

**DEPARTMENT OF TRANSPORTATION**

DIVISION OF ENGINEERING SERVICES

Office of Structural Materials

Quality Assurance and Source Inspection



Bay Area Branch  
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Contract #: 04-0120F4Cty: SF/ALA Rte: 80 PM: 13.2/13.9File #: 74.28**WELDING INSPECTION REPORT****Resident Engineer:** Pursell, Gary**Address:** 333 Burma Road**City:** Oakland, CA 94607**Report No:** WIR-007384**Date Inspected:** 18-Jun-2009**Project Name:** SAS Superstructure**OSM Arrival Time:** 730**Prime Contractor:** American Bridge/Fluor Enterprises, a JV**OSM Departure Time:** 1830**Contractor:** Goodwin Steel, UK**Location:** Stoke on Trent, UK**CWI Name:****CWI Present:**

Yes No

**Inspected CWI report:** Yes No N/A**Rod Oven in Use:**

Yes No N/A

**Electrode to specification:** Yes No N/A**Weld Procedures Followed:**

Yes No N/A

**Qualified Welders:** Yes No N/A**Verified Joint Fit-up:**

Yes No N/A

**Approved Drawings:** Yes No N/A**Approved WPS:**

Yes No N/A

**Delayed / Cancelled:**

Yes No N/A

**Bridge No:** 34-0006**Component:** Cable Band**Summary of Items Observed:**

The following report is based on METS observations at Goodwin Foundry in Stoke on Trent, England.

Documents received and reviewed

The QA inspector received and completed a review of the document packages including the Certificate of Conformity for;

GG29416-5, Drawing 5540-B1-1-M; this casting is awaiting dispatch to Goodwin International.

GG29416-6, Drawing 5540-B1-1-M; this casting is awaiting dispatch to Goodwin International.

The foundry operations are complete including Visual Inspection, Nondestructive Testing, Mechanical Testing, and casting repair.

The QA inspector received a copy of the Metal Proving Services "Radiographic Inspection Report" for casting GG29433-1, B8-1-F. The Radiographic Report was reviewed for accuracy and compliance with contract documents. Caltrans Lot Number B228-023-09 was assigned for tracking purposes.

The QA inspector received a copy of the Goodwin Steel Castings "Weld Excavation Map" for casting GG29425-1, B5-1-F. The Weld Excavation Map was reviewed for accuracy and compliance with contract documents. This first repair cycle is a major repair and requires post weld heat treatment. Caltrans Lot Number B228-024-09 was assigned for tracking purposes.

**Mechanical Testing**

The following tensile testing was performed by Goodwin Steel Castings Quality Control Technician, Mr. Martyn

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Hilditch. The testing was witnessed and completed today:

GG29417-10, Heat C7961 After PWHT (retest due to inclusion in first test)

Yield Strength 432 N/mm<sup>2</sup>

Ultimate Tensile Strength 628 N/mm<sup>2</sup>

Elongation 21 %

Reduction of area 28 %

Elongation and Reduction of area unacceptable. Defect was found in test sample and retest is required.

GG29419-2, Heat F7580 Initial test

Yield Strength 415 N/mm<sup>2</sup>

Ultimate Tensile Strength 637 N/mm<sup>2</sup>

Elongation 30 %

Reduction of area 55 %

GG29420-13, Heat C7520 Initial test

Yield Strength 448 N/mm<sup>2</sup>

Ultimate Tensile Strength 710 N/mm<sup>2</sup>

Elongation 63 %

Reduction of area 95 %

GG29420-15, Heat C7983 Initial test

Yield Strength 386 N/mm<sup>2</sup>

Ultimate Tensile Strength 600 N/mm<sup>2</sup>

Elongation 28 %

Reduction of area 60 %

GG31825-2, Heat C7984 Initial test

Yield Strength 397 N/mm<sup>2</sup>

Ultimate Tensile Strength 616 N/mm<sup>2</sup>

Elongation 24 %

Reduction of area 40 %

GG31825-3, Heat F7540 Initial test

Yield Strength 400 N/mm<sup>2</sup>

Ultimate Tensile Strength 595 N/mm<sup>2</sup>

Elongation 26 %

Reduction of area 41 %

GG31825-4, Heat F7539 Initial test

Yield Strength 464 N/mm<sup>2</sup>

Ultimate Tensile Strength 647 N/mm<sup>2</sup>

Elongation 20 %

Reduction of area 34 %

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Elongation and Reduction of area unacceptable. Defect was found in test sample and retest is required.

