
CHAPTER 5

QUALITY CONTROL AND QUALITY ASSURANCE

5.1 QUALITY CONTROL and QUALITY ASSURANCE

Quality Control and Quality Assurance are integrated into all aspects of bridge inspection. They contain the essential requirements to demonstrate that care, skill and diligence is used in the preparation of bridge inspection reports.

The Bridge Inspection Unit will put in place those management tools needed to define, implement, and evaluate the effectiveness of the Unit, to provide feedback for performance enhancement and institute actions to prevent recurrence. Together these activities ensure that:

- Personnel have the appropriate tools and information available to perform the work
- Personnel have clearly defined programs, processes, and procedures as a basis to perform their work
- Personnel are sufficiently trained to assure good work performance
- Appropriate management oversight is provided for work performance to identify and correct problems if they exist

Quality Control is the checks necessary to maintain a uniform level of quality. For the purposes of this Chapter, the District Bridge Inspection Engineer (DBIE) is the Quality Control Engineer who performs these checks.

Quality Assurance is an independent evaluation of a service (i.e., an inspection) to establish that a pre-described level of quality has been met. For the purposes of this Chapter, the Area Bridge Inspection Engineers (ABIE) and the Underwater Operations Engineer are the Quality Assurance Engineers who perform these evaluations. The Quality Assurance Supervisor is the Bridge Inspection Engineer (BIE).

The review for the Quality Control and Quality Assurance program shall include the Bridge Inspection Engineer, the Area Bridge Inspection Engineer, Underwater Operations Engineer and the District Bridge Inspection Engineer.

Note: At the discretion of the Bridge Inspection Engineer others within the MassDOT staff and/or Consultants may be designated to assist in reviewing material.

5.2 QUALITY CONTROL ENGINEER

The Quality Control Engineer's responsibilities include but are not limited to the review of the inspection reports, review of the inspection methods by the teams in field and the review of structures that are classified as structurally deficient (SD) by the Team Leaders.

5.2.1 Inspection Report Evaluations

The Quality Control Engineer and his/her assistant shall collectively review 100% of all inspection reports. The DBIE or ADBIE will sign all inspection reports reviewed by him/her. This review will be

performed on inspection reports prepared by MassDOT staff and/or Consultants. The DBIE is not responsible for the review of inspection reports prepared for other agencies, i.e.; MassPort, MBTA.

The Quality Control Engineer will be personally responsible for the review of all inspection reports that have an assigned numerical ratings of 5 or below for Item 58, Item 59, Item 60, or Item 62. The Assistant District Bridge Inspection Engineer may be responsible for the review of all inspection reports that have assigned numerical ratings of 6 or greater for Item 58, Item 59, Item 60, or Item 62 if the DBIE chooses to delegate that task to the ADBIE.

The Quality Control Engineer's review will consist of the following:

1. Overall review of the Inspection Report to ensure that the correct form has been used, that the correct bridge is identified and that all required information has been entered.
2. Review that all information has been correctly entered in accordance with the FHWA Coding Guide and the MassDOT Bridge Inspection Handbook criteria. This review will include but not be limited to a check that proper coding conventions, format, significant digits and correct units have been used.
3. Check that the Condition Ratings for Items 58 through 62 are consistent with the condition ratings of the individual sub-items.
4. Check that there is adequate documentation for inspection sub-items with condition ratings of 6 or lower.
5. Check that all Photographs and/or Sketches have been properly cross referenced to the Inspection Report.
6. Check that there is consistency of information between the current Inspection Report and previous Inspection Reports, as well as the Dive Report and/or Rating Report, if applicable.
7. Check that proper documentation was incorporated into the inspection report for any changes that may have occurred from the previous SI&A and previous Inspection Report.
8. Review of all Items in the SI&A after data entry to check that they have been properly and correctly entered.
9. For Initial Inventory Inspections, a check of the inventory data on the SI&A against the construction plans to ensure that the data is consistent.
10. For every initial inspection, a set of Inventory Photos has been taken and included in the report and saved in 4D.
11. For every routine inspection, an Element Level inspection created with the routine inspection shall be reviewed for accuracy, including elements, quantities and condition states.

5.2.2 Inspection Team Field Evaluation Procedures

The Quality Control Engineer (DBIE) shall be required to spot check the inspection teams performance working in the field on a monthly basis. Spot checking is defined as a brief visit to assess safety and inspection methods employed by the inspection teams during the inspection of the structure. The Quality Control Engineer shall keep a log of the dates, teams, and bridges field inspected and shall have the log available to present to FHWA on the FHWA's yearly review. The Quality Control Engineer shall document the field visits and shall prepare an Inspection Team Field Evaluation Form, see Attachment 5-1.

