

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 #: 69.25B**QUALITY ASSURANCE -- NON-CONFORMANCE REPORT****Location:** Changxing Island, Shanghai, P.R. China**Report No:** NCR-000497**Prime Contractor:** American Bridge/Fluor Enterprises, a JV**Date:** 28-Oct-2009**Submitting Contractor:** Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island**NCR #:** ZPMC-0470**Type of problem:**

Welding	Concrete	Other	
Welding	Curing	Procedural	Bridge No: 34-0006
Joint fit-up	Coating	Other	Component: 6CW Edge Plate to Deck Plate Splice Welds
Procedural	Procedural	Description: UT scanning pattern D not utilized	

Reference Description: Transverse indications in 6CW discovered with UT after the contractor's NDT acceptance

Description of Non-Conformance:

The Quality Assurance Inspector (QA) performed Ultrasonic Testing (UT) verification utilizing scanning pattern 'D' on weld joint identified as CA-0029-004 for OBG segment 6CW. The weld joint UT scanned connects the Edge Plate to Deck Plate corner joint at work point W2. One class "A" rejectable Transverse Indication was discovered measuring 13mm in length.

This weld was previously tested and accepted by ZPMC QC UT technicians although scanning pattern 'D' was not utilized.

The Y location of this class "A" Transverse Indication is as follow; Y=1182 mm.

The Y locations was taken from panel point 47 side to panel point 44 longitudinal weld seam.

Similarly, the Quality Assurance Inspector (QA) performed Ultrasonic Testing (UT) verification utilizing scanning pattern 'D' on weld joint identified as SEG-031-045 for OBG segment 6CW. The weld joint UT scanned connects the Edge Plate to Deck Plate corner joint at work point W5. One class "A" rejectable Transverse Indication was discovered measuring 10mm in length.

This weld was previously tested and accepted by ZPMC QC UT technicians although scanning pattern 'D' was not utilized.

The Y location of this class "A" Transverse Indication is as follow; Y=700 mm.

The Y locations was taken from panel point 47 side to panel point 44 longitudinal weld seam.

Applicable reference:

1. AWS D1.5-02 Section 6.6.2 "The Contractor shall be responsible for visual inspection and NDT described in 6.7 and necessary correction of all deficiencies in materials and workmanship in conformance with the requirements of Clause 3 and 6.26 and as specified elsewhere in the contract documents."

2. AWS D1.5-02 Section 6.26.3.1 "Welds that are subject to UT in addition to visual inspection shall be acceptable if they meet the following requirements:

QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

(Continued Page 2 of 2)

(1) Welds subject to tensile stress under any condition of loading shall conform to the requirements of Table 6.3.

3. AWS. D1.5-02 6.26.1.1 “The welds shall have no Cracks.”

Who discovered the problem: Subhasis Bera

Name of individual from Contractor notified: Steve Lawton

Time and method of notification: 1500 hours, Verbal

Name of Caltrans Engineer notified: Ching Chao and Bill Howe

Time and method of notification: 1600 hours, Verbal

QC Inspector's Name: Lay Tao

Was QC Inspector aware of the problem: Yes No

Contractor's proposal to correct the problem:

N/A

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, +(86) 134.7247.7571, who represents the Office of Structural Materials for your project.

Inspected By: Carreon,Albert

Lead Reviewer/Task Leader

Reviewed By: Wahbeh,Mazen

SMR

NCR PROPOSED RESOLUTION

To: CALTRANS - SAS Superstructure
333 Burma Road
Oakland CA 94607

Attention: Pursell, Gary
Resident Engineer

Ref: 05.03.06-000460

Subject: NCR No. ZPMC-0470

Dated: 18-Jan-2010

Contract No.: 04-0120F4
04-SF-80-13.2 / 13.9

Job Name: SAS Superstructure

Document No.: ABF-NPR-000512 Rev: 00

Contractor's Proposed Resolution:

Reference Resolution: As a means of preventing future occurrences, the ABF QCM has performed refresher UT training. See attached UT training agenda and attendance roster.

As it is necessary to respond to the NCR with a proposed plan of action, ABF is doing so without all of the repair documentation at this time. As a means of preventing future occurrences, the ABF QCM has performed refresher UT training. See attached UT training agenda and attendance roster. The ABF QCM has been discussing missed UT indications with the ZPMC QCM and related NDT supervisory personnel. The ZPMC level III is in the process of assessing personnel, techniques and equipment. ABF has purchased GE Technology transducers to distribute to both ZPMC and ABF UT personnel in a cooperative effort to match the equipment of CT. These transducers will arrive to the job site approximately the end of January 10 at which time they will be put into immediate use. ZPMC requests this NCR be placed in the Approved Action Pending status category until such time that all the repair documents have been assembled and submitted.

