

**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-000750**Prime Contractor:** American Bridge/Fluor Enterprises, a JV**Date:** 28-May-2010**Submitting Contractor:** Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island**NCR #:** ZPMC-0713**Type of problem:**

<b>Welding</b>	<b>Concrete</b>	<b>Other</b>	
<b>Welding</b>	<b>Curing</b>	<b>Procedural</b>	<b>Bridge No:</b> 34-0006
<b>Joint fit-up</b>	<b>Coating</b>	<b>Other</b>	<b>Component:</b> OBG Traveler Rail 20TR2-013
<b>Procedural</b>	<b>Procedural</b>	<b>Description:</b>	

**Reference Description:** Excessive heat was utilized during heat straightening of the traveler rail 20TR2-013**Description of Non-Conformance:**

During the Quality Assurance (QA) random in-process observations of the fabrication of OBG Traveler Rail (TR), this Caltrans QA Inspector observed the following:

- ZPMC personnel performed heat straightening of the traveler rail flange base plate. The material was heated to a bright red condition and the temperature is above 650°C.
- Per ZPMC Heat Straightening Report identified as HSR1 (B)-8350, the maximum allowable temperature is 650°C.
- The AWS D1.5 Section 3.7.3 states that the heated steel shall not exceed 650°C, which gives a dull red color.
- This QA Inspector observed the 760°C Tempilstik was melted when struck against the red base metal.
- A temperature indicating crayon, digital temperature measurement gauge, or other similar means of monitoring the temperature was not utilized by ZPMC QC and the actual maximum attained temperature was not measured.
- The Traveler rail is identified as 20TR2-013.
- The affected area was measured at Y location 800mm when measured from nearest leading edge, having a total area 150 x 1200mm.
- Additionally, this QA Inspector observed ZPMC apply a 13 Tons load on the Traveler rail.
- ZPMC HSR1 Report doesn't specify the exact weight or weight range to be applied on the TR during heat straightening process.
- This TR is located in fabrication Bay#5.

# QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

( Continued Page 2 of 3 )



## Applicable reference:

AWS 1.5 2002 section 3.7.3 "Members distorted by welding shall be straightened by mechanical means or by carefully supervised application of a limited amount of localized heat as approved by the Engineer. The temperature of the heated areas as measured by approved methods shall not exceed 600°C [1100°F] for quenched and tempered steel nor 650°C [1200°F] (a dull, red color) for other steels. The part to be heated for straightening shall be substantially free of stress and from external forces, except those stresses resulting from the mechanical straightening method used in conjunction with the application of heat."

**Who discovered the problem:** Surendra Prabhu.

**Name of individual from Contractor notified:** Chen Ji Wei

**Time and method of notification:** 1425 Hrs, 05/28/10, Verbal

**Name of Caltrans Engineer notified:** Stanley Ku, Sean Eagen

**Time and method of notification:** 1900 hours, 05/28/10, Email

**QC Inspector's Name:** Shen Jian Gao

**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, (818) 292-0659, who represents the

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# QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

( Continued Page 3 of 3 )

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Office of Structural Materials for your project.

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<b>Inspected By:</b>	Tsang, Eric	SMR
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<b>Reviewed By:</b>	Devey, Jim	SMR
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**DEPARTMENT OF TRANSPORTATION - District 4 Toll Bridge**  
 666 Feng Bin Road Room 708, Changxing Island  
 Shanghai 201913 PR China  
 Tel: 021-56856666 ext 207061 Fax:

**NON-CONFORMANCE REPORT TRANSMITTAL**

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

**Date:** 31-May-2010

**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:** 05.03.06-000706

**Subject:** NCR No. ZPMC-0713

**Reference Description:** Excessive heat was utilized during heat straightening of the traveler rail 20TR2-013

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:**

**Remarks:**

During the Quality Assurance (QA) random in-process observations of the fabrication of OBG Traveler Rail (TR), this Caltrans QA Inspector observed the following:

- ZPMC personnel performed heat straightening of the traveler rail flange base plate. The material was heated to a bright red condition and the temperature is above 650°C.
- Per ZPMC Heat Straightening Report identified as HSR1 (B)-8350, the maximum allowable temperature is 650°C.
- The AWS D1.5 Section 3.7.3 states that the heated steel shall not exceed 650°C, which gives a dull red color.
- This QA Inspector observed the 760°C Tempilstik was melted when struck against the red base metal.
- A temperature indicating crayon, digital temperature measurement gauge, or other similar means of monitoring the temperature was not utilized by ZPMC QC and the actual maximum attained temperature was not measured.
- The Traveler rail is identified as 20TR2-013.
- The affected area was measured at Y location 800mm when measured from nearest leading edge, having a total area 150 x 1200mm.
- Additionally, this QA Inspector observed ZPMC apply a 13 Tons load on the Traveler rail.
- ZPMC HSR1 Report doesn't specify the exact weight or weight range to be applied on the TR during heat straightening process.
- This TR is located in fabrication Bay#5.

**Action Required and/or Action Taken:**

Please provide HSR and documentations that demonstrate the over-heated element is acceptable. Propose a resolution for the identified non-conformance with revised procedures to prevent future occurrences. A response for the resolution of this issue is expected within 7 days.

**Transmitted by:** Sean Eagen Transportation Engineer

**Attachments:** ZPMC-0713

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# NCT

( Continued Page 2 of 2 )

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

## NCR PROPOSED RESOLUTION

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

**Attention:** Pursell, Gary  
Resident Engineer

**Ref:** 05.03.06-000706

**Subject:** NCR No. ZPMC-0713

**Dated:** 11-Jun-2010

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

**Job Name:** SAS Superstructure

**Document No.:** ABF-NPR-000706 Rev: 00

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### Contractor's Proposed Resolution:

**Reference Resolution:** ZPMC will provide hardness testing results to show that the material was not adversely affected by the heat.

ZPMC will provide hardness testing results to show that the material was not adversely affected by the heat. This issue has been addressed by ZPMC's QA and Production crews to prevent this issue. Based on this proposal ZPMC requests that this NCR be approved, with actions pending.

**Submitted by:** Ishibashi, Joshua

**Attachment(s):** ABF-NPR-000706R00

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### Caltrans' comments:

**Status:** REJ

**Date:** 15-Jun-2010

In addition to providing hardness testing results that show the material was not adversely affected by the excessive heat, please provide a description of the measures that will be take to ensure that this type of non-conformance does not happen again in the future.

**Submitted by:** Eagen, Sean

**Attachment(s):**

**Date:** 15-Jun-2010

## NCR PROPOSED RESOLUTION

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

**Attention:** Pursell, Gary  
Resident Engineer

**Ref:** 05.03.06-000706

**Subject:** NCR No. ZPMC-0713

**Dated:** 07-Jul-2010

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

**Job Name:** SAS Superstructure

**Document No.:** ABF-NPR-000706 **Rev:** 01

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### Contractor's Proposed Resolution:

**Reference Resolution:** ZPMC has performed the hardness testing and used Table 3 in ASTM370 to determine the approximate tensile values

ZPMC has performed the hardness testing and used Table 3 in ASTM370 to determine the approximate tensile values and compared them to minimum required values found in ASTM 709 for Grade 50[345] and found they meet the minimum required values. ZPMC QA has also written and internal NCR to notify the Technical Department to provide more detail when writing the HSR and the QC Department to ensure they have the correct temperature monitoring equipment on hand during heat straightening. Based on these actions ZPMC requests that this NCR be closed.

**Submitted by:** Ishibashi, Joshua

**Attachment(s):** ABF-NPR-000706R01;

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### Caltrans' comments:

**Status:** REJ

**Date:** 13-Jul-2010

The average hardness values for the area tested is over 95ksi in tensile strength. Please take a sample from the heated area and perform tensile testing in accordance with ASTM A370.

**Submitted by:** Woo, Laraine

**Date:** 13-Jul-2010

**Attachment(s):**



No. B-812

## LETTER OF RESPONSE

**TO: American Bridge/Flour**

**DATE: 2010-07-02**

**REGARDING: NCR-000750(ZPMC-0713)**

ZPMC has performed the hardness testing and used Table 3 in ASTM 370 to determine the approximate tensile values and compared them to minimum required values found in ASTM 709 for Grade 50[345] and found they meet the minimum required values. The testing was performed by CT's witness. ZPMC QA has written an internal NCR and advised to Technical Department to provide more detailing when issuing HSRs. All QC will be equipped with temperature monitoring equipment to prevent this issue from occurring again. Based on these, ZPMC is requesting that this NCR be closed.

**ATTACHMENT:**

N CR-000750(ZPMC-0713)

HARDNESS TESTING ANALYSIS

TENSILE AND HARDNESS REQUIRMENTS IN ASTM 709

APPROXIMATE HARDNESS CONVERSION NUMBERS IN ASTM 370

*[Handwritten signature]*  
*7/2/10*



DEPARTMENT OF TRANSPORTATION - District 4 Toll Bridge  
666 Feng Bin Road Room 708, Changxing Island  
Shanghai 201913 PR China  
Tel: 021-56856666 ext 207061 Fax:

## NON-CONFORMANCE REPORT TRANSMITTAL

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

**Date:** 31-May-2010

**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:** 05.03.06-000706

**Subject:** NCR No. ZPMC-0713

**Reference Description:** Excessive heat was utilized during heat straightening of the traveler rail 20TR2-013

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

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**Material Location:** OBG

**Lift:**

### Remarks:

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**Transmitted by:** Sean Eagen Transportation Engineer  
**Attachments:** ZPMC-0713

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## NCT

( Continued Page 2 of 2 )

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

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(707) 649-5453  
(707) 649-5493

