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-000696
Prime Contractor: American Bridge/Fluor Enterprises, a JV **Date:** 12-Mar-2010
Submitting Contractor: Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island **NCR #:** ZPMC-0663

Type of problem:

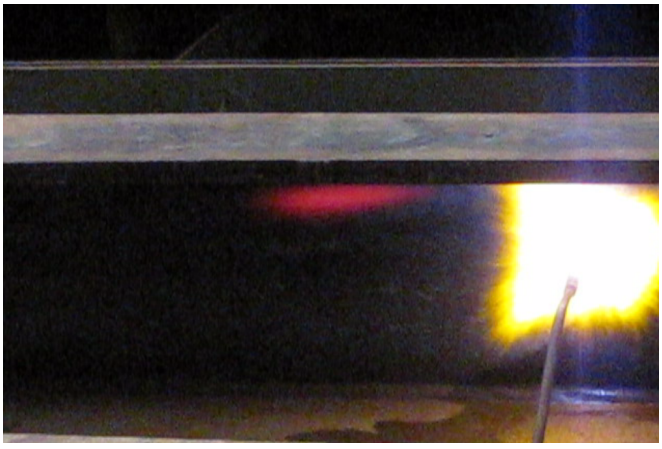
Welding	☐	**Concrete**	☐	**Other**	☑	
Welding	☐	**Curing**	☐	**Procedural**	☑	**Bridge No:** 34-0006
Joint fit-up	☐	**Coating**	☐	**Other**	☐	**Component:** Traveler Rail 10TR3-022
Procedural	☐	**Procedural**	☐	**Description:**		Excessive heat used in heat straightening

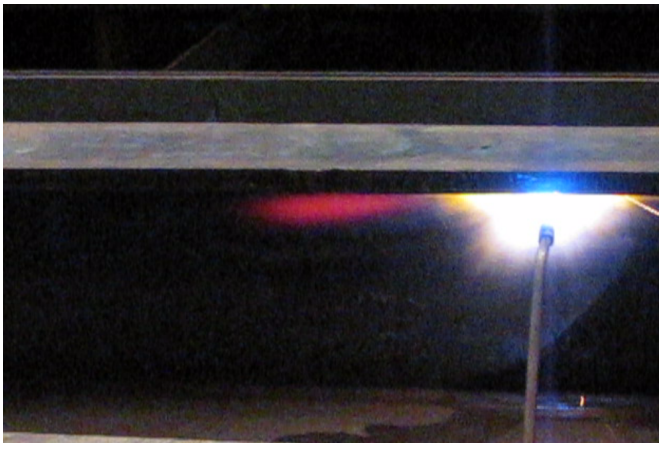
Reference Description: Excessive heat was utilized during heat straightening of the traveler rail 10TR3-022

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:

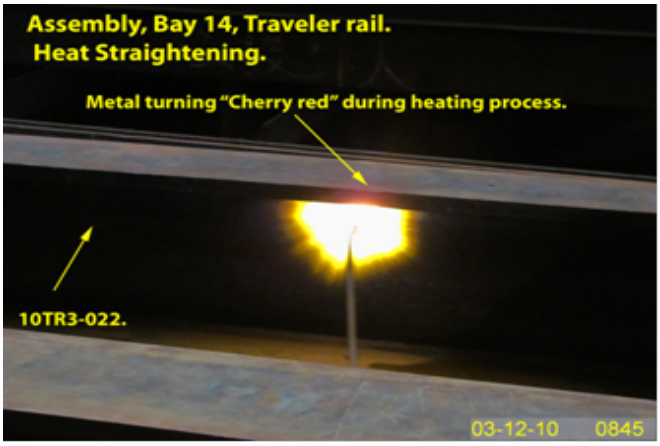
- Temperature of the heat straightened traveler rail was beyond the allowable 650 Degree Celsius.
- Metal color turns into “cherry red” after it was heat straightened.
- Per ZPMC heat straightening report (HSR) maximum temperature limit is 650 Degree Celsius.
- The 1100 Degree Celsius rating “templistick” was melted when check was made against the metal surface.
- “Y” location of the spot identified was 3890 mm and it is at the flange to web joint.
- The Traveler Rail is identified as 10TR3-022.

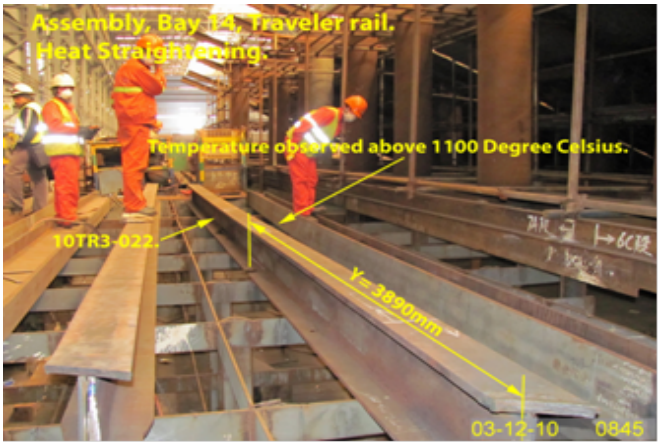




QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

(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: 0800 Hrs, 03/12/10, Verbal

Name of Caltrans Engineer notified: Bill Howe

Time and method of notification: 1000 Hrs, 03/12/10, Verbal

QC Inspector's Name: Zhang Wei

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
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	**Job Name:**	SAS Superstructure
Attention:	Mr. Thomas Nilsson Project/Fabrication Manager	**Document No:**	05.03.06-000653
Subject:	NCR No. ZPMC-0663		

Reference Description: Excessive heat was utilized during heat straightening of the traveler rail 10TR3-022

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.
- Metal color turns into “cherry red” after it was heat straightened.
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- The 1100 Degree Celsius rating “templistick” was melted when check was made against the metal surface.
- “Y” location of the spot identified was 3890 mm and it is at the flange to web joint.
- The Traveler Rail is identified as 10TR3-022.

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-0663

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

File: 05.03.06

AMERICAN BRIDGE/FLUOR ENTERPRISES, a JV

P.O. BOX 23223 Oakland, CA 94623

Phone (510) 419-0120 / Fax (510) 839-0666

NCR PROPOSED RESOLUTION

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

Attention: Pursell, Gary
Resident Engineer

Ref: 05.03.06-000653

Subject: NCR No. ZPMC-0663

Dated: **12-May-2010**

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

Job Name: SAS Superstructure

Document No.: **ABF-NPR-000656 Rev: 00**

Contractor's Proposed Resolution:

Reference Resolution: ZPMC is providing hardness testing results to show that the material that was heated was not compromised. Based on these results, ZPMC requests closure of this NCR.

ZPMC is providing hardness testing results to show that the material that was heated was not compromised. Based on these results, ZPMC requests closure of this NCR.

Submitted by: Ishibashi, Joshua

Attachment(s): ABF-NPR-000656R00;

Caltrans' comments:

Status: REJ

Date: 12-May-2010

Please provide revised hardness testing data as discussed.

Submitted by: Eagen, Sean

Date: 12-May-2010

Attachment(s):

No. B-753

LETTER OF RESPONSE

TO: American Bridge/Flour
DATE: 2010-5-12
REGARDING: NCR-000695(ZPMC-0662) NCR-000696(ZPMC-0663)

ZPMC acknowledged the heat straightening was performed overheated. ZPMC has written internal NCRs regarding to this issue. The HS areas where were heated to a bright red color have been tested by utilizing hardness testing. ZPMC is providing the hardness testing reports, hoping engineer could take a review and consider closure of these NCRs.

ATTACHMENT:
NCR-000695(ZPMC-0662)
HARDNESS TESTING FOR 11TR2-007
NCR-000696(ZPMC-0663)
HARDNESS TESTING FOR 10TR3-022

5/12/10

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:	14-Mar-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:	05.03.06-000652
Subject:	NCR No. ZPMC-0662		

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 "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.

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

STATE OF CALIFORNIA--BUSINESS,TRANSPORTACTION AND HOUSING AGENCY Arnold Schwarzenegger, Governor

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

Bay Area Branch
690 Walnut Ave.SL 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:

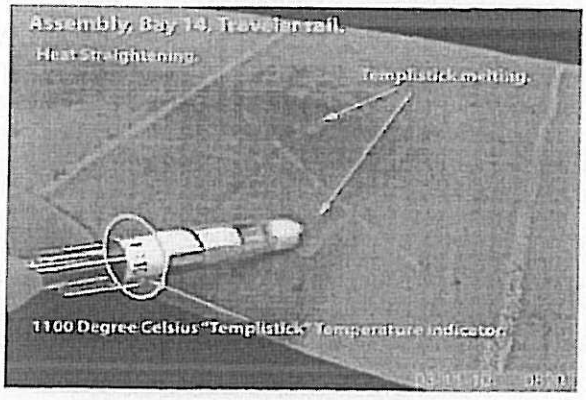
Welding	☐	**Concrete**	☐	**Other**	☑	
Welding	☐	**Curing**	☐	**Procedural**	☑	**Bridge No:** 34-0006
Joint fit-up	☐	**Coating**	☐	**Other**	☐	**Component:** Traveler Rail 11TR2-007
Procedural	☐	**Procedural**	☐			**Description:** Excessive heat used in heat straightening

