

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-005093**Date Inspected:** 16-Dec-2008**Project Name:** SAS Superstructure**OSM Arrival Time:** 830**Prime Contractor:** American Bridge/Fluor Enterprises, a JV**OSM Departure Time:** 1830**Contractor:** Japan Steel Works**Location:** Muroran, Japan**CWI Name:** Chung 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:**

Steel Structure Welding Shop:

Tower Saddle Steel Structure T1-3: Caltrans Quality Assurance Inspector (QAI) representative Mr. Wai Pau, traveled to Japan Steel Works (JSW) Muroran plant to observe one welder performed Flux Cored Arc Welding (FCAW) process on a rib #9-10 of T1-3 tower saddle steel structure. The weld numbered 9Y-10V-3-2. The material used for grillage was reported by CWI Mr. Chung Kuan as ASTM 709 Gr-345 plate having a thickness measurement of 120mm. The weld joint design used butt joint, double-V groove partial joint penetration groove weld (PJP). The filler metal and shield gas used for FCAW welding is Hoballoy wire TM-95K2, 1.6 diameter with 100% CO₂ made by Hobart Brothers, USA. The parameters used for FCAW welding of assemblies were conducted in accordance with Caltrans approved WPS #SJ-3012-3. The FCAW welding process and parameters have been monitored and recorded by CWI inspectors Mr. Chung Kuan. Based on Caltrans QA observation, the FCAW welding operation appeared to be in general compliance with requirements of AWS D1.5 2002 and Caltrans contract documents. The welder completed 70 % welding on weld 9Y-10V-3-2 and waited for the tower saddle to be turned to the other side and continue welding. This welding sequence procedure is for prevention of distortion during welding. The turning operation will take four hours to complete.

Tower saddle Steel Structure and Casting T1-1: JSW Mr. Kon, Mr. Nagaya, CWI Mr. Kuan and Caltrans QAI met at JSW welding shop to discuss the T1-1 tower saddle which was found an open gap of 3mm which exceeded the tolerance of Caltrans approved drawing (within 1mm). It happened late night during fit up the base portion and casting portion together. The open gap is caused by over machining. The discussion resulted in JSW use buttering welding method build up to 3mm height and 40mm width from center of stem casting portion. Next, the build up weldment would be ground to a suitable fit up bevel after welding. Then, Magnetic Particle Test (MT) and

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Ultrasonic Testing (UT) will performed to assure free defect on build up portion. Caltrans Informed to JSW Mr. Kon that build up weldment is major repair for welding, he has to file RFI to Caltrans for approval and QAI will refer this information to SMR Nina Choy and Mr. Jay Dorst.

Casting Shop:

West Deviation Saddle Casting W2W1: Caltrans QAI observed Nikko Inspection Service (NIS) NDT level II technician and an assistant performed Wet MT test on non-stamp side of West Deviation Saddle Segment numbered W2W1. The power source of MT testing is used electromagnetic yoke with Alternating Current (AC) made by Magnaflux; model number Y-8 AC/DC. The technique uses wet suspension particles that are applied while the magnetizing force (multi direction) is on. The particle application must cease before the current flow ceases. A flaw indicator used to check the magnetic field direction and to ensure adequate field strength during MT testing. The test surface has been machining and relatively clean and free of grease, oil and other moisture prior MT test.

First, the technician used 10 liter water mixed with 1kg non-fluorescent red magnetic particles in a container for 10 minutes. Next, the mixed wet suspension particle samples have been filled into a measurable glass container for settling volumes standard. The settling volumes have showed on glass container as is 2.3 ml (ASME standard from 1.2 ml to 2.4 ml per 100ml). Then, the technician performed wet MT test, the wet suspension particle carrier by a squeeze bottle. The wet suspension particle is gently sprayed out and flowed over the surface of the test part quickly and easily covered with a relatively uniform layer of particles. The magnetizing force applied immediately after applying the suspension of magnetic particles. The use of wet suspension particles is useful for detecting slightly discontinuities on the smooth surface such as after machining. The discontinuity is forming by magnetic leakage fields and visible indication. The West Deviation Saddle Casting W2W1 appeared to be approximately 80% complete at this time and no relative indication was found on the test surface for today. The wet MT test will continue on 2nd shift.

Tower Saddle Casting T1-3: The QAI periodically observed NIS NDT technicians perform dry MT testing of tower saddle casting T1-3 exterior surface trough area. The dry MT was performed and evaluated in accordance with ASTM standard E709 and Caltrans Special Provisions, using the yoke method. The yoke utilized appeared to be model UM 3BF, serial numbers 93-01. The yoke light output was verified with a Hioki model 3408 light. The magnetic field was verified with a field indicating gauge (pie gauge). Visible dry red magnetic particles were utilized and made by Magnotron, Japan. During MT test numerous indication spots were found on the surface. The size of indication has been marked by NDT technicians for additional grinding repair after UT inspection. Caltrans QAI also used the same MT method and randomly verified some of liner indications.

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A glass container use measure Wet MT power volumes



40mm buttering area on the casing stem portion



T1-1 Casing portion



The weld numbered 9Y-10V-3-2
70 percent weldment completed

Summary of Conversations:

As Note within the report 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 Nina Choy (510)385-5910, who represents the Office of Structural Materials for your project.

Inspected By: Pau,Wai

Quality Assurance Inspector

Reviewed By: Lanz,Joe

QA Reviewer