Contract #: 04-0120F4

Cty: SF/ALA Rte: 80 PM: 13.2/13.9

File #: 69.25B

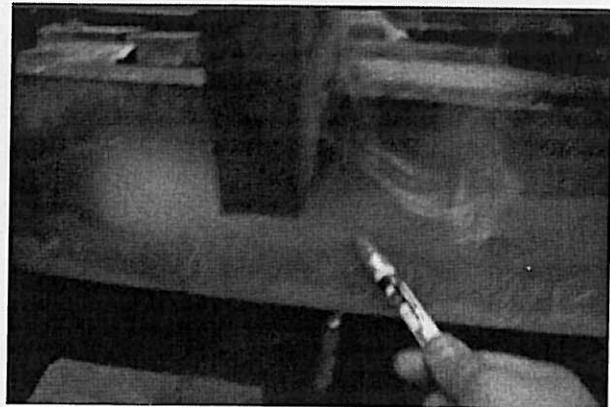
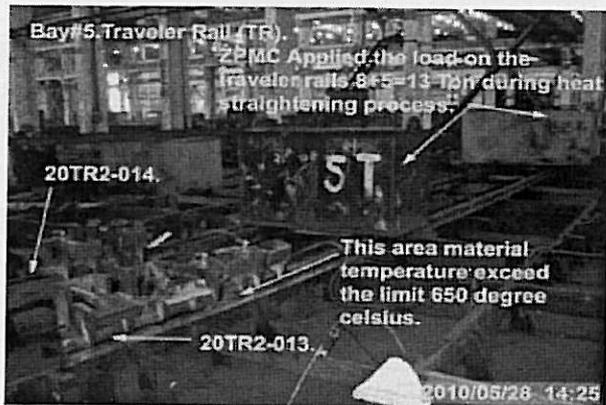
**QUALITY ASSURANCE -- NON-CONFORMANCE REPORT****Location:** Changxing Island, Shanghai, P.R. China**Report No:** NCR-000750**Prime Contractor:** American Bridge/Fluor Enterprises, a JV**Date:** 28-May-2010**Submitting Contractor:** Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island**NCR #:** ZPMC-0713**Type of problem:**Welding  Concrete  Other Welding  Curing  Procedural  **Bridge No:** 34-0006Joint fit-up  Coating  Other  **Component:** OBG Traveler Rail 20TR2-013Procedural  Procedural  Description:**Reference Description:** Excessive heat was utilized during heat straightening of the traveler rail 20TR2-013**Description of Non-Conformance:**

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## QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

(Continued Page 2 of 3)



### Applicable reference:

AWS 1.5 2002 section 3.7.3 "Members distorted by welding shall be straightened by mechanical means or by carefully supervised application of a limited amount of localized heat as approved by the Engineer. The temperature of the heated areas as measured by approved methods shall not exceed 600°C [1100°F] for quenched and tempered steel nor 650°C [1200°F] (a dull, red color) for other steels. The part to be heated for straightening shall be substantially free of stress and from external forces, except those stresses resulting from the mechanical straightening method used in conjunction with the application of heat."

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**QC Inspector's Name:** Shen Jian Gao

**Was QC Inspector aware of the problem:**  Yes  No

**Contractor's proposal to correct the problem:**

N/A

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## QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

( Continued Page 3 of 3 )

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Office of Structural Materials for your project.

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**Inspected By:** Tsang, Eric

SMR

**Reviewed By:** Devey, Jim

SMR

Area	Test ID					20TR2-013 Flange Hardness Testing Analysis					Meets Requirement?
	A*	B*	C*	D*	E*	Average Value**	Corresponding Brinell Hardness Value**	Approximate Tensile Strength (ksi)***	Minimum Tensile Strength (ksi)****		
1	149	196	197	194	190	193	195	92	65	YES	
2	192	219	208	193	209	203	205	98	65	YES	
3	205	201	208	205	184	204	205	98	65	YES	
4	212	207	192	212	192	204	205	98	65	YES	
5	195	204	194	213	183	198	200	94	65	YES	

\*All values are Brinell Hardness

\*\*High and low values excluded when determining average value

\*\*\* Per Table 3 ASTM A370-07b

\*\*\*\* For Grade 50[345], per Table 1, ASTM A709/A709M-05



A 709/A 709M – 05

TABLE 1 Tensile and Hardness Requirements<sup>A</sup>

NOTE 1— Where “...” appears in this table, there is no requirement.

Grade	Plate Thickness, in. [mm]	Structural Shape Flange or Leg Thickness, in. [mm]	Yield Point or Yield Strength, <sup>B</sup> ksi [MPa]	Tensile Strength, ksi [MPa]	Minimum Elongation, %				Reduction of Area <sup>C,D</sup> min, %	Brinell Hardness Number
					Plates and Bars <sup>C,E</sup>		Shapes <sup>F</sup>			
					8 in. or 200 mm	2 in. or 50 mm	8 in. or 200 mm	2 in. or 50 mm		
36 [250]	to 4 [100], incl	to 3 in. [75 mm], incl over 3 in. [75 mm]	36 [250] min 36 [250] min	58–80 [400–550] 58 [400] min	20 ...	23 ...	20 20	21 <sup>F</sup> 19	... ...	... ...
50 [345] 50S [345S]	to 4 [100], incl <sup>G</sup>	all all	50 [345] min 50–65 [345–450] <sup>H</sup> 50 [345] min	65 [450] min 65 [450] <sup>H</sup> min	18 ...	21 ...	18 18	21 <sup>F</sup> 21	... ...	... ...
50W [345W] and HPS 50W [HPS 345W] HPS 70W [HPS 485 W] 100 [690], 100W [690W], and HPS 100W [HPS 690W] 100 [690] and 100W [690 W]	to 4 [100], incl to 2½ [65], incl over 2½ to 4 [65 to 100]	all <sup>G</sup> <sup>G</sup>	70 [485] min <sup>B</sup> 100 [690] min <sup>B</sup> 90 [620] min <sup>B</sup>	85–110 [585–760] 110–130 [760–895] 100–130 [690–895]	... ... ...	19 <sup>J</sup> 18 <sup>J</sup> 16 <sup>J</sup>	... ... ...	... ... ...	κ κ	235–293 <sup>L</sup> ...

<sup>A</sup> See specimen orientation and preparation subsection in the Tension Tests section of Specification A 6/A 6 M.

<sup>B</sup> Measured at 0.2 % offset or 0.5 % extension under load as described in Section 13 of Test Methods A 370.

<sup>C</sup> Elongation and reduction of area not required to be determined for floor plates.

<sup>D</sup> For plates wider than 24 in. [600 mm], the reduction of area requirement, where applicable, is reduced by five percentage points.

<sup>E</sup> For plates wider than 24 in. [600 mm], the elongation requirement is reduced by two percentage points. See elongation requirement adjustments in the Tension Tests section of Specification A 6/A 6M.

<sup>F</sup> Elongation in 2 in. or 50 mm: 19 % for shapes with flange thickness over 3 in. [75 mm].

<sup>G</sup> Not applicable.

<sup>H</sup> The yield to tensile ratio shall be 0.85 or less.

<sup>J</sup> For wide flange shapes with flange thickness over 3 in. [75 mm], elongation in 2 in. or 50 mm. of 18 % minimum applies.

<sup>K</sup> If measured on the Fig. 3 (Test Methods A 370) 1½-in. [40-mm] wide specimen, the elongation is determined in a 2-in. or 50-mm. gage length that includes the fracture and shows the greatest elongation.

<sup>L</sup> 40 % minimum applies if measured on the Fig 3 (Test Methods A 370) 1½-in. [40-mm] wide specimen; 50 % minimum applies if measured on the Fig. 4 (Test Methods A 370) ½-in. [12.5-mm] round specimen.

<sup>L</sup> Applies only to Grades 100 [690] and 100W [690W] plates that are ¾ in. [10 mm] or less in thickness and are not tension tested (See B.1).

TABLE 2 Grade 36 [250] Chemical Requirements (Heat Analysis)

NOTE 1— Where “...” appears in this table there is no requirement. The heat analysis for manganese shall be determined and reported as described in the Heat Analysis section of Specification A 6/A 6M.

Product Thickness, in. (mm)	Shapes <sup>A</sup> All	Plates <sup>B</sup>				Bars <sup>B</sup>		
		To ¾ [20], incl	Over ¾ to 1½ [20 to 40], incl	Over 1½ to 2½ [40 to 65], incl	Over 2½ to 4 [65 to 100], incl	To ¾ [20], incl	Over ¾ to 1½ [20 to 40], incl	Over 1½ to 4 [100], incl
Carbon, max, %	0.26	0.25	0.25	0.26	0.27	0.26	0.27	0.28
Manganese, %	...	...	0.80–1.20	0.80–1.20	0.85–1.20	...	0.60–0.90	0.60–0.90
Phosphorus, max, %	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Sulfur, max, %	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Silicon, %	0.40 max	0.40 max	0.40 max	0.15–0.40	0.15–0.40	0.40 max	0.40 max	0.40 max
Copper, min, % when copper steel is specified	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

<sup>A</sup> Manganese content of 0.85 to 1.35 % and silicon content of 0.15 to 0.40 % is required for shapes with flange thickness over 3 in. [75 mm].

<sup>B</sup> For each reduction of 0.01 % below the specified carbon maximum, an increase of 0.06 % manganese above the specified maximum will be permitted up to a maximum of 1.35 %.

A 992/A 992M Specification for Structural Steel Shapes  
G 101 Guide for Estimating the Atmospheric Corrosion Resistance of Low-Alloy Steels

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

 A 370 - 05

**TABLE 3 Approximate Hardness Conversion Numbers for Non-austenitic Steels<sup>A</sup> (Rockwell B to Other Hardness Numbers)**

