

CONTRACT CHANGE ORDER

Change Requested by: Engineer

CCO: 89 Suppl. No. 0 Contract No. 04 – 0120F4 Road SF-80-13.2/13.9 FED. AID LOC.:

To: **AMERICAN BRIDGE/FLUOR ENTERPRISES INC A JOINT VENTURE**

You are directed to make the following changes from the plans and specifications or do the following described work not included in the plans and specifications for this contract. **NOTE: This change order is not effective until approved by the Engineer.**

Description of work to be done, estimate of quantities and prices to be paid. (Segregate between additional work at contract price, agreed price and force account.) Unless otherwise stated, rates for rental of equipment cover only such time as equipment is actually used and no allowance will be made for idle time. This last percentage shown is the net accumulated increase or decrease from the original quantity in the Engineer's Estimate.

This change revises Special Provisions section 10-1.59, "Steel Structures," subsection "Shop Welding," subsection "Welding of Closed Ribs to Box Shell Plate."

Adjustment of Compensation at Lump Sum

Replace section 10-1.59, "Steel Structures," subsection "Shop Welding," subsection "Welding of Closed Ribs to Box Shell Plate," subsection "C. Monitoring of Production Welds," of the Special Provisions as follows:

- C. Monitoring of Production Welds – During fabrication, conduct a weld monitoring test (WMT) for each operator and for each welding head to be used on each welding machine at the start of each work shift, or during the shift if the operator changes or the equipment is modified. Each test specimen shall consist of a continuous segment of a production panel sufficient to provide minimum test weld lengths of 500mm at the termination of the weld. Weld the rib to deck test segment with the same procedure as used in production panels including tack welds. Use Run-on and run-off tabs if used in the production panels. If multiple ribs are welded simultaneously in production, then weld the same number of ribs during the test, up to a maximum of three ribs, (six welds).

If a WMT does not meet the following acceptance criteria, the welding operator and equipment producing the failed WMT shall not fabricate panels until the cause of the deficiency has been determined, corrective action taken, and a passing WMT has been accepted by the Engineer. Deck panels fabricated, prior to evaluation of the WMT, will be rejected if the WMT fails to demonstrate the following:

1. Acceptance criteria for Visual Testing (VT) - Perform VT of 100% of each weld in accordance with AWS D1.5, The Special Provisions, and the acceptance criteria as follows:
 - a. No Cracks
 - b. Overlap \leq 100mm in length.
 - c. Undercut \leq 0.25mm, except that undercut greater than 0.25mm but less than 1.0mm is acceptable for a maximum total length of 5mm in each weld.
 - d. Undersized fillet reinforcement, up to 2mm undersized, less than 50mm total length in each weld, provided that a minimum of 80% weld penetration is provided locations of undersized reinforcement.
 - e. Oversized fillet reinforcement resulting in up to 2mm over the maximum defined reinforcing fillet weld size.
 - f. Incomplete fusion at the top of the weld in the welded position (weld toe at rib) for a maximum total length of 25mm in each weld.
 - g. Surface porosity per AWS D1.5

If a WMT is rejected due to failed VT, no further testing of the specimen is required.

2. Acceptance criteria for Ultrasonic Testing (UT) - Perform UT of 100% of each weld in accordance with the approved UT procedure. Each test weld must achieve a minimum joint penetration of 9.6mm, except that for a maximum of 5% of the weld length it is acceptable to achieve a minimum joint penetration of 8.4mm, provided that the effective weld size is at least 9.6mm. UT may begin prior to the completed weld cooling to ambient temperature. Air or Water cooling, (quenching), may be used to facilitate timely performance of UT. If a WMT is rejected due to failed UT, no further testing of the specimen is required.

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3. Macro-Etch Testing - Provide five macro-etched samples from each u-rib as determined by the Engineer with samples taken 25 mm from each end of the test weld and at a tack weld, total three (3) on one weld; and two macro-etch samples selected from the other weld on the same rib. Macro-etch samples will be evaluated for lack of penetration and lack of fusion. Macro-etch samples will not be used to re-evaluate weld profile criteria from VT. The following acceptance criteria apply to macro-etch testing:
 - a. No Cracks.
 - b. Joint Penetration ≥ 8.4 mm, provided the effective weld size is ≥ 9.6 mm.
 - c. No fusion type defect associated with a fusion boundary, i.e. fusions between weld and plate, between tack and root pass (GMAW), or between root pass (GMAW) and cover pass (SAW). No fusion type of discontinuity at the root of the weld may extend into the 9.6 mm depth of penetration.
 - d. Inclusions ≤ 3 mm unless associated with the fusion defects noted above.