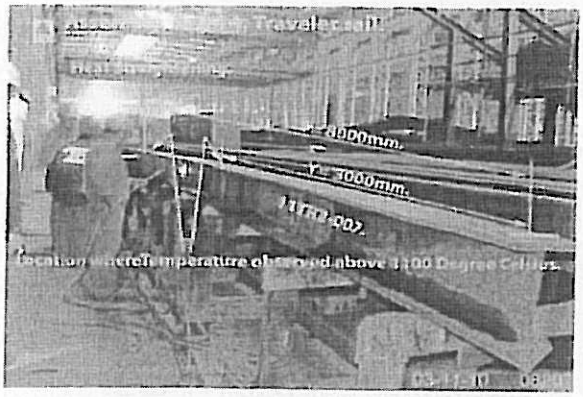
Reference Description: Excessive heat was utilized during heat straightening of the traveler rail 11TR2-007

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

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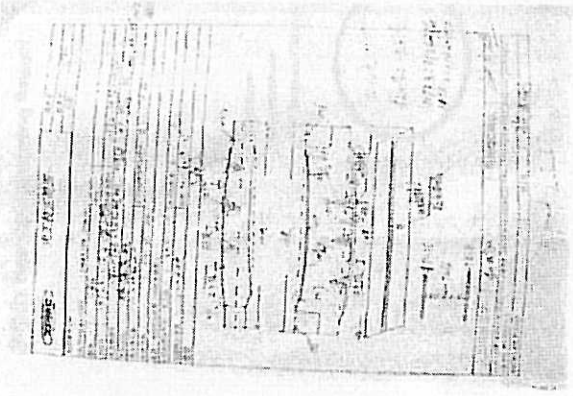
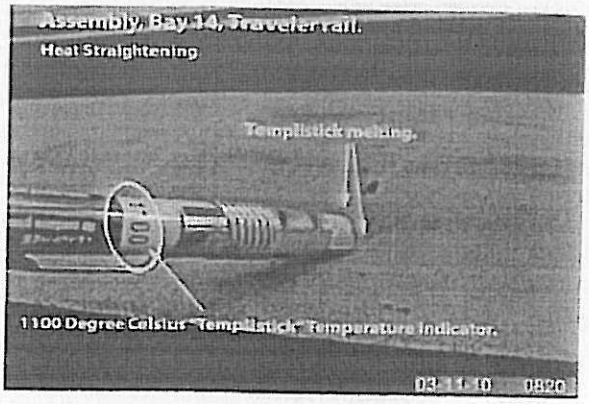




Applicable reference:
AWS 1.5 WORKMANSHIP, 3.7.3 "Members distorted by welding shall be straightened by mechanical means or by carefully supervised application of a limited amount of localized heat as approved by the Engineer. The temperature of the heated areas as measured by approved methods shall 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

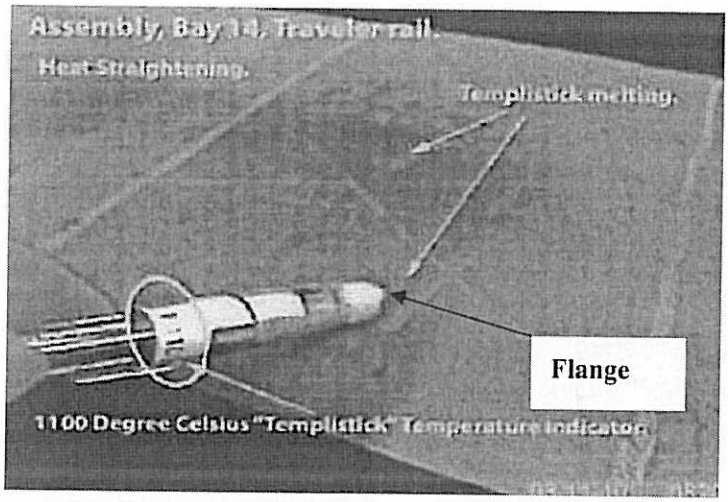
Was QC Inspector aware of the problem: ☐ Yes ☑ No

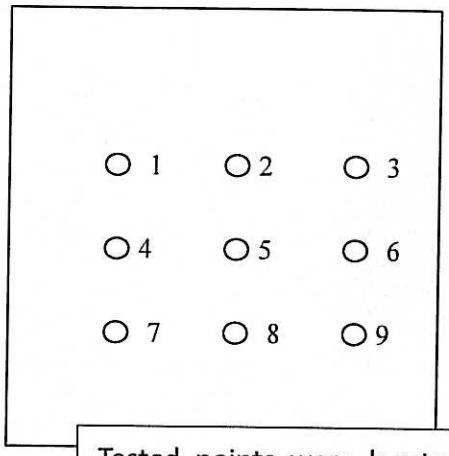
Contractor's proposal to correct the problem:
N/A

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

Hardness testing 11TR2-007





Tested points were located by 50mm * 50mm Square on the HS surface & compare area

Flange			
HS Area (3000~3150mm)		No HS Area (1950~2100mm)	
Location	Data	Location	Data
1	148	1	165
2	156	2	171
3	164	3	161
4	134	4	134
5	142	5	140
6	166	6	152
7	151	7	193
8	149	8	158
9	151	9	157

Remark: The compare area what called No HS Areas were located away from the HS Areas at same plate.

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	Job Name:	SAS Superstructure
Attention:	Mr. Thomas Nilsson Project/Fabrication Manager	Document No:	05.03.06-000653
Subject:	NCR No. ZPMC-0663		

Reference Description: Excessive heat was utilized during heat straightening of the traveler rail 10TR3-022

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:

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- "Y" location of the spot identified was 3890 mm and it is at the flange to web joint.
- The Traveler Rail is identified as 10TR3-022.

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-0663

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

02.02;15.04 *05.03.06-000653.NCT*

Received
NCT-000653 17 Mar 10

STATE OF CALIFORNIA--BUSINESS,TRANSPORTACTION AND HOUSING AGENCY Arnold Schwarzenegger, Governor

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-000696
Prime Contractor: American Bridge/Fluor Enterprises, a JV **Date:** 12-Mar-2010
Submitting Contractor: Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island **NCR #:** ZPMC-0663

Type of problem:

Welding	☐	**Concrete**	☐	**Other**	☑	
Welding	☐	**Curing**	☐	**Procedural**	☑	**Bridge No:** 34-0006
Joint fit-up	☐	**Coating**	☐	**Other**	☐	**Component:** Traveler Rail 10TR3-022
Procedural	☐	**Procedural**	☐			**Description:** Excessive heat used in heat straightening

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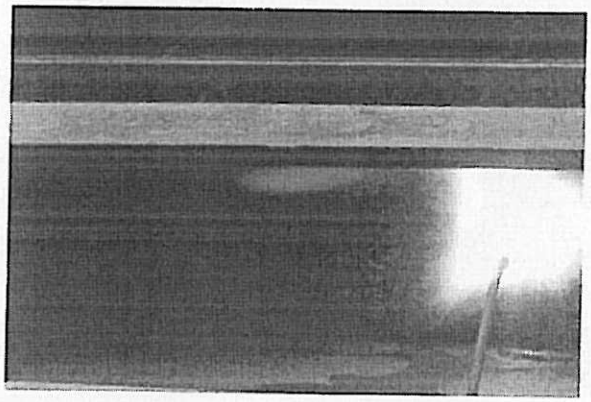

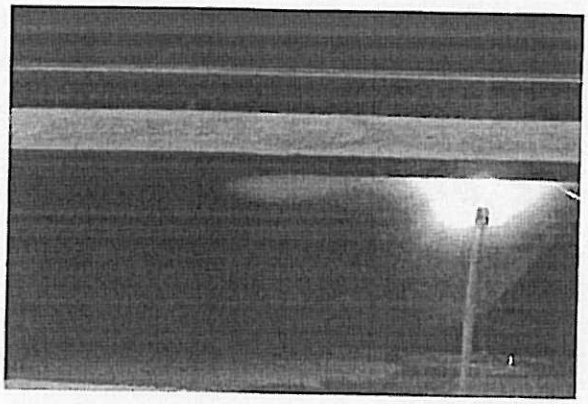

QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

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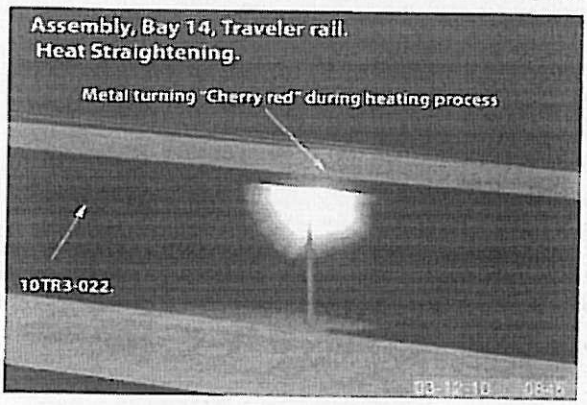

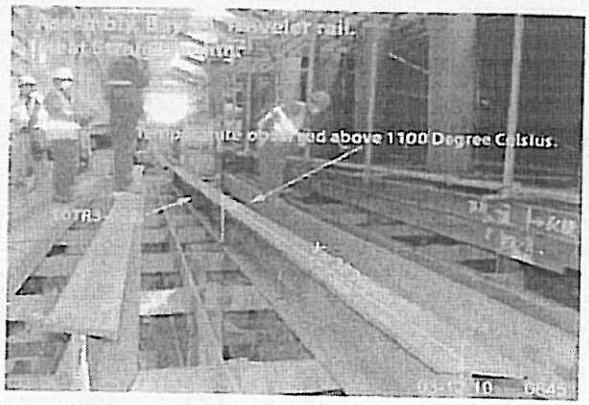

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Who discovered the problem: Amit K. Juvekar

