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Overview of MDOT QA/QC Project
Requires each state to assure that systematic Quality Control (QC) and Quality Assurance (QA) procedures are being used to maintain a high degree of accuracy and consistency in the inspection program.
Other Reasons for QA/QC

**SURPRISES**

- All of our data is grossly inaccurate... but I need data in order to manage.
- If I concentrate hard enough I can forget that the data is bad, then I can use it.
- I have to give him credit; managing is harder than it looks.
# Overview of MDOT QC/QA Project

## Metric #20: Inspection procedures – QC/QA

**NBIS Reference:** 23 CFR 650.313 (g) – QC/QA

<table>
<thead>
<tr>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Systematic quality control (QC) and quality assurance (QA) procedures are used to maintain a high degree of accuracy and consistency in the inspection program.</td>
</tr>
<tr>
<td>• QC/QA procedures include periodic field review of inspection teams, periodic refresher training requirements, and independent review of inspection reports and computations.</td>
</tr>
</tbody>
</table>

| Population: None (or as determined to be appropriate by the reviewer). |

<table>
<thead>
<tr>
<th>Compliance (C):</th>
</tr>
</thead>
<tbody>
<tr>
<td>All of the following must be met for C:</td>
</tr>
<tr>
<td>• QC/QA procedures are established, documented, implemented, and effective.</td>
</tr>
<tr>
<td>• QC/QA procedures include periodic field review of inspection teams, periodic refresher training requirements, and independent review of inspection reports and computations.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Compliance Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Substantial Compliance (SC):</strong> All of the following must be met for SC:</td>
</tr>
<tr>
<td>• QC/QA procedures are established, implemented, and effective, but minor aspects of the procedures are not documented or are not being performed.</td>
</tr>
<tr>
<td>• QC/QA procedures include periodic field review of inspection teams, periodic refresher training requirements, and independent review of inspection reports and computations.</td>
</tr>
</tbody>
</table>

| Non-Compliance (NC): One or more SC criteria are not met. |
Metric 20– QC/QA is impacted by the findings of the following metrics:

- Metric 12 – Quality Inspections
- Metric 13 – Load Rating
- Metric 18 – Scour
- Metric 22 – Prepare and Maintain an Inventory
Overview of MDOT QC/QA Project

FHWA’s Recommended Framework for QC/QA
https://www.fhwa.dot.gov/bridge/nbis/nbisframework.cfm

A. Documentation of a QC/QA Program
B. Quality Control (QC) Procedures
C. Quality Assurance (QA) Procedures
A. Documentation of a QC/QA Program

MiSIM documents the QC/QA Requirements

**QC** - Procedures intended to assure quality is maintained at a certain level.

**QA** - Methods intended to assure the effectiveness of QC and verify or measure the overall quality of the program.
Overview of MDOT QC/QA Project

C. Quality Assurance Procedures (FHWA Framework)

1) Define and Document QA Roles and Responsibilities
2) Establish Frequency
3) Document disqualification procedures for team leaders/firms
4) Document re-qualification procedures
5) Document procedures for conducting inspections on a “control” bridge
6) Document procedures to validate QC Procedures.
1) Define and Document QA Roles and Responsibilities

- Bridge Owner: Responsible for QC
- MDOT: Responsible for QA

2) Establish Frequency

QA is (typically) completed Annually for all agencies within a Specific MDOT Region
(+/- 5 years to complete all agencies, 20% per year)
3) Document disqualification procedures for team leaders/firms
4) Document re-qualification procedures
6) Document procedures to validate QC Procedures.