Replace Section 10-1.59, "Steel Structures," Subsection "Shop Welding," Subsection "Welding of Closed Ribs to Box Shell Plate," subsection "D. Panel Production," with the following:

- D. Panel Production – The dimensions of production panels of box shell plating shall be checked after welding. The welded panel, after straightening, if any, shall be flat within 5 mm in each 5 m length of box panels. Panels may be straightened using a written procedure that is in conformance to AWS D1.5 and is approved by the Engineer.

Ultrasonic technician shall be qualified using a mock-up weld with flaws that is approved by the Engineer.

If the flatness of more than one panel in five exceeds 6 in 1000 after welding, the Contractor shall propose a revised assembly procedure, such as a different amount of pre-bending, and shall demonstrate the revised method by welding a new panel in the presence of the Engineer.

Production panels shall be nondestructively tested at the rate specified in these special provisions except that ultrasonic testing of the first two production panels shall include 100% of the tack welds. Ultrasonic testing of tack weld areas shall continue until no more than one in ten tack welds are rejected, after which random ultrasonic testing shall proceed at the rate indicated in the table specified in these special provisions. In addition to random ultrasonic testing specified, ultrasonic testing shall be performed on 15% of all tack welds. Ultrasonic testing of the PJP weld shall be in accordance with a written procedure that is developed to measure the size of the incomplete joint penetration and approved by the Engineer. Approval of the UT procedure shall be contingent on a satisfactory comparison (+/- 0.2 mm) of the UT results with the measured incomplete joint penetration in the macrosections taken from the weld qualification trials. At a minimum, the UT procedure shall include reference blocks with notches that have depths of 90%, 80%, 70% and 60% of the rib thickness. For the 12 mm thick closed ribs, the notch depths are 1.3 mm (90%), 2.5 mm (80%), 3.8 mm (70%), and 5.0 mm (60%). The reference blocks shall be made available to the Engineer. The NDT reports for the UT testing of the PJP welds shall specify the length and magnitude of the incomplete joint penetration. Each of the Contractor's ultrasonic technicians shall be qualified using a mock-up weld with flaws that is approved by the Engineer.

The acceptance criteria for ultrasonic testing of rib to plate welds shall conform to the following:

1. Joint penetration ≥ 9.6 mm except that, for no more than 5% of the length tested of each individual weld, joint penetration ≥ 8.4 mm is permitted, provided the effective weld size is ≥ 9.6 mm.
2. If more than 5% of the length tested of an individual weld has a joint penetration less than 9.6mm, UT 100% of that weld.
3. If 100% of the weld length is tested, then joint penetration ≥ 8.4 mm is permitted for no more than 10% of the weld length, provided the effective weld size is ≥ 9.6 mm.
4. The following shall be cause for repair:
 - a. Any weld with less than a 70% Depth of Penetration (DOP)
 - b. Any weld with more than 10% of the weld length that is between 70% and 80% DOP.

CCO: 89 Suppl. No. 0 Contract No. 04 - 0120F4 Road SF-80-13.2/13.9 FED. AID LOC.:

For production panels associated with a failing WMT, due to lack of penetration (LOP), perform UT on 30% of each weld including 100% of tack weld locations. Acceptance criteria for these panels are the same as indicated above for production panels.

Consideration of a time adjustment will be deferred until completion of the work specified herein. Determination of a commensurate time adjustment will be made in accordance with Section 10-1.13, "PROGRESS SCHEDULE (CRITICAL PATH METHOD)" and Section 10-1.14, "TIME-RELATED OVERHEAD" of the Special Provisions, as well as Section 8-1.07, "LIQUIDATED DAMAGES", of the Standard Specifications.

Cost of Adjustment of Compensation at Lump Sum \$0.00



Estimated Cost: Increase Decrease \$0.00

By reason of this order the time of completion will be adjusted as follows: DEF

Submitted by			
Signature	<i>[Signature]</i>	Resident Engineer for Gary Pursell, Sup.T.E.	Date 11/3/08
Approval Recommended by			
Signature	<i>[Signature]</i>	Supervising Bridge Engineer Richard Morrow, Sup.B.E.	Date 10/03/08
Engineer Approval by			
Signature	<i>[Signature]</i>	Principal Transportation Engineer Peter Siegenthaler, Prin.T.E.	Date 2/5/09

We the undersigned contractor, have given careful consideration to the change proposed and agree, if this proposal is approved, that we will provide all equipment, furnish the materials, except as otherwise be noted above, and perform all services necessary for the work above specified, and will accept as full payment therefor the prices shown above.

NOTE: If you, the contractor, do not sign acceptance of this order, your attention is directed to the requirements of the specifications as to proceeding with the ordered work and filing a written protest within the time therein specified.

Contractor Acceptance by			
Signature	<i>[Signature]</i>	(Print name and title) Michael D. Flowers Project Director	Date 2-4-09