DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
Office of Structural Materials
Quality Assurance and Source Inspection

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Contract #: 04-0120F4
Cty: SF/ALA Rte: 80 PM: 13.2/13.9
File #: 69.28

WELDING INSPECTION REPORT

Resident Engineer: Pursell, Gary
Address: 333 Burma Road
City: Oakland, CA 94607

Report No: WIR-000519
Date Inspected: 17-Sep-2007

Project Name: SAS Superstructure
Prime Contractor: American Bridge/Fluor Enterprises, a JV
Contractor: Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island

OSM Arrival Time: 630
OSM Departure Time: 1530
Location: Shanghai, China

CWI Name: Ye YongJun

Inspected CWI report:	☐ Yes	☑ No	☐ N/A	**CWI Present:**	☑ Yes	☐ No	
Electrode to specification:	☑ Yes	☐ No	☐ N/A	**Rod Oven in Use:**	☑ Yes	☐ No	☐ N/A
Qualified Welders:	☑ Yes	☐ No	☐ N/A	**Weld Procedures Followed:**	☑ Yes	☐ No	☐ N/A
Approved Drawings:	☑ Yes	☐ No	☐ N/A	**Verified Joint Fit-up:**	☑ Yes	☐ No	☐ N/A
				Approved WPS:	☑ Yes	☐ No	☐ N/A
				Delayed / Cancelled:	☐ Yes	☑ No	☐ N/A

Bridge No: 34-0006
Component: PQR-Mechanical Testing & Ultrasonic Testin

Summary of Items Observed:

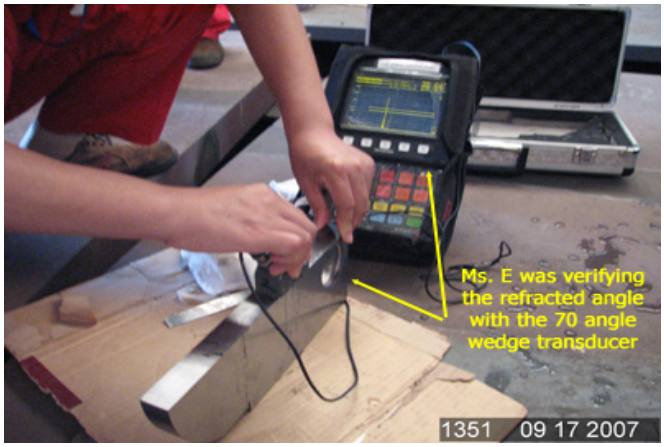
The CALTRANS Quality Assurance (QA) Inspector, Alfredo Acuna was present for the mechanical testing on the welding qualification tests for the procedure qualification record (PQR)PQR HP-2007153-1 scheduled for this project. The testing was at the ZPMC facility in Shanghai, China for the San Francisco Oakland Bay Self Anchored Suspension Bridge. The QA Inspector observed tensile test on reduced sections and all weld metal specimens along with side bends, Charpy Vee Notch (CVN) and macroetch tests. The tests were performed per AWS D1.5, Section 5.18 requirements. The tests appeared to comply with the contract documents with the exception of the charpy V notch tests as noted below. The QA Inspector issued a lot number of B71-056-07 for the PQR HP2007153-1 after the completion of the test. The QA inspector witnessed the CVN testing for the above mentioned PQR. The QA inspector observed that CVN test values from the specimen designated as PQR- HP 2007153-1 were below the minimum required values set forth by AWS D1.5 for fracture critical material. The allowable test value range is of - 30 degrees Celsius minimum. The actual values were of 17 Joules and the minimum required CVN value was 34 Joules for the under matched filler metal jointing A709 HPS 485W material. The QA inspector had a conversation with the ZPMC Welding Engineer Huang Wei. Mr. Huang relayed to the QA inspector that ZPMC rejected the PQR HP 2007153-1 due to the actual CVN values obtained were below the minimum required value. In addition, Mr. Huang said that ZPMC would use other approved PQR's in production instead of this PQR-HP 2007153-1. See TL_6032 for details of this test.
The digital photographs below show the tests results for the PQR-HP 2007153-1.