Name of individual from Contractor notified: Peter Shaw

Time and method of notification: 0800 Hrs, 03/12/10, Verbal

Name of Caltrans Engineer notified: Bill Howe

Time and method of notification: 1000 Hrs, 03/12/10, Verbal

QC Inspector's Name: Zhang Wei

Was QC Inspector aware of the problem: ☐ Yes ☑ No

Contractor's proposal to correct the problem:

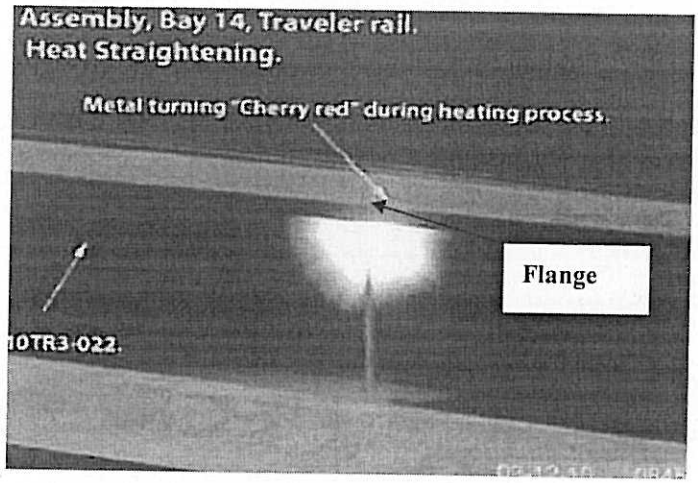
N/A

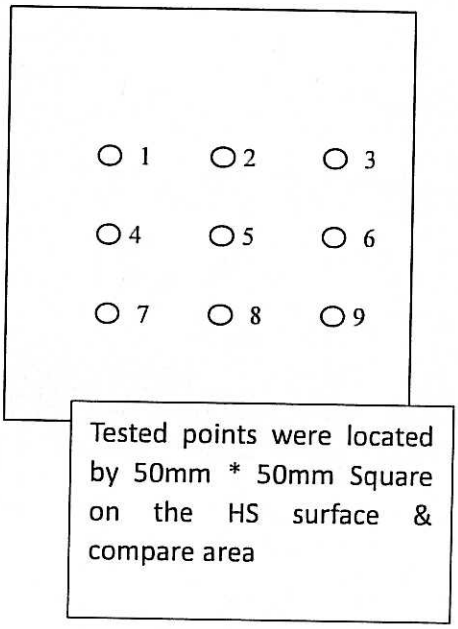
Comments:

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

Hardness testing 10TR3-002





Flange			
HS Area (3800~4000mm)		No HS Area (3000~3200mm)	
Location	Data	Location	Data
1	157	1	153
2	191	2	146
3	147	3	141
4	160	4	160
5	144	5	144
6	149	6	139
7	148	7	138
8	144	8	153
9	149	9	149

Remark: The compare area what called No HS Area was located away from the HS Areas at same plate.

AMERICAN BRIDGE/FLUOR ENTERPRISES, a JV

P.O. BOX 23223 Oakland, CA 94623

Phone (510) 419-0120 / Fax (510) 839-0666

NCR PROPOSED RESOLUTION

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

Attention: Pursell, Gary
Resident Engineer

Ref: 05.03.06-000653

Subject: NCR No. ZPMC-0663

Dated: **21-May-2010**

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

Job Name: SAS Superstructure

Document No.: **ABF-NPR-000656 Rev: 01**

Contractor's Proposed Resolution:

Reference Resolution: ZPMC has performed hardness testing with the Department's representative present and the results are acceptable based on applicable ASTMs. Based on this, ZPMC requests closure of this NCR.

ZPMC has performed hardness testing with the Department's representative present and the results are acceptable based on applicable ASTMs. Based on this, ZPMC requests closure of this NCR.

Submitted by: Ishibashi, Joshua

Attachment(s): ABF-NPR-000656R01;

Caltrans' comments:

Status: REJ

Date: 26-May-2010

Provide hardness scale unit for the tested value. (i.e., HV = Vickers Hardness, HB = Brinell Hardness)

Data shall include tested areas that were heated excessively along with control areas for comparison.

ZPMC stated that "after review with ASTM A709 & ASTM A370 what regarding the hardness & tensile requirement, these hardness values were found to be acceptable." Provide analysis to demonstrate how this conclusion is made. (i.e., comparing the actual MTR from the mill) Provide documentation for the Engineer to evaluate acceptance in accordance with the contract requirements.

It should be noted that the scope of ASTM A370 is "for the mechanical testing of wrought and cast steels, stainless steels, and related alloys." Reference such as ASM Metals Reference Book has more relevant approximation of the tensile strength supporting the analysis.

Submitted by: Eagen, Sean **Date:** 26-May-2010

Attachment(s): NPR CT Comments

No. B-766

LETTER OF RESPONSE

TO: American Bridge/Flour
DATE: 2010-5-21
REGARDING: NCR-000695（ZPMC-0662） NCR-000696（ZPMC-0663）
NCR-000713（ZPMC-0680） NCR-000726（ZPMC-0689）

ZPMC acknowledged the heat straightening was performed overheated. Hardness Tests were performed to the affected components under the witness of department's representative. After review with ASTM A709 & ASTM A370 what regarding the hardness & tensile requirement, these hardness values were found to be acceptable. Based on this, ZPMC is providing the hardness testing report and is requesting closures of these NCRs.

ATTACHMENT:
NCR-000695(ZPMC-0662)
HARDNESS TESTING FOR 11TR2-007
NCR-000696(ZPMC-0663)
HARDNESS TESTING FOR 10TR3-022
NCR-000713（ZPMC-0680）
HARDNESS TESTING FOR FB3014-001
NCR-000726（ZPMC-0689）
HARDNESS TESTING FOR TR6A-052

5/21/10

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:	14-Mar-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:	05.03.06-000652
Subject:	NCR No. ZPMC-0662		

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 "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.

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:

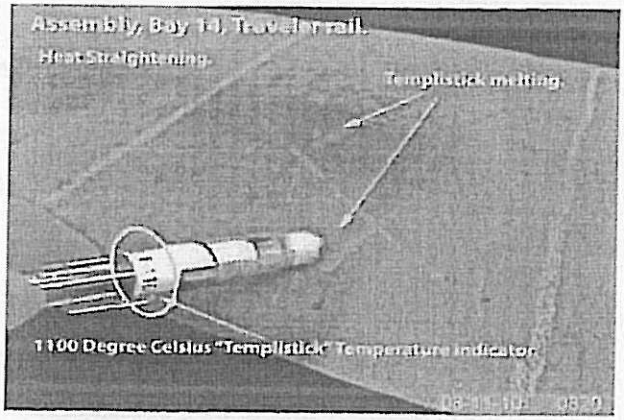
Welding	☐	Concrete	☐	Other	☑	
Welding	☐	Curing	☐	Procedural	☑	**Bridge No:** 34-0006
Joint fit-up	☐	Coating	☐	Other	☐	**Component:** Traveler Rail 11TR2-007
Procedural	☐	Procedural	☐			**Description:** Excessive heat used in heat straightening

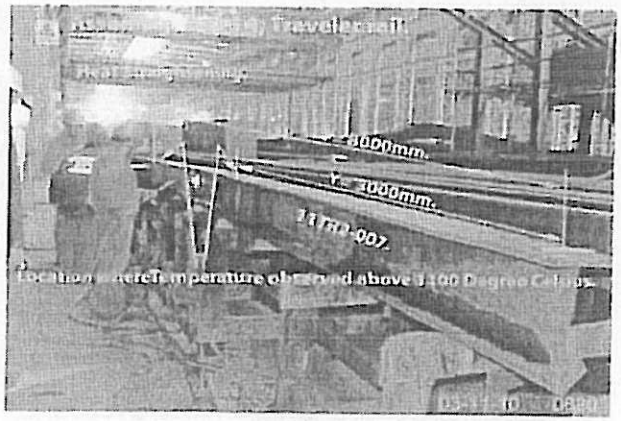
Reference Description: Excessive heat was utilized during heat straightening of the traveler rail 11TR2-007

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:

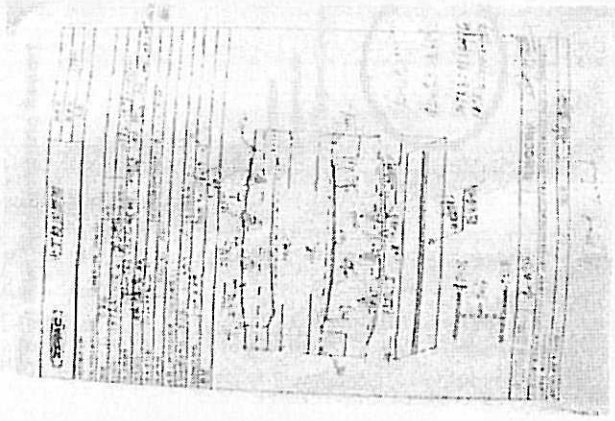
- Temperature of the heat straightened traveler rail was beyond the allowable 650 Degree Celsius in two locations.
- Per ZPMC heat straightening report (HSR) maximum temperature limit is 650 Degree Celsius.
- The 1100 Degree Celsius rating "templistick" was melted when check was made against the metal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