Rockwell B Scale, 100- kgf Load 1/16- in. (1.588- mm) Ball	Vickers Hardness Number	Brinell Hardness, 3000-kgf Load, 10-mm Ball	Knoop Hardness, 500-gf Load and Over	Rockwell A Scale, 60-kgf Load, Diamond Penetrator	Rockwell F Scale, 60-kgf Load, 1/16-in. (1.588-mm) Ball	Rockwell Superficial Hardness			Approximate Tensile Strength ksi (MPa)
						15T Scale, 15-kgf Load, 1/16-in. (1.588- mm) Ball	30T Scale, 30-kgf Load, 1/16-in. (1.588- mm) Ball	45T Scale, 45-kgf Load, 1/16-in. (1.588- mm) Ball	
100	240	240	251	61.5	...	93.1	83.1	72.9	116 (800)
99	234	234	246	60.9	...	92.8	82.5	71.9	114 (785)
98	228	228	241	60.2	...	92.5	81.8	70.9	109 (750)
97	222	222	236	59.5	...	92.1	81.1	69.9	104 (715)
96	216	216	231	58.9	...	91.8	80.4	68.9	102 (705)
95	210	210	226	58.3	...	91.5	79.8	67.9	100 (690)
94	205	205	221	57.6	...	91.2	79.1	66.9	98 (675)
93	200	200	216	57.0	...	90.8	78.4	65.9	94 (650)
92	195	195	211	56.4	...	90.5	77.8	64.8	92 (635)
91	190	190	206	55.8	...	90.2	77.1	63.8	90 (620)
90	185	185	201	55.2	...	89.9	76.4	62.8	89 (615)
89	180	180	196	54.6	...	89.5	75.8	61.8	88 (605)
88	176	176	192	54.0	...	89.2	75.1	60.8	86 (590)
87	172	172	188	53.4	...	88.9	74.4	59.8	84 (580)
86	169	169	184	52.8	...	88.6	73.8	58.8	83 (570)
85	165	165	180	52.3	...	88.2	73.1	57.8	82 (565)
84	162	162	176	51.7	...	87.9	72.4	56.8	81 (560)
83	159	159	173	51.1	...	87.6	71.8	55.8	80 (550)
82	156	156	170	50.6	...	87.3	71.1	54.8	77 (530)
81	153	153	167	50.0	...	86.9	70.4	53.8	73 (505)
80	150	150	164	49.5	...	86.6	69.7	52.8	72 (495)
79	147	147	161	48.9	...	86.3	69.1	51.8	70 (485)
78	144	144	158	48.4	...	86.0	68.4	50.8	69 (475)
77	141	141	155	47.9	...	85.6	67.7	49.8	68 (470)
76	139	139	152	47.3	...	85.3	67.1	48.8	67 (460)
75	137	137	150	46.8	99.6	85.0	66.4	47.8	66 (455)
74	135	135	147	46.3	99.1	84.7	65.7	46.8	65 (450)
73	132	132	145	45.8	98.5	84.3	65.1	45.8	64 (440)
72	130	130	143	45.3	98.0	84.0	64.4	44.8	63 (435)
71	127	127	141	44.8	97.4	83.7	63.7	43.8	62 (425)
70	125	125	139	44.3	96.8	83.4	63.1	42.8	61 (420)
69	123	123	137	43.8	96.2	83.0	62.4	41.8	60 (415)
68	121	121	135	43.3	95.6	82.7	61.7	40.8	59 (405)
67	119	119	133	42.8	95.1	82.4	61.0	39.8	58 (400)
66	117	117	131	42.3	94.5	82.1	60.4	38.7	57 (395)
65	116	116	129	41.8	93.9	81.8	59.7	37.7	56 (385)
64	114	114	127	41.4	93.4	81.4	59.0	36.7	...
63	112	112	125	40.9	92.8	81.1	58.4	35.7	...
62	110	110	124	40.4	92.2	80.8	57.7	34.7	...
61	108	108	122	40.0	91.7	80.5	57.0	33.7	...
60	107	107	120	39.5	91.1	80.1	56.4	32.7	...
59	106	106	118	39.0	90.5	79.8	55.7	31.7	...
58	104	104	117	38.6	90.0	79.5	55.0	30.7	...
57	103	103	115	38.1	89.4	79.2	54.4	29.7	...
56	101	101	114	37.7	88.8	78.8	53.7	28.7	...
55	100	100	112	37.2	88.2	78.5	53.0	27.7	...
54	...	...	111	36.8	87.7	78.2	52.4	26.7	...
53	...	...	110	36.3	87.1	77.9	51.7	25.7	...
52	...	...	109	35.9	86.5	77.5	51.0	24.7	...
51	...	...	108	35.5	86.0	77.2	50.3	23.7	...
50	...	...	107	35.0	85.4	76.9	49.7	22.7	...
49	...	...	106	34.6	84.8	76.6	49.0	21.7	...
48	...	...	105	34.1	84.3	76.2	48.3	20.7	...
47	...	...	104	33.7	83.7	75.9	47.7	19.7	...
46	...	...	103	33.3	83.1	75.6	47.0	18.7	...
45	...	...	102	32.9	82.6	75.3	46.3	17.7	...
44	...	...	101	32.4	82.0	74.9	45.7	16.7	...
43	...	...	100	32.0	81.4	74.6	45.0	15.7	...
42	...	...	99	31.6	80.8	74.3	44.3	14.7	...
41	...	...	98	31.2	80.3	74.0	43.7	13.6	...
40	...	...	97	30.7	79.7	73.6	43.0	12.6	...
39	...	...	96	30.3	79.1	73.3	42.3	11.6	...
38	...	...	95	29.9	78.6	73.0	41.6	10.6	...
37	...	...	94	29.5	78.0	72.7	41.0	9.6	...
36	...	...	93	29.1	77.4	72.3	40.3	8.6	...
35	...	...	92	28.7	76.9	72.0	39.6	7.6	...
34	...	...	91	28.2	76.3	71.7	39.0	6.6	...
33	...	...	90	27.8	75.7	71.4	38.3	5.6	...

TABLE 3 *Continued*

Rockwell B Scale, 100-kgf Load 1/16-in. (1.588-mm) Ball	Vickers Hardness Number	Brinell Hardness, 3000-kgf Load, 10-mm Ball	Knoop Hardness, 500-gf Load and Over	Rockwell A Scale, 60-kgf Load, Diamond Penetrator	Rockwell F Scale, 60-kgf Load, 1/16-in. (1.588-mm) Ball	Rockwell Superficial Hardness			Approximate Tensile Strength ksi (MPa)
						15T Scale, 15-kgf Load, 1/16-in. (1.588-mm) Ball	30T Scale, 30-kgf Load, 1/16-in. (1.588-mm) Ball	45T Scale, 45-kgf Load, 1/16-in. (1.588-mm) Ball	
32	...	...	89	27.4	75.2	71.0	37.6	4.6	...
31	...	...	88	27.0	74.6	70.7	37.0	3.6	...
30	...	...	87	26.6	74.0	70.4	36.3	2.6	...

<sup>A</sup> This table gives the approximate interrelationships of hardness values and approximate tensile strength of steels. It is possible that steels of various compositions and processing histories will deviate in hardness-tensile strength relationship from the data presented in this table. The data in this table should not be used for austenitic stainless steels, but have been shown to be applicable for ferritic and martensitic stainless steels. The data in this table should not be used to establish a relationship between hardness values and tensile strength of hard drawn wire. Where more precise conversions are required, they should be developed specially for each steel composition, heat treatment, and part.

TABLE 4 *Approximate Hardness Conversion Numbers for Austenitic Steels (Rockwell C to other Hardness Numbers)*

Rockwell C Scale, 150-kgf Load, Diamond Penetrator	Rockwell A Scale, 60-kgf Load, Diamond Penetrator	Rockwell Superficial Hardness		
		15N Scale, 15-kgf Load, Diamond Penetrator	30N Scale, 30-kgf Load, Diamond Penetrator	45N Scale, 45-kgf Load, Diamond Penetrator
48	74.4	84.1	66.2	52.1
47	73.9	83.6	65.3	50.9
46	73.4	83.1	64.5	49.8
45	72.9	82.6	63.6	48.7
44	72.4	82.1	62.7	47.5
43	71.9	81.6	61.8	46.4
42	71.4	81.0	61.0	45.2
41	70.9	80.5	60.1	44.1
40	70.4	80.0	59.2	43.0
39	69.9	79.5	58.4	41.8
38	69.3	79.0	57.5	40.7
37	68.8	78.5	56.6	39.6
36	68.3	78.0	55.7	38.4
35	67.8	77.5	54.9	37.3
34	67.3	77.0	54.0	36.1
33	66.8	76.5	53.1	35.0
32	66.3	75.9	52.3	33.9
31	65.8	75.4	51.4	32.7
30	65.3	74.9	50.5	31.6
29	64.8	74.4	49.6	30.4
28	64.3	73.9	48.8	29.3
27	63.8	73.4	47.9	28.2
26	63.3	72.9	47.0	27.0
25	62.8	72.4	46.2	25.9
24	62.3	71.9	45.3	24.8
23	61.8	71.3	44.4	23.6
22	61.3	70.8	43.5	22.5
21	60.8	70.3	42.7	21.3
20	60.3	69.8	41.8	20.2

requirement, the conversions listed in Table 2, Table 3, Table 4, and Table 5 shall be used.

15.2.2 When recording converted hardness numbers, the measured hardness and test scale shall be indicated in parentheses, for example: 353 HB (38 HRC). This means that a hardness value of 38 was obtained using the Rockwell C scale and converted to a Brinell hardness of 353.

## 16. Brinell Test

### 16.1 Description:

16.1.1 A specified load is applied to a flat surface of the specimen to be tested, through a hard ball of specified diameter. The average diameter of the indentation is used as a basis for calculation of the Brinell hardness number. The quotient of the applied load divided by the area of the surface of the

indentation, which is assumed to be spherical, is termed the Brinell hardness number (HB) in accordance with the following equation:

$$HB = P / [(\pi D/2)(D - \sqrt{D^2 - d^2})] \quad (4)$$

where:

- HB = Brinell hardness number,
- P = applied load, kgf,
- D = diameter of the steel ball, mm, and
- d = average diameter of the indentation, mm.

NOTE 11—The Brinell hardness number is more conveniently secured from standard tables such as Table 6, which show numbers corresponding to the various indentation diameters, usually in increments of 0.05 mm.

NOTE 12—In Test Method E 10 the values are stated in SI units, whereas in this section kg/m units are used.

**TABLE 5 Approximate Hardness Conversion Numbers for Austenitic Steels (Rockwell B to other Hardness Numbers)**

Rockwell B Scale, 100-kgf Load, 1/16-in. (1.588-mm) Ball	Brinell Indentation Diameter, mm	Brinell Hardness, 3000-kgf Load, 10-mm Ball	Rockwell A Scale, 60-kgf Load, Diamond Penetrator	Rockwell Superficial Hardness		
				15T Scale, 15-kgf Load, 1/16-in. (1.588-mm) Ball	30T Scale, 30-kgf Load, 1/16-in. (1.588-mm) Ball	45T Scale, 45-kgf Load, 1/16-in. (1.588-mm) Ball
100	3.79	256	61.5	91.5	80.4	70.2
99	3.85	248	60.9	91.2	79.7	69.2
98	3.91	240	60.3	90.8	79.0	68.2
97	3.96	233	59.7	90.4	78.3	67.2
96	4.02	226	59.1	90.1	77.7	66.1
95	4.08	219	58.5	89.7	77.0	65.1
94	4.14	213	58.0	89.3	76.3	64.1
93	4.20	207	57.4	88.9	75.6	63.1
92	4.24	202	56.8	88.6	74.9	62.1
91	4.30	197	56.2	88.2	74.2	61.1
90	4.35	192	55.6	87.8	73.5	60.1
89	4.40	187	55.0	87.5	72.8	59.0
88	4.45	183	54.5	87.1	72.1	58.0
87	4.51	178	53.9	86.7	71.4	57.0
86	4.55	174	53.3	86.4	70.7	56.0
85	4.60	170	52.7	86.0	70.0	55.0
84	4.65	167	52.1	85.6	69.3	54.0
83	4.70	163	51.5	85.2	68.6	52.9
82	4.74	160	50.9	84.9	67.9	51.9
81	4.79	156	50.4	84.5	67.2	50.9
80	4.84	153	49.8	84.1	66.5	49.9

16.1.2 The standard Brinell test using a 10-mm ball employs a 3000-kgf load for hard materials and a 1500 or 500-kgf load for thin sections or soft materials (see Annex A2 on Steel Tubular Products). Other loads and different size indentors may be used when specified. In recording hardness values, the diameter of the ball and the load must be stated except when a 10-mm ball and 3000-kgf load are used.

