

**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 #: 70.28**WELDING INSPECTION REPORT****Resident Engineer:** Pursell, Gary**Address:** 333 Burma Road**City:** Oakland, CA 94607**Report No:** WIR-002933**Date Inspected:** 10-Jun-2008**Project Name:** SAS Superstructure**OSM Arrival Time:** 800**Prime Contractor:** American Bridge/Fluor Enterprises, a JV**OSM Departure Time:** 1830**Contractor:** Japan Steel Works**Location:** Muroran, Japan**CWI Name:** Chung-Fu Kuan**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, Jacking and Deviation Saddles**Summary of Items Observed:**

The following report is based on METS observations at Japan Steel Works (JSW) in Muroran Japan. Current work: Casting, machining, repair and nondestructive testing of Saddles.

**Fabrication Shop 4**

On this date the Caltrans Quality Assurance (QA) inspector, Joe Lanz arrived at JSW fabrication shop number 4 and observed the in process welding operation of the structural steel plates for the West Deviation Saddle Base W2E1 stem plate 1-2 to base plate 1-3 repair. The weld designation is E1S-2L. The root weld repair was performed in the area of rib plate 1-7 where a multi-pass tack weld had cracked and then had been completely removed by grinding.

Prior to the start of welding the area was inspected by magnetic particle examination by the Nikko Inspection Services QC/NDT technician Mr. Kazuya Kobayashi. The MT was performed in accordance with ASTM standard E709 and Nikko Inspection Services procedure SF-MT-01 using the yoke method with high temperature dry visible powder. The yoke dead lift was verified with a 4.65kg test plate. The magnetic field was verified with a field indicating gauge (pie gauge). All calibrations appear to meet the minimum requirements of ASTM E709. The testing was evaluated in accordance with the contract special provisions. No relevant indications were reported.

The JSW welding personnel Mr. Kei Nakasato, identified as number 91-2247 performed the welding utilizing the Shielded Metal Arc Welding (SMAW) process per the welding procedure specification (WPS) SJ-3011-1. The welding was performed in the 2G (Horizontal) position. The filler metal utilized was identified as 4.8mm diameter,

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Class E9018-M-H4R, Brand name Hoballoy 9018-M. The preheating was performed by JSW personnel utilizing an oxygen fuel gas torch. The welding parameters and heat control were monitored by Intertek Testing Services Quality Control (QC) inspector Mr. Chung-Fu Kuan at periodic intervals. The minimum preheat temperature of 160 degrees Celsius and maximum interpass temperature of 260 degrees Celsius was verified to meet the WPS requirements by Mr. Kuan and the QA inspector utilizing Tempilstik temperature indicators. This data was entered into the QC inspector's daily log, identifying the location of the repair on a weld map. The SMAW welding average amperage and voltage by clamp type meter and travel speed were verified to be within the welding procedure specification parameter range of 245 amps to 270 amps, 22 volts to 25 volts and travel speed of 132 to 168 mm per minute for the 4.8mm electrode by the QA inspector.

Immediately after the root pass was welded in the repair area, the root pass was inspected by magnetic particle examination by the Nikko Inspection Services QC/NDT technician Mr. Kazuya Kobayashi utilizing the same procedure and equipment as noted above. No relevant indications were reported.

