

**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-001037**Date Inspected:** 21-Dec-2007**Project Name:** SAS Superstructure**OSM Arrival Time:** 1830**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:** Lu Lefeng**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:** Caltrans Mock-Up**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:

The Caltrans QA Inspector was informed by ZPMC Coordinator, Mr. Lei Tao, that ZPMC intended to perform magnetic particle examination (MT) on the root pass of several welds on the 89M Mock-Up. The Caltrans QA Inspector witnessed the dry powder MT of the root pass on the following welds: Drawing No. MUB-MA21-F/J, Weld Nos. 18, 19, 20 and 21; and Drawing No. MUSB-MA23, Weld Nos. 17, 18, 19, 20, 21 and 22. ZPMC, Level II Technician, Mr. Bo Tinrui (Certificate No. ZPMCQA-MT-II-10), whose qualifications are listed on ZPMC's list of qualified nondestructive examination personnel, performed these examinations. The QA Inspector observed that MT was performed twice at each location, once with the yoke transverse to the weld and once with it longitudinal to the weld. The accessible ends of the welds were also examined by MT. The inside ends were not accessible. See attached picture for example of both. It was observed that the MT technician marked an area for grinding on Weld No. MUB-MA21-F/J-17. The QA Inspector later randomly observed that six of the welds MT'd earlier were being welded using semi-automatic Flux Cored Arc Welding (FCAW) in the vertical groove (3G) welding position. The Weld Nos. were MUB-MA21-F/J, Weld Nos. 19 and 20; and MUSB-MA23, Weld Nos. 17, 19, 20 and 21. Two welders were being used, Wei Dashuai (I. D. No. 051246) and Wu Peiling (I. D. No. 044449), both of whose qualifications for this welding are listed in ZPMC's Master List of Welders/Welding Operators/Tack Welders, Revision 7. Welding Procedure Specification (WPS) No. WPS-B-T-2333-TC-P4-F was being used for these partial joint penetration (PJP) groove welds. It was observed that CWI, Lu Lefeng (AWS CWI No. 07031411) was present during this welding as was Bureau Veritas Inspector, Li Wen Shang. The QA

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## WELDING INSPECTION REPORT

( Continued Page 2 of 4 )

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Inspector also noted that ZPMC's documentation of minimum/maximum preheat/interpass temperatures, voltage, amperage and travel speed by the CWI were within the specified ranges of the WPS for the passes welded up until the time of observation.

The Caltrans QA Inspector also randomly observed the Machine Submerged Arc Welding (SAW) on the Lower Shaft Assembly of the 114M Mock-Up, Weld No. MUC-MA107 B/C-5A. This is the outside weld of Skin A to Skin E. This is a complete joint penetration (CJP) groove weld and was being welded in the flat groove (1G) welding position. The welding operator was Xu Yan (I.D. No. 052917), whose qualifications for this welding are listed in ZPMC's Master List of Welders/Welding Operators/Tack Welders, Revision 7. Welding Procedure Specification (WPS) WPS-B-T-2221-C-U2b-S was being used for this weld. ZPMC CWI, Lu Lefeng (CWI No. 07031411) was present during this welding. The QA Inspector also noted that ZPMC's documentation of minimum/maximum preheat/interpass temperatures, voltage, amperage and travel speed by the CWI were within the specified ranges of the WPS for the passes welded up until the time of observation. The QA Inspector also randomly measured the above four parameters by use of a calibrated Fluke amp/volt meter for amperage and voltage, temperature indicating crayons for preheat/interpass temperature, and a tape measure and stop watch for travel speed. At the time of observation, weld passes across the entire length were not being made, but short passes filling in low places in preparation for cap passes. The changing of welding electrode spool of wire was observed during this time and verified to meet the classification specified on the WPS. The QA Inspector later observed that this weld had been completed, the assembly moved to a different location and preheat was being applied to the weld joining Skin D to Skin E in preparation for welding.