16.1.3 A range of hardness can properly be specified only for quenched and tempered or normalized and tempered material. For annealed material a maximum figure only should be specified. For normalized material a minimum or a maximum hardness may be specified by agreement. In general, no hardness requirements should be applied to untreated material.

16.1.4 Brinell hardness may be required when tensile properties are not specified.

16.2 *Apparatus*—Equipment shall meet the following requirements:

16.2.1 *Testing Machine*—A Brinell hardness testing machine is acceptable for use over a loading range within which its load measuring device is accurate to  $\pm 1\%$ .

16.2.2 *Measuring Microscope*—The divisions of the micrometer scale of the microscope or other measuring devices used for the measurement of the diameter of the indentations shall be such as to permit the direct measurement of the diameter to 0.1 mm and the estimation of the diameter to 0.05 mm.

NOTE 13—This requirement applies to the construction of the microscope only and is not a requirement for measurement of the indentation, see 16.4.3.

16.2.3 *Standard Ball*—The standard ball for Brinell hardness testing is 10 mm (0.3937 in.) in diameter with a deviation from this value of not more than 0.005 mm (0.0004 in.) in any diameter. A ball suitable for use must not show a permanent change in diameter greater than 0.01 mm (0.0004 in.) when pressed with a force of 3000 kgf against the test specimen.

16.3 *Test Specimen*—Brinell hardness tests are made on prepared areas and sufficient metal must be removed from the surface to eliminate decarburized metal and other surface irregularities. The thickness of the piece tested must be such that no bulge or other marking showing the effect of the load appears on the side of the piece opposite the indentation.

16.4 *Procedure*:

16.4.1 It is essential that the applicable product specifications state clearly the position at which Brinell hardness indentations are to be made and the number of such indentations required. The distance of the center of the indentation from the edge of the specimen or edge of another indentation must be at least two and one-half times the diameter of the indentation.

16.4.2 Apply the load for a minimum of 15 s.

16.4.3 Measure two diameters of the indentation at right angles to the nearest 0.1 mm, estimate to the nearest 0.05 mm, and average to the nearest 0.05 mm. If the two diameters differ by more than 0.1 mm, discard the readings and make a new indentation.

## NCR PROPOSED RESOLUTION

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

**Attention:** Siegenthaler, Peter  
Resident Engineer

**Ref:** 05.03.06-000706

**Subject:** NCR No. ZPMC-0713

**Dated:** 20-Sep-2010

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

**Job Name:** SAS Superstructure

**Document No.:** ABF-NPR-000706 Rev: 02

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### Contractor's Proposed Resolution:

**Reference Resolution:** ZPMC has repaired the area that the sample came from and is providing the acceptable NDT to show the repair was successful and the tensile testing to show the material is acceptable

ZPMC has performed tensile testing on a sample of the heated area and found it to be acceptable. ZPMC has repaired the area that the sample came from and is providing the acceptable NDT to show the repair was successful and the tensile testing to show the material is acceptable. Based on this ZPMC requests closure of this NCR.

**Submitted by:** Ishibashi, Joshua

**Attachment(s):** ABF-NPR-000706R02;

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### Caltrans' comments:

**Status:** AAP

**Date:** 26-Sep-2010

The Contractor has supplied the post repair NDT, but the reports are labeled post HSR. The reports need to be labeled to show that the NDT was performed after the pieces were replaced and what they were replaced with. A copy of the updated weld maps for the newly added welds is also needed.

**Submitted by:** Woo, Laraine

**Date:** 26-Sep-2010

**Attachment(s):**



No. B-887

## LETTER OF RESPONSE

**TO: American Bridge/Flour**

**DATE: 2010-9-19**

**REGARDING: NCR-000750(ZPMC-0713) NCR-000695(ZPMC-0662)**

As required, ZPMC took the samples from the over heated area and performed both the tensile test and impact test under the witness of CT's representatives. After that, these rails were repaired according to the approved repair procedure. ZPMC is providing the tests' result and the NDT records to engineer for review, hoping these NCRs could be closed based on them.

**ATTACHMENT:**

NCR-000750(ZPMC-0713)

NCR-000695(ZPMC-0662)

TESTS' RESULT

B787-UT-15317

B787-UT-15316

B787-MT-28130

B787-MT-28129

*Handwritten signature*

*9/19/10*



DEPARTMENT OF TRANSPORTATION - District 4 Toll Bridge  
666 Feng Bin Road Room 708, Changxing Island  
Shanghai 201913 PR China  
Tel: 021-56856666 ext 207061 Fax:

## NON-CONFORMANCE REPORT TRANSMITTAL

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

Date: 31-May-2010

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

Dear: Mr. Charles Kanapicki  
Attention: Mr. Thomas Nilsson Project/Fabrication Manager  
Subject: NCR No. ZPMC-0713

Job Name: SAS Superstructure  
Document No: 05.03.06-000706

Reference Description: Excessive heat was utilized during heat straightening of the traveler rail 20TR2-013

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:

### Remarks:

During the Quality Assurance (QA) random in-process observations of the fabrication of OBG Traveler Rail (TR), this Caltrans QA Inspector observed the following:

- ZPMC personnel performed heat straightening of the traveler rail flange base plate. The material was heated to a bright red condition and the temperature is above 650°C.
- Per ZPMC Heat Straightening Report identified as HSR1 (B)-8350, the maximum allowable temperature is 650°C.
- The AWS D1.5 Section 3.7.3 states that the heated steel shall not exceed 650°C, which gives a dull red color.
- This QA Inspector observed the 760°C Tempilstik was melted when struck against the red base metal.
- A temperature indicating crayon, digital temperature measurement gauge, or other similar means of monitoring the temperature was not utilized by ZPMC QC and the actual maximum attained temperature was not measured.
- The Traveler rail is identified as 20TR2-013.
- The affected area was measured at Y location 800mm when measured from nearest leading edge, having a total area 150 x 1200mm.
- Additionally, this QA Inspector observed ZPMC apply a 13 Tons load on the Traveler rail.
- ZPMC HSR1 Report doesn't specify the exact weight or weight range to be applied on the TR during heat straightening process.
- This TR is located in fabrication Bay#5.

### Action Required and/or Action Taken:

Please provide HSR and documentations that demonstrate the over-heated element is acceptable. Propose a resolution for the identified non-conformance with revised procedures to prevent future occurrences. A response for the resolution of this issue is expected within 7 days.

Transmitted by: Sean Eagen Transportation Engineer

Attachments: ZPMC-0713

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NCT

( Continued Page 2 of 2 )

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

**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 #: 04-0120F4

Cty: SF/ALA Rte: 80 PM: 13.2/13.9

File #: 69.25B

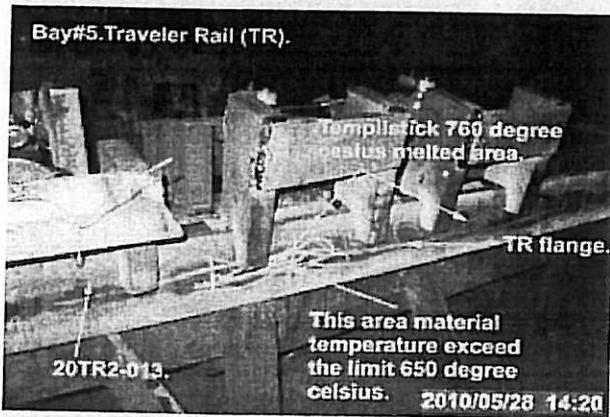
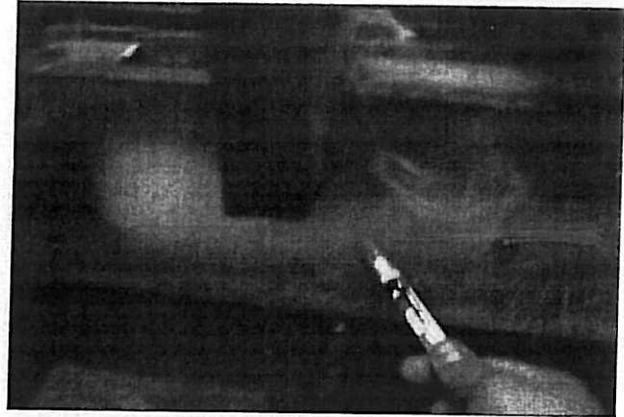
**QUALITY ASSURANCE -- NON-CONFORMANCE REPORT****Location:** Changxing Island, Shanghai, P.R. China**Report No:** NCR-000750**Prime Contractor:** American Bridge/Fluor Enterprises, a JV**Date:** 28-May-2010**Submitting Contractor:** Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island**NCR #:** ZPMC-0713**Type of problem:**Welding  Concrete  Other Welding  Curing  Procedural Joint fit-up  Coating  Other Procedural  Procedural  Description:**Bridge No:** 34-0006**Component:** OBG Traveler Rail 20TR2-013**Reference Description:** Excessive heat was utilized during heat straightening of the traveler rail 20TR2-013**Description of Non-Conformance:**

During the Quality Assurance (QA) random in-process observations of the fabrication of OBG Traveler Rail (TR), this Caltrans QA Inspector observed the following:

- ZPMC personnel performed heat straightening of the traveler rail flange base plate. The material was heated to a bright red condition and the temperature is above 650°C.
- Per ZPMC Heat Straightening Report identified as HSR1 (B)-8350, the maximum allowable temperature is 650°C.
- The AWS D1.5 Section 3.7.3 states that the heated steel shall not exceed 650°C, which gives a dull red color.
- This QA Inspector observed the 760°C Tempilstik was melted when struck against the red base metal.
- A temperature indicating crayon, digital temperature measurement gauge, or other similar means of monitoring the temperature was not utilized by ZPMC QC and the actual maximum attained temperature was not measured.
- The Traveler rail is identified as 20TR2-013.
- The affected area was measured at Y location 800mm when measured from nearest leading edge, having a total area 150 x 1200mm.
- Additionally, this QA Inspector observed ZPMC apply a 13 Tons load on the Traveler rail.
- ZPMC HSR1 Report doesn't specify the exact weight or weight range to be applied on the TR during heat straightening process.
- This TR is located in fabrication Bay#5.

# QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

(Continued Page 2 of 3)



## Applicable reference:

AWS 1.5 2002 section 3.7.3 "Members distorted by welding shall be straightened by mechanical means or by carefully supervised application of a limited amount of localized heat as approved by the Engineer. The temperature of the heated areas as measured by approved methods shall not exceed 600°C [1100°F] for quenched and tempered steel nor 650°C [1200°F] (a dull, red color) for other steels. The part to be heated for straightening shall be substantially free of stress and from external forces, except those stresses resulting from the mechanical straightening method used in conjunction with the application of heat."

Who discovered the problem: Surendra Prabhu.

Name of individual from Contractor notified: Chen Ji Wei

Time and method of notification: 1425 Hrs, 05/28/10, Verbal

Name of Caltrans Engineer notified: Stanley Ku, Sean Eagen

Time and method of notification: 1900 hours, 05/28/10, Email

QC Inspector's Name: Shen Jian Gao

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, (818) 292-0659, who represents the

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## QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

( Continued Page 3 of 3 )

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Office of Structural Materials for your project.

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**Inspected By:** Tsang, Eric

SMR

**Reviewed By:** Devey, Jim

SMR

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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: 14-Mar-2010

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

Dear: Mr. Charles Kanapicki

Attention: Mr. Thomas Nilsson Project/Fabrication Manager

Job Name: SAS Superstructure

Subject: NCR No. ZPMC-0662

Document No: 05.03.06-000652

Reference Description: Excessive heat was utilized during heat straightening of the traveler rail 11TR2-007

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: Other

Lift:

### Remarks:

During the Quality Assurance (QA) random in-process visual inspection of OBG traveler rail Heat Straightening, this QA Inspector observed the following:

- Temperature of the heat straightened traveler rail was beyond the allowable 650 Degree Celsius in two locations.
- Per ZPMC heat straightening report (HSR) maximum temperature limit is 650 Degree Celsius.
- The 1100 Degree Celsius rating "templstick" was melted when check was made against the metal surface.
- "Y" location of the spots identified as 3000mm & 8000mm at the flange.
- The Traveler Rail is identified as 11TR2-007.

### Action Required and/or Action Taken:

Propose a resolution for the identified non-conformance with revised procedures to prevent future occurrences. A response for the resolution of this issue is expected within 7 days.

Transmitted by: Bill Howe Sr. Transportation Engineer

Attachments: ZPMC-0662

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

File: 05.03.06

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 #: 04-0120F4

Cty: SF/ALA Rte: 80 PM: 13.2/13.9

File #: 69.25B

## QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

Location: Changxing Island, Shanghai, P.R. China

Report No: NCR-000695

Prime Contractor: American Bridge/Fluor Enterprises, a JV

Date: 11-Mar-2010

Submitting Contractor: Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island

NCR #: ZPMC-0662

### Type of problem:

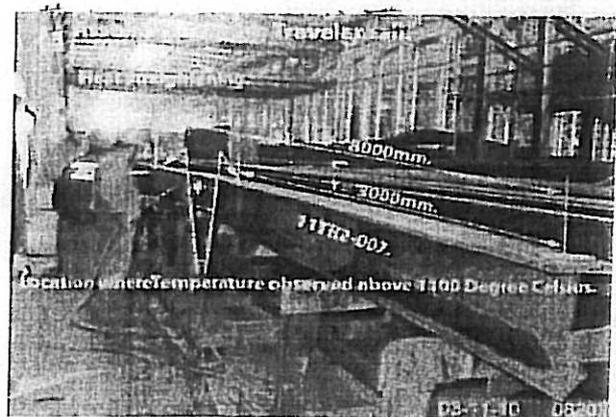
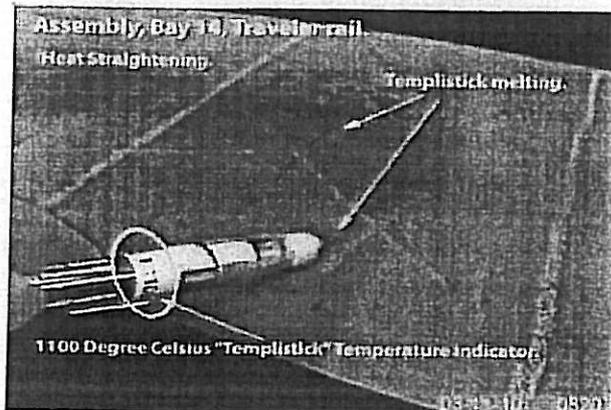
Welding  Concrete  Other Welding  Curing  Procedural  Bridge No: 34-0006Joint fit-up  Coating  Other  Component: Traveler Rail 11TR2-007Procedural  Description: Excessive heat used in heat straightening

Reference Description: Excessive heat was utilized during heat straightening of the traveler rail 11TR2-007

### Description of Non-Conformance:

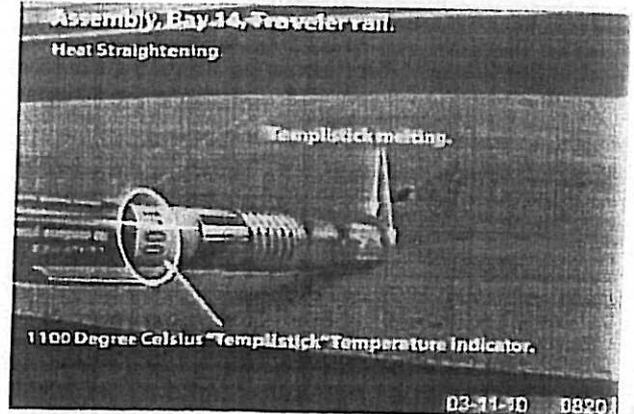
During the Quality Assurance (QA) random in-process visual inspection of OBG traveler rail Heat Straightening, this QA Inspector observed the following:

- Temperature of the heat straightened traveler rail was beyond the allowable 650 Degree Celsius in two locations.
- Per ZPMC heat straightening report (HSR) maximum temperature limit is 650 Degree Celsius.
- The 1100 Degree Celsius rating "templstick" was melted when check was made against the metal surface.
- "Y" location of the spots identified as 3000mm & 8000mm at the flange.
- The Traveler Rail is identified as 11TR2-007.



# QUALITY ASSURANCE – NON-CONFORMANCE REPORT

(Continued Page 2 of 2)



**Applicable reference:**

AWS 1.5 WORKMANSHIP, 3.7.3 "Members distorted by welding shall be straightened by mechanical means or by carefully supervised application of a limited amount of localized heat as approved by the Engineer. The temperature of the heated areas as measured by approved methods shall not exceed 600°C [1100°F] for quenched and tempered steel nor 650°C [1200°F] (a dull, red color) for other steels. The part to be heated for straightening shall be substantially free of stress and from external forces, except those stresses resulting from the mechanical straightening method used in conjunction with the application of heat."

**Who discovered the problem:** Amit K. Juvekar

**Name of individual from Contractor notified:** Peter Shaw

**Time and method of notification:** 0915 Hrs, 03/11/10, Verbal

**Name of Caltrans Engineer notified:** Bill Howe

**Time and method of notification:** 1100 Hrs, 03/11/10, Verbal

**QC Inspector's Name:** Zhang Wen

**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:** Tsang, Eric

SMR

**Reviewed By:** Wahbeh, Mazen

SMR



钢板冲击试验报告

CVN TEST REPORT FOR STEEL PLATE

报告编号 Report No.: G-J-CL-787-20100830-1-1

Testing Centre, Shanghai Zhenhua Heavy Industry Co., Ltd.

项目名称 Project	S. F. O. B. B. Project ZP06-787	样品接收日期 Date of receiving the specimen	August 30, 2010	ASTM A709、ASTM A370
实验员 Operator	邵飞飞 Shao Feifei 殷国华 Yin Guohua	见证 Witnessed by		批准 Approved by

审核  
Reviewed by

刘立涛

批准  
Approved by

刘立涛

上海振华重工(集团)股份有限公司  
检测中心  
报告专用章(力学)

试验结果仅对来样而言, 试样在本室保留三个月备查。

The test result are applicable to the specimens submitted only. The specimens tested will be kept in the LAB for 3 months for future reference.

报告盖章有效, 报告严禁涂改。

The report is effective with the stamped only. The report shall not be modified.

Note A: 板厚 $t \leq 11$ mm时, 标准小尺寸冲击试样尺寸mm: 5.0\*10.0\*65.0; 板厚 $t > 11$ mm时, 标准全尺寸冲击试样尺寸mm: 10.0\*10.0\*65.0

Note A: If the thickness of plate is equal to or less than 11mm, the standard sub-sized test specimen shall be used. If the thickness of plate is more than 11mm, the standard sized test specimen shall be used. The size of specimen is 10.0mm\*10.0mm\*65.0mm.

Note B: 1. 冲击试验机的摆锤能量是150J; The energy of pendulum of Charpy machine is 150J;

2. 试验过程中, 如果试样未折断, 呈弯曲形状, 报告中表明未折断; 如果试样未折断, 报告中表明未折断; If a specimen cannot be separated into two pieces in a single bending motion, it shall be reported as unbroken;

3. 当未折断试样的吸收能量低于机器能量的80%时, 取该试样平均值的80%; Unbroken specimens with absorbed energies of less than 80% of the machine capacity may be averaged with values from broken specimen;

4. 如果吸收能量超过机器能量的80%, 并且试样弯曲由试验机钳口中通过时, 报告数值取近似值, 不再取平均值, 用数学符号“ $\approx$ ”表示; If the absorbed energy exceeds 80% of the machine capacity and the specimen passes completely between the anvils, report the value as approximate do not average it with the other values, athematic symbol “ $\approx$ ” shall be used.

5. 如果未折断试样不能从试验机钳口之间通过, 报告数值超过机器最大值, 用数学符号“ $>$ ”表示; If an unbroken specimen does not pass between the machine anvils, (for example, it stops the pendulum), the result shall be reported as exceeding the machine capacity, mathematic symbol “ $>$ ” shall be used.

6. 如果试验结果不符合相关技术要求, 试验结果不合格; If the testing results are not confirm with the relative specifications, it shall be reported as failed.