2018-19 Bridge Inspection and Load Rating QA/QC
QA/QC Project Scope Summary

**PRELIMINARY ACTIVITIES**

- Review Bridge Network and Select Bridges
- Initialize Contact w/ the Bridge Owner
- Review QC Activities
QA/QC Project Scope Summary

- **AGENCY VISITS**
  - Bridge Owner and Team Leader
  - Review Inspection and Load Rating QA/QC Procedures (On File?)
  - Review QC Activities
  - Complete File Review
  - Complete Field Review

### REVIEW OF AGENCY’S QUALITY CONTROL PROCESS: INSPECTION

Does the owner have an engineer or technical person performing QC?  
☐ Yes  ☐ No

If yes:  
- Name:  
- Company:  
- Position:  

Quality control measures performed by the Agency or on the Agency’s behalf:

- Verify inspector credentials meet QTL requirements?  
  ☐ Yes  ☐ No  ☐ N/A
- Review diving inspector credentials?  
  ☐ Yes  ☐ No
- Maintain a file for Agency and/or Consultant credentials?  
  ☐ Yes  ☐ No
- Perform periodic timeliness reviews?  
  ☐ Yes  ☐ No
  When/How?  
- Review inspection documentation?  
  ☐ Yes  ☐ No
  How many?  
  When?  
- Field review selected structures?  
  ☐ Yes  ☐ No
  How many?  
  When?  
- Document RFAs in MiBRIDGE?  
  ☐ Yes  ☐ No
- Document critical findings in MiBRIDGE?  
  ☐ Yes  ☐ No
- Maintain scour action plans in MiBRIDGE?  
  ☐ Yes  ☐ No
- Document element level inspections in MiBRIDGE?  
  ☐ Yes  ☐ No
- Maintain Agency and/or Consultant QA/QC Plan on file?  
  ☐ Yes  ☐ No
- List any other QC activities performed:

Is there a formal feedback process to the inspectors as an outcome of QC findings?  
☐ Yes  ☐ No

Describe.  

Inspection Assessment:  
☐ QA  ☐ QC
QA/QC Project Scope Summary

**QA vs QC (Inspection)**

- **10% of Owners Inventory Selected - Bridge Review List**
  - Bridge Inspection File Review, Qualification Review Timeliness Review

**QA –**

- 50% of the Bridge File list will have a File/Field Review Completed

**QC –**

- Bridge Review List, Plus (Additional Structures Subject to Review)
- 100% of the Bridge File List will have a File/Field Review Completed
QA/QC Project Scope Summary

QA vs QC (Load Rating)

10% of Owners Inventory Selected - Bridge Review List

*NOTE: Structures will be added to the Bridge Review List As Needed.*

100% of the structures on the Bridge Review List will be subject to the QA/QC review.
Overview of MDOT QC/QA Project

- Bridge Owner’s Feed Back
- Reference Handouts
- Contact List
- MiSIM Chapters
- Frequency Guidelines
- etc.
Objectives of MDOT’s QA/QC Project

- Increase consistency and accuracy of Inspections and Load Rating documentation
- Increase the awareness of the NBIS and MDOT Requirements
  - Work with the Bridge Owners to help them understand the minimum requirements and prepare them for future reviews.
- Ensure that Written Documentation exists for completing the QA
Annual QA/QC Results (Findings)
2017 – First time agencies were reviewed for a second time

- Selected agencies that had previous deficiencies with inspection reports or missing information in the bridge files

- 33 agencies reviewed in Southwest, Grand, Bay, University, and Metro Regions (22 cities/villages, 10 counties, Blue Water bridge)
Annual QA/QC Results (Findings)

Quality Control and Personnel Qualifications

- Is quality control effective? 56% (56% Avg. 2007-2016, 45% 2017)
- Consultant performing inspections? 91% (91% Avg. 2007-2016, 88% 2017)
- Is the inspector a qualified team leader? 100% (100% Avg. 2007-2016, 95% 2017)
- Load ratings performed by PE? 100% (100% Avg. 2007-2016, 90% 2017)
- Using diving inspector to check for scour? 100% (100% Avg. 2007-2016, 60% 2017)
- Is the diving inspector certified? 100% (100% Avg. 2007-2016, 90% 2017)
Annual QA/QC Results (Findings)

Quality Control Process

![Quality Control Process Chart]

