

AASHTO/NSBA Steel Bridge Collaboration

G 4.4 - 2006



Sample Owners Quality Assurance Manual

AASHTO/NSBA Steel Bridge Collaboration

Preface

This document is a standard developed by the AASHTO/NSBA Steel Bridge Collaboration. The primary goal of the Collaboration is to achieve steel bridge design and construction of the highest quality and value through standardization of the design, fabrication, and erection processes. Each standard represents the consensus of a diverse group of professionals

It is intended that Owners adopt and implement Collaboration standards in their entirety to facilitate the achievement of standardization. It is understood, however, that local statutes or preferences may prevent full adoption of the document. In such cases Owners should adopt these documents with the exceptions they feel are necessary.

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D. Medlock

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**SURFACE DEPLOYMENT AND DISTRIBUTION
COMMAND TRANSPORTATION**

ENGINEERING AGENCY, Robert D. Franz

U.S. ARMY CORPS OF ENGINEERS -

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U.S. COAST GUARD, Nick E. Mpras, Jacob Patnaik

**U.S. DEPARTMENT OF AGRICULTURE -
FOREST SERVICE**, Rosana Barkawi

AASHTO / NSBA Steel Bridge Collaboration

Task Group 4, Quality Control / Quality Assurance
Denis Dubois, Maine Department of Transportation, *Chair*

Andy Kottensette, <i>G4.4 Task Chair</i>	Bureau Veritas
Frank Adragna	Non-Destructive Testing Group, Inc.
Joe Bracken III	Pennsylvania Department of Transportation
Tom Calzone	Carboline Company
Jamie Connor	D. S. Brown Company
Jon Edwards	Illinois Department of Transportation
Heather Gilmer	Texas Department of Transportation
Barry Glassman	Minnesota Department of Transportation
Bob Horwhat	Pennsylvania Department of Transportation
Darrin Kelly	DeLong's, Inc.
Adil Khan	MACTEC, Inc
Al Laffoon	Missouri Department of Transportation - Retired
Brian Leshko	Bureau Veritas
Terry Logan	Atema, Inc.
Ray Monson	MACTEC, Inc.
Dennis Nash	Stupp Bridge Company
Russ Panico	High Steel Structures, Inc.
Anna Petroski	Atema, Inc.
Cindy Rice	KTA Tator, Inc.
Greg Rzonca	Bureau Veritas
Bob Stachel	HRV Conformance, Ltd
Rochelle Stachel	HRV Conformance, Ltd.
Brad Streeter	D. S. Brown Company
Lou Triandafilou	Federal Highway Administration
Krishna Verma	Federal Highway Administration
Bill Wallhausser	KTA Tator, Inc.
Gary Wisch	DeLong's, Inc.

Sample Quality Assurance Manual

Structural Steel Shop Inspection

Name of Organization

Address Information

Date: _____

Revision No: _____

Revision Date: _____

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QUALITY ASSURANCE MANUAL

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SCOPE

This document serves as a sample quality assurance manual to be used as a guide for Bridge Owners or third party inspection agencies to develop their own quality assurance plans. This sample manual is based on the guidelines in AASHTO/NSBA Steel Bridge Collaboration Specification S4.1-2002, *Steel Bridge Fabrication QC/QA Guide Specification* (S4.1). As written, this sample manual is intended to be used on projects where S4.1 being used for the quality control guidelines.

As a sample manual, this is intended to serve as a model, or base document, for creating a QA manual. When using this document to create a QA manual, care should be exercised to determine if additional sections or instructions are necessary. Similarly, if any sections are not applicable, these should be removed or altered as necessary.

Refer to S4.1 for a listing of applicable terms and definitions.

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SECTION 1
SPECIFICATIONS AND DOCUMENTS

<<< *The intent of this section is to recommend the documents that the inspector should be furnished with or acquire during the course of a project. This list should be modified as necessary to suit the owner's specific requirements.* >>>

1.1 Quality Assurance Inspectors (QAIs) shall obtain, or have available, the following documentation at the fabrication shop:

- applicable current standard specifications, supplements, special provisions, special specifications, and addenda
- approved shop drawings with current revisions
- fabricator's Quality Control Plan (QCP), which is to include the company's Non-Destructive Evaluation (NDE) written practice
- prefabrication meeting minutes, if any
- applicable AASHTO/AWS D1.5, Bridge Welding Code
- applicable American Welding Society (AWS) D1.1, *Structural Welding Code*
- applicable provisions of the AREMA Manual for Railway Engineering, if required for the project
- AWS A2.4, *Symbols for Welding and Nondestructive Testing*
- AWS A3.0, *Standard Welding Terms and Definitions*
- applicable ASTM or AASHTO specifications
- applicable coating test methods
- applicable SSPC specifications
- metrication conversion tables, if required
- Mill Test Reports (MTRs) for material used in fabrication
- list of qualified welders, welding operators, and tack welders
- approved welding procedure specifications (WPSs)
- approved welding procedure qualification records (PQRs)
- applicable pre-approved non-critical fracture critical material (FCM) repair procedures
- applicable approved repair procedures
- copy of approved nondestructive testing procedures, only when submission and approval of these testing procedures is required by the owner's specification
- qualification documents for all certified welding inspectors (CWI) and NDE quality control (QC) personnel
- NDE reports for all work on this project that has been inspected and accepted by NDE
- project record log sheets
- copy of the approved coatings plan, when submission and approval of coatings plan is required by specification

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1.2 Familiarization with Requirements

The QAI shall become familiar with applicable portions of the Contract documents covering the work to be inspected. The QAI shall study the plans and specifications before fabrication commences to provide ample opportunity to coordinate with the Engineer.

1.3 Use of Shop Drawings

The QAI should become familiar with the shop drawings. The QAI shall coordinate with the Owner regarding any discrepancies between the plans and specifications and the shop drawings. Fabrication should proceed only with approved shop drawings. However, if the Fabricator elects to proceed prior to receipt of approved shop drawings (performing work at their own risk), notify the Owner and, if directed, proceed with QA functions using non-approved shop drawings. Later, verify conformance of fabrication with the approved drawings. The shop must submit revisions to the shop drawings to the Owner for approval to reflect changes in details and provide a permanent record of the as-built condition. The QAI should ensure that fabrication is in conformance with the latest revisions.

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SECTION 2
 INSPECTION EQUIPMENT

<<< *The intent of this section is to recommend those tools and equipment necessary for proper inspection. This list should be modified as necessary to suit the owner's specific requirements.* >>>

The QAI shall have/or have available the following equipment at the fabrication shop. Some equipment may not be applicable depending on the nature of fabrication:

- tape measure, 25 ft (7 m), 1/32 in, or 1 mm increments.
- metal tape measure, 100 ft (30 m), 1/8 in, or 0.01 ft (5 mm) increments
- pocket metal ruler(s), 1/32 in or 1 mm increments
- flashlight and spare batteries
- camera; QAI to photograph only raw and fabricated materials produced for the owner
- feeler gauges
- fillet weld gauges
- undercut gauge
- skewed fillet weld gauge
- bevel gauge
- micrometer
- mirror for examining restricted access areas (such as snipes)
- NDE tools, if applicable
- surface roughness gauges for machine and flame cutting (Ref. ANSI B41 or AWS C4.1-G)
- temperature indicating crayons for 30°F (15°C) above and below desired temperatures or surface pyrometer
- sling psychrometer
- thermometers for determining air, paint, and metal surface temperatures
- blast profile comparator or replica tape for direct measurements and a permanent record
- dry film thickness gauge
- tools for checking surface anomalies, coating adhesion, etc.
- surface profile comparator for media (sand, shot, or grit) used and/or deformable replica
- tape and micrometer to check profile depth before coating
- 10X Lens

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SECTION 3
 INSPECTOR QUALIFICATIONS

<<< *The intent of this section is to specify the minimum recommended qualification and training requirements for QAIs--the basis for which is given in AASHTO/NSBA Steel Bridge Collaboration Specification S4.1-2002, Steel Bridge Fabrication QC/QA Guide Specification. This list should be modified as necessary to suit the owner's specific requirements (these could include bolting training, etc.).* >>>

QAIs shall have the following minimum required knowledge, abilities, and experience:

3.1 Fabrication Inspection Qualifications

A QAI performing welding inspection must be a Certified Welding Inspector (CWI) or equivalent, in accordance with the Bridge Welding Code. QAIs who are Certified Associate Welding Inspectors (CAWI) may work under the direct supervision of a CWI. QAIs who interpret and perform NDE must be certified in accordance with the applicable ASNT SNT-TC-1A requirements for each NDE method being used in accordance with the Bridge Welding Code.