炉号/批号 Heat No./Batch No.	级别 Grade	钢板编号 I. D	板厚 Thickness mm	拉伸试验 Tensile Test				冲击试验 Impact Test AkV				试验日期 Test date.					
				取向方向 Specimens Orientation	屈服强度 Y. S MPa	抗拉强度 T. S MPa	伸长率 Elongatio n %	取向方向 Specimens Orientation	温度 Test Temp.	吸收功 Absorbed Energy (J)			评定 结果 Result				
										x1	x2			x3	说明 Description		
AB30249	A709M-345T2-X	CX090106Q306	19	Transverse	420	575	40.0	Transverse	4°C	>150	>150	>150	150	Unbroken.	Pass.	1	August 30, 2010
AB30249	A709M-345T2-X	CX090106Q306	19	Transverse	415	570	40.5	Transverse	4°C	>150	>150	>150	150	Unbroken.	Pass.	2	August 30, 2010
B700186-3	A709M-345T2-X	WY070516Q281	20	Transverse	465	610	27.0	-	-	-	-	-	-	-	Pass.	3	August 30, 2010
B700186-3	A709M-345T2-X	WY070516Q281	20	Transverse	-	-	-	Transverse	-4°C	>150	>150	>150	150	Unbroken.	Pass	4	August 30, 2010



# REPORT OF ULTRASONIC EXAMINATION

## UT探伤报告

REPORT NO. 报告编号 B787-UT-15317      DATE 2010.09.06      PAGE 1 OF 1      Revision No: 0

PROJECT NO.: 工程编号 ZP06-787      CONTRACTOR: CALTRANS

ITEMS NAME: TRAVELER RAIL      DRAWING NO.: TR11      CALTRANS CONTRACT NO.: 04-0120F4  
 部件名称      图号      加州工程编号

REFERENCING CODE 参考规范      ACCEPTANCE STANDARD 接受标准      PROCEDURE NO. 程序编号  
 AWS D1.5-2002      AWS D1.5-2002(Table 6.3)      ZPQC-UT-01

WELDING PROCESS 焊接方法      JOINT TYPE 焊缝类型      CALIBRATION DUE DATE 仪器校正有效期  
 FCAW      BUTT      Dec. 28<sup>ST</sup>, 2010

EQUIPMENT 设备      MANUFACTURER 制造商      MODEL NO. 样式编号      SERIAL NO. 序列编号  
 UT SCOPE      GE      USM33      0612032B

CALIBRATION BLOCK 试块      COUPLANT 耦合剂      MATERIAL/THICKNESS 材料厚度  
 AWS IIV BLOCK TYPE II      C.M.C      A709M-345T2-X      19mm

### TRANSDUCER 探头

MANUFACTURER 制造商	ANGLE 角度	FREQUENCY 频率	SIZE 尺寸	MANUFACTURER 制造商	ANGLE 角度	FREQUENCY 频率	SIZE 尺寸
AMERICA	70°	2.5MHz	0.75×0.625in				
Reference Level 参考灵敏度						20dB	

Base metal inspected per AWS D1.5-2002 Section 6.19.5      0° UT OK.

WELD IDENTIFICATION 焊缝部件编号	INDICATION NO. 指示号	PROBE ANGLE 探测角度	FROM FACE 检测面	LEG (次数)	DECIBELS分贝				DISCONTINUITY 不连续性					Discontinuity Evaluation 缺陷估计	Remark 备注
					Indication Level	Reference Level	Attenuation Factor	Indication Rating	LOCATION OF DISCONTINUITY 不连续位置(mm)						
									a	b	c	d	Length 长度		
11TR2-007-015		70.5				40								ACC.	100%
11TR2-007-016		70.5				40								ACC.	100%

AFTER HSR1(B)-9272

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EXAMINED BY 主探      REVIEWED BY 审核  
 Jiang yong      Jiang Yong 2010.9.6      Jiang Yong 2010.9.6  
 LEVEL - II SIGN / DATE      LEVEL - II SIGN / DATE

质量经理 / QCM      用户CUSTOMER  
 签字 SIGN / 日期 DATE      签字 SIGN / 日期 DATE



# REPORT OF ULTRASONIC EXAMINATION

## UT探伤报告

REPORT NO. 报告编号 B787-UT-15316      DATE 2010.09.06      PAGE 1 OF 1      Revision No: 0

PROJECT NO.: 工程编号 ZP06-787      CONTRACTOR: CALTRANS

ITEMS NAME: TRAVELER RAIL      DRAWING NO.: TR20      CALTRANS CONTRACT NO.: 04-0120F4  
 部件名称      图号      加州工程编号

REFERENCING CODE 参考规范      ACCEPTANCE STANDARD 接受标准      PROCEDURE NO. 程序编号  
 AWS D1.5-2002      AWS D1.5-2002(Table 6.3)      ZPQC-UT-01

WELDING PROCESS 焊接方法      JOINT TYPE 焊缝类型      CALIBRATION DUE DATE 仪器校正有效期  
 FCAW      T JOINT/BUTT      Dec. 28<sup>ST</sup>, 2010

EQUIPMENT 设备      MANUFACTURER 制造商      MODEL NO. 样式编号      SERIAL NO. 序列编号  
 UT SCOPE      GE      USM33      0612032B

CALIBRATION BLOCK 试块      COUPLANT 耦合剂      MATERIAL/THICKNESS 材料厚度  
 AWS IIV BLOCK TYPE II      C.M.C      A709M-345T2-X      20mm

### TRANSDUCER 探头

MANUFACTURER 制造商	ANGLE 角度	FREQUENCY 频率	SIZE 尺寸	MANUFACTURER 制造商	ANGLE 角度	FREQUENCY 频率	SIZE 尺寸
AMERICA	70°	2.5MHz	0.75×0.625in				
Reference Level 参考灵敏度						20dB	

Base metal inspected per AWS D1.5-2002 Section 6.19.5      0° UT OK.

WELD IDENTIFICATION 焊缝部件编号	INDICATION NO. 指示号	PROBE ANGLE 探测角度	FROM FACE 检测面	LEG (次数)	DECIBELS分贝				DISCONTINUITY 不连续性					Discontinuity Evaluation 缺陷估计	Remark 备注	
					Indication Level	Reference Level	Attenuation Factor	Indication Rating	LOCATION OF DISCONTINUITY 不连续位置(mm)							
									a	b	c	d	Length 长度			Sound Path 声程
20TR2-013-020		70.5				40									ACC.	100%
20TR2-013-017		70.5				40									ACC.	100%
20TR2-013-011		70.5				40									ACC.	100%

AFTER HSR1(B)-9276

BLANK

EXAMINED BY 主探  
 Jiang yong      *Jiang Yong*      2010.9.6  
 LEVEL - II SIGN / DATE

REVIEWED BY 审核  
*Xue Haining*      2010.9.6  
 LEVEL - II SIGN / DATE

质量经理 / QCM  
 \_\_\_\_\_  
 签字 SIGN / 日期 DATE

用户CUSTOMER  
 \_\_\_\_\_  
 签字 SIGN / 日期 DATE



# REPORT OF MAGNETIC PARTICLE EXAMINATION

## 磁粉检测报告

REPORT NO. 报告编号 B787-MT-28130      DATE日期 2010.09.07      PAGE OF 页码 1/1      Revision No: 0

PROJECT NO. 工程编号: ZP06-787		CONTRACTOR: 用户: CALTRANS	
DRAWING NO. 图号: TR11 TRAVELER RAIL		CALTRANS CONTRACT NO.: 加州工程编号: 04-0120F4	
REFERENCING CODE 参考规范编码 AWS D1.5-2002	ACCEPTANCE STANDARD 接受标准 AWS D1.5-2002	PROCEDURE NO. 程序编号 ZPQC-MT-01	CALIBRATION DUE DATE 仪器校正有效期 Dec. 28 <sup>ST</sup> , 2010
EQUIPMENT 设备 KOREA	MANUFACTURER 制造商 PARKER	MODEL NO. 样式编号 MP-A2L	SERIAL NO. 连续编号 MP1694
MAGNETIZING METHOD 磁化方法	Continuous magnetic yoke 磁轭式连续法	CURRENT 电流	AC
PARTICLE TYPE 磁粉类型	Dry magnet powder 干磁粉	YOKE SPACING 磁轭间距	70~150mm
MATERIAL TO BE EXAMINED 检测材料	<input checked="" type="checkbox"/> WELDING 焊接件 <input type="checkbox"/> CASTING 铸件 <input type="checkbox"/> FORGING 锻造	Material & thickness 母材, 厚度	A709M-345T2-X 16/19mm
WELDING PROCESS 焊接方法	FCAW	TYPE OF JOINT 焊缝类型	T-JOINT/BUTT

WELD I.D. 焊缝编号	DISCONTINUITY 不连续性			ACCEPT 接受	REJECT 拒收	REMARKS 备注
	INDICATION 指示	TYPE 类型	LENGTH IN mm 长度			
11TR2-007-015				ACC		100%MT
11TR2-007-016				ACC		100%MT
11TR2-007-008				ACC		100%MT
11TR2-007-009				ACC		100%MT
11TR2-007-011				ACC		100%MT
11TR2-007-012				ACC		100%MT

AFTER HSR1(B)-9272

BLANK


EXAMINED BY 主探 Jin Jianting LEVEL - II SIGN 签名 / DATE 日期 质量经理 / QCM	REVIEWED BY 审核 Sun Gary cheng LEVEL-II SIGN / DATE 日期 用户 CUSTOMER
签字 SIGN / 日期 DATE	签字 SIGN / 日期 DATE



## NCR PROPOSED RESOLUTION

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

**Attention:** Siegenthaler, Peter  
Resident Engineer

**Ref:** 05.03.06-000706

**Subject:** NCR No. ZPMC-0713

**Dated:** 13-Oct-2010

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

**Job Name:** SAS Superstructure

**Document No.:** ABF-NPR-000706 Rev: 03

---

### Contractor's Proposed Resolution:

**Reference Resolution:** ZPMC is providing the weld maps requested in the Department's previous response for the repairs made after testing to the traveler rails in ZPMC-0713 and ZPMC-0662.

ZPMC is providing the weld maps requested in the Department's previous response for the repairs made after testing to the traveler rails in ZPMC-0713 and ZPMC-0662. Previously submitted NDT was labeled post HSR because the parts were heat straightened after the test areas were re welded. Based on this and previously submitted NDT, ZPMC requests closure of this NCR.

**Submitted by:** Ishibashi, Joshua

**Attachment(s):** ABF-NPR-000706R03;

---

### Caltrans' comments:

**Status:** CLO

**Date:** 14-Oct-2010

With the provided weld map revision, along with the previous NDT records, this NPR is acceptable.

**Submitted by:** Woo, Laraine

**Attachment(s):** NPR CT Comments

**Date:** 14-Oct-2010



No. B-906

## LETTER OF RESPONSE

**TO:** American Bridge/Flour

**DATE:** 2010-10-12

**REGARDING:** NCR-000695 (ZPMC-0662) NCR-000750(ZPMC-0713)

Heat Straightenings were performed to these rails after the pieces were replaced. The submitted NDT records in the previously documentation are reflecting to these Heat Straightenings and are labeled post HSR. ZPMC is providing the revised weld maps for engineer's reviewal. Based on this, please consider closure of these NCRs.