Submitted by: Lawton, Steve

Attachment(s): ABF-NPR-000512R00;

Caltrans' comments:

Status: AAP

Date: 24-Jan-2010

The preventative measures taken by the QCM and the proposed resolution for closing NCR submitted by the contractor are acceptable. The NCR will be closed upon completion of the repair and review of the repair documents by the Engineer when submitted by the contractor.

Submitted by: Chao, Ching

Attachment(s):

Date: 24-Jan-2010

UT Refresher Training Agenda

Subject: UT Techniques

Reason for Training: Several CT NCR's for missed UT indications

1. Safety

- a. Safety Glasses
- b. Gloves (if required)
- c. Knee Pads
- d. Electrical Shock

2. Tools

- a. Calibrated UT Machine condition of machine
- b. Coaxial cable condition of cable
- c. Transducer condition of transducer
- d. IIW Block
- e. Scraper
- f. UT couplant

3. Inspection Techniques

- a. Surface preparation
- b. Location of weld UT from beveled plate
- c. Scanning patterns
- d. Correct choice of Angles
- e. Calibration per ZPMC procedure at regular intervals
- f. Scanning speed
- g. Know where your sound is at.... First leg, second leg etc...

4. Inspection Criteria

- a. Table 6.3 or Table 6.4
- b. Are surface inspections complete VT and or MT should always occur before UT
- c. Scanning Levels
- d. Criteria dictated by the thinner of the two members
- e. Planar flaws



教育培训纪录

培训编号:

培训内容:	UT复习培训教程 UT Techniques
培训对象:	ZPMC UT GUYS
授课人员:	STEVE LAWTON
培训类型:	UT Refresher Training Agenda
培训时间:	2009. 12. 24. 16:30
计划培训地点:	ZPMC NDT OFFICE

人员签到:

姓名	部门	姓名	部门
戴建 dai jian	江江 Jiang Jiang		
薛宇 xue yu	黄廷 Huang Ting		
马志长 ma zhi chang	黄廷 Huang Ting		
谭善 tan shan	李黎明 Li Liming		
马健 ma jian	李黎明 Li Liming		
王福 wang fu	徐军 Xu Jun		
沈健 shen jian	李黎明 Li Liming		
黄江 Huang Jiang			
金峰 jin feng			
吴文 wu wen			
解文 jie wen			
周海周 zhou hai zhou			
徐峰 xu feng			

NCR PROPOSED RESOLUTION

To: CALTRANS - SAS Superstructure
333 Burma Road
Oakland CA 94607

Attention: Pursell, Gary
Resident Engineer

Ref: 05.03.06-000460

Subject: NCR No. ZPMC-0470

Dated: 24-Feb-2010

Contract No.: 04-0120F4
04-SF-80-13.2 / 13.9

Job Name: SAS Superstructure

Document No.: ABF-NPR-000512 Rev: 01

Contractor's Proposed Resolution:

Reference Resolution: ZPMC has repaired the indication referenced in the NCR and is attaching the CWR and related NDT documentation to show that the weld is acceptable. ZPMC requests that this NCR be closed.

ZPMC has repaired the indication referenced in the NCR and is attaching the CWR and related NDT documentation to show that the weld is acceptable. ZPMC requests that this NCR be closed.

Submitted by: Ishibashi, Joshua

Attachment(s): ABF-NPR-000512R01;

Caltrans' comments:

Status: CLO

Date: 17-Mar-2010

The documentation received is sufficient to close this NCR.

Submitted by: Howe, Bill

Date: 17-Mar-2010

Attachment(s):



No. B-611

LETTER OF RESPONSE

TO: American Bridge/Flour

DATE: 2010-2-21

REGARDING: NCR-000497(ZPMC-0470)

With this letter of response, ZPMC requests closure of CT NCR-000497(ZPMC-0470), what mentioned that CT Inspector observed missed UT indication by ZPMC QC.

- ZPMC noticed this indication was found by utilizing scanning pattern D method and it was missed during ZPMC's UT process.
- The related CWR was issued reflecting to this Class "A" indication in Weld ID: CA029-004.
- After repair, NDT were performed to warrant the welds' quality.
- Refresh training has been performed by ABF QCM, to improve QC's technique.

Based on the taken action and attached documentations, ZPMC requests closure of this NCR.

ATTACHMENT:

NCR-000497(ZPMC-0470)

B-CWR1058 R1

UT-6W-019R3

A handwritten signature in black ink, appearing to be 'J. M. W.' or similar, written in a cursive style.

