

## **SECTION 2.5 WISDOT BRIDGE INSPECTION QUALITY ASSURANCE PROGRAM**

### **Subsection 2.5.1 Purpose**

In order to maintain the accuracy and consistency of structure inspections and structure inspection reports, structure owners should implement appropriate quality control and quality assurance (QC/QA) measures. Typical QC procedures include checklists to ensure uniformity and completeness and the review of inspection reports and computations by a third party. QA measures may include the periodic field review of inspection teams and their fieldwork. Furthermore, the WisDOT Bureau of Structures, each district, and each county should conduct QC/QA reviews of the WisDOT structure inspection programs as outlined in this section.

The purpose of the Quality Assurance Review Program is to evaluate program effectiveness, uniformity, and compliance with federal and state rules relating to bridge inspections. Quality assurance reviews may recommend program improvements and may require changes in a program.

### **Subsection 2.5.2 Program**

The Statewide Structure Inspection Quality Assurance Review Program, under the direction of the Statewide Program Manager (SPM), involves on-site reviews at WisDOT's district offices and other counties, cities, villages, and townships. In this program, there are two different levels of QA reviews: Level 1 and Level 2. Level 1 reviews are performed by the SPM, and Level 2 reviews are performed by the District Program Manager (DPM) or County Manager.

#### **Level 1 QA Review (District QA Review)**

A Level 1 review is a comprehensive review of a District Bridge Inspection Program coupled with a comprehensive review of selected units of government (county and/or local). The SPM, or their delegate, and a FHWA Structural Systems Engineer conduct the review and complete the eight-page Structure Inspection Quality Assurance Program Review Form – Level 1 (DT-2002-0403). The SPM may delegate QA review duties to the Assistant Statewide Program Manager (ASPM) or DPM. Major areas of the inspection program are reviewed in detail and documented.

## **Level 2 QA Review**

This review is less comprehensive than the Level 1 review. It is an informal, written QA evaluation of a county's or a local government's bridge inspection program. Level 1 QA reviews may be substituted for Level 2 QA reviews. Level 2 QA reviews fall into two categories:

1. County Program QA Reviews The District Program Managers (DPM) are responsible for conducting regular QA evaluations of the county structure inspection programs under their jurisdiction. The DPM should use the Structure Inspection Quality Assurance Program Review Form – Level 2 (DT-2003-0403) to document the review.
2. Local Program QA Reviews (city, town, village, etc.) The County Managers are responsible for conducting regular QA evaluations of the municipal and local government structure inspection programs under their jurisdiction. The County Manager should use the Structure Inspection Quality Assurance Program Review Form – Level 2 (DT-2003-0403) to document the review.

Quality assurance reviews are conducted annually in accordance with the following recommended schedule. The goal of the program is to perform a quality assurance review of all inspection programs once every four years.

1. Level 1 Reviews
  - Two WisDOT districts and selected local units of government each year.
2. Level 2 Reviews
  - Each county within each WisDOT district, minimum of once every four years.
  - Each city within each county, minimum of once every four years.
  - Each town and village within each county, minimum of once every four years.

The District will compile all Level 2 reports done in a calendar year and submit them to the Statewide Program Manager at the end of the year.

## **Subsection 2.5.3 Level 1 Review Order of Events**

Quality assurance reviews will be conducted in the following manner.

1. The SPM or their delegate will schedule quality assurance reviews.
2. The Structure Inspection Quality Assurance Program Review Form – Level 1 (DT-2002-

0403) will be sent out two weeks before the on-site review. All inspection agencies scheduled for review will receive an electronic copy and a hard copy, if requested.

3. Agencies scheduled for review are required to fill out Form DT-2002-0403 as completely as possible prior to the scheduled review date.
4. Participants in an on-site review shall include FHWA Structural Systems Engineer, SPM or their delegate, DPM, County or Local Manager, and the Inspection Team Leaders (ITL) from the inspection agency being reviewed, including consultants. Other appropriate Inspection Team Members (ITM) and management may attend.
5. An on-site review will be conducted at the district/local inspection agency's office and will include a field visit to selected bridges. Two to five bridges will be selected for each on-site review.

## **Subsection 2.5.4 Level 1 On-Site Office Review**

### **1. Inspector Qualifications**

The AASHTO Manual for Condition of Bridges states, "Qualified Personnel should be used in conducting bridge inspections". All structure inspectors who are performing inspection work in the jurisdiction receiving the quality assurance review should have an Inspector Qualifications Form on file with the SPM. Prior to the review, the DPM should request that all active structure inspectors submit documentation to support the experience listed on the Inspector Qualifications Forms. This information will be reviewed by SPM and FHWA to determine if IPM, ITLs, and ITMs meet federal qualification and state qualification requirements as described in this Manual.

