After ultrasonic examination (UT) and acceptance by ZPMC Level II UT Technician, Tang Xing Shan, the Caltrans QA Inspector designated the locations for the required macro-etch specimens. All macro-etch specimens were prepared and found acceptable by ZPMC CWI, and ABF QA Inspector. The macro-etch specimens were then examined by the Caltrans QA Inspector and the depth of penetration on each measured and the results recorded on Caltrans Project 04-0120F4 SAS OBG Fabrication Macro Etch Log.

All above observations appeared to meet the requirements of the job specifications.

## Heavy Machinery (Tower) Shop 1

The Caltrans Inspector also observed the machine Flux Cored Arc Welding (FCAW) of vertical stiffeners A1 thru A4 to South Tower Skin Plate "A", Lift 2, in the horizontal groove welding position. WPS-B-T-2332-TC-P5-F was being used for this welding. Weld Nos. SSD1-SA164D/F-3, 6, 12, 15 were being welded by Tao Qian (I. D. 040457). Weld Nos. SSD1-SA164D/F-2, 5, 11, 14 were being welded by Zhu Zhong Yun (I. D. 057194). Weld Nos. SSD1-SA164D/F-21, 26, 29 were being welded by Jiang Zhou (I. D. 040261). Weld Nos. SSD1-SA164E/F-2, 5, 11, 14 were being welded by Wang Gong Zhi (I. D. 050041). Weld Nos. SSD1-SA164D/F-22, 27, 30 were being welded by Jin Xiao Gang (I. D. 053474). Weld Nos. SSD1-SA164E/F-3, 6, 12, 15 were being welded by Yu Yong Lai (I. D. 048378). The QA Inspector verified the qualifications of all six welders for the work being performed. Certified Welding Inspector (CWI), An Qing Xiang (CWI No. 07120651) was monitoring this welding as were two ZPMC QC personnel and one ABF Inspector.

The Caltrans QA Inspector also randomly observed the machine Submerged Arc Welding (SAW) of fill passes on Weld No. NSD1-SA179D/E-10B, North Tower, Skin "C". The piece marks (member identification) were SA179 and p265. The welding operator was Hua Gui Mei (I. D. 050295). The welding was in the flat groove (1G) position using Welding Procedure Specification (WPS) No. WPS-B-T-2221-B-U3c-S-2. Certified Welding Inspector (CWI), An Qing Xiang (CWI No. 07120651) was monitoring this welding as were one additional ZPMC QC Inspector and one ABF QA Inspector. The QA Inspector verified the electrode as JW-3 (EM12K) and the diameter of the electrode as 4.0 mm.

The Caltrans QA Inspector also randomly observed the machine Submerged Arc Welding (SAW) of the root pass on Weld No. NSD1-SA179A/G-15A. The piece marks (member identification) were SA17 and p2612. The welding operator was Hua Gui Mei (I. D. 050295). The welding was in the flat groove (1G) position using Welding Procedure Specification (WPS) No. WPS-B-T-2221-B-U3c-S-2. Certified Welding Inspector (CWI), An Qing Xiang (CWI No. 07120651) was monitoring this welding as were one additional ZPMC QC Inspector and one ABF QA Inspector. The QA Inspector verified the electrode as JW-3 (EM12K) and the diameter of the electrode as 4.0 mm and that the voltage, amperage and travel speed were within the ranges specified on the WPS.

The Caltrans QA Inspector also randomly observed the machine Submerged Arc Welding (SAW) of cover passes on Weld No. SSD1-SA61A/G-2A, South Tower, Skin "E", Lift 2. The piece marks (member identification) were SA61, p194, p486 and p130. The welding operator was Yan Chuan Jin (I. D. 0503060). The welding was in the flat groove (1G) position using Welding Procedure Specification (WPS) No. WPS-B-T-2221-B-U3c-S-2. Certified Welding Inspector (CWI), An Qing Xiang (CWI No. 07120651) was monitoring this welding as were

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## WELDING INSPECTION REPORT

( Continued Page 3 of 3 )

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one additional ZPMC QC Inspector and one ABF QA Inspector. The QA Inspector verified the electrode as JW-3 (EM12K) and the diameter of the electrode as 4.0 mm and that the preheat, voltage amperage and travel speed were within the ranges specified on the WPS.

Heavy Machinery (Tower) Shop 2

The Caltrans QA Inspector also randomly observed that fill passes had been made by machine Submerged Arc Welding (SAW) on Weld Nos. ESD1-SA376B/E-4A, 2, 1A and ESD1-SA376C/E-25, East Tower, Skin "D". The piece marks (member identification) were SA376 and p1121 being welded to SA376 and p980. The welding operator was Xue Yian (I. D. No. 040636). The welding was in the flat groove (1G) position. All of the welds are on the same joint and are numbered as such because they alternate partial joint penetration (PJP) and complete joint penetration (CJP) along the joint. The "A" welds are CJP and the welds without a letter designation are PJP. The two Welding Procedure Specification (WPS) Nos. were WPS-B-T-2221-B-U3c-S-2 for the CJP and WPS-B-T-2321-P3-S-2 for the PJP. Certified Welding Inspector (CWI), An Qing Xiang (CWI No. 07120651) was monitoring this welding as were two additional ZPMC QC inspectors and one ABF QA Inspector. Although welding had stopped, the QA Inspector verified the qualifications of the welding operator, the electrode as JW-3 (EM12K) and the diameter of the electrode as 4.0 mm. The minimum preheat and maximum interpass temperatures, voltage, amperage and travel speed recorded by ZPMC personnel were verified as being within the parameters of the WPS.

All above observations appeared to meet the requirements of the job specifications.

### Summary of Conversations:

As identified within the contents of this report.

### 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 Peter Dautermann (1500219953) China, who represents the Office of Structural Materials for your project.

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<b>Inspected By:</b>	Jobes, Kenneth	Quality Assurance Inspector
<b>Reviewed By:</b>	Carreon, Albert	QA Reviewer

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