2/21/10



DEPARTMENT OF TRANSPORTATION - District 4 Toll Bridge
333 Burma Road
Oakland CA 94607
Tel: Fax:

NON-CONFORMANCE REPORT TRANSMITTAL

To: AMERICAN BRIDGE/FLUOR, A JV
375 BURMA ROAD
OAKLAND CA 95607

Date: 11-Dec-2009

Contract No: 04-0120F4
04-SF-80-13.2 / 13.9

Dear: Mr. Charles Kanapicki

Job Name: SAS Superstructure

Attention: Mr. Thomas Nilsson Project/Fabrication Manager

Document No: 05.03.06-000460

Subject: NCR No. ZPMC-0470

Reference Description: Transverse indications in 6CW discovered with UT after the contractor's NDT acceptance

The attached Non-Conformance Report describes an occurrence where the contractor did not comply with a requirement of the contract document as indicated below:

- Material or Workmanship not in conformance with contract documents.
- Quality Control (QC) not performed in conformance with contract documents.
- Recurring QC issue that constitutes a systematic problem in quality control.
- Non-Conformance Resolved.

Material Location: OBG

Lift: 06

Remarks:

The Quality Assurance Inspector (QA) performed Ultrasonic Testing (UT) verification utilizing scanning pattern 'D' on weld joint identified as CA-0029-004 for OBG segment 6CW. The weld joint UT scanned connects the Edge Plate to Deck Plate corner joint at work point W2. One class "A" rejectable Transverse Indication was discovered measuring 13mm in length.

This weld was previously tested and accepted by ZPMC QC UT technicians although scanning pattern 'D' was not utilized.

Action Required and/or Action Taken:

Submit a repair procedure to the engineer for approval.

Transmitted by: Bill Howe

Attachments: ZPMC-0470

cc: Rick Morrow, Gary Pursell, Peter Siegenthaler, Stanley Ku, Brian Boal, Jason Tom, Contract Files, Ching Chao
File: 05.03.06

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Office of Structural Materials

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QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

(Continued Page 2 of 2)

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Who discovered the problem: Subhasis Bera

Name of individual from Contractor notified: Steve Lawton

Time and method of notification: 1500 hours, Verbal

Name of Caltrans Engineer notified: Ching Chao and Bill Howe

Time and method of notification: 1600 hours, Verbal

QC Inspector's Name: Lay Tao

Was QC Inspector aware of the problem: Yes No

Contractor's proposal to correct the problem:

N/A

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, +(86) 134.7247.7571, who represents the Office of Structural Materials for your project.

Inspected By: Carreon,Albert

Lead Reviewer/Task Leader

Reviewed By: Wahbeh,Mazen

SMR

DEPARTMENT OF TRANSPORTATION

CHINA FABRICATION TEAM

666 Feng Bin Road

Changyang Island, Shanghai, PRC



REVIEW OF CONTRACTOR'S SUBMITTAL

To: Thomas Nilsson, American Bridge/Fluor, a Joint Venture
Gary Pursell, Resident Engineer

Review Date: Jan-21-2010From: Eric Tsang, Structural Materials RepresentativeContract No.: 04-0120F4Date/Time Submittal Received: Jan-21-2010/ 13:20
 China Standard Time
 (GMT+08:00)
Contractor's Transmittal #: AFC-CAL-TRN-005371Rev. # 0

<input checked="" type="checkbox"/> substantially complies with contract requirements and is approved			
<input type="checkbox"/> substantially complies with contract requirements and is approved as noted.			
<input type="checkbox"/> Lacks sufficient information and/or contains unacceptable items that must be corrected or prior to resubmittal			
Verbal Notification		<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes
		Date:	Time:
Name of individual from Contractor Notified:			
This submittal is a:	<input type="checkbox"/> Welding Report	<input checked="" type="checkbox"/> Critical Weld Repair	
	<input type="checkbox"/> Request for Information	<input type="checkbox"/> Heat Straightening Request	
	<input type="checkbox"/> Fabrication Procedures	<input type="checkbox"/> Other:	
Submitting Contractor: <u>American Bridge – Fluor, a Joint Venture</u>			
ITEMS REVIEWED	COMPLIES		COMMENTS
1.	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	UT Rejects From Initial Repair, DP to EP Longitudinal Weld, W2 Line, 6CW

Remarks:

Reviewer: Jim Simonis

Date: Jan-21-2010
 Construction Concurrence: JS Initial 1/22/10 Date

Received by (ABFJV): _____ Date: _____ Time: _____



关键焊缝返修报告

Critical Welding Repair Report (CWR)

版本
Rev. No.:

1

项目名称 Project Name:	美国海湾大桥 SFOBB	部件图号 Drawing No.:	Lift 6W	报告编号 Report No.:	B-CWR1058
合同号 Contract No.:	04-0120F4	部件名称 Item Name:	6CW longitudinal corner splice weld	NDT 报告编号 NDT Report No.:	NA
项目编号 Project No.:	ZP06-787				

Description:

描述:

These defects are located in repair areas from CWR1058.