### **2. Record Keeping**

The AASHTO Manual for Condition Evaluation of Bridges states, "Bridge Owners should maintain complete, accurate, and current records of each bridge under their jurisdiction." Records of recent and past bridge inspections including Routine and Special Inspections will be reviewed for legibility, accuracy, and accessibility. Inspection reports and records should be filed in an orderly manner. All state-owned bridge files are stored at the district offices. Locally-owned bridge files are stored under the authority of the County Commissioners (County Managers). Where bridge plans, repair plans, and/or rehabilitation plans are available, a set should be placed in the file folder with all other information about the bridge. Additional information such as correspondence, memos, etc. should be placed in the bridge file.

### **3. Bridge Inspection Planning & Scheduling**

The AASHTO Manual for Condition Evaluation of Bridges states, "Bridge inspections are conducted to determine the physical and functional condition of a bridge...Successful bridge inspection is dependent on proper planning, and techniques, adequate equipment, and the experience and reliability of the personnel performing the inspection." Inspection schedules, average inspection time, number of bridges in the program, and inspection preparation will be reviewed.

### **4. Routine Inspection Report Review**

Reports will be reviewed to make certain that each item on the inspection report is addressed, recommended repairs are recorded, notes are legible, and forms are signed and dated. Also, a survey of the type of inspection equipment and tools required to perform inspections will be reviewed.

### **5. Special Inspections Report Review**

File data will be reviewed to determine which structures require special inspections. Reports for Special Inspections, such as Fracture Critical, In-Depth, Underwater-Dive, Underwater-Profile, Underwater-Probe/Visual, Movable, Initial, Damage, Interim, and Load Posted Inspections, will be reviewed to make certain that each item on the inspection report is addressed, recommended repairs are recorded, notes are legible, and forms are signed and dated. Also, the equipment required to perform special inspections will be reviewed.

### **6. Load Posted/ Closed Bridge File**

File data will be reviewed to determine which bridges require load posting or closure. Reviewers will evaluate bridges with an operating rating less than the state legal load limits to determine if bridges are properly load posted. Bridges with low condition ratings for substructure and/or superstructure will be reviewed. Load rating analysis reports will be reviewed and new load rating analyses may be required to determine the load capacity of deficient bridges.

### **7. Follow-up Actions**

A rational method for identifying bridge deficiencies and recommending repairs is required. The methodology should include how recommended repairs are prioritized, how they are assigned to repair crews or contractors, how completed repairs are documented (with initials and dates), and how completed repairs are recorded in the file. These methods will be reviewed for adequacy and compliance.

## **8. Safety**

Safety of bridge inspectors and of the traveling public during bridge inspections is important. Work zone traffic control should be in accordance with the Manual of Uniform Traffic Control Devices.

Appropriate personal safety gear should be used by inspectors as prescribed by OSHA, WisDOT, and local policy. Bridge inspection safety procedures will be reviewed, and an inventory of safety equipment will be taken.

## **9. Bridge Replacement Program**

A review of how bridges are prioritized for rehabilitation and/or replacement will be conducted.

Bridge replacement funds will be discussed to determine if the agency is taking full advantage of all funding sources.

## **Subsection 2.5.5 Level 1 Field Review**

File data will be reviewed and a list will be generated that identifies deficient bridges, bridges that have unique problems or features or bridges that the owner has concerns about. From the established list of bridges, two to five bridges will be chosen for field review. All pertinent records contained in each bridge file will be taken to the field for the review.

The goals of a field review are:

1. To ensure that inspection forms are completed with all required information.
2. To ensure that element level ratings and NBI ratings are consistent with the WisDOT bridge inspection criteria and conventions. The reviewers will conduct an inspection of each bridge. The ratings and conditions determined by the reviewers may not exactly match the ratings recorded in the bridge file. In this case, a variability of plus or minus one is allowed for NBI ratings. A variability of plus or minus one condition state may be allowed for element level ratings. There will also be a review of traffic safety feature documentation.
3. Discuss variances found in the review at each bridge.

## **Subsection 2.5.6 Level 1 Closeout**

A closeout session will be conducted by the Statewide Program Manager or their delegate at the

conclusion of each quality assurance review. All persons involved in the quality assurance review shall attend. In addition, supervisors and managers of the structure inspection program should attend. The closeout session will include the following:

1. Oral summary of each program reviewed.
2. Oral summary of each program objective that met required FHWA and State requirements.
3. Discussion of each program objective that did not meet FHWA and State requirements.

