

Georgia Department of Transportation
Office of Materials and Research

Standard Operating Procedure (SOP) 8
Fabricating, Handling, Transporting, Storing and Field
Connections of Bridge Structural Steel

I. General

The purpose of this Standard Operating Procedure is to outline the responsibilities of contractors, fabricators, welders and GDOT personnel with regard to structural steel bridge fabrication and erection. The basic principles of this program insure that shop fabrication and field erection of structural steel on GDOT construction projects is performed in compliance with governing plans and Specifications: (current American Welding Society Bridge Welding Code, American Association of State Highway Transportation Officials, Georgia Department of Transportation Standard Specifications, Supplements, and Special Provisions). Each fabrication facility is required to be listed on the current revision of [Qualified Products List \(QPL\) 60, "Bridge Fabricators"](#) and is also required to be certified by the American Institute of Steel Construction (AISC) under their Major Steel Bridge classification. The [Office of Materials and Research](#) Inspection Services Branch (ISB) will administer GDOT's structural steel inspection program.

II. Shop Fabrication

The Inspection Services Branch (ISB) will schedule a prefabrication conference whenever deemed necessary.

An inspector will be assigned to the fabrication shop for as much time as the State Materials and Research Engineer deems necessary. Each phase of fabrication will be inspected and these phases will include the following operations:

1. Verify that fabricators welding procedures, welding consumables, welders and written quality control have been approved by the Department.
2. Check heat numbers and verify transfer of each number to beams and plates.
3. Check the identifying heat number die cut by the fabricator on near side of web and in a low stress area on all main members.

Standard Operating Procedure (SOP) 8

4. Check certified mill test reports which fabricator has received from mill and presented for approval of grade, dimensions and weight of steel with corresponding heat number.
5. Sample material for each heat number of main member material. Also sample material which is unidentifiable as to heat number and grade of steel or which inspector has reason to doubt available information.
6. Observe burning, cutting, grinding, fitting, welding and inspect these procedures for conformance to governing Specifications.
7. Perform or observe the performance of welding inspection and non-destructive testing of welds.
8. Inspect cambering for proper temperature control and method of cooling, and for correct amount of camber at required points after all heating and welding operations have been completed.
9. Randomly check dimensions and location of shapes, plates, holes, etc., for agreement with design drawings.
10. Check fit-up, alignment and dimensions (in lay-down position) of shop prepared splices to be field connected.
11. Visually inspect welds for required size (leg length and throat depth), cracks, slag, porosity, undercut, etc.
12. Check high strength bolts for proper size, grade and proper tension.
13. Perform or observe the performance of magnetic particle inspection at the minimum rate of 1 ft (300 mm) out of every 10 ft (30 m) of weld and 1 ft (300 mm) out of each weld length less than 10 ft (30 m).
14. Visually inspect welds 100% for defects such as cracks, undercut, slag, porosity, loss of cross sectional area, improper transitions, etc. Fabricator must position beams and girders for the inspector to inspect welds on both sides.
15. Perform or observe the performance of ultrasonic inspection of at least 25% of all complete joint penetration welds on redundant structures.
16. Perform or observe the performance of ultrasonic inspection of all complete joint penetration welds on non-redundant structures at the frequencies published in the contract Specifications.
17. Randomly check cleaning of all steel after blast cleaning prior to any assembly or painting for removal of mill scale, rust, grease, dirt, dust and all other foreign matter detrimental to obtaining an acceptable coat of paint.
18. Insure that paint to be applied has been approved by the State Materials and Research Engineer as meeting the requirements of the design drawings and governing specification.
19. Check paint application for being an approved method with proper mixing control and with regard to existing weather conditions.
20. Measure dry film thickness for conformance to minimum dry thickness requirement after paint has completely dried.
21. Inspect paint for sags, blisters, runs, and other unacceptable visual defects.
22. Check for paint in areas designated as "no paint" areas on approved drawings.

Standard Operating Procedure (SOP) 8

23. The inspector having performed all required inspection duties and having been fully satisfied that all material used on work performed during fabrication meet the governing specification to the best of his knowledge, will so indicate by: stamping accepted primary members with his GDT numbered stamp in black ink near piece mark.
24. Department's inspector may or may not GDT stamp secondary members as determined necessary by the State Materials and Research Engineer.

The Inspection Service Branch will prepare a formal acceptance report complete with all records of inspection and testing as well as copies of certified mill test reports. This report will indicate approval by the State Materials and Research Engineer and will be distributed as follows:

[Office of Materials and Research](#) Files: Original with inspector's report attached, including all required certifications

District Engineer's Office: One Copy

III. Field Connections

A. Area Engineer's Responsibility

1. It is the Area Engineer's responsibility to notify the [Office of Materials and Research](#) at least 72 hours prior to commencement of connections on a bridge. Notice may be given in writing or by telephone to the Inspection Services Branch, (404) 363-7515. This notice should include:
 - a. Correct project number including the county.
 - b. Bridge number.
 - c. Beginning date.
 - d. Estimated completion date.
2. The Area Engineer must:
 - a. Verify welder's certification and compare with a valid photo ID.
 - b. Check equipment such as electrodes, electrode drying oven, calibrated torque wrench, correct bolt size, and grade.
 - c. Visually check welds for correct size, profile, etc.
 - d. Observe tightening of high strength bolts for specified tension.
 - e. Notify the [Office of Materials and Research](#) when field connections are finished and ready for non-destructive testing.

B. Contractors must prequalify their welders at least annually

Each welder must demonstrate, by qualification test, his or her ability to perform the respective welding procedure(s) in accordance with the latest American Welding Society Bridge Welding Code. Welder qualification tests will be conducted at the [Office of Materials and Research](#), 15 Kennedy Drive, Forest Park, Georgia and should be scheduled by contacting the Inspection Services Branch at (404) 363-7515. Welders must furnish their own welding equipment, welding electrodes, electrode drying ovens and all required test plate material. The [Office of Materials and Research](#) will perform all destructive tests required to effectively

Standard Operating Procedure (SOP) 8

evaluate the welder qualification test plates at no cost to the contractor or welder. The contractor or welder will absorb all costs associated with excessive re-qualification testing.

C. Non-Destructive Tester Responsibility

1. A non-destructive tester shall on a random basis assist the field personnel in the inspection of all types of field connections as to the proper fit-up, weld size, profile, undercut, and surface irregularities, and proper bolt tension.
2. Ultrasonically test all full penetration flange and web butt welds 100%.
3. Check high strength bolts for proper tension.

IV. Reporting of Inspection

When all required field connections of a respective bridge have been inspected, tested and accepted, the Non-Destructive Tester will submit his report to the Inspection Services Branch. The Non-Destructive Tester will also furnish a hand written copy to the Project Engineer.

The completed bridge report will be distributed as follows:

[Office of Materials & Research](#) Files: Original Report

District Engineer's Files: One Copy

V. Handling, Storage, and Transporting of Structural Steel

Handling, transporting and storage of structural steel shall be in accordance with current Subsection 50I.2.01.B of the Department's Specifications.

Georgene M. Geary, P.E.
State Materials and Research Engineer

Glenn W. Durrence, P.E.
Director of Construction