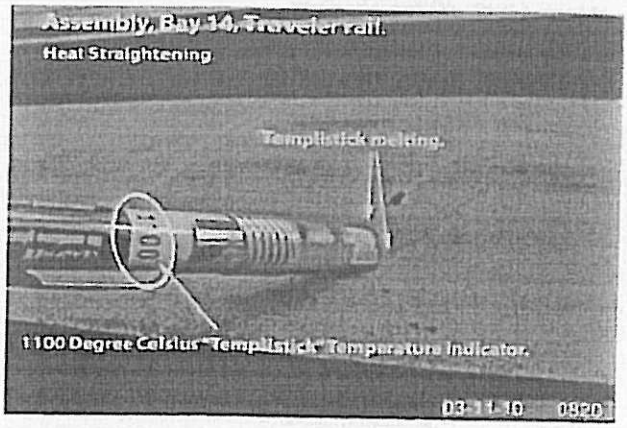




QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

(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:

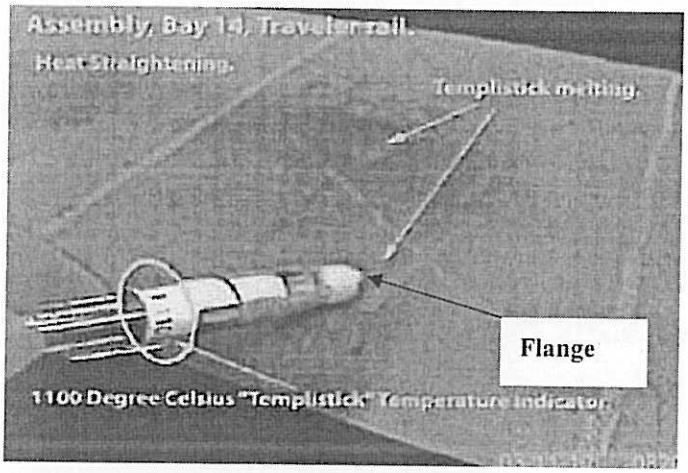
N/A

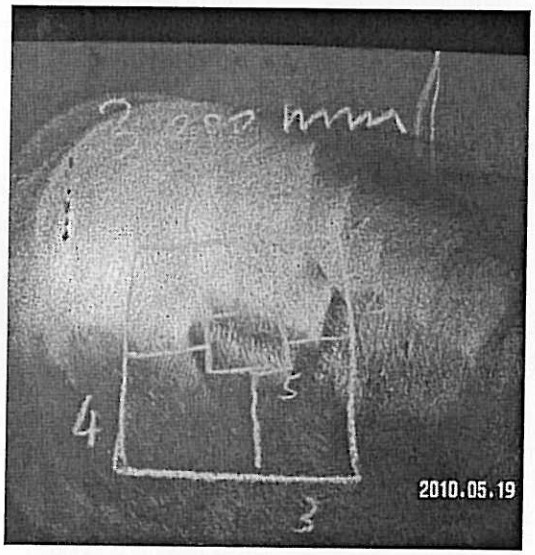
Comments:

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

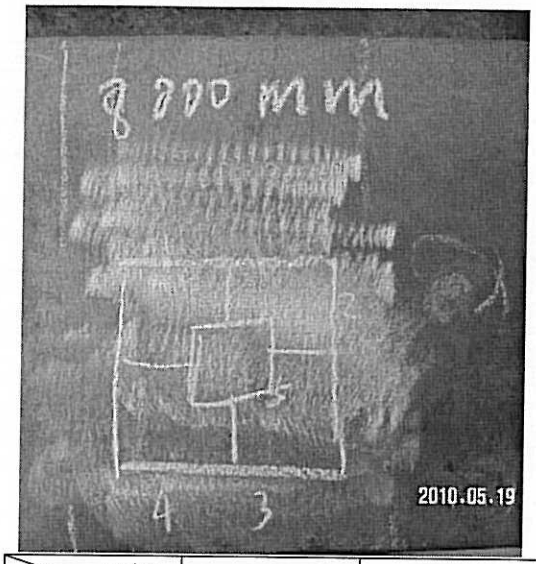
Hardness testing 11TR2-007





Area \ Value	a	b	c	d	e	Average Value
1	203	242	218	243	208	223
2	184	201	195	193	166	191
3	189	267	219	200	196	205
4	225	197	197	201	208	202
5	239	190	200	200	196	199

11TR2-007 Flange at 3000mm Hardness Testing Result



Area \ Value	a	b	c	d	e	Average Value
1	181	180	191	192	196	188
2	212	213	178	189	196	199
3	216	221	209	194	217	214
4	210	225	198	234	217	217
5	212	199	195	209	194	201

11TR2-007 Flange at 8000mm Hardness Testing Result

Remark: The highest and the lowest readings are discarded when calculating the average value.

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	Job Name:	SAS Superstructure
Attention:	Mr. Thomas Nilsson Project/Fabrication Manager	Document No:	05.03.06-000653
Subject:	NCR No. ZPMC-0663		

Reference Description: Excessive heat was utilized during heat straightening of the traveler rail 10TR3-022

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.
- Metal color turns into "cherry red" after it was heat straightened.
- 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 spot identified was 3890 mm and it is at the flange to web joint.
- The Traveler Rail is identified as 10TR3-022.

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-0663

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

Received
NCT-000653 17 Mar 10

STATE OF CALIFORNIA--BUSINESS,TRANSPORTACTION AND HOUSING AGENCY Arnold Schwarzenegger, Governor

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

Report No: NCR-000696
Date: 12-Mar-2010
NCR #: ZPMC-0663

Type of problem:

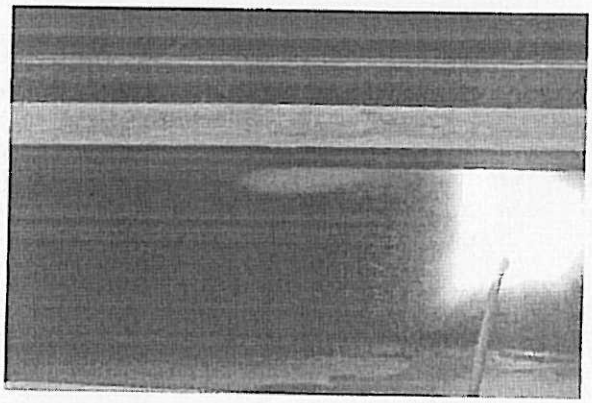
Welding	☐	**Concrete**	☐	**Other**	☑	
Welding	☐	**Curing**	☐	**Procedural**	☑	**Bridge No:** 34-0006
Joint fit-up	☐	**Coating**	☐	**Other**	☐	**Component:** Traveler Rail 10TR3-022
Procedural	☐	**Procedural**	☐			**Description:** Excessive heat used in heat straightening

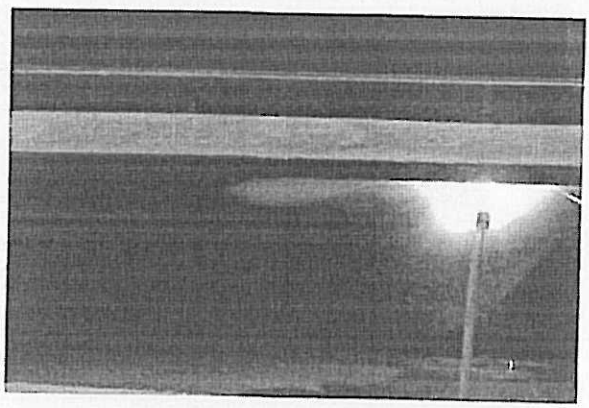
Reference Description: Excessive heat was utilized during heat straightening of the traveler rail 10TR3-022

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:

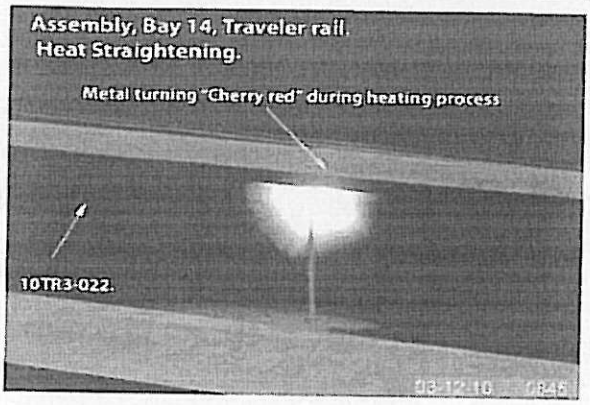
- Temperature of the heat straightened traveler rail was beyond the allowable 650 Degree Celsius.
- Metal color turns into "cherry red" after it was heat straightened.
- Per ZPMC heat straightening report (HSR) maximum temperature limit is 650 Degree Celsius.
- The 1100 Degree Celsius rating "templistick" was melted when check was made against the metal surface.
- "Y" location of the spot identified was 3890 mm and it is at the flange to web joint.
- The Traveler Rail is identified as 10TR3-022.