- Is MiBridge being utilized? 36% (Avg. 2007-2016) • 61% (2017)
- Utilizing periodic timeliness reviews? 78% (Avg. 2007-2016) • 94% (2017)
- Was the latest inspection completed on time? 75% (Avg. 2007-2016) • 100% (2017)
- Are critical findings documented in MiBridge? 64% (Avg. 2007-2016) • 63% (2017)
- Is a qualified person reviewing field inspections? 53% (Avg. 2007-2016) • 82% (2017)
- Is a qualified person reading inspection reports? 66% (Avg. 2007-2016) • 82% (2017)
- QA Review? 45% (Avg. 2007-2016) • 56% (2017)
## Annual QA/QC Results (Findings)

### Bridge File Components

<table>
<thead>
<tr>
<th>Component</th>
<th>2007-2016 (%)</th>
<th>2017 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is there a separate file for each bridge?</td>
<td>63</td>
<td>73</td>
</tr>
<tr>
<td>BSIR on file?</td>
<td>98</td>
<td>97</td>
</tr>
<tr>
<td>SI&amp;A form on file?</td>
<td>96</td>
<td>97</td>
</tr>
<tr>
<td>Work recommendations on file?</td>
<td>78</td>
<td>88</td>
</tr>
<tr>
<td>Load analysis calculations on file?</td>
<td>57</td>
<td>67</td>
</tr>
<tr>
<td>Load analysis assumption form?</td>
<td>36</td>
<td>52</td>
</tr>
<tr>
<td>Load analysis summary form?</td>
<td>36</td>
<td>55</td>
</tr>
</tbody>
</table>

*Note: Average for 2007-2016 and 2017.*
Annual QA/QC Results (Findings)

Bridge File Components

- Scour Assessment / Mitigation Actions: Avg. 2007-2016: 43%, 2017: 58%
- Correspondence: Avg. 2007-2016: 89%, 2017: 91%
- Pictures: Avg. 2007-2016: 94%, 2017: 94%

2019 Michigan Bridge Conference
Annual QA/QC Results (Findings)

Inspection Consistency with Established Criteria

<table>
<thead>
<tr>
<th>Category</th>
<th>Avg. 2007-2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comments consistent with the ratings?</td>
<td>88%</td>
<td>91%</td>
</tr>
<tr>
<td>Is the level of comments sufficient?</td>
<td>83%</td>
<td>88%</td>
</tr>
<tr>
<td>Ratings, comments align with help guides?</td>
<td>86%</td>
<td>88%</td>
</tr>
<tr>
<td>Inspection frequency modified appropriately?</td>
<td>64%</td>
<td>67%</td>
</tr>
</tbody>
</table>
The Perfect Review

**File Review (Owner)**
- Quality control plan
- Inspector credentials
- Documentation of file and field QC
- Separate file for each structure
- Current inspection report
- Load analysis with assumption and summary forms
- Scour assessment
- Plans, correspondence, maintenance records, photos

**Field Review (Inspector)**
- Ratings in alignment with MDOT NBI Rating Guidelines
- Comments consistent with ratings
- As ratings decrease level of comments increase
- Inspection frequency modified appropriately
- Report Critical Findings with RFA’s
- Request Detailed Inspection, Load Ratings, Underwater Inspections as needed

*Refer to Michigan Structure Inspection Manual (MiSIM) Chapter 2 “Quality Assurance and Quality Control”*
Improvements to Program Reviews
due to QA/QC Program
Improvements to Program Reviews due to QA/QC Program

www.Michigan.gov/BridgeInspect
Michigan Structure Inspection Manual (MiSIM)
## Improvements to Program Reviews due to QA/QC Program

### Numerous Timeliness and Data Checks

<table>
<thead>
<tr>
<th>Period Relative to NBI Inspection Due Date</th>
<th>Central Office Activities to Mitigate Late Bridge Inspections</th>
<th>TSC Manager Activities to Prevent Withholding of Funding from Local Agencies</th>
<th>Consequence of Late Inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Months Prior</td>
<td>Automated email notification provided to Bridge Owners registered with MiBRIDGE for all bridge inspections that are due within 90 days in their jurisdiction.</td>
<td>No action is necessary.</td>
<td>None</td>
</tr>
<tr>
<td>1 Month Prior</td>
<td>Table of unassigned bridge inspections manually drafted and emailed to all Consultants registered in MiBRIDGE. FHWA, Bureau of Bridges and Structures Director, and TSC Managers with agencies in the their jurisdiction included on correspondence.</td>
<td>No action is absolutely necessary; however, contacting the local agency to ensure their management is aware of the upcoming inspection(s) is beneficial. Notify the Bureau of Bridges and Structures if a position related to bridge management responsibilities at the agency has been vacated or if a</td>
<td>None</td>
</tr>
<tr>
<td>Greater than 1 Month Past Due</td>
<td>Bureau of Bridges and Structures will contact the agencies with inspections that are greater than one month past due and provide notification that reports must be entered in MiBRIDGE by the beginning of the following calendar month. Bureau of Bridges and Structures Director, TSC Manager, and most recent bridge inspector included on correspondence.</td>
<td>Communicate directly with proper local agency staff to ensure they are aware that the agency is currently in non-compliance, and that action must be taken to avoid funding restrictions.</td>
<td>Warning</td>
</tr>
<tr>
<td>Greater than 2 Months Past Due</td>
<td>Bureau of Bridges and Structures will email a letter to the Bridge Owner stating that the local agency is in non-compliance with the National Bridge Inspection Standards. The Development Services Division Local Agency Programs Section will follow internal processes to notify Bureau Management. The determination to restrict funding will be made at the Bureau Management level according to present action being undertaken by the agency.</td>
<td>Communicate that transportation related funds are going to be withheld, and new projects may not be obligated. Work with the agency to ensure action is taken. Provide regular status updates to Bridge Field Services and the Local Agency Programs Section regarding progress to complete the work.</td>
<td>Non-Compliance</td>
</tr>
</tbody>
</table>
Enhancement to MDOT QA Process Load Ratings
MDOT has a Plan of Corrective Action (PCA) with FHWA for:

- Metric 13: Inspection Procedures – Load Rating
- Metric 14: Inspection Procedures – Post or Restrict
Metric 13: Inspection Procedures – Load Rating
Deficiencies include

- Valid Load Rating Calculation unavailable
- Improper use of a Judgement Rating and/or Judgement Rating inadequately documented
- Incorrect Coding in the NBI
Load Rating Changes

Metric 14: Inspection Frequency – Post or Restrict
Deficiencies include

- Valid load rating calculations unavailable to support posting justification
- Posting confirmation missing from bridge file
- Incorrect Coding in the NBI
- Posting sign missing at bridge (BA-2018-01)
- Weight limits left blank on the posting sign
Improper use of Judgement Rating

Load Rating Changes

Steel Beams

Judgement Rating

NEW INVENTORY CODING

Sample Sign

WEIGHT
# Load Rating Changes

## Incorrect Coding in the NBI

A full load rating summary is not available for bridge key. A full load rating summary is not available for bridge key.

<table>
<thead>
<tr>
<th>STR</th>
<th>LOAD RATING SUMMARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility</td>
<td>Latitude / Longitude</td>
</tr>
<tr>
<td>Feature</td>
<td>Length / Width / Spans</td>
</tr>
<tr>
<td>Location</td>
<td>Built / Recon. / Paint / Ovly.</td>
</tr>
<tr>
<td>Region / County</td>
<td>Material / Design</td>
</tr>
<tr>
<td></td>
<td>5 Prestressed Concrete / 05 Box Bm/Gird- Multiple</td>
</tr>
</tbody>
</table>

### NEW INVENTORY CODING

- **NBI Item 63- Operating Rating Method**
  - 1 LFR in US tons
  - 56.5

- **NBI Item 64F- Federal Operating Rating**
  - 76.0

- **MDOT Item 64MB- Michigan Operating Rating**
  - 1 LFR in US tons
  - 34.0

- **NBI Item 65- Inventory Rating Method**
  - A A Open, no restriction
  - 5.5 - 100% or more