GG31825-5, Heat F7985 Initial test

Yield Strength 410 N/mm<sup>2</sup>

Ultimate Tensile Strength 617 N/mm<sup>2</sup>

Elongation 23 %

Reduction of area 37 %

GG31825-6, Heat F7987 Initial test

Yield Strength 405 N/mm<sup>2</sup>

Ultimate Tensile Strength 612 N/mm<sup>2</sup>

Elongation 22 %

Reduction of area 39 %

GG31826-2, Heat C7978 Initial test

Yield Strength 434 N/mm<sup>2</sup>

Ultimate Tensile Strength 610 N/mm<sup>2</sup>

Elongation 28 %

Reduction of area 56 %

GG29448-2, Heat F7580 Initial test

Yield Strength 441 N/mm<sup>2</sup>

Ultimate Tensile Strength 638 N/mm<sup>2</sup>

Elongation 27 %

Reduction of area 51 %

GG29449-2, Heat F7576 Initial test

Yield Strength 420 N/mm<sup>2</sup>

Ultimate Tensile Strength 612 N/mm<sup>2</sup>

Elongation 28 %

Reduction of area 55 %

### Magnetic Particle Testing

QA inspector observed , Goodwin Steel Castings NDT Level II technician Mr. Alan Banks perform Magnetic Particle testing (MT) of Cable Band casting GG29436-1, B9-1-M (preliminary inspection after repair and prior to post weld heat treatment). The MT was performed in accordance with ASTM standard E709 and Goodwin Steel Castings Magnetic Particle Procedure for Cable Band Castings MT06-09-02 revision 1, using the prod method with leach magnet contacts. Wet florescent magnetic particles were utilized. The direct current magnetizing current appeared to be approximately 1,700 amps. No relevant indications were marked by Mr. Banks. The testing was completed on this date and the Quality Assurance Inspector did concur with Mr. Bank's inspection results.

QA inspector observed , Goodwin Steel Castings NDT Level II technician Mr. Alan Banks perform Magnetic Particle testing (MT) of Cable Band casting GG29439-1, B10-1-F (inspection of excavations). The MT was

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performed in accordance with ASTM standard E709 and Goodwin Steel Castings Magnetic Particle Procedure for Cable Band Castings MT06-09-02 revision 1, using the prod method with leach magnet contacts. Wet florescent magnetic particles were utilized. The direct current magnetizing current appeared to be approximately 1,700 amps.

No relevant indications were marked by Mr. Banks. The testing was completed on this date and the Quality Assurance Inspector did concur with Mr. Bank's inspection results.

### Repair

QA inspector witnessed repair welding of casting GG29447-2, B14-CBB as submitted in ABF-SUB-000366 Rev. 33. The welder was observed welding in the flat position utilizing approved welding procedure WPS04-0120F4B. Parameters were observed to be within the limits of the WPS.

### Fettle

Two Goodwin employees were observed removing riser material from the exterior surface of one Type I cable band, casting GG29420, and one Type II cable band, casting GG429446. The material was removed utilizing an Oxygen Fuel Gas Torch method. Work was not completed on this date and appears to meet the minimum requirements of the contract documents.

### Dressing

Two Goodwin employees were observed removing excess material from the exterior surfaces of castings GG29448-2, B15-1-M and GG29420-7, B3-1-M. The exterior surfaces of the castings were dressed by grinding. Work was not completed on this date and appears to meet the minimum requirements of the contract documents.

### Radiography

The QA inspector witnessed radiography performed by Goodwin Steel Castings. Mr. Scott Bennett performed radiography on casting GG29440-1, B10-2-M, a type 2 cable band. The casting was radiographed using a single wall exposure. The radiographs were performed using a 3.2mm effective focal spot size, 8MEV linear accelerator. The source to film distance was maintained at 2,500mm. Number 40 to 100 hole type and Set 1C or 1D wire type image quality indicators were placed source side on each different thickness radiographed. AGFA type D4, D5 and D7 film of various sizes were used for single and composite views to cover the range of thicknesses. Radiography of this casting was not completed on this date. Radiography of the main body outside the suspender grooves was performed by Applied Inspections.

### Summary of Conversations:

As noted above.

### Comments

This report is for the purpose of determining conformance with the contract documents and is not for the purpose of making repair or fit for purpose recommendations. Should you require recommendations concerning repairs or remedial efforts please contact Nina Choy, (510) 385-5910, who represents the Office of Structural Materials for your project.

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<b>Inspected By:</b>	Lanz,Joe	Quality Assurance Inspector
<b>Reviewed By:</b>	Levell,Bill	QA Reviewer

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