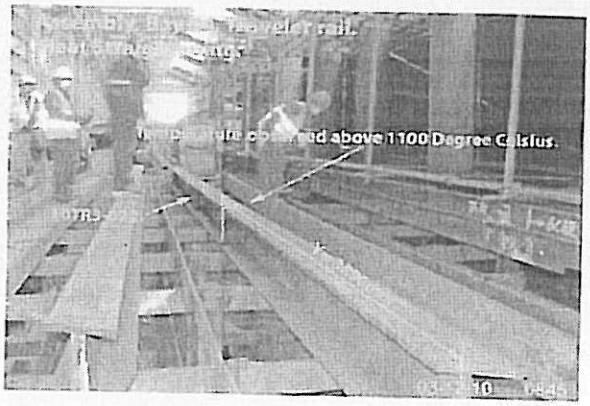




QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

(Continued Page 2 of 2)



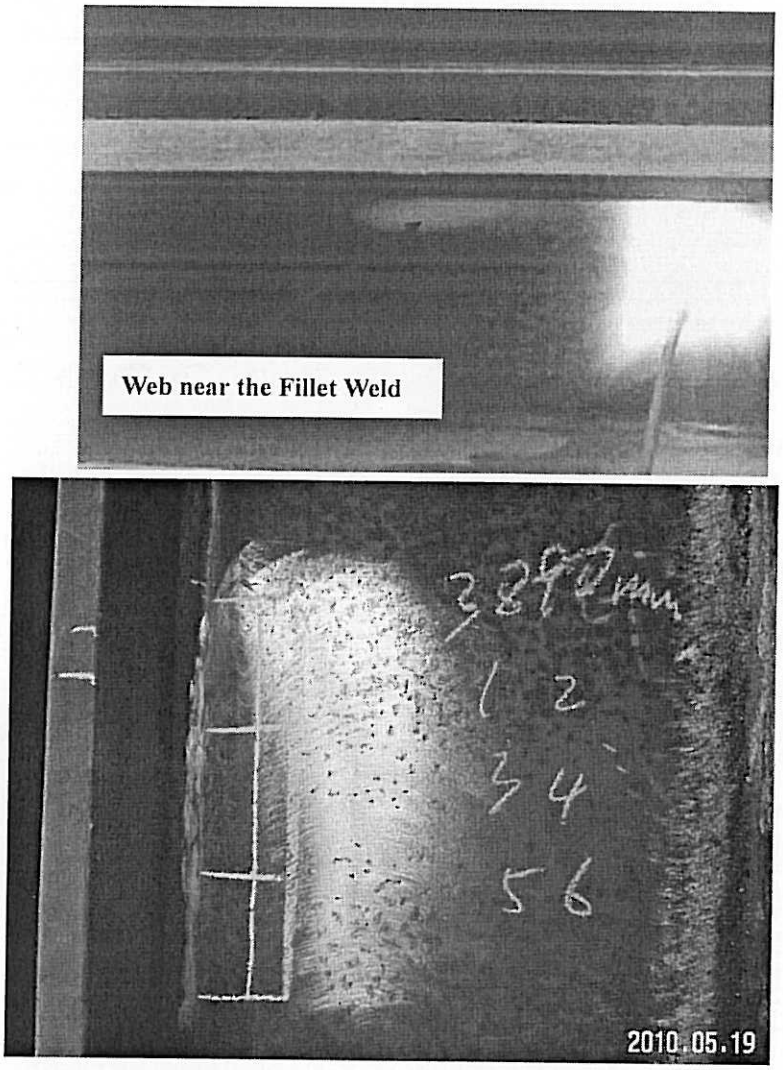


Applicable reference:
AWS 1.5 WORKMANSHIP, 3.7.3 "Members distorted by welding shall be straightened by mechanical means or by carefully supervised application of a limited amount of localized heat as approved by the Engineer. The temperature of the heated areas as measured by approved methods shall 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: 0800 Hrs, 03/12/10, Verbal
Name of Caltrans Engineer notified: Bill Howe
Time and method of notification: 1000 Hrs, 03/12/10, Verbal
QC Inspector's Name: Zhang Wei
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

Hardness testing 10TR3-022



Area \ Value	a	b	c	d	e	Average Value
1	175	177	172	175	196	176
2	180	183	185	184	184	184
3	175	180	178	180	181	179
4	186	178	186	179	178	181
5	179	182	172	168	171	174
6	179	182	172	168	171	174

10TR3-022 Web Hardness Testing Result

Remark: The highest and the lowest readings are discarded when calculating the average value.

DEPARTMENT OF TRANSPORTATION - District 4 Toll Bridge
666 Feng Bin Road Room 708, Changxing Island
Shanghai 201913 PR China
Tel: 510-376-8234 Fax:

NON-CONFORMANCE REPORT TRANSMITTAL

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

Date: 23-Apr-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

Document No: 05.03.06-000670

Subject: NCR No. ZPMC-0680

Reference Description: Heat straightening utilizing excessive heat and performing the work with no written procedure to show QA and QC on Floorbeam

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: 12

Remarks:

During random in process observations of OBG segment 12CE in Bay 14, Caltrans Quality Assurance (QA) Inspector observed the following issues:

-Heat straightening was performed on Floorbeam FB3014-001 without an approved heat straightening document.

-ZPMC had a crane lifting upward with an unknown amount of uplifting force on the Floorbeam while heat straightening the Floorbeam base metal to a bright cherry-red color.

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

-ZPMC QC Certified Welding Inspector (CWI) Geng Wei and the ABF representative Yang Chao were not aware that this heat straightening was taking place.

-ZPMC CWI did not know if a heat straightening document had been submitted for this activity, and no document was issued to record this activity had taken place.

-A temp stick, digital temperature measurement gauge, or other similar means of monitoring the heat input was not utilized by ZPMC personnel and the actual maximum attained temperature was not measured.

-Floorbeam FB3014-001 is welded in place at OBG segment 12CE near panel point PP115.5.

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 to prevent future occurrences. A response for the resolution of this issue is expected within 14 days.

Transmitted by: Stanley Ku Sr. Bridge Engineer

Attachments: ZPMC-0680

cc: Gary Pursell, Peter Siegenthaler, Jason Tom, Bill Casey

File: 05.03.06

02.02.15.04

05.03.06-000670,NCT

Received
NCT-000670 26 Apr 10

STATE OF CALIFORNIA--BUSINESS,TRANSPORTACTION AND HOUSING AGENCY Arnold Schwarzenegger, Governor

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

Report No: NCR-000713
Date: 21-Apr-2010
NCR #: ZPMC-0680

Type of problem:

Welding	☐	**Concrete**	☐	**Other**	☑
Welding	☐	**Curing**	☐	**Procedural**	☑
Joint fit-up	☐	**Coating**	☐	**Other**	☐
Procedural	☐	**Procedural**	☐	**Description:**	

Bridge No: 34-0006
Component: OBG Segment 12CE Floorbeam

Reference Description: Heat straightening utilizing excessive heat and performing the work with no written procedure to show QA and QC on Floorbeam FB3014-001

Description of Non-Conformance:

During random in process observations of OBG segment 12CE in Bay 14, this Caltrans Quality Assurance (QA) Inspector observed the following issues:

-Heat straightening was performed on Floorbeam FB3014-001 without an approved heat straightening document.

-ZPMC had a crane lifting upward with an unknown amount of uplifting force on the Floorbeam while heat straightening the Floorbeam base metal to a bright cherry-red color.

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

-ZPMC QC Certified Welding Inspector (CWI) Geng Wei and the ABF representative Yang Chao were not aware that this heat straightening was taking place.

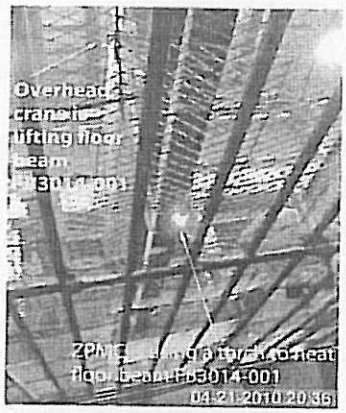
-ZPMC CWI did not know if a heat straightening document had been submitted for this activity, and no document was issued to record this activity had taken place.

-A temp stick, digital temperature measurement gauge, or other similar means of monitoring the heat input was not utilized by ZPMC personnel and the actual maximum attained temperature was not measured.

-Floorbeam FB3014-001 is welded in place at OBG segment 12CE near panel point PP115.5.

QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

(Continued Page 2 of 3)



Applicable reference:

AWS D1.5 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."

Special Provisions Section 8-3; The Engineer shall be notified in writing when welding problems, deficiencies, base metal repairs, or any other type of repairs not submitted in the WQCP are discovered and also of the proposal repair procedures to correct them.

Who discovered the problem: Paul Dawson
Name of individual from Contractor notified: Yang Chao
Time and method of notification: 2100 hours, 04-21-2010, Verbal
Name of Caltrans Engineer notified: Sean Eagen, Stanley Ku, Aaron Prchlik
Time and method of notification: 0720 hours, 04-22-2010, Verbal
QC Inspector's Name: Gang Wei
Was QC Inspector aware of the problem:

QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

(Continued Page 3 of 3)

☐ 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

Hardness testing for FB3014-001 @ PP115.5 12CE

Area \ Value	a	b	c	d	e	Average Value
1	161	129	159	181	186	167
2	165	159	152	169	159	161
3	128	151	179	161	166	159
4	166	183	173	173	166	171
5	169	181	179	182	195	181

Floor Beam Lower Flange Hardness Testing Result

Remark: The highest and the lowest readings are discarded when calculating the average value.

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:**	03-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:**	05.03.06-000684
Subject:	NCR No. ZPMC-0689		

Reference Description: Excessive heat was utilized during heat straightening of the traveler rail bracket TR6A-052; QC allowed heat straightening to

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:** N/A

Remarks:

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

-ZPMC personnel perform heat straightening of traveler rail bracket base plate. The material was heated to a bright red color.
-Per ZPMC Heat Straightening Report identified as HSR1 (B)-8405, the maximum temperature is 650 °C.
-AWS D1.5 2002 defines the color of material heated to 650 °C as a "dull red color".
-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.
-ZPMC QC personnel Shen Jian Gao was aware of the on-going heat straightening work performed without any temperature measuring device.
-The Traveler Rail Bracket is identified as TR6A-052.
-The base material thickness measured 30mm.