5.2.3 Evaluation of Structure's Assigned a SD Classification

Upon notification from a Team Leader of their decision to lower the numerical condition coding of a structure to a 4, or from a 4 to a 3, for Item 58, Item 59, Item 60, and Item 62 (refer to Section 4.5.10), the DBIE shall be responsible to field verify the decision and concur with the decision.

It is preferred that the Team Leader notify the DBIE of their decision when they are in the field so that the DBIE may utilize the traffic set up or the inspection equipment that the Team Leader is using. If the DBIE concurs with the decision to reduce the numerical condition coding of the structure, the DBIE will ensure the data entry into 4D is revised to reflect the date of the inspection report or special member inspection report and the inspection frequency reflects the new condition.

The DBIE shall notify the District Bridge Engineer, Bridge Inspection Engineer and Area Bridge Inspection Engineer when a structure's numerical condition coding is lowered to a numerical value of a 4 or less, which would classify it as a Structurally Deficient Structure. This notification shall be via an email specifying the Bridge Number and BIN Number as well as the Sub-Item(s) that dropped the condition.

5.3 QUALITY ASSURANCE ENGINEER

The review by the Quality Assurance Engineer (ABIE) will include the checking of the compliance of inspection data with the Federal and MassDOT requirements. As a minimum, the Quality Assurance Engineer shall review 100% of the inspection reports with numerical condition rating of 4 or less for Items 58, 59, 60, or 62. Also the Quality Assurance Engineer shall review a minimum of 10% of all reports for completeness. Upon completion of the review by the ABIE, he/she will check off on 4D whether the review was a regular review or an in depth review.

The Quality Assurance Engineer is responsible for ensuring that the defined quality control procedures are enforced in his/her respective Districts. A review includes all aspects of functions to ensure adherence to Federal and State inspection criteria, laws, codes, standards, and regulatory requirements.

Also, the review may include the evaluation of inspection personnel's choice of inspection equipment, information retrieval methods, investigational processes, time and frequency of required inspectional services, etc.

5.4 QUALITY ASSURANCE SUPERVISOR

The Quality Assurance Supervisor is the Bridge Inspection Engineer (BIE). The QA Supervisor has the responsibility to assure that all aspects of the bridge inspection program adhere to Federal and State inspection criteria, laws, codes, standards and regulatory requirements. He/she assures that the inspection staff is qualified and properly trained, that their performance meets acceptable standards and that inspections are completed in an acceptable time frame.

The Bridge Inspection Engineer's duties include assuring that MassDOT inspection personnel maintain the most current and applicable training and education that are required of the position. He/she shall maintain a current list of all qualified bridge inspection personnel with their most current personal data regarding titles, duties, education, certification and training. Copies of certificates should be maintained in a personnel file for each.

Bridge inspection consultants should also be required to provide the BIE annually with a list of their bridge inspection personnel with information required as stated above. The list should be updated as new employees are added to the consultant's inspection organization.

The Quality Assurance Supervisor is also charged with review of personnel performance evaluations and field and report evaluations to insure that bridge inspection staff are performing within the required parameters of the position description. Review may also include checking if personnel assignments and job descriptions need to be redefined and whether recommendations to the State Bridge Engineer need to be made.

The Quality Assurance Supervisor shall oversee and verify that corrective measures have been instituted when necessary and that such measures are implemented fully.

5.5 INSPECTION TEAM FIELD EVALUATION

The Inspection teams shall be field evaluated by the Quality Assurance Engineer (ABIE) and assisted by the Quality Control Engineer (DBIE). The purpose of the Field Evaluation is to establish a uniform method of evaluation for the field performance of a bridge inspection team.

5.5.1 Inspection Team Field Evaluation Procedures

This procedure shall be used as a basis for a bridge inspection field evaluation. This evaluation shall document the arrival time, set-up time, preparations made for equipment, safety conformance, access methods, and the quality and thoroughness of each inspection team's activities. It should also note whether or not safety equipment was properly used, whether appropriate access methods were used, and an evaluation of whether the inspection served its desired purpose.

Every MassDOT inspection team leader shall be evaluated in the field at least twice a calendar year. Also, every Consultant Firm shall be evaluated in the field at least once a calendar year.

After each field evaluation the Evaluation Team shall fill out an Inspection Team Field Evaluation Form (see Attachment 5-1: Inspection Team Field Evaluation Form) and shall discuss the result of its findings with the inspection team, so any improvement, as needed, can be initiated more quickly.

If a team field evaluation by the Quality Assurance Engineer (ABIE) and the Quality Control Engineer (DBIE) results in an unsatisfactory review of the actual inspection performed by the Team Leader, then the ABIE shall notify (via email) the Bridge Inspection Engineer, District Bridge Engineer and the Team Leader of the result of the field evaluation. The Team Leader shall then address the comments for the unsatisfactory review and shall forward them to the Bridge Inspection Engineer, Area Bridge Inspection Engineer, District Bridge Engineer and District Bridge Inspection Engineer. The ABIE shall then randomly perform another field evaluation on an inspection done by the same Team Leader not less than two months from the date of the unsatisfactory field evaluation.

