

ITEM 08564.730201 M - IN PLACE STEEL REPAIR
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DESCRIPTION:

This work shall consist of repairing steel stringers, floorbeams or girders in conformance with the "Repair Procedures" outlined for each bridge in the proposal. All work shall be done "in place" at the locations indicated by the contract documents.

MATERIALS:

Materials for this work shall conform to the following:

1. **STEEL** - Steel, when used in a repair, shall meet the requirements of ASTM A36. Certified copies of the mill test reports shall be given to the Engineer prior to the beginning of work. When fastening by bolting is required in a repair, bolts, nuts and washers shall meet the requirements of ASTM A325 steel.
2. **PAINT AND PAINTING PROCEDURES** - These shall meet the requirements of the painting specification found in the contract documents.
3. **HEATING TORCHES** - These shall be approximately 25 mm diameter, multi-orifice (rosebud) type. They shall operate on approximately 172 kilopascals propane to 862 kilopascals oxygen. Torches and tips proposed for use are subject to the approval of the D.C.E.S.
4. **WELDING ELECTRODES** - Welding electrodes shall be 4 mm diameter; AWS classification E7018. They shall be furnished in hermetically sealed containers. Immediately upon container opening, the electrodes shall be placed into an electrode drying oven. They shall be dried for at least two hours, but no longer than four hours at a temperature held between 232°C and 260°C. After drying, the oven temperature shall be lowered to 120°C. The electrodes shall be kept at 120°C continuously until they are used in the work. Electrodes removed from the oven shall be subject to the following time restrictions based upon relative humidity conditions:

<u>RELATIVE HUMIDITY</u>	<u>TIME TO USE</u>
UP TO 70%	4 HOURS
70% & ABOVE	2 HOURS

Electrodes not used within the times allowed shall be discarded. Redrying of electrodes will not be permitted.

5. **EQUIPMENT MAINTENANCE** - All equipment shall be maintained in good working condition for the duration of this work. Malfunctioning equipment shall be repaired, or replaced, without delay.

CONSTRUCTION DETAILS:

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1. SAFETY - Prior to performing any work, paint shall be removed from areas adjacent to the work location. The contractor shall meet the requirements of Code of Federal Regulation (CFR) 29 Part 1910.1025 which requires personal protective equipment such as respirator, coveralls or full body clothing, gloves, and head and shoe coverings. Contractor's personnel not so equipped will not be permitted access to the work site.
2. HEAT STRAIGHTENING - Heat straightening shall be done in accordance with the requirements of the Steel Construction Manual (SCM) Section 15.
3. OXYGEN CUTTING - Oxygen cutting shall be done in accordance with the requirements of the SCM, Section 6.
4. WELDING - Welding shall be done in accordance with the requirements of the SCM, Section 7.
5. NON-DESTRUCTIVE TESTING - This shall be done as required by the "Repair Procedure".
6. INSPECTION - Visual inspection and non-destructive tests shall be performed on all field welds of the repaired member. Should the welds not meet the acceptance criteria of the SCM, the D.C.E.S. shall be immediately notified of the particulars.

The contractor shall submit a proposed repair procedure based upon the inspection findings. The proposal shall be subject to the approval, modification and substitution requisites given in the "Repair Procedure" for each bridge in the proposal. No work of any nature shall be performed on, or in the near vicinity of, the unacceptable welds prior to the repair procedure being completed. The cost of repair shall be mutually agreed to by the contractor and the Engineer, if the weld existed prior to the stringer repair. The cost of repair shall be borne by the contractor if the weld is a repair weld.

7. TOLERANCES
 - A. Butt Joints - Fit up tolerances for butt joints prior to welding shall be ≤ 3 mm.
 - B. Sweep - Longitudinal alignment of stringers after heat straightening operations shall be 6 mm per 3 m, except at the point of impact where a localized longitudinal distortion of 20 mm in 1.5 m is acceptable.
 - C. Vertical Distortion - Horizontal alignment of stringer bottom flanges shall be within 3 mm of horizontal after heat bending operations except at the point of impact where a localized vertical distortion of 12 mm is acceptable.
 - D. Gouges at points of impact less than 6 mm deep shall be repaired by grinding adjacent surfaces to a 1 on 10 taper.

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8. **RECONNECTION** - All steel to be reconnected shall be reconnected after repair work has been completed.
9. **PAINTING** - Painting work shall be performed only after all other work has been completed. Locations from which existing paint has been removed or damaged, or those locations directed by the Engineer, shall be cleaned and painted in accordance with the requirements of the painting specification as shown in the contract documents. In so far as it is practicable, the finish coat shall match the existing paint color. The Engineer shall be the final determiner of color match.

METHOD OF MEASUREMENT:

This work will be measured as each stringer, floorbeam or girder is repaired and painted.

Strings, floorbeams and girders are defined as primary members.

Each repaired and painted primary member will be measured for payment only once regardless of how many places along the member are actually repaired and painted.

BASIS OF PAYMENT:

The unit price bid for each primary member shall include the cost of all labor, materials and equipment necessary to complete the work according to the "Repair Procedure", including cleaning, painting and work required on adjacent secondary members.

Unacceptable existing welds directed to be repaired by the Engineer will be paid for by agreed price. No payment will be made for the repair of welds installed by the contractor.

No payment will be made for work, that is specifically disallowed payment by the specification terms.