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 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-0689

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

Report No: NCR-000726
Date: 01-May-2010
NCR #: ZPMC-0689

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 Bracket

Reference Description: Excessive heat was utilized during heat straightening of the traveler rail bracket TR6A-052; QC allowed heat straightening to be performed without a temperature measuring device

Description of Non-Conformance:

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

-ZPMC personnel perform heat straightening of traveler rail bracket base plate. The material was heated to a bright red color.
-Per ZPMC Heat Straightening Report identified as HSR1 (B)-8405, the maximum temperature is 650 °C.
-AWS D1.5 2002 defines the color of material heated to 650 °C as a "dull red color".
-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.
-ZPMC QC personnel Shen Jian Gao was aware of the on-going heat straightening work performed without any temperature measuring device.
-The Traveler Rail Bracket is identified as TR6A-052.
-The base material thickness measured 30mm.

QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

(Continued Page 2 of 2)

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: Wang Wen Bin

Time and method of notification: 1515 Hrs, 05/01/10, Verbal

Name of Caltrans Engineer notified: Stanley Ku

Time and method of notification: 1030 hours, 05/02/10, Verbal

QC Inspector's Name: Shen Jian Gao

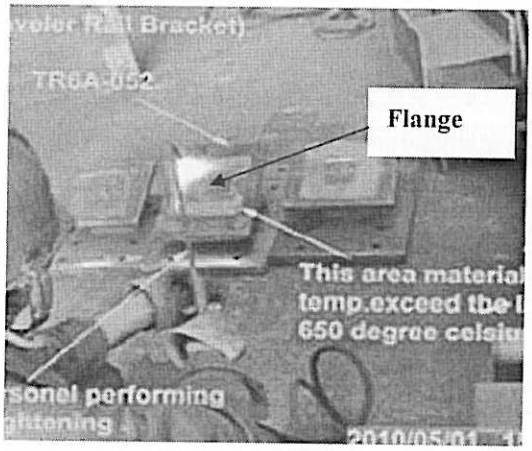
Was QC Inspector aware of the problem: ☐ **Yes** ☑ **No**

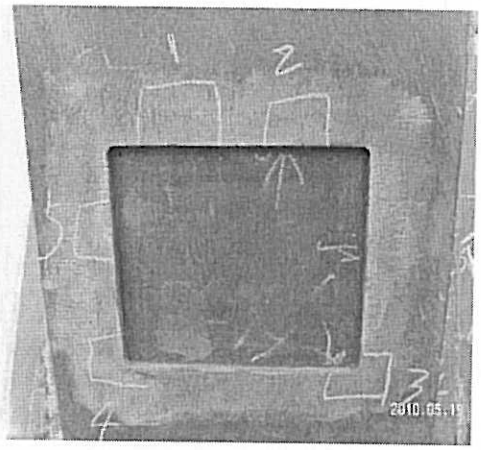
Contractor's proposal to correct the problem:
N/A

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 Office of Structural Materials for your project.

Inspected By:	Tsang,Eric	SMR
Reviewed By:	Wahbeh,Mazen	SMR

Hardness testing TR6A-052





Area \ Value	a	b	c	d	e	Average Value
1	177	187	184	199	232	190
2	194	186	177	207	177	186
3	188	195	202	196	190	194
4	186	193	208	192	204	196
5	186	201	188	192	181	189

TR6A-052 Flange Hardness Testing Result

Remark: The highest and the lowest readings are discarded when calculating the average value.

AMERICAN BRIDGE/FLUOR ENTERPRISES, a JV

P.O. BOX 23223 Oakland, CA 94623

Phone (510) 419-0120 / Fax (510) 839-0666

NCR PROPOSED RESOLUTION

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

Attention: Pursell, Gary
Resident Engineer

Ref: 05.03.06-000653

Subject: NCR No. ZPMC-0663

Dated: **11-Jun-2010**

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

Job Name: SAS Superstructure

Document No.: **ABF-NPR-000656 Rev: 02**

Contractor's Proposed Resolution:

Reference Resolution: Per discussion in China with senior METS personnel, the previously submitted results are acceptable. The hardness scale used is Brinell Hardness testing.

Per discussion in China with senior METS personnel, the previously submitted results are acceptable. The hardness scale used is Brinell Hardness testing. As for the Department's question about the validity of ASTM370, the ASTM is an internationally recognized standard while the ASM is a reference book. If the hardness meets ASTM standards then it should be acceptable. Based on this ZPMC requests closure of this NCR.

Submitted by: Ishibashi, Joshua

Attachment(s): ABF-NPR-000656R02

Caltrans' comments:

Status: REJ

Date: 18-Jun-2010

- METS personnel previously noted that the Contractor could use hardness testing to help prove the area of concern still fulfills the Contract requirement. However at this time, acceptance of the submitted results is not possible because no analysis has been provided explaining how it is acceptable.

- Provide analysis to show how "the hardness meets ASTM standards."

- Explain why and provide basis of how "if the hardness meets ASTM standards then it should be acceptable."

- The hardness scale unit used shall be provided in the test report.

- The Contractor has not demonstrate what action has been taken to mitigate this issue in the future. Please describe what measures are being taken to prevent this type of non-conformance from occurring in the future.

Submitted by: Eagen, Sean **Date:** 18-Jun-2010

Attachment(s):

AMERICAN BRIDGE/FLUOR ENTERPRISES, a JV

P.O. BOX 23223 Oakland, CA 94623

Phone (510) 419-0120 / Fax (510) 839-0666

NCR PROPOSED RESOLUTION

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

Attention: Pursell, Gary
Resident Engineer

Ref: 05.03.06-000653

Subject: NCR No. ZPMC-0663

Dated: **30-Jun-2010**

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

Job Name: SAS Superstructure

Document No.: **ABF-NPR-000656 Rev: 03**

Contractor's Proposed Resolution:

Reference Resolution: 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]

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. Based on these ZPMC, requests that this NCR be closed.

Submitted by: Ishibashi, Joshua

Attachment(s): ABF-NPR-000656R03;

Caltrans' comments:

Status: AAP

Date: 07-Jul-2010

The hardness values are acceptable. This NCR is considered closed.

Submitted by: Woo, Laraine

Date: 07-Jul-2010

Attachment(s):

No. B-807

LETTER OF RESPONSE

TO: American Bridge/Flour
DATE: 2010-6-29
REGARDING: NCR-000696(ZPMC-0663) NCR-000713(ZPMC-0680)
NCR-000726(ZPMC-0689)

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. Based on these ZPMC, requests that this NCR be closed.

ATTACHMENT:
N CR-000696(ZPMC-0663)
NCR-000713(ZPMC-0680)
NCR-000726(ZPMC-0689)
HARDNESS TESTING ANALYSIS
TENSILE AND HARDNESS REQUIRMENTS IN ASTM 709
APPROXIMATE HARDNESS CONVERSION NUMBERS IN ASTM 370

6/30/10

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:**	14-Mar-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:**	05.03.06-000653
Subject:	NCR No. ZPMC-0663		

Reference Description: Excessive heat was utilized during heat straightening of the traveler rail 10TR3-022

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.
- Metal color turns into "cherry red" after it was heat straightened.
- 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 spot identified was 3890 mm and it is at the flange to web joint.
- The Traveler Rail is identified as 10TR3-022.

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-0663

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

02.02:15.04 *05.03.06-000653,NCT*

Received
NCT-000653 17 Mar 10

STATE OF CALIFORNIA--BUSINESS,TRANSPORTACTION AND HOUSING AGENCY Arnold Schwarzenegger, Governor

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-000696
Prime Contractor: American Bridge/Fluor Enterprises, a JV **Date:** 12-Mar-2010
Submitting Contractor: Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island **NCR #:** ZPMC-0663

Type of problem:

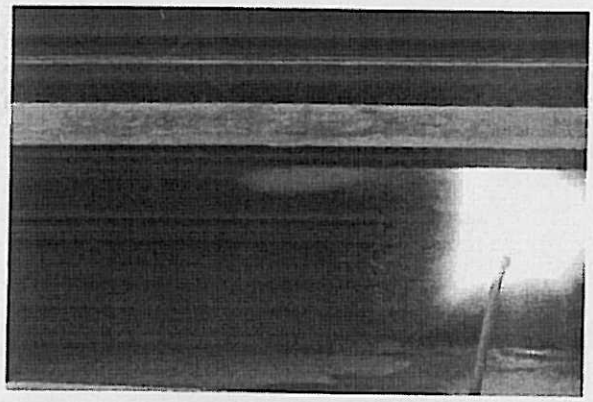
Welding	☐	**Concrete**	☐	**Other**	☑	
Welding	☐	**Curing**	☐	**Procedural**	☑	**Bridge No:** 34-0006
Joint fit-up	☐	**Coating**	☐	**Other**	☐	**Component:** Traveler Rail 10TR3-022
Procedural	☐	**Procedural**	☐	**Description:** Excessive heat used in heat straightening		