**ATTACHMENT:**

NCR-000695(ZPMC-0662)

NCR-000750(ZPMC-0713)

WELD MAPS OF TR11 & TR20

*Handwritten signature*  
10/12/2010



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: 14-Mar-2010

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

Dear: Mr. Charles Kanapicki  
Attention: Mr. Thomas Nilsson Project/Fabrication Manager  
Subject: NCR No. ZPMC-0662

Job Name: SAS Superstructure  
Document No: 05.03.06-000652

Reference Description: Excessive heat was utilized during heat straightening of the traveler rail 11TR2-007

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: Other

Lift:

### Remarks:

During the Quality Assurance (QA) random in-process visual inspection of OBG traveler rail Heat Straightening, this QA Inspector observed the following:

- Temperature of the heat straightened traveler rail was beyond the allowable 650 Degree Celsius in two locations.
- Per ZPMC heat straightening report (HSR) maximum temperature limit is 650 Degree Celsius.
- The 1100 Degree Celsius rating "templstick" was melted when check was made against the metal surface.
- "Y" location of the spots identified as 3000mm & 8000mm at the flange.
- The Traveler Rail is identified as 11TR2-007.

### Action Required and/or Action Taken:

Propose a resolution for the identified non-conformance with revised procedures to prevent future occurrences. A response for the resolution of this issue is expected within 7 days.

Transmitted by: Bill Howe Sr. Transportation Engineer

Attachments: ZPMC-0662

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

File: 05.03.06

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 #: 04-0120F4

Cty: SF/ALA Rte: 80 PM: 13.2/13.9

File #: 69.25B

## QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

Location: Changxing Island, Shanghai, P.R. China

Report No: NCR-000695

Prime Contractor: American Bridge/Fluor Enterprises, a JV

Date: 11-Mar-2010

Submitting Contractor: Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island

NCR #: ZPMC-0662

### Type of problem:

Welding  Concrete  Other Welding  Curing  Procedural 

Bridge No: 34-0006

Joint fit-up  Coating  Other 

Component: Traveler Rail 11TR2-007

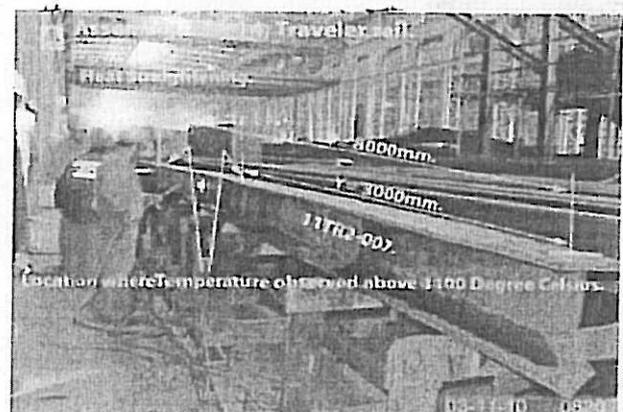
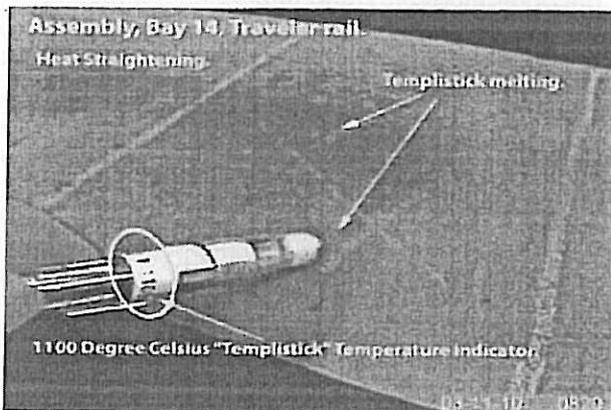
Procedural  Procedural  Description: Excessive heat used in heat straightening

Reference Description: Excessive heat was utilized during heat straightening of the traveler rail 11TR2-007

### Description of Non-Conformance:

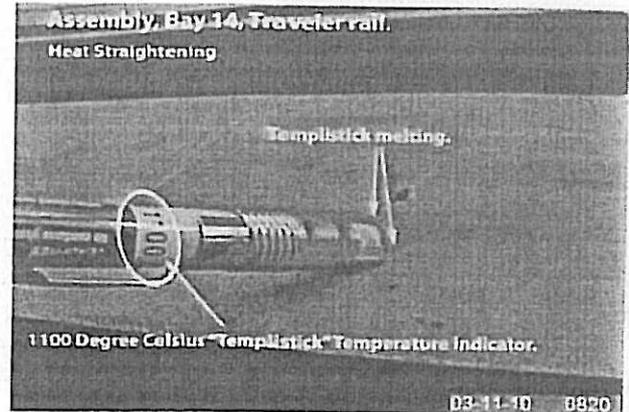
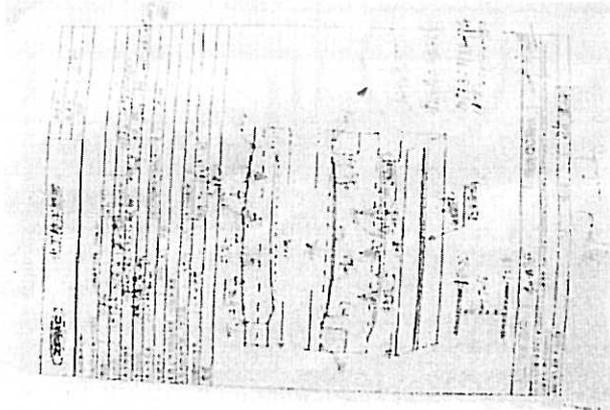
During the Quality Assurance (QA) random in-process visual inspection of OBG traveler rail Heat Straightening, this QA Inspector observed the following:

- Temperature of the heat straightened traveler rail was beyond the allowable 650 Degree Celsius in two locations.
- Per ZPMC heat straightening report (HSR) maximum temperature limit is 650 Degree Celsius.
- The 1100 Degree Celsius rating "templistick" was melted when check was made against the metal surface.
- "Y" location of the spots identified as 3000mm & 8000mm at the flange.
- The Traveler Rail is identified as 11TR2-007.



# QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

(Continued Page 2 of 2)



### Applicable reference:

AWS 1.5 WORKMANSHIP, 3.7.3 "Members distorted by welding shall be straightened by mechanical means or by carefully supervised application of a limited amount of localized heat as approved by the Engineer. The temperature of the heated areas as measured by approved methods shall not exceed 600°C [1100°F] for quenched and tempered steel nor 650°C [1200°F] (a dull, red color) for other steels. The part to be heated for straightening shall be substantially free of stress and from external forces, except those stresses resulting from the mechanical straightening method used in conjunction with the application of heat."

Who discovered the problem: Amit K. Juvekar

Name of individual from Contractor notified: Peter Shaw

Time and method of notification: 0915 Hrs, 03/11/10, Verbal

Name of Caltrans Engineer notified: Bill Howe

Time and method of notification: 1100 Hrs, 03/11/10, Verbal

QC Inspector's Name: Zhang Wen

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: Tsang, Eric

SMR

Reviewed By: Wahbeh, Mazen

SMR



DEPARTMENT OF TRANSPORTATION - District 4 Toll Bridge  
666 Feng Bin Road Room 708, Changxing Island  
Shanghai 201913 PR China  
Tel: 021-56856666 ext 207061 Fax:

## NON-CONFORMANCE REPORT TRANSMITTAL

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

**Date:** 31-May-2010

**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:** 05.03.06-000706

**Subject:** NCR No. ZPMC-0713

**Reference Description:** Excessive heat was utilized during heat straightening of the traveler rail 20TR2-013

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:**

### Remarks:

During the Quality Assurance (QA) random in-process observations of the fabrication of OBG Traveler Rail (TR), this Caltrans QA Inspector observed the following:

- ZPMC personnel performed heat straightening of the traveler rail flange base plate. The material was heated to a bright red condition and the temperature is above 650°C.
- Per ZPMC Heat Straightening Report identified as HSR1 (B)-8350, the maximum allowable temperature is 650°C.
- The AWS D1.5 Section 3.7.3 states that the heated steel shall not exceed 650°C, which gives a dull red color.
- This QA Inspector observed the 760°C Tempilstik was melted when struck against the red base metal.
- A temperature indicating crayon, digital temperature measurement gauge, or other similar means of monitoring the temperature was not utilized by ZPMC QC and the actual maximum attained temperature was not measured.
- The Traveler rail is identified as 20TR2-013.
- The affected area was measured at Y location 800mm when measured from nearest leading edge, having a total area 150 x 1200mm.
- Additionally, this QA Inspector observed ZPMC apply a 13 Tons load on the Traveler rail.
- ZPMC HSR1 Report doesn't specify the exact weight or weight range to be applied on the TR during heat straightening process.
- This TR is located in fabrication Bay#5.

### Action Required and/or Action Taken:

Please provide HSR and documentations that demonstrate the over-heated element is acceptable. Propose a resolution for the identified non-conformance with revised procedures to prevent future occurrences. A response for the resolution of this issue is expected within 7 days.