After the root pass was inspected, the JSW welding personnel Mr. Kei Nakasato, identified as number 91-2247 welded three fill passes over the root pass utilizing the Shielded Metal Arc Welding (SMAW) process per the welding procedure specification (WPS) SJ-3011-1. The welding was performed in the 2G (Horizontal) position. The filler metal utilized was identified as 4.8mm diameter, Class E9018-M-H4R, Brand name Hoballoy 9018-M. The preheating was performed by JSW personnel utilizing an oxygen fuel gas torch. The welding parameters and heat control were monitored by Intertek Testing Services Quality Control (QC) inspector Mr. Chung-Fu Kuan at periodic intervals. The minimum preheat temperature of 160 degrees Celsius and maximum interpass temperature of 260 degrees Celsius was verified to meet the WPS requirements by Mr. Kuan and the QA inspector utilizing Tempilstik temperature indicators. This data was entered into the QC inspector's daily log, identifying the location of the repair on a weld map. The SMAW welding average amperage and voltage by clamp type meter and travel speed were verified to be within the welding procedure specification parameter range of 245 amps to 270 amps, 22 volts to 25 volts and travel speed of 132 to 168 mm per minute for the 4.8mm electrode by the QA inspector. The QA inspector periodically observed The Nikko Inspection Services QC/NDT technician Mr. Kazuya Kobayashi perform magnetic particle (MT) testing of West Deviation Saddle Base W2E1 locations where multi-layer tack welds were believed to be cracked. These locations were identified by Intertek Testing Services Quality Control (QC) inspector Mr. Chung-Fu Kuan during visual examination of the multi-layer tack welds. The MT was performed in accordance with ASTM standard E709, Nikko Inspection Services procedure SF-MT-01 using the yoke method with dry visible powder. The yoke dead lift was verified with a 4.65kg test plate. The magnetic field was verified with a field indicating gauge (pie gauge). All calibrations appear to meet the minimum requirements of ASTM E709. The testing was evaluated in accordance with the contract special provisions. 3 tack welds were found to be cracked between rib plate 1-7 and the stem plate 1-2. The cracks were found to be the full length of the tack welds and located at the toe of the tack weld. The testing was not completed on this date and the work appears to meet the minimum requirements of the contract specifications.

After the cracked tack welds were verified, Japan Steel Works Deputy Manager, Mr. Kazunori Sato directed Japan Steel Works personnel to remove the tack welds by grinding. The work was not completed on this date.

On this date the QA representative Joe Lanz traveled to JSW foundry, to monitor the in process casting repair welding on West Deviation Saddle casting W2E1. The welding was performed to build up the thickness of the

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ribs in areas that were found to not meet the minimum thickness of the contract special provisions. The repair locations and repair details for this casting were submitted as number 000643, revision 02. The JSW welding personnel Mr. H. Sato, identified as number 69-2697 started the in process repair welding of Rib 3L, repair 3-4, location C-1 utilizing the Shielded Metal Arc Welding (SMAW) process per the welding procedure specification (WPS) SJ 3026-2. The welding was performed in the 2G (Horizontal) position. The filler metal utilized was identified as 4.8 mm diameter, Class E10016-G, Brand name LB-106. The minimum preheat temperature of 150° degrees Celsius and maximum interpass temperature of 260 degrees Celsius was verified to meet the WPS requirements by the QA inspector utilizing Tempilstik temperature indicators. The SMAW welding average amperage and voltage by clamp type meter and travel speed were verified to be within the welding procedure specification parameter range of 180 amps to 240 amps, 22 volts to 26 volts and travel speed of 115 to 280 mm per minute by the QA inspector. The repair on rib 3L, number 3-4 length is 550 mm, width is 360 mm and maximum depth is 6 mm with an area of 1,998 square centimeters. The work was not completed on this date and appears to meet the minimum requirements of the welding procedure specification and contract documents.

Item	Weld Identification	Applicable WPS	CWI Name	Amperage	Voltage	TravelSpeed	Preheat Temp	Remarks
1	W2E1, EIS-2L	SJ-3011-1	C. Kuan	250 AC	24 AC	140 mm/min.	160° C	K. Nakasato
2	W2E1, 3L	SJ-3026-2	N/A	220 AC	23 AC	200 mm/min.	190° C	H. Sato

### Summary of Conversations:

There were general conversations with Japan Steel Works, Ltd. representative and Mr. Kazunori Sato and Intertek Testing Services Certified Welding Inspectors Mr. Chung-Fu Kuan relative to the location of the welding and inspection personnel in the fabrication shop number 4 and as noted 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 Venkatesh Iyer, (858) 967-6363, who represents the Office of Structural Materials for your project.

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<b>Inspected By:</b>	Lanz,Joe	Quality Assurance Inspector
<b>Reviewed By:</b>	Brasel,Ron	QA Reviewer

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