5.6 INSPECTION TEAM REPORT EVALUATION

The inspection reports prepared by the inspection teams shall be field evaluated by a review team consisting of the Quality Assurance Engineer (ABIE) and the Quality Control Engineer (DBIE). The evaluation is conducted to ensure a uniform quality of the individual bridge inspection report. Also, the review is to monitor the inspection for completeness, thoroughness, consistency, accuracy and standardization. It is recommended that an evaluation be made soon after an inspection so that conditions will not have changed.

5.6.1 Inspection Team Report Evaluation Procedures

This procedure shall be used to form the basis of a bridge inspection report evaluation. The report shall list the structure type, team, and comparisons of the previous and current (and, if available the Review Team Inspection Report) for the Deck, Superstructure, and Substructure of a particular bridge. This procedure shall be undertaken in the field. Also the report shall address the documentation provided by the inspection team with a particular emphasis on sketches, photographs and detailed explanations. Conclusions shall be checked to verify that they are logically stated and correct and that they were independently checked by the Review Team. Finally an overall evaluation shall be given of the inspection report.

Reports by each MassDOT inspection team leader shall be evaluated at least twice a calendar year.

After each inspection report evaluation, the Evaluation Team shall fill out an Inspection Report Evaluation Form (see Attachment 5-2: Inspection Team Report Evaluation Form) and shall discuss the result of its findings with the inspection team, so any improvement, as needed, can be initiated more quickly.

If an evaluation by the Quality Assurance Engineer (ABIE) and the Quality Control Engineer (DBIE) results in an unsatisfactory review of the report prepared by the Team Leader, then the ABIE shall notify (via email) the Bridge Inspection Engineer, District Bridge Engineer and the Team Leader of the result of the report evaluation. The Team Leader shall then address and correct the changes that the Quality Assurance Engineer (ABIE) and the Quality Control Engineer (DBIE) observed in the prepared report and shall resubmit the report for review. The ABIE shall then randomly perform another report evaluation on a report prepared by the same Team Leader not less than two months from the date of the unsatisfactory evaluation.

5.7 CHAPTER 5 ATTACHMENTS

INSPECTION TEAM FIELD EVALUATION FORM

DISTRICT: _____ DATE OF INSPECTION: _____ TIME: _____

TEAM LEADER: _____

TEAM MEMBER(S): _____

TYPE OF INSPECTION: _____

STRUCTURE NUMBER: _____

LOCATION: _____

1. Did the team arrive at the bridge in a timely manner? Yes No

Comments: _____

2. Rate the degree to which the team sets-up to inspect the bridge:

Satisfactory Needs Improvement Unsatisfactory

Comments: _____

3. Rate the degree to which the team is properly equipped for the inspection:

Satisfactory Needs Improvement Unsatisfactory

Comments: _____

4. Rate the degree to which team members observe safety rules and wear proper safety equipment:

Satisfactory Needs Improvement Unsatisfactory

Comments: _____

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Attachment 5-1: Inspection Team Field Evaluation Form, Page 1 of 2

5. What method of access was used? (Ladder, Snooper, etc.)

6. Was access method appropriate? Yes No

Comments: _____

7. Rate whether the inspection was sufficiently thorough enough to serve its desired purpose:

Satisfactory Needs Improvement Unsatisfactory

Comments: _____

8. Comments:

9. Overall rating of inspection preparedness, quality and thoroughness by the team:

CHECK ONE: Satisfactory Needs Improvement Unsatisfactory

NAME: _____

TITLE: _____

DATE: _____

SIGNATURE: _____

INSPECTION TEAM REPORT EVALUATION

CITY/TOWN _____ BRIDGE NO./BIN _____

QA/QC REVIEW DATE _____ STRUCTURE NO. _____

43 - Structure Type _____ DISTRICT _____

07 - Facility Carried _____

06 - Features Intersected _____

REVIEW TEAM:

Quality Assurance Engineer (ABIE) _____

Team Leader _____

Team Member(s) _____

INSPECTION TEAM (From Report):

Quality Control Engineer (DBIE) _____

Team Leader _____

Team Member(s) _____

Date of Report _____ Type of Inspection _____

1. Is Quality Control Engineer Qualified? __Yes __No

2. Is Team leader Qualified? __Yes __No

3. Were all items completed? __Yes __No

4. Were conclusions logically stated and correct? __Yes __No

5. List items which changed from previous report:

INSPECTION TEAM REPORT EVALUATION

SUMMATION

1. Conclusions:

2. Recommendations for Corrective Action:

3. Evaluation of Report:

Satisfactory Unsatisfactory Need Improvement

4. If needs improvements, has Report been discussed with Team and Report corrected?

Yes No

5. Remarks:
