SPECIAL SPECIFICATION
4485
Truss Gusset Repairs

1. Description. Perform various repairs to steel truss gussets in accordance with the details shown on the plans and the requirements of this specification. This special specification applies to various G- and S-Type repairs.


   A. Steel. Provide steel in accordance with Item 442, “Metal for Structures” conforming to ASTM A 709, Grade 50, unless otherwise noted. Do not provide weathering steel. Shop-prime all new steel members.

   B. Bolts. Furnish mechanically galvanized high-strength bolts in accordance with Item 447, “Structural Bolting.” Use 7/8” ASTM A325, Type 1 bolts, unless otherwise noted in the plans. Galvanize bolts, washers, and nuts in accordance with Item 445, “Galvanizing”. Where required thread or bolt length prohibits the use of ASTM A325 bolts then substitute with ASTM A449, Type 1, high-strength bolts. Use heavy hex nuts. All mechanically galvanized bolts, nuts, and washers will be painted. Do not water-quench or chromate-quench these galvanized items.

   C. Paint. Provide epoxy zinc primer in accordance with DMS-8101, “Structural Steel Paints-Performance” or as approved. Primer used must be compatible with other coatings to be used on this project. All coatings must be from the same manufacturer. Provide a quick-drying epoxy zinc primer for gusset plate replacement. No slip coefficient requirements apply for this work.

3. Equipment.

   A. Access. Provide safe access to all parts of the work to allow a complete and detailed inspection.

   B. Steel Repair. Provide equipment for welding in accordance with Item 448, “Structural Field Welding” and equipment for bolting in accordance with Item 447, “Structural Bolting.”

   C. Cleaning and Painting. Provide equipment in accordance with Item 446, “Cleaning and Painting Steel.” Equipment that can meet the requirements of Class D Water-blasting and Class A Blast-Cleaning with a minimum surface profile of 2 mils will be required. A hand-held tool capable of cleaning a steel surface to an SSPC-SP11 with a 2 mil surface profile may be allowed for spot treatments of small areas.
4. Construction

A. **Sizing Members.** Field verify that existing steel gussets to be repaired match details provided in the existing plans and shop drawings. After verification, prepare shop drawings for G- and S-type repairs detailing each new steel gusset. Submit shop drawings to the Engineer for approval. Fabricate members after approval.

B. **Preparation.** Contain all material removed in the cleaning process. Gusset preparation will be in accordance with the following:

1. **Strengthening Existing Gusset Plate.** Provide Class D Water-blasting per Item 446 to all surfaces in the affected area using clean, potable water. After cleaning, test for chlorides and nitrates in the affected area utilizing Class A, Method A2 or equivalent method per SSPC TECHNOLOGY GUIDE 15, Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates. Determine salt concentrations using either ion detection tubes or paper strips. Use a test method capable of measuring salt concentration levels below the specified minimums. Repeat power washing if chloride levels exceed 7 $\mu$g/cm$^2$ or nitrate levels exceed 30 $\mu$g/cm$^2$. Retest for salts and continue power washing until chloride and nitrate levels are below the specified maximums. If it is not possible to test for salt contamination in the affected area, test for contamination on the nearest flat surface.

   Remove heavy corrosion (rust scale) and pack rust in the contact area using descaling power tools to the minimum depths indicated in the plans.

   Provide Class A Abrasive-blast to the contact area per Item 446 to produce a minimum surface profile of 2 mil. Clean blasted surfaces using dry, clean compressed air per Item 446 or by other methods approved by the Engineer. Remove all traces of blast residue, dirt, and debris.

   Brush apply one flood coat of epoxy penetrating sealer to all pack rust areas. Apply 3-10 mils of epoxy zinc primer to all blast-cleaned surfaces. Apply the epoxy zinc primer in a minimum of 2 coats and per the manufacturers’ recommendations. Insure primed surfaces are dry to the touch before installing new plates.

2. **Replacing Existing Gusset Plate.** After removing the existing gusset plate as indicated in the plans, provide a Class A Abrasive-blast per Item 446 to a minimum surface profile of 2 mil to the contact area. Clean blasted surfaces using dry, clean compressed air per Item 446 or by other methods approved by the Engineer. Remove all traces of blast residue, dirt, and debris. Test for chlorides and nitrates in the affected area utilizing Class A, Method A2 or equivalent method per SSPC TECHNOLOGY GUIDE 15, Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates. Determine salt concentrations using either ion detection tubes or paper strips. Use a test method capable of measuring salt concentration levels below the specified minimums. Repeat power washing if chloride levels exceed 7 $\mu$g/cm$^2$ or nitrate levels exceed 30 $\mu$g/cm$^2$. 
Apply 3-10 mils of epoxy zinc primer to all blast-cleaned and dried surfaces per the manufacturers’ recommendations. Apply the epoxy zinc primer in a minimum of 2 coats. Insure primed surfaces are dry to the touch before installing new plates.

C. Installation. Submit a schedule for approval detailing the repair sequence. Provide details regarding repair type, location, duration, and sequence at a minimum. Include enough detail to determine which repairs, if any, will be occurring simultaneously.

Install replacement gussets in accordance with the procedures provided in the plans. Do not remove any gussets not identified for replacement without approval. Execute the corresponding traffic control measures prior to removal and replacement of structural steel gussets. Replace gusset plates in the same day they are removed, unless otherwise allowed in the plans or approved by the Engineer.

Remove and replace fasteners. Only remove the number of fasteners allowed by the repair detail. Install high-strength bolts in accordance with Item 447, “Structural Bolting,” and Special Specification 4487, “Replace Rivets or Bolts.”

Touch-up any area where the primer has been disturbed after installation is complete.

5. Measurement. All completed gusset repairs will be measured by each repair.

6. Payment. The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Truss Gusset Repairs.” These prices are full compensation for furnishing and placing all materials; providing safe access for inspection; preparing repair area; reaming; debris containment and disposal; performing repair; painting repair area; removing rivets or bolts; installing high-strength bolts; bolt testing & testing equipment; calibrating wrenches; and for all labor, tools, equipment and incidentals necessary to complete the work.