这些缺陷在B-CWR1058的位置。

WJ No. 焊缝编号: CA029-002, CA029-004, CA029-006

Location位置: 2G/4G

Welding process焊接方法: SMAW

Li Liming 2010.1.21

检验员 (Inspector): Li Liming 日期 (Date): 2010-1-21

焊缝返修位置示意图:

Draft of Welding Discontinuity:

SEE ATTACHMENTS
见附件

This document is APPROVED
State of California
DEPARTMENT OF TRANSPORTATION
Pursuant to Section 5-1.02 of the
Standard Specifications
Initial *sh* Date: 1/22/10

Cause:

原因:

1. The excavation was not in the correct location, relative to the "x" value.
之前没有碳刨到正确的位置, 主要是 "x" 方向有误。
2. Inter pass cleaning may not have been adequate for all SMAW passes, very small defects as indicated in the UT report db readings.
对于SMAW焊道间的清理可能不到位, 通过UT报告来看, 其中有许多很小的缺陷。

车间负责人 (Foreman): *MaRuiguan*

日期 (Date): *2010.1.21*

This document is APPROVED
State of California
DEPARTMENT OF TRANSPORTATION
Pursuant to Section 5-1.02 of the
Standard Specifications
Initial *FW* Date: *1/22/10*

Disposition:

处理方法:

ABF assist to lay out repair area prior performing repairs. Notify CT prior to laying out/performing repairs.

ABF 在焊接返修前协助ZPMC进行定位。在定位/返修前通知CT。

1. Successful repairs are achievable only when careful application of *all* of the following process steps are carried out in sequence without variation.

只有当采用了如下所有的方法并按照顺序正确执行后，才可以成功得进行返修。

- a. Careful excavation of all defects and preparation of the repair site are paramount to a successful repair, and the grinding should be continuous unless a long portion of weld is removed
对超标和不超标的缺陷进行仔细地挖掘和焊接前对返修区域很好的处理是对成功得返修极为关键的。
- b. Provide positive controls and MT tests to ensure the complete removal of the defects.
提供正确得控制和MT检测，以确保缺陷完全被清除干净。
- c. Clean the repair site to remove foreign matter and debris before the start of any work.
在进行任何工作前，对返修区域清理干净。
- d. Apply preheat of at least 160°C to the repair and insure that the preheat covers a sufficient area of the repair.
对返修区域进行预热，并确保在足够的区域内达到足够的预热温度。
- e. Weld the repair in accordance to an approved welding procedure.
根据批准的WPS进行返修。
- f. Apply postheat blankets and heaters to maintain the proper postweld heat (at least one hour at 160°C) for the required time.
对返修后进行足够时间的后热处理，并使用电加热板进行。至少保证160°C一小时。
- g. Allow parts to cool to ambient temperature and wait the required time (48 hours minimum) before performing nondestructive evaluation of the repair site.
等构件冷却到室温并等待48小时后才能对返修区域进行NDT检测。

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DEPARTMENT OF TRANSPORTATION
Pursuant to Section 5-1.02 of the
Standard Specifications
Initial *[Signature]* Date 1/22/00

2. Excavation of the defect.

缺陷的挖掘清除

- b. Any contaminants present in the area to be repaired, such as rust, paint, UT gel etc, shall be removed before any gouging or grinding to remove the weld defect is done.
任何返修区域内的杂物，比如锈迹，油漆，UT的浆糊等，都应在对焊缝缺陷进行碳刨和打磨前清理干净。
- c. Using air-arc gouging or grinding to remove the weld defect including the material above and to either side of the defect to the prescribed limits. Removal shall be witnessed by the CWI and MT verify that the defect was located and totally removed.
使用碳刨或者打磨的方法对焊缝的缺陷消除，包括缺陷上面和左右的材料。碳刨过程需有CWI见证，确保缺陷的位置和缺陷完全被消除。之后MT确认。
- d. Preheat to 65° C before performing any gouging to remove weld metal defects.
在开始对焊缝缺陷进行碳刨，对焊缝预热到 65° C.
- e. Excavation shall be as long as necessary to remove any defects that are extend 50mm by each side.
碳刨应去除缺陷并左右延伸各50mm的区域。
- f. All excavations shall be ground to bright metal and 100% MT verify that no indication prior to doing any welding.
在进行焊接前对碳刨区域打磨出金属光泽。100%MT确认无缺陷。
- g. Excavation of material shall be limited to no more than 4 mm per pass and the depth of excavation shall not exceed 2/3T ±2mm.
每层碳刨深度不能大于4mm。碳刨的总深度不能大于2/3的板厚±2mm。
- h. When a crack is still present and excavations have reached the 2/3T +2mm maximum, and repair work shall proceed in accordance with one of the following procedures:
如果，当碳刨深度已经达到了2/3的板厚±2mm，但MT显示缺陷仍存在，则返修工作需要按照下述的两条要求进行。

Disposition:

处理方法:

1. repair both sides of excavation

两面进行碳刨和返修

a. preheat repair area to 65°C prior to performing any gouging.