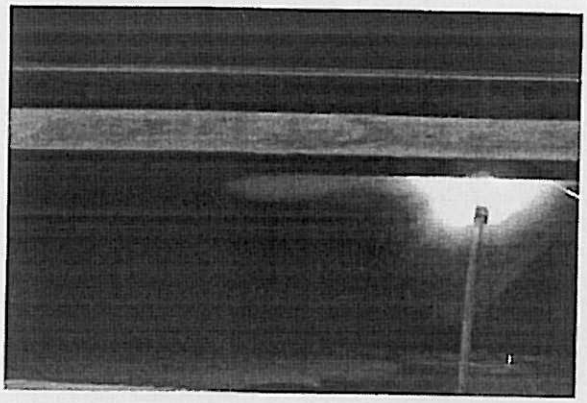
Reference Description: Excessive heat was utilized during heat straightening of the traveler rail 10TR3-022

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:

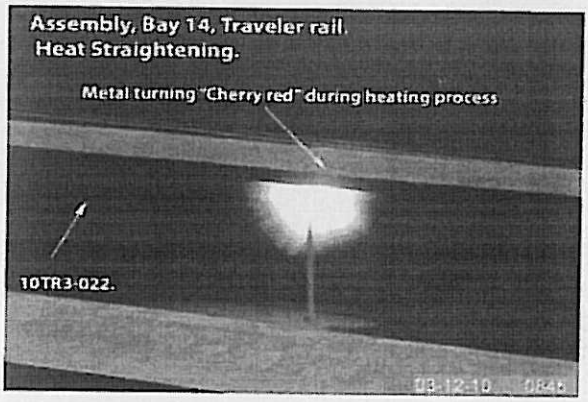
- Temperature of the heat straightened traveler rail was beyond the allowable 650 Degree Celsius.
- Metal color turns into "cherry red" after it was heat straightened.
- Per ZPMC heat straightening report (HSR) maximum temperature limit is 650 Degree Celsius.
- The 1100 Degree Celsius rating "templistick" was melted when check was made against the metal surface.
- "Y" location of the spot identified was 3890 mm and it is at the flange to web joint.
- The Traveler Rail is identified as 10TR3-022.

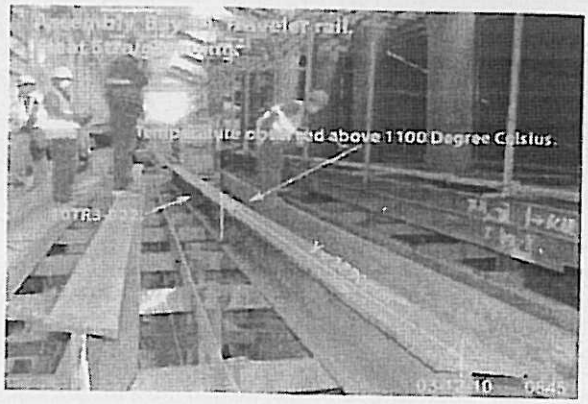




QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

(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: 0800 Hrs, 03/12/10, Verbal

Name of Caltrans Engineer notified: Bill Howe

Time and method of notification: 1000 Hrs, 03/12/10, Verbal

QC Inspector's Name: Zhang Wei

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: 510-376-8234 Fax:

NON-CONFORMANCE REPORT TRANSMITTAL

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

Date: 23-Apr-2010

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

Job Name: SAS Superstructure

Document No: 05.03.06-000670

Dear: Mr. Charles Kanapicki

Attention: Mr. Thomas Nilsson Project/Fabrication Manager

Subject: NCR No. ZPMC-0680

Reference Description: Heat straightening utilizing excessive heat and performing the work with no written procedure to show QA and QC on Floorbeam

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:** 12

Remarks:

During random in process observations of OBG segment 12CE in Bay 14, Caltrans Quality Assurance (QA) Inspector observed the following issues:

-Heat straightening was performed on Floorbeam FB3014-001 without an approved heat straightening document.

-ZPMC had a crane lifting upward with an unknown amount of uplifting force on the Floorbeam while heat straightening the Floorbeam base metal to a bright cherry-red color.

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

-ZPMC QC Certified Welding Inspector (CWI) Geng Wei and the ABF representative Yang Chao were not aware that this heat straightening was taking place.

-ZPMC CWI did not know if a heat straightening document had been submitted for this activity, and no document was issued to record this activity had taken place.

-A temp stick, digital temperature measurement gauge, or other similar means of monitoring the heat input was not utilized by ZPMC personnel and the actual maximum attained temperature was not measured.

-Floorbeam FB3014-001 is welded in place at OBG segment 12CE near panel point PP115.5.

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 to prevent future occurrences. A response for the resolution of this issue is expected within 14 days.

Transmitted by: Stanley Ku Sr. Bridge Engineer

Attachments: ZPMC-0680

cc: Gary Pursell, Peter Siegenthaler, Jason Tom, Bill Casey

File: 05.03.06

02.02;15.04
KZ 05.03.06-000670.NCT

Received
NCT-000670 26 Apr 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 #: 04-0120F4
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-000713
Prime Contractor: American Bridge/Fluor Enterprises, a JV **Date:** 21-Apr-2010
Submitting Contractor: Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island **NCR #:** ZPMC-0680

Type of problem:

Welding	☐	**Concrete**	☐	**Other**	☑	
Welding	☐	**Curing**	☐	**Procedural**	☑	**Bridge No:** 34-0006
Joint fit-up	☐	**Coating**	☐	**Other**	☐	**Component:** OBG Segment 12CE Floorbeam
Procedural	☐	**Procedural**	☐	**Description:**		

Reference Description: Heat straightening utilizing excessive heat and performing the work with no written procedure to show QA and QC on Floorbeam FB3014-001

Description of Non-Conformance:

During random in process observations of OBG segment 12CE in Bay 14, this Caltrans Quality Assurance (QA) Inspector observed the following issues:

-Heat straightening was performed on Floorbeam FB3014-001 without an approved heat straightening document.

-ZPMC had a crane lifting upward with an unknown amount of uplifting force on the Floorbeam while heat straightening the Floorbeam base metal to a bright cherry-red color.

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

-ZPMC QC Certified Welding Inspector (CWI) Geng Wei and the ABF representative Yang Chao were not aware that this heat straightening was taking place.

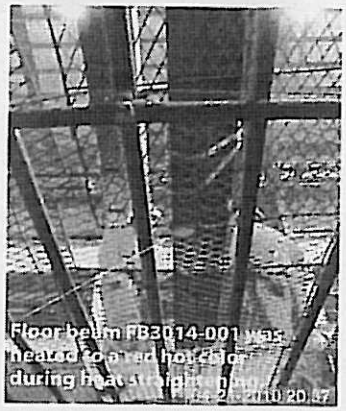
-ZPMC CWI did not know if a heat straightening document had been submitted for this activity, and no document was issued to record this activity had taken place.

-A temp stick, digital temperature measurement gauge, or other similar means of monitoring the heat input was not utilized by ZPMC personnel and the actual maximum attained temperature was not measured.

-Floorbeam FB3014-001 is welded in place at OBG segment 12CE near panel point PP115.5.

QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

(Continued Page 2 of 3)



Applicable reference:
AWS D1.5 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."

Special Provisions Section 8-3; The Engineer shall be notified in writing when welding problems, deficiencies, base metal repairs, or any other type of repairs not submitted in the WQCP are discovered and also of the proposal repair procedures to correct them.

Who discovered the problem: Paul Dawson
Name of individual from Contractor notified: Yang Chao
Time and method of notification: 2100 hours, 04-21-2010, Verbal
Name of Caltrans Engineer notified: Sean Eagen, Stanley Ku, Aaron Prchlik
Time and method of notification: 0720 hours, 04-22-2010, Verbal
QC Inspector's Name: Gang Wei
Was QC Inspector aware of the problem:

QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

(Continued Page 3 of 3)

☐ 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:**	03-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:**	05.03.06-000684
Subject:	NCR No. ZPMC-0689		

Reference Description: Excessive heat was utilized during heat straightening of the traveler rail bracket TR6A-052; QC allowed heat straightening to be per

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:** N/A

Remarks:

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

-ZPMC personnel perform heat straightening of traveler rail bracket base plate. The material was heated to a bright red color.
-Per ZPMC Heat Straightening Report identified as HSR1 (B)-8405, the maximum temperature is 650 °C.
-AWS D1.5 2002 defines the color of material heated to 650 °C as a "dull red color".
-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.
-ZPMC QC personnel Shen Jian Gao was aware of the on-going heat straightening work performed without any temperature measuring device.
-The Traveler Rail Bracket is identified as TR6A-052.
-The base material thickness measured 30mm.

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 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-0689

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-000726
Prime Contractor: American Bridge/Fluor Enterprises, a JV **Date:** 01-May-2010
Submitting Contractor: Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island **NCR #:** ZPMC-0689

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 Bracket

Reference Description: Excessive heat was utilized during heat straightening of the traveler rail bracket TR6A-052; QC allowed heat straightening to be performed without a temperature measuring device

Description of Non-Conformance:

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

-ZPMC personnel perform heat straightening of traveler rail bracket base plate. The material was heated to a bright red color.
-Per ZPMC Heat Straightening Report identified as HSR1 (B)-8405, the maximum temperature is 650 °C.
-AWS D1.5 2002 defines the color of material heated to 650 °C as a "dull red color".
-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.
-ZPMC QC personnel Shen Jian Gao was aware of the on-going heat straightening work performed without any temperature measuring device.
-The Traveler Rail Bracket is identified as TR6A-052.
-The base material thickness measured 30mm.

QUALITY ASSURANCE -- NON-CONFORMANCE REPORT

(Continued Page 2 of 2)

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: Wang Wen Bin

Time and method of notification: 1515 Hrs, 05/01/10, Verbal

Name of Caltrans Engineer notified: Stanley Ku

Time and method of notification: 1030 hours, 05/02/10, Verbal

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 Office of Structural Materials for your project.