- **NBI Item 66- Federal Inventory Rating**
  - 1 LFR in US tons
  - 34.0

- **NBI Item 41- Structure Open Posted Closed**
  - A A Open, no restriction
  - 5.5 - 100% or more

- **NBI Item 70- Bridge Posting**
  - 1 LFR in US tons
  - 34.0

- **NBI Item 141- Posted Loading**
  - 1 LFR in US tons
  - 34.0

- **MDOT Item 193A- Michigan Overload Class**
  - 1 LFR in US tons
  - 34.0

- **MDOT Item 193C- Overload Status**
  - 1 LFR in US tons
  - 34.0

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*Item 64MB is less than MI legal loads, yet the structure is not posted. Load rating must be updated.*
## Load Rating Changes

**Incorrect Posting/Coding**

<table>
<thead>
<tr>
<th>STR</th>
<th>LOAD RATING SUMMARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility</td>
<td>Latitude / Longitude</td>
</tr>
<tr>
<td>Feature</td>
<td>Length / Width / Spans</td>
</tr>
<tr>
<td>Location</td>
<td>Built / Recon. / Paint / Ovly.</td>
</tr>
<tr>
<td>Region / County</td>
<td>Material / Design</td>
</tr>
</tbody>
</table>

A full load rating summary is not available for bridge X.

**NEW INVENTORY CODING**

- NBI Item 63- Operating Rating Method: 1 LFR in US tons
- NBI Item 64F- Federal Operating Rating: 48.0
- MDOT Item 64MB- Michigan Operating Rating: 68.0
- NBI Item 65- Inventory Rating Method: 1 LFR in US tons
- NBI Item 66- Federal Inventory Rating: 28.8
- NBI Item 41- Structure Open Posted Closed: P P Posted for load
- NBI Item 70- Bridge Posting: 3 3 - 89% - 80%
- NBI Item 141- Posted Loading: NN84NN
- MDOT Item 193A- Michigan Overload Class
- MDOT Item 193C- Overload Status

The Maximum Allowable Gross Posting is 42 tons. Additionally, recommend 3 truck posting.
Load Rating Changes

Guidance for common load rating issues
- Michigan Structure Inventory and Appraisal of Bridges
- MDOT Bridge Advisory BA-2012-02
- MDOT Bridge Advisory BA-2016-01
- MDOT Bridge Advisory BA-2016-03
- MDOT Bridge Advisory BA-2018-01
Specific changes for 2019 Load Rating Reviews

Agencies will need to provide a copy of the load rating calculations and bridge plans.
Load Rating Changes

Specific changes for 2019 Load Rating Reviews

- If the load rating was performed in Virtis/BrR, a copy of the XML file, as well as the plans will be required.
Calculations will be reviewed for accuracy and verified for the following:

- Analyzed by and
- Reviewed by separate individuals
Analyzed Appropriate assumptions including material strengths