碳刨前预热至65度。

b. specify limit that the excavation to no more than 4mm per pass

每一道碳刨量深度不能大于4mm.

c. prepare excavation such that all metal is ground clean to a smooth, shiny metal finish and starts and stops are tapered to a 1:1 slope.

碳刨后将坡口打磨平滑, 且挖出的凹槽部分两个端头要有 1:1 的斜式过渡。

d. preheat to 160°C in accordance with table 1 and maintain this temperature throughout the entire repair procedure, including backgouging and welding of opposite side.

按照表一的要求预热到 160 度, 并且该温度要求持续整个焊接过程, 包括反面清根和反面的焊接。

e. weld first side of repair in accordance with the approved WPS.

按照批准的 WPS 进行第一个面的焊接。

f. excavate from the opposite side until sound weld metal is reached.

从反面进行碳刨和打磨直至露出金属光泽。

g. perform 100% MT of excavation to ensure crack has been removed entirely.

对碳刨出的坡口位置进行 100% 的 MT 检测, 确保裂纹消除干净。

h. prepare excavation such that all metal is ground clean to a smooth, shiny metal finish and starts and stops are tapered to a 1:1 slope.

对碳刨出的坡口要进行打磨平滑, 确保连个端头有 1:1 的斜式过渡。

i. weld opposite side of repair in accordance with the approved WPS.

按照 WPS 的要求进行反面的焊接。

j. after weld has been completed, apply post weld heat treatment (PWHT) in accordance with the temperature requirements of table 1 for a minimum of one hour.

焊接完成后, 按照表 1 的要求对焊缝进行后热处理, 处理时间至少 1 小时。

k. once repair has undergone the required PWHT, allow weld to cool gradually by automatic control of the heat machine. And the cooling speed has a maximum of 50°C per hour.

后热结束后, 需要对焊缝进行保温, 进行缓冷处理, 最大冷去速度为 50°C/h.

2. repairing in two stages 第2种返修方案

a. initial excavation 初步碳刨

i preheat repair area to 65°C prior to performing any gouging .

碳刨前加热到 65 度。

ii excavation of material shall be limited to no more than 4mm per pass.

碳刨的过程要注意每层刨除掉的焊缝厚度不能大于 4mm.

iii prepare excavation such that all metal is ground clean to a smooth, shiny metal finish and starts and stops are tapered to a 1:1 slope.

对碳刨出的坡口要进行打磨平滑, 确保连个端头有 1:1 的斜式过渡。

iv preheat to 160°C in accordance with table 1 and maintain this temperature throughout the entire repair procedure.

按照表一的要求预热到 160 度, 并且该温度要求持续整个焊接过程。

v weld first side of repair in accordance with the approved WPS.

按照批准的 WPS 进行第一个面的焊接。

vi after weld has been completed, apply PWHT in accordance with the temperature requirements of table 1 for a minimum of one hour.

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Initial *SW* Date 1/22/10

vii once repair has undergone the required PWHT, allow weld to cool gradually by automatic control of the heat machine. And the cooling speed has a maximum of 50°C per hour. 后热结束后, 需要对焊缝进行保温, 进行缓冷处理, 最大冷去速度为 50°C/h.

b. repair of opposite side

反面的返修

i preheat repair area to 65°C prior to performing any gouging .
碳刨前加热到 65 度。

ii excavation of material shall be limited to no more than 4mm per pass.
碳刨的过程要注意每层刨除掉的焊缝厚度不能大于 4mm.

iii prepare excavation such that all metal is ground clean to a smooth, shiny metal finish and starts and stops are tapered to a 1:1 slope.
对碳刨出的坡口要进行打磨平滑, 确保连个端头有 1:1 的斜式过渡。

iv preheat to 160°C in accordance with table 1 and maintain this temperature throughout the entire repair procedure.