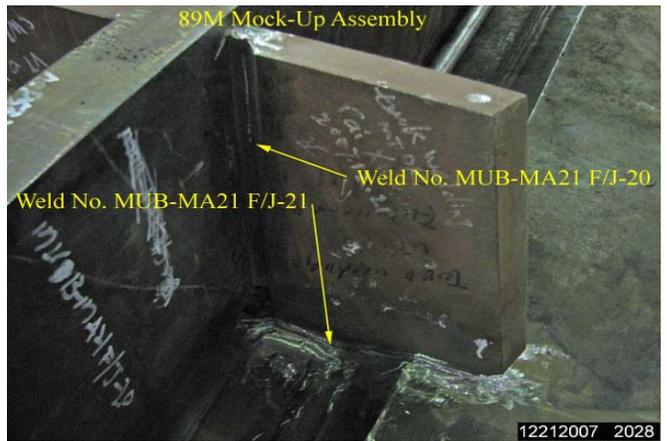
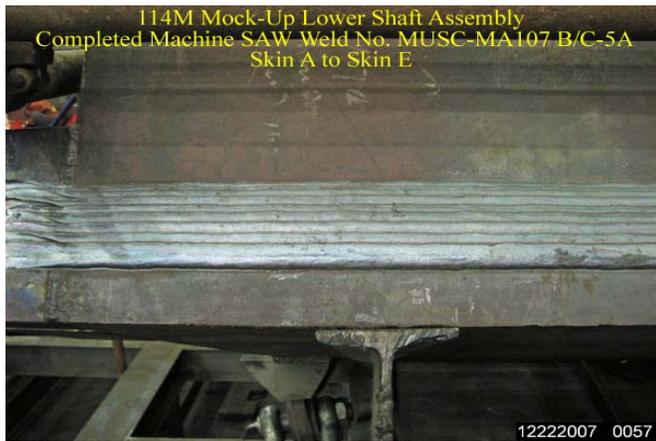
The Caltrans QA Inspector also randomly observed the manual Shielded Metal Arc Welding (SMAW) of tacks joining Sub-Assembly MUA-MA1 (Skin C) to Piece Mark MUSA-SA104 on the 77M Mock-Up. Preheating was observed prior to tacking. Reference Drawing No. MUA-MA1-D/F. From Drawing No. MUSA-SA104 A/B, the QA Inspector determined that SA104 is 75 mm thick, ASTM A709-HPS-485W. From Drawing No. MUSA-MA4, it was determined that MUA-MA1 is an assembly consisting of three pieces, mp12 and mp13 (both 90 mm thick); and MA4 (60 mm thick). The base material specified for all three is ASTM A709-50 (345)-2. It was verified by the QA Inspector that the WPS being used applied to this combination of base materials and thicknesses being joined.

The Caltrans QA Inspector also randomly observed the Manual Shielded Metal Arc Welding (SMAW) joining Sub-Assembly MA21 to Sub-Assembly SA214 on the 89M Mock-Up. There were a total of four welders making four welds, Weld Nos. MUB-MA21-C/J-1, 2, 3, 4. These are partial joint penetration (PJP) groove welds and were being welded in the horizontal groove (2G) welding position. There were four welders welding four weld joints. The welders' qualifications had been verified by the same QA Inspector on the previous night. Therefore, the QA Inspector only verified that four of the same welders were making these welds. Welding Procedure Specification (WPS) WPS-B-T-4312-TC-P4-2 was being used for this weld. ZPMC CWI, Lu Lefeng (CWI No. 07031411) was present during welding as was Bureau Veritas Inspector, Li Wen Shang. The QA Inspector also noted that ZPMC's documentation of minimum/maximum preheat/interpass temperatures, voltage, amperage and travel speed by the CWI were within the specified ranges of the WPS up until the time of random observation. The QA Inspector observed that there were portable electrode ovens being used to store the 5.0 mm diameter, THJ506Fe-1 (E7018-1) electrodes.

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

# WELDING INSPECTION REPORT

( Continued Page 3 of 4 )



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# WELDING INSPECTION REPORT

( Continued Page 4 of 4 )

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

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<b>Inspected By:</b>	Jobs, Kenneth	Quality Assurance Inspector
<b>Reviewed By:</b>	Cochran, Jim	QA Reviewer

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