<table>
<thead>
<tr>
<th>Material</th>
<th>Period Built (approx.)</th>
<th>Year of MDOT Spec.</th>
<th>ASTM Specification</th>
<th>Ultimate Stress Min. fu (psi)</th>
<th>Yield Stress Min. fy (psi)</th>
<th>Gross Section 0.50y (in²)</th>
<th>Net Section 0.50y (in²)</th>
<th>Gross Section 0.67y (in²)</th>
<th>Net Section 0.67y (in²)</th>
<th>ALLOWABLE STRESS METHOD ONLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATERIAL</td>
<td>1873-89</td>
<td>wrought iron</td>
<td>46,000</td>
<td>26,000</td>
<td>14,500</td>
<td>23,000</td>
<td>18,500</td>
<td>30,820</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1905</td>
<td>soft steel</td>
<td>52,000-62,000</td>
<td>26,000</td>
<td>14,500</td>
<td>26,000-31,000</td>
<td>19,600</td>
<td>34,840-41,540</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1924-1935</td>
<td>A-7, OH</td>
<td>52,000-62,000</td>
<td>26,000</td>
<td>14,500</td>
<td>26,000-31,000</td>
<td>22,500</td>
<td>34,840-41,540</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1933-1962</td>
<td>A-7</td>
<td>55,000-65,000</td>
<td>30,000</td>
<td>16,500</td>
<td>27,500-32,500</td>
<td>22,500</td>
<td>38,850-43,550</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1957-1962</td>
<td>A-373</td>
<td>58,000-75,000</td>
<td>32,000</td>
<td>18,000</td>
<td>29,000-37,500</td>
<td>24,000</td>
<td>38,860-50,250</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1963</td>
<td>A-38</td>
<td>80,000-80,000</td>
<td>36,000</td>
<td>20,000</td>
<td>30,000-40,000</td>
<td>27,000</td>
<td>40,200-53,600</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1945-1962</td>
<td>A-242, 1&quot;</td>
<td>70,000</td>
<td>50,000</td>
<td>27,500</td>
<td>35,000</td>
<td>37,500</td>
<td>46,900</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1985</td>
<td>1980</td>
<td>A-441 3/4&quot; thick</td>
<td>67,000</td>
<td>46,000</td>
<td>25,000</td>
<td>33,500</td>
<td>34,500</td>
<td>44,890</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1992-1995</td>
<td>A-94 A. 1&quot; 1/8&quot;</td>
<td>63,000</td>
<td>42,000</td>
<td>23,000</td>
<td>31,500</td>
<td>31,500</td>
<td>42,210</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1965-1979</td>
<td>A-588 &lt;=4&quot;</td>
<td>80,000-85,000</td>
<td>45,000</td>
<td>24,500</td>
<td>40,000-47,500</td>
<td>33,500</td>
<td>53,600-63,650</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1985</td>
<td>1985</td>
<td>A-572 Grade 50 &lt;=2&quot;</td>
<td>70,000</td>
<td>50,000</td>
<td>27,500</td>
<td>35,000</td>
<td>37,500</td>
<td>46,900</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1999-2011</td>
<td>AASHTO M270 Gr. 250</td>
<td>65,000</td>
<td>50,000</td>
<td>32,500</td>
<td>37,500</td>
<td>43,550</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1999</td>
<td>AASHTO M270 Gr. 345</td>
<td>65,000</td>
<td>50,000</td>
<td>32,500</td>
<td>37,500</td>
<td>43,550</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIPE</td>
<td>1998</td>
<td>A-53 Grade B</td>
<td>60,000</td>
<td>35,000</td>
<td>19,500</td>
<td>30,000</td>
<td>26,000</td>
<td>40,200</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1995</td>
<td>A-53 Grade A</td>
<td>48,000</td>
<td>30,000</td>
<td>16,500</td>
<td>24,000</td>
<td>22,500</td>
<td>32,160</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Load Rating Changes

- Is the correct load rating methodology used (BA-2012-02, BA-2016-01, BA-2016-03)
- Are judgement ratings used appropriately and documented according to BA 2012-02
- Are the current codes and guidelines being used, i.e. 2005 Bridge Analysis Guide, AASHTO MBE
Load Rating Changes

Do the load ratings reflect the current field conditions?
Do the load ratings reflect the current field conditions?
Load Rating Changes

Do the load ratings reflect the current field conditions?
Do the load ratings reflect the current field conditions?
Do the load ratings reflect the current field conditions?
Load Rating Changes

- Do the load ratings reflect the current field conditions?
Verify if load rating needs to be updated for changes in dead loads, i.e. new HMA/concrete overlays, new railings, etc. This is very COMMON issue.

Load ratings are a snapshot in time in regards to current guidelines, codes and condition.
Load Rating Changes

During the QAQC review process in previous years, load rating deficiencies were simply noted and the agency/consultant was made aware of the issues.