### **Subsection 2.5.7 Level 1 - Typical Quality Assurance Review**

A typical Level 1 review by the SPM, or their delegate, would have the following schedule:

- Day 1: District on-site office meeting where the information submitted will be reviewed using the completed Form DT-2002-0403, along with review of file organization and record keeping.
- Day 2: District field review of two to five bridges, comparing conditions reported on the bridge inspection report to actual conditions in the field.
- Day 3: Meeting at first local government's inspection program office where the information submitted on Form DT-2002-0403 will be reviewed, substantiated, and checked for completeness. The structure file will be reviewed for degree of organization and accuracy of records. The reviewer will conduct a field review of two to five bridges.
- Day 4: Meeting at second local government's inspection program office where the information submitted on Form DT-2002-0403 will be reviewed, substantiated, and checked for completeness. The structure file will be reviewed for degree of organization and accuracy of records. The reviewer will conduct a field review of two to five bridges.
- Day 5: A closeout session summarizing the review of the district and two county agencies is held in the district office.
- The on-site review of additional local government inspection programs (counties, cities, villages, and townships) can be done at the discretion of the SPM.

The SPM, or their delegate, will issue a final report to the Federal Highway Structural Systems Engineer.

The final report shall be distributed to:

- Federal Highway Structural Systems Engineer
- WisDOT Bureau of Structures Engineer
- WisDOT SPM
- WisDOT ASPM
- WisDOT DPM

- All other inspection agencies that were subject to the review

Quality assurance reviews are conducted per FHWA policies, WisDOT policies, and AASHTO Manual for Condition Evaluation of Bridges. The WisDOT Structure Inspection Quality Assurance Program Review Form – Level 1 is in Part 1, Appendix B.

## Subsection 2.5.8 Level 2 Quality Assurance Reviews

### **County Program QA Reviews**

In addition to the Quality Assurance Review Program requirements detailed above, the DPM should conduct regular and informal, but written, interim quality assurance evaluations of the county inspection programs. The DPM should use the Structure Inspection Quality Assurance Program Review Form – Level 2 to conduct the review and as a means of recording the information obtained during the review. The three-page form may be sufficient; however, additional sheets may be appended to the form if necessary. The DPM should feel free to use the Level 1 QA Review procedures as a guide to organize Level 2 reviews. The DPM should keep a file of the County Program Review records for all of the county inspection programs within the jurisdiction of the District. The WisDOT Structure Inspection Quality Assurance Program Review Form – Level 2 is in Part 1, Appendix B.

### **Local Program QA Reviews**

In addition to the Quality Assurance Review Program requirements detailed above, the County Manager should conduct regular and informal, but written, interim quality assurance evaluations of the local government's inspection programs. The County Manager should use the Structure Inspection Quality Assurance Program Review Form – Level 2 to conduct the review and as a means of recording the information obtained during the review. The three-page form may be sufficient; however, additional sheets may be appended to the form if necessary. The County Manager should feel free to use the Level 1 QA Review procedures as a guide to organize Level 2 reviews. The County Manager should keep a file of the Local Program Review records for all of the local inspection programs within the county. A copy of each Local Program QA Review report for reviews conducted during the course of a calendar year should be sent to the DPM by December 31 of that year. The WisDOT Structure Inspection Quality Assurance Program Review Form – Level 2 is in Part 1, Appendix B.

## **SECTION 2.6 AVAILABLE TRAINING, COURSES, AND MANUALS**

There are several educational resources available to individuals who wish to become qualified or maintain their qualifications as structure inspectors. A few of these NHI courses include:

- Bridge Inspector's Training Course Part I, Engineering Concepts for Bridge Inspectors
- Bridge Inspector's Training Course Part II, Safety Inspection of In-Service Bridges
- Culvert Inspection Course
- Inspection of Fracture Critical Bridge Members Course
- Non-Destructive Testing Methods for Steel Bridges Course

A complete list of the manuals used as references for the creation of this Manual is in Part 1, Appendix A.

## **SECTION 2.7 INITIAL IMPLEMENTATION PERIOD**

This Manual clarifies program requirements to reflect growing local and national concerns on qualification requirements for inspection teams and managers. Furthermore, it provides a documented procedure to transition from the "gray areas" previously found in the FHWA regulations to a more uniform and documented method of verifying the qualifications of an individual on a State Level.

All individuals involved in structure inspection work under the Wisconsin Structure Inspection Program shall complete and submit a copy of the Qualifications Form to the Statewide Program Manager. Refer to Part 1, Appendix B for a copy of the Qualifications Form. Qualifications Forms will be reviewed and only properly qualified individuals will be added to a centrally maintained list.

Program Managers and Team Leaders are required to meet the qualifications stated in Figures 2.3.1-1 and 2.3.2-1, respectively. After January 2004, these individuals applying under the 5/10 years experience option will need to fulfill the requirements stated in Appendix B-1, Inspector Qualifications Form, clarifying a Year-of-Bridge-Inspection-Experience.