Inspected By:	Tsang,Eric	SMR
Reviewed By:	Wahbeh,Mazen	SMR

HARDNESS TESTING RESULTS FOR 11TR2-007

	Test ID					10TR3-022 Web Hardness Testing Analysis				
Area	A*	B*	C*	D*	E*	Average Value**	Corresponding Brinell Hardness Value***	Approximate Tensile Strength (ksi)***	Minimum Tensile Strength (ksi)****	Meets Requirement?
1	175	177	172	175	196	176	176	86	65	YES
2	180	183	185	184	184	184	185	89	65	YES
3	175	180	178	180	181	179	180	88	65	YES
4	186	178	186	179	178	181	180	88	65	YES
5	179	182	172	168	171	174	172	84	65	YES
6	179	182	172	168	171	174	172	84	65	YES

*All values are Brinell Hardness

**High and low values excluded when detemrining average value

*** Per Table 3 ASTM A370-07b

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

HARDNESS TESTING RESULTS FOR 11TR2-007

	Test ID					FB3014-001 Lower Flange Hardness Testing Analysis				
Area	A*	B*	C*	D*	E*	Average Value**	Corresponding Brinell Hardness Value***	Approximate Tensile Strength (ksi)***	Minimum Tensile Strength (ksi)****	Meets Requirement?
1	161	129	159	181	186	167	165	82	65	YES
2	165	159	152	169	159	161	162	81	65	YES
3	128	151	179	161	166	159	159	80	65	YES
4	166	183	173	173	166	171	172	84	65	YES
5	169	181	179	182	195	181	180	88	65	YES

*All values are Brinell Hardness

**High and low values excluded when detemrining average value

*** Per Table 3 ASTM A370-07b

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

HARDNESS TESTING RESULTS FOR 11TR2-007

	Test ID					TR6A-052 Flange Hardness Testing Analysis				
Area	A*	B*	C*	D*	E*	Average Value**	Corresponding Brinell Hardness Value***	Approximate Tensile Strength (ksi)***	Minimum Tensile Strength (ksi)****	Meets Requirement?
1	177	187	184	199	232	190	190	90	65	YES
2	194	186	177	207	177	186	185	89	65	YES
3	188	195	202	196	190	194	195	92	65	YES
4	186	193	208	192	204	196	195	92	65	YES
5	186	201	188	192	181	189	190	90	65	YES

*All values are Brinell Hardness

**High and low values excluded when detemrining average value

*** Per Table 3 ASTM A370-07b

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

TABLE 1 Tensile and Hardness Requirements[A]

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

[A] See specimen orientation and preparation subsection in the Tension Tests section of Specification A 6/A 6 M.
[B] Measured at 0.2 % offset or 0.5 % extension under load as described in Section 13 of Test Methods A 370.
[C] Elongation and reduction of area not required to be determined for floor plates.
[D] For plates wider than 24 in. [600 mm], the reduction of area requirement, where applicable, is reduced by five percentage points.
[E] 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.
[F] Elongation in 2 in. or 50 mm: 19 % for shapes with flange thickness over 3 in. [75 mm].
[G] Not applicable.
[H] The yield to tensile ratio shall be 0.85 or less.
[I] For wide flange shapes with flange thickness over 3 in. [75 mm], elongation in 2 in. or 50 mm, of 18 % minimum applies.
[J] 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.
[K] 40 % minimum applies if measured on the Fig 3 (Test Methods A 370) 1 ½ –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.
[L] Applies only to Grades 100 [690] and 100W [690W] plates that are ⅜ in. [10 mm] or less in thickness and are not tension tested (See 8.1).

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[A] All	Plates[B] To ¾ [20], incl	Plates[B] Over ¾ to 1½ [20 to 40], incl	Plates[B] Over 1½ to 2½ [40 to 65], incl	Plates[B] Over 2½ to 4 [65 to 100], incl	Bars[B] To ¾ [20], incl	Bars[B] Over ¾ to 1½ [20 to 40], incl	Bars[B] 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

[A] 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].
[B] 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:*

3.1.1 *fracture critical member*—a main load-carrying tension member or tension component of a bending member whose failure would be expected to cause collapse of a structure or bridge without multiple, redundant load paths.

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TABLE 3 Approximate Hardness Conversion Numbers for Nonaustenitic Steels[A] (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	...

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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	...

[A] 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

17. Rockwell Test

17.1 *Description*:

17.1.1 In this test a hardness value is obtained by determining the depth of penetration of a diamond point or a steel ball into the specimen under certain arbitrarily fixed conditions. A minor load of 10 kgf is first applied which causes an initial penetration, sets the penetrator on the material and holds it in position. A major load which depends on the scale being used is applied increasing the depth of indentation. The major load is removed and, with the minor load still acting, the Rockwell number, which is proportional to the difference in penetration between the major and minor loads is determined; this is usually done by the machine and shows on a dial, digital display, printer, or other device. This is an arbitrary number which increases with increasing hardness. The scales most frequently used are as follows:

Scale Symbol	Penetrator	Major Load, kgf	Minor Load, kgf
B	1/16-in. steel ball	100	10
C	Diamond brale	150	10

17.1.2 Rockwell superficial hardness machines are used for the testing of very thin steel or thin surface layers. Loads of 15, 30, or 45 kgf are applied on a hardened steel ball or diamond

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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

penetrator, to cover the same range of hardness values as for the heavier loads. The superficial hardness scales are as follows:

Scale Symbol	Penetrator	Major Load, kgf	Minor Load, kgf
15T	1/16-in. steel ball	15	3
30T	1/16-in. steel ball	30	3
45T	1/16-in. steel ball	45	3
15N	Diamond brale	15	3
30N	Diamond brale	30	3
45N	Diamond brale	45	3

17.2 *Reporting Hardness*—In recording hardness values, the hardness number shall always precede the scale symbol, for example: 96 HRB, 40 HRC, 75 HR15N, or 77 HR30T.

17.3 *Test Blocks*—Machines should be checked to make certain they are in good order by means of standardized Rockwell test blocks.

17.4 *Detailed Procedure*—For detailed requirements of this test, reference shall be made to the latest revision of Test Methods E 18.

18. Portable Hardness Test

18.1 Although the use of the standard, stationary Brinell or Rockwell hardness tester is generally preferred, it is not always possible to perform the hardness test using such equipment due to the part size or location. In this event, hardness testing using portable equipment as described in Practice A 833 or Test Method E 110 shall be used.

CHARPY IMPACT TESTING

19. Summary

19.1 A Charpy V-notch impact test is a dynamic test in which a notched specimen is struck and broken by a single blow in a specially designed testing machine. The measured test values may be the energy absorbed, the percentage shear fracture, the lateral expansion opposite the notch, or a combination thereof.

19.2 Testing temperatures other than room (ambient) temperature often are specified in product or general requirement specifications (hereinafter referred to as the specification). Although the testing temperature is sometimes related to the expected service temperature, the two temperatures need not be identical.

20. Significance and Use

20.1 *Ductile vs. Brittle Behavior*—Body-centered-cubic or ferritic alloys exhibit a significant transition in behavior when impact tested over a range of temperatures. At temperatures above transition, impact specimens fracture by a ductile (usually microvoid coalescence) mechanism, absorbing relatively large amounts of energy. At lower temperatures, they fracture in a brittle (usually cleavage) manner absorbing less energy. Within the transition range, the fracture will generally be a mixture of areas of ductile fracture and brittle fracture.

20.2 The temperature range of the transition from one type of behavior to the other varies according to the material being tested. This transition behavior may be defined in various ways for specification purposes.

20.2.1 The specification may require a minimum test result for absorbed energy, fracture appearance, lateral expansion, or a combination thereof, at a specified test temperature.

20.2.2 The specification may require the determination of the transition temperature at which either the absorbed energy or fracture appearance attains a specified level when testing is performed over a range of temperatures.

20.3 Further information on the significance of impact testing appears in Annex A5.

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

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Contract #: 04-0120F4
Cty: SF/ALA Rte: 80 PM: 13.2/13.9
File #: xx.25A

QUALITY ASSURANCE -- NON-CONFORMANCE RESOLUTION

Location: Changxing Island, Shanghai, P.R. China **Report No:** NCS-000713
Prime Contractor: American Bridge/Fluor Enterprises, a JV **Date:** 07-Jul-2010
Submitting Contractor: Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island **NCR #:** ZPMC-0663

Type of problem:

Welding	☐	**Concrete**	☐	**Other**	☑	
Welding	☐	**Curing**	☐	**Procedural**	☑	**Bridge No:** 34-0006
Joint fit-up	☐	**Coating**	☐	**Other**	☐	**Component:**
Procedural	☐	**Procedural**	☐	**Descripton:**		

Date the Non-Conformance Report was written: 12-Mar-2010

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.
- Metal color turns into “cherry red” after it was heat straightened.
- 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 spot identified was 3890 mm and it is at the flange to web joint.
- The Traveler Rail is identified as 10TR3-022.

Contractor's proposal to correct the problem:
Perform hardness testing on the area in question.

Corrective action taken:
Contractor submitted results of hardness testing perfromed on the area in question. After review, the Department has found the results to be acceptable. ZPMC also issued an internal NCR in regards to this issue.

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

Inspected By: Simonis,Jim Quality Assurance Inspector

QUALITY ASSURANCE -- NON-CONFORMANCE RESOLUTION

(Continued Page 2 of 2)

Reviewed By: Wahbeh,Mazen QA Reviewer