按照表一的要求预热到 160 度, 并且该温度要求持续整个焊接过程。

v perform 100% MT of excavation to ensure crack has been removed entirely.
100%MT 确保所有的裂纹已经彻底移除干净。

vi weld opposite side of repair in accordance with the approved WPS.
按照 WPS 的要求进行反面的焊接。

vii after weld has been completed, apply post weld heat treatment (PWHT) in accordance with the temperature requirements of table 1 for a minimum of one hour.
焊接完成后, 按照表 1 的要求对焊缝进行后热处理, 处理时间至少 1 小时。

viii once repair has undergone the required PWHT, allow weld to cool gradually by automatic control of the heat machine. And the cooling speed has a maximum of 50°C per hour. 后热结束后, 需要对焊缝进行保温, 进行缓冷处理, 最大冷去速度为 50°C/h.

i. When the weld defect appears to have been removed the groove shall be ground clean to bright metal and the excavation shall be tested for complete defect removal using 100% MT per approved procedure.
当缺陷看似被清理后, 对清理区域进行打磨到金属光泽并使用 100%MT 确认缺陷移除干净。

j. If all indications are removed, the weld defect is considered to have been removed. No welding shall begin except on two sided repairs until all 100% MT indications have been removed.
如果所有的 MT 指示均被移除, 则认为所有的缺陷均被移除。在 MT 指示均被移除之前, 不得进行任何焊接。除非是双面返修。

k. Once the proper depth is reached, the groove shall be tapered to the surface of the existing weld by grinding at a slope of 1 to 1. The excavation of the defect shall extend a minimum of 50mm beyond each end of the defect including the taper.
当碳刨完成后, 碳刨表面应打磨成 1:1 的斜势。而且碳刨应在缺陷位置向两边各延伸 50mm, 包括斜势。

l. k. When all grinding is completed in the area to be repaired, a final 100%MT test will be run by QC personnel to verify that all indications have been removed.
返修区域打磨完成后, 应有 QC 进行 100%MT, 以确认所有的指示都已清除。

m. After the gouge is accepted by QC, the entire area shall be cleaned to remove all traces of loose debris and MT powder.

碳刨得到 QC 的验收后, 整个范围内的杂物比如小碎片和 MT 干磁粉等均需清理干净。

3. Welding.

焊接

a. Preheat shall be applied to the repair area in such a way that the entire area to be repaired and all adjacent material out to a distance of 75mm in all directions of excavation, heated to the higher of the appropriate value shown in Table 1. Preheat application is always stated as a minimum value. Higher preheat values

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Disposition:

处理方法:

必须对返修区域, 包括返修点周边 75mm 范围内进行预热, 预热温度应高于下面表 1 中的规定温度。预热温度要求始终只是一个最低值。如果接头的拘束应力很大的话, 也可以要求更高的预热温度值。

b. SMAW filler metal shall be rated to a hydrogen level of H4 or better.

SMAW 焊材的扩散氢等级必须等于或低于 H4。

c. The groove shall be filled using the approved SMAW or SAW filler metal in accordance with an approved WPS.

坡口应使用并根据批准的 SMAW 或者 SAW 进行焊接。

d. Once the preheating process is started the repair area shall be maintained at this preheat level until all welding is completed. This includes any additional time to remove the defect from the second side gouge. 当预热开始直到焊接结束, 返修区域的温度应始终维持。这也包括从反面碳刨将缺陷移除的预热时间。

e. The CWI shall verify that the welder understands all starts and stops which has bad formation are to be ground before an arc is struck on them to provide a means to tie the next weld pass into the end of the weld.

CWI 应该确保焊工在层间清理时能对层间成型不好的位置进行适当的打磨, 以使下一道焊接能融合到前一道。

f. Before welding over previously deposited metal, all slag shall be removed and the weld and adjacent base metal shall be brushed clean.

开始下一道焊接前, 所有的焊渣必须清理, 而且焊道和周边母材必须刷干净。

g. Preheat shall be maintained on the repair continuously once it is first applied until the weld is complete and the postweld heating phase begins at once.

预热温度在整个返修过程中必须维持好, 直到焊接结束。结束后, 立即就开始后热处理。

4. Postweld Heat Treatment.

后热处理

a. After welding is completed but before the temperature falls below that of the preheat value from Table 1, it shall be maintained at the post heat temperature shown in Table 1.

当焊接结束后, 等温度降到表1规定的最低预热温度前, 后热温度必须保持在表1中的规定温度。

b. Post weld heating shall be maintained for a minimum of 1 hour.

后热处理至少1小时。

c. After the post weld heating time has been reached the repair shall be cooled by removing the heating source and leaving the blankets in place or by another method that will insure the temperature is cooling down gradually. And the cooling speed has a maximum of 50°C per hour.

后热结束后, 通过移除加热源并用保温毯放在焊缝上或者其他方法, 使焊缝能够缓冷, 最大冷去速度为50°C/h。

d. Per the specification require performing the Final UT, MT and Visual inspections, which shall be done at least after 48 hours have passed after the weld repair area has cooled to ambient temperature.

只有当焊缝冷却到室温后的48小时之后, 才能开始最终的UT, MT和VT检测。

e. Perform all NDT in accordance with contract plans as well as ABF approved procedure by ABF/CT, ZPMC will coordinate.

