

## SECTION 418 - BRIDGE STRUCTURAL REPAIR

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### NOTE TO DESIGNERS:

*The following Subsections 418.07, 418.08, & 418.09 are to be included in Contracts where rivet removal will be required either as part of a structural steel repair or due to deterioration/section loss of the rivet heads.*

*Where rivets are to be replaced as part of a larger structural repair, removal/replacement of rivets shall be made incidental to the larger repair and no additional payment will be made.*

*Where rivets are to be replaced as a stand-alone item, the Designer shall explicitly designate riveted connections to be inspected and replaced on the Contract Plans. For this work type, payment for rivet removal/replacement will be made on an "if and where directed" basis.*

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### **418.07      REPAIR BEARINGS, RESET ROCKERS, RESET BEARINGS AND REPLACE MASONRY PLATES**

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#### **(C)    Repair of Structural Steel.**

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*The following is added at the end of this Paragraph:*

*Where required to complete steel repairs, removing and replacing deteriorated rivets with new high strength bolts shall be performed at the locations shown on the plans or as directed by the Engineer. Repairs shall be constructed as shown on the plans and approved Shop Drawings, as required.*

*Where directed on the Plans, the Contractor shall inspect riveted connections and replace deteriorated rivets with new high strength bolts. The Engineer will approve all proposed rivet replacements prior to starting the removal process. Rivets shall be considered as 'deteriorated' and suitable for replacement when the following conditions are noted:*

- 1. The rivet is missing or sheared.*
- 2. 50% or more of the rivet head is missing or where it has corroded to the point where 50% or more of the head can be removed with a 2 lb ball-peen hammer.*
- 3. The rivet can be moved or turned by hand.*

*Where rivets cannot be clearly identified as 'deteriorated', the Engineer will visually inspect the rivets and determine their condition.*

*The contractor shall submit to the Engineer for approval their proposed method for rivet removal in accordance with subsection 104.08 of the Specifications. Rivet removal will not be permitted until the removal method has been approved and demonstrated successfully in the judgment of the Engineer. In the event that the Engineer determines that rivet removal work is resulting in damage to the existing steel, the Contractor shall cease rivet removal operations until a new proposed method has been demonstrated and approved by the Engineer.*

*Rivets to be removed shall have their heads removed with a rivet-buster, by cutting, air-arc gouging, or grinding and the shank driven, drilled, cored, or jacked out as required.*

*Special provisions shall apply where air-arc gouging methods are to be used:*

1. All air-arc equipment operators shall be certified welders. Air-arc gouging procedures shall be performed in accordance with AWS D1.5 C-3.2.6. In the presence of the Engineer, each operator shall demonstrate the ability to remove the heads from four (4) button head ASTM F-1852 bolts mounted in a vertically oriented 12" x 12" x ½" thick plate without visibly damaging the plate, or raising the temperature of the plate to a temperature of greater than 150 degrees Fahrenheit. Operators which have not operated the air-arc equipment for 30 calendar days or more shall be required to re-demonstrate their ability as outlined above.
2. 50% of all rivets scheduled for removal shall be circled and crossed on the rivet head to remain using a 150 degree Fahrenheit "Tempilstik" heat sensitive chalk before air-arc gouging of the opposite rivet head. These rivets shall be submitted to the Engineer for review. Air-Arc operators who submit rivets with melted chalk shall be subject to recertification or expulsion from the worksite at the discretion of the Engineer.
3. The Engineer reserves the right to request recertification of any Air-Arc operator at any time at his discretion.

The method employed by the Contractor shall minimize damage to connected components. Care shall be taken not to enlarge rivet holes. Unless otherwise noted, all bolts shall be the same diameter as the rivets being replaced. If the bolts will not fit the existing rivet holes, the holes shall be carefully reamed to accommodate the bolts. High-strength bolts shall be installed after the nicks, burrs, and foreign substances that might interfere with seating of the bolt head and nut washers are removed. Light grinding may be ordered by the Engineer.

At locations where surrounding material has been damaged as a result of the Contractor's operations, the surrounding material shall be repaired at Contractor's expense to the satisfaction of the Engineer. When reaming of more than 1/16-inch in diameter greater than the original hole diameter shown on the plans and installing an oversize bolt is required for the repair, the reaming, furnishing and installing of oversized bolts shall be at the Contractor's expense.

The Contractor shall submit a Quality Control Plan for all rivet removal operations in accordance with subsection 104.08 of the Specifications.

High strength bolt installation shall be in accordance with Section 403.

Bolts shall be installed in vacated rivet holes as soon as is practicable. Only one vacant rivet hole per connection may be present at any time.

Where additional plates prohibit removing only one rivet at a time and replacing it with a new high strength bolt, the Contractor may, at the permission of the Engineer, temporarily occupy vacated rivet holes with drift pins.

Threads in bolts are to be excluded from all shear planes. The Contractor shall be responsible for maintaining an adequate inventory of bolt sizes and lengths such that rivet replacement operations may proceed in a timely fashion. After all bolts have been installed and fully tightened, the Contractor shall test all bolts for full torque via calibrated Skidmore type wrench.

*[Include the following for contracts where rivets are to be replaced as a stand-alone item:]*

*Replace Rivets with High Strength Bolts shall be measured by each on an "if and where directed" basis.*

*[Include the following for contracts where rivets are to be replaced as part of a larger structural repair:]*

*The removal/replacement of rivets shall be incidental to the repair item and no separate measurement will be made.*

## **418.09 PAYMENT**

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*The following is added:*

*[Include the following for contracts where rivets are to be replaced as a stand-alone item:]*

*Payment will be made under:*

<b>PAY ITEM</b>	<b>PAY UNIT</b>
Replace Rivets with High Strength Bolts.....	Each

*[Include the following for contracts where rivets are to be replaced as part of a larger structural repair:]*

*No separate payment shall be made when rivets are replaced as part of a larger structural repair as designated on the plans. All costs thereof shall be included in the larger structural repair item(s).*