3.2 Minimum Inspection Experience.

A QAI performing welding inspection should have the following minimum inspection experience:

Project Type	Minimum Recommended Years of Experience*
Rolled beam bridges	1 year
Welded plate girders (I sections, box sections, etc.)	2 years
Complex structures, such as trusses, arches, cable-stayed bridges, and moveable bridges	3 years
Fracture critical (FC) members	3 years (required by D1.5)

* Experience in rolled beam bridge inspection will not be counted towards the experience needed for plate girders, complex structures, or fracture-critical members.

Inspectors who have less experience than that specified above should work under the guidance of an inspector having those qualifications. QAIs must be proficient with the typical fabrication inspection procedures described in this document.

3.3 Coatings Inspection Qualifications.

A QAI performing coatings inspection must be qualified to inspect coatings and coatings applications.

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3.4 Training

Documented training in materials preparation, coatings application, and inspection is suggested for the QC and QA coatings inspectors. Recommended training includes one or more of the following:

- American Institute of Steel Construction (AISC) – Application and Inspection of Sophisticated Coatings
- National Association of Corrosion Engineers (NACE) – International Coating Inspector training and Certification Program Session I: Coating Inspection Training
- Society for Protective Coatings (SSPC) – C-1 Fundamentals of Protective Coatings for Industrial Structures
- National Highway Institute (NHI) – Bridge Coating Inspection Course No. 130079
- Other training programs that are considered acceptable by the Engineer

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SECTION 4
RECORDS AND REPORTING

<<< The intent of this section is to recommend the records and reporting required to be kept by QAIs. This section should be modified as necessary to suit the owner's specific requirements. >>>

The QAI shall maintain neat and orderly records for each project. Documentation of the status of fabrication and acceptability of members shall be performed on the forms included in Appendix A. *<<< note: specific forms and directions for completing shall be inserted by Owner >>>*

In addition to completion of the necessary forms, the QAI shall maintain a narrative report for each project, as directed by the Engineer. The narrative report should either be legibly hand-written in a permanently bound book, or be maintained in an electronic log with automatic date and time recording. Record the Fabricator's activity on the work inspected, including both positive and negative comments, information provided to the Fabricator, and any agreements made. Make entries as soon possible after the events or conversations.

Obtain copies of Fabricator generated records such as NDE reports, inspection reports, etc. for the project files and submission to the Engineer as directed.

Furnish a written report on a weekly basis to the Engineer as directed. Include those forms and documents required by the Engineer. Number the reports consecutively until completion of the work, with the last report noted "final".

Make notes, letters, faxes, reports, and memoranda clear and brief, and keep them on file. Sign on-site correspondence as its originator.

The QAI should maintain verbal communication with the Engineer or his representative as directed. The QAI shall also maintain good relations with the Fabricator's Quality Control Inspector (QCI). Ensure that both the Engineer and QCI are timely apprised of the QAI's findings including nonconformances. Written documentation is not a substitute for appropriate dialogue with the Fabricator, but should provide a record of important discussions.

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SECTION 5
GENERAL INSTRUCTIONS

<<< The intent of this section is to recommend the general requirements for QAI activities. This list should be modified as necessary to suit the owner's specific requirements. >>>

5.1 Responsibilities of the QAI

Verify that production quality and fabrication processes satisfy contract requirements, including the QCP. Verify that the fabricator has QCI performing inspection functions during all fabrication operations. Perform QA inspections in accordance with this manual and other instructions by the Engineer. Determine extent and frequency of inspection based on the Engineer's direction.

Accept materials that satisfy the Contract requirements. Do not waive items that are contractual obligations of the Fabricator and do not accept material that does not conform to the Contract requirements without the written approval of the Engineer.

Do not direct the Fabricator's personnel. Do not provide suggestions on how to fabricate material. However, the QAI should advise the Fabricator if any operation would, in their opinion, result in noncompliance with the Contract. Direct all official communications to the Fabricator's quality control. Do not convey directives or personal judgments about overall shop quality or concerns about employee competence to production personnel.

Do not divulge a fabricator's proprietary information to another fabricator. Do not publish, copy or distribute any proprietary information, documents, or forms received from the Fabricator for any purpose other than the contractual needs of the Owner.

5.2 Role of the QAI

Perform verification tests, measurements, inspection, or observations to assure that fabricated items conform to the Contract requirements. Although the QAI does not perform QC work, some QA activities may duplicate a portion of QC activity for verification.

If there are questions about a requirement or level of quality, contact the Engineer and, if directed, alert the Fabricator.

Conduct consistent inspections based on the Contract requirements while providing guidance to the Fabricator concerning interpretation of the plan details and specification mandates. Obtain assistance from the Engineer as needed.