返修结束之后, ABF和CT 按照标书要求和ABF批准的工艺对焊缝进行NDT检测, ZPMC进行配合。

f. All inspection activities shall be documented which includes backgouge inspections.

所有的检验工作均应被记录成文件, 也包括碳刨的检验。

工艺: *Nintiefeng*
Technical Engineer: *2010.1.21*

审核: *Lou Pawhus*
Approved By:

日期: *1/21/10*
Date:

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关键焊缝返修报告

Critical Welding Repair Report (CWR)

版本
Rev. No.:

1

项目名称 Project Name:	美国海湾大桥 SFOBB	部件图号 Drawing No.:	Lift 6W	报告编号 Report No.:	B-CWR1058
合同号 Contract No.:	04-0120F4	部件名称 Item Name:	6CW longitudinal corner splice weld	NDT 报告编号 NDT Report No.:	NA
项目编号 Project No.:	ZP06-787				

纠正措施:

Corrective Action to Prevent Re-occurrence:

1. All new segments splice welds shall be strictly controlled by the Lead CWI
所有新的箱体拼缝的焊接应有LEAD CWI严格监控。
2. All welding parameters shall be verified and recorded.
所有的焊接参数应被确认并记录成报告。
3. Welds shall be made using SMAW (H4) and / or SAW only. FCAW WPS using Supercored 71H shall be approved by ABF JV prior to use. Elevated preheats and postheats may be required by this procedure above what is required for normal SMAW or SAW welding.
必须只能使用SMAW (H4) 和/或SAW进行焊接。FCAW的方法必须通过ABF的审核后才能使用。而且, FCAW的预热温度和后热温度可能相对普通的SMAW和SAW情况时, 需要适当提高。
4. ZPMC shall document and provide results of all the inspections conducted
ZPMC必须记录所有的检验, 并将所有检验报告提交。
 - a. 100%VT of excavation and 50mm either side of the weld excavation.
对碳刨区域和两边50mm范围内碳刨后进行100%VT
 - b. 100%MT of excavation and 50mm either side of the weld excavation.
对碳刨区域和两边 50mm 范围内碳刨后进行 100%MT
 - c. Interpass cleaning.
层间清理
 - d. VT of repaired area.
返修区域返修后的VT
 - e. MT of repaired area.
返修区域返修后的MT
 - f. UT of repaired area.
返修区域返修后的UT
5. All the new segment splice weld joint shall be under the fabrication and control according to the revised welding procedure which all agreed by three parties.
以后环缝烧焊要按照三方同意的最新的焊接工艺的要求进行生产和监控。

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Table 1: Preheat & Postheat Requirements for Various Metal Thicknesses

表1 预热和后热温度表

Base Metal Thickness 母材厚度	Minimum Preheat 最低预热温度	Minimum Postheat 最低后热温度
T ≤ 40mm	160°C	160°C
40mm < T	200°C	200°C

车间负责人 (Foreman): *MaRuiguan*

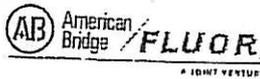
日期 (Date): 2010. 1. 21

参照的WPS编号 Repair WPS No.:		WPS-345-SMAW-2 G(2F)-FCM-Repair -1 WPS-345-SMAW-4 G(4F)-FCM-Repair -1		工艺员 Technologist:		N. utie feng 1/21/10	
返修(碳刨)前预热温度 Preheat Temperature Before Gouging:				返修的缺陷 Description of Discontinuity:			
焊前处理检查 Inspection Before Welding:				焊前预热温度 Preheat Temperature Before Welding:			
最大碳刨深度 Max. Depth of Gouge:				碳刨总长 Total Length of Gouge:			
焊工 Welder:		焊接类型 Welding Type:		焊接位置 Position:			
焊接电流 Current:		焊接电压 Voltage:		焊接速度 Speed:			
返修后检查 Inspection After Repair:							
外观检查 VT Result:		检验员 Inspector:		日期 Date:			
NDT复检 NDT Result:		探伤员 NDT Person:		日期 Date:			
见证: Witness/Review:							
备注: Remark:							

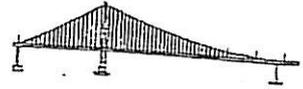
#R787-QCP-900

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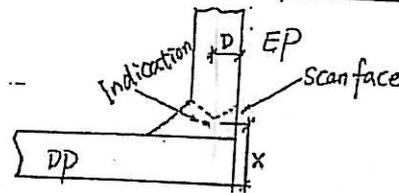
UT Report

Project Name: SFOBB SAS Bridge.

Date: 2010. 1. 20

Lift / Segment No.: 6CW Location: DP to EP-W₂R₁ Report Number: UT-6W-019R1

Refer to the attached sketch.