During the 2019 QAQC reviews, load rating deficiencies will be viewed as a compliance issue and will need to be corrected within a timeframe dictated by MDOT.
QC Plan and Documentation
QC Plan and Documentation

FHWA’s Recommended Framework for QC/QA
https://www.fhwa.dot.gov/bridge/nbis/nbisframework.cfm

A. Documentation of a QC/QA Program
B. Quality Control (QC) Procedures
C. Quality Assurance (QA) Procedures
FHWA’s QC Framework includes documenting:

1. QC Roles and Responsibilities
2. Qualifications
3. Process for tracking how qualifications are met.
4. Required refresher training.
5. Special skills, training, and equipment needs for specific types of inspections
6. Procedures for review and validation of inspection reports and data
7. Procedures for identification and resolution of data errors, omissions and/or changes.
MiSIM Chapter 2

- Maintain a File w/ QC Procedures
- Documentation that QC Procedures are being completed.
- QC Checks completed by Independent Team Leader / Engineer

Each agency must complete QC file reviews on at least 5 percent of the inspections and load ratings performed by each individual per year. Further action will occur with conducted field reviews on at least 50 percent of the files selected. The agency completing the QC must have a method to document that QC procedures are being followed. If QC procedures cannot be verified or deficiencies are discovered during the QA process the QC file review will be increased to 10 percent until the next review.
Bridge Owner’s Role

• Maintain a File w/ QC Procedures.
• Maintain a File w/ Qualifications and PE Certification
• Maintain Completeness of Bridge File Information
• Document Owner’s Role in the QC Process
QC Plan and Documentation

Team Leader’s Role

- Ensure QC Procedures are Documented
- Ensure that QC is being performed on work completed.
- Maintain a File w/ Qualifications and PE Certification
- Maintain a record showing 5% File and 2.5% Field checks have been completed.
"... And that, in a nutshell, is our Quality Control Plan. Any Questions?"
QC Plan and Documentation

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Item to Review</th>
<th>Ratings Level (0-9)</th>
<th>Quality Control Reviewer Concurs*</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Item 58: Deck</td>
<td>Previous Rating</td>
<td>Current Rating</td>
</tr>
<tr>
<td>2</td>
<td>Item 59: Superstructure</td>
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<tr>
<td>3</td>
<td>Item 60: Substructure</td>
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<td>Item 61: Culvert</td>
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<td>5</td>
<td>Item 113A: Scour Critical Bridge</td>
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* The Quality Control Reviewer shall provide concurrence for all item coded a 4 or less, or a change of two or more from the previous inspection. If no ratings are 4 or less, a minimum of one item is to be concurred with.
Access not an Excuse

BEARINGS – (5) Fair Condition, Minor Section Loss

Table 5.13.14 Recommended Condition Based In-Depth Inspection Guidelines for Superstructures

<table>
<thead>
<tr>
<th>NBI Item 59</th>
<th>Schedule Initial In-depth Within</th>
<th>In-Depth Frequency</th>
<th>Applicable Superstructure Materials</th>
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<tbody>
<tr>
<td>6</td>
<td>12 Months</td>
<td>48 Months</td>
<td>Concrete, Steel, Timber</td>
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<td>≤ 4</td>
<td>6 Months</td>
<td>24 Months</td>
<td>Concrete, Steel, Timber</td>
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# QC Plan and Documentation

**Document QC**

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<thead>
<tr>
<th>2018 Routine Bridge Inspections</th>
<th>1/1/2018 to 12/31/2018</th>
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<tr>
<td><strong>Inspector</strong></td>
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<td>Inspector A</td>
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<td>Inspector B</td>
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<td>Inspector C</td>
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**Success comes from what you do, not from what you SAY you are going to do.**

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<tr>
<th>Facility Carried</th>
<th>Features Intersected</th>
<th>Inspector Name</th>
<th>Bridge Owner</th>
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<th>Field Quality Control</th>
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2019 Michigan Bridge Conference
Questions and Discussion