**Transmitted by:** Sean Eagen Transportation Engineer  
**Attachments:** ZPMC-0713

---

**NCT**

*( Continued Page 2 of 2 )*

---

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

**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 #: 04-0120F4  
 Cty: SF/ALA Rte: 80 PM: 13.2/13.9  
 File #: 69.25B

## QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

**Location:** Changxing Island, Shanghai, P.R. China

**Report No:** NCR-000750

**Prime Contractor:** American Bridge/Fluor Enterprises, a JV

**Date:** 28-May-2010

**Submitting Contractor:** Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island

**NCR #:** ZPMC-0713

### Type of problem:

Welding  Concrete  Other

Welding  Curing  Procedural

Joint fit-up  Coating  Other

Procedural  Procedural  Description:

**Bridge No:** 34-0006

**Component:** OBG Traveler Rail 20TR2-013

**Reference Description:** Excessive heat was utilized during heat straightening of the traveler rail 20TR2-013

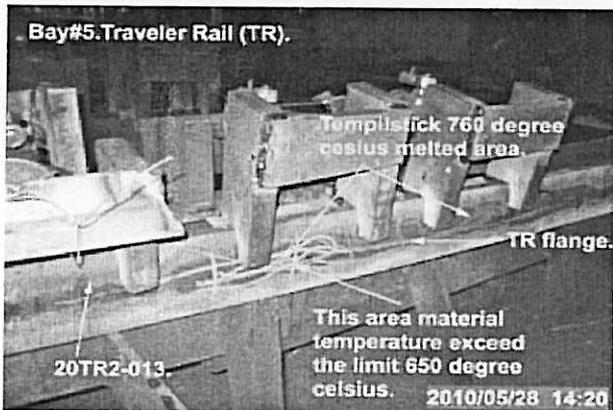
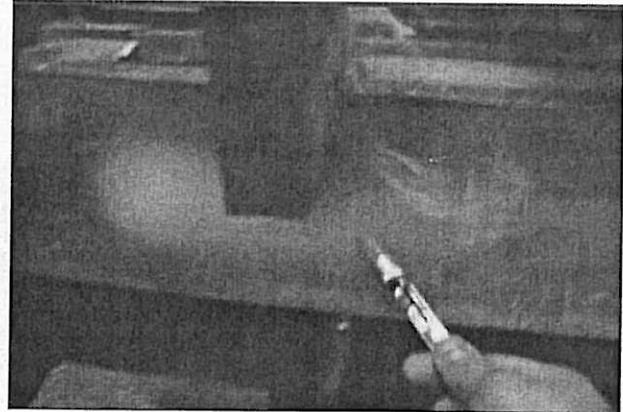
### Description of Non-Conformance:

During the Quality Assurance (QA) random in-process observations of the fabrication of OBG Traveler Rail (TR), this Caltrans QA Inspector observed the following:

- ZPMC personnel performed heat straightening of the traveler rail flange base plate. The material was heated to a bright red condition and the temperature is above 650°C.
- Per ZPMC Heat Straightening Report identified as HSR1 (B)-8350, the maximum allowable temperature is 650°C.
- The AWS D1.5 Section 3.7.3 states that the heated steel shall not exceed 650°C, which gives a dull red color.
- This QA Inspector observed the 760°C Tempilstik was melted when struck against the red base metal.
- A temperature indicating crayon, digital temperature measurement gauge, or other similar means of monitoring the temperature was not utilized by ZPMC QC and the actual maximum attained temperature was not measured.
- The Traveler rail is identified as 20TR2-013.
- The affected area was measured at Y location 800mm when measured from nearest leading edge, having a total area 150 x 1200mm.
- Additionally, this QA Inspector observed ZPMC apply a 13 Tons load on the Traveler rail.
- ZPMC HSR1 Report doesn't specify the exact weight or weight range to be applied on the TR during heat straightening process.
- This TR is located in fabrication Bay#5.

## QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

(Continued Page 2 of 3)



### Applicable reference:

AWS 1.5 2002 section 3.7.3 "Members distorted by welding shall be straightened by mechanical means or by carefully supervised application of a limited amount of localized heat as approved by the Engineer. The temperature of the heated areas as measured by approved methods shall not exceed 600°C [1100°F] for quenched and tempered steel nor 650°C [1200°F] (a dull, red color) for other steels. The part to be heated for straightening shall be substantially free of stress and from external forces, except those stresses resulting from the mechanical straightening method used in conjunction with the application of heat."

**Who discovered the problem:** Surendra Prabhu.

**Name of individual from Contractor notified:** Chen Ji Wei

**Time and method of notification:** 1425 Hrs, 05/28/10, Verbal

**Name of Caltrans Engineer notified:** Stanley Ku, Sean Eagen

**Time and method of notification:** 1900 hours, 05/28/10, Email

**QC Inspector's Name:** Shen Jian Gao

**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, (818) 292-0659, who represents the

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## QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

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Office of Structural Materials for your project.

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**Inspected By:** Tsang, Eric

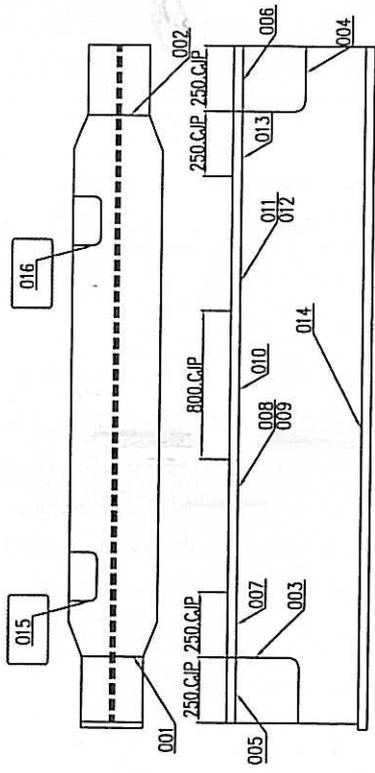
SMR

**Reviewed By:** Devey, Jim

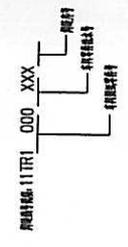
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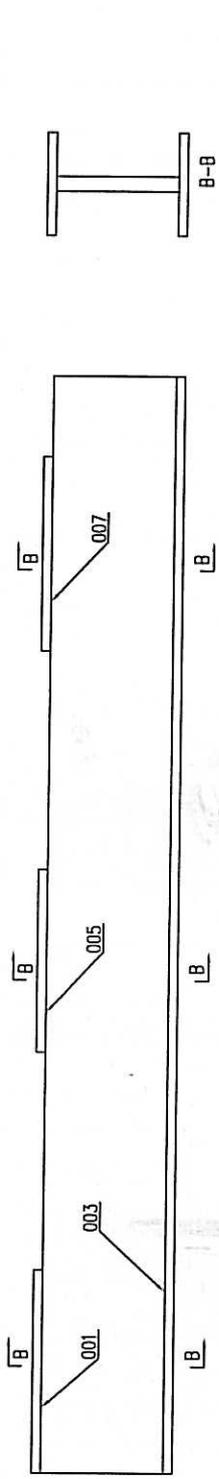
- 11TR1
- 11TR2
- 11TR3
- 11TR4
- 11TR5
- 11TR6
- 11TR7
- 11TR8
- 11TR9
- 11TR10
- 11TR11
- 11TR12



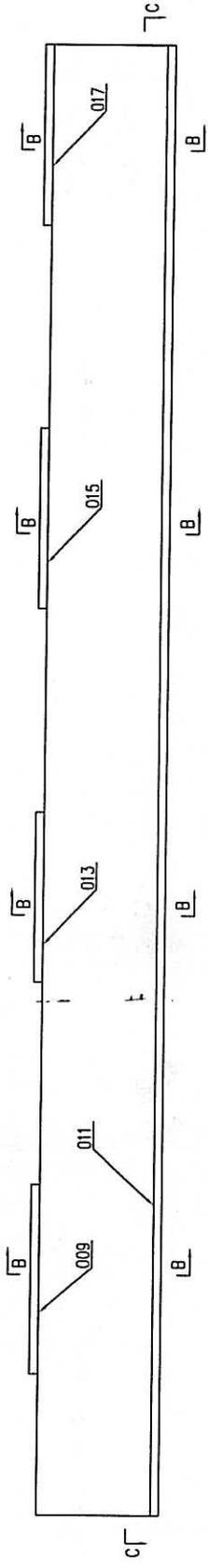
REVISED 11TR1 000 XXX

REVISED 11TR1 000 XXX

 ZPMC SHANGHAI ZHENGLIAO PORT MACHINERY CO., LTD.		WELDING MAP	
		DRAWN CHECKED	PROJECT DRAWING NO. 11TR11



20TR1



20TR2

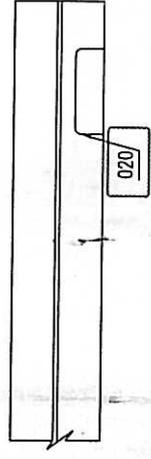


FIGURE 20TR1 000 XXX  
 材料  
 材料  
 材料

20TR20-013

材料

		
SHANGHAI ZHENHUA PORT MACHINERY CO., LTD.		
图号: 20TR20-013	图名: WELDING MAP	比例: 1:1
日期:	制图:	审核:
设计:	校对:	工艺:
材料:	规格:	数量:

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**QUALITY ASSURANCE -- NON-CONFORMANCE RESOLUTION**


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**Location:** Changxing Island, Shanghai, P.R. China**Report No:** NCS-000820**Prime Contractor:** American Bridge/Fluor Enterprises, a JV**Date:** 13-Oct-2010**Submitting Contractor:** Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island **NCR #:** ZPMC-0713**Type of problem:**

<b>Welding</b>	<b>Concrete</b>	<b>Other</b>	
<b>Welding</b>	<b>Curing</b>	<b>Procedural</b>	<b>Bridge No:</b> 34-0006
<b>Joint fit-up</b>	<b>Coating</b>	<b>Other</b>	<b>Component:</b>
<b>Procedural</b>	<b>Procedural</b>	<b>Description:</b>	

**Date the Non-Conformance Report was written:** 28-May-2010**Description of Non-Conformance:**

During the Quality Assurance (QA) random in-process observations of the fabrication of OBG Traveler Rail (TR), this Caltrans QA Inspector observed the following:

-ZPMC personnel performed heat straightening of the traveler rail flange base plate. The material was heated to a bright red condition and the temperature is above 650°C.

-Per ZPMC Heat Straightening Report identified as HSR1 (B)-8350, the maximum allowable temperature is 650°C.

-The AWS D1.5 Section 3.7.3 states that the heated steel shall not exceed 650°C, which gives a dull red color.

-This QA Inspector observed the 760°C Tempilstik was melted when struck against the red base metal.

-A temperature indicating crayon, digital temperature measurement gauge, or other similar means of monitoring the temperature was not utilized by ZPMC QC and the actual maximum attained temperature was not measured.

-The Traveler rail is identified as 20TR2-013.

-The affected area was measured at Y location 800mm when measured from nearest leading edge, having a total area 150 x 1200mm.

-Additionally, this QA Inspector observed ZPMC apply a 13 Tons load on the Traveler rail.

-ZPMC HSR1 Report doesn't specify the exact weight or weight range to be applied on the TR during heat straightening process.

-This TR is located in fabrication Bay#5.

**Contractor's proposal to correct the problem:**

Contractor will provide the weld maps revision for the repairs made. Contractor will submit NDT results to prove the welds are acceptable.

**Corrective action taken:**

Contractor provided the weld map revision, and NDT report. The NDT report shows the welds are acceptable.

The previous NDT was labeled post HSR because the parts were heat straightened and rewelded after test areas.

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## QUALITY ASSURANCE -- NON-CONFORMANCE RESOLUTION

( Continued Page 2 of 2 )

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**Did corrective action require Engineer's approval?**                      **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 Wahbeh, Mazen 818-292-0659, who represents the Office of Structural Materials for your project.

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**Inspected By:**    Ng,Michael

Quality Assurance Inspector

**Reviewed By:**    Wahbeh,Mazen

QA Reviewer