Item	Description	WBS	Dwg No.	Status

1 Ultrasonic Testing (UT) Demostration on the Weld interception (OBG)

The QA inspector was present during the ZPMC ultrasonic test (UT) demonstration (third demostration test). ZPMC and ABF's intent was to demonstrate that a sound weld could be achieved and ultrasonically tested at the weld intersection. This weld intersection was intented to be a replicate of a box girder connection iontersecting complete joint penetration groove weld. See digital photographs below. The demonstration was held at the ZPMC steel shop # 5, third bay at 1300 hours. ABF representatives Peter Fergunson, Gang Jiao and the QA inspector were present during the demonstration. The QA inspector observed UT technician Li Li Ming performing UT examination at the test plate.

The QA inspector observed that Mr. Li appeared to be following the approved ZPMC UT procedure and contract documents. The QA inspector observed that Mr. Li was verifying the transducer angle wedge by calculating the refracted angle by measuring the run and rise, based on the probe-target relationship in lieu of comparing sound entry index point with the angle marked on the calibrication block. The QA inspector verified both methods and ZPMC appeared to obtain approximate results.

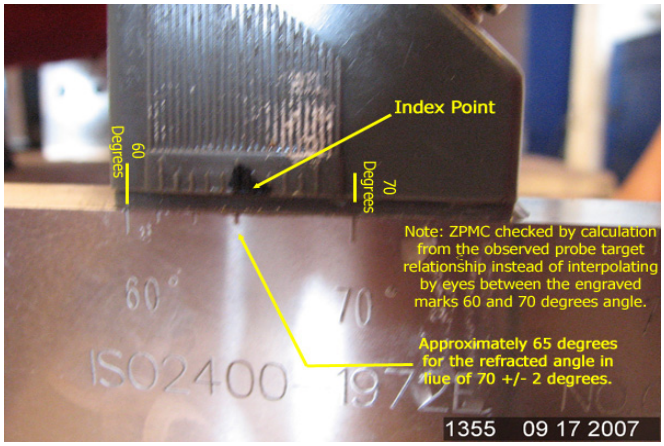


2 ZPMC UT Calibration Angle Verification

The QA inspector witnessed approved ultrasonic testing (UT) level II technician E. Shuiquin calibrating the UT unit with the IIW block type II. The QA inspector observed that Ms. E located the index point and then verified the wedge angle that is scheduled for use. Ms. E made a calculation and wrote it on the steel based on the transducer wedge

postioning and-target relationship. The QA inspector asked the ABF QA inspector Chang Wei of the angle that Ms. E calculated. Mr. Chang relayed that Ms. E calculated an angle at 68 º for the angle wedge transducer combination scheduled for use. The QA inspector checked the location of the index point and verified by visual means an approximate angle of 65º. See digital photograph below that supports this observation. The QA Inspector calculated the angle with the values used by Ms. E based on the wedge transducer combination position and target relationship. The values obtained by the QA inspector concurred approximately with the angle calculated by Ms E which she concluded based on visual means. The QA inspector asked Mr. Chang how Ms. E obtained the 68º angle. Mr. Chang said that ZPMC UT technicians typically memorize factors (without the use of calculator) which is used to multiply and obtain the refracted angle. The QA inspector relayed that he understood that the engraved marks on ZPMC IIW block were not divided equally which could made interpretation by visual means difficult to read. The QA Inspector also voiced that AWS D1.5 recommends that the wedge, transducer angle be checked by a target location. But the QA inspector did not recommend to use this method because AWS D1.5 and ZPMC UT procedure do not address such as an index point. the Caltrans QA Inspector also addressed the relationship of ZPMC's method to check the wedge transducer angle, in addition to the inherited error that could occur for miscalculation.

ZPMC, ABF and the QA inspector verified again the refracted angle from the transducer wedge with a calculator and making interpretation of the index location using visual means. The angle calculated and interpreted was approximately in between 66.5-67 degrees, which exceeded the angle tolerance of ± 2º for the 70º wedge transducer combination being attempted for use. ZPMC resolved to change the transducer.



3 Critical Weld Repair (CWR) CWR-001-Rev1

The QA inspector had a conversation with ZPMC QA inspector Xu Jun. Mr. Xu relayed to the QA inspector that ZPMC was planning to start welding the CWR-001 revision 1. The QA inspector performed fit-up verifications of the subassembly MA-110, skin D lower panel. The QA inspector found that the subassembly MA110 appeared to be in general compliance with the contract documents.

Summary of Conversations:

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

WELDING INSPECTION REPORT

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Inspected By:	Acuna,Alfredo	Quality Assurance Inspector
Reviewed By:	Cuellar,Robert	QA Reviewer