Material:- A709	Thickness:- 28/20	Examination Specification:- AWS D1.5
Surface Condition:- <input type="checkbox"/> As Welded <input checked="" type="checkbox"/> Dressed	Acceptance Criteria:- AWS D1.5 Table 6.3	
Type of Instrument:- HS610E	Test Procedure Number:- ZPQC-UT-01	
Type of Transducer:- 2.5P20, 2P20 X20A70	Reference Block:- IIW	
Transducer Angle:- 0° 70°	Couplant:- CMC Paste	
Welding Process:- <input type="checkbox"/> FCAW <input checked="" type="checkbox"/> SMAW <input type="checkbox"/> GMAW <input type="checkbox"/> SAW		

Weld No.	Indication No.	Scan Face	Dimensions (mm)				Indication Rating "d"	Evaluation	Inspector	Inspection Date
			"Y" from O Axis	"X"	Length "L"	Depth "D"				
DP to EP-W ₂ R ₁ -1		outside	16975	20	10	9.2	+19	TLI, ACC	5004	2010. 1. 20
6A029-00200400612	2		17635	19	12	11.8	+15	TLI, Rej	5021	
	3		18040	22	100	20.2	+9	LLI, Rej		
	4		18315	20	15	10.3	+16	TLI, Rej		
	5		18330	28	12	7.3	+16			

Observation:-
 Scanning Pattern:- A, B, C, D
 Pattern D conducted inline with Transverse Segment Assembly Splice Ultrasonic Testing Procedure.

Legend: ACC-Accept, REJ-Reject, TLI-Transverse Linear Indication, LLI-Longitudinal Linear Indication, RI-Rounded Indication, LF-Lack of Fusion.

Prepared By:- ZPMC	ABEJV	Reviewed By:-	ABEJV
Name	Ding Bao Hua	Name	STEVE LAWTON
Sign	BH (5002)	Sign	[Signature]
Position		Position	FOAM / LEVEL III
Date	2010. 1. 20.	Date	21 JAN. 10

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 #: xx.25A**QUALITY ASSURANCE -- NON-CONFORMANCE RESOLUTION****Location:** Changxing Island, Shanghai, P.R. China**Report No:** NCS-000571**Prime Contractor:** American Bridge/Fluor Enterprises, a JV**Date:** 29-Mar-2010**Submitting Contractor:** Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island **NCR #:** ZPMC-0470**Type of problem:**

Welding	Concrete	Other	
Welding	Curing	Procedural	Bridge No: 34-0006
Joint fit-up	Coating	Other	Component:
Procedural	Procedural	Descriptor:	

Date the Non-Conformance Report was written: 28-Oct-2009**Description of Non-Conformance:**

The Quality Assurance Inspector (QA) performed Ultrasonic Testing (UT) verification utilizing scanning pattern 'D' on weld joint identified as CA-0029-004 for OBG segment 6CW. The weld joint UT scanned connects the Edge Plate to Deck Plate corner joint at work point W2. One class "A" rejectable Transverse Indication was discovered measuring 13mm in length.

This weld was previously tested and accepted by ZPMC QC UT technicians although scanning pattern 'D' was not utilized.

The Y location of this class "A" Transverse Indication is as follow; Y=1182 mm.

The Y locations was taken from panel point 47 side to panel point 44 longitudinal weld seam.

Similarly, the Quality Assurance Inspector (QA) performed Ultrasonic Testing (UT) verification utilizing scanning pattern 'D' on weld joint identified as SEG-031-045 for OBG segment 6CW. The weld joint UT scanned connects the Edge Plate to Deck Plate corner joint at work point W5. One class "A" rejectable Transverse Indication was discovered measuring 10mm in length.

This weld was previously tested and accepted by ZPMC QC UT technicians although scanning pattern 'D' was not utilized.

The Y location of this class "A" Transverse Indication is as follow; Y=700 mm.

The Y locations was taken from panel point 47 side to panel point 44 longitudinal weld seam.

Contractor's proposal to correct the problem:

Repair said indications and perform NDT required to verify weld quality

Corrective action taken:

Contractor submitted approved CWR used to perform repairs along with subsequent NDT documentation verifying the welds are now in conformance with Contract specifications.

Did corrective action require Engineer's approval?

QUALITY ASSURANCE -- NON-CONFORMANCE RESOLUTION

(Continued Page 2 of 2)

Yes No

If so, name of Engineer providing approval:

Date:

Is Engineer's approval attached? Yes No

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 Jim Simonis 152. 1675.3703, who represents the Office of Structural Materials for your project.

Inspected By: Simonis,Jim

Quality Assurance Inspector

Reviewed By: Wahbeh,Mazen

QA Reviewer